START

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UNITED STATES PATENT AND TRADEMARK OFFICE

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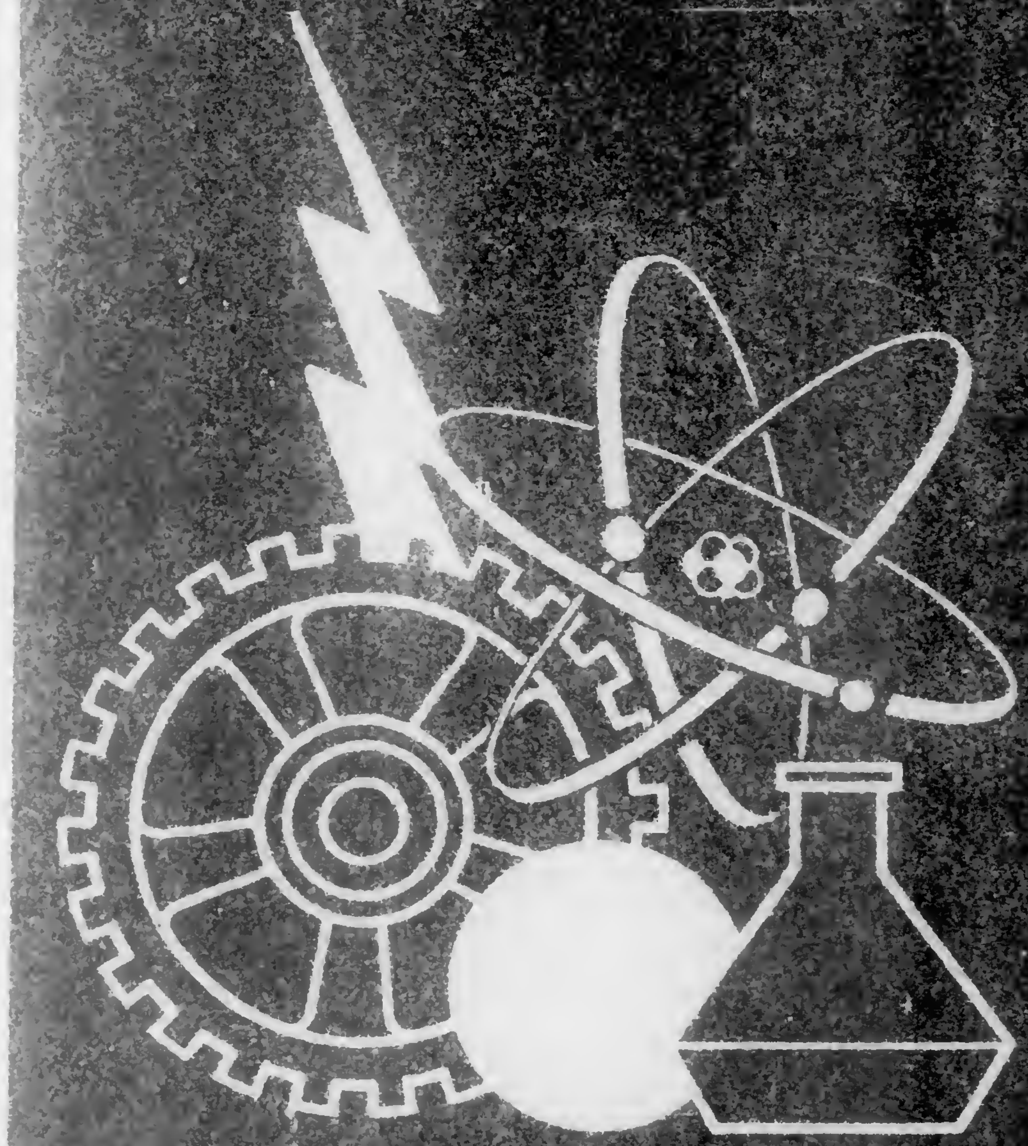
Office

PATENTS
June 4, 1991



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VOL
1127
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4
1991
UMI

OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE
June 4, 1991 Volume 1127 Number 1

CONTENTS

Page

Patent and Trademark Office Notices

Patent Cooperation Treaty (PCT) Information .... 1127 OG 2
Status of Appeal Cases .... 1127 OG 2
Notice of Maintenance Fees Payable .... 1127 OG 2
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees .... 1127 OG 3
Notification of Acceptance of Delayed Payment of Maintenance Fee .... 1127 OG 6
Reissue Applications Filed .... 1127 OG 6
Requests for Reexaminations Filed .... 1127 OG 6
Registration to Practice .... 1127 OG 7
Registration to Practice .... 1127 OG 7
Notice of Proposed Rulemaking .... 1127 OG 8
Errata .... 1127 OG 14
Notice .... 1127 OG 17
Patent Certificates of Correction .... 1127 OG 17
Special Boxes for Mail .... 1127 OG 18
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries .... 1127 OG 19
Patent Examining Corps .... 1127 OG 21
Postal Service Delay in Delivery of PTO MA/IL .... 1127 OG 23
Revision of Patent and Trademark Fees .... 1127 OG 28
Reexaminations 1
Statutory Invention Registrations 5
Reissue Patents Granted (33,600) 9
Plant Patents Granted (7,540) 13

Patents Granted

General and Mechanical (5,020,156) 15
Chemical (5,021,066) 329
Electrical (5,021,608) 487
Design Patents Granted (317,222) 657
Index of Patentees .... PI 1
Indices of Reissue, Reexamination, Design, Plant Patents and Statutory Invention Registrations .... PI 80

Classification of

Patents (Including Reissues and Reexaminations) .... PI 87
Designs, and Plants Applications .... PI 91

Geographical Index of Residence of Inventors

Patents (Including Reissues and Reexaminations) .... PI 93
Designs and Plant Applications .... PI 95
Change of Address Form and Subscription Order Form .... PI 97

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VOL
1127
ISS
1
JE
4
1991
UMI

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1118 O.G. 54 on Nov. 27, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Jan. 3, 1991, and was announced in the *Official Gazette* at 1122 O.G. 564 on Jan. 1, 1991.

International PCT fees were changed on March 1, 1991 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1122 O.G. 629S on Jan. 22, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
– No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1492.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	559.00
Basic Supplemental fee (for each page over 30)	11.00
Designation fee per country or region for the first 10 national or regional offices	135.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	171.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

April 11, 1991

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks

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Status of Appeal Cases

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel For A Decision Without a Hearing as of April 30, 1991.

Chemical Discipline -	May 1, 1990
Mechanical Discipline -	May 3, 1990
Electrical Discipline -	August 1, 1990

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting the Setting of Hearing Date as of April 30, 1991.

Chemical -	No cases awaiting to be set for hearing.
Electrical -	No cases awaiting to be set for hearing
Mechanical -	No cases awaiting to be set for hearing

Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of April 1991.

Affirmed	208
Affirmed-in-Part	50
Reversed	128
Total Decided	403

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on May 31, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,747,162 through 4,748,689
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on May 29, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,450,591 through 4,451,930
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges.

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant $245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant .... $495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) $415.00
By other than a small entity .... $830.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)) $835.00
By other than a small entity .... $1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982 .... $120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)) $60.00
By other than a small entity .... $120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable .... $550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED MARCH 24, 1991 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,377,011	06/222,173	3/22/83
4,377,012	06/292,269	3/22/83
4,377,013	06/324,056	3/22/83
4,377,014	06/241,842	3/22/83
4,377,015	06/234,854	3/22/83
4,377,016	06/303,173	3/22/83
4,377,018	06/277,037	3/22/83
4,377,037	06/235,031	3/22/83
4,377,039	06/286,675	3/22/83
4,377,055	06/251,938	3/22/83
4,377,062	06/279,565	3/22/83
4,377,064	06/322,332	3/22/83
4,377,069	06/236,102	3/22/83
4,377,074	06/278,849	3/22/83
4,377,078	06/291,221	3/22/83
4,377,080	06/295,818	3/22/83
4,377,099	06/241,904	3/22/83
4,377,100	06/236,025	3/22/83
4,377,112	06/231,158	3/22/83
4,377,115	06/292,020	3/22/83
4,377,116	06/295,712	3/22/83
4,377,117	06/291,965	3/22/83
4,377,118	06/332,379	3/22/83
4,377,121	06/245,043	3/22/83
4,377,127	06/229,265	3/22/83
4,377,128	06/345,040	3/22/83
4,377,131	06/263,888	3/22/83
4,377,133	06/299,330	3/22/83
4,377,147	06/299,926	3/22/83
4,377,148	06/217,188	3/22/83
4,377,172	06/237,752	3/22/83
4,377,173	06/244,847	3/22/83
4,377,197	06/233,483	3/22/83
4,377,202	06/267,114	3/22/83
4,377,203	06/264,444	3/22/83
4,377,211	06/310,453	3/22/83
4,377,212	06/338,420	3/22/83
4,377,223	06/223,675	3/22/83
4,377,236	06/242,447	3/22/83
4,377,249	06/246,283	3/22/83
4,377,250	06/254,061	3/22/83
4,377,254	06/277,792	3/22/83
4,377,257	06/320,321	3/22/83
4,377,263	06/274,842	3/22/83
4,377,264	06/275,645	3/22/83
4,377,275	06/229,719	3/22/83
4,377,276	06/326,000	3/22/83
4,377,278	06/260,208	3/22/83
4,377,281	06/237,475	3/22/83
4,377,289	06/332,339	3/22/83
4,377,323	06/217,163	3/22/83
4,377,328	06/267,574	3/22/83
4,377,337	06/223,978	3/22/83

VOL
1127
ISS
1
JE
4
1991
UMI

Patent Number	Serial Number	Issue Date
4,377,338	06/291,136	3/22/83
4,377,343	06/282,192	3/22/83
4,377,349	06/273,134	3/22/83
4,377,354	06/267,180	3/22/83
4,377,362	06/226,031	3/22/83
4,377,373	06/306,284	3/22/83
4,377,375	06/339,810	3/22/83
4,377,376	06/305,127	3/22/83
4,377,381	06/311,338	3/22/83
4,377,382	06/220,018	3/22/83
4,377,384	06/266,741	3/22/83
4,377,390	06/267,811	3/22/83
4,377,399	06/231,985	3/22/83
4,377,400	06/318,563	3/22/83
4,377,422	06/300,134	3/22/83
4,377,423	06/372,857	3/22/83
4,377,431	06/238,164	3/22/83
4,377,442	06/264,238	3/22/83
4,377,447	06/255,798	3/22/83
4,377,454	06/344,468	3/22/83
4,377,456	06/237,413	3/22/83
4,377,461	06/305,023	3/22/83
4,377,497	06/305,233	3/22/83
4,377,500	06/281,160	3/22/83
4,377,503	06/220,677	3/22/83
4,377,505	06/220,937	3/22/83
4,377,530	06/354,997	3/22/83
4,377,532	06/350,453	3/22/83
4,377,539	06/343,669	3/22/83
4,377,542	06/333,243	3/22/83
4,377,557	06/323,898	3/22/83
4,377,566	06/278,977	3/22/83
4,377,568	06/292,111	3/22/83
4,377,569	06/265,327	3/22/83
4,377,577	06/253,567	3/22/83
4,377,579	06/326,853	3/22/83
4,377,585	06/284,771	3/22/83
4,377,589	06/252,529	3/22/83
4,377,600	06/316,471	3/22/83
4,377,604	06/274,337	3/22/83
4,377,624	06/318,077	3/22/83
4,377,625	06/316,598	3/22/83
4,377,630	06/279,849	3/22/83
4,377,635	06/382,980	3/22/83
4,377,638	06/278,678	3/22/83
4,377,643	06/332,771	3/22/83
4,377,668	06/241,169	3/22/83
4,377,669	06/241,194	3/22/83
4,377,686	06/223,509	3/22/83
4,377,692	06/286,436	3/22/83
4,377,694	06/278,648	3/22/83
4,377,704	06/289,391	3/22/83
4,377,709	06/218,027	3/22/83
4,377,711	06/318,147	3/22/83
4,377,714	06/313,931	3/22/83
4,377,716	06/330,067	3/22/83
4,377,717	06/330,066	3/22/83
4,377,722	06/234,199	3/22/83
4,377,727	06/220,136	3/22/83
4,377,728	06/240,445	3/22/83
4,377,730	06/271,330	3/22/83
4,377,731	06/346,072	3/22/83
4,377,732	06/247,472	3/22/83
4,377,745	06/257,938	3/22/83
4,377,771	06/253,429	3/22/83
4,377,773	06/215,770	3/22/83
4,377,790	06/298,126	3/22/83
4,377,794	06/240,922	3/22/83
4,377,798	06/272,665	3/22/83
4,377,799	06/257,034	3/22/83
4,377,800	06/226,982	3/22/83
4,377,801	06/311,685	3/22/83
4,377,805	06/255,507	3/22/83
4,377,812	06/218,831	3/22/83
4,377,815	06/292,026	3/22/83
4,377,829	06/220,982	3/22/83
4,377,832	06/223,628	3/22/83
4,377,866	06/222,458	3/22/83
4,377,871	06/251,657	3/22/83
4,651,346	06/852,263	3/24/87
4,651,347	06/784,559	3/24/87
4,651,353	06/795,769	3/24/87
4,651,355	06/852,736	3/24/87
4,651,357	06/738,026	3/24/87
4,651,358	06/854,469	3/24/87
4,651,361	06/785,002	3/24/87
4,651,362	06/857,770	3/24/87
4,651,364	06/867,861	3/24/87
4,651,365	06/675,288	3/24/87
4,651,368	06/773,443	3/24/87
4,651,377	06/812,452	3/24/87
4,651,379	06/788,395	3/24/87
4,651,383	06/720,676	3/24/87
4,651,390	06/763,973	3/24/87
4,651,396	06/730,325	3/24/87
4,651,399	06/710,789	3/24/87
4,651,420	06/865,963	3/24/87
4,651,425	06/852,550	3/24/87
4,651,430	06/810,560	3/24/87
4,651,432	06/835,094	3/24/87
4,651,433	06/777,457	3/24/87
4,651,434	06/855,692	3/24/87
4,651,454	06/731,046	3/24/87
4,651,456	06/663,439	3/24/87
4,651,457	06/865,265	3/24/87
4,651,462	06/859,446	3/24/87
4,651,464	06/885,537	3/24/87
4,651,466	06/762,060	3/24/87
4,651,468	06/590,955	3/24/87
4,651,473	06/792,510	3/24/87
4,651,475	06/808,410	3/24/87
4,651,478	06/857,629	3/24/87
4,651,482	06/721,795	3/24/87
4,651,485	06/774,960	3/24/87
4,651,488	06/825,279	3/24/87
4,651,490	06/837,147	3/24/87
4,651,495	06/663,311	3/24/87
4,651,496	06/843,678	3/24/87
4,651,497	06/730,291	3/24/87
4,651,510	06/721,152	3/24/87
4,651,520	06/559,418	3/24/87
4,651,525	06/792,525	3/24/87
4,651,534	06/865,657	3/24/87
4,651,539	06/832,824	3/24/87
4,651,541	06/741,621	3/24/87
4,651,560	06/830,923	3/24/87
4,651,567	06/776,012	3/24/87
4,651,579	06/859,512	3/24/87
4,651,581	06/691,528	3/24/87
4,651,589	06/640,573	3/24/87
4,651,590	06/717,509	3/24/87
4,651,600	06/835,521	3/24/87
4,651,602	06/721,167	3/24/87
4,651,606	06/837,189	3/24/87
4,651,608	06/730,810	3/24/87
4,651,611	06/671,115	3/24/87
4,651,614	06/679,485	3/24/87
4,651,619	06/801,194	3/24/87
4,651,626	06/743,766	3/24/87
4,651,629	06/607,119	3/24/87
4,651,630	06/693,285	3/24/87
4,651,634	06/783,467	3/24/87
4,651,642	06/306,495	3/24/87
4,651,651	06/796,968	3/24/87
4,651,655	06/836,162	3/24/87
4,651,668	06/782,056	3/24/87
4,651,671	06/831,620	3/24/87
4,651,675	06/698,031	3/24/87
4,651,680	06/888,407	3/24/87
4,651,690	06/753,670	3/24/87
4,651,691	06/497,729	3/24/87
4,651,708	06/725,361	3/24/87
4,651,709	06/648,166	3/24/87
4,651,718	06/683,985	3/24/87
4,651,722	06/755,279	3/24/87
4,651,723	06/842,844	3/24/87

Patent Number	Serial Number	Issue Date
4,651,726	06/776,841	3/24/87
4,651,735	06/749,551	3/24/87
4,651,736	06/825,334	3/24/87
4,651,750	06/755,609	3/24/87
4,651,752	06/709,702	3/24/87
4,651,755	06/666,365	3/24/87
4,651,761	06/795,323	3/24/87
4,651,764	06/752,329	3/24/87
4,651,766	06/803,741	3/24/87
4,651,775	06/772,913	3/24/87
4,651,781	06/762,587	3/24/87
4,651,787	06/812,649	3/24/87
4,651,788	06/747,128	3/24/87
4,651,796	06/663,579	3/24/87
4,651,797	06/843,565	3/24/87
4,651,799	06/824,154	3/24/87
4,651,802	06/825,499	3/24/87
4,651,813	06/715,506	3/24/87
4,651,821	06/825,949	3/24/87
4,651,824	06/784,113	3/24/87
4,651,827	06/862,920	3/24/87
4,651,849	06/817,082	3/24/87
4,651,852	06/607,662	3/24/87
4,651,856	06/778,862	3/24/87
4,651,857	06/735,564	3/24/87
4,651,861	06/692,390	3/24/87
4,651,862	06/742,916	3/24/87
4,651,871	06/745,239	3/24/87
4,651,873	06/794,691	3/24/87
4,651,879	06/824,658	3/24/87
4,651,881	06/702,236	3/24/87
4,651,882	06/739,976	3/24/87
4,651,885	06/636,251	3/24/87
4,651,894	06/785,707	3/24/87
4,651,895	06/574,423	3/24/87
4,651,896	06/642,416	3/24/87
4,651,904	06/675,571	3/24/87
4,651,909	06/778,008	3/24/87
4,651,914	06/647,179	3/24/87
4,651,915	06/647,180	3/24/87
4,651,923	06/666,916	3/24/87
4,651,928	06/674,952	3/24/87
4,651,930	06/680,845	3/24/87
4,651,935	06/663,049	3/24/87
4,651,942	06/746,992	3/24/87
4,651,946	06/793,954	3/24/87
4,651,947	06/742,849	3/24/87
4,651,948	06/854,400	3/24/87
4,651,953	06/849,116	3/24/87
4,651,960	06/777,595	3/24/87
4,651,961	06/650,837	3/24/87
4,651,964	06/853,932	3/24/87
4,651,967	06/728,832	3/24/87
4,651,973	06/639,938	3/24/87
4,651,979	06/772,654	3/24/87
4,651,985	06/698,342	3/24/87
4,651,988	06/719,203	3/24/87
4,651,990	06/760,109	3/24/87
4,651,992	06/802,171	3/24/87
4,651,995	06/853,364	3/24/87
4,651,996	06/838,699	3/24/87
4,651,998	06/746,518	3/24/87
4,652,004	06/788,062	3/24/87
4,652,006	06/704,320	3/24/87
4,652,016	06/783,190	3/24/87
4,652,030	06/724,027	3/24/87
4,652,032	06/787,934	3/24/87
4,652,033	06/567,697	3/24/87
4,652,034	06/836,560	3/24/87
4,652,040	06/837,716	3/24/87
4,652,042	06/739,472	3/24/87
4,652,053	06/707,118	3/24/87
4,652,056	06/730,668	3/24/87
4,652,059	06/779,585	3/24/87
4,652,062	06/838,169	3/24/87
4,652,064	06/801,282	3/24/87
4,652,068	06/764,317	3/24/87
4,652,081	06/817,876	3/24/87
4,652,086	06/565,231	3/24/87
4,652,093	06/552,444	3/24/87
4,652,096	06/718,700	3/24/87
4,652,097	06/676,327	3/24/87
4,652,100	06/856,789	3/24/87
4,652,124	06/692,838	3/24/87
4,652,125	06/692,680	3/24/87
4,652,138	06/744,001	3/24/87
4,652,142	06/849,720	3/24/87
4,652,162	06/780,072	3/24/87
4,652,164	06/702,698	3/24/87
4,652,184	06/807,436	3/24/87
4,652,185	06/725,895	3/24/87
4,652,188	06/765,730	3/24/87
4,652,193	06/826,075	3/24/87
4,652,196	06/748,624	3/24/87
4,652,197	06/704,676	3/24/87
4,652,200	06/720,257	3/24/87
4,652,202	06/727,343	3/24/87
4,652,229	06/802,852	3/24/87
4,652,237	06/848,418	3/24/87
4,652,242	06/792,205	3/24/87
4,652,243	06/778,622	3/24/87
4,652,245	06/822,937	3/24/87
4,652,265	06/422,295	3/24/87
4,652,280	06/741,169	3/24/87
4,652,285	06/543,502	3/24/87
4,652,297	06/352,401	3/24/87
4,652,311	06/691,880	3/24/87
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4,652,349	06/842,986	3/24/87
4,652,353	06/695,310	3/24/87
4,652,354	06/656,462	3/24/87
4,652,357	06/752,310	3/24/87
4,652,362	06/817,730	3/24/87
4,652,371	06/811,043	3/24/87
4,652,375	06/831,099	3/24/87
4,652,376	06/702,169	3/24/87
4,652,379	06/605,763	3/24/87
4,652,391	06/779,331	3/24/87
4,652,396	06/492,071	3/24/87
4,652,399	06/835,288	3/24/87
4,652,400	06/850,584	3/24/87
4,652,403	06/738,728	3/24/87
4,652,405	06/405,854	3/24/87
4,652,415	06/700,282	3/24/87
4,652,420	06/559,766	3/24/87
4,652,423	06/659,736	3/24/87
4,652,430	06/654,832	3/24/87
4,652,440	06/606,731	3/24/87
4,652,452	06/700,241	3/24/87
4,652,456	06/809,516	3/24/87
4,652,459	06/761,078	3/24/87
4,652,469	06/625,947	3/24/87
4,652,481	06/452,496	3/24/87
4,652,482	06/601,558	3/24/87
4,652,493	06/371,149	3/24/87
4,652,528	06/640,676	3/24/87
4,652,532	06/686,073	3/24/87
4,652,544	06/767,982	3/24/87
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4,652,551	06/735,504	3/24/87
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4,652,558	06/833,947	3/24/87
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4,652,565	06/784,832	3/24/87
4,652,568	06/711,665	3/24/87
4,652,579	06/663,012	3/24/87
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4,652,642	06/643,341	3/24/87
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VOL
1127
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4,652,682	06/791,395	3/24/87
4,652,684	06/794,875	3/24/87
4,652,686	06/719,306	3/24/87
4,652,690	06/812,083	3/24/87
4,652,724	06/730,484	3/24/87
4,652,726	06/817,973	3/24/87
4,652,731	06/763,058	3/24/87
4,652,740	06/684,838	3/24/87
4,652,759	06/630,903	3/24/87
4,652,771	06/807,146	3/24/87
4,652,772	06/777,398	3/24/87
4,652,777	06/683,289	3/24/87
4,652,795	06/712,019	3/24/87
4,652,796	06/653,919	3/24/87
4,652,812	06/675,221	3/24/87
4,652,817	06/701,405	3/24/87
4,652,824	06/586,049	3/24/87
4,652,839	06/748,579	3/24/87
4,652,846	06/830,802	3/24/87
4,652,854	06/728,735	3/24/87
4,652,855	06/678,190	3/24/87
4,652,863	06/758,669	3/24/87
4,652,870	06/696,304	3/24/87
4,652,874	06/685,368	3/24/87
4,652,876	06/772,083	3/24/87
4,652,887	06/680,950	3/24/87
4,652,891	06/573,399	3/24/87
4,652,910	06/556,173	3/24/87
4,652,919	06/734,515	3/24/87
4,652,945	06/730,135	3/24/87
4,652,956	06/684,044	3/24/87
4,652,957	06/633,002	3/24/87
4,652,975	06/856,885	3/24/87
4,652,983	06/824,112	3/24/87
4,652,997	06/802,490	3/24/87
4,653,002	06/654,691	3/24/87
4,653,018	06/600,215	3/24/87
4,653,019	06/601,891	3/24/87
4,653,033	06/657,793	3/24/87
4,653,036	06/663,969	3/24/87
4,653,038	06/720,721	3/24/87
4,653,046	06/621,669	3/24/87
4,653,054	06/722,894	3/24/87
4,653,064	06/782,861	3/24/87
4,653,066	06/599,264	3/24/87
4,653,091	06/451,861	3/24/87
4,653,092	06/751,515	3/24/87
4,653,093	06/759,462	3/24/87
4,653,103	06/826,249	3/24/87
4,653,104	06/653,987	3/24/87

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE
(35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,571,498	06/664,316	2/18/86	10/24/84	4/29/91
4,574,902	06/566,148	3/11/86	12/28/83	4/29/91
4,589,365	06/665/949	5/20/86	10/29/84	4/29/91
4,590,746	06/374,741	5/27/86	5/04/82	4/29/91
4,610,783	06/705,359	9/09/86	2/22/85	4/29/91
4,614,720	06/432,457	9/30/86	10/04/82	4/29/91
4,619,218	06/574,871	10/28/86	1/30/84	4/29/91
4,624,155	06/747,686	11/25/86	6/21/85	4/29/91
4,632,565	06/665,645	12/30/86	10/29/84	4/26/91

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,628,259, Re. S. N. 07/686,996, Filed Apr. 18, 1991, Cl. 324/208, MAGNETO RESISTIVE SENSOR FOR DETECTING MOVEMENT OF A ROTATING BODY, Tadashi Takahashi, et al., Owner of Record: *Hitachi, Ltd., Tokyo, Japan*, Attorney or Agent: Donald R. Antonelli, Ex. Gp.: 267

4,656,546, Re. S. N. 07/613,469, Filed Nov. 7, 1990, Cl. 360/110, VERTICAL MAGNETIC RECORDING ARRANGEMENT, Michael L. Mallary, et al., Owner of Record: *Digital Equipment Corporation, Maynard, Mass.*, Attorney or Agent: James E. Maslow, Ex. Gp.: 233A

4,793,350, Re. S. N. 07/634,670, Filed Dec. 27, 1990, Cl. 606/195, LIQUID FILLED LOW PROFILE DILATATION CATHETER, Craig E. Mar, et al., Owner of Record: *Advanced Cardiovascular Systems, Inc., Mountain View, Calif.*, Attorney or Agent: Edward J. Lynch, Ex. Gp.: 336

4,801,486, Re. S. N. 07/648,480, Filed Jan. 30, 1991, Cl. 428/034, THERMOPLASTIC MULTI-LAYER PACKAGING FILM AND BAGS MADE THEREFROM, C. Quacquarella, et al., Owner of Record: *W. R. Grace & Co-Conn., Duncan, S. C.*, Attorney or Agent: Jennifer L. Skord, Ex. Gp.: 154

4,806,081, Re. S. N. 07/659,669, Filed FEb. 21, 1991, Cl. 417/354, MINIATURE AXIAL FAN, Siegfried Harmsen, et al., Owner of Record: *Papst-Motoren GmbH & Company KG, St. Georgen, Germany*, Attorney or Agent: Mark M. Newman, Ex. Gp.: 343

4,821,032, Re. S. N. 07/692,449, Filed Apr. 5, 1991, Cl. 340/825.21, COMMUNICATION SYSTEM FOR VIDEO INFORMATION APPATATUS, Keichiro Shimada, et al., Owner of Record: *Sony Corp., Tokyo, Japan*, Attorney or Agent: Philip M. Shaw, Ex. Gp.: 264

4,822,807 Re. S. N. 07/691,340, Filed Apr. 18, 1991, Cl. 514/347, PHARMACEUTICAL COMPOSITION CONTAINING A STABLE MODIFICATION OF TORASEMIDE, Fritz Topfmeir, et al., Owner of Record: *Boehringer Mannheim GmbH, Mannheim, Germany*, Attorney or Agent: Robert Murray, Ex. Gp.: 125

4,822,865, Re. S. N. 07/687,365, Filed Apr. 18, 1991, Cl. 526/292.5, ACRYLIC COMOPYMERS EXHIBITING NONLINEAR OPTICAL RESPONSE, Ronald N. DeMartino, Owner of Record: *Hoechst Celanese Corp., Somerville, N. J.*, Attorney or Agent: Michael W. Ferrell, Ex. Gp.: 155

4,823,440, Re. S. N. 07/690,138, Filed Apr. 23, 1991, Cl. 19/105, WEB WEIGHT CONTROL SYSTEM, Akiva Pinto, Owner of Record: *John D. Hollingsworth On Wheels, Inc., Greenville, S.C.*, Attorney or Agent: Cort Flint, Ex. Gp.: 247

4,823,864 Re. S. N. 07/691,360, Filed Apr. 25, 1991, Cl. 165/104.12, CHEMICAL ENERGY STORAGE SYSTEM, Uwe Rockenfeller, Owner of Record: *Rocky Research, Boulder City, Nev.*, Attorney or Agent: Jerry R. Seiler, Ex. Gp.: 347

4,824,546, Re. S. N. 07/690,541, Filed Apr. 23, 1991, Cl. 204/298, SEMICONDUCTOR MANUFACTURING APPARATUS, Tadahiro Ohmi, Owner of Record: *Inventor*, Attorney or Agent: Lawrence A. Steward, Ex. Gp.: 112

4,825,619, Re. S. N. 07/653,194, Filed Feb. 6, 1991, Cl. 53/562, BLOCK WALL, Paul J. Forsberg, Owner of Record: *Keystone Retaining Wall Systems, Inc., Edina, Minn.*, Attorney or Agent: David N. Fronek, Ex. Gp.: 354

4,827,152, Re. S. N. 07/692,139, Filed Apr. 26, 1991, Cl. 307/68, UNINTERRUPTIBLE POWER SUPPLY SYSTEM, Otto Farkas, Owner of Record: *Inventor*, Attorney or Agent: Hemi J. A. Charmasson, Ex. Gp.: 214

4,890,287, Re. S. N. 07/690,524, Filed Apr. 23, 1991, Cl. 371/37, ON-THE-FLY ERROR CORRECTION, Bruce E. Johnson, et al., Owner of Record: *Magnetic Peripherals, Inc., Minneapolis, Minn.*, Attorney or Agent: David R. Fairbairn, Ex. Gp.: 236

4,899,757, Re. S. N. 07/640,817, Filed Jan. 14, 1991, Cl. 128/662, ULTRASOUND IMAGING PROBE WITH ZERO DEAD SPACE, Joseph L. Pope, et al., Owner of Record: *Intertherapy, Inc., Costa Mesa, Calif.*, Attorney or Agent: Larry S. Nixon, Ex. Gp.: 335

4,928,544 Re. S. N. 07/685,804, Filed Apr. 15, 1991, Cl. 74/335, DUAL PRESSURIZED FLUID ACTUATED SHIFTING MECHANISM, Ronald K. Markyvech, et al., Owner of Record: *Eaton Corp., Cleveland, Ohio*, Attorney or Agent: Howard D. Gordon, Ex. Gp.: 352

4,954,858, Re. S. N. 07/689,000, Filed Apr. 12, 1991, Cl. 354/145, LENS-FITTED PHOTOGRAPHIC FILM PACKAGE, Hiroshi Ohmura, et al., Owner of Record: *Fuiji Photo Film Co., Ltd., Kanagawa, Japan*, Attorney or Agent: Robert J. Patch, Ex. Gp.: 211

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,071,424, Reexam. No. 90/002,335, Requested May 1, 1991, Cl. 522/014, PHOTOPOLYMERIZABLE COMPOSITION, Edward C. DArt, et al., Owner of Record: *Imperial Chemical Industries, Ltd., Millbank, London, Great Britian*, Attorney or Agent: Cushman, Darby & Cushman, Washington, D.C., Ex. Gp.: 157, Requester: Owner

4,217,901, Reexam. No. 90/002,327, Requested Apr. 23, 1991, Cl. 604/368, CRUSH-RESISTANT ADHESIVELY-ATTACHED ABSORBENT PRODUCT, James A. Bradstreet, et al., Owner of Record: *McNeil-Personal Products Co., Milltown, N. J.*, Attorney or Agent: Andrea L. Colby, Johnson & Johnson, New Brunswick, N.J., Ex. Gp.: 338, Requester: Owner

4,388,288 Reexam. No. 90/002,334, Requested Apr. 30, 1991, Ci. 423/416, PREPARATION OF SHAPED TITANIUM DIOXIDE CATALYST/CARRIER AND CATALYSIS OF GASEOUS SULFUR COMPOUNDS THEREWITH, Thierry Dupin, et al., Owner of Record: *Phone-Paulenc Industries, Paris, France*, Attorney or Agent: Burns, Doane, Swecker & Mathis, Alexandria, Va., Ex. Gp.: 113, Requester: Owner

4,427,068, Reexam. No. 90/002,330, Requested Apr. 26, 1991, Cl. 166/280, SINTERED SPHERICAL PELLETS CONTAINING CLAY AS A MAJOR COMPONENT USEFUL FOR GAS AND OIL WELL PROPPANTS, Jeremiah J. Fitzgibbon, Owner of Record: *Carbo Ceramics, Inc., Irving, Tex.*, Attorney or Agent: Pravel, Gambrell, Hewitt, Kimbal, et al., Houston, Tex., Ex. Gp.: 356, Requester: Norton-Alcoa Proppants, Fort Smith, Ark.

4,808,600 Reexam. No. 90/002,333, Requested Apr. 26, 1991, FUNGICIDAL PYRIDYE CYCLOPROPANE CARBOXANIDES, Don R. Baker, et al., Owner of Record: *ICI America, Inc., Wilmington, Del.*, Attorney or Agent: Michael J. Bradley & Denis A. Polyn Richmond, Calif., Ex. Gp.: 121, Requester: Owner

4,894,285, Reexam. No. 90/002,331, Requested Apr. 26, 1991, Cl. 428/402, SINTERED SPHERICAL PELLETS CONTAINING CLAY AS A MAJOR COMPONENT USEFUL FOR GAS AND OIL WELL PROPPANTS, Jeremiah J. Fitzgibbon, Owner of Record: *Carbo Ceramics, Inc., Irving, Tex.*, Attorney or Agent: James H. Riley, II, Pravel, Gambrell, Hewitt, et al., Houston, Tex., Ex. Gp.: 154, Requester: Norton-Alcoa Proppants, Fort Smith, Ark.

4,930,544, Reexam. No. 90/002,336, Requested May 1, 1991, Cl. 138/113, DOUBLE-CONTAINMENT THERMOPLASTIC PIPE ASSEMBLY, Christopher G. Ziu, Owner of Record: *Asahi/America, Inc., Malden, Mass.*, Attorney or Agent: Gerald E. Hespos, Castella & Hespos, New York, N. Y., Ex. Gp.: 242, Requester: Owner

4,951,835, Reexam. No. 90/002,332, Requested Apr. 29, 1991, Cl. 220/269, BEVERAGE CONTAINER OPENING AND RESEALING DEVICE, Robert A. DeMars, et al., Woodland Hills, Calif., Owner of Record: *Robert A. DeMars, Woodland Hills, Calif. & Spencer L. MacKay, Agoura Hills, Calif.*, Attorney or Agent: Jack C. Munro, Agoura Hills, Calif., Ex. Gp.: 241, Requester: Owner

Registration to Practice

The following list contains the names of persons that passed the registration examination that was held on April 4, 1990. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR § 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished to the Director of Enrollment and Discipline on or before July 19, 1991.

Griffith, Donald J., Jr., 15198 Brookridge Blvd., E., Brooksville, Fla. 34613
McAndrews, Isabelle Rodriguez, 5722 Fourth St., S., Arlington, Va. 22204

May 6, 1991

CAMERON WEIFFENBACH
Office of Enrollment and Discipline

Registration to Practice

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Disclipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical or other grounds should be furnished to the Director, Office of Enrollment and Disclipline on or before July 19, 1991.

VOL
1127
ISS
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1991
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Daley, Dennis R., 114 Roberts Lane, #400, Alexandria, Va. 22314
Gruber, Felix D., 9524 Baccarat Dr., Fairfax, Va. 22032
Kuharchuk, Terrance N., 18923-83rd Ave., Edmonton, Alb., T5T 4Z5, Canada
Sutto, Anton H., 10205 Ranger Rd., Fairfax, Va. 22030

May 6, 1991 CAMERON WEIFFENBACH, *Director*
Office of Enrollment and Discipline

DEPARTMENT OF COMMERCE
Patent and Trademark Office
37 CFR Parts 1, 2 and 3
[Docket No. 910246-1046]
RIN 0651-AA43

Changes in Patent and Trademark Assignment Practice

Agency: :Patent and Trademark Office, Commerce
Action:: Notice of Proposed Rulemaking

Summary :The Patent and Trademark Office (Office) proposes amendments to the rules of practice regarding assignments in patent and trademark cases to improve and clarify the rules, to codify changes in practice and to consolidate the rules. The Office proposes to combine the assignment rules currently in Parts 1 and 2 into a new Part 3 directed to assignments.

Dates·: Written comments must be received on or before July 9, 1991, to ensure consideration. A public hearing will be conducted in TWO CRYSTAL PARK, Suite 912, at 2121 Crystal Drive, Arlington, Virginia, beginning at 9:00 a.m. on July 17, 1991. Requests to present oral comments should be received on or before July 10, 1991.

Address: Address written comments to the Office of the Deputy Assistant Commissioner for Patents, Commissioner of Patents and Trademarks, Box DAC, Washington, D.C. 20231, marked to the attention of Jeffrey V. Nase. Written comments will be available for public inspection in Suite 912, on the 9th floor of TWO CRYSTAL PARK, located at 2121 Crystal Drive, Arlington, Virginia.

For Further Information Contact: Jeffrey V. Nase by telephone at (703) 557-4282 or by mail marked to his attention and addressed to Commissioner of Patents and Trademarks, Box DAC, Washington, D.C. 20231.

Supplementary Information:: The Office is proposing to amend the rules of practice in patent and trademark cases to revise, simplify, remove or clarify existing assignment rules or to codify certain practices which are currently in effect. Changes are proposed for rules relating to the documents that will be recorded; the requirements for recording a document; the effect of recording; new cover sheet requirements; the appointment of domestic representatives; and prosecution by assignees and issuance to assignees. While the present rules do not require a cover sheet to accompany each document submitted for recording, typically a cover letter is submitted to ensure proper processing of the document.

The Office has suggested and encouraged the public to use a cover letter, containing specific information concerning the document being submitted, with each document submitted for recording; see "Helpful Hints", 1114 *Official Gazette* 77 (May 29, 1990). The public has adopted the suggested procedure to such an extent that most documents now submitted for recordation are accompanied by a cover letter which contains the suggested data. Documents submitted for recording with cover sheets containing the specific information needed for recordation have enabled the Office to greatly improve the quality and efficiency of the recording process. To better ensure that the correct data is captured in recordation and recorded promptly, the Office is proposing to make a cover sheet mandatory. The proposed cover sheet will contain all the information necessary for the Assignment Branch to properly and promptly process the document.

Specific Rules Proposed to be Deleted or Added·: The existing rules of practice in Parts 1 and 2 of Title 37 of the Code of Federal Regulations which are proposed to be deleted are §§ 1.32, 1.331, 1.332, 1.333, 1.334, 2.185, 2.186 and 2.187. These rules are proposed to be deleted in their entirety and rewritten and renumbered under a proposed new Part 3. Table 1 is provided to assist readers in correlating present rules with the proposed rules.

TABLE 1

Present Rule	Proposed Rules
1.32	3.71 & 3.73
1.331(a)	3.11
1.331(b)	3.26
1.331(c)	3.21
1.332	3.51
1.333	3.56
1.334	3.81
2.185(a)	3.11
2.185(a)(1)	3.31
2.185(a)(2)	3.26
2.185(a)(3)	3.41
2.185(a)(4)	3.61
2.185(b)	3.31(b)
2.185(c)	3.51
2.186	3.71 & 3.73
2.187	3.85

Consideration was given to moving § 1.12 (Assignment records open to public inspection.) to proposed new Part 3. However, since this section primarily relates to records maintained by the Office and procedures for accessing those records, a tentative decision has been made to retain this section under the general heading "Records and Files" of the Patent and Trademark Office. Comments are requested on whether § 1.12 should be retained in Part 1, or moved to proposed Part 3.

Discussion of Specific Sections Proposed to be Changed or Added Section 1.12(a) is proposed to be revised to reflect the fact that all assignment records related to pre-1955 trademark records and pre-1957 patent records were transferred to the National Archives and Records Administration (NARA) during 1990. All assignments recorded on or after January 1, 1955, for trademarks and May 1, 1957, for patents continue to be maintained by the Office. The pre-1955/1957 records have been transferred to NARA to allow for greater accessibility to the public, improvement of file integrity for the older records, and preservation of these materials. The pre-1955/1957 assignment cards, digest books, and libers were stored in four locations: the Assignment Search Room (ASR) at the Office, the Federal Records Center, the National Archives in downtown Washington, and the National Archives location in Alexandria. Storage of information in these various locations made searching of old assignment records difficult. The materials located at the Federal Records Center could be ordered from the ASR. However, many times it took months to receive the materials.

All assignment records from 1837 to December 31, 1954, for trademarks and from 1837 to April 30, 1957, for patents are maintained and are open for public inspection in the National Archives Research Room located at the Washington National Records Center Building, 4205 Suitland Road, Suitland, Maryland 20746. Assignments recorded before 1837 are maintained at the National Archives and Records Administration, 941 South Pickett Street, Alexandria, Virginia 22304.

All requests for abstracts of title continue to be provided by the Office upon request and payment of fees set forth in §§ 1.19 and 2.6. Requests for copies and certified copies of the pre-1955 records for trademarks and pre-1957 records for patents should be directed to NARA since those records are not maintained by the Office. Since these record are maintained by NARA, it becomes more expeditious to request copies directly from NARA, rather than the Office, which would then have to route the requests to NARA. Payment of the fees required by NARA should accompany all requests for copies.

Another proposed change is to make clear that separate assignment records are kept for patents and trademarks, and to indicate that an extra charge will be imposed by the Office on requests for copies of recorded assignments if the correct reel and frame number are not identified.

Sections 1.17 and 1.46 are proposed to be amended to make reference to proposed § 3.81, which would replace § 1.334, and delete reference to § 1.334. The amount of the fee for recording a document would not be affected by this proposed rule change.

Section 1.104(e) is proposed to be amended to make reference to proposed Part 3, which would replace § 1.331, and delete reference to § 1.331.

Section 3.1 is proposed to be added to set out definitions of terms used in proposed Part 3. Terms which are defined include "application," "assignment," "document," "Office" (meaning Patent and Trademark Office), "recorded document," and "registration." Definitions are provided to make clear the intended meanings of the terms used in proposed Part 3. These definitions are intended to be applicable only to proposed Part 3. For example, the term "application" is defined, for the purpose of proposed Part 3, to mean either an application for patent or an application to register a trademark, unless otherwise indicated.

Section 3.11 is proposed to replace and modify the practice set forth in §§ 1.331(a) and 2.185(a), which specify the documents the Office will record. This proposed section specifies that assignments of patents and registrations will be recorded, as well as other documents which affect title to applications, registrations and patents. Proposed § 3.11 would require that a completed cover sheet as specified in proposed §§ 3.28 and 3.31 be submitted with the document to be recorded.

Section 3.16 is proposed to be added to incorporate the limitation set out in 15 U.S.C. § 1060 proscribing the assignment of an intent-to-use trademark application prior to the filing of a statement of use, except as a part of the sale of an on-going business. Because the proposed amendments to Part 3 are intended to address all rules relating to assignments, it is appropriate to refer to the statutory requirements of an assignment of an intent-to-use trademark application.

Section 3.21 is proposed to replace and modify the practice of § 1.331(c). Proposed § 3.21 sets forth requirements for the recording of assignments of patents or patent applications. An assignment relating to a patent must identify the patent by number. The name of the inventor, the issue date and title of the invention as stated in the patent may also be given in the assignment to provide additional information on the patent being assigned. An assignment relating to a national patent application must identify the national patent application by application number (consisting of the series code and the serial number, e.g., 07/123,456) or serial number and filing date. An assignment relating to an international patent application which designates the United States of America must identify the international application number (e.g., PCT/US90/01234). The name of the inventor, date of filing and title of the invention as stated in the patent application may also be given in the assignment. If an assignment is executed concurrently with, or subsequent to, the execution of the patent application, but before the patent application is filed, it must identify the patent application by its date of execution, name of each inventor, and title of the invention so that there can be no mistake as to the patent application intended. Assignments submitted for recording that do not identify the patent or patent application as required by this section will not be recorded, but will be returned to the correspondence address which would be required to be provided on the cover sheet by proposed § 3.31(e).

Section 3.24 is proposed as a new section to set forth formal document requirements aimed at facilitating and expediting the recording process. This section proposes that documents submitted for recording be legible, using only one side of each page. The paper used should be bond weight paper, preferably no larger than 8 1/2 x 14 inches (21.6 x 33.1 cm.), and with a one-inch (2.5 cm.) margin on all sides. Documents submitted in this form are camera-ready and can be recorded expeditiously with little additional handling required. Documents submitted that fail to meet the legibility and only-one-side-of-the-paper requirements of this proposed section will be returned as set forth in proposed § 3.51.

Section 3.26 is proposed to replace and modify the practice of §§ 1.331(b) and 2.185(a)(2). Proposed § 3.26 provides that the Office will accept and record non-English documents provided they are accompanied by a verified English translation signed by the translator. Documents submitted that fail to meet the requirements of this proposed section will be returned as set forth in proposed § 3.51.

Section 3.27 is proposed as a new section to set forth how documents submitted for recording should be addressed to the Office. To ensure prompt and proper processing, documents and their cover sheets should be addressed to the Commissioner of Patents and Trademarks, Box Assignments, Washington, D.C. 20231, unless they are filed together with new applications or with a petition under § 3.81(b). Petitions under § 3.81(b) should be addressed to the Commissioner of Patents and Trademarks, Box DAC, Washington, D.C. 20231. New applications and other petitions should be addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Section 3.28 is proposed as a new section to set forth a new requirement aimed at facilitating and expediting the recording process. This section would require that all requests to record a document in the Office be accompanied by the document to be recorded and at least one cover sheet referring either to the patent applications and patents or to the trademark applications and registrations against which the document is to be recorded. Only one set of documents and cover sheets to be recorded should be filed. If a document to be recorded includes interests in, or transactions involving, both patents and trademarks, separate patent and trademark cover sheets must be submitted. If a document to be recorded is not accompanied by a completed cover sheet, the document and any incomplete cover sheet will be returned to the correspondence address for proper completion of the cover sheet and resubmission of the cover sheet and document. While the present rules do not require a cover sheet to accompany each document submitted for recording, typically a cover letter is submitted to ensure proper processing of the document. The Office is proposing to make a cover sheet mandatory in order to better ensure prompt and proper processing of all documents submitted for recording. The proposed cover sheet will contain all the information necessary for the Office to process the document.

Section 3.31 is proposed as a new section to set forth the formal requirements of the new cover sheet. This section proposes that each patent or trademark cover sheet must contain (1) the name of the party conveying the interest; (2) the name and address of the party receiving the interest; (3) a brief description of the interest conveyed or transaction to be recorded (e.g., assignment, license, change of name, merger, security agreement, etc.); (4) each application number, patent number or registration number against which the document is to be recorded, or an indication that the document is filed together with a patent application; (5) the name and address of the party to whom correspondence concerning the request to record the document should be mailed; (6) the number of applications, patents or registrations identified in the cover sheet and the total fee; (7) the date the document was executed; (8) an indication that the assignee of a trademark application or registration who is not domiciled in the United States has designated a domestic representative; and (9) the signature of the party submitting the document and verification of the correctness of information contained on the cover sheet. The verification must be in oath or declaration form unless (1) the submitted documents pertain only to patents and patent applications and the cover sheet is signed by a registered practitioner, or (2) the submitted documents pertain only to trademark applications and registrations and the cover sheet is signed by an attorney as defined in § 10.1(c). Sample cover sheets for patent documents and for trademark documents are shown in Appendices A and B.

Section 3.34 is proposed as a new section to set forth a procedure to correct errors in a recorded cover sheet. This section proposes that if a recorded cover sheet contains an error that is apparent when the cover sheet is compared with the recorded document, the error will be corrected only if a corrected cover sheet is filed for recordation. The corrected cover sheet must be accompanied by the originally-recorded document or a copy of the originally-recorded document and by a new assignment recording fee in the appropriate amount.

Section 3.41 is proposed to replace and consolidate practice under §§ 1.331(a) and 2.185(a)(3) regarding recording fees. Proposed § 3.41 would require that all requests to record documents be accompanied by the appropriate fee. A fee is charged for each application, patent and registration identified in the cover sheet. The recording fee for patents and patent applications is specified in § 1.21(h). The recording fee for registrations and trademark applications is specified in § 2.6(q).

Section 3.51 is proposed to replace and modify the practice of §§ 1.332 and 2.185(c). Proposed § 3.51 would set the date of recording of a document as the date the document meeting the requirements for recording set forth in this Part is filed in the Office. A document which does not comply with the identifica-

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tion requirements of § 3.21 will not be recorded. Other documents not meeting the requirements for recording, for example, a document submitted without a completed cover sheet, without the required fee, or without any required translation will be returned for correction to the sender where a return address is available. The returned papers would be accompanied by a letter which would indicate that if the returned papers are corrected and resubmitted to the Office within the time specified in the letter, the Office would consider the original date of filing of the papers as the date of recording of the papers. Applicants could use the certificate procedure under either § 1.8 or § 1.10 for resubmissions of returned papers if they desired to have the benefit of the date of deposit in the United States Postal Service. If the returned papers were not corrected and resubmitted within the specified period, the date of filing of the corrected papers would be considered to be the date of recording of the papers. Extensions of time would not be available to extend the specified period to resubmit the returned papers.

Section 3.54 is proposed as a new section to set forth the effect of recording a document. This proposed section would set forth that the recording of a document is not a determination by the Office of the validity of the document or the effect that document has on the title to an application, a patent, or a registration. The Office will determine, when necessary, what effect a document has, including whether a party has the authority to take an action in a matter pending before the Office. Examples of when the Office will need to determine whether a party has the authority to take an action in a matter pending before the Office include: (1) prosecution by the assignee as in proposed § 3.71; (2) consent of an assignee to the filing of a reissue application as provided in § 1.172; and (3) execution of a disclaimer under § 1.321 by an assignee.

Section 3.56 is proposed to replace and modify the practice of § 1.333. proposed § 3.56 provides that an assignment, which at the time of its execution is conditional on a given act or event, will be treated by the Office as an absolute assignment. This section serves as notification as to how a conditional assignment will be treated by the Office in any proceeding requiring a determination of the owner of an application, patent or registration. Since the Office will not determine whether a condition has been fulfilled, the Office will treat the submission of such an assignment for recordation as signifying that the act or event has occurred.

Section 3.61 is proposed to replace and modify the practice of § 2.185(a)(4). Proposed § 3.61 sets forth that an assignee of a trademark application or registration not domiciled in the United States must designate a domestic representative in writing to the Office. Assignees of patent applications or patents may designate domestic representatives if the assignee is not residing in the United States. 35 U.S.C. 293. The designation would be required to state the name and address of a person residing within the United States on whom may be served process or notice of proceedings affecting the application, patent or registration or rights thereunder.

Section 3.71 is proposed to replace and modify the practice of §§ 1.32 and 2.186. Proposed § 3.71 sets forth that the assignee of record of the entire right, title and interest in an application for patent is entitled to conduct the prosecution of the patent application to the exclusion of the named inventor. Similarly, the assignee of record of the entire right, title and interest in an application for registration is entitled to conduct the prosecution of the trademark application to the exclusion of the applicant.

Section 3.73 is proposed as a new section to set forth the procedure by which an assignee can establish the right to take action in an application, patent or registration. The inventor is presumed to be the original owner of a patent application and any patent that may issue therefrom, unless there is an assignment. The original applicant is presumed to be the original owner of a trademark application and any registration that may issue therefrom, unless there is an assignment. Any action before the Office with respect to an assigned application, patent, or registration may be taken by the assignee of the entire right, title, and interest, provided ownership is established to the satisfaction of the Commissioner. The assignee may establish ownership by submitting to the Office documentary evidence of a chain of title from the original owner to the assignee or by specifying (e.g., reel and frame number, etc.) where such evidence is recorded in the Office. Additionally, a statement signed by the party seeking to take action in a matter pending before the Office or its attorney or agent of record must also be submitted stating the evidence has been reviewed and certifying that, to the best of the party's, attorney's, or agent's knowledge and belief, title is in the party seeking to take the action. Documents submitted to establish ownership may be required to be recorded in the Office as a condition to permitting the requesting party to take action in a matter pending before the Office.

Section 3.81 is proposed to replace and modify the practice of § 1 334. Proposed § 3.81 would set forth the procedure for issuance of a patent to an assignee. If an assignment of the entire right, title, and interest is recorded before the issue fee is paid for a patent application, the patent may issue in the name of the assignee. If the assignee holds an undivided part interest, the patent may issue jointly to the inventor and the assignee. At the time the issue fee is paid, the name of the assignee must be provided if the patent is to issue solely or jointly to that assignee. If the assignment is submitted for recording after the date of payment of the issue fee, but prior to issuance of the patent, the assignee may petition that the patent issue to the assignee. Any such petition must be accompanied by the fee set forth in § 1.17(i)(1).

Section 3.85 is proposed to replace and modify the practice of § 2.187. Proposed § 3.85 would set forth the procedure for issuance of a registration to an assignee. The certificate of registration may be issued to the assignee of the applicant, or in a new name of the applicant, provided that the party files a written request in the trademark application record by the time the application is being prepared for issuance of the certificate of registration, and an appropriate document is recorded in the Office. If the assignment or name change document has not been recorded in the Office, then the written request must state that the document has been filed for recordation. The address of the assignee must be made of record in the trademark application file.

Other Considerations

The proposed rule changes are in conformity with the requirements of the Regulatory Flexibility Act (5 U.S.C. 601 et seq.), Executive Orders 12291 and 12612 and the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq*.

The General Counsel of the Department of Commerce has certified to the Chief Counsel for Advocacy, Small Business Administration, that these proposed rule changes will not have a significant adverse economic impact on a substantial number of small entities (Regulatory Flexibility Act, 5 U.S.C. 605(b)). The principal impact of these proposed changes is to require that a cover sheet accompany each document submitted for recording. The rule change includes no additional or increased fees. Substantive rights to use trademarks and patents are not adversely affected.

The Office has determined that these proposed rule changes are not a major rule under Executive Order 12291. The annual effect on the economy will be less than $100 million. Because most of the proposed changes reduce procedural burdens, there will be no major increase in costs or prices for consumers; individual industries; Federal, state or local government agencies; or geographic regions. There will be no significant adverse effects on competition, employment, investment, productivity, or innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

These proposed rule changes contain a collection-of-information requirement subject to the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq*. The proposed rule changes add a requirement for a cover sheet to be submitted with each document to be recorded that will expedite the recording process and improve quality. The public reporting burden for this requirement is estimated to be *one-half* hour per filing, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collections of information. Send comments regarding the burden estimate or any other aspect of these collections of information, including suggestions for reducing this burden, to the Commissioner of Patents and Trademarks, Attention: Office of Management and Organization, Washington, D.C. 20231; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C.

20503. Attention: Paperwork Reduction Projects 0651-0009 and 0651-0011.

The Office has also determined that this notice has no Federalism implications affecting the relationship between the National Government and the States as outlined in Executive Order 12612.

List of Subjects
37 CFR Part 1

Administrative practice and procedure, Courts, Freedom of information, Inventions and patents.

37 CFR Part 2

Administrative practice and procedure, Courts, Lawyers, Trademarks.

37 CFR Part 3

Administrative practice and procedure, Inventions and patents, Trademarks, Assignments.

For the reasons set out in the preamble, it is proposed to amend 37 CFR Parts 1, 2 and 3 as follows, wherein removals are indicated by brackets ([ ]) and additions by arrows (> <):

PART 1 - RULES OF PRACTICE IN PATENT CASES

1. The authority citation for 37 CFR Part 1 would continue to read as follows:
Authority: 35 U.S.C. 6, unless otherwise noted.

2. Section 1.12 paragraphs (a) and (d) are proposed to be revised to read as follows:

§ 1.12 Assignment records open to public inspection.

(a) > (1) Separate assignment records are maintained in the Patent and Trademark Office for patents and trademarks.< The assignment records, relating to original or reissue patents, including digests and indexes > ,for assignments recorded on or after May 1, 1957< , and assignment records relating to pending or abandoned trademark applications and to trademark registrations > recorded on or after January 1, 1955< , are open to public inspection > at the Patent and Trademark Office< , and copies of > those assignment records< [any instruments recorded] may be obtained upon request and payment of the fee set forth in § 1.19 [(a)(3)] > and 2.6 of this Chapter.

(2) All records of assignments of patents recorded before May 1, 1957, and all records of trademark assignments recorded before January 1, 1955, are maintained by the National Archives and Records Administration (NARA). The records are open to public inspection. Certified and uncertified copies of those assignment records are provided by NARA upon request and payment of the fees required by NARA<.

* * * * *

(d) An order for a copy of an assignment > or other document should identify the reel and frame number where the assignment or document is recorded. If a document is identified without specifying its correct reel and frame< [should give the identification of the record. If identified only by the name of the patentee and number of the patent, or in the case of a trademark registration by the name of the registrant and number of the registration, or by name of the applicant and serial number or international application number of the application] , an extra charge as set forth in § 1.21(f) will be made for the time consumed in making a search for such assignment.

3. Section 1.17 is proposed to be amended by revising paragraph (i)(1) to read as follows:

§ 1.17 Patent application processing fees.

* * * * *

(i)(1) For filing a petition to the Commissioner under a section of this part listed below which refers to this paragraph $120.00
§ 1.12 —- -for access to an assignment record.
§ 1.14 — --for access to an application.
§ 1.53 — --to accord a filing date.
§ 1.55 —-- for entry of late priority papers.
§ 1.60 —-- to accord a filing date.
§ 1.62 —-- to accord a filing date.
§ 1.103 — to suspend action in application.
§ 1.177 — for divisional reissues to issue separately.
§ 1.312 — for amendment after payment of issue fee.
§ 1.313 — to withdraw an application from issue.
§ 1.314 — to defer issuance of a patent.
[§ 1.334 — for patent to issue to assignee, assignment recorded late.]
§ 1.666(b) — for access to interference settlement agreement.
§ 3.81 — for patent to issue to assignee, assignment submitted after payment of the issue fee.<

* * * * *

4. Section 1.32 is proposed to be removed and reserved.

§ 1.32 [Reserved]

5. Section 1.46 is proposed to be revised to read as follows:

§ 1.46 Assigned inventions and patents.

In case the whole or a part interest in the invention or in the patent to be issued is assigned, the application must still be made or authorized to be made, and an oath or declaration signed, by the inventor or one of the persons mentioned in §§ 1.42, 1.43, or 1.47. However, the patent may be issued to the assignee or jointly to the inventor and the assignee as provided in § [1.334] > 3.81<

6. Section 1.104 is proposed to be amended by revising paragraph (e) to read as follows:

§ 1.104 Nature of examination; examiner's action.

* * * * *

(e) Co-pending applications will be considered by the examiner to be owned by, or subject to an obligation of assignment to, the same person if:

(1) the application files refer to assignments recorded in the Patent and Trademark Office in accordance with [§ 1.331] > Part 3 of this chapter < which convey the entire rights in the applications to the same person or organization; or

(2) copies of unrecorded assignments which convey the entire rights in the applications to the same person or organization are filed in each of the applications; or

(3) an affidavit or declaration by the common owner is filed which states that there is common ownership and states facts which explain why the affiant or declarant believes there is common ownership; or

(4) other evidence is submitted which establishes common ownership of the applications.

In circumstances where the common owner is a corporation or other organization, an affidavit or declaration may be signed by an official of the corporation or organization empowered to act on behalf of the corporation or organization.

7. The heading prior to § 1.331 is proposed to be revised to read as follows:

[Assignments and Recording] > Arbitration Awards

§ 1.331 [Reserved]

8. Section 1.331 is proposed to be removed and reserved.

§ 1 332 [Reserved]

9. Section 1.332 is proposed to be removed and reserved.

§ 1.333 [Reserved]

10. Section 1.333 is proposed to be removed and reserved.

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§ 1.334 [Reserved]

11. Section 1.334 is proposed to be removed and reserved.

Part 2 - RULES OF PRACTICE IN TRADEMARK CASES

12. The authority citation for 37 CFR Part 2 would continue to read as follows:

Authority: 15 U.S.C. 1123; 35 U.S.C. 6, unless otherwise noted.

13. The heading prior to § 2.185 is proposed to be removed.

[Assignment of Marks]

§ 2.185 [Reserved]

14. Section 2.185 is proposed to be removed and reserved.

§ 2.186 [Reserved]

15. Section 2.186 is proposed to be removed and reserved.

§ 2.187 [Reserved]

16. Section 2.187 is proposed to be added to read as follows:

Part 3 -> ASSIGNMENT, RECORDING AND RIGHTS OF ASSIGNEE

Sec.
3.1 Definitions

DOCUMENTS ELIGIBLE FOR RECORDING

3.11 Documents which will be recorded.
3.16 Assignability of trademark prior to filing of use statement.

REQUIREMENTS FOR RECORDING

3.21 Identification of patent or patent application.
3.24 Formal requirements for document and cover sheet.
3.26 English language requirement.
3.27 Mailing address for submitting documents to be recorded.
3.29 Requests for recording.

COVER SHEET REQUIREMENTS

3.31 Cover sheet content.
3.34 Correction of cover sheet errors.

FEES

3.41 Recording fees.

DATE AND EFFECT OF RECORDING

3.51 Recording date.
3.54 Effect of recording.
3.56 Conditional assignments.

DOMESTIC REPRESENTATIVE

3.61 Domestic representative

PROSECUTION BY ASSIGNEE

3.71 Prosecution by assignee.
3.73 Establishing right of assignee to prosecute.

ISSUANCE TO ASSIGNEE

3.81 Issue of patent to assignee.
3.85 Issue of registration to assignee.

Authority: 15 U.S.C. 1123; 35 U.S.C. 6.

§ 3.1 Definitions.

For purposes of this part, the following definitions shall apply:

Application means an application for patent or an application to register a trademark unless otherwise indicated.

Assignment means a transfer by a party of all or part of its right, title and interest in a patent or patent application, or a transfer of its entire right, title and interest in a trademark application or registration.

Document means a document which a party requests to be recorded in the Office pursuant to § 3.11 and which affects some interest in an application, patent, or registration.

Office means the Patent and Trademark Office.

Recorded document means a document which has been recorded in the Office pursuant to § 3.11.

Registration means a trademark registration issued by the Office.

Documents Eligible for Recording

§ 3.11 Documents which will be recorded.

Assignments of applications, patents, and registrations, accompanied by completed cover sheets as specified in §§ 3.28 and 3.31, will be recorded in the Office. Other documents, accompanied by completed cover sheets as specified in §§ 3.28 and 3.31, affecting title to applications, patents, or registrations, will be recorded as provided in this Part or at the discretion of the Commissioner.

§ 3.16 Assignability of trademark prior to filing of use statement.

No application to register a mark under 15 U.S.C. 1051(b) is assignable prior to the filing of the verified statement of use under 15 U.S.C. 1051(d) except to a successor to the business of the applicant, or portion thereof, to which the mark pertains, if that business is ongoing and existing.

Requirements for Recording

§ 3.21 Identification of patent or patent application.

An assignment relating to a patent must identify the patent by the patent number. An assignment relating to a national patent application must identify the national patent application by the application number (consisting of the series code and the serial number, e.g., 07/123,456) or the serial number and filing date. An assignment relating to an international patent application which designates the United States of America must identify the international application by the international application number (e.g., PCT/US90/01234). If an assignment is executed concurrently with, or subsequent to, the execution of the patent application, but before the patent application is filed, it must identify the patent application by its date of execution, name of each inventor, and title of the invention so that there can be no mistake as to the patent application intended.

§ 3.24 Formal requirements for document and cover sheet.

The document and cover sheet must be legible. Only one side of each page shall be used. The paper used should be bond weight paper, preferably no larger than 8 1/2 x 14 inches (21.6 x 33.1 cm.), and with a one-inch (2.5 cm.) margin on all sides.

§ 3.26 English language requirement.

The Office will accept and record non-English language documents only if accompanied by a verified English translation signed by the individual making the translation.

§ 3.27 Mailing address for submitting documents to be recorded.

Documents and cover sheets to be recorded should be addressed to the Commissioner of Patents and Trademarks, Box Assignments, Washington, D.C. 20231, unless they are filed together with new applications or with a petition under § 3.81(b).

§ 3.28 Requests for recording.

All requests to record a document in the Office must be accompanied by the document to be recorded and at least one cover sheet as specified in § 3.31 referring either to each patent application and patent, or to each trademark application and registration, against which the document is to be recorded. If a document to be recorded includes interests in, or transactions involving, both patents and trademarks, separate patent and trademark cover sheets must be submitted. Only one set of documents and cover sheets to be recorded should be filed. If a document to be recorded is not accompanied by a completed cover sheet, the document and any incomplete cover sheet will be returned pursuant to § 3.51 for proper completion of a cover sheet and resubmission of the document and a completed cover sheet.

Cover Sheet Requirements

§ 3.31 Cover sheet content

Each patent or trademark cover sheet required by § 3.28 must contain:

(a) the name of the party conveying the interest;

(b) the name and address of the party receiving the interest;

(c) a description of the interest conveyed or transaction to be recorded;

(d) each application number, patent number or registration number against which the document is to be recorded, or an indication that the document is filed together with a patent application;

(e) the name and address of the party to whom correspondence concerning the request to record the document should be mailed;

(f) the number of the applications, patents or registrations identified in the cover sheet and the total fee;

(g) the date the document was executed;

(h) an indication that the assignee of a trademark application or registration who is not domiciled in the United States has designated a domestic representative (see § 3.61); and

(i) the signature of the party submitting the document and verification of the correctness of information contained on the cover sheet. The verification must be in oath or declaration form unless:

(1) the submitted patent cover sheet is signed by a registered practitioner, or

(2) the submitted trademark cover sheet is signed by an attorney as defined in § 10.1(c).

A cover sheet may not refer to both patents and trademarks.

§ 3.34 Correction of cover sheet errors.

An error in a cover sheet recorded pursuant to § 3.11 will be corrected only if:

(a) the error is apparent when the cover sheet is compared with the recorded document to which it pertains and

(b) a corrected cover sheet is filed for recordation. The corrected cover sheet must be accompanied by the originally-recorded document or a copy of the originally- recorded document and by an assignment recording fee as set forth in § 1.21(h) of this Chapter for patents and § 2.6(q) of this Chapter for trademarks.

Fees

§ 3.41 Recording fees.

All requests to record documents must be accompanied by the appropriate fee. A fee is required for each application, patent and registration against which the document is recorded as identified in the cover sheet. The recording fee is set in § 1.21(h) of this Chapter for patents and in § 2.6(q) of this Chapter for trademarks.

Date and Effect of Recording

§ 3.51 Recording date.

The date of recording of a document is the date the document meeting the requirements for recording set forth in this Part is filed in the Office. A document which does not comply with the identification requirements of § 3.21 will not be recorded. Documents not meeting the other requirements for recording, for example, a document submitted without a completed cover sheet or without the required fee, will be returned for correction to the sender where a correspondence address is available. The returned papers will be accompanied by a letter which will indicate that if the returned papers are corrected and resubmitted to the Office within the time specified in the letter, the Office will consider the original date of filing of the papers as the date of recording of the document. The certification procedure under either § 1.8 or § 1.10 of this Chapter may be used for resubmissions of returned papers to have the benefit of the date of deposit in the United States Postal Service. If the returned papers are not corrected and resubmitted within the specified period, the date of filing of the corrected papers will be considered to be the date of recording of the document. The specified period to resubmit the returned papers will not be extended.

§ 3.54 Effect of recording.

The recording of a document pursuant to § 3.11 is not a determination by the Office of the validity of the document or the effect that document has on the title to an application, a patent, or a registration. When necessary, the Office will determine what effect a document has, including whether a party has the authority to take an action in a matter pending before the Office.

§ 3.56 Conditional assignments.

Assignments which are made conditional on the performance of certain acts or events, such as the payment of money or other condition subsequent, if recorded in the Office, are regarded as absolute assignments for Office purposes until cancelled with the written consent of all parties or by the decree of a court of competent jurisdiction. The Office does not determine whether such conditions have been fulfilled.

Domestic Representative

§ 3.61 Domestic representative

If the assignee of a trademark application or registration is not domiciled in the United States, the assignee must designate, in writing to the Office, a domestic representative. An assignee of a patent application or patent may designate a domestic representative if the assignee is not residing in the United States. The designation shall state the name and address of a person residing within the United States on whom may be served process or notice of proceedings affecting the application, patent or registration or rights thereunder.

Prosecution by Assignee

§ 3.71 Prosecution by assignee.

The asignee of record of the entire right, title and interest in an application for patent is entitled to conduct the prosecution of the patent application to the exclusion of the named inventor or previous assignee. The assignee of record of the entire right, title and interest in a trademark application or registration is entitled to conduct the prosecution of the trademark application or registration to the exclusion of the original applicant or previous assignee.

§ 3.73 Establishing right of assignee to prosecute.

(a) The inventor is presumed to be the owner of a patent application, and any patent that may issue therefrom, unless there is an assignment. The original applicant is presumed to be the owner of a trademark unless there is an assignment.

(b) Any action before the Office with respect to an assigneed application, patent, or registration may be taken by the assignee of the entire right, title, and interest provided ownership is established to the satisfaction of the Commissioner. Ownership may be established by submitting to the Office documentary evidence of a chain of title from the original owner to the

VOL
1127
ISS
1
JE
4
1991
UMI

assignee or by specifying (e.g., reel and frame number, etc.) where such evidence is recorded in the Office. When a party holding ownership of an application through assignment(s) seeks to take action in a matter pending before the Office, a statement, signed by the party or its attorney or agent of record, must also be submitted specifying the documents placing ownership in the party, and stating the evidence has been reviewed and certifying that, to the best of the party's, attorney's, or agent's knowledge and belief, title is in the party seeking to take the action. Documents submitted to establish ownership may be required to be recorded as a condition to permitting the requesting party to take action in a matter pending before the Office.

Issuance to Assignee

§ 3.81 Issue of patent to assignee.

(a) For a patent application, if an assignment of the entire right, title, and interest is recorded before the issue fee is paid, the patent may issue in the name of the assignee. If the assignee holds an undivided part interest, the patent may issue jointly to the inventor and the assignee. At the time the issue fee is paid, the name of the assignee must be provided if the patent is to issue solely or jointly to that assignee.

(b) If the assignment is submitted for recording after the date of payment of the issue fee, but prior to issuance of the patent, the assignee may petition that the patent issue to the assignee. Any such petition must be accompanied by the fee set forth in § 1.17(i)(1) of this Chapter.

§ 3.85 Issue of registration to assignee.

The certificate of registration may be issued to the assignee of the applicant, or in a new name of the applicant, provided that the party files a written request in the trademark application by the time the application is being prepared for issuance of the certificate of registration, and the appropriate document is recorded in the Office. If the assignment or name change document has not been recorded in the Office, then the written request must state that the document has been filed for recordation. The address of the assignee must be made of record in the application file.<

Apr. 25, 1991

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner
of Patents and Trademarks

Note: Appendices A and B appear on the following pages.

Errata

"All reference to Patent No. 5,009,603 to Chi-Ming Fong of New Territories, Hong Kong for 'ELECTRONIC EDUCATIONAL VIDEO SYSTEM APPARATUS' appearaing in the Official Gazette of April 30, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 5,010,931 to Steven M. Hooser of Illinios for 'PORTABLE STUMP REMOVER' appearing in the Official Gazette of April 30, 1991 should be deleted since no patent was granted."

U. S. DEPARTMENT OF COMMERCE

Agency: Patent and Trademark Office
Action: Notice
Summary: In accordance with Section 10(a)(2) of the Federal Advisory Committee Act (Public Law 92-463), announcement is made of the open meeting of the Public Advisory Committee for Trademark Affairs.
Date: The Public Advisory Committee for Trademark Affairs will meet from 10:00 a.m. until 4:00 p.m. on June 11, 1991.
Place: U. S. Patent and Trademark Office, 2900 Crystal Drive, Arlington, Virginia, in the Conference Room on the Lobby level.
Status: The meeting will be open to public observation; seating will be available for the public on a first-come-first-served basis. Members of the public will be permitted to make oral comments of three (3) minutes each. Written comments and suggestions will be accepted before or after the meeting on any of the matters discussed. Copies of the minutes will be available upon request.
Matters to be considered: The agenda for the meeting is as follows:

(1) Finance
(2) Automation
(3) Strategic Planning
(4) Current Trademark Office Practice Issues
(5) International Trademark Law

Contact person for more information: For further information, contact Lynne Beresford, Office of the Assistant Commissioner for Trademarks, Room CPK2-910, Patent and Trademark Office, Washington, D. C. 20231. Telephone: (703) 557-7464.

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner
of Patents and Trademarks

Appendix A to Part 3

PATENTS ONLY **PATENTS ONLY**

To the Honorable Commissioner of Patents and Trademarks:
Please record the attached original document or copy thereof.

1. Name of Party(ies) conveying an interest:

2. Name and Address of Party(ies) receiving an interest:
Name: ____________
Internal Address: ____________
____
Street Address: ____________
____
City: ____________
State: ____________ Zip: ____________

3. Description of the interest conveyed:
☐ Assignment ☐ Change of Name Other ____________
☐ Security Agreement ☐ Merger ____________

4. Application number(s) or patent number(s). Additional sheet attached? ☐ Yes ☐ No
If this document is being filed together with a new application, the execution date of the application is:

____
Date

A. Patent Application No.(s) | B. Patent No.(s)

5. Name and address of party to whom correspondence concerning document should be mailed:
Name: ____________
Internal Address: ____________
____
Street Address: ____________
____
City ____________
State: ____________ Zip: ____________

6. Number of applications and patents involved:

7. Amount of fee enclosed or authorized to be charged:

8. Deposit account number (Attach duplicate copy of this form if paying by deposit account):

DO NOT USE THIS SPACE

9. Date of execution of attached document ____________

10. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed on:

____
Date

____________ ____________
Signature Name of Person Signing

VOL
1127
ISS
1
JE
4
1991
UMI

Appendix B to Part 3

TRADEMARKS ONLY **TRADEMARKS ONLY**

To the Honorable Commissioner of Patents and Trademarks:
Please record the attached original document or copy thereof.

1. Name of Party(ies) conveying an interest:

Entity:
☐ Individual(s) ☐ Association
☐ General Partnership ☐ Limited Partnership
☐ Corporation-State __________
☐ Other __________

3. Interest Conveyed:
☐ Assignment ☐ Change of Name
☐ Security Agreement ☐ Merger
☐ Other __________

2. Name and Address of Party(ies) receiving an interest:

Name: __________
Internal Address: __________
Street Address: __________
City: __________
State: ______ Zip: ______
Entity:
☐ Individual ☐ Association
☐ General Partnership ☐ Limited Partnership
☐ Corporation-State __________
☐ Other __________
Citizenship __________

If not domiciled in the United States, a domestic representative designation is attached:
☐ Yes
☐ No
(The attached document must not be an assignment)

4. Application number(s) or registration number(s). Additional sheet attached? ☐ Yes ☐ No

A. Trademark Application No.(s)

B. Trademark Registration No.(s)

5. Name and address of party to whom correspondence concerning document should be mailed:

Name: __________
Internal Address: __________
Street Address: __________
City __________
State: ______ Zip: ______

6. Number of applications and registrations involved:

7. Amount of fee enclosed or authorized to be charged:

8. Deposit account number (Attach duplicate copy of this form if paying by deposit account):

DO NOT USE THIS SPACE

9. Date of execution of attached document __________

10. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed on:

____
Date

__________ __________
Signature Name of Person Signing

PATENT NOTICES

Certificates of Correction For Week of June 4, 1991

B1. 4,728,471
D. 306,527
D. 308,146
Re. 33,093
Re. 33,140
4,507,188
4,615,848
4,672,960
4,718,093
4,720,377
4,721,718
4,742,078
4,748,448
4,758,343
4,772,020
4,776,231
4,778,309
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4,993,161
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Disclaimers

4,524,699—*Michael J. Pavlick*, Norristown, Pa. LOW LEVEL FREIGHT CAR FOR CARRYING TRAILERS. Patent dated June 25, 1985. Disclaimer filed Jan. 31, 1991, by the assignee, Transit America, Inc.

Hereby enters this disclaimer to claim 1 of said patent.

4,786,345—*Eric Wood*, Wellingborough, England. METHOD OF LINING A PASSAGEWAY. Patent dated Nov. 22, 1988. Disclaimer filed June 4, 1990, by the assignee, Insituform Licencees B.V.

Hereby enters this disclaimer to claim 5 of said patent.

4,841,723—*Monica M. Lau*, Okeana; *George A. Coffinberry*, West Chester, both of Ohio. MULTIPLE-PROPELLANT AIR VEHICLE AND PROPULSION SYSTEM. Patent dated June 27, 1989. Disclaimer filed Mar. 14, 1991, by the assignee, General Electric Company.

Hereby enters this disclaimer to claims 1-12 of said patent.

4,845,739—*Ronald A. Katz*, Los Angeles, Calif. TELEPHONIC-INTERFACE STATISTICAL ANALYSIS SYSTEM. Patent dated Jul. 4, 1989. Disclaimer filed Feb. 13, 1991, by the assignee, First Data Resources, Inc.

Hereby enters this disclaimer to claim 3 of said patent.

4,870,842—*Mark J. Plumer*, Los Angeles, Calif. SECURITY LOCKING SYSTEM FOR VEHICLE WHEEL NUTS. Patent dated Oct. 3, 1989. Disclaimer filed Jan. 28, 1991, by the inventor.

The term of this patent subqesuent to Oct. 3, 2006, has been disclaimed.

4,979,353—*John W. Seppala*, Braintree, Mass. APPARATUS FOR FILLING TWO OR MORE BAGS WITH PRODUCT. Patent dated Dec. 25, 1990. Disclaimer filed Aug. 23, 1990, by the assignee, Pneumatic Scale Corporation.

The term of this patent subsequent to Jul. 3, 2007, has been disclaimed

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Disclaimers and Dedications

4,382,026—*Stevens S. Drake; Harold E. Filter*, both of Midland, Mich. PROCESS FOR ENCAPSULATING RADIOACTIVE ORGANIC LIQUIDS IN A RESIN. Patent dated May 3, 1983. Disclaimer and Dedication filed Dec. 18, 1989, by the assignee, The Dow Chemical Company.

Hereby disclaims and dedicates to the public all the claims of said patent.

4,390,614—*Richard M. Peck*, Allentown, Pa.; *Robert B. Reif*, Grove City; *Loren R. Albrechtson*, Columbus, both of Ohio. COLOR FACSIMILE PRINTING DEVICE COMPRISING PHOTOSENSITIVE INK IN PORES. Patent dated June 28, 1983. Disclaimer and Dedication filed Dec. 6, 1990, by the inventor.

Hereby disclaims and dedicates to the public the remaining term of said patent.

4,420,552—*Richard M. Peck*, Allentown, Pa.; *Robert B. Reif*, Grove City; *Loren R. Albrechtson*, Columbus, both of Ohio. METHOD OF PRODUCING PRINTED IMAGES WITH A COLOR FACSIMILE PRINTING DEVICE. Patent dated Dec. 13, 1983. Disclaimer and Dedication filed Dec. 6, 1990, by the inventor.

Hereby disclaims and dedicates to the public the remaining term of said patent.

4,481,528—*Richard M. Peck*, Allentown Pa. MULTICOLOR IMAGE PRINTING DEVICE AND METHOD.Patent dated Nov. 6, 1984. Disclaimer and Dedication filed Dec. 7, 1990, by the inventor.

Hereby disclaims and dedicates to the public the remaining term of said patent.

4,519,851—*Charles H. Perry; Robert R. Shaw*, both of Poughkeepsie, N.Y. METHOD FOR PROVIDING PINHOLE FREE DIELECTRIC LAYERS. Patent dated May 28, 1985. Disclaimer and Dedication filed Nov. 23, 1990, by the assignee, International Business Machines Corporation.

Hereby disclaims and dedicates to the public the remaining term of said patent.

VOL 1127
ISS 1
JE 4
1991
UMI

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Washington, D.C. 20231

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Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and Internal Affairs.
Box 5	"No Fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor *except* communications relating to *pending litigation*; papers relating to pending litigation shall be mailed only to Office of the Solicitor, P.O. Box 15667, Arlington, Va. 22215
Box 9	Coupon orders for U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
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Box 14	Invoices directed to the Office of Finance.
Box 15	Mail for the Advisory Commission on Patent Law Reform.
Box 16	Deposit Account Replenishment Checks
Box 171	Vacancy Announcement Applications.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
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Box DD	Mail related to Disclosure Documents.
Box EEO	Mail for the Office of Equal Employment Programs.
Box FWC	Requests for File Wrapper Continuation Applications (under 37 CFR 1.62)
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All Communications following the receipt of a PTOL-85, "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments should be submitted in a separate envelope and not be sent to Box Issue Fee.
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Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non-Fee-Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection).
Box OED	Mail for the Office of Enrollment and Discipline
Box PATENT APPLICATION	New patent application and associated papers and fees.
Box TRADEMARK	New trademark application and associated papers and APPLICATION fees.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Requests for Reexamination for *original* request papers *only*
Box Sequence	Submission of diskette for biotechnical application.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications *prior* to the Office's standard notification (return postcard or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").

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The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining eftctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 640-8847
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 806-7252
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
	Orlando: University of Central Florida Libraries	(407) 823-2562
	Tampa: Tampa Campus Library, University of South Florida	(813) 974-2726
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Hawaii	Honolulu: Hawaii State Public Library System	(808) 586-3477
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5659
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
Iowa	Des Moines: State Library of Iowa	(515) 281-4118
Kansas	Wichita: Ablah Library, Wichita State University	(316) 689-3155
Kentucky	Louisville Free Public Library	(502) 561-8617
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 405-9157
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library and Information Center	(612) 372-6570
Misssissippi	Jackson: Mississippi Library Commission	Not Yet Operational
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska-Lincoln	(402) 472-3411
Nevada	Reno: University of Nevada-Reno Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University	(201) 932-2895
New Mexico	Albuquerque: University of New Mexico General Library	(505) 277-4412
New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D.H. Hill Library, North Carolina State University	(919) 737-3280
North Dakota	Grand Forks: Chester Fritz Library, University of North Dakota	(701) 777-4888
Ohio	Cincinnati and Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6175
	Toledo/Lucas County Public Library	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861

VOL
1127
ISS
1
JE
4
1991
UMI

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Rhode Island	Providence Public Library	(401) 455-8027
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2372
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Stevenson Science Library, Vanderbilt University	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext.2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: James Branch Cabell Library, Virginia Commonwealth University	(804) 367-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner

PATENT EXAMINING GROUPS	Phone Number Area Code 703
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director.	308-0661
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director	308-1235
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director	308-0651
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	308-2351
BIOTECHNOLOGY, GROUP 180—EDWARD E. KUBASIEWICZ, Director	308-0196
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. KELLY, Director	308-1782
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director	308-0511
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—GERALD GOLDBERG, Director	308-0754
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—CARLTON CROYLE Director	308-0771
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—JOSEPH J. ROLLA, Director.	308-0956
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director	308-0962
DESIGN, GROUP 290—ROBERT E. GARRETT, Director	308-0511
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	308-1113
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Director	308-1148
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	308-0858
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—JOHN KITTLE, Director	308-0861
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	308-0651

Expiration of patents: The patents within the range of numbers indicated below expire during May 1991 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,808,604 to 3,813,693 inclusive
Plant Patents	3,541 to 3,560 inclusive

VOL
1127
ISS
1
JE
4
1991
UMI

POSTAL SERVICE DELAY IN DELIVERY OF PTO MAIL

The United States Postal Service (USPS) has advised the Patent and Trademark Office (PTO) that delivery of mail picked up by the USPS at the PTO around March 18-19, 1991, was delayed. Delivery of that mail could have taken place as late as May 15-17, 1991.

To minimize, if not eliminate, any adverse impact caused by the USPS delay, and subject to the conditions specified in paragraph 5, the following times for taking action in response to a PTO letter involved in the delay apply.

1. If a decision of the Board of Patent Appeals and Interferences (BPAI) or the Trademark Trial and Appeal Board (TTAB), is date-stamped on any date in March 1991, and was delivered by the USPS after May 1, 1991, then the time for taking action under:

   (a) 37 CFR § 1.196 (new ground of rejection);

   (b) 37 CFR §§ 1.197, 1.658, 2.129, or 2.144 (seeking reconsideration); or

   (c) 35 U.S.C. § 141 or § 145 or 15 U.S.C. § 1071 (seeking judicial review),

will be extended to and including Monday, July 1, 1991, unless the date for taking action is already set to expire later than July 1, 1991, in which case the later date applies. 37 CFR §§ 1.304 and 2.145.

VOL
1127
ISS
1
JE
4
1991
UMI

2. If an order, decision, or other action of the BPAI or TTAB, other than those which would call for taking action under subparagraphs (a) through (c) of paragraph 1, is date-stamped on any date in March 1991, and was delivered by the USPS after May 1, 1991, then the time for taking action shall be determined by:

(1) the Chairman of the BPAI or his designee in a patent case; or

(2) the Chairman of the TTAB or his designee in a trademark case.

It is not possible, from a practical point of view, to set by general notice a date for taking action in the numerous situations which can arise in connection with most interlocutory orders, decisions, and other actions entered by the BPAI and TTAB. However, it is expected that appropriate relief will be granted on a case-by-case basis.

3. If an advisory action entered in an ex parte patent case after final rejection (see Manual of Patent Examining Procedure, § 714.13) is date-stamped on any date in March 1991, and was delivered by the USPS after May 1, 1991, and applicant can still take, and wants to take, action within the six-month period allowed by law (35 U.S.C. § 133), then the provisions of 37 CFR § 1.136(a) and (b) are waived (37 CFR § 1.183) to the extent that an extension of time under 37 CFR § 1.136(b) will be granted without a fee even though filed after the day on which action by the applicant is due. In no case can the extension carry the date on which a response is due beyond the six-month statutory limit (35 U.S.C. § 133).

4. If a PTO paper, i.e., any ex parte rejection, ex parte refusal, decision, order, requirement, request for payment of a fee, or other similar paper (except decisions or orders of the BPAI or TTAB, which are governed by paragraph 1 and 2, or an advisory action in a patent case, which is governed by paragraph 3), is date-stamped in March 1991, and was delivered by USPS after May 1, 1991, then:

(1) the PTO paper shall be deemed to have been mailed on Monday, May 20, 1991, and

(2) any response filed within the time period as reset by this notice will be deemed to be timely filed.

5. To receive the benefits set out in paragraphs 1 through 4 for a paper being submitted, a written request for appropriate relief must be filed with, and preferably as part of, the paper. The written request (1) must make reference to this notice, and (2) must include a statement signed by a practitioner, as defined in 37 CFR § 10.1(r), which identifies the PTO paper with reasonable particularity and states that the PTO paper being responded to:

(a) has been reviewed;

(b) bears a PTO date stamp having a date in March 1991, specifying the date of the PTO date stamp on the paper; and

VOL
1127
ISS
1
JE
4
1991
UMI

(c) was received after May 1, 1991, specifying the date the paper was received.

A copy of the page of the PTO paper bearing the PTO date stamp and a date-stamp, or other indication, showing receipt of the paper should be attached to and made a part of the statement. For example, an appropriate statement is:

> I, _______, an attorney (agent) of record in the above-identified proceeding before the Patent and Trademark Office, have reviewed the following paper: (identify the paper, i.e., the decision of the BPAI, the decision of the TTAB, the first Office action, the final refusal, etc.). The paper has a PTO date stamp of March __, 1991, and was received on May __, 1991. A copy of the page of the paper showing the PTO date stamp and a date stamp showing receipt of the paper is attached.

6. It is not possible to extend times set by statutes which leave the Commissioner no discretion to extend times, e.g., (1) responding to an ex parte patent rejection (35 U.S.C. § 133) or an ex parte trademark refusal (15 U.S.C. § 1062) after expiration of the six-month statutory period; (2) supplementing certain affidavits of continued use under 15 U.S.C. § 1058 [(*In re Mother Tucker's Food Experience (Canada), Inc*., 925 F.2d 1402, 17 USPQ2d 1795 (Fed. Cir. 1991); *In re Culligan International Co.*, 915 F.2d 680, 16 USPQ2d 1234 (Fed. Cir. 1990)]. Nevertheless, it is the intent of this notice to indicate that PTO intends to grant relief, where possible, to alleviate any hardship caused by the mail delay which occurred in this particular situation.

7. For specific situations not covered by this notice and involving the mail delay discussed above, members of the public may contact the following:

(1) Cases involving matters before the BPAI:

Office of the Chairman
Board of Patent Appeals and Interferences
Crystal Gateway 2, Room 12C06
(703) 557-4101

(2) Cases involving matters before the TTAB:

Office of the Chairman
Trademark Trial and Appeal Board
South Tower Building, 9th Floor
(703) 308-9300

(3) Patent cases not before the BPAI:

Office of Petitions
Crystal Park 2, Room 913
(703) 557-4282

(4) Trademark cases not before the TTAB:

Office of the Assistant Commissioner
for Trademarks
Crystal Park 2, Room 910
(703) 557-3916

May 20, 1991

Harry F. Manbeck Jr.
HARRY F. MANBECK, JR.
Commissioner of Patents
and Trademarks

VOL
1127
ISS
1
JE
4
1991
UMI

DEPARTMENT OF COMMERCE

Patent and Trademark Office

37 CFR Parts 1 and 2

[Docket No. 910373-1073]

RIN 0651-AA45

Revision of Patent and Trademark Fees

Correction

In proposed rule document 91-11223 beginning on page 21890 in the issue of Friday, May 10, 1991, make the following corrections:

1. On page 21892, in the first column, in the fifth paragraph, in the sixth line "(a)(2)(iii)" should read "(a)(2)(ii)".

§ 1.16 [Corrected]

2. On page 21896, in the first column, in § 1.16(c), in the third line, "30" should read "20".

3. On the same page, in the same column, in § 1.16(d), in the fifth line, "200.00" should read "100.00" and in the sixth line, "100.00" should read "200.00".

§ 1.19 [Corrected]

4. On page 21897, in the second column, in § 1.19(f), in the second line, after "States" insert "patent".

§ 1.20 [Corrected]

5. On page 21897, in the second column, in § 1.20(a), in the second line "application's" should read "applicant's".

§ 2.6 [Corrected]

6. On page 21901, in the first column, in § 2.6(a)(16), after "filing" insert "petition".

1127 OG 28

REEXAMINATIONS

JUNE 4, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,778,308 (1482nd)

MAGNETIC STORAGE DEVICE COATING AND PROCESS

Kent G. Roller; George H. Ahlborn, and Richard E. Brown, all of Boulder, Colo., assignors to Ball Brothers Research Corporation, Boulder, Colo.

Reexamination Request No. 90/001,181, Feb. 25, 1987.

Reexamination Certificate for Patent No. 3,778,308, issued Dec. 11, 1973, Ser. No. 99,528, Dec. 18, 1970.

Int. Cl.^{5} G11B *23/00*

U.S. Cl. 428—421

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **2–4** and **6** is confirmed.

Claims **1** and **5** are cancelled.

[**1**. A magnetic recording member comprising a substrate of a magnetic material and a thin outer coating of a friction-modifying, abrasion-resistant perfluoroalkyl polyether having a thickness between about 3 microinches and 50 microinches and having a molecular weight of at least 1000 on said surface.]

B1 4,383,668 (1479th)

CABLE CLAMP

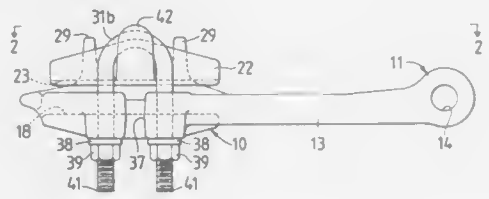
Gaddis G. Hall, P.O. Box 6699, Birmingham, Ala. 35210

Reexamination Request No. 90/002,142, Sep. 20, 1990.

Reexamination Certificate for Patent No. 4,383,668, issued May 17, 1983, Ser. No. 270,255, Jun. 4, 1981.

Int. Cl.^{5} E21F *17/02;* **F16L** *3/00*

U.S. Cl. 248—63



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claim **1** is confirmed.

Claim **2** is cancelled.

New claims **3** and **4** are added and determined to be patentable.

4. In an improved clamp having a body with a cable receiving groove therein and a clevis at one end thereof for pivotal connection to a supporting structure and a pulling eye at the other end thereof, a keeper mounted for movement in a direction substantially perpendicular to said cable receiving groove selectively to an open position spaced from said cable receiving groove and to a closed position engaging a cable in said cable receiving groove, a first U-bolt carried by said body, said first U-bolt adapted to engage a first laterally extending side portion of said keeper and having a base connected to spaced apart depending legs with said depending legs received by said body in a pair of openings through said body spaced laterally from said cable receiving groove, a spring connected between a portion of said first laterally extending side portion of said keeper extending intermediate the legs of said U-bolt and the adjacent side of said body extending intermediate the legs of said first U-bolt for urging said keeper toward said open position; a projection carried by said adjacent side of said body in position to receive said spring and there being a recess in the adjacent side portion of said keeper in position to also receive said spring, the improvement comprising: a second U-bolt carried by said body, said second U-bolt having a base connected to spaced apart depending legs with said legs received in a pair of openings in said body laterally spaced from said cable receiving groove with the outer most sides of said openings extending downwardly and inwardly in position to receive the legs of said second U-bolt with a loose fit and permit free outward tilting movement thereof, said second U-bolt engaging a second laterally extending side portion of said keeper disposed opposite of said first laterally extending side portion thereof, with said first and second U-bolts extending substantially parallel to said cable receiving groove and adapted to move said keeper to said closed position with said first and second U-bolt remaining parallel to said cable receiving groove in all positions of said U-bolts.

B1 4,413,883 (1480th)

DISPLAYS CONTROLLED BY MIM SWITCHES OF SMALL CAPACITANCE

David R. Baraff, Ottawa; Nur M. Serinken, Kanata; Richard W. Streater, Nepean; Carla J. Miner, Nepean; Robert J. Boynton, Nepean; Blair K. MacLaurin, Nepean, and William D. Westwood, Nepean, all of Canada, assignors to Northern Telecom Limited

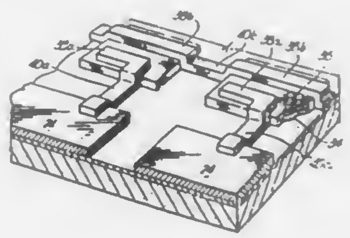
Reexamination Request No. 90/002,019, May 7, 1990.

Reexamination Certificate for Patent No. 4,413,883, issued Nov. 8, 1983, Ser. No. 212,271, Dec. 3, 1980.

Continuation-in-part of Ser. No. 44,247, May 31, 1979, abandoned

Int. Cl.^{5} G02F *1/133*

U.S. Cl. 350—334



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **20–23** is confirmed.

Claims **2, 3** and **5** are cancelled.

Claims **1, 4, 18** and **19** are determined to be patentable as amended.

Claims **6–17** and **24**, dependent on an amended claim, are determined to be patentable.

New claim **25** is added and determined to be patentable.

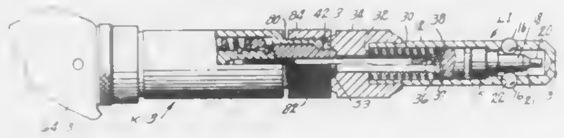
1. A matrix multiplexed display comprising a pair of plates, at least one of the plates being transparent, the plates having sealed therebetween a layer of liquid characterized by electric

VOL
1127
ISS
1
JE
4
1991
UMI

field dependent optical transmissivity, a first plurality of electrodes on an inside surface of one plate and a second plurality of electrodes on an inside surface of the other plate, the display having a plurality of picture elements, each element defined by a pair of opposed electrodes on the inside surfaces of respective plates, means for applying a voltage between the opposed electrodes of each element, each picture element being series connected to a respective switch comprising a thin insulating film flanked by thin film *metallic* conducting layers, the insulating film characterized by a gross change in resistivity at a predetermined voltage thereacross, the switches *being* formed on the inside surface of at least one of the plates, *each switch being laterally offset from and immediately adjacent to the picture element connected in series thereto, each switch being substantially smaller in area than the picture element connected in series thereto whereby* each switch [having] *has* a capacitance substantially less than the capacitance of its series connected picture element.

B1 4,426,860 (1481st)
LOCK AND KEY SYSTEM OF THE PLUNGER TYPE

James Swisher, Box 248, Southport, Conn. 06490
Reexamination Request No. 90/001,422, Jan. 19, 1988.
Reexamination Certificate for Patent No. 4,426,860, issued Jan. 24, 1984, Ser. No. 281,701, Jul. 9, 1981.
Int. Cl.^{5} E05B *19/18, 35/06*
U.S. Cl. **70—34**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **2-3**, **5-7** and **9** are cancelled.

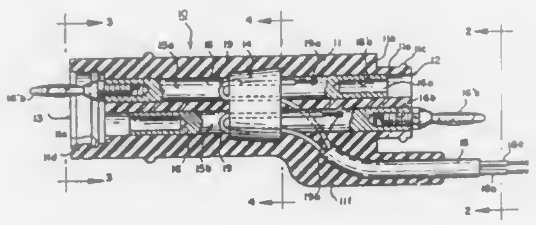
Claims **1**, **4** and **8** are determined to be patentable as amended.

New claim **10** is added and determined to be patentable.

4. [A system as set out in claim **3** in which] *A lock and key system of the type in which the lock comprises an elongated hollow housing with an internal operating plunger and a central opening from the plunger to a head end of the lock, a recess in said head end disposed about the central opening, and an operating key having a head and an elongated plunger-engaging mechanism projecting forwardly therefrom, and a spacing member disposed on the head about the plunger engaging mechanism, said system providing various "levels" of locks and keys by comprising a series of locks having successively deeper recesses in the head and a series of keys having successively longer spacing members projecting forwardly of the head, each spacing member having a length equal to the depth of the recess of the corresponding lock, wherein a predetermined amount of movement of the plunger of a lock of the series if required to effect unlocking, and the corresponding key of the series is capable of providing only that predetermined amount of movement, and* means is provided on the forward end of the key capable of forward adjustment to decrease the effective amount of projection of the spacing member and to thereby close the gap between the head of the key and the head of the lock when a key with a spaced of a predetermined length is inserted into a lock with a recess having a depth less than the length of the spacer.

B1 4,445,741 (1483rd)
DOUBLE-PLUG SEISMIC CONNECTOR

Ira R. Annoot, Pasadena, Tex., assignor to Houston Geophysical Products, Inc.
Reexamination Request No. 90/001,793, Jun. 20, 1989.
Reexamination Certificate for Patent No. 4,445,741, issued May 1, 1984, Ser. No. 310,387, Oct. 13, 1981.
Int. Cl.^{5} H01R *33/88*
U.S. Cl. **439—290**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **2-4** is confirmed.

Claims **1** and **5** are determined to be patentable as amended

New claims **6**, **7**, **8** and **9** are added and determined to be patentable.

1. A double-ended, seismic takeout clip comprising:
an elongated unitary body made of an elastic insulating material;
a solid cylindrical male connector plug, having a pair of electric contacts, projecting outwardly from one end of said body, and an O-ring around the cylindrical body portion of said male plug;
a tubular female connector plug, having a pair of electric contacts, projecting outwardly from the opposite end of said body, and the tubular body portion of the female plug having an inner cylindrical wall defining an annular groove;
said body portions of said male and female plugs being dimensioned to allow, in use, said tubular female plug to snugly accept a male plug of a second like takeout clip, whereby said groove (1) frictionally receives the male plug's O-ring for protecting the interconnected electric contacts of the male and female plugs against moisture penetration and (2) frictionally resists accidental disconnection between said male and female plugs;
a pair of longitudinal electric conductors embedded within said body, each conductor being electrically connected to, for providing a conductive path between, an electric contact in the male plug and an electric contact in the female plug; [and]
a pair of insulated wires, each wire having an inner end whose bare metallic end portion makes an electric connection with one of said conductors, and each wire having an outer end which projects outwardly of said body, whereby the pair of wires which project outwardly of said body are electrically connected across said pair of conductors and thus across the pair of contacts in each plug[.]*; and*
a geophone connected to said outer end of each wire of said pair of insulated wires.

B1 4,697,972 (1484th)
METHOD FOR SEAMING END CLOSURES TO A CONTAINER BODY

Lucien F. Le Bret, Saint-Gratien, and Robert Saada, Maisons-Alfort, both of France, assignors to Gallay S.A., Paris, France
Reexamination Request No. 90/002,098, Jul. 30, 1990.
Reexamination Certificate for Patent No. 4,697,972, issued Oct. 6, 1987, Ser. No. 785,382, Oct. 7, 1985.
Int. Cl.^{5} B21D *51/32*
U.S. Cl. **413—6**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1**, **2**, **3**, **10** and **15** are determined to be patentable as amended.

Claims **4-9**, **11-14** and **16-17**, dependent on an amended claim, are determined to be patentable.

New claims **18-32** are added and determined to be patentable.

1. A method of assembling an end closure to a container body by seaming flanges of the end closure and container body together, comprising the steps of:
providing a preformed end closure having a recessed transverse central portion, a skirt axially and radially extending away from the central portion, and a flange radially outwardly extending from the skirt, and a preformed container body having a sidewall and flange radially outwardly extending from the container body sidewall;
providing a rotatable chuck haivng an end and circumferential sidewall, and radially displaceable seaming tool;
positioning the end closure on the chuck end in driving engagement therewith, the end closure skirt being circumferentially radially spaced from the chuck sidewall;
nesting the container body relative to the end closure into centered engagement therewith with their flanges in mutual engagement; and
displacing the seaming tool radially inwardly while rotating said chuck to roll the flanges into a seam *having a radial projection* while deforming the skirt of the end closure against the chuck sidewall thereby reducing the radial projection of the [resulting] seam relative to the container body sidewall.

B1 4,717,268 (1485th)
BEARING CONSTRUCTION

Stanley S. Orkin, Vernon, Conn., assignor to Kamatics Corp., Bloomfield, Conn.
Reexamination Request No. 90/002,211, Nov. 27, 1990.
Reexamination Certificate for Patent No. 4,717,268, issued Jan. 5, 1988, Ser. No. 567,612, Jan. 3, 1984.
Continuation of Ser. No. 255,634, Apr. 20, 1981, abandoned
Int. Cl.^{5} F16C *33/20*
U.S. Cl. **384—280**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1-5** is confirmed.

1. A track-roller bearing assembly comprising a fixed inner race member having an outwardly facing peripheral bearing surface; an annular body of self-lubricating bearing material affixed to the outwardly facing bearing surface of said inner race; and a coaxial outer race rotatable about said inner race, said outer race including a metal bearing portion having an annular surface in sliding engagement with said bearing material.

VOL
1127
ISS
1
JE
4
1991
UMI

STATUTORY INVENTION REGISTRATIONS

PUBLISHED JUNE 4, 1991

A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

H923

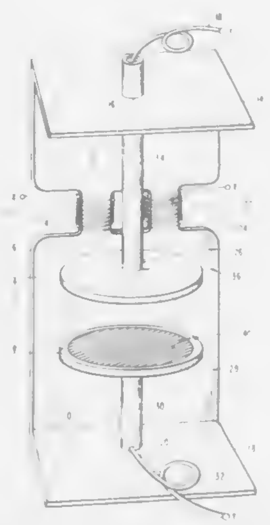
ACCELERATED FABRIC DRYING AND DECONTAMINATING APPARATUS AND METHOD

Hugh R. Carlon, Fallston, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 13, 1989, Ser. No. 437,970

Int. Cl.^{5} A47L *15/48*

U.S. Cl. 34—1 6 Claims



1. An apparatus for accelerated drying and decontamination of wetted fabric and material which comprises:

insulator frame means for holding said fabric in an electrostatic field;

heater means operatively disposed on a vertical section of said frame means for reducing electrical leakage and for preventing surface water layer absorption on said frame means;

fixed electrode means operatively attached to said frame means for holding said wetted fabric thereon;

slideable electrode means adjustably attached to said frame means, in axial alignment with said fixed electrode means for adjusting the gap distance between said fixed electrode means and said slideable electrode means and for exerting a field strength between said slideable electrode means and said wetted fabric to promote the flow of charge carriers, water ions, from said fixed electrode means to said slideable electrode means thereby greatly accelerating the drying of said wetted fabric when compared to the drying time under natural evaporation.

H924

SIGNAL ANALYSIS IN LEAKY LAMB WAVE NDE TECHNIQUE

Dale E. Chimenti, Centerville, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Continuation-in-part of Ser. No. 18,382, Feb. 24, 1987, abandoned. This application Mar. 15, 1988, Ser. No. 170,572

Int. Cl.^{5} G01N *9/24*

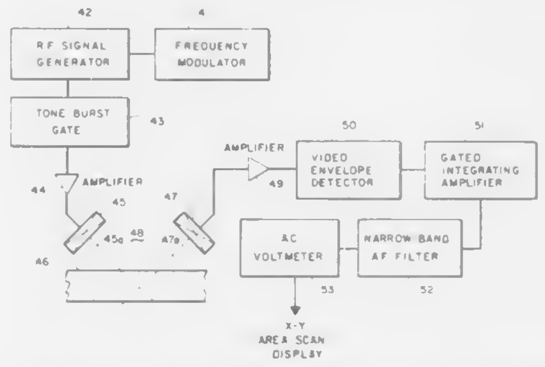
U.S. Cl. 73—644 14 Claims

1. A system for detecting defects in composite laminate material, comprising:

(a) first transducer means for directing an ultrasonic beam of preselected frequency along a transmission axis onto a surface of a laminate material at preselected angle to generate Lamb waves in said material and leaky Lamb waves reflected from said surface of said material;

(b) means for exciting said first transducer means with a radio frequency tone burst having preselected burst length and preselected on-off duty factor;

(c) second transducer means for receiving said leaky Lamb waves reflected from said material along a reflection axis and for providing an output signal corresponding to the amplitude of the reflected waves received by said second transducer means;



(d) means for recovering radio frequency signal amplitude information from said output resulting from the tone burst excitation of said first transducer means;

(e) said first transducer means and said second transducer means each disposed in preselected spaced relationship to said surface of said material and to each other such that said transmission axis and said reflection axis intersect within said material a preselected distance below said surface; and

(f) fluid means for sonically coupling said material with said first transducer means and said second transducer means.

H925

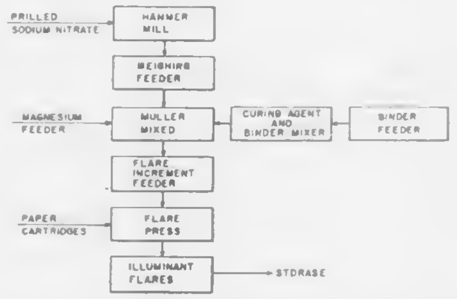
ENCAPSULATED SIGNAL ILLUMINATION FLARE COMPOSITION

David C. Sayles, Madison, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 22, 1989, Ser. No. 440,065

Int. Cl.^{5} F42B *7/02, 33/00, 4/26;* **C06B** *31/00*

U.S. Cl. 86—12 2 Claims



1. A method for the manufacture of a signal illuminant utilizing a signal illuminant flare composition wherein the binder

VOL 1127
ISS 1
JE 4
1991
UMI

composition of said signal illuminant flare composition is formed from ingredients released from ruptured capsules during the mixing procedure, said capsules having cell walls comprised of Arabic gum and gelatin for containing the ingredients for forming said binder composition and wherein said capsules flow as a free-flow powder until subjected to a compacting force which ruptures the cell walls during a mixing procedure to thereby release said ingredients, said method comprising:

(i) feeding milled sodium nitrate into a hammer mill and milling the same to a powder to achieve a particle size from about 20 micrometers to about 55 micrometers weight-mean-diameter by sieve analysis;

(ii) admitting said milled sodium nitrate from a weighing feeder to an operating dry mixer in a weight percent range from about 32 to about 49 of said signal illuminant flare compositions which is additionally comprised of magnesium powder of about 30 to about 50 weight-mean-diameter in an amount from about 45 weight percent to about 60 weight percent of said signal illuminant flare composition and said binder composition from about 6 to about 12 weight percent of said signal illuminant flare composition;

(iii) admitting said magnesium powder to said operating dry mixer in a weight percent range from about 45 to about 60 of said signal illuminant flare composition;

(iv) blending capsular adhesives ranging in sizes from about 300 to about 1000 micrometers in a ratio of one part of an epoxy adhesive to two parts of a polyester adhesive to achieve when blended, a blend which performs as a free-flow powder containing 91% liquid materials contained within capsules having cell walls composed of about 9% Arabic gum and gelatin in equal ratio amounts, said epoxy adhesive comprised of about 79.0 weight percent diglycidyl ether of Bisphenol A and of about 12.0 weight percent of benzoyl peroxide contained in capsules having cell walls comprised of said Arabic gum and gelatin of about 9.0 weight percent, said polyester adhesive comprised of about 86.0 weight percent polyester resin and of about 5.0 weight percent N,N'-dimethyl-o-toluidine contained in capsules having cell wall comprised of said Arabic gum and gelatin of about 9.0 weight percent;

(v) admitting said capsular adhesive blend to said operating dry mixer in a weight percent range from about 6 to about 12 weight percent of said signal illuminant flare composition ingredients to achieve homogeneity;

(vi) feeding said homogeneously, blended signal illuminant flare composition into a flare increment feeder for incremental feeding the same into a flare press for compacting into paper cartridges;

(vii) compacting said blended signal illuminant flare composition into a paper cartridge in two increments while employing 14,000 psi pressure which ruptures said capsular adhesives by hydraulic forces to achieve polymer mixing and the surrounding of the powder ingredients with said binder ingredients to thereby form a very homogeneous signal illuminant flare composition mass; and

(viii) curing said homogeneous signal illuminant flare composition mass for about 16 hours at a maximum temperature of about 170° F. to yield said signal illuminant flare.

H926

RIMFIRE BLANK ADAPTOR KIT FOR M16 RIFLES

Raymond A. Mahtook, Green Township, Sussex County, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 16, 1990, Ser. No. 618,200

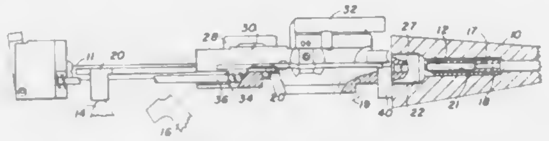
Int. Cl.^{5} F41A *5/08, 33/00*

U.S. Cl. 89—128 **10 Claims**

1. A conversion kit for a rifle having a full chamber for seating a full size cartridge, a receiver behind the full chamber, a standard bolt movable along a path in the receiver for feeding a full cartridge to and firing a full cartridge in the full chamber to conduct a gas activated firing cycle for the rifle, and an automatic fire sear connected to the receiver and movable into the path of movement of the standard bolt for engagement by the bolt during a firing cycle to produce automatic gas activated firing of the rifle, the conversion kit comprising:

a chamber insert adapted to be fixed in the full chamber and defining a reduced chamber for seating a reduced size cartridge;

a replacement bolt adapted for movement in the receiver behind said chamber insert for feeding a reduced cartridge to and firing a reduced cartridge in said reduced chamber to conduct a blow back activated firing cycle;



a sear trip bar engagable by said replacement bolt and positioned to engage the sear of the rifle when the sear is in the path of movement of the standard bolt so that said sear trip bar engages the sear to produce automatic blow back firing of the rifle with reduced cartridges; and

detent means connected to said chamber insert for engaging and momentarily holding said replacement bolt against said chamber insert when said replacement bolt strikes said chamber insert during a firing cycle to prevent bouncing of said replacement bolt from said chamber insert during automatic blow back firing of the rifle.

H927

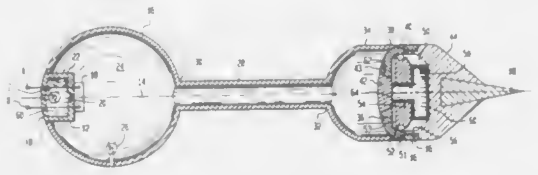
POST BURN HYDROGEN LIGHT GAS CARTRIDGE

Donald Miller, Rockaway, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 23, 1990, Ser. No. 642,974

Int. Cl.^{5} F42B *5/08, 5/067, 5/16*

U.S. Cl. 102—440 **11 Claims**



1. A post-burn light gas cartridge which comprises:

spherically shaped combustion chamber means for holding hydrogen gas therein;

aft oxidant ampoule means threadedly attached to said chamber means for storing liquid oxidant therein;

primer means operatively disposed in juxtaposition with said aft ampoule for initiating the firing sequence of said cartridge;

separation means operatively connected to said combustion chamber means for separating mixtures of hydrogen and super heated steam;

accumulator means integrally attached to said separation means for providing space for compression of said hydrogen gas resulting from the heat of reaction in said combustion chamber means and from shock waves generated in said separation means, and as a source of hydrogen gas at uniform temperature and pressure for expansion;

driver means crimpedly attached to said accumulator means for controlling the rate of pressure build up in said accumulator means;

housing-sabot means threadedly attached to said driver means for releasably holding a projectile therein and for providing a hermetically sealed space between said driver means and said housing-sabot means;

piston means slidably disposed in said hermetically sealed space for providing movement in response to pressures generated in said accumulator means; and

a fore oxidant ampoule means operatively disposed in said hermetically sealed space proximate to said piston means for providing oxygen to said hydrogen gas to effect its burning, providing additional energy to be released thereby imparting higher velocity to said sabot means.

H928

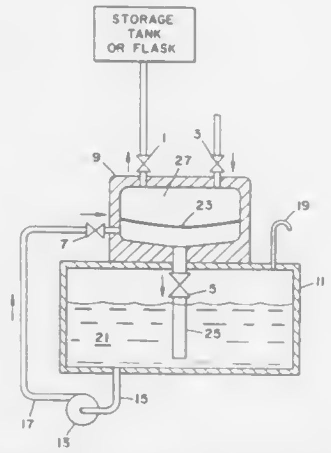
LIQUID COMPRESSING GAS SYSTEM

Francisco F. Gallegos, 2041 Severus Dr., Vallejo, Calif. 94589

Filed Dec. 29, 1989, Ser. No. 459,173

Int. Cl.^{5} F04B *45/04*

U.S. Cl. 417—395 **4 Claims**



1. A gas system for providing an oil-free pre-determined pressure to a gas comprising:

(a) means for holding said gas to which said pressure is provided, said holding means having an inlet valve and an outlet valve for said gas, said holding means further having a liquid supply valve for supplying liquid to said holding means and a drain valve for draining said liquid from said holding means;

(b) means for storing said liquid to be supplied to said holding mean; and

(c) means for transferring said liquid from said storing means to said holding means.

H929

LATCH FOR DETACHABLY SECURING ELECTRONIC CARDS ALONG ORTHOGONAL LOADING AXES

Stephen J. Kreta, Clarksburg, Md., and James J. Honn, Manassas, Va., assignors to The Unites States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 24, 1985, Ser. No. 748,094

Int. Cl.^{5} H01R *13/62*

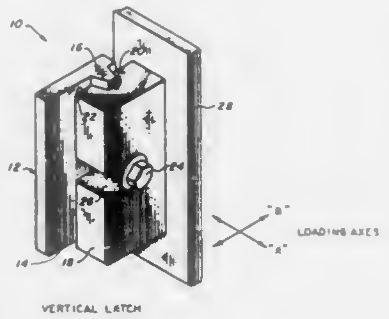
U.S. Cl. 439—325 **2 Claims**

1. A latch for detachably securing electronics cards along orthogonal loading axes comprising:

a planar gate fixed rigidly securable to an external supporting structure and provided with at least one elongated protrusion extending above one of a planar surface,

a planar movable gate rigidly securable to an external electronics mountable structure, said movable gate having at least one elongated groove on a planar surface matingly fitting with corresponding protrusions of the fixed gate,

the planar fixed gate and the planar movable gate being abuttingly engagable to each other with the protrusion matingly fitting into the corresponding groove, the longitudinal orientation of the protrusion and groove being orthogonal to the axis of a first loading force applicable to the moving gate, and



fastening means for rigidly maintaining the planar fixed gate in abutting engagement with the movable gate along a second loading axis orthogonal to the first loading axis

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H930

DRY-TYPE GLUCOSE ANALYZING ELEMENT

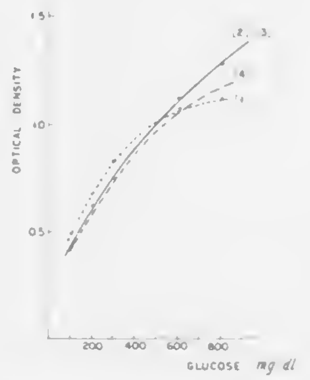
Keiko Kato; Fuminori Arai, and Harumi Katsuyama, all of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 10, 1989, Ser. No. 321,977

Claims priority, application Japan, Mar. 11, 1988, 63-57786

Int. Cl.^{5} C12Q *1/54, 1/26, 1/28*

U.S. Cl. 435—14 **11 Claims**



1. A dry-type quantitative glucose-analyzing element comprising a water-impermeable light-transmissive support having thereon a group of water-permeable layers comprising a reagent layer, an enzyme-containing layer, and a porous spreading layer which are laminated on said support in this order, and a hydrogen peroxide-detecting coloring composition comprising a hydrogen donor and a coupler; wherein

said reagent layer contains at least said coupler;

said enzyme-containing layer contains a glucose oxidase, a peroxidase and a mordant which immobilizes a dye formed by said coloring composition; and

said hydrogen donor is contained in at least one water-permeable layer of said group.

VOL
1127
ISS
1
JE
4
1991
UMI

H931

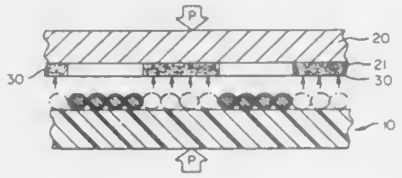
METHOD FOR FORMING IMAGES AND LAMINATION OF SUCH IMAGES TO A NON-REACTIVE SUBSTRATE

Lyudmila Feldman, and Marilyn K. Messer, both of The Mead Corporation, Mead World Headquarters, Courthourse Plz. NE., Dayton, Ohio 45463

Filed Jan. 10, 1990, Ser. No. 463,097

Int. Cl.^{5} G03C *1/72*

U.S. Cl. 430—138 34 Claims



1. A method for forming laminated images comprising the steps of:

image-wise exposing an imaging sheet, said imaging sheet comprising a support having a layer of photosensitive microcapsules on the surface thereof, said microcapsules containing a photohardenable or photosoftenable composition and a color precursor;

assembling said image-wise exposed imaging sheet with a developer sheet, said developer sheet including a web having a layer of thermoplastic developer resin on the surface thereof, said resin being capable of reacting with said color precursor to form an image;

subjecting said assembly of said imaging sheet and said developer sheet to a uniform rupturing force to cause said photosensitive microcapsules to rupture and image-wise transfer said color precursor to said developer layer, wherein said color precursor reacts with said developer resin thereby forming an image thereon;

separating said imaging sheet from said developer sheet;

assembling said image-bearing developer sheet with a non-reactive substrate to form a second assembly;

subjecting said second assembly to heat and a uniform force to laminate said image-bearing developer sheet to said non-reactive substrate.

REISSUES

JUNE 4, 1991

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification, matter printed in italics indicates additions made by reissue.

Re. 33,600

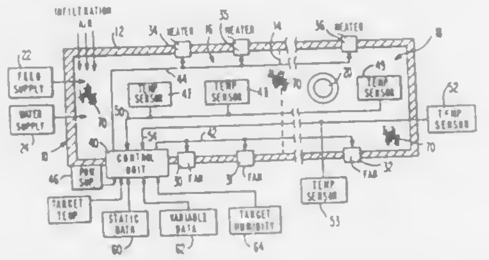
ENVIRONMENTAL CONTROL SYSTEM FOR POULTRY HOUSES

Michael B. Timmons, Ithaca, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Original No. 4,700,887, dated Oct. 20, 1987, Ser. No. 947,338, Dec. 29, 1986. Application for reissue Oct. 12, 1989, Ser. No. 427,259

Int. Cl.^{5} F24F *7/00;* G05D *21/00*

U.S. Cl. 236—49.3 13 Claims



10. A method of controlling environmental conditions in an animal enclosure to provide a maximum economic return from the growth of animals housed therein, said enclosure including at least one controllable ventilation fan and at least one controllable heater, comprising:

determining the configuration and thermal characteristics of the animal enclosure;

determining the number and type of animals to be housed in said enclosure;

determining current values of variable parameters, including current weight, heat production and market value of animals in said enclosure, air infiltration into said enclosure, and prices of fuel, electricity and feed;

determining, for each of a plurality of feasible interior temperatures, a ventilation rate VT required to maintain that feasible interior temperature which, when combined with the said enclosure configuration, thermal characteristics and variable parameters, will result in the maximum economic return;

selecting and maintaining the one of said feasible interior temperatures which will produce the maximum economic return for animals in said enclosure by operation of at least one of said ventilation device and said heater, to effect the ventilation rate VT, within said enclosure which will result in the maximum economic return.

Re. 33,601

REAR WHEEL SUSPENSION CONTROLLER

ken Asami, Nagoya; Kaoru Ohashi, Okazaki; Tosbio Onuma, Susono, and Shuuichi Buma, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Original No. 4,634,143, dated Jan. 6, 1987, Ser. No. 813,506, Dec. 26, 1985. Application for reissue Jan. 5, 1989, Ser. No. 293,441

Claims priority, application Japan, Dec. 25, 1984, 59-276514

Int. Cl.^{5} B60G *11/26*

U.S. Cl. 280—707 7 Claims

1. A rear wheel suspension controller for a vehicle having a suspension between a body and a wheel of the vehicle comprising:

a rear wheel suspension control portion including:

[a] front wheel vehicle height detection means for detecting an interval between a front wheel and a vehicle body and for generating a vehicle height signal indicative of the interval;

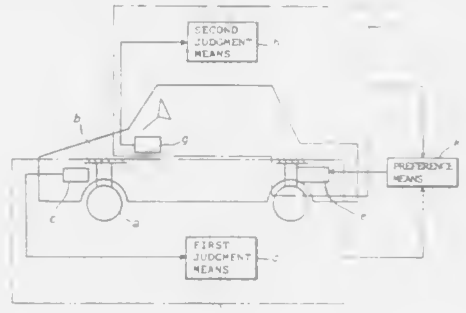
[a] first judgment means for comparing said vehicle height signal with a predetermined reference signal and for generating a first judgment signal when the vehicle height signal is greater than the reference signal; *and*

[a] rear wheel suspension characteristic alteration means for altering *a* suspension characteristic of a rear wheel in accordance with said first judgment signal;

a vehicle posture control portion including:

[a] driving state detection means for detecting a driving state of the vehicle and for generating *at least* one [or plural] state [signals] *signal* indicative of the driving state;

[a] second judgment means for comparing said *at least one* state [signals] *signal* with respectively corresponding predetermined [condition] *conditions* and for generating *a* second judgment signal when said *at least one* state [signals satisfy] *signal satisfies* the *respective* predetermined conditions;



[a] suspension characteristic alteration means for controlling the suspension characteristic in accordance with said second judgment signal; and

[a] preference means for preferring the control of [a] *said* vehicle posture control portion [which is consisted of the front wheel vehicle height detection means, the first judgment means and the rear wheel suspension characteristic alteration means] to that of [a] *said* rear wheel suspension control portion [which is consisted of the driving state detection means, the second judgment means and the suspension characteristic alteration means].

Re. 33,602

REFUSE COLLECTION APPARATUS

Fred T. Smith, Palos Verdes Peninsula, Calif., assignor to Sargent Industries, Inc., Los Angeles, Calif.

Original No. 3,899,091, dated Aug. 12, 1975, Ser. No. 264,021, Jun. 19, 1972. Application for reissue Jul. 24, 1987, Ser. No. 77,431

Int. Cl.^{5} B65F *3/00*

U.S. Cl. 414—525.4 69 Claims

1. In a refuse collector including a storage body[,] and a tailgate structure providing a [relatively short] loading hopper having a bottom surface continuous through an arc symmetrical about a substantially vertical radius with the hopper positioned rearwardly of and adjacent to an opening into said storage body;

apparatus for moving refuse from said hopper into said body comprising:

an upper panel extending across the width of said hopper and movably mounted above and longitudinally of said hopper for movement as a unit in the longitudinal and vertical directions relative to said hopper;

mounting means operatively coupled to said tailgate structure and said upper panel in a particular relationship for

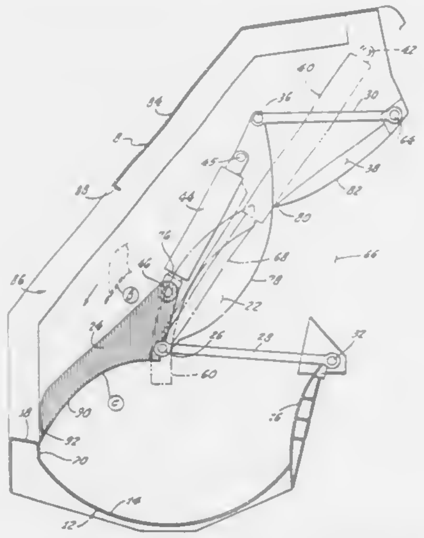
VOL
1127
ISS
1
JE
4
1991
UMI

providing a movement of the upper panel as a unit in a rearwardly and downwardly convexly curved path from an upward and forward position to a lowered and rearward position;

a lower panel having an upper edge pivotally connected to the lower edge of said upper panel;

pivotal mounting means operatively coupled to the lower panel for providing a rotary motion of the lower panel about the pivotal connection between the lower and upper panels as a fulcrum through a continuous arc symmetrical about a substantially vertical radius; and

means to actuate said upper and lower panels in the sequence of rotating said lower panel rearwardly, through the continuous arc symmetrical about the substantially vertical radius, with said upper panel positioned in the upward and forward position, moving said upper panel as a unit in a rearwardly and downwardly convexly curved path to the lowered and rearward position, rotating said lower panel forwardly, through the continuous arc symmetrical about the substantially vertical radius, with respect to said upper panel with the lower edge of said lower panel in close proximity to the bottom curved surface of said hopper *in a scooping movement forwardly of the vertical radius* and with the upper panel in the lowered and rearward position, and moving said upper panel in a forwardly and upwardly curved path to move refuse through said opening into said truck body.



Re. 33,603
APPARATUS FOR MANUFACTURING SEAL COMPONENTS

Keith W. Christiansen, Fox River Grove, Ill., assignor to Chicago Rawhide Manufacturing Co., Elgin, Ill.

Original No. 4,824,357, dated Apr. 25, 1989, Ser. No. 195,592, May 18, 1988. Application for reissue Oct. 17, 1989, Ser. No. 422,981

Int. Cl.^{5} B29C *33/12*

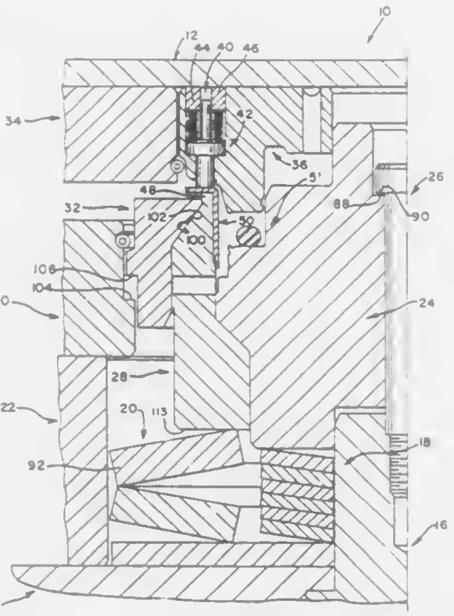
U.S. Cl. 425—117 **8 Claims**

9. A mold assembly for manufacturing fluid seals, said mold assembly being repeatedly operable through an operating cycle which includes the steps of receiving a seal casing having an axial annular skirt and a radial flange when said mold is open, forming flash barriers while closing, completing closure, and opening for finished part removal, said mold assembly comprising, in combination,

a lower mold cover plate having mold core and bottom insert support surfaces, an annular mold core having at least partially radially outwardly directed surfaces forming a part of an annular molding cavity, and a core barrier surface for snugly engaging a skirt margin surface on a seal casing positionable within the mold assembly such that a bonding surface on said casing forms a part of said molding cavity, an annular surface lying on said core adjacent said cavity-forming surfaces for receiving and positioning a charge of moldable material, and at least one guide and barrier surface on said core for cooperatively engaging a part of a top mold insert to create a flow barrier as portions of said mold assembly are closing,

a mold bottom insert member having a radially inwardly directed, annular cylindrical surface engagable with and supporting the axial skirt portion of said seal casing, a tapered surface at one end of said cylindrical surface engagable with a skirt margin portion of said axial annular casing skirt, and a radially extending annular support surface at the other end of said cylindrical surface for engaging a radial flange of said seal casing,

a top mold insert member having a cylindrical guide and barrier surface slidably engageable with said guide and barrier surface on said mold core, at least one surface defining another portion of said annular molding cavity, a surface disposed opposite said surface on said core for receiving and positioning said charge of moldable material, and a top insert annular flash barrier surface,



first resilient means disposed between said lower mold cover plate and a portion of said mold bottom insert member and biasing said bottom insert away from said lower mold cover plate,

second resilient means disposed between said lower mold cover plate and a portion of said core and biasing said core awoy from said lower mold cover plate, said mold bottom insert member and said core being relatively movable with respect to each other during the mold closure portion of said operating cycle, whereby, in use, a seal casing with a radial flange and an axial skirt may be positioned over and supported by said bottom insert when said mold assembly is open, and, upon mold closure, the relative motion between said core and said bottom insert serves to pinch the casing skirt margin between said tapered surface and said core barrier surface before said top insert has completed its closing movement relative to said core, whereby said fluent material is retained in said cavity by engagement between respective portions of said casing and said core barrier surface and said top insert barrier surface, said cavity also being sealed by engagement between said guide and barrier surface on said top insert and said core, respectively.

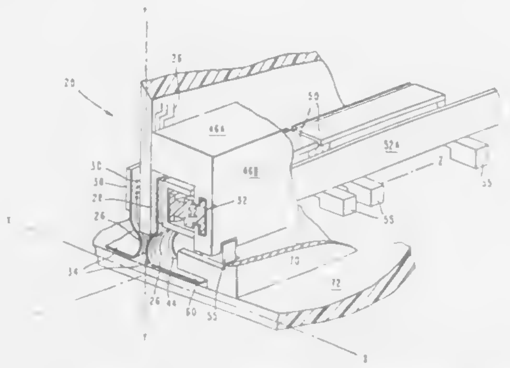
Re. 33,604
CONNECTOR MECHANISMS

John B. Gillett, Woodstock, and John A. Miraglia, West Hurley, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Original No. 4,636,019, dated Jan. 13, 1987, Ser. No. 801,386, Nov. 22, 1985. Continuation of Ser. No. 577,460, Feb. 6, 1984, abandoned. Application for reissue Nov. 30, 1987, Ser. No. 126,808

Int. Cl.^{5} H01R *9/09, 13/629*

U.S. Cl. 439—62 **41 Claims**



1. A zero insertion force connector mechanism releasably electrically interconnecting two structures, each said structures carrying conducting lines, said connector mechanism comprising:

a common actuator means mounted on a second of said two structures so as to have one degree of freedom of movement only relative thereto between a first position and a second position, said common actuator locking said two structures in fixed relationship to each other, when in an engaged juxtaposition;

first contact means electrically connected to said conducting lines on a first of said two structures and fixed relative to said first structure;

a flexible conductive film forming part of said second structure and incorporating at least extensions of said conducting lines thereon;

second contact means electrically connected to said conducting line extensions in said flexible conductive film and being carried by said common actuator means and being capable of independent orthogonal motion with two degrees of freedom relative to said first contact means by movement of said common actuator means, from its first to its second position while said first and second structures are maintained in an engaged juxtaposition.

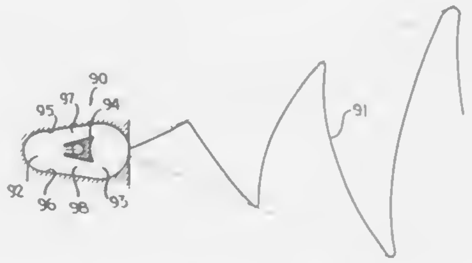
Re. 33,605
FLUIDIC OSCILLATOR AND SPRAY-FORMING OUTPUT CHAMBER

Peter Bauer, 13921 Esworthy Rd., Germantown, Md. 20767

Original No. 4,184,636, dated Jan. 22, 1980, Ser. No. 859,145, Dec. 9, 1977. Division of Ser. No. 227,227, Jan. 22, 1981. Application for reissue Jan. 25, 1982, Ser. No. 342,286

Int. Cl.^{5} B05B *1/08;* **F15B** *21/12;* **F15C** *1/08, 1/22*

U.S. Cl. 239—589.1 **24 Claims**



2. [The oscillator according to claim 1] *A fluid oscillator comprising:*

nozzle means for forming and issuing a jet of fluid in response to application thereto of fluid under pressure;

an oscillation chamber having a substantially central region and a common inlet and outlet opening, said oscillation chamber being positioned to receive said jet of fluid from said nozzle means through said common opening, said oscillation chamber including:

oscillation means for cyclically deflecting said jet from side to side in said chamber in a direction substantially transverse to the direction of flow in said jet; and

flow directing means for directing fluid from the cyclically oscillated jet out of said chamber through said common inlet and outlet opening along both sides of said jet such that less flow always egresses along the side toward which said jet is deflected than along the opposite side;

wherein said oscillation means comprises impingement means [,] disposed in said oscillation chamber in the path of said jet [,] for forming [, on each side of said jet,] *two* vortices of said jet fluid which [alternate in both strength and chamber position] *remain in said oscillation chamber during oscillation, one vortex on each side of said jet, said impingement means comprising: means for alternating the strengths of said vortices* in phase opposition, *and for moving said vortices, in phase operation, between positions proximate said common opening and said central region.*

VOL
1127
ISS
1
JE
4
1991
UMI

PLANT PATENTS

GRANTED JUNE 4, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing

7,540

NEW MINIATURE ROSE PLANT NAMED RUINIELOV

Ove Nielsen, Broby, Denmark, assignor to DeRuiter's Nieuwe Rozen B.V., Netherlands
Filed Sep. 21, 1989, Ser. No. 410,545
Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—10 **1 Claim**

1. A new and distinct variety of rose plant of the miniature rose class, substantially as shown and described, characterized particularly by a plant suitable for growing in pots and by attractive dark red flowers which are long lasting on the plant.

7,541

ROSE PLANT — MEILVAR VARIETY

Alain A. Meilland, Antibes, France, assignor to The Conard-Pyle Company, West Grove, Pa.
Filed Feb. 21, 1990, Ser. No. 482,716
Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—15 **1 Claim**

1. A new and distinct variety of Hybrid Tea Rose plant characterized by the following combination of characteristics:
(a) forms in abundance on a continuous basis attractive fragrant long lasting very double aureolin blossoms of good color stability.
(b) exhibits an erect growth habit,
(c) exhibits very vigorous semi-dull vegetation,
(d) is particularly suited for growing in parks and gardens, and
(e) exhibits good disease resistance;
substantially as herein shown and described.

7,542

ROSE PLANT BARBARA BUSH

William A. Warriner, Tustin, Calif., assignor to Bear Creek Gardens, Inc., Medford, Oreg.
Filed Aug. 20, 1990, Ser. No. 568,661
Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—18 **1 Claim**

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its deep coral pink color on petal margins that softens in the flower center, its vigorous and high flower production, light fruity fragrance, reddish-maroon peduncles, sepals and receptacle, wherever these have been exposed to sunlight.

7,543

LESCHENAULTIA HYBRID VARIETY 'ULTRAVIOLET'

Gregory P. Lamont, Wyoming, Australia, assignor to Ornamental Native Australian Plants Pty Ltd, Armidale, Australia
Filed Oct. 27, 1989, Ser. No. 427,591
Claims priority, application Australia, Oct. 31, 1988, 88/033
Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct hybrid variety of *Leschenaultia farmosa* by *Leschenaultia biloba* plant characterized by the combination of a violet blue flower paling to mauve at the center; a flowering period of Autumn through to late Spring; five winged petals and a corolla tube with both a basal tuft and lining of hairs internally.

7,544

ANIGOZANTHOS HYBRID VARIETY 'FIREFLY'

Gregory P. Lamont, Wyoming, Australia, assignor to Ornamental Native Australian Plants Pty Ltd, Armidale, Australia
Filed Oct. 27, 1989, Ser. No. 427,592
Claims priority, application Australia, Oct. 31, 1988, 88/031
Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of *Anigozanthos* hybrid known by the cultivar name "Firefly" and characterized as to uniqueness by the combined characteristics of arching leaves, average flower stem length of 28 cm, a flower with a yellow-green perianth flaring distally, a yellow ovary covered with red hairs and a style ending below the anthers and comes into flower all year round when propagated from tissue culture.

7,545

LESCHENAULTIA FORMOSA VARIETY 'FLAMINGO'

Gregory P. Lamont, Wyoming, Australia, assignor to Ornamental Native Australian Plants Pty Ltd, Armidale, Australia
Filed Oct. 27, 1989, Ser. No. 427,593
Claims priority, application Australia, Oct. 31, 1988, 88/034
Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of *Leschenaultia formosa* plant characterized by the combination of a large flower with frilled and rounded lower wings, deep pink petals and a bushy and erect growth habit.

7,546

LESCHENAULTIA FORMOSA VARIETY 'STARBURST'

Gregory P. Lamont, Wyoming, Australia, assignor to Ornamental Native Australian Plants Pty Ltd, Armidale, Australia
Filed Oct. 26, 1989, Ser. No. 427,594
Claims priority, application Australia, Oct. 31, 1988, 88/032
Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of *Leschenaultia formosa* plant characterized by the combination of a large flower with predominantly red petals and a yellow center, and a corolla tube which is predominantly maroon externally.

7,547

SEQUOIA SEMPERVIRENS TREE NAMED 'EGGLII PROSTRATA'

Jules Eggli, 514 Cornell Ave., San Mateo, Calif. 94402
Filed Jun. 27, 1989, Ser. No. 372,254
Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—50 **1 Claim**

1. A new and distinct variety of *Sequoia sempervirens* Egglii Prostrata substantially as illustrated and described, characterized particularly by its prostrate growth characteristics, and its main stem branching at a low height relative to the ground surface as compared to wild-type *Sequaia sempervirens.*

VOL
1127
ISS
1
JE
4
1991
UMI

PATENTS

GRANTED JUNE 4, 1991

ERRATA

For CLASS	See PATENT NO.
292-034	5,020,204
47-079	5,020,261
62-222	5,020,320
606-174	5,020,535
272-027	5,021,019
446-022	5,021,069
549-241	5,021,168
549-255	5,021,169
521-026	5,021,216
435-006	5,021,335
424-070	5,021,477
430-544	5,021,555
514-681	5,021,570
71-094	5,021,578
544-281	5,021,591
381-203	5,021,613
335-015	5,021,819
365-200	5,021,944

VOL
1127
ISS
1
JE
4
1991
UMI

PATENTS

GRANTED JUNE 4, 1991

GENERAL AND MECHANICAL

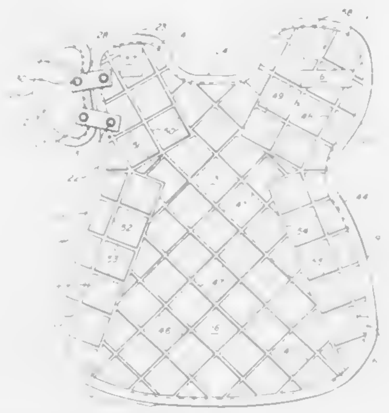
5,020,156
BASEBALL CATCHER'S CHEST PROTECTOR

Mark Neuhalfen, Villa Park, Ill., assignor to Wilson Sporting Goods Co., River Grove, Ill.

Filed Nov. 14, 1989, Ser. No. 436,221

Int. Cl.⁵ A41D *13/00*

U.S. Cl. 2—2 4 Claims



1 A baseball catcher's chest protector comprising a one piece substantially flat pad formed by an outer casing and a shock-absorbent cushion within the outer casing, the protector having a chest portion, a stomach portion, and right and left shoulder portions which are formed in one piece for covering the chest, stomach, and shoulders, respectively of a wearer, the cushion being provided with a first set of generally parallel hinge lines which extends from the lower right portion of the stomach portion to the left shoulder portion and a second set of generally parallel hinge lines which extends from the lower left stomach portion to the right shoulder portion and which intersect the first set of hinge lines wherein the cushion can flex about said hinge lines and conform to the body of a wearer, the hinge lines being provided by valleys in the cushion.

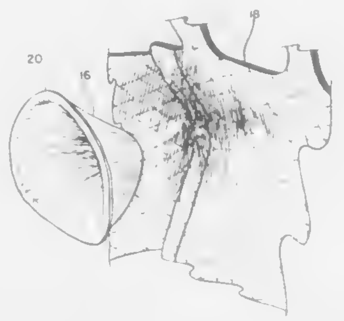
5,020,157
BALLISTIC PROTECTIVE INSERT FOR USE WITH SOFT BODY ARMOR BY FEMALE PERSONNEL

Peter A. Dyer, Huber Heights, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 2, 1990, Ser. No. 487,316

Int. Cl.⁵ F41H *1/02*

U.S. Cl. 2—2.5 2 Claims



1 A body armor garment for wear by a woman wearing a conventional soft brassiere having a pair of soft cups, comprising:

(a) a front portion made of ballistic fabric shaped for wear over the woman's bust area and the brassiere; and,

(b) a pair of rigid, inelastic, cups, wherein each rigid cup is shaped to conformably fit over a breast of the woman and under a soft cup of the brassiere.

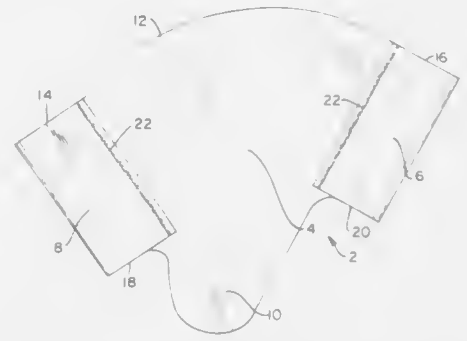
5,020,158
BALL CATCHING TOY

Carmine K. Capone, 42 Mason St., Jefferson, N.J. 07849

Filed Feb. 15, 1989, Ser. No. 311,653

Int. Cl.⁵ A41D *13/08*

U.S. Cl. 2—19 12 Claims



1. A device for catching a ball or other similar object with a hand consisting of a flexible web, shaped substantially similar to the space between the thumb and forefinger when the thumb and forefinger are spread apart, having a top, a bottom which extends beyond the arch between the thumb and forefinger of the hand, and two sides, flexible means for engaging the user's thumb on one side of said web and flexible means for engaging the user's forefinger on the other side of said web exclusive of engagement with any other of the user's fingers wherein the web and the means for engaging the user's thumb and forefinger are comprised of one or more flexible materials.

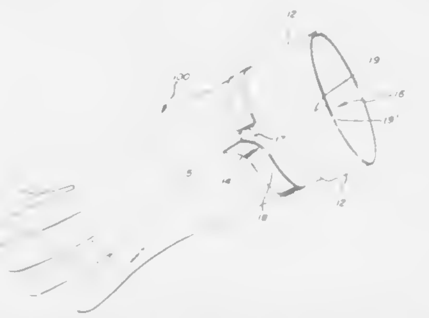
5,020,159
PROTECTIVE ARTICLE FOR HANDLING AND CONTAINING WASTE MATERIALS

Harold M. Hellickson, Atlanta, Ga., assignor to Delyle, Inc., Etowah, N.C.

Filed May 17, 1989, Ser. No. 353,863

Int. Cl.⁵ A41D *19/00*

U.S. Cl. 2—158 19 Claims



1. An article for safely enclosing waste material comprising:

a flexible glove member having an access opening through which a hand of a human being is inserted when putting on said glove member;

a relatively inflexible eversion-resistant continuous collar surrounding the access opening whereby when waste held by the hand covered by the glove member is pulled through the collar and the hand removed from the glove

VOL
1127
ISS
1
JE
4
1991
UMI

member the glove member is thereby everted to form a pouch enclosing the waste material and said collar remains in an uneverted position; and

means in the proximity of the collar for sealing the pouch created by eversion of the glove member.

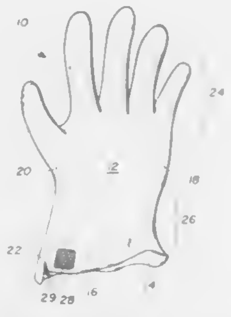
5,020,160
PROTECTIVE DISPOSABLE HAND COVERING

Rolando M. Cano, 604 Solar Dr., Mission, Tex. 78572

Filed Jul. 21, 1989, Ser. No. 383,018

Int. Cl.⁵ A41D *19/00*

U.S. Cl. 2—159 20 Claims



1. A protective, disposable hand covering comprising:

a hand covering body having a length, an interior space for receiving a human hand through an opening and an exterior surface; and

a tear line on the hand covering body extending from the opening at least partially along the length of the hand covering body, where the tear line is at least one groove within, but not piercing the hand covering body, in the absence of a rip cord to cause tearing of the tear line.

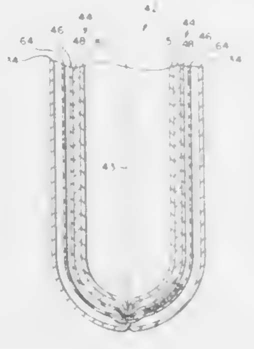
5,020,161
WATERPROOF GLOVE FOR PROTECTIVE COVERALLS

Milton A. Lewis, Jr., Richmond, Va.; Jeffrey S. Mason, Covington, Ind.; Carson B. Swinford, Danville, Ill., and Timothy R. Wiseman, Sr., Richmond, Va., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.

Filed Sep. 29, 1989, Ser. No. 414,485

Int. Cl.⁵ A41D *19/00*

U.S. Cl. 2—164 6 Claims



1. In combination with a protective coveralls having torso, sleeve and leg portions, said coveralls having an outer shell fabric of woven aramid fabric covered by a liquid impervious layer and an inner multilayer thermally insulating liner fabric of at least one layer of low density nonwoven fabric fastened to a woven fabric, a protective glove comprising:

an outer glove fabricated by sewing from said outer shell fabric of the coveralls and having a cuff, a palm attached to said cuff, and a thumb and four fingers attached to said palm;

a liner glove fabricated by sewing from said multilayer liner fabric of said coveralls and having a cuff, a palm attached to said cuff, and a thumb and four fingers attached to said palm, said thumb having a thumbtip and said four fingers having four fingertips, said liner glove being provided within said outer glove and said liner and outer gloves being attached together at said cuffs, said liner glove being unattached to said outer glove at said palm, thumb and fingers;

a continuous intermediate glove fabricated from a waterproof breathable expanded polymeric membrane and having a palm, a thumb with a thumbtip and four fingers with fingertips, said intermediate glove being provided between said outer glove and said liner glove and being secured at said thumbtip and said fingertips by adhesive to the outside of the thumbtip and the fingertips of the liner glove, said intermediate glove being unattached to said liner glove at the palm and the remainder of the thumb and fingers other than the thumbtip and the fingertips, and said intermediate glove further being unattached to the palm, thumb and fingers of the outer glove; and

means for attaching said protective glove to said sleeve portion of said protective coveralls.

5,020,162
GLOVE

Jean Kersten, Villers St. Amand; Etienne Lombard, Genappe, and Daniel Heindrichs, Waimes, all of Belgium, assignors to Baxter International Inc., Deerfield, Ill.

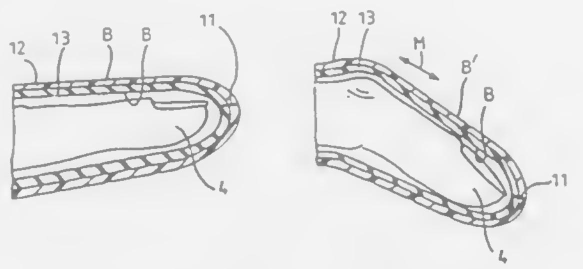
PCT No. PCT/US89/01300, § 371 Date Nov. 22, 1989, § 102(e) Date Nov. 22, 1989, PCT Pub. No. WO89/08995, PCT Pub. Date Oct. 5, 1989

PCT Filed Mar. 29, 1989, Ser. No. 435,531

Claims priority, application Belgium, Apr. 1, 1988, 08800385

Int. Cl.⁵ A41D *19/00*

U.S. Cl. 2—164 9 Claims



1. Glove comprising a front sheet (9) and a back sheet (10), at least one of said sheets having an outer layer (**12**) and an inner layer (**13**) made of polymeric films, said layers being permanently bound to each other along their periphery, characterized in that contacting faces (**18**) of said inner and outer layers (**12, 13**) are independent from each other so as to allow relative movements (M) between said inner and outer layers (**12, 13**) and that the dynamic and static friction coefficient of the contacting faces (**18**) is less than 0.80.

5,020,163
EARSEAL FOR SOUND-ATTENUATING EARCUP ASSEMBLY

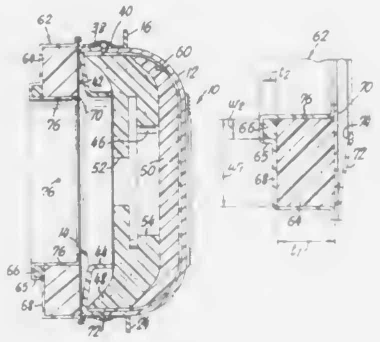
Jackson A. Aileo, Carbondale, and Richard J. Long, Lake Ariel, both of Pa., assignors to Gentex Corporation, Carbondale, Pa.

Filed Jun. 29, 1989, Ser. No. 376,125

Int. Cl.⁵ A42B *1/06*

U.S. Cl. 2—209 14 Claims

1. An earcup assembly including in combination a shell adapted to fit over a wearer's ear, and a resilient annular earseal for sealing the region between said shell and wearer's-head, said earseal being formed with an aperture for receiving the wearer's ear and having an outer peripheral portion of a predetermined thickness and a projecting inner peripheral portion of a greater thickness, the annular width of the inner peripheral portion being generally less than that of the outer peripheral portion.



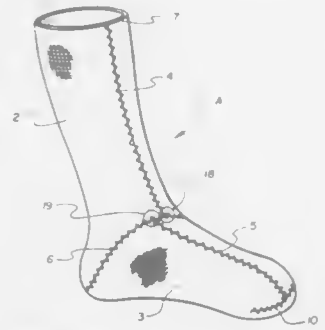
5,020,164
INSULATED STOCKING

Joseph Edwards, 3513 E. Danish Rd., Salt Lake City, Utah 84096

Filed Dec. 29, 1989, Ser. No. 459,269

Int. Cl.⁵ A41B *11/01*

U.S. Cl. 2—239 23 Claims



1. A stocking, comprising:

a foot piece formed from flat sheet material to have a longitudinal axis, said foot piece being folded and joined to itself along a first longitudinal seam to surround the foot of a user and to form a rearward edge;

an ankle piece formed from said flat sheet material to have a longitudinal axis, said ankle piece being folded and joined to itself along a second longitudinal seam to surround the ankle area of the leg of a user and to form a lower edge;

a lateral seam formed by joining said rearward edge of said foot piece to said lower edge of said ankle piece to form a cavity to receive the foot of a user, said lateral seam intersecting said first longitudinal seam to form a juncture which is offset from the juncture formed by the intersecting of said second longitudinal seam with said lateral seam; and

wherein at least one of said foot piece and said ankle piece is asymmetric about its longitudinal axis.

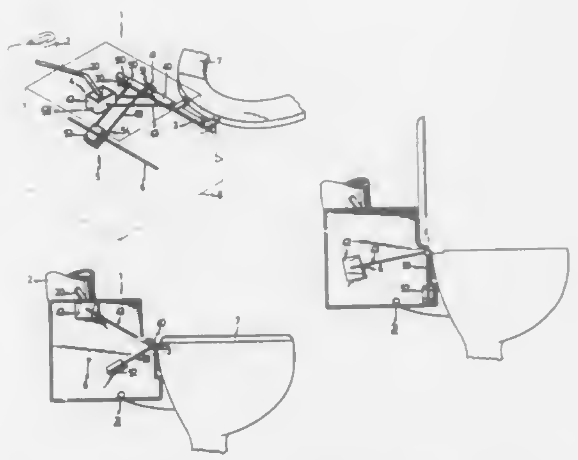
5,020,165
TOILET SEAT RAISING APPARATUS

Clark Huang, No. 4, Lane 60, Shou Fa Rd., Tao Yuan City, Taiwan

Filed Sep. 28, 1990, Ser. No. 590,216

Int. Cl.⁵ A47K *13/10*

U.S. Cl. 4—251 5 Claims



1. An apparatus for raising a toilet seat comprising:

a housing and a bar rotatably supported on said housing, said bar having a first radial pin and being fixedly connected to a rear side of the toilet seat for raising the toilet seat;

a driving means comprising a first tube rotatably mounted on said bar and a bucket, linked to said first tube by a pair of rods, situated to receive water from an inlet pipe, said first tube having a first L-shaped pin fixedly provided thereon, said bucket being capable of actuating said first tube tc rotate about said bar due to a weight of the recieved water contained within said bucket;

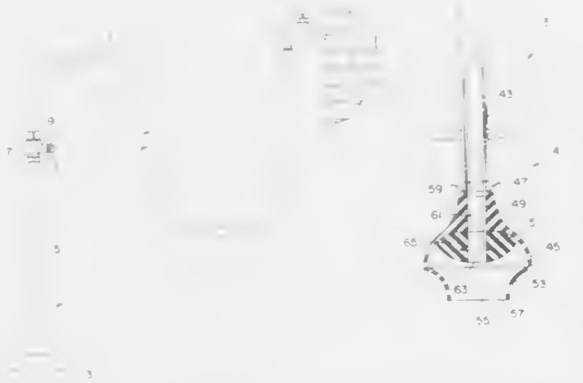
a weighting means comprising a second tube, rotatably mounted on said bar and adjacent to said first tube, and a block weight linked to said second tube by a U-shaped rod, said second tube having a second L-shaped pin fixedly provided thereon and adjacent to said radial pin of said bar, and a second radial pin fixedly provided thereon and adjacent to said first L-shaped pin of said first tube, said second L-shaped pin constantly abutting said first radial pin of said bar due to the weight of said block weight and thereby said block weight applies a moment intended to raise the toilet seat on said bar, said first L-shaped pin of said first tube being in contact with and abutting said second radial pin when said bucket actuates

VOL
1127
ISS
1
JE
4
1991
UMI

said first tube to rotate about said bar, said bucket containing a predetermined quantity of received water therein and said block weight mutually applying a resulting moment on said bar capable of raising the toilet seat.

5,020,166
MULTI-PURPOSE WATER PRESSURE PLUNGER

Clyde F. Davenport, 405 Oakwood St., Greenwood, S.C. 29646
Filed Mar. 23, 1990, Ser. No. 498,287
Int. Cl.^{5} E03D *11/00*
U.S. Cl. 4—255 6 Claims



1 A multi-purpose water pressure plunger which sanitarily, efficiently, and dependably utilizes water pressure to clear clogged bathroom drains and the like, the improvement including a sealing attachment comprising:

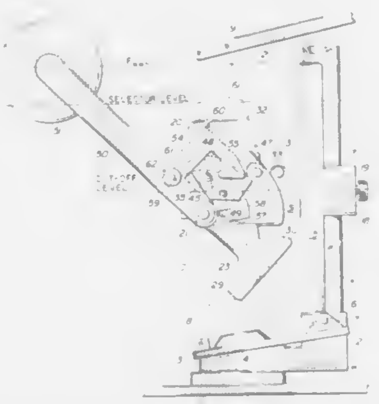
a compressible cup having an interior cavity and including an upper portion, fashioned of solid rubberized material, and a barrel-like bottom for partially extending into and sealing against walls of a drainage opening, said barrel-like bottom defining a nipple-shaped end with a circumferential orifice, said upper portion defining an entrance which conforms to the contour of said nipple-shaped end and having an interior passage therethrough beginning in a circular opening adjacent to said entrance, said barrel-like bottom constructed of a substantially deformable rubberized material;

a semi-spherical disc, formed of an occlusive and solid rubberized material, fixedly positioned on said upper portion inside said interior cavity, said semi-spherical disc including said interior passage therethrough, said interior passage terminating at said semi-spherical disc at an open end diametrically positioned thereon, said semi-spherical disc, when pressed downwardly, descends into said interior cavity pushing against the inner surface of said barrel-like bottom therefore causing said barrel-like bottom to buttress against the walls of a drainage opening;

a spring wire for attachment of said compressible cup to said cone-shaped member, a spring wire consisting of a U-shaped, springy and non-corrosive metal or steel which, when inserted into said lengthwise aperture via said central passage, expands thus firmly holding said compressible cup in place, said spring wire having unattached ends engaged in said semi-spherical disc and being elongated and longitudinally extending through said interior passage along the perimeter thereof and for several inches opposite said circular opening.

5,020,167
FLUSH TANK WATER SAVER

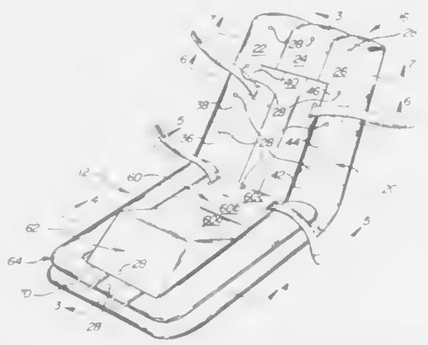
John L. Harris, 470 Palm Island NE., Clearwater, Fla. 34630
Filed Sep. 29, 1989, Ser. No. 414,664
Int. Cl.^{5} E03D *1/14*
U.S. Cl. 4—325 20 Claims



1. In a water saving device for a toilet flush tank having an outlet valve and a flush control for opening the valve on movement of the control to flush position, the combination of, first closing means for closing the valve for a full flush, second closing means including a float means for closing the valve at an intermediate level for a water saving flush, selective means controlled by the user for selecting which closing means closes the valve, said selective means being arranged to stop the float means before closure of the valve, causing a full flush, and converting means for converting a water saver flush to a full flush, said converting means including means for reopening the outlet valve and means for preventing said second closing means from reclosing the valve said preventing means including blocking means for the second closing means movable into position to stop movement of the second closing means.

5,020,168
INFLATABLE HANDICAPPED CHAIR

Marsha B. Wood, 3610 Wentworth Dr., Arlington, Tex. 76017
Filed Aug. 19, 1988, Ser. No. 233,720
Int. Cl.^{5} A47K *3/12*
U.S. Cl. 4—573 16 Claims



7. An inflatable chair intended for use in bathing a handicapped person in a bathtub, said chair comprising:

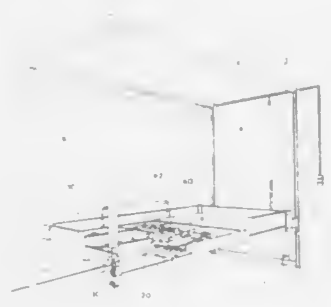
(A) a back structure adapted to be supported against an end wall of the bathtub and having a lower end; and

(B) a base structure connected to the lower end of said back structure and adapted to be supported on the bottom of the bathtub;

(C) said back structure including a back support section extending upwardly from said base structure about an angle such that said sections generally conform to the shape of a bath tub bottom and end wall and a lateral support section at each side of said back support section each lateral support section extending upwardly from said base structure and each including a plurality of individually inflatable sections arranged serially one on top of another oriented transverse to said upward extent.

5,020,169
ELEVATION BED

Takeaki Hamada; Kiyoshi Abe; Hitoshi Takei, and Kenji Sato, all of Tokyo, Japan, assignors to Sanwa Shutter Corporation, Tokyo, Japan
Filed Aug. 12, 1988, Ser. No. 231,762
Claims priority, application Japan, Aug. 13, 1987, 62-124296; Aug. 13, 1987, 62-124297; Aug. 13, 1987, 62-124298; Aug. 19, 1987, 62-126204; Nov. 19, 1987, 62-176639; Nov. 19, 1987, 62-176640; Mar. 18, 1988, 63-36238
Int. Cl.^{5} A47C *19/00*
U.S. Cl. 5—10.2 12 Claims



1 In an electrically driven elevation bed including:

a structural support frame (6,7);

a bed frame (10) movable in up and down directions within said support frame (6,7); and

means (21,23,30,31) for moving said bed frame (10) within said support frame (6,7), including an electrical driving means (21), the improvement comprising:

a spring arrangement (40) coupled to said driving means (21) for storing energy during movement of said bed frame (10) in one of said directions and to release the stored energy during movement of said bed frame (10) in the other direction.

5,020,170
BED FOR IMMOBILE PATIENTS

Hermann Ruf, Pfutzenstr. 54-58, D-6103, Darmstadt-Griesheim, Fed. Rep. of Germany
Filed Jul. 5, 1989, Ser. No. 375,812
Claims priority, application Fed. Rep. of Germany, Jul. 5, 1988, 3822723; Jul. 16, 1988, 3824203
Int. Cl.^{5} A61G *7/06*
U.S. Cl. 5—61 11 Claims

11. A bed for immobile patients, comprising:

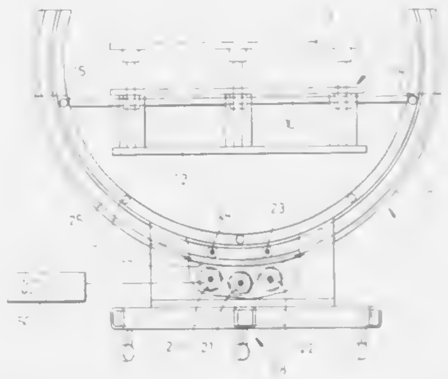
means for supporting a bed frame; and

a sub-structure mounted on said means for supporting and including:

a first sector and a second sector spaced axially apart and pivotable synchronously about a longitudinal axis, said sectors being connected with one another and having respective circumferences bridging opposite sides of each sector, at least one side of each of said sectors being formed with an arcuate indentation having a U-shaped cross-section and running along the respective side,

the circumference of the first of said sectors being provided with a trough extending therealong,

a plurality of rollers operatively connected with said means for supporting and juxtaposed with said trough for pivoting said sectors,

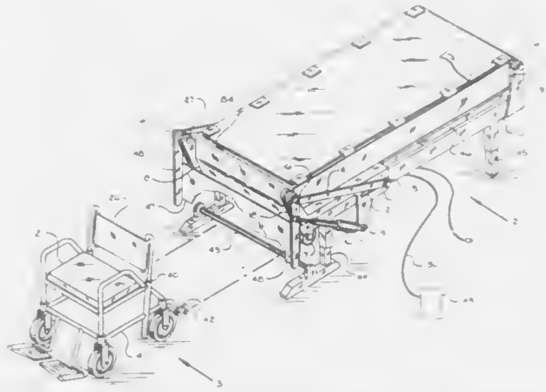


a flexible track element passing over said rollers and being received by the trough of said first sector for smooth motion of said bed frame between angular positions of said sectors, and

means for guiding said sectors operatively connected with said means for supporting and received by said indentation of each sector.

5,020,171
PATIENT TRANSFER ARRANGEMENT

Paul DiMatteo, Dix Hills, and Robert Segnini, Stony Brook, both of N.Y., assignors to Nova Technologies, Inc., Hauppauge, N.Y.
Filed Nov. 22, 1989, Ser. No. 440,604
Int. Cl.^{5} A61G *7/10*
U.S. Cl. 5—81 R 4 Claims



1. A patient transfer system comprising: a bed having a head end, a foot end, a mattress, a bed frame, and legs; a leg support at said foot end; transport means having rollers at said head end and said foot end of he bed; a transport sheet on which a patient may lie and extending over said mattress between said rollers; roller drive means for winding said transport sheet onto a roller at one bed end and unwinding said transport sheet from a roller on the opposite bed end to pull said transport sheet across the mattress surface for transporting said patient across the bed and on and off said leg support; a wheelchair having a foot rest and removable back rest; latching means for locking the wheelchair to said foot end; support drive means for moving said leg support over said wheelchair with said

VOL
1127
ISS
1
JE
4
1991
UMI

back rest removed; and lift means, including a lift member pivotably attached to said bed frame for raising a portion of said mattress near said foot end to a vertical position and thereby raising said patient into a sitting position on the wheelchair and concurrently lowering his legs onto said foot rest; and means for removing said leg support from behind the patient's legs.

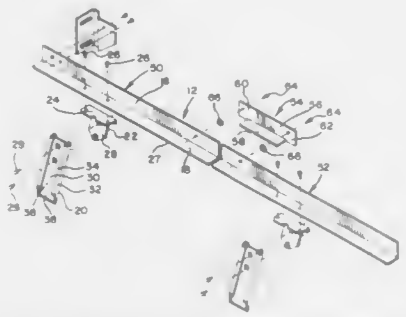
5,020,172
FOLDABLE SIDE RAIL MEMBER

Robert Timm, Park Forest, Ill., assignor to Dresher, Incorporated, Bedford, Ill.

Filed Dec. 8, 1989, Ser. No. 447,607

Int. Cl.^{5} A47C *19/00*

U.S. Cl. 5—200.1 **11 Claims**



1. A side rail member for supporting bed means or the like in spaced relationship to a floor, comprising: first and second elongated side rail sections of generally L-shaped cross section disposed in substantially aligned end to end relationship with respect to one another, said side rail sections having vertical leg portions and horizontal leg portions; and a generally L-shaped knuckle member having a vertical leg portion and a horizontal leg portion, said knuckle member being positioned adjacent the end portions of said side rail sections, said vertical leg portion of said knuckle member having a greater length than the length of said horizontal leg portion of said knuckle member so as to define extending end portions that extend beyond the edges of said horizontal leg portion, said extending end portions being secured to a vertical leg portion of a corresponding first and second side rail section by non-releasable pivot means so as to permit said rail sections to pivot between a first in-use position wherein said side rail sections are located in an end to end generally coplanar relationship with the inner surface of said horizontal leg portion of said knuckle member being in surface-to-surface supporting contact with the outer surfaces of said horizontal leg portions of said side rail sections and a second storage position wherein said side rail sections are disposed in a side-by-side and generally parallel relationship with respect to one another and said knuckle member is disposed generally perpendicular to said side rail sections.

5,020,173
BEDSTEAD STORAGE BOX

John F. Dreyer, Jr., 6 Lost Rock La., St. Paul, Minn. 55127

Filed Jan. 24, 1989, Ser. No. 301,593

Int. Cl.^{5} A47C *19/22*

U.S. Cl. 5—308 **3 Claims**

1 A bedstead storage box for a regular-size bed, to support a bed assembly above a floor in a bedroom, the bed assembly including springs, mattress, and bedding, and to provide storage space underneath the bed assembly, comprising:

a rectangular box of four upright sides,

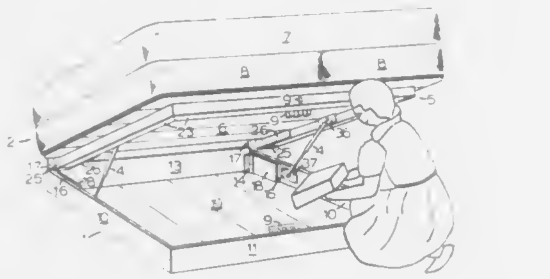
a lid for the box to carry the bed assembly upon the upstanding faces of the four upright sides,

means for hinging one side of the lid to a corresponding side of the box, to provide that the lid may be tilted upward, opening the box for access to the storage space within, said hinge means having a common pivot axis standing parallel with and adjacent to the hinged side of the box at a height closely approximating that of the box,

two gas springs, one mounted at each of the two sides of the box adjacent to the hinged side,

each gas spring selected to provide a spring force approximately equal to the combined weight of the lid and the bed assembly, and each spring having a stroke of approximately ten inches,

each gas spring having one end swively mounted to the side of the lid at approximately mid-length and the other end oriented toward the hinged side of the box but swively mounted to a point on the inside face of the corresponding side of the box to provide that the spring is fully retracted when the lid is closed, and fully extended when the bed is tilted open through an angle of about twenty-five degrees,



means for locking the lid in the closed position upon the box to provide security against unauthorized access to goods stored in the box.

5,020,174
SELF ADJUSTABLE, NECK SUPPORT PILLOW

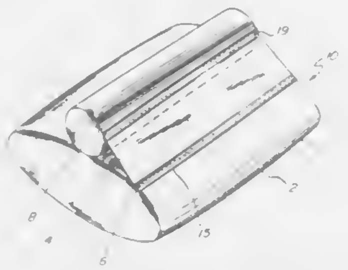
Jeff Sarkozi, 1117 N. Avila Pl., Orange, Calif. 92669

Continuation-in-part of Ser. No. 415,873, Oct. 2, 1989, Pat. No. 4,956,886. This application Aug. 27, 1990, Ser. No. 573,535

The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.

Int. Cl.^{5} A47G *9/00*

U.S. Cl. 5—437 **8 Claims**



1. A three-component, self adjustable pillow, comprising:

a. a base portion having a generally elliptically-shaped cross section, and including a cloth exterior and soft fill interior;

b. a generally rectangularly-shaped cloth attachment piece defining an attachment edge, and a free edge, the attachment edge being connected to the pillow; and,

c. a cylindrically-shaped neck support defining a longitudinal portion connected to the attachment piece along the free edge, the neck support providing a cloth exterior and soft fill interior; whereby:

i. the attachment piece is adapted to freely move over part of the said base portion along with the attached neck support, for adjustable positioning by the user;

ii. the soft fill interior of said base portion is adapted to transmit forces of compression by the shoulders inwardly along the said base portion and upwardly to the neck support for supporting the neck of the user;

iii. the head and shoulders of the user are supported by the said base portion, the size of the neck support being sufficient to maintain the head, shoulders and neck of the user reasonably aligned, thus reducing aching, discomfort, stiffness and muscle strain of the neck muscles, wherein the base portion dimensions are about 12"–30" wide and about 20"–40" long, the cloth attachment piece is up to about 6" wide, and the neck support is about 1"–6" in diameter; whereby,

d. i. during sleep, the inward forces of compression on the said base portion due to the user's shoulders will produce a corresponding upward force on the neck support, and self adjustment of the components; ii. the neck support provides a freely movable range along the plane or surface of the said base portion from about midway to about, the edge thereof; iii. the atachment piece maintains the neck support portion in contact with the said surface throughout its range of movement, while simultaneaously maintaining the user's head and neck on the said base portion; and, iv. the said neck support throughout its freely movable range may be purposefully adjusted by the user while awake, or may self adjust when the user is asleep, and maintains the user's head and shoulders on the pillow, while enabling the user to adjust the degree of support on the neck when adjusting body position from side to back.

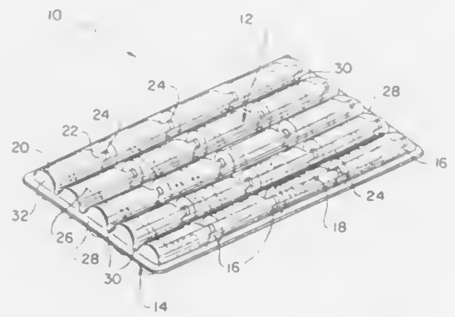
5,020,175
MULTICOMPARTMENT CUSHION COMPRISING RECYCLABLE PLASTIC BOTTLES

Paul A. Kirkpatrick, 422 Truby St., Greensburg, Pa. 15601, and Marvin L. Kahn, 12328 Areaca Dr., West Palm Beach, Fla. 33414

Filed Feb. 27, 1990, Ser. No. 485,481

Int. Cl.^{5} A47C *27/08;* **B65D** *85/66;* **B63C** *9/08*

U.S. Cl. 5—448 **20 Claims**



1. A cushion comprising

(a) a plurality of compartments formed from at least one flexible sheet, the compartments being configured so as to receive and to maintain a plurality of bottles in end to end relationship within each compartment,

(b) a plurality of bottles arranged in end to end relationship within the compartments, and

(c) means for closing the compartments.

5,020,176
CONTROL SYSTEM FOR FLUID-FILLED BEDS

Derek P. Dotson, Thousand Oaks, Calif., assignor to Angel Echevarria Co., Inc., Los Angeles, Calif.

Filed Oct. 20, 1989, Ser. No. 424,863

Int. Cl.^{5} F16K *31/12;* **A47C** *21/08*

U.S. Cl. 5—453 **21 Claims**

1. A control system for a fluid-filled bed comprising:

a plurality of containers for receiving fluid from a pressurized source, said containers being arranged to support a fluid flotation sleep surface;

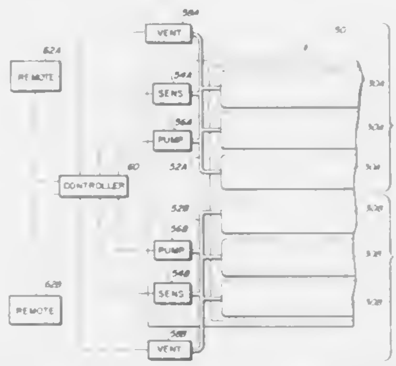
means coupling said containers to a common plenum chamber;

a sensor for monitoring the pressure of fluid in said chamber;

a pump for supplying fluid to said chamber;

a valve for venting fluid from said chamber;

a selector device for setting a chosen level of firmness corresponding to pressure within said containers and chamber; and



control means for comparing pressure signals from said sensor with said chosen firmness setting and selectively activating said pump and said venting valve upon detection of a difference between said pressure signals and said setting which exceeds a predetermined threshold value where said threshold value is greater than zero.

5,020,177
SHEET BEDDING CONSTRUCTION

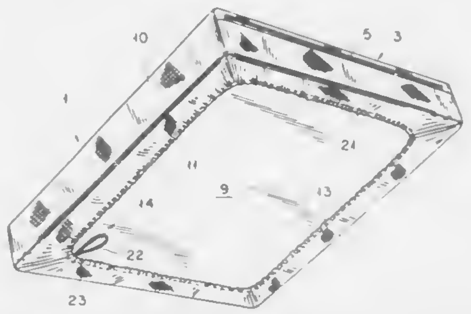
Suzanne M. Etherington, 2 Bannockburn Avenue, St. Andrews, New South Wales 2566, Australia

Filed Mar. 6, 1989, Ser. No. 319,405

Claims priority, application Australia, Mar. 10, 1988, PI7179

Int. Cl.^{5} A47G *9/02*

U.S. Cl. 5—496 **29 Claims**



1. A bed sheet arrangement comprising a fitted lower sheet having a substantially rectangular central area having a foot end and a head end with a side wall extending around the central area, that edge of said side wall remote from said central area being provided with a continuous elastically extendable draw string which is constrained to lie alongside the whole length of said side wall edge but to be movable along said side wall edge, and at least a portion of said draw string being manually accessible so that said draw string allows the lower sheet to be releasably attached to a mattress while also being of sufficient length so that movement of the manually accessible portion varies the length of draw string lying alongside the side wall edge to accomodate various sized mattresses.

VOL
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5,020,178
STABILIZING PRESSURE AND FLOW CONDITIONS IN A SCREENING APPARATUS

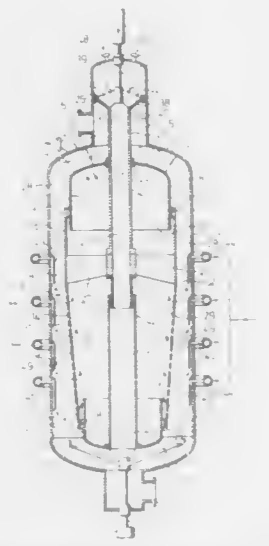
Finn Jacobsen, Karlstad, Sweden, assignor to Kamyr AB, Karlstad, Sweden

Filed Oct. 18, 1989, Ser. No. 423,245

Claims priority, application Sweden, Nov. 11, 1988, 8804082

Int. Cl.^{5} D21D *5/04*

U.S. Cl. 8—156 **11 Claims**



3. A method of stabilizing pressure and flow conditions in a screening apparatus during the treatment of fibrous cellulosic material pulp, utilizing a vessel having an inlet for pulp, and an outlet for pulp, a screen mounted in the vessel between the inlet and outlet for reciprocating movement along an axis in either a forward direction from the inlet toward the outlet, or a backward direction from the outlet toward the inlet, a space being formed for pulp movement between the interior of the vessel and the screen, and a liquid outlet for liquid extracted from the pulp by passing from the space through the screen, said method comprising the steps of:

(a) feeding pulp into the pulp inlet so that it flows in the space between the vessel and screen, and withdrawing treated pulp from the pulp outlet;
(b) withdrawing extracted liquid from the liquid outlet;
(c) reciprocating the screen along its axis by moving it relatively slowly in the forward direction and then relatively quickly in the backward direction so that backflushing of extracted liquid through the screen takes place during movement of the screen in the backward direction; and
(d) improving the distribution of backflush liquid adjacent both the pulp inlet and pulp outlet of the vessel by simultaneously controlling the pressure at the pulp inlet and pulp outlet of the vessel during movement of the screen in the backward direction.

5,020,179
ELECTRIC TOOTHBRUSH

Benjamin Scherer, Zürich, Switzerland, assignor to Gimelli & Co. AG, Zollikofen, Switzerland

Filed Jan. 5, 1990, Ser. No. 461,290

Claims priority, application Fed. Rep. of Germany, Jan. 11, 1989, 8900234

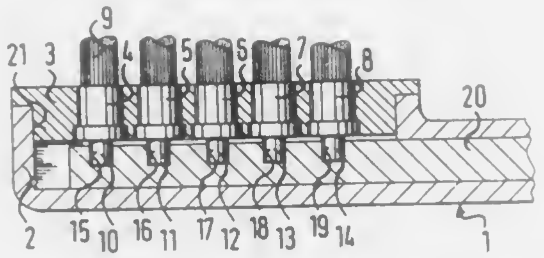
Int. Cl.^{5} A46B *13/02*

U.S. Cl. 15—22.1 **5 Claims**

1. A brush member for an electric toothbrush which is connectable at its lower end to a handle of the electric toothbrush, said brush member comprising:

an exchangeable insert comprising a plurality of axially rotatable bristle holders, each of said bristle holders comprising tufts of bristles extending from an upper portion of the bristle holders and an eccentric cam extending from a bottom portion of the bristle holders;

a brush head at an upper end of the brush member, said brush head comprising means for removably receiving the exchangeable insert, and



driving means for axially rotating said bristle holders, said driving means located within the brush head and comprising a plurality of substantially transverse grooves in a reciprocating connecting rod, said transverse grooves for engaging the eccentric cams of each of the bristle holders of an exchangeable insert received in the receiving means.

5,020,180
WINDOW-PANE CLEANING DEVICE

Noritaka Mimura, Tokyo, Japan, assignor to Nihon Biso Co., Ltd., Tokyo, Japan

Filed May 21, 1990, Ser. No. 526,117

Claims priority, application Japan, May 25, 1989, 1-132382

Int. Cl.^{5} A47L *1/00*

U.S. Cl. 15—103 **10 Claims**

1. A window-pane cleaning device provided in a cleaning unit which is moved along a window of a building comprising:

a squeezee for cleaning a window-pane by pressing its foremost end corner portion against the surface of the window-pane;

approaching and retraction servo means associated with said squeezee for moving said squeezee toward and away from the surface of the window-pane;

inclination angle adjusting servo means associated with said squeezee for adjusting the inclination angle of said squeezee with respect to the surface of the window-pane;

squeezee position detection means for detecting the current position of said squeezee;

squeezee pressing force detection means for detecting the current pressing force of said squeezee against the surface of the window-pane; and

control means responsive to detection outputs of said squeezee position detection means and said squeezee pressing force detection means for controlling the pressing force and the inclination angle of said squeezee to predetermined values respectively at starting of cleaning, during continuous cleaning and at finishing of cleaning.

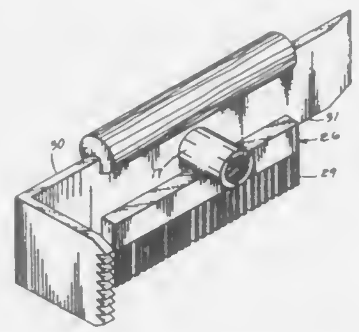
5,020,181
SCRAPING TOOL KIT

Douglas R. Leonard, Box #123, Rte. #12, Woodstock, Vt. 05091

Filed Feb. 28, 1990, Ser. No. 486,302

Int. Cl.^{5} A47L *25/00*

U.S. Cl. 15—105 **1 Claim**



1. A scraping tool kit for cleaning and shaping of a lawn mower comprising, in combination,

an elongate handle member, the elongate handle member including a planar longitudinally aligned central blade body orthogonally mounted to a forward end of the handle member, and

the blade body including a first elongate chisel edge orthogonally aligned relative to the longitudinally aligned planar blade body at a lowermost terminal end thereof, and

a serrated second edge arranged parallel to the first elongate chisel edge, wherein the serrated second edge is formed to a remote terminal end portion of the blade body, and

wherein the remote end portion includes a planar leg, the planar leg integrally and orthogonally mounted to the planar blade body at an upper terminal end of the planar blade body spaced from the first chisel edge, and the planar leg terminating in the serrated second edge spaced and parallel to the chisel edge, and

wherein the handle includes a first longitudinally aligned shank member integrally and angularly formed to a second longitudinally aligned shank members formed relative to one another defining an obtuse angle therebetween, and the planar leg arranged parallel to and spaced above the second shank, and

wherein the planar blade body includes a first side edge and a second side edge arranged parallel to one another and orthogonally relative to the first chisel edge and the second serrated edge, and a rearwardly tapering interior surface of the blade body directed rearwardly of the first chisel edge in confronting relationship relative to the handle, and a socket orthogonally and medially mounted to an interior surface of the blade body secured to a forward end of the second shank defining the forward end of the handle, and

further including a cylindrical hone adapted to sharpen a lawn mower blade of the lawn mower, the cylindrical hone including a radial slot directed interiorly and coextensively with the cylindrical hone from an exterior surface thereof interiorly thereof, and the cylindrical hone integrally mounted to the first side edge of the planar blade body, and

further including a brush head mounted to the second side edge of the planar blade body spaced from the cylindrical hone to permit subsequent cleaning of a scraping procedure, and

wherein the brush head includes a support base including a longitudinal slot, the longitudinal slot defined by a predetermined width equal to a predetermined width of the planar blade body defined by the first and second side edge, and the support base further including a matrix of wire bristles directed orthogonally and exteriorly of the support base remote from the longitudinal slot, and

wherein the cylindrical hone and the support base are adhesively mounted to the respective first and second side edge.

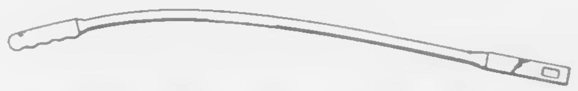
5,020,182
SINGLE HANDLE APPLICATOR

John W. Engel, Rte. 2, Box 177C, Smithville, Tex. 78957

Filed Mar. 19, 1990, Ser. No. 496,323

Int. Cl.^{5} B05C *1/06;* **A47K** *7/03*

U.S. Cl. 15—145 **4 Claims**



1. An applicator device adapted to be hand held by a user to selectively treat the skin of a user, said device comprising an elongated handle integrally formed with a receptacle end, said receptacle end comprising a pair of opposed inwardly facing grooves along the lateral sides thereof, each of said grooves including a locking recess in the sidewalls thereof,

a disposable insert having a generally flat rectangular base portion adapted to be slidably received in said grooves, said base portion including an integral tap portion mounted along the lateral sides thereof and extending outwardly beyond the ends thereof and adapted to be squeezably engaged by the fingers of a user, each tab including a laterally outwardly biased locking stud adapted to be snugly received in a respective locking means rescess and to be released therefrom by a user squeezing said tabs, said disposable insert being provided with a selected body treating means.

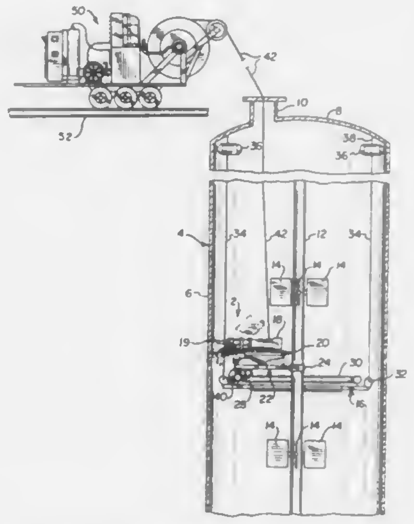
5,020,183
CLEANING APPARATUS FOR A PROCESS VESSEL

Louis A. Grant, Jr., Pittsburgh, Pa., assignor to Louis A. Grant, Inc., Pittsburgh, Pa.

Filed Mar. 16, 1990, Ser. No. 495,383

Int. Cl.^{5} F22B *37/48*

U.S. Cl. 15—246.5 **11 Claims**



1. Apparatus for cleaning hard deposits from an interior sidewall of a vessel having an upper wall and a central shaft vertically extending therein, said apparatus comprising:

a) a work platform for placement within the interior of the

VOL
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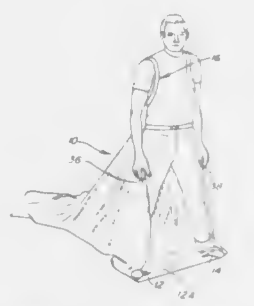
vessel, said platform having an open central portion adapted to pass around said central shaft;
b) means adapted to suspend said work platform from the upper wall of the vessel and for vertically moving said platform along said interior sidewall;
c) a ring-shaped guide rail means attached to said work platform;
d) impact tool means for removing said deposits; and
e) means supporting said impact tool means, including an elongated support arm assembly having a first end adapted to be attached to said central shaft and a second end carrying roller means for travel about said guide rail means.

5,020,184
DISPOSABLE RECEPTACLE FOR COLLECTING AND TRANSPORTING LOOSE DEBRIS

John W. Roberts, 9908 E. Bexhill Dr., Kensington, Md. 20895
Continuation-in-part of Ser. No. 204,112, Jun. 8, 1988, Pat. No. 4,854,003. This application Aug. 7, 1989, Ser. No. 390,161
The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.
Int. Cl.^{5} B65D *33/08, 33/28*
U.S. Cl. 15—257.5 **11 Claims**

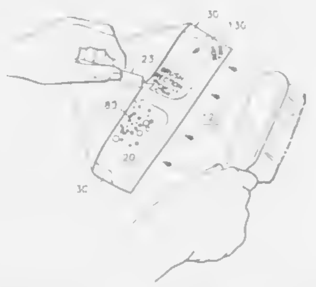


1. A disposable receptacle for collecting and transporting, and disposing of loose debris comprising:
(a) a closed end;
(b) a mouth end opposite said closed end having an upper and a lower portion;
(c) a harness and means for attachment of said harness to said upper portion for securing said upper portion to the upper body of a person raking lawn debris; and
(d) stirrups formed in said lower portion adapted to receive such person's feet;
such person thereby acting as a prop, when wearing said harness and stirrups, to support said disposable receptacle mouth end in an open position and to position said lower portion in sufficient proximity to the ground whereby loose debris can be readily introduced into the disposable receptacle, said disposable receptacle mouth end being located and oriented by such person's forward movement, said mouth end having a closed position when said bag is filled with loose debris for disposal of said bag.

5,020,185
DISPOSABLE DUST PAN AND METHOD

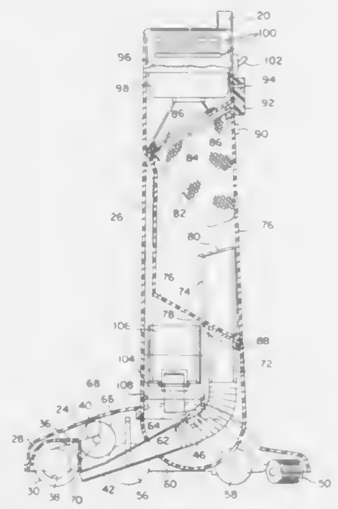
Raphael A. Hoefler, 8181 19th St., Westminster, Calif. 92683
Filed Feb. 21, 1989, Ser. No. 312,961
Int. Cl.^{5} A47L *25/00*
U.S. Cl. 15—257.1 **4 Claims**

1. A disposable collecting device comprising a flat and flexible rectangular sheet having opposed faces and four side edges on each face and intersecting corners, the first side edge opposite the second side edge and the third side edge opposite the fourth side edge; and adhesive coating placed along substantially the entire length of said first side edge on one face of said sheet and an adhesive coating placed along the entire length of said second edge and along substantially the entire length of said third and fourth side edges on the opposite face of said sheet; said collecting device being formed by folding said sheet to form a pocket, said pocket being formed by folding both the corners between the second and third side edges and the second and fourth side edges toward a center of the sheet about a fold line located about midway along the second side edge which divides said second side edge into two adhesive sections and said two adhesive sections of said second side edge being folded into mutual adhesive contact to form said pocket; said pocket functions as a receptacle for dirt particles and the like which may be swept into said pocket with the aid of a brush or broom, said first side edge, by virtue of its adhesive coating, being pressed against the surface to be cleaned in order to secure the pan in place while in use, said third and fourth side edges being pressed down into engagement with the top of the first side edge to form an enclosure, thus trapping said particles for convenient disposal.



5,020,186
VACUUM CLEANERS

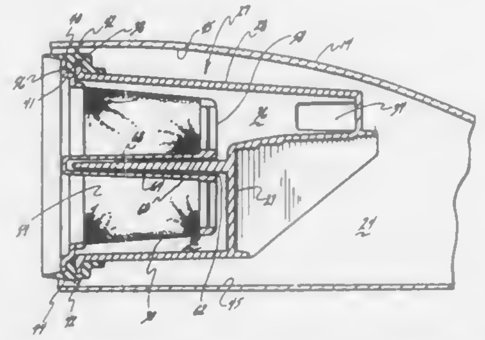
William R. Lessig, III, Hunt Valley, Md.; Rouse R. Bailey, Jr., New Park, Pa., and John R. Cochran, Baltimore, Md., assignors to Black & Decker Inc., Newark, Del.
Filed Jan. 24, 1990, Ser. No. 469,176
Int. Cl.^{5} A47L *5/30*
U.S. Cl. 15—339 31 Claims



1. A vacuum cleaner, comprising:
a body having a handle and a dust compartment;
said body containing a brush rotatable about an axis parallel in use to a surface to be cleaned, and a vacuum nozzle;
said nozzle having an inlet extending parallel to said brush axis and being spaced rearwardly from but adjacent said brush, said inlet extending for the length of said brush along said axis, being directed forwardly towards said brush, and being adjacent the surface to be cleaned;
said nozzle including therein an air passageway communicating with and extending from said inlet;
means for rotating said brush about said axis to sweep dirt directly from said surface through said inlet into said passageway;
a tube connected between said passageway in said nozzle and said dust compartment;
means for sucking air through said inlet, said passageway, and said tube into said dust compartment; and
said tube having a constant cross-sectional area, said inlet having a cross-sectional area larger than said constant cross-sectional area, an initial portion of said passageway immediately adjacent said inlet having a cross-sectional area which decreases from that of said inlet to that of said constant cross-sectional area, and the remainder of said passageway in said nozzle between said initial portion and said tube having a constant cross-sectional area the same as that of said tube.

5,020,187
FILTER ASSEMBLY FOR A VACUUM CLEANER

Richard B. Kosten, West Haven; Charles Z. Krasznai, Trumbull, both of Conn., and Gary Van Deursen, Upper Saddle River, N.J., assignors to Black & Decker, Inc., Newark, Del.
Filed Mar. 19, 1990, Ser. No. 498,135
Int. Cl.^{5} A47L *9/12*
U.S. Cl. 15—347 3 Claims

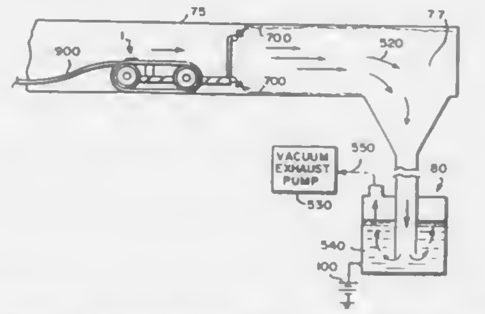


1. A filter housing and filter assembly for a vacuum cleaner, the vacuum cleaner including a motor, a housing enclosing the motor, a fan driven by the motor for producing a vacuum and a canister removably attached to the front end of the housing and having an intake nozzle for reception of foreign matter, liquid and air drawn into the canister in response to the vacuum developed by the fan, said assembly comprising:
means for filtering foreign matter from the air entering the canister;
means for housing said filtering means within the canister;
first grasping means extending from said filtering means towards a first open end of said canister and readily graspable by a user when the canister is removed from the front end of the vacuum cleaner housing to move the filtering means relative to the housing means towards the first open end of the canister; and
second grasping means extending from said housing means towards the first open end of
said canister and accessible by a user when the filtering means is removed from said housing means.

5,020,188
DUCT CLEANING APPARATUS

James Walton, Chelsea, Mass., assignor to J. F. Walton & Co., Inc., Chelsea, Mass.
Filed Aug. 4, 1989, Ser. No. 389,743
Int. Cl.^{5} B08B *9/04*
U.S. Cl. 15—406 **18 Claims**

1. Apparatus for cleaning ductwork having contaminant material built up over time on the interior wall surfaces thereof comprising:
a carriage means drivable through the interior of the ductwork for cleaning the interior walls thereof;
the carriage means including wheel means connected to a drive means for driving the carriage means forwardly and backwardly through the interior of the ductwork and a plurality of fluid spray nozzle means for directing a flow of one or more fluids at the surfaces of the interior walls of the ductwork;
vacuum means connected to the ductwork at a selected point along the length of the ductwork toward which the carriage means is driven during forward drive;
the fluid spray nozzles being mounted on the carriage means so as to direct a flow of a selected fluid at the interior surfaces of the walls of the ductwork and toward the point of the ductwork at which the vacuum means is connected;
pump means for inputting the selected fluid to the fluid spray nozzles at a rate sufficient to enable the flow of fluid emanating from the nozzles to dislodge the debris and contaminant material from the interior wall surfaces during forward drive of the carriage means and push the material toward the point of connection of the vacuum means with the ductwork;
wherein the carriage means includes arm means rotatably mounted on the carriage means for lateral movement toward and away from the interior wall surfaces of the ductwork, the arm means being connected to pneumatic actuation means for rotating the arm means inwardly and outwardly;
wherein the arm means includes nozzles means mounted thereon connected to a common source of fluid input to all nozzles mounted on the carriage means.



5,020,189
DOOR CLOSURE MECHANISM

Donald C. Grome, Edmonds, Wash.; Kurt H. Lundstedt, Long Grove, and William Olson, Barrington, both of Ill., assignors to Illinois Tool Works Inc., Glenview, Ill.
Filed Apr. 16, 1990, Ser. No. 514,929
Int. Cl.^{5} E05F *1/08*
U.S. Cl. 16—286 **20 Claims**

1. A door closure mechanism for use upon a door of a cabinet, comprising in combination:
housing means;
a drive cam rotatably mounted within said housing means;
a cam follower mounted within said housing means for reciprocating movement relative to said housing means in response to rotatable movement of said drive cam;
a coil compression spring mounted within said housing means for resiliently biasing said cam follower reciprocally against said drive cam;
cam surface means formed upon said drive cam and radially engaging said cam follower so as to control the relative movement of said cam follower with respect to said drive cam;
means for connecting said housing means to one of said door and said cabinet, and for connecting said drive cam with the other one of said door and said cabinet; and
means, for preventing full decompression of said coil compression spring in the event of a housing failure, comprising a pair of single-piece identical clips, one end of each of said clips having first hook means for engaging a periph-

VOL
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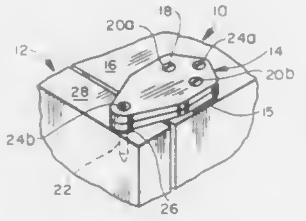
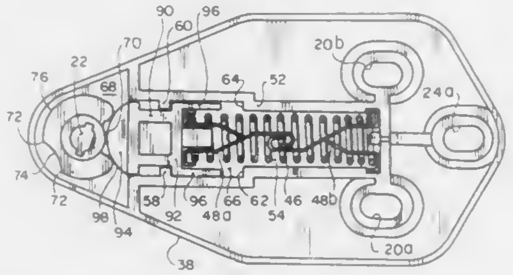
eral end portion of said coil spring, and a second end of each of said clips having second hook means for permitting disengagement between said clips with respect to each other when said compression coil spring undergoes a predetermined amount of axial compression so as to permit said compression coil spring to undergo said axial



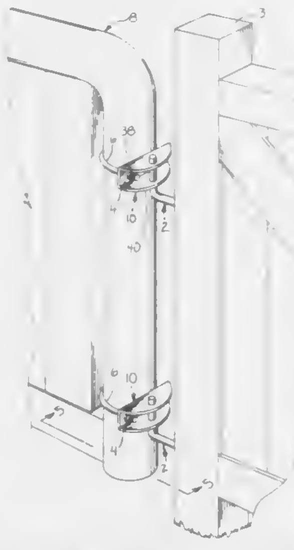


compression, and for permitting engagement between said clips with respect to each other when said compression coil spring undergoes a predetermined amount of axial expansion so as to prevent said full decompression of said coil compression spring in the event of said housing failure.

5,020,190
ANTI-LIFT AND ANTI-TWIST HINGE

Gerard J. Muegerl, Goshen, Ind., assignor to Universal Cooperatives, Inc., Minneapolis, Minn.

Filed Jun. 26, 1989, Ser. No. 371,384
Int. Cl.^{5} E05D *5/12, 5/02*
U.S. Cl. 16—380 **3 Claims**

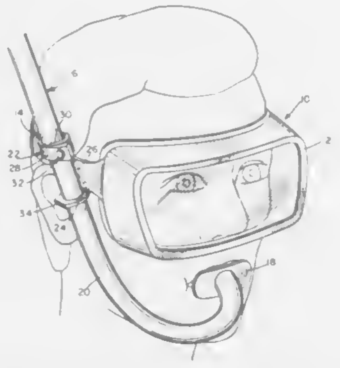


1. In a pivoting gate structure, a hinge consisting of an elongate, one-piece U-shaped bracket and a L-shaped hinge pin pivotally connected by an interference fit to said bracket, said bracket including a generally planar wall having an outer surface engagingly secured to a support and spaced converging flanges rigidly extending from longitudinal edges of said wall, each flange having a medial opening through which said hinge pin extends, each opening being defined by inner and outer edges, a portion of said inner and outer edges constituting means for engaging said hinge pin as said bracket is shifted relative to the hinge pin to restrict the movement of said bracket relative to the pin a pair of spaces apart openings in said wall and a connection means for connection of said bracket to said support.

5,020,191
SNORKEL STRAP

Alan K. Uke, 5980 Rancho Dieguено, P.O. Box 8531, Rancho Santa Fe, Calif. 92067

Filed Jan. 12, 1990, Ser. No. 459,961
Int. Cl.^{5} A44B *21/00;* **B63C** *11/16*
U.S. Cl. 24—3 R **5 Claims**



1. A snorkel strap for removably attaching a snorkel to a diving mask comprising:

a substantially flat ring member;

an elongated substantially flat first strap member coupled at one end to a peripheral edge of said ring member and extending radially therefrom;

an elongated substantially flat second strap member coupled at a side thereof to another end of said first strap, said first and second straps oriented substantially perpendicular to one another;

said ring member and said first and second strap members being integrally formed of a flexible material;

coupling means mounted upon said second strap member for overlapping coupling of the ends of said second strap;

said coupling means comprising first and second holes respectively formed in s aid second strap member adjacent opposite ends thereof, and a button member formed of a rigid material mounted in one of said first and second holes, said button member for also removably fitting within said other one of said first and second holes; and

a tab member integrally formed of said flexible material at said ring member peripheral edge opposite said first strap member.

5,020,192
ADJUSTABLE TIE DOWN APPARATUS AND METHOD

Al Gerlach, 7023 Etiwanda Ave., Reseda, Calif. 91335

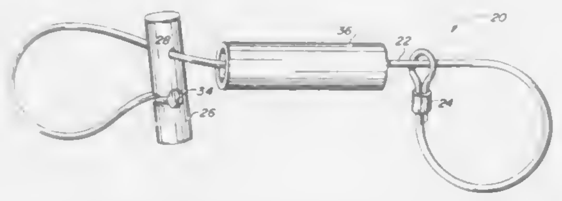
Filed Mar. 30, 1989, Ser. No. 330,542
Int. Cl.^{5} F16G *11/00*
U.S. Cl. 24—136 R **17 Claims**

1. An adjustable tie down for securing an object with respect to a reference point, comprising:

a cable having a first end and a second end;

means for attaching said first end of said cable to the object;

a handle having an aperture therethrough, said second end of said cable extending freely through said aperture in said handle and around the reference point, said second end of said cable then being fixedly attached to said handle, said handle being pulled toward the object to tighten said cable between the object and the reference point, said handle then being rotated approximately ninety degrees to a position approximately parallel to the portion of said cable between the object and the reference point, said handle when rotated crimping said cable on both sides of said aperture to prevent said handle from moving longitudinally with respect to said cable; and

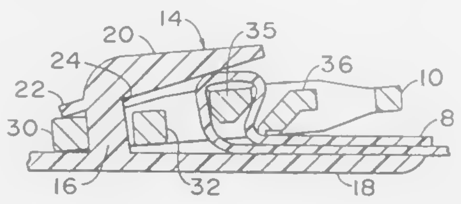


means for retaining said handle in said position approximately parallel to the portion of said cable between the object and the reference point, and said means engaging said handle and said cable.

5,020,193
CONNECTOR

Harry A. Kunze, Pittsburgh, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Jul. 2, 1990, Ser. No. 546,905
Int. Cl.^{5} A44B *11/25*
U.S. Cl. 24—323 **8 Claims**



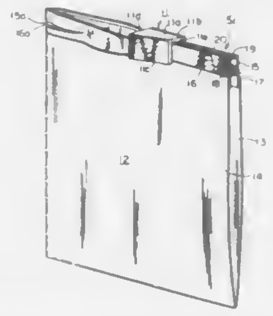
1. A unitary flexible mounting lug for receiving a slotted connector comprising a substrate, a web extending vertically from said substrate, an elongate flange extending from one side of said web substantially horizontal to and spaced from said substrate, and an opposing lip extending from the opposite side of said web, the flange and web being sized to fit through the slot in the slotted connector whereby the slotted connector slides over the flange and web to be secured between the substrate and the flange and lip.

5,020,194
LEAKPROOF ZIPPER WITH SLIDER

Fox J. Herrington, Holcomb, and Eric A. St. Phillips, Fairport, both of N.Y., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Mar. 7, 1990, Ser. No. 490,112
Int. Cl.^{5} A44B *19/16*
U.S. Cl. 24—400 **9 Claims**

1. A leakproof plastic reclosable fastener with slider particularly suited for thermoplastic bags and the like comprising a pair of flexible plastic strips having separable fastener means extending along the length thereof comprising reclosable interlocking rib and groove profile elements on the respective strips, said strips each including profiled track structure extending along the length thereof parallel to the rib and groove elements, a straddling slider on said strips for closing or opening the reclosable fastener elements comprising an inverted U-shaped plastic member having a back for moving along the top edges of the strips with depending side walls projecting therefrom for maintaining said track structure and said rib and groove elements therebetween, said slider including separator structure depending from said back and inserted between said track structure to open said rib and groove elements, said side walls extending from an opening end of the slider to a closing end, the side walls being spaced wider apart at the opening end to permit separation of the rib and groove elements and being spaced sufficiently close together at the closing end to press the rib and groove elements into interlocking relationship as the slider is moved in a fastener closing direction, and structure at one end of said pair of strips separating said track structure from said interlocking rib and groove elements whereby when said slider is moved in the fastener closing direction to said one end of said strips said opening end of said slider is ineffective on said track structure to open said interlocking rib and groove

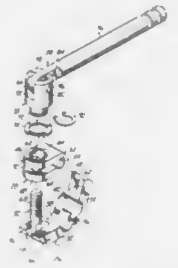


elements at said one end of said strips while said interlocking rib and groove elements are closed throughout the length of said strips by said closing end of said slider to prevent leakage through said reclosable fastener, wherein said structure at said one end of said pair of strips separating said track structure from said interlocking rib and groove elements comprising longitudinal slit structure whereby when said slider is moved in the fastener closing direction to said one end of said strips said track structure on said strips is moved apart at said at said one end of said strips by said opening end of said slider while said interlocking rib and groove elements are closed throughout the length of said strips by said closing end of said slider to prevent leakage through said reclosable fastener.

5,020,195
CLAMPING DEVICE FOR USE ON A RETRACTOR SUPPORT

Bruce A. LeVahn, New Brighton, Minn., assignor to Minnesota Scientific, Inc., St. Paul, Minn.

Continuation-in-part of Ser. No. 303,167, Jan. 27, 1989. This application Aug. 16, 1989, Ser. No. 394,578
Int. Cl.^{5} A44B *21/00;* **A61B** *17/02*
U.S. Cl. 24—514 **9 Claims**



1. A clamping device for use in a surgical retractor support comprising:

first clamping means for clamping a first rod, the first clamping means including first and second clamping section pivotally attached to each other;

second clamping means for clamping a second rod;

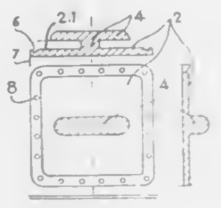
means for providing a single force to bring the first and second clamping means to a clamping position including a shaft pivotally attached to the first clamping section of the first clamping means, the shaft extending through the second clamping section of the first clamping means and

VOL
1127
ISS
1
JE
4
1991
UMI

through the second clamping means and further including means for engaging the shaft such that the clamping legs and the clamping sections are placed in clamping positions; and
wherein the first and second clamping sections of the first clamping means are pivotable from a clamping position to an open position.

5,020,196
NINETY DEGREE TURN FASTENER

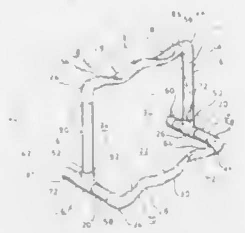
Rafael B. Panacb, and Rafael B. Royo, both of Poeta Artola 15., 46021 Valencia, Spain
Filed Feb. 28, 1990, Ser. No. 486,373
Int. Cl.^{5} A41F *1/00*
U.S. Cl. 24—590 12 Claims



1. NINETY DEGREE TURN FASTENER comprising male and female parts made of resistant materials, said females and male parts having the same outline shapes to ensure that they match; the face of the female part in its central area is made up of a raised flat surface with a concave rear side to accommodate the wings of the male part, this being surrounded by another dish-shaped plane, which constitutes the base for attachment of the fastener; the centre of the front face has a rectangular opening, with a width appropriate for carrying out its purpose, and substantially three times as long as it is wide, the outer attachment plate has a groove with several holes distributed along it, and a number of clamps for attachment, whether it be by sewing or by any other means; the male part is flat on its rear side; from the centre of the face there protrudes a round nucleus measuring the same as the width of the opening in the female part, which opening matches the central nucleus ended in a T shape, whose wings are sufficiently separted from the base plate as to clear the side faces of the female opening when turning through 90 degrees in order to fasten; the length is equal to that of the female opening; the means of attachment of the male part to its corresponding piece of garment are the same as the means of attachment of the female part to its corresponding piece.

5,020,197
BODY POSITIONING DEVICE

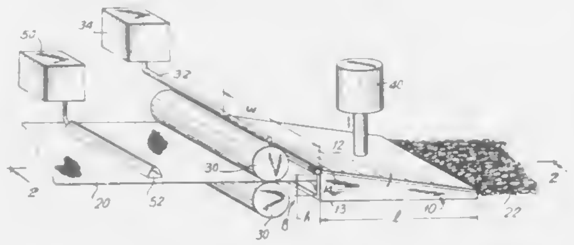
David W. Bull, Rt. 2 Manilla Rd., P.O. Box 415, Englewood, Tenn. 37329
Filed Aug. 13, 1990, Ser. No. 566,839
Int. Cl.^{5} A61G *1/00*
U.S. Cl. 27—21.1 9 Claims



1. A body positioning device for supporting the legs of a cadaver at a selected displacement above a supporting surface by changing the orientation of said device comprising:
a first support means with top and bottom portions for supporting said cadaver's legs when said first support means is oriented in a substantially upright position;
a second support means with top and bottom portions for supporting said cadaver's legs when said second support means is oriented in a substantially upright position; and
a base means for engaging a support surface and preventing said device from tilting, said base means including said bottom portions of said first support means and said second support means, said bottom portion of said second support means being connected to said bottom portion of said first support means such that when said first support means is oriented in a substantially horizontal position said top portion of said first support means is used in conjunction with said base means to engage said support surface and to prevent said device from tilting and when said second support means is oriented in a substantially horizontal position said top portion of said second support means is used in conjunction with said base means to engage said support surface and to prevent said device from tilting.

5,020,198
CRIMPED TEXTILE FIBERS AND STUFFER BOX APPARATUS AND METHODS FOR CRIMPING TEXTILE FIBERS

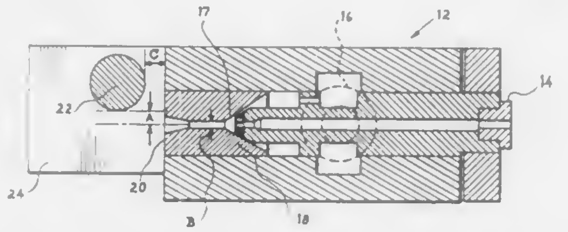
Michael Hill, Ascot, England, and Walter A. Nichols, Richmond, Va., assignors to Filter Materials Ltd., New York, N.Y.
Filed Aug. 10, 1988, Ser. No. 231,142
Int. Cl.^{5} D02G *1/12*
U.S. Cl. 28—250 45 Claims



18. Apparatus for texturizing advancing textile fibers having fiber bundles comprising a stuffer box having an entry aperture including a first width and a first height, and an exit orifice, said first width being within a range based upon the linear density of the advancing textile fibers whereby there is one millimeter of width for each fiber bundle having a linear density in the range of from about 400 to about 600 denier, said first height being from about 2 to about 20 mm, said exit orifice having a retention condition and a release condition, said retention condition being adapted to accumulate within the stuffer box the advancing textile fiber thereby to crimp said fiber, aid release condition being adapted to release through said exit orifice the crimped textile fiber when the pressure of the advancing accumulating textile fiber exceeds a first predetermined threshold force, the exit orifice further comprising
a lid for closing the exit orifice so that crimped textile fiber will accumulate within the stuffer box and for opening so that crimped textile fiber may be released through the exit orifice;
a hinge connecting the lid to the stuffer box; and
a pneumatic cylinder exerting a force on the lid, thereby urging the lid closed, whereby when the pressure within the stuffer box exceeds the predetermined force, the pneumatic cylinder will permit the lid to rotate about the hinge to open so that crimped textile fiber will pass through the exit orifice until the pressure inside the stuffer box falls below the predetermined pressure.

5,020,199
AIR TEXTURING JET

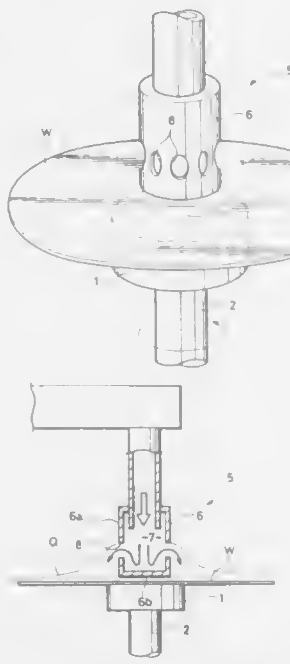
Adly A. Gorrafa, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Apr. 7, 1988, Ser. No. 178,961
Int. Cl.^{5} D02G *1/16*
U.S. Cl. 28—273 3 Claims



1. In a yarn treating jet including a body having yarn inlet and outlet ends connected by a central bore along a central axis, means for introducing pressurized gas through a gas inlet into said bore between said ends to contact yarn passing through the jet at a location in said bore, said yarn and said gas following a path from said outlet end of said jet, the improvement comprising: a baffle located adjacent the yarn outlet end of the jet, said baffle having a peripheral surface, the portion of said surface nearest said outlet and being a distance of 0.1 to 2.0 minimum diameters of the bore downstream of said location, the portion of said surface nearest said central axis being a distance of from 0.1 to 3.0 of said minimum diameters above said central axis and providing a guiding surface for said yarn around which said yarn travels after it leaves the outlet end of the jet to maintain the yarn away from the portion of said surface nearest said outlet.

5,020,200
APPARATUS FOR TREATING A WAFER SURFACE

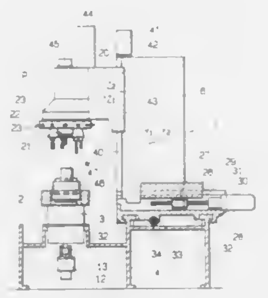
Masahiro Mimasaka, and Hiroyuki Hirai, both of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan
Filed Aug. 29, 1990, Ser. No. 574,164
Claims priority, application Japan, Aug. 31, 1989, 1-227140
Int. Cl.^{5} H01L *41/00*
U.S. Cl. 29—25.01 18 Claims



1. An apparatus for treating a wafer having a first surface to be treated and a second surface opposite to the first surface, comprising:
water holding means for holding said wafer such that the wafer is rotatable around a rotation axis at the center of said second surface; and
nozzle means for supplying a predetermined flow of a treatment liquid onto said first surface of said wafer held by said wafer holding means,
said nozzle means including
supply means for supplying a flow of said treatment liquid at a predetermined first flow speed to a predetermined position higher than said first surface by a predetermined distance, and
flow changing means for changing a speed of said treatment liquid from said first flow speed to a smaller second flow speed at said predetermined position and providing a speed component in a direction parallel to said first surface to a speed of said treatment liquid;
said flow changing means including
obstruction means for obstructing said flow of said treatment liquid supplied by said supply means at said predetermined position, and
flow enabling means for enabling said obstructed flow of treatment liquid to flow in the direction parallel to said first surface from said predetermined position.

5,020,201
MACHINE TOOL

Koichiro Kitamura, Takaoka, Japan, assignor to Kitamura Machinery Co., Ltd., Toyama, Japan
PCT No. PCT/JP88/00250, § 371 Date Aug. 15, 1989, § 102(e) Date Aug. 15, 1989, PCT Pub. No. WO88/06943, PCT Pub. Date Sep. 22, 1988
PCT Filed Mar. 10, 1988, Ser. No. 397,417
Claims priority, application Japan, Mar. 17, 1987, 62-60031
Int. Cl.^{5} B23B *3/16*
U.S. Cl. 29—27 C 10 Claims



1. A machine tool comprising:
a base;
a rotary table;
a non-rotary table arranged with respect to the base, the non-rotary table being equipped with the rotary table;
the non-rotary table being arranged with an upper face thereof flush with an upper face of the rotary table;
a first mounting means for mounting a workpiece on the rotary table;
a second mounting means for mounting the workpiece on the non-rotary table;
a column provided to the base;
a means for storing a plurality of tools;
a head means provided to the column;
a spindle mounted on the head means for mounting one of the tools so as to machine an end face of the workpiece;
a turret means mounted on the head means;
a first drive means for causing relative motion between either the head means or the turret means and either the rotary table or the non-rotary table along an X-axis;
a second drive means causing relative motion between either

VOL
1127
ISS
1
JE
4
1991
UMI

the head means (20) or the turret means (22) and either the rotary table or the non-rotary table along a Y-axis perpendicular to the X-axis;
a third drive means for causing relative motion between either the head means or the turret means and either the rotary table or the non-rotary table along a Z-axis perpendicular to both the X-axis and the Y-axis;
a fourth drive means for rotating the rotary table;
a fifth drive means for indexing the turret means;
a sixth drive means for revolving the spindle;
the head means, the spindle, and the turret means being positioned above either the upper face of the non-rotary table or the upper face of the rotary table;
the rotary table being rotated about a first axis parallel to the Z-axis directed in a vertical direction; and
the turret means adapted for mounting a plurality of further tools to machine a circumference of the workpiece on the rotary table by revolution of the rotary table, and the turret means being indexed about a second axis parallel to the Z-axis so as to position one of the further tools of the turret means at a predetermined position by the fifth drive means.

5,020,202

TOOL TO CLIP TOGETHER SHEET METAL ENDS

James A. Turrell, 1040 Camp Four Jacks Rd., Biloxi, Miss. 39532

Filed Nov. 6, 1989, Ser. No. 432,790

Int. Cl.^{5} B23P *11/00*

U.S. Cl. 29—243.56 **2 Claims**

1 A tool for positioning a spring clip to anchor adjacent, opposing sheet metal extensions comprising:
a handle member,
an end on said handle member defining a pusher face;
a jaw, pivotally affixed to said handle member, offset from said pusher face;
said jaw having a free end;
means upon said free end for engaging a sheet metal extension in a direction opposed to said pusher face;
a face upon said jaw for exerting a downward force upon said spring clip.
said handle member further comprising:
  a first handle section extending a distance;
  a handle midsection extending at an angle from said first handle section;
  said pusher face being offset from said midsection

5,020,203

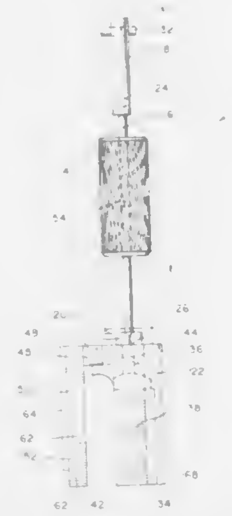
FUEL INJECTOR INSTALLATION AND REMOVAL TOOL FOR AN INTERNAL COMBUSTION ENGINE

David M. Rix, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed Mar. 29, 1990, Ser. No. 501,028

Int. Cl.^{5} B23P *19/04*

U.S. Cl. 29—255 **7 Claims**



1. A fuel injector installation tool for use in an internal combustion engine with at least one engine component located proximate to the fuel injector, comprising:
a central shaft forming the axis of said tool,
an end member attached to one end of said central shaft,
a driver member attached to the opposite end of said central shaft, said driver member having a generally cylindrical shape and adapted to slidingly receive the fuel injector to be installed,
a slide hammer for creating a force necessary to install said fuel injector, said slide hammer engaging said central shaft and being positioned between said end member and said driver member,
an impact surface located between said slide hammer and said driver member for transmitting said force from said slide hammer through said drive member to said fuel injector, and
a first alignment guide means attached to said central shaft and positioned adjacent to and spaced from said driver member for shielding said injector from other engine components and guiding said injector to the proper location on the engine.

5,020,204

TOOL FOR ALIGNING THE CONNECTING OF AN EXHAUST MANIFOLD TO AN ENGINE BLOCK

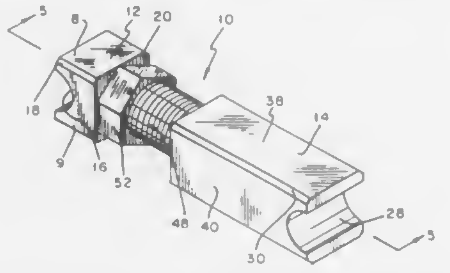
Eugene Desair, HC 01, Box 40, Damar, Kans. 67632

Filed Nov. 28, 1989, Ser. No. 442,300

Int. Cl.^{5} B66F *3/08*

U.S. Cl. 29—271 **8 Claims**

1 A tool for aligning apertures in an exhaust manifold with holes in cylinder heads of an engine block comprising a first member for contacting a first section of an exhaust manifold, said first member having a structure defining an elongated cylinder fitting and an arcuate surface for contacting said first section of said exhaust manifold; a second member for contacting a second section of said exhaust manifold, said second member having a structure defining a threaded cylindrical bore and an arcuate surface for contacting said second section of said exhaust manifold; and an adjustment bolt means engaged directly to both said first member and to said second member for adjusting the distance between said first member and said second member, said adjustment bolt means having a structure defining a threaded cylindrical surface for directly threadably engaging said threaded cylindrical bore of said second member, a cylindrical recess for directly slidably receiving said elongated cylindrical fitting of said first member, and a lug means for providing a surface that is to be contacted for rotating the adjustment bolt means.



5,020,205

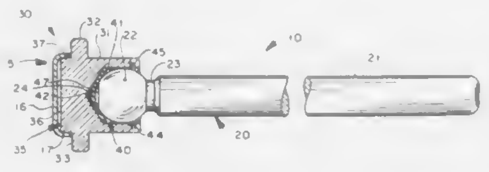
FREEZE PLUG INSTALLER HEAD AND TOOL KIT INCLUDING SAME

Gerald A. Wridt, Racine, Wis., assignor to Snap-on Tools Corporation, Kenosha, Wis.

Filed Apr. 23, 1990, Ser. No. 512,394

Int. Cl.^{5} B23P *19/04*

U.S. Cl. 29—275 **17 Claims**



1. A freeze plug carrier head for a freeze plug installer tool having a coupling ball, said carrier head comprising: a body, carrier means on said body adapted for mating engagement with an associated freeze plug, a socket formed in said body and dimensioned for receiving the coupling ball therein, retaining means carried by said body and movable between a normal rest condition resiliently projecting laterally into said socket for interference with the passage of the coupling ball into and out of said socket and a retracted condition accommodating passage of the coupling ball into and out of said socket, said retaining means in its normal rest condition being adapted for camming engagement with the coupling ball for movement of said retaining means to its retracted condition as the coupling ball is moved into and out of said socket, said retaining means resiliently returning to its normal condition when the coupling ball has moved past said retaining means, whereby when said coupling ball is disposed in said socket said retaining means serves to detachably retain said carrier head on the tool, and a flexible disk having a diameter greater than that of said socket and seated in said socket for contact with the coupling ball, said disk cooperating with said retaining means for limiting movement of the coupling ball when it is retained in said socket.

5,020,206

METHOD OF MANUFACTURING SLIDE FASTENER CHAIN BEARING PATTERNS

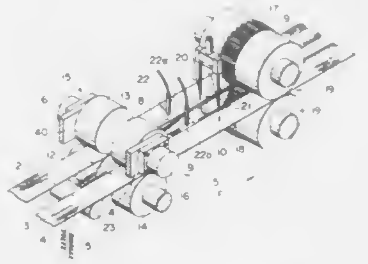
Hiroshi Yoshida; Sotoshi Saito, and Tatsuo Ito, all of Kurobe, Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Aug. 20, 1990, Ser. No. 569,981

Claims priority, application Japan, Aug. 23, 1989, 1-216831

Int. Cl.^{5} B21D *53/50*

U.S. Cl. 29—408 **2 Claims**



1. A method of manufacturing a slide fastener chain including a pair of continuous fastener tapes having their respective patterns matched with each other and two rows of continuous fastener elements mounted along the inner longitudinal edges thereof, the method comprising the steps of:
(a) applying two series of alignment markers to the continuous fastener tapes at intervals longitudinally thereof with the respective patterns of the continuous fastener tapes matched with each other;
(b) feeding the opposed continuous fastener tapes in side-by-side toward an element-attaching station;
(c) detecting the corresponding alignment markers during the feed of the opposed continuous fastener tapes;
(d) controlling the feed of the opposed fastener tapes in such a way as to let the fastener tapes continue to feed if the corresponding alignment markers prove to be in registry with each other, and to restrain the feed of the preceding fastener tape to thus bring the corresponding alignment markers into registry, if the corresponding alignment markers prove to be out of registry with each other; and
(e) attaching the two rows- of continuous fastener elements to the inner longitudinal edges of the opposed fastener tapes at the element-attaching station, with the alignment markers in registry with each other.

5,020,207

PROCESS FOR PRODUCING MAGNETIC HUB

Takeshi Minoda; Akira Todo; Toshio Kimura, and Masayoshi Kurisu, all of Ichihara, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Continuation of Ser. No. 226,886, Aug. 1, 1988, abandoned. This application Mar. 9, 1990, Ser. No. 492,385

Claims priority, application Japan, Jul. 31, 1987, 62-193087

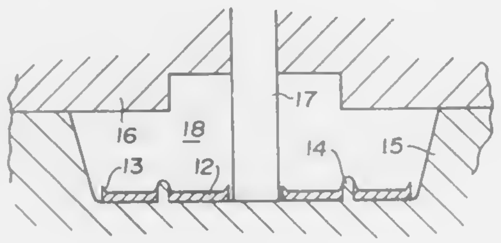
Int. Cl.^{5} B22C *9/28;* **B23P** *19/04*

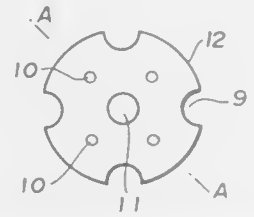
U.S. Cl. 29—527.4 **4 Claims**

1. A process for producing a magnetic hub for an optical disc which is fixed to a spindle of a disc drive by a magnetic clamp system, said magnetic hub having a predetermined shape including an inner diameter and an outer diameter, said process comprising
providing a mold having a mold cavity of said predetermined shape and a center pin extending through a center of the mold cavity,
providing a metal plate composed of ferromagnetic material, said metal plate having a first side and a second side,
punching said metal plate on said first side, thereby producing an annular metal plate having said first and second sides, an axle hole extending therethrough and an outer periphery, said punching producing a burr on said second side of said annular metal plate,

VOL
1127
ISS
1
JE
4
1991
UMI

positioning and setting said annular metal plate in a predetermined position within said mold cavity so that said first side of said annular metal plate comes in contact with an inner surface of said mold and inserting said center pin into said axle hole of said annular metal plate,





injecting a resin into said mold thereby filling said mold cavity with said resin, and

recovering the molded resin from said mold cavity with said annular metal plate embedded therein.

5,020,208

PROCESS FOR HEATING A SEMIFINISHED PRODUCT PRODUCED BY CONTINUOUS CASTING OR DEFORMATION

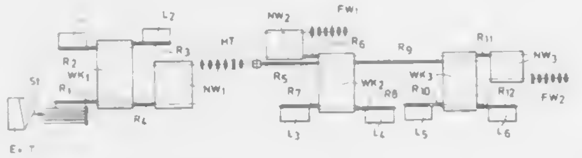
Hugo Feldmann, Alsdorf; Claus Schlanzke, Ratingen, and Ulrich Svejovsky, Wuppertal, all of Fed. Rep. of Germany, assignors to Sms Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

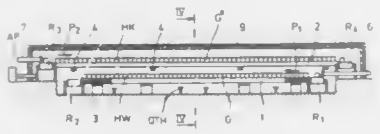
Filed Jan. 15, 1987, Ser. No. 4,084

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1986, 3601084; Jul. 3, 1986, 3622302

Int. Cl.^{5} B21B *1/46*

U.S. Cl. 29—527.7 12 Claims





1. In a process for the production of rolled products wherein:

a succession of relatively hot semifinished bodies forming a first group are produced by continuous casting;

the semifinished bodies of said first group are subjected to rough rolling to produce a second group of semifinished bodies; are

the semifinished bodies of said second group are finish rolled to produce a third group of bodies, the bodies of each group having temperatures different from the bodies of the remaining groups, the improvement which comprises controlling the temperature of the bodies of one of said groups by the steps of:

moving the bodies of one of said groups along a transport path in a generally horizontal plane;

moving the bodies of another of said groups along a transport path in a generally horizontal plane and in spaced relationship from but in horizontal plane and in spaced bodies of said one of said groups as to effect heat transfer by radiation and convention between the bodies of said one of said groups and said other of said groups during the movement thereof; and

regulating the temperature of the bodies of said one of said groups by controlling the heat transfer between the bodies of said one of groups and said other of said groups.

5,020,209

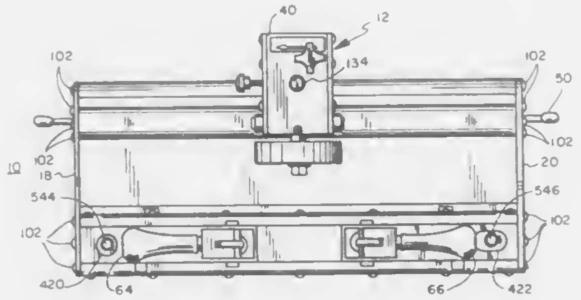
BELT LACING AND CUTTER ASSEMBLY

Brian W. Fullard, Naperville, Ill.; Thomas J. Bubula Beeber, Ill. assignor to Flexible Steel Lacing Company, Downers Grove, Ill.

Filed Nov. 6, 1989, Ser. No. 432,196

Int. Cl.^{5} B23P *11/00*

U.S. Cl. 29—564.8 20 Claims



1. A belt lacer assembly for cutting and clinching belt lacing elements to a belt end, said assembly comprising:

a frame means;

clamping means for clamping a belt to the frame means;

cutting means mounted on the frame means to cut the belt while it is clamped by the clamping means to the frame means,

means on the frame means for holding a plurality of belt lacing elements;

pressing means for inserting the belt lacing elements for clinching said belt lacing elements to said belt end;

said clamping means clamping the belt end to the frame means while the pressing means presses the belt lacing elements to clinch them to the belt at predetermined locations on the belt end.

5,020,210

AUTOMATIC TOOL CHANGER FOR A MACHINE TOOL

Akihiko Fujimoto, Yamanashi, Japan, assignor to Fanuc Ltd., Yamanashi, Japan

PCT No. PCT/JP89/00520, § 371 Date Feb. 23, 1990, § 102(e) Date Feb. 23, 1990, PCT Pub. No. WO90/00104, PCT Pub. Date Jan. 11, 1990

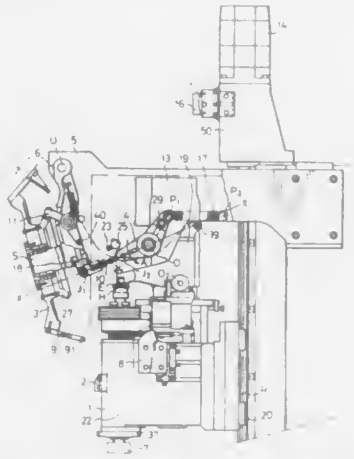
PCT Filed May 25, 1989, Ser. No. 465,136

Claims priority, application Japan, Jun. 30, 1988, 63-160731

Int. Cl.^{5} B23Q *3/157*

U.S. Cl. 29—568 4 Claims

1. An automatic tool changer for a machine tool, comprising: a crank (6) supported for swing motion on a support (5) and rotatably holding a turret (3) provided with a turret gear (27); a crank operating lever (4) supported for swing motion on the support (5) and provided with a roller (29), and a spring (17) for biasing the crank (6) to a standby position; a rod (10) combined with a spring (18) which functions as a load limiter, and interlocking the crank (6) and the crank operating lever (4); a first cam (8) provided on the vertically movable spindlehead (22) of the machine tool so as to be able to engage the roller (29); a lever stopper (24) provided on the support (5) to stop the crank operating lever (4) at a set position; and a crank stopper (23) provided on the support (5) to stop the crank (6) at a set position when the crank (6) is advanced toward the tool changing position.



5,020,211

METHOD FOR MANUFACTURING A YOKE FOR A STEPPING MOTOR

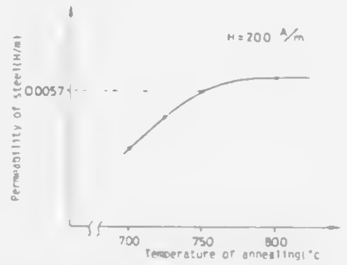
Fujio Nakagawa, and Masami Wada, both of Hirakata, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jul. 26, 1990, Ser. No. 557,991

Claims priority, application Japan, Nov. 22, 1989, 1-304125

Int. Cl.^{5} H02K *15/02*

U.S. Cl. 29—596 5 Claims



1. Method for manufacturing a yoke used in a stepping motor comprising steps of:

providing a non-galvanically surface-coated dead soft steel sheet;

press-working the non-galvanic surface-treated dead soft steel sheet to form a yoke piece having plural pole teeth provided on its periphery; and

annealing said yoke piece in an inactive gas at an annealing temperature of about 800° C. to relieve internal stress caused by said press-working.

5,020,212

METHOD OF MANUFACTURING A MAGNETIC HEAD

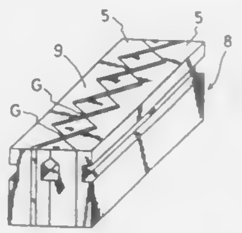
Masashi Michijima, Nara; Masaru Kadono, Kitakatsuragi, and Tatsushi Yamamoto, Ikoma, all of Japan, assignors to Sharp Corporation, Osaka, Japan

Filed May 29, 1990, Ser. No. 529,872

Claims priority, application Japan, May 29, 1989, 1-136485; Jun. 11, 1989, 1-140913; Aug. 2, 1989, 1-200842; Aug. 2, 1989, 1-200843; Aug. 25, 1989, 1-219199

Int. Cl.^{5} G11B *5/42*

U.S. Cl. 29—603 13 Claims



1. A method of manufacturing a magnetic head comprising:

forming a plurality of rectilinear V grooves in parallel on the top surface of a substrate by means of a first grinding wheel, each V groove having two slanted faces;

finishing one of the slanted faces of the V grooves by means of a second grinding wheel, having two outer surfaces forming a V-shape, the second grinding wheel being shaped such that one of the grinding wheel surfaces comes into contact with said one of the slanted faces of the V groove while the other grinding wheel surface has a clearance against the other slanted face of the V groove,

forming magnetic films on the slanted faces of the V grooves,

leveling the top surface of the substrate after filling the V grooves with glass,

cutting the substrate along a plane perpendicular to the V grooves to divide the substrate into first and second substrates,

forming grooves for coil winding on the top and bottom surfaces of each substrate in the direction perpendicular to the V grooves,

melting the glass of each V groove and bonding the first and second substrates to make a bonded body after superposing the first substrate on the second substrate so that the top surfaces of the first and second substrates contact each other and a magnetic gap is formed between each magnetic film of the first substrate and that of the second substrate, and

slicing the bonded body along a plane which is inclined by a predetermined angle to the bonded surface of the first and second substrates.

5,020,213

METHOD OF PRODUCING A HEAD CORE SLIDER

Michael I. Aronoff, Goleta, Calif.; Soichiro Matsuzawa, Kuwana, and Nobuhiro Terada, Kasugai, both of Japan, assignors to Applied Magnetics Corporation, Goleta, Calif. and NGK Insulators, Ltd., Aichi, Japan

Filed Dec. 14, 1989, Ser. No. 450,566

Int. Cl.^{5} G11B *5/42*

U.S. Cl. 29—603 3 Claims

1. A method of producing a core slider for a rigid magnetic disk drive, comprising the steps of:

forming a primary groove in at least one of abutting surfaces of a first and a second ferrite block, by etching said at least one abutting surface through a first etching mask applied thereto;

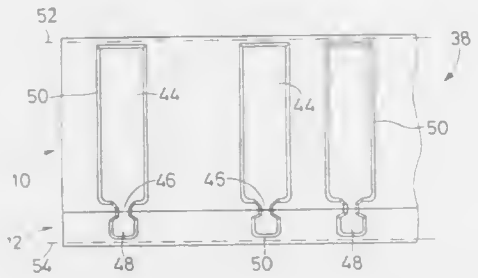
forming a plurality of secondary recesses in at least one of said abutting surfaces of the first and second ferrite blocks,

VOL
1127
ISS
1
JE
4
1991
UMI

by etching said at least one abutting surface through a second etching mask applied thereto;

butting and bonding together said first and second ferrite blocks at said abutting surfaces, to form an integral ferrite bar which has a closed magnetic path defined between said first and second blocks, said ferrite bar having a first magnetic gap corresponding to a total depth of said primary groove, and a second magnetic gap corresponding to a total depth of said primary groove and said secondary recesses;

applying a third etching mask to a surface of said ferrite bar in which said first and second magnetic gaps are open, and etching said surface of the ferrite bar to form a plurality of parallel spaced-apart air bearing portions on said first ferrite block, and a plurality of track portions which extend from said air bearing portions, respectively, and between said first and second ferrite blocks, said air bearing portions and said track portions having a predetermined height, and said track portions having a same width in a transverse direction perpendicular to a direction of extension of said air bearing portions, said first magnetic gap being open in one of each pair of two adjacent track portions of said plurality of track portions, while said second magnetic gap being open in the other of said each pair of two adjacent track portions; and



cutting said ferrite bar to prepare at least one core slider, each of which includes a slider body having the two adjacent air bearing portions corresponding to said adjacent two track portions, and a pair of yoke portions which are formed on said second ferrite block and which cooperate with said slider body to form said adjacent two track portions.

5,020,214

METHOD OF MANUFACTURING A HOT WIRE AIR FLOW METER

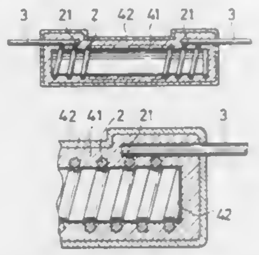
Shigeo Tsuruoka; Ken Takahashi; Tadahiko Miyoshi, and Hiroatsu Tokuda, all of Ibaraki, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 28, 1988, Ser. No. 250,212

Claims priority, application Japan, Sep. 30, 1987, 62-243791; Jan. 26, 1988, 63-15421; Jun. 23, 1988, 63-155196

Int. Cl.⁵ H05B *3/00;* **H01C** *17/02, 17/28*

U.S. Cl. 29—611 **19 Claims**



13. A method of making an exothermic resistor for an air flow meter, comprising steps of:

(1) providing a blank constituted by a resistor wire wound around a sublimatable core material, the resistor wire having opposed ends, the core material having opposite ends adjacent the opposed ends of the resistor wire;

(2) connecting a respective lead wire to the opposed ends of the resistor wire;

(3) forming a porous ceramic material coating on the resistor wire, the porous ceramic material coating having closed ends at the opposed ends of the resistor wire; and

(4) effecting sublimation of the sublimatable core material to remove the sublimatable core material.

5,020,215

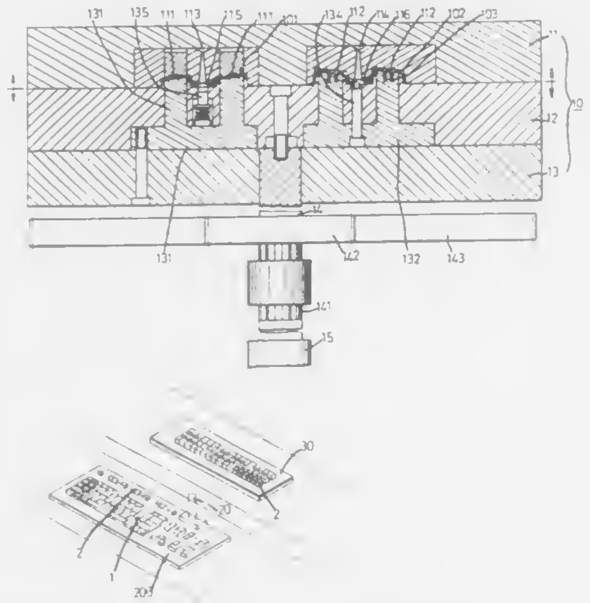
METHOD OF AN APPARATUS FOR MANUFACTURING A KEYBOARD

Huo-Lu Tsai, 6-6 Fl., No. 10, Chin-Shan Road, Taichung, Taiwan

Continuation-in-part of Ser. No. 113,760, Oct. 28, 1987, Pat. No. 4,831,719. This application Aug. 14, 1990, Ser. No. 567,384

Int. Cl.⁵ H01H *11/00;* **B23P** *19/00*

U.S. Cl. 29—622 **5 Claims**



1. A method of manufacturing a keyboard having character keys, function keys, and switches to be correspondingly socketted with said character and said function keys, said manufacturing method comprising:

molding said character keys in a first injection mold having cavities which coincide with character keys of a commercial keyboard;

removing said character keys from said first injection mold;

socketting said character keys on said corresponding switches of said keyboard;

molding said function keys in a second injection mold;

removing said function keys from said second injection mold and placing said function keys on a function key collecting board, said function keys being classified into individual groups corresponding to the arrangement of said function keys on said keyboard;

removing said individual groups of said function keys from said function key collecting board;

socketting said individual groups of said function keys on said corresponding switches of said keyboard; and

pressing said socketted character keys and said function keys onto said corresponding switches.

2. An apparatus for manufacturing a keyboard having character keys, function keys, and switches to be correspondingly socketted with said character and said function keys, said apparatus comprising:

a first injection mold for molding said character keys, said first injection mold having cavities which coincide with character keys of a commercial keyboard;

a second injection mold for molding said function keys;

a function key collecting board;

means for removing said character keys from said first injection mold and socketting said character keys on said corresponding switches of said keyboard, said removing and socketting means similarly removing said function keys from said second injection mold and placing said function keys on said function key collecting board, said function keys on said function key collecting board being classified into individual groups corresponding to the arrangement of said function keys on said keyboard, said removing and socketting means also removing said individual groups of said function keys from said function key collecting board and socketting said individual groups of function keys on said corresponding switches of said keyboard;

means for classifying said function keys into said individual groups and for controlling said removing and socketting means to effect movement of said individual groups of said function keys from said function key collecting board and socketting of said individual groups of said function keys on said corresponding switches of said keyboard; and

means for pressing said socketted character and said function keys onto said corresponding switches.

5,020,216

APPARATUS FOR LOADING CABLE ON CONNECTOR

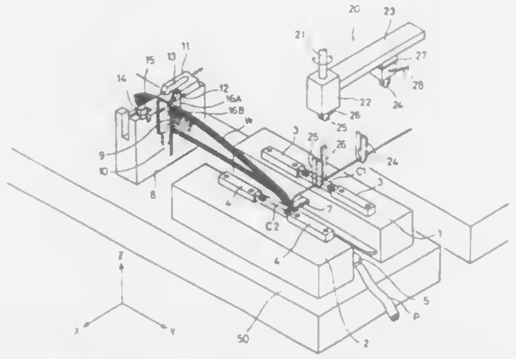
Hideyuki Ishioka, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan

Filed Apr. 27, 1990, Ser. No. 515,630

Claims priority, application Japan, May 30, 1989, 1-134764

Int. Cl.⁵ H01N *43/04*

U.S. Cl. 29—753 **4 Claims**



1. Apparatus for loading a plurality of conductors of a multiconductor cable on a plurality of contacts or retaining channels of a connector, which comprises:

a connector holder for holding said connector such that said contacts or retaining channels are exposed;

a cable holder provided adjacent said connector holder for holding said multiconductor cable beside said connector holder;

receiver means provided adjacent said connector holder, said receiver means including:

a receiver slit extending downwardly from a top surface of said receiver means and having a width substantially equal to a conductor diameter for receiving said conductors aligned one upon another in a vertical plane parallel to said connector holder;

a biasing plate provided at a bottom of said receiver slit for biasing upwardly said aligned conductors;

transfer means provided on said receiver means for reciprocating movement in a direction perpendicular to said vertical plane and having a transfer groove extending parallel to said vertical plane for moving a single top conductor in said receiving slit;

a receiving groove provided on said top surface extending parallel to said vertical plane for receiving a conductor when said transfer means is moved to an advanced position;

an escapement slot extending in a direction perpendicular to said vertical plane and downwardly from said top surface by a distance greater than said conductor diameter;

two pairs of fingers for entering said escapement slot to hold said conductor therebetween when said transfer means is moved to an advanced position, one of said fingers having a blade member which cuts an insulation of said conductor into contact with a core wire;

carrier means with a frame rotatable about a shaft parallel to said vertical plane and movable in each direction of a rectangular coordinate system and having an arm for changing a distance between said two pairs of fingers;

pusher means provided on said carrier means adjacent one of said finger pairs and movable along said shaft to push said conductor into said contact or connection groove of said connector;

a movable base on which said cable holder, said cable receiver means, said carrier means, and said connector holder are mounted as a unit so that they reciprocate along said vertical plane as a unit; and

control means in response to a conductor number signal to move said fingers so that said conductor is placed above a desired contact or connection groove and inserted thereinto by said pusher means to thereby load said conductor on said connector.

5,020,217

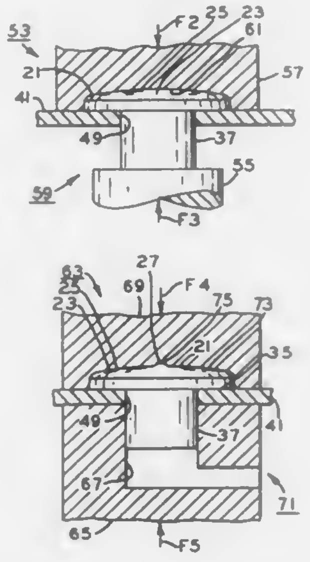
METHODS FOR FABRICATING AN ELECTRICAL CONTACT

Raphael A. Gonzalez, Sterling, and Ronald W. Kelly, Morrison, both of Ill., assignors to General Electric Company, Fort Wayne, Ind.

Filed Feb. 6, 1990, Ser. No. 475,916

Int. Cl.⁵ H01R *43/04*

U.S. Cl. 29—882 **50 Claims**



1. A method of fabricating an electrical contact having a centerline axis and formed at least in part of a precious metal defining a contact surface on the electrical contact extending about the centerline axis and with the electrical contact having a part arranged in spaced relation generally opposite the contact surface, the method comprising the steps of:

deforming the precious metal within a preselected central area on the contact surface at least adjacent the centerline axis and extending at least one projection of the precious

VOL
1127
ISS
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1991
UMI

metal to a preselected height beyond the preselected central area in response to the deforming step;
further deforming at least the at least one projection into a preselected configuration defining at least in part a chordal section of a sphere having a spherical radius in the range of between about 0.004 inches and about 0.010 inches and altering the extension of the at least one projection in its preselected configuration to another preselected height in a range between about 0.002 inches and about 0.008 inches beyond the preselected central area in response to the further deforming step; and
interconnecting the electrical contact part in retaining and electrically conductive engagement with an electrically conductive means for supporting the electrical contact during the further deforming step.

5,020,218

METHOD FOR MANUFACTURING A REFRIGERATOR COLD HEAD HOUSING

Wilhelm Strasser, Bergisch-Gladbach, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Fed. Rep. of Germany

Filed Jun. 30, 1989, Ser. No. 374,472

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1988, 3822239

Int. Cl.^{5} B23P *15/26*

U.S. Cl. 29—890.035 **11 Claims**

7. A method for manufacturing a refrigerator housing of a refrigerator cold head from a plurality of component parts including at least one cylindrical wall, said method comprising the following steps:
manufacturing said at least one cylindrical wall from a tube section by a cold-working process;
providing, among said component parts, means for closing a first end of said refrigerator housing;
manufacturing said means for closing a first end by deep-drawing; and soldering or welding said component parts to one another.

5,020,219

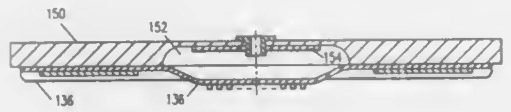
METHOD OF MAKING A FLEXIBLE TESTER SURFACE FOR TESTING INTEGRATED CIRCUITS

Glenn J. Leedy, 1061 E. Mountain Dr., Santa Barbara, Calif. 93108

Division of Ser. No. 194,596, May 16, 1988, Pat. No. 4,924,589. This application Nov. 14, 1989, Ser. No. 436,395

Int. Cl.^{5} H05K *3/02*

U.S. Cl. 2⁰—846 **27 Claims**



1. A method of making an integrated circuit tester surface comprising the steps of:
forming at least one layer of flexible material on a surface of substrate;
forming a plurality of conductive vias in each of said layers;
depositing a thin film of conductive metal on each of said layers and in said vias;
patterning said thin film to form conductive traces;
releasing said layer from said substrate; and
forming conductive probe points at said vias.

5,020,220

DEVICE FOR OPENING FILM-LIKE CLOSURE

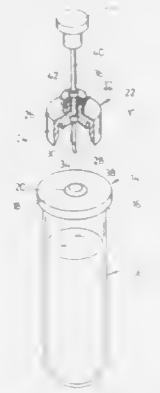
Sanae Miyake; Masaaki Kasai; Sakae Yamazaki, and Takato Murashita, all of Yamanashi, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 25, 1990, Ser. No. 469,941

Claims priority, application Japan, Jan. 27, 1989, 1-18223

Int. Cl.^{5} B67B *7/00*

U.S. Cl. 30—2 **20 Claims**



1. A device for opening a film-like closure which seals the open end of a bottomed cylindrical tubular container, said device comprising:
a cutter comprising a substantially solid cylindrical body having a substantially circular cross-section and a longitudinal axis, said cylindrical body having one end thereof defining a surface which is slanted with respect to said axis of said cutter, said cutter including a cutting edge disposed on a circumference of said slanted surface for cutting off at least a substantial portion of the film-like closure along said open end of said tubular container; and
gripper means for displacing said cutter with respect to said tubular container;
said circumference with said cutting edge thereon having a notch formed therein so as to prevent cutting of said film-like closure at a position corresponding to the notch; and
a stopper disposed on said substantially solid cylindrical body adjacent to said cutting edge for limiting entry of said cutter into said tubular container to a predetermined distance.

5,020,221

PIPE CHAMFER AND DEBURRING TOOL

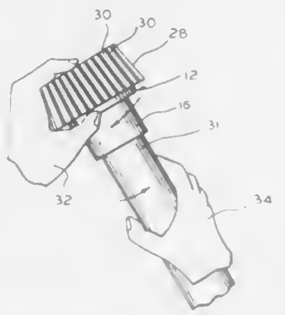
Clifford P. Nelson, 139½ E. Division, Kewanee, Ill. 61443

Filed Oct. 22, 1987, Ser. No. 112,501

Int. Cl.^{5} B26B *3/00*

U.S. Cl. 30—169 **11 Claims**

1. A deburring and chambering device for pipes, said device comprising an outer shell, a cutting means, a slotted inner tube fitting and a grip; said outer shell and said inner tube fitting over an locking said cutting means against axial movement as said cutting means fits into said slots, with said cutting means shaped to seat itself on the wall of the pipe for dramatically shaping an end of a pipe when turned in a counter-clockwise manner, and said grip surrounding and attached to said outer shell.



5,020,222

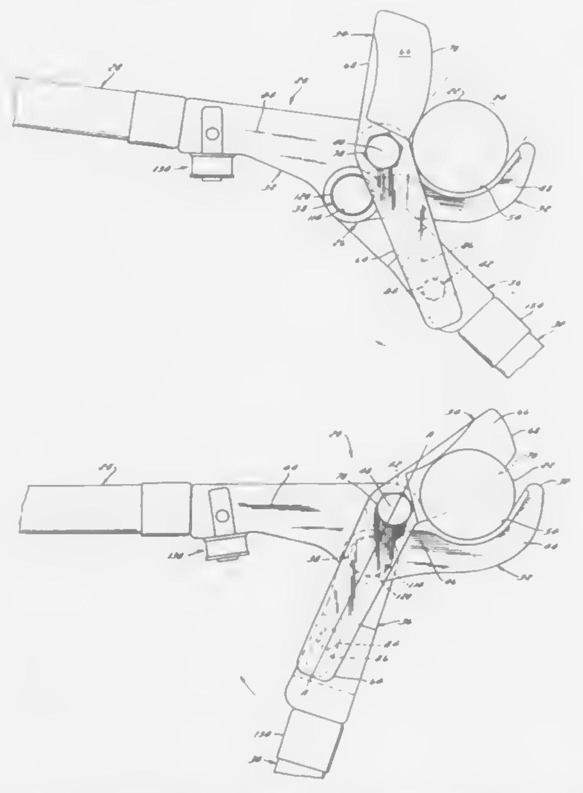
VARIABLE FORCE COMPOUND ACTION LEVERAGE TOOL

Robert G. Gosselin, Springfield, and Edward M. Wallace, Longmeadow, both of Mass., assignors to Fiskars Oy Ab, Helsinki, Finland

Filed Feb. 10, 1987, Ser. No. 12,890

Int. Cl.^{5} B26B *13/28*

U.S. Cl. 30—251 **9 Claims**



1. Shears for effecting a cutting stroke through a workpiece wherein a maximum resistance to cutting is anticipated at a predetermined point in the cutting stroke, said shears comprising:
first and second shearing members;
a first pivot connection between said shearing members; and
means for articulating said shearing members through said cutting stroke, said means for articulating comprising:
a lever;
a second pivot connection between said lever and said first shearing member; and
connecting means for effecting a point of interaction between said lever and said second shearing member, wherein:
said second shearing member overlies said first shearing member in the vicinity of said first pivot connection and said first shearing member overlies said lever in the vicinity of said second pivot connection;
said second pivot connection does not extend substantially further than said first shearing member in the vicinity of said second pivot connection, towards the plane of said second shearing member; and
said first and second pivots and said point of interaction are disposed to come into alignment, to thus provide maximum force in said cutting stroke, at said predetermined point in said cutting stroke.

5,020,223

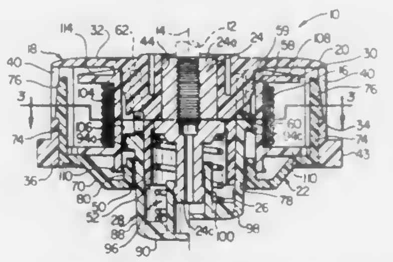
SIMPLIFIED BUMP-FEED TYPE CUTTING HEAD ASSEMBLY FOR FLEXIBLE LINE TRIMMERS

Nash S. Desent, and Imack L. Collins, both of Shreveport, La., assignors to White Consolidated Industries, Inc., Cleveland, Ohio

Filed Nov. 2, 1989, Ser. No. 430,672

Int. Cl.^{5} A01D *55/18*

U.S. Cl. 30—276 **21 Claims**



20. Apparatus for holding flexible cutting line within a rotatable cutting head assembly of a flexible line trimmer, said apparatus comprising:
a line storage spool member having:
a hollow, open-ended cylindrical hub having an interior side surface,
first and second axially spaced flanges secured to and extending radially outwardly from opposite end portions of said hub and defining therewith an annular line storage cavity,
a first circumferentially spaced annular series of radially inwardly directed tooth members formed on said interior side surface of said hub, and
a second circumferentially spaced annular series of radially inwardly directed tooth members formed on said interior side surface of said hub, said first and second series of tooth members being circumferentially and axially offset from one another.

5,020,224

SEMI-AUTOMATIC STRING TRIMMER HEAD

Eugene J. Haupt, Nipomo, Calif., assignor to White Consolidated Industries, Inc., Cleveland, Ohio

Continuation of Ser. No. 222,652, Jul. 21, 1988, Pat. No. 4,926,557. This application May 4, 1990, Ser. No. 518,962

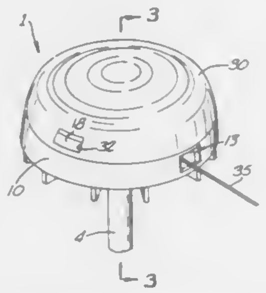
Int. Cl.^{5} B26B *7/00;* **A01D** *50/00*

U.S. Cl. 30—276 **4 Claims**

1. A feed head for a string trimmer or the like, said feed head being rotationally drivable at a high speed about a center axis thereof and comprising:
a hollow housing structure circumscribing said center axis and having a side wall portion with a line exit port therein;
a spool member coaxially disposed within said housing

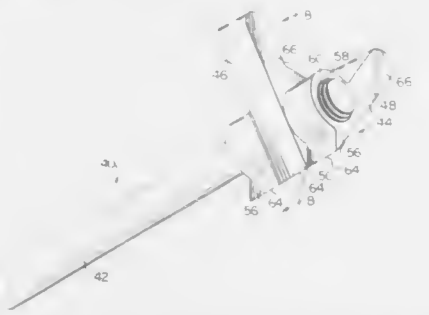
VOL
1127
ISS
1
JE
4
1991
UMI

structure for driven rotation therewith about said center axis, said spool member being adapted to hold a length of flexible cutting line with a free end portion of the line extending outwardly through said exit port to be whirled at high speed, in a cutting plane transverse to said center axis, in response to driven rotation of said feed head; and



cooperating means on said housing structure and said spool member for creating a predetermined incremental relative rotation between said housing structure and said spool member about said center axis, in a manner correspondingly lengthening the free end portion of the line, in response to a driven rotational acceleration of said feed head about said center axis from a stopped condition.

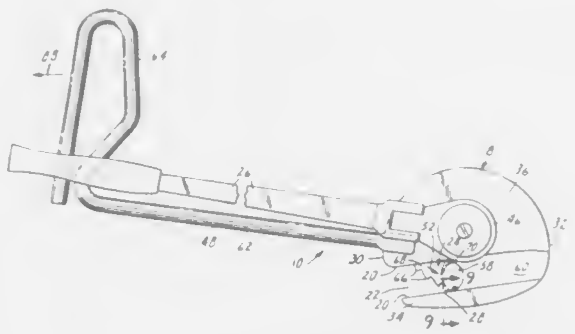
5,020,225
SPLITTING TOOL
Ewald A. Stellrecht, 407 Spackman La., Exton, Pa. 19341
Filed Aug. 3, 1990, Ser. No. 562,775
Int. Cl.⁵ B26B *23/00*
U.S. Cl. 30—308.1 8 Claims



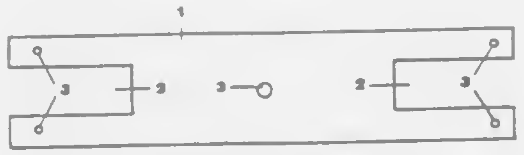
2. A splitting tool, comprising a splitting head and means for impelling the splitting head toward an object to be split, the splitting head comprising first and second wedge means, the first wedge means being fixed relative to the impelling means and the second wedge means being rotatable relative to the first wedge means about an axis of rotation, each wedge means having a front edge for striking and penetrating the object to be split, the second wedge means having a center of mass offset from the axis of rotation for creating a force moment about the axis acting on the second wedge means when the splitting head is accelerated, the force moment tending to align the front edges of the first and second wedge means along a common plane when the splitting head is accelerated in a first and second wedge means when the splitting head is accelerated in the opposite direction.

5,020,226
CAST CUTTER AND METHOD
Jean-Paul Chabbert, Venerque, France, assignor to Societe Laboratoires 3M Sante, Pithiviers, France
Filed Apr. 30, 1990, Ser. No. 516,448
Int. Cl.⁵ B23D *45/16;* A61B *17/32*
U.S. Cl. 30—390 12 Claims

1. An assembly for cutting through a cast of the type typically having flexible wrapping and a rigid shell, the assembly comprising:
- a side plate having edges defining an elongate notch for receiving the cast, the edges including at least one cutting portion;
- a cutting blade rotatably mounted on the side plate adjacent the notch and in sliding scissors-like engagement with the cutting portion of the side plate to shear the wrapping and shell between the cutting portion and the cutting blade as the cutting blade is rotated; and
- means for rotating the cutting blade relative to the cutting portion of the side plate;
- the cutting blade including cutting means for saw-like removal of material from the shell to cut the shell and for scissors-like tensioning and shearing of the wrapping between the cutting portion of the side plate and the cutting blade.

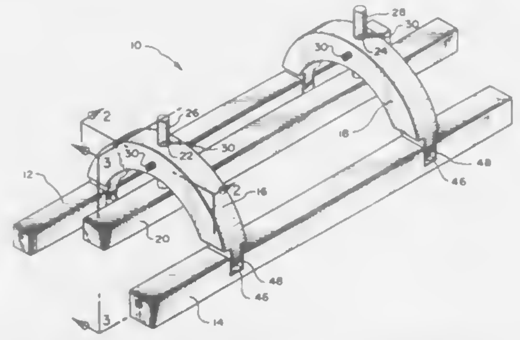


5,020,227
RADEI—A BEAM COMPASS
Carl F. Hagerup, 4900 Thane Rd., Juneau, Ak. 99801
Continuation of Ser. No. 896,807, Aug. 15, 1986, abandoned. This application May 17, 1989, Ser. No. 228,253
Int. Cl.⁵ B43L *9/04*
U.S. Cl. 33—27.03 1 Claim



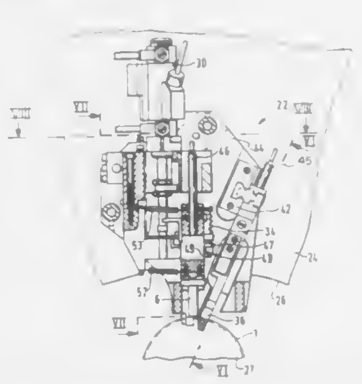
1. A beam compass comprising an elongated graduated beam member, a carriage having a hollow resilient body portion connected to a pivot point/indicator assembly, said resilient portion having an aperture therethrough adjacent said assembly for normally grippingly engaging and encompassing said graduated beam, said carriage being movable along said beam by application of finger pressure to said resilient portion to thereby release the normal gripping engagement of said body portion and beam, said carriage having a knob atop said resilient body portion and a pointed pivot member attached to the pivot point assembly, said beam adjacent and end thereof having an aperture therethrough for receiving an elongated scriber in parallel relation with said pivot member, said beam including means for resiliently retaining said scriber in said aperture, said means comprising a vertical slit extending past and intersecting said scriber aperture thereby forming two resilient arm members at said beam end, a pair of through apertures in the beam extending transversely to and adjacent said scriber aperture and a pair of horizontal grooves in said beam end orthogonally intersecting said vertical slit, and resilient means threaded through, said through apertures and engaging said horizontal grooves for creating inward pressure on the resilient arms for holding said scriber in said aperture.

5,020,228
JIG FOR ALIGNING CUTTER BLADES TO A CUTTER HEAD
Geroge D. Hessenthaler, 1415 Skyview Dr., Salt Lake City, Utah 84117
Filed Jul. 5, 1985, Ser. No. 751,890
The portion of the term of this patent subsequent to Jul. 4, 2004, has been disclaimed.
Int. Cl.⁵ B27G *23/00*
U.S. Cl. 33—628 4 Claims



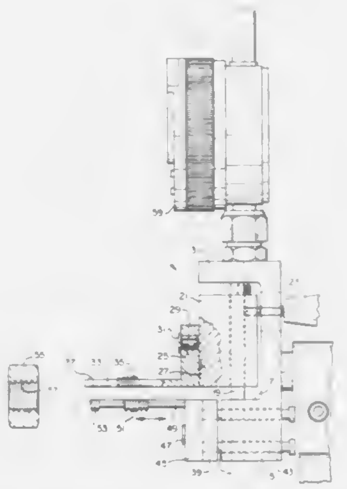
1. A jig for aligning cutter blades to a cutter head comprising: a pair of base bars,
- means holding the base bars in spaced apart, parallel relationship, said means including at least two support means, and means pivotally attaching ends of each of the support members to a base bar;
- a knife bar extending between and parallel to the base bars, said knife bar being supported at spaced positions therealong by the support members
- means carried by each of said support members and connected to the knife bar at said spaced positions for adjustably positioning the knife bar in a plane extending normal to the plane containing the parallel base bars; and
- magnets in the bottom surfaces of the base bars and the knife bar.

5,020,229
APPARATUS AND METHOD FOR MEASURING SCREW THREADS
Volker Schwarz, Zimmern, and Manfred Mayer, Schramberg, both of Fed. Rep. of Germany, assignors to Mauser-Werke Obernourf GmbH, Oberndorf, Fed. Rep. of Germany
Continuation of Ser. No. 57,795, Jun. 3, 1987, abandoned, which is a continuation-in-part of Ser. No. 758,209, Jul. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 490,354, May 2, 1983, abandoned. This application Aug. 28, 1989, Ser. No. 401,560
Claims priority, application Fed. Rep. of Germany, May 13, 1982, 3217995
Int. Cl.⁵ G01B *7/28*
U.S. Cl. 33—199 R 3 Claims



1. A device for measuring the external threads on pipes with a measuring head that has at least one measuring probe that can travel in linear measurement directions for point contacting two measurement surfaces of the external thread forming an angle between them wherein the measuring head (22) is essentially annular and may move freely in the axial direction (7) or (X) over the external thread (1) of the pipe (27) and has a first measuring probe (36) for positioning it on the pipe (27) and a hunting pin (60) at an axial distance from it, that is functionally connected to the first measuring probe (36) contacts in such a way that after the measuring probe (36) contacts with the pipe (27) axially, the hunting pin (60) travels radially into a thread groove (64) of thread (1) when the axial motion of the measuring head (22) is discontinued, and also has at least one other measuring probe (6) located at an axial distance from the hunting pin (60) that is biased forwards simultaneously in two different linear directions of measurement (7X, 8Y) by means of a plurality of springs (32, 34), whose displacements are discontinued when the measuring probe (6) contacts the measurement surfaces (16) and (17), the measuring probe (6) being mounted on the head for travel simultaneously in the two linear directions of measurement (7X, 8Y) independent of one another, with which is associated a direction of force (12) at an angle to the directions of measurement (7X, 8Y); acting as the resultant.

5,020,230
INTERNAL THREAD GAGE
Joe E. Greenslade, P.O. Box 330865, Fort Worth, Tex. 76063
Filed Jul. 10, 1990, Ser. No. 550,445
Int. Cl.⁵ G01B *3/48*
U.S. Cl. 33—199 R 12 Claims



1. An internal thread gage for gaging internal threads of a fastener, comprising in combination:
- a frame with a frame axis;
- a mounting block;
- a pair of gage fingers, each having a partially cylindrical section containing threads;
- first mounting means for mounting one of the gage fingers to the mounting block;
- second mounting means for mounting the other of the gage fingers to the frame, with the gage fingers in juxtaposition with the each other to define a common finger axis between them which is perpendicular to the frame axis;
- means for moving the mounting block in a straight line relative to the frame along the frame axis for positioning the gage fingers in a constricted position to allow a fastener to be inserted over the gage fingers and an expanded position with the threads of each in engagement with the internal threads of the fastener to measure the internal threads of the fastener; and

VOL
1127
ISS
1
JE
4
1991
UMI

one of the mounting means allowing one of the gage fingers to move relative to the frame and to the other gage finger along the finger axis so as to allow helical path alignment of the threads of the gage fingers.

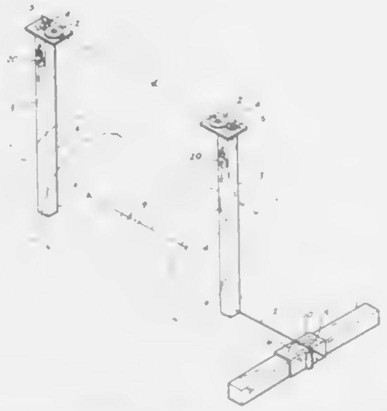
5,020,231
WHEEL ALIGNMENT TOOL

Nichol Huynh, 505 Harr Dr. #G, Midwest City, Okla. 73110

Filed May 30, 1989, Ser. No. 358,070

Int. Cl.⁵ G01B *5/255*

U.S. Cl. 33—203.18 **5 Claims**



1. A tool for measuring the steering angle of a wheel consists of a sliding block, a guiding track, a guiding pin, a protractor, and an indicator; said indicator is fixed to said tool's body, and it slides through said guiding pin to push said sliding block with said protractor on top along said guiding track; said guiding track is means to keep said sliding block moving in one direction; said guiding pin is means to allow said indicator to translate and rotate at the center of said protractor; therefore, said steering angle measuring tool comprises means to keep said protractor traveling in one direction and means to show angular displacement of said wheel on said protractor from said direction.

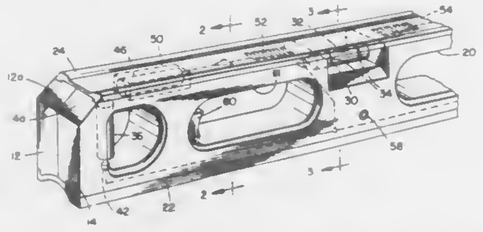
5,020,232
ILLUMINATED LEVEL

Carlton L. Whiteford, 3 High Point Rd., Westport, Conn. 06880

Filed Apr. 12, 1990, Ser. No. 508,802

Int. Cl.⁵ G01C *9/32*

U.S. Cl. 33—348.2 **8 Claims**



1. A spirit level comprising: an elongate body having a generally rectangular cross-section and parallel top and bottom surfaces, said body comprising firs and second planar shells secured together side-by-side by an elongate metal strip which covers said bottom surface and grips exterior side surfaces of said shells, and by an elongate strip of transparent material which covers said top surface and grips exterior side surfaces of said shells and is slidable back and forth with respect to said body,

a first bubble vial supported on said body equidistant from its ends near said top surface with its long axis disposed parallel to the bottom surface, and at least a second bubble vial supported within said body near an end thereof with its long axis disposed perpendicular to the long axis of said first bubble vial,

at least first and second light-emitting diodes supported within said body, each adjacent an end of a respective one of said first and said at least second bubble vial,

a rechargeable battery disposed in said body for energizing said light-emitting diodes when connected thereto,

solar cell means disposed in the top surface of said body beneath said transparent strip for exposure to ambient light and electrically connected to said battery for charging the same in response to light incident thereon, and

circuit means connected across the terminals of said battery including a normally open on/off switch connected in series with an orientation-dependent switch, said orientation-dependent switches each comprising a mercury switch for opening and closing an electric circuit by tilting a reservoir of liquid mercury and being supported within said body at different fixed relative orientations with respect to the body such that when said normally open on/off switch is closed said first orientation-dependent switch, and only said first switch, closes and applies voltage to said first light-emitting diode when said body is horizontally oriented for illuminating only said first bubble vial, and said second orientation-dependent switch, and only said second switch, closes and applies voltage to said second light-emitting diode when said body is approximately vertically oriented for illuminating only said second bubble vial.

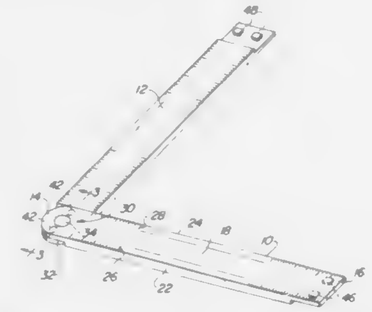
5,020,233
MEASURING INSTRUMENT

Jeffrey M. Syken, 211-10 73rd Ave., Apartment 4C, Bayside, N.Y.

Filed Mar. 14, 1990, Ser. No. 493,167

Int. Cl.⁵ B43L *7/10, 7/12*

U.S. Cl. 33—465 **11 Claims**



1. A measuring instrument, comprising: first and second elongated, substantially similar members, each having a generally flat bottom surface, opposite ends and side edges, and each side bearing measuring indicia, said members being arranged in a first mode in the form of a right-angled L with one end of the first member meeting one end of the second member, with the opposite ends of the members free, and with the top and bottom surfaces respectively coplanar, pivot means on an axis normal to the plane of the top surfaces and interconnecting the meeting ends of the members, detent means at said meeting ends for retaining the right-angled relationship of the members, said detent means being releasable in response to manual force to enable pivoting of one member relative to the other through 180° to a second mode in the form of a right-angled inverted L, and the detent means being effect in the second mode for retaining inverted right-angled relationship of the members in which the pivot means is separable to enable third-mode use of the members in coplanar, end-to-end, straight-line fashion with the free ends of the members meeting at a junction, and snap-fit means respectively on said free ends, cooperate to provide a releasable connection at said junction; wherein, in the third mode of use of the members the reoriented top and bottom surfaces of the members are coplanar.

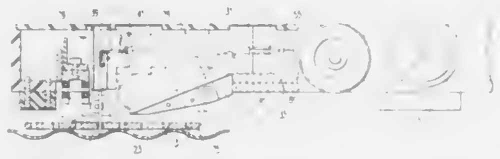
5,020,234
PROBER FOR TESTING GENERATOR STATOR WEDGE TIGHTNESS WITH ROTOR IN PLACE

Gerald R. Alkire, Winter Springs, Fla.; George F. Dailey, Plum Borough, and Mark W. Fischer, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 1, 1989, Ser. No. 403,419

Int. Cl.⁵ G01B *7/14, 21/16*

U.S. Cl. 33—656 **22 Claims**



1. Apparatus for measuring the tightness of stator wedges held in place by ripple springs in an electric generator having a rotor and a stator separated by a narrow radial gap without removing the rotor, where selected of said stator wedges have a series of longitudinally spaced holes through which the ripple springs are accessible, said apparatus comprising:

a low profile carriage insertable in said narrow gap between the rotor and stator and successively positionable adjacent each hole in said series of holes through said selected stator wedges;

a probe;

probe mounting means mounting said probe on said low profile carriage and selectively extending said probe through an adjacent hole in said selected wedges and into contact with said ripple springs; and

means measuring the extension of said probe.

5,020,235
LAYOUT DEVICE FOR WALL MOUNTED ITEM

Ronald L. Martin, Bristol, Wis., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jul. 11, 1988, Ser. No. 217,195

Int. Cl.⁵ G01B *3/10*

U.S. Cl. 33—668 **13 Claims**

1 A layout device for marking a measured location for use with a separate extendable measuring tape having a housing, the housing having a first side and a spring clip with a hole formed therein on said first side, said device comprising:

a bracket mountable on said housing, said bracket also demountable from said housing to allow independent use of said extendable measuring tape, said bracket having a first leg, said first leg having a detent formed therein said first leg adapted to be engaged by the spring clip and resiliently forced against said housing, said detent for engaging said hole to further secure said bracket to the housing;

means carried on said bracket for aligning said extendable measuring tape in a predetermined direction; and

means carried on said bracket for marking a measured location.

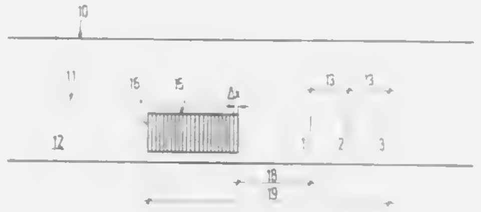
5,020,236
METHOD OF MEASURING THE DISTANCE BETWEEN THE AXLES OR WHEELS OF A VEHICLE, AND DEVICE FOR DOING SO

Harald Kauer; Knud Overlach, both of Ettlingen; Rolf Edelmann, Durmersheim, all of Fed. Rep. of Germany, and Siegfried Gassner, Waynesboro, Pa., assignors to Pietzsch AG, Ettlingen, Fed. Rep. of Germany

Filed Feb. 12, 1990, Ser. No. 479,067

Int. Cl.⁵ G01B *7/02*

U.S. Cl. 33—700 **14 Claims**



1. An arrangement for measuring the distance between axles or wheels of a vehicle comprising: a roadway with at least one sensing sill; a sensing section along said roadway having one end a maximum length from said sill corresponding to the smallest spacing between axles to be measured and having another end a minimum length from said sill corresponding to the largest spacing between axles to be measured, at least a first wheel on a first axle of the vehicle being located at said sensing sill and at least a second wheel on a second axle of the vehicle being located on said sensing section when measuring the distance between said first and second axles; and means on said sensing section for measuring the distance of said second wheel from said sensing sill and thereby measuring the distance between said first axle and said second axle.

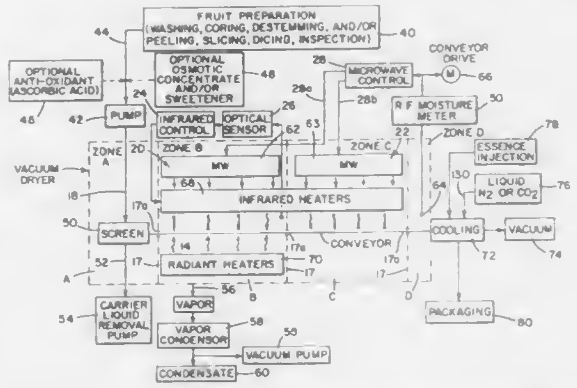
5,020,237
METHOD AND APPARATUS FOR DEHYDRATING FRUIT

David R. Gross, Orrville, and Robert J. Valenzky, Akron, both of Ohio, assignors to The J. M. Smucker Company, Orrville, Ohio

Division of Ser. No. 293,066, Jan. 3, 1989. This application Apr. 30, 1990, Ser. No. 516,474

Int. Cl.⁵ B01K *5/00*

U.S. Cl. 34—1 **40 Claims**



1. A vacuum dryer for removing moisture from a food product comprising: chamber means defining an elongated cavity having an inlet end and an outlet end; means for evacuating said cavity to a vacuum; inlet means communicating with said inlet end for presenting said food product into said cavity; outlet means associated with said outlet end for removing said food product from said cavity; conveyor means in said cavity

VOL
1127
ISS
1
JE
4
1991
UMI

for moving said food product from said inlet end to said outlet end through first and second heating zones on a preselected path; first infrared energy means and first microwave energy means operative simultaneously in said first heating zone for simultaneously heating the exterior and interior of said food product moving on said conveyor means along said path and through said first heating zone; second infrared energy means and second microwave energy means operatively associated with said cavity for simultaneously heating the interior and exterior of said food product moving on the conveyor means along said path and through said second heating zone; first control means for controlling the energy of said first infrared energy means to provide a predetermined surface temperature for said food product moving through said first zone; second control means for controlling the energy level of said first microwave energy means to provide predetermined internal heating of said food product in said first zone, said first control means and said second control means being effective to establish a moisture gradient toward the outer surface of said food product in said first zone and a surface temperature at said vacuum effective for evaporating substantially all of the moisture exiting from said food product; and, cooling means operatively associated with said outlet means for receiving said food product from said conveyor means and effective to cool said food product and discharge said food product at atmospheric pressure exterior of said chamber means.

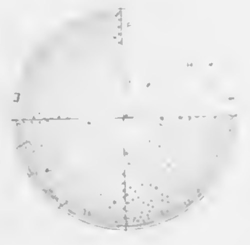
5,020,238
VACUUM GUIDE ROLL APPARATUS

Gregory L. Wedel, and Arnold J. Roerig, both of Beloit, Wis., assignors to Beloit Corporation, Beloit, Wis.

Division of Ser. No. 429,592, Oct. 31, 1989, Pat. No. 4,974,340. This application May 17, 1990, Ser. No. 525,380

Int. Cl.^{5} F26B *5/04, 11/02*

U.S. Cl. 34—16 2 Claims



1. A method for guiding a web between an upstream dryer and a downstream dryer of a dryer section, said method comprising the steps of:

guiding a web from the upstream dryer around a vacuum guide roll having a perforate shell, the shell having a first and second end, the shell defining an elongate chamber extending between the first and the second ends;

rigidly securing a first and second shaft disposed coaxially relative to the shell adjacent to the first and the second ends respectively of the shell, the shafts defining respectively first and second journals;

rotatably supporting the first and second journals within first and second bearings such that the roll shell is rotatably supported within the bearings;

rotating the shafts and the shell relative to a housing disposed coaxially relative to the shell, the housing defining a passageway connected to a source of partial vacuum; and

sealing the housing relative to the shell and one of the shafts such that when the housing is connected to the source of partial vacuum, air is drawn through the shell, the elongate chamber, and the passageway towards the source of partial vacuum so that the web is drawn into close conformity with the perforate shell, thereby inhibiting cockling and shrinkage of the web during transit of the web through the dryer section.

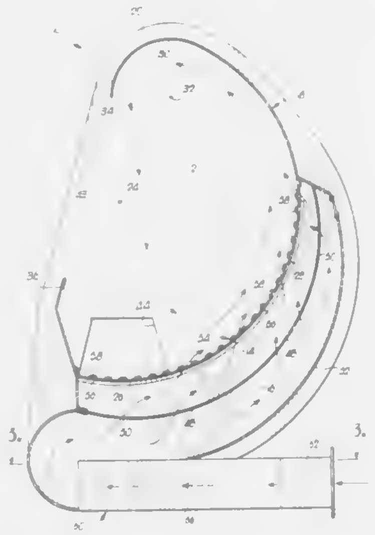
5,020,239
AIR SUSPENSION ENROBER

Roy E. Singer, Crystal, Minn., assignor to Wenger Manufacturing, Inc., Sabetha, Kans.

Filed Jun. 8, 1990, Ser. No. 558,235

Int. Cl.^{5} F26B *17/10*

U.S. Cl. 34—57 R 9 Claims



1. An apparatus for use in suspending material to be submitted to a treatment operation, the apparatus comprising:

an elongated treatment chamber extending axially in a first direction and having a front side and first and second axial ends, the treatment chamber being defined by a floor, a lateral guide surface which angles upward from the floor away from the front side, an upper guide surface spaced vertically from the floor, and a front wall extending upward from the floor along the front side of the treatment chamber,

the front wall and the upper guide surface together defining an unrestricted opening in the front side of the treatment chamber which extends axially along at least a portion of the length of the treatment chamber and circumferentially between the front wall and the upper guide surface; and

means for introducing a suspension fluid into the treatment chamber within a region extending axially along the length of the treatment chamber and circumferentially along at least a portion of the floor and lateral guide surface, the introduction means including fluid directing means for directing the suspension fluid in a direction substantially circumferential to the treatment chamber along said portion of the floor and lateral guide surface such that material in the treatment chamber is suspended in and carried by the suspending fluid from the floor upward along the lateral guide surface to the upper guide surface which directs the material vertically downward toward the floor past the opening.

5,020,240
FABRIC SOFTENER DISPENSER

Ling H. Lee, Memphis, Tenn., assignor to WAGI Partnership, Memphis, Tenn.

Filed Mar. 1, 1990, Ser. No. 486,832

Int. Cl.^{5} F26B *19/00*

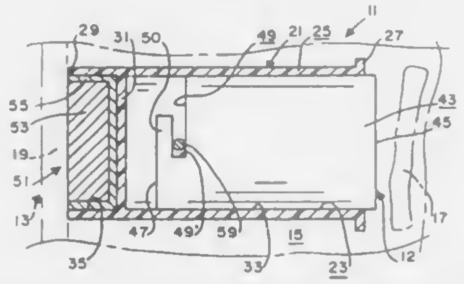
U.S. Cl. 34—60 17 Claims

1. The combination with a clothes dryer and a solid fabric softener cartridge, of a fabric softener dispenser, said clothes dryer having a drying chamber for receiving clothes to be dried, said solid fabric softener cartridge having a first end and a second end, said fabric softener dispenser comprising:

(a) housing means for holding said solid fabric softener cartridge; said housing means having a cavity for receiving said second end of said solid fabric softener cartridge;

(b) attachment means for attaching said housing means to said clothes dryer with said first end of said solid fabric softener cartridge extending into said drying chamber of said clothes dryer for contacting said clothes as said clothes are dried; and

(c) adjustment means for allowing said solid fabric softener cartridge to be advanced out of said cavity of said housing means as said first end of said solid softener cartridge is worn down by contact with said clothes as said clothes are dried; said adjustment means including means for allowing pressure to be applied to said solid fabric softener cartridge for advancing said solid fabric softener cartridge out of said cavity of said housing means as said first end of said solid softener cartridge is worn down by contact with said clothes as said clothes are dried.



5,020,241
SIEVE DRUM DEVICE WITH SCREEN COVER

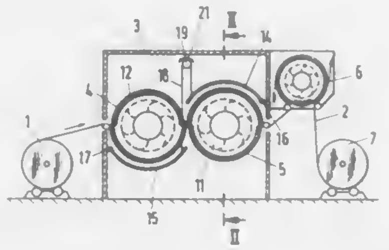
Gerold Fleissner, Chur, Switzerland, assignor to Fleissner Maschinenfabrik AG, Rebstein, Switzerland

Filed Feb. 20, 1990, Ser. No. 481,640

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1989, 3005001

Int. Cl.^{5} F26B *11/02*

U.S. Cl. 34—115 6 Claims



1. A sieve drum device for the flow-through heat treatment of a gas-permeable length of material, which comprises a substantially closed housing, the inner space of which is subdivided by a wall into a treatment chamber and a fan chamber; a sieve drum, under a suction draft and covered in a peripheral zone not blanketed by the material, rotatably mounted in the treatment chamber as a conveying element; and a fan in the fan chamber associated with the sieve drum at an end face side of the sieve drum, said fan blowing a treatment gas suctioned out of the sieve drum, after heating by means of an associated heating unit, again back into the treatment chamber via a perforated screen cover concentrically surrounding the sieve drum, the screen cover being articulated in the treatment chamber to be swingable about an axis in parallel to the sieve drum axis.

5,020,242
GUIDE ROLL FOR A POROUS BELT

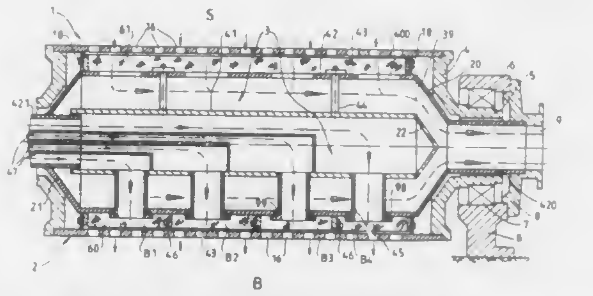
Wolfgang Mayer; Wolfram Sturm; Hans-Joachim Fissmann, all of Heidenheim; Gerhard Kotitschke, Steinheim; Georg Zürn, Heidenheim; Werner Kade, Heidenheim, and Georg Kugler, Heidenheim, all of Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Mar. 8, 1990, Ser. No. 490,835

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1989, 3907481; May 5, 1989, 3914761

Int. Cl.^{5} F26B *13/16, 13/08;* **D21F** *3/10*

U.S. Cl. 34—115 26 Claims



1. A guide roll for a porous belt comprising:

a hollow stationary air guide box having at least two air chambers disposed therein, each of said air chambers extending across the length of said guide roll, said air chambers being axially movable relative to one another, one of said air chamber being in communication with a blowing zone for the discharge of blowing air, and another of said air chambers being in communication with a suction zone for the intake and removal of suction air;

means for allowing relative axial movement of said air chambers; and

a perforated roll shell rotatable about said air guide box, said perforated roll shell and said air guide box defining an annular space therebetween, said annular space being divided through longitudinal seals into said blowing zone and said suction zone, said longitudinal seals being arranged on said air guide box and bearing on the inside of said roll shell.

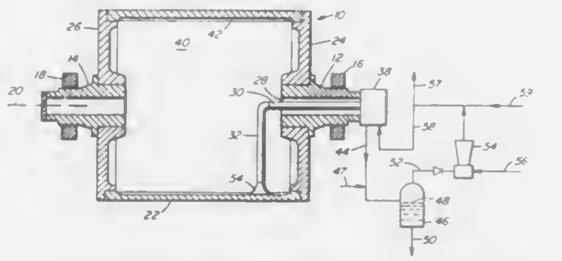
5,020,243
DRYER SYPHON

George B. Miller, North Vancouver, and John G. Sanderson, Burnaby, both of Canada, assignors to MacMillan Bloedel Limited, Burnaby, Canada

Filed Dec. 1, 1989, Ser. No. 444,242

Int. Cl.^{5} F26B *13/08*

U.S. Cl. 34—119 13 Claims



1. A dryer syphon for withdrawal of condensate from a steam heated drum having an outside shell mounted for rotation about an axis of rotation comprising a shoe mounted in said dryer, an inner shoe plate within and concentric with said shoe, said shoe having a condensate and steam inlet gap defined on one side by a lip on said shoe and on the other side by an inside surface said shell of said drum, said gap having a preselected area (a_p), said area being defined by a perimeter

VOL
1127
ISS
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JE
4
1991
UMI

(P_G) of said gap and a spacing (t) between said inside surface of said shell and an inside surface of said lip on said shoe, said perimeter P_G and said spacing (t) being correlated with rimming depth (Y) of condensate rimming said dryer drum when said dryer drum is operating under its preselected maximum operating conditions, said perimeter P_G and said spacing (t) being relatively dimensioned to accomodate flow of condensate and of steam from the interior of said drum into said gap in a ratio of condensate to steam entering said syphon so that distributed flow of said steam and said condensate is produced in said gap under maximum condensate flow into said syphon at said preselected maximum operating conditions with substantially a minimum amount of said steam required to produce distributed flow entering said gap, a transition passage extending from said gap to a conduit, said passage having throughout its length a substantially constant cross sectional area measured perpendicular to the direction of steam and condensate flow therethrough, said cross sectional area being not significantly greater than the area of said gap (a_p), said transition passage being defined by an inside surface on said shoe and an outside surface of said inner shoe plate, said inside and outside surfaces defining a smooth transition for distributed flow of said steam and condensate from a flow entering said gap around said periphery in a direction substantially parallel to said inside surface of said shell to a flow in a direction toward said axis or rotation and said conduit having a cross sectional area substantially the same as said cross sectional area of said passage whereby distributed flow of said steam and said condensate is maintained throughout their passage through said syphon to carry said condensate under distributed flow conditions from said dryer drum.

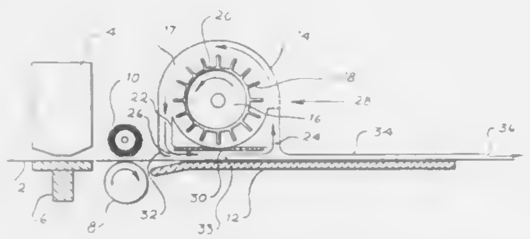
5,020,244
METHOD AND APPARATUS FOR DRYING LIQUID ON PRINTED MEDIA

Normand C. Smith, Versailles, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 1, 1989, Ser. No. 444,262

Int. Cl.^{5} F26B *13/00*

U.S. Cl. 34—155 **12 Claims**



1 An apparatus for drying ink on a printed media comprising;

- means for advancing a media, having ink deposited thereon, along a media path,
- a housing having an open portion in proximity to said media path and a separate opening for admitting ambient air,
- a fixed heating element mounted along said media path for heating air,
- a fan mounted within said housing and driven by motor means for drawing heated and ambient air into said housing,
- means for discharging heated air from said housing at high velocity onto said media path, said discharging means including a shroud extending from said housing and being parallel to said media path, thereby defining a thin cavity between said shroud and said media path to direct heated air onto said media, and
- means for capturing said heated air discharged onto said media path for recirculation by said fan.

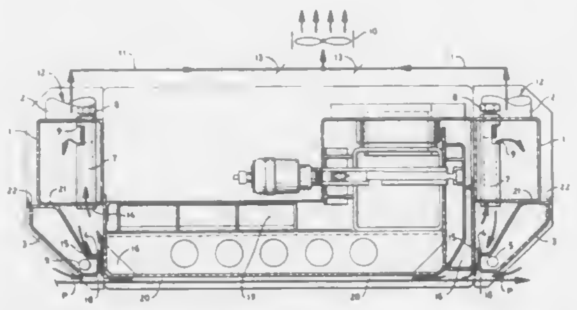
5,020,245
STEAM SHOWER VACUUM APPARATUS

Eric T. Langevin, Northboro; Austin L. Carter, Jr., Sutton; Michael J. Van Kleeck, Southbridge, all of Mass., and Bruce E. Taylor, San Jose, Calif., assignors to Thermo Electron Web Systems, Inc., Auburn, Mass.

Filed Apr. 18, 1989, Ser. No. 339,973

Int. Cl.^{5} F26B *13/00*

U.S. Cl. 34—155 **13 Claims**



1. An apparatus for removing excess steam from a web for the purpose of preventing condensation of the excess steam, the apparatus comprising:

- means for creating a vacuum;
- said means for creating a vacuum comprising
  - a vacuum header and
  - an exhaust fan for withdrawing fluid from said vacuum header;
- a stationary nozzle positioned adjacent, and extending across, the web;
- means for connecting said means for creating a vacuum to said nozzle;
- said means for connecting said means for creating a vacuum to said nozzle comprising:
  - a steam exhaust pipe having an inlet at a first end thereof and a discharge orifice proximate a second end thereof;
  - said inlet being disposed adjacent said nozzle; and
  - said discharge orifice being disposed in said vacuum header; and
- means for adjustably controlling an area of said discharge orifice which is open to said vacuum header.

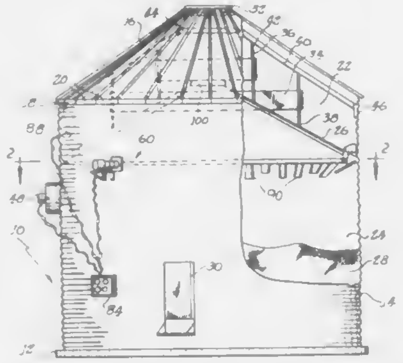
5,020,246
GRAIN DRYING SYSTEM

Marcus D. Rust, Seymour; Jeffrey L. Wilson, Brook, and Harmon L. Towne, Goshen, all of Ind., assignors to CTB, Inc., Milford, Ind.

Filed Apr. 6, 1990, Ser. No. 505,719

Int. Cl.^{5} F26B *19/00, 25/00*

U.S. Cl. 34—236 **10 Claims**



1. Apparatus for drying and storing grain comprising: a grain bin structure having an interior drying floor dividing said structure into a drying chamber and a storage chamber; and transfer means for transporting grain from said drying chamber into said storage chamber; said transfer means comprising a conveying system having inlet means in communication with said drying chamber, outlet means in communication with said storage chamber, and an elongate helical conveying element in the form of a continuous loop.

5,020,247
SLIDE FASTENER FOR SPORT SHOES, PARTICULARLY FOR CROSS-COUNTRY SKIING

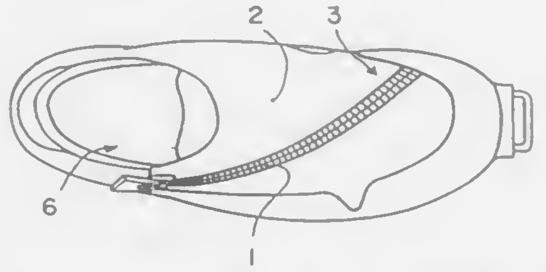
Thierry Barret, Pringy, and Pierre Rullier, Annecy, both of France, assignors to Salomon S.A., Annecy Cedex, France

Filed Jun. 14, 1989, Ser. No. 366,176

Claims priority, application France, Jun. 17, 1988, 88 08405

Int. Cl.^{5} A43B *11/00, 5/04*

U.S. Cl. 36—50 **7 Claims**



1. A shoe having a longitudinal axis, comprising a slide fastener mounted on the upper anterior part of an upper of the shoe, wherein the side fastener extends on the upper in a direction inclined with respect to the longitudinal axis of the shoe, and extends from the front of the foot of the wearer, beginning in the area of the first metatarso-phalangeal articulation area and running over the instep towards the rear and the area of the opposite malleolus.

5,020,248
SKI BOOT

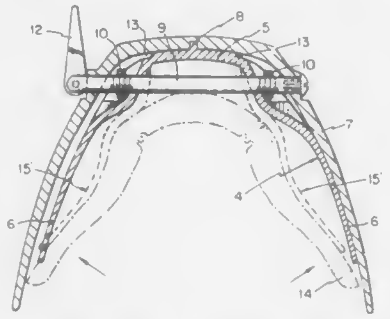
Milan Hercog, Graz, and Axel Kubelka, Obdach, both of Austria, assignors to Kastinger Skiboot GmbH, Seewalchen, Austria

Filed Mar. 23, 1989, Ser. No. 327,555

Claims priority, application Austria, Mar. 25, 1988, 815/88

Int. Cl.^{5} A43B *5/04*

U.S. Cl. 36—120 **1 Claim**



1. A ski boot comprising an adjustable support for the foot positioned in the heel portion, characterized in that the support is a substantially U-shaped spring (4) whose crosspiece (5) is positioned in the heel portion of the shell (7) of the boot and whose legs (6) extend forward on both sides inside the shell (7), embracing the foot substantially between the ankle and the heel-bone, said legs (6) being adjustable in various relative positions with respect to each other by an adjusting means engaging the crosspiece (5) or the legs (6), said adjusting means (9) extending substantially horizontally and transversely to the boot and being supported on the shell (7) and extending through the legs (6) near the crosspiece (5), said adjusting means (9) being provided on both sides with nuts (10) fixed against rotation with respct to the spring (4), each nut (10) engaging an outer surface of the legs (6) (FIGS. 3, 4, 6), and said adjusting means (9) extending outwardly through the shell (7) at least on one side and being provided on one side with a handle (12) which permits turning of the adjusting means (9) FIGS. 3, 4, 6).

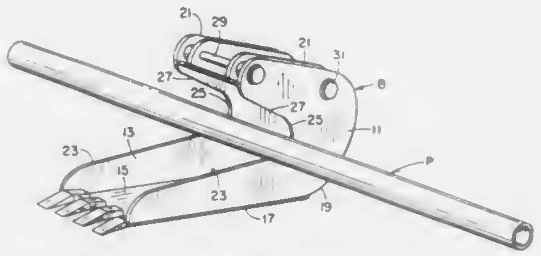
5,020,249
BUCKET FOR EXCAVATING BENEATH BURIED UTILITY LINES

Carl S. Matthews, 523 G NE., Miami, Okla. 74354

Filed Jun. 19, 1989, Ser. No. 367,565

Int. Cl.^{5} E02F *5/02*

U.S. Cl. 37—103 **2 Claims**



1. A bucket for excavating beneath buried utility lines comprising a pair of side walls spaced apart by a digging wall therebetween, said side walls having interior and exterior edges, each of said exterior edges having an elongated, substantially flat base portion, an upwardly curving back portion of progressively increasing radius and a top portion and each of said interior edges having an elongated, substantially flat base portion, an upwardly curving back portion of progressively decreasing radius and a top portion, said interior edge top portion joining said exterior edge top portion, each of said side walls having a pair of means for coupling said bucket to an operating means, each said pair of coupling means being disposed between respective interior and exterior edge top portions along a plane angularly displaced in relation to said exterior edge base portions, said plane and said radii being coordinated to simultaneously permit the utility lines to clear said inside edges and the excavation to clear said outside edges as said bucket rotates about said coupling means.

5,020,250
POWERED SNOWPLOW

Kiyoshi Fujii; Haruo Kitamura, both of Saitama; Shigeru Takahashi, and Norio Shimizu, both of Iwate, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 21, 1990, Ser. No. 586,257

Claims priority, application Japan, Sep. 21, 1989, 1-245653; Sep. 21, 1989, 1-245655

Int. Cl.^{5} E01H *5/09*

U.S. Cl. 37—257 **12 Claims**

1. A powered snowplow comprising:

- a snowplow body which houses at least a power source;
- a self-propelling mechanism supporting said snowplow body and drivable by said power source for propelling the snowplow;
- an auger mechanism mounted on a front portion of said snowplow body, said auger mechanism having a snow collecting auger; and
- a control mechanism mounted on a rear portion of said snowplow body, said control mechanism including a first control lever operable for transmitting power from said power source to said self-propelling mechanism, a second control lever operable for transmitting power from said

VOL
1127
ISS
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1991
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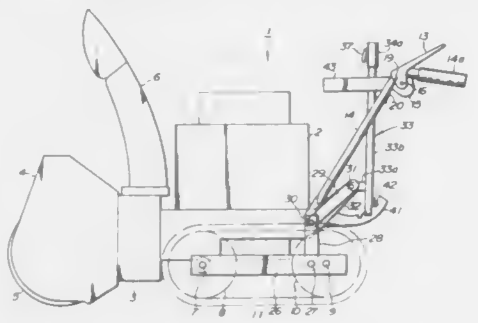
power source to said auger mechanism, an auger height adjusting handle disposed near said second control lever,



for adjusting a height of said auger, and means for keeping said second control lever operated in coaction with said first control lever when the first control lever is operated.

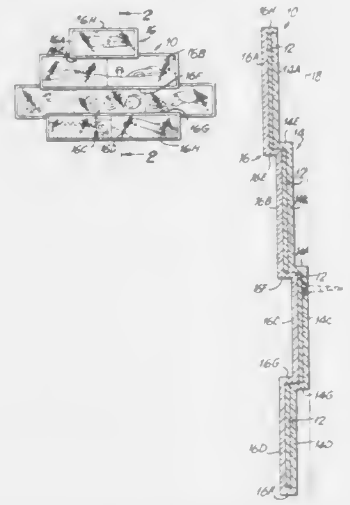
5,020,251
MULTI-LEVEL HOLDER OF SHEET MATERIALS

Peter S. C. Cheng, 5 Ross Street, Toronto, Ontario, Canada M5T 1Z8

Filed Mar. 19, 1990, Ser. No. 495,430

Int. Cl.⁵ A47G ***1/06***

U.S. Cl. 40—152.1 **15 Claims**



1. A holder for supportably displaying multiple sheet materials in a three-dimensional arrangement, comprising:

(a) a backing member having a plurality of non-overlapping back supports arranged in a predetermined pattern of rows, each extending along a first direction, said rows being stacked one above another along a second direction generally perpendicular to the first direction, some of the back supports lying at different levels as considered along a third viewing direction generally perpendicular to the first and second directions, said backing member having stepped outer and inner surfaces respectively facing away and toward the sheet materials to be displayed;

(b) a cover member having a corresponding plurality of non-overlapping cover supports arranged in the same predetermined pattern, some of the cover support lying at different levels as considered along the third viewing direction, said cover member having stepped outer and inner surfaces respectively facing away and toward the sheet materials to be displayed;

(c) means for mounting the cover member on the backing member in an assembled condition, and for mounting the cover supports over, and at a spacing from, the back supports, each back support and cover support mounted thereover together pressing and clampingly holding a respective sheet material in a respective spacing between the stepped inner surfaces of the backing and cover members; and

(d) said cover supports being light-transmissive to enable viewing therethrough of the pressed sheet materials held in said three-dimensional arrangement.

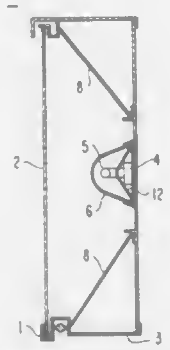
5,020,252
ILLUMINATED SIGN SYSTEM

Johannes A. G. De Boef, 121 Jules Verneweg, Tilburg, Netherlands

Continuation of Ser. No. 739,935, May 31, 1985, abandoned. This application Nov. 5, 1987, Ser. No. 122,475

Int. Cl.⁵ G09F ***13/04***

U.S. Cl. 40—564 **6 Claims**



1. An illuminated sign assembly having a housing and a sign mounted therein, the sign including a face plate with indicia thereon, said sign assembly including, within said housing, an elongated tubular fluorescent lamp for generating light output for illuminating the sign face plate from the rear, the improvement comprising a light shield interposed between said lamp and said face plate, in which said shield extends generally along the length of said lamp and is U-shaped in transverse section with the open part of the U-shape being directed toward said tubular lamp, said shield being especially adapted to illuminate the indicia on the face plate, said shield including a plurality of translucent strips extending generally parallel to each other and to the axis of said tubular lamp, which strips differ in light transmissivity from the non-strip portion of said shield to provide selected elongated horizontal illuminated areas on said face plate, which selected horizontal areas differ in illumination on said face plate.

5,020,253
DISPLAY BOARD ASSEMBLY

Liat-Chaw Lie, 40 Hillcroft Rd., Markham, Ontario, Canada L3S 1P8 , and Huang K. Suen, 167 Strathearn Ave., Richmond Hill, Ontario, Canada L4B 2M7

Filed Feb. 6, 1990, Ser. No. 475,533

Int. Cl.⁵ G09F ***13/04***

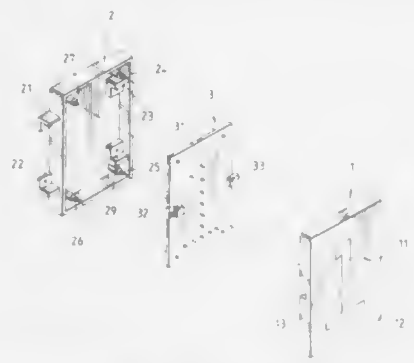
U.S. Cl. 40—576 **7 Claims**

1. A display board assembly comprising:

a plurality of symbol display units, each having a front panel attached to a bottom block and a printed circuit held therebetween, said bottom block having an edge about its periphery extending perpendicularly from said bottom block toward said front panel defining a top edge, a bottom edge and two side edges, two L-shaped projections extending from one of said side edges, two L-shaped recesses matching said L-shaped projections arranged within another of said two side edges; said front panel having a symbol thereon; and said printed circuit board including a plurality of LEDs corresponding to said symbol of said front panel, a power plug at one side thereof and a power socket at another side thereof adapted to receive said power plug.

said plurality of symbol display units joined together with their respective L-shaped projections received in respective L-shaped recesses of a neighboring symbol display unit and with their respective power plug received in a respective power socket of said neighboring unit; and

a start unit having L-shaped recesses receiving L-shaped projections from one of said symbol display units, and an end unit having L-shaped projections received in another



of said symbol display units, said start and end units together with said plurality of symbol display units forming a self-supporting structure with said start and end units each including a pair of holes and screws for fastening said display board assembly to an external surface, said end unit including a window with a photosensor therebehind for sensing the intensity of ambient light and turning on said LEDs when it is dark and an electric power supply device for converting regular alternating current power into low voltage direct current power.

5,020,254
ILLUMINATED SIGN SYSTEM HAVING TENSIONING MEANS

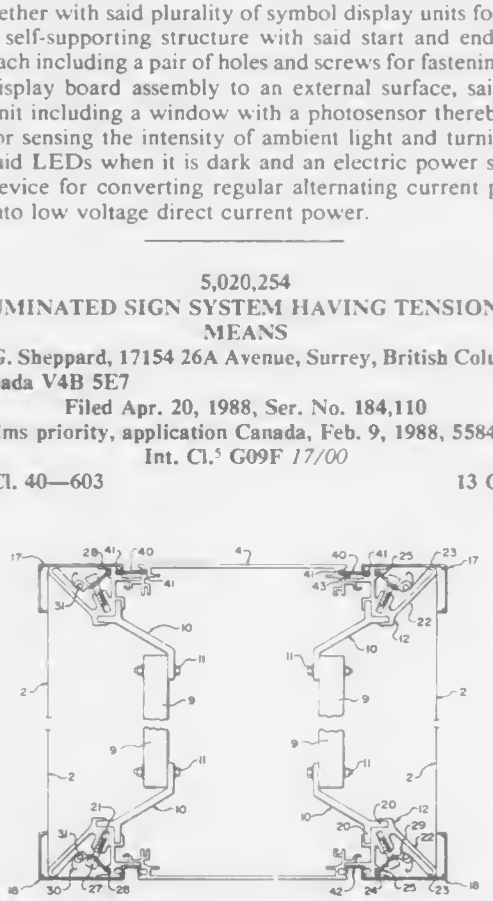
Paul G. Sheppard, 17154 26A Avenue, Surrey, British Columbia, Canada V4B 5E7

Filed Apr. 20, 1988, Ser. No. 184,110

Claims priority, application Canada, Feb. 9, 1988, 558490

Int. Cl.⁵ G09F ***17/00***

U.S. Cl. 40—603 **13 Claims**



1. A sign comprising a rigid frame defining a planar opening, a sheet of flexible sign face material extending across said opening, and means for tensioning said sign face material across said frame, said frame comprising:

a) means forming a fulcrum;

b) means for receiving threaded fastening means; and

c) an outwardly extended edge around which said material is drawn; and wherein said tensioning means comprises threaded fastening means, and an extended bar having opposed lateral edges and forming a layer between said two lateral edges thereof, and having means along a first lateral edge thereof for securing said material, a surface bearing against said threaded fastening means, a surface bearing against and pivoting about said fulcrum on said frame and an aperture for receiving said threaded fastening means located intermediate said means for securing and said pivoting surface whereby said threaded fastening means is inserted through said extended bar and threaded into said frame thereby drawing said material inwardly towards said frame and around said edge.

5,020,255
CARD HOLDER

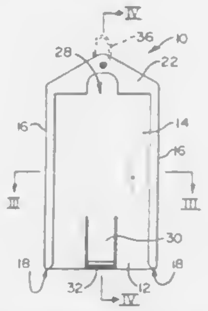
Robin F. Rodel, 17 Arne Crescent, Montclair, Durban, South Africa

Filed Sep. 12, 1989, Ser. No. 405,957

Claims priority, application South Africa, Sep. 12, 1988, 88/6789

Int. Cl.⁵ G09F ***3/20***

U.S. Cl. 40—654 **14 Claims**



1. A one piece card holder comprising a moulded body having a base wall and two spaced side walls extending from the base wall, holding formations for holding at least one card, said holding formations having access openings permitting the insertion and removal of a said card from the holding formations and a retaining tab integral with the base wall and formed by partially slitting the base wall, having a lug at a free end thereof, resiliently displaceable between a first position, in which the lug restricts the removal of said card from the holding formations, and a second position in which the retaining tab is manually displaced for resilient return to the first position, and wherein said card can be inserted into or removed from the holding formations via the access openings; and attachment means for attaching at least one key to the card holder.

5,020,256
ESCALATOR ADVERTISING

Andrew B. French, 173 Sydney Road, Fairlight, New South Wales, 2094, Australia

PCT No. PCT/AU88/00151, § 371 Date Feb. 27, 1989, § 102(e) Date Feb. 27, 1989, PCT Pub. No. WO88/09545, PCT Pub. Date Dec. 1, 1988

PCT Filed May 18, 1988, Ser. No. 302,748

Claims priority, application Australia, May 21, 1988, PI2126

Int. Cl.⁵ G09F ***3/18***

U.S. Cl. 40—661 **18 Claims**

1. A hand rail for a moving walkway, escalator or the like having a cover of transparent material substantially thereover

VOL
1127
ISS
1
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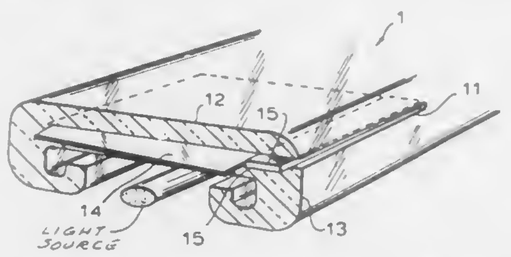
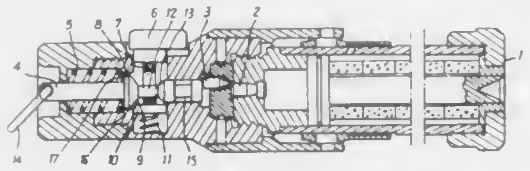
4
1991
UMI

such that advertising material and/or printed material placed on said hand rail may be seen through said cover, wherein said cover of transparent material is constructed as the upper portion of said hand rail.



5,020,257
PERCUSSION SAFETY DEVICE

Pierre Termet, Lyon, France, assignor to Bobet Materiel, Champagne, France
Filed Jan. 31, 1990, Ser. No. 472,056
Claims priority, application France, Feb. 3, 1989, 89 01416
Int. Cl.^{5} A22B *3/02;* **F41A** *17/76*
U.S. Cl. 42—1.12 **4 Claims**



1. An apparatus, actuated by the explosion of a cartridge, comprising:

a hammer able to slide in a bore of a breech between a cocking position and a percussion position;

a percussion spring means able to move the hammer from the cocking position to the percussion position;

a percussion pin pushed by the hammer against the cartridge;

a spring biased locking element able to lock the hammer in said cocking position as well as in a safety position between the cocking position and the percussion position;

whereby said apparatus being characterized by the fact that said percussion spring means stops pushing said hammer at a point before said hammer presses said percussion pin against the cartridge to be fired;

said spring biased locking element comprising a shoulder having an edge which is pushed in the direction of the hammer, and which, in a disarmed situation, rests against a tapered shoulder of the hammer, whereby the hammer rests against said percussion spring means so that the hammer cannot move the percussion pin for firing the cartridge.

5,020,258
GAS SEAL REVOLVER

Jens O. Rick, 220 Sanborn, Big Rapids, Mich. 49307
Continuation of Ser. No. 319,928, Mar. 6, 1989, Pat. No. 4,918,850, which is a continuation of Ser. No. 135,055, Dec. 18, 1987, abandoned. This application Feb. 20, 1990, Ser. No. 482,274
Int. Cl.^{5} F41C *3/16*
U.S. Cl. 42—65 **3 Claims**

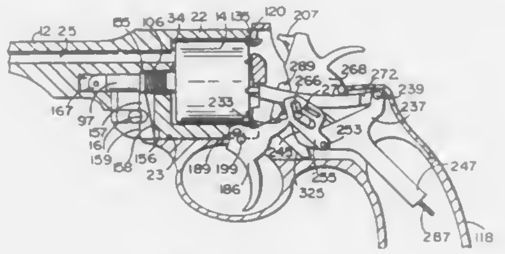
3. A revolver comprising:

a barrel having a longitudinal bore extending therethrough;

a cylinder rotatably coupled to said barrel, having an outer peripheral surface, opposite side surfaces, at least one camber adapted to receive a cartridge therein, and a plurality of radially extending grooves provided on one side surface in spaced apart intervals along said outer periphery;

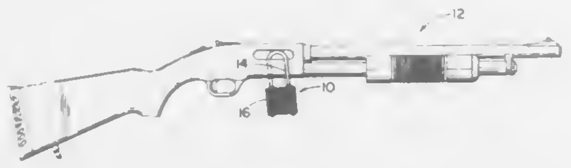
a trigger; and

an indexing mechanism having a pivotally mounted member wherein each end is provided with a means for engaging said grooves, a means for reciprocally moving said member in a path along said side surface with said grooves, and a means for biasing said two engaging means alternatively into said grooves, whereby said cylinder is rotated when one of said engaging means engages one of said grooves and said moves means moves said member in said path.



5,020,259
FIREARM LOCK

Alan I. Mossberg, Ste. 337, 4375-34th St. S., St. Petersburg, Fla. 33711
Filed May 24, 1990, Ser. No. 528,251
Int. Cl.^{5} F41A *17/02*
U.S. Cl. 42—70.110 **19 Claims**

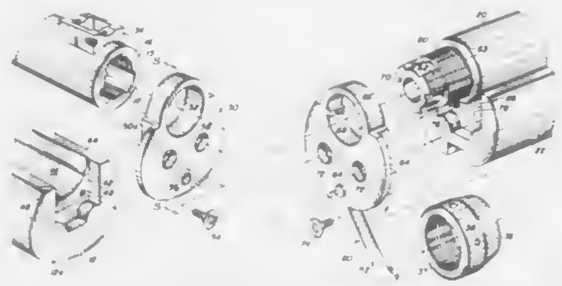


1. A lock for a firearm having a chamber sized to received an associated round of ammunition to be discharged by said firearm, said lock comprising a lock body having an opening therein communicating with the interior thereof, locking means for attaching said lock body to a firearm such as aforesaid and including a locking mechanism within said lock body having a locked position corresponding to a secured condition of said locking means and an unlocked position corresponding to a released condition of said locking means, and means for releasing said locking mechanism from its locked position in response to insertion of a portion of an associated round of ammunition such as aforesaid through said opening and to a predetermined position within said lock body.

5,020,260
TAKE-DOWN RIFLE

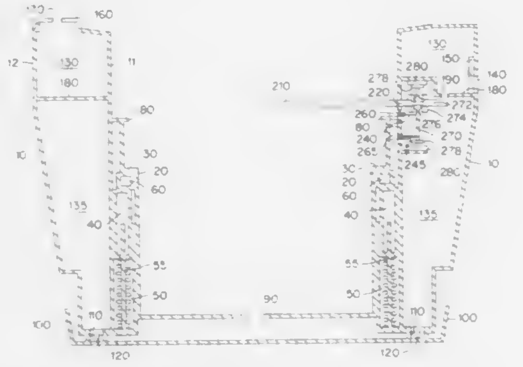
Thomas M. Houghton, Prescott, Ariz., assignor to H-S Precision, Inc., Rapid City, S. Dak.
Filed Dec. 29, 1989, Ser. No. 458,777
Int. Cl.^{5} F41A *11/00, 21/48*
U.S. Cl. 42—75.02 **13 Claims**

1. A take-down rifle having a stock and receiver secured together as a first unit and a forearm and barrel secured together as a second unit, with the receiver end of said barrel provided with means which engage with said receiver for securing said first and second units together as an assembled rifle, a reinforcing member mounted in said forearm, with said barrel being bonded to said forearm by means of an elastomeric adhesive, a barrel bracket mounted to the receiver end of said forearm and secured to said reinforcing member in said forearm with a portion of said bracket surrounding the receiver end of said barrel, and an adjusting collar positioned about the receiver end of said barrel and in contact with said barrel bracket and said barrel, whereby moving said adjusting collar in a direction toward said barrel bracket will cause said barrel to move in a direction away from said barrel bracket and said receiver end of said rifle to thereby compensate for wear in said means for securing said first and second units together as an assembled rifle.



5,020,261
MOISTURE SENSITIVE SELF-WATERING PLANTER

Fred W. Lishman, 7770 Marshall Heights Ct., Falls Church, Va. 22043
Continuation-in-part of Ser. No. 143,767, Jan. 14, 1988, abandoned. This application Dec. 15, 1988, Ser. No. 284,897
Int. Cl.^{5} A01G *27/00*
U.S. Cl. 47—79 **9 Claims**



1. A self-watering planter, comprising:

a housing unit;

a reservoir located within said housing unit;

as liner to be filled with soil into which a plant is potted, removably located within said housing unit;

weight determination means for determining the weight of said liner, the weight of the liner being indicative of the moisture content of the soil;

an elongated feeder tube communicating with said reservoir and terminating over said liner for hydrating the soil within said liner;

valve means connecting said tube to said reservoir for selectively allowing water to be delivered from said reservoir to said soil; and

control means, responsive to said weight determination means, for opening and closing said valve means when the weight of said liner reaches first and second specific values representative of dehydrated and hydrated soil conditions, respectively, said control means including,

a movable valve stem connecting said valve means to said weight determination means,

first and second magnetic elements mounted adjacent first and second ends of said valve stem,

a first magnetizable washer mounted on said valve stem above said first magnetic element, and

a second magnetizable washer mounted on said valve stem below said second magnetic element,

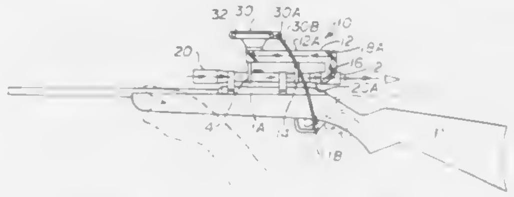
said first magnetic element contacting said first magnetizable washer when the weight of said liner reaches said second specific value to bias said valve means closed, and

said second magnetic element contacting said second magnetizable washer when the weight of said liner reaches said first specific value to bias said valve means open;

wherein said housing unit includes a base plate for supporting said liner and having an aperture in the center thereof, wherein said base plate is mounted within said housing unit on spring means for supporting said base plate around the periphery thereof and providing a predetermined resistance against the weight of said liner and wherein said base plate includes a plurality of apertures around the periphery thereof, and said spring means includes a plurality of post-supported springs, each post protruding through a respective peripheral aperture of said base plate.

5,020,262
CAMERA MOUNT FOR RIFLE SCOPES

Louis T. Pena, 15523 Barbarossa Drive, Houston, Tex. 77083
Filed Sep. 4, 1990, Ser. No. 576,775
Int. Cl.^{5} G03B *29/00*
U.S. Cl. 42—106 **26 Claims**



1. The combination with a rifle having an upper portion with a telescope mounted thereon with an eyepiece for viewing at close range the target of the rifle and a trigger for firing said rifle, of

an apparatus for mounting a camera on the telescope for photographing the image of the target when the trigger of the rifle is pulled comprising

an L-shaped hollow housing having a horizontal portion secured on said telescope and a vertically extending portion extending across the eyepiece of said telescope,

said vertically extending portion having an eyepiece at its lower end aligned with the eyepiece of said telescope for viewing,

a split prism contained in said housing eyepiece positioned for viewing the image of the target through said eyepiece, and reflecting the image of the target upwardly,

a first surface mirror in said housing positioned above said split prism for receiving the image of the target reflected from said split prism, and reflecting said image forwardly,

a second surface mirror contained in said housing positioned at the forward end thereof for receiving the image of the target reflected from said first surface mirror, and reflecting said image upwardly,

a camera mounted on said housing having a shutter mechanism positioned to photograph the image of the target reflected from said second surface mirror.

control means operatively connected to said trigger and arranged to operate said camera, and

said control means for the camera being remotely operated by the trigger of said rifle whereby said camera is operated simultaneously with the firing of said rifle.

VOL
1127
ISS
1
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1991
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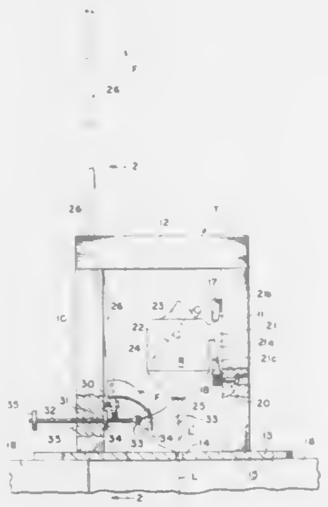
5,020,263
FISH ACTUATED ICE FISHING SIGNALING DEVICE AND METHOD OF USING IT

William A. Werner, 617 Sharon Rd., Oakley, Mich. 48649
Filed Mar. 26, 1990, Ser. No. 498,427
Int. Cl.⁵ A01K *97/12*
U.S. Cl. 43—17 **19 Claims**



1. A signaling fishing tip-up unit comprising:

a. an upright frame having a base adapted to rest on the ice surrounding a fishing opening therein;

b. said base having a fishing line-passing-opening therein, adapted to be positioned over the fishing opening in the ice;

c. a reel, on which a fishing line is wound, supported on said frame at a spaced distance above said opening in the base, with the line extending vertically as it leaves the reel and down through said opening in the base to support a baited hook or lure in the water below the ice;

d. A retainer on said frame below said reel at a level opposite the portion of said line between the reel and opening in the base;

e. a signal assembly comprising an elongated spring mounted on said frame with a signal device near the upper end thereof and normally biased to support the assembly in an upright position in which the spring is generally vertically upright with the signal device above the frame;

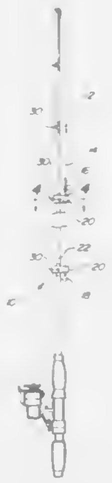
f. a keeper surface on said signal assembly adapted to be received by said retainer when the spring is depressed from its upright position; the keeper and retainer being configured such that, when the keeper and retainer are in alignment, the spring is retained with its upper end vertically downturned in a state of depressed arcuate configuration, but is permitted to spring free to vertically upright position when the keeper and retainer are relatively horizontally displaced;

g. a generally horizontally movable trigger having an inner end movable between a ready position and a tripping position, carried by said frame and having a line accommodating member on said inner end, through which a slacked portion of said line extends when the trigger is in ready position, said trigger inner end in the ready position holding the line in a vertically slacked condition, and in tripping position being moved as the pull of a fish tautens the line;

h. said trigger having a trip part thereon in horizontal alignment with said keeper so that it will push said keeper to relatively horizontally displace said keeper and retainer when a fish takes the lure to release the signal assembly to assume an upright position.

5,020,264
HOLDER FOR A FISHING HOOK, LINE, LEADER OR SINKER

Felix Demski, 4230 Linville Dr., Warren, Mich. 48092
Filed Aug. 4, 1989, Ser. No. 389,493
Int. Cl.⁵ A01K *97/06*
U.S. Cl. 43—25.2 **11 Claims**



1. A holder for a fishing hook, the eye of a sinker, a fishing line leader or a fishing line, said holder comprising:

a bendable body portion having a first end and a second end and having a longitudinal axis;

said body portion including means for removably attaching said first end to said second end;

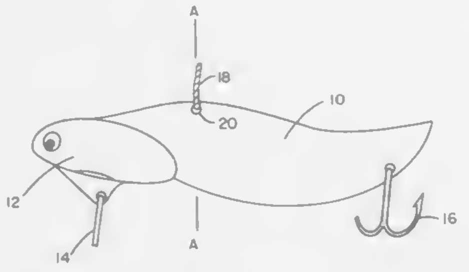
said means for removably attaching being movable from one of a connectably attached position to a disconnected position;

said means for removably attaching being partially porous when in said attached position whereby gas is allowed to pass therethrough; and

means for accommodating a fishing line guide of a fishing rod comprising a slot longitudinally defined in said body portion.

5,020,265
WEIGHTED FISHING LURE

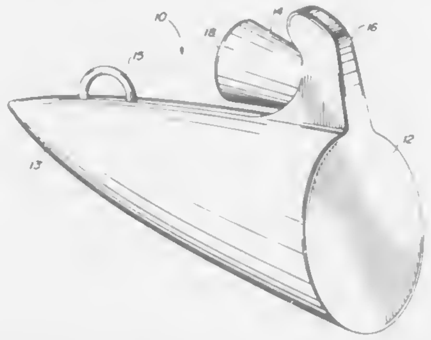
Charles E. Nuckols, P.O. Box 770, Blountville, Tenn. 37617
Filed Feb. 7, 1990, Ser. No. 476,526
Int. Cl.⁵ A01K *91/00*
U.S. Cl. 43—42.39 **11 Claims**



1. A weighted fishing lure having predesigned sinking characteristics and comprised principally of die cast zinc having a density of about 0.24 lbs/in^3

5,020,266
OFF-SHORE FISHING LURE

John G. Williamson, 28, Ridge Road, La Lucia, Durban, South Africa
Filed May 24, 1989, Ser. No. 356,455
Claim priority, application South Africa, Jul. 4, 1988, 884755
Int. Cl.⁵ A01K *85/00*
U.S. Cl. 43—42.39 **5 Claims**



1. A fishing lure, comprising:

an elongated head member having a leading, downwardly and forwardly angled planar front surface; a trailing, rearwardly and inwardly tapered, generally conical rear surface; a fin-shaped, generally planar portion extending up from said conical surface and having a front edge which forms a part of said front surface and a rear edge;

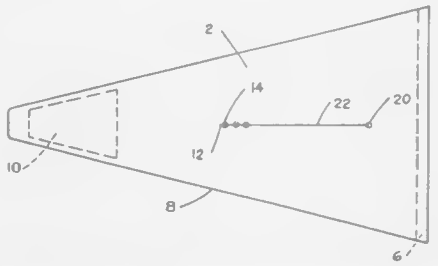
means for attaching a fishing line to said front edge for drawing said head member through water led by said front surface;

means for attaching a skirt to said rear edge for trailing said skirt through water behind said fin-shaped portion; and

means located on said rear surface for attaching a hook to said head member in general alignment with said elongation of said head member.

5,020,267
VORTEX DIVER

Francis R. Rasmussen, 910 Ocho Rios Dr., Danville, Calif. 94526
Filed Jul. 2, 1990, Ser. No. 547,171
Int. Cl.⁵ A01K *91/00*
U.S. Cl. 43—43.13 **4 Claims**

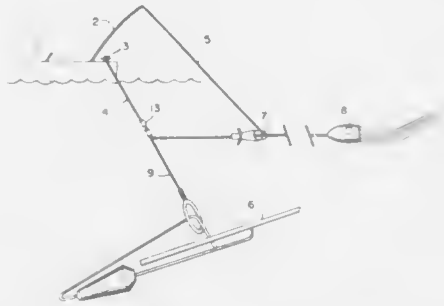


1. A thin substantially triangular hydrodynamic fishing lure comprising:

a pointed, narrow nose having a squared or sharp edge which is curved to form an angle at least 45 degrees away from the plane of the body of said lure at a leading edge; said leading edge being offset from said plane and extending at least 1/16 inch below said plane to force flow separation at said leading edge; whereby said lure can be operated over a wide range of angles in a stable condition with improved hydrodynamic forces.

5,020,268
AUTOMATIC LINE RELEASE WITH DEEP DIVING PLANER

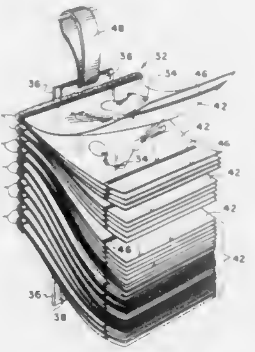
Milton E. Combs, III, Ft. Lauderdale, Fla., assignor to Milton E. Combs, Ft. Lauderdale, Fla.
Filed Jan. 18, 1990, Ser. No. 466,859
Int. Cl.⁵ A01K *95/00*
U.S. Cl. 43—43.13 **1 Claim**



1. A deep trolling device comprising a rectangular plate, a wire bail secured to a plate, a sliding ring stationed on said bail, with a weight positioned forward on the bail, the improvement comprising a line release devise which is positioned above the plate and bail and secured to said sliding ring with a harness, said release means consists of a fulcrum arrangement of two arms supported by a locking shaft focusing power on two compression discs, with a power adjustment at the opposite ends from said discs, increasing tension by placing said arms into parallel proximity and securing said position with interlocking teeth.

5,020,269
FISHING BAIT ORGANIZER

William T. Gentry, Italy, and Samuel M. Kogutt, Dallas, both of Tex., assignors to Dart Manufacturing Company, Dallas, Tex.
Filed Feb. 1, 1990, Ser. No. 473,333
Int. Cl.⁵ A01K *97/04;* **B65D** *85/00*
U.S. Cl. 43—54.1 **17 Claims**



1. A device for storing fishing accessories, comprising:

a backing member having a first attachment member on a surface thereof; and

a plurality of storage bags arranged in discrete groups, each bag having a closeable mouth at a first end thereof through which fishing accessories are removable from and insertable into the bag, each group having a second attachment member for securing the individual bags of each group together at respective second ends of the bags, opposite from the respective first ends thereof, the second attachment members being complementary with said first attachment member for removably attaching the respective groups of bags to the backing member at the respec-

VOL
1127
ISS
1
JE
4
1991
UMI

tive second ends of the bags, the first end of each bag being a free end.

6. A device for storing and transporting fishing accessories, comprising:

means for storing the fishing accessories, including:

a backing member having a first attachment member on a surface thereof;

a plurality of storage bags arranged in discrete groups, each bag having a closeable mouth at a first end thereof through which fishing accessories are removable from and insertable into the bag, each group having a second attachment member for securing the individual bags of each group together at respective second ends of the bags, opposite from the first ends thereof, the second attachment members being complementary with said first attachment member for removably attaching the respective groups of bags to the backing member at the respective second ends of the bags, the respective first end of each bag being a free end; and

a flexible casing for retaining the fishing accessory storage means in a substantially flat position within the casing.

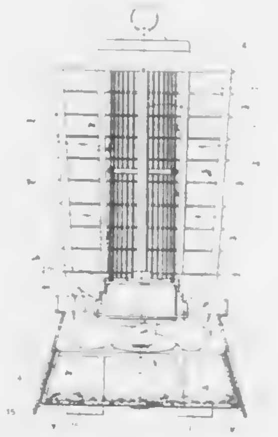
5,020,270
APPARATUS FOR KILLING INSECTS

Hsi-Chuan Lo, No. 14, Tsu-Li Street, Hsueh-Chia Town, Tainan Hsien, Taiwan

Filed Apr. 10, 1990, Ser. No. 506,849

Int. Cl.⁵ A01M *1/22*

U.S. Cl. 43—112 **1 Claim**



1. An apparatus for killing insects comprising:

a fan housing having a substantially cylindrical hollow casing defining an air flow passage therethrough and said fan housing being positioned vertically on a floor, and having a first opening at its upper end serving as an air intake opening and a second opening at its lower end serving as an air discharge opening;

a motor housing coaxially disposed in an upper portion of said fan housing for receiving a motor therein and for defining an air inlet passage extending downwardly towards said discharge opening;

a plurality of spaced legs extending downwardly from said fan housing for providing vertical positioning and for displacing said discharge opening of said fan housing from the ground;

an upper circumferential lug and a lower circumferential lug spaced each from the other, each of said lugs projecting inwardly from an inner surface of said fan housing;

a sleeve retained in said upper and lower circumferential lugs having an open top and an open bottom for confining an air flow passage defined by said fan housing;

blower means disposed in said fan housing for drawing air from an external environment above said fan housing and blowing said air through the fan housing along said air flow passage therein;

a net member distributed across said air flow passage of said fan housing at its lower open end having a mesh dimensioned to separate insects from air flow generated by said blower means;

a lamp assembly mounted to a top surface of said motor housing and axially extending therefrom for generating a light attractive to insects;

an electric screen surrounding said lamp assembly and mounted to a top surface of said motor housing for killing insects in contact therewith by means of a voltage applied thereto by an electric power source; and

a grill means surrounding said electrical screen and mounted to side surfaces of said motor housing.

5,020,271
WATERING DEVICES

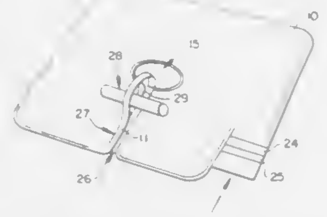
David A. Walker, 269 Fig Tree Pocket Road, Fig Tree Pocket, Queensland, Australia

Filed Apr. 27, 1990, Ser. No. 515,710

Claims priority, application Australia, Apr. 28, 1989, PJ3904; Oct. 11, 1989, PJ6801

Int. Cl.⁵ A01G *13/00*

U.S. Cl. 47—27 **10 Claims**



1. A fluid dispensing means comprising:

a flexible bag-like storage container for holding a volume of fluid having a fluid level in said container and said container being shaped to lie adjacent a site whereat fluid is to be dispensed;

a filling spout associated with the storage container whereby the fluid may be dispensed therefrom;

an outlet comprising an elongate flexible neck having a base connected to said container, a wick inserted in said neck and extending therethrough to the storage container, said wick being of a material capable of transmitting fluid from said storage container to an outer end of said wick by capillary action;

said elongate neck being of sufficient length that the neck and the wick in which it is inserted is at a height greater than the fluid level in the container, said neck being open to the atmosphere above said fluid level in the storage container so as to break any siphon effect; and

means for supporting said elongate neck above said fluid level so that said neck and wick fall progressively with said fluid level in the storage container.

5,020,272
LANDSCAPE EDGING SYSTEM

Robert T. Herrema, 5096 Waterside Dr., and Steven C. Windemuller, 350 - 24th Ave., both of Hudsonville, Mich. 49426

Filed Dec. 27, 1989, Ser. No. 457,929

Int. Cl.⁵ A01G *1/00*

U.S. Cl. 47—33 **22 Claims**

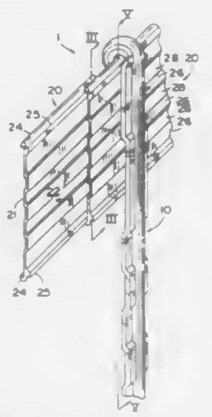
1. An area edging system, useful in landscaping and having other useful purposes, comprising:

an elongated edging strip having a length and two ends;

said edging strip throughout its length having a first side including a first and second means extending along said first side and spaced laterally from each other and configured to provide a male portion and a second side including a third and fourth means extending along said second side and spaced laterally from each other and configured to provide a female portion, said configurations of said sides being such that said male portion is receivable in said female portion whereby the two ends of a single piece of said edging can be coupled together by engaging said male portion of said first side with said female portion of said second side without introducing a twist into the length of said edging strip;

a plurality of securing stakes used in cooperation with said edging strip to secure said edging strip;

said stakes having a top portion which is bent over, forming a long leg and a short leg and defining a slot, such that said stakes can be snapped onto said edging strip by sliding said top edge of said edging into said slot of said top portion.



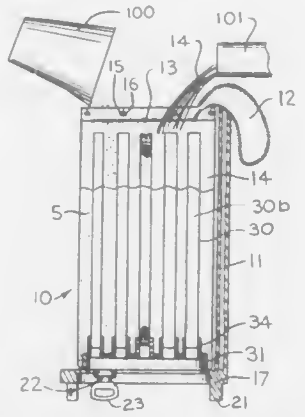
5,020,273
SEED GERMINATING DEVICE AND METHOD OF USE

Jesse D. Johnson, 133 Lake View La., Brighton, Mich. 48116

Filed Sep. 18, 1989, Ser. No. 409,609

Int. Cl.⁵ A01L *1/02*

U.S. Cl. 47—61 **18 Claims**



9. A device for germinating seeds prior to planting which comprises:

(a) container means defining an enclosure and having an upper end and a lower end and having an openable and closeable cover means at the upper end and an openable and closeable fluid and-air vent conduit means at the lower end;

(b) vertically oriented perforated tubular means with an opening along a length of the tubular means between opposed ends and with the length mounted between the upper end and lower end of and in the enclosure of the container means on a base means in the enclosure which provides a space adjacent to the conduit means, wherein the opening of the tubular means and the space of the base means are connected and wherein the tubular means has perforations between the opening and the enclosure of the container means; and

(c) stand means supporting the container means with the tubular means vertically oriented, wherein in use of the device the seeds are germinated by providing a solution with the seeds in the enclosure with the cover means and conduit means closed and then the seeds are retained in the enclosure without the solution for aeration with the cover means and conduit means open to aerate and germinate the seeds.

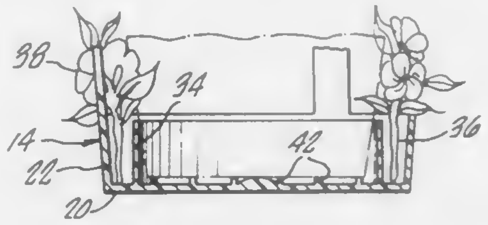
5,020,274
PLANT HANGER

Robert K. W. Wong, 1725 Camino Lindo, S. Pasadena, Calif. 91030

Filed Aug. 4, 1988, Ser. No. 228,027

Int. Cl.⁵ A01G *47/72*

U.S. Cl. 47—67 **10 Claims**



1. A hangable holder suitable for suspending plants and the like comprising:

(a) a receptacle suitable for holding a plant, the receptacle having at least one drainage hole in the bottom; and

(b) a unitary support for the receptacle, the supporting comprising (i) a solid, non-porous, non-leaking, waterproof bottom, (ii) an upstanding, exterior, peripheral wall extending upwardly from the bottom, the height of the wall being less than the height of the receptacle, with the wall ending proximate to the bottom end of the receptacle, and (iii) at least three longitudinally extending arms projecting upwardly from the exterior wall above the top of the receptacle, each arm having a support hole in its upper portion for suspending the support; wherein the peripheral wall and the arms are adapted to provide access to a substantial portion of the side of the receptacle, including a portion proximate to the bottom of the receptacle; wherein each arm has means for reinforcing the arm adjacent its support hole and wherein the entire support is made of the same material; and wherein the support is formed of a plastic material, and the reinforcing means comprises the wall thickness of the arm adjacent the support hole being greater than the wall thickness of the arm away from the support hole.

5,020,275
WATERING METHOD AND APPARATUS FOR PLANTS

Uwe H. Bednarzik, 264 Altamonte Bay Club Cir. 102, Altamonte Springs, Fla. 32701

Filed Oct. 15, 1990, Ser. No. 597,386

Int. Cl.⁵ A01G *25/00, 29/00*

U.S. Cl. 47—79 **7 Claims**

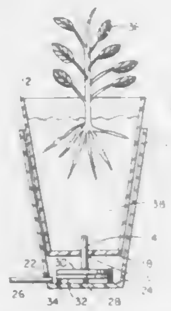
1. Apparatus for automatic irrigation of a potted plant comprising:

a first pot adapted for receiving a plant and a sufficient volume of soil to support the plant, the first pot including at least one aperture in the bottom thereof and a corresponding nozzle projecting from the at least one aperture for a preselected distance;

a second pot having at least a larger diameter than said first pot wherein said first pot fits loosely within said second

VOL
1127
ISS
1
JE
4
1991
UMI

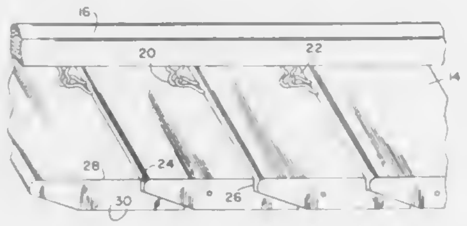
pot, said second pot including means for connection to a water line for admitting water thereinto; and



means positioned in said second pot and operable with said nozzle for selectively admitting water into said first pot when the weight of said first pot becomes less than a preselected value.

5,020,276
WOODEN MOVABLE LOUVER SHUTTERS

Frank F. Zittell, 1734 Buchanan St., Hollywood, Fla. 33020
Continuation-in-part of Ser. No. 205,921, Jun. 13, 1988, abandoned. This application Feb. 26, 1990, Ser. No. 484,545
Int. Cl.^{5} E05F *17/00*
U.S. Cl. 49—87 **12 Claims**

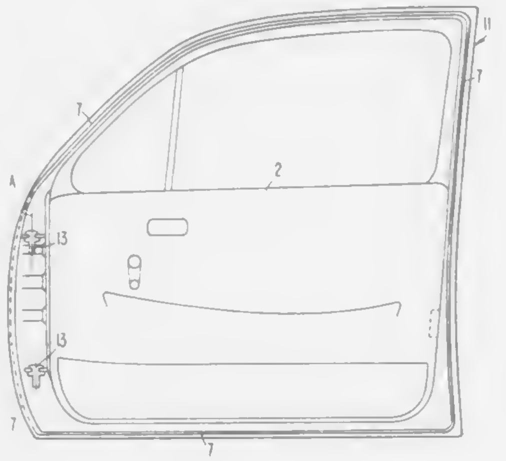


1. A louver shutter comprising:

two side members and two end members forming a frame: a plurality of louvers each having opposite upper and lower margins, and two opposite ends; a plurality of pivot points disposed in said side members, each pivot point supporting a respective end of a louver; a first plurality of staples arranged in a row, each staple inserted into the upper margin of a respective louver; a tilt rod; a second plurality of staples each inserted into said tilt rod in alignment with a respective one said first plurality of staples; wherein each of said staples of said first and second plurality of staples has a bight portion connected to spaced legs via intermediate portions, said intermediate portions extending inwardly of said spaced legs toward each other wherein said bight portion and said intermediate portions define an eyelet; and wherein each of said staples of said first plurality of staples is coupled by its eyelet with the eyelet of a respective staple of said second plurality of staples, for pivoting said louvers; and the eyelets remain locked together via the inwardly extending intermediate portions being crimped sufficiently together to prevent separation.

5,020,277
VEHICLE WITH VEHICLE DOOR AND DOOR GASKET

Edmund Hellriegel, Pulheim, Fed. Rep. of Germany, assignor to Huels Troisdorf Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany
Continuation of Ser. No. 131,711, Dec. 11, 1987, abandoned. This application Mar. 8, 1990, Ser. No. 490,386
Claims priority, application Fed. Rep. of Germany, Dec. 11, 1986, 3642428
Int. Cl.^{5} E06B *7/23*
U.S. Cl. 49—400 **21 Claims**



1. A vehicle with a vehicle body, at least one vehicle door, an associated vehicle door opening, at least one surrounding door gasket, and at least one surrounding contact surface for accommodating said surrounding door gasket, the vehicle door including:

an outer wall;

an inner wall arranged at a spacing with respect to the outer wall;

at least one hinge means for pivotably articulating the vehicle door to a vehicle body, said hinge means defining a pivot axis for the vehicle door;

a surrounding cavity formed between the vehicle door and the associated vehicle door opening when the vehicle door is closed, said surrounding cavity extending around the vehicle door;

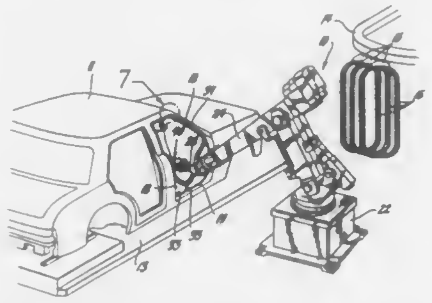
said pivot axis of the vehicle door passes through said surrounding cavity between the vehicle door and the vehicle body in such a manner that a partial zone of the outer wall of the vehicle door, during an opening of the vehicle door, is moved toward an interior of the vehicle, and a remaining region of the outer wall of the vehicle door is moved in the opposite direction;

said surrounding door gasket seals the surrounding cavity between the vehicle body and the vehicle door, and is arranged at one of the vehicle body or the vehicle door in such a manner that an outer door gap formed between the outer wall of the vehicle door and the vehicle body is one of completely sealed at or in an immediate vicinity of the outer door wall; and

wherein said surrounding door gasket includes means, during a closing of the vehicle door, for impinging upon said surrounding contact surface at such an angle that said surrounding door gasket is urged against said surrounding contact surface essentially without a sliding motion at all portions thereof and is compressed during the closing of the vehicle door at all portions thereof.

5,020,278
APPARATUS AND METHOD OF A ROBOT FOR INSTALLING WEATHER STRIPPING IN A DOOR OR LIKE OPENING AND VEHICLE PRODUCED THEREOF

Stephen St. Angelo, Jr., Rochester Hills, Mich.; George C. Carver, Albany; David W. Patterson, Duluth, both of Ga., and Owen K. Fremont, Rochester, Mich., assignors to General Motors Corporation, Detroit, Mich.
Continuation of Ser. No. 339,265, Apr. 17, 1989, abandoned, which is a division of Ser. No. 161,500, Feb. 29, 1988, abandoned, which is a continuation-in-part of Ser. No. 888,238, Jul. 18, 1986, abandoned. This application Sep. 24, 1990, Ser. No. 588,512
Int. Cl.^{5} E06B *7/16*
U.S. Cl. 49—490 **1 Claim**



1. A vehicle in combination comprising:

a body with an opening having corner sections and generally straight sections of a first linear length said body along said opening having a sheet metal flange; and

a fixed length closed loop of elastomeric longitudinally compressible weather stripping of a second linear length greater than said first linear length, said weather stripping having a carrier with a generally U-shaped cross-sectional portion with interior barbs adapted to be press fitted over said sheet metal flange, said weather stripping being affixed with said body opening by a robot having an arm with a powered pressure roller having a variable rotational velocity and said roller interacts and traces said opening at a first linear speed and a first rotational speed along the generally straight sections of said body opening allowing said pressure roller to free wheel along said straight sections, and said pressure roller at a second linear and rotational speed differing from said first speeds interacts and traces said corner sections of said opening with said pressure roller having a point along said pressure roller periphery with a relative velocity with respect to a point on said opening corner section whereby the amount of said fixed length greater than said first linear length is longitudinally compressed along said body opening corner sections.

5,020,279
MACHINE TOOL FOR MANUFACTURE AND DRESSING OF TOOLS AND FOR FINISH-MACHINING OF GEAR WHEELS

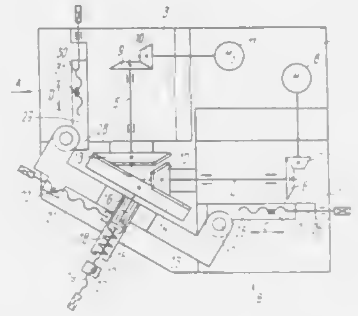
Nikolai A. Abysov, Valery A. Bezgodov, Valdimir S. Belgorodsky, and Nikolai D. Plotnikov, assignee: Saratovskoe Spetsiabnol Konstruktorskol Bjuro Zuboobrabty-Vajuschikh Stankov Saratovskogo Stankostro-Itelnogo Proiznodstverinogo Obiedinenia, all of Saratov, U.S.S.R.
PCT No. PCT/SU88/00192, § 371 Date Jul. 28, 1989, § 102(e) Date Jul. 28, 1989, PCT Pub. No. WO89/05703, PCT Pub. Date Jun. 29, 1989
PCT Filed Sep. 28, 1988, Ser. No. 392,918
Claims priority, application U.S.S.R., Dec. 24, 1987, 4342342
Int. Cl.^{5} B23F *19/00;* **B24B** *53/06*
U.S. Cl. 51—123 G **1 Claim**

1. In a machine tool for the manufacture of dressing tools and finish machining of gear wheels, the machine tool having a tool (**14**) and first and second, perpendicular spindles (**4, 5**) that defines relative horizontal and vertical, perpendicular directions, the first and second spindles (**4, 5**) being rotatably on respective, first and second heads (**2, 3**) and having respective but synchronous rotational drives (**8, 11**), the improvement comprising:

a third spindle (**15**) on which the tool (**14**) is fixed for rotational driving about an axis of the third spindle (**15**) from the first and second spindles (**4, 5**), the third spindle (**15**) being freely rotatable about its axis in a third head (**17**);

axial movement means (**18, 19, 20**) on the third head (**17**) for moving the third spindle (**15**) axially and away from the first and second heads (**2, 3**);

a plate (**23**);

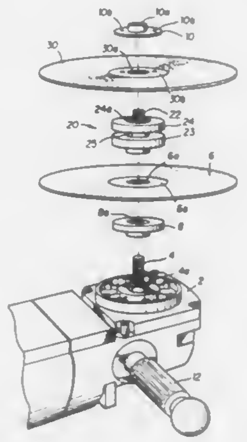


radial movement means (**21, 22**) connecting the third head (**17**) to the plate (**23**) for moving the third head (**17**) and third spindle (**15**) therein radially of the third spindle in the relative horizontal and vertical directions relative to the first and second spindles (**4, 5**); and

angular movement means (**24, 28**) for tilting the plate (**23**) and, thereby, the third spindle (**15**) angularly of the axis of the third spindle (**15**), wherein the angular movement means (**24, 28**) comprise hinge joints (**24, 28**) on the plate (**23**) respectively on diametrically opposite sides of the third spindle (**15**) and linking means (**25, 26, 27** and **29, 30, 31**) respectively linking the hinge joints (**24, 28**) movably to the first and second heads (**2, 3**) for the angular tilting of the plate (**23**) and third spindle (**15**).

5,020,280
GRINDING TOOL AND SPACER ASSEMBLY FOR USE THEREIN

Gerard O'Reilly, Box 309, Yisod Hama'ala, Israel
Filed Jul. 31, 1990, Ser. No. 560,830
Claims priority, application Israel, Aug. 11, 1989, 91283
Int. Cl.^{5} B24B *41/00*
U.S. Cl. 51—168 **20 Claims**



1. A grinding tool, comprising:

a rotary motor driving a rotary drive shaft;

VOL
1127
ISS
1
JE
4
1991
UMI

- a first grinding disc having a center opening for receiving said drive shaft with the outer end of the drive shaft projecting through the opening in the grinding disc;
- a spacer assembly having a socket at one end receiving the projecting end of said drive shaft, a pin at the opposite end, and spacer means between said socket and pin;
- a second grinding disc having a center opening for receiving said pin of the spacer assembly with the outer end of the pin projecting through the latter opening;
- and an outer collar attached to said projecting end of the pin for securing the two grinding discs to the drive shaft in spaced apart relationship such as to enable the grinding tool to simultaneously cut two spaced grooves.

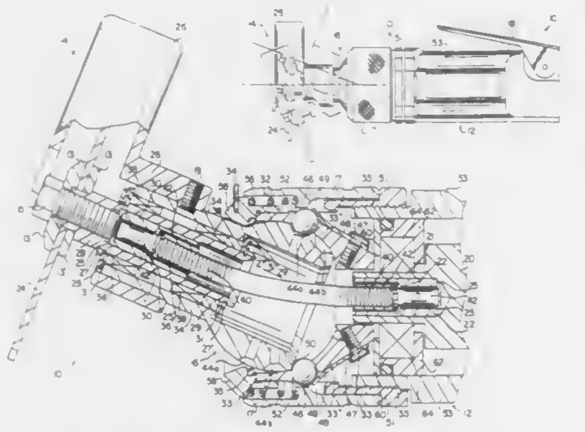
5,020,281
HIGH SPEED ROTARY HAND TOOL WITH ADJUSTABLE HEAD COUPLING

Edward R. Neff, Morris County, N.J., assignor to American Pneumatic Technologies, Inc., O'Fallon, Mo.

Filed Apr. 3, 1989, Ser. No. 332,481

Int. Cl.^{5} B24B *23/02*

U.S. Cl. 51—170 PT **12 Claims**



1. A high speed rotary tool apparatus of the hand-held type comprising a body, a tool head, and swivel means adjustably connecting the tool head to the body in preselected angular orientation; the body including a motor and a high speed rotary drive shaft; the tool head having a tool shaft for carrying a tool to be rotationally driven by the motor at high speed; the swivel means having a power shaft for coupling power from the motor drive shaft to the tool shaft; the power shaft being a single flexible shaft which is flexibly bent when the tool head is at a non-axial angular orientation to the body; and means for restraining at least one end of the power shaft when bent to prevent whipping or oscillation of the power shaft when rotating, said swivel means comprising a spherical head and a socket for receiving the head, and selectively engageable redundant detent means for interengaging the spherical head and socket to maintain a preselected one of a plurality of possible angular orientations.

5,020,282
GRINDING TOOL AND METHOD OF MAKING THE SAME

Hirosbi Okajima, and Susumu Sudo, both of Nagoya, Japan, assigners to Sankyo Rikagaku Co., Ltd., Tokyo and Takekawa Tekko Kabushiki Kaisha, Aichi, both of, Japan

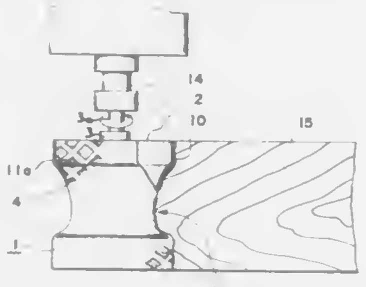
Filed Jan. 19, 1989, Ser. No. 299,041

Claims priority, application Japan, Apr. 2, 1988, 63-81879

Int. Cl.^{5} B24D *9/00*

'J.S. Cl. 51—206 R **7 Claims**

1. A grinding or sanding tool for working shaped objects comprising a rigid base having a shaped surface for forming the object, a heat shrinkable tube disposed freely over said base and being heat shrunk to conform to the shape of said base, the outer surface of said tube having discrete portions of adhesive material in which is held an abrasive, said discrete portions being arrayed in a selected pattern separated by surface portions of said tube free of abrasive and adhesive so that the differences in shrinkage therebetween cause said tube to contract into the exact shape of said base.



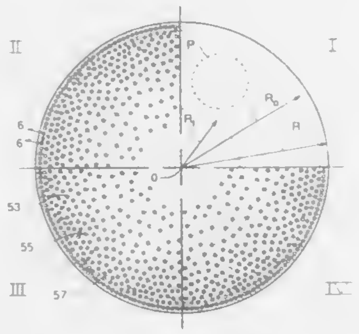
5,020,283
POLISHING PAD WITH UNIFORM ABRASION

Mark E. Tuttle, Boise, Id., assignor to Micron Technology, Inc., Boise, Id.

Continuation-in-part of Ser. No. 468,348, Jan. 22, 1990. This application Aug. 3, 1990, Ser. No. 562,288

Int. Cl.^{5} B24B *7/22*

U.S. Cl. 51—209 DL **8 Claims**



5. Apparatus to polish a workpiece, comprising:
- a polishing pad, rotatable about an axis and having a face perpendicular to and coaxial with said axis;
- said face, in use, to be urged against the workpiece to facilitate polishing of same;
- said face shaped by a plurality of like sized substantially circular voids; and
- said voids having a density within a work zone between radii from said axis which increases with the distance of the voids from said axis,
- wherein said face, by virtue of its shape, is able to provide a constant, or nearly so, surface contact rate to the workpiece for any radius bounded by an inner radius and an outer radius from said axis, said radii being sufficiently different to accommodate the workpiece between them.

5,020,284
SELF-BIASING HONING TOOL

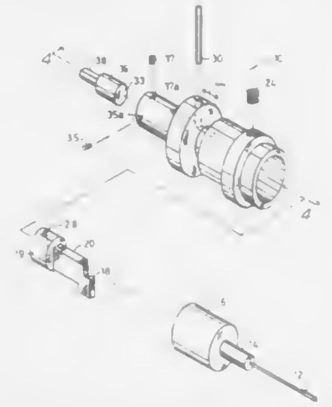
James G. Monahan, 4733 - 122od Ave. North, Clearwater, Fla. 34622

Filed Dec. 12, 1989, Ser. No. 449,646

Int. Cl.^{5} B24D *17/00*

U.S. Cl. 51—338 **8 Claims**

1. In a honing tool having a housing of the type where a tubular boss means is formed on a trailing end of the housing and where the trailing end of a feeding rod is slidably mounted for axial movement within said boss means, means for effecting axial travel of said feedup rod, comprising:
- a tubular sleeve member having a leading end fixedly secured in open communication and in axial alignment with a trailing end of said boss means;
- a bias means disposed in said sleeve member;
- a leading end of said bias means being disposed in abutting relation to the trailing end of said feedup rod;
- means external to said honing tool for compressing said bias means so that said bias means exerts pressure on said feedup rod;
- a pair of diametrically opposed, longitudinally extending slot members being formed in said sleeve member;



- a bore means being formed adjacent the trailing end of said feedup rod;
- a linear-in-configuration pin member extending through said slot members and said bore means;
- means for retaining said pin member in said slot members and said bore means;
- said means for retaining said pin member comprising a feedup ring member of generally toroidal configuration;
- said feedup ring member being centrally bored to axially receive said sleeve member; and
- said feedup ring member having a pair of diametrically opposed, radially disposed bore means formed therein to accommodate said pin member.

5,020,285

Patent Not Issued For This Number

5,020,286
PORTABLE SECTIONAL FLOORING SYSTEM WITH POST SUPPORT

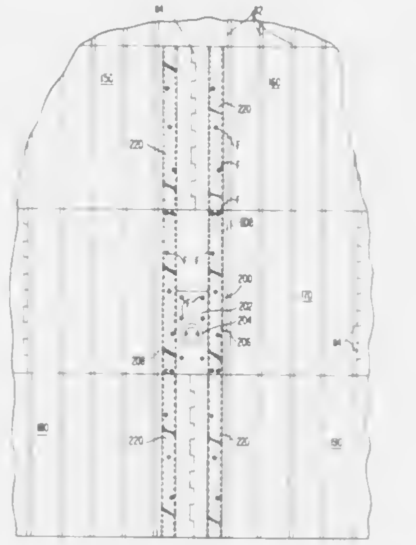
Douglas J. Hamar, Chassell; Gopal Jayaraman, Houghton; Richard Granroth, Laurium; Robert L. Whipple, South Range, and Harold A. Evensen, Houghton, all of Mich., assignors to Portage Holding, Inc., Mich.

Filed Aug. 5, 1988, Ser. No. 228,744

Int. Cl.^{5} E04C *1/10;* E02D *5/80*

U.S. Cl. 52—585 **32 Claims**

1. A floor section having a built-in post anchor for use with a portable sectionalized flooring system suitable for a volleyball court or the like comprising:
- a panel comprising a substantially planar member and a plurality of elevation members, said planar member having an upper surface and an undersurface, said plurality of elevation members supporting said planar member a distance above a base surface, said panel having a hole extending through it in a direction substantially normal to the planar upper surface;
- a post anchor base assembly comprising a plate support member and a hollow cylinder extending from said support member, said base assembly being fixedly secured to said undersurface with said hollow cylinder in alignment with said panel hole for receiving and supporting post; and



- coupling means connected to said plate support member for coupling said base assembly and said panel secured thereto to at least one adjacent panel.

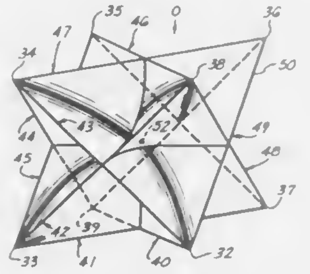
5,020,287
STRUCTURAL BUILDING COMPONENTS INCORPORATING INTEGRATED HYPERBOLIC PARABOLOID ELEMENTS

Ray A. Woods, P. O. Box 1, Cleo Springs, Okla. 73729

Filed Dec. 22, 1989, Ser. No. 455,220

Int. Cl.^{5} E04B *1/32*

U.S. Cl. 52—81 **1 Claim**



1. A structural building element comprising:
- six hyperbolic paraboloid elements integrated in intersecting relation at a common midpoint for forming an octalith having eight vertices and twelve linear edges in which pairs of the linear edges intersect at six points.

5,020,288
METHOD TO PROTECT GLASS IN DOORS AND WINDOWS FROM SCRATCHES, ABRASION, AND PAINTING PROCESSES

William B. Swensen, 1219 Creso Rd. South, Spanaway, Wash. 98387

Filed Jun. 12, 1990, Ser. No. 536,476

Int. Cl.^{5} E06B *1/00;* B32B *17/00;* C03C *11/00*

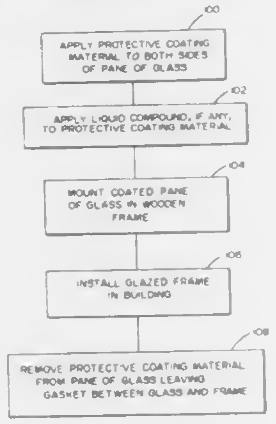
U.S. Cl. 52—202 **17 Claims**

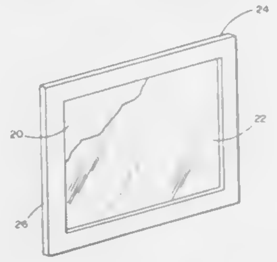
1. A method for producing a building product having a frame and at least one piece of glazing material having two planar surfaces and a plurality of edge surfaces secured within said frame for providing a seal between said frame and each surface of said at least one piece of glazing material, comprising the steps of:

VOL
1127
ISS
1
JE
4
1991
UMI

covering both planar surfaces of said at least one piece of glazing material with a protective coating;

assembling said at least one piece of protected glazing material in said frame, such that a portion of said protective coating is exposed within said frame and a portion of said protective coating remains between said frame and said at least one piece of glazing material; and


100
APPLY PROTECTIVE COATING MATERIAL TO BOTH SIDES OF PANE OF GLASS
102
APPLY LIQUID COMPOUND, IF ANY, TO PROTECTIVE COATING MATERIAL
104
MOUNT COATED PANE OF GLASS IN WOODEN FRAME
106
INSTALL GLAZED FRAME IN BUILDING
108
REMOVE PROTECTIVE COATING MATERIAL FROM PANE OF GLASS LEAVING GASKET BETWEEN GLASS AND FRAME



cutting and removing the exposed protective coating on said at least one piece of glazing material such that the portion of said protective coating remaining between said frame and each planar surface of said at least one piece of glazing material forms a waterproof seal between said piece of glazing material and said frame.

5,020,289
IN LOG JOINT AND MACHINE FOR FORMING LOG JOINT

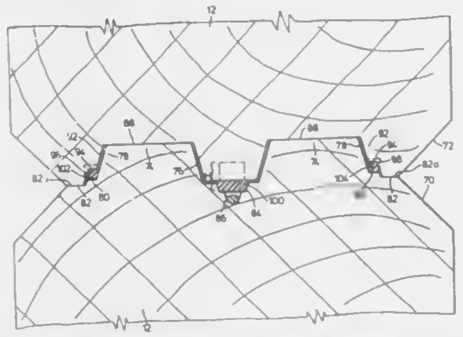
Ronald A. Wrightman, c/o P.O. Box 2169, Bracebridge Ontario, Canada K0M2K0

Continuation of Ser. No. 348,137, May 5, 1989, abandoned, which is a continuation of 199,798, May 27, 1988, abandoned. This application Oct. 5, 1990, Ser. No. 593,304

Claims priority, application Canada, Nov. 23, 1987, 552517

Int. Cl.⁵ E04B *1/10*

U.S. Cl. 52—233 **22 Claims**



1. In a wall of a log structure in which a plurality of logs are interconnected by double tongue and groove joints formed at an interface between abuting edges of adjacent logs and wherein the tongues are spaced from one another by a channel and a ridge is formed between the grooves, the improvement of;

a) a seal seating groove formed in the base of said channel and extending longitudinally thereof,

b) seal means in the form of an elongated length of compressible material seated in said seal seating groove and compressed between said ridge and the base of said channel to form a seal at said interface along the length of said log.

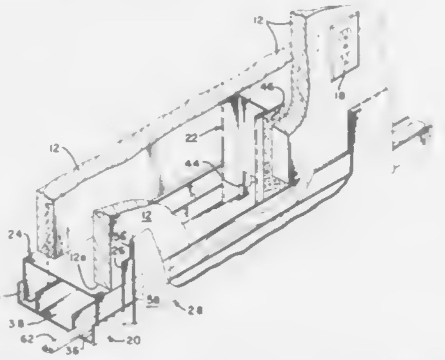
5,020,290
MODULAR WALL

Victor J. Hajjar, 1600 Galen Rd., Harrisburg, Pa. 17110

Filed Dec. 15, 1989, Ser. No. 451,011

Int. Cl.⁵ E04B *2/78;* **E04H** *1/00*

U.S. Cl. 52—242 **3 Claims**



1. An interior modular wall for use within a building or the like, said wall comprising

horizontal members with each having a pair of outer channels and a center channel with said channels being adapted to receive electrical and electronic wires and wiring harnesses, said members adapted to be attached to a floor and a ceiling in alignment with each other;

a plurality of vertical, I beam-shaped members positioned in and extending between said horizontal member and supported thereby;

a plurality of U-shaped support members having legs positioned in said outer channels of said horizontal member positioned on a floor and a bight extending over said center channel, said support members adapted to support panels which may be placed against the wall;

rectangular trim retaining clips having one end frictionally received between a leg of said support member and an adjacent sidewall of said horizontal member, and further having an outwardly extending free end; and

trim strips having side by side layers defining a downwardly open pocket therebetween, said trim strips attached to said clips by receiving said free ends in said pocket, said strips adapted to cover said horizontal members positioned on a floor and a lower edge of a panel which may be positioned on said support members.

5,020,291

Patent Not Issued For This Number

5,020,292
DOOR CONSTRUCTION

Hans Strom, and Jan Andersson, both of Astorp, Sweden, assignors to Svensk Dorrteknik AB, Sweden

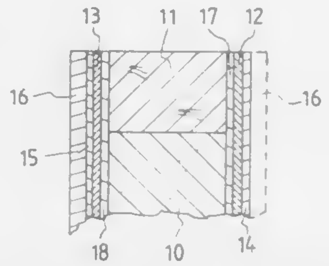
Continuation of Ser. No. 946,388, Dec. 23, 1986, abandoned, which is a continuation of Ser. No. 752,382, Jul. 3, 1985, abandoned. This application Jun. 22, 1990, Ser. No. 542,804

Claims priority, application Sweden, Jul. 4, 1984, 8403541

Int. Cl.⁵ E06B *5/20*

U.S. Cl. 52—309.9 **10 Claims**

1. A door construction comprising a wood frame having opposing sides, a core provided within said frame, said core including a heat insulating material having a heat conductivity between about 0.015 and 0.050 (W/m/C.°), the door construction further including first and second outer faces overlying opposite sides of said frame, each said outer face including a first wooden layer, a second wooden layer, and an iron plate having a thickness in the range of about 0.2 to 0.5 millimeters disposed between the wooden layers and adhesively secured



thereto, each said outer face being substantially prestressed, whereby said door construction is externally identifiable as a wooden door and is capable of counteracting warping and fire breakthrough.

5,020,293
DECORATIVE PANEL ASSEMBLY

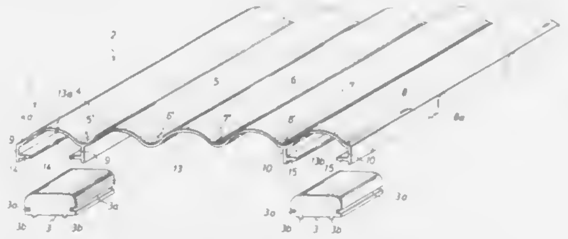
Takafumi Itagaki, Chiba, Japan, assignor to Tamatoshi Industries Limited, Tokyo, Japan

Filed Dec. 29, 1989, Ser. No. 459,349

Claims priority, application Japan, Jan. 27, 1989, 1-19092; Jan. 27, 1989, 1-19093

Int. Cl.⁵ E04F *13/00*

U.S. Cl. 52—314 **9 Claims**



1. A decorative panel assembly comprising:

a decorative panel having opposite sides and opposite ends, two pairs of legs extending from one of said sides, one leg of each pair being located at a said opposite end with the other leg of said pair spaced a selected distance from said one leg, each said leg having a projection extending therefrom toward the other leg of said pair, said legs defining a space on said one side of said panel between said panel and a mounting surface,

a securing device including a magnet for magnetically securing said device to a mounting surface, said device having receiving means for receiving said projections of a said pair of legs to attach said panel to said device to thereby prevent said panel from being detached from said mounting surface.

5,020,294
EXPANSION JOINT FOR COVERED PANELS

Robert W. Duda, P.O. Box 649, Blairstown, N.J. 07825

Filed May 7, 1990, Ser. No. 519,850

Int. Cl.⁵ E04B *1/68;* **E04F** *15/14*

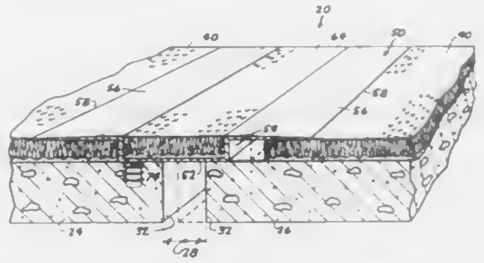
U.S. Cl. 52—573 **17 Claims**

1. An expansion joint, comprising:

two coextensive panels substantially abutting at a variable gap, the panels having coplanar surfaces on at least one side;

a covering material on the panels, the covering material extending on each side of the gap to a point spaced back from the gap;

a joint member with a body portion of a width greater than a maximum width of the gap, and means adjacent one side of the gap for affixing the body portion to one of said panels defining an attachment side of the joint, the body portion being affixed against the coplanar surface of the panel on said attachment side, the body portion bridging across the gap and resting freely on the coplanar surface of the panel on an opposite side of the gap, a first wing member being attached to the body portion on the attachment side at a space from said lower surface of the body portion substantially equal to a thickness of the covering material on said attachment side, and a second wing member being attached to the body portion at a space from said lower surface of the body portion substantially equal to a thickness of the covering material on said opposite side, said first and second wing members extending over the covering material on both sides of the gap.



5,020,295
CLADDING LAYER

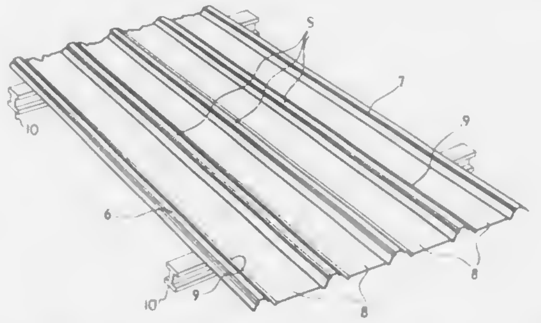
Neil R. Haines, Daisy Hill, and Kim Morgan, Mount Eliza, both of Australia, assignors to John Lysaght (Australia) Limited, Sydney, Australia

Continuation of Ser. No. 362,777, Jun. 7, 1989, abandoned. This application Aug. 20, 1990, Ser. No. 569,505

Claims priority, application Australia, Jun. 8, 1988, PI8693; Feb. 17, 1989, PJ2795

Int. Cl.⁵ E04C *2/32*

U.S. Cl. 52—630 **6 Claims**



1. A metal rood cladding panel having a protective or ornamental coating and intended for attachment to a supporting surface, the panel being formed of light gauge metal such that, if a panel is overloaded as when an installed panel is walked on, pans therein tend to deform causing formation of stress-reduced marks, said panel comprising:

an essentially flat pan extending in a plane longitudinally of said panel;

two ribs extending longitudinally of said panel wherein one of each said ribs is located on a longitudinal edge of said pan, each said rib and said pan being connected along a longitudinal junction and each said rib being substantially narrower than said pan; and

a bead along each said junction between each said rib and said pan, each said rib and said bead projecting from said pan in opposite directions relative to each other such that each said rib projects in an upward direction above the

VOL
1127
ISS
1
JE
4
1991
UMI

plane of said pan and each said bead projects in a downward direction below the plane of said pan;

said beads being of a small cross-section relative to said ribs such that said beads tend to form when the panel is overloaded to thereby minimize formation of stress-induced marks in the coating on the pan of the panel.

5,020,296
METHOD OF SECURING LIGHTING FIXTURE

Takayuki Aoshika, Tokyo, Japan, assignor to Ultima Ltd., Tokyo, Japan

Filed Sep. 11, 1989, Ser. No. 405,797

Claims priority, application Japan, Sep. 13, 1988, 63-227573

The portion of the term of this patent subsequent to Mar. 12, 2008, has been disclaimed.

Int. Cl.^{5} F21S *1/02;* **E04F** *19/00;* **E04G** *21/00*

U.S. Cl. 52—741 5 Claims

1 A method of fixedly securing a lighting fixture to a ceiling of a building structure, comprising:

a first securing step for securing an anchor grip at a prescribed position on a bottom face of a slab of said building structure, a flexible suspender being inserted through said anchor grip,

a second securing step for securing a suspender grasping assembly temporarily to a lighting fixture support member by inserting the grasping assembly through a hole of the support member and holding the assembly by a washer frictionally engaging with an outer periphery of said gripping assembly;

a suspending step for inserting said flexible suspender from the lower free end thereof through said suspender grasping assembly and then raising said suspender grasping assembly along said flexible suspender, while said lighting fixture support member is temporarily fixed to a temporary set position on said suspender;

an adjusting step for adjusting height of said lighting fixture support member to fit into a ceiling finish board, by moving said suspender grasping assembly along said flexible suspender together with said lighting fixture support member; and

a fixing step for fixing said lighting fixture support member to said flexible suspender at the height as adjusted by said adjusting step.

5,020,297
APPARATUS FOR FILLING PETRI DISHES

Gérard Borie; Jean Pellegrin, both of Rennes, and Alain Le Roch, Loudeac, all of France, assignors to Armor Equipment Scientifique, Combourg, France

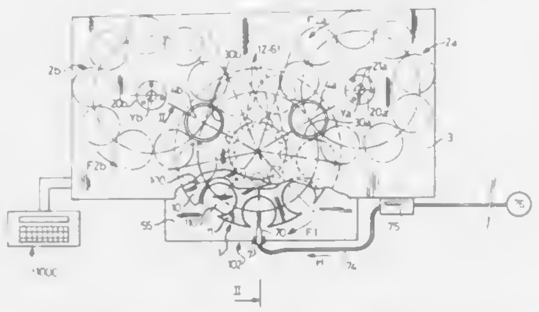
Filed Feb. 28, 1990, Ser. No. 486,532

Claims priority, application France, Mar. 3, 1989, 89 03008

Int. Cl.^{5} B65B *3/12, 43/40, 55/08, 63/08*

U.S. Cl. 53—127 13 Claims

1. Apparatus for filling petri dishes, said dishes being circular in shape, comprising a bottom onto which a lid of slightly larger diameter than the bottom is fitted freely, the apparatus being of the type comprising a transfer turntable (**1**) suitable for conveying open dishes (**9**) having their lids (**91**) held up at a distance above their bottoms (**90**) in succession and step by step from an empty dish dispensing station to a dish-filling station, and then from the dish-filling station to a filled dish receiving station. Said turntable (**1**) comprising two superposed coaxial circular horizontal plates (**10**, **11**) each pierced by a series of circular openings regularly distributed around its periphery and in register with the openings in the other disk, the diameter of the openings (**100**) in the top disk (**10**) being slightly smaller than the diameter of the lids (**91**) but slightly larger than the diameter of the bottoms (**90**), thereby allowing the bottoms to pass therethrough while retaining the lids, the apparatus being characterized in that:



firstly the openings (**110**) in the bottom plate (**11**) are slightly larger in diameter than the bottoms (**90**) so that they too allow the bottoms to pass therethrough; and

secondly the said transfer turntable (**1**) rests via its bottom plate (**11**) on a fixed sole plate (**55**) which is plane and horizontal, such that the dish bottoms (**90**) rest on said sole plate (**55**) while they are being transferred by means of said bottom plate (**11**), the turntable (**1**) being rotated by drive means (**63**, **62**, **6**) situated beneath the sole plate (**55**) and acting via magnetic coupling (**61**, **12**).

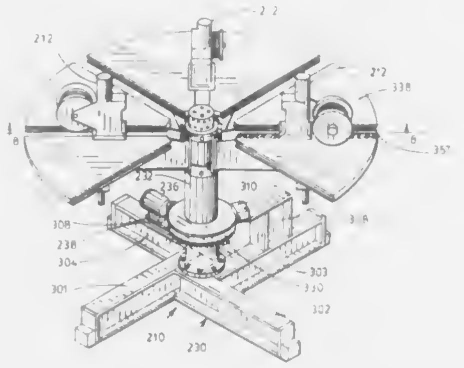
5,020,298
CONTINUOUSLY ROTATING PLATFORM WITH MULTIPLE MOUNTED DOUBLE CLIPPERS FOR CONTINUOUSLY FORMING LINK PRODUCT

Alfred J. Evans, Raleigh; Grant K. Chen, Cary; Dennis J. May, Pittsboro, and Edward P. Brinson, Raleigh, all of N.C., assignors to Delaware Capital Formation, Inc., Apex, N.C.

Continuation-in-part of Ser. No. 105,665, Oct. 7, 1987, Pat. No. 4,821,485. This application Nov. 14, 1988, Ser. No. 270,222

Int. Cl.^{5} B65B *9/15, 51/05;* **B23P** *11/00*

U.S. Cl. 53—138.2 13 Claims



1. An improved packaging device for filling flexible casing and sealing discrete lengths of filled casing comprising, in combination:

a clipper mounting assembly including a floor mounted frame and a plurality of separate and distinct wedge members supported by the frame, said wedge members rotatable in a horizontal plane relative to the frame;

a plurality of clippers mounted on the plurality of wedge members, each clipper spaced radially from a vertical axis through the center of the plurality of wedge members, each clipper including pressurized-fluid-driven means for attaching a clip about filled casing by gathering said casing and subsequently forming a U-shaped clip about the gathered casing with cooperative punch and die means, each of said clippers extending radially outwardly from the vertical axis through the center of the wedge members;

means for continuously rotating the wedge members and clippers mounted thereon about said axis in a uniform direction;

means positioned at one side of the wedge members for feeding filled casing sequentially into each clipper as each one of said clippers moves, by wedge member rotation, past the means for feeding; and

means for sequentially operating the clippers as the wedge members are rotated whereby as each clipper is in position to receive filled casing as it moves past the means for feeding, said clipper operates to subsequently gather the casing, to form a U-shaped metal clip about the casing, to separate links of casing, to release the casing link and to discharge the filled link from the device.

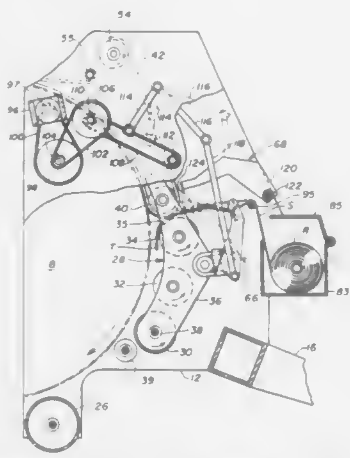
5,020,299
METHOD OF WRAPPING ROUND BALES

Kenneth R. Underhill, 219 Miller St., Strasburg, Pa. 17579

Filed Dec. 11, 1989, Ser. No. 448,406

Int. Cl.^{5} B65B *11/04*

U.S. Cl. 53—399 7 Claims



1. In combination with an agricultural baler of the type having a bale forming chamber in which cylindrical bales of crop material are formed, a method of wrapping the cylindrical bales with sheet material, said method comprising the steps of:

gripping a tail of the sheet material in dispensing means between a pair of clamping members during formation of a cylindrical bale of crop material in the bale forming chamber of the agricultural baler;

pivoting said dispensing means about a generally horizontal axis from a retracted position to a dispensing position after completion of the cylindrical bale;

inserting said tail of the sheet material into said bale forming chamber when said dispensing means is in said dispensing position;

wrapping the sheet material circumferentially around the cylindrical bale while it is disposed in said bale forming chamber; and

pivoting said dispensing means about said horizontal axis from said dispensing position to said retracted position after at least one layer of the sheet material has been wrapped circumferentially around the cylindrical bale.

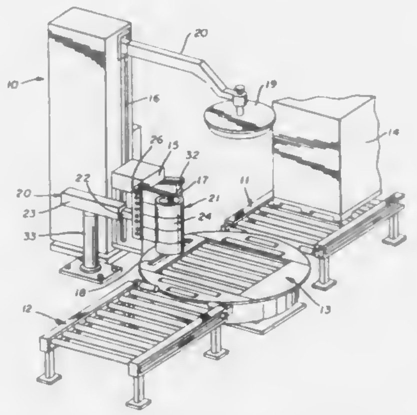
5,020,300
WIPE DOWN METHOD FOR STRETCH WRAPPING DEVICES

Larry Casteel, Homerville, Ohio, assignor to Liberty Industries, Inc., Girard, Ohio

Continuation-in-part of Ser. No. 427,502, Oct. 27, 1989, Pat. No. 4,955,181. This application Jul. 23, 1990, Ser. No. 556,327

Int. Cl.^{5} B65B *11/04*

U.S. Cl. 53—399 **4 Claims**



1. A method for wiping down a film web on a load after it has been wrapped comprises the steps of,

securing the film web within a film plane path, providing a wiper support arm along the path of movement of the load having a spaced loop strip wiper including a pair of unequal lengths of strips, one of said strips double back on a portion of itself forming a loop,

advancing a portion of the wiper support arm on which said spaced loop strip wiper is mounted towards the load, engaging said load with said spaced loop strip wiper, deforming said spaced loop strip wiper against the load, along two lines one of which is parallel to the load path and the other of which is at right angles to said load defining a focal point therebetween,

moving the wrapped load relative to the wiper support arm, wiping down the load during the moving step.

5,020,301
METHOD AND MACHINE FOR BALING SHRUBS AND BUSHES

Bernd Helms, Sparrieshoop, Fed. Rep. of Germany, assignor to W. Kordes' Söhne Rosenschulen GmbH & Co KG, Fed. Rep. of Germany

PCT No. PCT/EP89/00372, § 371 Date Nov. 21, 1989, § 102(e) Date Nov. 21, 1989, PCT Pub. No. WO89/09728, PCT Pub. Date Oct. 19, 1989

PCT Filed Apr. 7, 1989, Ser. No. 445,715

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1988, 3812273

Int. Cl.^{5} B65B *11/02, 13/16, 27/12*

U.S. Cl. 53—399 8 Claims

1. In a method of baling bare rooted plants, which comprises the steps of (a) forming a hollow from a portion of a flat wire grating having edges at least one of the edges of the grating remote from the others having projecting wire ends,

(b) partially filling the hollow with a moisture-retaining substrate,

(c) placing the roots of the plant in a lying position substantially freed from soil on the substrate,

(d) applying additional substrate to the roots,

(e) forming the wire grating into a tube by bending together at least two edges thereof and

VOL
1127
ISS
1
JE
4
1991
UMI

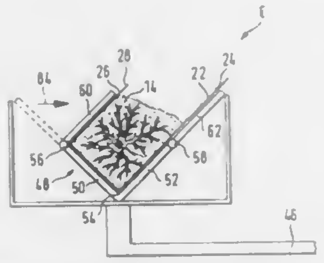
(f) fixedly connecting the edges together by inserting wire ends of one edge through meshes along another edge and thereafter bending the wire ends over,

the improvement comprising

(i) forming the hollow in the wire grating by bending it approximately at right-angles along a first edge line which lies approximately in the centre between said two edges,

(ii) after the steps (b), (c) and (d) above, again bending the wire grating approximately at right-angles along a second edge line which lies approximately in the centre between the first edge line and one of said edges, the wire grating being held fixed at said second edge line, and

(iii) bending the wire grating again approximately at right-angles along a third edge line which lies substantially in the centre between the first edge line and the other of said edges, the wire grating being held fixed along said third edge line.



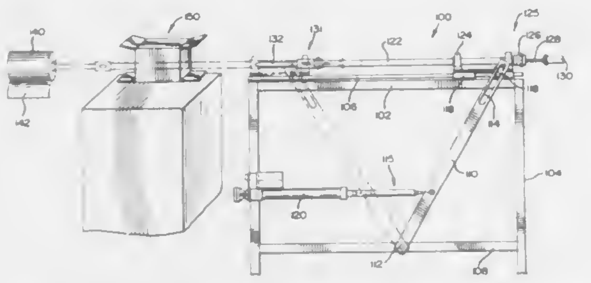
5,020,302
ROLL INSERTER

James E. Buchman, Hortonville, and Gregory J. Vanden Heuvel, Kaukauna, both of Wis., assignors to Reynolds Consumer Products, Inc., Appleton, Wis.

Filed Sep. 17, 1990, Ser. No. 583,827

Int. Cl.^{5} B65B *25/14*

U.S. Cl. 53—430 **22 Claims**



17. An automatic method of inserting a roll of material into an empty carton with opened opposing sides comprising:

a. moving a means for gripping the inside of a roll of material through the empty carton;
b. inserting the gripping means inside the roll of material;
c. gripping the roll of material to securely hold the roll;
d. drawing the roll of material into the empty carton;
e. releasing the roll of material; and,
f. retracting the gripping means away from the roll and carton.

5,020,303
MACHINE FOR FILLING CONTAINERS WITH A FOOD PRODUCT

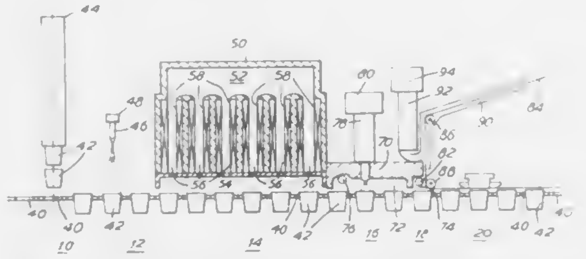
Ian M. Vokins, Oxfordshire, England, assignor to CMB Foodcan plc, Worcester, England

Filed Nov. 27, 1989, Ser. No. 441,946

Claims priority, application United Kingdom, Aug. 3, 1989, 8917810

Int. Cl.^{5} B65B *31/02*

U.S. Cl. 53—432 **16 Claims**



10. A method of filling containers with a food product comprising the steps of moving a conveyor along a substantially horizontal path, loading containers onto the conveyor at a loading station, filling the containers with a food product at a filling station, creating, prior to sealing, an atmosphere of a desired gas in the unfilled parts of the containers at a gassing station, applying closures to the containers at a sealing station, and unloading the containers from the conveyor at an unloading station, said stations being arranged along the horizontal path in the order recited, in which, in the step of creating an atmosphere of a desired gas in the unfilled parts of the containers, the desired gas in injected into a chamber located above the conveyor between the filling and sealing stations in a state of laminar flow by means of an injection tube formed from a sintered metal, the method further including the step of guiding sealing foil along a guide path to the sealing station with the aid of a set of rollers, said rollers including one roller located along the conveyor and upstream, in the direction of movement of the conveyor, from the sealing station, said guide path including a downward stretch leading to said one roller and the sealing foil passing along said downward stretch forming a wall of the chamber of the gassing station in which the upper surface of the wall of the gassing station approaches said downward stretch of the guide path at a position which is above or at the axis of rotation of said one roller.

5,020,304
METHOD AND APPARATUS FOR LOADING AND STACKING CRATES

Thomas H. Peterman, Farwell; David L. Anderson, Alexandria, both of Minn.; Jan Hakansson, Eslöv, Sweden, and Harijs B. Marovskis, Plymouth, Minn., assignors to Tetra Pak Holdings & Finance S.A., Pully, Switzerland

Filed Nov. 8, 1989, Ser. No. 433,369

Int. Cl.^{5} B65B *13/02, 43/00*

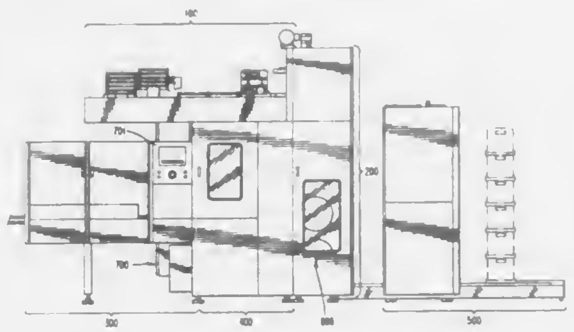
U.S. Cl. 53—458 **72 Claims**

1. An apparatus for loading crates comprising:

means for orienting a crate from a folded to an unfolded configuration, said means for orienting having first and second unfolding members for unfolding a first and second side of said crate wherein each of said first and second unfolding members are pivotable around a pivot axis of

each of said first and second side of said crate, respectively;

means for loading an unfolded crate with packages;



means for transporting said unfolded crate from said means for orienting to said means for loading; and

means for feeding said packages to said means for loading.

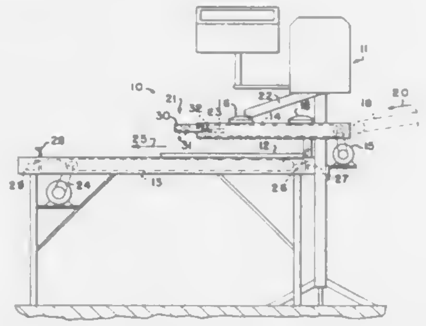
5,020,305
PACKAGE PLATTERING DEVICE AND METHOD

Fritz F. Treiber, Centerville, Ohio, assignor to Hobart Corporation, Troy, Ohio

Filed May 18, 1990, Ser. No. 525,790

Int. Cl.^{5} B65B *57/12, 35/56*

U.S. Cl. 53—500 **13 Claims**



1. A device for linearly shingling trayed, wrapped packages in an elongated platter, comprising:

a platter conveyor for intermittently moving a platter lengthwise in an essentially horizontal plane from a first, empty position to a second, loaded position,

drive means for said platter conveyor,

a package conveyor above and having at least its output end aligned with said platter conveyor for feeding packages individually off the output end thereof and lowering them by gravity onto a platter as it is moving along the platter conveyor, the output end being adjacent to and spaced a short distance above a leading end of an empty platter in said first, empty position,

sensor means adjacent said output end and activated by the presence of a package at the output end of the package conveyor, and

means responsive to activation of said sensor means to operate said drive means to initiate movement of said platter conveyor at a given delivery speed upon the sensor means being activated by a package and to interrupt movement essentially when the sensed package has passed beyond said sensor means, contact of one package with any previously-deposited package arresting movement of said one package and permitting it to settle against the previous package in shingled, stacked fashion.

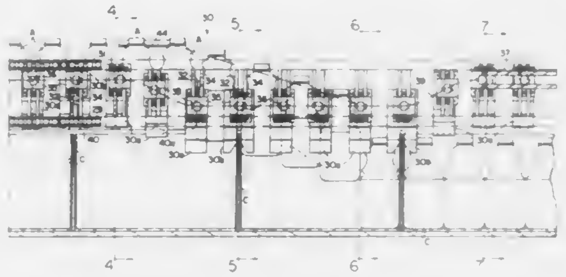
5,020,306
CONTINUOUS MOTION PACKER FOR FEEDING CONTAINERS INTO END-TO-END PACKING CASES

John L. Raudat, North Madison, Conn., assignor to Standard-Knapp, Inc., Portland, Conn.

Filed Feb. 15, 1990, Ser. No. 480,746

Int. Cl.^{5} B65B *35/44*

U.S. Cl. 53—534 **12 Claims**



1. Apparatus for loading containers into packing cases as the packing cases move in end-to-end relationship in a downstream direction, said apparatus comprising infeed conveyor means for orienting the containers into two columns so that the containers in these columns are provided in side-by-side relationship, container deadplate means, packing case conveying means for moving the packing cases downstream below the path of movement of the container columns, to feed the end-to-end cases in turn through a load station, container engaging lug conveyors alongside said container columns, said lug conveyors having longitudinally spaced first and second lugs that move between the containers to create a predetermined spacing therebetween as the containers move toward said load station,

said first lugs being uniformly spaced with respect to one another in order to space the containers uniformly within each slug to be loaded into each packing case, said second lugs so dimensioned as to create a slightly greater space between adjacent containers, container engaging gravity rails at the downstream end of said container deadplate means to lower the containers into a packing case at the load station, said container engaging lug conveyors being synchronized with movement of said packing cases so that said first lugs engage the containers, said second lugs including lower end portions for engaging the adjacent end panels of the packing cases, and means for achieving controlled vertical movement of at least said second lugs at the load station so that the lower end portions thereof engage the adjacent end panels of said end-to-end packing cases at said load station.

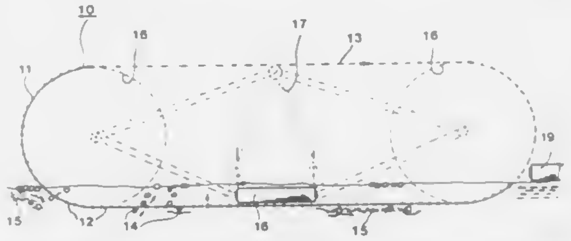
5,020,307
METHOD AND APPARATUS FOR WATER HARVESTING

Guenter E. Gutsche, 4476 Forget, Terrebonne Quebec, Canada J6X 1Z4

Filed Aug. 8, 1989, Ser. No. 390,965

Int. Cl.^{5} A01D *44/00*

U.S. Cl. 56—8 **16 Claims**



1. In a method to harvest berries having buoyancy in water,

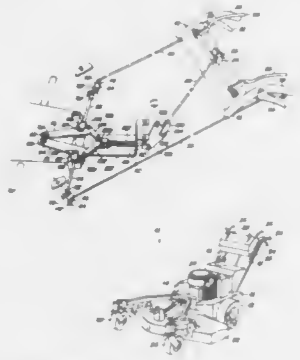
VOL
1127
ISS
1
JE
4
1991
UMI

wherein berries are removed from their plants by mechanical means and said berries are floated in water. the improvement comprising the steps of·

(a) immersing a separator having apertures greater in dimension than said berries into said water, thereby causing debris greater in at least one dimension present with said berries in said water to be held below said separator,
(b) causing said berries to rise by their buoyancy through said apertures toward the surface of said water and
(c) lifting said separator out of said water.

5,020,308
SELF-PROPELLED STEERABLE WALK BEHIND MOWER LINKAGE

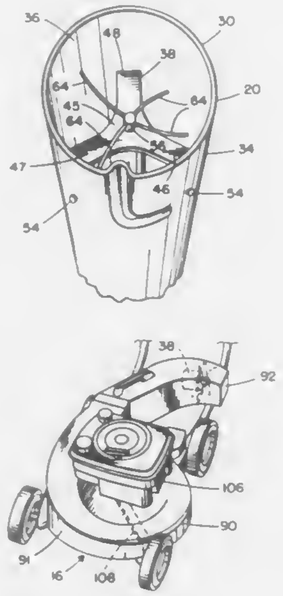
Stephen A. Braun, Horicon; Michael J. O'Neill, Mayville; David C. Polak, Beaver Dam, all of Wis., and Donald L. Cutshall, Burnsville, Minn., assignors to Deere & Company, Moline, Ill.
Filed Mar. 12, 1990, Ser. No. 491,779
Int. Cl.⁵ A01D *34/82*
U.S. Cl. 56—11.3 22 Claims



3. A mower comprising:
at least one ground engaging wheel;
left and right ground engaging driven wheels fore and aft offset from said one wheel;
a frame carried by the wheels;
rearwardly and upwardly extending support means carried by the frame;
a power source carried by the frame;
a dead man control lever means carried by the support means;
first and second steering lever means carried by the support means;
first and second transmission means that independently transmit power from the power source to the left and right wheels, each of said transmission means adapted to wheel driving or brake modes;
first and second input means coupled respectively with the left and right transmission means, for selecting power or brake modes of its respective transmission means; and
means operatively interconnecting the first and second input means, the dead man control lever means, and each of the steering control lever means, for causing the input means to select the power or brake modes as the dead man control lever means is shifted between first and second positions respectively, and for causing the first and second input means to move from the power mode to the brake mode when said respective steering control lever means has been actuated and the dead man control lever means is in the first position;
and means for biasing the dead man control lever means toward its second position.

5,020,309
LEAF SHREDDER ATTACHMENT FOR A MOWER BAGGING SYSTEM

John W. Hopkins, Charlotte, N.C., assignor to Textron, Inc., Providence, R.I.
Filed Nov. 8, 1989, Ser. No. 433,682
Int. Cl.⁵ A01D *34/12. 34/70;* A47L *5/24;* B02C *13/288*
U.S. Cl. 56—13.3 21 Claims



9. A discharge tube for use with a mower, the mower having a primary cutting area and being capable of exiting cut material from the primary cutting area through the discharge tube, the discharge tube comprising:
frame means forming a substantially rigid conduit with a first open end and a second open end;
means for connecting said first end to the mower for receiving cut material from the primary cutting area; and
means for cutting material passing through said frame means conduit including an electric motor mounted in said conduit having at least one string-type member mounted to said motor for rotation in said conduit such that material passing through said conduit can be cut into relatively small pieces by said cutting means.

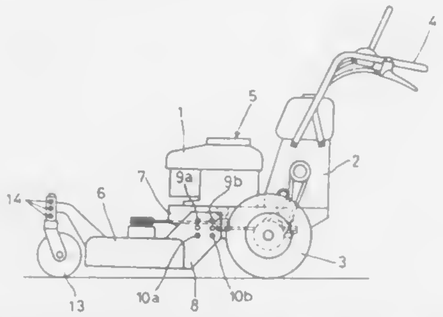
21. A shredder for use in a conduit of a leaf collector, the shredder comprising:
a frame suitably sized and shaped to be mounted inside the conduit and adapted to allow shreddable material to pass therethrough;
an electric motor fixedly connected to said frame and having a rotatable drive shaft, said motor being located on one side of said frame and said shaft extending from said motor through a portion of said frame to an opposite side thereof; and
a cutter connected to said drive shaft such that rotation of said drive shaft by said motor can rotate said cutter to substantially shred shreddable material passing through the conduit.

5,020,310
LAWN MOWER

Hiroshi Oshima, and Hideo Okura, both of Osaka, Japan, assignors to Kubota Corp., Osaka, Japan
Filed Apr. 20, 1990, Ser. No. 513,305
Claims priority, application Japan, Aug. 30, 1989, 1-223818
Int. Cl.⁵ A01D *34/74*
U.S. Cl. 56—17.2 7 Claims

1. A lawn mower comprising;

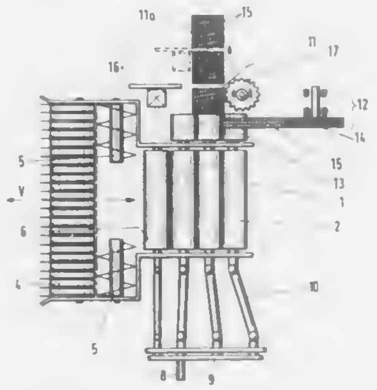
a vehicle body including a first connecting frame in a forward portion thereof,
an engine and a transmission case mounted on the vehicle body,
a grass cutting unit mounted on the forward portion of the vehicle body and including a second connecting frame connected to the first connecting frame of the vehicle body,
first connecting bore means including a pair of bores defined in one of the first connecting frame and second connecting frame,



second connecting bore means including plural pairs of bores defined in the other of the first connecting frame and second connecting frame, the respective pairs being disposed at different heights from the ground, and
connecting means insertible through the bores of the first and second connecting bore means to connect the grass cutting unit to the vehicle body,
wherein one of the bores in the first connecting bore means is shaped to fit with the connecting means, and the other of the bores is defined as a slot having play relative to the connecting means.

5,020,311
METHOD AND A DEVICE FOR PRODUCING HIGHLY COMPRESSED CYLINDRICAL BALES FROM LOOSE STALK MATERIAL

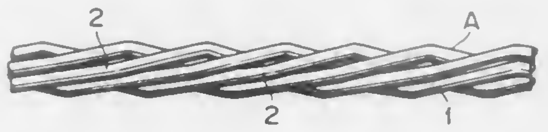
Hans J. Matthies, Braunschweig, Fed. Rep. of Germany, assignor to Gebrueder Welger GmbH & Co. KG, Wolfenbuettel, Fed. Rep. of Germany
Filed Nov. 1, 1989, Ser. No. 430,177
Claims priority, application Fed. Rep. of Germany, Nov. 2, 1988, 3837230
Iot. Cl.⁵ A01D *39/00*
U.S. Cl. 56—432 20 Claims



1. A method for producing highly compressed cylindrical bales from loose stalk material, comprising:
picking up loose stalk material;
forming a cylindrical roll by compressing and rotating the loose stalk material;
feeding the rotating compressed roll in an axial direction thereof;
binding at least a portion of the rotating compressed roll, while the roll is being axially fed and is subject to radial pressure; and
cutting a bound portion of the roll to produce a dimensionally stable bale of a desired length.

5,020,312
TIRE STEEL CORDS AND METHOD OF MANUFACTURING THEREOF

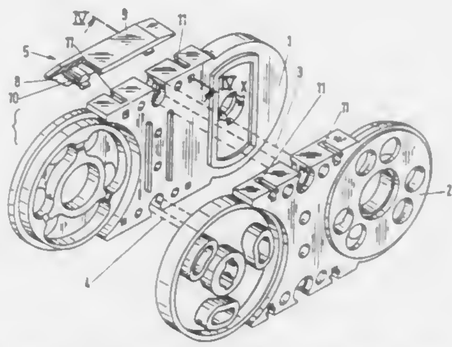
Hidenori Watakabe, Yamaguchi, Japan, assignor to Kokoku Steel Wire Ltd., Tokyo, Japan
Filed Oct. 26, 1989, Ser. No. 428,225
Claims priority, application Japan, May 23, 1989, 1-130674
Int. Cl.⁵ D07B *1/06;* D02G *3/48*
U.S. Cl. 57—200 **1 Claim**



1. A steel tire cord comprising more than three strands of wire, each strand extending in a longitudinal direction thereof, said strands of wire being twisted together, and at least one of said strands extending in a zig-zagging manner along the longitudinal direction thereof so as to form sharp angles therealong, said tire cord having gaps in a center thereof corresponding to positions of the angles.

5,020,313
GUIDE OR FEEDER CHAIN FOR GUIDING POWER LINES

Werner Moritz, Siegen; Volker Jud, Wilnsdorf, and Georg Wisser, Luckenbach, all of Fed. Rep. of Germany, assignors to Kabelschlepp Gesellschaft mit beschränkter Haftung, Siegen, Fed. Rep. of Germany
Filed Aug. 3, 1990, Ser. No. 562,636
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1989, 3928236
Int. Cl.⁵ F16G *13/16*
U.S. Cl. 59—78.1 8 Claims



1. In a guide or feeder chain for power and supply lines, including chain links formed from two spaced-apart parallel link members having narrow sides and being interconnected via crosspieces, with successive chain links being interconnected via crosspieces, with successive chain links being pivotably interconnected where their link members overlap one another, the improvement comprising:
on said narrow sides of said link members sliding skids that are detachably secured to said narrow sides of respective said link members and are made of plastic that has a sliding property, is resistant to wear, and has good damping

VOL
1127
ISS
1
JE
4
1991
UMI

characteristics, with said sliding skids overlapping said narrow sides of said link members and having a width corresponding to said narrow sides of said link members.

5,020,314

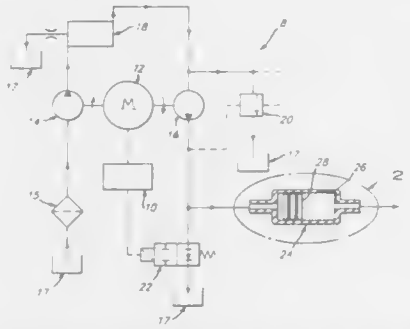
MULTIPLE FLUID SPEED SYSTEMS

Sean P. Brophy, Ann Arbor, and Richard D. Stephens, Brighton, both of Mich., assignors to Williams International Corporation, Walled Lake, Mich.

Filed Jun. 19, 1989, Ser. No. 367,613

Int. Cl.⁵ F02C *7/22*

U.S. Cl. 60—39.141 2 Claims



1. In a fuel system for supplying a run fuel and a different start fuel to a turbine engine, said fuel system comprising a fuel tank, a run fuel pump, and means for switching run fuel flow from said pump between a return to tank condition and an engine supply condition, the improvement comprising a starting fuel reservoir comprising a cylinder having a fuel inlet directly connected to said run fuel pump and a fuel outlet directly connected to said engine,

a piston in said cylinder movable from a start position to a run condition in response to movement of said switching means from the return to tank condition to the engine supply condition, and

a supply of starting fuel in said reservoir on an engine side of said piston, said starting fuel being biased out of said reservoir upon movement of said piston toward the run condition.

5,020,315

MULTIPLE FUNCTION FUEL VALVE AND SYSTEM

Frank A. Leachman, Jr., Bristol, and Edward F. Cole, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Aug. 8, 1989, Ser. No. 390,938

Int. Cl.⁵ F02C *7/232*

U.S. Cl. 60—39.281 30 Claims

1. A multiple function fuel valve comprising:

a valve body having an inlet pressure chamber at one end, a resisting pressure chamber at the other end, and a central piston receiving compartment between said chambers;

a piston slidable within said compartment and exposed to said inlet pressure chamber and to said resisting pressure chamber, and having an annular recess between the two ends forming a distribution chamber within said compartment;

a first spring between said body and said piston resisting movement of said piston toward said resisting pressure chamber;

a second spring between said body and said piston resisting movement of said piston toward said resisting pressure chamber;

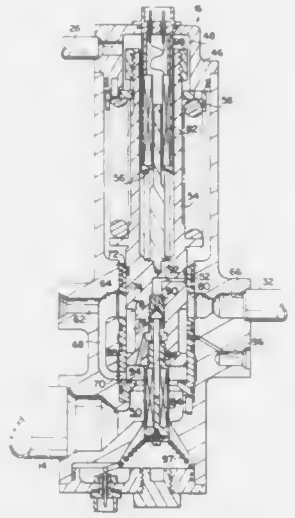
said first and second springs arranged to produce a lesser spring rate during a first increment portion of the travel of said piston and a greater spring rate during the remainder of the travel of said piston;

a plurality of outlet ports through said body in fluid communication with said compartment;

an inlet port through said body in fluid communication with said inlet pressure chamber;

at least one supply opening through said body in fluid communication with said inlet pressure chamber and said compartment;

said distribution chamber alternately out of fluid communication and in simultaneous fluid communication with both said outlet ports and said supply opening, depending on the axial position of said piston;



a vent opening through said piston in fluid communication with said inlet pressure chamber and at least one of said outlet ports when said piston is at the limit of axial travel toward said inlet pressure chamber, but out of fluid communication with said at least one outlet port when said piston is remote from said inlet pressure chamber; and

a fluid flow restriction in said vent opening.

5,020,316

HELICOPTER CONTROL WITH MULTIPLE SCHEDULE ROTOR SPEED DECAY ANTICIPATOR

David H. Sweet, Tequesta; Charles E. Greenberg, Jupiter, both of Fla.; Nicholas D. Lappos, Orange, Conn.; David M. Walsh, Jupiter, Fla., and Richard P. Meisner, Glastonbury, Conn., assignors to Coltec Industries Inc., West Hartford, Conn.

Filed May 19, 1989, Ser. No. 354,534

Int. Cl.⁵ F02C *9/28*

U.S. Cl. 60—39.282 9 Claims

1. A helicopter comprising:

a rotor;

an engine;

rotor drive means including an overruning clutch for connecting said rotor to said engine whenever the speed of said rotor does not exceed the speed of said engine;

engine speed means for providing an engine speed signal indicative of the rotary speed of said engine;

rotor speed means for providing a rotor speed signal indicative of the rotory speed of said rotor;

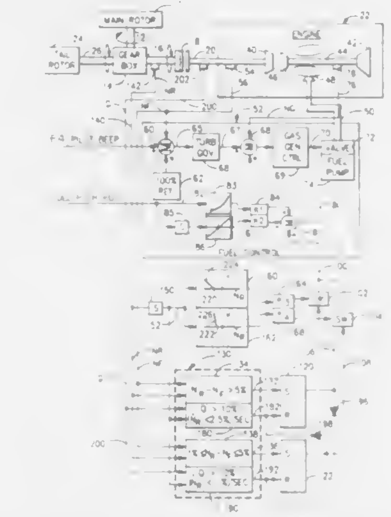
rotor acceleration means for providing a rotor acceleration signal indicative of the positive or negative acceleration of said rotor;

engine control means for providing a fuel command signal indicative of fuel flow required for desired engine operation, and for metering fuel flow to said engine in response to said fuel command signal;

characterized by said engine control means comprising means for:

a) detecting the magnitude of difference between said rotor speed signal and said engine speed signal and providing a difference signal indicative thereof; and

b) providing said fuel command signal with a selected one of a plurality of fuel increase-indicating components which are different, corresponding functions of the magnitude of said rotor acceleration signal, in dependence on the magnitude of said difference signal.



5,020,317

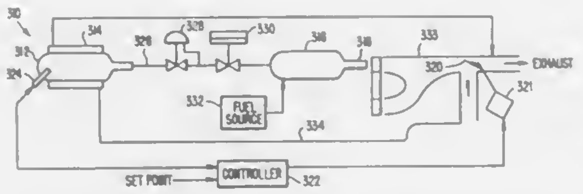
EMERGENCY POWER UNIT OXIDIZING GAS BOTTLE HEATING APPARATUS

Malcolm J. McArthur, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Division of Ser. No. 218,875, Jul. 17, 1989, Pat. No. 4,914,910. This application Aug. 16, 1989, Ser. No. 394,544

Int. Cl.⁵ F02C *7/10*

U.S. Cl. 60—39.511 5 Claims



1 An emergency power unit for providing emergency on board power to an aircraft comprising:

a fuel supply source for supplying fuel;

an oxidizing gas bottle containing pressurized oxidizing gas;

an oxidizing gas heating device for heating oxidizing gas within said oxidizing gas bottle by using heat energy generated by a combustor;

said combustor, being coupled to said fuel supply source, said oxidizing gas bottle and said oxidizing gas heating device, generates heat energy by combusting a mixture of fuel and oxidizing gas heated by said oxidizing gas heating device to produce a flow of hot gases a portion of which is supplied to said oxidizing gas heating device after driving the blades of a turbine, thereby producing emergency on board power to the aircraft;

a damper for controlling the flow of hot gasses to said oxidizing gas heating device; and

a damper actuator which controls the position of said damper in proportion to a control signal output by a controller which outputs said control signal based on a comparison of the temperature of said pressurized oxidizing gas in said oxidizing gas bottle detected by a temperature sensor and a set point within said controller.

5,020,318

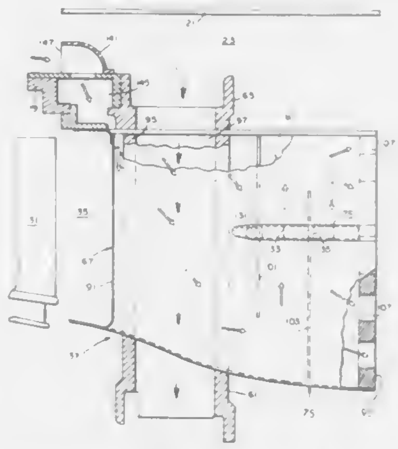
AIRCRAFT ENGINE FRAME CONSTRUCTION

John W. Vdoviak, Marblehead, Mass., assignor to General Electric Company, Lynn, Mass.

Filed Nov. 5, 1987, Ser. No. 117,187

Int. Cl.⁵ F02K *3/02, 3/08*

U.S. Cl. 60—226.1 29 Claims



1. A gas turbine engine of the type having generally cylindrical casings defining concentric bypass air and turbine discharge passages, and further comprising:

a support within the turbine discharge passage comprising an outer ring and an inner ring connected by a plurality of radially extending members, said radial members being positioned between members defining a flow channel for turbine discharge gases, each of the members including a hollow inner chamber;

means for delivering a supply of cooling air to the hollow inner chamber of each of the radial members; and,

means for discharging the cooling air from the radial members solely into an annulus spaced from and between said flow channel defining members for cooling a downstream engine member.

5,020,319

HOLLOW HEAT-RESISTING BODY ASSEMBLY FOR INTERNAL COMBUSTION ENGINE

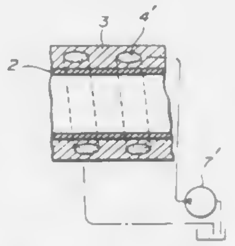
Tooru Matsuura; Mitsuyoshi Kawamura, and Yoshinori Narita, all of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Continuation of Ser. No. 204,503, Jun. 9, 1988, abandoned. This application Jul. 26, 1990, Ser. No. 559,409

Claims priority, application Japan, Jun. 9, 1987, 62-88689; Aug. 25, 1987, 62-128080

Int. Cl.⁵ F01N *7/06*

U.S. Cl. 60—321 3 Claims



1. An exhaust manifold for an internal combustion engine, comprising:

an outer tubular member made of an aluminum alloy by casting;

an inner tubular member made of aluminum titanate and embedded in said outer tubular member at the time of casting of said outer tubular member; and

a coolant jacket formed in said outer tubular member wherein said coolant jacket is formed into a coiled shape.

5,020,320

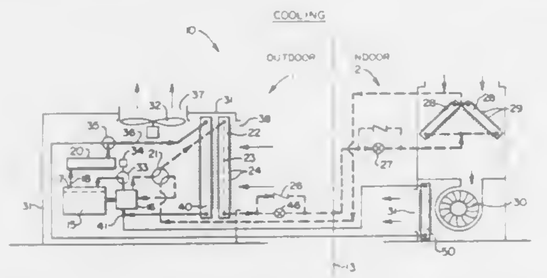
ENGINE DRIVEN HEAT PUMP SYSTEM

Sherwood G. Talbert, Columbus, and Frank E. Jakob, Worthington, both of Ohio, assignors to Gas Research Institute, Chicago, Ill.

Filed Dec. 20, 1989, Ser. No. 453,755

Int. Cl.^{5} F25B *27/00*

U.S. Cl. 62—238.7 **8 Claims**



1 A heat pump system selectively operable in cooling or heating modes of operation and connected with cooling or heating loads and a heat sink or source to selectively provide heat to or remove heat from the load comprising:

a) a refrigerant vapor compressor motively driven by a combustion prime mover and connected to selectively provide compressed refrigerant vapor to a first heat exchanger in heat exchange relationship with a heat source or sink, or to a second heat exchanger in heat exchange relationship to a load;

b) valve means operable to selectively connect the compressor to the first heat exchanger to operate as a condenser in the cooling mode or to connect the compressor to the second heat exchanger in the heating mode, said first and second heat exchangers connected together to provide a first vapor compression subsystem; and

c) a second subsystem comprising: fluid distribution means including a recuperator means in connection with said prime mover connected to flow a working fluid from said prime mover through said recuperator means to recuperate heat generated by said prime move in amounts greater than the usable energy to compress said refrigerant vapor;

d) connecting means between said recuperator and a first radiator means to flow the working fluid through the first radiator means; and additionally flow the working fluid through a second radiator means; and a flow proportioning valve between the first and second radiator means to proportion the flow of working fluid between the first and second radiator means;

e) said first heat exchanger and said first radiator juxtaposed one to the next in position to transfer heat one to the other by ambient air flow of the heat source or sink; and

f) said second heat exchanger and said second radiator in heat transfer relation to the load.

5,020,321

EXHAUST POWERED WASTE PROCESSING UNIT

Carter K. Lord, 2433 N. Perry Park Rd., Sedalia, Colo. 80135

Filed Nov. 29, 1989, Ser. No. 442,995

Int. Cl.^{5} F01N *3/02;* **C02F** *1/72*

U.S. Cl. 60—317 **13 Claims**

1. In the combination of the exhaust from an internal combustion engine, a waste processing unit and an appropriate system for introducing human waste into the waste into the waste processing unit, wherein said waste processing unit comprises:

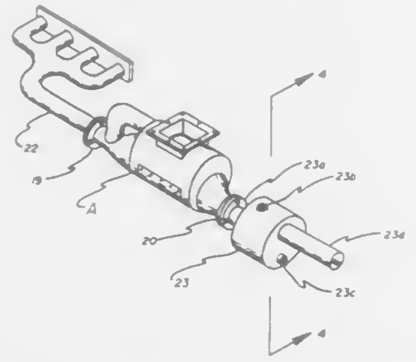
an internal configuration which provides for a bypass route for engine exhaust which precludes restriction of normal exhaust flow;

an incinerating chamber which incorporates a sloped grating at the outlet end to retain solid waste material for processing;

turbulent flow of exhaust gases within the incineration chamber to adequately process the waste material;

a flange for mounting to the exhaust manifold of an internal combustion engine;

a flange for mounting to the exhaust pipe of a vehicle's exhaust system;



a flange for attaching an appropriate waste delivery system to the waste processing unit;

an access port to permit inspection and cleaning of the incineration chamber;

all stainless steel construction;

gaskets which are capable of withstanding 1880 deg. F. continuously; and

an insulating blanket of ceramic refractory fiber insulating, with an outer covering of protective metal foil.

5,020,322

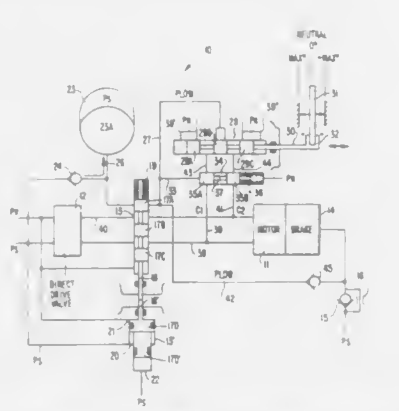
ACCUMULATOR BLOW-BACK HYDRAULIC CIRCUIT

Robert A. Schwarz, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 8, 1988, Ser. No. 268,862

Int. Cl.^{5} F15B *1/02, 20/00*

U.S. Cl. 60—404 **20 Claims**



10. An accumulator blow-back hydraulic circuit for at least one aircraft control surface, comprising means for supplying system pressure to actuate the control surface during normal system operation, and means operatively associated with the system pressure supplying means for supplying emergency pressure such that the control surface is driven back to a neutral position and thereafter locked in that position in the event of failure of the system pressure, wherein said means for supplying emergency pressure includes an accumulator, a shut-off valve selectively communicating system pressure with a motor for actuating the control surface during normal system operation and communicating the accumulator with a directional control valve during failure of the system pressure, and wherein the directional control valve is movable in response to the position of the control surface such that it opens communication between the accumulator and the motor in the case of failure of the system pressure where the control position of the surface is other than the neutral position.

5,020,323

TELESCOPICALLY EXTENDABLE AND RETRACTABLE ARM

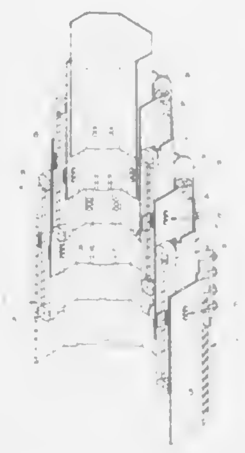
Peter Hürlimann, Minervastrasse 46, 8032 Zürich, Switzerland

Filed Sep. 29, 1989, Ser. No. 415,585

Claims priority, application Switzerland, Oct. 3, 1988, 3670/88

Int. Cl.^{5} F16D *31/02*

U.S. Cl. 60—413 **16 Claims**



1. A telescopically extendable and retractable arm comprising a supporting tube member of large diameter, a plurality of telescoping tube members of decreasing diameter each telescoping tube member having tube walls and an upper and a lower open end, and an innermost tube member of smallest diameter;

at least one belt means for each one of said tube members, with the exception of said supporting tube member, mounted slidingly surrounding said tube wall at said upper and lower ends and fixedly connected to a respective outer one and to a respective inner one of said tube members for supporting said inner one of said tube members; and

driving means for dislocating one of said telescoping tube members relative to said supporting tube member, said dislocation being transmitted to all other telescoping tube members by said belt means.

5,020,324

CHARGE FLOW PRIORITY CIRCUIT

Donald J. MacDonald, Waterloo; James A. Miller, Cedar Falls, and Derek M. Eagles, Hudson, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Mar. 13, 1990, Ser. No. 492,198

Int. Cl.^{5} F04B *41/06*

U.S. Cl. 60—430 **8 Claims**

1. A hydraulic system comprising:

a sump;

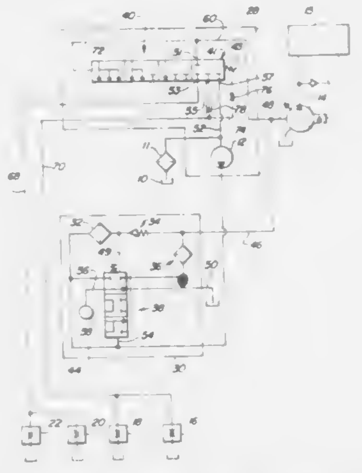
a main pump for supplying pressurized fluid to a first hydraulic function;

a charge pump for transferring fluid from the sump to the main pump, the charge pump being capable of supplying fluid in excess of that which is required by the main pump;

a second hydraulic function; and

a priority/diverter circuit connected to the charge pump, to the main pump and to the second hydraulic function for selectively distributing excess fluid from the charge pump to the second hydraulic function and to an inlet of the charge pump, the priority/diverter circuit comprising:

a feed line coupled between the outlet of the charge pump and the inlet of the main pump; and



a pressure-responsive control valve having an inlet port communicated with the main pump inlet, a first outlet communicated with the second hydraulic function, a second outlet communicated with the inlet of the charge pump, and a valve member movable in response to fluid pressure at the main pump inlet from a first position wherein all ports are blocked to a second position wherein the inlet port in communicated with the first outlet, and to a third position wherein the inlet port is communicated to second outlet.

5,020,325

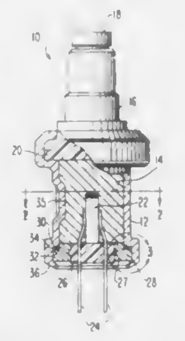
HEAT MOTOR

Claude Henault, Arpajon Cedex, France, assignor to Procedes Vernet, Arpajon Cedex, France

Filed Feb. 13, 1990, Ser. No. 479,160

Int. Cl.^{5} F03G *7/06*

U.S. Cl. 60—528 **17 Claims**



1. A heat motor comprising:

a metal body defining a chamber having an open end, said body including a metal end wall, a metal side wall, and a flange on said side wall extending under said end wall;

an element movable with respect to said body to perform an operation;

a thermally expansible wax in said chamber, said expansible wax being expansible in response to an increase in its temperature to move said movable element;

an electric heating element positioned in said chamber and within said thermally expansible wax, said thermally ex-

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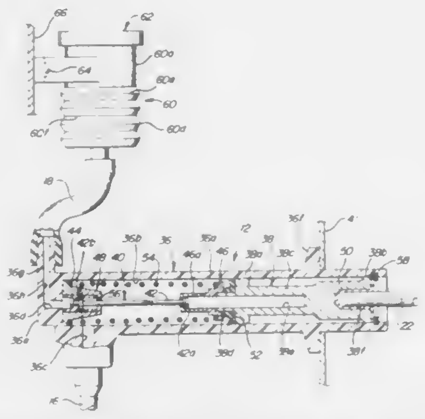
pansible wax being interposed between all significant surfaces of said heating element and said body;
electrical leads extending from said electric heating element to a region outside said body of the heat motor; and
electrical insulating material secured in said metal end wall of said body, said leads extending through said electrical insulating material, and said metal end wall having substantially the same coefficient of thermal expansion as the electrical insulating material, so that no leakage of said expansible material occurs between said end wall and the electrical insulating material as the temperature of the heat motor changes.

5,020,326
HYDRAULIC CONTROL SYSTEM WITH PREFILLED PRESSURIZED RESERVOIR

David C. Barker, Utica; Richard A. Nix, Auburn Hills, and Keith V. Leigh-Monstevens, Troy, all of Mich., assignors to Automotive Products plc, Warwickshire, England
Filed Jul. 24, 1989, Ser. No. 383,712
Int. Cl.^{5} B60T *11/26;* F15B *7/08*
U.S. Cl. 60—586 5 Claims

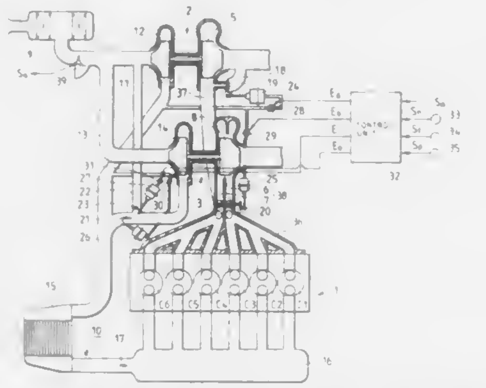


1. A method of providing a prefilled and pressurized hydraulic control system comprising the steps of:
providing a cylinder housing defining a central bore, a reservoir port, and a discharge port;
providing a piston mounted for reciprocal movement in said central bore;
providing an expandable reservoir in communication with said reservoir port and having a relaxed state in which it defines a first volume and a stressed stated in which it defines a second, larger volume; and
introducing hydraulic fluid into said system through said discharge port and thereby filling said system with hydraulic fluid to an extent to move said reservoir from its relaxed to its stressed state so that said reservoir pressurizes said system.

5,020,327
AIR SUPPLY CONTROL SYSTEMS FOR TURBOCHARGED INTERNAL COMBUSTION ENGINES

Seiji Tashima; Haruo Okimoto, and Toshimichi Akagi, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan
Filed Mar. 17, 1989, Ser. No. 324,662
Claims priority, application Japan, Mar. 19, 1988, 63-66791
Int. Cl.^{5} F02B *37/12*
U.S. Cl. 60—600 20 Claims

1. An air supply control system for an internal combustion engine comprising:
a plurality of separated exhaust passages connected with the engine,
a plurality of separated intake passages connected with the engine,
a plurality of superchargers including at least a first supercharger and a second supercharger constituted as a turbosupercharger having a turbine disposed in one of the separated exhaust passages and a blower connected through a shaft with the turbine and disposed in one of the separated intake passages,
an exhaust cutoff valve operative selectively to be open and closed respectively for opening and closing the separated exhaust passage in which the turbine of said second supercharger is disposed,
an intake air cutoff valve operative selectively to be open and closed respectively for opening and closing the separated intake passage in which the blower of said second supercharger is disposed,
first actuating means for driving said exhaust cutoff valve to be open and closed selectively,
second actuating means for driving said intake air cutoff valve to be open and closed selectively,
engine operation detecting means for detecting operating conditions of the engine to produce a first detection output,



actuator control means for controlling, in response to the first detection output form said engine operation detecting means, said first and second actuating means to close both said exhaust cutoff valve and said intake air cutoff valve so that said second supercharger is restrained from supercharging the engine when the first detection output shows a situation that intake air mass flow fed to the engine is relatively small and to open both said exhaust cutoff valve and said intake air cutoff valve so that both of said first and second superchargers work for supercharging the engine when the first detection output shows a situation that the intake air mass flow fed to the engine is relatively large,
engine operation change detecting means for detecting, based on the first detection output from said engine operation detecting means, changes in operating condition of the engine between a situation wherein the intake air mass flow fed to the engine is relatively small and a situation wherein the intake air mass flow fed to the engine is relatively large and producing a second detection output, and
valve operation setting means for controlling, in response to the second detection output from said engine operation change detecting means, said actuator control means so that the intake air cutoff valve opening point in time is delayed compared with the exhaust cutoff valve opening point in time when the second detection output shows that the operating condition of the engine is changed into the situation wherein the intake air mass flow fed to the engine is relatively large from the situation wherein the intake air mass flow fed to the engine is relatively small and said intake air cutoff valve closing point in time is delayed compared with said exhaust cutoff valve closing point in time when the second detection output shows the operating condition of the engine is changed into the situation wherein the intake air mass flow fed to the engine is relatively small from the situation wherein the intake air mass flow fed to the engine is relatively large,
wherein:
said actuator control means is operative to detect, based on the first detection output from said engine operation detecting means, one of predetermined operating areas provided on an operating characteristic map defined by coordinates of operating parameters of the engine in which an actual operating condition of the engine resides and to control said first and second actuating means in accordance with the detected operation area, and
said operating characteristic map contains a first predetermined operating area used for controlling said intake air cutoff valve to be open from closed and a second predetermined operating area used for controlling said exhaust cutoff valve to be open from closed, said first predetermined operating area having larger intake air mass flow compared with said second predetermined operating area

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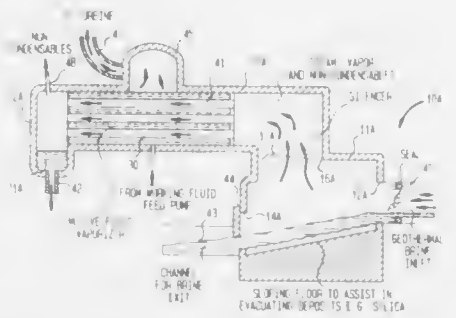
5,020,328
SILENCER FOR GEOTHERMAL POWER PLANT AND METHOD FOR USING THE SAME

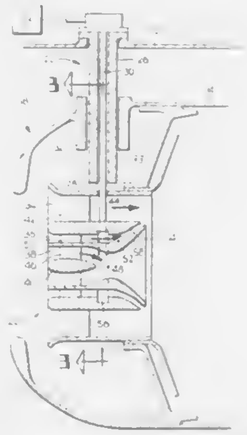
Lucien Y. Bronicki, Yavne, Israel, assignor to Ormat Turbines (1965) Ltd., Yavne, Israel
Filed Nov. 22, 1989, Ser. No. 440,204
Int. Cl.^{5} F03G *4/06*
U.S. Cl. 60—641.5 24 Claims



1. A method for improving the operation of an open cycle geothermal power plant of the type having a silencer in the form of a base, and a stack for disposing of hot geothermal fluid comprising hot geothermal vapor and hot geothermal brine, the geothermal vapor including steam and non-condensable gases that pass through the stack and are vented to the atmosphere, the brine passing through the base of the silencer and being directed to a surface stream, said method comprising the steps of:
(a) diverting the geothermal vapor from the stack to a tube-and-shell heat exchanger containing a working fluid that absorbs heat from the geothermal vapor and is converted thereby to a vaporized working fluid, the heat given up by the geothermal vapor producing a low pH condensate and non-condensable gases;
(b) producing power using the vaporized working fluid; and
(c) combining the condensate and non-condensable gases produced by the heat exchanger with the geothermal brine to form a waste fluid.

5,020,329
FUEL DELIVERY SYSTEM

Edward E. Ekstedt, Montgomery, and Jack R. Taylor, Cincinnati, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio
Continuation of Ser. No. 18,723, Feb. 24, 1987, which is a continuation of Ser. No. 684,434, Dec. 20, 1984, abandoned. This application Sep. 29, 1988, Ser. No. 251,989
Int. Cl.^{5} F02C *7/22*
U.S. Cl. 60—737 3 Claims



1. A gas turbine engine fuel delivery system generally disposed within an annular engine casing comprising:
a combustor disposed within the casing and connected to the casing by at least one combustor support pin disposed in a sliding joint in said said combustor for providing axial support for said combustor with respect to the annular engine casing, said pin including a duct therethrough;
a fuel atomizer disposed within said combustor;
a tube for delivering fuel to said atomizer, said tube being removably located within said duct; and
wherein said atomizer includes an annular air passage defined by an annular outer wall with an inner surface and a fuel passage therethrough, a radially, with respect to said annular outer wall, tapered groove having a deep end and a shallow end and formed in and in part defined by said outer annular wall and circumferentially disposed upon said inner surface wherein said fuel passage connects said tube to said deep end of said groove.

5,020,330
CO$_2$ FOOD FREEZER

George D. Rhoades, La Grange, Ill., and Gary D. Lang, Wooster, Ohio, assignors to Liquid Carbonic Corporation, Chicago, Ill.
Continuation-in-part of Ser. No. 373,056, Jun. 28, 1989, Pat. No. 4,953,365. This application Mar. 20, 1990, Ser. No. 496,457
Int. Cl.^{5} F25D *13/06*
U.S. Cl. 62—63 13 Claims

9. A method of cryogenically freezing food products, which method comprises providing a thermally insulated enclosure having an entrance through which food products can be delivered, delivering such food products to a freezing region within said enclosure, injecting liquid CO$_2$ through a plurality of spray nozzles located above at least portions of said freezing region, supplying said liquid CO$_2$ through piping which extends vertically upward within the insulated enclosure to the spray nozzles from a lower entrance thereinto, controlling the flow of liquid CO$_2$ to said spray nozzles by valve means lo-

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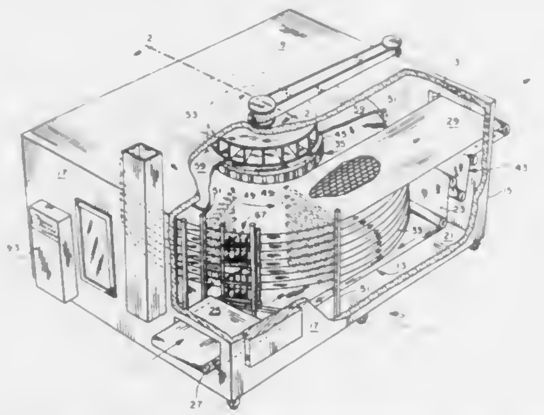
cated upstream of said entrance so that there is a natural gravitational flow of vapor to the vicinity of said spray nozzles



where it melts any solid CO_2 at the upstream side of the orifices of said spray nozzles.

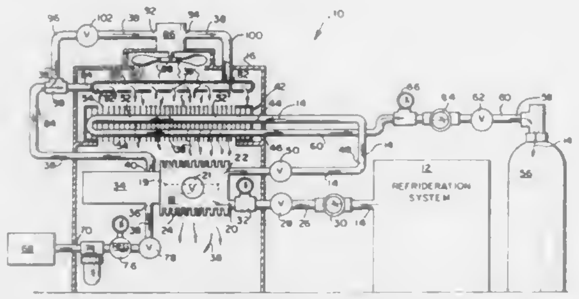
5,020,331
REFRIGERANT RECLAMATION SYSTEM

Robert S. Michny, Morris, Pa., assignor to National Refrigeration Products, Inc., Plymouth Meeting, Pa.

Filed Feb. 9, 1990, Ser. No. 478,814

Int. Cl.⁵ F25B *45/00*

U.S. Cl. 62—77 15 Claims



13. A method of reclaiming refrigerant from a refrigeration system having a refrigerant therein, the method comprising the steps of:

- removing refrigerant from the refrigeration system utilizing a pump driven by compressed gas;
- passing the removed refrigerant through a heat exchanger for cooling the removed refrigerant; and
- routing gas exhausted from the pump for impingement upon the heat exchanger for cooling thereof.

5,020,332
AIR CONDITIONER AND A DRIVE APPARATUS THEREFOR

Eiji Nakatsuno; Yasunori Himeno, both of Otsu; Yasuhiko Ebata, Kurita, and Masatosi Nagano, Otsu, all of Japan, assignors to Matsusbita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 6, 1990, Ser. No. 505,656

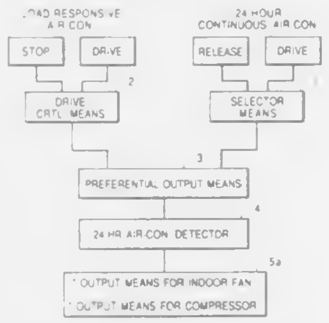
Claims priority, application Japan, Apr. 7, 1989, 1-88878; Apr. 7, 1989, 1-88883; Apr. 7, 1989, 1-88884

Int. Cl.⁵ G05D *23/32*

U.S. Cl. 62—157 7 Claims

1. A drive control apparatus for an air conditioner, which comprises:

- a selector means for selecting one of drive and release positions of a 24-hour air-conditioning mode;
- a drive control means for effecting one of drive and stop controls of a load-responsive air-conditioning mode under which the air conditioner is operated in dependence on a load in a space to be air-conditioned; and


LOAD RESPONSIVE AIR CON
STOP
DRIVE
24 HOUR CONTINUOUS AIR CON
RELEASE
DRIVE
2
DRIVE CRTL MEANS
SELECTOR MEANS
3
PREFERENTIAL OUTPUT MEANS
4
24 HR AIR-CON DETECTOR
5a
OUTPUT MEANS FOR INDOOR FAN
OUTPUT MEANS FOR COMPRESSOR

- a preferential output means for outputting a signal from the drive control means in preference to an output signal from the selector means.

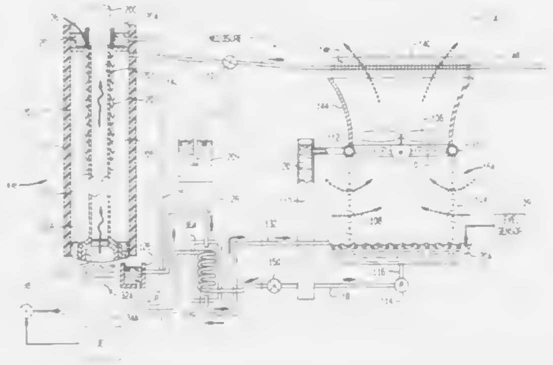
5,020,333
METHOD OF AND MEANS FOR CONTROLLING THE CONDITION OF AIR IN AN ENCLOSURE

Gad Assaf, Rehovot, and Uriyel Fisher, Haifa, both of Israel, assignors to Geophysical Engineering Company, Seattle, Wash.

Continuation-in-part of Ser. No. 479,009, Mar. 23, 1983, Pat. No. 4,819,447, which is a continuation-in-part of Ser. No. 377,368, May 12, 1982, abandoned. This application Feb. 28, 1989, Ser. No. 316,915

Int. Cl.⁵ F25D *23/00*

U.S. Cl. 62—271 23 Claims



1. Apparatus for conditioning air in an enclosure comprising:

a) a direct contact air/brine heat exchanger;
b) means for exchanging air in the enclosure with said direct contact heat exchanger;
c) a reservoir of concentrated brine;
d) means for establishing a first brine loop in which brine from said reservoir is exchanged with said direct contact heat exchanger for condensing water vapor in the enclosure onto the exchanged brine to form dilute brine that flows into said reservoir;
e) a brine boiler having a heat transfer element having opposite surfaces;
f) means for establishing a second brine loop in which dilute brine from said first loop is exchanged with said boiler;
g) burner means for producing flue gases that contact one surface of said heat transfer element;
h) said boiler having means for effecting the flow of dilute brine in said second loop as a thin film on the other surface of said heat transfer element which effects evaporation of water from the dilute brine and production of steam and heated concentrated brine.

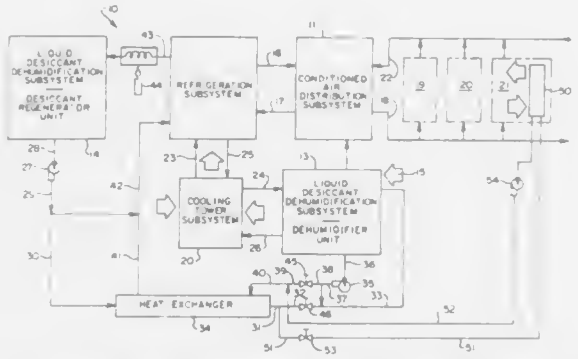
5,020,334
LOCALIZED AIR DEHUMIDIFICATION SYSTEM

William H. Wilkinson, Columbus, Ohio, assignor to Gas Research Institute, Chicago, Ill.

Filed Feb. 23, 1990, Ser. No. 483,675

Int. Cl.⁵ F25D *23/00*

U.S. Cl. 62—271 10 Claims


LIQUID DESICCANT DEHUMIDIFICATION SUBSYSTEM
DESICCANT REGENERATOR UNIT
REFRIGERATION SUBSYSTEM
CONDITIONED AIR DISTRIBUTION SUBSYSTEM
COOLING TOWER SUBSYSTEM
LIQUID DESICCANT DEHUMIDIFICATION SUBSYSTEM
DEHUMIDIFIER UNIT
HEAT EXCHANGER

1. A building air-conditioning system for effecting air temperature and moisture content changes in air distributed to, flowed through, and recirculated from multiple separate building occupancy zones, comprising:

a.) a plurality of separate building occupancy zones which together source a system base sensible heat load and a system base latent heat load, and which has at least one building occupancy zone which sources a system intermittent local latent heat load which is in addition to said system base latent heat load;
b.) a refrigeration sub-system handling said system base sensible heat load and effecting temperature changes in recirculated air distributed to said separate building occupancy zones;
c.) a first dehumidification subsystem handling said system base and additional intermittent local latent heat loads, effecting moisture content changes in recirculated air distributed to said separate building occupancy zones, and comprising a first desiccant dehumidifier unit, a first concentrated desiccant solution supply cooperating with said first desiccant dehumidifier unit, and a first dilute desiccant solution regenerator cooperating with said first desiccant dehumidifier unit and with said first concentrated desiccant solution supply; and
d.) a second desiccant dehumidification subsystem comprising a second desiccant dehumidifier unit located within said one building occupancy zone, a second concentrated desiccant solution supply cooperating with said second desiccant dehumidifier unit, and means recirculating air within said one building occupancy zone in mass-transfer relation to said second desiccant dehumidifier unit to effect moisture content changed in air recirculated within said one building occupancy zone by said air recirculating means,

said second desiccant dehumidification subsystem transferring moisture from said second desiccant dehumidifier unit for subsequent removal from the building through said first desiccant dehumidification subsystem dehumidifier unit and connected dilute desiccant solution regenerator.

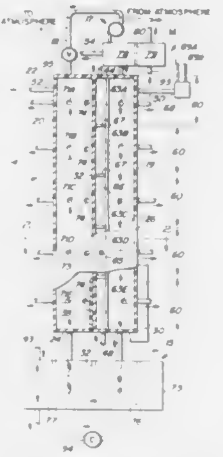
5,020,335
METHOD AND APPARATUS FOR SIMULTANEOUS HEAT AND MASS TRANSFER

Walter F. Albers, 2626 E. Arizona Biltmore Cir., #23, Phoenix, Ariz. 85016, and James R. Beckman, Tempe, Ariz., assignors to Walter F. Albers, Phoenix, Ariz.

Continuation of Ser. No. 883,734, Jul. 9, 1986, abandoned. This application May 19, 1989, Ser. No. 355,766

Int. Cl.⁵ F25B *17/02;* **F25D** *3/04*

U.S. Cl. 62—271 30 Claims



1. An apparatus for air conditioning, said apparatus comprising:

- a first chamber divided into a plurality of first chamber sectors;
- a second chamber divided into a plurality of second chamber sectors,
- said first and second chambers further being thermally connected by a partition, wherein said partition is implemented to conduct heat;
- means for causing air to be conditioned to flow through a one of said chambers, and, after exchanging heat, through another of said chambers, air flow in said first and second chambers being thermally countercurrent;
- wetting means in said first chamber for segmentally wetting at least a plurality of said first chamber sectors with a desiccant solution, wherein an interaction by said desiccant solution with said air progressively dehumidifies said air;
- migration means for providing a migratory movement for said desiccant solution from a first sector to a second sector within said first chamber; and
- means for segmentally wetting said plurality of sectors of said second chamber with a vaporizable liquid,
- said partition conducting heat between said air in said first and second chambers.

5,020,336
ICE MAKING MACHINE

Junichi Hida, Toyoake, Japan, assignor to Hoshizaki Electric Co., Ltd., Toyoake City, Japan

Filed Feb. 22, 1990, Ser. No. 483,934

Int. Cl.⁵ F25C *5/18*

U.S. Cl. 62—344 4 Claims

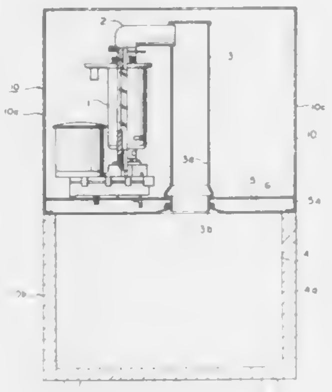
1. An ice making machine, comprising:

- a lower ice storage section defining an ice storage chamber therein;
- an upper ice making machinery section including a bottom plate having a lower surface, an opening formed therethrough and ice discharge means housed in said ice making machinery section for discharging ice produced in said ice making machinery section therefrom, said ice making machinery section having its said bottom plate disposed

VOL
1127
ISS
1
JE
4
1991
UMI

on said ice storage section, said ice discharge means including an ice discharge chute having a lower end portion extending downwardly through said bottom plate opening to communicate with said ice storage chamber; and

wherein a portion of said bottom plate at which said opening is formed is concaved upwardly surrounding said opening



to thereby define a recess of said bottom plate into which said lower end portion of said ice discharge chute extends to such an extent that the bottom end of said lower end portion of said ice discharge chute terminates at a level below said opening and above the lower surface of said bottom plate.

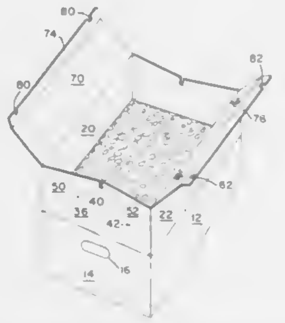
5,020,337
COMBINATION ICE PACKAGE AND EXPANDABLE COOLER

David F. Krieg, 19 Nightengale La., Dubuque, Iowa 52001

Filed Jan. 11, 1990, Ser. No. 463,476

Int. Cl.^{5} F25D *3/02*

U.S. Cl. 62—464 **5 Claims**



1 A receptacle for packaging and storing particulate ice and selectively storing and cooling consumables comprising:

a bottom surface;

first and second opposing side walls connected to said bottom surface;

first and second opposing end walls connected to said bottom surface and said first and second side walls to form a container for receiving particulate ice; and

an expandable closure means integrally connected to said container for selectively extending from a closed collapsed position for packaging particulate ice to a closed extended position for selectively storing and insulating consumables, said expandable closure means having,

first and second upper side sections coextensive with said first and second opposing side walls,

first and second upper end sections coextensive with said first and second opposing end wall and connected to said first and second upper side sections, each of said first and second upper end sections having a notch along an upper edge,

first and second top flaps coextensive with said first and second upper side sections, and

first and second locking flaps coextensive with said first and second top flaps, each of said first and second flap members having notches along an outward edge, said notches of said first and second flap members being operable to engage with said notches of said first and second upper end sections to maintain said container in the closed extended position.

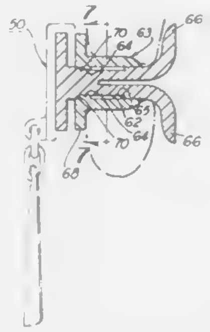
5,020,338
EARRING POST FOR PIERCED EARS

Susan M. Payne, and Jay M. Payne, both of 7010 Old Winder Hwy., Braselton, Ga. 30517

Filed Aug. 31, 1989, Ser. No. 401,429

Int. Cl.^{5} A44C *7/00*

U.S. Cl. 63—12 **8 Claims**



1. An earring post for pierced ears comprising a shaft member having a proximal end and a distal end, said shaft member being split at said distal end and having at least one prong means extending therefrom, said prong means having a first tensioned position being in generally axial alignment with said shaft member for insertion into the earlobe and a second resting position biased out of axial alignment with said shaft member for retaining said post in the earlobe, said proximal end being adapted to be fixed in relation to the earlobe after insertion therethrough, said post including a sleeve member slidably mounted around said shaft member and having a first position disposed near said distal end for holding said prong means in axial alignment and a second position disposed near said proximal end for allowing said prong means to assume their biased resting state, said shaft member including a recessed slot means in the outer surface thereof and said sleeve member including a tab means extending therefrom and received in said slot means for guiding said sleeve member along said shaft member.

5,020,339
TRANSFORMABLE EARRING

Carlo Cardena', 8 Via Angiolo Cabrini, I-00139 Roma RM, Italy

PCT No. PCT/IT88/00079, § 371 Date Jul. 5, 1989, § 102(e) Date Jul. 5, 1989, PCT Pub. No. WO89/04127, PCT Pub. Date May 18, 1989

PCT Filed Nov. 3, 1988, Ser. No. 382,795

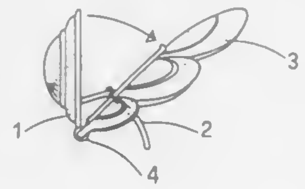
Claims priority, application Italy, Nov. 5, 1987, 36095/87[U]

Int. Cl.^{5} A44C *7/00*

U.S. Cl. 63—13 **2 Claims**

1. A transformable earring formed of a fixed element (1), having a front side and a rear side, and a movable element (3) having an aperture (5) therethrough, said fixed and movable elements being hingedly connected at a lowermost portion of the fixed element, so that the movable element (3) can rotate about said hinged connection between a closed position to assume the form of a button-like type of earring and an open position in which the movable element (3) is pendent on the fixed element (1) to form a pendant-like type of earring; and a fastener (2) mounted on the rear side of said fixed element (1) for releasably locking the earring to the ear lobe of a wearer,

said fixed element having said fastener thereon disposed in operative relationship to allow the rotation of said movable element to said open position through a space on the rear side of said fixed element whereby said fastener passes through said aperture with no interference between said fastener and said movable element, and wherein there is interference between said movable element and fixed element in said closed position to prevent the movable element from passing to the front side of the fixed element.



5,020,340
CIRCULAR TEXTILE MACHINE FOR SIMULTANEOUSLY FORMING A PLURALITY OF TUBULAR KNITTED ARTICLES SUCH AS PANTY-HOSE (TIGHTS) AND THE LIKE

Franco Gariboldi, Torino, and Paolo Conti, Firenze, both of Italy, assignors to Lambda S.r.l., Firenze, Italy

Filed Mar. 5, 1990, Ser. No. 488,731

Claims priority, application Italy, Mar. 7, 1989, 9357 A/89

Int. Cl.^{5} D04B *9/38*

U.S. Cl. 66—125 **18 Claims**

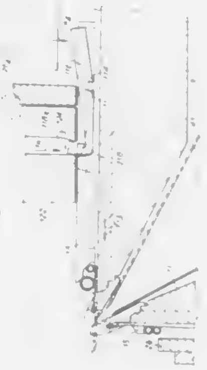


Fig 5

1. A circular textile machine for simultaneously forming a plurality of tubular knitted articles, including shaped and finished articles, comprising: two fixed bars for knitting needles, a plurality of articles being simultaneously formed on individual arcs of needles facing each other on said two bars, each having rows constructed partly by the needles of one bar and partly by the needles of the other bar; two apparatuses rotating in continuous motion and in opposite directions, and one apparatus carrying control cams for the needles of one bar and another apparatus carrying control cams for the needles of the other bar; and, on each of said apparatuses, means for entraining yarn alternately in the two directions along the respective arc which is forming an article, the exchange of the yarn between the two counter-rotating entraining means taking place at working ends of the respective arc of needles; said machine wherein that, in order to obtain two successive yarn feeds for each working arc of needles and always having the same yarn fed first, in order to form rows of the continuous helical type: two successive yarn feeds (**344**, **345**); means (**458**, **459**, **460**, **463**) for guiding and switching the position of the two yarns in order to supply them to the needles at two angles and to exchange the yarn positions at each reversal of the entrainment thereof by the entraining means; as entraining means, pairs of hooks (**342**, **343**; **349**, **350**) with the hooks of each pair being of said entraining means disposed one behind the other in the direction of the respective direction of advance, and a first hook (**342**; **349**) being shaped so as to penetrate into a space between the two threads (**344**,**345**) to take only one thereof (**344**) and a second hook (**343**; **350**) being shaped to take the other yarn (**345**); on said two counter-rotating apparatuses (**26**, **32**) supports (**352**)for said hooks (**342**, **343**; **349**, **350**) to permit the displacement thereof between an engagement position of the yarn and a release position of the thread; and, on the fixed structure (**1**, **1F**), control means (**354**, **354'**; **355**, **355'**, **353A**) for bringing about timely displacements of the hooks (**342**, **343**, **349**, **350**) at the end of active travel along a working arc.

5,020,341
BRAKING DEVICE ON THE THREAD GUIDE BOX OF A FLAT BED KNITTING MACHINE

Reinhold Schimko, Westhausen, Fed. Rep. of Germany, assignor to Universal Maschinenfabrik Dr. Rudolf Schieber GmbH, Westhausen, Fed. Rep. of Germany

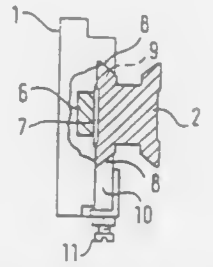
PCT No. PCT/EP88/00845, § 371 Date Mar. 29, 1990, § 102(e) Date Mar. 29, 1990, PCT Pub. No. WO89/02946, PCT Pub. Date Apr. 6, 1989

PCT Filed Sep. 15, 1988, Ser. No. 469,569

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3733121

Int. Cl.^{5} D04B *15/48*

U.S. Cl. 66—126 R **3 Claims**



1. Braking device on the thread guide box (1) of a flat bed knitting machine which is mounted on a slide rail (2) extending along the needle beds and which can be driven along the slide rail (2) in either direction of travel of the carriage of the bolt carriage in each case by a carrier bolt (4) fitted to the bolt carriage, characterised in that at least one permanent magnet (6) is fitted onto the thread guide box (1) near the slide rail (2), which has a fixed air gap (7) relative to the magnetically conducting slide rail (2).

5,020,342
SAFETY LOCK

Frank W. Doan, Fort Erie, and Robert L. Weckman, Whitby, both of Canada, assignors to 529900 Ontario Ltd., Fort Erie, Canada

Filed Oct. 3, 1989, Ser. No. 416,800

Int. Cl.^{5} E05B *73/00*

U.S. Cl. 70—14 **3 Claims**

1. A device for use in restricting access by attaching the device to a staple associated with a hasp and locking the device by use of padlocks, the device comprising:

a sleeve element;

a core element positioned inside the sleeve element and movable by reciprocal linear movement between a release position and an engagement position;

bail means having first and second ends and attached at the first end to one of the sleeve and core elements;

said one of the sleeve element and the core element being adapted to locate said second end with the device in the release position and being operable by relative movement

VOL
1127
ISS
1
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4
1991
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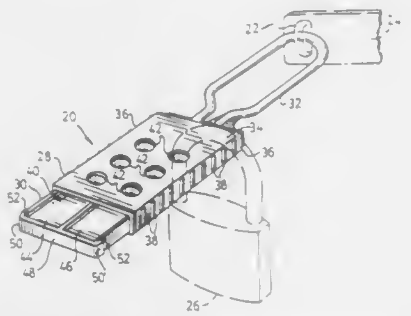
of the sleeve and core elements into the engagement position to lock the bail to the staple;

both the sleeve element and the core element further defining openings such that openings in the sleeve element and openings in the core element are aligned with one another



when the device is in the engagement position for receiving the padlocks; and

at least one barb on the core element adapted to be deflected on assembly of the core element in the sleeve element to prevent separation of these elements.

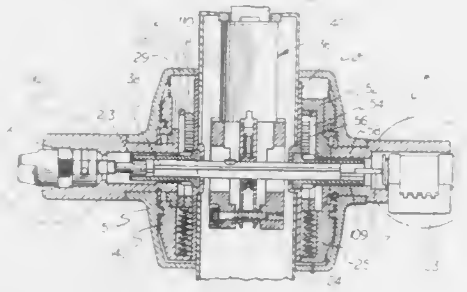
5,020,343
LOCKSET HAVING IMPROVED ACTUATOR

LeRoy Hart, Farmington, and Theodore H. Miller, deceased, late of New Britain, both of Conn. by Cecilia B. Miller, administratrix , assignors to Emhart Industries, Inc., Towson, Md.

Continuation of Ser. No. 225,988, Jul. 29, 1988, abandoned. This application Sep. 7, 1990, Ser. No. 579,222

Int. Cl.^{5} E05B *55/06*

U.S. Cl. 70—143 13 Claims



1. A lockset for a door comprising:

a latchbolt assembly having a latchbolt movable between a partially extended latching position, a fully extended dead-bolt position and a retracted position;

a spindle extending through said latchbolt assembly in a direction transverse of the direction of movement of said latchbolt;

means connecting said spindle to said latchbolt at a connecting location on said spindle for moving said latchbolt between its positions upon rotation of said spindle;

a hand operator;

a first plate located for linear sliding movement adjacent said spindle and primarily in a first plane spaced from said latchbolt assembly and said connecting location;

a second plate located for sliding movement relative to said first plate adjacent said spindle and primarily in a second plane spaced from said latchbolt assembly and said connecting location;

an actuator member mounted for movement adjacent said spindle and having an actuator surface in a third plane spaced from said latchbolt assembly and said connecting location;

means responsive to the operation of said hand operator for moving said actuator member;

an ear formed on said second plate and located in said third plane in position for engagement with said actuator surface upon movement of said actuator member to facilitate movement of said second plate;

a tab extending from said first plate and located in said second plane;

a tab-engaging surface formed on said second plate and located in said second plane in position for engagement with said tab upon movement of said second plate to facilitate movement of said first plate; and

means formed independently of said first plate and coupling said first plate to said spindle for rotating said spindle upon movement of said first plate thereby to move said latchbolt within the latchbolt assembly.

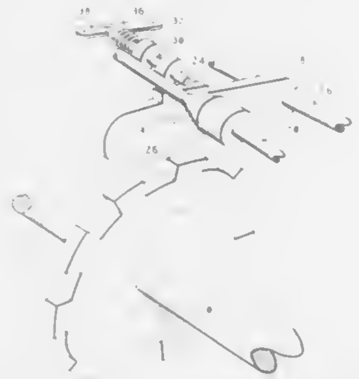
5,020,344
AUTOMOBILE ANTI-THEFT DEVICE

Gervasio B. Garcia, G.P.O. Box 1201, San Juan, P.R. 00936

Continuation of Ser. No. 911,663, Sep. 25, 1986, abandoned, which is a continuation-in-part of Ser. No. 535,822, Sep. 26, 1983, Pat. No. 4,615,355. This application Jun. 25, 1990, Ser. No. 542,795

Int. Cl.^{5} B60R *25/06*

U.S. Cl. 70—245 2 Claims



1. A security device for an automatic vehicle transmission having a plurality of gears operatively mounted to a chasis consisting of, combination,

(a) said chasis having means for mounting said device to said automatic transmission,

(b) bushing means attached to said chasis in which a locking rod is slidably mounted,

(c) said locking rod attached to an actuator rod and being constructed to engage a locking pawl,

(d) said locking pawl pivotally attached to the chasis and having a downwardly extending element designed to fit into a groove in a gear of said automatic transmission thereby locking said gear in a non-operative position,

(e) means for releasing said locking rod and locking pawl consisting of a spring which biases the locking rod into a non locking position thereby releasing the locking pawl from engagement with the gear of the automatic transmission.

5,020,345
SELF-LOCKING ELECTRONIC LOCK

Klaus W. Gartner, Palos Verdes Estates; Alan K. Uyeda, Pico Rivera, and Peter J. Phillips, Long Beach, all of Calif., assignors to La Gard, Inc., Torrance, Calif.

Continuation-in-part of Ser. No. 311,696, Feb. 16, 1989, Pat. No. 4,926,664, and a continuation-in-part of Ser. No. 533,896, Jun. 6, 1990. This application Aug. 9, 1990, Ser. No. 565,229

Int. Cl.^{5} E05B *47/00*

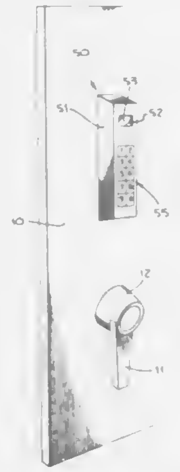
U.S. Cl. 70—277 3 Claims

1. An electrically operated lock having a housing and comprising:

a spring bias bolt and mounting means for mounting said bolt to said housing for movement inward and outward of said housing, said bolt being normally biased outwardly of said housing;

an electric motor and connecting means between said motor and bolt for moving said bolt inwardly of said housing against its bias by operation of said motor, said connecting means comprising a lost motion connection between said motor and bolt whereby said bolt is selectively movable independently of said motor;

electrical means for selectively operating said motor to move said bolt via said connecting means, said electrical means comprising a lock combination entry means for receiving entry of a predetermined lock opening combination, a signal generating means operated by said entry means for sending a motor operating signal to said motor to move said bolt when said predetermined combination is entered on said entry means, a circuit board and means for mounting said circuit board within said housing, said circuit board providing said signal generating means, wherein said motor operating signal is provided to first operate said motor in a first bolt withdrawal mode wherein said motor is in a dwell condition and then in a third mode wherein said motor is reversed;



a release means associated with said connecting means to release said bolt for authorized inward movement of said bolt when said electrical means selectively operates said motor and connecting means.

5,020,346
PERMUTATION LOCK, PARTICULARLY FOR STORAGE COMPARTMENTS

Armin Eisermann, Velbert, Fed. Rep. of Germany, assignor to Schulte-Schlagbaum Aktiengesellschaft, Velbert, Fed. Rep. of Germany

Filed Oct. 13, 1989, Ser. No. 421,467

Int. Cl.^{5} E05B *47/00*

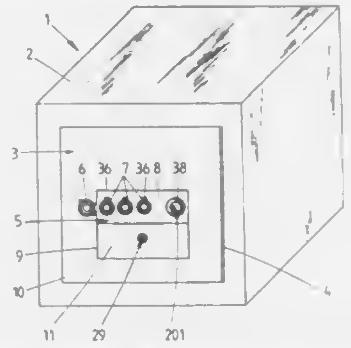
U.S. Cl. 70—279 16 Claims

1. A permutation lock suitable for storage compartments and operating with a variable combination, comprising

a bolt and an emergency opening mechanism; and

wherein an opening combination corresponds to a combination to which the lock is set by advancement of the bolt into a locked position;

said emergency opening mechanism is activated by use of an emergency key; and



the emergency opening mechanism is deactivatable only by means of a reactivation key.

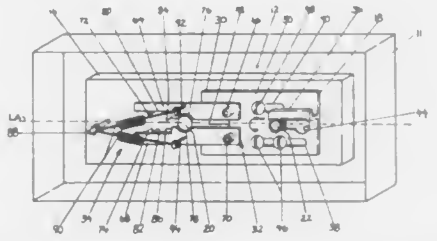
5,020,347
KEY SAFE APPARATUS

Karl P. Logan, Charlotte, N.C., assignor to One Way Out, Inc., Charlotte, N.C.

Filed Feb. 7, 1990, Ser. No. 476,817

Int. Cl.^{5} E05B *11/00*

U.S. Cl. 70—389 3 Claims



1. A device for alternately locking a selected one of a pair of keys and releasing the other key for removal from the device, the device comprising:

a home key normally locked in the device, the home key including a main body portion having a free insertion end and a portion, spaced from its free end, of reduced cross-section;

a visitor key normally not locked in the device, the visitor key including a main body portion having a free insertion end, a portion, spaced from its free end, of reduced cross-section, and a gear portion;

lock base means defining a pair of key receptacles, one key receptacle for receiving the home key and the other key receptacle for receiving the visitor key; and

locking means movable relative to the lock base means between a first position locking the home key in its key receptacle and a second position releasing the home key for removal from its key receptacle, the locking means including:

a slider member movably mounted to the lock base means for moving transversely to the key receptacle, the slider member including a home key slot having a width less than the cross-sectional extend of the main body portion of the home key yet greater than the cross-sectional extent of the reduced cross-section portion thereof, a visitor key slot having a narrow portion of a width less than the cross-sectional extent of the main body portion of the visitor key yet greater than the cross-sectional extent of the reduced cross-section portion thereof, the narrow portion of the visitor key slot being adapted for selectively engaging the visitor key at its reduced cross-section portion in a fork-like manner, and an enlarged

VOL
1127
ISS
1
JE
4
1991
UMI

portion having a width greater than the cross-sectional extend of the main body portion of the visitor key,
a toothed rack secured to the slider member and being configured for engagement by the gear portion of the visitor key when the visitor key is received in its key receptacle for actuating movement of the slider member relative to the lock base means, the toothed rack being located relative to the visitor key slot such that the visitor key extends through the enlarged portion of the slider member when the locking means is in its first position locking the home key in its key receptacle and such that the narrow portion of the visitor key slot engages the reduced cross-sectional portion of the visitor key as the rotation of the gear portion of the visitor key along the toothed rack moves the slider member relative to the lock base means, the home key slot being located to release the home key therefrom as the slider member is moved relative to the lock base means to dispose the locking means in the second position, and
a slider member limit means cooperating with the home key to move between a non-stopping position when the locking means is in its first position and a stopping position when the locking means is in its second position for preventing movement of the slider member to a position in which the visitor key is released therefrom.

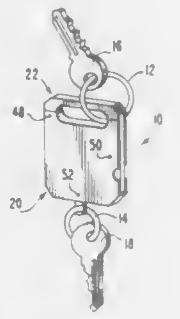
5,020,348
KEY RING

Robert A. Scungio, West Warwick, R.I., assignor to Linden D. Nelson, Birmingham, Mich.

Filed Feb. 2, 1990, Ser. No. 473,593

Int. Cl.⁵ A47G *29/10*

U.S. Cl. 70—456 R 8 Claims



1. A key ring, comprising:
a housing having an end and having a side that is transverse to the end;
an elongated cover having first and second ends, the cover having a slot adjacent the second end;
means for pivotably mounting the first end of the cover at the end of the housing, the cover being movable with respect to the housing between an engaged position and an open position, the housing and cover together defining an opening for retaining at least one key holder in the engaged position and the second end of the cover being spaced apart from the end of the housing in the open position; and
means for releasably latching the cover in the engaged position, the means for latching including
an elongated latch bar having a tooth,
means for pivotably mounting the latch bar at the side of the housing so that the tooth is positioned to engage the slot adjacent the second end of the cover when the cover is in the engaged position and so that the latch bar is directly manually accessible, and
spring means for urging the tooth into the slot when the cover is in the engaged position.

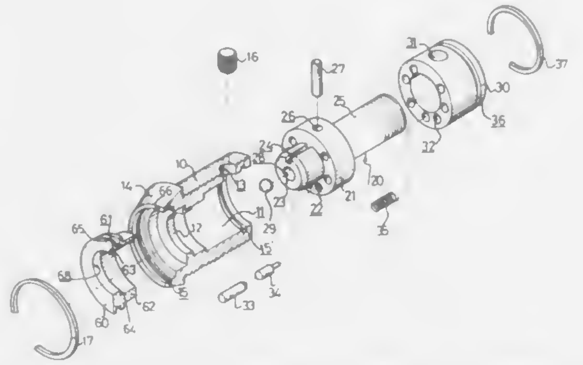
5,020,349
TUMBLER PIN LOCK SYSTEM

Miko Lee, No. 5, Li Hsing Lane, Chung Cheng Rd., Hsing Chuang City, Taipei Hsien, Taiwan

Filed Nov. 6, 1990, Ser. No. 609,603

Int. Cl.⁵ E05B *27/08*

U.S. Cl. 70—491 6 Claims



1. A tumbler pin lock system for computers, comprising a lock mechanism and a key, said lock mechanism comprising an outer tubular casing mounted to a frame of said computer, a mountinng flange protruding radially from an outer periphery of said tubular casing to divide said outer periphery into a key-end portion and a threaded portion, said lock mechanism being secured to said frame by means of said threaded portion, said tubular casing having a central through hole for rotatably receiving a locking spindle, said locking spindle comprising a driver pin sleeve having a set of bore holes each for receiving a driver pin, a rotating shaft protruding from a first side of said driver pin sleeve, a protrusion with a keyway slot protruding from a second side of said driver pin sleeve, a tumbler sleeve being provided on said rotating shaft next to said first side of said driver pin sleeve and being fixed to said tubular casing by an anchoring means, said tumbler sleeve having a distributed annular set of blind holes each for receiving a tumbler spring and a tumbler pin and being alignable with said bore holes in said driver pin sleeve;
said key comprising a flattened key handle and a substantially cylindrical portion, a set of annularly disposed semi-cylindrical slots being formed on an outer periphery of a first end of said cylindrical portion, each of a proper depth to engage with corresponding driver pins disposed in said bore holes in said driver sleeve, a key guide lug being formed inside said set of semi-cylindrical slots to engage with said keyway slot to rotate said rotating shaft relative to said tumbler sleeve to provide a locking or unlocking function, a cutout portion being formed in a middle portion of said cylindrical portion, a groove being formed in an outer periphery of a rear portion of said cylindrical portion, a retaining flange being formed on an inner peripheral wall of said cylindrical portion for attaching an engaging piece of said flattened key handle with said cylindrical portion to form a complete key, the improvements comprising:
a shielding ring being rotatably received in said key-end portion of said tubular casing, said shielding ring having an eccentric through hole defining an eccentric flange such that at least one of said driver pins is shielded.

5,020,350
APPARATUS AND METHOD FOR LUBRICATING AND COOLING IN A DRAW AND IRON PRESS

James E. Knepp, Plum Borough; Robert E. Welsh, Mount Lebanon; James A. Miller, Washington Township, Armstrong County, and Raymond Miller, Lower Burrell, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Jun. 19, 1989, Ser. No. 368,284

Int. Cl.⁵ B21D *22/20, 37/16, 37/18*

U.S. Cl. 72—45 20 Claims

1. Apparatus for drawing and ironing aluminum to make a closed end hollow aluminum body of acceptable surface quality comprising:
(a) at least one ironing ring;
(b) a punch adapted for reciprocal motion in coaxial alignment with said ironing ring to drawn and iron an aluminum workpiece through said ironing ring to form a closed end hollow aluminum body;
(c) a lubricating and cooling ring adjacent said ironing ring provided with channels for receiving, circulating, and discharging a lubricant or a coolant into the ring at an interior location, respectively, to lubricate or cool the ironing ring and said workpiece being forced therethrough;
(d) a coolant supply line leading to said lubricating and cooling ring;
(e) means for mechanically dispersing lubricant in coolant to make a lubricant dispersion;
(f) a lubricant dispersion supply line leading to said lubricating and cooling ring; and
(g) means for injecting said coolant through said coolant supply line to said lubricating and cooling ring controllably intermittently with said lubricant dispersion through said lubricant dispersion supply line to said lubricating and cooling ring to form a uniform application of lubricant dispersion on said aluminum body and to vary lubricity at selected times during a working cycle of drawing and ironing.

5,020,351
APPARATUS FOR FLATTENING IRREGULAR CIRCUMFERENTIAL SURFACES IN SPIRALLY FORMED PIPE

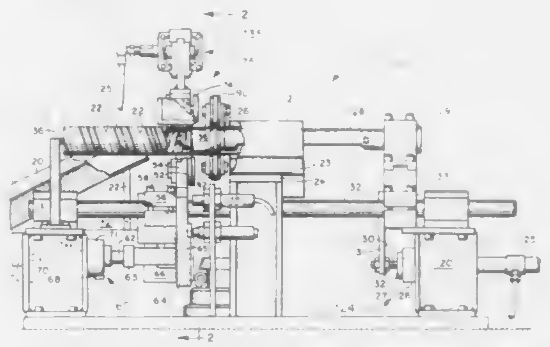
Wilhelmus P. H. Castricum, Rolling Meadows, Ill., assignor to Spiro America Inc., Wheeling, Ill.

Filed May 24, 1990, Ser. No. 528,247

Int. Cl.⁵ B21C *37/12*

U.S. Cl. 72—70 14 Claims

1. An apparatus for flattening irregular circumferential surfaces in spirally formed pipe wherein the pipe moves in an axial direction and rotates while it is being formed, comprising:
inner surface flattening means to be positioned inside the pipe;
outer surface flattening means to be positioned outside the pipe;
first moving means for moving the outer surface flattening means into contact with the pipe at a position vertically aligned with the inner surface flattening means;
guide means for allowing the inner surface flattening means and outer surface flattening means to move in the axial direction of the pipe, so that the inner and outer surface flattening means will cooperate to flatten raised surface irregularities on the pipe as the pipe moves axially and rotates between the inner and outer surface flattening means.



5,020,352
ROLLER SCREENING APPARATUS

Martin B. Vine, New South Wales, Australia, assignor to M. J. Vine Enterprises Pty. Ltd., New South Wales, Australia

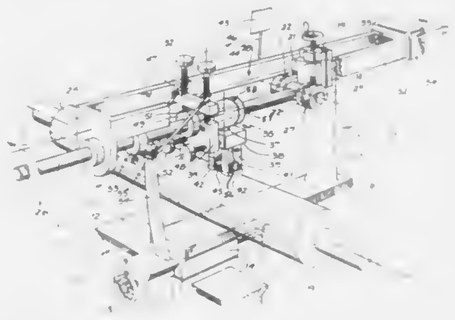
PCT No. PCT/AU87/00332, § 371 Date May 19, 1989, § 102(e) Date May 19, 1989, PCT Pub. No. WO88/02287, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 28, 1987, Ser. No. 334,956

Claims priority, application Australia, Sep. 26, 1986, PH8211

Int. Cl.⁵ B21B *27/06*

U.S. Cl. 72—84 13 Claims



1. A tool support assembly comprising:
a support attachment adapted to be secured to a roller screening apparatus having a notional axis of rotation about which an ink transfer roller may be rotated;
a tool support arm orientated relative to the support attachment so as to be transverse of and above the axis of rotation when attached thereto;
a pivot between the support arm and support attachment with a pivot axis normal to the arm and substantially parallel to the axis of rotation;
a tool holder secured to the support arm and fixably traversible therealong;
a screen forming tool held in the tool holder and rotatable about a tool axis substantially parallel to the pivot axis; and
a vibration damping means secured at one end to the arm and secured at an opposite end to the support attachment.

VOL
1127
ISS
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1991
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5,020,353

METHOD OF MACHINING AN OBLONG WORKPIECE AND A MACHINE FOR PERFORMING THE METHOD

Christian M. Christiansen, Skanderborg, Denmark, assignor to Enkotec A/S, Skanderborg, Denmark

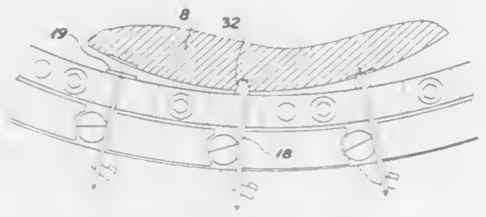
PCT No. PCT/DK88/00172, § 371 Date Jun. 20, 1990, § 102(e) Date Jun. 20, 1990, PCT Pub. No. WO89/03735, PCT Pub. Date May 5, 1989

PCT Filed Oct. 25, 1988, Ser. No. 473,997

Claims priority, application Denmark, Oct. 26, 1987, 5602/87

Int. Cl.⁵ B21G *3/12*

U.S. Cl. 72—187 17 Claims



1. A method of machining an oblong workpiece (18), which is placed substantially radially in a ring-shaped tool and is deformed by cooperation with a roller (8) rotating in a hold ring (1), comprising driving the roller relative to the position of the workpieces in the holding ring so that each workpiece is caused to cooperate with a plurality of differently shaped areas (16) of the surface of the roller.

5,020,354

COMPACT ROLLING MILL FOR ROLLING STRUCTURAL STEEL

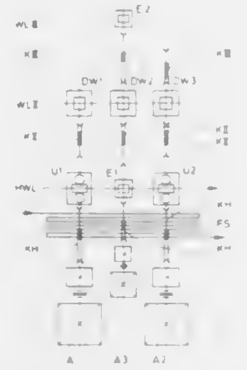
Dietmar Kosak, Neuss; Wolfgang Ellinghaus, Kaarst; Hugo Feldmann, Alsdorf-Warden, and Georg Engel, Kaarst, all of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Sep. 12, 1988, Ser. No. 243,441

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1987, 3730471

Int. Cl.⁵ B21B *1/10, 13/10*

U.S. Cl. 72—225 2 Claims



1. A rolling mill for rolling sections, comprising a universal tandem compact stand group with at least two universal roll stands and a two-high roll stand, additional universal roll stands and two-high roll stands, the stands being arranged in rolling positions on at least three rolling lines extending in a rolling direction, the stands having axes extending transversely of the rolling direction, means for displacing the sections in the direction of the rolling lines and means for displacing the sections transversely of the rolling lines, means for displacing the stands in the direction of the rolling lines and means for displacing the stands transversely from one of the rolling lines to another of the rolling lines, driving means arranged adjacent the rolling positions of an outermost of the rolling lines, and coupling means for coupling the driving means with the stands and with transmission means arranged in the rolling positions which are located adjacent the driving means and adjacent each other in axial direction of the stands.

5,020,355

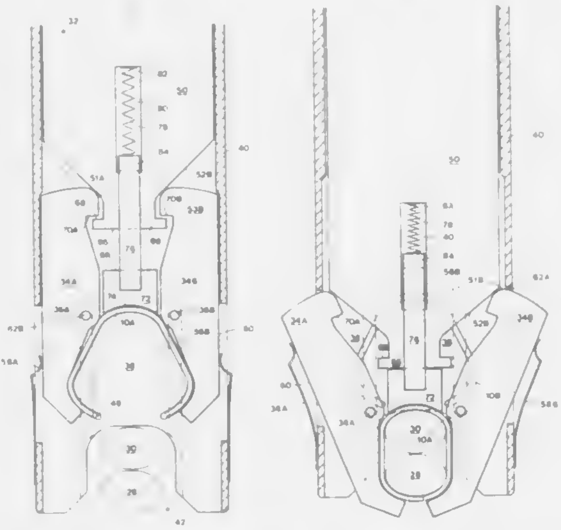
METHOD AND APPARATUS FOR SECURING FIRST AND SECOND MEMBERS

Roy D. Payne, 4711 Fountainhead Dr., Houston, Tex. 77066, and Mark A. Lammon, 112 Tree Crest Cir., The Woodlands, Tex. 77381

Filed Nov. 30, 1989, Ser. No. 443,912

Int. Cl.⁵ B21D *9/08;* B21F *15/04*

U.S. Cl. 72—407 19 Claims



1. An apparatus for securing a first member to a second member comprising:

a pair of jaws, each of said jaws being mounted to a pivot point so that each jaw pivots about said pivot point;

means for loading a fastener into said jaws;

means for moving the pivot point of said jaws from a first position in which said jaws receive a fastener from said loading means to a second position in which said jaws are pivoted on said pivot point to bend the fastener loaded therein around a first and a second member;

means for engaging the fastener while the fastener is being bent by a pivoting of said jaws to resist movement of the fastener away from the first and second members, causing the fastener to conform to the shape of the first and second members as the fastener bends to tightly secure the fastener to the first and second members; and

means for movably biasing the fastener engaging means against the fastener to increase the resistance to movement of the fastener while the fastener is being bent.

5,020,356

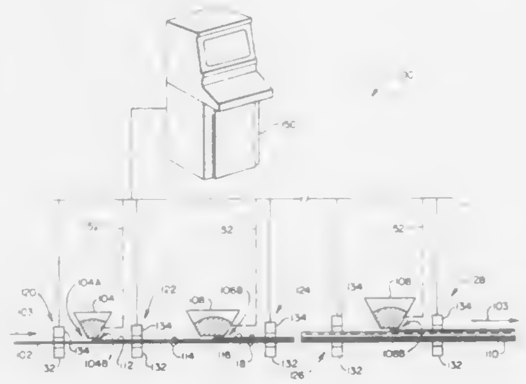
METHOD AND APPARATUS FOR MEASURING CHARACTERISTICS OF A MULTILAYER PRODUCT

John R. Dukes, Worthington, Ohio, assignor to Process Automation Business, Inc., Columbus, Ohio

Filed Aug. 25, 1989, Ser. No. 398,757

Int. Cl.⁵ G01G *23/01, 9/00, 11/04*

U.S. Cl. 73—1 B 15 Claims



1. A method for measuring characteristics of a product including a substrate and at least one layer of material different than the substrate deposited, coated or otherwise applied thereto as the substrate passes through a number of processing stations corresponding to at least the number of layers to be measured, the method comprising the steps of:

positioning a first gauging system on an input side of a first processing station to monitor a base substrate prior to entering said first processing station;

positioning a second gauging system on an output side of said first processing station to monitor said base substrate and a first layer applied by said first processing station;

calibrating said first and second gauging systems with a product calibration corresponding to said first layer; and

determining the basis weight of said first layer by subtracting a first output signal generated by said first gauging system from a second output signal generated by said second gauging system.

5,020,357

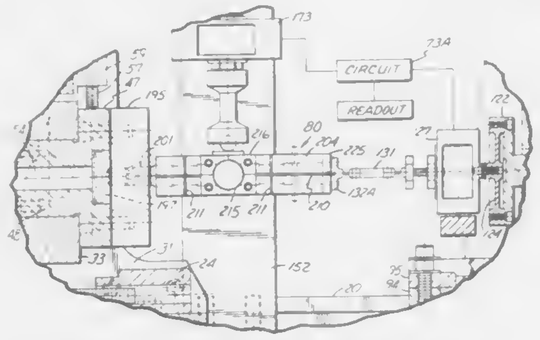
CALIBRATION STAND FOR SENSOR

Nebojsa Kovacevic, Plymouth, Minn., and Paul B. Hasselquist, Santa Fe, N. Mex., assignors to N. K. Biotechnical Engineering Company, Minneapolis, Minn.

Filed Aug. 18, 1989, Ser. No. 395,757

Int. Cl.⁵ G01L *25/00;* G01D *11/30*

U.S. Cl. 73—1 B 20 Claims



1. A calibration stand for a sensor comprising:

a base, said base having a longitudinal axis and a transverse width;

a first sensor support assembly mounted on said base and having means for supporting a sensor for calibration;

a sensor loading assembly mounted on the base and positioned spaced from the first assembly and having means for applying a load to the sensor supported on the support assembly along a loading axis which is generally parallel to the longitudinal axis;

the first assembly including means for adjusting the pitch of the means for supporting the sensor relative to the longitudinal axis of said base.

5,020,358

DOUBLE WALLED FIBROUS REINFORCED RESINOUS STORAGE TANKS WITH COMMON RIB SUPPORTS

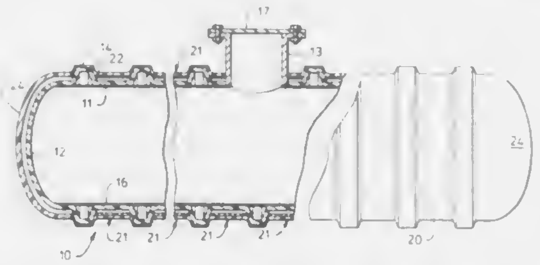
Bruce R. Sharp, 22375 Edgewater Dr., Unit 241, Charlotte Harbor, Fla. 33980

Continuation-in-part of Ser. No. 186,190, Jul. 5, 1988, Pat. No. 4,875,361. This application Apr. 26, 1989, Ser. No. 343,853

The portion of the term of this patent subsequent to Oct. 2, 2006, has been disclaimed.

Int. Cl.⁵ G01M *3/00*

U.S. Cl. 73—49.2 10 Claims



1. A double walled ribbed storage tank system using a common set of support ribs for strength, comprising:

(a) an inner storage tank having a cylindrical-shaped main body with a set of integral spaced protruding support ribs extending circumferentially around the exterior of the main body to form a generally contoured exterior with recesses between the support ribs and further having an end cap at each end of the main body; and

(b) a set of outer wall sections wherein each wall section is bonded to adjoining support ribs at a distance of less than about 90% of the height of the support ribs and further wherein each wall section is at least partially separated from the cylindrical-shaped main body.

5,020,359

MEASURING METHOD AND DEVICE FOR DETERMINING A PUMPING CHARACTERISTIC OR A PARAMETER OF A FLUID

Yvon Castel, Croissy sur Seine, France, assignor to Institut Francais du Petrole, Rueil Malmaison, France

Filed Jun. 30, 1989, Ser. No. 374,151

Claims priority, application France, Jun. 30, 1988, 88 08886

Int. Cl.⁵ G01N *7/14*

U.S. Cl. 73—61 R 18 Claims

1. A measuring method for determining at least one of a pumping characteristic and a parameter of a multi-phase fluid having at least a liquid phase and a gas phase, a volume of the gas phase being related to a volume of the liquid phase defining a parameter GLR, the method comprising the steps of:

introducing said fluid into a chamber of a positive-displacement pump having a suction pressure, a delivery pressure, and a variable volume,

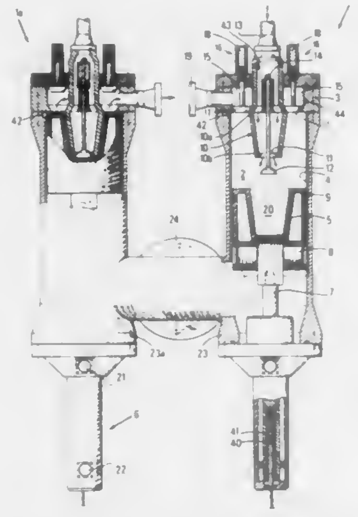
causing a variation of the volume of said chamber,

establishing at least one relationship between physical characteristics associated with at least one of said variation of volume and said parameter GLR, said characteristics each taking on values during the variation of volume of said chamber,

measuring at least one of said values of one of said physical

VOL 1127 ISS 1 JE 4 1991 UMI

characteristics during a transfer of said multi-phase fluid, and



determining from said relationship and said measured value other values of at least one of the physical characteristics and said parameter GLR.

5,020,360

PROCESS FOR DETERMINING AND EVALUATING THE COMBUSTION PRESSURE OF AN INTERNAL COMBUSTION ENGINE

Thomas Brosi, Sulzbach/Murr; Werner Hess, Fellbach; Winfried Moser, Ludwigsburg, and Hermann Schneider, Heilbronn, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

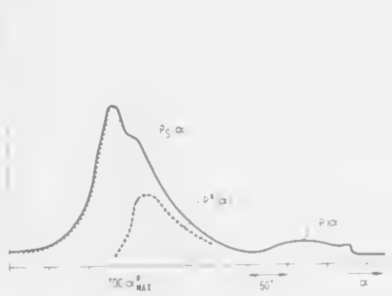
PCT No. PCT/DE88/00657, § 371 Date Apr. 27, 1990, § 102(e) Date Apr. 27, 1990, PCT Pub. No. WO89/03983, PCT Pub. Date May 5, 1989

PCT Filed Oct. 26, 1988, Ser. No. 477,981

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1987, 3736430

Int. Cl.^{5} G01M *15/00*

U.S. Cl. 73—115 17 Claims



1. A process for determining the combustion pressure of an internal combustion engine, characterized by the following steps:

the combustion chamber pressure ($p(\alpha)$) arising during normal engine operation as a function of the crankshaft angle (α) and the compression pressure ($P_k(\alpha)$) arising during purely compression operation in the combustion chamber are detected;

for determining the combustion pressure course ($P^*(\alpha)$) as a function of the crankshaft angle (α), the difference between the combustion chamber pressure ($p(\alpha)$) and the compression pressure ($P_k(\alpha)$) is formed;

wherein for determining the compression pressure ($P_k(\alpha)$) and combustion chamber pressure ($p(\alpha)$) for a piston until reaching a predetermined crankshaft angle is measured as a function of the crankshaft angle (α) and stored in memory; that the memorized curve course is reflected at an axis determined by a crankshaft angle, in that the values memorized before attainment of the predetermined crankshaft angle are called up symmetrically with respect to the axis; and that as the predetermined crankshaft angle, the top dead center of a piston is selected.

5,020,361

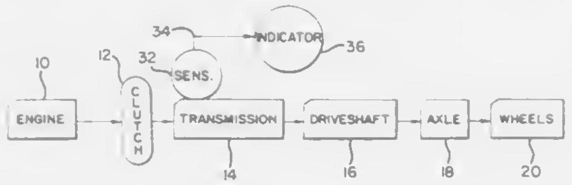
ENGINE OVERSPEED SENSING AND READOUT

Richard L. Malecki, Ft. Wayne; W. T. Irick, and Robert L. Dowler, both of New Haven, all of Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.

Filed Sep. 14, 1989, Ser. No. 407,099

Int. Cl.^{5} G01M *19/00*

U.S. Cl. 73—118.1 12 Claims



1. In a land vehicle having an engine that drives one or more land-engaging wheels through a transmission that is coupled to the engine by a clutch, said transmission having an input shaft means coupled to an output side of said clutch and one of a plurality of speed changing gears disposed between said input shaft means and said wheels, the improvement for warning the vehicle operator of potential motoring of the engine by said one or more wheels acting through the transmission, said improvement comprising sensor means for sensing the rotational speed of said input shaft means and indicator means operated by said sensor mean for presenting to the vehicle operator, when said clutch is disengaged and an inappropriate one of said speed changing gears is engaged, an indication that motoring of the engine will result upon reengagement of said clutch.

5,020,362

FUEL INJECTION SYSTEM TESTER

George R. Hart, Lakewood, and Charles J. Nehoda, Broadview Heights, both of Ohio, assignors to Hickok Electrical Instrument Company, Cleveland, Ohio

Filed Jun. 15, 1990, Ser. No. 538,767

Int. Cl.^{5} G01M *19/00*

U.S. Cl. 73—119.00 A 17 Claims

1. A device for testing the integrity of a fuel delivery system within a vehicle comprising means for pressuring the fuel delivery system for a first predetermined period of time; means for measuring the fuel pressure within the fuel delivery system after the expiration of said first predetermined period of time and after the expiration of a second predetermined period of time; and means for displaying said pressure measurements after said first and second predetermined periods of time.

5,020,363

METHOD FOR DETERMINING ATMOSPHERIC AIR PRESSURE IN PRESSURE-CONTROLLED FUEL INJECTION SYSTEMS

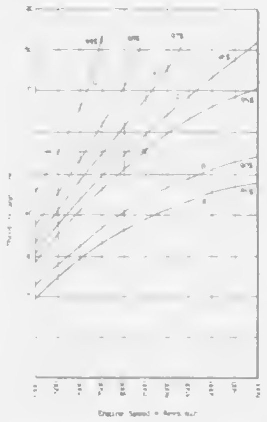
Eberhard Schnaibel, Hemmingen; Erich Junginger, Stuttgart, and Klaus Hirschmann, Leonberg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/EP88/00377, § 371 Date Dec. 6, 1989, § 102(e) Date Dec. 6, 1989, PCT Pub. No. WO89/11033, PCT Pub. Date Nov. 16, 1989

PCT Filed May 5, 1988, Ser. No. 449,891

Int. Cl.^{5} G01M *15/00*

U.S. Cl. 73—119 A 10 Claims



1. A method of determining a prevailing atmospheric air pressure in a pressure-controlled injection system of an engine, comprising the steps of detecting when the engine is not operating below a predetermined load condition and measuring a prevailing intake manifold pressure (P_S) at that condition and multiplying the measured intake manifold pressure (P_S) by a predetermined numerical factor (K) to provide a pressure value (P_0) representative to said prevailing atmospheric air pressure, said predetermined load corresponding to a pre-established condition that the measured intake manifold pressure is a predetermined percentage (Q) of the prevailing atmospheric air pressure; and pre-establishing a characteristic engine-specific curve of a respective throttle valve opening angle (α) necessary to achieve at a plurality of engine speeds (N) a condition that the measured intake manifold pressure is a predetermined fixed percentage (Q) of the prevailing atmospheric air pressure, the existence of said predetermined load condition being established when the curve is exceeded during engine operation and producing a pressure value (P_0) representative of the prevailing atmospheric air pressure by multiplying said factor K (100/Q) by the prevailing intake manifold pressure (P_S).

5,020,364

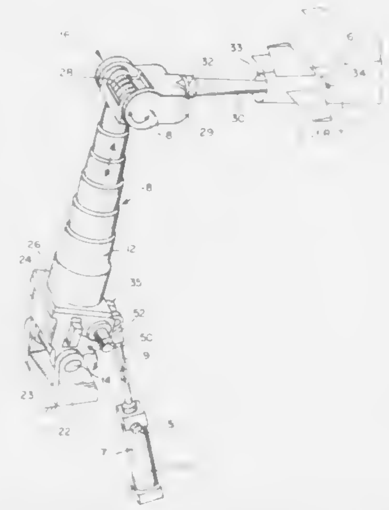
WIND TUNNEL MODEL POSITIONING DEVICE

Philip J. Manitt, East Setauket; Vincent F. Thomas, Lynbrook, and William J. McAllister, Smithtown, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed May 30, 1990, Ser. No. 530,295

Int. Cl.^{5} G01M *9/00*

U.S. Cl. 73—147 3 Claims



1. A wind tunnel model movable support comprising:
- a telescoping column;
- hydraulic means connected to the column enabling pivoting of the column about an axis passing through its base;
- a joint connected to a top segment of the column for rotation about an axis perpendicular to the column;
- a sting connected at a first end thereof to the joint while a second end of the sting is secured to the model;
- hydraulic means connected to the column for varying the length thereof;
- hydraulic means for rotating the joint; and
- a turntable for supporting the column thereon;
- wherein coordinated continuous movement of the joint and column in a plane results in corresponding continuous first angle change of a model about a rotational axis fixed in space; and
- further wherein turntable rotation varies the orientation of the model about a second axis.

5,020,365

FLOW RATE METER

Heinz Gneiss, Ludwigsburg, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Feb. 23, 1990, Ser. No. 483,710

Claims priority, application Fed. Rep. of Germany, May 27, 1989, 3917311

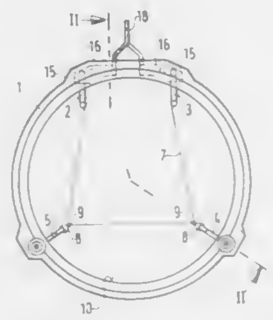
Int. Cl.^{5} G01F *1/68*

U.S. Cl. 73—204.27 4 Claims

1. A flow rate meter for measuring the mass of flowing medium for measuring the mass of air aspirated by internal combustion engines, comprising a sensor ring made of plastic, a temperature-dependent resistor disposed in the flow of the medium and embodied as a hot wire, the temperature and/or

VOL
1127
ISS
1
JE
4
1991
UMI

resistance of said hot wire is regulated as a function of the flowing mass and the control variable of which is a standard for the mass of the flowing medium, said hot wire being guided in the form of a loop from one end support member to another end support member along at least two additional support members supported by said sensor ring, wherein each end support member associated with one end of the hot wire is made of wire and is electrically conductively connected by a fastening end (**15**) to a respective electrically conductive angular connection plate embedded in the sensor ring and surrounded by plastic, said angular connection plate (**16**) includes a connection portion (**18**) which extends from said sensor ring (**1**) to an outside thereof and said angular connection plate (**16**) and said fastening end (**15**) of said end support members (**2**, **3**) are embedded within and surrounded by the plastic sensor ring (**1**).



5,020,366
LIQUID LEVEL SENSOR

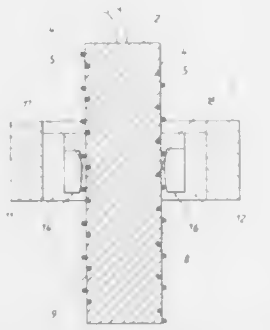
Sven Elfverson, Mullsjo; Kenneth Skogward, Huskvarna, and Bengt Hermansson, Mullsjo, all of Sweden, assignors to Scandmec Plast AB, Sweden

Filed Jun. 18, 1990, Ser. No. 476,409

Claims priority, application Sweden, Dec. 8, 1987, 8704889-8

Int. Cl.^{5} G01F *23/60*

U.S. Cl. 73—313 5 Claims



1. A liquid level sensor comprising a rod of insulating material, a float of insulating material surrounding said rod and being displaceable along the rod first and second resistance wires, a contact element arranged on the float and electrically connected to said first and second resistance wires to provide a current circuit whose resistivity varies depending on the position of the float along the rod, said contact element comprising a first contact plate for the first resistance wire and a second contact plate for the second resistance wire, the float including stabilizing means for preventing said float from turning about the rod the resistance wires being wound helically and parallel about the rod with the first wire being recessed in the rod in the area in which the second resistance wire bears against the contact plate and the second wire being recessed in the rod in the area in which the first resistance wire bears against the contact plate.

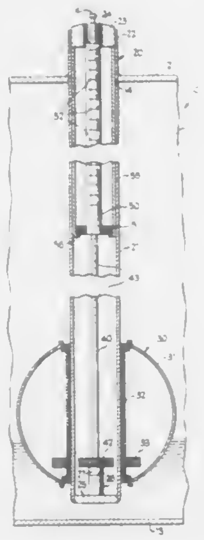
5,020,367
TANK-LEVEL GAUGE

John J. White, Wilmette, Ill., assignor to Midland Manufacturing Corp., Skokie, Ill.

Filed Sep. 4, 1990, Ser. No. 576,976

Int. Cl.^{5} G01F *23/62. 23/56*

U.S. Cl. 73—319 11 Claims



1. A tank-level gauge for use in indicating the level of liquid in a tank, comprising an outer tube having a lower end for extending into the tank and an upper end for protruding from the tank, a float encircling said outer tube, wherein a rising level of liquid in the tank would cause said float to rise, first magnet means in said float generally of ring shape and encircling said outer tube, a plurality of gauging rods disposed inside said outer tube and axially movable therein and each having lower and upper ends, second magnet means attached to the lower end of one of said gauging rods and being adapted to magnetically couple to said first magnet means, wherein a rising level of liquid in the tank would cause said one gauging rod to rise so as to be visible above the tank which will indicate the level of the liquid in the tank, third magnet means attached to the lower end of another of said gauging rods and being adapted to magnetically couple to said first magnet means, wherein a further increase in the level of liquid in the tank would cause said another gauging rod to rise so as to be visible above the tank which will indicate the level of the liquid in the tank, and means on said outer tube for defining a level above which said second magnet means cannot rise and below which said third magnet means cannot fall.

5,020,368
METHOD AND SYSTEM MEASURING A VERTICAL DENSITY PROFILE OF A FLUID

Peter G. Evans, and John B. Cole, both of Ince, Great Britain, assignors to Shell Oil Company, Houston, Tex.

Filed Nov. 27, 1989, Ser. No. 441,502

Claims priority, application United Kingdom, Nov. 30, 1988, 8827901

Int. Cl.^{5} G01N *9/28*

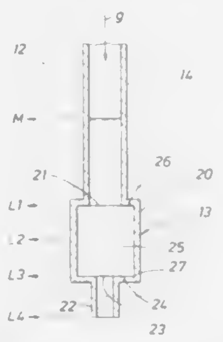
U.S. Cl. 73—439 8 Claims

1. A method for measuring a vertical density profile of a fluid in a fluid storage tank by using an array of open-ended upright pressure pipes, which pipes extend downward into said fluid, each said pipe having at its upper end means for connecting to a common pressurizing gas supply and said pipe having at its lower end a fluid level sensor head, the method comprising the following sequence of steps, carried out for each pipe:

connecting said pipe with said common gas supply,

conducting the pressurizing gas into said pipe thereby forcing the fluid downward into said fluid level sensor head, said sensor head comprising a lower end part in which the fluid passes an outlet opening forming an abrupt transition between said lower end part and an open ended tube,

determining a level-indicating signal of the passing fluid,



determining a pressure-indicating signal of the pressure on the fluid, and

deriving a vertical density profile of said fluid from said level-indicating and pressure-indicating signals.

5,020,369
IMAGE STABILIZING OPTICAL DEVICE

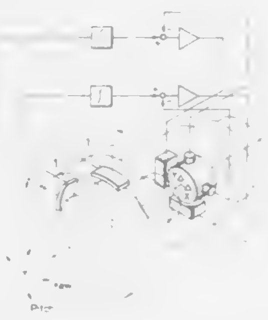
Koichi Washisu, Tokyo; Ichiro Ohnuki, Yokohama, and Toru Nagata, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 12, 1989, Ser. No. 350,854

Claims priority, application Japan, May 13, 1988, 63-116099; May 25, 1988, 63-128067

Int. Cl.^{5} G01P *15/08*

U.S. Cl. 73—517 A 26 Claims



1. An angular acceleration meter for detecting angular acceleration of an object, comprising:
- (a) sensing mass formed into a shape corresponding to a shape of the object;
- (b) supporting means for movably supporting said sensing mass relative to the object; and
- (c) angular acceleration sensing means for measuring an angular acceleration of said sensing mass relative to the object.

5,020,370
VIBRATING BEAM FORCE-FREQUENCY TRANSDUCER AND PENDULOUS ACCELERATOR COMPRISING APPLICATION THEREOF

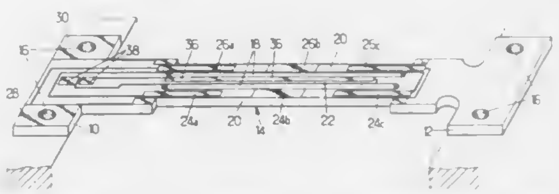
Alain Deval, Courbevoie, and Yvon Amand, Soisy Sous Montmorency, both of France, assignors to Societe D'Applications Generales D'Electricite et de Mecanique Sagem, Paris, France

Filed Nov. 28, 1989, Ser. No. 422,170

Claims priority, application France, Dec. 2, 1988, 8815835

Int. Cl.^{5} G01L *1/10. 1/26*

U.S. Cl. 73—517 AV 7 Claims



1. A vibrating force transducer comprising a flat elongated strip of piezo-electric material having end portions arranged for being securely connected to elements which apply a force to be measured along the direction of elongation when the transducer is in service, said strip being fractionated by slits parallel along the direction of elongation and orthogonal to major faces of said strips into a central beam and lateral beams which are in a common plane, said lateral beams carrying electrode means for flexural vibration in said common plane at a resonance frequency indicative of the value of the force applied to said end portions and said central beam carrying a resistive temperature sensor.

5,020,371
DEVICE FOR THE PRECISE TRANSVERSE POSITIONING FOR A MEMBER DISPLACEABLE ALONG A RAIL OF A RAILWAY TRACK WITH RESPECT TO SAID RAIL

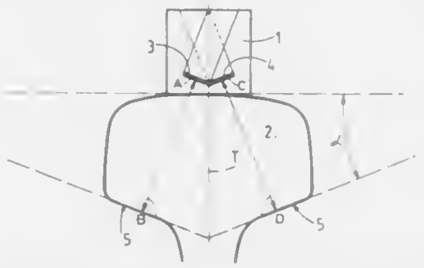
Romolo Panetti, Geneva, Switzerland, assignor to Speno International S.A., Geneva, Switzerland

Filed Oct. 12, 1989, Ser. No. 420,463

Claims priority, application Switzerland, Dec. 19, 1988, 4677/88

Int. Cl.^{5} G01N *29/04*

U.S. Cl. 73—636 10 Claims



1. Method for positioning a member displaced along a rail of a railway track transversely with respect to the symmetry plane of said rail, comprising emitting through the head of the rail two diverging ultrasound beams practically perpendicular each to a respective one of the fish plates of said rail, receiving the echoes of these beams reflected by the said fish plates; forming a regulating signal which is a function of the time difference between the emission and the reception of tis echo for each of said two ultrasound beams, using this regulating signal to elaborate a control signal, and using this control signal to control the transverse positioning of the said member.

VOL
1127
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5,020,372
PRESSURE MEASUREMENT DEVICES

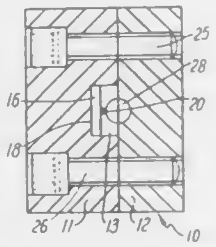
Grant J. Tuff, Oxford, England, assignor to Rolls-Royce Motor Cars Limited, Cheshire, England

Filed Jan. 10, 1990, Ser. No. 463,034

Claims priority, application United Kingdom, Jan. 10, 1989, 8900465

Int. Cl.^{5} G01L *7/02, 9/00*

U.S. Cl. 73—730 9 Claims



1. A pressure measurement device comprising:
- a housing adapted to accommodate a duct passing through said housing, and
- means replaceably located in the housing so as to be disposed in use adjacent an exterior wall of the duct for directly detecting distortion of the wall of the duct caused by pressure within the duct and for producing a signal representing that pressure.

5,020,373
COMPOSITE FLOW METER

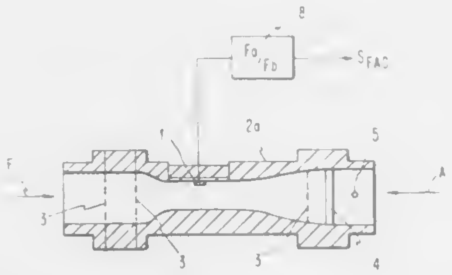
Shoji Kamiunten, Kamakura, and Tetsuo Hisanaga, Yokohama, both of Japan, assignors to Yamatake-Honeywell Co., Ltd., Tokyo, Japan

Filed Dec. 5, 1989, Ser. No. 446,415

Claims priority, application Japan, Dec. 15, 1988, 63-314936

Int. Cl.^{5} G01F *1/32, 7/00*

U.S. Cl. 73—861.22 3 Claims



2. A composite flow meter comprising:
- a flow tube with an inlet and an outlet and a region of reduced diameter between said inlet and outlet;
- a thermal flow sensor for measuring flows extending from a low flow range to a mid flow range located in said reduced diameter section of said flow tube;
- a post and a pair of ports in said flow tube located downstream of said reduced diameter region forming a Karman vortex flow sensor for measuring flows extending from said mid range to a high flow range;
- means for modifying the output of said thermal flow sensor by a factor determined by the ratio of the output of said Karman flow sensor to the output of said thermal flow sensor for a flow rate in said mid range.

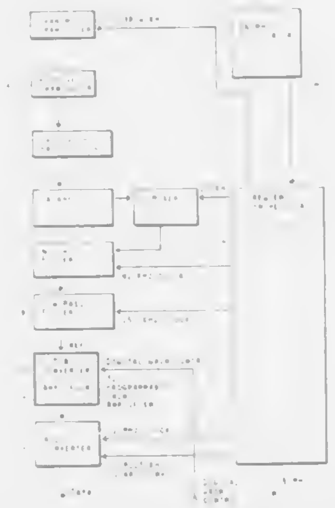
5,020,374
VELOCITY MEASUREMENT SYSTEM

Alan M. Petroff, and Larry W. Fullerton, both of Huntsville, Ala., assignors to ADS Environmental Services, Inc., Huntsville, Ala.

Filed Nov. 17, 1989, Ser. No. 440,502

Int. Cl.^{5} G01F *1/66*

U.S. Cl. 73—861.25 9 Claims



1. A fluid flow velocity measurement system comprising:
- acoustic emission means for transmitting an acoustic signal of a discrete frequency into a volume of moving fluid;
- acoustic reception means including a transducer positioned to receive a plurality of Doppler shifted signals related to said acoustic signal from fluid borne objects, and said Doppler shifted signals being received over a discrete time and comprising a time domain signal train;
- frequency domain translation means responsive to said time domain signal train for translating it to a plurality of frequency domain signals;
- frequency selection means for selecting a frequency signal from said frequency domain signals; and
- velocity computation means responsive to said frequency selection means for providing as an output a signal representative of an average velocity of said fluid flow, being a velocity related to a frequency from said frequency signals less than the highest fluid velocity present.

5,020,375
FLOW METER WORKING ON THE CORIOLIS PRINCIPLE (II)

Andreas Back-Pedersen, Valby; Ole B. Nielsen, Sonderborg, and Hans C. Moller, Augustenborg, all of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Jul. 10, 1989, Ser. No. 377,328

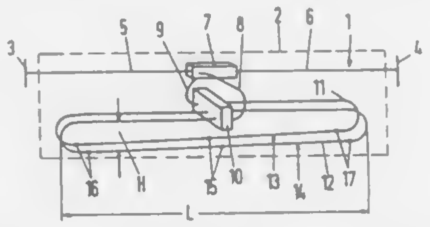
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, 3829059

Int. Cl.^{5} G01F *1/84*

U.S. Cl. 73—861.38 13 Claims

1. A flow meter working on the Coriolis principle for measuring fluid flow, comprising a tubular upstream attachment end portion, a tubular downstream attachment end portion, the attachment end portions having adjacent ends, a tube formed from a single piece and having a first measuring loop that has a first end and an opposite end, a second measuring loop having a first end and an opposite end joined to the first loop opposite end, first tubular means for joining the upstream end portion to the first loop first end, and second tubular means for joining the second loop first end to the downstream end portion, each of the tubular means having a first end remote from the respective attachment portion to which it is joined that is

joined to the first end of the respective loop, the measuring loops having several bends and being juxtaposed, oscillator means adjacent to the loops for oscillating the loops in the opposite sense relative to one another, sensors means adjacent to the loops for providing a measurement that depends on motion of the measuring loops that are being oscillated, a first tube holder block having the tube extended thereinto and joined to the tube adjacent to the juncture of the first and second loop opposite ends, the juncture of the first tubular means to the first loop first end, and the juncture of the second tubular means to the second loop first end for retaining each of the loop first ends in spaced relationship to one another and to the opposite ends of the loops, and a second tube holder block for interconnecting the attachment portions adjacent to the juncture of the attachment means to the tubular means, and having the attachment portions ends extending thereinto, the first block being separate and spaced from the second block and being carried by the tubular means.



5,020,376
MICROENVIRONMENTAL SENSORS

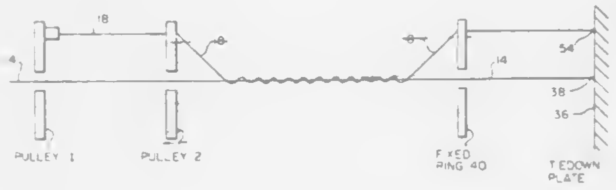
Peter Wall, Wyndham; Robert S. Pickard, Cardiff; Graham Ensell, Salisbury, and David Leong, Southampton, all of United Kingdom, assignors to University College Cardiff Consultants Limited, Cardiff, United Kingdom

Filed Jan. 29, 1988, Ser. No. 149,847

Claims priority, application United Kingdom, Jan. 30, 1987, 8702066; Dec. 1, 1987, 8728102

Int. Cl.^{5} G01R *3/00;* **H01L** *21/306*

U.S. Cl. 73—866.5 16 Claims



16. A microenvironmental sensor comprising a crystalline substrate released by a combination of anisotropic and isotropic etching from a crystalline material, and sensing interface means on the surface of at least a portion of the substrate, wherein one dimension of the portion of the substrate is 10–20μ and the sensor means is of dimensions 1–10μ.

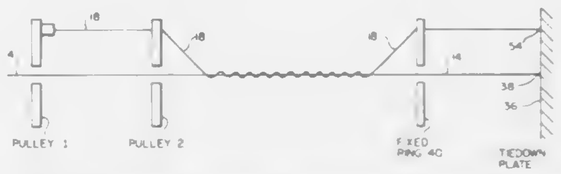
5,020,377
LOW PRESSURE TRANSDUCER USING METAL FOIL DIAPHRAGM

Kyong Park, Thousand Oaks, Calif., assignor to Kavlico Corporation, Moorpark, Calif.

Filed Jan. 23, 1990, Ser. No. 468,608

Int. Cl.^{5} G01L *9/12*

U.S. Cl. 73—718 17 Claims



1. A low pressure capacitive transducer assembly comprising:
- a nonconductive plate having a substantially planar surface;
- a thin electrically conductive layer deposited on said planar surface;
- an epoxy layer silk-screened to form a border around said conductive layer on said planar surface;
- a planar metal foil diaphragm member having a flat surface, said diaphragm member being positioned with said flat surface opposite said planar surface and with its periphery firmly in contact with said epoxy layer, but not in contact with said conductive layer;
- the central area of said foil diaphragm member being free of engagement with other portions of said transducer assembly;
- said foil diaphragm member being between $\frac{1}{3}$ and 3 mils thick, and being spaced away from said conductive layer by a distance of between $\frac{1}{2}$ mil and 20 mils;
- a retaining member of approximately the shape of said epoxy layer, said retaining member engaging said diaphragm member on the opposite side thereof from said epoxy layer, such that the capacitance between said diaphragm member and said thin electrically conductive layer is at a predetermined level and
- means for detecting changes in the capacitance between said foil diaphragm member and said thin conductive layer.

5,020,378
DEVICE FOR NON-CONTACT MEASURING OF STRESSES IN A BAR-SHAPED BODY

Tore Hesthamer, and Carl Tyren, both of Lund, Sweden, assignors to AB SKF, Gothenburg, Sweden

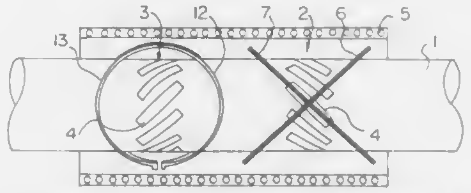
PCT No. PCT/SE88/00447, § 371 Date Mar. 1, 1990, § 102(e) Date Mar. 1, 1990, PCT Pub. No. WO89/02070, PCT Pub. Date Mar. 9, 1989

PCT Filed Sep. 1, 1988, Ser. No. 469,506

Claims priority, application Sweden, Sep. 3, 1987, 8703418

Int. Cl.^{5} G01B *7/24;* **G01L** *5/16*

U.S. Cl. 73—779 6 Claims



1. Device for non-contact measuring of stresses in a bar-shaped body having an axis, wherein the bar has at least one transverse zone (2, 3) which is provided with a coating of an

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amorphous magnetoelastic material in which the magnetic dipoles are oriented along the circumferential surface of said zone substantially in a direction extending at an angle with respect to said axis, said surface coating consisting of a plurality of thin strips(**4**) being affixed to the circumferential surface of said zone and extending at said angle therealong, and wherein means for generating a magnetic field are provided for in influencing said zone (**2, 3**) and a pick-up coil (**6, 13**) encircling the bar is provided for said zone (**2, 3**), said pick-up coil (**6, 13**), being connected to a measuring unit (**16, 16A**) for indicating signals generated in the pick-up coil (**6, 13**), characterized in that said pick-up coil (**6, 13**) encircling the bar (**1**), which is associated with said zone (**2, 3**), is oriented in relation to the bar (**1**) in such a manner that the magnetosensitive axis of the pick-up coil forms an acute angle with said axis of the bar(**1**) in said zone (**2, 3**).

5,020,379

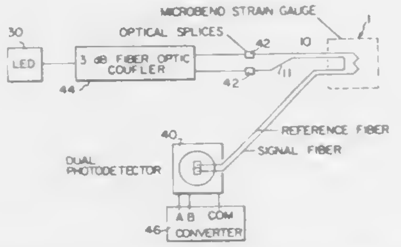
MICROBEND FIBER OPTIC STRAIN GAUGE

John W. Berthold, Salem, and Stuart E. Reed, Homeworth, both of Obio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Continuation-in-part of Ser. No. 924,962, Oct. 30, 1986, abandoned. This application Sep. 9, 1987, Ser. No. 94,580

Int. Cl.^{5} G01L *1/24*

U.S. Cl. 73—800 **4 Claims**



1. A strain gauge operable in hostile environments comprising:

a pair of plates made of a material having a temperature expansion coefficient dissimilar to that of a material to be tested for the purpose of increasing the range of the sensor and having facing and offsetting corrugated surfaces and wherein at least one plate is attached to the material to be tested;

a buffer coated first optical signal fiber clamped between the corrugations of the plates for being bent to a greater or lessor extent depending on pressure exerted on the plates for moving the plates together;

a buffer coated reference optical signal fiber located in the vicinity of the plates so as to be simultaneously exposed to the same thermal and other conditions along its length as the first optical fiber;

optical signal applying means including a light source and light splitting means connected to one end of each optical fiber for simultaneously applying an optical signal to both optical fibers; and

optical detector means connected to the opposite ends of both optical fibers for measuring the modulations in the optical signal transmitted through the first optical fiber which modulations correspond to pressures applied to the plates and for reading the modulations in the optical signal transmitted through the reference optical fiber.

5,020,380

MASS FLOW OPERATING BY THE CORIOLIS PRINCIPLE

Mamadi Keita, Basel, Switzerland, assignor to Flowtec AG, Reinach, Switzerland

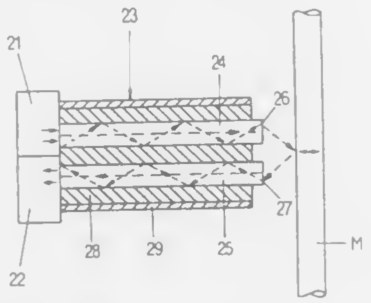
PCT No. PCT/EP89/00517, § 371 Date Jan. 8, 1990, § 102(e) Date Jan. 8, 1990, PCT Pub. No. WO89/11084, PCT Pub. Date Nov. 16, 1989

PCT Filed May 10, 1989, Ser. No. 457,814

Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816045.5

Int. Cl.^{5} G01F *1/84*

U.S. Cl. 73—861.37 **10 Claims**



1. A Coriolis type mass flow meter comprising a mechanical oscillating system and optical sensor means for detecting mechanical oscillations of the oscillating system, said optical sensor means comprising a light transmitter, a light receiver, and optical waveguide means for transmitting light from said light transmitter to said light receiver so that the transmitted light flux is influenced by the mechanical oscillations, said optical wave guide means comprising at least one quartz or sapphire rod wherein each quartz or sapphire rod is surrounded by a ceramic material or glass and the outside of said ceramic material or glass is surrounded by a metal cladding.

5,020,381

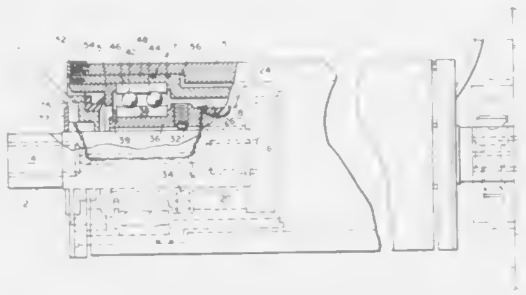
WEB TENSION MONITOR

Edward C. Bartlett, 447 Sixth St., Dover, N.H. 03820

Filed Feb. 20, 1990, Ser. No. 481,313

Int. Cl.^{5} G01L *5/10*

U.S. Cl. 73—862.48 **4 Claims**



1. In a system for monitoring the tension in a web traveling over a guide roll mounted for rotation about a pair of stub shafts, a load cell cantilever-mounted on one of said stub shafts including diametrically oppositely disposed beams of arcuate cross-section and a plurality of gauges, two of said gauges being disposed in axially spaced relationship on each of said arcuate beams, a self-aligning bearing for said guide roll including an inner bearing race normally non-rotating about said one stub shaft, bearing balls, and an outer bearing race normally rotatable with said guide roll, said load cell being disposed within said guide roll inwardly of said bearing, whereby tension exerted by said web on said guide roll causes strain on said load cell to produce a signal in response thereto.

5,020,382

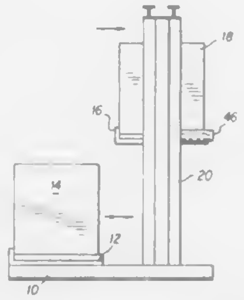
APPARATUS FOR LOADING AND UNLOADING OBJECTS

David W. Lutz, P.O. Box 4444, Carlisle, Pa. 17013

Filed Feb. 20, 1990, Ser. No. 481,432

Int. Cl.^{5} B60K *1/04*

U.S. Cl. 74—89.2 **35 Claims**



1. Apparatus for loading and unloading objects, said apparatus comprising:

- (a) a first carriage;
- (b) first means for moving said first carriage back and forth in a straight line in a first plane between a first position and a second position, said first means comprising:
  - (i) a first chain having a first run that is parallel to or in said first plane;
  - (ii) third means for attaching said first carriage to said first run of said first chain; and
  - (iii) fourth means for moving said first run of said first chain back and forth;
- (c) a second carriage; and
- (d) second means for moving said second carriage back and forth between said first position and said second position such that, when said first carriage is in said first position, said second carriage is in said second position and, as said first carriage moves to said second position, said second carriage moves out of said first plane, then back into said first plane and into said first position, said second means comprising:
  - (i) a gantry;
  - (ii) a second chain having a first run that is parallel to or in said first plane;
  - (iii) fifth means for attaching said gantry to said first run of said second chain; and
  - (iv) sixth means for moving said second carriage up and down relative to said gantry, said sixth means comprising a third chain a first end of which is attached to said second carriage.

5,020,383

INTERMITTENT ROTATION DRIVE APPARATUS UTILIZING AIR PRESSURE

Shigeo Kanaya, Suita, Japan, assignor to Myotoku Ltd., Tokyo, Japan

PCT No. PCT/JP88/01091, § 371 Date Apr. 25, 1989, § 102(e) Date Apr. 25, 1989, PCT Pub. No. WO89/03948, PCT Pub. Date May 5, 1989

PCT Filed Oct. 27, 1988, Ser. No. 371,580

Claims priority, application Japan, Oct. 27, 1987, 62-163937; Jan. 20, 1988, 63-5438

Int. Cl.^{5} F16H *31/00*

U.S. Cl. 74—128 **3 Claims**

1. An intermittent rotation drive apparatus utilizing air pressure comprising:

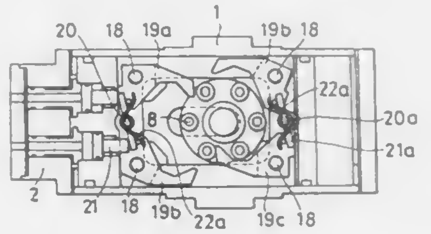
a body receiving a piston capable of reciprocating within said body in response to air pressure;

hole formed in said piston and defined by a large mortise in a substantially central portion of said piston;

a spindle extending through said hole;

a roller housing mounted on said spindle in such a manner as to be rotatable relative thereto, said roller housing having a plurality of rollers disposed around the circumference thereof;

a pair of pawl members pivotally supported by shafts fixed to said piston at positions at which said shafts extend in a direction normal to the direction of movement of said shafts extend in a direction normal to the direction of movement of said piston, said pawl members being adapted to feed said rollers by one pitch during the reciprocation of said piston, thereby causing rotation of said roller housing through a predetermined angle; and



a selector lever supported by the piston and operable by air pressure so as to permit the tip of only one of said pawl members to abut on said rollers when said piston is reciprocated in response to air pressure.

5,020,384

INFINITELY VARIABLE TRACTION ROLLER TRANSMISSION

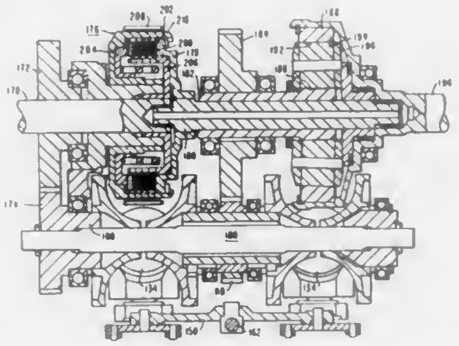
Charles E. Kraus, Austin, Tex., assignor to Excelermatic Inc., Austin, Tex.

Division of Ser. No. 259,043, Oct. 17, 1988, Pat. No. 4,964,312. This application Jul. 25, 1990, Ser. No. 557,464

The portion of the term of this patent subsequent to Dec. 12, 2006, has been disclaimed.

Int. Cl.^{5} F16H *37/06*

U.S. Cl. 74—200 **7 Claims**



1. An infinitely variable traction roller transmission comprising: a housing; coaxial input and output shafts rotatably supported in said housing; a main transmission shaft rotatably supported in said housing in parallel spaced relationship with said input and output shafts, said main transmission shaft being operatively connected to said input shaft for rotation therewith; two toric traction roller transmission structures including outer and inner toric discs disposed on said main shaft and having their axially outer toric discs mounted for rotation with said main transmission shaft and their inner toric discs mounted for rotation with a first hollow transmission shaft surrounding said main transmission shaft between said toric traction roller transmission structures, each of said toric traction roller transmission structures including a plurality of motion transmitting traction rollers in engagement with the toric discs of said each toric traction roller transmission structure, each said traction roller being supported on respective pivot trunnions so as to be rotatable about an axis normal to the respective pivot trunnion

VOL
1127
ISS
1
JE
4
1991
UMI

axis and disposed on opposite sides of a plane defined by the axes of said input and output and said main transmission shafts and including means associated with said trunnions for causing pivoting of said trunnions in order to change the ratio of motion transmission between said outer and inner toric discs; an intermediate shaft rotatably supported between said input and output shafts and having at its one end a disc-shaped clutch structure associated therewith for coupling said intermediate shaft selectively with said input shaft and a brake structure for preventing rotation of said intermediate shaft, said intermediate shaft having at its other end a planetary transmission associated therewith including a ring structure mounted for rotation with said output shaft; a planet carrier mounted for rotation with said intermediate shaft and a sun structure disposed in engagement with the planets of said planetary transmission and being associated with a second hollow transmission shaft rotatably supported on said intermediate shaft and provided with means in engagement with corresponding means on said first hollow transmission shaft for rotation therewith; said disc-shaped clutch structure and said planetary type transmission having a given width and diameter and being arranged such that portions thereof fit between the toric discs of the toric traction roller transmission structures on said main transmission shaft.

5,020,385
MOTOR-VEHICLE GEAR-CHANGE TRANSMISSION

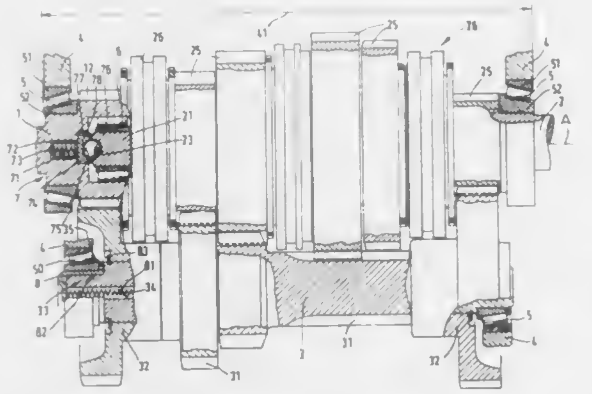
Josef Bader, Friedrichshafen, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Fed. Rep. of Germany

Filed Dec. 26, 1989, Ser. No. 456,383

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1989, 3901755

Int. Cl.⁵ F16H *3/08*

U.S. Cl. 74—333 8 Claims



1. A motor-vehicle transmission comprising:

a housing extending along an axis and having axially spaced front and rear sides;

a main input shaft centered on the axis and having a front end at the front housing side and a rear end spaced axially backward therefrom;

a main output shaft centered on the axis and having a front end at the input-shaft rear end and a rear end at the rear housing side;

a secondary countershaft adjacent the input and output shafts and having front and rear ends respectively at the front and rear housing sides;

a cylindrical-roller bearing supporting the output-shaft front end on the input-shaft rear end for rotation therein, the cylindrical-roller bearing preventing relative radial movement but permitting relative axial movement of the input-shaft rear end and output-shaft front end;

respective roller-type axial-thrust bearings supporting the input-shaft front end, the output-shaft rear end, and one of the ends of the countershaft on the housing;

a main support element between the output-shaft front end and the input-shaft rear end;

formations rotationally coupling the support element to one of the main shafts;

a main spring braced between the one main shaft and the support element and urging same axially against the other main shaft;

a secondary support element between the other end of the countershaft and the housing;

another axial-thrust bearing supporting the secondary support element on the housing;

formations rotationally coupling the secondary support element to the countershaft; and

a secondary spring braced between the countershaft and the secondary support element and urging same axially apart.

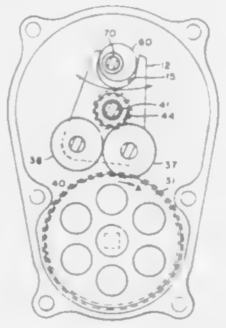
5,020,386
REVERSING MECHANISM FOR A MOTOR DRIVE

Alistair G. Taig, Edwardsburg, Mich., assignor to Allied-Signal Inc., Morristown, N.J.

Filed Nov. 27, 1989, Ser. No. 441,857

Int. Cl.⁵ F16H *35/00*

U.S. Cl. 74—384 18 Claims



1. A reversing mechanism for a motor drive, comprising motor means, shaft means connected with said motor means, first gear means connected with said shaft means and engaging second gear means, the second gear means engageable with a driven gear, third gear means engaging said second gear means, carrier means which carries rotatably said second and third gear means, means for axial shifting connected with said shaft means, the axial shifting means connected with axial means which is biased axially by resilient means, and cam means connected with said axial means and carrier means, so that rotation of said shaft means by said motor means causes said first gear means to rotate said second and third gear means, the second gear means rotating said driven gear when engageable therewith, a cessation of rotation of said shaft means causing said shifting means to shift and effect axial displacement of the axial means which effects rotation of the cam means, rotation of the cam means displacing the carrier means to cause said second gear means to disengage the driven gear and said third gear means to engage said driven gear.

5,020,387
LEVER SHIFTING DEVICE FOR A BICYCLE

Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company, Ltd., Osaka, Japan

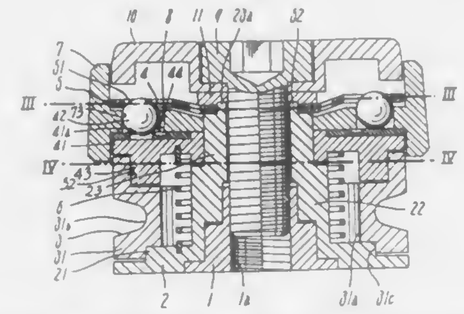
Filed Mar. 5, 1986, Ser. No. 836,420

Claims priority, application Japan, Mar. 7, 1985, 60-45150; Mar. 7, 1985, 60-45151

Int. Cl.⁵ B60K *20/04*

U.S. Cl. 74—475 8 Claims

1. A lever shifting device for operating a derailleur having a return spring, said device comprising a fixing member, an operating lever supported rotatably on said fixing member, a positioning mechanism having a positioning member rotatable in association with said operating lever so as to set the speed change stage of said derailleur, and an auxiliary spring positioned between said fixing member and said positioning member which biases said operating lever in a direction opposite to a biasing direction of said return spring of said derailleur.



5,020,388
WIRE GUIDE APPARATUS FOR WIRE-DRIVEN MECHANISM

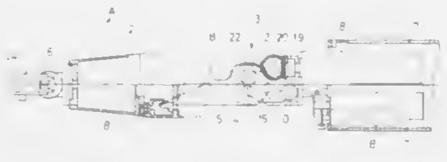
Yuji Maeda, Kashiwa, Japan, assignor to Agency of Industrial Science and Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

Filed Sep. 14, 1990, Ser. No. 582,104

Claims priority, application Japan, Sep. 21, 1989, 1-246091

Int. Cl.⁵ G05G *11/00;* **A61F** *2/58;* **B25J** *11/00*

U.S. Cl. 74—479 1 Claim



1 A wire guide apparatus for a wire driven mechanism, comprising:

an arm stem member provided with first and second drive sources;

an arm end member provided at one end thereof with a hand section driven by said first drive source of said arm stem member via wires;

joint means rotatably coupling the other end of said arm end member and one end of said arm stem member;

a wire gudie pulley rotatably supported at an eccentric position with respect to an elbow position of said arm end member for guiding said wires such that the wires pass through said arm stem member and said arm end member; and

means for causing said arm end member to be bent in said joint means with respect to said arm stem member by said second drive source of said arm stem member;

said wire guide pulley being displaced toward said arm stem member by an amount corresponding to an extent of bending of said arm end member.

5,020,389
CONTROL DEVICE HAVING PUSH TO TURN SELECTOR MEANS AND METHOD OF MAKING THE SAME

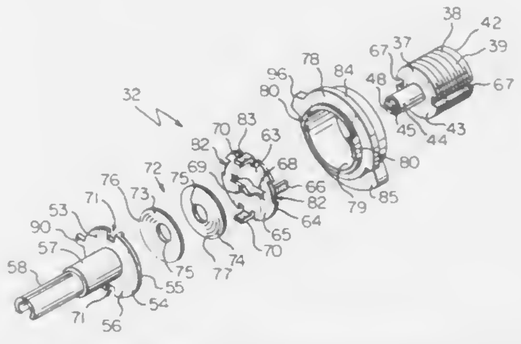
Kent K. Sigler, Youngwood, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Aug. 30, 1989, Ser. No. 400,475

Int. Cl.⁵ G05G *1/10*

U.S. Cl. 74—553 8 Claims

1. In a control device having a push to turn selector means and comprising a support means, a first selector member threadedly carried by said support means so as to be rotatable and axially movable relative thereto, a second selector member rotatably carried by said support means and being axially movable relative thereto, coupling means coupling said selector members together to cause said first selector member to rotate in unison with said second selector member when said second selector member is axially pushed inwardly and then rotated, and spring means disposed between said selector members to tend to maintain said second selector member axially away from said first selector member, the improvement wherein said coupling means comprising a drive plate rotatably carried by said support means intermediate said selector members and having means respectively splined to said selector members to transmit rotatable movement of said second selector member to said first selector member while permitting axial movement of said selector members relative to said drive plate, said drive plate comprising a one-piece member with its spline means, said spline means comprising a plurality of tangs bent relative to said drive plate.



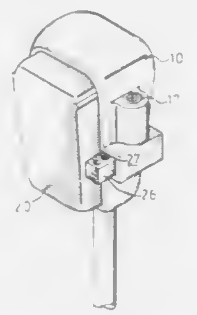
5,020,390
LOCKING MECHANISM FOR AN AUTOMATIC SHIFTER BAR

Yu M. Chang, No. 148-98, Kuang Hua 1st Rd., Kaohsiung, Taiwan

Filed Sep. 11, 1990, Ser. No. 581,571

Int. Cl.⁵ B60R *25/06;* **F16P** *1/00;* **B62D** *1/06*

U.S. Cl. 74—608 1 Claim



1. A locking mechanism for an automatic shifter bar comprising a first cap and a second cap, each having an open end facing each other and each having a notch formed in a bottom plate thereof, said first cap and said second cap being substantially identical in shape, said second cap having a smaller size than that of said first cap, a head portion of said automatic shifter bar being enclosable by said first cap and said second cap, a groove being laterally formed in a side wall of said first cap, a channel being formed in another side wall of said first cap, a lock being provided on said channel, a pin being provided on a lower end of said lock, said pin being insertable into said channel when said lock is depressed to a lock position, a protrusion being formed on an outer surface of a side wall of said second cap and being arranged to be engaged in said groove of said first cap, a block being provided on an outer surface of another side wall of said second cap and being insertable into said channel of said first cap, at least one hole being formed in an upper surface of said block, and said first

VOL 1127
ISS 1
JE 4
1991
UMI

cap and said second cap being locked in a lock position when said lock is depressed downward so that said pin is engaged in either hole of said block, and so that a press button of said automatic shifter bar can not be depressed and so that said automatic shifter bar can not be operated.

5,020,391

APPARATUS FOR CONTROLLING GEARSHIFTS IN AUTOMATIC TRANSMISSION USING THROTTLE AND ENGINE SPEED MAP SCHEDULE

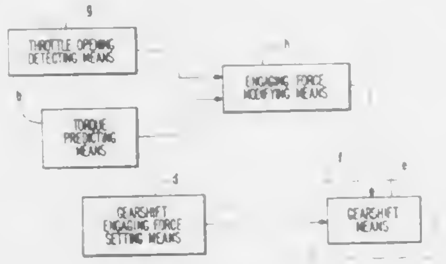
Takashi Aoki; Satoshi Terayama; Yoshihisa Iwaki; Shigeo Ozawa; Toshitaka Imai, and Takamichi Shimada, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 4, 1989, Ser. No. 389,765

Claims priority, application Japan, Aug. 6, 1988, 63-196656; Aug. 6, 1988, 63-196658; Aug. 6, 1988, 63-196660

Int. Cl.⁵ F16H *59/14, 59/46, 59/74*

U.S. Cl. 74—866 **14 Claims**


THROTTLE OPENING DETECTING MEANS
ENGAGING FORCE MODIFYING MEANS
TORQUE PREDICTING MEANS
GEARSHIFT ENGAGING FORCE SETTING MEANS
GEARSHIFT MEANS

1. A gearshift control apparatus for an automatic transmission having power transmitting means providing a plurality of power transmission paths, and a plurality of gearshift means engageable and disengageable to select one of said power transmission paths at a time, said gearshift control apparatus comprising:

engaging force setting means for setting a plurality of gearshift modes according to an accelerator pedal condition and a gearshift type when a gearshift is to be effected and for setting engaging forces for the gearshift means according to the shift modes when the gearshift is to be effected wherein said gearshift modes include a mode (SYU mode) in which the gearshift type is an upshift and the accelerator pedal condition is a power-off condition, a mode (SYD mode) in which the gearshift type is a downshift and the accelerator pedal condition is a power-on condition, a mode (IPU mode) in which the gearshift type is an upshift and the accelerator pedal condition is a power-on condition, and a mode (IPD or EPD mode) in which the gearshift type is a downshift and the accelerator pedal condition is a power-off, and condition said engaging forces being determined based on at least a calculated engine torque (ETQ).

5,020,392

TRANSMISSION RATIO CONTROL SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION

Yosbihiko Morimoto, Mitaka, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 30,032, Mar. 24, 1987, abandnned. This application Nov. 18, 1988, Ser. No. 273,162

Claims priority, application Japan, Mar. 25, 1986, 61-66829; Mar. 31, 1986, 61-73694

Int. Cl.⁵ B60K *41/14*

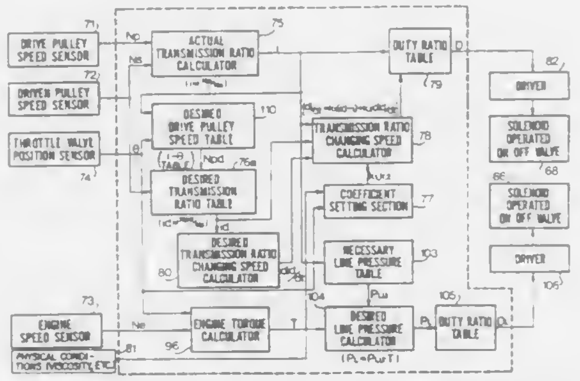
U.S. Cl. 74—866 **14 Claims**

1. In a control system for control operation of a continuously variable transmission for transmitting the power of an internal combustion engine, the transmission comprising a drive pulley having a hydraulically shiftable first disc and a first hydraulic cylinder for operating the disc, a driven pulley having a hydraulically shiftable second disc and a second hydraulic cylinder for operating the second disc, and a belt engaged with both pulleys, the control system including a first hydraulic circuit having a pump for supplying oil to both of said hydraulic cylinders, a transmission ratio control valve having a spool for controlling the oil supplied to the first hydraulic cylinder to change the transmission ratio of the transmission to a desired transmission ratio, and shifting means for shifting the spool, the improvement in the control system comprising

sensing means for sensing operating conditions of the engine and the transmission and for producing condition signals dependent on the conditions,

first means responsive to the condition signals for producing a desired transmission ratio signal and an actual transmission ratio signal,

desired transmission ratio changing speed calculating means responsive to the desired transmission ratio signal for producing a desired transmission ratio changing speed signal,


DRIVE PULLEY SPEED SENSOR
71
DRIVEN PULLEY SPEED SENSOR
72
THROTTLE VALVE POSITION SENSOR
74
ENGINE SPEED SENSOR
73
PHYSICAL CONDITIONS (VISCOSITY, ETC.)
81
Np
Ns
θ
Ne
ACTUAL TRANSMISSION RATIO CALCULATOR
75
DESIRED DRIVE PULLEY SPEED TABLE
110
Npd
76a
DESIRED TRANSMISSION RATIO TABLE
id
DESIRED TRANSMISSION RATIO CHANGING SPEED CALCULATOR
80
ENGINE TORQUE CALCULATOR
96
T
DUTY RATIO TABLE
79
D
TRANSMISSION RATIO CHANGING SPEED CALCULATOR
78
COEFFICIENT SETTING SECTION
77
NECESSARY LINE PRESSURE TABLE
103
Pu
104
DESIRED LINE PRESSURE CALCULATOR
(PL=PuT)
PL
DUTY RATIO TABLE
105
DL
DRIVER
82
SOLENOID OPERATED ON OFF VALVE
68
66
SOLENOID OPERATED ON OFF VALVE
DRIVER
106

transmission ratio changing speed calculating means responsive to the desired transmission ratio, the actual transmission ratio and the desired transmission ratio changing speed signals for producing an actual transmission ratio changing speed signal,

driving means responsive to the actual transmission ratio changing speed signal and the actual transmission ratio signal for operating the shifting means, so as to advance a phase of the control operation for eliminating control delay,

coefficient setting means for producing a first coefficient signal in relation to an opening degree of a throttle valve of the engine and a second coefficient signal in relation to a physical condition of the system, and

said transmission ratio changing speed calculating means being further responsive to said coefficient signals.

5,020,393

HYDRAULIC CONTROLLER FOR AN AUTOMATIC TRANSMISSION

Yoshinari Kuwayama; Masahiko Ando, and Yoichi Hayakawa, all of Aichi, Japan, assignors to Aisin AW Kabushiki Kaisha, Japan

Filed Jun. 27, 1990, Ser. No. 544,692

Claims priority, application Japan, Jun. 29, 1989, 1-167516

Int. Cl.⁵ B60K *41/06*

U.S. Cl. 74—869 **12 Claims**

2. A hydraulic controller for an automatic transmission for establishing a low transmission speed, an intermediate transmission speed, and a high transmission speed having

a planetary gear unit, and

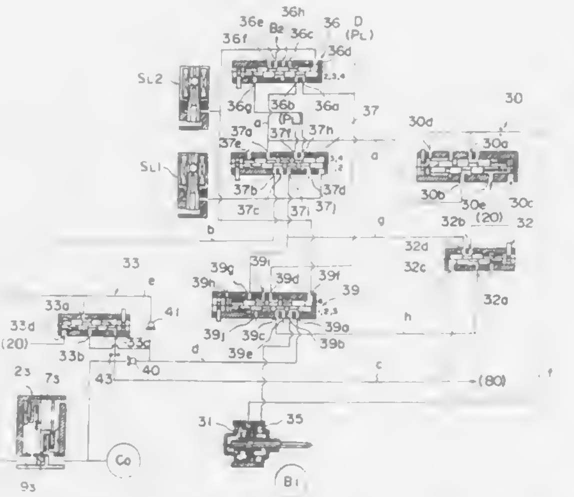
a plurality of frictional engagement elements for establishing a transmission speed by engaging or disengaging an element of a planetary gear unit, having a band brake with a brake engaging hydraulic chamber and a brake releasing hydraulic chamber for establishing the low and high transmission speeds by engaging the element of the planetary gear unit and establishing the intermediate transmission speed by disengaging the element of the planetary gear unit, said element of the planetary gear unit being stopped from rotating in the self-binding direction at the low transmission speed and rotating against the self-binding direction at the intermediate and high transmission speeds by engaging another frictional engagement element of the plurality of frictional engagement elements;

said hydraulic controller comprising:

an oil pressure source,

a primary regulator valve connected to the oil pressure source for regulating a line pressure,

a shift valve device provided between the primary regulator valve and the brake releasing hydraulic chamber for connecting the brake releasing hydraulic chamber to the primary regulator valve at the intermediate transmission speed and disconnecting the brake releasing hydraulic chamber from the primary regulator valve, and



a modulator valve device provided between the primary regulator valve and the brake engaging hydraulic chamber for supplying a line pressure to the brake engaging hydraulic chamber at a transmission speed other than the low and intermediate transmission speeds and supplying a modulated pressure from the line pressure therethrough to the brake engaging hydraulic chamber at the low and intermediate transmission speeds,

whereby the element of the planetary unit is not engaged with the band brake by the modulated pressure supplied to the brake engaging hydraulic chamber but rotating against the self-binding direction when the modulated pressure is supplied to the brake engaging hydraulic chamber and the brake releasing hydraulic chamber is disconnected from the primary regulator valve by the shift valve device.

5,020,394

POLYCRYSTAL DIAMOND FLUTED TOOL AND A PROCESS FOR THE PRODUCTION OF THE SAME

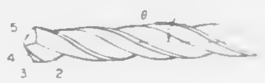
Tsutomu Nakamura, and Tetsuo Nakai, both of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

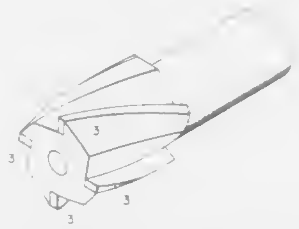
Filed Oct. 12, 1989, Ser. No. 420,483

Claims priority, application Japan, Oct. 14, 1988, 63-257359

Int. Cl.⁵ B23B *27/20, 27/18*

U.S. Cl. 76—108.6 **18 Claims**





1. A polycrystal diamond fluted tool, in which at least a part of the rake face of a fluted tool base metal of a cemented carbide alloy is brazed with a polycrystal diamond film synthesized by a vapor phase method to form a cutting edge.

5,020,395

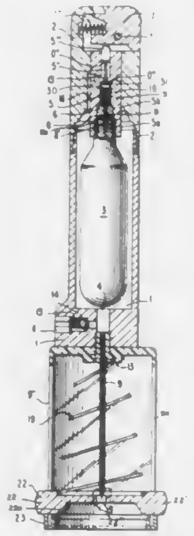
PRESSURIZED CORK-REMOVAL APPARATUS FOR WINE BOTTLES AND OTHER CONTAINERS

Edward R. Mackey, 28 Nottingham Rd., Dracut, Mass. 01826

Continuation of Ser. No. 278,980, Dec. 1, 1988, abandoned, which is a continuation-in-part of Ser. No. 222,163, Jul. 21, 1988, which is a continuation of Ser. No. 2,871, Jan. 13, 1987, abandoned. This application Apr. 13, 1990, Ser. No. 509,315

Int. Cl.⁵ B67B *7/08*

U.S. Cl. 81—3.2 **9 Claims**



1. In an apparatus for removing a stopper from a container, said apparatus being of the type including a gas cylinder for the storage of gas under pressure, hollow needle means for piercing the stopper and injecting gas into the container thereby to pressurize the container and eject the stopper, and gas passage means for establishing a gas flow path from the gas cylinder to

VOL
1127
ISS
1
JE
4
1991
UMI

said hollow needle means, the improvement of pressure actuated valve assembly means comprising:

- A. valve body means interposed in the gas passage means, said valve body means including:
  - i. valve seat means formed in one portion of said valve body means for defining a valve body sealing surface, and
  - ii. valve body passage means for conveying gas from said valve seat means to said hollow needle means.
- B piston-driven valve means for controlling the flow of gas under pressure from the gas cylinder to the hollow needle means, said piston-driven valve means having:
  - i. actuator stem means extending through said valve body passage means to terminate at a free end, said actuator stem means guiding said valved means between sealing and open positions, and
  - ii. piston means connected to the other end of said actuator stem means, said piston means being located upstream of and overlying substantially all of said valve seat means,
- c. sealing means carried on said actuator stem means for being interposed between said piston means and said valve seat means for effecting a seal with said valve seat means, and
- D actuator means for engaging said free end of said actuator stem means to move said valve means to an open position whereby the gas passes through said gas passage means to the hollow needle means, said valve means being moved to the sealing position when said actuator means is released, gas pressure acting on said piston means providing the dominant force for displacing said piston toward said valve seat means and producing a seal by forcing said piston means and said sealing means against said valve seat means.

5,020,396

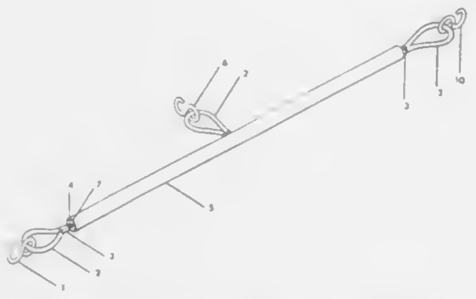
CHAIN LUMPER

Mark M. Dunn, 4462 S. 1720 West, Roy, Utah 84067

Filed Feb. 17, 1989, Ser. No. 281,742

Int. Cl.⁵ B60C *27/06*

U.S. Cl. 81—15.8 2 Claims



1. A tire chain applying tool for applying tire chains to one or more tires mounted on wheels in a set comprising:

- an elongated tube-like member having an opening transverse to the axis of the elongated tube-like member spaced equidistant from both ends of the elongated tube-like member;
- an elongated flexible member passing from one end of the elongated tube-like member continuously through the opening and on through the other end of the elongated tube-like member;
- portions of the elongated flexible member extending from the one end, the opening, and the other end being formed into loops to prevent the elongated flexible member from dislodging from the elongated tube-like member;
- hook means secured to each of the formed loops;
- wherein the tool is placed internally of the wheels and the tire chain is secured to each of the hooks so that upon rotation of the tire and wheel, the tire chain is wound onto the tire.

5,020,397

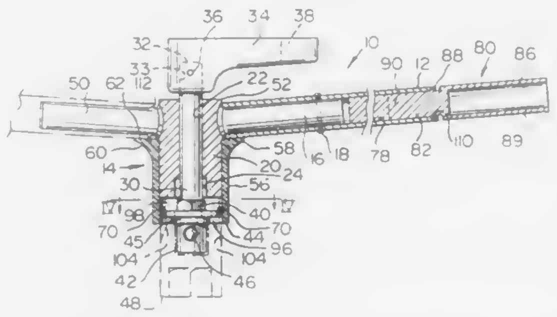
WRENCH

Paul G. Minuto, 66 Mount Pleasant, P.O. Box 1904, Hudson, Quebec, Canada J0P 1H0

Continuation of Ser. No. 309,987, Feb. 13, 1989, abandoned, which is a continuation of Ser. No. 184,987, Apr. 22, 1988, abandoned. This application Oct. 16, 1989, Ser. No. 429,468

Int. Cl.⁵ B25B *13/00*

U.S. Cl. 81—58.1 10 Claims



1. A wrench comprising:

- hub means having a bore therethrough;
- means secured to said hub means defining a first elongate handle means;
- shaft means having a portion within said bore, said shaft means having fastener drive means connected to one end thereof and second handle means connected to the other end thereof, said shaft means being adapted for rotation and axial movement relative to said hub means;
- said shaft means and hub means having complementary engaging means, whereby said shaft means may be selectively engaged to said hub means in a first position for rotation therewith by said first handle means to develop a first torque, or a second position disengaged from said hub means for rotation relative to said hub means by said second handle means to develop a second lesser torque;
- shield means secured to said hub means and having a skirt extending axially in the direction of said fastener drive means, said shaft means and skirt having cooperating detent means outside said hub means for positively locating said shaft means relative to said hub means in said first or second positions.

5,020,398

HOLLOW ENDED FOUR-WAY SOCKET WRENCH

James M. Leu, 159 Thornhurst, Bolingbrook, Ill. 60439

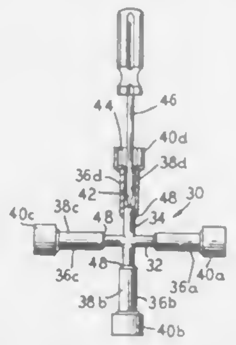
Continuation of Ser. No. 467,352, Jan. 23, 1990, abandoned, which is a continuation of Ser. No. 317,579, Mar. 1, 1989, abandoned. This application Nov. 27, 1990, Ser. No. 618,811

Int. Cl.⁵ B25B *13/00*

U.S. Cl. 81—124.4 6 Claims

1. A four-way socket wrench comprising:

- (a) two cross bar members operatively joined together so as to form an x shape having four axial ends, each cross bar member having a longitudinal axis, said cross bar members being joined so that a force applied to one of said cross bar members imparts torque to the other of said cross bar members to cause same to rotate about its longitudinal axis;
- (b) a socket member located at each axial end of each cross bar member, said socket member including a socket head and a tubular member, said tubular member having rigidly connected between said socket head and said axial end of said cross bar member, said socket head including an opening adapted to conform to the shape of a lug nut, and tubular member having a bore therein in communication with said opening of said socket head so as to define a continuous opening in the socket head and said tubular member, said socket member adapted to receive therein a rigid member extending, in succession, through said opening in said socket head and said bore, said bore having a uniform diameter and being of a size and depth wherein the depth is at least three times the diameter of said bore so that when said rigid member is fully inserted in said bore, said rigid member is held substantially in alignment with said longitudinal axis and free of contact with said socket head thereby to extend the length of the cross bar member attached to the socket member in which said rigid member is received so as to increase the torque imparted to an adjacent orthogonal disposed socket head of said cross bar members.



5,020,399

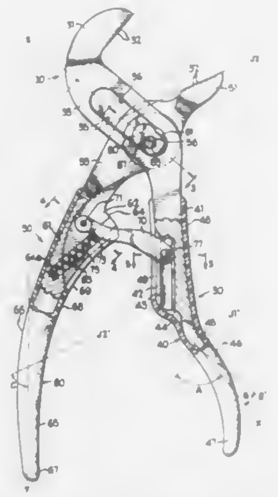
SELF-ADJUSTING PLIERS WITH CURVED HANDLES

Jeffrey R. Annis, Waukesha, and Daniel M. Eggert, Kenosha, both of Wis., assignors to Snap-On Tools Corporation, Kenosha, Wis.

Filed Mar. 12, 1990, Ser. No. 491,957

Int. Cl.⁵ B25B *7/12*

U.S. Cl. 81—358 20 Claims



1. In self-adjusting pliers including two elongated handle members having opposed respective jaw portions and handle portions, and means interconnecting the handle members so that an initial manual closing action of the handle members when they are in a normally open condition causes a point on one handle member to move slidably with respect to the other handle member along a sliding axis for moving the jaw portions toward each other to grip a workpiece, and then a further manual closing action of the handle members halts the sliding movement and causes the handle members to pivot relative to each other about the point, the improvement comprising: the handle portion of one of the handle members including an inclined section engageable with the hand of a user and extending at an angle with respect to the sliding axis in the range of from about +30 degrees to about −30 degrees.

5,020,400

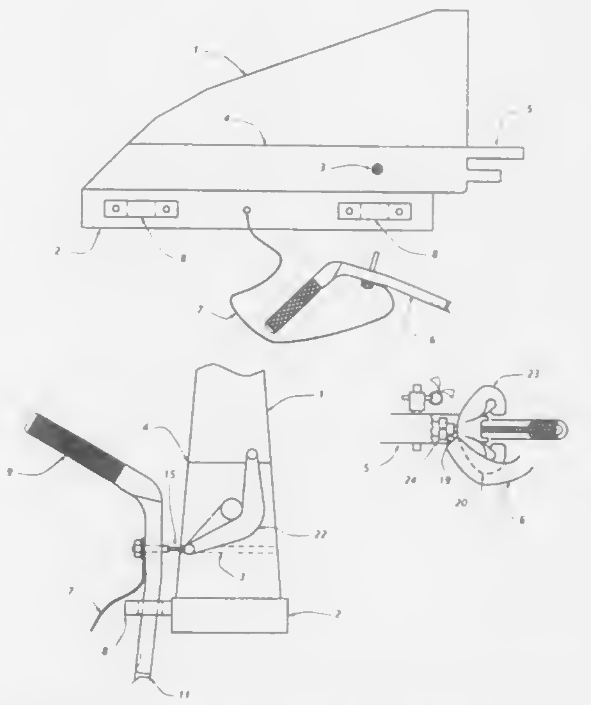
WING FOLDING TOOL

Robert E. Sylvia, Woodford, and Thomas E. Dillard, Fredericksburg, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 26, 1989, Ser. No. 456,884

Int. Cl.⁵ B25B *33/00*

U.S. Cl. 81—484 5 Claims



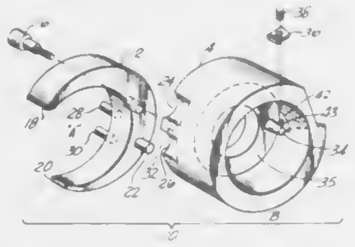
1. A tool for unlocking a wing deployment mechanism inside a missile's foldable wings which are mounted on a mounting bar and for removing a release link from the wing's lanyard release assembly, comprising:

- an angled shaft having a front and aft end and a top and bottom face;
- a handle composing said aft end of said angled shaft;
- a bolt with its lower threads removed, said bolt protruding through said bottom face to said top face and secured to said angled shaft, said bolt sized to engage the wing deployment mechanism on the wing;
- a U-shaped bracket bolted onto the mounting bar directly beneath the wing deployment mechanism.

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,401
UNIVERSAL PLASTIC-PIPE TOOL

Stephen L. Jiles, 1513 Dogwood, Anaheim, Calif. 92801
Filed Oct. 13, 1989, Ser. No. 421,161
Int. Cl.^{5} B23B *3/22*
U.S. Cl. 82—113 **9 Claims**

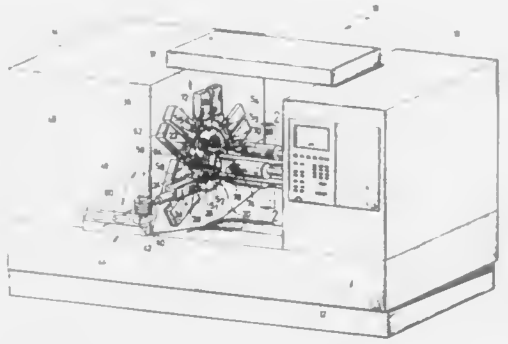


1. A universal tool for use with plastic pipes, including:
a cylindrical chamfer element having a base ring and a cylindrical wall coaxial therewith and extending therefrom, said cylindrical wall having an inner surface defining an axially-positioned pipe-receiving opening and an outer surface, the axes of said base and wall forming the axis of said chamfering element;
a ledge on the exterior of said wall extending from the outer surface of said wall toward its inner surface;
a through slot in said wall intersecting said ledge;
a tapered pin defining a longitudinal axis and mounted on said base ring proximate said slot, said pin extending from said base ring, with the longitudinal axis of said pin parallel to the axis of said chamfering element and spaced from the inner surface of said cylindrical wall by a distance approximately the thickness of the wall of a plastic pipe to be chamfered and with the longitudinal axis of said pin being spaced from the axis of said chamfering element; and
a cutting element supported on said ledge and extending partially through said slot, to present a cutting edge that extends into said opening at the desired chamfering angle; whereby, upon insertion of a pipe to be chamfered into said pipe-receiving opening and rotation thereof while under axial pressure, the end of the pipe being chamfered is urged by said tapered pin into forceful engagement with said cutting edge and is chamfered by said edge.

5,020,402
METHOD AND APPARATUS FOR MACHINING BOTH SIDES OF WORKPIECES

Helmut F. Link, Aichwald, and Günther Trautmann, Kirchheim-Nabern, both of Fed. Rep. of Germany, assignors to Index-Werke KG, Esslingen, Fed. Rep. of Germany
PCT No. PCT/DE87/00459, § 371 Date Jun. 3, 1988, § 102(e) Date Jun. 3, 1988, PCT Pub. No. WO88/02678, PCT Pub. Date Apr. 21, 1988
PCT Filed Oct. 9, 1987, Ser. No. 221,456
Claims priority, application Fed. Rep. of Germany, Oct. 9, 1986, 3634363; Mar. 24, 1987, 3709668
Int. Cl.^{5} B23Q *7/04*
U.S. Cl. 82—124 33 Claims

32. Multiple-spindle automatic machine tool for machining both sides of workpieces, comprising:
a machine housing;
a working area within said machine housing;
a spindle drum comprising several spindles, said spindles facing said working area and having spindle axes which are parallel to each other and are arranged at equal angular spacings around a drum axis, said spindles being positionable in different spindle positions fixedly arranged with respect to said machine housing by rotating said spindle drum, said spindle drum being indexable in single steps for positioning each spindle in the subsequent spindle position, said spindles being designed as successive first and second spindles for clamping the workpieces on a first or second clamping side, respectively,
at least one of said spindle positions being selected to be used for feeding of raw workpieces to said spindles, removal of finished workpieces from said spindles and changing over of half-finished workpieces from a first spindle to a second spindle, said respective spindle in said selected spindle position being a selected spindle;
feeding means associated with said selected spindle for delivering raw workpieces to a feeding position;
conveying away means associated with said selected spindle for conveying finished workpieces away from a removing position;
at least one workpiece holding device facing said working area and being arranged opposite said selected spindle in said selected spindle position;
at least one workpiece gripping device being movable into a workpiece gripping position facing said selected spindle in said selected spindle position for feeding or removing workpieces from said selected spindle, into a workpiece changing position facing said workpiece holding device for exchanging a workpiece with said workpiece holding device, into said feeding position for taking over a workpiece from said feeding means, and into said removing position for passing a workpiece to said conveying away means;

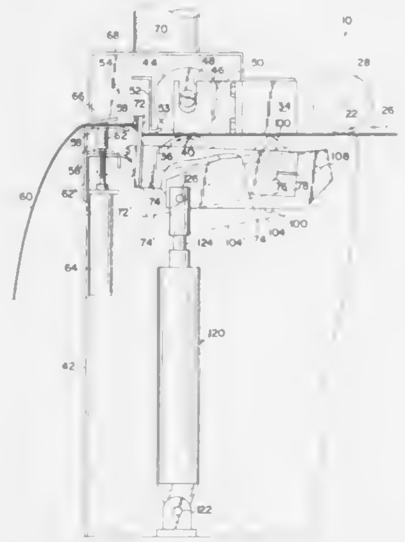


means for controlling said machine tool; comprising:
loading mode means for transferring a raw workpiece from said feeding position to said one of said first spindles in said at least one selected spindle position using said workpiece gripping device;
changing over mode means for removing a half-finished workpiece from said first spindle in said at least one selected spindle position for turning said workpiece around from said first clamping side to said second clamping side using said workpiece gripping device in cooperation with said workpiece holding device, for indexing said spindle drum bringing one of said second spindles into said at least one selected spindle position, for reinserting said half-finished workpiece with said second clamping side in said second spindle in said at least one selected spindle position; and
unloading mode means for transferring said finished workpiece from said second spindle in said at least one selected spindle position to said removing position using said workpiece gripping device.

5,020,403
WEB FEEDING, CUTTING AND DISPENSING MACHINE

Joseph J. D'Angelo, 378 Annette Ct., Wycoff, N.J. 07481, and Joseph J. D'Angelo, Jr., 2 Summit Ave., Pompton Lakes, N.J. 07442
Filed Jun. 20, 1989, Ser. No. 368,833
Int. Cl.^{5} B26D *9/00*
U.S. Cl. 83—171 10 Claims

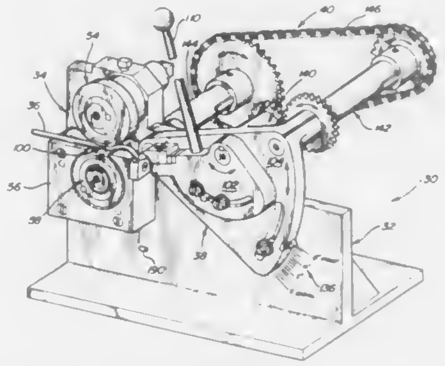
1. A web feeding cutting and dispensing machine having a frame with back, front and left and right sides, said machine being capable of being turned "ON" comprising:
roll support means for supporting a roll of a web for supplying the web to be fed in a downstream direction along a predetermined path for exiting from the front of the machine,
a first rotatable feed roll positioned adjacent to said path for continually contracting the web,
drive means coupled to said first feed roll continually rotating said first feed roll in contact with the web for applying to the web a continual force urging the web in said downstream direction along said path for causing an end of the web to exit from the front of the machine,
feed means on an opposite side of said web from said first feed roll and in position opposed to said first feed roll for keeping the web in contact with said continually rotating first feed roll,
clamp means positioned along said path upstream from said first feed roll,
said clamp means being movable to a clamping position for clamping the web for holding the web stationary in spite of said continual force resulting from continual rotation of said first feed roll,
said clamp means also being movable to a release position for allowing the web to move in said downstream direction along said path in response to said continual force,



a pneumatic clamp cylinder connected to said clamp means for moving said clamp means into said clamping and releasing positions,
said pneumatic clamp cylinder having two ends into which air flow can be fed, one end being a clamping end for air flow into said clamping end moving said clamp means into said clamping position, and the other end being a releasing end for air flow into said releasing end moving said clamp means into said releasing position,
cut means positioned along said path downstream from said first feed roll,
said cut means being movable in a cutting stroke passing through said path for cutting off from the web a portion of the web including its end which has exited from the front of the machine for dispensing a cut sheet from the front of the machine,
said cut means also being movable in a retraction stroke for clearing the path while the web is being fed downstream,
a pneumatic cut cylinder connected to said cut means for moving said cut means in said cutting stroke and in said retraction stroke,
said pneumatic cut cylinder having two ends into which air flow can be fed, one end being a cutting end for air flow into said cutting end moving said cutting means in said cutting stroke, and the other end being a retraction end for air flow into said retraction end moving said cutting means in said retraction stroke,
a pneumatic control system including solenoid-actuated valve means having a first condition for feeding air flow to said clamping end and cutting end and having a second condition for feeding air flow to said releasing end and retraction end,
throttling means associated with said cutting end of said cut cylinder for relatively throttling air flow to said cutting end in relation to relatively freer air flow to said clamping end of the clamp cylinder for causing the clamp cylinder to move said clamp means into its clamping position for clamping the web for holding the web stationary before the cut cylinder moves the cut means in its cutting stroke for cutting off a cut sheet from the web, and
throttling means associated with said releasing end of said clamp cylinder for relatively throttling air flow to said releasing end in relation to relatively freer air flow to said retraction end of said cut cylinder for causing the cut cylinder to move said cut means in its retraction stroke before the clamp cylinder moves the clamp means into its releasing position for allowing the web to be fed downstream by said continually rotating lower feed roll.

5,020,404
TESTING APPARATUS FOR STRAND PELLETIZING OPERATION

James A. Hoeh, 33 N. Seventh St., Sebewaing, Mich. 48759
Filed Jun. 30, 1989, Ser. No. 374,538
Int. Cl.^{5} B26D *1/58*
U.S. Cl. 83—298 **11 Claims**

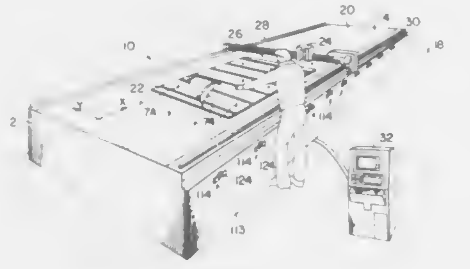


1. A manually activated apparatus for simulating automatic cutting of plastic strands comprising:
a mounting frame;
a feed roller rotatably coupled with said mounting frame;
a pinch roller rotatably coupled with said mounting frame and positioned adjacent to said feed roller such that a feed plane is defined between said rollers;
a stationary cutter associated with said mounting frame;
oscillating cutter means associated with said mounting frame, said oscillating cutter means positioned with respect to said stationary cutter such that strands are adapted to be severed as the oscillating cutter means moves by said stationary cutter said oscillating cutter means being adjustably positioned to a plurality of different cutting positions enabling the oscillating cutter means to pass through a plurality of different cutting paths with respect to said stationary cutter; and
transmission means adapted for providing simultaneous movement of said oscillating cutter means and said feed roller for feeding said strands between said stationary cutter and oscillating cutter means, said transmission means being manually actuated.

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,405
APPARATUS WITH MOVEABLE PINS FOR SPREADING AND CUTTING LAYUPS OF SHEET MATERIAL

Lawrence S. Wolfson, West Hartford; Kevin A. Pearl, Manchester, and Russell M. Moskwa, Mansfield Center, all of Conn., assignors to Gerber Garment Technology, Inc., Tolland, Conn.
Filed May 17, 1990, Ser. No. 525,870
Int. Cl.^{5} B26D *7/02*
U.S. Cl. 83—374 **12 Claims**



5. In an apparatus for spreading and cutting layups of sheet material, the combination comprising:

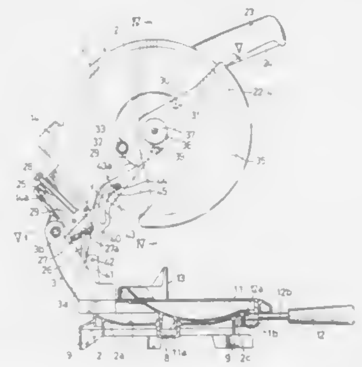
a table having a top structure providing a generally upwardly facing supporting surface and having first and second side edges extending longitudinally of the table, said supporting surface consisting of a plurality of surface sections arranged next to one another along the length of said supporting surface,
a plurality of pin mechanisms associated with each of said surface sections, each of said pin mechanisms including a generally vertical pin with a pointed upper end portion and which pin is moveable vertically between a raised position at which said upper end portion extends upwardly from said supporting surface and a lowered position at which said upper end portion is located entirely below said supporting surface,
means for moving the pins of the plurality of pin mechanisms of each surface section in unison between their raised and lowered positions, said means including a manually operable control element located adjacent said first side edge of said table-top structure,
an X-carriage extending transversely over said supporting surface and moveable longitudinally thereof,
a cutter supported on said X-carriage and moveable longitudinally of said X-carriage for cutting sheet material spread on said supporting surface, and
means responsive to the position of said X-carriage longitudinally of said supporting surface for causing the pins of the pin mechanisms located in the vicinity of said X-carriage to be moved to their lowered positions so that during cutting of sheet material spread on said supporting surface by said cutter the possibility of said cutter striking any of said pins is avoided.

5,020,406
MITER SAW

Katsuhiko Sasaki, and Hisashi Higuchi, both of Anjo, Japan, assignors to Makita Electric Works, Ltd., Anjo, Japan
Filed Jul. 6, 1990, Ser. No. 549,072
Claims priority, application Japan, Jul. 7, 1989, 1-176410
Int. Cl.^{5} B23D *45/04*
U.S. Cl. 83—397 **6 Claims**

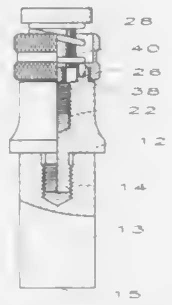
1. A miter saw comprising:

a base on which a workpiece is placed;
a miter saw unit substantially vertically pivotally mounted on said base;
drive means supported by said miter saw unit for driving a rotary tool;
a blade case mounted on said miter saw unit and partly covering said rotary tool so as to provide an exposed operational portion of said rotary tool;
a safety cover pivotally mounted on said blade case for covering the exposed operational portion of said rotary tool;
an actuating link having a slot formed substantially in the central portion thereof, one end of said actuating link being pivotally connected with said base, while the other end of said actuating link being engaged with said safety cover; and
a guide member mounted on said blade case and being engaged with said slot of said actuating link;
whereby said safety cover is pivoted to uncover the exposed operational portion of said rotary tool in association with the movement of the engaging position of said slot with said guide member as said miter saw unit is pivoted downwardly toward said base.



5,020,407
ADJUSTABLE FORM TOOL HEAD

Charles P. Brinlee, 205 E. Harmon, #709, Las Vegas, Nev. 89109
Continuation-in-part of Ser. No. 194,825, May 17, 1988, abandoned. This application Dec. 13, 1989, Ser. No. 450,269
Int. Cl.^{5} B26F *1/14*
U.S. Cl. 83—530 **6 Claims**

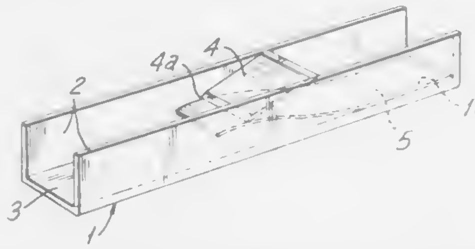


1. A form tool head assembly, comprising:

a punch head base adapted to be rigidly coupled to a form tool body,
a punch driver having a capped head on its upper end and a threaded portion on its lower end with the threaded portion being threadable into a threaded bore in the punch head base to a variable depth,
a length control member mounted on the punch driver intermediate the punch head base and the capped head portion of the punch driver,
the length control member comprising an annular collar having a central aperture through which the punch driver projects,
the annular collar aperture being shaped to slidably and non-rotatably fit over a complementary portion of the punch driver beneath the capped head of the latter,
whereby rotation of the annular collar in clockwise or counterclockwise directions will result in threaded longitudinal movement of the punch driver relative to the punch head to either shorten or lengthen the length of the form tool head assembly depending on the chosen direction of rotation,
the annular collar having a first position on the punch driver in which it is operable to cause punch driver longitudinal adjustment movement and a second position on the punch driver in which it locks the punch driver against longitudinal adjustment movement.

5,020,408
TOOL FOR OBLIQUELY SEVERING FLOWER STEMS

Gert Idema, Penninghoek 1, 4331 PN Middelburg, Netherlands
Filed Feb. 16, 1990, Ser. No. 483,033
Claims priority, application Netherlands, Feb. 16, 1989, 8900379
Int. Cl.^{5} B26B *27/00;* **A01G** *5/00*
U.S. Cl. 83—446 **3 Claims**



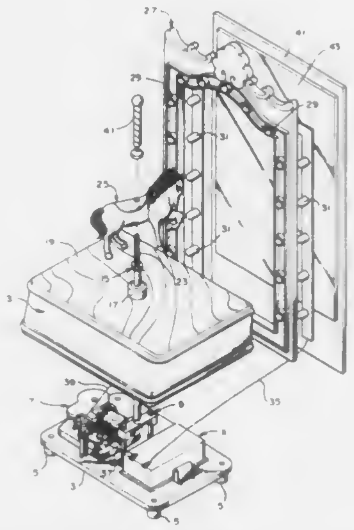
1. A tool for obliquely severing flower stems, comprising a housing having a passage for inserting a flower stem to be severed thereinto; a cutting blade extending between two opposing side walls defining with a bottom wall of said housing said passage, said cutting blade having a cutting edge projecting in a direction of insertion of a flower stem and extending obliquely towards said bottom wall, and wall portion means provided on said bottom wall, said cutting blade and said wall portion means being mounted in said housing one relative to the other such that said cutting blade and said wall portion means are at a minimal distance from each other when the tool is in a non-use condition but are permitted to spread away from each other against a slight spring force of said wall portion means acting on a stem when a stem to be severed is inserted into said passage.

5,020,409
ORNAMENTAL DISPLAY ASSEMBLY

Jack Hou, P.O. Box 78-5, Taipei, Taiwan
Filed Jan. 25, 1990, Ser. No. 471,832
Int. Cl.^{5} G10F *1/06*
U.S. Cl. 84—95.2 **7 Claims**

1. An ornamental display assembly comprising:

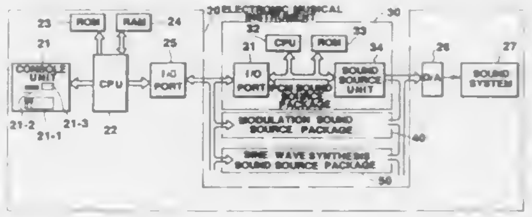
(a) a windup music box mechanism having a rotary power output shaft;
(b) a tappet rod having first and second ends;
(c) transmission means connected to the power output shaft for imparting a corresponding movement to the tappet rod in response to rotation of the power output shaft and including a cam member mounted on the power output shaft, an eccentric cam element carried by the cam member, a cam follower engaged by the cam element for raising and lowering the cam follower, means for guiding the movement of the cam follower, and the first end of the tappet rod being secured to the cam follower;
(d) a base unit, the power drive source and transmission means being supported on the base unit;
(e) a casing carried by the base unit, the casing enclosing the power drive source and transmission means, the first end of the tappet rod being disposed interiorly of the casing and the second end of the tappet rod being disposed exteriorly of the casing for mounting an ornament thereon; and



(f) a mirror secured to a rear portion of the casing and extending vertically therefrom for reflecting the image of the ornament.

5,020,410
SOUND GENERATION PACKAGE AND AN ELECTRONIC MUSICAL INSTRUMENT CONNECTABLE THERETO

Hiroyuki Sasaki, Fussa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Oct. 20, 1989, Ser. No. 424,893
Claims priority, application Japan, Nov. 24, 1988, 63-294592
Int. Cl.^{5} G10H *7/00, 1/00*
U.S. Cl. 84—602 **15 Claims**



1. A sound source package connectable to an electronic musical instrument from outside of the electronic musical instrument, comprising:

sound source means for outputting a sound signal; and
timbre editing program storing means for storing a timbre editing program for transfer to said electronic musical instrument so that timbre parameters defining a timbre of a sound signal to be output from said sound source means can be edited by operation of the electronic musical instrument.

5,020,411
MOBILE ASSAULT LOGISTIC KINETMATIC ENGAGEMENT DEVICE

Larry Rowan, 3440½ Caroline Ave., Culver, Calif. 90230
Filed Mar. 6, 1989, Ser. No. 277,122
Int. Cl.^{5} F41B *15/00*
U.S. Cl. 89—1.11 **12 Claims**

1. An automated, independently targetable extra-vehicular platform including:

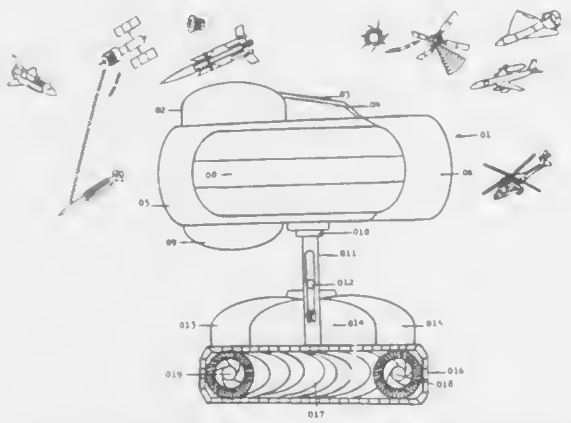
a plurality of propulsion engines carried by said platform, each of said engines including an array of plasma induc-

VOL
1127
ISS
1
JE
4
1991
UMI

tion motors, each of said plasma induction motors being coupled to a silicon nitride sintered turbine; energy weapons carried by said platform;

programmed control means coupled to said propulsion engines and to said energy weapons for controlling the direction and magnitude of the thrust from said propulsion engines and for firing said energy weapons, all in accordance with an operational program in said programmed control means; and,

a source of electrical power carried by said platform and electricity coupled to said propulsion engines, to said energy weapons and to said programmed control means for operating the same.



5,020,412
MISSILE LAUNCHER

Thomas P. Adams, Havant, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

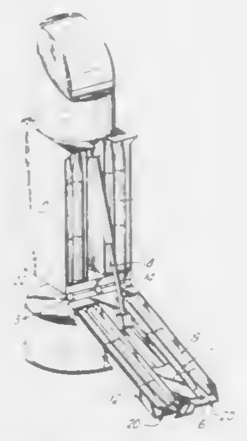
PCT No. PCT/GB89/00067, § 371 Date Jun. 20, 1990, § 102(e) Date Jun. 20, 1990, PCT Pub. No. WO89/06777, PCT Pub. Date Jul. 27, 1989

PCT Filed Jun. 19, 1989, Ser. No. 488,077

Claims priority, application United Kingdom, Jan. 20, 1988, 8801311

Int. Cl.^{5} F41F *3/04*

U.S. Cl. 89—1.805 14 Claims



1. A ship's projectile launcher comprising:

(a) a projectile magazine (**10**) having walls defining an enclosure for storing projectiles and one wall member (**12, 33, 34**) adapted to locate projectiles (**19**) in a firing position;

(b) means (**41, 42**) to move projectiles from the stored position to the firing position; and

(c) a plinth mounting (**11**) cooperating with the magazine such that, in use, the magazine is rotatable about an axis parallel to the longitudinal axes of the projectiles;

the arrangement being such that the magazine wall member (**12, 33, 34**) is rotatable about an axis perpendicular to the magazine rotation axis and a means (**18, 36, 37**) for moving the wall member between the closed and a pivotally rotated open position whereby the projectiles in the firing position may be directed towards a target.

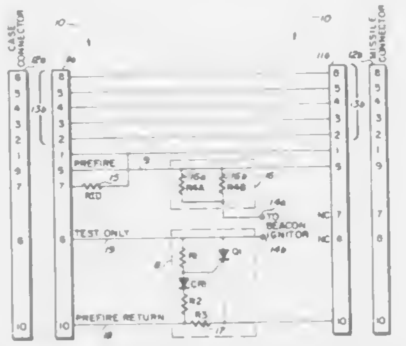
5,020,413
THERMAL BEACON IGNITOR CIRCUIT

Richard W. Oaks, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 30, 1989, Ser. No. 400,599

Int. Cl.^{5} F41F *3/04*

U.S. Cl. 89—1.814 5 Claims



1. In a missile system of the type including a missile disposed within a missile launching case and requiring electrical current during a pre-launch period, the improvement comprising:

(a) monitor means for monitoring the electrical current of said missile during said pre-launch period;

(b) a thermal beacon; and,

(c) activator means responsive to said monitor means for activating said thermal beacon within said missile during said pre-launch period when the electrical current of the missile decreases to a predetermined level.

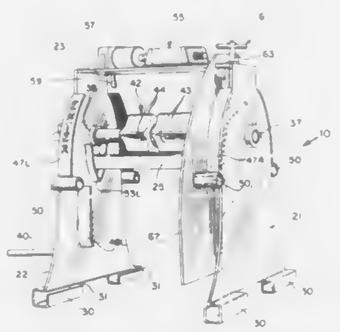
5,020,414
PORTABLE AMMUNITION COUNTER

Mark A. Cook, Orlando, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 6, 1990, Ser. No. 506,416

Int. Cl.^{5} F41A *9/79*

U.S. Cl. 89—33.16 5 Claims



1. A portable counter for belted ammunition contained in linked tubes of a flexible ammunition carrier, comprising:

(a) a pair of upright wall members and a top plate holding said upright wall members in preselected spaced relationship to each other, said upright wall members and said top plate defining an entrance side and an exit side for said counter for feeding said flexible ammunition carrier therethrough;

(b) a rotatable paddle wheel disposed between said upright wall members and defining a passageway between said paddle wheel and said top plate from said entrance side to said exit side of said counter, said paddle wheel including a plurality of paddles sized and spaced to engage spaces between adjacent tubes of said flexible ammunition carrier and thereby carry said flexible ammunition carrier through said passageway from said entrance side to said exit side with rotation of said paddle wheel; and

(c) mechanical counting means including means for contacting said tubes of said flexible ammunition carrier and counting said tubes as said flexible ammunition carrier is carried through said passageway with the rotation of said paddle wheel.

5,020,415
TANKS

Sven Lindberg, Degerfors, Sweden, assignor to Aktiebolaget Bofors, Bofors, Sweden

Filed Oct. 12, 1989, Ser. No. 420,430

Claims priority, application Sweden, Oct. 12, 1988, 8803614

Int. Cl.^{5} F41A *9/13*

U.S. Cl. 89—46 14 Claims

1. In a tank having an overlying gun and a loading pendulum, the gun being pivotably mounted in a cradle which is disposed on a revolvable portion of the tank, and the loading pendulum pivotably mounted on a ring member rotatable with respect to the revolvable portion with a pivotal center of the pendulum being offset from a pivotal center of the gun;

a device for adjustably mounting the gun with respect to movements of the loading pendulum having a journal that maintains a fixed distance with respect to a central revolving axis of the revolvable portion of the tank, said device comprising:

means effecting elevation/depression movements of the gun with respect to the tank;

means for controlling retraction of the gun, cooperating with said means for effecting the elevation/depression movement;

means for longitudinal/vertical displacement of the gun in the plane of elevation at different elevation/depression positions of the gun adapted to adjust a position of a breech of the gun to pivotal movements of said longitudinally fixed loading pendulum.

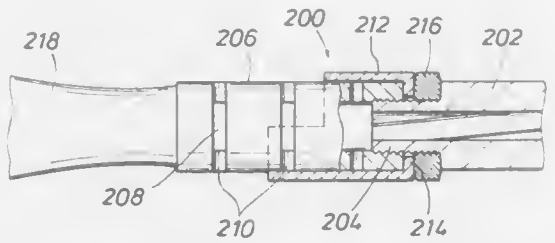
5,020,416
MUZZLE BRAKE FOR FIREARMS

Fred D. Tripp, Austin, Tex., assignor to Pantera Armory, Inc., Austin, Tex.

Continuation of Ser. No. 162,908, Mar. 2, 1988, abandoned, which is a continuation of Ser. No. 15,103, Feb. 17, 1987, abandoned. This application May 18, 1989, Ser. No. 287,630

Int. Cl.^{5} F41A *21/38*

U.S. Cl. 89—14.3 5 Claims



1. A muzzle brake for firearms comprising:

(a) housing means defining front and rear ends and having connection means at the rear end thereof for attachment to the free end of a gun barrel and defining generally cylindrical side wall means and end wall means at the front end thereof cooperating to define an elongated gas expansion chamber receiving muzzle gases exiting a bore of the gun barrel after a bullet has cleared the bore during gun discharge:

(b) said end wall means defining a bullet orifice aligned with the bore of said gun barrel;

(c) said side wall means defining a plurality of elongated vent ports extending transversally of said housing means and along upper and side portions of said housing means and being positioned in spaced relation along said housing means, said vent ports vectoring venting muzzle gases in a controlled manner and developing vectored forces controlling muzzle jump of said gun barrel, said vent ports being so located relative to said end wall means such that gas pressure rise at said vent ports is sequential beginning with the vent port nearest side end wall means and progressing rearward, causing a period of time for vented gas vectoring from said expansion chamber to be materially lengthened as compared with instantaneous gas venting from a conventional firearm barrel and thus materially reducing felt recoil of said firearms;

(d) a generally cylindrical vent adjustment sleeve positioned in rotatable relation about said cylindrical housing and forming vent adjustment shoulder means being adjustably positioned rotationally about said housing means to selectively cover at least a side part of at least one of said vent ports to thus control an effective dimension of said one of said vent ports and to control directional orientation of muzzle gases exiting said one vent port relative to said housing means for selectively orienting muzzle jump of said firearm, said vent adjustment shoulder means having outer walls disposed in generally parallel relation with a longitudinal axis of said cylindrical housing; and

(e) means for locking said vent adjustment shoulder means at said rotationally adjustable position.

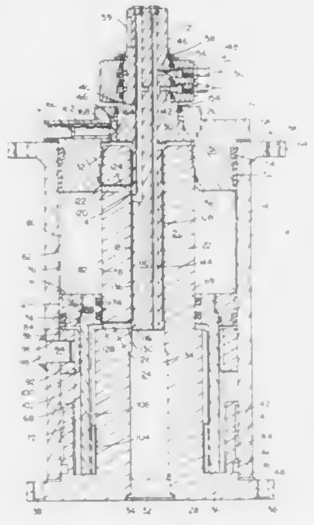
5,020,417
ROTARY SERVO ACTUATOR WITH INTERNAL VALVE

Paul P. Weyer, 1462 Blake St., Enumclaw, Wash. 98022

Filed Aug. 15, 1990, Ser. No. 568,277

Int. Cl.^{5} F15B *9/12, 9/14*

U.S. Cl. 91—375 R 29 Claims



29. A fluid-powered servo actuator connectable to an external supply of pressurized fluid, comprising:

a body having a longitudinal axis, and first and second ends;

a drive member extending longitudinally and generally coaxially within said body to define an annular chamber between said body and said drive member, said drive

VOL
1127
ISS
1
JE
4
1991
UMI

member having first and second ends with said member first end toward said body first end and said member second end toward said body second end, said drive member being supported for rotational movement relative to said body, said member second end being adapted for coupling to an external device to provide rotational drive thereto, said drive member having an interior chamber extending longitudinally and generally coaxial therein and interior of said body, said drive member including a first fluid channel extending between said member chamber and said annular chamber for fluid communication therebetween, and a second fluid channel extending between said member chamber and said annular chamber for fluid communication therebetween;

an annular piston mounted in said annular chamber for reciprocal longitudinal movement within said body in response to the selective application through said first and second channels of pressurized fluid to a first side thereof toward said body first end to drive said piston toward said body second end, and to a second side thereof toward said body second end to drive said piston toward said body first end, said piston having a central aperture through which said drive member projects;

a fluid-supply channel in fluid communication with a fluid-supply port connectable to the external supply of pressurized fluid;

a drain channel in fluid communication with a drain port for discharge of fluid from said first side of said piston in response to movement of said piston toward said body first end, and for discharge of fluid from said second side of said piston in response to movement of said piston toward said body second end;

linear-to-rotary means for translating longitudinal movement of said piston toward one of said body first or second ends into clockwise relative rotational movement between said drive member and said body, and translating longitudinal movement of said piston toward the other of said body first or second ends into counterclockwise relative rotational movement between said drive member and said body;

a valve spool positioned in said member chamber, said valve spool being rotatable within said member chamber and longitudinally movable therewithin toward said member first and second ends from a neutral position to control the flow of fluid through said first and second channels, said valve spool being movable from said neutral position toward one of said member first or second ends to place said first channel in fluid communication with said fluid-supply channel and said second channel in fluid communication with said drain channel, and said valve spool being movable from said neutral position toward the other of said member first or second ends to place said first channel in fluid communication with said drain channel and said second channel in fluid communication with said fluid-supply channel; and

control means for selectively moving said valve spool longitudinally within said member chamber from said neutral position toward said member first end or toward said member second end in response to rotation of said valve spool by a selected amount in a selected direction relative to said drive member, and for longitudinally moving said valve spool back toward said neutral position and positioning said valve spool in said neutral position in response to the resulting rotational movement of said drive member upon said drive member rotating by an amount and in a direction corresponding to said selected amount and direction said valve spool was rotated, whereby when said control means returns said valve spool to said neutral position, rotation of said drive member and longitudinal movement of said valve spool ceases until said valve spool is again moved longitudinally within said drive member in response to rotation of said valve spool by the next selected amount and direction.

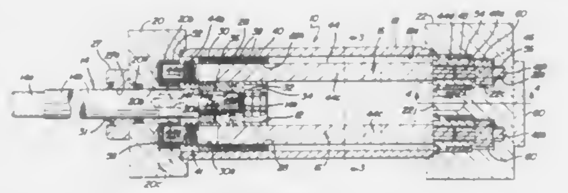
5,020,418
PISTON LOCK FOR POWER CYLINDERS

Jack J. Sendoykas, 23510 Denton, Apt. 227 T, Mt. Clemens, Mich. 48043

Filed Aug. 2, 1989, Ser. No. 388,481

Int. Cl.^{5} F15B *15/26*

U.S. Cl. 92—17 **18 Claims**



1. A power cylinder comprising:
a cylinder housing defining an axial bore;
a guide rod extending axially in said bore;
a piston mounted on said guide rod for movement in said bore along said guide rod through a stroke;
fluid pressure means operative to move said piston along said guide rod through a first portion of said stroke; and
thread means operative to move said piston along said guide rod through a second portion of said stroke.

5,020,419
THREE POSITION FLUID-CONTROLLED ACTUATOR

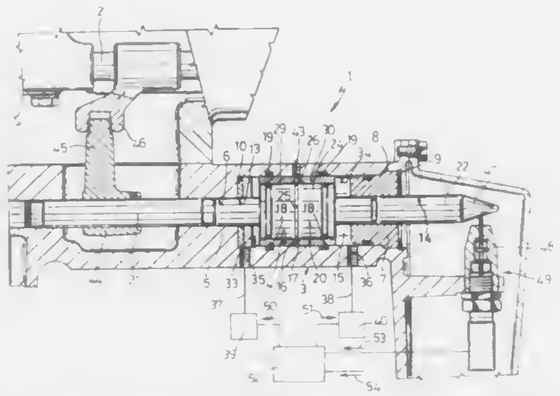
Giuseppe Amedei, Modena, and Angelo Rondelli, Centn, both of Italy, assignors to Fiatgeotech - Tecnologie Per La Terra S.p.A., Modena, Italy

Filed May 31, 1989, Ser. No. 359,374

Claims priority, application Italy, May 31, 1988, 67500 A/88

Int. Cl.^{5} F01B *7/20*

U.S. Cl. 92—52 **9 Claims**



1. A three-position fluid-controlled actuator comprising an outer body defining a cylindrical cavity having a constant diameter; a piston sliding inside said cavity and having at least one rod projecting from said outer body and secured to clutch means for a mechanical assembly; control means for controlling said piston via a fluid, and connected to two openings formed on said outer body close to opposite ends of said cavity: and auxiliary means sliding inside said cavity and designed to establish an intermediate piston stop position; characterized by the fact that said auxiliary means comprise a couple of bushes (**29, 30**) coaxial with said piston (**20**) and sliding in a sealed manner between said piston (**20**) and the lateral wall (**15**) of said cavity (**4**); first axial locating means (**17**) for axially locating said bushes with respect to a center portion of said cavity; and second axial locating means (**26**) for axially locating said bushes (**29, 30**) with respect to a center portion of said piston (**20**), said bushes being mounted on opposite axial sides with respect to said first and second locating means.

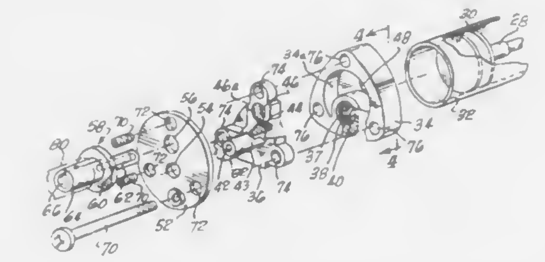
5,020,420
VACUUM ADAPTER PLATE

Lamar Ellis, 320 W. Walnut Ave., Ontario, Calif. 91762

Filed May 16, 1989, Ser. No. 352,743

Int. Cl.^{5} F01B *29/04, 29/00;* **F04B** *19/00*

U.S. Cl. 92—59 **1 Claim**



1. An adapter device for portable compressor pumps of the type that direct atmospheric air into a chamber within a pump body by means of a reciprocating piston means, and forces compressed atmospheric air out of said chamber, and in which said adapter device allows a controlled vacuum source to be utilized, which comprises:
a flat adapter plate; a fitting; a first adapter plate opening formed in said flat adapter plate of sufficient size to allow a first fitting extension of said fitting to pass therethrough; a second flat adapter plate opening formed in said flat adapter plate of sufficient size to allow an elongated projection of a head member of said pump body to pass therethrough; a plurality of fastener accepting openings formed near the outer periphery of said flat adapter plate, such openings being of sufficient size to permit fasteners to pass therethrough; said elongated projection of said head member being of sufficient extension through said second flat adapter plate opening to accomodate a second conduit; said fitting having a second fitting extension at the opposite end of said fitting than said first fitting extension; an enlarged separating flange located between said first and second fitting extensions; said second fitting extension of a sufficient size to accomodate a first conduit means.

5,020,421
WORKING CYLINDER WITHOUT PISTON ROD

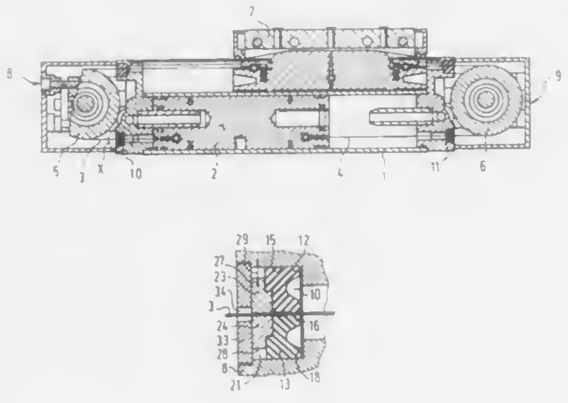
Heinz Podlesak, Munich, Fed. Rep. of Germany, assignor to Knorr-Bremse AG, Fed. Rep. of Germany

Filed May 7, 1990, Ser. No. 519,461

Claims priority, application Fed. Rep. of Germany, May 5, 1989, 3914889

Int. Cl.^{5} F01B *9/00*

U.S. Cl. 92—137 **11 Claims**



1. Working cylinder devoid of a piston rod having at least one band (**3,4**) connecting a piston (**2**) to an output member (**7**), said band penetrating at least one cylinder cover (**8,9**) arranged at one end of a cylinder pipe (**1**) accommodating said piston (**2**), movably sealed, coaxially or concentrically to the piston (**2**), said cylinder cover (**8,9**) having a receiving chamber (**10**) penetrated by said band (**3**), being wider than said band (**3**) and having laterally rounded ends, and in which, facing the piston, two identical, strip-like sealing elements (**12, 13**) made of elastic material being located in said receiving chamber facing said piston, said sealing elements being forced against both wide sides (**17**) of said band by bracing against a wall (**15**) of said receiving chamber (**10**) with pre-stressing, and a band guide facing away from said piston and made of a form-stable material, said band guide comprising a slot for said band to pass through, said band guide being adapted to be braced against said wall (**15**) of said receiving chamber (**10**), wherein
(a) each sealing element (**12, 13**) corresponding in its outer contour (**14**) essentially to the contour of said wall (**15**) of said receiving chamber (**10**) has on its side facing away from said piston a first groove (**20**) that extends parallel to a wide side (**17**) of said band (**3**) and transversely to said band and is open in the direction of said band,
(b) said band guide in the plane of said band is divided into two identical guide elements (**23, 24**), each of said guide elements (**23, 24**) having a bar-like body (**25**) reaching into said first groove (**20**);
(c) each sealing element (**12, 13**) has in a center region of its longitudinal extent a second groove (**21**), starting from said first groove (**20**), extending at a right angle to said first groove and leading to said outer contour (**14**);
(d) each said guide element (**23, 24**) has an extension (**27**) which reaches into said second groove (**21**) and which ends with clearance (**29**) in front of said wall (**15**) of said receiving chamber (**10**) with a stop face (**28**);
(e) and each guide element (**23, 24**) has on the side of said extension (**27**) a pin shoulder (**31**), said shoulder extending parallel to said extension and also ending with clearance (**29**) in front of said wall (**15**) of said receiving chamber (**10**) with a stop face (**32**), said pin shoulder being located in a bore-like recess (**22**) of said sealing element (**12, 13**)

5,020,422
PISTON/CYLINDER ASSEMBLY

James O. Sims, 1100 Brooks St., Decatur, Ala. 35601

Filed Jan. 29, 1990, Ser. No. 471,627

Int. Cl.^{5} F01B *1/00*

U.S. Cl. 92—146 **13 Claims**

1. A piston/cylinder assembly comprising.
a substantially flat housing having a plurality of piston receiving chambers therein in side-by-side relation, said housing having lower and upper sections and an elongated space between said sections;
a piston reciprocally mounted in said chambers, each said piston having sealing means for effecting a fluid seal with said housing;
a piston guide member secured to each of said pistons intermediate the ends thereof for providing corresponding reciprocal movement of said pistons, said guide member disposed in said space between said lower and upper sections
first passage means communicating into said chambers for directing fluid pressure into or out of said chambers;

VOL
1127
ISS
1
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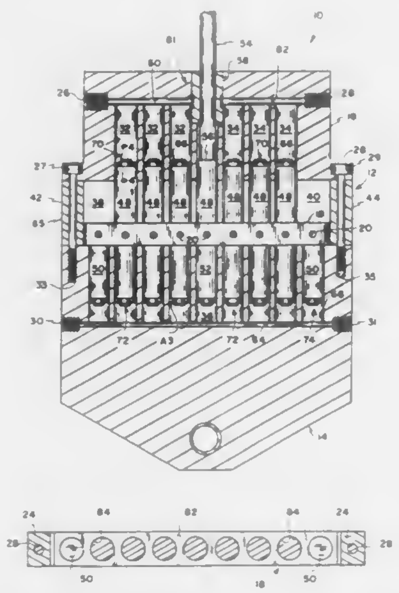
4
1991
UMI

second passage means communicating into said chambers for directing fluid pressure into or out of said chambers; and



output means operatively connected to said pistons for transferring said reciprocal movement thereof out of said housing.

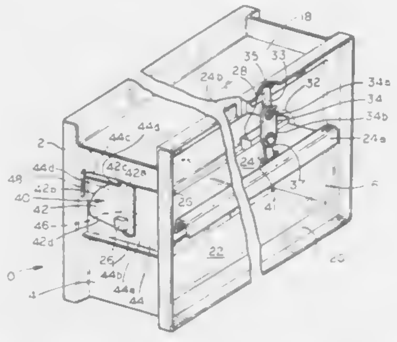
5,020,423
ROTATING BLADE DAMPER WITH BLADE LOCK AND STOP MECHANISM

James R. Hill, Toledo, Ohio, assignor to Mestek, Inc., Westfield, Mass.

Filed Jul. 20, 1990, Ser. No. 556,122

Int. Cl.^{5} F24F *11/00*

U.S. Cl. 98—1 **42 Claims**



1 A damper which is adapted to be positioned within a duct or wall opening and which is adapted to define a flow passage with the duct or through the wall opening, said damper comprising:

frame means defining an opening, said frame means having aperture means therein, the flow passage extending through the opening;

blade means, said blade means comprising;

a blade which is positioned in the opening, and

rod means extending from said blade through the aperture means in said frame means, said rod means being attached to said blade for rotation in unison therewith;

said blade means being rotatable with respect to said frame means between a first position in which said blade extends generally along the flow passage and a second position in which the blade extends generally transversely of the flow passage;

heat or smoke sensitive means acting on said blade means to normally maintain said blade in the first position, said heat or smoke sensitive means permitting rotation of said blade means from the first position to the second position in the event of a condition of excessive temperature or smoke; and

a latch mechanism, said latch mechanism comprising;

a disc segment, said disc segment having an arcuate portion and a generally radially extending stop surface at an end of the arcuate portion, said disc segment being rotatable with said rod means, and

a slide plate, said slide plate having an elongate slot therein, said slide plate being slidable with respect to said rod means between a first position in which said blade means is in said first position and a second position in which said blade means is in said second position, said slide plate having a stop surface which engages said stop surface of said disc segment to prevent the return rotation of said blade means from said second position to said first position.

5,020,424
APPARATUS FOR CONTROLLING AN AUTOMOTIVE AIR-CONDITIONER

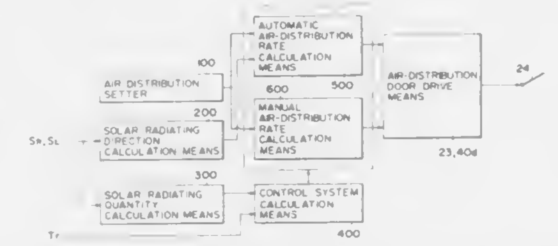
Katsumi Iida; Yoshihiko Sakurai; Akihiko Takano, all of Konan; Hideo Yamaguchi, and Teruaki Yano, both of Aki, all of Japan, assignors to Zexel Corporation, Tokyo and Mazda Motor Corporation, Hiroshima, both of, Japan

Filed Aug. 1, 1990, Ser. No. 561,502

Claims priority, application Japan, Aug. 3, 1989, 1-201967; Aug. 3, 1989, 1-201968

Int. Cl.^{5} B60H *1/00*

U.S. Cl. 98—2.01 **10 Claims**


AUTOMATIC AIR-DISTRIBUTION RATE CALCULATION MEANS
100
AIR DISTRIBUTION SETTER
600
500
AIR-DISTRIBUTION DOOR DRIVE MEANS
24
200
MANUAL AIR-DISTRIBUTION RATE CALCULATION MEANS
Sr, St
SOLAR RADIATING DIRECTION CALCULATION MEANS
23,40d
300
SOLAR RADIATING QUANTITY CALCULATION MEANS
CONTROL SYSTEM CALCULATION MEANS
Tr
400

1. An apparatus for controlling an automotive air-conditioner including an air-flow duct having at least left and right air outlets disposed on left and right sides, respectively, a passenger component of a motor vehicle, said apparatus comprising:

(a) an air-distribution door adapted to be disposed adjacent to a downstream end of the air-flow duct for changing proportions of air distributed toward the left air outlet and air distributed toward the right air outlet;

(b) air-distribution setting means for setting proportions of air to be distributed toward said left air outlet and air to be distributed toward said right air outlet;

(c) solar radiating direction calculation means for calculating a direction of solar radiation based on quantities of solar radiation detected by at least two solar radiation sensors;

(d) solar radiation quantity calculation means for calculating an intensity of solar radiation based on the detected solar radiation quantities;

(e) air distribution door drive means for actuating said air distribution door selectively in an automatic mode and in a manual mode, based on an air distribution rate calculated by said air-distribution setting means and said solar radiating direction calculation means; and

(f) control system calculation means for selecting one of the automatic mode and the manual mode based on a predetermined solar radiation quantity when a vehicle passenger compartment temperature is lower than a predetermined temperature, and based on a characteristic performance curve higher than said predetermined solar radiation quantity when the vehicle passenger compartment temperature is higher than said predetermined temperature.

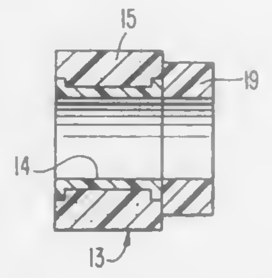
5,020,425
SPRING ROD HINGELESS VENTILATOR

Timothy A. Kelly, P.O. Box 885, Salem, Va. 24153

Filed Jun. 7, 1990, Ser. No. 534,471

Int. Cl.^{5} B60H *1/26*

U.S. Cl. 98—2.18 **5 Claims**



1. A hingeless ventilator for ventilating a compartment through an aperture in a wall thereof, comprising a frame attachable to said wall about said aperture and having an opening alignable therewith, closure means swingable against an outside of said frame for opening and closing said opening, guide means instanding from said frame beyond opposite ends of said opening, a spring rod having ends ridable on said guide means for selectively positioning said closure means relative to said frame, means for bowing said spring rod intermediate ends thereof toward said closure means for generating a tensile force for holding said closure means in selected positions relative to said frame, and a composite roller mounted on each end of said spring rod and each rolling on a guideway of one of said guide means, each roller including an inner antifriction bearing journalled on said rod end and an antislip wear-resistant elastomeric collar bonded against relative movement to said bearing and riding on said guideway.

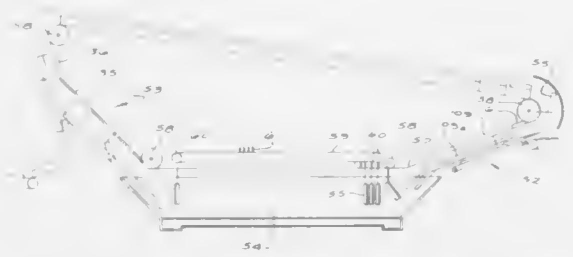
5,020,426
FOOD PRODUCT COOKER

Jonathan C. Cope; Michael F. Grady, and Willard W. Pitman, all of Madera, Calif., assignors to Valley Grain Products, Inc., Madera, Calif.

Filed Jun. 26, 1989, Ser. No. 371,125

Int. Cl.^{5} A47J *37/12*

U.S. Cl. 99—353 **19 Claims**



1. In a food product cooker having a main frame, a cooking oil pan, a plurality of product carriages, and a main drive endless chain for moving said carriages about said main frame to and from said pan, with each of said carriages including a food product holder for holding a food product and a support arm having first and second ends with said drive chain attached at said first end and with said holder attached at said second end,

the improvement including loading means defining a loading path and carried on said frame,

said loading means including a load support member and a loading conveyor downstream of said load support member,

said loading means also including a first lifting rail for lifting said food holder away from said loading conveyor and a first pressure rail for moving said food holder toward said loading conveyor.

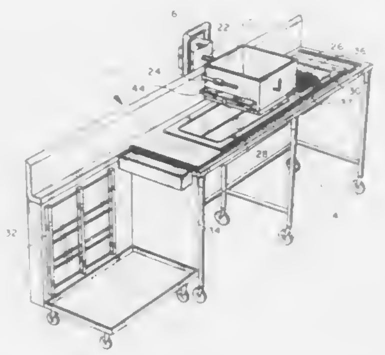
5,020,427
HAND BREADING APPARATUS

Thomas M. Kennefick, 50 W. Leslie La., Villa Park, Ill. 60181, and Frank Portillo, Jr., 6 Oak Brook Club Dr., Oak Brook, Ill. 60521

Filed Nov. 19, 1990, Ser. No. 615,321

Int. Cl.^{5} A23B *4/10;* A23G *3/26,* B05C *3/00, 11/00*

U.S. Cl. 99—494 **5 Claims**



1. Apparatus for hand breading of food products comprising an elongate support table;

an elongate vertical support member disposed on one long side of said table;

a carriage assembly supported by and linearly translatable with respect to said support member;

a sifter basket coupled to and translatable with said carriage assembly above the top surface of said support table and manually rotatable with respect to said carriage assembly about an axis transverse to the longitudinal axis of said support member;

a flour pan disposed in the top surface of said table and adapted to receive and retain a quantity of flour mixture;

a batter pan disposed in the top surface of said table linearly adjacent said flour pan and adapted to receive and retain a quantity of batter mixture; and

a batter basket disposed in said batter pan for receiving said food products and removing said food products after immersion in said batter mixture;

whereby food products placed in said flour pan may be dredged in flour mixture and removed to said sifter basket where excess flour mixture is removed by oscillatory rotation of said sifter basket, floured products are translated to said batter pan and discharged into said batter basket then removed and returned to said flour pan, for re-dredging in said flour mixture, the breaded products are then removed to the sifter basket where excess flour mixture is again removed.

VOL 1127 ISS 1 JE 4 1991 UMI

5,020,428
PRINTED STAMP MACHINE

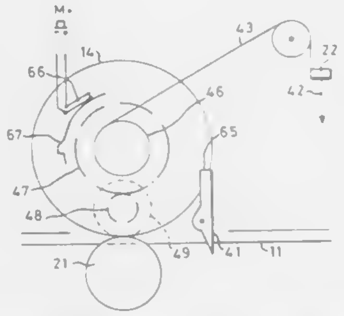
David A. Gawler; Dennis T. Gilham, both of Brentwood, and Thomas D. Williams, Billericay, all of United Kingdom, assignors to Alcatel Business Systems Limited, Essex, United Kingdom

Filed Dec. 27, 1989, Ser. No. 457,493

Claims priority, application United Kingdom, Dec. 30, 1988, 8830419

Int. Cl.^{5} B41L *47/46*

U.S. Cl. 101—91 13 Claims



9 A postage stamping machine comprising a base unit; a print drum rotatable relative to the base unit and carrying settable print elements for printing a postal impression including a postage value on a postal item; manually operable means on the drum to set the print elements to print a desired value of postage; a pressure roller mounted to press postage items into engagement with the print drum; means to rotate the print drum in a printing cycle from an initial position through a printing position in which the print elements are brought into printing engagement with the postal item and thence to said initial position an ejection roller carried by and rotatable relative to said print drum and effective to co-operate with said pressure roller when said print drum is in said initial position to grip a postal item between said ejection roller and said pressure roller; and ejection means operable when the print drum is in said initial position to rotate the ejection roller relative to the print drum the ejection roller to feed to postal item thereby eject the postal item from the machine.

5,020,429
DIE PROTECTION ASSEMBLY FOR PREVENTING FRAUDULENT PRINTING BY AN ELECTRONIC POSTAGE METER

Gilbert N. Riley, Wilton; Richard S. Holodnak, Stratford, and Richard A. Malin, Westport, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Continuation of Ser. No. 114,361, Oct. 27, 1987, abandoned. This application Dec. 15, 1989, Ser. No. 449,153

Int. Cl.^{5} B41J *29/58. 1/48*

U.S. Cl. 101—93 10 Claims

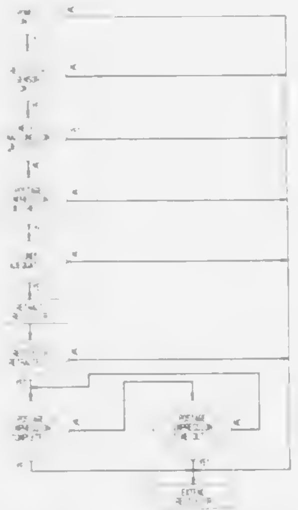
1. In a postage meter having a print die which includes printing elements for printing postal value, a die protector arrangement comprising:

die protector blades disposed adjacent said printing elements and normally extending outwardly beyond a printing plane defined by said die and said printing elements, said protector blades being locked for preventing proper printing whenever the blades are in such extended position;

a first plurality of said die protector blades being retracted when at least a first condition has occurred;

the remainder of said die protector blades being retracted when at least a second condition different from said first condition has occurred while said first plurality of die protector blades are retracted whereby proper printing is enabled by the retraction of all of the die protector blades when said first and said second conditions have occurred; and,

a microprocessor means for controlling printing such that the retraction of the first plurality and the remainder of the die protector blades is controlled by the microprocessor, said microprocessor actuates said first plurality of die protector blades only after determining as said first condition that there are no meter malfunctions.



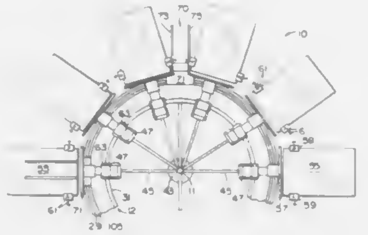
5,020,430
PRINTER

Charles W. Harpold, and James Belcher, both of Grand Rapids, Mich., assignors to Harco Graphic Products, Inc., Grand Rapids, Mich.

Filed May 2, 1989, Ser. No. 346,068

Int. Cl.^{5} B41F *15/26*

U.S. Cl. 101—126 15 Claims



1. A machine for screen printing comprising.

a plurality of support tracks;

at least one printing head support member disposed on at least one of said tracks;

a print screen support arm pivotally mounted at one end on each of said printing head support members;

a clamp for supporting a printing screen terminating the distal end of said print screen support arm remote from said pivot so that a printing screen, when in place, can be lowered into position for printing or moved along said track;

a platen carriage disposed on at least one of said tracks other than the track supporting said printing head support member;

a platen supporting arm extending from said platen carriage so that a platen, when in place, can be moved along said track and so that the platens and printing screens can be brought into registration for screen printing by moving the platens or printing screens.

5,020,431
GUIDE ROLLER APPARATUS FOR ROTARY PRESS

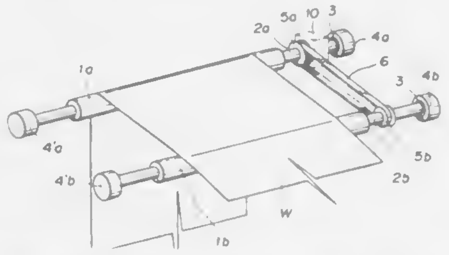
Yasuo Shibuya, Kodaira, Japan, assignor to Tokyo Kikai Seisakusho, Ltd., Tokyo, Japan

Filed Feb. 3, 1989, Ser. No. 305,669

Claims priority, application Japan, Feb. 18, 1988, 63-34002

Int. Cl.^{5} B41F *13/54*

U.S. Cl. 101—228 2 Claims



1 A rotary printing press including a paper roller and having a plurality of guide rollers for guiding a paper web said guide rollers being rotated solely in response to movement of the paper web,

a power transmission for connecting a first one of said guide rollers with at least a second one of said guide rollers, said power transmission including

a power transfer member,

means for drivingly connecting said first one of said guide rollers to said power transfer member, and

means for drivingly connecting at least said second guide roller to said power transfer member to rotate said second one of said guide rollers at a peripheral speed of rotation different from the peripheral speed of rotation of said first guide roller,

said power transfer member being driven solely by one of said guide rollers, the power transfer member being constructed to drive the means drivingly connecting the other guide roller to rotate the first and second ones of the guide rollers at respective peripheral speeds different from the surface speed of said paper web traversing said first and second ones of the guide rollers.

5,020,432
DEVICE FOR METERING INK IN OFFSET PRINTING PRESSES

Willi Jeschke, Heidelberg, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

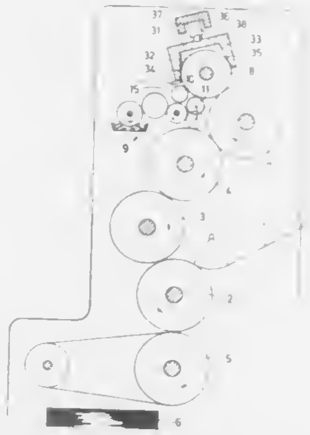
Continuation of Ser. No. 262,097, Oct. 19, 1988, abandoned, which is a continuation of Ser. No. 52,214, May 15, 1987, abandoned, which is a division of Ser. No. 810,837, Dec. 19, 1985, Pat. No. 4,699,055, which is a continuation of Ser. No. 493,750, May 11, 1983, abandoned. This application Feb. 26, 1990, Ser. No. 485,816

Claims priority, application Fed. Rep. of Germany, May 11, 1982, 3217569

Int. Cl.^{5} B41F *31/04, 31/06;* B41L *27/06*

U.S. Cl. 101—350 7 Claims

1. Device for metering ink in offset printing machines comprising an ink cylinder having an outer cylindrical surface portion formed of rigid material, an inking cylinder in contact with said ink cylinder, at least one U-shaped metering body having a U-shaped cross-section having two arms, said metering body being parallel to said ink cylinder, said arms forming two substantially oppositely facing metering surfaces tangentially engaging said ink cylinder surface at substantially diametrically opposite lines of engagement, said metering surfaces forming an acute angle having an apex pointing away from said inking cylinder, and wherein said ink cylinder and said inking cylinder have opposite direction of rotation, an ink well disposed between the surface of the ink cylinder and at least one of said metering surfaces, said metering body being carried on a fixed support through the intermediary of an adjusting element subjected to a pressure medium, one of said metering surfaces extending with a constant spacing from an parallel to the longitudinal axis of said ink cylinder.



5,020,433
DEVICE FOR CLEANING A PLATE CYLINDER AND/OR A BLANKET CYLINDER OF AN OFFSET PRINTING MACHINE, AND METHOD OF OPERATING THE DEVICE

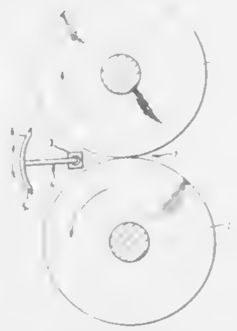
Willi Jeschke, Bad Herrenalb, and Anton Rodi, Leimen, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Jul. 17, 1989, Ser. No. 381,129

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1988, 3824236

Int. Cl.^{5} B41F *35/00*

U.S. Cl. 101—425 11 Claims



7. Method of operating a device for cleaning selected surface portions of selectively one and both of a plate and a blanket cylinder of an offset printing machine including a device for adjusting ink zones of an inking device having a plurality of cleaning elements disposed adjacent one another in a direction parallel to respective cylindrical peripheral surfaces of a plate and a blanket cylinder and being mounted so as to be displaceable towards and away from said cylinders positioning at least some of the cleaning elements selectively towards at least one of said cylinders and towards both of said cylinders and actuating the respective cleaning elements, by depressing at least one key of a keyboard for a period of time corresponding to the time period during which cleaning is effected by the cleaning device.

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,434

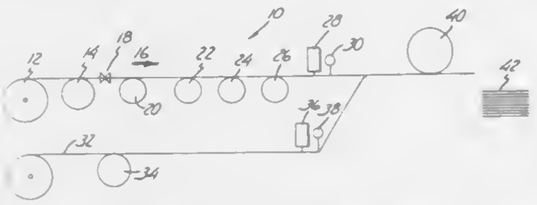
BASE STOCK FOR SERIES CHECKS AND THE LIKE AND A METHOD OR PRINTING THE SAME

David L. Copham, Forest Lake, Minn., assignor to Base Stock Press, Inc., Mounds View, Minn.

Filed Aug. 14, 1990, Ser. No. 567,146

Int. Cl.⁵ B41F *1/34*

U.S. Cl. 101—485 **21 Claims**



1. A method of forming a stack of printed sheets, each sheet having an arrangement of printed patterns with each printed pattern being printed at a designated printing area and each sheet in the stack bearing a different arrangement of printed patterns than adjacent sheets, wherein a selected sequence of printed patterns, including at least two different patterns appears along a length of each sheet and on consecutively positioned sheets in the stack, the method comprising:

printing a plurality of printed pattern arrangements onto a web of paper, each arrangement bearing at least one printed pattern along a width, and at least Y printed patterns or a multiple of Y printed patterns along a length in a selected sequence;

cutting the web across the width along a boundary between adjacent patterns to form a plurality of sheets, each sheet comprising Z printed patterns along a length wherein Z is an integer which is greater than one and which differs from a prime number of Y, or a multiple of a prime number of Y; and

stacking each sheet in the order in which the sheets are cut, forming a stack, wherein the selected sequence of printed patterns or its reverse, appears on a selected printing area of consecutively stacked sheets.

5,020,435

FUZE

Daniel C. Cawte, Dysart, Australia, assignor to Meadowside Pty. Ltd., Queensland, Australia

Filed Apr. 10, 1990, Ser. No. 507,023

Int. Cl.⁵ C06C *5/00*

U.S. Cl. 102—275.1 **5 Claims**

1. An elongate tubular detonator fuze for propogating a gaseous percussion from a detonation intitiator to an explosive charge, characterized in that the length of the fuze is marked on the outer surface thereof.

5,020,436

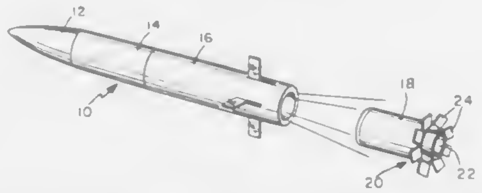
BOOSTER RETARDING APPARATUS

Robert W. Coburn, Apple Valley, Calif., assignor to General Dynamics Corp., Air Defense Systems Div., Pomona, Calif.

Filed Jul. 24, 1989, Ser. No. 383,484

Int. Cl.⁵ F42B *15/10*

U.S. Cl. 102—377 **16 Claims**



1 Booster retarding apparatus for a missile having a front and a rear end and a separable booster releasably mounted at the rear end, the apparatus comprising:

a series of flaps;

securing means for pivotally securing each flap to an aft end of a missile booster for movement between an inner operative position in which the flaps extend rearwardly from the booster and an extended operative, booster retarding position in which the flaps project outwardly from an outer periphery of the booster, the securing means including biasing means for urging each flap outwardly into its extended position; and

retaining means for normally retaining each flap n its inner position, the retaining means including release means responsive to booster thrust termination to release said retaining means so that the flaps are urged outwardly on booster thrust termination.

5,020,437

AMMUNITION SHELL FORMING A STACK OF MULTIPLE PROJECTILES

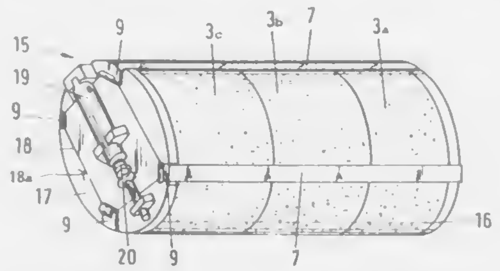
Ulrich Rieger, Feldkirchen/Westerham, and Dieter Kalus, Munich, both of Fed. Rep. of Germaoy, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 23, 1989, Ser. No. 397,759

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1988, 3828501

Int. Cl.⁵ F42B *12/58*

U.S. Cl. 102—489 **21 Claims**



1. An ammunition shell forming a stack of multiple projectiles for firing from a firing tube, comprising a plurality of projectiles including at least a front projectile and a rear projectile, as viewed in a firing direction, forming said stack, holding means including a plurality of springy, flexible flat holding bands initially holding said stack together, tensioning means for initially clamping together free ends of said holding bands and for then releasing said free ends at an appropriate time by permitting said springy, flexible flat bands to flare radially outwardly under their own spring bias to free said projectile bodies in a controlled manner, and wherein each of said holding bands comprises an essentially U-shaped configuration with an end bail and two lengthwise extending arms interconnected by said end bail, said end bail holding a front end of said stack, said lengthwise extending arms extending alongside said stack, each of said lengthwise extending arms having a bent hook at a free end of said lengthwise extending arm for engaging a rear end of said stack, said tensioning means normally engaging said hooks of said holding bands until said releasing.

5,020,438

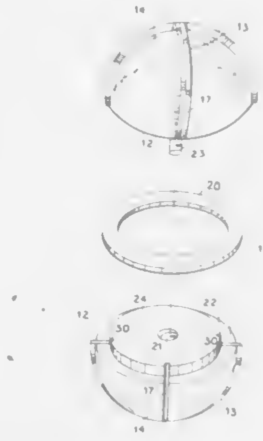
BLADED PROJECTILE

Jim W. Brown, Rte. 1, Box 182, Kinston, Ala. 36453

Filed Oct. 10, 1989, Ser. No. 419,324

Int. Cl.⁵ F42B *12/00*

U.S. Cl. 102—517 **14 Claims**



1. A projectile comprising:

a three dimensional body having an exterior surface,

said body comprised of two substantially equal portions,

said portions removably engageable with one another by an attachment means,

a plurality of grooves disposed across said exterior surface of said body,

a corresponding number of removable blades cooperating with and closely fitting within said grooves,

each of said blades projecting radially from the center of said body, each of said blades extending continually around the exterior surface of said body,

said blades having attachement means between said blades and said body portions, whereby

said blade attachement means maintains said blades within said grooves.

5,020,439

PROJECTILE HAVING IMPROVED BASEPLUG

Joseph Winter, New Haven; Deepak Mahulikar, Meriden, and Frank N. Mandigo, North Branford, all of Conn., assignors to Olin Corporation, Cheshire, Conn.

Filed May 5, 1989, Ser. No. 347,631

Int. Cl.⁵ F42B *12/04*

U.S. Cl. 102—518 **20 Claims**

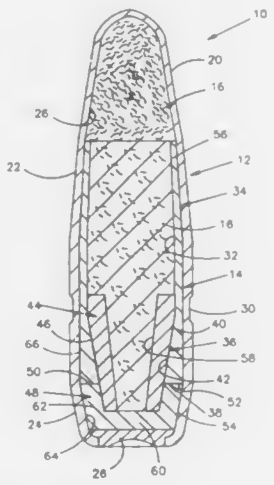
1. A baseplug for a target-penetrating projectile containing an explosive charge, said baseplug comprising:

at least a first and second member;

said first member being substantially frustoconical and having a bore extending from its forward end at least a portion of the way therethrough;

said second member being cup-shaped and having an aft end and a forward extending wall portion, said wall portion having an internal surface tapering forwardly and outwardly;

said first member having its aft end received within the opening defined by the wall portion of said second member, said internal surface of said second member being in the mating engagement with the external surface of the aft end of said first member; and



said first and second member comprising from about 5 to about 30% volume hydrogen.

5,020,440

CONVEYOR WITH PIVOTALLY DAMPED WORKPIECE CARRIER

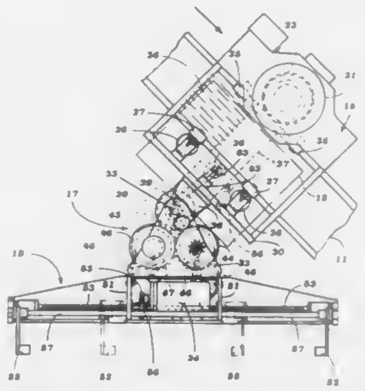
Osamu Ohara; Hiroshi Kawashima, and Hiroshi Takata, all of Shizuoka, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Shizuoka, Japan

Filed Jan. 25, 1990, Ser. No. 470,929

Claims priority, application Japan, Jan. 31, 1989, 1-21149

Int. Cl.⁵ B61B *3/00*

U.S. Cl. 104—127 **8 Claims**

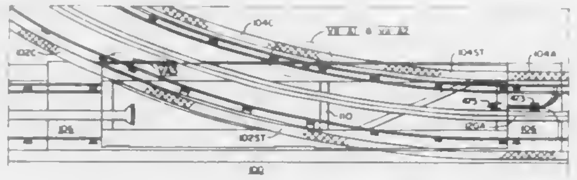


1. A conveying apparatus for conveying articles along a path between different levels while maintaining the article in a horizontal position regardless of the angle of inclination of the path, said apparatus comprising a drive member for conveying said apparatus along the path, a driving motor carried by said drive member and driving a shaft journaled thereon, an elevator mechanism supported by said shaft for pivotal movement relative to said drive member about an axis extending transversely to the direction of movement, and means carried by said elevator for handling an article, said elevator being operative to vary the height between the article and the drive member.

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,441
ELECTRIC COUPLING FOR ROTARY GUIDEWAY SWITCH

Thomas J. Burg, Forest Hills, Pa., assignor to AEG Westinghouse Transportation Systems, Inc., Pittsburgh, Pa.
Filed Jun. 27, 1988, Ser. No. 213,206
Int. Cl.^{5} E01B *25/06*
U.S. Cl. 104—130 11 Claims



1. A rotary switch for a people mover guideway having a predetermined tire path, guidebeam and electric rail configuration, the electric rail configuration including a power rail circuit and a signal rail circuit, said rotary switch providing for routing a transit car having electric power and signal collection means from one entry guideway path to at least either of two exit guideway paths or vice versa and comprising:

an elongated structural switch frame member provided with guidebeam, electric rail and tire path structure on one side compatible with the guideway configuration to provide car routing to one of said two exit paths; said switch frame member further provided with guidebeams, electric rail and tire path structure on another side compatible with the guideway configuration to provide car routing to the other of said two exit paths;

first support means having first shaft means for supporting one end of said switch frame member;

second support means having second shaft means for supporting the other end of said switch frame member;

means for driving at least one of said shaft means to rotate said switch frame member between first and second frame positions;

said switch frame member having its one side aligned with the entry guideway path and the one exit guideway path in said first frame position and having its other side aligned with the entry guideway path and the other exit guideway path in said second frame position;

said first support means including first fixed frame means for supporting said first shaft means;

said second support means including second fixed frame means for supporting said second shaft means;

means for locking said switch frame member against rotation from said first or second frame position;

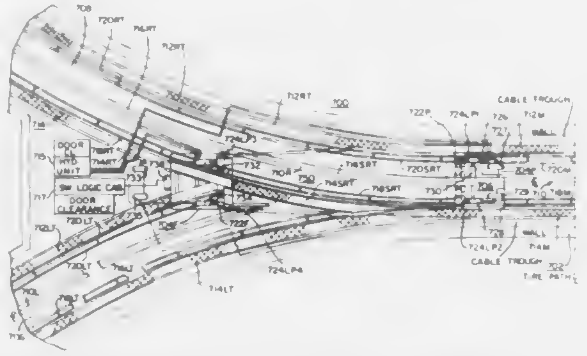
said electric rail structure on each side of said switch frame member including power rail means and signal rail means disposed along respective paths of travel of a transit car over said switch for respectively contacting the electric collection means of the transit car;

electric connection means including: first electric conductor means for connecting said switch power rail means to the guideway electric power rail circuit; and second electric conductor means for connecting said switch signal rail means to the guideway signal rail circuit; and

means for supporting at least said first and second electric conductor means to permit rotational motion of said switch frame member between its two frame positions while maintaining electric continuity from the guideway electric power and signal circuits, respectively, to said electric power and signal rail means on the two sides of said switch frame member.

5,020,442
GUIDEWAY STATION FOR A ROTARY GUIDEWAY SWITCH

Thomas J. Burg, Forest Hills; Ronald H. Ziegler, Elizabeth, and Robert J. Anderson, McMurray, all of Pa., assignors to AEG Westinghouse Transportation Systems, Inc., Pittsburgh, Pa.
Filed Jun. 27, 1988, Ser. No. 211,725
Int. Cl.^{5} E01B *25/06*
U.S. Cl. 104—130 5 Claims



1. A switching station for a people mover guideway including a guideway configuration having a predetermined tire path, guidebeam and electric rail configuration, said switching station providing for routing a transit car from an entry guideway path to either of two exit guideway paths or vice versa and comprising:

a guideway section structured at each of its entry and exit points to provide the predetermined guideway configuration including a pair of spaced tire running surfaces for cars operating in the people mover system;

said guideway section having an elongated switch pit located substantially within the periphery of said guideway and under a reference plane through the tire running surfaces and generally located to extend longitudinally along the tire running surfaces and laterally between the tire running surfaces;

an elongated rotary switch frame member disposed in said switch pit and assembled with said guideway section for alignment with said spaced tire running surfaces and provided with guidegeam, electric rail and tire path structure on one side compatible with the guideway configuration to provide car routing from the entry path to a first of the two exit paths; said switch frame member further provided with guidebeam, electric rail and tire path structure on another side compatible with the guideway configuration to provide car routing from the entry path to the second of the two exit paths;

first and second shaft means for rotatively supporting opposite ends of said switch frame member;

first fixed frame means for supporting said first shaft means and supported in said pit at one end of said switch frame member;

second fixed frame means for supporting said second shaft means and supported in said pit at the other end of said switch frame member;

means for driving at least said first shaft means to rotate said switch frame between first and second frame positions;

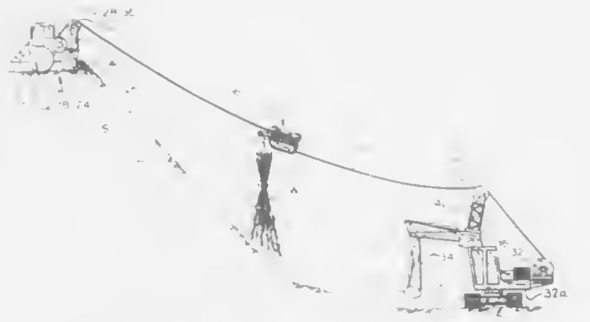
said driving means including a hydraulic actuator supported by said first fixed frame means;

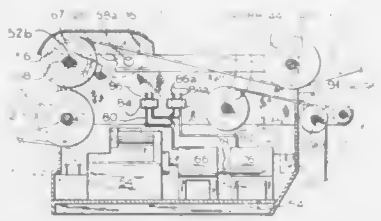
said switch frame having its one side aligned with said entry guideway path and said first exit guideway path in said first frame position with its other side facing downwardly and stored vertically below said reference plane;

said switch frame having its other side aligned with said entry guideway path and said second exit guideway path in said second frame position with its one side facing downwardly and stored vertically below said reference plane; and respective locking means supported by said first and second fixed frame means for locking said switch frame member against rotation from said first or second frame position.

5,020,443
SKYLINE-SUSPENDED CARRIAGE FOR HEAVY LOAD PULLING

Daniel Gauthier, 16 Route 354, Saint-Gilbert, Canada
Filed Dec. 18, 1989, Ser. No. 452,059
Int. Cl.^{5} B61B *12/00*
U.S. Cl. 104—230 5 Claims





1 A skyline suspended carriage system for moving a load, comprising a skyline anchored to and extending between an upper and a lower anchor point, an elongated carriage having an uphill and a downhill carriage suspending idle pulley mounted at the uphill and downhill ends of said carriage respectively and engaging longitudinally spaced portions of the top of the skyline, and an intermediate driving pulley mounted on said carriage for moving said carriage along the skyline, said driving pulley located nearer to said downhill idle pulley than to said uphill idle pulley and engaging the bottom of said skyline, the topmost sector of said driving pulley being higher than the straight line joining the lowermost sectors of the two idle pulleys so that said skyline is wrapped around said driving pulley through a sector of at least 30°;

and power means mounted in said carriage for rotating said driving pulley.

5,020,444
METHOD OF AND APPARATUS FOR CONTROLLING MAGNETIC LEVITATION

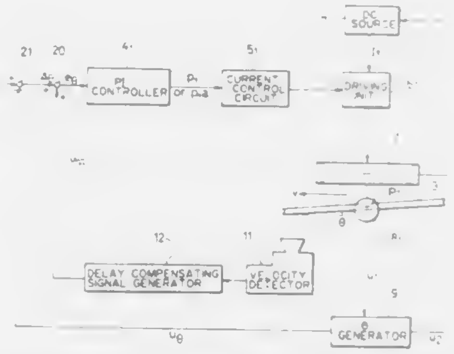
Akihiro Furutani; Junichi Okada, and Tomoaki Tanimoto, all of Kitakyushu, Japan, assignors to Kabushiki Kaisha Yasakawa Denki Seisakusho, Kitakyushu, Japan
Filed May 2, 1990, Ser. No. 517,745
Claims priority, application Japan, May 9, 1989, 1-114095
Int. Cl.^{5} B60L *13/06*
U.S. Cl. 104—284 6 Claims

4. An apparatus for controlling magnetic levitation in a linear slider device wherein first and second magnetic fields directed substantially vertically are generated, and a slider having a weight Mg is levitated by first and second magnetic forces, said first and second magnetic fields acting on said slider at first and second points of action, respectively, and moved horizontally at a constant velocity v with the center of gravity of the slider positioned between said first and second points of action, said apparatus comprising.

a center of gravity levitation controlling apparatus for levitating the center of gravity of the slider magnetically; and

an inclination controlling apparatus for compensating for an angle deviation which is the angle of inclination of the slider with respect to a horizontal plane about a horizontal axis passing through said center of gravity of the slider and perpendicular to the direction in which the slider moves;

said inclination controlling apparatus including a first PI controller for generating a first PI control signal p_1 for effecting a proportional integral control action of a proportional gain K_1 and an integral time T_1 in response to an angle error signal; first magnetic field generating means for generating a first magnetic force having a strength $K_{F1}p_1$ proportional to the first PI control signal p_1; and means for comparing, with a preset angle, an angle of inclination of the slider about a horizontal axis passing through said center of gravity and perpendicular to the direction in which the slider moves, thereby generating an angle deviation signal; characterized in that said inclination controlling apparatus further comprises:



a velocity detector for detecting the velocity of the slider;

a first delay compensation signal generator for calculating $MgvT_1/(K_1K_{F1})$ from said velocity detected by said velocity detector and outputting the calculated value as a first delay compensation signal; and

first adding means for adding said angle deviation signal and said first delay compensation signal, and generating said angle error signal.

5,020,445
TRUCK-TRAIN SYSTEM FOR TRANSPORTING TRUCK TRAILERS ALONG RAILS USING RAILWAY DOLLIES

George W. Adams, Jr., 3468 Sandpiper Ct., Hayward, Calif. 94542
Filed Jan. 8, 1990, Ser. No. 461,706
Int. Cl.^{5} B61D *15/00*
U.S. Cl. 105—4.1 9 Claims

1 A truck-train apparatus comprising

at least a first truck-trailer and a second truck-trailer each comprising

a fifth wheel connector end,

a rear wheel end, and

a set of roadable wheels connected to said truck-trailer proximate said rear wheel end,

a railway dolly having a first end and a second end,

means for connecting said first truck-trailer fifth wheel end to said first end of said railway dolly comprising

a first generally horizontal truck-trailer support member pivotally connected to said railway dolly,

a first incline ramp member sloping downward from said first generally horizontal truck-trailer support member adapted to engage said first wheel connector end of said first truck-trailer and guide said fifth wheel connector end

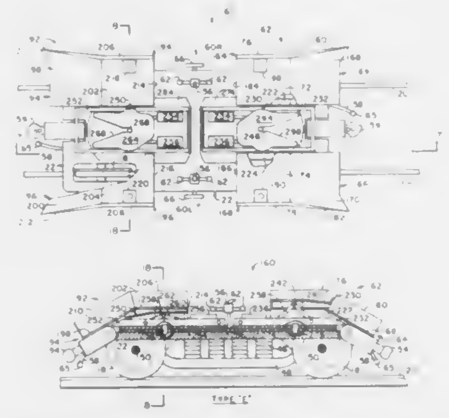
VOL 1127
ISS 1
JE 4
1991
UMI

up to said first generally horizontal truck-trailer support member, and

means for connecting said first truck-trailer fifth wheel connector end to said first generally horizontal truck-trailer support member,

means for connecting said second truck-trailer rear wheel end to said second end of said railway dolly comprising

a second generally horizontal truck-trailer support member pivotally connected to said railway dolly,



a second incline ramp member having generally vertical side members extending upwardly therefrom, said ramp sloping downward from said second generally horizontal truck-trailer support member and adapted to engage said rear wheel end of said second truck-trailer proximate the bottom and vertical sides thereof and guide said rear wheel end up to said second generally horizontal truck-trailer support member, and

means for connecting said second said second truck-trailer rear wheel end to said second generally horizontal truck-trailer support member.

5,020,446

THREE-DIMENSIONAL SINGLE-WHEEL SUSPENSION FOR WHEELS OF RAILED VEHICLES

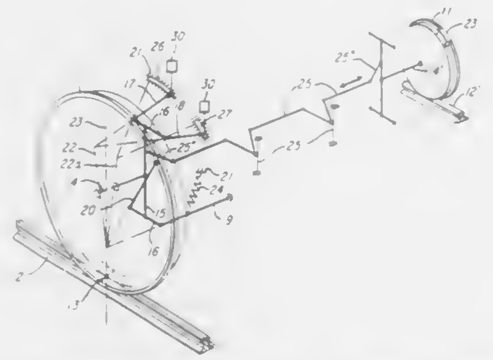
Heinrich Potthoff, Hattingen, Fed. Rep. of Germany, assignor to Bergische Stahl-Industrie, Remscheid, Fed. Rep. of Germany

Filed Nov. 15, 1989, Ser. No. 436,592

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1988, 3838845

Int. Cl.^{5} B61F *15/00*

U.S. Cl. 105—218.1 **8 Claims**



1. A three-dimensional single-wheel suspension system for a railway vehicle having a body, comprising:

a wheel unit including a wheel mounted on a non-rotating wheel carrier means, said wheel carrier means being connected to another wheel carrier means of an oppositely disposed wheel by a connecting rod arrangement in the form of a tie bar arrangement which includes intermediate elements connected to said wheel carrier means, each said wheel carrier means also being movably connected to the body of said railway vehicle via linkage means, further improvements comprising:

said linkage means including linkage members, at least two of said linkage members having ends shiftably connected to the body of said railway vehicle via guide means mounted on the body of said railway vehicle. said guide means being provided for allowing the ends of said at least two linkage members to move relative to said body of said railway vehicle as a function of at least one of the following states of said railway vehicle: forward travel, rearward travel, straight ahead travel, travel through a curve, braking, driving and wear condition of the wheels of said railway vehicle, said wheels always being positioned tangential to rails to eliminate squeaking in narrow curves of the rails, to reduce wear on said wheels and to eliminate the weight of non-cushioned mass of said railway vehicle

5,020,447

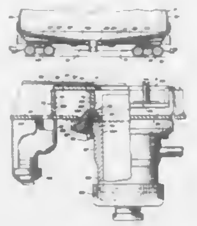
TANK CAR DISCHARGE VALVE HEATING UNIT

Richard P. Loevinger, 216 Oak Ridge Rd., Brandon, S. Dak. 57005

Filed Jul. 14, 1989, Ser. No. 380,095

Int. Cl.^{5} B61D *27/00, 5/00*

U.S. Cl. 105—451 **5 Claims**



3. Heat exchanger structure for a valve of a steam heated railway car having a tank for containing pourable lading and a bottom discharge spigot having a body and a valve therefor; said heat exchanger structure comprising:

means for heating the spigot for maintaining the viscosity of said lading in a pourable state,

said heating means comprising a torus encircling said spigot body in heat transfer relation therewith,

said torus having an annular chamber for receiving hot condensate therein about said spigot body and having an outlet port for discharging cooled condensate,

said torus having top and bottom closures and radially spaced inner and outer rings,

wherein said inner ring is in tight close coupled thermal transfer with the body of the spigot,

a thermal transfer annulus connecting the bottom closure with one of said rings and having an extensive heat transfer area exposed to said chamber,

and means connecting said annulus with said spigot body in heat transfer relation thereto,

wherein said extensive heat transfer area is frusto-conical shaped.

5,020,448

SHELF STRUCTURES FOR USE IN MOVING VEHICLES

Patrick P. Treadway, Ontario, Calif., assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 22, 1989, Ser. No. 397,018

Int. Cl.^{5} A47B *23/00*

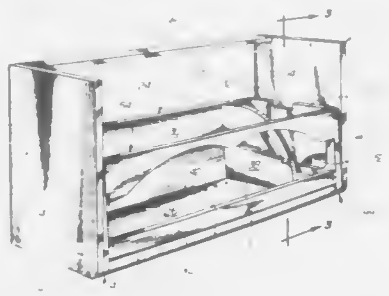
U.S. Cl. 108—42 **13 Claims**

1. A shelf structure comprising:

a shelf having a bottom and first and second vertically extending parallel end panels located at opposite ends of said bottom;

a support means for receiving, containing, and supporting said shelf and including first and second sides having a front, rear, top and bottom edge, a back, an open front, and a bottom; and

first and second bell-shaped links, being pivotally mounted to a respective one of said first and second sides of said support means at respective first and second pivot points thereon, said first and second pivot points substantially at said front and bottom edges of said first and second sides, said bell-links being C shaped further pivotally mounted at respective third and fourth pivot points thereon to said shelf for moving said shelf outwardly away from and in front of said support means as said first and second links pivot about the respective first and second pivot points in a first direction and inwardly toward said support means as said first and second links pivot about said first and second pivot points in a second direction to provide a toggle movement.



5,020,449

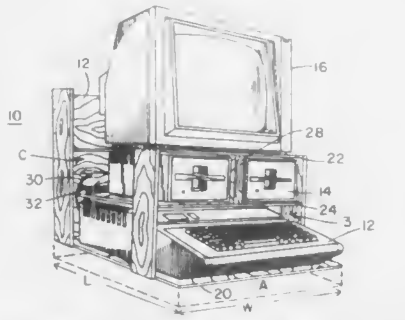
SHELVED COMPUTER STAND

Jerry K. Forte, Rte. 1, Box 313, Hibbing, Minn. 55746

Continuation of Ser. No. 228,327, Aug. 4, 1988, abandoned. This application Jan. 22, 1990, Ser. No. 465,641

Int. Cl.^{5} A47B *49/00*

U.S. Cl. 108—92 **4 Claims**



1. A self-contained, portable shelved support device for a computer and computer peripheral equipment comprising:

(a) a vertically oriented back wall with a base portion, an upper portion, a top edge and a bottom edge;

(b) a horizontally oriented lower shelf perpendicularly connected to the base portion of the back wall, the lower shelf having an area defined by a length and a width;

(c) a horizontally oriented upper shelf perpendicularly connected with the upper portion of the back wall at a location below the top edge of the back wall, the upper shelf having a front surface and a rear surface;

(d) a horizontally oriented middle shelf located between the upper and the lower shelves, the middle shelf having a front surface, a rear surface, and two half sections separated by vertically oriented medial connecting means connected to the middle shelf and to the upper shelf, the connecting means extending from the front surface to the rear surface of the middle shelf;

(e) the rear surface of the middle shelf being spacially separated from the back wall to define a cable storage space permitting simultaneous mounting of computer equipment on both the lower shelf and the middle shelf while continuously maintaining a cabling path of electrical conductivity between the equipment, the path of electrical conductivity thus being located within and above the area defined by the lower shelf, and

(f) strengthening means extending vertically and separately between the lower shelf and the upper shelf comprising:

(i) rear located strengthening members attached perpendicularly to the back wall, the lower shelf, and the upper shelf, the rear located members providing nominal barriers for protection of the equipment cabling and for electrical safety; and

(ii) forward located strengthening members attached perpendicularly to the lower shelf, the middle shelf, and the upper shelf, the rear located strengthening members and the forward located strengthening members being constructed and arranged to form side apertures in the device to permit cooling of electronic equipment located on each shelf and to provide side access to each shelf to facilitate installation and removal of equipment without separation of the cabling between the equipment.

5,020,450

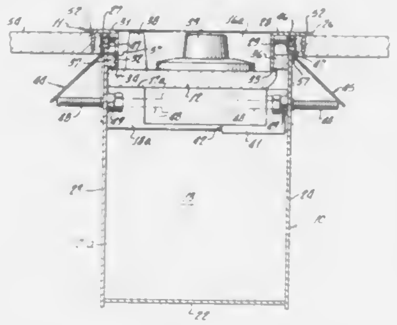
APPARATUS FOR MOUNTING A SAFE IN A FLOOR

Robert J. Lichter, 15571 Placid Cir., Huntington Beach, Calif. 92647

Filed May 22, 1990, Ser. No. 527,096

Int. Cl.^{5} E05G *1/00;* **G12B** *9/08*

U.S. Cl. 109—50 **3 Claims**



1. A combination floor section, floor safe, and mounting means for securing said floor safe in an opening in said floor section, comprising:

(a) a floor section having an opening therein,

(b) a floor safe having a body that defines a valuables chamber, having an access opening to said valuable chamber, and having a strong door that blocks said access opening and prevents ingress to said valuables chamber except by a person capable of opening said door,

said safe having a flange extending outwardly therefrom in the vicinity of said access opening,

said flange being sufficiently large to engage the upper surface of said floor section around said opening in said floor section to thereby prevent said safe from moving downwardly farther than permitted by said flange,

said body of said safe having gap means therein relatively adjacent the underside of said flange,

(c) wing means provided exteriorly of said safe and extending downwardly from upper edge portions of said wing means to lower distal portions that are located substantial distances beneath the underside of said floor section,

said wing means having flanges at the upper ends thereof and which extend into said gap means,

said flanges of said wing means cooperating with the body of said safe at an underside of said gap means to

VOL
1127
ISS
1
JE
4
1991
UMI

prevent said wing means from moving downwardly relative to said safe, and

(d) elongate threaded fastener means threaded through walls of said safe and having outer ends disposed to engage said wing means at locations spaced substantial distances from said flanges of said wing means,

said threaded fastener means being threaded outwardly to maintain said wing means in spread relationship relative to said safe whereby the lower corners of said floor section at said opening therein are engaged by said wing means to thus prevent pulling of said safe through said floor opening.

5,020,451
FLUIDIZED-BED COMBUSTION FURNACE

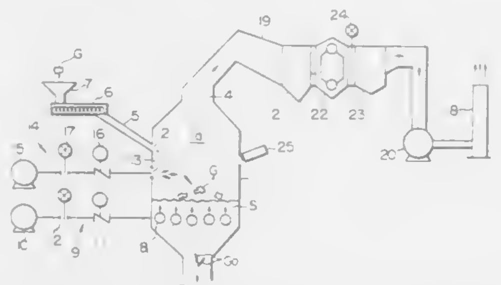
Kunji Maebo, Kasukabe, and Shigeru Hirabayashi, Kure, both of Japan, assignors to Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan

Filed Oct. 3, 1990, Ser. No. 592,258

Claims priority, application Japan, Oct. 5, 1989, 1-260918; Nov. 30, 1989, 1-311750

Int. Cl.⁵ F23N *5/18*

U.S. Cl. 110—189 4 Claims



1. A means for providing a feedback control system of combustion processes in a fluidized-bed incinerator wherein a solid furnace charge is converted to gaseous products in two consecutive stages:

(a) first-stage combustion generating a mixture of gaseous and particulate products of combustion, and

(b) second-stage combustion wherein said products of combustion are further treated with supplemental air;

wherein said control system regulates.

(c) feedback signals from the radiative energy of the first-stage combustion process to provide timely control of the volume of supplemental air to be supplied to the secondary combustion region.

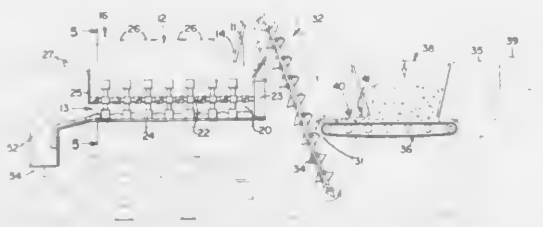
5,020,452
THERMAL REMEDIATION APPARATUS AND METHOD

David T. Rybak, Fridley, Minn., assignor to Murya, Inc., New Brighton, Minn.

Filed Oct. 11, 1989, Ser. No. 419,894

Int. Cl.⁵ F23D *11/00*

U.S. Cl. 110--241 41 Claims



1. A thermal remediation apparatus for the combustion of hydrocarbon contaminants within particulate fill, said apparatus comprising:

(a) a chamber having an inlet, an outlet, an exhaust port, means for combusting the fill contaminants within the chamber, and paddle means for agitating the fill into an air suspension in the path of said combusting means, said combusting means comprising at least one burner and said agitating paddle means comprising a mill;

(b) a condenser having an inlet and an outlet, said condenser inlet in communication with the exhaust port of said combustion chamber; and

(c) a fan affixed adjacent said condenser outlet.

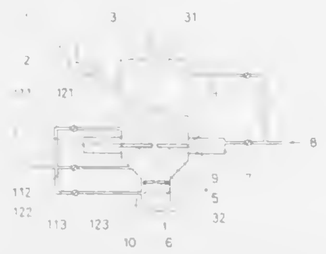
5,020,453
VERTICAL INCINERATOR

Seizo Katsui, Osaka, Japan, assignor to Kabushiki Kaisha Plantec, Osaka, Japan

Filed Feb. 12, 1990, Ser. No. 478,396

Int. Cl.⁵ F23G *5/04*

U.S. Cl. 110—255 8 Claims



1. A vertical incinerator for burning general refuse and industrial wastes which comprises:

a furnace equipped with a gas exit at its top and an ash withdrawal port at its bottom,

a plurality of sets of grates adapted to open and close and divide said furnace into a plurality of combustion chambers when closed,

a refuse feeder communicating with said furnace at the top thereof and adapted to feed refuse in metered amounts to the upper part of said combustion chambers,

means for blasting cooling air against at least one of said sets of grates, and combustion air feeding means adapted to feed air for combustion to said combustion chambers, said sets of grates being opened and closed relatively in the order of the uppermost to the lowermost set to let the refuse drop successivley from the upper part of combustion chamber to the lower part of combustion chamber while it is burned and the ashes produced by combustion being discharged from said ash withdrawal port.

5,020,454
CLUSTERED CONCENTRIC TANGENTIAL FIRING SYSTEM

Todd D. Hellewell, North Granby; John Grusha, Windsor, and Michael S. McCartney, Bloomfield, all of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Oct. 31, 1990, Ser. No. 606,682

Int. Ct.⁵ F23D *1/02*

U.S. Cl. 110—264 19 Claims

1. In a fossil fuel-fired furnace having a plurality of walls embodying therewithin a burner region, a clustered concentric tangential firing system comprising:

a. a windbox mounted within the burner region of the fossil fuel-fired furnace;

b. a first pair of fuel compartments mounted at a first elevation within said windbox;

c. a cluster of fuel nozzles supported in mounted relation within said first pair of fuel compartments;

d. an air compartment mounted at a second elevation within said windbox such as to be located substantially in juxtaposed relation to said first pair of fuel compartments;

e. an air nozzle supported in mounted relation within said air compartment;

f. a second pair of fuel compartments mounted at a third elevation within said windbox;

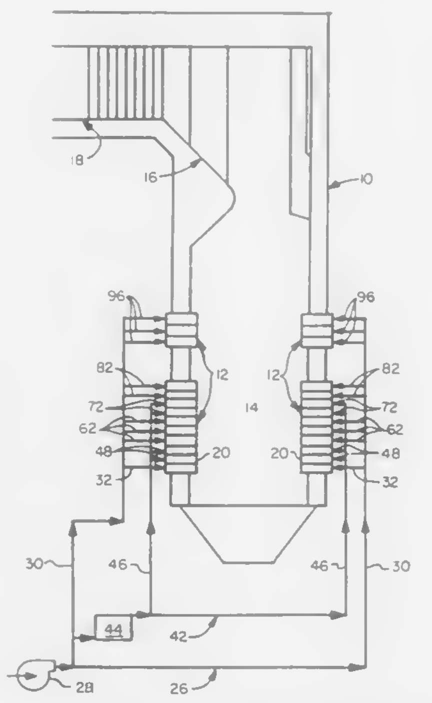
g. a pair of fuel nozzles supported in mounted relation within said second pair of fuel compartments.

h. a close coupled overfire air compartment mounted at a fourth elevation within said windbox;

i. a close coupled overfire air nozzle supported in mounted relation within said close coupled overfire air compartment;

j. a separated overfire air compartment mounted within the burner region of the fossil fuel-fired furnace so as to be spaced from said close coupled overfire air compartment and so as to be substantially aligned with the longitudinal axis of said windbox;

k. a separated overfire air nozzle supported in mounted relation within said separated overfire air compartment,



l. a fuel supply means connected to said cluster of fuel nozzles and to said pair of fuel nozzles, said fuel supply means being operative to supply fuel to said cluster of fuel nozzles and therethrough into the burner region of the fossil fuel-fired furnace so as to create a fuel-rich zone therewithin, said fuel supply means further being operative to supply fuel to said pair of fuel nozzles and therethrough into the burner region of the fossil fuel-fired furnace; and

m. an air supply means connected to said air nozzle, to said close coupled overfire air nozzle and to said separated overfire air nozzle, said air supply means being operative to supply a sufficient amount of air to said air nozzle and to said close coupled overfire air nozzle and therethrough into the burner region of the fossil fuel-fired furnace so that the stoichiometry within said windbox is approximately 0.85, said air supply means further being operative to supply a sufficient amount of air to said separated overfire air nozzle and therethrough into the burner region of the fossil fuel-fired furnace so that the stoichiometry within the burner region of the fossil fuel-fired furnace above said windbox is approximately 1.0.

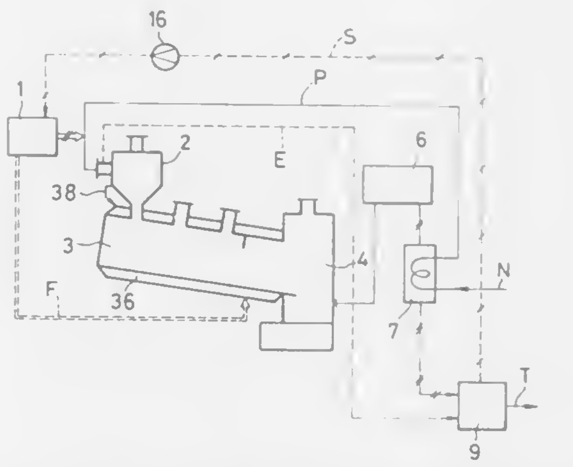
5,020,455
SYSTEM FOR TREATING WASTE MATERIAL IN A MOLTEN STATE

Ishida Takashi; Yoshikazu Ueda; Teruji Kubota; Misao Igarashi; Norichika Tanaka, and Yasuhiko Kamijo, all of Tokyo, Japan, assignors to Chiba City & Tsukishima Kikai Kubushiki Kaisha, Japan

Filed Jan. 3, 1990, Ser. No. 460,579

Int. Cl.⁵ F23B *7/00*

U.S. Cl. 110—342 9 Claims



1. In a process for treating waste material in the form of sludge in a molten state wherein said sludge is first dried, the dried sludge is then treated at a high temperature in the atmosphere of a swirling flow to generate molten slag and said molten slag is cooled later, the improvement comprising.

drying said sludge by means of steam in a drier,

mixing the dried sludge with combustion air which is preheated to a temperature in the range of 400° to 600° C.,

subjecting the mixture of dried sludge and air to primary combustion at a temperature in the range of 1000° to 1200° C. while maintaining a swirling flow state,

feeding combustion air and a fluidized mixture derived from said primary combustion into a secondary combustion furnace, burning said fluidized mixture at a temperature in the range of 1350° to 1450° C. in said secondary combustion furnace while maintaining a swirling flow state, forming waste gas and completely molten slag in said secondary combustion furnace,

discharging completely molten slag from the secondary combustion furnace to a slag discharging section, cooling said molten state, conveying condensed water from said drier to a heating jacket mounted around the secondary combustion furnace, heating said condensed water from a temperature lower than about 90° C. coming from a drier up a temperature in the range of 180° to 190° C., delivering the resultant hot water to a boiler together with waste gas discharged from the secondary combustion furnace to generate steam in said boiler, said waste gas being transferred to fresh air by heat exchanging between the waste gas and said fresh air, reducing the pressure of said steam to a level so as to allow the pressure reduced steam to be used in said drier as heating medium, transferring a part of the thermal energy in said waste gas to fresh air by heat exchange between the waste gas and said fresh air to thereby preheat said air, and

distributing the thus preheated air for combustion to the primary combustion furnace and the secondary combustion furnace for use as combustion air therein.

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,456

PROCESS AND APPARATUS FOR EMISSIONS REDUCTION FROM WASTE INCINERATION

Mark J. Khinkis, Morton Grove; Hamid A. Abbasi, Darien, both of Ill.; Robert A. Lisauskas, Shrewsbury, and Daniel C. Itse, Blackstone, both of Mass., assignors to Institute of Gas Technology, Chicago, Ill.

Filed Feb. 28, 1990, Ser. No. 486,065

Int. Cl.⁵ F23J *11/00*

U.S. Cl. 110—345 **30 Claims**

1. A process for waste combustion comprising the steps of:
(a) introducing the waste into a drying zone within a combustion chamber;
(b) supplying air to the drying zone for preheating, drying, and partially combusting the waste
(c) advancing the waste to a combustion zone within the combustion chamber;
(d) supplying air to the combustion zone for further combustion chamber;
(e) advancing the waste to a burnout zone within the combustion chamber;
(f) supplying air to the burnout zone for final burnout of organics in the waste;
(g) injecting fuel and recirculated glue gases into the combustion chamber above the waste to create a reducing secondary combustion zone;
(h) supplying overfire air into the combustion chamber above the secondary combustion zone for thorough mixing and final burnout of combustibles in combustion products of the waste in a tertiary combustion zone;
ash from the combustion chamber:
(i) removing
(j) ejecting vitiated air from the burnout zone; and
(k) injecting the vitiated air into the combustion chamber for thorough mixing and final burnout of combustibles in combustion products of the waste in the tertiary combustion zone.

5,020,457

DESTRUCTION OF ACID GAS EMISSIONS

Mahendra P. Mathur, Pittsburgh, Pa.; Yuan C. Fu, Muroran, Japan; James M. Ekmann, and John M. Boyle, both of Pittsburgh, Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

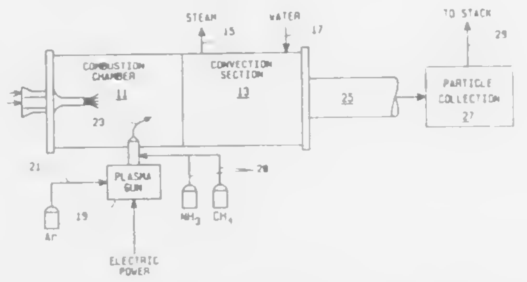
Filed Jun. 22, 1990, Ser. No. 541,992

Int. Cl.⁵ F23J *11/00*

U.S. Cl. 110—345 **17 Claims**

1. A method of destroying NO_x and SO_2 species in a combustion gas comprising;

generating active species by treating stable molecules in a high temperature plasma;



injecting the active species into the combustion gas at a location where the combustion gas is at a sufficiently high temperature to maintain the species in active state.

5,020,458

SEWING MACHINE, PARTICULARLY FOR EDGING OR HEMMING MATERIALS

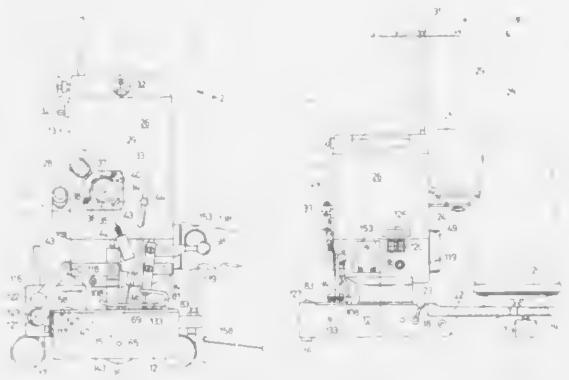
Stefan Michelberger, Weikersheim, Fed. Rep. of Germany, assignor to Maximilian Janser, Fed. Rep. of Germany

Filed Jan. 5, 1990, Ser. No. 461,500

Claims priority, application Fed. Rep. of Germany, Jan. 5, 1989, 3900209

Int. Cl.⁵ D05B *23/00*

U.S. Cl. 112—7 **18 Claims**



1. A sewing machine for edging a material comprising:
a machine frame provided with a drive motor;
a sewing mechanism coupled to said motor including a straight needle;
conveying means for conveying said material relative to the sewing mechanism, a holder for supplying at least one binding thread introduced via said straight needle from above;
means for forming a loop of said thread, a cutting device for cutting the material including a relatively fixed counterknife, a drivable knife mounted for movement in an oscillating manner, upstream of a path of movement of said needle mechanism and engageable with said counterknife, knife drive means for driving said knife, a switching device for switching said knife drive means on and off during operation of said straight need, a sensor for sensing the presence or absence of said material for automatically controlling said switching device and said sensor being positioned in a base part of said sewing machine forming a material support table for said material.

5,020,459

BLIND STITCH SEWING MACHINE AND BLIND STITCHING METHOD

Kohsuke Yuyama, Yamagata, Japan, assignor to Suzuki Manufacturing Co., Ltd., Japan

Filed Sep. 1, 1989, Ser. No. 401,920

Claims priority, application Japan, Sep. 14, 1988, 63-231355

Int. Cl.⁵ D05B *1/24, 57/06*

U.S. Cl. 112—178 **10 Claims**

1. A blind stitch sewing machine comprising:
a needle plate having an aperture;
a press member and spring means for biasing said press member against a first surface of said needle plate to clamp a workpiece therebetween;
work feed means for feeding the workpiece in a first linear path along said first surface of said needle plate as the workpiece is blind-stitched,
a straight needle mounted on the opposite side of said needle plate relative to said first surface;
a needle guide which, in cooperation with said needle plate, defines a confined straight path for the motion of said needle, said needle guide pressing said needle downward against said needle plate;
needle drive means for driving said needle with linear reciprocating motion in a second linear path, said second linear path being parallel to said needle plate and orthogonal to said first linear path during stitching;
work engaging means for pushing a portion of the workpiece through said aperture into said second path to allow said needle to pierce said workpiece; and
a looper and looper drive means for driving said looper in synchronized cooperation with said motion of said needle to blind stitch the workpiece with a single-yarn chain stitch.

5,020,460

METHOD AND APPARATUS FOR ALIGNING A FABRIC PLY IN A SEWING MACHINE

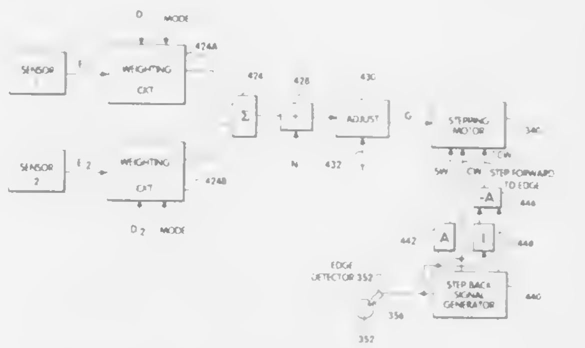
Edward S. Babson, Ipswich; Thomas G. Brophy, Gloucester, and Michael R. Porter, Topsfield, all of Mass., assignors to Porter Sewing Machines, Inc., Beverly, Mass.

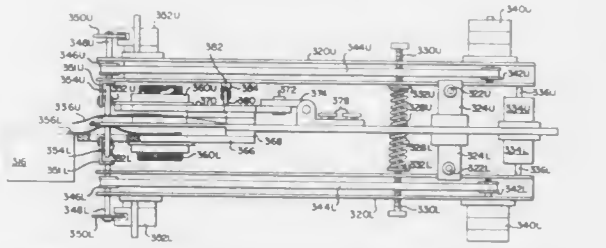
Continuation-in-part of Ser. No. 52,577, May 20, 1987, Pat. No. 4,825,787. This application May 1, 1989, Ser. No. 345,404

Int. Cl.⁵ D05B *35/10, 21/00*

U.S. Cl. 112—262.3 **39 Claims**

32. A method for aligning a ply of material moving in a prescribed direction and preferably through a desired path of travel prior to stitching at a sewing head in a sewing machine, the method comprising the steps of:
sensing the transverse position of said ply at at least two points in said travel path;
weighting the results of the sensing step;
combining the results of the weighting step in a predetermined way; and
utilizing the results of the combining step to control a transverse force component applied to said ply by a guide





means, said transverse force component modifying the alignment of said ply.

5,020,461

LOWER THREAD AMOUNT DISPLAY DEVICE OF SEWING MACHINE

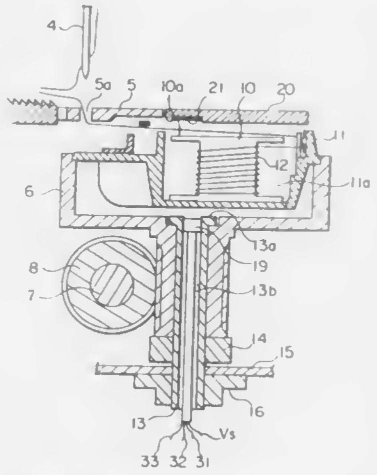
Susumu Hanyu, and Kenji Kato, both of Tokyo, Japan, assignors to Janome Sewing Machine Company Limited, Tokyo, Japan

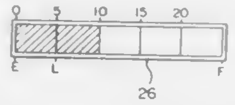
Filed Jul. 13, 1990, Ser. No. 553,446

Claims priority, application Japan, Jul. 14, 1989, 1-180160

Int. Cl.⁵ D05B *59/02*

U.S. Cl. 112—278 **3 Claims**





1. A lower thread amount display device of a sewing machine having a rotatable drive shaft which is rotated to vertically reciprocate a machine needle through a throat plate, a hook operatively connected to the drive shaft and rotated in synchronism with the vertical reciprocation of the needle

VOL
1127
ISS
1
JE
4
1991
UMI

carrying an upper thread, the hook being rotated around a vertical stationary shaft below the throat plate and having a bobbin carrier located therein, the bobbin carrier carrying a bobbin therein, the bobbin having a central axis and two substantially transparent flanges, one of said flanges being on one end of the central axis and the other of said flanges being on the opposite end of the central axis, the bobbin having a lower thread wound around the central axis thereof, and a cover plate located above the hook and cooperating with the throat plate to provide a flat place for carrying a fabric thereon to be sewn, the machine needle and the hook cooperating with each other to form lock stitches with the upper and lower threads,

said lower thread amount display device comprising:

photosensor means mounted on said central axis, said photosensor means including a light emitting element and a light receiving means, the light emitting element being arranged such that light from said light emitting element illuminates an under surface of said cover plate through an opening formed on a bottom of said bobbin carrier and through said substantially transparent flanges of said bobbin;

reflecting means provided on the under surface of said cover plate for reflecting the light from said light emitting element toward said light receiving means;

means for converting an amount of light received by said light receiving means to an amount of said lower thread wound around the central axis of said bobbin; and

display means for displaying said amount of said lower thread wound around the central axis of said bobbin, said display means including a plurality of light emitting diodes arranged in alignment and defining a plurality of display regions.

5,020,462

SLACKENED NEEDLE THREAD ASSURING UNIT

Shuichi Sato; Yoshiharu Kobayashi, and Shirou Ayusawa, all of Utsunomiya, Japan, assignors to SSMC Inc., Edison, N.J.

Filed Aug. 18, 1989, Ser. No. 395,835

Claims priority, application Japan, Sep. 30, 1988, 63-244258

Int. Cl.^{5} 112 *253, 254, 255, 292, 300, 302*

U.S. Cl. 112—302 **3 Claims**

1. A slackened needle thread assuring unit for a sewing machine, the sewing machine having a bed, the unit comprising

a frame secured to the bed, said frame having front side and bottom walls;

a needle bar having a needle and mounted on the bottom wall of the frame;

a thread tension member mounted on the side wall of said frame;

a thread takeup positioned above said thread tension member on the side wall;

a support plate attached to the front wall of said frame;

a needle thread successively threaded into the thread tension member, the thread takeup, and the needle;

a needle/bobbin thread cutter disposed in spaced apart position from and under the frame for cutting the needle thread;

a thread end holder positioned adjacent to the needle bar for holding an end of the thread to be cut by the needle/bobbin thread cutter;

a thread guide extending across the front wall of said frame having one end supported by said support plate and another free end defining a hook, said hook being adapted for threading the thread into the thread tension member, the thread takeup, and the needle; and

a drive means supported by the support plate for reciprocally moving the hook in a direction substantially perpendicular to a threading direction of the needle thread.

5,020,463

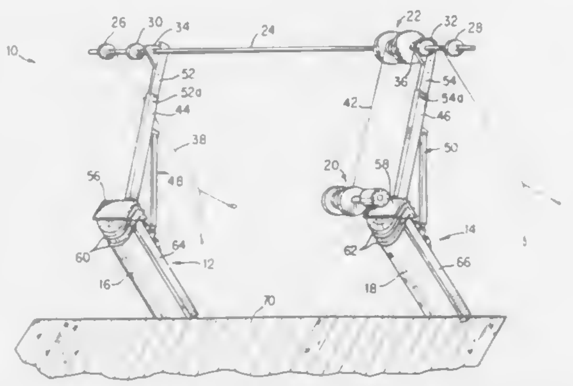
ARRANGEMENT FOR RAISING OR LOWERING BOATS OR THE LIKE

Robert E. Franklin, HCR 67, Box 2576, Jamaica, Va. 23079, and Philip L. Hill, IV, Rte. 2, Box 5, Rockville, Va. 23146

Filed Dec. 18, 1989, Ser. No. 452,171

Int. Cl.^{5} B63B *21/00*

U.S. Cl. 114—230 **12 Claims**



1. An arrangement which is attachable to a pier for raising or lowering a vessel while the orientation of said vessel remains substantially unchanged, said pier including a first and a second pier piling and a pier decking having an upper surface, said first and second pier pilings each being substantially vertically oriented, said first and second pier pilings each including an upper projection above said upper surface of said pier decking and a lower extension beneath said upper surface of said pier decking, said arrangement comprising:

a first and a second stanchion respectively mounted substantially vertically on each of said first and second pier pilings along said upper projection and further at least along a portion of said lower extension;

a first and a second davit each having a near end mounted on said first and second stanchion respectively, each of said first and second davits having a far end disposed substantially vertically above said vessel while said vessel is being raised or lowered;

a rotatable drive axle extending between respective said far ends of said first and second davits;

self-aligning bearing means mounted on each of said first and second davits proximally to each respective said far end to rotatably bear said rotatable drive axle;

first and second pick-up means disposed on said rotatable drive axle for raising or lowering said vessel; and

electrical motor means operatively associated with one of said first and second davits and with said rotatable drive axle for rotating said rotatable drive axle so as to cause said first and second pick-up means to raise or lower said vessel;

whereby said self-aligning bearing means is operative to compensate for misalignments between respective said far ends of said first and second davits;

wherein said rotatable drive axle is disposed at a horizontal distance from said first and second stanchions so that said vessel is maintained at a given lateral distance from said pier.

5,020,464

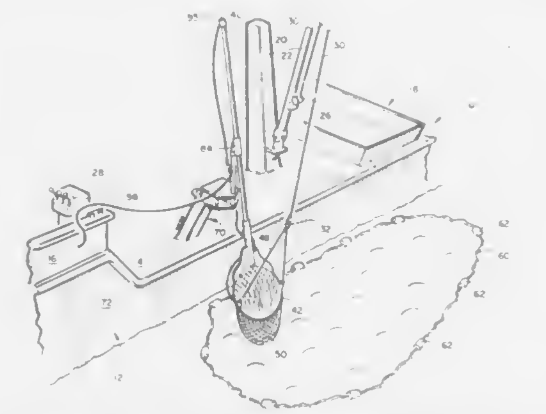
BRAILING SYSTEM FOR COMMERCIAL FISHING BOATS

Augusto R. Rodrigues, 5061 Camino Playa Portofino, San Diego, Calif. 92124

Filed Apr. 30, 1990, Ser. No. 516,531

Int. Cl.^{5} A01K *79/00*

U.S. Cl. 114—255 **8 Claims**



1 A brailing system for commercial fishing boats comprsing:

a fishing ship having a hull with upright oriented lateral side walls and a top deck, a mast extending upwardly from said top deck;

an elongated boom having a top end and a bottom end, the bottom end of said boom being pivotally connected to a swivel assembly mounted on structure on said top deck;

a fish unloading station on said top deck;

an upright support standard having a top end and a bottom end and a longitudinally extending axis, the bottom end of said support standard being secured to said top deck;

a post attachment support assembly connected to the top end of said support standard;

a vertically oriented tubular post having a top end and a bottom end, said bottom end being secured to said post attachment support assembly;

an elongated brailer pole having a front end and a rear end, said brailer pole having a predetermined diameter D1, a net support ring mounted on the front end of said pole;

a brailer net having a top end and a bottom end, said top end formed into a closed loop having a diameter substantially equal to that of said net support ring, the bottom end of said net having means for completely closing it to trap fish in its interior and also for opening it so that fish captured there within can be unloaded;

a tubular sleeve having an internal diameter slightly larger than D1 and said brailer pole is reciprocally positioned therein;

means for pivoting said tubular sleeve about a horizontal axis so that said brailer net can be dipped into a pursing net full of fish; and

means connected to the top end of said tubular post for permitting said tubular sleeve to be pivoted about a vertical axis.

5,020,465

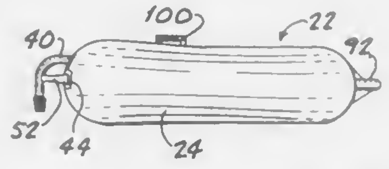
COUPLEABLE FLOTATION APPARATUS FORMING LINES AND ARRAYS

Frederick Langford, 212 Crest Rd., Cape May Court House, N.J. 08210

Filed Nov. 15, 1989, Ser. No. 437,445

Int. Cl.^{5} B63B *7/00*

U.S. Cl. 114—345 **26 Claims**



13 A coupling for a flotation body, comprising:

a mounting plate to be fixed to a wall of the flotation body;

a coupling prong having a proximal end attached to the mounting plate, the coupling prong having a proximal section extended outwardly from the wall of the flotation body and a distal section turned vertically from the proximal section, the distal section being spaced from the mounting plate; and,

a coupling ring attached to said mounting plate, the coupling ring having an opening dimensioned to complement a respective said coupling prong attached to a second said mounting plate and defining an axis parallel to an axis of the coupling prong, the coupling ring being spaced laterally from the coupling prong.

5,020,466

BREAKDOWN SIGNAL DEVICE

Jörg Mätzener, Bosshardstr. 6, CH-8051 Zürich, Switzerland

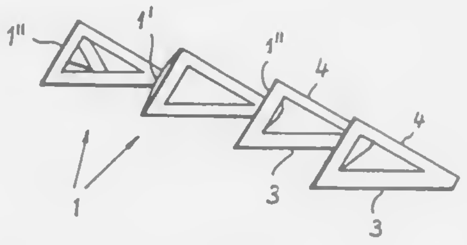
PCT No. PCT/CH89/00001, § 371 Date Aug. 30, 1989, § 102(e) Date Aug. 30, 1989, PCT Pub. No. WO89/06200, PCT Pub. Date Jul. 13, 1989

PCT Filed Jan. 5, 1989, Ser. No. 415,251

Claims priority, application Switzerland, Jan. 7, 1988, 42/88

Int. Cl.^{5} E01F *13/00*

U.S. Cl. 116—63 P **7 Claims**



1. A breakdown signalling device characterized by a plurality of triangular-shaped panels, each panel having oppositely disposed first and second connecting edges and first and second free edges lying between said connecting edges, said panels being connected in series with like connecting edges hingedly connected together such that adjacent panels are oppositely directed, said device further including first means for hinging adjacent first connecting edges together and second means for hinging adjacent second connecting edges together, said plurality of panels being foldable into a congruently superimposed stack of panels for storage and being extendable in a zigzag manner with one free edge of each adjacent panel engaging the ground to permit said panels to be supported in an upright position upon the ground and thereby form a barrier.

VOL
1127
ISS
1
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1991
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5,020,467

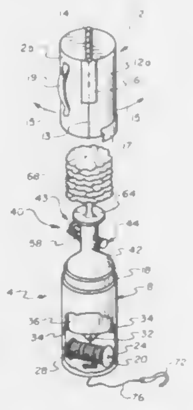
BALLOON SIGNALLING SYSTEM

Norman Van Patten, 564 S. 1st East, Springville, Utah 84663, and Blaine Van Patten, 16 La Vesta Verde-Rancho, Palo Verde, Calif. 90274

Filed May 1, 1989, Ser. No. 345,363

Int. Cl.^{5} B64B *1/50*

U.S. Cl. 116—210 8 Claims



8 A balloon signalling system comprising

a hollow, generally cylindrical casing having a container section with an upper open end and a bottom closed end, and a cap placeable on and removable from the upper end of the container section,

a spool on which a tether may be wound, said spool being disposed in the container section near the bottom end thereof to rotate about an axis which is generally transverse with the cylindrical axis of the casing,

a cartridge containing lighter-than-air gas under pressure and including a tether attachment end and a nozzle end, said nozzle end having a valve disposed therein, and a valve mechanism extending from the nozzle end for grasping to enable opening of the valve to allow gas to escape from the cartridge through the nozzle end, said tether attachment end having means for attaching the cartridge to a tether, and

an inflatable balloon having an opening which fits over and is retainable on the nozzle end of the cartridge so that when the valve is opened, gas flows from the cartridge to the halloon to inflate the balloon, said balloon being collapsible to fit within the cap of the casing,

said cartridge being dimensioned for insertion into the container section of the casing so that the nozzle end and valve mechanism are exposed when the cap is removed from the container section,

said nozzle end of the cartridge includes a neck portion, a plug disposed in the neck portion and having a bore therein which is generally parallel with the neck and through which gas may pass into and out of the cartridge, and a cross opening extending transversely through the neck portion and plug to intersect with the bore, said bore having a smaller width than the width of the opening, and wherein said valve includes a valve key movably disposed in the cross opening to block passage of gas through the bore in one position, and allow the passage of gas through the bore in another position,

said valve key comprises a push rod slidably disposed in the cross opening and extending outwardly on each side of the neck position, with first and second buttons mounted on first and second ends of the push rod, said push rod having a narrowed section, with said push rod being moveable between said one position, in which the narrowed section is pushed out of alignment with the bore to block the passage of gas, and said other position, in which the narrowed section is pushed into alignment with the bore to allow the passage of gas,

spring means mounted between the neck portion and the first button to urge the first button and first push rod end away from the neck portion to said other position, and

catch means extending from the neck portion and moveable between an engage position, in which the catch means engages and prevents the second button and second push rod end from moving toward the neck portion, and a release position, in which the catch means is disengaged from the second button to allow the second button and second push rod end to move toward the neck portion to said one position.

5,020,468

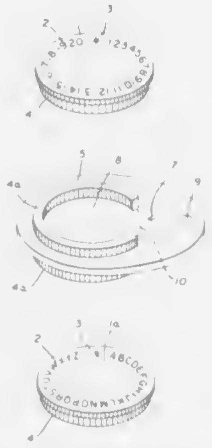
COMBINATION VEHICLE PARKING PLACE LOCATOR COIN AND KEYHOLDER

Joseph M. Ciminelli, 531 4th St., Struthers, Ohio 44471

Continuation-in-part of Ser. No. 394,971, Aug. 17, 1989, abandoned. This application Aug. 20, 1990, Ser. No. 510,617

Int. Cl.^{5} G09F *11/00;* A45C *1/00*

U.S. Cl. 116—318 5 Claims



1. A combination vehicle parking place locator, coin and key holder comprising;

a central body having a front and back faces, a C-shaped wall extending from each said face, first index means located centrally of and adjacent to an opening in the C-shaped wall of each said face, and means for attaching a key chain to said body;

first and second circular discs, each of said disc having inner and outer surfaces, the inner surface of each said disc includes a C-shaped wall with an outer diameter that is smaller than an inner diameter of the C-shaped walls of said body so as to be rotatably mounted within one of said C-shaped walls of said body, the outer surface of each said disc having indicia and a second index means thereon, said second index means being aligned centrally of an opening in the C-shaped wall on the inner surface of each said disc;

a coin holder on opposite sides of said body defined by one of the faces of said body, the inner surface of one of the discs and their respective C-shaped walls, whereby manual rotation of said discs to cause alignment of said first index means with said second index means aligns the openings in the C-shaped walls of the body and discs so as to permit the insertion and removal of a coin therethrough said openings;

means for frictionally securing said discs to said body, whereby the discs may be manually rotated to selectively align the indicia of each disc with respective first index means on the faces of said body to designate a vehicle's location in a parking area.

5,020,469

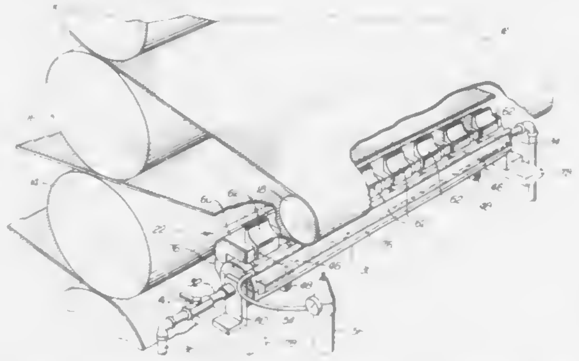
CROSS-DIRECTIONAL STEAM APPLICATION APPARATUS

Mathew G. Boissevain, Los Altos; Tobias J. Boissevain, Mountain View, and Anthony D. Foskett, San Jose, all of Calif., assignors to Measurex Corporation, Cupertino, Calif.

Filed Jan. 27, 1989, Ser. No. 303,494

Int. Cl.^{5} B05C *12/00*

U.S. Cl. 118—67 10 Claims



7. The apparatus of claim 1, wherein the bucket nozzle includes:

(a) a first deflector of the plurality of defectors disposed so as to deflect the working fluid as it vents from a valve, whereby the deflection by the first deflector decreases the velocity of the working fluid;

(b) the container for collecting the deflected working fluid and removing liquid therefrom, the container having a plurality of sides and a bottom having at least a first drain orifice through which the liquid is discharged; and

(c) means for discharging the working fluid at a further reduced velocity.

5,020,470

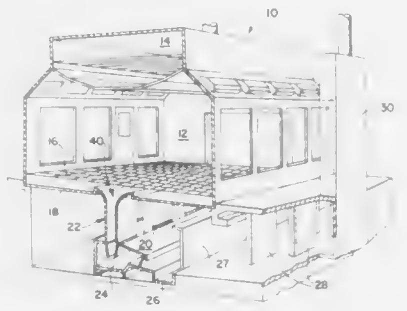
WET SCRUBBER APPARATUS AND PAINT SPRAYBOOTH IN COMBINATION WITH WET SCRUBBER APPARATUS

Kenneth J. West, and Andrew Slater, both of Troy, Mich., assignors to Haden Schweitzer Corporation, Madison Heights, Mich.

Filed Aug. 31, 1989, Ser. No. 402,217

Int. Cl.^{5} B05B *15/12;* B01D *47/00*

U.S. Cl. 118—326 12 Claims



1. A paint spraybooth comprising:

an application chamber in which paint may be applied to an article to be painted;

a partition extending across said application chamber below the article to be painted;

a scrubber chamber located below said partition including a receptacle for containing water;

a discharge structure defining a fluid passageway between said application chamber and said scrubber chamber;

means for supplying water onto said partition and through said discharge structure;

means for conveying air containing paint particulate from said application chamber into and through said discharge structure; and

said discharge structure including an elongated inlet channel and a plurality of discrete discharge tubes, said inlet channel having a top and a bottom and converging sidewalls depending from said partition at the top of said channel; said discharge tubes each having sidewalls and endwalls extending from the bottom of said channel and forming a discharge port directed at the receptacle of said scrubber chamber; said inlet sidewalls and said discharge tube sidewalls joining together to form a substantially continuous and generally unobstructed surface to permit unimpeded flow of said water as said water moves from said application chamber into the receptacle of said scrubber chamber.

5,020,471

DEVELOPING UNIT

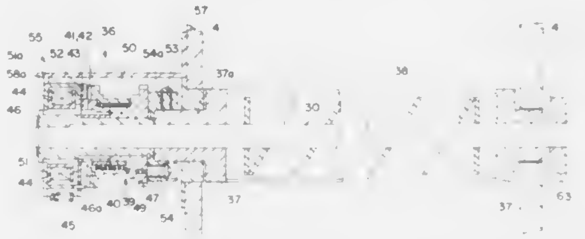
Tamio Yoshikai, Kyoto, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 16, 1989, Ser. No. 367,184

Claims priority, application Japan, Jul. 6, 1988, 63-90106

Int. Cl.^{5} G03G *15/06*

U.S. Cl. 118—653 8 Claims



1. A developing unit comprising:

a developing roller disposed in a developer tank in a location facing a recording medium;

a supply passage for supplying developer to the developing roller;

a shut-off device that is rotatable about the center axis thereof for opening and closing the supply passage;

switching means that is provided with a spring clutch for transmitting rotational driving force to the shut-off device and is used for switching the shut-off device between the open and closed states; and

a stopping position correcting mechanism for preventing variations in the stopping position of the shut-off device, said correcting mechanism having a clutch fixing plate mounted with screws on the outer wall of the developer tank such that the position of the clutch fixing plate is adjustable around the center axis of said shut-off device and an engaging plate projecting from said clutch fixing plate and engaging with the case of said spring clutch.

5,020,472

WAX COATING DEVICE

Hiroshi Kiba, and Hajime Akeno, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jun. 7, 1989, Ser. No. 362,603

Claims priority, application Japan, Jun. 8, 1988, 63-140913

Int. Cl.^{5} B05B *13/02*

U.S. Cl. 118—668 8 Claims

1. A coating device for application of corrosion protection wax on a lower surface of a floor panel of a vehicle transferred by a slat conveyor, comprising:

first robot means for coating a first area with corrosion protection wax, formed within the lower surface of the

VOL
1127
ISS
1
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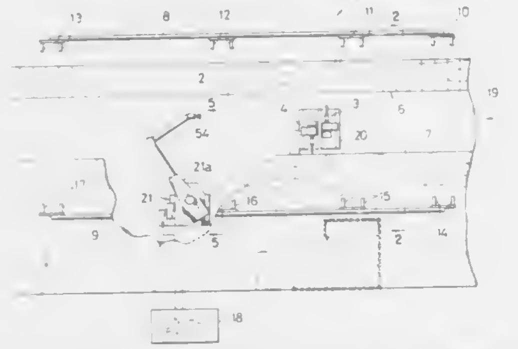
4
1991
UMI

floor panel at opposite peripheral portions of the floor panel to extend in a transfer direction in which the vehicle is transferred,
second robot means for coating a second area with corrosion protection wax, formed within the lower surface of the floor panel between the opposite peripheral portions,
control means for controlling movement of said first and second robot means,
nozzle means provided on said first and second robot means for injecting the corrosion protection wax upwardly, the first and second robot means being arranged so as to be spaced from each other in the transfer direction and mounted in a chamber formed below the vehicle being transferred, the nozzle means on the first robot means extending transversely and projecting above the conveyor,



first robot drive means included in said control means for reciprocating the first robot means transversely within the first area as the vehicle is transferred, and
second robot drive means included in said control means for controlling movement of the second robot means with regard to five different axes so that the second robot means reciprocates longitudinally and transversely within the second area as the vehicle is transferred.

5,020,473

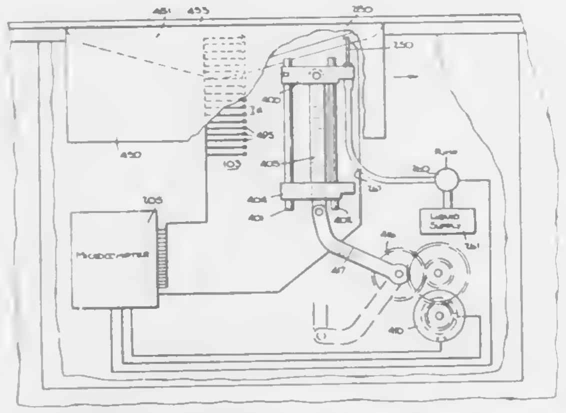
CONTROL SYSTEM FOR NOZZLE POSITIONING MOTOR

Norman J. Bergman, Danbury, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,461

Int. Cl.^{5} B05B *13/04*

U.S. Cl. 118—669 **3 Claims**



1. A moistening arrangement for moistening a flap of an envelope said flap having a varying width, comprising a nozzle for moistening said flap of said envelope, a source of first signals that are a function of said width of said flap, a motor coupled to provide relative movement between said nozzle and said flap, and control means responsive to said first signals for controlling said motor to vary the relative positions of said flap and nozzle in a direction for moistening said flap at determined positions thereof, said control means comprising means responsive to said first signals for determining a rate of change of said width, means responsive to said rate of change being below a determined rate of change for controlling said motor to move in a servo mode, and means responsive to said rate of change being above said determined rate of change for controlling said motor to move in a torque mode.

5,020,474

APPARATUS FOR VAPOR PHASE EPITAXIAL GROWTH

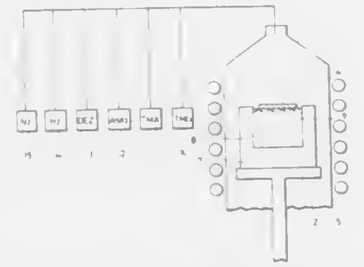
Toshio Tanaka, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 13, 1989, Ser. No. 379,389

Claims priority, application Japan, Jul. 21, 1988, 63-182110

Int. Cl.^{5} C23C *16/46*

U.S. Cl. 118—725 **18 Claims**



1. An apparatus for vapor phase epitaxial growth on a substrate by introducing a raw material gas or gas mixture for thin film formation onto a heated substrate, comprising:
a reactor tube,
a raw material gas supplying means for supplying a raw material gas or gas mixture for thin film formation into said reactor tube,
a substrate having a thin film receiving side and a reverse side,
a liquid tank disposed within said reactor tube,
a melt stored in said liquid tank and allowed to come into contact with the reverse side of said substrate, the reverse side of the substrate being coated with a protective film for preventing reaction between the substrate and the melt, and
a heating means for heating said melt to thereby heat said substrate to a desired temperature by heat conduction from said melt.

5,020,475

SUBSTRATE HANDLING AND TRANSPORTING APPARATUS

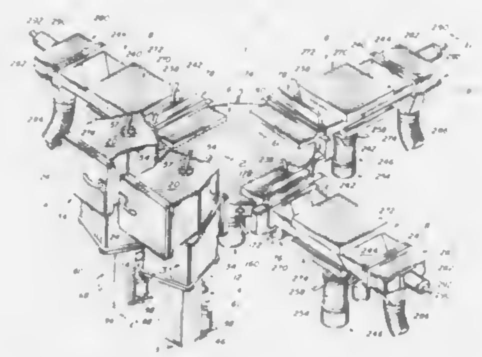
Richard Crabb, Mesa; McDonald Robinson, Paradise Valley; Mark R. Hawkins, Mesa; Dennis L. Goodwin, Tempe, and Armand P. Ferro, Scottsdale, all of Ariz., assignors to Epsilon Technology, Inc., Tempe, Ariz.

Division of Ser. No. 108,771, Oct. 15, 1987, Pat. No. 4,828,224. This application Feb. 24, 1989, Ser. No. 315,723

Int. Cl.^{5} C23C *16/00*

U.S. Cl. 118—719 **40 Claims**

1. A chemical vapor deposition system for processing substrates comprising:
(a) a substrate handling sub-system including a housing defining a handling chamber having at least one substrate input port, at least one substrate output port, at least one one substrate delivery port and having pick-up means for moving substrates one at a time between the input, output and delivery ports of said housing;
(b) a substrate loading sub-system connected to the input port of said handling sub-system for receiving at least one planar substrate to be processed from an external source and moving it to a predetermined position for movement by said pick-up means of said handling sub-system from the input port to the delivery port thereof;
(c) a processing sub-system coupled to the delivery port of said handling sub-system for receiving the substrate to be processed from said pick-up means of said handling sub-system, said processing sub-system including,
I. a reaction chamber means coupled to the delivery port of said handling sub-system,



II. a susceptor in said reaction chamber for receiving the substrate to be processed,
III. means for injecting a reactant gas into said reaction chamber for depositing a material carried thereby on the substrate receivable on said susceptor; and
(d) a substrate unloading sub-system coupled to the outlet port of said handling sub-system for receiving a processed substrate from the pick-up means of said handling sub-system and moving it to an off-loading position.

5,020,476

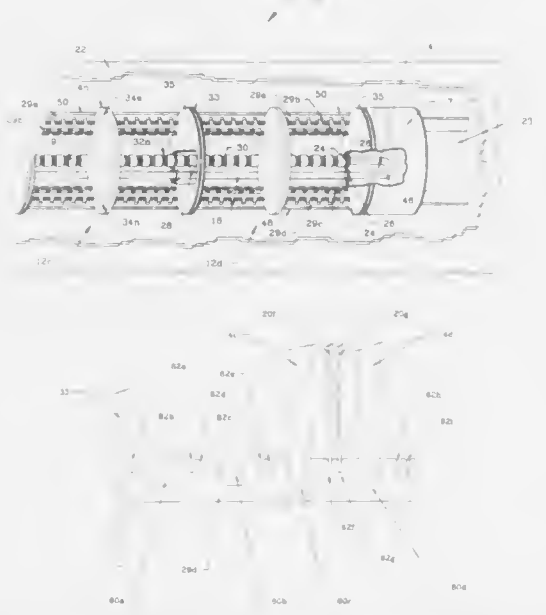
DISTRIBUTED SOURCE ASSEMBLY

Steven T. Bay, San Jose, and Dan Prince, Irvine, both of Calif., assignors to DS Research, Inc., San Jose, Calif.

Filed Apr. 17, 1990, Ser. No. 509,750

Int. Cl.^{5} C23C *16/00*

U.S. Cl. 118—728 **20 Claims**



1. Apparatus for producing thin film coatings and/or dopant levels on or in semiconductor wafers or other substrates with improved film growth uniformity (of thickness and composition) and/or dopant uniformity, comprising:
a. a set of rails slotted for support of substrates to be processed at desired spacings and also slotted;
b. a primary injection tube having ball joint fittings at each end for mating with other manifold link fixtures and linked by small tubes to a secondary injection tube;
c. a secondary injection tube having ball joint fittings at each end for mating with other manifold link fixtures and slotted and recessed at intervals; and,
d. a plurality of gas distribution discs or plates resting on the recesses cut into said secondary injector, facing said substrates, fed by said slots cut into the secondary injector, and including a number of small openings in both faces for the uniform distribution of process gases or vapors to the surfaces of the substrates.

5,020,477

AUTOMATIC MILKING DEVICE AND METHOD OF OPERATION THEREOF

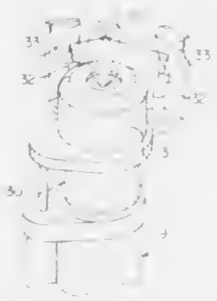
Jacobus P. M. Dessing, Nieuw-Vennep; Pieter J. Roodenburg, Lelystad; Erik A. Aurik, Amsterdam, and Fokko P. Borgman, Witteueen, all of Netherlands, assignors to Multinorm B.V., Nieuw-Vennep, Netherlands

Filed Jan. 9, 1989, Ser. No. 294,794

Claims priority, application Netherlands, Jan. 8, 1988, 8800042; Feb. 4, 1988, 8800272; Jul. 13, 1988, 8801785

Int. Cl.^{5} A01J *7/00*

U.S. Cl. 119—14.08 **10 Claims**



1 An automatic milking device comprising a plurality of milking cups to be placed around the teats of a cow, moving means for moving said cups into operative position relative to the teats of a cow, and control means for controlling the movement of said moving means, said control means including ultrasonic detector means, said ultrasonic detector means comprising a plurality of ultrasonic detectors spaced from one another, each of said ultrasonic detectors comprising a transmitter for transmitting ultrasonic waves and a receiver for receiving ultrasonic waves, each of the transmitters producing an ultrasonic detection field, the detection fields intersecting one another at a position spaced from said transmitters, and substantially conical reflection surface means disposed adjacent the transmitters and receivers for reflecting ultrasonic waves transmitted by said transmitters to obtain a detection field of predetermined dimensions and for reflecting ultrasonic waves received by said receivers to determine the area within which the ultrasonic waves are reflected back to said receivers.

5,020,478

ANIMAL RESTRAINING DEVICE

Gene Salvatore, 912 S. Temple Blvd., Temple, Pa. 19560

Filed Apr. 4, 1990, Ser. No. 503,954

Int. Cl.^{5} A61D *3/00*

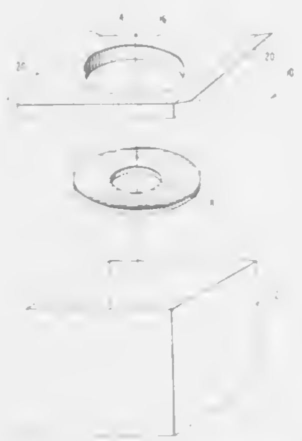
U.S. Cl. 119—98 **9 Claims**

1. An animal restraining device for permitting a human to safely attend to caring for an animal comprising:

VOL
1127
ISS
1
JE
4
1991
UMI

a base having a peripheral side wall for surrounding said animal,

a cover having an opening for the animal's head, wherein said cover is to be placed over the animal's head and is capable of movement relative to the base so that said animal is comfortably restrained within the base to be able to move the cover within a predetermined range relative to the base while the human is safely protected from injury from the lower or rear extremities of the animal;



wherein said cover comprises a substantially flat plate-like member arranged to fit within the inside of the base to be moved up and down in the base on the shoulders of the animal; and

wherein said cover includes flaps extending at the peripheral edge of the cover into contact with an inner side wall of the base to create a frictional fit between the cover and the base.

5,020,479
WATERTUBE BOILER AND ITS METHOD OF COMBUSTION

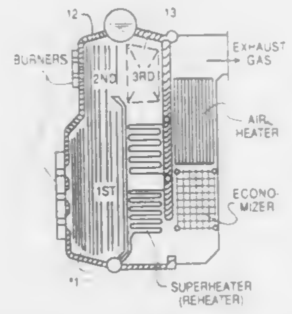
Yasuhiko Suesada; Takashi Moriyama; Junichi Sugioka, and Hiroshi Tahara, all of Osaka, Japan, assignors to The Kansai Electronic Power Company Inc. and Hirakawa Iron Works, Ltd., both of Osaka, Japan

Filed Aug. 29, 1989, Ser. No. 400,053

Claims priority, application Japan, Sep. 10, 1988, 63-227181

Int. Cl.⁵ F22B *15/00*

U.S. Cl. 122—235.11 **6 Claims**



1. A watertube boiler, comprising:

a furnace having a heat absorption chamber;

a burner directed into said heat absorption chamber of said furnace for combusting air and fuel in a combustion path in said heat absorption chamber;

a plurality of furnace water tubes extending along the inside walls of said furnace; and

a plurality of heat absorption water tubes forming a heat absorption watertube unit of said furnace extending through said heat absorption chamber, said unit having a relatively dense arrangement of said plurality of heat absorption water tubes, and said unit being disposed in said combustion path of said burner such that the flame of the burner will impinge on said unit.

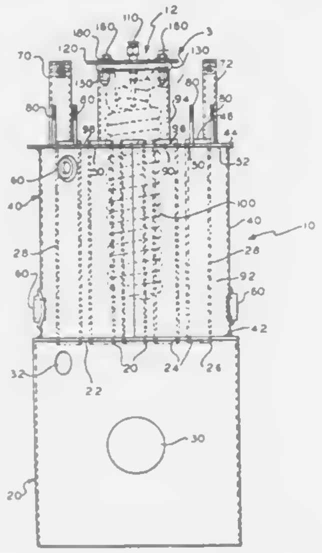
5,020,480
ARRANGEMENT FOR SECURING AND SEALING A COIL ASSEMBLY TO A BOILER

Samad Pooyan, Chappaqua, N.Y., assignor to Ford Products Corporation, Valley Cottage, N.Y.

Continuation of Ser. No. 453,764, Dec. 20, 1989, abandoned. This application Jul. 6, 1990, Ser. No. 549,625

Int. Cl.⁵ F22B *21/00*

U.S. Cl. 122—249 **26 Claims**



1. An arrangement for securing and sealing a coil assembly to a boiler including boiler walls defining the boiler and a chamber therewithin wherein boiler fire tubes are disposed and within which a space is provided of a predetermined size and configuration sufficient to receive at least a first portion of the coil assembly; comprising.

(a) an opening formed through a wall of the boiler proximate the space provided therewithin;

(b) sleeve means including wall means having a first wall end secured to the boiler in proximity to and so as to surround said opening, and extending from said first wall end to a second wall end spaced from said first wall end and defining within said wall means an area of a predetermined size and configuration to receive therewithin at least a second portion of the coil assembly;

(c) resilient sealing means disposed along said second wall end and so as to extend downwardly therefrom so as to remain disposed in position thereon;

(d) coil assembly plate means carrying the coil assembly and being formed to a size and configuration to be positioned upon said resilient sealing means when disposed along said second wall end and for cooperation therewith;

(e) a plurality of releasable fastening means each extending through a respective fastener opening formed through said coil assembly plate means and in spaced relationship thereabout and through a tubular fastener positioner means carried by said sleeve means in alignment with a respective one of said fastener openings such that when fastened said coil assembly plate means is secured in position upon said second wall end of said sleeve means and said resilient sealing means is squeezed therebetween to provide an effective seal between said second end of said sleeve means and said coil assembly plate means.

5,020,481
THERMAL INSULATION JACKET

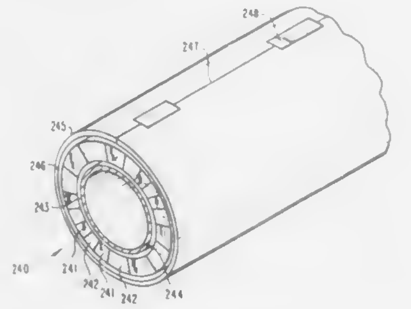
Thomas E. Nelson, 6100 Old La Grange Rd., Crestwood, Ky. 40014

Continuation of Ser. No. 412,923, Sep. 26, 1989, which is a continuation-in-part of Ser. No. 309,658, Feb. 13, 1989, Pat. No. 4,878,459. This application Aug. 22, 1990, Ser. No. 571,135

The portion of the term of this patent subsequent to Nov. 27, 2007, has been disclaimed.

Int. Cl.⁵ F22B *37/36*

U.S. Cl. 122—494 **1 Claim**



1. A method of thermally insulating an inner member by an outer jacket comprises the steps of:

providing said inner member;

forming a flexible, generally rectangular insulation panel with a cover member and a thickness of insulation received by said cover member, said thickness of insulation being an alternating series of flexible insulation strips and rigid insulation strips;

flexing said insulation panel around said inner member into a generally cylindrical shape; and

securing said insulation panel so as to maintain said generally cylindrical shape and to enclose said thickness of insulation.

5,020,482
DEVICE FOR COOLING A CHARGED PISTON INTERNAL-COMBUSTION ENGINE

Herbert Deutschmann, Friedrichshafen, Fed. Rep. of Germany, assignor to MTU Friedrichshafen, Friedrichshafen, Fed. Rep. of Germany

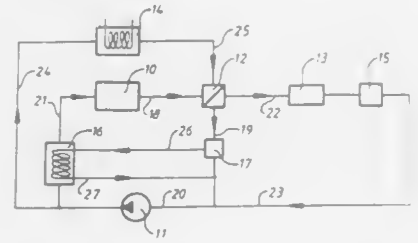
PCT No. PCT/DE89/00417, § 371 Date Mar. 19, 1990, § 102(e) Date Mar. 19, 1990, PCT Pub. No. WO90/01111, PCT Pub. Date Feb. 8, 1990

PCT Filed Jun. 23, 1989, Ser. No. 490,687

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1988, 3824412

Int. Cl.⁵ F01P *3/00*

U.S. Cl. 123—41.29 **3 Claims**



1. A device for cooling a charged piston internal combustion engine equipped with a charge air cooler and a coolant recooler, comprising:

a closed coolant circulating system having several circulating-system branches with a common coolant pump;

a change-over device for controlling coolant flow to the several circulating-system branches which selectively connects a coolant outlet pipe of the piston internal combustion engine and a coolant outlet pipe of the coolant recooler with a coolant inlet pipe of the charge air cooler and a charge air cooler bypass pipe; and

a heat exchanger arranged in a coolant inlet pipe of the piston internal combustion engine which is provided with coolant from the charge air cooler bypass pipe under the control of a thermostat valve.

5,020,483
INTAKE SYSTEM FOR TWO CYCLE INTERNAL COMBUSTION ENGINE

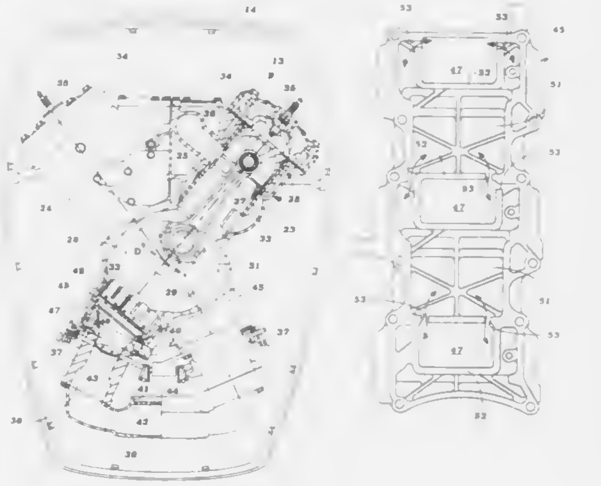
Eifu Watanabe, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jan. 30, 1990, Ser. No. 472,340

Claims priority, application Japan, Jan. 31, 1989, 1-22429

Int. Cl.⁵ F02M *35/10*

U.S. Cl. 123—52 MV **19 Claims**



1. An induction system for a V-type crankcase compression two cycle internal combustion engine having a pair of angularly disposed cylinder banks extending from a crankcase defining compression crankcase chamber sections for the individual cylinders of the respective cylinder banks, and a pair of angularly related intake passages having respective longitudinal central axes for delivering a charge to the crankcase chamber sections of the respective cylinder banks, the angle between said central axes of said intake passages being less than the angle between the cylinder banks.

5,020,484
LUBRICATING SYSTEM FOR A TWO-CYCLE ENGINE

Hideyuki Ishikawa, Ohmiya; Mitsugi Chonan, Ibaragi; Fusao Tachibana, and Shinichi Kurosu, both of Saitama, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 12, 1990, Ser. No. 596,789

Claims priority, application Japan, Nov. 6, 1989, 1-129951; Dec. 28, 1989, 1-151505

Int. Cl.⁵ F02B *33/04*

U.S. Cl. 123—73 AD **3 Claims**

1. A lubricating system for a two-cycle engine having an intake passage including an intake port and a fuel injector

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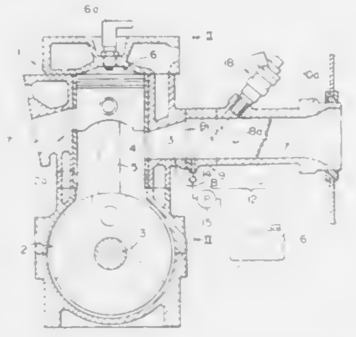
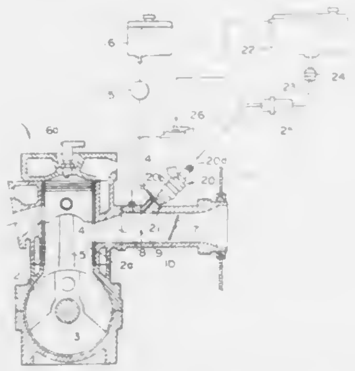
provided on a wall of the intake passage for injecting fuel toward the intake port, comprising





lubricating oil supply means provided on the wall of the intake passage for supplying lubricating oil to the intake passage so as to mix with fuel injected from said fuel injector.

5,020,485
TWO-CYCLE ENGINE

Hideo Watanabe, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 2, 1990, Ser. No. 488,354

Claims priority, application Japan, Mar. 27, 1989, 1-34540

Int. Cl.⁵ F02B *33/04*

U.S. Cl. 123—73 C 3 Claims

1 A two-cycle engine having at least one cylinder, a piston reciprocating in the cylinder, a combustion chamber defined in the cylinder, a scavenge port and an exhaust port formed on a wall of the cylinder, a fuel injector provided in the combustion chamber for injecting fuel directly therein, and a spark plug provided in the cylinder, wherein:

- a top of the combustion chamber has an offset cavity with a hemispherical shape in vertical section, and being located opposite to the exhaust port;
- the spark plug is located at a top portion of the cavity;
- the fuel injector is inserted in the cylinder at an angle to a plane passing through the longitudinal central axis of the cylinder and at a predetermined angle with respect to a crown of the piston to inject the fuel in the opposite direction to the discharge direction of the exhaust port, and
- the crown of the piston has a recess corresponding to the cavity and the fuel injector, and the recess has a bottom wall with substantially the same inclination angle with respect to said plane as that of the fuel injector

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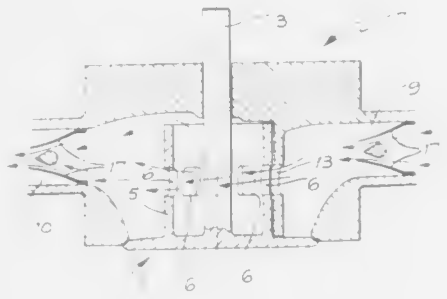
5,020,486
PARTITIONED POPPET VALVE MECHANISM SEPRATING INLET AND EXHAUST TRACTS

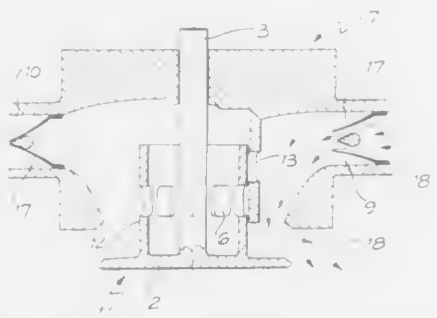
Paul T. Unger, Lot 9, Collie's Lane, Mardi, NSW 2259, Australia

Filed Oct. 3, 1990, Ser. No. 592,216

Int. Cl.⁵ F01L *1/28*

U.S. Cl. 123—79 R 6 Claims





1 A valve mechanism for a reciprocating piston internal combustion engine having one or more combustion chambers, said mechanism comprising a single poppet valve having a head and a stem for each combustion chamber, said valve being actuated by a drive mechanism to move between open and closed positions at predetermined times in the operating cycle of the piston, an inlet tract arranged to supply inlet gases to one side of the upper face of the poppet valve, an exhaust tract arranged to remove exhaust gases from the opposite side of the face of the poppet valve, a partition separating the inlet and exhaust tracts and having one or more gas flow ports therethrough, one or more gas flow ports in the stem of the valve arranged to align with the ports in the partition when the valve is closed permitting gases to flow from the inlet tract through the aligned ports and out the exhaust tract, and non-return valves in the inlet and exhaust tracts allowing gases in the inlet tract to flow only toward the valve, and gases in the exhaust tract to flow only away from the valve.

5,020,487
INTERNAL COMBUSTION ENGINE WITH LOAD-RESPONSIVE VALVE CONTROL FOR COMBUSTION CHAMBER SCAVENGING

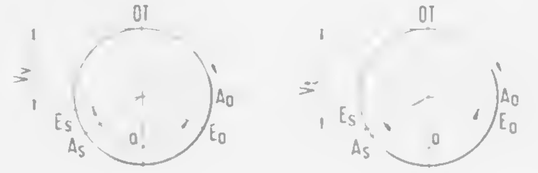
Hermann Krüger, Wolfsburg, Fed. Rep. of Germany, assignor to Volkswagen, Wolfsburg, Fed. Rep. of Germany

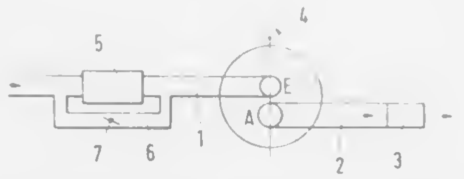
Filed Mar. 27, 1990, Ser. No. 499,890

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1989, 3913706

Int. Cl.⁵ F01L *1/34*

U.S. Cl. 123—90.15 11 Claims





1 An internal combustion engine comprising a cylinder having a combustion chamber and a piston movable in the cylinder, at least one intake valve communicating with the combustion chamber, at least one exhaust valve communicating with the combustion chamber, wherein the opening phases of the intake valve and the exhaust valve overlap at the bottom dead center position to permit combustion chamber scavenging with fresh gas, and wherein the compression stroke is defined by the closing time of the intake valve or the intake valve last to close, respectively, and the top-dead-center position of the piston and the power stroke is defined by the top-dead-center position of the piston and the opening time of the exhaust valve or the exhaust valve first to open, respectively, and valve control means for increasing the compression stroke with decreasing engine load by advancing the closing time of the intake valve or at least the intake valve last to close, respectively, as a function of load.

5,020,488
VALVE MECHANISM FOR AN INTERNAL COMBUSTION ENGINE

Kenzo Watanabe, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 12, 1990, Ser. No. 596,770

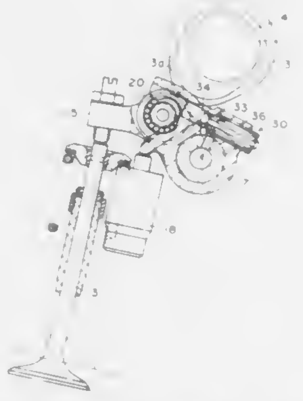
Claims priority, application Japan, Nov. 22, 1989, 1-306077; Nov. 22, 1989, 1-306078

Int. Cl.⁵ F01L *1/34, 1/18*

U.S. Cl. 123—90.16 4 Claims

1 A valve mechanism for an internal combustion engine having at least one intake valve and at least one exhaust valve, a cam shaft having a low-speed cam and a high-speed cam, a low-speed rocker arm operatively connected to said at least one of said valves and a high-speed rocker arm which are rocked by the cams to operate the at least one valve, changeover means for connecting the low-speed rocker arm and the high-speed rocker arm with each other so as to be rocked together by the high-speed cam, an improvement of the mechanism comprises:

- a base circle of said low-speed cam having a larger diameter than that of the base circle of the high-speed cam;
- a roller follower rotatably mounted on a shaft provided in the low-speed rocker arm, a part of a peripheral portion of the roller follower being projected from the low-speed rocker arm to be engaged with the low-speed cam;
- said high-speed rocker arm having a slipper engaging with the high-speed cam; and



- said changeover means comprising a piston slidably mounted in said high-speed rocker arm and means for pushing the piston so as to connect the high-speed rocker arm with the low-speed rocker arm.

5,020,489
INTERCONNECTION ARRANGEMENT FOR DIESEL ENGINE PREHEATING APPARATUS

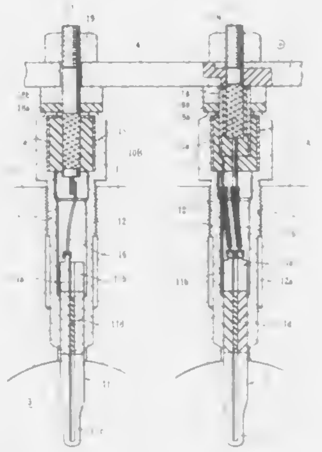
Hatanaka Koji, and Aota Takashi, both of Saitama, Japan, assignors to Jidosha Kiki Co., Ltd., Japan

Filed Jan. 22, 1990, Ser. No. 468,403

Claims priority, application Japan, Feb. 13, 1989, 1-14590[U]

Int. Cl.⁵ F02B *9/08;* **F23Q** *7/22*

U.S. Cl. 123—145 A 8 Claims



1. A device for facilitating electrical interconnection of a plurality of body grounded glow plugs arranged in corresponding cylinder chambers of a multi-cylinder diesel engine, the plurality of glow plugs including at least one unipolar glow plug having a central external connecting terminal and at least one bipolar glow plug having first and second external connecting terminals, said device comprising:

- a first terminal connecting plate having a central body portion and a pair of end portions each provided with an aperture, each one of said apertures being sized to receive the first external connecting terminal of a bipolar glow plug, said apertures being spaced to accommodate the separation distance between the first external connecting terminals of a pair of bipolar glow plugs when installed in a diesel engine;
- a second terminal connecting plate having a body portion

VOL
1127
ISS
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1991
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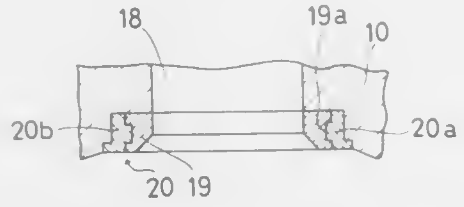
with a longitudinally extending opening terminating at opposite ends thereof adjacent thin-walled inwardly offset portions o said body portion, said opening being sized to receive said first terminal connecting plate; and

insulating means interposed between said first and second terminal connecting plates for providing electrical isolation therebetween,

said inwardly offset lower portions of said second terminal connecting plate providing electrical connection to the second external connecting terminal of a bipolar glow plug when secured thereto.

5,020,490
VALVE SEAT ARRANGEMENT

Hideo Seko, Gifu, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan
Filed Jan. 19, 1990, Ser. No. 467,167
Claims priority, application Japan, Jan. 19, 1989, 1-4824[U]
Int. Cl.^{5} F01L *3/00*
U.S. Cl. 123—188 S **4 Claims**



1. A valve seat arrangement for a combustion chamber of an internal combustion engine having an aluminum cylinder head comprising:

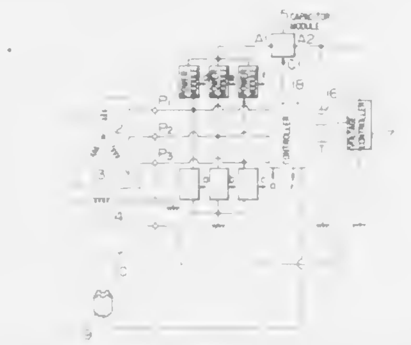
a valve actuating mechanism disposed in said internal combustion engine;
an exhaust conduit extending from said combustion chamber;
a valve movable between a first position for permitting communicating between said combustion chamber and said exhaust conduit and a second position blocking said communication;
a valve seat provided in said cylinder head for said valve when said valve is in said second position wherein said valve seat is made of ceramic; and
a valve seat holder formed in two separate semi-circular portions, each portion having a flange in contact with the cylinder head leading to the exhaust conduit, the valve seat holder arranged between the valve seat and the cylinder head.

5,020,491
METHOD AND APPARATUS FOR CONTROLLING POWER GENERATION IN INTERNAL COMBUSTION ENGINES

Keiichi Mashino, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan
Filed Aug. 8, 1989, Ser. No. 390,760
Claims priority, application Japan, Aug. 12, 1988, 63-199891
Int. Cl.^{5} F02B *75/06*
U.S. Cl. 123—192 R **9 Claims**

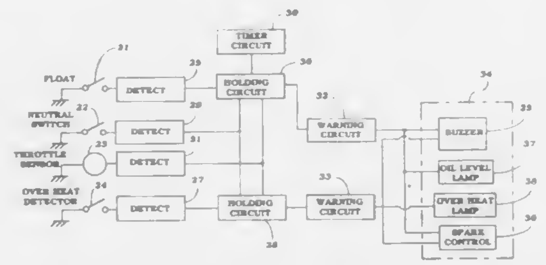
1. A power generation control apparatus for an internal combustion engine comprising:

an ac generator including a plurality of armature windings and driven by said engine;
power storage means for storing power supplied from said ac generator;
a selector circuit for detecting an electromotive force difference generated by said plurality of armature windings to select one of said windings to be energized;
a plurality of rectifiers for respectively rectifying outputs of said plurality of armature windings;
a plurality of switch elements connected in parallel with said plurality of rectifiers to apply the power stored in said power storage means to said selected armature winding in response to a signal from said selector circuit;
a position sensor for detecting a rotational angle of said engine; and
a control unit responsive to a rotational speed signal generated by differentiating an engine rotational speed signal generated by said position sensor to control in such a manner that a generated output from said armature windings is supplied to said power storage means through said plurality of rectifiers to apply a rotational load to said engine when said rotational speed is greater than a time average value thereof and the power from said power storage means is selectively supplied to said armature windings through said plurality of switch elements to supply a torque to said engine when said rotational speed is smaller than said time average value.



5,020,492
WARNING SYSTEM FOR MARINE PROPULSION ENGINE

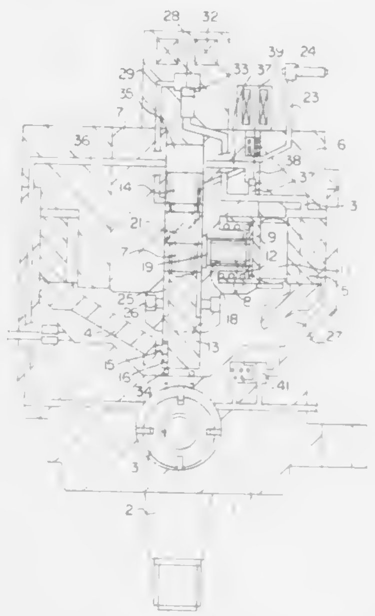
Isao Kanno, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan
Filed Aug. 28, 1990, Ser. No. 573,852
Claims priority, application Japan, Aug. 28, 1989, 1-221333
Int. Cl.^{5} F02B *77/00*
U.S. Cl. 123—198 D **2 Claims**



1. A warning system for an engine having an abnormal condition sensor, warning means for providing a warning in the event the abnormal condition has been sensed, reset means for permitting the operator to reset the warning means to a non-warning condition, and timer means for maintaining the warning means in a warning mode for a predetermined time period even if the reset device is set before the time period expires.

5,020,493
DISTRIBUTOR FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

André Brunel, St. Genis Laval, France, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany
Filed Dec. 4, 1989, Ser. No. 445,052
Claims priority, application Fed. Rep. of Germany, Jan. 7, 1989, 3900318
Int. Cl.^{5} F02M *41/00;* **F02B** *77/00*
U.S. Cl. 123—198 DB **20 Claims**

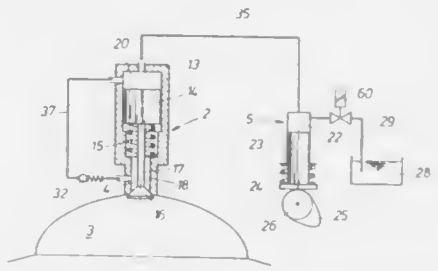


1. A distributor fuel injection pump for internal combustion engines, comprising, a housing, a suction chamber and a distributor piston in said housing;

a driven cam ring;
at least one pump piston driven via said cam ring counter to a restoring force for a reciprocating working stroke;
said pump piston including a pump work chamber;
a distributor piston, the axis of which extends at right angles to the axis of the pump piston and which with the pump piston defines a pump work chamber, a distributor groove and longitudinal intake grooves disposed parallel to the distributor piston axis in the jacket face of the distributor piston, said longitudinal intake grooves can be made to communicate via intake conduits with said suction chamber and the distributor groove can be made to communicate with pressure lines leading to the engine, wherein said distributor groove is offset relative to the longitudinal intake grooves for the distributor motion such that via these grooves an opening of the intake conduits and pressure lines is not simultaneously possible;
a controlled longitudinal displacement of said distributor piston, in which after execution of a predetermined stroke said longitudinal intake grooves are made to communicate with said suction chamber for pressure relief of said pump work chamber,
said distributor piston including a control face extending obliquely to the axis thereof; upon the longitudinal displacement of the distributor piston (**14**), by means of said control face (**51**) extending obliquely to the axis of the distributor piston (**14**), a relative rotation of the distributor piston (**14**) is effected such that during a compression stroke of the pump piston (8) said longitudinal intake grooves (**25**) are in coincidence with said intake conduits (**26**), so that the fuel in the pump work chamber is pumped directly back into the suction chamber (**27**).

5,020,494
METHOD AND DEVICE FOR FEEDING FUEL INTO THE COMBUSTION CHAMBER OF AN INTERNAL COMBUSTION ENGINE

Diethard Plohberger; Peter Herzog; Keith Elliott; Christof D. Fischer, and Josef Greier, all of Graz, Austria, assignors to Avl Gesellschaft Für Verbrennungskraftmaschinen und Messtechnik M.B.H. Prof.Dr.Dr.h.c. Hans List, Graz, Austria
PCT No. PCT/AT88/00061, § 371 Date Jun. 9, 1989, § 102(e) Date Jun. 9, 1989, PCT Pub. No. WO89/01568, PCT Pub. Date Feb. 23, 1989
PCT Filed Aug. 9, 1988, Ser. No. 350,560
Claims priority, application Austria, Aug. 12, 1987, 2039/87; May 18, 1988, 1303/88
Int. Cl.^{5} F02M *67/04*
U.S. Cl. 123—250 **12 Claims**



1. A method of feeding fuel into a combustion chamber of a cylinder of an internal combustion engine, wherein the following steps are discerned:

(a) timed withdrawal of a small amount of compressed hot gas via a valve opening into said combustion chamber of said cylinder during one working cycle;
(b) storage of said small amount of hot gas withdrawn, in a valve chamber of said valve;
(c) injection of fuel by a fuel pump at a given high fuel pressure into said valve chamber containing said small amount of hot gas, building a fuel-gas mixture;
(d) opening said valve by said fuel pump at a lower fuel pressure and injecting said fuel-gas mixture into said combustion chamber of said cylinder during the subsequent working cycle.

5,020,495
FUEL-METERING SYSTEM FOR INTERNAL COMBUSTION ENGINES

Güntber Plapp, Filderstadt, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany
PCT No. PCT/DE88/00047, § 371 Date Oct. 4, 1989, § 102(e) Date Oct. 4, 1989, PCT Pub. No. WO88/08077, PCT Pub. Date Oct. 20, 1988
PCT Filed Feb. 2, 1988, Ser. No. 427,858
Claims priority, application Fed. Rep. of Germany, Apr. 4, 1987, 3711398
Int. Cl.^{5} F02D *41/12, 41/34;* **F02M** *51/00*
U.S. Cl. 123—326 **18 Claims**

1. A fuel metering system for an internal combustion engine having operating characteristic quantities including speed, air flow and temperature, the engine being operable in an overrun mode from time to time and the system comprising:

control means for determining a first quantity of fuel to be metered to the engine per ignition interval in dependence upon at least one of said operating characteristic quantities;
overrun detecting means for detecting the presence of the overrun mode and for emitting a signal indicative thereof;
adjusting means for reducing said first quantity of fuel in response to said signal when the overrun mode of operation begins and for again allowing the fuel to be metered to the engine upon termination of the overrun mode;
enrichment means for acting on said adjusting means to

VOL
1127
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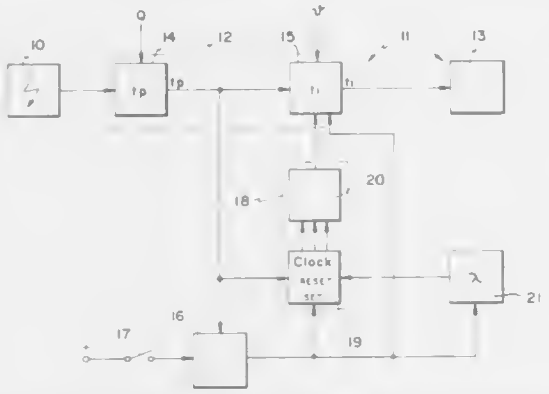
enrich said first quantity of fuel by a predetermined additional quantity after said termination of the overrun mode;
a lambda probe for generating an identifying signal indicative of an increased fuel component in the air/fuel mixture; and
means for interrupting the enrichment of said fuel quantity in response to said identifying signal.



5,020,496

APPARATUS HAVING A CONTROL MOTOR FOR INTERVENTION INTO A FORCE TRANSMISSION DEVICE

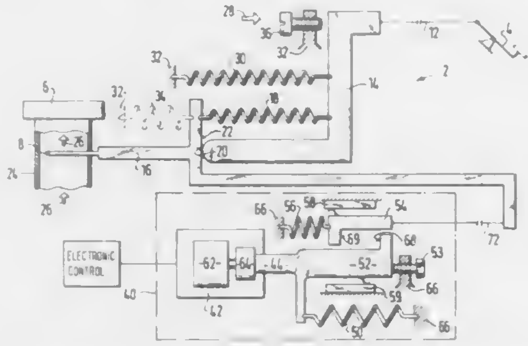
Werner Huber, Schwaikheim, and Guenter Spiegel, Worms, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Aug. 17, 1990, Ser. No. 568,813

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1989, 3934739

Int. Cl.^{5} F02D *7/00*

U.S. Cl. 123—399 **23 Claims**



1. An apparatus having a control motor (**42**) for intervention into a force transmission device (**2**) between an operating element (**4**) and a control device (**8**) that determines an output of a driving engine (**6**), said operating element is operatively connected to a first driver element (**14**) and said control device is operatively connected to a second driver element (**16**), a coupling spring (**18**) connected between said first and second driver elements, said coupling spring acts on one end on the first driver element and on the other on the second driver element such that said first and second driver elements are urged to execute a motion relative to one another until a coupling stop (**20**) of one driver element comes to rest on a coupling stop of the other drive element, said control motor, upon a desired intervention, can act via a third driver element (**52**) upon said second driver element (**16**) in a direction of reducing an output of the driving engine, an intermediate part (**54**) operatively connected to said second driver element (**16**) via a transmission means (**72**) via which said third driver element (**52**) can act upon the second driver element (**16**), said control motor (**42**), third driver element (**52**) and intermediate part (**54**) form parts of a final control element (**40**) that can be disposed spaced apart from the control device (**8**).

5,020,497

METHOD FOR CONTROLLING IGNITION TIMING OF AN ENGINE FOR MARINE VESSELS

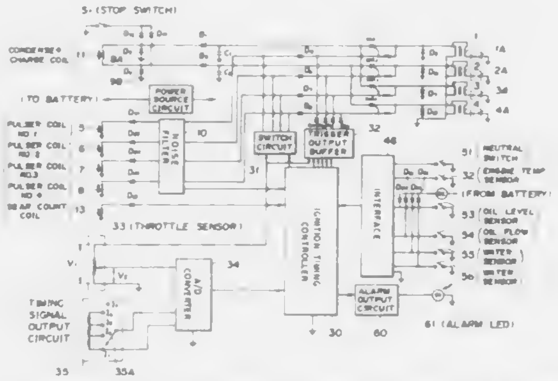
Kazubiro Umehara, and Tsugio Sugimoto, both of Shizuoka, Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Jan. 23, 1990, Ser. No. 469,039

Claims priority, application Japan, Jan. 31, 1989, 1-21668

Int. Cl.^{5} F02P *5/15*

U.S. Cl. 123—418 **3 Claims**



1. A method for controlling the ignition timing of an engine for use in a marine vessel comprising the step, when a sudden fluctuation of a load is to be generated in the engine through a connecting operation of the load at a low speed revolution of the engine, of spark advancing the ignition timing from a normal trolling time by a few degrees as said connecting operation is performed, and the step of terminating said spark advancing step a predetermined time interval after commencement thereof

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5,020,498

FUEL INJECTION APPARATUS

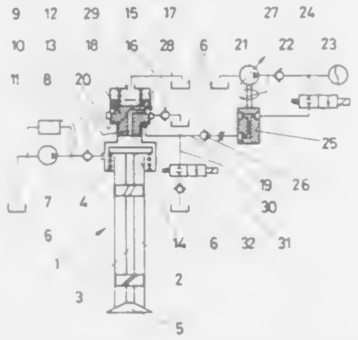
Ernst Linder, Muehlacker; Helmut Rembold, Stuttgart, and Manfred Wier, Anzing, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 18, 1989, Ser. No. 452,090

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1988, 3844365

Int. Cl.^{5} F02M *47/02, 45/08, 57/02*

U.S. Cl. 123—450 **19 Claims**



1. A fuel injection apparatus having an injection nozzle opening at predetermined pressure, to which fuel is deliverable under pressure, comprising an injection nozzle chamber (2) communicating with a fuel supply (**8**, **40**) provided with a check valve (**9**, **37**, **41**) closing toward the outside, said check valve adapted to maintain a pressure in the fuel supply line (**8**, **40**) lower than an opening pressure of the injection nozzle, the injection nozzle chamber (**2**) further communicating with a first work chamber (**14**) of a spring-loaded work piston (**12**, **43**, **44**), said spring-loaded work piston having an associated second work chamber (**20**) subject to spring loading from said work piston, said spring-loaded work piston being adapted to be displaced to increase pressure in the nozzle chamber (**2**) above the opening pressure of the injection nozzle (**1**) by relieving pressure in said second work chamber (**20**).

5,020,499

APPARATUS FOR DETECTING ABNORMALITY OF OXYGEN SENSOR AND CONTROLLING AIR/FUEL RATIO

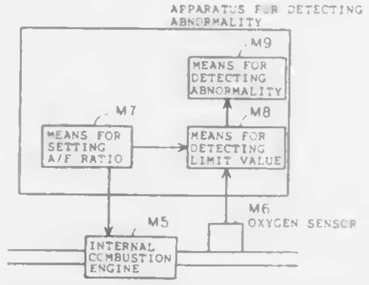
Takao Kojima, Nagoya; Masaru Yamano, Komaki, and Toshiki Sawada, Nagoya, all of Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Filed Jun. 18, 1990, Ser. No. 539,119

Claims priority, application Japan, Jun. 16, 1989, 1-155229; Jun. 16, 1989, 1-155230

Int. Cl.^{5} F02D *41/22*

U.S. Cl. 123—479 **18 Claims**


APPARATUS FOR DETECTING ABNORMALITY
M9
MEANS FOR DETECTING ABNORMALITY
M7
M8
MEANS FOR SETTING A/F RATIO
MEANS FOR DETECTING LIMIT VALUE
M5
M6
OXYGEN SENSOR
INTERNAL COMBUSTION ENGINE

1. An apparatus for regulating the emission of exhaust gas discharged from an internal combustion engine, comprising:
oxygen sensing means for generating an oxygen concentration signal indicating the concentration of exhaust gas discharged from an internal combustion engine;
air/fuel ratio setting means for setting the air/fuel ratio of air to fuel in an air/fuel mixture supplied to the internal combustion engine based on a predetermined threshold value and the value of the oxygen concentration signal during closed loop control and for selectively setting the air/fuel ratio to either rich or lean during open loop control; and
abnormality detection means operable during open loop and closed loop control for determining that the oxygen sensing means is abnormal when the oxygen concentration signal is outside of a predetermined range.

5,020,500

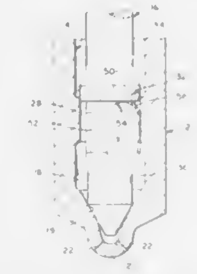
HOLE TYPE FUEL INJECTOR AND INJECTION METHOD

William W. Kelly, Granby, Conn., assignor to Stanadyne Automotive Corp., Windsor, Conn.

Filed Mar. 28, 1990, Ser. No. 500,714

Int. Cl.^{5} F02M *41/00*

U.S. Cl. 123—467 **21 Claims**



1. A hole type fuel injector comprising a nozzle body with an elongated valve bore, an annular valve seat and longitudinally spaced, upper and lower valve guides above the valve seat; an elongated nozzle needle valve in the valve bore having upper and lower guides which cooperate with the upper and lower valve guides for axial movement of the needle valve within the valve bore between a lower closed position in engagement with the valve seat and an upper fully open position with a predetermined lift; the nozzle body having a nozzle tip below the needle valve and enclosing the lower end of the valve bore and spray hole means connected to the valve bore below the valve seat; the nozzle body providing an upper fuel chamber surrounding the needle valve between the upper and lower valve guides and a lower fuel chamber surrounding the needle valve between the lower valve guide and valve seat, valve closure spring means biasing the needle valve downwardly into engagement with the valve seat; the upper guide of the needle valve having a greater diameter than the valve seat to provide a differential area for hydraulically opening the needle valve against the bias of the closure spring means; the upper fuel chamber being connected to receive periodic high pressure pulses of fuel for opening the needle valve against the bias of the closure spring means and for supplying fuel for fuel injection through the spray hole means; the lower valve guide forming an outer metering ring with an internal, annular metering surface with an upper metering edge; the lower guide of the needle valve forming an inner metering ring with an external annular, metering surface with a lower metering edge; the inner metering ring, with the needle valve in its closed position, being received within the outer metering ring with the inner ring metering edge below the outer ring metering edge by a predetermined axial overlap substantially less than said predetermined lift and with a predetermined clearance between the inner and outer metering surfaces providing a metering passageway to regulate fuel flow between the upper and lower fuel chambers during an initial stage of upward movement of the needle valve from the valve seat.

5,020,501

CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

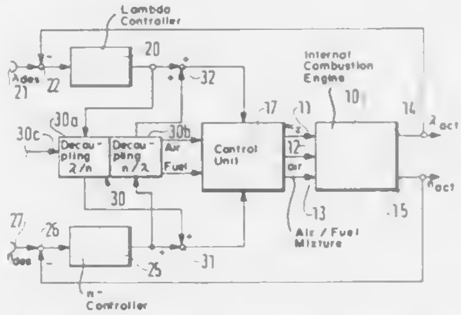
Chi-Thuan Cao, Korntal; Andreas Erban, Bietigheim-Bissingen; Helmut Janetzke, Schwieberdingen; Henning Cordes, Eberdingen; Alfred Schulz, and Wolfgang Matuschek, both of Oberriexingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 12, 1990, Ser. No. 551,310

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1989, 3923031

Int. Cl.^{5} F02D *43/00, 41/16, 41/14;* **F02P** *5/145*

U.S. Cl. 123—489 **9 Claims**



1. A control system for an internal combstion engine, the control system comprising:
a control unit for supplying signals to the engine indicative of parameters including air and air/fuel mixture;
a plurality of sensors for sensing respective operating variables of the engine;
first control means for producing a first control signal for controlling a first one of said operating variables;

VOL
1127
ISS
1
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4
1991
UMI

second control means for producing a second control signal for controlling a second one of said operating variables; and,

decoupling means interposed between said first control means and said control unit and between said second control means and said control unit for decoupling between said first and second control signals acting at different speeds.

5,020,502
METHOD AND CONTROL DEVICE FOR CONTROLLING THE AMOUNT OF FUEL FOR AN INTERNAL COMBUSTION ENGINE

Ernst Wild, Oberriexingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

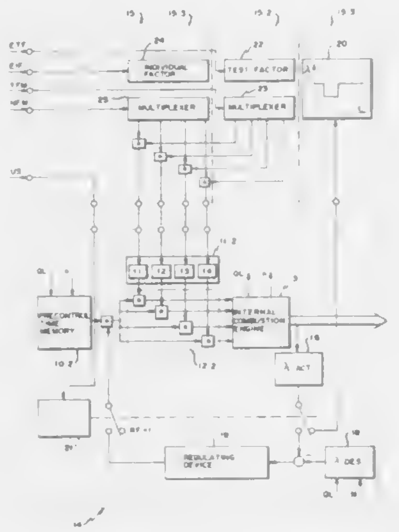
PCT No. PCT/DE88/00754, § 371 Date Jun. 21, 1990, § 102(e) Date Jun. 21, 1990, PCT Pub. No. WO89/06310, PCT Pub. Date Jul. 13, 1989

PCT Filed Dec. 9, 1988, Ser. No. 477,924

Claims priority, application Fed. Rep. of Germany, Jan. 7, 1988, 3800176

Int. Cl.^{5} F02D *41/14, 41/40*

U.S. Cl. 123—489 **8 Claims**



1. A method of controlling the quantity of fuel which is metered to the individual cylinders of an internal combustion engine by means of an injection device, the method comprising the steps of:

correcting precontrol times, which are common to all cylinders and dependent on rotational speed and air quantity drawn in by suction, with individual corrective values dependent upon lambda actual values;

forming the individual corrective values from a combination of individual factors (az) and individual summands (bz);

determining the cylinder for which there is a deviation of the airfuel ratio from a pregiven lambda value in the event of a deviation of the value, which is measured by the lambda probe, from a pregiven lambda value;

adjusting the desired lambda value by changing the individual factors (az);

determining the value of the injection time (tiu) corrected as may be required and belonging to the desired lambda value at (tLu);

adjusting the desired lambda value by changing the individual factors after an upper value (tLo) of the load variable occurs and in the event of a deviation of the value measured by the lambda probe from a pregiven value;

determining the value of the injection time (tio) corrected as may be required and belonging to the desired lambda value (tLo);

computing and storing the individual factor (az) and the individual summand (bz) for a specific cylinder from the equations:

$$tiu = az \times tLu + bz$$

$$tio = az \times tLo + bz$$

and,

again examining the computed values for (az) and (bz) and correcting said values (az) and (bz) as may be required after the occurrence of the value (tLu) of the load variable.

5,020,503
AIR-FUEL RATIO CONTROL SYSTEM FOR AUTOMOTIVE ENGINES

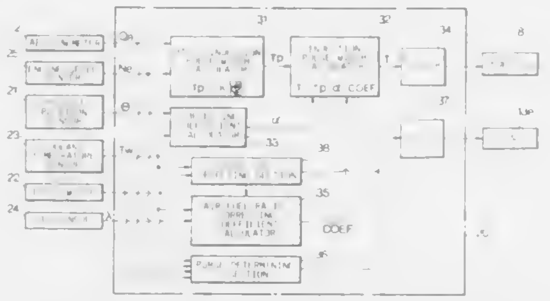
Yusuke Kanasashi, Akishima, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 2, 1989, Ser. No. 360,366

Claims priority, application Japan, Jun. 21, 1988, 63-154469

Int. Cl.^{5} F02M *33/02*

U.S. Cl. 123—520 **5 Claims**



1. An air-fuel ration control system for an automotive engine, said engine having a canister for purging fuel vapor from a fuel tank from the canister to an intake passage of said engine, an O_2-sensor for detecting oxygen concentration of exhaust gases of said engine and for producing a corresponding voltage signal, a feedback control system responsive to said voltage signal for producing a coefficient as a function of said voltage signal for controlling air-fuel ratio of air-fuel mixture induced into said intake passage of said engine, and a fuel injection control system for calculating amount of fuel by an equation including said coefficient to inject a proper amount of said fuel in dependency on driving conditions of said engine, the improvement of the air-fuel ratio control system which comprises:

detector means for detecting when the fuel vapor stops purging from said canister to the intake passage and for producing a purge cut-off signal when said detector means detects the stopping of said purging of the fuel vapor; and

correcting means responsive to said purge cut-off signal for simultaneously stopping the controlling of the air-fuel ratio via said feedback control system by setting said coefficient to 1.0, thereby preventing said engine from malfunctioning when the fuel vapor stops purging.

5,020,504
FUEL INJECTION CONTROL SYSTEM FOR A TWO-CYCLE ENGINE

Koji Morikawa, Musashino, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 18, 1989, Ser. No. 395,952

Claims priority, application Japan, Aug. 30, 1988, 63-216090

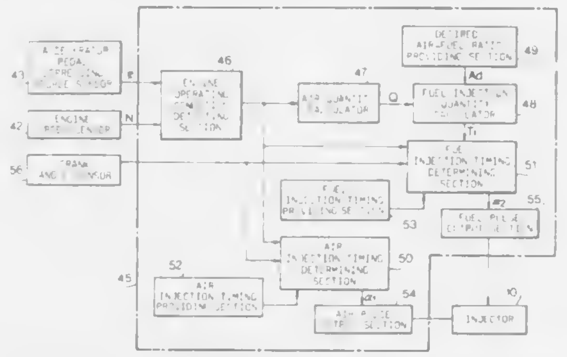
Int. Cl.^{5} F02M *67/02*

U.S. Cl. 123—531 **9 Claims**

1. In an air-fuel ratio control system for a two cycle engine having a cylinder with a scavenge port and an exhaust port, an intake passage communicating with said scavenge port, an

exhaust passage connected to said exhaust port, a two-fluid type injector for directly separately injecting therein an amount of fuel and air for injection by the injector into said cylinder, a scavenge pump provided in said intake passage for supplying compressed air into said cylinder, and a throttle valve interposed in a bypass of said intake passage, the control system having a crank angle sensor provided at a crankshaft of the engine for detecting a crank angle of said crankshaft and for producing a corresponding crank angle signal, an engine speed sensor for detecting engine speed and for producing a corresponding engine speed signal, and an accelerator position sensor for detecting depressing degree of an accelerator pedal and for producing a corresponding degree signal, the accelerator pedal being operatively connected with said throttle valve, the improvement in the control system which comprises:

detecting means responsive to said engine speed and degree signals for detecting a corresponding of engine operating conditions as a function of said engine speed and said depressing degree of said accelerator pedal and for producing a corresponding engine operating condition signal;


43
ACCELERATOR PEDAL DEPRESSING DEGREE SENSOR
42
ENGINE SPEED SENSOR
56
CRANK ANGLE SENSOR
N
46
ENGINE OPERATING CONDITION DETECTING SECTION
47
AIR QUANTITY CALCULATOR
Q
49
DESIRED AIR-FUEL RATIO PROVIDING SECTION
Ad
FUEL INJECTION QUANTITY CALCULATOR
48
Ti
FUEL INJECTION TIMING DETERMINING SECTION
51
FUEL INJECTION TIMING PROVIDING SECTION
53
55
FUEL PULSE OUTPUT SECTION
AIR INJECTION TIMING DETERMINING SECTION
50
52
AIR INJECTION TIMING PROVIDING SECTION
45
54
AIR PULSE OUTPUT SECTION
10
INJECTOR

a calculator responsive to said engine operating condition signal for calculating an air quantity and for producing a corresponding air quantity signal;

air injection timing determining means responsive to said engine operating condition signal and said crank angle signal for deciding an air injection timing and for producing a corresponding air pulse signal;

fuel injection timing determining means responsive to said air quantity, said engine operating condition, and said crank angle signals for deciding a fuel injection timing and for producing a corresponding fuel pulse signal; and

said two-fluid type injector being responsive to said air and fuel pulse signals for injecting the fuel directly into a stream of air as the air is passing through the injector within a period of air injection from the injector into said cylinder after starting of the air injection during a light load range for injecting said fuel and air into said cylinder so as to form a stratified stream of said fuel and air and to effect complete combustion in said cylinder in all of the respective of said engine operating conditions.

5,020,505
EXHAUST GAS RECIRCULATION VALVE ASSEMBLY

Thaddeus J. Grey, Rochester; Charles W. Braun, Livonia, and Dwight O. Palmer, Rochester, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 435,924, Nov. 13, 1989, Pat. No. 4,961,413. This application Jul. 2, 1990, Ser. No. 546,991

Int. Cl.^{5} F02M *25/07*

U.S. Cl. 123—571 **1 Claim**

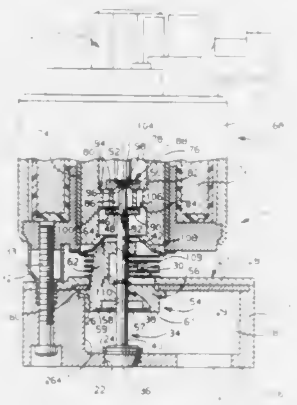
1. An exhaust gas recirculation valve assembly comprising:

a base having an exhaust gas chamber through which exhaust gas passes;

a pintle valve assembly having a valve member disposed within said exhaust gas chamber and a valve stem extending outwardly of said chamber through an opening therein;

an actuator, maintained in a fixed relationship to said base, comprising a reciprocably movable armature disposed therein, said armature coupled to said valve stem to reciprocably operate said valve member within said exhaust gas chamber; and

coupling means, extending between said valve stem and said



armature and configured to allow lateral movement of said valve stem relative to said armature to compensate for misalignment of said actuator relative to said base thereby preventing said misalignment from affecting the reciprocal operation of said pintle valve assembly relative to said base.

5,020,506
ENGINE IGNITER

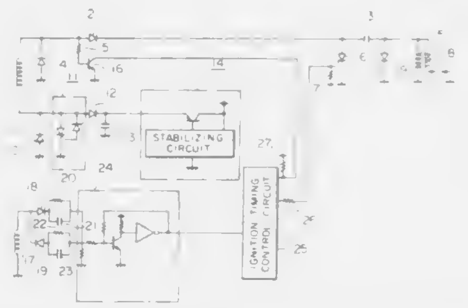
Masayuki Ozawa, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 16, 1989, Ser. No. 367,178

Claims priority, application Japan, Jun. 17, 1988, 63-79424[U]

Int. Cl.^{5} F02D *1/08*

U.S. Cl. 123—631 **3 Claims**



1. An engine igniter comprising:

current generating means for generating an alternating current in synchrony with the rotation of an engine;

reference signal generating means for generating an advance-side reference signal followed by a lag-side reference signal during a half-cycle of the alternating current from the current generating means, each of the reference signals corresponding to a prescribed rotational angle of the engine;

igniting means for generating an ignition voltage from the alternating current from said current generating means and firing a spark plug of the engine; and

ignition timing control means responsive to the reference signals and the alternating current for determining the direction of rotation of the engine based on the polarity of the alternating current when the reference signals are generated, for calculating the ignition timing and controlling said igniting means using the lag-side reference signal as a reference during forward operation of the engine at

VOL
1127
ISS
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1991
UMI

below a prescribed engine speed and using the advance-side reference signal as a reference during forward operation of the engine at above the prescribed engine speed, and for preventing ignition from taking place during reverse rotation of the engine.

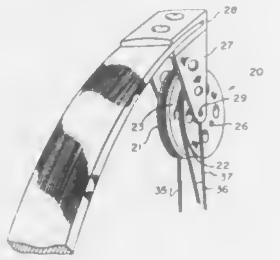
5,020,507
COMPOUND ARCHERY BOW

Marlow W. Larson, Ogden, Utah, assignor to Browning Arms Company, Morgan, Utah

Division of Ser. No. 236,781, Feb. 23, 1981, Pat. No. 4,748,962, and a continuation-in-part of Ser. No. 12,799, Feb. 9, 1987, Pat. No. 4,774,927, which is a continuation-in-part of Ser. No. 676,740, Nov. 29, 1984, Pat. No. 4,686,955. This application May 25, 1988, Ser. No. 198,231

Int. Cl.^{5} F41B *5/10*

U.S. Cl. 124—25.6 **4 Claims**



1. An eccentric for a compound bow comprising:

a wheel element mounted to pivot on an axis and carrying

a string groove with a periphery having a geometric center remote from said axis, said string groove being parallel a plane approximately normal said axis; and

a take-up groove with a periphery which is both non-concentric with and out of registration with the periphery of said string groove about substantially the entire periphery of said string groove;

said wheel element being structured for paying out from said string groove a central stretch of a bowstring whereby said central stretch is tangent to said string groove at successive first points along the periphery of said string groove as said wheel pivots on said axis from a rest position to a peak force position and then to a fully drawn position;

said wheel further being structured for receiving onto said take-up groove an end stretch of a said bowstring whereby said end stretch is tangent to said take-up groove at successive second points along the periphery of said take-up groove as said wheel pivots on said axis from said rest position to said peak force position to said fully drawn position, said second points being opposite said axis with respect to said first points;

said string groove being configured with respect to said axis such that a distance measured between the axis and any of said first points is relatively small between said rest and peak force positions, as compared to a distance measured between said axis and any of said first points between said peak force and said fully drawn positions.

5,020,508
APPARATUS FOR SELECTIVELY RELEASING A BOWSTRING OF AN ARCHERY BOW

John F. Greene, Jr., Rte. 2, Box 300, Boone, N.C. 28607

Filed Feb. 14, 1990, Ser. No. 479,987

Int. Cl.^{5} F41B *5/00*

U.S. Cl. 124—35.2 **7 Claims**

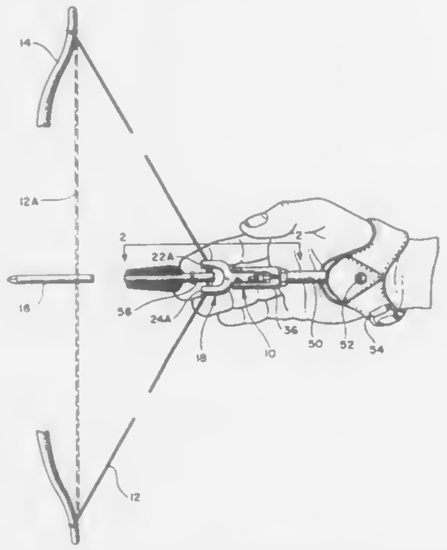
1 A trigger apparatus for selectively releasing a bowstring of an archery bow from a cocked disposition to propel an arrow engaged thereon, the arrow being of the type having a nock engaging the bowstring and the bowstring being of the type extending linearly in an uncocked disposition of the archery bow and being movable from the uncocked disposition to the cocked disposition in an arrow cocking direction opposite to the direction of flight of the arrow, comprising:

a first jaw means having an upper engagement portion and a lower engagement portion spaced from said upper engagement portion in the linear direction of the bowstring, said upper and lower engagement portions of said first jaw means defining a linearly extending gap therebetween;

a second jaw means having an upper engagement portion and a lower engagement portion spaced from said upper engagement portion in the linear direction of the bowstring, said upper and lower engagement portions of said second jaw means defining a linearly extending gap therebetween;

means for supporting said first and second jaw means in opposed lateral disposition for movement of said first and second jaw means in respective opposite directions laterally of the bowstring; and

means for individually moving said first and second jaw means in laterally opposite directions between a closed bowstring drawing disposition in which the respective upper and lower engagement portions define a receiving space therebetween for receiving the nock of the arrow therein upon engagement of the bowstring by the nock, and a bowstring release disposition to which said first and second jaw means have been moved laterally oppositely substantially simultaneously by said moving means for balanced release of the bowstring for propulsion of the arrow thereby, the trigger apparatus being movable, in said bowstring drawing disposition, to draw the bowstring into a cocked disposition,



the linear extent of said linearly extending gaps being greater than the linear extent of the arrow nock and said linearly extending gaps extending sufficiently laterally outwardly and rearwardly beyond the respective pairs of said upper and lower engagement portions of said first and second jaw means for form combined lateral and rearward extending gaps which are greater than the lateral and rearward extent of the arrow nock, wherein the relatively greater linear, lateral and rearward extents of said gaps with respect to the arrow nock permit said first and said second jaw means to be spaced from an arrow nock of an arrow engaged with said bowstring when in said bowstring engaging disposition and to move between said bowstring engaging and release dispositions out of interference with an arrow engaged with the bowstring.

5,020,509
HEATING ELEMENT

Ryoichi Suzuki; Hiroyuki Kondo, and Susumu Mizunuma, all of Kawasaki, Japan, assignors to Nippon Steel Corporation; Nissin Food Products Co., Ltd. and Nitto Seiki Co., Ltd., Japan

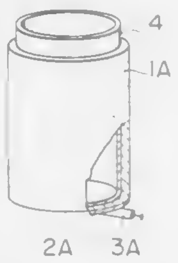
PCT No. PCT/JP89/00293, § 371 Date Nov. 17, 1989, § 102(e) Date Nov. 17, 1989, PCT Pub. No. WO89/08804, PCT Pub. Date Sep. 21, 1989

PCT Filed Mar. 17, 1989, Ser. No. 439,405

Claims priority, application Japan, Mar. 18, 1988, 63-63524; May 17, 1988, 63-118377

Int. Cl.^{5} F24J *1/00*

U.S. Cl. 126—263 **11 Claims**



1 A heating device comprising a heat generating portion comprising a mixture of at least one of ferric oxide, cupric oxide and trilead tetraoxide powder and powder selected from the group consisting of silicon, silicon-iron alloy and mixture thereof, a firing portion disposed contiguous to said heat generating portion and comprising of a mixture of a member selected from the group consisting of boron, aluminum powder and mixture thereof and at least one of ferric oxide, cupric oxide, barium peroxide and strontium peroxide powder, and an igniting portion situated adjacent to said firing portion and said igniting portion generating frictional sparks of a flint to set off said firing portion.

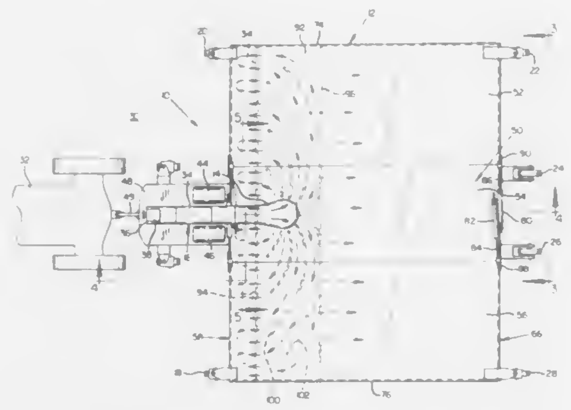
5,020,510
METHOD AND APPARATUS FOR HEATING THE GROUND, ROADS OR THE LIKE

Darrell R. Jones, 7515 N. Fessenden, Portland, Oreg. 97203

Filed Jan. 10, 1989, Ser. No. 295,376

Int. Cl.^{5} F23C *5/00*

U.S. Cl. 126—271.1 **21 Claims**



1 A method for killing plants growing in the ground comprising the steps of:

generating a flow of heated air having a moisture content equal to or less than that of the ambient air,

placing an enclosure having a single downwardly-directed opening over the plants for a selected time period, said enclosure further having a ratio of less than 1 5 1 of enclosure surface area to opening area,

directing the heated air into the enclosure; and

adjusting the temperature of the air and the time period so that the plants are killed by the heat but are not ignited

10. Apparatus for heating the surface of the ground, roads or the like comprising:

means for generating a flow of heated air having a moisture content equal to or less than that of the ambient air;

an enclosure in fluid communication with the heated air flow and having a single downwardly directed opening for directing such an air flow toward the surface when said apparatus is in operative condition, said enclosure further having a ratio of less than 1.5:1 of enclosure surface area to opening area;

means for distributing the air flow in said enclosure; and

means for moving the enclosure over the surface

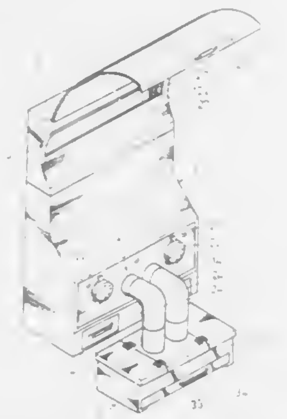
5,020,511
VERTICAL TYPE SMOKELESS EXHAUSTER

Wan-Tien Liu, No. 44, Sec. 1, Yuan Lin Road, Ta Hsi Town, Taoyuan Hsien, Taiwan

Filed Aug. 15, 1990, Ser. No. 567,899

Int. Cl.^{5} F24C *15/20*

U.S. Cl. 126—299 R **5 Claims**



1. A vertical type smokeless exhauster comprising:

(a) a main body having a top portion and a bottom portion, a holder opening formed in the top portion, a ventilation opening formed in a lower sidewall of the main body, a pair of detachable oil collectors provided at the bottom portion, and a pair of oil discharge pipes positioned internally of the main body above the oil collectors;

(b) a guide plate holder detachably received within the holder opening of the main body and including a curvilinear wall surface, a smoke exhaust port, an upper side portion, and a positioning slot formed in the upper side portion;

(c) a curvilinear guide plate received through the positioning slot of the guide plate holder for sliding movement to an outermost portion;

(d) an air box body secured to the main body, the air box body including a seating block disposed in the ventilation opening, a pair of fan motors positioned adjacent the pair of oil discharge pipes, and a pair of exhaust pipes extending through the air box body;

(e) an oil filter chamber including a filter tank, a filter element disposed within the filter tank, a detachable cover, a pair of intake pipes supported on the cover and a detachable oil pan positioned below the filter tank, and

(f) pipe means connecting the pair of exhaust pipes of the air box body to the pair of intake pipes of the oil filter chamber

VOL
1127
ISS
1
JE
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1991
UMI

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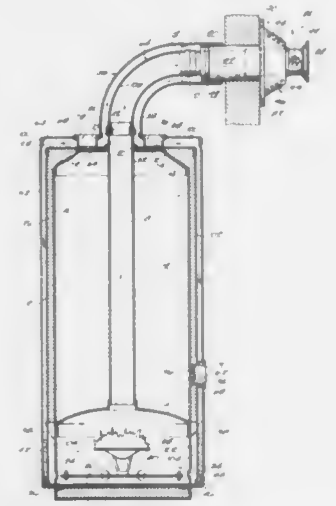
WATER HEATER CONSTRUCTION AND METHOD OF HEATING WATER

Otto Z. Vago, Burns, and Ernest Wenczl, Nashville, both of Tenn., assignors to State Industries, Inc., Ashland City, Tenn. Continuation of Ser. No. 639,195, Aug. 9, 1984, abandoned. This application Jun. 24, 1987, Ser. No. 65,140

Int. Cl.⁵ F24H *1/00*

U.S. Cl. 126—350 R **13 Claims**



1 A water heater comprising·

a water tight tank means including a tank wall and top and bottom head members welded thereto;

a combustion chamber located beneath said bottom head member;

a burner means mounted in said combustion chamber;

a flue tube means extending upwardly in said water tight tank means for conducting products of combustion from said combustion chamber up through said top head member;

combustion products vent means connected directly to said flue tube means for conducting the products of combustion from said flue tube means directly to the outside through an exterior wall in the space in which the water heater is installed;

combustion air transmission means for conducting combustion air directly from outside through an exterior wall in the space in which the water heater is installed to said combustion chamber, said combustion air transmission means including a first air passage space between a first jacket member mounted around and spaced from said tank wall and a second jacket member mounted around and spaced from said first jacket member, said first and second jacket members being concentrically arranged with the space therebetween constituting said first air passage space, said space between said first jacket member and said tank wall filled with insulation material.

5,020,513

SCREEN ADAPTED TO BE PLACED IN FRONT OF A HEARTH FIRE OR OTHER SOURCE OF RADIANT HEAT

Johannes B. Ratelband, Haydnstraat 27, 6661 BS Elst, Netherlands

Filed Mar. 26, 1990, Ser. No. 498,546

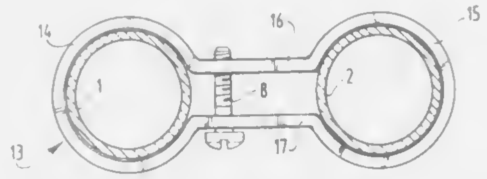
Claims priority, application Netherlands, Mar. 28, 1989, 8900763

Int. Cl.⁵ F24B *1/192*

U.S. Cl. 126—544 **3 Claims**

1. In a screen adapted to be placed between a radiant heat source and a room to be heated, said screen comprising a plurality of vertically-extending pipes which are positioned in a horizontal row, each pipe defining a vertical axis and having a lower end and an upper end, each pipe providing an air inlet opening at or near said lower end thereof and an air outlet opening at or near said upper end thereof, and a hinge joint for connecting a pair of adjacent pipes so that a first pipe of said pair can be swung around a second pipe of said pair with the vertical axis of said first pipe following the surface of an imaginary circular cylinder about the vertical axis of said second pipe,

the improvement wherein said hinge joint comprises a one-piece coupling member and a clamping means, said one-piece coupling member consisting of an endless strip-like element which is shaped to define a first split ring part for positioning around said first pipe, a second split ring part for positioning around said second pipe and two connecting parts extending between said first and second split ring parts, and wherein said clamping means engages said two connecting parts so as to cause said first split ring part to firmly grip said first pipe while said second split ring part remains rotatably positioned around said second pipe.



5,020,514

ENDOSCOPE FOR NASAL SURGERY

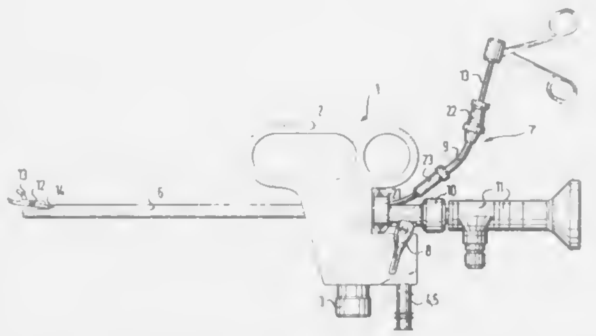
Helmut Heckele, Knittlingen, Fed. Rep. of Germany, assignor to Richard Wolf GmbH, Knittlingen, Fed. Rep. of Germany

Filed May 22, 1990, Ser. No. 527,221

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1989, 3923851

Int. Cl.⁵ A61B *1/00*

U.S. Cl. 128—4 **5 Claims**



1. An endoscope for nasal surgery, comprising:

an outer endoscope shaft incorporating a suction and flushing shaft;

a handle connected to the outer shaft, in which handle is provided a switching valve for connecting the suction and flushing shaft to, and disconnecting it from, a negative pressure source and a flushing fluid source;

a working insert for the outer shaft couplable thereto proximally of the handle and having a shaft for receiving an auxiliary instrument inserted thereinto by way of an angled connector on said insert, and a shaft for receiving an optical system connectable proximally to said insert;

a lever on said insert for pivotally displacing a distal end of the auxiliary instrument when said instrument is received in said instrument receiving shaft;

an angularly displaceable operating handle for said lever, on either side of said insert; and

elongate means connecting said handles to said lever for angular displacement thereof by angular displacement of said handles.

5,020,515

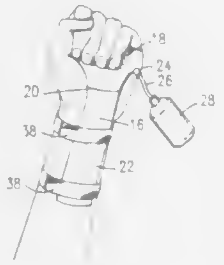
INFLATABLE HAND SPLINT

Donaerl B. Mann, and David Baras, both of St. Petersburg, Fla., assignors to D'Mannco, Inc., St. Petersburg, Fla.

Filed Nov. 13, 1990, Ser. No. 612,319

Int. Cl.⁵ A61H *1/02;* A61F *5/04*

U.S. Cl. 128—26 **11 Claims**



1 An inflatable hand splint comprising

a soft two-ply sheet having an inflatable first end sealed off from a second end, the first end having an air valve connectable to a hand operated air pump to provide a source of air to inflate the first end.

a pair of connectable strap ends integral with each opposite side of the first end of the soft sheet to tightly attach around a clinched fist,

a flat stiff sheet substantially conforming in width to a patient's wrist and forearm located in parallel alignment with the soft sheet, at least two straps each having means to connect together at oppositely connecting ends attached to an exterior surface of the stiff sheet and the soft sheet located adjacent an interior surface of the stiff sheet and between the stiff sheet and a wrist and forearm of a patient. the straps being wound around and connected at each end to hold the stiff and soft sheets in position around a forearm of a patient,

the deflated first end of the soft sheet being located between contorted fingertips and palmer portion of the hand of the patient and the first end of the soft sheet when inflated causing the patient's fingers to move away from the palmer region of the hand.

5,020,516

CIRCULATORY ASSIST METHOD AND APPARATUS

James W. Biondi, North Haven, and Richard A. Mentelos, Hamden, both of Conn., assignors to Cardiopulmonary Corporation, Branford, Conn.

Filed Mar. 31, 1988, Ser. No. 175,810

Int. Cl.⁵ A61H *31/02*

U.S. Cl. 128—30.2 **25 Claims**

20. An apparatus for improving the cardiac output of a patient, said apparatus comprising:

detection means for detecting the onset of ventricular ejection in the cardiac cycle of the patient,

continuously or periodically monitoring means for monitoring the patient's cardiac output on a breath by breath basis,

pressure increasing means including means for injecting a respiratory fluid into the patient's lungs for selectively increasing intrathoracic pressure of the patient; and

control means responsive to said detection means for activating said pressure increasing means in relative phase with respect to said ventricular ejection and for repeatedly adjusting said relative phase of pressure increase to ventricular ejection to maximize cardiac output by reducing ventricular afterload and maintaining ventricular preload

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5,020,517

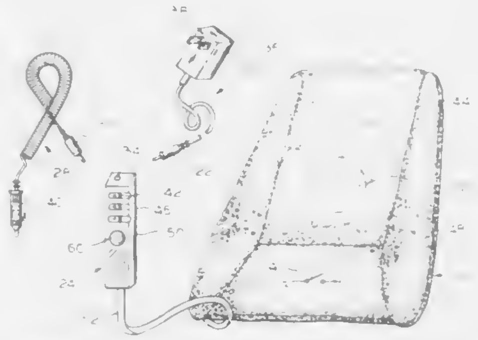
BACK MASSAGER FOR USE IN HOME OR AUTO

Robert W. Foster, Jr., Hinsdale, and Jefferson L. Gentry, Deerfield, both of Ill., assignors to Associated Mills Inc., Chicago, Ill.

Filed Nov. 13, 1989, Ser. No. 434,790

Int. Cl.⁵ A61H *1/00*

U.S. Cl. 128—33 **7 Claims**



1. A massager comprising a cushion having two vibrator motors therein, one of said vibrator motors being positioned in the upper thoracic region of said cushion, the other of said vibrator motors being in the lower lumbar region of said cushion, a control unit attached to said cushion via a cable for controlling at least an application of power thereto for switching said vibrator on or off, a jack associated with said control unit, at least two adaptor means for selectively applying power through said jack and said control unit to said vibrator motors, one of said adapter means being arranged to be connected to an AC commercial power source, and the other of said adapter means being arranged to be connected to a battery means in said control unit for selectively and individually energizing said vibrator motors at either a "high" or a "low" energy level, an air bladder in said cushion in a region which confronts the lumbar region of a person resting against said cushion, and means for selectively adjusting the degree of inflation of said bladder in order to adjust the firmness of said massager.

VOL
1127

ISS
1

JE
4

1991

UMI

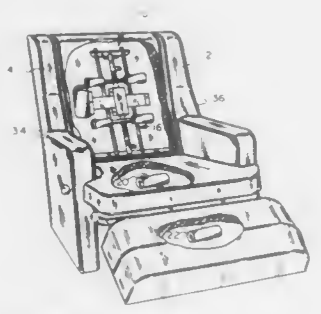
5,020,518
TRAVELLING ROLLER MASSAGE APPARATUS

Kevin A. Spears; Clinton J. Stafford, both of Gastonia; Kenny C. Frey, Dallas, and Daniel P. Wall, Gastonia, all of N.C., assignors to Integrity Health Systems Corporation, Gastonia, N.C.

Filed Feb. 9, 1990, Ser. No. 478,083

Int. Cl.^{5} A61H *15/00*

U.S. Cl. 128—52 16 Claims



1 Massage apparatus comprising:

track means;

a travelling carriage mounted for movement along the track means;

a housing on said carriage;

at least one massaging element carried by said housing;

a pair of motors in said housing, including a drive motor for driving said carriage along said track means, and a kneading motor with unidirectional output for driving said massaging element with a pulsating pressure;

a crank arm for rotatably mounting said massage element; and

pivot means for pivoting said crank arm, including a cam contacting the crank arm, driven by the kneading motor.

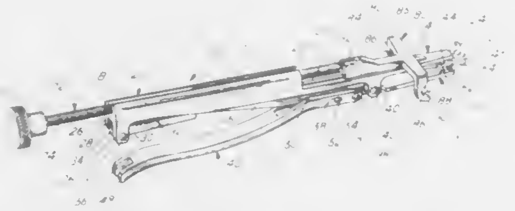
5,020,519
SAGITTAL APPROXIMATOR

S. Kyle Hayes, Warsaw; John E. Meyers, Columbia City, and Antony J. Lozier, Warsaw, all of Ind., assignors to Zimmer, Inc., Warsaw, Ind.

Filed Dec. 7, 1990, Ser. No. 623,470

Int. Cl.^{5} A61B *17/56. 17/58;* **A61F** *5/00*

U.S. Cl. 128—69 7 Claims



1 A surgical device for clamping engagement with a spinal fixation hook and for urging a spinal rod into seating engagement with the clamped hook, the hook having a body having a slot therein for accommodating the rod, said device including a clamp having a fixed handle with integral fixed jaw, a shiftable jaw and a shiftable handle being pivotally connected to said fixed handle and jaw, wherein as said shiftable handle pivots toward said fixed handle said pivotal jaw pivots toward said fixed jaw for clamping engagement with said body of the hook positioned between the jaws, said device further including an engagement means slidably carried by said fixed handle adapted for engagement with said spinal rod to urge said spinal rod through said slot and into seating engagement with said body of the hook, said engagement means being longitudinally shiftable along an upper surface of said fixed handle and jaw between a retracted position and an extended position relative to said fixed jaw, and a shifting means connected to said engagement means and carried by said fixed handle for longitudinally shifting said engagement means.

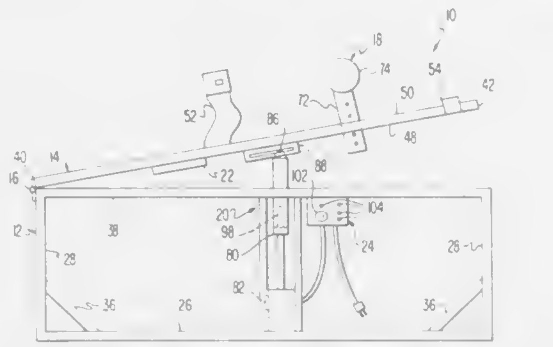
5,020,520
THERAPEUTIC DEVICE FOR TREATING BACK PAIN

G. Frank Lawlis, 405 San Sebastai, Denton, Tex. 76205

Filed Feb. 24, 1989, Ser. No. 341,915

Int. Cl.^{5} A61F *5/00*

U.S. Cl. 128—71 12 Claims



1 A therapeutic device for treating a patient's pain and other related ailments, comprising:

a frame portion;

a table portion having an upper surface, a lower surface, a first end and a second end;

a leg support coupled to said table portion between said first and second ends for supporting a patient's legs above said upper surface of said table portion, said leg support being spaced from said second end for engaging substantially beneath a patient's knees to support the patient's knees in a bent position, said leg support including means for adjusting to fix said leg support relative to said table portion at various spaced distances above said upper surface of said table portion;

hinge means for pivotably connecting said first end of said table portion to said frame portion; and

tilting means, coupled to said frame portion and said table, for pivoting said table portion and said leg support simultaneously about said hinge means.

5,020,521
EXTERNAL APPARATUS FOR MOTOR HANDICAPS OF AT LEAST ONE UPPER LIMB

Guy J. Salort, 219, rue Raymond Losserand, 75014 Paris, France

Continuation of Ser. No. 320,827, Dec. 29, 1988, abandoned, which is a continuation of Ser. No. 774,481, Sep. 10, 1985, abandoned, which is a division of Ser. No. 556,122, Nov. 29, 1983, Pat. No. 4,559,932. This application May 17, 1990, Ser. No. 524,699

Claims priority, application France, Nov. 10, 1982, 82 18902

The portion of the term of this patent subsequent to Dec. 24, 2002, has been disclaimed.

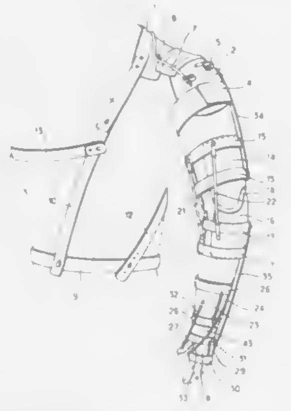
Int. Cl.^{5} A61F *5/10. 5/04*

U.S. Cl. 128—77 8 Claims

1. An external apparatus for overcoming motor handicaps of at least one hand of a human subject to allow the subject to move his hand comprising.

(a) a lower radial-cubital connecting assembly comprised of two part-shells respectively covering the radial part and the cubital part of the forearm, said part shells being separated by a narrow space along the cubitus, and the two part shells being secured around the forearm by at least one peripheral strap so that the forearm can be introduced between the part shells from the side opposite the narrow space.

(b) a hand connecting assembly comprising a shell comprised of three segments, a first segment covering the thenar eminence, a second segment covering the second, third, and fourth carpal and metacarpal bones to the base of the fingers, and a third segment covering the hypothenar eminence, a first peripheral strap on the first and second segments and extending generally around the palm of the hand, but not the thumb, in the region of the metacarpals, a second peripheral strap extending around the the wrist and passing over the three segments of the shell in the region of the wrist, said second strap being connected to the lower radial-cubital connecting assembly by elastic means.



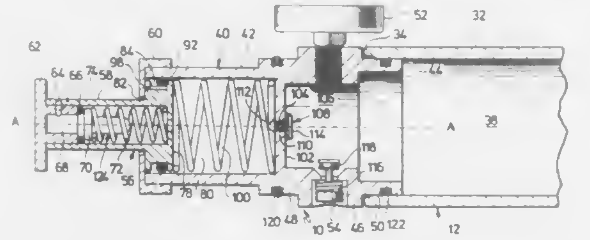
5,020,522
COMPACT VACUUM THERAPY SYSTEM

Edward T. Stewart, 107 Plaza Ter., Dodge City, Kans. 67801

Filed Mar. 8, 1990, Ser. No. 490,465

Int. Cl.^{5} A61F *5/00*

U.S. Cl. 128—79 9 Claims



1 A compact vacuum therapy system for assisting a male erection comprising:

a tube presenting a first end sized for receiving a human penis therein and a second end;

a pump body detachably mountable to said second end of said tube in air-sealing relationship, and presenting an intake end in fluidic communication with said tube;

a piston axially reciprocal within said pump body; and

a sealing member positioned in said pump body, said piston including a circumscribing groove sized for receiving said sealing member therein, said groove being sized relative to said sealing member so as to permit shifting of said sealing member in an axial direction within said groove, said groove including a forward wall section and a rear wall section, said rear wall section including structure defining at least one opening therein, said groove being configured to present an axially oriented air passageway extending rearwardly from said front wall and located between said piston and said sealing member.

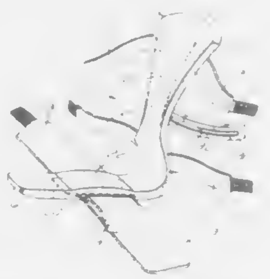
5,020,523
FOOT AND LEG SPLINT DEVICE

Robert C. Bodine, Mission Viejo, Calif., assignor to Capra Resources, Inc., Mission Viejo, Calif.

Filed Oct. 9, 1990, Ser. No. 594,842

Int. Cl.^{5} A61F *3/00. 5/04. 5/37*

U.S. Cl. 128—80 R 10 Claims



1. A foot and leg splint device comprising:

a generally L-shaped inner core member, the inner core member having a heel portion, a generally horizontal basal portion extending frontally from the heel portion, and a generally vertical portion extending upwardly from the heel portion; and

a flexible foam cover disposed on the inner core member in a manner as to form a body of the splint device which is positionable against the lower leg, heel, and plantar surface of the foot, said flexible foam cover being sized and configured to fully surround the inner core member.

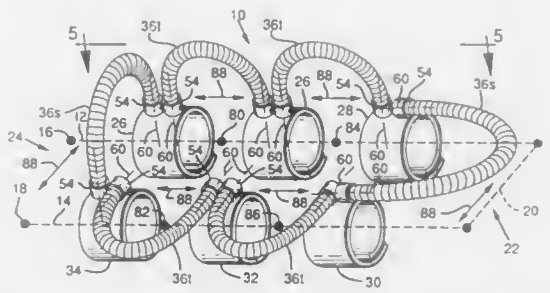
5,020,524
MODULAR DIGITAL TRACTION SYSTEM

Patrick T. Donohue, 1822 NE. 143rd, Portland, Oreg. 97230

Filed Aug. 3, 1989, Ser. No. 389,698

Int. Cl.^{5} A61F *5/04. 5/10*

U.S. Cl. 128—84 C 37 Claims



1. A traction band for mounting on a digit of an extremity and facilitating the application of traction and other manipulative forces to the digit, the band being characterized in that it is engageable with the digit so as to substantially encircle it and so grip the digit that the band is displaced neither axially nor rotationally when the band is subjected to an externally applied manipulative force, and in that the application of the band to the digit establishes a generally cylindrical external surface of the band, the cylindrical surface having a longitudinal axis coinciding approximately with the longitudinal axis of the digit and in that the cylindrical surface carries at least one connecting element for connecting with an end of an elongated force exerting member and in that the connecting element has a directional axis extending generally perpendicular to the longitudinal axis of the cylindrical surface and is shaped to hold the end of the force exerting member so that the longitudinal axis of said end is parallel to the directional axis of the connecting element.

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,525

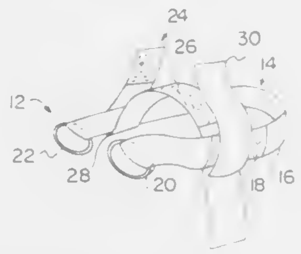
ANKLE DISTRACTION APPARATUS

John Ewing, Akron; Dan Olson, Dover, both of Ohio, and Walter P. Preston, Statesville, N.C., assignors to Zimmer, Inc., Warsaw, Ind.

Filed Sep. 19, 1989, Ser. No. 409,074

Int. Cl.^{5} A61F *5/04*

U.S. Cl. 128—84 R **11 Claims**



1. An ankle distraction apparatus for use in performing ankle arthroscopy on a patient situated on an operating table, comprising:

ankle engaging means for engaging a patient's ankle;

tension means, operably connectable to said ankle engaging means, for providing adjustable tension to said ankle engaging means in a direction away from a patient's body and along a line substantially longitudinal of a patient's leg;

support means for supporting said tension means in a position spaced from said operating table; and

clamp means for clamping said support means to said operating table;

said ankle engaging means comprising a first strap and a second strap;

said first strap, operably connectable to said tension means, including a central portion for wrapping about an achilles tendon proximal to its attachment to the os calcis and two attachment portions situated on opposite sides of said central portion and spaced apart therefrom;

said second strap including a central part having a bottom surface for wrapping contact with the dorsum of a patient's foot and a top surface, intermediate parts located outwardly of said central part and having upper surfaces with means thereon for releasable attachment to respective ones of said attachment portions of said first strap, and two end parts located outwardly of respective ones of said intermediate parts and having upper surfaces with means thereon for releasable attachment to said top surface of said central part.

5,020,526

EYE BOTTLE

David L. Epstein, 14 Glezen La., Wayland, Mass. 01778

Continuation of Ser. No. 16,538, Feb. 19, 1987, abandoned. This application Feb. 13, 1989, Ser. No. 310,480

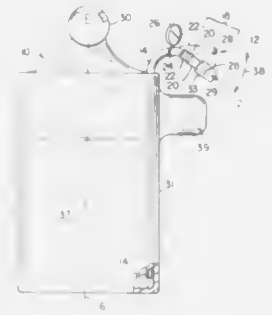
Int. Cl.^{5} A61M *11/00*

U.S. Cl. 128—200.14 **7 Claims**

1. An eye drop dispenser for dispensing a liquid into an eye of a human, comprising:

a plastically deformable bottle, said bottle comprising an internal tube portion extending into said bottle, said internal tube portion having a pathway communicating with an external flexible, open-ended tube portion extending outwardly from said bottle,

said bottle further comprising a protrusion adapted to rest against the face of a human below the eye, and to cooperate with the open end of said external tube portion such that when said protrusion is rested against the face of a human below the eye the open end is located adjacent to the eye, wherein



squeezing said bottle to deform it causes the liquid in said bottle to pass through said internal tube portion and out the open end of said external tube portion into the eye.

5,020,527

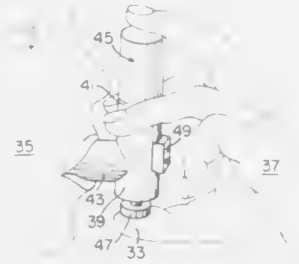
INHALER DEVICE WITH COUNTER/TIMER MEANS

Pauline L. Dessertine, Flemington, N.J., assignor to Texax-Glynn Corporation, Flemington, N.J.

Filed Feb. 20, 1990, Ser. No. 482,155

Int. Cl.^{5} A61B *7/00*

U.S. Cl. 128—200.23 **10 Claims**



1. A device for inhaling medicine from an inhalation canister with a spray stem which comprises:

(a) a hollow-bodied tubular main body having a back end adapted to receive an inhalation canister and a front end adapted for placement to or in a mouth or nose;

(b) a spray-directing element fixedly located within said main body, and having a continuous opening with an insert end for receiving a spray stem of an inhalation canister and a spray end for directing sprays of medicine through and out of the front end of said main body when an inhalation canister is activated by a user;

(c) counting means connected to said main body for displaying a count of total activations of an inhalation canister, said counting means being advanced by each activation of an inhalation canister and being resettable to zero; and,

(d) timer means connected to said main body for signaling time periods between each activation of an inhalation canister, said timer means including on/off capabilities.

5,020,528

METHOD AND APPARATUS FOR PERMITTING MEDICAL PERSONNEL TO ATTEND TO A PATIENT SITUATED IN A HAZARDOUS LOCATION REMOTE THEREFROM

Phillip R. Myers, 6060 Brook Dr., Falls Church, Va. 22044

Filed May 30, 1990, Ser. No. 530,410

Int. Cl.^{5} A61B *5/04*

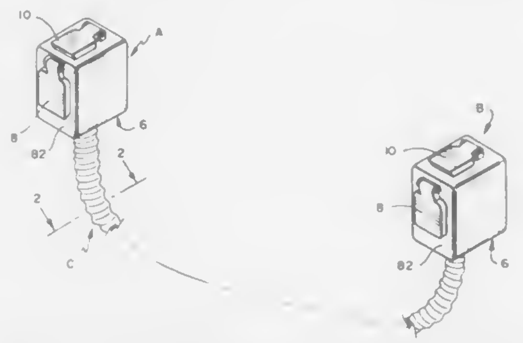
U.S. Cl. 128—202.13 **20 Claims**

1. An apparatus for permitting medical personnel to attend to a patient from a remote location, comprising:

a) a conduit having first and second ends, said first end being removed from said second end;

b) first connecting means for connecting a health aid storage unit and a physiological condition monitoring unit to said first end of said conduit;

c) second connecting means for connecting a health aid administering unit and a physiological condition sensor unit to said second end of said conduit;



d) said conduit including a first transmission line means for transmitting a health aid from said first connecting means to said second connecting means, said conduit further including a second transmission line means for transmitting a signal indicating at least one physiological condition of the patient from said second connecting means to said connecting means; and,

e) at least one of said first transmission line means and said second transmission line means having means for conveying a fluid.

5,020,529

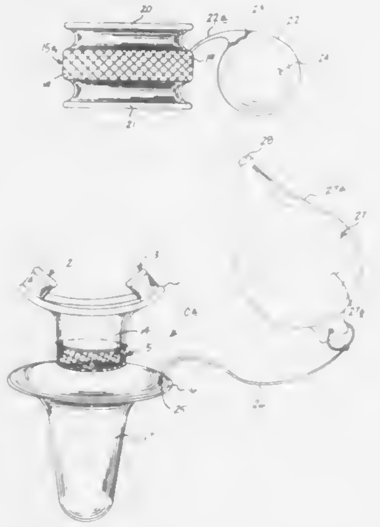
RESUSCITATION DEVICE WITH FILTER

Phil L. Gobin, 601 Winterset Pky., Marietta, Ga. 30067

Filed Dec. 18, 1989, Ser. No. 451,602

Int. Cl.^{5} A61M *16/00, 15/00*

U.S. Cl. 128—202.28 **3 Claims**



1. A resuscitation device comprising,

an elliptical mouthpiece defined by a major axis and a minor axis, and

an upper conduit orthogonally and integrally mounted to the mouthpiece defined by an upper conduit diameter less than that defined by the major axis of a mouthpiece, and

the upper conduit including a lower terminal end secured to an upper end of a cylindrical filter, and

a lower terminal end of the cylindrical filter secured to an upper terminal end of an annular skirt, and

the annular skirt defined by a skirt diameter, and

a lower flexible conduit axially aligned with the upper conduit and filter and of a generally "C" shaped configuration terminating in an outlet opening, and

wherein the skirt diameter is greater than that defined by the major axis, and the lower flexible conduit is defined by a conduit diameter less than that defined by the skirt diameter, and

wherein the mouthpiece includes a first and second projection diametrically disposed relative to one another along the major axis of the mouthpiece, the first and second projection each including a central support integrally mounted to the mouthpiece, and wherein each central support includes an abutment cap integrally and orthogonally mounted thereon, wherein the abutment cap defines a flange extending beyond the central support to enable grasping of the central support by clenching teeth of an administrator of the device, and

wherein the filter includes a central cylindrical filter body, and further includes an upper "U" shaped channel circumferentially mounted to an upper end of the central filter body, and a lower "U" shaped channel fixedly mounted to a lower end of the central filter body, and the upper "U" shaped channel selectively receiving a lower flange of the upper conduit, and the lower "U" shaped channel selectively receiving an upper flange defined by the upper terminal end of the annular skirt.

5,020,530

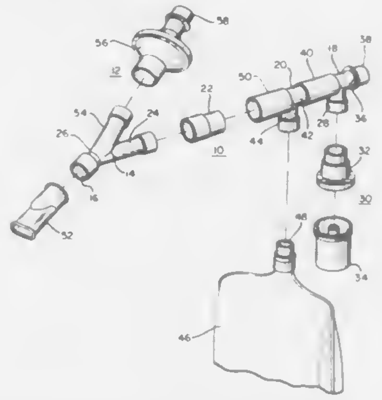
INHALATION THERAPY DEVICE

Warren C. Miller, 623 Bay Vista, Seabrook, Tex. 77586

Filed May 7, 1990, Ser. No. 519,912

Int. Cl.^{5} A61M *16/10*

U.S. Cl. 128—203.28 **12 Claims**



1. An inhalation therapy device comprising:

(a) a nebulizer having an inlet adapted for connection to a positive pressure air source, a receptacle for receiving medication in liquid form to be nebulized, and an outlet for continuously dispensing the medication in aerosol form;

(b) a patient breathing port;

(c) a first conduit connecting the nebulizer outlet to the breathing port;

(d) a check valve in the first conduit for permitting flow only in the direction from the nebulizer toward the breathing port.

(f) a second conduit intersecting the first conduit between the check valve and the breathing port, and leading to atmosphere.

VOL
1127
ISS
1
JE
4
1991
UMI

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AUTOMATIC REGULATOR FOR BREATHING APPARATUS

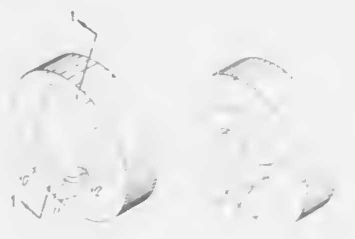
Giovanni Garofalo, Rapallo, Italy, assignor to AMF Mares S.p.A., Italy

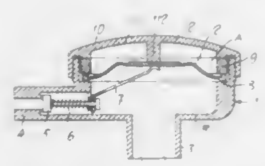
Filed Dec. 8, 1989, Ser. No. 447,833

Claims priority, application Italy, Dec. 29, 1988, 15184/88[U]

Int. Cl.^{5} A62B *9/02, 18/10*

U.S. Cl. 128—205.24 8 Claims





1. An automatic regulator for breathing apparatus, comprising a chamber which communicates with the breathing apparatus, including therein an air-dispensing valve, and a chamber which communicates with the environment, said chambers being sealingly separated from each other by means of a flexible membrane which controls said dispensing valve, while said chamber which communicates with the environment is defined exteriorly by a cover provided with pressure means acting on said membrane, for manual control of said dispensing valve, wherein said pressure means comprises a tongue which is obtained by a partial cut in said cover and which is resiliently deflected inward by an external depressing force, so as to deflect said membrane towards the interior of said camber which communicates with the breathing apparatus and to cause the opening of said dispensing valve.

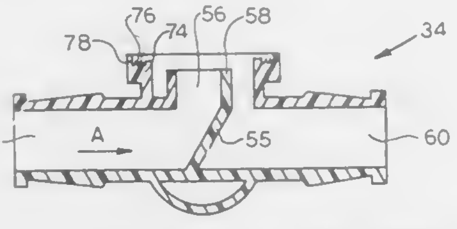
5,020,532
EXHALATION VALVE FOR RESPIRATORY CIRCUIT

Michael R. Mahoney, Cucamonga, Calif.; Wayne H. Nieman, Lake Forest, Ill.; Douglas J. McDowell, Canyon Country, and Virginia Krapil, Irvine, both of Calif., assignors to Baxter International Inc.

Filed Nov. 14, 1988, Ser. No. 270,703

Int. Cl.^{5} A62B *9/02*

U.S. Cl. 128—205.24 3 Claims



1. A valve for use in an expiratory tube of a ventilator circuit through which expired air flows from a patient comprising:

a horizontal inlet to receive said flow of expired air;

a guiding wall downstream from said inlet and disposed at an angle of greater than 90 degrees but less than 180 degrees with respect to said expired air flow at said inlet to smoothly direct said air flow form a horizontal to vertical direction;

a vertical channel downstream from said guiding wall;

a valve seat in said vertical channel downstream from said guiding wall;

a sealing ridge displaced outwardly from said valve seat,

an outlet downstream from said valve seat;

a diaphragm having a flange positioned on top of said sealing ridge, said diaphragm having

- a center portion concentrically disposed horizontally within said flange and normally positioned above said valve seat by a gap,
- a thin web connecting said center portion to said flange; and

means for periodically applying air pressure from a ventilator to said center portion to cause said center portion to seat against said valve seat to close said valve.

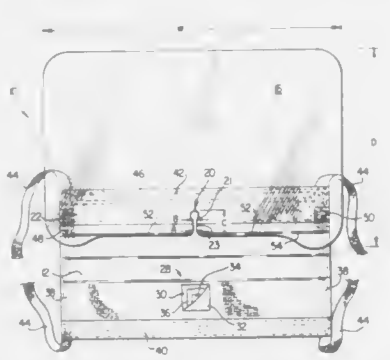
5,020,533
FACE MASK WITH LIQUID AND GLARE RESISTANT VISOR

Vance M. Hubbard, and Welton K. Brunson, both of Bedford, Tex., assignors to Tecnol, Inc., North Richland Hills, Tex.

Continuation-in-part of Ser. No. 104,807, Oct. 2, 1987, Pat. No. 4,920,960. This application Nov. 8, 1988, Ser. No. 268,558

Int. Cl.^{5} A62B *18/08;* **A61F** *11/00, 9/02;* **A41D** *13/00*

U.S. Cl. 128—206.23 6 Claims



1. A method for manufacturing a liquid shield to protect the eyes, nose and mouth of a wearer, comprising the steps of:

forming a mask dimensioned to fit over the mouth and nose of a wearer;

darkening a top edge of said mask to further reduce the likelihood of reflections;

fixing a plastic visor to said mask only at the extreme ends thereof to extend over and protect the eyes of the wearer from liquids directed at the eyes from exterior of said visor; and

forming a cutout approximate the center of said visor adjacent said mask to facilitate the conformance of said mask and said visor to the face of the wearer and to reduce the likelihood of reflections.

5,020,534
ENDOTRACHEAL TUBE APPARATUS AND METHOD

Donald M. Pell, 3441 16th Ave., North, St. Petersburgh, Fla. 33713, and Cosimo Martinetto, 5613 Half Moon Lake Dr., Tampa, Fla. 33625

Division of Ser. No. 9,280, Jan. 30, 1987, Pat. No. 4,850,348, which is a continuation-in-part of Ser. No. 693,891, Jan. 23, 1985, abandoned, and a continuation-in-part of Ser. No. 748,446, Jun. 25, 1985, abandoned, and a continuation-in-part of Ser. No. 771,819, Sep. 3, 1985, abandoned. This application May 11, 1989, Ser. No. 350,209

Int. Cl.^{5} A61M *16/00*

U.S. Cl. 128—207.15 2 Claims

1. Endotracheal apparatus comprising

a flexible tubular member having distal and proximal open ends and a tubular passage therebetween,

said member including means formed from silicone material that is heat stable in its physical characteristics within the range of human body temperatures to be encountered in use, has a hardness of about 80 durometer and a radius to wall thickness ratio in the range of about 3 to 4:1 so that the member is non-collapsible during insertion and while in place in a trachea, and is capable of withstanding a 90 degree bend without collapsing,

means including an oral bit piece having distal and proximal ends for insertion into an oral cavity of a patient and having first and second apertures passing therethrough from the distal end to the proximal end, at least one of said apertures receiving said tubular member and substantially securing said tubular member against movement, said bite piece comprising

means including a shaped end for extending into the mouth of the patient,

said shaped end having means including opposite lateral surfaces for engagement by the top and bottom dental arches of a patient, and curving outwardly from said lateral surface at said proximal end thereof,

a lip guard integral with said bit piece and contiguous to the outwardly curving portions of said shaped end and extending beyond the outwardly curving portions of the shaped end,

said continuous regions of said lip guard and outwardly curving portions of the shaped end being transversely shaped to conform to those portions of a patient's dental arches that includes only the front four teeth on each dental arch,

first and second studs or collets formed integrally as part of said bit piece extending outwardly from the proximal side of the lip guard, said collets defining hollow openings in registration with said first and second apertures, respectively,

at least one of said collets being externally threaded at its base region adjacent said lip guard,

the proximal end region of said one collet being slotted for a portion of its length to form flexible fingers thereat,

an independent internally-threaded adapter-connector having an axial passageway therethrough receiving said one collet therein,

a first portion of the axial passageway of said adapter-connector threadably engaging the exterior threads on one collet, and

a second portion of said axial passageway of said adapter-connector having a decreasing diameter so that when the threads of the adapter-connector and one collet are substantially fully engaged the flexible fingers of the end of the collect are urged radially inwardly by the second portion of the axial passageway to thereby clamp said tubular member in a selected position with respect to said bit piece.

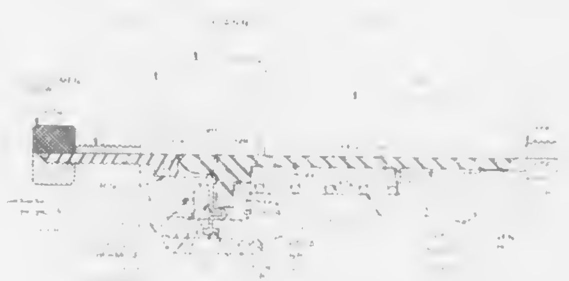
5,020,535
HANDPIECE DRIVE APPARATUS FOR POWERED SURGICAL SCISSORS

Donald A. Parker, Berkeley, and Wayne W. Rogers, Napa, both of Calif., assignors to Alcon Laboratories, Inc., Fort Worth, Tex.

Continuation of Ser. No. 780,689, Sep. 26, 1985, Pat. No. 4,768,506. This application Dec. 21, 1987, Ser. No. 136,208

Int. Cl.^{5} A61B *17/32*

U.S. Cl. 606—174 3 Claims



1. An apparatus for driving scissors blades comprising

a body for providing support and having a bore providing access to the inside of the body;

a sliding rod inside said body having a projecting portion which is housed in and guided by said bore and having a dimension relative to said bore so as to be slidably coupled to said body, said sliding rod having an annular shoulder,

a biasing means for biasing said sliding rod to a predetermined position in said body and resisting movement of said rod with linearly increasing force as a function of distance of movement;

a chamber having an inlet for receiving pressurized fluid and having a movable wall coupled to said sliding rod so as to move said rod in said bore when the pressure of said pressurized fluid is sufficient to cause movement of said movable wall,

control transducer means for indicating the desired blade movement of said scissors;

computer means coupled to said control transducer means for reading the desired blade movement from said control transducer and for converting said desired blade movement to a digital number and for digitally scaling said digital number according to a constant which may be altered to generate scaled blade movement data and for converting the scaled blade movement data to an analog blade movement signal;

electrically operated valve means having a fluid inlet for coupling to a source of pressurized fluid having a constant pressure, and having an electrical control input coupled to receive said analog blade movement signal, for converting said flow of said pressurized fluid to a flow having a variable flow rate which is a function of an electrical characteristic of said analog blade movement signal; and

conversion means including a cavity having a controlled leak rate and an inlet coupled to receive said flow of pressurized fluid from said electrically operated valve means and having a pressure outlet coupled to said inlet of said chamber, said conversion means for converting said variable flow rate of pressurized fluid to a corresponding variable pneumatic pressure having variations which track the variations in said flow rate and applying said variable pneumatic pressure to said inlet for pressurized fluid via said pressure outlet.

VOL
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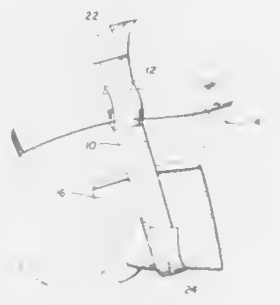
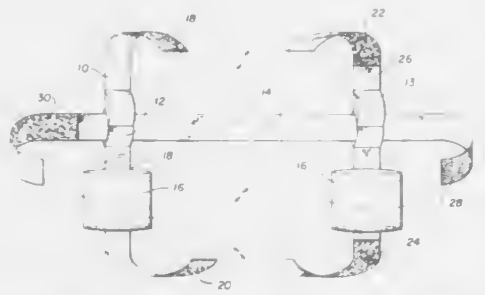
5,020,536
POSTOPERATIVE CRYOKINETIC THERAPY APPARATUS AND METHOD

Robert E. Keen, 507 South Second Street, Champaign, Ill. 61820
Filed Feb. 25, 1986, Ser. No. 832,695
Int. Cl.⁵ A61F *7/00*
U.S. Cl. 128—402 8 Claims



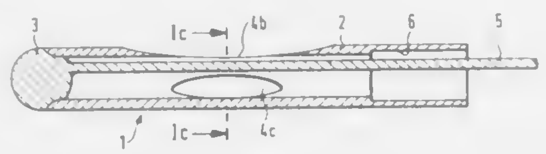


1 Apparatus for postoperative cryokinetic therapy following oral and maxillofacial surgery comprising:

- a first flat vertical strap of predetermined length having a loop intermediate the ends thereof;
- a first pouch carried by said first vertical strap on the flat side thereof facing the patient.
- first and second "VELCRO"-like hook surfaces carried respectively by said first strap over adjacent opposite ends of said first strap on the flat side thereof facing away from the patient, said "VELCRO"-like surfaces aggregating in length approximately fifty percent of the length of said first strap;
- a second flat vertical strap having a length approximating that of said first strap and a loop intermediate the ends thereof;
- first and second "VELCRO"-like eye surfaces carried respectively by said second strap adjacent opposite ends of said second strap on the flat side thereof facing the patient, said "VELCRO"-like surface aggregating in length approximately fifty percent of the length of said second strap;
- a flat horizontal strap passing through the loops in said first and second vertical straps, said horizontal strap having a length approximately 150 percent of the length of said first and second straps and having a "VELCRO"-like hook surface adjacent one end thereof on the flat side facing away from the patient and a "VELCRO"-like eye surface adjacent the other end thereof on the flat side thereof facing the patient, said patient, said "VELCRO"-like surfaces aggregating in length approximately thirty-five percent of the length thereof; and
- a sealable container for ice sized and configured for removable insertion into said first pouch to thereby apply cold to a preselected area of the patient's face during the exercise of the jaw muscle by the patient.

5,020,537
MEASURING PROBE

Martin Günther, Wildberg, Fed. Rep. of Germany, assignor to Hewlett-Packard Company, Palo Alto, Calif.
Filed Mar. 20, 1989, Ser. No. 326,582
Claims priority, application European Pat. Off., Apr. 9, 1988, 88105675.8
Int. Cl.⁵ A61B *6/00*
U.S. Cl. 128—634 6 Claims

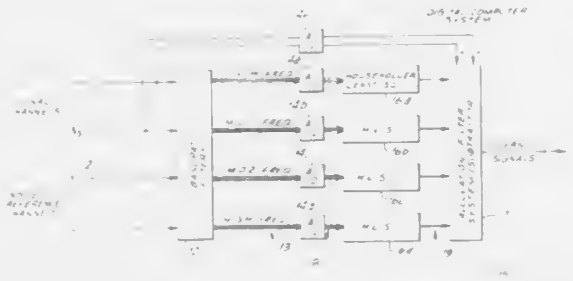


1 An optical probe comprising:

- an outer sheath comprising a first end, a second end, and at least one opening therethrough between said first end and said second end, said first end being adapted for receipt within the artery of a patient and comprising a rigid spherical member;
- a tubular conduit operatively connected to said sheath comprising an inner end positioned within said sheath, and an outer end extending beyond said second end of said sheath;
- at least one sensor unit positioned within said tubular conduit comprising an optical fiber, a portion of gel having at least one dye therein, and a reflector unit positioned adjacent said portion of gel for reflecting light from said optical fiber which has passed through said portion of gel; and
- a wire positioned within said tubular conduit adjacent said sensor unit having a first end and a second end, said first end of said wire being fixedly secured to said rigid spherical member, and said second end of said wire being fixedly secured to said outer end of said conduit.

5,020,538
LOW NOISE MAGNETOENCEPHALOGRAM SYSTEM AND METHOD

Nelson H. Morgan, Berkeley, and Alan S. Gevins, San Francisco, both of Calif., assignors to SAM Technology, Inc., San Francisco, Calif.
Continuation-in-part of Ser. No. 231,385, Aug. 12, 1988, abandoned, and a continuation-in-part of Ser. No. 27,264, Mar. 18, 1987, abandoned. This application Nov. 14, 1989, Ser. No. 435,754
Int. Cl.⁵ A61B *5/05*
U.S. Cl. 128—653 R 10 Claims



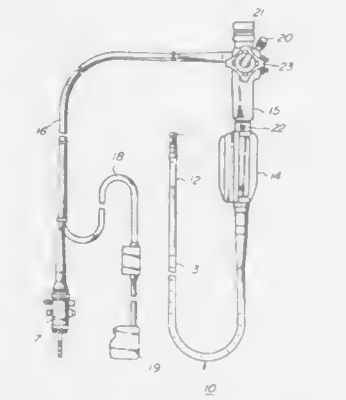
1. A low noise magnetoencephalogram (MEG) system in an environment having magnetic activity, the system being for the detection of brain neuromagnetic activity of a human subject, including:

- a first plurality of magnetic sensor means at least part of each sensor means being adapted to be positioned adjacent the head of a subject to detect neuromagnetic brain signals; a plurality of brain signal channels, each brain signal channel connected to one of said first magnetic sensor means;

- a second plurality of magnetic sensor means to detect signals from environmental magnetic activity; a plurality of environmental noise reference channels, each reference channel being connected to one of said second magnetic sensor means;
- a bandpass filter means, connected to the brain signal channels and the reference channels to separate said brain signals and environmental signals into a plurality of predetermined frequency bands and reject said signals not within said predetermined frequency bands;
- computer transformation means which act separately on each of said frequency bands to provide a least squares noise component estimate of the noise component present in each brain signal channel;
- computer calculation means to algebraically subtract said least square noise component estimate from the signals in each brain wave channel thereby providing a filtered brain signal having reduced noise.

5,020,539
ULTRASONIC ENDOSCOPE APPARATUS

Takeshi Yokoi, and Yoshihito Horikawa, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan
Filed Mar. 8, 1989, Ser. No. 320,607
Claims priority, application Japan, Mar. 30, 1988, 63-74728; Apr. 22, 1988, 63-54203[U]; May 31, 1988, 63-131677
Int. Cl.⁵ A61B *8/12*
U.S. Cl. 128—662.06 22 Claims



1. An ultrasonic endoscope apparatus for viewing a body cavity, said ultrasonic endoscope apparatus comprising:

- an insertion section adapted to be inserted into the body cavity to be observed and having a proximal end and a distal end;
- a first distal end support member having a front end and a rear end, said rear end being secured to the distal end of the insertion section;
- an ultrasonic wave transmission window having a rear end and a front end, said rear end of the ultrasonic wave transmission window being secured to said front end of the first distal end support member and said ultrasonic wave transmission window extending around an axis of the first distal end support member to form a space therein;
- an ultrasonic vibrating unit provided in said space to transmit and receive an ultrasonic wave through said ultrasonic wave transmission window;
- a second distal end support member having a front end and a rear end, said rear end of said second distal end support member being secured to the front end of the first distal end support member and said second distal end support member being arranged near said ultrasonic transmission window in parallel with the ultrasonic wave transmission window; and
- an optical viewing means arranged substantially within said second distal end support member for providing both a forward observing field and an oblique observing field;
- wherein said ultrasonic vibrating unit is an electronic scan type ultrasonic vibrating unit emitting an ultrasonic beam over substantially a full scope of the compass.

5,020,540
CARDIAC BIOPOTENTIAL ANALYSIS SYSTEM AND METHOD

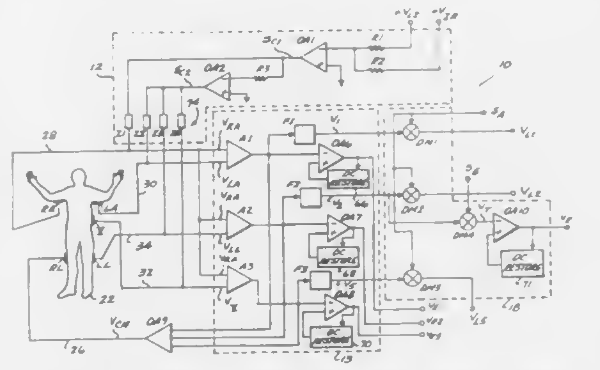
Nassib G. Chamoun, Dedham, Mass., assignor to Biometrak Corporation, Cambridge, Mass.
Continuation-in-part of Ser. No. 107,419, Oct. 9, 1987. This application Aug. 22, 1989, Ser. No. 396,990
Int. Cl.⁵ A61B *5/04*
U.S. Cl. 128—696 56 Claims

1 A method of noninvasively detecting cardiac phenomena comprising the steps of:

- acquiring electrocardiographic signals from a body surface of a subject being analyzed through a surface electrode;
- determining a waveform template representing a QRST waveform in said subject;
- selecting a number of signals that match said waveform template and storing said signals for processing;
- generating bispectral values from selected signals, comparing said bispectral values to reference bispectral values to analyze cardiac phenomena.

5,020,541
APPARATUS FOR SENSING LEAD AND TRANSTHORACIC IMPEDANCES

Arthur R. Marriott, Seattle, Wash., assignor to Physio-Control Corporation, Redmond, Wash.
Continuation of Ser. No. 219,080, Jul. 13, 1988, Pat. No. 4,919,145. This application Jan. 12, 1990, Ser. No. 464,348
The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.
Int. Cl.⁵ A61B *5/08*
U.S. Cl. 128—723 11 Claims



1. An apparatus for use with medical diagnostic and therapeutic apparatus, employing a first lead having a first lead impedance and a plurality of second leads having a plurality of second lead impedances coupled to electrodes attached to a patient's skin, for sensing the integrity of lead connections and patient transthoracic impedance comprising:

VOL
1127
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(a) a carrier signal source means coupleable to said first lead and coupleable to said plurality of second leads:

(i) for producing a first carrier signal having a lead impedance frequency component and an impedance respiration frequency component and for applying said first carrier signal to said first lead; and,

(ii) for producing a second carrier signal having said lead impedance frequency component and said impedance respiration frequency component and for applying said second carrier signal to said plurality of second leads;

(b) a receiver means coupled to said first lead and said plurality of second leads for receiving:

(i) a first lead voltage produced by said first carrier signal and said first lead impedance; and,

(ii) a plurality of second lead voltages produced by said second carrier signal and said plurality of second lead impedances;

(c) amplifying means, coupled to receive a plurality of combinations of said first lead voltage with one of said plurality of second lead voltages, for amplifying the difference between said first and second lead voltages in each of said combinations and producing:

(i) a plurality of first stage output voltages, one of said first stage output voltages being produced for each of said combinations of said first and second lead voltages; and,

(ii) a plurality of second stage output voltages, one of said second stage output voltages being produced for each of said combinations of said first and second lead voltages; and,

(d) a signal separator means coupled to said amplifying means for receiving said plurality of first stage output voltages and for producing:

(i) a plurality of lead impedance-related voltages related to said lead impedance frequency component of said first and second carrier signals, and,

(ii) at least one impedance respiration-related voltage related to said impedance respiration frequency component of said first and second carrier signals.

5,020,542

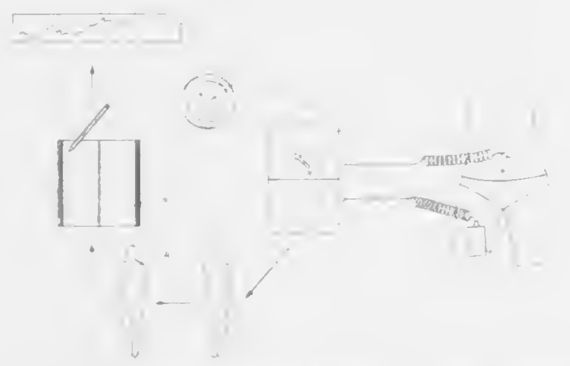
METHOD OF MEASURING SKIN SENSITIVITY TO ELECTRICAL STIMULATION

Charles Rossmann, and Tatiana Rossmann, both of Medical Arts Plaza, 214 17th St., Huntingburg, Ind. 47542

Filed Apr. 16, 1990, Ser. No. 509,713

Int. Cl.^{5} A61B *15/05*

U.S. Cl. 128—741 **3 Claims**



1. A method of measuring skin sensitivity to electrical stimulation comprising,

providing and positioning a plurality of electrical directing electrode members at spaced orientations onto a preselected skin surface of an individual, and

providing an electrical directing grounding electrode on the individual spaced from the plurality of electrical directing electrode members, and

providing a nerve stimulating electrical amplifier member to direct a nerve stimulating electrical current at a predetermined amplitude to the individual through the electrode member and the grounding electrode to effect skin stimulation of the skin surface whereby the individual is made aware of the skin stimulation, and

directing a cycle of a predetermined impulse and amplitude of nerve stimulating electrical current to the individual over a predetermined time, and

repeating the cycle to provide a plurality of cycles, and

providing a recording means for plotting the cycles as a function of time, versus a current amplitude, and

plotting the cycles as a function of time versus current amplitude, and

wherein the step of providing a nerve stimulating electrical amplifier includes providing the amplifier with an adjustment control to adjust the current amplitude, and

whrein the amplifier member includes a manually manipulatable current amplifier and further providing an automatic step amplifier to automatically increase the current amplitude at predetermined incremental increases and amplitude, and

providing the individual with a first switch, wherein the individual selectively engages the switch to cease directing of the nerve stimulating electrical current to the individual upon the individual made aware of the skin stimulation and wherein the individual engaging the first switch simultaneously resets the amplifier member to permit repeating of the cycle.

5,020,543

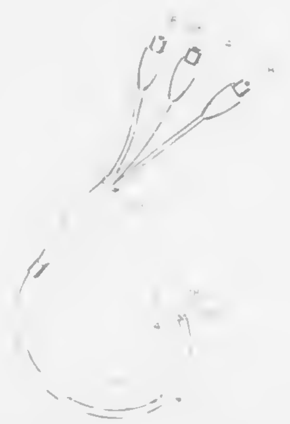
VENOUS ACCESS CATHETER FOR REMOVING A CULTURE

Robert E. Rothenberg, 35 Sutton Pl., New York, N.Y. 10022; Raymond D. LaRaja, 3 Beechwood Rd., Bronxville, N.Y. 10708, and John W. Odom, 2100 Linwood Ave., Apt. 6N, FortLee, N.J. 07024

Filed Nov. 3, 1989, Ser. No. 431,651

Int. Cl.^{5} A61B *5/00*

U.S. Cl. 128—760 **19 Claims**



1. A catheter for administering or removing fluids, and for extracting a culture sample, comprising:

a flexible cannula having at least two lumens formed in the length of the cannula;

plug means for providing a seal for sealing one end of one of the lumens, to thereby seal the one lumen until a culture sample is desired, flexible filament means having two ends with one end connected to the plug means, said filament means extending through the length of the one lumen, said plug means being configured such that by pulling the other end of filament means, the seal of the plug means with the one lumen is broken and the plug means is pulled through the one lumen to extract a culture sample, whereby a culture sample may be extracted through the one lumen in the catheter when the catheter is implanted without removal of the catheter, the one lumen also providing an additional access or collection lumen after the culture sample is extracted.

5,020,544

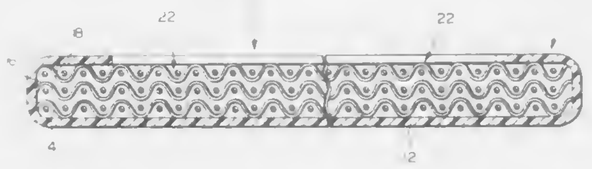
LOW ENERGY DEFIBRILLATION ELECTRODE

Roger W. Dahl, Andover; Ronald W. Heil, Jr., Roseville; Graydon E. Beatty, New Brighton, all of Minn., and Morton M. Mower, Lutherville, Md., assignors to Cardiac Pacemakers, Inc., St. Paul, Minn.

Filed Nov. 1, 1989, Ser. No. 430,050

Int. Cl.^{5} A61N *1/05*

U.S. Cl. 128—784 **38 Claims**



1 A defibrillation electrode of the type for implantation on or about the heart of a patient for connection to an implantable electrical defibrillation system, said electrode comprising:

a conductive discharge volume region comprising at least two layers of porous electrically conductive screen, said at least two layers of porous electrically conductive screen substantially filling said conductive discharge volume region but allowing the flow of body fluids therethrough for making intimate electrical contact with the body fluids;

an insulation element attached to said layers of conductive screen for occupying a surface of said electrode facing away from the heart.

5,020,545

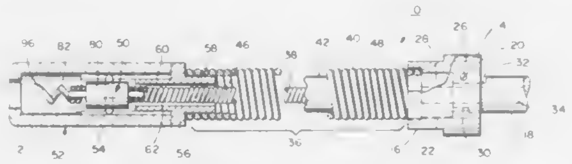
CARDIAC LEAD ASSEMBLY AND METHOD OF ATTACHING A CARDIAC LEAD ASSEMBLY

Thomas M. Soukup, Lake Jackson, Tex., assignor to Siemens-Pacesetter, Inc., Sylmar, Calif.

Filed Jan. 23, 1990, Ser. No. 468,527

Int. Cl.^{5} A61N *1/05*

U.S. Cl. 128—785 **18 Claims**



1 A cardiac lead assembly comprising:

a first conductor;

a first electrode having a conduit therein having a lock groove within said conduit, said first electrode being connected to a distal end of said first conductor;

a second electrode having a fixation bobbin, a fixation screw fixedly connected to said fixation bobbin and a lock pin extending from said fixation bobbin, said second electrode being longitudinally movable within said first electrode conduit when in a first position wherein said lock pin and said lock groove substantially prevents axial rotation of said second electrode relative to said first electrode and in a second position wherein said second electrode is capable of axial rotation relative to said first electrode; and

a torsion coil having a first distal end fixedly connected to said fixation bobbin and an opposite second end, said coil ends being axially rotatable relative to each other for storing torsional potential energy while said second electrode is at said first position and for releasing stored torsional energy to axially rotate said second electrode at said second position, said coil having a coil channel therein for passage of a stylet therethrough for manually pushing and longitudinally moving said second electrode from said first position to said second position such that, upon movement of said second electrode to said second position, said stored torsional energy can be, at least partially, released for axially rotating said coil first distal end and second electrode, a tip of said second electrode fixation screw can penetrate a surface of a patient's heart, and said fixation screw can automatically screw said second electrode into the patient's heart as said second electrode rotates thereby embedding and fixing the lead with the heart.

5,020,546

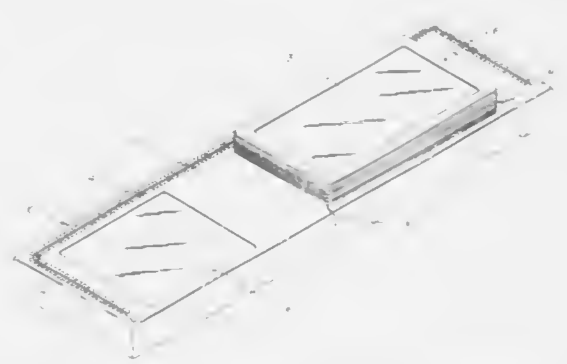
CASUALTY WRAP WITH INTEGRAL MEDICAL ACCESS CHAMBER

Anthony L. Russo, Lansdale, Pa., assignor to Calspan Corporation, Buffalo, N.Y.

Filed Feb. 20, 1990, Ser. No. 481,547

Int. Cl.^{5} A61B *19/00*

U.S. Cl. 128—849 **21 Claims**



1. An apparatus for providing medical treatment to a casualty including a first enclosure for isolating a casualty from a contaminated environment;

a flexible access chamber attached to said first enclosure;

said access chamber being formed as a collapsible structure including a flexible wall portion adapted to assume a first expanded position when said access chamber is in use for providing access to said casualty in said first enclosure;

said access chamber being adapted to assume a second collapsed position when said access chamber is not in use; and

said flexible wall portion including passage means for receiving a pressurized fluid such that when said passage means is supplied with a pressurized fluid, said access chamber moves from said collapsed to said expanded position to form a semi-rigid structure.

5,020,547

PROTECTIVE BODY APPLIANCE

Alvin E. Strock, 647 Commonwealth Ave., Newton Center, Mass. 02159

Filed Jan. 26, 1990, Ser. No. 470,858

Int. Cl.^{5} A61F *13/00*

U.S. Cl. 128—891 **20 Claims**

1. A protective body appliance to be adhered to a body region to be protected, comprising:

a pad made of a relatively flexible and relatively compressible material having a first surface and a second surface, said second surface having a central portion which contains means for adhering said pad to the body region and having two opposite end portions which are free from said means for adhering; and,

a relatively rigid shield having a curved shape secured to said first surface in such a manner so that said pad assumes a contour approximating that of the body region;

whereby the appliance, when adhered to the body region, is

VOL
1127
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1991
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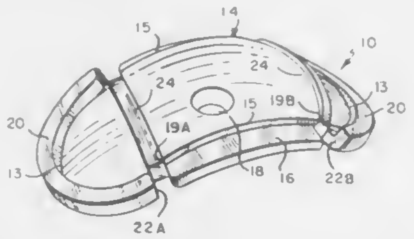
permitted a limited degree of rocking movement relative to the body region underlying said opposite end portions of said

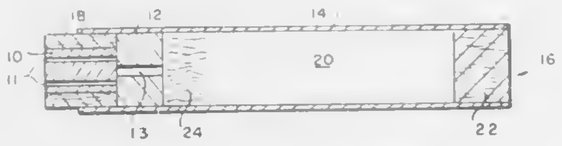


second surface and whereby said shield transfers external forces exerted upon said shield to areas spaced from said central portion.

5,020,548
SMOKING ARTICLE WITH IMPROVED FUEL ELEMENT

Ernest G. Farrier, Winston-Salem; James L. Harris, Westfield; Alan B. Norman, Clemmons; James L. Resce, Yadkinville; Andrew J. Sensabaugh, Jr., and Michael D. Shannon, both of Winston-Salem, all of, assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Aug. 26, 1985, Ser. No. 769,532
Int. Cl.^{5} A24D *1/00, 1/02, 1/18;* A24F *1/00*
U.S. Cl. 131—194 40 Claims



6. An elongated smoking article comprising.

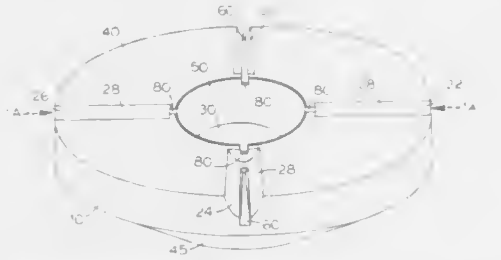
(a) a combustible fuel element less than about 8 mm in diameter and less than about 30 mm in length, prior to smoking, having a plurality of longitudinal passageways at least partially therethrough; and

(b) a physically separate aerosol generating means including an aerosol forming material.

5,020,549
SMOKELESS ASHTRAY WITH CONTROLLED COMBUSTION CHAMBERS

Tadeusz P. Wojcik, P.O. Box 1659, Guelph, Ontario, Canada N1H 6R7

Filed May 26, 1989, Ser. No. 198,863
Int. Cl.^{5} A45D *4/18*
U.S. Cl. 131—231 1 Claim



1. A smokeless ashtray comprising:

a body having a top surface and a bottom surface, the top surface having an ash receiving cavity recessed therein having a sidewall;

at least one controlled combustion chamber integrated with said top surface comprising a cigarette receiving channel having a curved surface and a groove in said surface extending along the length of said channel;

a first end of said channel being in communication with said ash receiving cavity via a notch in said sidewall of said cavity;

said groove having a depth which increases along the length of said channel from said first end to the opposite end thereof, such that the combustion rate of a lit cigarette placed in said channel may be adjusted by adjusting the position of the cigarette along the length of said channel

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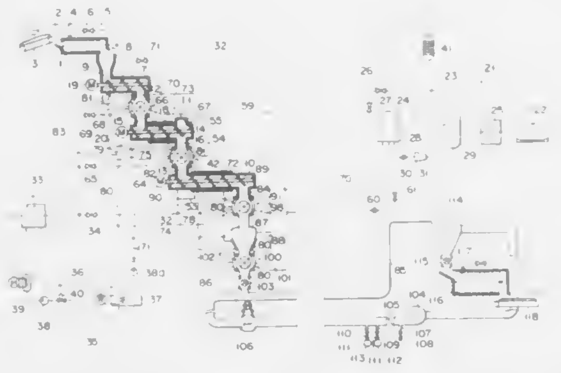
5,020,550
APPARATUS FOR EXPANDING MATERIAL OF AN AGRICULTURAL ORIGIN

Kensuke Uchiyama; Hiromi Uematsu; Manabu Takeuchi, all of Hiratsuka, and Masao Kobari, Tokyo, all of Japan, assignors to Japan Tobacco Inc., Tokyo, Japan

PCT No. PCT/JP88/00750, § 371 Date Mar. 23, 1989, § 102(e) Date Mar. 23, 1989, PCT Pub. No. WO89/00821, PCT Pub. Date Feb. 9, 1989

PCT Filed Jul. 27, 1988, Ser. No. 329,782
Claims priority, application Japan, Jul. 27, 1987, 62-185427
Int. Cl.^{5} A24B *3/18*
U.S. Cl. 131—296 16 Claims



1. An apparatus for expanding material of agricultural origin comprising: an impregnating agent source for storing an impregnating agent to be impregnated in the material to be expanded and capable of assuming at least a gaseous phase;

a preparatory vessel in communication with ambient atmosphere for receiving the material to be expanded;

substituting means for substituting air in said preparatory vessel with a gaseous impregnating agent supplied from said impregnating agent source;

an impregnation vessel for impregnating the material with the impregnating agent

supplying means for supplying to said impregnation vessel the impregnating agent supplied from said impregnating agent source and having an impregnation pressure higher than atmospheric pressure and to thereby create an interior atmosphere within said impregnation vessel that includes the impregnating agent,

convey pipe means for interconnecting said preparatory vessel and said impregnation vessel and for guiding the material to be expanded from said preparatory vessel to said impregnation vessel;

conveying means for conveying the material from said preparatory vessel to said impregnation vessel through said convey pipe means;

booster means for filling said convey pipe means with the impregnating agent supplied from said impregnating agent source and, immediately before the material is received from said convey pipe to said impregnation vessel, for increasing the impregnating agent pressure around said material to a pressure substantially equal to the impregnation pressure in said impregnation vessel while maintaining the impregnation pressure within said impregnating vessel substantially constant;

delivery pipe means, one end of which is connected to said impregnation vessel, for guiding the material impregnated in said impregnation vessel;

a blow pipe, connected to the other end of said delivery pipe, for blowing the impregnated material;

delivering means for delivering the impregnated material from said impregnation vessel to said blow pipe through said delivery pipe means;

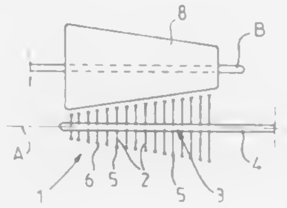
debooster means for filling said delivery pipe means with impregnating agent supplied from said impregnating agent source and, immediately before the impregnated material which was discharged from said impregnation vessel to said delivery pipe is then discharged to said blow pipe, for reducing the impregnating agent pressure around said impregnated material to a pressure substantially equal to a pressure in said blow pipe while maintaining the impregnation pressure within said impregnation vessel substantially constant; and

blowing means operatively associated with said blow pipe, for generating a flow of a heating medium heated to a predetermined temperature, and for delivering the flow of said heating medium to the impregnated material in said blow pipe.

5,020,551
METHOD FOR MANUFACTURING A MAKE-UP BRUSH

Jean-Louis Guerret, Paris, France, assignor to L'Oreal, Paris, France

Filed Oct. 5, 1989, Ser. No. 417,719
Claims priority, application France, Oct. 12, 1988, 88 13409
Int. Cl.^{5} A45D *24/00*
U.S. Cl. 132—200 7 Claims

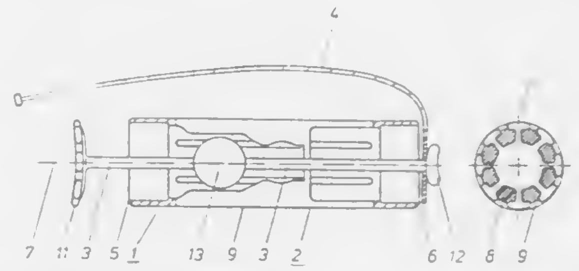


1. A method for manufacturing a mascara product supplying brush of the type having a multiplicity of bristles mounted on a core having a longitudinal axis and oriented transversely relative to said axis of the core, and the steps comprising utilizing bristles for the brush having a diameter of from 0.1 mm to 0.3 mm and grinding the ends of the bristles of the brush with a rotary grinding wheel in order to shred the ends of the bristles farthest from the core and to form small hooks at said ends.

5,020,552
EXPANDABLE HAIR CURLER

Detlef Hollenberg, Hilden; Hans Schneider, Schwalmtal, and Georg Weihrauch, Kreidach, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany

Division of Ser. No. 921,653, Oct. 21, 1986, Pat. No. 4,856,542.
This application Jul. 17, 1989, Ser. No. 380,935
Claims priority, application Fed. Rep. of Germany, Oct. 21, 1985, 3537374; Dec. 14, 1985, 3544275
Int. Cl.^{5} A45D *2/24*
U.S. Cl. 132—265 4 Claims



1. A hair curler comprising:

A) a hollow radially expandable and contractible, generally cylindrical curler body with a notational longitudinal central axis;

B) a detachable holding strap stretching from one longitudinal end of said body to the other;

C) expansion actuation means including:

1) a plunger adapted for longitudinal motion, coaxial with and within said body projecting longitudinally from at least one end of said body,

2) biasing means comprising at least one element inside the curler body cooperating between said plunger and said cylindrical body, so that said body will expand upon the application of bias generated by said plunger moving longitudinally in one direction, and contract upon removal of said such bias via longitudinal movement of said plunger in an opposite direction back to its original position; and

3) said biasing means including at least one cup lamella which projects outwardly from said plunger and whose free end biases against the inner surface of said curler body, a hinge connecting said cup lamella to said plunger, said lamella being at an acute angle to said plunger, and being cup-shaped when said curler body is contracted, and is swung on said hinge by the longitudinal movement of said plunger until it is perpendicular to said plunger to expand said curler body.

5,020,553
LIPSTICK APPLICATOR

Daniel D. De La Rocha, 5376 W. 14th La., Hialeah, Fla. 33012
Filed Dec. 26, 1989, Ser. No. 456,505
Int. Cl.^{5} A45D *40/26*
U.S. Cl. 132—320 6 Claims

1. A lipstick applicator for use in applying lipstick by a user comprising:

a sheet of paper having opposite main faces with an upper and lower edge and side edges spaced from one another a distance of about two and one-half inches, said upper edge spanning said side edges and said lower edge defining a fair curve between the side edges symmetrical with respect to a centerline between the side edges of the sheet, said lower edge defining a leading edge for use, each of said opposite main faces having an upper zone and a lower

VOL
1127
ISS
1
JE
4
1991
UMI

zone extending between the side edges, the upper zones extending from the upper edge about one-third of the distance between the upper and lower edges,

a coating of lipstick on the lower zones on the opposite main faces of the sheet,

an envelope formed from a wax coated paper having an entrance/exit slot, said envelope normally protectively jacketing the sheet, said envelope including flap means to foldably close with respect to the slot to captivate the sheet within the envelope with the upper zone of the sheet being accessible when the flap means are generally coplanar with the envelope and the sheet for removal of the sheet by grasping it at the slot, and said sheet being useful for applying lipstick to upper and lower lips of a user by inserting the leading edge into a mouth of the user and grasping the coated lower zone with the lips and applying pressure to opposite sides of the lower zone of the sheet so that some of the lipstick adheres to the lips of the user upon withdrawing the sheet from the user'mouth,

said flap means on the envelope including an outwardly extending free distal edge defining a gripping surface to facilitate opening thereof, and

said envelope including a tab attached to and extending from a bottom peripheral edge of the envelope for grasping by the user to prevent smudging of the coating of lipstick during removal of said sheet of paper from the envelope

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5,020,554

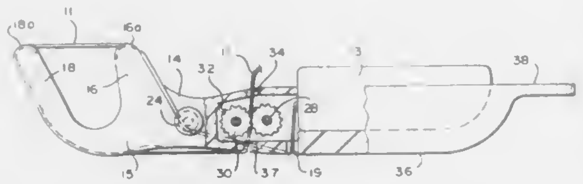
DENTAL FLOSS DISPENSER AND APPLICATOR

Andrew S. Feinberg, P.O. Box 12279, El Paso, Tex. 79913

Filed Nov. 8, 1989, Ser. No. 433,243

Int. Cl.^{5} A61C *15/00*

U.S. Cl. 132—323 **12 Claims**



1. A dental floss dispenser and applicator comprising:

(a) a hollow handle having a supply of dental floss;

(b) an axially-extending shank attached to one end of said handle;

(c) dental floss anchoring means mounted on said shank;

(d) a U-shaped fork integral with said shank, said U-shaped fork comprising a pair of curved prongs having notched tips for holding the dental floss in position for applying said dental floss to teeth;

(e) a pair of axially spaced-apart, contra-rotatable, intermeshing gear wheels, each wheel having outwardly extending teeth on its periphery, said wheels being rotatably mounted within said handle for advancing the dental floss inserted between the meshing teeth of said gears;

(f) means mounted on said handle for rotating said pair of gear wheels and thereby advancing the floss positioned therebetween;

(g) pawl means mounted in said handle and operatively connected to one of said gear wheels to prevent reverse rotation of said pair of gear wheels; and

(h) a pathway for said dental floss extending from said supply of dental floss along said shank, past said dental floss anchoring means, between the tips of said prongs and back along said shank and between said pair of intermeshing gear wheels

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5,020,555

CONTINUOUS WASHING APPARATUS

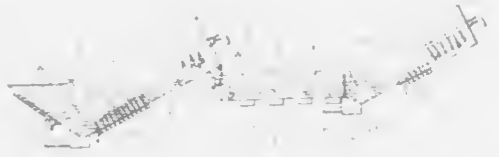
Seitaro Nishibayashi, 2-36-910, Minamiothsuka, Tnshima-ku, Tokyo, Japan

Filed Jul. 6, 1989, Ser. No. 376,311

Claims priority, application Japan, Sep. 30, 1988, 63-246541

Int. Cl.^{5} B08B *3/06*

U.S. Cl. 134—65 **4 Claims**



1. A continuous washing apparatus comprising a first elongated cylindrical washing tub inclined at an angle to a horizontal plane for holding a first body of cleaning liquid, said first washing tub having an inlet region for washing objects at a lower end portion of said first washing tub and an outlet region for washing objects at an upper end portion of said first washing tub with an upper side surface of the first body of cleaning liquid being disposed at a lower level than the outlet region for the washing objects, first transfer means in said first washing tub for moving the washing objects from the inlet region and through the upper side surface of the first body of cleaning liquid to the outlet region, said first transfer means including a first screw assembly rotatably mounted in said first washing tub for rotation about a first axis which is inclined at an angle to a horizontal plane, said first screw assembly including a first band-like helical fin extending from the inlet region to the outlet region and first drive means for rotating said first helical fin relative to said first washing tub to move washing the objects upwardly from the inlet region to the outlet region, said first helical fin having a large central opening which extends from the inlet region to the outlet region and through which washing objects can move downwardly toward the inlet region to prevent overloading of said first helical fin with the washing objects, a second elongated washing tub for at lest partially holding a second body of cleaning liquid, said second washing tub being generally horizontal and having an inlet region disposed adjacent to the outlet region of said first washing tub, said first screw assembly being operable to effect movement of the washing objects from the outlet region of said first washing tub to the inlet region of said second washing tub, said second washing tub having an outlet region at a end of said second washing tub opposite from the inlet region of said second washing tub, second transfer means in said second washing tub for moving washing objects from the inlet region of said second washing tub to the outlet region of said second washing tub, said second transfer means including a second screw assembly rotatably mounted in said second washing tub for rotation about a second axis which is generally horizontal, said second screw assembly including a second band-like helical fin extending from the inlet region to the outlet region of said second washing tub and second drive means for rotating said second helical fin relative to said second washing tub to move the washing objects along a generally horizontal path from the inlet region to the outlet region of said second washing tub, said second helical fin having a large central opening which extends from the inlet region of said second washing tub to the outlet region of said second washing tub and through which washing objects can move to prevent overloading of said second helical fin with washing objects, a third elongated cylindrical tub inclined at an angle to a horizontal plane, said third tub having an inlet region disposed adjacent to the outlet region of said second washing tub, said second screw assembly being operable to effect movement of the washing objects from the outlet region of said second washing tub to the inlet region of said third tub, said second body of cleaning liquid extending from the inlet region of said second washing tub and through the outlet region of said second washing tub into the inlet region of said third tub, said third tub having an outlet region for the washing objects at an upper end portion of said third washing tub with an upper side surface of the second body of cleaning liquid being disposed at a lower level than the outlet region of said third tub, third transfer means in said third tub for moving the washing objects from the inlet region of said third tub and through the upper side surface of the second body of cleaning liquid to the outlet region of said third tub, said third transfer means including a third screw assembly rotatably mounted in said third tub for rotation about a third axis which is inclined at an angle to a horizontal plane, said third screw assembly including a third band-like helical fin extending from the inlet region of said third tub to the outlet region of said third tub and third drive means for rotating said third helical fin relative to said third tub to move the washing objects upwardly from the inlet region of said third tub to the outlet region of said third tub, said third helical fin having a large central opening which extends from the inlet region of said third tub to the outlet region of said third tub and through which washing objects can move downwardly toward the inlet region of said third tub to prevent overloading of said third helical fin with washing objects.

5,020,556

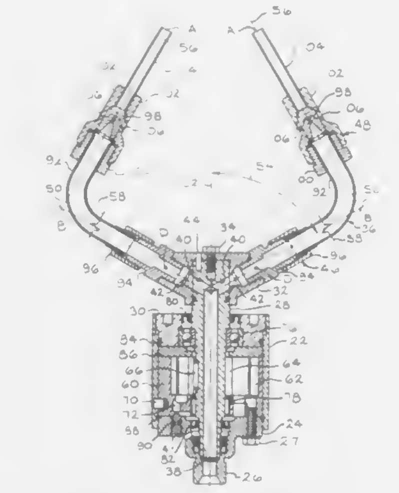
VEHICLE WASH APPARATUS WITH SPINNING NOZZLES

Olli Lamminen, Ann Arbor, and Erkki A. Koivunen, Livonia, both of Mich., assignors to 501 Peerless Pump Company, Egan, Minn.

Filed Jan. 18, 1990, Ser. No. 466,991

Int. Cl.^{5} B60S *3/04;* B05B *3/06*

U.S. Cl. 134—112 **9 Claims**



1. A water nozzle assembly, comprising:

a stationary nozzle housing having an axis;

a hollow shaft disposed axial within said housing forming water flow conduit therethrough with one end of said shaft extending from a first axial end of said housing;

a pair of axially spaced bearings supporting said shaft for rotation about said axis;

water inlet means for receiving pressurized water at a second axial end of said housing, said inlet communicating with said water flow conduit;

means coupled to said one end of said shaft forming at least one water nozzle creating a water jet of said pressurized water as said water exits said nozzle assembly, said at least one nozzle having an outlet oriented relative to said axis so that water reaction forces acting on said at least one nozzle creates a moment about said axis;

said housing forming an oil chamber surrounding said shaft with said bearings disposed in said oil chamber whereby oil in said chamber lubricates said bearings; and

brake means for controlling the rotational speed of said shaft, said brake means including a pump for circulating oil in said chamber.

7. A wash system for cleaning a motor vehicle with pressurized water, comprising:

a plurality of water nozzle assemblies for directing pressurized wash water toward said vehicle, said nozzle assemblies each having a stationary nozzle housing having an axis, a hollow shaft disposed axial within said nozzle housing forming a water flow conduit therethrough with one end of said shaft extending from a first axial end of said nozzle housing, a pair of axially spaced bearings supporting said shaft for rotation about said axis, water inlet means for receiving pressurized water at a second axial end of said nozzle having, said inlet communicating with said water flow conduit, means coupled to said one end of said shaft forming at least one water nozzle creating a water jet of said pressurized water as said water exits said nozzle assembly, said at least one nozzle having an outlet oriented relative to said axis so that water reaction forces acting on said at least one nozzle creates a moment about said axis, said nozzle housing forming an oil chamber surrounding said shaft with said bearings disposed in said oil chamber whereby oil in said chamber lubricates said bearings;

brake means for controlling the rotational speed of said shaft, said brake means including a pump circulating said in said chamber; and

means forming a raised arch structure for the vehicle to be passed through with said nozzle assemblies supported thereon.

5,020,557

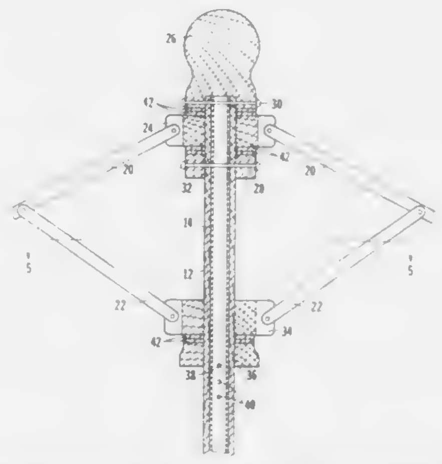
ROTATING CANOPY UMBRELLA

Phillip C. Apple, Mt. Pleasant Mills, Pa., assignor to American Holtzkraft, Inc., Mt. Pleasant Mills, Pa.

Filed Jul. 19, 1990, Ser. No. 554,555

Int. Cl.^{5} A45B *11/00*

U.S. Cl. 135—15.1 **3 Claims**



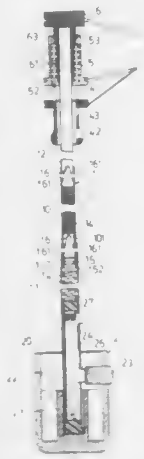
1. An umbrella incorporating a canopy assembly that is free to rotate about its axis including a central post, a plurality of ribs surrounding the post and pivotally connected to a rotating

VOL
1127
ISS
1
JE
4
1991
UMI

hub surrounding the post near the post's upper end, an end cap and stop located on either side of the foregoing rotating hub and rigidly attached to the post confining the hub to a location near the upper end of the post, a second rotating hub surrounding the post and free to slide between the upper and lower ends of the post, a plurality of struts surrounding the post and having post ends pivotally connected to the sliding hub and rib ends pivotally connected to the ribs so that moving the sliding hub upwardly along the post opens the ribs, a canopy attached to the ribs, a movable stop limiting the movement of the sliding hub down the length of the post, an umbrella having a collapsed position where the canopy, ribs and struts are adjacent the post and the sliding hub is located in a lowered position on the post, and an open position where the canopy, ribs, and struts are opened away from the post and the sliding hub is located in an elevated position.

5,020,558
AUTOMATIC UMBRELLA HAVING STABLE EXTENDING AND FOLDING STRUCTURE

Sheng-Fu Huang, P.O. Box 55-1670, Taipei (10477), Taiwan
Filed Oct. 29, 1990, Ser. No. 605,666
Int. Cl.^{5} A45B *25/14*
U.S. Cl. 135—24 **6 Claims**



1 An automatic umbrella comprising:

a telescopic shaft means including a lower outer tube, an upper inner tube telescopically mounted in the lower outer tube, a lower sleeve inserted in a lower portion of said lower outer tube, and a shaft-restoring spring held in said shaft means for resiliently extending said upper inner tube beyond said lower outer tube;

a grip fixed on a lower portion of said lower outer tube having a tip cap formed on an upper portion of said grip defining a tip socket therein, a push button protruding laterally from a lower locking means pivotally formed in said lower sleeve through the grip, and an upper hook portion formed on an upper portion of said locking means resiliently urged by a hook spring formed in said sleeve to be protruded outwardly through said lower sleeve and said lower tube;

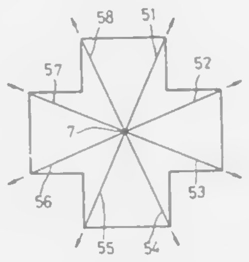
a lower runner pivotally secured with a stretcher rib of a rib assembly means secured with an umbrella cloth thereon having a central cylindrical hole formed through said lower runner having a diameter slightly larger than an outside diameter of said lower outer tube, and at least a hook hole formed in said lower runner operatively engageable with said hook portion of said lower locking means;

a middle runner pivotally secured with a main rib of said rib assembly means having a truncated-cone hole formed in an upper portion of a runner sleeve retaining a rib-restoring spring in said runner sleeve and on said lower runner for resiliently extending said rib assembly means; and

an upper notch pivotally secured with a top rib of said rib assembly means having an upper sleeve protruding downwardly from said upper notch to be slidably engageable with said truncated-cone hole in said middle runner for stabilizing said upper notch and said middle runners when opening the automatic umbrella.

5,020,559
UMBRELLA COVER CONSTRUCTION

Chenmin Lai, 2, Alley 2, Lane 102, Dong Hwa St., Taipei, Taiwan
Filed Nov. 22, 1988, Ser. No. 275,065
Int. Cl.^{5} A45B *25/18*
U.S. Cl. 135—33.2 **3 Claims**

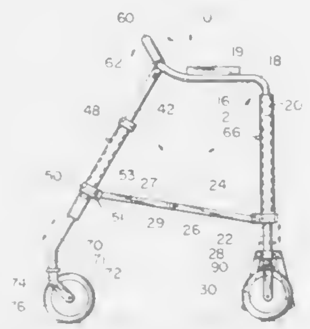


1. An umbrella cover for use with an umbrella structure having a plurality of umbrella ribs, comprising:

a normally planar cover cloth coupled to said umbrella structure having a warp extending in a first direction and a weft extending in a second direction, said second direction being orthogonal to said first direction, said cover cloth having a closed stepped outer contour defining a plurality of perimeter edges disposed in parallel relationship with either said warp or said weft, and said perimeter edges defining a plurality of vertices for respective coupling to end portions of said plurality of umbrella ribs.

5,020,560
WALKER HAVING WHEELS AND BRAKES

Rob Turbeville, 207 Dunbridge Dr., Palm Harbor, Fla. 34684
Filed Aug. 17, 1990, Ser. No. 568,995
Int. Cl.^{5} A61H *3/00*
U.S. Cl. 135—67 **20 Claims**



1. A walker, comprising:

a main rear frame,

said main rear frame having a horizontally disposed tubular member, a pair of rearwardly extending arms integral to opposite ends thereof, and a pair of downwardly extending rear leg members,

a rotatably mounted rear wheel disposed at the lower end of each of said rear leg members,

a brake member associated with each of said rear wheels,

means adapting said rear wheel brake members to hold said rear wheels against rotation when a user of said walker is placing weight below a predetermined threshhold on said walker, thereby indicating that said user is supporting that user's body weight by means other than said walker and relying upon the walker during such time as a non-rolling support means,

a forward wheel support having an upper end secured to said horizontally disposed tubular member of said main rear frame and having a rotatably xounted forward wheel disposed at a lower end thereof

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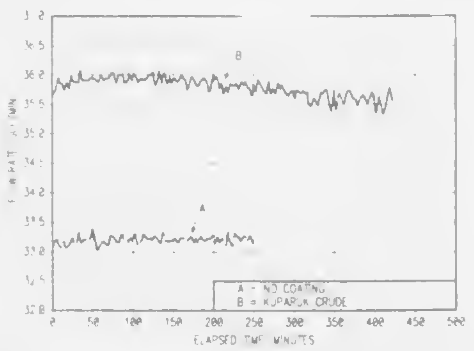
5,020,561
DRAG REDUCTION METHOD FOR GAS PIPELINES

Ying-Hsiao Li, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.
Filed Aug. 13, 1990, Ser. No. 566,186
Int. Cl.^{5} F17D *1/16*
U.S. Cl. 137—13 **4 Claims**

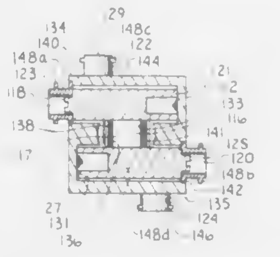


1. A method for reducing drag on a gas flowing in a gas pipeline, said method comprising:

injecting a drag reducer into said gas pipeline wherein said drag reducer is selected from a class of chemical compounds which are comprised of molecules having a polar group forming one end thereof which bonds with said inner wall of said pipeline and a non-polar group forming the other end which smoothes the gas-solid interface between said wall and said flowing gas thereby reducing gas turbulence therebetween wherein said drag reducer is a fatty acid amine and wherein said polar group is comprised of an amine and said non-polar group is comprised of a long-chain hydrocarbon.

5,020,562
MULTILINE CHECK VALVE ASSEMBLY

Frank M. Richmond, Harvard, Ill.; Timothy Vanderveen, Poway, and Rick Kimes, Carlsbad, both of Calif., assignors to IMED Corporation, San Diego, Calif.
Continuation-in-part of Ser. No. 441,954, Nov. 28, 1989. This application Aug. 9, 1990, Ser. No. 565,257
Int. Cl.^{5} F16K *15/18*
U.S. Cl. 137—15 **16 Claims**



16. A method for infusing fluid from a plurality of secondary sources into an IV line which is carrying fluid from a primary source, which comprises the steps of:

(a) engaging said primary source in fluid communication with a device comprising:

a valve base defining a central fluid passageway and having a plurality of valve cavities disposed in said base transverse to said passageway, said valve cavities each having a bottom and an opening spaced from said bottom, said openings having respective valve seats circumscribing said openings, each of said valve cavities being in fluid communication with said passageway intermediate respective said opening and said bottom each of said bottoms being distanced from said passageway;

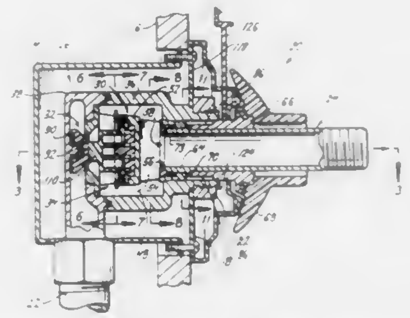
resilient valve elements disposed in respective said valve cavities between respective said bottoms and respective said openings, said valve elements being individually deformable between first configurations wherein said valve elements are in fluid sealable contact with respective said valve seats to occlude respective said openings and second configurations wherein said valve elements are distanced from respective said seats to establish respective fluid pathways through respective said openings into said passageway; and

means projecting from respective said bottoms of said valve cavities and engageable with respective said valve elements for substantially centering respective said valve elements within said respective valve chambers; and

(b) inserting a plurality of adaptors connected in fluid communication with respective said secondary sources into respective said openings to deform respective said valve elements into said second configurations to thereby establish a respective plurality of fluid pathways between respective said secondary sources and said fluid passageway.

5,020,563
CONNECTOR SET

Riebard E. Hoffman, Overland Park, Kans.; Richard Topping, Framingham, Mass.; Tom W. Nelson, Lenexa, Kans.; Marie L. Murville, Cambridge, and Paul Belkus, Whitinsville, both of Mass., assignors to Gas Research Institute, Chicago, Ill.
Filed Jun. 22, 1990, Ser. No. 542,310
Int. Cl.^{5} F16K *17/40*
U.S. Cl. 137—75 **28 Claims**



1. A connector set for releasably connecting a gas conduit from a gas appliance or the like to a gas line to provide gas to the appliance, the connector set comprising a nipple adapted to be connected to the gas conduit, and a receptacle adapted to be connected to the gas line, the receptacle having a socket adapted to receive the nipple, first and second valves, each operable between an open position and a closed position and arranged so that gas can pass from the gas line to the socket only when both valves are in their open positions, and means for operating the second valve as the first valve is operated so that the second valve opens when the first valve opens and closes when the first valve closes, the first valve being operable only when the nipple is in the socket, and the nipple being removable from the socket only when the first valve is in its closed position.

VOL
1127
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1991
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5,020,564

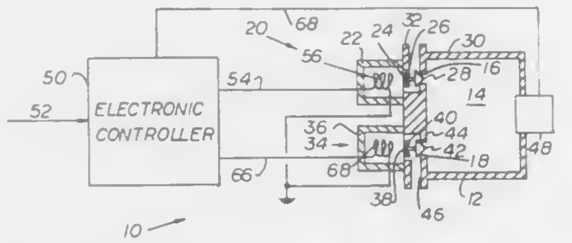
DOSER SYSTEM FOR REGULATING PRESSURE IN A CONTROL CHAMBER OF A TEST STAND

David C. Thoman, Mishawaka; Marvin N. Briggs, and James M. Eastman, both of South Bend, all of Ind., assignors to Allied-Signal Inc., Morristown, N.J.

Continuation of Ser. No. 374,040, Jun. 29, 1989, abandoned. This application Jul. 2, 1990, Ser. No. 545,689

Int. Cl.^{5} G05D *16/20*

U.S. Cl. 137—102 1 Claim



1. In a test stand having a normally sealed control chamber having a fluid pressure (Pc) therein for simulating an operational parameter for a device, a doser system for establishing a desired pressure (Px) within said control chamber, said doser system comprising:

a first housing having a first inlet port connected to a source of high pressure fluid (Ps) and a first outlet port connected to said control chamber, said first housing having a first surrounding said first outlet port;

a second housing having a second inlet port connected to said control chamber and a second outlet port connected to the surrounding environment having a third pressure (P_r), said second housing having a second seat surrounding said second inlet port;

a first solenoid valve located in said first housing and having a first plunger with a first face urged toward said first seat;

a second solenoid valve located in said second housing and having a second plunger with a second face urged toward said second seat;

a pressure transducer connected to said control chamber for developing a feedback signal indicative of the fluid pressure (Pc); and

control means connected to receive an input signal from an operator corresponding to said desired pressure (Px) and connected to said pressure transducer to receiver said feedback signal, said control means responding to said input signal by supplying one of said first and second solenoid valves with an error signal derived from the difference between (Px) and (Pc), said error signal moving either said first face away from said first seat to allow high pressure fluid (Ps) to be communicated to said control chamber or said second face away from said second seat to allow fluid to flow from said control chamber through said outlet port to establish a current fluid pressure (Pc') in said control chamber, said control means continuing to supply an error signal to one of said first and second solenoid valves until (Pc') is equal to (Px), said error signal being a series of fixed frequency pulses which logarithmically vary in duration as (Pc') approaches (Px), each pulse in said series of pulses being incrementally less in duration than the preceding pulse, said pulse supplied to said first or second solenoid valves being of such duration that the effect of each valve movement is reflected in a difference between (Px) and (Pc) before the next pulse is computed to thereby assure continuous brief movement of the selected first or second valves until the error signal is reduced to a desired level and Px is equal to Pc.

5,020,565

WATER HAMMER ABSORBER

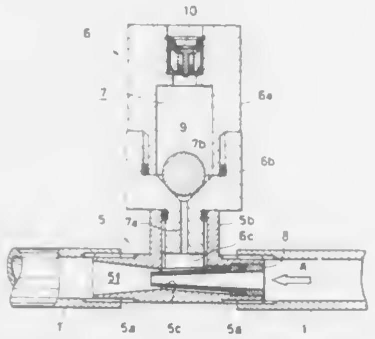
Mitsutaka Hattori; Toshiaki Yoshimi, and Toshio Fukushima, all of Aichi, Japan, assignors to Inax Corporation, Japan

Continuation of Ser. No. 218,201, Jul. 13, 1988, abandoned. This application Feb. 21, 1990, Ser. No. 483,316

Claims priority, application Japan, Jul. 24, 1987, 62-113618; Nov. 18, 1987, 62-175919; Nov. 18, 1987, 62-175920

Int. Cl.^{5} F15B *1/02*

U.S. Cl. 137—207 6 Claims



1. A water hammer absorber, comprising:

a tubular portion formed in a water supply passage for supplying cold or hot water, the cross-section of said tubular portion gradually decreasing in a direction of flow of the cold or hot water until an inner diameter of said tubular portion becomes minimum and then gradually increasing in said direction;

a pressure-absorbing chamber formed at the minimum inner diametered section of said tubular portion or therearound at the downstream side thereof, so as to communicate with the water supply passage, said chamber having a passageway communicated with the atmosphere and a check valve mounted in the passageway for permitting air to flow only into the pressure-absorbing chamber;

a communication passage provided between the water supply passage and the pressure-absorbing chamber; and

means provided within said communication passage for permitting only cold or hot water to flow from the pressure-absorbing chamber into the water supply passage while inhibiting air from entering the water supply passage.

5,020,566

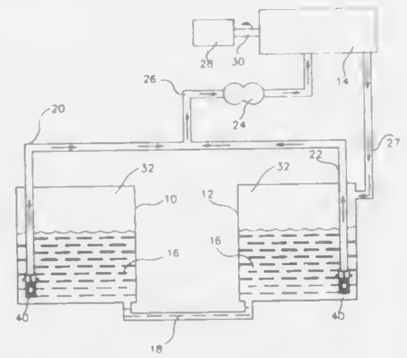
FUEL SUPPLY SYSTEM FOR PORTABLE ENGINE DRIVEN EQUIPMENT

John C. Shoop, LaPorte, Ind., assignor to Sullair Corporation, Michigan City, Ind.

Filed Aug. 13, 1990, Ser. No. 566,936

Int. Cl.^{5} F02M *37/00*

U.S. Cl. 137—265 17 Claims



1. A fluid supply system, comprising:

a first tank;

a second tank;

a first conduit connecting said first tank in fluid communication with said second tank, said first conduit being connected to the bottom segments of said first and second tanks, said first conduit being external to both said first and second tanks, said first conduit is connected to a portion of said bottom segment of said first tank that is proximate said second tank, said first conduit is connected to a portion of said bottom segment of said second tank that is proximate said first tank;

means for pumping fluid from said first and second tanks;

a second conduit connecting said pumping means in fluid communication with said first tank; and

a third conduit connecting said pumping means in fluid communication with said second tank;

means, associated with said second conduit, for preventing said fluid communication between said pumping means and said first tank when a level of liquid in said first tank is below a predefined magnitude; and

means, associated with said second conduit, for preventing said fluid communication between said pumping means and said second tank when a level of a liquid in said second tank is below a predefined magnitude, said second conduit being connected in fluid communication with a region of a bottom portion of the volume of said first tank that is farthest from said second tank and said third conduit being connected in fluid communication with a region of a bottom portion of the volume of said second tank that is farthest from said first tank.

5,020,567

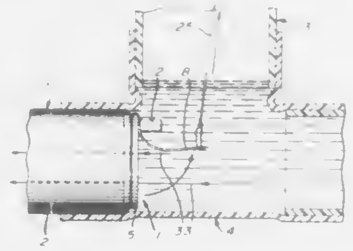
DRAINAGE VALVE HAVING A FLEXIBLE FLAP WITH AN EDGE TAPER

Serge L. Proulx, St-Rédempteur-de-Vaudreuil, Canada, assignor to Innotag Inc., Montreal, Canada

Filed Sep. 26, 1990, Ser. No. 588,174

Int. Cl.^{5} F16K *43/00, 31/20, 33/00*

U.S. Cl. 137—315 17 Claims



1. A drainage valve for installation into a water draining conduit, comprising

a plate provided with apertures therein to enable water to flow through the said plate, said plate having an upstream surface;

means for mounting the plate within the water draining conduit with the said plate extending across the said conduit, said plate mounting means including means for sealing a peripheral joint between the plate and an inner surface of the conduit;

a flap made of flexible material and applied against the upstream surface of the plate, said flap comprising an portion, a lower portion, and a peripheral portion encompassing the apertures of the plate the peripheral portion having a thickness which tapers toward a peripheral edge of the flap so that the peripheral portion has an increased flexibility, whereby pressure applied on the flap by water upstream of the drainage valve forces the tapered peripheral portion against the upstream surface of the plate to form a peripheral, sealed joint between the said flap and plate;

means for attaching the upper portion of the flap to a corresponding upper portion of the plate; and

means for lifting the lower portion of the flap to drain water upstream of the drainage valve through the apertures of the plate.

5,020,568

UNITIZED DISC FLOW CONTROL ASSEMBLY FOR A RESTRICTOR VALVE

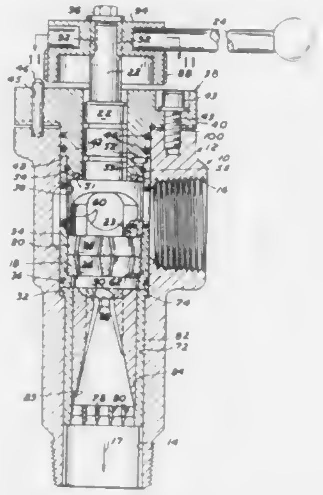
Julian S. Taylor, 8300 SW. 8, Oklahoma City, Okla. 73128

Continuation-in-part of Ser. No. 303,434, Jan. 30, 1989, Pat. No. 4,922,950, and a continuation-in-part of Ser. No. 474,979, Feb. 5, 1990, Pat. No. 4,967,787. This application May 1, 1990, Ser. No. 517,102

The portion of the term of this patent subsequent to Nov. 6, 2007, has been disclaimed.

Int. Cl.^{5} F16K *27/06*

U.S. Cl. 137—316 6 Claims



1. In a flow restrictor valve assembly having its body counterbored opposite one valve port defining an annular outwardly facing shoulder for receiving superposed multiple orifice discs adjacent the shoulder in face to face axial alignment with said one port, said body having a lateral port communicating with the counterbore, the improvement comprising:

cage means including a first sleeve within and normally sealing with the counterbore adjacent said annular shoulder and surrounding said discs,

said first sleeve having a wall port axially communicating with the lateral port and having a recess in its end surface opposite the discs;

a valve bonnet secured at one end portion to said first sleeve and closing the counterbore end portion opposite said shoulder;

yoke means axially connected with the disc opposite said one port and having a yoke stem projecting beyond said valve body at the outer end of the counterbore for angular rotation of one disc relative to the other disc;

valve top means secured to and surrounding said yoke stem for angularly rotating said yoke;

second sleeve means adjacent the downstream limit of said first sleeve for creating a pressure drop across its position; and,

indexing means for referencing the position of the first sleeve the bonnet, the bonnet to the valve body and the valve top to the yoke and bonnet.

VOL
1127
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1991
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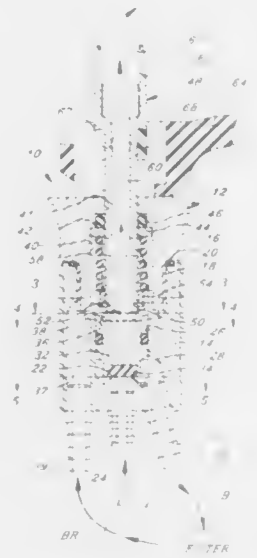
5,020,569
VENTED FAUCET SYSTEM

Frank J. Agresta, Wallingford, Conn., assignor to WPM, Inc., Waterbury, Conn.
Filed Oct. 1, 1990, Ser. No. 591,382
Int. Cl.⁵ E03C *1/02*
U.S. Cl. 137—544 6 Claims



1 A vented faucet system comprising:

(a) a valve housing having a top and a bottom and enclosing an upwardly facing valve seat, an inlet fitting extending out the bottom of the housing and connected to the seat, a bypass chamber in the housing extending laterally from above the seat and communicating therewith, a bypass fitting extending out the bottom of the housing and connected to the bypass chamber, a valve chamber above the seat and having a cylindrical wall coaxial with the seat, a valve stem chamber above the valve chamber and coaxial therewith, the top of the housing extending inward to form a neck in the valve stem chamber, annular downward shoulder means under the neck, a lateral inlet passage communicating with the valve stem chamber, and a bypass return fitting extending out the bottom of the housing and connected to the lateral inlet passage,

(b) a valve element reciprocably disposed in the valve chamber and sealingly engaging the cylindrical wall thereof and adapted to seat on the valve seat,

(c) a valve stem disposed in the valve stem chamber and extending up through the neck, annular upward shoulder means outward from the stem spaced upward from lower end thereof, the stem having a radial inlet disposed between the upward shoulder means and the downward shoulder means and an axial passage in the stem connected to the radial inlet and extending upward to a system outlet,

(d) spring means surrounding the valve stem and disposed in compression between the upward shoulder means and the downward shoulder means and urging the stem downward, the lower end of the stem engaging the valve element to hold it normally on the valve seat,

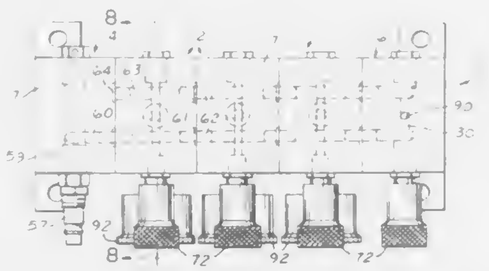
(e) activating means engaging the stem above the housing to raise the stem to permit the valve element to unseat, pressed upward by water pressure in the seat,

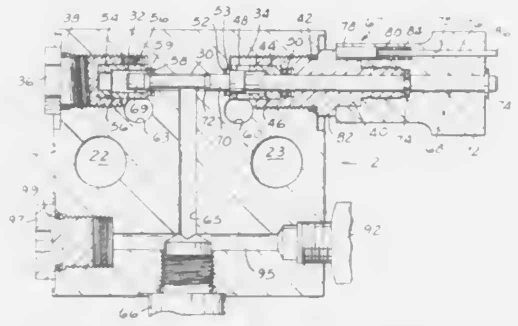
(f) a filter housing enclosing a filter element and having an intake and a discharge,

(g) tubular line means connecting the bypass fitting and the filter housing intake and connecting the filter housing discharge and the bypass return fitting.

5,020,570
COMBINED VALVE MODULAR CONTROL PANEL

Jonathan P. Cotter, Dearborn, Mich., assignor to Power Components, Inc., Redford, Mich.
Filed Aug. 17, 1990, Ser. No. 569,409
Int. Cl.⁵ F16K *11/10*
U.S. Cl. 137—596.12 15 Claims



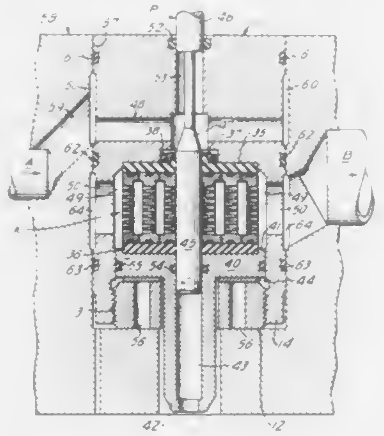


1. A modular control valve panel, comprising a plurality of at least two separable valve modules arranged end-to-end, each said valve module having a valve chamber therein, a supply module at one end of said plurality of valve modules, a bleed module at the other end of said plurality of valve modules, a supply passage having an inlet in said supply module and leading from said supply module through said valve modules into said bleed module, a bleed passage extending through said plurality of valve modules into said bleed module, each valve module having valve means operable in a first mode to open its valve chamber to said supply passage while sealing it from said bleed passage, in a second mode to open its valve chamber to said bleed passage while sealing it from said supply passage, and in a third mode to seal its valve chamber from both said supply passage and said bleed passage, means for supplying fluid under pressure to said inlet of said supply passage, a bleed outlet in said bleed module, and valve means in said bleed module operable selectively to place said bleed outlet in communication with said supply passage while sealing it from said bleed passage, to place said bleed outlet in communication with said bleed passage while sealing it from said supply passage, and to isolate said bleed outlet from both said supply passage and said bleed passage.

5,020,571
NOISE-REDUCING VALVE CONSTRUCTION

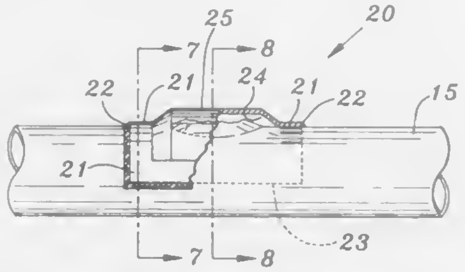
Peter A. Tartaglia, Butler; Richard B. Collins, Denville, and Robert S. Smolen, Bloomingdale, all of N.J., assignors to Marotta Scientific Controls, Inc., Montville, N.J.
Filed Jun. 15, 1990, Ser. No. 538,560
Int. Cl.⁵ F16K *47/08;* **F15D** *1/00*
U.S. Cl. 137—625.3 11 Claims

1. Noise-reducing valve structure, comprising a cylindrical body of nested tubular body members, said tubular members collectively defining spaced radial end walls when in nested array, a poppet member guided by the bore of the inner one of said tubular body members, said body members having plural generally radial passages and circumferential manifold groove formations at interface regions between body members, a valve casing comprising separable parts defining a cylindrical cavity containing the nested array of tubular members, said cavity having radial clearance via a portion of said manifold surface, the radial passages and manifold-groove formations of said body members extending over an axial range which is short of each axial end, the radially adjacent axial end portions of said body members being cylindrical and circumferentially continuous, whereby a pair of radially confronting land surfaces exists at each axial end of radially adjacent body members, one of the cylindrical land surfaces of each said pair having a circumferentially continuous groove formation, and an elastomeric O-ring in each of said grooves and establishing a circumferentially continuous seal between the cylindrical land surfaces of each pair



5,020,572
PIPE REPAIR CLIP

William G. Hunt, 1210 N. Main St., Sunset Beach, N.C. 28459
Continuation of Ser. No. 208,769, Jun. 20, 1988, Pat. No. 4,890,373. This application Dec. 18, 1989, Ser. No. 451,945
Int. Cl.⁵ F16L *55/16*
U.S. Cl. 138—99 2 Claims



1 A pipe repair clip for sealing a rupture in a pipe and comprising:

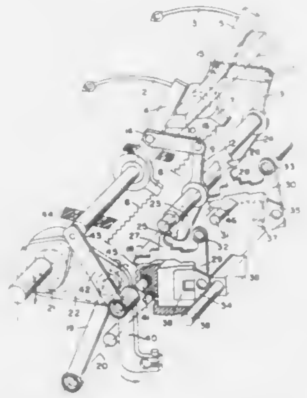
(a) a piece of imperforate rigid material formed in an arcuate configuration in cross-section and having opposed longitudinal side surfaces and opposed transverse end surfaces each conforming to an arcuate surface of the pipe to be repaired around the periphery of the rupture, said clip defining an arc of substantially greater than 180 degrees to permit the clip to be snapped over the pipe to be repaired and held in position over the rupture while the repair takes place;

(b) a centrally disposed raised chamber positioned radially outwardly from the pipe in the area of the rupture when the clip is in position on the pipe to be reparied and constituting a means to receive and enclose a sealing and bonding agent; and

(c) said chamber further having an integrally formed tapering transition area joining said side surfaces and end surfaces with said chamber to define a tapered area of a size to surround the area of the rupture to receive and enclose a sealing and bonding agent.

5,020,573
CONTROL MECHANISM FOR THE SELECTION OF WEFT YARNS IN RAPIER LOOMS

Johnny Debaes, Wenduine, Belgium, assignor to N.V. Michel Van de Wiele, Kortrijk-Marke, Belgium
Filed Jan. 23, 1990, Ser. No. 469,031
Claims priority, application Belgium, Jan. 23, 1989, 8900071
Int. Cl.⁵ D03D *47/38*
U.S. Cl. 139—453 16 Claims



1. A control mechanism for selection of the weft yarns in rapier looms, comprising a plurality of levers and presenting needles, the presenting needles being located on presenting levers, wherein the presenting needles are controlled by the plurality of levers and connecting elements operatively connected to a series of electromagnets having means for being energized individually, depending on the particular weft which is utilized in a fabric pattern, and wherein pivot points of the presenting levers are on a first shaft generally referred to as main shaft which is a drive shaft and wherein the connecting elements connect the presenting levers mounted on the main shaft and control levers mounted on a second shaft.

5,020,574
MECHANISM FOR MOUNTING A PART ON A LOOM SLEY

Philippe van Bogaert, Schaarbeek, and Rik Hillaert, Avelgem, both of Belgium, assignors to PIC ANOL N.V., naamloze vennootschap, Belgium
Filed Apr. 12, 1990, Ser. No. 508,182
Claims priority, application Belgium, Apr. 28, 1989, 8900468
Int. Cl.⁵ D03D *49/62*
U.S. Cl. 139—188 R 12 Claims

1. A mechanism for mounting a part on a sley of a weaving machine, comprising a holder on which said part is mounted; said holder including a protruding element and an opening which extends through the holder; a groove in and extending a length of the sley, said groove having lateral faces; a clamp mounted in the groove having two non-intersecting non-paral-

VOL
1127
ISS
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JE
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1991
UMI

lel faces, and tightening means which fit through said opening for causing said protruding element on said holder to be clamped between one of said non-parallel faces of the clamp and one of said lateral faces of the groove.

5,020,575

METHOD AND INSTALLATION FOR FEEDING LONGITUDINAL ELEMENTS TO A WELDING MACHINE FOR GRATES OR GRATINGS

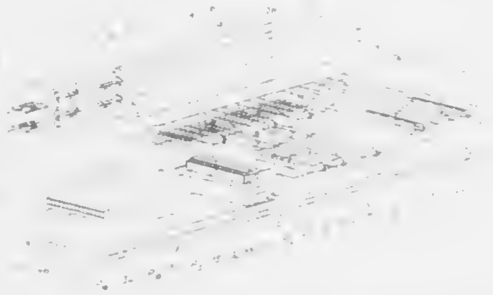
Josef Grabuschnig; Rudolf Scherr; Klaus Ritter, and Gerhard Ritter, all of Graz, Austria, assignors to EVG Entwicklungs -u Verwertungs-Gesellschaft m.b.H., Graz, Austria

Filed Nov. 22, 1989, Ser. No. 440,772

Claims priority, application Austria, Nov. 30, 1988, 2948/88

Int. Cl.⁵ B21F *1/02, 11/00, 15/08*

U.S. Cl. 140—112 **13 Claims**



1. A method of feeding longitudinal elements (L) of round or flat stock material to a welding machine (41) for making gratings,

said welding machine defining a push-in line (S) for said elements (L),

comprising the steps of:

after straightering, cutting said elements (L) off endless longitudinal element stock material;

locating the cut-off elements (L), with predetermined spacing in a direction transverse to said push-in line, in a group;

subsequently shifting the entire group of said elements into said push-in line;

delivering the shifted group to said welding machine,

said method further including the improvement comprising the steps of:

in said locating step, arranging said longitudinal elements (L) in said group on a flat surface with indefinitely, freely selectable spacing between said elements and

securing at least the front ends of said longitudinal elements on said flat surface, by applying a positioning force against said elements on said surface;

in said shifting step, moving said elements, in said group, by means of said flat surface directly into said push-in line (S), and

in said delivery step, releasing said positioning force and lifting at least the aligned front ends of said longitudinal elements before delivering to said welding machine above the level of said flat surface.

5,020,576

WIRE TWISTING MACHINE FOR ELECTRICAL HARNESSES

Stuart J. Williams, Houston, Tex., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Apr. 12, 1990, Ser. No. 507,763

Int. Cl.⁵ B21F *7/00*

U.S. Cl. 140—149 **7 Claims**

1. A wire-twisting machine for fabricating straight and contrahelically wound sections comprising:

means for securing a first wire between first and second fixed end means,

first and second coaxially spaced pulley wheels located inwardly of the fixed points and having central openings therein through which the first wire passes,

stationary guide means located between the second pulley wheel and the second fixed end means, the guide means having a coaxially located central opening for allowing the first wire to pass therethrough;

a second wire secured to a radially outward point on the first pulley wheel and positioned in parallel spaced relation to the first wire;

radially outward openings formed in the second pulley wheel and the guide means for passing the second wire for securement to a point on the second fixed end means; and

means for rotating the pulley wheels in synchronous rotation while undergoing limited translation therebetween wherein the second wire is helically wound around the first wire between the second pulley wheel and the guide means while the first and second wires remain parallel and unwound outwardly of the second pulley wheel and the guide means.

5,020,577

APPARATUS AND METHOD FOR REPAIRING VEHICLE HEATER CORES

Mark B. McMillan, 1143 East Vine Street, Salt Lake City, Utah 84121

Filed Aug. 25, 1989, Ser. No. 398,588

Int. Cl.⁵ B08B *3/00, 9/00*

U.S. Cl. 141—98 **5 Claims**

1. An apparatus for repairing a leak in a vehicle heater core having fluid coupling lines, without requiring its removal from its vehicle mounted position, said apparatus comprising:

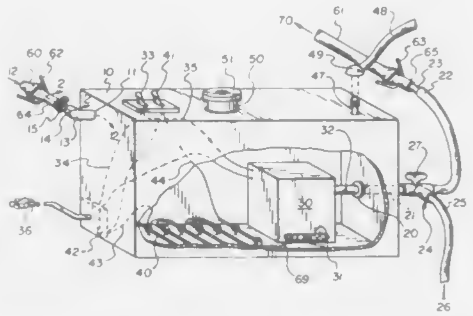
an air-tight container having a container volume capable of selectively holding liquid coolant and sealing compound, said container including (i) an inlet port for receiving fluid from the heater core and (ii) an outlet port for delivering fluid from the container to the heater core;

an immersible pump positioned within the container, said pump having a fluid intake opening and an outlet opening, said outlet opening being coupled to the outlet port of the container, said pump including a power source and switch means for turning the pump on and off;

an intake connector line having one end coupled to the inlet port of the container, the remaining end including means for coupling in line with an unconnected end of one of the fluid coupling lines of the heater core;

an output connector line having one end coupled to the outlet port of the container, the remaining end including means for coupling in line with an unconnected end of one of the fluid coupling lines of the heater core;

an output connector line having one end coupled to the outlet port of the container, the remaining end including means for coupling in line with an unconnected end of a second fluid coupling line of the heater core;



means for pressurizing the container volume and contained fluid lines during operation of the apparatus, the means for pressurizing comprising a valve stem mounted in the container wall and configured for charging with a tire inflation device; and

means for introducing sealant compound into the container volume, said introducing means being sealable against fluid flow therethrough during pressurized operation of the apparatus.

5,020,578

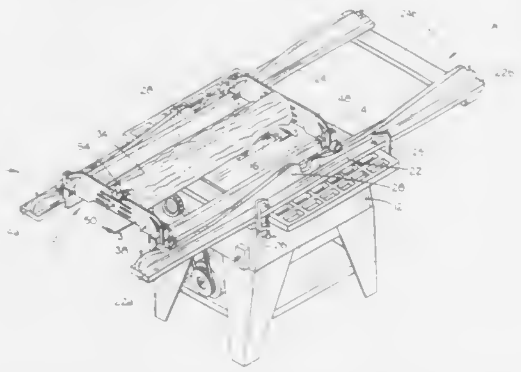
WOODWORKING APPARATUS

Ralph L. Jennings, 205 Williams Ave., North Platte, Nebr. 68101

Filed Oct. 22, 1990, Ser. No. 601,193

Int. Cl.⁵ B26D *7/06;* **B27C** *5/00*

U.S. Cl. 144—145 R **4 Claims**



1. A woodworking apparatus for use with a conventional table saw having a table and projecting circular saw blade, comprising:

a stock moving apparatus to move a piece of stock material into engagement with said saw blade; said stock moving apparatus including:

a pair of longitudinal, parallel, elongated support members having forward and rearward ends;

a forward plate connected between the forward ends of said support members;

a rearward plate connected between the rearward ends of said support members; and

means for selectively rotatably connecting a piece of stock material between said forward and rearward plates;

guide means connected to said saw table for guiding said stock moving apparatus in a straight line across said saw table; and

a pattern apparatus selectively connected to said saw table for selectively raising and lowering said stock moving apparatus in a predetermined pattern as the stock moving apparatus is moved across said saw table.

5,020,579

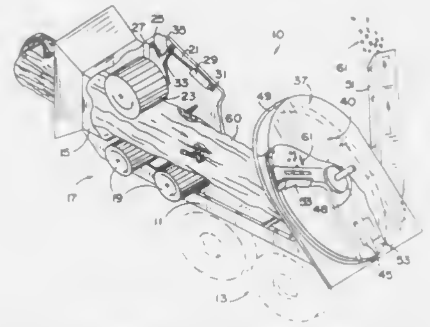
AUTOMATIC INFEED CONTROL

Donald E. Strong, Remus, Mich., assignor to Strong Manufacturing, Remus, Mich.

Filed May 21, 1990, Ser. No. 527,124

Int. Cl.⁵ B27C *1/12;* **B02C** *18/16*

U.S. Cl. 144—176 **18 Claims**



13. In a wood chipper with an infeed conveyor, said conveyor having a drive system for powering and controlling said conveyor, an infeed control system comprising: adjustment means for increasing infeed material capacity, an operating system for operating said adjustment means and a sensor responsive to the loading of said conveyor for actuating said adjustment means to prevent stalling of said conveyor.

5,020,580

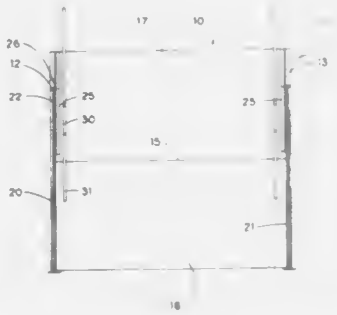
HYDRAULIC DOOR CONSTRUCTION

Austin L. Dalman, Box 261, Balduc, Manitoba, Canada R0K 0B0

Filed Jun. 19, 1989, Ser. No. 367,632

Int. Cl.⁵ E05D *15/00*

U.S. Cl. 160—213 **13 Claims**



1. A door arrangement for a building comprising a door, a door frame including a pair of vertical door posts, means mounting the door on the door frame for pivotal movement about a horizontal axis adjacent the top of the posts from a closed position in which a plane of the door lies in the same plane as the posts to an open position in which the door extends outwardly from the horizontal axis, the door being formed in the first and a second part, the first part being mounted on the door frame at said horizontal axis for pivotal movement about

VOL
1127
ISS
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4
1991
UMI

said horizontal axis and the second being mounted on the first part and foldable relative thereto about a second axis parallel to said horizontal axis, the second part in the open position of the door being arranged such that it is folded under the first part so as to lie directly parallel thereto, and including a first and a second lever mechanism extending between said first part of the door and the second part of the door and arranged to cause movement of the second part of the door into the folded position in dependence upon pivotal movement of said first part about said horizontal axis, first and second coupling means each fixedly mounted on the first part of the door at a respective side thereof at a position projection outwardly from the plane of the door, and first and second extendable hydraulic cam means, means connecting one end of each ram means to a base of a responsive one of the posts to communicate force from the door solely to the base, means connecting an opposed end of each ram means to a respective one of the coupling means, the ram means being extendable from a first position in which the door is closed to a second position raising the door to the open position.

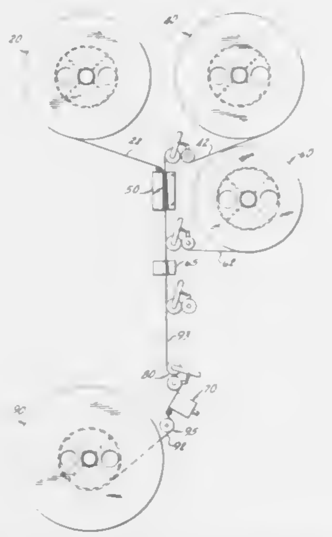
5,020,581
PROCESS FOR INSERTING RIGID SEGMENTS IN SECURITY PAPER

Felipe Gutierrez, Madrid, Spain, assignor to Charlesworth Overseas Limited, Ramsey, Isle of Man

Filed Sep. 24, 1990, Ser. No. 587,140

Int. Cl.⁵ D21H *21/42*

U.S. Cl. 162—103 4 Claims



1. A process for inserting rigid segments into a paper web being formed comprising the steps of:

A. cutting segments from a continuous rigid wire member;
B. placing said rigid segments on a continuous strip of an adhesive carrier means;
C. placing elastic filler means between said rigid segments placed on said carrier means;
D. placing a continuous elastic jacket means covering said rigid segments and said filler means thereby forming a hybrid band; and
E. feeding said hybrid band to said paper web being formed in a paper manufacturing process.

5,020,582
METHOD AND APPARATUS FOR COMPACTING FOUNDRY MOLDING MATERIAL IN A FOUNDRY MOLD

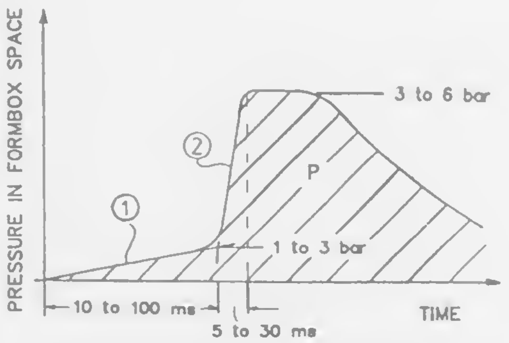
Norbert Damm, Karlsdorf-Neuthard, and Thomas Parr, Karlsruhe, both of Fed. Rep. of Germany, assignors to BMD Badische Maschinenfabrik Durlach GmbH, Karlsruhe, Fed. Rep. of Germany

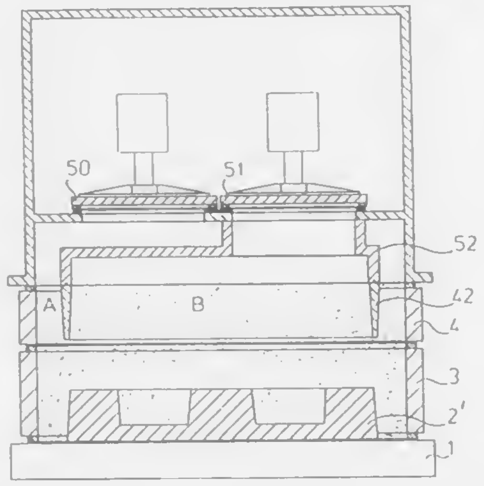
Filed Oct. 24, 1989, Ser. No. 426,588

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1988, 3836876

Int. Cl.⁵ B22C *15/00*

U.S. Cl. 164—37 17 Claims





1. A method of compacting molding material (M) surrounding a casting model (2, 2') retained in a foundry form (1, 2, 3), comprising the steps of

first fluidizing the molding material and then compacting the still fluidized molding material by applying a single pressure pulse of pressurized gas thereto,
wherein said pulse applies pressures above atmospheric pressure and has sequential phases of different pressure gradients, including
a first or initial phase of low, rising pressure gradient for fluidizing the material, and
a second or subsequent phase of increasing pressure at a pressure gradient higher than said pressure gradient of said first or initial phase for compacting said previously fluidized material; and
wherein the step of first fluidizing the molding material comprises applying said first or initial phase of low pressure gradient until an intermediate pressure value in the order of about 1–3 bar above atmospheric will result, and
the step of increasing the pressure at said pressure gradient of the second or subsequent phase comprises raising the pressure from said intermediate pressure value to a final pressure valve above said intermediate valve.

5,020,583
DIRECTIONAL SOLIDIFICATION OF METAL MATRIX COMPOSITES

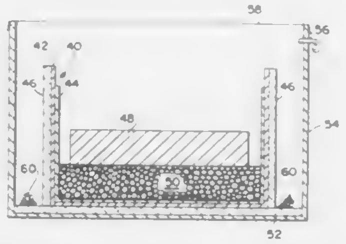
Michael K. Aghajanian, Bel Air, Md.; Robert C. Kantner, and John P. Biel, Jr., both of Newark, Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Filed Nov. 10, 1988, Ser. No. 269,602

The portion of the term of this patent subsequent to May 21, 2008, has been disclaimed.

Int. Cl.⁵ B22D *19/14*

U.S. Cl. 164—97 45 Claims



1. A method for making a metal matrix composite, comprising:

providing a substantially non-reactive filler;
providing an infiltration enhancer precursor in at least a portion of said filler;
spontaneously infiltrating at least a portion of the filler with molten matrix metal to form a spontaneously infiltrated mass; and
directionally solidifying at least a portion of said spontaneously infiltrated mass.

5,020,584
METHOD FOR FORMING METAL MATRIX COMPOSITES HAVING VARIABLE FILLER LOADINGS AND PRODUCTS PRODUCED THEREBY

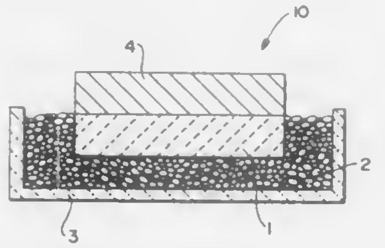
Michael K. Aghajanian, Bel Air, Md.; Alan S. Nagelberg, Wilmington, and Christopher R. Kennedy, Newark, both of Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Filed Nov. 10, 1988, Ser. No. 269,312

The portion of the term of this patent subsequent to May 21, 2008, has been disclaimed.

Int. Cl.⁵ B22D *19/14*

U.S. Cl. 164—97 47 Claims



41. A method for forming a metal matrix composite body comprising:

mixing powdered matrix metal and at least one infiltration enhancer precursor with at least one material selected from the group consisting of a substantially non-reactive filler and a substantially non-reactive preform to form a permeable mass;
contacting said permeable mass with a source of molten matrix metal alloy;
communicating an infiltrating atmosphere with said permeable mass;
spontaneously infiltrating at least a portion of the permeable mass with molten matrix metal; and
cooling said matrix metal within said permeable mass thereby forming a metal matrix composite body.

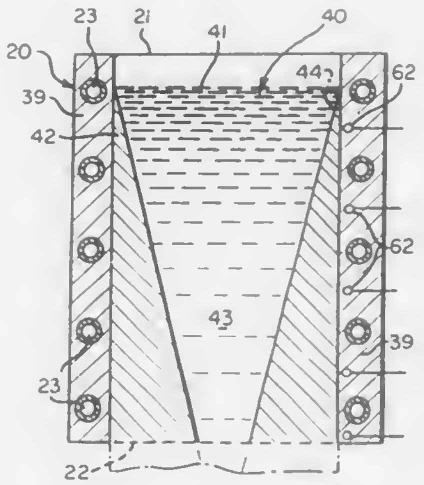
5,020,585
BREAK-OUT DETECTION IN CONTINUOUS CASTING

Kenneth E. Blazek, Crown Point, and Ismael G. Saucedo, Highland, both of Ind., assignors to Inland Steel Company, Chicago, Ill.

Filed Mar. 20, 1989, Ser. No. 326,081

Int. Cl.⁵ B22D *11/16*

U.S. Cl. 164—452 29 Claims



29. In continuous casting equipment for forming a cast metal shell from molten metal wherein said equipment includes a vertically disposed mold having walls, an upper end and an open lower end, and said mold has a predetermined vertical dimension, apparatus for predicting the likelihood of a molten metal break-out from said shell, at said lower end of the mold, said apparatus comprising:

means for continuously measuring the wall temperature of the mold at each of a multiplicity of vertically spaced locations between said upper and lower mold ends;
means for continuously determining the molten metal level location in said mold;
computer means;
means for feeding each of said temperature measurements into said computer means;
means for feeding the molten metal level determination into said computer means;
said computer means comprising each of the following elements (a)–(h):
(a) means for displaying a graph in which one coordinate is said mold wall temperature and the other coordinate is the vertical distance from the top of the mold;
(b) means for plotting, on said graph, a curve showing said mold wall temperature along said vertical dimension between said upper and lower ends of the mold;
(c) means for depicting, on said graph, the location of said molten metal level in relation to the top of the mold;
(d) means for periodically changing said curve to reflect change in said mold wall temperatures;
(e) means for periodically changing the depiction on said graph of said molten metal level location, to reflect change in the location of said molten metal level in relation to the top of the mold;
(f) means for noting the location on said curve of the peak mold wall temperature, in relation to the top of the mold;
(g) means for noting, from the information represented on said curve, the vertical distance between said peak mold wall temperature location and said molten metal level location;
(h) and means for continuously monitoring said vertical distance to detect any increase in said distance.

VOL 1127
ISS 1
JE 4
1991
UMI

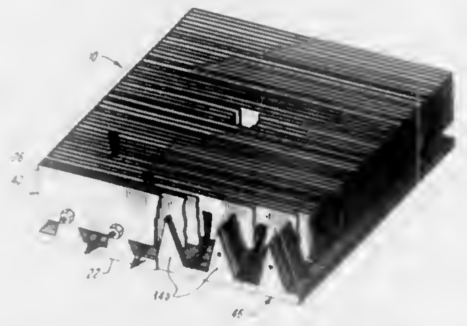
5,020,586
AIR-COOLED HEAT EXCHANGER FOR ELECTRONIC CIRCUIT MODULES

Vivek Mansingh, Santa Clara, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 8, 1989, Ser. No. 405,562

Int. Cl.^{5} F28F *3/06;* **H05K** *7/20*

U.S. Cl. 165—80.3 **22 Claims**



1 Apparatus for cooling an object, comprising:

a heat sink having a surface for thermal contact with said object, said heat sink including multiple fins defining channels between them and means defining a plurality of passages located between said fins and said surface, said passages interconnecting with said channels, said heat sink further including ribs between said fins; and

means for directing a cooling gas at said heat sink such that said cooling gas flows at least in part through said channels into said passages, said ribs directing said cooling gas toward said passages.

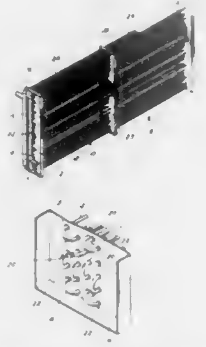
5,020,587
FULLY FLOATING TUBE BUNDLE

Manmohan Mongia, Decatur, Ga., and Shelby J. Meade, Wilmington, N.C., assignors to Lennox Industries Inc., Dallas, Tex.

Filed Nov. 1, 1990, Ser. No. 607,539

Int. Cl.^{5} F28F *7/00*

U.S. Cl. 165—82 **8 Claims**



1 An air cooled heat exchanger comprising:

a tube bundle; supporting means; and connecting means; the tube bundie comprising a plurality of first tubes, and return bends connecting the ends of pairs of first tubes, the first tubes being substantially parallel to one another and operatively connected at their ends by the return bends to form a circuit for refrigerant, the supporting means comprising a plurality of second support tubes and two end plates, the second support tubes being substantially parallel to one another and to the first tubes of the tube bundle, the second support tubes being fixedly attached at their ends to the end plates, a plurality of openings defined in the end plates, the diameter of said openings being substantially greater then the outside diameter of the first tubes to allow passage of the first tubes through the openings without any contact to permit floating of the first tubes relative to the end plates, the connecting means comprising a plurality of fins, said fins extending generally perpendicular to the first and second tubes and generally parallel to the end plates, the fins being secured to the first tubes and in heat transfer relationship therewith, the fins also being secured to the second tubes whereby the tube bundle is in a floating relationship with respect to the end plates to obviate damage to the first tubes during operation of the air cooled heat exhanger.

5 The method of fabricating an air cooled heat exchanger comprising the steps of: forming a refrigerant circuit by connecting pairs of a plurality of generally parallel tubes at their ends by return bends, providing a plurality of parallel support tubes, securing the tubes of the refrigerant circuit and the support tubes with fins, with the fins oriented generally perpendicular to the support tubes and the tubes forming the refrigerant circuit, and securing the support tubes adjacent their ends to end plates, while permitting the ends of the tubes forming the refrigerant circuit to pass freely through openings in the end plates, whereby the tubes of the refrigerant circuit form a tube bundle which is freely floating with respect to the end plates.

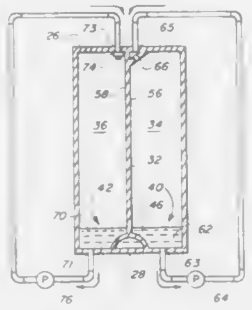
5,020,588
METHOD AND APPARATUS FOR SIMULTANEOUS HEAT AND MASS TRANSFER UTILIZING A PLURALITY OF GAS STREAMS

Walter F. Albers, 2626 E. Arizona Biltmore Cir., #23, Phoenix, Ariz. 85016, and James R. Beckman, Tempe, Ariz., assignors to Walter F. Albers, Phoenix, Ariz.

Filed May 3, 1989, Ser. No. 347,159

Int. Cl.^{5} F28D *3/04;* **F28F** *13/02*

U.S. Cl. 165—111 **9 Claims**



1. Apparatus for changing at least one selected property of two wetting substances, said apparatus comprising:

a first chamber containing a plurality of sectors;

first wetting means for segmentedly wetting substantially all of said sectors with a first substance;

migration means coupled to said first wetting means for providing a migratory movement for said first substance between adjacent sectors;

a second chamber containing a second plurality of sectors;

second wetting means for segmentedly wetting substantially all of said sectors of said second chamber with a second substance;

a heat transferring partition thermally connecting said first and second chambers wherein sectors in said first chamber and said second sector are bounded by said heat transferring partition;

first gas flow means controlling a flow of a first gas through said first chamber; and

second gas flow means controlling a flow of a second gas through said second chamber, said first gas and said second gas being substantially independent, said gas flow in said first chamber being a generally opposite direction from said gas flow in said second chamber, wherein temperatures and humidities of said first gas and said second gas when entering said first and second chambers interacting with said wetting substances allow a temperature of said first gas exiting said first chamber to be different from a temperature of said second gas entering said sectors of said second chamber, said changing of temperature resulting in transfer of heat between said first and second chambers through said partition between said first substance and said second substance, wherein temperatures of said first substance and temperatures of said second substance are respectively below a boiling temperature for each substance during substance wetting, wherein interaction in said sectors between said substances and said gas causes a change in at least one selected property of said first and second substances, said gas approaching a vapor-liquid equilibrium with said substances for each of said wetted sectors, wherein interaction by said first substance and said migratory movement causes said selected property of said first substance of a sector to influence said selected property of said first substance in an adjacent sector.

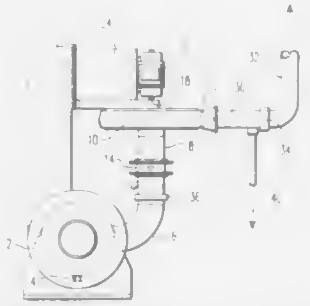
5,020,589
SYSTEM FOR REMOVING UNCONDENSED PRODUCTS FROM A STEAM TURBINE CONDENSER

Paul W. Viscovich, Longwood, and James A. Martin, Winter Springs, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 19, 1990, Ser. No. 555,332

Int. Cl.^{5} F28B *9/10*

U.S. Cl. 165—112 **18 Claims**



1 In a steam condenser system for a turbine, which system includes: a condenser having an outlet for conveying uncondensed products out of the condenser; an exhauster having a housing, an inlet connected between the housing and the condenser outlet, an exhaust outlet connected to the housing, and a rotatable member, disposed in the housing and rotatable about an axis for propelling uncondensed products from the exhauster inlet to the exhauster outlet; and an electric motor having an output shaft connected for rotating the rotatable member, the improvement wherein said motor is disposed relative to said exhauster such that said motor shaft forms an angle with the horizontal and extends in a downward direction from said motor to said exhauster.

5,020,590
BACK PRESSURE PLUG TOOL

Roderick D. McLeod, 5104-125 Street, Edmonton, Alberta, Canada T6H 3V5

Filed Nov. 30, 1989, Ser. No. 443,475

Claims priority, application Canada, Dec. 1, 1988, 584718

Int. Cl.^{5} E21B *19/00, 33/068*

U.S. Cl. 166—77 **3 Claims**

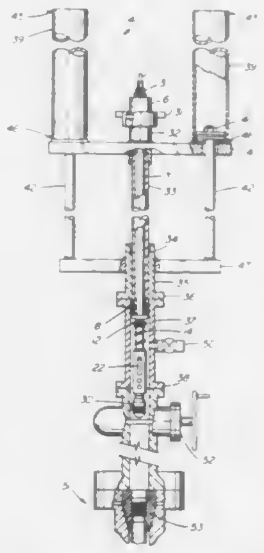
1 A back pressure plug tool assembly for mounting on a wellhead valve, said assembly comprising:

(a) spaced, parallel upper and lower beam members oriented transverse to the longitudinal axis of said wellhead valve and wellhead casing on which said wellhead valve is mounted;

(b) hydraulic ram means interconnecting said upper and lower beam members and for moving said beam members toward and away from one another.

(c) upper and lower mandrel support bodies mounted in axial alignment with one another in said upper and lower beam members, respectively, said lower support body being adapted for mounting on said wellhead valve;

(d) a mandrel assembly mounted in and extending between said upper and lower support bodies, said mandrel assembly including (i) an elongated splined slidable sleeve; (ii) a plug installation and removal pin detachably connected to the lower end of said slidable sleeve, (iii) a cylindrical wrenching shaft having a splined lower end concentrically located and telescopically slidable in the upper end of said splined slidable sleeve;



(e) a compression spring positioned on the exterior of said wrenching shaft, spring retaining means on the wrenching shaft and on the upper end of said slidable sleeve whereby said spring biases said wrenching shaft outwardly of said sleeve;

(f) thrust bearing means slidably receiving said wrenching shaft in said lower mandrel support body;

(g) packing gland means in the upper mandrel support body and slidably receiving the upper end of said wrenching shaft;

(h) means adjacent the upper end of said wrenching shaft for rotating the same; and

(i) a signal rod centrally and concentrically located in said mandrel assembly and having its lower end connected to said slidable sleeve and its upper end extending outwardly and upwardly of the upper end of said wrenching shaft.

5,020,591
OIL TOOL COUPLING DEVICE

James B. Shore, 110 Royal Ct., Friendswood, Tex. 77546

Filed Sep. 11, 1989, Ser. No. 405,318

Int. Cl.^{5} E21B *43/16;* **F16L** *37/252*

U.S. Cl. 166—55 **25 Claims**

1. A locking and coupling device for interconnecting a tubular socket end member having an annular internal locking groove to a cylindrically shaped pin end member receivable in said socket end member, said device including:

an annular locking ring rotatably mounted on said cylindrically shaped pin end member in an annular recess in said pin end member,

means for limiting the rotational movement of said locking ring between- first and second angular positions relative to the central axis of said cylindrically shaped pin end member,

means coupling said locking ring to said pin end member for

VOL
1127
ISS
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1991
UMI

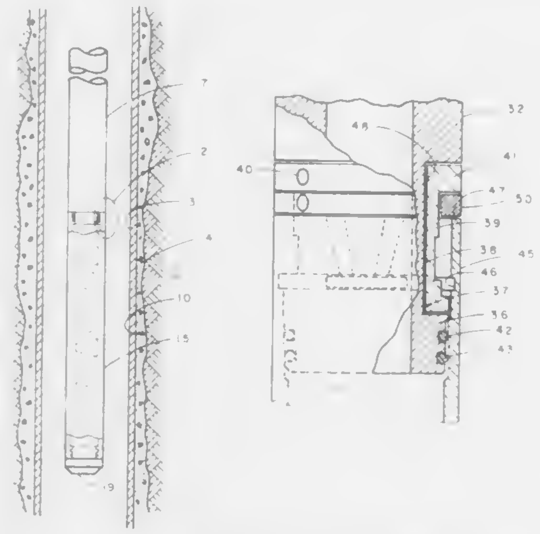
moving said locking ring longitudinally relative to said pin end member during rotation of said locking ring member between said first and second angular positions relative to said cylindrically shaped member,

at least one arcuate locking element on said locking ring for engaging said internal locking groove and for moving radially and progressively from a non-engagement position into a fully engaged position in said locking groove during rotational movement of said locking ring relative to said pin end member, and

cam means on said pin end member for progressively moving said locking element radially into said locking groove.

10. The device as set forth in claim 1 wherein said internal locking groove has at least one end surface which interengages with another end surface on a locking element where said end surfaces are inclined with respect to a plane normal to the central axis of said end member at an angle of 15° or more for minimizing the shear loading on a locking element when disposed in the locking groove.

24. A subcombination for use in an oil well perforating apparatus wherein coupling devices with O-rings couple and seal adjacent ends of tubular perforating gun housing members relative to one another by use of a locking element on a latching mechanism in a coupling device where the locking element interengages with an annular groove in a tubular perforating gun housing member for locking a coupling device to a tubular perforating gun housing member and for reducing the shear load on the locking element when a perforating gun in the housing member is detonated, said subcombination consisting of:



a tubular perforating gun housing member sized for passage through a well bore and for carrying perforating means, said housing member having a central bore and having at each end thereof at least two diametrically stepped cylindrical surfaces for receiving and compressing O-ring sealing means on a coupling device;

said housing member, intermediate of said stepped cylindrical surfaces and a terminal end at each end of said tubular housing member having an annular latching groove for receiving a locking element on a latching mechanism in a coupling device; and

said annular groove having at least one side surface for locking interengagment and abutment with a side surface on a locking element on a latching mechanism in a coupling device and where said side surfaces in abutment are inclined with respect to a plane normal to the central axis of said housing member at an angle of 15° or more for minimizing the shear loading on a locking element upon detonation of a perforating means in said housing member.

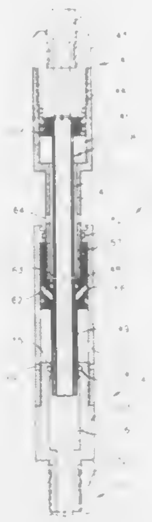
5,020,592
TOOL FOR TREATING SUBTERRANEAN WELLS

Laurent Muller, Sugar Land, and Ervin Randermann, Beasley, both of Tex., assignors to Dowell Schlumberger Incorporated, Tulsa, Okla.

Division of Ser. No. 282,437, Dec. 9, 1988, abandoned. This application Dec. 8, 1989, Ser. No. 447,869

Int. Cl.^{5} E21B *33/24, 33/27, 34/12*

U.S. Cl. 166—187 9 Claims



1. A system for treating subterranean wells comprising an elongated treatment tool having inflatable packers, a support tube connected to one end of said tool operable to lower said tool from a well head into a well and to supply liquid to said tool, said tool providing valve means operable in response to changes in tension in said tube and without rotating said tube to sequentially:

(a) inflate said packers to isolate one portion of said well from the remaining portions thereof and to lock said tool against movement along said well;
(b) inject treatment fluid supplied to said tool through said support tube into said one portion of said well; and
(c) deflate said packers permitting further movement of said tool along said well.

5,020,593
LATCH RING FOR CONNECTING TUBULAR MEMBERS

Lionel J. Milberger, Houston, Tex., assignor to Vetcogray Inc., Houston, Tex.

Continuation-in-part of Ser. No. 286,603, Dec. 16, 1988, Pat. No. 492,876, and a continuation-in-part of Ser. No. 362,843, Jun. 6, 1989. This application Apr. 30, 1990, Ser. No. 516,261

Int. Cl.^{5} E21B *33/043*

U.S. Cl. 166—208 3 Claims

1. A device for releasably locking an inner member within a bore of a tubular outer member, comprising in combination:

a grooved inner member profile formed on the exterior of the inner member, the inner member profile having at least one upward facing load shoulder and at least one downward facing load shoulder;

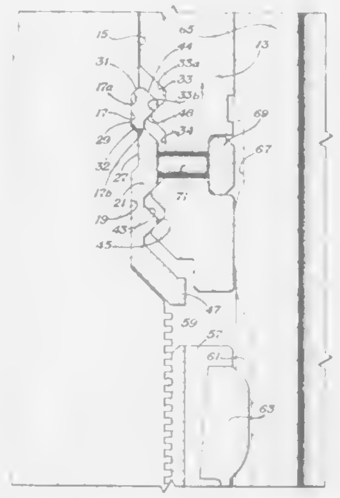
a grooved outer member profile formed in the bore of the outer member, the outer member profile having at least one upward facing load shoulder and at least one downward facing load shoulder;

a split ring carried by the inner member, the ring having a grooved inner profile on its interior for engaging the inner member profile, the ring being resiliently contractible into the inner member profile so as to be able to pass into the bore of the outer member;

the ring having a grooved outer profile on its exterior that mates with the outer member profile, the ring springing outward into the outer member profile when aligned with the outer member profile, the outer profile of the ring having at least one upward and at least one downward facing load shoulder, the upward and downward facing load shoulders of the outer profile being spaced apart substantially the same axial distance as the mating upward and downward facing load shoulders of the outer member profile so as to prevent substantially all pure axial movement of the ring relative to the outer member when the ring engages the outer member profile;

the inner member being axially movable, relative to the outer member and ring when the ring is engaging the outer member profile, from a lower position to an upper position, in the lower position, a downward force on the inner member transmitting from the downward facing load shoulder of the inner member profile through the ring to the upward facing load shoulder of the outer member profile to support the inner member in downward load, in the upper position, an upward force on the inner member transmitting from the upward facing load shoulder of the inner member profile through the ring to the downward facing load shoulder of the outer member profile to support the inner member in upward load; and

means movable independently of the inner and outer members for causing the ring to contract from the profile of the outer member to release the inner member from the outer member.



5,020,594
METHOD TO PREVENT GAS INTRUSION INTO WELLBORES DURING SETTING OF CEMENTS

James A. Gill, Houston, Tex., assignor to Sans. Gas. Inc., Enid, Okla.

Filed Jun. 28, 1990, Ser. No. 545,427

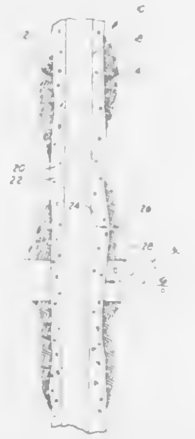
Int. Cl.^{5} E21B *21/08, 33/16, 47/06*

U.S. Cl. 166—250 7 Claims

1. A method for preventing fluid intrusion in wells comprising the steps of:

measuring the natural formation pressures of the formation through which the well passes;

placing a slurry into an annulus, between a pipe and a borehole wall, so that the slurry exerts a pressure against the borehole wall; and



maintaining the pressure against the borehole wall below a pressure that will cause the borehole wall to balloon.

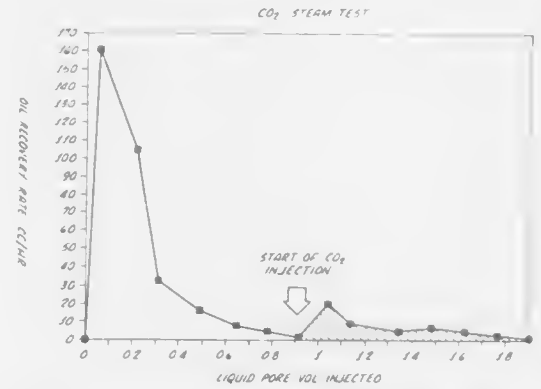
5,020,595
CARBON DIOXIDE-STEAM CO-INJECTION TERTIARY OIL RECOVERY PROCESS

Donald C. Van Slyke, Brea, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Jul. 12, 1989, Ser. No. 379,623

Int. Cl.^{5} E21B *43/24*

U.S. Cl. 166—272 32 Claims



1. A process for reducing corrosion of well tubing while recovering oil from an oil-bearing formation using a carbon dioxide-steam co-injection method, the process comprising the steps of:

(a) heating feedwater to generate steam;
(b) injecting a carbonate-containing pH adjusting agent into the steam to form a pH adjusting agent-containing steam;
(c) injecting carbon dioxide into the pH adjusting agent-containing steam to form an enhanced oil recovery composition having a pH of about 6.3 to less than 7.5;
(d) injecting the enhanced oil recovery composition into at least a portion of an oil-bearing formation: and
(e) withdrawing oil from the formation.

VOL
1127
ISS
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1991
UMI

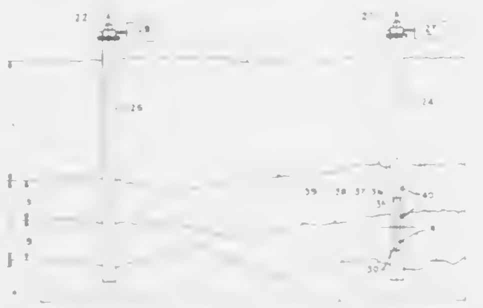
5,020,596
ENHANCED OIL RECOVERY SYSTEM WITH A RADIANT TUBE HEATER

Klaus H. Hemsath, Toledo, Ohio, assignor to Indugas, Inc., Toledo, Ohio

Filed Jan. 24, 1990, Ser. No. 469,173

Int. Cl.⁵ E21B *43/24*

U.S. Cl. 166—272 **16 Claims**



1. An in situ method for recovering oil from a reservoir formation comprising the steps of:

i) providing a conventional production well bore extending into said reservoir formation for extracting oil therefrom;

ii) providing a conventional injection well bore extending into said reservoir formation;

iii) filling said reservoir formation with water such that the pressure of said water, static or otherwise, pressurizes said reservoir formation at a predetermined pressure;

iv) providing a heater of the type which radiates heat along its length, said heater having a predetermined length and inserting said heater into said injection bore to a position whereat said heater is adjacent said reservoir formation;

v) heating said reservoir formation including said water from heat generated along the entire length of said heater within said reservoir to a predetermined temperature whereat said water and said oil within said formation will not produce vaporized gases;

vi) controlling said heat produced in said heating step so that the vaporized gases are not produced and the viscosity of said oil contained between said injection and production well bores in said reservoir formation is reduced to a viscosity such that said oil may be caused to move fluidly together with said heated water; and

vii) recovering said oil from said production well bore.

5,020,597
ARRANGEMENT AND METHOD FOR CONDUCTING SUBSTANCE AND LOCK THEREFOR

Britt O. Braddick, Houston, Tex., and Michael Langer, Nienhagen, Fed. Rep. of Germany, assignors to Texas Iron Works, Inc., Houston, Tex.

Filed Feb. 1, 1990, Ser. No. 471,292

Int. Cl.⁵ E21B *33/16*

U.S. Cl. 166—291 **93 Claims**

1. Apparatus for conducting a substance through the bore of an operating string into a well bore wherein lower and upper wiper means are releasably supported on the operating string for sealably receiving lower and upper plug means, respectively, for wiping ahead of and behind, respectively, the substance, said apparatus comprising:

a seal between the upper wiper means and the bore of the operating string;

a seal arrangement to close off communication between the operating string adjacent the lower and upper wiper means and the well bore;

releasable means for releasably securing each the lower and upper wiper means on the operating string; and

lock means to assist in securing said releasable means against release by manipulation of the operating string.

8. Apparatus for use in a well bore with upper and lower wiper means releasably supported on an operating string having a bore and wherein the upper and lower wiper means sealably receive upper and lower plug means, respectively, and being then releasable from the operating string for wiping ahead of and behind, respectively, a substance prior to its discharge into the well bore, said apparatus including:

a member;

said member having a body with a longitudinal bore therethrough;

circumferentially spaced segments extending longitudinally on said member;

said spaced segments defining longitudinal, external recesses in said member;

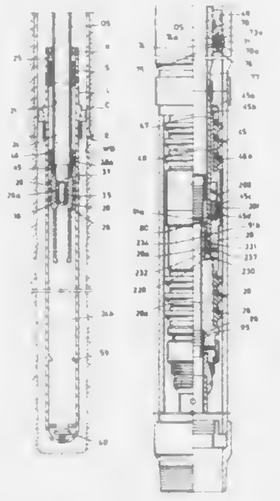
said longitudinal recesses having openings therein communicating with the bore of said member;

cooperating surfaces on the upper wiper means and said member to secure said member to the upper wiper means,

seal means for sealably engaging between said member body and the bore of the operating string; and

cooperating surface means on the lower wiper means and operating string and on said member and operating string for releasably connecting the upper and lower wiper means to the operating string against release by manipulation of the operating string.

91. A method of cementing a liner in a well bore wherein the liner is sealably and releasably supported on an operating string having a bore for conducting cement into the well bore comprising the steps of:



positioning upper wiper means to sealably engage the bore of the operating string to seal off communication between the operating string adjacent the upper wiper means and the well bore;

positioning lower wiper means to sealably engage with the upper wiper means;

connecting the upper and lower wiper means to the operating string by releasably locking each the upper and lower wiper means to the operating string against release therefrom by manipulation of the operating string;

lowering the operating string with the wiper means thereon in the well bore;

releasing the liner from the operating string in the well bore;

discharging lower plug means into the operating string to wipe the operating string with cement therebehind;

sealably seating the lower plug means in the lower wiper means and unlocking the lower wiper means with the lower plug means therein from the operating string by fluid pressure in the operating string for wiping ahead of the cement;

discharging upper plug means into the operating string to wipe in the operating string behind the cement;

sealably seating the upper plug means within the upper wiper means and releasing the upper wiper means with the plug means therein from the operating string by fluid pressure in the operating string for wiping behind the cement;

moving the lower wiper and plug means through the liner to wipe ahead of the cement,

moving the upper wiper and plug means through the liner to wipe behind the cement, and

discharging the cement from the liner into the well bore

5,020,598
PROCESS FOR CEMENTING A WELL

Kenneth M. Cowan, Sugarland, and Arthur H. Hale, Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Jun. 8, 1989, Ser. No. 363,226

Int. Cl.⁵ E21B *33/14*; C04B *24/02, 26/00*

U.S. Cl. 166—293 **3 Claims**

1. A process for cementing a casing in a borehole of a well, comprising, preparing an aqueous cement slurry containing a sufficient amount of a selected water soluble polyalcohol having from 2 to 18 carbon atoms and 2 to 13 hydroxyl groups, the concentration of polyalcohol in the water used to prepare and set the slurry being about 0.01 to about 5% by volume, the selection of the polyalcohol being restricted to a polyalcohol which functions to promote a more fluid-tight seal and better mechanical shear bond between the cement and surfaces contacting the cement; and

injecting the cement slurry into the well between the casing and the borehole.

5,020,599
DRILLING TOOL

Werner Lau, Cults, Scotland, assignor to The Red Baron (Oil Tools Rental) Limited, Aberdeen, Scotland

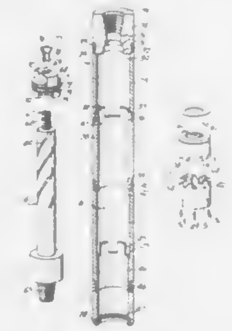
PCT No. PCT/GB89/00019, § 371 Date Jun. 22, 1990, § 102(e) Date Jun. 22, 1990, PCT Pub. No. WO89/06737, PCT Pub. Date Jul. 27, 1989

PCT Filed Jan. 11, 1989, Ser. No. 488,090

Claims priority, application United Kingdom, Jan. 12, 1988, 8800572

Int. Cl.⁵ E21B *31/20*

U.S. Cl. 166—301 **19 Claims**



1. A tool for use in an oil or gas well to retrieve a drilling or production string from the well, said tool comprising an assembly having means (**12**) to mount the assembly on a supporting string, means (**56**) within the assembly to drive a driven member (**63**) carried by the assembly, in response to vertical movement of the assembly, in a predetermined rotational direction, characterized in that said driven member (**63**) is provided with or supports a self-tapping thread (**65**) at the lowermost end of the assembly, the self-tapping thread having the same sense as said predetermined direction of rotation, and in that the tool is suspended from a suspension unit (**10**) which has means (**14,15**) to engage a casing (**1,2,3**) to prevent rotation of the suspension unit whilst permitting vertical movement of the tool.

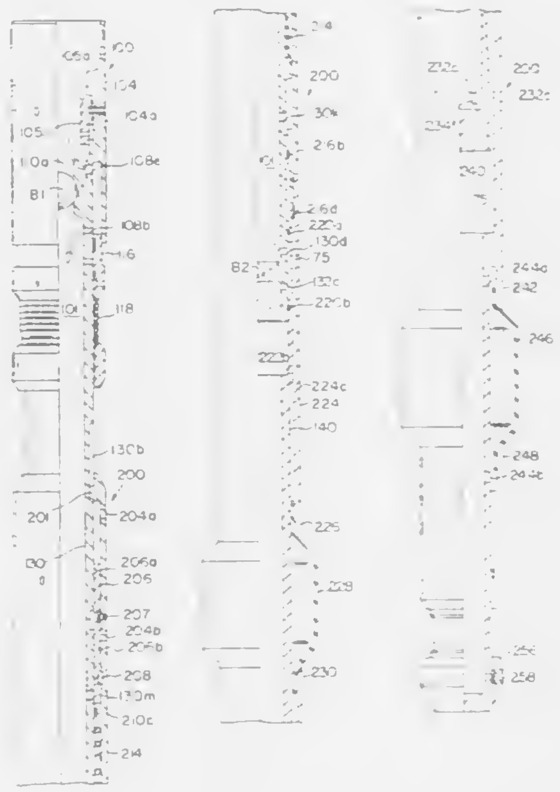
5,020,600
METHOD AND APPARATUS FOR CHEMICAL TREATMENT OF SUBTERRANEAN WELL BORES

Martin P. Coronado, Houston, Tex., assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Apr. 28, 1989, Ser. No. 345,343

Int. Cl.⁵ E21B *33/127, 34/10*

U.S. Cl. 166—387 **45 Claims**



1. An inflatable well treatment tool suitable for insertion into a well through a well conduit disposed in a well bore comprising

a central tubular body assemblage connectable to a fluid supply conduit extending to the surface;

said central tubular body assemblage defining a central fluid passage communicating with the fluid supply conduit;

an outer tubular assemblage surrounding a medial portion of said central tubular body and cooperating therewith to define a generally annular fluid passage surrounding said central tubular body assemblage;

resilient means urging said central tubular body assemblage downwardly relative to said outer tubular assemblage to a run-in position;

said outer tubular assemblage including at least one angular elastomeric means expandable by pressured inflation fluid supplied through said annular fluid passage into sealing engagement with the well bore;

inflate port means in the lower portion of said central tubular body assemblage connecting said central fluid passage to said annual fluid passage;

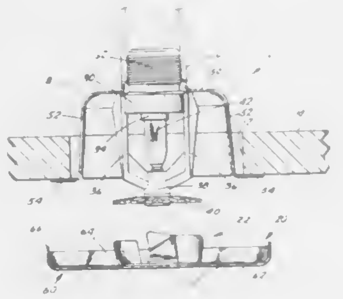
said central tubular body assemblage having a first radial port in its upper end communicating with the well bore, whereby calculation may be maintained during run-in.

VOL 1127 ISS 1 JE 4 1991 UMI

a valve seat surrounding said central fluid passage adjacent said first radial port
a second radial port in said central tubular body assemblage below said valve seat;
an annular piston sealably surrounding the upper end of said central tubular body assemblage and responsive to fluid pressure in said central fluid passage for axially shiftable movement relative to said first and second radial ports between a first position permitting circulation and a second position bypassing said valve seat; and
a valve head seatable on said valve seat to permit buildup of fluid pressure in said central fluid passage to shift said annular piston to said second position and supply pressurized fluid to expand said annular elastomeric means into sealing engagement with the well bore.

5,020,601
CONCEALED SPRINKLER ASSEMBLY

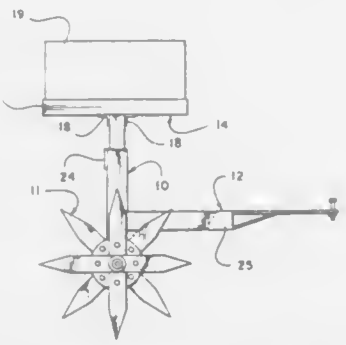
James G. Retzloff, Lansing, and Gerald W. Sanders, Middleville, both of Mich., assignors to Viking Corporation, Hastings, Mich.
Filed Mar. 26, 1990, Ser. No. 499,065
Int. Cl.⁵ A62C *37/12*
U.S. Cl. 169—37 16 Claims



1. A concealed sprinkler assembly, comprising:
a sprinkler head assembly including a body defining an orifice an arm extending from said body and a deflector mounted on said arm opposite said orifice;
a mounting base secured to said sprinkler head body;
a cover plate; and
clip means on said cover plate for resiliently securing said cover plate to said deflector in a snap-on detent fashion, said clip means releasing said cover plate from said deflector upon exposure to a predetermined ambient temperature, said clip means including a pair of opposed metal clips secured to said cover plate, each of said metal clips including:
a clip base;
end tabs integral with said clip base, said end tabs extending upwardly from said clip base; and
an actuator arm resiliently joined to one of said end tabs, said end tabs being configured and dimensioned to capture said deflector with the deflector being positioned between said cover plate and said actuator arms, said actuator arms each moving towards an initial prebent configuration upon exposure to said predetermined ambient temperature.

5,020,602
AERATOR FOR LAWNS AND THE LIKE

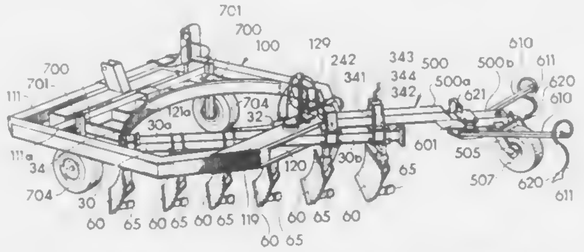
Henry P. Dellinger, P.O. Box 852, Forest Park, Ga. 30050
Filed Mar. 5, 1990, Ser. No. 488,947
Int. Cl.⁵ A01B *1/24*
U.S. Cl. 172—21 8 Claims



1. An aerator for lawns, said aerator including a plurality of standards, means for connecting said plurality of standards to one another, and a tray carried by said standards, said tray being adapted for receiving weights thereon, spring means for resiliently supporting said tray with respect to said standards, and a plurality of spiders for rolling over the ground to be aerated, said plurality of spiders being carried by said plurality of standards, said tray including a plurality of vertical supports, each of said plurality of vertical supports being slidably received within one of said standards, said spring means including a coil spring within each of said standards below said vertical support.

5,020,603
REVERSIBLE PLOW

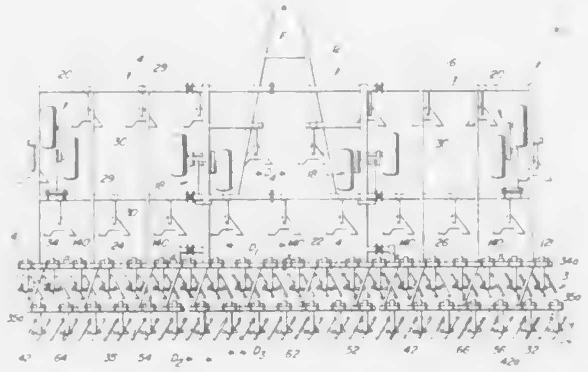
Danny H. Harrell, Rte. 3, Camillia, Ga. 31799
Filed Jan. 25, 1990, Ser. No. 470,062
The portion of the term of this patent subsequent to Mar. 19, 2008, has been disclaimed.
Int. Cl.⁵ A01B *3/28*
U.S. Cl. 172—131 14 Claims



1. A reversible plow of the type having a frame, an elongated tool bar pivotally secured to said frame for swinging about a vertical axis, support means for supporting a bidirectional moldboard suspended from said tool bar wherein said bidirectional moldboard is arcuate about a horizontal axis, and an arcuate moldboard wear plate conforming in shape to and removably secured to a front earth engaging surface of said moldboard, said moldboard plate being reversible so that it is selectively received on said moldboard in either of two positions.

5,020,604
DUAL TILLAGE IMPLEMENT

Donald R. Peek, Clive, Iowa, assignor to Deere & Company, Moline, Ill.
Filed Jan. 26, 1990, Ser. No. 471,293
Int. Cl.⁵ A01B *21/04*
U.S. Cl. 172—177 20 Claims

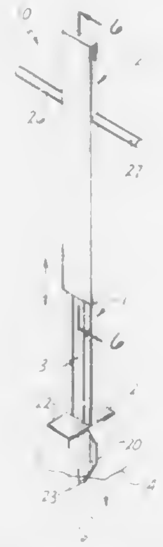


1. A tillage implement having a frame adapted for forward movement over a field and including spider wheels adapted for forward movement over the ground, wherein the spider wheels have rotational axes offset at an acute angle to the direction transverse to the forward direction to generally define leading and trailing faces, the implement comprising:
a spider wheel support comprising a support arm having a forward end pivotally connected to the frame for rocking about a generally transverse axis; first and second upright arms fixed at their upper ends to the aft end of the support arm and extending downwardly therefrom to lower spider wheel support ends; first and second bearing assemblies fixed to the support ends of the first and second upright arms, respectively, the bearing assemblies projecting forwardly and in the same transverse direction from the respective support ends to define said rotational axes, and a rotary incorporator spider wheel connected to each of the bearing assemblies for rotation about the axes;
wherein the implement frame includes a rearward transverse beam supporting a plurality of the support arms in transversely spaced relation and a parallel rearmost support beam fixed to the rearward transverse beam above and behind the rotary incorporator spider wheels associated with said plurality of support arms; and a second plurality of support arms carried on the rearmost transverse beam and spaced in the transverse direction generally between the support arms on the rearward support beam; and wherein two front and rear spaced rows of rotary incorporator spider wheels are defined which each extend the width of the implement, the wheels in each row being uniformly spaced parallel to each other and located in generally an uninterrupted pattern along a line extending in the transverse direction so that a continuous direct flow pattern is established by the wheels across the width of the implement.

5,020,605
POST DRIVER AND METHODOLOGY

Layne S. Leishman, Huntington Beach, Calif., assignor to Product Research and Development, Santa Ana, Calif.
Filed Oct. 19, 1989, Ser. No. 424,058
Int. Cl.⁵ B25D *17/00;* E02D *5/22*
U.S. Cl. 173—1 18 Claims

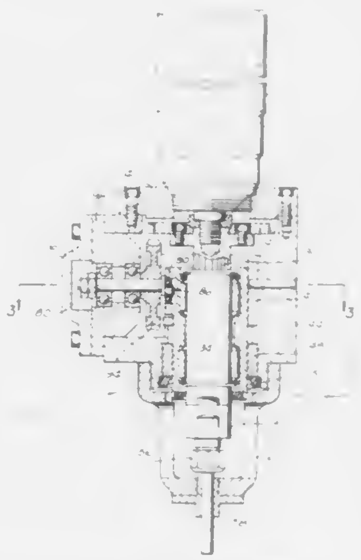
13. A method of driving a post into the ground comprising:
providing a post having an upper end with the post being within an elongated sleeve and with the sleeve slidably receiving the post so the post can be driven relative to the sleeve and into the ground;
telescoping a driver having a driving surface over the sleeve and post; and



moving the driver longitudinally on the sleeve to cause the driving surface to strike the upper end of the post to drive the post relative to the sleeve and into the ground.

5,020,606
RECIPROCATING ROTARY TOOL DRIVER

Louis Odor, and Herman O. Hamilton, both of Columbus, Ohio, assignors to Rockwell International Corporation, El Segundo, Calif.
Continuation of Ser. No. 289,943, Dec. 27, 1988, abandoned. This application May 29, 1990, Ser. No. 529,675
Int. Cl.⁵ E21B *3/00*
U.S. Cl. 173—163 9 Claims



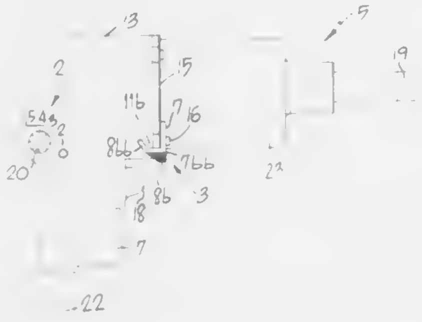
1. A rotary cutter tool driver comprising
motive means,
a rotatable cutter tool,
rotary drive means operatively coupling said cutter tool with said motive means,
an oscillatory drive mechanism operatively coupled to said motive means for effecting oscillatory motion of said cutter tool during rotation thereof, said oscillatory drive mechanism including

VOL
1127
ISS
1
JE
4
1991
UMI

a pinion gear connected to said rotary drive means,
a worm actuated by said pinion gear,
a worm gear in operative engagement with said worm,
crank means actuated by said worm gear, and
means associated with said crank means, and mounted on said rotary drive means, for limiting movement of said rotatable cutter tool to oscillating motion along an axis thereof.

5,020,607
LUG-REMOVING PNEUMATIC IMPACT-GUN AIR BLAST-DEFLECTOR

Robert R. Sentivan, 63 King George Rd., Warren, N.J. 07060
Filed Dec. 13, 1989, Ser. No. 450,074
Int. Cl.^{5} B23B *45/00*
U.S. Cl. 173—171 **17 Claims**

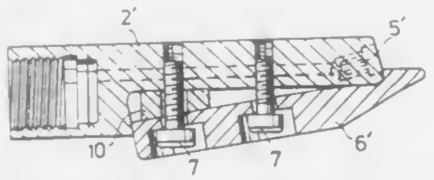


1. An impact lug-removing pneumatic impact-gun air blast-deflector adapted to divert forwardly directed air-exhaust blast from at-lest one forwardly-directed air exhaust port of an impact lug-removing pneumatic gun produceable of an impact for impact lug-removing, comprising: an air-blast deflector means (a) for mounting on the impact lug-removing pneumatic gun structured to blast exhaust air forwardly from the air exhaust port, (b) for mounting on the impact lug-removing pneumatic gun in a position adapted (1) to intercept the forwardly-directed air-exhaust blast and (2) to redirect intercepted forwardly-directed air-exhaust blast to at-least one lateral direction while concurrently limiting back pressure sufficiently that the torque is reduced to not less than a minimum of at-lest about 140 foot-pounds, and (c) for preventing the forwardly-directed air-exhaust blast from the impact lug-removing pneumatic gun from blasting forwardly-located debris, said air-blast deflector means being detachably mountable onto said impact lug-removing pneumatic gun, such that when the air-blast deflector means is mounted on the said impact lug-removing pneumatic gun, forwardly-directed air from the air exhaust port is intercepted, blocked and directed laterally.

5,020,608
DEVICE FOR BORING HOLES IN THE GROUND

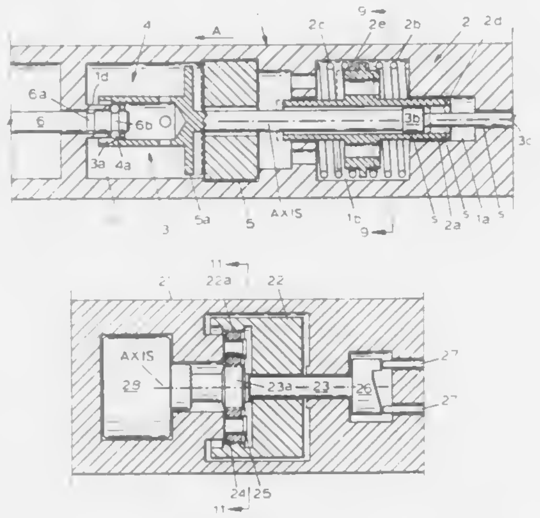
Anders Odén, Stocksund, and Gunnar Jonsson, Täby, both of Sweden, assignors to Diamant Boart Craelius AB, Marsta, Sweden
PCT No. PCT/SE89/00452, § 371 Date Nov. 16, 1989, § 102(e) Date Nov. 16, 1989, PCT Pub. No. WO90/02242, PCT Pub. Date Mar 8, 1990
PCT Filed Aug. 29, 1989, Ser. No. 435,461
Claims priority, application Switzerland, Aug. 31, 1988, 8803046
Int. Cl.^{5} E21B *7/18, 7/26*
U.S. Cl. 175—21 **14 Claims**

1. A device for forming an elongated hole in the ground, comprising a hollow, flexible conduit, a head which is connected to one end of the conduit and which is fitted with at least one nozzle through which fluid passing along the conduit under pressure is delivered in such a direction and under such pressure that when the head is not in rotation, the head will form a hole of curved configuration and such that when the head rotates about its longitudinal axis and the conduit is moved forwards in the hole-forming direction the head will form a substantially straight hole, the end of said head facing towards the hole-forming direction being provided with a surface which is positioned obliquely to the longitudinal axis of the head and which assists the head in forming a curved hole, characterized in that the oblique surface is formed on a member mounted on the head the member being adjustably attached to the head in a manner to enable adjustments to be made to the angle of said member relative to the longitudinal axis of the head without replacing the head.



5,020,609
ACCELERATION COMPENSATING SYSTEM

John D. Jeter, 1403 Teebe Dr., St. Martinville, La. 70582
Filed Mar. 12, 1990, Ser. No. 492,901
Int. Cl.^{5} E21B *7/00*
U.S. Cl. 175—48 **15 Claims**

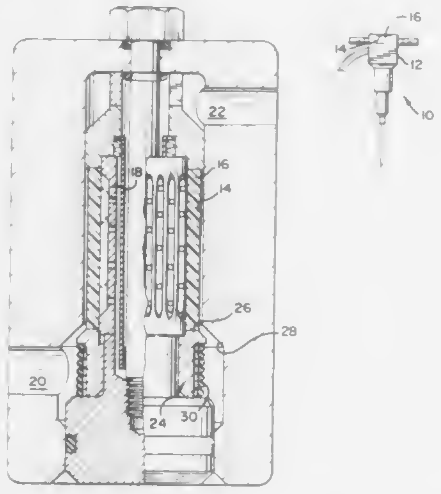


1. An acceleration compensator for use downhole in apparatus used for drilling operations, to reduce acceleration reaction induced movement of elements within the apparatus, relative to the apparatus, when the apparatus is subjected to acceleration, the compensator comprising:

a) an apparatus housing having an axis and means for attachment to a drill string;
b) a member carried in said housing for movement relative to said housing in a general direction parallel to said axis, requiring movement to accomplish the purpose of the apparatus;
c) a compensator weight supported in said housing for movement generally parallel to said general direction;
d) coupling means supported in said housing and arranged to cooperatively function with said member and said weight such that, if they move, they move in unison in opposite directions relative to said housing with movement ratios such that the product of the mass of the effective weight to be compensated of said member times its distance moved during compensation approximate the product of the mass of said weight times its distance moved during compensation.

5,020,610
REMOVABLE FILTER FLUID FLOW SHUTOFF APPARATUS

Leland H. Lyon, and Richard L. Eggeling, both of Roanoke, Va., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.
Filed Feb. 28, 1990, Ser. No. 486,500
Int. Cl.^{5} E21B *1/02, 21/06, 21/10*
U.S. Cl. 175—135 **8 Claims**

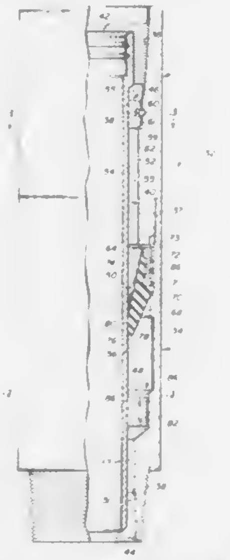


1 An apparatus comprising:
a percussive rock drill including a housing having a recess formed within the housing, a fluid inlet and a fluid outlet are both in fluid communication with the recess;
a valve is displaceably disposed within the recess between an open and a closed position, whereby fluid passage between the fluid inlet and the fluid outlet is stopped when the valve is in said closed position, and fluid is permitted to flow when the valve is in said open position; and
a filter disposable within the recess wherein insertion of the filter means displaces the valve from the closed position to the open position while removal therefrom returns the valve to the closed position.

5,020,611
CHECK VALVE SUB

Alan K. Morgan, and Timothy R. Schamburger, both of 40 Industrial Loop, Midland, Tex. 79701
Filed Jun. 9, 1989, Ser. No. 364,747
Int. Cl.^{5} E21B *17/18, 21/10, 21/12*
U.S. Cl. 175—215 **8 Claims**

1. A check valve sub assembly for series connection in a dual pipe string, said check valve sub assembly comprising an outer annular body member for series connection to the outer pipe of a dual pipe string and an inner annular body member for series connection to the inner pipe of a dual pipe string;
said inner annular body member and said outer annular body member jointly form an annular space therebetween that can communicate with an annulus between the pipes of the dual pipe string;
said outer annular body member comprises an upper sub removably connected to a lower sub to form an annular chamber therebetween; an annular check valve received within said annular chamber; said check valve includes an annular elastomeric member removably received within said annular chamber, said elastomeric member extends from said outer annular body member into resilient engagement with the outer surface of said inner annular body member; said annular elastomeric member divides said annular space into an upper annular area and a lower annular area;
said annular elastomeric member is in the form of a frustum of a cone having a passageway formed axially therethrough through which said inner annular body member is telescopingly received in sealed relationship therewith whereby uphole flow of fluid through the annular space results in the elastomeric member sealingly engaging the inner surface of the outer annular member and the outer surface of the inner annular member, while downhole flow of fluid through said annular space forces the elastomeric member away from the inner annular body and provides an annular flow path therebetween;



an inner tube support and locking ring assembly comprising a circumferentially extending groove formed about the inner wall surface of the outer annular member, a plurality of inner tube supports, each affixed to said inner annular member and radiating therefrom, each of said tube supports have a groove formed therein that registers with said circumferentially extending groove; a locking ring positioned within the circumferentially extending groove of the outer annular member and grooves of the inner tube supports;
and a shoulder spaced below said circumferentially extending groove against which said spaced tube supports are abuttingly received.

5,020,612
WIRE LINE CORE DRILLING APPARATUS

David Stanley Williams, Krugersdorp, South Africa, assignor to Boart International Limited, South Africa
Filed Feb. 22, 1990, Ser. No. 483,024
Claims priority, application South Africa, Feb. 22, 1989, 89/1364
Int. Cl.^{5} E21B *25/02*
U.S. Cl. 175—234 **2 Claims**

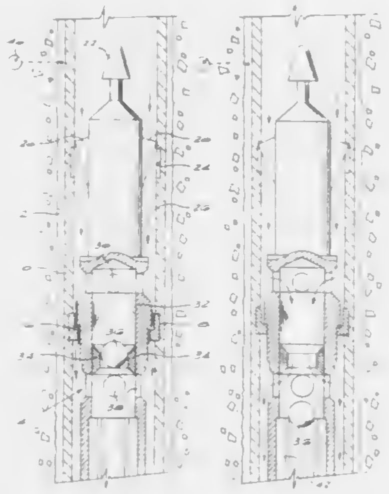
1. A core barrel inner tube assembly for a wire line core drilling apparatus, comprising:
a body having a valve chamber;
seating means comprising a landing shoulder on the body for seating upon a landing ring carried by a core barrel outer tube of the wire line core drilling apparatus when the core barrel inner tube assembly is correctly landed in the core barrel outer tube;
an inlet port and an outlet port leading from an exterior portion of the body to the valve chamber on opposite sides of the landing shoulder so as to establish a bypass passage which bypasses the landing shoulder and through which

VOL
1127
ISS
1
JE
4
1991
UMI

drilling liquid is forced to flow when the landing shoulder is correctly seated upon the landing ring;

a deformable, annular valve seat disposed within the bypass passage;

valve closing means made of harder material than the valve seat for seating on the valve seat to prevent drilling liquid from flowing through the bypass passage until pressure of the drilling liquid is sufficient to force the valve closing means through the valve seat; and



pressure monitoring and recording means for monitoring an increase in the pressure of the drilling liquid and for recording a pulse in the pressure indicating that correct landing has taken place;

wherein said valve seat comprises a central region having a diameter less than that of the valve closing means, and tapered end regions which facilitate forcing of the valve closing means through the valve seat from either end.

5,020,613

DEVICE FOR CUTTING UNDERCUTS

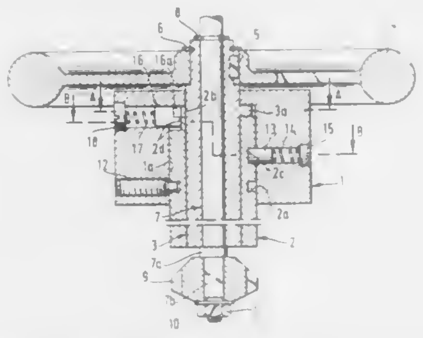
Arndt Bergner, Munich, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft

Filed Jul. 6, 1990, Ser. No. 549,461

Claims priority, application Fed. Rep. of Germany, Jul. 7, 1989, 3922376

Int. Cl.⁵ B28D *1/14*; E21B *7/28*

U.S. Cl. 175—273 3 Claims



1 Device for cutting an undercut in a borehole at a location spaced from the surface of a material into which the borehole is formed, comprising a housing (1) arranged to abut against the surface of the material and having a axially extending bore (1*a*) therein, a guide sleeve (2) mounted in said housing bore, said guide sleeve (2) having an eccentric bore therethrough disposed parallel to the axis of said housing bore, a bushing (3) rotatably mounted within said guide sleeve bore and having an eccentric bore therethrough parallel to the guide sleeve bore, said bushing (3) being rotatably displacable within said guide sleeve (2) through an angle of approximately 180°, a drive shaft (7) extending through and rotatably supported in the eccentric bore of said bushing, said shaft (7) having a first end extending out of one end of said bushing with a cutting head secured thereon and a second end extending out of an opposite end of said bushing and arranged to be coupled with a driving device, blocking means (13) in said housing and displacably engageable with said guide sleeve for permitting rotation of said guide sleeve (2) within the housing bore in only rotational direction, wherein the improvement comprising a snap-in element (16) mounted in said housing and extendable into said housing bore, said snap-in element (16) is radially displacable from said housing bore by said bushing, said snap-in element having an engaged position within said housing bore with said guide sleeve (2) locking said guide sleeve against rotation relative to said housing (1) and a disengaged position displaced from said housing bore permitting relative rotation between said housing and said guide sleeve.

5,020,614

TRACTION SYSTEM

Lloyd Gilbert, 4865 S. Ravenna Rd., Ravenna, Mich. 49451

Filed May 22, 1989, Ser. No. 354,850

Int. Cl.⁵ B62D *65/104*

U.S. Cl. 180—9.21 6 Claims

1 In combination with a vehicle having a frame and at least one wheel supporting member mounted for vertical movement with respect to said frame, and having a drive wheel mounted on said wheel-supporting, an endless track system comprising.

a positioning roller rotatably mounted on said frame for rotation on an axis parallel to the axis of said drive wheel;

endless track means engaging the periphery of said drive wheel and said roller providing an upper and a lower course for said endless track means;

track-supporting means disposed above said lower course and mounted on said frame for vertical movement with respect thereto;

load-transfer means interconnecting said wheel-supporting member and said track-supporting means for inducing vertical movement of said track-supporting means in response to a corresponding direction of movement of said wheel-supporting member; and

a bracket slidably mounted on said frame, said bracket having bearing means supporting said roller, said track-supporting means also being pivotally supported by said bearing means

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5,020,615

ELECTRIC DRIVE UNIT MOUNTED TO A VEHICLE

Shinichi Asaoka, Kariya, Japan, assignor to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Feb. 6, 1990, Ser. No. 475,748

Claims priority, application Japan, Feb. 9, 1989, 1-14543

Int. Cl.⁵ B60K *7/00*

U.S. Cl. 180—11 3 Claims

1. A drive unit mounted to a vehicle having opposite front side frame members, said drive unit comprising a front axle with front axle shafts rotatably supported therein, an electric motor, reduction gear means operatively connecting said electric motor to said front axle shafts, a housing for housing said reduction gear means and fixedly mounting said electric motor to said front axle, a pair of axle brackets for connecting opposite end portions of said front axle to said opposite front side frame members, respectively, so that said housing with said electric motor is swingable about an axis of said front axle shafts, means defining a first hole in said housing and means defining a second hole in at least one of said axle brackets with said first and second holes aligned with each other, and bolt means inserted through said first and second holes for detachably fixing said housing with said axle bracket, to thereby fix said electric motor to said front side frame member via said axle bracket

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5,020,616

POWER STEERING APPARATUS

Tadashi Yagi; Masahiko Noguchi, both of Osaka; Hajime Kozuka, Tokyo; Mitsuharu Morishita, and Masayoshi Onishi, both of Himeji, all of Japan, assignors to Mitsubishi Denki K.K., Tokyo, Japan

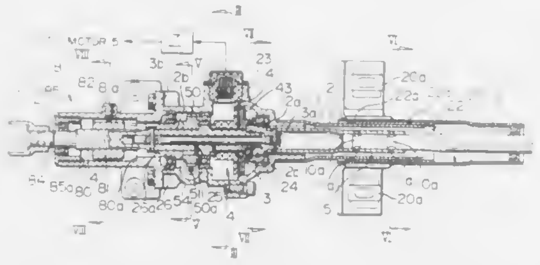
PCT No. PCT/JP88/00915, § 371 Date Mar. 10, 1989, § 102(e) Date Mar. 10, 1989, PCT Pub. No. WO89/02387, PCT Pub. Date Mar. 23, 1989

PCT Filed Sep. 9, 1988, Ser. No. 360,912

Claims priority, application Japan, Sep. 11, 1987, 62-228741; Sep. 11, 1987, 62-228742; Sep. 11, 1987, 62-228743

Int. Cl.⁵ B62D *5/04*

U.S. Cl. 180—79.1 12 Claims



1 A power steering apparatus for power steering the steerable wheels of a vehicle comprising:

a steering wheel;

a steering column having one end connected with said steering wheel and the other end operatively connected with the steerable wheels;

a housing means for surrounding said steering column;

a torque sensor disposed in said housing means for detecting a steering torque exerted on said steering wheel by a driver;

a lead line wound around said steering column and accommodated in said housing means, said lead line having one end electrically connected to said torque sensor and the other end to terminal means which is disposed outside said steering column; and

a motor installed on said housing means and operatively connected with said steering column for power assisting the steering effort exerted on the steering wheel by the driver, said motor being driven to run in accordance with the steering torque detected by said torque sensor

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5,020,617

METHOD AND APPARATUS FOR CHECKING TORQUE SENSOR IN ELECTRIC POWER STEERING SYSTEM FOR VEHICLE

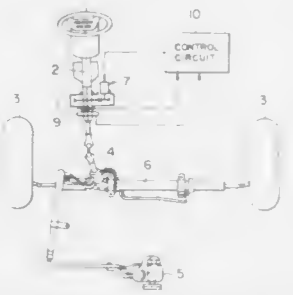
Saiichiro Oshita; Toyohiko Mouri, and Tsutomu Takahashi, all of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 17, 1989, Ser. No. 324,672

Claims priority, application Japan, Mar. 25, 1988, 63-71231

Int. Cl.⁵ B62D *5/04*

U.S. Cl. 180—79.1 5 Claims



1. A method for checking a torque sensor of an electric power steering system having an electric motor provided to generate an assisting power in response to a torque signal generated from the torque sensor, the method comprising the steps of:

generating a detection signal when the torque signal is substantially equal to zero;

producing a decision signal when a rate of changing steering angle is larger than a predetermined value;

outputting a judgment signal when the steering angle is increasing; and

determining an abnormality of the torque sensor in response to the detection signal, decision signal and judgment signal.

5,020,618

FULL HYDRAULIC POWER STEERING APPARATUS

Makoto Nagao, Kameoka, Japan, assignor to Eaton Corporation, Cleveland, Ohio

Filed Jun. 13, 1990, Ser. No. 537,403

Claims priority, application Japan, Jul. 12, 1989, 1-177957

Int. Cl.⁵ B62D *5/06*

U.S. Cl. 180—132 15 Claims

1. A full hydraulic power steering apparatus of the type including a steering unit having a directional control valve operated by an input handle; a steering cylinder which is connected with said steering unit through first hydraulic pressure lines comprising a left line and a right line, and steers a steered wheel; a hydraulic power source for supplying hydraulic pressure to said steering cylinder through said steering unit and said first hydraulic pressure lines; a second hydraulic pressure line for connecting said hydraulic power source and said steering unit; characterized by:

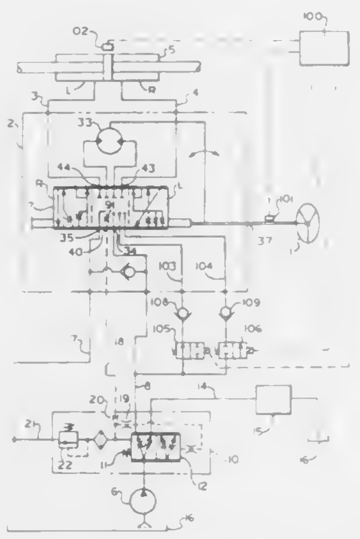
(a) third and fourth hydraulic pressure lines for communicating said second hydraulic pressure line with said steering unit and including first and second auxiliary open-close valves, respectively;

(b) first and second detection members for outputting signals corresponding to displacement from a neutral position of said input handle and a neutral position of said steering cylinder, respectively;

(c) a controller for inputting therein the signals from said

VOL 1127 ISS 1 JE 4 1991 UMI

detection members to achieve opening and closing of said auxiliary open-close valves respectively; and



(d) check valves disposed in said third and fourth hydraulic pressure lines; respectively.

5,020,619

REAR WHEEL STEERING DEVICE FOR A VEHICLE

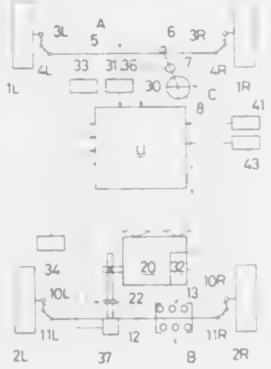
Hirotaka Kanazawa; Hiroshi Ohmura; Atsuo Tomoda; Akihiro Furuzawa; Takashi Nakashima, and Masao Hideshima, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jan. 17, 1990, Ser. No. 466,543

Claims priority, application Japan, Jan. 18, 1989, 1-9484; Jan. 18, 1989, 1-9487; Jan. 23, 1989, 1-14292

Int. Cl.⁵ B62D *5/06, 7/00*

U.S. Cl. 180—140 **7 Claims**



1. A rear wheel steering device for a vehicle having steering control means for steering rear wheels in accordance with the formula,

$$TG\theta_R = -K_F\cdot\theta_F + K_R\cdot V\cdot\psi$$

where

$TG\theta_R$: a target steering angle of the rear wheels

θ_F: a steering angle of the front wheels

V: a vehicle speed

ψ: a yaw rate

K_F, K_R: coefficients determined by the properties of the vehicle, comprising:

vehicle condition detecting means for detecting various conditions of the vehicle; and

changing means connected with said steering control means and said vehicle condition detecting means for changing at least one of the coefficients K_F, K_R depending on the conditions of the vehicle.

5,020,620

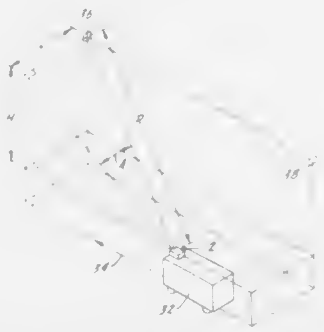
OFFSETTING THE COURSE OF A LASER GUIDED VEHICLE

Bruce F. Field, Golden Valley, Minn., assignor to Tennant Company, Minneapolis, Minn.

Filed Sep. 28, 1989, Ser. No. 413,631

Int. Cl.⁵ B62D *1/28*

U.S. Cl. 180—169 **11 Claims**



1. A method of automatically guiding a floor maintenance machine so as to treat a floor area of extended width relative to the machine width, comprising the steps of:

placing a plurality of retroreflective targets at nonspecific distances in a row relative to the floor area to be treated;

causing the floor maintenance machine to traverse the floor area in a pass from one end of the floor area to the other;

guiding the machine during the pass with reference to each target successively to maintain a predetermined offset distance from the row of targets; and

successively changing the predetermined offset distance after completion of at least one pass so as to make the offset distance either more or less than the width of the machine, and;

making additional passes at the successive offset distance until the enter floor area has been treated.

5,020,621

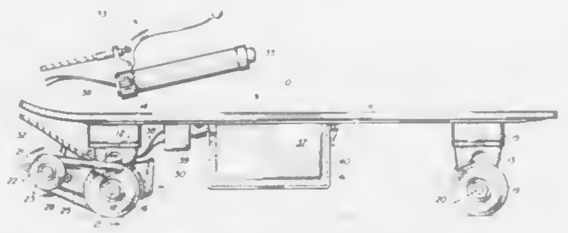
ELECTRIC MOTOR POWERED SKATEBOARD WITH INTEGRAL BRAKES

Christopher V. Martin, 8510 E. Jenan, Scottsdale, Ariz. 85260

Filed Dec. 19, 1989, Ser. No. 452,376

Int. Cl.⁵ A63C *5/08*

U.S. Cl. 180—181 **2 Claims**



1. A motorized skateboard for the unfettered feet of a user comprising:

an elongated board having top and bottom surfaces with its top surface forming a platform for the unfettered feet of a user;

truck means comprising a pair of spaced wheel supporting axles journaled on the bottom surface of said board and laterally thereacross;

frictional means mounted on the bottom of said board and being movable from a first position clear of the wheels of one of said truck means to a second position frictionally engaging at least one of the associated wheels to brake same;

an electric motor mounted on the bottom of said board and connected to one of said pair of axles for rotation thereof;

a battery detachably mounted on the bottom of said board and connected to said motor through an on/off switch,

an on/off switch means interconnecting said motor and said battery for controlling the energization of said motor and the rotation of said one of said axles;

motor control means carried by the user of the skateboard for controlling said motor, and

pulley means interconnecting said motor with said one of the axle supported wheels for rotation thereof,

said pulley means comprises a pulley connected to said motor and having a shallow U-shape groove formed therein for cooperation with a drive belt,

said shallow U-shape groove being provided in one of the wheels of one of said pair of axles for receiving said drive belt which exposes said belt to a ground surface during operation of said skateboard

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5,020,622

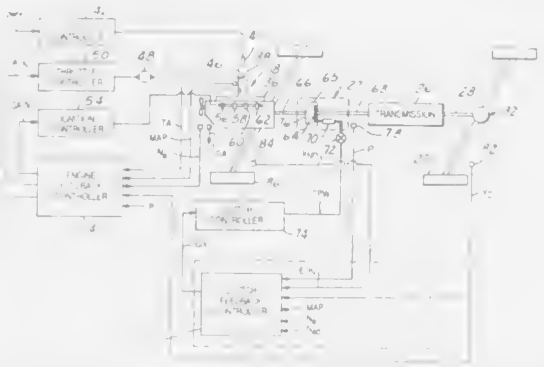
MULTIPLE FEEDBACK LOOP CONTROL METHOD AND SYSTEM FOR CONTROLLING WHEEL SLIP

Davorin D. Hrovat, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 233,084, Aug. 17, 1988, Pat. No. 4,936,405. This application May 6, 1990, Ser. No. 489,160

Int. Cl.⁵ B60K *27/00*

U.S. Cl. 180—197 **10 Claims**



1. A feedback control method for controlling the wheel slip of a wheel driven by torque coupled through an electronically controlled hydraulically operable control method comprising the steps of:

generating a first feedback variable related to the wheel slip;

generating a second feedback variable related to the wheel slip;

summing said first and second feedback variables to generate a feedback control signal;

slipping the clutch by regulating the hydraulic pressure applied to the clutch in response to said feedback control signal to reduce the wheel slip; and

reducing engine speed to a desired engine speed to prevent over-revving and maintain a desired predetermined positive torque on said driven wheel to prevent clutch lock-up while the clutch is being slipped during said regulation step.

5,020,623

TRACTION CONTROL SYSTEM

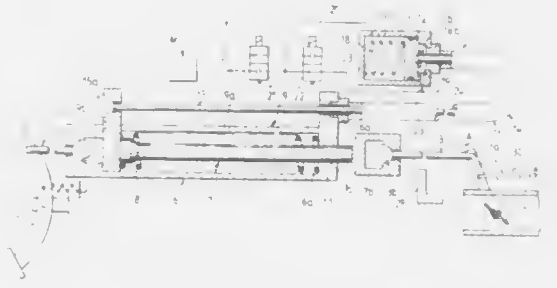
Toshifumi Maehara, Saitama, Japan, assignor to Akebono Brake Industry Co., Ltd., Tokyo and Akebono Research Development Centre Ltd., Saitama, both of, Japan

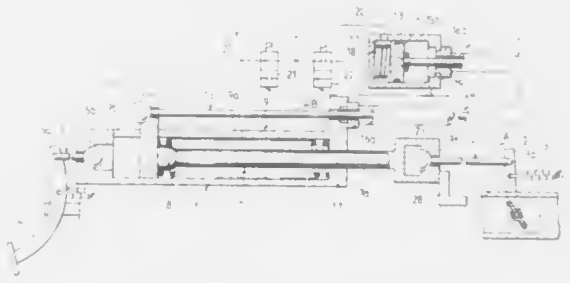
Filed Jul. 7, 1989, Ser. No. 376,523

Claims priority, application Japan, Jul. 25, 1988, 63-183674

Int. Cl.⁵ B60K *28/16*

U.S. Cl. 180—197 **18 Claims**





1. A traction control system of the type including motive control components of a vehicle for preventing a vehicle driving wheel from slipping when the vehicle is accelerated, the system comprising:

a housing connected to an accelerator pedal of the vehicle,

a control rod connected to a throttle lever of the vehicle, said control rod being accommodated and slidably movable within said housing;

a control device interconnected with said control rod for controlling the movement of said control rod within said housing; and

means including a set spring in communication with said control rod and disposed within said housing for moving the control rod together with said housing towards said throttle lever when said vehicle driving wheel slips during acceleration and said accelerator pedal is lightly pressed, and for moving only said control rod towards said throttle lever when said accelerator pedal is strongly pressed and said set spring is compressed.

5,020,624

POWER DRIVE SCOOTER

Elaine M. Nesterick, Ventura; Robert W. Reynolds, Camarillo; Spencer L. MacKay, Agoura Hills, and Cleve A. Graham, Simi Valley, all of Calif., assignors to Everest & Jennings, Inc., Camarillo, Calif.

Filed Nov. 13, 1989, Ser. No. 434,361

Int. Cl.⁵ B62K *11/02, 5/06, 15/00*

U.S. Cl. 180—210 **32 Claims**

1. A power drive scooter, comprising.

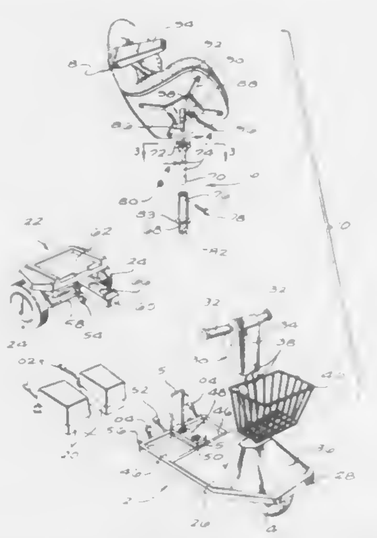
a mainframe including a platform, a front wheel at a first end of the platform, and a tiller assembly connected to the front wheel for steering the scooter, the platform including at least one cup-like port located adjacent to a second end thereof;

a trailer including a rear wheel, motor means for power

VOL 1127
ISS 1
JE 4
1991
UMI

driving the scooter, and a stem member adapted for overlapping engagement with the mainframe, the stem member including at least one aperture located thereon such that overlapping engagement of the stem member with the mainframe will align the at least one aperture with the at least one cup-like port;

coupling means for detachably connecting the mainframe to the trailer, the coupling means including a first coupling attachment associated with the mainframe, and a second coupling attachment associated with the trailer, wherein the first coupling attachment is adapted for releasible engagement with the second coupling attachment;



a power source module for the motor means; and

a seat module including a seat post for supporting a seat over the mainframe, the seat post being removably inserted through the at least one aperture and into the at least one port to lock the trailer and the mainframe together

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5,020,625
MOTOR BICYCLE PROVIDED WITH ARTICLE ACCOMMODATING APPARATUS

Kosaku Yamauchi, Shizuoka; Akihiko Muramatsu, and Shinji Kaku, both of Hamamatsu, all of Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Sep. 1, 1989, Ser. No. 402,194

Claims priority, application Japan, Sep. 6, 1988, 63-221454; Sep. 6, 1988, 63-221455; Sep. 7, 1988, 63-222284; Sep. 28, 1988, 63-240654; Sep. 29, 1988, 63-242564; Dec. 22, 1988, 63-322182; Feb. 10, 1989, 1-31921; Feb. 10, 1989, 1-31922; Mar. 20, 1989, 1-65893

Int. Cl.^{5} B62K *11/00*

U.S. Cl. 180—219 **37 Claims**

1. A motor bicycle, comprising:

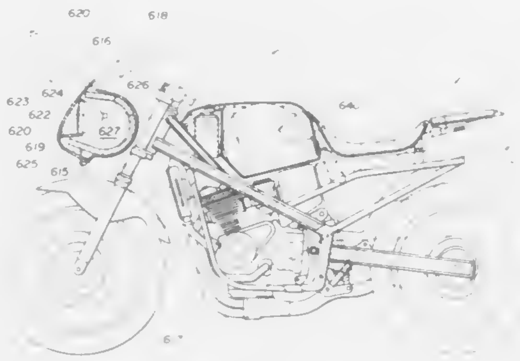
a front wheel steered by means of a handle and through means of a head pipe;

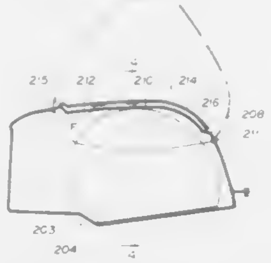
a main body equipped with an engine unit located at a substantially central portion of said main body and including multiple cylinders having cylinder heads and with an intake system extending rearwardly from said cylinders of said engine unit;

a seat for a rider located at a rearwardly upper portion of said main body;

a rear wheel disposed below said seat and driven by said engine unit; and

an article accommodating box provided with a cover to be opened and a locking means for locking said article accommodating box when said cover is disposed in a closed position, said article accommodating box being provided with a bottom portion extending rearwardly above and along said intake system and having a front portion extending upwardly at a rear upper portion of said cylinder heads, said cover being of a double wall structure having outer and inner plates between which is defined an air space which is divided by projection means into a plurality of sections extending in a direction along a travelling direction of said motor bicycle, and having means for providing air flow through said air space as said motor bicycle travels along said travelling direction.





5,020,626
POWER TRANSMITTING SYSTEM FOR A FOUR-WHEEL DRIVE VEHICLE

Yukio Kodama, Ohta, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

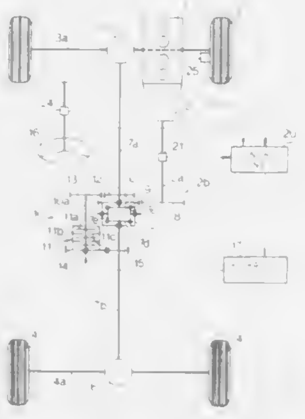
Division of Ser. No. 338,714, Apr. 14, 1989, which is a division of Ser. No. 63,173, Jun. 15, 1987, Pat. No. 4,896,738. This application Mar. 15, 1990, Ser. No. 494,078

Claims priority, application Japan, Jun. 20, 1986, 61-144477; Jun. 20, 1986, 61-144476; Jun. 20, 1986, 61-144475; Jun. 20, 1986, 61-144478; Jun. 20, 1986, 61-144479

The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.^{5} B60K *17/34, 23/08*

U.S. Cl. 180—233 9 Claims



1. A power transmitting system for a four-wheel drive vehicle in which power of an engine is transmitted to front and rear wheels of the vehicle through a central differential, the system comprising

a torque distribution device including clutch means for changing torque transmitted to the front and rear wheels,

detecting means for detecting driving conditions of the vehicle including steering angle of the vehicle for producing an output signal, and

control means responsive to the output signal for rendering the clutch means operative so as to change torque distribution ratio for the rear wheels.

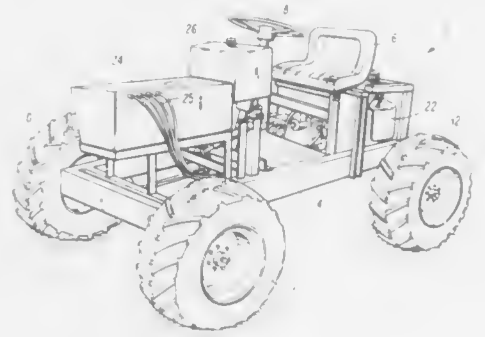
5,020,627
FOUR-WHEEL DRIVE TRACTOR

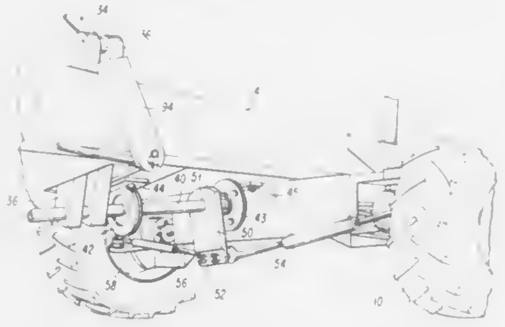
Rudolph H. Wittke, 1659 Glenny Ave., Waterloo, Iowa 50702

Continuation of Ser. No. 341,618, Apr. 21, 1989, abandoned. This application Sep. 12, 1990, Ser. No. 582,805

Int. Cl.^{5} B62D *5/00, 7/00*

U.S. Cl. 180—234 22 Claims





1 Tractor apparatus comprising

an elongated frame supported by a plurality of rotatable wheels,

at least one of said wheels capable of pivot relative to said frame about a generally vertical axis,

an engine mounted to said frame,

an elongated bar mounted longitudinally upon said frame and axially rotatable relative thereto,

a pump driven by said engine and operative upon a working fluid,

a piston selectively driven by said working fluid,

said piston operatively interconnected to said elongated bar, said elongated bar axially rotatable by action of said piston,

said elongated bar operable upon at least one of said wheels to cause said wheel to pivot upon said frame.

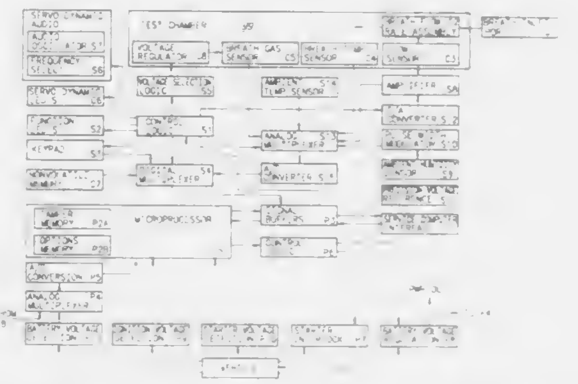
5,020,628
VEHICULAR IGNITION INTERLOCK SYSTEM

Achille M. Bigliardi, Woodside, and Terry R. Jablonski, San Jose, both of Calif., assignors to Sencion Corporation, Woodside, Calif.

Filed Dec. 5, 1989, Ser. No. 446,390

Int. Cl.^{5} B60K *28/06*

U.S. Cl. 180—272 45 Claims



1 In an ignition interlock system, an apparatus for measuring the alcohol concentration of breath sample, comprising:

means for receiving said breath sample from a person exhaling into said receiving means;

means for measuring the rate of flow of said breath sample while said breath sample is being exhales by said person into said receiving means;

means responsive to said rate of flow measuring means for indicating to said person the length of time that said person must exhale into said receiving means so as to insure that said person provides a predetermined volume of said breath sample;

means responsive to said rate of flow measuring means for extending said period of time when said rate of flow is below a selected magnitude and for reducing said period of time when said rate of flow is above said selected magnitude; and

means located in said receiving means for measuring the alcohol concentration of said breath sample at the end of said period of time when said predetermined volume of breath sample has been received in said receiving means.

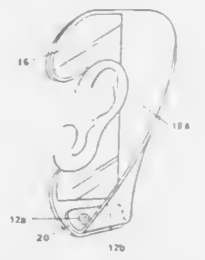
5,020,629
LISTENING ENHANCEMENT DEVICE

Paul G. Edmundson, 1341 Drake Ave., Burlingame, and Terry Merritt, 730 Hillsborough Blvd., Hillsborough, both of Calif. 94010

Filed Dec. 11, 1989, Ser. No. 448,282

Int. Cl.^{5} G10K *11/28*

U.S. Cl. 181—136 5 Claims



1. A convertible listening enhancement device adapted to be attached to a peripheral portion of an outer ear of a user, comprising:

a flat flexible body having a first surface composed of one material and a second surface composed of another mate-

VOL
1127
ISS
1
JE
4
1991
UMI

rial, an elongated flange portion, and a cut-out area of predetermined configuration provided in a peripheral side edge portion of said body, said cut-out area defining a hook structure for attachment to said peripheral portion of said outer ear of said user, said hook structure being reinforced to provide a higher rigidity than other portions of said flat body by attaching a reinforcing member shaped according to the configuration of said cut-out area defining said hook structure;

said flat body of flexible materials being bendable to form an adjustable scoop structure that extends away from and surrounds an outer portion of the outer ear when said hook structure is attached to the peripheral portion of the outer ear, said scoop structure defining a sound gathering means for sound energy directed into said scoop structure; and

fastening means provided on said flange portion and a portion below said hook structure for selective engagement in securing and maintaining said flat body in the form of said scoop structure.

5,020,630

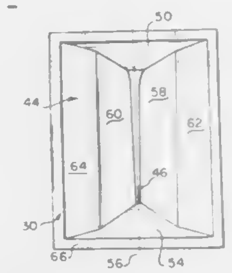
LOUDSPEAKER AND HORN THEREFOR

David W. Gunness, Buchanan, Mich., assignor to Electro-Voice, Inc., Buchanan, Mich.

Filed Dec. 8, 1989, Ser. No. 447,608

Int. Cl.^{5} G10K *11/00*

U.S. Cl. 181—192 **20 Claims**



1 A loudspeaker for projecting sound over an area from a position located above the area comprising a driver having a sound output port, said driver producing a uniform distribution of sound energy across the output port throughout a frequency range of the loudspeaker, and a horn having walls defining a sound path extending between a sound inlet opening and a mouth, the sound inlet opening of the horn being acoustically coupled to the output port of the driver, said horn comprising a coupling portion extending from the inlet opening to an interface and an outwardly flaring portion extending from the interface to the mouth, portions of the walls of said horn forming a slot of a particular shape extending across the sound path at the interface between the coupling portion and the outwardly flaring portion of substantially smaller cross section than the mouth, said slot having a central axis of elongation and opposite ends on the axis of elongation, the walls of the horn providing a smooth transition between the inlet opening of the horn and the slot, and said horn including means for controlling the sound energy along the axis of elongation of the slot, the sound energy per unit of area being smallest at a first portion of the slot and greatest at a second portion of the slot, the sound energy increasing progressively between the first portion and second portion of the slot.

5,020,631

MODULAR SILENCER

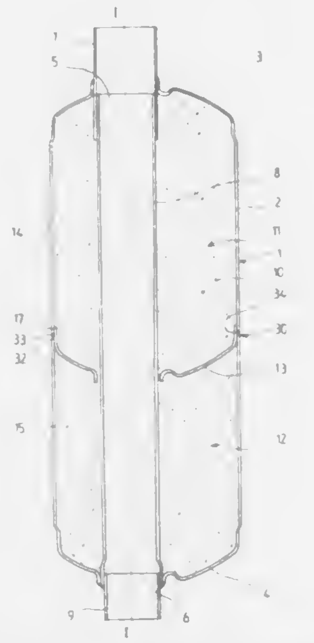
Paul DeVille, Bonneville, France, assignor to Devil, société anonyme, Bonneville, France

Filed Apr. 6, 1990, Ser. No. 505,926

Claims priority, application France, Apr. 25, 1989, 89 05937

Int. Cl.^{5} F01N *1/02*

U.S. Cl. 181—249 **12 Claims**



1. An exhaust silencer for transferring exhaust gases from an inlet tube to an outlet tube, comprising an outer case forming a closed enclosure defined by an axial peripheral sidewall developed along a longitudinal axis and first and second transverse end walls, the case being pierced with at least one inlet orifice and one outlet orifice respectively for the inlet and outlet of the exhaust gases and adapted for connection of an inlet tube and an outlet tube, the case containing means for the expansion of the exhaust gases and conduction thereof between the inlet and outlet orifices, the case comprising:

at least a first case element formed of a continuous wall comprising a first tubular axial portion forming a portion of said axial peripheral sidewall between a first end and a second end of the first tubular axial portion, the axial portion being limited at its first end by a first free annular edge and being connected at its second end to a radial portion forming said first transverse end wall,

at least a second case element, formed of a continuous wall comprising a second tubular axial portion forming a portion of said axial peripheral sidewall, the axial portion being defined at its first end by a second free annular edge and being connected at its second end to a radial portion forming a transverse wall, the first and second free annular edges of the respective first and second case elements being configured similarly,

said first and second case elements being assembled axially together in opposition, along an intermediate peripheral annular connection zone formed by said first and second edges applied axially together edge to edge, said case elements being joined together sealingly along the peripheral annular connection zone,

in line with the intermediate radial annular connection zone, an inner piece with cylindrical peripheral surface forming a connecting support against which bear simultaneously two inner faces of the tubular axial portions of the first and second case elements.

5,020,632

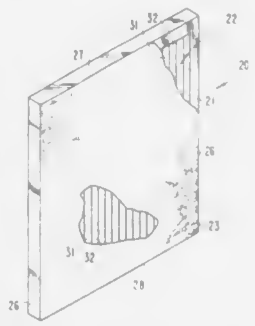
ACOUSTICAL PARTITION AND METHOD OF MAKING SAME

Thomas E. Nelson, Anchorage, Ky., assignor to Soltech, Inc., Shelbyville, Ky.

Filed May 1, 1989, Ser. No. 345,943

Int. Cl.^{5} E04B *1/82, 9/00*

U.S. Cl. 181—290 **11 Claims**



1 An acoustical partition comprising:

a rigid frame including a top portion, a bottom portion, a first side portion and an oppositely disposed second side portion which collectively define an interior opening;

an acoustical core disposed within said interior opening, secured to said rigid frame; and

said acoustical core including an abutting side-by-side, laterally stacked series of insulation strips sized so as to occupy the interior opening of said rigid frame, the lateral stacking of said insulation strips extending from said first side portion to said second side portion, wherein said series of insulation strips includes a first plurality of insulation strips of a first material and a second plurality of insulation strips of a second material which is different from said first material.

5,020,633

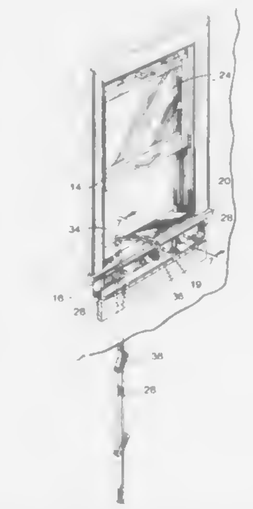
EMERGENCY ESCAPE DEVICE

Louis R. Rangel, 3104 Minnehaha Ave. S., Minneapolis, Minn. 55406

Filed Feb. 13, 1990, Ser. No. 479,382

Int. Cl.^{5} E06C *9/14, 1/56*

U.S. Cl. 182—70 **2 Claims**



1 An emergency escape device for assisting in escaping over the windowsill from a window situated above ground level in the wall of a building, under emergency conditions, said emergency escape device comprising:

(a) an enclosure having a top, bottom, sides, back and front, the interior top, interior bottom and interior side surfaces of said enclosure being lined by an embedded aluminum plate box for providing fire-proof support and rigidity to said enclosure, and wherein said front of said enclosure is hinged at its bottom edge allowing said front to remain in an upright, closed position when said enclosure is in a position of non-use, and to pivot downwardly to a vertical position below said enclosure when said enclosure is in, or is about to be placed in, a position of use, said enclosure being adapted for installation on the inside building wall below the frame of the window situated within said building wall, the horizontal distance spanned by said enclosure being greater than the distance from the left inner edge to the right inner edge of said window frame, and with the front of said enclosure facing the building interior;

(b) an elongated flexible rope- or strap-like support with a proximal end composed of steel cable or chain of sufficient length to reach the outside building wall said proximal end affixed to the middle portion of the interior back wall of said enclosure, and a distal end, said distal end provided with an adjustable loop adapted to circumscribe a human body, said support being wound, folded or otherwise packed within said enclosure when said support and said enclosure are in a position of non-use, and extending from said enclosure interior, over the windowsill, to the building exterior, and down the outside building wall when said support and said enclosure are in a position of use, said support being doubled back upon itself at resulting, spaced intervals and secured in such configuration by fastening means; and

(c) spaced posts affixed to the interior back wall of said enclosure, said posts extending perpendicularly toward, but not reaching, the interior surface of the front wall of said enclosure, to thereby provide for storage of said support within said enclosure.

5,020,634

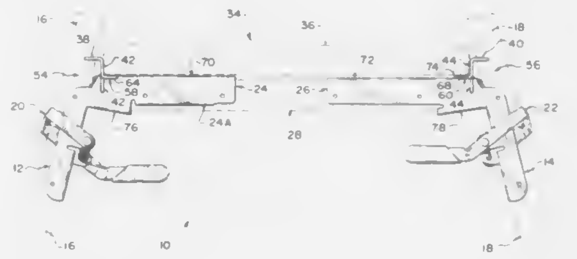
SUPPORT BRACKET

Robert A. Gunderson, St. Alberta; Leonard E. Koffski, Duncan, and Gary W. Gunderson, Lake Cowichan, all of Canada, assignors to First Choice Distributors, Inc., Canada

Filed Feb. 27, 1990, Ser. No. 485,447

Int. Cl.^{5} B27B *21/00;* B25H *1/06*

U.S. Cl. 182—184 **11 Claims**



1. In a work support bracket comprising:

(a) first and second opposed, generally vertical sockets for receiving first and second leg members;

(b) first and second releasable clamps for releasably clamping said first and second leg members within said first and second generally vertical sockets respectively;

(c) joined to, and extending generally perpendicular to said first and second generally vertical sockets, first and second interconnectible, horizontal sockets for receiving opposed ends of an extension member; and,

first and second upwardly extending brace members projecting transversely atop said first and second

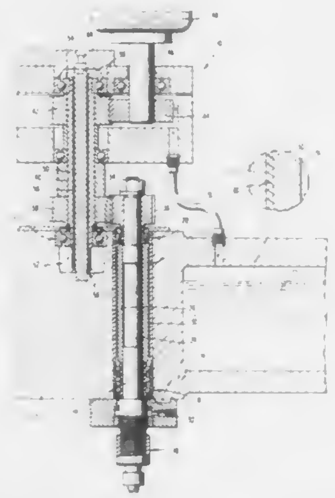
VOL
1127
ISS
1
JE
4
1991
UMI

horizontal sockets respectively, the improvement wherein:
- (i) said brace members have a cross sectional shape;
- (ii) said brace members are fixed to said first and second horizontal sockets respectively such that the upper horizontal segments of said brace members extend away from one another; and,
- (iii) the lower, central region of the vertical segments of said brace members are notched to straddle said first and second horizontal sockets respectively.

5,020,635

ROTARY SHAFT AND LUBRICATING SYSTEM THEREFOR

Garfield R. Lunn, Amherstburg, Canada, assignor to Arvid Machine Tools Ltd., Windsor, Canada
Filed Oct. 26, 1989, Ser. No. 426,712
Int. Cl.⁵ F01M *11/00*
U.S. Cl. 184—6.18 **12 Claims**



1. Apparatus comprising a stationary member, a shaft mounted for rotation relative to said stationary member about a vertical axis, a drilling tool connected to said shaft, vertically spaced bearings supporting said shaft for rotation about said axis, a segment of said shaft extending between said bearings being substantially longer than an outer diameter of said shaft, a gap formed radially between opposing annular surfaces of said shaft and said stationary member, a length of said gap extending between said bearings being substantially greater than a width of said gap, a lubricant inlet communicating with said gap adjacent one vertical end thereof, a lubricant out let communicating with said gap adjacent an opposite vertical end thereof, said gap and said lubricant inlet and outlet defining portions of a lubricant conduit means, said bearings lying in said lubricant conduit means, a reservoir having an outlet communicating with said lubricant inlet, said reservoir containing a supply of lubricant oil, drive means operably connected to said shaft for rotating said shaft at least at 500 rpm, one of said opposing annular surfaces including helical thread means for inducing a vertical flow of lubricant oil through said conduit means for lubricating said bearings and creating hydrostatic support for said segment of said shaft extending between said bearings, said vertically spaced bearings including an upstream bearing disposed adjacent said lubricant inlet, and a downstream bearing disposed adjacent said lubricant outlet, said upstream and downstream bearings being so arranged in said conduit means that all of said lubricant traveling through said conduit means flows through said upstream and downstream bearings.

5,020,636

PIEZOELECTRIC LUBRICATING DEVICE FOR A BEARING

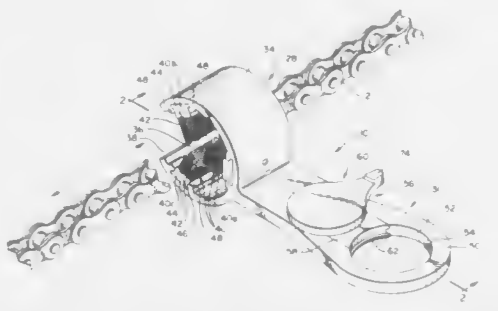
Johannes Daeges, Lichtenfels, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany
Continuation of Ser. No. 378,151, Jul. 11, 1989, abandoned. This application Sep. 7, 1990, Ser. No. 579,083
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1988, 3823497
Int. Cl.⁵ F01M *1/00*
U.S. Cl. 184—6.26 **41 Claims**

1. Lubricating device for a bearing across which a gas pressure gradient exists, comprising a piezoelectric tubule operating as a pump receiving a lubricant and introducing the lubricant into a propellant gas stream flowing past said piezoelectric tubule in a given direction and passing through the bearing due to a pressure gradient across the bearing, said piezoelectric tubule ejecting lubricant droplets into the propellant gas stream in said given direction, at least one sensor determining the operating state of the bearing, and an electric current supply connected between said at least one sensor and said piezoelectric tubule.

5,020,637

BICYCLE CHAIN LUBRICATING AND CLEANING APPARATUS AND METHOD

John F. Hoenselaar, Anacortes, and Eivind Clausen, Bellingham, both of Wash., assignors to Allsop, Inc., Wash.
Continuation of Ser. No. 359,087, May 26, 1989, abandoned, which is a continuation-in-part of Ser. No. 243,422, Sep. 12, 1988, abandoned, which is a continuation-in-part of Ser. No. 142,066, Jan. 11, 1988, abandoned, which is a continuation-in-part of Ser. No. 54,444, May 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 884,285, Jul. 10, 1986, abandoned, which is a continuation-in-part of Ser. No. 708,680, Mar. 6, 1985, abandoned. This application Jun. 1, 1990, Ser. No. 532,249
Int. Cl.⁵ F16N *21/00*
U.S. Cl. 184—15.1 **21 Claims**

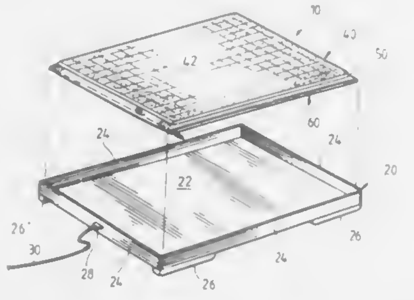


1. A method for using a handheld lubricant dispensing container to apply lubricant to a drive chain having at least one horizontally extending portion, such as a drive chain for a bicycle or a motorcycle, said container having a dispensing head at one end of said container, with said dispensing head having a discharge opening to discharge lubricant from said head in a predetermined direction, said method comprising:
- mounting an applicator to said housing, said applicator having:
  - a. a peripheral housing defining an opening, linearly extending lubricating area to receive a said horizontally extending portion of said drive chain, with the housing extending around at least a substantial portion of said lubricating area and having an access opening to receive said drive chain, said housing having a lengthwise axis and comprising a sidewall extending along said lengthwise axis and also extending around said lengthwise axis
  - b. brush means mounted within said housing and extending inwardly to said lubricating area; and
  - c. discharge tube means for conveying lubricant from said discharge opening in said dispensing tube to said lubricating area in said housing;
- receiving a said horizontally extending portion of said drive chain in said lubricating area of said housing so that said lengthwise axis of said housing extends in a horizontal direction;
- positioning a portion of said sidewall of said housing beneath said horizontally extending portion of said drive chain which is received in said lubricating area so as to prevent lubricant which is applied to said chain from dripping from said lubricating area; and
- discharging lubricant from said dispensing head of said container through said discharge tube means to said lubricating area of said applicator mounted to said container so that lubricant is in contact with said brush means so as to be applied to said portion of said drive chain which is received in said lubricating area.

5,020,638

VEHICLE LIQUID DRIP CATCHING SYSTEM

Pok N. Smith, 11902 Loveland Pass, Houston, Tex. 77067
Filed Dec. 6, 1989, Ser. No. 446,802
Int. Cl.⁵ F16N *31/00*
U.S. Cl. 184—106 **16 Claims**

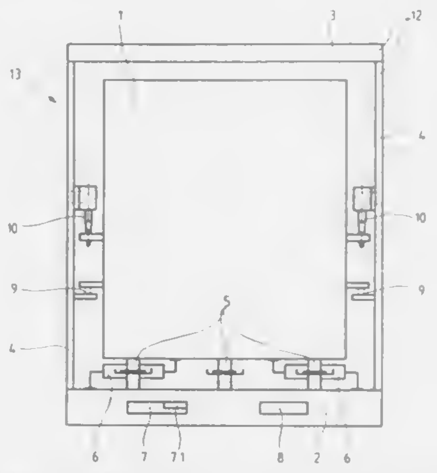


1. A device for catching liquids dripping from vehicles, said device comprising:
- a substantially rigid tray member having a base and substantially vertical sides emanating upwardly from the edges of the base;
- a flexible liquid absorbent pad constructed and arranged to fit within the substantially vertical sides of said substantially rigid tray member; and
- a bag assembly attached to one side of said flexible liquid absorbent pad so that said bag assembly is positioned entirely underneath said flexible liquid absorbent pad;
- whereby when said flexible liquid absorbent pad is saturated, said flexible liquid absorbent pads may be separated from said bag assembly and placed within said bag assembly for disposal.

5,020,639

METHOD OF, AND APPARATUS FOR, ABSORBING VIBRATIONS IN CARS OF HIGH-SPEED ELEVATORS

Aime Michel, Elancourt, France, assignor to Inventio AG, Hergiswil, Switzerland
Filed Oct. 25, 1989, Ser. No. 426,552
Claims priority, application Switzerland, Nov. 2, 1988, 04073/88
Int. Cl.⁵ B66B *1/44*
U.S. Cl. 187—1 R **16 Claims**



1. A method of supporting at low friction an elevator car body at a support frame of an elevator car, comprising the steps of:
- floatingly supporting the elevator car body at the support frame during travel of the elevator car;
- isolating the elevator car body which is floatingly supported at said support frame, against substantially horizontal movements carried out by said support frame relative to said elevator car body during said travel of said elevator car;
- positioning said elevator car body relative to said support frame in at least two predeterminate substantially horizontal positions one of which is a travelling position assumed by said elevator car body during said travel of said elevator car, and another one of which is a stop position assumed by said elevator car body during a stop at a preselected destination of said elevator car;
- said step of positioning said elevator car body in said stop position entailing, during approach of said elevator car to said preselected destination, the steps of displacing said elevator car body from said travelling position into said stop position close to a elevator shaft wall and ultimately locking said elevator car in said stop position at said support frame for providing a reduced entrance gap;
- said step of positioning said elevator car body in said travelling position entailing, during departure of said elevator car from a predeterminate destination, the step of displacing said elevator car body relative to said support frame from said stop position into said travelling position and thereby providing a predetermined spacing of said elevator car body from said elevator shaft wall;
- generating a variable adjusting force for positioning said elevator car body relative to said support frame in said at least two predeterminate positions;
- during travel of said elevator car, counteracting and thereby compensating for substantially horizontal relative movements between said elevator car and said support frame by means of said variable adjusting force; and
- varying said variable adjusting force as a function of an offset of the elevator car body from said travelling position.

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,640
ELEVATOR BRAKE

Jacob A. Nederbragt, Akersloot, Netherlands, assignor to Bongers & Deimann, Dusseldorf, Fed. Rep. of Germany
Filed Sep. 1, 1989, Ser. No. 401,989
Claims priority, application Fed. Rep. of Germany, Sep. 10, 1988, 3830865; May 26, 1989, 3917594
Int. Cl.^{5} B66B *5/16*
U.S. Cl. 187—89 7 Claims

1. An elevator brake, comprising:
- brake jaws acting on at least one bearer rope;
- brake applying means;
- a safety switch that actuates the brake applying means, said safety switch being pulse count dependent and being actuated in a pulse circuit by a pulse generator responsive to a part of the elevator installation that moves dependent on the speed of the elevator car; and
- at least one time delayed, pulse count dependent monitoring switch connected in a series with said safety switch in a safety circuit and controlled through said pulse generator in said pulse circuit so as to actuate the brake applying means when the elevator car begins to move from a stopped position or is in motion when no command to move is present, and so as to monitor start-up of the elevator.

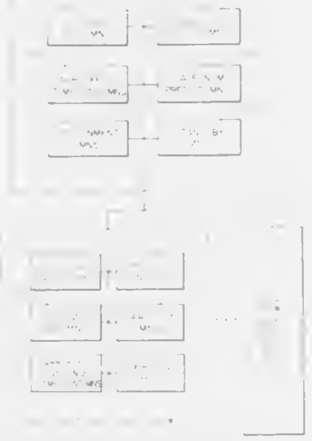
5,020,641
METHOD AND APPARATUS FOR ERECTING HYDRAULIC ELEVATOR RAILS

J. H. Olsen, Pearl River, N.Y.; Thomas L. Harvey, Ownings; Mark J. Cornett, Waldorf, both of Md., and Demetre Galatis, Springfield, Va., assignors to Otis Elevator Company, Farmington, Conn.
Filed Jun. 20, 1990, Ser. No. 541,003
Int. Cl.^{5} B66B *7/02*
U.S. Cl. 187—95 16 Claims

11. An apparatus for mounting rails which guide an elevator in a hoistway, the elevator being driven by a piston, the rails being comprised of a plurality of sections one mounted on top of another, the sections being connected together at joints thereof, the apparatus comprising:
- a platform attaching to said piston,
- a segmented stile attaching to said platform, said stile extending a height above said platform sufficient to allow access to the joints connecting said rail sections,
- means attaching to said stile for guiding said stile and said platform along said rails, and
- an upper support structure attaching to said stile for receiving an elevator cab.

5,020,642
GROUP-SUPERVISORY APPARATUS FOR ELEVATOR SYSTEM

Shintaro Tsuji, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan
Filed Feb. 14, 1989, Ser. No. 310,310
Claims priority, application Japan, Feb. 17, 1988, 63-34317
Int. Cl.^{5} B66B *1/20*
U.S. Cl. 187—124 18 Claims

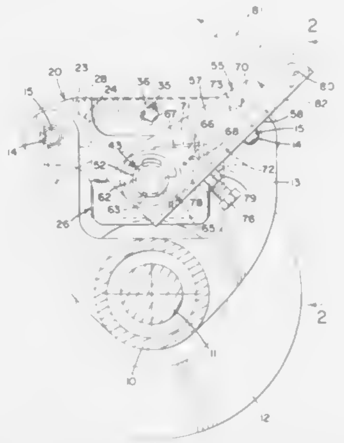


1. A group-supervisory elevator system comprising:
- hall call registration means for registering hall calls when hall buttons are depressed;
- assignment means for selecting a cage from among a plurality of cages and assigning the selected cage to a hall call;
- cage control means for controlling a traveling direction of each cage, starting and stopping each cage, and opening and closing a door of each cage, thereby causing the assigned cage to respond to a cage call and the corresponding hall call;
- standby means for causing an assigned cage, after it has responded to all corresponding calls, to stand by at a floor at which the assigned cage responded to the last call;

- cage position prediction means for predictively calculating cage positions and cage directions after the respective cages have successively responded to the cage calls and the correspondingly assigned hall calls after the lapse of a predetermined time; and
- cage number prediction means for predictively calculating the presence and absence and the number of the cages at predetermined floors or in predetermined floor zones after the lapse of the predetermined time, on the basis of the predicted cage positions and the predicted cage directions, wherein at least one of said assignment means, said cage control means and said standby means is actuated using the number of the cages predicted by said cage number prediction means.

5,020,643
FLOATING FRICTION BRAKE

Philip D. Redenbarger, Centerpoint, Ind., assignor to Motion Control Industries, Inc., Ridgway, Pa.
Continuation-in-part of Ser. No. 252,326, Oct. 3, 1988, abandoned. This application Jun. 16, 1989, Ser. No. 367,415
Int. Cl.^{5} F16D *65/46, 65/50*
U.S. Cl. 188—196 M 4 Claims



1. A disk brake for braking a rotatable brake disk comprising a stationary support, caliper member having a central opening defining a pair of opposed depending legs and a pair of opposed guideways, said depending legs located on opposite sides of said disk, a pair of braking pad means mounted on opposite sides of said disk and guided for movement toward and away from said disk on said guideways, said caliper member slidably mounted on guide rods secured to said support to position said caliper member over said rotor brake disk to provide a floating caliper member, a power screw journaled in one of said depending legs for actuating said braking pad means into braking action with said rotor brake disc, a cam secured to said power screw for rotating said screw, a control lever means mounted on one end of said screw and overlying said cam, adjusting means interconnecting said cam and said lever means to effect a rotation of said cam relative to said control lever means to effect an axial movement of said screw to provide adjustments for wear of said braking pad means, said one depending leg has a nut secured therein for receiving said power screw, said nut having a bore therethrough whose axis is parallel to the axis of said rotatable disk, said depending leg having a plurality of circumferentially bores that are registerable with said one bore in said nut, and a pin interconnected one of said plural bores in said depending leg with said one bore in said nut to provide means for adjusting the relative rotative position of said nut and said power screw.

5,020,644
AUXILIARY MASS DAMPER FOR SLENDER FLEXIBLE ELEMENT SUBJECT TO VIBRATION

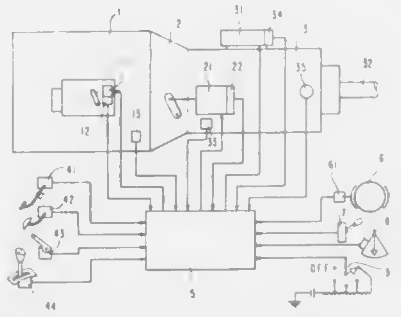
Fernando Novoa, Luis Zegers 303, Santiago, Chile
Continuation-in-part of Ser. No. 704,132, Feb. 20, 1985, Pat. No. 4,858,738, which is a continuation of Ser. No. 606,131, May 2, 1984, abandoned, which is a continuation of Ser. No. 936,051, Aug. 23, 1978, abandoned. This application Jun. 1, 1989, Ser. No. 359,887
Claims priority, application Chile, Jul. 26, 1978, 470/78
Int. Cl.^{5} F16F *7/10*
U.S. Cl. 188—378 30 Claims

1. An auxiliary mass damper system for reducing or limiting the amplitude of vibratory oscillations induced from an external cause such as seismic activity, in an elongated and slender structurally flexible mechanical element having when oscillating in a given oscillatory mode a given mass, a given natural period of oscillation at a given natural frequency, and which is mounted to the ground so as to have, when subjected to said oscillations, a region of maximum displacement,

said auxiliary mass damper system comprising:
- at least one closed receptacle containing as a ballast, in an enclosed space having a given volume, a given quantity of loose particles which are subject to being freely shaken;
- means rigidly mounting each said receptacle to said mechanical element within said region of maximum displacement.

5,020,645
VEHICLE CLUTCH CONTROL SYSTEM

Yuki Sasa, Tokyo, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan
Filed Nov. 21, 1989, Ser. No. 439,330
Claims priority, application Japan, Dec. 20, 1988, 321532
Int. Cl.^{5} B60K *41/28*
U.S. Cl. 192—0.09 13 Claims



1. A vehicle clutch control system having an engine mounted in an automotive vehicle, a transmission, a clutch disposed between the engine and the transmission, an accelera-

VOL
1127
ISS
1
JE
4
1991
UMI

tor pedal for controlling fuel to be supplied to the engine, a brake device for causing a braking force to act upon wheels of the vehicle, and a parking brake, the system comprising:

a clutch actuator for engaging and disengaging said clutch;

means for detecting the amount of depression of said accelerator pedal;

means for sensing operation of said parking brake;

means for detecting the braking force applied by braking operation of said brake device;

clutch engagement deciding means for deciding an amount of clutch engagement based on the braking force applied by said brake device, said amount of clutch engagement being smaller as the braking force is greater and being gradually greater up to a partly clutch engaging region as the braking force is smaller; and

means for controlling said clutch actuator based on the amount of clutch engagement decided by said clutch engagement deciding means when the amount of depression of the accelerator pedal is zero and parking brake is not applied

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5,020,646
TORQUE CONVERTER DEVICE

Masahiko Koshimo, Osaka, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

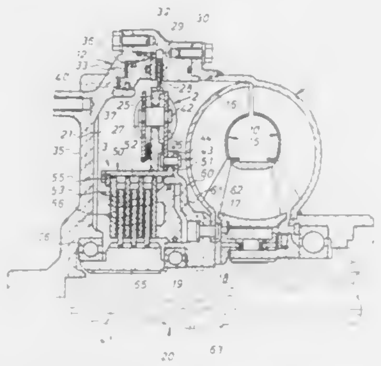
PCT No. PCT/JP89/00047, § 371 Date Oct. 2, 1989, § 102(e) Date Oct. 2, 1989, PCT Pub. No. WO89/07725, PCT Pub. Date Aug. 24, 1989

PCT Filed Jan. 19, 1989, Ser. No. 423,470

Claims priority, application Japan, Feb. 10, 1988. 63-29899

Int. Cl.^{5} F16H *45/00*

U.S. Cl. 192—3.25 3 Claims



1. A torque converter device having an input unit comprising a front cover main body and an outer circumferential part, an impeller having a shell, an outer circumference of said shell being fastened to said outer circumferential part of said input unit, a turbine located axially between said front cover main body and said impeller, said turbine being fixed to a turbine hub, a directly coupled clutch for selectively coupling to said outer circumferential part of said front cover with said turbine hub, hydraulic piston means disposed in a groove provided in an outer circumferential portion of said front cover main body for engaging and disengaging said friction directly coupled clutch, an output clutch disposed axially between an inner circumferential part of said turbine and an inner circumferential part of said front cover main body in a space filled with working fluid radially inside of said directly coupled clutch, said output clutch being composed of a multi-disc friction clutch and having an output unit and an input unit, an output disc of said directly coupled clutch and said turbine hub being linked to said input unit of said output clutch, and said output unit of said output clutch being linked to an output shaft.

5,020,647
LOCK-UP DAMPER DEVICE FOR TORQUE CONVERTER

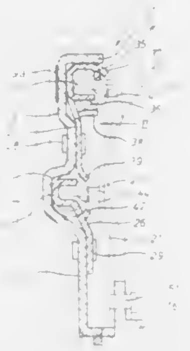
Shinji Fujimoto, and Yukiynshi Takada, both of Neyagawa, Japan, assignors to Kabushiki Kaisha Daikin Seisakushn, Osaka, Japan

Filed Mar. 16, 1990, Ser. No. 494,375

Claims priority, application Japan, Mar. 20, 1989, 1-68188; Mar. 20, 1989, 1-68189

Int. Cl.^{5} F16D *3/14*

U.S. Cl. 192—3.29 3 Claims



1. A lock-up damper device for a torque converter, in which a piston clutch plate, slidable in an axial direction and equipped with a friction facing for pressing on a front cover, and a driven plate, interconnected to a turbine, are installed between the front cover and the turbine, a drive plate, secured to the piston clutch plate, and the driven plate are coupled, through plural torsion springs, longitudinal of said springs and in circumferential direction of said plates, in such a manner that said driven plate and said drive plate are rotatable relative to each other, said damper device having outer and inner peripheral parts, torsion springs are installed on both said outer and said inner peripheral parts of said damper device; characterized by that said torsion springs; installed on said inner peripheral part of said damper device are at at least their radial outer periphery, radial inner periphery and side portion between said radial outer and inner peripheries in contact with a wall of a concave portion formed on said piston clutch plate, and said torsion springs installed on said outer and inner peripheral parts of said damper disc are held in place by said drive plate.

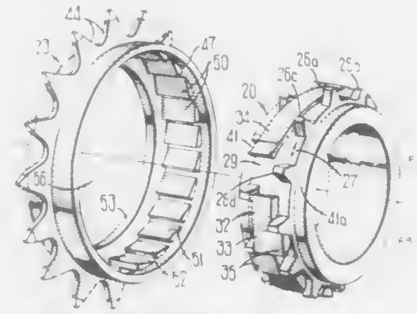
5,020,648
RATCHET ASSEMBLY

Mike Bush, Nottingham, England; Norman Hatton, Marietta, Ga., and Keith Mellor, deceased, late of Nottingham, England by Bernadette L. Mellor, administratrix , assignors to Reliable Plastics Engineering Company, Marietta, Ga.

Filed Nov. 14, 1988, Ser. No. 270,148

Int. Cl.^{5} F16D *11/00, 13/00*

U.S. Cl. 192—46 6 Claims



4. A ratchet assembly comprising:

an outer wheel having ratchet teeth on an inner surface;

an inner wheel coaxial with the outer wheel, said inner wheel having a plurality of radially extending studs on the outer surface of said inner wheel;

a C-shaped ring defining a plurality of radial apertures on the ring to receive the studs and having at least one angularly extending pawl,

whereby the pawl rides freely over the inner surface when the inner wheel rotates in a first direction and the pawl engages with the ratchet teeth when the inner wheel rotates in a second reverse direction.

5,020,649
CLUTCH OR BRAKE INCHING ARRANGEMENT

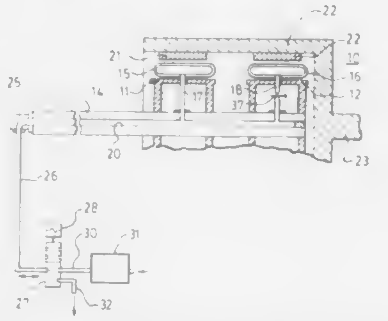
Peter D. Eastcott, Peterborough, Canada, assignor to General Electric Canada Inc., Mississauga, Canada

Filed Mar. 28, 1990, Ser. No. 500,620

Claims priority, application Canada, Aug. 17, 1989, 608650

Int. Cl.^{5} F16D *25/04*

U.S. Cl. 192—48.1 5 Claims



1. In a clutch for use in an inching arrangement in a load sharing drive system comprising at least a first and a second clutch unit mounted on a driving shaft, each clutch unit having a respective first and second inflatable, flexible tube for pressing respective first and second friction shoes outwardly against a drum mounted on a driven shaft, said driving shaft having therein a central bore connected to a supply of fluid under pressure,

a first and a second air line each communicating with said bore and with a respective one of said first and second tubes, and

a restriction in said second air line for restricting the flow of said fluid into and out of said second tube, whereby the pressure in said second tube falls only slightly in response to a pressure reduction in said bore for a short time interval, said pressure reduction for said short time interval causing the pressure in said first tube to fall sufficiently to permit the clutch to slip.

5,020,650
TORQUE LIMITING CLUTCH HAVING SET TORQUE RANGE OVER ITS USEFUL LIFE

David C. Heidenreich, Akron, and Keith A. Nichols, North Canton, both of Ohio, assignors to Power Transmission Technology, Sharon Center, Ohio

Filed May 3, 1990, Ser. No. 518,661

Int. Cl.^{5} F16D *7/02*

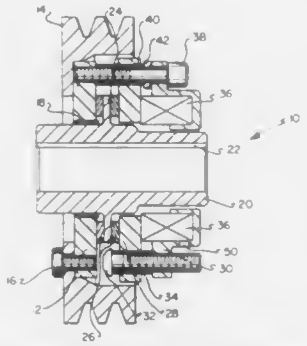
U.S. Cl. 192—56 R 11 Claims

1. A torque limiting clutch, comprising:

first and second coaxial hubs, said first hub being received upon said second hub;

a friction member interposed between said first and second hubs; and

a force generating member forcefully engaging said first and second hubs at said friction member, wherein said force generating member comprises a pressure plate interconnected with a cover member and a plurality of spring means interposed between said pressure plate and cover member for urging said pressure plate and cover member apart, said pressure plate and cover member being interconnected by first bolts threaded to said cover member and slidingly receiving said pressure plate, each said first bolt passing through a first sleeve passing through said pressure plate, said first sleeve and first bolt establishing a maximum separation between said pressure plate and said spring cover and further establishing a minimum spring force on said pressure plate by precompression of said spring means.



5,020,651
LAUNDRY CHUTE

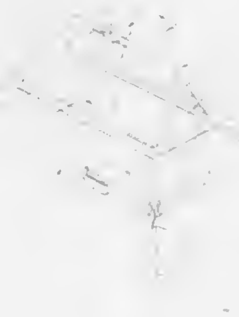
Stephen Lockett, 2422 Goodison Ave., Mississauga, Canada L5B 2A1

Continuation-in-part of Ser. No. 238,794, Aug. 31, 1988, abandoned. This application Jan. 18, 1990, Ser. No. 466,909

Claims priority, application Canada, Jun. 22, 1988, 570164

Int. Cl.^{5} B65G *11/10*

U.S. Cl. 193—25 R 14 Claims



1. A chute for use in an opening in a planar partition, comprising:

a tubular frame, adapted to be securely inserted into said opening, having a peripheral wall defining an inlet in communication with one side of the partition, and an outlet extending from the other side of the partition;

a peripheral flange outwardly directed from said peripheral wall adjacent to said inlet, said flange contacting said partition to prevent said frame from passing through the partition;

a gripping projection extending transversely around said peripheral wall and spaced from said partition other side;

a flexible tube having an open end portion adapted to be slid onto said frame over said gripping projection;

attaching means located on said flexible tube end portion for bringing said flexible tube end portion into engagement with said gripping projection to releasably attach the tube

VOL
1127
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to the frame, said attaching means being a sleeve formed in the open end portion of said tube and a flexible attaching member threaded therethrough; and

planar closure means, movably connected to said frame proximate said inlet, for selectively covering and exposing said inlet.

5,020,652

ARTICLE DISPENSING APPARATUS HAVING INTEGRAL COIN RECEIVING CASE AND ARTICLE DISCHARGE MECHANISM

Ryohei Seiriki, 2107, Tochi-3-chome, Minato-ku, Nagoya, Japan

Filed Mar. 6, 1989, Ser. No. 319,569

Claims priority, application Japan, Mar. 15, 1988, 63-34244[U]

Int. Cl.^{5} G07F *5/04, 11/22*

U.S. Cl. 194—229 **3 Claims**

3. An article-dispenser comprising:

a main body including front and rear walls, upper and lower walls and side walls,

a stacking storage chamber disposed in said main body, said chamber receiving articles stacked therein,

a slot for coin mounted on said upper wall,

a push button mounted slidably on said front wall, said push button being biased in a side of said front wall by a spring.

5,020,653

DEVICE FOR DISCRIMINATING BETWEEN COINS

Kazuo Shimizu, Isesaki, Japan, assignor to Sanden Corporation, Japan

Filed Mar. 6, 1989, Ser. No. 319,292

Claims priority, application Japan, Mar. 4, 1988, 63-49874

Int. Cl.^{5} G07D *5/08*

U.S. Cl. 194—317 **12 Claims**

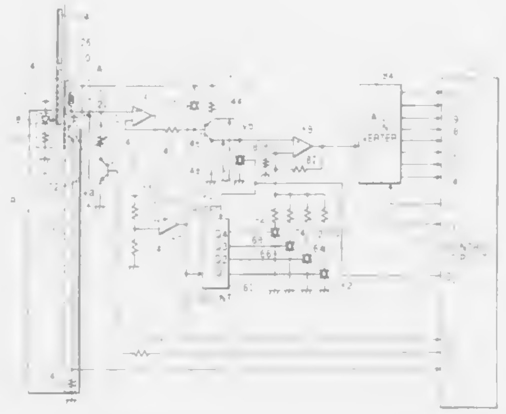
1. A coin discriminating device, said device comprising:

coin pressure detecting means for sensing the presence of a coin and providing a corresponding presence signal;

coin sensing means for generating sensing data corresponding to the type of coin;

control means coupled to said coin presence detecting means and to said coin sensing means for controlling the operation of said coin presence detecting means and said coin sensing means, said control means comparing said sensing data with stored data in order to discriminate a first coin from a second coin; and

an impedance matching device and an integrating device, said sensing data being coupled to a first input of said impedance matching device and the output of said integrating device being coupled to a second input of said impedance matching device, wherein said sensing data is in the form of a series of damped voltage oscillations, the amplitude and frequency of said oscillations being unique for each particular type of coin.



5,020,654

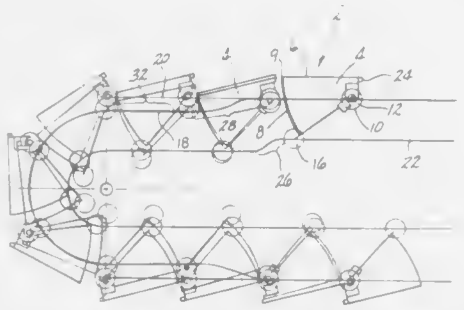
CURVED ESCALATOR STEP CHAIN TURNAROUND ZONE

Frank Sansevero, West Hartford, Conn.; Klaus Seehausen, Niedernwohren, Fed. Rep. of Germany, and James A. Rivera, Bristol, Conn., assignors to Otis Elevator Company, Farmington, Conn.

Filed Aug. 31, 1990, Ser. No. 576,535

Int. Cl.^{5} B66B *21/02*

U.S. Cl. 198—328 **6 Claims**



1. An escalator assembly having a series of steps which follow a path of travel which is curved in plan view and which includes a passenger conveying upper portion, and a return portion which underlies said passenger conveying portion, said steps being connected together by radially inner and outer step chains entrained on respective inner and outer sprockets at opposite ends of the escalator and operable to transfer said steps from said passenger conveying to said return portions of said path of travel, and reverse, said inner sprocket having a smaller radius than said outer sprocket; and said escalator assembly including inner and outer tracks which carry inner and outer step rollers journaled on said steps, said inner track defining a dip zone adjacent to said inner sprocket where said steps are shifted from a horizontal position to a tilted position preparatory to engaging said sprockets, said inner track dip zone having a smooth S-shaped curve when viewed in elevation.

5,020,655

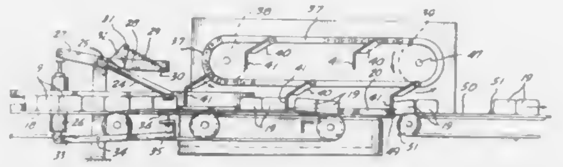
ARTICLE GROUP-SEGREGATING APPARATUS AND METHOD

Michael Cruver, Port Townsend, Wash., assignor to Formost Packaging Machines, Inc., Woodinville, Wash.

Continuation-in-part of Ser. No. 256,899, Oct. 13, 1988. This application Aug. 17, 1989, Ser. No. 395,381

Int. Cl.^{5} B65G *47/26*

U.S. Cl. 198—419.3 **3 Claims**



1. In apparatus for segregating groups of articles from a continuous line of such articles including an orbiting flight movable along a substantially horizontal path for controlling movement of a group of articles behind it, article infeed means for moving articles in a row toward such orbiting flight and crowding articles in such row against the back side of such flight to form a group and clamping means for arresting movement of an article rearwardly of such group of articles having opposed jaws engageable with opposite sides of such an article, the improvement comprising drive means for moving the jaws toward each other, lost motion means engaged between said driven means and at least one of the jaws for enabling movement of said drive means to continue after approach movement of the jaws has been stopped by engagement with an article therebetween, and said lost motion means including spring means for pressing such one jaw against the article engaged between the jaws while movement of said drive means is continued after relative approach movement of the jaws has been stopped.

5,020,656

FLAT TOP CONVEYOR

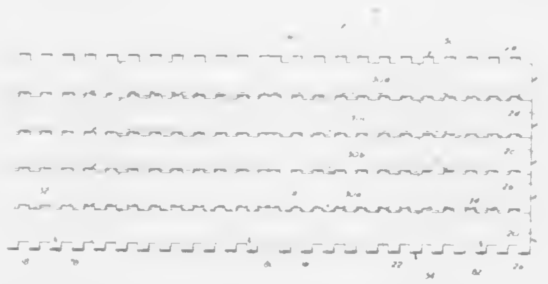
William G. Faulkner, 6608 Edgebrooke, Oklahoma City, Okla. 73132

Continuation-in-part of Ser. No. 220,601, Jul. 18, 1988, Pat. No. 4,972,942. This application Jun. 14, 1989, Ser. No. 366,773

The portion of the term of this patent subsequent to Nov. 27, 2007, has been disclaimed.

Int. Cl.^{5} B65G *45/10, 23/06, 17/06*

U.S. Cl. 198—494 **21 Claims**



1. A conveyor belt wherein the conveyor belt moves over a support surface at least a portion of the time during the operation of the conveyor belt and wherein the conveyor belt is adapted to clean material deposited from the support surface while the conveyor belt is moving over the support surface, comprising:

a plurality of link assemblies, each link assembly having a forward end, a rearward side, an upper surface, a lower surface, a first side, and a second side, the forward end of each link assembly being connectable to the rearward side of one other link assembly for forming the conveyor belt, a plurality of spaced apart support surface ribs being formed on the lower surface of each link assembly, each support surface rib being spaced a distance from adjacent support surface ribs and each support surface rib extending at an angle generally between the forward end and the rearward end, the support surface ribs engaging the support surface as the conveyor belt is moved over the support surface whereby material on the support surface tends to be moved from the support surface for tending to clean material from the support surface; means for connecting the forward end of each link assembly to the rearward end of one other link assembly for forming the conveyor belt.

5,020,657

DRIVE ROLLER UNIT

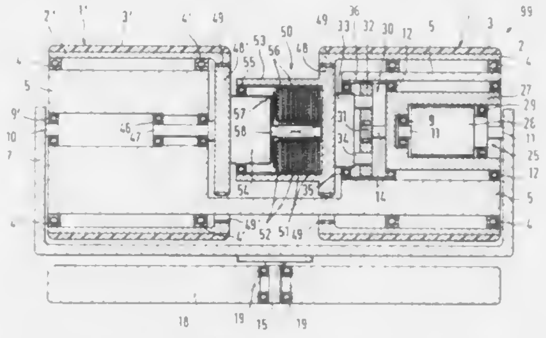
Thomas Huber, Iffeldorf, Fed. Rep. of Germany, assignor to Bavaria Cargo Technologie GmbH, Fed. Rep. of Germany

Filed May 30, 1990, Ser. No. 530,511

Claims priority, application European Pat. Off., Feb. 21, 1990, 90103340

Int. Cl.^{5} B65G *13/02*

U.S. Cl. 198—782 **10 Claims**



1. A drive roller unit (**99**) for driving an article (**100**) on a conveyor track, comprising:

first and second drive rollers (**1, 1'**) arranged with their axes of rotation substantially transversely with respect to the direction of drive of the article (**100**) to be driven and in juxtaposed relationship in their axial direction, the drive rollers (**1, 1'**) having a drive position in which they are in engagement with the underside of the article (**100**) to be driven;

an electric motor means (**25**);

a transmission means (**30, 48, 49, 48', 49'**) including a first transmission wheel (**48**) adapted to be driven by the electric motor means (**25**) and drivingly connected to the first drive roller (**1**) to drive same in rotation, and a second transmission wheel (**48'**) drivingly connected to the second drive roller (**1'**) to drive same in rotation;

a slipping clutch means (**50**) operatively coupling the second transmission wheel (**48'**) to the first transmission wheel (**48**) for the selective transmission of drive to the second transmission wheel, the clutch torque of the slipping clutch means (**50**) being such that the drive rollers (**1, 1'**) rotate in the same direction as long as the driven article (**100**) can move substantially unimpededly beyond the drive roller unit (**99**); and

a holding means (**7**) which carries the drive rollers (**1, 1'**) and which is mounted rotatably about a vertical axis (**15**) with respect to a base structure (**18**) of the conveyor track with which the drive roller unit (**99**) is adapted to be used.

VOL 1127 ISS 1 JE 4 1991 UMI

5,020,658
CONNECTION ARRANGEMENT TO PROVIDE IN ENDLESS BAND

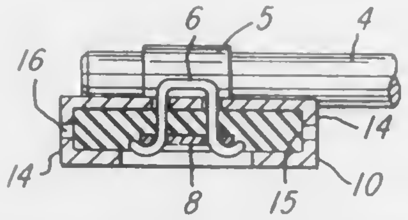
Arnold Jäger, Gehrbergsweg 6, D-3164 Burgdorf, and Claudius Jäer, Burgdorf, both of Fed. Rep. of Germany, assignors to Arnold Jäger, Burgdorf, Fed. Rep. of Germany

Filed Feb. 9, 1990, Ser. No. 478,094

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1989, 3903921

Int. Cl.^{5} B65G *15/30*

U.S. Cl. 198—844.2 15 Claims



1. In a connection arrangement to provide an endless, inextensible, flexible, flat band that is essentially made of rubber or rubber-like material and reinforcing inserts, especially a band for a screening rod belt, especially for an agricultural harvester, whereby band ends are securely disposed between legs of essentially U-shaped fittings of metal or the like, with said fittings being held together by a transverse pin, and whereby rivet-like securement elements extend through said legs of said fittings and through said band ends, the improvement wherein:

said legs of said fittings have lateral edges that extend in the direction of rotation of said band, with said lateral edges of said legs being provided with portions that are bent toward one another and against which a large portion of side surfaces of said band ends that are held between said legs rest; and

said securement elements are driven through said band ends, which have no holes for receiving same, accompanied by displacement of material of said band ends.

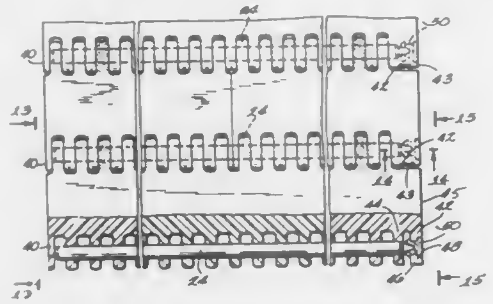
5,020,659
CONVEYOR CHAIN ASSEMBLY

William G. Hodlewsky, Greendale, Wis., assignor to Rexnord Corporation, Milwaukee, Wis.

Continuation of Ser. No. 225,898, Jul. 25, 1988, abandoned, which is a continuation of Ser. No. 38,845, Apr. 15, 1987, abandoned. This application Feb. 21, 1990, Ser. No. 485,775

Int. Cl.^{5} B65G *17/06*

U.S. Cl. 198—853 9 Claims



1. A conveyor chain assembly comprising

a multiplicity of rows of chain modules, each of said rows of chain modules including a plurality of chain modules, and each chain module having opposite ends and a plurality of link ends projecting forwardly and rearwardly from the module with respect to the direction of movement of the conveyor chain, and at least one of the chain modules of a first one of said rows including link ends intermeshing with opposed link ends of at least two chain modules in the adjacent row,

a pivot pin passing through the intermeshing link ends between the rows, the pivot pin having opposite ends,

each of the multiplicity of rows of chain modules having opposite ends, one end of each of the rows being formed by a chain module including a solid link end, the solid link end including a surface portion positioned in opposed facing relation with respect to one end of the pivot pin and adapted to engage the one end of the pivot pin to prevent movement of the pivot pin out of the intermeshing link ends, and the other end of each of the rows of modules being formed by a module having a plugged link end, said plugged link end having a hole therethrough in alignment with said pivot pin, and

a plug, at least a portion of said plug being housed in said hole in said plugged link end to prevent axial movement of said pivot pin and retain said pivot pin in its operative position, said plug being resiliently engaged in said hole in said plugged link end

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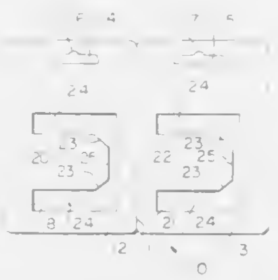
5,020,660
DISPLAY HANGER PACKAGE FOR ROLL

Arnold J. Akerley, Westborough, Mass., and W. Paul Manning, Jr., Bowling Green, Ky., assignors to The Kendall Company, Lexington, Mass.

Filed Mar. 26, 1990, Ser. No. 498,653

Int. Cl.^{5} B65D *85/671*

U.S. Cl. 206—45.14 5 Claims



1. A one-piece blank for forming a display hanger for a roll of tape comprising a flat sheet, said sheet having a fold line to thereby divide the blank into essentially a first half and a second half, said first half having a first U-shaped aperture, thereby defining a first tongue, said second half having a second U-shaped aperture, thereby defining a second tongue, said U-shaped apertures and tongues each facing in the same direction when said first and second half are not folded and in opposite directions when said first half and second half are folded, each of said U-shaped apertures comprising an apex and two legs, the apices when measured top to bottom, of each of said U-shaped apertures being of smaller dimension than said respective legs when measured left to right of said U-shaped apertures, said U-shape apertures being in registry when said blank is folded along said fold line to thereby define in the folded blank the space apertures

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5,020,661
CARRIER STOCK WITH TEAR-OPEN TABS

Leslie S. Marco, Bloomingdale, Ill., assignor to Illinois Tool Works Inc., Glenview, Ill.

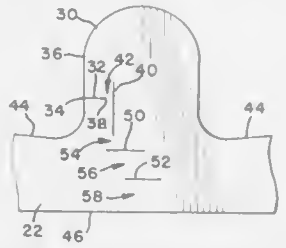
Filed Jun. 14, 1990, Ser. No. 537,674

Int. Cl.^{5} B65D *71/00*

U.S. Cl. 206—150 17 Claims

1. Carrier stock for machine application to substantially identical containers, said stock being formed from a single sheet of resilient polymeric material and being severable to form individual carriers with separate apertures to receive the individual containers, said stock being formed for each individual carrier with integrally joined band segments defining the separate apertures, said segments including outer segments extending in a generally longitudinal direction when said stock is unstressed, each outer segment being formed with a tab extending in a generally transverse direction from such outer segment when said stock is unstressed, each tab being slitted therein so as to define a first slit, which extends in a generally longitudinal direction when said stock is unstressed, and each tab being slitted so as to define a second slit, which extends in a generally transverse direction when said stock is unstressed

12. Carrier stock for machine application to substantially identical containers, said stock being formed from a single sheet of resilient polymeric material and being severable to form individual carriers with separate apertures to receive the individual containers, said stock being formed for each individual carrier with integrally joined band segments defining the separate apertures, said segments including outer segments extending in a generally longitudinal direction when said stock is unstressed, each outer segment being formed with a tab extending in a generally transverse direction from such outer segment when said stock is unstressed, each tab extending into one of the separate apertures when said stock is unstressed, each tab having an outer edge, each outer segment having an outer edge and an inner edge with the inner edge merging with the outer edge of the tab extending from such outer segment, each tab and each outer segment being slitted therein so as to define a series of frangible bridges between the outer edge of such tab and the outer edge of such outer segment.



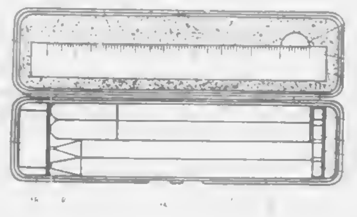
5,020,662
WRITING-UTENSIL PACKED KIT ASSEMBLY

Masaaki Aida, Tokyo, Japan, assignor to Midori, Co. Ltd., Tokyo, Japan

Filed Dec. 9, 1988, Ser. No. 283,264

Int. Cl.^{5} A45C *11/34*

U.S. Cl. 206—214 3 Claims



1. A writing-utensil packed kit assembly comprising a body hingedly joined to a lid member so as to be openable,

said body having two pairs of opposed, parallel, substantially straight sides, said sides meeting in rounded corners.

said lid member being congruent with said body,

said lid member being laid with a mat formed of a foam material, said mat having an opening adapted to releasably receive a miniature ruler and having a fingertip-inserting hole adjacent said opening, said mat including a miniature ruler received in said opening,

said body having a first straight, transverse partition defining therein a first portion including two of said rounder corners and including a miniature eraser received in said first portion, and a second straight, transverse partition, parallel to said first partition, defining a second, rectangular portion, and a plurality of miniature writing utensils disposed in said second portion, said utensils each being of a length equal to the length of said second portion and a combined width equal to the width of said second portion, and

mating female and male latch members formed on the peripheral edges of said body and said lid member.

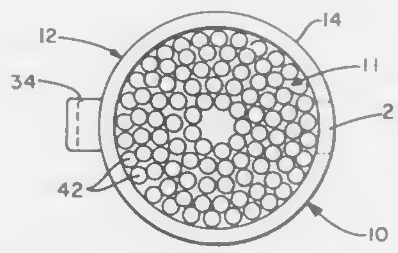
5,020,663
COIL DISPENSER FOR COILED NAILS

David Dallas, Box 107, Mineral City, Ohio 44656, and David R. Watkins, 5906 Louisville St., Louisville, Ohio 44641

Filed Mar. 27, 1990, Ser. No. 499,781

Int. Cl.^{5} B65D *85/24*

U.S. Cl. 206—338 26 Claims



1. A portable dispenser for a plurality of like articles stacked one on top of the other, said dispenser comprising:

(a) a generally cup-shaped open top container comprising a thin, essentially rigid, upright, generally tubular side casing member having parallel upper and lower edges, and a bottom end closure member integrally joined to said side casing member at the lower edge thereof;

(b) a top end closure member removably secured to said dispenser member, said top end closure and said dispenser member together forming an enclosure for said articles;

(c) a cutout in said side casing member for affording access to said articles, said cutout extending from one of said edges toward the other whereby said other edge forms a closed curve extending around the entire perimeter of the adjacent end closure member, the width of said cutout, as measured along the perimeter of the adjacent closure member, being not more than one-half of said perimeter; and

(d) means on the exterior of said container for affixing said dispenser to an article of clothing of a user.

23. A package comprising:

(a) A portable dispenser for a plurality of like coils of nails stacked one on top of the other, said dispenser comprising:

  (1) a generally cup-shaped open top container comprising a thin, essentially rigid, upright, generally tubular side casing member having parallel upper and lower edges, and a bottom end closure member integrally joined to said side casing member at the lower edge thereof;

  (2) a top end closure member removably secured to said dispenser member, said top end closure and said dispenser member together forming an enclosure for said articles; and

  (3) a cutout in said side casing member for affording access to said articles, said cutout extending from one of said edges toward the other whereby said other edge forms a closed curve extending around the entire perimeter of the adjacent end closure member, the width of said cutout, as measured along the perimeter of the adjacent closure member, being not more than one-half of said perimeter; and

(b) a plurality of coils of nails of like size and shape contained therein and stacked one on top of the other, each coil comprising a plurality of nails oriented in the same direc-

VOL
1127
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4
1991
UMI

tion and spiral wound unitizing means adhered to each of said nails and extending in a direction transverse to that of the nails.

25 A disposable package comprising:

(a) a portable dispenser for a plurality of like articles stacked one on top of the other, said dispenser being in the shape of a right circular cylinder and comprising
  (1) a generally cup shaped open top container comprising a thin, essentially rigid, upright, generally tubular cardboard side casing member having parallel upper and lower edges, and a bottom end closure member integrally joined to said side casing member at the lower edge thereof,
  (2) a top end closure member removably secured to said dispenser member, said top end closure member and said dispenser member together forming an enclosure for said articles;
  (3) a cutout in said side casing member for affording access to said articles, said cutout extending from one of said edges toward the other whereby said other edge forms a closed curve extending around the entire perimeter of the adjacent enclosure member, the width of said cutout, as measured along the perimeter of the adjacent closure member, being not more than one half of said perimeter, and
  (4) a handle affixed to the exterior of said dispenser, said handle and said cutout being diametrically opposite to each other; and
(b) a plurality of articles of like size and shape contained therein.

5,020,664

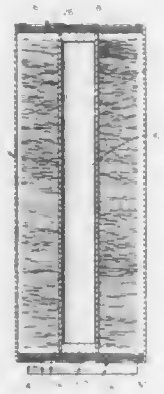
ROTARY TUBE BROOM PACKAGING

John R. Hughes, Marysville, and Mark S. Sutherin, Mt. Victory, both of Ohio, assignors to United Rotary Brush Corporation, Marysville, Ohio

Filed Oct. 29, 1990, Ser. No. 604,189

Int. Cl.⁵ B65D *83/10*

U.S. Cl. 206—361 **9 Claims**



1 A package for a rotary tube broom having a central tube support and flexible bristles extending radially therefrom to form a broom of substantially cylindrical form and with the tube having exposed ends, a protective carton surrounding the broom and having closures at opposite ends thereof, said closures having inwardly projecting centering means which engage with the exposed ends of said tube to center the broom in the carton and to prevent axial movement thereof.

5,020,665

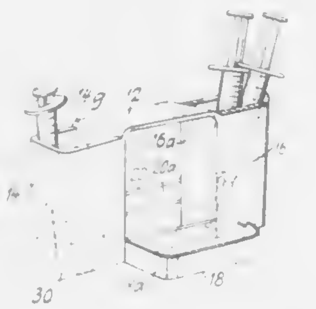
STORAGE/CARRYING DEVICES FOR TRANSPORT OF HYPODERMIC NEEDLE/SYRINGE ASSEMBLIES TO BEDSIDE USE AND ULTIMATE DISPOSAL

John Bruno, 77-83 Second Ave., Paterson, N.J. 07514

Division of Ser. No. 214,332, Jul. 1, 1988. This application Mar. 21, 1990, Ser. No. 496,857

Int. Cl.⁵ B65D *83/10*

U.S. Cl. 206—366 **29 Claims**



1 A hand-holdable, storage/carrying device for needle syringe assemblies, comprising.
  a carrying handle;
  a first transport well, said first transport well attached along an upstanding sidewall portion thereof to one end of said carrying handle, said first transport well provided with a needle engaging element insertable therewithin, said needle engaging element being formed from a foam-type material adapted to receive and engage a plurality of intravenous-type needles insertable thereinto for transport to disposal;
  a second transport well, said second transport well being attached along an upstanding sidewall portion thereof to the other end of said carrying handle in generally opposed placement to said first transport well; and
  a pair of carrying trays disposed on opposite sides of said carrying handle, each of said pair of carrying trays being attached to both said first and second transport wells

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5,020,666

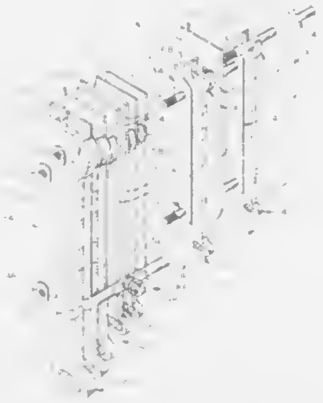
HOLDER FOR OPEN END WRENCHES

Bernard T. Barlean, 504 F. Main, Everson, Wash. 98247

Filed Mar. 2, 1990, Ser. No. 488,727

Int. Cl.⁵ B65D *85/20;* **A47F** *7/00*

U.S. Cl. 206—376 **5 Claims**



1 A tool holder for storing wrenches which have an elongated shank and first and second spaced apart jaws at one end of said shank, said tool holder being vertically orientable and, thus oriented, having an upper end, a lower end, a front, sides and a back, the tool holder in a vertical orientation comprising

  a series of tool rests disposed in side-by-side relationship, each of said tool rests extending from near the upper end to the lower end of the holder and having one edge at the back of the tool holder, an opposed second, stop-providing edge for the shank of a wrench stored in said holder, a lower end and a beveled upper end which provides a seat for a jaw of a wrench installed in the holder;
  partitions sandwiching adjacent tool rests, a said partition and a side wall component sandwiching each of the outermost tool rests, said partitions and side wall components having portions lying beyond the second edges of the tool rests at the front of the tool so that said partitions are capable of embracing the shanks of wrenches stored in said tool holder and keeping said wrenches from shifting from side to side in said holder; and
  a pin extending from side to side through the tool holder, said pin being spaced above the beveled upper ends of said tool rests so as to engage wrench jaws seated on said tool rests and so trap said jaws on said rests as to keep wrenches stored in the tool holder from dropping out of said holder.

5,020,667

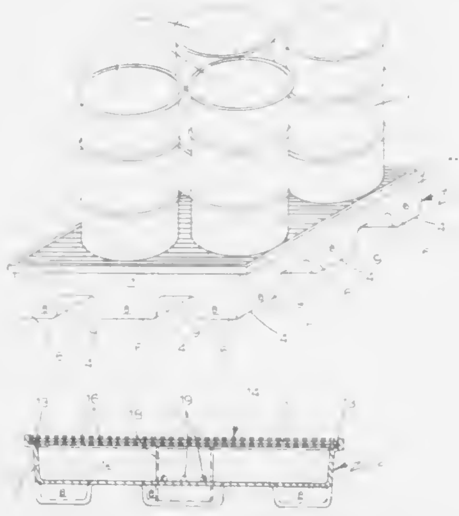
PORTABLE HAZARDOUS WASTE PALLET STRUCTURE

Harry Bush, 8330 Manchester Rd., St. Louis, Mo. 63144

Filed Sep. 5, 1989, Ser. No. 402,662

Int. Cl.⁵ B65D *19/00*

U.S. Cl. 206—386 **7 Claims**



3. A pallet for containing a hazardous spill comprising:
  a confined chamber means including a corrosion-resistant, non-porous bottom wall member and at least one side wall member, said side wall member extending generally upwardly from said bottom wall member and shaped so that said chamber means includes a plurality of subchambers with at least one set of access passages extending there between to permit insertion of a pallet lifting means, said side wall member further defining a upper peripheral skirt, said skirt being shaped to include a support ledge;
  a corrosion-resistant, porous, removable container support member mounted to said chamber means, said support member being sized so that the peripheral edge thereof rests on said support ledge; and
  at least one under support mounted in said chamber means and extending between said bottom wall and said container support member, said under support defining an internal volume, said under support including at least one aperture therein to allow spill material to flow between said internal volume and said confined chamber means.

5,020,668

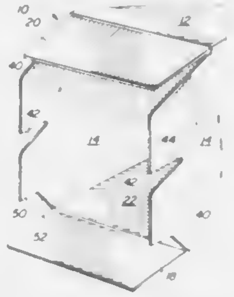
SLEEVE-TYPE CARRIER WITH INTEGRAL ALIGNMENT FEATURE

Richard L. Schuster, Monroe, La., assignor to Manville Corporation, Denver, Colo.

Filed Oct. 5, 1989, Ser. No. 417,343

Int. Cl.⁵ B65D *5/02*

U.S. Cl. 206—427 **12 Claims**



1. In a sleeve-type article carrier adapted to carry articles having relatively narrow upper portions and relatively wide lower portions, wherein the carrier comprises a relatively short top panel, a relatively long bottom panel, side panels foldably connected to the top and bottom panels, the side panels having lower end edge portions and upper end edge portions extending at an angle to each other and intersecting each other so that the distance between the lower end edge portions of a side panel is greater than the distance between the upper end edge portions thereof, an improved end panel structure connecting the top, bottom and side panels at each end of the carrier, comprising:
  a dust flap connected to the angled upper and lower end edge portions of each side panel along a correspondingly angled fold line;
  an upper end flap foldably connected to the bottom panel and adhered to the adjacent dust flaps,
  each dust flap having an upper edge, a lower edge and an end edge opposite said angled fold line; and
  the end edge of each dust flap containing a cutout extending toward the angled fold line and terminating at a point spaced from the intersection of the upper and lower edge portions of the associated side panel;
  the portion of the dust flap between said cutout termination point and said intersection being sufficiently wide so as to strengthen the side panels against a vertical force tending to bow the side panels but sufficiently narrow so as to permit the dust flap to be folded in about said angled fold line.

5,020,669

PHOTOGRAPHIC FILM PACKAGE

Isao Nakagoshi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Continuation of Ser. No. 414,310, Sep. 29, 1989, abandoned. This application Aug. 3, 1990, Ser. No. 563,666

Claims priority, application Japan, Oct. 17, 1988, 63-134470[U]

Int. Cl.⁵ B65D *73/00*

U.S. Cl. 206—466 **2 Claims**

1 A photographic film package consisting essentially of a header paper mount formed in a L-shape so as to have a back plate with a transversely extending placing part, at least one photographic film placed on said placing part, and a shrinked film integrally wrapping said at least one photographic film and the paper mount, at least one side edge of the paper mount provided with an engaging recess for the shrinked film around an upper edge of the photographic film and a perforation line provided in the shrinked film along a rear side of the package.

VOL
1127
ISS
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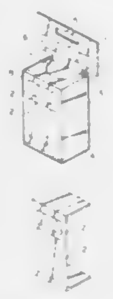
1991
UMI

further including a substantially U-shaped plate adapted to receive advertising indicia, said plate consisting of a first panel

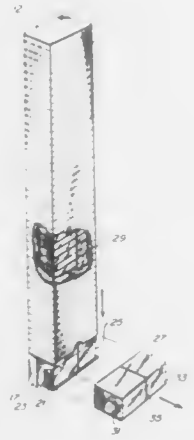


having two transversely extending end panels overlying opposite sides of said photographic film.

5,020,670

SHIPPING CARTON AND DIPSENSER FOR SPONGE ARTICLES

Peter H. Bedford, 3817 Mistral Ave., Huntington Beach, Calif. 92649, assignor to Peter H. Bedford, Huntington Beach, Calif.
Filed Aug. 10, 1990, Ser. No. 565,942
Int. Cl.^{5} B65D *21/00*
U.S. Cl. 206—499 6 Claims

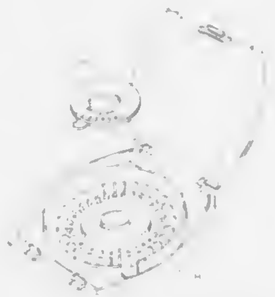


1. A combined shipping and dispenser container for sponge articles of a size capable of being held in a human hand, said container comprising:
- a bottom container having length and width dimensions sized to the length and width dimensions of the sponge articles to be contained therein, said bottom container having an open top and a closed bottom, with a slot, through which one sponge article can fit, cut into one side at its closed bottom;
- a top container sized slightly larger in length, width and height than said bottom container so as to slidably fit over said bottom container, said top container having a closed top and a hinged bottom flap that fits over the bottom of said bottom container when assembled for shipping; and
- a plurality of sponge articles stacked one on top of the other in said bottom container and compressed when the top container is sealed to said bottom container.

5,020,671

METHOD AND APPARATUS FOR OPTIMUM SELF-EXAMINATION OF BREASTS BY USERS OF BIRTH CONTROL PILLS

Raleigh A. Smith, 211 Medical Dr., Ste. 3, and Alfred Kager, Llano Route, Box 77-A, both of Fredericksburg, Tex. 78624-4469
Filed Sep. 19, 1989, Ser. No. 409,405
Int. Cl.^{5} B65D *75/54*
U.S. Cl. 206—534 9 Claims



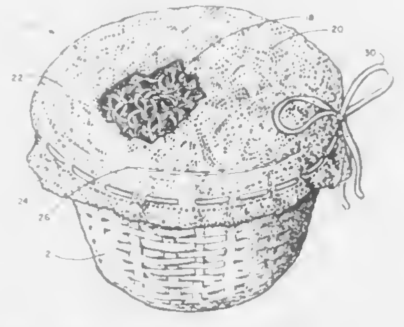
1 A method for women taking female hormone supplements to regulate monthly breast self-examinations, which comprises:
- providing a female hormone supplement monthly dispenser having:
  - a plurality of hormone supplement pills, and imprinted messages on said female hormone supplement dispenser immediately adjacent only a portion of said plurality of hormone supplement pills; and
- prompting the female taking said hormone supplement pills with said messages to self-examine her breasts on days designated by said imprinted messages.

9. A female hormone supplement monthly dispenser, comprising:
- a plurality of hormone supplement pills; and
- a labeling means inserted into said female hormone supplement dispensers, comprising:
  - a panel means imprinted with messages, said imprinted messages prompting the female taking said hormone supplement pills to self-examine her breasts on days designated by said imprinted messages, and wherein
  - said panel means is superimposed over said female hormone supplement dispenser such that said imprinted messages are immediately adjacent only a portion of said hormone supplement pills.

5,020,672

BASKET GRASS CONTAINER

Lucille M. Watts, 11 Ray Way, Las Vegas, Nev. 89124
Filed Jan. 26, 1990, Ser. No. 470,891
Int. Cl.^{5} B65D *85/52*
U.S. Cl. 206—575 14 Claims



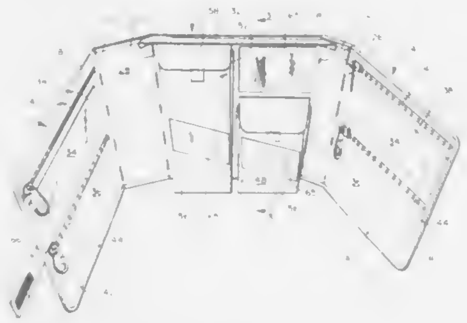
1. A container for holding grass strips for use in a basket comprising:
- (a) a first mesh sheet,

- (b) a second mesh sheet,
- (c) means for joining the periphery of the first mesh sheet against the periphery of the second mesh sheet to form an internal cavity therebetween, said first mesh sheet directly overlying the second mesh sheet beyond the joining means to constitute a marginal edge spaced from said joining means and said cavity,
- (d) a plurality of grass strips contained in the internal cavity, and
- (e) means interwoven through interstices in the mesh sheets and extending around the peripheral edges of the mesh sheets for adjusting the size of the internal cavity whereby the container can be made either flatter or thicker as desired.

5,020,673

CARRYING CASE FOR PERSONAL ITEMS

David R. Adams, 3735 Millcrest Rd., Salt Lake City, Utah 84109
Filed Mar. 15, 1990, Ser. No. 495,737
Int. Cl.^{5} B65D *69/00*
U.S. Cl. 206—581 12 Claims



1 A carrying case for personal items comprising:
- a generally planar, semi-rigid central member including a sheet of stiffening plastic and having a pair of opposing ends;
- two generally planar, semi-rigid outer members, each including a sheet of stiffening plastic, and each hingedly connected to an opposing end of said central member so that said members may be folded to overlap one another in side-by-side configuration to form a folded, relatively compact case during transportation and storage and so that said outer members can be unfolded to extend angularly outwardly from the ends of the central member to allow access to all members and support said members in an upright position on a surface; and
- pocket means associated with said members for receiving and holding personal items, said pocket means being properly oriented for access thereto when said members are in upright position.

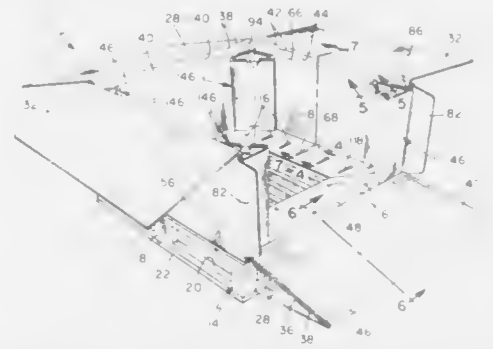
5,020,674

COLLAPSIBLE CONTAINER AND PALLET ASSEMBLY

Stanley R. Thorud, Plymouth, and LeRoy Miller, Rogers, both of Minn., assignors to Liberty Diversified Industries, New Hope, Minn.
Filed Jan. 26, 1990, Ser. No. 470,942
Int. Cl.^{5} B65D *19/20*
U.S. Cl. 206—600 54 Claims

1 A collapsible container and pallet assembly comprising:
- a pallet, said pallet having a pair of opposing sides and a pair of opposing ends;
- a pair of side walls attached to and hingedly mounted on said pallet, one of said pair of side walls being positioned adjacent to each of said opposing sides of said pallet; and
- a pair of end walls attached to and hingedly mounted on said pallet, one of said pair of end walls being positioned adjacent to each of said opposing ends of said pallet, said side walls and said end walls being pivotally movable to and securable in an upright container configuration defining a receptacle region and being pivotally movable to a collapsed stored configuration, said pair of end walls being slidably attached to said pallet for movement inwardly and outwardly generally perpendicular to said ends of said pallet.

53. In a container and pallet assembly having a pallet and a plurality of walls mounted on said pallet, said walls each being pivotally movably to and securable in an upright container configuration defining a receptacle region, and said walls being pivotally movable to a collapsed stored configuration, the improvement comprising:
- at least one blank cut from a generally planar sheet material and folded to form one of the plurality of walls, said blank



being scored to define a plurality of panels including a first wall panel, a second wall panel extending from and being hingedly connected to said first wall panel, and a third wall panel extending from and being hingedly connected to said second wall panel, said second wall panel being pivotable relative to said first wall panel such that said first wall panel is parallel with and closely adjacent to said second wall panel, said third wall panel being pivotable relative to said second wall panel such that said third wall panel is parallel with and closely adjacent to said second wall panel when the walls are secured in the upright container configuration, said plurality of panels being connected to one another such that said plurality of panels may be pivoted in unison together to the collapsed stored configuration.

5,020,675

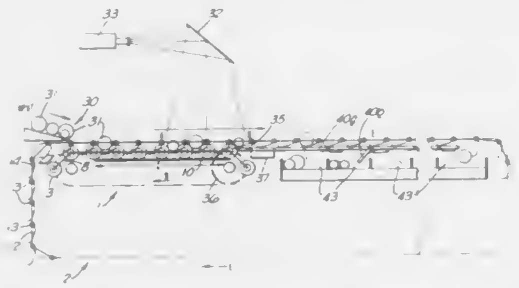
APPARATUS FOR SORTING CONVEYED ARTICLES

Simon Cowlin, Kelsale; Leslie Clark; Timothy Dennis, both of Colchester, and Charith Gunawardena, Colchester, all of United Kingdom, assignors to Lockwood Graders (UK) Limited, Danbury, England
Division of Ser. No. 119,380, Nov. 12, 1987, Pat. No. 4,940,536. This application Jun. 14, 1989, Ser. No. 365,713
Claims priority, application United Kingdom, Nov. 12, 1986, 8626991; Nov. 12, 1986, 8626992; Dec. 3, 1986, 8628931
Int. Cl.^{5} B07C *5/02, 5/34*
U.S. Cl. 209—538 13 Claims

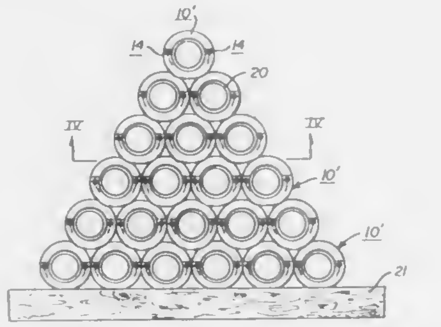
1 Apparatus for sorting articles comprising a conveyor arranged to convey the articles through an inspection region, inspection means for scanning the articles in the inspection region and for determining the presence of the boundaries of said articles, means for determining specified parameters for each article, and means for routing articles differently in accordance with the parameters determined, wherein said inspection means is arranged to scan the articles at at least a first station and a second station in the inspection region, said apparatus further comprising means for determining from each of said scans information related to the number and the position of the articles at the respective station, means for associating the parameters determined for each article with the appropriate number and position information, means for storing the num-

VOL
1127
ISS
1
JE
4
1991
UMI

ber and position information determined from the scan at the first station together with the associated parameters, and means for assessing, from the said stored information and from corresponding information related to the number and position of the articles at the second station and the associated parameters, the actual number of articles, their location at the second station and their associated parameters.

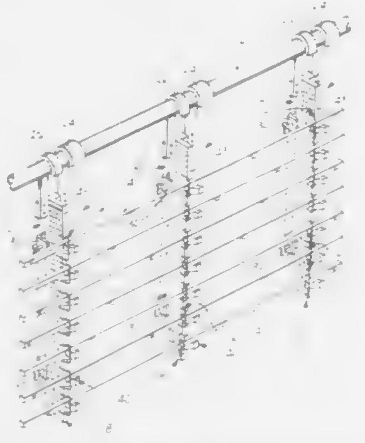


5,020,676
STACKING PIPE PROTECTOR
Glenn E. McFarland, Humble, Tex., assignor to Alco Industries, Inc., Valley Forge, Pa.
Continuation-in-part of Ser. No. 423,049, Oct. 18, 1989, abandoned. This application Jan. 24, 1990, Ser. No. 469,257
Int. Cl.⁵ A47F *5/00*
U.S. Cl. 211—59.4 **19 Claims**



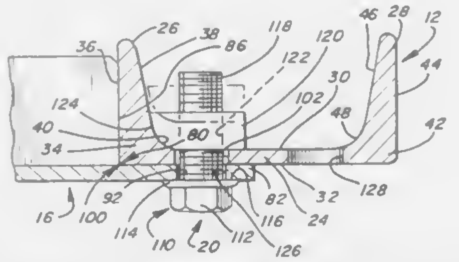
1. In a hook-on and lift-off pipe-encircling collar type of stacking pipe protector device for, in combination with a spaced apart group of the same devices, positioning horizontally extending heavy pipe members such as those used in oil field operations in a protected vertically spaced apart and stacked relation with respect to each other, a pair of pipe encircling arms of semicircular shape adapted to be removably mounted in an end to end closed encircling relation on and about the circumference of a pipe member and having a sufficient strength to support a lengthwise extending pipe member in combination with a horizontally spaced-apart group of like devices in such a manner as to retain the pipe member along its full length extent in a vertically and horizontally spaced-apart stacked relation with respect to other pipe members, each of said arms being of elastomer material having a strength and cross-sectional thickness sufficient when mounted in an encircling relation about a pipe member to maintain the pipe member in a vertically spacedapart relation with respect to adjacently stacked-on pipe members, said arms having a pair of adjacent end portions in an interlatching cross sectionally aligned and abutting relation with each other, and means detachably connecting said pair of adjacent end portions of said arms in a cross sectionally aligned and abutting relationship with respect to each other for mounting and dismounting the device with respect to a pipe member.

5,020,677
COMMON RACK SYSTEM FOR ANODIZING AND PAINTING LARGE PARTS
David J. Wirth; Mike M. Zaragoza, both of Seattle, Wash., and Jon Rosner, Chicago, Ill., assignors to The Boeing Company, Seattle, Wash.
Filed Apr. 6, 1990, Ser. No. 505,911
Int. Cl.⁵ A47F *5/00*
U.S. Cl. 211—113 13 Claims



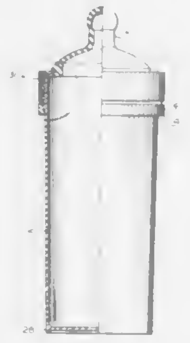
1. A common rack system for anodizing and painting operations, comprising:
a first electrically conductive elongated bar for supporting a plurality of parts to be anodized and painted;
a second electrically conductive elongated bar having a substantially larger cross section than said first bar, and being releasably joinable to said first bar in a manner so as to define an area of contact between said bars;
wherein said second bar is joined to said first bar when said parts are to be anodized, and said second bar is detached from said first bar prior to painting said parts so as to minimize paint shadowing.

5,020,678
STRUCTURAL RACK
Herbert H. Klein, Arlington Heights, Ill., assignor to Unarco Industries, Inc., Chicago, Ill.
Filed Jun. 27, 1989, Ser. No. 371,926
The portion of the term of this patent subsequent to Feb. 27, 2007, has been disclaimed.
Int. Cl.⁵ A47B *47/00*
U.S. Cl. 211—191 9 Claims



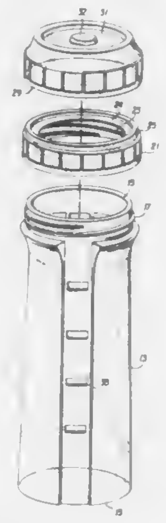
1. A structural rack comprising: first and second structural members adapted to be connected to one another and having abutment means thereon, said abutment means being adapted to abut when said structural members are connected; and an aperture in each of said structural members, each said aperture having an internal margin, said apertures being positionable in alignment with one another when said structural members are connected; a fastener defining an axis and extending through said apertures when said structural members are connected; and cam means having a cam surface engaging one of said structural members as said cam means is moved axially along said fastener thereby to effect relative movement between said structural members so as to bring said abutment means into abutment; wherein said fastener bears against the internal margin of one said aperture of said first structural member as the cam means effects said movement.

5,020,679
NURSING APPARATUS
Alberto Signorini, Rua Engenbeiro Alvaro Niemeyer, 113, Sao Conrado, 22600 Rio de Janeiro, RJ, Brazil
Continuation of Ser. No. 345,723, Jun. 2, 1989, abandoned. This application Sep. 12, 1990, Ser. No. 582,132
Claims priority, application Brazil, Jun. 8, 1988, 8802780
Int. Cl.⁵ A61J *9/00, 11/04*
U.S. Cl. 215—11.1 4 Claims



1. A nursing device comprising:
a bottle body comprising a hollow frustum having an exterior and an interior surface and having first and second ends, said first end being open and said second end being closed, said second end of said bottle body having a smaller circumference than said first end of said bottle body, and said bottle body having a first portion and a second portion;
a counter-cap comprising a sleeve having exterior and interior surfaces, having a first end and a second end, and having a first section and a second section, said counter-cap so sized and configured that said first end of said counter-cap may be slidably mounted over said second end of said bottle body such that said counter-cap may be slid toward said first end of said bottle body to a stop position, such that said first end of said counter-cap is proximal to and spaced apart from said first end of said bottle body;
a stop means comprising a first engaging means and a second engaging means, said first engaging means located on said exterior surface of said bottle body intermediate said first end and said second end of said bottle body, and said second engaging means formed solely on said interior surface of said counter-cap intermediate said first end and said second end of said counter-cap, such that when said counter-cap is mounted on said bottle body, said first end of said counter-cap is held in spaced apart relation from said first end of said bottle body, said first end of said counter-cap is intermediate said first end of said bottle body and said first engaging means, said first end of said counter-cap being located radially outwardly from said first engaging means on said bottle body, and said first end of said counter-cap extending upwardly beyond said first engaging means;
a nipple removably sealed to said first end of said bottle body;
a nipple holding cap to which said nipple may be removably mounted, said cap having an interior surface; and
an attaching means wherein said nipple holding cap may be removably attached to said counter-cap, such that said nipple is removably sealed in liquid flow relationship to said first end of said bottle body.

5,020,680
DISPOSABLE NURSER SHELL AND HOOD
Bart Bale, Chagrin Falls, Ohio, assignor to Spalding & Evenflo Companies, Inc., Tampa, Fla.
Filed Feb. 16, 1990, Ser. No. 481,007
Int. Cl.⁵ A61J *9/00, 9/06, 9/08*
U.S. Cl. 215—11.6 **1 Claim**



1. A nursing unit for holding a retention bag comprising
an elongated tubular body having an exterior surface which is substantially circular at both its top and bottom ends and has substantially circular openings at both said top and bottom ends, said exterior surface of said tubular body at said bottom end having a predetermined diameter, and said exterior surface of said tubular body having a progressively smaller diameter than said predetermined diameter along a substantial distance of said surface of said body from said bottom end toward said top end;
external threading on said body adjacent said circular opening at said top end of said body;
a substantially circular retainer ring;
internal threading in said retainer ring adapted to mate with said external threading on said elongated tubular body;
a substantially circular flange extending inwardly about said retainer ring above said internal threading, said flange mating with the upper edge of said top end of said tubular body when said retainer ring is screwed onto said tubular body;
a substantially circular lip extending outwardly from said retainer ring and above said flange, the outer diameter of said lip being substantially the same as said predetermined diameter of said exterior surface at said bottom end of said tubular body; and
a substantially rigid hood comprising a circular top panel and a cylindrical skirt projecting downwardly from the perimeter of said top panel, the free edge of said cylindrical skirt opposite said top panel defining a circular opening in said hood, at least a substantial portion of the interior surface of said cylindrical skirt extending axially from said free edge of said skirt towards said top panel, said substantial portion having a predetermined constant diameter such that said skirt frictionally fits about said lip when said hood is mounted on said retainer ring and such that the entirety of said substantial axial portion of said interior surface of said skirt continuously, frictionally engages said exterior surface of said tubular boy at said bottom end as said hood is pressed upwardly over said bottom end of said tubular body;

VOL
1127
ISS
1
JE
4
1991
UMI

whereby said hood may be frictionally fitted about said circular lip to close said nursing unit when not in use and about said bottom end of said tubular body to cover and prevent access to said circular opening in said bottom end of said tubular body when said nursing unit is in use.

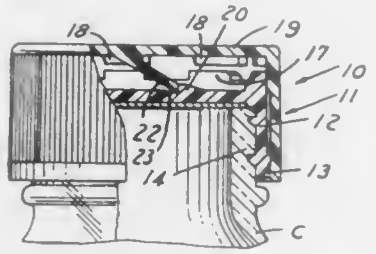
5,020,681
CHILD RESISTANT CLOSURE

Maximillian Kusz, Waterville, Ohio, assignor to Owens-Illinois Closure Inc., Toledo, Ohio

Filed Feb. 1, 1990, Ser. No. 473,557

Int. Cl.^{5} B65D *55/02*

U.S. Cl. 215—220 **5 Claims**



1. A child resistant closure comprising
outer and inner nested closure members,
- each of which has a base wall on a peripheral skirt with sets of lugs on the inner surface of the outer closure member and on the outer surface of the inner closure member which are adapted to be engaged when the members are moved axially toward one another,
- the inner surface of the base wall of the outer closure member being formed with a plurality of integral spring fingers yieldingly urging said outer closure member away from said inner closure member,
- said outer surface of the base wall of the inner closure member being provided with a plurality of ramps and adjacent recesses,
- each said ramp including a ramp surface extending axially outwardly from the outer surface of the base wall of said inner closure and having an abutting surface extending axially inwardly below the outer surface of the inner closure and adapted to be engaged by the ends of the spring fingers,
- each said recess associated with an adjacent ramp includes an inclined surface extending axially inwardly from said outer surface of said inner closure member to said abutting surface of said ramp to form said recess,
- said ramps and recesses being constructed and arranged such that when the closure is rotated to apply the closure, the spring fingers engage the abutting surface and engage the recesses to orient the outer closure member and inner closure member such that the lugs on the outer closure member are aligned with the lugs on the inner closure member to prevent inadvertent engagement of the lugs by any top load, and when the outer closure member is rotated relative to the inner closure member without bringing the lugs thereof into engagement, the spring fingers slip over the ramps and the recesses allowing the outer closure member to rotate with respect to the inner closure member and when the outer closure member is rotated relative to the inner closure member and moved axially relative to the inner closure member, the lugs are brought into engagement so that the closure can be removed from the container.

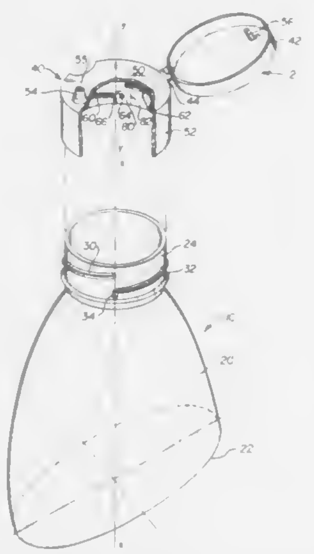
5,020,682
CLOSURE SYSTEM

Herbert V. Dutt, Sarasota, Fla., assignor to Continental Plastics, Inc., Tridelphia, W. Va.

Filed Nov. 3, 1989, Ser. No. 431,204

Int. Cl.^{5} B65D *55/02*

U.S. Cl. 215—253 **24 Claims**



1. A closure system comprising:
- a container having a container neck with external threads thereon; and
- a cap having an end wall, an annular skirt extending from said end wall and a dispensing opening extending through said end wall, said skirt including internal threads complementary to the external threads on said container neck for selectively screwing said cap onto said container neck;
- said closure system further including cooperating locking members on the outer surface of said container neck and on the inner surface of said skirt, said locking members defining substantially axially extending engagement surfaces that are engaged when said cap is fully screwed on said container and said locking members preventing rotation of said cap when an attempt is made to unscrew said cap from said container neck; and
- a tear out section on said cap skirt to which the locking member on the cap skirt is secured and which is torn by said locking member on said inner surface of said cap when an attempt is made to unscrew said cap from said container neck after said cap is fully unscrewed on said container neck, whereby a visual indication of said attempt to unscrew said cap from said container is provided; and
- said locking members are a projection on said outer surface of said container neck and a terminal end of said internal threads on said cap skirt which is spaced apart from the remainder of said internal thread by a gap.

5,020,683
PLASTIC CLOSURE

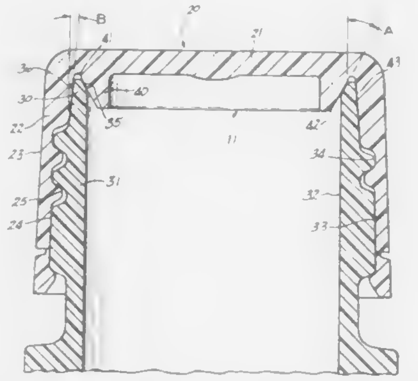
Herbert Strassheimer, Windermere, Fla., assignor to Extrudiplast Investments, S.A., Geneva, Switzerland

Filed Jan. 29, 1990, Ser. No. 471,644

Int. Cl.^{5} B65D *41/00*

U.S. Cl. 215—354 **9 Claims**

1. A plastic closure and a deformable container which comprises: a bottle cap having a top wall, a cylindrical side wall depending from the top wall and a thread on the inner surface of the side wall; a hollow plastic container having an open neck end including a lip region and extending downwardly therefrom an outer threaded wall portion engagable with the thread on the cap; an inwardly facing first taper on the lip region engagable with a corresponding mating first taper on the bottle cap and an outwardly facing second taper on the lip region engagable with a corresponding mating second taper on the bottle cap; wherein the second taper on the bottle cap is greater than the second taper on the lip region suitable to inwardly deform the lip region and to stress the first lip taper against the first cap taper.



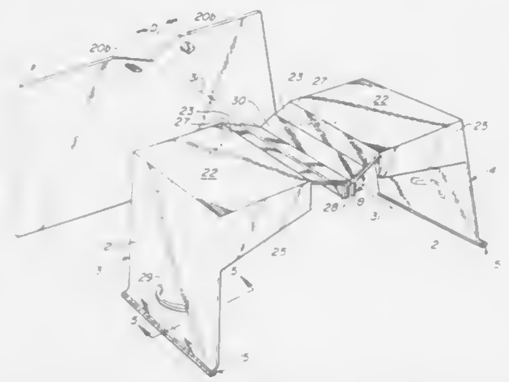
5,020,684
FOOD COVER FOR PROVIDING BOTH CLOSED AND FULL OPEN POSITIONS AND INCLUDING SIDE PANELS, AN OFF-SITE MOUNTABLE HINGE AND MIRROR IMAGE FRONT AND BACK PANELS

Warren Jow, 5222 Gordon Ave., El Cerrito, Calif. 94530

Filed Jul. 17, 1990, Ser. No. 553,709

Int. Cl.^{5} B65D *43/02*

U.S. Cl. 220—4.24 **12 Claims**



1. A food cover for providing stable closed and open positions relative to a horizontal base, comprising
- (i) a pair of upright side panels resting upon a substantially horizontal base, each of said side panels having a pair of oppositely canted, integral support stops positioned about a working plane substantially normal to both said pair of side panels and said horizontal base,
- (ii) a pair of L-shaped front and back panels each having a side wall segment and a roof segment, said roof segment terminating in a canted end-roof segment and a lip positioned adjacent to said working plane,
- (iii) a hinge means having a pivot axis coincident with said working plane, said hinge means being segmented into a plurality of arms and legs radiating from a central spine segment also coincident with said pivot axis,
- (iv) hand tightened attaching means for separately but disconnectably connecting said lip of each of said front and back panels relative to said hinge means in an easy assembly/diassembly relationship yet after connection with said lip, permitting surprisingly stable rotation about said pivot axis of an associated L-shaped panel relative to the other, from an original stable position to a new stable position (CLOSED-TO-OPEN or OPEN-TO-CLOSED) relative to said horizontal base.

5,020,685
FILLER NECK CAP WITH PRESSURE VALVE

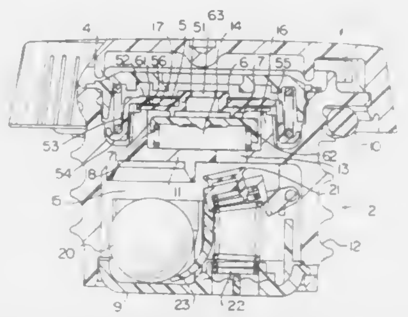
Kyokuichi Sato; Tooru Kayatani, and Toru Kenmotsu, all of Okayama, Japan, assignors to O M Industrial Co., Ltd., Okayama, Japan

Filed Jan. 23, 1990, Ser. No. 468,639

Claims priority, application Japan, Sep. 6, 1989, 1-231993

Int. Cl.^{5} B65D *51/16*

U.S. Cl. 220—203 **4 Claims**



1. A filler neck cap with a pressure valve including an outer cap and an inner cap, said inner cap being provided with a screw portion on its outer periphery and a partition or separation plate with a communication hole at the intermediate portion therewithin, to separate the interior of the inner cap into an upper and lower spaces respectively serving as a receptacle for a pressure control valve and as a receptacle for an anti-leakage assembly, wherein: said pressure control valve is of a positive-negative pressure valve type which comprises a valve body, a valve body retainer plate, and a negative pressure valve body; said valve body retainer plate is formed into a hat-like configuration including an upper portion with a passing hole at its center, an outer peripheral wall and a spring reception tongue; said valve body is in engagement with the valve body retainer plate whose passing hole sustains a portion of the valve body; the valve body presents a double-disk shape with a smaller upper disk and a larger lower disk having on the upside a peripheral upper ridge and on the downside a lower ridge inside the upper ridge, and further having a center communication opening extending through both the disks; the diameter of said negative pressure valve body is predetermined larger than the extension of the lower ridge on the bottom of the valve body, forming a pan-like shape setting the opening side down with a skirt portion extending downwardly on the periphery; and the negative valve body is accommodated in a valve body reception circular casing extending upwardly from the separation plate of the inner cap, while being compressed at the upper face thereof against the lower ridge of the valve body by means of an inner coil spring.

5,020,686
CLOSURE FOR A RESEALABLE CONTAINER

Herbert V. Dutt, Sarasota, Fla., assignor to Continental Plastics, Inc., Triadelphia, W. Va.

Filed Nov. 29, 1989, Ser. No. 443,610

Int. Cl.^{5} B65D *41/32*

U.S. Cl. 220—276 **16 Claims**

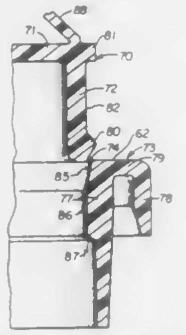
1. A closure for a container, said container having an opening defined by an edge of said container, said closure comprising:
- an annular container engaging member, fixedly attached to said edge of said container and having an inner surface of a first diameter;
- a lid having an end wall and an annular skirt, said annular

VOL
1127
ISS
1
JE
4
1991
UMI

skirt having an outer surface of a second diameter which is no greater than said first diameter, said lid being attached to and separable from said container engaging member at a failure zone extending generally radially between said inner surface of the annular container engaging member and said outer surface of said annular skirt;

said lid being adapted to reseal said container after said lid is separated from said container engaging member by positioning said lid such that said annular skirt engages said container engaging member and said end wall covers at least a portion of said opening of said container; and

cooperating sealing means on said outer surface of said annular skirt and on said inner surface of said container engaging member which are separate from said failure zone and which radially overlap said failure zone and each other, said sealing means being engaged when said lid is used to reseal said container.



5,020,687

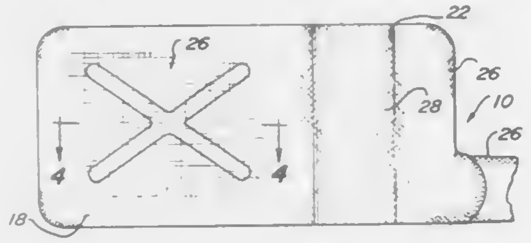
FABRIC REINFORCEMENT FOR PLASTIC FUEL TANKS

Robert D. Seizert, Canton, Mich., assignor to Solvay Automotive, Inc., Houston, Tex.

Filed Feb. 12, 1990, Ser. No. 479,081

Int. Cl.^{5} B60K *15/03*

U.S. Cl. 220—645 20 Claims



1. A blow molded plastic fuel tank for use in motor vehicles comprising at least one reinforcement insert encapsulated on a preselected area of an exterior surface of said tank for providing supplemental support at said preselected area wherein said reinforcement insert comprises a porous fabric material having a weave defining a plurality of openings between interwoven strands in said fabric, said openings being substantially filled with said plastic so as to encapsulate said fabric material in generally flush relation to said exterior surface of said tank.

5,020,688

HOT POPCORN MICROWAVE VENDING MACHINE

Patrick J. Power, 530 Governor's Dr., Winthrop, Mass. 02152

Filed May 31, 1989, Ser. No. 358,874

Int. Cl.^{5} A23L *1/18;* **G07F** *11/10*

U.S. Cl. 221—150 A 1 Claim

1. A hot popcorn vending machine comprising:

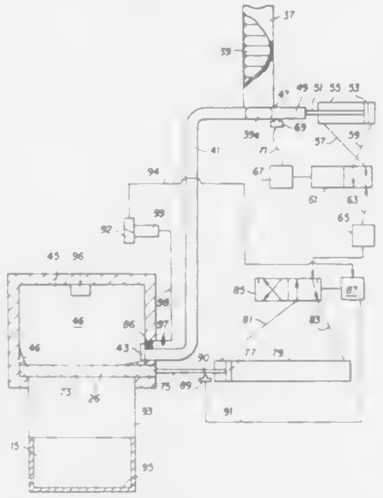
a. a plurality of storage bins for holding stacks of bags of popcorn;

b. a common chute to which each of said bins is connected;

c. pneumatically operated plunger means for selectively pushing a single one of said bags into said chute;

d. a microwave cooking chamber connected to said chute;

e. sensing means for sensing entry of one of said bags into said chamber, said sensing means comprising a door connecting said chute and said chamber, and switch means associated with said door; said door operable by the impact of one of said bags;



f. timer means responsive to said switch for timing a cooking period;

g. dispensing means in said chamber comprising a pneumatically operated sliding door responsive to said timer means for releasing said bag from said machine at the conclusion of said cooking period.

5,020,689

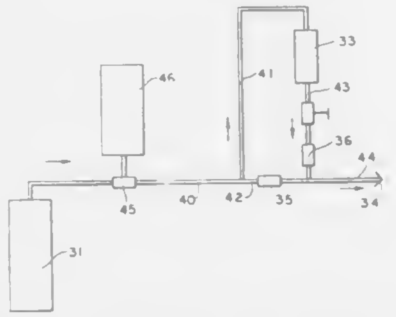
METERING AND DISPENSING SYSTEM

Joseph G. Eitner, Jr., Park Ridge, and Robert J. Tice, Jr., Stockholm, both of N.J., assignors to The Wellcome Foundation Limited, London, England

Filed Oct. 27, 1989, Ser. No. 428,852

Int. Cl.^{5} G01F *11/00*

U.S. Cl. 222—1 18 Claims



12. A method of mixing and dispensing a predetermined amount of vaporized active ingredient to atmosphere including the steps of passing liquid solvent/propellent from a pressurized source into a dosing cylinder of fixed volume to fill said dosing cylinder, isolating said source from said dosing cylinder, coupling said dosing cylinder, via a first junction, with a sample cylinder containing a charge of active ingredient, utilizing said first junction to divide flow of liquid solvent/propellent from the dosing cylinder upstream of said sample cylinder to cause a first portion of liquid solvent/propellent to flow into said sample cylinder and both absorb and force out said active ingredient and a second portion of said liquid solvent/propellent to by-pass said sample cylinder, coupling an outlet from said sample cylinder to said by-pass portion, creating a pressure differential between said sample cylinder outlet and said by-pass portion upstream of said coupling to enable total absorption of the active ingredient whereupon said active ingredient passes through the outlet and said by-passed portion of solvent/propellent absorbs and propels said absorbed active ingredient to a discharge station at which all liquid solvent/-propellent vaporizes to discharge a mist of active ingredient particles.

5,020,690

POURING PLUG FOR LIQUID CONTAINER

Kenjiro Kishikawa; Yoshitaka Nishihara, and Masayuki Okudaira, all of Tokyo, Japan, assignors to Toppan Printing Co., Ltd., Tokyo, Japan

PCT No. PCT/JP88/00659, § 371 Date Feb. 27, 1989, § 102(e) Date Feb. 27, 1989, PCT Pub. No. WO89/00136, PCT Pub. Date Jan. 12, 1989

PCT Filed Jun. 30, 1988, Ser. No. 347,962

Claims priority, application Japan, Jun. 30, 1987, 62-100844[U]; Aug. 25, 1987, 62-129044[U]; Aug. 25, 1987, 62-129045[U]; Aug. 25, 1987, 62-129046[U]; Feb. 5, 1988, 63-14408[U]; Feb. 15, 1988, 63-18449[U]; Jun. 14, 1988, 63-78454[U]

Int. Cl.^{5} B67D *5/06*

U.S. Cl. 222—83 6 Claims

1. A pouring plug for a liquid container, comprising a pourer which is attached to a pouring port of the liquid container and the lower edge opening of which corresponds to an easily breakable film which seals said pouring port or the lower edge opening thereof; a substantially cylindrical breaking blade inserted in the cylindrical section of said pourer in an up and down transferable manner and provided with blade section confronting said film at the lower edge thereof; and a cap attached rotatably so as to cover said cylindrical section; said cap being provided with a pipe member which is inserted in the breaking blade; one of the opposing surfaces defined between the pipe member and the breaking blade being equipped with a guiding inclined section which inclines with a rising gradient in the opening rotational direction of the cap extending from the upper edge side to the lower edge side of the pipe member; and the other of said opposing surfaces being provided with slidably contacting members which are slidably in contact with said guiding inclined section, whereby the breaking blade is arranged to descend at the time of applying an opening rotation to the cap.

5,020,691

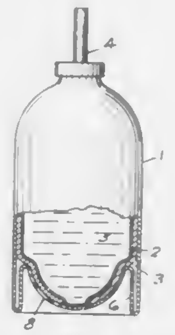
CONTAINER SHELL AND METHOD OF PRODUCING SAME

Norman H. Nye, 1348 Highbridge Rd., Cuyahoga Falls, Ohio 44223

Filed Dec. 12, 1988, Ser. No. 283,220

Int. Cl.^{5} B65D *35/28*

U.S. Cl. 222—95 7 Claims



1. A self-pressurized dispensing container comprising:

an essentially nonelastic inner plastic liner capable of receiving and containing an agent introduced under pressure, said liner having sufficient dimension to contain a volume of said agent,

a valve operatively attached to said inner liner for controllably dispensing said agent from the container,

an elastic sleeve surrounding said inner liner, said sleeve provides dispensing pressure to said agent,

an outer shell formed from a previously molded shell, for containing said elastic sleeve and said inner plastic liner and having sufficient strength to resist said filling pressure of said agent, said outer shell having a top, a bottom and an outer wall, said bottom further comprising a convex center and a periphery, said periphery being telescoped inward such that said center is recessed to define a bottom rim formed from said outer wall and surrounding said center, a semi-spherical interior base surface to minimize said inner liner from elongation or stretching when said inner liner is expanded, said inwardly telescoped periphery of said outer shell bottom is essentially parallel and in close proximity to the outer wall of said outer shell so as to define an essentially void free continuum around said elastic sleeve and said inner plastic liner.

5,020,692

CONTAINER INCLUDING UNITARY BLOW MOLDED BOTTLE HAVING DRAIN-BACK DISPENSING SPOUT AND PLASTIC INSERT

Richard C. Darr, Seville, Ohio, assignor to Plastipak Packaging, Inc., Plymouth, Mich.

Division of Ser. No. 863,686, May 15, 1986, abandoned. This application May 19, 1988, Ser. No. 196,041

Int. Cl.^{5} B67D *1/16*

U.S. Cl. 222—109 6 Claims

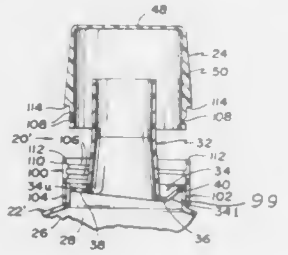
1. A drain-back container for dispensing liquid contents, comprising:

a plastic blow molded bottle of a unitary, integral, one-piece construction including: (a) a hollow body portion for receiving the liquid contents, (b) an annular wall that projects vertically in an upward direction from the body portion, said annular wall having an outer surface, (c) a moat wall structure that extends inwardly from the annular wall, and (d) a dispensing spout that projects upwardly from the moat wall structure within the annular wall to provide dispensing of the liquid contents upon tipping of the bottle; and

a plastic insert of an annular shape having a lower end including an inner surface secured to the outer surface of the annular wall of the bottle, the insert cooperating with the

VOL
1127
ISS
1
JE
4
1991
UMI

moat wall structure of the bottle to define a moat that extends around the dispensing spout and has an opening into the interior of the body portion, and the insert including an upper end having an inner surface including a retainer for securing a measuring cup that functions as a closure over the dispensing spout such that excess liquid contents from the measuring cup drain into the moat and through the opening thereof into the interior of the hollow body portion.



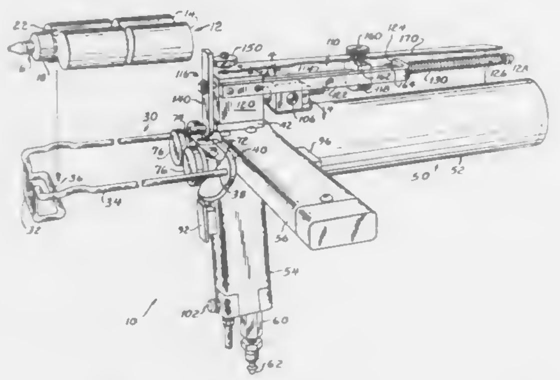
5,020,693
DOSAGE CONTROL FOR ADHESIVE DISPENSER

Richard J. Ernst; Sigismund Paul, both of Palatine; Frederick G. Sevald, Evanston, and Marian Olma, Chicago, all of Ill., assignors to Illinois Tool Works Inc., Glenview, Ill.

Filed Jun. 30, 1989, Ser. No. 373,424

Int. Cl.^{5} B65D *88/54*

U.S. Cl. 222—137 20 Claims



1. A pneumatically actuatable dispenser for an adhesive, as provided within a cartridge having a chamber containing said adhesive, said cartridge having a first end and a second end and having a nozzle mounted upon said first end, said chamber having a plunger accessible from said second end and displaceable through said chamber, toward said nozzle, so as to force said adhesive into said nozzle, through which said adhesive is ejected, said dispenser comprising:

(a) a frame adapted to hold said cartridge;
(b) a pneumatic mechanism connectable to a source of pressurized air and attached to said frame so as to support said frame with said cartridge held by said frame, said pneumatic mechanism including
  (i) a pneumatic cylinder fixed to said frame;
(ii) pneumatic piston means arranged to be pneumatically driven within said pneumatic cylinder by said pressurized air;
  (iii) control means for selectively driving said pneumatic piston means within said pneumatic cylinder in either a forward direction or in a reverse direction by said pressurized air;
  (iv) a piston rod extended from said pneumatic piston means, through one end of said pneumatic cylinder, and arranged to move conjointly with said pneumatic piston means, to drive said plunger of said cartridge held by said frame toward said nozzle when said pneumatic piston means is driven in said forward direction, and to withdraw from said plunger of said cartridge when said pneumatic piston means is driven in said reverse direction; and
(c) means predeterminedly adjustable by means of a user and operatively connected to said piston means for actuating said pneumatic control means so as to predeterminedly limit said conjoint movement of said pneumatic piston means and said piston rod in said forward direction beyond a predetermined amount of travel of said pneumatic piston means and said piston rod so as to enable said dispenser to eject an adjustably controlled dose of said adhesive from said cartridge held by said frame.

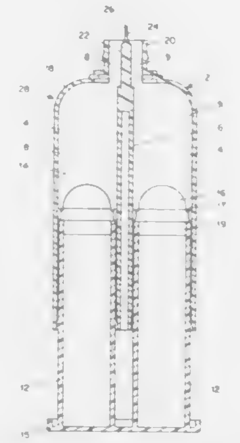
5,020,694
MULTI-CAVITY DISPENSING CONTAINER

Edwin R. Pettengill, Stratford, Conn., assignor to Chesebrough-Pond's, Inc., Greenwich, Conn.

Filed Mar. 16, 1989, Ser. No. 324,588

Int. Cl.^{5} B67D *5/52*

U.S. Cl. 222—137 16 Claims



1. A multi-cavity dispensing continer for the coextrusion of at least two flowable materials, comprising:

a dispensing container comprising at least two hollow and separate parallel cylinders, each cylinder for containing one of said flowable materials, said cylinders having a first generally closed end and a second end telescopically and slidingly accommodating at least two parallel pistons which conform to ride sealingly along the interior walls of said cylinders so as to force said flowable materials to flow toward said first end of said cylinder upon relative compression of the cylinders and pistons, said cylinders having outlet channels; and

an outlet means in fluid communication with said outlet channels, said outlet means having a peripheral wall and being divided by at least one flat tapered septum assembly extending from said outlet channels and extending to or beyond the end of said outlet means to completely separate said flowable materials within said outlet means while being dispensed and to cause said materials to be dispensed in a single unmixed stream; said outlet means includes smooth peripheral walls and wherein said tapered septum is textured so as to possess a dull finish.

5,020,695
APPARATUS FOR CONTROLLING THE DISCHARGE OF MATERIAL FROM A STORAGE TANK

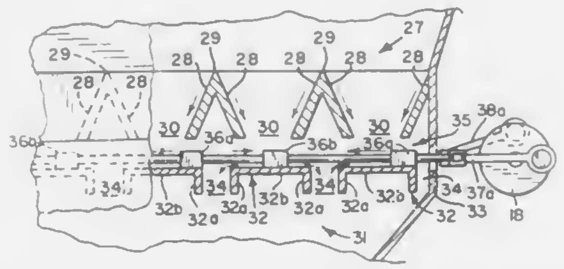
Eduardo C. de Almeida Thompson, and Joao P. Taveira, both of San Paulo, Brazil, assignors to California Pellet Mill Company, San Francisco, Calif.

Filed Dec. 11, 1989, Ser. No. 448,293

Claims priority, application Brazil, Jun. 26, 1989, 8903115

Int. Cl.^{5} B65D *83/06*

U.S. Cl. 222—185 12 Claims



8 Apparatus for controlling the discharge of a material from a storage tank, comprising:

(a) a first stationary grate (27) comprising a plurality of perforated plates (28) which define symmetrical ridges (29) for directing the material toward a number of openings (30) for the material;
(b) a second stationary grate (31), which comprises a plurality of perforated parallel plates (32) having inverted U-shaped profiles with their legs (32A) joined by a flat section (32B) positioned so as to provide openings (34) between adjacent plates and between the end plates and the wall (33) of the apparatus located below the first grate (27), the openings (34) of the second grate (31) being offset in relation to the openings (30) of the first grate (27);
(c) a movable grate (35), located between the first stationary grate (27) and the second stationary grate (31), comprising a first set of scrapers (36A) driven back and forth by a first drive element (37) and a second set of scrapers (36B) driven back and forth by a second drive element (38); and
(d) the connection of the first and second drive elements (37, 38) by their projecting ends (37A, 38A) to cranks (18) on a shaft (16) at a certain angle to each other, by which means the first and second sets of scrapers (36A, 36B) are moved back and forth in essentially opposite directions.

5,020,696
ATOMIZING FLUID DISPENSER TWO

Miro S. Cater, Newtown, Conn., assignor to RJS Industries, Inc., Marlboro, N.J.

Filed Nov. 27, 1989, Ser. No. 441,893

Int. Cl.^{5} B65D *83/64*

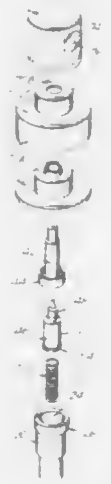
U.S. Cl. 222—321 5 Claims

1. An atomizing dispenser for dispensing fluid from a container of this fluid, the dispenser comprising:

a vertical hollow elongated body having a vertical axis, the body having an upper section defining a first hollow vertical cylinder having a top opening and a lower section defining a second outer hollow vertical cylinder having a diameter smaller than that of the first cylinder and a third inner hollow vertical cylinder concentric with and spaced inwardly from the second cylinder, the second and third cylinders being joined together at their lower ends, the upper end of the third cylinder being disposed below the upper end of the second cylinder and having an aperture therein, the upper end of the second cylinder being open, the lower end of the first cylinder curving inwardly to merge with the upper end of the second cylinder, the inner cylindrical surface of the second cylinder in a region adjacent but below the region of merger of the first and second cylinders having a horizontally extending groove disposed therein;

a hollow piston having upper and lower open ends and having an axis coincident with the body axis, the piston being vertically movable along its axis with the lower end of the piston slidably engaging the inner surface of the upper section of the body;

a vertical member having an axis coincident with the body axis and being vertically movable along its axis between fully raised and fully lowered positions, the member having an upper section extending through the lower end of the piston into the hollow interior thereof, an integral middle section which is enlarged with respect to the upper section and an integral lower section which is further enlarged, the lower section defining a fourth vertical hollow cylinder disposed between the second and third cylinders and having an open lower end, the fourth cylinder having an inwardly extending horizontal shoulder at its upper end and having a diameter which is slightly less than that of the second cylinder and is larger than that of the third cylinder, the lower end of the fourth cylinder slidably engaging the inner surface of the upper end of the second cylinder when the member is fully raised and being disposed adjacent the joined lower ends of the second and third cylinders when the member is fully lowered;



spring means disposed within the body to bear against the joined lower ends of the second and third cylinders and to extend upwardly into the fourth cylinder to bear against said shoulder, the spring means having fully extended and fully compressed positions;

a pump chamber defined by a hollow vertical region bounded by adjacent portions of the body, member and piston, the region in horizontal cross section defining a hollow circular annulus centered on the body axis, the chamber cooperating with said adjacent portions to establish a first chamber port for fluid entry and a second chamber port for fluid discharge, the first port being formed between the lower end of the fourth cylinder and the horizontal groove, the first port being open when the lower end of the fourth cylinder is aligned therewith and being closed when the lower end of the fourth cylinder is out of alignment with the horizontal groove, the second port being formed between the middle member section and the piston, the second port being opened when the piston is separated from the middle member section and being closed when the piston and middle member section are engaged, the chamber, after the dispenser is primed, being normally filled with fluid and sealed at both ports to prevent fluid from leaking out of the chamber when the piston and member are in fully raised positions, the first port being at least partially unsealed to allow fluid to enter

VOL
1127
ISS
1
JE
4
1991
UMI

the chamber when the member is being raised from fully lowered to fully raised position, the lower end of the fourth cylinder is aligned with the horizontal groove and the middle member section and piston are engaged, the second port being at least partially unsealed to allow fluid to be discharged from the chamber when the member is being lowered from fully raised to fully lowered position and the upper member section is disengaged from the piston; and

actuator means provided with a fluid discharge orifice and having an axis coincident with the body axis, the actuator means being disposed above and engaging the piston in a normal fully raised position at which the member and piston are in fully raised position, both chamber ports are sealed and the spring means is in fully extended position, the actuator means, when subjected to downward pressure, establishing a force which moves the piston and member downwardly with the piston and middle member section being disengaged, thereby producing a spray discharge of fluid through the discharge orifice, until the piston and middle member section are engaged in fully lowered postions and the spring means is in fully compressed position, the spring means, when the downward pressure on the actuator means is released, automatically returning to its fully extended position, thereby returning the actuator means to its normal raised position.

5,020,697
IMAGE RECORDING APPARATUS HAVING TONER RESERVOIR

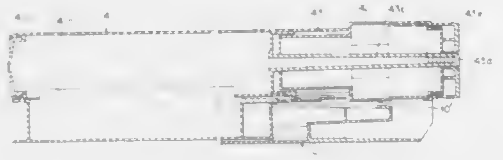
Jun-ichi Koiso, and Atsuo Ohmura, both of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jun. 21, 1989, Ser. No. 369,477

Claims priority, application Japan, Jun. 24, 1988, 63-157725; Mar. 17, 1989, 1-65034

Int. Cl.^{5} G03G *15/00*

U.S. Cl. 222—325 **9 Claims**



1. A toner cartridge comprising a supply toner reservoir having a supply opening therein, a recovery toner reservoir having a recovery opening therein, and a connecting means between said reservoirs for connecting said reservoirs, said connecting means permitting, said supply toner reservoir to rotate about its axis relative to said recovery toner reservoir, wherein said recovery opening faces upward while said supply opening is rotated so that it faces downward.

5,020,698
ICE-CREAM EJECTOR

Jimmy L. Crossley, 3218 Nebraska Ave., Council Bluffs, Iowa 51501

Filed May 23, 1988, Ser. No. 197,426

Int. Cl.^{5} B67D *5/42*

U.S. Cl. 222--386 **1 Claim**

1. An ice-cream ejector having:

a frame,

a cup support attached to said frame and provided with a cup-receiving opening extending downwardly therethrough from its upper side,

a cup disposed in said opening and supported by said support,

said cup having an upwardly opening inlet and a downwardly opening outlet,

a piston slidably received in said cup,

hand-operable means attached to said piston and said frame and capable of pressing said piston downwardly in said cup for pressing ice-cream through said outlet,

said outlet being smaller than said inlet,

a flexible disposable cover covering the underside of said piston so that a cover used in an earlier ejection will not deliver a different and undersired flavor to ice-cream later being ejected,

said cover being held in place merely by engagement with said piston and said cup whereby said cover can be quickly replaced with a clean cover so that a cover used in an earlier ejection will not deliver a different and undesired flavor to ice-cream later being ejected,

said cover material being waxed paper,

said cover being of flat flexible stock capable of folding into pleats at the edges of a piston as said piston moves through said cup,

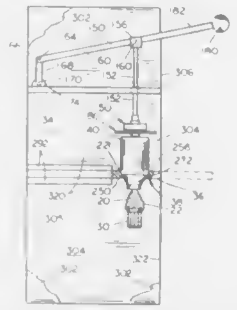
a lever,

anchor means pivotally attaching said lever to said frame at a first point,

said hand operable means comprising piston connecting means pivotally attaching said piston to said lever at a second point horizontally spaced from said first point,

said anchor means and said piston connecting means allowing said piston to move substantially in a straight line downwardly in said cup when said lever is pulled downwardly adjacent said second point,

said anchor means further comprising an anchoring link pivotally connected to said frame, the pivot connections of said link-to-frame and of said link-to-lever, and of said piston connecting means permitting rotation only about horizontal axes, said axes being parallel,



said lever having a handle end projecting forwardly from said frame, the manual pulling down of said handle causing said piston to move downwardly,

said piston connecting means further comprising a piston rod, said piston being attached to said piston rod by a piston attachment assembly comprising said piston having a main portion and an upwardly protruding mounting portion of lesser horizontal size than the horizontal size of said main piston portion,

said mounting portion being adjacent and above at least sections of said main portion,

said mounting portion having a keeper hole therethrough,

said rod having a rod opening therethrough,

a keeper removably disposed in said keeper hole and said rod opening and attaching said piston mounting portion removably to said rod, said keeper being a pin extending through said keeper hole and said rod opening, and a pin holder attached to said pin and engagable with said piston mounting portion for releasably holding said pin in said keeper hole and said rod opening,

said cup support having an opening extending vertically therethrough, the walls of said support opening holding said cup in upright position during ejection,

said support being a support shelf slidably attached to said frame by fixed guide means and capable of being pulled outwardly away from said frame for ease of implacement of said cup into said support shelf and for quick removal of said cup from said support shelf,

said cup having a shoulder means on its exterior which engages said cup support for supporting said cup, the outlet of said cup being disposed below said shoulder means,

said outlet of said cup being disposed below the bottom of said support,

said piston having a sidewall and having an undersurface tapering from said sidewall inwardly and downwardly so that as said piston enters said cup said piston is automatically guided toward registry with and into said cup,

said cup having an inner wall having at its lower end a constricted spout portion,

said piston having a main piston portion,

said piston having a pushing portion of lesser size than said main piston portion, said pushing portion being capable of substantially filling said spout portion of said cup to substantially push the ice-cream therefrom.

5,020,699
DISPENSING CONTAINERS

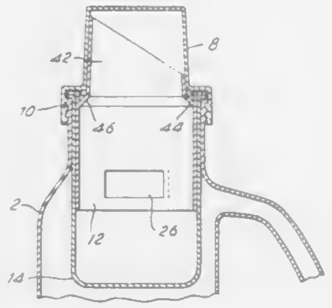
Bernard Sams, London, England, assignor to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Filed Mar. 25, 1987, Ser. No. 30,203

Claims priority, application United Kingdom, Mar. 27, 1986, 8607780; Nov. 6, 1986, 8626559

Int. Cl.^{5} G01F *11/28*

U.S. Cl. 222—450 19 Claims



1. A fluid container comprising a main internal volume for the contents of the container and metering means for dispensing a measured quantity of fluid from said main volume, the container having an upper outlet for the metered fluid and external closure means for said upper outlet, said metering means comprising a pair of concentric members providing with said external closure means an enclosed chamber, openings being provided on the members, said openings being registrable to form an aperture placing said chamber in communication with the main volume of the container, one of the members being fixed relative to the container and forming an upwardly projecting pourer opening for the metered quantity of fluid, rotary mounting means for the closure means permit rotation of the closure means on the container to and from an operative position, the outer of said concentric members having engagement means for rotation by closure means in its rotary movement whereby to locate said openings in registration and thereby to put the aperture in communication with the main interior space of the container when the closure means is operative, and rotation of the closure means from its operative position placing said openings out of registration to isolate the chamber from the main chamber interior and to permit dispensing of the fluid metered by said chamber.

5,020,700
LID PROVIDED WITH A VARIABLE-FLOW POURING SPOUT AND WITH AN IMPROVED VENT DEVICE, PARTICULARLY FOR CANS OF BASE COLOR FOR AUTOMOBILE COACHWORK

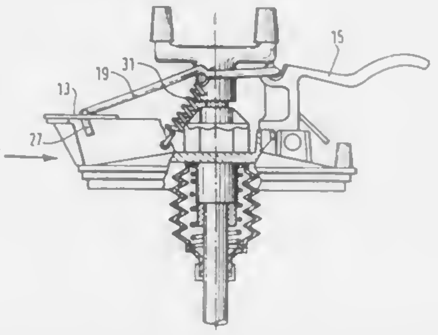
Alain Krzywdziak, 13 Bis Rue De La Binoche, Orleans; Daniel Parmenon, 17, rue Albert Schweitzer, Orleans La Source, and Jean Godat, 35, aiiee du Houx, Olivet, all of France

Filed Apr. 26, 1989, Ser. No. 343,911

Claims priority, application France, Apr. 27, 1988, 88 05604

Int. Cl.^{5} B67D *3/00*

U.S. Cl. 222—487 6 Claims



1. A lid for cans of base color in agitator machines, which comprises:

at least one member for fastening on a color can,

a pouring spout provided with an opening having an edge which is strictly planar,

an operating lever pivoted at a bottom end thereof to a top wall of the lid and movable between a position of rest and a pulled operative position,

a likewise planar slide slidable on said edge in such a manner as to close it leaktightly, and being pulled for pouring purposes by means of the operating lever, the operating lever having on a front face thereof, at a distance from the pouring spout, a stop member securing said operating lever in the position of rest and bearing leaktightly against a vent opening formed in the top wall of the lid, the slide being fastened to said operating lever by a lever pivoted on the one hand at a top middle part of the slide and on a pivot axis of said operating lever, while spring means return said slide under pressure against the edge of the pouring spout and return said operating lever to its position of rest, in which the edge of the pouring spout is closed by the slide, in which lid the vent opening is provided on an inner face of the lid with a channel which leads out at a point close to the edge of the lid and substantially diametrically opposite the pouring spout, said slide being provided with two opposite lateral rims or lugs which are disposed in the plane of the slide and through which there vertically pass respective bent-over pivoting ends of two branches of a U-shaped rod connected to the operating lever.

5,020,701
GRAIN SPREADING DEVICE FOR GRAIN BINS

Harlan J. Donelson, 3705 Windmill La., Plano, Tex. 75074

Filed May 22, 1989, Ser. No. 354,752

Int. Cl.^{5} B65D *5/72*

U.S. Cl. 222—494 **20 Claims**

1. A grain spreading device adapted to uniformly distribute grain deposited therein within a grain bin in which the grain spreading device is mounted, comprising:

an inverted conically-shaped hopper, having an open upper end and a smaller open end;

a motor mounted on said hopper;

an output power shaft operatively secured to said motor and extending downwardly through said open lower end;

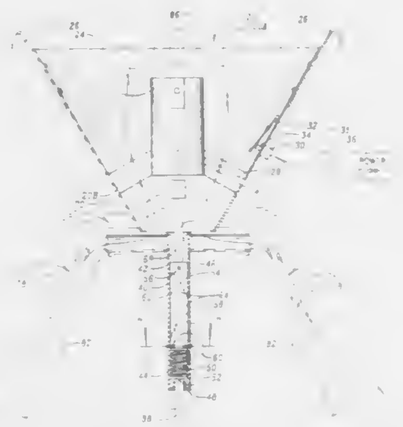
a horizontally disposed grain spreading table operatively

VOL
1127
ISS
1
JE
4
1991
UMI

secured to said power shaft and being normally disposed closely adjacent said lower end;

resilient means interconnecting said grain spreading table and said power shaft whereupon said grain spreading table will move downwardly with respect to said shaft to create a grain discharge opening at said lower end of said hopper when said hopper contains sufficient grain to cause said resilient means to compress;

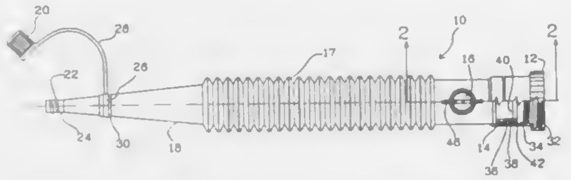
said grain spreading table being secured to an elongated sleeve that slidably embraces said power shaft and is operatively connected to said resilient means; and



a first cam element secured to said power shaft within said sleeve, a second cam element slidably mounted on said power shaft below said first stop element and engaging said resilient means, a third cam element slidably mounted on said power shaft and operatively engaging said first and second cam elements, said second cam element being secured to said sleeve, whereby rotational power imparted to said power shaft by said motor will be transmitted to said sleeve and said grain spreading table through said cam elements.

5,020,702
LIQUID POURING SPOUT

Jimmie J. James, 1 Woodland Ct., Novato, Calif. 94947
Filed May 19, 1989, Ser. No. 354,394
Int. Cl.⁵ B67C *11/04*
U.S. Cl. 222—529 **8 Claims**



1. A pouring spout for drip-free pouring of liquids from containers having threaded necks, comprising,

a flexible generally tubular portion permitting bending of the pour spout,

threaded coupling means at an upstream end of the pouring spout, for accommodating at least two different sizes of male threads on containers of liquids to be dispensed through the pouring spout,

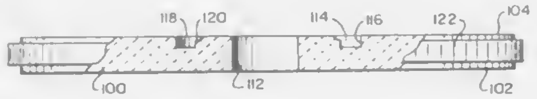
a valve connected between the flexible tubular portion and the threaded coupling means, the valve body including valve means for selectively passing liquid from the upstream end through the tubular portion or shutting off the flow of liquid, including a rotatable valve handle adapted for manual rotation to turn on or shut off liquid flow,

a pouring end at the downstream end of the pouring spout, connected to the flexible tubular portion, and having means for receiving a closure cap, and

a closure cap with means for securing in a leak proof manner to the pouring end of the pour spout, and including a flexible strap securing the closure cap to the pouring spout so as to captively hold the closure cap when it is not secured in closing relationship on the pouring end of the spout.

5,020,703
STATIONARY TOP PLATE FOR A SLIDING GATE VALVE AND METHOD OF MANUFACTURE THEREOF

Albert L. McQuillen, Jr., Pittsburgh, Pa.; Michael McQuillen, Crown Point, Ind., and Mark McQuillen, Pittsburgh, Pa., assignors to Serusteel, Inc., Morgan, Pa.
Filed Jan. 26, 1990, Ser. No. 470,742
Int. Cl.⁵ B22D *41/28*
U.S. Cl. 222—590 **6 Claims**



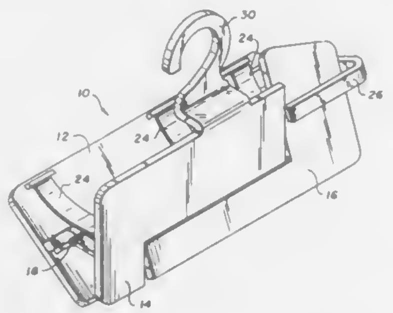
1. A stationary top plate for a sliding gate valve for controlling the discharge of molten metal from a metallurgical vessel comprising:

an apertured plate of refractory material having:
  a lower planar surface adapted to slidingly contact a surface of a movable plate in said gate valve, and
  an upper surface parallel to and approximately one and six-tenths inches spaced apart from said lower surface, said upper surface being provided with an annular groove adapted to mate with an annular ring on the well block nozzle of the vessel; and

a rigid carbon steel band surrounding the periphery of said plate of refractory material intermediate said upper and lower surfaces for maintaining said plate of refractory material under compression, said band having a width of approximately one inch and a thickness of approximately three-sixteenths of an inch to achieve rigidity sufficient to inhibit cracking of said plate during handling and use, and a length such that the distal ends of said band are sufficiently close when said band surrounds said plate to allow said ends to be butt welded.

5,020,704
GARMENT HANGER WITH ROTATING PROJECTIONS TO INTRODUCE GARMENTS WITHIN

Keith Kent, 806 Richards, Vancouver, British Columbia, Canada V6B 4A9
Filed Sep. 29, 1989, Ser. No. 414,543
Int. Cl.⁵ A47G *25/48, 25/14*
U.S. Cl. 223—96 **6 Claims**



1. A garment hanger comprising:

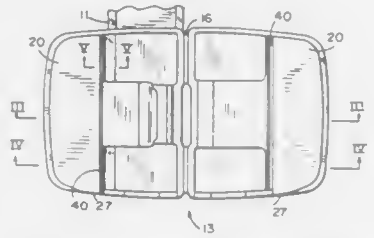
a base plate;

a pair of front plates independently hingedly attached to the base plate, each front plate being positioned relative to the base plate to form a gripping surface adjacent one edge of the garment hanger, said gripping surface being defined by pairs of aligned projections, one projection of each pair of projections formed on the base plate and one projection of each pair of projections formed on a separate front plate;

resilient means urging the front plates towards the base plate at the gripping surface.

5,020,705
ARTICLE GRIPPING MEANS AND METHOD OF MAKING SAME

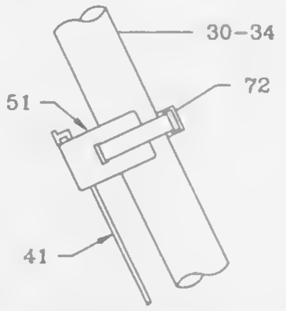
Judd Garrison, Grand Rapids, Mich., assignor to Batts, Inc., Zeeland, Mich.
Filed Aug. 7, 1989, Ser. No. 389,947
Int. Cl.⁵ A47G *25/48, 25/14*
U.S. Cl. 223—96 **9 Claims**



3. A polymer molded plastic garment clamping hanger having an improved garment gripping means, said hanger having a pair of jaws pivotally joined whereby they can be moved toward and away from each other for receiving and clamping a garment seated between them, the inwardly directed face of each of said jaws being flat and having a garment engaging pad, the improvement in said pad comprising: said pad being permanently bonded to the hanger body by a non-rupturable permanent bond without adhesives at the boundary between the polymers of the pad and those of the hanger boy, which bond will not permit separation of the pad from the hanger body during repeated subsequent use even with heavy clothing, said pads each being a thin layer of substantially uniform thickness on a flat surface of the jaw and having a flat garment engaging surface having a high coefficient of friction and capable of garment engagement throughout its entire area facing toward the garment.

5,020,706
BICYCLE SPOKE HOLDER

Scott Birch, 16624 22nd Ave., SE., Bothell, Wash. 98012
Division of Ser. No. 415,868, Oct. 2, 1989, abandoned. This application Jun. 11, 1990, Ser. No. 536,080
Int. Cl.⁵ B62J *9/02*
U.S. Cl. 224—39 **2 Claims**



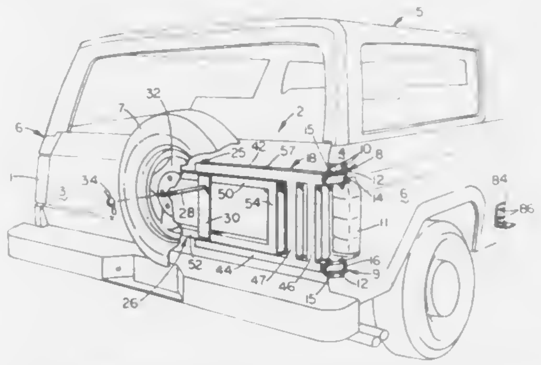
1. A bicycle spoke holder assembly comprising:

(a) at least one frame-mountable body member containing multiple holes passing therethrough, the inside diameter of said holes being substantially the same as the outside diameter of a bicycle spoke and a thin membrane comprised of an elastomer transecting said holes; and

(b) a self locking tie strap means for securing said body member to said bicycle frame member.

5,020,707
COMPOUND HINGED TIRE CARRIER

Richard J. Nozel, 354 Edith Dr., West St. Paul, Minn. 55118, and Ulric W. Trombley, Rural Rte. #1, Chisago City, Minn. 55013
Filed Sep. 30, 1988, Ser. No. 251,310
Int. Cl.⁵ B62D *43/02*
U.S. Cl. 224—42.21 **13 Claims**



1. A vehicular utility carrier comprising:

(a) first and second brackets and means for mounting said first and second brackets in displaced relation to each other and to a vehicle;

(b) first and second pivot arms and means for respectively pivotally securing each of said first and second pivot arms to said first and second brackets along a first vertical pivot axis;

(c) a first framework and means for pivotally coupling said first framework to said first and second pivot arms along a second vertical pivot axis;

(d) latch means for selectively restraining said first framework in parallel alignment with said vehicle at an end mounting position and a side mounting position rotated approximately 270 degrees from said end position; and

(e) means coupled to said first framework at a third vertical pivot axis for pivotally supporting a spare tire and wheel about said first framework and on said third vertical pivot axis whereby the same surface of said tire and wheel is exposed at each of said end and side mounting positions without dismounting said spare tire.

5,020,708
OUTBOARD MOTOR STAND APPARATUS

Albert L. Kalbach, 4323 Santa Fe, Riverbank, Calif. 95367
Filed Sep. 20, 1990, Ser. No. 585,753
Int. Cl.⁵ B60R *9/00*
U.S. Cl. 224—42.32 **8 Claims**

1. An outboard motor stand apparatus for use in the interior of a vehicle wherein the apparatus comprises:

a mounting unit operatively secured to the interior of the vehicle; and, including a base member fastened to the floor of the vehicle and further provided with a hollow cylindrical stub member;

a main support unit rotatably disposed relative to said mounting unit and having an upper end and a lower end; wherein the main support unit comprises: a first elongated vertical support member which is rotatably disposed in said stub member; and, a second elongated vertical support member spaced from and secured to said first elongated support member; and

an auxiliary support unit pivotally secured on one end to the lower end of said mounting unit; wherein, the other end of

VOL
1127
ISS
1
JE
4
1991
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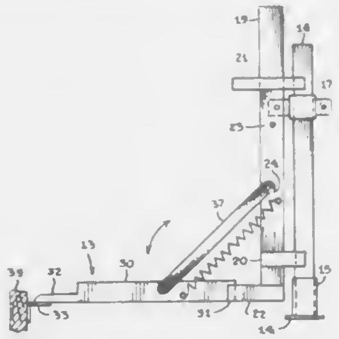
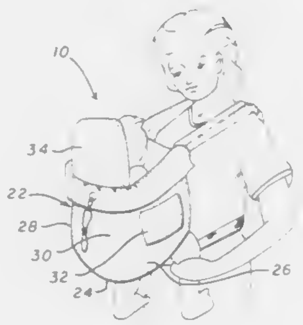
said auxiliary support unit has means for receiving the conventional engine mount on said outboard motor to maintain the outboard motor in a vertically upright disposition during the unloading and storage modes of disposition of the outboard motor relative to the interior of said vehicle.

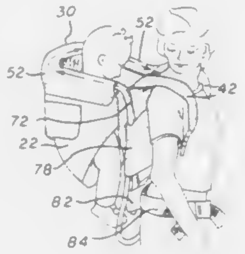


5,020,709

CONVERTIBLE CHILD CARRIER

Anna M. Hoaglan, Woodland Hills, Calif., assignor to International Design/Manufacturing, Inc., Redondo Beach, Calif.
Continuation-in-part of Ser. No. 335,868, Apr. 10, 1989, abandoned. This application Jan. 16, 1990, Ser. No. 466,003
Int. Cl.^{5} A47D *13/02*
U.S. Cl. 224—151 20 Claims





1. A convertible child carrier apparatus capable of being used by a wearer in either a front style, soft carrier mode, or a back style, frame carrier mode, comprising:

a) an outer seat member having upper and lower portions, including a pair of shoulder straps attached to said upper portion adapted to engage a wearer's shoulders, and said outer seat member including means for connecting said shoulder straps to said lower portion of said outer seat in said front style, soft carrier mode;

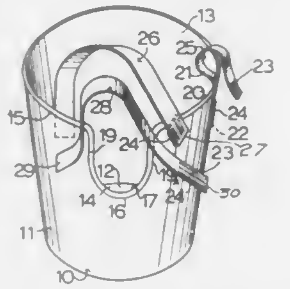
b) an inner seat member for receiving and supporting a child, said inner seat member having a first side fixedly mounted to an inside portion of said outer seat member and a second side adjustably mounted to an opposite inside portion of said outer seat member; and

c) a frame channel in said outer seat member including means for opening and closing said frame channel for removably receiving at least a portion of a rigid frame member; whereby said convertible child carrier apparatus may be used in said front style, soft carrier mode without a frame, and in said back style, rigid frame carrier mode when a frame is received in said frame channel.

5,020,710

HAND SUPPORTED BERRY RECEPTACLE

William A. Meszaros, Box 6, Whitewood, Saskatchewan, Canada S0G 5C0
Filed Apr. 5, 1990, Ser. No. 504,940
Continuation-in-part of Ser. No. 316,300, Feb. 27, 1989, abandoned.
Int. Cl.^{5} A01D *46/00*
U.S. Cl. 224—219 16 Claims



1. A berry receiving container having an open upper side and a closed lower end, and means adapted to support said container from the hand of the user which is used for picking berries, said means including first and second strap means extending from the container to support said container from the hand whereby the container is supported from the hand substantially below the third or ring finger thereof when the hand is held in the substantially vertical position with the fourth finger located at the under side of the hand of the user, said container including an upper edge and a surrounding wall, a cutout portion having an open upper end and extending from said upper edge of said container, vertically downwardly through said wall and terminating in a rounded lower end spaced downdwardly from said upper edge, said cutout portion engaging over the edge of the palm of the hand and adjacent to the fourth finger thereof, whereby at least the fourth finger of the hand is inside the container and extends across the open upper side of said container, said first strap means including a fourth finger engaging adjustable closed finger loop portion on the inside of said surrounding wall of said container, restraining the fourth finger against the inside of said surrounding wall below the open upper side of said container, a slot formed through the wall of said container, one upon each side of said cutout portion and adjacent to the upper edge of said container, said second strap means extending from the interior of said upper end of said container, through each of said slots, adjustable second strap fastening means cooperating with said second strap means to form a closed second strap loop having inner and outer portions, the inner portion being situated within said open end of said container and being engageable around the thumb of the hand of the user, the outer portion engaging over the wrist of the hand of the user thereby suspending the container below the thumb and fingers of the user.

5,020,711

POUCH FOR REUSABLE HOT/COLD PACKS FOR MEDICAL USAGE

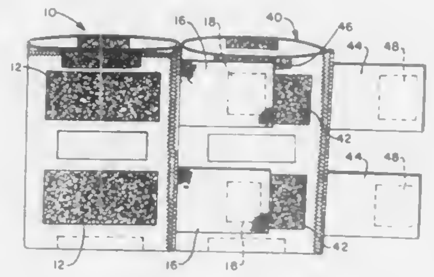
Jerry S. Kelley, 126 Tudor Ave., Akron, Ohio 44312
Filed Nov. 3, 1989, Ser. No. 431,543
Int. Cl.^{5} A45C *13/30;* A61F *7/00*
U.S. Cl. 224—222 10 Claims

1. A holder for a thermo transfer pack use for variant temperature treatment and capable of being attached to an adjacent similar holder comprising:

at least one flexible envelope, the boundary of each said envelope being front side a back side and a defined by a perimeter having a top, a bottom and side edges and having an open area extending along a portion of the perimeter thereof; each said envelope being dimensioned slightly larger than a corresponding thermo transfer pack such that a transfer pack can be inserted into each envelope;

a closing means located along at least a portion of the open area of each holder for retaining each thermo pack in said holder until removed;

a plurality of securing sites, said sites located along the top edge, the bottom edge and on the front side of each envelope;

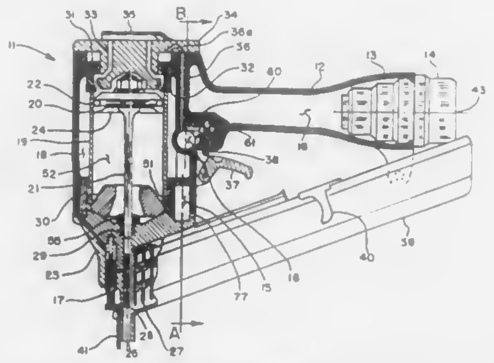


a plurality of bands, said bands having first and second ends wherein said first end is affixed to the envelope and the second end has securing means on at least one side, thereof; whereby one of said holders can be attached to an adjacent holder either in a vertical configuration by attaching said securing site along the top edge of one envelope to the securing site along the bottom edge of a second envelope or in a horizontal configuration by attaching the securing means at the ends of said bands to the securing site of the front side of an adjacent holder.

5,020,712

PNEUMATIC POWERED FASTENER DEVICE

Umberto Monacelli, Via Parini, 6, Monza (Milan), Italy
Filed Apr. 6, 1989, Ser. No. 333,973
Claims priority, application European Pat. Off., Apr. 7, 1988, 88200663
Int. Cl.^{5} B25C *1/04*
U.S. Cl. 227—8 15 Claims

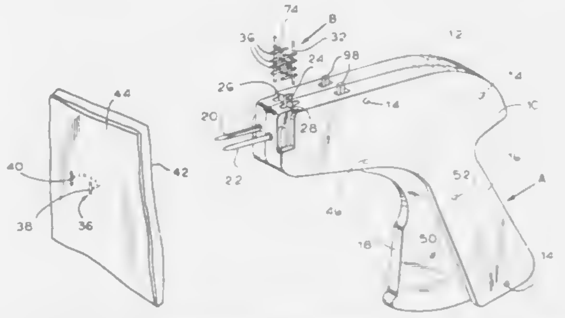


1. A pneumatically powered fastener driving device comprising in combination a housing, a cylinder within said housing, a piston within said cylinder, a driver connected to said piston, a driving stroke means providing pressurized air to the upper side of said piston, a portion of said housing forming a driving throat through which said driver can move, means for inserting a fastener into said driving throat, a chamber within said housing to function as an air pressure reservoir, characterized in that it further comprises return stroke means providing an appreciably lower pressurized air to the underside of said piston, said return stroke means when in a first position allowing a flow of pressurized air from said reservoir to said underside of piston, after said pressurized air under said piston increases to a reduced predetermined ratio to that in said reservoir said return stroke means shifting to a second position blocking said flow, said return stroke means being capable of shifting to a third position allowing communication of said air pressure under the piston with atmosphere while continuing to block communication with said reservoir.

5,020,713

ASSEMBLY OF ATTACHMENTS AND DEVICE FOR ATTACHING SAME

Steven J. Kunreuther, 285 Central Park West, New York, N.Y. 10024
Continuation-in-part of Ser. No. 347,419, May 4, 1989, abandoned. This application Aug. 31, 1990, Ser. No. 575,853
Int. Cl.^{5} B25C *1/00*
U.S. Cl. 227—67 8 Claims



1. A device for dispensing attachments of the type having first and second T-bar ends with a flexible filament therebetween, the attachments being supplied in an assembly between first and second spaced connecting bars joined to the first and second T-bar ends, respectively, the device comprising a housing, a recess in said housing having first and second spaced sections adapted to receive the first and second connecting bars, respectively, first and second hollow needles extending from said housing, each of said needles comprising a channel through which a different one of the T-bar ends of an attachment is adapted to move, means within said housing for pushing the T-bar ends through said needles to dispense an attachment, means for severing each of the T-bar ends from the connecting bar to which it is joined and means for advancing the assembly through the housing.

5,020,714

METHOD AND PRESS APPARATUS FOR MANUFACTURING

Larry N. Miles; Cecil A. Drinnen; David W. Hackler, all of Wichita; Tom L. Bogart, Pratt, all of Kans.; Arnold D. Macklin, Newkirk, Okla.; Ben E. Sharpsteen; Truett M. Hyles, both of Wichita, Kans., and Herschel M. Stephens, Haysville, Kans., assignors to The Boeing Company, Seattle, Wash.
Filed Apr. 12, 1989, Ser. No. 336,900
Int. Cl.^{5} B23K *37/04*
U.S. Cl. 228—15.1 20 Claims

1. A ram press for applying variable pressure to selected areas of a bonding assembly jig to shape a face plate to conform to the contoured surface of a header and to hold the face plate in place for welding, comprising:

at least one inverted U-shaped support frame including two spaced apart elongated vertical support members each having a bottom end and a top end, and an elongated horizontal top beam extending between and connecting said top ends of said vertical support members;

a track extending between said vertical support members;

fastening means for adjustably fastening said track to said

VOL
1127
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1991
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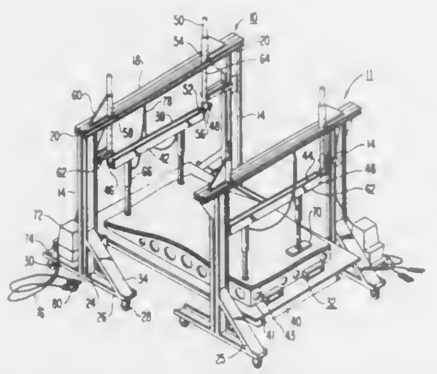
support frame for vertical movement of the ends of the track relative to the horizontal top beam;

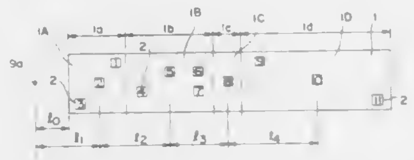


at least one press means slidably suspended from said track and adapted to apply pressure to a bonding assembly jig.

5,020,715
BONDING METHOD

Kazumasa Kimura, Tokyo; Akira Komamiya, Saitama, and Takashi Endo, Tokyo, all of Japan, assignors to Kabushiki Kaisha Shinkawa, Tokyo, Japan

Continuation of Ser. No. 289,182, Dec. 22, 1988, abandoned. This application Feb. 1, 1990, Ser. No. 474,213
Claims priority, application Japan, Dec. 23, 1987, 62-325726
Int. Cl.^{5} H01L *21/58;* **B23K** *101/36*
U.S. Cl. 228—102 4 Claims



1. A bonding method for irregular bonding patterns characterized in that said method comprises the steps of:

dividing a substrate into a plurality of regions along its length, each of said plurality of regions having a plurality of pellets to be placed therein;

storing substrate feeding data and bonding pattern data for each of the plurality of regions of said substrate into a data memory, said substrate feeding data and said bonding pattern data for each of said plurality of regions being different;

feeding said substrate in accordance with said substrate feeding data for each of said plurality of bonding regions such that a center of each of said plurality of regions is placed beneath a bonding tool; and

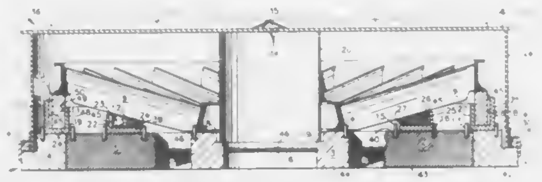
performing bonding pattern operations successively for each of the plurality of regions in accordance with said bonding pattern data for each of said plurality of regions to place each of plurality of pellets in each of said plurality of regions;

whereby a plurality of pellets are placed in each of said plurality of regions.

5,020,716
INTEGRATED BRAZING FIXTURE FOR BRAZING TITANIUM

Steven M. Miller, Jupiter, and Daniel A. Bales, Palm City, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 26, 1989, Ser. No. 457,080
Int. Cl.^{5} B23K *37/00*
U.S. Cl. 228—212 20 Claims



20. A method of maintaining metal parts in fixed relation to each other prior to and during brazing in a brazing furnace. said method comprising:

positioning said metal parts on support means at room temperature, said support means located on a base and including primary support means which has a coefficient of thermal expansion essentially equal to that of the parts being brazed, secondary support means concentric with, and in contact with, said primary support means for supporting said primary support means, said primary support means, said secondary support means, and said base each including a coating which prevents the primary support means, the secondary support means and said base from alloying or bonding to each other or to said metal parts at braze temperature;

heating said metal parts up to braze temperature in said furnace, said heating causing said primary support means and said base to slide with respect to said secondary support means, said heating occurring at a rate which causes the metal parts and the primary support means to thermally expand at essentially the same rate so that the parts do not slide with respect to said primary support means;

providing positioning means on said base for ensuring that said secondary support means is correctly positioned with said base at braze temperature;

supporting said primary support means with said secondary support means at braze temperature to ensure that said primary support means supports said metal parts in fixed relation to each other during brazing of the metal parts; and,

cooling said metal parts back down to room temperature in said furnace, said cooling occurring at a rate which causes the metal parts and the primary support means to thermally contract at the same rate so that the parts do not slide with respect to said primary support means.

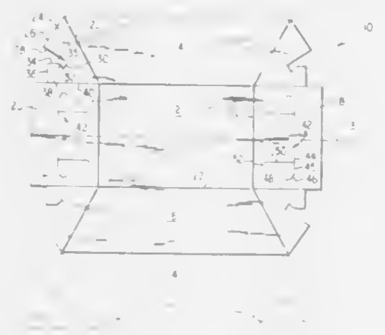
5,020,717
LOCK SET TRAY

Benjamin J. Cassidy, Waldwick, N.J., assignor to International Paper Company, Purchase, N.Y.

Filed Apr. 9, 1990, Ser. No. 506,143
Int. Cl.^{5} B65D *5/30*
U.S. Cl. 229—114 7 Claims

1. A paperboard blank for forming a tray, the blank defining a plane, the blank having a central, rectangular bottom forming panel, upper and lower side forming panels each having ends and foldably connected to respective upper and lower sides of the central panel, left and right end forming panels foldably connected to respective left and right ends of the central panel, ends of the side forming panels each carrying a latching tongue, each end panel provided with a pair of generally T-shaped latching slits with the base of each T-shaped slit being horizontal and generally parallel to said upper and lower sides of the central panel whereby each latching tongue can be

inserted into a respective latching slit upon the upward bending of the side and end panels form the plane of the central panel and each tongue can slide in its respective latching T-shaped latching slit after insertion therein, each end of the side forming panels provided with a foldable web panel, each web

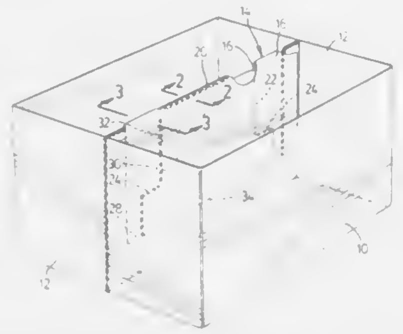


panel carrying a respective one of said latching tongues, and wherein the foldable connection between each web panel and its respective side panel is at an angle to the left and right ends of the central panel, so that each side panel becomes wider with increasing distance from the central panel.

5,020,718
SEVERABLE CONNECTION BETWEEN A HANDLE AND A DIVIDER PANEL OF A CARTON

John Zimmermann, Scarborough, Canada, assignor to Paperboard Industries Corporation, Toronto, Canada

Filed Jul. 9, 1990, Ser. No. 550,125
Int. Cl.^{5} B65D *5/46, 5/48*
U.S. Cl. 229—117.22 1 Claim



1. In a divider panel assembly of the type which has a handle panel that is formed integrally with a anchor panel, the handle panel having shoulders that project laterally from opposite side edges of the handle portion thereof which serve to support the weight of a carton that is carried by the handle in use, the handle panel being severed from the anchor panel along a severance cut that extends in a severance plane that extends transversely below the handle panel and is interrupted by first and second tearable joining means that connect the handle panel and the anchor panel, the first and second joining means being located one below each side edge of the handle portion, the improvement wherein each joining means comprises;

a) a first cut which has a first portion of its length that extends along the severance plane and a second portion of its length that extends downwardly and inwardly from the first portion to a terminal end,

b) a second cut which has first and second portions of its length located below and extending parallel to the first and second portions of the first cut and a third portion that extends inwardly from the second portion of the second cut in a plane that is parallel to the severance plane to form a first tear bar between the first and second cuts,

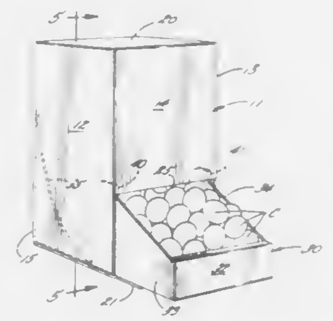
c) a third cut that extends from a first end and has first and second portions of its length that are located below and extend parallel to the second and third portions of the second cut and a third portion that extends upwardly and inwardly to the severance plane, the second and third cuts being separated from one another by a second tear bar,

d) the terminal end of the first cut and the first end of the third cut being disposed opposite one another on opposite sides of the second cut.

5,020,719
DISPENSING CONTAINER

Michael C. Roth, Naugatuck, and Walter J. Buttrick, Brookfield, both of Conn., assignors to Chesapeak Display & Packaging Company, Winston-Salem, N.C.

Filed Jun. 30, 1988, Ser. No. 213,599
Int. Cl.^{5} B65D *5/36, 5/38*
U.S. Cl. 229—122.1 3 Claims



1. A dispensing container comprising a substantially rectangular main body potion having opposing side, back and front and top and bottom walls, means provided on a lower portion of the front wall for facilitating removal of a portion of the front wall from the main body portion to form an access opening thereat for gaining access to the interior of the body portion, a slidable tray within said body portion with said tray resting on the bottom wall of said body portion and slidably movable from a position within the body portion to an extended position wherein said tray is withdrawn through the access opening in the lower portion of the front wall of the body portion for gaining ready access to any contents in the tray, said tray having side panels serving as tray side walls and a back wall panel serving as a chute for facilitating dispensing of any contents from the container when the tray is in an extended position, abutment means carried by said tray side panels and adapted to engage an inner surface of said front wall adjacent the access opening for preventing withdrawal of said tray completely from said main body wherein said back wall panel includes a plurality of score lines extending widthwise of the tray to guide the contents of the tray toward the front panel of the tray.

5,020,720
MAILBOX HOLDER

Joseph A. Harpe, 4680 Miller Rd., Buckley, Mich. 49620

Filed Jan. 26, 1990, Ser. No. 470,763
Int. Cl.^{5} B65D *91/00*
U.S. Cl. 232—39 7 Claims

1. An impactable mailbox support device comprising:

a vertical support post fixedly mountable in the ground;

a resilient, horizontal support member having a first end fixedly mounted on said support post, and terminating in a free second end; and

a mailbox support surface mounted on said horizontal sup-

VOL
1127
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1991
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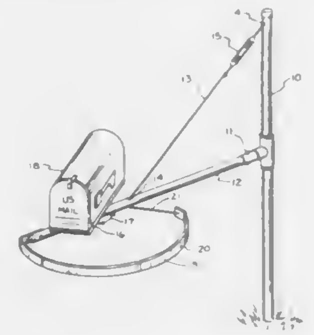
port member proximate the free end thereof, wherein, when an object strikes the mailbox support device or a



mailbox mounted thereon, the resilient support member deflects out of the path of said moving object.

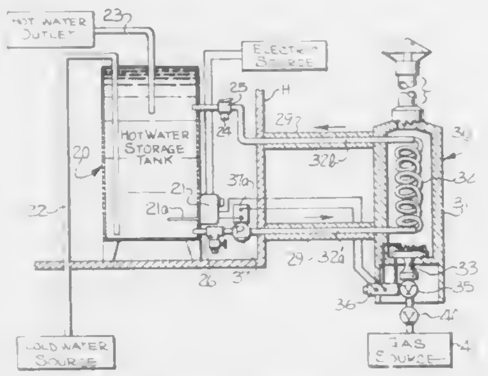
5,020,721
RAPID RECOVERY GAS HOT WATER HEATER

Frank L. Horne, Charlotte, N.C., assignor to Gas Fired Products, Charlotte, N.C.

Filed Sep. 19, 1989, Ser. No. 409,143

Int. Cl.^{5} F23N *1/08*

U.S. Cl. 236—20 R 5 Claims



1. The combination with a building structure of a rapid recovery water heating system therefor comprising a water storage tank positioned within said building structure and having a cold water inlet communicating with lower regions of the tank and a hot water outlet communicating with upper regions of the tank, a gas water heater separate from said storage tank and mounted outside said building structure and being the sole water heating means for said building, said gas water heater comprising a housing, a heat exchanger for the flow of water therethrough positioned in said housing, said heat exchanger having a water capacity of only a small fraction of the capacity of said water storage tank, said heat exchanger having inlet and outlet ends, said outlet end communicatively connected with upper regions of said storage tank and said inlet end communicatively connected with lower regions of said storage tank, gas burner means positioned adjacent said heat exchanger for heating the water therein, a water pump communicating with said heat exchanger and with said storage tank for pumping of water from lower regions of said storage tank into and through said heat exchanger and back into said storage tank, a thermostat having water temperature sensing means positioned in said storage tank adjacent lower portions thereof, and means operatively connecting said thermostat to said water pump and said gas burner means for actuating both the water pump and said gas burner means in response to the sensed temperature of the water in said storage tank falling below a predetermined temperature value as when heated water in upper regions of the tank is drawn off causing cold inlet water to enter said storage tank.

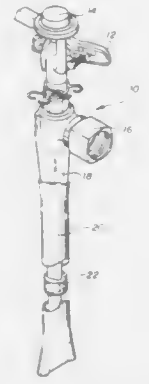
5,020,722
SELECTIVELY CONTROLLABLE SPRINKLER SYSTEM FOR LAWNS, YARDS, GARDENS AND THE LIKE

Marvin H. Wardell, 4301 Wild Ivy Ct., Arlington, Tex. 76016

Filed Dec. 1, 1989, Ser. No. 444,280

Int. Cl.^{5} A01G *25/00;* **B05B** *15/06*

U.S. Cl. 239—1 3 Claims



1. A device for facilitating the controlled and repetitive placement of a portable lawn sprinkler adjacent an area that is to be periodically watered, said lawn sprinkler being of the type that has a sprinkler head, a water hose connection and an elongated spike that is intended to be forced into the ground to temporarily anchor the lawn sprinkler for use, comprising:

a. an elongated and generally tubular anchor member formed from a piece of tubular stock, said anchor member having an inner diameter that is just large enough to receive the elongated spike of the lawn sprinkler, and the length of the anchor member being sufficient to telescopically receive at least most of the sprinkler's elongated spike, and the bottom of the anchor member being at least partially squeezed together to form a wedge shape when seen in a plan view, said wedge shape being effective to foster entrance of the anchor member into the ground and to resist rotation of the anchor member about its longitudinal axis after it has been forced into the ground, and the anchor member being flattened near its bottom by squeezing together two opposite sides of the generally tubular stock, such that the anchor member is essentially flattened adjacent the middle of the bottom end, but the bottom of the anchor member is still partially open at its two edges, whereby any rainwater that might otherwise collect in an open top of the anchor member is permitted to drain downwardly out of the two openings at its two edges;

b. means for ensuring that the elongated spike of the lawn sprinkler can be sequentially inserted into each of a plurality of anchor members with the same relative orientation, after each anchor member has been forced into the ground with a generally vertical orientation and with its top being accessible, whereby a water-hose that is in communication with the water-hose connection can be used to supply water to the water sprinkler at selected times, and whereby the water sprinkler will provide a repetitive and predictable pattern of watered area because the water sprinkler can be repeatedly placed in each anchor member with an identical orientation every time that the water sprinkler is installed.

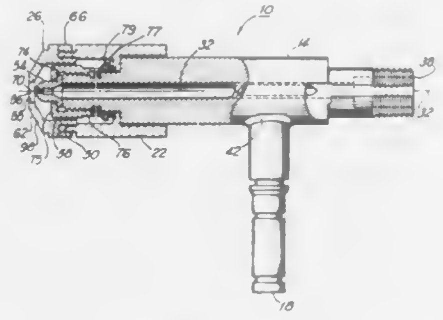
5,020,723
HOT MELT GLUE SPRAYING DEVICE

Lawrence E. Crist, 3517 Jefferson Township Pkwy., Marietta, Ga. 30066

Filed Aug. 10, 1989, Ser. No. 391,871

Int. Cl.^{5} B05B *17/04, 1/24, 7/10*

U.S. Cl. 239—11 **10 Claims**



1 A method for spraying adhesive, comprising the steps of:

a. providing a pressurized stream of thermoplastic adhesive to a nozzle received by a nozzle retainer having a hexagonal segment and a substantially circular segment, each segment having an exterior surface;

b. impacting the exterior surface of the substantially circular segment with pressurized air;

c. forcing the air into a first passage having an interior boundary defined by the hexagonal segment and an exterior boundary defined by a tubular surface, thereby imparting angular, spiral motion to the air;

d. forcing the air into a second passage having a substantially conical exterior boundary; and

e. emitting the air and adhesive through a common orifice so that the air will impinge upon the adhesive.

5,020,724
NOZZLE FOR WATER JET CUTTING

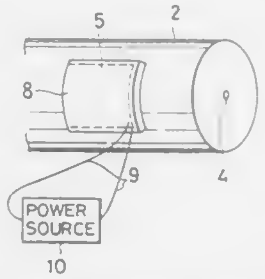
Fumio Kiyono; Takayuki Saito, and Keiji Handa, all of Tsukuba, Japan, assignors to Agency of Industrial Science and Technology, Ministry of International Trade & Industry, Tokyo, Japan

Filed Oct. 30, 1989, Ser. No. 428,938

Claims priority, application Japan, Nov. 22, 1988, 63-295513

Int. Cl.^{5} B05B *1/08*

U.S. Cl. 239—102.2 **3 Claims**



1. A nozzle for water jet cutting, comprising:

a nozzle body defining a high pressure chamber therein, said nozzle body having one end connected to a high pressure fluid supply source, said nozzle body having another end including an orifice communicating said high pressure chamber with an outside area to jet a high pressure fluid from said high pressure chamber to the outside area;

at least one piezoelectric element mounted on said nozzle body so as to transmit oscillation to said high pressure fluid, said at least one piezoelectric element oscillating at a frequency in synchronism with a voltage applied thereto by a power source, said frequency being in the order of several MHz and the amplitude of oscillation of the piezoelectric element being proportional to the magnitude of the applied voltage, wherein said piezoelectric element is provided on the outer surface of said nozzle body.

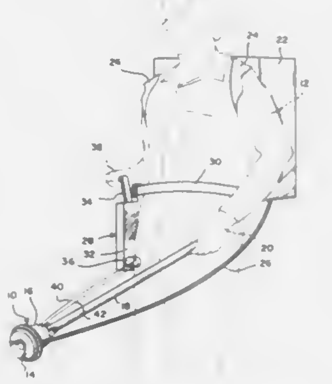
5,020,725
MANUAL SPRAY APPARATUS

John E. Waldrum, 349 Fairview Ave., Ambler, Pa. 19002

Filed May 24, 1989, Ser. No. 356,070

Int. Cl.^{5} B05B *3/10*

U.S. Cl. 239—154 **11 Claims**



1. A manual, portable spray apparatus comprising

an agricultural chemical, rotary spray head;

a small electric motor connected to rotatively drive the spray head when the motor is energized;

a liquid chemical containing tank feeding liquid chemical to the spray head through an intercommunicating conduit; a hand rotated dynamo having an output and being adapted to power the electric motor, the dynamo producing an electrical current at the dynamo output when the dynamo is turned;

a speed changing gear train having an input and an output, the dynamo being connected to the gear train output; electrical conveying means interconnecting the output dynamo with an input of the electric motor to cause rotation of the electric motor upon rotation of the dynamo; and

an electrical appliance connected to the dynamo output, the electrical appliance generating an electrical impulse upon receiving sufficient electrical current from the dynamo,

the electrical appliance being a radio transmitter and the electrical impulse being a radio signal;

whereby, the electric motor and the rotary spray head are rotated when the dynamo is rotated to generate the electric current to energize the electric motor.

5,020,726
TWO STAGE FLUID VALVE ASSEMBLY

Michael J. Myres, 347½ Concord St., El Segundo, Calif. 90245

Filed Jan. 5, 1990, Ser. No. 461,241

Int. Cl.^{5} B05B *9/00*

U.S. Cl. 239—525 **22 Claims**

1. A plural stage air gun assembly for discharging through a nozzle air from a source of air under pressure at a selected unambiguous air flow rate, said assembly comprising in combination:

a) at least two valves for independently controlling the flow rate through said assembly, each of said valves including a component and each said component of each of said valves including a translatable piston and means for translating said piston;

b) means for manually actuating any one of said valves;

VOL
1127
ISS
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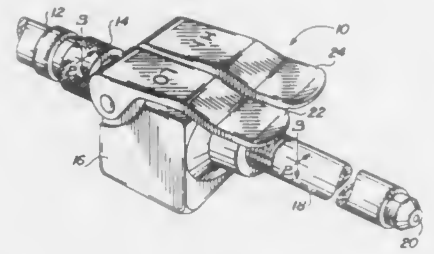
1991
UMI

c) means for directing air from the source of pressure to each of said valves;

d) means for conveying from each of said valves the air to be discharged; and



e) means for providing a predetermined level of restriction of the air flow rate flowing through each of said valves upon actuation of a respective one of said valves and wherein the level of restriction is a function of the configuration of said component of the respective one of said valves.

5,020,727

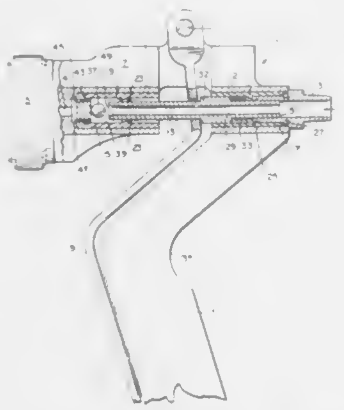
SPRAY NOZZLE TRIGGER OPERATED SUPPLY VALVE

James E. Smith, St. Petersburg, Fla., assignor to Graves Spray Supply, Inc., Clearwater, Fla.

Filed May 22, 1990, Ser. No. 526,652

Int. Cl.⁵ B05B *9/01*

U.S. Cl. 239—526 20 Claims



1. A spray gun having a supply valve connecting an inlet with a spray nozzle and a trigger at a spray gun handle for operating said valve, comprising:

a valve chamber having an inlet and an outlet;

a first valving means which is shiftable in said chamber between an open position to allow flow of material from the inlet to the outlet and to a closed position precluding flow of material from said inlet to said outlet;

a second valving means free floating in said chamber when said first valving means is in its open position and engaged and positioned by said first valving means when said first valving means is in its closed position.

5,020,728

FUEL INJECTION NOZZLE FOR INTERNAL COMBUSTION ENGINES

Ernst Linder, Mühlacker, and Helmut Rembold, Stuttgart, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

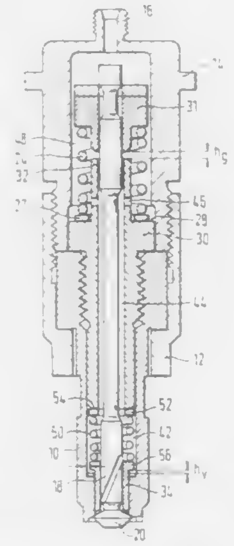
PCT No. PCT/DE88/00176, § 371 Date Dec. 11, 1989, § 102(e) Date Dec. 11, 1989, PCT Pub. No. WO88/09869, PCT Pub. Date Dec. 15, 1988

PCT Filed Mar. 22, 1988, Ser. No. 449,968

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1987, 3719459

Int. Cl.⁵ F02M *61/00*

U.S. Cl. 239—533.12 8 Claims



4. A fuel injection nozzle for internal combustion engines, comprising a nozzle body having a valve seat; a valve needle displaceable in said nozzle body and having a closing head for engaging said valve seat; a first spring for biasing said closing head of said valve needle into engagement with said valve seat, said valve seat defining a first stop for said valve needle, and said first spring biasing said closing head in a direction opposite to a direction in which axial forces resulting from flow of fuel in said nozzle body, act on said valve needle, said valve seat and said closing head of said valve needle defining an outer valve annular gap upon disengagement of said closing head from said valve seat; a valve sleeve displaceably supported in said nozzle body upstream of said closing head and connected with said valve needle for joint axial displacement and relative thereto, said valve sleeve and said valve needle defining a fuel filled pressure space, and said valve sleeve having, in a vicinity of said pressure space, a plurality of lateral spray openings for directing clustered fuel sprays, said closing head having a conical seat surface for engaging said valve seat and said valve sleeve having a downstream end edge for defining with said conical seat surface an inner valve annular gap for directing a central fuel umbrella spray; a second stop fixedly connected with said nozzle body and engageable by said valve sleeve during an opening stroke and after said valve sleeve and said valve needle joint axial displacement, said joint axial displacement controlling fuel flow through said lateral spray openings wherein upon engagement of said valve sleeve with said second stop said closing head is lifted off said valve sleeve and said inner valve annular gap is formed; a second spring for biasing said valve sleeve into engagement with said closing head and acting constantly in a direction of opening movement of said valve needle; and stop means surrounding said valve needle and secured in said nozzle body for at least partially supporting said second spring.

5,020,729

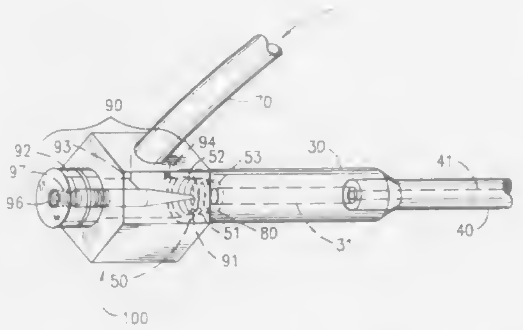
FLUID JET APPARATUS

Jack B. Roach, 1451 Wilson Rd., Clearwater, Fla. 34615

Filed Feb. 22, 1990, Ser. No. 483,911

Int. Cl.⁵ B05B *1/00;* **B23K** *31/02;* **B21D** *39/04*

U.S. Cl. 239—600 14 Claims



1. An improved fluid jet nozzle apparatus, the apparatus comprising:

a rigid nozzle member comprising an elongated exterior surface, an elongated inner cylindrical open channel which is generally parallel with said exterior surface, a nozzle end which is suitable for dispersement of a fluid, and an intake end, said intake end having a planar surface which is perpendicular with the length of said elongated exterior surface and inner channel;

a rigid base member, said base member further comprising an exterior surface and an inner cylindrical channel, said inner cylindrical channel being smaller than the said nozzle member exterior surface;

said base member being further adapted with a drilled hole on one end, said hole being cylindrical and having a diameter within a range only slightly more or less than 0.003 of an inch larger than the exterior surface diameter of said nozzle member, said hole further having an end within said base member which is planar and perpendicular to said base member inner channel and is in fluid communication with said base member inner channel;

said base member and said nozzle member being attached to each other by means of a durable and noncorrosive silver braze, said braze extending between the exterior surface of the said nozzle member and the interior surface of the drilled hole of the base member at all points while the intake end of the nozzle member is received through the drilled hole of the base member until said planar surface of said nozzle member is in firm contact with said planar end of said drilled hole;

said base member further comprising a threaded hole on an end opposite said nozzle member receiving end, said thread adapted to receive a screw end of a needle valve member in a fluid-tight manner except for a needle valve member interior channel which is adapted to permit a flow of fluid from the interior channel of said needle valve member into the inner channel of said base member;

said needle valve member further comprising a fluid-tight housing, a needle valve with a threaded exterior surface and a needle valve channel with interior threads matching said needle valve threads so as to permit adjustment of the size of the said needle valve member interior channel by turning said needle valve through said matching threads by means of a set screw end on said needle valve; and

said set screw end further adapted so that it may be recessed within a recessed portion of said needle valve housing and secured in place by filling said needle valve housing recessed portion with a hardening fluid, semi-fluid, or semi-solid substance.

5,020,730

AUTOMATIC IRRIGATION MACHINE INCLUDING A DRUM DRIVEN BY A HYDRAULIC ACTUATOR, AND A COMPUTER FOR REGULATING THE ACTUATOR RATE

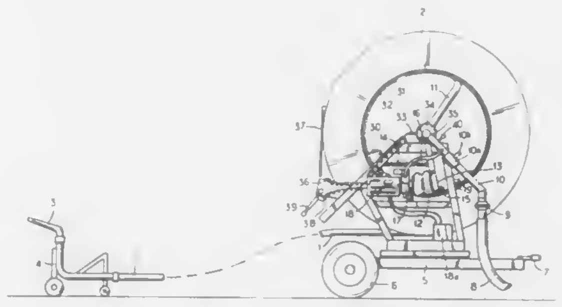
Bruno G. Perroud, Toulouse; Claude J. Rouquayrol, Roujan, and Jean C. Guilhem, Paulhan, all of France, assignors to Irrifrance-Cofadsi, Paulhan, France

Filed Feb. 22, 1990, Ser. No. 484,121

Claims priority, application France, Feb. 24, 1989, 89 02626

Int. Cl.⁵ A01G *25/16, 25/09, 25/00*

U.S. Cl. 239—745 13 Claims



1. An automatic irrigation machine of the type comprising a flexible irrigation hose feeding a sprinkler apparatus mounted on a carriage and wound onto a drum which is rotated by a deformable actuator that reciprocates a rocker arm carrying a finger at its free end which co-operates with holes regularly spaced apart on a ring concentric with said drum, the machine including a computer provided with a memory and with a keyboard, a first angular displacement sensor for sensing angular displacement of the drum and situated in the proximity of said ring to deliver a pulse to the computer each time one of said holes goes past it, and a water sensor which delivers a signal to the computer proportional to the water pressure or the water flow rate at the inlet to the machine, said computer being programmed to calculate on a continuous basis a theoretical winding speed for delivering a predetermined depth of water all along a strip of ground while taking account of the instantaneous flow rate as measured or calculated on the basis of the inlet pressure, and for calculating, firstly the length of hose wound in during each go-and-return cycle of the actuator as a function of the number of layers of hose already wound on the drum, and secondly the ideal go-and-return cycle time of the actuator corresponding to said ideal speed, with the computer regulating the duration of the go-and-return cycles of said actuator so that they are constantly equal to said ideal duration.

5,020,731

PROCESS FOR REDUCING ACIDITY OF UNRECRYSTALLIZED EXPLOSIVES BY WET GRINDING

Carlos Somoza, and Lee C. Estabrook, both of Minden, La., assignors to Thiokol Corporation, Ogden, Utah

Filed Jul. 6, 1990, Ser. No. 549,286

Int. Cl.⁵ B02C *19/00*

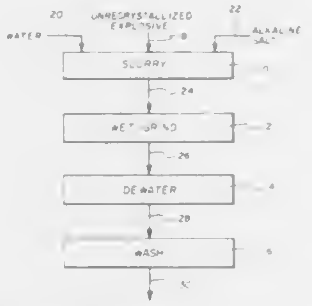
U.S. Cl. 241—1 15 Claims

1. A method for removing occluded acidity from particulate explosive material, comprising: slurrying said particulate explosive material in an inert liquid;

passing said slurry proximate and an ultrasonic generator to grind said slurried particulate explosive material in the wet state to simultaneously reduce the particle size to said explosive material, release said occluded acidity from said

VOL
1127
ISS
1
JE
4
1991
UMI

explosive material, and dissolve said released acidity in said inert liquid; and recovering said explosive material of reduced particle size and reduced occluded acidity from said slurry.



5,020,732
PROCESSES FOR DEHUSKING PSYLLIUM SEEDS

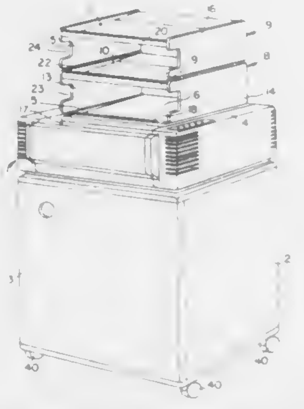
Abdul S. Bahrani, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Jun. 30, 1989, Ser. No. 374,405
Int. Cl.⁵ B02C *19/12*
U.S. Cl. 241—7 9 Claims

1. A process for preparing high yields of high purity psyllium seed husk from intact psyllium seeds comprising the steps of:

(a) milling intact psyllium seeds in a mill which causes the husk to be fragmented by collision under conditions utilizing impact speeds of from about 5 m/sec to less than about 30 m/sec whereby the husk is fractured and separated from the non-husk portion of the psyllium speed without substantial breakage and size reduction of the non-husk portion;
(b) dividing the dehusked seed mixture into at least one fragment enriched with non-husk material and at least one fragment enriched in husk;
(c) optionally repeating steps (a) and (b); and
(d) collecting the fragments enriched in psyllium husk.

5,020,733
DOCUMENT SHREDDER WITH ONE OR MORE TRAYS FOR STACKS OF PAPER IN CONTINUOUS FORM

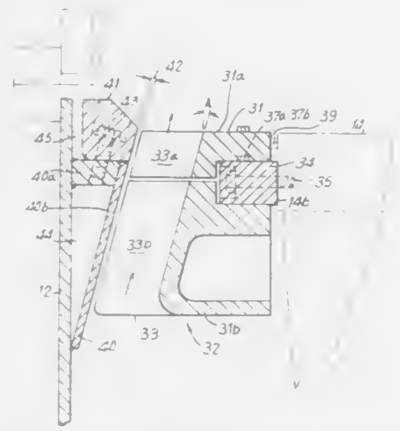
Willi Strohmeyer, Hanover, Fed. Rep. of Germany, assignor to Geba-Werke GmbH, Hanover, Fed. Rep. of Germany
Continuation of Ser. No. 323,918, Mar. 15, 1989. This application Apr. 17, 1990, Ser. No. 509,742
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1988, 3808486
Int. Cl.⁵ B02C *18/22*
U.S. Cl. 241—100 4 Claims



1. A document shredder with at least one tray for holding at least one stack of paper in continuous form, wherein said document shredder contains an infeed duct, said tray is arranged above said infeed duct and is provided with a contiguous stop on the side facing said infeed duct of said shredder, and said tray for said stack of paper is arranged on the top of said document shredder so as to slope at a fixed angle downwardly towards said contiguous stop.

5,020,734
PULVERIZER HAVING ROTATABLE TABLE WITH REPLACEABLE AIR PORT SEGMENTS

Randall J. Novotny, Morris, and Ralph L. Cummins, High Bridge, both of N.J., assignors to Foster Wheeler Energy Corporation, Clinton, N.J.
Continuation of Ser. No. 382,374, Jul. 20, 1989, abandoned. This application Apr. 16, 1990, Ser. No. 511,926
Int. Cl.⁵ B02C *15/00*
U.S. Cl. 241—119 8 Claims

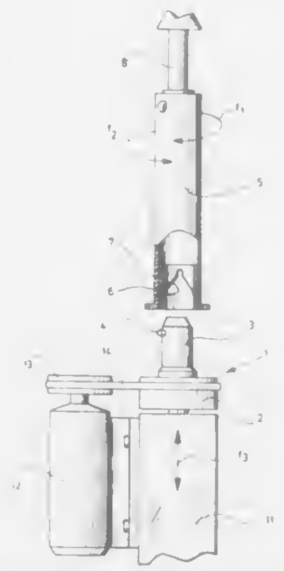


1. A pulverizer assembly for pulverizing particulate materials, including a housing, a grinding table rotatably mounted in the housing and having annular air port openings provided between the grinding table and the housing, and roller means contacting the grinding table upper surface for pulverizing the particulate material thereon, wherein the improvement comprises:

(a) an outer segmented ring attached to the housing wall at a location opposite the grinding table, said outer ring segments each including an upper part which is removably attached to a lower part; and
(b) an inner segmented ring removably attached onto an outer periphery surface of the grinding table so as to provide a narrow radial gap between said outer segmented ring and the inner segmented ring, wherein said inner ring segments each include a lower part removably attached onto the grinding table outer periphery, each said lower part having a plurality of upwardly oriented flow passages therein, and an upper part also removably attached to the outer periphery of the grinding table in an overlapping arrangement with the ring segment lower part, each said upper part having a plurality of upwardly oriented flow passages therein, the cross-sectional area of the flow passages in said ring segment upper parts being smaller than the cross-sectional area of the flow passages in said ring segment lower parts, whereby the ring segment upper parts can be removed and replaced independent of the ring segment lower parts.

5,020,735
TRANSPORT DEVICE FOR PACKAGES AND/OR TUBES THEREOF

Siegfried Inger, Krefeld, and Manfred Schroeders, Moenchen-Gladbach, both of Fed. Rep. of Germany, assignors to Palitex Project Company GmbH, Fed. Rep. of Germany
Filed Feb. 21, 1990, Ser. No. 482,556
Claims priority, application Fed. Rep. of Germany, Mar. 4, 1989, 3906951
Int. Cl.⁵ B65H *67/06, 54/00*
U.S. Cl. 242—1 4 Claims

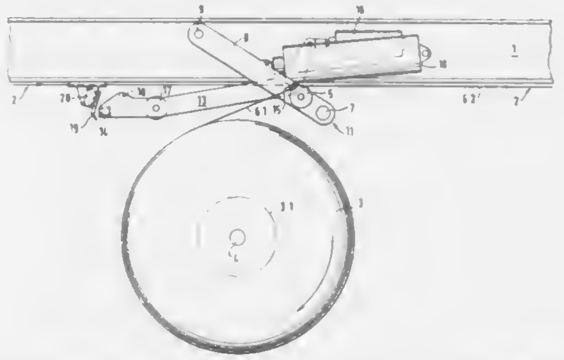


1. In a transport and holding device for at least one hollow thread package comprising a hollow elongate package adapter insertable into the hollow thread package for holding the package thereon; and a package adapter carrier having a mandrel insertable into a lower end of said package adapter for supporting said package adapter and the thread package carried thereby; the improvement of positioning means on said mandrel of said package adapter carrier, and means on said package adapter cooperating with said positioning means for position said package adapter and thread package carried thereby in a certain angular position relative to the position of said package adapter carrier so that work can be performed on the thread package or said thread package adapter in a desired position.

5,020,736
DEVICE FOR CONNECTING STRIPS OF MATERIAL

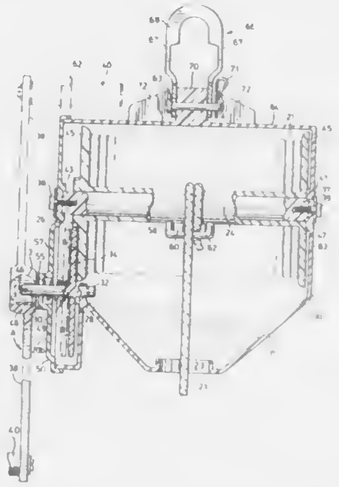
Karl Thievessen, Grevenbroich, Fed. Rep. of Germany, assignor to Jagenberg Aktiengesellschaft, Fed. Rep. of Germany
Filed Nov. 27, 1989, Ser. No. 441,799
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1989, 3901854
Int. Cl.⁵ B65H *19/14*
U.S. Cl. 242—58.300 5 Claims

1. In a take-off machine including a device for connecting the end of one strip of material which is being taken off a first roll with the start of a strip from a new roll on the take-off machine which is replacing the first roll, including means for holding the roll in each case, a guide roller arranged above the take-off point to deflect the strip being taken off, means to cut the strip being taken off, means for holding the strip end produced by such cutting, and means to press the strip end to the outside circumference of the new roll replacing the old roll, in order to produce an adhesive bond, the improvement which comprises a frame, first and second pairs of pivot arms (8, 13), each parallel, attached to the frame above the take-off point, the first pair of pivot arms (8) carrying a transport element (7) to lift part (6.4) of the strip being taken off, means for pivoting the transport element opposite the strip movement direction, from a rest position (11) behind the strip part (6.1) guided to the guide roller (5) in the strip movement direction, into an end position (12) located outside the area of a full roll (3), the second pair of pivot arms (13) carrying a holder element (14) at its free end, in front of the holder element a press-down element (17) for the lifted strip part (6.4) which can be pivoted from the end position of the first pair of pivot arms (8) in the strip movement direction up to the outside circumference of a full roll (3), and a cutting device (19, 20) attached to the frame in the area between the transport element (7) in the end position (12) of the first pair of pivot arms (8) and the holder element (14) when the second pair of pivot arms (13) are pivoted up.



5,020,737
TOW-LINE WINDING DEVICE

Douglas Sehl, Waterdown, Canada, assignor to The Ski-Ease Limited Partnership, Waterdown, Ontario, Canada
Continuation of Ser. No. 242,661, Dec. 9, 1988, Pat. No. 4,930,719. This application Nov. 14, 1989, Ser. No. 435,926
Claims priority, application Canada, Apr. 8, 1988, 563628
Int. Cl.⁵ B65H *75/34;* **B66D** *1/14*
U.S. Cl. 242—86.5 9 Claims



1. A device for winding and unwinding a water skiing tow-line, the device comprising:

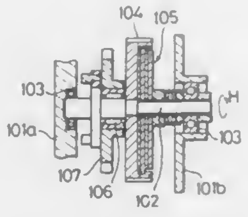
a substantially enclosed housing having an opening through which the tow-line may freely pass;
a spool means mounted for rotation in the housing and adapted for retaining the tow-line in winding relation around a centrally disposed axle portion;

VOL
1127
ISS
1
JE
4
1991
UMI

- a driven gear mounted on the spool means for rotational driving thereof;
- a drive shaft journaled in the housing for rotation and for axial sliding relative to the housing and having a first end portion protruding from the housing and a second end portion extending into the housing;
- a drive gear affixed to the drive shaft for rotation and for axial sliding with the drive shaft;
- a spring means mounted in the housing and adapted for biasing the drive gear into meshing engagement with the driven gear;
- a crank member having a handle portion on one end and an integral yoke portion on the opposite other end, the crank member being pivotally connected to the second end portion of the drive shaft by means of a pivot pin passing eccentrically through the yoke portion and the second end portion, such that, upon pivoting movement of the crank member to a first orientation generally transverse to the axis of the drive shaft, the yoke portion urgingly contacts the housing so as to cause axial sliding of the drive shaft in a first axial direction against the biasing of the spring means, thereby causing disengagement of the drive gear from the driven gear, so as to allow for free-rotation of the spool means and unwinding of the tow-line from said axle portion of the spool means, and such that, upon pivoting movement of the crank member to a second orientation 180° opposite to said first orientation, the yoke portion is removed from said contact with the housing so as to allow the drive shaft to slide in an axially opposite second direction under biasing of the spring means thereby to cause engagement of the drive gear with the driven gear so as to allow for controlled rotation of the spool means upon rotation of the crank member, thereby to wind the tow-line around said axle portion of the spool means.

5,020,738
FISHING REEL ANTI-REVERSE MECHANISM

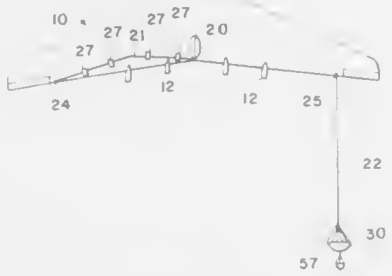
Nobuyuki Yamaguchi, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan
Division of Ser. No. 453,060, Dec. 13, 1989, abandoned, which is a continuation of Ser. No. 235,993, Aug. 24, 1988, abandoned.
This application Apr. 12, 1990, Ser. No. 507,797
Claims priority, application Japan, Aug. 28, 1987, 62-1322079; Aug. 29, 1987, 62-131739
Int. Cl.⁵ A01K *89/033*
U.S. Cl. 242—298 **1 Claim**



1 A fishing reel of the type in which the rotation of a handle supported on a reel body is transmitted to a spool through a rotation transmission system incorporated in the reel body, wherein the improvement comprises: a one-way bearing fitted on the outer periphery of a rotary member rotated by actuating said handle; a ratchet wheel fitted on the outer periphery of said one-way bearing in such a manner that said ratchet wheel is unable to rotate relative to said bearing; and a pawl disengageably engaged with said ratchet wheel.

5,020,739
SELECTABLE TOWLINE SPIN CHUTE SYSTEM

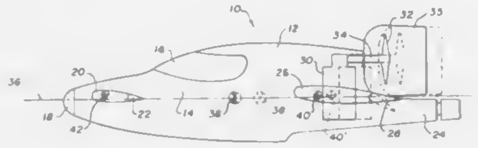
Daniel M. Vairo, and Raymond D. Whipple, both of Newport News, Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.
Filed Oct. 25, 1990, Ser. No. 603,335
Int. Cl.⁵ B64C *17/00*
U.S. Cl. 244—75 R **14 Claims**



1. A spin recovery system for an aircraft comprising, in combination:
- an aircraft having an aft surface and including a wing;
- a parachute housing secured at substantially the longitudinal center of said aft surface;
- a deployable parachute carrier by said parachute housing;
- said parachute, when deployed, having one end of a tow line connected thereto and having the other end of the tow line connected to an attachment point on said aircraft;
- means for in-flight selection of the location of said attachment point on said aircraft to a point adjacent a tip of said aircraft wing; and
- means for deploying said parachute from said housing on command.

5,020,740
PITCH CONTROL TRIMMING SYSTEM FOR CANARD DESIGN AIRCRAFT

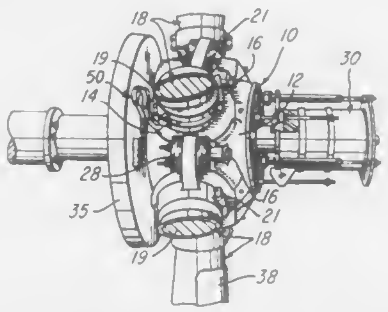
Hugh O. Thomas, 4519 Emily Carr Dr., Victoria, B.C., Canada V8X 2N5
Filed Mar. 28, 1990, Ser. No. 500,643
Int. Cl.⁵ B64C *17/00*
U.S. Cl. 244—93 **17 Claims**



1. A canard design aircraft having a canard and a rear main wing, comprising: a power plant associated with the aircraft movable substantially along the longitudinal axis of the aircraft; an actuating means for moving the power plant forward and aft on the longitudinal axis to reposition the center of gravity of the aircraft; and
- means coupled to said rear main wing and to said actuating means, for activating said actuating means when said rear main wing is reconfigured.

5,020,741
AIRCRAFT PROPELLER WITH IMPROVED ELECTRICALLY DE-ICER LEADS

David E. Ziegler, Troy, and Arthur J. Bowser, Fleteber, both of Ohio, assignors to Hartzell Propeller Inc., Piqua, Ohio
Filed Dec. 7, 1989, Ser. No. 447,410
Int. Cl.⁵ H05B *1/00*
U.S. Cl. 244—134 D **15 Claims**

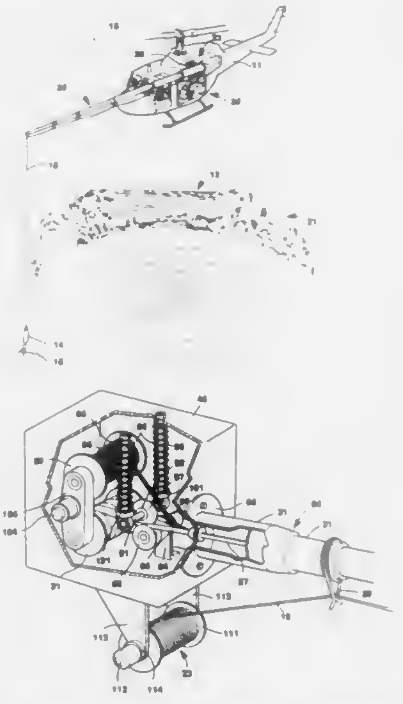


1. A propeller assembly for use on an aircraft having an electrical power supply system, said assembly comprising a propeller hub, a plurality of angularly disposed adjustable pitch propeller blades supported by said hub, an electrical heating element carried by each said blade for de-icing said blade, means for conducting electricity from the aircraft power supply system to said heating elements, said conducting means including a plurality of elongated flexible leads, each of said leads having an intermediate portion connecting opposite end portions and including an elongated flexible element, a flexible braided tube of electrical conducting material surrounding said flexible element, said braided tube having sufficient clearance with said flexible element to provide for free axial movement of said braided tube on said flexible element along said intermediate portion of said lead in response to flexing of said lead, a flexible insulating tube of electrical insulation material surrounding said braided tube, and electrical connecting means for said opposite end portions of said leads and connected to said flexible element and said braided tube.

5,020,742
AIRBORNE RESCUE SYSTEM

Leonard A. Haslim, Hayward, Calif., assignor to The United States of America as represented by the Administrator of National Aeronautics and Space Administration, Washington, D.C.
Filed Oct. 6, 1989, Ser. No. 418,320
Int. Cl.⁵ B64D *1/08, 9/00;* **B64C** *1/22;* **B63C** *9/01*
U.S. Cl. 244—137.2 **14 Claims**

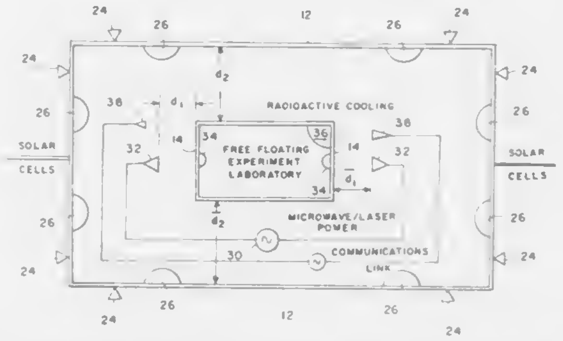
10. An airborne rescue system for extending a rescue line to a person in need of rescue comprising:
- a lightweight boom having a plurality of telescoping members:
- a row of clips fastened to said boom, said clips each having an opening adapted to receive said rescue line and said line remaining within said clips until a predetermined level of tension is reached on said rescue line so as to separate said rescue line from said boom:
- translating means for moving said boom into an extended state or a retracted state; and



- each telescoping member having a longitudinal axis, an elliptical cross section, and at least one tapered portion oriented in the direction of said longitudinal axis.

5,020,743
NANO-G RESEARCH LABORATORY FOR A SPACECRAFT

Friedrich O. von Bun, Silver Spring, Md., and Owen K. Garriott, Madison, Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.
Filed Apr. 28, 1989, Ser. No. 344,872
Int. Cl.⁵ B64G *1/42*
U.S. Cl. 244—159 **12 Claims**



1. A spacecraft that will provide an extremely low acceleration laboratory environment for conducting research and development comprising, in combination:
- an outer shell;
- an inner part, the laboratory, surrounded by said outer shell, and free of any physical engagement with said outer shell;
- means for sensing the position of said inner part with respect to said outer shell;
- means for changing or correcting the position of said inner part with respect to said outer shell;
- means for providing power to said inner part.

VOL
1127
ISS
1
JE
4
1991
UMI

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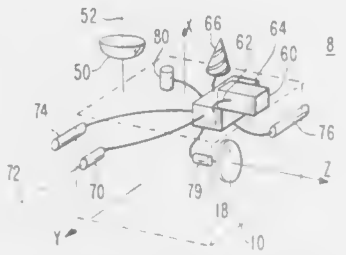
METHOD FOR ACQUIRING THREE-AXIS EARTH POINTING ATTITUDE FOR AN INITIALLY SPINNING SPACECRAFT

Marc Schwarzschild, East Brunswick, N.J., assignor to General Electric Company, East Windsor, N.J.

Filed Jan. 12, 1990, Ser. No. 465,817

Int. Cl.^{5} B64G *1/24*

U.S. Cl. 244—164 **17 Claims**



1. A method for acquiring a 3-axis Earth pointing attitude for an initially spinning spacecraft, which spacecraft includes means for providing three-axis spacecraft angular rate information and sun sensing means, and torquing means, comprising the steps of:

- generating 3-axis angular rate information from said means for providing three-axis angular rate information;
- determining the attitude of the spin axis of said spinning spacecraft relative to the sun to produce axis orientation information;
- generating a sun pulse from said sun sensing means at an instant during the spin cycle of said spinning spacecraft to produce additional orientation information which, together with said axis orientation information, completely determines the 3-axis attitude of said spacecraft;
- beginning at the time of said sun pulse, calculating the 3-axis instantaneous attitude of said spacecraft by updating said attitude of said spin axis and said additional orientation information with said angular rate information.

5,020,745

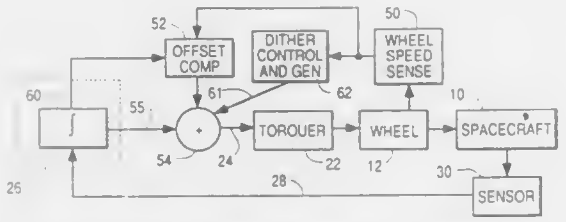
REACTION WHEEL FRICTON COMPENSATION USING DITHER

John B. Stetson, Jr., Newton, Pa., assignor to General Electric Company, East Windsor, N.J.

Filed Dec. 20, 1989, Ser. No. 454,651

Int. Cl.^{5} B64G *1/28*

U.S. Cl. 244—165 **6 Claims**



1 A reaction-wheel stabilized spacecraft, comprising:

- a spacecraft body;
- at least one reaction wheel mounted for rotation about an axis on said spacecraft body;
- controllable torquing means coupled to said spacecraft body and to said wheel for applying torque to said wheel in response to a torque command signal for acceleration or deceleration thereof for transferring momentum to said spacecraft body;
- sensing means mounted on said spacecraft body for sensing the attitude of said spacecraft body, and for generating a signal in response to deviation of said spacecraft body from a desired rotational position about said axis;
- control means including integrating means coupled to said sensing means for generating an attitude-sensitive component of said torque command signal;
- summing means including a first input port coupled to said control means and an output port coupled to said torquing means, for receiving said attitude-sensitive component of said torque command signal from said control means, and further including a second input port, for combining said attitude-sensitive component of said torque command signal with a signal applied to said second input port of said summing means to generate said torque command signal; and
- alternating signal generating means coupled to said second input port of said summing means for generating a signal of alternating polarity and for applying said signal of alternating polarity to said second input port of said summing means, whereby said torque command signal may include an alternating component.

5,020,746

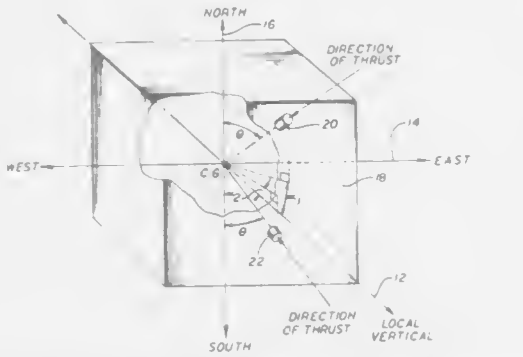
METHOD FOR SATELLITE STATION KEEPING

Bernard M. Anzel, Venice, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 29, 1989, Ser. No. 415,005

Int. Cl.^{5} B64G *1/26*

U.S. Cl. 244—169 **19 Claims**



1. An improved method for station keeping of three-axis stabilized satellites comprising the steps of:

- a) mounting first and second thrusters on the anti-nadir face of a satellite;
- b) canting said first thruster at an angle Θ in a first direction and at an angle α_1 in a second direction from said face of said satellite with the line of force from the thrust of said first thruster passing through the center-of-gravity of said satellite;
- c) canting said second thruster at an angle Θ in a third direction opposite from said first direction and at an angle α_2 in said second direction from said face of said satellite with the line of force from the thrust of said second thruster passing through the center-of-gravity of said satellite;
- d) providing first and second servo mechanisms to control the angles α_1 and α_2 respectively;
- e) providing first and second slide mechanisms to translate said first and second thrusters respectively along said face of said satellite in said second direction to maintain said lines of force from said thrusters through said center-of-gravity of said satellite for a change in said angles α_1 or α_2 respectively; and
- f) firing said first and second thrusters for the required length of time and with the appropriate angles for α_1 and α_2 to maintain the proper stationary orbit.

5,020,747

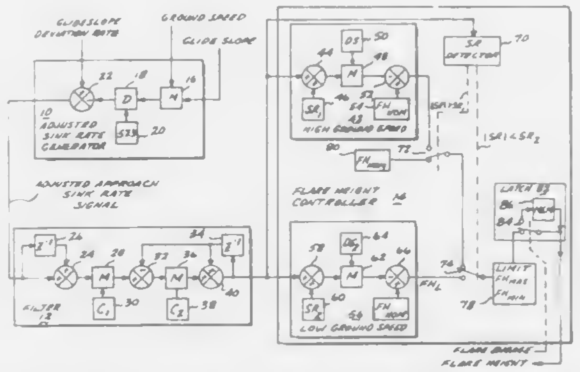
METHOD AND APPARATUS FOR CONTROLLING FLARE ENGAGEMENT HEIGHT IN AUTOMATIC LANDING SYSTEMS

Munir Orgun, Woodinville; Venkata R. Pappu, Kirkland, and Alfredo A. Toledo, Jr., Seattle, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Jan. 26, 1990, Ser. No. 470,823

Int. Cl.^{5} G06G *7/78*

U.S. Cl. 244—187 **21 Claims**



1. A signal processing method for establishing aircraft flare height during an automatic landing procedure, said method comprising:

- generating a sink rate signal representative of the descent rate of the aircraft during the approach phase of an automatic landing procedure;
- detecting the magnitude of said sink rate signal relative to two predetermined sink rate magnitudes SR_1 and SR_2, where the magnitude of SR_1 is greater than the magnitude of SR_2;
- establishing said aircraft flare height at a first predetermined value FH_{NOM} when the magnitude of said sink rate signal is greater than said sink rate magnitude SR_2 and does not exceed said predetermined sink rate magnitude SR_1;
- establishing said aircraft flare height in accordance with the relationship $FH=FH_{NOM}-DS_1(SR_1+SR)$, when said magnitude of said sink rate exceeds said predetermined sink rate magnitude SR_1 and where SR denotes the value of said sink rate signal, DS_2 represents a first predetermined rate of change of aircraft flare height per unit change in said sink rate magnitude and FH_{NOM} represents said first predetermined flare height; and
- establishing said aircraft flare height in accordance with the relationship $FH=FH_{NOM}-DS_2(SR_2+SR)$, when said magnitude of said aircraft sink rate is less than said predetermined sink rate magnitude SR_2 and where FH_{NOM} represents said first predetermined aircraft flare height, DS_2 represents a second predetermined rate of change in said aircraft flare height per unit change in said magnitude of said sink rate signal and SR represents the value of said signal representative of said aircraft sink rate.

5,020,748

MOUNTING STRUCTURE FOR MOUNTING AN INSTRUMENT ON A SUPPORTING MEMBER OF A MOTOR VEHICLE

Tomoki Okajima, Kawagoe, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Oct. 29, 1990, Ser. No. 604,274

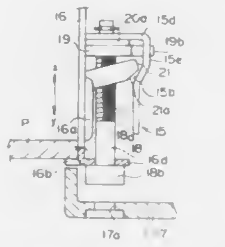
Claims priority, application Japan, Apr. 25, 1990, 2-111503

Int. Cl.^{5} G12B *9/00*

U.S. Cl. 248—27.1 2 Claims

1. A mounting structure for securing a casing of an instrument on a periphery of an opening formed in a board member of a motor vehicle, comprising:

- projections formed on the casing so as to abut on an outside of said periphery when the casing is inserted in an inside space behind the board member passing through the opening;
- a front side supporting member and a rear side supporting member formed on the casing;
- a screw rotatably supported in the casing by said supporting members;
- a movable member engaged with the screw and provided to be moved along the screw by rotating the screw; and
- a clamping member having an engaging portion disposed between said rear side supporting member and said movable member and axially slidably mounted on the screw and pivotably engaged thereon so that the clamping member may be pivoted in a plane including an axis of the screw, a clamping portion which is provided to be projected from the casing as the clamping member pivots in said plane, arms provided to be engaged with the movahle member to cause an axial movement and pivoting of the clamping member, and clamping portion provided to be abutted on an inside wall of the board member when the clamping member is pivoted and axially moved, whereby clamping the board member together with said projections.



5,020,749

BAND ELEMENT FOR BINDING AND HOLDING OF OBJECTS

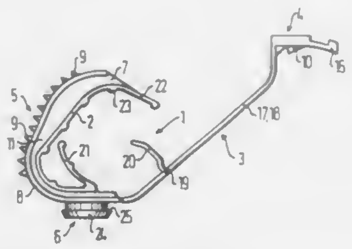
Willibald Kraus, Grunstadt, Fed. Rep. of Germany, assignor to TRW United Carr GmbH & Co., Enkenbach-Alsenborn, Fed. Rep. of Germany

Filed Nov. 16, 1989, Ser. No. 437,186

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1989, 3933304

Int. Cl.^{5} F16L *3/08*

U.S. Cl. 248—74.3 **9 Claims**



1. In a band strap element for the binding and holding of objects to a support comprising a bearing portion for the objects to be held, said bearing portion including a base part and a band-form binding part having a free end and at least one engaging element which can be detachably connected with at least one catch element, and with fastening zone adjoining the bearing zone for fastening the band strap element to a support, the improvement wherein the base part **(2)** is at least partially concave and is connected through at least one transverse guide stay **(7)** with an outer shell **(8)** having on an outer wall surface thereof a catch element comprised of several saw-tooth profiles **(9)**; and engaging element **(4)** including a catch projection **(10)** formed at the free end of the bonding part **(3)**; and wherein in the mounted condition a portion of the binding part **(3)** is

VOL
1127
ISS
1
JE
4
1991
UMI

received into a space (**11**) between the base part (**2**) and the outer shell (**8**); and, further, wherein the free end of the bonding part (**3**) has an opening (**12**) with an inverted T-shape in the middle zone (**13**) of which the catch projection (**10**) is arranged, the upper limit zones (**14, 15**) of the inverted T-shaped opening (**12**) in the mounted condition being received into the space (**11**) between the base part (**2**) and the outer shell (**8**).

5,020,750

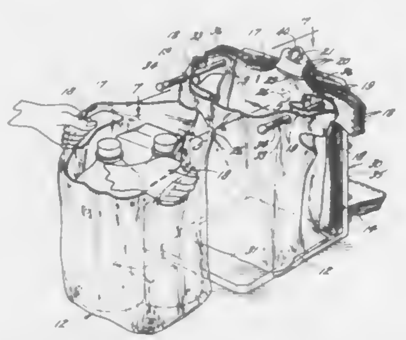
SYSTEM FOR AUTOMATIC CONSECUTIVE OPENING AND DISPENSING THERMOPLASTIC GROCERY OR RETAIL PRODUCT BAGS

Carll D. Vrooman, and Harry B. Wilfong, Jr., both of Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed Jun. 5, 1989, Ser. No. 361,130

Int. Cl.^{5} B65D *1/34*

U.S. Cl. 248—97 16 Claims



1. A system for automatic consecutive opening and dispensing thermoplastic grocery or retail product bags of the T-shirt type while providing for supporting consecutive bags in an open position and for facilitating easy removal of the consecutive loaded bags; said system comprising:

a bag pack comprising a plurality of stacked T-shirt type bags secured together, each of said bags comprising

front and rear wall portions integrally connected at sides thereof and secured together at the bottom thereof and defining an open top mouth portion,

laterally spaced handles integral with said wall portions and extending upwardly from opposed sides of said mouth portion and including a support arm receiving aperture formed through an intermediate portion of each of said handles,

a detachable mounting tab extending upwardly from each of said front and rear wall portions at a central area of said mouth portion, each of said mounting tabs including a

mounting aperture therein and means detachably connecting said mounting tab to said respective wall portion and defining a predetermined severance strength for detachment from said respective wall portion, and

disengageable adhesive means connecting each said rear wall portion to each said front wall portion of each consecutive bag in said bag pack and providing a predetermined adhesive severance strength therebetween; and

a rack for mounting said bag pack and consecutive dispensing of said bags, said rack comprising

generally horizontally extending bag supporting base means,

two generally horizontally and outwardly extending support arm means laterally spaced from each other and vertically spaced from said base means and each having a linearly-extending free outer end portion (1) for slidably receiving said apertures in said bag handles and mounting said bag pack, (2) for supporting consecutive ones of said bags in an open loading position on said base means as said bags are consecutively removed from said pack and slid along said support arms and (3) for facilitating removal of consecutive loaded bags by sliding said handles off said support arms at said linearly-extending free outer end portion,

each of said support arm means comprising a cylindrical metal rod forming a rear portion, and a linearly-extending cylindrical plastic rod of generally the same diameter as said metal rod and forming said free outer end portion and providing a predetermined resistive force against sliding of said bags therealong,

bag mounting tab retaining means positioned generally between said support arm means and extending outwardly a distance less than the extension of said support arm means (1) for receiving said mounting apertures in said mounting tabs, (2) for cooperating with said support arm means to mount said bag pack on said rack and (3) for allowing consecutive detachment of said front and rear wall portions of each of said bags from said mounting tabs as said bags are slid outwardly along said support arm means into the open loading position;

said predetermined tab severance strength being less than said predetermined adhesive severance strength so that said, detachable mounting tab detaches prior to severance of said adhesive means as said bags are consecutive removed from said pack and slid along said support arm means; and

said predetermined adhesive severance strength being less than said predetermined resistive force of said support arm means so that said adhesive means severe as said bags are slid along said support means and are consecutive removed from said rack.

5,020,751

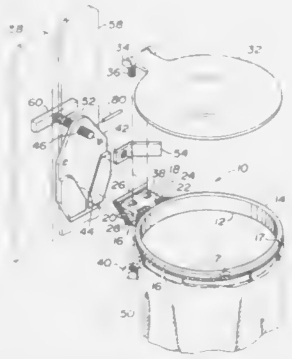
GARBAGE BAG AND UTILITY HOLDER

Patrick J. Larkin, Edmonton, Canada, assignor to Easybagger Inc., Edmonton, Canada

Filed Oct. 23, 1989, Ser. No. 425,070

Int. Cl.^{5} B65B *67/12*

U.S. Cl. 248—99 2 Claims



1. A garbage bag holder for attachment to a variety of objects comprising:

a ring having an edge defining a plane, and the ring being elongated in a direction perpendicular to the plane;

the edge forming a lip extending outward from and surrounding the ring;

means for attaching a garbage bag to the ring, including an arm extending from the ring, a cord having sufficient length to extend around the ring adjacent the lip and having first and second ends, and first and second ends in the arm for receiving and retaining the first and second ends of the cord;

a V-shaped plate rigidly attached to the ring and having bevelled edges, the plate being attached to the ring by the arm and further including a brace extending between the plate and the arm;

a bracket having a complementary groove for receiving and retaining the bevelled edges of the V-shaped plate; and

the bracket including a first hole for receiving a bolt and a plurality of smaller holes for receiving screws and thereby being attachable to a variety of objects.

5,020,752

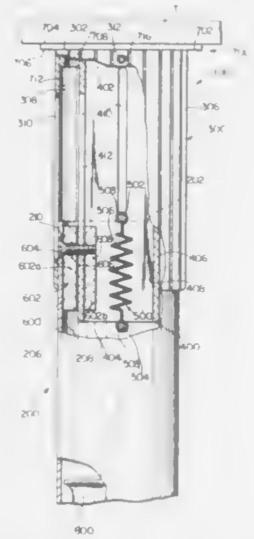
ADJUSTABLE PEDESTAL FOR TABLES AND THE LIKE

John J. Rizzi, Weston, Conn., and Joseph J. Smith, Palm, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jun. 12, 1990, Ser. No. 536,399

Int. Cl.^{5} F16M *11/00*

U.S. Cl. 248—162.1 2 Claims



1. An adjustable pedestal comprising:

a tubular base having a top, a bottom, an exterior surface, and an interior surface;

a tubular collar having a top, a bottom, an exterior surface, and an interior surface, said interior surface telescopically engaging said exterior surface of said base, and said collar being coaxial with said base and movable between an extended and a retracted position with respect to said base;

a guide tube interior to said base and coaxial with said base and said collar, said guide tube being movable with said collar between an extended and a retracted position with respect to said base;

extension spring means for normally biasing said collar and said guide tube in their extended positions, said extension spring means normally being in a retracted condition, whereby a force exerted on said top of said guide tube causes said extension spring means to assume an extended condition; and

locking means for locking said guide tube in one of said extended or retracted positions or a position in between.

5,020,753

SOAP HOLDER

William P. Green, 3570 E. Lombardy Rd., Pasadena, Calif. 91107

Filed May 30, 1989, Ser. No. 358,000

Int. Cl.^{5} F16M *11/00*

U.S. Cl. 248—176 26 Claims

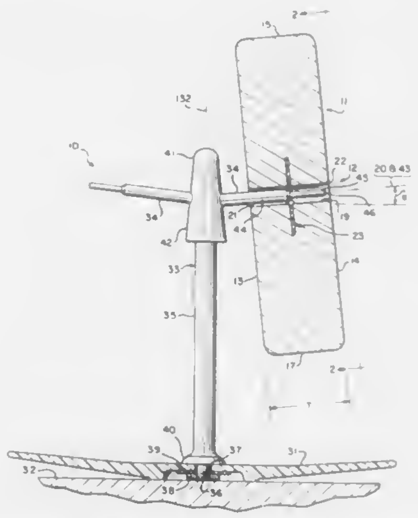
1. For use with a bar of soap containing a recess and having outer surfaces soluble in water, a device comprising:

a base adapted to be placed on and supported by a generally horizontally extending upwardly facing counter surface;

a post connected at its lower end to said base and projecting upwardly therefrom; and

a projection carried by said post at a location spaced above said base and projecting laterally from the post and constructed to extend into said recess in the bar of soap for movement of the bar of soap onto and off of the projection between a position detached therefrom and a position in which said projection extends into said recess and supports the bar of soap at least in part from its interior to enhance drying of said outer surfaces;

said projection being inclined to advance progressively upwardly as it advances laterally away from said post, in a relation tending to retain the bar of soap on the projection by gravity;



the inclination of said projection being at a small angle very near horizontal, to facilitate viewing of said recess in the soap as it is slipped onto the nearly horizontal projection;

said base being adapted to support the post and projection and a bar of soap on the projection from the counter surface without attachment of the base to the counter surface.

5,020,754

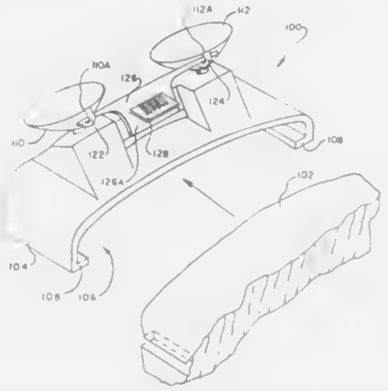
METHOD AND APPARATUS FOR MOUNTING RADAR DETECTOR

Gregg M. Davis, Columbus, Ohio, and David E. Roche, Nashua, N.H., assignors to Valentine Research, Inc., Cincinnati, Ohio

Filed Jan. 22, 1990, Ser. No. 467,969

Int. Cl.^{5} F16B *47/00*

U.S. Cl. 248—206.3 10 Claims



1. Apparatus for mounting a device such as a radar detector to the interior of a windshield of a motor vehicle, said apparatus being readily secured to and removed from the interior of said windshield and comprising:

a bracket for receiving and supporting the radar detector or other device;

at least two suction cups secured to said bracket for mount-

VOL
1127
ISS
1
JE
4
1991
UMI

ing said bracket to the interior of the windshield, said suction cups each having a release ear projecting outwardly adjacent a rim thereof; and

removal actuator means comprising a release bar movably mounted to said bracket and coupled to the release ears of said suction cups for releasing said suction cups in response to movement of said release bar relative to said bracket, said movement resulting from the application of a single removal force to said release bar.

5,020,755

HANDLE SUPPORT ASSEMBLY

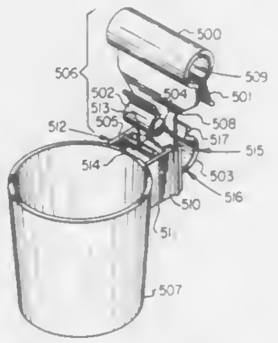
Gail B. Frankel, Dallas, Tex., assignor to Kel-Gar, Inc., Dallas, Tex.

PCT No. PCT/US89/02402, § 371 Date Jan. 31, 1990, § 102(e) Date Jan. 31, 1990, PCT Pub. No. WO89/11810, PCT Pub. Date Dec. 14, 1989

PCT Filed Jun. 1, 1989, Ser. No. 460,860

Int. Cl.^{5} E04G *3/00*

U.S. Cl. 248—215 **18 Claims**



1. A support assembly system for use with a generally cylindrical horizontal bar, shaft, or handle comprising:

a body portion;

an end portion extending upwardly from said body portion, said end portion including first and second ends and a generally tubular intermediate section for circumferentially and frictionally gripping said generally cylindrical horizontal bar, shaft, or handle, said generally tubular intermediate section integrally formed with said body portion at said first end;

means for inserting said generally cylindrical horizontal bar, shaft, or handle into said generally tubular intermediate section for circumferential frictional gripping therewith, said means for inserting said generally cylindrical horizontal bar, shaft, or handle into said generally tubular intermediate section further comprising a lip integrally formed with said tubular intermediate section at said section end; and

hook means extending from said body portion for selective hooking-engagement with an article to be held by said assembly.

5,020,756

SHELF SUSPENSION MEMBER FOR DOUBLE-HUNG SASH WINDOWS

Peter Bauer, 13921 Esworthy Rd., Germantown, Md. 20874

Continuation of Ser. No. 294,976, Jan. 3, 1989, abandoned, which is a continuation of Ser. No. 928,213, Nov. 7, 1986, abandoned. This application Dec. 19, 1989, Ser. No. 453,163

Int. Cl.^{5} A47G *29/00*

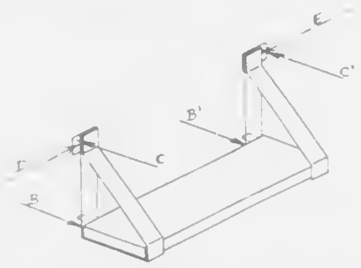
U.S. Cl. 248—236 **13 Claims**

1. A shelf suspension member for holding a shelf and mounting on a window of the type having a grooved, vertical frame member including a vertical groove therein and a bottom sash and having at least one framed window pane that is slideable in a plane substantially coplanar therewith for opening and closing of said window, said shelf suspension member being affixable to said window in a cantilevered manner and comprising:

a vertical member including an upper end and an outer vertical surface;

a horizontal member joined at one end thereof to said vertical member;

an outwardly-extending ear including an inner surface, said outwardly-extending ear being rigidly and immovably affixed to said upper end of said vertical member, said inner surface being disposed substantially in the same plane as said outer vertical surface of said vertical member, said outwardly-extending ear being operative for entering into and engaging said vertical groove;



said outwardly-extending ear and at least a portion of said outer vertical surface of said vertical member being operative in combination as a tilting-force-couple-bearing means for supporting said shelf suspension member against tilting; and, said horizontal member being operative to support said shelf along a substantial length thereof;

wherein said vertical member includes a horizontally-extending seat tab member having an inner end attached to and projecting orthogonally from said outer vertical surface and having a free outer end, said horizontally-extending seat tab member being operative as a weight-bearing means for vertically supporting said shelf bracket.

5,020,757

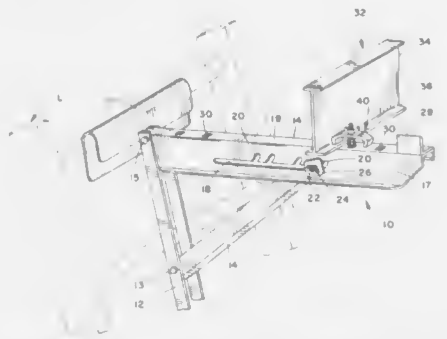
LADDER JACK CLAMPING DEVICES

Richard P. Sulecki, Transfer, and Stanley A. Kiska, Greenville, both of Pa., assignors to R. D. Werner Co., Inc., Greenville, Pa.

Filed Jun. 15, 1987, Ser. No. 62,104

Int. Cl.^{5} E04G *5/00*

U.S. Cl. 248—238 **4 Claims**



1. A ladder jack adapted to be supported by a portable inclined ladder in a ladder scaffolding system comprising two or more laterally spaced inclined ladders, where each ladder jack is adapted to support on a midsection of each of aligned rungs of the said ladders a work platform suspended between said inclined ladders, the ladder jack comprising:

a bracket adapted to overlie each of said aligned rungs, a vertical post secured to the bracket, a horizontal support member for supporting said work platform, a diagonal brace adjustably secured to the vertical post and the horizontal support member to brace the horizontal support member, and a longitudinally movable clamping assembly for securing the work platform to the horizontal support member, said horizontal support member pivotally mounted to the upper part of the vertical post, said diagonal brace being adjustably mounted between the vertical post and the horizontal support member to permit horizontal adjustment of the horizontal support member relative to the incline of each said inclined ladder into substantially a horizontal plane, said horizontal support member containing a plurality of longitudinally spaced openings adapted to secure the movable clamping assembly in a fixed longitudinal position, the movable clamping assembly comprising an inverted C-clamp having inwardly tapered downturned tip portions at either end adapted to securely engage and lock the work platform in a longitudinally fixed position to the horizontal support member, the C-clamp including a member passing through one of the openings in the horizontal support member where rotational movement of a threaded member tightens the locking engagement of the C-clamp with the work platform and to the horizontal support member to prevent movement of the work platform in all directions and planes while in use.

5,020,758

SHELF BRACKET

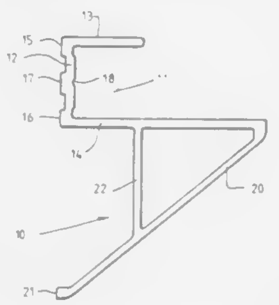
Bert Rawlyk, Huntingdale, Australia, assignor to B. R. Products Pty. Limited, Huntingdale, Australia

Filed Jun. 27, 1990, Ser. No. 544,399

Claims priority, application Australia, Dec. 7, 1987, 27065/88

Int. Cl.^{5} A47G *29/02*

U.S. Cl. 248—250 **6 Claims**



1 A shelf bracket having an open mouth in the form of a U-shaped member, a web of the U-shaped member being adapted to be flexibly located against a surface, a generally horizontal upper flange being of a length as to overlay at least an inner edge of a shelf and a generally horizontal lower flange extending outwardly for a substantial portion of the width of the shelf and a brace extending downwardly and inwardly from an outer edge of the lower flange, which brace terminates in an inner end in the plane in which the most inwardly directed portions of the web of the bracket extend and a strut between the lower flange and the brace spaced away from the surface.

5,020,759

HOLDER FOR EXTENSION CORDS OR THE LIKE

Earl P. Weber, Rte. 1, Dunlap, Iowa 51529

Filed Jun. 21, 1990, Ser. No. 541,633

Int. Cl.^{5} A47F *5/00*

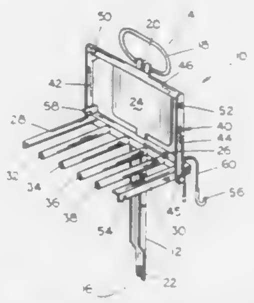
U.S. Cl. 248—309.2 **8 Claims**

1. A holder for extension cords or the like comprising,

a substantially vertically disposed support means having rearward and forward sides,

a plurality of substantially horizontally spaced apart elongated support members extending forwardly from said support means for receiving loops of the cord thereon, said support members having forward ends, said support members being substantially straight for their entire lengths whereby the loops of the cord may be selectively pulled therefrom.

a substantially U-shaped gate means operatively selectively pivotally mounted on said support means and being movable between first and second positions, said gate means including a pair of horizontally spaced apart, elongated side members which have rearward and forward ends and a front member extending between the forward ends thereof,



said front member being positioned in front of the forward ends of said support members, when said gate means is in its said first position, to yieldably maintain said loops of said cord or the like on said support members,

said gate means partially moving from its said first position towards its said second position to permit the loops of the cord or the like to be horizontally pulled from the forward ends of said support members when it is desired to remove the cord or the like from said support members.

5,020,760

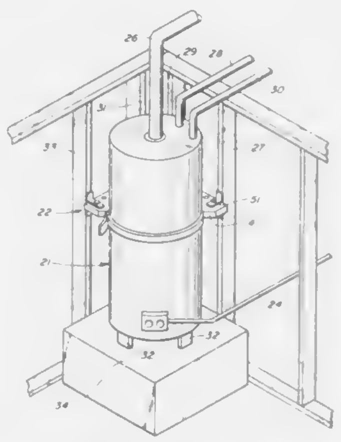
HOT WATER TANK BRACKET ASSEMBLY

Robert S. Mayr, 7301 Langley Canyon Rd., Salinas, Calif. 93907

Filed Apr. 12, 1990, Ser. No. 507,991

Int. Cl.^{5} A47K *1/08*

U.S. Cl. 248—313 **15 Claims**



1. An apparatus for securing a hot water tank, having an outer housing, against lateral movement relative to a wall of a building, said apparatus comprising:

a bracket means extending circumferentially around the entire outer periphery of said housing, said bracket means being secured to said housing against transverse displacement relative to said housing; and

mounting means for substantially slack-free mounting of said bracket means to said wall, said mounting means being disengagably connectable to said bracket means at a selected position of a plurality of positions to permit alignment of said mounting means with a plurality of positions

VOL
1127
ISS
1
JE
4
1991
UMI

on said wall independently of relative displacement of said bracket means with respect to said outer periphery of said housing, said mounting means further including fastening means for positively fastening said mounting means to said wall against transverse displacement relative to said wall, whereby said hot water tank is securely affixed to said wall.

5,020,761

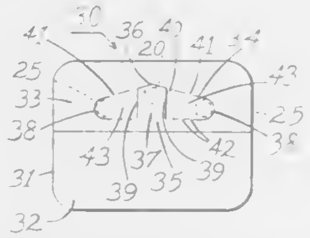
HANG TAB FOR HANGING OBJECT ON SINGLE OR DOUBLE WIRE HANGER

David M. Good, Peachtree City, Ga., and Eugene S. Stephens, Rochester, N.Y., assignors to Voxcom, Inc., Peachtree City, Ga.

Continuation of Ser. No. 161,490, Feb. 29, 1988, abandoned. This application Nov. 7, 1989, Ser. No. 432,923

Int. Cl.^{5} F16L *3/08*

U.S. Cl. 248—317 **15 Claims**



1. A hanging system for suspending an object from a single wire hanger and a double wire hanger comprising:

a. a hang tab formed of sheet resin material and having a stick-on region for securing the object to said hang tab and a hanging region for suspending said hang tab from the wire hangers;

b. said hanging region being cut through in a configuration defining a central region and two end regions;

c. two uncut breakable tension zones that are located on opposite sides of said central region and in between each of said end regions, respectively, and that help support weight of the object when suspended from the single wire hanger;

d. said central region being further defined by through cuts that permit a portion of the sheet resin material to be bent in the shape of a flap forming an opening within said central region for suspending said hang tab on the single wire hanger;

e. said tension zones being spaced apart through a distance that permits the single wire hanger to pass through said opening in the central region without breaking said tension zones;

f. said end regions being further defined by through cuts which permit further portions of the sheet resin material to be bent in the shape of flaps forming within said end regions respective openings that cooperate with said opening within said central region for suspending said hang tab on the double wire hanger; and

g. said tension zones also being spaced apart through a distance which permits the double wire hanger to pass through said openings in the central and end regions by breaking said tension zones.

5,020,762

POWER SEAT FOR AUTOMOBILE

Susumu Hatta, Akishima, Japan, assignor to Tachi-S Co., Ltd., Tokyo, Japan

Filed Jul. 13, 1989, Ser. No. 379,293

Int. Cl.^{5} A45D *19/04*

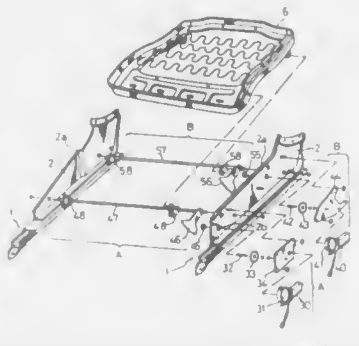
U.S. Cl. 248—394 **3 Claims**

1. A power seat for an automobile, in which a seat cushion is moved in a vertical direction or in a fore-and-aft direction by means of a driving force of an electric motor, and power seat comprising:

a slide rail provided under said seat cushion, said slide rail being adapted to allow said seat cushion to be adjustably moved forwardly and backwardly, and including an upper rail and a lower rail, said upper rail being slidably fitted in said lower rail; and

a bracket fixed on said upper rail of said slide rail in a manner erecting thereupon,

wherein said electric motor is disposed at a lateral surface of said bracket and extends in parallel to said surface and has its drive shaft parallel to said surface wherein said power seat further comprises a forward height adjusting mechanism adapted to adjust a height of a forward part of said seat cushion and a rearward height adjusting mechanism adapted to adjust a height of a rearward part of said seat cushion, and wherein said electric motor is provided two in number, one of them being arranged to actuate said forward height adjusting mechanism and the other of them being arranged to actuate said rearward height adjusting mechanism.



5,020,763

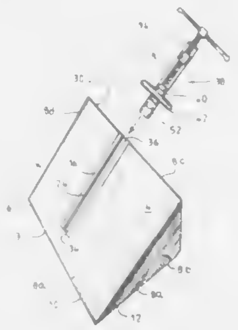
MULTI-POSITIONABLE SUPPORT STAND WITH MOVABLE CENTER OF GRAVITY

David Hegarty, 36 Wyatt Rd., Garden City, N.Y. 11530

Continuation-in-part of Ser. No. 442,247, Nov. 28, 1989, abandoned, which is a continuation-in-part of Ser. No. 273,404, Nov. 18, 1988, Pat. No. 4,925,146, which is a continuation of Ser. No. 45,630, May 1, 1987, Pat. No. 4,787,595. This application Feb. 26, 1990, Ser. No. 485,273

Int. Cl.^{5} A47G *1/24*

U.S. Cl. 248—454 **25 Claims**



1. An article support stand for removably mounting a securing article holder thereon, which comprises:

a main body, the main body having a mounting side;

means for mounting an article holder on the mounting side of the body, the article holder mounting means including means defining an elongated slot situated on the mounting side of the body, the slot defining means forming the slot with a substantially "T" shape in cross-section, and with a narrowed portion and a widened portion communicating with the narrowed portion for mounting the article holder on the mounting side; and

an article holder, the article holder including a body, the body including at least one piece having an upper support side for supporting an article, a lower cooperating side and means mounted on the cooperating side for cooperating with the article holder mounting means of the article support stand so as to be mountable on the support stand;

the article holder further including a releasable securing means for securing the article on the article support side;

wherein the cooperating means includes a rail member having a widened portion and narrowed portion which respectively cooperate with the widened portion and narrowed portion of the slot defined by the slot defining means, the rail member being slidably received by the slot of the slot defining means;

the article securing means being located and releasable at the lower cooperating side of the holder body, to allow the article securing means to be secured when the article holder is mounted on the article support stand.

5,020,764

POLE BALLASTING DEVICE

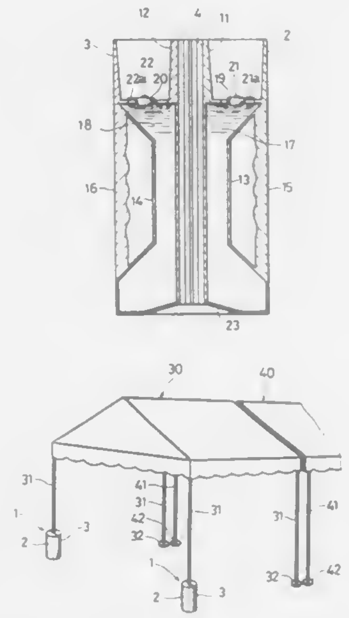
Tadayuki Yamamoto, Suzuka, Japan, assignor to Yamamoto Co., Ltd., Suzuka, Japan

Filed Jan. 19, 1990, Ser. No. 467,163

Claims priority, application Japan, Jan. 23, 1989, 1-13627

Int. Cl.^{5} F16M *13/00*

U.S. Cl. 248—529 **13 Claims**



8. A pole ballasting device for lateral positioning about the lower end of a vertical pole of a pole-using temporary structure for the purpose of holding the pole, the pole having a disk-like foot plate formed at the lower end thereof for seating said pole ballasting device thereon, said ballasting device comprising:

at least two discrete blocks adapted to assemble about the pole above the foot plate, said blocks, in an assembled condition, meeting along a vertical interface and having a common vertically extending through hole formed therebetween at said interface and sized both to receive the pole therethrough and to preclude passage of the foot plate therethrough,

means for releasably joining said discrete blocks into a unitary assembly about the pole for selective disassembly for removal of said discrete blocks from the pole; and

a container formed in at least one of said discrete blocks and means for charging said container with a fluid load and for discharging said fluidic load from said container.

5,020,765

U-SHAPED ANTENNA MOUNTING ASSEMBLY

Jack Evans, and Christopher R. Morley, both of Mokena, Ill., assignors to Cellular 1C, Mokena, Ill.

Filed Apr. 26, 1990, Ser. No. 516,259

Int. Cl.^{5} H01Q *1/32*

U.S. Cl. 248—539 **9 Claims**

1. An improved U-shaped antenna mounting assembly having in combination:

a U-shaped clip with two parallel planar portions extending in the same direction from a base portion; the planar portions each including an inner and an outer face, the inner faces of the planar portions being the faces closest to one another;

at least one section of the base portion being removed between the two parallel planar portions;

means for attaching the clip to the edge of a rigid sheet member;

a U-shaped bracket with two parallel planar portions extending in the same direction from a base portion, at least one section of the base portion of the bracket being removed between the two parallel planar portions such that the remaining section of the base portion of the bracket and the remaining section of the base portion of the clip interfit with one another when the planar portions of the bracket extend over outer faces of the planar portions of the clip, thereby to hold the bracket in a fixed position relative to the clip; and

means for attaching an antenna to the bracket.

5,020,766

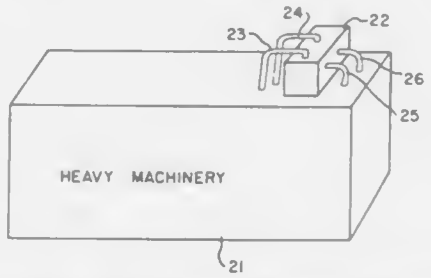
SOUND AND VIBRATION DAMPER

Elerth Persson, Domarringen 15, S-245 00 Staffanstorp, Sweden

Filed Mar. 24, 1989, Ser. No. 328,507

Int. Cl.^{5} F16C *55/00*

U.S. Cl. 248—559 **10 Claims**



1. A noise and vibration damping apparatus comprising:

a piece of heavy machinery having at least one hydraulic line for operating part of said piece of heavy machinery and

VOL
1127
ISS
1
JE
4
1991
UMI

thereby tending to produce noise and vibration as a result of pressure shocks in said hydraulic line;

means for damping said sound and vibration as apparent at a location on said piece of heavy machinery, comprising a block of unyielding solid material mounted on said piece of heavy machinery between said location and a site where said noise vibration originate;

said block having internal passageway means defining at least one hydraulic fluid duct extending through said block, said duct extending for a first distance in a first direction in said block, then turning at a bend and extending for a second distance in a second direction in said block;

said block being interposed in said hydraulic line, so that said duct forms a respective portion of said hydraulic line;

said hydraulic line being provided with a working pressure which reaches approximately 200 kp/cm^2;

said block having a mass of at least several tens of kilograms;

said block, in use, transferring noise and vibration from hydraulic fluid in said hydraulic line to said block, sufficient to reduce sound level at said location by a rate of about 90 db (undamped) to 71.6 (damped).

5,020,767
MOTOR MOUNTING STRUCTURE FOR WASHING MACHINES

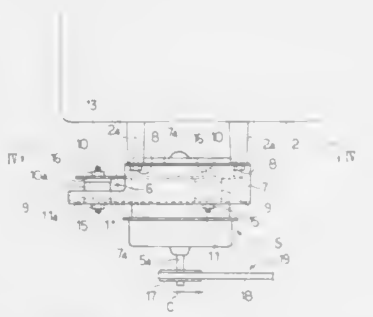
Masami Ueda, Ichinomiya, and Michiaki Ito, Seto, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jan. 30, 1990, Ser. No. 475,763

Claims priority, application Japan, Jan. 31, 1989, 1-22409; Feb. 28, 1989, 1-47725; Feb. 28, 1989, 1-47727

Int. Cl.^{5} F16M *13/00*

U.S. Cl. 248—638 **18 Claims**



1. A motor mounting structure for a washing machine wherein a motor is mounted on a water-receiving tube, the motor being provided with a bracket which is integral with the motor and a pulley mounted on a drive shaft downwardly projected so that a driven load is coupled to the drive shaft through a belt, said motor mounting structure comprising:

a) a motor mount provided on the outer bottom of the water-receiving tub, the motor mount having an upper side; and

b) a buffer interposed between the motor bracket and the upper side of the motor mount so as to be subjected to a compressive force through the bracket, said buffer including a lumped non-metallic elastic body having two ends and two end plates, each end plate being secured to a different one of the end surfaces of the elastic body and coupled to a different one of the bracket and the upper side of the motor mount.

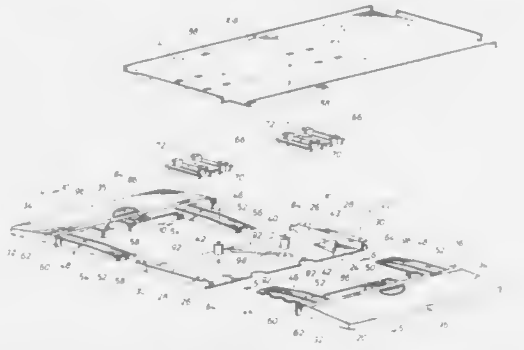
5,020,768
STABILIZING APPARATUS WITH EXTENSIBLE LEGS FOR COMPUTER SYSTEM TOWER UNIT

Thomas T. Hardt, Missouri City, and Steven D. Gluskoter, Houston, both of Tex., assignors to Compao Computer Corporation, Houston, Tex.

Filed Nov. 3, 1989, Ser. No. 431,571

Int. Cl.^{5} A47B *91/00*

U.S. Cl. 248—678 **11 Claims**



1. A computer system unit comprising:

a tower unit having a generally narrow width base with respect to the depth and height of said tower unit;

two slidably extensible legs, each of said legs capable of extending to only one side of said tower unit for preventing said tower unit from overturning, said extensible legs slidably engaging and cooperatively interacting with each other; and means for attaching said extensible legs to said tower unit.

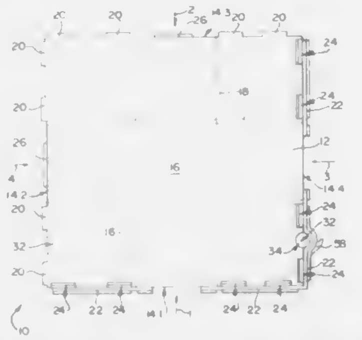
5,020,769
SHUTTERING FOR USE IN BUILDING CONSTRUCTION

Hendrik P. Botes, Plot 27, Estate Road, Benoni Small Farms, Benoni, Transvaal Province, South Africa

Filed Jun. 15, 1989, Ser. No. 366,438

Int. Cl.^{5} E04G *9/05, 11/08, 17/07*

U.S. Cl. 249—44 **7 Claims**



1. A shuttering element, comprising: a rigid synthetic plastic rectangular body having

a planar shuttering wall having a forward face and a rearward face and an outer perimeter,

four side walls extending rearwardly from the outer perimeter of the forward face of said shuttering wall, and having rearward edges;

two adjacent first side walls being provided at their rearward edges with tongue formations extending outwardly, said tongue formations being generally J-shaped and being sized to receive a rearward edge of a side wall of a shuttering element therein; said planar shuttering wall being provided in its forward face with recesses along the outer perimeter thereof adjacent said two first side walls;

said planar shuttering wall being provided in its forward face with resilient hook formations along the outer perimeter thereof adjacent the two adjacent other side walls, said hook formations being sized to fit into and engage said recesses;

whereby said shuttering element may be secured to other shuttering elements having similarly sized and located side walls, tongue formations, recesses and hook formations by the engagement of the tongue formations of the two first side walls of the shuttering element with the rearward edges of the two other side walls of the other shuttering elements, and the engagement of the tongue formations of the two first side walls of the other shuttering elements with the rearward edges of the two other side walls of the shuttering element, and by the engagement of the hook formations of the shuttering element with the recesses of the other shuttering elements, and the engagement of the hook formations of the other shuttering elements with the recesses of the shuttering element.

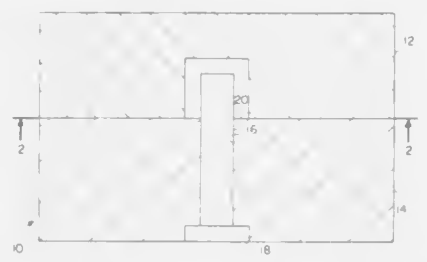
5,020,770
COMBINATION OF MOLD AND ALLOY CORE PIN

Clifford A. Moberg, W328 N4065 Alleodalc Dr., Nashotah, Wis. 53058

Filed May 12, 1988, Ser. No. 193,728

Int. Cl.^{5} B29C *33/38*

U.S. Cl. 249—111 **4 Claims**



1. A mold structure for molding a molten material comprising in combination:

(a) a mold body defining a mold cavity therein;

(b) core pin structure received within said mold body in frictional engagement therewith and extending into said cavity such that at least part of said pin will be in contact with the molten material when the material is introduced into said mold;

(c) said core pin being an alloy of metals consisting of nickel, silicon, chromium and copper, said copper being 96.5% of such alloy; and

(d) said mold structure being a metal excluding the alloy of the pin and having a greater resistance to thermal distortion than said core pin alloy.

5,020,771
PROPORTIONAL CONTROL VALVE

Keiichiroh Nakatsukasa, and Kenmei Kuneguchi, both of Utsunomiya, Japan, assignors to Ranco Japan Ltd., Tokyo, Japan

Division of Ser. No. 306,624, Feb. 3, 1989, abandoned. This application Feb. 12, 1990, Ser. No. 479,238

Int. Cl.^{5} F16K *31/42*

U.S. Cl. 251—30.02 **2 Claims**

1. A proportional control valve comprising:

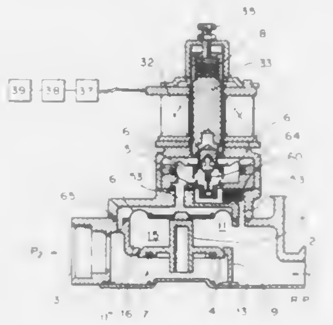
a main fluid passage,

a valve portion having a flap,

a magnetic means disposed in proximity to said valve portion and mounted integrally on said main passage,

a movable body disposed inside said magnetic means and actuated by said magnetic means,

a separated chamber provided on one side of said valve portion facing a direction from which fluid is introduced and located between said valve portion and said magnetic means, said separated chamber being divided into first and second separate subchambers by a diaphragm extended between a wall portion of said separated chamber and a supporting rod mounted on said flap of said valve portion and movable with said flap, to form said first subchamber between said valve portion and said diaphragm and a part of said main fluid passage, wherein said second subchamber is formed between said diaphragm and an upper wall of said separated chamber and is provided with an auxiliary passage connected to a point upstream of said main fluid passage, and an auxiliary valve portion coupled with an auxiliary valve flap is provided in an intermediate portion of said auxiliary passage between said second subchamber and the portion upstream of said main fluid passage so that a fluid passed through, a pressure level of which is controlled by said auxiliary valve portion, is directed to the second subchamber, said auxiliary valve flap being in contact either directly or indirectly with said movable body arranged inside said magnetic means to be operated, and an electric control means being connected to a detecting means for detecting a characteristic parameter to be controlled and connected to said magnetic means.



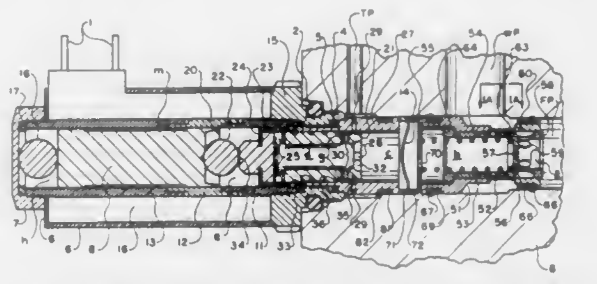
5,020,772
PROPORTIONAL ELECTROMAGNETIC FLOW VALVE

Joseph R. Degenfelder, 3103 Morley Rd., Shaker Hts., Ohio 44122, and James F. Sikorski, 6463 Seminole Dr., Mentor, Ohio 44060

Filed Feb. 15, 1989, Ser. No. 310,636

Int. Cl.^{5} F16K *31/40*

U.S. Cl. 251—30.02 **11 Claims**



1. In an electrically controlled valve for controlling the flow of fluid from a volume at high pressure to a volume at low pressure:

a. a cylindrical tube assembly closed at one end comprised of a trailing magnetic pole adjacent the closed end, a spaced attracting magnetic pole and a nonmagnetic spacer between said poles, a housing held in fixed relation to said tube assembly, said housing having radial throttling ports spaced from said attracting pole and open to said low pressure;

b. a solenoid outside of said tube assembly and surrounding said poles which when energized creates a magnetic flux between said poles;

c. a magnetic armature movable in said tube assembly in closed spaced relationship therewith and having a trailing

VOL
1127
ISS
1
JE
4
1991
UMI

portion overlapping said trailing pole, an attracted portion having an attracted end adjacent to and adapted to underlap and/or overlap the end of said attracted pole, and an intermediate portion:

d. a spool slidable in said housing and operably associated with said armature to be moved thereby, said spool having an orifice therethrough communicating fluid from said high pressure through said throttling ports to said low pressure;

the improvement which comprises:

e. said intermediate portion of armature having a diameter less than said trailing and attracted portions to create a space to hold contaminants between said tube assembly and said intermediate portion, and said trailing and attracted portions having diametrically opposed flats to create passages from said attracted end to said trailing end of said armature.

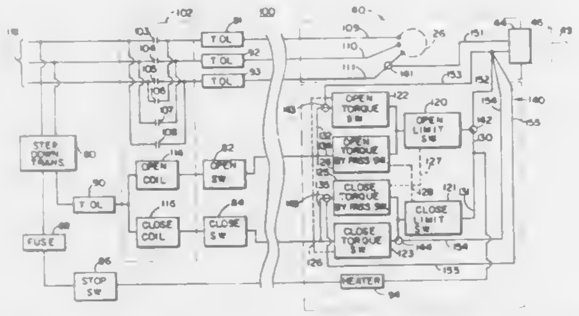
5,020,773
ACTUATOR ASSEMBLY WITH PERMANENTLY MOUNTED MONITORING SYSTEM

Richard H. Tuft, Wallingford, and Robert L. Leon, Maple Glen, both of Pa., assignors to Liberty Technology Center, Inc., Conshohocken, Pa.

Continuation-in-part of Ser. No. 232,392, Aug. 15, 1988, Pat. No. 4,911,004, which is a continuation-in-part of Ser. No. 87,541, Aug. 20, 1987, Pat. No. 4,805,451, and Ser. No. 185,210, Apr. 22, 1988, Pat. No. 4,879,901. This application Jan. 22, 1990, Ser. No. 468,409

Int. Cl.^{5} G01M *19/00*

U.S. Cl: 251—129.12 **22 Claims**



1. In an actuator system including actuator means for providing a mechanical movement and a control system including a plurality of switch means for controlling the actuator means, a monitoring system comprising:

a first sensor means for sensing a state of a first one of the control system switch means;

a second sensor means for sensing a state of a second one of the control system switch means;

a third sensor means for sensing a state of a third one of the control system switch means; and

an electrical connector spaced from and wired to each of the first, second and third sensor means and adapted to removably mate with a complementary connector for electrically coupling the complementary connector simultaneously with each of the first, second and third sensor means.

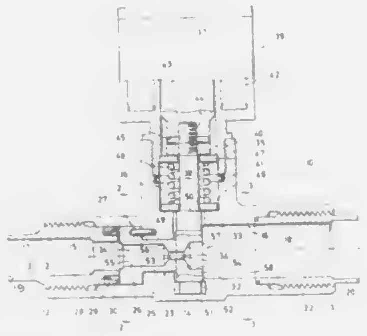
5,020,774
VARIABLE ORIFICE FLOW REGULATOR

Rollin C. Christianson, Las Cruces, N. Mex., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 11, 1990, Ser. No. 507,553

Int. Cl.^{5} F16K *31/06, 3/32*

U.S. Cl. 251—129.15 **20 Claims**



1. Apparatus for regulating the flow of fluids comprising:

a body including inlet and outlet flow passages on opposite sides of an intermediate central portion;

a first fixed orifice member arranged in said inlet flow passage and a transversely movable second orifice member in said central portion, said orifice members having juxtaposed adjacent ends which are shaped for cooperatively defining complemental transverse surfaces as well as first and second longitudinal orifice passages extending between the opposite ends of said orifice members and terminating in first and second reduced throat portions which are respectively circumscribed by said complemental end surfaces and aligned with the longitudinal axis of the fixed orifice in a first flow position;

means for maintaining at least those portions of said complemental end surfaces surrounding said throat portions of said orifice passages in contact with each other as said second orifice member is being moved transversely in relation to said first orifice member; and

actuating means cooperatively arranged on said body for selectively moving said second orifice member transversely in relation to said first orifice member only between a first flow-regulating position where said throat portions are in alignment with one another for establishing the first flow rate for fluids flowing through said flow passage and a second flow-regulating position where said throat portions are only partially misaligned in relation to one another to establish a reduced second flow rate for fluids flowing through said flow passage.

5,020,775
ISOLATION VALVE USED IN A SINGLE CRYSTAL PULLING APPARATUS

Atsushi Iwasaki, Takefu; Koji Mizuishi, and Michiaki Oda, both of Annaka, all of Japan, assignors to Shin-Etsu Handotai Co., Ltd., Tokyo, Japan

Filed Mar. 20, 1990, Ser. No. 495,964

Claims priority, application Japan, Mar. 24, 1989, 1-70692

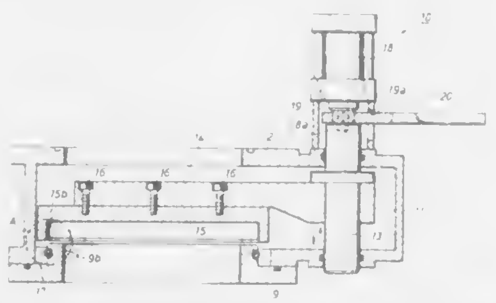
Int. Cl.^{5} F16K *1/24, 3/10, 31/143*

U.S. Cl. 251—215 **4 Claims**

1. In an isolation valve for use in a single crystal pulling apparatus for opening and closing a communication passage between a main chamber and an upper pull chamber of the single crystal pulling apparatus, said valve having a frame body, a vertical passageway for communicating the main chamber and the upper pull chamber, a vertical shaft capable of turning about its axis and reciprocating vertically, a lever for turning the shaft about the shaft's axis and reciprocating vertically a drive means for driving the shaft and the lever to reciprocate vertically for a predetermined distance, a horizontal arm fixed to the shaft at one end, a shutter means horizontally held by the arm for closing and opening the vertical passageway, and a flange defining a hole which communicates the passageway with the main chamber,

the improvement comprising:

said shaft being supported to vertically penetrate said main body of said isolation valve in a manner such that said shaft and said lever can turn about its own axis and reciprocate vertically so that said horizontal arm fixed to a middle portion of said shaft is caused to swing horizontally and reciprocate vertically;



a cavity of which at least the lower portion is formed in the shape of a circular cylinder is made in the bottom of said shutter means which is circular;

said flange has a circular raised rim extending vertically upward whose outer diameter is slightly smaller than the diameter of said circular cylindrical portion of the cavity of said shutter means; and

an endless circular seal means which is embedded partially in a vertical engaging face which slides when said circular cylindrical portion of said cavity of said shutter means engages with said circular raised rim.

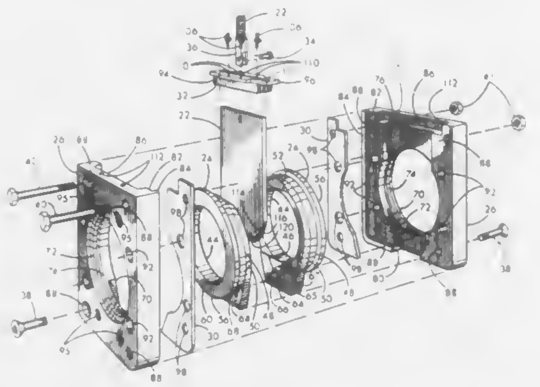
5,020,776
SPLIT SEAT GATE VALVE

Brian S. Owens, Hancock, and Alvin A. Kimpel, Edgerton, both of Wis., assignors to Warman International, Inc.

Filed Jun. 4, 1990, Ser. No. 532,954

Int. Cl.^{5} F16K *3/02*

U.S. Cl. 251—327 **19 Claims**



1. A gate valve assembly having a top, a bottom, and two sides, comprising:

(a) two body housing members having coaxial through passages and means connecting the members together in end-to-end relation, the housing members having portions defining a gate slot for admitting a gate between the housing members and a seat portion slot located beneath the through passages and the gate slot;

(b) resilient sealing means located between the body housing members and compressed by the body housing members to form a liquid-tight seal on the two sides of the valve;

(c) two resilient valve liners fitted within the housing members, each valve liner having a body with a cylindrical through passage and a generally cylindrical outer surface which engages within the through passage of a housing member, a planar front face and a seat portion which extends downwardly from the body and which increases in thickness as it extends from the body, the seat portion having a front surface which extends from the front face of the body, wherein the valve liners are adjacent one another within the housing members such that the planar front faces of the valve liners are adjacent and contacting one another and the seat portions are compressed within the seat portion slots to form a tight seal along the bottom of the valve, and the liner cylindrical passages are aligned;

(d) a packing chamber formed by the two housing members above the valve liners and filled with a compressible packing material;

(e) an imperforate gate slidable through the gate slot formed between the two housing members between a valve open position wherein the gate does not block fluid flow through the aligned valve liner passages and a valve closed position wherein the gate passes between the valve liners and is engaged by the valve liners in fluid-tight contact to prevent any fluid flow; and

(f) a packing compressor extending into the packing chamber and compressing the packing material therein to form a liquid-tight seal around the gate, the packing compressor having an opening to permit the gate to slidably pass through the compressor, wherein the packing material, the resilient sealing means, and the seat portions form a liquid tight seal in both the valve open and valve closed positions, and wherein the seat portions extend to the bottom of the valve such that particles trapped between the seat portions may be expelled from the valve between the seat portions.

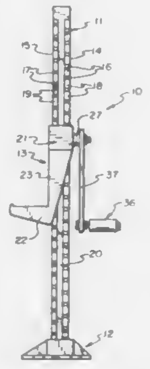
5,020,777
HIGH LIFT JACK

David C. Yocum, 557 S. 600 W., Orem, Utah 84058

Filed Jul. 23, 1990, Ser. No. 556,555

Int. Cl.^{5} B66F *3/02*

U.S. Cl. 254—95 **5 Claims**



1. A self locking jack comprising

a support base,

a rail adapted to be vertically mounted in said support base, said rail having a pair of rows of notches projecting from one face thereof with the notches in one row being offset with respect to the notches of the other row,

a rider adapted to reciprocate along said rail, said rider including a housing, a load platform projecting from said housing, a crankshaft extending through a wall of said housing, and a pair of pinions carried by said crankshaft and offset with respect to a longitudinal axis of said crankshaft, one of said pinions being aligned with and rotatable into and out of notches of one of said pairs of rows and

VOL
1127
ISS
1
JE
4
1991
UMI

another of said pairs of pinions being aligned with and rotatable into and out of the notches of another of said pair of rows, and

a handle connected to said crankshaft,

whereby, turning of the handle will rotate the crankshaft to sequentially move the pinions into and out of the notches to thereby move the rider along the rail.

5,020,778
APPARATUS FOR STIRRING MOLTEN METAL

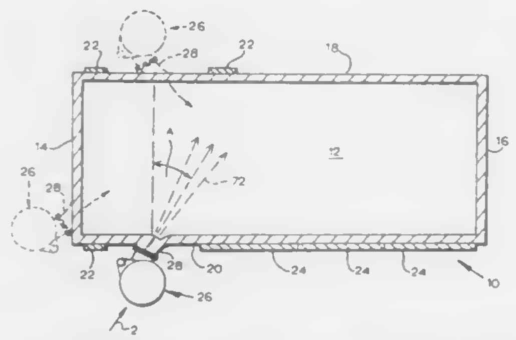
Marc-Andre Thibault; Marc Auger, both of Jonquiere; Bruno Gariepy, Chicoutimi, and Andre Gendron, Jonquiere, all of Canada, assignors to Alcan International Limited, Montreal, Canada

Filed May 12, 1989, Ser. No. 351,024

Claims priority, application Canada, May 20, 1988, 567368

Int. Cl.^{5} F27D *23/04*

U.S. Cl. 266—89 29 Claims



1. Stirring apparatus for use in combination with a furnace having a furnace chamber containing molten metal and for stirring the molten metal therein, the apparatus comprising:

a reservoir chamber separate from the furnace chamber;

a nozzle portion which when the reservoir chamber and the furnace chamber are connected together connects the interior of the furnace and reservoir chambers for the passage of the molten metal between them through the nozzle;

vacuum/pressure generating means connected to the reservoir chamber interior for alternatively and successively producing therein a vacuum for drawing molten metal into its interior from the furnace chamber, and a positive pressure for expelling the molten metal therefrom into the furnace chamber in the form of a stirring jet;

wherein the ratio of the cross-section area of the nozzle to the horizontal cross-section area of the reservoir chamber interior is between 1:50 and 1:250.

5,020,779
METHOD AND AN APPARATUS IN HOT-DIP GALVANIZING

Lars Lindblom, Box 87, S-830 05 Jarpen, Sweden, and Torstein Evensen, P.O. Box 1108, N-1601 Fredrikstad, Norway

PCT No. PCT/SE89/00406, § 371 Date May 8, 1990, § 102(e) Date May 8, 1990, PCT Pub. No. WO90/00631, PCT Pub. Date Jan. 25, 1990

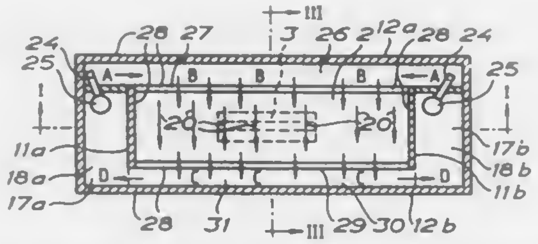
PCT Filed Jul. 11, 1989, Ser. No. 469,529

Claims priority, application Sweden, Jul. 15, 1988, 8802654

Int. Cl.^{5} B05C *19/02*

U.S. Cl. 266—112 12 Claims

1. In the method of galvanizing an object by immersion of the object in a bath of molten zinc in a box-like container having longitudinal side walls and transverse end walls, said bath having a working surface through which the object passes upon immersion into and removal from the bath, the improvement comprising providing a flow of substantially pure molten zinc in the zinc bath at the working surface thereof to convey away any surface impurities at said working surface so that during passage of the object through the working surface of the bath the object will not come into contact with impurities, said flow of substantially pure molten zinc at said working surface being effected by forming a gutter along one longitudinal side wall of the container and a channel along the other longitudinal side wall of the container, said container having a main region between the gutter and the channel containing molten zinc having a surface constituting said working surface, producing a transverse flow of said molten zinc at said working surface in the main region of the container by causing the molten zinc to flow from the gutter to the channel, passing the molten zinc in said channel in the longitudinal direction of the container to a side region in the container in which the zinc bath is isolated from said main region and from said gutter, and pumping the molten zinc from said side region into said gutter from a lower depth of the molten zinc in said region where the molten bath is substantially pure.



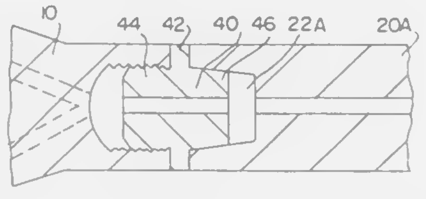
5,020,780
QUICK CONNECT-DISCONNECT COUPLING FOR BLAST FURNACE TAP HOLE DRILL BIT

Robert T. Woodings, Pittsburgh, Pa., assignor to Woodings Industrial Corporation, Mars, Pa.

Filed Apr. 4, 1990, Ser. No. 504,434

Int. Cl.^{5} C21C *5/48*

U.S. Cl. 266—271 26 Claims



1. A blast furnace tap hole drill having an elongated drill rod assembly comprising a plurality of component parts coupled together, said component parts including at least a drill bit and a drill rod, at least two of said component parts coupled together by a quick connect-disconnect coupling wherein a first of said two component parts has an extension thereon having frusto-conical side walls adapted to be inserted into and mate with a socket having frusto-conical side walls within the second of said two component parts, said frusto-conical side walls having an angle sufficient to permit said frusto-conical side walls of said extension to frictionally engage and be tightly fastened to said frusto-conical side walls of said socket.

5,020,781
CONTROLS FOR A SEMIACTIVE CHASSIS

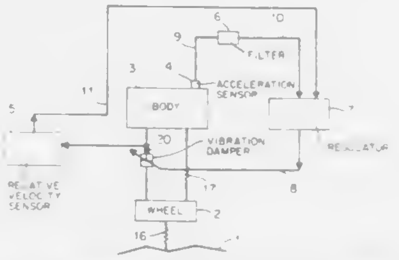
Zhen Huang, Wuppertal, Fed. Rep. of Germany, assignor to August Bilstein GmbH & Co. KG, Ennepetal, Fed. Rep. of Germany

Filed Jun. 19, 1990, Ser. No. 540,369

Claims priority, application Fed. Rep. of Germany, Jun. 20, 1989, 3920049

Int. Cl.^{5} F16M *1/00;* **B60G** *17/00*

U.S. Cl. 267—136 4 Claims



1 A control arrangement for a semi-active chassis in a motor vehicle with variable vibration dampers having a bypass valve comprising: vehicle wheel means; vehicle body means supported by said wheel means, said wheel means and said body means having each a velocity in traveling over a surface; a relative velocity sensor positioned between said wheel means and said body means for generating a velocity difference signal corresponding to the difference between the velocity of said wheel means and the velocity of said body means; regulator means connected to said relative velocity sensor for receiving said velocity difference signal; an acceleration sensor on said body means for sensing accelerations of said body means and applying a corresponding acceleration signal to said regulator means; signal filter means connected between said acceleration sensor and said regulator means; vibration damper means with a bypass valve located between said wheel means and said body means; said regulator means having an output connected to said vibration damper for controlling opening and closing of said bypass valve dependent on said acceleration signal and said velocity difference signal to reduce vibrations transmitted from said wheel means to said body means.

5,020,782
HYDRAULICALLY DAMPED RUBBER BEARING HAVING A FLEXIBLY EXPANDABLE WAVEGUIDE

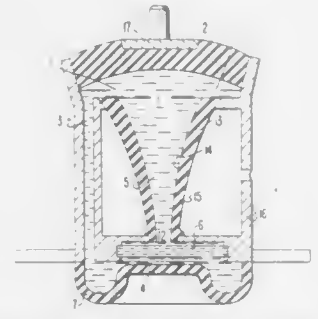
Ulrich Freudenberg, Hirschberg, and Tillman Freudenberg, Weinheim, both of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/Bergstrasse, Fed. Rep. of Germany

Filed Oct. 17, 1989, Ser. No. 422,763

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1988, 3835384

Int. Cl.^{5} F16F *9/00*

U.S. Cl. 267—140.1 14 Claims



1 A hydraulically damped rubber bearing comprising: a liquid-filled working chamber;

an elastically expandable bearing spring defining the working chamber and having a first expanding compliance;

a surge chamber;

a damping opening connected between the working chamber and the surge chamber, and through which liquid from said chambers is displaceable for damping low-frequency vibrations below 20 Hz when such vibrations are introduced into the rubber bearing;

a conduit connecting the working chamber with the surge chamber;

a damping element having a resistance to flow R, said damping element closing off said conduit at a point opposite the surge chamber;

said conduit having a funnel-shaped cross-section widening in the direction towards the working chamber and a length L, which is at least 0.2 times as great as the largest wavelength of pressure fluctuations produced in the conduit when high frequency vibrations above zotlz are introduced, said conduit being elastically expandable within the length L at least at one circumferential location and having a second expanding compliance, which cumulative supplements the first expanding compliance in such a way that the desired energy dissipation is produced in the damping opening when low-frequency vibrations are introduced and wherein said conduit has a wave impedance Zw at its narrowest location, the resistance to flow R essentially conforms to the wave impedance Zw, and the length L of the conduit is substantially invariable; and

said conduit, said damping element and said surge chamber cooperating to absorb sound waves, produced by the introduction of the high frequency vibrations into the bearing, in a refection-free manner.

5,020,783
TORSIONAL SPRING

Bernd Schröder, Bietigheim; Rudolf Hartmann, Karlsbad-Auerbach, and Helmut Thate, Neustadt, all of Fed. Rep. of Germany, assignors to IBP Pietzsch GmbH, Ettlingen, Fed. Rep. of Germany

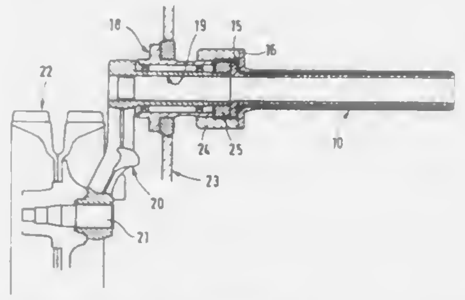
PCT No. PCT/DE89/00364, § 371 Date Jan. 26, 1990, § 102(e) Date Jan. 26, 1990, PCT Pub. No. WO89/11993, PCT Pub. Date Dec. 14, 1989

PCT Filed Jun. 2, 1989, Ser. No. 459,696

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1988, 3819162

Int. Cl.^{5} F16F *1/48, 1/14*

U.S. Cl. 267—273 17 Claims



1. A torsional spring comprising: at least two thin-walled tubular sections positioned coaxially and loosely separated radially along a common longitudinal axis of said tubular sections; said tubular sections being secured together at a first non-rotating end, said tubular sections comprising resilient sections; means for securing a second non-rotating end of said tubular sections to mutually rotating members at said second end and comprising a torsion bar for a connecting rod pivoting in a bearing mounted stationary in a vehicle to position wheel means at an end remote from said bearing; said tubular sections being integral with one another at said first end and one tubular section merging directly into another tubular section to form a

VOL
1127
ISS
1
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1991
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curved integrally continuous portion at said first end, said portion being a transition point at which one tubular section reverses direction and becomes the other coaxial tubular section, said tubular sections comprising a one-piece unit.

5,020,784
METHOD AND APPARATUS FOR ARRANGING PAPERS

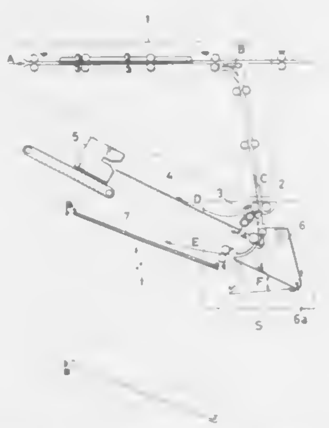
Shinji Asami, and Tadashi Ikoma, both of Yokohama, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 18, 1989, Ser. No. 408,528

Claims priority, application Japan, Sep. 27, 1988, 63-239688; Oct. 14, 1988, 63-257339

Int. Cl.⁵ B42B *2/00*

U.S. Cl. 270—53 **8 Claims**



1. An apparatus for arranging papers comprising:

a switch means for changing a paper conveyor route for conveying a paper after a treatment depending on whether the paper is to be directly transferred to a discharge tray or to be stacked to form a paper group to be stapled together;

a stapling means for receiving papers one by one so as to form a paper stack and for stapling the paper stack at one end thereof; and

a junction means including a pair of rollers being able to be positioned at each of a first position opposing to the stapling means and a second position opposing to the discharge tray, and a moving means for moving the rollers selectively to one of the first position and the second position the rollers being adapted to receive the stapled paper stack at the first position and to discharge the stapled paper stack at the second position.

5,020,785
SHEET FINISHER

Kenji Kosaka, Naka; Hiroshi Kimura, Manabeshin; Akihiro Suzuki, Ibaraki, and Kenji Hayashi, Takaba, all of Japan, assignors to Ikegami Tsushiniki Co. Ltd., Tokyo, Japan

Filed Jul. 11, 1989, Ser. No. 378,051

Claims priority, application Japan, Jul. 14, 1988, 63-173884; Jul. 14, 1988, 63-173885; Jul. 14, 1988, 63-173886; Jul. 14, 1988, 63-173887; Jul. 14, 1988, 63-173888; Jul. 14, 1988, 63-173889; Jul. 14, 1988, 63-173890

Int. Cl.⁵ B42B *2/00*

U.S. Cl. 270—053 **29 Claims**

1. A sheet finisher comprising:

first and second transfer guides, said first guide being arranged to receive a sheet which is introduced in the finisher;

first sheet direction switching means for selectively guiding the sheet into one of said first and second transfer guides;

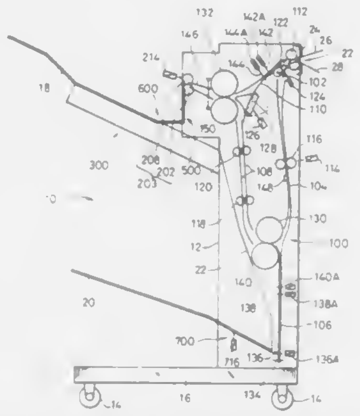
a temporary accommodation guide arranged to receive the sheet which is transferred through said first transfer guide;

a third transfer guide arranged to extend from the outlet of said first guide to the outlet of said second guide;

a first pair of press rollers disposed at the entrance of said third transfer guide and arranged to press a fold into the sheet which passes therebetween;

first restricting means, disposed in said temporary accommodation guide; for restricting movement of the leading edge of the sheet;

a second pair of press rollers, disposed adjacent to the exits of said second and third transfer guides, said second pair of press rollers being arranged to press a fold into the sheet which passes therebetween;



second sheet direction switching means for selectively guiding the sheet which is transferred through said third transfer guide into one of said second transfer guide and said second pair of press rollers;

second restricting means, disposed in said second transfer guide, for restricting movement of the leading edge of the sheet;

a first pair of transfer rollers disposed in said first transfer guide; and

a second pair of transfer rollers disposed in said third transfer guide.

5,020,786
PAPER INSERTING APPARATUS

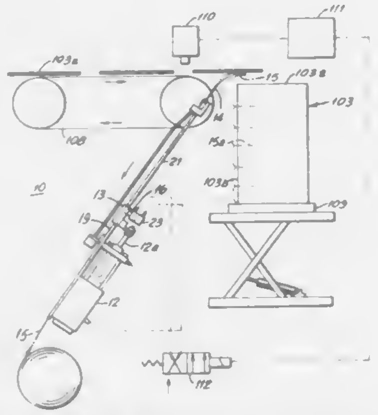
Akira Kimura, Suita; Osamu Tomita, Osaka; Tetsuji Tomimoto; Satoru Fujita, both of Hyogo, and Masami Kanemoto, Ibaragi, all of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan

Filed Aug. 29, 1989, Ser. No. 399,905

Claims priority, application Japan, Aug. 31, 1988, 63-218846; Mar. 28, 1989, 1-77559; Apr. 28, 1989, 1-50988[U]

Int. Cl.⁵ B65H *45/22*

U.S. Cl. 270—95 **3 Claims**



1. A paper inserting apparatus, comprising: a guide bar having a flat guide path containing an upper surface and a lower surface, said surfaces extending parallel to and facing each other, for inserting tape into said guide path from a tape supply source, said tape having an upper side and a lower side;

a tape pusher slidably affixed to said guide bar so as to move slidably thereon, said tape pusher movable within a defined range of movement in the longitudinal direction of said bar;

engaging means affixed to said tape pusher for engaging said tape on both sides, said engaging means movable longitudinally along said guide path so as to insert said tape through said upper surface and said lower surface;

an elongated flexible elastic leaf for sliding said lower surface of said tape on said guide path, said leaf folding and driving the free portion of said tape as said free portion of said tape emerges from the end of said guide path; and

reciprocal drive means to slide said tape pusher within said defined range of movement, characterized in that said guide bar is equipped at a position in relation to a cut sheet stack so that said free portion of said tape is inserted a predetermined distance into a cut sheet area at an insertion position on the upper side of a top sheet positioned at a predetermined level of said sheet stack, said tape remaining for a succeeding cut sheet to fall upon said cut sheet stack upon the counting-up of a defined number of the sheets while the folded portion of said tape is held by said elastic leaf against said top sheet; and

a non-return blade is provided in the rear portion of said guide path which allows forward movement of said tape along said guide path but prevents backward movement thereof, such that engaging means is released and said pusher is moved backward. only said elongated leaf is moved backward together with said pusher, said folded portion of said tape remaining in said insertion position.

5,020,787
BILL PROCESSING APPARATUS

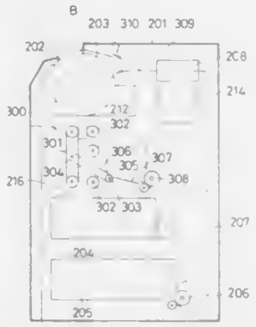
Junichi Arikawa, Kawaguchi, Japan, assignor to Laurel Bank Machines Co., Ltd., Tokyo, Japan

Filed May 5, 1989, Ser. No. 347,909

Claims priority, application Japan, May 6, 1988, 63-110029; Jan. 24, 1989, 1-104154

Int. Cl.⁵ B65H *83/00*

U.S. Cl. 271—3 **6 Claims**



1. A bill processing apparatus capable of receiving and/or dispensing bills, said bill process apparatus comprising drum means disposed in the vicinity of a bill transaction opening capable of communicating between the outside and inside of the bill processing apparatus and secured to a center shaft rotatably mounted on said bill processing apparatus, said drum means having a bill accumulating means which has a bill-receiving opening at one side thereof and can receive the bills via said bill-receiving opening and accumulate them therein, bill feed-in passage means for feeding the accumulated bills from said bill accumulating means into the inside of the bill processing apparatus, bill feed-out passage means for feeding the bills one by one from the inside of the bill processing apparatus to said bill accumulating means, drum rotating means for rotating said drum means so that said bill-receiving opening of said bill accumulating means can selectively communicate with the bill transaction opening, the bill feed-in passage means or the biil feed-out passage means, and bill transporting means provided for said bill accumulating means and capable of feeding the bills one by one into said bill accumulating means at a first speed and feeding out the accumulated bills from said bill accumulating means at a second speed, said first speed being faster than said second speed.

5,020,788
PAPER FEEDING DEVICE

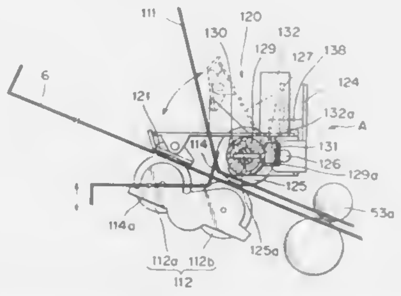
Masaru Hatano, Amagasaki, and Tsukasa Sugiyama, Moriguchi, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Nov. 21, 1989, Ser. No. 439,839

Claims priority, application Japan, Nov. 25, 1988, 63-299217

Int. Cl.⁵ B65H *1/14*

U.S. Cl. 271—126 **8 Claims**



5. A paper feeding device for feeding paper sheets from an intermediate tray provided inside of an image forming apparatus, the intermediate tray temporarily containing the paper sheets after a first image has been formed thereon by an image forming section of the image forming apparatus, said paper feeding device comprising:

a preliminary feed roller for sending out from the intermediate tray the paper sheets contained in the intermediate tray;

a pressure plate for pressing the paper sheets contained in the intermediate tray against said preliminary feed roller to assist said preliminary feed roller in sending out the paper sheets from the intermediate tray;

a feed roller for conveying the paper sheets sent out by said preliminary feed rolller in the direction of the image forming section;

a pressure roller for pressing the paper sheets sent out by said preliminary feed roller against said feed rooler to assist said feed roller in conveying the paper sheets;

a roller supporting shaft for rotatably supporting said pressure roller;

a supporting member pivotably attached to said roller supporting shaft and supporting said pressure plate for pivoting of the pressure plate around said roller supporting shaft in response to rotation of said roller supporting shaft;

a gear connected to said roller supporting shaft to drive said roller supporting shaft, said roller supporting shaft and said gear being relatively rotatable over a predetermined angle such that said pressure plate can be pivoted to a position according to the number of paper sheets contained in said intermediate tray; and

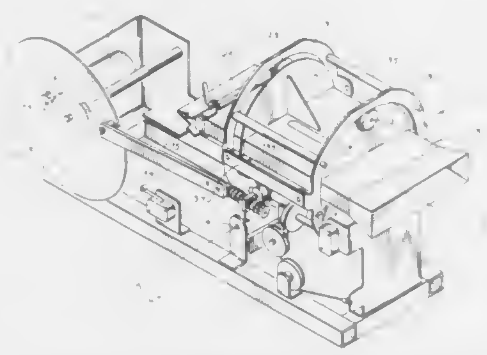
a motor for rotating said gear to rotate said roller supporting shaft.

5,020,789
DRIVE UP TELLER MACHINE

David A. Droge, Charlotte; Jeffrey B. Lyerly; William E. Mott, both of Harrisburg; Lance W. Whitehead, and Matthew G. Yenik, both of Charlotte, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 9, 1988, Ser. No. 282,414
Int. Cl.⁵ B65H *5/00*

U.S. Cl. 271—225 7 Claims



2 A transaction machine having a user panel and a safe for storing documents, said machine comprising:
a slot in a wall of said safe, said slot allowing passage of ones of said documents through said wall, said slot having a length which is longer than a width of said slot, an axis of said slot passing through ends of said slot and lying along said length of said slot;
an opening in said user panel, said opening allowing passage of ones of said documents between said machine and a user of said machine, said opening being longer than said opening is wide, an axis of said opening passing through ends of said opening and lying along said length of said opening, said axis of said opening being transverse to said axis of said slot;
means for carrying documents between said slot and said opening, said means for carrying comprising:
a document carrier for receiving and holding a document;
means for rotating said carrier holding said document about an axis, said axis being substantially perpendicular to said axis of said slot;
whereby a document being carried by said carrier is oriented by said carrier to pass through said slot at one end of the travel of said carrier and to pass through said opening at another end of said travel of said carrier.

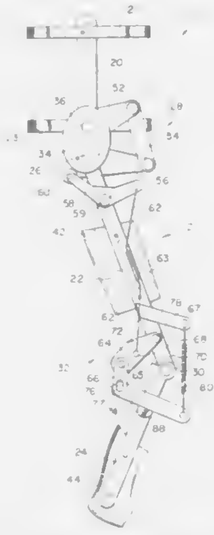
5,020,790
POWERED GAIT ORTHOSIS

John E. Beard; Franklin L. Spillman, both of Baton Rouge, La.; Oscar Banos, Dallas, Tex.; David Showers, Monroe; John M. Fussell, Bogalusa, both of La., and George LeBlanc, N. Palm Beach, Fla., assignors to Board of Supervisors of Louisiana State University and Agricultural and Mechanical College, Baton Rouge, La.

Filed Oct. 23, 1990, Ser. No. 602,003
Int. Cl.⁵ A61F *2/60, 2/64, 2/70*

U.S. Cl. 272—70 17 Claims

1. A powered gait orthosis, comprising:
a torso member for connection to the torso of a wearer;
a hip joint connected to said torso member;
a thigh member connected at said hip joint to said torso member, for connection to the thigh of the wearer;
a knee joint connected to said thigh member;
a shank member connected at said knee joint to the thigh member, for connection to the shank of the wearer;
motor driven hip drive means located on said torso member and connected to the thigh member for pivoting said thigh member forwardly and rearwardly on the hip joint with respect to the torso member;
knee drive means connected between said hip drive means and said shank member for pivoting said shank member rearwardly on the knee joint with respect to the thigh member, the hip and knee drive means being operatively engaged with each other for simulating the taking of a natural step by the wearer; and
an automatic knee joint lock operatively connected between the thigh member and the shank member for locking the knee joint, said knee joint lock being connected to the knee drive means for unlocking the knee joint in synchronism with activation of the hip drive means and the knee drive means to allow the shank member to pivot on the knee joint.

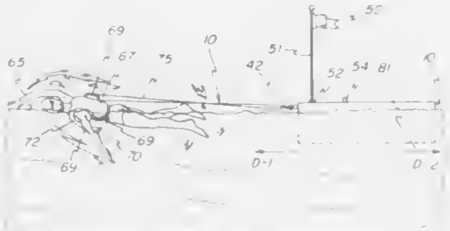


5,020,791
AQUATIC EXERCISE DEVICE

Edward D. Phillips, 7258 Warwick, Reynoldsburg, Ohio 43068

Filed May 26, 1989, Ser. No. 357,229
Int. Cl.⁵ A63B *31/00*

U.S. Cl. 372—71 16 Claims



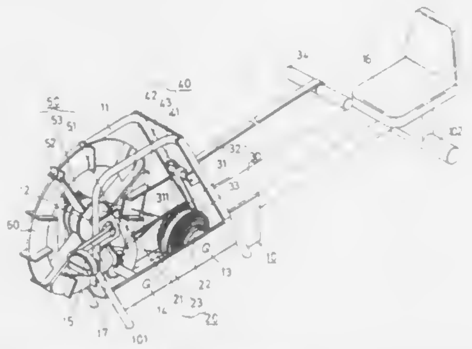
1. An aquatic device comprising a housing having a convex front wall and a concave rear wall, a top, and a bottom, said housing having a first interior cavity and a second interior cavity, said second interior cavity having sealing means, and said housing having water inlet means, said water inlet means having water inlet sealing means, said second interior cavity also comprising a compartment having a wall, said wall having an aperture therethrough, said compartment containing a hose member having two ends, one end extending through said aperture into said first interior cavity, the other end being closed by air flow control means.

5,020,792
EXERCISE BICYCLE FOR EXERCISING ARMS AND LEGS

T. C. Chen, No. 89, Lane 465, Lien-Tsun Rd., Feng-Yuan City, Taiwan

Filed Mar. 22, 1990, Ser. No. 497,429
Int. Cl.⁵ A63B *21/00*

U.S. Cl. 272—72 1 Claim



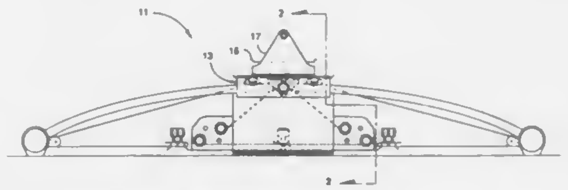
1. An exercise bicycle comprising:
an elongated base frame having a front portion and a rear portion, said front portion of said elongated base frame having two support frames respectively mounted on two sides thereof, said rear portion of said elongated base frame having an adjustable seat mounted thereto, said two support frames having a first, second and third shaft transversely journalled therebetween, said first shaft having two crank arms respectively connected to two ends thereof and two pedals secured to said crank arms respectively;
a driving assembly including a first wheel mounted to said first shaft, a first one-way bearing provided between said first wheel and said first shaft so that said first wheel is rotated in a predetermined direction by said first shaft when said first shaft is rotated by said pedals in said predetermined direction but not rotated by said first shaft when said first shaft is rotated in an opposite direction relative to said predetermined direction, a second wheel fixed to said second shaft, and a first flexible element trained on said first wheel and said second wheel so that said second wheel can be driven by said first wheel, the diameter of said second wheel being smaller than that of said first wheel;
a hand operated assembly including a third wheel with a peripheral groove mounted to said second shaft, a rope member wound around said third wheel in said peripheral groove, said rope member connected to said third wheel at one end thereof and connected to a handle at the other end thereof, said third wheel being rotated in said predetermined direction when a user pulls said handle toward said seat and thus pulls said rope member out of said peripheral groove of said third wheel, a return spring connected to said third wheel at one end thereof and said front portion of said base frame at the other end thereof, forcing said third wheel to be rotated in said opposite direction so that said rope member can be rewound onto said third wheel after being pulled out, a second one-way bearing being provided between said third wheel and said second shaft so that said second shaft can be rotated by said third wheel in said predetermined direction when said third wheel is rotated by pulling said rope member out of said peripheral groove of said third wheel but not rotated with said third wheel when said third wheel is rotated by said return spring in said opposite direction;
a transmission assembly including a fourth wheel fixed to said second shaft and coaxially rotated with said second wheel, a fifth wheel fixed to said third shaft, and a second flexible element trained on said fourth and fifth wheels so that said fifth wheel can be rotated with said fourth wheel, the diameter of said fifth wheel being smaller than that of said fourth wheel; and
a load applying assembly including a sixth wheel fixed to said third shaft and coaxially rotated with said fifth wheel, a seventh wheel journalled on said first shaft, and a third flexible element trained on said sixth and said seventh wheels so that said seventh wheel can be rotated with said sixth wheel, said seventh wheel having a damping fan coaxially connected thereto and journalled on said first shaft, the diameter of said seventh wheel being smaller than that of said sixth wheel;
whereby, when said pedals are rotated in said predetermined direction, said first, second, fourth, fifth, sixth, and seventh wheels and said damping fan are in turn rotated in said predetermined direction; and
when said handle is pulled toward said seat by the user, said third, forth, fifth, sixth, and seventh wheels and said damping fan are in turn rotated in said predetermined direction.

5,020,793
SKI EXERCISING APPARATUS

R. Joel Loane, 535 Placitas Ave., Atherton, Calif. 94025

Continuation-in-part of Ser. No. 178,354, Apr. 6, 1988. This application Oct. 24, 1989, Ser. No. 426,881
Int. Cl.⁵ A63B *69/18*

U.S. Cl. 272—97 3 Claims



1. A ski exercising apparatus comprising:
two rails positioned in a spaced-apart, parallel relationship;
brace means for holding said rails in said spaced-apart relationship;
carriage means for providing a stable riding area for riding along said rails;
resilient means for providing a restoring force on said carriage means toward the middle of said rails; and
a generally U-shaped platform means having only one foot support surface, said foot support surface adequate in size for only one of a user's feet, said platform means pivotally attached at respective legs of the U-shaped platform means to said carriage means to pivot around a horizontal pivot axis above said surface, said pivot axis directed at substantially a right angle to the direction of travel of said carriage, such that said platform means acts as a swing in operation, said platform means such that said surface is maintained at substantially a right angle to the line of action of the force a user applies to said surface;
said carriage means adapted to be attached to only one said platform means.

5,020,794
MOTOR CONTROL FOR AN EXERCISE MACHINE SIMULATING A WEIGHT STACK

William H. Englehardt, Wood Dale; Olgerts J. Svilans, Chicago, both of Ill., and Augustine Nieto, Newport Beach, Calif., assignors to Bally Manufacturing Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 4,006, Jan. 16, 1987, abandoned. This application Jun. 10, 1988, Ser. No. 204,665
Int. Cl.⁵ A63B *21/005*

U.S. Cl. 272—129 91 Claims

1. An exercise machine comprising:
a user interface;
an electric motor;

VOL
1127
ISS
1
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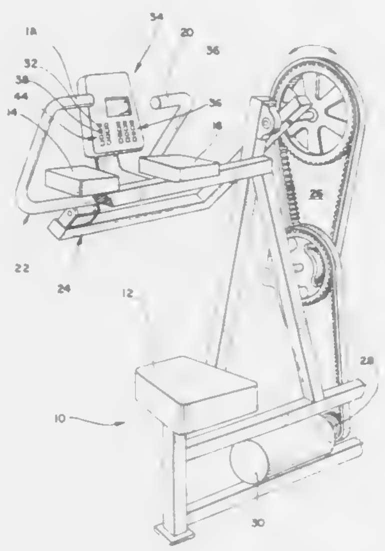
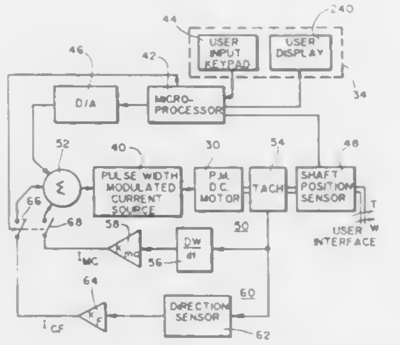
1991
UMI

linkage means for mechanically connecting said user interface to said electric motor;
control means operatively connected to said electric motor for generating a power input signal for controlling the torque output of said electric motor;
user input means operatively connected to said control means for permitting a user to operate the exercise machine; and
compensation means operatively connected to said control means for subtracting from said power input signal a compensation factor effective to reduce the torque output of said electric motor to compensate for at least a portion of the inertia of said electric motor.

84. In an exercise machine having a user interface engaged by a user to exert a force, means for exerting against the user a counterforce simulating a weight stack comprising:
a D.C. motor coupled to the user interface for providing a counterforce against the user;

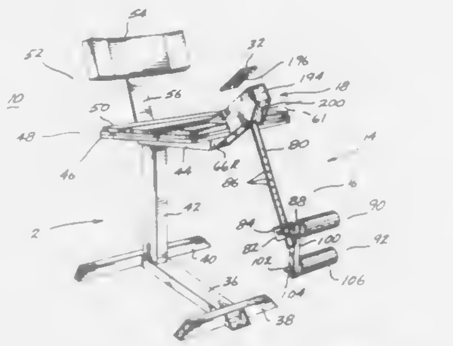


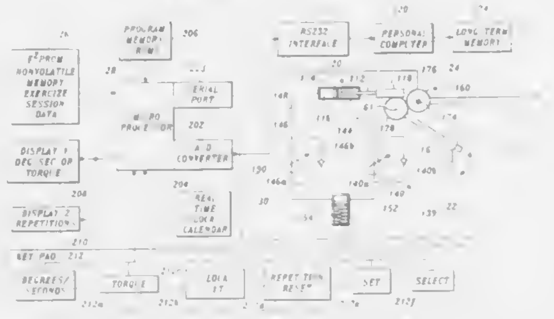


input means operable by the user for selecting the level of difficulty of an exercise formed of a plurality of repetitions;
programmable processing means responsive to said input means for controlling the amount of counterforce provided by said D.C. motor to provide said exercise formed of a progressive phase in which the counterforce is gradually increased from a starting level to a plateau level over a first group of repetitions followed by a plateau phase in which the counterforce is maintained constant at the plateau level over a second group of repetitions followed by a regressive phase in which the counterforce is gradually decreased from the plateau level to the starting level over a third group of repetitions wherein said processing means varies the magnitude of the plateau level counterforce and the number of different progressive level and regressive level repetitions in said exercise in response to the difficulty level selected such that as the level of difficulty increases, the magnitude of the plateau level counterforce and the number of different counterforces applied during the progressive and regressive levels increase.

5,020,795
PHYSICAL THERAPY AND EXERCISE APPARATUS FOR BODY LIMBS

James F. Airy, and Thomas D. Kadavy, both of Bellevue, Wash., assignors to Soma Dynamics Corporation, Bellevue, Wash.
Filed Jun. 7, 1989, Ser. No. 362,887
Int. Cl.^{5} A63B ***21/005***
U.S. Cl. 272—129 **19 Claims**





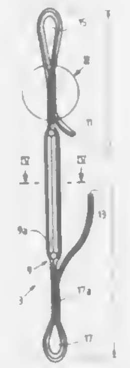
1. A physical therapy and exercise apparatus, comprising:
(a) a frame;
(b) actuating means mounted on the frame for movement by a portion of a user's body;
(c) double acting resistance means operably interconnected with the actuating means to resist movement of the actuating means, the resistance means including control means to control the magnitude of the resistance force imposed on the actuating means by the resistance means;
(d) means for monitoring at least one parameter related to the use of the physical therapy exercise apparatus and providing a corresponding signal;
(e) integrated circuit means having signal receiving means for receiving the signals from the monitoring means, data storage means for storing the data indicative of the signal received by the integrated circuit means from the monitoring means and interface means for accessing the data storage means to transmit the data to a remotely located data processor for further processing the data, wherein the integrated circuit means is disposed within a portable first subassembly detachably mounted on the frame; and,
(f) means for detachably mounting the portable first subassembly on the frame for convenient removal from the frame.

12. A physical therapy and exercise apparatus, comprising:
(a) a frame;
(b) actuating means mounted on the frame for movement by a portion of a user's body;
(c) double acting resistance means operably interconnected with the actuating means to resist movement of the actuating means the resistance means including control means to control the magnitude of the resistance force imposed on the actuting means by the resistance means;
(d) means for monitoring at least one parameter related to the use of the physical thereapy and exercise apparatus and providing a corresponding signal;
(e) integrated circuit means having signal receiving means for receiving the signals from the monitoring means data storage means for storing the data indicative of the signal received by the integrated circuit means from the monitoring means and interface means for accessing the data storage means to transmit the data to a remotely located data processor to process the data;
(f) a second subassembly composed of the actuating means, the resistance means and the control means;
(g) a second subassembly frame on which the second subassembly is mounted;
(h) means for detachably mounting the second subassembly frame on the apparatus frame;
(i) wherein the integrated circuit means is also mounted on the second subassembly frame; and,
(j) further including means for detachably mounting the integrated circuit means on the second subassembly frame.

13. A physical therapy and exercise apparatus having actuating means moveable by a portion of a user's body, resistance means to resist movement of the actuating means including control means to control the magnitude of the resistance force imposed on the actuating means by the resistance means, and further comprising:
(a) means for monitoring at least one parameter related to the use of the physical therapy and exercise apparatus and providing corresponding signals;
(b) integrated circuit means disposed within a portable housing, the integrated circuit means having signal receiving means for receiving the signals from the monitoring means data storage means for storing data indicative of the signals received from the monitoring means, and interface means for accessing the data storage means to transmit the data to a data processor for further processing the data; and,
(c) means for detachably mounting the portable housing on the physical therapy and exercise apparatus for convenient removal and transportation independently of the remainder of the physical therapy and exercise apparatus.

5,020,796
EXPANDER TYPE EXERCISING APPARATUS

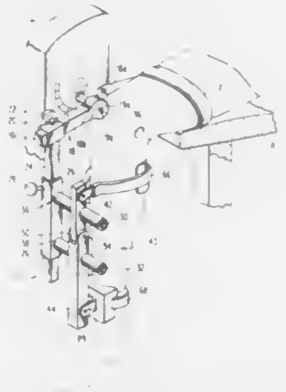
Martin Ullmann, Tellenweg 1, CH-9030 Abtwil, Switzerland
Filed Feb. 28, 1990, Ser. No. 486,530
Int. Cl.^{5} A63B ***21/055***
U.S. Cl. 272—143 **14 Claims**



1. An expander comprising a stretchable elongated elastic element having a first end and a second end; and an envelope including a longitudinally deformable elongated median portion surrounding said elastic element, and first and second end portions secured to and both extending beyond the respective ends of said elastic element, said end portions including handles which are spaced apart from the respective ends of said elastic element and can be grasped by the hands of a person preparatory to stretching of the elastic element by way of said end portions.

5,020,797
METHOD AND APPARATUS FOR EXERCISING THE KNEE WHILE CORRECTING FOR TIBIAL SUBLUXATION

Clay A. Burns, 55 Washiogton St., #10, Medford, Mass. 02155
Filed Dec. 15, 1989, Ser. No. 451,370
Int. Cl.^{5} A63B ***21/00;*** **A61F** ***5/00***
U.S. Cl. 272—143 **11 Claims**



1. An apparatus for use in exercise therapy for rehabilitation of a patient's leg having an injured knee, and a tibia which is subluxated in a first, posterior direction proximate said knee, said apparatus comprising:
A) first pivotal means for applying a first, supportive force in a second, anterior direction near a first end of said tibia, said first end being proximate said knee, said second direction being opposite from said first direction;
B) second pivotal means for applying a second, resistive force in said first direction near a second end of said tibia, said second end being distal from said knee; and
C) third means pivotally coupling adjacent ends of the first and second pivotal means such that an application of said resistive force tends to rotate said second pivotal means in a first rotational direction, which in turn, via said pivotal coupling means, tends to rotate said first pivotal means in a second, opposite rotational direction to attendantly displace the tibia in a direction to lessen the subluxation.

5,020,798
SPINNING TOP GAME KIT

Mang M. Yang, 897-B Six Oaks Cir., Norcross, Ga. 30093
Filed Jul. 16, 1990, Ser. No. 553,190
Int. Cl.^{5} A63F ***9/00;*** **A63H** ***1/04***
U.S. Cl. 273—440 **3 Claims**

1. A spinning game top kit comprising,
a plurality of spinning top members, each spinning top member including an inverted conical lower surface, with a balancing projection directed coaxially and exteriorly of the conical lower surface, and
an annular medial surface coaxially aligned and positioned medially with the spinning top member, and
a convex upper surface, the convex upper surface including a crown member positioned coaxially of the spinning top member, with each crown member including an inverted conical side wall surface, and each spinning top member further including a string member for securement about the convex upper surface to impart gyroscopic rotation to the spinning top member, and

VOL
1127
ISS
1
JE
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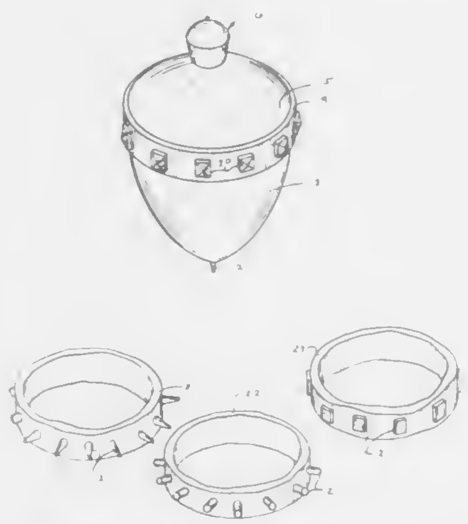
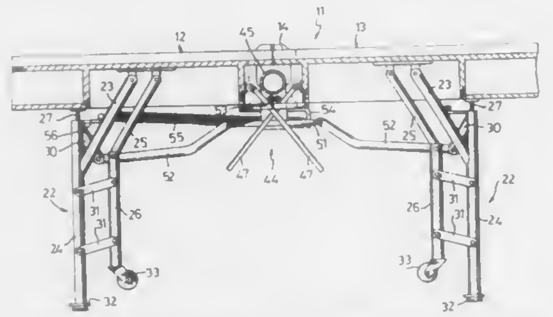
1991
UMI

wherein each spinning top member annular surface is defined by a predetermined height, and each spinning top member further includes a plurality of elastomeric bands



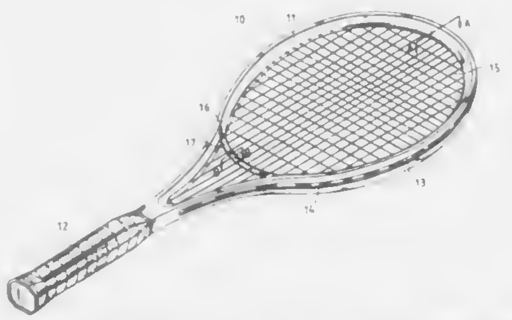
for securement about the annular surface, with each elastomeric band defined by a height equal to the predetermined height.

5,020,799
FOLDING BILLIARD TABLE
Yong-Hong Chang, No. 53-5, Fu Hsing Village Chi An Hsiang, Hwalien Hsien, Taiwan
Filed Aug. 9, 1988, Ser. No. 230,237
Int. Cl.⁵ A63B *71/00*
U.S. Cl. 273—3 C 6 Claims



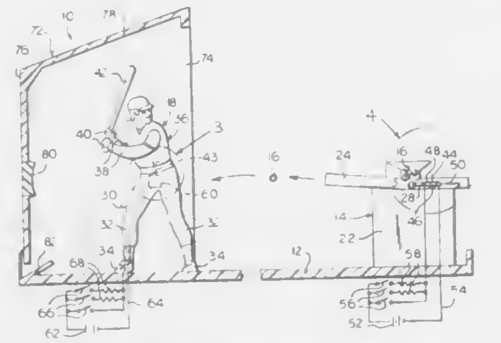
3. A foldable table according to claim 1, wherein said table folding mechanism further comprises:
first and second positioning plates depending from said elongate spindle at spaced locations along the length thereof, each said plate having a pair of openings therethrough horizontally aligned with the openings in the other plate,
first and second rotatable gears disposed between said first and second positioning plates each having shafts at both ends supported for rotation in respective aligned openings in said plates with said gears in meshing relationship,
first and second elongate gear racks each having a first end pivotally connected to the underside of a respective table half at a location near said spindle for pivotal movement into positions where the gears of said first and second gear racks respectively engage said first and second rotatable gears, and bracket means for maintaining said gear racks and rotatable gears engaged in such a way that both gear racks are moved by equal amounts in response to rotation of said rotatable gears, and
an elongate bar secured to one of said positioning plates and extending transversely of said spindle, said linking elements being pivotally connected between respective ends of said elongate bar and said support structures.

5,020,800
SHOCK DAMPING AND ABSORBING RACKET
Dennis Chen, 293 Pei Tun Road, Taichung, Taiwan
Filed Mar. 27, 1990, Ser. No. 499,654
Int. Cl.⁵ A63B *49/02*
U.S. Cl. 273—73 G 3 Claims



1. A shock damping and absorbing racket comprising: a frame substantially in an oval form and a handle extending from two opposite lateral sides at the bottom of said frame;
a groove formed around the outer periphery of said frame;
said groove having a plurality of through holes evenly spaced along said groove;
a plurality of vertical and transverse strings passing through said holes and interweaving to form a large web within said frame;
a thin, curved, and reinforced rib integrally formed with said frame and connected to said two opposite lateral sides of said frame disposed at a throat portion of said frame, the vertical distance between said rib and said vertical string is approximately 0.2 mm;
wherein said vertical taut strings cross said rib in such a way that a prior portion of each said vertical taut string crosses over said rib and a posterior portion of each said vertical taut string crosses under said rib, and whereby said reinforced rib can rapidly and efficiently stop and prevent the transmission of shock waves.

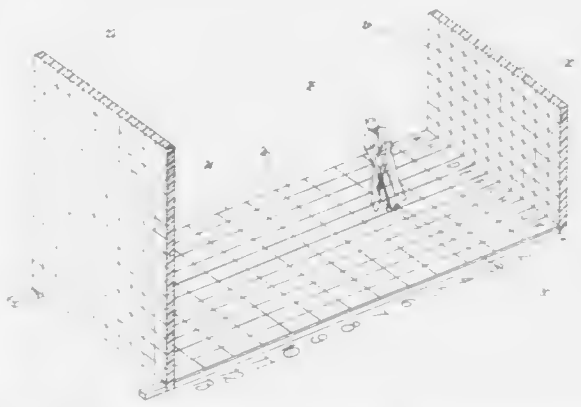
5,020,801
BASEBALL HOME RUN CONTEST GAME
William Negron, 70 E. 162nd St., Apt. 6-H, Bronx, N.Y. 10452
Filed Apr. 23, 1990, Ser. No. 512,397
Int. Cl.⁵ A63F *7/06*
U.S. Cl. 273—89 5 Claims



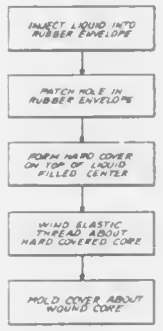
1. A baseball home run contest game comprising:
(a) an elongated platform;
(b) a pitching mechanism mounted to one end of said platform, said pitching mechanism electrically and selectively operable at various speeds by a first player to propel a miniature baseball therefrom, wherein said pitching mechanism includes:
(i) a support member affixed to said platform;
(ii) a barrel affixed to a top of said support member with a distal end of the barrel being slanted upwardly therefrom;
(iii) a hopper connected to a top of said barrel to allow one miniature baseball at a time to fall therefrom into said barrel;
(iv) a plunger carried within said barrel to make contact with the one miniature baseball; and
(v) means for electrically operating said plunger so as to propel the miniature baseball out of said barrel towards a batting mechanism;
(c) said batting mechanism mounted to an opposite end of said platform, said batting mechanism electrically and selectively operable at various speeds by a second player to hit the miniature baseball propelled thereto, wherein said batting mechanism is a simulated miniature baseball batter which includes:
(i) an upstanding lower body section having legs with feet affixed to said platform;
(ii) an upstanding upper torso section having arms with hands holding a simulated baseball bat;
(iii) an upright shaft extending between said lower body section and said upper torso section so that said upper torso section can rotate with respect to said lower body section about a generally upright axis; and
(iv) means for electrically rotating said shaft so that the baseball bat on said upper torso section can hit the propelled baseball; and
(d) a miniature wall structure positionable remotely behind said pitching mechanism, whereby balls not hit with sufficient force by said batting mechanism may be captured in said miniature wall structure, while balls hit with sufficient force may pass over said miniature wall structure; and
(e) means for electrically operating said pitching mechanism by said first player including:
(i) a solenoid having an iron core rod connected at one end to said plunger and a coil for operating said rod;
(ii) a spring connected between another end of said rod and a back of said barrel to help return the rod back to its original position after it is activated;
(iii) a battery connected in circuit to the coil of said solenoid to operate the rod;
(iv) a first series of at least three switches connected in a parallel relationship with the circuit; and
(v) at least two different resistors, each connected between one of said switches and the coil so that said switches can selectively operate said solenoid at the various speeds.

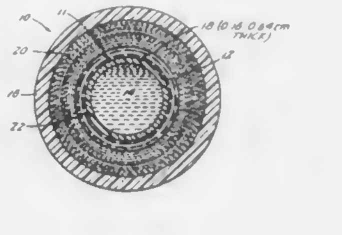
5,020,802
GOLF TRAINING DEVICE AND METHOD
Oscar R. F. af Strom, Ave. Residencial Chiluca 207, Club Campestre Chiluca, Atizapan, Mexico
Continuation-in-part of Ser. No. 413,113, Sep. 27, 1989, abandoned. This application Apr. 10, 1990, Ser. No. 507,003
Int. Cl.⁵ A63B *69/36*
U.S. Cl. 273—185 R 25 Claims

21. A gold training device comprising:
a front wall;
a rear wall opposite and substantially parallel thereto;
a light training ball located at a position on the floor between the walls, to be hit to the front wall by a golfer standing between the walls; and
at least one golf club;
wherein the walls are spaced apart a distance such that the training ball, when hit from said position by a well-executed shot with said club will bounce off the front wall, then the rear wall and provide instantaneous feedback to the golfer on the quality of the shot.



5,020,8C3
GOLF BALL AND METHOD OF MAKING SAME
Paul M. Gendreau, Swansea, and Lauro C. Cadorniga, S. Dartmouth, both of Mass., assignors to Acushnet Company, New Bedford, Mass.
Filed Mar. 20, 1989, Ser. No. 325,546
Int. Cl.⁵ A63B *37/06, 37/08, 47/04;* **B29H** *3/08*
U.S. Cl. 273—225 34 Claims


INJECT LIQUID INTO RUBBER ENVELOPE
PATCH HOLE IN RUBBER ENVELOPE
FORM HARD COVER ON TOP OF LIQUID FILLED CENTER
WIND ELASTIC THREAD ABOUT HARD COVERED CORE
MOLD COVER ABOUT WOUND CORE



15. A method for making a center for a thread wound golf ball comprising the steps of:
(a) filling a hollow spherical envelope with a liquid to form a filled envelope;
(b) applying a layer of uncured rubber around said filled envelope; and
(c) curing said rubber to form a rubber shell about said filled envelope to form a center for a thread wound golf ball
21. A golf ball center made in accordance with the method of claim 15.

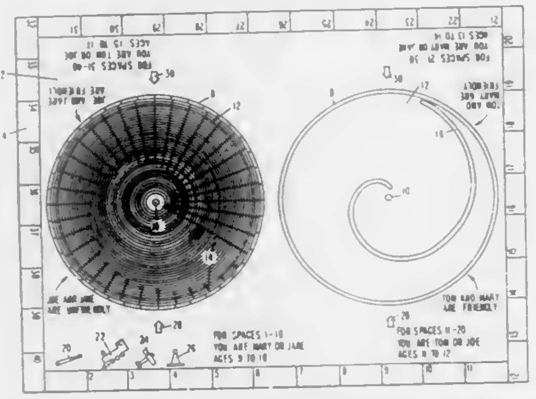
5,020,804
PSYCHOLOGY GAME
Gail H. Weedman, 607 Tumbleweed Ct., Kokomo, Ind. 46901
Filed Jun. 13, 1990, Ser. No. 537,915
Int. Cl.⁵ A63F *3/00*
U.S. Cl. 273—249 18 Claims

1. A method of playing a psychology game with one or more players wherein, said method comprising the steps of:
(1) assigning one or more players a hypothetical person having at least one undisclosed character trait;
(2) selecting a description of a circumstance with which the hypothetical person is confronted;
(3) providing each player with a plurality of descriptions of

VOL
1127
ISS
1
JE
4
1991
UMI

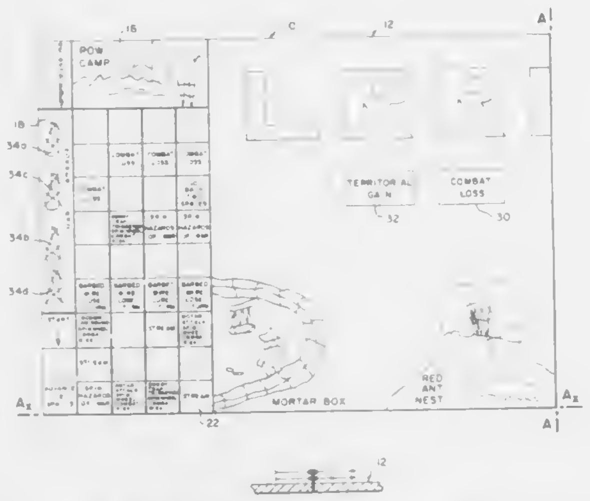
possible reactions of the hypothetical person to the circumstance;
(4) selecting as most appropriate one or the plurality of descriptions of possible reactions to the selected circumstance;
(5) determining the quality of the player's reaction selection in the reaction selection step;
(6) rewarding the one or more players with a performance rating which is a game benefit in proportion to the quality of the player's reaction selection determined in the quality determining step; and
(7) determining the at least one undisclosed character trait by comparing the player's selected circumstances and reaction selection to the circumstances to the respective performance ratings awarded to the player,

whereby the determination of the at least one undisclosed character trait of the hypothetical person increases a player's ability to determine the most appropriate selection in the reaction selection step.



5,020,805
WAR GAME

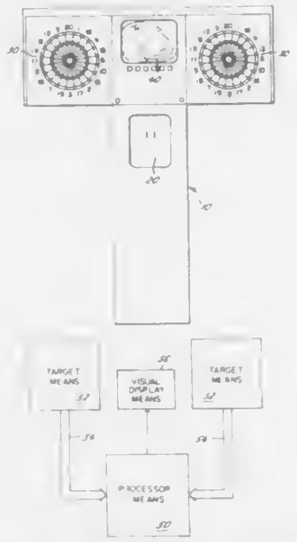
John J. Fratangelo, 266 Ridge Rd., New City, N.Y. 10956, and George Spector, 233 Broadway, New York City, N.Y. 10007
Filed Dec. 6, 1989, Ser. No. 446,683
Int. Cl.⁵ A63F *3/00*
U.S. Cl. 273—255 4 Claims



1. A long range reconnaissance patrol Vietnam War board game comprising:
(a) a game board with jungle background having a plurality of different colored trails, one for a chopper ride and other trails to be used by squads on foot, said game board also having a POW camp, chopper pad, L.Z., river and streams, V. C. trails, V. C. village, mountaingnard village, rice paddy, combat loss space and territorial gain space disposed onto the background of said game board;
(b) a plurality of helicopter playing pieces each colored to match one of said colored foot trails;
(c) a plurality of squad team sets of squad member character cards, each said squad team set colored to match one of said helicopter playing pieces;
(d) a plurality of first type pawns to represent squad movement on said game board, each said pawn colored to match one of said squad teams of squad member character cards;
(e) a plurality of combat loss cards;
(f) a plurality of territorial gain cards;
(g) a spinner wheel having a double headed random pointer to point at a combination of hazards of war and combat risk information to be used during play of said board game;
(h) a plurality of second type pawns to represent reinforcements, each said pawn colored to match one of said squad teams of squad member character cards; and
(i) a pair of playing dice.

5,020,806
MULTIPLE TARGET ELECTRONIC DART GAME

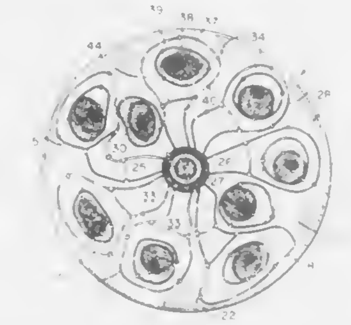
John Martin, Rockford, Ill., assignor to Arachnid, Inc., Rockford, Ill.
Filed Apr. 16, 1990, Ser. No. 509,170
Int. Cl.⁵ F41J *1/16, 5/04*
U.S. Cl. 273—371 10 Claims



1. A multiple target electronic dart game, comprising in combination:
first target means including first dart hit detection means for detecting dart hits on the first target means;
second target means including second dart hit detection means for detecting dart hits on the second target means; and
shared processor means for monitoring and servicing both the first and second target means.

5,020,807
PROJECTILE BOARD

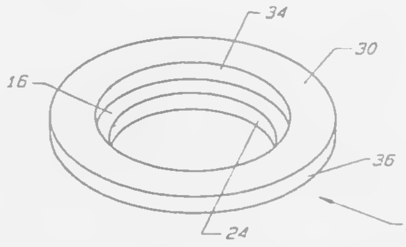
Richard D. Barkley, Chesterville, Canada, assignor to Barkley-Harwood Ltd., Chesterville, Canada
Filed Nov. 30, 1989, Ser. No. 443,338
Claims priority, application Canada, Jun. 28, 1989, 604289
Int. Cl.⁵ F41J *3/00*
U.S. Cl. 273—409 4 Claims



1. A target for darts comprising a generally flat target surface, a two-dimensional pattern of figures supported thereon to emulate the holes of a golf course, said pattern comprising:
a plurality of concentric rings centrally located on said target's surface;
a plurality of irregularly shaped non-abutting closed loops radiating outwardly from said concentric rings at spaced points thereabout and defining fairways with an irregularly shaped undivided rough surrounding and separating said fairways outward of said concentric rings; and
at least one closed floating loop spaced from said concentric rings in said rough between adjacent ones of said closed radiating loops, said closed radiating loops being additionally subdivided into at least two segments, namely an innermost segment adjacent said concentric rings, and an outermost segment remote from said concentric rings, each of said closed radiating loops including at least one smaller closed loop solely in the outermost segment thereof and representing a golf green.

5,020,808
TOSSING RING

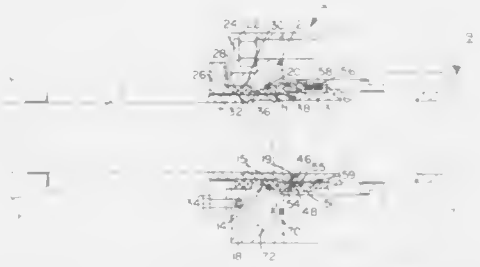
Marvin D. Richards, 418 Del Sol, Pleasanton, Calif. 94566
Filed Jan. 11, 1990, Ser. No. 463,453
Int. Cl.⁵ A63B *65/10*
U.S. Cl. 273—425 9 Claims



1. A tossing ring, adapted to be manually thrown into the air and to be caught by grasping its peripheral edge while in flight comprising:
a. a first annular body having a first transverse surface relative to the opening of said annular body, a second transverse surface relative to said opening of said annular body and an outer end surface, said first annular body opening extending through said annular body between said first and second transverse surfaces thereof;
b. a second annular body having a first transverse surface relative to the opening of said annular body, a second transverse surface relative to said opening of said annular body, and an outer end surface, said second annular body opening extending through said annular body between said first and second transverse surfaces thereof; and
c. means for adhering said second transverse surface of said first annular body to said first transverse surface of said second annular body with said openings of said first and second annular bodies being superimposed, said outer end surface of said second annular body extending further outwardly transversely from said superimposed openings of said annular bodies, the outer end surfaces of said first and second annular bodies being exposed and separated from each other in stepped configuration.

5,020,809
HIGH-SPEED EASY-MAINTENANCE SPLIT SEAL

John J. Mullaney, Warwick, R.I., assignor to EG&G Sealol, Inc., Providence, R.I.
Filed Feb. 9, 1990, Ser. No. 477,417
Int. Cl.⁵ F16J *15/34*
U.S. Cl. 277—81 S 14 Claims



1. A split seal for providing a seal between a housing and a shaft comprising:
a stationary split mating ring attached to the housing;
a annular rotary split seal ring having a sealing face abutting said mating ring and an outer tapered surface which tapers in decreasing diameter away from said sealing face;
an annular seal ring shell having an inner tapered portion adapted for slidingly fitting over said outer tapered portion of said seal ring, said seal ring shell being fixed to rotate with the shaft;
means for axially urging said shell toward said rotary split seal ring and said stationary split mating ring; and
means for uniformly transferring the urging force from said shell to said rotary split seal ring by providing a constant point of force between shell and ring and for preventing leakage along said rotary split seal ring, said means including an annular groove formed in said inner tapered portion, and an "O" ring fitted in said annular groove.

5,020,810
LIQUID SIGHT MONITOR WITH MULTI-CONTACT INSERT

Benjamin L. Jobe, Houston, Tex., assignor to Jogler, Inc., Houston, Tex.
Continuation-in-part of Ser. No. 274,743, Nov. 14, 1988, which is a continuation of Ser. No. 140,880, Jan. 6, 1988, abandoned, which is a continuation of Ser. No. 785,782, Oct. 9, 1985, abandoned. This application Apr. 21, 1989, Ser. No. 344,951
Int. Cl.⁵ F16J *15/10*
U.S. Cl. 277—207 A 2 Claims

1. A one-piece holding and sealing connector for connecting a fluid conducting tubular member to an adjoining fluid system, comprising
a first end adaptable for communicatively connecting the tubular member with the system for fluid conduction therewith,
a second end integral with said first end, said second end being generally cylindrical for surrounding the tubular member, said second end being substantially flexless, and

VOL
1127
ISS
1
JE
4
1991
UMI

a plurality of resilient ridges formed integrally of and projecting inwardly from an interior surface of said second end, said ridges bending over and bearing against the tubular member to hold the tubular member firmly in place and to provide a seal at an interface between said ridges and the tubular member.

5,020,811

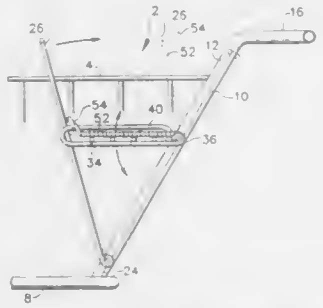
WHEELED GROCERY CART

V. John Ondrasik, 11215 S. Wilmington, Los Angeles, Calif. 90059

Continuation of Ser. No. 112,729, Oct. 23, 1987, abandoned. This application Jun. 26, 1989, Ser. No. 372,238

Int. Cl.^{5} B62D *39/00*

U.S. Cl. 280—33.993 **7 Claims**



4. In a grocery cart with a container the improvement of a raised pocket in said container for carrying a child or other things, said improvement comprising:

(a) a panel having a lower end pivoted to a lower end of a rear wall of the container and movable between an open position tilted away from said rear wall and a collapsed position flat against said rear wall for providing a forward and wall for the pocket and a back rest for a rearward facing seated child,

(b) a base member extending generally horizontally between said panel in its open-position and the rear wall to provide a base for a child's seat and a floor for the pocket, the base member being pivoted at its rearward end to an intermediate position on said rear wall and being linked at its forward end to said panel, said panel having an opening and said base member being collapsible downwardly through said opening as said panel moves towards its collapsed position,

(c) at least one hole defined by said rear wall for extension therethrough of a seated child's legs,

(d) a hole closure pivotally mounted at the rearward end of said base member and movable between a raised position against said rear wall and a lowered position resting on said base member to provide a seat surface for the buttocks of the child, the hole closure generally closing said hole or holes when in the raised position, the hole closure having an upwardly angled forward edge for contacting the panel as it is being collapsed and being urged upwardly into its raised position by the back rest on the full collapse of the panel.

5,020,812

FOUR-WHEEL STEERING SYSTEM IN WHEELED VEHICLE

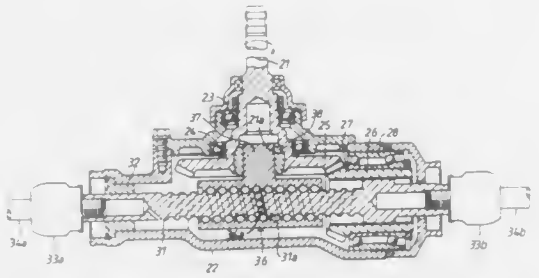
Mizuho Sugiyama, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jun. 29, 1990, Ser. No. 545,065

Claims priority, application Japan, Jun. 30, 1989, 1-170730

Int. Cl.^{5} B62D *3/08, 7/15*

U.S. Cl. 280—91 4 Claims



1. A four-wheel steering system in a wheeled vehicle having a front-wheel steering mechanism operable in response to the driver's effort applied to a steering wheel of the vehicle to steer a pair of dirigible front road wheels and a rear-wheel steering mechanism drivingly interconnected to the front-wheel steering mechanism by means of a mechanical linkage to steer a pair of dirigible rear road wheels in dependence upon the turn-angle of the steering wheel,

wherein the rear-wheel steering mechanism comprises:

a housing mounted on a body structure of the vehicle;

an input shaft rotatably mounted within said housing and having a front end drivingly connected to said front-wheel steering mechanism through said mechanical linkage;

a lateral relay rod arranged on an axis perpendicular to the axis of said input shaft and being axially slidable and rotatably mounted within said housing, said relay rod having an intermediate portion formed thereon with a screw groove containing therein a plurality of balls and being operatively connected at the opposite ends thereof to the rear road wheels;

means for effecting rotary motion of said relay rod in accordance with a rotation angle of said input shaft;

a ball nut assembled with a rear end of said input shaft and having an axial bore formed with a screw groove containing therein said balls, said ball nut being coupled over the intermediate portion of said relay rod through said balls to effect axial displacement of said relay rod in accordance with rotary motion of the same; and

means for effecting axial displacement of said ball nut in the opposite direction relative to the displacement direction of said relay rod in accordance with the rotation angle of said input shaft when said input shaft is rotated at a small angle.

5,020,813

BICYCLE DRAWN TRAILER

Peter J. Gottschalk, 671 E. Wheelock Pky., St. Paul, Minn. 55106

Filed Mar. 13, 1990, Ser. No. 492,822

Int. Cl.^{5} B62K *27/14*

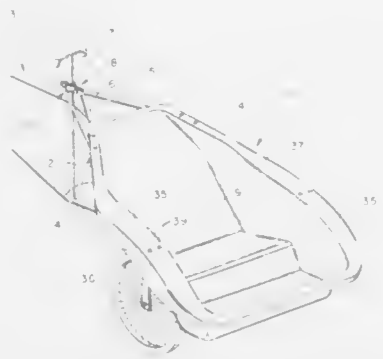
U.S. Cl. 280—204 **8 Claims**

6. Device for attaching a wheeled trailer to a bicycle seat

post on a bicycle for pulling the trailer with the bicycle, said trailer having an interior for carrying passengers or cargo and a front, a rear, two sides and a bottom, said device comprising:

(a) tow bar means having two ends attached at one end to the front of the trailer, said tow bar means extending from its attachment to the trailer toward a forward end in the direction of the bicycle;

(b) hitch means rigidly affixed to the forward end of said tow bar means;



(c) said hitch means comprising a pair of relatively stiff metal strips each having a semicircular section, said semicircular sections facing one another to form a separable circular band having upper and lower edges for encircling a bicycle seat post, a resilient annular bushing located within said circular band, said bushing having an interior circular lip for making encircling contact with the bicycle seat post, and means for releasably securing together said metal strips when said circular band and bushing are encircling said bicycle seat post.

5,020,814

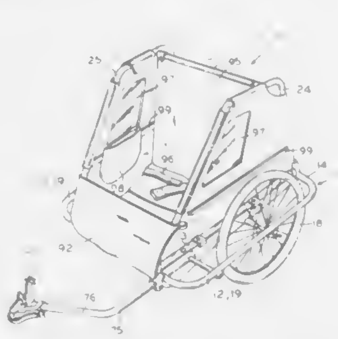
COLLAPSIBLE BICYCLE TRAILER

Donald A. George; Peter B. Berry; Bruce W. Creps, and Geraldine C. Roles, all of Eugene, Oreg., assignors to Burley Design Cooperative, Eugene, Oreg.

Filed Jun. 11, 1990, Ser. No. 535,705

Int. Cl.^{5} B62K *27/02*

U.S. Cl. 280—204 **8 Claims**



1. A collapsible bicycle trailer, comprising:

a. a chassis frame, having a front, a rear and two sides, including:
  (1) a generally rectangular-shaped outer frame member;
  (2) two inner frame members, attached to the outer frame member, being inwardly located within the plane of the chassis frame and parallel to the two sides thereof;

b. wheel axle mounts attached to the sides of the chassis frame so as to provide a location for the attachment of two wheels having a plane of rotation between the outer frame member and the inner frame members;

c. two side rails, a first side rail and a second side rail, generally U-shaped;

d. means for pivotally attaching the side rails to the chassis frame, to permit rotation of each side rail between a folded position substantially parallel to the chassis frame and an extended position substantially perpendicular to the chassis frame, which include a side rail hinge member having:
  (1) a base formed to attach to the chassis frame between the outer frame member and an end of an inner frame member, said base including:
    (a) a cylindrical extension sized to fit longitudinally within the end of said inner frame member;
    (b) an aperture, extending through said base of the side rail hinge member, said aperture being aligned with a corresponding aperture formed in said outer frame member;
    (c) so that a threaded fastening member, passing through said outer frame member aperture and said base aperture into a connector affixed within the inner frame member, secures said base of the side rail hinge member tightly against said outer frame member, thereby fixing the position of said base relative to the outer frame member and providing, by the cylindrical extension, a rigid protrusion upon which the inner frame member may be mounted;
  (2) a pivot member about which an end of a side rail is attached and rotates; and
  (3) a vertical stop which limits the upward extending rotation to a vertical position;

e. means for retaining the side rails in the extended position;

f. a tongue; and

g. means for pivotally attaching the tongue to the chassis frame, to permit rotation of the tongue between a folded position, substantially parallel and adjacent to the chassis frame and an extended position to the front of the chassis frame.

5,020,815

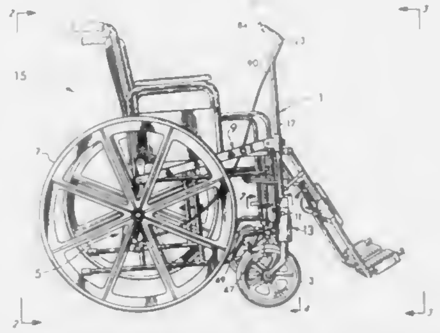
SELF-PROPELLED, STEERABLE WHEELCHAIR

Godfrey Harris, Littleton, Colo.; Ralph B. Noell, Ajo, Ariz., and Larry R. Bradshaw, Arvada, Colo., assignors to Scott Orthotic Labs, Inc., Arvada, Colo.

Filed Oct. 17, 1989, Ser. No. 422,620

Int. Cl.^{5} B62M *1/14*

U.S. Cl. 280—246 **31 Claims**



1. In a wheelchair having a frame, rear wheels, and front casters wherein at least one of said rear wheels has an axis and a plurality of spokes extending radially outwardly of said rear wheel axis, with said spokes being substantially equally spaced from each other about said rear wheel axis, and wherein at least one of said front casters includes a yoke member and caster wheel with the yoke member mounted to said frame for rotation about a first substantially vertical axis and said caster wheel mounted to said yoke member for rotation about a substantially horizontal axis, the improvement including:

a drive arrangement, means for mounting said drive arrangement to said at least one rear wheel, and means for manually activating said drive arrangement to propel said wheelchair wherein said means for mounting said drive arrangement to said rear wheel includes a hub member having an axis and a plurality of arms projecting out-

VOL
1127
ISS
1
JE
4
1991
UMI

wardly of said hub axis with said arms being spaced from each other about said hub axis, the spacing between adjacent arms of said hub member being dimensioned wherein each of said arms is receivable between two of said spokes of said rear wheel, said mounting means further including means for fixedly attaching said hub member to said rear wheel with said rear wheel axis and said hub axis substantially colinear and each of said hub arms respectively received between two of said spokes, said means for activating said drive arrangement to propel said wheelchair including an elongated drive arm extending along an axis and means for mounting said drive arm for pivotal movement about a pivot axis relative to said frame, and

steering means for selectively rotating said yoke member of said front caster about said first vertical axis to steer said wheelchair, said steering means including a first gear and means for mounting said first gear substantially symmetrically about said first vertical axis to said yoke member for movement therewith, said steering arm extending along an axis and having two end portions with one end portion having a handle portion, means for mounting said steering arm for rotation about said steering arm axis relative to said drive arm and said frame to rotate said first gear to steer said wheelchair, and means for mounting said steering arm for pivotal movement with said drive arm about the pivot axis of said drive arm wherein said handle portion of said steering arm can be gripped by the occupant of the wheelchair and manually manipulated about said pivot axis with said drive arm to propel said wheelchair and manipulated about said steering arm axis relative to said drive arm and said frame to steer said wheelchair.

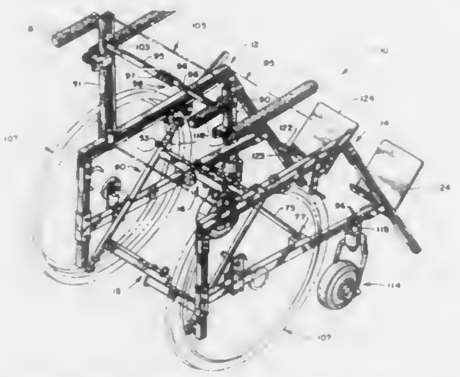
5,020,816
ADJUSTABLE FRAME WHEELCHAIR

Lawrence K. Mulholland, Santa Paula, Calif., assignor to Mulholland Designs, Inc., Santa Paula, Calif.

Continuation of Ser. No. 289,383, Jan. 30, 1989, which is a continuation of Ser. No. 109,777, Oct. 19, 1987, abandoned. This application Aug. 1, 1990, Ser. No. 561,680

Int. Cl.⁵ B62M *1/14*

U.S. Cl. 280—250.1 — 41 Claims



1. In a wheelchair having a seat backrest and wheels, the improvement comprising:

opposing adjustable sideframes supporting said seat, backrest and wheels, each sideframe being adjustably fixed in a predetermined configuration comprising a base section, an upright section, an upper section and a front section, said upright section extending upwardly from said base section to the upper section, said upper section extending from said upright section to the front section, said front section extending downwardly from said upper section, said upright section and said front section each being connected to said upper section by a respective tightenable link means, said upright, upper and front sections each having a track means comprising a longitudinal slot containing at least one slidable fastener which is movable along said slot whereby said link means can engage a corresponding slidable fastener at any predetermined location along the length of said slot and form a tightenable adjustable joint between respective upright, upper and front sections.

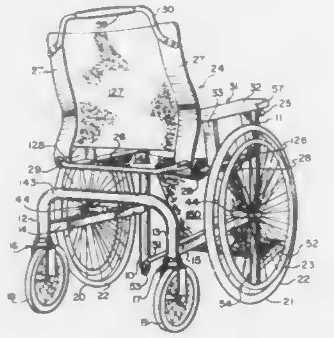
5,020,817
WHEELCHAIR

Roger K. Leib, Los Angeles, Calif., assignor to Rober K. Leib, Los Angeles, Calif.

Filed Oct. 30, 1987, Ser. No. 115,777

Int. Cl.⁵ B62M *1/14*

U.S. Cl. 280—250.1 — 35 Claims



1. A rocking wheelchair comprising:
(a) spaced front legs, bottom portion of the front legs including rollers mounted for rotation on a floor;
(b) rearwardly directed supports extending from the front legs;
(c) a rear frame connected with the rearwardly directed supports, the rear frame including a pair of rear wheels;
(d) a rocking supporting seating frame member substantially pivotally supported and flexibly cantilevered from the front legs and depending rearwardly of the front legs towards the rear frame, the seating frame member having a seat support section and a back support section;
(e) a seating means supported by the seat support section of the seating frame member;
(f) forward wheels supported off of the rearwardly directed supports; and
(g) means for mounting the rollers for permitting location selectively in an extended non-rotating floor-engaging position and in a retracted, floor-engaging rotating position.

5,020,818
ALL-TERRAIN WHEELCHAIR

Stuart G. Oxford, 13616 N. 78th St., Omaha, Nebr. 68122

Continuation-in-part of Ser. No. 263,417, Oct. 27, 1988, Pat. No. 4,892,323. This application Nov. 20, 1989, Ser. No. 439,612

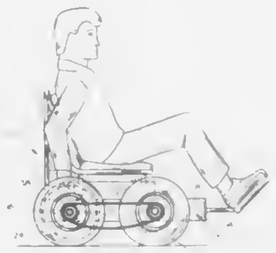
Int. Cl.⁵ A61G *5/02;* **B62M** *1/16*

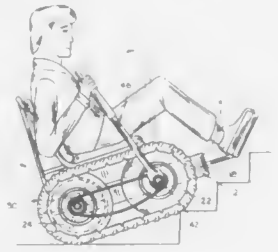
U.S. Cl. 280—250.1 — 8 Claims

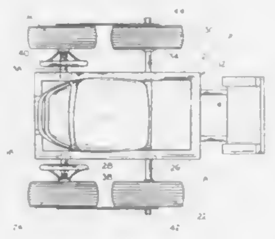
1. An all-terrain wheelchair, comprising,
a frame means having a forward end, a rearward end, and opposite sides,
a first pair of wheels, which are normally in ground engagement, rotatably mounted on said frame means at one side thereof comprising a front wheel and a rear wheel,
a second pair of wheels, which are normally in ground engagement, rotatably mounted on said frame means at the other side thereof comprising a front wheel and a rear wheel,
a seat means on said frame means for supporting a person thereon,
a gripping wheel positioned inwardly of each of the said rear wheels and operatively connected thereto whereby the person sitting on said seat means may grasp the same to propel said rear wheels.

5. An all-terrain wheelchair, comprising,

a frame means having a forward end, a rearward end, and opposite sides,
a first pair of wheels, which are normally in ground engagement, rotatably mounted on said frame means at one side thereof comprising a front wheel and a rear wheel,
a second pair of wheels, which are normally in ground engagement, rotatably mounted on said frame means at the other side thereof comprising a front wheel and a rear wheel,







a seat means on said frame means for supporting a person thereon,
a ratchet means operatively connected to one of said wheels at each side of said frame means and including an elongated actuating arm extending upwardly therefrom at opposite sides of said seat mans whereby the person sitting on said seat means may propel said wheels by selectively reciprocating said actuating arms.

5,020,819
REPLACEABLE DERAILLEUR HANGER

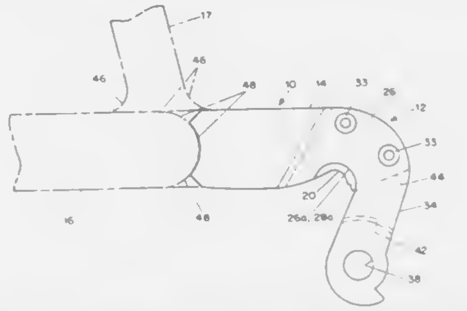
Christopher D'Aluisio, Georgetown, and David Graham, Danbury, both of Conn., assignors to Cannondale Corporation, Georgetown, Conn.

Filed Oct. 2, 1989, Ser. No. 415,702

Int. Cl.⁵ B62K *25/02*

U.S. Cl. 280—288 — 4 Claims

1. A rear wheel axle dropout and replaceable derailleur hanger assembly for a bicycle having a frame that includes a rear wheel mount comprising a plate-like dropout member having an attachment portion adapted to be permanently fastened to the bicycle frame rear wheel mount and a dropout portion shaped in profile to form a dropout for the bicycle rear wheel axle, the rear wheel axle being received by a dropout notch in the dropout portion, and a plate-like hanger member having a coupling portion joined removably to the dropout portion of the dropout member and a hanger portion adapted to receive a chain derailleur for a bicycle freewheel, with the dropout and coupling portions having a juncture therebetween, the coupling portion of the hanger member being bifurcated and having spaced-apart legs defining a slot and the dropout portion of the dropout member being received with a close fit in the slot, the spaced-apart legs of the hanger member having matching notches which are deeper than the dropout notch of the dropout portion to insure that the rear wheel axle bears against only the dropout notch, and at least one removable fastener joining the dropout and hanger members at the juncture of the dropout and coupling portions thereof.



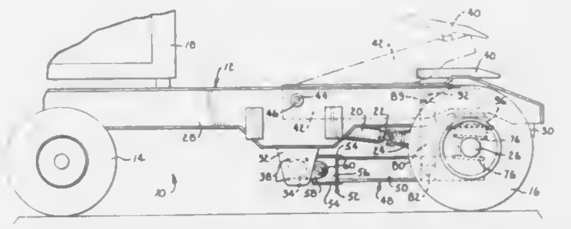
5,020,820
TRACTOR SUSPENSION

J. John Renner, Columbus, Nebr.; Steven J. Palmateer, Gardner, Kans.; John S. Petry, Littleton, Colo.; Frederick J. Hoppe, Manhattan, Kans., and Steven R. Bertrand, White Oak, Tex., assignors to Capacity of Texas, Inc., Longview, Tex.

Filed Dec. 26, 1989, Ser. No. 456,553

Int. Cl.⁵ B62D *53/06;* **B60G** *11/26, 15/07*

U.S. Cl. 280—439 — 19 Claims



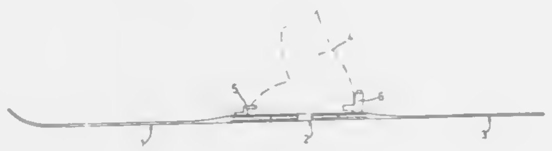
1. A suspension system for a tractor having a frame, a rear axle carrying wheels and a fifth wheel for supporting a semitrailer pulled by the tractor, said suspension system comprising:
a sub-frame including a pair of rigid arms each having opposite end portions, each arm being rigidly connected at one end portion thereof with the rear axle;
means for coupling the opposite end portion of each arm with the frame for universal pivotal movement relative to the frame;
means for mounting the fifth wheel on said sub-frame in a manner to transmit loads applied to the fifth wheel to the rear axle; and
plural suspension elements interposed between the sub-frame and frame to transfer forces applied to the rear axle through said suspension elements to the frame, said subframe presenting an A-frame configuration with said arms

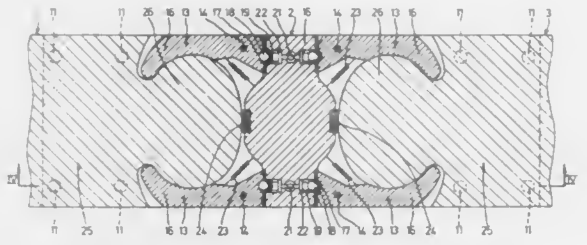
VOL 1127
ISS 1
JE 4 1991
UMI

converging toward said opposite end portions and being jointed at an apex of said A-frame configuration;
said coupling means comprising means for coupling said apex with the tractor frame for universal pivotal movement relative thereto.

5,020,821
SKI AND SAFETY BINDING ASSEMBLY

Dominique Leroy, 68, rue du Colonel de Rochebrunne, F-92380 Garches, France
PCT No. PCT/FR87/00507, § 371 Date Aug. 14, 1989, § 102(e) Date Aug. 14, 1989, PCT Pub. No. WO89/05679, PCT Pub. Date Jun. 29, 1989
PCT Filed Dec. 17, 1987, Ser. No. 397,480
Int. Cl.^{5} A63C *5/02*
U.S. Cl. 280—603 **8 Claims**



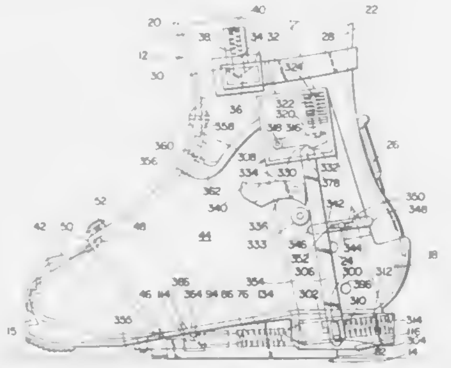


1. A ski and safety binding combination, comprising,
a ski body including a front portion, a middle portion and a rear portion;
said portions being longitudinally aligned and having aligned lower surfaces to define a bottom surface of a ski;
front coupling means on said front portion and said middle portion for connecting the front and middle portions in longitudinal alignment; said front coupling means being releasable in response to a predetermined lateral force on said front portion;
rear coupling means on said rear portion and said middle portion for connecting the rear and middle portions in longitudinal alignment; said rear coupling being releasable in response to a predetermined lateral force on said rear portion;
fixing means secured on an upper surface of said middle portion for securing a boot to said middle portion, said fixing means being operable to release said boot from said middle portion when there is a predetermined upward force on a boot relative to said middle portion.

5,020,822
SKI BOOT AND SKI BOOT-BINDING

Elmer B. Wulf, 1907 Jasmine, Denton, Tex. 76205, and Mark E. Wulf, 24447 Boulevard DeJohn, Naperville, Ill. 60564
Continuation-in-part of Ser. No. 224,887, Jul. 27, 1988, Pat. No. 4,880,251. This application Nov. 8, 1989, Ser. No. 433,850
Int. Cl.^{5} A63C *9/08*
U.S. Cl. 280—613 **34 Claims**

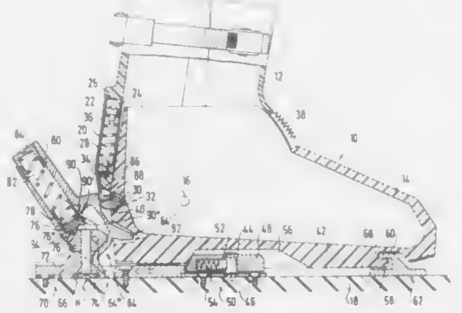
1. In combination, a ski boot and a binding for releasably attaching the ski boot to a ski, comprising
a. first connecting means secured to the ski beneath the ski boot,
b. second connecting means secured to the ski boot and spanning said first connecting means with portions of said second connecting means being in a fore-and-aft relationship generally along the length of the ski,
c. means for releasably coupling said first and second connecting means so that said first and second connecting means may be separated in the forward, backward, or lateral directions, or a combination thereof, under predetermined load conditions, said coupling means including a first coupling element of said first connecting means engaged by a second coupling element of said second connecting means, and



d. actuation means for both urging said first and second coupling elements into engagement and temporarily disengaging said first and second coupling elements, said actuation means including
i. a pivotal lever arm having opposite ends and being secured at one end to one of said first and second coupling elements, and
ii. an arm stay secured to the ski boot at the other end of said lever arm, said stay including means for retaining said lever arm and for releasing said lever arm to permit said lever arm to pivot away from said retaining means about said one end.

5,020,823
BINDING COUPLED SKI BOOT SHAFT DELATCHING DEVICE

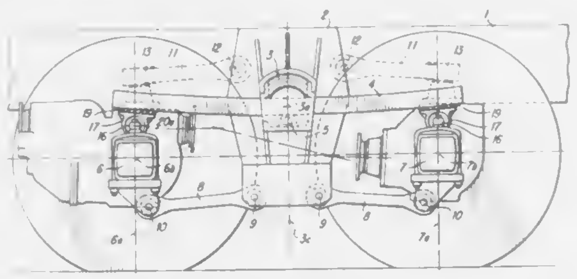
Martin Bogner, Ostfildern, Fed. Rep. of Germany, assignor to GEZE Sport International GmbH, Leonberg, Fed. Rep. of Germany
Filed Jul. 20, 1989, Ser. No. 383,384
Claims priority, application Fed. Rep. of Germany, Jul. 22, 1988, 3825004
Int. Cl.^{5} A63C *9/10*
U.S. Cl. 280—634 **19 Claims**



1. A binding coupled ski boot shaft delatching device comprising:
a latching lever, which extends along and essentially parallel to a rear outer surface of a ski boot, and having a first end secured to a ski boot pivotable shaft and a free end detachably connected to a ski boot lower part, which secures said pivotable shaft to said lower part when in a latched position and wherein said pivotable shaft is pivotable when said latching lever is in an open position;
a spring, coupled to said latching lever, for biasing said latching lever in the open position;
a sole clamp, having a boot engagement member which engages the lower part of said ski boot when said sole clamp is in a closed position and a latching lever engagement member which contacts an outer surface of said latching lever when said sole clamp is in the closed position and exerts a force on said latching lever opposite a force exerted by said spring; and
wherein when said sole clamp is in the closed position, said ski boot is secured to said ski and said latching lever is maintained in the latched position and when said sole clamp is in an open position.

5,020,824
DEVICE FOR MOUNTING A COMPOSITE MATERIAL LEAF SPRING

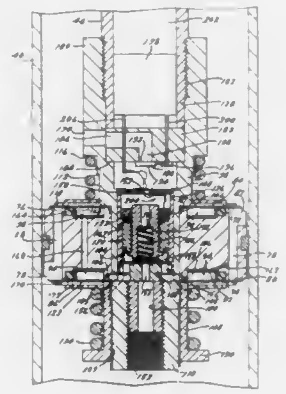
Francois Mounier-Poulat; Marcel Savoie, both of Heyrieux, and Raymond Armanet, Chatonnay, all of France, assignors to Renault Vehicules Industriels, Lyon, France
Filed Sep. 5, 1989, Ser. No. 402,456
Claims priority, application France, Sep. 2, 1988, 88-11484
Int. Cl.^{5} B60G *5/00, 11/04, 11/38*
U.S. Cl. 280—686 **6 Claims**

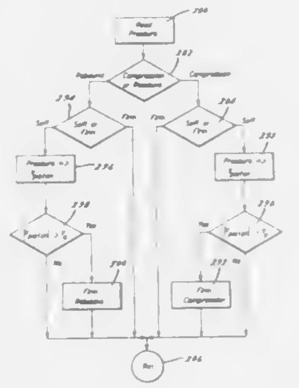


5. A vehicle suspension comprising:
tandem axles suspended from a vehicle frame portion;
an elongate composite leaf spring having ends respectively coupled to said axles by coupling means; and
support mans for bending a central part of said leaf spring about an axis transverse to the length thereof,
wherein said support means comprises a concave, arcuate elastic support fixed relative to said vehicle frame portion and engaging a top horizontally extending surface of said leaf spring at two points spaced along the length thereof, said two points being on opposite sides of said transverse axis,
whereby said support means acts as a fulcrum to bend said leaf spring about said transverse axis in response to vertical loads on said axles,
wherein said elastic support comprises a laminated body formed of elastic leaves and having a concave, arcuate surface with edges contacting and fixed to said top surface of said leaf spring at said two points, and wherein a radial center of said concave, arcuate surface lies substantially on said transverse axis.

5,020,825
METHOD AND APPARATUS FOR ABSORBING MECHANICAL SHOCK

Magnus B. Lizell, Stockholm, Sweden, assignor to Monroe Auto Equipment Company, Monroe, Mich.
PCT No. PCT/US87/00618, § 371 Date Dec. 9, 1988, § 102(e) Date Dec. 9, 1988, PCT Pub. No. WO88/06983, PCT Pub. Date Sep. 22, 1988
PCT Filed Mar. 18, 1987, Ser. No. 331,668
Int. Cl.^{5} B60G *17/01*
U.S. Cl. 280—707 **145 Claims**





1. A direct acting hydraulic shock absorber for damping the movement of the body of an automobile comprising:
a pressure cylinder forming a working chamber having first and second portions operable to store damping fluid;
a piston disposed within said pressure cylinder between first and second portions of said pressure cylinder;
a piston support member mechanically communicating with said piston;
first sensor means for determining the difference in pressure between the damping fluid in said first and second portions of said working chamber so as to sense rebound and compression of said shock absorber, said first sensor means operable to generate a first electrical signal in response to the difference in pressure between the damping fluid stored in said first and second portions, said first sensor means being disposed within said piston support member;
second sensor means for determining the vertical velocity of the body of said automobile, said second sensor means

VOL
1127
ISS
1
JE
4
1991
UMI

operable to generate a second electrical signal in response to the movement of the body of said automobile, said second sensor means being disposed within said piston support member;

means for generating an electrical control signal in electrical control signal being responsive to whether said shock absorber is in compression or rebound and whether the vertical velocity of the body of said automobile exceeds a predetermined value, and flow of damping fluid between said first and second portions of said working chamber in response to said electrical control signal.

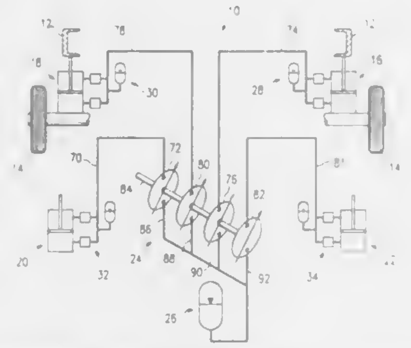
5,020,826
VEHICLE SUSPENSION SYSTEM

Gary L. Stecklein, San Antonio, and Glenn R. Wendel, Pipe Creek, both of Tex., assignors to Southwest Research Institute, San Antonio, Tex.

Filed Nov. 6, 1989, Ser. No. 432,683

Int. Cl.^{5} B60G *11/26*

U.S. Cl. 280—707 **8 Claims**



1. A suspension system comprising:

hydraulic suspension strut means for resiliently supporting and damping movement between suspended and unsuspended parts of a mass or energy system;

flow means for providing hydraulic fluid flow to/from said strut means; and

accumulator means for pressurizing said hydraulic fluid, a gas over hydraulic accumulator located at said suspension strut means and connected with said flow means, said accumulator means including a system accumulator connected with said flow means to pressurize said system to resiliently support said suspended parts in the static condition and to pressurize said flow means to reduce the pressure thereacross.

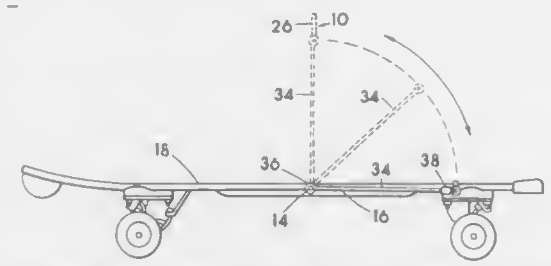
5,020,827
SKATEBOARD BRIDLE

Rashirl J. Murdoch, 520 W. 7th St., Chico, Calif. 95926

Filed Aug. 27, 1990, Ser. No. 573,902

Int. Cl.^{5} A63C *7/14*

U.S. Cl. 280—816 **3 Claims**



1. A skateboard bridle for attachment to a skateboard having a planar surface and a pair of longitudinally extending sides, comprising:

(a) a pair of elongated rods, each rod having a first end and a second end;

(b) attachment means for pivotally attaching the first end of each rod to a respective side of said skateboard for pivotal movement about a common transverse axis between an operative position, with said rods extending vertically above said skateboard and a retracted position, with each of said rods extending parallel to a respective side of said skateboard;

(c) spring means for biasing each of said elongated rods to said retracted position;

(d) a one-piece cord made of elastic material and having two terminal ends; and

(e) means for attaching each of said terminal ends of said cord to the second end of a respective rod, wherein said cord extends in a straight manner between said rods when the rods are in a retracted position and said cord is capable of being stretched to assume an inverted U-shaped configuration while being grasped and pulled by a standing skateboard rider, when the rods are in an operative position.

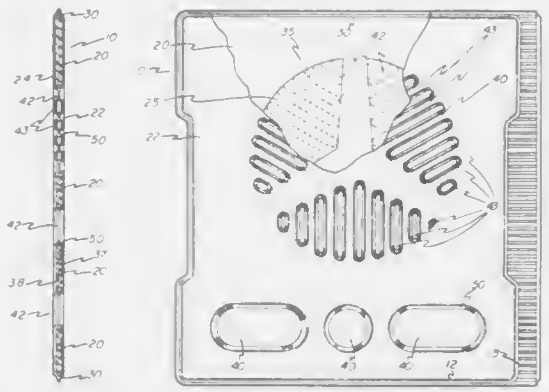
5,020,828
HEAT-SEALED DIE CUT BINDER

Marc L. Moor, Dayton, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed May 24, 1989, Ser. No. 356,152

Int. Cl.^{5} B42D *3/00, 3/08*

U.S. Cl. 281—29 **7 Claims**



1. A binder comprising relatively stiff front and rear hingedly connected covers, each of said covers comprising a cover panel, an inner cover sheet coextensive with and covering the inner surface of said cover panel, and an outer cover sheet coextensive with and covering the outer surface of said cover panel; said cover sheets joined about the periphery of the cover panel associated therewith, characterized in that:

at least one cover panel is provided with an interior opening positioned and sized so as not to impair substantially the structural integrity of said cover and into which opposing surfaces of said cover sheets are depressed together and joined so as to create a three-dimensional geometric cover design.

5,020,829
TWO-WAY COMMUNICATION SHEETS IN THE FORM OF DOUBLE POST CARD, DOUBLE LETTER SHEET, AND THE LIKE

Kenji Shibahara, and Norio Houchin, both of Osaka, Japan, assignors to Kabushiki Kaisha Challenge Five and Evercoat Kabushiki Kaisha, both of Osaka, Japan

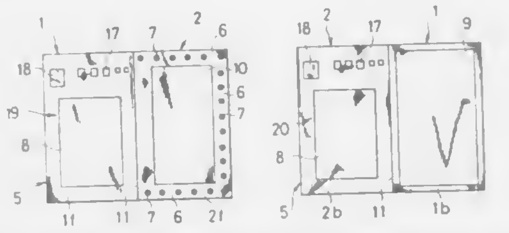
Filed Feb. 13, 1990, Ser. No. 479,409

Claims priority, application Japan, Jun. 14, 1989, 1-69437[U]

Int. Cl.^{5} B42D *15/00*

U.S. Cl. 283—62 **4 Claims**

1. A two-way communication sheet in the form of a folded post card or letter sheet for forward and reply communication, comprising a sheet body consisting of at least first and second sheet portions, a forward addressing section for name and address of an addressee and a reply addressing section for name and address of reply or which are respectively provided on front and back surfaces of said at least first and second sheet portions, forward and reply information writing sections for writing written information which are respectively provided on at least one of the surfaces of first and second sheet portions other than that on which said forward addressing section and reply addressing section are provided, the front and back surfaces of the first and second sheet portion having adhesion means for adhering the front and back surfaces of the first and second sheet portions together such that the forward and reply information writing sections are respectively concealed.



5,020,830
SEALED CARD

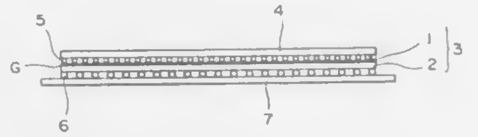
Shigenari Shishido, Tokyo, Japan, assignor to Sayama Kako Co., Ltd., Tokyo, Japan

Filed Jan. 26, 1990, Ser. No. 470,761

Claims priority, application Japan, Jan. 28, 1989, 1-8437

Int. Cl.^{5} B42D *15/02*

U.S. Cl. 283—101 **4 Claims**



1. A sealed card comprising

(a) a card substrate having a surface to be concealed;

(b) a cover sheet disposed over the surface of said card substrate for sealing said surface;

(c) a transparent resin film having a thin opaque membrane peelably deposited on said film, said film and membrane being positioned between said substrate and said cover sheet;

(d) a transparent pressure sensitive adhesive layer disposed between said card substrate and said resin film; and

(e) a second pressure sensitive adhesive layer disposed between said opaque membrane and said cover sheet,

wherein the bonding strength of said second pressure-sensitive adhesive layer is greater than the peeling strength of said opaque membrane.

5,020,831
IMPRINTED PRODUCT WITH TAMPERPROOF SEAL METHOD OF PRODUCING PRODUCT

Giovanni Benardelli, Coldrerio, Switzerland, assignor to Arysearch Arylan AG, Vaduz, Liechtenstein

Filed Aug. 23, 1989, Ser. No. 397,520

Claims priority, application Switzerland, Dec. 23, 1988, 4769/88; Feb. 17, 1989, 548/89

Int. Cl.^{5} B42D *15/00*

U.S. Cl. 283—108 **13 Claims**

1. Imprinted product for the subsequent visible display of a latent message-representing image, for controlling and certification, advertising and security against counterfeiting of commercial articles, documents, industrial and consumer packaging; comprising:

(a) a substrate constituted of a transparent plastic sheet;

(b) a discontinuous non-anchorable layer of a transparent non-detachable transfer primer on said sheet for defining an invisible graphic configuration which is latent and unpredictable in configuration;

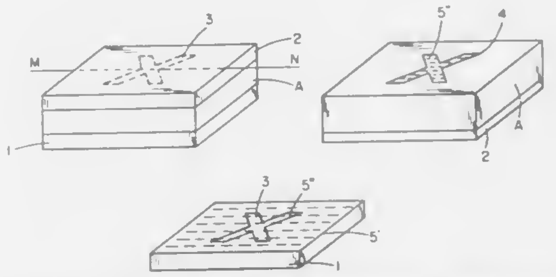
(c) a continuous decorative interlaced inking multilayer which is selectively subdividable being provided on said substrate and primer, said inking multilayer having intermittent portions anchored to said substrate, and remaining portions being loosely anchored to said discontinuous non-anchorable primer layer;

(d) said discontinuous primer layer being smaller in area than the area of said continuous interlaced inking multilayer and being interlaced with said multilayer;

(e) an ordinal reference number sub-surface printed in an inverse print, and non-repeatable within the same series of numbers on a transparent area of the substrate;

(f) a plurality of colored breakable inking bars, for the producing of an optical alarm set in a sub-surface in non-anchored parallel lines and adhesively fastened at the extremities thereof to said transparent area of the substrate, said bars contacting and safeguarding the number against counterfeiting;

(g) an adhesive layer coated in register, whereby upon a single use of said individual imprinted product and attachment to a new support, said non-detectable graphic configuration is renderable visible subsequently upon separation of the two supports and generates an actual irreversible image in sharp detail, through the precise subdivision of said inking multilayer in register with said latent image through extraction and transposal of said part together with the primer of the latent image to the new support in response to a pulling action by the adhesive layer so that an irreversible rupture of said inking bars takes place to produce an optical alarm display.



9. Printing process for preparing an interlaced inking multilayer imprinted product for controlling and certification, advertising and security against counterfeiting of commercial articles, documents, industrial and commercial packaging; including a printing substrate and a support to transfer a printing substrate and a support to transfer a graphic subject; comprising register-coating on at least the substrate, such as a plastic transparent material in formatted sheets or in roll form for a reel-to-reel printing operation, a non-anchorable transparent transfer primer ink on the area of an intended graphic configuration so as to produce with a primer a corresponding virtual latent image; coating the whole surface of the substrate with a multiplicity of inking layers which are finely screened to display a trademark and a surrounding countersign, a resultant inking multilayer only in portions thereof subsequently forming an actual image with the loosely anchored areas printed upon said primer; overlanging a transparent ink so as to penetrate the inking multilayer screen and to interlace with the inferior primer ink, applying a covering ink; printing sub-surface an unrepeatable ordinal reference number in inverse print

VOL
1127
ISS
1
JE
4
1991
UMI

on a transparent area of the substrate through a computer-controlled jet printer; forming on the same area a plurality of breakable colored ink bars area so as to contact said number, said bars being in non-anchored parallel lines and adhesively fastened to said sub-surface at only the extremities thereof; applying a pressure-sensitive high tack adhesive, after bonding the substrate with finger pressure to the support selected between a sheet of plastic material and a support of a generic type, whereby responsive to a subsequent separation, in addition to the rupture of the bars, a selective extraction and transposal of the interlaced inking multilayer non-anchored portions coherent to the latent graphic configuration produces an actual irreversible visible image on the support.

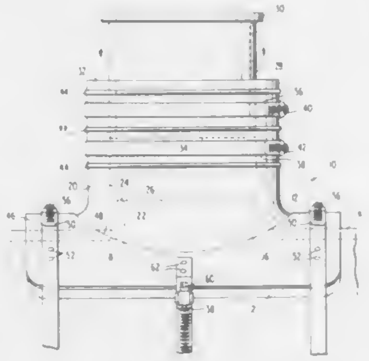
5,020,832
FLEXIBLE PIPE SADDLE

David L. Coblentz, Middletown, Md., assignor to General Engineering Company, Fredrick, Md.

Filed Apr. 4, 1990, Ser. No. 504,511

Int. Cl.⁵ F16L *5/00*

U.S. Cl. 285—197 **4 Claims**



1. A flexible pipe saddle assembly for connecting lateral pipe to a main pipe comprising:
- a hollow, semi-cylindrical saddle portion of flexible, resilient material having a radially directed aperture,
- a radially, inwardly directed circumferential flange made integral with said saddle, extending about said aperture, and extending into a corresponding aperture in the main pipe,
- a radially, outwardly directed hollow tubular sleeve made integral with said saddle and surrounding said aperture for receiving a lateral pipe,
- a flexible, metallic skirt substantially completely overlying said saddle portion, and
- adjustable strap means secured to said skirt and extending about the main pipe to clamp said saddle assembly to said main pipe in fluid tight sealing engagement with the main pipe,
- said hollow tubular sleeve having a first internal diameter portion continuous with an internal surface of said flange to provide a smooth continuous inner cylindrical surface extending through said saddle portion and a second portion having a larger, internal diameter to define a stepped shoulder between said first and second portions for limiting the insertion of the lateral pipe.

5,020,833
ACCESSORY TOOL FOR ANGLERS

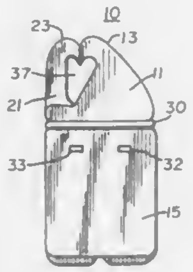
Thad E. Wardall, 1020 W. Lk. Sammamish NE., Bellevue, Wash. 98008

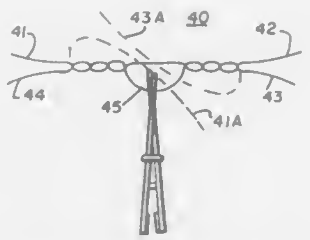
Filed Mar. 6, 1990, Ser. No. 489,347

Int. Cl.⁵ D03J *3/00*

U.S. Cl. 289—17 **3 Claims**

1. A device for assisting in the tying of knots, said device having a longitudinal centerline and comprising a first lever having a first surface, a second surface, a lower portion, a middle portion, an upper portion, a first side and a second side; a second lever of substantially the same size as said first lever, said second lever having a first surface, a second surface, a lower portion, a middle portion, an upper portion, a first side and a second side; fulcrum means separating said middle portions of said first and second levers, said upper portion of said first side of said first lever extending upward and toward said centerline to form a first hook having a first tip; said second side of said second lever extending up and toward said centerline to form a second hook having a second tip; resilient means for drawing said upper portions together into a first position such that said first and second tips are in contact and an opening is formed enclosed by said hooks; said device being put into a second position when said lower portions are pressed toward each other, said first and second tips being separated in said second position, thereby providing a gap in said opening;





- said upper portion of said first lever having an edge which in said first position contacts said inside surface of said second lever and, in said second position is separated from said second lever, said edge being urged toward said second lever by said resilient means, whereby said edge and said inside surface of said second lever serve to secure a line betweem them in said first portion.

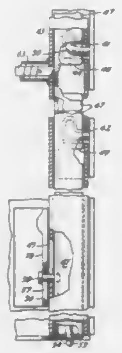
5,020,834
WINDOW GATE CONSTRUCTION

Uri Zilkha, 307 Third Ave., New York, N.Y. 10010

Filed Apr. 18, 1990, Ser. No. 510,842

Int. Cl.⁵ E06B *3/68*

U.S. Cl. 292—74 **3 Claims**



1. In a window gate having a relatively fixed frame element adapted to be installed in a window opening, and a pivotally mounted gate element supported within an opening in said frame element, manual locking means for securing said gate in coplanar relation with said frame element, said locking means including a hollow elongated channel-forming member on a vertical edge of said gate element, said channel-forming member having an opening therein for access to the interior thereof by a user, said opening being accessible from only one side of said frame element, and a plurality of spaced openings disposed within said channel-forming member; an elongated bar slideably disposed within said channel-forming member for manual vertical axial movement between first and second positions, means on said bar for manual engagement therewith for such movement, said bar having plural locking openings positioned therealong selectively alignable with one of said plurality of openings in said channel-forming member, corresponding plural locking projections on said frame element positioned opposite said plural openings in said channel-forming member when said gate element is in coplanar position with said frame element, downward movement of said bar to one of said first and second positions serving to engage said plural locking openings in said bar with said corresponding locking projections on said frame element, the improvement comprising: means for selectively engaging and maintaining said bar in the other of said first and second positions whereby to maintain said locking openings and projections on said frame element in disengaged condition against the force of gravity.

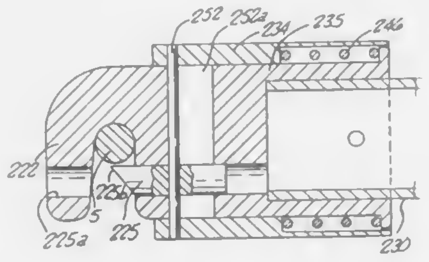
5,020,835
ROD END LOCK

L. Richard Pce, Long Beach, Calif., assignor to Hartwell Corporation, Placentia, Calif.

Division of Ser. No. 92,049, Sep. 2, 1987, Pat. No. 4,902,051. This application Nov. 21, 1989, Ser. No. 439,483

Int. Cl.⁵ E05C *19/10*

U.S. Cl. 292—127 **6 Claims**



1. A rod end lock for latching a keeper comprising:
- a barrel having a mounting end and a latch end;
- a mount connection attached to the mounting end of said barrel and coaxial with said barrel;
- a bite portion attached to the latch end of said barrel, said bite portion having substantially a U-shape for accommodating a rod of the keeper;
- a locking element movably attached to said barrel and having an open and a closed position, said locking element comprising: a locking pin slidably positioned parallel to the axis of said barrel such that when the locking element is in the closed position, said locking pin and said bite portion form an enclosed space therebetween for latching the rod of the keeper, wherein when the rod is inserted into the enclosed space, a centerline of the rod is perpendicular to the centerline of said barrel;
- a biasing means connected to said barrel for urging said locking element into the closed position; and
- a means for actuating said locking element to the open position.

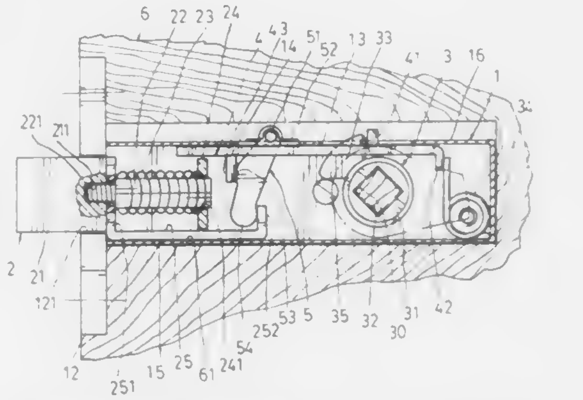
5,020,836
EASILY OPENABLE TUBULAR LATCH

Frank Su, c/o Hung Hsing Patent Service Center, P.O. Box 55-1670, Taipei, Taiwan

Filed Nov. 28, 1990, Ser. No. 619,009

Int. Cl.⁵ E05C *1/16*

U.S. Cl. 292—165 **5 Claims**



1. A tubular latch comprising:
- a housing combined by two half covers for integrally forming the housing fixed in a hole of a door, having a front fixing plate fromed on a front portion of the housing for fixing the housing on a door;
- a latch means including a latch member reciprocatively held in said front fixing plate of said housing, a latch bolt secured with said latch member having a latch restoring spring disposed around said latch bolt for normally urging said latch member outwardly or frontwardly for locking purpose, a retainer plate fixed on said housing for retaining said latch restoring spring, and a follower plate having a front bending portion secured between the latch member and the latch bolt and a rear bending portion bending upwardly, said follower plate slidably held between said retainer plate and a bottom portion of said housing;
- a handle driving means including a shaft rotatably mounted in a rear portion of said housing for securing a handle on said shaft, a cam portion circumferentially formed on said shaft in opposite to said handle, and a handle restoring spring resiliently restoring said handle driving means for normally levelling said handle;
- a drag slide generally formed as an elongate plate slidably held in between said retainer plate, said shaft and an upper portion of said housing, having a rear lug protruding upwardly from a rear portion of said enlongated plate to be operatively pushed by said cam poriton, a rearmost bending portion formed on a rearmost end portion of said slide operatively actuated by said handle restoring spring, a front lug protruding downwardly from a front portion of said elongate slide, and a longitudinal slot formed in said slide between two said lugs; and
- a biasing lever pivotally secured in said housing having an upper depression portion formed on a middle portion of said lever operatively depressed by said front lug, and a lower forcing portion formed on a lower portion of said lever below said depression portion operatively depressing said rear bending portion of said follower plate, whereby upon a depression of said handle to rotate at a small angle, said cam portion of said handle driving means will be rotated to urge said rear lug of said slide rearwardly to allow said front lug of said slide to depress said upper depression portion of said lever, thereby allowing said lower forcing portion of said lever to force said rear bending portion of said follower plate rearwardly to retract said latch member for opening the door.

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,837

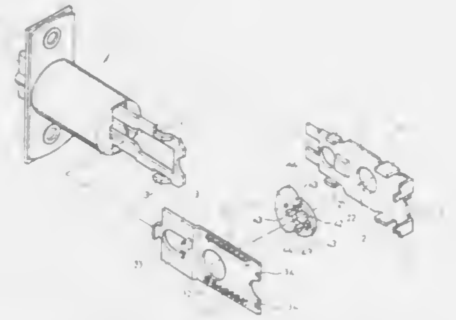
TUBULAR DOOR LOCK WITH PLATE SHAPED BOLT ACTUATOR

Jui C. Lin, Kaohsiung, Taiwan, assignor to Taiwan Fu Hsing Industry Co., Ltd., Kaohsiung, Taiwan

Filed Jul. 23, 1990, Ser. No. 556,184

Int. Cl.^{5} E05C *1/16*

U.S. Cl. 292—169.13 1 Claim



1. In a tubular door lock for mounting on doors including two spaced assembling plates, an actuating plate rotatably mounted between the assembling plates and having actuating elements therein, a bolt operating plate mounted between the assembling plates for reciprocating movement and having abutment elements thereon engageable with the actuating elements so that rotation of said actuating plate reciprocates said bolt operating plate, and a bolt longitudinally slidably mounted and engaging with said bolt operating plate for extension and retraction thereby in response to rotation of said actuating plate, the improvement comprising:

a round hole in each assembling plate, said holes being aligned and forming circular edges on said assembling plates;
a square hole in said actuating plate for receiving a square shaft extending therethrough and through said aligned round holes;
four projections extending from one side of said actuating plate around said square hole extending into a round hole of one assembling plate and slidably engaging said circular edge of said one assembling plate to support and guide said actuating plate for rotational movement by rotation of a square shaft extending through said square hole;
two teeth on said bolt operating plate; and
two cams on said actuating plate engageable with said two teeth, respectively, so that rotation of said actuating plate engages one of said cams with a respective one of said teeth for reciprocating the bolt operating plate and retracting the bolt.

5,020,838

LUGGAGE-DOOR LOCK DEVICE

Ryoichi Fukumoto, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Oct. 2, 1989, Ser. No. 415,955

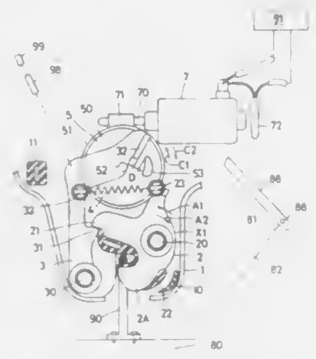
Claims priority, application Japan, Sep. 30, 1988, 63-248479

Int. Cl.^{5} E05C *3/26*

U.S. Cl. 292--201 6 Claims

1. A luggage-door lock device comprising:

a body having therein a space and provided with an opening through which the space is accessible;
a striker element secured to a portion of the body adjacent the opening of the body;
lid means pivoted to the body for closing the opening of the body;
a base secured to the lid;
latch means provided with a pawl and movable between a first position at which the pawl is in engagement with the striker and a second position at which the pawl is in full disengagement with striker;
a swing member pivoted to the base and having a shoulder portion engageable with the latch at the first position;
spring means disposed between the swing member and the latch so that engagement therebetween is maintained and the latch is urged continually towards the second position;
a motor having a shaft including a worm gear;
a worm-wheel provided at a peripheral portion thereof with a geared-portion engaged with the worm so that rotation is transmitted from the worm to the geared portion and vice versa, and having a projection engagable with the swing member and mounted rotatably on the base;
wherein said pawl includes a rubber-stopper which is brought into engagement with another rubber-stopper when said latch means is moved into said second position.



5,020,839

CONTAINER TENSION RING CLOSURE

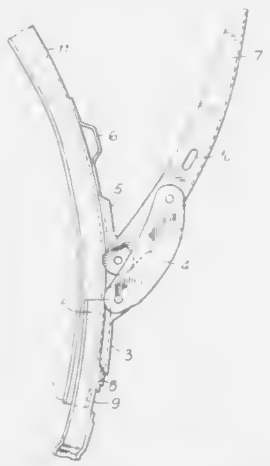
Alfred Kalb, Neuwied, Fed. Rep. of Germany, assignor to Mauser-Werke GmbH, Bruehl, Fed. Rep. of Germany

Filed Dec. 22, 1989, Ser. No. 455,684

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1988, 8815876

Int. Cl.^{5} B65D *45/34*

U.S. Cl. 292—256.69 2 Claims



1. An improved tension ring closure for containers, the ring having upper and lower ends clamped one over the other in a locked position by a tension lever closure means with the closure means including lever members disposed adjacent to ends of the ring and pivotally connected together, and in which the improvement characterized in that, when the ring ends (1, 2) are overlapping, an upwardly reaching locking loop (8) on the lower ring adjacent the lower ring end (1) is disposed at a location spaced circumferentially from and independent of said tension lever closure means; and a window-like opening (9) on the upper ring adjacent the upper ring end (2) is disposed at a location spaced circumferentially from and independent of said tension lever closure means for receiving the locking loop therethrough when the ends of the ring are clamped in locked position, said locking loop being exposed for reception therein of a locking device when the ring is in said locked position.

5,020,840

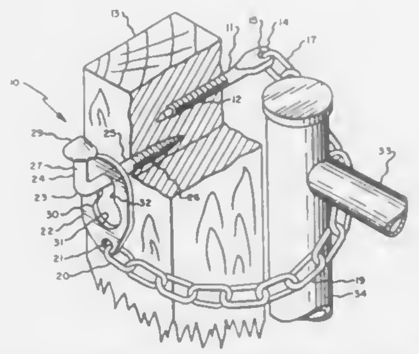
GATE LATCH

Clarence P. Winter, 11169 Rte. 75 at Langford, North Collins, N.Y. 14111

Filed Jul. 11, 1990, Ser. No. 551,027

Int. Cl.^{5} E05C *17/36*

U.S. Cl. 292—264 12 Claims



1. A gate latch comprising keeper means for attachment to a gate post, a shank on said keeper means, an enlarged head on said shank, an elongated flexible member, anchoring means at one end of said elongated flexible member for attaching said elongated flexible member relative to said gate post, latching tab means on the opposite end of said elongated flexible member for attachment to said keeper means, and aperture means in said latching tab means, said aperture means having a larger portion which is smaller than said enlarged head and through which said enlarged head cannot pass and said aperture means having a smaller portion which is a continuation of said larger portion and which is also smaller than said enlarged head and through which said enlarged head cannot pass, said enlarged head being capable of passing through said aperture means only when it passes through said larger portion of said aperture means and an adjacent portion of said smaller portion of said aperture means and only when said latching tab means is tilted to a predetermined position relative to said enlarged head during mounting on and demounting from said shank on said keeper means.

5,020,841

MECHANISM FOR LINKING AN OPENING HANDLE TO A PUSH PIN FOR THE LOCK OF A VEHICLE DOOR

Patrice Cardine, Orleans, France, assignor to Rockwell Automotive Body Systems-France, France

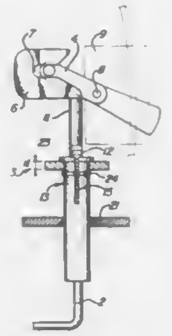
Filed Oct. 15, 1990, Ser. No. 597,250

Claims priority, application France, Oct. 17, 1989, 89 13558

Int. Cl.^{5} E05C *21/00*

U.S. Cl. 292—336.3 4 Claims

1. Mechanism (3) for linking an opening handle (4) to a push pin (2) for the lock (1) of a vehicle door, comprising a calliper (6) designed to receive the handle (4), a rod (11) which connects this calliper with the pin, engaged so as to slide in only one direction in a sleeve (13) by virtue of a non-return system, in such a way that after the handle and calliper have been assembled, a swinging down of the handle causes a relative movement of the rod (11) and of the sleeve (13), setting their respective positions without play, the rod (11) being provided for this purpose with a rack (12) which penetrates axially into the sleeve (13) between flexible longitudinal clamping arms (14), which are able to interact with the rack (12) to set the axial position of the rod in the sleeve, characterized in that the sleeve (13) is equipped with a ring (19) which is slidably fitted around the sleeve and can be moved during set-up from a first position at the base of the flexible arms (14) to a second position situated at the ends of the said arms nearest the calliper (6), in which position the ring (19) clamps the arms (14) around the rack (12), and these arms are provided at their said ends with means for retaining the ring in the said second position.



5,020,842

INSTRUMENT FOR INOCULATING BULB SCALES

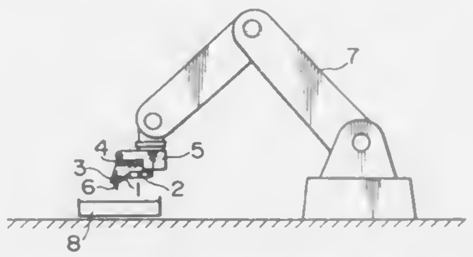
Yoshiyuki Miwa; Hiroshi Kodama; Skinya Murasugi, all of Tokyo; Sadao Shikae, Kagoshima; Masaya Nakagawa, and Tsutomu Kabumoto, both of Tokyo, all of Japan, assignors to Waseda University and Mitsubishi Jukogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Aug. 25, 1989, Ser. No. 398,421

Claims priority, application Japan, Sep. 2, 1988, 63-218510

Int. Cl.^{5} B25J *15/06;* **B65G** *47/91*

U.S. Cl. 294—2 2 Claims



1. An instrument for inoculating bulb scales which comprises an instrument body, a scale sucking finger having a suction means therein for attracting a scale, the sucking finger being rotatably joined to the instrument body, and a scale gripping finger, with one end thereof rotatably joined to the instrument body and with an intermediate part thereof connected to the instrument body with a spring made of shape memory alloy, the fingers being configured for gripping a scale between the suction means and a free end of the gripping finger.

5,020,843

CRANE HOOK LATCH WITH SLIDING LOCK BAR

Charles E. Lucas, 2664 W. 71st St., Tulsa, Okla. 74132

Filed Mar. 2, 1990, Ser. No. 488,746

Int. Cl.^{5} B66C *1/36*

U.S. Cl. 294—82.21 11 Claims

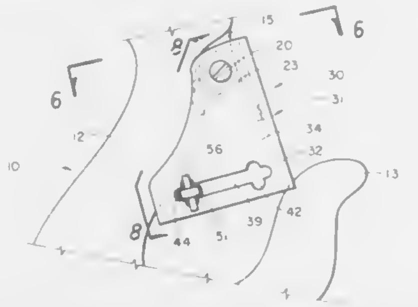
11. For use with a hook having a shank and a tip defining a mouth therebetween, the shank having a projection on its upper interior surface with an aperture transverse to said mouth therethrough, a gate latch for closing the mouth of the hook comprising:

a U-shaped housing having a base portion adapted to span said mouth from said projection to the underside of said tip and parallel side walls adapted to receive said shank therebetween during rotation of said latch into an open

VOL
1127
ISS
1
JE
4
1991
UMI

condition, each of said side walls having an aperture axially alignable with said projection aperture therebetween for pivotal engagement of said latch to said projection, said side walls having oppositely disposed linear guide slots adapted to extend, when said latch is in a closed condition, from a point proximate the interior lower surface of said shank toward **16** the tip end of said base portion;

means cooperable with said apertures for pivotally engaging said housing to said projection;



means for biasing the free end of said base portion toward said tip;

means disposed in said guide slots manually slidable in transverse relationship to said shank; and

means for selectively locking said slidable means in position at either the shank end or the tip end of said guide slots whereby, when said slidable means is looked at the tip end, said latch maY be pivoted to open said mouth and, when said slidable means is locked at the shank end, said latch may not be pivoted to open said mouth.

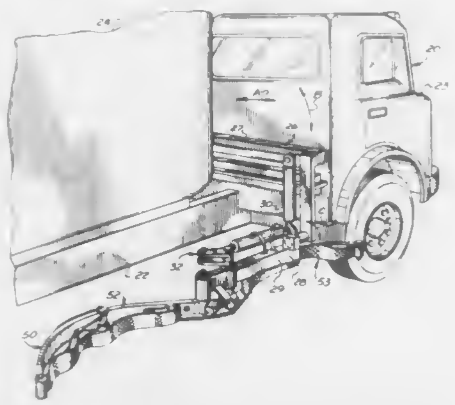
5,020,844
GRIPPING APPARATUS

John W. Pickrell, Scottsdale, Ariz., assignor to Government Innovators, Inc., Phoenix, Ariz.

Filed Feb. 9, 1989, Ser. No. 308,839

Int. Cl.⁵ B66F *9/18*

U.S. Cl. 294—86.4 16 Claims



1. A gripping apparatus for use in combination with

a container handling mechanism having grip actuating means selectively movable between a retracted position and an extended position

and for alternately gripping

a first container having a perimeter, and a second container having a perimeter smaller than the perimeter of said first container,

said gripping apparatus comprising:

a) a first arm carried by said actuating means;

b) a second arm carried by said actuating means;

said first and second arms being movable in opposing directions in response to said actuating means between a retracted position for alternately receiving said first container and said second container, and

an extended position for at least partially encircling the respective said container in spaced relationship to the perimeter thereof;

c) a first elongate flexible member carried by said first arm,

d) a second elongate flexible member carried by said second arm; and

e) grip control means carried by each said arm for normally presenting the respective said flexible member for engaging the perimeter of said second container and for alternately presenting said flexible member for engaging the perimeter of said first container in response to the presence of said first container as said arms move from the retracted position to the extended position, said grip control means comprising

i) a limb pivotally extending from each said arm and movable between a retracted position and an extended position;

ii) first means for moving said limb to the retracted position in response to movement of the respective said arm to the retracted position; and

iii) second means for moving said limb to the extended position in response to movement of the respective said arm to the extended position,

said flexible member being presented for engagement with the perimeter of said second container as said limb moves toward the extended position thereof, and

said limb being moved toward the retracted position thereof in response to the presence of said first container.

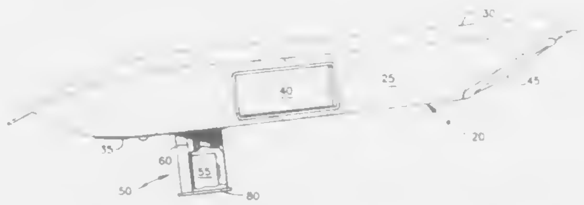
5,020,845
OVERHEAD CONSOLE WITH DROP-DOWN COMPARTMENT

Monte L. Falcoff, Southfield, and Edward G. Curtindale, Farmington Hills, both of Mich., assignors to United Technologies Automotive, Dearborn, Mich.

Filed Dec. 1, 1989, Ser. No. 444,496

Int. Cl.⁵ B60R *5/00*

U.S. Cl. 296—37.7 9 Claims



1. An overhead console of the passenger compartment of a motor vehicle or the like having a roof, said overhead console being characterized by:

a housing for mounting within said passenger compartment adjacent to the interior of said vehicle roof, said housing including an opening on the underside thereof;

a compartment for accommodating therewithin an electronic signaling device or the like, said compartment being receivable within said housing and at least partially removable therefrom by the downward translation of said compartment, for exposure of the contents thereof to an occupant of said vehicle, said compartment comprising a wall structure including a lower wall accessible to the occupant of said vehicle through said opening;

means disposed in said housing for guiding said compartment in said translation; and

means associated with said housing and compartment for selectively latching said compartment to said housing, said latching means being actuatable by pushing said compartment upwardly for both releasing said compartment from a stored position within said compartment and latching said housing in said stored position;

said latching means comprising a catch disposed within said housing above said compartment; and

a detent interchangeable with said catch and carried by said compartment at an upper surface of the exterior of said wall structure.

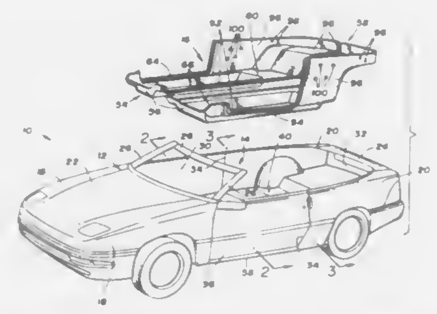
5,020,846
REINFORCING INSERT FOR CONVERTIBLE VEHICLE

Roy E. Bonnett, Birmingham, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed May 30, 1989, Ser. No. 358,307

Int. Cl.⁵ B62D *25/00*

U.S. Cl. 296—186 16 Claims



1. For use in a convertible type vehicle including an occupant compartment having front and rear extremities and side door openings therebetween and said vehicle including front and rear quarter panels between which the side door openings are located, rear quarter panel inner members spaced inwardly from the rear quarter panels, rocker structures that extend between the front and rear quarter panels and define the lower extremities of the side door openings, side doors that open and close the side door openings, and a floor pan that extends between the front and rear extremities of the occupant compartment and between the rocker structures at the lower extremities of the side door openings, the invention comprising: a reinforcing insert molded from plastic and having a shell-like construction positionable within the occupant compartment; said reinforcing insert having a front end including a foot portion and also having a rear end of an upwardly and forwardly opening shape; said insert also having an intermediate portion including a floor that extends between the front and rear ends thereof and has side edges for positioning adjacent the rocker structures at the lower extremities of the side door openings of the vehicle with the insert floor positioned above the vehicle floor pan; and the rear end of the insert having rear quarter panels securable to the rear quarter panel inner member of the vehicle.

5,020,847
SCOOTER BODY OPEN FRAME OF LOOP FORM WITH A LATERAL BEAM JOINING LONGITUDINAL, LATERALLY SPACED SIDE BARS

Chun-Jih Shih, #49-3, Hsin Yi Street, Chung Hsiao Li, Hsing Chuang City, Taipei Hsien, Taiwan

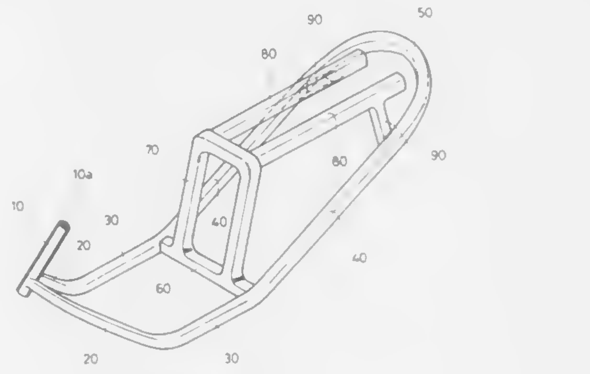
Filed Feb. 27, 1990, Ser. No. 485,713

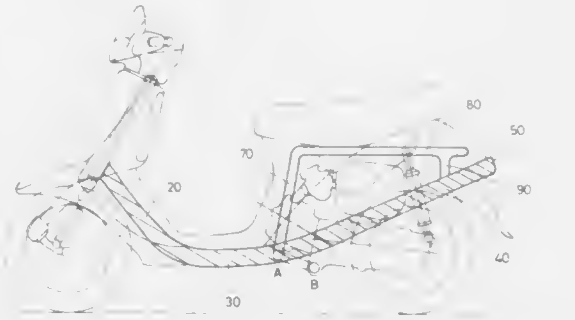
Int. Cl.⁵ B60R *27/00*

U.S. Cl. 296—204 3 Claims

1. A unitary scooter main body frame comprising:

a main body frame bottom portion of endless loop form sized to the outer periphery of a lower rim of a scooter body, said bottom portion having integral, laterally spaced, longitudinal side bars including forwardly and upwardly directed portions at one longitudinal end thereof, and rearwardly and upwardly directed portions at the other end thereof, a unitary semi-circular rear portion joining ends of the upward and rearward portions of said side bars, said forward and upward portions of said side bars having ends being integrally joined with a head tube having a hollow bore for the insertion of a steering stem to form a head, said loop form bottom portion being symmetrical in the longitudinal direction of the main body frame, a lateral beam integrally connected at opposite ends to the respective side bars at the juncture of the side bars and the upward and rearward portions of said side bars, a lateral bent beam of inverted U-shape integrally connected to said lateral beam and extending generally vertically upright from said lateral beam, laterally spaced, elongated top ribs extending generally horizontally rearwardly of





said lateral beam at the top of said lateral bent beam, respectively on opposite sides thereof and straight beams connected respectively, at one end to the laterally spaced, generally horizontal ribs remote from said lateral bent beam and at another end to said upward and rearward portions of said side bars, forward of said rear bar, such that said bent beam and said horizontal, laterally spaced ribs support a seat of the scooter, form a storage space and protect an engine, carburetor and air cleaner of the scooter.

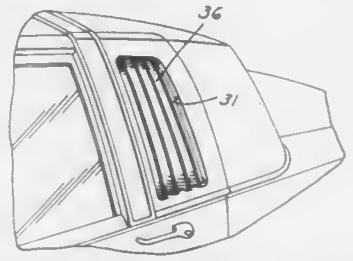
5,020,848
CUSTOMIZING AUTOMOBILE BODIES

Joseph T. Raj, Riverview, Mich., assignor to Evans Industries, Inc., Wayne, Mich.

Continuation-in-part of Ser. No. 101,585, Sep. 28, 1987, Pat. No. 4,793,650. This application Dec. 22, 1988, Ser. No. 289,232

Int. Cl.⁵ B60J *7/00;* **B21K** *21/16*

U.S. Cl. 296—210 14 Claims



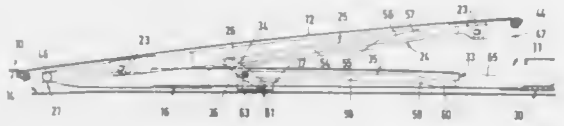
1. A customizing kit for an automobile body comprising

VOL
1127
ISS
1
JE
4
1991
UMI

a plastic body having a recess that is adapted to overlie a portion of the automobile body,
said recess of said plastic body comprising a base wall and a peripheral flange,
a louver body adapted to be inserted in said recess,
and a deeply tinted plastic sheet adapted to be interposed between the plastic body and the body of the automobile when the base wall of the recess is cut away,
said plastic body comprising a part adapted to overlie the door of an automobile.

5,020,849
SLIDING-LIFTING ROOF FOR AUTOMOBILES

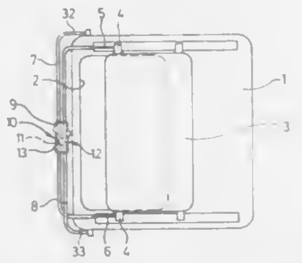
Albert Schlapp, Dreieich; Rainer Grimm, Wetzlar, and Horst Böhm, Frankfurt, all of Fed. Rep. of Germany, assignors to Rockwell-Golde GmbH, Fed. Rep. of Germany
Filed Feb. 28, 1990, Ser. No. 486,642
Claims priority, application Fed. Rep. of Germany, Mar. 16, 1989, 3908645
Int. Cl.^{5} B60J *7/05*
U.S. Cl. 296—221 10 Claims



1. A sliding-lifting roof for an automobile having a roof opening comprising:
a rigid lid mounted for movement relative to said roof opening,
a guide rail secured laterally to a roof frame at each side of said roof opening,
a front and a rear sliding element slidably guided by said guide rails at each side of said roof opening,
a cable acting in compression-stiff manner on each of said rear sliding elements and displaceably guided on said guide rails,
a pivot bearing connected with each of said front sliding elements and pivotally journalling said rigid lid for movement about a horizontal axis extending transverse to a direction of sliding movement of said lid,
a guide link fixed at each side of said lid, each of said guide links having a guide slit,
a guide pin carried by each of said rear sliding elements and engaging one of said guide slits in one of said guide links,
a recess in each of said guide rails, each of said recesses being opposite the other recess in the vicinity of a rear edge of the roof opening,
a guide element slidably guided on the guide rail adjacent a rear edge of the rigid lid,
a detent element connected to said guide element at each side of said lid, each of said detent elements engaging one of said recesses when said rigid lid is not being slidably displaced relative to said roof opening,
a coupling element connected to said detent element and operative to couple each of said rear sliding elements to said guide element when said detent elements are disengaged from said recesses and to decouple the rear sliding element from said guide element when said detent elements are engaged in said recesses,
a control link on each side of said lid and rigidly connecting the front sliding element with the guide element,
a two-armed control lever at each side of said rigid lid, each of said guide pins mounted at one end of one of said control levers, means mounting the other end of each of said control levers for articulating movement relative to one of said rear sliding elements, and
a control pin mounted on each control lever between the two ends thereof and engaging one of said control links.

5,020,850
ROOF AND FRAME ASSEMBLY FOR A MOTOR VEHICLE AND METHOD OF FORMING SAME

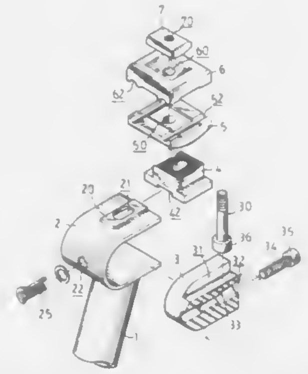
Horst Bienert, Gauting; August Hirschberger; Bernd Schleicher, both of Muenchen; Richard Igel, Germering, and Kurt Meier, Oberdolling, all of Fed. Rep. of Germany, assignors to Webasto AG Fahrzeugtechnik, Fed. Rep. of Germany
Filed Sep. 22, 1989, Ser. No. 410,893
Claims priority, application Fed. Rep. of Germany, Sep. 27, 1989, 3832681
Int. Cl.^{5} B60J *7/057*
U.S. Cl. 296—223 14 Claims



1. A vehicle roof assembly having a frame for setting within an opening of a fixed vehicle roof and a cover movably mounted to said frame, comprising:
pressure-resistant drive cables connected between said cover and a drive means, said drive means including a drive pinion, and a holding means for fixedly locating guide tubes through which said pressure-resistant drive cables are driven at a zone of contact of said drive pinion and said pressure-resistant drive cables, said holding means comprising a sheathing part that is molded around said guide tubes, and wherein said sheathing part further includes a recess formed therein for accommodating said drive pinion therein, said guide tubes running completely through said sheathing part and an opening being formed in a portion of the guide tube and the sheathing part adjacent said recess to expose said drive cables from within said recess in said zone of contact.

5,020,851
SADDLE SUPPORT DEVICE FOR A BICYCLE

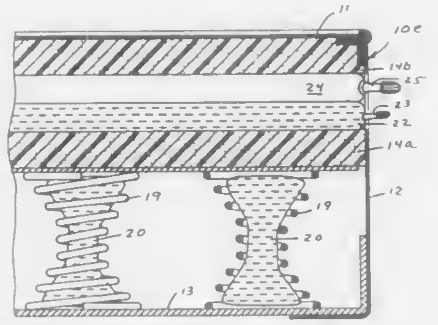
King P. Chen, No. 198, Feng Chou Rd., Shen Kang Hsiang, Taichung Hsien, Taiwan
Filed Sep. 7, 1990, Ser. No. 579,308
Int. Cl.^{5} B62J *1/00*
U.S. Cl. 297—195 2 Claims



1. A saddle support device comprising a support member integrally fixed on an upper end of a seat post of a bicycle, said support member being substantially C-shaped with an open rear end so as to provide a resilient structure, a lower blade of said support member being integrally fixed on said seat post, a rib being formed in an upper surface of an upper blade of said support member, an opening being formed in said rib; a base, a carriage and a yoke being provided in series upon said support member and each having a hole formed therein, a slot being formed in a lower surface of said base for engagement with said rib of said support member so that said base is guided to move longitudinally along said support member, a pair of first grooves being formed in an upper surface of said carriage and a pair of second grooves being formed in a lower surface of said yoke, a pair of saddle frames of a saddle being received in said first grooves and said second grooves when said carriage and said yoke are coupled together; a bolt extending through said opening of said support member and said holes of said base, said carriage and said yoke, and a block being threadedly engaged to an upper end of said bolt so that said base, said carriage and said yoke are clamped together by said bolt and said block; and said resilient structure of said support member being provided for absorbing a shock or a vibration which may be transferred to a rider so that said rider may feel more comfortable.

5,020,852
BICYCLE SEAT

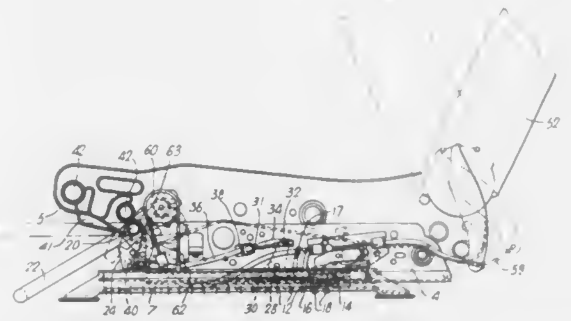
Laura E. Marion, 61 Cheryl Ann Dr., Coldwater, Mich. 49036
Filed May 29, 1990, Ser. No. 529,537
Int. Cl.^{5} B62J *1/00;* A47C *27/08*
U.S. Cl. 297—200 5 Claims



1. A bicycle seat comprising, in combination,
a rigid support floor, and
a flexible extensible arcuate side wall, and
a flexible top surface layer of a generally kidney shaped configuration, and
the top layer extending rearwardly into a rear ridge extending upwardly from the top surface layer, and
the seat further including a thick cushion insert mounted in a spaced relationship above the rigid support floor defining a spring chamber therebetween, wherein a plurality of springs are mounted between the rigid support floor and the cushion insert, and
wherein the springs include spaced parallel springs mounted within the spring chamber, and
wherein each of the springs include coiled springs, each coil spring of a generally hourglass configuration and arranged orthogonally between the cushion insert and the support floor, and
wherein each coil spring includes a flexible fluid filled shock dampening bag mounted therewithin coextensively within each coil spring, and wherein each bag is filled with a compressible fluid to effect dampening of each coil spring in use.

5,020,853
VEHICLE SEAT SLIDE MECHANISM

Frederick W. Babbs, Nottingham, England, assignor to Dunlop Cox Limited, United Kingdom
Filed Jul. 30, 1990, Ser. No. 559,069
Claims priority, application United Kingdom, Aug. 2, 1989, 8917633
Int. Cl.^{5} B60N *1/04*
U.S. Cl. 297—341 8 Claims

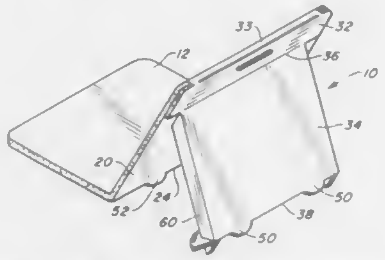


1. A vehicle seat slide mechanism comprising:
two seat slide pairs, each comprising a first elongate slide member adapted to be connected to the floor of the vehicle and a second elongate slide member adapted to be connected to the body of the vehicle seat and in sliding relationship with the first member;
a trigger member mounted on each said second slide member and normally urged by a spring into a locked position where it is in engagement with at least one of a series of apertures or notches in the first slide member to prevent relative sliding movement of the two slide members;
a release member co-operating with each of the two trigger members and arranged to move each of the two trigger members from the locked position to an unlocked position where each is out of engagement with the at least one aperture or notch in the first slide member;
a memory member carried by the first slide member and moveable parallel thereto;
first and second engagement members carried by the second slide member and engageable with the memory member to effect movement thereof parallel to the first slide member;
a coupling member linked to the release member;
a forwardly tiltable lever to which the coupling member is linked and which, when tilted forwardly operates the release members through the coupling members to move the trigger members to the unlocked position;
an actuator associated with the coupling member which co-operates with the first engagement member on said forward tilting of the lever to move the first engagement member out of engagement with the memory member which thus remains stationary as the seat is moved forwardly; and
a locking member which co-operates with the memory member and is so constructed and arranged that when the seat is moved forwardly and the memory member remains stationary, the locking member moves to a position where it co-operates with the actuator whereby when the lever is returned to its untilted position the coupling member is prevented from returning to a position in which each trigger member may return to the locked position, but when the seat is moved rearwardly the locking member engages the memory member and returns to its original position thereby permitting the coupling member to return to its original position whereafter each trigger member returns to the locked position thus locking the seat in its original position.

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,854
FOLDING CHAIR CONSTRUCTED OF SHEET MATERIAL

Robert A. Powell, 146 - 46th St., Sacramento, Calif. 95819
Filed Sep. 21, 1990, Ser. No. 586,145
Int. Cl.^{5} A47C *1/14, 7/16*
U.S. Cl. 297—377 **11 Claims**



1. A folding chair formed from sheet material, said chair comprising, in combination:

a seat panel having an outer surface and spaced first and second ends, said seat panel adapted to be positioned on the ground;

a back panel having an upper end and a lower end foldably connected at said lower end thereof to said seat panel second end, said back panel having an outer surface and being adapted to be positioned relative to said seat panel whereby said back panel extends upwardly from said seat panel and said back panel outer surface and said seat panel outer surface define an obtuse angle;

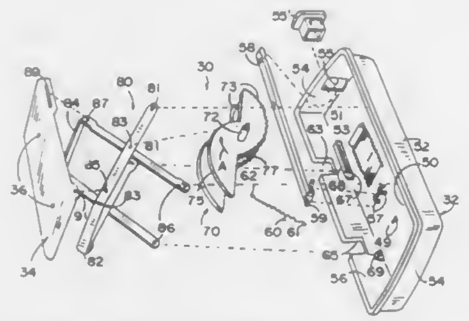
a support panel having an upper end and a lower end, said support panel upper end being located at said back panel and said support panel slanting downwardly and away from said back panel toward said ground;

an end panel adapted for positioning on the ground foldably connected to the support panel at the support panel lower end and projecting from said support panel when positioned on the ground; and

at least one brace panel having an upper end and a lower end and connected to said support panel and extending between said back panel and said end panel to strengthen and stabilize said chair.

5,020,855
ADJUSTABLE HEADREST

Kenneth M. Lindberg; David J. Spykerman; Philip C. George, and Wesley D. Mersman, all of Holland, Mich., assignors to Prince Corporation, Holland, Mich.
Filed Feb. 9, 1990, Ser. No. 477,411
Int. Cl.^{5} A47C *7/36*
U.S. Cl. 297—391 **20 Claims**



7. A vehicle headrest comprising:

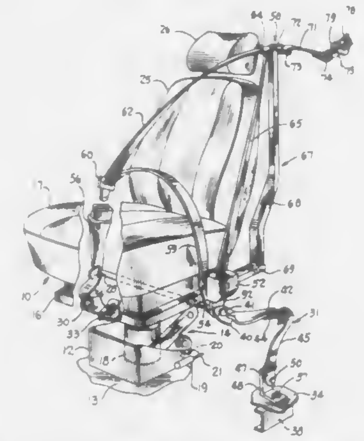
a stationary member adapted to be mounted to a vehicle seat;

a movable member defining a head support, said movable member movably mounted to said stationary member; and

an adjustment member body having a pair of alternately staggered arcuate surfaces, said body including means for pivotally mounting said body between said stationary and said movable members, and means for locking said body in a predetermined rotated position.

5,020,856
THREE-POINT SEAT BELT

Philip C. George, Greensboro, N.C., assignor to Volvo GM Heavy Truck Corporation, Greensboro, N.C.
Filed Nov. 18, 1986, Ser. No. 932,185
Int. Cl.^{5} A62B *35/00*
U.S. Cl. 297—483 **25 Claims**



1. For use with a vehicle seat, a three point seat belt assembly comprising:

a) a retractor for connection to a seat frame;

b) a seat belt anchor for connection to such frame;

(c) a seat belt including a coiled portion within the retractor and a free end coupled anchor;

d) a seat belt latch slidably carried by the belt;

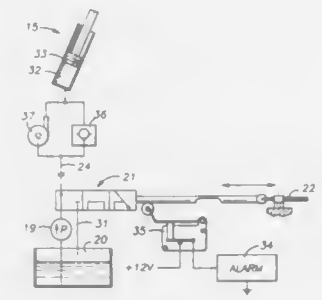
e) a shoulder span anchor and support for attachment to such frame and including a portion slidably connected to the belt and adapted to be positioned near a user's shoulder;

f) a belt lock for connection to such seat frame and adapted retainingly to engage the latch; and,

g) tethers for connecting the retractor, the belt anchor, the latch and the span anchor to a vehicle cab and frame structure whereby a vehicle occupant can be restrained without regard to the vertical positioning of such heat.

5,020,857
USE OF FLUID DYNAMIC RESTRICTOR FOR LOWERING DUMP TRUCK BEDS

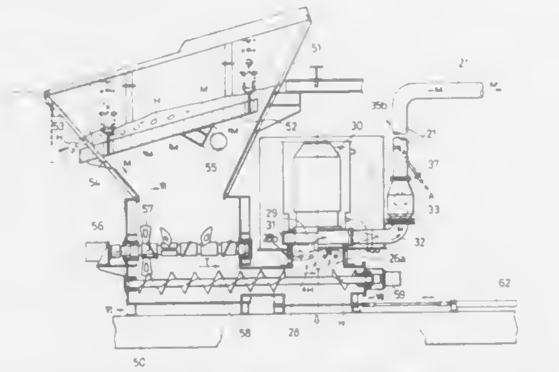
Peter C. Bertelson, 30325 Ponds View Dr., Franklin, Mich. 48025
Filed Jan. 23, 1990, Ser. No. 468,609
Int. Cl.^{5} B60P *1/28*
U.S. Cl. 298—22 R **7 Claims**



1. A hydraulic lift mechanism for a vehicle having a chassis and a bed mounted on said chassis, said lift mechanism including a piston and cylinder coupled between said chassis and said bed, a pump for supplying fluid under pressure to said cylinder for lifting said bed from said chassis, and a fluid dynamic restrictor for defining a fluid vortex limiting a discharge of said fluid from the cylinder, whereby the speed at which the bed is lowered is limited to a safe speed when the bed has a full load.

5,020,858
METHOD OF AND APPARATUS FOR FORMING AND TRANSPORTING MUD CLOGS

Yutaka Nishikawa, Higashimurayama, Japan, assignor to Toa Corporation, Tokyo, Japan
Filed Sep. 28, 1990, Ser. No. 590,534
Claims priority, application Japan, Sep. 21, 1988, 63-234841
Int. Cl.^{5} E02F *7/06*
U.S. Cl. 299—8 **7 Claims**



1. A mud transporting method comprising the steps of: agitating and fluidizing dredged mud; pressurizing the fluidized mud by pumping said fluidized mud with a motor driven pressurizing vane and supplying said fluidized mud to a mud supply end of a mud supply pipe through a check valve; and supplying pressurized air down-stream of said check valve and in a mud transporting direction to said fluidized mud in said mud supply pipe for transporting said mud in mud clogs in said mud supply pipe with pressurized air therebetween by pneumatic force of said pressurized air.

5,020,859
APPARATUS FOR DISINTEGRATING MONOLYTHIC ENTITIES

Abram I. Pesin, Orel, and Ivan V. Chevakin, Tula, both of U.S.S.R., assignors to Spetsializirovanny Trest PO Remontu Promyshlennykh Zdany I Sorruzheny Predpriyaty Chernoi Metallurgii Tsentrainogo Raiona "Tsentremetallurgremont", Tula, U.S.S.R.
PCT No. PCT/SU88/00160, § 371 Date Apr. 25, 1990, § 102(e) Date Apr. 25, 1990, PCT Pub. No. WO90/02245, PCT Pub. Date Mar. 8, 1990
PCT Filed Aug. 19, 1988, Ser. No. 477,891
Int. Cl.^{5} E21C *37/04, 37/06*
U.S. Cl. 299—21 **10 Claims**

1. An apparatus for disintegrating monolythic entities comprising a body having a longitudinal axis;

at least two thrust plates defining said body and capable of reciprocating in a direction perpendicular to said longitudinal axis of said body, said thrust plates having an inner surface;

a partitioning means comprised of at least two similar parts to provide spaces within said body extending parallel to said longitudinal axis of the body;

said similar parts symmetrically positioned with respect to said longitudinal axis of the body and adapted to reciprocate in a direction perpendicular to said longitudinal axis of the body;

said similar parts comprising a surface facing toward said longitudinal axis of the body and defined by two intersecting planes parallel to said longitudinal axis of the body;

first wedge-shaped inserts accommodated in each of said spaces and in contact with said similar parts and the inner surface of said thrust plates;

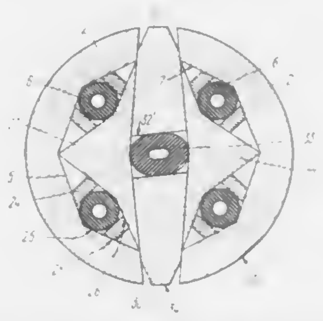
first expansion chambers accommodated in said spaces between said first wedge-shaped inserts to exert force on said thrust plates and said first wedge-shaped inserts;

fastening means adapted to secure said thrust plates to said body;

second wedge-shaped inserts positioned between said similar parts and adapted to move on said surfaces facing toward said longitudinal axis of the body and exert a force on said similar parts and thrust plates;

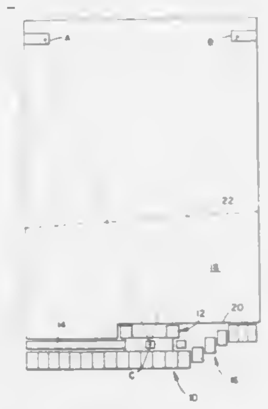
a second expansion chamber accommodated coaxially with said longitudinal axis of the body between said second wedge-shaped inserts and being in contact therewith for exerting a force on the second wedge-shaped inserts acting on said similar parts and thrust plates; and

a source of working fluid communicating with said first and second expansion chambers to feed the working fluid thereto and thereby produce pressure in said first and second expansion chambers for the resulting force to be transmitted to said first and second wedge-shaped inserts, said similar parts and thrust plates.



5,020,860
METHODS AND APPARATUS FOR MAINTAINING LONGWALL FACE ALIGNMENT

Stephen L. Bessinger, Morgantown, W. Va., and Michael G. Nelson, Fairbanks, Ak., assignors to Consolidation Coal Company, Pittsburgh, Pa.
Continuation-in-part of Ser. No. 264,670, Oct. 31, 1988, abandoned. This application Feb. 26, 1990, Ser. No. 484,835
Int. Cl.^{5} F21D *23/14;* **G01B** *7/00*
U.S. Cl. 299—1 **12 Claims**



1. In the mining of a longwall panel, the method of maintaining panel face alignment by controlling the functions of a longwall mining system which includes a shearer, comprising:

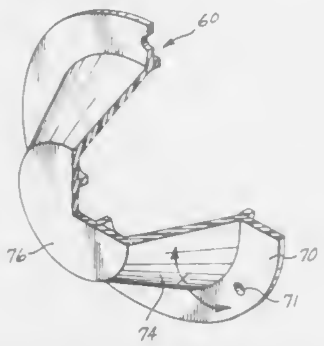
a) placing spaced transceivers at known locations in the

VOL
1127
ISS
1
JE
4
1991
UMI

panel ahead of the shearer and placing a transceiver on the shearer;
b) providing electromagnetic communication between each of the spaced transceivers and the transceivers on the shearer;
c) measuring the phase modulation of the communication between the spaced transceivers and the transceivers on the shearer;
d) repeating and recording the phase modulation in a controller of the longwall mining system's functions; and,
e) controlling longwall mining system functions as required to maintain face alignment.

5,020,861
AIRCRAFT WHEEL HUBCAP

Frederick J. Gorges, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.
Filed Mar. 8, 1990, Ser. No. 490,193
Int. Cl.^{5} B60B *7/02*
U.S. Cl. 301—108 R **7 Claims**

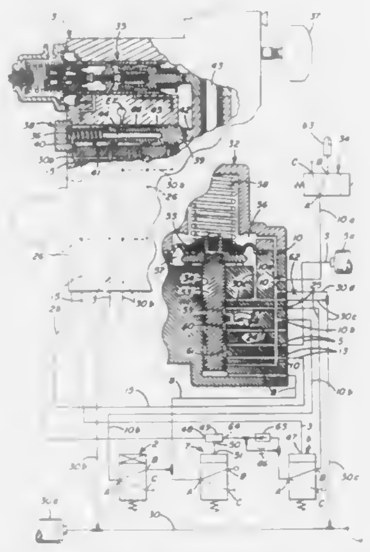


7. A cap for covering an aircraft wheel hub containing an anti-skid transducer therein, the transducer including a body and at least one finger which is attached to the body, the cap comprising:
a. a sloped sidewall having a first end and a second end;
b. an end plate which is connected to the second end of the sidewall;
c. means, connected to the end plate, for engaging the transducer in a manner that rotation of the cap, due to rotation of the wheel hub, is transmitted to the transducer;
c. means for attaching the cap to the wheel hub in a manner that a first passageway is formed between the transducer body and the sidewall such that the size of the first passageway increases due to an increasing distance between the sidewall and the transducer body when proceeding in an axial direction along the transducer body away from the end plate; and
e. the transducer engaging means further includes a plurality of slots for receiving the finger therein, the slots being located on the end plate so that a portion of a wall forming each slot forms an inner wall about the center of the end plate so as to form a second passageway which is in communication with the first passageway so as to permit the flow of air through the first and second passageways along the sidewall and end plate of the cap.

5,020,862
PENALTY BRAKE CONTROL SYSTEM

Richard F. Balukin, Pittsburgh, and John R. Reiss, North Versailles, both of Pa., assignors to American Standard Inc., Wilmerding, Pa.
Filed Sep. 27, 1989, Ser. No. 413,140
Int. Cl.^{5} B60T *7/12*
U.S. Cl. 303—15 **13 Claims**

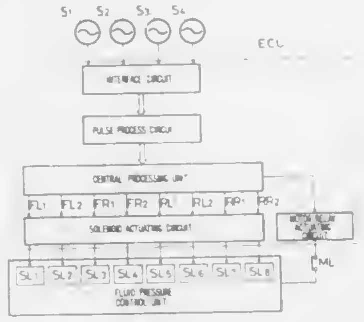
1. A penalty brake control system for a railway vehicle comprising:
(a) an operator's brake valve device having an operating handle movable to a service position in which a service brake application is initiated, the degree of said service brake application being determined by the duration said handle is in said service position and a release position in which the service brake application is released;
(b) a penalty valve device having an application position in which a penalty brake application is initiated independently of said brake valve initiated service application and a release position in which said penalty brake application is released;
(c) sensing means operative in response to an unsafe operating condition of said vehicle for effecting operation of said penalty valve device to said application position;
(d) interlock means for preventing said penalty valve device from resetting to said release position following said actuation thereof to said application position comprising:
(i) said penalty valve device having a control chamber and a piston valve operable in response to pressurization of said control chamber to establish said release position of said penalty valve device and operable in response to depressurization of said control chamber to establish said application position of said penalty valve device; and
(ii) a flow path established by said piston valve in said application position of said penalty valve device via which said control chamber is connected to atmosphere to vent fluid pressure therefrom; and
(e) means for disabling said interlock means in response to said penalty valve being actuated to said application position and to said operating handle of said brake valve device being in a position other than said release position to thereby permit said penalty valve device to reset to said release position thereof when said unsafe operating condition has been corrected.



5,020,863
ANTILOCK CONTROL DEVICE

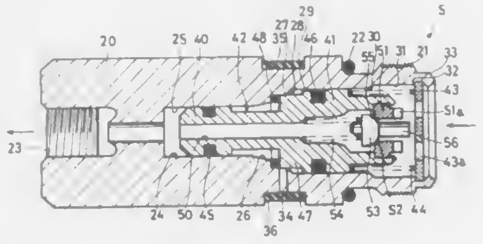
Masato Yoshino, Itami, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan
Filed Dec. 26, 1989, Ser. No. 457,164
Claims priority, application Japan, Dec. 24, 1988, 63-327426
Int. Cl.^{5} B60T *8/32*
U.S. Cl. 303—96 **10 Claims**

1. An antilock control device comprising:
first and second wheel speed sensor means for respectively detecting a wheel speed of a right front wheel and a left front wheel of a motor vehicle and for outputting corresponding first and second wheel speed signals;
an electronic control means for processing said first and second wheel speed signals so as to determine whether the right front wheel and the left front wheel are exhibiting a tendency to enter a locked state and whether the right front wheel and the left front wheel are recovering from a locked state, and for outputting first and second pressure control signals for selectively reducing, maintaining, and increasing a braking pressure applied to the right front wheel and the left front wheel, respectively; and,
a fluid pressure control means for controlling the braking pressure applied to the right front wheel and the left front wheel in accordance with said first and second pressure control signals, respectively;
said electronic control means comprising (a) control mode changeover means for selecting one of a first control mode in which said first and second pressure control signals are determined independently from one another, and a second control mode in which said both of said first and second pressure control signals are determined based on a locking tendency of one of the right front and left front wheels having a higher wheel speed than the other, and (b) a timer means for measuring a duration in which said first and second pressure control signals are both for one of continuously reducing, and alternatively reducing and maintaining, the braking pressure to the right front and left front wheel, respectively;
said control mode changeover means operative to select said first control mode when said duration is less than a predetermined value, and to select said second control mode when said duration is more than a predetermined value.



5,020,864
BRAKING SYSTEM FOR VEHICLE

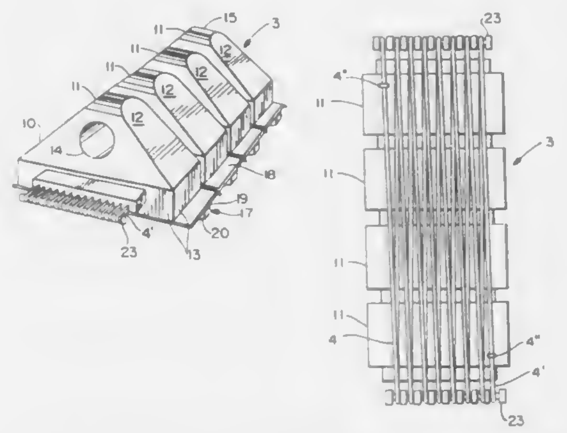
Ryuichi Tanaka, Kanagawa, Japan, assignor to Nippon Air Brake Co., Kobe, Japan
Filed Aug. 15, 1989, Ser. No. 394,009
Claims priority, application Japan, Sep. 20, 1988, 63-235767
Int. Cl.^{5} B60T *17/18, 8/40*
U.S. Cl. 303—113 **10 Claims**



1. A braking system for a vehicle, comprising:
(A) a brake fluid pressure generating source;
(B) a brake-applying apparatus for braking a wheel or wheels with the brake fluid pressure supplied from said brake fluid pressure generating source;
(C) a pulsating-pressure absorbing apparatus arranged between said brake fluid pressure generating source and said brake-applying apparatus; and,
(D) throttling means arranged in said pulsating-pressure absorbing apparatus, for limiting the brake fluid flowing from the side of said brake-applying apparatus towards said brake fluid pressure generating source, wherein said pulsating-pressure absorbing apparatus further comprises a main body, a plunger slidably fitted through a hole of said main body and being arranged between the inlet and outlet of said main body and further being movable in response to the brake fluid pressure difference between both sides of said plunger, a poppet-type valve body arranged in an axial hole of said plunger and in the inside wall of said plunger, a spherical head portion of said valve body being contactable with said valve seat, a rod portion of said valve body passing through a narrow end portion of said axial hole and said throttle means being formed as a cut-off groove in said spherical head portion of the valve body, wherein when said plunger is located at the first side of said outlet said spherical head portion of the valve body contacts with said valve seat and said cut-out groove functions as a throttle between said spherical head portion of the valve body and said valve seat, and wherein when said plunger is located at the second side of said inlet said spherical head portion of the valve body is separated from said valve seat.

5,020,865
ENDLESS DRIVE TRACK JOINT ASSEMBLY

John W. Edwards, Brandon; Daniel R. Harper, and Quinton B. McNew, both of Ft. Myers, all of Fla., assignors to Edwards, Harper, McNew & Company, Ft. Myers, Fla.
Continuation-in-part of Ser. No. 146,187, Jan. 20, 1988, Pat. No. 4,844,560, which is a continuation-in-part of Ser. No. 113,670, Oct. 28, 1987, which is a continuation-in-part of Ser. No. 51,830, May 20, 1987, Pat. No. 4,906,054, which is a continuation-in-part of Ser. No. 49,819, May 14, 1987, Pat. No. 4,861,120. This application Sep. 2, 1988, Ser. No. 239,645
Int. Cl.^{5} B62D *55/253*
U.S. Cl. 305—35 EB **26 Claims**



1. A joint assembly for an endless drive track, comprising:
at least one connector member having at least two substantially parallel lengths and loops, said at least one connector member being situated within said endless drive track in such a way that said at least two substantially parallel

VOL
1127
ISS
1
JE
4
1991
UMI

lengths of said connector member extend longitudinally of said endless drive track and said loops of said connector member extend from ends of said endless drive track;

a circumferentially grooved retaining rod situated between abutting ends of said endless drive track, each connector member loop extending from said abutting ends being looped around said retaining rod within a respective groove therein so that said connector member loops lie below an outer circumferential surface of said retaining rod and lateral spacing of said connector member loops is maintained;

a master link with a one-piece upper part and a one-piece lower part, said upper and lower parts having cooperating recesses for receiving said retaining rod with said connector member loops therearound; and

means for fastening said upper and lower master link parts to one another to sandwich therebetween said retaining rod and said connector member loops with compression exerted upon said retaining rod and not upon said connector member loops.

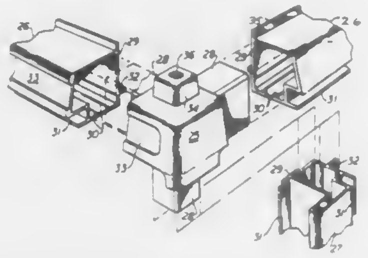
5,020,866
ENCLOSURE FOR HOUSING ELECTRONIC COMPONENTS

George McIlwraith, Stone Mountain, Ga., assignor to Gichner Systems Group, Inc., Dallastown, Pa.

Filed Nov. 13, 1989, Ser. No. 434,323

Int. Cl.⁵ A47B *88/00*

U.S. Cl. 312—265.4 **8 Claims**



1. A cabinet comprising:

a corner member having a plurality of brackets extending therefrom and positioned normal to one another;

a plurality of frame members corresponding to said plurality of brackets, one of said frame members being slidably positioned over each of said brackets and abutting said corner member;

a flange extending upwardly from each of said plurality of frame members; and

a top panel having a downwardly extending lip formed around its periphery, said top panel being positioned atop said plurality of frame members such that said lip on said top panel is disposed exteriorly of said flange on said plurality of frame members such that said flange extends upwardly toward said top panel at a point inside outer periphery.

5,020,867
PORTABLE SERVING AND STORAGE CABINET

James A. McManus, 21219 So. Figueroa St., Carson, Calif. 90745

Filed Jul. 9, 1990, Ser. No. 550,290

Int. Cl.⁵ A47B *77/00*

U.S. Cl. 312—314 **4 Claims**

1. A portable storage cabinet comprising the combination of:

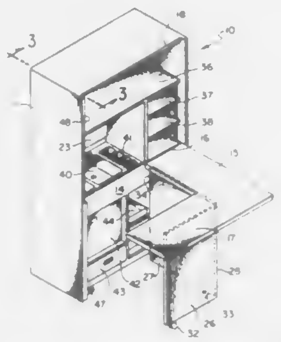
an upright wheeled housing having an internal storage compartment;

said housing having a top joining opposite sides to define said internal storage compartment and further including a midsection member extending between said sides to separate said internal storage compartment into an upper compartment and a lower compartment;

an L-shaped upper panel hinged to said midsection member for deployment between a closed position against said housing to cover said upper compartment and an open position outwardly projecting normal to said housing to uncover said upper compartment;

a lower panel hinged to said housing adjacent one of said sides for deployment between a closed position against said housing to cover said lower compartment and an open position outwardly projecting normal to said housing to uncover said lower compartment; and

said lower panel including two panel portions hingeably connected together along adjacent ends whereby said lower panel in its open position extends said two panel portions normal to each other to support said L-shaped panel when in its open position.



5,020,868
CLOSING DEVICE FOR A DRAWER ARRANGED IN A FURNITURE BODY

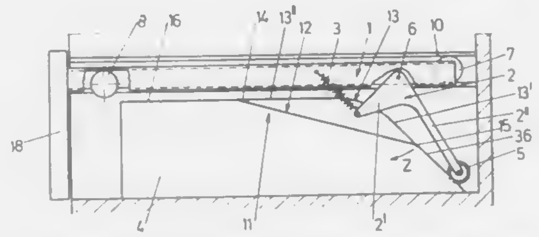
Eberhard Brunnert, Elchingen, Fed. Rep. of Germany, assignor to Julius Blum Gesellschaft m.b.H., Hochst, Austria

Filed Dec. 21, 1989, Ser. No. 454,506

Claims priority, application Austria, Jan. 2, 1989, A3/89

Int. Cl.⁵ A47B *88/00, 95/00*

U.S. Cl. 312—319 **41 Claims**



1. A closing device, for use with a drawer that is movable in opposite directions with respect to an article of furniture between open and closed positions, to ensure that, upon the drawer being moved toward the closed position, the drawer is moved to and maintained at the closed position, said closing device comprising:

a guide member to be mounted on a side wall of a body of the article of furniture, said guide member having a guide path defined over a portion of the length thereof by a double-track portion including first and second tracks;

a pull-in assembly to be mounted on the drawer and operable, when the drawer is moved at least partially in a direction to the closed position, in cooperation with said guide member to move the drawer over a final portion of the movement thereof to the closed position, said pull-in assembly comprising a member mounted on a pivotable lever and acted on by a spring to be urged under pressure against said guide path; and

said member being guided along said first track during movement of the drawer from the closed position to the open position, and said member being guided along said second track during movement of the drawer from the open position to the closed position.

5,020,869
DRAWER RUNNER FOR DRAWERS PREFERABLY MADE OF PLASTIC

Karl-Volker Faust, Bielefeld, Fed. Rep. of Germany, assignor to Paul Hettich GmbH & Co., Kirchlengern, Fed. Rep. of Germany

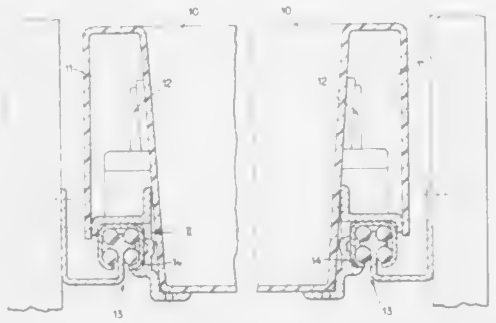
PCT No. PCT/DE88/00416, § 371 Date Apr. 5, 1989, § 102(e) Date Apr. 5, 1989, PCT Pub. No. WO89/01305, PCT Pub. Date Feb. 23, 1989

PCT Filed Jul. 13, 1988, Ser. No. 335,784

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1987, 8710830.5

Int. Cl.⁵ A47B *88/14*

U.S. Cl. 312—341.1 **18 Claims**



1. A runner for a drawer which is movable in a predetermined direction and has a pair of oppositely disposed sides generally parallel to the direction of movement of the drawer when the drawer is mounted in an article of furniture, particularly for a plastic drawer in which the oppositely disposed sides are provided with pockets for respective runners, said runner comprising an elongated supporting element designed to be mounted at either of the oppositely disposed sides of the drawer so as to extend in the direction movement of the drawer, said supporting element having a transverse central plane which divides said supporting element into two mirror symmetrical halves and said supporting element comprising a one-piece tongue which is displaceable transversely of the longitudinal direction of said supporting element; an elongated guide element for guiding the drawer during movement and designed to be releasably connected to said supporting element so as to extend generally parallel thereto; and cooperating first and second locking means on said supporting element and said guide element, respectively, for releasably connecting said guide element to said supporting element so as to inhibit relative longitudinal displacement of said guide element and said supporting element, said first locking means including a pair of locking elements on said tongue and having two halves which are substantially mirror symmetrical to each other with reference to said plane.

5,020,870
BINOCULAR KALEIDOSCOPE

Steven J. Gray, 2970 Sourdough Rd., Bozeman, Mont. 59715

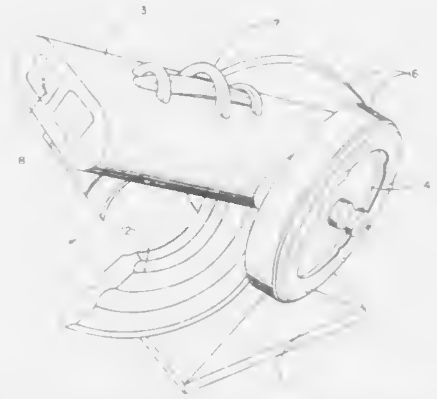
Filed Oct. 6, 1988, Ser. No. 254,163

Int. Cl.⁵ G02B *23/00*

U.S. Cl. 350—4.1 **18 Claims**

1. A binocular kaleidoscope for producing images, the kaleidoscope comprising:

a converging viewing channel having a pair of converging mirror surfaces, including an upper planar mirror surface and a lower planar mirror surface wherein said upper and said lower planar surfaces converge at a converging end and diverge at a viewing end; and wherein the interior surface of said upper and said lower surfaces are light reflective and wherein said viewing channel further provides a pair of side image producing openings.



5,020,871
OPTICAL FIBER WIRING APPARATUS

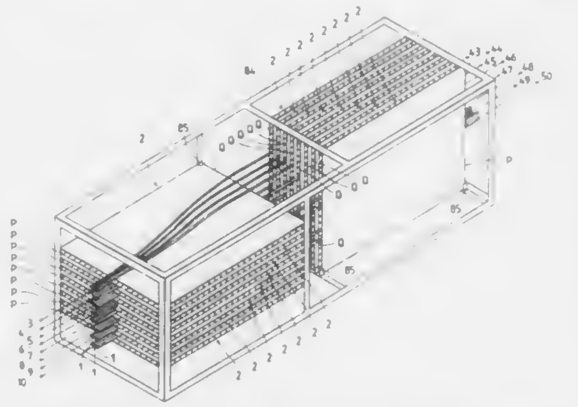
Akira Nishimura, Yokohama, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jan. 12, 1990, Ser. No. 464,107

Claims priority, application Japan, Jan. 12, 1989, 1-3717

Int. Cl.⁵ G02B *6/00*

U.S. Cl. 350—96.1 **6 Claims**



1. An optical fiber wiring apparatus comprising:

a plurality of first substrates stacked in a first direction, each said first substrate having grooves formed therein;

a plurality of second substrates stacked in a second direction, each said second substrate having grooves formed therein; and

at least one optical fiber being fixed in at least one of the grooves on each of said plurality of first and second substrates;

wherein said at least one optical fiber is fixed in one of the grooves formed in one of said first substrates and is fixed also in one of the grooves formed in one of said second substrates;

wherein said plurality of first substrates and said plurality of second substrates are positioned such that none of said optical fibers cross over any other of said optical fiber.

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,872

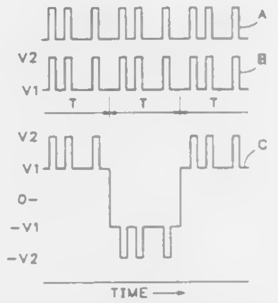
METHOD OF OPERATING AN ELECTROOPTIC MODULATOR

Richard E. DuPuy, Aloha; John D. Liebenrood, Portland, both of Oreg., and Leon McCaughan, Madison, Wis., assignors to Smiths Industries Aerospace & Defense Systems Incorporated, Grand Rapids, Mich.

Filed Jan. 4, 1990, Ser. No. 460,761

Int. Cl.^{5} G02B *6/10*

U.S. Cl. 350—96.14 19 Claims



1. A method of operating an electrooptic modulator comprising a body of electrooptic material having at least one waveguide formed therein, said method comprising:

during a first interval, establishing an electric field in a first direction in a length segment of the waveguide, the electric field having a first of at least two magnitudes during a first finite part of the first interval and a second of said magnitudes during a second finite part of the first interval, and

during a second interval, establishing an electric field in a second direction, opposite said first direction, in said length segment of the waveguide, the electric field having a first of at least two magnitudes during a first finite part of the second interval and a second of the latter magnitudes during a second finite part the second interval,

such that the integral with respect to time over the first and second intervals of the field in said length segment of the waveguide is essentially zero.

5,020,873

OPTICAL COMPONENT FOR ACCURATELY LOCATING THE END FACE OF AN OPTICAL WAVEGUIDE WITH RESPECT TO AN OPTICAL DEVICE

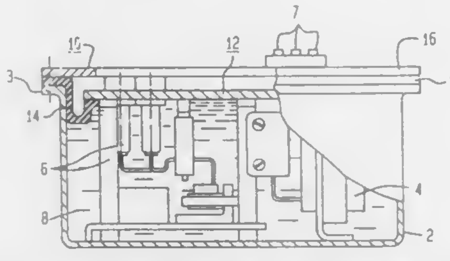
Hans Althaus, Lappersdorf; Werner Kuhlmann, Munich, and Werner Spaeth, Holzkirchen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Division of Ser. No. 126,067, Nov. 27, 1987, Pat. No. 4,888,081, which is a division of Ser. No. 885,275, Apr. 24, 1986, Pat. No. 4,741,796. This application Sep. 13, 1989, Ser. No. 406,662

Claims priority, application Fed. Rep. of Germany, May 29, 1985, 3519260

Int. Cl.^{5} G02B *6/26;* **B23K** *37/00;* **H05B** *1/00*

U.S. Cl. 350—96.20 14 Claims



1. An optical component for positioning and boding an optical waveguide in alignment with an object, comprising a support base and a common base on which said support base and said object are located; a bonding material attached to said support base for receiving a portion of said optical waveguide such that said optical waveguide is embedded in said bonding material parallel to said portion of the longitudinal axis of said optical waveguide; and an upper body member distinct from said support base for providing a source of heat to said bonding material and having a hollowed-out portion for receiving said bonding material and said optical waveguide embedded therein such that said optical waveguide is attached to said support base together with said bonding material and said upper body member.

5,020,874

METHOD OF AND DEVICE FOR FEEDING A PLURALITY OF OPTICAL WAVEGUIDES INTO A CLAMPING DEVICE

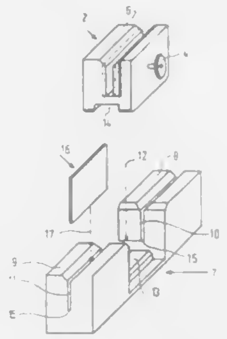
Werner V. Zell, Köln; Johann A. Becker, Overath; Detlef M. Boehm, Neunkirchen-S.; August G. Fröhlich, Köln; Detlef Schade, Köln, and Bernhard R. Goletz, Köln, all of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.

Filed May 4, 1989, Ser. No. 347,592

Claims priority, application Fed. Rep. of Germany, May 6, 1988, 3815459

Int. Cl.^{5} G02B *6/36, 7/26*

U.S. Cl. 350—96.20 16 Claims



1. A method of feeding a plurality of optical waveguides into a clamping device having clamping jaws, the optical waveguides being clamped between said clamping jaws in one plane.

wherein (a) the clamping device is applied by means of form-locking elements in a fixed position at a housing member between two sorting forks of a sorting device having threading channels so that feed-in channels of the sorting forks are in alignment with a take-up channel; (b) the optical waveguides are placed in the sorting forks and in the take-up channel which has previously been widened by loosening the clamping jaws of the clamping device; (c) the optical waveguides are then pressed together by means of insertion of a slide-film material which is inserted into the threading channels and/or the take-up channel so that the clamping action of the clamping jaws causes the optical waveguides to be clamped; and the clamping device is taken from the sorting device together with the optical waveguides inserted therein.

5,020,875

COMMUNICATIONS CABLE HAVING MICROBIAL RESISTANT WATER BLOCKING PROVISIONS

Candido J. Arroyo, Lithonia, and Walter J. Paucke, Tucker, both of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jan. 23, 1990, Ser. No. 468,559

Int. Cl.^{5} G02B *6/44;* **H01B** *7/28*

U.S. Cl. 350—96.23 10 Claims

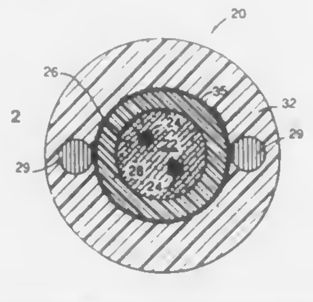
1. A communications cable, which comprises:

a core comprising at least one transmission medium;

a jacket which comprises a plastic material and which encloses said core; and

a longitudinally extending laminate which is disposed about said core between said core and said jacket, said laminate comprising:

two microbial resistant substrate tapes each having a thickness that is controlled to optimize the tensile strength of said each tape and its porosity which is relatively high;



a microbial resistant superabsorbent material being disposed between said tapes and being swellable upon contact with water to block entry of the water into and movement longitudinally along the core; and

an adhesive system which is sufficient to hold together said tapes and to prevent said superabsorbent material from moving through said tapes without inhibiting the swelling of said superabsorbent material upon contact with water.

5,020,876

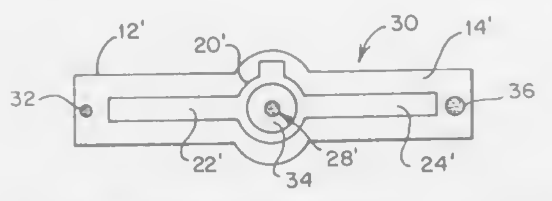
STANDARD REMOTE MANIPULATOR SYSTEM DOCKING TARGET AUGMENTATION FOR AUTOMATED DOCKING

Richard T. Howard, Huntsville; Richard W. Dabney, Toney, and Thomas C. Bryan, Huntsville, all of Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Feb. 20, 1990, Ser. No. 481,538

Int. Cl.^{5} G02B *5/122*

U.S. Cl. 350—102 20 Claims



11. In a standard remote manipulator system docking target comprising laterally extending arm portions and a central post extending outwardly from the plane of said arm portions from the center of the target, the improvement comprising at least three individual reflective areas provided on said target for enabling use of said target by an automated docking system, two of said reflective areas being located at the outboard ends of said arm portions and the third reflective area being located at the free end of said central post.

5,020,877

REAR PROJECTION SCREEN

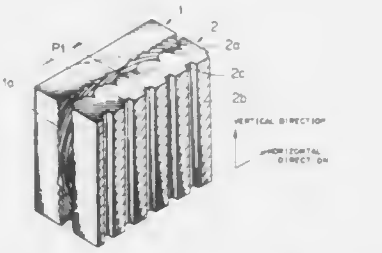
Toru Yokoo; Takashi Kobane; Akihiko Seki; Yasuhiro Yamakawa, and Yoshikazu Kawakami, all of Tokyo, Japan, assignors to Pioneer Electronic Corp., Tokyo, Japan

Filed Apr. 26, 1990, Ser. No. 514,804

Claims priority, application Japan, Nov. 7, 1989, 1-287954

Int. Cl.^{5} G03B *21/60*

U.S. Cl. 350—128 1 Claim



1. A reverse projection screen comprising, in combination, a Fresnel lens and a lenticular lens, characterized in that the pitch ratio P1/P2 between the radial pitch P1 of the concentric annular ridges of the Fresnel lens and the pitch P2 of the lenticulars of the lenticular lens is in the range of 0.1505 to 0.1545 or in the range of 0.176 to 0.181.

5,020,878

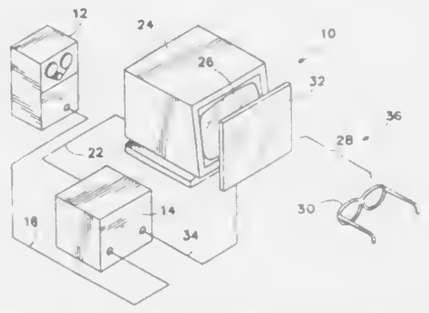
METHOD AND APPARATUS FOR GENERATING A BINOCULAR VIEWING MODEL AUTOMATICALLY ADAPTED TO A SELECTED IMAGE

Daniel A. Brokenshire, Portland; Ronald W. Bryant, Mount Angel; Javad Farjami, Beaverton, and Gary L. Brown, Lake Oswego, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Mar. 20, 1989, Ser. No. 325,843

Int. Cl.^{5} G02B *27/02*

U.S. Cl. 350—133 19 Claims



1. In a stereoscopic graphics display system having a display screen upon which an image is formed in accordance with stereoscopic image data representing right- and left-eye views of an object, the right- and left-eye views differing by a binocular disparity, a method of generating the right- and left-eye views, comprising:

identifying a region that bounds the image;

designating within the region a zero disparity location having a zero disparity axis between the right- and left-eye views; and

limiting the binocular disparity such that corresponding image components in the right- and left-eye views are separated on the display screen by a distance of less than a preselected maximum distance, the preselected maximum distance being selected to provide nominal fusing of the right- and left-eye views into the image.

VOL
1127
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1991
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5,020,879
FLEXIBLE REPLICA GRATING

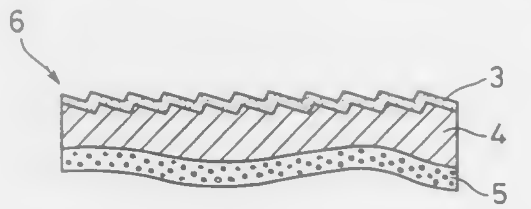
Nobuyuki Kuzuta; Eiichi Hasegawa, and Teiyu Kimura, all of Atsugi, Japan, assignors to Shimadzu Corporation, Kyoto, Japan

Filed Jun. 27, 1988, Ser. No. 212,171

Claims priority, application Japan, Jun. 27, 1987, 62-160220; Jul. 31, 1987, 62-193243

Int. Cl.^{5} G02B *5/18;* **B32B** *27/00*

U.S. Cl. 350—162.17 1 Claim



1. A flexible replica grating comprising:
an outer flexible metal layer having a thickness of substantially 0.1 μm and further having a pair of mutually opposing surfaces each including a zig-zag surface pattern;
an intermediate synthetic resin layer having a thickness in the range of substantially 10–20 μm and comprised of epoxy for supporting said metal layer to maintain the shape of said metal layer when flexed; and
a flexible synthetic resin film having a thickness of substantially 125 μm and comprised of polyimide for supporting said synthetic resin layer.

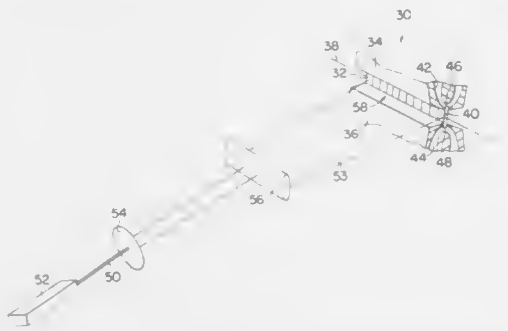
5,020,880
LOW DISTORTION WINDOW FOR USE WITH HIGH ENERGY LASERS

John Bluege, Lake Park, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Mar. 13, 1990, Ser. No. 492,778

Int. Cl.^{5} G02B *5/00*

U.S. Cl. 350—319 19 Claims



1. A window for transmitting radiation distributed over an axis, comprising:
a transmission element means having a width, a length and outer peripheral surfaces, said transmission element means receiving and transmitting said radiation with a portion of the energy thereof absorbed by said transmission element means; and
first and second base members adapted to receive said transmission element means along opposed ones of the peripheral surfaces which are parallel to said axis; said first and second members locating said transmission element means such that said axis is centrally positioned along the length of said transmission element means and dissipating said absorbed energy portion; said transmission element means having a length to width ratio substantially greater than one such that substantially all of said energy portion is transferred to said first and second base members.

5,020,881
LIGHT MODULATING DEVICE WITH OPTICAL SWITCHING UNIT OF LAMINATED INSULATING AND CONDUCTIVE LAYERS

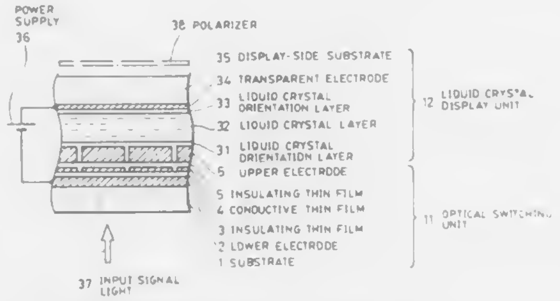
Hiroshi Matsuda, Isehara; Haruki Kawada, Yokohama; Kunihiro Sakai, Isehara; Kiyoshi Takimoto, Kawasaki; Hisaaki Kawade; Yoshihiro Yanagisawa, both of Atsugi, and Yuko Morikawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 26, 1989, Ser. No. 301,476

Claims priority, application Japan, Jan. 26, 1988, 63-13499

Int. Cl.^{5} G02F *1/133*

U.S. Cl. 350—333 64 Claims



13. A light modulating device comprising:
a signal input unit for generating an optical signal;
an optical switching unit comprising a laminated structure provided between a pair of electrodes, wherein said laminated structure comprises a conductive or semiconductive layer provided between a pair of insulating layers; and
a light modulating medium which is responsive to an electric field, wherein the electric field strength which is applied to said light modulating medium is controlled by irradiating or interrupting light incident on said optical switching unit in accordance with an input signal, whereby light modulation corresponding to the input signal can be performed.

5,020,882
ELECTRO-OPTIC ANIMATED DISPLAYS AND INDICATORS

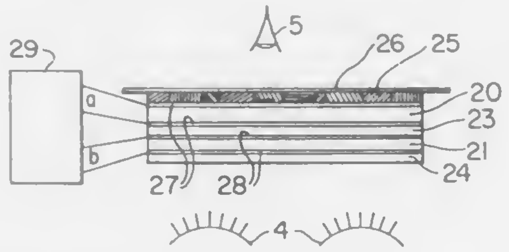
David M. Makow, 14 Davidson Crescent, Gloucester, Ontario, Canada K1J 6M2

Filed Mar. 9, 1988, Ser. No. 165,822

Claims priority, application Canada, Nov. 6, 1987, 551216

Int. Cl.^{5} G02F *1/13;* **B44F** *1/00*

U.S. Cl. 350—335 24 Claims



1. A display device comprising
i) a light source;
ii) a linear polariser for plane polarising light from said source;
iii) at least one first electro-optical cell capable of changing the angle of the plane of polarisation of polarised light emerging from said polariser;
iv) at least one layer of a chromatic polariser;
v) at least one second electro-optical cell capable of changing the angle of the plane of polarisation of the coloured polarised light emerging from said chromatic polariser;
vi) at least one layer mosaic of light polarising means consisting of at least two parts, each part oriented in a different direction of polarisation, located to be illuminated by coloured polarised light emerging from said second electro-optical cell;
vii) a transparent viewing screen carrying information located to be illuminated by said light source directly or from said second cell and said mosaic; said second cell and said mosaic illuminating at least a part of said screen;
viii) means of generating a voltage or voltage waveforms for changing and controlling the angle of polarisation of at least one said cell (iii), and (v), thereby also controlling the pattern and colour of light emerging from said mosaic (vi) which in turn illuminates said information on said screen (vii).

5,020,883
FERROELECTRIC LIQUID CRYSTAL DEVICE

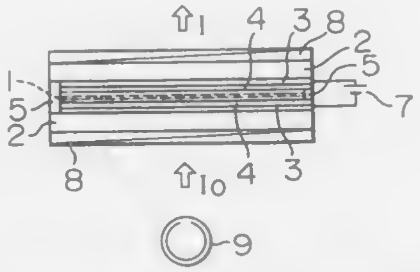
Susumu Era, Hitachi; Kishiro Iwasaki, Hitachiota; Hisao Yokokura, Hitachi; Yasuo Hanawa, Katsuta; Katsumi Kondo, Hitachi; Tadao Nakada; Teruo Kitamura, both of Katsuta, and Akio Mukoh, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 849,382, Apr. 8, 1986, abandoned. This application Oct. 27, 1988, Ser. No. 263,982

Claims priority, application Japan, Apr. 8, 1985, 60-72642

Int. Cl.^{5} G02F *1/13;* **C09K** *19/52*

U.S. Cl. 350—350 S 4 Claims



1. A ferroelectric liquid crystal device which comprises at least one pair of counterposed substrates, a ferroelectric liquid crystal material provided between the substrates, means for applying an electric field to the liquid crystal material and provided at the substrates, an alignment-controlling layer provided on the surface on the liquid crystal material side of each of the substrates, and a sealing member at the peripheral edges of the substrates, the alignment-controlling layer being a film of polyphenylene.

5,020,884
OPTICAL CELL

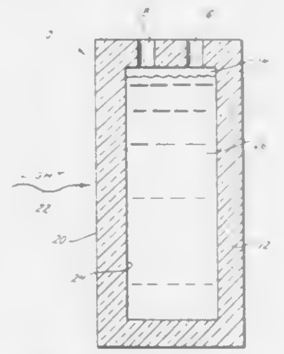
Kenny P. Murphy, Ellisville, Mo., assignor to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Jan. 16, 1990, Ser. No. 466,004

Int. Cl.^{5} G02B *5/23, 5/00, 26/02, 5/24*

U.S. Cl. 350—354 4 Claims

1. An optical shutter, comprising:
a. an outer housing constructed from a material with a certain index of refraction and having an external polished surface for appearing optically clear at a certain frequency to impinging light beams;
b. a cavity contained within the outer housing wherein the cell has inner surfaces which are frosted for diffusing and scattering the impinging light beams at the frosted surface;
c. at least one orifice means for providing a passage between the cavity and an external atmosphere;
d. a fluid contained within the cavity with an index of refraction equal to that of the outer housing for offsetting the diffusing and scattering of the frosted surfaces of the cell to make the optical shutter appear optically clear at a certain frequency; and
e. said fluid having a vaporization coefficient wherein at excessive energy levels the fluids vaporizes and escapes from the orifice such that the high energy light beams are diffused and scattered such that the shutter blocks the high energy light beams.



5,020,885
OPTICAL ELEMENT

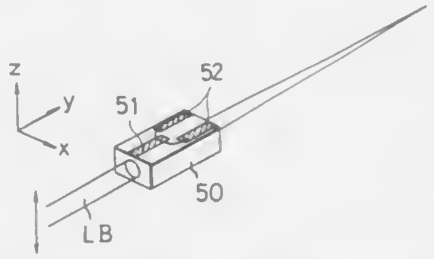
Takashi Shibaguchi, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 8, 1989, Ser. No. 320,613

Claims priority, application Japan, Mar. 10, 1988, 63-56766

Int. Cl.^{5} G02F *1/01, 2/00;* **G02B** *5/30*

U.S. Cl. 350—355 20 Claims



1. An optical element having a lens function, comprising:
an electro-optic medium having a parallelepiped shape and permitting a linearly polarized light beam to pass therethrough;
a pair of electrodes disposed respectively on two opposite surfaces of said electro-optic medium in such a manner as to be opposite to each other, said two opposite surfaces extending along the optical axis of said light beam, each of said electrodes having a shape of rectangle from which a circle is removed from a central portion of said rectangle; and
a power source electrically connected to a pair of electrodes for applying a voltage to a pair of said electrodes.

5,020,886
FRESNEL LENS TYPE COMPLEX REFLECTION SYSTEM HAVING A LENS FUNCTION

Tatsuoki Takeda, and Goro Miyamoto, both of Naka, Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Filed May 15, 1989, Ser. No. 351,664

Claims priority, application Japan, Jul. 5, 1988, 63-167340

Int. Cl.^{5} G02B *5/12*

U.S. Cl. 350—409 4 Claims

1. A complex reflecting system comprising:
a plurality of parabolic reflective surfaces sharing a common

VOL
1127
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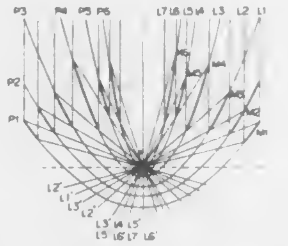
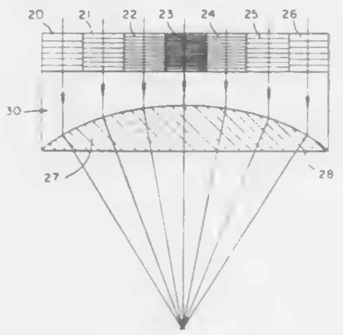
focal point, wherein said common focal point is on a first side of said complex reflecting system;
wherein incident electromagnetic waves impinge on said



plurality of parabolic reflective surfaces from a second side of said complex reflecting system, and wherein said first and second sides are on opposite sides of said complex reflecting system.

5,020,887
CONFORMALLY DOPED OPTICAL ELEMENTS

Anthony J. Orler, Redondo Beach; Lowell M. Hobrock, and Barret Lippey, both of Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.
Filed Sep. 11, 1989, Ser. No. 405,785
Int. Cl.^{5} G02B *3/00*
U.S. Cl. 350—409 18 Claims



1. An optical element comprising at least one flat surface adapted for exposure to incident radiation and, within said element, at least one doped region having a predetermined, desired non-flat shape adapted for exposure to the same incident radiation as said flat surface, said doped region being adapted to reflect, focus, absorb, refract or scatter at least that portion of the incident radiation having wavelengths in a first predetermined, desired range while transmitting radiation having wavelengths in a second, predetermined, desired range.

5,020,888
ASPHERICAL GLASS LENS ELEMENT SUITABLE FOR A COLLIMATOR LENS

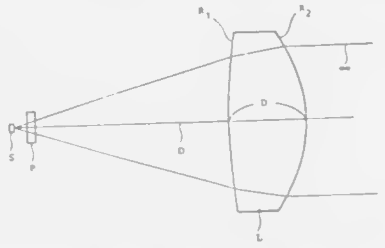
Isao Ishibai, and Hitonobu Otsu, both of Tokyo, Japan, assignors to Hoya Corporation, Tokyo, Japan
Filed Mar. 9, 1990, Ser. No. 491,262
Claims priority, application Japan, Mar. 9, 1989, 1-55052
Int. Cl.^{5} B29D *11/00*
U.S. Cl. 350—432 3 Claims

1. An aspherical glass lens formed by a glass material having a transformation temperature Tg higher than 430° C., said aspherical glass lens having an optical axis, a focal length f, a thickness D along said optical axis, first and second aspherical convex surfaces, a refractive index nd and an Abbe number (ν)d, said first and second aspherical convex surfaces having first and second apexes through which said optical axis passes, first and second of curvature radii r_1 and r_2 at said first and second apexes, and first and second coefficients k_1 and k_2 of cones, respectively, and being determined by first and second predetermined formulae given by:

$$Z_1=(C_1Y^2)/(1+(1-(1+k_1)C_1{}^2Y^2)^{\frac{1}{2}}+E_1Y^4+F_1Y^6+G_1Y^8+H_1Y^{10} \text{ and}$$

$$Z_2=(C_2Y^2)/(1+(1-(1+k_2)C_2{}^2Y^2)_{\frac{1}{2}}+E_2Y^4+F_2Y^6+G_2Y^8+H_2Y^{10}$$

where
Y is representative of an incident height from the optical axis;
Z_1 is representative of a distance between a point placed on the first surface at the incident height Y and a tangential plane which is tangential to the first surface at the apex of the first surface;
Z_2 is representative of a distance between a point placed on the second surface at the incident height Y and a tangential plane which is tangential to the second surface at the apex of the second surface;
C_1 is curvature of the apex of the first surface R_1 and is equal to $(1/r_2)$;
C_2 is curvature of the apex of the second surface R_2 and is equal to $(1/r_2)$;



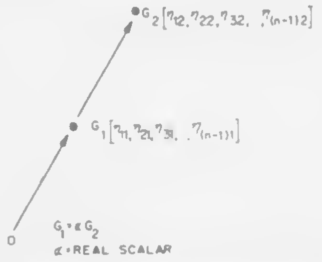
K_1 is representative of a coefficient of cone of the first surface;
K_2 is representative of a coefficient of cone of the second surface;
E_1, F_1, G_1, and H_1 and representative of those aspherical coefficients of the first surface which are proportional to fourth, sixth, eighth, and tenth power of the incident height Y, respectively, and
E_2, F_2, G_2 and H_2 are representative of those aspherical coefficient of the second surface which are proportional to fourth, sixth, eighth, and tenth power of the incident height Y;
where in turn r_1 and r_2 are representative of radii of curvature of the apexes of the first and the second surfaces R_1 and R_2, respectively,
said aspherical glass lens element being defined by the following numerical data:
$f=8.00$, $D=2.6500$, $r_1=5.22265$, $k_1=-0.805713$, $E_1=-0.219176E-3$, $F_1=-0.500459E-4$, $G_1=-0.707755E-5$, $H_1=-0.10231E-6$,, $r_2=-13.31522$, $k_2=-21.871856$, $E_2=-0.978640E-3$, $F_2=-0.752019E-4$, $G_2=-0.127070E-4$, $H_2=0.102635E-5$, $f/D=3.0189$, $r_1/r_2=-0.3922$, $nd=1.497$ and $\nu d=81.6$.

5,020,889
COLOR-CORRECTED OPTICAL SYSTEMS

Romeo I. Mercado, San Jose, and Paul N. Robb, Sunnyvale, both of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.
Continuation of Ser. No. 419,705, Sep. 20, 1982, abandoned. This application Aug. 9, 1989, Ser. No. 393,087
Int. Cl.^{5} G02B *9/62*
U.S. Cl. 350—463 46 Claims

1. A method of selecting optical materials for designing an optical system that is color-corrected at a number of wavelengths, each optical material having a characteristic dispersive power, said method comprising:

a) representing the dispersive power of each optical material by a polynomial expression in a variable that is a function of wavelength, the polynomial expression for each optical material being of a degree that is numerically one less than the number of wavelengths for which color correction is required;
b) comparing a ratio of coefficients in the polynomial expression for one of said optical materials with corresponding ratios of coefficients in the polynomial expressions for others of said optical materials;

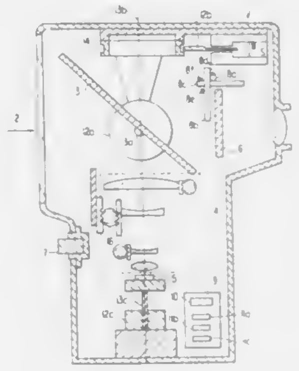


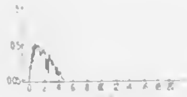
c) identifying particular optical materials from among said others of said optical materials for which said corresponding ratios of coefficients are substantially equal to said ratio of coefficients for said one optical material; and
d) choosing optical materials for designing said system from among those particular optical materials for which said corresponding ratios of coefficients are substantially equal.

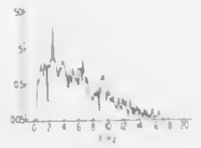
5,020,890
CAMERA APPARATUS WITH FLUCTUATION SUPPRESSING MEANS

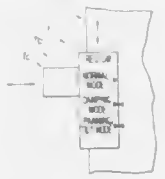
Mitsuaki Oshima, Moriguchi; Masataka Izaki, Yawata; Jirou Kajino, Neyagawa; Yoshiaki Igarashi, Ikoma, and Hiroshi Mitani, Daito, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Division of Ser. No. 886,424, Jul. 17, 1986, Pat. No. 4,856,882, which is a division of Ser. No. 688,154, Dec. 31, 1984, Pat. No. 4,623,930. This application Apr. 12, 1989, Ser. No. 336,909
Claims priority, application Japan, Dec. 29, 1983, 58-251306
Int. Cl.^{5} G02B *27/64, 7/04;* **G03B** *5/00*
U.S. Cl. 350—500 2 Claims

1. A camera apparatus operable in an automatic panning mode in which an image taking direction is smoothly changed in a panning direction, comprising:
focusing means for optically focusing a beam of light from an object to form an optical image of the object;
imaging means, optically coupled to said focusing means, for converting the optical image into electrical or physicochemical information and issuing or recording the information as an image;
fluctuation detecting means for detecting an angular velocity of a fluctuation of said camera apparatus and issuing a fluctuation detecting signal indicative of the thus detected angular velocity;
control signal issuing means, responsive to the fluctuation detecting signal, for issuing an image fluctuation control signal; and,
fluctuation suppressing means, responsive to the image fluctuation control signal, for changing an image taking direction so as to suppress a fluctuation of the image due to the fluctuation of said camera apparatus,
wherein said control signal issuing means comprises: (a) constant signal generating means for generating a specific constant signal in the automatic panning mode; (b) adding means for adding the specific constant signal and the fluctuation detecting signal; and, (c) means for integrating an output signal of the adding means to obtain the image fluctuation control signal;
wherein said fluctuation suppressing means includes means for changing the image taking direction substantially at a constant angular velocity proportional to the specific









constant signal with respect to an absolute coordinate system in the automatic panning mode.

5,020,891
SINGLE APERTURE CONFOCAL SCANNING BIOMICROSCOPE AND KIT FOR CONVERTING SINGLE LAMP BIOMICROSCOPE THERETO

Jeffrey W. Lichtman, St. Louis; Jay S. Pepose, Town & Country, and Rakhal Dave, St. Louis, all of Mo., assignors to Washington University, St. Louis, Mo.
Continuation-in-part of Ser. No. 243,353, Sep. 14, 1988, Pat. No. 4,884,880, and Ser. No. 243,354, Sep. 14, 1988, Pat. No. 4,884,881. This application Dec. 5, 1989, Ser. No. 446,312
Int. Cl.^{5} G02B *21/06, 21/00, 26/02*
U.S. Cl. 350—527 49 Claims

1. In a device having means for producing a confocal image of a desired object positioned at an object plane, the improvement comprising a light source having means for producing non-collimated light, means for collimating a substantial portion of the light from said light source in at least one orientation into a light field, and means for focusing a substantial

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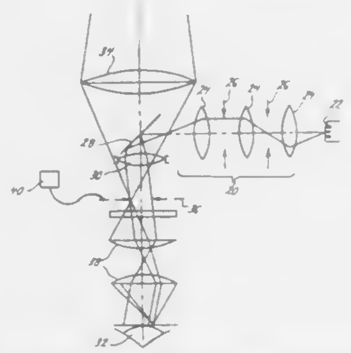
portion of said collimated light field into an aperture shaped beam at a field plane conjugate to the object plane so that as the



focusing means is moved the aperture shaped beam confocally scans the object.

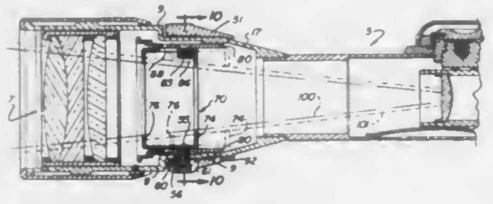
5,020,892
APERTURE CONTROL FOR TELESCOPIC GUNSIGHT

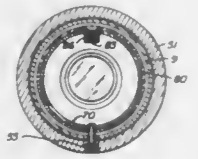
Larry A. Glover, Fort Collins; John P. McCarty, Greeley, and Donald J. Burris, deceased, late of Greeley, all of Colo. by Shirley C. Burris, United Bank of Greeley, co-personal representatives , assignors to Burris Company, Inc., Greeley, Colo.

Filed Sep. 25, 1989, Ser. No. 411,676

Int. Cl.^{5} G02B *23/00;* **F41G** *1/38*

U.S. Cl. 350—537 5 Claims





1. In a rifle scope having a tubular housing barrel with enlarged end portions, and optical axis defined by an optical system including objective lens means disposed in the enlarged front end thereof, eyepiece lens means disposed in the enlarged other end thereof and erector lens means intermediate the said two ends and an optical aperture along said optical axis, the improvement which comprises;

variable optical aperture forming means for varying the size of said optical aperture,

cylindrical guide means secured interiorly of the barrel and carrying the variable optical aperture forming means and having a circumferentially extending slot,

a rotatable setting ring carried by and disposed exteriorly of the barrel and having an inwardly radially directed actuating pin which passes through the barrel and through the circumferential slot of the guide means and operatively engages the variable optical aperture forming means to vary the light passing capacity of the barrel in response to rotation of the setting ring,

sealing means disposed between the setting ring and the barrel for and aft of the actuating pin.

5,020,893
BICONVEX ROD LENS

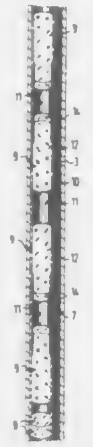
Siegfried Karst, Eislngen; Wilfried Uhrich, Oberderdingen-Flehingen, and Rolf Zickwolf, Bretten-Rinklingen, all of Fed. Rep. of Germany, assignors to Richard Wolf, GmbH, Fed. Rep. of Germany

Filed Nov. 13, 1989, Ser. No. 434,356

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1988, 3839364

Int. Cl.^{5} G02B *23/16*

U.S. Cl. 350—573 15 Claims



1. A biconvex rod lens for an optics assembly of an endoscope, the rod lens comprising a light transmitting rod, a correcting lens connected to an end of the rod by means of a cemented joint and at least one cylindrical collar for supporting the rod lens on an inner surface of an internal tube of said assembly, each collar having a greater diameter about the rod than the parts of the rod adjacent to the collar, both the correcting lens and the rod in the region of the cemented joint being of a smaller diameter than the diameter of the collar.

5,020,894
EYEPIECE AND LENS CAP FOR A SIGHTING TELESCOPE

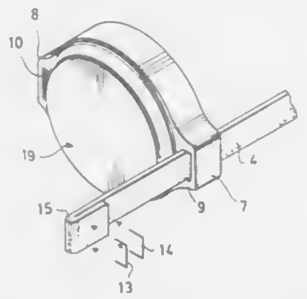
Adolf Weyrauch; Bernd Dorband, and Ferdinand Schlipf, all of Aalen, Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Fed. Rep. of Germany

Filed Jul. 23, 1990, Ser. No. 557,330

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1989, 8908923[U]

Int. Cl.^{5} G02B *23/16*

U.S. Cl. 350—587 3 Claims



1. In a combination lens cap and eyepiece cap for a sighting telescope, said caps each having a front side and an axially-extending skirt portioned proportioned to surround and cover the lens end and the eyepiece end, respectively, of the telescope, said caps being connected to each other by bands, the improvement wherein:

the axially-extending skirt portion of each of said caps includes lateral extensions, each lateral extension being provided with an axially-oriented rectangular channel therethrough, the size of each said rectangular channel opening in proximity to the front side of the cap being larger than the size of the opening at its opposite end, While the smaller end of said channel is proportioned to permit one end of one of said resilient bands to be tightly threaded therethrough;

each end portion of each of said resilient bands extending through a respective one of said channels being folded over, and being secured to itself to form a thickened endpiece; and

each thickened endpiece being positioned within its respective channel.

5,020,895
LASER MIRROR HEAD

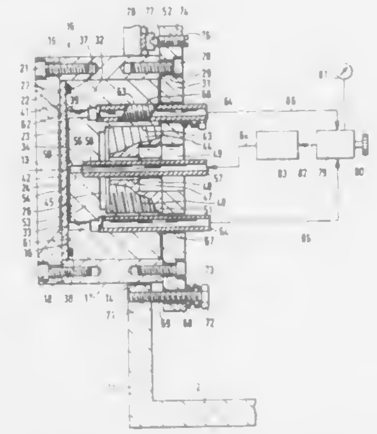
Adolf Giesen, Fröbelstr. 60, 7253 Renningen; Martin Bea, Allmandring 18 A, 7000 Stuttgart 80, and Stefan Borik, Edelweissstr. 13, 7022 Leinfelden-Echterd. 1. all of Fed. Rep. of Germany

Filed Jan. 9, 1990, Ser. No. 462,602

Claims priority, application Fed. Rep. of Germany, Jan. 10, 1989, 3900467

Int. Cl.^{5} G02B *7/18, 5/10*

U.S. Cl. 350—608 20 Claims



1. In an apparatus for a mirror head of high power lasers, comprising

a metallic mirror having a reflective front side with an exposed central region, a rear side and an outer rim,

a first pressure-bearing surface for the front side near the outer rim of the mirror,

a second pressure-bearing surface for the rear side near the outer rim of the mirror, and

a fluid line arrangement in a region of the mirror head remote from the mirror,

the improvement wherein:

(a) the mirror is a disc that is thin in relation to the diameter of its exposed central area,

(b) a hollow space is provided in the mirror head on the rear side of the mirror so that the central region of the mirror is free to bend perpendicular to the front side, both toward the front side and toward the rear side, and

(c) the hollow space communicates with the fluid line arrangement.

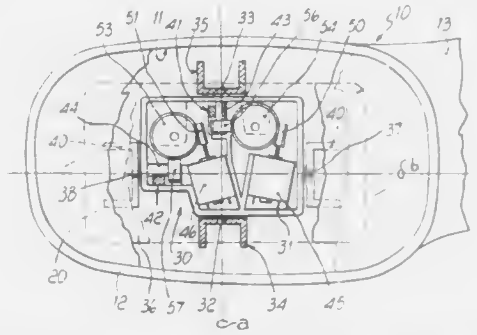
5,020,896
REVERSIBLE ELECTROMECHANICAL DEVICE FOR REMOTELY CONTROLLING THE ORIENTATION OF THE REFLECTING SURFACE OF REAR-VIEW MIRRORS FOR MOTOR VEHICLES

Piercarlo Vercesi, Pavia; Claudio Davico, Grugliasco, and Gerardo Giorgini, Moncalieri, all of Italy, assignors to Foggini Progetti S.r.l., Beinasco, Italy

Filed May 30, 1989, Ser. No. 358,914

Int. Cl.^{5} G02B *7/18;* **B60R** *1/06*

U.S. Cl. 350—636 8 Claims



1. An electromechanical device for remotely controlling the orientation of a reflecting surface of rearview mirrors for motor vehicles, said device comprising a frame means for oscillably supporting the reflecting surface, said frame means being connected to a body means which is rigidly connectable to a motor vehicle, said frame means comprising a first frame portion pivoted to said body means about a first oscillation axis, said frame means further comprising a second frame portion for rigidly supporting the reflecting surface, said second frame portion being pivoted to said first frame portion about a second oscillation axis, said first and second oscillation axes being mutually orthogonal oscillation axes, said device further comprising a first rod means and a second rod means, said first rod means being rigidly connected to said body means and being arranged eccentrically to said first oscillation axis, said second rod means being rigidly connected to said second frame portion and being arranged eccentrically to said second oscillation axis, said device further comprising a first actuation roller means, a second actuation roller means, and at least one electric motor means for rotating said actuation roller means, said first actuation roller means being interposed between said first rod means and said first frame portion, said second roller means being interposed between said second rod means and said first frame portion, whereby said first actuation roller means co-operate in contact engagement with said first rod means when said motor means rotates said first actuation roller means to thereby cause a relative movement of said first rod means with respect to said first actuation roller means which in turn causes a relative rotation of said first frame portion with respect to said body means, and whereby said second actuation roller means co-operate in contact engagement with said second rod means when said motor means rotates said second actuation roller means to thereby cause a relative movement of said second rod means with respect to said second actuation roller means which in turn causes a relative rotation of said second frame portion with respect to said first frame portion means.

5,020,897
MIRRORED DEVICE FOR EYE DROP USERS

Richard D. Frye, 3324 Lakeside Cir., Parrish, Fla. 34219

Filed May 25, 1990, Ser. No. 529,215

Int. Cl.^{5} G02B *7/18*

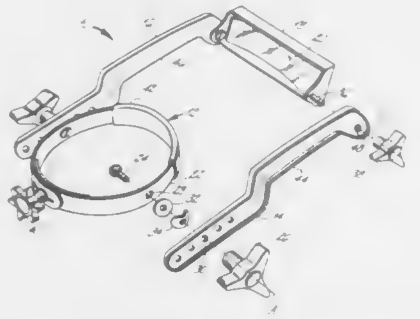
U.S. Cl. 350—638 6 Claims

1. A portable mirrored device for eyedrop and contact lens users comprising:

a headband formed to snugly fit around the user's head;

VOL
1127
ISS
1
JE
4
1991
UMI

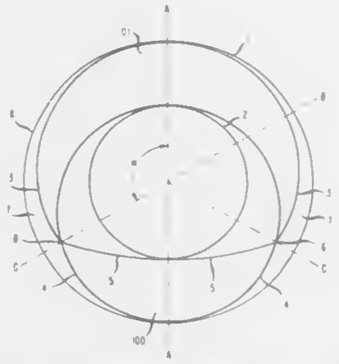
an elongated extension arm pivotally connected at one end to either side of, and forwardly extending from, said headband about a first transverse axis;
pivotal connection means, connecting said headband to each said extension arm, for permitting at least 90° of pivotal motion through a central position wherein said extension arms forwardly extend from said headband;
a transverse mirror housing pivotally connected at each end between the other ends of each said extension arm about a second transverse axis which is generally parallel to and forwardly spaced from said first axis;



said mirror housing having a mirrored rearwardly facing surface;
each said extension arm, said mirror housing, and said pivotal connection therebetween, and said pivotal connection means between said headband and each said extension arm cooperatively structured and arranged to allow the user to view his or her eyes on said mirrored surface as eye medication and contact lenses are placed into the eyes.

5,020,898
CONTACT LENS FOR CORRECTION OF ASTIGMATISM

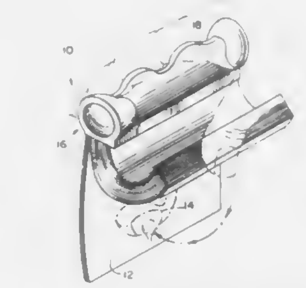
Malcolm Townsley, Park Ridge, Ill., assignor to Schering Corporation, Kenilworth, N.J.
Filed Jan. 29, 1990, Ser. No. 471,563
Int. Cl.⁵ G02C *7/04*
U.S. Cl. 351—160 R 21 Claims



1. A contact lens of general concavo-convex configuration having improved rotational stability and rotational orientation wherein the anterior surface of said lens comprises a central optical zone and an outer carrier having a generally tapered surface with a thin portion at the upper edge of the lens and two points of maximum thickness located at oblique angles, α, of about 110° to about 130° as measured from the vertical axis from the top of the lens; the anterior surface of said lens being symmetrical about the vertical axis, the carrier tapering from the points of maximum thickness to a thin portion located at the top of the lens and a thin portion located at the lower edge of the lens in a smooth curve and the carrier tapering in a smooth curve along the vertical axis from the optical zone to the bottom of the lens.

5,020,899
HAND GRIP FOR A SEQUENTIAL CARD PACK DISPLAY DEVICE

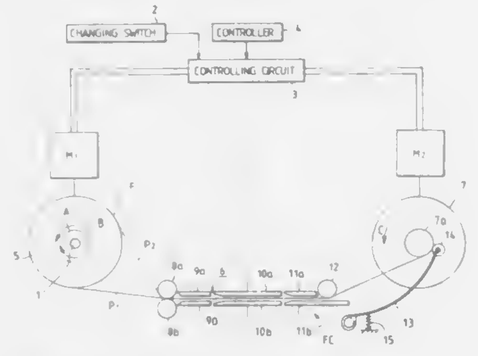
Hoite C. Caston, 3589 Multiview Dr., Hollywood, Calif. 90068
Filed Dec. 13, 1989, Ser. No. 449,763
Int. Cl.⁵ G03B *25/00*
U.S. Cl. 352—99 7 Claims



1. In combination with a card pack display device including a plurality of pictures showing a series of incremental movements of a body in motion, the pictures being connected together at one end thereof, the opposite end of said pictures being flexible to permit a user to flip the said opposite end with the fingers for sequential viewing of said pictures to produce an illusion of motion wherein the improvement comprises:
a grip device attached to said one end of said card pack display device characterized by a plurality of contoured depressions on said upper surface to accommodate the fingers of a user to facilitate the flipping of the cards by the fingers.

5,020,900
FILM FEEDING APPARATUS

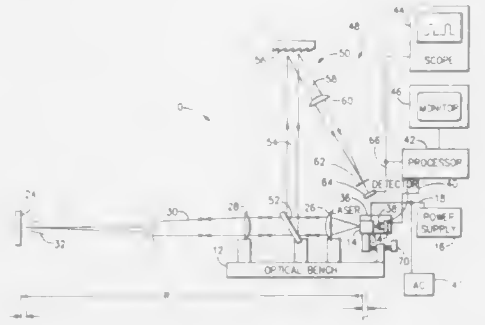
Minoru Sashida, Yokohama; Masaaki Yanagi, Tokyo; Katsuhiko Okitsu, and Hirokazu Higuchi, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 7, 1989, Ser. No. 432,585
Claims priority, application Japan, Nov. 7, 1988, 63-281003; Nov. 7, 1988, 63-281005
Int. Cl.⁵ G03B *23/12*
U.S. Cl. 353—26 R 17 Claims



13. A film projecting system comprising:
illuminating means for illuminating a film;
optical means for projecting an image on the film illuminated by said illuminating means onto a projection surface; and
a film feeding unit removably mounted on a predetermined position, said film feeding unit including a driving shaft for removably holding a reel carrying a roll film, driving means for rotating said driving shaft in a normal or reverse direction, feeding means for feeding the film from the reel held by said driving shaft to take-up means, detecting means for detecting a rotational direction of the reel while the film is being fed from the reel to said take-up means by said feeding means, and control means for controlling said driving means to change a rotational direction of said driving shaft on the basis of an output from said detecting means when the film is rewound on the reel.

5,020,901
MULTIMODE LASER DIODE SYSTEM FOR RANGE MEASUREMENT

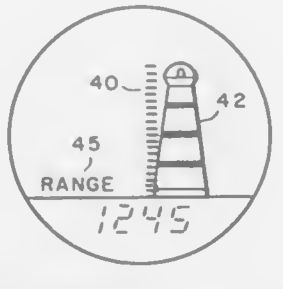
Peter de Groot, Bethel, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.
Filed Jan. 30, 1990, Ser. No. 472,973
Int. Cl.⁵ G01C *3/08;* **G01B** *9/02*
U.S. Cl. 356—5 38 Claims



1. A laser system for precision measurement of small changes in the range of a target object, comprising a multimode laser diode, power supply means for providing a DC driver current to the laser diode so as to produce laser emission with a plurality of optical frequencies each corresponding to a separate lasing mode and having a corresponding mode power, positioning means for positioning the laser diode at a range from a target, beaming means for directing a beam of the emission to the target so as to allow backscatter therefrom to return into the laser diode and thereby modify the emission, modulation means for generating a modulation frequency in the emission so as to effect oscillatory mode transitions at the modulation frequency and thereby create an amplitude modulation in mode power for a selected mode such that the amplitude modulation varies cyclically through changes in the range, detector means receptive of emission at the optical frequency for the selected mode for detecting the amplitude modulation thereof and producing a detector signal representative thereof, and analyzing means receptive of the signal for relating the amplitude modulation to an incremental change in the range.

5,020,902
RANGEFINDER WITH HEADS-UP DISPLAY

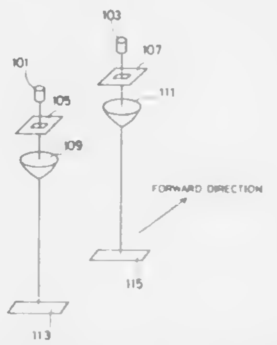
Martin A. Kits van Heyningen, Newport, R.I., and Robert C. Randall, Westport, Mass., assignors to KVH Industries, Inc., Middletown, R.I.
Filed Jun. 22, 1989, Ser. No. 370,342
Int. Cl.⁵ G01C *3/06*
U.S. Cl. 356—21 13 Claims



1. A rangefinder comprising:
a digital display;
means for viewing an object having a known dimension (D) located at a point to which a range determination is to be made, said viewing means including means for focusing an image of said object at said display;
processing means;
means for inputting said known dimension to said processing means;
means responsive to user input for generating a reticle on said display, said reticle being formed of display segments of predetermined size in said dimension, said reticle generating means including means responsive to a first user input for increasing the number of said segments, and means responsive to a second user input for decreasing the number of said display segments, the number of said display signals in said dimension after said user inputs being proportional to the extent of said image in said dimension;
means for inputting the number of display segments in said dimension to said processing means;
said processing means including means responsive to said known dimension and said number of display segments for determining the range to said point.

5,020,903
OPTICAL CORRELATION-TYPE VELOCITY MEASUREMENT APPARATUS

Satoshi Sakai, and Kazuteru Maekawa, both of Anjo, Japan, assignors to Aisin AW Co., Ltd., Anjo, Japan
Filed Dec. 27, 1988, Ser. No. 290,341
Claims priority, application Japan, Dec. 28, 1987, 62-333042; Dec. 28, 1987, 62-333043; Dec. 28, 1987, 62-333044
Int. Cl.⁵ G01P *3/36*
U.S. Cl. 356—28 12 Claims



5. An optical correlation-type velocity measurement apparatus comprising:
processing means to which is inputted detection signals from two sensors arranged one in front of the other in a direction of movement;
a light source for irradiating a road surface with light; and
means controlled by the processing means for turning the light source on and off;
said processing means computing a correlation function of the detection outputs of the two sensors and determining velocity from a stagger time for which a correlation function value is maximized, and determining a coefficient of friction of the road surface from a difference between the detection outputs of said sensors when said light source is turned on and off.

VOL
1127
ISS
1
JE
4
1991
UMI

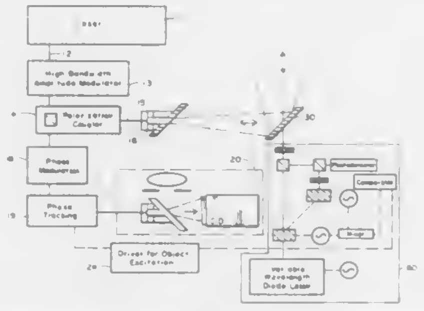
5,020,904
DYNAMIC LASER SPECKLE PROFILOMETER AND METHOD

Robert K. McMahan, Jr., 103 Laurel Hill Circle, Chapel Hill, N.C. 27514

Filed Sep. 6, 1989, Ser. No. 403,733

Int. Cl.^{5} G01B *9/02*

U.S. Cl. 356—35.5 **16 Claims**


Laser
12
High Bandwidth Amplitude Modulator
13
Polarization Coupler
19
18
30
20
Phase Modulation
Phase Tracking
Driver for Object Excitation
28
Variable Wavelength Diode Laser
80

1. A dynamic laser speckle profilometer comprising:
a laser for generating a laser beam;
an electro-optic amplitude modulator;
a beam splitting coupler for splitting the beam of said laser into first and second beams;
an first spatial filter positioned in the path of said first beam;
projection means for projecting said first beam from said first spatial filter;
an electro-optic phase modulator to increment the phase of said second beam relative to said first beam;
a second spatial filter located for said second beam to pass through;
combining optics means for combining said first and second beams;
camera means for forming an image from said combined first and second beams; and
processing means for producing a phase map of the image signals from said combined beams imaged from said camera.

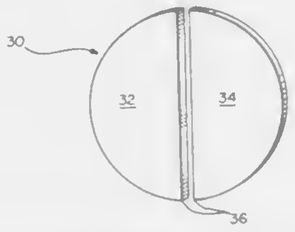
5,020,905
APPLICATION OF THE FOUCAULT KNIFE-EDGE TEST TO A SEGMENTED OPTIC

Thomas W. Dey, Springwater; Edward M. Granger, Rochester; Donald E. Vandenberg, Brockport; John G. Pitek, and William D. Humbel, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 27, 1990, Ser. No. 485,413

Int. Cl.^{5} G01B *9/00*

U.S. Cl. 356—124 **6 Claims**



1. An improved Foucault knife-test, the test comprising:
(1) providing an optical assembly, the optical assembly comprising:
(a) A segmented optic capable of imaging radiation; the optic comprising at least two physically decoupled rigid body monolithic imaging devices having respective individual and disjoint entrance pupil contributions aggregated in sum to form a common entrance pupil;
(b) a source of radiation direction along a reference axis to the segmented optic; and
(c) a detection means aligned on the reference axis, for detecting the radiation imaged by the segmented optic;
(2) introducing a knife-edge into the optical assembly, for gradually cutting the radiation imaged by the segmented optic, thereby producing a variable radiation pattern for detection by the detection means; and
(3) aligning the rigid body devices, using the detected variable radiation pattern to emulate a monolithic optic having a non-disjoint and contiguous single entrance pupil.

5,020,906
BORESIGHT MODULE

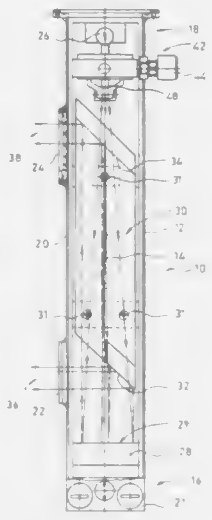
Ofer Paz, Jerusalem, Israel, assignor to Aryt Optronics Industries Ltd., Jerusalem, Israel

Filed Aug. 16, 1989, Ser. No. 411,413

Claims priority, application Israel, Aug. 28, 1988, 87577

Int. Cl.^{5} G01B *11/26*

U.S. Cl. 356—138 **19 Claims**



1. A boresight module comprising:
a housing defining an optical axis and having a day optical window and a night optical window;
a source of sensible radiation located along said optical axis;
a collimator mounted in association with said housing operative to receive beams of radiation emitted by said radiation source and to reflect said beams parallel to said optical axis; and
an optical assembly formed of a single piece of material located within said housing and comprising first and second optical surfaces in respective optical association with said day and night optical windows and positioned so as to receive said reflected beams such that a first plurality of said beams is deflected by said first optical surface through said day optical window and a second plurality of said beams is deflected by said second optical surface through said night optical window.

5,020,907
AXIS OFFSET MEASURING DEVICE

Hiroyuki Ibe, Nyu, Japan, assignor to Shin-Etsu Handotai Company, Limited, Tokyo, Japan

Filed Oct. 27, 1989, Ser. No. 427,428

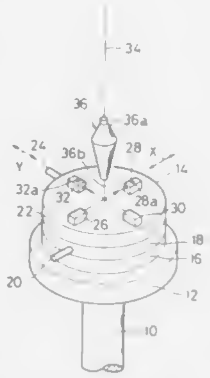
Claims priority, application Japan, Oct. 28, 1988, 63-273942

Int. Cl.^{5} C30B *15/00;* **G01D** *11/27*

U.S. Cl. 356—153 **6 Claims**

1. A center axis offset measuring device for use in a single crystal production apparatus based upon Czochralski method, comprising:

a crucible rotary shaft (**10**);
a table (**12**) fixed to the upper end of said crucible rotary shaft (**10**);
a base member (**16**, **16**A, **16**B) mounted on said table (**12**) such that the central axis of said crucible rotary shaft passes through a reference point on said base member (**16**, **16**A, **16**B);
a weight suspended from a wire (**34**) and having a linear thin member (**36***b*, **36***c*) emerging from the lower end thereof,



said linear thin member having an axis which coincides with the central axis of said wire when said weight is freely suspended from said wire (**34**);
optical position detection means disposed on said base member (**16**, **16**A, **16**B) and capable of detecting the position of said linear thin member with respect to said reference point within a plane perpendicular to the axis of said linear thin member; and
means for displaying the detected position.

5,020,908
APPARATUS FOR THE OPTICAL DETECTION OF FLAWS, IN PARTICULAR CRACKS IN TRANSPARENT OBJECTS

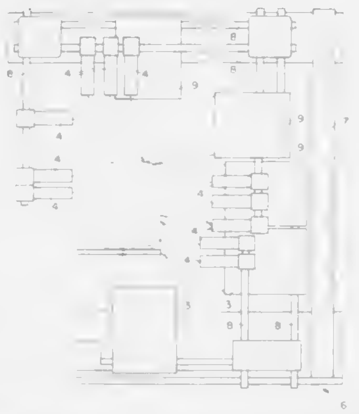
Peter Hermann, Haldenstrasse 33, 2555 Brügg/Biel, Switzerland

Continuation of Ser. No. 931,519, Nov. 14, 1986, abandoned. This application Mar. 30, 1990, Ser. No. 503,131

Claims priority, application European Pat. Off., Nov. 15, 1985, 85810544.8

Int. Cl.^{5} G01N *21/90*

U.S. Cl. 356—239 **24 Claims**



1. An apparatus for detecting by optical means, flaws such as cracks throughout transparent objects, comprising,
a plurality of radiation sources,
a plurality of detectors arranged in detector groups disposed around the surface of the transparent object in a vertical strip and having several sensitivity levels, each of the detectors being capable of detecting radiation emitted from a plurality of said radiation sources, the detectors and radiation sources forming independent electro-optical channels,
detecting means for detecting flaws in the transparent objects through adjustment of the sensitivity levels of each of the detector groups, the sensitivity level of each detector group being able to be independently controlled,
switching means for switching through a series of independent electro-optical channels sequentially and periodically, each electro-optical channel comprising the emission of an impulse from at least one of said plurality of radiation sources and the detection of the impulse by at least one of said detectors, the switching means including means for adjusting the sensitivity level of each detector after each impulse,
evaluation means for evaluating the independent electro-optical channels for flaws in the transparent objects through the independently controlled detector groups,
support means for supporting the radiation sources and detector groups, and
transport means for transporting the transparent object.

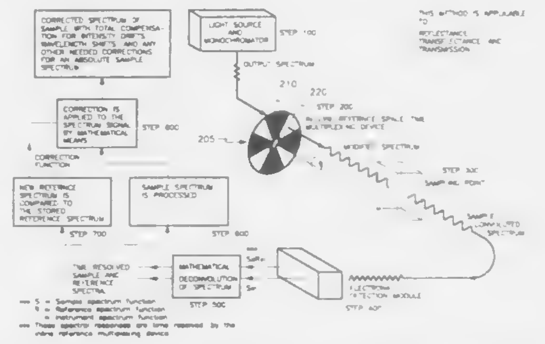
5,020,909
"IN-LINE" SPECTRAL REFERENCE METHOD FOR SPECTROMETERS

Issac J. Landa, 7616 Fontaine St., Potomac, Md. 20854

Filed Mar. 2, 1990, Ser. No. 487,041

Int. Cl.^{5} G01J *3/42*

U.S. Cl. 356—300 **1 Claim**

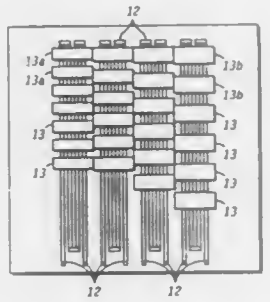

CORRECTED SPECTRUM OF SAMPLE WITH TOTAL COMPENSATION FOR INTENSITY DRIFTS WAVELENGTH SHIFTS AND ANY OTHER NEEDED CORRECTIONS FOR AN ABSOLUTE SAMPLE SPECTRUM
LIGHT SOURCE AND MONOCHROMATOR
STEP 100
THIS METHOD IS APPLICABLE TO REFLECTANCE TRANSFLECTANCE AND TRANSMISSION
OUTPUT SPECTRUM
210
220
STEP 200
CORRECTION IS APPLIED TO THE SPECTRUM SIGNAL BY MATHEMATICAL MEANS
STEP 800
205
CORRECTION FUNCTION
STEP 300
SAMPLING POINT
NEW REFERENCE SPECTRUM IS COMPARED TO THE STORED REFERENCE SPECTRUM
SAMPLE SPECTRUM IS PROCESSED
STEP 700
STEP 600
SAMPLE CONVOLUTED SPECTRUM
TIME RESOLVED SAMPLE AND REFERENCE SPECTRA
MATHEMATICAL DECONVOLUTION OF SPECTRUM
STEP 500
ELECTRONIC DETECTION MODULE
STEP 400

1. An in-line spectral method adapted for use with a single-beam references spectrometer scanning a sample, the method comprising the steps of:
(a) scanning a sample with a single-beam spectrometer;
(b) rotating a filter wheel in synchronization with the single-beam spectrometer of step (a), said wheel having open segments alternating with segments comprising reference material, said reference material being largely transparent with a predetermined absorption spectrum, said wheel placed in the optical path of the spectrometer;
(c) producing with step (b) alternate spectral scans as follows:
(i) of the spectrometer and the sample, and
(ii) of the spectrometer, the sample and said reference material;
(d) comparing said spectral scans of step (c) in order to extract the spectrum of said reference material; and
(e) using said extracted spectrum for real-time, dynamic spectral compensation to result in absolute correct sample spectrum.

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,910
MONOLITHIC DIFFRACTION SPECTROMETER

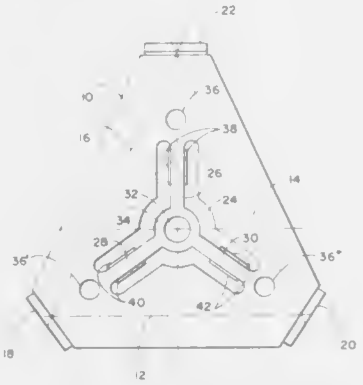
William C. Dunn, Mesa, and Stuart T. Langley, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 5, 1990, Ser. No. 488,158
Int. Cl.^{5} G01J *3/18, 3/36*
U.S. Cl. 356—328 10 Claims



1. A spectrometer comprising: a semiconductor substrate; an array of light sensing devices formed in the substrate; and an opaque diffraction grating formed on the substrate wherein the diffraction grating has a variable pitch.

5,020,911
RING LASER GYRO COMPRISING ROTARY OSCILLATION APPARATUS

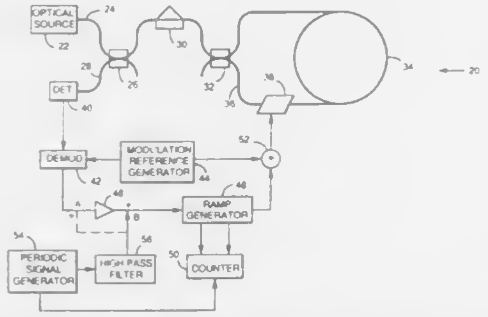
Rolf Gauert, Alzenau, and Werner Hansli, Alsbach, both of Fed. Rep. of Germany, assignors to Honeywell Regelsysteme GmbH, Fed. Rep. of Germany
Filed May 25, 1990, Ser. No. 529,160
Claims priority, application Fed. Rep. of Germany, Jun. 2, 1989, 3918049
Int. Cl.^{5} G01C *19/64*
U.S. Cl. 356—350 17 Claims



1. A ring laser gyro comprising a block of gas-tight material, respectively having a low temperature expansion coefficient with said block comprising bores to provide a closed laser path and further comprising means to oscillate said block with said means comprising spokes between a stationary inner portion and a movable outer potion, wherein said spokes are formed by a removal of material from said laser block so as to form an integral component of said laser block.

5,020,912
FIBER OPTIC ROTATION SENSING SYSTEM AND METHOD FOR BASING A FEEDBACK SIGNAL OUTSIDE OF A LEGION OF INSTABILITY

George A. Pavlath, Thousand Oaks, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.
Filed Feb. 3, 1989, Ser. No. 305,621
Int. Cl.^{5} G01B *9/02*
U.S. Cl. 356—350 26 Claims



1. A fiber optic rotation sensing system that produces a signal indicative of the phase difference of two counterpropagating waves in a fiber optic sensing coil to measure the rotation rate of the sensing coil, comprising:

means for modulating the counterpropagating waves with a reference signal;

means for demodulating the signal indicative of the phase difference of two counterpropagating waves with the reference signal;

means for forming a feedback circuit to carry a feedback signal from the demodulating means to the modulating means, the feedback signal having a region of instability, the feedback circuit including:

generator means for driving the modulating means to null the phase difference between the counterpropagating waves;

means for adjusting the feedback signal with a periodic signal having a zero mean value to maintain a current in the feedback circuit outside the region of instability; and

means for processing signals output from the generator means for determining the rotation rate of the sensing loop.

5,020,913
FIBER OPTIC GYRO WITH TEMPERATURE COMPENSATED PHASE RAMP

Kenichi Okada, Tokyo; Shu Tanigawa, Fukuoka, and Masashi Nishino, Tokyo, all of Japan, assignors to Japan Aviation Electronics Industry Limited, Tokyo, Japan
Filed Mar. 22, 1990, Ser. No. 497,307
Claims priority, application Japan, Mar. 23, 1989, 1-72764
Int. Cl.^{5} G01B *9/02*
U.S. Cl. 356—350 8 Claims

1. A fiber optic gyro comprising:

an optical fiber coil;

a light source;

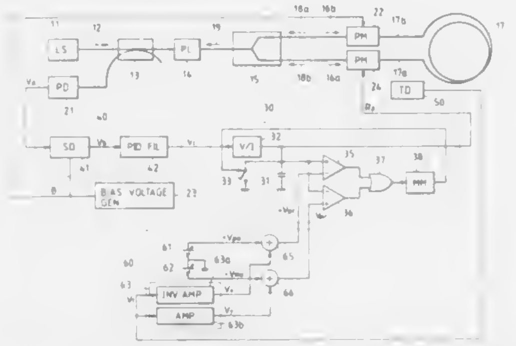
optical splitter/coupler means whereby light from said light source is split into two for input into said optical fiber coil at opposite ends thereof respectively, and said two rays of light having propagated through said optical fiber coil in opposite directions and output therefrom are caused to interfere with each other;

photodetector means for detecting said interference light output from said optical splitter/coupler means;

a phase modulator disposed between said optical splitter/-coupler means and one end of said optical fiber coil;

ramp voltage generating means for generating a ramp voltage for phase modulation use which is applied to said phase modulator;

phase difference detect and control means for detecting from the output of said photodetector means the phase difference between said two rays of light output from said optical fiber coil which interfere with each other in said optical splitter/coupler means and whereby the polarity and frequency of said ramp voltage to be generated by said ramp voltage generating means are controlled according to said phase difference detected output so that said phase difference is 2 mπ rad (where m=0, ±1, ±2, . . .);

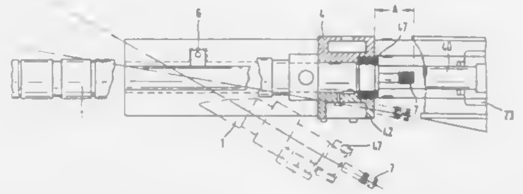


temperature sensor means for sensing the temperature of said fiber optic gyro; and

peak value control means supplied with the output of said temperature sensor means, for controlling the peak value of said ramp voltage according to said output of said temperature sensor means so that a maximum phase shift of light in said phase modulator is an integral multiple of 2π rad regardless of the temperature of said fiber optic gyro when said gyro temperature stays within a predetermined temperature range.

5,020,914
PROCESS FOR REMOVING THE SCREW FROM THE SCREW CYLINDER OF A SCREW-TYPE INJECTION MOLDING MACHINE AND A SCREW-TYPE MOLDING MACHINE OF CORRESPONDENCE CONFIGURATION

Ernst Würl, Höttingen; Alfred Hafner, Fürth; Jürgen Paulsen, Nuremberg; Peter Marienfeld, Hersbruck, and Bruno Grögor, Leinburg, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Dusseldorf, Fed. Rep. of Germany
PCT No. PCT/DE87/00463, § 371 Date Jun. 19, 1989, § 102(e) Date Jun. 19, 1989, PCT Pub. No. WO88/04605, PCT Pub. Date Jun. 30, 1988
PCT Filed Oct. 10, 1987, Ser. No. 382,786
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1986, 3643884
Int. Cl.^{5} B29B *1/04*
U.S. Cl. 366—79 12 Claims



1. A screw-type injection molding machine comprising:

a base frame;

an injection unit supported by said base frame, said injection unit including a screw cylinder, a screw which is rotatably and axially displaceably mounted within said screw cylinder and a drive device for driving said screw, said drive device being positioned axially behind said screw cylinder, said screw cylinder and said drive device being axially displaceable with respect to each other;

a carriage movably mounted to said base frame;

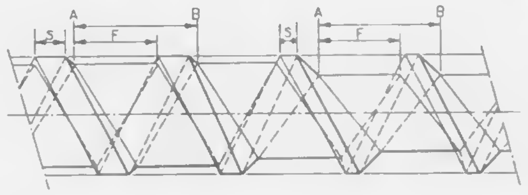
a pivot mounting connected to said carriage;

said screw cylinder being mounted to said pivot mounting such that it is rotatable about a vertical pivot axis which is disposed approximately at the longitudinal center of said screw cylinder, said vertical pivot axis being laterally displaced with respect to the longitudinal axis of said screw cylinder;

whereby the rear end of said screw is accessible when said screw cylinder is rotated about said vertical pivot axis to a first rotational position.

5,020,915
EXTRUSION SCREW FOR THERMOPLASTIC MATTER

Philippe Julien, Brussels, Belgium, assignor to Advanced Recycling Technology Ltd., Lausanne, Switzerland
PCT No. PCT/BE88/00024, § 371 Date May 11, 1989, § 102(e) Date May 11, 1989, PCT Pub. No. WO89/02359, PCT Pub. Date Mar. 23, 1989
PCT Filed Sep. 14, 1988, Ser. No. 358,380
Claims priority, application Belgium, Sep. 16, 1987, 8701043
Int. Cl.^{5} B29C *47/60*
U.S. Cl. 366—89 5 Claims



1. An extrusion screw for thermoplastic matter having opposite first and second ends, a core with an inside diameter, and a helical thread having a root, a flat crest and inclined flanks, characterized in that the pitch and the width of the root of the thread are constant, while the inside diameter of the core increases from the first end toward the second end of the screw and in that the width of the crest of the thread increases as the diameter of the core increases.

5,020,916
APPARATUS FOR CONTINUOUSLY TREATING LIQUIDS, EMULSIONS AND THE LIKE

Rudolf P. Fritsch, Goslarerstrasse 58, D7000 Stuttgart 31, Fed. Rep. of Germany
Continuation of Ser. No. 871,422, filed as PCT DE85/00283 on Aug. 22, 1985, published as WO86/01432 on Mar. 13, 1986, abandoned
This applicatioo Oct. 11, 1988, Ser. No. 256,261
Claims priority, application Fed. Rep. of Germany, Aug. 22, 1984, 3430885
Int. Cl.^{5} B01F *7/26*
U.S. Cl. 366—97 21 Claims

1. Apparatus for continuous processing of materials including at least one of: liquids, emulsions, suspensions, and viscous substances, by at least one of: mixing, homogenizing, gassing, degassing and polymerizing, having

a plurality of essentially parallel vertical shafts (**1**), each having a center and axially upper and lower terminal regions, said shafts having their centers located on the circumference of a circle;

means for rotating said shafts in the same direction;

upper support means (**3**) rotatably mounting said shafts at the axially upper terminal regions thereof;

lower support means (**4**) rotatably mounting said shafts at the axially lower terminal regions thereof;

a plurality of disk-like processing elements (**13, 14, 15; 37, 60**) secured in axially stacked positions on said shafts for rotation therewith,

said disk-like processing elements defining disk face surfaces

VOL
1127
ISS
1
JE
4
1991
UMI

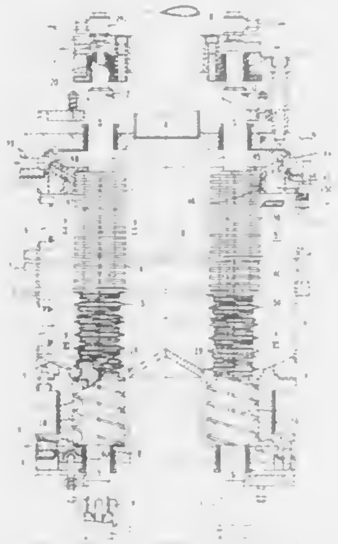
and edge surfaces, said disk-like elements on adjacent shafts being interdigited or interengaged with each other,

said interengaged processing elements, in combination with said shafts, defining a common interior chamber (**16**) inwardly of said circle,

material supply means (**47–49**) extending through one of said support means for the shafts and communicating with one of the adjacent terminal regions of said shafts; and processed material removal means (**40–42**) extending through the other support means for the shafts and communicating with the other of the terminal regions of said shafts; wherein,

said processing elements (**13**, **14**, **15**; **37**, **600**) define, at least over a portion of the axial length of the shafts,

inner disk face surfaces and edge surfaces which extend radially, with respect to said shaft, towards each other and which are located in portions of said chamber, and



outer disk surfaces and edge surfaces which extend radially outwardly of said shafts and away from said chamber, said outer disk face surfaces and edge surfaces being located in outer regions, which outer regions are located radially with respect to the shafts remote from said chamber (**16**); and

comprising

an arrangement for preventing, in operation of the apparatus and upon rotation of the processing element, the occurrence of excessive shearing stresses on the material to be processed arising adjacent said outer regions,

which arrangement is characterized in that

said outer regions are devoid of close confinement, and exposed to free space; and

wherein in said free space no interaction effect of materials on the processing elements and supplied by said material supply means will result with any surfaces located in said regions other than said disk face surfaces and said edge surfaces of the processing elements themselves.

5,020,917

CLEANING SOLUTION MIXING AND METERING SYSTEM

George F. Homan, Kettering, Ohio, assignor to ChemStation International, Inc., Dayton, Ohio

Filed Dec. 23, 1987, Ser. No. 137,188

Int. Cl.^{5} G05D *11/00;* **B08B** *3/00*

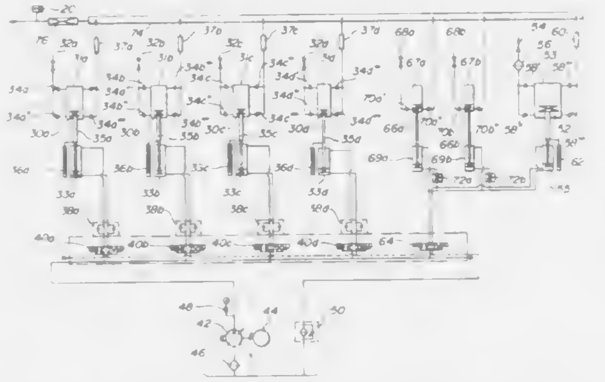
U.S. Cl. 366—161 8 Claims

1. A cleaning solution delivery system for mixing and metering a number of different cleaning solutions from liquid bulk storage containers into on-site individual usage dispensers, comprising a portable mixing and metering station adapted for input to be connected to a plurality of liquid bulk storage containers containing different liquid cleaning concentrates, adapted to be connected to a source of water, and adapted to be connected to liquid chemical additive tanks, said portable mixing and metering station being self-contained and having the following components mounted on a frame so that it can be moved from one area to another, placed on a delivery truck, or otherwise transported to the desired location:

(a) a first set of hydraulic cylinders, each hydraulic cylinder in said first set of hydraulic cylinders having a first cylinder position in fluid communication with a liquid cleaning concentrate inlet connected to an associated liquid bulk storage container, and a piston within the first cylinder portion to form a liquid pumping portion, and having a second cylinder portion in fluid communication with a hydraulic fluid reservoir and a piston within the second cylinder portion to form a hydraulic pumping portion, and having a connecting rod between said first cylinder portion and said second cylinder portion,

(b) a second hydraulic cylinder having a first cylinder portion in fluid communication with a water inlet which in connectable to a source of water, and a piston within the first cylinder portion to form a liquid pumping portion, and having a second cylinder portion in fluid communication with a hydraulic fluid reservoir and a piston within the second cylinder portion to form a hydraulic pumping portion, and having a connecting rod between said first cylinder portion and said second cylinder portion,

(c) a third set of hydraulic cylinders, each hydraulic cylinder in said third set of hydraulic cylinders having a first cylinder portion in fluid communication with a liquid chemical additive inlet connected to an associated liquid chemical additive tank, and a piston within the first cylinder portion to form a liquid pumping portion, and having a second cylinder portion in fluid communication with a hydraulic fluid reservoir and a piston within the second cylinder portion to form a hydraulic pumping portion, and having a connecting rod between said first cylinder portion and said second cylinder portion,



(d) a single outlet pipe, said outlet pipe having a fluid connection first to a water outlet from said second hydraulic cylinder and, then, to liquid cleaning concentrate outlets from each hydraulic cylinder in said first set of hydraulic cylinders, and to liquid chemical additive outlets from each hydraulic cylinder in said third set of hydraulic cylinders,

(e) said water inlet having two check valves and said water outlet having two check valves, whereby pumping of water is possible with minimum air entrapment,

(f) each of said liquid cleaning concentrate inlets having two check valves and each of said liquid cleaning concentrate outlets having two check valves, whereby pumping of liquid cleaning concentrate is possible with minimum air entrapment,

(g) a pump for pumping hydraulic fluid to said hydraulic pumping portion of said first set of hydraulic cylinders, second hydraulic cylinder, and third set of hydraulic cylinders and thereby operate each of the liquid pumping portions of said hydraulic cylinders in said first set of hydraulic cylinders to convey predetermined amounts of liquid cleaning concentrate from the associated liquid bulk storage container to said outlet pipe, operate the liquid pumping portion of said second hydraulic cylinder to convey predetermined amounts of water from the source of water to said outlet pipe, and operate each of the liquid pumping portions of said hydraulic cylinders in said third set of hydraulic cylinders to convey predetermined amounts of liquid chemical additives from the associated liquid chemical additive tank to said outlet pipe,

(h) a potentiometer for controlling the amount of hydraulic fluid pumped to said hydraulic pumping portion of said second hydraulic cylinder and thereby predetermine the amounts of water first conveyed to said outlet pipe,

(i) potentiometers and solenoid operated control valves for controlling the amount of hydraulic fluid pumped to said hydraulic pumping portions of said first set of hydraulic cylinders and thereby predetermine the amounts of liquid cleaning concentrate conveyed to said outlet pipe after said predetermined amounts of water,

(j) solenoid operated fluid control valves for controlling the amount of hydraulic fluid pumped to said hydraulic pumping portions of said third set of hydraulic cylinders and thereby predetermine the amounts of liquid chemical additives conveyed to said outlet pipe after said predetermined amounts of water,

(k) means associated with said outlet pipe for mixing said predetermined amounts of said liquid cleaning concentrate and said chemical additive with said water to form a cleaning solution, and means associated with said outlet pipe for delivering said cleaning solution into on-site individual usage dispensers, and

(l) a motor for driving said pump.

5,020,918

MIXER TRAILER FOR FIBROUS PRODUCTS

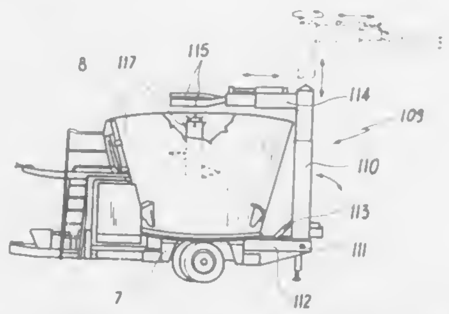
Tiziano Faccla, Via Padova 102, 35026 Conselve (Province of Padova), Italy

Filed Apr. 19, 1990, Ser. No. 511,174

Claims priority, application Italy, Apr. 19, 1989, 41577 A/89

Int. Cl.^{5} B01F *7/24, 15/06*

U.S. Cl. 366—279 11 Claims



1. Improved mixer trailer for fibrous products of the kind which comprises a wheeled chassis on which a mixing container is mounted, said mixing container being substantially in the shape of an inverted conical frustum and being internally provided with at least one vertical scroll which is welded to a rotating shaft which is coupled to the container wherein said wheels are in close pairs associated with a same axis of rotation and articulated to the chassis on an axis which is orthogonal to said axis of rotation, a loading device with grippers being fixed to said container, a system for drying the product contained in said container being fixed thereto, and auxiliary actuation means being connectable at the end of operation to said at least one scroll, imparting thereto a high speed rotary motion.

5,020,919

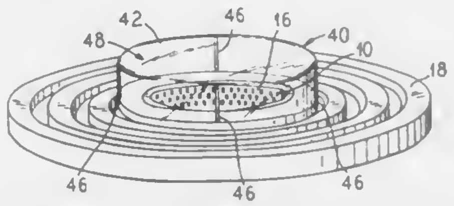
HEAT FLOW SENSING APPARATUS AND METHOD

Verner K. Suomi, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Apr. 24, 1990, Ser. No. 513,251

Int. Cl.^{5} G01K *1/00, 1/14, 17/00*

U.S. Cl. 374—29 31 Claims



1. An apparatus for determining neat flow at an interface between a water surface and the atmosphere, comprising:

a) a floatable transparent panel member having a lower surface in contact with the water and an upper surface adapted to receive a water layer in contact with the atmosphere;

b) thermocouple means operatively associated with the lower surface and upper surface of the transparent panel member for sensing the temperature of the water and the water layer in contact with the atmosphere; and

c) electronic circuit means including a power supply operatively associated with the thermocouple means for recording the temperature of the water in contact with the lower surface and the water layer on the upper surface

whereby the difference between the temperature of the water and the temperature of the water layer provides a measure of the heat flow at the interface.

5,020,920

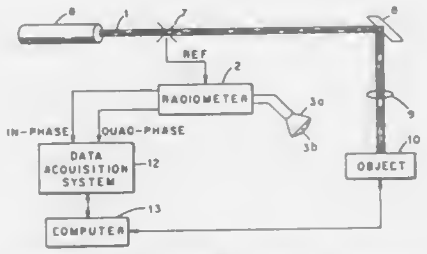
METHOD AND APPARATUS FOR MILLIMETER-WAVE DETECTION OF THERMAL WAVES FOR MATERIALS EVALUATION

Nachappa Gopalsami, Naperville, and Apostolos C. Raptis, Downers Grove, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 3, 1989, Ser. No. 431,363

Int. Cl.^{5} G01N *25/00, 25/72*

U.S. Cl. 374—57 10 Claims



1. An apparatus for identifying thermal inhomogeneities in electrically nonconducting materials comprising:

an intensity modulated heat source directed toward a material sample, generating thermal waves in said sample,

antenna means directed toward said sample, for receiving thermal radiation resulting from said thermal waves within said sample,

radiometer means for monitoring said thermal radiation, and for synchronously demodulating said thermal radiation with respect to the modulating signal of said intensity modulated heat source, and

imaging means for displaying in-phase and quadrature-phase components of said thermal radiation, revealing variations in said thermal radiation caused by thermal inhogeneities in said sample.

VOL
1127
ISS
1
JE
4
1991
UMI

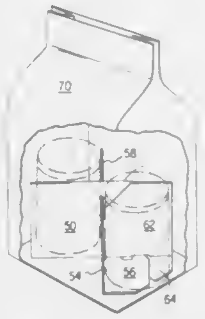
8. A method for identifying thermal inhomogencities at subsurface levels comprising the steps of:
- generating thermal radiations in an object using an intensity modulated source,
- detecting said thermal radiations from a volume within said object and using radiometer means for converting said thermal radiations into a millimeter-wave signal,
- synchronously demodulating said millimeter-wave signal into in-phase and quadrature-phase components with respect to the modulating signal of said intensity modulated source, and
- storing and displaying amplitude and phase values of said in-phase and quadrature-phase components of said signal, thereby revealing variations in said thermal radiation caused by thermal inhomogeneities in said object.

5,020,921
PAPERBOARD PARTITION

Jonathan T. Beales, Philadelphia, Pa., assignor to International Paper Company, Purchase, N.Y.

Filed Aug. 2, 1990, Ser. No. 561,753
Int. Cl.⁵ B65D *30/22*

U.S. Cl. 383—38 7 Claims



4. A paperboard partition for spacing and supporting items in a paper bag or the like, the partition formed of a single blank of paperboard and erectable from a flattened storage or shipping configuration, the partition including two at least substantially identical, diagonal supporting cells each of which is defined by two vertical panels meeting along a common vertical axis and a bottom shelf, the bottom shelf comprising two at least partially overlapping panels integral with a respective said vertical panel, said bottom shelf being orthogonal to each of said vertical panels, one of said bottom shelf overlapping panels carrying a locking tab which is received in a slot at the bottom of one of said vertical panels, the lowermost of said bottom shelf overlapping panels having a fold line therein which extends in a direction radially outwardly from said common vertical axis, that portion of said lowermost bottom shelf panel on that side of said glue fold line which is remote from the junction of said lowermost bottom shelf panel with its respective vertical panel provided with a glue spot to secure it to the uppermost of said bottom shelf panels.

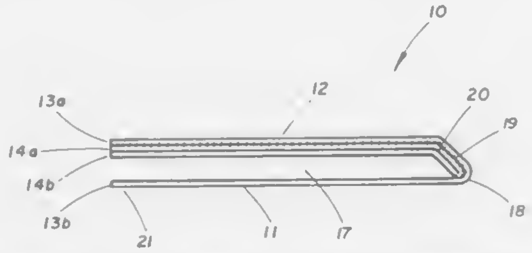
5,020,922
BONE PUNCTURE RESISTANT BAG

Henry G. Schirmer, Spartanburg, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Continuation of Ser. No. 704,158, Feb. 22, 1985, abandoned, which is a continuation of Ser. No. 509,492, Jun. 30, 1983, abandoned. This application Mar. 6, 1986, Ser. No. 316,588
Int. Cl.⁵ B65D *30/10*

U.S. Cl. 383—119 2 Claims

1. A seamless, puncture-resistant thermoplastic bag comprising:
- (a) a first panel comprising one layer of thermoplastic film;
- (b) a second panel approximately equal in length to said first panel, and comprising three layers of thermoplastic film;
- (c) said first and second panels adjoining at seamless bottom and side portions of said bag;
- (d) an envelope defined by said first and second panels, and suitable for containing a meat product having bone sections; and



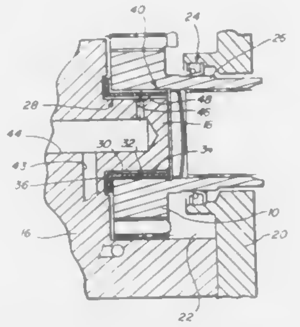
- (e) said three layers of said second panel comprising respectively an outer layer, an intermediate layer, and an inner layer, adjacent surfaces of the outer and intermediate layers being interfacially bonded, and adjacent surfaces of the intermediate and inner layers being interfacially bonded.

5,020,923
TRANSMISSION/GEARBOX VIBRATION DAMPING SYSTEM

Steven A. Heitz; Jeffery N. Fairchild, and John Readman, all of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 4, 1987, Ser. No. 116,771
Int. Cl.⁵ F16C *27/02*

U.S. Cl. 384—99 16 Claims



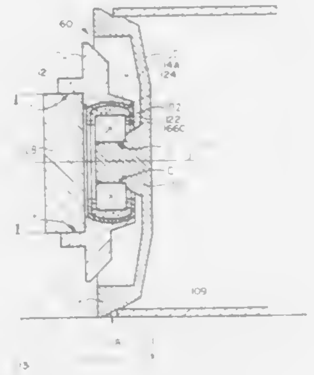
1. A vibration damping system for a transmission and the like which includes rotatable components, comprising:
- a housing structure for supporting and journaling an inner rotatable component drivingly coupled to a plurality of outer rotatable components defining a plural load path; and
- compliant bearing means between the housing and the inner rotatable component, the bearing means including a laminated structure having an inner bearing member rotatably journaled on the housing, an outer bearing member supporting and rotatably journaling the inner rotatable component, and a resilient damping layer between and fixed to both the inner and outer bearing members.

5,020,924
BEARING UNIT, ESPECIALLY FOR USE IN A BOBBIN TUBE AND PACKAGE SUPPORT

Robert Demuth, Nürensdorf; Walter Hefti, Ettenhausen; Urs Keller, Seuzach, and Daniel Hanselmann, Winterthur, all of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Division of Ser. No. 943,120, Dec. 18, 1986, Pat. No. 4,848,686. This application Jan. 19, 1989, Ser. No. 299,312
Claims priority, application United Kingdom, Dec. 24, 1985, 8531722
Int. Cl.⁵ F16C *27/06*

U.S. Cl. 384—536 2 Claims



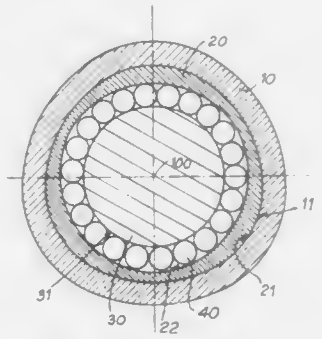
1. A bearing unit, comprising:
- a plurality of bearing elements rotatable relative to each other about a bearing rotational axis;
- said plurality of bearing elements being capable of rotatably supporting one end of a hollow roller body;
- a circumferential shell positioned adjacent said plurality of bearing elements in a spaced relationship therefrom and defining a space therebetween;
- resilient means located at least at predetermined circumferential locations between said shell and said plurality of bearing elements;
- said resilient means possessing a predetermined resiliency;
- said shell and at least one preselected one of said plurality of bearing elements constituting relatively rigid parts adjoining said resilient means;
- said resilient means permitting displacement of said plurality of bearing elements and said shell relative to each other within the limits determined by the amount of said resilient means located between said shell and said plurality of bearing elements and said predetermined resiliency of said resilient means;
- said resilient means permitting said displacement of said plurality of bearing elements and said shell relative to each other in order to compensate for misalignment between said hollow roller body and a drive roll frictionally driving said hollow roller body and to establish essentially line contact between said hollow roller body and said drive roll;
- said resilient means being located at least at said predetermined circumferential locations between said circumferential shell and said at least one preselected bearing element;
- said resilient means permitting, as said displacement, a displacement of said plurality of bearing elements relative to said circumferential shell substantially in a radial direction with respect to said bearing rotational axis;
- said resilient means constituting a body of resiliently deformable material possessing a predetermined deformability;
- said body of resiliently deformable material permitting said displacement within the limits of said predetermined deformability of said body of said resiliently deformable material;
- said body of resiliently deformable material constituting a porous body of resiliently compressible material possessing a predetermined compressibility;
- said porous body of resiliently compressible material, at least at said predetermined circumferential locations, substantially filling the space between said circumferential shell and said at least one preselected bearing element; and
- said porous body of resiliently compressible material permitting said displacement of said plurality of bearing elements and said circumferential shell relative to each other in said substantially radial direction with respect to said bearing rotational axis within the limits of said predetermined compressibility which defines said predetermined deformability.

5,020,925
PRESTRESSED ROLLING RADIAL BEARING AND ITS APPLICATION PARTICULARLY TO AUTOMOBILE SUSPENSIONS

Gérard Stephan, Croissy-sur-Seine, and Jean-Denis Labedan, Bourges, both of France, assignors to Nadella, Vierzon, France

Filed Jul. 26, 1990, Ser. No. 557,731
Claims priority, application France, Aug. 10, 1989, 8910788
Int. Cl.⁵ F16C *33/58*

U.S. Cl. 384—569 13 Claims



1. Prestressed rolling radial bearing in which rolling elements are interposed between two races, characterized in that it comprises an external piece (**10**) with a cylindrical housing (**11**) having an axis (**100**) and an internal wall (**110**) with circular cross-section, a hollow insert sleeve (**20**) having an external wall (**21**) with circular cross-section and an internal wall (**22**) with curvilinear triangular cross-section the vertices (**221**) of which are separated by arcs (**222**) the concavity of which is turned towards this axis (**100**), an internal piece (**30**) with an external seating (**31**) having an external wall (**310**) with circular cross-section of specified given diameter (D), and rolling elements (**40**) of specified diameter (d) which are interposed between sleeve (**20**) and seating (**31**) and which bear, on the one hand, on the circumference of the external wall (**310**) of the seating (**31**) which serves as internal race and, on the other hand, on the arcs (**222**) of the internal wall (**22**) of the sleeve (**20**) which serves as external race, and characterized in that the sleeve (**20**) is tightly engaged in the housing (**11**) of the external piece (**10**) in such a way that the latter exerts a prestress on the sleeve, in that the perimeter of the curvilinear triangular cross-section of the internal wall (**22**) of the sleeve (**20**) is larger than the circumference of a circle the diameter of which is equal to the sum of the diameter (D) of the circular cross-section of the external wall (**310**) of the seating (**31**) increased by twice the diameter (d) of the rolling elements (**40**), and in that the diameter (Δ) of an inscribed circle tangent to the arcs (**222**) of the wall (**22**) with curvilinear triangular cross-section is less than the sum of the diameter (D) of the circular cross-section of the external wall (**310**) of the seating (**31**) increased by twice the diameter (d) of the rolling elements (**40**).

VOL
1127
ISS
1
JE
4
1991
UMI

5,020,926

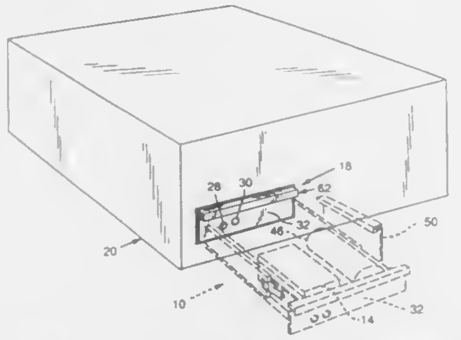
PRINTER MOUNTING ARRANGEMENT

Joseph R. Wilhelm, Lake Oswego, Oreg., assignor to Sejus Corporation, Lake Oswego, Oreg.

Filed Jun. 8, 1990, Ser. No. 535,739

Int. Cl.⁵ B41J *29/38;* **H05K** *7/16*

U.S. Cl. 400—54 **23 Claims**



1. In a method of operating an electronic apparatus with an associated printer, the apparatus including a case and a drive bay positioned therein, the drive bay being sized to receive an industry standard-sized disk unit, said industry standard size disk unit having front panel dimensions of approximately 5.5 or 3.5 inches in width and 1.75 or 3.5 inches in height, the drive bay further including mechanical supports adapted to receive and support an accessory apparatus within the drive bay, the method comprising providing power and data to the printer, an improvement comprising the steps:

mounting the printer on a supporting structure including first and second rails adapted to cooperate with the mechanical supports in the drive bay; and

installing the printer and associated supporting structure within the drive bay by engaging the rails of the supporting structure with the mechanical supports in the drive bay.

5,020,927

GROUPING OF DOT DATA IN A MULTIPLE COLUMN DOT-MATRIX PRINTER

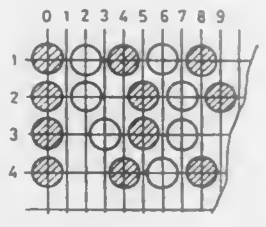
Takeshi Niikawa, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 122,838, Nov. 19, 1987, abandoned. This application Jul. 27, 1989, Ser. No. 385,995

Claims priority, application Japan, Nov. 21, 1986, 61-279097

Int. Cl.⁵ B41J *2/51*

U.S. Cl. 400—121 **20 Claims**



1. A control system for a dot printer which prints a dot according to dot data indicating whether or not said dot is to be printed at an intersection defined by a row and a column under the limitation that it is not allowed to print two dots at both the adjacent intersections in the same row, said dot printer having a printing head mounting two printing elements thereon per row along a moving direction of said printing head, said two printing elements being selectively driven accordingly to a moving position of said printing head and said dot data to print said dot at said intersection on a printing paper; said control system comprising:

(a) means for grouping into two groups print dot data existing at intersections on each row where dots are to be printed according to said dot data for all the intersections containing said print dot data in each row, wherein said grouping means first assigns into one of said two groups a first dot at said intersection in each row containing said print dot data and a subsequent fourth intersection after the previously assigned dot in said row if said fourth intersection exists and contains one of said print dot data or a next intersection existing and containing one of said print dot data after said fourth intersection in said row and secondly assigns into the other group the remaining intersections of each row with said print dot data not grouped in the first grouping step;

(b) means for driving said printing elements on the basis of the data grouped to each group; and

(c) means for moving said printing head by four columns during a period of time equal to the inverse of the repetition rate of the printing elements.

5,020,928

RIBBON GUIDING MECHANISM

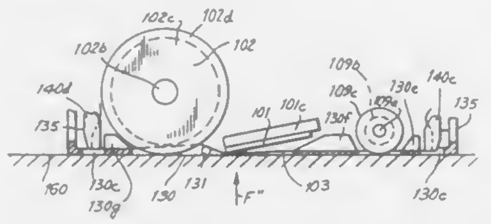
Takaaki Akiyama; Shuji Matsuo; Masahiro Fujii; Mitsukazu Kurose; Osamu Nakamura, and Masahiro Kamijo, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Division of Ser. No. 378,667, Jul. 12, 1989, which is a division of Ser. No. 198,536, May 25, 1988. This application Nov. 22, 1989, Ser. No. 440,524

Claims priority, application Japan, May 25, 1987, 62-127412; May 25, 1987, 62-127413; Jan. 13, 1988, 63-5081; Jan. 13, 1988, 63-5082

Int. Cl.⁵ B41J *3/36*

U.S. Cl. 400—193 **6 Claims**



1. A printing mechanism for a hand held printer which prints characters and drawings on a print surface as said printer is manually pressed to the print surface, the print mechanism comprising: a thermal head supported in the thermal printer, a thermal transfer ribbon movably mounted within the printer for tracing a path through the printer, ribbon guide means for guiding the thermal ribbon along the path within the printer, cover means for pressing against and engaging with the print surface, the cover means including a contact portion for coming in contact with the print surface, slide guide means for guiding the ribbon, the slide guide means being slidable relative to the print surface, slide means engaging with the ribbon guide means, cover means and slide guide means for guiding the thermal ribbon, and slide biasing means for biasing the slide means, thereby biasing the contact portion to the print surface.

5,020,929

PAPER FEED DEVICE

Masaya Funamoto, Nagoya, and Akira Kobayashi, Anjyo, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Dec. 28, 1989, Ser. No. 458,298

Claims priority, application Japan, Dec. 29, 1988, 63-331792

Int. Cl.⁵ B41J *13/02*

U.S. Cl. 400—639.1 **16 Claims**

1. A paper feed device comprising:

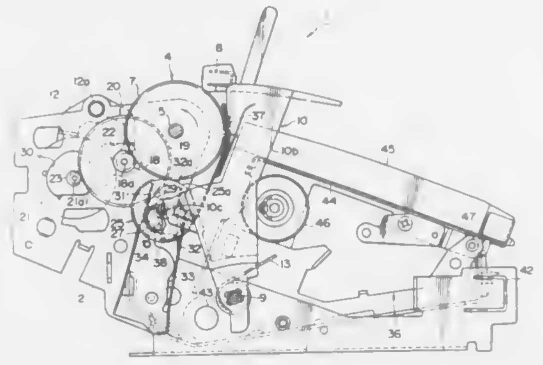
a platen member arranged to be rotated by a drive motor member;

a paper bail member provided parallel to said platen member, said platen member and said paper bail member being arranged to be relatively movable with each other so that said paper bail member is arranged to be brought into and out of contact with said platen member;

a first biasing member for generating a first biasing force for biasing said paper bail member toward said platen member, and;

control means for controlling said drive motor member, said platen member and said paper bail member in such a manner that said platen member and said paper bail member are brought out of contact after said platen member is driven to be rotated at a first predetermined angle, while said platen member and said paper bail member are brought into contact with each other after said platen member is further driven to be rotated at a second predetermined angled

said control means comprising actuate means for actuating said paper bail member so as to be brought out of contact from said platen member; inhibit means for inhibiting by said actuate means; and release means for releasing said inhibit means in case said platen member is driven to be rotated between said first and said second predetermined angles.



5,020,930

DISPENSER WITH REDUCTION TRANSMISSION

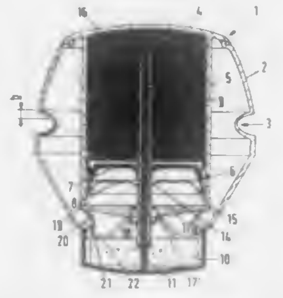
Peter H. A. N. Kuhn, Delft, Netherlands, assignor to Sara Lee/DE N.V., Netherlands

Filed Jan. 23, 1990, Ser. No. 468,732

Claims priority, application Netherlands, Jan. 24, 1989, 8900170

Int. Cl.⁵ A45D *40/02;* **A47L** *23/05*

U.S. Cl. 401—146 **7 Claims**



1. A dispenser for viscous material, such as shoe polish, comprising a substantially cylindrical reservoir having near one reservoir end a filling discharge passage terminating in a distribution channel extending through a porous applicator, and wherein at least a part of the dispenser wall is deformable for pressing the filling out of the reservoir through the filling discharge passage into the distribution channel, wherein at the other end of the reservoir, there is provided a follower piston which, while confining the filling at the discharge end of the reservoir, under the influence of a force exerted axially on said piston is movable stepwise in the direction of the filling discharge passage, the dispenser being further provided with pumping means operative upon deformable of the deformable portion of the dispenser wall, said portion being resilient, and further including a reduction transmission between the deformable portion of the dispenser wall and the pumping means.

5,020,931

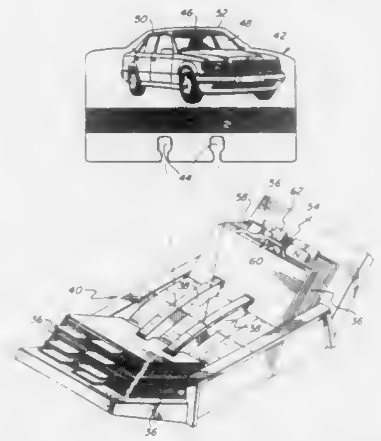
SHAPED INDEX CARD

Alexander Sloot, Stamford, Conn., assignor to Printmark Industries, Inc., Stamford, Conn.

Filed Apr. 20, 1990, Ser. No. 511,721

Int. Cl.⁵ B42F *13/00*

U.S. Cl. 402—79 **3 Claims**



1. A shaped index card for an index card system having retainer rails for holding the lower edges of a plurality of like sized conventional index cards whose upper edges are straight and which align when mounted on the retainer rails, comprising:

an index card having an upper segment that extends visibly above the upper edges of conventional index cards when said index card is mounted in an index card system;

a pictorial image which identifies goods or services of a supplier, said image having an upper outline located on said upper segment, said upper segment having a peripheral upper edge which is shaped to cooperate with said image upper outline to visually enhance said image, and said image further having a side outline, said shaped index card having a side edge shaped to conform with said image side outline and cooperate with and visually enhance said image, said side edge surrounding a side segment of said index card that laterally extends visibly beyond the side edges of conventional index cards when said shaped index card is mounted in an index card system and wherein said image is located at least partially on said side segment; and

means for mounting said index card to the retainer rails of an index card system.

5,020,932

HIGH TEMPERATURE CERAMIC/METAL JOINT STRUCTURE

Gary L. Boyd, Tempe, Ariz., assignor to Allied-Signal Inc., Morris Township, N.J.

Division of Ser. No. 280,761, Dec. 6, 1988, Pat. No. 4,934,138. This application Feb. 15, 1990, Ser. No. 480,695

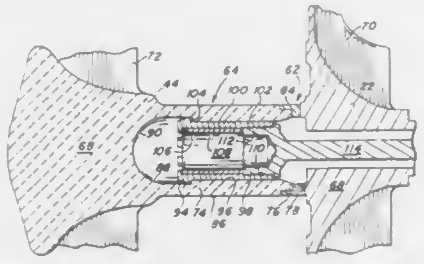
Int. Cl.⁵ F16B *9/00*

U.S. Cl. 403—30 **9 Claims**

1. A hybrid ceramic/metallic structure comprising: a first

VOL
1127
ISS
1
JE
4
1991
UMI

ceramic portion defining a respective first axially extending bore opening outwardly thereon, said first portion further defining on said first bore an annular step disposed away from said bore opening, a second portion axially adjacent said first ceramic portion, a metallic annular collet member received into said first bore and including a circumferentially arrayed plurality of axially elongate radially resilient finger portions, said plurality of finger portions proximate the distal end thereof defining a radially, outwardly extending shoulder engaging said step, tensile means engaging said collet member and extending axially toward said second portion for applying an axially directed tensile force to the collet member which force is reacted through the second portion to secure the latter and said first portion axially together.



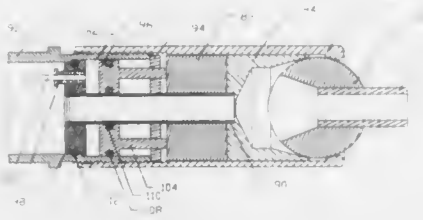
5,020,933
LOCKING MECHANISM FOR MEDICAL DEVICES

Aldo T. Salvestro; Rainer M. Bobl, both of Vancouver, Canada, and Martin L. Furse, Dallas, Tex., assignors to Andronic Devices, Ltd., British Columbia, Canada

Filed Sep. 1, 1989, Ser. No. 401,838

Int. Cl.^{5} F16C *11/06*

U.S. Cl. 403—90 8 Claims



1. An apparatus for amplifying and applying a force, comprising:
- a container;
- a nonhomogeneous, deformable member disposed within the container, the deformable member having a first side and a second side;
- a part disposed within the container and having a face adjacent to the second side of the deformable member;
- force means for applying a force to a first surface area located on the first side of the deformable member, the area of the face of the part being larger than the first surface area of the deformable member, the container, deformable member, and part being arranged so that the force applied to the first surface area is applied to the area of the part face.

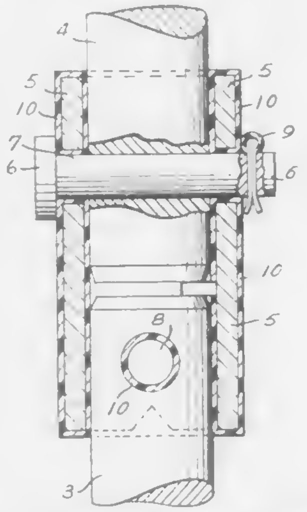
5,020,934
CORROSION RESISTANCE FOR FIRE HYDRANT STEM SAFETY COUPLING

Carl E. Floren, Decatur, Ill.; Mike Weller, House Springs, Mo., and Timothy M. Logman, Monticello, Ill., assignors to Mueller Co., Decatur, Ill.

Filed May 16, 1990, Ser. No. 524,032

Int. Cl.^{5} B25G *3/00*

U.S. Cl. 403—306 16 Claims



1. A valve stem coupling comprising a length of metallic tube, the tube having a longitudinal axis, a first pair of apertures in the tube, and a second pair of apertures in the tube, the first pair of apertures being aligned with one another at a first location, the second pair of apertures being aligned with one another at a second location spaced from said first location, the tube having a coating of an organic polymer that is compressible with the inside of the apertures also coated with said organic polymer coating.

5,020,935
CONNECTOR

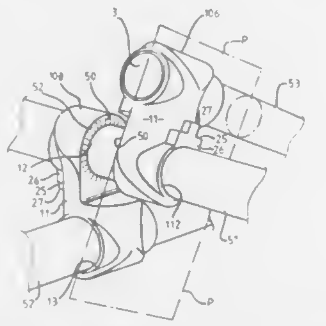
Peter J. Lewis, Sparkhill, and Reginald Povey, Willenhall, both of United Kingdom, assignors to Burn Tubes Limited, So Lihull, United Kingdom

Filed Apr. 24, 1989, Ser. No. 342,343

Claims priority, application United Kingdom, Apr. 29, 1988, 8810283; Sep. 27, 1988, 8822686

Int. Cl.^{5} F16B *7/04*

U.S. Cl. 403—391 16 Claims



1. A connector comprising a body and a wedge member connecting together two mutually inclined members, the body presenting,
- a first socket having a longitudinal axis, one of said members being received in the first socket,
- a second socket having a longitudinal axis inclined to said longitudinal axis of said first socket, another of said members being received in the second socket,

- a pocket which opens to each of the sockets and has a longitudinal axis parallel to said longitudinal axis of the first socket and transverse to said longitudinal axis of the second socket,
- the wedge member being received in the pocket and being movable therein in a direction parallel to said longitudinal axis of the pocket, the wedge member presenting,
- a first part which extends into the first socket and presents a first clamping surface which extends parallel to said longitudinal axis of the first socket and engages said one member over a region of said one member which extends parallel to said longitudinal axis of the first socket, and
- a second part which extends onto the second socket and presents a second clamping surface which extends parallel to said longitudinal axis of the second socket and engages said second member over a region of said second member which extends parallel to said longitudinal axis of the second socket.

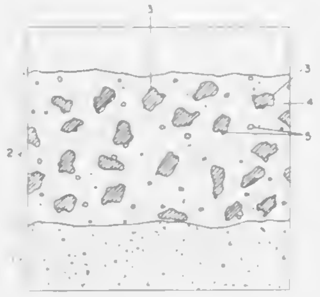
5,020,936
ANIMAL RUNNING SURFACE

Robert C. Malmgren; Jan Cipra, and Edward L. Umlauf, all of Fort Collins, Colo., assignors to International Soil Systems, Inc., Fort Collins, Colo.

Filed Jul. 28, 1989, Ser. No. 387,496

Int. Cl.^{5} E01C *5/18*

U.S. Cl. 404—32 26 Claims



1. An animal running surface comprising:
- a. a foundation layer comprised of indigenous, firm in-place soil; and
- b. a non-compacted surface layer extending for a specified depth which comprises a mixture of:
  - (1) non-foam, solid rubber particles having a size in the range of about 0.25 to 0.75 inch in diameter; and
  - (2) earthen material;

wherein said rubber particles comprise about 15 to 40% by volume of said surface layer.

5,020,937
METHOD AND APPARATUS FOR CONSTRUCTION OF PERDURABLE ARTIFICIAL ROADS

Joseph E. Pouyer, 503 Martin Rd., Houston, Tex. 77018

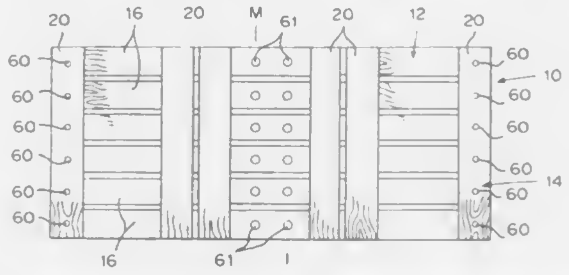
Continuation-in-part of Ser. No. 195,371, May 12, 1988, Pat. No. 4,889,444, which is a continuation-in-part of Ser. No. 161,780, Feb. 29, 1988, abandoned. This application Oct. 20, 1989, Ser. No. 424,392

The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.

Int. Cl.^{5} E01C *5/00*

U.S. Cl. 404—35 20 Claims

1. A temporary decking system to facilitate transportation over poor soil and rough terrain conditions comprising a plurality of overlapping units placed in at least first and second horizontal layers vertically disposed relative to each other, each unit comprising inner and outer faces wherein:
- (a) said outer faces comprise a first group of elements substantially longitudinally parallel;
- (b) said inner faces comprise a second group of substantially parallel runner elements attached to said first group in spaced relation to one another and transverse to said first group, wherein said spaced relationship is such that said first and second transverse elements are disposed one near each end of each unit and the remaining transverse elements are positioned between said end transverse elements to present at least one interior ridge and so as to define at least two channels between said end transverse elements wherein each channel and each interior ridge is of greater width than said end transverse elements so that transverse ridge elements of any one unit will conform to channels of any other inverted unit, and when units are so interconnected during installation will substantially prevent longitudinal movement of any unit relative to adjacent units; and,



- (c) wherein said first layer comprises a plurality of units arranged in end to end relationship with the outer faces down and wherein said second layer comprises a layer of units arranged in end to end relationship with outer faces up and arranged so that each unit in said upper layer overlaps at least one adjacent unit in the lower level, and so that each unit in the upper layer interlocks with at least two units in the lower layer by fitting said transverse runner elements of one unit into the transverse channels defined by the transverse runner elements of any other inverted opposed unit.

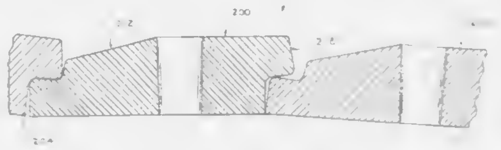
5,020,938
BLOCK-FORMED REVETMENT SYSTEM FOR CONTROLLING SOIL EROSION

Michael J. Scales, 4905 Windwood Dr., Dorville, Ga. 30360

Filed Jul. 14, 1989, Ser. No. 380,090

Int. Cl.^{5} E02B *3/12*

U.S. Cl. 405—16 6 Claims



1. A revetment block for being coupled with other similar blocks to form a flexible revetment mat for controlling erosion of soil, comprising:
- a grid having a top surface, a bottom surface, and a plurality of side surfaces, and wherein a tongue extends from at least one of said side surfaces, each tongue having a height and width less than the total height and width of said grid, and wherein at least one of said side surfaces which has no tongue has a tongue receiving cavity surrounded by a pair of cavity sidewalls, a cavity backwall and a cavity upperwall, said cavity being of a size sufficient to receive and allow limited vertical and horizontal movement of tongues from other blocks within said cavity, wherein the top surface adjacent to at least one of said side surfaces is tapered downwardly towards said adjacent side surface to form an upstream side surface and wherein the side sur-

VOL
1127
ISS
1
JE
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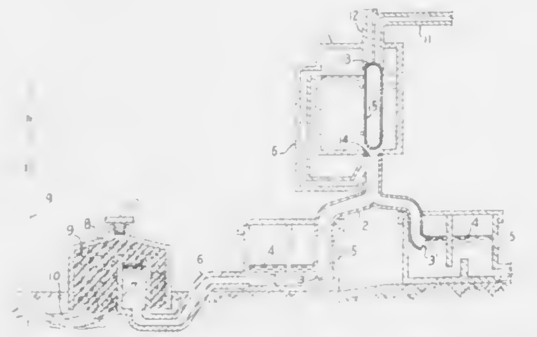
1991
UMI

face opposite said upstream side surface is taller than said upstream side surface.

5,020,939
IRRIGATION METHOD AND APPARATUS

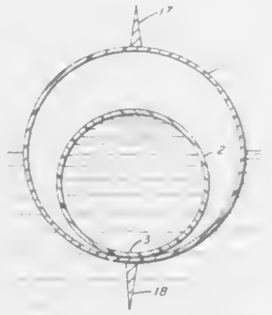
Yasuo Tsuruta, 22-2, 4-chome, Sanno, Ota-ku, Tokyo, 143, Japan
Continuation of Ser. No. 786,706, Oct. 11, 1985, abandoned, which is a continuation of Ser. No. 589,689, Mar. 15, 1984, abandoned, which is a continuation of Ser. No. 451,097, Dec. 20, 1982, abandoned, which is a continuation of Ser. No. 147,229, May 6, 1980, abandoned. This application Oct. 19, 1988, Ser. No. 262,114
Int. Cl.^{5} E02B *13/00*
U.S. Cl. 405—36 8 Claims



1. A method of irrigating a plant from a top surface of soil in which the plant is growing, comprising very slowly infusing water into the soil to a root region of the plant from an air-tight casing having an open bottom essentially sealed to the top surface of the soil, said infusing comprising infusing the water into the soil through a filler material within the casing from an upwardly opening outlet of a water supply receptacle in the casing, and supplying water to the receptacle from a water source below the level of said upwardly opening outlet.

5,020,940
WATER-BALLASTED OIL SPILL CONTAINMENT BOOM

Lawrence R. Smith, 10126 Holly Spring, Houston, Tex. 77042
Filed Jan. 17, 1990, Ser. No. 466,554
Int. Cl.^{5} E02B *15/04*
U.S. Cl. 405—63 25 Claims

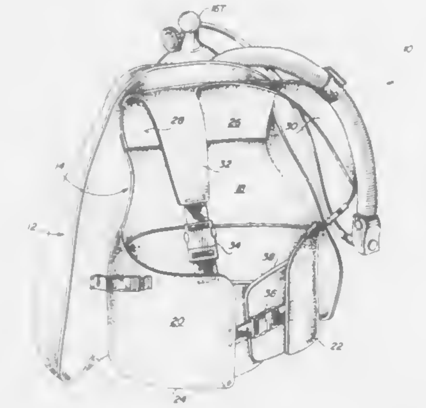


1. An inflatable barrier for confining a first liquid floating on a second liquid comprising:
(a) an outer elongated chamber having means for inflation with an outer chamber fluid medium;
(b) at least one inner chamber within said outer chamber having means for inflation with an inner chamber fluid medium having a density different from that of said outer chamber fluid medium;
(c) whereby, after both said inner and said outer chambers have been inflated with fluid media, said barrier will float on said second liquid with a portion of said barrier sufficiently exposed above the surface of said second liquid as to prevent splashover of said first liquid, and with a portion of said barrier sufficiently submerged as to prevent said first liquid from escaping under said barrier.

25. A method for confining a first liquid floating on a second liquid, using an inflatable barrier, which comprise the steps of:
(a) placing said barrier on said second liquid, said barrier comprising:
(i) an outer elongated chamber having means for inflation with an outer chamber fluid medium;
(ii) at least one inner chamber within said outer chamber having means for inflation with an inner chamber fluid medium having a density different from that of said outer chamber fluid medium,
(iii) whereby, after both said inner and said outer chambers have been inflated with fluid media, said barrier will float on said second liquid with a portion of said barrier sufficiently exposed above the surface of said second liquid as to prevent splashover of said first liquid, and with a portion of said barrier sufficiently submerged as to prevent said first liquid from escaping under said barrier; and
(b) inflating said barrier so as to allow said barrier to float partly submerged on said second liquid.

5,020,941
BUOYANCY COMPENSATOR WITH DETACHABLE SHOULDER SECTION

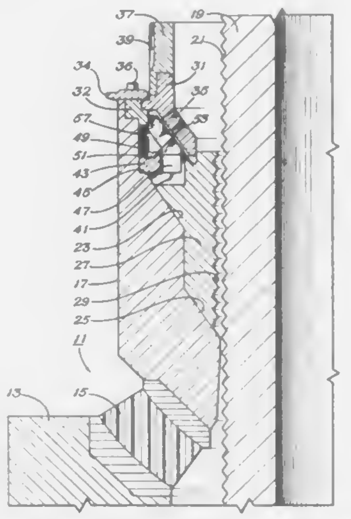
Dennis G. Bulin, Wesley Chapel, and Joseph P. James, Lutz, both of Fla., assignors to Zeagle Systems, Inc., Zephyrhills, Fla.
Filed Oct. 18, 1990, Ser. No. 600,317
Int. Cl.^{5} B63C *11/02*
U.S. Cl. 405—186 15 Claims



1. A diver's vest assembly for supporting a air cylinder to the back of a scuba diver, comprising in combination:
a vest to be worn about the diver's torso, said vest including a back section for supporting the air cylinder, a waist band section having left and right side portions for removably affixing about the diver's waist, a shoulder section for positioning over the diver's shoulders, comprising a horizontal portion and left and right shoulder portions extending substantially perpendicular from said horizontal portion and means for removably fastening said horizontal portion of said shoulder section to an upper portion of said back section;
means for interconnecting said vest and the air cylinder;
means for connecting said waist band section to said back section;
means for removably interconnecting said left and right side portions of said waist band section about the diver's waist; and
means for removably interconnecting said shoulder portions of said shoulder section to said left and right portions of said waist band section,
whereby, said shoulder section may be replaced by another shoulder section of a different torso length so as to provide a comfortable fit of said vest to the height of the diver's torso.

5,020,942
ALIGNMENT DEVICE FOR A TENSION LEG PLATFORM TENDON TOP CONNECTOR

Joseph W. Pallini, Jr., Tomball, Tex., assignor to Vetco Gray Inc., Houston, Tex.
Filed Jun. 29, 1990, Ser. No. 546,091
Int. Cl.^{5} E02B *17/06*
U.S. Cl. 405—224 5 Claims

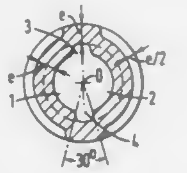


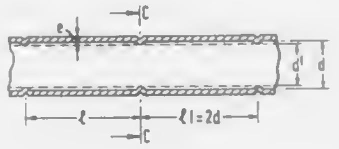
1. In a floating platform having a plurality of tendons, each extending in tension from the sea floor through an axial bore of a housing carried by the platform, the bore having a conical shoulder which carries a plurality of segments, each segment having interior threads for engaging exterior threads formed on each tendon, and actuating means for causing each segment to slide down the conical shoulder and rotate into engagement with the threads of the tendon, an improvement comprising in combination:
a guide ring mounted to the housing radially outward from the segments and having an interior surface that opposes an exterior surface on each of the segments;
a slot on one of said surfaces for each of the segments; and
a plurality of fingers, each protruding from the other of said surfaces and extending into one of the slots for maintaining circumferential spacing of the segments relative to each other as the actuating means is rotated; and
the guide ring being rotatable relative to the housing to allow rotation of the segments on the conical shoulder when sufficient rotational force by the actuating means is applied to the segments.

5,020,943
PIPE FOR THE PNEUMATIC TRANSPORT OF POLYMER PARTICLES

Michel C. H. Filipelli, London, England, assignor to BP Chemicals Limited, London, England
Filed Dec. 18, 1989, Ser. No. 450,869
Claims priority, application France, Dec. 30, 1988, 88 17593
Int. Cl.^{5} B65G *51/18*
U.S. Cl. 406—195 5 Claims

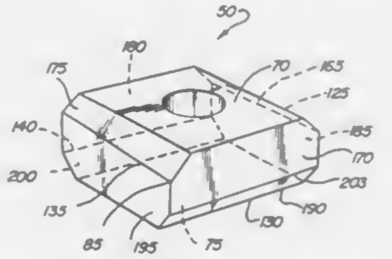
1. A cylindrical pipe of internal diameter d and cross-sectional area S, intended for pneumatic transport of solid polymer particles, said pipe comprising constrictions located over its length in such a way that the distance 1 between two consecutive constrictions is between d and $10\times d$, each constriction consisting of an non-uniform restriction of the cross-sectional area S of the pipe, said non-uniform restriction defining a new internal cross-sectional area S' of between $0.009\times S$ and $0.995\times S$ and having at least one unrestricted free passage defined by a circular sector of the area S with a vertex situated on the axis of the pipe and an angle at the vertex ranging from 5° to 60°.





5,020,944
INDEXABLE INSERT FOR ROUGHING AND FINISHING

James A. Pawlik, Sterling Heights, Mich., assignor to GTE Valenite Corporation, Troy, Mich.
Continuation of Ser. No. 268,391, Oct. 31, 1988, abandoned, which is a continuation of Ser. No. 171,332, Mar. 21, 1987. This application Feb. 23, 1990, Ser. No. 485,808
Int. Cl.^{5} B26D *1/29*
U.S. Cl. 407—42 30 Claims



1. A cutting tool comprising a body with a central axis,
said body having at least one recessed pocket disposed about said axis for receipt of at least one cutting insert,
a cutting insert within said at least one recessed pocket,
means for securing said insert in said at least one recessed pocket,
said insert comprising a wafer of hardened material with polygonal shaped top and bottom faces,
said top and bottom faces oriented parallel to each other and separated by at least three adjoining peripheral side sections,
each of said side sections forming at least one acute angle with an adjoining side,
each of said side sections further comprising first and second

VOL
1127
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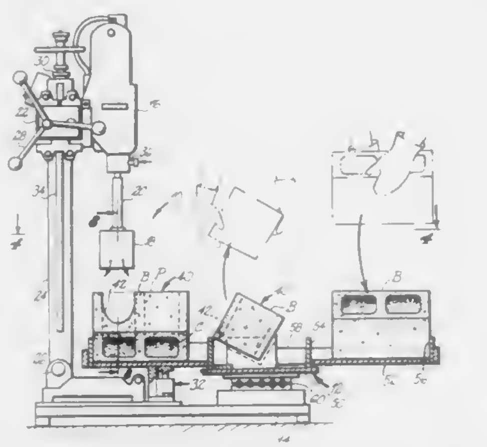
surfaces which intersect with each other to form an obtuse included angle,
said intersecting surfaces forming a line which is skewed with respect to the plane of said top and bottom faces,
said first surface of one side intersecting said top face at a right angle,
said first and second surfaces of at least one adjoining side intersecting said top face at an obtuse included angle and said bottom face at a right angle respectively,
said first surfaces on adjacent sides intersecting at an acute included angle to form at least one cutting edge,
said cutting edge having a positive lead angle, and
said cutting edge having a negative true rake and a positive angle of inclination.

5,020,945
BORING APPARATUS AND METHOD OF MODIFYING CONCRETE BLOCKS

Samuel R. Becker, 4336 Eastwood Dr., Sarasota, Fla. 34232
Division of Ser. No. 477,330, Feb. 8, 1990, Pat. No. 4,958,467. This application Apr. 2, 1990, Ser. No. 503,226
Int. Cl.⁵ B23B *35/00*
U.S. Cl. 408—1 R **5 Claims**



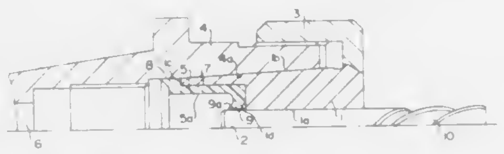
1. A method of making a modified concrete block comprising the steps of:

A. holding a conventional concrete block having a longitudinal axis and having upright parallel side and end walls, said side walls spaced apart by said end walls, and at least one interior transverse partition which forms at least two upright cavities through said conventional block;
B. aligning the longitudinal axis of a boring device generally perpendicular to the longitudinal axis of said concrete block and at an acute angle to one said side wall, said boring device generally equal in diameter to the length of, and aligned with, one said cavity;
C. boring a hole through one said side wall and into said one said cavity, said hole extending from through the edge margin of one said side wall, toward, but not to, the other edge margin of said side wall.

5,020,946
TOOL CHUCK COOLANT SYSTEM

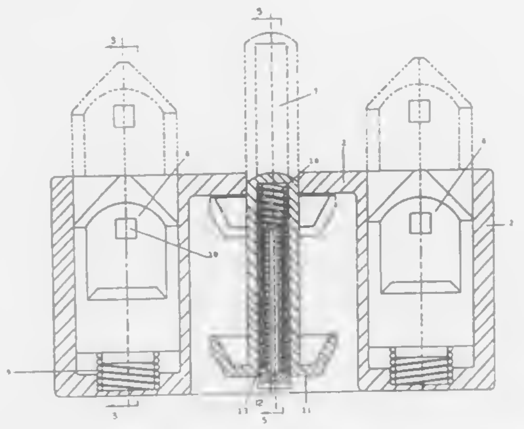
Eugen Nann, Boettingen, Fed. Rep. of Germany, assignor to Simon Nann KG, Fabrik fuer Spannwerkzeuge, Boettingen, Fed. Rep. of Germany
Filed Nov. 28, 1989, Ser. No. 442,134
Int. Cl.⁵ B23B *31/20, 51/06;* **B23C** *5/28*
U.S. Cl. 409—136 **11 Claims**

1. A tool chuck assembly comprising a collet having a bore for supporting a tool, a collet holder having a portion circumscribing said collet, a tension nut cooperatively associated with said collet holder to mount and dismount said tool, means defining a coolant channel in said collet holder, a sealing element mounted in said collet having a first peripheral sealing surface (8) engaging the inner wall of said collet holder to form a seal behind said collet and a second peripheral sealing surface (9) engageable with the outer periphery of said tool to form a seal therewith, and means mounting said sealing element relative to said collet holder and said collet, such that a substantially uniform and constant seal pressure is produced between said tool and said peripheral sealing surface (8, 9) regardless of the seating pressure of said collet, said collet holder and said tool relative to one another.



5,020,947
AUTOMATIC LOCKING SYSTEM

Peter Marcelius, Loddekopinge, Sweden, assignor to Buffers AB, Täby, Sweden
Filed Oct. 3, 1989, Ser. No. 415,954
Int. Cl.⁵ B60P *01/64;* **A44B** *17/00*
U.S. Cl. 410—70 **9 Claims**



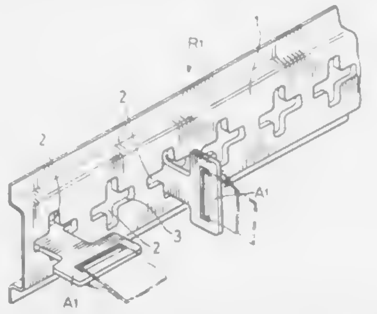
2. A locking housing device comprising one housing consisting of one lower guiding part and one upper locking part mounted on a spring, and kept in locking position by two movable locking plates situated underneath the housing, comprising a triggering device,

wherein said locking plates are L-shaped and have a bevelled upper edge in a trigger pin area and said housing having a bottom area at the outer parts of the locking area and said locking plate resting on an area in a locking housing of a box.

5,020,948
BELT FITTING ENGAGEMENT RAIL

Ryoseki Ihara, Aichi, Japan, assignor to Kabushiki Kaisha Ihara Kogyo, Hoigun, Japan
Filed May 16, 1989, Ser. No. 353,333
Claims priority, application Japan, Jun. 17, 1988, 63-80457[U]
Int. Cl.⁵ B65D *61/00, 63/16*
U.S. Cl. 410—105 **1 Claim**

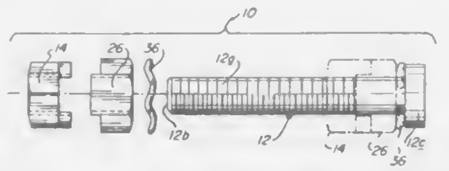
1. A belt fitting engagement rail, comprising:
A rail body for mounting on the inside of a side of a container and having longitudinally extending edge portions and a center portion bulged laterally from said longitudinally extending edge portions; and
said center portion having a plurality of engagement holes therein spaced along the length of said rail at constant intervals, said engagement holes having a cross-shape defined by two elongated intersecting portions, one extending longitudinally of said rail and the other extending transversely of said rail, the ends of the transversely extending portion being spaced inwardly of said edge portions to leave a space on said center portion; and



flange means around the edge of the entire periphery of each said engagement holes, said flange means extending in a direction opposite from the direction in which said center portion is bulged from said edge portions.

5,020,949
CONTROLLED-TORQUE FASTENER

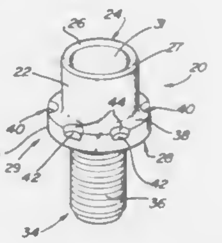
Eugene P. Davidson, and Alegra G. Davidson, both of Colebrook Stage, Winsted, Conn. 06098
Continuation of Ser. No. 320,561, Mar. 8, 1989, abandoned. This application Dec. 12, 1989, Ser. No. 453,039
Int. Cl.⁵ F16B *3/00, 33/04*
U.S. Cl. 411—7 **15 Claims**



1. A controlled-torque threaded fastener comprising:
(a) a shaft having a threaded portion dimensioned and configured to threadably engage a complementary threaded bore;
(b) a tool seat carried on the shaft and dimensioned and configured to be engaged by a driving tool for rotating the tool seat, the tool seat having a driving face and an opposing face and being movable between (i) a driving position in which it is in driving engagement with the shaft, and (ii) a non-driving position in which the tool seat is out of driving engagement with one of the driving tool and the shaft whereby the shaft is disengaged from driving engagement with the driving tool;
(c) biasing means carried on the fastener and positioned to exert a pre-determined biasing force on the opposing face of the tool seat to urge the tool seat into its driving position in opposition to driving torque imposed on the tool seat by the driving tool whereby, upon imposition upon the tool seat of a driving torque which exceeds the biasing force, the biasing force is overcome and the imposed driving torque forces the tool seat into its non-driving position to terminate driving of the shaft by the driving tool; and
(d) a torque transmission means mounted on the shaft for rotation therewith and having a driven face against which the driving face of the tool seat is urged by the biasing means, the driven face being dimensioned and configured to urge the tool seat against the biasing means in opposition to the biasing force.

5,020,950
RIVETING FASTENER WITH IMPROVED TORQUE RESISTANCE

Harold A. Ladouceur, Livonia, Mich., assignor to Multifastener Corporation, Detroit, Mich.
Filed Mar. 6, 1990, Ser. No. 489,437
Int. Cl.⁵ F16B *39/00*
U.S. Cl. 411—107 **17 Claims**

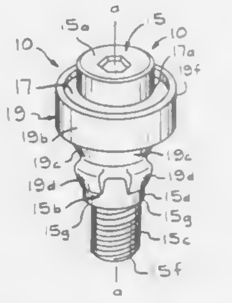


1. A riveting fastener having improved panel assembly torque resistance, said riveting fastener including a tubular riveting barrel portion having a free end and a body portion having a diameter greater than said barrel portion, said body portion having a side wall and a continuous surface extending radially between said barrel portion and said body portion side wall, said tubular barrel portion adapted to be received through an opening in a panel for riveting said barrel portion of said panel and said body portion adapted to be driven into said panel adjacent said panel opening deforming said panel, the improvement comprising:

torque resistance means on said body portion thereby preventing relative rotation of said riveting fastener in said panel, said torque resistance means comprising a plurality of spaced pockets in said body portion, each one of said pockets defined by pocket walls within said body, said pocket walls extending axially towards and intersecting said radial surface of said body portion and said pocket walls generally diverging radially toward and intersecting said body side walls, said intersection of said pocket walls with said body side walls and radial surface defining a pocket opening which channels panel material into said pockets as said body portion is driven into said panel forming a mechanical interlock between said body portion and said panel resisting rotation of said riveting fastener relative to said panel.

5,020,951
FASTENER ASSEMBLY

David G. Smith, 917 N. Hickory St., Owosso, Mich. 48867
Filed Oct. 5, 1990, Ser. No. 593,063
Int. Cl.⁵ F16B *39/00*
U.S. Cl. 411—107 **9 Claims**



1. A fastener assembly for fastening a member with a hole for the assembly to a support with a threaded opening which comprises:
(a) bolt means having a head at one end, an intermediate shaft and a threaded portion at an opposite end from the one end along a longitudinal axis, wherein the shaft has a

VOL
1127
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larger cross-section adjacent the threaded portion which engages an entrance to the threaded opening upon assembly;

(b) a flexible grommet means having an opening which receives the shaft of the bolt means, wherein the bolt means is moveable in the opening in the grommet means along the longitudinal axis so that the threaded portion projects from the grommet when the assembly is fastened into the threaded opening and the threaded portion can be positioned inside the grommet means prior to fastening; and

(c) flat washer means mounted around the shaft means and secured to the grommet means, wherein the bolt means and the washer means have interference portions which engage each other so that the grommet means can move axially on the bolt means until the interference portions engage each other with the threaded portion at least partially inside the grommet means.

5,020,952

RIVETLESS NUT PLATE AND FASTENER

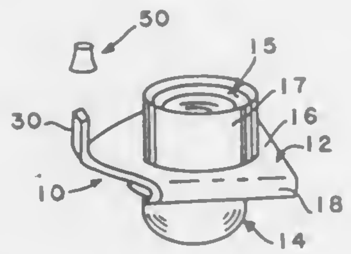
Henry J. Zeigler, Orlando, and Bruce L. Frisinger, Windermere, both of Fla., assignors to Martin Marietta Corporation, Bethesda, Md.

Continuation of Ser. No. 204,285, Jun. 9, 1988, Pat. No. 4,919,578. This application Apr. 13, 1990, Ser. No. 508,482

The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.

Int. Cl.^{5} F16B *37/04. 39/28*

U.S. Cl. 411—113 12 Claims



1. A nut plate for use with a threaded fastener, the nut plate comprising:

a generally flat portion having a passageway therethrough, said generally flat portion defining a plane;

means for securing said nut plate to a mounting plate, said means for securing including a tubular portion which extends generally perpendicularly with respect to said flat portion, said tubular portion being substantially immovable in the plane defined by said generally flat portion after said tubular portion extends generally perpendicularly with respect to said flat portion;

means for loosely securing a threaded fastener to said nut plate adjacent said passageway whereby a threaded member may be received by said threaded fastener, said threaded fastener being loosely secured to said nut plate after said nut plate is secured to said mounting plate; and

means for preventing relative rotation between said nut plate and said mounting plate, said means for preventing relative rotation including a projection which extends generally perpendicularly with respect to said flat portion, said projection extending on the same side of said flat portion as the tubular portion of said means for securing, said projection being substantially immovable in the plane defined by said generally flat portion.

5,020,953

LOCK NUT

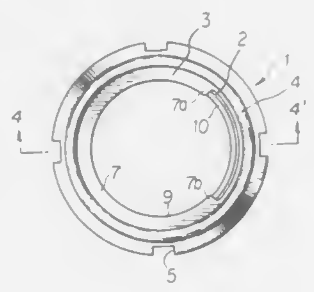
Takeji Wada, Osaka, Japan, assignor to Fuji Seimitsu Mfg. Co., Ltd., Osaka, Japan

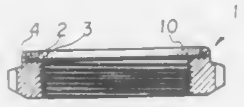
Continuation of Ser. No. 71,542, Jul. 7, 1987, abandoned, which is a continuation of Ser. No. 830,240, Feb. 18, 1986, abandoned, which is a continuation of Ser. No. 675,249, Nov. 26, 1984, abandoned, which is a continuation of Ser. No. 303,104, Sep. 17, 1981, abandoned. This application Mar. 23, 1988, Ser. No. 172,955

Claims priority, application Japan, Nov. 26, 1980, 55-169380[U]

Int. Cl.^{5} F16B *39/284*

U.S. Cl. 411—247 30 Claims





1. A lock nut for reliably and securely setting bearings mounted on a threaded shaft, said nut comprising:

a circular nut body having an outer peripheral surface, said body having first and second ends, said first and second ends having an annular surface, and said body having internal female threads being at least one of fine and extra fine pitch;

groove means for facilitating rotation of said nut body, adapted for rotation by a tool, said groove means being formed on said peripheral surface of said nut body at the outer circumference of said body;

a cylindrical portion having first, second and third portions, said first portion having first and second ends, said first end of said first portion being integrally connected to said first end of said body near the outer periphery of said annular surface of said first end of said nut body and extending from said annular surface of said first end of said nut body in an axial direction from said body, said second portion having an inverted "U" shape, and having first and second ends, said first end of said second portion being integrally connected to said second end of said first portion, bending inwardly from said second end of said first portion toward the center of said circular nut body, said third portion having first and second ends, said first end of said third portion being integrally connected to said second end of said second portion and extending from said second end of said second portion in an axial direction toward said nut body; and

an annular apertured flat sheet formed of resilient material, said annular flat sheet having an inner and outer circumferential periphery, said outer circumferential periphery of said sheet being secured on said annular surface of said first end of said nut body by said third portion pressing said periphery of said annular flat sheet on said annular surface of said first end of said nut body, said sheet having an integral arcuate protrusion extending inwardly from said inner circumferential periphery of said sheet, said arcuate protrusion being greater than or equal to 50% and less than or equal to 75% of said inner circumference so as to be adapted to contact the surface of the male threads on said threaded shaft onto which said nut is screwed, and said arcuate protrusion being fixedly secured relative to said nut body such that said sheet rotates about said threaded shaft with said nut body.

5,020,954

SCREW DRIVING SOCKET

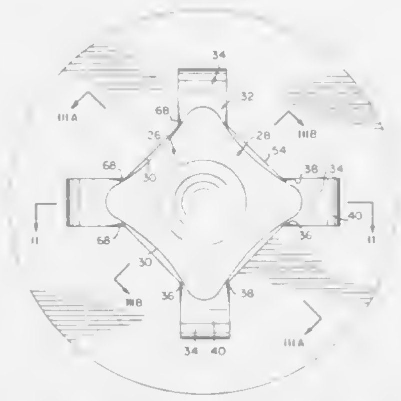
Geoffrey Dreger, Etobicoke, Canada, assignor to Intools, Limited, Ontario, Canada

Continuation-in-part of Ser. No. 652,992, Sep. 21, 1984, abandoned, which is a continuation of Ser. No. 360,501, Mar. 22, 1982, abandoned, and a continuation-in-part of Ser. No. 740,682, Jun. 3, 1985, abandoned, which is a continuation-in-part of Ser. No. 652,992, Sep. 21, 1984, abandoned. This application Nov. 29, 1989, Ser. No. 442,678

Claims priority, application United Kingdom, Mar. 30, 1981, 8109924

Int. Cl.^{5} F16B *35/00. 23/00*

U.S. Cl. 411—403 21 Claims



1. A screw having a combined driving socket adapted to individually receive both a square, Robertson type driver and a cross-point Phillips type driver, the Robertson type and Phillips type drivers each being of standard sizes conventionally associated with the screw size, and the socket being shaped so that only parts of either a Robertson type or a Phillips type screw driver received in the socket contact sides of the socket to provide clearance between the socket and the driver, the combined driving socket comprising:

four nearly vertical faces that together define a square recess adapted to receive a square, Robertson type driver;

four wings disposed diagonally with respect to the square recess and extending outwardly from the corners of the square recess, each of the wings being defined by a pair of nearly vertical and generally parallel side walls and a curved end wall, each of said curved end walls being convex and having a deepest zone that is nearly vertical, a relieving zone adjacent the top of the socket that is at an angle to the vertical substantially greater than 26½ degrees, and a driver-engaging zone intermediate the deepest and the relieving zones, said driver-engaging zone being at an angle of substantially 26½ degrees to the vertical; and

said wings defining a cross-slot shaped recess adapted to receive a cross-point Phillips type screw driver with the blades of the driver contacting the driver-engaging zones of the end walls, the profile of the cross-slot shaped recess permitting ready disengagement of the Phillips type driver, and when such a cross-point Phillips type driver is at an angle to the longitudinal axis of the screw, the curved end walls enable positive engagement of that driver with its blades contacting the driver-engaging zones in the end walls of the wings.

5,020,955

METHOD OF MANUFACTURING A CLOSURE UNIT MADE OF SHEET METAL OR PLATING AND CONTAINER HAVING A CLOSURE UNIT OBTAINED THEREBY

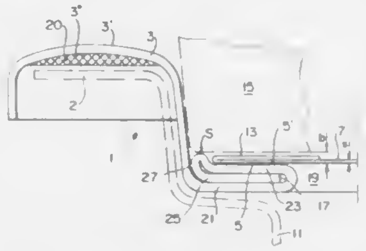
Horst Zumsteg, Rorschach, Switzerland, assignor to Alcan Rorschach AG, Rorschach, Switzerland

Division of Ser. No. 280,304, Dec. 5, 1988, Pat. No. 4,915,254. This application Oct. 18, 1989, Ser. No. 423,204

Claims priority, application Switzerland, Dec. 14, 1987, 4867/87

Int. Cl.^{5} B21D *35/00*

U.S. Cl. 413—8 5 Claims



1. A method of manufacturing a closure unit formed of sheet metal and containing a holding ring having a ring area bounding a central opening and comprising three substantially flat superjacent and folded sections for attachment with a membrane, said method comprising the step of:

performing in a single deep-drawing operation predetermined shaping and punching operations upon a blank from which there is formed the closure unit wherein said step of performing in a single deep-drawing operation said predetermined shaping and punching operations upon the blank forming the closure unit comprises the steps of:

punching out the blank for the closure unit, peripherally shaping a holding ring and cupping a central portion of the blank to form a substantially cup-shaped part, punching out the bottom of the substantially cup-shaped part to provide a central opening, rolling predetermined sections back into the substantially cup-shaped part, and flattening the rolled-back sections adjacent the central opening; wherein said steps of punching out the blank, peripherally shaping a holding ring and cupping a central portion of the blank, and punching out the bottom are performed during a travel path of a tool in a given direction; and said steps of rolling and flattening are performed during a travel path of said tool in a direction which is reverse to said given direction.

5,020,956

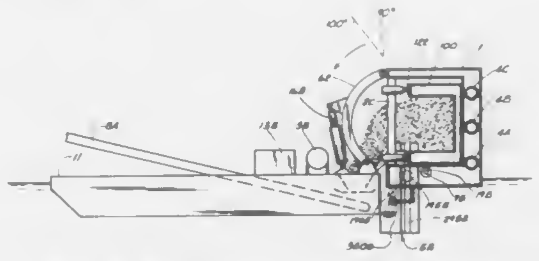
OPEN HOPPER BARGE UNLOADING SYSTEM

John Marsden, Cutoff, La., assignor to Margrif Design Corporation, Destrehan, La.

Filed Aug. 19, 1988, Ser. No. 234,340

Int. Cl.^{5} B63B *27/00*

U.S. Cl. 414—138.1 11 Claims



1. A barge unloader system for rapidly unloading granular materials from an open hopper barge, comprising:

a self-contained support structure having compressed gas

VOL
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system means comprising a compressed gas system for creating, storing and delivering compressed gas, and associated cargo system means for handling granular materials;

a guide assembly integral to said support structure having at least one essentially vertically oriented slot and at least one essentially vertically oriented rail assembly, wherein said rail assembly is essentially parallel to said slot;

a floating barge lifting platform rotatably and translatably connected to said guide assembly having at least one slot roller post which is fitted with a slot roller which travels within said essentially vertically oriented slot, and at least one mechanical roller post which is fitted with a rail roller which travels in contact with said essentially vertically oriented rail assembly, and mechanical stop sub-system means for stopping the rotation of said platform when said floating barge lifting platform is moved to an unloading position;

raising means fitted to said floating barge lifting platform, which is operated by said compressed gas system, for elevating said floating barge lifting platform in said guide assembly relative to said support structure;

latch beam means comprising at least one latch beam pivotally attached at one end to said floating barge lifting platform, for spanning an open hopper barge positioned within said floating barge lifting platform and which is affixable at the end opposite to the pivotally attached end to said floating barge lifting platform;

clamp means comprising at least one clamp mounted on said latch beam for holding an open hopper barge in position within said floating barge lifting platform;

rotating arm means comprising at least one rotating arm pivotally attached at one end to said support structure and which attaches at the end opposite to the pivotally attached end to said floating barge lifting platform for rotating said floating barge lifting platform about said guide assembly relative to said support structure; and

a power means for operating said rotating arm.

5,020,957

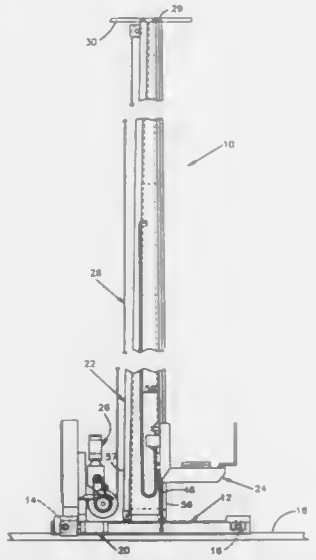
MAST TO BASE CONNECTION FOR A STORAGE AND RETRIEVAL MACHINE

Sergay D. Liston, Centerville, Utah, assignor to Eaton-Kenway, Inc., Salt Lake City, Utah

Filed Dec. 21, 1989, Ser. No. 454,340

Int. Cl.^{5} B65G *1/00;* B66C *23/06*

U.S. Cl. 414—279 **4 Claims**



1. In a storage/retrieval machine comprising a base assembly; drive means mounted on said base assembly for supporting said machine on a floor-mounted horizontal rail and for driving said machine along said rail; and a mast assembly attached to said base assembly, means mounted on said mast for storing and retrieving loads, said mast assembly and said base assembly including pin connection means for attaching the mast assembly to the base assembly; the improvement wherein said base assembly comprises a plurality of upstanding plates extending substantially the full length of said storage/retrieval machine, and a top plate welded to said plurality of upstanding plates, a plurality of longitudinally aligned apertures formed in said top plate, each of said upstanding plates having a pair of upstanding first lugs formed integrally therewith and spaced apart along the longitudinal axis of the upstanding plate and extending through said apertures in said top plate; said mast assembly comprises first and second mast elements each having a plurality of second lugs thereon interfitting with said first lugs; and said pin connection means comprises pin means received in said interfitting lugs.

5,020,958

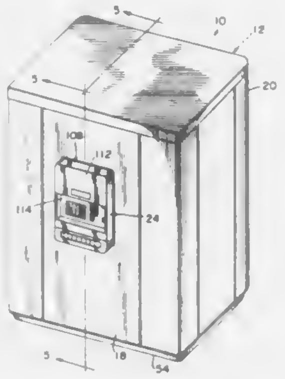
ARTICLE VENDING MACHINE

Philip Tuttobene, #148, 22979 Barton Rd., Grand Terrace, Calif. 92324

Filed Feb. 23, 1989, Ser. No. 315,345

Int. Cl.^{5} B65G *1/00*

U.S. Cl. 414—281 **17 Claims**



1. In an article handling machine operable by users having identification (ID) cards bearing user identifying codes for handling articles bearing article identifying codes, the combination comprising:

ID card receiving means into which a user may insert his ID card,

transport means for transporting articles between certain positions, and

a single common code reader for reading both the user code on a user ID card inserted into said card receiving means and the article code on an article transported between said positions by said transport means.

5,020,959

ADJUSTABLE SHUTTER FOR CONTAINMENT OF ELECTRICAL COMPONENTS IN TAPE FEEDERS

Henry J. Soth, Brackney, Pa., assignor to Universal Instruments Corporation, Binghamton, N.Y.

Continuation-in-part of Ser. No. 337,856, Apr. 14, 1989, abandoned. This application Oct. 15, 1990, Ser. No. 598,762

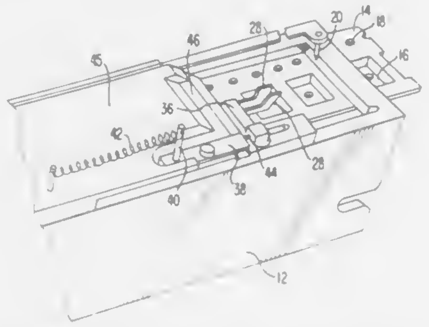
Int. Cl.^{5} B65G *65/00*

U.S. Cl. 414—416 **8 Claims**

8. A feeder device for high-speed feeding of electronic components contained within pockets of a reeled tape which is indexed to present each pocket and the component therein sequentially to a pick-up station, each component having an upper face, said device comprising:

a shutter means for covering said pocket at said pick-up station, said shutter means including a pair of upwardly extending spring blades; and

a movable pick-up head means for opening said shutter means sufficiently to access the component prior to removal from the pocket said pick-up head means having a cross-sectional tip surface area greater than or equal to the surface area of the upper face of the component.



5,020,960

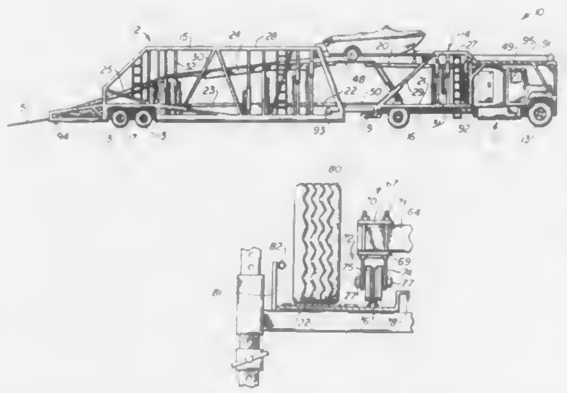
BOAT HAUL VEHICLE

Victor A. Provenson, Woodstock, Ga., assignor to Auto Transport Equipment Co., Kennesaw, Ga.

Filed Apr. 23, 1990, Ser. No. 512,340

Int. Cl.^{5} B60P *3/08;* B60R *9/00;* B62D *39/00*

U.S. Cl. 414—494 **10 Claims**



8. A load carrying vehicle for carrying a plurality of trailers in multiple layers, with each of the trailers including road wheels at one end and a removable dolly at its other end, with the dolly including track wheels, said load carrying vehicle comprising:

side frames mounted parallel to each other and defining a load space therebetween,

a plurality of ramps positioned in said load space and movably mounted to said side frames, said ramps each including a substantially flat road wheel surfaces extending along the length of the ramp for receiving the road wheels of the trailers and track means extending along the length of the ramp and shaped to guide the track wheels of the dolly along the length of the ramp,

ramp power means for raising and lowering said ramps and for aligning the ends of said ramps to place the road wheel surfaces and the track means of adjacent ramps in alignment to form effectively continuous road wheel surfaces and effectively continuous track means from ramp to ramp, and

power means mounted to said vehicle for moving said trailers along said ramps,

whereby the trailers are moved along the ramps by the power means with the road wheels rolling along the flat road wheel surfaces and the track wheels of the dollies rolling along the track means.

5,020,961

TRANSFER CAR

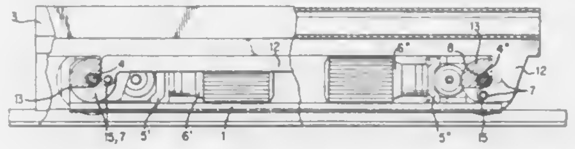
Jari Mäki-Rahkola, Kauhajoki; Juhani Könönen, and Jorma Surakka, both of Hyvinkää, all of Finland, assignors to Insinooritoimisto Pesmel Oy, Kauhajoki, Finland

Filed Dec. 22, 1989, Ser. No. 455,300

Claims priority, application Finland, Jan. 4, 1989, 890038

Int. Cl.^{5} B60P *1/02*

U.S. Cl. 414—495 **7 Claims**



1. A transfer car which has a chassis frame (1) moving on first and second pairs of wheels (2) rotatably supported by respective first and second transverse axles and having a raisable flatbed (3) thereon, in which said first axle (4") mounted with bearings to the chassis frame and locked to said first wheel pair, is coupled by a first power transmission means (5") to a transfer motor (6, 6") for horizontally transferring the car, and which additionally has a first lever mechanism (7'), turning on said transverse axles and coupled to a raising motor (6, 6') by a second power transmission means (5'), for raising and lowering the flatbed (3) with respect to said chassis frame (1), characterized in that the first lever mechanism (7') is fitted to turn, supported by the axles (4', 4") of the two wheel pairs (2), being mounted freely rotatable with bearings (8) at least on said first axle (4") which is locked (9) to said first wheel pair (2).

5,020,962

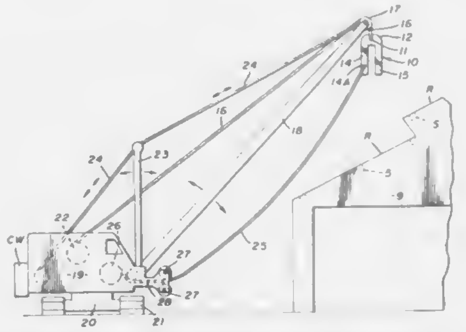
APPARATUS FOR DISMANTLING BUILDINGS

John R. Ramun, Youngstown, Ohio, assignor to Allied Gator, Inc., Youngstown, Ohio

Filed Sep. 10, 1990, Ser. No. 580,092

Int. Cl.^{5} B66B *17/00;* B66C *23/00, 23/82*

U.S. Cl. 414—569 **4 Claims**



1. An apparatus for dismantling a building comprising:

a crane having an elongated boom with an outer end, means for moving said boom relative to said crane in a vertical plane,

first and second winches rotatably mounted on said crane, first and second cables, respectively, operatively engaged

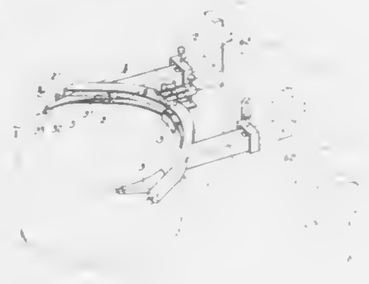
VOL
1127
ISS
1
JE
4
1991
UMI

with said first and second winches, respectively, an end portion of said first cable being trained over said outer end of said boom for movement relative thereto;
a metal inverted U-shaped tool with a front side and a back side, a raised semi-v-shaped configuration mounted on each of said sides at the upper end of said tool, a first aperture mounted in said tool adjacent the upper end thereof within said raised semi-v-shaped configuration, said inverted U-shaped tool including bifurcated arms, a second aperture mounted in one of said arms adjacent the lowermost end thereof;
an end of said first cable being engaged in said first aperture, an end of said second cable being engaged in said second aperture;
a pair of vertically spaced roller guides mounted on said crane outwardly of said second winch for guiding said second cable between said second winch and said second aperture;
whereby said inverted U-shaped tool may be dropped by gravity by an unreeling action of said first winch for engagement in said building to be dismantled and whereby a reeling in action by said second winch on said second cable moves said inverted U-shaped tool engaged in said building toward said crane so as to pull down and dismantle at least a portion of said building.

5,020,963

DEVICE FOR CLAMPING CONTAINER

Minoru Okada, Suita, Japan, assignor to Osaka Taiyu Co., Ltd., Osaka, Japan
Filed Dec. 1, 1989, Ser. No. 444,514
Claims priority, application Japan, Dec. 6, 1988, 63-159317
Int. Cl.^{5} B65G *7/00*
U.S. Cl. 414—607 **14 Claims**

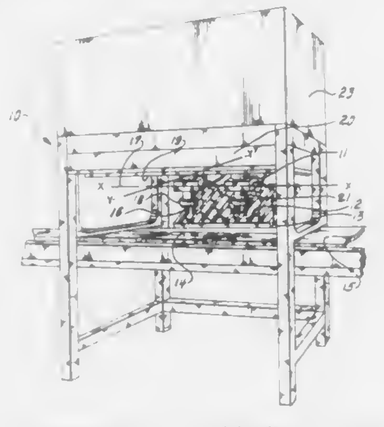


1. A device for clamping a container having a body, a circumference, a center and a diameter comprising:
a support frame having a first free end and a second free end and positionable around the container to be clamped over approximately one-half of the circumference thereof.
a pair of support rods provided respectively on the first end and the second end of the support frame, each of said support rods having a front end and extending in a generally horizontal plane and generally longitudinally of the support frame so that said support rods extend away from each other and have a distance therebetween which increases toward their respective said front end, and
a pair of claw plates, each having a front end and being mounted on the respective support rods being upwardly and downwardly rotatable and having inwardly curved edges opposed to each other for the body of the container to partly fit in, each of the claw plates having an upper surface positioned at a higher level than the support rod, the shortest distance between the pair of claw plates through the center of the container to be clamped corresponding to the diameter of the container body, the distance between said front end of said each claw plate being smaller than the diameter of the container body, and
said each support rod being rotatably mounted on the support frame and externally threaded, and said each claw plate having a slide block at its base end with the support rod extending through the slide block in screw-thread engagement therewith to rotatably support the base end of the class plate, which claw plates are adjustable with respect to the distance therebetween by rotating the support rods, depending upon the size of the container.

5,020,964

METHOD AND APPARATUS FOR ROBOTIC TRANSFER OF WORKPIECES

Robert J. Hyatt, Stanford, Calif.; Edward H. Abbott, Ann Arbor, Mich.; Robert E. Bush, Rochester Hills, Mich., and Francis J. Shannon, Northville, Mich., assignors to Ford Motor Company, Dearborn, Mich.
Filed Nov. 27, 1989, Ser. No. 441,854
Int. Cl.^{5} B25J *17/02*
U.S. Cl. 414—751 **21 Claims**



21. A robotic apparatus for positioning an attached tool to perform an operation on a workpiece, comprising:
(a) means to support said tool upon a linear translating arm, said support having transverse motion means to move in a first X-Y plane and vertical motion means to move in a direction perpendicular to said first plane; and
(b) compliant float wrist for connecting the gripper tool to the support means to permit compliance between the workpiece having one portion thereof out of compliance within a range of plus or minus 0.125 inches in a translatory direction and plus or minus 10° in a rotational direction from another portion of the workpiece which is prepositioned within a holding die, said compliant wrist having means for magnetically supporting a positioning member carrying the gripper tool, and pneumatic means for selectively separating and floating the positioning member from the supporting means to permit lateral adjustment of the positioning member in response to substantially small forces received from the gripper tool as it carries out gripping.

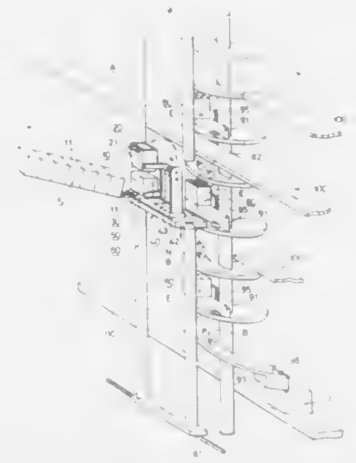
5,020,965

METHOD FOR SHIFTING GOODS AND APPARATUS THEREFOR

Nobuhiro Tanaka, Saitama; Hirotoshi Tawara, and Eiji Hirata, both of Koshigaya, all of Japan, assignors to Kao Corporation, Tokyo, Japan
Filed Apr. 24, 1989, Ser. No. 341,856
Claims priority, application Japan Apr. 28, 1988, 63-106168; Jul. 21, 1988, 63-812050; Nov. 21, 1988, 63-151583; Dec. 26, 1988, 63-167860; Jan. 23, 1989, 1–6305; Jan. 24, 1989, 1-14776; Jan. 26, 1989, 1-16927; Jan. 30, 1989, 1-20584;
Int. Cl.^{5} B65G *65/23*
U.S. Cl. 414—786 **13 Claims**

1. A method for shifting goods arranged in a predetermined manner within a container having an opening portion in which the goods are taken out of the container in such a manner as to correspond to the arrangement of a storing state of the goods which are standing in the container, the method comprising the steps of:

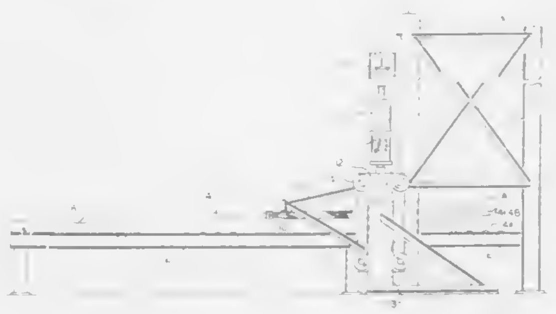
superposing a goods take-out tool over the container in which the goods are standing, the goods take-out tool including partitions which correspond to the arrangement of the storing state of the goods;
inserting a foremost end portion of the goods take-out tool into the opening portion of the container, the foremost end portion including end portions of the partitions;
inverting the container and superposed goods take-out tool;
removing the goods from the container into the goods take-out tool without changing the arrangement of the storing state of the goods, said goods being guided by the end portions of the partitions inserted into the container as said goods move into the goods take-out tool;
providing a shutter in the goods take-out tool, said shutter initially blocking movement of the goods from the goods take-out tool when the container and goods take-out tool are inverted. and
sliding the shutter out of the goods take-out tool to permit at least a portion of the goods to be removed therefrom.



5,020,966

PALLET DISPENSER/ACCUMULATOR

Donald E. Kiker, 2410 Richelieu La., Birmingham, Ala. 35216
Filed Jan. 17, 1989, Ser. No. 296,945
Int. Cl.^{5} B65G *60/00*
U.S. Cl. 414—797.5 **1 Claim**

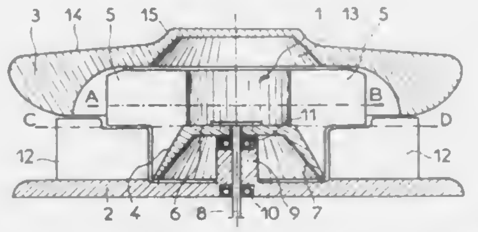


1. A pallet dispenser and accumulator comprising a storage magazine for a stack of pallets, at least one probe insertable into a pallet, a probe support and guide structure mounting the probe for vertical movement, a first pneumatic cylinder for horizontally moving the probe, second and third pneumatic cylinders mounted end to end and connected to the probe support and guide structure for vertically moving the probe and a roller conveyor, whereby a pallet is dispensed from the bottom of the stack by atuating the second and third pneumatic cylinders to lower the stack onto the roller conveyor, actuating the first pneumatic cylinder to retract the probe from engagement with a bottom pallet in the stack, the second pneumatic cylinder is actuated to raise the probe into position to engage the second pallet from the bottom of the stack, the first pneumatic cylinder is actuated to insert the probe into the second pallet from the bottom of the stack, the third pneumatic cylinder is actuated to raise the pallet stack off the bottom pallet and the roller conveyor is actuated to remove the pallet from underneath the stack.

5,020,967

WIND MOTOR MODULE MADE BY ASSEMBLING A PARABOLIC-FLOW TURBINE BETWEEN A BASE AND A DOME

Dominique Gual, and Georges Gual, both of F-30400 Villeneuve, Lez Avignon, France
PCT No. PCT/FR88/00586, § 371 Date Aug. 1, 1989, § 102(e) Date Aug. 1, 1989, PCT Pub. No. WO89/05403, PCT Pub. Date Jun. 15, 1989
PCT Filed Nov. 30, 1988, Ser. No. 392,968
Claims priority, application France, Dec. 4, 1987, 87 17256
Int. Cl.^{5} F03D *1/04*
U.S. Cl. 415—4.4 **7 Claims**



1. A wind motor module that produces a parabolic laminar flow, comprising:
a parabolic turbine having a centrally located vertical rotating shaft;
a base on which said turbine turns, said base having vertical peripheral wings; and
a dome for protecting the turbine and having a hemi-lenticular shape wherein said hemi-lenticular dome includes an interiorally disposed truncated cone shaped section

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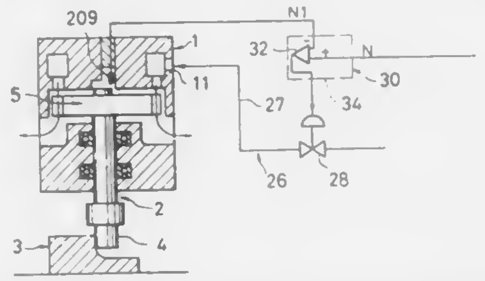
5,020,968

SYSTEM FOR CONTROLLING THE ROTATING SPEED OF A PNEUMATICALLY DRIVEN SPINDLE

Akio Yamada, and Fumio Hayashi, both of Tokyo, Japan, assignors to Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan
Filed Mar. 16, 1989, Ser. No. 324,149
Claims priority, application Japan, Apr. 15, 1988, 63-49930[U]; Apr. 21, 1988, 63-52787[U]; Sep. 30, 1988, 63-127081[U]
Int. Cl.^{5} F01D *17/06*
U.S. Cl. 415—36 **6 Claims**



1. A system for controlling the rotating speed of a pneumatically operated, turbine driven spindle used in a machine tool, comprising:
an element for mounting said turbine on said spindle;

VOL
1127
ISS
1
JE
4
1991
UMI

a casing for said spindle and said turbine;
an air supply line connected to said casing for supplying air to drive said turbine;
a valve disposed in said air supply line for adjusting the flow rate of the air supplied to said turbine;
a sensor for detecting the rotating speed of said turbine; and
control means for closing said valve when the rotating speed (N1) detected by said sensor is zero.

5,020,969
TURBO VACUUM PUMP

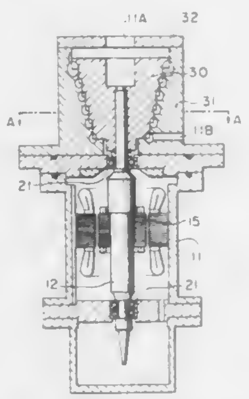
Masahiro Mase, Tochigi; Seiji Sakagami; Takeshi Okawada, both of Ibaraki; Shinjiroo Ueda, Abiko; Yoshihisa Awada, and Takashi Nagaoka, both of Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 20, 1989, Ser. No. 409,720

Claims priority, application Japan, Sep. 28, 1988, 63-240727; Apr. 4, 1989, 1-83921

Int. Cl.^{5} F04D *29/00;* **F01D** *1/00*

U.S. Cl. 415—55.3 **30 Claims**



1. A vacuum pump comprising a housing having an inlet port and an outlet port, a rotary shaft rotationally supported in said housing, a multistage peripheral-flow impeller supported by said rotary shaft, and a stator constituting a multistage peripheral-flow pump in cooperation with said peripheral-flow impeller within said housing so that a gas suctioned through said inlet port is discharged through said outlet port, said multistage peripheral flow impeller having a conical cross-sectional configuration and including a plurality of steps defined about an outer periphery thereof, with each stp respectively defining a stage of the multistage peripheral flow impeller, said steps being spaced from each other in an axial direction of the impeller, outer diameters of the individual steps decreasing in a step-by-step fashion in a direction from the inlet side of the pump toward an outlet side thereof such that an outer diameter of the immediately preceding step is greater than a following step, and a plurality of circumferentially spaced blades arranged at each step at projecting corners thereof, and wherein said stator surrounds the outer periphery of said impeller, said stator includes a plurality of steps along an interior thereof in opposition to the respective steps of said peripheral flow impeller, inner diameters of the individual steps of the stator decrease in the direction from the inlet toward the outlet side of the vacuum pump in a step-by-step fashion corresponding to said steps of said impeller, and said stator and said peripheral-flow impeller are dimensioned such that a small gap is provided between opposed surface portions thereof, and wherein said impeller and said stator can be assembled and disassembled from each other without disassembly of said stator.

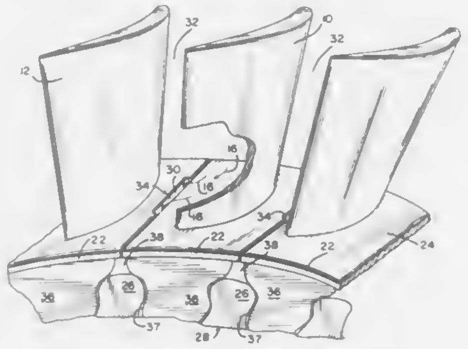
5,020,970
FLUID-HANDLING, BLADED ROTOR

Jules L. Dussourd, Princeton, N.J.; Pawan J. Singh, Quakertown, Pa., and J. C. Miller, Rockford, Ill., assignors to Dresser-Rand Company, Corning, N.Y.

Filed Jul. 13, 1989, Ser. No. 379,315

Int. Cl.^{5} F01D *5/14*

U.S. Cl. 415—115 **10 Claims**



1. A fluid-handling, bladed rotor, comprising:
a rotor body;
said body having a plurality of juxtaposed recesses formed therein;
an annular wall circumscribing said body;
elongate blades;
each of said blades having (a) a first, radially-extending end projecting outwardly from said wall, and (b) an opposite, attachment end set in one of said recesses; wherein
adjacent ones of said blades define fluid flow passages therebetween which accommodate a given fluid flow capacity therewithin; and
means in said wall for extracting fluid from said passages; wherein
said means comprises means for extracting between approximately one-third of one percent to approximately one and two/thirds percent of said capacity of said passages.

5,020,971
ROTATABLE ASSEMBLY

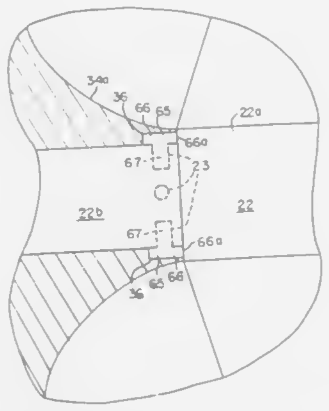
Alexander Greenspan, Russell, Ohio, assignor to Super Stream, Inc., Warrensville Heights, Ohio

Division of Ser. No. 265,284, Oct. 26, 1988, Pat. No. 4,929,149, which is a continuation of Ser. No. 175,649, Mar. 21, 1988, abandoned, which is a continuation of Ser. No. 864,927, May 19, 1986, abandoned, which is a continuation-in-part of Ser. No. 689,642, Jan. 8, 1985, abandoned. This application Sep. 27, 1989, Ser. No. 413,354

Int. Cl.^{5} F04D *29/20*

U.S. Cl. 416—204 A **5 Claims**

1. A rotatable assembly comprising a shaft having a generally cylindrical first section and a generally cylindrical second section, the diameter of the first section being greater than the diameter of the second section, and a shoulder having a generally annular face extending between the first and second sections of the shaft,
a member having a face and an axial bore sized to receive the second section of the shaft and adapted to confront the face of the first section of the shaft when the member is mounted on the shaft,
means for securing the member against rotation relative to the shaft comprising a plurality of pins, each pin comprising a pin head and a pin shaft formed integrally with and extending from the pin head, the pin head having a generally semicylindrical curved surface distal from the pin shaft, the curved surface being curved in a direction generally transverse to the shaft,
a plurality of radial bores formed radially symmetrically in the second section of the shaft proximate the first section and adapted to securely receive the pin shafts in a press fit, and
a plurality of slots formed in the wall of the axial bore of the member, each slot having a blind end and an open end formed in the face of the member, each slot having a shape and size complementary to the shape and size of the pin heads, the slots being adapted to align with and receive the pin heads when the pin shafts are inserted into the radial bores and the member is positioned on the shaft.



5,020,972
METHOD AND APPARATUS FOR PREVENTING THE NO-LOAD OPERATION OF A PUMP FOR A LIQUID SUPPLY SYSTEM

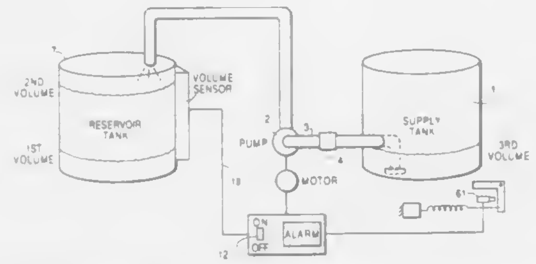
Shunichi Nakayama, Takasaki; Masashi Kanai, Azuma, and Yasuyuki Arai, Sakai, all of Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Nov. 29, 1989, Ser. No. 442,800

Claims priority, application Japan, Nov. 29, 1988, 63-99436

Int. Cl.^{5} F04B *49/02*

U.S. Cl. 417—37 **18 Claims**



1. In a device for preventing the no-load operation of a pump for a liquid supply system including a supply tank to accommodate liquid, a reservoir tank connectively coupled to said supply tank, first sensor means for detecting the amount of liquid in said reservoir tank and outputting a first output signal, and a pump, said pump connectively coupled between said supply tank and said reservoir tank, said pump, in response to said first output signal from said first sensor means, supplying liquid from said supply tank to said reservoir tank until the amount of liquid in said reservoir tank increases from a first predetermined volume to a second predetermined volume, said second predetermined volume being greater than said first predetermined volume, the improvement comprises:
second sensor means for detecting the amount of liquid in said supply tank and outputting a second output signal when the amount of liquid is at a third predetermined volume;
control circuit means for controlling the operation of said pump;
said control circuit means being operable to disable the operation of said pump and to simultaneously output a first indication control signal in response to said second output signal from said second sensor means;
said control circuit means also being operable to disable the operation of said pump after a predetermined period of time and to simultaneously output a second indication control signal; and
indication means responsive to each of said first and said second indication control signals separately for indicating that the operation of said pump is disabled by said control circuit means.

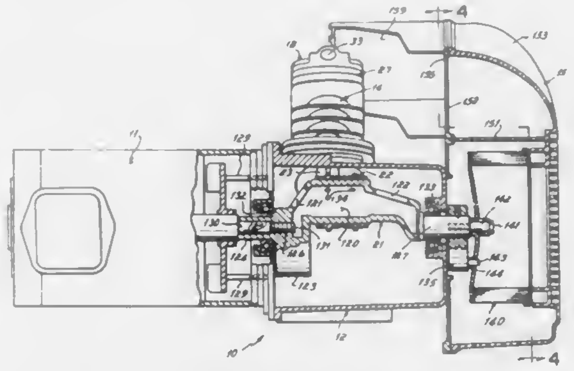
5,020,973
AIR COMPRESSOR SHROUD

James B. Lammers, Cleves, Ohio, assignor to The Scott & Fetzer Company, Lakewood, Ohio

Division of Ser. No. 252,695, Oct. 3, 1988, Pat. No. 4,915,594, which is a division of Ser. No. 856,645, Apr. 25, 1986, Pat. No. 4,801,250. This application Jan. 10, 1990, Ser. No. 462,779

Int. Cl.^{5} F04B *1/02, 39/06*

U.S. Cl. 417—243 **1 Claim**



1. An air compressor having two cylinders in V-shaped configuration mounted on a crankcase, an intercooler disposed between said cylinders for conducting air from one cylinder to the other, a fan mounted at an end of said crankcase and a fan shroud operably disposed about said fan, and said shroud further including:
a scroll-shaped vane disposed around said fan for directing air from said fan;
two projections extending upwardly in V-shaped configuration from said shroud;
cooling air discharge passageways extending from said fan and vane into said shroud projections;
a shroud back plate having two projections in V-shaped configuration corresponding to said shroud projections, said plate closing off said shroud and forming with said shroud a cooling air chamber for receiving cooling air from said fan and vane;
transverse exhaust ports in ends of the backplate projections for exhausting cooling air from said chamber;
deflector means disposed in operable alignment with said exhaust ports for directing cooling air over said respective cylinders; and
a further exhaust port disposed in said back plate in general register with said intercooler means for directing cooling air from within said shroud over said intercooler.

5,020,974
FLUID COMPRESSORS

Robin H. J. Searle, Somerset, England, assignor to Normalair-Garrett (Holdings) Limited, Yeovil, England

Filed Oct. 31, 1989, Ser. No. 430,660

Claims priority, application United Kingdom, Nov. 17, 1988, 8826867

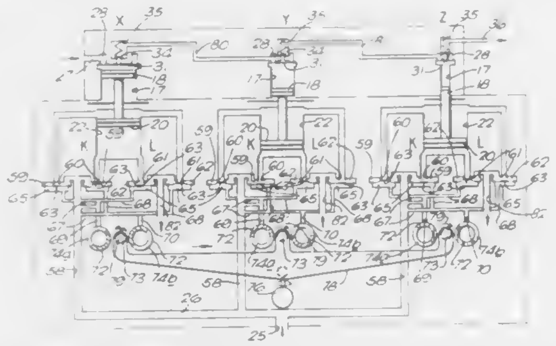
Int. Cl.^{5} F04B *25/00*

U.S. Cl. 417—246 **20 Claims**

18. A fluid compressor comprising a plurality of compres-

VOL
1127
ISS
1
JE
4
1991
UMI

sion stages each having a compression piston operating in a compression cylinder and drive means for driving each compression stage comprising a pneumatically operated drive piston operated in a drive cylinder, each said drive piston controlled by control means comprising at least one diaphragm inlet valve co-operating with an annular valve seat opening into the drive cylinder and located centrally of an annular inlet pressure chamber, and at least one diaphragm exhaust valve co-operating with an annular valve set opening into the drive cylinder and located centrally of an annular exhaust chamber,



a control pressure chamber located at the side of the diaphragm inlet and exhaust valve opposite said annular inlet pressure and exhaust chambers, the inlet pressure chambers and the control pressure chambers being connected during operation to a supply of pressurized air and the exhaust chambers being connected via the exhaust valve to ambient, said control means including a rotatable cam means adapted to operate valves for selectively venting the control pressure chambers to operate each of the drive pistons and drive and sequencing means for rotating each cam means in a predetermined sequence.

5,020,975
VARIABLE-DELIVERY VANE-TYPE ROTARY COMPRESSOR

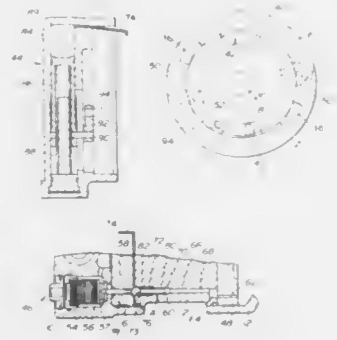
Toshinori Aihara, Kanagawa, Japan, assignor to Atsugi Motor Parts Company, Limited, Kanagawa, Japan

Filed Aug. 21, 1989, Ser. No. 396,843

Claims priority, application Japan, Aug. 22, 1988, 63-109832[U]

Int. Cl.⁵ F04B *49/08*

U.S. Cl. 417—295 **10 Claims**



1. A variable-delivery vane-type rotary compressor comprising:

a cam ring;

a front member closing a front end of said cam ring, said front member having first opening means;

a rear member closing a rear end of said cam ring;

a rotor rotatably provided in said cam ring between said front and rear members to define working chamber means in said cam ring, said rotor having a plurality of vanes each of which is reciprocatively mounted to said rotor for compressing working fluid introduced from an induction chamber provided in said compressor into said working chamber means through said first opening means and for discharging the compressed working fluid from said working chamber means into a discharge chamber provided in said compressor;

an adjust member having second opening means, said adjust member rotatably provided in said cam ring between said rotor and said front member, a rotational displacement of said adjust member changing a position of said second opening means relative to said first opening means so as to vary a compression starting point of the vane in said working chamber means;

adjust member actuating means, provided in said compressor, for controlling said rotational displacement of the adjust member in response to a pilot pressure applied to said adjust member actuating means from pilot pressure applying means provided in said compressor;

said pilot pressure applying means including:

first passage means communicating said adjust member actuating means with valve means;

second passage means communicating said induction chamber with said valvc means;

third passage means communicating said discharge chamber with said valve means;

biasing means for biasing said valve means in a first direction through said second passage means, said biasing means varying its biasing force in response to a pressure within said induction chamber applied thereto;

said valve means including a valve member and a plunger, said plunger provided in said third passage means with a clearance between said plunger and walls of said third passage means to define a throttle portion therebetween, said plunger receiving a pressure within said discharge chamber through said third passage means for biasing said valve member in a second direction opposite to said first direction;

said valve member being movable in response to a differential between said biasing force applied to said valve member through said biasing means and said pressure applied to said valve member through said plunger, between a first position where said valve member is most displaced in said second direction and fully blocks the communication between said adjust member actuating means and said induction chamber through said first and second passage means while allowing the communication between said adjust member actuating means and said discharge chamber through said first and third passage means for applying said pressure within said discharge chamber to said adjust member actuating means through said throttle portion as said pilot pressure, and a second position where said valve member is most displaced in said first direction and fully opens the communication between said adjust member actuating means and said induction chamber through said first and second passage means for applying said pressure within said induction chamber to said adjust member actuating means as said pilot pressure.

5,020,976
VARIALE CAPACITY VANE COMPRESSOR

Nobuyuki Nakajima; Toshio Yamaguchi, and Yuji Kawashima, all of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed May 21, 1990, Ser. No. 525,846

Claims priority, application Japan, May 26, 1989, 1-133673; Jun. 23, 1989, 1-161145

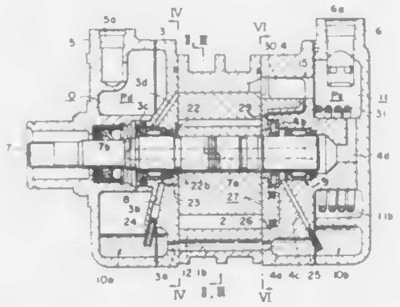
Int. Cl.⁵ F04B *49/00*

U.S. Cl. 417—295 **6 Claims**

1. In a variable capacity vane compressor including a cylinder, a rotor rotatably received within said cylinder, a plurality of vanes slidably fitted in respective vane slits formed in said rotor, vane back pressure chambers defined within said vane slits by respective ones of said vanes, a high pressure zone

having high pressure created therein by said compressor, a control element rotatably arranged in said cylinder for varying the compression starting timing and hence the capacity of said compressor,

the improvement comprising back pressure compensation hole means formed through said control element and communicating with said high pressure zone, said back pressure compensation hole means being communicatable with each of said vane back pressure chambers for introducing said high pressure within said high pressure zone into said each vane back pressure chamber when said control element is in a first position wherein the compression starting timing is retarded, and disconnectable from said each vane back pressure chamber for inhibiting said high pressure within said high pressure zone from being introduced into said each vane back pressure chamber when said control element is in a second position wherein the compression starting timing is advanced.



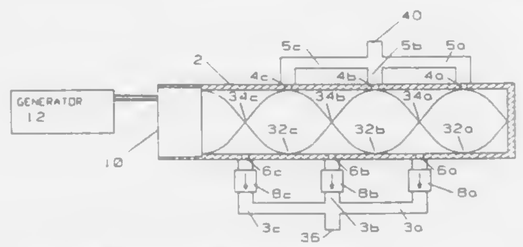
5,020,977
STANDING WAVE COMPRESSOR

Timothy S. Lucas, 4614 River Mill Ct., Glen Allen, Va. 23060

Continuation-in-part of Ser. No. 256,322, Oct. 11, 1988, abandoned. This application Jul. 12, 1989, Ser. No. 380,719

Int. Cl.⁵ F04B *35/00*

U.S. Cl. 417—322 **23 Claims**



1. A refrigerant compressor comprising:

(a) a chamber for receiving a gaseous refrigerant to be compressed and discharged;

(b) a driving means for establishing a traveling acoustic wave in said gaseous refrigerant in said chamber;

(c) means including said driving means and said chamber for converting said traveling acoustic wave to a standing acoustic wave in said gaseous refrigerant in said chamber having one or more pressure nodes and one or more pressure antinodes therein;

(d) one or more input ports in said chamber;

(e) one or more output ports in said chamber.

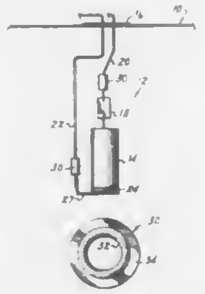
5,020,978
APPARATUS AND METHOD FOR REDUCING VEHICULAR FUEL PUMP NOISE

Ahid D. Nashif, 9698 Ash Ct., Cincinnati, Ohio 45242

Filed Nov. 30, 1989, Ser. No. 444,054

Int. Cl.⁵ F04B *11/00*

U.S. Cl. 417—363 **11 Claims**



1. In a vehicular fuel pump system including a fuel pump and at least one fuel line mounted inside a fuel tank,

noise reduction means comprising,

a passive vibrator mounted inside said tank to said line, at a position on said line at which said line vibrates at substantially its maximum amplitude,

said vibrator comprising spring means mounting a weight to said line, said vibrator having a mass and said spring means having stiffness and damping values selected to cause said vibrator to vibrate resonantly when said line vibrates, out of phase with respect to the vibration of said line and at an amplitude of sufficient magnitude to at least partially reduce the vibration of said line,

said vibrator being connected to said pump and tank only through said line.

5,020,979
INJECTION PUMP HAVING PILOT AND MAIN INJECTION

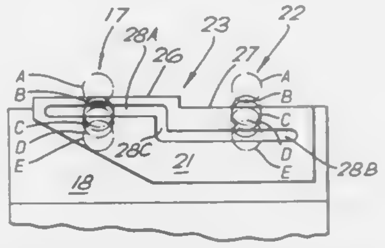
James M. A. Askew, Brockworth, Great Britain, assignor to Lucas industries PLC, United Kingdom

Filed Oct. 5, 1989, Ser. No. 417,273

Claims priority, application United Kingdom, Oct. 6, 1988, 8823453

Int. Cl.⁵ F04B *7/04;* **F02B** *3/00*

U.S. Cl. 417—499 **7 Claims**



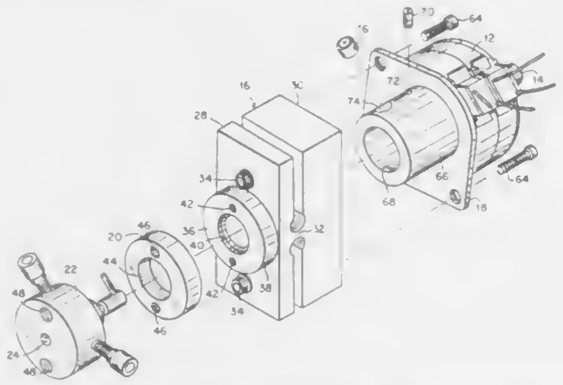
1. A liquid pump comprising a cylinder, a piston reciprocable within the cylinder and generally sealing with the cylinder, the cylinder having a closed end including a liquid outlet, port means to introduce a liquid into said closed end of said cylinder, and said piston including, on its peripheral surface, helical groove means fluidly connected to the closed end of the cylinder said piston including further means to communicate said port with said closed end of said cylinder when the piston is in a position between a position in which the port directly communicates with the closed end of the cylinder and a position in which the port communicates with the helical groove means, said further means comprising a second groove in the peripheral surface of the piston between said helical groove means and the part of the piston adjacent the closed end of the cylin-

VOL
1127
ISS
1
JE
4
1991
UMI

der, characterised in that said further means further comprises a cutaway portion in the wall of said cylinder to communicate with said second groove, said cutaway portion being coaxial with an axis of said port means.

5,020,980
VALVELESS, POSITIVE DISPLACEMENT PUMP INCLUDING HINGE FOR ANGULAR ADJUSTMENT

Dennis Pinkerton, 260 Sherbrook Rd., Lindenhurst, N.Y. 11757
Filed Jan. 5, 1990, Ser. No. 461,377
Int. Cl.^{5} F04B *7/06*
U.S. Cl. 417—500 17 Claims



1. A valveless, positive displacement metering pump comprising:

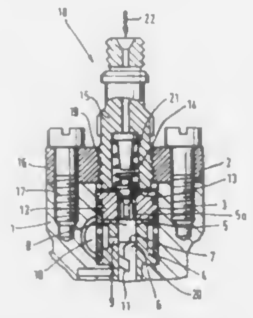
- a housing including a substantially cylindrical working chamber therein and at least two ports communicating with said working chamber;
- a first support;
- means for mounting said housing to said first support;
- a second support;
- flexible hinge means connecting said first and second supports such that said first support is pivotable with respect to said second support about said hinge means, said first and second supports and said hinge means being of integral construction,
- a piston positioned within said working chamber, said piston including a duct therein;
- a rotatable member;
- means for rotatably securing said rotatable member to said second support;
- means for rotating said rotatable member; and
- means for connecting said piston to said rotatable member such that said piston rotates and reciprocates within said working chamber upon rotation of said rotatable member, the stroke of said piston being dependent upon the angular position of said first support with respect to said second support.

5,020,981
FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

Eberhard Hofmann, Kirchberg/M, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany
Continuation of Ser. No. 404,957, Aug. 4, 1982, abandoned. This application Mar. 30, 1988, Ser. No. 178,785
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1981, 3138409
Int. Cl.^{5} F02M *59/48*
U.S. Cl. 417—501 3 Claims

1. A multi-cylinder fuel injection pump for internal combustion engines comprising a pump housing made of a light metal, said pump housing including a plurality of reception bores therein, each of said reception bores including a large diameter portion and a small diameter portion formed by a shoulder, a plurality of pumping elements inserted one each into each of said reception bores of said pump housing, each of said pumping elements comprising a cylinder sleeve having a large diameter portion and a smaller diameter portion approximately the same as said large and smaller diameter portions of said reception bore and a shoulder that seats on said shoulder of said reception bore, each of said cylinder sleeves including an axial cylinder bore,

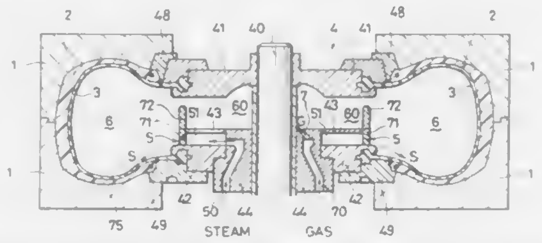
a pressure valve body (12) having an outer diameter substantially the same diameter as said cylinder sleeve and an axial bore therein having the same longitudinal axis as said axial cylinder bore and positioned in said reception bore axially juxtaposed said cylinder sleeve, a steel plate tightly secured to an upper end face of said light metal housing to form a part of said pump housing, said steel plate including a plurality of aligned threaded apertures, each of said threaded apertures being in axial alignment with each of said plurality of said reception bores with said threaded apertures having a smaller diameter than said larger diameter portion of said reception bores, a threaded nipple threaded into each of said threaded apertures in said steel plate, whereby each said cylinder sleeve and said pressure valve are clamped together and tightly fastened axially in one of said reception bores between said shoulder of said reception bore and an inner end of one of said threaded nipples by means of said threaded nipples threaded into said threaded apertures in said steel plate, the thickness of said steel plate being substantially equal to the length of said threads on said nipple, said threaded nipple including an axial spring chamber, a movable value member having a large portion in said spring chamber and a small extension extending into said bore of said pressure valve body, a valve seat on an upper end of said pressure valve body, a spring in said spring chamber that forces said movable valve member against said valve seat, and a pump piston slidably guided in said cylinder bore provided with at least one oblique control edge and rotatable to vary the fuel supply quantity for said fuel combustion engine.



5,020,982
APPARATUS FOR VULCANIZING ELASTOMER PRODUCT

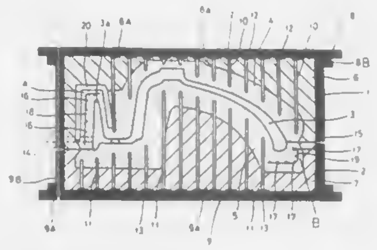
Akinori Kubota, Kobe; Masaaki Ijiri, Aichi, and Michihito Kobayashi, Toyota, all of Japan, assignors to Sumitomo Rubber Industries Limited, Kobe, Japan
Filed Dec. 20, 1988, Ser. No. 287,413
Claims priority, application Japan, Dec. 29, 1987, 62-334256; Jul. 19, 1988, 63-180798
Int. Cl.^{5} B29C *35/04;* **B29D** *30/00*
U.S. Cl. 425—42 17 Claims

1. An apparatus for vulcanizing an elastomeric product comprising mold means in which said elastomeric product to be vulcanized is disposed, said product having a central axis which is vertically disposed such that upper and lower interior portions of said product overlie one another, a piston gland means having first supply passage means for supplying a heating medium, junction chamber means defining an annular junction chamber, said first supply passage means communicating with the interior of said junction chamber, said junction chamber means having an outer wall which separates said junction chamber from the interior of said product, nozzle means in said outer wall directing heating medium from said junction chamber into the interior of said product in a downward direction toward said lower portion of said product, enclosure means defining an enclosure overlying said junction chamber, said piston gland means having a second supply passage means for supplying a pressurizing medium, said second supply passage means communicating with said enclosure means to supply said pressurizing medium to said enclosure, said enclosure means having a top wall and a bottom wall, said enclosure means also having a weir wall extending upwardly from said bottom wall, said weir wall having an upper end spaced from said top wall to thereby define a weir passage between said upper end of said weir wall and said top wall of said enclosure means such that pressurizing medium passes from said enclosure to the upper portion of the interior of said product through said weir passage.



5,020,983
DIVISIBLE SLIP-CASTING MOLDS

Takeshi Ito, Nagoya; Kazushige Murata, Tokoname, and Kuniyoshi Kohmura, Nagoya, all of Japan, assignors to Inax Corporation, Japan
Continuation-in-part of Ser. No. 381,050, Jul. 17, 1988. This application Oct. 30, 1989, Ser. No. 428,613
Claims priority, application Japan, Jul. 19, 1988, 63-95503[U]; Nov. 9, 1988, 63-146320[U]
Int. Cl.^{5} B28B *1/26*
U.S. Cl. 425—85 17 Claims



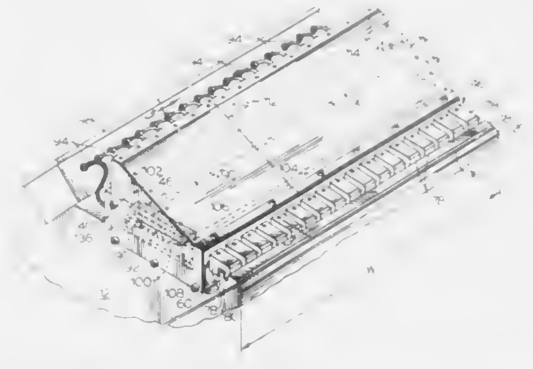
1. A mold for casting a slip into a desired shape comprising,

- a plurality of mold parts assembled together to define an enclosed mold cavity having a shape corresponding to said desired shape, each of said plurality of mold parts including a porous body forming a filter layer for removing water from a volume of said slip in said mold cavity, a plurality of fluid-flow conduits disposed in said filter layer, and a housing member for retaining said porous body, said filter layer having a filter surface in communication with said mold cavity, the filter layer of at least one of said mold part having first and second portions, and said housing members defining a housing for said mold upon assembly of said plurality of mold parts,
- a fluid-flow duct for connecting said plurality of fluid-flow conduits with the exterior of said housing, and
- a slip supply duct communicating between a source of said slip and said mold cavity,

said plurality of fluid-flow conduits including a combination of porous ropes arranged in said second portions of said filter layer and blind holes extending from said housing into said first portions of said filter layer, wherein said combination of porous ropes and blind holes provide said filter layer with substantially uniform fluid-flow properties without reducing said second mechanical strength of said second portions of said filter layer.

5,020,984
APPARATUS FOR ADJUSTING DIE LIP GAP

Peter F. Cloeren, and Richard L. Linam, both of Orange, Tex., assignors to The Cloeren Company, Orange, Tex.
Filed May 9, 1990, Ser. No. 521,101
Int. Cl.^{5} B29C *47/22*
U.S. Cl. 425—141 4 Claims



1. An extrusion apparatus comprising means forming an exit opening which extends along the width of the apparatus, and exit opening control means comprising a plurality of spaced-apart members each having capacity to expand and contract thermally, and each operatively arranged to adjust the exit opening at an individual location by expansion and contraction, individual heating means structurally associated with, and in direct contact with, each of said plurality of members, and the combination of said associated heating means and said plurality of members being disposed within a common plenum having a plurality of outlets for a gaseous cooling medium, said common plenum being in fluid communication with a chamber having means for inletting said gaseous medium and forming in combination with said chamber a flow path for cooling of said plurality of members by said gaseous medium, and insulating means interposed between a main body of said apparatus, and said flow path and said plurality of members disposed therein.

5,020,985
LAMINATE BENDING DEVICE

Carlos M. Torres, 719 W. Middle Turnpike, Manchester, Conn. 06040
Filed Nov. 27, 1989, Ser. No. 441,630
Int. Cl.^{5} B29C *53/02*
U.S. Cl. 425—384 20 Claims

1. A laminate bending device, comprising:

- a housing;
- a pair of parallel shafts extending outwardly from said housing;
- rotary mounting means in said housing mounting each of said shafts for reciprocal rotation;
- clamping jaw means secured on each of said shafts for holding a strip of laminate;
- guide means in said housing mounting said shafts for relative

VOL
1127
ISS
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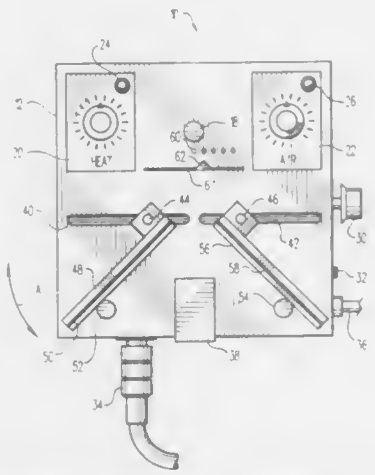
1991
UMI

linear movement to allow manual adjustment of shaft center line spacing;

and



rotary actuating means in said housing for rotating said shafts to bend a laminate strip held by said clamping jaw means.

5,020,986

APPARATUS FOR CONVEYING A SLEEVE WHICH IS CLOSED AT ONE END OUT OF A PROCESSING STATION AND INTO TRANSPORTER MEANS

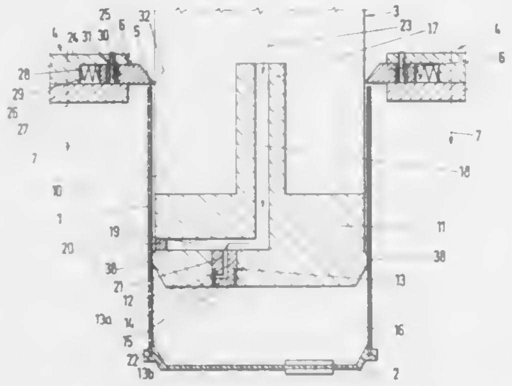
Wilbelm Reil, Bensheim, Fed. Rep. of Germany, assignor to Die Tetra Pak Rausing & Co., Pully, Switzerland

Filed Apr. 17, 1989, Ser. No. 339,296

Claims priority, application Fed. Rep. of Germany, May 14, 1988, 3816542

Int. Cl.⁵ B29C *45/42, 45/43;* B31B *1/28*

U.S. Cl. 425—437 **5 Claims**



1. Apparatus for conveying plastics coated paper or cardboard sleeves having one end closed by a plastic lid molded thereto from a mandrel to a transporter in sequence, comprising:

a mandrel wheel having a multiplicity of mandrels extending radially outwardly therefrom, said mandrels having proximal and distal ends, said distal ends having end faces and widened out portions adjacent said end faces;

air blowing means connected to said mandrel wheel;

an air blowing passageway extending through said mandrels and connected to said air blowing means;

at least one end face insert forming an air outlet on the face of each of said mandrels, said inserts being connected to said passageway;

a scraper located adjacent one of said mandrels located in a starting position, said scraper being positioned to engage each of said mandrels and including at least a base member, a reciprocable lifting rod and scraper arm, said lifting rod being capable of reciprocating in a direction parallel to an axis extending through said mandrel in said starting position, said scraper arm having means biased perpendicularly to said axis and into contact with said mandrel positioned closest to said scraper, and being reciprocable in conjunction with said lifting rod to engage a sleeve on said mandrel in said starting position;

control means connected to rotate said mandrel wheel to receive sleeves on said mandrels and to position said mandrels adjacent said scraper, to reciprocate said lifting rod and said scraper arm from said proximal end to said distal end of said mandrels and substantially simultaneously to blow air through said air outlets and to reciprocate said lifting rod from said distal end to said proximate end of said mandrels.

5,020,987

PULSE COMBUSTION DEVICE

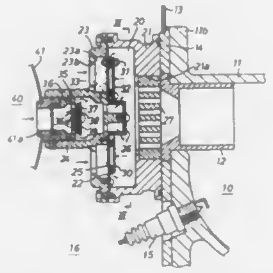
Katsusuke Ishiguro, and Nobuyoshi Yokoyama, both of Nagoya, Japan, assignors to Paloma Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Apr. 24, 1989, Ser. No. 341,916

Claims priority, application Japan, Apr. 22, 1988, 63-100697

Int. Cl.⁵ F23C *11/04*

U.S. Cl. 431—1 **7 Claims**



1. A pulse combustion device comprising a housing forming therein a combustion chamber and supporting a tailpipe connected thereto at an outlet port of the combustion chamber; a cylindrical support member joined to said housing at an inlet portion of the combustion chamber to form a mixing chamber in open communication with the combustion chamber; a perforated end wall member coupled with an open end of said support member to permit air supplied therethrough to enter into the mixing chamber; a central cylindrical member mounted in the center of said endwall member to form therein a gas passage in open communication with the mixing chamber; an annular plate formed with a plurality of air inlet ports and being secured to annular end surfaces of said end wall member and said central cylindrical member; a shroud housing assembly arranged to form therein an air intake chamber in open communication with the inlet ports of said annular plate through said perforated end wall member; and a blower arranged to forcibly supply air into the air intake chamber;

wherein a deflector plate is mounted in place within the mixing chamber to block a reverse flow of combustion products applied thereto from the combustion chamber through the mixing chamber and spaced from said annular plate without intervention of an air-flapper valve to permit inward flow of the air passing therethrough into the mixing chamber, and wherein a controller is provided to control operation of said blower according to the amount of gaseous fuel supplied into the mixing chamber during operation of the pulse combustion device.

5,020,988

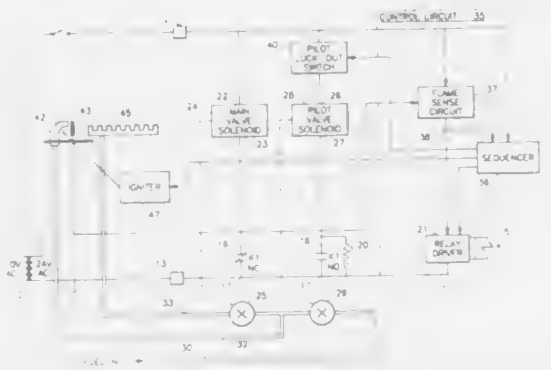
INTERMITTENT PILOT TYPE BURNER CONTROL WITH A SINGLE CONTROL RELAY

Scott M. Peterson, Eden Praire, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 22, 1990, Ser. No. 600,791

Int. Cl.⁵ F23Q *9/08*

U.S. Cl. 431—51 **4 Claims**



1. In a burner control system for use in a system of the type having a pilot burner with an intermittent flame, a main burner, a first electrically controlled valve having first and second control terminals for controlling flow of fuel for the pilot and main burner, and a second electrically controlled valve having first and second control terminals, said second valve in series fuel flow connection with and downstream of the first valve for controlling flow of main burner fuel only, improved valve control apparatus wherein the first valve is one of the type having a pull-in current appreciably greater than the valve's drop-out current, comprising

a) a single pole double throw relay having a normally open contact pair controlling electrical power to the first valve and a normally closed contact pair controlling power to the second valve; and

b) a resistor shunting the relay's normally open contact pair, said resistor of value allowing current flow to the first valve greater than the drop-out current for the first valve and less than the pull-in current for the first valve, when the normally open contact pair is open.

5,020,989

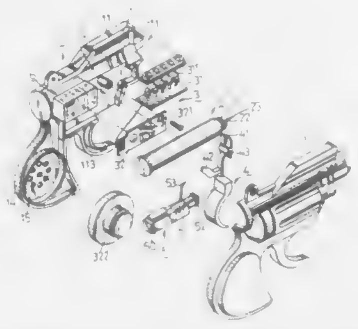
PISTOL LIGHTER

Jack Liu, No. 39, Alley 1, Lane 314, Wan-Chiao Tsuen, Chu-Chi Hsiang Chia-Yi Hsien, Taiwan

Filed Aug. 10, 1990, Ser. No. 565,570

Int. Cl.⁵ F23Q *3/32*

U.S. Cl. 431—125 **1 Claim**



1. A pistol shaped lighter comprising a hollow pistol casing having a barrel portion and a butt portion, a gas cylinder disposed inside said barrel portion, a movable trigger to release gas from said gas cylinder, a spark generator having a biased push button abutting said trigger and an electrode to ignite the released gas from said gas cylinder, and improvements, wherein:

said butt portion is perforated, said pistol lighter further comprises a plurality of light emitting diodes disposed at said barrel portion, a speaker fixed inside said hollow pistol casing adjacent said butt portion, a circuit means similarly disposed inside said hollow casing to actuate said light emitting diodes and said speaker, cell means to supply power to said circuit means, said speaker and said light emitting diodes, and a contact switch to activate said circuit means, said trigger having a contact member to actuate said contact switch whenever said trigger is pulled.

5,020,990

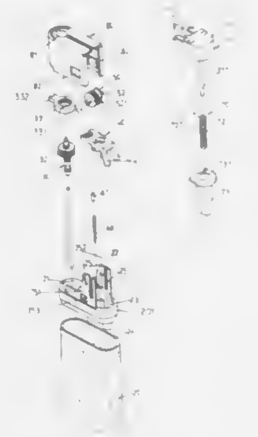
GAS FUEL LIGHTER

Ming P. Chen, Tainan Hsien, Taiwan, assignor to First Glorious Enterprise Co., Ltd., Tainan, Taiwan

Filed Apr. 11, 1990, Ser. No. 507,431

Int. Cl.⁵ F23Q *1/02*

U.S. Cl. 431—274 **5 Claims**



1. A lighter comprising:

a case defining a gas well;

a base mounted on the case and having a gas valve aperture, a flint aperture, an operating member aperture, and two parallel support plates extending upwardly each having a vertical slot;

a gas valve mounted in the valve aperture of the base, having its bottom connected with a gas tube extending down into the gas well, and engaging a flame adjusting wheel mounted thereon for adjusting an amount of gas flowing through the valve;

a flint having a compression spring mounted in the flint aperture of the base and engaging a striker wheel;

a cover enclosing one side of the base and an operating member arranged on another side of the base within the operating member aperture;

the operating member including a displaceable body, the displaceable body having an upper pressing face, and a curved vertical wall and a straight vertical wall each extending downward from the pressing face defining a hollow space below the pressing surface, the straight vertical wall having two L-shaped feet extending horizontally and inwardly and engaging the vertical slots of the two parallel support plates of the base for guiding vertical movement of the operating member, the operating member also including a coil spring and a downwardly extending rod, the coil spring having a top portion engaging a curved groove on an underside of the pressing face and extending along a straight groove to a position beneath one of the two L-shaped feet, the rod extending within the spring, the operating member further including a support bar having a central vertical recess containing the rod and

VOL
1127
ISS
1
JE
4
1991
UMI

the coil spring and having a top side edge abutting an inner wall of the displaceable body;

the striker wheel rotatabiy mounted above the flint aperture between the two parallel support plates, having a curved circumferential face and a rotatable disc at one side, the disc having ratchet-like projections, the projections being engaged by an end portion of the coil spring of the operating member so that the striker wheel turns and rubs against the flint for generating sparks when the operating member is initially pressed downward; and

a control plate having its front section cooperating with an outlet of the gas valve and two downwardly angled arms on its rear section extending into the operating member aperture and cooperating with movement of the operating member, so that downward movement of the support bar causes the gas valve to release gas when the operating member is pressed further downward.

5,020,991
HEATING DEVICE OPERATED BY MEANS OF LIQUID FUEL

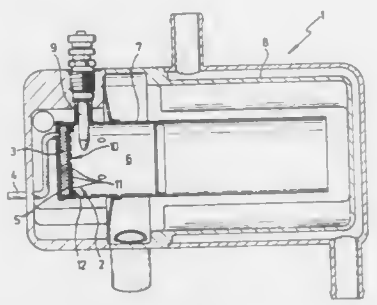
Klaus Schaale, Krailling; Hermann Schoenberger, Germering, and Johann Sperl, Penzberg, all of Fed. Rep. of Germany, assignors to Webasto AG Fahrzeugtechnik, Fed. Rep. of Germany

Filed Mar. 30, 1990, Ser. No. 501,731

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1989, 3910424

Int. Cl.⁵ F23D *3/02*

U.S. Cl. 431—319 **20 Claims**



1. Heating device operated by means of liquid fuel of the type having a vaporization burner which has an absorbent body supported on an essentially imperforate rear wall of the burner and which is acted upon by liquid fuel which is delivered through said rear wall by a fuel supply means, said absorbent body having at least one surface facing a combustion chamber of the heating device; wherein a cover overlies at least a major portion of the absorbent body facing the combustion chamber, said cover being made of sheet steel which is highly resistant to corrosion and high temperature, and having a plurality of openings distributed throughout in a sieve-like manner, said cover shielding the absorbent body against effects of gases produced by combustion in the combustion chamber and acting as a means for equalization of heat distribution across said portion of the absorbent body and for fuel pretreatment.

5,020,992
SHAFT FURNACE

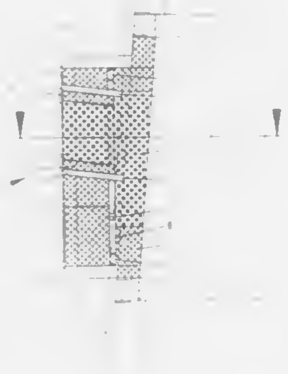
Ronald N. Molenaar, Heemskerk, and Joseph A. M. Van der Hoeff, Limmen, both of Netherlands, assignors to Hoogovens Groep B.V., IJmuiden, Netherlands

Filed Sep. 13, 1990, Ser. No. 583,844

Claims priority, application Netherlands, Sep. 25, 1989, NL 8902381

Int. Cl.⁵ F27D *1/08;* **F27B** *14/08*

U.S. Cl. 432—248 **11 Claims**



1. A shaft furnace having

(a) a steel outer shell

(b) a refractory lining inside and against said outer shell

(c) at least one sealed tap hole structure comprising

- (i) a steel sleeve fitted to said outer shell and projecting outwardly therefrom
- (ii) a permanent lining inside said sleeve
- (iii) a refractory sealing material within said permanent lining, which sealing material is to be at least partly removed when a tap hole is formed
- (iv) a metal closure plate having an opening at which said tap hole is to be formed, said plate being located within said sleeve and having a periphery coupled gas-tightly to said sleeve, and
- (v) means for removing heat from said closure plate,
- (vi) said permanent lining, said refractory sealing material and said closure plate each being located against said refractory lining of said outer shell.

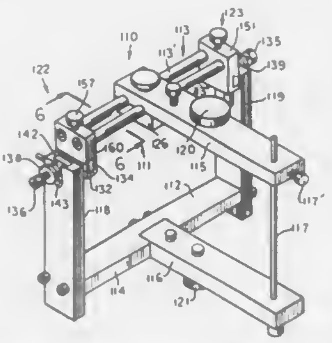
5,020,993
DENTAL ARTICULATOR

Ronald R. Levandoski, 1103 Powell Ave., Erie, Pa. 16505

Filed Jan. 2, 1990, Ser. No. 460,041

Int. Cl.⁵ A61C *11/00*

U.S. Cl. 433—65 **23 Claims**



1. An articulator comprising an upper frame and a lower frame,

said upper frame being swingably supported on said lower frame to swing about a horizontal axis about pivot means,

said lower frame comprising a laterally extending lower beam,

spaced upwardly extending first condyle post and second condyle post supported on said laterally extending lower beam,

a lower arm supported on said lower beam and extending forwardly and generally perpendicular thereto,

said upper frame comprising an upper beam,

said upper beam having a first end and a second end,

an upper arm,

a laterally adjustable support means laterally slidably supporting said upper arm on said upper beam,

said laterally adjustable support means comprising a laterally extending downwardly facing concave surface on said upper arm and a laterally extending upwardly facing convex surface on said upper beam,

said downwardly facing concave surface resting on said convex surface slidably supporting said upper arm on said upper beam received in said concave surfaces,

a vertically adjustable first condyle support assembly supporting said first end of said upper beam on said first condyle post for adjusting each said end of said upper beam vertically relative to said first condyle post and said second condyle post,

a vertically adjustable second condyle support assembly supporting said second end of said upper beam on said second condyle post.

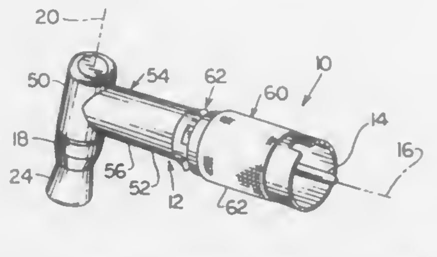
5,020,994
DENTAL PROPHYLAXIS ANGLE

Jerry T. Huang, P.O. Box 3200, La Puenta, Calif. 91744

Filed Feb. 9, 1990, Ser. No. 477,238

Int. Cl.⁵ A61C *1/08*

U.S. Cl. 433—126 **4 Claims**



1. In a dental prophylaxis angle which includes an elbow-shaped tubular housing with a forward tubular arm and a tubular leg extending in a predetermined rearward direction from said arm, an output rotor rotatably mounted in said forward arm and having an output gear, an input rotor rotatably mounted in said leg about an axis extending in forward and rearward directions, said input rotor also having an input gear engaged with said output gear to drive it, the improvement wherein:

said housing includes separate forward and rearward tubular housing members forming forward and rearward portions of said tubular leg, and fastener portions that join said housing members to lie in tandem;

said input rotor has forward and rearward rotor portions lying respectively in said forward and rearward housing members, said forward rotor portion having a rearwardly-facing rotor shoulder, and said rearward rotor portion forming a shaft of smaller diameter than said rotor shoulder;

said forward rotor portion has an extreme front end with cutouts forming teeth which comprise said input gear, and said forward rotor portion includes a region immediately rearward of the location where the teeth of said gear mesh, which has an outside diameter at least as great as the outside of said input gear, and said forward portion of said tubular leg closely surrounds said forward rotor region to serve as a radial bearing, whereby to rotatably support said input rotor very close to said input gear thereon.

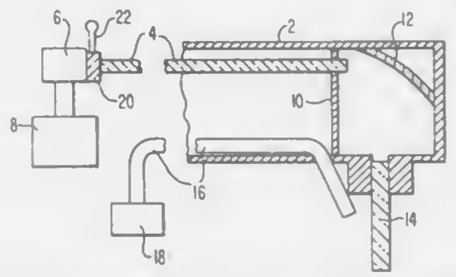
5,020,995
SURGICAL TREATMENT METHOD AND INSTRUMENT

Guy Levy, 49, rue Croix de Regnier, F-13004 Marseille, France

Filed Jan. 18, 1989, Ser. No. 299,472

Int. Cl.⁵ A61C *5/00*

U.S. Cl. 433—215 **27 Claims**



1. A method for cutting tooth tissue comprising: imparting a dark coloration to the tooth tissue at a location where the tissue is to be cut; generating laser radiation at a wavelength which is absorbed more strongly by hydroxyapatite than by water; producing a succession of pulses of the generated radiation with an energy level, pulse duration, and repetition rate selected to cut the tooth tissue without causing harmful side effects; and concentrating the radiation pulses on the tissue at the location of the dark coloration and to a spot sufficiently small to cause cutting of the tissue.

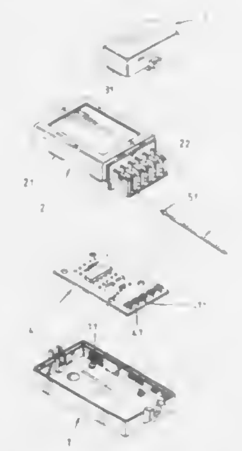
5,020,996
DECORATIVE STRING CONTROL BOX

Pi-Yen Cheng, No. 2, Lane 188, Tung Kuang Rd., Hsinchu, Taiwan

Filed Sep. 28, 1990, Ser. No. 589,569

Int. Cl.⁵ H01R *9/09*

U.S. Cl. 439—76 **1 Claim**



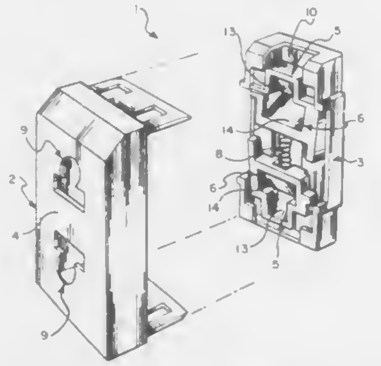
1. A decorative string control box, comprising a casing covered with a cover and a cap for holding a decorative string control circuit board permitting a plurality of decorative string conductor terminals to fasten in a plurality of mounting slots on said cover and secured by said cap to respectively electrically connect with a plurality of contacts on said control circuit board, characterized in that said mounting slots are each formed of a wider left half part and a narrower right half part with a recessed portion made on the back of said narrower right half part so that a decorative string conductor terminal

VOL
1127
ISS
1
JE
4
1991
UMI

can be conveniently inserted through said wider left half part and pulled outward to engage in said recessed portion and then firmly pressed by said cap in a position to electrically contact a corresponding contact on said decorative string control circuit board.

5,020,997
SAFETY DEVICE FOR SHIELDING OFF THE RECEPTACLES OF AN ELECTRIC CURRENT TAP

Ennio Calderara, Cuasso al Piano, and Gianmaria Carabelli, Induno Olona, both of Italy, assignors to Bticino S.r.l., Italy
Filed Apr. 5, 1990, Ser. No. 504,924
Claims priority, application Italy, Jul. 5, 1989, 21100 A/89
Int. Cl.^{5} H01R *13/453*
U.S. Cl. 439—137 9 Claims

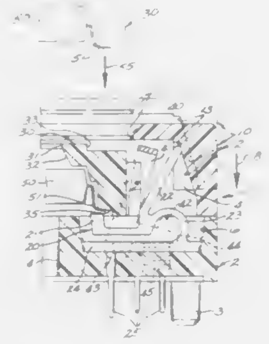


1. A safety device for shielding off the receptacles of an electric current socket comprising a body and means defining holes forwardly of said body and in alignment with said receptacles for receiving pins of an electrical plug, a shutter member mounted for sliding movement within said body at a location between said holes and said receptacles, spring means for biasing said shutter member against said sliding movement, said body having a back wall with two oppositely pitched surfaces at slight inclination angles, said shutter member being supported by said body for relative tilting movement with respect to said back wall pitched surfaces, and means for blocking sliding movement of said shutter member when a portion of the shutter member is brought to bear on one of said pitched surfaces.

5,020,998
TEST SOCKET

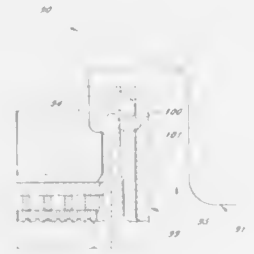
Kiyokazu Ikeya, Shizuoka, and Masanori Yagi, Sagamihara, both of Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed Oct. 13, 1989, Ser. No. 421,220
Claims priority, application Japan, Nov. 4, 1988, 63-280197
Int. Cl.^{5} H01R *11/22*
U.S. Cl. 439—266 **11 Claims**

1. A socket comprising a body, a plurality of contact elements on the body to be electrically connected in an elastically compressed state with respective terminals of an electrical device, a pair of holding members on the body for detachably locating the electrical device relative to the body, and a reciprocating member mounted for reciprocating movement relative to the body for moving the contact elements and holding members from original positions thereof to receive insertion of the electrical device into the socket and permitting the reciprocating member and the contact elements and holding members to thereafter return to their original positions to hold the electrical device in a selected position with the contact elements engaging respective device terminals, the contact elements being resilient to be movable from their original positions to receive insertion of the electrical device in response to movement of the reciprocating member in a first direction and for biasing the reciprocating member to move in an opposite direction to return to its original position after insertion of the electrical device, the holding members being pivotally mounted on the body to be engaged by the reciprocating member and rotated from their original positions in response to movement of the reciprocating member in said first direction to receive insertion of the electrical device, and means bias the holding members to return to their original positions for holding the electrical device in said selected position when the reciprocating member is moved in said opposite direction said contact elements being disposed around an electrical device insertion axis to electrically engage respective device terminals disposed around a device periphery, and having the pair of said holding members pivotally mounted on the body to be pivoted from their original positions away from each other in response to movement of the reciprocating member in said first direction to receive insertion of the electrical device therebetween along said device insertion axis, the means biasing the holding members to return to their original positions being arranged to return the holding members to their original positions to define a position for the electrical device in the socket, and the contact elements being adapted to resiliently engage the respective device terminals and the reciprocating member for resiliently supporting the device in said device position and for moving the reciprocating member in said opposite direction to its original position.



5,020,999
PERSONAL COMPUTER WITH CONNECTOR ASSEMBLY HAVING INTEGRAL RETAINER

John R. Dewitt, and Jay H. Neer, both of Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Jul. 19, 1990, Ser. No. 556,932
Int. Cl.^{5} H01R *13/62, 13/64*
U.S. Cl. 439—328 4 Claims

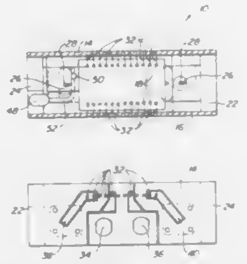


4. A personal computer system having a high speed system, processor compatible with application programs and operating system software designed to execute on slower speed system processors, said personal computer system comprising:
- a high speed microprocessor having a real and protected mode of operation coupled to a high speed data bus;

- non-volatile memory electrically coupled to a slower speed data bus;
- bus controller for providing communications between the high speed data bus and the slower speed data bus;
- volatile memory electrically responsive to the high speed data bus;
- memory controller electrically coupled to said volatile memory and said non-volatile memory, said memory controller regulating communications between said volatile memory and said high speed microprocessor;
- a printed circuit card for interconnecting functional components of the computer, said card defining a plane and having an elongate side edge,
- a card edge connector portion defined by said card intermediate the length of said side edge and having a plurality of conductive strips extending adjacent said connector portion for communicating signals among components interconnected by said card,
- said card edge connector portion being defined by a pair of recesses formed in said card immediately adjacent opposite ends of said connector portion and intermediate the length of said side edge, each said recess defining an undercut portion spaced inwardly of said card from said side edge and having a predetermined dimension measured perpendicularly to said side edge, said undercut portion of each of said recesses extending parallel to said side edge,
- a multiple conductor cable for connection with said conductive strips, and
- a cable end connector engaging said cable for establishing connection thereof with said card and said conductive strips, said cable end connector having a housing member for substantially enclosing said card edge connector and a pair of latches enclosed within said housing member for entering into said recesses and for grippingly engaging said undercut portions for exerting forces retaining said cable end connector in connection with said card, each of said latches comprising an elongate member having a base end fixed in said housing member and an engagement end, said engagement ends of said latches being biased one relative to the other for exerting on said side edge a gripping force directed longitudinally thereof.

5,021,000
ZERO INSERTION FORCE SOCKET WITH LOW INDUCTANCE AND CAPACITANCE

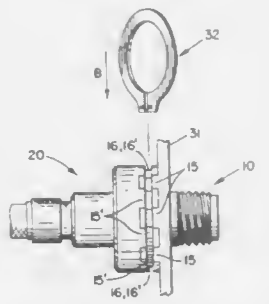
Harry J. Scheibner, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.
Filed Nov. 20, 1989, Ser. No. 439,900
Int. Cl.^{5} H01R *4/50*
U.S. Cl. 439—342 21 Claims



1. A socket with low parasitic inductance and capacitance for holding a device having pins, said socket comprising:
- a supporting plate including a plurality of insertion openings for receiving said device pins;
- a first plurality of contact springs aligned with said insertion openings;
- means for positioning said springs relative to said device pins so that said springs and said device pins are electrically coupled; and
- a plurality of selective electrical connectors positioned proximate said supporting plate and further connected to said contact springs.

5,021,001
MULTIPLE USE ELECTRICAL CONNECTOR HAVING PLANAR EXPOSED SURFACE

Ronald A. Ramirez, Damascus, Md., assignor to Lucas Weinschel Inc., Gaithersburg, Md.
Continuation of Ser. No. 249,849, Sep. 27, 1988, abandoned, which is a continuation of Ser. No. 008,374, Jan. 29, 1987, Pat. No. 4,836,801. This application Sep. 6, 1989, Ser. No. 403,790
Int. Cl.^{5} H01R *13/627*
U.S. Cl. 439—349 10 Claims



1 An improved high frequency signal line connector establishing a continuous transmission medium, comprising:
- a first connector member having a first face, and a first set of regularly spaced, peripheral projections, and
- a second connector member having a second face and a second set of peripheral projections dimensioned to correspond with and interleave with said first set,
- said first face is a low profile planar face,
- said first face having a first central conductor and a first outer ring shaped conductor coaxial with said first central conductor,
- said second face having a spring biased central conductor configured for electrical contact with said first central conductor, and a spring biased outer ring shaped conductor configured for electrical contact with said first outer ring conductor of said first face, and
- a third connector member interacting with and providing only a mechanical connection between said first and second connector members when interleaved to retain said connector members in interleaved relationship and
- to maintain electromagnetic continuity operable at frequencies in excess of 18 GHz and providing a torque resistance interface for preventing rotation of said members relative to one another.

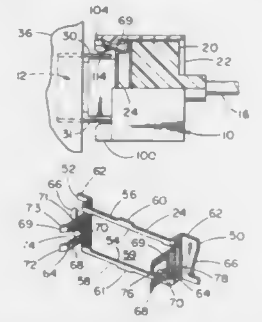
5,021,002
SNAP-LOCK ELECTRICAL CONNECTOR WITH QUICK RELEASE

Rocco J. Noschese, Wilton, Conn., assignor to Burndy Corporation, Norwalk, Conn.
Filed Dec. 20, 1989, Ser. No. 453,724
Int. Cl.^{5} H01R *13/627*
U.S. Cl. 439—352 **35 Claims**

1. An electrical connector having at least one electrical contact, an inner housing comprising dielectric material, and a latch for mechanically connecting the electrical connector to a second connector, the latch comprising:
- a first side portion having a first leg with a first latch prong thereon, said first prong projecting in a first direction and having a general wedge shape with a first sloped section and a second relatively non-sloped section;
- a second side portion having a second leg with a second latch prong thereon, said second prong projecting in a second direction different from said first direction and

VOL
1127
ISS
1
JE
4
1991
UMI

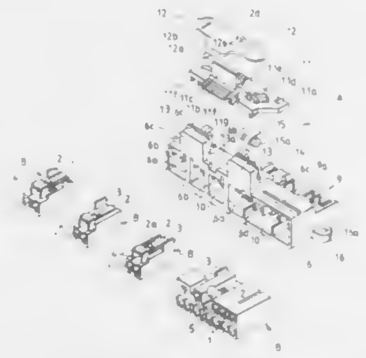
having a general wedge shape with a first sloped section and a second relatively non-sloped section; and
a first connecting portion between said first and second side portions, said first and second side portions being located on opposite sides of said connecting portion with said side



portions and said connecting portion forming a general box shaped aperture such that said side portions and connecting portion can be slidingly mounted over a generally box shaped portion of the electrical connector inner housing and be fixedly connected thereto.

5,021,003
APPARATUS FOR CONFIRMING FITTING OF ELECTRIC CONNECTOR

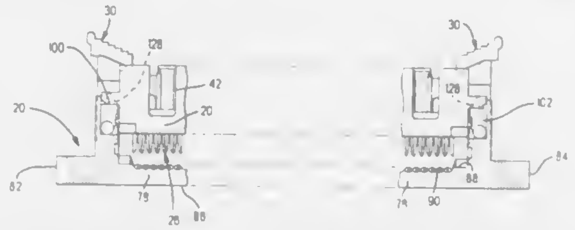
Kazuto Ohtaka, and Shigemitsu Inaba, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan
Filed Jul. 18, 1990, Ser. No. 553,846
Claims priority, application Japan, Jul. 18, 1989, 1-183602
Int. Cl.^{5} H01R *13/627*
U.S. Cl. 439—357 19 Claims



1 An apparatus for confirming the fitting of an electric connector wherein a male connector housing is fitted in a hood of a female connector housing so as to connect together metal terminals received respectively in terminal receiving chambers of said male connector and female connector housings, said apparatus comprising:
- a lock lever, having a holder spring, pivotally connected at one end thereof to a first side portion of said hood;
- a lock plate, having a provisional locking groove and a complete locking groove separated by an inclined surface, formed on a second side portion of said hood, said provisional and complete locking grooves being engageable with said holder spring; and
- a fitting confirmation projection formed on a reverse surface of said lock lever, said fitting confirmation projection interfering with said male connector housing when a fitting of said male connector housing into said hood of said female connector housing is imperfect, thereby preventing an engagement between said holder spring and said complete locking groove.

5,021,004
SECONDARY LATCH FOR PIN CONNECTOR

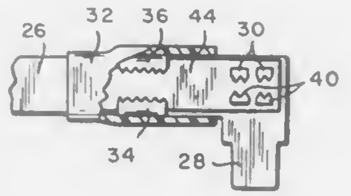
Francis M. Heiney, Elizabethtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Jul. 26. 1990, Ser. No. 558,136
Continuation-in-part of Ser. No. 489,647, Mar. 6, 1990.
Int. Cl.^{5} H01R *4/24*
U.S. Cl. 439—317 20 Claims



1. A connector for insulation displacement termination of conductors of a multiple conductor cable, comprising:
- an elongate termination cover movable to a termination position, said termination cover defining an endwall and an inner surface, said termination cover having a pair of spaced legs extending from the inner surface proximate the endwall, said legs having facing surfaces and opposed outer surfaces, said legs having aligned apertures extending therethrough from a facing surface to a respective outer surface;
- a latch/eject lever having pivot protrusions thereon, said latch/eject lever pivotally secured to said termination cover between the facing surfaces of said legs with the pivot protrusions received in respective ones of said aligned apertures; and
- an elongate housing defining a wall and having insulation displacement contacts secured therein, each of said insulation displacement contacts having an insulation displacement portion extending beyond a cable receiving face for termination to a conductor of the multiple conductor cable, a pair of spaced latching protrusions extending from said wall, each of said protrusions having a transverse extension defining a latching shoulder facing away from said cable receiving face, said latching protrusions spaced to receive said pair of spaced legs therebetween, said latching shoulder on each latching protrusion extending toward the outer latching protrusion and adapted to be received in a respective one of said aligned apertures of said leg means when said termination cover is in said termination position.

5,021,005
FLEXIBLE CONDUCTOR CONNECTOR

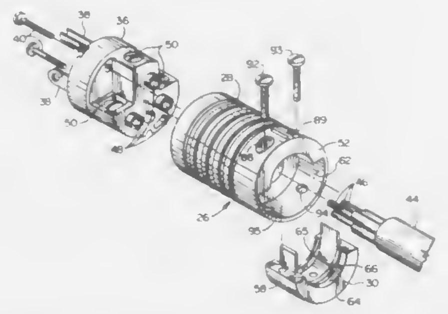
Stephen Slenker, 26 Cummings Rd., Tyngsboro, Mass. 01879
Filed Mar. 6, 1990, Ser. No. 489,375
Int. Cl.^{5} H01R *4/24*
U.S. Cl. 439—421 4 Claims



1. A flexible conductor connector comprising a flat metal foil conductor laminated with plastic coatings,
- a metal spade plug connector,
- said foil conductor having a portion of its laminate removed to the bare metal,
- said metal spade connector having a flat surface in facing contact with said bare metal and a portion thereof wrapped around the laminated conductor and crimped to said plastic coating surface so as to pressure engage said flat surface of the metal connector to the base metal surface of the foil conduct, and
- said conductors encapsulated with metal varnish.

5,021,006
CABLE CLAMP FOR ELECTRICAL CONNECTOR

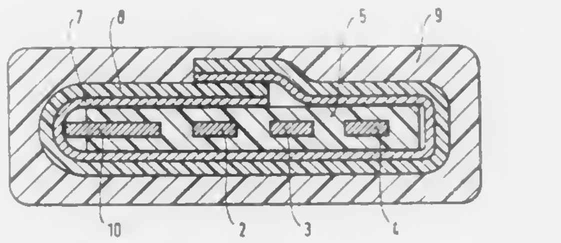
Daniel Fargeaud, Dewitt, N.Y., and Gerard Tarrade, Limoges, France, assignors to Pass & Seymour, Inc., Syracuse, N.Y.
Filed Jul. 5, 1990, Ser. No. 548,677
Int. Cl.^{5} H07R *13/595*
U.S. Cl. 439—469 19 Claims



1 A strain-relief electrical connector for a multi-conductor cable and associated wiring device, said connector comprising:
- a) a first piece including:
  - i) a hollow, cylindrical shell having forward and rear sections separated by an internal wall having an opening therein concentric with the central axis of said shell and large enough for passage of said cable;
  - ii) means within said forward section for affixing said wiring device;
  - iii) a portion integrally formed as one piece with said shell within said rear section having a curved surface with an axis of curvature parallel to said central axis, said portion extending radially from said shell into said rear section by a distance not greater than the periphery of said opening, and extending from said wall for substantially the full axial extent of said rear section, and extending circumferentially for less than 180° and greater than about 90°; and
  - iv) a first pair of openings extending through said rear section, including said shell and said portion, along spaced, parallel axes perpendicular to and on opposite sides of said central axis;
- b) a second, generally semi-cylindrical piece having inner and outer arcuate surfaces and positioned within said cylindrical shell in said rear section of said shell with said inner arcuate surface opposing said curved surface to engage said cable therebetween, said second piece including a second pair of internally threaded openings respectively aligned with said first pair of openings; and
- c) a pair of screws respectively passing through said first pair of openings and threadedly engaged in said second pair of openings, whereby tightening said screws pulls said second piece toward said portion of said first piece to firmly engage said cable between said curved surface of said portion of said first piece and said inner arcuate surface of said second piece.

5,021,007
SCREENED FLAT ELECTRIC CABLE HAVING A PLURALITY OF PARALLEL CONDUCTORS

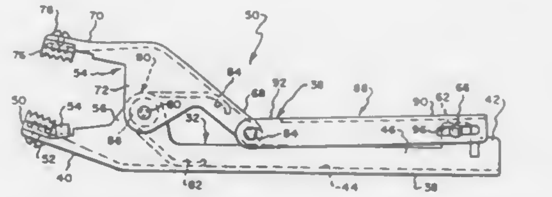
André Viaud, Crosne, France, assignor to Filotex, Draveil, France
Filed May 14, 1990, Ser. No. 522,878
Claims priority, application France, May 12, 1989, 89 06267
Int. Cl.^{5} H01R *13/00*
U.S. Cl. 439—497 2 Claims



1. A flat electric cable comprising:
- a flat sheath (5) of electrical insulation material, a row of individual, flat, interior conductors (2, 3, 4) embedded within said insulation material sheath (5) at laterally spaced positions such that said row of individual, flat, interior conductors are completely buried within said insulation material sheath, and
- at least one exterior flat conductor (10), said at least one exterior conductor (10) being of substantially the same thickness to said interior conductors (2, 3, 4) but having a width which is considerably greater than that of any one of said interior conductors, being partially embedded within said insulation material sheath (5) and being spaced from the flat, interior conductor of said row proximate thereto at a distance equal to the distance between consecutive interior conductors of said row, with a side of said at least one exterior, flat conductor (10) projecting exterior beyond a side of said insulation material sheath (5) and being directly contactable with a metallic screen for draining the screen when surrounding said insulation sheath (5).

5,021,008
TANGLE FREE MANUALLY ENGAGEABLE DEVICE

Peter J. Scherer, R.R. 1 Box 53, Machias, N.Y. 14101
Filed Jun. 19, 1990, Ser. No. 540,162
Int. Cl.^{5} H01R *13/00*
U.S. Cl. 439—504 6 Claims



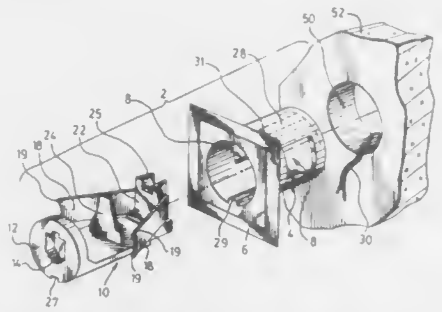
1. A tangle free manually engageable device adapted to be secured to a cable or the like comprising:
- an elongated first element having first and second ends and a pivot receiving portion located between the ends, the first end being adapted to be secured to the cable or the like, the first element further having an elongated gripping portion between the pivot receiving portion and the first end;
- a pivotal second element disposed to one side of the elongated first element and having first and second ends and a pivot receiving portion between the ends, the pivotal second element further having a relatively short portion between the first end and the pivot receiving portion considerably shorter than the elongated gripping portion of the first element;

VOL
1127
ISS
1
JE
4
1991
UMI

- a first pivot pin extending through the pivot receiving portions of the first and second elements for pivotally securing the second element to the first element in such a manner that as the first ends move apart the second ends move together;
- spring means extending between the first and second elements for forcing the second ends of the first and second elements towards one another;
- a gripping lever disposed to one side of the elongated first element and extending between the first end of the first element and the first end of the second element, the gripping lever having first and second spaced apart ends;
- a second pivot pin connecting the first end of the gripping lever of the first end of one of the first and second elements; and
- slidable connection means for slidably connecting the second end of the gripping lever and the first end of the other of the first and second elements.

5,021,009
WALL MOUNTING PLATE

Michael Cox, R.R. #2, Orangeville, Ontario, Canada L9Y 2Y9
Continuation-in-part of Ser. No. 152,819, Feb. 5, 1988, Pat. No. 4,840,584. This application Mar. 31, 1989, Ser. No. 330,916
Int. Cl.^{5} H01R *13/74*
U.S. Cl. 439—538 **12 Claims**

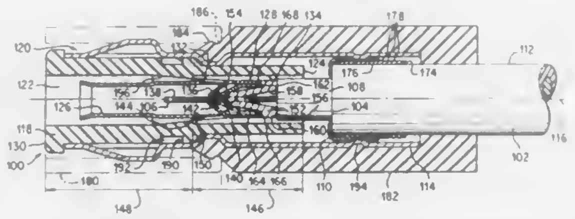


1. A mounting plate assembly for electrical connections comprising:

- a face plate having associated therewith a tubular-like extension open through said face plate and extending in a generally perpendicular manner from a back surface of said face plate a predetermined depth,
- a plug portion sized to be partially received within said tubular-like extension and move from a nonsecuring position to a substrate engaging position, and
- control means for controlling movement of said plug portion between said nonsecuring position and said wall engaging position,
- said plug portion including substrate engaging means which are forcible through said tubular-like extension to a clear position where said substrate engaging means move outwardly past the sides of said tubular-like extension to engage a rear surface of a substrate, said plug portion including means for receiving an electrical connector,
- said control means being operative to urge said plug portion towards said nonsecuring position even when said substrate engaging means have moved past the sides of said tubular-like extension to draw said substrate engaging means and said face plate into engagement with a substrate when located therein.

5,021,010
SOLDERED CONNECTOR FOR A SHIELDED COAXIAL CABLE

John O. Wright, York, Pa., assignor to GTE Products Corporation, Stamford, Conn.
Filed Sep. 27, 1990, Ser. No. 588,781
Int. Cl.^{5} H01R *17/04*
U.S. Cl. 439—578 12 Claims

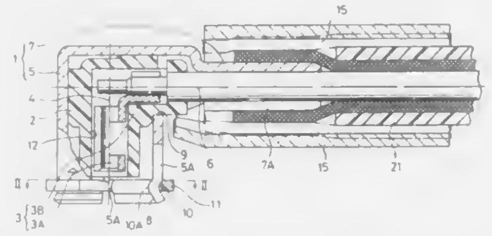


1. A connector for electrical and mechanical connection to a shielded coaxial cable which has an end portion including an exposed length of an inner lead extending from said end portion and a shield layer folded back upon an outer surface of said shielded coaxial cable, said connector comprising:

- an elongated metal tubular connector housing extending along a longitudinal axis;
- a non-conductive bushing internal of and attached at one end of said housing, said bushing having a longitudinal bore extending therethrough along said longitudinal axis, said longitudinal bore having a first end for inserting said exposed length of said inner lead when connecting said shielded coaxial cable to said connector;
- a metal tubular ferrule having one end for insertion into an opposite second end of said longitudinal bore when connecting said shielded coaxial cable to said connector, said one end of said tubular ferrule including an inner portion protruding toward said longitudinal axis and adjacent an outer surface of said inner lead during said insertion, said inner portion including a solder strip; and, wherein said one end of said ferrule further includes at least one cantilevered retaining tab which extends away from said longitudinal axis and engages an inner bore wall of said longitudinal bore during said insertion to prevent removal of said ferrule through said first end, said at least one retaining tab including a cantilevered electrical contact tab which extends toward said longitudinal axis against an outer surface of said inner lead during said insertion, said electrical contact tab including an inner surface which forms said inner portion.

5,021,011
CONNECTOR FOR COAXIAL CABLE

Norihide Kawanami; Fumio Kobayashi, and Ikujiro Mitani, all of Tokyo, Japan, assignors to Hirose Electric Co., Ltd., Tokyo, Japan
Filed Nov. 2, 1990, Ser. No. 608,462
Claims priority, application Japan, Nov. 7, 1989, 1-129366
Int. Cl.^{5} H01R *9/05*
U.S. Cl. 439—582 **1 Claim**



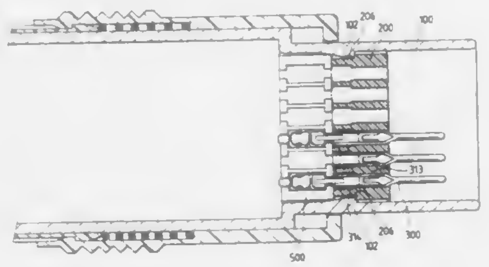
1. A coaxial cable connector comprising:

- a tubular outer conductive shell having a coupling opening,

  a slit extending upwardly from said coupling opening, and an annular groove on an outside surface adjacent said coupling opening; and
- a stop ring loosely fitted over said annular groove and having a polygonal inner face.

5,021,012
MULTIPIN CONNECTOR

Yasuji Shibano, Lzumisano, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan
Filed Apr. 10, 1990, Ser. No. 506,833
Claims priority, application Japan, Apr. 17, 1989, 64-45269[U]
Int. Cl.^{5} H01R *9/03*
U.S. Cl. 439—610 **7 Claims**

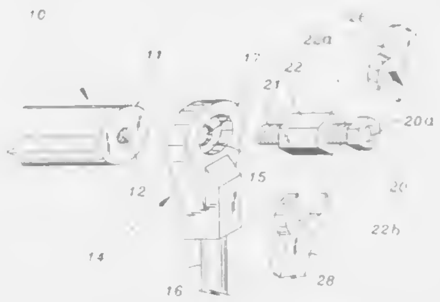


1. A multipin connector comprising:

- a square-shaped insulation body having a plurality of contact housing holes extending along a front and rear direction through said insulation body, said contact housing holes being arranged in rows and columns,
- a plurality of pin contacts provided with front portions of pins projecting forward from said insulation body and rear portions of cord connection portions projecting rearward from said insulation body, said pin contacts being inserted through each contact housing hole formed in the insulation body,
- a cylindrical metal shielding body having a front portion into which said insulation body is inserted and secured thereto and a rear portion provided with a cable lead-out opening,
- contact holding plates each of which is provided for a corresponding one of said rows or columns of contact housing holes, each said contact holding plate being made of an insulating material and having contact holding grooves formed on a face of the contact holding plate to extend in a front and rear direction to face said contact housing holes, said cord connection portions of said pin contacts in each row or column being pressed into and secured to the contact holding grooves of a corresponding one of said contact holding plates,
- press-in contact portions formed integrally with the cord connection portions, said press-in contact portions having conductive plates each of which extends substantially perpendicularly to the front and rear direction of the cord connection portion and has a slot of a width smaller than the diameter of a core bundle of a cord, so that a covered cord is pressed into the slot, tearing the cover to make the core bundle in contact with edges of the slot, and
- engagement pieces provided at middle portions of said pin contacts so as to engage with stepped portions formed on the inner walls of said contact housing holes, whereby when the pin contacts are inserted to the contact housing holes, said pin contacts and the contact holding plates are firmly held in the insulation body.

5,021,013
BATTERY CABLE CONNECTOR

Dorothy Wiesler, 981 W. 18th St., Costa Mesa, Calif. 92629
Filed Jun. 4, 1990, Ser. No. 532,630
Int. Cl.^{5} H01R *4/30*
U.S. Cl. 439—755 **11 Claims**

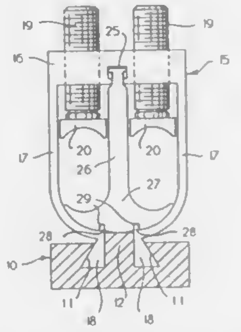


1. A battery cable connection arrangement for a battery having a terminal with a threaded aperture with the battery cable having a conductive end with aperture means for receiving a shaft of a bolt member therethrough, said arrangement comprising:

- an at least partially electricallY conductive bolt member having a head end and a threaded shaft portion for being receIved within the aperture of said terminal; and
- a nut member having a threaded aperture therethrough for being received on the shaft portion of said bolt member, said nut member being adapted for rotation on said shaft portion in first and second directions, rotation in said first direction resulting in relative displacement on said shaft portion toward the head end of said bolt member, rotation in the second direction resulting in relative displacement in the opposite direction on said shaft portion, said connector arrangement being utilized for connection of the battery cable with said nut member initially rotated in said first direction, and, upon insertion of said shaft portion through said aperture means of said battery cable into threaded engagement with the aperture of said terminal, said nut member is then rotated in said second direction with said bolt member held stationary for urging the conductive end of said cable toward said battery terminal under force of said nut member.

5,021,014
BUS BAR ASSEMBLY

Gerard S. Walter, 2625 Middle Rd., Glenshaw, Pa. 15116, and John Hagan, Hardies Rd., Gibsonia, Pa. 15044
Filed May 7, 1990, Ser. No. 519,640
Int. Cl.^{5} H01R *11/26*
U.S. Cl. 439—798 **4 Claims**



1. An electrical bus bar assembly comprising an elongate conductor member having a generally flat surface with two spaced parallel channels extending lengthwise thereof, a riser member extending above the flat surface of said conductor

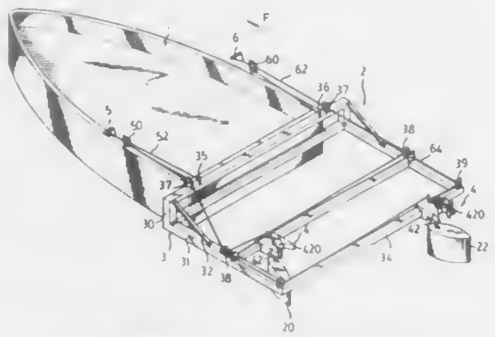
VOL
1127
ISS
1
JE
4
1991
UMI

member between said channels and forming adjacent walls of each, at least one wall of each channel extending upwardly at an angle from the bottom of the channel to form an opening in the flat surface of the conductor member smaller in width than the bottom of the channel, at least one connector module having a top member and depending legs at each side, each leg having a depending foot member remote from the top member with a cross section corresponding to the cross section of the channels in the conductor member and slidable through the opening, said foot members being separated to receive the riser therebetween, a screw member threaded in the top member and extending between the legs and a clamp member pivoted on the end of the screw member between the depending legs for clamping a wire between the clamp member and riser and the depending legs where the connector module is forced away from the flat surface of the conductor member causing the foot members to tightly engage the channels, wherein the top member of the connector module has a first groove intermediate and parallel to the legs, a generally T shaped member having a stem with a transverse head at one end, the other end of said stem being slidable in said first groove and the head bearing on and slidable on the riser of the elongate member and on adjacent portions of said legs, wherein each of said legs are provided with a lip and said transverse head of said T shaped member is provided with a pair of second grooves adapted to receive said lips on said legs and prevent said foot members from spreading apart.

5,021,015
PROPULSION MECHANISM FOR A BOAT

June-Chi Wang, No. 2-1, Alley 9, Hung En 3 Lane, Sec. 3, Hsi Tun Rd., Hsi Tun District, Taichung, Taiwan
Filed Feb. 20, 1990, Ser. No. 482,332
Int. Cl.

Int. Cl.^{5} B63H *16/16*
U.S. Cl. 440—13 **7 Claims**

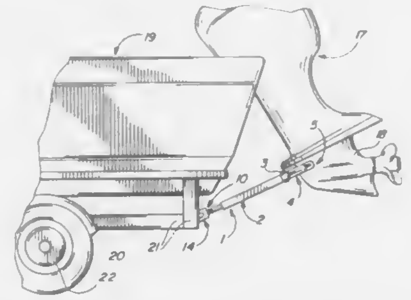


1. A propulsion mechanism for a boat comprising:
a boat body;
a frame body being disposed on a rear end of said boat body, said frame body including a bar which is lateral to said boat body;
a plurality of pulleys being substantially disposed on both sides of said frame body;
a sliding block being provided on and slidable along said bar;
a shaft being pivotally and vertically disposed on said sliding block;
a paddle being disposed on a lower end of said shaft and being substantially submerged in water on which said boat body is floated;
a restraining device being coupled to an upper end of said shaft so that said restraining device and said paddle rotate in concert, said restraining device limiting a rotatable range of said paddle;
a cable being provided and surrounding said pulleys, said sliding block being fixed to a middle portion of said cable;
two pulling rings being fixed to two free ends of said cable; and
said sliding block being drawn to move laterally and reciprocally when said pulling rings are alternatively and reciprocally pulled by a user, so that said paddle moves relative to said water and so that a reactive force is produced to propel said boat body.

7. A propulsion mechanism for a boat comprising:
a boat body;
a beam being laterally provided on said boat body;
two first pulleys being disposed on both ends of said beam;
two second pulleys being disposed on a middle portion of said beam;
a pair of sliding blocks being provided on and slidable along said beam;
a shaft being pivotally and vertically disposed on each of said sliding blocks;
a paddle being disposed on a lower end of each said shaft and being substantially submerged in water on which said boat body is floated;
a restraining device being coupled to an upper end of each said shaft so that said restraining device and said paddle rotate in concert, said restraining device limiting a rotatable range of said paddle;
a first cable being provided and surrounding said first pulleys and two ends of said first cable being fixed to said sliding blocks;
two second cables, one end of each second cable being fixed to a respective sliding block, each second cable surrounding a respective second pulley;
two pulling rings being fixed to free ends of said second cables; and
said sliding blocks being drawn to move laterally and reciprocally when said pulling rings are alternatively and reciprocally pulled by a user, so that said paddles move relative to said water and so that a reactive force is produced to propel said boat body.

5,021,016
OUTBOARD MOTOR SUPPORT

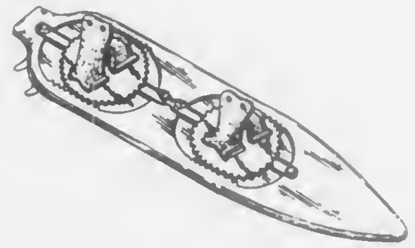
Lesley B. Currey, 122 Park St., Monticello, Ark. 71655
Filed Mar. 5, 1990, Ser. No. 487,847
Int. Cl.^{5} B60P *3/10*
U.S. Cl. 440—113 **10 Claims**



1. An outboard motor support for supporting an outboard motor from a trailer, comprising a first support member having a V-shaped foot-engaging member and a foot-engaging bar carried by said foot-engaging member for attachment to said first support member at one end for engaging the outboard motor; a rubber cylinder carried by said first support member; a second support member having trailer-engaging means provided on one end thereof, said second support member slidably carried by said first support member; a flexible cuff provided on said foot-engaging bar at said first support member for sealing the interface between said foot-engaging bar and said first support member; and a coil spring carried by said first support member between said rubber cylinder and said second support member, whereby said first support member and said second support member are positioned between the outboard motor and the trailer with said motor-engaging means engaging the motor and said trailer-engaging means engaging the trailer, responsive to sliding of said second support member with respect to said first support member against the bias of said coil spring and compressing said coil spring against said resilient shock absorbing means.

5,021,017
WATER SPORTS BOARD WITH ADJUSTABLE BINDER PLATES

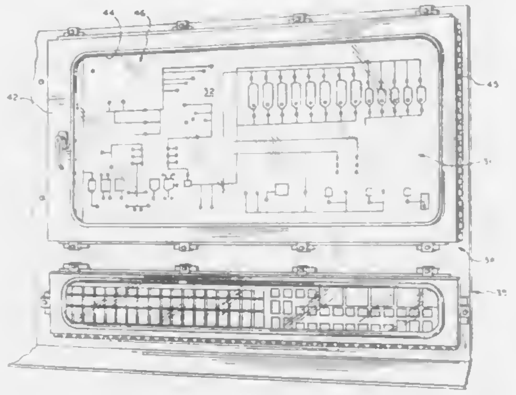
Arthur Ott, Greensboro, Ga., assignor to Wellington Leisure Products, Inc., Madison, Ga.
Filed Aug. 30, 1990, Ser. No. 575,385
Int. Cl.^{5} B63B *35/85*
U.S. Cl. 441—70 **13 Claims**



1. A water sports board comprising an elongated base having a longitudinal axis that longitudinally bisects the base and detent means on each side of said axis, at least one generally disk-shaped binder plate having a plurality of radially projecting peripheral teeth, a boot mounted to said binder plate, and means for mounting said disk-shaped binder plate to said base in a plurality of angular positions with respect thereto with said detent means in engagement with said peripheral teeth.

5,021,018
METHOD FOR MAKING A PANEL ASSEMBLY

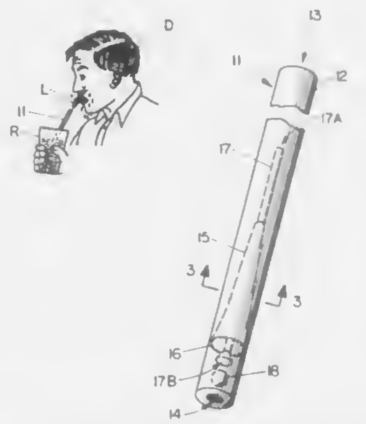
David W. Duback, Glenview, and James R. Vogenthaler, Mount Prospect, both of Ill., assignors to Accurate Metering Systems, Inc., Schaumburg, Ill.
Division of Ser. No. 155,856, Feb. 16, 1988, Pat. No. 4,928,205. This application Mar. 15, 1990, Ser. No. 493,715
Int. Cl.^{5} H05K *3/30*
U.S. Cl. 445—24 **6 Claims**



1. A method for constructing a panel assembly for a control unit comprising the steps of: creating a layout of the system to be controlled in a computer-aided-design system; providing in the layout circle areas for elements of the system to be illuminated to indicate a certain operating mode of the element; creating an overlay of centers for each of the circle areas in the computer-aided-design system; storing in a memory of the computer-aided-design system the layout of the system and a layout of the centers; printing a layout for an overlay of the system to be controlled to a desired scale; printing a layout of the centers to the desired scale; placing the layout of the centers adjacent an outer panel for marking centers thereon; drilling holes at the centers; placing the layout of centers over an inner panel for identifying the centers of the holes to be drilled; drilling holes in the inner panel; mounting light emitting means in the holes drilled in the inner panel; placing the overlay of the system on the outer face of the outer panel with the circle areas thereof in alignment with holes drilled through the outer panel; and storing the graphical representations of the layout of the system and the layout of the centers in the memory of the computer-aided-design system.

5,021,019
NOVELTY SQUIRTING STRAW

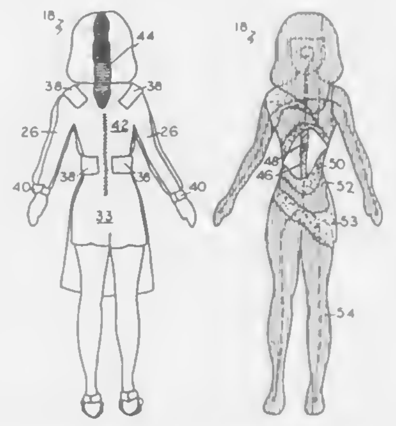
Kenneth A. Gandy, 11706 E. 75th St., Indianapolis, Ind. 46236
Filed Jan. 19, 1990, Ser. No. 467,773
Int. Cl.^{5} A63J *23/00*
U.S. Cl. 272—27 B **18 Claims**



1. A squirting straw device for playing a practical joke on a drinker or on another nearby, comprising:
a cylindrical member having at least a first opening;
means for directing pressurized liquid to strike said drinker or another nearby in response to suction applied at said first opening.

5,021,020
FLAT TOY DOLL AND FLAT TOY DOLL AND FOLIO SYSTEM

Pauline Hambly, 532 Hixville Rd., and Ann Frias, 51 State Rd., both of No. Dartmouth, Mass. 02747
Filed Feb. 15, 1990, Ser. No. 480,228
Int. Cl.^{5} A63H *3/00, 3/08, 3/02*
U.S. Cl. 446—73 **8 Claims**



1. A substantially flat doll apparatus to be dressed by the user which apparatus comprises in combination;
(a) a figure of an animate object shaped in silhouette form of

VOL
1127
ISS
1
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4
1991
UMI

disproportionate thickness to width, constructed of a plurality of flat layers of fabric material, having a head member, a plurality of arm members, a plurality of leg members and a torso comprising;

(i) a flexibie wire means for providing a flexible frame for the figure and for providing for positioning of the figure;

(ii) an essentially planar front panel constructed of a layer of fabric and covering the entire front surface of the flat doll having an outer peripheral edge in the form of a doll silhouette;

(iii) a essentially planar back panel covering an entire rear of the figure constructed of a flat layer of loop fastener fabric covering the entire rear surface of the doll figure;

(iv) an intermediate body formed consisting of a plurality of flat layers of material disposed intermediate the front planar panel and the back planar panel having an outer peripheral edge in the form of a doll silhouette for providing firmness to the flat doll and for permitting flexing of the figure;

(v) a fabric fastening means extending around the outer peripheral edge of the front planar panel and rear planar panel for providing a rounded outer edge extending around the outer periphery of the doll figure;

(b) a plurality of essentially planar clothing members having tab fastener means comprising the hook section of a hook and loop fastener for dressing the figure to be selected by a user wherein the tab fastener means extends outwardly and rearwardly for engagement with the rear panel and for secure attachement of the clothes to the doll figure during play.

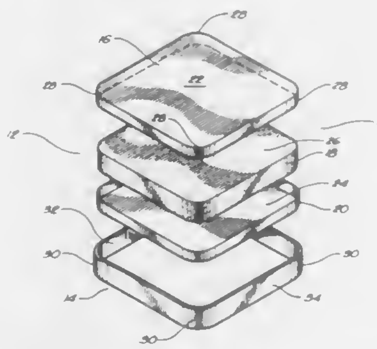
5,021,021
MAGNETIC BUILDING BLOCK

Scott T. Ballard, 2228 Colquitt, Houston, Tex. 77098

Filed Jan. 24, 1990, Ser. No. 469,229

Int. Cl.^{5} A63H *33/04, 33/26*

U.S. Cl. 446—92 16 Claims



1. An apparatus comprising:

a metallic body;

a magnetic strip extending around the periphery of said metallic body, said magnetic strip permanently affixed to said metallic body, said magnetic strip having multiple alternating magnetic poles on an exterior surface of said magnetic strip opposite said metallic body.

5,021,022
SADDLE CONNECTION FOR BALLOONS

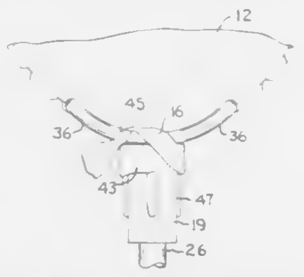
Gilbert J. Ganz, 2927 Exposition Blvd., Los Angeles, Calif. 90018

Filed Jul. 9, 1990, Ser. No. 550,190

Int. Cl.^{5} A63H *33/00*

U.S. Cl. 446—220 4 Claims

1. A saddle connector for an inflated balloon, comprising an upstanding post having an upper end, a slot extending diametrically through the post from its upper end downwardly to a point located a considerable distance below said upper end; two pairs of balloon-engagement arms extending in opposite directions radially away from the upper end of said post, each arm having an upper face that curves outwardly and upwardly from the post, such that the four arms collectively define a concave seating structure for the convex lower surface of an inflated balloon; the arms in each pair of arms extending from a point on the post that borders a side edge of the slot, such that the arms in each pair are spaced from each other by the width of the slot; the slots and the spaces between the arms serving to accommodate the tail portion of a balloon resting against the aforementioned concave seating structure; each said arm including a circular cross-sectional rib and a flange extending laterally from the rib toward an imaginary vertical centerplane defined by the diametrical slot.



5,021,023
APPARATUS FOR THE SKINNING OF FISH

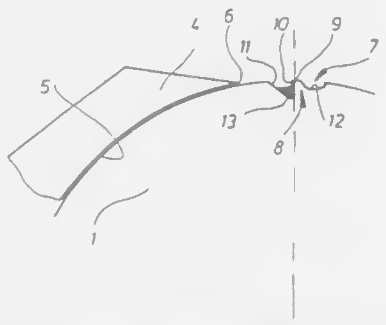
Horst Braeger, Lübeck, Fed. Rep. of Germany, assignor to Nordischer Maschinenbau Rud. Baader GmbH & Co. KG, Lubeck, Fed. Rep. of Germany

Filed Mar. 30, 1990, Ser. No. 501,887

Claims priority, application Fed. Rep. of Germany, Apr. 5, 1989, 3910984

Int. Cl.^{5} A22C *25/17*

U.S. Cl. 452—127 20 Claims



1. An apparatus for removing the skin from fish fillets, said apparatus comprising

(a) a skinning roller driven to rotate in a predetermined rotational direction about an axis of rotation, provided with a plurality of grooves which extend essentially parallel to said axis and define a groove base area and having a cylindrical circumferential surface limited to ridge faces defined by a plurality of tooth webs formed between adjacent ones of said grooves, respectively, each of which webs defines a leading and a trailing flank, respectively, with regard to said rotational direction;

(b) a presser face opposing said circumferential surface of said skinning roller, and

(c) a skinning knife associated with and designed to correspond to said presser face, wherein

(d) the depth of each groove in the region of said leading flank of said tooth web, when viewed in said direction of movement, is smaller than in the region of said trailing flank of said web;

(e) the size ratio between the width of the grooves measured on said circumferential surface and the greatest depth of said grooves is equal to or greater than 3:1;

(f) the size ratio between the width of said ridge face of said tooth webs and the minimum dimension of the depth of said grooves does not exceed 2:1; and

(g) the smallest dimension of the depth of the grooves does not fall below 0.5 mm.

5,021,024
CUTTING UP FOWL

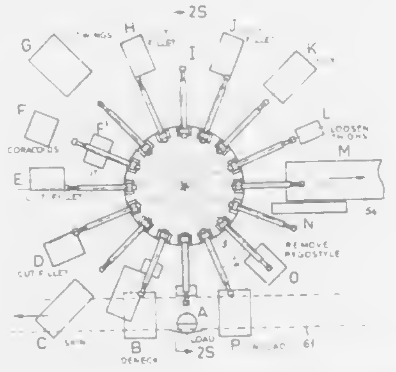
Daniel Villemin, Chennevieres S/Marne; Janusz Plusa, Champigny sur Marne; Daniel Guilbaud, Saint Fulgent; Jean Leclere, Creteil, and Paul Romand, Valence, all of France, assignors to Etablissements Arrive S.A., Saint Fulgent and Union Financiere pour le Developpement de L'Economie Cerealiere - Unigrains, Paris, both of, France

Filed Mar. 12, 1990, Ser. No. 491,677

Claims priority, application France, Mar. 13, 1989, 89 03709

Int. Cl.^{5} A22C *21/00*

U.S. Cl. 452—149 17 Claims



1. A method of cutting up a bird, the method comprising the steps of sequentially:

a) cutting free the fillets;

b) loosening the wings;

c) dislocating the thighs; and

d) removing as one piece a subassembly comprises of the thighs, the fillets, and the wings.

5,021,025
METHOD AND MACHINE FOR MAKING FOOD PATTIES

Richard C. Wagner, c/o Hollymatic Corporation, 600 E. Plainfield Rd., Countryside, Ill. 60525

Filed Sep. 12, 1989, Ser. No. 404,327

Int. Cl.^{5} A22C *7/00*

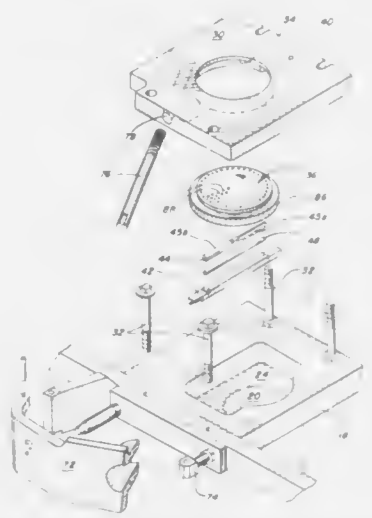
U.S. Cl. 452—174 27 Claims

1. A meat patty molding machine comprising:

a fill plate having a substantially flat surface thereon and having openings therethrough, said fill plate being rotatably mounted to a base plate and substantially circular with a gear surface therearound;

means for defining a disk shaped mold cavity on said fill plate;

means for teeding meat through said fill plate openings into the defined mold cavity; and



a gear drive engaging said fili plate gear surface for rotating one of said fill plate or said mold cavity defining means relative to the other during feeding of said meat

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5,021,026
COIN RECEIVING AND DISPENSING MACHINE

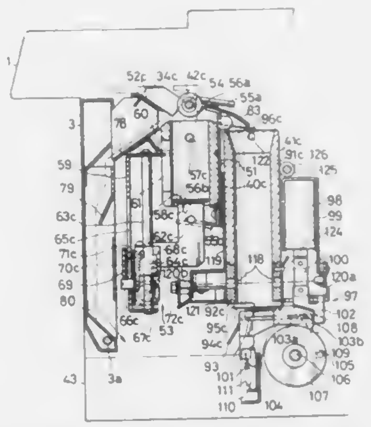
Kouichi Goi, Kawasaki, Japan, assignor to Laurel Bank Machines Co., Ltd., Tokyo, Japan

Filed Jul. 18, 1989, Ser. No. 381,526

Claims priority, application Japan, Jul. 22, 1988, 63-183269; Jul. 4, 1989, 1-172644

Int. Cl.^{5} G07D *1/00, 3/02*

U.S. Cl. 453—40 17 Claims



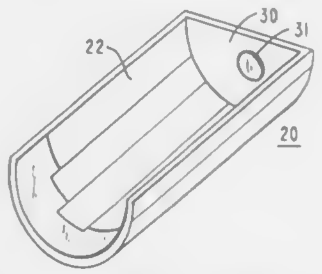
1. A coin receiving and dispensing machine comprising a plurality of temporary storing means for receiving deposited coins from an upper opening thereof and temporarily storing the received coins as stacked separately in accordance with their denominations, a plurality of dispensing coin storing means for receiving and storing the coins stored in said plurality of temporary storing means as dispensing coins separately in accordance with their denominations, and coin dispensing means which is adapted for receiving coins from said temporary means to return the coins when deposited coins are returned and for receiving coins from said dispensing coin storing means to dispense the coins when coins are dispensed, each pair of said temporary storing means and said dispensing coin storing means which store the same denomination of coins being arranged laterally of each other and so that a top of the dispensing coin storing means is positioned above a bottom of the temporary storing means.

VOL
1127
ISS
1
JE
4
1991
UMI

5,021,027

COIN COMPUTER WITH INTEGRAL COIN INDICIA

John D. Bremer, 2 Poe Ave., Somerset, N.J. 08873
Filed Apr. 27, 1989, Ser. No. 344,091
Int. Cl.^{5} G07D *9/06*
U.S. Cl. 453—58 3 Claims



1. A coin counter apparatus comprising:

a longitudinal transparent tubular member having a closed bottom defined by a bottom wall and an open top and a sidewall therebetween and having a substantial elongated opening along one side directed from said opened top to said closed bottom wherein said opened top enables said member to function as a scoop to scoop up coins of one of a plurality of different denominations,

said longitudinal tubular member being semicircular in cross section with said substantial elongated opening being a rectangular slot to enable said member to scoop coins, and

means located on the surface of said member to provide a plurality of reference levels, each one of said reference levels indicative of the height of a corresponding stack of different denomination coins whereby when one scoops coins of the same denomination into said member one can determine the exact amount of coins when said stack is aligned within said member from said bottom towards said top and supported by said wide walls of said member,

said means comprising a plurality of individual color coded bars imprinted side-by-side on the outer surface of said member and extending from the bottom toward the opened top with each bar of a different length and color and with each bar corresponding to a different stack of different denomination coins, whereby said plurality of bars are four in number with a first bar corresponding to a stack of quarters, a second bar corresponding to a stack of dimes, a third bar corresponding to a stack of pennies and a fourth bar corresponding to a stack of nickels, the coin value of each bar being the accepted value for the particular associated coin, and

an indentation in said bottom wall extending into the interior of said tubular member and providing a reference level for each stack of coins to rest on whereby an accurate measure of each stack of coins is obtained.

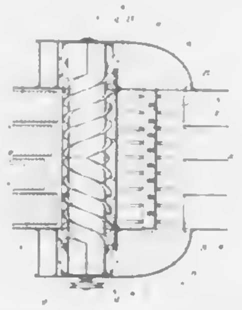
5,021,028

HARVESTER THRESHER WITH CHOPPER

Hermann Kersting, Oelde/Lette, and Franz Piesch, Harsewinkel, both of Fed. Rep. of Germany, assignors to Claas Ohg, Harsewinkel, Fed. Rep. of Germany
Filed Oct. 5, 1989, Ser. No. 417,270
Claims priority, application Fed. Rep. of Germany, Oct. 7, 1988, 3834102
Int. Cl.^{5} A01D *49/00*
U.S. Cl. 460—85 7 Claims

1. A harvester thresher, comprising:

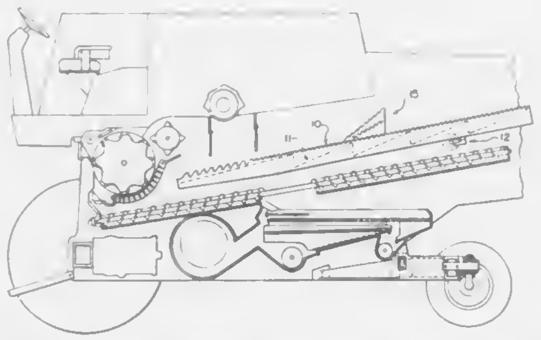
a threshing device; straw shakers located downstream said threshing device and having a discharge end; a threshing and separating device located downstream said straw shaker and having two lateral product outlet openings; a chopper having two opposite ends; and passages each having one end connected with a respective one of said product outlet openings of said threshing and separating device and another end located above a respective one of said ends of said chopper, each of said passages having a bottom which extends in a downwardly inclined manner from a respective one of said product outlet openings of said threshing and separating device to said chopper.



5,021,029

GRAIN SAVER ATTACHMENT FOR THE STRAW WALKER OF A COMBINE

Cliff Usick, Box 25, Newdale, Manitoba, Canada R0J 1J0
Filed Nov. 1, 1989, Ser. No. 429,996
Int. Cl.^{5} A01D *41/02;* **A01F** *12/30*
U.S. Cl. 460—85 8 Claims



8. An attachment device for mounting on a straw walker of a combine harvester comprising a pair of plates each including means for connection to a sawtooth element of the straw walker so as to extend upwardly therefrom and each having an inclined upper edge thereof which has a sawtooth configuration and a plate member for extending across the straw walker between the plates and having an upper surface which inclines upwardly and rearwardly from the straw walker.

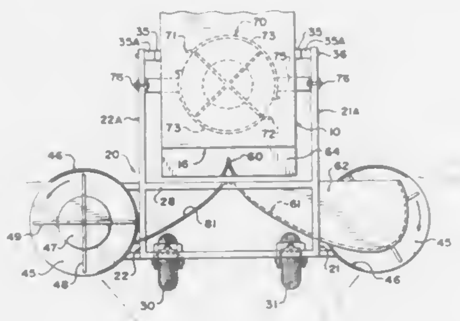
5,021,030

STRAW SPREADER FOR A COMBINE HARVESTER AND METHOD OF SPREADING

James Halford, Box 417, Indian Head, Saskatchewan, Canada S0G 2K0 , and William B. Reed, Saskatoon, Canada, assignors to James Halford, Indian Head, Canada
Filed Mar. 2, 1990, Ser. No. 487,261
Int. Cl.^{5} A01F *29/12*
U.S. Cl. 460—111 17 Claims

1. A combine harvester including a straw spreader, the combine harvester comprising a housing, a straw discharge opening at a rear end of the housing, a straw chopper and discharge assembly mounted adjacent the opening for projecting chopped straw rearwardly of the housing out of the opening, the straw spreader comprising a frame, at least one ground wheel on the frame for engaging the ground and supporting the frame at a predetermined height relative to the ground independently of changes in height of the discharge opening from the ground, hitch means for coupling the frame to a rear part of the combine for transportation behind the combine, rotatable spreader means mounted on the frame at a vertical height below a vertical height of the discharge opening for discharging straw in a spread pattern outwardly to a least one side of the frame and guide surface means shaped and arranged to engage the straw as it is projected rearwardly of the housing and to redirect the straw downwardly on to the spreader means.

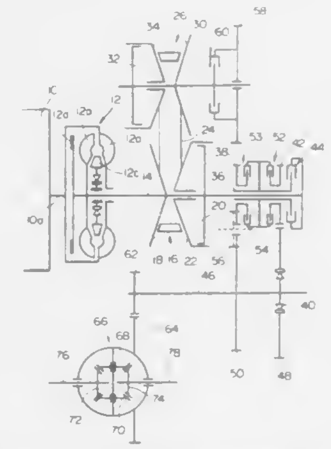
14. A method of spreading straw from a combine harvester comprising collecting from a portion of ground a crop including straw therein, chopping and discharging the straw rearwardly from a rear discharge opening of the combine harvester, collecting the straw as it is discharged from the discharge opening on storage means carried behind the combine harvester on a frame having at least one ground wheel for support of the frame relative to the ground and trailed behind the combine harvester, accumulating a volume of the collected straw on the storage means, discharging the collected straw from the storage means in a spread pattern across the ground behind the storage means, and varying the amount of straw discharged from the storage means relative to the amount of straw collected from the discharge opening of the combine harvester so as to vary the amount of straw spread on the portion of the ground relative to the amount of straw collected from the portion of the ground.



5,021,031

RATIO CHANGE CONTROL FOR TRANSMISSION

Toshifumi Hibi, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan
Filed Jul. 27, 1990, Ser. No. 558,330
Claims priority, application Japan, Jul. 27, 1989, 1-192566
Int. Cl.^{5} F16H *61/02*
U.S. Cl. 474—18 6 Claims



1. A ratio change control for a transmission, the transmission including a gearing mechanism and a continuously variable transmission mechanism, the gearing mechanism and continuously variable transmission mechanism being operatively combined with each other such that they alternatively take over a drive, the ratio change control comprising:

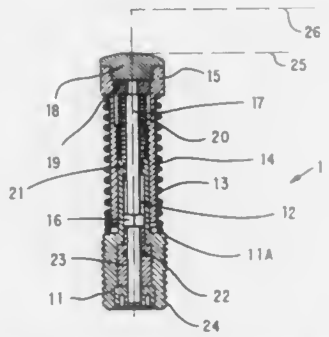
means for detecting whether a transition from a drive owing to the gearing mechanism to a drive owing to the continuously variable transmission mechanism is completed or not and generating a signal as long as said transition is not completed yet; and

means for preventing shifting operation of the continuously variable transmission mechanism when said signal is present.

5,021,032

TENSIONING DEVICE FOR FLEXIBLE DRIVING BELTS

Vincenzo Macchiarulo, Pescara; Edoardo Robecchi, Milan, and Alberto Ruffini, Chieti, all of Italy, assignors to Pirelli Trasmissioni Industriali S.p.A., Milan, Italy
Filed Mar. 14, 1990, Ser. No. 493,427
Claims priority, application Italy, Mar. 15, 1989, 19788 A/89
Int. Cl.^{5} F16H *7/12*
U.S. Cl. 474—138 20 Claims



1. A tensioning device for a flexible belt wound around a plurality of pulleys of a drive mechanism in an endless configuration, said tensioning device supplying to the belt a load to produce in said belt a predetermined tensioning, said device comprising:

- (a) a cylindrical envelope having a base adapted to be secured to a fixed support;
- (b) a sleeve slidably and coaxially mounted on the cylindrical envelope and having a flange at one end thereof;
- (c) a lid mounted on the flange of the sleeve;
- (d) a biasing means interposed between the base of the cylindrical envelope and said flange to apply on the belt a force oriented in a predetermined direction to oppose slackenings of the belt;
- (e) a damping mechanism partially disposed inside an interior space defined in the cylindrical envelope and having a stem slidably guided through a throughbore disposed in an upper base of said cylindrical envelope opposite with respect to the fixed support, and including a head provided for acting against said lid; and
- (f) an elastic means acting on the head of the stem to urge said head against said lid, said elastic means cooperating with the biasing means to apply to the belt forces acting in said predetermined direction to maintain said predetermined tensioning, the biasing means acting independently of the damping mechanism in response to instantaneous elongations of the belt.

5,021,033

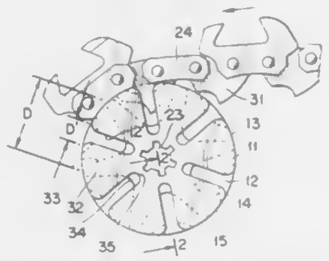
DRIVE SPROCKET FOR CHAIN SAWS

Erik Sundström, Sandviken, Sweden, assignor to Sandvik AB, Sandviken, Sweden
Filed Jul. 17, 1990, Ser. No. 553,381
Claims priority, application Sweden, Jul. 17, 1989, 8902542
Int. Cl.^{5} F16H *55/30*
U.S. Cl. 474—152 10 Claims

1. Drive sprocket for use in a chain saw to transmit move-

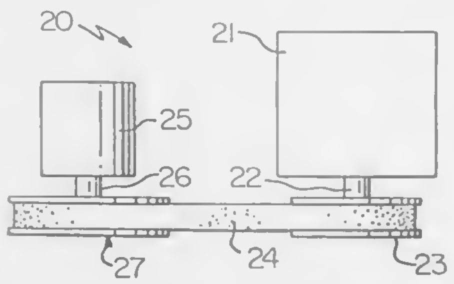
VOL
1127
ISS
1
JE
4
1991
UMI

ment to a saw chain, the drive sprocket having a central hole therethrough for receiving a drive shaft, said hole defining a longitudinal axis of the drive sprocket, the drive sprocket including front and rear plates oriented laterally relative to said longitudinal axis and spaced apart longitudinally, said front plate including openings extending longitudinally therethrough, said sprocket including a gear section disposed between said front and rear plates, said gear section including radial teeth disposed in circumferentially spaced relationship to form radial gullets therebetween, said gullets sized to receive drive links of a sawchain, said gullets arranged in communication with respective ones of said openings in said front plate, each gullet including an inclined surface at a radially inner end thereof, said surface facing a respective one of said openings and being inclined at an acute angle greater than 20° relative to said axis for causing debris entering said gullet to be directed toward said opening.



5,021,034
PULLEY CONSTRUCTION, DRIVE SYSTEM UTILIZING THE SAME AND METHODS OF MAKING THE SAME

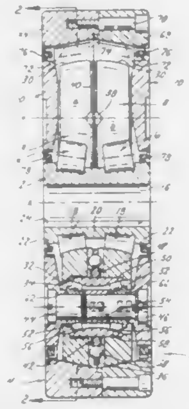
Michael E. Allen, Morrisville, Mo., assignor to Dayco Products, Inc., Dayton, Ohio
Division of Ser. No. 333,206, Apr. 4, 1989, Pat. No. 4,906,223, which is a division of Ser. No. 99,174, Sep. 21, 1987, Pat. No. 4,820,246. This application Dec. 22, 1989, Ser. No. 455,479
The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.
Int. Cl.^{5} F16H *55/36*
U.S. Cl. 474—174 20 Claims



1. In a pulley construction for use with an endless drive belt means, said pulley construction comprising a body member having a peripheral means for receiving part of said belt means thereon and having securing means, and a hub member having securing means secured to said securing means of said body member so as to hold said members in aligned assembled relation to rotate in unison, said hub member having means for being interconnected to a shaft means so that said pulley construction and said shaft means will be adapted to rotate in unison, the improvement wherein said securing means are so constructed and arranged that said securing means of one of said members has a part thereof that is adapted to break away from said one member under a certain normal driving force of said belt means when said shaft means is prevented from rotating so as to permit said securing means of said body member to rotate on said securing means of said hub member while said securing means maintains said members in said aligned assembled relation thereof.

5,021,035
TRACTION DRIVE UNIT

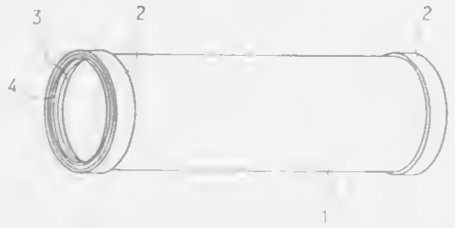
Rao-Sheng Zhou, Canal Fulton, Ohio, assignor to The Timken Company, Canton, Ohio
Filed Jun. 4, 1990, Ser. No. 532,865
Int. Cl.^{5} F16H *15/48*
U.S. Cl. 475—183 24 Claims



1. A traction drive unit comprising: a sun member having outwardly presented first and second raceways which are beveled in opposite directions; an outer ring having inwardly presented raceways which are beveled in opposite directions, and planet rollers arranged in at least two circumferential rows of different diameter between the sun member and the outer ring with the rollers of the one row contacting the rollers of the other row, the rollers of the two rows being captured axially by the sun member and the outer ring.

5,021,036
SEAMLESS SEMICONDUCTIVE BELT

Akihiro Tanaka; Tetsuhiro Ohsima, both of Moriyama, and Takumi Sakamoto, Shiga, all of Japan, assignors to Gunze Ltd., Ayzbe, Japan
Filed Aug. 28, 1990, Ser. No. 573,754
Claims priority, application Japan, Sep. 1, 1989, 1-227689
Int. Cl.^{5} F16G *1/00*
U.S. Cl. 474—237 8 Claims



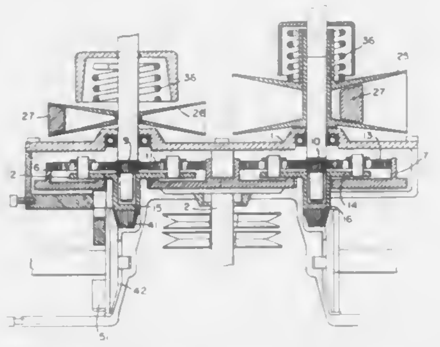
1. A seamless semiconductive belt produced by cutting a seamless tubelike film made of a polycarbonate containing conductive carbon to desired length at right angles to the axial direction of the film, the film having a surface electrical resistance of about 10^5 to about 10^{13} $\Omega/\square$ and the ratio of minimum surface electrical resistance to maximum surface electrical resistance being at least 0.01.

5,021,037
STEPLESS TRANSMISSION WITH STEERING

Pentti J. Tervola, 3663 Lakewood Rd., Lake Worth, Fla. 33461
Continuation-in-part of Ser. No. 303,079, Jan. 30, 1989, Pat. No. 4,913,003, which is a continuation-in-part of Ser. No. 909,009, Sep. 18, 1986, abandoned. This application Feb. 23, 1990, Ser. No. 484,684
Int. Cl.^{5} F16H *37/00*
U.S. Cl. 475—25 29 Claims

1. A combined stepless transmission and steering apparatus comprising:
(a) a rotary input shaft means for transmitting power from a rotating power source;

(b) two rotary output shafts, a first output shaft and a second output shaft;
(c) two planetary gear assemblies each operatively connected to said input shaft means, a first gear assembly operatively connected to said first output shaft and a second gear assembly operatively connected to said second output shaft; and
(d) two variator means for stepless controlling of the speed and direction of said output shafts, a first variator means operatively connected between said input shaft means and said first gear assembly and a second variator means operatively connected between said input shaft means and said second gear assembly, wherein operation of said first and second variator means varies the rate and direction of rotation of said output shafts so as to control in a stepless fashion each output shaft rotation independently of the other for control of both speed and direction;
(e) each said variator means including a pair of variable diameter pulleys and endless belt means for operatively connecting said pulleys; and

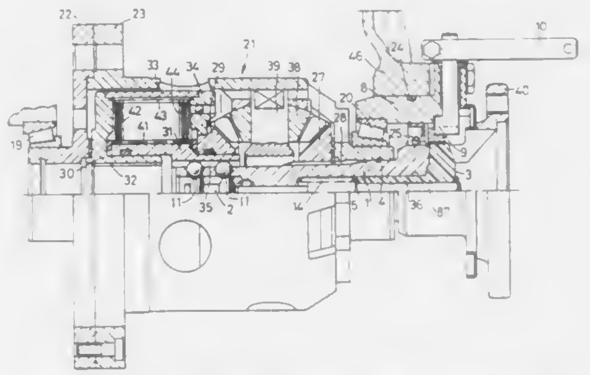


(f) each said planetary gear assembly including: a sun gear operatively connected to one of said pulleys; a planet gear carrier operatively connected to said output shaft; and a ring gear operatively connected to said input shaft means;
in which each said variator means includes a bidirectional control means for controlling both the rate and direction of rotation of said output shaft, whereby movement of said control means in a first direction from a first extreme position to a second extreme position varies said output shaft from a maximum rate of clockwise rotation through progressively slower rates to zero output at an intermediate position of said control means and then through progressively faster counterclockwise rotation to maximum rate at a second extreme position. shaft, whereby movement of said control means in a first direction from a first extreme position to a second extreme position varies said output shaft from a maximum rate of clockwise rotation through progressively slower rates to zero output at an intermediate position of said control means and then through progressively faster counterclockwise rotation rates to maximum rate at a second extreme position.

5,021,038
DIFFERENTIAL UNIT

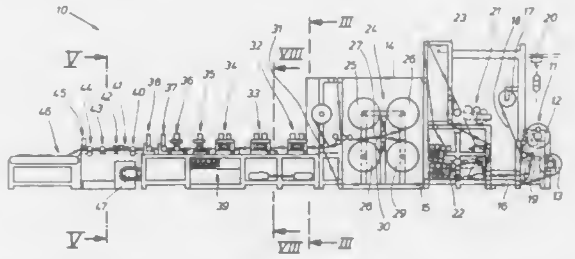
Wolfgang Beigang, Ruppichteroth, Fed. Rep. of Germany, assignor to GKN Automotive AG, Siegburg, Fed. Rep. of Germany
Filed Jun. 7, 1990, Ser. No. 534,720
Claims priority, application Fed. Rep. of Germany, Jun. 7, 1989, 3918565
Int. Cl.^{5} F16H *1/44*
U.S. Cl. 475—85 18 Claims

1. A differential gear unit, comprising a differential carrier, two output gears, and a coupling device for restricting differential rotation of the output gears in dependence on the difference in speed therebetween, the coupling device including first and second parts torque-transmittingly connected respectively to one of the output gears or to the differential carrier and to the other output gear of the differential, one of said torque-transmitting connections being established by way of a releasable connecting device, the releasable connecting device comprising:
a sleeve element;
coupling members guided in openings in the sleeve element for radial movement therein;
an actuating member disposed in said sleeve element and movable axially therein, having at least one formation engagable with said coupling members such that in a first relative position of the sleeve element and actuating member the coupling members are held in radially outer positions to provide a torque transmitting connection with said second part of the coupling device, and in a second relative axial position the coupling members can move radially inwardly to break said torque-transmitting connection;
a positioning member movable axially and operable on said actuating member by way of latching members displaceable at least radially to latching positions;
the latching members being engagable with at least one surface which, as a result of axial force exerted thereon, applies a radial component of force to the latching members to urge them away from their latching positions;
the positioning member having a surface which supports the latching members against said radial component of force.



5,021,039
APPARATUS FOR MANUFACTURING AIR CUSHION DISPATCH PACKAGES

Karl-Heinz Richter, Crailsheim; Hubert Kurz, Munich, and Georg Kuecba, Feuchtwangen, all of Fed. Rep. of Germany, assignors to Vereinigte Papierwarenfabriken GmbH, Munich, Fed. Rep. of Germany
Continuation of Ser. No. 37,308, Apr. 10, 1987, abandoned. This application Nov. 20, 1989, Ser. No. 438,980
Claims priority, application Fed. Rep. of Germany, Apr. 10, 1986, 3612136
Int. Cl.^{5} B31B *1/64*
U.S. Cl. 493—14 14 Claims



1. Apparatus for producing air-cushion mailing bags, said bags comprising an air-cushion sheet and paper, said sheet and paper facing each other over an area of their surfaces, said apparatus comprising:

VOL
1127
ISS
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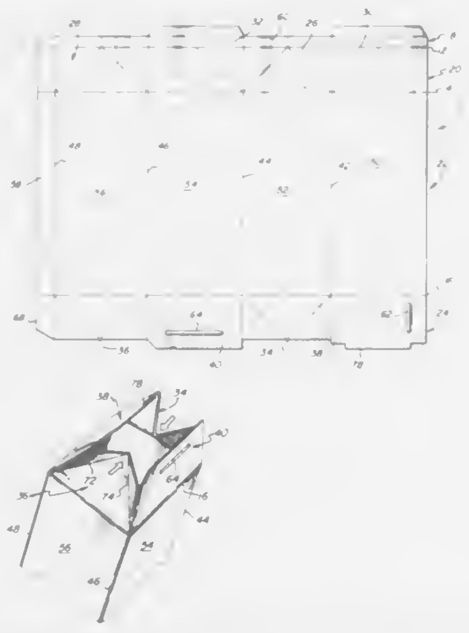
JE
4
1991
UMI

a paper unwinding means for unwinding two separate paper webs;
air-cushion sheet unwinding means for unwinding two separate air-cushion sheet webs between the paper webs and in registration thereto;
each of said webs having a pair of longitudinal outer edges;
area sealing means disposed in a downstream direction from the unwinding means for sealing at least part of the area of the two paper webs brought together to the two air-cushion sheet webs introduced between said paper webs, and for holding said paper and air-cushion webs in registration to each other during subsequent production steps;
at least one longitudinal sealing means and one transverse sealing means for sealing an edge region of each mailing bag being produced, said transverse and longitudinal sealing means comprising means for defining a pair of transversely adjacent mailing bags there being at least three longitudinal sealing means in the apparatus;
said longitudinal sealing means comprising means for joining an upper paper web to an upper air-cushion web and a lower paper web to a lower air-cushion web at each outer web edge and means for longitudinally joining the upper and lower webs at the center of the webs;
means for cooperating with said longitudinal sealing means and for preventing joining of the upper webs to the lower webs at the outer web edges and thereby defining a pair of pocket openings in the bags, one opening at each of the outer web edges;
said longitudinal and transverse sealing means disposed downstream of the area sealing means;
a traction means for transporting the paper sealed to the air-cushion sheet, said traction means disposed downstream of the transverse and longitudinal sealing means;
means for cutting the mailing bags to an intended format, said cutting means disposed downstream of the traction means, and
triggering means for actuating the sealing and cutting means to define a bag format.

5,021,040
PAPERBOARD CONTAINER HAVING LEAK PREVENTATIVE RAISED SEALING SCORES

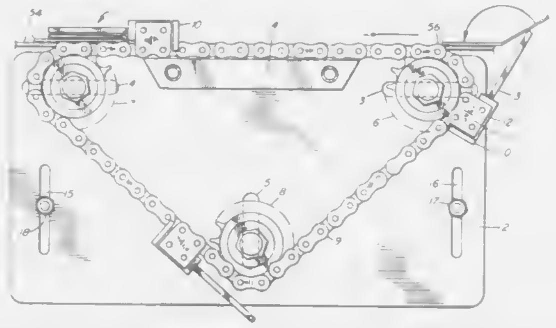
Robert D. Phillips, 153 Seaward Way, Avon Lake, Ohio 44012
Filed May 21, 1987, Ser. No. 54,308
Int. Cl.⁵ B65D *5/42, 5/08*
U.S. Cl. 493—133 2 Claims

1. A method for sealing a liquid container formed from a blank having a plurality of cooperative panels foldable about a plurality of folding score lines, comprising the steps of:
forming a raised sealing score having a front and a rear edge in a first panel and assembling said blank into a container so that the free edge of a second panel having a longitudinal free edge substantially abuts the raised portion of said raised sealing score; said abutting free edge contacting the front edge of said raised sealing score; and
heat sealing the liquid container without deforming said free edge whereby after sealing the effects of surface tension of a liquid contained in the sealed liquid container are mitigated by the physical abutment between said raised sealing score and said abutting free edge of said panel.



5,021,041
ATTACHMENT FOR BOX MAKING MACHINE

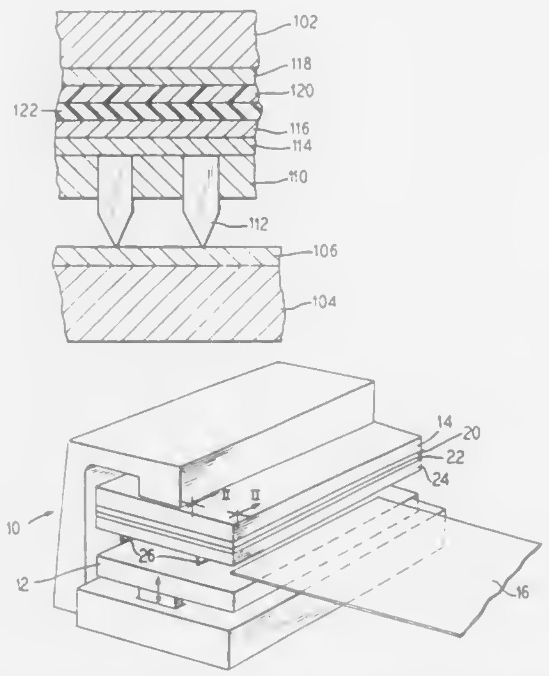
Roger R. Pigeau, 60 Cliftonvale Avenue, London, Ontario, Canada N6J 1J8 , and Fred Schuster, 40 Hampton Crescent, London, Ontario, Canada N6H 2N8
Division of Ser. No. 263,056, Oct. 27, 1988. This application Mar. 23, 1990, Ser. No. 498,321
Claims priority, application Canada, Oct. 4, 1988, 579203
Int. Cl.⁵ B31B *1/52, 1/58*
U.S. Cl. 493—177 9 Claims



1. A self-driven attachment for use with a folder gluer box making machine comprising: a frame; at least two sprockets mounted on said frame for rotation; an endless chain mounted on said sprockets; at least three push plates mounted on said chain; and at least one folder lifter arm integral in one piece with one of said push plates, wherein, in operation pre-cut box boards are moved forwardly on a conveyor and when each of said box boards abuts a push plate said first push plate moves said chain forwardly such that said lifter arm integral with a second following push plate, abuts the rear of said box board thereby folding the rear flap of said box board.

5,021,042
DIE CUTTING APPARATUS WITH IMPRESSIBLE COATING

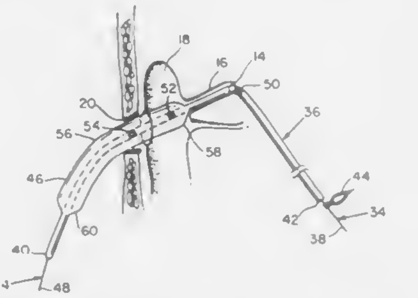
Michael Resnick, Niles, and Walter Saebeler, McHenry, both of Ill., assignors to X-Print, Inc., Morton Grove, Ill.
Continuation-in-part of Ser. No. 271,629, Nov. 15, 1988, Pat. No. 4,955,855. This application Sep. 6, 1990, Ser. No. 578,742
Int. Cl.⁵ B31B *1/20*
U.S. Cl. 493—404 27 Claims



1. A method of die cutting a sheet into a blank using a machine having movable and stationary platens associated therewith, and a tool-carrying die assembly associated with one of said platens, said tool carrying die assembly including a slotted die, tools positioned in the die, and a die backing plate comprising the steps of:
casting a liquid onto a plate;
solidifying said liquid into a coating having the characteristics of being impressible so as to form an impression and hardenable so as to harden said coating and retain an impression;
positioning said coated plate in said machine between the tool-carrying die assembly and the associated platen;
selectively positioning spotting paper means between the die assembly and coated plate;
impressing said coating with the die assembly and spotting paper means so as to adjust for irregularities between the tool and platen and so as to assure uniform cutting of the sheet to a blank, by moving one of said platens toward the other so that the working end of the tool engages the other platen and the irregularities between the tool and the platen are adjusted for by the coating;
removing the coated plate from the machine;
hardening the coating;
returning the hardened coating to said machine in substantially the initial impression position;
positioning an elastomeric sheet between the hardened coating and die assembly; and thereafter
die cutting sheet stock into blanks.

5,021,043
METHOD AND CATHETER FOR DILATATION OF THE LACRIMAL SYSTEM

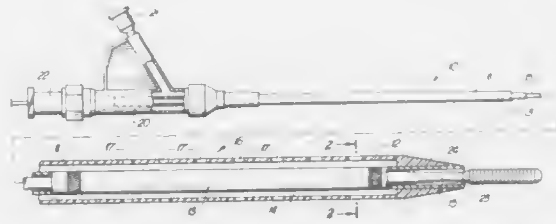
Bruce B. Becker, Encino, Calif., and William A. Berthiaume, Hudson, Mass., assignors to C. R. Bard, Inc., Murray Hill, N.J.
Filed Sep. 11, 1989, Ser. No. 405,766
Int. Cl.⁵ A61M *31/00*
U.S. Cl. 604—49 52 Claims



13. A method of restoring patency to an obstructed portion of the lacrimal system of a patient, comprising:
providing a catheter including:
a catheter body having a proximal end and a distal end;
an inflatable member formed of noncompliant material and disposed proximate to the distal end of the catheter body, the inflatable member having when inflated a center region, a distal tapered region and a proximal tapered region, the distal region attached to the distal end of the center region and the proximal tapered region attached to the proximal end of the center region; and
at least one visually perceivable marker having a known spaced relationship from one of the distal end and the proximal end of the center region for enabling alignment of the inflatable member with the obstructed portion of the lacrimal system to be dilated;
inserting the catheter into the lacrimal system;
positioning the inflatable member in the obstructed portion of the lacrimal system by aligning the marker relative to an opening into the lacrimal system; and
inflating the inflatable member to dilate the obstructed portion to restore patency to the lacrimal system.

5,021,044
CATHETER FOR EVEN DISTRIBUTION OF THERAPEUTIC FLUIDS

Ahmed Sharkawy, College Station, Tex., assignor to Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.
Filed Jan. 30, 1989, Ser. No. 304,062
Int. Cl.⁵ A61M *31/00*
U.S. Cl. 604—53 10 Claims



1. A multilumen catheter having an operative distal portion for the uniform delivery of therapeutic fluid to a location within a patient's vascular system, comprising:
a) an elongated tubular body having proximal and distal ends, a first longitudinally extendinginner lumen with an axial opening in the distal end of the tubular body which is adapted to receive a guidewire and a sidewall which

VOL
1127
ISS
1
JE
4
1991
UMI

defines at least in part an additional longitudinally extending inner lumen adapted to receive therapeutic fluid;

b) a plurality of longitudinally spaced fluid passageways which extend radially through the sidewall of the elongated tubular body in the operative distal portion of the catheter from the additional inner lumen to the exterior of the tubular body and which are adapted to direct therapeutic fluid from the additional inner lumen to the exterior of the tubular body, the transverse cross-sectional area of the passageways and the spacing therebetween being controlled to provide a flow discharge area per unit length of the operative distal portion of the catheter which increases in the distal direction to provide a uniform flow of therapeutic fluid to the exterior of the tubular member; and

c) means at the proximal end of the tubular member to direct treatment fluid to the additional lumen adapted to receive said fluid.

5,021,045

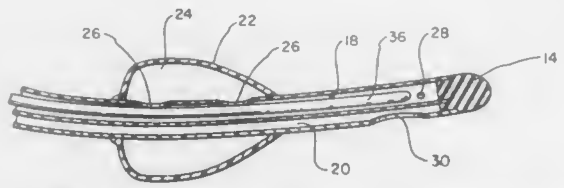
RETROGRADE VENOUS CARDIOPLEGIA CATHETERS AND METHODS OF USE AND MANUFACTURE

Gerald D. Buckberg, Los Angeles, Calif., and Robert J. Todd, Salt Lake City, Utah, assignors to Research Medical, Inc., Salt Lake City, Utah

Filed Apr. 28, 1988, Ser. No. 187,230

Int. Cl.^{5} A61M *29/02*

U.S. Cl. 604—53 79 Claims



1. A catheter for performing retrograde venous cardioplegia by delivering a cardioplegic solution into the coronary sinus of the heart, the catheter comprising:

a flexible, dual lumen cannula of a size capable of insertion into the coronary sinus of the heart, said cannula having an infusion lumen and a sensing lumen;

a balloon attached to the cannula periphery near the distal end of the cannula, thereby forming a chamber between the balloon and the cannula;

at least one balloon aperture in the infusion lumen positioned such that the infusion lumen is in communication with the chamber formed by the balloon and the cannula through the at least one balloon aperture, the aggregate of said balloon apertures having a total cross-sectional area which is greater than the cross-sectional area of the infusion lumen;

at least one infusion lumen outlet in the infusion lumen positioned between the balloon and the distal end of the cannula such that, when cardioplegic solution passes through the infusion lumen, a portion of the cardioplegic solution enters the chamber through the at least one balloon aperture and a portion of the cardioplegic solution exits the infusion lumen and the cannula through the at least one infusion lumen outlet, the aggregate of said infusion lumen outlets having a total cross-sectional area which is in the range of from about twenty-five percent to about seventy-five percent of the cross-sectional area of the infusion lumen, thereby creating a pressure within the infusion lumen which causes the cardioplegic solution to enter the chamber through the at least one balloon aperture in order to fill the balloon until it is turgid and in sealing engagement with the walls of the coronary sinus; and

at least one sensing lumen orifice in the sensing lumen located at a point between the balloon and the distal end of the cannula which is remote from the at least one infusion lumen outlet, said sensing lumen orifice having a cross-sectional area greater than the cross-sectional area of the sensing lumen.

5,021,046

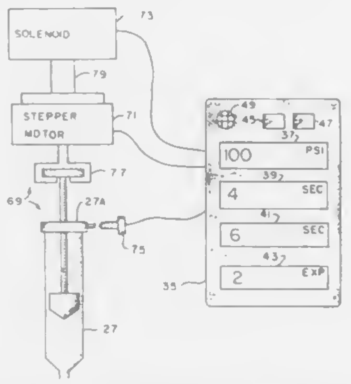
MEDICAL PRESSURE SENSING AND DISPLAY SYSTEM

William D. Wallace, Salt Lake City, Utah, assignor to Utah Medical Products, Inc., Midvale, Utah

Filed Aug. 10, 1988, Ser. No. 230,783

Int. Cl.^{5} A61M *29/00*

U.S. Cl. 604—97 4 Claims



1. A system for measuring fluid pressure in a balloon of a catheter, said balloon being adapted for inflation inside a vessel in a human body, said catheter having an inflation lumen providing a fluid path between the interior of the balloon and an external source of fluid for inflating the balloon, said system comprising:

a pressure transducer in fluid communication with the interior of the balloon, said pressure transducer including means for providing an electrical signal which is a function of the pressure in the interior of the balloon;

electronic digital display means responsive to the electrical signal from the pressure transducer for displaying the balloon pressure measured by the pressure transducer;

means, responsive to the electrical signal from the pressure transducer, for detecting a pressure change indicative of a potential failure of the vessel in the human body during inflation of the balloon;

alarm means responsive to the detecting means for signalling to the user the potential failure; and

means responsive to said detecting means for positively and rapidly deflating said balloon upon detection of potential failure of the vessel.

5,021,047

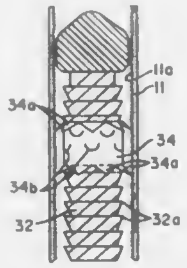
RESTRICTED USE HYPODERMIC SYRINGE

John B. Movern, 3622 Norton Pl., NW., Washington, D.C. 20016

Filed Aug. 29, 1989, Ser. No. 400,060

Int. Cl.^{5} A61M *5/00*

U.S. Cl. 604—110 7 Claims



1. A restricted use hypodermic syringe comprising:

a tubular barrel having a forward end, a rearward end and an inner wall surface defining an interior space for accommodating a liquid to be administered and a movable plunger assembly, said barrel having means at said forward end thereof for coupling to a hypodermic needle;

a movable plunger assembly received within said barrel, said plunger assembly having (1) a piston with an exterior surface sealingly engaging said inner wall surface of said barrel, (2) a plunger rod having a forward end joined to said piston and a rearward end extending through said rearward end of said barrel and (3) a thin-walled tubular plunger lock disposed within said barrel and surrounding said plunger rod;

said plunger lock having inwardly struck rearwardly angled elements engaging said plunger rod to form a one-way clutch which permits movement of said piston and plunger rod relative to said plunger lock in a rearward direction and couples said piston and plunger rod and said plunger lock for movement together in a forward direction;

said plunger lock having outwardly struck rearwardly angled elements engaging said inner wall of said barrel to form a one-way brake which permits movement of said plunger lock in said barrel in a forward direction and prevents movement of the plunger lock in a rearward direction;

whereby (1) the piston and plunger rod can be moved rearwardly in said barrel from a first position to a second position for drawing liquid into said barrel, (2) subsequently said piston and plunger rod and said plunger lock can be moved together in said barrel forwardly from said second position to a third position to expel liquid from said interior space and establish a blocking position of said plunger lock and (3) thereafter the extent of rearward movement of said piston and plunger rod in said barrel is limited by the blocking position of said plunger lock.

5,021,048

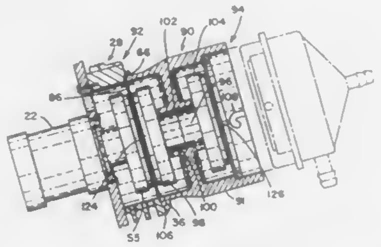
BLOOD PUMP DRIVE SYSTEM

Dwight A. Buckholtz, Eden Prairie, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Aug. 4, 1989, Ser. No. 389,634

Int. Cl.^{5} A61F *1/24*

U.S. Cl. 604—151 4 Claims



1. An apparatus for pumping blood, comprising:

(a) a controller console, the controller console further comprising:
  (i) a wall; and
  (ii) a motor, the motor being rigidly mounted to the wall, the motor having a first shaft which rotates in response to operation of the motor;

(b) a kinetic pump having an inlet and outlet, the kinetic pump including a rotator assembly with magnetic means for driving the pump; and

(c) a manually installable coupler, the coupler further comprising:
  (i) a console adapter, the console adapter being rigidly affixed to the wall, the console adapter comprising:
    (A) a non-ferrous cover;
    (B) a magnetic driver, the magnetic driver being rigidly affixed to the first shaft, the magnetic driver being proximate to the non-ferrous cover such that a magnetic field induced by the magnetic driver is perceptible through the nonferrous cover;
    (C) a detent assembly, the detent assembly comprising:
      (I) a prong;
      (II) a spring, the spring being cooperatively connected to the prong so as to urge the prong to an extended position; and
      (III) a thumb slide, the thumb slide being cooperatively connected to the prong so as to permit retraction of the prong in opposition to the spring;
      (IV) an annular recess, the annular recess being formed with a peripheral area of the console adapter so as to mate with an intermediate power transfer assembly; and
    (D) an intermediate power transfer assembly comprising:
      (I) a drive receiver, the drive receiver being in magnetic communication with the magnetic driver;
      (II) a receiver shaft, the receiver shaft having a first end and a second end, the first end being rigidly affixed to the drive receiver; and
      (III) a cooperating magnetic driver, the cooperating magnetic driver being rigidly affixed to the second end of the receiver shaft, thereby transferring mechanical energy from the drive receiver via the cooperating magnetic driver to the magnetic means of the pump; and
  (ii) a pump receptacle, the pump receptacle comprising:
      (IV) a flange, the flange formed so as to mate with the annular recess of the console adapter; and
    (A) a first end, the first end being cooperatively connected to the intermediate power transfer assembly, and
    (B) a second end, the second end being cooperatively connected to the pump.

5,021,049

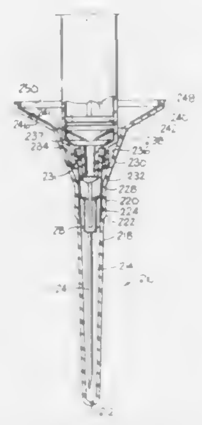
NEEDLE SHEATH HOLDER WITH SEEPAGE PRECLUDING ENGAGEMENT ZONES

Richard S. Howard, 6737 Locust, Kansas City, Mo., 64131

Filed Feb. 26, 1990, Ser. No. 484,889

Int. Cl.^{5} A61M *5/32*

U.S. Cl. 604—192 8 Claims



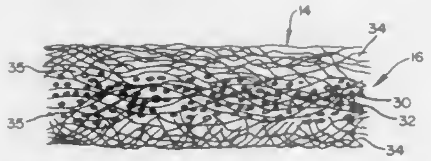
1. For use with a medical needle device having a needle assembly with a needle projecting from an end of a fluid collection tube, a sheath having a closed distal end and an open proximal end, comprising:

an elongated barrel having a distal closed end and a proximal end for enclosing said needle and having a barrel bore with distal and proximal ends, said barrel bore extending between said distal and proximal ends of said barrel, said barrel bore having a cross section to provide a zone for engagement of said barrel bore with a portion of said needle assembly;

VOL
1127
ISS
1
JE
4
1991
UMI

a hub extending from the barrel proximal end for enclosing a portion of said needle assembly therein, said hub having a hub bore with a distal end, in communication with said proximal end of said barrel bore, and a proximal end, said hub bore having a cross section to provide a zone for annular engagement of a portion of said hub bore about a portion of said needle assembly, the zone of the annular engagement being displaced from the zone of the barrel bore engagement, the annular engagement precluding seepage of fluid between said hub and said portion of said needle assembly;
a cone having a distal end and a proximal end and extending from the hub proximal end for receiving a portion of said collection tube therein, said cone having a converging cone extending through said cone with a distal end in communication with the hub bore proximal end, said cone bore guiding said needle into said hub and presenting a visible aperture at said proximal end of said cone;
a shield with a proximal end and a distal end and extending from the cone proximal end and encompassing said visible aperture, said shield having a sloping wall between said proximal and distal ends for guiding said needle into said visible aperture of said cone through said hub and into said barrel.

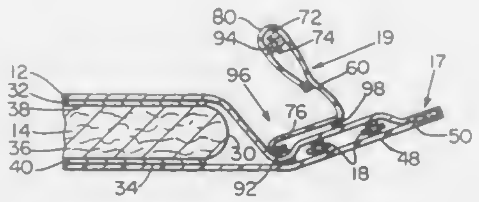
5,021,050
ABSORBENT PANEL STRUCTURE
Michael J. Iskra, Kent, Wash., assignor to Weyerbaeuser Company, Federal Way, Wash.
Filed Dec. 11, 1989, Ser. No. 448,710
Int. Cl.^{5} A61F *13/00*
U.S. Cl. 604—379 20 Claims



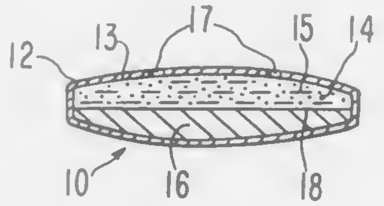
1. An absorbent panel structure, comprising:
an absorbing layer comprised of a substantially high loft, inherently resilient fibrous web containing at least about 400 percent dry basis weight of superabsorbent material to the dry basis weight of the fibers distributed therein, said fibrous web being maintained in a compressed state by said superabsorbent material such that upon wetting of said superabsorbent material said fibrous web expands from its compressed state due to the inherent resilience of said fibrous web to facilitate swelling of said superabsorbent material;
at least one wicking layer of densified hydrophilic fiber particles, said at least one wicking layer being coextensive with at least a portion of a respective expansive surface of said fibrous web to promote liquid transport within said absorbing layer; and
said absorbent panel having an average Taber stiffness value in the machine direction of less than about 7, a panel weight of at least about 21 grams, and an absorptive capacity of at least about 300 ml.

5,021,051
DISPOSABLE ABSORBENT ARTICLE HAVING IMPROVED BARRIER LEG CUFFS
Takashi Hiuke, Osaka, Japan, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Apr. 6, 1989, Ser. No. 334,641
Int. Cl.^{5} A61F *13/00*
U.S. Cl. 604—385.2 23 Claims

1. A unitary disposable absorbent article comprising:
a liquid permeable topsheet;
a liquid impermeable backsheet affixed to said topsheet;
an absorbent means for absorbing liquids, said absorbent means being encased between said topsheet and said backsheet;
a first end, a second end opposed to said first end, a first longitudinal side and a second longitudinal side;
a barrier leg cuff corresponding to each of said first and second longitudinal sides, each said barrier leg cuff having a proximal edge affixed to the absorbent article, a distal edge spaced from said proximal edge, and an attachment zone disposed between said proximal edge and said distal edge, said attachment zone being affixed to the absorbent article in an area between said the portion of said barrier cuffs that is between said attachment zone and said proximal edges and said longitudinal side corresponding to said attachment zone so as to increase the lateral spacing between said distal edges along a portion of the length of the absorbent article; and
a spacing means operatively associated with each said barrier leg cuff in an elastically contractible condition for spacing said distal edge away from said proximal edge.

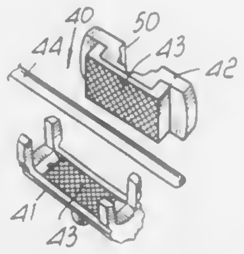


5,021,053
ORAL OSMOTIC DEVICE WITH HYDROGEL DRIVING MEMBER
Brian L. Barclay; Jerry D. Childers, both of Sunnyvale; Jeri Wright, Dublin, all of Calif.; Virgil A. Place, Kawaihae, Hi., and Patrick S. L. Wong, Palo Alto, Calif., assignors to Alza Corporation, Palo Alto, Calif.
Filed Jul. 14, 1989, Ser. No. 380,229
Int. Cl.^{5} A61F *2/00*
U.S. Cl. 604—892.1 49 Claims



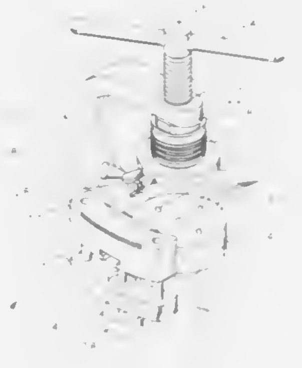
1. An osmotic device for the controlled delivery of a beneficial agent to an oral cavity of an animal over an extended delivery period, the device having a size and shape suitable for comfortably retaining the device in the oral cavity for the extended delivery period, the device including a wall surrounding and forming a compartment containing (i) a layer of a dose of the beneficial agent and a gelling agent, the beneficial agent being insoluble to very soluble in an exterior aqueous fluid present in the oral cavity, and (ii) a layer of a hydrophilic polymer, and a passageway in the semipermeable wall communicating with the layer of beneficial agent in the compartment and with the exterior of the device, the wall being formed of a semipermeable material which is (i) permeable to the passage of the aqueous fluid and (ii) substantially impermeable to the passage of the hydrophilic polymer;
the device further comprising a mechanism for signaling the animal, the mechanism including a contrast in the colors of the beneficial agent layer and the hydrophilic polymer layer,
the semipermeable wall being sufficiently translucent to permit visual inspection of the beneficial agent present in the compartment, and having at least one mark indicating when a predetermined percentage of the drug dose has been delivered into the oral cavity by comparing the location of the interface with the mark.

5,021,054
EXTRAFOCAL FIXING APPARATUS FOR TRANSOSTEAL SYNDESIS OF STRAINS AND COMPRESSIONS IN ORTHOPEDICS AND TRAUMATOLOGY
Alessio Monfardini, and Angelo Grassi, both of Palazzolo sull-'Oglio, Italy, assignors to Ortomedical S.r.l., Palazzolo sull-'Oglio, Italy
Filed Mar. 19, 1990, Ser. No. 495,180
Claims priority, application Italy, Mar. 22, 1989, 19859 A/89
Int. Cl.^{5} A61F *5/04*
U.S. Cl. 606—54 15 Claims



1. An extrafocal fixing apparatus for orthopedic use comprising rectilinear rod-like elements, curved rod-like elements, wire means, and clamp means for interconnecting said rod-like elements and wire means in said fixing apparatus, wherein said clamp means comprise a body means defining a longitudinal extension, said body means further defining body threaded means, said body threaded means being at least partially cylindrical body threaded means, said clamp means further comprising a securing knob means which define a knob threaded means, said knob threaded means being at least partially cylindrical knob threaded means which are threadingly engageable with said cylindrical body threaded means to allow an axial movement of said knob means relative to said longitudinal extension of said body means, said body means further defining a first seat means and a second seat means both transversing said body means and both extending substantially perpendicular to said body means longitudinal extension, said first seat means and said second seat means being arranged at different positions along said body means longitudinal extension, said first seat means and said second seat means extending along substantially mutual perpendicular directions, said clamp means further comprising a mandrel means being arranged between said first and second seat means and having first side and a second side, said first side of said mandrel means constituting at least a portion of said first seat means and said second side of said mandrel means constituting at least a portion of said second seat means, said clamp means further comprising a presser pad means which defines at one end a recess means which constitutes at least another portion of said second seat means, said knob means being provided with a bush means for acting on a second end of said presser pad means, said rod-like elements and said wire means being accommodatable in said seat means, whereby a loosened position of said knob means allows free movement of said rod-like elements and said wire means in said seat means and a tightening rotation of said knob means clamps said rod-like elements and said wire means in said seat means.

5,021,055
PATELLAR CLAMP AND SURGICAL SAW GUIDE
Brian D. Burkinshaw, and Steven G. Brown, both of Pflugerville, Tex., assignors to Intermedics Orthopedics, Inc., Austin, Tex.
Filed Sep. 19, 1990, Ser. No. 585,315
Int. Cl.^{5} A61F *5/00*
U.S. Cl. 606—82 12 Claims



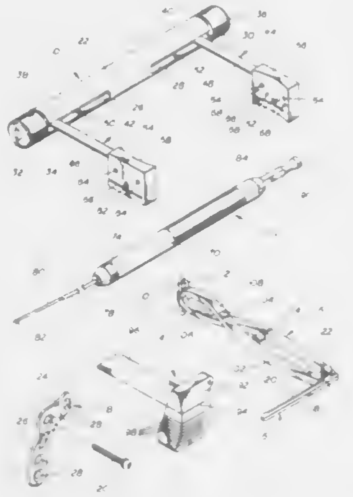
1. A surgical apparatus for holding a patella for resection and for providing a sagittal saw guide, said apparatus comprising
a base for supporting said patella,
a cap opposed to said base for pressing said patella against said base,
means for clamping said patella between said base and said cap,
a sagittal saw guide adapted to be axially displaced along an axis through said base and said cap,
pivoting means pivotal about said axis for supporting said saw guide, and
means for securing said pivoting means at a selected angular displacement.

5,021,056
UPPER TIBIAL OSTEOTOMY SYSTEM
Aaron A. Hofmann, Salt Lake City, Utah, and Albert G. Burdulis, Jr., Austin, Tex., assignors to Intermedics Orthopedics, Inc., Austin, Tex.
Filed Sep. 14, 1989, Ser. No. 407,244
Int. Cl.^{5} A61F *5/04*
U.S. Cl. 606—86 5 Claims

1. A surgical kit for performing an upper tibia osteotomy, said kit comprising:
a transverse alignment guide assembly having at least one cutting blade alignment slot for guiding a cutting blade to cut a first slot in a tibia;
an osteotomy guide comprising mounting means for attaching the guide in a predetermined relation to the first cut, said osteotomy guide having a plurality of aligned parallel cutting blade slots formed therein, said slots being angularly offset from the first slot so that a cutting blade passing through any one of the cutting blade slots will intersect the first slot thereby defining wedge shaped bones of different angular dimensions; and

VOL
1127
ISS
1
JE
4
1991
UMI

a fixation plate adapted to be secured to the tibia and to hold surfaces of the tibia created by the first and second cuts in



proper relationship to each other during the healing of the tibia by new bone growth.

5,021,057

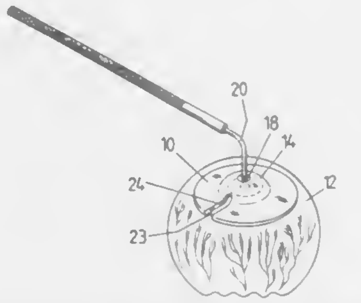
CORNEAL EXPULSIVE HEMORRHAGE INSTRUMENT

James B. Byrne, Jr., Huntsville, Ala., assignor to Vitreoretinal Development, Inc., Birmingham, Ala.

Filed Jun. 28, 1990, Ser. No. 544,990

Int. Cl.⁵ A61F *9/00;* **A61B** *17/00*

U.S. Cl. 606—107 **21 Claims**



1. An instrument for the control of ocular expulsive choroidal hemorrhage during intraocular surgery, comprising:

(a) a substantially rigid, transparent dome having an outer annular region with a concave bottom surface whose curvature approximates the curvature of the sclera proximate the limbus of the eye;

(b) an inner region circumscribed by said outer annular region having a concave bottom surface whose curvature approximates the curvature of the cornea of the eye; and

(c) an aperture formed in said outer annular region and extending into said inner region to permit access to the underlying eye.

5,021,058

METHOD FOR RELIEVING HEADACHES AND APPARATUS FOR PRACTICING THE SAME

Charles S. McKee, 705 Lakeshore Dr., Newport, Ark. 72112

Filed Sep. 12, 1988, Ser. No. 243,510

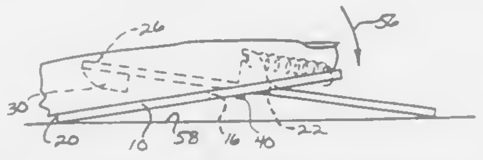
Int. Cl.⁵ A61H *39/02*

U.S. Cl. 606—204 **13 Claims**

1. Apparatus for simultaneously applying pressure to the back of the hand side of the webs of skin between the middle and forefinger of both hands comprising:

means defining a plate for receiving both hands of a person with the middle and forefingers at least slightly spread;

a pair of spaced parallel arms pivoted to said plate such that corresponding ends of each said arm overlie said plate;



skin web engaging pads on said ends; and said plate, said arms and said pads being oriented so that pressure applied to said plate by hands placed thereon will cause said arm ends and said pads to move towards said plate and to engage and apply pressure to the skin webs of the hands on the plate.

5,021,059

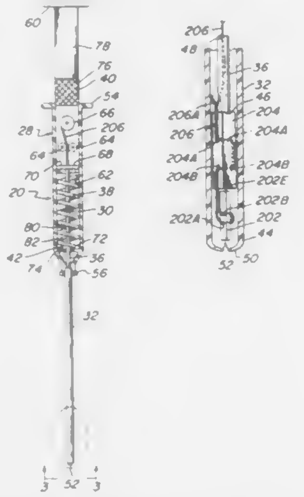
PLUG DEVICE WITH PULLEY FOR SEALING PUNCTURES IN TISSUE AND METHODS OF USE

Kenneth Kensey, Chester Springs; John Nash, Downingtown, and Douglas Evans, King of Prussia, all of Pa., assignors to Kensey Nash Corporation, Exton, Pa.

Filed May 7, 1990, Ser. No. 519,622

Int. Cl.⁵ A61B *17/00;* **A61F** *13/20;* **A61M** *31/00*

U.S. Cl. 606—213 **55 Claims**



1. An instrument for sealing an opening in tissue separating one portion of the body of a living being from another portion thereof, said instrument comprising carrier means for receipt of closure means, said closure means being arranged to be expelled from said carrier means, said carrier means comprising tubular means having a proximally located portion and a distally located portion, said distally located portion having a free end arranged to be introduced through said opening, said closure means comprising anchoring means, sealing means, and filament means, said anchoring means including a tissue engaging portion configured to pass through said opening in one direction but resistant to passage therethrough in the opposite direction, said sealing means including a tissue engaging portion, said filament means being connected between said anchoring means and said sealing means and comprising a first portion and a second portion, said instrument being arranged to expel said anchoring means through said opening and to draw said tissue engaging portion of said anchoring means into engagement with the tissue contiguous with said opening, said first portion of said filament means being arranged to be drawn in the proximal direction by a force applied thereto, whereupon said second portion of said filament means causes said tissue engaging portion of said sealing means to move with respect to said anchoring means and into engagement with the tissue contiguous with said opening on the opposite side thereof from said anchoring means, whereupon said tissue engaging portion of said sealing means seals said opening from the flow of fluid therethrough.

5,021,060

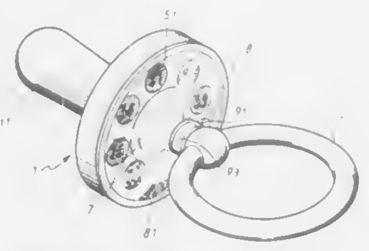
NIPPLE ASSEMBLY WITH ALARM BUZZER AND BODY TEMPERATURE INDICATOR (II)

Jieh-Shan Lu, 56, Alley 115, Shing Her Lane, Jang Her Li, Nan Tour City, Taiwan

Filed Aug. 29, 1990, Ser. No. 574,135

Int. Cl.⁵ G01K *13/00*

U.S. Cl. 606—234 **1 Claim**



1. A nipple assembly comprising:

(a) a hollow base provided with a nipple and including an opening on one side of the base;

(b) a thin shell pot-shaped main case having an open end, an inwardly extending circular flange, and a central hole therethrough, a plurality of glue pits formed on an outer circumference of the flange for receiving waterproof glue to attach the main case to the base;

(c) a thin shell inner case having a cylindrical hollow projection and a flange, a plurality of liquid guiding slots formed through a wall of the hollow projection, and the hollow projection being receivable within the central hole of the main case;

(d) a heat sensing plate provided with a plurality of heat reaction areas through which the temperature of a heat conductive liquid can be indicated, the heat sensing plate being secured to a rear end of the main case;

(e) an IC board and a heat sensitive resistor;

(f) a transparent cover enclosing the heat sensing plate, IC board and heat sensitive resistor within the main case;

(g) a circular waterproof cover secured to an inner circumference of the main case by waterproof glue around the circumference of the cover to define a sealed space between the cover and hollow base, and the sealed space being filled with a heat conductive liquid; and

(h) an alarm buzzer, an energy source for powering the alarm buzzer, whereby when the temperature of the heat conductive liquid reaches a predetermined level, a signal from the heat sensitive resistor is sent through the IC board to activate the alarm buzzer and provide a warning to a person caring for a baby using the nipple assembly.

5,021,061

PROSTHETIC PATELLO-FEMORAL JOINT

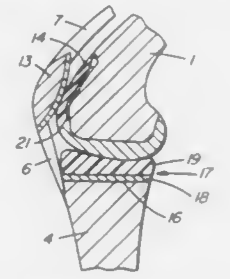
Henk W. Wevers, Glenburnie, and John F. Rudan, Kingston, both of Canada, assignors to Queen's University at Kingston, Kingston, Canada

Filed Sep. 26, 1990, Ser. No. 588,263

Int. Cl.⁵ A61F *2/38*

U.S. Cl. 623—20 **9 Claims**

1. A knee joint prosthesis comprising a patellar component and a femoral component; said patellar component comprising a thin metallic shell having a shaped anterior surface adapted to be secured within a resected patella of a patient, and a convex posterior surface adapted to articulate within a resected femur of said patient between opposed condyles thereof; the femoral component including a metal shell having a shaped posterior surface portion between opposed condyles adapted to be secured within said resected femur and a con-



cave anterior surface adapted to receive and retain an element of dissimilar material to said thin shell having a mating convex posterior surface and a concave anterior surface for articulation with said convex posterior surface of said patellar component.

5,021,062

ACETABULAR CUP ASSEMBLY

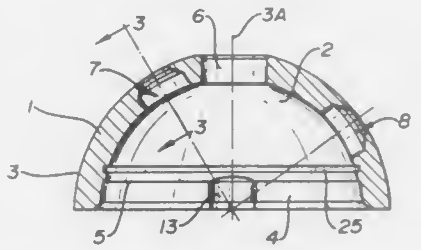
José Adrey, 43, Faubourg St. Jaumes, 34000 Montpellier; Daniel Berteaux, 64bis, rue des Fossés, 45400 Fleury les Aubrais; Christian Goalard, 43, Faubourg St. Jaumes, 34000 Montpellier; Alain Gueret, 29-31 rue Thiers, 88000 Epinal; Georges Hamon, rue Henri Barbusse, 59880 Saint Saulve, and Christian Nourissat, 75 rue Général Giraud, 42308 Roannes Cedex, all of France

Filed May 31, 1990, Ser. No. 531,268

Claims priority, application France, Jun. 21, 1989, 89 08289

Int. Cl.⁵ A61F *2/32*

U.S. Cl. 623—22 **7 Claims**



1. An acetabular cup for use with a bone screw comprising:

a generally hemispherically shaped cup having a substantially hemispherically-shaped inner surface and a substantially hemispherically-shaped outer surface defining a wall therebetween, said wall having a plurality of generally circular apertures therein for accommodating the bone screw, the wall surrounding each aperture having a bevelled surface extending toward said outer surface followed by a generally cylindrical surface extending from said bevelled surface to said outer surface of said cup, said generally cylindrical surface being threaded with threads of predetermined diameter and pitch.

5,021,063

JOINT SOCKET MEMBER FOR A JOINT PROSTHESIS

Karl H. Täger, Gauting, Fed. Rep. of Germany, assignor to Howmedica, Gmbh, Schonkirchen, Fed. Rep. of Germany

Filed Feb. 9, 1989, Ser. No. 310,119

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1988, 3804239

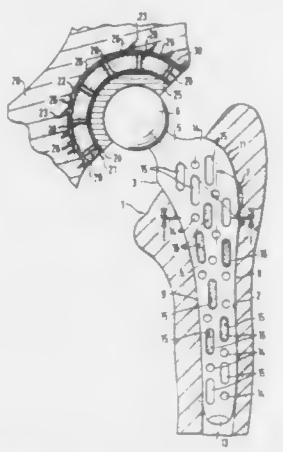
Int. Cl.⁵ A61F *2/34*

U.S. Cl. 623—23 **15 Claims**

1. A prosthetic joint socket member having a cup element which is configured and dimensioned to be affixed to the bone

VOL
1127
ISS
1
JE
4
1991
UMI

and defines a cup-shaped recess for accommodating a bearing element; said cup element comprising a hollow outer shell which is adapted to be affixed to the bone, and an inner shell that forms said recess, said inner shell and said outer shell being spaced radially from each other at a predetermined distance to define an intermediate space therebetween, wherein at least said outer shell has openings to permit loose bone material to be introduced into and held in said intermediate space during surgical emplacement of the member so as to enhance the growth of new bone tissue into said intermediate space.



5,021,064

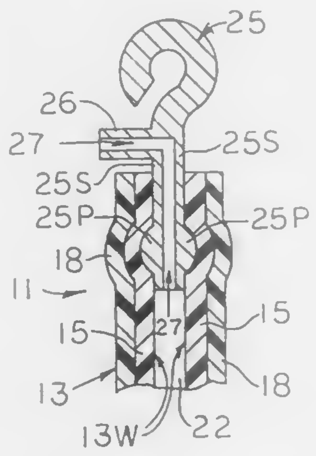
ROBOTIC FLUID-ACTUATED MUSCLE ANALOGUE

R. Scott Caines, Greer, S.C., assignor to Dolores R. Rudy, Midland, Mich., a part interest

Filed Jun. 3, 1982, Ser. No. 384,533

Int. Cl.⁵ A61F *2/72*

U.S. Cl. 623—26 **76 Claims**



1. A robotic, fluid-actuated muscle analogue device adapted to exert contractile and pulling motive power upon its activation, which device is comprised of:

a hollow expandable central conduit member containing an interior void space and having a expandable balloonable, fluid-confining wall structure thereabout and respective end portions terminating same, said expandable conduit member being characterizable in exhibiting end-to-end contractibility when inflated from a position of undistended upon admission thereinto within said interior void space thereof of a fluid under pressure for expanding activation of said conduit member;

at least a single, longitudinally-extending strand of filamentary material running at least relatively peripherally as to, and fixedly secured with, said wall structure of the expandable conduit member of which said filamentary material is an integral part in physical attachment thereto,

said filamentary material aligned so as to extend along from one end of the expandable conduit to another end of said conduit member in emplacement therewith that is at least substantially parallel with a longitudinal center line of said conduit,

said filamentary material being further characterizable in having a tensile extensibility not in excess of the elongatability under internal fluid-pressurization of said expandable conduit member;

means connected into and with the void space in said hollow expandable conduit member for introducing fluid under pressure thereinto for inflationary activation thereof, whereby

said expandable conduit member becomes so as to contractibly assume a foreshortened end-to-end length with corresponding lessening of the effective longitudinal span of the therewith emplaced and associated filamentary material; and

mechanical means for interlinkingly coupling through and with extremity portions of said filamentary material the contractible ends of said expandable conduit member for physically anchoring same at and from one end thereof and connecting same to and with a load to be moved at and from the other end thereof, respectively.

5,021,065

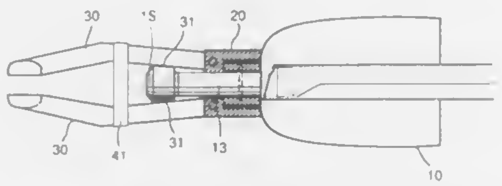
ROTATIONALLY ACTUATED PROSTHETIC HELPING HAND

William E. Norton; Jewell G. Belcher, Jr.; James R. Carden, and Thomas W. West, all of Huntsville, Ala., assignors to The United States of America as represented by the Administrator, National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 12, 1990, Ser. No. 508,154

Int. Cl.⁵ A61F *2/58, 2/68*

U.S. Cl. 623—63 **13 Claims**



1. A prosthetic hand, comprising:

a cuff. said cuff having an open end and a closed end;

a stem, said stem having a plain end and a cam end, said plain end is attached to said closed end of said cuff;

a housing pivotally mounted on said stem whereby said stem is free to pivot within said housing, said housing having two opposite sides;

a first finger pivotally mounted to said housing, said first finger having a first bearing surface and a first clamping end whereby said first bearing surface rides against said cam end of said stem;

a second finger pivotally mounted to said housing, said second finger having a second bearing surface and a second clamping end whereby said second bearing surface rides against said cam end of said stem;

means for holding said bearing surfaces of said fingers against said cam end of said stem; and

a brace attached to said housing for stabilizing said housing whereby said cuff can pivot said stem within said housing moving said first clamping end relative to said second clamping end by action of said cam end rotating against said bearing surfaces.

5,021,066

OXIDATIVE HAIR DYE COMPOSITION BASED ON A GEL VEHICLE AND A PROCESS TO DYE HAIR

Johann Aeby, Marly; Herbert Mager, Fribourg, both of Switzerland, and Eugen Konrad, Darmstadt, Fed. Rep. of Germany, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 192,516, Mar. 16, 1988, abandoned. This application Dec. 8, 1989, Ser. No. 449,078

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1986, 3625916

Int. Cl.⁵ A61K *7/13*

U.S. Cl. 8—408 **16 Claims**

1. A composition for oxidative dyeing of hair consisting of a gel vehicle and a dye mixture dissolved therein, wherein the gel vehicle consists of

A) from 8 to 16% by weight of oleic acid,

B) from 12 to 30% by weight of an ethoxylated alcohol selected from the group consisting of nonyl phenol ethoxylated with from 2 to 6 moles of ethylene oxide. fatty alcohols having 12 to 20 carbon atoms ethoxylated with from 2 to 6 moles of ethylene oxide and mixtures thereof,

C) from 8 to 14% by weight of a fatty alcohol having from 10 to 20 carbon atoms,

D) from 4 to 18% by weight of an alcohol selected from the group consisting of ethanol, isopropanol and mixtures thereof,

E) from 0 to 0.5% by weight of antioxidants,

F) from 0 to 0.1% by weight of perfume oils,

G) from 0 to 5.0% by weight of complexing agents,

H) from 0.1 to 10% by weight of wetting agents and emulsifiers,

I) from 0.1 to 5.0% by weight conditioners selected from the group consisting of lanolin derivatives, cholesterol, panto thenic acid, and betaine

J) from 0.1 to 5% by weight of an organic or inorganic base selected from the group consisting of ammonia, monoethanolamine, triethanolamine, sodium hydroxide and potassium hydroxide,

K0 from 16 to 70% by weight of water, as a proportion of the total quantity of the hair dye composition, wherein the sum total of the % by weight of said components A) to K) does not exceed 99.9 %.

5,021,067

COMPOSITION FOR DYEING KERATINOUS FIBRES EMPLOYING AN INDOLE DYE AND AT LEAST ONE PARA-PHENYLENEDIAMINE DISUBSTITUTED ON ONE OF THE AMINO GROUPS AND PROCESS EMPLOYING IT

Jean F. Grollier, Paris, France, assignor to L'Oreal, Paris, France

Filed Feb. 8, 1989, Ser. No. 307,792

Claims priority, application Luxembourg, Feb. 8, 1988, 87128

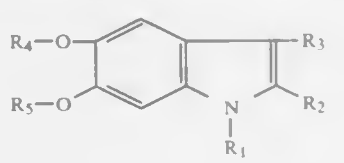
Int. Cl.⁵ A61K *7/13*

U.S. Cl. 8—409 **17 Claims**

1. A composition for dyeing keratinous fibers comprising in a cosmetically acceptable aqueous medium

(a) at least one indole dye having the formula

(I)



wherein

R_1 represents hydrogen, lower alkyl or $—SiR_6R_7R_8$.

R_2 and R_3, each independently, represent hydrogen, lower alkyl, carboxyl, lower alkoxy carbonyl or $—COO\text{-}SiR_6R_7R_8$,

R_4 and R_5, each independently, represent hydrogen, linear or branched C_1–C_{20} alkyl, formyl, linear or branched C_2–C_{20}acyl, linear or branched C_3–C_{20} alkenoyl, $—SiR_6R_7R_8$, $—P(O)(OR_9)_2$ or $—SO_2OR_9$, or R_4 and R_5 together with the oxygen atoms to which they are attached form a ring optionally containing a carbonyl group, a methylene group, a thiocarbonyl group, a $>P(O)OR_9$ group or a $>CR_{10}R_{11}$ group,

R_9 and R_{10} represent hydrogen or lower alkyl,

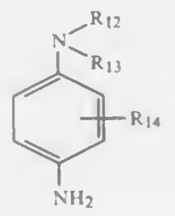
R_{11} represents lower alkoxy, monoalkylamino or dialkylamino, and

R_6, R_7 and R_8, each independently, represent linear or branched alkyl, and

the acid addition salt thereof with an inorganic or organic acid or the corresponding alkali metal, alkaline earth metal or amine salt thereof, said indole dye being present in an amount ranging from 0.1 to 5 percent by weight based on the total weight of said composition, and

(b) a para-phenylenediamine disubstituted on one of the amino groups thereof and having the formula

(II)



wherein

R_{12} and R_{13}, each independently, represent C_1–C_4 alkyl, C_2–C_4 hydroxyalkyl, C_1–C_4 alkyl substituted with SO_3H, mesylamino, acetylamino, C_1–C_4 alkoxy, carbamyl or carbamyl substituted with one or two C_1–C_4 alkyl groups or with a heterocyclic amine, or R_{12} and R_{13} together with the nitrogen atom to which they are attached form a 4- to 6-membered heterocycle; and

R_{14} in position 2- or 3- represents hydrogen, C_1–C_4 alkyl, C_1–C_4 alkoxy or halogen,

or the cosmetically acceptable salt thereof with an acid, said para-phenylenediamine being present in an amount ranging from 0.05 to 1 percent by weight based on the total weight of said composition.

5,021,068

TINTED CONTACT LENS AND METHOD OF MANUFACTURE THEREOF: REACTIVE DYE AND QUATERNARY PHOSPHONIUM SALT

William M. Hung, and Kai C. Su, both of Alpharetta, Ga., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 468,025, Jan. 22, 1990, which is a continuation-in-part of Ser. No. 323,355, Mar. 14, 1989, Pat. No. 4,954,132. This application Aug. 7, 1990, Ser. No. 563,768

Int. Cl.⁵ D06P *5/00;* **C09B** *62/04*

U.S. Cl. 8—507 **13 Claims**

1. An improvement in a process for preparing a soft contact lens tinted over at least a portion of its surface having the steps of forming an aqueous tinting solution comprising a reactive dyestuff and applying said tinting solution to a polymeric hydrogel contact lens material, wherein the improvement comprises adding an effective amount of a quaternary phosphonium salt to said tinting solution before said applying step.

VOL
1127
ISS
1
JE
4
1991
UMI

5,021,069
METHOD OF EFFECTING A BIOREACTION

John G. Whellock, 9400 East Iliff Avenue, #134, Denver, Colo. 80231, and Jonathan Goodbody, 45A Elsworthy Road, London NW3 3BS, England

Filed Dec. 20, 1988, Ser. No. 286,944

Claims priority, application United Kingdom, Oct. 6, 1988, 8823533

Int. Cl.^{5} C10L *9/10;* **C22B** *3/00;* **C12S** *13/00*

U.S. Cl. 44—622 **20 Claims**

1. A method of effecting a bioreaction which comprises introducing a gas into a mixture comprising a continuous liquid phase material and a solid biomass dispersed therein, the mixture containing a micro-organism to enable the bioreaction to proceed, which comprises confining the mixture in a reaction vessel and circulating the mixture around a loop, the loop including a column in which gas transfer is effected, at least the liquid being introduced into the top of the column in the form of at least one stream, the velocity of which stream(s) is sufficient to generate and maintain, at least in an upper region of the column, a substantially continuous foam formed of close-packed bubbles of the gas in the liquid extending across the entire cross-section of the column, driven to violent agitation and backmixing by the incoming stream(s) of liquid, and of relatively uniform bubble size, the velocity of the inlet stream(s) of liquid and the rate of introduction of the gas being sufficient to prevent gas from accumulating at the top of the column.

3. A method according to claim 1 wherein the solids comprise a sulfide-containing ore which includes one or more of the metals Au, Ag, As, Pt, Pd, Rh, Co, Cu, Fe, Mn. Ni, Zn or Pb, and wherein the method is operated to recover or liberate one or more of said metals.

5. A method according to claim 1, wherein the solids comprise a carbonaceous material such as coal, and wherein the sulfur content of the said material is reduced by the method.

6. A method according to claim 3, wherein the ore is iron pyrite, arseno-pyrite or another combined sulfide.

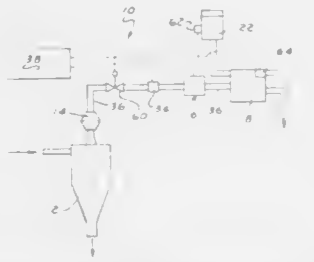
5,021,070
METHOD AND APPARATUS FOR THE SAFE SEPARATION OF COMBUSTIBLE AND/OR EXPLOSIVE GASEOUS MIXTURES FROM AQUEOUS SOLUTIONS

Philip J. Birbara, Windsor Locks, and Joseph E. Genovese, East Granby, both of Conn., assignors to United Technologies Corporation. Hartford, Conn.

Filed Aug. 7, 1990, Ser. No. 564,253

Int. Cl.^{5} B01D *19/00*

U.S. Cl. 55—46 9 Claims



1. A multi-step method for safe separation of combustible and/or explosive gaseous mixtures from aqueous solution which comprises:
- a. separating entrained gases contained therein along with an effective amount of liquid phase;
- b. mixing the separated gas/entrained liquid mixture;
- c. reducing the pressure of the gas/entrained liquid mixture to ambient pressure;
- d. separating the entrained liquid phase component from the gaseous phase component; and
- e. diluting the gaseous phase component with a diluent gas.

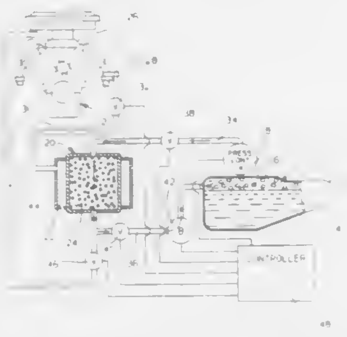
5,021,071
VEHICLE FUEL TANK PRESSURE CONTROL METHOD

S. Raghuma Reddy, West Bloomfield, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 14, 1990, Ser. No. 493,261

Int. Cl.^{5} B01D *51/06*

U.S. Cl. 55—58 2 Claims



1. In a vehicle having a fuel storage tank that produces a mixture of air and hydrocarbon vapor that pressurizes said tank, and which requires pressure relief above a predetermined threshold, a method for controlling said tank pressure, comprising the steps of,

providing a source of selectively applicable vacuum.
providing a source of selectively applicable heat,
providing said fuel tank with a pressure control port that opens in response to an increase in tank pressure above said predetermined threshold,
providing a closed container filled with zeolite of the type that adsorbs air, but passes hydrocarbon vapor, and from which air may be desorbed by applying heat and vacuum.
providing a selectively openable and closable inlet line between said tank control port and said container,
providing a selectively openable and closable outlet line between said container and said fuel tank,
opening said inlet line and said outlet line, when said tank pressure threshold has been exceeded, thereby admitting air and hydrocarbon to said container, with said air being adsorbed in said zeolite and said hydrocarbon passing back to said fuel tank through said first outlet line. and,
closing said inlet line and said first outlet line, and simultaneously applying said heat and vacuum source to said canister, when said zeolite has adsorbed its capacity of air, thereby allowing air to be desorbed from said zeolite.

5,021,072
METHOD FOR MAKING A CARBON-COATED AND POLYMER-COATED OPTICAL FIBER

Robert M. Atkins, Millington; George E. Peterson, Warren, and Raymond D. Tuminaro, Livingston, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

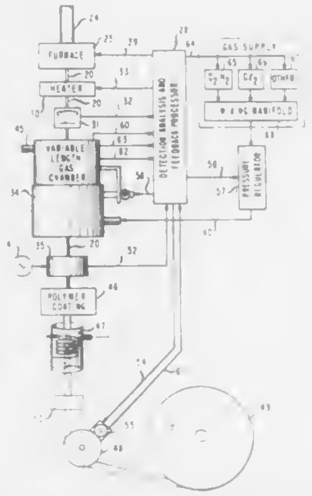
Filed Jan. 16, 1990, Ser. No. 465,698

Int. Cl.^{5} C03B *37/027*

U.S. Cl. 65—3.11 3 Claims

1. A process for making an optical fiber comprising a core and cladding, a hermetic coating on the cladding surface of the optical fiber, and an organic coating layer over the hermetic coating, the process comprising the following steps:

heating at least an end portion of a cylindrical optical fiber perform having a core and cladding and drawing material from the heated portion of the optical fiber preform into an elongated moving optical fiber comprising a core and a cladding;
coating the entire circumference of the cladding surface of the moving optical fiber with a continuous layer of carbon, said carbon layer being thick enough to effectively hermetically seal the optical fiber and, yet, thin enough to avoid vulnerability of the carbon coating to cracking which could lead to a reduction in the strength of the fiber;
depositing a heat-curable polymeric liquid material on the entire circumference of the carbon coating on the optical fiber; and
heat-curing the polymer by heating the carbon coating by induction; and



curing the polymeric material by conduction of heat from the carbon coating whereby an inside-out curing occurs and any bubbles forming in the polymer via the thermal process are driven toward the outer surface and do escape from the outer surface of the polymer coating prior to the transformation of the outer surface from a liquid to a solid state.

5,021,073
METHOD OF MANUFACTURING SYNTHETIC SILICA GLASS

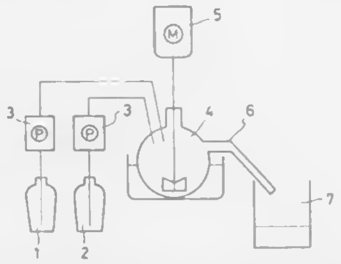
Masatoshi Takita, and Takaaki Shimizu, both of Joetsu, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Aug. 31, 1990, Ser. No. 576,224

Claims priority, application Japan, Sep. 4, 1989, 1-228906

Int. Cl.^{5} C03B *19/06*

U.S. Cl. 65—18.1 9 Claims



1. A method for manufacturing synthetic silica glass comprising the steps of:
- (a) reacting methyl silicate and aqueous ammonia to produce silica particles;
- (b) dispersing the silica particles in water to obtain a dispersion solution having a pH of from about 9 to 13;
- (c) adding methyl silicate to the solution in an amount such that the silica contained in the additive methyl silicate accounts for 5 to 20% by weight of the overall silica;
- (d) heating, dehydrating, de-solventing, and decarburizing the solid silica; and
- (e) sintering the solid silica at a temperature of about 1400° C. or higher.

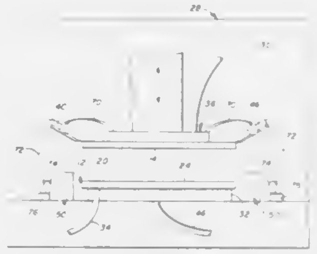
5,021,074
METHOD OF AND APPARATUS FOR JOINING EDGES OF GLASS SHEETS, ONE OF WHICH HAS AN ELECTROCONDUCTIVE COATING AND THE ARTICLE MADE THEREBY

Paul J. Kovacik, Ford City; Charles R. Davidson, Natrona Heights, both of Pa.; Kevin B. Lindsay; Darrel V. Lundberg, both of Marshall, Minn.; Cameron A. Mulder, Minneota, Minn., and Everett Boerboom, Amiret, Minn., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 146.873, Jan. 22, 1988, abandoned. This application Jan. 22, 1990, Ser. No. 468,039

Int. Cl.^{5} C03B *23/203. 23/24*

U.S. Cl. 65—40 16 Claims



1. A method of making a multiple glazed unit having two sheets with one of the sheets having an electroconductive coating, comprising the steps of:

providing two sheets, the first sheet having a non-conductive major surface with a conductive stripe along the marginal edges thereof and the second sheet having an electroconductive coating:
positioning the first and second sheets in facing spaced relationship to one another a sufficient distance to prevent arcing during the practice of the following moving step;
moving electric current along the conductive stripe of the first sheet to heat the marginal edges to a temperature sufficient to sag material edges of the first sheet;
discontinuing the practice of said moving step:
displacing the sheets relative to one another to move marginal edges of the first and second sheets into contact with one another; and
pulling the sheets apart to provide an airspace therebetween.

5,021,075
DEVICE FOR TEMPERING BY CONTACT OF GLAZINGS

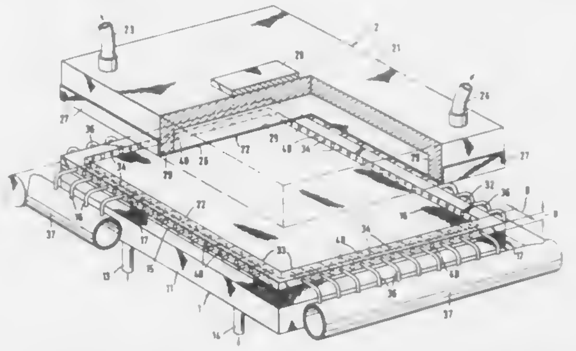
Luc Vanaschen, Eupen, Belgium; Hans-Werner Kuster, Aachen, and Carsten Bremer, Wassenberg, both of Fed. Rep. of Germany, assignors to Saint-Gobain Vitrage International, Courbevoie, France

Filed Jun. 22, 1990, Ser. No. 544,103

Claims priority, application France, Jun. 22, 1989, 89 08311

Int. Cl.^{5} C03B *27/04*

U.S. Cl. 65—287 10 Claims



1. A device for tempering a glazing by contact, comprising:

VOL 1127
ISS 1
JE 4
1991
UMI

two cooled compression plates between which the glazing can be held; and

a device for cooling the peripheral surface of the glazing held between said compression plates, said device comprising parallelepipedic arrangement of blowing ramps placed between said cooling and compression plates, said ramps having slots oriented for directing cooling air jets toward the peripheral surfaces of the glazing, and exhaust openings placed between adjacent pairs of said slots, said slots having a diameter of at least 1 mm and at most equal to the thickness of the glazings, the exhaust openings having a cross section which is equal in area to at least three times that of said slots,

wherein said compression plates and said ramps are dimensioned such that a distance between outlet orifices of said slots and the facing peripheral surface of the glazing is between two times and six times the diameter of each of said slots.

5,021,076
ENHANCEMENT OF NITROGEN FIXATION WITH *BRADYRHIZOBIUM JAPONICUM* MUTANTS

Larry D. Kuykendall, Columbia, Md., and William J. Hunter, Fort Collins, Colo., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Mar. 17, 1989, Ser. No. 325,184

Int. Cl.^{5} C12P *01/04;* **C12N** *01/20;* **C05F** *11/08*

U.S. Cl. 71—7 7 Claims

4. A method for promoting nitrogen fixation by *Bradyrhizobium japonicum* in symbiotic combination with a leguminous plant comprising inoculating the plant or the locus of the plant roots with an effective amount of a stable prototrophic revertant of the non-nodulating TA-11 auxotroph NRRL B-18465 derived from wild-type *Bradyrhizobium japonicum* I-110 ARS, said revertant being capable of enhanced nodulation and nitrogen-fixation in leguminous plants as compared to said wild-type, and culturing the inoculated plant in an environment conducive to symbiotic nitrogen fixation.

5,021,077
HIGH INTEGRITY NATURAL NITROGENOUS GRANULES FOR AGRICULTURE

William P. Moore, Hopewell, Va., assignor to Harmony Products, Inc., Chesapeake, Va.

Filed Jan. 10, 1990, Ser. No. 463,254

Int. Cl.^{5} C05F *1/00;* **C05C** *9/00;* **C05G** *1/00, 5/00*

U.S. Cl. 71—17 15 Claims

1. A method of preparing high integrity natural nitrogenous granules for agriculture comprising:

(a) heating natural nitrogenous materials containing between 5 and 70 percent moisture under basic conditions at a pH between about 8 and 14 with a temperature between about 40° and 100° C. for a period of time between 3 and 60 minutes until between 5 and 50 percent of contained nitrogen is solublized and the nitrogenous materials exhibit adhesive properties, the natural nitrogenous materials being selected from those substances formed in nature by living organisms containing between about 3 and 13 percent nitrogen as complex organic compounds which exhibit an ability to be solublized under basic conditions and selected from the group consisting of poultry waste, poultry feather meal, hair meal, blood meal, bone meal and soybean meal;

(b) forming the natural nitrogenous materials into granules within a mechanically fluidized bed by mechanical means while the materials exhibit adhesive properties, the mechanical means comprising a stationary granulating cylinder containing mixing elements mounted on a rotating central shaft operated at speeds sufficient to throw the natural nitrogenous materials toward the center of the granulating cylinder, forcing axial and radial flows simultaneously on the materials, thereby forming granules in open space in the granulating cylinder;

(c) heating the natural nitrogenous granules at a temperature between 75° and 100° C. for a period of time between 5 and 20 minutes until they harden and exhibit no adhesive properties.

5,021,078
2-(2-IMIDAZOLIN-2-YL)PYRIDINES AND QUINOLINES, PROCESS AND INTERMEDIATES FOR THE PREPARATION THEREOF, AND USE OF SAID COMPOUNDS AS HERBICIDAL AGENTS

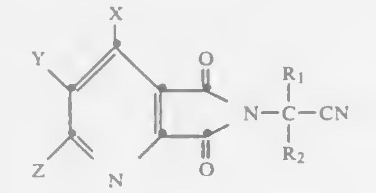
Marinus Los, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 280,906, Dec. 9, 1988, Pat. No. 4,923,504, which is a division of Ser. No. 850,192, Apr. 10, 1986, Pat. No. 4,798,619, which is a division of Ser. No. 382,041, May 25, 1982, Pat. No. 4,638,068, which is a continuation-in-part of Ser. No. 252,704, Apr. 8, 1981, abandoned, which is a continuation-in-part of Ser. No. 155,909, Jun. 2, 1980, abandoned, Ser. No. 155,910, Jun. 2, 1980, abandoned, Ser. No. 155,867, Jun. 2, 1980, abandoned, Ser. No. 155,908, Jun. 2, 1980, abandoned, and Ser. No. 155,865, Jun. 2, 1980, abandoned. This application Feb. 26, 1990, Ser. No. 484,754

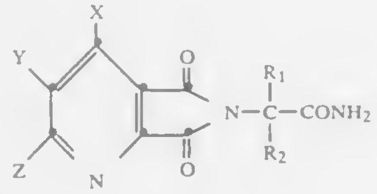
Int. Cl.^{5} A01N *43/90;* **C07D** *471/04*

U.S. Cl. 71—66 19 Claims

1. A compound having the structure:



b.



c.

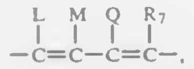
wherein

R_1 is C_1–C_4 alkyl;

R_2 is C_1–C_4 alkyl or C_3–C_6 cycloalkyl; and when R_1 and R_2 are taken together with the carbon to which they are attached they may represent C_3–C_6 cycloalkyl optionally substituted with methyl;

X is hydrogen, halogen, hydroxyl or methyl, with the proviso that when Y and Z are taken together to form a ring and YZ is represented by the structure: $—(CH_2)_n—$, where n is 3 or 4, X is hydrogen;

Y and Z are each hydrogen, halogen, C_1–C_6 alkyl, hydroxyloweralkyl, C_1–C_6 alkoxy, C_1–C_4 alkylthio, phenoxy, C_1–C_4 haloalkyl, nitro, cyano, C_1–C_4 alkylamino, diloweralkylamino or C_1–C_4 alkylsulfonyl group, or phenyl optionally substituted with one C_1–C_4 alkyl, C_1–C_4 alkoxy or halogen; and, when taken together, Y and Z may form a ring in which YZ are represented by the structure: $—(CH_2)_n—$, where n is an integer of 3 or 4, provided that X is hydrogen; or



$$-\overset{L}{\overset{|}{C}}=\overset{M}{\overset{|}{C}}-\overset{Q}{\overset{|}{C}}=\overset{R_7}{\overset{|}{C}}-,$$

where L, M, Q and R_7 are each hydrogen, halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 alkylthio, C_1–C_4 alkylsulfonyl, C_1–C_4 haloalkyl, NO_2, CN, phenyl, phenoxy, amino, C_1–C_4 alkylamino, diloweralkylamino, chlorophenyl, methylphenyl, or phenoxy substituted with one Cl, CF_3, NO_2 or CH_3 group, with the proviso that only one of L, M, Q or R_7 may represent a substituent other than hydrogen, halogen, C_1–C_4 alkyl or C_1–C_4 alkoxy.

5,021,079
SODIUM CHLORIDE IN NOVEL CRYSTAL FORM AND AQUEOUS SOLUTION CONTAINING THE SAME

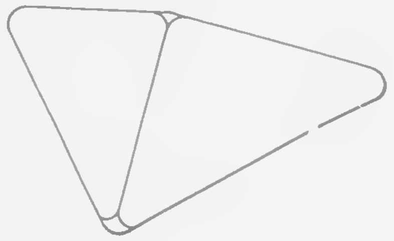
Shigeru Nakane, Yokohama, Japan, assignor to Techno-Bio Co., Ltd., Tokyo, Japan

Filed Jun. 9, 1989, Ser. No. 363,733

Claims priority, application Japan, Jun. 21, 1988, 63-151262

Int. Cl.^{5} A01N *3/02;* **C01D** *3/24, 3/04;* **C09K** *19/04*

U.S. Cl. 71—68 4 Claims



1. Sodium chloride in a flat tetrahedronal crystal form.

5,021,080
HERBICIDAL SUBSTITUTED 4-AMINO-5-ALKYLTHIO-1,2,4-TRIAZOL-3-ONES

Klaus-Helmut Müller, Duesseldorf; Joachim Kluth, Langenfeld; Klaus König, Odenthal; Karl-Rudolf Gassen, Odenthal; Kurt Findeisen, Odenthal; Markus Lindig, Hilden; Klaus Lürssen, Bergisch Gladbach; Hans-Joachim Santel, Leverkusen, and Robert R. Schmidt, Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

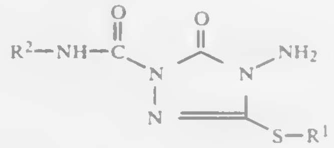
Filed Apr. 4, 1990, Ser. No. 504,463

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1989, 3911219; Oct. 10, 1989, 3933750

Int. Cl.^{5} A01N *43/653;* **C07D** *249/12*

U.S. Cl. 71—92 17 Claims

1. A substituted 4-amino-5-alkylthio-1,2,4-triazol-3-one of the formula



(I)

in which

R^1 represents straight-chain or branched alkyl, alkenyl or alkenyl, each of which has up to 4 carbon atoms, and

R^2 represents unsubstituted sec.-butyl, tert.-butyl, C_5–C_{10}-alkyl, C_5–C_{10}-alkenyl or C_5–C_{10}-alkynyl, or substituted alkyl, alkenyl or alkynyl, each of which has up to 10 carbon atoms and each of which is substituted by halogen, cyano, C_3–C_6-cycloalkyl, aryloxy having 6 to 10 carbon atoms or C_1–C_6-alkoxy, or represents C_1–C_6-alkyl substituted by, in each case, piperidyl or morpholinyl or represents cyclopropyl, cyclobutyl, cyclopentyl or cycloheptyl, each of which is optionally substituted by halogen, aryl having 6 to 10 carbon atoms, C_1–C_6-alkyl or C_1–C_4-halogenoalkyl, or represents cyclo-hexyl which is substituted by halogen, C_1–C_6-alkyl, C_2–C_4-alkenyl or C_1–C_4-halogenoalkyl, or represents phenyl-C_1–C_2-alkyl or naphthyl-C_1–C_4-alkyl, C_1–C_2-halogen-alkyl, C_1–C_4-alkoxy, C_1–C_2-halogenoalkoxy, C_1–C_4-alkylthio, C_1–C_4-aklylsulphinyl, C_1–C_4-alkylsulphonyl, phenoxy, and/or phenyl.

5,021,081
HERBICIDAL SUBSTITUTED TRIAZOLES

Kurt Findeisen, Odenthal; Markus Lindig, Hilden; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch-Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

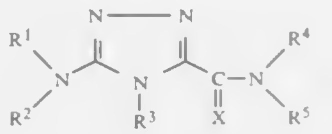
Filed Mar. 15, 1989, Ser. No. 324,361

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1988, 3809053

Int. Cl.^{5} A01N *43/653;* **C07D** *249/14*

U.S. Cl. 71—92 9 Claims

1. A substituted triazole of the formula



(I)

in which

R^1 and R^2 independently of one another each stands for hydrogen, for in each case straight-chain or branched alkyl which has 1 to 8 carbon atoms, alkenyl which as 2 to 8 carbon alkynyl which has 2 to 8 carbon atoms, halogenoalkyl which has 1 to 8 carbon atoms and 1 and 17 identical or different halogen atoms, halogenoalkenyl which has 2 to 8 carbon atoms and 1 to 15 identical or different halogen atoms, halogenoalkynyl which has 2 to 8 carbon atoms and 1 to 13 identical or different halogen atoms, alkoxyalkyl which has 1 to 6 carbon atoms in the individual alkyl moieties, for cycloalkyl which has 3 to 7 carbon atoms, for cycloalkylalkyl which has 3 to 7 carbon atoms in the cycloalkyl moiety and 1 to 6 carbon atoms in the straight-chain or branched alkyl moiety or for aralkyl which has 6 to 10 carbon atoms in the aryl moiety and 1 to 6 carbon atoms in the straight-chain or branched alkyl moiety, aryl which has 6 to 10 carbon atoms and which is optionally substituted once or more than once by identical or different substituents from the group consisting of halogen, cyano, nitro, in each case straight-chain or branched alkyl, alkoxy or alkylthio, and in each case straight-chain or branched halogenoalkyl, halogenoalkoxy or halogenoalkylthio, each of which has 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms,

R^3 stands for in each case straight-chain or branched alkyl which has 1 to 8 carbon atoms, alkenyl which has 2 to 8 carbon atoms, alkynyl which has 2 to 8 carbon atoms, halogenoalkyl which has 1 to 8 carbon atoms and 1 to 17 identical or different halogen atoms, halogenoalkenyl which has 2 to 8 carbon atoms and 1 to 15 identical or different halogen atoms, halogenoalkynyl which has 2 to 8 carbon atoms and 1 to 13 identical or different halogen atoms, alkoxyalkyl which has 1 to 6 carbon atoms in each of the individual alkyl moieties, for cycloalkylalkyl which has 3 to 7 carbon atoms in the cycloalkyl moiety and 1 to 6 carbon atoms in the straight-chain or branched alkyl moiety, for cycloalkyl which has 3 to 7 carbon atoms, or for aralkyl which has 6 to 10 carbon atoms in the aryl moiety and 1 to 6 carbon atoms in the straight-chain or branched alkyl moiety, or aryl which has 6 to 10 carbon atoms, the aralkyl or aryl being optionally substituted once or more than once by identical or different substituents selected from the group consisting of halogen, cyano, nitro and in each case straight-chain or branched alkyl, alkoxy or alkylthio having 1 to 4 carbon atoms, or halogenoalkyl, halogenoalkoxy or halogenoalkylthio, each of which has 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms,

R^4 and R^5 independently of one another each stands for hydro-

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gen, for in each case straight-chain or branched alkyl which has 1 to 18 carbon atoms, alkenyl which has 2 to 8 carbon atoms, alkynyl which has 2 to 8 carbon atoms, halogenoalkyl which has 1 to 8 carbon atoms and 1 to 17 identical or different halogen atoms, halogenoalkenyl which has 2 to 8 carbon atoms and 1 to 15 identical or different halogen atoms, halogenoalkynyl which has 2 to 8 carbon atoms and 1 to 13 identical or different halogen atoms, cyanoalkyl which has 1 to 8 carbon atoms, hydroxyalkyl which has 1 to 8 carbon atoms and 1 to 6 hydroxyl groups, alkoxyalkyl, alkoximinoalkyl, alkoxycarbonylalkyl or alkoxycarbonylalkenyl each of which has up to 6 carbon atoms in the individual alkyl or alkenyl moieties, alkylaminoalkyl or dialkylaminoalkyl each of which has 1 to 6 carbon atoms in the individual alkyl moieties, or for cycloalkyl, cycloalkylalkyl, cycloalkenyl or cycloalkenylalkyl each of which has 3 to 8 carbon atoms in the cycloalkyl or cycloalkenyl moiety, and if appropriate 1 to 6 carbon atoms in the straight-chain or branched alkyl moiety when present and each of which is optionally substituted once or more than once by identical or different substituents from the group consisting of halogen, cyano and in each case straight-chain or branched alkyl which has 1 to 9 carbon atoms or halogenoalkyl which has 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms or in each case double-linked alkanediyl or alkenediyl each of which has up to 4 carbon atoms; in addition, for aralkyl, aroyl or aryl each of which has 6 to 10 carbon atoms in the aryl moiety and if appropriate 1 to 8 carbon atoms in the straight-chain or branched alkyl moiety and each of which is optionally substituted once or more than once by identical or different substituents selected from the group consisting of halogen, cyano, nitro, hydroxyl, in each case straight-chain or branched alkyl, alkoxy, alkylthio, alkylsulphinyl, alkylsulphonyl, alkanoyl or alkoxycarbonyl each of which has 1 to 6 carbon atoms, and halogenoalkyl, halogenoalkoxy, halogenoalkylthio, halogenoalkylsulphinyl or halogenalkylsulphonyl each of which has 1 to 6 carbon atoms and 1 to 9 identical or different halogen atoms, cycloalkyl which has 3 to 6 carbon atoms or phenoxy, and the alkyl radicals optionally being substituted by halogen or cyano, and

X stands for oxygen or sulphur.

5,021,082
HERBICIDAL SUBSTITUTED SULPHONYLAMINOAZOLES

Rolf Kirsten, Monheim; Joachim Kluth, Langenfeld; Christa Fest, Wuppertal; Ernst Gesing, Erkrath-Hochdahl; Klaus-Helmut Müller, Duesseldorf; Hans-Jochem Riebel; Peter Babczinski, both of Wuppertal; Otto Schallner, Monheim; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

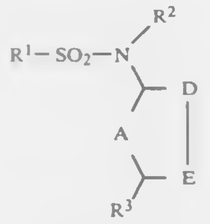
Division of Ser. No. 317,219, Feb. 28, 1989, Pat. No. 4,941,912. This applicatioo Apr. 3, 1990, Ser. No. 504,442

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807034; Jul. 29, 1988, 3825867

Int. Cl.^{5} C07D *403/14;* **A01N** *43/653*

U.S. Cl. 71—93 7 Claims

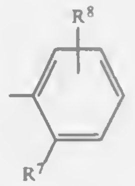
1. A substituted sulphonylaminoazole of the formula



(1)

in which

R^1 stands for the radical



wherein

R^7 and R^8 are identical or different and stand for hydrogen, fluorine, chlorine, bromine, iodine, cyano, nitro, C_1–C_6-alkyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, C_1–C_4-alkoxycarbonyl, C_1–C_4-alkylamino-carbonyl, di-(C_1–C_4-alkyl)aminocarbonyl, hydroxyl, C_1–C_4-alkoxy, formyloxy, C_1–C_4-alkylcarbonyloxy, C_1–C_4-alkoxycarbonyloxy, C_1–C_4-alkylamino-carbonyloxy, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl, C_1–C_4-alkylsulphonyl, di-(C_1–C_4-alkyl)-aminosulphonyl, C_3–C_6-cycloalkyl or phenyl), for C_2–C_6-alkenyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, C_1–C_4-alkoxy-carbonyl, carboxyl or phenyl), for C_2–C_6-alkinyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, C_1–C_4-alkoxycarbonyl, carboxyl or phenyl), for C_1–C_4-alkoxy (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, C_1–C_4-alkoxycarbonyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl), for C_1–C_4-alkylthio (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, C_1–C_4-alkoxy-carbonyl, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl), for C_3–C_6-alkenyloxy (which is optionally substituted by fluorine, chlorine, bromine, cyano or C_1–C_4-alkoxycarbonyl), for C_2–C_6-alkenylthio (which is optionally substituted by fluorine, chlorine, bromine, cyano, nitro, C_1–C_3-alkylthio or C_1–C_4-alkoxycarbonyl), C_3–C_6-alkinyloxy, C_3–C_6-alkinylthio or for the radical $—S(O)_p—R^9$, p standing for the numbers 1 or 2 and

R^9 standing for C_1–C_4-alkyl (which is optionally substituted by fluorine, chlorine, bromine, cyano or C_1–C_4-alkoxycarbonyl), C_3–C_6-alkenyl, C_3–C_6-alkinyl, C_1–C_4-alkoxy, C_1–C_4-alkoxy-C_1–C_4-alkylamino, C_1–C_4-alkylamino, di-(C_1–C_4-alkyl)-amino or for the radical $—NHOR^{10}$,

R^{10} standing for C_1–C_6-alkyl (which is optionally substituted by fluorine, chlorine, cyano, C_1–C_4-alkoxy, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl, C_1–C_4-alkylsulphonyl, C_1–C_4-alkyl-carbonyl, C_1–C_4-alkoxy-carbonyl, C_1–C_4-alkylamino-carbonyl or di-(C_1–C_4-alkyl)-amino-carbonyl), for C_3–C_6-alkenyl (which is optionally substituted by fluorine, chlorine or bromine), C_3–C_6-alkinyl, C_3–C_6-cycloalkyl, C_3–C_6-cycloalkyl-(C_1–C_2-alkyl, phenyl-C_1–C_2-alkyl (which is optionally substituted by fluorine, chlorine, nitro, cyano, C_1–C_4-alkyl, C_1–C_4-alkoxy or C_1–C_4-alkoxy-carbonyl), for benzhydryl or for phenyl (which is optionally substituted by fluorine, chlorine, nitro, cyano, C_1–C_4-alkyl, trifluoromethyl, C_1–C_4-alkoxy, C_1–C_2-fluoroalkoxy, C_1–C_4-alkylthio, trifluoromethylthio or C_1–C_4-alkoxy-carbonyl),

R^7 and R^8 furthermore stand for phenyl or phenoxy, for C_1–C_4-alkylcarbonylamino, C_1–C_4-alkoxycarbonylamino, C_1–C_4-alkylamino-carbonylamino, di-(C_1–C_4-alkyl)-amino-carbonylamino, or for the radical $—CO—R^{11}$,

R^{11} standing for C_1–C_6-alkyl, C_1–C_6-alkoxy, C_3–C_6-cycloalkoxy, C_3–C_6-alkenyloxy, C_1–C_4-alkylthio, amino, C_1–C_4-alkylamino, C_1–C_4-alkoxyamino, C_1–C_4-alkoxy-C_1–C_4-alkyl-amino or di-(C_1–C_4-alkyl)-amino (which are optionally substituted by fluorine and/or chlorine),

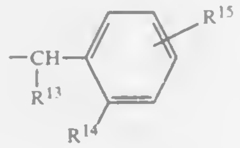
R^7 and R^8 furthermore stand for C_1–C_4-alkylsulphonyloxy, di-(C_1–C_4-alkyl)-aminosulphonylamino or for the radical $—CH{=}N—R^{12}$,

R^{12} standing for C_1–C_6-alkyl which is optionally substituted by fluorine, chlorine, cyano, carboxyl, C_1–C_4-alkoxy,

C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl, for benzyl which is optionally substituted by fluorine or chlorine, for C_3–C_6-alkenyl or C_3–C_6-alkinyl, each of which is optionally substituted by fluorine or chlorine, for phenyl which is optionally substituted by fluorine, chlorine, bromine, C_1–C_4-alkyl, C_1–C_4-alkoxy, trifluoromethyl, trifluoromethoxy or trifluoromethylthio, for C_1–C_6-alkoxy, C_3–C_6-alkenoxy, C_3–C_6-alkinoxy or benzyloxy, each of which is optionally substituted by fluorine and/or chlorine, for amino, C_1–C_4-alkylamino, di-(C_1–C_4-alkyl)-amino, phenylamino, C_1–C_4-alkyl-carbonyl-amino, C_1–C_4-alkoxy-carbonylamino, C_1–C_4-alkylsulphonylamino or for phenylsulphonylamino which is optionally substituted by fluorine, chlorine, bromine or methyl,

wherein furthermore

R^1 stands for the radical



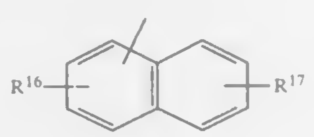
wherein

R^{13} stands for hydrogen or C_1–C_4-alkyl,

R^{14} and R^{15} are identical or different and stand for hydrogen, fluorine, chlorine, bromine, nitro, cyano, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), carboxyl, C_1–C_4-alkoxy-carbonyl, C_1–C_4-alkylsulphonyl or di-(C_1–C_4-alkyl)aminosulphonyl;

wherein furthermore

R^1 stands for the radical

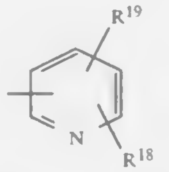


wherein

R^{16} and R^{17} are identical or different and stand for hydrogen, fluorine, chlorine, bromine, nitro, cyano, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine) or C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine);

wherein furthermore

R^1 stands for the radical

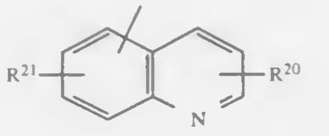


wherein

R^{18} and R^{19} are identical or different and stand for hydrogen, fluorine, chlorine, bromine, nitro, cyano, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine), C_2–C_4-alkenyl (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), for C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl (which are optionally substituted by fluorine and/or chlorine), and for di-(C_1–C_4-alkyl)aminosulphonyl, C_1–C_4-alkoxy-carbonyl, dimethylaminocarbonyl or dioxolanyl;

wherein furthermore

R^1 stands for the radical

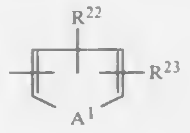


wherein

R^{20} and R^{21} are identical or different and stand for hydrogen, fluorine, chlorine, bromine, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or bromine), C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), for C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl (which are optionally substituted by fluorine and/or chlorine), or for di-(C_1–C_4-alkyl)-aminosulphonyl;

wherein furthermore

R^1 stands for the radical



wherein

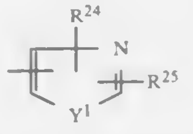
R^{22} and R^{23} are identical or different and stand for hydrogen, fluorine, chlorine, bromine, cyano, nitro, C_1–C_4-alkyl (which is optionally substituted by fluorine, chlorine, C_1–C_4-alkoxy and/or C_1–C_4-halogenoalkoxy), C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl (which is optionally substituted by fluorine and/or chlorine), di-(C_1–C_4-alkyl)-amino-sulphonyl or C_1–C_4-alkoxycarbonyl, and

A^1 stands for oxygen, sulphur or the grouping $N—Z^1$,

Z^1 standing for hydrogen, C_1–C_4-alkyl (which is optionally substituted by fluorine, chlorine, bromine or cyano), C_3–C_6-cycloalkyl, benzyl, phenyl (which is optionally substituted by fluorine, chlorine, bromine or nitro), C_1–C_4-alkylcarbonyl, C_1–C_4-alkoxy-carbonyl or di-(C_1–C_4-alkyl)-aminocarbonyl;

wherein furthermore

R^1 stands for the radical



wherein

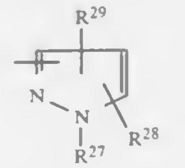
R^{24} and R^{25} are identical or different and stand for hydrogen, C_1–C_4-alkyl, halogen, C_1–C_4-alkoxycarbonyi, C_1–C_4-alkoxy or C_1–C_4-halogenoalkoxy,

Y^1 stands for sulphur or the grouping $N—R^{26}$,

R^{26} standing for hydrogen or C_1–C_4-alkyl;

wherein furthermore

R^1 stands for the radical



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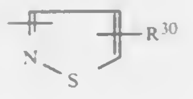
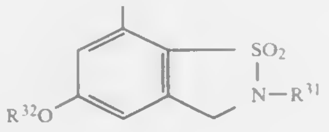
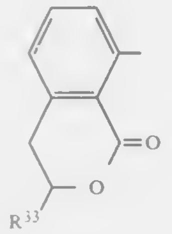
R^{27} stands for hydrogen, C_1–C_4-alkyl, phenyl or (iso)-quinolinyl,
R^{28} stands for hydrogen, halogen, cyano, nitro, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), dioxolanyl or C_1–C_4-alkoxy-carbonyl and R^{29} stands for hydrogen, halogen or C_1–C_4-alkyl;
wherein furthermore
R^1 stands for the radical



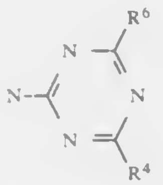
wherein
R^{30} stands for hydrogen, halogen, C_1–C_4-alkyl or C_1–C_4-alkoxy-carbonyl;
wherein furthermore
R^1 stands for the radical



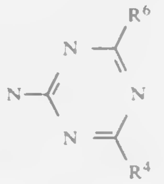
wherein
R^{31} stands for C_1–C_4-alkyl and
R^{32} stands for C_1–C_4-alkyl,
wherein furthermore
R^1 stands for the radical



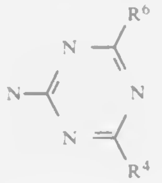
wherein
R^{33} stands for hydrogen or methyl;
in which furthermore
R^2 stands for hydrogen or for the grouping —SO_2—R^1,
in which furthermore
R^3 stands for hydrogen, fluorine, chlorine, bromine, iodine, hydroxyl, mercapto, amino or for a radical from the group consisting of C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, C_1–C_4-alkylamino and di-(C_1–C_4-alkyl)amino, which radical is optionally substituted by fluorine and/or chlorine,
A stands for nitrogen, a CH grouping or the grouping



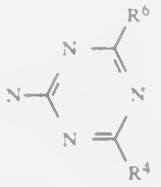
D stands for nitrogen or the grouping



E stands for nitrogen or the grouping



provided one of the radicals A, D or E is



wherein
R^4 stands for hydrogen, fluorine, chlorine, bromine, C_1–C_4-alkyl, C_1–C_4-halogenoalkyl, C_1–C_2-alkoxy-C_1–C_2-alkyl, C_1–C_4-alkoxy, C_1–C_4-halogenoalkoxy, C_1–C_4-alkylthio, C_1–C_4-halogenoalkylthio, amino, C_1–C_4-alkylamino, dimethylamino or diethylamino,
R^6 stands for hydrogen, fluorine, chlorine, bromine, C_1–C_4-alkyl, C_1–C_4-halogenoalkyl, C_1–C_4-alkoxy, C_1–C_4-halogenoalkoxy, C_1–C_4-alkylthio, C_1–C_4-alkyl-amino, dimethylamino or diethylamino.

5,021,083

STABLE AQUEOUS OR AQUEOUS ALCOHOLIC DISPERSION BASED ON DERIVATIVES OF OXYNIL, HERBICIDAL COMPOSITION COMPRISED THEREOF AND SELECTIVE HERBICIDAL TREATMENT COMPRISING THE USE OF THE SAID HERBICIDAL COMPOSITION

Joseph Schapira, Paris; Jacques Pecheur, Colombes; Jacques Vincent, Mareil Marly; Jacques Schild, Gennevilliers, and Bruno Bosselin, Chelles, all of France, assignors to Compagnie Francaise De Produits Industriels, Gennevilliers, France

Filed Aug. 5, 1988, Ser. No. 228,899
Claims priority, application France, Aug. 6, 1987, 8711230
Int. Cl.^{5} A01N *33/00, 43/66*

U.S. Cl. 71—105 11 Claims

1. Aqueous or aqueous dispersion, stable up to two years, of at least one ester of at least one of the herbicides of the group consisting of ioxynil and bromoxynil in the solid state of a granulometry substantially less than about 5 μm, said at least one ester having a melting point higher than 65° C. and being selected from the group consisting of technical grade acetate, propionate, butyrate, isobutyrate and pivalate of bromoxynil and technical grade acetate, propionate, butyrate, isobutyrate and pivalate of ioxynil.

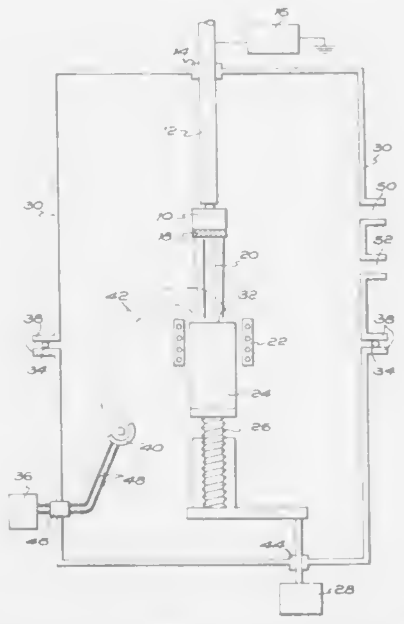
5,021,084

PROCESS FOR IMPROVING HIGH-TEMPERATURE ALLOYS

Leonard M. Bianchi, 5330 Taylor Mill Rd., Taylor Mill, Ky. 41015

Filed Feb. 24, 1987, Ser. No. 17,794
Int. Cl.^{5} C21G *11/10*

U.S. Cl. 75—10.13 7 Claims



1. A process for decreasing the size of nonmetallic inclusions, increasing the fineness of grain structure and increasing the purity in high-temperature metal alloys having iron, nickel, cobalt, titanium, zirconium, aluminum or magnesium as the base metal element comprising the ordered steps of

producing a source ingot comprising a high-temperature alloy whose base metal is selected from the group consisting of iron, nickel, cobalt, titanium, zirconium, aluminum and magnesium by a method selected from the group consisting of vacuum arc remelting, vacuum arc double electrode remelting, electroslag remelting, vacuum induction melting, electron beam cold hearth refining, plasma melting, induction slag melting, laser beam melting and electron beam melting, or combinations of two of the methods from this group;
placing said source ingot in a chamber;
placing an electron beam source in said chamber;
placing a starting pad on a movable rod in said chamber;
evacuating said chamber to a pressure of less than about 0.5 millitorr;
energizing said electron beam source to generate an electron beam aimed at a surface of said source ingot to cause said source ingot to evaporate from said surface, forming a vapor;
moving said starting pad near said surface to initiate deposition of said vapor on said starting pad to form the product ingot;
controlling the motion of said movable rod to rotate and change the orientation of said forming product ingot during deposition to obtain the desired shape and size of said product ingot;
turning off said electron beam after completion of the product ingot;
raising the chamber pressure to atmospheric;
removing the starting pad and product ingot from the chamber; and separating the product ingot from the starting pad.

5,021,085

HIGH SPEED TOOL STEEL PRODUCED BY POWDER METALLURGY

Sadi Karagoz, Yildiz-Istanbul, Turkey; Bruno Hribernik, Bruck an der Mur, Austria; Johann Stamberger, Kapfenberg, Austria; Josef Puber, Wimpassing, Austria; Franz Jeglitsch, Leoben, Austria; Hellmut Fischmeister, Stuttgart 1, Austria; Franz Matzer, Leoben, Austria; Claus-Dieter Locker, Leoben, Austria; Elfriede Kudielka, Leoben, Austria, and Heimo Jager, Bruck an der Mur, Austria, assignors to Boehler Ges m.b.H., Kapfenberg, Austria

Continnation of Ser. No. 288,210, Dec. 22, 1988, abandoned.
This application Feb. 7, 1990, Ser. No. 476,138
Claims priority, application Austria, Dec. 23, 1987, A3401/87
Int. Cl.^{5} C22C *29/02*

U.S. Cl. 75—239 16 Claims

1 A high speed tool steel produced by powder metallurgy, which is suitable for use in parts that are subject to heavy wear, particularly tools, wherein said high speed tool steel has a Nb content of 2–15% by weight, a V content of 1–4% by weight, a metal carbide content of 10–30% by volume, and wherein the lower limit of the C content is given by the formula:

$$C_{min} = 0.45 + 0.1(\%\ Nb) + 0.20(\%\ V),$$

and the upper limit of the C content is given by the formula:

$$C_{max} = 1.0 + 0.15(\%\ Nb) + 0.24(\%\ V).$$

5,021,086

IRON DESULFURIZATION ADDITIVE AND METHOD FOR INTRODUCTION INTO HOT METAL

Leon A. Luydkx, Rio Rancho, N. Mex.; Joseph R. Jackman, New Castle; James W. Robison, Jr., Wexford, both of Pa., and James H. Young, Poland, Ohio, assignors to Reactive Metals and Alloys Corporation, West Pittsburg, Pa.

Filed Jul. 5, 1990, Ser. No. 548,619
Int. Cl.^{5} C22C *33/08*

U.S. Cl. 75—315 26 Claims

1. An additive for desulfurization of liquid iron and iron alloys, comprising:
calcium oxide;
magnesium; and
a hydrocarbon-containing material which contributes volatile material to the additive, such that the volatile content of the additive is between 0.25 and 5 percent.

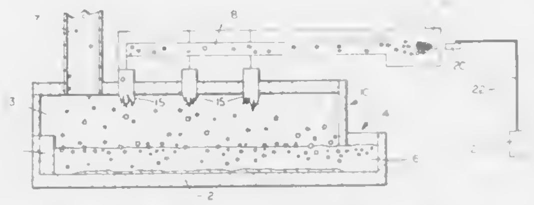
5,021,087

PROCESS AND APPARATUS FOR TREATING MOLTEN ALUMINUM TO ADD HYDROGEN GAS

Douglas H. Morton, 1520 Pleasant Ridge Ave., Minerva, Ohio 44657

Filed Aug. 13, 1990, Ser. No. 566,151
Int. Cl.^{5} C22B *9/00*

U.S. Cl. 75—678 20 Claims



1. The process of melting aluminum into molten form for casting to satisfy the affinity of molten aluminum for hydrogen and to improve its casting properties, said process comprising the steps of heating the aluminum into molten form within an enclosed melting furnace, introducing a hydrogen-containing treating gas into the atmosphere above the molten aluminum,

VOL
1127
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the amount of treating gas ranging in amount from about 0.04 cubic centimeters of hydrogen gas per 100 grams of aluminum to the saturation point temperature of said treating gas in said molten aluminum.

5,021,088

BIOHYDROMETALLURGICAL PROCESSING OF ORES, AND MICROORGANISMS THEREFOR

Ralpb J. Portier, Baton Rouge, La., assignor to Louisiana State University, Baton Rouge, La.

Continuation-in-part of Ser. No. 265,950, Nov. 2, 1988, abandoned. This application May 22, 1990, Ser. No. 527,135

Int. Cl.^{5} C22B *3/18*

U.S. Cl. 75—736 **20 Claims**

1. In a process for the recovery of gold from a gold-bearing carbonaceous, carbon-containing particulate ore, a component of which is capable of adsorbing aurocyanide complexes from an aqueous cyanide leaching solution when the metal is extracted from the ore during hydrometallurgical treatment of the ore

the improvement comprising

pretreating said carbonaceous, carbon-containing ore to enhance recovery of the gold therefrom by contact therewith of a liquid medium which contains a heterotrophic microorganism, or admixture of heterotrophic microorganisms, at heterotrophic conditions sufficient to cultivate and grow said microorganism or microorganisms, and reduce the carbon content of the ore by consumption of the carbon, and

hydrometallurgically treating the pretreated ore, the carbon component of which has been reduced by action of the heterotrophic microorganisms, to recover the gold therefrom.

5,021,089

COMPOSITION FOR PROTECTING NONPOROUS SURFACES FROM WATER

Satoshi Kuwata, and Takashi Ohkawara, both of Gunma, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Feb. 28, 1990, Ser. No. 486,641

Claims priority, application Japan, Feb. 28, 1989, 1-48374

Int. Cl.^{5} C09K *3/18*

U.S. Cl. 106—2 **7 Claims**

1. A water repellent composition comprising a solution in a volatile organic solvent of 1-20 wt % of a silyl phosphate having a 1-10 wt % phosphorus content, and (b) less than 20 wt % of an organopolysiloxane having a viscosity of 5-10,000 centistokes at 25° C. and of the formula $R_aSiO_{(4-a)/2}$ wherein "a" has a value in the range $1.95<a<2.20$, and R is a saturated or unsaturated monovalent hydrocarbon group of 1-30 carbon atoms, a halogenated hydrocarbon group, an alkoxy group, an hydroxyl group or a hydrogen atom.

5,021,090

WATER-BASED DIARYLIDE PIGMENT COMPOSITIONS

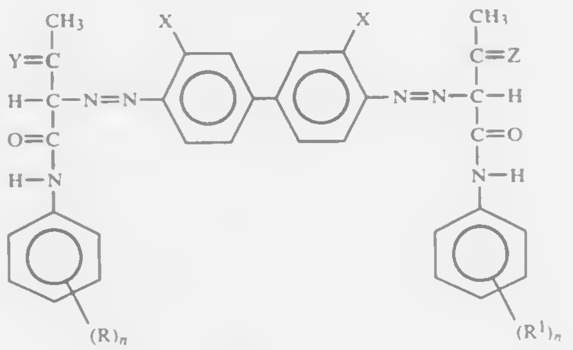
Russell J. Schwartz, and Manuel Z. Gregorio, both of Cincinnati, Ohio, assignors to Sun Chemical Corporation, Fort Lee, N.J.

Filed May 23, 1989, Ser. No. 356,022

Int. Cl.^{5} C09D *11/02*

U.S. Cl. 106—23 **14 Claims**

1. A water-based ink composition, comprising an aqueous vehicle, diarylide pigment and an azomethine composition of matter having the formula:



wherein:

R and R^1 are independently selected from the group consisting of H, CH_3, OCH_3, OCH_2CH_3 and Cl;

n is an integer from 1 to 5;

X is selected from the group consisting of Cl, CH_3 and OCH_3;

Y is $N—R^2$, wherein $N—R^2$ is derived from a water-soluble primary amine, and R^2 is a monomeric or polymeric hydrocarbyl group containing 1-20 carbon atoms in the monomeric unit; and

Z is selected from the group consisting of O and Y.

5,021,091

HARD COATING COMPOSITIONS

Mitsuhiko Takarada, Annaka; Kazuharu Sato, Gunma; Kenji Yamamoto, and Shigeru Mori, both of Annaka, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Jan. 16, 1990, Ser. No. 465,978

Claims priority, application Japan, Jan. 18, 1989, 1-10393

Int. Cl.^{5} C09D *183/6, 7/12;* **C08J** *7/4;* **G02B** *1/10*

U.S. Cl. 106—287.16 **11 Claims**

1. A hard coating composition comprising in admixture,

(A) an organic silicon compound of the formula:

$$R^1_aSi(OR^2)_{4-a}$$

wherein R^1 is selected from the class consisting of epoxy containing organic groups having 2 to 8 carbon atoms, alkyl groups having 1 to 6 carbon atoms, alkenyl groups having 2 to 6 carbon atoms, halo-alkyl groups having 1 to 6 carbon atoms, and aryl groups having 6 to 10 carbon atoms,

R^2 is selected from the class consisting of hydrogen, alkyl groups having 1 to 4 carbon atoms, alkoxyalkyl groups having 2 to 8 carbon atoms, and acyl groups, and

letter a is equal to 1, 2 or 3, or a partial hydrolysate thereof,

(B) inorganic submicron particles, and

(C) aluminum perchlorate.

5,021,092

METHOD FOR THE PREPARATION OF GRAY-GREEN PIGMENTS BASED ON ZIRCONIUM SILICATE/VANADIUM COMPOUNDS AND SODIUM COMPOUND

Dietrich Speer, Hanau; Akos Kiss, Wasserlos, and Peter Kleinschmit, Hanau, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 389,761

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1988, 3827068

Int. Cl.^{5} C08K *3/22*

U.S. Cl. 106—451 **11 Claims**

1. A method for the preparation of a gray-green pigment body based on zirconium silicate and vanadium oxide comprising forming a mixture of zirconium oxide and silicon oxide in a mole ratio of about 1:1 and in a sufficient amount of each to be capable of forming the desired gray-green pigment body and adding thereto (a) vanadium oxide or ammonium vanadate and (b) lithium compounds and at least one sodium compound as mineralizers and heating at a temperature over 600° C. to achieve the pigment formation, wherein said vanadium compound, calculated as V_2O_5, is present in a quantity of over 17 weight percent of the mixture, and the amount of said lithium compound used is such that the atom ratio Li/Li+V, calculated as metal, ranges from 0.1 to 0.5 and said sodium compound is present in an amount effective to support the mineralizing action of said lithium compound.

5,021,093

CEMENT/GYPSUM COMPOSITES BASED CELLULOSE-I

Alphons D. Beshay, 3595 de Courval, Trois-Riviéres, Quebec, Canada G8Z 1S8

Continuation-in-part of Ser. No. 95,119, Sep. 11, 1987, Pat. No. 4,820,749, which is a continuation-in-part of Ser. No. 739,169, May 29, 1985, Pat. No. 4,717,742. This application Jun. 9, 1988, Ser. No. 204,272

Int. Cl.^{5} C04B *7/02;* **C08K** *9/06*

U.S. Cl. 106—731 **8 Claims**

1. A composite material comprising a cement material, cellulosic fibers and optionally water, wherein said cellulosic fibers are (essentially) pregrafted with a silylating agent by generating a free radical process.

5,021,094

GROUTING COMPOSITION

Richard K. Brown, and Robert W. Stichman, both of Billings, Mont., assignors to Wyo-Ben, Inc., Billings, Mont.

Continuation-in-part of Ser. No. 235,422, Aug. 12, 1988, Pat. No. 4,964,918. This application Oct. 23, 1990, Ser. No. 601,348

The portion of the term of this patent subsequent to Oct. 23, 2007, has been disclaimed.

Int. Cl.^{5} C04B *24/24, 24/02*

U.S. Cl. 106—803 **33 Claims**

1. A reswellable grouting composition which, when mixed with water is useful for effecting a seal in an earthen borehole or other subsurface cavity, wherein the composition consists essentially of 90.0-99.9% water swellable clay and 0.1 to 10.0% thinner, wherein the thinner comprises a water dispersible salt of a polymeric carboxylic acid having a molecular weight of less than about 95,000, where the percentages are by weight of the composition prior to mixing with water.

5,021,095

PROCESS FOR REMOVING ASBESTOS AND THE DEVICE FOR REMOVING THE SAME

Masaru Tamaki, Satomimachi, Japan, assignor to Hokkaido Pipeline Industrial Co., Ltd., Sapporo, Japan

Filed Jan. 25, 1989, Ser. No. 302,574

Int. Cl.^{5} B08B *5/04*

U.S. Cl. 134—21 **6 Claims**

1. A process for removing a sprayed asbestos layer from a surface, comprising:

simultaneously cutting and suctioning asbestos by a scraper and a suction air duct;

directing the thus-suctioned asbestos into a collector through a closed conduit to collect asbestos dust within water as a primary collecting step;

carrying out a secondary collecting step in a wet cyclone by showering, in said cyclone, air that has passed through said collector to effect separation of asbestos out of said air; and

then carrying out a tertiary collecting step to treat, with a scrubber and a compound filter, air that has passed through said cyclone.

2. A device for removing a sprayed asbestos layer comprising:

an attachment comprising a scraper integrally formed with a suction air duct which is provided with a plurality of apertures perforated therein and with a suction inlet,

a closed conduit connected to said air duct through a hose, for carrying asbestos dust thus suctioned,

a collector, said collector connected to a wet cyclone, and said wet cyclone connected to a scrubber within said closed conduit, and

a compound filter disposed at an end of said closed conduit.

5,021,096

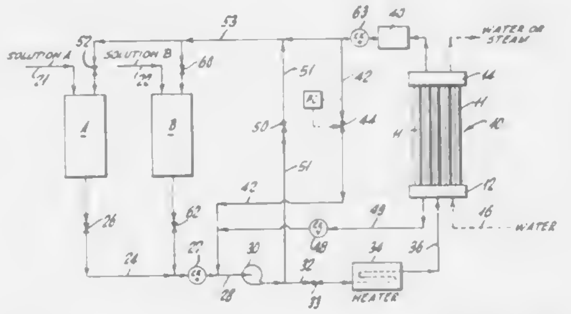
METHOD FOR REMOVAL OF SCALE

Khodahandeh Abadi, 5042 E. Camino Alisa, Tucson, Ariz. 85718

Continuation of Ser. No. 269,625, Nov. 10, 1988, abandoned. This application Mar. 26, 1990, Ser. No. 501,312

Int. Cl.^{5} B08B *9/06;* **C02F** *5/08*

U.S. Cl. 134—22.14 **5 Claims**



1. A method for the removal of iron oxides and hard water scale from scale-contaminated surfaces of a heat exchanger which comprises circulating a composition consisting essentially of an aqueous solution containing from 2 to about 20 weight percent hydroxyacetic acid and from about 0.001 to about 0.3 weight percent polysaccharide gum through said heat exchanger for a period of time in the range of from about one to about twenty four hours thereby effecting removal of scale from said scale-contaminated surface with the formation of a gelatinous residue or sludge which remains in the heat exchanger in those areas not in the direct path of flow of said-composition, and thereafter circulating a water solution of citric acid containing from about 0.5 to about 5 weight percent citric acid through said heat exchanger for a period of time in the range of from about one to about five minutes thereby dissolving and removing said gelatinous residue and sludge from said heat exchanger.

5,021,097

METHOD AND APPARATUS FOR CLEANING WINDOW FURNISHINGS

Reinhard König, and Friedrich König, both of Mahlbergweg 5, 7505 Ettlingen, Fed. Rep. of Germany

Filed Jul. 27, 1989, Ser. No. 386,419

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825622

Int. Cl.^{5} B08B *11/00*

U.S. Cl. 134—25.5 **10 Claims**

4. An arrangement for cleaning window furnishings while located in their place of use, comprising: support means from which said window furnishings hang; washing means hung on said support means and comprising an abutment for defining a position of said washing means on said support means; nozzle means for passing liquid over said window furnishings; casing means extending downwardly from said nozzle means to enclose the window furnishings in a tubular configuration; said washing means supplying washing medium from above and over the window furnishings; means for circulating rinsing liquid from above and over the window furnishings; means for drying said window furnishings; and means for collecting

VOL
1127
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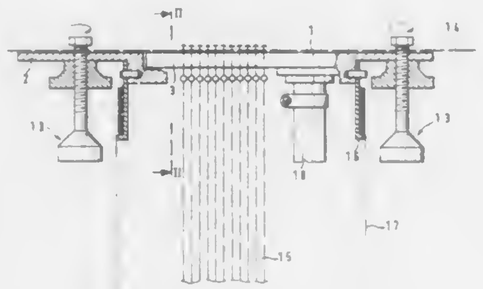
surplus fluids at a base of said window furnishings, said window furnishings being cleaned while handling in their locations of normal use on windows, so that the window furnishings are not removed from the windows for the cleaning.



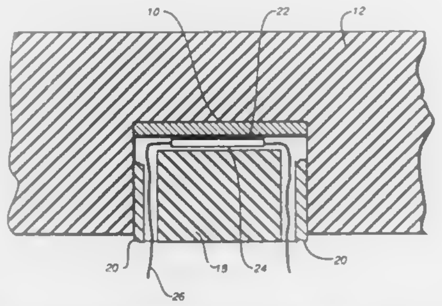
5,021,098
HIGH CONTACT BLIND HOLE THERMOCOUPLE PLUG

Donald R. Burnett, Cupertino, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 28, 1990, Ser. No. 501,068

Int. Cl.^{5} H01L *35/34*

U.S. Cl. 136—201 4 Claims



1. A method of mounting a thermocouple within a a carbon phenolic heat shield, comprising the steps of:

(a) forming a cylindrical blind hole in the back of a carbon phenolic heat shield, said hole having a flat bottom at a right angle to a cylindrical side,

(b) forming a cylindrical plug of the same material as the heat shield to fit the hole, said cylindrical plug having flat ends at right angles to a cylindrial side,

(c) coating a thermocouple with ceramic,

(d) forming a continuous groove across one end of said plug and the cylindrial side, the depth of said groove on the end being less than the diameter of the ceramic coated thermocouple,

(e) forming a thin disc of metal to fit the bottom of said hole, said disc having perforation means for passing gasses,

(f) inserting said thermocouple into said grooves,

(g) inserting said disc in said hole,

(h) coating the sides of said plug with glue,

(i) inserting said plug and thermocouple into said hole with sufficient pressure to force said thermcouple into good contact with said disc, and

(j) maintaining said pressure until the glue dries.

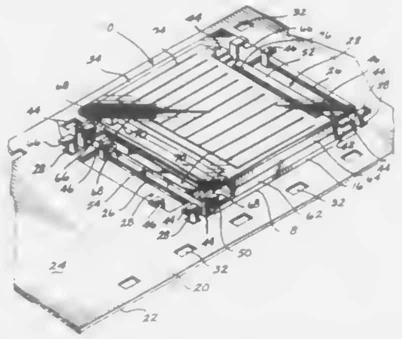
5,021,099
SOLAR CELL INTERCONNECTION AND PACKAGING USING TAPE CARRIER

Namsoo P. Kim, Bellevue, and Billy J. Stanbery, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Aug. 4, 1989, Ser. No. 389,728

Int. Cl.^{5} H01L *31/05*

U.S. Cl. 136—249 79 Claims



1. An array of photovoltaic cells comprising:

(a) a plurality of photovoltaic cells having a ratio of mass to surface area of less than 60 milligrams/square centimeter;

(b) a dielectric tape having a carrier surface for supporting said photovoltaic cells;

(c) interconnect means including an electrical circuit for electrically interconnecting said photovoltaic cells, said interconnect means supported by said dielectric tape on said carrier surface, said electrical circuit including a plurality of contact fingers; and

(d) means defining a plurality of primary openings in said dielectric tape, a primary opening being associated with a contact finger and positioned such that said contact finger can be directed from below said carrier surface in the direction of said photovoltaic cells and electrically connected to a photovoltaic cell, a portion of both sides of said contact finger being substantially free of said dielectric tape.

7. The array of claim 1, wherein said photovoltaic cells are tandem cells including an upper subcell and a lower subcell.

5,021,100
TANDEM SOLAR CELL

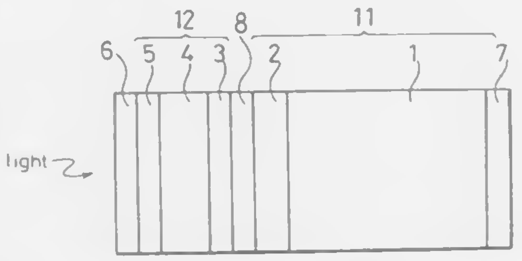
Takashi Ishihara; Hajime Sasaki, and Masao Aiga, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Dec. 12, 1989, Ser. No. 449,009

Claims priority, application Japan, Mar. 10, 1989, 1-58761

Int. Cl.^{5} H01L *31/052, 31/075, 31/078*

U.S. Cl. 136—249 15 Claims



1. A multiple cell photovoltaic device comprising a second solar cell for receiving incident light, for absorbing relatively short wavelength light, for generating an electrical current in response, and for transmitting relatively long wavelength light and a first solar cell for absorbing relatively long wavelength light transmitted through said second solar cell and for generating an electrical current in response, said first and second solar cells being electrically in series, and an electrically conductive wavelength selective reflection film disposed between said first solar cell and said second solar cell wherein said wavelength selective reflection film has a thickness selected to provide a distinct reflection maximum at a relatively short wavelength of light that may be absorbed by said second solar cell and to provide a distinct transmission maximum at a relatively long wavelength of light that is not absorbed by said second solar cell and that may be absorbed by said first solar cell.

5,021,101
METHOD OF MANUFACTURE OF A COPPER WATCH CASE

Eric Loth, and Pierre-Alain Walder, both of Bienne, Switzerland, assignors to ETA SA Fabriques d'Ebauches, Grenchen, Switzerland

Filed Dec. 20, 1989, Ser. No. 453,929

Claims priority, application Switzerland, Dec. 21, 1988, 04731/88-0

Int. Cl.^{5} C21D *1/78;* **G04B** *37/22;* **C23C** *16/06, 30/00*

U.S. Cl. 148—11.5 C 8 Claims

1. A method of manufacture of a watch case comprising the following steps:

providing a material consisting essentially of at least 95% copper by weight, and a remainder containing one or more elements selected from the group consisting of nickel, lead, phosphorus, tin and manganese; said elements increasing the mechanical strength of the copper,

cold forming said material in a single operation in order to provide at least one element of the watch case, said operation simultaneously constituting a drawing operation tending to increase the hardness of the material,

coating said watch case element with a protective and decorative layer.

5,021,102
METHOD OF MAKING A BAND FOR A BAND PRESS

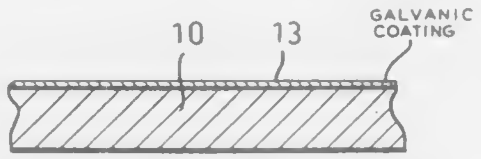
Rupert Harreither, Baden, Austria, assignor to Austria Metall Aktiengesellschaft, Braunau am Inn, Austria

Filed Feb. 7, 1990, Ser. No. 477,360

Claims priority, application Austria, Feb. 7, 1989, 249/89

Int. Cl.^{5} C21D *1/48;* **B32B** *15/18*

U.S. Cl. 148—13 3 Claims



1. A method of making a pressing bank for a band press, comprising in consecutive order the steps of:

(a) providing a solution-annealed band-shaped precipitation-hardenable steel workpiece having a tensile strength of at most 1250 N/mm^2;

(b) galvanically coating at least one surface of said solution-annealed band-shaped precipitation-hardenable steel workpiece with a hard-chromium layer; and

(c) thereafter precipitation-hardening said solution-annealed band-shaped precipitation-hardenable steel workpiece with said hard-chromium layer thereon to a tensile strength of at least 1400 N/mm^2.

5,021,103
METHOD OF FORMING MICROCRYSTALLINE SILICON-CONTAINING SILICON CARBIDE FILM

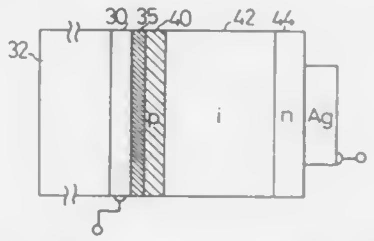
Yoshihiro Hamakawa, 3-17-4, Minamihanayashiki, Kawanishi-shi, Hyogo-ken; Hiroaki Okamoto, Kawanishi, and Yutaka Hattori, Takatsuki, all of Japan, assignors to Nippon Soken, Inc., Nishio; Nippondenso Co., Ltd., Kariya and Yoshihiro Hamakawa, Kawanishi, all of, Japan

Continuation of Ser. No. 173,446, Mar. 25, 1988, abandoned. This application May 2, 1990, Ser. No. 517,479

Claims priority, application Japan, Aug. 22, 1987, 62-208987

Int. Cl.^{5} H01L *31/101*

U.S. Cl. 148—33 5 Claims



1. A silicon carbide semiconductor film mainly composed of silicon, carbon and hydrogen; said silicon carbide semiconductor film having microcrystalline silicon islands, an optical energy gap of not less than 2.0 eV, and a dark electric conductivity of not less than 10^{-6} Scm; wherein the Raman scattering light of said silicon carbide film which shows the presence of the microcrystalline silicon has a peak in the vicinity of 520 cm^{-1}.

5,021,104
STEEL STRIP FOR FOOD PACKAGING AND PROCESS FOR PRODUCTION THEREOF

Nazzareno Azzerri, Pomezia, and Leonardo Giorgi, Anzio, both of Italy, assignors to Nuova Italsider S.p.A., Genova, Italy

Continuation of Ser. No. 186,090, Apr. 19, 1988, abandoned, which is a division of Ser. No. 66,934, Jun. 26, 1987, Pat. No. 4,886,712. This application Jul. 11, 1989, Ser. No. 377,791

Claims priority, application Italy, Jul. 14, 1986, 48264 A/86

Int. Cl.^{5} B32B *15/04*

U.S. Cl. 148—276 3 Claims

1. In a process to improve lacquer adhesion to a surface of a metallic strip which is either uncoated black plate or black plate with metal deposits weighing between 400 and 800 mg m^{-2}, to form the inside surface of a food can, the improvement comprising forming on said surface a patina of semiconducting oxide having mainly P-Type behavior, the ratio of the number of Type-P charge bearing atoms (NA) of said semiconducting oxide to the number of Type-N charge bearing atoms (ND) being greater than 1.2, and thereafter coating said surface of said strip with lacquer.

5,021,105
COPPER ALLOY FOR ELECTRONIC INSTRUMENTS

Makoto Asai; Yoshimasa Ohyama; Tohru Tanigawa; Shigeo Shinozaki, all of Nikko, and Shoji Shiga, Utsunomiya, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 81,314, Aug. 4, 1987, abandoned. This application Feb. 8, 1989, Ser. No. 307,488

Claims priority, application Japan, Sep. 30, 1986, 61-232956; Oct. 23, 1986, 61-252642

The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.

Int. Cl.^{5} C22C *9/02, 9/06*

U.S. Cl. 148—433 6 Claims

1. A copper alloy for electronic instruments, consisting of: from 2.0 to 7.0 wt. % of Sn, from 1.0 to 6.0 wt. % in total of

VOL
1127
ISS
1
JE
4
1991
UMI

at least one element selected from the group consisting of Ni, Co and Cr, form 0.1 to 2.0 wt. % of Si, with the remainder being Cu and the unavoidable impurities, the content of oxygen in the impurities being not more than 50 ppm, the content of S being not more than 20 ppm and the average particle diameter of precipitates in the alloy being not larger than 10 μm.

5,021,106

BRAZEABLE ALUMINUM ALLOY SHEET AND PROCESS OF MAKING SAME

Ichiro Iwai, and Hiroyuki Eda, both of Tochigi, Japan, assignors to Showa Aluminum, Osaka, Japan

Filed Oct. 19, 1989, Ser. No. 424,083

Claims priority, application Japan, Oct. 21, 1988, 63-266874; Oct. 21, 1988, 63-266875; Apr. 28, 1989, 1-110641

Int. Cl.^{5} C22C *21/00;* C22F *1/04*

U.S. Cl. 148—437 2 Claims

1. A brazeable aluminum alloy sheet consisting essentially of 0.8 to 1.3 wt % of Mn and 0.2 to 0.7 wt % of Si, the balance being aluminum and unavoidable impurities, said aluminum alloy sheet containing recrystallized grains of not smaller than 200 μm in diameter, each recrystallized grain having a length of l in a rolling direction and a thickness of d wherein l/d is not smaller than 20.

5,021,107

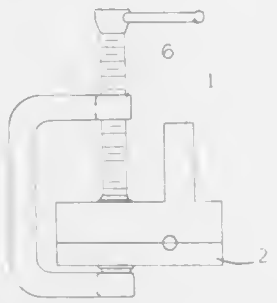
PROCESS FOR JOINING OR COATING CARBON-CARBON COMPOSITE COMPONENTS

Kenneth H. Holko, 3620 Ticonderoga St., San Diego, Calif. 92117

Continuation of Ser. No. 145,129, Jan. 19, 1988, abandoned. This application Nov. 17, 1989, Ser. No. 440,405

Int. Cl.^{5} B32B *31/06*

U.S. Cl. 156—89 14 Claims



1. A process for joining carbon-carbon composite component comprising the steps of:

(a) preparing the surface of a first carbon-carbon composite component to be joined,

(b) preparing a surface of a second carbon-carbon composite component so that the surface of said second component mates with said prepared surface of said first component,

(c) preparing a thin interlayer having a thickness of between 0.001 inch and 0.004 inch and comprised of material having a melting point greater than 2500 F.,

(d) assembling said first component, said interlayer and said second component so that said mating surfaces are facing each other with said interlayer sandwiched between, and

(e) while holding said assembly together under compression, heating for a time said assembly at a temperature not exceeding 36650 F. but sufficient to cause substantial mixing of the atoms of the interlayer with the atoms of the carbon-carbon composite.

5,021,108

METHOD AND APPARATUS FOR MANUFACTURING A FOAMED PLASTIC LAMINATED PANEL

Tonny E. Bergqvist, Cotton Tree, Australia, assignor to Coral Irene Bergqvist, Queenland, Australia

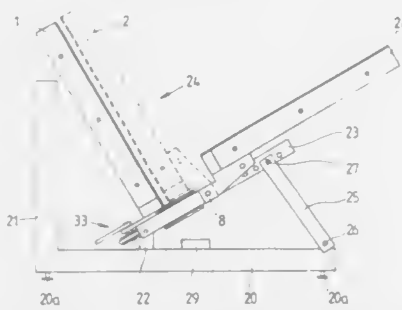
PCT No. PCT/AU88/00266, § 371 Date May 22, 1989, § 102(e) Date May 22, 1989, PCT Pub. No. WO89/00496, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 22, 1988, Ser. No. 334,955

Claims priority, application Australia, Jul. 22, 1987, PI3255

Int. Cl.^{5} B32B *5/20*

U.S. Cl. 156—79 11 Claims



8. A method of manufacture of laminated panels having a foamed plastics core and opposed outer skins of cladding material, said method comprising the steps of:

supporting a layer of outer skin material in said press member against a fixed platen surface;

supporting a layer of outer skin material in said press member against a hingeable opposed platen surface;

clamping said fixed and hingeable platen surfaces together in predetermined spaced relationship with peripheral sealing means therebetween defining a hollow cavity between respective said layers of outer skin material;

inclining said opposed platen surfaces;

injecting through a plurality of nozzles extending through an upper longitudinal sealing means a liquid foamable plastics composition which expands to fill said hollow cavity; and

removing said panel from said press after said foamed plastics core has substantially hardened.

5,021,109

METHOD OF PREPARING A MULTILAYERED BELT

Mark Petropoulos, and John M. Hammond, both of Ontario, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 29, 1989, Ser. No. 459,130

Int. Cl.^{5} G03G *5/00*

U.S. Cl. 156—137 33 Claims

1. A method for fabricating a seamless belt, comprising the steps of:

heating a substrate formed of a polymeric material in the shape of an endless belt to at least about the apparent glass transition temperature of said polymeric material to expand said substrate;

mounting said heated substrate on a mandrel;

applying at least one layer to said mounted substrate to form a composite belt;

heating said composite belt to at least about said apparent glass transition temperature to expand said composite belt; and

removing said composite belt from said mandrel.

5,021,110

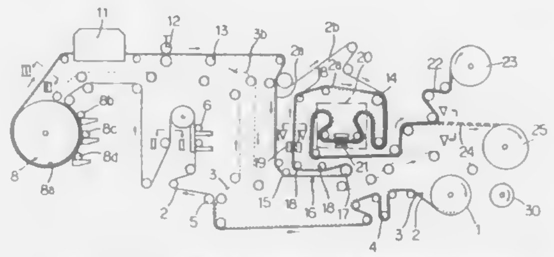
PROCESS FOR MANUFACTURING SELF-ADHESIVE MULTILAYERED LABEL

Junichi Kobayashi, Tokyo, Japan, assignor to Ko-pack Corporation, Tokyo, Japan

Filed Nov. 20, 1989, Ser. No. 439,280

Int. Cl.^{5} B32B *31/18*

U.S. Cl. 156—249 12 Claims



1. A method of manufacturing self-adhesive multilayered labels, comprising the steps of:

supplying an elongated label stock of a predetermined width sufficient to print plural messages widthwise thereon in parallel to each other, to a printer, said label stock having a release paper thereon and including a face paper portion;

printing plural messages in at least two parallel rows on the face paper portion of said label stock;

cutting the label stock into halves lengthwise between said at least two parallel rows of the messages on a conveyer line;

peeling off a release paper from one half of the cut label stock and forwarding the face paper portion thereof along the conveyor line, and discarding the peeled off release paper;

forwarding the other half of the cut label stock with its release paper still on;

conveying either one of said face paper portion or said label stock to a feed track adjustment means which is provided on the conveyor line to adjust the feed track of the conveyor line so that said face paper portion and said label stock are aligned with each other on substantially the same line;

superposing said face paper portion without said release paper thereon upon said aligned label stock with the release paper thereon and bonding the two together; and

punching the thus bonded superposed papers into a contour framing the messages printed thereon.

5,021,111

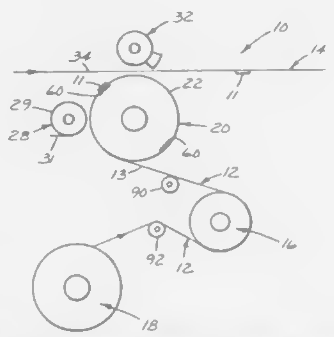
APPARATUS AND METHOD FOR APPLYING HEAT-SENSITIVE ADHESIVE TAPE TO A WEB MOVING AT HIGH SPEED

Douglas A. Swenson, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 31, 1988, Ser. No. 238,568

Int. Cl.^{5} B32B *31/10;* B65C *9/25*

U.S. Cl. 156—264 24 Claims



17. A method of applying pieces of heat-sensitive adhesive tape, such as frontal diaper tape, of the type having a layer of heat sensitive adhesive material that is generally tacky at an elevated temperature substantially greater than room temperature but substantially not tacky at room temperature to a web moving at high speed, such as a web of water-resistant material designed for use as the outer layer of disposable diapers, the pieces being applied in spaced relationship along the web, the method comprising the following steps:

maintaining a peripheral surface of a tape-applying wheel in rolling engagement with the web and rotating the tape-applying wheel at a tape-applying velocity where the velocity of the peripheral surface of the tape-applying wheel is substantially equal to the speed of the web;

feeding the tape along a tape-feed wheel to the tape-applying wheel from a supply of generally continuous tape at a tape-feed velocity lower than the tape-applying velocity and appropriate for feeding a sufficient quantity of tape for application to the web;

preheating the tape along the tape-feed wheel to a tape-feed temperature at which the heat-sensitive adhesive layer is tacky or substantially softened;

providing suction through a portion of the peripheral surface of the tape-applying wheel to hold the tape thereon;

heating the peripheral surface of the tape-applying wheel to heat the tape substantially to the elevated temperature at which the heat-sensitive adhesive is generally tacky and for maintaining the tape substantially at the elevated temperature until it is applied to the web;

cutting successive end portions of the tape against the tape-applying wheel into pieces to be applied to the web in response to the rotary position of the tape-applying wheel;

maintaining the portion of the tape to be cut in generally low-friction sliding engagement with the peripheral surface of the tape-applying wheel such that the tape is substantially undistorted and untorn by the sliding engagement and with the tape moving at the tape-feed velocity until it is cut;

accelerating each successive piece of tape cut from the successive end portions of the tape from the tape-feed velocity to the tape-applying velocity substantially equal to the velocity of the web so that the tape and web are moving at substantially equal velocity when the tape is applied to the web; and

pressing the web and the piece of tape to be applied to the web together between a buffing means and the tape-applying wheel so that the piece of tape adheres to the web.

5,021,112

PROCESS OF MULTICOLOR PRINTING BY LASER

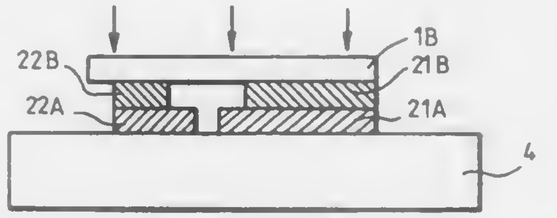
Guy Breger, 10 Chemin des Violettes, Rosoy-Sens (Yonne), France

Filed Jul. 19, 1989, Ser. No. 383,206

Claims priority, application France, Jul. 26, 1988, 88 10052

Int. Cl.^{5} B41M *1/18;* B44C *3/02*

U.S. Cl. 156—305 10 Claims



1. A process for multi-color printing comprising:

a. providing as a temporary support a first sheet with a first layer of a first color material thereon;

b. by use of a laser beam, destroying an area of said first layer of said first color material to leave a first image of said first color material;

c. applying said first image of said first color material to a

VOL
1127
ISS
1
JE
4
1991
UMI

permanent support to transfer said first image to said permanent support;

d. providing a second sheet with a second layer of a second color material thereon;

e. by use of a laser beam destroying an area of said second layer of said second color material to leave a second image of said second color material;

f. applying said second image of said second color material to said permanent support with correct register relative to said first image to transfer said second image to said permanent support, and with said second image of said second material being superimposed over said first image so as to form on said permanent support a combined image of said first and second images.

5,021,113

TIE LAYER COMPOSITION AND LAMINATED STRUCTURES CONTAINING SAME

Andrea Sanders, Katy, and Glenn R. Himes, Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 425,154, Oct. 23, 1989, abandoned, which is a division of Ser. No. 139,549, Dec. 30, 1987, Pat. No. 4,898,784. This application Jun. 25, 1990, Ser. No. 542,687

Int. Cl.⁵ C09J *153/02;* **C08L** *53/02*

U.S. Cl. 156—334 9 Claims

1. A method for bonding polymeric materials which comprises applying between said polymeric materials an adhesive composition comprising at least one carboxylated, selectively hydrogenated block copolymer, said carboxylated block copolymer comprising at least one polymeric block containing predominantly monoalkenyl aromatic hydrocarbon monomer units and at least one polymeric block containing predominantly hydrogenated conjugated diolefin monomer units, and at least one uncarboxylated block copolymer, said uncarboxylated, selectively hydrogenated block copolymer comprising at least one polymeric block containing predominantly hydrogenated conjugated diolefin monomer units and at least one polymeric block containing hydrogenated conjugated diolefin monomer units, wherein said composition comprises, on average, from about 0.1 to about 10 carboxyl radicals per polymer chain contained in the composition.

5,021,114

APPARATUS FOR TREATING MATERIAL BY USING PLASMA

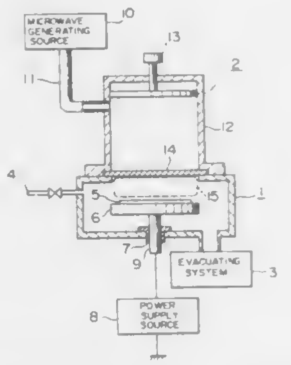
Hiroshi Saito, Fujisawa; Yasumichi Suzuki, Yokohama; Shunji Sasabe, Iruma, and Kazuhiro Nakajima, Ome, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,272

Claims priority, application Japan, Jul. 20, 1987, 62-178997; Aug. 10, 1987, 62-198200; Nov. 6, 1987, 62-279239

Int. Cl.⁵ H01L *21/00*

U.S. Cl. 156—345 20 Claims



1. A plasma treatment apparatus comprising:

a microwave generating source generating a microwave;

a waveguide feeding the microwave;

a cavity resonator resonating the microwave fed along the waveguide so that an electric field of the microwave is intensified;

a gas supply source;

an evacuator;

a vacuum chamber connected to said gas supply source and said evacuator, said vacuum chamber providing a plasma treatment electrode supporting a substrate thereon;

a microwave injection window supplying a microwave energy resonated in said cavity resonator so as to generate plasma by the microwave energy, wherein the plasma is disposed against the substrate in the vacuum chamber, the microwave injection window being interposed between said cavity resonator and said vacuum chamber so that the microwave injection window is provided in opposition to said substrate;

a first voltage supply provided in association with said plasma treatment electrode causing ions in said plasma to impact against said substrate; and

magnetic field generator generating a magnetic field in such a manner that said plasma produced within a space defined between said substrate and said microwave injection window is peripherally surrounded by a magnetic line of force so as to prevent said plasma from diffusing radially and outwardly.

5,021,115

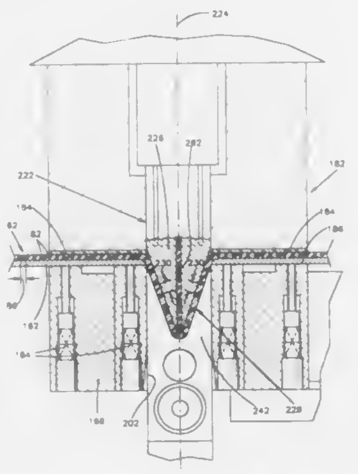
JOINING REINFORCED ELASTOMERIC SHEET MATERIAL

Noboru Tokita, Woodbridge, Conn., assignor to The Uniroyal Goodrich Tire Company, Akron, Ohio

Filed Jul. 7, 1989, Ser. No. 376,480

Int. Cl.⁵ B29D *30/44*

U.S. Cl. 156—406.6 8 Claims



1. An apparatus for building a tire, said apparatus comprising:

means for supplying a predetermined length of elastomeric sheet material having spaced apart first and second end portions and a plurality of parallel extending reinforcing members of which adjacent reinforcing members are spaced apart a substantially equidistant first distance,

means for elastically deforming only the first and second end portions of the elastomeric sheet material to increase spacing apart of adjacent reinforcing members in each of the first and second end portions to a second distance greater than the first distance;

drum means for receiving the elastomeric sheet material therearound so the first and second end portions of the elastomeric material are overlapped; and

means for bonding together the first and second end portions of the elastomeric sheet material under heat and pressure to form a joint and to locate at least one reinforcing member in the first end portion between a pair of adjacent reinforcing members in the second end portion;

said means for elastically deforming only the first and second end portions of the elastomeric sheet material comprises:

means for gripping the elastomeric sheet material adjacent one of the first and second end portions of the elastomeric sheet material at spaced apart locations;

surface means defining a cavity located between a pair of parallel planes extending perpendicular of the elastomeric sheet material at the spaced apart locations and located on a first side of the elastomeric sheet material when the elastomeric sheet material is gripped by said gripping means;

tool means having an end portion located on a second side of the elastomeric sheet material opposite the first side and being movable in a direction transverse to the elastomeric sheet material; and

means for moving said end portion of said tool means from a first position spaced from the elastomeric sheet material to a second position within the cavity to elastically deform a portion of the elastomeric sheet material located between the parallel extending planes during movement of said end portion of said tool means from said first position to said second position.

5,021,116

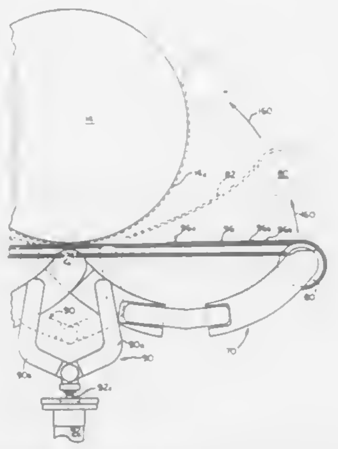
LABELING MACHINE

Joseph B. Milgram, Jr., and P. Clark Hungerford, Jr., both of Cleveland Heights, Ohio, assignors to Aexcel Corporation, Willoughby, Ohio

Filed Jul. 18, 1988, Ser. No. 220,500

Int. Cl.⁵ B65C *31/00*

U.S. Cl. 156—475 31 Claims



1. A labeling apparatus for applying labels to containers or the like, comprising:

a) means for positioning a label to be applied at a label presenting position;

b) a label applying head operative to receive a label from the positioning means and further operative to move the label to a label applying position at which said label is clamped into abutting engagement with a container;

c) said label applying head moveable between a label receiving position and a label applying position and including a pair of moveable supports and an elastic belt supported between portions of said supports, each of said supports including another portion spaced longitudinally from said one portion, said other portions mounted for movement about a substantially common pivot means such that as said supports move about said substantially common pivot means, said one portions of said supports move towards and away from each other along a predetermined path;

d) actuating means for moving said one support portions between a retracted position at which said one support portions are spaced apart by a first predetermined distance and an extended position at which said one support portions are spaced apart by a second predetermined distance less than said first predetermined distance;

e) label holding means for holding a label to said label applying head including an elastic member defining apertures and a source of sub-atmospheric pressure for creating suction at said apertures by which a label is attracted and held to the labeling head.

5,021,117

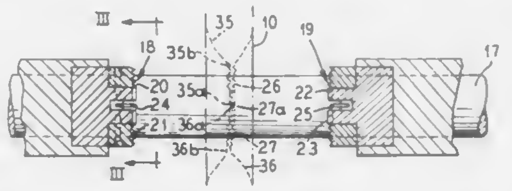
SEALING JAW FOR HEAT SEALABLE FILM WITH ZIPPERED SECTION

Hugo Boeckmann, Arlington Heights, Ill., assignor to Zip-Pak, Inc., Northbrook, Ill.

Filed Jun. 26, 1989, Ser. No. 371,329

Int. Cl.⁵ B65B *51/00*

U.S. Cl. 156—515 18 Claims



1. A mechanism for thermally joining layers of plastic sheeting to form a seam comprising in combination:

a sealing jaw having a sealing surface for engaging the outer surface of overlaid confronting plastic sheets extending in a longitudinal direction to form a cross seam joining the sheets, said cross seam extending laterally of said longitudinal direction;

a support jaw having a support surface opposed to said sealing jaw for pressure squeezing the sheets therebetween along a seaming area of the cross seam;

said sealing jaw surface being non-parallel to said support jaw to apply a penetration pressure tapered in the longitudinal direction to press one portion of the sheets more firmly together than the other;

and means for moving said sealing jaw and said support jaw in reciprocal movement at right angles to the cross seam to move the jaws against and away from the sheets.

5,021,118

METHOD OF DRAWING-UP A SINGLE CRYSTAL USING A DOUBLE-CRUCIBLE APPARATUS AND DOUBLE-CRUCIBLE APPARATUS AND DOUBLE-CRUCIBLE APPARATUS THEREFOR

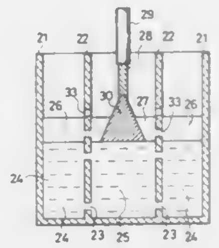
Akihisa Kawasaki, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Nov. 24, 1986, Ser. No. 933,924

Claims priority, application Japan, Nov. 25, 1985, 60-265489

Int. Cl.⁵ C30B *15/00, 35/00*

U.S. Cl. 156—607 4 Claims



1. A method of drawing up a single crystal using a double-crucible apparatus comprising the steps of:

a) providing a double-crucible apparatus including an outer crucible and an inner crucible attached in said outer cruci-

VOL
1127
ISS
1
JE
4
1991
UMI

ble, said inner crucible having first holes formed at its lower portions to allow molten raw material to move therethrough, and second holes formed at its upper portions to allow sealing agent to move therethrough;

b) pouring molten raw materials of different impurity concentration into said outer and inner crucibles, and pouring liquid sealing agents into said outer and inner crucibles so that said molten raw materials in said outer and inner crucibles are covered with said liquid sealing agents and so that said liquid sealing agents in said outer and inner crucibles are in contact with said second holes;

c) soaking a seed crystal in said molten raw material in said inner crucible in an atmosphere of an inert gas; and

d) gradually drawing up said seed crystal so that a single crystal is grown, said sealing agents being controlled to be in contact with said second holes at least until the formation of a shoulder portion of said single crystal is completed.

3. In a fixed double-crucible for the growth of semiconductor single crystals apparatus, the apparatus comprising:

(a) an outer crucible;
(b) an inner crucible attached to said outer crucible;
(c) means formed on a lower portion of said inner crucible for allowing restricted passage of low impurity molten raw material from said outer crucible to a higher impurity raw material in said inner crucible;

the improvement comprising:

(d) means formed on an upper portion of said inner crucible for allowing unrestricted passage of an encapsulent liquid between said inner and outer crucibles.

5,021,119

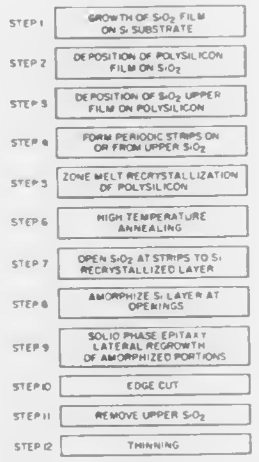
ZONE-MELTING RECRYSTALLIZATION PROCESS

John C.C. Fan, Chestnut Hill; Paul M. Zavracky, Norwood, both of Mass.; Jagdish Narayan, Raleigh, N.C.; Lisa P. Allen, Norton, and Duy-Phach Vu, Taunton, both of Mass., assignors to Kopin Corporation, Taunton, Mass.

Continuation of Ser No. 385,661, Jul. 26, 1989, abandoned, which is a continuation of Ser. No. 120,016, Nov. 13, 1987, Pat. No. 4,885,052. This application Oct. 18, 1990, Ser. No. 600,246

Int. Cl.^{5} C30B *13/00*

U.S. Cl. 156—620.71 10 Claims


STEP 1
GROWTH OF SiO_2 FILM ON Si SUBSTRATE
STEP 2
DEPOSITION OF POLYSILICON FILM ON SiO_2
STEP 3
DEPOSITION OF SiO_2 UPPER FILM ON POLYSILICON
STEP 4
FORM PERIODIC STRIPS ON OR FROM UPPER SiO_2
STEP 5
ZONE MELT RECRYSTALLIZATION OF POLYSILICON
STEP 6
HIGH TEMPERATURE ANNEALING
STEP 7
OPEN SiO_2 AT STRIPS TO Si RECRYSTALLIZED LAYER
STEP 8
AMORPHIZE Si LAYER AT OPENINGS
STEP 9
SOLID PHASE EPITAXY LATERAL REGROWTH OF AMORPHIZED PORTIONS
STEP 10
EDGE CUT
STEP 11
REMOVE UPPER SiO_2
STEP 12
THINNING

1. A method of zone melting and recrystallization of semiconductor film formed on an insulator over a silicon substrate comprising the steps of:

a. forming a protective capping layer over the semiconductor film;
b. zone melting and recrystallizing said film to transform said film to a single crystal, or nearly single crystalline structure;
c. removing the protective capping layer, in selected regions where it is desired to selectively amorphize and regrow underlying structure to minimize crystalline defects, to expose the single crystal or nearly single crystal underlying structure in said regions;
d. selectively amorphizing the exposed underlying structure while leaving single crystal or nearly single crystal regions laterally adjacent thereto;
e. laterally regrowing said selectively amorphized structure to transform the amorphized structure to single crystal or nearly single crystal material seeded by the single crystal or nearly single crystal regions laterally adjacent thereto.

5,021,120

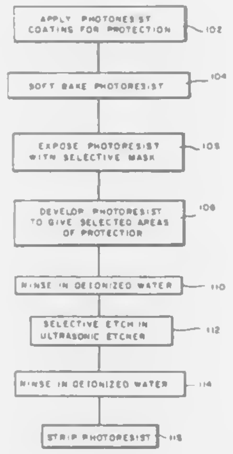
PROCESS FOR ETCHING PATTERNED SUBSTRATES

Roy V. Buck, 8323 Maloe Ct., Oak Ridge, N.C. 27310, and Darrell P. Adams, 1820 Heilwood Dr., Greensboro, N.C. 27407

Division of Ser. No. 345,079, Apr. 28, 1989, Pat. No. 4,957,853. This application Feb. 15, 1990, Ser. No. 480,598

Int. Cl.^{5} B44C *1/22;* C23F *1/02;* C03C *15/00, 25/06*

U.S. Cl. 156—637 2 Claims


APPLY PHOTORESIST COATING FOR PROTECTION
102
SOFT BAKE PHOTORESIST
104
EXPOSE PHOTORESIST WITH SELECTIVE MASK
105
DEVELOP PHOTORESIST TO GIVE SELECTED AREAS OF PROTECTION
108
RINSE IN DEIONIZED WATER
110
SELECTIVE ETCH IN ULTRASONIC ETCHER
112
RINSE IN DEIONIZED WATER
114
STRIP PHOTORESIST
116

1. A method of wet etching a workpiece including a metallization layer on a substrate, comprising:

a. applying a photoresist to the metallization layer of the workpiece;
b. subjecting the workpiece to a soft baking cure;
c. exposing the photoresist to a selective mask;
d. developing the photoresist;
e. selectively etching the metallization layer in an ultrasonically activated etchant bath;
f. removing the workpiece from the etchant bath and rinsing it in a washing solution, upon completion of etching; and
g. removing the workpiece from the washing solution.

5,021,121

PROCESS FOR RIE ETCHING SILICON DIOXIDE

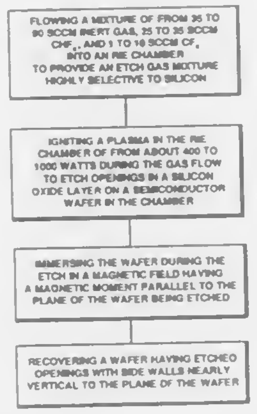
David W. Groechel, Sunnyvale, Calif.; Brad Taylor, Seattle, Wash.; John R. Henri, Los Altos, and Naomi Obinata, Mountain View, both of Calif., assignors to Applied Materials, Inc., Santa Clara, Calif.

Filed Feb. 16, 1990, Ser. No. 481,135

Int. Cl.^{5} B44C *1/22;* C03C *15/00, 25/06*

U.S. Cl. 156—643 20 Claims

1. An improved RIE process for etching an oxide of silicon characterized by a nearly vertical contact angle and highly selective to silicon which comprises flowing from about 15 to about 185 sccm of an inert gas and from about 15 to about 60 sccm of CHF_3 into an RIE chamber while maintaining a plasma therein at a power level within a range of from about 400 to about 1000 watts.


FLOWING A MIXTURE OF FROM 35 TO 90 SCCM INERT GAS, 25 TO 35 SCCM CHF_3, AND 1 TO 10 SCCM CF_4 INTO AN RIE CHAMBER TO PROVIDE AN ETCH GAS MIXTURE HIGHLY SELECTIVE TO SILICON
IGNITING A PLASMA IN THE RIE CHAMBER OF FROM ABOUT 400 TO 1000 WATTS DURING THE GAS FLOW TO ETCH OPENINGS IN A SILICON OXIDE LAYER ON A SEMICONDUCTOR WAFER IN THE CHAMBER
IMMERSING THE WAFER DURING THE ETCH IN A MAGNETIC FIELD HAVING A MAGNETIC MOMENT PARALLEL TO THE PLANE OF THE WAFER BEING ETCHED
RECOVERING A WAFER HAVING ETCHED OPENINGS WITH SIDE WALLS NEARLY VERTICAL TO THE PLANE OF THE WAFER

5,021,122

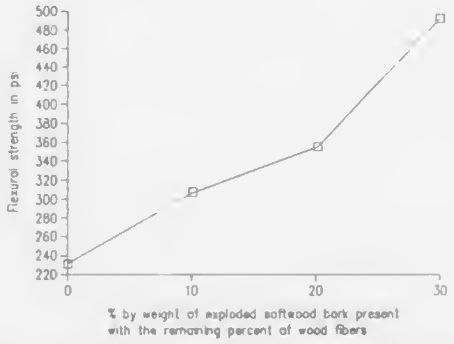
EXPLODED BARK PRODUCTS

Michel J. Desrochers, Dollard des Ormeaux; Michel Jean, Pointe Claire, and Michel P. Drouin, Ile Perrot, all of Canada, assignors to Domtar Inc., Montreal, Canada

Filed Jan. 22, 1990, Ser. No. 468,347

Int. Cl.^{5} D21H *11/00*

U.S. Cl. 162—150 23 Claims



1. A pressed and dryed shaped product comprising at least 7.5% of exploded softwood bark having at least 23% cellulose and at least 18% lignin and polyphenols content said percent being on the dry weight basis of said bark said product being held together by no other binder than the adhesives present in said exploded bark, the lignin on the cellulose being the active ingredient to glue the cellulose fibers together.

5,021,123

PROCESS FOR PRODUCING PAPER FROM A POLY(PARAPHENYLENE TEREPHTHALAMIDE) FIBROUS GEL

Wilfred Sweeny, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 332,792, Apr. 3, 1989, Pat. No. 4,959,453. This application May 17, 1990, Ser. No. 524,734

Int. Cl.^{5} D21H *13/26*

U.S. Cl. 162—157.3 6 Claims

I. A process for preparing a poly(paralphenylene terephthalamide) paper comprising the steps of:

(a) combining, under agitation to yield a slurry:
  (i) a poly(paraphenylene terephthalamide) fibrous gel composition prepared by a process consisting essentially of placing substantially stoichiometric amounts of terephthaloyl chloride in reactive contact with paraphenylenediamine in a solution of at least one amide solvent in an amount sufficient to yield a final concentration of poly(paraphenylene terephthalamide) in the range from about 3 to about 7 percent by weight of the solvent, at least 1.5 moles of an alkaline earth metal salt per mole of para-phenylenediamine and N-methylpyrrolidine present in the range of from 1.0 to 2.0 moles per mole of para-phenylenediamine;
  (ii) poly(paraphenylene terephthalamide) fiber; and
  (iii) a liquid precipitating medium;
(b) pouring the slurry onto a screen to yield a sheet;
(c) washing the sheet;
(d) pressing the sheet; and
(e) drying the sheet.

5,021,124

DOUBLE DOCTOR FOR A PAPER MACHINE AND METHOD FOR ADJUSTMENT OF SAME

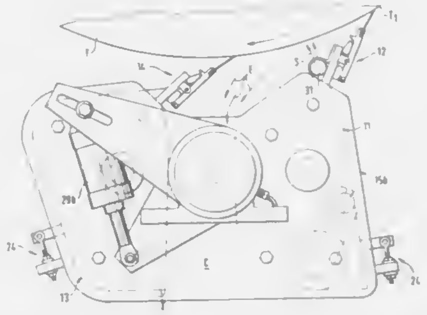
Pekka Turtinen, and Antti Kähönen, both of Jyväskylä, Finland, assignors to Valmet Paper Machinery Inc., Finland

Filed Jan. 26, 1990, Ser. No. 470,968

Claims priority, application Finland, Feb. 15, 1989, 890733

Int. Cl.^{5} D21G *3/00*

U.S. Cl. 162—199 6 Claims



1. A double doctor for a paper machine comprising:

a first doctor beam;
a first doctor blade mounted in said first doctor beam;
a second doctor beam;
a second doctor blade mounted in said second doctor beam;
first and second end plates respectively connected to first and second ends of said first and second doctor beams such that an opening exists defined by said first and second doctor beams and said first and second end plates through which opening a paper web or other material scraped off a paper machine roll can be passed directly and without obstruction into a pulper;
means for separately and independently rotating said first and second doctor beams;
wherein said rotating means comprises first and second journals respectively connected between said first end plate and said first doctor beam and between said second end plate and said second doctor beam, and an adjusting device for rotating said first and second doctor beams about their respective central longitudinal axes;
wherein said adjusting device comprises means for engaging one of said end plates and both of said first and second doctor beams;
wherein said engaging means comprises a bracket connected to both doctor beams, a pin connected with one of said end plates, and one or more screws which are connected to said bracket and to said pin such that rotation of one of said screws causes rotation of one of said first and second doctor beams about one of said respective central longitudinal axes; and wherein at least one of said first and second plates has a curved opening in which said screws move for adjustment of one of said first and second doctor beams.

5. A method for adjustment of the doctor blades in a double-

VOL
1127
ISS
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1991
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doctor construction in a paper machine, said method comprising the steps of:

attaching said doctor blades to respective doctor beams in said paper machine; and

utilizing an adjusting device to rotate at least one of said doctor beams relative to a respective end plate attached thereto;

wherein each of said doctor beams can be rotated independently about its own axis of rotation to position each of said doctor beams for scraping material from a common roll of said paper machine and further comprising rotating one or more of said doctor beams about its axis of rotation by means of a journal having a shaft connected to one of said doctor beams to be rotated, said shaft being fixedly attached to one of said end plates.

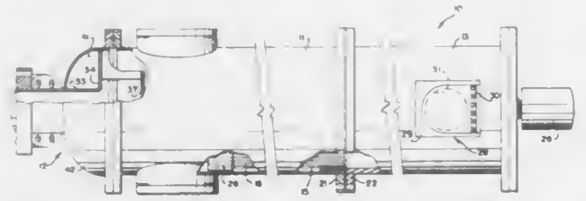
5,021,125
PISTONLESS ACCUMULATOR

Joseph R. Phillips; John D. Weston, both of Glens Falls, N.Y., and Michael D. Meredith, Beaverton, Oreg., assignors to Kamyr, Inc., Glens Falls, N.Y.

Filed Aug. 30, 1989, Ser. No. 400,737

Int. Cl.^{5} F16L *55/04*

U.S. Cl. 162—232 20 Claims



18. A hydraulic accumulator comprising:

(a) a casing;

(b) means providing at least one opening in said casing for the passage of oil into said casing and out of said casing;

(c) means providing a gas pad for acting on the oil within said casing;

(d) means for providing laminar flow of oil from contact with the gas to said opening for passage of oil out of said casing so as to prevent entrainment of gas in oil that passes out of said opening; and

said means providing at least one opening comprising: an inlet tube, a baffle surrounding said inlet tube to prevent oil entering said casing from moving in a straight path upon initial entry into said casing; a perforated plated surrounding said inlet tube at the opening thereof into said casing and leading from said casing to an outlet chamber; and an outlet tube leading from said outlet chamber to components exterior of said casing.

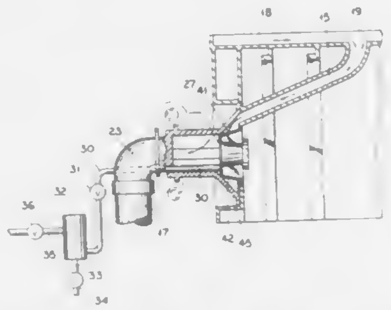
5,021,126
DRUM WASHER HAVING LIQUID COLLECTING MEANS

Dennis L. Gwin, Clatskanie, Oreg.; Keith T. Van Scotter, Boise, Id., and Ron L. Montgomery, Trenton, N.J., assignors to Union Camp Corporation, Wayne, N.J.

Continuation-in-part of Ser. No. 394,277, Aug. 15, 1989, abandoned, which is a continuation-in-part of Ser. No. 877,370, Jun. 23, 1986, abandoned. This application Jan. 18, 1990, Ser. No. 466,948

Int. Cl.^{5} D21C *9/00, 9/06*

U.S. Cl. 162—263 2 Claims



1. A drum washer for washing pulp for paper manufacture for continuously sampling filtrate from said pulp, comprising:

a vat;

means to feed a pulp slurry into the vat;

a mesh covered cylinder mounted for continuous rotation in the vat and through the slurry;

means to apply vacuum within the cylinder for a portion of the rotation of the cylinder to deposit a mat on the cylinder;

means to cut off the vacuum within the cylinder for the remainder of the rotation of the cylinder to permit removal of the mat from the cylinder;

a valve connected at the end of the cylinder provided with a valve chamber and a valve segment having an atmospheric port, said segment governing the application and cut-off of the vacuum during rotation of the cylinder;

a drop leg connected to the valve chamber; and drainage means within the cylinder to drain liquid from the mat and cylinder to the end of the cylinder and then to the valve chamber and drop leg; and

conduit means having a first and second end and having its first end connected to the atmospheric port of the valve segment and passing through the valve chamber, the second end of the conduit connected to a means for collecting the liquid at the atmospheric port as it flows by gravity from the final displacement zone of the cylinder when the vacuum has been cut off,

whereby the liquid can be analyzed for solids content for an indication of the washing efficiency.

5,021,127
EXTENDED DELIGNIFICATION IN PRESSURE DIFFUSERS

Michael D. Meredith, Glens Falls, N.Y., assignor to Kamyr, Inc., Glens Falls, N.Y.

Division of Ser. No. 127,055, Dec. 1, 1987, abandoned. This application Sep. 28, 1989, Ser. No. 413,682

Int. Cl.^{5} D21C *7/00*

U.S. Cl. 162—237 2 Claims

1. Apparatus for producing extended kraft pulp delignification, comprising:

(a) a continuous digester comprising an upright vessel for effecting digestion of pulp therein, and including an inlet for comminuted cellulosic fibrous material at a top thereof, treatment zones, and a pulp discharge at a bottom thereof;

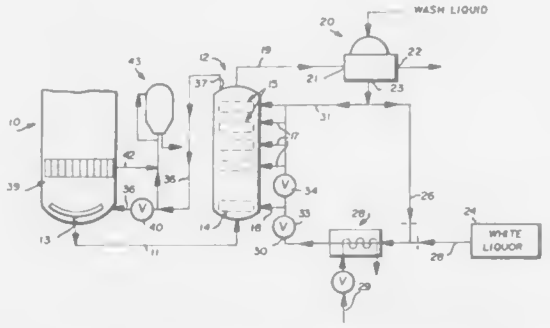
(b) a multiple stage pressure diffuser for effecting diffusion treatment of kraft pulp, including means for defining a first stage and means for defining at least one subsequent stage and having a pulp inlet, a pulp outlet, and a screened liquid outlet; and having a first wash liquid inlet and associated components of material resistant to corrosion from alkali liquid, and at least one subsequent wash liquid inlet and associated components;

(c) treatment means for treating kraft pulp, having a pulp inlet, a pulp outlet, and a filtrate outlet;

(d) a source of white liquor;

(e) liquid heating means;

(f) first conduit means for transporting pulp from the bottom of the digester of the pulp inlet to the pressure diffuser;



(g) second conduit means for transporting pulp from the diffuser pulp outlet to the treatment means pulp inlet;

(h) third conduit means for supplying a portion of the filtrate from the treatment means filtrate outlet mixed with white liquor from the white liquor source to the heating means;

(i) fourth conduit means for supplying a heated mixture of white liquor and filtrate from the heating means to the treatment liquid inlet to the diffuser first stage; and

(j) fifth conduit means for supplying wash liquid to the subsequent wash liquid inlets of the pressure diffuser, including at least some liquid from the filtrate outlet.

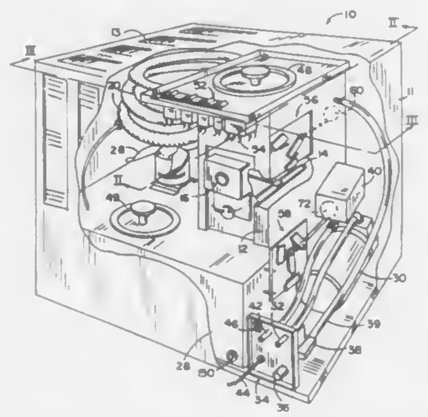
5,021,128
WATER DISTILLATION SYSTEM AND METHOD WITH CONTROLS

David G. Palmer, Lincoln, Nebr., assignor to Pure Water, Inc., Lincoln, Nebr.

Filed Feb. 25, 1988, Ser. No. 160,132

Int. Cl.^{5} B01D *3/42*

U.S. Cl. 203—1 22 Claims



1. A method for controlling the operation of a water distillation apparatus having a boiling tank, heating means for converting water in said boiling tank to steam, feed water admission means for admitting untreated feed water to said boiling tank, draining means for removing the contents of said boiling tank, condensing means for condensing steam produced by said heating means into distilled water, and a distilled water holding tank operatively connected to said condensing means to receive water therefrom, said method comprising the steps of:

(a) monitoring the level of distilled water in said holding tank and the level of untreated water in said boiling tank;

(b) processing a batch of untreated water by operating said heating means when said level of water in said boiling tank is above a first predetermined level to produce distilled water irrespective of the level of distilled water in said holding tank;

(c) filling said boiling tank with a batch of untreated water by operating said feed water admission means when the level of water in said boiling tank decreases to said first level as a result of operating said heating means until said level of water in said boiling tank reaches a second predetermined level higher than said first level; and

(d) diluting the untreated water in said boiling tank and discharging a batch of tempered untreated water by operating said draining means after said level in said boiling tank increases to said second level as a result of operating said feed water admission means in step (c) when the level of water in said holding tank increases to a third predetermined level as a result of producing distilled water.

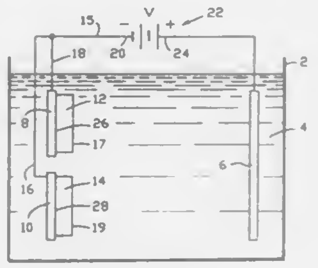
5,021,129
MULTILAYER STRUCTURES OF DIFFERENT ELECTROACTIVE MATERIALS AND METHODS OF FABRICATION THEREOF

Gary V. Arbach, Mahopac; Terrence R. O'Toole, Hopewell Junction, and Alfred Viebbeck, Stormville, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 25, 1989, Ser. No. 411,952

Int. Cl.^{5} C25D *5/02*

U.S. Cl. 204—15 37 Claims



1. A structure comprising:

a first electroactive body;

a second electroactive body disposed against said first electroactive body;

said second electroactive body having a pattern therein exposing at the base of said pattern said first electroactive body;

said first and second electroactive bodies having different redox potential energies.

VOL
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5,021,130
AQUEOUS ACIDIC SOLUTIONS FOR THE ELECTRODEPOSITION OF TIN AND LEAD/TIN ALLOYS

Willi Metzger; Manfred Schmitz, and Karl-Jürgen Schmidt, Solingen, all of Fed. Rep. of Germany, assignors to Blasberg-Oberflächentechnik GmbH, Solingen, Fed. Rep. of Germany

Filed Jan. 23, 1990, Ser. No. 469,066

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1989, 3902042

Int. Cl.^{5} C25D *3/56*

U.S. Cl. 204—44.4 **14 Claims**

1. An aqueous acidic solution for the electrodeposition of tin and lead/tin alloys, the solution comprising:

a metal salt of alkanesulfonic acid, said metal salt selected from the group consisting of tin salts of alkanesulfonic acid, lead salts of alkanesulfonic acid, and mixtures of tin and lead salts of alkanesulfonic acid; a free alkanesulfonic acid having an alkyl moiety having from 1 to 5 carbon atoms; a non-ionic wetting agent; and a brightener comprising a reaction product of acetaldehyde or an aldol condensation product of acetaldehyde with at least one member selected from the group consisting of ammonia, an acyclic ketone, an aliphatic amine, an aliphatic amide, an aliphatic amino acid and an aliphatic hydrazine compound.

5,021,131
OPTICALLY PURE 1,4-DIOLS

Mark J. Burk, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 17, 1990, Ser. No. 524,736

Int. Cl.^{5} C25B *3/00, 3/04*

U.S. Cl. 204—59 R **10 Claims**

1. A process for the preparation of optically active 1,4-diols of enantiomeric purity of greater than or equal to about 90% of the structure

$$R^1R^2C(OH)CH_2CH_2C(OH)R^1R^2$$

wherein:

R^1 and R^2 are each independently hydrogen, lower alkyl, phenyl, substituted phenyl, aralkyl, or ring-substituted aralkyl; or R^1 and R^2 together are a 4-, 5-, or 6-membered ring,

said process comprising the steps of

a) dissolving or suspending β-hydroxy carboxylic acid with a high degree of enantiomeric purity of the formula $R^1R^2C(OH)CH_2COOH$, wherein R^1 and R^2 are as defined above, in a lower alcohol solvent, together with a catalytic amount of a corresponding alkali metal alkoxide,
b) passing through said solution or suspension at least an equivalent amount of electrical current, and
c) isolating the product.

5,021,132
ELECTROCHEMICAL PROCESS FOR PREPARING 4,4'-DINITROSTILBENE-2,2'-DISULFONIC ACID AND THE SALTS THEREOF

Baldev K. Bandlish, Charlotte, N.C., assignor to Sandoz Ltd., Basel, Switzerland

Filed Aug. 7, 1990, Ser. No. 563,457

Int. Cl.^{5} C25B *3/10*

U.S. Cl. 204—78 **24 Claims**

1. An electrochemical process for preparing 4,4'-dinitrostilbene-2,2'-disulfonic acid or the salts thereof which comprises the steps of:

a. providing an aqueous alkaline reaction medium comprising p-nitrotoluene-2-sulfonic acid salts (PNTSA) in the anodic compartment of an electrolytic cell, and providing an aqueous alkaline solution in the cathodic compartment;
b. passing current to the cell at a current density of about 1 to 30 A/dm^2 for a time and under conditions sufficient to result in oxidative condensation of PNTSA to form 4,4'-dinitrostilbene-2,2'-disulfonic acid or the salts thereof

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5,021,133
ELECTROLYTIC METHOD FOR PRODUCING AMMONIUM PARATUNGSTATE FROM CEMENTED TUNGSTEN CARBIDE

Clarence D. Vanderpool, and Tai K. Kim, both of Towanda, Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Apr. 4, 1990, Ser. No. 504,480

Int. Cl.^{5} C25B *1/00*

U.S. Cl. 204—86 **3 Claims**

1. A method for producing ammonium paratungstate from cemented tungsten carbide, said method comprising:

(a) subjecting said cemented tungsten carbide to electrolysis by passing about 0.5 to about 20 volts through an ammoniacal solution selected from the group consisting of ammonium hydroxide and ammonium chloride solution, ammonium hydroxide and ammonium carbonate solution, and ammonium hydroxide and ammonium sulfate solution, wherein platinum and said cemented tungsten carbide serve as an anode, immersing said anode in said solution, decomposing said cemented tungsten carbide and forming a solution of ammonium tungstate;
(b) crystallizing ammonium paratungstate from said ammonium tungstate solution.

5,021,134
PRODUCTION OF NITROGEN COMPOUNDS

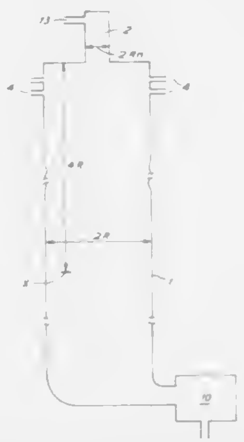
Stephen R. Blackburn, Middlesbrough, and Anthony G. Jones, Sedgefield, both of England, assignors to Tioxide Group PLC, Cleveland, England

Continuation-in-part of Ser. No. 340,790, Apr. 20, 1989. This application May 4, 1990, Ser. No. 519,674

Claims priority, application United Kingdom, Jun. 7, 1989, 8913106

Int. Cl.^{5} C01B *21/06, 21/068, 21/076, 35/14*

U.S. Cl. 204—177 **14 Claims**



1. A method for the manufacture of a nitride comprising heating ammonia and a halide selected from the class consisting of halides of ziconium, hafnium, silicon, germanium, tin, lead, boron, aluminium gallium, indium and thallium and mixtures of said halides containing less than 40% by weight of a titanium halide to a chosen reaction temperature by means of an electric plasma formed in a stream of a non-oxidizing gas generated by the discharge of direct current electricity between a pair of electrodes, introducing said heated gas through an inlet nozzle into a reactor and said reactor being so constructed and operated as to induce circulation of gaseous material in the reactor such that the recirculation ratio (RR) is greater than 2.5 and collecting a nitride powder in which method the recirculation ratio is defined according to the formula

$$RR = \frac{0.425\,Mn \cdot R}{M \cdot Rn}\left[\frac{D}{Dn}\right]^{\frac{1}{2}} - 0.425$$

wherein

Mn = mass flow of gas stream through inlet nozzle
R = internal radius of the reactor into which said nozzle flows
M = mass flow at a distance 4R downstream from the inlet nozzle
Rn = radius of inlet nozzle
Dn = density of gas stream passing through inlet nozzle
D = density of gases in reactor at a distance 4R downstream from the inlet nozzle.

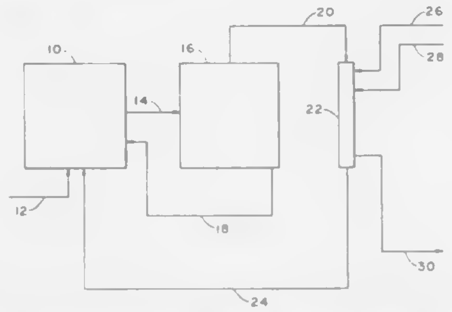
5,021,135
METHOD FOR TREATMENT OF ELECTRODEPOSITION BATH

Craig A. Wilson, Bakerstown; Kurt G. Olson, Gibsonia; Jeffrey G. Koren, Saxonburg; Debra M. Longhini, Pittsburgh; Carol S. Dugan, New Kensington, and Edward L. Jozwiak, Jr., Allison Park, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 17, 1989, Ser. No. 422,860

Int. Cl.^{5} G25D *13/22, 13/10*

U.S. Cl. 204—180.8 **25 Claims**



1. In a method for electrocoating an electrically conductive surface serving as an electrode, which method comprises passing an electrical current between the electrically conductive surface to be electrocoated and a counter electrode in contact with an electrodeposition bath comprising a synthetic resin ionically dispersed in an aqueous medium and also containing metals, wherein the improvement comprises (a) adding a complexing agent, and then (b) removing at least a portion of the complexing agent along with metals coordinated therewith from the bath.

5,021,136
APPARATUS AND METHOD FOR REMOVING LIQUID FROM LIQUID BEARING MATERIAL

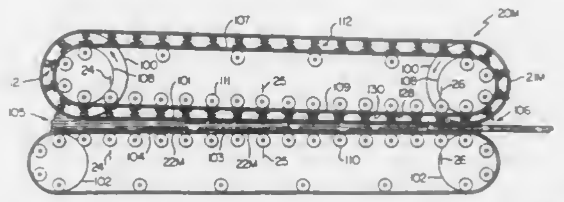
James T. Candor, 5440 Cynthia La., Dayton, Ohio 45429

Continuation of Ser. No. 386,579, Jul. 27, 1989, abandoned, which is a continuation-in-part of Ser. No. 284,197, Dec. 14, 1988, Pat. No. 4,877,503, which is a continuation-in-part of Ser. No. 213,709, Jun. 30, 1988, abandoned, which is a continuation-in-part of Ser. No. 189,974, May 4, 1988, abandoned, which is a continuation-in-part of Ser. No. 62,201, Jun. 15, 1987, Pat. No. 4,780,188, which is a continuation-in-part of Ser. No. 32,746, Mar. 31, 1987, Pat. No. 4,767,514. This application Jan. 16, 1990, Ser. No. 464,982

The portion of the term of this patent subsequent to Dec. 4, 2007, has been disclaimed.

Int. Cl.^{5} B01D *57/02*

U.S. Cl. 204—182.1 **20 Claims**



1. In an apparatus for removing liquid from liquid bearing material and comprising a pair of electrode means having portions thereof disposed adjacent each other, means for disposing said liquid bearing material between said adjacent portions, and means for creating a voltage between said electrode means so as to create an electrostatic field arrangement between said adjacent portions of said electrode means for acting through said material that is disposed therebetween to remove liquid from said material that is disposed therebetween, the improvement wherein said apparatus has means for providing different voltages respectively between a plurality of different pairs of adjacent parts of said electrode means so that the intensities of the resulting electrostatic fields that respectively act through the parts of said material that are respectively disposed between said different pairs of adjacent parts of said electrode means are different.

5,021,137
CERAMIC SOLID ELECTROLYTE BASED ELECTROCHEMICAL OXYGEN CONCENTRATOR CELL

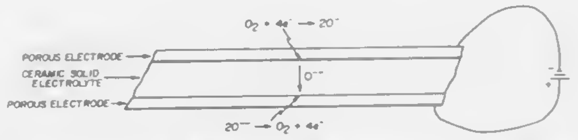
Ashok V. Joshi; Mustafa B. Syammach, both of Salt Lake City, and Scott S. Campbell, West Valley City, all of Utah, assignors to Ceramatec, Inc., Salt Lake City, Utah

Continuation-in-part of Ser. No. 156,549, Feb. 16, 1988, Pat. No. 4,879,016, which is a continuation-in-part of Ser. No. 889,214, Jul. 25, 1986, Pat. No. 4,725,346. This application Nov. 6, 1989, Ser. No. 432,919

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.^{5} C25B *1/02, 9/00*

U.S. Cl. 204—242 **7 Claims**



1. An electrolyte assembly for an electrochemical oxygen generating device consisting essentially of:

an electrolyte comprising ceria;

a pair of substantially continuous, porous, substantially sin-

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tered thin electrodes comprising lanthanum strontium cobaltite contacting said electrolyte; and

an overcoat of a thin, continuous, substantially non-porous layer of silver over each of said electrodes.

5,021,138

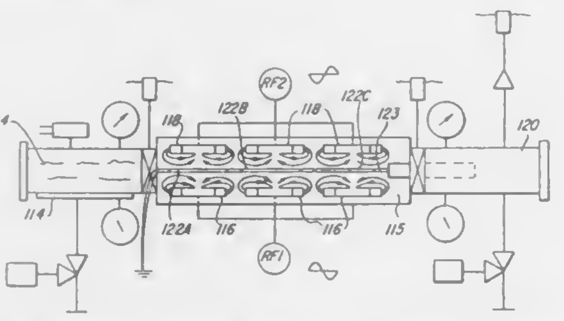
SIDE SOURCE CENTER SINK PLASMA REACTOR

Suryadevara V. Babu, One Carol Ct., Potsdam, N.Y. 13676; Neng-hsing Lu, 1206 Park Manor Blvd., Endwell, N.Y. 13760, and Carl-Otto Nilsen, 1800 King Street, Vestal, N.Y. 13850

Continuation of Ser. No. 199,838, May 27, 1988, abandoned, which is a continuation of Ser. No. 894,240, Aug. 4, 1986, abandoned, which is a continuation of Ser. No. 692,144, Jan. 17, 1985, abandoned. This application Sep. 18, 1989, Ser. No. 409,289

Int. Cl.⁵ C23F *3/00*

U.S. Cl. 204—298.33 **9 Claims**



1. A plasma processing apparatus for plasma processing substrates having first and second surfaces as said substrates pass along a path therein, said apparatus comprising:
- (a) a plasma reactor chamber;
- (b) a plurality of pairs of first and second hollow electrodes positioned within said plasma reactor chamber, each of said pairs of electrodes including a front wall oriented substantially parallel to said path having said substrates pass therealong such that the front wall of the first electrode of each of said pairs of electrodes is adapted for facing said first surface of each of said substrates and the front wall of the second electrode of each of said pairs of electrodes is adapted for facing said second surface of each of said substrates, each of said first and second hollow electrodes including a pair of substantially flat side walls each having a plurality of tapered apertures therein;
- (c) first means comprising a first radio frequency power source adapted for applying electrical power to the first electrode of each of said pairs of electrodes;
- (d) second means comprising a second radio frequency power source adapted for applying electrical power to the second electrode of each of said pairs of electrodes, said first means adapted for applying electrical power being out of phase with respect to said second means adapted for applying electrical power;
- (e) means for continuously introducing into said plasma reactor chamber a gas for being converted into a plasma upon application of said electrical power by said first and second means for applying said power, said means directing said gas through said apertures such that said gas emerges from said apertures and is uniformly distributed across the respective surface of said substrate that said electrode faces;
- (f) means for continuously evacuating said plasma reactor chamber;
- (g) drive means for continuously advancing each of said substrates seriatim along said path within said reactor chamber between said pairs of first and second hollow electrodes; and
- (h) vacuum lock means for maintaining a substantially controlled atmosphere as each substrate is inserted into and removed from said reactor chamber and as each substrate is passed through said reactor chamber.

5,021,139

CATHODE SPUTTERING APPARATUS

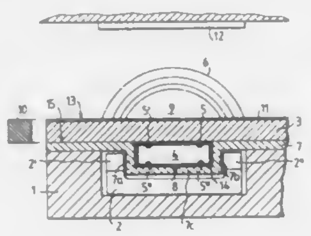
Klaus Hartig, Ronneburg, and Reiner Seiler, Hanau, both of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 10, 1990, Ser. No. 506,939

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1989, 3937558

Int. Cl.⁵ C23C *14/34, 14/35*

U.S. Cl. 204—298.09 12 Claims



1. A high-rate cathode sputtering apparatus comprising the following:

a cathode having an outer, sputtering surface adapted to receive material to be sputtered onto a substrate;

magnet means for producing a loop-shaped discharge region formed by magnetic field lines emanating from and returning to said sputtering surface;

an anode disposed outside said discharge region;

a carrier plate having a lateral surface, facing toward said cathode, in which is formed a channel groove having inside walls; and

a coolant tube disposed in said channel groove and having outside walls in contact with said inside walls of said channel groove and with an inner, contact surface of said cathode;

wherein said channel groove and said coolant tube have corresponding cross-sectional profiles.

5,021,140

ION-SELECTIVE ELECTRODE

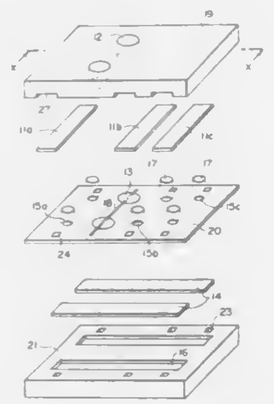
Takehiko Sato, Saitama, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 10, 1989, Ser. No. 295,456

Claims priority, application Japan, Jan. 13, 1988, 63-5416

Int. Cl.⁵ G01N *27/333*

U.S. Cl. 204—416 7 Claims



1. An ion-selective electrode comprising a non-conductive support, a sheet inner reference electrode formed on said support, said inner reference electrode comprising a conductive metal layer mounted on said support, and a layer containing a water-insoluble salt of said metal which layer is mounted on said conductive metal layer, a halide ion-selective layer formed on said inner reference electrode, and a material which forms a contact angle of at least 90° with water, a surface of said ion-selective layer being covered with said material.

5,021,141

SYNTHESIS OF CRYSTALLINE ZSM-12 TYPE STRUCTURE

Mae K. Rubin, Bala Cynwyd, Pa., assignor to Mobil Oil Corp., Fairfax, Va.

Filed Sep. 14, 1990, Ser. No. 582,070

Int. Cl.⁵ C10G *1/00, 11/05;* **C01B** *33/34;* **B01J** *21/00*

U.S. Cl. 208—46 **18 Claims**

1. A method for synthesizing crystalline material exhibiting a characteristic X-ray diffraction pattern including d-spacing maxima values, in Angstroms, as follows:

11.9 ± 0.2
10.1 ± 0.2
4.76 ± 0.1
4.29 ± 0.08
3.98 ± 0.08
3.87 ± 0.07
3.49 ± 0.07
3.38 ± 0.07
3.20 ± 0.06
3.05 ± 0.05
2.54 ± 0.04

which comprises (i) preparing a mixture capable of forming said material, said mixture comprising sources of alkali or alkaline earth metal (M), an oxide of trivalent element (X), an oxide of tetravalent element (Y), water and hexamethyleneimine directing agent (R), and having a composition, in terms of mole ratios, within the following ranges:

YO_2/X_2O_3	60 to >2000
H_2O/YO_2	5 to 200
OH^-/YO_2	0.1 to 0.4
M/YO_2	0.05 to 1.0
R/YO_2	0.1 to 1.0

(ii) maintaining said mixture under sufficient conditions until crystals of said material are formed; and (iii) recovering said crystalline material from step (ii), said recovered crystalline material containing said R.

5,021,142

TURBINE OIL PRODUCTION

Robert W. Bortz, Woodbury Heights; William E. Garwood, Haddonfield; Quang N. Le, Cherry Hill, and Stephen S. Wong, Medford, all of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 81,935, Aug. 5, 1987, abandoned. This application Dec. 14, 1988, Ser. No. 284,048

Int. Cl.⁵ C10G *47/00*

U.S. Cl. 208—58 **7 Claims**

1. A method of making a turbine oil from a distillate lubricant fraction by aromatics extraction of the distillate fraction to produce a raffinate with a reduced aromatic content, catalytic hydrodewaxing of the raffinate to produce a dewaxed raffinate having a pour point below 20° F. and a cloud point more than 10° F. above the pour point hydrotreating the dewaxed raffinate to hydrogenate aromatics in the dewaxed raffinate to produce an intermediate product having an aromatic content below 5 wt. % and a reduced viscosity relative to the starting material and an unacceptably high cloud point, characterized by treating the dewaxed raffinate with an organic peroxide compound to increase the viscosity of the dewaxed raffinate and to reduce the cloud point to within 10° F. of the pour point.

5,021,143

PROCESS OF FRACTIONATION AND EXTRACTION OF HYDROCARBONS ALLOWING OBTAINING A CUT OF INCREASED OCTANE INDEX AND A KEROSENE OF IMPROVED SMOKE POINT

Sigismond Franckowiak, Rueil-Malmaison; Paul Mikitenko, Noisy Le Roi; Pierre Baumgartner, Lyon, and Georges Cohen, Aigremont, all of France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

Filed Aug. 2, 1989, Ser. No. 388,033

Claims priority, application France, Aug. 2, 1988, 88 10545

Int. Cl.⁵ C10G *57/00*

U.S. Cl. 208—70 **13 Claims**

1. A process for the fractionation and extraction of a hydrocarbon charge with a final boiling point of at least 220° C. to obtain a petrol and a kerosene comprising:
- (a) fractionating said charge under fractionation conditions to produce at least three fractions:
  - (1) a light petrol fraction with a boiling point between approximately 25° and approximately 80° C. and containing an aromatic hydrocarbon content approximately less than 10% by weight of the light petrol fraction,
  - (2) a medium petrol fraction with a boiling point between approximately 80° C. and at the most approximately 150° C. and having a nitrogen content below approximately 50 ppm,
  - (3) a heavy petrol fraction with a boiling point at the most equal to 220° C. and having an aromatic hydrocarbon content between 25 and 75% by weight of the heavy petrol fraction,
- (b) extracting most of the aromatic hydrocarbons from said heavy petrol fraction by a first solvent for the aromatic hydrocarbons under extraction conditions in a first extraction zone, the volume ratio of said first solvent to the heavy petrol fraction being between 1 and 3, thereby producing a dearomatized refined product and an extract containing said first solvent and said aromatic hydrocarbons,
- (c) extracting said extract containing said first solvent and said aromatic hydrocarbons by a second auxiliary solvent under extraction conditions in a second extraction zone, producing an extract comprising said second auxiliary solvent, said first solvent being recycled to stage (b), the volume ratio of the auxiliary solvent to said extract containing said first solvent and said aromatic hydrocarbons being between 0.5 and 2, wherein said second auxiliary solvent is the light petrol fraction (approximately 25° C.–approximately 80° C.), and
- (d) collecting at least part of the dearomatized refined product of stage (b), so as to obtain a kerosene with an improved smoke point.

5,021,144

PROCESS FOR THE REDUCTION OF NO_X IN AN FCC REGENERATION SYSTEM BY SELECT CONTROL OF CO OXIDATION PROMOTER IN THE REGENERATION ZONE

Diana M. Altrichter, Concord, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 28, 1989, Ser. No. 317,233

Int. Cl.⁵ C10G *11/18*

U.S. Cl. 208—113 **19 Claims**

1. A process for cracking hydrocarbons in a cracking system employing a catalytic cracker, a catalyst regenerator having a dilute phase and an inventory of circulating particulate solids including cracking catalyst and CO oxidation promoters, wherein said hydrocarbons are cracked in contact with said cracking catalyst and coke is formed on said cracking catalyst at cracking conditions in said catalytic cracker and wherein

VOL
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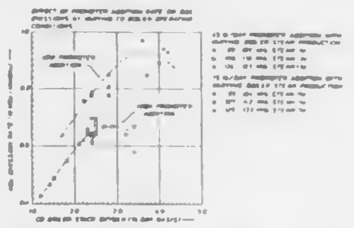
said regenerator is operated to regenerate said catalyst having coke thereon in the presence of an added oxygen-containing gas to produce a quantity of CO greater than 1.0% by volume



and wherein said CO oxidation promoter is present in a quantity at least three times greater than the minimum amount of oxidation promoter sufficient to prevent afterburn combustion in the dilute phase of the regenerator.

5,021,145
CATALYST

Andrew P. Chapple, Clwyd, Wales, assignor to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Division of Ser. No. 328,715, Mar. 27, 1989, Pat. No. 4,948,769, which is a continuation of Ser. No. 153,482, Feb. 2, 1988, abandoned, which is a continuation of Ser. No. 870,545, Apr. 6, 1986, abandoned. This application Jun. 5, 1990, Ser. No. 533,443

Claims priority, application United Kingdom, Jun. 5, 1985, 8514209

Int. Cl.^{5} C10G *11/04*

U.S. Cl. 208—120 1 Claim

1. A method of cracking vanadium containing hydrocarbon feedstocks wherein the feedstock is contacted with a catalyst composition comprising:
(i) a crystalline zeolite,
(ii) a matrix material, and
(iii) a single phase crystalline mixed oxide selected from calcium and barium tin oxides, the strontium tin oxides Sr_2SnO_4 and $Sr_3Sn_2O_7$, strontium titanium oxides and the barium titanium oxides $BaTi_2O_5$, $BaTi_4O_9$, $BaTi_5O_{11}$, Ba_2TiO_4, $Ba_2Ti_5O_{12}$, $Ba_2Ti_9O_{20}$, $Ba_4Ti_{13}O_{30}$, and $Ba_6Ti_{17}O_{40}$, and mixtures thereof.

5,021,146
REDUCING NO_x EMISSIONS WITH GROUP IIIB COMPOUNDS

Arthur A. Chin, Cherry Hill, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Dec. 28, 1989, Ser. No. 458,004

The portion of the term of this patent subsequent to May 1, 2007, has been disclaimed.

Int. Cl.^{5} C10G *11/18*

U.S. Cl. 208—122 20 Claims

1. In a process for the catalytic cracking of a heavy hydrocarbon feed containing nitrogen compounds by contact with a circulating inventory of catalytic cracking catalyst to produce catalytically cracked products and spent catalyst containing coke comprising nitrogen compounds, and wherein said spent catalyst is regenerated by contact with oxygen or an oxygen-containing gas in a catalyst regeneration zone operating at catalyst regeneration conditions to produce hot regenerated catalyst which is recycled to catalytically crack the heavy feed and said catalyst regeneration zone produces a flue gas comprising CO, CO_2 and oxides of nitrogen (NO_x), the improvement comprising reducing the NO_x content of the flue gas by adding to the circulating catalyst inventory an additive comprising discrete particles comprising oxides of Group IIIB elements, exclusive of Group III elements which are ion exchanged or impregnated into said cracking catalyst, said additive being added in an amount sufficient to reduce the production of NO_x relative to operation without said additive.

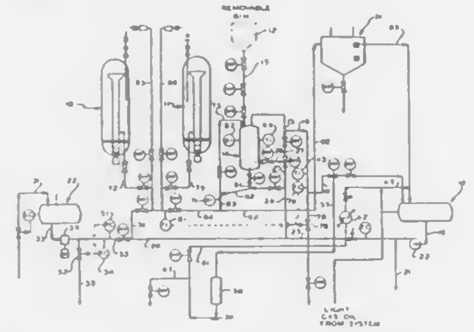
5,021,147
SOLID ADDITION AND WITHDRAWAL

Roger P. Van Driesen, Titusville; William R. Adams, Upper Montclair; Mario Baldasarri, Paramus; John Caspers, Basking Ridge, all of N.J., and Harold Trimble, Grove, Tex., assignors to Abb Lummus Crest, Inc., Bloomfield, N.J.

Division of Ser. No. 153,347, Feb. 8, 1988, Pat. No. 4,875,995, which is a division of Ser. No. 811,491, Dec. 20, 1985, Pat. No. 4,744,887. This application Jun. 7, 1989, Ser. No. 362,853

Int. Cl.^{5} C10G *35/00*

U.S. Cl. 208—152 6 Claims



1. A process for adding solids to a reactor, said reactor contained in a system for adding solids to and withdrawing solids from a reactor, said process comprising:
mixing solids with a pressurized flowing stream of transport liquid to supply a slurry of solids in the transport liquid, introducing the slurry into the reactor; and
maintaining a set flow rate for the pressurized flowing stream of transport liquid during the adding of solids whereby said set flow rate is maintained independently of pressure changes in the system.

5,021,148
METHOD OF REFINING COAL BY SHORT RESIDENCE TIME PARTIAL LIQUEFACTION TO PRODUCE PETROLEUM SUBSTITUTES AND CHEMICAL FEEDSTOCKS

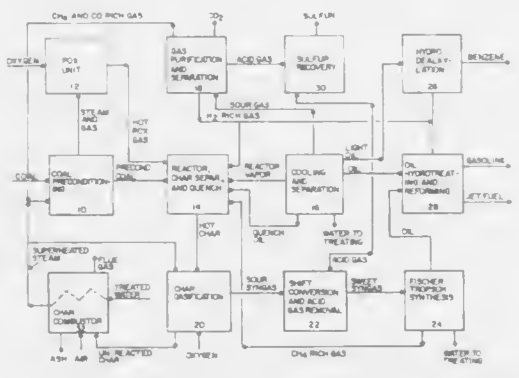
Lee G. Meyer, and Gerald F. Cavaliere, both of Englewood, Colo., assignors to Carbon Fuels Corporation, Englewood, Colo.

Continuation-in-part of Ser. No. 277,603, Nov. 29, 1988, Pat. No. 4,938,782, and a continuation-in-part of Ser. No. 84,270, Aug. 11, 1987, Pat. No. 4,787,915, and a continuation-in-part of Ser. No. 59,288, Jun. 8, 1987, Pat. No. 4,832,831, and a continuation-in-part of Ser. No. 658,880, Oct. 9, 1984, Pat. No. 4,658,936. This application May 23, 1989, Ser. No. 355,528

The portion of the term of this patent subsequent to Nov. 20, 2007, has been disclaimed.

Int. Cl.^{5} C10G *1/00*

U.S. Cl. 208—431 22 Claims



1. An improved method for refining a volatile containing carbonaceous material in a partial liquefaction type process to produce a slate of hydrocarbon-containing products wherein

char is gasified with oxygen and the resulting syngas subjected to a Fischer Tropsch type synthesis to produce liquids and a methane-rich gas comprising the steps of:
(a) heating a particulate volatile containing carbonaceous material at a heat rate sufficient to maximize decomposition and minimize formation of char and condensation products to a volatilization temperature effective to produce a substantially decomposed volatilization product and char; and
(b) contacting said substantially decomposed volatilization product with a hydrogen donor-rich gaseous atmosphere at a hydrogenation temperature effective to minimize formation of condensation products and reduce thermal cracking for a hydrogenation residence time effective to produce a hydrogenated volatilization product wherein said hydrogen donor-rich gaseous atmosphere is produced in substantial part from said carbonaceous material, including the gasification of said char.

5,021,149
PROCESS AND DEVICE FOR PROCESSING GRANULATED MATERIALS

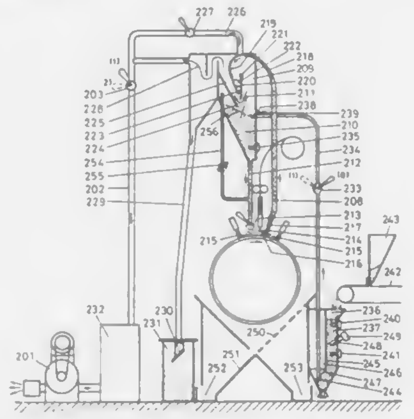
Max Geisseler, Ettenhausen, Switzerland, assignor to Aspa Zürich AG, Zürich, Switzerland

Filed Jun. 30, 1989, Ser. No. 373,523

Claims priority, application Switzerland, Jul. 1, 1988, 2515/88

Int. Cl.^{5} B07B *7/02;* **B23K** *9/18*

U.S. Cl. 209—141 10 Claims



1. A process for purifying granulated materials used in a work station, comprising the steps of:
drawing in a variable amount of ambient air as a conveying air for conveying said granulated material, a variable portion of this conveying air being used to separate non-granular particles flowing with the granulated material from the granulated material;
conveying the granulated material as a flow of material in a pipeline with a first circular cross-section, the end of said pipeline being gradually changed in shape to provide a flow of material with a second cross-section which is wider and thinner and also larger than said first cross-section, and ultimately being changed gradually, on an inclined surface, into a flow of material with a third cross-section wider than said second cross-section and in a thin, greatly retarded layer reaching an accumulation area having a variable storage volume;
trickling the flow of material down from said accumulation area in the form of a curtain through which said variable portion of the conveying air flows transversely to a storage area;
varying the grain size of the non-granular particles to be separated from the granulated material by modifying the thickness of the screen and the amount of variable portion conveying air; and
delivering additional granulated material by increasing the amount of conveying air when the amount of granulated material in said storage area falls below a variable preset minimum.

5,021,150
SIEVE DRUM FOR SIEVING OUT WASTE OR THE LIKE

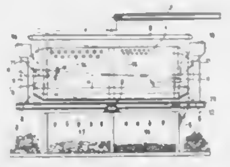
Werner Bürklin, Sonnhaldenstrasse 8, CH-8280, Kreuzling en, Fed. Rep. of Germany

Filed Jan. 17, 1990, Ser. No. 466,212

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1989, 3901351

Int. Cl.^{5} B07B *1/22, 1/46*

U.S. Cl. 209—245 18 Claims



1. A sieve for sieving out waste material comprises an elongated sieve drum pivotably mounted on a base support structure about a pivot point, said elongated sieve drum having an elongated axis A, a length M, a radial plane which passes through the pivot point and a pair of openings at each end of the drum; intake hoppers associated with said openings for communicating waste material there through; and a feed conveyor member associated with said intake hoppers, said feed conveyor member being selectively moved in two conveying directions.

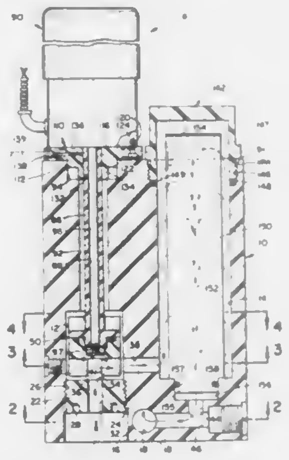
5,021,151
PLASTIC IMPELLER PUMP AND FILTRATION UNIT FOR SEMI-CONDUCTOR ETCHING SYSTEM

Daryl J. Yane, 1182 Lake Martin Dr., Kent, Ohio 44240

Filed May 12, 1989, Ser. No. 351,443

Int. Cl.^{5} B01D *35/31*

U.S. Cl. 210—167 25 Claims



1. A pump and filtration unit comprising:
a pump including an impeller made of a plastic material;
a filter; and,
a one piece plastic housing wherein said housing and said impeller are made of a material which is resistant to high temperature corrosive fluids, that are maintained at a temperature on the order of 100° C., said housing including:
a pump chamber for housing said pump impeller,
a filter chamber for housing said filter, wherein said filter chamber is spaced from said pump chamber by a wall of said housing,
an inlet port in said housing for allowing fluid to flow into said housing to be acted on by said pump impeller and said filter, and
an outlet port in said housing for allowing an exit of fluid from said housing after it has been acted on by said pump impeller and said filter.

VOL
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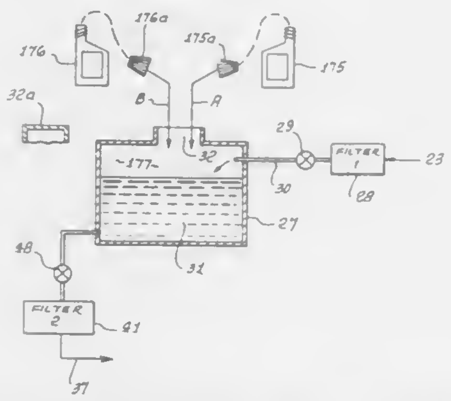
5,021,152
ENGINE COOLANT FLUSH-FILTERING EXTERNALLY OF ENGINE WITH ION PRECIPITATION

Mark S. Filowitz, Fullerton; Marcel Vataru, Los Angeles; James L. Baylor, Fontana; Rainer H. Labus, Burbank, and Laszlo G. Lugosi, Claremont, all of Calif., assignors to Wynn Oil Company, Fullerton, Calif.

Continuation-in-part of Ser. No. 256,328, Oct. 3, 1988, Pat. No. 4,901,786, and a continuation-in-part of Ser. No. 248,172, Sep. 23, 1988, Pat. No. 4,899,807, which is a continuation-in-part of Ser. No. 87,696, Aug. 20, 1987, Pat. No. 4,793,403. This application Feb. 10, 1989, Ser. No. 308,639

Int. Cl.^{5} C02F *1/56;* F28G *13/00*

U.S. Cl. 210—712 29 Claims



1. In the method of treating coolant liquid in an internal combustion engine cooling system, the steps that include:

(a) forcing the coolant liquid from the cooling system to the exterior of that system,

(b) treating the coolant liquid in a zone or zones outside the cooling system, said treating including effecting precipitation of anions and cations, in the coolant liquid to produce contaminant particulate and removing contaminant particulate from the coolant liquid, and

(c) returning the treated coolant liquid to the cooling system.

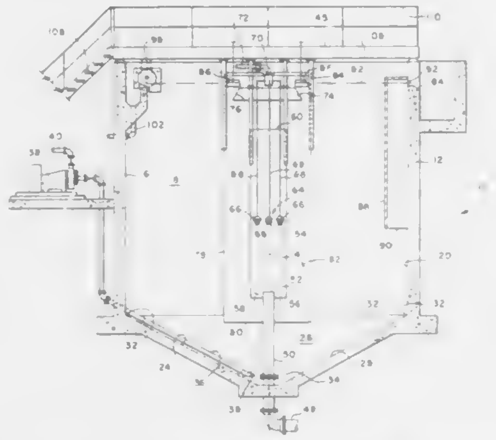
5,021,153
COMBINED APPARATUS FOR REMOVING GRIT AND GREASE FROM SEWAGE

Ray C. Haws, La Porte, Tex., assignor to G-H Systems, Inc., La Porte, Tex.

Filed Nov. 20, 1989, Ser. No. 439,851

Int. Cl.^{5} B01D *21/00*

U.S. Cl. 210—221.2 17 Claims



1. Apparatus for removing grit and grease from sewage, comprising:

a tank having walls;

grit removal means disposed in said tank for transporting grit out of said tank;

a sewage inlet conduit extending into said tank for transporting sewage into said tank, said sewage inlet conduit terminating at an open end within said tank;

a mixing eductor having a lower end disposed to receive sewage from said sewage inlet conduit, and said mixing eductor having an open upper end vertically located above said mixing eductor lower end;

aeration means within said mixing eductor and vertically located between said mixing eductor lower and upper ends for violently agitating and transporting said sewage upwardly within said mixing eductor said aeration means including at least one air diffuser body connected to a compressed air conduit, and said aeration means constructed and arranged to provide agitation sufficiently violent to wash grease from grit in said sewage;

a down draft baffle greater in dimension than said mixing eductor walls and disposed to define a down draft annular space between said down draft baffle and said mixing eductor, and said down draft baffle having an upper portion disposed to receive aerated sewage from said mixing eductor upper end;

said tank having a volume about said down draft baffle sufficient for settling substantially all grit from said sewage and floating substantially all grease from said sewage;

effluent removing means for removing substantially grit and grease free effluent from said tank, said effluent removing means including an opening for receiving substantially grit and grease free effluent, with said opening being located below a normal liquid surface elevation; and

grease removal means for transporting grease at said normal liquid surface elevation out of said tank.

5,021,154
MIXER/AERATOR FOR WASTE WATER

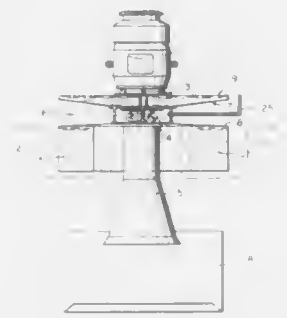
Johny H. Haegeman, 126, Steenweg naar Alsemberg, Buizingen B-1510, Belgium

Filed Oct. 24, 1989, Ser. No. 427,211

Claims priority, application Belgium, Oct. 26, 1988, 8801233

Int. Cl.^{5} B01F *3/04*

U.S. Cl. 210—221.2 8 Claims



1. Apparatus for selectively mixing or aerating waste water by floating on the surface of the water, comprising a reversible motor having a shaft oriented downwards and driving a propeller, a guide tube disposed below said propeller, and at least two flotation elements mounted in spaced relation one above the other and arranged concentrically relative to the axis of the motor to form a water deflecting device between said flotation elements in the region of said propeller, means for operating said flotation elements so as to allow the apparatus to be positioned between two limiting levels relative to the surface of the water, namely a lower level where only the upper one of said flotation elements is situated on the surface of the water and in which the apparatus is suitable for use as a mixer and an upper level where only the lower one of said flotation elements is operational and in which the apparatus is suitable for use as an aerator.

5,021,155
MEMBRANE FILTER PLATE

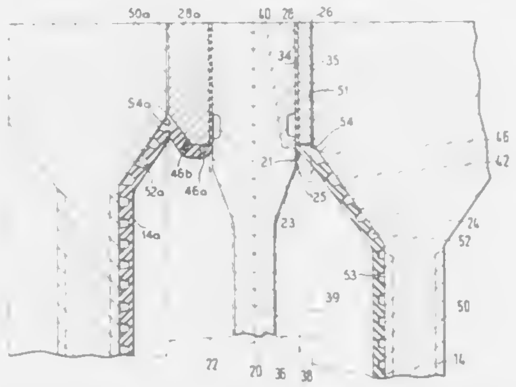
Reimund Stanik, Marktoberdorf-Leuterschach, Fed. Rep. of Germany, assignor to Klinkau Besitzgesellschaft mbH, Fed. Rep. of Germany

Filed Dec. 12, 1989, Ser. No. 448,897

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1988, 3842662

Int. Cl.^{5} B01D *25/168, 25/21*

U.S. Cl. 210—231 2 Claims



1. In a membrane filter plate for a filter press comprising a carrier plate having a center plane, at least one membrane being arranged on one side of the carrier plate and being provided with spacing ribs for placement of a filter cloth, a sealing edge frame surrounding the carrier plate and clamping the membrane against the carrier plate to connect the membrane and the carrier plate to one another essentially in a fluid-tight arrangement, said sealing edge frame having an inner peripheral edge and having circumferential planar surfaces extending parallel to said center plane of the carrier plate and coacting with a peripheral flat surface of the carrier plate that extends parallel to said center plane, said carrier plate having a seating surface facing toward the membrane and extending parallel to the center plane being connected to the peripheral flat surface of the plate by an oblique surface portion extending at an angle of approximately 15° to the center plane so that during the filtration phase and the pressing phase, the membrane has spaced bend lines determined by the surfaces of the carrier plate and the inner peripheral edge of the edge frame, said membrane filter plate including a chamber plate attached to the carrier plate with the improvements comprising the thickness of the edge frame at least at the inner peripheral edge being approximately equal to the height of the spacing ribs of the membrane and the surface of the chamber plate facing toward the membrane having a first flat peripheral portion, a second portion proceeding obliquely therefrom and obliquely away from the carrier plate at an angle of a range of 10°–45° beginning at a line immediately adjacent the inner peripheral edge of the edge frame and then merging in a second flat surface extending parallel to the center plane of the carrier plate over the entire central region of the chamber plate.

5,021,156
DUMP TRUCK FOR RECEIVING DRAINING AND DISPOSING OF DREDGED MATERIAL

Albert H. Sloan, Ft. Lauderdale, Fla., assignor to Subaqueous Services, Inc., Ft. Lauderdale, Fla.

Continuation of Ser. No. 346,951, May 3, 1989, Pat. No. 4,975,205. This application Sep. 13, 1990, Ser. No. 581,875

Int. Cl.^{5} B60P *1/28*

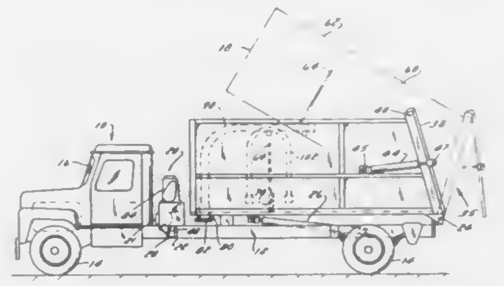
U.S. Cl. 210—241 6 Claims

1. A mobile dump truck for use in dredging and having a dump body tiltable between a horizontal loading position and a rearwardly tilted dumping position, said body having a tailgate mounted at the rear end of said body and swingably mounted thereon for swinging between (1) a closed, sealed position for containing water in said truck when said body is in said horizontal position, and (2) an open dumping position when said body is tilting to said tilted dumping position;

a sealing means for sealing said tailgate with said body when in the closed position;

a hydraulic pump means having an inlet port for connection with a hose means for receiving a dredged mixture of solids and water from a pumping site and delivering said mixture to said truck body;

an imperforate and fixed partition wall mounted transversely in said body and having a top edge, said wall mounted in and dividing said body into first and second compartments, each compartment being open to atmosphere;



said first compartment being adapted to receive and contain said mixture from said pump means and to enable said solids to settle at the bottom of said first compartment under the force of gravity and to enable said water to rise towards the top of said compartment;

said second compartment being adapted to receive and contain said water which rises in said first compartment and flows over said top edge of said partition wall;

drain means selectively operable to effect removal of substantially all water from said second compartment;

and one-way valve means between said first and second compartments and operable when said body is tilted to permit residual water in said second compartment to flow therethrough and into said first compartment to effect removal of solids, remaining after said body is tilted, from said first compartment by washing it out of said tilted body via said open tailgate.

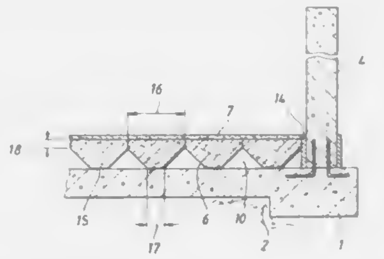
5,021,157
FILTRATION, DRAINAGE, AND DRYING APPARATUS FOR DELIQUIFICATION OF SLUDGES

Kenneth M. Drake, 16734 Manowar La., Friendswood, Tex. 77546; John W. Anderson, 403 Hidden Harbor, Houston, Tex. 77079; Lee D. Carr, 18610 Martinique, Houston, Tex. 77058, and Fred I. Peyton, Box 1791, Kingsland, TX

Continuation-in-part of Ser. No. 347,162, May 3, 1989, abandoned. This application Feb. 12, 1990, Ser. No. 478,614

Int. Cl.^{5} B01D *24/12*

U.S. Cl. 210—248 9 Claims



1. An improved filtration, drainage and drying apparatus for deliquifying sludges comprising

VOL 1127
ISS 1
JE 4
1991
UMI

a rigid, thin, porous, monolithic, continuous top layer of small, hard, uniform particles of material of of narrow size distribution bonded together by a cross-linking monomeric resin resistant to ultraviolet light in such manner such that the interstices between the particles are not filled while liquid drainage is permitted through said top layer,

a rigid, porous, lower layer comprising a side-by-side and end-to-end array of uniformly shaped support blocks of elongated length and narrow cross-section normal to the length, the cross-section of each of said blocks having a wider top dimension than its bottom dimension, said blocks being comprised of hard uniform particles of material of narrow size distribution no smaller than said particles of said top layer and bonded together in the identical manner of said top layer,

said lower layer forming a plurality of open, parallel flumes formed by the dimensions of said blocks in said array,

vertical containment walls located about said top layer comprising four sides, at least one of which serves as a removable gate wall for providing access to said top layer, and

a rigid, planar, impervious base on which said array of top layer, lower layer and vertical containment walls are mounted.

5,021,158

PROCESS AND APPARATUS FOR THE SEPARATION OF MIXTURES OF SUBSTANCES

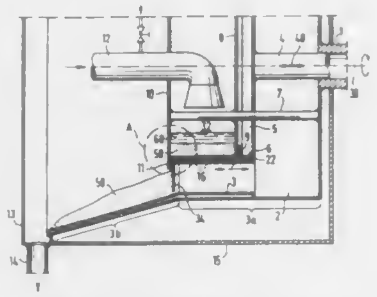
Herbert Schiele, Karlsfeld, Fed. Rep. of Germany, assignor to Krauss-Maffei AG, Fed. Rep. of Germany

Filed Mar. 21, 1985, Ser. No. 714,273

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1984, 3410423

Int. Cl.^{5} B01D *21/26*

U.S. Cl. 210—326 **22 Claims**



1. An apparatus for centrifugal separation of substances comprising:

first means for defining a closed chamber for partially separating a mixture and forming a cake of solid particles wherein said first means includes a cylindrical wall radially defining said closed chamber and two axially spaced walls enclosing said closed chamber;

means for introducing a mixture into said closed chamber;

second means for defining a continuous flow open chamber integrated with and spatially proximate to said closed chamber;

means for transferring substantially all material in said closed chamber to said open chamber.

5,021,159

APPARATUS FOR THICKENING PULP AND PAPER STOCK

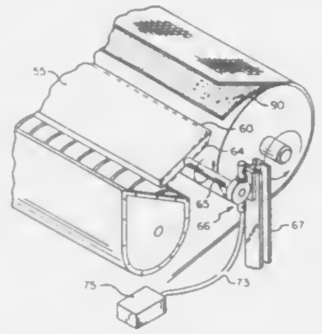
Terry L. Bliss; David E. Chupka; Christopher E. McCarthy, and Larry J. Walters, all of Middletown, Ohio, assignors to The Black Clawson Company, Middletown, Ohio

Filed Aug. 8, 1988, Ser. No. 229,673

Int. Cl.^{5} B01D *33/00*

U.S. Cl. 210—396 **3 Claims**

1. In apparatus for thickening a suspension of pulp material in water, comprising means defining a frame, first and second liquid-impervious rolls rotatably mounted on substantially parallel axes in spaced relation in said frame, an endless foraminous wire trained around said rolls in wrapping relation with a substantial portion of the surfaces thereof headbox means including an outlet for the pulp suspension to be thickened so positioned that said outlet causes the pulp suspension to be delivered into and to be trapped in the space between said first roll and the portion of said wire wrapping said roll, means for driving one of said rolls to cause said wire to travel around said rolls at a speed effecting the development of centrifugal force causing liquid to be expressed through the portion of said wire wrapping each of said rolls and thereby to thicken the pulp carried on the inner surface of said wire, and means for collecting the resulting thickened pulp from the surface of said second roll, characterized in that said last named means comprises:



(a) trough means supported in said frame adjacent but spaced from the portion of said second roll not wrapped by said wire,

(b) a doctor blade having a working edge of the same effective length as said second roll for effecting transfer of said thickened pulp from the surface of said second roll to said trough means,

(c) means supporting said doctor blade with said working edge thereof in close but spaced relation with said roll surface to effect removal of said thickened pulp from said surface without direct contact with said surface,

(d) means including said doctor blade of sufficient width to extend from said roll surface to said trough to deliver said removed pulp to said trough, and

(e) means for periodically moving said working edge of said doctor blade away from and back to said close but spaced relation with said roll surface.

5,021,160

STRONGLY ACIDIC MICROPOROUS MEMBRANES FOR CATION EXCHANGE

Stephen M. Wolpert, Detroit, Mich., assignor to Gelman Sciences, Inc., Ann Arbor, Mich.

Filed Jan. 9, 1990, Ser. No. 462,261

Int. Cl.^{5} B01D *53/22, 71/68*

U.S. Cl. 210—500.35 **26 Claims**

10. A strongly acidic charge modified microporous filter membrane comprising a base membrane having an internal microstructure throughout said base membrane comprising by post-treatment a charge modifying amount of a charge modifying agent bonded by drying and curing from a solvent to substantially all of said base membrane internal microstructure without substantial pore size reduction or pore blockage wherein the charge modifying agent is a crosslinked acid copolymer of a strong acid monomer which is an acrylamide alkane sulfonic acid monomer having the formula:

$$CH_2{=}C(R){-}CO{-}NH{-}R'{-}SO_3{-}X$$

where

R is hydrogen or a lower alkyl or phenyl group;

R' is a methylene group or a lower alkyl, lower cycloalkyl, aromatic, or bivalent hydrocarbon group or other bridging group having its valence bonds on different carbon atoms; and

X is hydrogen or sodium, ammonium, organic amine or other salt forming atom or compound,

with a crosslinkable monomer having hydroxyl crosslinking functionality selected from (1) N-methylolacrylamide alkoxyether compounds and (2) N-methylolacrylamide, hydroxyalkyl acrylates, and hydroxyalkyl methacrylates that are crosslinkable by reaction with aminoplast resins.

5,021,161

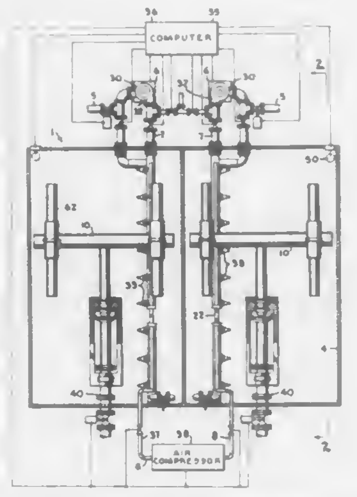
METHOD FOR THE TREATMENT OF WASTEWATER

Glen R. Calltharp, Olathe, Kans., assignor to JMO Holding, Inc., Industrial Airport, Kans.

Filed Feb. 16, 1990, Ser. No. 481,506

Int. Cl.^{5} C02F *3/30*

U.S. Cl. 210—614 **6 Claims**



1. A method for the treatment of wastewater wherein wastewater is introduced into a batch wastewater treatment system at varying flow rates, said method comprising:

(a) introducing the wastewater into a batch reactor until the first to occur of either a preselected period expires or the reactor becomes full; said reactor containing an activated sludge and a buffer volume of clarified effluent prior to addition of the wastewater;

(b) determining the amount of wastewater introduced into the reactor;

(c) mixing the wastewater with the sludge and aerating the wastewater in the reactor; the wastewater being aerated for a selected period of time generally proportional to the amount by volume of wastewater introduced into the reactor;

(d) thereafter allowing the aerated wastewater to settle into a layer of clarified effluent and a layer of sludge; and

(e) decanting a portion of the clarified effluent down to said buffer volume.

5,021,162

METHOD FOR FORMING A GEL BED IN A COLUMN FOR LIQUID CHROMATOGRAPHY AND AN AXIALLY ADJUSTABLE-TYPE COLUMN DEVICE USED FOR THIS METHOD

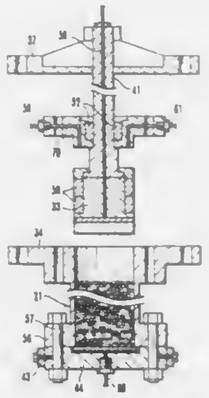
Kiyoaki Sakamoto, Hofu; Kenichi Matsubara, Shinnanyo; Yasuhiro Nakahara, Yamaguchi, and Masaki Nomura, Tokuyama, all of Japan, assignors to Tosoh Corporation, Shinnanyo, Japan

Division of Ser. No. 315,857, Feb. 27, 1989, Pat. No. 4,927,531. This application Jan. 30, 1990, Ser. No. 472,230

Claims priority, application Japan, Feb. 25, 1988, 63-43003

Int. Cl.^{5} B01D *15/08*

U.S. Cl. 210—635 **2 Claims**



1. A method to form a gel bed in a cylindrical column for liquid chromatography, comprising the steps of:

providing a gel bed section between upper and lower liquid-tight partition members positioned apart from each other at upper and lower positions in the column;

continuously percolating liquid downward through said gel bed section to form a gel bed in the gel bed section;

applying a liquid pressure from a constant flow pump onto the upper partition member during said continuous percolating step to move said upper partition member downward in response to a downward movement of the upper surface of the gel bed during said continuous percolating step;

performing a separation operation; and

mechanically locking the position of said upper partition member during said separation operation.

5,021,163

CATALYTIC DESTRUCTION OF SULFUR-OXYGEN ANIONS

Ernest R. Anderson; Dominick Vacco, both of Rochester, and Thomas J. Dagon, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 25, 1990, Ser. No. 559,106

Int. Cl.^{5} C02F *1/42, 1/70*

U.S. Cl. 210—661 **17 Claims**

1. A method for the destruction of a sulfur oxyanion in an aqueous solution containing inert cations, said sulfur oxyanion being selected from the group consisting of $SO_3=$, $S_2O_3=$, $S_2O_6=$, and $S_3O_6=$, said method comprising:

contacting a catalytic quantity of a protonated anion ion exchange resin having silver sulfide imbibed therein with

VOL
1127
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1991
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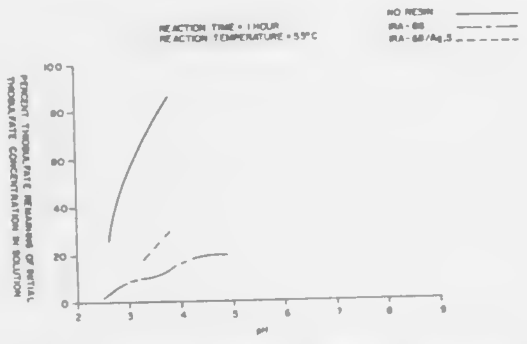
said aqueous solution containing said sulfur oxyanion while maintaining the pH of said solution at a pH below about 8, whereby said sulfur oxyanion is reduced to elemental sulfur.



5,021,164
OXIDIZED ACTIVATED CARBON AND ITS USE IN REMOVAL OF AROMATIC COMPOUNDS FROM AQUEOUS SOLUTIONS

Walter A. Gay, Cheshire, Conn., assignor to Olin Corporation, Cheshire, Conn.

Filed Dec. 27, 1988, Ser. No. 290,330

Int. Cl.^{5} B01D *15/04;* **B01J** *20/02*

U.S. Cl. 210—694 **30 Claims**

1. A process for removing aromatic hydrocarbon compounds, selected from the group consisting of aromatic hydrocarbons and aromatic hydrocarbons having as ring substituents nitro groups, halogen atoms, and alkyl groups having from 1 to about 12 carbon atoms, from an aqueous solution which comprises contacting the aqueous solution containing the aromatic hydrocarbon compounds with an oxidized activated carbon prepared by treating activated carbon with less than about 1,000 milligrams of oxidant per gram of carbon.

3. A process for producing oxidized activated carbon particles which comprises contacting activated carbon with an acidic oxidizing agent at a concentration of less than about 1000 milligrams per gram of carbon.

5,021,165
OIL AND WATER SEPARATING SYSTEM WITH HYDROCYCLONE AND FLOATATION DEVICE

Charles M. Kalnins, The Woodlands, Tex., assignor to Conoco Specialty Products, Houston, Tex.

PCT No. PCT/AU88/00184, § 371 Date Dec. 8, 1989, § 102(e) Date Dec. 8, 1989, PCT Pub. No. WO88/09696, PCT Pub. Date Dec. 15, 1988

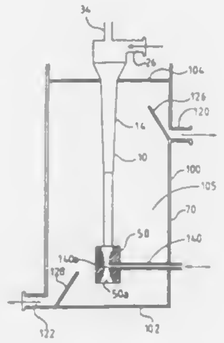
PCT Filed Jun. 10, 1988, Ser. No. 449,830

Claims priority, application Australia, Jun. 10, 1987, PI2388/87; Jun. 10, 1987, PI2389/87; Dec. 24, 1987, PI6104/87

Int. Cl.^{5} B01D *17/035, 17/038*

U.S. Cl. 210—703 **27 Claims**

15. A method for separating oil and water components of a fluid mixture one from the other by use of a hydrocyclone having an inlet means through which the mixture is admitted, an underflow outlet, and an overflow outlet, the hydrocyclone being operated whereby a less dense oil component of the mixture emerges from the underflow outlet of the hydrocyclone in the form of a material comprising oil droplets dispersed in a more dense water component of the mixture, admitting the material emerging from the underflow outlet to a flotation device to effect further separation of the mixture by adherence of gas bubbles to the oil droplets to cause the less dense component to float to the surface of the admitted material and directing material from the overflow outlet in a flowpath which is not in direct communication with the flotation device to which the underflow material is admitted.



5,021,166
METHOD AND AN APPARATUS FOR EXTRACTING A LIQUID FROM A SLUDGE

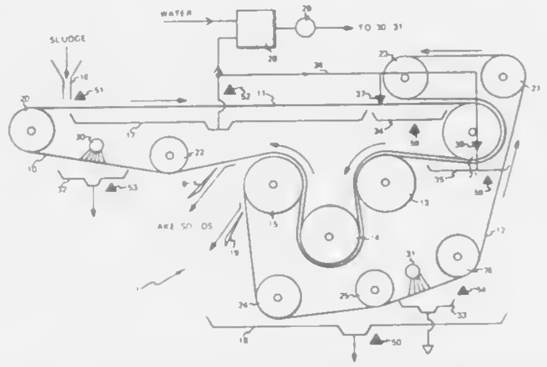
Patrick Torpey, 26 Hyde Road, Dalkey, County Dublin, Ireland

Filed Sep. 28, 1989, Ser. No. 413,719

Claims priority, application United Kingdom, Sep. 30, 1988, 2986/88

Int. Cl.^{5} B01D *21/01, 29/82, 33/04*

U.S. Cl. 210—709 **13 Claims**



1. A method for extracting liquid from a sludge which method comprises the steps of

feeding a conditioning agent to the sludge to form a mixture;

feeding the mixture to a separator means for enabling a significant proportion of the liquid, known as the resulting liquid, to be removed therefrom;

continuously or substantially continuously measuring a characteristic of the resulting liquid so as to produce a first input signal;

continuously or substantially continuously monitoring and analyzing the first input signal in an analyzer means so as to determine a first empirical rate of change of the characteristic;

outputting from the analyzer means a first output signal related to the first input signal which first output signal serves to control the rate of flow of the mixture through the separator means;

creating an overload condition wherein the mixture flows from the separator means into the resulting liquid thereby producing contaminated liquid;

continuously or substantially continuously monitoring the characteristic of the contaminated liquid so as to produce a second input signal;

continuously or substantially continuously monitoring and analyzing the second input signal in the analyzer means so as to determine a second empirical rate of change of the characteristic;

determining a transition point between the first rate of change and the second rate of change; which transition point is the upper limit of said first rate of change; and subsequently maintaining the flow of the mixture so that the value of the characteristic is maintained near but not at said upper limit.

5,021,167
METHOD FOR SEPARATING LIQUID FROM WATER USING AMINE CONTAINING POLYMERS

Michael L. Braden, and Stephan J. Allenson, both of Richmond, Tex., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Jul. 10, 1989, Ser. No. 377,880

The portion of the term of this patent subsequent to Jun. 5, 2007, has been disclaimed.

Int. Cl.^{5} B01D *17/04*

U.S. Cl. 210—708 **11 Claims**

1. A method for clarifying oil-in-water dispersions by liquid/liquid separation comprising dosing the water to be clarified with a copolymer produced by oil-in-water emulsion polymerization of only hydrophobic monomers where at least one hydrophobic monomer is an amine containing monomer present in the polymer at at least 40 mole percent of total monomer which monomer is hydrophobic when the amine is neutral and hydrophilic when the amine is salified at a pH below about 8, adjusting the pH of the water to be clarified, as required, to a pH of 8 or below, and then coalescing the oil dispersion to form a separate oily liquid which is then separated from the water.

5,021,168
PROCESS FOR THE PREPARATION AND RECOVERY OF OXYDIPHTHALIC ANHYDRIDES

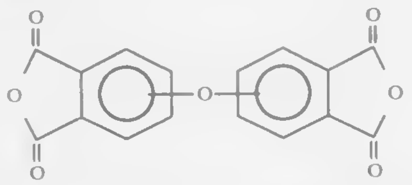
John R. Molinaro, Kenmore; Joseph A. Pawlak, Cheektowaga, and Willis T. Schwartz, Grand Island, all of N.Y., assignors to Occidental Chemical Corporation, Grand Island, N.Y.

Division of Ser. No. 160,036, Feb. 24, 1988, Pat. No. 4,870,194, which is a continuation-in-part of Ser. No. 102,055, Sep. 28, 1987, abandoned. This application Jul. 18, 1989, Ser. No. 381,345

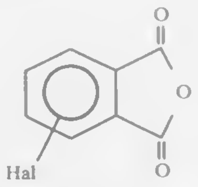
Int. Cl.^{5} C07D *307/89*

U.S. Cl. 549—241 **56 Claims**

1. A process for the preparation of oxydiphthalic anhydride of the formula

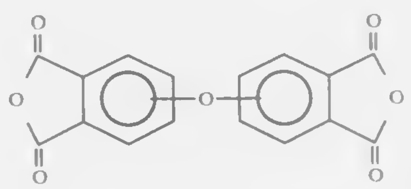


comprising the neat reaction of a halophthalic anhydride of the formula

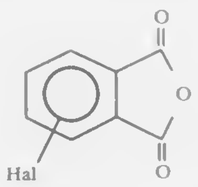


where Hal is F, Cl, Br or I with potassium carbonate in a reaction medium comprising a molar ratio of halophthalic anhydride:potassium carbonate of greater than 2:1.

31. A process for the preparation of oxydiphthalic anhydride of the formula



comprising the reaction of a halophthalic anhydride of the formula



where Hal is F, Cl, Br or I with potassium carbonate in the presence of a catalytic amount of a catalyst for the reaction, and a reaction medium comprising a solvent that is a liquid at a temperature in the range of about 30° C. to the reaction temperature, that is non-deleterious to the reaction, that is a good solvent for the anhydride product of the reaction temperature, but is a poor solvent for the anhydride product at about 30° C. said solvent being selected from the group consisting of 1,2-dichlorobenzene, 1,3-dichlorobenzene and 1,2,4-trichlorobenzene.

5,021,169
ALKENYL SUCCINIC ANHYDRIDES PROCESS

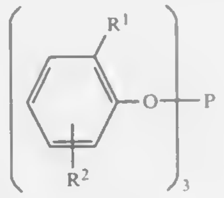
Kju H. Shin, and Paul S. Hale, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Nov. 13, 1989, Ser. No. 435,267

Int. Cl.^{5} C07D *307/60*

U.S. Cl. 549—255 **7 Claims**

1. A process for making an alkenyl succinic anhydride having reduced levels of tar and color bodies, said process comprising reacting maleic anhydride with an aliphatic olefin containing about 4–250 carbon atoms at a temperature of about 190°–250° C. in the presence of a triarylphosphite having the structure:



wherein R^1 is a tert-alkyl group containing 4–12 carbon atoms and R^2 is an alkyl group containing 1–12 carbon atoms.

5,021,170
OIL-BASED WELL BORE FLUIDS AND GELLANTS THEREFOR

Thomas G. Shumate, Spring, and Louis P. Sokol, Sugar Land, both of Tex., assignors to Baroid Technology, Inc., Houston, Tex.

Filed Dec. 18, 1987, Ser. No. 135,140

Int. Cl.^{5} C09K *17/06*

U.S. Cl. 252—8.515 **21 Claims**

1. An oil-based drilling fluid comprising:

a liquid oleaginous phase;

a polar liquid phase, said oleaginous phase being present in an amount of from about 30 to about 98% by volume of

VOL
1127
ISS
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4
1991
UMI

the liquid phase, said polar liquid phase being present in an amount of from about 2 to about 70% by volume of the liquid phase;

an emulsifier; and

a gellant comprising

a sulfonated ethylene/propylene/5-phenyl-2-norbornene terpolymer having a number average molecular weight of about 5,000 to about 300,000; and

an organophilic clay comprising the reaction product of an organic onium compound and a smectite clay, the weight ratio of said organophilic clay to said terpolymer being from about 6:1 to about 20:1, said gellant being present in an amount sufficient to viscosify said oleaginous medium to the desired degree.

16. A method of preparing a composition for gelling liquid hydrocarbon based well bore fluids comprising:

introducing into a mixer a smectite clay, an organic onium compound and a sulfonated ethylene/propylene/5-phenyl-2-norbornene terpolymer having a number average molecular weight of about 5,000 to about 300,000, the weight ratio of said organophilic clay to said terpolymer being from about 6:1 to about 20:1; and

forming an organophilic clay by the reaction of said organic onium compound and said smectite clay while said clay and said terpolymer are being mixed.

5,021,171

ORGANOTITANIUM COMPOSITIONS USEFUL FOR CROSS-LINKING

Kenneth C. Smeltz, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 326,551, Mar. 20, 1989, Pat. No. 4,958,038. This application Aug. 10, 1989, Ser. No. 392,042

Int. Cl.^{5} E21B *43/26*

U.S. Cl. 252—8.551 **16 Claims**

1. In a hydraulic fracturing process wherein an aqueous cross-linked polysaccharide gel is introduced into a subterranean oil- or gas-containing formation at a flow rate and pressure sufficient to create or extend one or more fractures therein, the improvement comprising efecting cross-linking of the gel with a composition prepared by a process which comprises (A) combining (i) a polyol selected from group consisting of glycerol, erythritol, arabitol, xylitol, sorbitol, dulcitol, mannitol, inositol, a monosaccharide, and a disaccharide, (ii) water and (iii) an α-hydroxy carboxylic acid selected from the group consisting of lactic acid, glycolic acid, malic acid, citric acid, tartaric acid, saccharic acid, gluconic acid, glyceric acid or mandelic acid to provide an aqueous solution of the polyol and the α-hydroxy carboxylic acid, and (B) then at an alkaline pH of 10 or less reacting said solution with a tetravalent titanium compound of an inorganic acid at an α-hydroxy carboxylic acid:titanium mol ratio between about 0.5:1 and about 4:1 and a polyol:titanium mol ratio between about 0.25:1 and about 2:1.

5,021,172

PAINT COMPATIBLE PRE-LUBRICANT

Zara M. Kavnatsky, Farmington Hills, and Tsae S. Chen, Detroit, both of Mich., assignors to Diversified Chemical Technologies, Inc., Detroit, Mich.

Filed Dec. 1, 1989, Ser. No. 444,324

Int. Cl.^{5} C10M *141/02*

U.S. Cl. 252—32.7 E **10 Claims**

1. A pre-lubricant composition for use in metal forming operations, which is compatible with aqueous based paint formulations, said pre-lubricant comprising by weight:

0–6% of an oxidized hydrocarbon wax;
10–30% of metyl oleate;
1–5% of sodium petroleum sulfonate;
0–5% of calciumpetroleum sulfonate;
0.1–1% of zinc dialkyldithioiphosphate;
0.05–2% of an antioxidant;
0.5–1.5% of oleic acid; and
the balance napthenic oil.

5,021,173

FRICTION MODIFIED OLEAGINOUS CONCENTRATES OF IMPROVED STABILITY

Malcolm Waddoups, Westfield, N.J., and Jacob Emert, Brooklyn, N.Y., assignors to Exxon Chemical Patents, Inc., Linden, N.J.

Continuation of Ser. No. 160,686, Feb. 26, 1988, abandoned. This application Aug. 30, 1990, Ser. No. 575,048

Int. Cl.^{5} C10M *141/06, 141/12*

U.S. Cl. 252—35 **54 Claims**

1. An oleaginous composition comprising lubricating oils and (A) an oil soluble ashless dispersant which comprises the oil soluble reaction product of a reaction mixture comprising:

(i) a hydrocarbyl substituted C_4 to C_{10} monounsaturated dicarboxylic acid producing material formed by reacting olefin polymer of C_2 to C_{10} monoolefin having a number average molecular weight of from about 300 to 5,000 and a C_4 to C_{10} monounsaturated acid material, said acid producing material having an average of at least about 0.8 dicarboxylic acid producing moieties per molecule of said olefin polymer present in the reaction mixture used to form said acid producing material; and

(ii) a nucleophilic reactant selected from the group consisting of amine, amino alcohol and mixtures thereof;

(B) an oil soluble friction modifier additive which comprises at least one glycol ester derivative of a polycarboxylic acid, and (C) an oil soluble copper antioxidant compound, said oleaginous composition being substantially free of boron.

5,021,174

COMPOUNDS USEFUL AS DETERGENT ADDITIVES FOR LUBRICANTS AND LUBRICATING COMPOSITIONS

Paolo Koch, Melegnano, and Alfonso Di Serio, Rome, both of Italy, assignors to Euron S.p.A., Milan and Agip Petroli S.p.A., Rome, both of, Italy

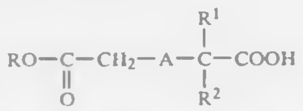
Continuation of Ser. No. 372,134, Jun. 26, 1989, abandoned, which is a continuation of Ser. No. 49,396, May 14, 1987, abandoned. This application Feb. 8, 1990, Ser. No. 478,705

Claims priority, application Italy, May 27, 1986, 20572 A/86

Int. Cl.^{5} C10M *125/10, 129/28*

U.S. Cl. 252—38 **13 Claims**

I. A concentrated additive, having a high content of alkali or alkaline earth metals, consisting of a colloidal dispersion of an alkali-metal or alkaline earth metal carbonate, in admixture with at least one alkali metal or alkaline earth metal salt of a compound having the formula:



$$RO-\underset{\substack{\|\\ O}}{C}-CH_2-A-\overset{\substack{R^1\\ |}}{\underset{\substack{|\\ R^2}}{C}}-COOH$$

wherein R is alkyl, R^1 is ether hydrogen or alkyl, R^2 is alkyl and A is a single bond or alkylene with the proviso that:

a) the sum of carbon atoms contained in R, A, R^1 and R^2 is equal to, or greater than 15; and

b) when A is a single bond, the sum of carbon atoms contained in R^1 and R^2 is less than 15; and an oil.

5,021,175

ADDITIVES TO LUBRICATING OILS HAVING EXTREME PRESSURE, ANTIWEAR AND ANTIOXIDANT EFFECTS, PROCESS FOR PREPARATION THEREOF AND LUBRICATING COMPOSITIONS CONTAINING SAID ADDITIVES

Laurent Germanaud, Irigny, and Robert Nouguier, Plan de Cuques, both of France, assignors to Elf France, Paris, France

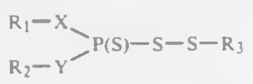
Continuation of Ser. No. 341,574, Apr. 21, 1989, abandoned. This application Oct. 4, 1990, Ser. No. 593,462

Claims priority, application France, Jun. 5, 1988, 88 06091

Int. Cl.^{5} C10M *137/10, 137/14*

U.S. Cl. 252—46.6 **6 Claims**

1. A process for the preparation of dithiophosphorous disymmetric bisulfide of the formula.



(I)

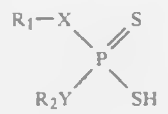
wherein X and Y can be identical or different, and represent an oxygen or sulphur atom or a methylene group, with the provisos that:

(a) if X and Y represent an oxygen or sulphur atom, R_1, R_2 and R_3 can be identical or different and represent a hydrocarbon acyclic or cyclic, saturated, unsaturated or aromatic radical or a chain of the general formula:

$R_4-Z_1+R_5-Z_2+nR_5-$

wherein Z_1 and Z_2, can be identical or different, and correspond to an oxygen or sulphur atom, R_4 corresponds to an alkyl group, R_5 corresponds to an alkylene group and is an between 0 and 8, and

(b) if X and Y represent a methylene group, R_1 and R_2, can be identical or different, and represent a hydrogen atom or a hydrocarbon radical and R_3 represents a hydrocarbon radical, said process comprising condensing a compound of the general formula:



(II)

with an S-alkylthiosulphate of the general formula

R_3-S-SO_3M (III)

in a two phase medium containing water and an organic solvent in the presence of a phase transfer agent, wherein R_1, R_2, R_3, X and Y are as indicated and M represents an alkaline or alkaline earth metal or an ammonium ion.

5,021,176

FRICTION MODIFIER

John V. Bullen, Feltham, and David K. Walters, Camberley, both of England, assignors to Ethyl Petroleum Additives, Limited, Bracknell, England

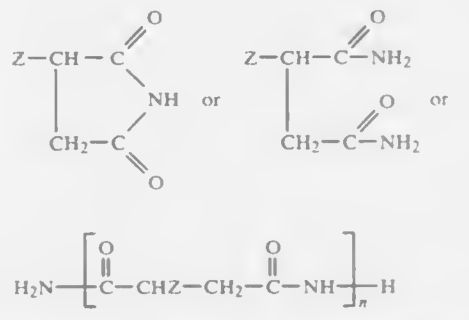
Filed Mar. 5, 1990, Ser. No. 487,779

Claims priority, application United Kingdom, Mar. 20, 1989, 8906345

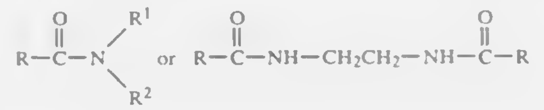
Int. Cl.^{5} C10M *133/16*

U.S. Cl. 252—51.5 A **9 Claims**

1. An oil-soluble friction reducing additive composition which comprises at least one succinimide derivative having the structure



wherein n is an integer from 2 to 4 and wherein Z has the structure R_1R_2CH- wherein R_1 and R_2 are each independently straight or branched chain hydrocarbon groups containing from 1 to 34 carbon atoms and the total number of carbon atoms in the groups R_1 and R_2 is from 11 to 35, and at least one oil-soluble acid amide of the general formula



in which each R, which may be the same or different, is hydrogen or alkyl or alkenyl of 1 to 35 carbon atoms, R^1 and R^2 are each hydrogen or alkyl or alkenyl of 1 to 23 carbon atoms or one of R^1 and R^2 is hydrogen and the other is a group RCO— in which R is as defined above.

5,021,177

DISPERSANT-ANTIOXIDANT MULTIFUNCTIONAL VISCOSITY INDEX IMPROVER

Maria M. Kapuscinski, Carmel, N.Y.; Thomas F. Derosa, Passaic, N.J.; Robert T. Biggs, Walden, and Theodore E. Nalesnik, Wappinger Falls, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Apr. 23, 1990, Ser. No. 513,374

Int. Cl.^{5} C10M *149/04*

U.S. Cl. 252—51.5 R **16 Claims**

1. A method of preparing a substantially linear polymer composition containing a carbon-carbon backbone which comprises: forming a reaction mixture at a temperature of 100–180° C. for 0.1–10 hours containing a substantially liner, carbon-carbon backbone polymer which is a copolymer of ethylene-propylene or a terpolymer of ethylene-propylene-diene; graft polymerizing or a terpolymer of ethylene-propylene-diene; graft polymerizing onto said substantially linear carbon-carbon backbone polymer, under graft polymerization reaction conditions in the presence of free radical initiator, a graft monomer containing an ethylenically unsaturated carbon-carbon double bond which is allyl isocyanate, buten-2-yl isocyanate, buten-3-yl oisocyanate, p-isocyanate styrene, or 2,6-diisocyanato tyrene, or m-isoprenyl-a-, a-dimethyl benzylisocyanate; and an isocyanate group thereby forming a graft polymer bearing a pendant isocyanate group; amidizing said graft polymer bearing a pendant isocyanate group with an aromatic hindered amine containing a non-tertiary amino nitrogen atom thereby converting said isocyanate group to a urea group pendant on said polymer composition and forming a graft polymer containing a pendant urea group; and recovering said graft polymer containing said urea group with an hindered aromatic amine.

VOL
1127
ISS
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5,021,178
ACYLATION OF LOWER OLEFIN OLIGOMERS

Catherine S. H. Chen, Berkley Heights, and Paul G. Rodewald, Rocky Hill, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Feb. 7, 1990, Ser. No. 476,080

Int. Cl.⁵ C10M *105/20, 129/24*

U.S. Cl. 252—52 R **7 Claims**

1. A process for the production of liquid lubricant or lubricant additive comprising;

contacting an oligomeric olefin and a carboxylic acid anhydride under acylating conditions in contact with acidic acylation catalyst, said olefin comprising the oligomerization product of lower olefin oligomerized in contact with medium pore, shape selective metallosilicate catalyst under oligomerization conditions;

separating the acylation reaction product and recovering said liquid lubricant or additive containing alpha, beta unsaturated ketone.

5,021,179
LUBRICATION FOR REFRIGERANT HEAT TRANSFER FLUIDS

Eugene R. Zehler, West Chester, and Nicholas E. Schnur, Cincinnati, both of Ohio, assignors to Henkel Corporation, Ambler, Pa.

Filed Jul. 12, 1990, Ser. No. 551,979

Int. Cl.⁵ C10M *129/78*

U.S. Cl. 252—54.6 **20 Claims**

1. A refrigerant working fluid comprising:

(A) a fluoro-group-containing heat transfer fluid; and

(B) a lubricant composition consisting essentially of materials selected from the group consisting of esters of (i) alcohols containing at least two —OH groups and (ii) organic carboxylic acids, wherein:

(a) at least about 22 number percent of the acyl groups in the total of all the esters in said lubricant composition include no more than six carbon atoms, or include at least one carbon atom bonded to at least three other carbon atoms by single bonds, or both;

(b) the ratio of the number percent of acyl groups in the total of all the esters in said lubricant composition that are that contain 8 or more carbon atoms and are unbranched to the number percent of acyl groups in the total of all the esters in said lubricant composition that are both branched and contain not more than 6 carbon atoms is not greater than about 1.56;

(c) the number percent of acyl groups in the total of all the esters in said lubricant composition that contain nine or more carbon atoms is not greater than about 81; and

(d) at least 62 number percent of the total of all the alcohol moieties in the esters in said lubricant composition contain at least one carbon atom that is bonded by carbon-carbon single bonds to four other carbon atoms.

5,021,180
POLYGLYCOL LUBRICANTS FOR REFRIGERATION COMPRESSORS

Philip W. McGraw, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 298,534, Jan. 18, 1989, abandoned. This application Nov. 7, 1989, Ser. No. 432,958

Int. Cl.⁵ C09K *5/04;* **C10M** *129/08*

U.S. Cl. 252—68 **15 Claims**

1. Fluid compositions for use in compression refrigeration which have an upper solution critical temperature equal to or greater than 65° C. comprising

(A) a refrigerant selected from the group consisting of hydrofluorocarbons and hydrochlorofluorocarbons, and

(B) a liquid lubricant base selected from the group consisting of polyether polyols which (1) have a viscosity of greater than 80 centistokes at 38° C. and (2) are represented by the formula

$$Z—((CH_2—CH(R_1)—O—)_n—(CH_2—CH(CH_3)—O—)_m—H)_p$$

where

Z is the residue of an active hydrogen compound selected from the group consisting of glycerine, pentaerythritol, sorbitol, ethylene diamine, diethylene triamine, hydrazine, ethanolamine, diethanolamine, triethanolamine, isopropanolamine, diisopropanolamine and triisopropanolamine,

R_1 is hydrogen, ethyl, or mixtures thereof, n is 0 or a positive number,

m is a positive number,

n+m is a number having a value which will give a polyether polyol with a number average molecular weight range from about 400 to about 2000, and

p is an integer having a value equal to the number of active hydrogens of Z.

5,021,181
WATER-GLYCOL HYDRAULIC FLUID

Hideo Kanamori, Ichihara, Japan, assignor to Idemitsu Kosan Co., Ltd., Tokyo, Japan

Filed Oct. 12, 1989, Ser. No. 420,538

Claims priority, application Japan, Oct. 31, 1988, 63-273132

Int. Cl.⁵ C10M *173/02, 145/12*

U.S. Cl. 252—75 **6 Claims**

1. In a water-glycol hydraulic fluid containing water and glycol, the improvement which comprises a higher aliphatic acid having a carbon number of 10 to 22 in a ratio of 2 to 15% by weight based on the total weight of the hydraulic fluid, alkali hydroxide in an amount less than an equivalent amount of said higher aliphatic acid, and an organic alkaline compound containing nitrogen atoms selected from the group consisting of morpholine, cyclohexylamine, dicyclohexylamine, dimethyle thanolamine and diethylethanolaminein an amount sufficient to adjust to the pH of the whole fluid to 10 to 12; the mixing ratio of the alkali hydroxide to the higher aliphatic acid being 0.95 to 0.995 (mol ratio).

5,021,182
BACTERIOCIDAL WASHING AGENTS CONTAINING A PER-COMPOUND AND A TAED:PAG MIXTURE

Gunter Jentsch, Rodgau, Fed. Rep. of Germany, assignor to Roman A. Epp and Wolfgang Luderschmidt, both of, Fed. Rep. of Germany

Filed Jan. 7, 1988, Ser. No. 141,700

Claims priority, application Fed. Rep. of Germany, May 10, 1986, 3615788

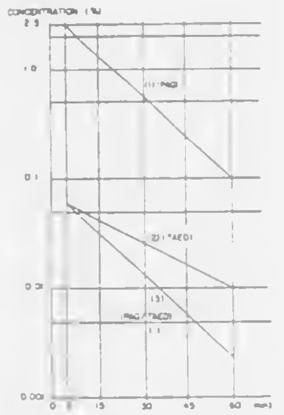
Continuation of PCT/DE87/00215, May 9, 1987, abandoned.

Int. Cl.⁵ A61L *2/18;* **C11D** *3/39, 3/395, 3/48*

U.S. Cl. 252—102 **9 Claims**

1. Washing agent comprising surfactants and builders of from 10 to 70% by weight, per-compounds of from 5 to 40% by weight and N,N,N',N'-tetracetylethylene diamine (TAED) as acetyl donor and pentaacetyl glucose (PAG) further donor, wherein the TAED:PAG ratio is 0.75 to 1.25:1.25 to 0.75, total acetyl donors being 2–20% by weight, said weight ratio based on total washing agent, the total weights of said components being 100%.

9. A process for the disinfection of bacterially contaminated clothing by washing the same at a temperature at least 40° C. for at least 15 minutes in a washing material comprising surfactants and builders of from 10 to 70% by weight, per-compounds of from 5 to 40% by weight and N,N,N',N'-tetraacetylethylene diamine (TAED) and pentaacetyl glucose (PAG), wherein the TAED:PAG ratio is between 0.75 to 1.25:1.25 to 0.75, the total amount of TAED and PAG comprises between 2 and 20% by weight of the washing agent and the wash solution comprises at least 0.5% by weight of the washing agent.



5,021,183
SOAP COMPOSITION

Abel Saud, 6060 Center Hill Rd., Cincinnati, Ohio 45224

Continuation of Ser. No. 104,474, Oct. 8, 1987, abandoned, which is a continuation-in-part of Ser. No. 923,379, Oct. 27, 1986, Pat. No. 4,704,224. This application Sep. 7, 1988, Ser. No. 241,683

The portion of the term of this patent subsequent to Nov. 3, 2004, has been disclaimed.

Int. Cl.⁵ C11D *1/50*

U.S. Cl. 252—108 **10 Claims**

1. A toilet bar comprising from about 65% to about 90% by weight alkali metal soap (anhydrous basis) and from about 0.5% to about 8% by weight nonionic guar gum, said nonionic guar gum being provided in a pre-reacted nonionic guar gum complex wherein said complex is prepared by suspending 1 part by weight guar gum in from about 1 to about 12 parts by weight molten fatty acid and reacting therewith from about 0.03 to about 0.2 part by weight alkali metal hydroxide per each part by weight said fatty acid.

5,021,184
ADAMANTANE DERIVATIVES, COMPOSITIONS OF MATTER CONTAINING SAME, PROCESSES FOR PREPARING SAID ADAMANTANE DERIVATIVES AND SAID COMPOSITIONS, AND ORGANOLEPTIC AND DEODORANCY USES OF SAID ADAMANTANE DERIVATIVES AND SAID COMPOSITIONS

William Gillaspey, Germantown, Tenn.; Myrna L. Hagedorn, Edison, N.J.; Marie R. Hanna, Keyport, N.J.; Kathleen E. Boardwick, Keyport, N.J.; Charles E. J. Beck, Summit, N.J.; Futoshi Fujioka, Oakhurst, N.J.; Anthony G. Branco, Matawan, N.J.; Anubhav Narula, Hazlet, N.J., and Richard M. Boden, Ocean, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 261,275, Oct. 21, 1988, Pat. No. 4,956,481. This application Sep. 29, 1989, Ser. No. 414,526

The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.

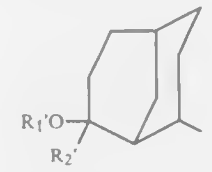
Int. Cl.⁵ C11D *3/50;* **A61K** *7/46;* **C07C** *35/22*

U.S. Cl. 252—174.11 **11 Claims**

1. A deodorant detergent product comprising:

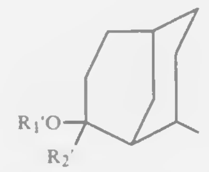
(i) from 0.5 to 99.99% by weight of a non-soap detergent active compound; and

(ii) from 0.01% to 10% by weight of a deodorant composition comprising from 45 to 100% by weight of at least one adamantane derivative defined according to the structure:



wherein R_1' is hydrogen or acetyl; R_2' is hydrogen or lower alkyl; and the dashed line represents a carbon-carbon single bond or a carbon-carbon double bond.

5. A process for augmenting or enhancing the aroma or taste of a consumable material selected from the group consisting of perfume compositions, perfumed articles, colognes, smoking tobacco compositions, smoking tobacco articles, deodorizing articles, deodorizing compositions and malodor maskants comprising the step of adding to said consumable material an aroma or taste augmenting or enhancing quantity of at least one adamantane derivative defined according to the generic structure:



wherein R_1' is hydrogen or acetyl; R_2' is hydrogen or lower alkyl and the dashed line is a carbon-carbon single bond or a carbon-carbon double bond.

5,021,185
CLEANSING-AGENT COMPOSITION AND ITS USE

Kimmo K. Mustakallio, Helsinki, Finland, assignor to Orion-Yhtma Oy, Finland

Filed Jul. 11, 1989, Ser. No. 378,370

Claims priority, application Finland, Jul. 12, 1988, 883310

Int. Cl.⁵ C11D *1/12, 7/08*

U.S. Cl. 252—142 **31 Claims**

1. A cleansing-agent composition, comprising the following constituents by weight:

(a) boric acid, 1–3%;

(b) anionic detergent, 0.5–20%;

(c) fatty alcohol, 5–30%; and

(d) fatty vehicle comprising at least ethoxylated glycerides of saturated fatty acids, 30–75%,

said composition having the ability to form a borate chelate with a dihydrodiol which contains cyclic hydrocarbon.

5,021,186
CHLOROISOCYANURIC ACID COMPOSITION HAVING STORAGE STABILITY

Masanori Ota; Masafumi Aoki; Masashi Nakamura; Kenichi Mizusawa, and Kumi Kasahara, all of Funabashi, Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Filed Mar. 21, 1989, Ser. No. 326,741

Claims priority, application Japan, Mar. 25, 1988, 63-70990; Mar. 25, 1988, 63-70991

Int. Cl.⁵ C09K *15/00;* **C01B** *7/00*

U.S. Cl. 252—186.35 **4 Claims**

1. A chloroisocyanuric acid composition having stability during storage comprising trichloroisocyanuric acid and/or dichloroisocyanuric acid characterized by formulating, as a main component, 1 to 200 parts by weight of at least one aluminum sulfate salt selected from hydrated aluminum sulfate ($Al_2(SO_4)_3 \cdot XH_2O$, X=6 to 18), hydrated potassium alum (KAl

VOL 1127
ISS 1
JE 4
1991
UMI

$(SO_4)_2 \cdot XH_2O$, X=6 to 12) and hydrated sodium alum (NaAl $(SO_4)_2 \cdot XH_2O$, X=6 to 12) in 100 parts by weight of said trichloroisocyanuric acid and/or dichloroisocyanuric acid.

5,021,187

COPPER DIAMINE COMPLEXES AND THEIR USE AS BLEACH ACTIVATING CATALYSTS

Sharon M. Harriott, Rutherford, N.J.; Van Au, Peekskill, N.Y., and Wayne M. Rees, Cincinnati, Ohio, assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Filed Apr. 4, 1989, Ser. No. 333,527
Int. Cl.^{5} C09K *3/00;* **C07F** *1/08*

U.S. Cl. 252—186.38 **17 Claims**

1. A bleaching composition comprising:
(i) from about 1 to 60% of a peroxygen compound capable of yielding hydrogen peroxide in an aqueous solution; and
(ii) from about 0.01 to about 3% of a bleach activator having the stoichiometric formula:

$$[Cu(R_1R_2NCHR_5(CH_2)_nR_6CHNR_3R_4)X_m] \qquad (1)$$

wherein R_1, R_2, R_3, R_4, R_5 and R_6 are each a radical selected from the group consisting of hydrogen, alkyl, aryl, alkylaryl, arylalkyl, phenyl, benzyl and mixtures thereof,
or R_5 and R_6 together form a hydrogen carbon ring,
n is an integer from 0 to 1,
m is an integer from 1 to 2, and
X is selected from mono- and polyvalent anions.

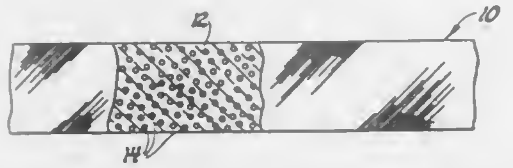
5,021,188

POLYMER DISPERSED LIQUID CRYSTAL FILMS FORMED BY ELECTRON BEAM CURING

Nuno A. Vaz, West Bloomfield, and George W. Smith, Birmingham, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 411,178, Sep. 22, 1989, Pat. No. 4,971,719. This application Dec. 28, 1989, Ser. No. 458,466
Int. Cl.^{5} C09K *19/54*

U.S. Cl. 252—299.5 **2 Claims**



1. A method for making a film containing microdroplets of a birefringent nematic and/or birefringent chiral nematic liquid crystal material dispersed in a polymer film comprising:
mixing a liquid crystal material with the electron-beam curable liquid precursor mixture, said electron-beam curable liquid precursor mixture comprising a mercaptan activated allyl compound; and thereafter
curing the mixture in the form of a film with an electron beam to thereby form a cured polymer matrix having therein droplets of liquid crystal material displaying positive dielectric anisotropy and/or positive diamagnetic anisotropy.

5,021,189

LIQUID CRYSTAL COMPOSITION

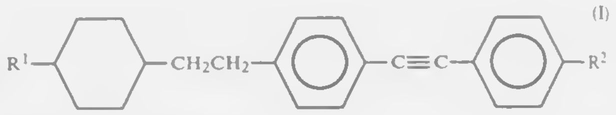
Shinichi Sawada, Ichihara; Tetsuya Matsushita, Chiba; Toyoshiro Isoyama, and Hideo Saito, both of Ichihara, all of Japan, assignors to Chisso Corporation, Japan

Continuation of Ser. No. 269,161, Nov. 9, 1988, abandoned. This application Apr. 5, 1990, Ser. No. 507,083
Claims priority, application Japan, Nov. 11, 1987, 62-283115
Int. Cl.^{5} C09K *19/34*

U.S. Cl. 252—299.61 **8 Claims**

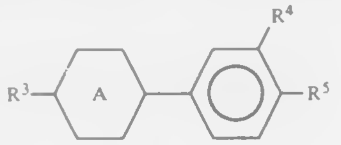
1. A super-twisted birefringence effect mode liquid crystal display device comprising a first component including at least one compound represented by the general formula (I):

(I)

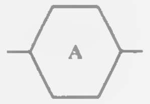


wherein R^1 and R^2 each represent an alkyl group having 1 to 8 carbon atoms, and a second compartment including at least one compound represented by the general formula (II):

(II)



wherein R^3 represents an alkyl group having 1 to 8 carbon atoms, or an alkenyl group having 2 to 8 carbon atoms. R^4 represents H or F, R^5 represents a CN-group or F, and



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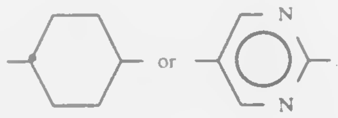


5,021,190

FERROELECTRIC LIQUID CRYSTAL COMPOSITION

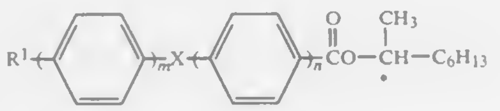
Makoto Kikuchi; Kanetsugu Terashima; Mitsuyoshi Ichihashi; Fusayuki Takeshita, all of Chiba, and Kenji Furukawa, Kanagawa, all of Japan, assignors to Chisso Corporation, Japan

PCT No. PCT/JP89/00001, § 371 Date Aug. 25, 1989, § 102(e) Date Aug. 25, 1989, PCT Pub. No. WO89/06266, PCT Pub. Date Jul. 13, 1989
PCT Filed Jan. 5, 1989, Ser. No. 408,500
Claims priority, application Japan, Jan. 5, 1988, 63-541
Int. Cl.^{5} C09K *19/34*

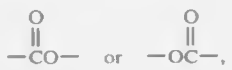
U.S. Cl. 252—299.61 **7 Claims**

1. A ferroelectric liquid crystal composition, characterized by comprising two components A and B and having a ratio of component A to component B of 1.5 or less,
said component A being at least one compound selected from a compound represented by the following formula:

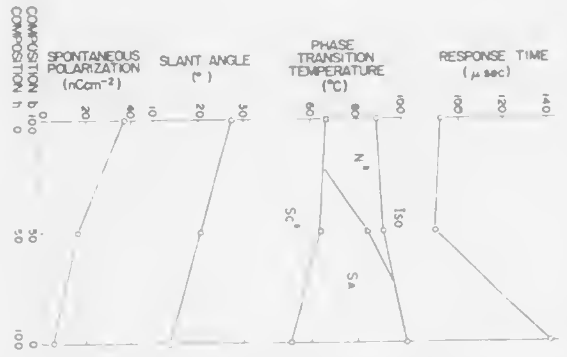
(I)



wherein R1 is an alkyl or alkoxy group of 1 to 18 carbon atoms, X is —CH2O—, —OCH2,

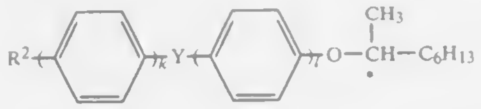


$$-\overset{\displaystyle O}{\overset{\|}{C}}O- \quad \text{or} \quad -O\overset{\displaystyle O}{\overset{\|}{C}}-,$$

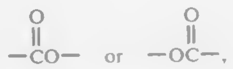


and are each an integer of 1 or 2 and * is an asymmetric carbon atom; and a compound represented by the following formula:

(II)



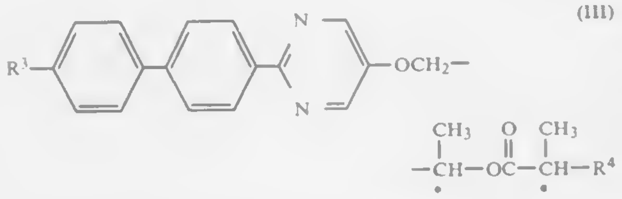
wherein R2 is an alkyl or alkoxy group of 1 to 18 carbon atoms, Y is —CH2O—, —OCH2—,



$$-\overset{\displaystyle O}{\overset{\|}{C}}O- \quad \text{or} \quad -O\overset{\displaystyle O}{\overset{\|}{C}}-,$$

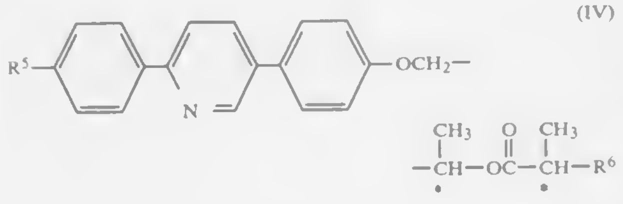
k and l are each an integer of 1 or 2 and * is an asymmetric carbon atom and
said component B being at least one compound selected from a compound represented by the following formula:

(III)



wherein R3 is an alkyl or alkoxy group of 1 to 18 carbon atoms, R4 is an alkyl group of 2 to 18 carbon atoms or an alkoxy group of 1 to 18 carbon atoms and * is an asymmetric carbon atom; and a compound represented by the following formula:

(IV)



wherein R5 is an alkyl or alkoxy group of 1 to 18 carbon atoms, R6 is an alkyl group of 2 to 18 carbon atoms or an alkoxy group of 1 to 18 carbon atoms and * is an asynmetric carbon atom.

5,021,191

OPTICALLY ACTIVE-2-ALKOXY-PROPYL ETHER AND LIQUID CRYSTAL COMPOSITION

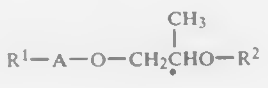
Shinichi Saito; Makoto Ushioda; Hiromichi Inoue; Kazutoshi Miyazawa, and Kouji Ohno, all of Kanagawa, Japan, assignors to Chisso Corporation, Ohsaka, Japan

Filed Feb. 4, 1988, Ser. No. 152,420
Claims priority, application Japan, Feb. 5, 1987, 62-25235
Int. Cl.^{5} C09K *19/34;* **C07D** *241/10, 239/24*

U.S. Cl. 252—299.61 **4 Claims**

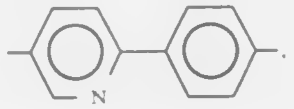
1. An optically active-2-alkoxy-propyl ether expressed by the formula (I)

(I)



$$R^1-A-O-CH_2\underset{*}{\overset{\overset{\displaystyle CH_3}{|}}{C}}HO-R^2$$

wherein R^1 represents a straight chain alkyl group, of 6 to 12 carbon atoms; R^2 represents a linear chain alkyl group of 2 to 8 carbon atoms; —A— represents



and * indicates an asymmetric carbon atom.

5,021,192

COLLOIDAL DISPERSIONS OF CERIUM (IV) COMPOUND

Claire David, and Claude Magnier, both of Paris, France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Mar. 26, 1987, Ser. No. 30,133
Claims priority, application France, Mar. 26, 1986, 86 04348
Int. Cl.^{5} B01J *13/00*

U.S. Cl. 252—313.1 **19 Claims**

1. An aqueous acid colloidal dispersion of cerium (IV) hydroxynitrate comprising from about 400 g/l to about 700 g/l of cerium values, expressed as CeO_2, wherein said aqueous acid colloidal dispersion comprises a pH between 0.5 and 2.

18. A process for the preparation of cerium (IV) hydroxynitrate comprising precipitating said cerium (IV) hydroxynitrate having a mole ratio of NO_3/CeO_2 of from 0.25 to 0.35 by reacting an aqueous solution of a cerium (IV) salt with a quantity of base sufficient to maintain said solution at a pH between 4.0 and 9.0.

5,021,193

NONAQUEOUS POLYPYRROLE COLLOIDS

Steven P. Armes, Los Alamos, and Mahmoud Aldissi, Santa Fe, both of N. Mex., assignors to United States Department of Energy, Washington, D.C.

Filed Jun. 30, 1989, Ser. No. 373,533
Int. Cl.^{5} H01B *1/06*

U.S. Cl. 252—500 **10 Claims**

1. A processable, electrically conductive polymer composition comprising:
an oxidized, polymerized aromatic heterocyclic monomer selected from the group consisting of pyrrole, N-substituted pyrrole, and beta-substituted pyrrole;
a stabilizing effective amount cf a polymer consisting essentially of poly(vinyl acetate), said amount effective to prevent precipitation of the conductive polymer composition during preparation by oxidative polymerization in a nonaqueous medium; and,
dopant anions.

VOL
1127
ISS
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1991
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5,021,194
THICK FILM RESISTOR MATERIAL AND THERMAL HEAD OBTAINED THEREFROM

Michihiro Watanabe, Tsuchiura; Kazutaka Sato, Kashiwa; Munetoshi Zen, Kashiwa; Kazuhiko Ato, Mito; Yoshinobu Watanabe, Hiratsuka, and Sadayoshi Taguchi, Hadano, all of Japan, assignors to Hitachi, Ltd., Tokyo and Tanaka Matthey Co., Ltd., Tokyo-to, both of, Japan

Continuation of Ser. No. 119,918, Nov. 13, 1987, abandoned. This application Oct. 23, 1989, Ser. No. 425,442

Claims priority, application Japan, Nov. 14, 1986, 61-269687

Int. Cl.^{5} H01B *1/06;* **C03C** *8/14*

U.S. Cl. 252—518 **33 Claims**

1. A material for thick film resistor for thermal head consisting essentially of fine particles of ruthenium oxide; fine particles of glass which, during a calcining process of the material in forming a thick film resistor, become molten such that the material, after said calcining process, forms a network of ruthenium oxide in glass; and a dispersant which disperses these fine particles and disappears by calcining, said fine particles of glass having a particle size of at most 1 μm, said fine particles of ruthenium oxide having a specific surface area of 10 to 40 m^2/g and a particle size of 1 μm as the upper limit value of particle size distribution, such that a uniform mutual distance between fine particles of ruthenium oxide and a uniform distribution of fine particles of ruthenium oxide among the glass particles is achieved, as compared to the uniformity in mutual distance between particles and in particle distribution when the fine particles of ruthenium oxide are outside the specific surface area range of 10 to 40 m^2/g and the upper limit value of particle size distribution of 1 μm, whereby scattering of resistance values of the thick film resistor can be suppressed.

5,021,195
STRUCTURED AQUEOUS DETERGENT COMPOSITIONS CONTAINING SALTING-OUT ELECTROLYTES AND SURFACTANTS AND METHODS OF FORMING THEM

David Machin; Appaya Naik, both of Oxton, Great Britain; Cornelis Buytenhek, and Johannes C. van de Pas, both of Vlaardingen, Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Feb. 8, 1989, Ser. No. 308,343

Claims priority, application United Kingdom, Feb. 10, 1988, 8803037

Int. Cl.^{5} C11D *1/00*

U.S. Cl. 252—545 **13 Claims**

1. A structured aqueous detergent composition containing detergent-active material in the form of at least one detergent-active component and at least one electrolyte and having the following phases:

- (a) an isotropic aqueous solution forming a continuous phase;
- (b) distributed and suspended in said solution (a) discrete units of one or more non-network-forming phases, each selected from the following:
  - (i) solid particles containing detergent-active material,
  - (ii) lyotropic liquid crystals containing detergent-active material; and
  - (iii) non-encapsulated liquid droplets containing detergent-active material,
- (c) one or more suspending phases which cause the composition to be structured so as to suspend the non-network-forming phase (b);
  - said non-network-forming phase (b) having a higher concentration by weight of detergent-active material than said aqueous solution (a);
  - said composition having a viscosity of less than 2.5 Pas and a shear rate of $21S^{-1}$ and, if phase (b)(i) or (b)(ii) is present, the composition giving substantially no clear layer formation upon centrifuging at 800 G at 25° C. for 17 hours.

5,021,196
METHOD FOR PREPARING VARIABLE-LIGHT TRANSMITTANCE ARTICLE

John C. Crano; Patricia L. Kwiatkowski, both of Akron, Ohio, and Rodney J. Hurditch, Providence, R.I., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 147,430, Jan. 25, 1988, Pat. No. 4,968,454. This application Jul. 16, 1990, Ser. No. 554,321

Int. Cl.^{5} G02B *5/23*

U.S. Cl. 252—586 **16 Claims**

1. A method for imparting photochromicity to an organic host material, which comprises placing in near proximity to or in contact with the surface of the host material (a) a first organic photochromic substance selected from the group consisting of spiro(indolino) naphthoxazines, spiro(indolino) pyridobenzoxazines, spiro(benzindolino) pyridobenzoxazines and spiro(benzindolino) naphthoxazines, and having an activated absorption maximum in the visible range of greater than 590 nanometers in said host material and (b) a second organic photochromic spiro(indolino) benzoxazine substance having at least one activated absorption maximum in the visible range of between 400 nanometers and less than 590 nanometers in said host material, and incorporating by thermal transfer said first and second organic photochromic substances into said surface of the host material, said first and second organic photochromic substances being present in said surface in photochromic amounts and in such a relative proportion that the spectral characteristics of the surface of the organic host material is a near neutral color when the surface is exposed to solar radiation.

5,021,197
PROCESS FOR PRODUCTION OF SULFONIUM COMPOUNDS

Mutsuhiko Takeda; Masamichi Mizukami; Yasumasa Norisue; Isao Hagiwara, and Fumiya Zaima, all of Tokyo, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

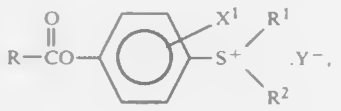
Filed May 26, 1989, Ser. No. 358,872

Claims priority, application Japan, Jun. 16, 1988, 63-146901; Oct. 18, 1988, 63-260579; Jan. 31, 1989, 1-19780

Int. Cl.^{5} C08H *3/00*

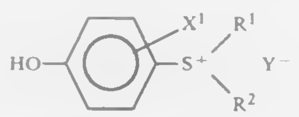
U.S. Cl. 260—399 **26 Claims**

1. A process for producing a sulfonium compound of the formula



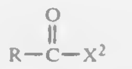
(III)

which process comprises reacting a p-dialkylsulfoniophenol of the formula



(I)

and a carbonyl halogenide compound of the formula



$$R-\overset{\overset{\displaystyle O}{\|}}{C}-X^2$$

(II)

in the presence of a secondary amine having a structure in which two secondary alykl groups are linked to the nitrogen atom:

wherein R1 and R2 are the same or different and are independently an alkyl group having 1 to 4 carbon atoms, X1 is a hydrogen atom, a halogen atom or an alkyl group having 1 to

4 carbon atoms, Y is a halogen anion, a perchlorate anion, an alkylsulfate anion, a hydrogensulfate anion or a p-toluenesulfonate anion, R is an alkyl group having 1 to 20 carbon atoms, a tert-butoxty group, a benzyloxy group, a p-methoxybenzyloxy group, a phenyl group or a 9-fluorenylmethoxy group, and X2 is a halogen atom,

wherein the reacting is carried out in a solvent selected from the group consisting of polar aprotic solvents, ethers and halogenated hydrocarbons, at a temperature of −80° C. to 30+ C. and for a reaction time of 0.5 hour to 10 hours.

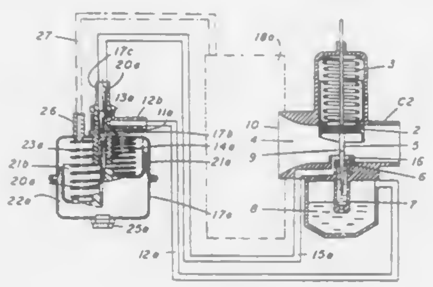
5,021,198
CARBURETOR WITH HIGH ALTITUDE COMPENSATOR

Willy Bostelmann, Wels, Austria, assignor to Bombardier Inc., Canada

Filed Jan. 16, 1990, Ser. No. 465,423

Int. Cl.^{5} F02M *9/06*

U.S. Cl. 261—44.3 **5 Claims**



1. A carburetor for an internal combustion engine, comprising:

an air flow passage that forms a venturi throat;

a fuel delivery line that opens into said passage in the vicinity of said venturi throat and is connected to a fuel bowl containing fuel at a pressure controlled by a control system;

wherein said control system for the pressure within the fuel bowl comprises a pressure splitter that is acted upon by the reduced pressure in the venturi throat in the area in which the fuel delivery line opens out and, also by the induction pressure in the area of the inlet end of the air flow passage;

said pressure splitting incorporating a pressure line with two chokes that are connected in series, the fuel bowl being connected to said pressure line between said chokes;

one of the two chokes being controlled as a function of specific air density, and consisting of a needle valve having a needle carried on a diaphragm which is exposed on one side to the pressure within a sealed air-filled metering chamber and on the other side to the induction pressure in the area of the inlet and of said air flow passage, said needle valve controlling the area of said one choke through which said pressure line is exposed to said induction pressure;

wherein said needle is of varying profile along its length and has a first section that cooperates with a first jet passage to define said one choke, and a second section that cooperates with a second jet passage to define the other said choke.

5,021,199
SIEVE PLATE FOR EFFECTING GAS-LIQUID CONTACT AND STRUCTURE CONTAINING SIEVE PLATE

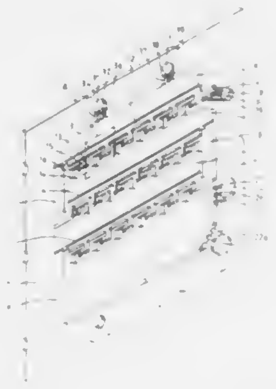
Keith Brattan, Great Boughton, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Dec. 1, 1989, Ser. No. 444,431

Claims priority, application United Kingdom, Dec. 2, 1988, 8828223

Int. Cl.^{5} B01F *3/04*

U.S. Cl. 261—114.1 **9 Claims**



1. A sieve plate for use in a structure in which direct contact may be effected between a gas and a liquid, said sieve plate having a plurality of channels within the plate leading from one surface of the plate to an opposite surface of the plate, in which the channels are so shaped as to provide in the channel within the plate a weir over which liquid must pass if it is to flow downwardly through the channel and which is formed from a stack comprising a plurality of substantially planar plates each of which comprises a frame part and a bridging part positioned between opposite sides of the frame part, in which at least some of the bridging parts of the substantially planar plates have a plurality of grooves in a face thereof such that, when the substantially planar plates are stacked together the bridging parts of the plates abut against each other and together form a sieve plate, the grooves in a bridging part forming together with a bridging part of an adjacent plate a plurality of channels which comprise a weir in said sieve plate.

5,021,200
PROCESS FOR THE PRODUCTION OF AQUEOUS DISPERSIONS OF LIPID SPHERES

Guy Vanlerberghe, Claye-Souilly, and Rose-Marie Handjani, Paris, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Division of Ser. No. 204,034, Jun. 8, 1988, Pat. No. 4,897,308, which is a continuation of Ser. No. 102,935, Dec. 12, 1979, Pat. No. 4,772,471, which is a continuation-in-part of Ser. No. 865,499, Dec. 29, 1977, Pat. No. 4,217,344, which is a continuation-in-part of Ser. No. 700,038, Jun. 25, 1976, abandoned. This application Sep. 14, 1989, Ser. No. 407,051

Claims priority, application France, Jun. 30, 1975, 75 20456; Belgium, Jun. 23, 1976, 0168219; France, Nov. 15, 1977, 77 34249

Int. Cl.^{5} A61K *9/127;* **B01J** *13/02*

U.S. Cl. 264—4.3 **11 Claims**

1. A process for producing a dispersion of spherules comprising arranged molecular layers of a lipid compound encapsulating an aqueous phase, the steps comprising (1) admixing at least one water-dispersible lipid compound having the formula X-Y wherein X represents a hydrophilic ionic or non-ionic group and Y represents a lipophilic group with an aqueous phase to be encapsulated in said spherules, said lipid compound having a lipophile group/hydrophile group ratio such that the

VOL
1127
ISS
1
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4
1991
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lipid compound swells in the aqueous phase to be encapsulated therein so as to form a lamellar phase, (2) agitating the resulting mixture so that said lamellar phase is formed, (3) adding an aqueous liquid dispersion phase in an amount greater than the amount of lamellar phase obtained, said aqueous liquid dispersion phase being other than said aqueous phase being encapsulated so that when the resulting mixture is agitated the said lamellar phase is transformed into said spherules in the presence of said aqueous liquid dispersion phase, and (4) vigorously shaking the resulting mixture for a sufficient period of time.

6. The process of claim 1 wherein the resulting dispersion of spherules is submitted to an ultrasonic treatment.

5,021,201
PROCESS FOR PREPARING UNIFORM DISCOID PARTICLES

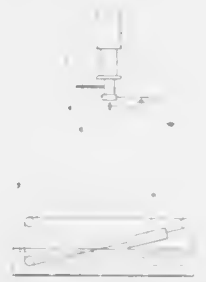
Tamiyuki Eguchi, and Michito Tsunomori, both of Kobe, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 113,701, Oct. 28, 1987, abandoned. This application Nov. 9, 1989, Ser. No. 433,102

Claims priority, application Japan, Oct. 31, 1986, 61-261519

Int. Cl.^{5} B01J *13/00;* **B29B** *9/02*

U.S. Cl. 264—9 **2 Claims**



1. A process for preparing uniform discoid particles, wherein each particle has a diameter of 20 to 2,000 μm and a thickness/diameter ratio of ½ to 1/50, and not less than 80% of the whole particles have a diameter within the range of 0.5 to 2 times the number average diameter, which comprises jetting a solution in the form of uniform droplets with electric charges with a same sign, the solution containing at least one member selected from the group consisting of a natural high molecular substance, a synthetic high molecular substance, an inorganic compound and an organometal compound, and having a viscosity of 20 to 2,000 cP, from an orifice into a gas atmosphere at a constant flow rate while applying cyclic turbulences having a constant frequency to the solution;

letting the droplets adhere to a flat and smooth surface before the droplets coagulate; and coagulating the droplets adhered to the surface by subjecting the droplets to the drying or to the contact with a coagulating liquid.

5,021,202
METHOD AND APPARATUS FOR CONSTRUCTING RAMMED EARTH WALLS WITH INTEGRAL CEMENT JACKETS

Jan Novotny. 18 St. Austell Road, Belgrave South, Victoria, Australia 3160

PCT No. PCT/AU88/00025, § 371 Date Jul. 27, 1989, § 102(e) Date Jul. 27, 1989, PCT Pub. No. WO88/05849, PCT Pub. Date Aug. 11, 1988

PCT Filed Jan. 29, 1988, Ser. No. 397,418

Claims priority, application Australia, Feb. 2, 1987, PI0146

Int. Cl.^{5} B28B *1/08. 13/00;* **E04B** *1/16;* **E04G** *11/18*

U.S. Cl. 264—33 **20 Claims**

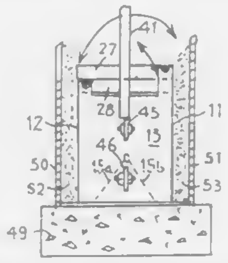
18. A method for constructing rammed earth ealls with integral rammed sand and cement mix jackest for buildings which comprises:

A. placing side and end wall formwork members upon a wall foundation and in parallel arrangement to form a rectangular wall moulding cavity;

B. outside of said formwork members, level filling with loose earth an earth hopper comprising a rectangular container having:
  (1) side and end walls,
  (2) a lateral dimension which is substantially less than the internal width of said moulding cavity, and
  (3) a bottom trapdoor;

C. lifting said filled earth hopper over said formwork members;

D. lowering said hopper into said moulding cavity and onto said foundation, said hopper being equally laterally spaced from said formwork members to define a central core cavity within said moulding cavity and a pair of jacket cavities straddling said moulding cavity;



E. filling said jacket cavities with a loose, moist sand and cement mix;

F. opening said trapdoor so that portions of said loose earth fall downwardly into said core cavity and initially outwarldy toward and against the side walls of said container;

G. raising said hopper out of said moulding cavity while the remainder of said loose earth falls into said core cavity;

H. simultaneously ramming said loose earth and said loose mix to obtain a bottom layer of integrated rammed earth and rammed sand and cement mix as an earth core and integral cement jackets, respectively; and

I. successively repeating steps B through H to obtain additional layers upon and attached to said bottom layer until a selected wall height is reached.

5,021,203
METHOD FOR REGULATION THE PRESSURE OF A LIQUID CONTAINED IN MOLD PORES WHICH COMMUNICATE WITH A MOLD CAVITY

Owe G. T. Larsson, Höganäs, and Anders B. H. Aberg, Tollarp, both of Sweden, assignors to Toolvac Engineering AB, Perstorp, Sweden

Filed Nov. 16, 1989, Ser. No. 437,257

Claims priority, application Sweden, Nov. 16, 1988, 8804129

Int. Cl.^{5} B29C *45/34. 45/37. 45/76*

U.S. Cl. 264—40.3 **22 Claims**

1. Method for regulation of process conditions in a moulding tool intended for production of products of natural or synthetic polymers, which moulding tool comprises one or more moulding parts made of sintered metal with communicating pores obtained by pressing at a high pressure and sintering at a high temperature of a powdered material, in which moulding part or parts a moulding cavity has then been made, whereby the pores forming a pore system are open towards the moulding cavity, while the moulding too has an outer envelop surface which is tightened against leakage, which comprises filling the communicating pores during the entire production cycle with a liquid of high vaporizing temperature, which liquid is stationary during said cycle in the pores system, and regulating pressure on the liquid in the pores by means of a suitable pressure producer connected with the communicating pores in the moulding tool in such a manner that the liquid will be forced very slowly out of the pores into the moulding cavity and form a thin layer on the surface of the cavity;

wherein a thermosetting resin is moulded, wherein a gaseous state curing agent or catalyst which is inert to the liquid in the pores is used as a pressure medium for said liquid, which curing agent or catalyst will pass through the liquid and reach the resin in the moulding cavity which is closed in a concentration large enough to cure the thermosetting resin.

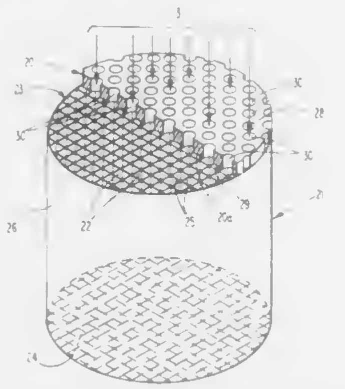
5,021,204
METHOD FOR SELECTIVELY CHARGING HONEYCOMB STRUCTURES

Rodney I. Frost, and Robert J. Paisley, both of Corning, N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Jul. 15, 1981, Ser. No. 283,733

Int. Cl.^{5} C04B *37/00*

U.S. Cl. 264—60 **24 Claims**



1. A method of loading a flowable material into a selected plurality of cells of a honeycomb structure having a multiplicity of mutually adjoining cells, including said selected plurality of cells, which are open ended at and extend into the structure from an open surface thereof comprising the steps of:

covering said open surface with a mask for charging the flowable material into said selected plurality of cells, said mask comprising a body formed of a material impermeable to said flowable material and having a plurality of openings extending therethrough from an outer face thereof to an opposing face thereof positioned juxtaposed said open surface, the openings being sized and positioned across said body to expose therethrough the open ends of said plurality of cells; and

charging the flowable material from said mask outer face through said openings into the open ends of said plurality of cells.

5,021,205
CONCRETE MANUFACTURING PROCESS

Yoshio Niioka, 40, Oaza-kunotsuboyama, Nishiharu-cho, Nishikasuga-gun, Japan, assignor to Yoshio Niioka, Aichi, Japan and Marvin Gottlieb, Hiland Park, Ill.

Filed Oct. 31, 1990, Ser. No. 607,450

Claims priority, application Japan, Nov. 1, 1989, 1-286160

Int. Cl.^{5} B28B *1/08. 3/02;* **B29C** *43/02. 43/32*

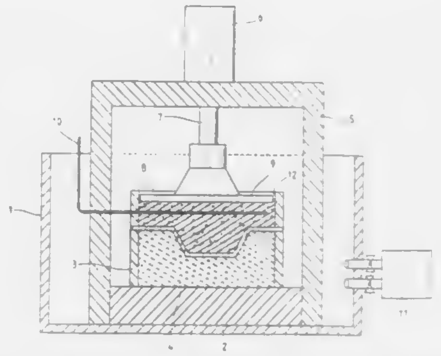
U.S. Cl. 264—69 **4 Claims**

1. A concrete manufacturing process which comprises:

pouring a fluidized cement containing a short fiber as an admixture into a concrete manufacturing mold;

applying a predetermined level of pressure to the entire fluidized cement poured into said mold, while a gas is forcedly introduced into said cement; and

hardening said cement as said gas introduced thereto forms bubbles which are vented into the atmosphere through a venting section provided for said mold said bubbles bursting when vented into said atmosphere thereby generating vibration which improves affinity between said short fiber and said cement.



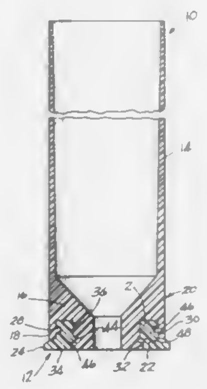
5,021,206
METHOD OF MOLDING A DUAL PLASTIC SHOTSHELL CASING

Billie J. Stoops, Shipman, Ill., assignor to Olin Corporation, Cheshire, Conn.

Division of Ser. No. 282,549, Dec. 12, 1988, abandoned. This application Nov. 21, 1989, Ser. No. 439,892

Int. Cl.^{5} B29C *43/02, 45/14, 45/16, 45/44*

U.S. Cl. 264—155 **3 Claims**



1. A method of making a dual plastic shotshell casing comprising the steps of:
  (a) injection molding independently a hard plastic annular-shaped rimmed base; and
  (b) forming a plastic tubular body in a two-step operation by
    (1) first, injection molding a plastic preform onto said rimmed base, said preform having an integral basewad in mechanically interlocked relation to the rimmed base, and;
    (2) second, compression forming the tubular body into said casing from the preform mechanically locked to the rimmed base.

VOL
1127
ISS
1
JE
4
1991
UMI

5,021,207
HIGH STRENGTH FIBERS FROM CHITIN DERIVATIVES

George V. De Lucca; Hollis S. Kezar, III, both of Wilmington, Del., and John P. O'Brien, Oxford, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 90,144, Aug. 27, 1987, abandoned, which is a division of Ser. No. 942,442, Dec. 16, 1986, abandoned. This application Dec. 19, 1988, Ser. No. 287,533

Int. Cl.^{5} D01F *9/00*

U.S. Cl. **264—186** 3 Claims

1. A process for preparing chitin acetate/formate fiber comprising forming an anisotropic solution of chitin acetate/formate in a solvent of a mixture of trichloroacetic acid and methylene chloride and spinning the solution through an air gap into a coagulating bath to form a fiber whereby the fiber has an as-spun tenacity of greater than 4 grams per denier.

5,021,208
METHOD FOR REMOVAL OF PARAFFIN WAX BASED BINDERS FROM GREEN ARTICLES

David C. Ludwig, Towanda, and Joseph J. Penkunas, Sayre, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed May 14, 1990, Ser. No. 522,616

Int. Cl.^{5} C04B *38/06*

U.S. Cl. **264—344** 5 Claims

1. A method for removing a paraffin wax based binder containing a fatty acid from a green article, said method comprising:

(a) heating said article wherein said article is made of material selected from the group consisting of ceramic powders and metallic powders, in a non-oxidizing atmosphere in a furnace by raising the temperature in said furnace at a rate of about 0.5° C. per minute to about 1.0° C. per minute to a first temperature of about 50° C. to about 80° C. and thereafter maintaining said first temperature for about 30 to about 90 minutes to essentially completely melt said binder;

(b) raising the temperature in said furnace from said first temperature at a rate of about 0.5° C. per minute to about 1.0° C. per minute to a second temperature of about 200° C. to about 225° C. and thereafter maintaining said second temperature for about 30 to about 90 minutes to essentially completely vaporize said paraffin wax;

(c) raising the temperature in said furnace from said second temperature at a rate of about 0.5° C. per minute to about 1.0° C. per minute to a third temperature of about 260° C. to about 300° C. and thereafter maintaining said third temperature for about 30 to about 90 minutes to essentially completely vaporize said fatty acid; and

(d) raising the temperature in said furnace from said third temperature at a rate of about 0.5° C. to about 1.0° C. per minute to a fourth temperature of about 430° C. to about 480° C. and thereafter maintaining said fourth temperature for about 30 to about 90 minutes to insure complete vaporization of essentially all of said binder.

5,021,209
PROCESS FOR FORMING AN EXTRUSION-BLOW MOLDED ULTRATHIN CONTAINER USING A HEAT GENERATING PINCH OFF ARRANGEMENT

Albert B. Dickinson, Muscle Shoals, Ala., assignor to Edward S. Robbins, III, Florence, Ala.

Filed Oct. 31, 1989, Ser. No. 429,779

Int. Cl.^{5} B29C *33/42, 49/04, 49/50*

U.S. Cl. **264—540** 7 Claims

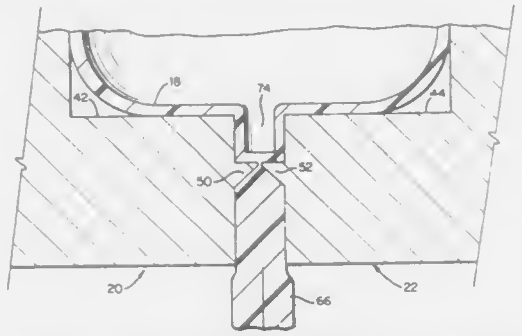
1. A method of forming an ultra thin film plastic container and heat sealing a seam thereof comprising the steps of:

a) forming a parison of plastic material having a first predetermined wall thickness, said wall thickness being substantially uniform in an area where the seam is to be formed;

b) providing a pair of blow mold halves, each of which is formed with a mold cavity portion surrounded by a parting survice, at least one portion of said parting surface of each blow mold half having a pinch-off projection located intermediate opposite edges of said parting surface;

c) closing said blow mold halves about said parison to enclose said parison within a mold cavity formed by said mold cavity portions, said pinch-off projections and said one portion of said parting surface establishing a first recess which opens to said mold cavity;

d) blow molding the parison within said mold cavity to form an ultra thin film plastic container having a second predetermined thickness less than said first predetermined wall thickness, said second predetermined wall thickness being substantially uniform at least adjacent said pinch-off projections within said first recess; and wherein said pinch-off projections are sized and shaped relative to said at least one portion of said parting surface of each blow mold half and said pinch-off portions and said parting surface establish a second recess extending away from said mold cavity, said second recess having a width less than twice said first predetermined wall thickness of the parison so as to cause said plastic material below said pinch-off projections to be compressed out of the second recess thereby generating heat during steps (c) and (d) sufficient to raise the temperature of the plastic material within said first recess and adjacent said pinch-off projections to at least a melting temperature of the plastic material to thereby provide an effective head sealed seam immediately adjacent said pinch-off projections and within said first recess, said seam having a wall thickness substantially equal to said second predetermined wall thickness.



5,021,210
ANOMALY DIAGNOSIS SYSTEM FOR A NUCLEAR REACTOR CORE

Kazuhiro Utsunomiya; Nobumi Ooyama, and Hideo Sakaba, all of Ibaraki, Japan, assignors to Power Reactor and Nuclear Fuel Development Corporation, Tokyo, Japan

Division of Ser. No. 231,088, Aug. 11, 1988, Pat. No. 4,943,683. This application Jun. 5, 1990, Ser. No. 533,359

Claims priority, application Japan, Aug. 17, 1987, 62-203070

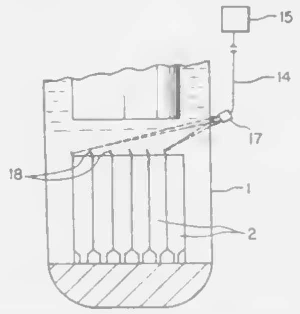
Int. Cl.^{5} G21C *17/00*

U.S. Cl. **376—247** 4 Claims

3. In combination, a nuclear reactor having a reactor core with a plurality of fuel assemblies, a plant protection system, and an anomaly diagnosis system, said anomaly diagnosis system comprising:

ultrasonic wave reflecting members provided respectively on the fuel assemblies, the ultrasonic wave reflecting members including a shape memory alloy which permits changing the shape thereof when said members are heated to the shape memory restoration temperature of said shape memory alloy; and

an ultrasonic wave emitter-receiver means for emitting an ultrasonic wave toward the ultrasonic wave reflecting members and for receiving ultrasonic waves reflected respectively by the ultrasonic wave reflecting members, said emitter-receiver means including means for providing an anomaly detection signal to said plant protection system when the ultrasonic wave reflected by any one of the ultrasonic wave reflecting members is not received by said emitter-receiver means, said fuel assemblies including means for permitting coolant to pass therethrough, and the ultrasonic wave reflecting members being disposed so as to reflect the ultrasonic waves toward the ultrasonic wave emitter-receiver means while the temperature of the coolant flowing through the associated fuel assemblies if below the shape memory restoration temperature thereof.



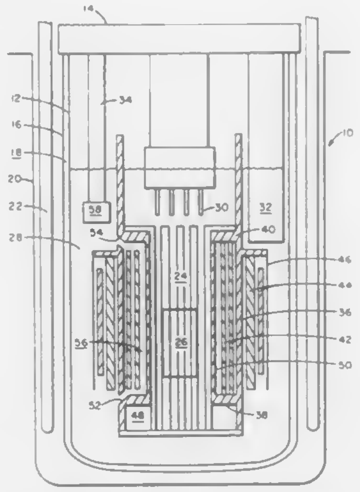
5,021,211
LIQUID METAL COOLED NUCLEAR REACTORS WITH PASSIVE COOLING SYSTEM

Anstein Hunsbedt, Los Gatos, and Alan W. Fanning, San Jose, both of Calif., assignors to General Electric Company, San Jose, Calif.

Filed Jul. 25, 1989, Ser. No. 384,385

Int. Cl.^{5} G21C *15/18*

U.S. Cl. 376—299 10 Claims



1. A passive cooling system for liquid metal cooled nuclear reactors consisting essentially of the combination of a reactor vessel enclosing a heat generating core and assembly containing fissionable fuel surrounded by a spaced apart encircling fuel core assembly support cylinder provided with an upper and a lower inward projecting flange for securing the fuel core assembly within the reactor vessel, a primary heat exchanger cylinder positioned concentrically intermediate the fuel core assembly support cylinder and the fuel core assembly in spaced apart relation with each the support cylinder and the fuel core assembly, said reactor vessel being substantially filled with liquid metal coolant whereby the fuel core assembly is submerged therein, the fuel core assembly having a multiplicity of vertical coolant passages extending through the axial length thereof providing for a primary heat exchanging convection circuit for the liquid metal coolant passing upward through the heat producing fuel core to an area above the fuel core assembly and returning around down through a space between the fuel core assembly and the primary heat exchanger cylinder for recycling around and up through the fuel core assembly, a pump extending down projecting below the surface of the liquid metal coolant for circulating the coolant through the primary heat exchanging circuit, said support cylinder having at least one flow slot passing therethrough in an upper portion of the cylinder and at least one flow slot passing therethrough in a lower portion of the cylinder providing for a secondary heat exchanging convection circuit for the liquid metal coolant passing into the support cylinder through the lower flow slot and upward through a space between the primary heat exchanger cylinder and the core support cylinder and then out from the space through the upper flow slot and returning around down to the lower flow slot for carrying heat away from the primary heat transferring circuit, said fluid flow slots passing through the fuel assembly support cylinder between the inward projecting upper and lower flanges of the assembly support cylinder, and a flow guiding skirt extending around the assembly support cylinder in spaced apart relationship between the upper and lower flow slots whereby the liquid metal coolant flows downward external to the flow guiding skirt when circulating through the secondary heat exchanging convection circuit.

5,021,212
PRIMARY CONTAINMENT VESSEL WITH OUTER POOL

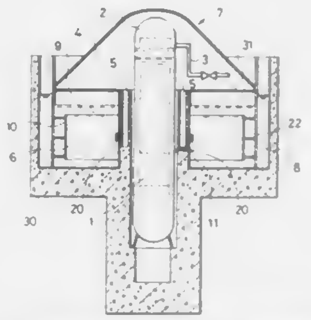
Yoshiyuki Kataoka; Isao Sumida, both of Ibaraki; Masataka Hidaka, and Masanori Naitoh, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 11, 1990, Ser. No. 522,033

Claims priority, application Japan, May 11, 1989, 1-118369

Int. Cl.^{5} G21C *15/18*

U.S. Cl. 376—283 10 Claims



10. A primary containment vessel comprising:

a dry-well volume accommodating a reactor pressure vessel in which a core is accommodated and covering the upper portion of said reactor pressure vessel;

an annular suppression chamber provided with a suppression pool surrounding an intermediate portion of said reactor pressure vessel and filled with cooling water, the water surface of which is positioned higher than the top end of said core;

a plurality of vent tubes establishing a connection between said dry-well volume and said suppression pool;

a steel containment vessel forming an annular outer wall of said suppression chamber and hermetically surrounding said dry-well volume;

an outer pool surrounding the outer wall and filled with cooling water:

an equalizing line for establishing a connection between said suppression pool and said reactor pressure vessel via a check valve thereof for stopping a flow into said suppression pool, said equalizing line having its opening in said suppression pool at a position lower than said outlet and its opening in said reactor pressure vessel at a position higher than said core; and

VOL
1127
ISS
1
JE
4
1991
UMI

an annular baffle plate disposed in said suppression pool along said outer wall by being secured by a plurality of supports fastened to said outer wall, having its top end positioned at a height between a free surface of said suppression pool and an outlet of said vent tube opened in said suppression pool and its lower end positioned at a height between said outlet and the bottom of said suppression pool, said baffle plate having a vertical cross sectional shape formed in such a manner that it is positioned close to said outer wall in a portion higher than said outlet and it is positioned close to said outlet in a portion lower than said outlet, wherein said baffle plate is disposed at a position at which $h_3=0.75\ h_1$ is satisfied where the difference in height between said top end of said baffle plate and said outlet is h_1 and the difference in height between said outlet and said lower end of said baffle plate is h_3 so that a natural pool water convection passage circulating from the inside of said baffle plate to the inside of the same is formed.

5,021,213
METHOD OF CASTING POWDER

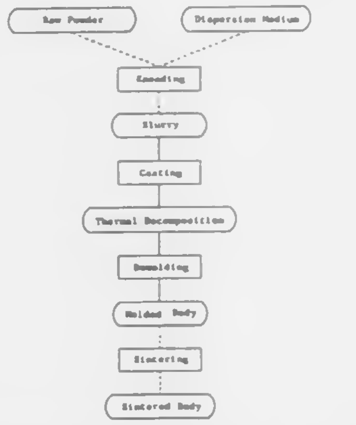
Hiroaki Nishio; Akira Kato; Michitaka Sato, and Keiji Watanabe, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Jun. 20, 1990, Ser. No. 540,555

Claims priority, application Japan, Jun. 22, 1989, 1-158338; Jul. 10, 1989, 1-175733

Int. Cl.^{5} B22F *1/00*

U.S. Cl. 419—36 **13 Claims**



1. A method of casting a metal or ceramic powder which comprises casting a slurry of 45 to 85 vol. % of the metal or ceramic powder suspended in a dispersion medium into a porous mold having a strength to resist a casting pressure of at least 3 kg/cm^2 and a capacity to absorb the dispersion medium contained in the cast slurry in the porous mold which is insufficient for the molded body to maintain a molded form without a mold and heating the slurry placed in the porous mold to remove the dispersion medium through the evaporation or the decomposition of the dispersion medium.

5,021,214
AG ALLOY OF HIGH DISCOLOURATION RESISTANCE

Hiroshi Sasaki, and Makoto Nishiya, both of Hakodate, Japan, assignors to Kabushiki Kaisha Zero One, Hakodate, Japan

Filed Dec. 26, 1989, Ser. No. 454,312

Claims priority, application Japan, Jan. 11, 1989, 1-4448

Int. Cl.^{5} C22C *5/06, 5/08*

U.S. Cl. 420—504 **4 Claims**

1. Ag alloy of high discolouration resistance comprising:
0.2 to 9.0% by weight of In;
0.02 to 2.0% by weight of Al; and
the balance Ag.

5,021,215
HIGH-STRENGTH, HEAT-RESISTANT STEEL WITH IMPROVED FORMABILITY AND METHOD THEREOF

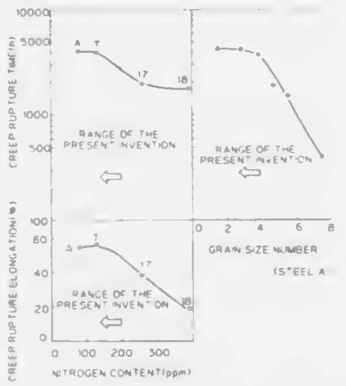
Yoshiatsu Sawaragi, Nishinomiya, and Nobuyuki Maruyama, Amagasaki, both of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Jan. 30, 1990, Ser. No. 472,165

Claims priority, application Japan, Jan. 30, 1989, 1-22032

Int. Cl.^{5} C22C *38/44, 38/48, 38/50*

U.S. Cl. 420—584.1 **27 Claims**



1. A high-strength, heat-resistant steel with improved formability which consists essentially of, by weight %:

C: 0.15–0.30%,
Mn: not greater than 10%,
Ni: 15–50%,
B: 0.001–0.01% and/or
at least one of Ti· 0.05–1.0%,
Mo. 0–3.0%,
(Mo + ½ W = 3.0% or less)
Si: not greater than 3.0%
Cr: 15–35%,
Mg: 0.001–0.02%,
Zr: 0.001–0.10%,
Nb: 0.1–2.0%, and
Al: 0.05–1.0%,
W: 0–6.0%,

a balance of Fe and incidental impurities, of the impurities, oxygen and nitrogen being restricted to 50 ppm or less and 200 ppm or less, respectively, and the austenite grain size number being restricted to not greater than 4.

5,021,216
METHOD OF REMOVING AND CRYSTALLIZING CATION RESIN ABSORBED CALCIUM AND MAGNESIUM

Solon G. Whitney, Bartow, Fla., and Harold J. Kleiss, Cary, N.C., assignors to American Pembroke, Inc., Bartow, Fla.

Filed May 17, 1990, Ser. No. 525,091

Int. Cl.^{5} C08J *5/20;* **B01J** *49/00*

U.S. Cl. 521—26 **7 Claims**

1. The method of removal and controlled crystallization of metal ions adsorbed on cation exchange resin beads from wet process phosphoric acid, said metal ions including principally calcium and magnesium ions and the resin beads to be treated being pulse increments transferred from a pulsed-bed metal ion adsorption column, wherein the improvement comprises:

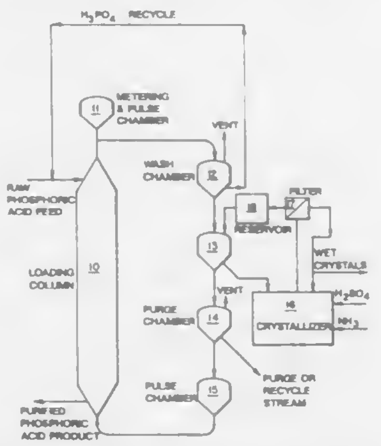
(a) establishing a recycle circuit including a container for the resin bead increments to be treated, a crystallizer for precipitation of metal ions, and a liquid reservoir;

(b) maintaining in said reservoir a regenerant comprising a solution of sulfuric acid (H_2SO_4), and ammonium sulfate, said solution containing on a solution weight percent basis from 5 to 50% sulfuric acid and 10 to 40% ammonium sulfate, and being at a pH below 2.0 and at a temperature of from 40° to 125° F. at which said solution is substantially saturated with calcium and magnesium sulfates while being substantially below saturation with ammonium sulfate;

(c) passing said regenerant through the resin beads in said container to remove calcium, magnesium, and other metal ions by exchanging the adsorbed metal ions for hydrogen and ammonium ions in the regenerant;

(d) passing the resulting metal ion-containing regenerant from said container into said crystallizer;

(e) adjusting the sulfuric acid and ammonium sulfate concentration of said metal ion-containing regenerant to the said concentrations being maintained in the reservoir;



(f) precipitating at least calcium and magnesium sulfates in the form of filterable crystals, the pH in said crystallizer being below 2.0 and there being sufficient H_2SO_4 present to co-precipitate the magnesium and calcium sulfates in the form of filterable crystals;

(g) separating the crystalline precipitate from the regenerant; and

(h) passing the resulting regenerant to the reservoir for recycle use.

5,021,217
MULTIPIPET

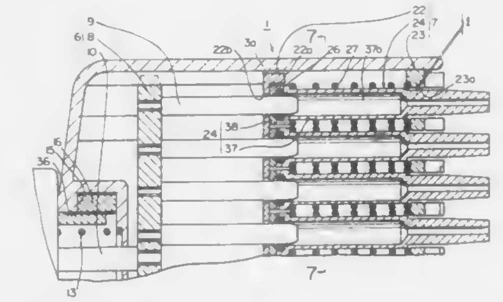
Yuju Oshikubo, Tokyo, Japan, assignor to Nichiryo Co., Ltd., Tokyo, Japan

Filed Jun. 19, 1989, Ser. No. 368,276

Claims priority, application Japan, Dec. 20, 1988, 63-321304

Int. Cl.^{5} B01L *3/02;* **G01N** *1/14*

U.S. Cl. 422—100 **7 Claims**



1. In a multipipet designed to allow a plurality of plungers to be fittingly advanced by a manual operation in a plurality of cylinders, respectively, against the force of a spring, said plungers thereafter being returned to suck predetermined amounts of liquids into said cylinders and then moved downward again to discharge said predetermined amounts of liquids from said cylinders,

an improvement characterized in that said cylinders are supported by a supporting member in such a manner that each cylinder is individually oscillatable sideward relative to said supporting member.

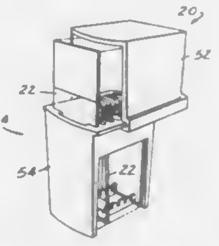
5,021,218
APPARATUS FOR TRANSPORTING SPECIMEN SLIDES

Richard E. Davis, Grand Rapids, Mich., and Michael D. Glant, Indianapolis, Ind., assignors to DLP, Inc., Grand Rapids, Mich.

Filed Jan. 19, 1990, Ser. No. 467,484

Int. Cl.^{5} B01L *9/00, 3/00;* **B65D** *85/48;* **F24H** *7/00*

U.S. Cl. 422—104 **9 Claims**



1. A slide identification and transportation kit constructed and arranged to mark, identify, index and display a plurality of slides and specimens thereon and to secure and protect said slides and specimens comprising:

a slide carrier comprising a cap and slide holder constructed and arranged with internal slots to maintain said plurality of slides in spaced relation while exposing said plurality of slides to display said plurality of slides and to provide access to at least a bottom portion of said plurality of slides while securing and protecting said plurality of slides and specimens;

said slide holder comprising a front wall and an opposed back wall, connected by opposed side walls; said opposed side walls containing openings; an open top and a base connected to said front wall and said opposed back wall and a plurality of slots formed by grooves in one of either said opposed side walls or said base; and wherein each of said openings extending from the base of said holder to sections adjacent the top of said opposed side walls, and extending transversely to respective points adjacent said front wall and said opposed back wall; and said openings constructed and arranged to provide opposed partial side walls to provide access to a bottom portion and a mid portion of said plurality of slides.

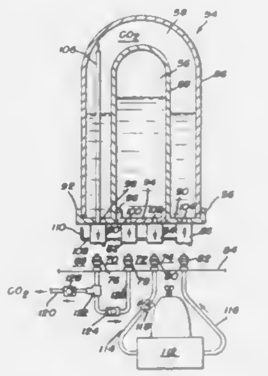
5,021,219
GAS GENERATOR FOR A CARBONATED DRINK DISPENSER

Arthur G. Rudick, and Ashis S. Gupta, both of Marietta, Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Filed Dec. 8, 1988, Ser. No. 281,219

Int. Cl.^{5} B01J *14/00*

U.S. Cl. 422—112 **16 Claims**



1. Self-regulating gas generator apparatus for producing a

VOL
1127
ISS
1
JE
4
1991
UMI

carbonating gas utilized in a carbonated drink dispenser and which generates the gas by a chemical reaction comprising:

first container means for holding a first chemical reagent utilized in generating a carbonating gas for the drink dispenser;

second container means for holding a second chemical reagent utilized in generating a carbonating gas for the drink dispenser,

a reaction chamber integral with said second container means for generating a carbonating gas for the drink dispenser when said first and second reagents are mixed;

said first and second container means respectively comprising a pressurized centralized inner chamber and an adjoining outer annular chamber located within a common housing, wherein pressure in the inner chamber is initially greater than the pressure in the outer chamber and wherein the pressure in the outer chamber increases due to gas generation therein,

means coupled between said inner and outer chambers for controlling the transfer of said first reagent from said inner chamber to said outer chamber, said means for controlling the transfer of reagent between said inner and outer chambers comprising means responsive to a pressure differential between said chambers to enable reagent flow therebetween to effect gas generation when the pressure in said inner chamber is greater than the pressure in said outer chamber and the pressure in said outer chamber drops below a preset value and to inhibit reagent flow when the pressure in the outer chamber is equal to that of said inner chamber and further when the pressure in said outer chamber is greater than that of the inner chamber,

discharge means for feeding the generated carbonating gas from said second container means to a drink dispenser,

said common housing for said inner and outer chamber further including a generally flat base region constructed for mounting a support surface of the drink dispenser and including openings therein to the inner and outer chambers, and additionally including fluid coupling means intermediate said openings and said pressure responsive means and said discharge means.

5,021,220
KIT FOR PREPARING RADIODIAGNOSTIC EXAMINATION COMPOSITIONS

John Mertens, Brussels, Belgium, assignor to Mallinckrodt, Inc., St. Louis, Mo.

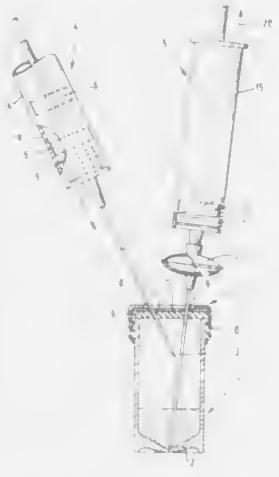
Division of Ser. No. 417,057, Oct. 4, 1989, abandoned, which is a continuation of Ser. No. 735,037, May 17, 1985, Pat. No. 4,942,231. This application Aug. 17, 1990, Ser. No. 569,058

Claims priority, application Belgium, May 24, 1984, 8491739; Netherlands, Jul. 5, 1984, 8402138

Int. Cl.^{5} A61K *49/02;* **B65D** *69/00*

U.S. Cl. 424—1.1 6 Claims

1. A kit for the preparation of a radiodiagnostic examination composition, comprising a bromine bromine-, or iodine-substituted aromatic or heteroaromatic starting compound, a water-soluble acid, a copper salt, a reducing agent stable in an acid medium, and instructions for preparing the composition by reacting the starting compound with a water-soluble chloride, bromide radiobromide, iodide or radioiodide in the water-soluble acid in the presence of (a) the copper salt as a catalyst



and (b) the reducing agent in a quantity exceeding the quantity of the catalyst.

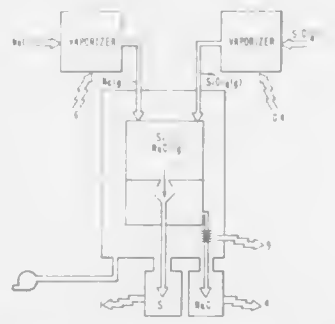
5,021,221
APPARATUS FOR PRODUCING HIGH PURITY SILICON FROM FLAMES OF SODIUM AND SILICON TETRACHLORIDE

Robert K. Gould, E. Windsor, and Charles R. Dickson, Princeton, both of N.J., assignors to Aero Chem Research Lab., Inc., Princeton, N.J.

Division of Ser. No. 680,923, Dec. 12, 1984, abandoned, which is a continuation of Ser. No. 368,460, Apr. 14, 1982, abandoned, which is a continuation of Ser. No. 249,396, Mar. 31, 1981, abandoned, which is a continuation of Ser. No. 199,100, Oct. 20, 1980, abandoned. This application Dec. 4, 1986, Ser. No. 938,049

Int. Cl.^{5} B01J *14/00;* **C01B** *33/02*

U.S. Cl. 422—129 15 Claims



1. An apparatus for producing high purity metal, which comprises:

a vessel including a reactor, a product separation chamber and a by-product separation chamber, said reactor positioned within said vessel comprising a reaction chamber and a reaction products outlet nozzle;

reactant conduit means for introducing vaporized reactants into said reaction chamber of said reactor to effect reaction thereof to form reaction products including droplets of said high purity metal;

conduit means including said reaction products cutlet nozzle connecting said reactor to said product separation chamber and a conduit connecting said separation chamber to said by-product separation chamber of said vessel;

vacuum means connected to said vessel to effect a pressure differential between said reaction chamber and said product separation chamber to form a product stream at supersonic velocity of said reaction products exiting outlet

nozzle of said reactor and entering said product separation chamber;

a product separator plate in said product separation chamber having a surface positioned within said product separation chamber of said vessel proximate to said reaction products outlet nozzle said surface of said separator plate disposed towards said reaction products outlet nozzle at a distance within which a shock wave zone forms from said supersonic product stream to cause said droplets of sail metal to impinge on said surface of said separator plate, said separation having side walls of a height (L) defined by:

$$L < \frac{W - D_E - 2(d/F)}{2(0.35 + (1/F))}$$

wherein W is the width of said separation chamber, d is the distance from said reaction products outlet nozzle to said separator plate surface, E_E is the expandable supersonic jet diameter immediately after the outlet orifice, and wherein:

$$D_E = \frac{D_N}{M^{\frac{1}{2}}}\left(\frac{2}{\gamma+1}\right)^{\frac{\gamma+1}{4(\gamma-1)}}\left(\frac{P_T}{P_0}\right)^{\frac{\gamma+1}{4\gamma}}$$

wherein D_N is the diameter of the outlet orifice, P_T is the pressure in said reaction chamber, P_O is the pressure in the separation chamber, P_T/P_O is the nozzle pressure ratio, γ is the ratio of specific heats at constant pressure to specific beats at constant volume of gases exiting said reaction products nozzle and M is the Mach number, and wherein:

$$M = \left(\frac{2}{\gamma-1}\left[\left(\frac{P_T}{P_0}\right)^{\frac{\gamma-1}{\gamma}} - 1\right]\right)^{\frac{1}{2}}$$

with $F=0.22+5.22M^{0.9}$; and

means for collecting said droplets of said metal.

5,021,222
RESID CRACKING APPARATUS

Hartley Owen, Belle Mead, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Division of Ser. No. 259,561, Oct. 18, 1988, Pat. No. 4,895,637. This application Nov. 20, 1989, Ser. No. 438,836

Int. Cl.^{5} F27B *15/08*

U.S. Cl. 422—144 7 Claims

1. An apparatus for fluidized bed combustion of, and elutriation of, a stream of a mixture of elutriable particles, comprising relatively fluidizable particles and relatively heavier particles which are relatively faster settling in dense phase fluidized beds than said relatively light fluidizable particles, comprising:

(a) a single vessel adapted to maintain said elutriable mixture as a single dense phase fluidized bed and to elutriate said mixture by contact with an upflowing combustion gas stream into an upper dense phase fluidized bed portion enriched in relatively light fluidizable particles and a contiguous lower dense phase fluidized bed portion enriched in relatively fast settling particles;

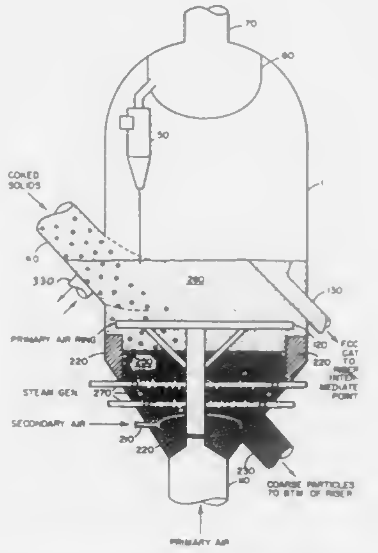
(b) an inlet means connective with said vessel for admission of said elutriable particle mixture;

(c) an upper combustion gas inlet means in said upper portion of said single dense phase fluidized bed;

(d) a lower combustion gas inlet means in said lower portion of said single dense phase fluidized bed;

(e) a flue gas outlet means connective with a dilute phase region above said single dense phase fluidized bed for withdrawal of a flue gas stream;

(f) an upper particle outlet connective with said upper portion of said single dense phase fluidized bed for withdrawal of a stream of particles rich in relatively light



fluidizable particles from said single dense phase fluidized bed; and

(g) a lower particle outlet connective with said lower portion of said single dense phase fluidized bed for withdrawal of a stream of particles enriched in relatively light fluidizable particles.

5,021,223
TRANSFER OF CATALYST

Keith W. Hovis, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 12, 1990, Ser. No. 464,263

Int. Cl.^{5} F28D *21/00*

U.S. Cl. 422—198 4 Claims

1 In a system for performing an alkylation process of the type which includes settler vessel means for receiving an admixture of liquid hydrocarbons and liquid catalyst and allowing the separation of said liquid hydrocarbons from said liquid catalysts; catalyst cooler means for cooling liquid catalyst; first conduit means in fluid flow communication between a lower portion of said settler vessel means and said catalyst cooler means for conducting liquid catalyst from said settler vessel means to said catalyst cooler means; riser-reactor means in fluid flow communication among said catalyst cooler means,

VOL
1127
ISS
1
JE
4
1991
UMI

said settler vessel means, and a source of liquid hydrocarbon feed for conducting cooled catalyst from said catalyst cooler means and liquid hydrocarbon from said source of liquid hydrocarbon feed in admixture to said settler vessel means; and said settler vessel means, said first conduit means, said catalyst cooler means, and said riser-reactor means each being positioned at an elevation above a first elevation, the improvement comprising:

catalyst storage vessel means for containing at least a portion of the liquid catalyst employed in said system for performing an alkylation process, said catalyst storage vessel means being positioned at a second elevation below said first elevation;

second conduit means connected in fluid flow communication between said catalyst cooler means and said catalyst storage vessel means for conducting liquid catalyst therebetween; and

first valve means interposed in said second conduit means for blocking passage of liquid catalyst through said second conduit means, and, alternately, for allowing passage of liquid catalyst through said second conduit means and vent means connected to said catalyst storage means providing fluid communication with said settler vessel means.

5,021,224

APPARATUS FOR GROWING MULTICOMPONENTS COMPOUND SEMICONDUCTOR CRYSTALS

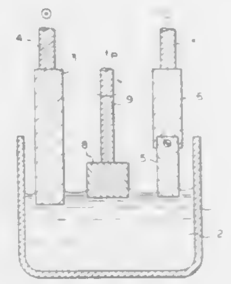
Kazuo Nakajima, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Division of Ser. No. 652,239, Sep. 19, 1984, Pat. No. 4,620,897. This application May 20, 1986, Ser. No. 864,982

Claims priority, application Japan, Sep. 19, 1983, 58-171174; Jan. 26, 1984, 59-11090

Int. Cl.^{5} C30B *35/00*

U.S. Cl. 422—248 5 Claims



1. An apparatus for growing crystals of a three or more multicomponent compound semiconductor from its growth solution on a seed crystal or substrate, which apparatus comprises a container for said growth solution, a semiconductor seed crystal or substrate disposed within said container, a first electrode, at least one source material each of which contains at least one element which is essential to complete said compound semiconductor, one end of said source material being arranged to be immersed in said growth solution and another end of said source material being connected with said first electrode, and a second electrode arranged to be immersed in said growth solution and arranged to be connected to a source of DC electric current such that DC electric current is conducted from said second electrode, through the growth solution and through said source material to said first electrode, said second electrode being separately disposed from the seed crystal or substrate such that DC electric current is not passed through said seed crystal or substrate.

5,021,225

CRYSTAL PULLING APPARATUS AND CRYSTAL PULLING METHOD USING THE SAME

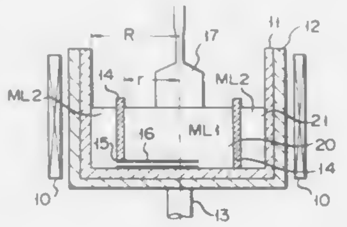
Youji Yamashita, Yokohama, and Masakatu Kojima, Yokosuka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 21, 1989, Ser. No. 312,847

Claims priority, application Japan, Feb. 22, 1988, 63-39152

Int. Cl.^{5} C30B *35/00, 15/12*

U.S. Cl. 422—249 21 Claims



1. A crystal pulling apparatus comprising:

an outer crucible with radius R, for receiving a first material melt;

an inner crucible coaxially disposed in said outer crucible, for receiving a second material melt, said inner crucible having inner peripheral length b and radius r equal to substantially $\sqrt{k}$ times the radius R where the segregation coefficient of dopant included in the second material melt is k and k does not equal zero; and

coupling means having length L and an inner diameter a, for permitting the first material melt to flow in one direction, from said outer crucible to said inner crucible, wherein $b>L>4a$; and

magnetic field means for generating a magnetic field greater than 1500 Gauss.

5,021,226

METHOD OF PRODUCING FIBROUS MAGNESIUM OXYSULFATE OF GRANULAR FORM

Kouhei Ueno; Tomohiko Akagawa, both of c/o Sakai Factory, Ube Industries, Ltd., 1, Chikkoshinmachi 3-chome, Sakai-shi, Osaka-fu, and Kazuyoshi Obana, c/o Hirakata Laboratory, Ube Industries, Ltd., 3-10, Nakamiya, Kitamachi, Hirakata-shi, Osaka-fu, all of Japan

Division of Ser. No. 333,273, Apr. 5, 1989, abandoned. This application Jul. 10, 1989, Ser. No. 371,556

Claims priority, application Japan, Apr. 5, 1988, 63-83702

Int. Cl.^{5} C01F *11/46, 5/42*

U.S. Cl. 423—554 1 Claim

1. A method of producing fibrous magnesium oxysulfate of granular form, sequentially comprising the steps of:

synthesizing fibrous magnesium oxysulfate using a hydrothermal reaction of an aqueous solution containing magnesium sulfate and magnesium hydroxide or magnesium oxide;

removing ball-like portions of 250μm or more from said fibrous magnesium oxysulfate;

dehydrating said fibrous magnesium oxysulfate to a water content of 65–80% by weight;

pelletizing the dehydrated fibrous magnesium oxysulfate; and drying the pelletized fibrous magnesium oxysulfate.

5,021,227

METHOD OF REMOVING NITROGEN OXIDES IN EXHAUST GASES FROM A DIESEL ENGINE

Motonobu Kobayashi; Futoru Kinoshita; Mitsuharu Hagi, all of Hyogo; Akira Inoue, and Terushige Uno, both of Osaka, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Filed Feb. 2, 1990, Ser. No. 474,274

Claims priority, application Japan, Feb. 2, 1989, 1-25209; Feb. 2, 1989, 1-25210

Int. Cl.^{5} B01D *47/00, 51/34;* **B01J** *8/00;* **C01B** *21/00*

U.S. Cl. 423—212 7 Claims

1. A method of removing nitrogen oxides in exhaust gases from a diesel engine, comprising the steps of:

using a catalyst in a reactor under the presence of ammonia,

measuring in-take air humidity as a specific measuring factor and at least one of engine power, fuel consumption, engine in-take air temperature and exhaust gas temperature as other measuring factors,

controlling the flow rate of ammonia based on said measured factors, and

supplying said controlled flow of ammonia into an exhaust gas flow channel from the engine to the reactor.

5,021,228

CONTROL OF SOX EMISSION

Pei-Shiog E. Dai, Port Arthur, and Edward H. Holst, Nederland, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Oct. 23, 1989, Ser. No. 425,157

Int. Cl.^{5} B01J *8/00;* **C01B** *17/00;* **C10G** *11/00, 11/02*

U.S. Cl. 423—244 18 Claims

1. A process for removing a gaseous sulfur component from a mixture of gases containing sulfur oxides which comprises

contacting said mixture of gases containing sulfur oxides at 800° F.-1500° F. with a composite containing a porous refractory support bearing as a first component (i) of 0.5 wt. %-10 wt. % of at least one metal of the actinium series and as a second component (ii) 1 wt. %-5 wt. % of at least one alkali metal.

5,021,229

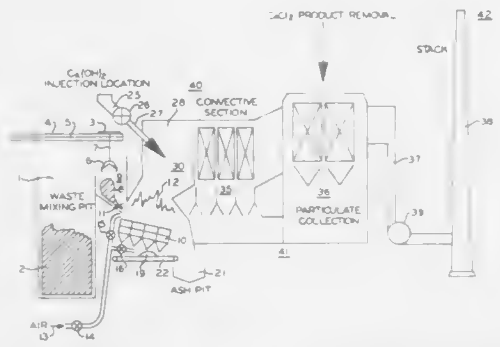
REDUCTION OF CHLORINATED ORGANICS IN THE INCINERATION OF WASTES

Brian K. Gullett, Durham, N.C., assignor to The United States of America as represented by the Environmental Protection Agency, Washington, D.C.

Filed Dec. 21, 1988, Ser. No. 287,495

Int. Cl.^{5} B01J *8/08*

U.S. Cl. 423—245.3 15 Claims



1. In a waste incinerator, including a combustion chamber nd a stack through which the flue gas produced by the combustion of waste material in the combustion chamber passes for emission into the atmosphere, an improved method of reducing the missions into the atmosphere of flue gases including chlorinated organics from the group consisting of chiorinated dioxins and furans produced by the combustion comprising the steps of:

injecting a calcium-based sorbent material selected from the group consisting of CaO, Ca(OH)$_2$, CaCO$_3$, CaCO$_3$–MgCO$_3$, CaO-CaCl$_2$, and calcium silicate into said flue gas in having a temperature the range of 400 to 900° C.;

heating said sorbent for a time sufficient for said sorbent to react with HCl in said flue gas and form CaCl$_2$ thereby to modify said flue gas by removing HCl from said flue gas;

passing said modified flue gas from said combustion chamber toward said stack with diminished HCl thereby diminishing the amount of said chlorinated organics which would otherwise have been formed;

removing residual chlorinated organics through condensation and absorption on the sorbent surface as said sorbent passes toward said stack in said modified flue gas; and releasing said flue gas into the atmosphere.

5,021,230

METHOD OF MAKING SILICON CARBIDE

Vladimir D. Krstic, 7 Lochinvar Road, Kingston, Ont., Canada K7M 6R9

Continuation-in-part of Ser. No. 41,052, Apr. 22, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 323,713

Int. Cl.^{5} C01B *31/36*

U.S. Cl. 423—345 17 Claims

1. A method of making beta-silicon carbide powder, comprising mixing carbon powder with silica powder, as reactants, the method comprising the steps of: ,(i) heating the reactants in a reaction chamber under a non-reactive gas pressure which is equal to or greater than atmospheric pressure, which maintains a carbon monoxide partial pressure sufficient to prevent significant loss of silicon monoxide until the reactants reach a temperature of between 1200 and 2000 degrees C; and (ii) subsequently maintaining the temperature of the reactants between 1200 and 2000 degrees C. to cause the reactants to react to form silicon carbide and carbon monoxide, and simultaneously applying a subatmospheric pressure to the reactants which is from about 50 millitorrs to about 500 millitorrs (i), which pressure is sufficient to remove carbon monoxide gas from the reaction chamber, while agitating the reactants to allow for passage of carbon monoxide therefrom, whereby the removal of the carbon monoxide drives the reaction to substantial completion.

5,021,231

PRODUCTION OF CHLORINE AND SODIUM SULPHATE

Just J. C. Jansz, The Hague, and Gerhardus Santing, Arnhem, both of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed May 3, 1990, Ser. No. 518,614

Claims priority, application United Kingdom, May 5, 1989, 8910387

Int. Cl.^{5} C01B *7/01;* **C01D** *5/02;* **C01G** *49/14*

U.S. Cl. 423—506 14 Claims

1. A process for the preparation of chlorine and sodium sulphate which comprises reacting sulphuric acid with sodium sulphate and ferric oxide or alumina, crystallizing and drying the resulting double salt trisodium-iron(III) sulphate or trisodium-aluminum sulphate and roasting the obtained trisodium-

VOL
1127
ISS
1
JE
4
1991
UMI

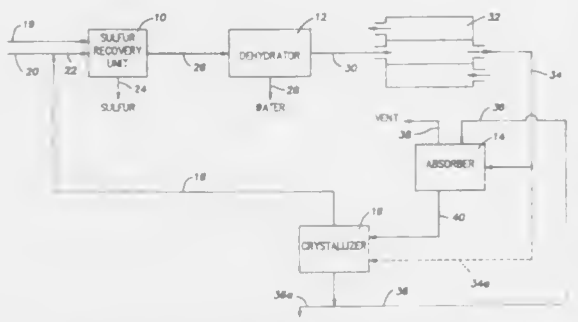
iron(III) sulphate or trisodium-aluminum sulphate with sodium chloride under the influence of oxygen thereby forming sodium sulphate, chlorine and ferric oxide or alumina.

5,021,232

SULFUR RECOVERY PROCESS

Ralph E. Hise, Shaker Heights, and W. Jeffrey Cook, Cleveland Heights, both of Ohio, assignors to CNG Research Company, Pittsburgh, Pa.

Filed Sep. 29, 1989, Ser. No. 415,100
Int. Cl.^{5} C01B *17/04;* **F25J** *3/06*
U.S. Cl. 423—574 R **36 Claims**



1. A method for recovering sulfur from a process feed stream mixture of gases comprising sulfur-containing compounds including hydrogen sulfide using the Claus reaction to convert sulfur-containing compounds to elemental sulfur and crystallization to separate sulfur-containing compounds from a tail gas of the Claus reaction for further processing as a recycle stream comprising the steps of:

- (a) providing a Claus feed stream containing a stoichiometric excess of hydrogen sulfide, said Claus feed stream including said process feed stream and said recycles stream;
- (b) introducing said Claus feed stream and an oxidizing agent into a sulfur recovery unit for converting sulfur-containing compounds in the Claus feed stream to elemental sulfur and producing a tail gas containing unconverted sulfur-containing compounds including carbonyl sulfide using the Claus reaction;
- (c) withdrawing said tail gas from said sulfur recovery unit;
- (d) separating water from said tail gas to producing a dehydrated tail gas;
- (e) separating sulfur-containing compounds including carbonyl sulfide from said dehydrated tail gas as an excluded material by crystallization and withdrawing an excluded material-enriched output from the crystallization to produce said recycle stream; and
- (f) combining said recycle stream with said process feed stream to produce said Claus feed stream in step (a).

5,021,233

WATER GAS SHIFT REACTION WITH ALKALI-DOPED CATALYST

Kamil Klier, Bethlehem; Richard G. Herman, Whiteball, and Gamimi A. Vedage, Bethlehem, all of Pa., assignors to Lehigh University, Bethlehem, Pa.

Division of Ser. No. 135,571, Dec. 27, 1987, Pat. No. 4,843,101, which is a continuation of Ser. No. 70,593, Jul. 7, 1987, abandoned, which is a continuation of Ser. No. 919,592, Oct. 17, 1986, abandoned, which is a continuation of Ser. No. 759,494, Jul. 26, 1985, abandoned, which is a continuation of Ser. No. 558,366, Dec. 5, 1983, abandoned, which is a continuation-in-part of Ser. No. 500,073, Jun. 1, 1983, Pat. No. 4,480,131. This application Jun. 26, 1989, Ser. No. 371,425
Int. Cl.^{5} C01B *3/16*
U.S. Cl. 423—656 **1 Claim**

1. A process for carrying out the water gas shift reaction in the presence of carbon monoxide and water in contact with a catalyst system selected from one of an alkaline, binary, and ternary alkalized catalyst consisting essentially of metallic copper dispersed in zinc oxide, copper dispersed in zinc oxide and chromium oxide, or copper dispersed in zinc oxide and aluminum oxide, said catalyst including a dopant comprising one or more alkali metals selected from the group of cesium, rubidium and potassium.

5,021,234

AGENT AND PRODUCT FOR THE DIAGNOSIS AND TREATMENT OF TUMORS AND FOR THE TREATMENT OF WEAKNESSES OF THE CELLULAR AND HUMORAL IMMUNE DEFENSE

Udo Ehrenfeld, Furtmayrstr. 20, 8400 Regensburg, Fed. Rep. of Germany

Continuation of Ser. No. 689,728, Jan. 8, 1985, abandoned, which is a continuation-in-part of Ser. No. 557,738, Dec. 2, 1983, abandoned. This application Feb. 26, 1990, Ser. No. 485,757
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1983, 3334751; Oct. 7, 1983, 3336583; Jan. 24, 1984, 3402312
Int. Cl.^{5} A61K *49/02, 37/22;* **C12N** *1/00, 1/20*
U.S. Cl. 424—1.1 **14 Claims**

1. An agent for the diagnosis and treatment of malignant tumors and for the treatment of reduced cellular and humoral immune defense, comprising a pharmaceutical carrier and an a immune modulator which is an extract from bacteria or a mixture of bacteria extracts, wherein the bacteria are selected from the group consisting of Norcardia rubra, Nocardia opaca, Calmette-Guerin bacillus and salmonella, and which immune modulator is (1) tagged with a radioactive tracer, dyestuff or cytostatic or a mixture of such tagged immune modulators, or (2) tagged with a radioactive tracer, dyestuff or cytostatic or a mixture of such tagged immune modulators or tagged with tin-II-chloride (a) in and on liposomes or (b) in or on liposomes or (c) lipidized.

5,021,235

PREPARATION OF RHENIUM PHOSPHONATE THERAPEUTIC AGENTS FOR BONE CANCER WITHOUT PURIFICATION

David W. Pipes, St. Louis, Mo., assignor to Mallinckrodt, Inc., St. Louis, Mo.

Filed May 2, 1989, Ser. No. 346,411
Int. Cl.^{5} A61K *43/00;* **C01G** *47/00*
U.S. Cl. 424—1.1 **9 Claims**

1. A process for preparing a rhenium therapeutic agent which does not require purification prior to administration comprising:

- (a) preparing a first aqueous solution of rhenium in the form of radioactive perrhenate, the concentration of rhenium in said solution within the range of about 5×10^{31} ^{6}M to about 2×10^{-3}M; and
- (b) reducing and complexing the radioactive perrhenate by mixing the first solution with either a second solution or a lyophilized solid form thereof, said second solution or said solid comprising a ligand which complexes with the radioactive perrhenate and a reductant wherein the reductant is present at a concentration in the range of about 0.005M to about 0.020M and the ligand is present at a concentration in the range of about 0.01M to about 0.15M;

wherein the pH of the resultant solution is within the range of about 1.5 to about 5.5.

5,021,236

METHOD OF ENHANCING NMR IMAGING USING CHELATED PARAMAGNETIC IONS BOUND TO BIOMOLECULES

Heinz Gries; Douwe Rosenberg; Hanns-Joachim Weinmann; Ulrich Speck; Wolfgang Mützel; Georg-Alexander Hoyer, all of Berlin, and Heinrich Pfeiffer, deceased, late of Berlin, all of Fed. Rep. of Germany by Brigitte Pfeiffer, executrix , assignors to Schering Aktiengesellschaft, Fed. Rep. of Germany

Division of Ser. No. 573,184, Jan. 23, 1984, Pat. No. 4,647,447, which is a continuation-in-part of Ser. No. 401,594, Jul. 26, 1982, abandoned. This application Mar. 2, 1987, Ser. No. 20,300
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1981, 3129906; Jan. 21, 1983, 3302410; Jan. 11, 1984, 3401052
Int. Cl. A61K *49/00*
U.S. Cl. 424—9 **148 Claims**

1. A method of imaging body tissue in a patient, comprising subjecting the patient to NMR tomography and prior to performing the NMR tomography administering to the patient an effective amount of a pharmaceutical agent for affecting the relaxation times of atoms in body tissue undergoing NMR diagnosis, whereby image contrast is enhanced, said agent comprising an amount, effective to affect such relaxation times, of a paramagnetic, physiologically compatible chelate complex of an ion of a lanthanide element of atomic numbers 58–70 or of a transition metal of atomic numbers 21–29, 42, or 44, wherein said chelate complex is bound to a biomolecule effective to transport said chelate complex to a specific site in said patient; and a pharmaceutically acceptable carrier.

5,021,237

GEL INSECTICIDAL COMPOSITIONS

Francis J. Bruey, Bloomfield, N.J., assignor to The Clorox Company, Oakland, Calif.

Filed Nov. 27, 1989, Ser. No. 441,594
Int. Cl.^{5} A01N *25/02;* **A61K** *31/155, 37/52, 9/00*
U.S. Cl. 424—43 **6 Claims**

1. An insecticidal gel composition for aerosol application for destroying cockroaches which comprises, by weight, 20 to 40% of a sugar, 0.25 to 1% of a pentadienone insecticide, 2.3–4% stearic acid, 5 to 7% of ethanol or propanol, 0.15 to 0.2% of an antimicrobial agent, about 3.0% cetyl/stearyl alcohol, 50% to 65% water, 0.2 to 0.36% of a base, 0.05 to 0.20% polydimethyl siloxane, 0 to 5% glycerin, and 3 to 7% propane.

5,021,238

WATER-BASED TWO-PHASE AEROSOL HAIRSPRAYS

Gary T. Martino, Plainsboro, and Frank A. Nowak, Jr., Somerville, both of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Sep. 18, 1989, Ser. No. 408,659
Int. Cl.^{5} A61K *7/11*
U.S. Cl. 424—47 **9 Claims**

1. In an aerosol hair-fixing composition which comprises one or more hair-fixing resins, water, and dimethyl ether, the improvement consisting essentially of

- (i) using the dimethyl ether and water in a ratio greater than 0.5/1 (wt/wt) such that two liquid phases are present, and
- (ii) employing an effective amount of hair-fixing resin, such that no precipitated resin is present, and characterized in that the two liquid phases, when shaken, form an emulsion which does not separate for at least 10 seconds.

5,021,239

USE OF M-CSF TO IMPROVE LIPOPROTEIN CHOLESTEROL PROFILES

Marc Garnick, Brookline, Mass., assignor to Genetics Institute, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 170,478, Mar. 21, 1988. This application Dec. 8, 1988, Ser. No. 281,432
Int. Cl.^{5} A61K *37/02*
U.S. Cl. 424—85.1 **1 Claim**

1. A method for lowering cholesterol levels in a primate comprising administering to said primate a cholesterol reducing amount of a pharmaceutical composition comprising M-CSF in admixture with a pharmaceutically acceptable carrier.

5,021,240

WS7622A, B, C AND D SUBSTANCES, DERIVATIVES THEREOF, PROCESSES FOR PREPARATION THEREOF AND USE THEREOF

Hiroshi Hatanaka, Ibaraki; Masami Ezaki, Tsukuba; Eisaku Tsujii, Tsukuba; Masanori Okamoto, Tsukuba; Nobuharu Shigematsu, Tsukuba; Masakuni Okuhara, Tsukuba, and Shigehiro Takase, Tsukuba, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Feb. 21, 1990, Ser. No. 482,822
Claims priority, application United Kingdom, Mar. 14, 1989, 8905817; Sep. 11, 1989, 8920485; Sep. 18, 1989, 8921078; Oct. 2, 1989, 8922164
Int. Cl.^{5} C12R *1/465;* **C12P** *1/04;* **A61K** *35/74, 31/71*
U.S. Cl. 424—118 **7 Claims**

1. WS7622 components and their pharmaceutically acceptable salts, selected from WS7622A substance, WS7622B substance, WS7622C substance and WS7622D substance, physicochemical properties of which are as follows:

WS7622A substance		
Appearance		colorless prism
Nature of substance		acidic
Color reaction		positive; cerium sulfate, iodine vapor negative; ninhydrin, Molish
Solubility		soluble; methanol, ethanol, n-butanol sparingly soluble; chloroform, acetone, ethyl acetate insoluble; water, n-hexane
Thin Layer Chromatography (TLC)		
chloroform-methanol (5:1, V/V)		Rf 0.51
acetone-methanol (10:1) (Kiesel gel 60 F254 silica gel plate, Merck)		0.62
Melting point		250–252° C. (dec.)
Specific rotation		$[\alpha]_D^{23}$ + 36° (c = 1.0, MeOH)
UV spectrum	λ_{max}^{MeOH}	287 nm (ϵ = 3600)
	$\lambda_{max}^{MeOH-HCl}$	287 nm
	$\lambda_{max}^{MeOH-NaOH}$	298 nm
Molecular formula		$C_{47}H_{63}N_9O_{13}$
Elemental analysis		
calcd. $C_{47}H_{63}N_9O_{13}.2H_2O)$;		C 56.56, H 6.77, N 12.63%
found;		C 56.65, H 6.62, N 12.27%
Molecular weight		FAB-MS m/z 984 (M + Na)$^+$
Infrared absorption spectrum :		
ν_{max}^{KBr}		3400, 3300, 3060, 2980, 2940, 1735, 1710, 1690, 1670, 1660, 1640, 1540, 1520, 1470, 1380, 1330, 1300, 1260 1220, 1200, 1160, 1130, 1090, 1000, 980, 940, 920 cm^{-1}

^{1}H Nuclear magnetic resonance spectrum (400MHz, CD_3OD) δ	
7.22–7.09	(3H, m)
6.88–6.77	(3H, m)
6.74	(1H, s)
6.46	(1H, s)
5.46	(1H, m)
5.18	(1H, s)
4.85	(1H, s)
4.77	(1H, m)
4.65	(1H, m)
4.50	(1H, m)
3.96	(1H, m)
3.91	(1H, d, J = 9Hz)

VOL
1127
ISS
1
JE
4
1991
UMI

-continued

3.60–3.47	(2H, m)
3.03	(1H, m)
2.90	(3H, s)
2.86	(1H, m)
2.59–2.49	(2H, m)
2.39	(1H, m)
2.29–2.16	(2H, m)
2.00	(1H, m)
1.84	(1H, m)
1.74	(3H, d, J = 6Hz)
1.72–1.53	(4H, m)
1.44	(3H, d, J = 6Hz)
1.12	(1H, m)
1.10	(6H, d, J = 6Hz)
0.99	(3H, d, J = 6Hz)
0.94	(3H, d, J = 6Hz).

^{3}C Nuclear magnetic resonance spectrum (100MHz, CD_3OD) δ

179.7	(s)
176.3	(s)
174.7	(s)
173.3	(s)
172.4	(s)
171.4	(s)
170.3	(s)
165.8	(s)
160.2	(s)
145.7	(s)
145.6	(s)
137.5	(s)
134.0	(d)
131.4	(s)
130.6	(d) × 2
129.8	(s)
129.1	(d) × 2
129.1	(s)
127.6	(d)
119.1	(d)
118.0	(d)
76.0	(d)
73.4	(d)
63.1	(d)
61.4	(d)
57.1	(d)
53.6	(d)
52.7	(d)
50.5	(d)
39.9	(t)
36.1	(t)
35.8	(d)
31.8	(q)
31.0	(t)
30.8	(d)
29.9	(t)
29.7	(t)
25.2	(t)
22.3	(t)
20.2	(q)
20.0	(q) × 2
19.7	(q)
19.5	(q)
13.3	(q)

WS7622B substance	
Appearance	colorless needles
Nature of substance	acidic
Color reaction	positive; cerium sulfate, iodine vapor, ferric chloride negative; ninhydrin, Molish, Dragendorff
Solubility	soluble; methanol, ethanol, n-butanol sparingly soluble; chloroform, acetone insoluble; water, n-hexane
Thin Layer Chromatography (TLC) chloroform-methanol (5:1, V/V) (Kiesel gel 60 F254 silica	Rf 0.55

-continued

gel plate, Merck)	
Melting point	248–250° C. (dec.)
Specific rotation	$[\alpha]_D^{23}$ + 39° (C = 1.0, MeOH)
UV Spectrum	λ_{max}^{MeOH} 287 nm (ϵ = 3800) $\lambda_{max}^{MeOH-HCl}$ 287 nm $\lambda_{max}^{MeOH-NaOH}$ 299 nm
Molecular formula	$C_{48}H_{65}N_9O_{13}$
Elemental analysis	
calcd. ($C_{48}H_{65}N_9O_{13}$.3-H_2O);	C 55.96, H 6.95, N 12.24%
found;	C 55.84, H 7.05, N 12.12%
Molecular weight	FAB-MS m/z 998 (M + Na)$^+$
Infrared absorption spectrum ν_{max}^{KBr}	3400, 3300, 2960, 1735, 1680, 1660, 1640, 1540, 1520, 1460, 1400, 1380, 1330, 1290, 1250, 1200, 1180, 1150, 1130, 1080, 1050, 1000, 980, 940, 920 cm^{-1}

^{1}H Nuclear magnetic resonance spectrum (400MHz, DMSO-d_6) δ

9.48	(1H, broad s)
9.03	(1H, broad s)
8.76	(1H, broad s)
8.30	(1H, broad d, J = 6Hz)
7.77	(1H, d, J = 7Hz)
7.21	(1H, d, J = 8Hz)
7.20–7.11	(3H, m)
6.97	(1H, broad d, J = 7Hz)
6.80	(2H, d, J = 8Hz)
6.72	(1H, broad s)
6.67	(1H, s)
6.63	(1H, q, J = 7Hz)
6.37	(1H, s)
5.48	(1H, m)
5.40	(1H, m)
5.09	(1H, m)
4.77	(1H, m)
4.64	(1H, m)
4.38	(1H, m)
4.31	(1H, m)
3.87–3.80	(2H, m)
3.40–3.30	(2H, m)
2.95	(1H, m)
2.79	(3H, s)
2.65	(1H, m)
2.40–2.20	(4H, m)
2.00	(1H, m)
1.87	(1H, m)
1.73	(1H, m)
1.65	(3H, d, J = 7Hz)
1.65–1.40	(5H, m)
1.32	(3H, d, J = 6Hz)
1.27	(1H, m)
0.97	(3H, d, J = 6Hz)
0.97	(1H, m)
0.91	(3H, d, J = 6Hz)
0.88	(3H, d, J = 6Hz)
0.81	(3H, t, J = 7Hz)

^{13}C Nuclear magnetic resonance spectrum (100MHz, DMSO-d_6) δ

175.6	(s)
174.8	(s)
172.0	(s)
170.9	(s)
170.6	(s)
170.3	(s)
168.7	(s)
162.5	(s)
157.4	(s)
144.2	(s)
144.2	(s)

-continued

136.5	(s)
131.1	(d)
130.7	(s)
129.6	(d) × 2
128.4	(s)
127.9	(d) × 2
127.8	(s)
126.4	(d)
118.9	(d)
116.8	(d)
74.2	(d)
72.1	(d)
61.0	(d)
59.8	(d)
55.2	(d)
51.6	(d)
50.8	(d)
48.6	(d)
40.9	(d)
38.2	(t)
35.0	(t)
30.8	(q)
29.8	(t)
28.8	(d)
28.4	(t)
28.1	(t)
27.1	(t)
23.3	(t)
21.2	(t)
19.6	(q)
19.1	(q)
19.0	(q)
17.7	(q)
12.9	(q)
11.9	(q)

WS7622C substance	
Appearance	colorless needles
Nature of substance	acidic
Color reaction	positive; cerium sulfate, iodine vapor, ferric chloride negative; ninhydrin, Molish, Dragendorff
Solubility	soluble; methanol, ethanol sparingly soluble; chloroform, acetone, ethyl acetate insoluble; water, n-hexane
Thin Layer Chromatography (TLC) chloroform-methanol (4:1, V/V) (Kiesel gel 60 F254 silica gel plate, Merck)	Rf 0.56
Melting point	250–252° C. (dec.)
Specific rotation	$[\alpha]_D^{23}$ + 36° (C = 0.5, MeOH)
UV spectrum	λ_{max}^{MeOH} 287 nm (ϵ = 3500) $\lambda_{max}^{MeOH-HCl}$ 287 nm $\lambda_{max}^{MeOH-NaOH}$ 298 nm
Molecular formula	$C_{46}H_{61}N_9O_{13}$
Elemental analysis	
calcd ($C_{46}H_{61}N_9O_{13}.6H_2O$);	C 52.31, H 6.97, N 11.94%
found	C 51.95, H 6.66 N 11.77%
Molecular weight	FAB-MS m/z 970 (M + Na)$^+$
Infrared absorption spectrum : ν_{max}^{KBr}	3400, 3300, 2980, 1740, 1700, 1660, 1640, 1540, 1470, 1450, 1410, 1335, 1260, 1230, 1200, 1160, 1140, 1070, 1010, 980, 940, 920, 880 cm^{-1}

^{1}H Nuclear magnetic resonance spectrum (400MHz, CD_3OD) δ

7.21–7.10	(3H, m)
6.86–6.77	(3H, m)
6.75	(1H, s)
6.47	(1H, s)
5.46	(1H, m)
5.18	(1H, m)
4.85	(1H, s)

-continued

4.74	(1H, m)
4.65	(1H, m)
4.51	(1H, m)
3.94	(1H, m)
3.90	(1H, d, J = 10Hz)
3.58–3.46	(2H, m)
3.02	(1H, m)
2.90	(3H, s)
2.86	(1H, m)
2.55	(1H, m)
2.38	(1H, dd, J = 14 and 11Hz)
2.28	(2H, q, J = 7Hz)
2.30–2.16	(2H, m)
1.99	(1H, m)
1.84	(1H, m)
1.75	(3H, d, J = 7Hz)
1.78–1.54	(4H, m)
1.44	(3H, d, J = 6.5Hz)
1.13	(3H, t, J = 7Hz)
1.12	(1H, m)
1.01	(3H, d, J = 6.5Hz)
0.97	(3H, d, J = 6.5Hz)

^{13}C Nuclear magnetic resonance spectrum (100MHz, CD_3OD) δ

176.7	(s)
176.4	(s)
174.7	(s)
173.4	(s)
172.5	(s)
171.4	(s)
170.4	(s)
165.8	(s)
160.4	(s)
145.8	(s)
145.7	(s)
137.5	(s)
134.0	(d)
131.4	(s)
130.6	(d) × 2
129.8	(s)
129.1	(d) × 2
129.1	(s)
127.7	(d)
119.1	(d)
118.0	(d)
76.0	(d)
73.5	(d)
63.1	(d)
61.4	(d)
57.1	(d)
53.7	(d)
52.7	(d)
50.5	(d)
39.9	(t)
36.1	(t)
31.8	(q)
31.0	(t)
30.8	(d)
29.9	(t)
29.7	(t)
29.7	(t)
25.3	(t)
22.3	(t)
20.2	(q)
19.4	(q)
19.4	(q)
13.3	(q)
10.3	(q)

WS7622D substance	
Appearance	colorless needles
Nature of substance	acidic
Color reaction	positive; cerium sulfate, iodide vapor, ferric chloride negative; ninhydrin, Molish, Dragendorff
Solubility	soluble; methanol, ethanol sparingly soluble; water, chloroform insoluble;

VOL
1127
ISS
1
JE
4
1991
UMI

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	n-hexane
Thin Layer Chromatography (TLC) chloroform-methanol (4:1, V/V) (Kiesel gel 60 F254 silica gel plate, Merck)	Rf 0.45
Melting point	250–252° C. (dec.)
Specific rotation	$[\alpha]_D^{24}$ + 35.8° (C = 0.5, MeOH)
UV spectrum	λ_{max}^{MeOH} 287 nm ($\epsilon = 3640$) $\lambda_{max}^{MeOH-HCl}$ 287 nm $\lambda_{max}^{MeOH-NaOH}$ 298 nm
Molecular formula	$C_{45}H_{59}N_9O_{13}$
Elemental analysis	
calcd. ($C_{45}H_{59}N_9O_{13}.6H_2O$);	C 51 86, H 6.87, N 12.10%
found:	C 51 90, H 6.26, N 12.08%
Molecular weight	FAB-MS m/z 956 $(M + Na)^+$
Infrared absorption spectrum ν_{max}^{KBr}	3360, 2950, 1730, 1700, 1680, 1660, 1640, 1530, 1460, 1380, 1330, 1290, 1250, 1200, 1170, 1160, 1140, 1080, 980, 940, 920, 880 cm^{-1}

^{1}H Nuclear magnetic resonance spectrum (400MHz, CD_3OD) δ

7.20–7.10	(3H, m)
6.85–6.77	(3H, m)
6.73	(1H, s)
6.46	(1H, s)
5.46	(1H, m)
5.18	(1H, m)
4.84	(1H, s)
4.73	(1H, m)
4.64	(1H, m)
4.50	(1H, m)
3.99–3.87	(2H, m)
3.58–3.46	(2H, m)
3.01	(1H, m)
2.90	(3H, s)
2.87	(1H, m)
2.53	(1H, m)
2.38	(1H, dd, J = 14 and 11Hz)
2.30–2.16	(2H, m)
2.00	(1H, m)
1.99	(3H, s)
1.84	(1H, m)
1.75	(3H, d, J = 7Hz)
1.76–1.55	(4H, m)
1.43	(3H, d, J = 6.5Hz)
1.15	(1H, m)
1.00	(3H, d, J = 6.5Hz)
0.95	(3H, d, J = 6.5Hz)

^{3}C Nuclear magnetic resonance spectrum (100MHz, CD_3OD) δ

176.4	(s)
174.6	(s)
173.4	(s)
173.0	(s)
172.4	(s)
171.4	(s)
170.4	(s)
165.8	(s)
160.3	(s)
145.9	(s)
145.9	(s)
137.5	(s)
134.0	(d)
131.4	(s)
130.6	(d) × 2
129.8	(s)
129.1	(d) × 2
129.1	(s)
127.6	(d)
119.0	(d)
118.0	(d)
76.0	(d)
73.5	(d)
63.1	(d)
61.3	(d)
57.1	(d)
53.9	(d)
52.7	(d)
50.5	(d)
39.9	(t)
36.1	(t)
31.8	(q)
31.0	(t)
30.7	(d)
29.9	(t)
29.6	(t)
25.3	(t)
22.4	(q)
22.3	(t)
20.2	(q)
19.5	(q)
19.4	(q)
13.3	(q)

5,021,241

LONG-TERM SUSTAINED-RELEASE PREPARATION

Yoshiya Yamahira, Kobe; Keiji Fujioka, Amagasaki; Shigeji Sato, Ibaraki, and Yoshihiro Takada, Takatsuki, all of Japan, assignors to Sumitomo Pharmaceuticals Company, Limited, Osaka, Japan

Division of Ser. No. 846,193, Mar. 31, 1986, Pat. No. 4,774,091, which is a continuation-in-part of Ser. No. 660,052, Oct. 12, 1984, abandoned. This application Apr. 28, 1988, Ser. No. 187,443

Claims priority, application Japan, Oct. 14, 1983, 58-193064; Nov. 1, 1983, 58-206226; Dec. 14, 1983, 58-236994; Dec. 14, 1983, 58-236995; Dec. 14, 1983, 58-236996; Apr. 11, 1985, 60-77250

Int. Cl.^{5} A61K *37/24*

U.S. Cl. 424—426 **23 Claims**

1. A solid sustained-release preparation for injection or implantation into the body consisting essentially of a pharmaceutically active ingredient and a pharmaceutically acceptable protein carrier in the form of a needle-like or bar-like shape, which is prepared by a process comprising the steps of: mixing under aqueous conditions a physiologically active ingredient that is unstable to heat and a pharmaceutically acceptable biodegradable protein carrier to incorporate the active ingredient in a carrier matrix to a degree sufficient to provide sustained-release properties, and subjecting the mixture to drying and forming.

5,021,242

SOLID DRUG PREPARATIONS CONTAINING MICRONIZED CRYSTALS OF EBSELEN

Axel Römer, Hürth-Gleuel, and Jürgen Seidel, Pulheim, both of Fed. Rep. of Germany, assignors to A. Nattermann & Cie GMBH, Cologne, Fed. Rep. of Germany

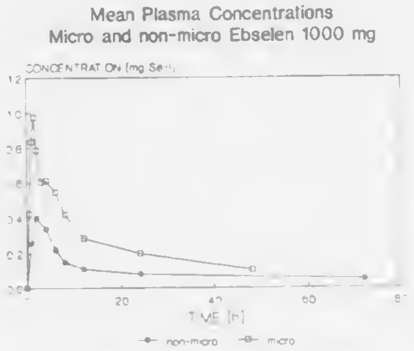
Filed Jun. 20, 1988, Ser. No. 209,325

Claims priority, application Fed. Rep. of Germany, Jun. 20, 1987, 3720493

Int. Cl.^{5} A61K *9/02*

U.S. Cl. 424—436 **2 Claims**

1. Solid drug preparations of 2-phenyl-1,2-benzisoselenazol-3(2H)-one with high bioavailability thereof, characterized in that they contain 2-phenyl-1,2-benzisoselenazol-3(2H)-one in the form of micronized crystals having an average particle diameter from about 0.5 to about 2 μm, and said preparations are in the form of tablets, pills, dragees, capsules or suppositories.



5,021,243

PROCESS FOR THE PREPARATION OF FACTOR VIII:C-DEFICIENT PLASMA, AND A DEFICIENT PLASMA OBTAINED IN THIS WAY

Udo Becker, München; Norbert Heimburger, Marburg, and Konrad Braun, Ebsdorfergrund, all of Fed. Rep. of Germany, assignors to Behringwerke Akitengesellschaft, Marburg, Fed. Rep. of Germany

Filed Mar. 4, 1988, Ser. No. 164,486

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1987, 3707213

Int. Cl.^{5} A61K *35/16*

U.S. Cl. 424—530 **7 Claims**

1. A process for the preparation of a factor VIII:C-deficient plasma from a starting plasma using immobilized antibodies, which comprises contacting the starting plasma successively with immobilized antibodies against von Willebrand factor and against factor VIII:AG.

5,021,244

SEX-ASSOCIATED MEMBRANE ANTIBODIES AND THEIR USE FOR INCREASING THE PROBABILITY THAT OFFSPRING WILL BE OF A DESIRED SEX

Glenn F. Spaulding, Phoenix, Ariz., assignor to Cytogam, Inc., Chandler, Ariz.

Continuation of Ser. No. 282,922, Dec. 6, 1988, abandoned, which is a continuation of Ser. No. 35,986, Apr. 8, 1987, abandoned. This application May 12, 1989, Ser. No. 351,642

Int. Cl.^{5} A01N *1/02;* **A61K** *35/52*

U.S. Cl. 424—561 **19 Claims**

1. An antibody which binds to a mammalian X sex-associated membrane (X-SAM) protein, said antibody being essentially free of antibodies which bind to a mammalian Y sex-associated membrane protein, to the H-Y antigen, or to non-sex-specific components of the sperm plasma membrane.

2. An antibody which binds to a mammalian Y sex-associated membrane (Y-SAM) protein, said antibody being essentially free of antibodies which bind to a mammalian X sex-associated membrane protein, to the H-Y antigen, or to non-sex-specific components of the sperm plasma membrane.

7. A mammalian semen sample enriched for Y-sperm comprising viable Y-sperm and X-sperm substantially inactivated with the antibody of claim 1.

8. A mammalian semen sample enriched for X-sperm comprising viable X-sperm and Y-sperm substantially inactivated with the antibody of claim 2.

5,021,245

INFANT FORMULA CONTAINING A SOY POLYSACCHARIDE FIBER SOURCE

Marlene W. Borschel, Worthington; John D. Benson, Dublin; Merle D. Breen, Westerville; William C. MacLean, Jr., Upper Arlington; Debra L. Ponder, Worthington, all of Ohio; Alan D. Strickland, Dallas, Tex., and William R. Treem, Avon, Conn., assignors to Abbott Laboratories, Abbott Park, Ill.

Filed May 22, 1990, Ser. No. 526,912

Int. Cl.^{5} A23C *9/20*

U.S. Cl. 426—2 **17 Claims**

1. An infant formula, said formula comprising:
1) protein, said protein being of a concentration of between 10 and 25 grams per liter of formula;
2) fat, said fat being of a concentration of between 20 and 45 grams per liter of formula;
3) carbohydrates, said carbohydrates including those from total dietary fiber being of a concentration of between 60 and 110 grams per liter of formula; and
4) total dietary fiber, said fiber being of a concentration of above 3.1 and below 14.1 grams per liter of formula and wherein the source of said fiber is soy polysaccharide derived from soy beans.

5,021,246

STEP MASHING PROCESS FOR PRODUCING LOW ALCOHOL BEER

Roger L. Sieben, Webster Groves, and Klaus D. Zastrow, St. Louis County, both of Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.

Continuation-in-part of Ser. No. 595,315, Mar. 30, 1984, abandoned. This application Mar. 28, 1985, Ser. No. 716,989

Int. Cl.^{5} C12C *7/00/7/04, 11/00*

U.S. Cl. 426—13 **25 Claims**

1. A process for mashing to produce a wort of low fermentable sugar content but high carbohydrate content, comprising the steps of
(a) forming a main mash,
(b) maintaining the temperature of the main mash below the activity range for beta-amylase,
(c) adding the main mash incrementally into a body of brewing liquid which is maintained at a temperature above the deactivation temperature of beta-amylase and below the deactivation temperature of alpha-amylase, at a rate such that the added main mash is substantially instantaneously raised to the temperature of the body of liquid to limit the conversing of starches by beta-amylase and other enzymes without significant loss of alpha-amylase from overheating, whereby, upon completion of mashing, the wort has a low real degree of fermentation of from about 40% to about 46%.

5,021,247

HIGH INTEGRITY NATURAL NITROGENOUS GRANULES FOR AGRICULTURE

William P. Moore, Hopewell, Va., assignor to Harmony Products, Inc., Chesapeake, Va.

Division of Ser. No. 463,254, Jan. 10, 1990. This application Jun. 11, 1990, Ser. No. 536,698

Int. Cl.^{5} A23K *1/22*

U.S. Cl. 426—69 **3 Claims**

1. A method of preparing high integrity natural nitrogenous animal feed supplements, comprising:
(a) healing natural nitrogenous materials containing between 5 and 70 percent moisture selected from the group consisting of soybean meal, poultry feather meal, corn gluten meal, hair meal, seafood meal, meat and bone meal, blood meal, and grain by products, under basic conditions at a pH between about 8 and 14, at a temperature between about 40° and 100° C. until between about 5 and 20 percent of the natural nitrogen is water soluble and the nitrogenous materials exhibit adhesive properties;

VOL 1127
ISS 1
JE 4
1991
UMI

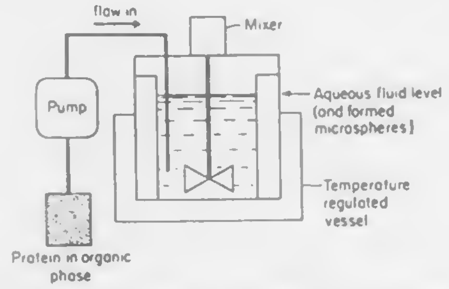
(b) forming the nitrogenous materials into granules by mechanical means while the materials exhibit adhesive properties, the mechanical means comprising a mechanically fluided bed;

(c) heating the natural nitrogenous granules at a temperature between 75° and 100° C. until they harden and exhibit no adhesive properties.

5,021,248

HYDROPHOBIC PROTEIN MICROPARTICLES AND PREPARATION THEREOF

Leonard E. Stark, Naperville, Ill., and Akiva T. Gross, Newton, Mass., assignors to Enzytech, Inc., Cambridge, Mass.
Continuation-in-part of Ser. No. 246,435, Sep. 19, 1988, abandoned. This applicatinn Sep. 1, 1989, Ser. No. 403,111
Int. Cl.^{5} A23J *1/12;* **C08H** *1/00*
U.S. Cl. 426—96 **41 Claims**


flow in
Mixer
Pump
Aqueous fluid level (and formed microspheres)
Temperature regulated vessel
Protein in organic phase

1. Microparticles consisting essentially of hydrophobic protein, said hydrophobic protein being water-insoluble in its non-denatured state, said microparticles having a generally spherical shape and a median particle size of less than about 200 microns and said microparticles being water-dispersible whereby they are freely dispersible in an aqueous medium to form a homogeneous non-aggregated suspension of said microparticles.

5,021,249

METHOD OF MAKING A SAVORY FLAVOR GRANULE AND A FREE FLOWING SAVORY FLAVOR GRANULE

Frank J. Bunick, Budd Lake; Shiuh J. Luo, Morris Plains; James J. Shaw, Morristown, and Stephen R. Hellman, Mt. Tabor, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed Nov. 9, 1989, Ser. No. 433,873
Int. Cl.^{5} A23L *1/22*
U.S. Cl. 426—96 **42 Claims**

1. A free-flowing savory flavor granule which comprises:

a) a core composition comprising a nonsweet carbohydrate; and

b) a coating on the core comprising a flavoring material said core composition and said coating on the core being formed to produce a free flowing savory flavor granule.

5,021,250

APPARATUS AND METHOD FOR DISPENSING PURIFIED AND CARBONATED LIQUIDS

George Ferguson, Kelowna, Canada, assignor to Filtercold Corporation, Tempe, Ariz.
Continuation-in-part of Ser. No. 295,782, Jan. 10, 1989, abandoned. This application May 26, 1989, Ser. No. 358,483
Int. Cl.^{5} A23L *2/00;* **B67D** *1/00*
U.S. Cl. 426—231 **48 Claims**

40. A method for dispensing a purified and carbonated liquid, comprising the steps of:

providing purification means for purifying a liquid, said purification means having a fluid inlet and fluid outlet thereof;

providing carbonation means for charging a liquid with a carbonating gas;

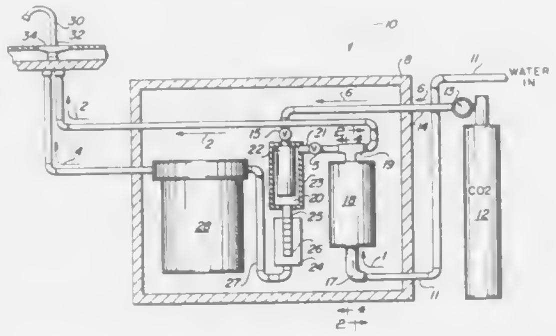
providing a carbonating gas source and associated gas conduit from said carbonating gas source to said carbonation means and in communication therewith;

introducing a flow of liquid into said purification means;

purifying said flow of liquid in said water purification means,

conducting said flow of purified liquid away from said purification means;

splitting said flow of purified water into at least two flow components;



conducting a first of said at least two flow components to said carbonation means;

conducting a second of said at least two flow components to a tap;

controlling a flow of said carbonating gas into said carbonation means in response to a pressure of said first of said at least two flow components in said carbonation means, whereby said first of said at least two flow components of purified liquid is charged with said carbonating gas; and

conducting said charged liquid away from said carbonation means to said tap.

5,021,251

PROCESS FOR PRESERVING LEMON JUICE UTILIZATING A NON-SULFITE PRESERVATIVE

Ronald J. McKenna, Camillus; David J. Keller, Syracuse, and Lauren S. Bibeau, LaFayette, all of N.Y., assignors to Borden, Inc., Columbus, Ohio
Filed Jul. 23, 1990, Ser. No. 556,758
Int. Cl.^{5} A23L *2/02*
U.S. Cl. 426—330.5 **6 Claims**

1. A process for preserving lemon juice in the absence of a sulfite agent which process comprises mixing sodium benzoate and lemon juice with one or more materials selected from the group consisting of ascorbic acid, glucose oxidase, sodium hexametaphosphate, sodium acid pyrophosphate, helium, and nitrogen, wherein the sodium benzoate is added to the lemon juice in amount of from 250 to 1200 ppm, and wherein carbon dioxide is then bubbled through the juice, wherein said lemon juice is produced in the absence of a sulfiting agent.

5,021,252

VINDICIA CONTAINING FOOD MANUFACTURING METHOD

Alvin S. Huang, Wheeling; Myron D. Nicholson, Lemont, and Rama Ramagopal, Bolling Brook, all of Ill., assignors to Viskase Corporation, Chicago, Ill.
Division of Ser. No. 285,454, Dec. 16, 1988, Pat. No. 4,917,924. This application Feb. 1, 1990, Ser. No. 473,550
Int. Cl.^{5} A23L *1/275;* **A22C** *13/00*
U.S. Cl. 426—412 **19 Claims**

1. A method for making an indicia-containing food comprising the steps of:

(a) providing a. casing article having a plasticized flexible inner surface with an aluminum-organic dye lake and a binder-carrier on said inner surface as a substrate in a desired indicia, said lake being dispersed in said carrier and bonded to said substrate by said binder-carrier in a moisture insensitive manner to form said indicia;

(b) filling said casing with water moisturized processable food such that the water moisturized food outer surface is in direct contact with said indicia on the casing inner surface;

(c) processing the food-containing casing at elevated temperature to cook said food and simultaneously substantially completely transfer said indicia from said casing inner surface to the water processed food outer surface; and

(d) peeling the casing from the indicia-containing processed food outer surface.

5,021,253

DECAFFEINATION OF LIQUID MEDIUM

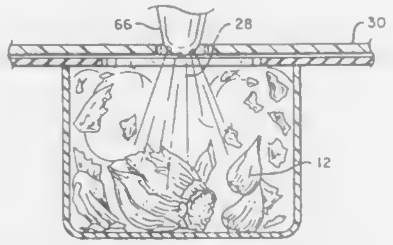
Kari R. Dawson-Ekeland, and Richard T. Stringfield, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.
Filed Dec. 13, 1989, Ser. No. 450,786
Int. Cl.^{5} A23F *5/22*
U.S. Cl. 426—422 **33 Claims**

1. An improved process of decaffeinating a liquid solution by contacting the liquid solution with an effective amount of an adsorbent resin so as to adsorb caffeine from the liquid solution onto the adsorbent resin, wherein the improvement comprises contacting the liquid solution containing caffeine with an adsorbent resin that is made from a gel copolymer of a monovinyl aromatic monomer and a crosslinking monomer, where the gel copolymer has been post-crosslinked in the swollen state in the presence of a Friedel-Crafts catalyst.

5,021,254

METHOD FOR PEELING GARLIC

Rich Fischer, Aromas; Richard Silva, Gonzales, and Henry P. Welton, Gilroy, all of Calif., assignors to Dalgety Produce, Inc., Salinas, Calif.
Division of Ser. No. 363,530, Jun. 8, 1989, abandoned. This application Jun. 4, 1990, Ser. No. 532,901
Int. Cl.^{5} A23N *7/00*
U.S. Cl. 426—482 **2 Claims**



1. A method of removing the inedible outer skins from garlic cloves, which comprises the steps of:

locating one or more garlic cloves with outer skins intact within an open-top container;

moving the container along a path with the container open top facing vertically upward and maintained spaced from a plate surface an amount sufficient to allow air to pass therebetween but insufficient to enable cloves to escape from the container;

directing a pressurized air stream downwardly through an opening in the plate onto the garlic cloves of sufficient pressure to tumble the cloves about and remove the outer skins from the cloves; and

withdrawing air and garlic clove skins from the space between the plate and the cup container open top.

5,021,255

PROCESS OF MAKING CHEESE CROQUETTES

Rene Castillo, 101 SW. 129th Ave., Miami, Fla. 33184
Continuation of Ser. No. 150,608, Feb. 1, 1988, abandoned. This application Dec. 6, 1989, Ser. No. 445,158
Int. Cl.^{5} A23 *19/086*
U.S. Cl. 426—582 **4 Claims**

I. A method of forming a product used in making cheese croquettes which comprises:

(a) forming a first component mixture by blending substantially 4 pounds of edible oil, ½ pound of salt, ¼ ounce of yellow dye and 8 liters of water and bringing the ingredients to a boil;

(b) forming a second component mixture by blending 20 pounds of wheat flour, 1½ pounds of Romano cheese and 2 ounces of monosodium glutamate;

(c) thoroughly mixing together said first component mixture and second component mixture to form a first main mixture;

(d) storing said first main mixture under refrigeration;

(e) forming a second main mixture by thoroughly blending together substantially 38 to 42 pounds of cram cheese, 2 pounds of non-fat milk and 4 pounds of Romano cheese;

(f) storing said second main mixture under refrigeration;

(g) thoroughly mixing together said first main mixture and said second main mixture and separating the resulting mixture in croquette-size portions shaped in generally cylindrical form.

5,021,256

SHORTENING COMPOSITIONS CONTAINING POLYOL POLYESTERS

Timothy B. Guffey; Donn N. Boatman, both of West Chester; Susan S. Abe, Mason, all of Ohio; Sherry R. Talkington, Florence, Ky., and Marko D. Mijac, Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio
Continuation-in-part of Ser. No. 175,004, Apr. 12, 1988, Pat. No. 4,880,657, which is a continuation-in-part of Ser. No. 47,367, May 6, 1987, abandoned. This application Nov. 6, 1989, Ser. No. 432,251
The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.
Int. Cl.^{5} A23D *9/00*
U.S. Cl. 426—601 **20 Claims**

1. A shortening composition comprising:

(a) from about 10% to about 80% by weight intermediate melting polyol fatty acid polyesters having at least 4 fatty acid ester groups, wherein the polyols are selected from the group consisting of sugars and sugar alcohols containing 4 to 8 hydroxyl groups and mixtures thereof and wherein each fatty acid group has from about 2 to about 24 carbon atoms; and wherein the polyol polyesters have: (i) a viscosity of not less than about 2.5 poise at 100° F. (37.8° C.) after 10 minutes of steady shear at a shear rate of

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10 seconds^{-1}, (ii) a liquid/solid stability of not less than about 30 percent at 100° F. (37.8° C.), and (iii) an iodine value between 15 and 55;
- (b) from about 20% to about 88% by weight soft oil comprising from about 0% to about 50%, by weight of the shortening, liquid polyol fatty acid polyesters having an iodine value between 60 and 130 and from about 20% to about 88%, by weight of the shortening, liquid triglycerides having an iodine value between 70 and 130;
- (c) from about 2% to about 20% by weight hardstock fat comprising from about 0% to about 10%, by weight of the shortening, hardstock polyol fatty acid esters and from about 2% to about 20%, by weight of the shortening, hardstock triglycerides;
- (d) from about 0% to about 50% by weight intermediate melting triglycerides; and
- (e) from about 0% to about 15% by weight other shortening ingredients;
- (f) wherein the shortening has a Solid Fat Content (SFC) such that the overall slope of the SFC curve between 50° F. (10° C.) and 105° F. (41° C.) is between 0.00 and −0.40;
- (g) wherein the shortening has a penetration between about 120 mm/10 and about 400 mm/10 at 70° F. (21° C.).

5,021,257
HOT-MELT ADHESIVE COMPOSITION

Bruce W. Foster; Clyde N. Clubb, and Richard K. Stuart, Jr., all of Longview, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 314,626, Feb. 23, 1989, Pat. No. 4,886,853, which is a continuation-in-part of Ser. No. 126,439, Nov. 30, 1987, abandoned. This application Oct. 2, 1989, Ser. No. 415,816

Int. Cl.^{5} A61K *47/32;* **C08K** *5/01;* **C09J** *3/14*

U.S. Cl. 427—2 **6 Claims**

1. A method comprising applying an adhesive composition to a disposable diaper or portion thereof, wherein said adhesive composition is a hot-melt adhesive composition having a melt viscosity of about 3,000 to about 25,000 centipoise at 135° C., a cone penetration value as measured by ASTM Procedure D-1403 of at least 10 dmm, and a Ring and Ball softening point of about 90° C., to about 125° C., said composition a blend of:
- (a) at least one substantially amorphous propylene/hexene copolymer having an acid number of less than about 0.5,
- (b) at least one tackifier, and
- (c) at least one substantially crystalline, low viscosity hydrocarbon wax containing substantially no propylene and having a melt viscosity of from about 3 to about 4,000 centipoise at 150° C. and a melting point of from about 90° C. to about 125° C.,

the concentrations of components (a), (b), and (c) being such that said adhesive composition has an elastic delamination resistance of at least about 4 hours wherein elastic delamination resistance is the length of time a polyethylene to elastic bond can withstand the stress of elastic relaxation at body temperature.

5,021,258
METHOD OF COATING FIBERS WITH METAL OR CERAMIC MATERIAL

Frederick J. McGarry, Weston, Mass., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 8, 1990, Ser. No. 564,485

Int. Cl.^{5} B05D *3/06*

U.S. Cl. 427—35 **14 Claims**

1. A process for synthesizing a coated fiber comprising the step of contacting an ordered polymer fiber with a vapor of a metal or ceramic material under reduced pressure sufficient to provide a high mean free path between the source of the vapor and the ordered polymer fiber, under conditions such that physical vapor deposition occurs.

5,021,259
METHOD OF APPLYING A CONTINUOUS THERMOPLASTIC COATING WITH ONE COATING STEP

James D. Singelyn, Newington, Conn., assignor to International Fuel Cells Corp., South Windsor, Conn.

Continuation-in-part of Ser. No. 237,924, Aug. 29, 1988, abandoned. This application Nov. 29, 1989, Ser. No. 443,856

Int. Cl.^{5} B05D *3/02, 5/08, 1/10*

U.S. Cl. 427—115 **10 Claims**

1. A method of applying a continuous, pinhole free coating of thermoplastic polymer to a porous metal surface in a single coating step comprising spraying all the thermoplastic polymer, in the form of particles, required to produce the coating in a desired thickness from a thermal spray gun at a temperature at which it will only soften the particles passing therethrough such that the particles adhere but do not completely fuse onto a porous metal surface to create a semi-fused, highly porous coating, and heating the porous metal surface onto which the thermoplastic polymer has been sprayed in order to fuse the coating of thermoplastic polymer into a well-anchored, continuous film.

5,021,260
METHOD OF PREVENTING THE DETERIORATION OF A HARDENED CEMENT-BASED MASS

Akio Kitagawa; Takahiro Hori, and Yuji Nakamura, all of Funabashi, Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Filed May 15, 1990, Ser. No. 523,416

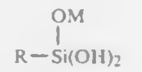
Claims priority, application Japan, May 18, 1989, 1-125255

Int. Cl.^{5} B05D *3/02, 5/10, 1/36;* **E01C** *5/12*

U.S. Cl. 427—140 **19 Claims**

1. In a method of preventing the deterioration of a hardened cement-based mass having a corrosive metallic material embedded therein, or containing an aggregate which is reactive with an alkaline substance, the improvement which comprises:

impregnating said mass with an aqueous solution containing 1 to 50% by weight of a dissolved nitrite of an alkali metal or alkaline earth metal, and 0.01 to 20% by weight of a dissolved organic silicon compound represented by general formula I, or a dissolved or emulsified polymer of said compound:



$$R-\overset{\overset{\displaystyle OM}{|}}{Si}(OH)_2 \qquad (I)$$

wherein M represents a sodium or potassium atom, and R represents a monovalent hydrocarbon group having 1 to 12 carbon atoms; and

allowing said mass to dry in the air.

5,021,261
PROCESS FOR MAKING A MANHOLE COVER SUPPORT HAVING ENHANCED GRIP

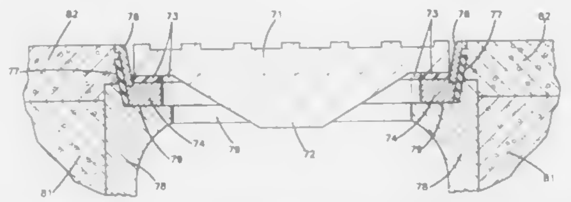
Harold M. Bowman, 18867 N. Valley Dr., Fairview Park, Ohio 44126

Division of Ser. No. 366,177, Jun. 14, 1989, Pat. No. 4,969,771, and a continuation-in-part of Ser. No. 207,326, Jun. 15, 1988, abandoned, Ser. No. 201,573, Jun. 1, 1988, Pat. No. 4,867,600, Ser. No. 207,325, Jun. 15, 1988, abandoned, Ser. No. 207,266, Jun. 15, 1988, Pat. No. 4,867,601, Ser. No. 207,185, Jun. 15, 1988, Pat. No. 4,872,780, Ser. No. 323,622, Mar. 14, 1989, abandoned, Ser. No. 362,257, Jun. 6, 1989, Pat. No. 4,963,053, Ser. No. 362,216, Jun. 6, 1989, Pat. No. 4,966,489, and Ser. No. 362,277, Jun. 6, 1989, Pat. No. 4,969,770, each is a continuation-in-part of Ser. No. 76,668, Jul. 23, 1987, Pat. No. 4,834,574. This application Feb. 1, 1990, Ser. No. 473,324

Int. Cl.^{5} B05D *5/00*

U.S. Cl. 427—286 **9 Claims**

1. In a process for the manufacture of a manhole cover support for emplacement onto and raising the grade of an existing receiving structure, the receiving structure having an upwardly extending shoulder surface and a sill therebelow for accommodating a manhole cover, wherein the manhole cover support comprises a body that is adjustable in outer perimeter dimension and has a seat with a lateral keeper for a manhole cover and a base with an outer wall that is reactable against the should surface of the receiving structure, the body being equipped with at least one spreader that provides a gap in the base and seat, the improvement which comprises applying a deposit of a fluent composition on at least a substantial portion of the outer wall, the fluent composition being curable on the outer wall to leave thereon a compressible and flexible adherent solid polymer-containing residue that has a coefficient of static friction with respect to said wall and shoulder surfaces that substantially exceeds the coefficient of static friction obtainable directly between said surfaces, and curing the resulting deposit on said outer wall.



5,021,262
WATERPROOFING/SHAPING OF QUARRIED BUILDING MATERIALS

Gerard Bouillard, Paris, and Henri Chauffriat, Lyons, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Sep. 15, 1989, Ser. No. 407,746

Claims priority, application France, Sep. 15, 1988, 88 12304

Int. Cl.^{5} B05D *3/12*

U.S. Cl. 427—289 **6 Claims**

1. A process for the production of a waterproofed and sawn quarried building material, comprising sawing a quarried building material into a structurally shaped article while concomitantly introducing water into the cutting zone, such water containing an effective waterproofing amount of a silicone emulsion.

5,021,263
AQUEOUS TEXTILE TREATMENT AGENT AND CREASE RESIST FINISHING OF TEXTILE MATERIAL

Xaver Kästele, Neusäss; Michael Bernheim, Aystetten, and Erich Rössler, Stadtbergen, all of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 316,126, Feb. 27, 1989, abandoned. This application May 21, 1990, Ser. No. 526,193

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807030

Int. Cl.^{5} B05D *3/02*

U.S. Cl. 427—353 **13 Claims**

4. A process for the crease resist finishing of textile material consisting at least partly of cellulose or regenerated cellulose fibers which comprises treating said material with an aqueous liquor containing effective amounts of a 1,3-dialkyl-4,5-dihydroxyimidazolidinone whose hydroxyl groups may be wholly or partly etherified with a low monohydric alcohol, 2-methyl-2,4-pentanediol or a polyhydric alcohol of formula I a) or I b) and a customary catalyst, drying, heating and finalizing in a conventional manner, wherein the aqueous liquor contains 2-methyl-2,4-pentanediol or a polyhydric alcohol of the general formula I a) or I b) as defined in claim 1 as such or at least partially etherified with the imidazolidinone.

12. The process according to claim 4, wherein after heating the textile material is additionally washed.

5,021,264
AQUEOUS TEXTILE TREATMENT AGENT AND CREASE RESIST FINISHING OF TEXTILE MATERIAL

Xaver Kästele, Neusäss; Michael Bernheim, Aystetten, and Erich Rössler, Stadtbergen, all of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 316,126, Feb. 27, 1989, abandoned. This application May 21, 1990, Ser. No. 526,192

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807030

Int. Cl.^{5} B05D *3/02*

U.S. Cl. 427—353 **12 Claims**

4. A process for the crease resist finishing of textile material consisting at least partly of cellulose or regenerated cellulose fibers by treatment with an aqueous liquor containing effective amounts of a 1,3-dialkyl-4,5-dihydroxyimidazolidinone whose hydroxyl groups may be wholly or partly etherified with a low monohydric alcohol, 1,1,1,-trimethylolpropane and a customary catalyst, drying, heating and finalizing in a conventional manner, wherein the aqueous liquor contains 1,1,1,-trimethylolpropane as such or at least partially etherified with the imidazolidinone.

11. The process according to claim 4, wherein after heating the textile material is additionally washed.

5,021,265
ROLL ARRANGEMENT FOR NON-DEFORMING TREATMENT OF MOVING WEB-TYPE PRODUCTS

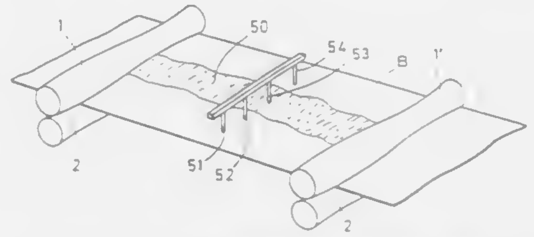
Wilfried Bald, Hilchenbach; Hugo Feldmann, Alsdorf-Warden; Manfred Pabst, Cologne, and Rüdiger Fischer, Düsseldorf, all of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Division of Ser. No. 101,825, Sep. 28, 1987, abandoned. This application Mar. 16, 1989, Ser. No. 325,015

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1986, 3634367

Int. Cl.^{5} B05D *3/12*

U.S. Cl. 427—365 **15 Claims**



1. In a method for the treatment of moving flat woven or mesh material of fiber, felt or textile by means of a roll arrangement including at least two rotatable treatment rolls which are adjustable radially and axially relative to each other, the rolls including roll bodies, each roll having a slightly S-shaped or bottle-shaped contour over the entire length of the roll body in axial direction thereof, wherein the contours of two rolls arranged adjacent each other and defining a roll gap therebetween each other only in a certain relative position of the rolls, the improvement comprising moving the material through the roll gap under low pressure such that the contour or shape of the products is essentially not permanently changed by the rolls.

VOL
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5,021,266
PRIMER COMPOSITION

Masaaki Yamaya, Annaka; Kazuharu Sato, Myogi, and Masayuki Takahashi, Annaka, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Division of Ser. No. 278,593, Dec. 1, 1988, Pat. No. 4,960,809. This application Jun. 13, 1990, Ser. No. 537,414

Claims priority, application Japan, Dec. 4, 1987, 62-308373

Int. Cl.^{5} B05D *3/02*

U.S. Cl. 427—379 **4 Claims**

1. A method for providing a protective coating layer on the surface of an article made of a plastic resin which comprises the successive steps of:

- (A) coating the surface of the plastic-made article with a primer composition in the form of a solution in an organic solvent;
- (B) evaporating the organic solvent in the coating layer on the surface of the plastic-made article bringing the primer composition in the coating layer into a cured coating film;
- (C) coating the surface of the cured coating film of the primer composition with a coating composition comprising a hydrolysis product of an alkoxy silane compound represented by the general formula $R^2{}_mSi(OR)_{4-m}$, in which R^2 is a monovalent hydrocarbon group having 1 to 6 carbon atoms, R is a monovalent hydrocarbon group or alkoxyalkyl group having 1 to 6 carbon atoms and the subscript m is zero, 1 or 2, and a colloidal silica uniformly dispersed therein; and
- (D) heating the thus coated article at a temperature in the range from 50° to 140° C. to cure the coating composition, said primer composition comprising:
  - (a) 100 parts by weight of a copolymer of a monomer mixture composed of (a-1) from 2 to 50% by weight of an ethylenically unsaturated monomeric compound having, in a molecule, an alkoxysilyl group and (a-2) from 98 to 50% by weight of an ethylenically unsaturated monomeric compound free from alkoxysilyl groups and copolymerizable with the monomeric compound (a-1); and
  - (b) from 5 to 300 parts by weight of an amidated product obtained by the reaction of an amidating agent selected from the group consisting of acetyl chloride, acetyl bromide, propionyl chloride, butyryl chloride, acetic anhydride, isopropenyl acetate, benzoyl chloride and mixtures thereof and a product obtained by the reaction of an amino group-containing alkoxysilane compound, an epoxy group-containing alkoxysilane compound and a silylating agent.

5,021,267
TREATMENT OF CORDS, THREADS AND FILAMENTS

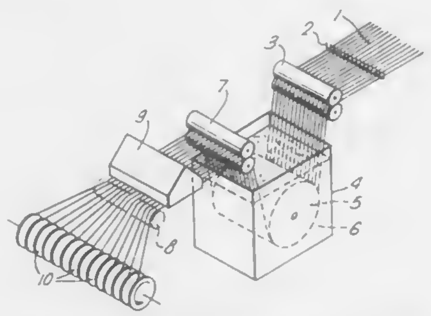
John A. G. Gent, Liphook, and Jacob M. Blass, London, both of England, assignors to Cogent Limited, London, England

Filed Mar. 6, 1990, Ser. No. 488,881

Claims priority, application United Kingdom, Mar. 21, 1989, 8906422

Int. Cl.^{5} B05D *3/02*

U.S. Cl. 427—387 **13 Claims**



1. A process for treating a thread-like article comprising at least one filament, said filament or filaments defining an outer envelope of said article, said process comprising the steps of:

- (i) applying to the article a dilute solution of a polysiloxane prepolymer, and
- (ii) curing the prepolymer,

such that substantially only said outer envelope of said filament or filaments is enrobed by a protective sheath of cured polysiloxane polymer.

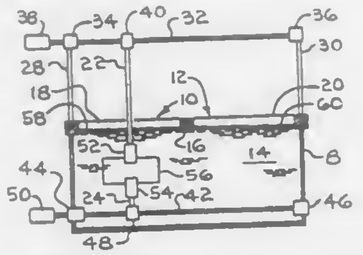
5,021,268
METHOD OF MAKING ASYMMETRIC LANGMUIR-BLODGETT FILMS

Garo Khanarian, Berkeley Heights; James B. Stamatoff, Westfield, and Alan Buckley, Berkeley Heights, all of N.J., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 17, 1990, Ser. No. 467,830

Int. Cl.^{5} B05D *1/20*

U.S. Cl. 427—430.1 **1 Claim**



1. In a system for depositing multiple monomolecular layers of amphiphillic molecules on a substrate, said system including a tank having multiple enclosures on a common subphase, said system also including first and second substrate support means, said first substrate support means being located entirely above the surface of said subphase, said second substrate support means being located entirely below the surface of said subphase, said substrate initially being supported by said first substrate support means and, the molecules in each enclosure being compressed independently of the molecules in other enclosures, the method comprising the steps of:

- a. immersing said substrate through said molecules in a first of said enclosures and into said subphase;
- b. transferring said substrate from said first substrate support means to said second substrate support means;
- c. moving said second substrate support means and said substrate below the surface of said subphase to a second of said enclosures; and
- d. withdrawing said substrate from said subphase through the molecules on the surface of the subphase of said second enclosure, whereby the surface of said subphase is undisturbed except by said substrate moving therethrough.

5,021,269
METHOD FOR FORMING A METAL FILM ON THE SURFACE OF A SUBSTRATE METAL

Masanao Kono; Yoshihiro Hasegawa, both of Kakogawa; Yasutaka Nishi; Hisao Irie, both of Takasago; Tatsuji Mizuta, Kobe, and Shinsuke Ohara, Kyoto, all of Japan, assignors to Harima Chemicals, Inc., Hyogo, Japan

Continuation of Ser. No. 51,299, May 19, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,094

Claims priority, application Japan, May 19, 1986, 61-114441; Jun. 30, 1986, 61-154811

Int. Cl.^{5} C23C *18/00*

U.S. Cl. 427—436 **14 Claims**

1. A method for forming a soldering alloy film on the surface of a circuit panel metal substrate for electronic parts, which comprises soaking the metal substrate or a non-metal support having the metal substrate disposed thereon in a solution of a

soldering alloy salt in a high boiling point solvent, at a temperature of from about 230° to 280° C., characterized in that the soldering alloy salt is a salt of a soldering alloy, which is the soldering alloy to be formed on the surface of the metal substrate, and an acidic substance selected from the group consisting of an organic carboxylic acid having at least 4 carbon atoms, an acidic substance of natural origin containing abietic acid and d-pimaric acid and that which has been modified to contain 2 or 3 carboxyl groups, wherein the metal substrate is larger in ionization tendency than the soldering alloy to be formed on the surface of the metal substrate.

5,021,270
METHOD FOR IMPROVING MOISTURE BARRIER PROTECTION AND ELECTROSTATIC DISCHARGE PROTECTION OF A COMPOSITE MATERIAL CASED ROCKET MOTOR

Robert E. Black, Jr., Newark, Del.; Don C. Carson, North East, Md., and Frederick W. Van Name, Newark, Del., assignors to Thiokol Corporation, Ogden, Utah

Filed Dec. 11, 1989, Ser. No. 448,741

Int. Cl.^{5} F02F *7/00;* **B05D** *3/06, 7/22, 90/04*

U.S. Cl. 428—34.1 **36 Claims**

1. A method for improving the moisture barrier protection of a composite pressure vessel comprising immersing the composite pressure vessel in a curable liquid polymer solution during pressure testing of said vessel so that said curable liquid polymer solution flows into voids, cracks or fractures in said pressure vessel and subsequently curing said liquid polymer in said voids, cracks or fractures.

5,021,271
BELLOWS

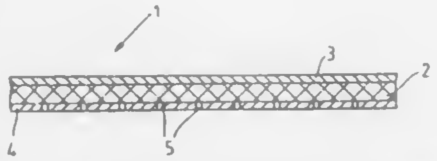
Kurt Hennig, Munich, Fed. Rep. of Germany, assignor to Febr. Hennig GmbH, Fed. Rep. of Germany

Filed Jun. 19, 1989, Ser. No. 367,879

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1988, 3822746

Int. Cl.^{5} F16J *3/04*

U.S. Cl. 428—36.2 **15 Claims**



1. Bellows in which the bellows body is formed by the bonding of multiple layers of material together to form a multilayer cover, characterised by the following features:

- (a) a cover including
  - a carrier layer having an inner and an outer face and formed by a natural or plastic fiber fabric,
  - an outer layer made from a weldable plastic material, adhered to the outer face of the carrier layer,
  - and a reinforcing layer made from a weldable plastic material adhered to the inner face of the carrier layer;
- (b) and wherein the carrier layer, the outer layer and the reinforcing layer are welded together over their entire surfaces to form the cover.

5,021,272
OVERHEAD PROJECTOR SHEET FOR PRINTING BY THERMAL TRANSFER PRINTING AND METHOD OF PRINTING THE SAME

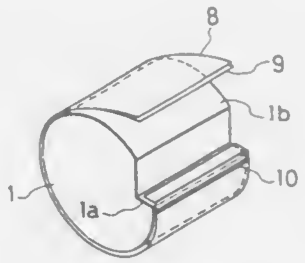
Hidemasa Mohri; Michiaki Tobita, both of Yokohama, and Masahiko Ishida, Fujisawa, all of Japan, assignors to Taiho Industries Co., Ltd., Tokyo, Japan

Filed Aug. 25, 1988, Ser. No. 237,271

Claims priority, application Japan, Aug. 25, 1987, 62-209282

Int. Cl.^{5} B32B *7/06, 7/12*

U.S. Cl. 428—40 **13 Claims**



1. An overhead projection sheet for printing by thermal transfer printing comprising an overhead projection sheet of a transparent film, a backing sheet overlaid on a surface of said overhead projection sheet opposite a printing surface thereof and bonding means for detachably attaching a respective one end of said overlaid sheet to one end of said overhead projection sheet.

5,021,273
METHOD AND APPARATUS FOR MAKING LABELS

Junichi Kobayashi, Tokyo, Japan, assignor to Ko-Pack (UK) Limited, Peterborough, England

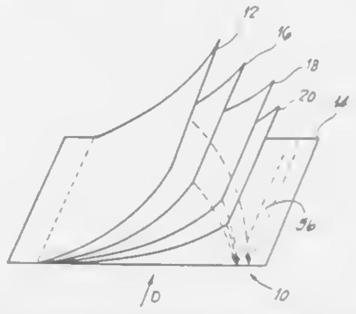
PCT No. PCT/GB87/00687, § 371 Date Mar. 22, 1989, § 102(e) Date Mar. 22, 1989, PCT Pub. No. WO88/02308, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 30, 1987, Ser. No. 340,295

Claims priority, application United Kingdom, Sep. 30, 1986, 8623496

Int. Cl.^{5} B32B *7/06*

U.S. Cl. 428—40 **10 Claims**



1. A method of making multiple-part printed labels (**10**) each comprising at least a printed and releasable outer label member (**12**) together with one or more printed inner label members (**16**, **18**, **20**) which are rendered accessible in use on a product by releasing one edge of said outer label member, the method comprising providing one or more webs (**32**, **34**, **36**) of label material, and feeding said label material lengthwise while assembling same to enable labels to be obtained from the assembled web or webs of label material; characterised in that

said method comprises the step of printing said label material with text or other material required for said labels continuously immediately prior to assembling said web or webs, said printing step producing a printed web of label material; and said method comprising the subsequent step of

VOL 1127 ISS 1 JE 4 1991 UMI

continuously folding at least said printed web in a lengthwise direction with respect to said feed direction to produce a folded web portion providing said inner label members fold-joined to an adjacent web portion (12), said web portions being in generally fact-to-face relation, and the step of continuously applying an adhesive (**24, 26, 54, 56**) to at least said printed web, said method further comprising the step of subjecting the said folded web to a separating or cutting action at spaced locations and in mutually parallel directions generally transverse to said lengthwise direction to produce individual mutually parallel labels arranged side by side along the length of the web.

5,021,274

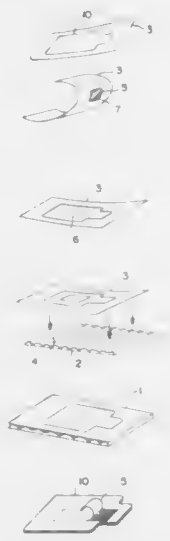
DETACHABLE COUPON FOR LAMINATED CORRUGATED PACKAGING MATERIAL AND METHOD OF MANUFACTURE

Louis B. Beck, and Joseph C. Beck, both of Little Rock, Ark., assignors to Union Camp Corporation, Wayne, N.J.

Filed Dec. 5, 1988, Ser. No. 280,302

Int. Cl.^{5} A61F *13/02;* **B65D** *73/00;* **G09F** *3/00*

U.S. Cl. 428—41 10 Claims



1. A laminated packaging material comprising:
a corrugated inner ply;
an outer ply having a portion outlined with a perforated die cut;
means between an inner surface of said outer ply and a surface of said corrugated inner ply for fixedly adhering said outer ply and said corrugated inner ply to one another; and
means on said inner surface of said outer ply within said perforated die cut outline portion for preventing the fixed adhesion of said outer ply within said perforated die cut outline to said corrugated inner ply to permit the removal of said perforated die cut outline portion of said outer ply without damage to said corrugated inner ply, said perforated die cut outline portion and a remainder of said outer ply outside the perforated die cut outline.

5,021,275

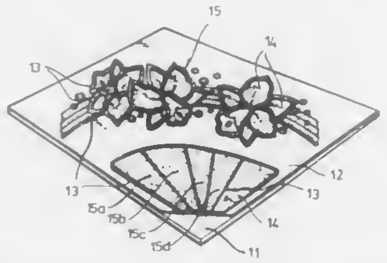
ORNAMENTAL STICKERS NECESSITATING NO SEPARATE CUTTING PROCESS AND THE MANUFACTURING METHOD THEREOF

Jae-Duck Kim, 467-1 Yong Gea-Dong, Dong-gu, Taegu 630-75, Rep. of Korea

Filed Apr. 6, 1989, Ser. No. 334,203

Int. Cl.^{5} D06N *7/04;* **B32B** *3/16*

U.S. Cl. 428—42 9 Claims



1. A removable and reusable ornamental sticker comprising the following layers:
(a) a sheet of paper-like material, capable of withstanding temperatures of up to 200° C., and coated with a film comprising teflon or silicone;
(b) an adhesive layer formed in a predetermined design by a silk screen process upon said sheet material;
(c) a basic plate layer of resin attached to said adhesive layer and formed in the same predetermined shape as said adhesive layer by a silk screen process; and
(d) a colored layer applied to said basic plate layer and comprising a printing ink containing polyvinyl chloride, dioctyl phthalate, and pigments, the colored layer being composed of one or more color components and formed in a predetermined shape by a silk screen process.

5,021,276

OPTICAL DATA RECORDING MEDIUM AND MANUFACTURING METHOD THEREOF

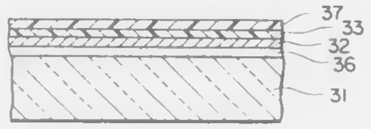
Hisamitsu Kamezaki; Masashi Suenaga, both of Ibaraki; Osamu Saito, Takatsuki; Shin-ichiro Iuchi, Ibaraki; Hitoshi Watanabe, Ibaraki; Hideo Fujiwara, Ibaraki, and Yoshitane Tuburaya, Toride, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Jun. 19, 1989, Ser. No. 367,721

Claims priority, application Japan, Jun. 20, 1988, 63-150065; Oct. 31, 1988, 63-273221; Jan. 11, 1989, 1-2882; Feb. 28, 1989, 1-45300; Mar. 23, 1989, 1-69265

Int. Cl.^{5} B32B *3/02*

U.S. Cl. 428—64 23 Claims



1. An optical data recording medium comprising a transparent substrate, a recording layer provided on said substrate, and a thin layer formed on said recording layer with or without an underlayer interposed between said recording layer and said substrate, both of said recording layer and thin layer being applied by a spin coating method,
said recording layer being composed of an organic dye recording material substantially insoluble and non-dispersible in water and said thin layer being composed of a water soluble polymer.

5,021,277

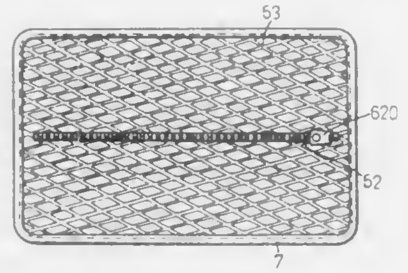
AUTOMOBILE MAT

Sung-Hsing Fan, No. 236, Sec. 1, Ta-Tung Rd., Tainan City, Taiwan

Filed Sep. 15, 1989, Ser. No. 407,559

Int. Cl.^{5} B32B *3/10, 1/06*

U.S. Cl. 428—76 6 Claims



1. An automobile mat comprising:
an upper layer with a first periphery, having a plurality of holes formed therein;
a lower layer with a second periphery having a opening formed therein and means for closing said opening;
a middle layer with a third periphery sandwiched between said upper and lower layers, said middle layer having a plurality of holes formed therein;
means for binding said first, second and third peripheries of said upper, lower and middle layers; and
means for spacing said middle layer and lower layer which is provided between said middle layer and lower layer.

5,021,278

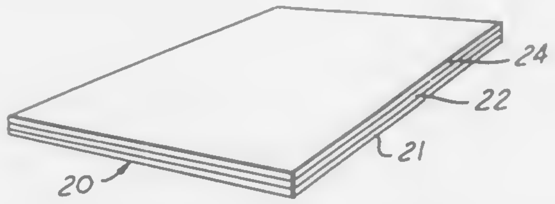
THERMOFORMABLE MULTIHUED LAMINATE FILMS AND PROCESSES

William T. Short, Southfield, Mich., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 233,312, Aug. 17, 1988, Pat. No. 4,960,558. This application Aug. 9, 1989, Ser. No. 391,020

Int. Cl.^{5} B32B *3/02*

U.S. Cl. 428—76 7 Claims



1. A moldable laminate for forming a finished surface appearance on the exposed unfinished surface of a substrate comprising:
a thermoformable carrier film;
a decorative feature covering the exposed planar surface area of the carrier film; and
a clearcoat of no more than 3 mils thickness covering the decorative feature having a thickness differential therebetween selected to vary the surface appearance of the decorative feature when the thermoformable carrier film is molded to provide an enhanced finished surface appearance when molded to the unfinished surface of the substrate.

5,021,279

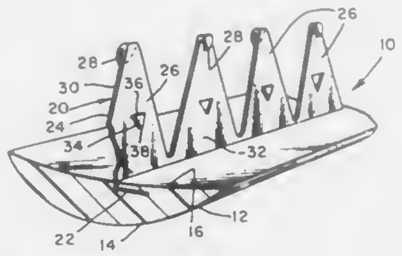
EDGE PROTECTOR WITH ENHANCED GRIPPING MEMBER

Gary Whitener, 7220 E. Somerset Blvd., Paramount, Calif. 90723-0437

Filed Jun. 26, 1989, Ser. No. 372,706

Int. Cl.^{5} B32B *3/06, 3/10*

U.S. Cl. 428—100 30 Claims



1. An edge protector, comprising:
a. an edge protector member having an outer surface and a transverse inner surface defining the body of the edge protector member;
b. a gripping member further comprising a transverse base and a insert gripping member;
c. said transverse base of said gripping member embedded within the body of said edge protector;
d. said insert gripping member protruding from the transverse inner surface of said edge protector and extending at an angle relative to said transverse inner surface; and
e. said insert gripping member further comprising a multiplicity of generally triangular shaped structures aligned along the length of said insert gripping member, each triangular shaped structure extending at an angle relative to said transverse inner surface of said edge protector member, the triangular shaped structures having a pair of lateral faces and the tip of each of said triangular shaped structures bent at an angle relative to one lateral face of the triangular shaped structure such that its tip points in the general direction of the transverse inner surface of the edge protector member.

5,021,280

WATERPROOF SWEAT-TRANSMITTING CLOTHING INSULATION

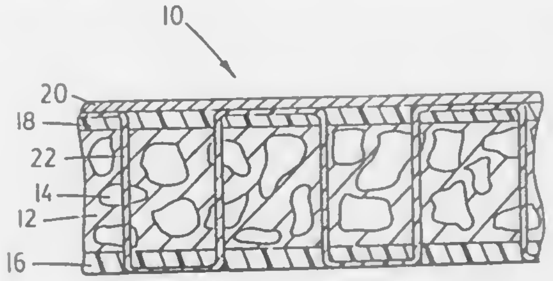
Brian Farnworth, Kinburn, and Rita M. Crow, Stittsville, both of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada

Filed Sep. 6, 1989, Ser. No. 403,340

Claims priority, application Canada, Dec. 9, 1988, 585533

Int. Cl.^{5} B32B *3/06*

U.S. Cl. 428—102 15 Claims



1. A composite insulating garment laminate comprising a layer of water-impermeable insulating material having inner and outer surfaces, a thin first layer of a wicking fabric on said inner surface, a thin second layer of a wicking fabric on said outer surface, and sewing thread means of a wicking material extending through said insulating material in a conventional

VOL
1127
ISS
1
JE
4
1991
UMI

stitching pattern and connecting said first layer of wicking fabric to said second layer of wicking fabric, whereby moisture absorbed by said first layer of wicking fabric can advance through said insulating material via said thread means to said second layer of wicking fabric for evaporation therefrom.

5,021,281

LAMINATED MATERIAL REINFORCED BY A MULTI-DIMENSIONAL TEXTILE STRUCTURE AND METHOD FOR PRODUCING THE SAME

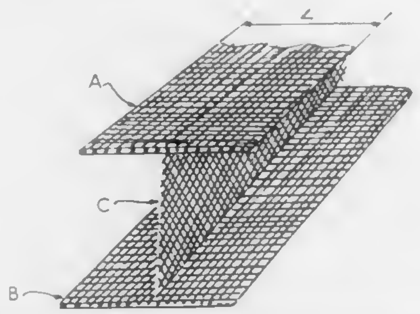
Bruno Bompard, Lyons, and Jean-Paul Lamarie, Caluire, both of France, assignors to Brochier S.A., Cedex, France

Filed Jul. 24, 1987, Ser. No. 77,643

Claims priority, application France, Aug. 1, 1986, 86 11214

Int. Cl.^{5} B32B *3/12*

U.S. Cl. 428—116 32 Claims



1. Laminated material comprising an impregnated reinforcing textile structure, said structure including two woven laps spaced from one another and a connector extending between said two woven laps and maintaining said two woven laps spaced apart, each of said spaced-apart woven laps comprising a plurality of layers of warp threads, a plurality of layers of weft threads and a woven lap warp binding thread binding said plurality of layers together, and said connector consisting of at least one layer of only warp binding threads extending around, in the direction of the warp of said spaced-apart woven laps, and binding the weft threads of said two spaced-apart woven laps thereby connecting said two spaced-apart woven laps.

5,021,282

HONEYCOMB TABLE MANUFACTURE AND CLEAN-ROOM COMPATIBLE HONEYCOMB TABLES

Dennis C. Terry, Costa Mesa; Waldemiro M. Filho, Laguna Hills, and John J. Turechek, Glendale, all of Calif., assignors to Newport Corporation, Fountain Valley, Calif.

Division of Ser. No. 148,592, Jan. 26, 1988, Pat. No. 4,853,065, which is a continuation-in-part of Ser. No. 890,632, Jul. 30, 1986, abandoned, which is a continuation-in-part of Ser. No. 663,343, Oct. 22, 1984, Pat. No. 4,621,006. This application Apr. 12, 1989, Ser. No. 336,893

The portion of the term of this patent subsequent to Nov. 4, 2003, has been disclaimed.

Int. Cl.^{5} B32B *3/12*

U.S. Cl. 428—116 46 Claims

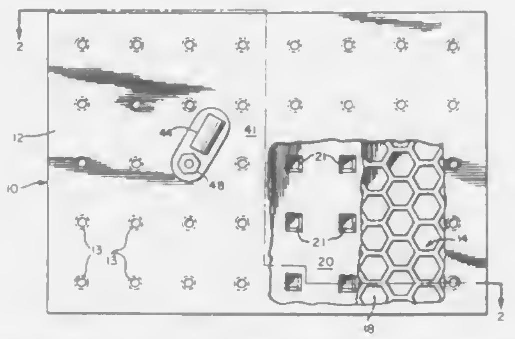
1. A honeycomb table, comprising in combination:

a table leaf having an outside surface and apertures for receiving fasteners for attaching objects at said outside surface;

means for rendering said honeycomb table clean-room compatible, including a sealing sheet having projections corresponding in number and location at least to said apertures and extending from an inside of said table leaf for a first distance;

a facing sheet spaced from said table leaf; and

a honeycomb core supporting said sealing sheet and said table leaf and extending between said sealing sheet and said facing sheet for a second distance being larger than said first distance and having internal cells between said sealing sheet and said facing sheet sealed off against said apertures by said sealing sheet.



5,021,283

WOVEN FABRIC HAVING MULTI-LAYER STRUCTURE AND COMPOSITE MATERIAL COMPRISING THE WOVEN FABRIC

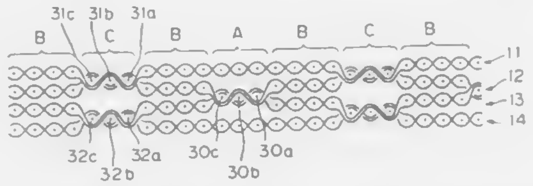
Koji Takenaka, Ishikawa, and Eiji Sato, Nobeoka, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jul. 13, 1989, Ser. No. 379,736

Claims priority, application Japan, Mar. 31, 1987, 62-76364; Mar. 31, 1987, 62-76365; Dec. 19, 1987, 62-320153

Int. Cl.^{5} B32B *3/12;* **D03D** *1/00, 11/02, 15/00*

U.S. Cl. 428—116 7 Claims



4. A composite material having a honeycomb structure, which comprises as a matrix a thermoplastic resin having a heat distortion temperature of at least 150° C. and as a reinforcer an expanded woven fabric having a multi-layer structure, the amount of fibers constituting the multi-layer woven fabric being 20 to 70% by weight and the amount of the resin constituting the matrix being 80 to 30% by weight, based on the weight of the composite material, said multi-layer woven fabric comprising a plurality of woven fabric layers which are integrated through combined portion formed by interlacing warps or wefts of one of adjacent woven fabric layers or some of warps or wefts of said one woven fabric layer and warps or wefts of the other woven fabric layer or some of warps or wefts of said other woven fabric layer with common wefts or warps, wherein a set of adjacent four woven fabric layers comprises recurring structural unit comprising (A) a part having one combined portion formed by intermediate two woven fabric layers, (B) a first non-combined part having no combined portion, (C) a part having two combined portions each formed by adjacent two woven fabric layers, respectively, and (B) a second non-combined part having no combined portion; a honeycomb shape of tetragons, hexagons or a combination of tetragons and hexagons is formed among the entire woven fabric layers when the multi-layer woven fabric is expanded in the thickness direction; 40 to 100% by weight of the fibers constituting the woven fabric are one or more kinds of organic fibers selected from the group consisting of aromatic polyamide fibers, polybenzoxazole fibers and polybenzothiazole fibers, which have a tensile strength of at least 300 g/d, and 0 to 60% by weight of the fibers constituting the woven fabric are inorganic fibers or metal fibers wherein the ratio of the density

of the expanded multi-layer woven fabric to the density of the multi-layer woven fabric before the expansion is in the range of from 0.05 to 0.3, the density of the expanded multi-layer woven fabric being an apparent density determined from the volume and weight measured when the multi-layer woven fabric is normally expanded so that the inner angles of each tetragonal or hexagonal cell are equal; and the sum of the cover factor kw in the warp direction and the cover factor kf in the weft direction, which are represented by the following formulas, is at least 300 and the sum of the cover factor kw in the warp direction and the cover factor Kf in the weft direction, which are represented by the following formulas, is at least 3,000:

$$kw = dw\sqrt{d/\rho}$$

$$kf = df\sqrt{d/\rho}$$

$$Kw = Dw\sqrt{d/\rho} \text{ and}$$

$$Kf = Df\sqrt{d/\rho}$$

wherein kw and kf stand for cover factors of each layer constituting the multi-layer woven fabric in the warp direction and weft direction, respectively, Kw and Kf stand for cover factor of the entire multi-layer woven fabric in the warp direction and weft direction, respectively; dw and df stand for warp and weft densities of each layer, expressed by the number of warps or wefts per inch respectively; Dw and Df stand for total warp and weft densities of the entire multi-layer woven fabric, expressed by the number of warps or wefts per inch, respectively; d stands for the fineness (denier) of warps or wefts; and ρ stands for the density (g/cm^3) of the fibers.

5,021,284

ELECTROCONDUCTIVE INTEGRATED SUBSTRATE AND PROCESS FOR PRODUCING THE SAME

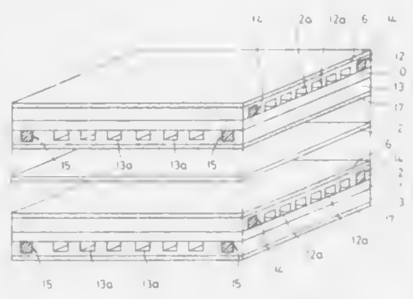
Kishio Miwa; Hiroaki Fukui, and Fumiaki Noma, all of Shiga, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Feb. 24, 1989, Ser. No. 315,115

Claims priority, application Japan, Feb. 24, 1988, 63-43084; Jun. 2, 1988, 63-136282

Int. Cl.^{5} B32B *9/00*

U.S. Cl. 428—166 18 Claims



1. An electroconductive integrated substrate comprising:

at least one gas impermeable electroconductive plate; and

at least one porous carbonaceous plate having a large number of pores and having gas permeability, said at least one porous carbonaceous plate being laminated over one surface of said at least one gas impermeable electroconductive plate and integrally bonded thereto by thermoplastic resin which is present substantially only in the pores of said porous carbonaceous plate, said at least one porous carbonaceous plate comprising short carbon fibers, having a diameter of single fiber of from 4 to 15 μm and a fiber length of from 2 to 20 mm, which are randomly dispersed within a substantially 2-dimensional plane and are bonded with each other by carbonized resin, and said at least one porous carbonaceous plate having a mean pore diameter of from 20 to 150 μm and a porosity of from 40 to 85%.

5,021,285

NON-WOVEN FABRIC SHEET FOR AGRICULTURAL USE

Tatsuya Ohe, Otake, and Mitsuaki Fujimura, Iwakuni, both of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

PCT No. PCT/JP88100667, § 371 Date May 3, 1989, § 102(e) Date May 3, 1989, PCT Pub. No. WO89/00002, PCT Pub. Date Dec. 1, 1989

PCT Filed Jul. 2, 1988, Ser. No. 329,897

Claims priority, application Japan, Jul. 3, 1987, 62-102569[U]

Int. Cl.^{5} A01G *9/00, 9/24;* **B32B** *3/00, 33/00*

U.S. Cl. 428—195 5 Claims

1. A nonwoven sheet for agricultural use comprising a hydrophobic nonwoven fabric which has been subjected to hydrophilic treatment which comprises applying a surfactant to at least part of the surface of said hydrophobic nonwoven fabric, said sheet being characterized in that said hydrophilic treatment creates channels that allow water to pass from the obverse surface of said nonwoven fabric to the underside thereof and in that the percentage of water retention is within the range of 150 to 300 wt %.

5,021,286

CUSHION MATERIAL AND METHOD OF MANUFACTURING THE SAME

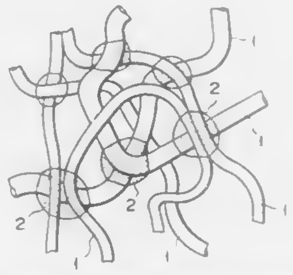
Takeshi Minegishi; Kiyotugu Takabatake, and Kunio Asobe, all of Yokohama, Japan, assignors to NHK Spring Co., Ltd., Yokohama, Japan

Filed Aug. 3, 1990, Ser. No. 562,204

Claims priority, application Japan, Aug. 10, 1989, 1-207739; Aug. 10, 1989, 1-207741; Oct. 13, 1989, 1-265002

Int. Cl.^{5} B32B *27/14*

U.S. Cl. 428—198 17 Claims



1. A cushion obtained by impregnating an aqueous emulsion of hydrophilic polyurethane in three-dimensionally interwined fibers and hardening the resultant material with heat, wherein the surface of said fibers is covered with a hydrophilic polyurethane resin, and said fibers are bonded by said hydrophilic polyurethane resin at intersected portions of said fibers.

5,021,287

CERAMIC GREEN SHEETS

Tadashi Otagiri; Masahiro Shirai, both of Nagoya; Minoru Ohara, Komaki, and Go Suzuki, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Aichi, Japan

Filed Dec. 16, 1988, Ser. No. 285,413

Claims priority, application Japan, Dec. 24, 1987, 62-327715

Int. Cl.^{5} B32B *17/06*

U.S. Cl. 428—212 9 Claims

1. A ceramic green sheet for use in laminating a metallized pattern between respective ceramic green sheets, wherein no gaps exist between portions of said metallized pattern, said ceramic green sheet comprising a green sheet as a core for

VOL
1127
ISS
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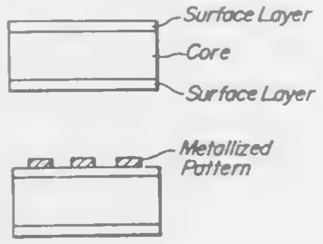
maintaining a shape thereof and a green surface layer formed on at least one surface of said green sheet as a lamination assisting layer, wherein said green surface layer is more flexible than said green sheet as a core.



5,021,288

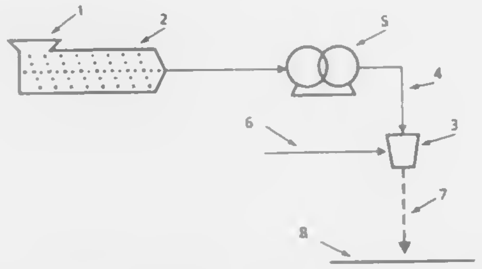
MICROFIBERS OF SYNDIOTACTIC VINYL AROMATIC POLYMERS, NONWOVEN MATS OF THE MICROFIBERS

Zdravko P. Jezic, Lake Jackson, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jan. 4, 1990, Ser. No. 460,701

Int. Cl.^{5} D03D *3/00*

U.S. Cl. 428—224 **3 Claims**



1. A microfiber of a vinyl aromatic polymer having a stereoregularity of greater than 50 percent syndiotactic and a crystalline structure, and having an average diameter of from 0.1 to 400 microns.

5,021,289

REINFORCED POLYMERIC SHEET MATERIAL

Ronald R. Light, and Robert W. Seymour, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 15, 1988, Ser. No. 271,822

Int. Cl.^{5} B32B *5/08, 5/26, 17/04;* **C08J** *5/08;* **C08K** *9/06;* **D04H** *1/48*

U.S. Cl. 428—285 **7 Claims**

1. Glass fiber reinforced thermoplastic sheet material capable of being thermoformed into parts having improved heat resistance and a notched impact strength of 15 ft-lb in. or greater, said sheet material being constructed of at least one glass fiber mat having a density of about 1 to 5 oz/ft^2 impregnated with a thermoplastic composition, said sheet material comprising
   (a) about 20 to 60 weight % fibers in the form of matted bundles containing about 200 to 300 strands, said strands having a length of about 2 to 10 inches, a diameter of about 14 microns to about 30 microns and having a coating of a glycidal silane or amino silane, and
   (b) about 80 to 40 weight % of a thermoplastic composition comprising poly(ethylene terephthalate) or poly(cyclohexylene dimethylene terephthalate) having an I.V. of about 0.4 to about 1.0, a degree of crystallinity of at least 20%.

5,021,290

VINYL BASED COATINGS FOR FOAMED MATERIALS

Richard T. Rowell, Wickliffe, Ohio, assignor to Continental Products Company, Euclid, Ohio

Filed Mar. 26, 1990, Ser. No. 498,841

Int. Cl.^{5} B32B *27/30, 27/40;* **C08J** *9/00*

U.S. Cl. 428—319.3 **14 Claims**

3. A product suitable for use in medical and athletic applications comprising a foam substrate having a predetermined configuration and having a coating on the surface thereof said coating consisting essentially of an admixture of about 10 to about 90 mole percent of an aqueous PVC copolymer dispersion, from about 10 to about 90 moles percent of an aqueous polyester based polyurethane polymer dispersion, and suitable wetting agents, pigments, dispersants, fillers, viscosity adjuvants and foam control agents, said coating composition having a pH in the range of from about 7.5 to about 10.

5,021,291

MULTIPLE-TIME INK-BEARING MEDIUM FOR THERMAL PRINTING

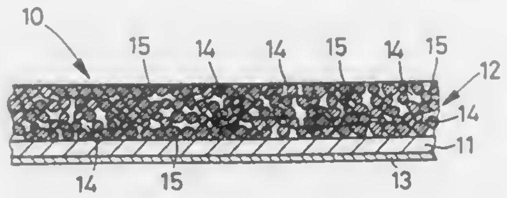
Tetuo Kobayashi, Yokkaichi, and Mikio Imaeda, Biasi, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Continuation of Ser. No. 114,284, Oct. 29, 1987, abandoned, which is a division of Ser. No. 772,680, Sep. 5, 1985, Pat. No. 4,769,258. This application Jun. 12, 1989, Ser. No. 364,592

Claims priority, application Japan, Sep. 12, 1984, 59-191312; Sep. 12, 1984, 59-191313

Int. Cl.^{5} B41M *5/26*

U.S. Cl. 428—319.9 **15 Claims**



1. A reuseable ink-bearing medium containing a thermally-transferable ink for thermal printing, comprising:
   a substrate;
   a porous resin layer formed on one surface of said substrate and formed of a water-soluble resin comprising polyvinyl alcohol as a major constituent, said porous resin layer having a multiplicity of continuous pores of less than 6 microns; and
   a fusible ink material contained in said multiplicity of continuous pores in said porous resin layer, said fusible ink material comprising at least one solid saturated fatty acid of a formula: $CH_3(CH_2)_nCOOH$, wherein $n=14$ through 20 inclusive, a coloring agent and a fusible agent having a low melting point,
   the proportion of said solid fatty acid to the sum of said solid fatty acid and said fusible agent is within the range of 40-95% by weight.

5,021,292

MAGNETIC RECORDING MEDIUM AND MAGNETIC COATING COMPOSITION THEREFOR

Kyoiti Imai, and Tateo Ishida, both of Fukui, Japan, assignors to Nissin Chemical Industry Co., Ltd., Fukui, Japan

Filed Dec. 8, 1988, Ser. No. 281,054

Claims priority, application Japan, Dec. 9, 1987, 62-311761

Int. Cl.^{5} G11B *23/00*

U.S. Cl. 428—323 **10 Claims**

1. A magnetic coating composition which comprises, in admixture:
   (A) a vinyl chloride-based copolymeric resin, having an average degree of polymerization in the range from 200 to 800, as a resinous vehicle, and
   (B) ferromagnetic particles having a specific surface area of at least 35 m^2/g as determined by the BET method dispersed in the vehicle of the copolymeric resin,
   the copolymeric resin being composed of (a) a moiety of vinyl chloride, (b) a moiety of vinyl alcohol, (c) a moiety of a vinyl carboxylate having from 6 to 20 carbon atoms in a unit, (d) a moiety of a vinyl or allyl monomer having a sulfonic acid group or a sulfonic acid group in the form of a metal salt in the molecule, and (e) a moiety of a vinyl or allyl monomer having an epoxy group in the molecule.

5,021,293

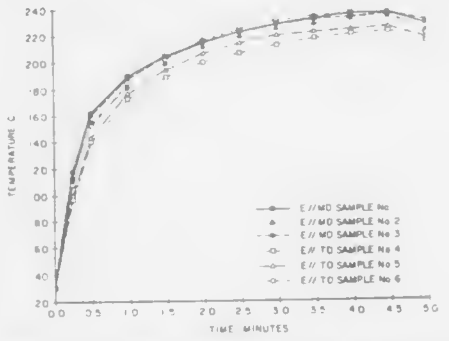
COMPOSITE MATERIAL CONTAINING MICROWAVE SUSCEPTOR MATERIAL

Hua-Feng Huang, Mendenhall, Pa., and Donald E. Plorde, Midlothian, Va., assignors to E. I. Du Pont de Nemours and Company, Wilmiogton, Del.

Continuation of Ser. No. 2,980, Jan. 23, 1987, abandoned, which is a CIP of S.N. 06/832287, Feb. 21, 1986 and now abandoned. This application Aug. 28, 1989, Ser. No. 398,995

Int. Cl.^{5} B32B *15/04;* **B65D** *85/00*

U.S. Cl. 428—328 **29 Claims**



1. A composite flexible packaging film material for controlled generation of heat by absorption of microwave energy so as to generate additional heat for food packaged by said film during transmission of said microwave energy by said film material during microwave cooking of said food, comprising
   (a) a dielectric substrate substantially transparent to microwave radiation, and
   (b) a coating on at least one surface of the substrate comprising
      (i) about 5 to 80% by weight of metal or metal alloy susceptor in flake form, and (ii) about 95 to 20% by weight of a thermoplastic dielectric matrix, said flakes being dispersed in said dielectric matrix so that they are substantially insulated from each other,
   wherein the surface weight of said coating on the substrate is in the range of about 2.5 to 100 g/m^2 D.C. surface resistance of the resulting composite material is at least 1×10^6 ohms per square.

23. In combination with food for microwave cooking, a flexible film packaging for said food incorporating composite film material for controlled generation of heat by absorption of microwave energy so as to generate additional heat for said food during transmission of said microwave energy by said composite film material for microwave cooking of said food, said composite film material comprising
   (a) a dielectric substrate substantially transparent to microwave radiation, and
   (b) a coating on at least one surface of the substrate comprising
      (i) about 5 to 80% by weight of metal or metal alloy susceptor in flake form, and (ii) about 95 to 20% by weight of a thermoplastic dielectric matrix, said flakes being dispersed in said dielectric matrix so that they are substantially insulated from each other,
   wherein the surface weight of said coating on the substrate is in the range of about 2.5 to 100 g/m^2.

24. In combination with food for microwave cooking, a composite flexible packaging film material for controlled generation of heat by absorption of microwave energy so as to generate additional heat for food packaged by said film during transmission of said microwave energy by said film material during microwave cooking of said food, comprising
   (a) a dielectric substrate substantially transparent to microwave radiation, and
   (b) a coating on at least one surface of the substrate comprising
      (i) about 5 to 80% by weight of metal or metal alloy susceptor in flake form, and (ii) about 95 to 20% by weight of a dielectric matrix, said flakes being dispersed in said dielectric matrix so that they are substantially insulated from each other,
   wherein the surface weight of said coating on the substrate is in the range of about 2.5 to 100 g/m^2.

25. A composite material for controlled generation of heat by absorption of microwave energy during transmission of said microwave energy, comprising
   (a) a dielectric substrate substantially transparent to microwave radiation, and
   (b) a coating on at least one surface of the substrate comprising
      (i) about 25 to 80% by weight of metal or metal alloy susceptor in flake form, and
      (ii) about 75 to 20% by weight of a dielectric matrix, said flakes being dispersed in said dielectric matrix so that they are substantially insulated from one another,
   wherein the surface weight of said coating on the substrate is in the range of about 2.5 to 100 g/m^2.

5,021,294

PLASTIC SLIDES FOR MICROSCOPES

Yoshiharu Karasawa, and Ken Hirohashi, both of Tokyo, all of Japan, assignors to Biomate Co., Ltd., Japan

Filed Sep. 22, 1987, Ser. No. 99,471

Claims priority, application Japan, Sep. 24, 1986, 61-223862

Int. Cl.^{5} B32B *13/12, 27/06*

U.S. Cl. 428—332 **9 Claims**

1. A slide for a microscope comprising a transparent polymer film having at least one surface layer which is hydrophilic, inactive to both specimens and staining and insoluble in water and organic solvent, said hydrophilic layer being selected from the group consisting of metal oxide, cross-linked polysaccharide or derivative thereof, and cross-linked synthetic plastic.

5,021,295

FLAME-RETARDANT HALOGENATED POLYESTER RESIN COMPOSITION AND ELECTRIC WIRE COATED WITH THE SAME

Toshio Nakane; Michiro Naka, both of Fuji; Hiroaki Konuma, Shimizu, and Kenji Hijikata, Mishima, all of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Filed Mar. 9, 1989, Ser. No. 321,068

Claims priority, application Japan, Mar. 14, 1988, 63-60012

Int. Cl.^{5} C08L *67/02;* **B32B** *15/02*

U.S. Cl. 428—379 **14 Claims**

1. A flame-retardant halogenated polyester resin composition prepared by melt-mixing:
   copolyester (A) prepared by the condensation polymerization of monomers mainly comprising
      (a) a component mainly comprising an aromatic dicarboxylic acid or an ester-forming derivative thereof,
      (b) a component mainly comprising an aliphatic glycol or an ester-forming derivative thereof and
      (c) an ester-forming halogenated compound, which has a halogen content of 0.5 to 30% by weight, with copolyester (B) comprising a branched polymer prepared by the condensation polymerization of monomers mainly

VOL 1127
ISS 1
JE 4
1991
UMI

comprising (a)' a component mainly comprising an aromatic dicarboxylic acid or an ester-forming derivative thereof,

(b)' a component mainly comprising an aliphatic glycol or an ester-forming derivative thereof and

(d) a branching compound having at least three functional groups selected from a carboxyl group, a hydroxyl group, an ester-forming group derived therefrom or mixtures thereof, which contains 0.001 to 0.5 molar % (B), of said branching compound (d), in such a proportion that the content of copolyester (B) is 0.1 to 50% by weight based on the total of copolyesters (A) and (B).

5,021,296

CIRCUIT BOARD AND PROCESS FOR PRODUCING THE SAME

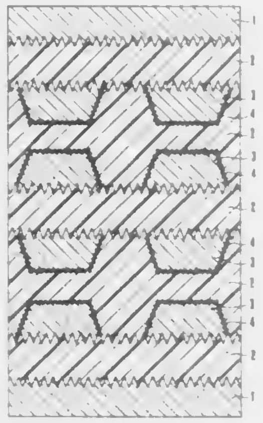
Yoshihiro Suzuki; Toshinari Takada, both of Hitachi; Masahiro Suzuki, Iwaki; Haruo Akahoshi; Akira Nagai, both of Hitachi; Akio Takahashi, Hitachiota; Shigeo Amagi; Toshikazu Narahara, both of Naka; Motoyo Wajima, Yokohama, and Kiyonori Kogawa, Hiratsuka, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 18, 1989, Ser. No. 408,530

Claims priority, application Japan, Sep. 20, 1988, 63-233630

Int. Cl.^{5} B32B *9/00*

U.S. Cl. 428—409 **33 Claims**



1. A circuit board, which comprises an insulating substrate, a copper wiring provided on the insulating substrate, said copper wiring having a coarsely roughened surface facing the insulating substrate, and a copper oxide-reduced layer provided on a surface opposite to the coarsely roughened surface of the copper wiring and formed by reduction of copper oxide and electroless plating, the copper oxide-reduced layer having a finely roughened surface and having a deposited layer of at least one of nickel and cobalt; the roughened surface of the copper oxide-reduced layer being roughened in a range of 0.05 to 5 μm in terms of a maximum vertical distance between the top of convex parts and the bottom of concave parts of the copper oxide-reduced layer per μm of the longitudinal distance of the copper oxide-reduced layer.

5,021,297

PROCESS FOR COATING PLASTIC SUBSTRATES WITH POWDER COATING COMPOSITIONS

Frederick F. Rhue, Natrona Heights, Pa.; William D. Franks, Medina, and Gary C. Craig, Fairview Park, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 2, 1988, Ser. No. 279,464

Int. Cl.^{5} B05D *3/00*

U.S. Cl. 428—430 **14 Claims**

1. A process of coating a preformed fiber-reinforced plastic substrate susceptible to gassing upon heating comprising:

(a) preheating the substrate at temperatures and for time sufficient to degas the substrate, said temperatures above the temperature sufficient to cure a subsequently applied thermosetting powder coating composition;

(b) applying immediately a thermosetting powder coating composition to the preheated substrate above the temperature sufficient to cure the thermosetting powder coating composition; and

(c) heating immediately the coated substrate at a temperature and for a time sufficient to cure the thermosetting powder coating composition.

5,021,298

HIGH BARRIER METALLIZED FILM

Kenneth M. Revell, Thetford, England, assignor to Bowater Packaging Limited, London, England

Filed Apr. 7, 1989, Ser. No. 334,534

Claims priority, application United Kingdom, Apr. 8, 1988, 8808219

Int. Cl.^{5} B32B *15/08, 27/08*

U.S. Cl. 428—458 **10 Claims**

1. A coated and vacuum-metallised plastic film having low permeability to gases, moisture and light, which comprises a film substrate selected from the group consisting of polyolefin and regenerated cellulose, which film is coated on at least one surface with at least one thin but smooth layer of a thermally stable plastic resin coating material other than polyvinylidene chloride, and a vacuum-metallised layer over the coated surface, said vacuum-metallised layer having an optical density of 1.0 to 4.0.

5,021,299

COMPOSITE CASTING FOR ADDING LITHIUM TO MOLTEN ALLOYS

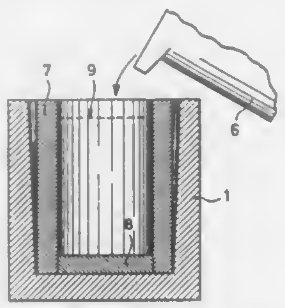
Hartwig Rupp, Frankfurt am Main, and Otto Stenzel, Grundau, both of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Division of Ser. No. 230,707, Aug. 9, 1988, Pat. No. 4,919,187, which is a continuation of Ser. No. 908,332, Sep. 17, 1986, abandoned. This application Jan. 2, 1990, Ser. No. 459,549

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1986, 3628276

Int. Cl.^{5} B22D *7/02*

U.S. Cl. 428—585 4 Claims



1. A pre alloy composite casting comprising

a metal core portion-having sufficient lithium to be reactive at room temperature, said core portion having 6 to 10% lithium by weight,

a metal surface portion which is non-reactive at said room temperature, said metal surface portion completely enclosing said core portion.

5,021,300

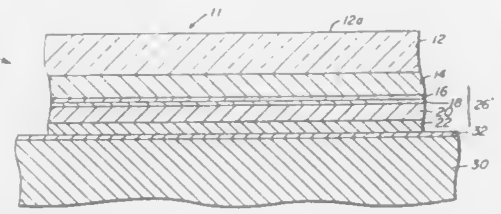
SOLDER BACK CONTACT

William F. Stacey, Framingham, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Sep. 5, 1989, Ser. No. 402,410

Int. Cl.^{5} H01L *21/283;* **C25D** *3/60*

U.S. Cl. 428—620 **14 Claims**



1 In combination:

a semiconductor substrate having a pair of opposing surfaces, a semiconductor circuit disposed over a first surface, and a contact comprised of gold disposed on a second one of said surfaces; and

a layer of cadmium disposed over the contact.

5,021,301

METHOD OF PRODUCING A STEEL SHEET PLATED WITH ZN-MG ALLOY SUPERIOR BOTH IN PLATING ADHESION AND CORROSION RESISTANCE, AND STEEL SHEET PLATED WITH THE SAME

Hisatada Nakakoji; Seiji Nakajima; Akira Yasuda, and Hajime Kumura, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan

Filed Oct. 19, 1990, Ser. No. 600,523

Claims priority, application Japan, Oct. 23, 1989, 1-273863

Int. Cl.^{5} C25D *3/66, 7/06*

U.S. Cl. 428—659 **7 Claims**

1. A method of producing a Zn-Mg alloy plated steel sheet superior both in plating adhesion and corrosion resistance, comprising the step of electroplating at least one surface of a steel sheet by using a plating bath of a fused salt at about 350 to 500° C. and containing a chloride of Zn, a chloride of Mg and one, two or more chlorides selected from the group consisting of Na, K and Li, with a plating current density ranging between about 20 and 350 A/dm^2.

5,021,302

BISMUTH-IRON GARNETS WITH LARGE GROWTH-INDUCED MAGNETIC ANISOTROPY

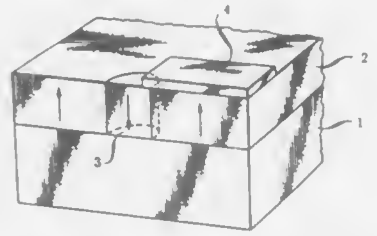
Charles D. Brandle, Jr., Basking Ridge; Vincent J. Fratello, New Providence; Lars C. Luther, Basking Ridge, and Susan E. G. Slusky, Highland Park, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 897,565, Aug. 15, 1986, abandoned. This application Jun. 3, 1988, Ser. No. 213,431

The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.

Int. Cl.^{5} G11B *23/00*

U.S. Cl. 428—692 **4 Claims**



1. Device comprising a layer of epitaxially grown magnetic garnet material, said material having a composition which is essentially as represented by the formula

$$\{Bi_pTb_tX_{3-p-t}\}(Fe_{5-z}Z_z)O_{12},$$

where X denotes at least one dodecahedral site substituent element selected from the group consisting of yttrium samarium, europium, gadolinium, ytterbium, calcium, erbium, holmium, dysprosium, praseodymium, and neodymium, Z denotes at least one tetrahedral or octahedral site substituent element selected from the group consisting of aluminum, gallium, silicon, and germanium, p is greater than or equal to 0.1, z is less than or equal to 1.5 and t is greater than 0.6 and wherein the amount of any one or both of samarium and europium when used is greater than 0.6 each.

5,021,303

MOLTEN CARBONATE FUEL CELL START-UP PROCESS

Rafael A. Donado, Chicago, Ill., assignor to Institute of Gas Technology, Chicago, Ill.

Filed Dec. 18, 1989, Ser. No. 451,567

Int. Cl.^{5} H01M *8/14*

U.S. Cl. 429—16 **21 Claims**

1. A molten carbonate fuel cell start-up process comprising:

heating at least one cell unit comprising a metallic cathode, a metallic anode and green tapes comprising electrolyte matrix and electrolyte carbonate between said cathode and said anode to temperatures about 250° to about 350° C. in the presence of oxygen-containing gas;

continue heating to temperatures above the melting point of said electrolyte carbonate in the presence of inert gas and about 0.5 to about 10 mole percent hydrogen, based upon the total gas composition, and maintaining temperatures above the melting point of said electrolyte carbonate for a time sufficient for said carbonate to distribute itself to the cell components; and

introducing oxidant gas to contact said cathode and fuel gas to contact said anode for operation of said fuel cell.

5,021,304

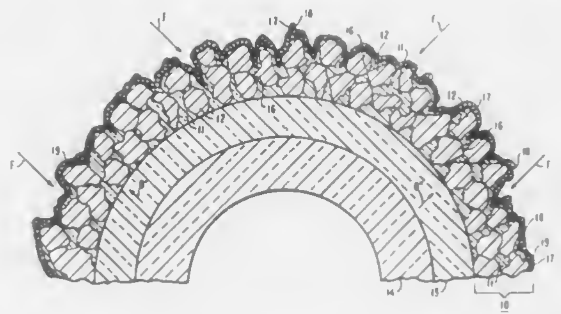
MODIFIED CERMET FUEL ELECTRODES FOR SOLID OXIDE ELECTROCHEMICAL CELLS

Roswell J. Ruka, Churchill Boro, and Charles J. Spengler, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 22, 1989, Ser. No. 327,478

Int. Cl.^{5} H01M *8/10, 4/86*

U.S. Cl. 429—30 **10 Claims**



1. A composite of an exterior porous elecrtrode bonded to a solid oxygen ion conducting electrolyte, where the electrolyte is also in contact with an interior electrode, the exterior electrode comprising coarse metal particles selected from the group consisting of nickel particles, cobalt particles, and mixtures thereof, having diameters from 3 micrometers to 35 micrometers, the improvement characterized in that the particles of the exterior electrode are coated with a separate elec-

VOL
1127
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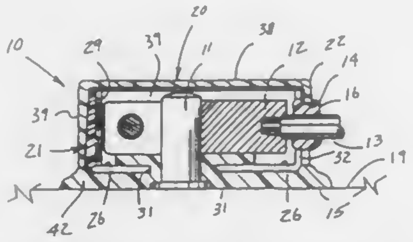
tronically conductive, porous, multiphase layer, consisting essentially of:

(a) fine metal particles selected from the group consisting of discrete nickel particles, discrete cobalt particles, and mixtures thereof, having diameters from 0.05 micrometer to 1.75 micrometer, and

(b) conductive oxide, selected from the group consisting of cerium oxide, doped cerium oxide, strontium titanate, doped strontium titanate and mixtures thereof.

5,021,305
BATTERY TERMINAL SEAL

William C. Turner, 1020 N. 23rd St., Coeur d'Alene, Id. 83814
Continuation-in-part of Ser. No. 373,109, Jun. 28, 1989, Pat. No. 4,920,018. This application Feb. 15, 1990, Ser. No. 480,227
The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.
Int. Cl.^{5} H01M *2/00*
U.S. Cl. 429—65 21 Claims

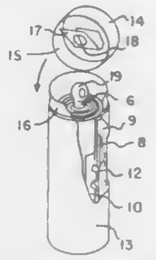


1. A battery case terminal, cable, and connector seal assembly, comprising:

- a cap including a top and a side wall extending about the periphery of the top, the cap forming an enclosure to releasably receive the battery terminal, connector and a portion of the cable;
- the side wall including a cable passage for receiving the cable;
- a first seal for substantially sealing the cap side wall and the battery case about the terminal and the connector; and
- a second seal for sealing the cable passage about the battery cable.

5,021,306
SPIRAL-WOUND GALVANIC CELL

Hans Sauer, Idstein-Walsdorf, and Peter Kramer, Konigstein, both of Fed. Rep. of Germany, assignors to Varta Batterie Aktiengesellschaft, Hanover, Fed. Rep. of Germany
Filed Nov. 15, 1989, Ser. No. 436,650
Claims priority, application Fed. Rep. of Germany, Jan. 30, 1989, 3902648
Int. Cl.^{5} H01M *2/30*
U.S. Cl. 429—94 8 Claims



1. A galvanic cell comprising a spiral-shaped electrode body which is formed from windings of band-shaped positive and negative electrodes with the imposition of a band-shaped separator, a current collector which serves as a winding mandrel and which is electrically connected with a first of said electrodes, wherein said current collector is a metal needle having a slit clamped to carrier portions of said first electrode, a metal housing for receiving the spiral-shaped electrode body and which is electrically connected with a second one of said electrodes, a cover which seals the opening of the housing and which serves as a terminal post for the electrode which is electrically connected to the current collector, and a contact for bridging the cover and the current collector, wherein said contact takes the form of a leaf spring attached to interior portions of the cover and which rests upon the current collector under elastic tension.

5,021,307
HIGH EXPANSION, LITHIUM CORROSION RESISTANT SEALING GLASSES

Richard K. Brow, and Randall D. Watkins, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.
Division of Ser. No. 146,560, Jan. 21, 1988. This application Sep. 7, 1990, Ser. No. 578,903
Int. Cl.^{5} H01M *2/08*
U.S. Cl. 429—184 9 Claims

1. In an ambient temperature lithium battery, the improvement in combination therewith comprising a glass-to-metal seal, comprising:

(a) a metal selected from the group consisting of an alloy of 50% iron and 50% nickel and 446 SS; and

(b) a glass consisting essentially of, in mole %:

RO about 40–60
B_2O_3 about 30–50
Al_2O_3 about 10–25
where RO may be BaO, SrO, or CaO, or any combination of the three.

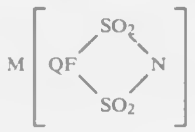
5,021,308
NEW ION CONDUCTIVE MATERIAL COMPOSED OF A SALT IN SOLUTION IN A LIQUID ELECTROLYTE

Michel Armand, St-Martin d'Uriage, France; Michel Gauthier, La Prairie, Canada, and Daniel Muller, Pau, France, assignors to Hydro-Quebec, Montreal, Canada and Nationale Elf Aquitane Societe, Courbevoie, France
Division of Ser. No. 224,915, filed as PCT FP87/00428 on Oct. 29, 1987, published as WO88/03331 on May 5, 1988, abandoned. This application Jan. 23, 1990, Ser. No. 467,358
Claims priority, application France, Oct. 30, 1986, 86 15114
The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.
Int. Cl.^{5} H01M *6/16*
U.S. Cl. 429—194 16 Claims

1. An electrochemical cell containing two electrodes upon which opposite polarity may be established and a liquid electrolyte which is an ion conductive material consisting of a salt in solution in a liquid consisting essentially of at least one polar aprotic solvent, wherein said salt is represented by one of the following formulas:

$$M\,[RF-SO_2-N-SO_2R'F] \qquad (I)$$
$$M\,[RF-SO_2-N-CO-R'F] \qquad (II)$$
$$M\,[RF-CO-N-CO-R'F] \qquad (III)$$

(IV)



wherein:

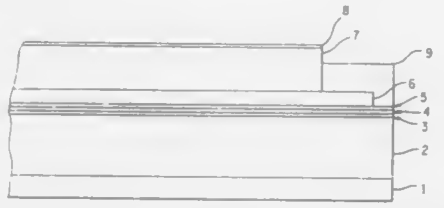
M is an alkaline or alkaline earth metal, a transition metal or a rare earth metal,

RF and R'F are identical or different and each represent a perhalogen radical having from 1 to 12 carbon atoms,

QF is a perfluorinated bivalent radical having from 2 to 6 carbon atoms.

5,021,309
MULTILAYERED PHOTORECEPTOR WITH ANTI-CURL CONTAINING PARTICULATE ORGANIC FILLER

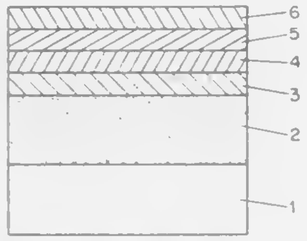
Robert C. U. Yu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Apr. 30, 1990, Ser. No. 516,819
Int. Cl.^{5} G03G *5/04, 5/047*
U.S. Cl. 430—58 20 Claims



13. An electrophotographic imaging member comprising an anti-curl layer, a flexible supporting substrate having an electrically conductive layer, a hole blocking layer, an adhesive layer, a charge-generating layer, and a charge transport layer, said anti-curl layer comprising a binder and a dispersion of organic filler selected from the group consisting of fluorocarbon polymers, polyethylene waxes, polypropylene waxes, metal stearates, fatty amides, and polyethylene-fluorocarbon blends.

5,021,310
ELECTROPHOTOGRAPHIC PHOTORECEPTOR

Seizou Kitagawa, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan
Filed Jun. 16, 1989, Ser. No. 368,237
Int. Cl.^{5} G03G *15/08, 15/02, 5/00*
U.S. Cl. 430—85 1 Claim



1. An electrophotographic photoreceptor, which comprises, in sequence:

a) a conductive base;

b) a carrier transport layer comprising arsenic and selenium in an atomic ratio of approximately 2 to 3;

c) a carrier generation layer comprising a selenium alloy;

d) a carrier injection regulating layer having a band gap energy greater than that of the carrier generation layer and comprising selenium and up to about 10 weight % arsenic;

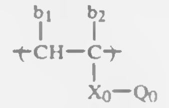
e) a thermal expansion relieving layer comprising arsenic and selenium; and

f) a surface protective layer comprising arsenic and selenium in an atomic ratio of approximately 2 to 3; wherein the arsenic concentration in the thermal expansion relieving layer gradually increases from a concentration substantially equal to that of the carrier injection regulating layer on a face of the thermal expansion relieving layer adjacent to the carrier injection regulating layer to a concentration substantially equal to that of the surface protective layer on an opposite face of the thermal expansion relieving layer adjacent to the surface protective layer, whereby damage to the photoreceptor caused by thermal stress is reduced.

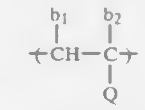
5,021,311
ELECTROPHOTOGRAPHIC PHOTORECEPTOR

Eiichi Kato, and Kazuo Ishii, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Sep. 1, 1989, Ser. No. 401,884
Claims priority, application Japan, Sep. 2, 1988, 63-218590
Int. Cl.^{5} G03G *5/00;* **C08F** *18/16*
U.S. Cl. 430—96 9 Claims

1. An electrophtographic photoreceptor comprising a support having provided thereon at least one photoconductive layer containing at least inorganic photoconductive particles and a binder resin, wherein said binder resin comprises at least one copolymer resin comprising a monofunctional macromonomer (M) and a monomer (A), said monofunctional macromonomer (M) having a weight average molecular weight of from 1×10^3 to 2×10^4 and containing at least one polymerization component represented by formula (II-a) or (II-b):

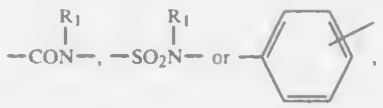


$$-\!\!\left(\overset{b_1}{\mathrm{CH}}-\underset{X_0-Q_0}{\overset{b_2}{\mathrm{C}}}\right)\!\!- \qquad \text{(II-a)}$$

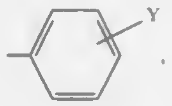


$$-\!\!\left(\overset{b_1}{\mathrm{CH}}-\underset{Q}{\overset{b_2}{\mathrm{C}}}\right)\!\!- \qquad \text{(II-b)}$$

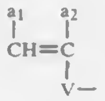
wherein X_0 represents —COO—, —OCO—, —CH_2OCO—, —CH_2COO—, —O—, —SO_2—, —CO—,



wherein R_1 represents a hydrogen atom or a hydrocarbon group; Q_0 represents an aliphatic group having from 1 to 18 carbon atoms or an aromatic group having from 6 to 12 carbon atoms, said carbon numbers not inclusive of substituents; b_1 and b_2, which may be the same or different, each represents a hydrogen atom, a halogen atom, a cyano group, a hydrocarbon group, —COO—Z or —COO—Z bonded via a hydrocarbon group, wherein Z represents a hydrogen atom or a substituted or unsubstituted hydrocarbon group; and Q represents —CN, —$CONH_2$ or



wherein Y represents a hydrogen atom, a halogen atom, an alkoxyl group or —COOZ′, wherein Z′ represents an alkyl group, an aralkyl group or an aryl group, with a polymerizable double bond-containing group represented by formula (I) being bonded to only one of the terminals of the main chain of said macromonomer:



$$\overset{a_1}{\mathrm{CH}}=\underset{V-}{\overset{a_2}{\mathrm{C}}} \qquad (I)$$

wherein V has the same meaning as X_0; and a_1 and a_2, which may be the same or different, each has the same meaning as b_1 and b_2, said monomer (A) being represented by formula (III):

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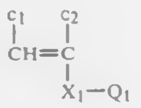
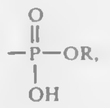


$$\mathrm{CH(c_1)=C(c_2)-X_1-Q_1}$$

(III)

wherein X_1 has the same meaning as X_0; Q_1 has the same meaning as Q_0; and c_1 and c_2, which may be the same or different, has the same meaning as b_1 and b_2, and at least one polar group selected from $—PO_3H_2$, $—SO_3H$, —COOH, —OH, —SH, and



$$-\mathrm{P}(=\mathrm{O})(\mathrm{OH})-\mathrm{OR},$$

wherein R represents a hydrocarbon group, being bonded to only one of terminals of the main chain of said copolymer.

5,021,312

APPARATUS AND METHOD FOR CONTROLLING THE QUANTITY OF DEVELOPER DELIVERED TO A FILM PROCESSING HEAD

Akira Yoda, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 23, 1988, Ser. No. 288,882

Claims priority, application Japan, Dec. 28, 1987, 62-335052

Int. Cl.⁵ G03G *13/10*

U.S. Cl. 430—97 **20 Claims**

1. A process for developing a film, which carries an electrostatic latent image formed by exposing the film in a charged state to image-bearing light from an original, by feeding a liquid developer to the film in a film developing compartment via a liquid delivery means, said film having a plurality of frames, each of said frames having an image portion, corresponding to said electrostatic latent image, and a background portion, said process comprising the following steps:

(a) electrifying a predetermined area for one frame;
(b) exposing said one frame;
(c) developing all of said one frame at the same time after said step (b);
(d) integrating and detecting the quantity of light from both the image portion and background portion of said one frame over substantially all of the predetermined area; and
(e) controlling the quantity of liquid developer fed to the film developing compartment via the liquid delivery means for developing said one frame in a field to be developed, in accordance with said step (d).

5,021,313

IMAGE REVERSAL PROCESS

Julie M. Alston, Myrtle Bank, Australia, assignor to Stork Colorproofing B.V., Boxmeer, Netherlands

PCT No. PCT/US88/00005, § 371 Date Jun. 10, 1989, § 102(e) Date Jun. 10, 1989, PCT Pub. No. WO88/05561, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 4, 1988, Ser. No. 424,294

Claims priority, application Australia, Jan. 15, 1987, PH9884

Int. Cl.⁵ G03G *13/09*

U.S. Cl. 430—100 **30 Claims**

1. A method of producing a positive image proof from a negative film separation in a colorproofer having a photoconductor plate which is mounted on the lower surface of a plate platen and is adapted to move over a charging station, an exposure station, toning units containing toners of different colors and bias plates for applying a bias voltage, vacuum suction means, wetting means, and a transfer station, and having a receptor sheet which is mounted on the first surface of a paper platen for image transfer thereto in said transfer station, said paper platen being optionally adapted to be turned over and to move over said toning units for toning a support member mounted on its second surface, said transfer station containing an offset member adapted to transfer thereto from said photoconductor and optionally from said support member on said second surface of said paper platen, and to transfer therefrom onto said receptor on the first surface of said paper platen, comprising the steps of:

A. depositing a uniform toner layer of a first color onto said offset member,
B. charging said photoconductor,
C. exposing said photoconductor to a negative film separation of said first color to thereby form exposed image and unexposed non-image areas thereon,
D. contacting said photoconductor with said offset member to transfer said toner therefrom to said unexposed areas of said photoconductor to thereby form a toner residue on said offset member corresponding to said exposed image areas, and
E. transferring said toner residue from said offset member to said receptor to produce thereon a positive first color image.

5,021,314

COLORED MAGNETICALLY ATTRACTABLE TONER POWDER

Gerardus C. P. Vercoulen, Velden; Robert P. Faessen, Best; Marcel L. M. Pennings, Horst, and Arnold B. M. H. van der Meij, Venlo, all of Netherlands, assignors to Oce-Nederland B.V., Netherlands

Filed Jun. 26, 1989, Ser. No. 371,519

Claims priority, application Netherlands, Jul. 4, 1988, 8801683

Int. Cl.⁵ G03G *9/083, 9/09*

U.S. Cl. 430—106 **6 Claims**

1. A colored magnetically attractable toner powder, comprising individual particles of magnetically attractable material enveloped by or finely distributed in a coloring substance, said coloring substance comprising a thermoplastic resin and coloring material, said coloring material comprising a first colorant and a second yellow-fluorescent colorant of which a standard mass consisting of 20% by weight of titanium dioxide, 80% by weight of thermoplastic resin and fluorescent colorant in an amount such that maximum fluorescence is observed, has the following characteristics: light-reflection in the wavelength range between 400 and 450 nm at most 15%, fluorescence peak in the wavelength range between 500 and 580 nm, light-reflection at the fluorescence peak at least 120%, lightness (L) at least 90 and chrona (C) at least 90.

5,021,315

METHOD FOR MAKING MAGNETIC PARTICLES HAVING IMPROVED CONDUCTIVITY AND THEIR USE IN ELECTROSTATOGRAPHIC PRINTING APPLICATIONS

Dov B. Goldman, Secaucas, N.J., assignor to Olin Hunt Sub I Corp., Cheshire, Conn.

Filed Jun. 7, 1989, Ser. No. 364,046

Int. Cl.⁵ G03G *9/083*

U.S. Cl. 430—106.6 **10 Claims**

1. A process for making conductive colored magnetic particles comprising:

a) providing magnetic core particles comprising a finely divided metal oxide, said particles having an average particle size within the range of from about 1 to about 50 microns,
b) depositing finely divided submicron size particles of copper oxide on the surface of said core particles, and
c) reducing said copper oxide to metallic copper.

5,021,316

COATED CARRIERS FOR DEVELOPING ELECTROSTATIC IMAGES

Motonobu Kubo, Minoo; Hiroshi Inukai, Takatsuki, and Takahiro Kitahara, Suita, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

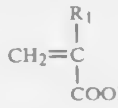
Filed Oct. 6, 1989, Ser. No. 418,155

Claims priority, application Japan, Oct. 6, 1988, 63-253576; Oct. 13, 1988, 63-258906; Dec. 21, 1988, 63-324486; Apr. 20, 1989, 1-101475; Aug. 11, 1989, 1-208925

Int. Cl.⁵ G03G *9/13*

U.S. Cl. 430—108 **1 Claim**

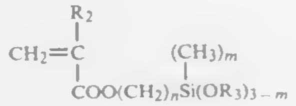
1. A carrier for developing electrostatic images, the carrier comprising a core and a coating on the core, the coating being formed from a copolymer or a composition containing the copolymer, the copolymer comprising about 50 to about 99% by weight of a monomer represented by the formula



$$\mathrm{CH_2=C(R_1)-COOR_f}$$

(a)

wherein R_1 is a hydrogen atom, a fluorine atom, a chlorine atom or a methyl group, and R_f is a fluoroalkyl group, and about 50 to about 1% by weight of a monomer represented by the formula



$$\mathrm{CH_2=C(R_2)-COO(CH_2)_nSi(CH_3)_m(OR_3)_{3-m}}$$

(b)

wherein R_2 is a hydrogen atom, a fluorine atom, a chlorine atom or a methyl group, R_3 is a methyl group, an ethyl group, a propyl group, a methoxyethyl group or an acetyl group, m is 0, 1 or 2 and n is an integer of 1 to 4.

5,021,317

ELECTROSTATIC LATENT IMAGE DEVELOPER WITH TONER PARTICLES SURFACE TREATED WITH A POLYSILOXANE HAVING AMMONIUM SALT FUNCTIONAL GROUPS

Akitoshi Matsubara; Jiro Takahashi; Hiroyuki Takagiwa, and Hiroya Masaki, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

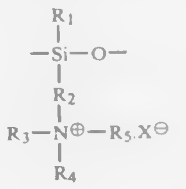
Filed Oct. 24, 1988, Ser. No. 261,741

Claims priority, application Japan, Oct. 28, 1987, 62-272516; Oct. 28, 1987, 62-272517

Int. Cl.⁵ G03G *9/097, 13/22*

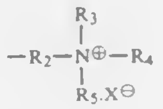
U.S. Cl. 430—110 **18 Claims**

1. A developer for developing an electrostatic latent image comprising toner particles; and 0.1 to 5 percent by weight relative to said toner particles of inorganic fine particles surface treated with a polysiloxane having a repeating unit represented by



$$-\mathrm{Si}(\mathrm{R_1})(\mathrm{R_2}-\mathrm{N^{\oplus}}(\mathrm{R_3})(\mathrm{R_4})-\mathrm{R_5}.\mathrm{X^{\ominus}})-\mathrm{O}-$$

wherein R_1 is a hydrogen atom, a hydroxyl group, an alkyl group, an aryl group, an alkoxy group or a



$$-\mathrm{R_2}-\mathrm{N^{\oplus}}(\mathrm{R_3})(\mathrm{R_5}.\mathrm{X^{\ominus}})-\mathrm{R_4}$$

group, R_2 is a divalent linkage group or a linkage valence, R_3, R_4 and R_5 independently represent a hydrogen atom, an alkyl group, or an aryl group, X represents a halogen atom, provided that R_1, R_2, R_3, R_4 and R_5 may independently have a substituent.

5,021,318

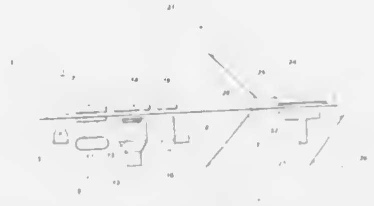
PROCESS FOR FORMING SECURE IMAGES

James D. Mayo; Stephen Drappel, both of Toronto; James M. Duff, Mississauga; Melvin D. Croucher, Oakville, all of Canada, and John M. Lennon, Newark, Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 28, 1989, Ser. No. 386,751

Int. Cl.⁵ G03G *13/22*

U.S. Cl. 430—124 **23 Claims**



1. A process for forming secure images which comprises electrostatically charging an imaging member; imagewise exposing the charged member, thereby forming a latent image on the member; developing the latent image with a liquid developer comprising a liquid medium, a charge control additive, and toner particles comprising a colorant and a polymeric material; allowing the developed image to dry on the imaging member; contacting the portion of the imaging member with the dry developed image with a substantially transparent sheet having an adhesive material on the surface thereof in contact with the imaging member, thereby transferring the developed image from the imaging member to the substantially transparent sheet; contacting the adhesive surface of the substantially transparent sheet with the developed image with a paper sheet having a polymeric coating on the surface that is in contact with the substantially transparent sheet; and applying heat and pressure to the substantially transparent sheet and the paper sheet at a temperature and pressure sufficient to affix the image permanently to the paper.

5,021,319

LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, REDUCING AGENT, POLYMERIZABLE COMPOUND AND A FLUORINE ATOM-CONTAINING COMPOUND

Fujio Kakimi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 19, 1989, Ser. No. 409,207

Claims priority, application Japan, Sep. 19, 1988, 63-235679

Int. Cl.⁵ G03C *1/68, 1/76;* **B41M** *5/12*

U.S. Cl. 430—138 **7 Claims**

1. A light-sensitive material comprising a support and a light-sensitive layer provided thereon which contains silver halide, a reducing agent and an ethylenically unsaturated polymrizable compound, at least said silver halide and said polymerizable compound being contained in a microcapsule;

wherein the light-sensitive layer further contains a fluorine

VOL
1127
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atom-containing compound adsorbed on a shell of the microcapsule.

5,021,320
POLYAMIDE CONTAINING THE HEXAFLUOROISOPROPYLIDENE GROUP WITH O-QUINONE DIAZIDE IN POSITIVE WORKING PHOTORESIST

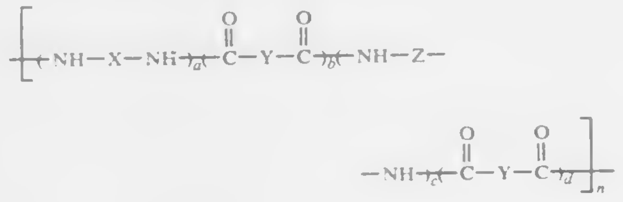
Werner H. Mueller, Warwick; Dinesh N. Khanna, West Warwick, and Bernd Hupfer, North Kingstown, all of R.I., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Division of Ser. No. 915,342, Oct. 2, 1986, abandoned. This application Jul. 7, 1989, Ser. No. 376,684

Int. Cl.⁵ G03C *1/52*

U.S. Cl. 430—192 **21 Claims**

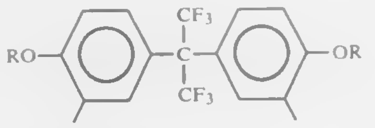
1. A heat resistant positive-acting photoresist composition comprising a sensitizing amount of an o-quinone diode photosensitizer in admixture with a solvent soluble polyamide polymer, said polyamide polymer having the formula



$$\left[\left(NH-X-NH \right)_a \left(\overset{O}{\overset{\|}{C}}-Y-\overset{O}{\overset{\|}{C}} \right)_b \left(NH-Z- NH \right)_c \left(\overset{O}{\overset{\|}{C}}-Y-\overset{O}{\overset{\|}{C}} \right)_d \right]_n$$

where:

X is the divalent group:



a = 0.10 to 0.50 mole fraction
b = 0.25 to 0.50 mole fraction
c = 0.00 to 0.40 mole fraction
d = 0.00 to 0.25 mole fraction;
a + b + c + d = 1, said mole fractions being based upon the total moles of X + Y + Z in said polyamide;
n is an integer from 2 to 500
R is independently selected from hydrogen and a substituted or unsubstituted aliphatic or aromatic monovalent group having up to nine carbons; and
Y and Z are independently selected from a substituted or an unsubstituted aliphatic, aromatic or alicyclic divalent group having up to 60 carbons and mixtures thereof

5,021,321
PHOTOSENSITIVE MEMBER AND MULTI-COLOR IMAGE FORMING METHOD

Tetsuro Fukui, Kawasaki; Masato Katayama, Yokohama; Akihiro Mouri, Kokubunji; Kazuo Isaka, Tokyo; Kenji Kagami, Atsugi, and Masao Suzuki, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 8, 1990, Ser. No. 564,060

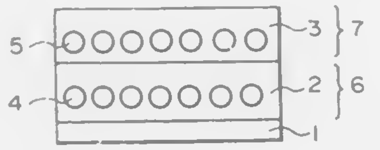
Claims priority, application Japan, Aug. 10, 1989, 1-205626

Int. Cl.⁵ G03C *5/54, 1/46, 1/68*

U.S. Cl. 430—201 **15 Claims**

8. An image forming method of forming an image by using a photosensitive member which comprises a substrate, and a plurality of photosensitive layers laminated on the substrate; each photosensitive layer comprising a matrix phase and particles dispersed therein; the matrix phase comprising a photosensitive silver salt, an organic silver salt and a reducing agent which react with each other on exposure and heating to form a light-absorbing organic compound; the particles comprising a heat-diffusive colorant, a polymerizable polymer precursor and a -photopolymerization initiator; the light-absorbing organic compound in a photosensitive layer being capable of absorbing a wavelength of light to which the photopolymerization initiator in the photosensitive layer is sensitive; the image forming method comprising:

- an imagewise exposure step for subjecting the photosensitive member to imagewise exposure to form a latent image in at least one of the photosensitive layers.



- a heating step for heating the photosensitive member to form a light-absorbing organic compound in the photosensitive layers corresponding to the latent image.
- a polymerization exposure step for exposing the photosensitive member to provide the particles with different polymerization states due to the light-absorbing characteristic of the light-absorbing organic compound, and
- a transfer step for heating the photosensitive member to transfer the heat-diffusive colorant to an image-receiving member depending on the polymerization states of the particles containing the heat-diffusive colorant.

5,021,322
PHOTOGRAPHIC ELEMENT COMPRISING A DEVELOPMENT INHIBITOR RELEASING COMPOUND HAVING A LINKING GROUP BETWEEN THE CARRIER AND THE INHIBITOR

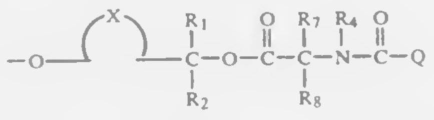
William J. Begley, Webster, and Teh-Hsuan Chen, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 22, 1990, Ser. No. 483,602

Int. Cl.⁵ G03C *7/305, 8/00, 7/34, 7/36*

U.S. Cl. 430—223 **6 Claims**

1. A photographic element comprising a support bearing at least one photographic silver halide emulsion layer and at least one development inhibitor releasing compound (A) represented by the formula CAR—LINK—Q where CAR is a carrier moiety capable of releasing LINK—Q during photographic processing upon reaction with oxidized developing agent; LINK—Q is in turn capable of releasing a development inhibitor group (Q) by a displacement reaction; and LINK—Q is represented by the formula:



wherein

X represents the atoms necessary to complete an unsubstituted or substituted arylene or heterocyclic group;
R_1 and R_2 individually are hydrogen or unsubstituted or substituted alkyl, aryl, or together complete a 5-, 6- or 7-member ring;
R_7 and R_8 individually are hydrogen, alkyl or aryl or together complete a ring;
R_4 is hydrogen, unsubstituted or substituted alkyl, cycloalkyl, heterocyclic, or aryl; and
Q is a releasable development inhibitor group.

5,021,323
LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, REDUCING AGENT AND POLYMERIZABLE COMPOUND

Soichiro Yamamoto, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 218,180, Sep. 15, 1988, abandoned, which is a continuation-in-part of Ser. No. 12,462, Feb. 9, 1987, abandoned. This application Mar. 19, 1990, Ser. No. 496,156

Claims priority, application Japan, Feb. 7, 1986, 61-25576

Int. Cl.⁵ G03C *5/00*

U.S. Cl. 430—292 **16 Claims**

1. An image-forming method which comprises the steps of:
imagewise exposing to light a light-sensitive element comprising a support and a light-sensitive layer which contains silver halide grains, a reducing agent and an ethylenic unsaturated polymerizable compound, said silver halide grains being contained in such amount that the total silver content in the light-sensitive layer is in the range of from 0.1 mg/m^2 to 10 g/m^2, said reducing agent being contained in the range of from 0.1 to 1,500 mole % based on the total silver content in the light-sensitive layer, and said polymerizable compound being contained in the range of from 5 to 120,000 times by weight as much as the amount of the silver halide grains; and
simultaneously or thereafter heating the light-sensitive element at a temperature in the range of 80° C. to 200° C. to imagewise polymerize the polymerizable compound,
wherein the silver halide grains have a mean grain size of 0.001 to 5 μm and at least 50% of number of the silver halide grains have an aspect ratio of not more than 5 and have such a core/shell structure that the shell portion contains iodine at a concentration higher than that in the core portion, the iodine concentration in the shell portion is not less than 10 mold % of the halogen content therein, and the shell portion contains silver in an amount of 0.01 to 50 weight % of the silver in the silver halide grains.

5,021,324
PRINTING PLATE PROTECTANT

Paul A. Jargiello, Livingston, and Thomas J. Dooley, Teaneck, both of N.J., assignors to Polychrome Corporation, Yonkers, N.Y.

Filed Oct. 5, 1990, Ser. No. 593,131

Int. Cl.⁵ G03C *5/00*

U.S. Cl. 430—331 **20 Claims**

1. An aqueous composition useful for the protection of actinic light-exposed presensitized lithographic printing plates, when applied to the surface of the revealed substrate of said plates after they have been developed but before treatment to heat, to prevent surface contamination from said heat treatment, which comprises an effective amount of the di-potassium salt of hydroxyethylidene diphosphonic acid dissolved in water.

5,021,325
PHOTOGRAPHIC MATERIAL AND PROCESS COMPRISING A PYRAZOLOTRIAZOLE COUPLER

Paul A. Burns, and John W. Harder, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 19, 1989, Ser. No. 452,997

Int. Cl.⁵ G03C *7/38*

U.S. Cl. 430—387 **7 Claims**

1. A photographic element comprising a support bearing at least one silver halide emulsion layer having associated therewith a pyrazolotriazole dye-forming coupler wherein the coupler contains on a carbon atom in a non-coupling position a ballast group derived from and bonded through a carboxylic acid portion of an unsubstituted or substituted alpha amino acid.

5,021,326
PROCESS FOR RAPIDLY PROCESSING A COLOR PHOTOGRAPHY MATERIAL

Heinz Meckl, Bergisch Gladbach; Karl-Heinz Reuter, Frechen, and Rudolf Tromnau, Cologne, all of Fed. Rep. of Germany, assignors to Agfa Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 4, 1990, Ser. No. 504,549

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1989, 3912639

Int. Cl.⁵ G03C *7/30, 7/26*

U.S. Cl. 430—399 **6 Claims**

1. In the continuous wet-processing of a color photographic silver halide recording material wherein
a color photographic silver halide recording material having a chloride content of at least 80 mol % is subjected to wet-processing to a developed material in a total wet-processing time of not more than 60 seconds the steps comprising
developing said recording material in a developing bath having
a concentration of halide adapted to develop the material in the developing bath and not exceeding 10^{-2} mol/L and
the chloride content of the developing bath halide being at least 80 mol %
bleach-fixing, and
stabilizing or washing,
while replenishing said developing bath such that the halide concentration does not exceed 10^{-2} mol/L.

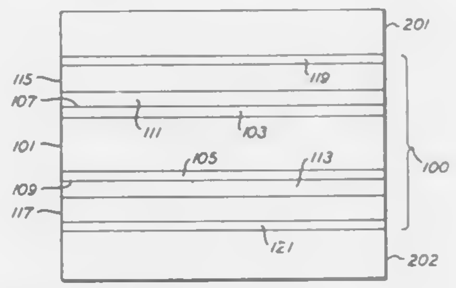
5,021,327
RADIOGRAPHIC SCREEN/FILM ASSEMBLIES WITH IMPROVED DETECTION QUANTUM EFFICIENCIES

Phillip C. Bunch, and Robert E. Dickerson, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 373,720, Jun. 29, 1989, abandoned, which is a continuation-in-part of Ser. No. 314,023, Feb. 23, 1989, abandoned. This application Dec. 26, 1989, Ser. No. 456,889

Int. Cl.⁵ G03C *1/46*

U.S. Cl. 430—496 **17 Claims**



1. An imaging assembly comprised of
a transparent film support,
front and back silver halide emulsion layer units coated on opposite sides of the film support,
a front and back pair of intensifying screens adjacent said front and back emulsion layer units, respectively, for absorbing exposures to X-radiation and emitting electromagnetic radiation having a wavelength longer than 300 nm to imagewise expose said front and back silver halide emulsion layer units, and
means for reducing to less than 10 percent crossover of the longer than 300 nm wavelength electromagnetic radiation emitted from the front screen to the back emulsion layer unit and from the back screen to the front emulsion layer unit, said crossover reducing means being decolorized in less than 90 seconds during processing of said emulsion layers, characterized in that,
the back screen and back emulsion layer unit in combination

VOL
1127
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exhibit a photicity at least twice that of the front screen and the front emulsion layer unit in combination and the front screen is chosen to exhibit modulation transfer factors greater than those of reference curve A in FIG. 2.

5,021,328

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIALS

Osamu Takahashi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

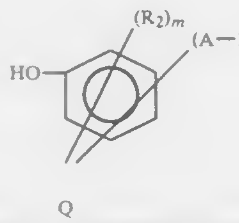
Filed Jun. 29, 1990, Ser. No. 545,591

Claims priority, application Japan, Jun. 30, 1989, 1-168895

Int. Cl.^{5} G03C *7/26, 7/32, 7/34*

U.S. Cl. 430—502 **17 Claims**

1. A silver halide color photographic material comprising a support having thereon (i) at least one silver halide light-sensitive emulsion layer containing substantially silver iodide free silver halide with a silver chloride content of at least 90 mol%, (ii) at least one coupler which forms a dye by means of a coupling reaction with the oxidized product of a primary aromatic amine developing agent, and (iii) at least one light-insensitive layer containing at least one oil soluble anti-color mixing agent which reacts with the oxidized product of the developing agent, said light-insensitive layer containing at least one oil soluble and substantially non-diffusible anti-color mixing promotor selected from the group consisting of compounds represented by general formula (I) or general formula (II):



(I)

wherein A represents a divalent electron attractive group, R_1 represents an aliphatic group, an aryl group, an alkoxy group, an aryloxy group, ar alkylamino group, an anilino group, a heterocyclic ring-amino group or a heterocyclic group, l represents 1 or 2, R_2 represents an aliphatic group, an alkoxy group, a hydroxyl group or a halogen, m represents an integer of value from 0 to 4, and a benzene ring or heterocyclic ring formed by Q may be condensed with the benzene ring, in formula (I);

$$HO{-}R_3 \qquad (II)$$

wherein R_3 represents an aliphatic group having a total number of carbon atoms of at least 12;

said anti-color mixing promotor may form a dimer or more polymer.

13. A silver halide color photographic material as in claim **1**, wherein said light-insensitive layer is an interlayer provided between two silver halide light-sensitive emulsion layers or an interlayer provided between a silver halide light-sensitive emulsion layer and a protective layer.

5,021,329

SILVER HALIDE PHOTOGRAPHIC MATERIAL CONTAINING A DYE PRECURSOR RESIDUE

Toshio Kawagishi; Atsuhiro Ohkawa, and Seiji Ichijima, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 27, 1989, Ser. No. 302,786

Claims priority, application Japan, Jan. 29, 1988, 63-18636; Dec. 7, 1988, 63-309206

Int. Cl.^{5} G03C *1/08, 7/333*

U.S. Cl. 430—543 **19 Claims**

1. A silver halide photographic color negative material having at least one silver halide emulsion layer on a base, which comprises a color negative containing at least one compound having a dye precursor residue represented by the following formula (II):

$$A\text{-}L\text{-}Dp\text{-}(Sol)_n \qquad (II)$$

wherein A represents a coupler residue or a redox group which is capable of splitting off from the L-Dp-$(Sol)_n$ portion to formula II by a reaction with the oxidized product of a developing agent, said L-Dp-$(Sol)_n$ portion of formula (II) is capable of dissolving into a developing solution, L represents a divalent linking group, Dp represents a dye precursor residue capable of producing a dye having absorption in the visible light range by a hydrolysis reaction in the presence of a silver (I) ion or a soluble silver complex which is present in the developing solution, fixing solution, bleach-fixing solution or a processing solution, Sol represents a water-soluble group, and n is an integer of 1 or more.

5,021,330

COLOUR PHOTOGRAPHIC RECORDING MATERIAL CONTAINING A COUPLER RELEASING A PHOTOGRAPHICALLY ACTIVE COMPOUND

Peter Bergthaller, Bergisch Gladbach; Thomas Krüger, Leverkusen; Rudolf Stolzenburg, Langenfeld, Fed. Rep. of Germany, and Dirk Hübner, Cologne, all of, assignors to Agfa Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

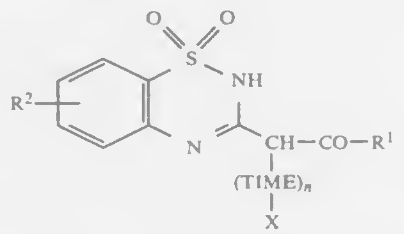
Filed Jul. 18, 1990, Ser. No. 554,700

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1989, 3925438

Int. Cl.^{5} G03C *7/36*

U.S. Cl. 430—544 **7 Claims**

1. Colour photographic recording material having at least one light sensitive silver halide emulsion layer and, associated therewith, a coupler capable of releasing a photographically active compound, wherein the coupler corresponds to the following general formula I



I

wherein

- R^1 denotes alkyl, aryl, NH-aryl or NH-NH-R^3;
- R^2 denotes H, halogen, alkoxy, alkylthio or NH-R^4.
- R^3 and R^4 denote acyl;
- X denotes the residue of a photographically active compound containing a monocyclic 1,2,3- or 1,2,4-triazole ring;
- TIME denotes a linking member which is released together with the attached residue X when the coupler reacts with the oxidation product of a colour developer and in turn releases the residue X as photographically active compound under the conditions of development;
- n denotes 0 or 1.

5,021,331

COLOR PHOTOGRAPHIC RECORDING MATERIAL CONTAINING A DIR COUPLER

Hans Vetter, Cologne; Heinrich Odenwälder, Leverkusen; Peter Bergthaller, Gladbach, and Thomas Krüger, Leverkusen, all of Fed. Rep. of Germany, assignors to Agfa Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 23, 1990, Ser. No. 528,043

Claims priority, application Fed. Rep. of Germany, Jun. 6, 1989, 3918394

Int. Cl.^{5} G03C *7/32*

U.S. Cl. 430—544 **1 Claim**

1. A color photographic recording material comprising at least one photosensitive silver halide emulsion layer and, associated therewith, a coupler bearing a releasable triazolyl group attached to its coupling position, characterized in that the coupler corresponds to formula I:

$$A{-}(TIME)_n{-}Z \qquad I$$

in which

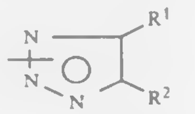
A is the residue of a coupler which couples with the oxidation product of a silver halide developing agent under the conditions of photographic development and, in doing so, releases a group corresponding to the following formula

$$-(TIME)_n{-}Z$$

TIME is a binding link which together with the group Z (a triazole ring) attached thereto is released on reaction of the coupler with the oxidation product of a silver halide developing agent and which, in turn, releases the group Z with delay under the development conditions;

n is 0 or 1;

Z is a triazole ring corresponding to the following formula



- R^1 is alkylthio;
- R^2 is H, alkyl, alkylthio, aryl or a heterocyclic group; at least one of the substituents R^1 and R^2 contains at a distance of 2 to 4 atoms from the triazole ring a group $-CO-OR^3$, $-O-CO-OR^3$ or $-O-CO-R^3$ hydrolyzable in aqueous alkali;
- R^3 is alkyl, cycloalkyl or aryl.

5,021,332

COLOR PHOTOGRAPHIC RECORDING MATERIAL CONTAINING A DIR COUPLER

Peter Bergthaller, Bergisch Gladbach; Thomas Krüger, Leverkusen; Hans Vetter, Cologne, and Heinrich Odenwälder, Leverkusen, all of Fed. Rep. of Germany, assignors to Agfa Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

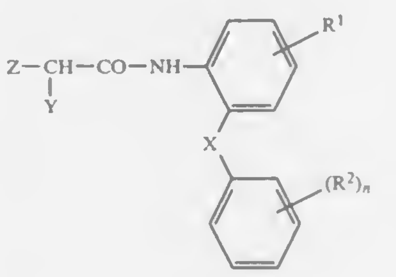
Filed May 23, 1990, Ser. Nn. 528,045

Claims priority, application Fed. Rep. of Germany, Jun. 6, 1989, 3918395

Int. Cl.^{5} G03C *7/36*

U.S. Cl. 430—544 **5 Claims**

1. A color photographic recording material comprising at least one photosensitive silver halide emulsion layer and a DIR coupler associated therewith, characterized in that the DIR coupler corresponds to general formula I:



I

in which

- R^1 is H, Cl, $-CF_3$, alkoxy, sulfamoyl;
- R^2 is H, Cl, alkyl, cycloalkyl, alkoxy, alkoxycarbonyl, carbamoyl;
- n is 0, 1 or 2;
- X is O or S;
- Y is a group with a silver halide development inhibiting function releasable during color development;
- Z is benzoyl, carbomoyl or a quinazolin-4-on-2-yl group.

5,021,333

COLOR PHOTOGRAPHIC ELEMENT, COMPOUNDS AND PROCESS

Llewellyn J. Leyshon, Watford, United Kingdom; Paul R. Buckland, and Paul A. Burns, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

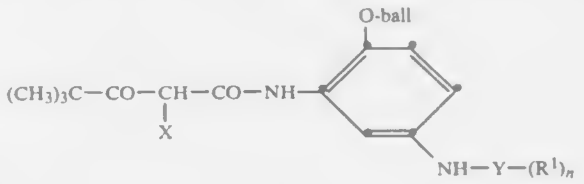
Filed Aug. 24, 1990, Ser. No. 572,927

Claims priority, application United Kingdom, Sep. 5, 1989, 8920059; Nov. 2, 1989, 8924665

Int. Cl.^{5} G03C *7/36*

U.S. Cl. 430—551 **8 Claims**

1. A color photographic element comprising a support bearing at least one photographic silver halide emulsion layer and a yellow dye-forming coupler represented by the formula:



(I)

wherein:

- R^1 is alkyl of 1 to 4 carbon atoms;
- ball is a ballast group of such size and configuration as to render the coupler nondiffusible in a photographic element;
- Y is CO, PO_3 or SO_2;
- X is an aryloxy coupling-off group; and
- n is 1 or, when Y is PO_3, n is 2.

7. A color photographic element as in claim **1**, also comprising a blocked bis-phenol dye stabilizer.

5,021,334

LIGHT-SENSITIVE ELEMENT FOR THE DIFFUSION TRANSFER PROCESS

Keizo Koya, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 8, 1990, Ser. No. 462,172

Claims priority, application Japan, Jan. 10, 1989, 1-3472

Int. Cl.^{5} G03C *5/54, 7/26*

U.S. Cl. 430—562 **8 Claims**

1. A light-sensitive element for the diffusion transfer process which comprises a support having thereon a light-sensitive silver halide emulsion layer having associated therewith a yellow dye providing compound represented by the following general formula (I):

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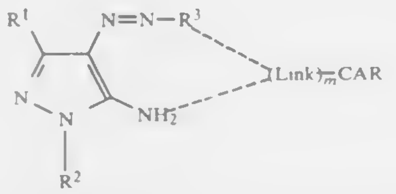

(1)

wherein CAR represents a carrier moiety which is capable of releasing a diffusible dye from the compound in correspondence or counter-correspondence to development under alkaline conditions; Link represents a group connecting CAR with a diffusible dye; m represents 0 or 1; the dotted lines mean that at least one of the dotted lines is a bond; R^1 represents a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkoxycarbonyl group, an aryloxycarbonyl group or a carbamoyl group; R^2 represents an alkyl group or an aryl group; and R^3 represents an aryl group excepting an aryl group having a Hammett's σ_p value less than 0.01.

5,021,335
IN SITU TRANSCRIPTION IN CELLS AND TISSUES

Laurence Tecott, Norwalk, Conn.; Jack D. Barchas, Stanford, and James Eberwine, Menlo Park, both of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Jun. 17. 1988, Ser. No. 208,267
Int. Cl.^{5} C12Q *1/68*

U.S. Cl. 435—6 2 Claims

1. A method for determining the occurrence of transcription of a target DNA sequence in cells in a fixed tissue section, said method comprising.

contacting said tissue section with a primer complementary to a sequence in the 3′ proximal region MRNA of said DNA sequence;

contacting said tissue section containing said primer with reverse transcriptase and deoxynucleotide triphosphates, wherein at least one of the triphosphates is labeled with a label to provide a detectable signal, whereby cDNA is produced by extension of said primer;

washing said tissue to remove substantially all of said triphosphates present in said tissue; and

detecting the presence of said cDNA in cells in said tissue by means of said label.

5,021,336
COLOR PHOTOGRAPHIC MATERIAL

Helmut Reuss; Bruno Mücke, both of Bergisch Gladbach; Helmut Mäder, Odenthal, and Dieter Rockser, Leicblingen, all of Fed. Rep. of Germany, assignors to Agfa Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 173,802, Mar. 28, 1988, abandoned. This application Jul. 13, 1990, Ser. No. 553,351

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1987, 3712426

Int. Cl.^{5} G03C *1/30, 1/34*

U.S. Cl. 430—608 3 Claims

1 Color photographic recording material containing on a reflective layer support at least one blue-sensitive at least one green-sensitive and at least one red-sensitive layer of binder containing silver halide and optionally other light-insensitive layers of binder, in which the binders are hardened with an instant hardener, the blue-sensitive layer or layers or one or more silver halide-free layers adjacent to the one or more than one blue-sensitive layer containing a soluble halide selected from the group consisting of alkali metal chloride, alkali metal bromide, ammonium chloride and ammonium bromide in an amount of from 100 to 900 mMol of soluble chloride and from 0 to 50 mMol of soluble bromide per Mol of Ag or from 0 to 600 mMol of soluble chloride and from 5 to 50 mMol of soluble bromide per Mol of Ag.

5,021,337
NON-INTRUSIVE PROCESS FOR MONITORING THE PRODUCTION OF RECOMBINANT PROTEINS

Patrick T. T. Wong; Saran A. Narang, both of Ottawa, and Wing L. Sung, Gloucester, all of Canada, assignors to National Research Council of Canada, Ottawa, Canada

Filed Jul. 15, 1988, Ser. No. 219,306
Int. Cl.^{5} C12Q *1/02*

U.S. Cl. 435—29 8 Claims

1. A process for monitoring the production of recombinant proteins synthesized in *E. coli* which comprises retaining a sample or produced recombinant protein in a pressure holder, applying a high pressure to the sample in the holder, subjecting the pressurized sample to infrared spectroscopic analysis at a selected infrared band and comparing the pressure induced infrared frequency shift of this band obtained against the pressure-induced shift of a standard at the pressure used, thereby determining the completeness of the protein production.

5,021,338
ENZYME EXTRACT FROM GERMINATED SORGHUM FOR HYDROLYSIS OF PROTEIN MATERIAL

Roberto Gianna; Enrico De Gregoriis, both of Rome, and Renzo Boni, Castelnuovo Di Porto, all of Italy, assignors to Enichem Synthesis S.p.A., Milan and Enichem Synthesis S.p.A., Palermo, both of, Italy

Filed Dec. 16, 1988, Ser. No. 285,668

Claims priority, application Italy, Dec. 18, 1987, 23084 A/87

Int. Cl.^{5} C12P *21/06;* C12N *9/50;* A23J *3/00;* A61K *37/02*

U.S. Cl. 435—68.1 16 Claims

1. A process for preparing a protein hydrolyzate, which comprises subjecting a protein material from plant or animal sources to enzymatic hydrolysis at a pH of from about 3.0 to 6.5 with an enzyme extract from germinated sorghum seeds and recovering said protein hydrolyzate, said enzyme extract containing an enzyme system comprising a proteolytic component active on intact proteins and large peptides at an optimum pH of 3.2 to 4.2 and a peptidase component active on small peptides at an optimum pH of 4.5 to 6.5, whereby a protein hydrolyzate having an average molecular weight within a selected range can be obtained by varying the pH so as to depress activity of the proteolytic component or the peptidase component.

5,021,339
YEAST PROMOTER TRUNCATED GAP-DH

Hiromichi Mukai; Hajime Horii; Muneo Tsujikawa; Haruhide Kawabe; Hirofumi Arimura, all of Osaka, and Tadakazu Suyama, Kyoto, all of Japan, assignors to Green Cross Corporation, Osaka, Japan

Continuation of Ser. No. 914,979, Oct. 3, 1986, abandoned. This application Aug. 24, 1989, Ser. No. 397,347

Claims priority, application Japan, Oct. 3, 1985, 60-219191; Feb. 4, 1986, 61-21198

Int. Cl.^{5} C07H *15/12;* C12N *1/00;* C12P *19/31*

U.S. Cl. 435—69.1 6 Claims

1. A DNA sequence of the yeast glyceraldehyde-3-phosphate dehydrogenase (GAP-DH) promoter which consists of, as a minimum unit, the region upstream of the initiator codon of the yeast GAP-DH protein of from at least −25 bp up to −164 bp.

5,021,340
CLONING VECTOR, MOLECULES OF RECOMBINANT DNA, *BACILLUS SUBTILIS* STRAINS TRANSFORMED WITH THE SAID MOLECULES AND METHODS FOR THE EXPRESSION OF HETEROLOGOUS GENES AND THE PRODUCTION AND SECRETION OF PROTEINS CODED BY THE SAID GENES

Salvatore Toma; Marina Del Bue, both of Milan; Antonio Mele, Pavia, and Guido Grandi, Segrate, all of Italy, assignors to Eniricerche S.p.A., Milan, Italy

Continuation of Ser. No. 884,238, Jul. 10, 1986, abandoned. This application Aug. 17, 1989, Ser. No. 395,173

Claims priority, application Italy, Jul. 10, 1985, 21507 A/85

Int. Cl.^{5} C12N *1/21, 15/09, 15/75*

U.S. Cl. 435—69.1 11 Claims

1. A recombinant DNA molecule useful for expressing and secreting a heterologous protein in *Bacillus subtilis* comprising:

(a) a DNA sequence comprising an nprR2 regulating region, a promoter, a ribosome binding site and a signal secretion sequence of a neutral protease gene isolated from plasmid pSM127, said region having the nucleotide sequence given in FIG. *2a;* and

(b) a heterologous gene encoding said heterologous protein, wherein the expression of said heterologous gene is under the control of said DNA sequence.

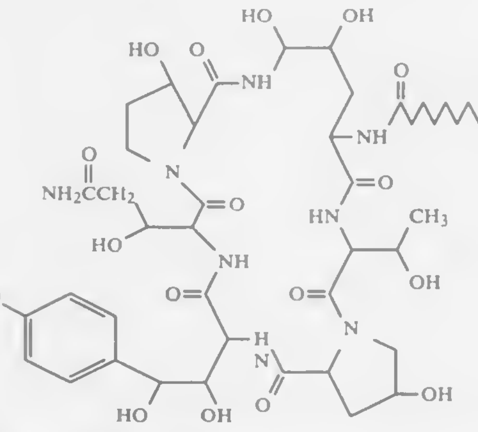
5,021,341
ANTIBIOTIC AGENT PRODUCED BY THE CULTIVATION OF *ZALERION* MICROORGANISM IN THE PRESENCE OF MANNITOL

Robert A. Giacobbe, Lavallette; Jan S. Tkacz, Piscataway; Prakash S. Masurekar, Warren, all of N.J.; Louis Kaplan, New City, N.Y., and Margaret S. Sosa, Elizabeth, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Mar. 12, 1990, Ser. No. 492,026
Int. Cl.^{5} C12P *21/04;* C12N *1/00, 1/14, 1/32*

U.S. Cl. 435—71.1 6 Claims

1. A method for enhancing the production of compound having the formula


(I)

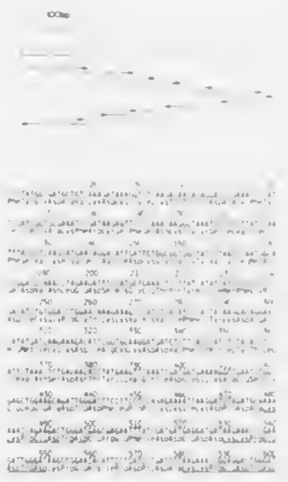
which comprises cultivating *Zalerion arboricola* ATCC 20868 in a nutrient medium containing mannitol as the primary source of carbon.

5,021,342
EXPRESSION CDNA CLONES ENCODING ANTIGENS OF *ONCHOCERCA VOLVULUS*

Bruce M. Greene, Shaker Heights, and Thomas R. Unnasch, South Euclid, both of Ohio, assignors to University Hospitals of Cleveland, Cleveland, Ohio

Filed Jun. 30, 1988, Ser. No. 214,264
Int. Cl.^{5} C12P *19/34, 21/06;* C12N *15/00, 7/00, 1/22;* C07H *15/12;* C07K *13/00*

U.S. Cl. 435—91 8 Claims



1. An isolated and purified nucleic acid having the nucleotide sequence according to FIG. 7.

5,021,343
METHOD FOR PRODUCING TRICHOTHECENES

Marian N. Beremand, Peoria, Ill.; Frank L. VanMiddlesworth, Fanwood, N.J., and Ronald D. Plattner, Goodfield, Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 10, 1988, Ser. No. 192,084
Int. Cl.^{5} C12P *17/18;* C12N *1/14, 1/38*

U.S. Cl. 435—119 6 Claims

1. A method of producing trichothecenes selected from the group consisting of neosolaniol, 8-propionyl-neosolaniol and 8-isobutyryl-neosolaniol comprising fermenting a culture medium containing L-leucine with a leucine auxotroph having all the identifying characteristics of *Fusarium sporotrichiodes* ARS Culture Collection Accession No. NRRL 18365 and mutants thereof, wherein said auxotroph and mutants have the capability of producing and accumulating higher levels of neosolaniol, 8-propionyl-neosolaniol and 8-isobutyryl-neosolaniol than the wild type parent strain *Fusarium sporotrichiodes* NRRL 3299 from which the auxotroph is derived, and recovering said trichothecenes from the culture medium.

VOL
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APPLICATION OF ANTIBIOTICS OF THE PHLEOMYCIN FAMILY AS SELECTION AGENT IN THE FIELD OF GENETIC ENGINEERING

Elise Armau; Daniel Drocourt; Gilles Etienne, and Gérard Tiraby, all of Toulouse, France, assignors to Centre National de la Recherche Scientifique (CNRS), Paris, France

PCT No. PCT/FR85/00234, § 371 Date Apr. 30, 1986, § 102(e) Date Apr. 30, 1986, PCT Pub. No. WO86/01537, PCT Pub. Date Mar. 13, 1986

PCT Filed Aug. 30, 1985, Ser. No. 864,726

Claims priority, application France, Aug. 31, 1984, 84 13502

Int. Cl.^{5} C12N *15/70, 15/64, 15/74, 15/79*

U.S. Cl. 435—172.3 **1 Claim**

1. A method of transforming eukaryotic and prokaryotic cells sensitive to an antibiotic of the phleomycin family to confer resistance against said antibiotic, wherein the eukaryotic and prokaryotic cells are selected from the group consisting of *Escherichia coli, Bacillus subtilis*, mouse cells, *Saccharomyces cerevisiae* and *Rhizobium meliloti*, comprising:

inserting a phleo^r gene of transposon Tn5, a phleo^r gene of plasmid pUB110, or a phleo^r SV gene of plasmid pUT212 into the eukaryotic or prokaryotic cell to transform the cell to confer resistance against the antibiotic.

5,021,345

IMMOBILZATION OF LIPASE FOR RESOLVING RACEMATES OF ESTERS OF RACEMIC ALCOHOLS

Dieter Urban, Mannheim; Wolfgang Ladner, Fussgoenheim, and Axel Paul, Mannheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,287

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1987, 3737335

Int. Cl.^{5} C12N *11/08, 9/20;* **C12P** *7/62;* **C07C** *67/00*

U.S. Cl. 435—180 **15 Claims**

1. A process for the preparation of an immobilized lipase, which comprises:

(a) mixing a substrate, crude porcine pancreatic lipase, an aqueous buffer solution at pH 5–9 and one or more water-soluble polyhydric aliphatic alcohols having from 2 to 6 carbon atoms and from 2 to 6 hydroxyl groups at a temperature of from 0° to 40° C., and allowing the mixture to stand for from 1 minute to 3 days, and wherein said substrate is a pulverulent, insoluble, only slightly swellable copolymer of one or more N-vinyllactams of 4 to 6 carbon atoms with a cyclic amide which contains two or more ethylenically unsaturated, copolymerizable groups, one or more of which are bonded directly to amide nitrogen; and

(b) filtering the mixture to produce a filter cake, and washing the cake, to obtain said immobilized lipase.

5,021,346

SOLID PHASE REACTANT FOR INHIBITION AND REMOVAL OF SERINE PROTEASES AND METHOD OF USE

Mats G. Ranby, and Hans Peterson, both of Umea, Sweden, assignors to Biopool International, Inc., New York, N.Y.

Filed Jun. 15, 1987, Ser. No. 62,782

Int. Cl.^{5} C12N *9/50, 9/68;* **B07J** *13/00*

U.S. Cl. 435--219 **5 Claims**

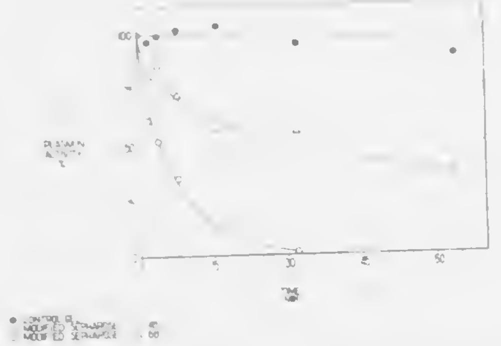
1. A modified affinity gel for the binding of serine proteases comprising:

(a) an affinity gel matrix including hydroxyl groups, and

(b) an organophosphorous compound coupled to said matrix at said hydroxyl groups,

wherein the coupling of said organophosphorous compound to said affinity gel causes the modification of said affinity gel providing a specific ligand for the binding of serine proteases, said modified affinity gel having the following chemical formula:

Matrix-O-POX-OR



wherein X is fluorine, P is phosphorous, O is oxygen, R is isopropyl alcohol, and the matrix is a hydrophilic affinity gel selected from the group consisting of 4% cross-linked agarose and 6% epoxy-activated cross-linked agarose.

5,021,347

RECOMBINANT VACCINIA VIRUS EXPRESSING E-PROTEIN OF JAPANESE ENCEPHALITIS VIRUS

Kotaro Yasui, Tokyo; Asato Kojima, Kuki; Atsushi Yasuda, and Takanori Sato, both of Kamakura, all of Japan, assignors to Nippon Zeon Co., Ltd.; Director-General of National Institute of Health and Tokyo Metropolitan Institute for Neuroscience, all of Tokyo, Japan

Filed Sep. 15, 1988, Ser. No. 244,778

Claims priority, application Japan, Sep. 16, 1987, 62-231496

Int. Cl.^{5} C12N *7/01*

U.S. Cl. 435—235 **8 Claims**

I. A recombinant vaccinia virus having inserted cDNA coding for a surface antigen protein of Japanese encephalitis virus containing a cDNA coding for a whole or substantially all of prematrix protein of Japanese encephalitis virus, a cDNA containing a whole or substantially all of cDNA coding for matrix protein of Japanese encephalitis virus and a cDNA containing the whole or a substantially all of E-protein of Japanese encephalitis virus in sequence, respectively, into a genome region non-essential to growth of a vaccinia virus, wherein said cDNA coding for said surface antigen is of sufficient length to code for a protein having improved antigenic properties as compared with said E-protein.

5,021,348

ATTENUATED HEPATITIS A VIRUS

Paula A. Giesa, Lansdale; Maurice R. Hilleman, Lafayette Hill, and Philip J. Provost, Harleysville, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 437,095, Oct. 27, 1982, abandoned, which is a continuation-in-part of Ser. No. 71,648, Sep. 4, 1979, abandoned. This application May 14, 1984, Ser. No. 609,677

Int. Cl.^{5} C12N *7/08*

U.S. Cl. 435—237 **29 Claims**

I. A method of attenuating the virulence of hepatitis A virus comprising passaging the virus at least once in a tissue culture in which hepatitis A virus is capable of replicating using as inoculum a human clinical specimen containing hepatitis A virus.

7. A process for propagating human hepatitis A virus in vitro in cell culture comprising inoculating a cell culture in which hepatitis A virus is capable of replicating using as inoculum a human clinical specimen containing hepatitis A virus but in which clinical specimen hepatitis A virus is not capable of replicating, incubating the susceptible cell culture until the presence of hepatitis A virus is detected in the susceptible cell culture, and harvesting the hepatitis A virus from the cell culture.

5,021,349

CULTURE MEDIUM CONTAINING HUMAN ALBUMIN, PROCESS FOR THE PREPARATION OF AN INJECTABLE PRODUCT FROM THIS MEDIUM, PRODUCT OBTAINED AND ITS USE, AND COMPOSITION OBTAINED

Xavier Drouet; Dominique Goossens, both of Paris, and Philippe Rouger, Chaville, all of France, assignors to Foundation Centre National De Transfusion Sanguine, Paris, France

Filed Jun. 11, 1987, Ser. No. 61,706

Claims priority, application France, Jun. 12, 1986, 86 08494

Int. Cl.^{5} C12N *5/00*

U.S. Cl. 435—240.31 **6 Claims**

1. A lymphoblastoid cell culture medium making it possible in particular to prepare products which can be administered to man by intravenous injection, this said culture medium containing, in addition to the constituent components of Iscove's medium, only human albumin protein in a proportion of 100 to 700 mg/l, and at least one unsaturated fatty acid selected from the group consisting of linoleic acid, oleic acid, arachadonic acid and palmetoleic acid, at a concentration from 0.09 to 14 mg/l, and one diamine selected from the group consisting of spermidine and spermine at a concentration from 10 nM to 100 μM and 1.4 diaminobutane and diaminopentane in a concentration from 100 nM to 100 μM.

5,021,350

PROCESS FOR INCLUSION OF MYCORRHIZAE AND ACTINORHIZAE IN A MATRIX

Gerard Jung, Montlhery; Jacques Mugnier, Chasieu; Yvon Dommergues, Saint Mande, and Hoang G. Diem, Billy Montigny, all of France, assignors to Rhone-Poulenc Industries, Cour Bevoie, France

Continuation of Ser. No. 37,127, Apr. 9, 1987, abandoned, which is a continuation of Ser. No. 921,891, Oct. 21, 1986, abandoned, which is a continuation of Ser. No. 352,946, Feb. 26, 1982, abandoned. This application Jun. 8, 1989, Ser. No. 364,554

Claims priority, application France, Mar. 6, 1981, 81 04474

Int. Cl.^{5} C12N *1/00, 11/10, 11/08, 11/04, 1/12, 1/14*

U.S. Cl. 435—243 **13 Claims**

1. A method of preparing and storing a stable, storable homogeneous preparation of a mycorrhizae microorganism, said method comprising embedding said mycorrhizae microorganism in the form of a liquid mycelian culture in a polymer gel matrix based on at least one polymer from the polysaccharide group, the volume of the resulting polymer gel matrix being substantially the same as the volume of said liquid culture, and storing the resulting homogeneous preparation of a mycorrhizae microorganism in the polymer gel matrix in the form of a homogeneous moist preparation.

5,021,351

PETRI DISH

Klon R. Ervin, Glen Arm, Md., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

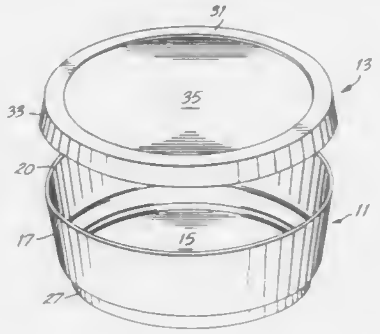
Continuation-in-part of Ser. No. 490,271, May 2, 1983, abandoned. This application Mar. 20, 1986, Ser. No. 842,722

Int. Cl.^{5} C12M *1/22, 1/16*

U.S. Cl. 435—297 **21 Claims**

1. A Petri dish for the culturing of microorganisms comprising:

a unitary bottom container having a substantially flat bottom wall merging into an upstanding, substantially cylindrical, side wall through a transition zone extending between the bottom wall and the side wall and a lid; said transition zone including first, second and third curved sections and first and second straight sections, said first curved section connecting said side wall and said first straight section, said second curved section connecting said first and second straight sections, said third curved section connecting said second straight section and said bottom wall, said first straight section extending from said side wall toward said bottom wall at a first angle relative to the plane of said bottom wall, said second straight section forming a second angle relative to the plane of said bottom wall, the lower terminus of said second straight section being substantially coincident with a portion of said bottom wall, said bottom wall having a projection on the bottom surface thereof.



5,021,352

METHOD FOR QUANTIFYING OXYGEN

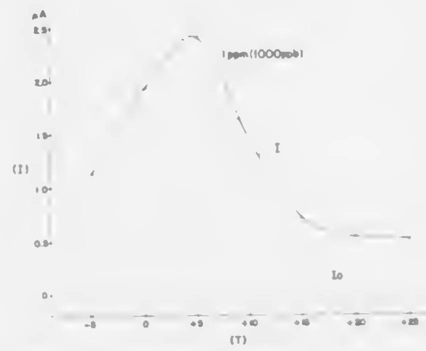
Takashi Suzuki, Yokohama, and Teruo Akiyama, Tokyo, both of Japan, assignors to Japan Oxygen, Co., Ltd., Japan

Filed Jan. 26, 1988, Ser. No. 148,841

Claims priority, application Japan, Jan. 29, 1987, 62-19241

Int. Cl.^{5} G01N *21/76*

U.S. Cl. 436—136 **3 Claims**



1. A method of quantifying oxygen in a sample gas, comprising reacting oxygen in a sample gas and vapor of yellow phosphorus, the vapor pressure of the yellow phosphorus vapor being lower than the saturated vapor pressure of yellow phosphorus at 20° C.; and measuring an intensity of light emitted by reaction of the oxygen and the yellow phosphorus vapor.

5,021,353

SPLIT-POLYSILICON CMOS PROCESS INCORPORATING SELF-ALIGNED SILICIDATION OF CONDUCTIVE REGIONS

Tyler A. Lowrey; Dermot M. Durcan; Trung T. Doan; Gordon A. Haller, and Mark E. Tuttle, all of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Feb. 26, 1990, Ser. No. 485,029

Int. Cl.^{5} H01L *21/265, 21/336*

U.S. Cl. 437—34 **5 Claims**

1. An improved process for the fabrication of CMOS integrated circuits on semiconductor material having both N-type material regions and P-type material regions, each of which is covered by a gate dielectric layer, said process comprising the following sequence of steps:

VOL
1127
ISS
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1991
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a) a blanket deposition of conductive layer on top of the gate dielectric layer;

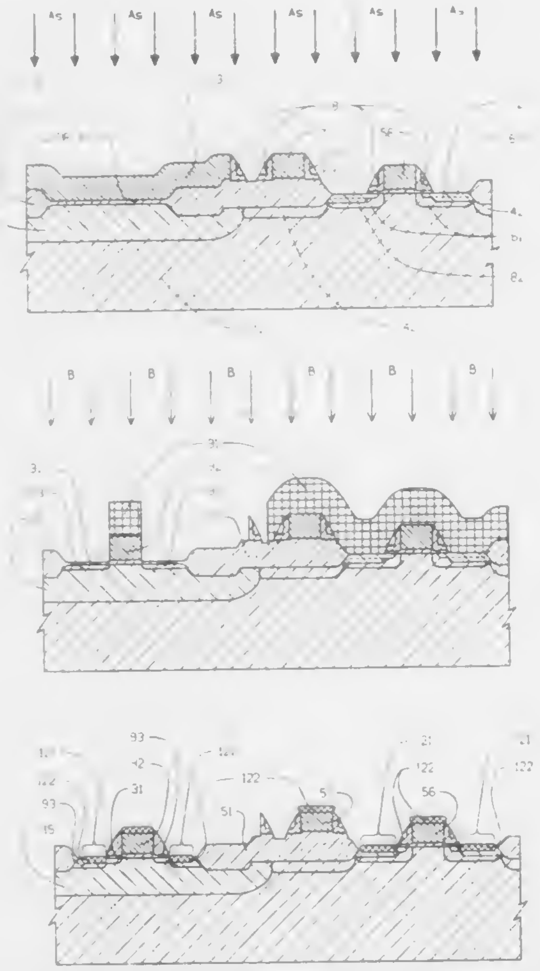
b) masking of said conductive layer with a first photomask which, in P-type material regions, defines N-channel gates and interconnects, and in N-type material regions, blankets said conductive layer;

c) etching away unmasked portions of said conductive layer and underlying portions of the gate dielectric layer to form N-channel gates and interconnects;

d) stripping said first photomask;

e) implantation of a P-type conductivity-creating impurity self-aligned to said N-channel gates which functions as a punchthrough implant, the conductive layer masking the N-type regions from the implanted P-type impurity;

f) creation of a mini-spacer oxide layer on at least N-channel transistor gate sidewalls;



g) low-dosage implantation of an N-type conductivity-creating impurity to create lightly-doped drain and source regions self-aligned to said mini-spacer oxide layer, the conductive layer masking the N-type material regions from this low-dosage implantation of an N-type impurity;

h) blanket deposition of a first silicon dioxide layer;

i) anisotropic etching of said first silicon dioxide layer to create N-channel transistor gate sidewall spacers;

j) high-dosage implantation of an N-type conductivity-creating impurity to create heavily-doped drain and source regions self-aligned to said N-channel transistor gate sidewall spacers, the conductive layer masking the N-type material regions from this high-dosage implantation of an N-type impurity;

k) using a second photomask to blanket the P-type material regions and to define P-channel gates and interconnects in the N-type material regions;

l) etching away unmasked portions of said conductive layer and underlying portions of the gate dielectric layer to form P-channel gates and interconnects;

m) low-dosage implantation of a P-type conductivity-creating impurity to create lightly-doped drain and source regions self-aligned to said P-channel gates, said second photomask blocking this low-dosage implantation of a P-type impurity in the P-type material regions;

n) blanket deposition of a second silicon dioxide layer;

o) anisotropic etching of said second silicon oxide layer to create P-channel transistor gate sidewall spacers;

p) unmasked high-dosage implantation of a P-type conductivity-creating impurity to create heavily-doped drain and source regions self-aligned to said P-channel transistor gate sidewall spacers, said unmasked high dosage implantation being effected at a level that is substantially less than that employed for said high-dosage implantation of an N-type conductivity-creating impurity which created the heavily-doped drain and source regions; and

q) silicidation of all exposed silicon regions.

5,021,354

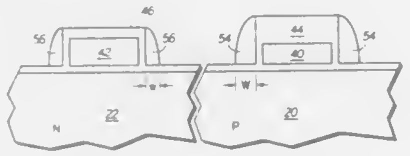
PROCESS FOR MANUFACTURING A SEMICONDUCTOR DEVICE

James R. Pfiester, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 4, 1989, Ser. No. 445,241

Int. Cl.^{5} H01L *21/266*

U.S. Cl. 437—34 **14 Claims**



1. A process for fabricating a CMOS device comprising the steps of:

providing a semiconductor substrate including a first N-type surface area and a second P-type surface area and having a gate insulator overlaying the first and second surface areas;

depositing a layer of polycrystalline silicon overlaying the gate insulator;

selectively doping portions of the layer of polycrystalline silicon overlaying the P-type surface area with N-type conductivity determining impurities;

thermally oxidizing the layer of polycrystalline silicon to form a thermal oxide having a first thickness over the portions not receiving the selective doping and a second thickness greater than the first thickness over those portions receiving the selective doping;

implanting the polycrystalline silicon with P-type conductivity determining impurities at an implant energy sufficient to penetrate the thermal oxide of first thickness but not sufficient to penetrate the thermal oxide of second thickness;

patterning the polycrystalline silicon and thermal oxide to form a first gate electrode overlaying the first surface area and a second gate electrode overlaying the second surface area and retaining the thermal oxide overlaying the gate electrodes;

depositing a layer of sidewall spacer forming material overlaying the gate electrodes;

anisotropically etching the layer of sidewall spacer forming material to form sidewall spacers at the edges of the gate electrodes, the sidewall spacers over the first surface area having a first width and the sidewall spacers over the second surface area having a second width greater than the first width.

5,021,355

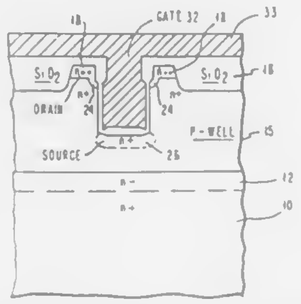
METHOD OF FABRICATING CROSS-POINT LIGHTLY-DOPED DRAIN-SOURCE TRENCH TRANSISTOR

Sang H. Dhong, Mahopac; Wei Hwang, Armonk, and Nicky C. Lu, Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 355,232, May 22, 1989, Pat. No. 4,954,854. This application May 18, 1990, Ser. No. 513,711

Int. Cl.^{5} H01L *21/265*

U.S. Cl. 437—35 **5 Claims**



1. A process for fabricating a self-aligned, lightly-doped drain/source field effect trench transistor device comprising the steps of:

Step 1) on semiconductor substrate material having a layer of epitaxial material thereon, implanting dopants to form a retrograde well region in said epitaxial material,

Step 2) forming oxide isolation regions in the surface of said well region and implanting dopants between said isolation regions to form a diffusion region to provide first drain junction regions,

Step 3) etching a vertical trench through said diffusion region into said well region,

Step 4) implanting dopants into the vertical sides of said trench using a low angle oblique ion implantation technique,

Step 5) forming layers of silicon nitride masking material on the vertical sidewalls of said trench extending below the level of said diffusion region formed in Step 2,

Step 6) forming self-aligned and lightly doped second drain junction regions on the sidewalls of said vertical trench above said silicon nitride mask layers and form buried source junction below the bottom of said trench by using said low angle oblique ion implantation technique,

Step 7) growing oxide on said recessed oxide regions and on the bottom of said trench over said source junction,

Step 8) removing said silicon nitride mask layer from said vertical trench sidewalls and growing a thin gate oxide on said vertical trench sidewalls, and

Step 9) filling said trench with polysilicon and depositing polysilicon over said filled trench and over said recessed oxide regions and well surface to form transfer gate and wordline elements.

5,021,356

METHOD OF MAKING MOSFET DEPLETION DEVICE

Mark F. Henderson, and John R. Schlais, both of Kokomo, Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Division of Ser. No. 399,565, Aug. 24, 1989. This application Nov. 16, 1989, Ser. No. 437,241

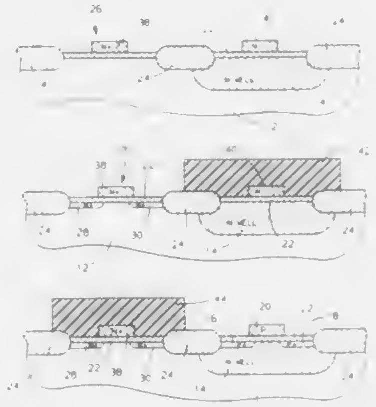
Int. Cl.^{5} H01L *21/265*

U.S. Cl. 437—45 **1 Claim**

1. A method for forming a p-channel depletion device in an MOSFET comprising the following steps:

forming an N-well region of conductivity type within an appropriate substrate;

forming a polysilicon gate over said N-well region which is characterized by a N— conductivity type; and



implanting boron into said N-well region to form source and drain regions of P+ type conductivity while concurrently counter doping said gate, so that said gate is now characterized by a P- type conductivity;

such that the threshold voltage of the p-channel depletion device is approximately +250 millivolts or greater.

5,021,357

METHOD OF MAKING A DRAM CELL WITH STACKED CAPACITOR

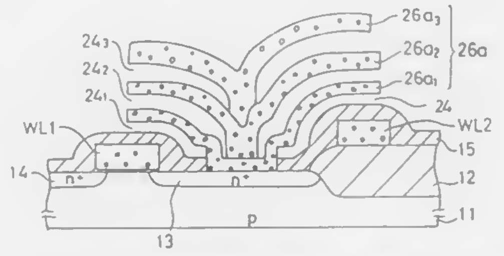
Masao Taguchi, Sagamihara, and Taiji Ema, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Division of Ser. No. 376,470, Jul. 5, 1989, which is a division of Ser. No. 206,791, Jun. 15, 1988, abandoned. This application Aug. 1, 1990, Ser. No. 561,424

Claims priority, application Japan, Jun. 17, 1987, 62-149143; Dec. 3, 1987, 62-306416; Dec. 10, 1987, 62-314764

Int. Cl.^{5} H01L *21/70*

U.S. Cl. 437—52 **12 Claims**



1. A method of producing a dynamic random access memory device comprising the steps of:

forming a transfer transistor comprising a pair of impurity diffused regions which are located within an area defined by a field insulating film formed on a substrate, and a gate electrode being located between the pair of impurity diffused regions;

forming an insulating film so as to cover the transfer transistor for insulation;

forming a first conductive film on the insulating film;

forming a second conductive film on the first conductive film, an etching rate with respect to the second conductive film being different from an etching rate with respect to the first conductive film;

patterning the first conductive film and the second conductive film in accordance with a desired size of a storage electrode of a capacitor;

selectively etching either one of the patterned first conduc-

VOL
1127
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1991
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tive film and the patterned second conductive film so that there is formed a groove;

forming a dielectric film around exposed surfaces of the first conductive film and the second conductive film; and

forming a third conductive film so as to completely cover the first and second conductive films around which the dielectric film is formed.

5,021,358

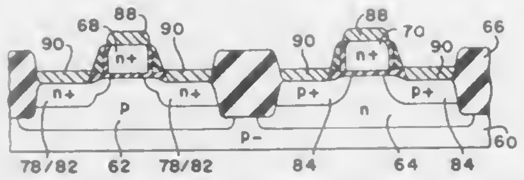
SEMICONDUCTOR FABRICATION PROCESS USING SACRIFICIAL OXIDATION TO REDUCE TUNNEL FORMATION DURING TUNGSTEN DEPOSITION

Janet M. Flarrer, Union City, and Michelangelo Defino, Los Altos, both of Calif., assignors to North American Philips Corp. Signetics Division, Sunnyvale, Calif.

Continuation of Ser. No. 50,598, May 14, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 277,475

Int. Cl.^{5} H01L *21/335, 21/285*

U.S. Cl. 437—57 8 Claims



1. A method in which first and second electrically conductive portions are formed respectively on first and second dielectric portions lying on a surface of a semiconductor body consisting substantially of monocrystalline silicon; ions of at least one species containing n-type dopant are selectively implanted through the surface into p-type material of the body to form a pair of first doped regions separated by p-type material underlying the first dielectric portion; ions of at least one species containing boron are selectively implanted through the surface into n-type material of the body to form a pair of second doped regions separated by n-type material underlying the second dielectric portion; tungsten is deposited on exposed silicon of the doped regions and on exposed material of the conductive portions to form at least one tungsten layer; and a patterned electrically conductive layer is provided over at least part of each tungsten layer so as to contact it; characterized in that a sacrificial oxidation is performed after both implanting steps but before the depositing step in order to substantially reduce tunnel formation during the depositing step, the sacrificial oxidation comprising the steps of:

oxidizing material of each doped region along the surface to create a sacrificial oxide layer; and

removing material of each sacrificial layer down to the remainder of its doped region to expose underlying silicon.

5,021,359

RADIATION HARDENED COMPLEMENTARY TRANSISTOR INTEGRATED CIRCUITS

William R. Young; Anthony L. Rivoli, both of Palm Bay, and William W. Wiles, Jr., West Melbourne, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Division of Ser. No. 209,365, Jun. 21, 1988. This application Oct. 3, 1989, Ser. No. 416,419

Int. Cl.^{5} H01L *21/265, 29/52, 29/78*

U.S. Cl. 437—21 12 Claims

1. A method of fabricating an integrated circuit comprising:

forming a plurality of trenches in a substrate to form at least first and second laterally separated islands in said substrate;

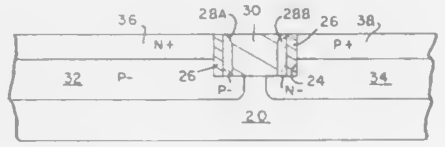
forming a first insulative layer along the lateral walls of said trenches;

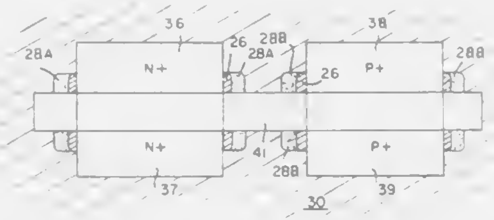
forming a semiconductor layer on said first insulative layer, said semiconductor layer being in contact with said substrate at the bottom of said trench;

filling said trenches with insulative material;

selectively introducing impurities of a first conductivity type into said first island and an adjacent first portion of said semiconductor layer to form a first region intersecting and underlying a portion of said trench and said first semiconductor layer portion;

selectively introducing impurities of a second conductivity type into said second island and an adjacent second portion of said semiconductor layer to form a second region intersecting and underlying a portion of said trench and said second semiconductor layer portion;





selectively introducing second conductivity type impurities into said first region to form a third and a fourth region laterally spaced and intersecting a trench; and

selectively introducing first conductivity type impurities into said second region to form a fifth and a sixth region laterally spaced and intersecting a trench.

5,021,360

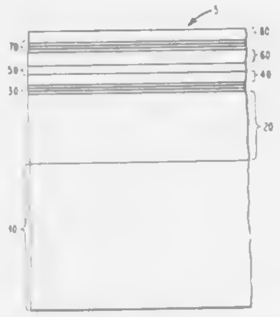
METHOD OF FARBICATING HIGHLY LATTICE MISMATCHED QUANTUM WELL STRUCTURES

Paul Melman; Boris S. Elman, both of Newton; Emil S. Koteles, Lexington, and Chirravuri Jagannath, Medfield, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Sep. 25, 1989, Ser. No. 412,354

Int. Cl.^{5} H01L *21/20*

U.S. Cl. 437—81 6 Claims



1. A method of fabricating a semiconductor heterostructure, comprising the steps of:

providing a substrate;

growing a buffer layer of semiconducting material on said substrate wherein said layer is lattice-mismatched relative to said substrate and has a thickness greater than a critical thickness;

growing a strained superlattice structure on said buffer layer wherein said provided substrate, said buffer layer, and said superlattice structure together form an effective substrate;

growing an unstrained barrier layer on said superlattice structure; and

forming on said unstrained barrier layer a quantum well structure serving as an active region wherein a lattice constant mismatch between said quantum well structure and said barrier layer is smaller than the lattice constant mismatch between said quantum well structure and said provided substrate;

whereby only a fraction of the stress due to the large lattice mismatch between said quantum well structure and said provided substrate is accommodated by coherent strain in said quantum well structure, while the remainder of said stress is relieved in said effective substrate through the formation of misfit dislocations spatially separated from said quantum well structure.

5,021,361

METHOD FOR MAKING A FIELD EFFECT TRANSISTOR INTEGRATED WITH AN OPTO-ELECTRONIC DEVICE

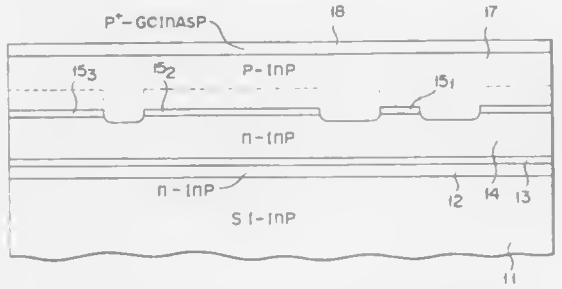
Jun'ichi Kinoshita, Yokohama; Nobuo Suzuki, Tokyo; Motoyasu Morinaga, Yokohama; Yuzo Hirayama, Yokohama, and Masaru Nakamura, Kawaguchi, all of Japan, assignors to Kabushiki Kaisba Toshiba, Kawasaki, Japan

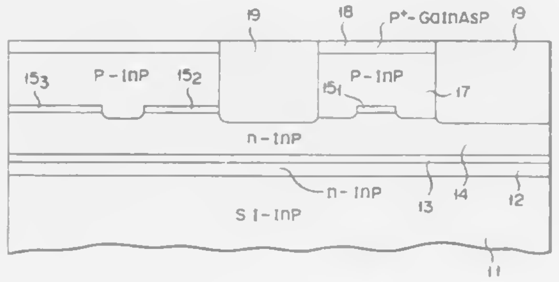
Continuation-in-part of Ser. No. 9,919, Feb. 2, 1987, abandoned. This application Dec. 11, 1989, Ser. No. 449,441

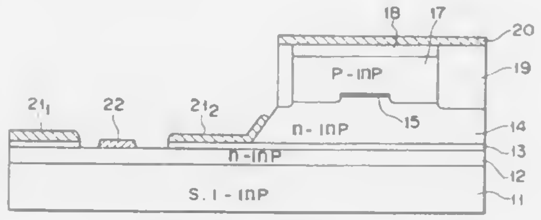
Claims priority, application Japan, Feb. 18, 1986, 61-33348; Feb. 18, 1986, 24-33349

Int. Cl.^{5} H01L *21/20*

U.S. Cl. 437—129 8 Claims







1. A method of manufacturing an opto-electronic integrated circuit device in which a light-emitting device and a field effect transistor are integrated on a substrate, comprising the steps of

growing a first semiconductor layer, serving as a channel layer of a field effect transistor, on a semi-insulating semiconductor substrate,

growing a second semiconductor layer, serving as an etching stopper layer and made of a material different from that of said first semiconductor layer on said first semiconductor layer,

growing a third semiconductor layer, serving as a first clad layer of said light-emitting device and source and drain layers with a high impurity concentration of said field effect transistor and made of a material different from that of said second semiconductor layer, on said second semiconductor layer,

growing a fourth semiconductor layer serving as an active layer of said light-emitting device and an etching mask used when a gate region of said field effect transistor is recess-etched and made of a material different from that of said third semiconductor layer,

selectively etching a region around said active layer of said light-emitting device and said gate region of said field effect transistor of said fourth semiconductor layer,

sequentially growing a fifth semiconductor layer serving as a second clad layer of said light-emitting device and a sixth semiconductor layer serving as a cap layer,

selectively etching a region of said sixth and fifth semiconductor layers wherein said field effect transistor is formed, and subsequently etching said third semiconductor layer exposed at said gate region using said fourth semiconductor layer exposed at source and drain regions as a mask, thereby isolating source and drain layers of said third semiconductor layer,

forming source and drain electrodes respectively on said source and drain layers with a high impurity concentration, and

forming a gate electrode on said first semiconductor layer between said source and drain layers with a high impurity concentration.

5,021,362

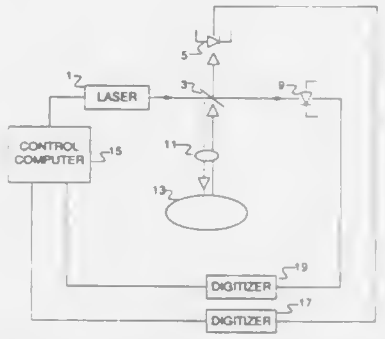
LASER LINK BLOWING IN INTEGRATEED CIRCUIT FABRICATION

James D. Chlipala, Lower Macungie Township, Lehigh County, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 29, 1989, Ser. No. 459,168

Int. Cl.^{5} H01L *21/268, 21/00*

U.S. Cl. 437—173 6 Claims



1. A method of integrated circuit manufacture in which portions of the circuit are rendered non-conductive by the application of incident radiation energy, said method comprising the steps of:

Illuminating said portions of said integrated circuit which are desired to be rendered non-conductive with a beam of radiation, said portions comprising an electrically conducting material on a non-conducting substrate; and,

analyzing the incident and reflected radiation intensities to determine if said portions were redered non conductive, and increasing the output of said laser if said portions were not rendered non-conductive or decreasing the output of said laser if significant substrate involvement occurred.

VOL
1127
ISS
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1991
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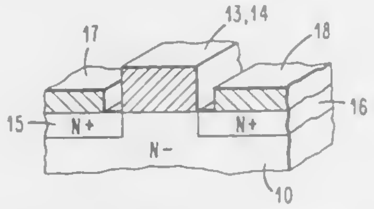
5,021,363
METHOD OF SELECTIVELY PRODUCING CONDUCTIVE MEMBERS ON A SEMICONDUCTOR SURFACE

Harry F. Lockwood, Waban; Margaret B. Stern, Sudbury; Marvin Tabasky, Peabody, and Victor Cataldo, Wilmington, all of Mass., assignors to Laboratories Incorporated, Waltham, Mass.

Filed Sep. 7, 1989, Ser. No. 404,237
Int. Cl.^{5} H01L *21/44*
U.S. Cl. 437—200 4 Claims



1. The method of fabricating a semiconductor device comprising

providing a substrate of compound semiconductor material having a lightly doped first zone with a first surface area at a surface of the substrate and having a heavily doped second zone of one conductivity type with a second surface area at said surface;

placing a first layer of silicon on a portion of said first surface area of said first zone and placing a second layer of silicon on a portion of said second surface area of said second zone with the remainder of said surface begin uncovered;

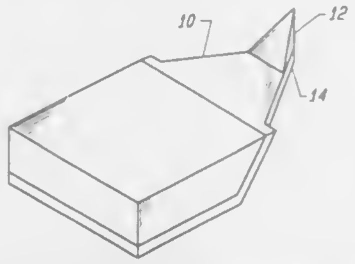
exposing the substrate to an atmosphere containing a tungsten compound which reacts with the silicon to form a first layer of tungsten on said first layer of silicon and a second layer of tungsten on said second layer of silicon and which does not react with the material of the substrate;

heating to cause tungsten of the first and second layers of tungsten to react with silicon of the first and second layers of silicon to form first and second conductive members, respectively, each having a layer of tungsten silicide so that the first conductive member overlying said portion of the first surface area forms a rectifying barrier with the underlying lightly doped compound semiconductor material of said first zone and the second conductive member formed overlying said portion of the second surface area forms an ohmic contact with the underlying heavily doped compound semiconductor material of said second zone.

5,021,364
MICROCANTILEVER WITH INTEGRAL SELF-ALIGNED SHARP TETRAHEDRAL TIP

Shinya Akamine, and Calvin F. Quate, both of Stanford, Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Oct. 31, 1989, Ser. No. 429,415
Int. Cl.^{5} H01L *21/465*
U.S. Cl. 437—228 16 Claims



1. A method of forming a microfabricated cantilever with a single crystal, integral self-aligned silicon tip, comprising the steps of:

forming a cantilever structure with a silicon membrane having a (100) lower surface on which is formed a layer of cantilever material;

oxidizing exposed sidewall portions of the silicon membrane to provide an oxide sidewall to define the sides of a silicon tip to be subsequently formed in the silicon membrane;

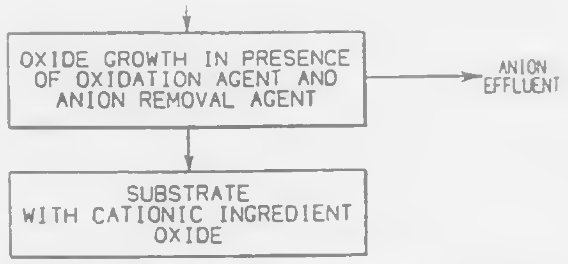
anisotropically etching the exposed front surface of the silicon membrane to remove portions of the silicon membrane covering the layer of cantilever material to provide a self-aligned tetrahedral silicon tip having one exterior surface bounded by a (111) plane and having two additional exterior surfaces defined by the oxide sidewall; and

removing the oxide sidewall to provide a microcantilever formed from the layer of cantilever material and having a tetrahedral silicon tip formed at its free end with the sides of tip defined by the oxide sidewall.

5,021,365
COMPOUND SEMICONDUCTOR INTERFACE CONTROL USING CATIONIC INGREDIENT OXIDE TO PREVENT FERMI LEVEL PINNING

Peter D. Kirchner, Garrison; Alan C. Warren, Peekskill; Jerry M. Woodall, Bedford Hills, and Steven L. Wright, Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 874,738, Jun. 16, 1986, Pat. No. 4,843,450. This application Mar. 13, 1989, Ser. No. 322,583
Int. Cl.^{5} H01L *21/00, 21/02, 21/306, 29/78*
U.S. Cl. 437—237 8 Claims


OXIDE GROWTH IN PRESENCE OF OXIDATION AGENT AND ANION REMOVAL AGENT
ANION EFFLUENT
SUBSTRATE WITH CATIONIC INGREDIENT OXIDE

1. The process of providing a cationic ingredient oxide on a surface area of a compound semiconductor member comprising in combination the steps of:

growing on said surface area, in the presence of an oxidation enhancement agent, a composite oxide of oxides of each ingredient of said compound semiconductor member while simultaneously subjecting said surface area and said composite oxide to an anionic species removal agent to remove said anionic species leaving said cationic ingredient oxide.

5,021,366
FLUORINE-FREE PHOSPHATE GLASSES

Bruce G. Aitken, Painted Post, N.Y., assignor to Corning Incorporated, Corning, N.Y.

Filed Oct. 19, 1990, Ser. No. 599,751
Int. Cl.^{5} C03C *3/16, 3/17, 4/00*
U.S. Cl. 501—45 8 Claims

1. A glass having a composition which is essentially fluorine-free exhibiting an annealing point between 300°–340° C., a linear coefficient of thermal expansion (25°–300° C.) between $145\text{–}170\times10^{-7}/^\circ$C., and a weight loss after exposure to boiling water for six hours no greater than 0.25% consisting essentially, expressed in terms of mole percent on the oxide basis, of:

Li_2O	5–10	P_2O_5	30–36
Na_2O	5–15	Al_2O_3	0–5
K_2O	0–6	CeO_2	0–2
$Li_2O + Na_2O + K_2O$	15–25	SnO	0–20
ZnO	10–33	PbO	0–20
CaO	0–20	Sb_2O_3	0–12
SrO	0–20	Bi_2O_3	0–6
BaO	0–20	$SnO + PbO + Sb_2O_3 + Bi_2O_3$	0–20.
CaO + SrO + BaO	12–25		

5,021,367
FIBER-CONTAINING COMPOSITE

Raj N. Singh, Schenectady, and William A. Morrison, Albany, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 216,488, Jul. 8, 1988, Pat. No. 4,944,904, which is a continuation-in-part of Ser. No. 066,271, Jun. 25, 1987, abandoned. This application Oct. 10, 1989, Ser. No. 419,190
Int. Cl.^{5} C04B *35/56, 35/84, 35/80*
U.S. Cl. 501—88 29 Claims

1. A composite comprised of boron nitride-coated carbon-containing fibrous material and a matrix phase, said matrix phase containing silicon carbide phase and/or boron-containing silicon carbide phase and a solution phase comprised of a solution of boron and silicon wherein boron is present in an amount of at least about 0.1% by weight of silicon, said carbide phase being present in an amount of at least about 5% by volume of said composite, said solution phase being present in an amount of at least about 1% by volume of said composite, said fibrous material of said boron nitride-coated fibrous material being present in an amount of at least about 5% by volume of said composite, said boron nitride coating being at least detectable by scanning electron microscopy, said composite having a porosity of less than about 20% by volume.

5,021,368
NOVEL CERAMIC-METAL COMPOUNDS

Ronald J. Hoffman, Midland, and Cindy S. Hart, Freeland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 29, 1988, Ser. No. 250,578
Int. Cl.^{5} C04B *35/52, 35/56, 35/58;* **F27B** *09/04*
U.S. Cl. 501—92 26 Claims

1. A ceramic-metal intercalation compound having the formula

$$M_x[A]$$

wherein A is a ceramic selected from the group consisting of at least one of nitrides, silicides, carbides, borides, phosphides, and arsenides, and metal alloys thereof and M is a metal capable of incorporation into the crystal structure of the ceramic, said metal (M) is selected from at least one of the metals of Groups 1a, 1b, 2a, 2b, 3a, 3b, 4a, 4b, 5a, 5b, 6a, 6b, 7a, 7b, and 8 of The Periodic Table of the Elements, and x has a value of about 0.002 to about 0.5.

5,021,369
PROCESS FOR GELLING A SOL IN FIBERFORMED CERAMIC INSULATION

Patrice K. Ackerman, Kent, and Anna L. Baker, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Aug. 1, 1988, Ser. No. 226,647
Int. Cl.^{5} C04B *3/00*
U.S. Cl. 501—95 24 Claims

1. A method for gelling a sol to strengthen a felted mat of ceramic fibers, comprising the steps of:

(a) impregnating the mat with a sol-gel binder; and

(b) exposing the impregnated mat at ambient temperature and ambient pressure to a low voltage, direct current for a sufficient time to gel the binder.

5,021,370
CERAMIC FIBERS AND A PROCESS FOR PRODUCING THE SAME

Toshikatsu Ishikawa, Tokyo; Haruo Teranishi, Machida; Hiroshi Ichikawa, and Shiro Mitsuno, both of Yokohama, all of Japan, assignors to Nippon Carbon Co, Limited, Tokyo, Japan

PCT No. PCT/JP88/01197, § 371 Date Jul. 21, 1989, § 102(e) Date Jul. 21, 1989, PCT Pub. No. WO89/04884, PCT Pub. Date Jun. 1, 1989
PCT Filed Nov. 25, 1988, Ser. No. 391,567
Claims priority, application Japan, Nov. 27, 1987, 62-297780
Int. Cl.^{5} C04B *35/56, 35/58*
U.S. Cl. 501—95 4 Claims

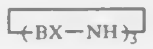
1. A process of producing ceramic fibers consisting essentially of a quaternary system composed of Si, C, N and O, wherein Si, C, N and O content of the ceramic fibers obtained is Si: 40 to 60% by weight, C: 0.2 to 30% by weight, N: 5 to 30% by weight and O: 5 to 20% by weight, which consists of the steps of: (1) reacting infusible polycarbosilane fibers with ammonia at a temperature of 100° to 450° C. to obtain nitrogen containing fibers and (2) further heat treating said nitrogen-containing fibers in an inert gas at a temperature up to 1,600° C.

5,021,371
LOW CARBON/HIGH PURITY BORON NITRIDE

Gerard Mignani, Lyons; Pierre Ardaud, Ste-Foy-les-Lyon, and Roger Trichon, Villeurbanne, all of, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Feb. 20, 1990, Ser. No. 482,073
Claims priority, application France, Feb. 20, 1989, 89 02169
Int. Cl.^{5} C03C *3/14;* **C04B** *35/51, 35/56, 35/58*
U.S. Cl. 501—96 14 Claims

1. A process for the production of a boron nitride ceramic material, which comprises pyrolyzing an organoboron polymer under an atmosphere of ammonia, said organoboron polymer comprising the polymerizate between (i) at least one B-trihalogenoborazole having the formula:



$$\left(BX-NH\right)_3$$

and (ii) at least one primary amine having the formula:

$$H_2N-R$$

in which formulae X is a halogen atom and R is an optionally substituted hydrocarbon radical having from 1 to 6 carbon atoms.

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5,021,372

METHOD OF PREPARING A SELF-REINFORCED SILICON NITRIDE CERAMIC OF HIGH FRACTURE TOUGHNESS

Aleksander J. Pyzik; Douglas B. Schwarz; Harold E. Rossow; Donald R. Beaman, and Barbara M. Pyzik, all of Midland, William J. Dubensky, Traverse City, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 297,627, Jan. 13, 1989, abandoned, which is a continuation-in-part of Ser. No. 148,748, Jan. 27, 1988, Pat. No. 4,883,776. This application Aug. 25, 1989, Ser. No. 398,801

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.^{5} C04B *35/58*

U.S. Cl. 501—97 28 Claims

1. A process for preparing a silicon nitride ceramic body having a fracture toughness greater than about 6 MPa $(m)^{\frac{1}{2}}$ and containing predominantly β-silicon nitride whiskers having a high average aspect ratio, the process comprising: preparing a powder mixture comprising:

(a) silicon nitride in an amount sufficient to provide a ceramic body;

(b) a densification aid, said densification aid being a non-oxide derivative of magnesium or a source of an element selected from the group consisting of beryllium, calcium, strontium, barium, radium, lithium, sodium, potassium, rubidium, cesium and francium, said source being present in an amount sufficient to promote densification of the powder;

(c) a conversion aid, said conversion aid being a non-oxide derivative of yttrium or a source of an element selected from the group consisting of scandium, actinium, lanthanum, lithium, sodium, potassium, rubidium, cesium and francium, said source being present in an amount sufficient to promote the essentially complete conversion of the starting silicon nitride to β-silicon nitride; and

(d) at least one whisker growth enhancing compound in an amount sufficient to promote the formation of β-silicon nitride whiskers, said compound being a non-oxide derivative of calcium, or a derivative of an element selected from the group consisting of sodium, potassium, scandium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, strontium, zirconium, niobium, barium, lanthanum, and mixtures thereof, or an oxide of an element selected from the group consisting of gallium, indium, hafnium, tantalum and boron;

provided that (b), (c) and (d) are each derivatives or sources of different elements; and subjecting the powder mixture to conditions of temperature and pressure sufficient to provide for densification and in situ formation of β-silicon nitride whiskers having an average aspect ratio of at least about 2.5 and such that the silicon nitride ceramic body having a fracture toughness greater than about 6 MPa $(m)^2$ is formed.

5,021,373

POROUS CORDIERITE COMPOSITIONS WITH IMPROVED THERMAL EXPANSION CHARACTERISTICS

Robert L. Mitchell, Atlanta, and Frank R. Rhodes, Jr., Doraville, both of Ga., assignors to Applied Ceramics, Inc., Doravilla, Ga.

Filed Mar. 2, 1990, Ser. No. 487,659

Int. Cl.^{5} C04B *35/18, 35/20*

U.S. Cl. 501—119 10 Claims

6. A ceramic composition made according to a process comprising the steps of:

providing a substantially dry mixture comprising kaolin clay, talc, alumina, and kyanite;

adding germanium dioxide to the substantially dry mixture in an amount from about 0.025 to about 1.5 percent by weight of the dry mixture;

adding liquid to said substantially dry mixture to form a wet mixture;

forming the wet mixture into a shape;

drying the formed shape; and

heating said formed and dried shape to a temperature at which sintering occurs and cordierite is formed, said cordierite exhibiting a CTE which is essentially isotropic and is less than 1.24×10^{-6} in./in./°C.

5,021,374

DEAD-BURNED MAGNESITE AND MAGNESIA-ALUMINA SPINEL REFRACTORY COMPOSITION

Christopher L. Macey, Pittsburgh, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Nov. 17, 1987, Ser. No. 121,896

Int. Cl.^{5} C04B *35/04*

U.S. Cl. 501—120 3 Claims

1. A refractory composition for forming shaped refractories consisting essentially of from about 60 to 75% by weight of a dead-burned magnesite and, correspondingly, about 25 to 40% by weight of a fused synethetic magnesia-alumina spinel grain; said refractory having a total lime and silica content of about 2 to 4% by weight and a lime-to-silica ratio ($CaO:SiO_2$) greater than about 1 but not to exceed 2.1.

5,021,375

CHROME OXIDE REFRACTORY COMPOSITION

Anthony K. Butkus, Worcester, Mass., assignor to Norton Company, Worcester, Mass.

Filed Apr. 19, 1990, Ser. No. 512,236

Int. Cl.^{5} C04B *35/12*

U.S. Cl. 501—132 17 Claims

1. A chrome based refractory composition resistant to attack by silica comprising a mixture of fused chrome oxide particles in a matrix of fine chrome oxide particles, wherein the composition is at least about 98.5% by weight chrome oxide, the magnesia content is less than about 0.5% by weight, and the chrome oxide is fused in the substantial absence of other oxides.

5,021,376

METHOD FOR PREPARING A CERAMIC SUSPENSION

Hans Nienburg; Friedrich Harbach, both of Heidelberg, and Peter Stein, Mannheim, all of Fed. Rep. of Germany, assignors to Asea Brown Boveri Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

Filed Jan. 19, 1989, Ser. No. 300,112

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1988, 3801326

Int. Cl.^{5} C04B *35/10*

U.S. Cl. 501—153 21 Claims

1. A method for preparing a suspension of 30–90 wt. % alpha-Al_2O_3 in deagglomerated form from alpha-Al_2O_3 having a mean grain size under 1 μm which comprises the steps of forming a dispersion by dissolving 0.1 to 2% by weight, with respect to the alpha-Al_2O_3, of a dispersing agent in a dispersion medium, wherein the medium is selected from the group consisting of (a) water and (b) a lower alkanol of up to three carbon atoms and when the medium is (a) water, the dispersing agent is an electrolyte selected from the group consisting of ammonium hydroxide, lower organic amines, nitric acid and carboxylic acids and at least one complex water-soluble polyelectrolyte selected from the group consisting of 3,6,9-trioxaundecane diacid, polyglycol diacid, naphthalene sulfonic acid condensate, polyacrylic acid, partially esterified polyacrylic acid and the ammonium salts of the complex acids; and when the dispersion medium is the (b) alkanol the dispersing agent is selected from the group consisting of triethylamine and tetrabutyl ammonium hydroxide strong organic bases; acetic acid, p-hydroxy-benzoic acid and 3,6,9-trioxaundecane diacid carbolic acids; and polyvinyl pyrrolidone, nitrocellulose, polyacrylic acid, partially esterified polyacrylic acid and polyvinyl butyral polymers and a mixture thereof; then adding the alpha Al_2O_3 to the solution and agitating for a time sufficient to deagglomerate the alpha-Al_2O_3 to the mean grain size.

5,021,377

DEMETALLIZATION AND PASSIVATION OF SPENT CRACKING CATALYSTS

Michael K. Maholland, Chia-Min Fu, both of Bartlesville; Richard E. Lowery, Tulsa; Brent J. Bertus, Donald H. Kubicek, both of Bartlesville, all of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 5, 1990, Ser. No. 533,623

The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.

Int. Cl.^{5} B01J *29/38, 38/66, 38/54;* **C10G** *11/05*

U.S. Cl. 502—26 16 Claims

1. In a process for reactivating a spent zeolite-containing catalytic cracking catalyst composition, which contains at least one metal contaminant, comprising contacting said spent catalytic cracking catalyst composition with (a) at least one fluorine compound selected from the group consisting of NH_4F, NH_4HF_2 and HF and (b) at least one metals passivating agent selected from the group consisting of antimony compounds, under such contacting conditions as to result in reduced hydrogen generation caused by said at least one metal contaminant contained in said spent catalytic cracking catalyst composition during catalytic cracking; the improvement which comprises employing, in said contacting with agents (a) and (b), a substantially coke-free, spent, metal-contaminated catalytic cracking catalyst composition which has previously been subjected to treatment with at least one chlorine-containing substance at an elevated temperature so as to obtain a chlorinated catalyst composition, followed by cooling the chlorinated catalyst composition, and washing the cooled, chlorinated catalyst composition with at least one aqueous liquid so as to reduce the content of said at least one metal contaminant in said substantially coke-free, spent, metal-contaminated catalytic cracking catalyst composition.

5,021,378

MOLDED ARTICLES BASED ON PYROGENICALLY PREPARED SILICON DIOXIDE, PROCESS FOR THEIR PRODUCTION AND THEIR USE

Klaus Deller, Hainburg; Reinhard Klingel, Alzenau, and Helmfried Krause, Rodenbach, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 308,125, Feb. 9, 1989, abandoned. This application Feb. 23, 1990, Ser. No. 488,379

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1988, 3803895

Int. Cl.^{5} B01J *21/12, 21/16, 21/18*

U.S. Cl. 502—62 6 Claims

1. A molded article based on pyrogenically prepared silicon dioxide and having the following physical-chemical characteristic data:

External diameter	2 to 15 mm
BET surface area	50 to 400 m^2/g
Total pore volume	0.6 to 1.3 ml/g
Crushing strength	40 to 120 N
Pore size distribution	no pores <5 nm in diameter at least 80% of the pores in the range 5 to 40 nm in diameter
Composition	$>95\%$ by weight of SiO_2 remainder Al_2O_3.

2. A process for the production of molded article based on pyrogenically prepared silicon dioxide and having the following physical-chemical characteristic data:

External diameter	2 to 15 mm
BET surface area	50 to 400 m^2/g
Total pore volume	0.6 to 1.3 ml/g
Crushing strength	40 to 120 N
Pore size distribution	no pores <5 nm in diameter at least 80% of the pores in the range 5 to 40 nm in diameter
Composition	$>95\%$ by weight of SiO_2 remainder Al_2O_3.

which comprises homogenizing pyrogenically prepared silicon dioxide with kaolin and/or graphite, sugar, starch, urea or wax in the presence of water, drying the mixture at a temperature of from 80° to 120° C. and comminuting it to form a powder, pressing the powder to form a molded article, and tempering the molded article at a temperature of from 400° to 1200° C. for a period of 0.5 to 6 hours.

3. A catalyst support comprising the molded article of claim 1 in the shape of a pellet, rod or annular ring.

4. A catalyst comprising the catalyst support of claim 3 having a catalytically active substance deposited thereon.

5,021,379

OLEFIN POLYMERIZATION

Shirley J. Martin; Max P. McDaniel, both of Bartlesville, Okla.; Brian K. Conroy, Naperville, Ill., and Joel L. Martin, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 29, 1990, Ser. No. 501,056

Int. Cl.^{5} C08F *4/52*

U.S. Cl. 502—102 16 Claims

1. A process for producing a catalyst suitable for the polymerization of olefins comprising contacting an inorganic lanthanide halide with an ether in a suitable diluent, then contacting the resulting lanthanide composition with an alkali metal alkyl compound stabilized against beta-hydride elimination, and depositing the resulting lanthanide product on a particulate support.

5,021,380

CATALYST FOR PREPARATION OF BIARYL COMPOUNDS

Thomas A. Puckette, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 346,769, May 3, 1989, Pat. No. 4,939,309. This application Mar. 12, 1990, Ser. No. 492,017

Int. Cl.^{5} C08F *4/70*

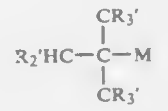
U.S. Cl. 502—107 9 Claims

1. A method for the generation of nickel (0) species from nickel (II) compounds comprising contacting a nickel (II) compound with

(i) an organophosphine ligand of the formula PR''_3 or R''_2P-Z-PR''_2 wherein each R'' is independently selected from the group consisting of alkyl, aryl and alkaryl radicals having up to 20 carbon atoms and -Z- is an alkylene, alkenylene, or arylene radical;

(ii) a bidentate ligand selected from the group consisting of 2,2'-bipyridine, 2-picolinic acid, ethylenediamine tetraacetic acid, N,N,N',N'-tetramethylethylenediamine, 1,10-phenanthroline, N,N'-bis(salicylidene)ethylenediamine, and polyvinyl pyridine;

(iii) a tertiary-alkyl organometallic compound of the structure:



$$R_2'HC-\underset{\displaystyle CR_3'}{\overset{\displaystyle CR_3'}{\underset{|}{\overset{|}{C}}}}-M$$

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wherein each R' is independently selected from the group consisting of H and alkyl groups having in the range of 1 up to 20 carbon atoms, and M is selected from the group consisting of Li, Na, K, and MgX, wherein X is a halogen; wherein said contacting is carried out in a substantially anhydrous, non-polar, ethereal solvent system, optionally containing up to 95 volume percent of an aliphatic or aromatic hydrocarbon diluent at a temperature in the range of about 0° up to 100° C. for a time in the range of about 0.5 up to 24 hours.

5,021,381
SYNDIOTACTIC 1,2-POLYBUTADIENE LATEX

Gary L. Burroway, Doylestown; George F. Magoun, and Ramesh N. Gujarathi, both of Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 235,397, Aug. 24, 1988, Pat. No. 4,902,741. This application Nov. 13, 1989, Ser. No. 435,856

Int. Cl.^{5} C08F *4/622*

U.S. Cl. 502—117 **24 Claims**

1. A catalyst emulsion composition which is useful in the emulsion polymerization of 1,3-butadiene monomer into syndiotactic 1,2-polybutadiene, which is prepared by dissolving in an inert organic solvent containing at least one polyene (a) at least one cobalt compound selected from the group consisting of (i) β-ketone complexes of cobalt, (ii) β-keto acid ester complexes of cobalt, (iii) cobalt salts of organic carboxylic acids having 6 to 15 carbon atoms, and (iv) complexes of halogenated cobalt compounds of the formula CoX_n, wherein X represents a halogen atom and n represents 2 or 3, with an organic compound selected from the group consisting of tertiary amine alcohols, tertiary phosphines, ketones and N,N-dialkylamides, and (b) at least one organoaluminum compound of the formula AlR_3 wherein R represents a hydrocarbon radical of 1 to 6 carbon atoms to produce microencapsulated catalyst component solution, and microfluidizing the catalyst component solution with (i) an oil selected from the group consisting of hydrocarbons containing from about 12 to about 28 carbon atoms and long chain alcohols containing from about 12 to about 28 carbon atoms, (ii) a surfactant, and (iii) water to an average particle size which is within the range of about 10 nanometers to about 1000 nanometers.

5,021,382
DIENE ACTIVATED ZIEGLER TRANSITION METAL CATALYST COMPONENTS FOR ETHYLENE POLYMERIZATION

Gerald D. Malpass, Jr., Clearwater, Canada, assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Feb. 28, 1990, Ser. No. 486,572

Int. Cl.^{5} C08F *4/654, 4/656, 4/68*

U.S. Cl. 502—117 **40 Claims**

1. A transition metal-containing catalyst component comprising the reaction product obtained by:

(I) treating an inert solid support material in an inert solvent sequentially with at least:
  an organometallic compound (B) of a Group IIa, IIb or IIIa metal wherein all the metal valencies are satisfied with a hydrocarbyl group,
  an oxygen-containing compound (C) selected from alcohols, aldehydes, ketones, siloxanes, or mixtures thereof,
  at least one transition metal compound (F) of a Group IVb, Vb, VIb or VIII metal, or mixtures thereof, and
(II) treating the solid material resulting from step (I) with from about 0.01 to about 3,000 mole of an aliphatic diene (K) per gram atom of the transition metal of the transition metal compound (F), said diene having at least 4 carbon atoms and at least one terminal double bond.

5,021,383
CATALYST FOR THE DESTRUCTION OF TOXIC ORGANIC CHEMICALS

Jozsef M. Berty, Akron, Ohio, assignor to Berty Reaction Engineers, Ltd., Fogelsville, Pa.

Filed Jun. 16, 1989, Ser. No. 367,003

Int. Cl.^{5} B01J *27/232*

U.S. Cl. 502—174 **12 Claims**

1. An improved catalyst for the destructive oxidation of hydrocarbon and halocarbon toxic materials and their conversion into non-toxic by-products, said catalyst consisting essentially of a metal selected from the group consisting of manganese, copper, silver, iron, aluminum, or a metal oxide selected from the group consisting of nickel oxide, cobalt oxide, aluminum oxide, vanadium oxide, tungsten oxide, molybdenum oxide, or mixtures thereof, impregnated on or dispersed in an alkali metal carbonate, alkali metal bicarbonate, alkaline earth metal carbonate, alkaline earth metal bicarbonate, or mixtures thereof.

5,021,384
PROCESS FOR PRODUCING CRYSTALLINE OXIDE OF VANADIUM-PHOSPHORUS SYSTEM AND CATALYST CONTAINING THE CRYSTALLINE OXIDE

Masakatsu Hatano; Masayoshi Murayama; Kenji Shima, and Masumi Ito, all of Yokohama, Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 414,313

Claim priority, application Japan, Oct. 5, 1988, 63-249953; Aug. 10, 1989, 1-205570

Int. Cl.^{5} B01J *27/198, 31/22;* **C01B** *25/45;* **C07D** *307/60*

U.S. Cl. 502—209 **16 Claims**

1. A process for producing a crystalline oxide of vanadium-phosphorus system, which comprises hydrothermally treating at a temperature of 110°-250° C. in a closed container an aqueous medium containing (1) a tetravalent vanadium compound, (2) a pentavalent phosphorus compound, (3) a coordinate compound having at least two ligand atoms selected from the group consisting of a polyamine and an amide and (4) a compound of at least one metal element selected from the group consisting of iron, nickel, cobalt and chromium, to form a crystalline oxide of vanadium-phosphorus system having a X-ray diffraction pattern shown in Table A:

TABLE A

X-ray diffraction peaks (Anticathode: Cu-Kα) 2θ (± 0.2°)			
15.6°	19.7°		24.3°
27.2°	28.8°	30.5°	33.8°

wherein the coordinate compound is used in a molar ratio of from 0.01 to 1.0 to vanadium, the atomic ratio of phosphorus/-vanadium is from 0.5 to 2.0, and the atomic ratio of the compound of at least one metal element to vanadium is from 0.001 to 1.0.

5,021,385
CATALYST COMPRISING A TITANIA-ZIRCONIA SUPPORT AND SUPPORTED CATALYST PREPARED BY A PROCESS

Francis P. Daly, Monroe; Hiei Ando, Stamford, both of Conn.; Henry C. Foley, Newark, Del., and Hyun J. Jung, Wayne, Pa., assignors to American Cyanamid Company, Stamford, Conn.

Filed Sep. 18, 1987, Ser. No. 98,635

Int. Cl.^{5} B01J *21/06, 23/88, 27/185, 27/19*

U.S. Cl. 502—211 **7 Claims**

1. A catalyst composition consisting essentially of a high density support of co-precipitated titania and zirconia of compacted bulk density of 0.8–1.2 g/cc, a pore volume of 0.4–0.8 cc/g and a specific surface area by nitrogen BET of greater

than 250 to about 400m^2/g, having associated therewith from 2-30 percent by weight of molybdenum oxide and 1-10 percent by weight of at least one member selected from the group consisting of nickel oxide and cobalt oxide, and, optionally, 0.68-6.8 percent, by weight, phosphorus.

5,021,386
COMPOSITIONS INVOLVING V_2O_3-ZRO_2-TIO_2

Arnulf Muan, Lacey Spring, Va., and Mitri S. Najjar, Wappingers Falls, N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Mar. 21, 1990, Ser. No. 496,848

Int. Cl.^{5} B01J *21/06, 23/22*

U.S. Cl. 502—248 **14 Claims**

1. A method of preparing compositions, from V_2O_3, ZrO_2 and TiO_2 that fall within the shaded area circumscribed by ABCDF as shown in the disclosed figure, and wherein said method comprises the steps of

(1) heating V_2O_5 powder having a particle size of less than about 50 microns in an atmosphere in which the partial pressure of oxygen is in the range of 10^{-8} to 10^{-10} atmospheres while gradually increasing the temperature over a temperature range of about 600° C. to 1300° C. and holding the temperature at about 1300° C. for a period to ensure complete reduction of all vanadium to V^{3+};
(2) heating TiO_2 and ZrO_2 powders each having a particle size of less than about 50 microns for a period of about 10 to 14 hrs. at a temperature in the range of about 600° C. to 800° C. for TiO_2 and about 1000° C. to 1200° C. for ZrO_2;
(3) thoroughly grinding together about 24 to 98 wt. % of V_2O_3 from (1), with about 2 to 50 wt. % of ZrO_2 and about 0 to 66 wt. % of TiO_2 from (2) to produce a mixture having a grain size of less than about 50 microns;
(4) pelletizing the mixture from (3) at a pressure of about 5,000 psi; and
(5) heating and reacting together the pellets from (4) at a temperature in the range of about 1100° C. to 1700° C. for a period in the range of about 12 to 48 hrs. in an atmosphere in which the partial pressure of oxygen is in the range of 10^{-10} to 10^{-5} atmosphere.

12. Compositions produced from V_2O_3, ZrO_2 and TiO_2, wherein said compositions are solid solutions and fall within the shaded area circumscribed by ABCDF as shown in the disclosed Figure wherein the amounts of V_2O_3, ZrO_2 and TiO_2 are characterized as shown in the table below:

	Coordinates (Wt %)		
Vertices	V_2O_3	ZrO_2	TiO_2
A	50	50	0
B	24	50	26
C	24	10	66
D	32	2	66
F	98	2	0

5,021,387
CATALYST FOR THE PREPARATION OF HYDROCARBONS FROM CARBON MONOXIDE AND HYDROGEN

Donald Reinalda, Amsterdam, and Jelte Kars, Rotterdam/Pernis, both of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jun. 11, 1990, Ser. No. 535,694

Claims priority, application United Kingdom, Aug. 18, 1989, 8918845

Int. Cl.^{5} B01J *21/08, 23/74*

U.S. Cl. 502—260 **3 Claims**

1. Catalyst comprising agglomerates of cobalt oxide crystallites distributed over a porous, inert carrier, having an agglomerate size of about 1-10 micrometers, wherein the carrier is silica.

5,021,388
PROCESS FOR APPLYING A CATALYST LAYER COMPOSED OF NOBLE METALS AND/OR NOBLE-METAL COMPOUNDS TO A CARRIER MADE OF CERAMIC MATERIAL

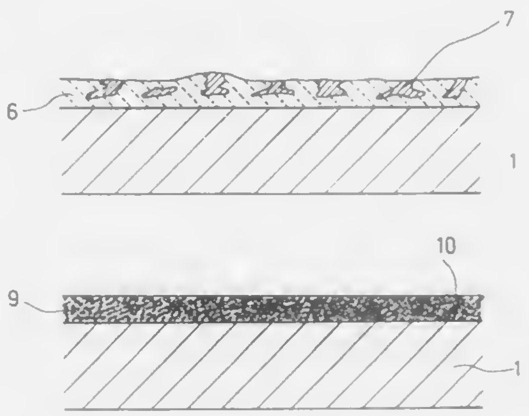
Jean-Daniel Fridez, Wohlenschwil, and Gabriele Gerharz, Untersiggenthal, both of Switzerland, assignors to Comprex AG, Baden, Switzerland

Filed Apr. 6, 1989, Ser. No. 334,371

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1988, 3813946

Int. Cl.^{5} B01J *23/38, 21/12, 21/08;* **C01B** *41/88*

U.S. Cl. 502—261 **3 Claims**



1. A process for applying a layer of exhaust gas cleaning catalyst to a ceramic rotor substrate comprising the steps:

(a) applying to a ceramic rotor at least one intermediate layer of a silicate glass frit, water and an organic adhesive capable of forming a glaze slip with the silicate glass frit, wherein said glaze slip has a melting point not exceeding 800° C. and a low coefficient of thermal expansion; and step a) further comprises applying another layer containing a suspension of boehmite γ-AlOOH in water then drying;
(b) heat treating the whole to form a glaze, whereby a γ-Al_2O_3 layer is embedded in the glaze slip,
(c) depositing a noble meal catalyst layer on said intermediate layer by chemical, electrochemical or physical deposition.

2. A process for applying a layer of exhaust gas cleaning catalyst to a ceramic rotor substrate comprising the steps;

(a) applying to a ceramic rotor substrate at least one intermediate layer of a slip containing a suspension of silicon particles in water glass which is then dried;
(b) heat treating the whole to form a glaze;
(c) depositing a noble metal catalyst layer on said intermediate layer by chemical, electrochemical or physical deposition.

5,021,389
THREE-WAY CATALYST FOR AUTOMOTIVE EMISSION CONTROL AND METHOD OF MAKING THE CATALYST

Mohinder S. Chattha, Northville, Mich.; William L. H. Watkins, Toledo, Ohio, and Haren S. Gandhi, Farmington Hills, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 22, 1989, Ser. No. 440,578

The portion of the term of this patent subsequent to Feb. 12, 2008, has been disclaimed.

Int. Cl.^{5} B01J *21/04, 21/06, 23/10, 23/44*

U.S. Cl. 502—303 **14 Claims**

1. A three-way catalyst for automotive emission control, comprising:

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- (a) a mechanical carrier having a support comprised substantially of alumina;
- (b) discontinuous lanthanum oxide on said support;
- (c) a catalytic palladium compound supported discontinuously on the decorated support having a major constituent of palladium; and
- (d) a discontinuous phase of titanium oxide on said alumina, lanthana, and catalytic compound composite, said titanium oxide being 0.1–8.0% by weight of the total weight of the catalyst.

5,021,390
LIQUID HYDROCARBON ABSORBENT COMPOSITION AND METHOD

John H. Hatton, 1802 Eucalyptus Ave., Leucadia, Calif. 92024

Continuation-in-part of Ser. No. 906,813, Sep. 12, 1986, abandoned. This application Apr. 6, 1989, Ser. No. 334,293

Int. Cl.^{5} B01J *20/24*

U.S. Cl. 502—401 **11 Claims**

1. A hydrophobic composition for absorbing a hydrocarbon liquid, said composition comprising a fibrous plant material coated with a hydrophobic coating of sodium methyl silicate that is pervious to hydrocarbon liquids.

5,021,391
CARBONACEOUS ADSORBENT FOR REMOVAL OF PYROGEN AND METHOD OF PRODUCING PURE WATER USING SAME

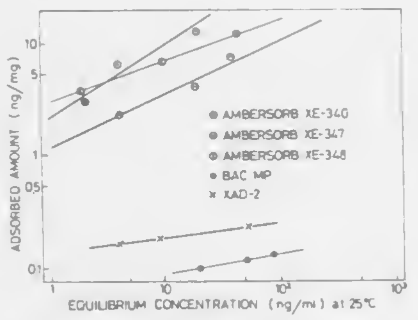
Wataru Agui, Tokyo; Shuji Tamura, Ohmiya; Hiroshi Kuyama, Urawa; Yoshiya Kurachi, Tokyo; Masahiko Abe, Noda; Yukihiro Kaneko, Funabashi, and Keizo Ogino, Tokyo, all of Japan, assignors to Tokyo Organic Chemical Industries, Ltd., Tokyo, Japan

Division of Ser. No. 167,239, Mar. 11, 1988, Pat. No. 4,883,596. This application Sep. 1, 1989, Ser. No. 403,035

Claims priority, application Japan, Mar. 31, 1987, 62-76093; Mar. 31, 1987, 62-76094

Int. Cl.^{5} C01B *31/12, 31/10, 31/08;* **B01J** *20/20*

U.S. Cl. 502—426 **6 Claims**



1. A carbonaceous adsorbent for the removal of pyrogens dissolved in pure water, which adsorbent is produced by suspension polymerizing divinylbenzene and styrene in the presence of an additive of butanol or toluene;

subjecting the resulting porous cross-linked copolymer beads to sulfonation;

infusibilizing the thus-treated copolymer beads;

carbonizing the infusibilized copolymer beads; and

activating the carbonized beads by steam, thereby producing an adsorbent which retains the skeletal structure of the copolymer beads intact and which is capable of reducing the pyrogenic content of water containing the same to at least the pyrogen detection limit of 0.01 ng/ml.

5,021,392
HIGH POROSITY TITANIA-ZIRCONIA CATALYST SUPPORT PREPARED BY A PROCESS

Francis P. Daly, Monroe; Hiei Ando, Stamford, both of Conn.; Henry C. Foley, Newark, Del., and Hyun J. Jung, Wayne, Pa., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 98,635, Sep. 18, 1987. This application Jun. 14, 1990, Ser. No. 527,410

Int. Cl.^{5} A01J *32/00*

U.S. Cl. 502—439 **6 Claims**

1. A binary oxidic catalyst support material having high porosity and a specific surface area by nitrogen BET of greater than 250 m^2/g prepared by a process comprising the steps of:

- (i) providing a seed hydrosol of at least two members, one member selected from the group consisting of oxides, halides and oxyhalides of titanium and one member selected from the group consisting of oxides, halides and oxyhalides of zirconium;
- (ii) mixing a first pH controlling agent with said hydrosol to adjust the pH of said hydrosol to a first region and maintaining said hydrosol at said first pH region, while agitating it, at a temperature and for a period of time sufficient to dissolve fine hydrosol particles;
- (iii) then mixing a second pH controlling agent with said hydrosol to adjust the pH of said hydrosol to a second region and maintaining said hydrosol at said second pH region, while agitating it, at a temperature and for a period of time sufficient to cause deposition of the dissolved hydrosol on the undissolved hydrosol and repeating (ii) and (iii) more than once so that said seed hydrosol is caused to grow to an aggregate hydrogel; and, thereafter,
- (iv) calcining the hydrogel at a temperature above 325° C. and below about 450° C. for from about 0.5 to about 24 hours.

5,021,393
CYAN DYES IN DYE-DONOR ELEMENTS FOR THERMAL DYE TRANSFER

Luc J. Vanmaele, Lochristi, and Wilhelmus Janssens, Aarschot, both of Belgium, assignors to Agfa-Gevaert, N.V., Mortsel, Belgium

Filed Apr. 16, 1990, Ser. No. 509,176

Claims priority, application European Pat. Off., Apr. 25, 1989, 89201082.8

Int. Cl.^{5} B41M *5/035, 5/26*

U.S. Cl. 503—227 **6 Claims**

1. Dye-donor element for use according to thermal dye transfer methods, said element comprising a support having thereon a dye/binder layer comprising a cyan dye carried by a polymeric binder resin, wherein said cyan dye is a 1,4-quinonediimine or 1,4-quinonediimine carrying on the quinone ring structure a fused on aromatic ring system, alicyclic ring system, or heterocyclic ring system, the hydrogen atom of the 1-imino function being substituted by a carboxylic-acid derived acyl group, an alkyl ester group, an aryl ester group, a carbamoyl group, a substituted phosphono group, a substituted phosphinyl group, a substituted sulphonyl group, a sulpho group, or a sulphamoyl group, the hydrogen atom of the 4-imino function being substituted by a p-aminoaryl group.

5,021,394
HEAT TRANSFER SHEET

Jumpei Kanto; Hitoshi Saito; Hiroshi Eguchi, and Masayuki Nakamura, all of Tokyo, Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 13, 1990, Ser. No. 537,929

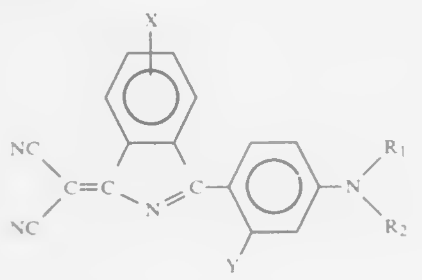
Claims priority, application Japan, Jun. 15, 1989, 1-150416; Jun. 15, 1989, 1-184984

Int. Cl.^{5} B41M *5/035, 5/26*

U.S. Cl. 503—227 **4 Claims**

1. A heat transfer sheet comprising a substrate sheet and a

dye-carrying layer formed on the substrate sheet, said dye-carrying layer comprising a binder and a dye expressed by the following general formula (I):



(I)

wherein:

- X stands for a hydrogen atom or at least one substituent,
- Y indicates a hydrogen atom, a hydroxyl group, an alkyl group, an alkoxy group, —OCOR', —NHCOR' or —NHSO$_2$R' in which R' stands for an alkyl group or a substituted alkyl group, and
- R_1 and R_2 each denote an alkyl group or a substituted alkyl group.

5,021,395
PROCESS FOR MAKING SUPERCONDUCTORS AND THEIR PRECURSORS

Joe D. Druliner, Newark; Harold S. Horowitz, Wilmington; Stephan J. McLain, Hockessin, all of Del., and Arthur W. Sleight, Goleta, Calif., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 214,702, Jul. 1, 1988, abandoned. This application Jun. 28, 1989, Ser. No. 372,726

Int. Cl.^{5} H01L *39/12;* **C01F** *17/00, 11/00, 1/00*

U.S. Cl. 505—1 **19 Claims**

4. A process for preparing a powder comprising the orthorhombic phase having the formula $MBa_2Cu_3O_x$, wherein M is selected from the group consisting of Y, Nd, Sm, Eu, Gd, Dy, Ho, Er, Tm, Yb, and Lu; and x being from about 6.5 to about 7, consisting essentially of the following steps:

- (a) forming an essentially carbon-free precursor powder of compounds of M, Ba and Cu, said Cu in the precursor powder of compounds of M, Ba and Cu, said Cu in the precursor powder having a valence of 1.6 to 2, by a process comprising mixing compounds of M, Ba and Cu, the quantities of said compounds in the mixture so formed being such as to provide an atomic ratio of M:Ba:Cu of 1:2:3;
- (b) heating said precursor powder in the presence of an inert gas to a temperature of about 650° C. to about 800° C.;
- (c) maintaining said temperature above 650° C. for a time sufficient to provide a powder of the tetragonal phase having the formula $MBa_2Cu_3O_y$ wherein y is from about 6 to about 6.5;
- (d) cooling the powder formed in step (c) to a temperature below 350° C. in an inert atmosphere; and
- (e) reheating the powder resulting from step (d) to a temperature from about 350° C. to about 600° C. in an oxygen-containing atmosphere and maintaining said powder in said oxygen-containing atmosphere at a temperature of at least 350° C. for a time sufficient to transform at least a portion of said tetragonal phase to the orthorhombic phase.

5,021,396
OXYGEN PLASMA TREATMENT FOR PRODUCING HIGH TC OXIDE SUPERCONDUCTING MATERIAL

Nobuhiko Fujita; Hideo Itozaki; Saburo Tanaka; Shuji Yazu, and Tetsuji Jodai, all of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

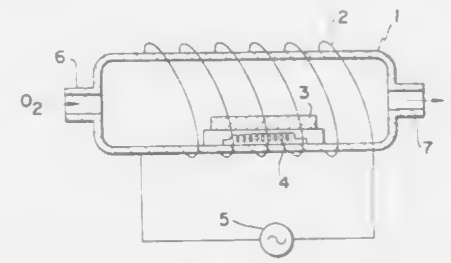
Continuation of Ser. No. 195,145, May 18, 1988, Pat. No. 4,900,716. This application Nov. 16, 1989, Ser. No. 437,170

Claims priority, application Japan, May 18, 1987, 62-120819

The portion of the term of this patent subsequent to Feb. 13, 2007, has been disclaimed.

Int. Cl.^{5} B05D *5/12, 3/06*

U.S. Cl. 505—1 **14 Claims**



1. Improvement in a process for producing a high Tc compound oxide type superconducting material, characterized in that the compound oxide type superconducting material is treated in oxygen plasma while the compound oxide type superconducting material is heated at a temperature range from 400° C. to 1050° C.

5,021,397
SYNTHESIS OF CERAMIC SUPERCONDUCTOR CPO FROM XENOTYME

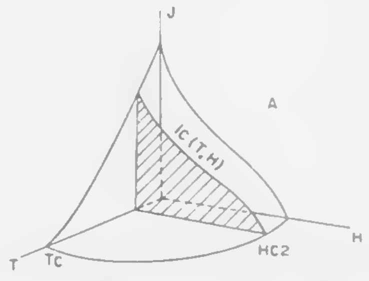
Geni Vellego; Cesar A. Filipini, both of Sao Paulo; Pedro I. P. Filho; Sebastiao V. Canevarolo, Jr., botb of Sao Carlos, and Oswaldo A. Serra, Ribeirao Preto, all of Brazil, assignors to Pirelli S.A. Cia. Indl. Brasileira and Fundacao Universidade Sao Carlos e Universidade de Sao Paulo, both of Sao Paulo, Brazil

Filed Dec. 23, 1988, Ser. No. 289,852

Claims priority, application Brazil, Dec. 23, 1987, PI 8707200

Int. Cl.^{5} H01B *12/00;* **C01F** *17/00*

U.S. Cl. 505—1 **2 Claims**



1. A process for the preparation of a superconductor of the type $AB_2Cu_3O_{7-x}$, where x is less than one, A is a mixture of rare earths and B is an alkaline earth metal, consisting essentially of the steps of:

- (a) melting xenotime with a 1:1 mixture of Na_2CO_3 and K_2CO_3cooling the mett to obtain a solid;
- (b) dissolving the solid obtained from step (a) in HCl;
- (c) treating the resulting solution of step (b) with NH_4OH to precipitate the rare earth to form a solution;
- (d) dissolving the resulting rare earth precipitate of step (c) in HCl to form a solution;
- (e) treating the resulting solution of step (d) with oxalicacid ($H_2C_2O_4$) to precipitate the rare earth;
- (f) calcinating the resulting rare earth precipitate of step (e) to obtain rare earth oxide;

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(g) mixing said rare earth oxide with an alkaline earth metal compound and a copper oxide; and
(h) heat treating the resultant mixture of step (g) to obtain said superconductor.

5,021,398
METHOD OF FORMING PATTERNED OXIDE SUPERCONDUCTING FILMS

Suniti K. Sharma, Redwood City; Susanna C. Ventura, Mountain View, and Subhash C. Narang, Redwood City, all of Calif., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 26, 1989, Ser. No. 428,392
Int. Cl.^{5} B05D *3/06, 5/12*

U.S. Cl. 505—1 **23 Claims**

1. A process to produce a high T_c electrically superconducting article having a pattern, which method comprises:
(A) combining compounds selected from:
  (i) at least one unsaturated organic acid metal salt of a Group IIA element,
  (ii) at least one unsaturated organic acid metal salt of bismuth or a Group III A, III B, IVA, VA element, and
  (iii) an unsaturated organic acid copper salt, to produce a solution or a suspension in an organic solvent, wherein the ratio of metal atoms in (i), (ii) and (iii) is selected wherein each unsaturated organic acid metal salt above contains at least one $C=C$ bond or two or more $C \equiv C$ bonds, to produce a high T_c electrically superconducting article upon its subsequent high temperature pyrolysis in an oxygen or air atmosphere;
(B) coating the surface of an article with the solution of step (A);
(C) covering selected portions of the coated article with a mask pattern;
(D) subjecting the coated surface to electromagnetic radiation effective to polymerize and crosslink the portion of the compounds (i), (ii) and (iii) exposed to the radiation;
(E) removing the unpolymerized and uncrosslinked compounds (i), (ii) and (iii), to produce a solid residue on the coated surface;
(F) calcining the solid residue of step (E) in sufficient oxygen or air at a temperature of between 700° and 900° C. for a time effective to obtain a mixed metal oxide; and
(G) slowly cooling the solid residue obtained at a temperature of between about 900° C. and about 500° C. at a rate of between about 1° and 5° C. per minute in excess air or oxygen and subsequently slowly annealing the mixed metal oxide obtained in flowing oxygen or air by slowly cooling from about 500° C. to ambient temperature at a rate of between about 1° and 5° C. per minute.

5,021,399
SPRAY PYROLYSIS PROCESS FOR PREPARING SUPERCONDUCTIVE FILMS

Hsyh-Min Hsu, and Ian Y. K. Yee, both of Austin, Tex., assignors to Microelectronics & Computer Technology Corp., Austin, Tex.

Filed Mar. 10, 1989, Ser. No. 322,454
Int. Cl.^{5} B05D *5/12, 3/02*

U.S. Cl. 505—1 **23 Claims**

1. A spray pyrolysis method for preparing thin superconductive film, comprising the steps of:
(a) preparing a spray pyrolysis solution comprising Bi,Sr,Ca and Cu metals in a solvent;
(b) heating a substrate to a first temperature;
(c) spraying said solution onto said heated substrate to form a film thereon;
(d) heating said film and substrate to a second temperature of about 700°–825° C., said second temperature being higher than said first temperature;
(e) heating said film and substrate to a third temperature of about 870°–890° C. to melt said film;
(f) once said film and substrate reach said third temperature, further heat treating said film and substrate at a fourth temperature of about 840°–860° C.; and
(g) cooling said film and substrate to ambient temperature.

13. A spray pyrolysis method for preparing thin superconductive films, comprising the steps of:
(a) preparing a spray pyrolysis solution comprising Bi, Sr, Ca and Cu metals and a fluxing agent in a solvent;
(b) heating a substrate to a first temperature;
(c) spraying said solution onto said heated substrate to form a film thereon;
(d) heating said film and substrate to a second temperature of about 700°–825° C., said second temperature being higher than said first temperature;
(e) heating said film and substrate at a third temperature of about 840°–860° C.; and
(f) cooling said film and substrate to ambient temperature.

FIG. 1a

FIG. 1b

5,021,400
POWDER CONTAINING THALLIUM, CALCIUM, BARIUM AND COPPER

Jacob Block, Potomac, and Leonard E. Dolhert, Clarksville, both of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation of Ser. No. 188,926, May 2, 1988, abandoned. This application Oct. 17, 1989, Ser. No. 423,718
Int. Cl.^{5} H01B *12/00, 1/06;* **H01L** *39/12*

U.S. Cl. 505—1 **3 Claims**

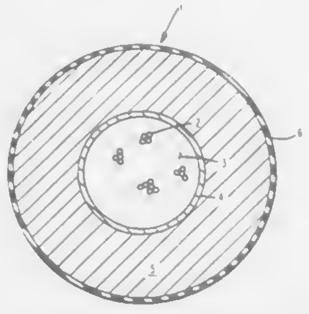
1. Process comprising the sequential steps of:
(A) preparing a pre-mix comprising dissolving monocarboxylates of Ca, Ba, and Cu in water or in a monohydroxy alkanol of 1–4 carbons to provide about 5–25 weight % monocarboxylates in the solution; the Ca, Ba, and Cu being present in amounts to provide an atomic ratio of Ca_b-Ba_c-Cu_d, where b is about 0.5–3; c is about 0.5–3; and d is about 1–4; the monocarboxylate being formate, acetate, propionate, or butyrate;
(B) drying the monocarboxylate solution of (A), thereby to provide a dry homogeneous monocarboxylate mixture;
(C) heating the dry mixture of (B) to convert the monocarboxylates to the oxides, thereby forming a homogeneous mixture of the oxides of Ca, Ba, and Cu;
(D) admixing the oxide mixture of (C) with Tl_2O_3 in an amount to provide an atomic ratio of Tl_a-Ca_b-Ba_c-Cu_d where a is about 0.5–3 and b, c, and d are as defined in (A); and
(E) heating the oxide mixture of (D) to form a superconductor.

5,021,401
INTEGRATED PRODUCTION OF SUPERCONDUCTOR INSULATION FOR CHEMICAL VAPOR DEPOSITION OF NICKEL CARBONYL

Thomas S. Snyder, Oakmont; Richard A. Stoltz, and George R. Wagner, both of Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 3, 1989, Ser. No. 331,768
Int. Cl.^{5} C23C *8/12, 8/80, 16/16*

U.S. Cl. 505—1 8 Claims



1. A process for use in fabrication of nickel suboxide insulation on a superconductor; said process comprising:
a. reacting essentially oxygen-free nickel powder with essentially oxygen-free carbon monoxide at a temperature of at least 50° C. to produce a nickel carbonyl;
b. separating said nickel carbonyl from reaction by-products and excess reagents by cooling said carbonyl to 10°–43° C. and decanting the nickel carbonyl liquor to produce a purified carbonyl; and
c. at least periodically contacting said purified carbonyl to a surface of a wire containing superconductor or superconductor precursors in an atmosphere at least periodically containing a controlled amount of oxygen, with said wire being at a temperature of 50°–800° C., to produce nickel suboxide insulation on said wire.

5,021,402
CYCLIC ETHERS AND THEIR UTILIZATION AS PERFUMING OR FLAVORING INGREDIENTS

Anthony F. Morris, Gingins; Regula Naef, Carouge; Sina Escher, Confignon, all of Switzerland, and Alain Velluz, La Roche/Foron, France, assignors to Firmenich SA, Geneva, Switzerland

Filed Nov. 21, 1989, Ser. No. 439,406

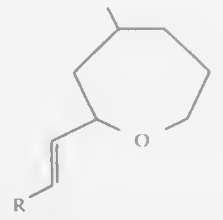
Claims priority, application Switzerland, Nov. 28, 1988, 4414/88

Int. Cl.^{5} A61K *7/46*

U.S. Cl. 512—11 **6 Claims**

1. A method to confer, enhance, improve or modify the organoleptic properties of a perfuming or flavoring composition, or a perfumed or flavored product which method comprises adding to said composition or product an organoleptically effective amount of a compound having the formula

(I)



wherein the dotted line indicates the location of a single or double bond and the symbol R stands for an isopropenyl radical or a 1-ethoxy-1 methylethyl radical.

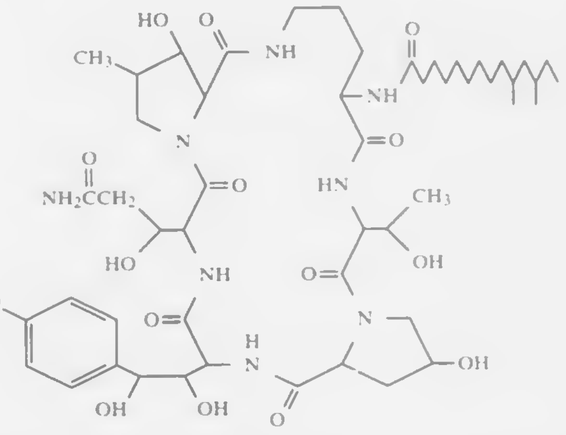
5,021,403
ANTIBIOTIC AGENTS

David F. Sesin, Rahway; Jerrold M. Liesch, Princeton Junction; Jimmy M. Fountoulakis, Westfield; Prakash S. Masurekar, Warren, all of N.J.; Louis Kaplan, New City, N.Y., and Carol F. Wichmann, Westfield, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Mar. 19, 1990, Ser. No. 495,651
Int. Cl.^{5} A61K *31/395;* **C07D** *7/64, 487/14*

U.S. Cl. 514—9 **5 Claims**

1. A compound having the formula



2. A method for the treatment of or for the prevention of *Pneumocystis carinii* infections in mammals which comprises administering to mammals an anti-infective amount of the compound of claim 1.

5,021,404
ANGIOSTATIC COLLAGEN MODULATORS

Judah Folkman, Brookline, and Donald Ingber, Boston, both of Mass., assignors to The Children's Medical Center Corporation, Boston, Mass.

Filed Apr. 20, 1988, Ser. No. 183,973
Int. Cl.^{5} A61K *31/395, 31/44, 31/56, 31/725*

U.S. Cl. 514—26 **17 Claims**

1. A method of inhibiting angiogenesis in a mammal by administering to said mammal an angiogenesis-inhibiting dose of a collagen matrix metabolism modulator in combination with an angiostatic compound, said collagen matrix modulator being selected from the group consisting of:
(a) proline analogs which inhibit proline hydroxylation when substituted for proline in collagen;
(b) inhibitors of proline hydroxylase;
(c) inhibitors of collagen cross-linking; and
(d) all trans-retinoic acid;

9. A therapeutic composition comprising a mixture of a pharmaceutically acceptable vehicle, a collagen matrix metabolism modulator, and an angiostatic compound, said collagen matrix metabolism modulator being selected from the group consisting of:
a) proline analogs which inhibit proline hydroxylation when substituted for proline in collagen;
(b) inhibitors of proline hydroxylase; and
(c) inhibitors of collagen cross-linking.

5,021,405
EMOLLIENT DURABILITY ENHANCING SILOXANES

Helen M. Klimisch, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Mar. 5, 1990, Ser. No. 488,163
Int. Cl.^{5} A61K *31/695*

U.S. Cl. 514—63 **18 Claims**

1. A method of enhancing the durability of an emollient

VOL
1127
ISS
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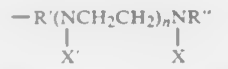
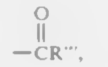
1991
UMI

material on human skin comprising applying to human skin a mixture of an emollient material and an effective amount of an organosilicon compound, the organosilicon compound being an amidofunctional siloxane having an average of 50 to 1000 siloxane units per molecule with an average of 1 to 50 of the siloxane units per molecule being amide-containing siloxane units bearing a substituent of the formula



$$-R'(\underset{X'}{N}CH_2CH_2)_n\underset{X}{N}R''$$

wherein n is 0 or 1, R′ denotes an alkylene radical of 3 to 6 carbon atoms, and R″ denotes a hydrogen radical or an alkyl radical of 1 to 6 carbon atoms, X denotes an acyl radical of the formula



$$-\overset{O}{\overset{\|}{C}}R''',$$

X′ denotes a hydrogen radical or X, and R‴ denotes an alkyl radical of 1 to 4 carbon atoms and substantially all other organic substituents in the polysiloxane being methyl groups, the emollient material being selected from the group consisting of (i) straight, branched, and cyclic hydroxy compounds containing 1 to 30 carbon atoms, (ii) straight, branched, and cyclic carboxylic acids containing 1 to 31 carbon atoms, (iii) alkanes of the formula $H—(CH_2)_n—H$ wherein n is 5 to 30, and (iv) siloxanes.

5,021,406
2-PYRANONE DERIVATIVE AND PROCESS FOR PRODUCTION THEREOF

Mitsuru Maeda, Ohtsu; Tobru Kodama, Takatsuki; Sumio Asami, Ibaraki; Noribide Amano, Takatsuki; Takaaki Kusumi, Suita, and Hidekazu Hosono, Yokohama, all of Japan, assignors to Suntory Limited, Osaka, Japan

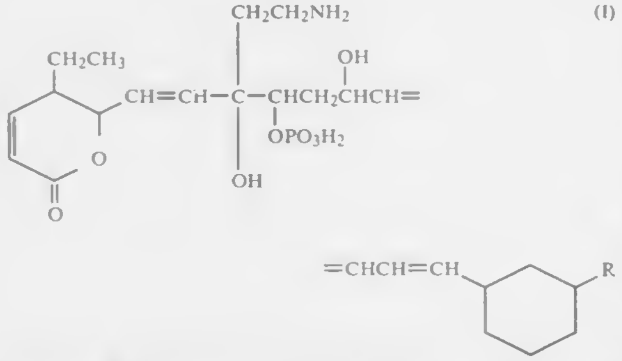
Filed Feb. 13, 1989, Ser. No. 309,673

Claims priority, application Japan, Feb. 13, 1988, 63-30069

Int. Cl.^{5} A61K ***31/665;*** **C07F** ***9/143***

U.S. Cl. 514—99 **13 Claims**

1. A 2-pyranone derivative represented by the formula (I):



(I)

wherein R represents a hydrogen atom, or a linear, or branched aklylcarbonyloxy, cyclohexylethylcarbonyloxy or cyclo-alkylcarbonyloxy group having 3 to 10 carbon atoms, and salts thereof.

5,021,407
TETRACYCLINE ACTIVITY ENHANCEMENT

Stuart B. Levy, Boston, Mass., assignor to Trustees of Tufts College, Boston, Mass.

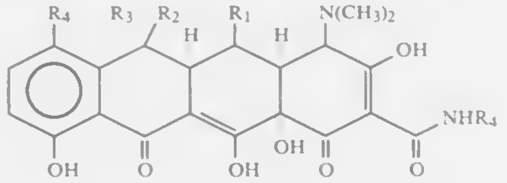
Continuation of Ser. No. 442,688, Nov. 18, 1982, abandoned. This application Apr. 11, 1986, Ser. No. 850,843

The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

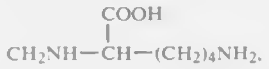
Int. Cl.^{5} A01N ***37/18***

U.S. Cl. 514—154 **12 Claims**

1. A method of overcoming the resistance of tetracycline resistant bacteria to a tetracycline-type antibiotic, comprising contacting the bacteria with a subinhibitory amount of a blocking agent which interfers with the ability of the bacteria to efflux the antibiotic, wherein the blocking agent is contacted with the bacteria in conjunction with a tetracycline-type antibiotic, the tetracycline-type antibiotic having the structure:



wherein R_1 is hydrogen or hydroxy, R_2 is hydrogen, hydroxy or, together with R_3, is methylene, R_3 is hydrogen, methyl, or together with R_2, is methylene, R_4 is hydrogen, halogen, or amino, and R_5 is hydrogen, N-methyl pyrole, or



$$CH_2NH-\overset{COOH}{\overset{|}{C}H}-(CH_2)_4NH_2.$$

and the blocking agent is a compound which contains a sufficient part of the molecular structure of tetracycline to be bound to at least one of the TET A and TET B proteins, the blocking agent being different from the tetracycline-type antibiotic and employed in an amount which is sufficient to make the bacteria susceptible to a pharmaceutically acceptable amount of the tetracycline-type antibiotic, the blocking agent and antibiotic being employed in a molar ratio of blocking agent to tetracycline-type antibiotic of from about 0.01 to 100.

5,021,408
HYDROCORTISONE-17-OXO-21-THIOESTERS, THEIR PREPARATION AND THEIR USES AS MEDICAMENTS

Gilbert G. Aubard, Palaiseau; Agnès G. Grouhel, Meudon; Jean-Louis Junien; Claude P. Roux, both of Paris, and Diéran R. Torossian, Bourg-La-Reine, all of France, assignors to Jouveinal S.A., Paris, France

Continuation of Ser. No. 794,737, Nov. 4, 1985, Pat. No. 4,933,331, which is a continuation of Ser. No. 629,975, Jul. 11, 1984, abandoned. This application Jul. 9, 1987, Ser. No. 71,315

Claims priority, application France, Aug. 26, 1983, 83 13777

Int. Cl.^{5} A61K ***31/56***

U.S. Cl. 514—179 **3 Claims**

1. A method for treating an inflammatory ailment comprising administering to a person suffering from said inflammatory ailment an amount effective to treat said ailment of a member selected form the group consisting of 3,20-dione-11β-hydroxypregn-4-ene-21-thioacetate-17-butyrate and 3,20-dione-11β-hydroxypregn-4-ene-21-thiopropionate-17-butyrate.

5,021,409
ANTIVIRAL CYCLIC POLYAMINES

Barry A. Murrer, Reading, England, and David A. Schwartz, Exton, Pa., assignors to Johnson Matthey PLC, London, England

Filed Dec. 21, 1989, Ser. No. 454,418

Int. Cl.^{5} A61K ***31/33;*** **C07D** ***255/02***

U.S. Cl. 514—183 **9 Claims**

1. A method of treating infection by a retrovirus of a mammal, which comprises administering to the mammal an effective dose of an active ingredient selected from linked cyclic compounds of the general formula 1

$$Z—(A)_n—Y \qquad (I)$$

in which

- Z and Y are independently cyclic polyamine moieties having from 9 to 32 ring members and from 3 to 8 amine nitrogen atoms in the ring,
- A is a linking atom or group, and
- n is O or an integer from 1 to 6,

and their acid addition salts and metal complexes.

5,021,410
COMBINATIONS OF SELECTIVE ALPHA-ADRENERGIC AGONISTS AND ANTAGONISTS USEFUL IN LOWERING INTRAOCULAR PRESSURE

James A. Burke, Tustin, Calif., assignor to Allergan, Inc., Irvine, Calif.

Filed May 22, 1989, Ser. No. 354,969

Int. Cl.^{5} A61K ***31/55***

U.S. Cl. 514—213 **10 Claims**

1. A method for lowering intraocular pressure (IOP) comprising co-administrating to the eye of a mammal suffering from ocular hypertension a therapeutic amount of $alpha_2$ agonist and $alpha_3$ antagonist wherein the amount of $alpha_3$ potentiates the ocular hypotensive effect of the $alpha_2$ agonist.

5,021,411
IMIDAZODIAZEPINE DERIVATIVES

Walter Hunkeler, Magden; Emilio Kyburz, Reinach, both of Switzerland, and Marc Meier, Village-Neuf, France, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Aug. 22, 1989, Ser. No. 396,884

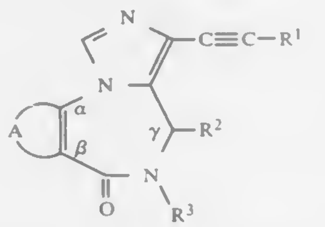
Claims priority, application Switzerland, Aug. 31, 1988, 3237/88; Jun. 5, 1989, 2108/89

The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.

Int. Cl.^{5} C07D ***487/08, 495/14;*** **A61K** ***31/55***

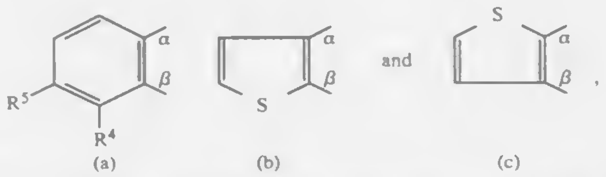
U.S. Cl. 514—220 **33 Claims**

1. A compound of the formula



I

wherein A together with the two carbon atoms denoted by α and β represents one of the following groups:



(a) (b) (c)

R^1 is a partially unsaturated lower hydrocarbon group having from 2 to 7 carbon atoms which is optionally substituted with hydroxy, oxo, aryl or the group —OR, —SR or —OCOR, or R^1 is a lower alkyl group which is substituted with aryl or the group —OR′, —SR′ or —OCOR′, R and R′ each represents aryl or a saturated or partially unsaturated C_{1-18}-hydrocarbon group which is optionally substituted with aryl or lower alkoxy, R^2 is hydrogen, R^3 is lower alkyl or R^2 and R^3 together represent dimethylene or trimethylene, R^4 and R^5 each represents hydrogen, halogen, trifluoromethyl, cyano, nitro or lower alkyl, the group —OR′ being different from lower alkoxy, wherein aryl represents monocyclic aromatic hydrocarbon residues which are unsubstituted or substituted with lower alkyl, lower alkoxy and/or halogen, and the compounds of formula I having the (S)- or (R,S)-configuration with reference to the carbon atom denoted by γ when R^2 and R^3 together represent dimethylene or trimethylene.

5,021,412
THIADIAZINES, AND INSECTICIDAL AND ACARICIDAL PREPARATIONS

Michihiko Nakaya, Zushi; Yukiharu Fukushi, Sapporo; Kenji Kodaka, Yokohama; Masayuki Ooka, Yokohama; Shirou Shiraishi, Yokohama; Masahiko Nakamura, Yokohama, and Satoshi Numata, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

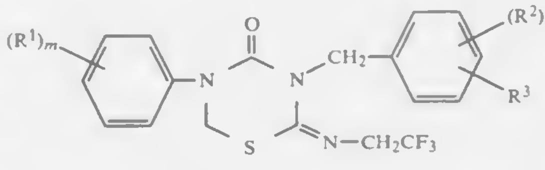
Continuation-in-part of Ser. No. 248,230, Sep. 23, 1988, abandoned. This application Mar. 24, 1989, Ser. No. 328,398

Claims priority, application Japan, Sep. 25, 1987, 62-239002; Jul. 8, 1988, 63-168997; Jul. 14, 1988, 63-176063

Int. Cl.^{5} A01N ***43/88;*** **C07D** ***285/34***

U.S. Cl. 514—223.8 **33 Claims**

17. An insecticidal and acarididal commposition comprising at least one tetrahydro-1,3,5-thiadiazin-4-one represented by the following formula (I)



(I)

wherein each of R^1 and R^2 represents a halogen atom or an alkyl group having 1 to 4 carbon atoms; R^3 represents a halogen atom, an alkyl group having 1 to 4 carbon atoms, a cycloalkyl group having 3 to 6 carbon atoms, an alkoxy group having 1 to 4 carbon atoms, an acetyl group, a phenoxy group, a halo-substitued phenoxy group, a benzyl group, a benzyloxy group, a phenylcarbonyl group, a haloalkyloxy group having 1 to 4 carbon atoms, a haloalkyloxymethyl group having 1 to 4 carbon atoms, a haloalkenyloxy group having 2 to 4 carbon atoms, a haloalkylthio group having 1 to 4 carbon atoms, a haloalkylthiomethyl group hving 1 to 4 carbon atoms, a haloalkylthio group having 2 to 4 carbon atoms, a haloalkyl group having 1 to 8 carbon atoms, a haloalkenyl group having 2 to 8 carbon atoms, an alkyloxycarbonyl group having 1 to 8 carbon atoms, a 2,4-dichloro-phenoxycarbonyl group, or a 3-chloro-5-trifluoroinenthyl-2-pyridyloxy group; m represents 0, 1, 2 or 3; and n represents 0, 1, 2 or 3,

or a salt thereof as an active ingredient, in admixture with a liquid or solid carrier.

VOL
1127
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ANALGESIC THIOMORPHOLINS THEIR PREPARATION, AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Atsusuke Terada; Yoshio Iizuka; Kazuyuki Wachi, and Kenji Fujibayashi, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

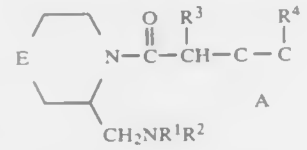
Filed Aug. 22, 1989, Ser. No. 397,105

Claims priority, application Japan, Aug. 24, 1988, 63-210074

Int. Cl.^{5} A61K *31/54;* **C07D** *417/00, 417/02, 417/14*

U.S. Cl. 514—227.5 **36 Claims**

1. A compound of the formula (I):



(1)

in which,

R^1 and R^2 are the same or different and each is selected from the group consisting of a hydrogen atom and C_1–C_6 alkyl groups, or R^1 and R^2 together with the nitrogen atom to which they are attached form a heterocyclic ring selected from the group consisting of pyrrolidinyl, piperidyl, (4-methyl)piperazinyl, hexamethyleneiminyl, thiazolidinyl and morpholinyl;

E is a sulfur atom;

ring A is an unsubstituted benzene ring; a benzene ring substituted with at least one substituent of a Group (i) as defined below; or a ring selected from the group consisting of furan, thiophene, pyrazole, imidazole, oxazole, isoxazole, thiazole, isothiazole, triazole, thiadiazole, pyridine, pyridazine, pyrimidine, pyrazine, quinoline, isoquinoline and acridine, said ring being unsubstituted or having at least one substituent of Group (i) as defined below;

said Group (i) comprising halogen atoms, C_1–C_6 alkyl groups, halogenated C_1–C_6 alkyl groups, C_1–C_6 alkoxy groups, halogenated C_1–C_6 alkoxy groups, C_1–C_6 alkylthio groups, phenyl, naphthyl, C_1–C_6-aliphatic acyl groups, nitro groups, and hydroxy groups;

R^3 represents a hydrogen atom or a C_1–C_6-alkyl group and R^4 represents a hydrogen atom, or R^3 and R^4 together represent a group of formula (IV):

$$—CR^aR^b{}_m—C(=Y)— \qquad (IV)$$

wherein each of R^a and R^b represents hydrogen or a C_1–C_3 alkyl group, provided that there are not more than three alkyl groups in the groups in the group of formula (IV), m represents 1, 2, or 3, and Y represents two hydrogen atoms or an oxygen atom;

and pharmaceutically acceptable salt thereof.

5,021,414

PHENOL DERIVATIVES

William R. Pilgrim, Reims, France; Derek W. Young, Wilmslow, United Kingdom; Brian S. Tait, United Kingdom; Graham C. Crawley, both of Macclesfield, United Kingdom; Philip N. Edwards, Bramhall, United Kingdom, and George B. Hill, Sandbach, United Kingdom, assignors to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 134,320, Dec. 16, 1987, Pat. No. 4,904,661, which is a division of Ser. No. 604,964, Apr. 27, 1984, Pat. No. 4,732,912. This application Dec. 18, 1989, Ser. No. 452,069

Claims priority, application United Kingdom, Apr. 28, 1983, 8311678

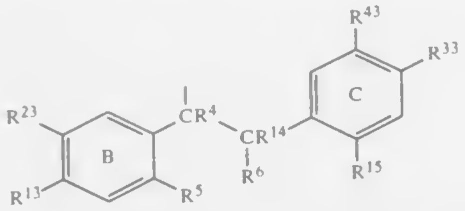
Int. Cl.^{5} A61K *31/535;* **C07D** *295/18*

U.S. Cl. 514—237.5 **8 Claims**

1. A phenol derivative of the formula:

$$NU—A—X—R'$$

where NU is a bis-phenolic nucleus of the general formula



wherein one of R^{13} and R^{23}, and one of R^{33} and R^{43}, has the formula $R^3O—$, wherein each R^3, which may be the same or different, is hydrogen or alkyl, cycloalkyl, alkanoyl, alkoxycarbonyl, carboxyalkanoyl or aroyl each of up to 10 carbon atoms, and wherein the other of R^{13} and R^{23}, and the other of R^{33} and R^{43}, is hydrogen;

wherein R^4 and R^{14}, which may be the same or different, each is hydrogen or alkyl of up to 5 carbon atoms, or R^4 and R^{14} are joined together so that CR^4 $—CR^{14}$ is an olefinic double bond;

wherein R^5 and R^{15} are both hydrogen and R^6 is alkyl of up to 5 carbon atoms;

and whrein the aromatic rings B and C each may optionally bear one or more halogen or alkyl substituents;

wherein A is straight- or branched-chain alkylene, alkenylene or alkynylene each of from 4 to 12 carbon atoms; or A has the formula:

$$—A—Y^3—A^{21}—$$

wherein A^1 is alkylene or alkenylene and A^{21} is a direct link or alkylene, alkenylene or cycloalkylene, such that A' and A^{21} together have a total of 2 to 10 carbon atoms, and Y^3 is phenylene or naphthylene;

wherein R^1 is alkyl, alkenyl, cycloalkyl or halogenoalkyl each of up to 10 carbon atoms, phenyl, chlorophenyl, o-ethylphenyl, p-cyanophenyl, p-hydroxyphenyl, p-methoxyphenyl, alkyl of 1 to 3 carbon atoms which bears a phenyl, tolyl, halogenophenyl or trifluoromethylphenyl substituent, α-methylbenzyl, 3,4-dichlorobenzyl, p-cyanobenzyl or p-methylthiobenzyl, or R' is joined to R^2 as defined below; and wherein X is $—CONR^2—$, $—CSNR^2—$, $—NR^{12}CO—$ or $—NR^{12}CS—$, wherein R^2 is hydrogen or alkyl of up to 6 carbon atoms, or R^1 and R^2 together form alkylene such that, with the adjacent nitrogen atom, they form a heterocyclic ring of 5 to 7 ring atoms, one of which may be a second heterocyclic atom selected from oxygen, sulphur and nitrogen; and

wherein R^{12} is hydrogen or alkyl of up to 6 carbon atoms;

or a pharmaceutically-acceptable salt of a compound wherein R^3 is carboxyalkanoyl.

6. A pharmaceutical composition having antioestrogenic activity comprising an amount of the phenol derivative, claimed in claim **1** sufficient to exert an antioestrogenic effect, together with a pharmaceutically acceptable diluent or carrier.

5,021,415

TRIAZINE CARBOXYLIC ACIDS AND ESTERS

Nicholas A. Meanwell, East Hampton, Conn., assignor to Bristol-Myers Squibb Co., New York, N.Y.

Filed Feb. 13, 1990, Ser. No. 479,563

Int. Cl.^{5} A61K *31/53;* **C07D** *253/06*

U.S. Cl. 514—242 **12 Claims**

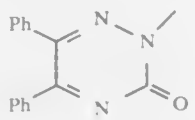
1. A compound of Formula I

$$HET_1—(CH_2)_nCO_2R \qquad (1)$$

wherein

n is 6 to 9:

R is hydrogen or lower alkyl or an alkali metal ion : and HET_1 is a heterocyclic radical selected from the group consisting of



2,3-dihydro-3-oxo-5,6-diphenyl-1,2,4-triazin 2-yl.

9 The method for inhibiting blood platelet aggregation in a mammal which comprises administering a therapeutically effective amount of a compound of claim **1**

5,021,416

METHOD FOR USING (2-IMIDAZOLIN-2-YLAMINO) QUINOXALINES TO REDUCE OR MAINTAIN INTRAOCULAR PRESSURE

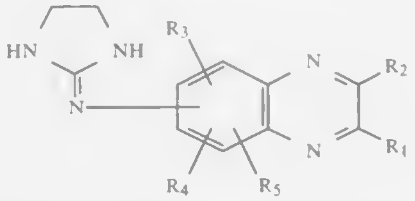
Charles Gluchowski, Mission Viejo, Calif., assignor to Allergan, Inc., Irvine, Calif.

Filed Oct. 31, 1989, Ser. No. 429,835

Int. Cl.^{5} A61K *31/50*

U.S. Cl. 514—249 **28 Claims**

1. A method for reducing or maintaining the intraocular pressure in a mammalian eye comprising administering directly to a mammalian eye an amount effective to reduce or maintain the intraocular pressure in the mammalian eye of a compound selected from the group consisting of those having the formula



, and pharmaceutically acceptable acid addition salts thereof and mixtures thereof, wherein R_1 is H, R_2 is selected from the group consisting of alkyl radicals containing 1 to 4 carbon atoms and alkoxy radicals containing 1 to 4 carbon atoms, the 2-imidazolin-2-ylamino group may be in any of the 5-, 6-, 7-or 8- positions of the quinoxaline nucleus, and R_3, R_4 and R_5 each is located in one of the remaining 5-, 6-, 7- or 8-positions of the quinoxaline nucleus and is independently selected from the group consisting of Cl, Br, H and alkyl radicals containing 1 to 3 carbon atoms.

5,021,417

USE OF A FOLINIC ACID SUBSTANCE AS A PLATELET AGGREGATION INHIBITOR

Michel Prost, Couternon, France, assignor to Spiral Recherche et Developpement, Couternon, France

PCT No. PCT/FR89/00257, § 371 Date Jan. 18, 1990, § 102(e) Date Jan. 18, 1990, PCT Pub. No. WO89/11280, PCT Pub. Date Nov. 30, 1989

PCT Filed May 29, 1989, Ser. No. 465,090

Claims priority, application France, May 27, 1988, 88 07075

Int. Cl.^{5} A61K *31/50, 31/495*

U.S. Cl. 514—249 **4 Claims**

1. A method of treatment for reducing blood platelet aggregation in a mammal, comprising the step of administering to the mammal a therapeutically effective amount of a blood platelet aggregation inhibiting substance selected from the group consisting

(i) N-[4-[[(2-amino-1,4,5,6,7,8-hexahydro-5-methyl-4-oxo-6-pteridinyl)methyl]amino]benzoyl]-L-glutamic acid,

(ii) alkali metal and alkaline earth metal salts thereof and

(iii) mixtures thereof.

5,021,418

ANTIHYPERTENSIVE BENZOPYRAN COMPOUNDS

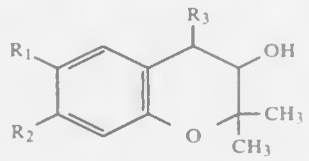
Dominick A. Quagliato, Edison, and David D. Deininger, New Brunswick, both of N.J., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 417,350, Oct. 5, 1989, Pat. No. 4,983,612. This application Sep. 11, 1990, Ser. No. 580,902

Int. Cl.^{5} A61K *31/495;* **C07D** *487/04*

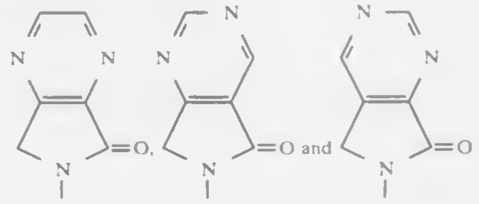
U.S. Cl. 514—249 **5 Claims**

1. A compound of formula (I)



(I)

wherein R_1 and R_2 are independently selected from the group consisting of H, halogen, F, C_1 to C_7 alkyl, C_3 to C_7 cycloalkyl, cyano, nitro, trifluoromethyl, trifluoromethoxy, trifluoroethoxy, C_1 to C_7 alkoxy, C_1 to C_7 alkylcarbonyl, C_3 to C_7 cycloalkylcarbonyl, C_1 to C_7 thio alkyl, C_1 to C_7 sulfoxy alkyl, C_1 to C_7 sulfonyl alkyl, amino, C_1 to C_7 mono-or disubstituted amino, C_1 to C_7 mono- or disubstituted amido; R_3 is selected from the group consisting of



and the N-oxides and pharmaceutically acceptable salts thereof.

5,021,419

NOVEL PYRAZINOXIDE COMPOUND OF NF-1616-904 AND A PHARMACEUTICAL COMPOSITION CONTAINING THE SAME

Yoshimasa Nakano; Michiharu Sugawara; Setsuyoshi Uetsuki; Taketoshi Izawa; Tomoyuki Kawaguchi, and Akira Wada, all of Tokushima, Japan, assignors to Otsuka Pharmaceutical Co., Ltd., Tokyo, Japan

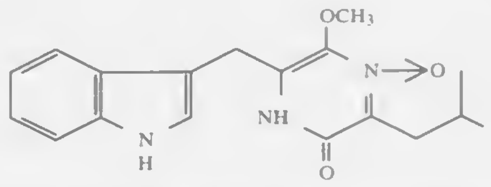
Continuation of Ser. No. 230,829, Aug. 11, 1988, abandoned. This application May 7, 1990, Ser. No. 518,252

Claims priority, application Japan, Aug. 11, 1987, 62-201537

Int. Cl.^{5} A61K *31/495;* **C07D** *403/06*

U.S. Cl. 514—253 **8 Claims**

1. Pyrazinoxide compound of NF-1616-904 having the formula (1),



(1)

2. A pharmaceutical composition for preventing and treating diseases caused by superoxide radicals containing, as the active ingredient, a therapeutically effective amount of a pyrazinoxide compound of NP-1616-904 having the formula (1) as

VOL
1127
ISS
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claimed in claim 1 and a pharmaceutically acceptable carrier, wherein said diseases are selected from the group consisting of rheumatoid arthritis, arteriosclerosis, ischemic heart disease, transient cerebral ischemic attack, hepatic insufficiency, renal insufficiency and nephritis.

5,021,420

DERIVATIVES OF (AZA)NAPHTHALENESULTAM, THEIR PREPARATION AND COMPOSITIONS CONTAINING THEM

Marie-Ihérèse Comte, Chevilly-Larue; Claude Gueremy, Houilles; Jean-Luc Malleron, Marcoussis; Serge Mignani, Livry-Gargan; Jean-Francois Peyronel, Palaiseau, and Alain Truchon, Creteil, all of France, assignors to Rhone-Poulenc Sante, Antony, France

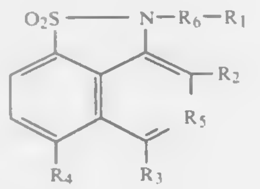
Filed Jul. 6, 1989, Ser. No. 375,934

Claims priority, application France, Jul. 7, 1988, 88 09218; Feb. 20, 1989, 89 02167

Int. Cl.^{5} A61K *31/495, 31/445;* **C07D** *403/00, 417/06*

U.S. Cl. 514—253 **6 Claims**

1. A compound of formula



in which

R_1 represents

- a 1,2,3,6-tetrahydro-1-pyridyl radical substituted in the 4-position by (a) a phenyl radical, (b) a phenyl radical substituted by a halogen atom or an alkyl, hydroxy or alkoxy radical, (c) a 3-indolyl radical, (d) a 3-indolyl radical substituted on the nitrogen atom by an alkyl or alkylcarbonyl radical and/or in the 5-position by a chlorine or fluorine atom or (e) a 3-(5-hydroxyindolyl) radical.
- a 1-piperazinyl radical substituted in the 4-position by (a) a phenyl radical, (b) a phenyl radical substituted by an alkoxy, alkyl, hydroxy, nitro or amino radical or a halogen atom, (c) a 1,2-benzisothiazol-3-yl radical, (d) a 1,2benzisoxazol-3-yl radical or (e) a 2-pyridyl radical,
- a piperidino radical substituted in the 4-position by (a) a phenyl radical, (b) a phenyl radical substituted by a halogen atom or a hydroxy, alkyl or alkoxy radical, (c) two phenyl radicals, (d) a bis(4-fluorophenyl)methylene radical, (e) a 4-fluorobenzoyl radical, (f) a 2-oxo-1-benzolinyl radical, (g) a 2-oxo-1-benzimidazolinyl radical substitutes in the 3-position by an alkylcarbonyl or benzoyl radical, (h) a hydroxy radical and a phenyl radical optionally substituted by an alkyl, alkoxy or hydroxy radical or a halogen atom, (i) a 3-indolyl radical, (j) a 3-indolyl radical substituted on the nitrogen atom by an alkyl or alkylcarbonyl radical and/or in the 5-position by a chlorine or fluorine atom or (k) a 3-(5-hydroxyindolyl) radical.

either:

R_2 and R_3, which are identical, represent a hydrogen or halogen atom and R_4 represents a hydrogen atom or

R_2 and R_4 represent a hydrogen atom and R_3 represents a halogen atom or an acetylamino radical or

R_2 and R_3 represent a hydrogen atom and R_4 represents a halogen atom

and R_5 represents a —CH= group,

R_6 represents an alkylene chain containing 2 to 4 carbon atoms or a propylene chain substituted in the 1- or 3-position by an alkyl radical or in the 2-position by an alkyl, alkoxy, hydroxy, dialkylamino, piperidono, morpholino or thiomorpholino radical, with the reservation that when R_6 represents a propylene radical substituted in the 2-position by a dialkylamino, piperidino, morpholino or thiomorpholino radical, R_1 cannot be a radical containing a hydroxy radical and it being understood that the alkyl and alkoxy radicals and the alkyl and alkoxy portions contain 1 to 4 carbon atoms in a straight or branched chain, or its salt with in-organic and organic acid.

5. A method for the treatment of ailments in which serotonin is implicated which comprises administering to a subject in need of such treatment, an effective amount of a compound according to claim 1 in the free form or in the form of an addition salt with pharmaceutically acceptable salt.

5,021,421

2-(1-PIPERAZINYL)-4-PHENYLCYCLOALKANOPYRIDINE DERIVATIVES, PROCESSES FOR THE PRODUCTION THEREOF, AND PHARMACEUTICAL COMPOSITION CONTAINING THE SAME

Katsuhiko Hino, Nara; Naoki Kai, Amagasaki; Masato Sakamoto, Toyonaka; Tatsuya Kon, Ashiya; Makoto Oka, Ibaraki; Kiyoshi Furukawa, Shiga, and Yosbiaki Ochi, Toyonaka, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan

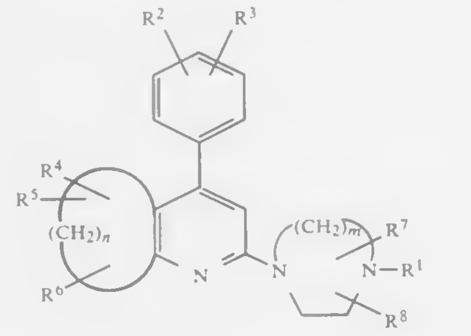
Filed Feb. 20, 1990, Ser. No. 481,183

Claims priority, application Japan, Mar. 3, 1989, 1-52544

Int. Cl.^{5} A61K *31/495;* **C07D** *401/04*

U.S. Cl. 514—254 **19 Claims**

1. A compound of the formula (I):



(I)

wherein n is 3, 4, 5, 6 or 7,

R^1 is a hydrogen atom, C_1–C_{10} alkyl, C_2–C_6 alkenyl, C_2–C_6 alkynyl, C_3–C_8 cycloalkyl, C_3–C_6 cycloalkyl-(C_1–C_4) alkyl, hydroxy-(C_2–C_6) alkyl, C_1–C_3 alkoxy-(C_2–C_6) alkyl, C_1–C_4 alkanoyloxy (C_2–C_6) alkyl, C_5–C_6 cycloalkylcarbonyloxy (C_2–C_6) alkyl, benzoyloxy (C_2–C_6) alkyl which is optionally substituted by halogen, C_1–C_3 alkyl or C_1–C_3 alkoxy, furoyloxy (C_2–C_6) alkyl, thenoyloxy (C_2–C_6) alkyl, pyridylcarbonyloxy (C_2–C_6)alkyl, pyrimidylcarbonyloxy (C_2–C_6) alkyl or isoquinolylcarbonyloxy (C_2–C_6) alkyl, a benzoyl or naphthyloyl (C_1–C_6) alkyl group which is optionally mono- or disubstituted on the phenyl or naphthyl ring by substituents(s) selected from the group consisting of halogen, C_1–C_3 alkyl, C_1–C_3 alkoxy and trifluoromethyl, a phenyl or napthyl group which is optionally mono- or disubstituted by substituent(s) selected from the group consisting of halogen, C_1–C_3 alkyl, C_1–C_3 alkoxy and trifluoromethyl, furyl, thienyl, pyridyl, pyrimidyl or isoquinolyl, C_1–C_4 alkanoyl, C_5–C_6 cycloalkylcarbonyl, a benzoyl group which is optionally substituted by halogen, C_1–C_3 alkyl or C_1–C_3 alkoxy, furoyl, thenoyl, pyridylcarbonyl, pyrimidylcarbonyl or isoquinolylcarbonyl,

R^2 and R^3 are the same or different and are each a hydrogen atom, a halogen atom, C_1–C_6 alkyl, C_1–C_6 alkoxy, trifluoromethyl, or hydroxy,

R^4, R^5 and R^6 are the same or different and are each a hydrogen atom, C_1–C_6 alkyl, or phenyl, or two of R^4, R^5 and R^6 combine to form a single bond or C_1–C_3 alkylene,

R^7 and R^8 are the same or different and are each a hydrogen atom or C_1–C_3 alkyl,

m is 2 or 3,

or an acid addition salt thereof.

15. A psychotropic composition comprising as an active ingredient an efficient amount of the compound of the formula (I) as set forth in claim 1, or a pharmaceutically acceptable salt thereof in admixture with a pharmaceutically acceptable carrier or diluent.

5,021,422

METHOD AND COMPOSITION FOR TREATING HYPERPROLIFERATIVE SKIN DISEASES USING 6-AMINOPURINE CYTOKININS

Lars Bolund, Risskov; Peter K. A. Jensen, Ry, and Peter Bjerring, Risskov, all of Denmark, assignors to Senetek PLC, Risskov, Denmark

Filed Jun. 8, 1989, Ser. No. 364,364

Int. Cl.^{5} A61K *31/52*

U.S. Cl. 514—261 **3 Claims**

1. A method of treating psoriasis in a human suffering therefrom which method comprises administering to the hyperproliferating cells, associated with said disease, of the skin of said human a differentiation-inducing-effective amount of a 6-(substituted amino)purine cytokinin.

5,021,423

MITOMYCIN DERIVATIVES AND INTERMEDIATES THEREFOR

Yutaka Kanda, Houston, Tex.; Hitoshi Arai, Shizuoka, Japan; Masaji Kasai, Kanagawa, Japan, and Makoto Morimoto, Shizuoka, Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, Japan

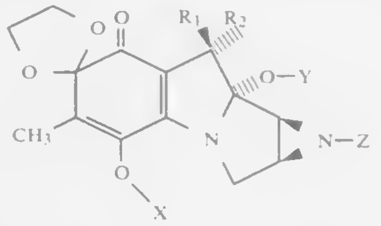
Filed May 26, 1989, Ser. No. 358,272

Claims priority, application Japan, May 30, 1988, 63-131914; Mar. 10, 1989, 1-58278

Int. Cl.^{5} C07D *492/22;* **A61K** *31/40*

U.S. Cl. 514—262 **9 Claims**

1. Mitomycin derivatives having the formula



wherein

X is acyl having the structure of the formula RCO, wherein R is selected from straight or branched alkyl having 1–17 carbon atoms, alkenyl having 2–17 carbon atoms and phenyl, the alkylene chain of said alkyl being optionally interrupted by one member selected from 1–3 oxygen atoms and carbonyl;

Y is selected from hydrogen and methyl; and

Z is selected from hydrogen and methyl;

one of R_1 and R_2 represents carbamoyloxymethyl and the other represents hydrogen.

5,021,424

VITAMIN COMPOSITION FOR TREATMENT OF FLEA INFESTATION IN ANIMALS

Jennylyn Lawton-Wall, 318 D Texas Rd., Morganville, N.J. 07751

Filed Jun. 1, 1989, Ser. No. 359,957

Int. Cl.^{5} A61K *31/51, 31/415, 31/34*

U.S. Cl. 514—276 **5 Claims**

1. A method for the treatment and prevention of flea infestation and the associated allergic reaction, hair loss and irritation in canine and feline animals which comprises administering to the animal an effective amount of a vitamin composition comprising the combination of:

(a) about 50 to 1,500 milligrams of Vitamin C;
(b) about 50 to 100 milligrams of Vitamin B-1; and,
(c) about 300 to 800 micrograms of Biotin.

5,021,425

USE OF 2-AZABICYCLOI[2.2.2]OCTANE-3-CARBOXYLIC ACID DERIVATIVES FOR THE TREATMENT OF ARTERITIS

Bernard Teisseire, Paris, France, assignor to Adir et Compagnie, Neuilly-sur-Seine, France

Filed Aug. 22, 1989, Ser. No. 396,864

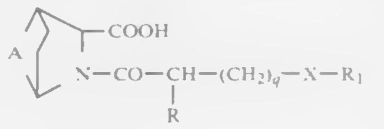
Claims priority, application France, Aug. 24, 1988, 88 11157

Int. Cl.^{5} A01N *43/42*

U.S. Cl. 514—299 **6 Claims**

1. A method for the treatment of arteritis including disorders of vision associated with arteritis,

in a patient in need of the same, comprising the step of administering to said patient an amount of a 2-azabicyclo[2.2.2]octane compound of Formula I:



(I)

in which

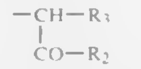
A denotes dimethylene,

q is 0,

R denotes lower-alkyl (C_1–C_4) which can bear an amino group,

X denotes —NH—, and

R_1 denotes



$$-\underset{\displaystyle CO-R_2}{\underset{|}{CH}}-R_3$$

wherein

R_2 denotes hydroxyl or (C_1–C_4) lower-alkoxy,

R_3 denotes (C_1–C_4) alkyl or phenyl (C_1–C_4) alkyl

or a pharmaceutically-acceptable salt thereof with a therapeutically-compatible inorganic or organic base or with a therapeutically-compatible inorganic or organic acid,

which is effective for said purpose but essentially devoid of antihypertensive effect.

5,021,426

METHOD OF TRAETING MALARIA WITH CYPROHEPTADINE DERIVATIVES

John J. Baldwin, Gwynedd Valley, Pa.; Gabriel F. Eilon, Irvine, Calif.; Paul A. Friedman, Rosemont, and David C. Remy, North Wales, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 26, 1990, Ser. No. 484,774

Int. Cl.^{5} A61K *31/47, 31/445*

U.S. Cl. 514—313 **11 Claims**

1. A method of treating a patient afflicted with malaria comprising administering to the patient in need of such treatment a therapeutically effective dose of the cyproheptadine compound which is selected from the group consisting of:

(−)-1-cyclopropylmethyl-4-(3-trifluoromethylthio-5H-dibenzo[a,d]cyclohepten-5-ylidene)piperidine;

(+)-1-cyclopropylmethyl-4-(3-iodo-5H-dibenzo[a,d]cyclohepten-5-ylidene)piperidine;

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4-amino-5-chloro-2-methoxy-N-((5-(1-methyl-4-piperidinylidene)-5H-dibenzo[a,d]cyclohepten-3-yl)methyl)-benzamide;
3,4,5-trimethoxy-N-((5-(1-methyl-4-piperidinylidene)-5H-dibenzo[a,d]cyclohepten-3-yl)methyl)benzamide;
diethy 1,4-dihydro-2,6-dimethyl-4-(5-(1-methyl-4-piperidinylidene)-5H-dibenzo[a,d]cyclohepten-3-yl)-pyridinedicarboxylate;
or pharmaceutically acceptable acid addition salt thereof, in combination with, prior to, concurrent to or subsequent to the administration of a therapeutically effective dose of the compound which is selected from the group consisting of:
chloroquine; hydroxychloroquine; amodiaquine; mefloquine; or pharmaceutically acceptable acid addition salt thereof.

5,021,427

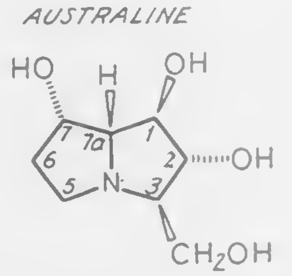
NOVEL PYRROLIZIDINE ALKALOID

Alan D. Elbein, and Joseph E. Tropea, both of San Antonio, Tex., assignors to The Board of Regents, The University of Texas System, Austin, Tex.

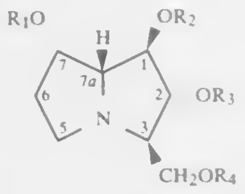
Filed Dec. 23, 1988, Ser. No. 289,907

Int. Cl.⁵ C12N *9/99;* **C12P** *17/18;* **C07D** *209/04, 209/52*

U.S. Cl. 514—315 **9 Claims**



1. A purified bioactive compound having the formula:



wherein at least one of R_1, R_2, R_3 and R_4 is H or acyl having less than about five carbon atoms.

5,021,428

NOVEL CHEMICAL COMPOUNDS FOR THE PROPHYLACTIC TREATMENT OF MIGRAINE

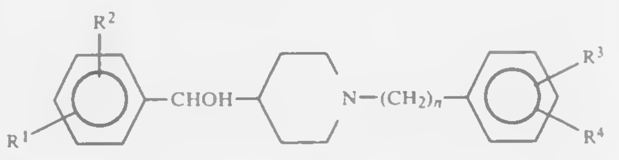
Albert A. Carr, and Norbert L. Wiech, both of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Division of Ser. No. 219,415, Jul. 15, 1988, Pat. No. 4,912,117, which is a division of Ser. No. 71,524, Jul. 7, 1987, Pat. No. 4,783,471, which is a continuation of Ser. No. 867,122, May 30, 1986, abandoned, which is a continuation-in-part of Ser. No. 751,419, Jul. 2, 1985, abandoned. This application Nov. 17, 1989, Ser. No. 428,256

Int. Cl.⁵ A61K *31/445;* **C07D** *211/22*

U.S. Cl. 514—317 **10 Claims**

1. A method for the prophylactic treatment of migraine comprising administering to a patient in need thereof by an appropriate route of administration, a pharmaceutically effective amount of a compound of the formula



the optical isomers thereof, and the pharmaceutically acceptable salts thereof, wherein n is 2, 3, or 4, each of R^1, R^2, R^3, and R^4 is independently selected from hydrogen, halogen, trifluoromethyl, C_{1-6} alkyl, C_{1-6} alkoxy, hydroxy or amino.

5,021,429

PHARMACOLOGICALLY ACTIVE AMINOALKYLPHENYL COMPOUNDS AND THEIR USE

Michael Martin-Smith, Ware, England, assignor to Allen & Hansburys Limited, England

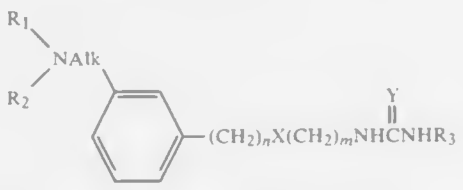
Continuation of Ser. No. 502,674, Jun. 9, 1983, abandoned, which is a continuation of Ser. No. 200,607, Oct. 24, 1980, abandoned, which is a continuation of Ser. No. 906,619, May 16, 1978, abandoned. This application Dec. 22, 1986, Ser. No. 944,217

Claims priority, application United Kingdom, May 17, 1977, 20660/77; Sep. 27, 1977, 40129/77

Int. Cl.⁵ A61K *31/13, 31/155, 31/17;* **C07C** *217/26*

U.S. Cl. 514—331 **19 Claims**

1. A compound of the formula:



and physiologically acceptable salts, and hydrates of such compounds in which

R_1 and R_2, which may be the same or different, represent hydrogen or C_{1-6} alkyl; or R_1 and R_2 may, together with the nitrogen atom to which they are attached, form a 5- or 6-membered heterocyclic ring;

R_3 represent hydrogen, C_{1-6} alkyl or C_{1-6} alkoxy C_{1-6} alkyl;

X represents —O—;

Y represents =S, =O, =$CHNO_2$ or =NR_6, in which R_6 represents hydrogen, nitro, cyano or C_{1-6} alkylsulphonyl;

m is an integer from 2 to 4 inclusive;

n is zero, and

Alk denotes a straight alkylene chain of 1 to 3 carbon atoms.

17. A method of treating a condition mediated through histamine H_2-receptors which comprises administering to a patient an effective amount of a compound as claimed in claim 1 to relieve said condition.

5,021,430

CERTAIN N-SUBSTITUTED BUTYRAMIDE DERIVATIVES

Gary M. Ksander, Milford, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

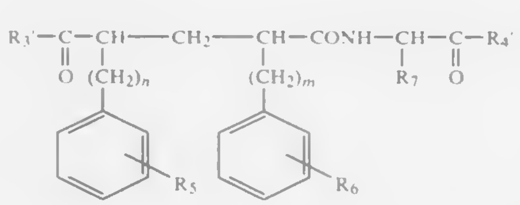
Continuation-in-part of Ser. No. 806,061, Dec. 6, 1985. This application Jun. 29, 1987, Ser. No. 67,587

Int. Cl.⁵ A61K *31/44*

U.S. Cl. 514—332 **11 Claims**

1. A compound of the formula

(IV)



wherein m and n independently represent an integer from 1 to 4, R_3' and R_4' independently represent hydroxy, alkoxy of 1 to 4 carbon atoms, 3-pyridylmethoxy, benzyloxy, pivaloyloxymethoxy, 3-phthalidoxy, bornyloxycarbonylmethoxy or 1-(ethoxycarbonyloxy)-ethoxy, R_5 and R_6 independently represent hydrogen, halogen, hydroxy, lower alkoxy, lower alkyl or trifluoromethyl; R_7 represents, aryl-C_1–C_4-alkyl, C_5–C_7-cycloalkyl-C_1–C_4-alkyl, amino-C_1-C_4-alkyl, hydroxy-C_1–C_4-alkyl, guanidino-C_1–C_4-alkyl, C_1–C_4-alkylthio-C_1–C_4-alkyl, C_1–C_4-alkyloxy- C_1–C_4-alkyl, aryl-C_1–C_4-alkylthio-C_1–C_4-alkyl, aryl-C_1–C_4-alkyloxy-C_1–C_4-alkyl in which definitions aryl represents phenyl, pyridyl, indolyl, imidazolyl, or phenyl mono- or disubstituted by lower alkyl, hydroxy, lower alkoxy, lower alkanoyloxy, halogen or trifluoromethyl; or a pharmaceutically acceptable salt thereof.

5,021,431

IMIDAZOLYL ALKYL GUANIDINE DERIVATIVES, PROCESSES FOR THEIR PREPARATION AND PHARMACEUTICAL PREPARATIONS CONTAINING THESE COMPOUNDS

Armin Buschauer, Berlin; Helmut Schickaneder, Eckental; Walter Schunack, Berlin; Sigurd Elz, Mainz; Istvan Szelenyi, Schwaig; Gert Baumann, Munich, and Kurt H. Ahrens, Nuremberg, all of Fed. Rep. of Germany, assignors to Heumann Pharma GmbH & Co., Nuremberg, Fed. Rep. of Germany

Continuation of Ser. No. 802,976, Nov. 29, 1985, abandoned. This application Feb. 28, 1989, Ser. No. 318,467

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1985, 3512084; Aug. 6, 1985, 3528214; Aug. 6, 1985, 3528215

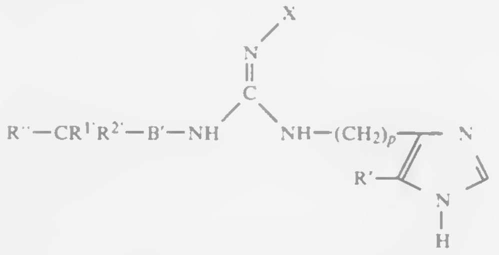
The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.

Int. Cl.⁵ A61K *31/44, 31/415, 31/38;* **C07D** *403/13*

U.S. Cl. 514—333 **56 Claims**

1. An imidazolyl alkyl guanidine derivative corresponding to the formula I

(I)



wherein X denotes hydrogen or benzoyl; p has the value 2 or 3; R′ denotes hydrogen or methyl; R″ represents phenyl, pyridine, thiophene, or naphthyl, each of which may be unsubstituted or substituted with a halogen atom, C_1–C_3-alkyl or C_1-C_3-alkoxy; $R^{1'}$ denotes hydrogen or methyl and $R^{2'}$ denotes phenyl or pyridyl, each of said phenyl or pyridyl may be unsubstituted or substituted with at least one halogen atom or C_1–C_3-alkyl; and B′ represents the group —CH(Y)—S—(CH_2)m′—, —CH_2—S—CH_2—CH(Y)—CH_2—, —CH_2—S—CH(Y)—CH_2—, —CH_2—S—CH_2—CH(Y)—, —$(CH_2)_{n''}$—, —$(CH_2)_{n''}$—CH(Y)—, —O—$(CH_2)_2$—, —CH_2—O—(CH₂o′—, —CH_2—O—CH_2—CH(Y)—CH_2—, —O—CH_2—CH(Y)—, —O—CH(Y)—CH_2—, —S—$(CH_2)_q$—, —S—CH_2—CH(Y)—, —S—CH(Y)—CH_2— or —S—CH_2—CH(Y)—CH_2— wherein Y denotes hydrogen or a straight chain C_1–C_3-alkyl, m′ and o′ have the value 2 or 3, and n″ and q have the value 2, 3, 4 or 5.

4. A method for eliciting an agonistic response on histamine —H_2 receptors and an antagonistic response on H_1-receptors in a mammalian organism, comprising administering to such organism a pharmaceutically effective amount of the imidazolyl alkyl guanidine compound as claimed in claim **1**, or a pharmaceutically active salt thereof.

5,021,432

BENZOPYRAN COMPOUND AND ITS PHARMACEUTICAL USE

Tsutomu Yamanaka; Toshio Seki; Tohru Nakajima, and Osamu Yaoka, all of Nakatsu, Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed Apr. 19, 1989, Ser. No. 340,271

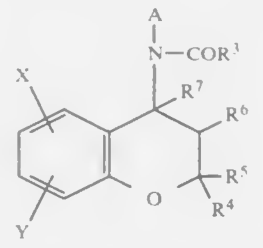
Claims priority, application Japan, Apr. 26, 1988, 63-103222; Nov. 1, 1988, 63-278142; Nov. 25, 1988, 63-299190

Int. Cl.⁵ A61K *31/44, 31/38;* **C07D** *405/12, 333/32*

U.S. Cl. 514—337 **7 Claims**

1. A benzopyran compound of the formula (I)

(I)



wherein A represents —OR^1 (wherein R^1 represents hydrogen, lower alkyl, formyl, alkanoyl, benzoyl, naphthoyl, phenylalkyl or naphthylalkyl having, as the alkyl moieties, straight- or branched-chain alkyls having 1 to 4 carbon atoms, or a phenylalkyl or a naphthylalkyl each substituted on the aromatic ring by at least one of halogen, lower alkyl, lower alkoxy, hydroxy, trifluoromethyl, cyano, nitro and amino); R^3 represents furyl, pyridyl, thienyl, or furyl, pyridyl or thienyl each substituted by at least one of halogen, lower alkyl, lower alkoxy, hydroxy, trifluoromethyl, cyano, nitro, or amino; R^4 and R^5 are the same or different, and respectively represent hydrogen or lower alkyl, or together form an alkylene having 2 to 5 carbon atoms; R^6 represents hydroxy, formyloxy, alkanoyloxy, haloalkanoyloxy, lower alkoxycarbonyloxy, benzoyloxy, naphthoyloxy, furoyloxy, pyridylcarbonyloxy, thienoyloxy, carbamouloxy, mono- or di- lower alkylcarbomoyloxy and R^7 represent hydrogen, or R^6 and R^7 together form a bond and, X and Y are the same or different, and respectively represent hydrogen, halogen, nitro, cyano, lower alkyl, lower alkoxy, halo-lower alkyl, carboxyl, formyl, alkanoyl, benzoyl, naphthoyl, haloalkanoyl, carbamoyl, lower alkylsulfinyl, phenylsulfinyl, naphthylsulfinyl, or a phenylsulfinyl or a naphthylsulfinyl each substituted on the aromatic ring by at least one of halogen, lower alkyl, lower alkoxy, hydroxy, trifluoromethyl, cyano, nitro or amino, lower alkylsulfonyl, phenylsulfonyl, naphthylsulfonyl, or a phenylsulfonyl or a naphthylsulfonyl each substituted on the aromatic ring by at least one of halogen, lower alkyl, lower alkoxy, hydroxy, trifluoromethyl, cyano, nitro or amino, sulfonamido or mono- or di-alkylsulfonamido having, as the alkyl moieties, straight- or branched-chain alkyls having 1 to 6 carbon atoms, or a pharmaceutically acceptable salt thereof.

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5,021,433
PHARMACOLOGICAL COMPOUNDS

Tomas B. Alminger, Lindome; Hakan S. Larsson, Göteborg; Per L. Lindberg, Askim, and Gunnel E. Sundéo, G/ teborg, all of Sweden, assignors to Aktiebolaget Hassle, Sweden

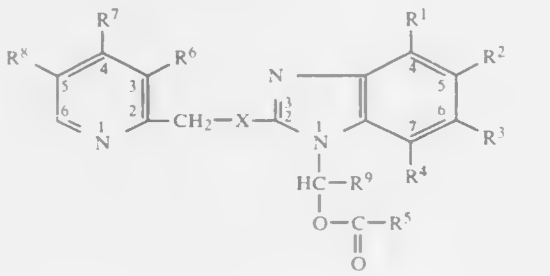
Continuation of Ser. No. 31,008, Nov. 24, 1986. This application May 12, 1988, Ser. No. 195,343

Claims priority, application Sweden, Oct. 29, 1985, 8505112; PCT Int'l Appl., Oct. 28, 1986, PCT/SE86/00493

Int. Cl.^{5} A61K *31/44;* C07D *401/12*

U.S. Cl. 514—338 **7 Claims**

1. A compound of the formula



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or physiologically acceptable salts thereof, wherein

X is —S— or —SO—;

R^1, R^2, R^3 and R^4, which are the same or different, are
- (a) H
- (b) alkyl containing 1-6 carbon atoms
- (c) cycloalkyl containing 3-7 carbon atoms
- (d) alkoxy containing 1-6 carbon atoms
- (e) alkoxyalkyl containing 1-3 carbon atoms in each alkyl part
- (f) alkoxyalkoxy containing 1-3 carbon atoms in each alkyl part
- (g) halogen
- (h) —CN
- (i) —CF_3
- (j) —NO_2
- (k) —COR^{10}
- (l) alkylthio containing 1-6 carbon atoms in the alkyl part
- (m) alkylsulfinyl containing 1-7 carbon atoms in the alkyl part
- (n) phenyl
- (o) phenylalkyl containing 1-6 carbon atoms in the alkyl part
- (p) phenoxy
- (q) haloalkoxy containing 1-6 carbon atoms and 1-6 halogen atoms
- (r) phenylalkoxy containing 1-6 carbon atoms in the alkyl part

R^5 is selected from the group consisting of a dialkyl (1-3 carbon atoms)-amino-substituted alkoxy containing 1-6 carbon atoms in the form of a salt and a carboxy-substituted phenyl,

R^6 and R^8 are the same or different and selected from
- (a) H
- (b) alkyl containing 1-6 carbon atoms

R^7 is
- (a) H
- (b) alkyl containing 1-7 carbon atoms
- (c) alkoxy containing 1-7 carbon atoms
- (d) phenyl
- (e) phenylalkyl containing 1-7 carbon atoms in the alkyl part
- (f) phenoxy
- (g) phenylalkoxy containing 1-7 carbon atoms in the alkoxy part
- (h) alkenyloxy containing 1-7 carbon atoms in the alkenyl part
- (i) alkynyloxy containing 1-7 carbon atoms in the alkynyl part
- (j) alkylthio containing 1-7, preferably 1-3 carbon atoms in the alkyl part
- (k) phenylthio
- (l) phenylakylthio containing 1-7, preferably 1-3 carbon atoms in the alkyl part
- (m) dialkylamino containing 1-7, preferably 1-3 carbon atoms in each of the alkyl parts
- (n) morpholino
- (o) piperidino

R^9 is
- (a) H
- (b) alkyl containing 1-4 carbon atoms;

R^{10} is
- (a) alkyl containing 1-6 carbon atoms
- (b) alkoxy containing 1-6 carbon atoms.

5,021,434
N-SUBSTITUTED IMIDAZOLES, AS WELL AS THEIR USE IN PHARMACEUTICAL AGENTS

Peter Strehlke; Rolf Bohlmann, and David Henderson, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

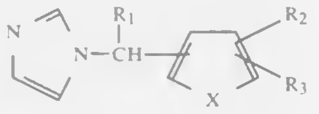
Filed Mar. 31, 1989, Ser. No. 331,320

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3811574

Int. Cl.^{5} C07D *401/06, 409/06;* A61K *31/415*

U.S. Cl. 514—341 **17 Claims**

1. An imidazole of the formula



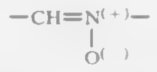
wherein

R_1 is C_{1-10}-alkyl, C_{2-10}-alkenyl, C_{3-9}-cycloalkyl, C_{3-9}-cycloalkenyl, C_{4-12}-cycloalkylalkyl or C_{7-10}-arylalkyl;

R_2 is hydrogen; halogen; a cyano group, a methyl group; methyl substituted with halogen, cyano, hydroxy, C_{1-4}-alkoxy, mono- or di-C_{1-16}-alkylamine, or pyrrolidonyl; a carboxyl group or a C_{1-6}-alkyl ester, amide, C_{1-16}-alkyl amide, anilide or $N(CH_2)_{4-5}$ derivative thereof; an alkanoyl group with 2 to 10 carbon atoms; an alkanoyl having 2 to 10 carbon atoms substituted with halogen, methoxy, ethoxy, amino, hydroxyl, cyano or a combination thereof; a benzoyl group, or a benzoyl group substituted with halogen, C_{1-4}-alkyl, methoxy, ethoxy, amino, hydroxy, cyano or a combination thereof;

R_3 is a hydrogen atom, a benzyloxy group, or benzyloxy substituted with halogen, hydroxyl, ether, amino, cyano or combinations thereof;

X means -CH=N;



$$-CH{=}\underset{\displaystyle O^{(-)}}{\underset{|}{N^{(+)}}}-$$

or S or a pharmaceutically acceptable salt thereof.

9. A method of inhibiting ovulation comprising administering to a female otherwise capable of ovulation an effective amount of a compound of claim 1.

5,021,435
CERTAIN PYRIDYL-THIAZOLIDIN-4-ONE HAVING ANTI-ULCER ACTIVITY

Naruhito Masai, Sakai; Masao Enomoto, Osaka; Atsuyuki Kojima, Takarazuka; Hiroaki Masumori; Nobuyuki Hara, both of Ibaraki; Youichi Hara, Suita, and Shigeaki Morooka, Kawanishi, all of Japan, assignors to Sumitomo Pharmaceuticals Company, Limited, Osaka, Japan

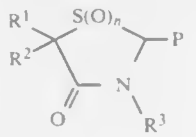
Filed Jan. 17, 1989, Ser. No. 297,313

Claims priority, application Japan, Jan. 22, 1988, 63-12380

Int. Cl.^{5} C07D *417/04;* A61K *31/44*

U.S. Cl. 514—342 **6 Claims**

1 A method for treatment of a patient suffereing from a stress induced ulcer or an ulcer caused by gastric acid which comprises administering to said patient an antiulcerogenically effecitve amount of the compound represented by the following formula or a pharmaceutically acceptable salt thereof:



wherein

R^1 is hydrogen or C_1-C_6 alkyl; R^2 is an unsubstituted or substituted member of the group consisting of aryl and aralkyl, in which the member, if substituted, is substituted by halogen, C_1-C_6 alkyl, C_1-C_6 alkoxy or halogenated C_1-C_6 alkyl; R^3 is hydrogen, C_1-C_6 alkyl or C_1-C_6 alkyl substituted by halogen, amino, C_1-C_6 alkyl amino or di C_1-C_6 alkyl amino, C_2-C_{20} alkenyl or C_2-C_{20} alkylnyl;

P is an unsubstituted or substituted member of the group consisting of 3-pyridyl and 4-pyridyl in which the member, if substituted, is substituted by halogen or C_1-C_6 alkyl; and

n is 0 or 1.

5,021,436
2-THIOMETHYL-SUBSTITUTED-1,4-DIHYDROPYRIDINES, AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME AND ANTIHYPERTENSIVE PROPERTIES

Carmelo A. Gandolfi; Marco Frigerio; Silvano Spinelli; Odoardo Tofanetti, and Sengio Tognella, all of Milan, Italy, assignors to Boehringer Mannheim Italia, S.p.A., Milan, Italy

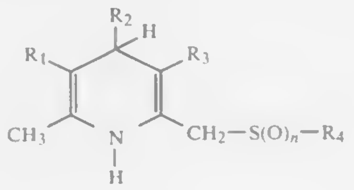
Division of Ser. No. 889,379, Jul. 25, 1986. This application Sep. 28, 1989, Ser. No. 413,896

Claims priority, application Italy, Aug. 6, 1985, 21876 A/85; Jun. 27, 1986, 20965 A/86; Jun. 27, 1986, 20966 A/86

Int. Cl.^{5} A61K *31/455;* C07D *211/86*

U.S. Cl. 514—356 **8 Claims**

1. A compound of formula I



wherein:

R_1 is a group of formula CO_2R_5:

R_2 is a phenyl ring unsubstituted or substituted with a member selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 alkoxy, halo-C_1-C_4 alkoxy, halo-C_1-C_6 alkyl, halogen, nitro, cyano, C_1-C_6 alkoxycarbonyl, C_1-C_6 alkylthio, C_1-C_6 alkylsulphinyl; or R_2 is pentafluorophenyl;

R_3 is a group of formula CO_2R_5;

R_4 is

a C_2-C_{12} alkyl group unsubstituted of substituted by two dissimilar substituents selected from the group consisting of:

hydroxy;
thio;
cyano;
halogen;
amino;
monobenzylamino;
benzyl(C_1-C_2)alkylamino;
C_1-C_4 alkoxy;
C_1-C_4 alkylthio;
C_1-C_4 acyloxy;
C_1-C_4 acylthio;
CO_2H;
C_1-C_4 alkoxycarbonyl;
$CONR_6R_7$;
a C_3-C_7 cycloalkyl;

n is 0, 1 or 2;

R_5 is hydrogen, a cation of ammonium or of an alkaline metal; a C_1-C_6 alkyl chain unsubstituted or substituted by hydroxy, amino, mono(C_1-C_3)alkylamino, benzylamino, di(C_1-C_2)alkylamino, benzyl(C_1-C_2)alkylamino, C_1-C_6 alkoxy; or C_3-C_6 alkenyl;

each of R_6 and R_7, which are the same or different, may be hydrogen, C_1-C_6 alkyl, benzyl or phenyl;

or a pharmaceutically acceptable salt thereof.

6. A method of producing an antihypertensive condition in a patient in need of such condition, said method comprising administering to said patient an antihypertensive effective amount of a compound of claim 1.

5,021,437
2-ACETYLPYRIDINE 5-[(2-CHLOROANILINO)THIOCARBONYL]THIOCARBONOHYDRAZONE COMPOUND AND SALTS THEREOF

Todd A. Blumenkopf, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Jun. 26, 1989, Ser. No. 371,877

Claims priority, application United Kingdom, Jun. 27, 1988, 8815241

Int. Cl.^{5} A61K *31/44;* C07D *213/02*

U.S. Cl. 514—357 **6 Claims**

6. A topical pharmaceutical composition comprising an effective amount of a pharmaccutically acceptable salt of the compound 2-acetylpyridien 5-[(2-chloroanilino)thiocarbonyl]-thiocarbonohydrazone and a pharmaceutically acceptable topical carrier therefor.

5,021,438
1,3,4,5-TETRAHYDROBENZ(C,D)INDOLES

Bodo Junge, Wuppertal; Bernd Richter, Bergisch-Gladbach; Thomas Glaser, Roesrath, and Jörg Traber, Lohmar, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

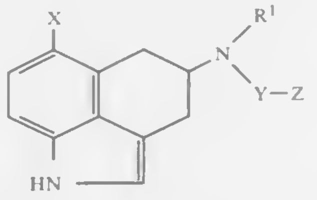
Filed Mar. 15, 1989, Ser. No. 324,518

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1988, 3809155

Int. Cl.^{5} A61K *31/425;* C07D *513/00*

U.S. Cl. 514—373 **14 Claims**

1. A 1,3,4,5-tetrahydrobenz[c,d]indole of the formula



in which

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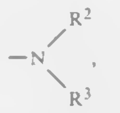
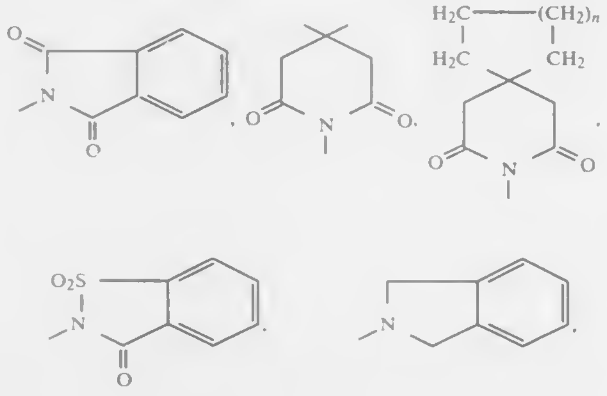
R^1 stands for H, C$_1$-C$_4$-alkyl or benzyl,
X stands for H, OCH$_3$, OH, SCH$_3$, F, Cl, Br, CN or CONH$_2$,
Y stands for a straight-chain or branched, saturated or unsaturated alkylene chain having up to 6 carbon atoms
and
Z stands for cyano or for a group of the formula



—SO$_2$NR^{7}R^8 or —CONR^{7}R^8
wherein
R^7 and R^8 are identical or different, and stand for hydrogen, lower alkyl, phenyl, benzyl or phenethyl,
R^2 and R^3 are identical or different and stand for hydrogen, lower alkyl, phenyl or benzyl where the phenyl radicals can be substituted by fluorine, chlorine, bromine, lower alkyl, lower alkoxy or trifluoromethyl, or stand for a group of the formula —COR^9 or —SO$_2$R^{10},
wherein
R^9 denotes hydrogen or a group NHR^{11}, or denotes lower alkyl or lower alkoxy, or denotes phenyl, benzyl, benzyloxy, thienyl, furyl, pyridyl, pyrimidyl, quinolyl, isoquinolyl, benzothiazolyl, benzoxazolyl, thiazolyl, oxazolyl, isoxazolyl or isothiazolyl each of which is optionally substituted by lower alkyl, lower alkoxy, fluorine, chlorine, bromine, trifluoromethyl, dimethylamino or diethylamino,
R^{10} denotes lower alkyl which is optionally substituted by cyano, fluorine, chlorine, bromine, trifluoromethyl or lower alkoxycarbonyl, or denotes phenyl, naphthyl, benzyl, thienyl, furyl, pyrimidyl, pyridyl, quinolyl, isoquinolyl, benzothiazolyl, benzoxazolyl, thiazolyl, oxazolyl, isoxazolyl or isothiazolyl each of which is optionally substituted by lower alkyl, lower alkoxy, fluorine, chlorine, bromine, trifluoromethyl, dimethylamino or diethylamino, or denotes a group NR^{7}R^8,
where
R^7 and R^8 have the abovementioned meaning,
and
R^{11} denotes lower alkyl which is optionally substituted by cyano, fluorine, chlorine or bromine, or denotes phenyl, benzyl, thienyl, furyl, pyridyl, pyrimidyl, quinolyl, isoquinolyl, benzothiazolyl, benzoxazolyl, thiazolyl, oxazolyl, isoxazolyl or isothiazolyl each of which is optionally substituted by lower alkyl, lower alkoxy, fluorine, chlorine, bromine, trifluoromethyl, dimethylamino or diethylamino,
or
R^2 and R^3, together with the nitrogen atom, form a heterocyclic ring from the group consisting of



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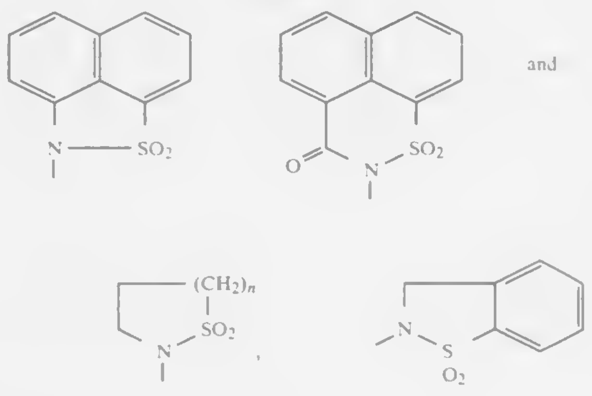
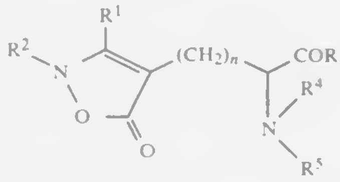


wherein
n denotes a number 1 or 2,
or a salt thereof.

5,021,439
CEREBRAL FUNCTION AMELIORATING AGENTS RELATED TO TAN-950 A

Setsuo Harada; Akinobu Nagaoka, both of Kawanishi; Katsumi Itoh, and Shinji Terao, both of Toyonaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan
Filed Sep. 18, 1989, Ser. No. 408,389
Claims priority, application Japan, Oct. 31, 1988, 63-276919; Apr. 14, 1989, 1-095595; Aug. 29, 1989, 1-222241; Sep. 11, 1989, 1-235123
Int. Cl.^{5} A61K *31/42, 31/445, 31/495;* **C07D** *261/12*
U.S. Cl. 514—380 **15 Claims**

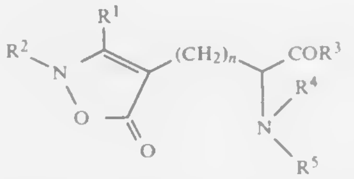
1. A compound of the formula (I')


(I')

or a pharmaceutically acceptable salt thereof wherein R^1 is a hydrogen atom, or a C$_{1-6}$ alkyl, C$_{2-6}$ alkenyl, C$_{2-6}$ alkynyl, C$_{3-7}$ cycloalkyl, phenyl, 1-naphthyl, 2-naphthyl, biphenyl, anthryl, indenyl, phenyl-C$_{1-4}$ alkyl; pyridyl, pyrrolyl, furyl, pyranyl or thienyl;
R^2 is a hydrogen atom, or an N-protecting group;
—COR^3 is an optionally esterified or amidated carboxyl group;
R^4 and R^5 are the same or different and respectively a hydrogen atom, an acyl group A selected from benzoyl, nitrobenzoyl, C$_{1-4}$ alkylbenzoyl, benzenesulfonyl, C$_{1-4}$ alkylbenzenesulfonyl, C$_{1-4}$ alkanoyl which can be substituted with 1-3 chlorine atoms, C$_{1-4}$ alkylsulfonyl, phenyl-C$_{1-4}$ alkoxycarbonyl and C$_{1-4}$ alkoxycarbonyl, or
an amino acid residue of the group consisting of phenylalanyl, α-alanyl, β-alanyl, glycyl, histidyl, isoleucyl, leucyl, lysyl, methionyl, norleucyl, norvalyl, ornityl, prolyl, sarcosyl, seryl, tyrosyl, valyl, triptophyl, α-aspartyl, β-aspartyl, asparaginyl, α-glutamyl, τ-glutamyl, glutaminyl, β-aminoalanyl, 4-thialysyl, 3-(2-aminoethyl) sulfinylalanyl and 4-oxalysyl wherein the carboxyl group may be esterified and the amino group acylated by an acyl group A as defined above; or
a C$_{1-6}$ alkyl, C$_{2-6}$ alkenyl, C$_{2-6}$ alkynyl, C$_{3-7}$ cycloalkyl, or a phenyl-C$_{1-4}$ alkyl each of which may be substituted by phenyl, 1-naphtyl, 2-naphthyl, biphenyl, anthryl or indenyl; and
n' is an integer of 0 to 3; or

R^4 and R^5 together with the adjacent nitrogen atom may form a phthalimido, succinimido, maleinimido, benzylidenamino or p-nitrobenzylidenamino group
provided that when R^1, R^2, R^4 and R^5 are hydrogen atoms, —COR^3 is carboxyl group and the steric configuration of the asymmetric carbon atom to which the α-amino group is bonded is S, n' is 0, 2 or 3.

15. A method of treating senile dementia and memory dysfunction which comprises administration to a mammal in need thereof of an effective amount of a compound having the formula:

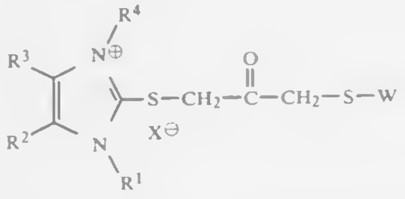

(1)

or a pharmaceutically acceptable salt thereof, wherein R^1 is a hydrogen atom, a C$_{1-6}$ alkyl, C$_{2-6}$ alkenyl, C$_{2-6}$ alkynyl, C$_{3-7}$ cycloalkyl, phenyl, 1-naphthyl, 2-naphthyl, biphenyl, anthryl, indenyl, phenyl-C$_{1-4}$ alkyl; pyridyl, pyrrolyl, furyl, pyranyl and thienyl; R^2 is a hydrogen atom, or an N-protecting group —COR^3 is an optionally esterified or amidated carboxyl group; R^4 and R^5 are the same or different and respectively a hydrogen atom, an acyl group selected from benzoyl, nitrobenzoyl, C$_{1-3}$ alkylbenzoyl, benzenesulfonyl, C$_{1-4}$ alkylbenzenesulfonyl, C$_{1-4}$ alkanoyl which can be substituted with 1-3 chlorine atoms, C$_{1-4}$ alkylsulfonyl, phenyl-C$_{1-4}$ alkoxycarbonyl and C$_{1-4}$ alkoxycarbonyl, or an amino acid residue of the group consisting of phenylalanyl, α-alanyl, β-alanyl, glycyl, histidyl, isoleucyl, leucyl, lysyl, methionyl, norleucyl, norvalyl, ornityl, prolyl, sarcosyl, seryl, tyrosyl, valyl, triptophyl, α-aspartyl, β-aspartyl, asparaginyl, α-glutamyl, τ-glutamyl, glutaminyl, β-aminoalanyl, 4-thialysyl, 3-(2-aminoethyl)sulfinylalanyl and 4-oxalysyl wherein the carboxyl group may be esterified and the amino group acylated by an acyl group A as defined above;
or a C$_{1-6}$ alkyl, C$_{2-6}$ alkenyl, C$_{2-6}$ alkynyl, C$_{3-7}$ cycloalkyl, or a phenyl-C$_{1-4}$ alkyl each of which may be substituted by phenyl, 1-naphthyl, 2-naphthyl, biphenyl, anthryl or indenyl; and n is an integer of 0 to 3; or R^4 and R^5 together with the adjacent nitrogen atom may form a phthalimido, succinimido, maleinimido, benzylidenamino or p-nitrobenzylidenamino group.

5,021,440
IMIDAZOLE COMPOUNDS AND THEIR USE AS TRANSGLUTAMINASE INHIBITORS

David C. Remy, North Wales; John J. Baldwin, Gwyneed Valley; David A. Claremon, Audubon, and Stella W. King, Lansdale, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.
Filed Jul. 31, 1989, Ser. No. 386,646
Int. Cl.^{5} A61K *31/415;* **C07D** *403/12*
U.S. Cl. 514—381 **12 Claims**

1. an imidazolium salt represented by the formula


(A)

or

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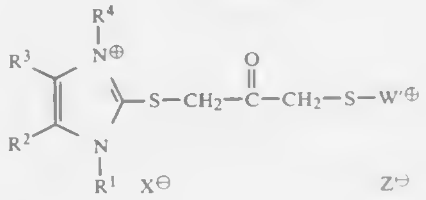
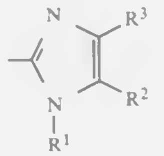
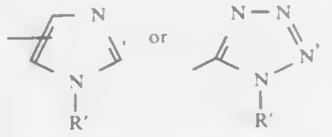

(B)

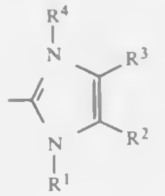
wherein
R^1 is lower alkyl or ArC$_n$H$_{2n}$— wherein Ar is phenyl, (lower alkyl)phenyl, or halophenyl and n is 1 to 3
R^2 is hydrogen, lower alkyl, phenyl or substituted phenyl containing from 1 to 3 substituents selected from lower alkyl, lower alkoxy, halo and hydroxy;
R^3 is hdyrogen, lower alkyl, halo, phenyl or substituted phenyl containing from 1 to 3 substituents selected from lower alkyl, lower alkoxy, halo and hydroxy;
R^2 and R^3 taken together is alkylene of from 3 to 10 carbon atoms;
R^4 is lower alkyl or aralkyl;
W is



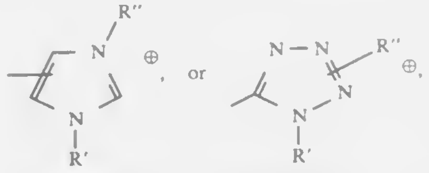
where R^1, R^2, and R^3 are as previously defined, or


R'-imidazolyl R'-tetrazolyl

wherein R' is lower alkyl or ArC$_n$H$_{2n}$— wherein Ar is phenyl, (lower alkyl)phenyl, (lower alkoxy)phenyl or halophenyl and n is 1–3;
W' is



where R^1, R^2, and R^3 are as previously defined, or


R'R"-imidazolyl R'R"-tetrazolyl

wherein R' and R" independently are lower alkyl or ArC$_n$H$_{2n}$ wherein Ar is phenyl, (lower alkyl)phenyl, (lower alkoxy)phenyl) or halophenyl and n is 1–3;
X is an anion of a pharmaceutically acceptable salt;
Z is an anion of a pharmaceutically acceptable salt.

VOL
1127
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5,021,441
ORGANIC COMPOUNDS AND THEIR PHARMACEUTICAL USE

Stephen R. Baker, Indianapolis, Ind., and Alec Todd, Workingham, England, assignors to Lilly Industries Limited, Basingstoke, England

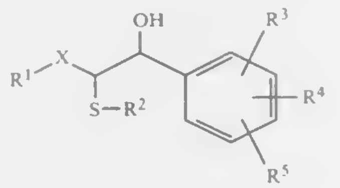
Filed Mar. 22, 1989, Ser. No. 326,939

Claims priority, application United Kingdom, Mar. 24, 1988, 8807016

Int. Cl.⁵ A61K *31/41, 31/19;* **C07D** *257/04;* **C07C** *63/14*

U.S. Cl. 514—381 **8 Claims**

1 A compound of the formula



in which
- R^1 is halo-substituted C_1–C_{10} alkyl;
- X is C_5–C_{30} alkenylene;
- R^2 is $C_{1\text{-}5}$ alkyl substituted by —COOH or 5-tetrazolyl;
- R^4 and R^5 are each hydrogen
- and R^3 is —COOH or 5-tetrazolyl; and pharmaceutically acceptable salts thereof.

8. A method of treating an animal, including a human, suffering from or susceptible to an allergic or cardiovascular disorder, which comprises administering an effective amount of an unprotected compound of formula (I) as defined in claim 1, or a pharmaceutically-acceptahle salt thereof.

5,021,442
FUNGICIDE AZOLYL-DERIVATIVES

Roberto Colle, Basiglio; Giovanni Camaggi, Novara; Giuseppina Ratti, Seregno; Carlo Garavaglia, Cuggiono, and Luigi Mirenna, Milan, all of Italy, assignors to Presidenza del Consiglio Dei Ministri, Rome, Italy

Filed Nov. 4, 1988, Ser. No. 267,317

Claims priority, application Italy, Nov. 9, 1987, 22560 A/87

Int. Cl.⁵ A01N *43/653;* **C07D** *249/08*

U.S. Cl. 514—383 3 Claims

1. 1-(1,2,4-triazolyl)-2-hydroxy-2-(2,4-dichlorophenyl)-3-methyl-4-(1,1,2,2-tetrafluoroethoxy)butane.

2. Fungicide composition having as active ingredient an effective amount of 1-(1,2,4-triazolyl)-2-hydroxy-2-(2,4-dichlorophenyl)-3-methyl-4-(1,1,2,2,-tetrafluoroethoxy) butane, together with an inert solid or liquid carrier.

5,021,443
NOVAL BENZIMIDAZOLE AND AZABENZIMIAZOLE DERIVATIVES WHICH ARE THROMBOXANE RECEPTOR ANTAGONISTS. THEIR METHODS OF PREPARATION AND PHARMACEUTICAL COMPOSITIONS IN WHICH THEY ARE PRESENT

Nicole Bru-Magniez, Paris; Eric Nicolai, Caen, and Jean-Marie Teulon, La Celle St Cloud, all of France, assignors to Laboratoires UPSA, France

Filed Mar. 15, 1990, Ser. No. 493,880

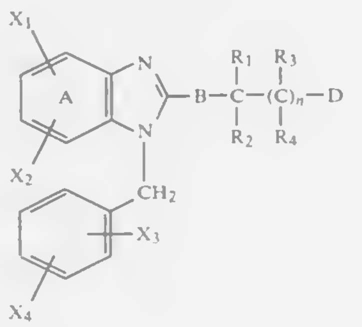
Claims priority, application France, Feb. 16, 1990, 90 01925

Int. Cl.⁵ A61K *31/415*

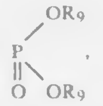
U.S. Cl. 514—394 13 Claims

1. A benzimidazole derivative of formula (I):

(I)



in which:
- A is an aromatic ring;
- X_1, X_2, X_3 and X_4 are independently a hydrogen atom, a halogen atom, a lower alkyl radical, an alkoxy radical, an alkylthio radical, a sulfone group, a sulfoxide group, a trifluoromethyl group, a hydroxyl group, a nitro group, a methylene alcohol radical or a group COOR′, in which R′ is a hydrogen or a lower alkyl; X_3 and X_4 can also form a naphthalene with the phenyl;
- B is CR_5R_6, R_5 and R_6 being a hydrogen atom or a lower alkyl radical, or the sulfur atom;
- R_1, R_2, R_3 and R_4 are independently a hydrogen atom or a lower alkyl radical; CR_1R_2 or CR_3R_4 can form with B, when the latter is CR_5R_6, a cycloalkyl or a cycloalkylene having 3 to 7 carbon atoms; R_1R_2 and R_3R_4 can also form a ring having 3 to 6 carbon atoms;
- n is an integer from 1 to 4 and can be 0 if R_1 and R_2 are other than hydrogen; and
- D is a chemical group which is: $COOR_7$, R_7 being the hydrogen atom or a lower alkyl, CONH-R_8, R_8 being the hydrogen atom or a lower alkyl, CN,



R_9 being the hydrogen atom or a lower alkyl, or $NHSO_2CF_3$, or a pharmaceutically acceptable addition salt thereof.

5,021,444
THIANAPHTHENE DERIVATIVES

Atsusuke Trada; Yoshiya Amemiya; Keiichi Matsuda, and Takeshi Oshima, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Division of Ser. No. 7,375, Jan. 27, 1987, Pat. No. 4,847,272.

This application May 19, 1989, Ser. No. 354,984

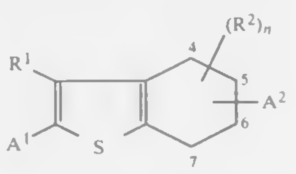
Claims priority, application Japan, Jan. 28, 1986, 61-16501; Sep. 27, 1986, 1-228769

Int. Cl.⁵ A61K *31/415;* **C07D** *409/06*

U.S. Cl. 514—397 **16 Claims**

1. A compound of formula (I):

(I)



in which:
- R^1 and R^2 are independently selected from the group consisting of hydrogen atoms, C_1–C_4 alkyl groups, C_6–C_{10} carbocyclic aryl groups and substituted C_6–C_{10} carbocyclic aryl groups having one to three substituents selected from the group consisting of substituents (a);
- n is 1 or 2;
- A^2 represents a group of formula —Z—Y in which Y represents 1-imidazolyl or 2-, 3- or 4-pyridyl and Z represents a methylene, ethylene, trimethylene or vinylene group or a methylene, ethylene, trimethylene or vinylene group having one or two substituent selected from the group consisting of substituents (b);
- A′ represents a group of formula —W—COOH, where W represents a direct bond, a methylene group, an ethylene group, a vinylene group or a substituted methylene, ethylene or vinylene group having one to three substituents selected from the group consisting of substituents (c);
- A^2 is at the 5- or 6-position on the thianaphthene system;
- each broken line represents a single or double carbon-carbon bond between the 4 and 5 or the 6 and 7 positions, provided that, when A^2 is at the 5-position, there is a single bond between the 6 and 7 positions, and that, when A^2 is at the 6-position, there is a single bond between the 4 and 5 positions;
- substituents (a): C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups, C_2–C_6alkanoyloxy groups, aromatic carboxylic acyloxy groups, C_2–C_5 aliphatic carboxylic acylamino groups, aromatic carboxylic acylamino groups, trifluoromethyl groups, halogen atoms, nitro groups, cyano groups, amino groups, C_1–C_4 alkylamino groups, dialkylamino groups in which each alkyl part is C_1–C_4, carboxy groups and esters and amides of said carboxy groups, the aromatic parts of said aromatic acyloxy and aromatic acylamino groups being C_6–C_{10} carbocyclic aryl groups which are unsubstituted or have at least one substituent selected from the group consisting of C_1–C_4 alkyl groups, C_1–C_4 alkoxy groups and halogen atoms;
- substituents (b): C_1–C_5 alkyl groups, C_3–C_6 cycloalkyl groups, C_6–C_{10} carbocyclic aryl groups, and substituted C_8–C_{10} carbocyclic aryl groups having one to three substituents selected from the group consisting of C_1–C_4 alkyl, C_1–C_4 alkoxy, and halogen; and
- substituent (c): C_1–C_4 alkyl groups, C_6–C_{10} carbocyclic aryl groups and substituted C_6–C_{10} carbocyclic aryl groups having one to three substituents selected from the group consisting of C_1–C_4 alkyl, C_1–C_4 alkoxy and halogen;
- or a pharmaceutically acceptable salt, ester or amide wherein said esters is C_1–C_8 alkyl, benzyl, p-nitrobenzyl, benzhydryl, (C_1–C_4) alkoxycarbonyl-(C_1–C_4) alkyl, (C_1–C_4) alkoxycarbonyloxy-(C_1–C_4) alkyl, phthalidyl, phenacyl, p-nitrophenacyl or (5-methyl-2-oxo-1,3-dioxolen-4-yl) methyl ester; and said amide is a (C_1–C_4) alkyl amide or di-(C_1–C_4) alkyl amide thereof.

5,021,445
COMPOUNDS USEFUL FOR THE TREATMENT OF HYPOGLYCEMIA

John M. Berge, and Michael A. Cawthorne, both of Epsom, England, assignors to Beecham Group P.L.C., Epsom, England

Continuation of Ser. No. 260,004, Oct. 19, 1988, abandoned.

This application Sep. 10, 1990, Ser. No. 581,202

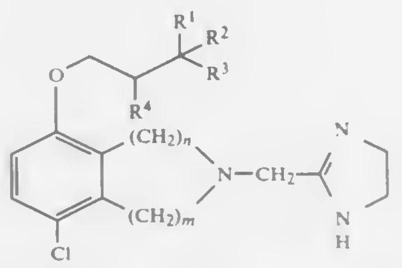
Claims priority, application United Kingdom, Oct. 19, 1987, 8724441; Nov. 9, 1987, 8726197

Int. Cl.⁵ C07D *401/06, 403/06;* **A61K** *31/47, 31/415*

U.S. Cl. 514—402 **9 Claims**

1. A compound of formula (I):

(I)



or a pharmaceutically acceptable salt thereof, wherein:
- $R^{1\ and\ R2}$ may each represent hydrogen or alkyl providing that at least one of $R^{1\ or\ R2}$ represents alkyl;
- R^3 and R^4 together represent a bond;
- n represents an integer 1 or 2;

and
- m represents an integer 1 or 2.

8. A method for the treatment of hyperglycaemia in a human or non-human mammal which comprises administering an effective, non-toxic, amount of a compound of formula (I), as recited in claim 1 or a pharmaceutically acceptable salt thereof, to a hyperglycaemic human or non-human mammal in need thereof.

9. A method for the treatment of hypertension and/or inhibiting blood platelet aggregation in a human or non-human mammal, which method comprises administering an effective non-toxic amount of a compound of formula (I), as recited in claim 1 or a pharmaceutically acceptable salt thereof, to a human or non-human mammal in need thereof.

5,021,446
PYRAZOLE COMPOUNDS, INSECTICIDAL AND ACARICIDAL COMPOSITIONS AND USE

Naoto Meki, Kobe; Kazue Nishida, Tokyo, and Tomotoshi Imahase, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Osaka, Japan

Continuation of Ser. No. 496,176, Mar. 20, 1990, abandoned, which is a continuation of Ser. No. 348,217, May 5, 1989, abandoned. This application Aug. 17, 1990, Ser. No. 569,223

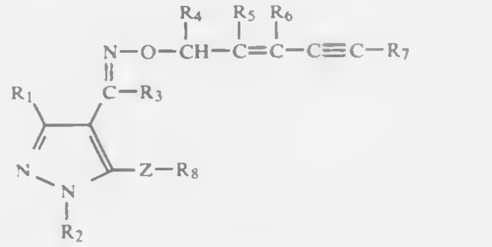
Claims priority, application Japan, May 6, 1988, 63-111046; Jul. 15, 1988, 63-177749; Jan. 20, 1989, 1-12672; Feb. 27, 1989, 1-47344

Int. Cl.⁵ A01N *43/56;* **C07D** *231/18, 231/20*

U.S. Cl. 514—407 **15 Claims**

1. A pyrazole compound represented by the formula,

(I)



where R_1 is hydrogen, C_1–C_4 alkyl or phenyl; R_2 is hydrogen, C_1–C_4 alkyl or chloro-, bromo- or fluoro- (C_1–C_4) alkyl; R_3 is hydrogen, C_1–C_2 alkyl or phenyl; each of R_4, R_5 and R_6, which may be the same or different, is hydrogen or C_1–C_3 alkyl or optionally two of them may be bonded together to form a C_2–C_4 alkylene chain; R_7 is hydrogen, C_1–C_8 alkyl which may be substituted with phenyl, chloro-, bromo- or fluoro- (C_1–C_8) alkyl which may be substituted with phenyl, C_2–C_8 alkenyl, C_2–C_8 alkoxyalkyl, or C_3–C_8 cycloalkyl, C_3–C_8 cycloalkenyl, phenyl or pyridyl which may be substituted with C_1–C_3 alkyl, C_1–C_3 alkoxy, chlorine, bromine or fluorine; R_8 is C_1–C_8 alkyl, chloro-, bromo- or fluoro- (C_1–C_8) alkyl, C_2–C_8 alkenyl, chloro-, bromo- or fluoro-(C_2–C_8) alke-

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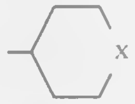
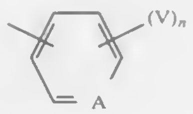
nyl, C_2-C_8 alkynyl, C_2-C_{10} alkoxyalkyl, C_2-C_{10} alkylthioalkyl or mono-(C_2-C_{10}) or, C_3-C_8 cycloalkyl which may be substituted with C_1-C_3 alkyl, C_1-C_3 alkoxy, chlorine, bromine or fluorine, a group represented by



(in which X is oxygen or sulfur), or a group represented by



(A)

(in which each of V's, which may be same or different, is hydrogen, chlorine, bromine, fluorine, C_1-C_3 alkyl, chloro-, bromo-, or fluoro-(C_1-C_2) alkyl, C_1-C_2 alkoxy, chloro-, bromo- or fluoro-(C_1-C_2)alkoxy, or methylenedioxy, A is nitrogen or methine, and n is an integer of from 1 to 5; and Z is oxygen or sulfur.

15. A method for controlling or exterminating insects and/or acarids which comprises applying as an active ingredient an insecticidally and/or acaricidally effective amount of a pyrazole compound according to claim **1** to the locus where insects and/or acarids propagate.

5,021,447
TETRAHYDROCARBAZOLE 1-ALKANOIC ACIDS AND PHARMAECUTICAL COMPOSITIONS

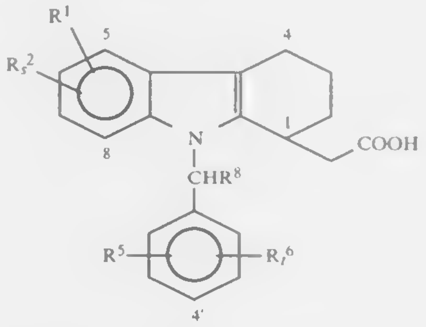
Yvan Guindon; Christiane Yoakim, both of Montreal; John W. Gillard, Baie d'Urfe, and Yves Girard, Ile Bizard, all of Canada, assignors to Merck Frosst Canada, Inc., Kirkland, Canada

Division of Ser. No. 76,424, Jul. 21, 1987, Pat. No. 4,808,608, which is a continuation-in-part of Ser. No. 1,739, Jan. 9, 1987, abandoned, which is a continuation-in-part of Ser. No. 821,726, Jan. 23, 1986, abandoned. This application Nov. 7, 1988, Ser. No. 268,824

Int. Cl.⁵ A61K *31/40;* **C07D** *209/82, 209/86*

U.S. Cl. 514—411 **9 Claims**

1. A compound of the formula:



wherein:

R^1 is H, C_1-C_6 alkyl, OR^{13}, F, Cl, or Br;
R^2 is H, Cl, F, or Br;
R^5 is H, Cl, or OR^{13};
R^6 is H or Cl;
R^8 is H or C_1-C_6 alkyl;
R^{13} is C_1-C_6 alkyl;
s is 0 when R^1 is C_1-C_6 alkyl or OR^{13};
s is 1 when R^1 is H, F, Cl, or Br;
t is 0 when R^5 is OR^{13};
t is 1 when R^5 is H or Cl;

or a pharmaceutically acceptable salt thereof.

5,021,448
METHOD OF REDUCING SERUM URIC ACID AND/OR INCREASING RENAL URIC ACID CLEARANCE WITH THROMBOXANE SYNTHETASE INHIBITOR INHIBITOR AND/OR THROMBOXANE RECEPTOR ANTAGONIST

Anthony J. Piraino, Media, and Steven D. Saris, Ardmore, both of Pa., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 22, 1990, Ser. No. 483,160

Int. Cl.⁵ A61K *31/415, 31/40, 31/34, 31/335, 31/265, 31/18, 31/135, 31/095, 31/10, 31/075, 31/045, 31/05, 31/44*

U.S. Cl. 514—415 **10 Claims**

1. A method of treating or preventing hyperuricemia in a mammal in need thereof comprising administering to said mammal a hyperuricemia reducing or preventing effective amount of

a) a thromboxane synthetase inhibitor;
b) a thromboxane receptor antagonist; or both a) and b).

5,021,449
ORGANIC COMPOUNDS AND THEIR USE AS PHARMACEUTICALS

Maria I. Fernandez Fernandez, Madrid, Spain; Terrence M. Hotten, Farnborough, and David E. Tupper, Reading, both of England, assignors to Lilly S.A., Alcobendas, Spain and Lilly Industries Limited, Basingstoke, England

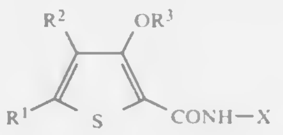
Filed Sep. 26, 1989, Ser. No. 412,685

Claims priority, application United Kingdom, Sep. 30, 1988, 8823040

Int. Cl.⁵ C07D *403/12, 409/12;* **A61K** *31/38, 31/40*

U.S. Cl. 514—422 **5 Claims**

1. A compound of the invention of the formula



in which R^1 is —CHO, $—CH_2OH$, $—CH_2OC_{1\text{-}4}$ alkyl, $—COC_{1\text{-}3}$ alkyl, $—CH(OH)C_{1\text{-}3}$ alkyl or —COOH, R^2 is $C_{1\text{-}4}$ alkyl, —CHO, $—CH_2OH$, $—CH_2OC_{1\text{-}4}$ alkyl, $—COC_{1\text{-}3}$ alkyl, $—CH(OH)C_{1\text{-}3}$ alkyl, or —COOH, R^3 is $C_{1\text{-}4}$ alkyl and X is pyrrolidinyl or pyrrolidinylmethyl; or a salt or an ester of a carboxylic acid thereof.

5. A method of treating an animal, or a human, suffering from emesis, depression, anxiety, schizophrenia, or acute mania, which comprises administering an effect amount of a compound according to claim **1** or a pharmaceutically-acceptable salt or ester thereof.

5,021,450
NEW CLASS OF COMPOUNDS HAVING A VARIABLE SPECTRUM OF ACTIVITIES FOR CAPSAICIN-LIKE RESPONSES, COMPOSITIONS AND USES THEREOF

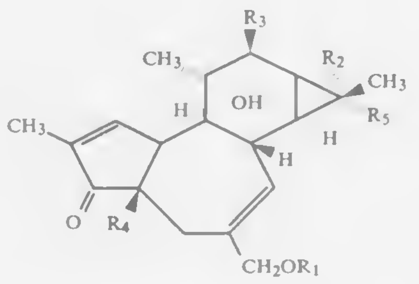
Peter M. Blumberg, Frederick, Md., assignor to The United States of America as represented by the Secretary of the Department of Health and Human Services, Washington, D.C.

Filed May 30, 1989, Ser. No. 358,073

Int. Cl.⁵ A61K *31/35, 31/12;* **C07D** *311/78;* **C07C** *69/76*

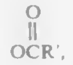
U.S. Cl. 514—453 **18 Claims**

1. A compound selected from the group consisting of formulas (I)–(IV):



(I)

wherein in formula (I), R_2 is


$O\overset{O}{\overset{\|}{C}}R'$,

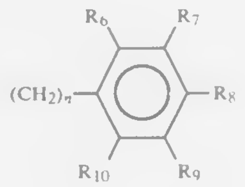
R_3 is H or

$O\overset{O}{\overset{\|}{C}}R''$,

R_4 is H or OH, R_5 is CH_3 or

$O\overset{O}{\overset{\|}{C}}R'''$,

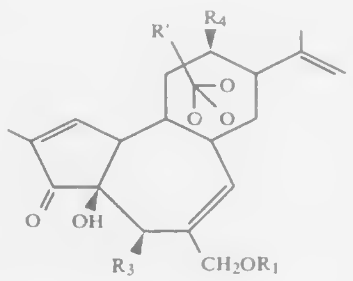
and wherein at least one of R', R'' and R''' is an aromatic group and the remainder are $(CH_2)_{n'}—CH_3$ wherein n' is 0-14; said aromatic group having the formula:



wherein R_6-R_{10} each independently represents OH,

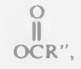
$O\overset{O}{\overset{\|}{C}}H_3$

or H; and n is 0–10;



(II)

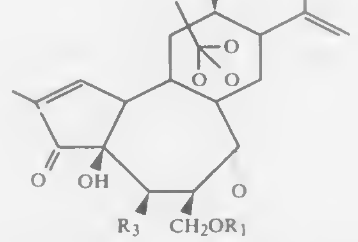
wherein in formula (II), R_3 is H, OH or


$O\overset{O}{\overset{\|}{C}}R''$,

R_4 is H or

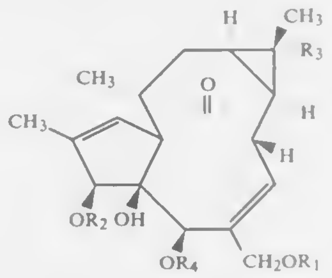
$O\overset{O}{\overset{\|}{C}}R'''$,

and R', R'' and R''' are as defined above;



(III)

wherein in formula (III), R_3, R_4, R', R'' and R''' are the same as defined in formula (II); and

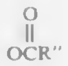


(IV)

wherein in formula (IV), R_2 is

$O\overset{O}{\overset{\|}{C}}R$,

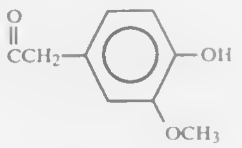
R_3 is CH_3 or


$O\overset{O}{\overset{\|}{C}}R''$

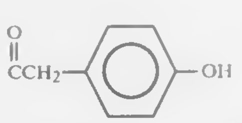
and R_4 is H or

$O\overset{O}{\overset{\|}{C}}R'''$,

and R', R'' and R''' are as defined above; wherein R_1 in formulas (I)-(IV) represents



or



with the proviso that in formula (II), R' is not

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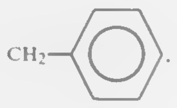
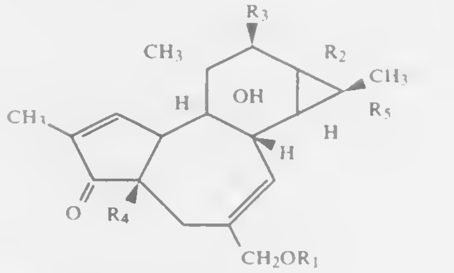


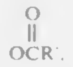
R₃ and R₄ are not H at the same time.

5. A method for desensitizing a subject animal, which comprises administering to said subject animal a therapeutically effective desensitizing amount of a compound selected from the group consisting of formulas (I)-(IV).



(I)

wherein in formula (I), R₂ is



$\overset{\mathrm{O}}{\overset{\|}{\mathrm{OCR'}}}$,

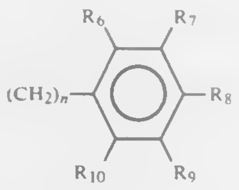
R₃ is H or

$\overset{\mathrm{O}}{\overset{\|}{\mathrm{OCR''}}}$,

R₄ is H or OH, R₅ is CH₃ or

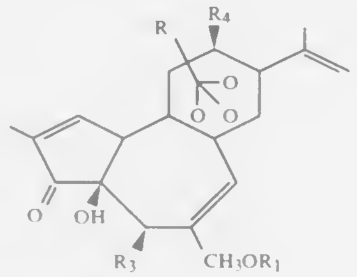
$\overset{\mathrm{O}}{\overset{\|}{\mathrm{OCR'''}}}$,

and wherein at least one of R', R'' and R''' is an aromatic group and the remainder are $(CH_2)_{n'}-CH_3$ wherein n' is 0-14, said aromatic group having the formula:



wherein R_6-R_{10} each independently represents OH, OCH_3 or H; and n is 0-10;

wherein R₁ is homovanillic acid or an analog thereof possessing a pattern of substitution which would confer capsaicin-like activity were it in a capsaicin-like structure;



(II)

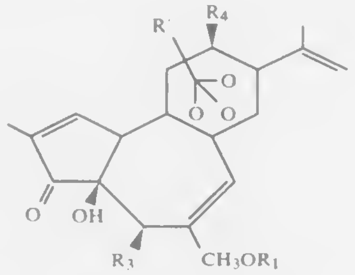
wherein in formula (II), R₃ is H, OH or

$\overset{\mathrm{O}}{\overset{\|}{\mathrm{OCR'}}}$,

R₄ is H or

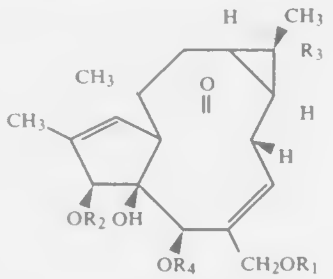
$\overset{\mathrm{O}}{\overset{\|}{\mathrm{OCR'''}}}$,

and R₁, R', R'' and R''' are as defined above;



(III)

wherein in formula (III), R₁, R₃, R₄, R', R'' and R''' are the same as defined in formula (II); and



(IV)

wherein in formula (IV), R₂ is

$\overset{\mathrm{O}}{\overset{\|}{\mathrm{CR'}}}$,

R₃ is CH₃ or

$\overset{\mathrm{O}}{\overset{\|}{\mathrm{OCR''}}}$

and R₄ is H or

$\overset{\mathrm{O}}{\overset{\|}{\mathrm{OCR'''}}}$,

and R₁, R', R'' and R''' are as defined above, for desensitizing the subject to neurogenic inflammation, to chemically and thermally induced pain, to responses involving sensory afferent pathways sensitive to capsaicin and to responses involving the hypothalamic temperature control region, with the proviso that said compound is not resiniferatoxin.

5,021,451
METHOD FOR INHIBITING HYPERPROLIFERATIVE DISEASES

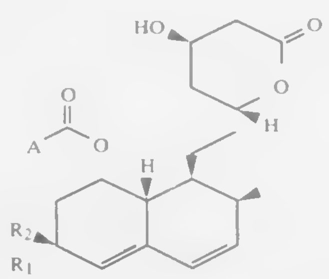
John A. McLane, West Haven, Conn., and Milan R. Uskokovic, Upper Montclair, N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.

Filed Nov. 14, 1988, Ser. No. 270,983

Int. Cl.⁵ B61K *31/35*

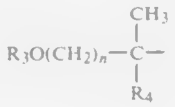
U.S. Cl. 514—460 **19 Claims**

1. A method for treating a hyperproliferative skin disease in a patient in need of treatment of such skin disease comprising: administering an antihyperproliferatively effective amount of a compound of formula



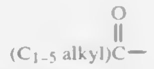
I

wherein R₁ is hydrogen or methyl and R₂ is hydroxy or hydrogen, with the proviso that when R₁ is hydrogen, R₂ is hydroxy and when R₁ is methyl, R₂ is hydrogen; and A is alkyl; cycloalkyl; alkenyl; alkyl substituted with trifluoromethyl; phenyl; halophenyl; phenyl-C_{1-3} alkyl; phenyl-C_{1-3} alkyl substituted on the phenyl with 1 to 3 substituents selected from the group consisting of halo, C_{1-3} alkyl, or C_{1-3} alkoxy; or A is



$$R_3O(CH_2)_n-\underset{\underset{R_4}{|}}{\overset{\overset{CH_3}{|}}{C}}-$$

wherein R₃ is hydrogen or



$$(C_{1-5}\ \mathrm{alkyl})\overset{\mathrm{O}}{\overset{\|}{\mathrm{C}}}-$$

R₄ is hydrogen or methyl, and n is 1 to 5.

5,021,452
PROCESS FOR ENHANCING WOUND HEALING

Robert F. Labbé, and Rebecca L. Rettmer, both of Seattle, Wash., assignors to The Board of Regents of the University of Washington, Seattle, Wash.

Continuation of Ser. No. 295,113, Jan. 9, 1989, abandoned. This application Mar. 28, 1990, Ser. No. 501,434

Int. Cl.⁵ A01N *43/08;* A61K *31/375*

U.S. Cl. 514—474 **13 Claims**

1. A process for enhancing cellular uptake of ascorbate, ascorbic acid or dehydroascorbic acid at a wound site of a mammal, comprising administering to the wound site ascorbate, ascorbic acid or dehydroascorbic acid at an extracellular concentration measured at the wound site of at least 20μmol/L and also irradiating the wound site with a low-power laser at a wave length of from about 600 nm to about 1100 nm.

5,021,453
3-KETO HMG-COA REDUCTASE INHIBITORS

Henry Joshua, Staten Island, N.Y.; Kenneth E. Wilson, Westfield, N.J.; Michael S. Schwartz, Glenside, Pa.; Ta J. Lee, Lansdale, Pa., and Gerald E. Stokker, Gwynedd Valley, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

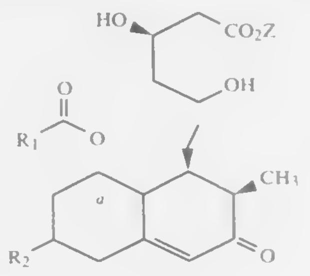
Filed Jun. 6, 1990, Ser. No. 533,745

Division of Ser. No. 363,792, Jun. 9, 1989 U.S. Pat. 4,968,693, which is a continuation-in-part of 162,785, March 22, 1988 abandoned.

Int. Cl.⁵ A61K *31/215;* C07C *69/22*

U.S. Cl. 514—510 **10 Claims**

1. A compound represented by the following structural formulae (I) or (II):



(II)

wherein:

R₁ is selected from:
- (1) C_{1-10} alkyl;
- (2) substituted C_{1-10} alkyl in which one or more substituent(s) is selected from
  - (a) halogen,
  - (b) hydroxy,
  - (c) C_{1-10} alkoxy,
  - (d) C_{1-5} alkoxycarbonyl,
  - (e) C_{1-5} acyloxy,
  - (f) C_{3-8} cycloalkyl,
  - (g) phenyl,
  - (h) substituted phenyl in which the substituents are X and Y,
  - (i) C_{1-10} alkyl$S(0)_n$ in which n is 0 to 2,
  - (j) C_{3-8} cycloalkyl$S(0)_n$,
  - (k) phenyl$S(0)_n$,
  - (l) substituted phenyl$S(0)_n$ in which the substituents are X and Y, and
  - (m) oxo;
- (3) C_{1-10} alkoxy;
- (4) C_{2-10} alkenyl;
- (5) C_{3-8} cycloalkyl;
- (6) substituted C_{3-8} cycloalkyl in which one substituent is selected from
  - (a) C_{1-10} alkyl
  - (b) substituted C_{1-10} alkyl in which the substituent is selected from
    - (i) halogen,
    - (ii) hydroxy,
    - (iii) C_{1-10} alkoxy,
    - (iv) C_{1-5} alkoxycarbonyl,
    - (v) C_{1-5} acyloxy,
    - (vi) phenyl,
    - (vii) substituted phenyl in which the substituents are X and Y
    - (viii) C_{1-10} alkyl$S(0)_n$,
    - (ix) C_{3-8} cycloalky1$S(0)_n$,
    - (x) phenyl$S(0)_n$,
    - (xi) substituted phenyl$S(0)_n$ in which the substituents are X and Y, and
    - (xii) oxo,
  - (c) C_{1-10} alkyl$S(0)_n$,
  - (d) C_{3-8} cycloalkyl$S(0)_n$,
  - (e) phenyl$S(0)_n$,
  - (f) substituted phenyl$S(0)_n$ in which the substituents are X and Y,
  - (g) halogen,
  - (h) hydroxy,

VOL
1127
ISS
1
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1991
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(i) C_{1-10} alkoxy,
(j) C_{1-5} alkoxycarbonyl,
(k) C_{1-5} acyloxy,
(l) phenyl, and
(m) substituted phenyl in which the substituents are X and Y;
(7) phenyl,
(8) substituted phenyl in which the substituents are X and Y,
(9) amino,
(10) C_{1-5} alkylamino;
(11) di(C_{1-5} alkyl)amino,
(12) phenylamino;
(13) substituted phenylamino in which the substituents are X and Y,
(14) phenyl C_{1-10} alkylamino,
(15) substituted phenyl C_{1-10} alkylamino in which the substituents are X and Y,
(16) a member selected from
(a) piperidinyl,
(b) pyrrolidinyl,
(c) piperazinyl,
(d) morpholinyl, and
(e) thiomorpholinyl, and
(17) R_3S in which R_3 is selected from
(a) C_{1-10} alkyl,
(b) phenyl, and
(c) substituted phenyl in which the substituents are X and Y,
R_2 is H, CH_3, or CH_2OH,
X and Y are independently selected from
(a) OH,
(b) halogen,
(c) trifluoromethyl,
(d) C_{1-3} alkoxy,
(e) C_{1-5} alkylcarbonyloxy,
(f) phenylcarbonyloxy,
(g) C_{1-5} alkoxycarbonyl
(h) phenyloxycarbonyl,
(i) hydrogen,
(j) C_{1-5} alkyl
Z is selected from
(1) hydrogen,
(2) C_{1-5} alkyl
(3) substituted C_{1-5} alkyl in which the substituent is selected from
(a) phenyl
(b) dimethylamino, and
(c) acetylamino, and
(4) 2,3-dihydroxypropyl
halogen is Cl or F; a is a single bond or a double bond; and pharmaceutically acceptable salts of the compound (I) in which Z is hydrogen.

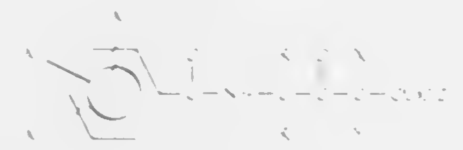
5,021,454
BENZOYLAMINOALKANOIC ACIDS AND ESTERS

Ashok K. Sharma, Perkasie, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Oct. 6, 1989, Ser. No. 418,063
Int. Cl.⁵ A01N [illegible]

U.S. Cl. 514—541 14 Claims

1. A compound of the formula



wherein

A, A' and A'' are each independently selected from hydrogen, halogen, (C_1-C_4)alkyl, halo(C_1-C_4)alkyl, (C_1-C_4)alkoxy, halo(C_1-C_3)alkoxy, cyano, nitro, phenyl, phenyl(C_1-C_3)alkyl or phenyloxy;

R and R^1 are each independently selected from hydrogen, (C_1-C_6)alkyl, phenyl, phenyl(C_1-C_4)alkyl and halo(C_1-C_3)alkyl;

X is halogen, cyano or thiocyano (—SCN);

Y is hydrogen, halogen, cyano or thiocyano (—SCN); and Z is hydrogen, (C_1-C_8)alkyl, (C_1-C_3)alkoxy(C_1-C_3)alkyl, halo(C_1-C_8)alkyl, phenyl, phenyl(C_1-C_4)alkyl, phenoxy(C_1-C_4)alkyl, (C_1-C_4)alkoxycarbonyl(C_1-C_4)alkyl, acyl(C_1-C_6)alkyl or thio(C_1-C_8)alkyl; and its agronomically acceptable salts.

5,021,455
SOLUTION FOR NEUTRALIZING CAUSTIC EFFECTS OF ALKALINE CEMENTITIOUS MATERIALS ON HUMAN SKIN

Gary C. Wilkerson, P.O. Box 414, Paradise, Calif. 95967

Filed Dec. 15, 1989, Ser. No. 451,139
Int. Cl.⁵ A61K *31/19, 31/185, 49/00*

U.S. Cl. 514—574 26 Claims

1. A method of treating the caustic effects of alkaline cementitious materials on human skin which comprises administering an effect amount of a composition which comprises a non-caustic acid to said human skin.

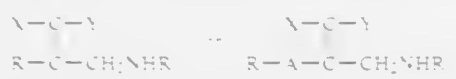
5,021,456
INHIBITORS OF LYSYL OXIDASE

Michael G. Palfreyman; Philippe Bey, both of Cincionati, and Ian A. McDonald, Loveland, all of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Division of Ser. No. 407,175, Sep. 19, 1989, which is a division of Ser. No. 160,364, Feb. 25, 1988, abandoned. This application May 4, 1990, Ser. No. 519,084
Int. Cl.⁵ A61K *31/135, 31/15*

U.S. Cl. 514—649 7 Claims

1. A method of inhibiting lysyl oxidase in a patient in need thereof which comprises administering to the patient a therapeutically effective amount of a compound of the formula



$$\begin{array}{c}X-C-Y\\ \|\\ R-C-CH_2NHR\end{array} \quad \text{or} \quad \begin{array}{c}X-C-Y\\ \|\\ R-A-C-CH_2NHR\end{array}$$

wherein

X and Y are identical and are each either a fluoro, chloro or bromo group or one of X and Y is a hydrogen and the other is a fluoro, chloro or bromo group

R is a hydrogen or a (C_1-C_4)alkyl group

A is a divalent radical group selected from

$$\begin{array}{c}R_2\\ |\\ -(CH_2)_n-CH(CH_2)_m-\end{array}$$

wherein

R_2 is hydrogen, methyl or ethyl, and m and n independently are an integer of from [illegible] provided that m+n cannot be greater than [illegible]

$-(CH_2)_p-D-(CH_2)_q-$

wherein

D is oxygen or sulfur, p is an integer of from [illegible] and q is an integer of from [illegible] provided that p+q cannot be greater than [illegible] and

$-(CH_2)_p-CH=CH-(CH_2)_q-$

wherein

p is an integer of from [illegible] and q is an integer of from [illegible] provided that p+q cannot be greater than [illegible] and

R is a methyl group, a phenyl, or a phenyl substituted with one or two members of the group (C_1-C_5)alkyl, (C_1-C_5)alkoxy, hydroxy, chloro, bromo, fluoro, iodo, trifluoromethyl, nitro, (C_1-C_5)alkylcarbonyl, benzoyl, or phenyl;

or a pharmaceutically acceptable salt thereof.

5,021,457
METHOD FOR AIDING CESSATION OF SMOKING

Frank J. Akin; Robert Klesges, and Lisa Klesges, all of Germantown, Tenn., assignors to Plough Inc., Memphis, Tenn.

Filed Aug. 9, 1989, Ser. No. 391,814
Int. Cl.⁵ H01N *33/02*

U.S. Cl. 514—653 7 Claims

1. A method of aiding individuals in smoking cessation, said method comprising administering to an individual in need thereof an effective amount of phenylpropanolamine.

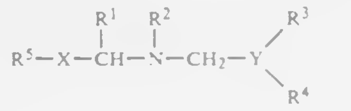
5,021,458
AMINE DERIVATIVES AND FUNGICIDES CONTAINING THE SAME

Tetsuya Maeda, Tokorozawa; Toshiyuki Yamamoto, Tokyo; Mituo Takase, Hino; Kazuya Sasaki, Higashikurume; Tadashi Arika, Kasukabe; Mamoru Yokoo, Kawagoe; Rieko Hashimoto, Asaka; Kouji Amemiya, Kodaira, and Sakae Koshikawa, Kawaguchi, all of Japan, assignors to Kaken Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 73,329, Jun. 13, 1987, abandoned, which is a continuation of Ser. No. 740,596, Jun. 3, 1985, abandoned. This application Dec. 7, 1988, Ser. No. 283,055
Claims priority, application Japan, Jun. 9, 1984, 59-118636
Int. Cl.⁵ A01N *33/04;* C07C *211/01*

U.S. Cl. 514—655 3 Claims

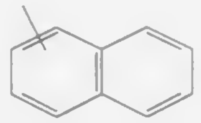
1. Amine derivatives having the formula (I).



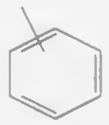
$$\begin{array}{c}R^1 \quad R^2 \qquad\quad R^3\\ R^5-X-CH-N-CH_2-Y\\ \qquad\qquad\qquad\qquad R^4\end{array} \qquad (I)$$

wherein

X is



Y is



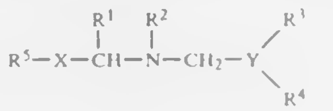
R^1 is hydrogen atom or an alkyl group of 1 to 6 carbon atoms;

R^2 is hydrogen atom or an alkyl group of 1 to 6 carbon atoms;

R^3 is hydrogen atom or an alkyl group of 1 to 6 carbon atoms;

R^4 is an alkyl group of 1 to 10 carbon atoms, a cycloalkyl group of 3 to 7 atoms or a halogenated alkyl group; R^5 is hydrogen atom, an alkyl group of 1 to 6 carbon atoms, a halogen atom or a nitro group; R^5 is attached to an arbitrary position of X, and R^3 or R^4 is attached to an arbitrary position of Y

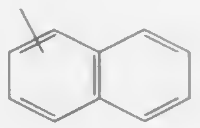
3. A method of controlling fungi in an animal subject, which comprises treating the animal subject with an amine derivative represented by the Formula (I):



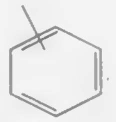
$$\begin{array}{c}R^1 \quad R^2 \qquad\quad R^3\\ R^5-X-CH-N-CH_2-Y\\ \qquad\qquad\qquad\qquad R^4\end{array} \qquad (I)$$

wherein

X is



Y is



R^1 is hydrogen atom or an alkyl group of 1 to 6 carbon atoms;

R^2 is hydrogen atom or an alkyl group of 1 to 6 carbon atoms;

R^3 is hydrogen atom or an alkyl group of 1 to 6 carbon atoms;

R^4 is an alkyl group of 1 to 10 carbon atoms, a cycloalkyl group of 3 to 7 carbon atoms or a halogenated alkyl group, R^5 is hydrogen atom, an alkyl group of 1 to 6 carbon atoms, a halogen atom or a nitro group, R^5 is attached to an arbitrary position of X, and R^3 or R^4 is attached to an arbitrary position of Y.

5,021,459
WOOD PRESERVATIVES

Reimer Goettsche, Baden-Baden, Fed. Rep. of Germany, assignor to Dr. Wolman GmbH, Sinzheim, Fed. Rep. of Germany

Filed Nov. 1, 1989, Ser. No. 432,178
Claims priority, application Fed. Rep. of Germany, Nov. 24, 1988, 3839640
Int. Cl.⁵ A01N *33/02*

U.S. Cl. 514—663 15 Claims

1. An amine-based wood preservative, which comprises an effective amount of a mixture of

(a) N,N-dimethyl-N-alkylamine, N-tridecyl-2,6-dimethylmorpholine, 4-(3-(para-tert-butylphenyl)-2-methylpropyl)-2,6-cis-dimethylmorpholine or a mixture thereof,
(b) an emulsifier, and
(c) a water-insoluble acid selected from the group consisting of a C_5-C_{20} saturated monocarboxylic acid, C_5-C_{20} saturated dicarboxylic acid, benzoic acid and N-cyclohexyldiazenium dioxide, or a salt thereof

VOL
1127
ISS
1
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1991
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P-ALKYL PHENOXY ALKANOLS FOR THE TREATMENT OF ALLERGIC CONDITIONS

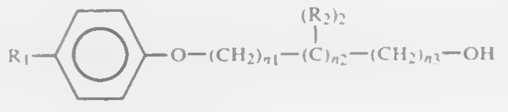
Frank M. Berger, 190 E. 72nd St., New York, N.Y. 10031; Howard L. Johnson, and Joseph I. DeGraw, Jr., both of Sunnyvale, Calif., assignors to Frank M. Berger, New York, N.Y.

Division of Ser. No. 47,379, May 7, 1987, Pat. No. 4,816,491, which is a continuation of Ser. No. 551,453, Dec. 27, 1983, abandoned, which is a division of Ser. No. 327,141, Dec. 3, 1981, Pat. No. 4,451,474, which is a continuation-in-part of Ser. No. 114,183, Jan. 22, 1980, abandoned. This application Dec. 22, 1988, Ser. No. 288,778

Int. Cl.^{5} A61K *31/075*

U.S. Cl. 514—718 12 Claims

1. A therapeutic composition in a dosage unit form selected from the group consisting of a tablet, a capsule, a suppository, and a cachet effective in inhibiting the release of chemical mediators that are responsible for the symptoms of allergic diseases comprising an amount, effective in inhibiting said release, of a compound of the formula:



(1)

wherein

R_1 is an alkyl group having from one to six carbon atoms;

R_2 is lower alkyl having from one to three carbon atoms or is hydrogen;

n_1, n_2 and n_3 represent the number of CH_2, $C(R_2)_2$ and CH_2 groups, respectively, and are numbers within the range from 0 to 10; and at least one of n_1, n_2 and n_3 is other than zero; and

an insert pharmaceutically acceptable carrier.

5,021,461

METHOD OF TREATING DIABETES MELLITUS WITH BISPHENOL DERIVATIVES

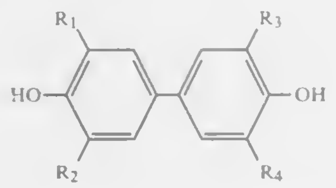
Keith M. Robinson, Glendale; Simon J. T. Mao, Loveland; Roger A. Parker, and Richard L. Jackson, both of Cincinnati, all of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Division of Ser. No. 385,623, Jul. 26, 1989. This application Aug. 21, 1990, Ser. No. 570,577

Int. Cl.^{5} A61K *31/05*

U.S. Cl. 514—731 3 Claims

1. A method of lowering blood glucose in a patient afflicted with diabetes mellitus comprising administering to said patient a therapeutically effective glucose lowering amount of a compound of the formula



wherein R_1, R_2, R_3 and R_4 are each independently a C_1–C_6 alkyl group.

5,021,462

POROUS MATERIAL AND ITS PREPARATION

Alfred R. Elmes; Kevin Hammond, both of Wirral, England, and David C. Sherrington, Kirkintilloch, Scotland, assignors to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Division of Ser. No. 185,671, Apr. 25, 1988, Pat. No. 4,985,468. This application Oct. 31, 1990, Ser. No. 606,937

Claims priority, application United Kingdom, Apr. 24, 1987, 8709688

Int. Cl.^{5} C08J *9/28*

U.S. Cl. 521—63 7 Claims

1. A process for preparing a three-dimensional porous polymeric material having a void space consisting of a three-dimensional network of cells separated from each other by walls and interconnected by holes through said walls, the cells having diameters in the range 100 to 0.5 μm, and the void space being in the range 75 to 98% of the total volume of the polymeric material, wherein the polymeric material is a cross-linked polycondensation polymeric material,

said process comprising preparing an emulsion having a continuous phase containing polymerizable precursor materials for said polymeric material and an internal phase comprising 75 to 98 volume % of the emulsion and consisting of globules having dimensions in the range 100 to 0.5 μm and forming, in said continuous phase, by condensation polymerisation and condensation cross-linking, said cross-linked polycondensation polymeric material.

5,021,463

METHOD FOR MAKING MULTICOLORED RESIN MATERIAL AND PRODUCT THEREOF

Matthew L. Kozma, Osterville, Mass., assignor to Packaging Industries Group, Inc., Hyannis, Mass.

Filed Jun. 17, 1988, Ser. No. 208,106

Int. Cl.^{5} C08J *3/22*

U.S. Cl. 521—143 3 Claims

1. A batch process for making a multicolored foamed resin, comprising:

compounding a base resin reselected from the group consisting of polyolefins, polystryrene, ethylene vinyl acetate and polyvinyl chloride to a predetermined pliable base resin formulation,

adding coloring material to a portion of the pliable base resin formulation,

mixing the base resin formulation and the portion having added coloring material only sufficiently to incompletely blend said coloring material into the base resin formulation so that the coloring material is partially dispersed in the base resin formulation,

terminating the mixing step when the coloring material is only partially dispersed in the base resin formulation, whereby the separate colors of the base resin formulation and colored portion are each visible le, and the separate colors form a marbled pattern in the resin formulation,

forming the incompletely blended resin formulation into resin material wherein separately colored portions form a marbled pattern, and

forming the incompletely blended resin material to provided form a material wherein separately colored portions from a marbled pattern.

5,021,464

Patent Not Issued For This Number

5,021,465

PHOTOCURABLE RESIN COMPOSITION AND METHOD OF PRODUCING DECORATIVE MATERIAL USING THE SAME

Eiichiro Takiyama, Kamakura, and Katsubisa Morita, Takasaki, both of Japan, assignors to Showa Highpolymer Co., Ltd., Tokyo, Japan

Filed Jun. 9, 1988, Ser. No. 204,266

Int. Cl.^{5} C08F *124/00*

U.S. Cl. 522—60 8 Claims

1. A photocurable resin composition comprising a combination of the following three components:

(A) a curable polymer or oligomer of spiroacetal(meth)acrylate;

(B) a white pigment; and

(C) a radical-generating compound having a half-life of 10 hours at a decomposition temperature of 60° C. or less.

5,021,466

NOVEL UV CURABLE POLYACRYLATE/SOLVENT COMPOSITIONS

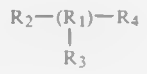
Peter Cueli, 555 Hillsborough Rd., Bellemead, N.J. 08502

Continuation-in-part of Ser. No. 818,244, Jan. 13, 1986. This application Oct. 24, 1988, Ser. No. 261,696

Int. Cl.^{5} C08K *0/00*

U.S. Cl. 522—75 11 Claims

1. A method of curing a substantially anhydrous UV curable composition of less than 2% w/w water consisting essentially of between 1 and 9 parts of monomer and 1 part of solvent of a b.p. exceeding 115° C. wherein the monomer is a multi-functional, non-oxygen inhibited polyacrylate and the solvent is a member selected from the group of solvents of the formula



$$R_2-\underset{\underset{R_3}{|}}{(R_1)}-R_4$$

wherein R_1 is an straight or branched chain alkanetriyl moiety of 3 to 6 carbon atoms,

R_2 is selected from the group consisting of hydrogen, hydroxy and COOH,

R_3 and R_4 are selected from the group consisting of hydrogen, OH, $—(CO)OR_5$,$—O(CO)R_6$, R_7O-and $R_7OR_8O—$,

wherein R_5, R_6, R_7 and R_8 are straight or branched chain alkyl or hydroxyl alkyl of 1 to 5 carbon atoms and may be the same or different provided that where R_2 is hydrogen or hydroxy, R_3 and R_4 are other than hydrogen or other than simultaneously hydroxy, provided that where R_2 is hydroxy only one of R_3 and R_4 may be hydroxy,

further provided that where R_2 is linked to R_3 or R_4, said linkage is a lactone linkage formed from the corresponding compound wherein R_2 is COOH and R_3 and R_4 are hydroxy,

in the presence of an UV activated catalyst, which comprises exposing said composition in the undried state of a source of UV radiation.

5,021,467

PHOTOCURABLE DI-(METH)ACRYLIC ACID ESTER RESIN COATING COMPOSITION

Minoru Yokoshima, Asa; Tetsuo Ohkubo, Ube, and Masayuki Kiyomoto, Asa, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

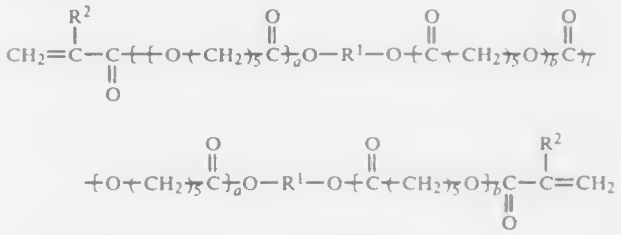
Division of Ser. No. 875,064, Jun. 17, 1986, Pat. No. 4,783,544. This application Feb. 25, 1988, Ser. No. 160,336

Claims priority, application Japan, Jun. 19, 1985, 60-131631; Jun. 19, 1985, 60-131632; Sep. 6, 1985, 60-195725

Int. Cl.^{5} C08F *2/50, 218/00, 226/00, 234/02*

U.S. Cl. 522—96 5 Claims

1. A resin composition useful for coating optical glass fiber, comprising (A) di-(meth)acrylic acid ester represented by the formula:



$$CH_2=\overset{\overset{R^2}{|}}{C}-\underset{\underset{O}{\|}}{C}\left(\left(O\left(CH_2\right)_5\overset{\overset{O}{\|}}{C}\right)_aO-R^1-O\left(\overset{\overset{O}{\|}}{C}\left(CH_2\right)_5O\right)_b\overset{\overset{O}{\|}}{C}\right)_l$$

$$\left(O\left(CH_2\right)_5\overset{\overset{O}{\|}}{C}\right)_aO-R^1-O\left(\overset{\overset{O}{\|}}{C}\left(CH_2\right)_5O\right)_b\underset{\underset{O}{\|}}{C}-\overset{\overset{R^2}{|}}{C}=CH_2$$

wherein R^1 represents an alkylene group having 4 to 10 carbon atoms; R^2 represents a hydrogen atom or a methyl group; the mean values of a and b are respectively 0 to 5; the sum value of a plus b is 0.5 to 5 and the mean value of l is 1 to 10, (B) a monoethylenically unsaturated monomer and (C) an initiator of photopolymerization.

5,021,469

BINDER FOR AQUEOUS GLOSS PAINTS

Klaus Langerbeins, Langen; Wolfgang Klesse, Mainz; Dieter Tessmer, Ruesselheim; Wilhelm Elser, Griesheim, and Hans-Juergen Geyer, Muehltal, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Jan. 23, 1990, Ser. No. 468,600

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1989, 3902103

Int. Cl.^{5} C08F *263/02*

U.S. Cl. 523—201 5 Claims

1. A vehicle or binder for water based gloss paints consisting of an aqueous phase and, dispersed therein, particles of a multiphase emulsion polymer having an average particle diameter less than 200 nanometers and comprising

(a) a polymeric core having a glass transition temperature greater than 40° C. and

(b) a polymeric shell having a glass transition temperature less than 70° C. and at least 20 Centigrade degrees below that of said polymeric core, said shell including an emulsion polymer containing at least 4 percent by weight of polymerized units of an ethylenically unsaturated free radically polymerizable carboxylic acid monomer and more than 80 percent by weight of polymerized units of at least one monomer selected from the group consisting of styrene and alkyl esters of acrylic acid and methacrylic acid having at least 4 carbon atoms in the alkyl group.

VOL
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5,021,470

FLEXIBLE ARYL ALKYL EPOXY RESINS, THEIR AMINE RESIN DERIVATIVES AND THEIR USE IN ELECTRODEPOSITION COATINGS

James A. Laugal, Union Lake; Glenn E. Martin, Farmington Hills; Donald L. St. Aubin, Westland, and Gerald G. Wold, Brighton, all of Mich., assignors to BASF Corporation, Clifton, N.J.

Division of Ser. No. 77,492, Jul. 24, 1987, Pat. No. 4,857,567. This application Mar. 23, 1989, Ser. No. 327,751

Int. Cl.^{5} C08G *59/02, 59/14;* **C08L** *63/00;* **C25D** *13/00*

U.S. Cl. 523—414 **62 Claims**

1. A D2E epoxide compound comprising the addition reaction oligomer of the monomers Diol D1, Diepoxide E1 and Diepoxide E2 wherein:

Diol D1 has at least two aryl groups between the hydroxyls,
Diepoxide E1 is a bis(glycidyl ether) of Diol D1, and
Diepoxide E2 is a bis(glycidyl ether) of a bis (labile hydrogen functionalized alkoxy) arylene.

8. A D3E epoxide compound comprising the addition reaction oligomer of monomers Diol D1 and Diepoxides E1, E2 and E3 wherein:

Diol D1 has at least two aryl groups between the hydroxyls,
Diepoxide E1 is a bis(glycidyl ether) of Diol D1,
Diepoxide E2 is a bis(glycidyl ether) of a bis (labile hydrogen functionalized alkoxy) arylene; and
Diepoxide E3 is a bis(glycidyl ether) of a Diol D2 said Diol D2 having only one aryl group between the hydroxyls.

16. A DEE epoxide compound comprising an addition reaction oligomer of the monomers Diol D1, Diepoxide E2 and Diepoxide E3 wherein:

Diol D1 has at least two aryl groups between the hydroxyls,
Diepoxide E2 is a bis(glycidyl ether) of a bis (hydrogen functionalized alkoxy) arylene, and
Diepoxide E3 is a bis(glycidyl ether) of a Diol D2 having only one aryl group between the hydroxyls.

5,021,471

MODIFIED EPOXY RESIN COMPOSITIONS

Duane S. Treybig, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 11, 1990, Ser. No. 522,331

Int. Cl.^{5} C08G *59/50*

U.S. Cl. 523—414 **30 Claims**

1. A modified epoxy resin resulting from reacting
- (A) at least one epoxy resin selected from the group consisting of
  - (1) at least one epoxy resin having an average of more than one vicinal epoxy group per molecule;
  - (2) at least one epoxy resin having an average of more than one vicinal epoxy group per molecule wherein from about 1 to about 85 percent of the vicinal epoxy groups have been reacted with
    - (a) at least one compound containing an aromatic hydroxyl group;
    - (b) at least one compound containing a secondary amine group; or
    - (c) any combination of (a) and (b); and
  - (3) any combination of (1) and (2);
- (B) at least one pyridine-containing compound selected from the group consisting of
  - (1) at least one compound containing more than one pyridine group per molecule; and
  - (2) a mixture of pyridine-containing compounds comprising
    - (a) at least one compound containing more than one pyridine group per molecule; and
    - (b) at least one compound containing only one pyridine group per molecule: and
- (C) at least one Brönsted acid.

5,021,472

ADHESIVE FOR ELECTROLESS PLATING AND METHOD OF PREPARATION OF CIRCUIT BOARD USING THIS ADHESIVE

Ryo Enomoto, Oogaki, Japan, assignor to Ibiden Co. Ltd., Oogaki, Japan

Continuation of Ser. No. 146,081, Jan. 20, 1988, abandoned, which is a division of Ser. No. 860,886, May 8, 1986, Pat. No. 4,752,499. This application May 25, 1989, Ser. No. 357,693

Claims priority, application Japan, May 16, 1985, 60-102632; Jun. 3, 1985, 60-118898

Int. Cl.^{5} C08G *59/22, 59/42*

U.S. Cl. 523—427 **3 Claims**

1. An adhesive for electroless plating comprising:

solid fine powders of cured heat resistant resin soluble in an oxidizing aqueous solution;
uncured liquid heat resistant resin which is sparingly soluble in said oxidizing aqueous solution by curing treatment; and
said solid fine powders being dispersed in said uncured liquid heat resistant resin are less than 10 μm in average particle size.

5,021,473

PROCESS FOR ENHANCING THE ELECTROSTATIC CHARGEABILITY OF POWDER COATINGS OR POWDERS, AND THE USE THEREOF FOR SURFACE-COATING SOLID OBJECTS

Hans-Tobias Macholdt, Darmstadt; Alexander Sieber, Frankfurt am Main; Claus Godau, Kiedrich, and Albrecht Manz, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

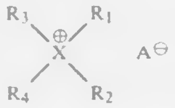
Filed Nov. 3, 1988, Ser. No. 266,510

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3737496

Int. Cl.^{5} C08K *5/59, 5/49, 5/20, 5/17*

U.S. Cl. 523—451 **8 Claims**

1. A process for enhancing the electrostatic chargeability of a triboelectrically sprayable powder coating composition consisting essentially of
- (1) an epoxy resin; or
- (2) a hydroxyl- or carboxyl-containing polyester resin; or
- (3) an acrylic resin; or
- (4) a combination of hydroxyl- or carboxyl-containing polyester resin and epoxy resin or a combination of (1), (2), (3) or (4) with each other, intended for surface-coating solid objects, which comprises homogeneously incorporating, by dissolving or dispersing into said powder coating composition, at least one salt-like, cationic compound of the formula (1)



(1)

in which R_1, R_2, R_3 and R_4, independently of one another, denote hydrogen atoms, straight-chain or branched alkyl groups having 1 to 30 carbon atoms, mononuclear or polynuclear cycloaliphatic radicals having 5 to 12 carbon atoms, oxethyl groups of the formula $—(CH_2—CH_2—O)_n—R$ in which n denotes a number from 1 to 10 and R denotes a hydrogen atom, a $(C_1–C_4)$alkyl or acyl group, furthermore denote mononuclear or polynuclear aromatic radicals or araliphatic radicals, where the aliphatic, aromatic and araliphatic radicals may be substituted by hydroxyl, $(C_1–C_4)$alkoxy, secondary or tertiary amino groups, acid amide groups and/or acid imide groups, and where the alkyl, cycloakyl, aralkyl and aryl radicals for R_1 to R_4 may be substituted by fluorine, chlorine or bromine atoms, X denotes a phosphorus, arsenic or antimony

atom, where, in the case where X denotes an arsenic or antimony atom, at least one of the radicals $R_1–R_4$ is not a hydrogen atom, and $A^{\ominus}$ denotes the equivalent of an inorganic or organic anion, in an amount from about 0.01 to about 10 percent by weight into powder coatings.

5,021,474

LATENT HARDENERS FOR MELAMINE RESIN MOULDING COMPOSITIONS

Peter Günther; Hermann O. Wirth, both of Bensheim, and Wilhelm Endlich, Heppenheim, all of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 334,419, Apr. 7, 1989, Pat. No. 4,925,887. This application Feb. 26, 1990, Ser. No. 484,714

Claims priority, application Switzerland, Apr. 8, 1988, 1296/88

Int. Cl.^{5} C08L *61/28*

U.S. Cl. 524—14 **21 Claims**

1. A method of producing a moulding comprising injection moulding a composition comprising
- (a) a melamine/formaldehyde resin, a melamine/phenol/formaldehyde resin or a mixture of said resins,
- (b) organic and/or inorganic fillers,
- (c) a lubricant, and
- (d) 0.1 to 2% by weight, based on the total composition, of 3-chloro-1,2-propanediol as latent hardener at a mould temperature in the range of from 150° C. to 200° C.

5,021,475

COMPOSITE THERMOPLASTIC ELASTOMER BLEND AND PROCESS FOR PREPARING THE SAME

Avraam I. Isayev, Akron, Ohio, assignor to University of Akron, Akron, Ohio

Filed Dec. 12, 1988, Ser. No. 283,333

The portion of the term of tbis patent subsequent to Mar. 1, 2005, has been disclaimed.

Int. Cl.^{5} C08L *1/26;* **C08J** *3/05*

U.S. Cl. 524—30 **12 Claims**

1. A composite elastomer blend comprising:
- (a) a thermoplastic elastomer and
- (b) from about 1% to about 20% by weight of a water insoluble thermotropic liquid crystal polymer, based on the combined amounts of said thermotropic liquid crystal polymer and said thermoplastic elastomer, said thermotropic liquid crystal polymer being a water insoluble alkyl cellulose in which the alkyl radical has at least two carbon atoms;

said liquid crystal polymer being essentially incompatible with said thermoplastic elastomer and being present in the form of domains essentially uniformly dispersed in a matrix of said thermoplastic elastomer.

5,021,476

DYEABLE PAVEMENT MATERIAL

Olli Pinomaa, Helsinki, Finland, assignor to O Pinomaa KY, Helsinki, Finland

Filed Aug. 15, 1988, Ser. No. 232,154

Claims priority, application Finland, Aug. 27, 1987, 873713; Nov. 10, 1987, 874963; Jan. 22, 1988, 880305

Int. Cl.^{5} C08J *3/22*

U.S. Cl. 524—77 **29 Claims**

1. An elastic street pavement mass comprising aggregate bound by a binding agent, characterized in that said binding agent comprises:

a natural resin selected from a group consisting of tall oil rosin, wood resin, and turpentine resin;
a solid polymer selected from a group consisting of polypropene, polyethylene, polyamide and polyester; and
a process oil selected from a group including mineral oil, vegetable oil and tall oil.

5,021,477

POLYSILOXANE-GRAFTED COPOLYMER TOPICAL BINDER COMPOSITION WITH NOVEL HYDROPHILIC MONOMERS AND METHOD OF COATING THEREWITH

James E. Garbe, Inver Grove Heights, and Smarajit Mitra, West St. Paul, botb of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 390,226, Aug. 7, 1989, Pat. No. 4,981,903. This application Oct. 25, 1990, Ser. No. 603,208

Int. Cl.^{5} A61K *7/06*

U.S. Cl. 424—70 **8 Claims**

1. A hair composition comprising the following ingredients:
- (a) c copolymer which comprises repeating A, B, and C monomers wherein:
  - A is at least one free radically polymerizable acrylic or methacrylic monomer present in 0.1–99.9% by weight of all monomer present;
  - B is at least one highly polar acrylic or methacrylic monomer copolymerizable with A and different from A, the amount by weight of B monomer being from 0.1 to 99.9% of the total weight of all monomers in said copolymer; and
  - C is a monomer present as from 0.01 to 50% by weight of all monomer present and having the general formula

$$X(Y)_nSi(R)_{3-m}Z_m$$

wherein:

X is a vinyl group copolymerizable with the A and B monomers;
Y is divalent linking group;
R is hydrogen, lower alkyl, aryl, or alkoxy; having a number of average molecular weight of at least about 500 and is essentially unreactive under copolymerization conditions;
n is zero or 1;
m is an integer of from 1 to 3; and

- (b) a medicinally effective amount of a medicament or a cosmetically effective amount of a conditioner or cosmetically active ingredient;

wherein (a) and (b) are present as a solution, dispersion, or emulsion in a liquid carrying medium.

5,021,478

COMPOUNDS CONTAINING BOTH UV-ABSORBER AND 1-HYDROCARBYLOXY HINDERED AMINE MOIETIES AND STABILIZED COMPOSITIONS

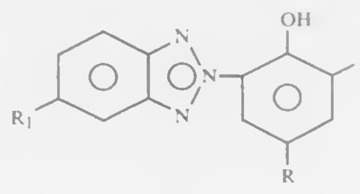
Ramanathan Ravichandran, Nanuet, and James P. Galbo, Hartsdale, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 326,848, Mar. 21, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 479,880

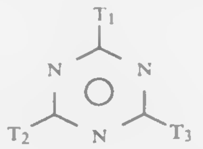
Int. Cl.^{5} C08K *5/3435, 5/3492;* **C07D** *211/34, 403/00*

U.S. Cl. 524—91 **35 Claims**

1. A compound having one of the formulas I to VII



(I)



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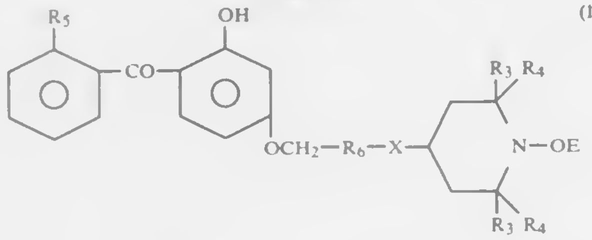
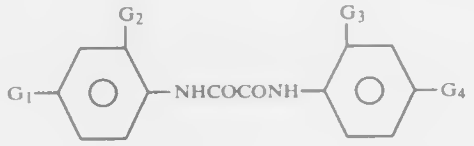
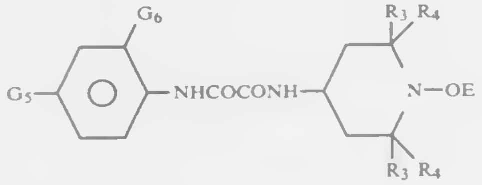


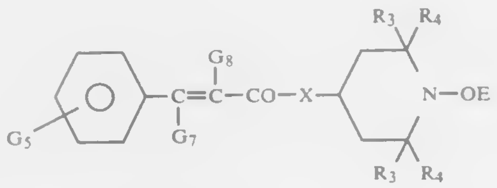
(III)



(IV)



(V)

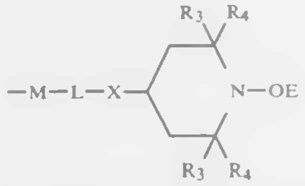


(VI)

wherein

R_1 is hydrogen, halogen, alkyl of 1 to 12 carbon atoms or aralkyl of 7 to 15 carbon atoms,

R and R_2 are independently hydrogen, alkyl of 1 to 12 carbon atoms, aralkyl of 7 to 15 carbon atoms or the group of formula VII



(VII)

with the proviso that one of R_2 and R_3 is a group of formula VII

R_3 and R_4 are independently alkyl of 1 to 4 carbon atoms or together R_3 and R_4 are pentamethylene,

M is a direct bond, $—NG_9—$, —O—, —S—, $—SO_2NG_9$, $—SO_2—$, $—SO_2O—$, $—CONG_9—$, —COO— or —OCO—,

L is a direct bond, alkylene of 1 to 12 carbon atoms, alkenylene of 3 to 18 carbon atoms, alkynylene of 3 to 18 carbon atoms, cycloalkylene of 5 to 12 carbon atoms, said alkylene interrupted by one or more —O— atoms,

X is —COO—, $—CONG_9—$, —O—, $—NG_9—$ or —NY— where G_9 is hydrogen or alkyl of 1 to 8 carbon atoms,

R_5 is hydrogen or hydroxyl,

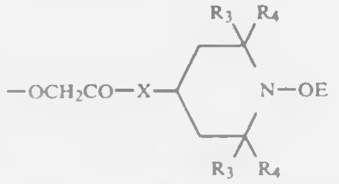
R_6 is —CO—, $—CHOHCH_2—$ or $—CH(CH_2OH)—$,

G_1, G_2, G_3, and G_4 are independently hydrogen, halogen, alkyl of 1 to 12 carbon atoms, aryl of 6 to 10 carbon atoms, aralkyl of 7 to 15 carbon atoms, phenoxy, alkoxy of 1 to 12 carbon atoms, $—OCH_2COO—L_1$ or the group T

where

L_1 is alkyl of 1 to 8 carbon atoms, and

T is



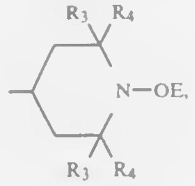
with the proviso that at least one of G_1 to G_4 must be T,

G_5 and G_6 have independently the same definitions as G_1 to G_4, with the proviso that at least one of G_5 and G_6 do not need to be T,

G_7 is hydrogen, phenyl or phenyl substituted by G_5,

G_8 is cyano, —COO—L or —CO—X—Y, where

Y is



E is hydrogen, alkyl of 1 to 18 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, alkenyl of 2 to 18 carbon atoms, cycloalkenyl of 5 to 12 carbon atoms, aralkyl of 7 to 15 carbon atoms, a radical of a saturated or unsaturated bicyclic or tricyclic hydrocarbon of 7 to 12 carbon atoms or aryl of 6 to 10 carbon atoms or said aryl substituted by alkyl,

T_1, T_2 T_3 are independently alkyl of 1 to 12 carbon atoms, aryl of 6 to 10 carbon atoms, said aryl substituted by one or two alkyl of 1 to 4 carbon atoms, aralkyl of 7 to 15 carbon atoms, $—OR_7$, $—SR_7$, $—NR_7R_8$, $—SO_3H$, or o-hydroxyphenyl substituted by the group T, with the proviso that at least one of T_1, T_2 and T_3 must be o-hydroxyphenyl substituted by the group T, and

R_7 and R_8 are independently hydrogen, alkyl of 1 to 18 carbon atoms, alkenyl of 2 to 18 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aryl of 6 to 10 carbon atoms, said aryl substituted by one or two alkyl of 1 to 4 carbon atoms, aralkyl of 7 to 15 carbon atoms, or the group Y.

5,021,479

SUBSTITUTED HYDROXYLAMINE ESTER STABILIZERS

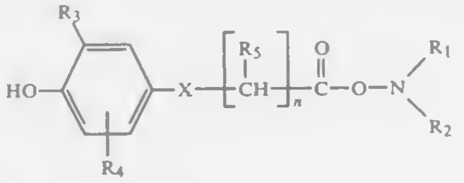
Ramanathan Ravichandran, Yonkers, N.Y., and Stephen D. Pastor, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 114,992, Oct. 26, 1987, Pat. No. 4,888,444. This application Oct. 12, 1989, Ser. No. 420,194

Int. Cl.^{5} **C08K** *5/32, 5/38, 5/357, 5/3477, 5/3435, 5/3432*

U.S. Cl. 524—96 **19 Claims**

1. A composition of matter comprising an organic material subject to oxidative, thermal and actinic degradation which is selected from the group consisting of natural and synthetic polymers, natural and synthetic fats, oils and waxes, and aqueous emulsions of natural or synthetic rubbers stabilized with an effective stabilizing amount of a compound of the formula



wherein

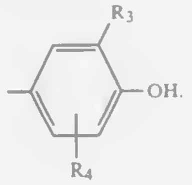
n is 0–2;

X is a direct bond, —S— or $—CH_2S—$;

R_1 and R_2 independently are hydrogen, alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, allyl, aryl, aralkyl of 7 to 9 carbon atoms, said aralkyl substituted by alkyl of 1 to 36 carbon atoms, or R_1 and R_2 together with the nitrogen atom can form a 5-7 membered heterocyclic ring;

R_3 and R_4 independently are alkyl of 1 to 18 carbon atoms, cycloalkyl of 5 to 6 carbon atoms, phenyl, alkaryl of 7 to 18 carbon atoms or aralkyl of 7 to 9 carbon atoms; and

R_5 is hydrogen or the group



5,021,480

AZO FREE RADICAL INITIATORS CONTAINING HINDERED AMINE MOIETIES WITH LOW BASICITY

Ramanathan Ravichandran, Nanuet, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 326,850, Mar. 21, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 480,175

Int. Cl.^{5} **C08K** *5/3435;* **C07D** *211/34, 211/40, 211/58*

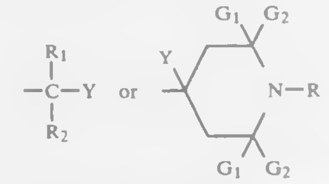
U.S. Cl. 524—99 **27 Claims**

1. A compound having in the same molecule a hindered amine moiety of low basicity and an azo free radical initiating moiety, said compound having the formula I

$$E_1—N{=}N—E_2 \qquad (I)$$

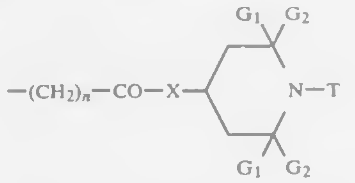
where

E_1 is a radical of the formula



where R_1 and R_2 are independently alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 20 carbon atoms, or

R_1 and R_2 together are alkylene of 2 to 10 carbon atoms, or one of R_1 and R_2 is a group of formula II



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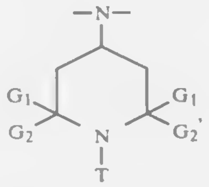
Y is —CN, $—N_3$, $—COOT_1$, $—CONH_2$, $—OT_1$, $—ST_1$, —OOH or —OH,

G_1 and G_2 are independently alkyl of 1 to 4 carbon atoms, or G_1 and G_2 together are pentamethylene,

X is —O—, —NH—, $—NT_1—$ or



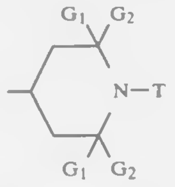
T is formyl, $—OT_1$ or $—OCOT_2$,

where

T_1 is alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, alkenyl of 3 to 18 carbon atoms, cycloalkenyl of 5 to 12 carbon atoms, aralkyl of 7 to 15 carbon atoms, a radical of a saturated or unsaturated bicyclic or tricyclic hydrocarbon of 7 to 12 carbon atoms or aryl of 6 to 10 carbon atoms or said aryl substituted by alkyl,

T_2 is alkyl of 1 to 18 carbon atoms, alkoxy of 1 to 18 carbon atoms, phenyl or said phenyl substituted by hydroxy, alkyl or alkoxy; or amino or said amino mono- or disubstituted by alkyl or phenyl, and

E_2 has the same meaning as E_1 or E_2 is alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms or aralkyl of 7 to 20 carbon atoms, with the proviso that one of E_1 or E_2 must contain a group having a



moiety present.

5,021,481

N-HYDROCARBYLOXY HINDERED AMINE LIGHT STABILIZERS WITH PHOSPHORUS MOIETIES

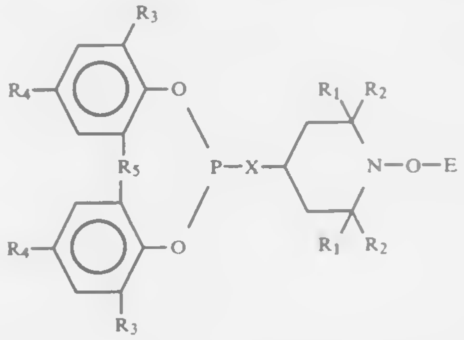
James P. Galbo, Hartsdale, and Raymond Seltzer, New City, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 326,851, Mar. 21, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 480,174

Int. Cl.^{5} **C08K** *5/3435;* **C07D** *215/00;* **C07F** *9/06*

U.S. Cl. 524—99 **39 Claims**

1. A compound which is an N-hydrocarbyloxy hindered amine substituted by a trivalent phosphorus moiety having a formula I, II, II, IV or V



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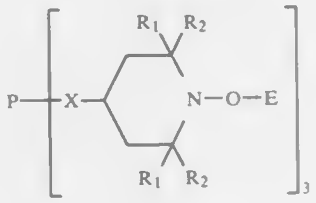
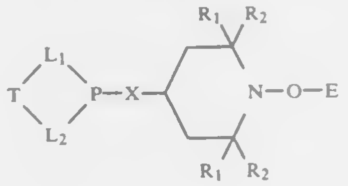
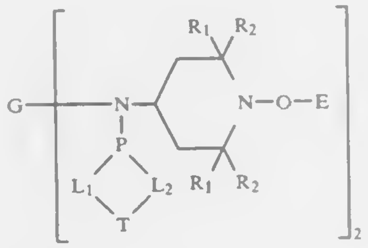


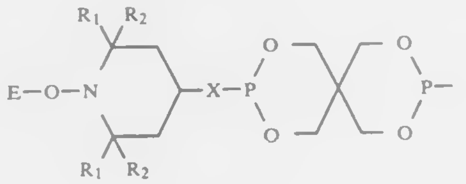
(II)



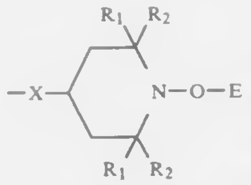
(III)



(IV)



(V)



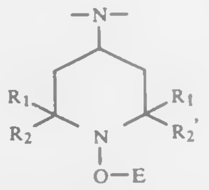
wherein

R₁ and R₂ are independently methyl or ethyl or R₁ and R₂ together are pentamethylene,

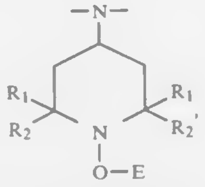
R₃ and R₄ are independently alkyl of 1 to 4 carbon atoms,

R₅ is a direct bond, methylene or 1,1-alkylidene of 2 to 5 carbon atoms,

X is —O—or—NY—where Y is hydrogen or alkyl of 1 to 18 carbon atoms, or X is



L₁ and L₂ are independently—O—or—NY—where Y is hydrogen or alkyl of 1 to 18 carbon atoms, or L₁ and L₂ are independently



T is alkylene of 2 or 3 carbon atoms or said alkylene substituted by one or two alkyl groups each of 1 to 4 carbon atoms,

G is alkylene of 2 to 12 carbon atoms, and

E is alkyl of 1 to 18 carton atoms, cycloalkyl of 5 to 12 carbon atoms, alkenyl of 2 to 8 carbon atoms, cycloalkenyl of 5 to 12 carbon atoms, aralkyl of 7 to 15 carbon atoms, a radical of a saturated or unsaturated bicyclic or tricyclic hydrocarbon of 7 to 12 carbon atoms or aryl of 6 to 10 carbon atoms or said aryl substituted by alkyl.

5,021,482

ADHESION AND PAINTABILITY IMPROVEMENTS IN PVC PLASTISOLS AT LOW BAKE TEMPERATURES

Don S. Wozniak, Powell, Ohio, assignor to Schering Berlin Polymers Inc., Dublin, Ohio

Filed Aug. 21, 1990, Ser. No. 570,966

Int. Cl.⁵ C08K *8/34;* **C08F** *5/30*

U.S. Cl. 524—100 14 Claims

1. An adhesion promoter for vinyl chloride plastisols comprising the non-gelled condensation product of

a) a polymerized fatty acid, and

b) a mixture of amines being present in a concentration to produce a final amine value that ranges up to about 191 in the condensation product, and said mixture being comprised of a polyalkylene polyamine and an N-aminoalkylpiperazine.

5,021,483

HINDERED AMINE DERIVATIVES OF S-TRIAZINE-TRICARBOXYLIC ACID

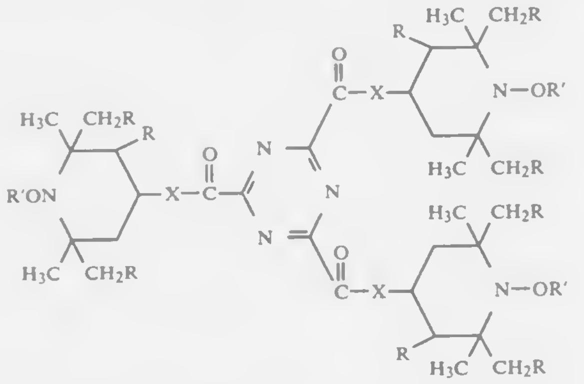
James P. Galbo, Hartsdale, N.Y., assignor to CIBA-GEIGY Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 326,856, Mar. 21, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 479,919

Int. Cl.⁵ C08K *5/3492;* **C07D** *403/00*

U.S. Cl. 529—100 16 Claims

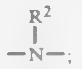
1. A compound corresponding to the formula



wherein R is hydrogen or methyl;

R' is C_1–C_{18} alkyl, C_2–C_{18} alkenyl, C_2–C_{18} alkynyl, C_5–C_{12} cycloalkyl, C_5–C_{12} cycloalkenyl, C_6–C_{10} bicycloalkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl or C_7–C_{12} aralkyl substituted by C_1–C_{12} alkyl or C_6–C_{10} aryl;

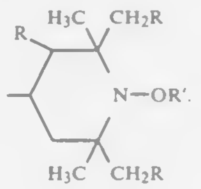
X is —O— or



$$-\overset{\overset{\displaystyle R^2}{|}}{N}-,$$

and

R^2 is hydrogen, C_1–C_{12} alkyl or



5,021,484

FIRE RETARDANT CURABLE 1-OXA-3-AZA TETRALINE (ALSO TERMED "3,4-DIHYDRO-1,3-BENZOXAZINE") DERIVED RESIN COMPOSITION

Herbert Schreiber, Wollerau, and Wolfgang Saur, Buttikon, both of Switzerland, assignors to Gurit-Essex AG, Switzerland

Filed Jul. 7, 1989, Ser. No. 376,875

Claims priority, application Switzerland, Jul. 18, 1988, 2733/88; Jun. 27, 1989, 2383/89

Int. Cl.⁵ C08K *5/34, 5/15, 3/38, 3/32, 3/26, 3/22*

U.S. Cl. 524—100 34 Claims

1. A resin which may be cured to form a polymeric resin which is difficultly inflammable and resistant to high temperatures, said resin being a mixture of

(a) a resin component comprising at least one thermically curable 1-oxa-3-aza tetraline group containing compound; and of

(b) a second component comprising at least one flame retardant selected from the group consisting of:
aluminum hydroxide;
hydrated calcium magnesium carbonate;
magnesium hydroxide;
elemental red phosphorus;
oxygen acids of phosphorus;
inorganic salts of oxygen acids of phosphorus;
organic salts of oxygen acids of phosphorus;
polyphosphates;
boric acid; and
salts of boric acid.

7. The resin of claim 1 wherein component (b) comprises a melamine phosphate.

5,021,485

LIGHT STABILIZER COMBINATION

Francois Gugumus, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 172,881, Mar. 25, 1988, abandoned. This application Aug. 7, 1989, Ser. No. 390,321

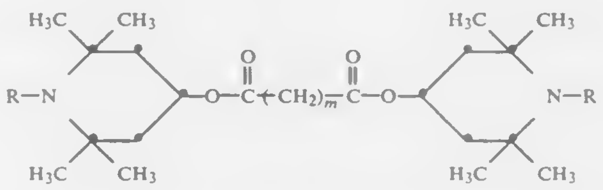
Claims priority, application Switzerland, Apr. 3, 1987, 1282/87

Int. Cl.⁵ C08K *5/3492, 5/3435;* **C09K** *15/22*

U.S. Cl. 524—100 31 Claims

1. A light stabilizer combination comprising

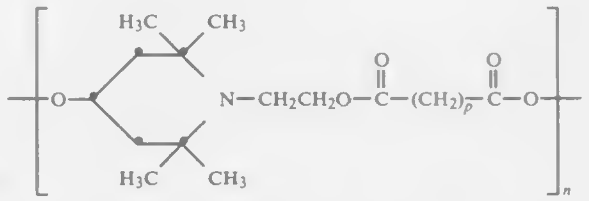
(A) at least one compound of formula I



I

wherein m is 2 or 3 and R is hydrogen C_1–C_4 alkyl, 2-hydroxyethyl, 2-hydroxypropyl, allyl, benzyl, acetyl or acryloyl, and

(B) a polyester of formula III



III

wherein n is an integer from 4 to 20, p is an integer from 2 to 8 and having a molecular weight higher than 700.

5,021,486

HINDERED AMINE-SUBSTITUTED MALONIC ACID DERIVATIVES OF S-TRIAZINE

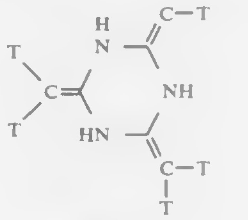
James P. Galbo, Hartsdale, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 326,853, Mar. 21, 1989, abandoned. This application Feb. 14, 1989, Ser. No. 479,878

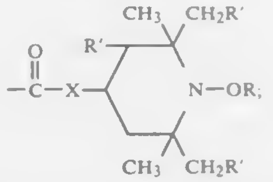
Int. Cl.⁵ C08K *5/3492;* **C07D** *251/00*

U.S. Cl. 524—100 17 Claims

1. A compound corresponding to the formula



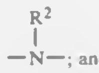
wherein T is



R is C_1–C_{18} alkyl, C_2–C_{18} alkenyl, C_2–C_{18} alkenyl, C_5–C_{12} cycloalkyl, C_5–C_{12} cycloalkenyl, C_6–C_{10} bicycloalkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl or C_7–C_{12} aralkyl substituted by C_1–C_{12} alkyl or C_6–C_{10} aryl;

R' is hydrogen or methyl;

X is —O—or



$$-\overset{\overset{\displaystyle R^2}{|}}{N}-;\ \text{and}$$

R^2 is hydrogen, C_1–C_{12} alkyl or

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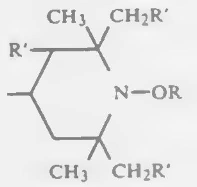


5,021,487
THERMALLY STABILIZED ACRYLIC ADHESIVE COMPOSITIONS AND NOVEL METHACRYLATED MALEMIDE COMPOUNDS USEFUL THEREIN

Philip Klemarczyk, Collinsville, Conn., assignor to Loctite Corporation, Newington, Conn.

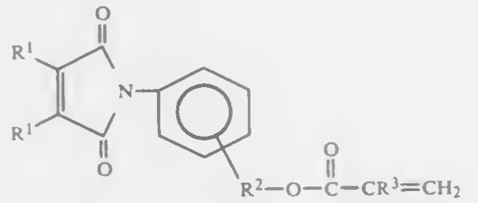
Filed May 27, 1988, Ser. No. 199,389

Int. Cl.^{5} C08K *5/3415;* **C08F** *4/32, 22/40;* **C07D** *207/40*

U.S. Cl. 524—104 **8 Claims**

1. A substantially solvent free adhesive formulation comprising:

a) an acrylic functional maleimide compound of the formula:



where the R^1 groups are independently H or C_1–C_3 alkyl, R^2 is C_1–C_6 alkylene, and R^3 is defined as for R^1.

b) at least one other acrylate or methacrylate compound or prepolymer compound other than that defined in a) provided that when R^1 is C_1–C_3 alkyl, said other acrylate or methacrylate compound is a di- or poly-acrylate or methacrylate; and,

c) an effective amount for initiating polymerization of an anaerobic or thermal free radical initiator.

5,021,488
FLAMEPROOFED, NON-DRIPPING POLYAMIDE MOULDING COMPOSITIONS

Karl Fuhr, Krefeld; Friedemann Müller, Neuss; Karl-Heinz Ott, Leverkusen; Aziz El-Sayed, Leverkusen; Peter-Rolf Müller, Leverkusen, and Martin Wandel, Dormagen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 23, 1990, Ser. No. 556,345

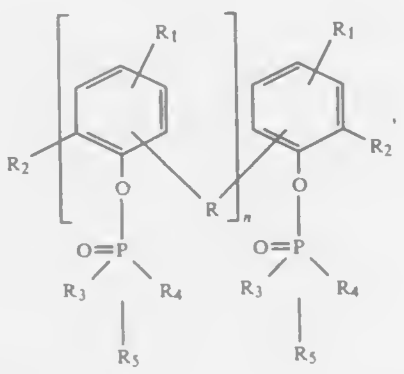
Claims priority, application Fed. Rep. of Germany, Aug. 4, 1989, 3925792

Int. Cl.^{5} C08K *5/5313*

U.S. Cl. 524—116 **10 Claims**

1. Thermoplastic, flameproofed, non-dripping polyamide moulding compositions based on phosphinic acid esters, containing, per 100 parts by wt. of these polyamide moulding compositions,

(A) 3 to 20 wt.% phosphinic acid esters of polyphenols of the formula (I)



(I)

wherein

n is an integer between 1 and 20,

R is an alkylene group having 1 to 4 carbon atoms, a cycloalkylene group having 5 to 9 carbon atoms or, if n=1, also a direct bond, a sulphonyl or carbonyl group or oxygen or sulphur,

R_1 and R_2 are hydrogen, halogen, alkyl groups having 1 to 12 carbon atoms, cycloalkyl having 5 to 9 carbon atoms or aryl groups having 6 to 10 carbon atoms and

R_3 and R_4 are alkyl groups having 1 to 4 carbon atoms and/or aryl groups having 6 to 10 carbon atoms, it also being possible for R_3 and R_4, in the case of alkyl groups, to be bonded by a single or double bond and for the ring formed via the phosphorus atom to carry alkyl groups R_5 having 1 to 4 carbon atoms,

(B) antidripping agents in a total amount of not more than 6 wt.% from the series comprising

(B1) 0.1 to 3 wt.%, of a polyfluoroethylene polymer and/or

(B2) 0.1 to 5 wt.%, of an aramide,

(C) 0.5 to 15 wt.%, zinc borate (hydrates) as a flameproofing reinforcing agent

and if appropriate other additives from the series comprising

(D) 0 to 40 wt.%, inorganic fillers, reinforcing agents or pigments,

(E) 0 to 30 wt.%, other flameproofing agents,

(F) 0 to 10 wt.%, processing auxiliaries and

(G) 0 to 20 wt.% customary additives for polyamides, selected from the group consisting of UV, light and heat stabilizers, known agents for improving impact strength, agents for improving compatibility and blend polymers.

5,021,489
CORROSION-INHIBITING COATING COMPOSITION

Walter E. Knight; Kenneth G. Clark, both of Chalfont, and David L. Gauntt, Jamison, all of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 1, 1990, Ser. No. 486,689

Int. Cl.^{5} C08K *5/521*

U.S. Cl. 524—140 **10 Claims**

1. A water displacing corrosion-inhibiting composition which comprises from about 10 to 35 parts by weight of an acrylic resin, 10 to 35 parts by weight of a silicone resin, 2 to 35 parts by weight of a silicone-alkyd copolymer resin, 0.5 to 5.0 parts by weight of an organic phosphate, 1.0 to 10 parts by weight of a sulfonate, 5 to 40 parts by weight of at least one lower molecular weight alcohol, and 10 to 50 parts by weight of at least one organic solvent.

5,021,490
INTERNALLY PLASTICIZED POLYVINYL HALIDE COMPOSITIONS AND ARTICLES PREPARED THEREFROM

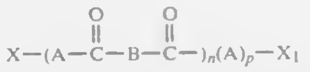
Josef C. Vyvoda, Avon Lake, Ohio, and James T. Harvilcbuck, Orland Park, Ill., assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Aug. 3, 1989, Ser. No. 389,031

Int. Cl.^{5} C08K *5/52;* **C08F** *20/00*

U.S. Cl. 524—140 **13 Claims**

1. An internally-plasticized vinyl halide copolymer composition comprising a copolymerization product of a vinyl halide and a reactive polyester, said vinyl halide being polymerized in the presence of the reactive polyester and wherein the reactive polyester has the formula:



$$X-(A-\overset{O}{\overset{\|}{C}}-B-\overset{O}{\overset{\|}{C}}-)_n(A)_p-X_1$$

wherein A is a linear or branched polyol residue having from about 2 to about 10 carbon atoms and one oxy group at each of its molecular ends; B is a linear alkylene from about 2 to about 12 carbon atoms, or B is phenylene; and X and X_1 independently are selected from the group consisting of hydrogen; an acyl group from a saturated or a monounsaturated monocarboxylic acid having from about 3 to about 18 carbon atoms; and R—C(O)—O—Y, wherein R is a saturated or an unsaturated hydrocarbon including from about 3 to about 18 carbon atoms and Y is a linear alkylene from 1 to about 4 carbon atoms; n is an integer from 1 to 60; and p is 0 or 1; with the proviso that when p is 0, X_1 is hydrogen; and that at least one of X and X_1 includes ethylenic monounsaturation.

5,021,491
ORGANOTIN ALKOXYCARBONYLPHENYL MERCAPTIDES AND THE USE THEREOF

Gerd Abeler, Darmstadt, Fed. Rep. of Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

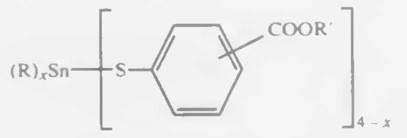
Continuation of Ser. No. 385,938, Jul. 21, 1989, abandoned, which is a continuation of Ser. No. 278,875, Dec. 2, 1988, abandoned. This application Mar. 1, 1990, Ser. No. 488,483

Claims priority, application Switzerland, Dec. 17, 1987, 4924/87

Int. Cl.^{5} C08K *5/58;* **C07F** *7/22*

U.S. Cl. 524—180 **14 Claims**

1. A compound of the formula I



(I)

wherein Ris C_3-C_{14}alkyl or R"OOC—CH_2—CH_2—, R' is C_2-C_{12}alkyl, cyclohexyl or benzyl, R" is C_1-C_{14}alkyl and x is 1 or 2, subject to the proviso that, if x is 1, the group COOR is not located in the ortho-position relative to the mercapto group.

12. A chlorine-containing thermoplastic which contains 0.1 to 5% by weight relative to the thermoplastic, of at least one compound of the formula I according to claim 1, as stabilizer.

5,021,492
RUBBER COMPOSITIONS CONTAINING A MIXTURE OF ALKYL ESTERS OF ROSIN ACID

Paul H. Sandstrom; Lawson G. Wideman, both of Tallmadge, and Thomas J. Segatta, Fairlawn, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 22, 1990, Ser. No. 601,101

Int. Cl.^{5} C08L *217/00*

U.S. Cl. 524—274 **10 Claims**

1. A process for preparing rubber compositions which comprises admixing a rubber selected from the group consisting of natural rubber, homopolymers of conjugated diolefins, copolymers of conjugated diolefins and ethylenically unsaturated monomers or mixtures thereof with a mixture of alkyl esters of rosin acid wherein said mixture of alkyl esters of rosin acid comprise at least

(a) from about 10 to about 50 percent by weight of a C_6 ester of rosin acid;

(b) from about 10 to about 50 percent by weight of a C_{12} ester of rosin acid; and

(c) from about 10 to about 50 percent by weight of a C_{18} ester of rosin acid.

5,021,493
RUBBER COMPOSITION AND TIRE WITH COMPONENT(S) THEREOF

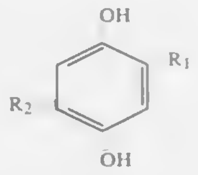
Paul H. Sandstrom, Tallmadge, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 21, 1990, Ser. No. 496,726

Int. Cl.^{5} C08L *7/00, 9/00;* **C08K** *5/05*

U.S. Cl. 524—347 **17 Claims**

1. A sulfur curable rubber composition which is comprised of at least one of natural rubber and synthetic rubber and is characterized by containing, based on 100 parts by weight of said rubber, from about 0.5 to about 5 parts by weight of 2,5-diorganohydroquinone having the structure:



where R_1 and R_2 are the same or different hydrocarbon radicals containing from 1 to 20 carbon atoms selected from saturated alkyl and cycloalkyl radicals containing 3 to 20 carbon atoms and from aryl and hydrocarbon substituted aryl radicals (alkaryl radicals) and aralkyl radicals containing from 6 to 20 carbon atoms; wherein said rubber composition is prepared by mixing essentially all of the 2,5-diorganohydroquinone in the absence of sulfur and vulcanization accelerators in a first, nonproductive, stage, of a multiple stage rubber mixing process.

5,021,494
THERMAL CONDUCTIVE SILICONE COMPOSITION

Masanori Toya, Gunma, Japan, assignor to Toshiba Silicone Co., Ltd, Tokyo, Japan

Filed Oct. 3, 1989, Ser. No. 416,752

Claims priority, application Japan, Oct. 3, 1988, 63-249607

Int. Cl.^{5} C08K *3/38*

U.S. Cl. 524—404 **12 Claims**

1. A thermally conductive silicone composition comprising:

(A) 100 parts by weight of a polyorganosiloxane containing at least two silicon-bonded alkenyl groups per molecule and having a viscosity as measured at 25° C. of 10 to 100,000 cP;

(B) a polyorganohydrogensiloxane containing at least three silicon-bonded hydrogen atoms per molecule in an amount such that the number of silicon-bonded hydrogen

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atoms contained therein is 0.5 to 4.0 per alkenyl group contained in component (A);

(C) a catalyst selected from the group consisting of platinum and platinum compounds, in an amount of 0.1 to 100 ppm by weight, in terms of the amount of platinum atoms, based on the amount of component (A);

(D) 100 to 800 parts by weight of a heat transfer filler having an average particle diameter of 5 to 20 μm and having a particle size distribution such that particles having a particle diameter of 5 μm or less are 20% or more of the whole particles and particles having a particle diameter of 10 μm or more are 20% or more of the whole particles; and

(E) 0.001 to 10 parts by weight of an adhesion promoter.

5,021,495

POLYESTER MOLDING COMPOSITION HAVING IMPROVED FLAME RESISTANT

Larry A. Minnick, Bluff City, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 23, 1990, Ser. No. 617,842

Int. Cl.^{5} C08K *5/03*

U.S. Cl. 524—410 **7 Claims**

1. A composition of matter comprising

(a) a polyester containing repeat units from at least 90 mol % terephthalic acid and at least 90 mol % butanediol or 1,4-cyclohexanedimethanol based on 100 mol % dicarboxylic acid and 100 mol % glycol, said polyester having an I.V. of about 0.5 to about 1.3,

(b) about 5% to about 20%, based on the total composition weight, of a halogenated organic compound,

(c) about 1% to about 10%, based on the total composition weight, of an antimony compound, and

(d) about 1% to about 20%, based on the total composition weight of a polymer of at least one olefin containing 2-6 carbon atoms and about 1-30 weight %, based on the weight of said polymer, of acid, anhydride, or epoxide functional groups.

5,021,496

FILLED POLYKETONE BLEND

Joseph M. Machado, Richmond, and Eric R. George, Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Nov. 13, 1990, Ser. No. 612,059

Int. Cl.^{5} C08K *3/32*

U.S. Cl. 524—417 **10 Claims**

1. A filled polymer composition comprising, as a major component, a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon and a lesser amount, on a volume basis, of a hydroxyapatite.

5,021,497

POLYARYLENE SULFIDE RESIN COMPOSITION

Shinji Ohara; Okihiro Morimoto, and Nobumasa Suemura, all of Ube, Japan, assignors to Ube Industries, Ltd., Ube, Japan

Continuation of Ser. No. 358,686, May 30, 1989, abandoned. This application Nov. 8, 1990, Ser. No. 613,941

Claims priority, application Japan, Jun. 17, 1988, 63-148022; Aug. 30, 1988, 63-213727

Int. Cl.^{5} C08K *3/22*

U.S. Cl. 524—436 **10 Claims**

1. A resin composition, comprising 100 parts by weight of a polyarylene sulfide resin, 10 to 300 parts by weight of metal hydroxides composed of 50% by weight or more of magnesium hydroxide represented by the formula $Mg(OH)_2$ and 20 to 120 parts by weight of glass fibers.

5,021,498

ASPHALTENE DISPERSANTS - INHIBITORS

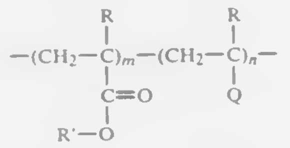
William K. Stephenson, Sugarland, and Morris Kaplan, Houston, both of Tex., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Nov. 8, 1989, Ser. No. 433,885

Int. Cl.^{5} C08L *33/06*

U.S. Cl. 524—484 **10 Claims**

1. An asphalt/asphaltene dispersant comprising an admixture of polymer A and polymer B ranging from 100 to 10 weight percent A to from 10 to 100 weight percent B, wherein polymer A is an alkyl substituted phenol-formaldehyde liquid resin having a weight average molecular weight ranging from about 1000 to about 20,000 and an alkyl substituent containing from 4 to 24 carbon atoms, which alkyl substituent may be a linear or branched alkyl group; and Polymer B is a hydrophilic-lipophilic vinylic polymer having a structure essentially described as:



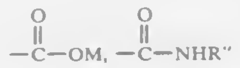
$$-(CH_2-\overset{\overset{R}{|}}{\underset{\underset{\underset{\underset{R'-O}{|}}{C=O}}{|}}{C}})_m-(CH_2-\overset{\overset{R}{|}}{\underset{\underset{Q}{|}}{C}})_n-$$

wherein

R is chosen, at each occurrence, from hydrogen and methyl groups; and

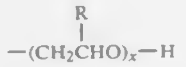
R' is a hydrocarbonaceous group containing from 4–24 carbon atoms and chosen from linear or branched alkyl groups, aromatic, cyclic, alkaryl, aralkyl groups, and mixtures thereof; and

Q is chosen from the groups,



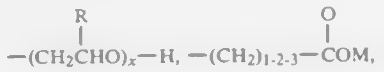
$$-\overset{\overset{O}{\|}}{C}-OM,\ -\overset{\overset{O}{\|}}{C}-NHR''$$

and mixtures thereof; and M is chosen, at each occurrence, from the group hydrogen, alkali metal cations, alkaline earth metal cations, ammonium ions, protonated amines, quaternary amines, hydroxyl ethyl, hydroxy propyl and



$$-(CH_2\overset{\overset{R}{|}}{C}HO)_x-H$$

groups, and mixtures thereof; and R'' is chosen, at each occurrence, from the group



$$-(CH_2\overset{\overset{R}{|}}{C}HO)_x-H,\ -(CH_2)_{1\text{-}2\text{-}3}-\overset{\overset{O}{|}}{C}OM,$$

and mixtures thereof; and

m and n are both integers of sufficient number to achieve a weight average molecular weight ranging from about 5000–250,000, and being of such a ratio as to describe the presence of from 90 to 10 weight percent of the lipophilic monomer, m, and from 10 to 90 weight percent of the hydrophilic monomer, n, and

wherein

x ranges from 1 to 20.

5,021,499

HOT MELT ADHESIVE CONTAINING IMPROVED HYDROCARBON TACKIFIER RESIN

Chiaki Tochinai, Tokyo; Tadanao Kohara, Yokohame; Sadayoshi Budo, Kanagawa; Hiroaki Masuda, Yokohama, and Takayoshi Yoshida, Kanagawa, all of Japan, assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation of Ser. No. 356,092, May 24, 1989, abandoned, which is a division of Ser. No. 152,274, Feb. 4, 1988, Pat. No. 4,845,182, which is a division of Ser. No. 799,520, Nov. 19, 1985, Pat. No. 4,757,114. This application Jul. 9, 1990, Ser. No. 550,237

Claims priority, application United Kingdom, Nov. 21, 1984, 8429356

Int. Cl.^{5} C08L *33/00, 91/06, 99/00*

U.S. Cl. 524—487 **9 Claims**

1. In a hot melt adhesive comprising:

(i) an ethylene vinyl acetate copolymer,

(ii) wax, and

(iii) an improved resin tackifier, wherein said resin is a block copolymer tackifier resin from a reaction mixture wherein a feed A or feed B is polymerized completely in the presence of a Friedel-Crafts catalyst and thereafter either respectively feed B or feed A is added to the reaction mixture and polymerization continued and the reactor effluent is stripped to obtain the resin, said feed A being a feed of about C_8 or C_9 aromatic, unsaturated, hydrocarbon-containing feed, and feed B being a feed of about C_5 aliphatic unsaturated hydrocarbon-containing feed, provided that feed A may contain up to 18 wt. % of C_4 or C_5 unsaturated aliphatic hydrocarbons based on the total weight of monomers in feed A.

5,021,500

DYNAMICALLY VULCANIZED ALLOYS OF CRYSTALLINE POLYOLEFIN RESIN AND HALOBUTYL RUBBER MATERIAL

Robert C. Puydak, Cranbury; Donald R. Hazelton, Chatham, both of N.J.; Silvestro Cartasegna, and Leonard Dogniez, both of Brussels, Belgium, assignors to Exxon Chemical Company, Linden, N.J.

Continuation of Ser. No. 264,487, Oct. 28, 1988, abandoned. This application May 24, 1990, Ser. No. 528,264

Int. Cl.^{5} C08L *15/02, 23/10, 23/26;* **C08K** *5/17*

U.S. Cl. 524—525 **15 Claims**

1. A thermoplastic olefin composition having improved long-term heat aging characteristics comprising a crystalline polyolefin blended with from about 20 to about 80 wt.% of a halobutyl rubber material under conditions of dynamic vulcanization and in the presence of a curing system containing from 0.5 to 4.0 phr (parts per hundred) of a maleimide curing agent so as to effect a fully cured state of at least a portion of the halobutyl rubber.

5,021,501

FLUORINE-CONTAINING WATER-REPELLENT OIL-REPELLENT COMPOSITION

Akira Ohmori, Ibaraki, and Hiroshi Inukai, Settsu, both of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

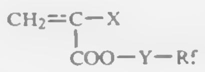
Continuation of Ser. No. 211,121, Jun. 21, 1988, abandoned, which is a division of Ser. No. 50,018, May 15, 1987, abandoned. This application Dec. 11, 1989, Ser. No. 445,950

Claims priority, application Japan, May 28, 1986, 61-122920; Oct. 6, 1986, 61-238535

Int. Cl.^{5} C08K *27/12*

U.S. Cl. 524—544 **6 Claims**

1. A method of providing improved water- and oil-repellent properties to an article selected from the group consisting of textile and leather articles, the method comprising applying to said article a composition comprising a fluorine-containing polymer which comprises at least 10 mole % of a fluorine-containing acrylate represented by the formula



$$CH_2{=}\underset{\underset{COO-Y-Rf}{|}}{C}-X$$

(1)

wherein X is a fluorine atom or $-CFX^1X^2$ group wherein X^1 and X^2 are the same or different and are each a hydrogen atom or fluorine atom, Y is alkylene having 1 to 3 carbon atoms, $-CH_2CH_2N(R)SO_2-$ group wherein R is alkyl having 1 to 4 carbon atoms or $-CH_2CH(OZ)CH_2-$ wherein Z is a hydrogen atom or acetyl, and Rf is fluoroalkyl having 3 to 21 carbon atoms, or fluoroalkyl having 3 to 21 carbon atoms and 1 to 10 oxygen atoms in its carbon chain wherein no two oxygen atoms are present adjacent to each other

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5,021,502

AQUEOUS ELECTRODEPOSITION LACQUER COATING COMPOSITION

Hans-Peter Patzschke; Peter W. Cerny; Dietrich Saatweber, all of Wuppertal, and Georg H. L. Hendrikx, Velbert, all of Fed. Rep. of Germany, assignors to Herberts Gesellschaft mit beschränkter Haftung, Wuppertal, Fed. Rep. of Germany

Continuation of Ser. No. 89,933, Aug. 25, 1987, abandoned, which is a continuation of Ser. No. 783,831, Oct. 3, 1985, abandoned. This application Jan. 10, 1990, Ser. No. 463,902

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1984, 34345

Int. Cl.^{5} C08G *18/00*

U.S. Cl. 524—591 **6 Claims**

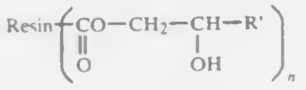
1. An aqueous electrodeposition lacquer coating composition comprising an organic synthetic resin binder dilutable in water by protonization with acids, said binder consisting essentially of

(A) from 95 to 505 by weight, based on the total quantity of binder, of an organic externally crosslinkable synthetic resin containing tertiary amino groups, primary and/or secondary hydroxyl groups and having a hydroxyl number of from 50 to 500, an amine number of from 30 to 150, and an average molecular weight (Mn) of from about 250 to about 10,000 and

(B) from 5 to 50% by weight of a crosslinking mixture of

  (a) polyisocyanates blocked with protective groups which are split off at baking temperatures below 210° C. and above 110° C.;

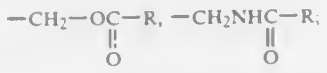
  (b) transesterifiable crosslinking agents containing at least two ester groups per molecule which are substantially stable in neutral, aqueous medium, but which form an ester with the hydroxyl groups of component (A) in basic medium at temperatures above 140° C., said transesterificable crosslinking agent being a polyester of the following formula



$$Resin\left(\underset{\underset{O}{\|}}{CO}-CH_2-\underset{\underset{OH}{|}}{CH}-R'\right)_n$$

wherein

R' is —H, —R, $-CH_2OH$, $-CH_2-O-R$,



$$-CH_2-O\underset{\underset{O}{\|}}{C}-R,\ -CH_2NH\underset{\underset{O}{\|}}{C}-R,$$

n is at least 2;

R is a linear or branched $C_{1\text{-}15}$ alkyl residue;

resin is a residue of a carboxyl group containing polyester, and

the components (A) and (B) being present in a ratio of from 1:20 to 20:1 parts by weight.

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5,021,503
RESIN FOR PLASTIC LENS HAVING HIGH-REFRACTIVE INDEX, LENS COMPRISING THE RESIN, AND METHOD FOR PREPARATION OF THE LENS

Teruyuki Nagata; Koju Okazaki, both of Omuta; Nobuyuki Kajimoto, Yokohama; Tohru Miura, Yokohama; Yoshinobu Kanemura, Yokohama, and Katsuyoshi Sasagawa, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 311,352

Claims priority, application Japan, Feb. 17, 1988, 63-32842; Feb. 18, 1988, 63-33871; Feb. 18, 1988, 63-33872; Feb. 22, 1988, 63-37515; Feb. 22, 1988, 63-37523; Feb. 22, 1988, 63-37525

Int. Cl.^{5} C08L *75/00*

U.S. Cl. 524—706 19 Claims

1. A resin comprising the product of reacting one or more of sulfur-containing aliphatic polyisocyanate compounds with one or more active hydrogen compounds selected from the group consisting of polyol compounds and polythiol compounds.

5,021,504
THERMOPLASTIC POLYOLEFIN-POLYCARBONATE COMPOSITION

Yuuji Fujita; Tadashi Sezume; Kitsusho Kitano, all of Ooi; Kiyotada Narukawa, Tokorozawa; Takashi Mikami, Komae; Tetsuya Kawamura, Tokyo; Shigeru Sato, Ooi; Takeyoshi Nishio, Okazaki; Toshio Yokoi, and Takao Nomura, both of Toyota, all of Japan, assignors to Tonen Sekiyukagaku Kabushiki Kaisha, Tokyo and Toyota Jidosha Kabushiki Kaisha, Aichi, both of, Japan

Filed Sep. 19, 1988, Ser. No. 247,015

Claims priority, application Japan, Sep. 17, 1987, 62-234277; Sep. 17, 1987, 62-234278; Sep. 17, 1987, 62-234279; Sep. 17, 1987, 62-234280; Sep. 17, 1987, 62-234281; Sep. 17, 1987, 62-234282; Sep. 17, 1987, 62-234283; Sep. 17, 1987, 62-234284; Sep. 17, 1987, 62-234285

Int. Cl.^{5} C08L *69/00, 23/10*

U.S. Cl. 525—57 58 Claims

1. A thermoplastic resin composition consisting essentially of:
(a) 95–5 weight % of crystalline polyolefin,
(b) 5–95 weight % of polycarbonate, and
(c) 5–100 parts by weight, per 100 parts by weight of said (a) + said (b), of a
styrene-ethylene-propylene block copolymer having a single styrene block and a single ethylene-propylene block.

5. A thermoplastic resin composition comprising:
(a) 95–5 weight % of crystalline polyolefin,
(b) 5–95 weight % of polycarbonate,
(c) a styrene-ethylene butylene-styrene block copolymer, and
(d) a low-crystallinity ethylene-α-olefin copolymer having a crystallinity of 20% or less, said (c) + said (d) being 5–100 parts by weight per 100 parts weight of said (a) + said (b), and a weight ratio of said (c) to said (d) being 30/70–95/5.

20. A thermoplastic resin composition comprising:
(a) 95–5 weight % of crystalline polyolefin,
(b) 5–95 weight % of polycarbonate, and
(c) 2–100 parts by weight, per 100 parts by weight of said (a + said (b), of a modified polyolefin, and
(d) 2–100 parts by weight, per 100 parts by weight of said (a) + said (b), of polybutylene terephthalate.

5,021,505
PHOTOSENSITIVE POLY(VINYL ALCOHOL) DERIVATIVE

Kunihiro Ichimura, Tsukuba; Noriaki Tochizawa, and Hideo Kikuchi, both of Funabashi, all of Japan, assignors to Director General of the Agency of Industrial Science and Technology and Toyo Gosei Kogyo Co., Ltd., both of, Japan

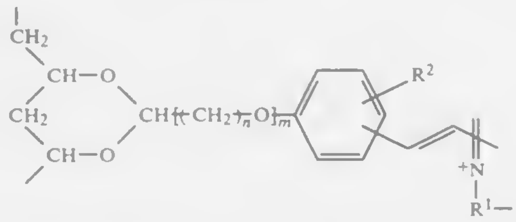
Filed Dec. 1, 1989, Ser. No. 444,626

Claims priority, application Japan, Dec. 14, 1988, 63-313680

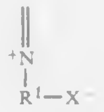
Int. Cl.^{5} C08F *8/00*

U.S. Cl. 525—59 5 Claims

1. A photosensitive poly(vinyl alcohol) derivative comprising units of the formula



wherein R_1 is alkylene of 1 to 8 carbon atoms, R_2 is hydrogen or alkoxy of 1 to 8 carbon atoms,



is a quaternary aromatic nitrogen-containing heterocycle, X— is SO_3— or CO_2—, m is 0 or 1, and n is an integer of 1 to 6.

5,021,506
POLYOL POLYACRYLATE DISPERSANTS

Robert G. Gastinger, West Chester, Pa., and John E. Hayes, Wilmington, Del., assignors to ARCO Chemical Technology, Inc., Wilmington, Del.

Filed Jul. 29, 1988, Ser. No. 226,347

Int. Cl.^{5} C08L *51/08, 33/08, 32/10, 71/02*

U.S. Cl. 525—63 31 Claims

1. A stable polymer polyol composition comprising a continuous phase, a disperse phase within the continuous phase, and a dispersant for enhancing the stability of the polymer polyol, wherein
(a) the disperse phase consists essentially of vinyl polymer particles;
(b) the continuous phase consists essentially of a first polyoxyalkylene polyether polyol; and
(c) the dispersant is a polyol polyacrylate formed by polymerizing from about 5 to about 90 weight percent of at least one acrylate monomer selected from the group consisting of C_1–C_{20} alkyl esters of acrylic and methacrylic acids in from about 95 to about 10 weight percent of a second polyoxyalkylene polyether polyol to form a single phase homogeneous liquid intermediate reaction product followed by transesterifying from about 1 to about 30 mole percent of the total ester groups of the acrylate in the intermediate reaction product with the hydroxyl groups of said second polyoxyalkylene polyether polyol to form the polyol polyacrylate dispersant,
said dispersant being employed in an amount sufficient to enhance the stability of the resulting polymer polyol as compared to the stability of the polymer polyol in the absence of polyol polyacrylate dispersant.

15. A stable polymer polyol composition comprising a continuous phase, a disperse phase within the continuous phase, and a dispersant for enhancing the stability of the polymer polyol, wherein
(a) the disperse phase consists essentially of vinyl polymer particles;
(b) the continuous phase consists essentially of a first polyoxyalkylene polyether polyol; and
(c) the dispersant is a polyol polyacrylate formed by blending from about 5 to about 90 weight percent of at least one acrylate polymer selected from the group consisting of homopolymers and copolymers of C_1–C_{20} alkyl esters of acrylic and polymers and copolym methacrylic acids with from about 95 to about 10 weight percent of a second polyoxyalkylene polyether polyol to form a single phase homogeneous liquid intermediate blend followed by transesterifying from about 1 to about 30 mole percent of the total ester groups of the acrylate with the hydroxyl groups of the second polyoxyalkylene polyether polyol to form the polyol polyacrylate dispersant, said dispersant being employed in an amount sufficient to enhance the stability of the resulting polymer polyol as compared to the stability of the polymer polyol in the absence of polyol polyacrylate dispersant.

5,021,507
ARCYLIC MODIFIED REACTIVE URETHANE HOT MELT ADHESIVE COMPOSITIONS

Henry Stanley, Cedar Grove; Irwin Davis, and Wen B. Chiao, both of Bridgewater, all of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Continuation-in-part of Ser. No. 43,140, Apr. 30, 1987, abandoned, which is a continuation-in-part of Ser. No. 859,539, May 5, 1986, abandoned. This application May 27, 1988, Ser. No. 200,092

Int. Cl.^{5} C08F *8/30;* **C08L** *75/04*

U.S. Cl. 525—127 28 Claims

1. A solvent-free hot melt polyurethane adhesive composition which is solid at room temperature consisting essentially of:
(a) 5 to 90% by weight of a urethane prepolymer having an isocyanate content of 0.25 to 15% and an isocyanate index greater than 1 and no more than about 2;
(b) 10 to 95% by weight of a low molecular weight polymer of ethylenically unsaturated monomers containing no active hydrogen, the monomers being polymerized to an intrinsic viscosity of 0.1 to 0.4 as measured in a 9:1 mixture of tetrahydrofuran and alcohol; said hot melt adhesive formulation being characterized, in the absence of tackifiers or plasticizers, by a viscosity of 3000 to 50,000 cps at 120° C. (Thermocel).

5,021,508
THERMOPLASTIC MOLDING MATERIALS CONSISTING OF POLYESTERS AND POLYCARBONATES AND HAVING A GOOD LOW-TEMPERATURE IMPACT STRENGTH

Christof Taubitz, Wachenheim; Hans-Henning Hub, Worms; Walter Ziegler, Edingen-Neckarhausen, and Juergen Sadlowski, Muenster-Hiltrup, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 289,430, Dec. 22, 1988, abandoned, which is a continuation of Ser. No. 145,705, Jan. 15, 1988, abandoned, which is a continuation of Ser. No. 875,576, Jun. 18, 1986, abandoned. This application Feb. 27, 1990, Ser. No. 488,428

Claims priority, application Fed. Rep. of Germany, Jun. 20, 1985, 3521956

Int. Cl.^{5} C08L *69/00, 67/02*

U.S. Cl. 525—133 3 Claims

1. A thermoplastic molding material having good low-temperature impact strength which comprises:
(A) from 5 to 94 parts by weight of one or more aliphatic polyesters of an aromatic dicarboxylic acid,
(B) from 5 to 94 parts by weight of one or more aromatic polycarbonates, and
(C) from 1 to 40 parts by weight of one or more olefin polymers which contain epoxide groups and which has a melt flow index (MFI 190/2.16) of from 5 to 13 g/10 min., the amounts of components A, B and C summing to 100 parts by weight of wherein component C is composed of
a) from 50 to 98% by weight of ethylene,
b) from 1 to 40% by weight of glycidyl (meth)acrylate and
c) from 1 to 45% of a material selected from the group consisting of n-butyl acrylate, 2-ethylhexyl acrylate and mixtures thereof.

5,021,509
BUTYL RUBBER COMPOSITIONS HAVING IMPROVED ADHESION TO POLYESTER

Robert C. Keller, Morris Plains, N.J., and Marc R. Kuhnhein, Wadsworth, Ohio, assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Sep. 1, 1989, Ser. No. 403,306

Int. Cl.^{5} C08L *9/00, 15/02, 33/02, 33/06, 23/08*

U.S. Cl. 525—221 18 Claims

1. A vulcanizable composition comprising an admixture of:
(a) an elastomer selected from the group consisting of butyl rubber and halogenated butyl rubber, and
(b) an adhesion promoter comprising a terpolymer of from about 60 to about 96% by weight of polymerized ethylene, from about 4 to about 30% by weight of a polymerized C_1 to C_4 alkyl acrylate or methacrylate, and from about 0.5 to about 10% by weight of polymerized acrylic or methacrylic acid, said adhesion promoter being present at a level of from about 0.5 to about 15% by weight based o the rubber content of the composition.

5,021,510
GRAFT-MODIFIED LINEAR LOW-DENSITY POLYETHYLENES, PROCESS FOR THEIR PREPARATION AND THE APPLICATION THEREOF

Hubertus J. Vroomans, Beek, Netherlands, assignor to Stamicarbon B.V., Geleen, Netherlands

Continuation of Ser. No. 177,649, Apr. 5, 1988, abandoned. This application Oct. 5, 1989, Ser. No. 418,754

Claims priority, application European Pat. Off., Apr. 11, 1987, 87200680.4

Int. Cl.^{5} C08F *255/02;* **C08L** *67/00, 59/00;* **B32B** *27/08*

U.S. Cl. 525—285 13 Claims

1. Graft-modified linear polyethylene having a density lower than 940 kg/m^3, wherein the polyethylene is grafted with one or more compounds containing carboxyl groups and one or more vinylaromatic compounds, the molar ratio of the vinylaromatic compound(s) to the carboxyl group containing compound(s) is from 2:1 to 1:2 in the presence of a solvent in a weight ratio of 2:1 to 1:10 calculated on the total graft material, the amount of carboxyl group containing compound(s) is 0.2 to 15% (wt), calculated on the polyethylene.

5,021,511
POLYMER COMPOSITIONS DERIVED FROM ACRYLOXYALKYLCYANOACETAMIDES

Gary R. Larson, Hatfield; William D. Emmons, Huntingdon Valley, both of Pa., and Palaiyur S. Kalyanaraman, Fanwood, N.J., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Dec. 27, 1988, Ser. No. 290,672

Int. Cl.^{5} C08F *20/60*

U.S. Cl. 525—295 7 Claims

1. A composition of matter comprising a polymer which is prepared from at least one cyanoacetamide monomer having the formula:

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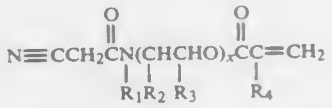


$$N\equiv CCH_2\overset{\overset{O}{\|}}{C}\underset{R_1}{N}(\underset{R_2}{C}H\underset{R_3}{C}HO)_x\overset{\overset{O}{\|}}{C}\underset{R_4}{C}=CH_2$$

where R_1 is $-CH_3$, $-(CH_2)_mCH_3$ or $-H$; R_2 and R_3 independently are $-H$, (C_1-C_4) alkyl or aryl; R_4 is $-CH_3$ $-(CH_2)_nCH_3$ or H; m is 1 to 10; n is 1 to 10; and x is 1 to 20; wherein said polymer is reacted with one or more compound(s) functioning as a carbon-Michael acceptor to form a carbon-Michael reaction product.

5,021,512
THIOL/ENE COMPOSITIONS

John G. Woods, Stillorgan, and John M. Rooney, South Glastonbury, Conn., assignors to Loctite (Ireland) Ltd., Tallaght, Ireland

Continuation of Ser. No. 1,498, Jan. 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 824,903, Jan. 31, 1986, Pat. No. 4,640,849, and a continuation-in-part of Ser. No. 779,737, Sep. 24, 1985, Pat. No. 4,732,956, which is a continuation-in-part of Ser. No. 667,724, Dec. 4, 1984, Pat. No. 4,543,397, which is a continuation-in-part of Ser. No. 621,419, Jun. 18, 1984, abandoned. This application May 4, 1989, Ser. No. 351,310

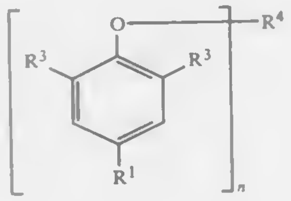
Claims priority, application Ireland, Jan. 7, 1986, 32/86

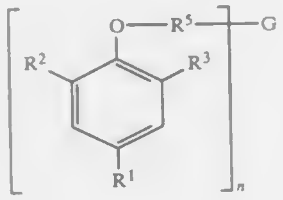
Int. Cl.^{5} C08F *8/34*

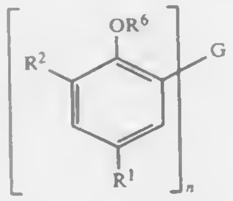
U.S. Cl. 525—328.2 **10 Claims**

1. Curable compositions comprising

1) a multifunctional styryloxy monomer having one or more of the following structures

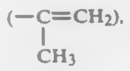






wherein

R^1, R^2 and R^3 are selected from vinyl $(-CH=CH_2)$, 1-propenyl$(-CH=CH-CH_3)$, isopropenyl



$$(-\underset{CH_3}{\underset{|}{C}}=CH_2),$$

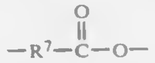
hydrogen, lower alkyl or alkoxy, provided that at least one of R^1, R^2 and R^3 must be vinyl, 1-propenyl or isopropenyl;

n is an integer≧1;

if n=1, then R^4 is a monovalent hydrocarbon radical containing one free-radically copolymerisable alkenyl or cycloalkenyl group,

if n≧2, R^4 is a multivalent hydrocarbon radical which may contain a maximum of one free-radically copolymerisable alkenyl or cycloalkenyl group;

R^5 is a divalent hydrocarbon radical; or a carbon atom which is part of a cyclic group in the radical G; or a radical of formula



$$-R^7-\overset{\overset{O}{\|}}{C}-O-$$

where R^7 is a divalent hydrocarbon radical;

if n=1, G is a monovalent organic or inorganic radical, free of phenolic hydroxyl groups or other groups which substantially interfere with radical polymerisation, containing one free-radically copolymerisable alkenyl or cycloalkenyl group;

if n≧2, G is a multivalent organic or inorganic radical, free of phenolic hydroxyl groups or other groups which substantially interfere with radical polymerisation, which may contain a maximum of one free-radically copolymerisable alkenyl or cycloalkenyl group;

R^6 is lower alkyl or cycloakyl group; or if n=1, R^6 may also be an alkenyl or cycloalkenyl group, provided that G does not contain an alkenyl or cycloalkenyl group.

2) a multifunctional thiol.

3) a free-radical curing rate accelerator.

5,021,513
CURABLE EPOXIDE RESIN COMPOSITIONS

Madan M. Bagga, Cambridge, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 420,193, Oct. 12, 1989, Pat. No. 4,977,214. This application Oct. 4, 1990, Ser. No. 592,720

Claims priority, application United Kingdom, Oct. 18, 1988, 8824391

Int. Cl.^{5} C08F *12/24;* **C08G** *59/68, 8/28*

U.S. Cl. 525—328.8 **7 Claims**

1. An epoxy resin cure accelerator comprising a solid solution of a polymeric phenol with an aliphatic polyamine having two or more amine groups, each of the amine groups being tertiary and at least two of the amine groups being dimethylamino groups.

5,021,514
IMIDIZED ACRYLIC POLYMERS AND PROCESS FOR THEIR PREPARATION

Luciano Canova, Novara; Umberto Giannini, Milan, and Enrico Albizzati, Arona, all of Italy, assignors to Vedril S.p.A., Milan, Italy

Division of Ser. No. 143,321, Jan. 13, 1988, Pat. No. 4,968,755. This application May 29, 1990, Ser. No. 529,466

Claims priority, application Italy, Jan. 14, 1987, 19065 A/87

Int. Cl.^{5} C08F *8/32*

U.S. Cl. 525—351 **8 Claims**

1. A process for the preparation of imidized acrylic polymers, comprising reacting an acrylic resin and a modifying agent having the formula:

R-X-NH-R' (I)

wherein:

R and R' are either equal to or different from each other, and represent hydrogen or an alkyl, cycloalkyl, aryl or alkylaryl radical containing from 1 to 20 carbon atoms, and

X is a bifunctional radical selected from the group consisting of: $-CO-$, $-CONH-$, $-NHCO-$, $-OCO-$, $-SO_2-$, $-C_6H_4SO_2-$

where R and R' differ, the former can contain halogen atoms under ambient pressure, or, lower, and at a temperature higher than the melting temperature of the acrylic resin.

5,021,515
PACKAGING

Michael A. Cochran, Wantage; Rickworth Folland, Faringdon; James W. Nicholas, Wantage, and Melvin E. R. Robinson, Oxfordshire, all of England, assignors to CMB Foodcan plc, Worcester, England

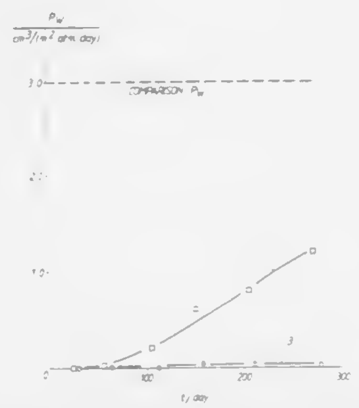
PCT No. PCT/GB88/00532, § 371 Date Mar. 23, 1989, § 102(e) Date Mar. 23, 1989, PCT Pub. No. WO89/01012, PCT Pub. Date Feb. 9, 1989

PCT Filed Jul. 6, 1988, Ser. No. 340,416

Claims priority, application United Kingdom, Jul. 27, 1987, 8717754; Mar. 12, 1988, 8805931; Mar. 22, 1988, 8806752; Jul. 1, 1988, 8815699

Int. Cl.^{5} C08K *5/00, 5/09;* **B32B** *27/18;* **B65D** *81/26*

U.S. Cl. 525—371 **58 Claims**



1. A wall for a package, which wall comprises, or includes a layer comprising, a composition which comprises a polymer, said composition being capable of scavenging oxygen through the metal promoted oxidation of an oxidizable organic polymer component which is a polyamide, the metal oxidation promoter being selected from the transition metals in positive oxidation states and mixtures thereof, such that the permeance of the wall for oxygen is not more than 10.0 $cm^3/(m^2$ atm day).

5,021,516
POLY(PERFLUOROETHER)ACYL PEROXIDES

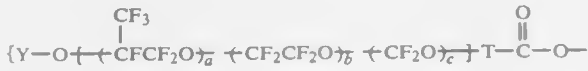
Robert C. Wheland, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 26, 1989, Ser. No. 371,138

Int. Cl.^{5} C08G *65/22, 65/26, 65/32*

U.S. Cl. 525—403 **20 Claims**

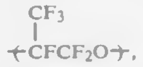
1. A poly(perfluoroether)acyl peroxide of the formula



$$\{Y-O-\!\left[\left(\overset{CF_3}{\overset{|}{C}}FCF_2O\right)_a\left(CF_2CF_2O\right)_b\left(CF_2O\right)_c\right]\!-T-\overset{\overset{O}{\|}}{C}-O-\}_2$$

wherein

Y is a perfluoroalkyl group containing up to 12 carbon atoms,



$$\left(\overset{CF_3}{\overset{|}{C}}FCF_2O\right),$$

$-CF_2CF_2O-$ and $-(CF_2O)-$ are repeat units where a+b+c is a minimum of 2 and a maximum such that the maximum molecular weight of the peroxide is about 33,000; and

T is $-CF_2-$ and $-CF(CF_3)-$,

provided that when a is zero, T is not $-CF(CF_3)-$, when b is zero T is not $-CF_2-$, and further provided that when a and b are zero, T is $-CF_2-$.

5,021,517
PROCESS FOR THE FABRICATION OF RODLIKE POLYMER REINFORCED MOLECULAR COMPOSITES INTO SHAPED ARTICLES

Chyi-Shan Wang, Fairborn; Ivan J. Goldfarb, and Thaddeus E. Helminiak, both of Dayton, all of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 28, 1989, Ser. No. 360,950

Int. Cl.^{5} C08F *283/04*

U.S. Cl. 525—417 **12 Claims**

1. A process for fabricating rod-like aromatic heterocyclic polymer-reinforced composite materials into shaped articles which comprises the steps of:

(a) dissolving a rigid-rod aromatic heterocyclic polymer and a flexible, coil-like thermoplastic polymer in a common solvent at a concentration less than the critical concentration point of the solution;

(b) extruding the solution resulting from step (a) into a liquid bath for removing the solvent;

(c) placing the extrudate from step (b), in the liquid-wet state, into a mold, and consolidating the extrudate in the mold to provide a molded article;

(d) drying the molded article resulting from step (c); and

(e) compression molding the article to provide a fully consolidated, solid article.

5,021,518
ETHYNYL TERMINATED IMIDOTHIOETHERS AND RESINS THEREFROM

Paul M. Hergenrother, Yorktown; John W. Connell, Newport News, and R. Gerald Bass, Richmond, all of Va., assignors to The United States of America as represented by the Administration of the National Aeronautics and Space Administrations, Washington, D.C.

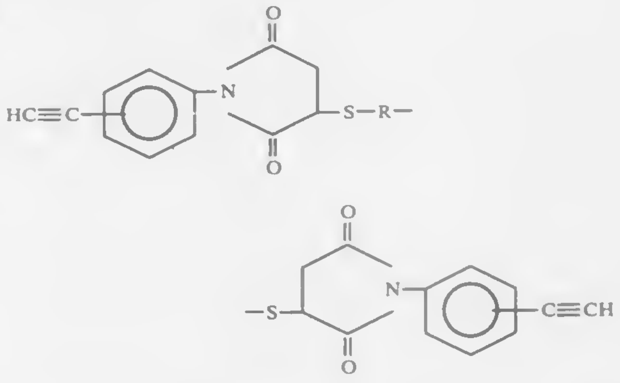
Division of Ser. No. 218,792, Jul. 14, 1988, Pat. No. 4,861,882. This application May 4, 1989, Ser. No. 347,558

Int. Cl.^{5} C08F *283/04, 283/00;* **C08G** *73/10, 16/00*

U.S. Cl. 525—422 **7 Claims**

1. A resin blend comprising an ethynyl terminated polymeric material selected from the group consisting of ethynyl terminated sulfones and ethynyl terminated arylene ethers in combination with:

an ethynyl terminated imidothioether having the following structural formula:



wherein R is selected from the group of divalent radicals consisting of CH_2CH_2, $CH_2CH_2CH_2$, $CH_2CH_2CH_2CH_2CH_2$, $CH_2OCH_2OCH_2$,

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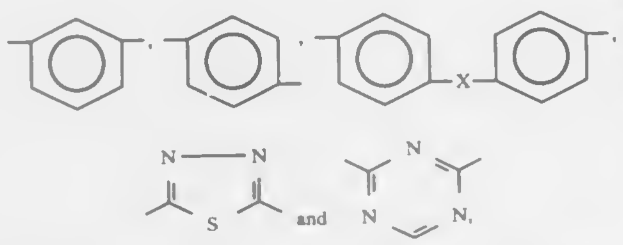


wherein X is a bond or is a member selected from the group consisting of CH_2, O, S, $C(CH_3)_2$, $C(CF_3)_2$, SO_2, and O=C, and

wherein the ethynyl terminated imidothioether is formed as a mixture of stereoisomers and comprises the d, l, and meso forms.

5,021,519

EPOXY-POLYIMIDE BLEND FOR LOW TEMPERATURE CURE, HIGH-PERFORMANCE RESIN SYSTEM AND COMPOSITES

Uday M. Varde; Michael N. Tackie, both of Plum Borough, Pa., and Rakesh K. Gupta, Fairborn, Ohio, assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Mar. 24, 1988, Ser. No. 173,245

Int. Cl.^{5} C08L *79/08*

U.S. Cl. 525—423 **18 Claims**

1. An essentially solvent-free cured resin blend consisting essentially of:

(i) a polyimide curable at a temperature above about 150° C. (302° F.), and, having (a) plural imide groups connected to an aliphatic, cycloaliphatic, aromatic or heterocyclic radical having the same number of valences as there are imide groups, (b) a divalent radical containing from 2 to about 20 carbon atoms and a single C=C double bond;

(ii) a liquid non-elastomeric epoxy having a molecular weight less than about 10,000, curable at a temperature below about 150° C.; and,

(iii) an epoxy-curing-agent present in an amount sufficient to cure said epoxy into a polymeric matrix having a viscosity high enough to provide a stable three-dimensional structure which fixes the distribution of said polyimide within said matrix;

said epoxy and epoxy-curing agent forming a continuous phase having a sufficiently low viscosity to form a single liquid phase in which said polyimide is miscible, and present in an amount sufficient to permit molecular interaction between polyimide molecules at a temperature higher than that required to cure said epoxy;

whereby said epoxy is cured at a temperature below about 150° C. to provide said matrix; and said polyimide is thereafter cured at a temperature above about 150° C. to yield said cured resin blend.

5,021,520

CROSSLINKED POLYURETHANE-POLYUREA POWDERS, A PROCESS FOR THEIR PRODUCTION AND THEIR USE AS FILLERS IN TWO-COMPONENT POLYURETHANE COATING COMPOSITIONS

Helmut Reiff; Dieter Dieterich, both of Leverkusen, Fed. Rep. of Germany, and René Stepanek, Pfungen, Switzerland, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 19, 1990, Ser. No. 495,530

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1989, 3909597

Int. Cl.^{5} C08F *283/06*

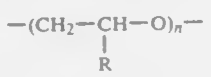
U.S. Cl. 525—458 **3 Claims**

1. A process for the production of a crosslinked polyurethane-polyurea powder which comprises dispersing an NCO semiprepolymer in an aqueous medium, forming a powder and isolating the powder from the aqueous medium, said NCO semiprepolymer having an NCO content of 10 to 20%, being liquid at room temperature and/or dissolved in an isocyanate-inert, water-soluble solvent and comprising the reaction product of

(a) a polyisocyanate component comprising at least one organic polyisocyanate with a polyol component having an average hydroxyl functionality of 2.3 to 4.0 and comprising

(b) a hydrophobic polyol component containing less than 25% by weight of ethylene oxide units, $—CH_2—CH_2—O—$, and comprising at least one polyether polyol-having a molecular weight of 400 to about 10,000 and up to 10% by weight, based on the total weight of component b), of one or more polyhydric alcohols having a molecular weight below 400 and

(c) a hydrophilic polyether component comprising a monohydric or polyhydric alcohol containing at least 70% by weight, based on the weight of component c), of structural units corresponding to the formula



$$—(CH_2—\underset{\displaystyle R}{\underset{|}{CH}}—O)_n—$$

wherein

n equals 15 to 80 and

R is hydrogen or a methyl group, provided that at least 80% of the substituents R are hydrogen, said hydrophilic polyether component being present in an amount sufficient to provide said NCO semiprepolymer with a content of about 0.5 to 12% by weight of said structural units.

5,021,521

PROCESS OF REACTING BRANCHED THERMOPLASTIC POLYCARBONATE WITH POLYHYDRIC PHENOL HAVING MORE THAN TWO HYDROXY GROUPS

Herman O. Krabbenhoft, and Eugene P. Boden, both of Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 297,380, Jan. 17, 1989, Pat. No. 4,888,400. This application Dec. 22, 1989, Ser. No. 455,057

Int. Cl.^{5} C08G *64/42*

U.S. Cl. 525—462 **7 Claims**

1. A process for the preparation of a thermoplastic, branched-chain, polycarbonate which comprises reacting a branched aromatic polycarbonate with a polyhydric phenol having more than two hydroxy groups per molecule in the presence of a catalytic amount of a carbonate equilibration catalyst.

5,021,522

RUBBER COMPOUNDING RESIN

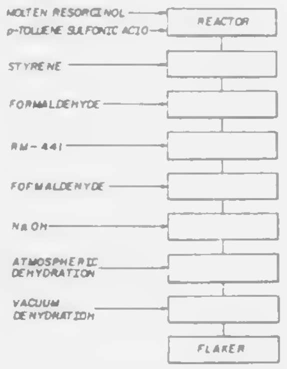
Bojayan Durairaj; Alex Peterson, Jr., both of Pittsburgh, Pa.; Robert M. Lamars, Willoughby Hills, Ohio, and Richard T. Hood, Murrysville, Pa., assignors to Indspec Chemical Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 214,325, Jul. 1, 1988. This application Feb. 21, 1990, Ser. No. 482,704

Int. Cl.^{5} C08G *14/02;* **C08F** *61/00;* **D04B** *1/00;* **B32B** *25/00*

U.S. Cl. 525—502 **22 Claims**

1. An improved vulcanizable rubber composition of the type comprising (I) a rubber component selected from natural rubber, synthetic rubber or combinations thereof, and (II) a methylene donor compound which generates formaldehyde upon heating, and (III) a phenolic novolak resin type methylene acceptor compound; wherein the improvement comprises using a phenolic novolak resin having at least a portion of the phenolic compounds being aralkylated with one or more compounds selected from the group consisting of styrene, alpha methyl styrene, beta methyl styrene, p-methyl styrene, alpha chloro styrene, and vinyl naphthalenes.



5,021,523

POLYMER ALLOY OF POLYARYLENE THIOETHER AND A PROCESS FOR PRODUCING THE SAME

Yo Iizuka; Ken Kashiwadate; Shunzo Endo; Toshio Hosokawa; Takayuki Katto, all of Iwaki; Toshiya Mizuno, Tsuchiura, and Kenichi Katase, Ushiku, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 4, 1988, Ser. No. 267,371

Claims priority, application Japan, Nov. 5, 1987, 62-279900

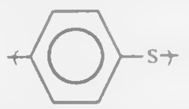
The portion of the term of this patent subsequent to Jan. 15, 2008, has been disclaimed.

Int. Cl.^{5} C08L *81/02*

U.S. Cl. 525—537 **8 Claims**

1. A process for producing a polymer alloy of polyarylene thioether, comprising the steps of:

(1) impregnating 100 parts by weight of particulate polyarylene thioether consisting of repeating units Ar-S, wherein Ar is an arylene group, which contains not less than 60 mol % of repeating units of paraphenylene sulfide,



with 0.1-100 parts by weight of at least one kind of radically polymerizable monomer containing a polymerization initiator at a temperature at which polymerization of said monomer does not substantially begin; and

(2) increasing the temperature of the reaction system so that substantially all the monomer sufficiently radically polymerizes.

5,021,524

INITIATOR FOR GROUP TRANSFER POLYMERIZATION

Ira B. Dicker, Wilmington, Del., and Walter R. Hertler, Kennett Square, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 14, 1988, Ser. No. 181,662

Int. Cl.^{5} C08F *4/16, 120/14*

U.S. Cl. 526—190 **3 Claims**

1. Group Transfer Polymerization process for preparing a "living" polymer, the process comprising contacting under polymerizing conditions at least one acrylic or maleimide monomer with (i) a tetracoordinate organosilicon, organotin or organogermanium polymerization initiator containing at least one initiating site, and (ii) a co-catalyst which is a source of biflouride, flouride, cyanide or azide ions, or a suitable oxyanion or bioxyanion, Lewis acid or Lewis base, the process further characterized in that the initiator is one or more tetracoordinate organosilicon, organogermanium or organotin compounds of the formula:

$$(R^1)_3MZ^4 \qquad (1);$$

wherein:

each R^1, independently, is a hydrocarbyl radical which is an aliphatic, alicyclic, aromatic or mixed aliphatic-aromatic radical containing up to 20 carbons atoms or H, provided that at least one R^1 group is not H;

M is Si, Sn or Ge;

Z^4 is an activating substituent selected from $—OC(X')=C(X^2)(Y^1)$, its keto isomer $—C(X^2)(Y^1)—C(O)X'$, mixtures thereof and $—N=C=C(R^4)(M[R_1]_3)$;

X' is $—OSi(R^1)_3$, —R, —OR or —NR'R''; R is a hydrocarbyl radical which is an aliphatic, alicyclic, aromatic or mixed aliphatic-aromatic radical containing up to 20 carbon atoms, optionally containing one or more ether oxygen atoms within aliphatic segments thereof and optionally containing one or more functional substituents that are unreactive under polymerizing conditions;

R^1 is as defined above;

each of R' and R'' is independently selected from C_{1-4} alkyl; R^4 is $—M(R^1)$, or R^2; R^2 is selected from H and hydrocarbyl, defined as for R above;

Y^1 is —R and X^2 is $—CO_2R$.

5,021,525

PROCESS FOR THE MANUFACTURE OF POLYMERS

Peter G. Montague, Warwicks; Philip A. Lagar, Rugby, and Peter Bainbridge, Northants, all of United Kingdom, assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Jun. 12, 1989, Ser. No. 365,058

Claims priority, application United Kingdom, Jun. 13, 1988, 8813966

Int. Cl.^{5} C08F *2/10, 218/0, 222/0*

U.S. Cl. 526—210 **19 Claims**

1. A process for the preparation of polymers containing at least one hydrophilic monomeric component and at least one hydrophobic monomeric component comprising the step of polymerizing the monomers in the presence of free radical polymerization initiators in an aqueous medium consisting of water and a cosolvent, wherein the amount of water miscible cosolvent is monitored so as to maintain the ratio of water to cosolvent equal or greater than unity during the reaction, thereby keeping the polymer as it forms in a sufficiently mobile condition and preventing homopolymerization and precipitation of the polymer from the hydrophobic monomer; thereby producing a polymer as a relatively high solids, low viscosity, opaque or semi-opaque product which is stable and slightly cloudy, opaque or semi-opaque, which exhibits no gelling, coagulation or product separation on standing and which, upon dilution to 0.25% solids content w/w, has a turbidity of at least 10 Nephelometric Turbidity units.

5,021,526

ANIONIC POLYMERIC STABILIZERS FOR OIL-IN-WATER EMULSIONS

Lawrence E. Ball, Akron, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 214,791, Jul. 5, 1988, abandoned, which is a continuation-in-part of Ser. No. 26,583, Mar. 17, 1987, abandoned, which is a division of Ser. No. 706,229, Feb. 27, 1985, abandoned. This application Mar. 5, 1990, Ser. No. 492,413

Int. Cl.^{5} C08F *30/04*

U.S. Cl. 526—240 **3 Claims**

1. A water soluble terpolymer having emulsifying and emulsion stabilizing properties consisting essentially of the polymerized mixture of (1) 30 to 85 weight percent of a water soluble vinyl monomer selected from the group consisting of acrylam-

VOL 1127
ISS 1
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1991
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ide, methacrylamide, vinyl methyl ether, N-methyl acrylamide, N,N-dimethylacrylamide, N-methacryloylglycinamide, vinyl pyrrolidone, and N-vinyloxazolidone, (2) 0.1 to 20 weight percent of a water insoluble vinyl monomer having an alkyl chain containing about 12 to 30 carbon atoms selected from the group consisting of alkyl acrylate esters, vinyl esters and vinyl ethers, and (3) 10 to 50 weight percent of a polymerizable vinyl monomer containing an acid group or its water soluble salt selected from the group consisting of ethylenically unsaturated carboxylic acids, sulfonic acids, vinyl phosphonic acids, and the sodium, lithium, calcium or ammonium water soluble salts of these carboxylic acids, sulfonic acids and vinyl phosphonic acids.

5,021,527

FLUORINE-CONTAINING WATER-REPELLENT OIL-REPELLENT COMPOSITION

Akira Ohmori, Ibaraki, and Hiroshi Inukai, Settsu, both of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 165,174, Mar. 7, 1988, abandoned, which is a division of Ser. No. 50,018, May 15, 1987, abandoned. This application Dec. 11, 1989, Ser. No. 449,442

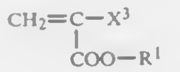
Claims priority, application Japan, May 28, 1986, 56-122920; Oct. 6, 1986, 56-238535

Int. Cl.^{5} C08F *18/20*

U.S. Cl. 526—245 **4 Claims**

1. A fluorine-containing water- and oil-repellent composition comprising a fluorine-containing polymer which comprises

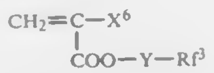
(i) 10 to 90 mole % of a monomer represented by the formula:



$$\begin{array}{l} CH_2{=}C{-}X^3 \\ \qquad | \\ \qquad COO{-}R^1 \end{array} \qquad (3)$$

wherein X^3 is a fluorine atom, or $—CFX^4X^5$ group (wherein X^4 and X^5 are the same or different and are each a hydrogen atom or fluorine atom), and R^1 is alkyl having 1 to 20 carbon atoms, alicyclic group, aromatic group or aralkyl;

(ii) 10 to 80 mole % of a monomer represented by the formula:



$$\begin{array}{l} CH_2{=}C{-}X^6 \\ \qquad | \\ \qquad COO{-}Y{-}Rf^3 \end{array} \qquad (4)$$

wherein X^6 is a hydrogen atom or methyl, Y is alkylene having 1 to 3 carbon atoms $—CH_2CH_2N(R)SO_2—$group (wherein R is alkyl having 1 to 4 carbon atoms) or $—CH_2CH(OZ)CH_2—$(-wherein Z is a hydrogen atom or acetyl), and Rf^3 is fluoroalkyl having 3 to 21 carbon atoms, or fluoroalkyl having 3 to 21 carbon atoms and 1 to 10 oxygen atoms in its carbon chain (wherein no two oxygen atoms are present adjacent to each other); and

(iii) 0 to 50 mole % of other copolymerizable ethylenically unsaturated monomer, the combined amount of the monomers (i) to (iii) being 100 mole %.

5,021,528

CROSSLINKED BISPHENOL CONTAINING ARYLCYCLOBUTENE ALKYL ETHERS AND CURED COMPOSITIONS THEREFROM

Pui K. Wong, Katy, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 349,546, May 9, 1989, Pat. No. 4,943,665. This application Mar. 30, 1990, Ser. No. 503,415

Int. Cl.^{5} C08F *10/00, 32/08;* **C08G** *59/00*

U.S. Cl. 526—280 **9 Claims**

1. The rigid, crosslinked product obtained by heating to a temperature above about 150° C. the ether of the formula

Ar—R—O—X—O—R—Ar

wherein Ar is an aromatic ring system of up to 30 carbon atoms and up to 4 aromatic rings inclusive having a cyclobutene ring fused to at least one of the aromatic rings, R is alkylene of up to 4 carbon atoms and inclusive and X has up to 30 carbon atoms and from 1 to 2 aromatic rings which, when two rings are present, are fused or are joined by a direct valence bond or alkylene of up to 8 carbon atoms inclusive, oxy, thio, carbonyl, carboxyl or carbonate, wherein each R is attached to a carbon atom of a six-membered aromatic ring.

5,021,529

FORMALDEHYDE-FREE, SELF-CURING INTERPOLYMERS AND ARTICLES PREPARED THEREFROM

Robert Y. Garrett, Avon lake, Ohio, assignor to The BFGoodrich Company, Akron, Ohio

Continuation of Ser. No. 402,363, Sep. 5, 1989, abandoned. This application Oct. 9, 1990, Ser. No. 595,646

Int. Cl.^{5} C08F *20/58*

U.S. Cl. 526—304 **10 Claims**

1. A substantially formaldehyde-free, self-curing interpolymer comprising repeating units derived from

a) from about 75 to about 99.5 percent by weight of at least one monomer selected from the group consisting of butadiene, styrene, ethylene, propylene, isoprene, methyl styrene, vinyl chloride, vinylidene chloride, chloroprene, chlorostyrene, vinyl acetate, acrylonitrile and its homologs, esters of saturated carboxylic acids and acrylic esters of ethylenically unsaturated functionalized monomers and containing 1 to 12 carbon atoms in the alkyl group, and where said functionality is selected from the group selected from hydroxyl, carboxyl, amide, and epoxy and vinyl; and

b) from about 0.5 to about 25 percent by weight of at least one N-alkylol amide of an alpha, beta ethylenically unsaturated carboxylic acid selected from the group consisting of N-ethylol acrylamide, N-ethylol methacrylamide, N-ethylol maleimide, N-propylol acrylamide, N-propylol methacrylamide, N-propylol maleimide, N-butylol acrylamide, N-butylol methacrylamide, N-butylol maleimide, N-benzylol acrylamide, N-benzylol methacrylamide, and mixtures thereof;

and said at least one monomer having at least one comonomer comprising itaconic acid.

5,021,530

FINELY DIVIDED GELLED POLYMER AND PROCESS FOR PRODUCING THE SAME

Kenji Yamamoto, Hiratsuka, and Hiraki Tadayoshi, Odawara, both of Japan, assignors to Kansai Paint Co., Ltd., Hyogo, Japan

Filed Aug. 8, 1989, Ser. No. 390,876

Claims priority, application Japan, Aug. 9, 1988, 63-197055; Aug. 9, 1988, 63-197056

Int. Cl.^{5} C08F *20/10*

U.S. Cl. 526—323.2 **12 Claims**

1. A finely divided gelled polymer obtained by emulsion polymerizing

(a) a polymerizable monomer containing at least two radically polymerizable unsaturated groups in the molecule, and

(b) a radically polymerizable unsaturated monomer other than the one mentioned in (a), above in the presence of a reactive emulsifier containing an allyl group in the molecule.

5,021,531

METHOD FOR RECOVERING AND USING LIGNIN IN ADHESIVE RESINS BY EXTRACTING DEMETHYLATED LIGNIN

Herbert A. Schroeder, Ft. Collins, Colo., assignor to Colorado State University Research Foundation, Ft. Collins, Colo.

Continuation-in-part of Ser. No. 332,716, Apr. 3, 1989. This application Feb. 20, 1990, Ser. No. 483,247

Int. Cl.^{5} C08H *5/02*

U.S. Cl. 527—400 **48 Claims**

1. A method for employing demethylated lignin dissolved in a demethylated lignin-containing aqueous solution to produce an adhesive, said method comprising:

(1) mixing a demethylated lignin-containing aqueous solution with a polar, partially water immiscible organic solvent to form a demethylated lignin-containing aqueous solution/organic solvent mixture;

(2) allowing the demethylated lignin-containing aqueous solution/organic solvent mixture to form at least two phases wherein at least one of the at least two phases is an aqueous phase and at least one of the at least two phases is an organic solvent phase which contains at least a portion of the demethylated lignin which was contained in the demethylated lignin-containing aqueous solution;

(3) separating the aqueous phase from the organic solvent phase;

(4) recovering the demethylated lignin contained in the organic solvent phase; and

(5) mixing the recovered demethylated lignin with an alkaline material, an aldehyde and an adhesive filler in order to produce an adhesive.

5,021,532

ONE END-REACTIVE ORGANOPOLYSILOXANE COMPOUND

Toshikazu Sugita, and Akinari Itagaki, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Sep. 14, 1989, Ser. No. 407,280

Claims priority, application Japan, Sep. 27, 1988, 63-242062

Int. Cl.^{5} C08G *77/06*

U.S. Cl. 528—15 **7 Claims**

1. An organopolysiloxane compound represented by the general formula

$R_3Si—O—SiR_2—O)_nSiR_2—CH_2CH_2CH_2OCH_2$-
$CHOHCH_2NR^1R^2$,

in which R is a monovalent hydrocarbon group, R^1 and R^2 are each a hydrogen atom or a monovalent hydrocarbon group selected from the class consisting of alkyl groups having 1 to 18 carbon atoms and aryl groups having 6 to 15 carbon atoms, provided that R^1 and R^2 may not both be hydrogen on the same molecule of the compound, or R^1 and R^2 are each a divalent group jointly forming the ring structure of a morpholino group together with the nitrogen atom and the subscript n is zero or a positive integer not exceeding 1000.

5,021,533

CROSSLINKABLE POLY(THIO)UREASILAZANE COMPOSITION CONTAINING A FREE RADICAL GENERATOR

Joanne M. Schwark, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 286,839, Dec. 20, 1988, Pat. No. 4,929,704. This application May 23, 1990, Ser. No. 527,613

The portion of the term of this patent subsequent to May 29, 2007, has been disclaimed.

Int. Cl.^{5} C08G *77/06*

U.S. Cl. 528—21 **11 Claims**

1. A poly(thio)ureasilazane composition that is capable of being crosslinked by an energy input comprising (a) a poly(thio)ureasilazane containing at least one 2–6 carbon alkenyl or alkynyl group, and (b) at least one free radical generator in an amount effective to crosslink the poly(thio)ureasilazane.

5,021,534

THERMOSETTING URETHANE ELASTOMER

Masahiro Kawasaki; Yukio Ohbuchi; Yoshiaki Maeda, and Susumu Sato, all of Yokohama, Japan, assignors to Nippon Polyurethane Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 267,444, Nov. 4, 1988, abandoned. This application Jun. 27, 1990, Ser. No. 544,820

Claims priority, application Japan, Nov. 11, 1987, 62-28299

Int. Cl.^{5} C08G *18/10, 18/65*

U.S. Cl. 528—60 **18 Claims**

1. A thermosetting urethane elastomer having improved heat resistance and compression set properties prepared from:

(a) a prepolymer having isocyanate groups at terminal ends obtained by allowing p-phenylene diisocyanate to react with a compound having 2 or more active hydrogens, and

(b) a curing agent selected from the group consisting of

  i. 1,4-bis(2-hydroxyethoxy)benzene and trimethylolpropane, and

  ii. 1,4-bis(2-hydroxyethoxy)benzene and a polyol having an isocyanurate ring.

5,021,535

CASTOR OIL BASED POLYURETHANE FOR UNDERBODY COATINGS AND THE LIKE

Cung Vu, Columbia, Md., and Norman E. Blank, Heidelburg, Fed. Rep. of Germany, assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation of Ser. No. 369,970, Jun. 22, 1989, abandoned, which is a continuation-in-part of Ser. No. 247,137, Sep. 21, 1988, abandoned, which is a continuation-in-part of Ser. No. 209,406, May 19, 1988, Pat. No. 4,877,829. This application Aug. 31, 1990, Ser. No. 577,836

Int. Cl.^{5} C08G *18/30*

U.S. Cl. 528—66 **32 Claims**

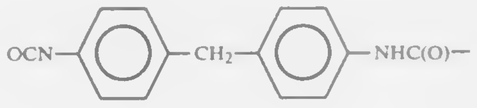
1. A polyisocyanate mixture comprising

(i) a mixture of about 50–55% by weight a prepolymer of the formula

$K—O—(CH_2CH[CH_3]O)_m—K$

wherein

K is



and

m is about 2–5;

and about 45–50% by weight a diphenylmethane diisocyanate from the group consisting of diphenylmethane-4,4′-

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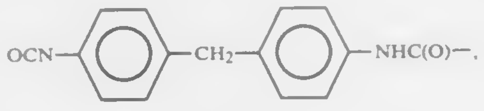
diisocyanate, diphenylmethane-4,2'-diisocyanate, and diphenylmethane-2,4'-diisocyanate; and

(ii) a polyisocyanate of the formula

$$K—(CH_2C[CH_3]H—O—)_p(CH_2CH_2O—)_t—K$$

wherein
K is



p is about 50; and
t is in the range of about 18–20;
and up to about 20% by weight a diphenylmethane diisocyanate from the group consisting of diphenylmethane-4,4'-diisocyanate, diphenylmethane-4,2'-diisocyanate, and diphenylmethane-2,4'-diisocyanate.

5,021,536

STORAGE STABLE RESIN REACTION MIXTURES, AND THE PREPARATION AND USE THEREOF

Hanns P. Müller, Bergisch Gladbach, and Heinrich Heine, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 28, 1989, Ser. No. 317,162

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1988, 3807660

Int. Cl.⁵ C08G *18/00, 18/58*

U.S. Cl. 528—73 **17 Claims**

1. A composition comprising a storage stable resin reaction mixture obtained by mixing simultaneously or successively
(a) at least one organic polyisocyanate,
(b) at least one organic compound containing at least two epoxide groups, and
(c) at least one alkylating agent that inhibits reaction of isocyanate groups of component (a) and epoxide groups of component (b).

5,021,537

POLYACETOACETATE-CONTAINING EPOXY RESIN COMPOSITIONS

Charles J. Stark, and Rita D. Pietruszka, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Apr. 27, 1990, Ser. No. 515,904

Int. Cl.⁵ C08G *59/56, 59/40*

U.S. Cl. 528—106 **22 Claims**

1. A composition comprising:
(a) a polyglycidyl ether having an average of at least about 1.5 epoxide groups per molecule and
(b) a polyacetoacetate having two to four acetoacetate groups per molecule and a molecular weight within the range of about 200 to about 800.

5,021,538

POLYIMIDE/POLYAMIDE DERIVATIVES OF DIELS-ALDER/ENE ADDUCTS OF PHENOL-MODIFIED ROSIN ESTERS

Everett Crews, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

Filed Dec. 1, 1989, Ser. No. 444,593

Int. Cl.⁵ C08G *14/02, 8/34;* **C09F** *1/00;* **C08L** *63/00*

U.S. Cl. 528—129 **16 Claims**

1. The method of preparing a phenolic resin comprising the steps of:
(a) forming a phenol-rosin condensate by introducing an aldehyde into a molten mixture of rosin and a phenol in an inert environment at a temperature of from about 100° C. to about 220° C. for from about 1.5 hours to about 8 hours;
(b) forming a polyol ester of the phenol-rosin condensate by reacting the adduct with a polyol at a temperature of from about 200° C. to about 300° C. for from about 1 hour to about 8 hours; and
(c) forming an adduct of the polyol ester of the phenol-rosin condensate by reacting the ester with a dienophile in an inert environment at a temperature of from about 25° C. to about 250° C. for from about 0.25 hour to about 1.5 hours.

5,021,539

ALKALINE BENZYLIC ETHER PHENOLIC RESIN BINDERS

David R. Armbruster, Forest Park, and Merlyn C. Pasion, Chicago, both of Ill., assignors to Acme Resin Corporation, Westchester, Ill.

Filed Mar. 24, 1989, Ser. No. 328,438

Int. Cl.⁵ C08G *8/04;* **C08L** *61/00;* **B22C** *1/22, 9/00*

U.S. Cl. 528—129 **40 Claims**

1. A process for preparing a modified benzylic ether resole resin comprising the steps:
(a) first reacting a phenol with a molar excess of an aldehyde in the presence of a divalent metal ion catalyst at a pH below 7 until from about 20% to about 90% by weight of the aldehyde has combined with the phenol;
(b) then adding sufficient basic catalyst to the mixture of step (a) to raise the pH to at least about 8; and
(c) heating the mixture obtained in step (b) until the free aldehyde in the mixture is less than about 2% by weight of the mixture.

5,021,540

POLYIMIDES FROM DIAMINOBENZOTRIFLUORIDES

Andrea Leone-Bay; Steven L. Peake, both of Ridgefield, and Stanley S. Kaminski, Stamford, all of Conn., assignors to American Cyanamid, Me.

Filed Sep. 18, 1990, Ser. No. 584,561

Int. Cl.⁵ C08G *63/00*

U.S. Cl. 528—183 **4 Claims**

1. A polyimide resin made by reaction of a dianhydride, its diester or tetracid derivative having at least one aromatic ring in the molecule and a bis(trifluoromethyl) oxydianiline.

5,021,541

POLYCARBONATE RESIN FROM BIS(HYDROXY BENZOYL OXY-TETRA OXA SPIRO) CPD.

Mitsuhiko Masumoto; Satoshi Kanayama; Toshiaki Asoh, and Teruo Kawahigashi, all of Osaka, Japan, assignors to Mitsubishi Gas Chemical Co., Ltd., Tokyo, Japan

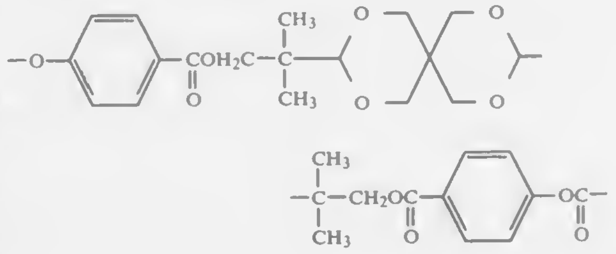
Filed Feb. 15, 1990, Ser. No. 480,461

Claims priority, application Japan, Feb. 15, 1989, 1-33835

Int. Cl.⁵ C08G *64/04*

U.S. Cl. 528—196 **17 Claims**

1. A polycarbonate resin comprising a repeating structural unit represented by the following structural formula A and derived from a spiro ring-contained dihydric phenol;



5,021,542

POLYCARBONATE OF POLYSUBSTITUTED CYCLOHEXYLIDENE BISPHENOLS

Volker Serini; Dieter Freitag; Karsten-Josef Idel, all of Krefeld; Uwe Westeppe, Mettmann; Ulrich Grigo, Kempen, and Klaus-Christian Paetz, Burscheid, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Dec. 13, 1989, Ser. No. 450,655

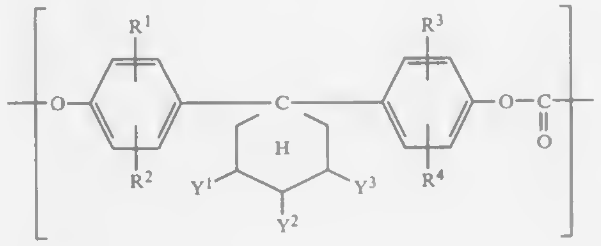
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1988, 3842943; Aug. 12, 1989, 3926767

Int. Cl.⁵ C08G *64/06*

U.S. Cl. 528—204 **3 Claims**

1. A molding composition comprising a thermoplastic aromatic polycarbonate resin having a weight average molecular weight of at least 10,000 comprising bifunctional carbonate structural units corresponding to

(I)



in which
R^1, R^2, R^3, R^4 independent of one another represent hydrogen, a C_{1-12} hydrocarbon radical or a halogen atom
Y^1, Y^2, Y^3 independently of one another represent hydrogen, C_{1-15} alkyl, or a C_{6-12} hydrocarbon radical,
at least two of the substituents Y^1, Y^2 and Y^3 being other than hydrogen and
at least one of the substituents Y^1, Y^2 and Y^3 being C_{1-5} alkyl,
in quantities of from 100 to 1 mol-%, based on the total quantity of difunctional carbonate structural units in the polycarbonate.

5,021,543

PROCESS FOR THE PRODUCTION OF BIFUNCTIONAL OH-TERMINATED POLYPHENYLENE OXIDES WITH DIPOLAR APROTIC SOLVENT

Paul J. Mayska; Volker Eckhardt; Dieter Freitag, and Karsten-Josef Idel, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 4, 1989, Ser. No. 445,275

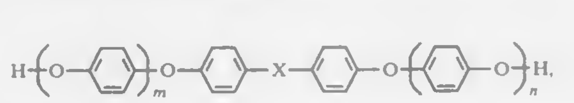
Claims priority, application Fed. Rep. of Germany, Dec. 17, 1988, 3842624

Int. Cl.⁵ C08G *65/44*

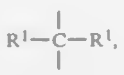
U.S. Cl. 528—217 **1 Claim**

1. A process for the production of bifunctional polyphenylene ethers (polyphenylene oxides) terminated by a hydroxyl group having the formula (I)

(I)

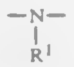


in which
X is a group



$$R^1—\overset{|}{\underset{|}{C}}—R^1,$$

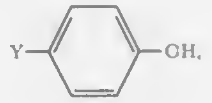
where R^1 is hydrogen or a C_1–C_{10} alkyl radical, —CO—, S, —O—,



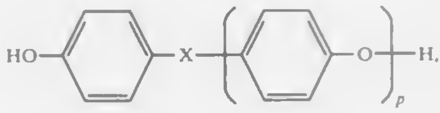
$$—\underset{\underset{R^1}{|}}{N}—$$

or —SO_2—, 3,3,5-trimethyl cyclohexylidene, isopropylene,
m and n independently of one another represent an integer of from 5 to 60,
wherein a mixture of phenols corresponding to formulae (II) and (III)

(II)



(III)



in which
X is as defined for formula (I) and
Y represents halogen,
p is zero or 1 and, X is O (oxygen)
is reacted in the presence of Cu(I) halide at a temperature in the range from −80° C. to 250° C. in a dipolar aprotic solvent selected from the group consisting of DMI (N,N'-dimethyl imidazolidin-2-one), NMC (N-methyl caprolactam), NMP (N-methyl pyrrolidone), diphenyl sulfone and DMSO (dimethyl sulfoxide).

5,021,544

POLYESTER POLYMERS AND AQUEOUS DISPERSIONS THEREOF

John C. Padget, Frodsham, and David A. Pears, Chester, both of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England

Filed Nov. 6, 1989, Ser. No. 431,637

Claims priority, application United Kingdom, Nov. 4, 1988, 8825814

Int. Cl.⁵ C08G *63/20*

U.S. Cl. 528—272 **36 Claims**

1. A water dispersible polyester polymer comprising one or more polyester chains and one or more non-ionic polyoxyalkylene chains in which at least 40% of the repeating oxyalkylene units are oxyethylene units, said polyester polymer having a structure in which one or more of the polyoxyalkylene chains are pendent to at least one of the polyester chains.

5,021,545

FLAME-RETARDANT HALOGENATED COPOLYESTER AND ELECTRIC WIRE COATED WITH THE SAME

Toshio Nakane; Michiro Naka, both of Fuji; Hiroaki Konuma, Shimizu, and Kenji Hijikata, Mishima, all of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Division of Ser. No. 311,855, Feb. 17, 1989. This application Oct. 11, 1990, Ser. No. 595,558

Claims priority, application Japan, Feb. 26, 1988, 63-43523

Int. Cl.⁵ C08G *63/02*

U.S. Cl. 528—272 **8 Claims**

1. A copolyester resin composition prepared by adding 0.1 to 3% by weight, based on the total amount of the composition, of a stabilizer to a flame-retardant halogenated copolyester prepared by the condensation polymerization of
(a) a component mainly comprising an aromatic dicarboxylic acid or an ester-forming derivative thereof,

VOL
1127
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- (b) A component mainly comprising an aliphatic glycol or an ester-forming derivative thereof.
- (c) an ester-forming halogenated compound and
- (d) a branching compound,

which has a halogen content of 0.5 to 30% by weight and contains 0.001 to 0.5 molar %, based on the total amount of the carbonyl groups of the copolyester, of said branching compound (d).

5,021,546

COPOLY(PHENYLENE SULFIDE)

David R. Fagerburg; Mark Rule; Joseph J. Watkins, and Paul B. Lawrence, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

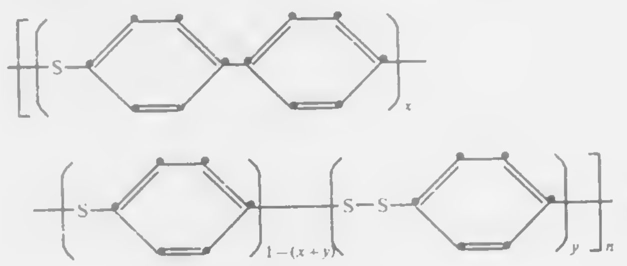
Continuation of Ser. No. 324,063, Mar. 16, 1989, abandoned. The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.

This application Jun. 11, 1990, Ser. No. 536,049

Int. Cl.^{5} C08G *75/14*

U.S. Cl. 528—389 5 Claims

1. A process for producing elemental iodine and a copoly-(arylene sulfide) corresponding to the structure



wherein y is in the range of 0.001 to 0.15, x is in the range of 0.02 to 0.65 and n is at least 100, consisting essentially of

- (1) reacting at a temperature above about 175° C., a mixture of diiodobenzene and diiodobiphenyl and elemental sulfur to produce the elemental iodine and the copoly(arylene sulfide), and
- (2) recovering the elemental iodine.

5,021,547

CONTINUOUS POLYMERIZATION OF CO/OLEFIN IN PLURALITY OF REACTORS IN SERIES

Pieter A. Gautier; Maarten M. Geuze; Barend Mastenbroek, and Leonardus Petrus, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed May 24, 1990, Ser. No. 527,925

Claims priority, application Netherlands, Aug. 7, 1989, 8902019

Int. Cl.^{5} C08G *67/02*

U.S. Cl. 528—392 16 Claims

1. In the process of producing linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon by contacting the carbon monoxide and hydrocarbon under polymerization conditions in the presence of a liquid reaction diluent and a catalyst composition formed from a palladium compound, the anion of a strong non-hydrohalogenic acid and a bidentate ligand of phosphorus, nitrogen or sulfur, the improvement of conducting the contacting in a continuous manner in at least two reactors operating in series.

5,021,548

SODIUM HYDROXYMETHANE SULFONATE TO IMPROVE THE COLOR STABILITY OF ROSIN RESINS

James Minn, Hattiesburg, Miss., assignor to Hercules Incorporated, Wilmington, Del.

Filed Jan. 22, 1990, Ser. No. 468,295

Int. Cl.^{5} C09F *1/04*

U.S. Cl. 530—216 6 Claims

1. In a method for preparing a rosin ester having improved color stability wherein rosin is esterified by heating a mixture of rosin and a polyol, the improvement comprisin esterifying the rosin in the presence of sodium hydroxymethane sulfonate.

5,021,549

PHYSIOLOGICALLY ACTIVE SUBSTANCES, PROBESTIN AND PROSTATIN AND PRODUCTION THEREOF

Tomio Takeuchi, Tokyo; Takaaki Aoyagi, Fujisawa; Masa Hamada, Tokyo; Hiroshi Naganawa, Tokyo, and Shigemi Yoshida, Tokyo, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

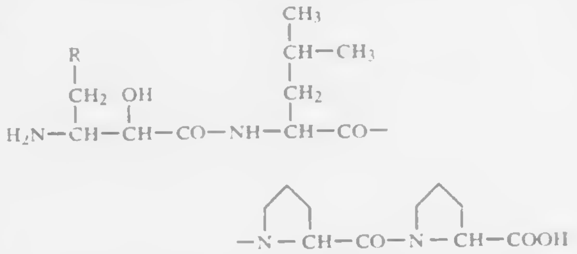
Filed Aug. 16, 1988, Ser. No. 232,852

Claims priority, application Japan, Sep. 28, 1987, 62-240600

Int. Cl.^{5} C07K *5/08, 5/10*

U.S. Cl. 530—330 3 Claims

1 A substance selected from probestin and prostatin which are represented by the following formula;



[I]

wherein R denotes a phenyl group for probestin, or R denotes a 2-methyl-butyl group for prostatin, or a pharmaceutically acceptable salt thereof.

5,021,550

METHOD FOR PREVENTING DELETION SEQUENCES IN SOLID PHASE SYNTHESIS

Allen R. Zeiger, Philadelphia, Pa., assignor to Thomas Jefferson University, Philadelphia, Pa.

Continuation of Ser. No. 916,282, Oct. 7, 1986, abandoned. This application Sep. 11, 1990, Ser. No. 581,063

Int. Cl.^{5} C07K *1/00, 1/04*

U.S. Cl. 530—334 11 Claims

1. A method of preparing a polypeptide comprising:
- (a) providing an intermediate polypeptide having a carboxyl terminus and an amine terminus, convalently bound to a solid support at the carboxyl terminus of said intermediate polypeptide;
- (b) reacting an amino acid moiety with the intermediate polypeptide under conditions selected to covalently bond the amino acid moiety with the intermediate polypeptide; and
- (c) exposing the products of step (b) to reaction conditions selected to effect covalent bonding of at least a portion of any unreacted intermediate polypeptide remaining after step (b) with the solid support at the amine terminus of said intermediate polypeptide.

5,021,551

METHOD OF ENHANCING PEPTIDE IMMUNOGENICITY

Paul M. Allen, and Emil R. Unanue, both of St Louis, Mo., assignors to Washington University, St. Louis, Mo.

Filed Jan. 18, 1989, Ser. No. 298,377

Int. Cl.^{5} A61K *37/02;* **C07K** *1/00*

U.S. Cl. 530—345 8 Claims

1. A method of enhancing the immunogenicity of a T cell immunogenic peptide which binds to Ia molecules comprising carrying out a reaction of covalently bonding an acidic amino acid to the peptide amino terminus or changing the free acid of the peptide carboxy terminus to amide or by carrying out both said reactions of the peptide.

5,021,552

PROCESS FOR MANUFACTURING ORGANIZED COLLAGEN STRUCTURES, PARTICULARLY OF HUMAN ORIGIN, AND ORGANIZED COLLAGEN STRUCTURES CORRESPONDING THERETO

Israel Goldstein, Paris, France, assignor to Diatech S.A., Nanterre, France

Filed Jul. 1, 1988, Ser. No. 214,346

Claims priority, application France, Jul. 1, 1987, 87 09297

Int. Cl.^{5} C07K *15/20*

U.S. Cl. 530—356 34 Claims

1. A process for preparing organised structures of collagen of animal origin comprising the following sequence of steps:
- a) collagen-containing fragmented animal tissue is washed and sterilized to obtain a specimen free of all contaminants;
- b) at least a portion of the collagen obtained according to a) is solubilized in an aseptic aqueous solution of at least one compound selected from the group consisting of diamino compounds, alkali metal salts and alkaline-earth metal salts at a pH between 6.5 and 7.5, any non-solubilized residue is separated and a suspension of collagen fibrils, free of non-fibrillary residue is obtained;
- c) the suspension obtained according to b) is diluted with pyrogen-free water and to it is added at least one catalyst consisting of monoamino sugars having a molecular weight between 180 and 240, uronic acids and uronic acid derivatives;
- d) the mixture obtained according to c) is allowed to stand for a time sufficient for the reconstitution of the organized collagen structures;
- e) said reconstituted organized collagen structures are separated from the aqueous medium, washed and conditioned.

5,021,553

ANTI-HUMAN ADENOCARCINOMA ANTIGEN SPECIFIC MONOCLONAL ANTIBODY

Eiichi Tahara; Atsushi Ochiai; Hiroshi Yokozaki; Toyoharu Hozumi, and Eikai Kyo, all of Hiroshima, Japan, assignors to Wakunaga Seiyaka Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 790,400, Oct. 23, 1985, abandoned. This application Jul. 10, 1989, Ser. No. 377,764

Claims priority, application Japan, Oct. 26, 1984, 59-223830; Sep. 10, 1985, 60-198592

Int. Cl.^{5} A61K *39/395;* **C07K** *15/28;* **C12N** *5/02*

U.S. Cl. 530—387 2 Claims

1. A monoclonal antibody against human cancer, produced by a hybridoma selected from the group consisting of 9A3, and 20D11.

5,021,554

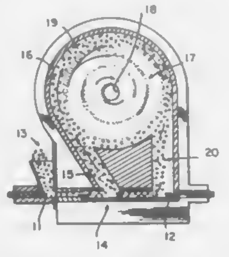
PROCESS FOR PROTEIN PARTICLE SIZE REDUCTION USING A FLUID-ENERGY MILL

William W. Thompson, Greenfield, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 24, 1989, Ser. No. 315,097

Int. Cl.^{5} C07K *15/14, 3/00*

U.S. Cl. 530—399 1 Claim



1. A process for formulating a protein material selected from bovine somatotropin and growth hormone releasing factor as a parenteral product, which comprises
- (a) passing amorphous flakes of the protein material through a fluid-energy mill, and
- (b) admixing the milled material with a pharmacologically acceptable carrier or diluent.

5,021,555

COLOR PHOTOGRAPHIC MATERIAL

Richard P. Szajewski, and Terry R. Taber, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 213,415, Jun. 30, 1988, abandoned. This application Jun. 7, 1990, Ser. No. 534,829

Int. Cl.^{5} G03C *7/305, 7/34*

U.S. Cl. 430—544 10 Claims

1. A color photographic element comprising a support and a silver halide emulsion layer having associated therewith a DIR compound having the structure I:

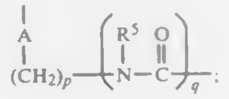
$$\mathrm{CAR-TIME-INH}$$

I

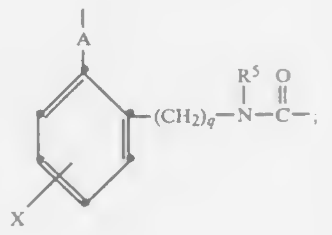
wherein:

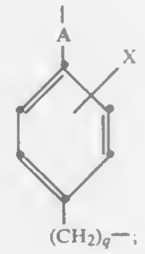
CAR is a carrier moiety;

TIME is a timing group having one of the structures;

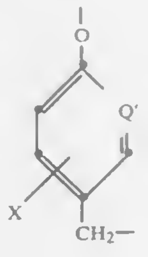


$$-A-(CH_2)_p-\left(\overset{R^5}{\overset{|}{N}}-\overset{O}{\overset{\|}{C}}\right)_q-;$$





and



where:

p is 1 to 4;

q is 0 or 1;

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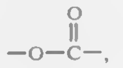
A is —O— or

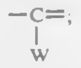


$$-O-\overset{\overset{O}{\|}}{C}-,$$

R^5 is hydrogen, alkyl of 1–20 carbon atoms or aryl of 6 to 20 carbon atoms;

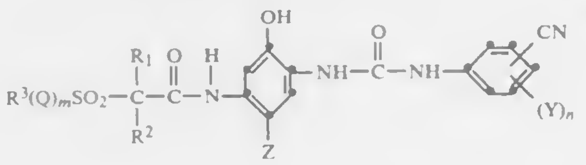
X is hydrogen and one or more substituents independently selected from hydroxy, cyano, fluoro, chloro, bromo, iodo, nitro, alkyl, alkoxy, aryl, aryloxy, alkoxycarbonyl, aryloxycarbonyl, carbonamido, and sulfonamido;

Q' is —N= or



$$-\underset{\underset{W}{|}}{C}=;$$

W is a substituent with a σ_m value greater than 0.0 and INH is a development inhibitor moiety; together with a cyan dye-forming coupler having the structure II·



II

wherein:

m is 0 or 1;

n is 0, 1 or 2;

Y is halogen, or sulfonyl;

Q is —O— or —NH—;

R^1 is an unsubstituted or a substituted, straight or branched chain alkyl group having from 1 to about 20 carbon atoms, an unsubstituted or a substituted cycloalkyl group having from 3 to about 8 carbon atoms in the ring, an alkylcarbonyl or an alkoxycarbonyl group having from 1 to about 20 carbon atoms in the alkyl or the alkoxy moiety;

R^2 is as defined for R^1 or is hydrogen;

R^3 is an unsubstituted or substituted alkyl group having from 1 to about 24 carbon atoms, an unsubstituted or a substituted cycloalkyl group having from 3 to about 8 carbon atoms in the ring, an unsubstituted or a substituted aryl group having from 6 to about 24 carbon atoms, or an unsubstituted or a substituted heterocyclic group having from 3 to about 8 atoms in the heterocyclic ring;

when R^3 is a primary alkyl group, R^1 contains at least 2 carbon atoms;

Z is hydrogen or a coupling-off group; and

the —CN substituent on the phenyl ureido group is para or meta to the ureido group.

5,021,556

METHOD OF RADIOLABELING CHELATING COMPOUNDS COMPRISING SULFUR ATOMS WITH METAL RADIONUCLIDES

Ananthachari Srinivasan, Kirkland, Wash., assignor to NeoRx Corporation, Seattle, Wash.

Continuation-in-part of Ser. No. 76,277, Jul. 22, 1987, abandoned. This application Jul. 1, 1988, Ser. No. 212,688

Int. Cl.⁵ C07F *19/00, 13/00;* **A61K** *43/00*

U.S. Cl. 534—10 20 Claims

1. A method of producing a radionuclide metal chelate, comprising reacting a radionuclide metal with a chelating compound under conditions of acidic pH, thereby producing said radionuclide metal chelate, wherein said chelating compound comprises one or more sulfur donor atoms attached to a protecting group, and said protecting group, when taken together with the one or more sulfur donor atoms attached thereto, is a hemithioacetal group or a thioacetal group.

5,021,557

REACTIVE DYES

Rainer Begrich, Rheinfelden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

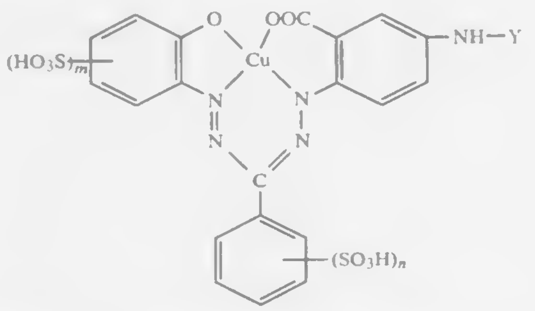
Filed Mar. 8, 1989, Ser. No. 320,658

Claims priority, application Switzerland, Mar. 17, 1988, 1003/88

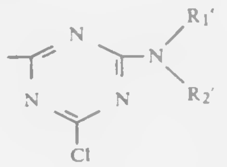
Int. Cl.⁵ C07C *245/22*

U.S. Cl. 534—560 3 Claims

1. A reactive dye of the formula



wherein m is 1 or 2, and n is 0,1 or 2,and the sum of m+n is 2,3 or 4,and Y is a radical of the formula



wherein $—NR_1'R_2'$ is —ethylamino, propylamino, isopropylamino, butylamino, hexylamino, β-methoxyethylamino, γ-methoxypropylamino, β-ethoxyethylamino, N,N-dimethylamino, N,N-diethylamino, β-chloroethylamino, β-cyanoethylamino, γ-cyanopropylamino, β-carboxyethylamino. sulfomethylamino, β-sulfoethylamino, N-methyl-N-β-sulfoethylamino, N-ethyl-N-β-sulfoethylamino, β-hydroxyethylamino, N,N-bis-(β-hydroxyethyl)amino, βsulfatoethylamino, γ-hydroxypropylamino, benzylamino, phenethylamino, cyclohexylamino, phenylamino, toluidino, xylidino, chloranilino, 3- or 4-ureidoanilino, 4-carboxy-3-hydroxyanilino, anisidino, phenetidino, N-methyl-N-phenylamino, N-ethyl-N-phenylamino, N-sulfomethyl-N-phenylamino, 3- or 4-acetylaminoanilino, N-β-hydroxyethyl-N-phenylamino, 2-, 3- or 4carboxyphenylamino, 4- or 5-sulfonaphth-1-yl-amino, 4,6- or 3,6-disulfonaphth-1-yl-amino, 3,6,8- or 2,5,7-trisulfonaphth-1-ylamino, 4,6,8-trisulfonaphth-1-ylamino, 1-sulfonaphth-2-ylamino, 1,5- 1,6-, 6,8-, 4,8- or 5,7-disulfonaphth-2yl-amino, 1-, 4-, 5, 6- or 7-sulfonaphth-2-ylamino, morpholino, piperidino, piperazine, 3- or 4-β- hydroxyethylsulfonylanilino, 3-(N,N-dimethylamino)-propylamino, carboxymethylamino, cyclohexylamino, β-hydroxyethylsulfonylethoxyethylamino.

5,021,558

WATER-SOLUBLE FIBER REACTIVE DYES

Holger M. Büch, Hofheim am Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

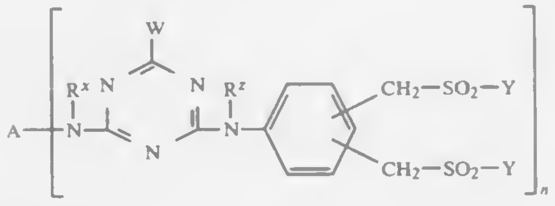
Filed Mar. 20, 1990, Ser. No. 496,534

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1989, 3909391; Oct. 10, 1989, 3933768

Int. Cl.⁵ C09B *62/04, 62/503;* **D06P** *1/382, 1/384*

U.S. Cl. 534—618 13 Claims

1. A water-soluble dye of the general formula (1)



(1)

in which

A is the radical of a monoazo, disazo or polyazo dye or of a heavy metal complex azo dye or of an anthraquinone, phthalocyanine, formazan, azomethine, dioxazine, phenazine, stilbene, triphenylmethane, xanthene, thioxanthone, nitroaryl, naphthoquinone, pyrenequinone or perylenetetracarbimide dye;

R^x is hydrogen of alkyl of 1 to 4 carbons, which is unsubstituted or substituted by halogen, hydroxyl, cyano, alkoxy of 1 to 4 carbons, alkoxycarbonyl of 2 to 5 carbons, carboxyl, sulfamoyl, sulfo or sulfato;

R^z is hydrogen or alkyl of 1 to 4 carbons, which is unsubstituted or substituted by halogen, hydroxyl, cyano, alkoxy of 1 to 4 carbons, alkoxycarbonyl of 2 to 5 carbons, carboxyl, sulfamoyl, sulfo or sulfato;

W is fluorine, chlorine, bromine, sulfo, phenylsulfonyl or alkylsulfonyl of 1 to 4 carbons,

Y is vinyl or β-sulfatoethyl, β-thiosulfatoethyl, β-phosphatoethyl, β-alkanoyloxyethyl of 2 to 5 carbons, in the alkanoyl radical, β-benzoyloxyethyl, β-(sulfobenzoyloxy)ethyl, β-(p-toluenesulfonyloxy)ethyl or β-halogenoethyl;

n is the number 1 or 2.

5,021,559

WATER-SOLUBLE AZO COMPOUNDS CONTAINING A FIBER-REACTIVE GROUP OF THE VINYLSULFONE SERIES, SUITABLE AS DYESTUFFS

Hartmut Springer, Königstein/Taunus, and Uwe Reiber, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 21, 1990, Ser. No. 526,176

Claims priority, application Fed. Rep. of Germany, May 23, 1989, 3916712

Int. Cl.⁵ C09B *62/85, 62/51, 62/513;* **D06P** *1/382, 1/384*

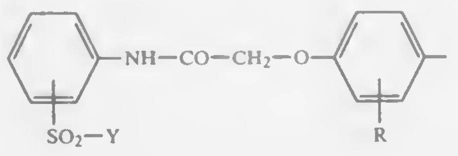
U.S. Cl. 534—638 14 Claims

1. A water-soluble azo compound corresponding the formula

D—N-N—K

in which:

D is a group of the formula

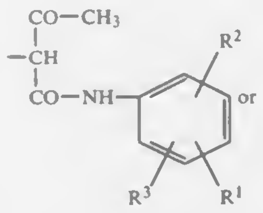


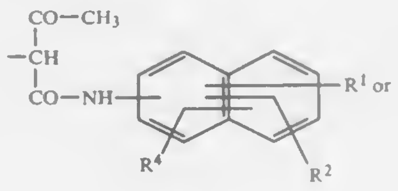
in which

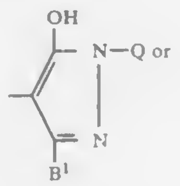
Y is vinyl or a group of the formula $—CH_2—CH_2—X$ in which X is a substituent which is eliminated by an alkali while forming the vinyl, and

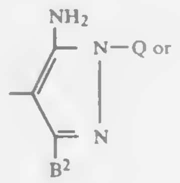
R is hydrogen, nitro, alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons, carboxy, hydroxy or halogen;

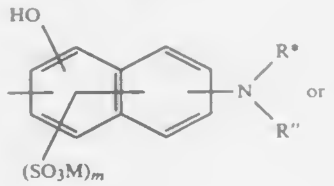
K is a group of the formula

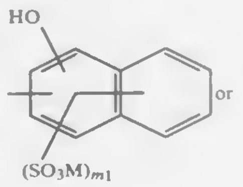


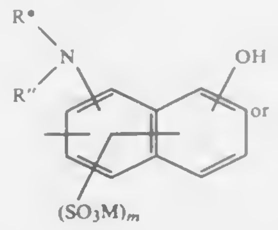












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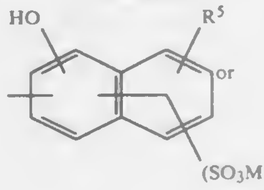

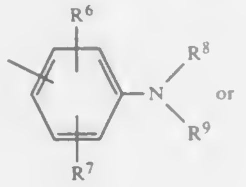

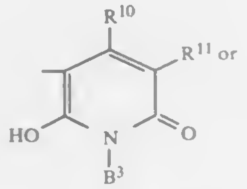

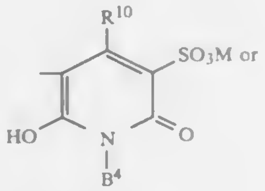

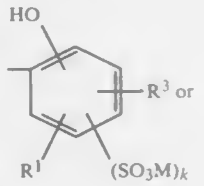

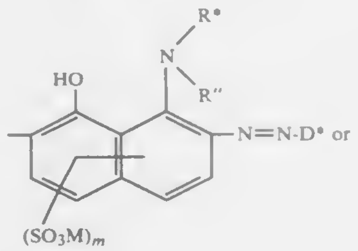

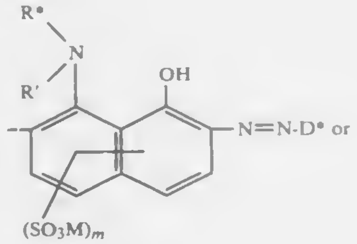

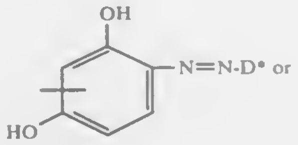

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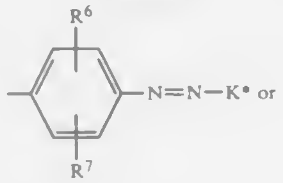
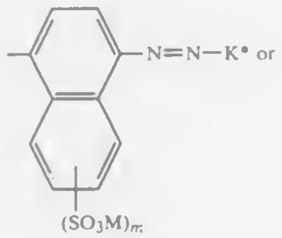
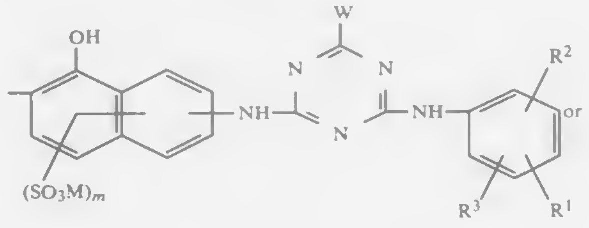
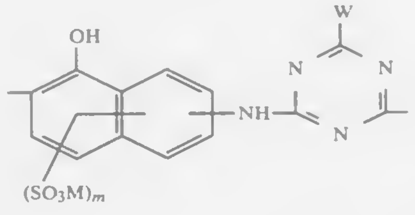
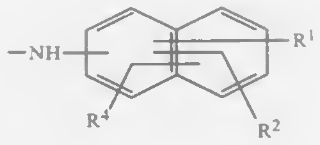










in which:

M is hydrogen or an alkali metal,

R^1 is hydrogen, carboxy or sulfo, or a group of the formula —SO$_2$—Y in which Y has one of the above meanings,

R^2 is hydrogen, alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons, chlorine, bromine, carboxy, sulfo or nitro,

R^3 is hydrogen, alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons, chlorine or bromine,

R^4 is hydrogen, sulfo or carboxy,

B^1 is alkyl of 1 to 4 carbons, carboxy, carbalkoxy of 2 to 5 carbons or carbamoyl, or is phenyl substituted by substituents selected from sulfo, carboxy, methyl, ethyl, methyoxy, ethoxy and chlorine,

B^2 is alkyl of 1 to 4 carbons, carboxy, carbalkoxy of 2 to 5 carbons or carbamoyl, or is phenyl which is optionally substituted by 1 or 2 substituents selected from alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons, chlorine, bromine and sulfo,

Q is phenyl which is optionally substituted by 1, 2 or 3 substituents selected from chlorine, bromine, methyl, ethyl, methoxy, ethoxy, carboxy, sulfo, acetylamino and a group of the formula —SO$_2$—Y with Y having the above mentioned meaning, or is a naphthyl which is optionally substituted by 1, 2 or 3 sulfos or by an alkyl of 1 to 4 carbons, an alkoxy of 1 to 4 carbons, a chlorine or an alkanoylamino of 2 to 5 carbons, or by a group of the formula —SO$_2$—Y with Y having the above mentioned meaning, or is a naphthyl substituted by 1, 2 or 3 sulfos and by a substituent selected from alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons, chlorine, alkanoylamino of 2 to 5 carbons and a group of the formula —SO$_2$—Y with Y having the above mentioned meaning,

R^* is hydrogen or alkyl of 1 to 4 carbons, which is optionally substituted by a phenyl which is further optionally substituted by sulfo or by —SO$_2$—Y or by sulfo and —SO$_2$—Y in which Y is defined as above,

R'' is hydrogen or alkyl of 1 to 4 carbons which is optionally substituted by phenyl or by a group of the formula —SO$_2$—Y with Y of the above mentioned meaning, or is phenyl which is optionally substituted by 1 or 2 substituents selected from alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons, chlorine, bromine, sulfo and —SO$_2$—Y with Y of the above mentioned meaning,

R^5 is phenylureido wherein the phenyl is optionally substituted by a group of the formula —SO$_2$—Y with Y of the above mentioned meaning, or is alkanoylamino of 2 to 5 carbons which is optionally substituted in the alkyl moiety by a group of the formula —SO$_2$—Y with Y of the above mentioned meaning, or is alkenoylamino of 3 to 5 carbons, or is benzoylamino which is optionally substituted by substituents selected rom chlorine, methyl, methoxy, nitro, sulfo, carboxy and a group of the formula —SO$_2$—Y with Y of the above mentioned meaning,

R^6 is hydrogen, alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons, sulfo, carboxy, carbalkoxy of 2 to 5 carbons, halogen or alkoxy of 1 to 4 carbons substituted by hydroxy, acetoxy, carboxy, carbamoyl, cyano or halogen,

R^7 is hydrogen, alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons, halogen, cyano, trifluoromethyl or alkoxy of 1 to 4 carbon atoms substituted by hydroxy, acetoxy, carboxy, carbamoyl, cyano, halogen or a group of the formula —SO$_2$—Y with Y of the above mentioned meanings, or is alkanoylamino of 2 to 5 carbons which is optionally substituted by chlorine, bromine, alkoxy of 1 to 4 carbons, phenoxy, phenyl, hydroxy, carboxy, sulfo or a group of the formula —SO$_2$—Y with Y of the above mentioned meanings, or is alkenoylamino of 3 to 5 carbons which is optionally substituted by chlorine, bormine, carboxy or sulfo, or is benzoylamino which is optionally substituted in the benzene ring by substituents selected from chlorine, methyl, sulfo and a group of the formula —SO$_2$—Y with Y of the abovementioned meanings, or is alkylsulfonyl of 1 to 4 carbons, or is phenylsulfonyl which is optionally substituted in the phenyl by substituents selected from chlorine, methyl, sulfo and a group of the formula —SO$_2$—Y with Y of the above mentioned meanings, or is alkylsulfonylamino of 1 to 4 carbons which is optionally substituted by hydroxy, sulfato, chlorine, bromine, alkoxy of 1 to 4 carbons or a group of the formula —SO$_2$—Y with Y of the above mentioned meanings, or is phenylsulfonylamino which is optionally substituted in the phenyl by substituents selected from chlorine, methyl, sulfo and a group of the formula —SO$_2$—Y with Y of the abovementioned meanings, or is carbamoyl which is optionally mono- or disubstituted on th nitrogen by one or two substituents selected from the group: alkyl of 1 to 4 carbons, alkyl of 1 to 4 carbons substituted by hydroxy, sulfo, carboxy, sulfato, phenyl or a group of the formula —SO$_2$—Y with Y of the above mentioned meanings, cycloalkyl of 5 to 8 carbons; phenyl; phenyl substituted by substituents selected from chlorine, sulfo, methyl, methoxy, carboxy and a group of the formula —SO$_2$—Y with Y of the above mentioned meanings; or is sulfamoyl which is optionally mono- or disubstituted on the nitrogen by one or two substituents selected from the group consisting of: alkyl of 1 to 4 carbons; alkyl of 1 to 4 carbons substituted by hydroxy, sulfo, carboxy, sulfato, phenyl or a group of the formula —SO$_2$—Y with Y of the above mentioned meanings; cycloalkyl of 5 to 8 carbons; phenyl; phenyl substituted by substituents selected from chlorine, sulfo, methyl, methoxy, carboxy and a group of the formula —SO$_2$—Y with Y of the above mentioned meanings; or is ureido which is optionally mono- or disubstituted on the terminal nitrogen by one or two substituents from the group consisting of: alkyl of 1 to 4 carbons; alkyl of 1 to 4 carbons substituted by substituents selected from hydroxy, sulfo, carboxy, sulfato, phenyl or a group of the formula —SO$_2$—Y with Y of the above mentioned meanings; cycloalkyl of 5 to 8 carbons; phenyl; phenyl substituted by substituents selected from the group consisting of chlorine. sulfo, methyl, methoxy, carboxy and a group of the formula —SO$_2$—Y with Y of the above mentioned meaning;

R^8 is hydrogen, alkyl of 1 to 4 carbons or alyl of 1 to 4 carbons substituted by hydroxy, sulfo, carboxy, sulfato, a group of the formula —SO$_2$—Y with Y of the above mentioned meanings or by phenyl, or is alkenyl of 2 to 4 carbons which is optionally substituted by carboxy, sulfo, chlorine or bromine, or is cycloalkyl of 5 to 8 carbons;

R^9 is hydrogen, alkyl of 1 to 4 carbons or alkyl of 1 to 4 carbons substituted by hydroxy, sulfo, carboxy, sulfato, phenyl or a group of the formula —SO$_2$—Y where Y has the above mentioned meanings, or is alkenyl of 2 to 5 carbons which is optionally substituted by carboxy, sulfo or a group of the formula —SO$_2$—Y with Y of the above mentioned meaning, or by chlorine or bromine, or is cycloalkyl of 5 to 8 carbon atoms, or is phenyl which is optionally substituted by substituents selected from chlorine, sulfo, methyl, methoxy, carboxy and a group of the formula —SO$_2$—Y of the above mentioned meanings, or

R^8 and R^9 represent together with the nitrogen N-piperidino, N-morpholino or N-piperazino,

R^{10} is hydrogen, alkyl of 1 to 4 carbons or alkyl of 1 to 4 carbons substituted by alkoxy of 1 to 4 carbons or by cyano,

R^{11} is hydrogen, sulfo, sulfoalkyl with an alkyl moiety of 2 to 5 carbons, cyano or carbamoyl,

B^3 is hydrogen or alkyl of 1 to 6 carbons which is optionally substituted by phenyl, sulfo, sulfophenyl or a group of the formula —SO$_2$—Y with Y of the above mentioned meanings,

B^4 is hydrogen, alkyl of 1 to 4 carbons or alkyl of 1 to 4 carbons substituted by alkoxy of 1 to 4 carbons, sulfo, carboxy, sulfato, acetylamino, benzoylamino, cyano or a group of the formula —SO$_2$—Y with Y of the above mentioned meanings, or is alkenyl of 2 to 4 carbon atoms, cyclohexyl or phenyl which is optionally substituted by substituents selected from carboxy, sulfo, benzoylamino, acetylamino, a group of the formula —SO$_2$—Y with Y of the above mentioned meanings, and chlorine,

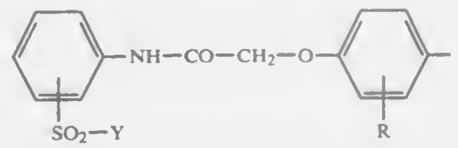
k is zero or 1 (and in the case where k is zero. this group is hydrogen),

m is 1 or 2,

m_1 is 1, 2 or 3,

W is sulfo, alkylsulfonyl of 1 to 4 carbons, phenylsulfonyl, bromine, fluorine or chlorine,

D^* is a group of the formula

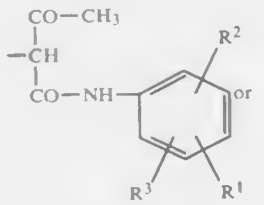


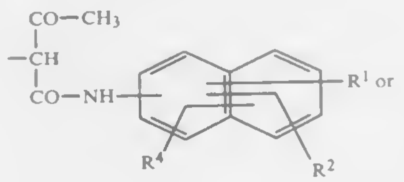
in which Y and R are defined as above, or

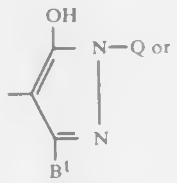
D^* is phenyl which is optionally substituted by 1, 2 or 3 substituents selected from alkyl of 1 to 4 carbons, alkoxy

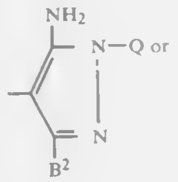
VOL 1127
ISS 1
JE 4
1991
UMI

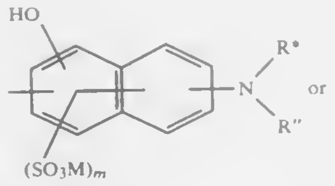
of 1 to 4 carbons, chlorine, bromine, hydroxy, carboxy, sulfo, carbamoyl, sulfamoyl and alkanoylamino of 2 to 5 carbons, or substituted by a group of the formula $—SO_2—Y$ with Y of the above mentioned meanings, or by a combination of those substituents, or is naphthyl substituted by 1, 2 or 3 sulfos, or by 1 or 2 sulfos and 1 or 2 groups of the formula $—SO_2$-Y with Y of the abovementioned meanings, or by one group $—SO_2—Y$;
K* is a group of the formula

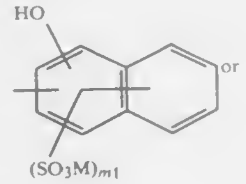


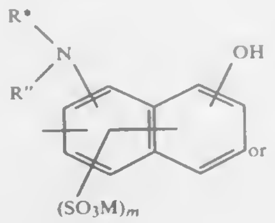












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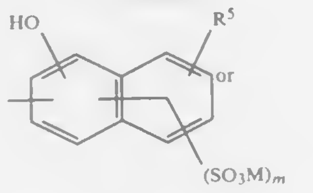
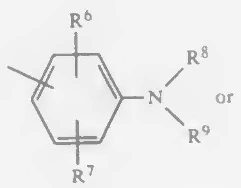
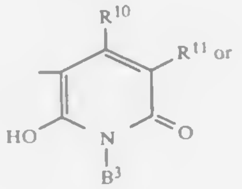
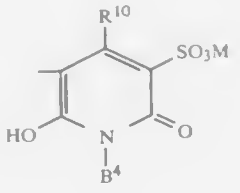








defined above.

5,021,560

IMMUNOGENIC FRACTION ACTIVE AGAINST BILHARZIOSES, ITS PREPARATION, AND IMMUNIZING COMPOSITIONS CONTAINING IT

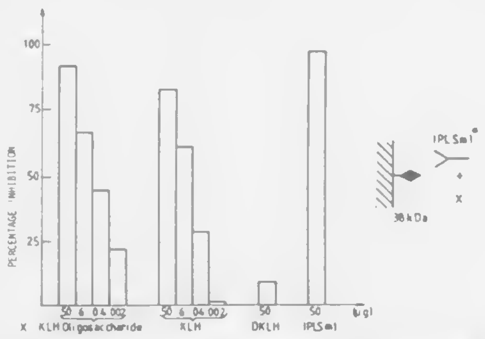
Jean Montreull, Geneviéve Spik; André58 rue du Capitaine Jasmin Capron; Colette Dissous, Jean-marie Grzych, 1 rue Marcq en Baroeul, all of France. Assignors: Institut Pasteur, Institut Pasteur de Lille, Institut National de la Sante et de la Recherche Medicale-Inserm, Paris, France

Filed Jul. 7, 1987, Ser. No. 72,656

Claims priority, application France, Jul. 7, 1986, 86 09842

Int. Cl.⁵ A61K *37/02, 39/00, 39/395;* **C04K** *15/14*

U.S. Cl. 536—1.1 43 Claims



1. A glycoprotein extract obtained by proteolysis of the hemocyanin of a mollusc taken from the group comprising Megathura crenulata, wherein the glucidic fraction of said extract represents 5 to 5.25% of the glycoprotein and the molar composition of said glucidic fraction, calculated on the basis of 3 mannose residues, is substantially as follows:

	Monosaccharidic residues
Mannose	3
Galactose	3 to 4
Fucose	2 to 3
Glucose	2 ± 0.2
Xylose	0.5-1
N-acetylglucosamine	3-4
N-acetylgalactosamine	2 ± 0.3.

5,021,561

COMPLEXES OF IRON OR OTHER METALS WITH SULPHONATED DERIVATIVES OF CHITOSAN

Federico Butelman, Milan, Italy, assignor to Etablissement Texcontor, Vaduz, Liechtenstein

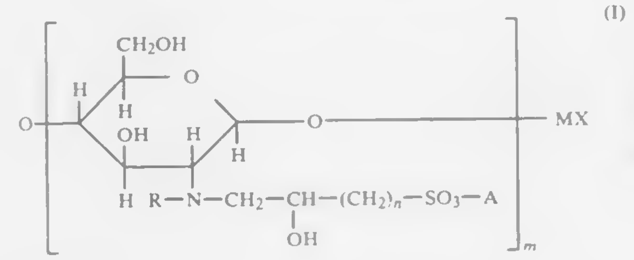
Filed Nov. 20, 1989, Ser. No. 438,077

Claims priority, application Italy, Apr. 10, 1989, 20082 A/89

Int. Cl.⁵ C08B *37/00;* **C07H** *5/00, 11/00, 1/00;* **A61K** *31/00*

U.S. Cl. 536—20 9 Claims

1. Complexes of iron or other metals with sulphonated derivatives of chitosan, having the following formula (I):



in which:

R is H or a C_1-C_5 alkyl group, or an arylalkyl group;

A is H or an alkaline metal or an alkaline earth metal;

X is a pharmacolcgically acceptable anion;

m is a whole number from 50 to 1000;

n is zero or a whole number from 1 to 10;

M is Fe^{II}, Fe^{III}, Mg, Ca or Bi.

9. A pharmaceutical composition comprising an aqueous solution containing an effective amount of the compound of formula (I) according to claim 1, wherein M is Fe^{II} or Fe^{III}.

5,021,562

METHOD FOR AZIDE DISPLACEMENT OF α-TRIFLATES OF 1,5-LACTONES

George W. J. Fleet, and Ian Bruce, both of Oxford, United Kingdom, assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 352,068, May 15, 1989, abandoned, and a contionation-in-part of Ser. No. 419,806, Nov. 11, 1989. This application May 17, 1990, Ser. No. 524,514

Int. Cl.⁵ C07H *13/02;* **C07D** *311/02*

U.S. Cl. 536—53 3 Claims

1. 2-Azido-2-deoxy-3,4:6,7-di-O-isopropylidene-D-glycero-D-talo-heptono-1,5-lactone.

5,021,563

METAL NAPHTHALOCYANINE DERIVATIVE AND PROCESS FOR PRODUCING THE SAME

Shigeru Hayashida; Seiji Tai; Nobuyuki Hayashi; Yasushi Iwakabe; Noriyuki Kinjo, and Shunichi Numata, all of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd. and Hitachi, Ltd., both of Tokyo, Japan

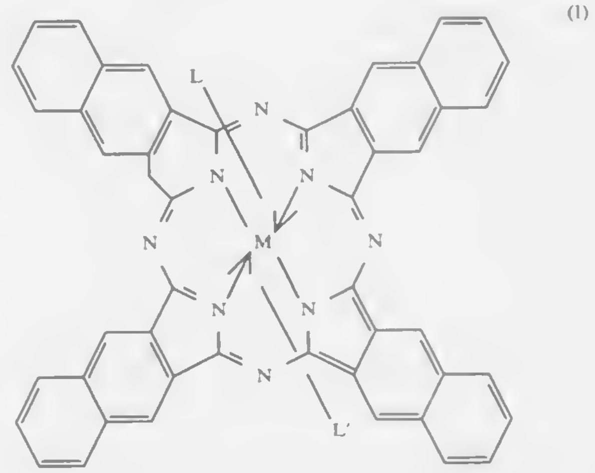
Division of Ser. No. 147,694, Jan. 25, 1988, Pat. No. 4,886,721. This application Oct. 6, 1989, Ser. No. 418,087

Claims priority, application Japan, Jan. 29, 1987, 62-19155

Int. Cl.⁵ C09B *47/04;* **C07D** *257/00;* **G11B** *7/24;* **B21M** *5/26*

U.S. Cl. 540—128 10 Claims

1. A naphthalocyanine compound represented by the formula:



wherein M represents germanium or tin; L and L' each independently represent a siloxy group of the formula $R_1R_2R_3SiO$- wherein R_1, R_2 and R_3 each independently represent an alkyl group having 1 to 4 carbon atoms.

5,021,564

PROCESS FOR PREPARING CEFTAZIDIME PENTAHYDRATE

David D. Wirth, Lafayette, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Contiouation of Ser. No. 518,277, May 1, 1990, abandoned, which is a continuation of Ser. No. 407,512, Sep. 14, 1989, abandoned, which is a continuation of Ser. No. 10,252, Feb. 2, 1987, abandoned. This application Nov. 26, 1990, Ser. No. 618,004

Int. Cl.⁵ C07D *501/38*

U.S. Cl. 540—225 12 Claims

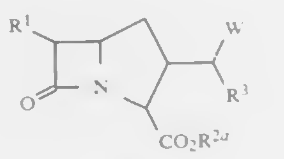
1. In the process for preparing ceftazidime pentahydrate from ceftazidime dihydrobromide, the improvement which comprises adding a secondary-amine-type ion-exchange resin in a water-immiscible organic solvent to an aqueous solution of ceftazidime dihydrobromide, stirring the resulting mixture while maintaining a pH at or below about 6.0 until the byproducts are adsorbed on the resin and isolating the ceftazidime in its pentahydrate form from the aqueous phase.

VOL
1127
ISS
1
JE
4
1991
UMI

5,021,565
2-SUBSTITUTED ALKYL CARBAPENEM ANTIBACTERIALS

Ronald W. Ratcliffe, Matawan, and Mary F. Woods, Metuchen, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.
Continuation of Ser. No. 396,729, Aug. 18, 1989, abandoned, which is a continuation of Ser. No. 283,016, Dec. 3, 1988, abandoned, which is a continuation of Ser. No. 163,231, Feb. 26, 1988, abandoned, which is a continuation of Ser. No. 919,725, Oct. 16, 1986, abandoned. This application Jun. 21, 1990, Ser. No. 541,442
Int. Cl.^{5} C07D *487/04*
U.S. Cl. 540—302 9 Claims

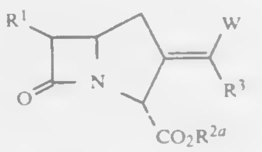
1. A compound of the structural formula:



IV

wherein R^1 is independently selected from C_1–C_3 linear or branched alkyl substituted with hydroxy or protected hydroxy; R^{2a} is an ester protecting group, H, or a water-soluble cation; R^3 is H or C_1–C_4 alkyl; W is CN wherein the dotted line represents an endo or exo double bond, or mixture thereof.

4. A compound of the structural formula:

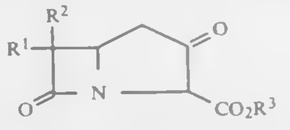


wherein R^1 is independently selected from C_1–C_3 linear or branched alkyl substituted with hydroxy or protected hydroxy; R^{2a} is an ester protecting group, H, or a water-soluble cation; R^3 is H or C_1–C_4 alkyl; W is CO_2R^4 wherein R^4 is selected from C_1–C_4 alkyl or C_7–C_{11} aralkyl; wherein the aryl portion is phenyl, or phenyl substituted with chloro C_1-C_5 alkoxy or di (C_1–C_3 alkyl) amino.

5,021,566
6- AND 6,6-DISUBSTITUTED-3-SUBSTITUTED-1-AZABICYCLO(3.2.0)HEPT-2-EN-7-ONE-2-CARBOXYLIC ACIDS

Burton G. Christensen, Scotch Plains, and Ronald W. Ratcliff, Matawan, both of N.J., assignors to Merck & Co. Inc., Rahway, N.J.
Continuation of Ser. No. 320,846, Mar. 6, 1989, abandoned, which is a continuation of Ser. No. 183,539, Apr. 14, 1988, abandoned, which is a continuation of Ser. No. 854,737, Apr. 22, 1986, abandoned, which is a continuation of Ser. No. 576,604, Feb. 3, 1984, abandoned, which is a continuation of Ser. No. 306,128, Sep. 28, 1981, abandoned, which is a division of Ser. No. 130,719, Jun. 18, 1980, abandoned, which is a continuation-in-part of Ser. No. 468, Jan. 2, 1979, abandoned, which is a continuation of Ser. No. 843,612, Oct. 12, 1977, abandoned. This application Feb. 15, 1990, Ser. No. 481,760
Int. Cl.^{5} C07D *487/04*
U.S. Cl. 540—302 5 Claims

1. A compound having the structural formula:

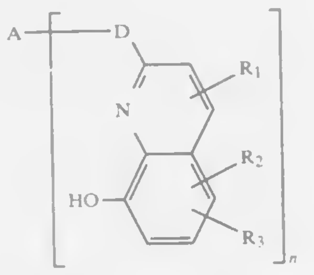


wherein R^2 is hydrogen and R^1 is selected from substituted and unsubstituted alkyl having from 1–4 carbon atoms, wherein the substituents are selected from the group consisting of hydroxyl, amino, and halo, and R^3 is a carboxyl protecting group.

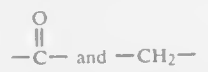
5,021,567
8-HYDROXYQUINOLINE CHELATING AGENTS

David K. Johnson, Vernon Hills, and Steven J. Kline, Grayslake, both of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.
Filed Sep. 24, 1987, Ser. No. 100,390
Int. Cl.^{5} C07D *403/06, 403/02*
U.S. Cl. 540—470 13 Claims

1. A compound characterized by having the structure

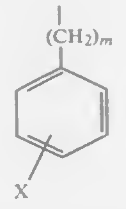


wherein D is selected from the group consisting of



$$-\overset{O}{\overset{\|}{C}}- \text{ and } -CH_2-$$

wherein R_1, R_2 and R_3 are the same or different and are selected from the group consisting of
hydrogen, halogen, C_1–C_3 alkyl, nitro, nitroso, sulfonate, sulfo-trialkyl ammonium salts, phosphate, $-CH_2COOH$, $-CH_2CH_2COOH$ and $-CH_2CH_2CH_2COOH$, carboxyamide, sulfonamide, phosphonic acid and sulfate
wherein n is 3 or 4 and
wherein A is a linear, cyclic or trifurcate tri- or tetraamine wherein the amine nitrogens are linked by alkane, cycloalkane or ortho-substituted phenyl ring substituents having from 2 to 4 carbon atoms between amine nitrogens, the amine nitrogens being positioned such that all of the attendant 8-hydroxyquinoline units are capable of binding a single metal center and
wherein A may optionally be substituted at a methylene carbon by the group

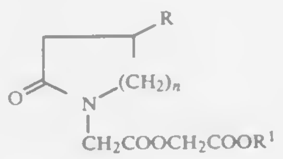


wherein X is meta or para and is a nitro or a substrate reactive moiety and wherein m is 0 to 10.

5,021,568
LACTAM-1-ACETIC ACID CARBALKOXYMETHYL ESTERS AND METHOD FOR PREPARING SAME

Alexandr G. Shipov, ulitsa Molodogvardeiskaya, 4, kv. 86, Moscow; Evgenia P. Kramarova, ulitsa Z. Kosmodemyanskoi, 17, korpus 2, kv. 19, Moskovskaya oblast, Schelkovo; Natalia A. Orlova, prospekt Vernadskogo, 99, korpus 1, kv. 57, Moscow; Jury I. Baukov, ulitsa Akademika Anokhina, 34, korpus 2, kv. 253, Moscow, and Kristap M. Ziemelis, ulitsa Muryanu, 48, kv. 40, Riga, all of U.S.S.R.
PCT No. PCT/SU88/00093, § 371 Date Jan. 12, 1990, § 102(e) Date Jan. 12, 1990, PCT Pub. No. WO89/10359, PCT Pub. Date Nov. 2, 1989
PCT Filed Apr. 22, 1988, Ser. No. 457,827
Int. Cl.^{5} C07D *223/10, 207/27*
U.S. Cl. 540—531 5 Claims

1. Lactam-1-acetic acid carbalkoxymethyl esters of the general formula:

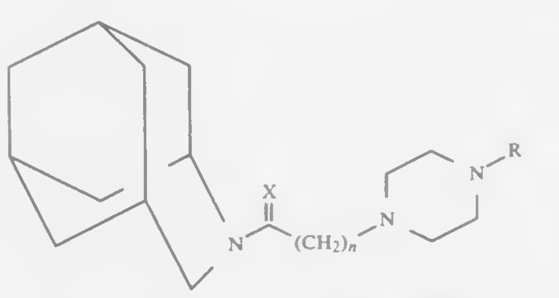


wherein with R = H, n = 1 or 3; R = phenyl, n = 1; R^1 = an alkyl.

5,021,569
4-AZATRICYCLO[4.3.1.1(3,8)]UNDECYLARYLPIPERAZINES WITH ANXIOLYTIC ACTIVITY

William A. Kinney, Churchville, Pa., and Nancy E. Lee, Attleboro, Mass., assignors to American Home Products Corporation, New York, N.Y.
Filed Jun. 12, 1990, Ser. No. 537,188
Int. Cl.^{5} C07D *403/14*
U.S. Cl. 540—581 7 Claims

1. The compound having the structure (I)



(I)

wherein R is unsubstituted or substituted phenyl, or pyrimidinyl, wherein the substituents are selected from the group consisting of lower alkyl containing 1 to 6 carbon atoms, lower alkoxy containing 1 to 6 carbon atoms, halo, cyano, nitro, and perhalomethyl; X is O or H_2; n is 1 to 4 or a pharmaceutically acceptable salt thereof.

5,021,570
AQUEOUS SOLUTION CONTAINING FAT-SOLUBLE VITAMIN K

Katsumi Ida, Saitama; Takayuki Ikeuchi, Kounan, and Masanori Kayano, Saitama, both of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan
Filed Jul. 7, 1989, Ser. No. 376,708
Claims priority, application Japan, Jul. 11, 1988, 63-172463
Int. Cl.^{5} A61K *31/12, 47/00*
U.S. Cl. 514—681 6 Claims

1. An aqueous solution comprising (A) about 0.5 wt. %, based on the weight of said aqueous solution, of fat-soluble vitamin K selected from the group consisting of vitamin K_1 and vitamin K_2, (B) about 0.8 wt. %, based on the weight of said aqueous solution, of hydrogenated lecithin, (C) from 0.02 to 1.0 wt. %, based on the weight of said aqueous solution, of stabilizer selected from the group consisting of (i) a triester of glycerol with fatty acids having 8 to 12 carbon atoms, and (ii) a monoester and triester of glycerol with oleic acid, stearic acid or palmitic acid, and (D) water, said stabilizer being effective to maintain the transmittance of said aqueous solution at 640 nm, when measured after storing said aqueous solution at 45° C. for 30 days, at a value of at least 76.9% of said transmittance of said aqueous solution prior to said storing of same.

5,021,571
CYCLOHEXYL EDTA MONOANHYDRIDE

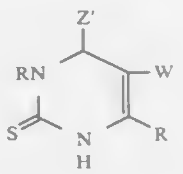
Ronnie C. Mease, Coram, and Suresh C. Srivastava, Setauket, both of N.Y., assignors to Associated Universities, Inc., Washington, D.C.
Filed Jun. 29, 1989, Ser. No. 372,905
Int. Cl.^{5} C07D *265/30*
U.S. Cl. 544—166 1 Claim

1. Cyclohexyl EDTA monoanhydride.

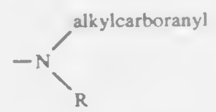
5,021,572
THIOUREA DERIVATIVES, METHODS OF THEIR PREPARATION AND THEIR USE IN NEUTRON CAPTURE THERAPY OF MALIGNANT MELANOMA

Detlef Gabel, Bremen, Fed. Rep. of Germany, assignor to The United States Department of Energy, Washington, D.C.
Filed Jan. 27, 1989, Ser. No. 302,289
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1988, 3803063
Int. Cl.^{5} C07F *5/02*
U.S. Cl. 544—229 6 Claims

1. A compound of the formula



wherein R is hydrogen or an alkyl group having from 1 to 8 carbon atoms; Z′ is =O, =S, -S-alkylcarboranyl, or



wherein the alkyl group has from 1 to 8 carbon atoms; and W is hydrogen when Z′ is a carboranyl group and dihydroxyboryl when Z′ is =O or =S and their salts with physiologically compatible organic and inorganic bases or acids.

5,021,573
HETEROCYCLIC PIGMENTS AND DYES

Peter Bitterli, Reinach, Switzerland; Bansi L. Kaul, Biel-Benken both of Switzerland, assignor to Sandoz Ltd., Basel, Switzerland
Filed Apr. 19, 1989, Ser. No. 340,348
Claims priority, application Fed. Rep. of Germany, Apr. 20, 1988, 3813243
Int. Cl.^{5} C07D *403/14, 487/02, 417/00, 235/04*
U.S. Cl. 544—284 12 Claims

1. A compound of formula I

VOL
1127
ISS
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1991
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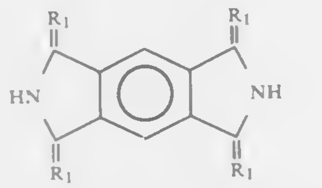
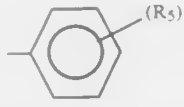
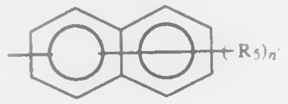


(I)

in which each R_1, independently, is oxygen, =NH or =N—R_2 where R_2 is a thienyl, pyrazolyl, imidazolyl, benzthiazolyl or benzimidazolyl group or a group of formula α or β

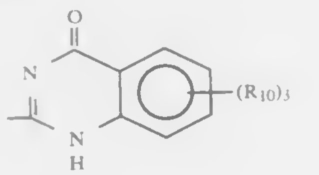


(α)



(β)

where n' is 2 or 3 and each R_5, independently, is halogen, (C_{1-4} alkyl)aminocarbonyl, (C_{1-4} alkyl)carbonylamino, carboxyl, (C_{1-4} alkoxy)carbonyl, phenylaminocarbonyl, benzoylamino, phenoxycarbonyl or a group of formula δ



(δ)

where each R_{10}, independently, is hydrogen, halogen, C_{1-4} alkyl, C_{1-4} alkoxy, cyano or nitro, provided not more than one group R_5 attached to any one phenyl group is a group of formula δ; provided that not more than two groups R_1 are selected from oxygen and =NH.

5,02:,574

6-SUBSTITUTED PURINYL PIPERAZINE DERIVATIVES

Zoltan G. Hajos, Princeton; Ramesh M. Kanojia, Somerville, and Jeffery B. Press, Rocky Hill, all of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Continuation-in-part of Ser. No. 163,487, Mar. 3, 1988, Pat. No. 4,876,257. This application Apr. 14, 1989, Ser. No. 337,984

The portion of the term of this patent subsequent to Oct. 24, 2006, has been disclaimed.

Int. Cl.⁵ C07D *473/36, 473/34, 473/24*

U.S. Cl. 544—276 **4 Claims**

1. A compound selected from the group consisting of:

6-[1-[1-[bis(3-trifluoromethylphenyl)methyl]piperazin-4-yl]-2-hydroxy-3-propanylthio]purine,

6-[1-[1-[bis(4-fluorophenyl)methyl]piperazin-4-yl]-2-hydroxy-3-propanylthio]-8-phenylpurine,

2-amino-6-[1-[1-[bis(4-fluorophenyl)methyl]piperazin-4-yl]-2-hydroxy-3-propanyl-thio]purine, and

6-[1-[1-[bis(4-fluorophenyl)methyl]piperazin-4-yl-]-2-acetoxy-3-propanylthio]purin-9-yl-3-propanoic acid, methyl ester.

5,021,575

METHOD FOR INTRODUCING A 1,2 DOUBLE BOND INTO AZASTEROIDS

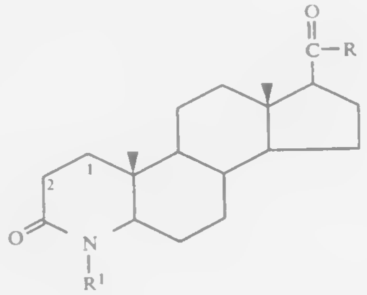
Anthony O. King, Colonia; Robert K. Anderson, Plainsboro; Richard E. Shuman, Westfield, and Leonard M. Weinstock, Belle Meade, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 13, 1989, Ser. No. 434,663

Int. Cl.⁵ A61K *31/395*

U.S. Cl. 546—77 **10 Claims**

1. A method of introducing a double bond at the 1,2 position of a compound having the formula:



I

wherein

R is

(i) a straight or branched chain alkyl group having 1 to 12 carbons;

(ii) a straight or branched chain alkyl group having 1 to 12 carbons in which a hydrogen is substituted with a hydroxy, carboxylic acid or an alkyl ester having 1 to 4 carbons;

(iii) a cycloalkyl group having 3 to 6 carbons;

(iv) phenyl;

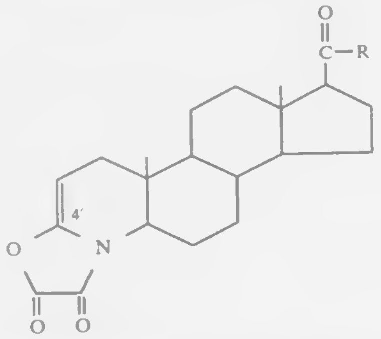
(v) OR^1 where R^1 is hydrogen or alkali metal, a C_{1-18} straight or branched chain alkyl group or benzyl;

(vi) NHR^2R^3, where R^2 and R^3 are each independently selected from hydrogen, C_{1-12} straight or branched chain alkyl, C_{1-12} straight or branched chain alkyl having a hydrogen substituted with ahydroxy, carboxylic acid or C_{1-4} alkyl ester, C_{3-10} cycloalkyl, phenyl, or R^2 and R^3 taken together with the nitrogen to which they are attached represent a 5–6 member saturated ring comprising up to one other heteroatom selected from oxygen and nitrogen;

R^1 is hydrogen, methyl, or ethyl;

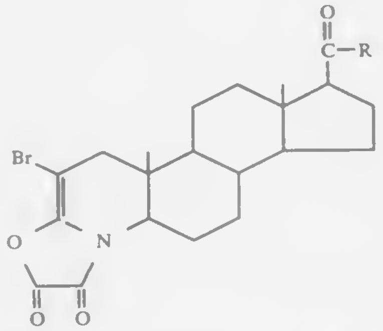
which comprises the steps of:

(a) reacting the compound of formula I with oxalyl chloride in a dry inert organic solvent, in the presence of an amine, base at a temperature of about −70° C. to 0° C., to produce a compound of the formula:



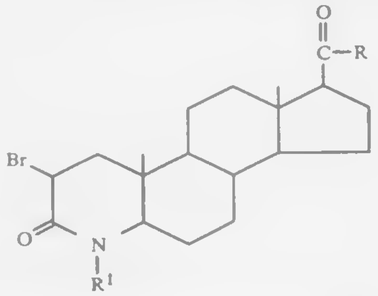
II

(b) reacting the compound of formula II with bromine in a dry inert organic solvent at a temperature in the range of −70° C. to 0° C., to produce a compound of the formula:



III

(c) reacting the compound of formula III with ethylenediamien or 2-methylaminoethanol, in a dry inert organic solvent, at a temperature in the range of −60° C. to −65° C., to produce a compound of the formula:



IV

(d) reacting the compound of formula IV with DBN, DBU or potassium t-butoxide, in a dry inert organic solvent, at a temperature of about 0° C., to introduce a double bond at the 1,2 position of the compound of formula I.

5,021,576

2-ANILINO PHENYLACETIC ACID DERIVATIVES

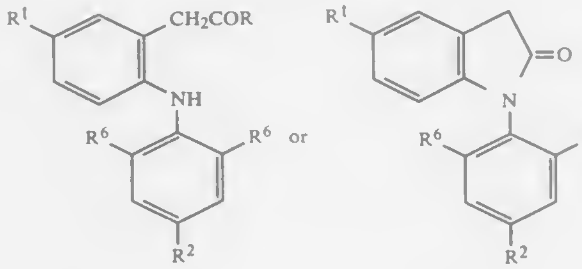
Amedeo A. Failli, Princeton Junction, N.J.; Anthony F. Kreft, III, Trooper, and John H. Musser, Yardley, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Oct. 27, 1989, Ser. No. 428,092

Int. Cl.⁵ C07D *215/14, 403/12*

U.S. Cl. 546—174 **13 Claims**

1. A compound having the formula



wherein

R is hydroxy, lower alkoxy or lower alkoxyamino;

R^1 is hydrogen or $A(CH_2)_nO$—;

R^2 is hydrogen or $A(CH_2)_nO$—, with the proviso that one of R^1 and R^2 is $A(CH_2)_nO$—and the other is hydrogen;

n is 1–2;

A is quinolinyl or chloroquinolinyl;

R^6 is hydrogen, halo or lower alkyl;

and the pharmacologically acceptable salts thereof.

5,021,577

POLYSUBSTITUTED N-HYDROCARBYLOXY HINDERED AMINE LIGHT STABILIZERS

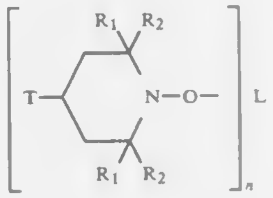
James P. Galbo, Hartsdale, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 326,704, Mar. 21, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 479,879

Int. Cl.⁵ C07D *401/12, 401/14;* **C08K** *5/3435*

U.S. Cl. 546—188 **12 Claims**

1. A polysubstituted N-hydrocarbyloxy compound of the formula



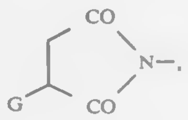
where

n is 2 to 10,

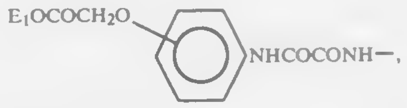
R_1 and R_2 are independently alkyl of 1 to 4 carbon atoms, or R_1 and R_2 together are pentamethylene,

L is an n-valent radical of an alkane or alkene of 1 to 18 carbon atoms, an n-valent radical of a cycloalkane or cycloalkene of 5 to 12 carbon atoms, an n-valent radical of a bicyclic or tricyclic hydrocarbon of 7 to 12 carbon atoms or an n-valent radical of an aryl, alkyl substituted aryl or aralkyl hydrocarbon of 6 to 15 carbon atoms, with the proviso that the N—O groups are not necessarily attached to the same carbon atom in L,

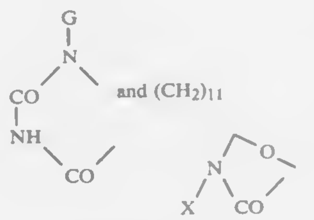
T is an organic moiety selected from the group consisting of E—COO—, E_1—OCO—, E—$CONR_3$—



E_1NHCOCONH—,



$E_1OCO(CH_2)_mNH$—, $E_1OCO(CH_2)pCOO$—,



where

E is phenyl, vinyl or alkyl of 1 to 17 carbon atoms,

E_1 is methyl or ethyl,

R_3 is hydrogen, alkyl of 1 to 8 carbon atoms or

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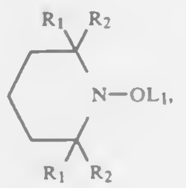


where

L$_1$ is a monovalent radical of the definition of L,

m is 2 to 4, p is 0 to 10,

G is hydrogen or alkyl of 1 to 18 carbon atoms, and

X is hydrogen or $-CH_2CH_2COOC_{12}H_{25}$.

9. The compound according to claim 1 which is 1,4-bis(4-benzoyloxy-2,2,6,6-tetramethylpiperidin-1-yloxy)-2-cyclohexene.

5,021,578
CERTAIN PERFLUOROLOWERALKOXY-2-PYRIDYLOXY PROPIONATES HAVING HERBICIDAL ACTIVITY

Volker Koch, Kelkheim; Lothar Willms, Hillscheid; Andreas Fuss, Karlstein; Klaus Bauer, Rodgau; Hermann Bieringer, Eppstein/Taunus, and Helmut Bürstell, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

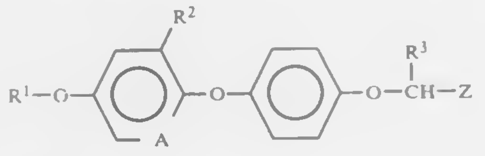
Continuation of Ser. No. 944,324, Dec. 19, 1986, abandoned. This application Feb. 22, 1989, Ser. No. 314,319

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545571

Int. Cl.^{5} C07D *213/69, 413/12;* **A01N** *43/40*

U.S. Cl. 546—296 **9 Claims**

1. A compound of the formula



in which

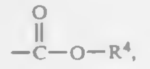
R^1 is CF_2H,

R^2 is Cl,

A is N,

R^3 is methyl,

Z is a group of the formula

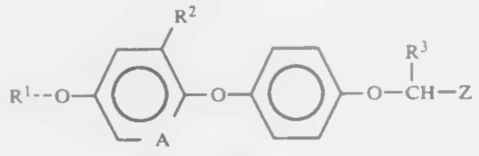


$$-\overset{O}{\overset{\|}{C}}-O-R^4,$$

and

R^4 is $CH_2-C\equiv CH$.

4. A compound of the formula



which is the D-isomer in which

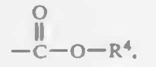
R^1 is CF_2H.

R^2 is Cl,

A is N,

R^3 is methyl,

Z is a group of the formula



$$-\overset{O}{\overset{\|}{C}}-O-R^4.$$

and

R^4 is C_2H_5.

5,021,579
CYCLOHEXANE HERBICIDES

Kenji Arai; Nobuaki Mito, both of Takarazuka; Kouichi Morita, Toyonaka, and Naonori Hirata, Sakai, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

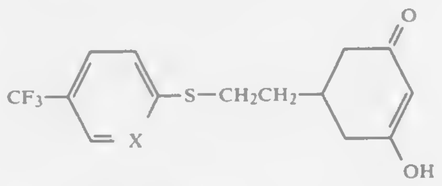
Division of Ser. No. 244,167, Sep. 14, 1988, Pat. No. 4,981,971, which is a division of Ser. No. 71,662, Jul. 9, 1987, Pat. No. 4,789,396. This application Sep. 28, 1990, Ser. No. 589,647

Claims priority, application Japan, Jul. 9, 1986, 61-161582; Dec. 19, 1986, 61-304821; Dec. 24, 1986, 61-310456

Int. Cl.^{5} C07D *213/62;* **C07C** *321/28*

U.S. Cl. 546—302 **1 Claim**

1. A compound the formula,



wherein X is CH or nitrogen.

5,021,580
POLYBENZOXAZOLES HAVING PENDANT METHYL GROUPS

Zenon Lysenko, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 23, 1989, Ser. No. 425,159

Int. Cl.^{5} C07D *211/72, 213/00;* **C07C** *205/00*

U.S. Cl. 546—307 **6 Claims**

1. A monomer suitable for synthesizing polybenzoxazole polymers, said monomer comprising:

(a) an aromatic group;

(b) two o-amino-hydroxy moieties bonded to the aromatic group; and

(c) a methyl group bonded to the aromatic group.

5,021,581
FUNGICIDES

John M. Clough, Marlow; Christopher R. A. Godfrey, Bracknell; Paul J. de Fraine, Wokingham; Michael G. Hutchings, Prestwich, and Vivienne M. Anthony, Maidenhead, all of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Feb. 2, 1988, Ser. No. 151,522

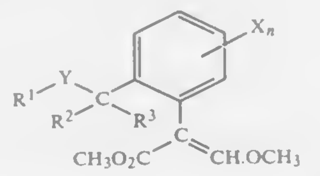
Claims priority, application United Kingdom, Feb. 9, 1987, 8702845; May 5, 1987, 8710594

Int. Cl.^{5} C07D *211/72*

U.S. Cl. 546—309 **9 Claims**

1. A compound of the formula (1):

(I)



and stereoisomers thereof, wherein R^1 is optionally substituted heteroaryl; Y is oxygen, sulphur or NR^4; R^2, R^3 and R^4, which may be the same or different, are hydrogen, C_{1-4} alkyl or C_{2-4} alkenyl; X is halogen, C_{1-4} alkyl, C_{2-4} alkenyl, C_{1-4} alkoxy, nitro or cyano; and n is 0 or an integer of 1 to 4.

5,021,582
FAMOTIDINE POLYMORPHIC FORMS AND THEIR PREPARATION PROCESS

Montserrat Ballester-Rodes; Francisco E. Palomo-Nicolau, and Antonio L. Palomo-Coli, all of Barcelona, Spain, assignors to Centro Marga Para La Investigacion S.A., Barcelone, Spain

Filed May 23, 1988, Ser. No. 197,329

Claims priority, application Spain, Jun. 22, 1987, 8702020; Oct. 29, 1987, 8703326; Mar. 23, 1988, 8800888

Int. Cl.^{5} C07D *277/48*

U.S. Cl. 548—197 **3 Claims**

1. A process for preparing famotidine polymorphs, comprising the steps of:

adding an acid to a suspension of famotidine in a C1–C3 alcohol to produce to a solution, said acid being selected from the group consisting of hydrogen chloride, hydrogen bromide, sulfuric acid, nitric acid and phosphoric acid;

reacting said solution with a tertiary organic base or a bicyclic amidine selected from the group consisting of 1,8-diazabicyclo [5.4.0]undec-7-ene and 1,5-diazabicyclo [4.3.0]non-5-ene, thereby forming a precipitate;

redissolving said precipitate by heating the solution containing the precipitate at a temperature between 50° and 650° C., thereby producing an alcoholic solution;

diluting said alcoholic solution with a chlorinated hydrocarbon selected from the group consisting of dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane and trichloroethylene; and then

recovering a famotidine polymorph of low apparent density and low melting point from the diluted alcoholic solution by precipitation or crystallization under cooling at 0°–5° C. and isolation by filtration at a temperature between 0° and 15° C.

5,021,583
FORMATION OF REISSERT COMPOUND OF BISBENZIMIDAZOLE

Harry V. Gibson, and Yajnanarayana H. R. Jois, both of Blacksburg, Va., assignors to Virginia Tech Intellectual Properties, Inc., Blacksburg, Va.

Division of Ser. No. 418,319, Oct. 6, 1989, Pat. No. 4,977,271. This application Sep. 21, 1990, Ser. No. 586,463

Int. Cl.^{5} C07D *403/06*

U.S. Cl. 548—328 **5 Claims**

1. A process for the formation of a Reissert compound of bisbenzimidazole which comprises:

(a) reaction of benzimidazole with a diacid chloride to form bisbenzimidazole; and

(b) reaction of the bisbenzimidazole with acid chloride and cyanide to form the Reissert compound thereof.

5,021,584
PROCESS FOR PREPARATION OF 1-BENZYLIMIDAZOLE COMPOUND

Natsuo Sawa, Tadotsu; Takeshi Masuda, Marugame; Shozo Miura, Mino; Naoki Kano, Marugame; Kazuo Kamagata, Hatoyama, and Masayuki Ito, Sakado, all of Japan, assignors to Shikoku Chemicals Corporation, Kagawa, Japan

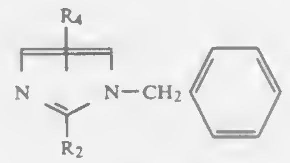
Filed Sep. 6, 1989, Ser. No. 403,460

Claims priority, application Japan, Sep. 6, 1988, 63-224127; Feb. 28, 1989, 1-48943

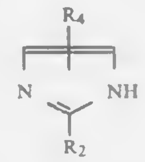
Int. Cl.^{5} C07D *233/58*

U.S. Cl. 548—335 **5 Claims**

1. A process for the preparation of a 1-benzylimidazole compound represented by the following formula:



wherein R$_2$ represents a lower alkyl group or phenyl group, and R$_4$ represents a hydrogen atom or a methyl group, which comprises heating a 1-unsubstituted imidazole compound represented by the following formula:



wherein R$_2$ and R$_4$ are as defined above, with benzyl alcohol in the presence of a carboxylic acid, a carboxylic anhydride, a benzyl ester thereof or a lower alkyl ester thereof, and neutralizing the reaction product with an alkali.

5,021,585
AROMATIC POLYIMIDE SILANOL COMPOUNDS, PRECURSORS AND POLYMERS THEREOF

Thomas K. Dougherty, Playa Del Rey, and Thomas W. Giants, Santa Monica, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

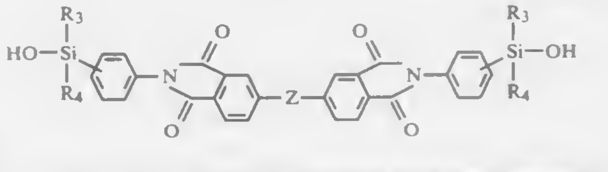
Filed Jun. 14, 1989, Ser. No. 365,868

Int. Cl.^{5} C07F *7/18, 7/10;* **C07B** *43/06*

U.S. Cl. 548—406 **12 Claims**

1. A compound having Formula I

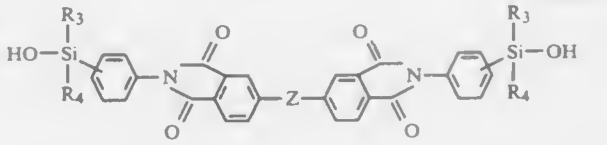
Formula I



where R$_3$ and R$_4$ are each selected from the group consisting of a C_1 to C_6 alkyl group and an aryl group, and Z is a divalent radical selected from the group consisting of $-C(CF_3)_2-$, CO, SO_2, and O.

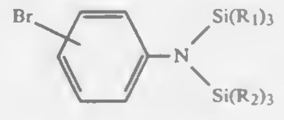
4. A method for forming a compound having Formula I

Formula I



where R$_3$ and R$_4$ are each selected from the group consisting of a C_1 to C_6 alkyl group and an aryl group, and Z is a divalent radical selected from the group consisting of $-C(CF_3)_2-$, CO, SO_2, and O comprising the steps of:

(a) reacting a bromoaniline compound with a chosen silylating agent to form a compound having the formula



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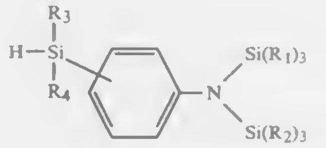
where R_1 and R_2 are each a C_1 to C_4 alkyl group or where the group $—NSi(R_1)_3Si(R_2)_3$ is 2,2,5,5-tetramethyl-1-aza2,5-disilacyclopentane

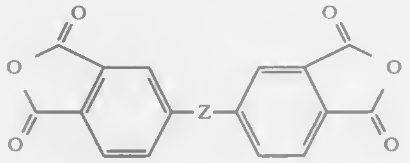
(b) reacting the compound formed in step "a" with n-butyllithium, followed by reaction with a chosen halogenated silane compound to form a compound having Formula II



Formula II

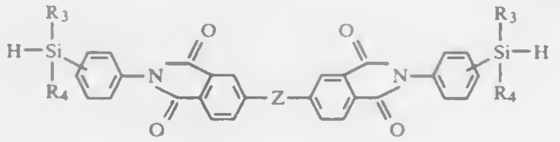
where R_1, R_2, R_3, and R_4 are as defined above

(c) reacting the compound of Formula II formed in step "b" with a dianhydride compound having the formula



where Z is as defined above to form a compound having Formula III

Formula III

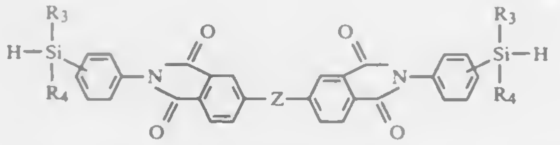


where R_3, R_4, and Z are as defined above

(d) hydrolyzing the compound of Formula III formed in step "c" to form the compound of Formula I.

7. A compound having Formula III

Formula III



where R_3 and R_4 are each selected from the group consisting of a C_1 to C_6 alkyl group and an aryl group, and Z is a divalent radical selected from the group consisting of $—C(CF_3)_2—$, CO, SO_2, and O.

5,021,586

DITHIOPHENYLPYRROLE DERIVATIVE MONOMERS FOR PREPARING SEMI-CONDUCTING POLYMERS

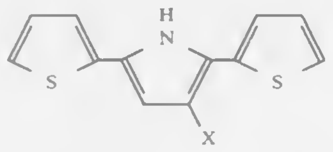
James P. Albarella, and Nan-Horng Lin, both of Elkhart, Ind., assignors to Miles, Inc., Elkhart, Ind.

Filed Mar. 31, 1989, Ser. No. 331,345

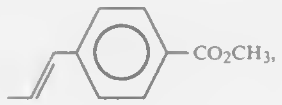
Int. Cl.⁵ C07D *409/14*

U.S. Cl. 548—527 **2 Claims**

1. The compound



in which X is $—CHO$, $—CH{=}CH—NO_2$, $—CH{=}CH—CO_2CH_3$, $—CHOHCH_2SO_3CH_3$, $—CHOH—CH_2—CO_2t—C_4H_9$, $—CH{=}CH—(CH_2)_4—CO_2H$,



$—N(C_3H_5)_2$, $—NH(CH_2)_6—NHCOCF_3$, $—NH—(CH_2)_3—CO_2CH_3$, $—NH—C_6H_4—CO_2—CH_3$, $—(CH_2)_2—NHCOCF_3$, $—Br$, $—CONHSO_2Cl$, $—CHO$, $—CH_2N(C_3H_5)_2$, $—COCH_3$, $—CO(CH_2)_2CO_2H$ or $—CO(CH_2)_2CO_2CH_3$.

5,021,587

SYNTHESIS OF N,3,4-TRISUBSTITUTED-3-AZOLINE-2-ONES

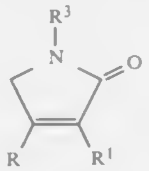
Jacob Mathew, Fenton, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Jan. 24, 1990, Ser. No. 469,657

Int. Cl.⁵ C07D *207/38*

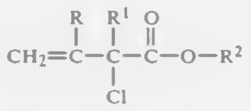
U.S. Cl. 548—543 **14 Claims**

1. A method of synthesizing an N,3,4-trisubstituted-3-azoline-2-one of the formula:



in which R, R^1, and R^3 are each independently H; a C_1-C_{32} alkyl radical; or a C_1-C_{32} aryl radical, comprising reacting together under cyclizing conditions

a. an ester of the formula:



$$CH_2{=}\overset{R}{\overset{|}{C}}-\underset{\underset{Cl}{|}}{\overset{\overset{R^1}{|}}{C}}-\overset{\overset{O}{\|}}{C}-O-R^2$$

wherein R and R^1 are as defined above, and R^2 is a C_1-C_{16} alkyl radical; with

b. a primary amine of the formula:

$H_2N—R^3$

wherein R^3 is as defined above.

5,021,588

VAPOR PHASE CATALYTIC OXIDATION OF BUTANE TO MALEIC ANHYDRIDE

Rashmikant M. Contractor, Wilmington, Del., assignor to E.I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 17,181, Feb. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 692,474, Jan. 18, 1985, Pat. No. 4,668,802. This application Aug. 26, 1988, Ser. No. 236,743

Int. Cl.⁵ C07D *307/60*

U.S. Cl. 549—259 **5 Claims**

1. Improved process for the selective vapor phase oxidation of n-butane to maleic anhydride over a vanadium/phosphorus oxide catalyst, in oxidized form, the improvement consisting of:

a) contacting a feed gas containing n-butane, oxygen and inert gas, where the amount of oxygen present in the feed gas is in excess of the stoichiometric amount required to convert the total amount of n-butane converted to maleic anhydride in the process,

with an effective amount of vanadium/phosphorus oxide catalyst, in oxidized form, comprised of particles about 20 to about 300 μm in size,

in the reaction zone of a recirculating solids reactor, at a temperature of about 300° C. to about 500° C., at a gas residence time in the reaction zone of about 1.2 seconds to about 15 seconds, and at a catalyst residence time in the reaction zone of at least 1.5 times greater than the gas residence time;

b) removing the effluent produced in step (a) from the reaction zone and separating the resultant reduced catalyst from the effluent gases, transporting the reduced catalyst to the regeneration zone of the recirculating solids reactor, and recovering maleic anhydride from the effluent gases;

c) oxidizing the reduced catalyst in the regeneration zone using an oxygen-containing gas, at a temperature of about 300° C. to about 500° C., at a catalyst residence time in the regeneration zone of about 5 seconds to about 5 minutes, and at an oxygen-containing gas residence time of about 1 second to about 30 seconds; and

d) recycling the oxidized catalyst from step (c) to the reaction zone.

5,021,589

METHOD FOR PRODUCING A LACTONE

Keisuke Wada, Yokohama; Yoshinori Hara, Machida, and Koushi Sasaki, Kawasaki, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Division of Ser. No. 72,744, Jul. 13, 1987, Pat. No. 4,892,955. This application Oct. 30, 1989, Ser. No. 428,785

Claims priority, application Japan, Aug. 19, 1986, 61-193691; Apr. 18, 1987, 62-95681

The portion of the term of this patent subsequent to Jan. 9, 2007, has been disclaimed.

Int. Cl.⁵ C07D *307/26*

U.S. Cl. 549—325 **7 Claims**

1. A method for producing a lactone by hydrogenating a dicarboxylic acid, a dicarboxylic acid anhydride and/or a dicarboxylic acid ester in the presence of a catalyst, wherein said catalyst is a ruthenium catalyst comprising (1) ruthenium, (2) an organic phosphine and (3) a conjugate base of an acid having a pKa of less than 2, selected from the group consisting of Bronsted acids including p-toluenesulfonic acid, trifluoromethanesulfonic acid, nitric acid, benezensulfonic acid, methanesulfonic acid, dodecylsulfonic acid and octadecylsulfonic acid, and alkali metal salts, alkali earth metal salts, ammonium salts and silver salts of these Bronsted acids.

5,021,590

PROCESS FOR PRODUCING N-ALKYL-CARBAMATES

Franco Mizia, Milan; Franco Rivetti, Schio, and Ugo Romano, Vimercate, all of Italy, assignors to Enichem Synthesis SpA, Palermo, Italy

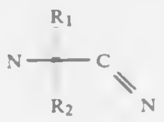
Continuation of Ser. No. 220,463, Jul. 18, 1988, abandoned. This application Feb. 22, 1990, Ser. No. 485,858

Claims priority, application Italy, Jul. 31, 1987, 21561 A/87

Int. Cl.⁵ C07D *317/64, 307/78;* **C07C** *125/067*

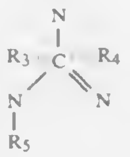
U.S. Cl. 549—438 **13 Claims**

1. A process for preparing N-alkyl-carbamates by reacting a phenol or a naphthol and an alkyl-isocyanate in an inert organic solvent and in the presence of a catalyst, wherein said catalyst is a bicyclic amidine (I) or a bicyclic guanidine (II), containing a stretched tertiary nitrogen bonded to a ketoiminic carbon atom, and which is represented by the following formulae:



(I)

and



(II)

wherein:

R_1 and R_2 independently represent non-substituted or substituted alkylenic radicals containing from 3 to 5 carbon atoms with one or more $(C_1–C_5)$-alkyl or phenyl substituents;

R_3 and R_4 independently represent non-substituted or substituted alkylenic radicals containing 3 or 4 carbon atoms with one or more $(C_1–C_5)$-alkyl or phenyl substituents; and

R_5 is a $(C_1–C_5)$-alkyl, or an alkyl-aryl radical.

5,021,591

PYRAZOLO[1,5-A]PYRIMIDINE-2-SULFIDE COMPOUNDS

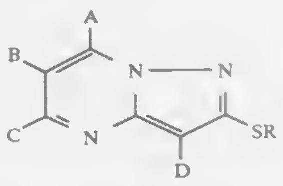
Anna P. Vinogradoff, Concord, and William A. Kleschick, Martinez, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 255,109, Jul. 27, 1988, which is a division of Ser. No. 884,696, Jul. 11, 1986. This application Jan. 23, 1990, Ser. No. 468,486

Int. Cl.⁵ C07D *487/04*

U.S. Cl. 544—281 **4 Claims**

1. A compound having the formula:



wherein B represents hydrogen, halogen or $C_1–C_4$ alkyl; A, C and D independently represent hydrogen, halogen, $C_1–C_4$ alkyl, $C_1–C_4$ alkoxy, $C_1–C_4$ haloalkyl, $C_1–C_4$ haloalkoxy, cyano, hydroxy, CO_2 alkyl of 1–3 carbon atoms; or A and B or B and C are bonded together in a cyclic structure $-(CH_2)_n-$ wherein n is 3, 4 or 5; and R represents benzyl.

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5,021,592
REDOX-ACTIVE CENTRES

Paul D. Beer, and Elizabeth L. Tite, both of Birmingham, England, assignors to Imperial Chemical Industries PLC, London, England

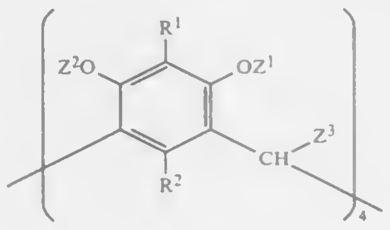
Filed Apr. 26, 1989, Ser. No. 343,342

Claims priority, application United Kingdom, Apr. 26, 1988, 8809862; Oct. 5, 1988, 8823384

Int. Cl.^{5} C07C *15/02, 11/00, 15/00*

U.S. Cl. 556—1 **8 Claims**

1. A polymetallocene macrocycle of the General Formula



wherein

- Z^1 and ^{2}, which may be in the same as or different from each other, may be hydrogen, hydrocarbyl, acyl, aroyl, alkylimino, acylimino, metallocene-CO— or metallocene-CH_2—, or Z^1 and Z^2 on one aromatic group may together form a link between the 0's thereof or Z^1 on one aromatic group and Z^2 on an adjacent aromatic group may form an intramolecular link between the 0's on the two said groups;
- R^1 and R^2, which may be the same as or different from each other, may be hydrogen, hydrocarbyl, acyl, aroyl, nitro, amino, hydroxyl, carbonyl, carboxyl, etc or R^2 may be ferrocenecarbonyloxy; and
- Z^3 is a hydrocarbyl group, a metallocene residue, or a heterocyclic group or a transition metal complex thereof except that least one of Z^1, Z^2 or Z^3 bears a metallocene residue and/or Z^3 is a metal complex of the heterocyclic group wherein the metal in Z^1, Z^2, or Z^3 is a transition metal.

5,021,593
RUTHENIUM-OPTICALLY ACTIVE PHOSPHINE COMPLEX

Hiroyuki Nohira, Saitama; Hidemasa Takaya, Shiga, and Akira Miyashita, Saitama, all of Japan, assignors to Takasago International Corporation, Tokyo, Japan

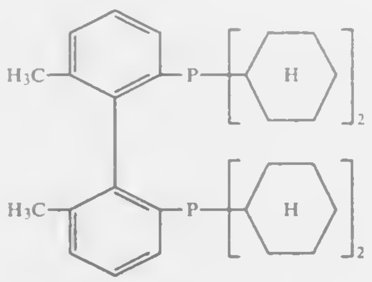
Filed Jul. 11, 1990, Ser. No. 551,110

Claims priority, application Japan, Jul. 11, 1989, 1-177257; Mar. 9, 1990, 2-58791

Int. Cl.^{5} C07F *15/00*

U.S. Cl. 556—20 **6 Claims**

1. A ruthenium-optically active phosphine complex having, as a ligand, BICHEP which means 2,2'-bis(dicyclo-hexylphosphino)-6,6'-dimethyl-1,1'-biphenyl represented by formula (I):



(I)

5,021,594
ENHANCED REDUCTION AND INHIBITION OF ETU CONTENT IN ALKYLENEBISDITHIOCARBAMATES

Jacobus A. M. Nouws, Etten-leur; Pieter Kool, Oostvoorne, and Pieter C. Diepenhorst, Spijkenisse, all of Netherlands, assignors to Pennwalt France S.A., Plaisir, France

Filed Mar. 12, 1990, Ser. No. 492,526

Int. Cl.^{5} C07C *155/06;* **C07F** *13/00*

U.S. Cl. 556—38 **18 Claims**

1. A method of stabilizing alkylene dithiocarbamates (EBDC) comprising mixing with the EBDC a formaldehyde donor and a co-polymerization agent for formaldehyde, which co-polymerization agent forces the polymerization reaction of formaldehyde and ethylenethioureas toward completion, said formaldehyde donor and copolymerization agent being mixed with the EBDC in amounts effective to reduce the content of ethylenethiourea in the EBDC.

5,021,595
TRANSITION METAL CATALYST COMPOSITION FOR OLEFIN POLYMERIZATION

Sudhin Datta, Matawan, N.J., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Mar. 2, 1990, Ser. No. 487,695

Int. Cl.^{5} C07C *9/00, 7/00, 11/00*

U.S. Cl. 556—42 **67 Claims**

1. A catalyst composition comprising a trivalent transition metal compound wherein two valencies of the transition metal are filled by bidentate chelating compounds, each of the bidentate chelating compounds having a combined hydrocarbyl constituency such that the trivalent transition metal compound is soluble in hydrocarbon solvents.

5,021,596
ZIRCONIUM CHELATES, THEIR PREPARATION, AND THEIR USE IN PRINTING INKS

Dieter Barfurth, Troisdorf-Spich; Claus Lindzus, Cologne, and Heinz Nestler, Troisdorf-Eschmar, all of Fed. Rep. of Germany, assignors to Huels Troisdorf Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Filed Feb. 23, 1989, Ser. No. 314,816

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 3805879

The portion of the term of this patent subsequent to Jun. 5, 2007, has been disclaimed.

Int. Cl.^{5} C07F *7/00*

U.S. Cl. 556—55 **4 Claims**

1. A compound of the formula

$$Zr(OR)_{4-x}(\text{dialkyl citrate})_x$$

wherein

- x is an integer from 1 to 4, inclusive;
- R is alkyl of 1 to 8 carbon atoms;
- the alkyl moieties of the citrate are identical alkyls of 1 to 8 carbon atoms; and
- when x is 1 or 2, the R's are identical.

5,021,597
NOVEL ACRYLIC ACID SALTS, A PROCESS FOR THEIR PREPARATION, PHARMACEUTICAL COMPOSITIONS CONTAINING THEM AND THEIR USE IN THE MEDICINE

Tamas Fodor; Janos Fischer; Laszlo Dobay; Ferenc Trischler; Elemer Ezer; Judit Matuz; Katalin Saghy; Laszlo Szporny, and György Hajos, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

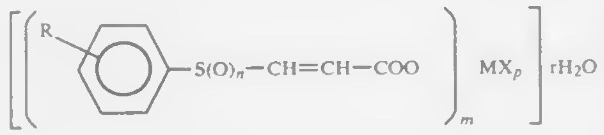
Filed Jul. 11, 1990, Ser. No. 551,519

Claims priority, application Hungary, Jul. 14, 1989, 3570/89

Int. Cl.^{5} C07F *9/94, 3/06*

U.S. Cl. 556—69 **14 Claims**

1. A compound of formula



wherein

- R represents a hydrogen or a halogen atom, a C_{1-4}alkyl, a C_{1-4}alkoxy or a nitro group,
- M represents a cation derived from bismuth, zinc or a pharmaceutically acceptable organic base,
- X represents an inorganic anion,
- n is an integer of from 0 to 2,
- m is an integer of from 1 to 3,
- p is 0 or 1, and
- r is an integer of from 0 to 6.

5,021,598
PROCESS FOR MAKING BISMUTH CARBOXYLATES

Prabodh K. Patnaik, Warren, and Paul L. Cells, Cleveland, both of Ohio, assignors to Mooney Chemicals, Inc., Cleveland, Ohio

Filed Jul. 24, 1989, Ser. No. 384,245

Int. Cl.^{5} C07F *9/94*

U.S. Cl. 556—77 **35 Claims**

1. A process for making a bismuth carboxylate reaction product comprising:

- (A) heating an anhydrous reaction mixture comprising a carboxylic acid or anhydride, bismuth metal, and a reducing agent to a temperature of from about 80° C. up to, but not including, the temperature of decomposition of any reactant, the reducing agent or the desired bismuth carboxylate;
- (B) bubbling an oxygen-containing gas through the reaction mixture during (A); and
- (C) removing water formed during (B) from the reaction mixture and/or reaction product.

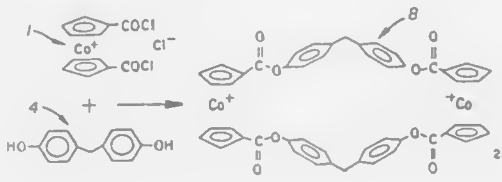
5,021,599
REDOX-RESPONSIVE ANION RECEPTORS

Paul D. Beer, Birmingham, and Anthony D. Keefe, Surrey, both of United Kingdom, assignors to Serpentix Conveyor Corporation, Westminster, Colo.

Filed Aug. 31, 1989, Ser. No. 401,977

Int. Cl.^{5} C07C *15/12*

U.S. Cl. 556—142 **14 Claims**



1. A family of ligands consisting of at least the $(C_5H_4)_2M^+$ moiety as a part of a macrocyclic host structure, wherein said moiety defines a cavity within the macrocyclic host structure capable of binding an anionic guest, wherein M is a metal ion having at least two valence states, and the host is capable of complexing with a larger fraction of said guest when M is in one of the valence states as compared to the other.

5,021,600
NEW SILYLATING AGENT FOR THE PREPARATION OF CHROMATOGRAPHIC SUPPORTS

Franco Cardinali, Ostia Lido; Maria G. Longobardi, Rome; Giuseppe C. Viscomi, Monterotondo, and Alessandra Ziggiotti, Colleverde Guidonia, all of Italy, assignors to Eniricerche S.p.A., Milan and Sclavo S.p.A., Siena, both of, Italy

Filed Aug. 15, 1989, Ser. No. 393,787

Claims priority, application Italy, Sep. 2, 1988, 21810 A/88

Int. Cl.^{5} C07F *7/10*

U.S. Cl. 556—411 **4 Claims**

1. A compound of general formula (I)

$$(R_1,R_2,R_3)Si—NH—CO—O——Si(R_1,R_2,R_3) \qquad (I)$$

wherein R_1 and R_2, each independently, represent a straight or branched alkyl radical containing from 1 to 22 carbon atoms, and R_3 represents a straight or branched alkyl radical containing from 4 to 22 carbon atoms, a straight or branched alkyl radical of from 1 to 22 carbon atoms substituted with one or more groups independently selected from amino, hydroxy, halogen, cyano, and carboxy, a mono- or poly-cyclic cycloalkyl radical of from 6 to 12 carbon atoms, a cycloalkyl-(C_1–C_4)alkyl radical, and a phenyl or naphthyl group optionally substituted with one or more (C_1–C_4)alkyl groups.

5,021,601
NOVEL POLYORGANOSILOXANES COMPRISING PROPANALDEHYDE FUNCTIONAL GROUPS

Jean-Mare Frances, Villeurbanne, and Francois Metz, Lyon, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

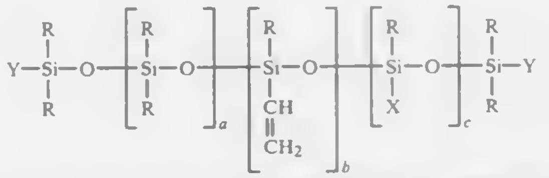
Filed Sep. 5, 1989, Ser. No. 402,768

Claims priority, application France, Sep. 5, 1988, 88 11768

Int. Cl.^{5} C07F *7/08;* **C08G** *77/06, 77/20*

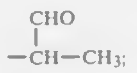
U.S. Cl. 556—436 **8 Claims**

1. A polyorganosiloxane comprising a diorganopolysiloxane of the formula:



$$Y-\underset{R}{\overset{R}{\underset{|}{\overset{|}{Si}}}}-O-\left[\underset{R}{\overset{R}{\underset{|}{\overset{|}{Si}}}}-O\right]_a-\left[\underset{\underset{CH_2}{\overset{\|}{CH}}}{\overset{R}{\underset{|}{\overset{|}{Si}}}}-O\right]_b-\left[\underset{X}{\overset{R}{\underset{|}{\overset{|}{Si}}}}-O\right]_c-\underset{R}{\overset{R}{\underset{|}{\overset{|}{Si}}}}-Y$$

in which the radicals Y, which may be identical or different, are each a radical X; X is one of the radicals $—CH_2—CH_2—CHO$ or



$$—\overset{\overset{CHO}{|}}{CH}—CH_3;$$

the radicals R, which may be identical or different, are each a phenyl or 3,3,3-trifluoropropyl radical or an alkyl radical containing from 1 to 12 carbon atoms; a is an integer ranging from 0 to 1,000; b is an integer ranging from 0 to 50; c is an integer ranging from 0 to 100; and a+b+c is equal to at least 1.

5,021,602
REACTIVE COMPOUNDS CONTAINING PERFLUOROCYCLOBUTANE RINGS

Katherine S. Clement; David A. Babb, and Bobby R. Ezzell, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 9, 1989, Ser. No. 364,686

Int. Cl.^{5} C07C *327/00*

U.S. Cl. 558—230 **17 Claims**

1. A compound having at least one perfluorocyclobutane

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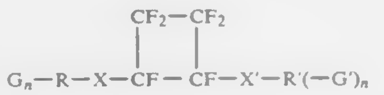
ring and at least two reactive functional groups and a structure represented by Formula II:


$$G_n-R-X-\underset{}{CF}-CF-X'-R'(-G')_n \quad (\text{ring } CF_2-CF_2)$$

wherein R and R' independently represent optionally inertly substituted groups: X and X' represent any molecular structures which link R an R' with the perfluorocyclobutane ring; n and n' are the number of G and G' groups, respectively; and G and G' independently represent any reactive functional groups or any groups convertible into reactive functional groups, and wherein R represents an unsubstituted or inertly substituted aromatic hydrocarbyl group, or X represents a group selected from the group consisting of oxygen atoms, sulfur atoms, sulfoxide, sulfone, carbonyl, and thiocarbonyl groups.

5,021,603
THIURAM POLYSULFIDE PRODUCTION

Manfred Bergfeld, Erlenbach; Ludwig Eisenhuth, Obernburg, and Hans-Georg Zengel, Kleinwallstadt, all of Fed. Rep. of Germany, assignors to Akzo N.V., Netherlands
Filed May 9, 1985, Ser. No. 732,310
Int. Cl.⁵ C07C *333/00*
U.S. Cl. 558—237 **8 Claims**

1. A process for the production of thiuram polysulfides substituted by at least one member selected from the group consisting of aliphatic, araliphatic and cycloaliphatic hydrocarbon radicals, comprising reacting (a) a secondary amine substituted by at least one member selected from the group consisting of aliphatic, araliphatic and cycloaliphatic hydrocarbon radicals, said secondary amine having a pKa value of ≧8, (b) carbon disulfide and (c) sulfur, the reaction being carried out in a solvent at temperatures of from 0° to 150° C. in the presence of an oxidizing agent comprising oxygen or an oxygen-containing gas, and a metal-containing catalyst.

5,021,604
Patent Not Issued For This Number

5,021,605
TRIFLUOROBENZENE COMPOUNDS

Hiroshi Kobayashi, Fukuoka, and Masaaki Shimizu, Kanagawa, both of Japan, assignors to SDS Biotech K.K., Tokyo, Japan
Division of Ser. No. 243,753, Sep. 14, 1988, Pat. No. 4,925,966. This application Dec. 12, 1989, Ser. No. 449,220
Claims priority, application Japan, Sep. 14, 1987, 62-228286
Int. Cl.⁵ C07C *255/51*
U.S. Cl. 558—425 **1 Claim**

1. 2,4,5-Trifluoroisophthalonitrile.

5,021,606
Patent Not Issued For This Number

5,021,607
OXIDATION OF SATURATED HYDROCARBON CHAINS

Diana R. C. Huybrechts, Turnhout, Belgium, assignor to Exxon Chemical Patents Inc., Linden, N.J.
PCT No. PCT/GB89/01328, § 371 Date Sep. 10, 1990, § 102(e) Date Sep. 10, 1990, PCT Pub. No. WO90/05126, PCT Pub. Date May 17, 1990
PCT Filed Nov. 11, 1989, Ser. No. 536,679
Claims priority, application Belgium, Nov. 8, 1988, 08801275
Int. Cl.⁵ C07C *45/28*
U.S. Cl. 568—311 **17 Claims**

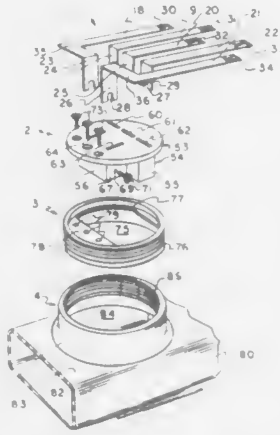
1. The use for the oxidation of saturated hydrocarbon chains a titanium containing silicalite catalyst having an infra red absorption band around 950 cm^{-1}.

7. A process for the oxidation of saturated hydrocarbon chains by the treatment of the compound containing the saturated organic group with an oxidising agent in the presence of a titanium containing silicalite catalyst having an infra red absorption band around 950 cm^{-1}.

ELECTRICAL

5,021,608
ACTIVATING UNDERCARPET CABLE FROM INFLOOR CONDUCTORS

Robert W. Hadfield, Parkersburg, W. Va., assignor to Butler Manufacturing Company, Kansas City, Mo.
Filed Nov. 17, 1989, Ser. No. 437,736
Int. Cl.⁵ H02G *3/12*
U.S. Cl. 174—48 12 Claims

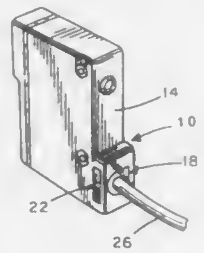


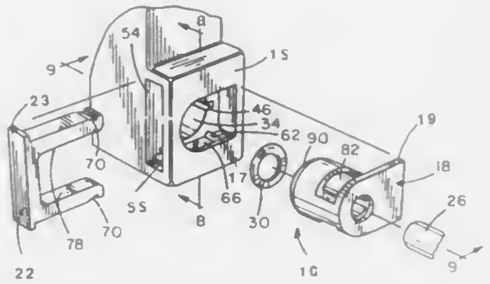
1 In a building:
a concrete floor having a bore extending between the top of the floor and the bottom of the floor;
a flat-conductor cable on the top of said floor;
a junction splice section on said floor adjacent said bore and having mechanism making an electrical connection with each conductor of said flat conductor cable;
a plurality of round power conductors extending from underneath the surface of said floor up into said bore; and
means including an adaptor in said bore, the adaptor having means electrically connected with said junction splice section and with flat conductors and electrically connecting the flat and round conductors together.

5,021,610
STRAIN RELIEF CONNECTION

Kenneth P. Roberts, Asheville, N.C., assignor to Square D Company, Palatine, Ill.
Filed Jan. 4, 1990, Ser. No. 461,139
Int. Cl.⁵ H01R *13/58*
U.S. Cl. 174—65 R 6 Claims

1. A strain relief connector for connecting an electrical cable into a housing of an electrical or electronic device, said connector comprising:
a. a portion of the housing including an interior surface, an exterior surface, and a passage between said interior and exterior surfaces,
b. a bushing insertable into said passage for enclosing the cable at its point of entry into said housing,
c. means connectable to the portion of the housing and extending generally perpendicular to the axis of the bushing for simultaneously clamping the cable in said bushing and for locking said bushing and cable into said portion of the housing in a generally tamper-resistant manner, and

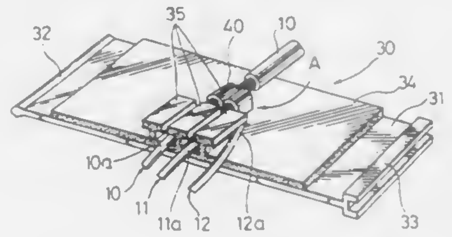


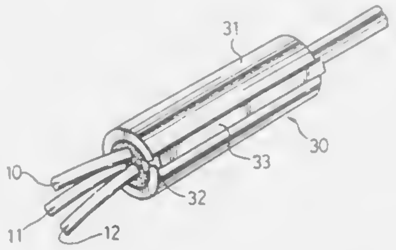


d. means locatable between the portion of the housing and said bushing for sealing between the passage, said bushing, and the cable to prevent liquids from entering the housing.

5,021,611
WATERPROOF JOINT FOR WIREHARNESS

Masataka Amano, Shizuoka, Japan, assignor to Yazaki Corporation, Japan
Filed Oct. 5, 1989, Ser. No. 417,790
Claims priority, application Japan, Oct. 7, 1988, 63-131023[U]; Dec. 9, 1988, 63-160171[U]
Int. Cl.⁵ H02G *15/113*
U.S. Cl. 174—88 R **16 Claims**





1 A waterproof joint for a joint section of a plurality of wires of a wireharness to be connected, each wire having a conductor and an insulating cover surrounding the conductor, the joint section comprising a connecting portion of the conductors and the insulating covers of the wires near the connecting portion, which waterproof joint comprises:
a thermally shrinkable joint member including a thermally shrinkable sheet having an inner surface and a thermoplas-

VOL
1127
ISS
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1991
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tic layer of thermoplastic material formed on the inner surface of the thermally shrinkable sheet, the thermally shrinkable joint member being adapted to be wound around the joint section in such a manner that the thermally shrinkable layer faces the joint section;

secondary sealing means formed of a thermoplastic material for filing up spaces between the wires of the joint section when heat is applied thereto in cooperation with the thermoplastic material of the thermoplastic layer, the secondary sealing means being provided within the thermally shrinkable joint member, whereby when heat is applied to the thermally shrinkable joint member the thermally shrinkable sheet is shrunk and the thermoplastic material of the thermally shrinkable layer and the secondary sealing means is melted and spreads within the thermally shrinkable sheet thus sealing spaces between the thermally shrinkable sheet and the wires and filling spaces between the wires by the assistance of a shrinking force in the thermally shrinkable sheet;

means for positioning the joint section with respect to the thermally shrinkable joint member such that the connecting portion of the joint section is placed at the center of the joint member when the joint member is attached to the joint section; and

said positioning means formed by the secondary sealing means which comprises a plurality of rib means of thermoplastic material integrally formed on the thermally shrinkable sheet for provisionally supporting the wires of the joint section such that the connecting portion is placed at the center of the thermally shrinkable joint member.

5,021,612

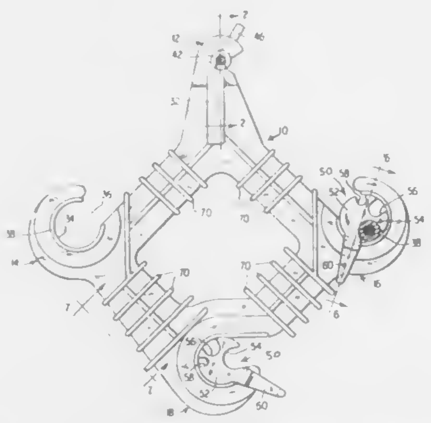
CABLE SPACER

Edward J. Joffe, 940 Park Ave., Linden, N.J. 07036a

Filed Aug. 16, 1990, Ser. No. 568,080

Int. Cl.^{5} H02G *7/12*

U.S. Cl. 174—146 **13 Claims**



1. A device for holding power transmission cables in spaced relation to one another and to a messenger wire comprising:

a spacer body having a first, messenger wire engaging hook at the upper end thereof and a plurality of second, cable engaging hooks spaced from said first hook and from one another. each of said first and second hooks having a seat in the form of a cylindrical sector extending through an arc greater than 180°;

a first retainer having a cylindrical body with a messenger wire receiving groove extending the length thereof and a handle projecting radially outwardly from said body, said first retainer being axially slidable into said first hook and rotatable therein between a first position in which said groove is aligned with the opening of said first hook and a second position in which said groove is within the confines of said seat of said first hook; and

for each of said second hooks, a second retainer, each of said second retainers having a cylindrical body with at least one cable receiving groove extending the length thereof and a lever arm projecting radially outwardly from said body, each said second retainer being axially slidable into a said second hook and rotatable therein between a first position in which said groove of said second retainer is aligned with the opening of said second hook and a second position in which said groove of said second retainer is within the confines of said seat of said second hook, said groove of said second retainer being of such width as to permit lateral insertion of a cable therein when said second retainer is in said first position.

5,021,613

RIBBON LOUDSPEAKER

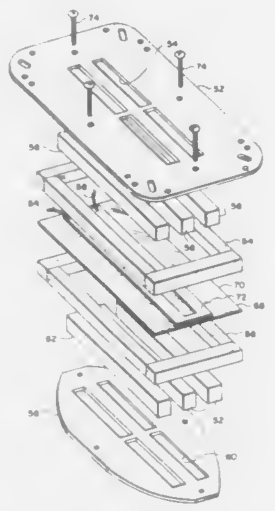
Warren W. Garcia, Iowa City, Iowa, assignor to Gold Ribbon Concepts, Inc., Iowa City, Iowa

Filed Sep. 23, 1985, Ser. No. 593,415

The portion of the term of this patent subsequent to Jul. 4, 2004, has been disclaimed.

Int. Cl.^{5} H04R *7/04, 9/02*

U.S. Cl. 179—115 V **7 Claims**



2. A ribbon loudspeaker comprising; a first plate having spaced-apart apertures; a first set of multiple rows of permanent magnets combined with said first plate in a parallel spaced-array alongside said apertures; a second plate having spaced-apart apertures; a second set of multiple rows of permanent magnets combined with said second plate alongside said apertures and arranged in a substantially identical parallel spaced-apart array as said first set of magnets; the magnets of said first set and the magnets of said second set being disposed such that the poles of the outside rows of said first set of magnets oppose the same poles of the outside rows as said second set of magnets; means separating said first and second sets of magnets and maintaining them in spaced-apart relationship; a diaphragm stretched taut between said first and second set of magnets; an electric current conductor disposed on one face of said diaphragm and aligned with the spaces of said parallel spaced-apart array of said first set of magnets and with the spaces of said parallel spaced-apart array of said second set of magnets, said conductor being comprised of a plurality of thin layers of metals of different compositions so as to obtain the desired impedance of the speaker; said conductor having a high surface area relative to its mass; and means for holding the diaphragm between said sets of magnets.

5,021,614

POWER SEAT DEVICE

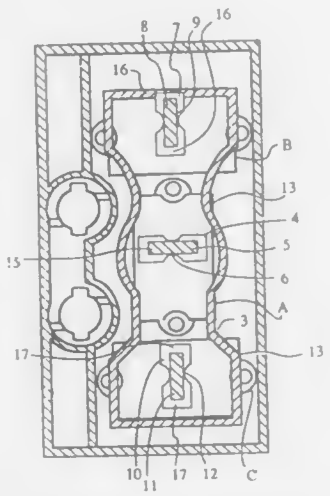
Makoto Sasaki; Nobuo Ebishi, and Shinji Yanai, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed May 5, 1989, Ser. No. 348,614

Claims priority, application Japan, Jul. 25, 1988, 63-97346[U]

Int. Cl.^{5} H01H *3/00, 9/20*

U.S. Cl. 200—5 R **2 Claims**



1. A power seat switch device comprising:

a single operating knob;

a sliding member cooperatively connected to said operating knob, said sliding member having an inner surface with a first, a second, and a third groove formed therein, said second and third grooves being disposed in a parallel relationship to each other, said first groove being disposed between said second and third grooves in perpendicular relationship thereto, wherein each of said grooves has a first end and a second end and two sides;

a first switch disposed in the switch device having a lever, said lever having a first end and a second end and two sides, wherein said lever is engaged with said first groove of said sliding member in such a manner that a pair of gaps are defined between said first and second ends of said lever of said first switch and said first and second ends of said first groove, respectively;

a second switch disposed in the switch device having a lever, said lever having a first end and a second end and two sides, wherein said lever is engaged with said second groove of said sliding member in such a manner that a pair of gaps are defined between said first and second ends of said lever of said second switch and said first and second ends of said second groove, respectively;

a third switch disposed in the switch device having a lever, said lever having a first end and a second end and two sides, wherein said lever is engaged with said third groove in such a manner that a pair of gaps are defined between said first and second ends of said lever of said third switch and said first and second ends of said third groove, respectively;

a first pair of projections formed on said two sides of said first groove contacting said two sides of said lever of said first switch; and

a second pair of projections formed said two sides of said second groove contacting said two sides of said lever of said second switch; and

a third pair of projections formed said two sides of said third groove contacting said two sides of said lever of said third switch.

5,021,615

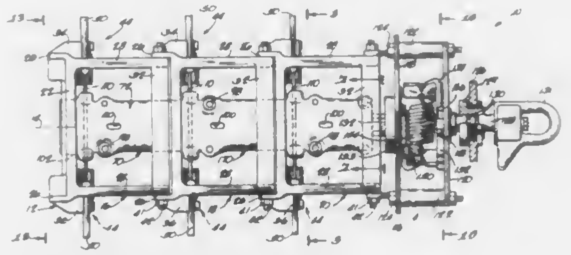
ON/OFF LOADBREAK SWITCH

Frank J. Muench, Waukesha, and William B. McFarlin, Wauwatosa, both of Wis., assignors to Cooper Power Systems, Inc., Houston, Tex.

Filed Sep. 29, 1989, Ser. No. 414,445

Int. Cl.^{5} H01H *19/10, 21/18*

U.S. Cl. 200—11 TC **20 Claims**



1. A switch apparatus comprising

a housing,

a first contact supported by said housing,

a shaft supported by said housing for rotation relative thereto about a longitudinal axis, said shaft including opposite halves mating along a longitudinally extending plane,

a second contact supported by said shaft for common movement therewith, and

means for moving said shaft relative to said housing and about said axis between a closed position wherein said second contact engages said first contact and an open position wherein said second contact is spaced from said first contact.

10. A switch apparatus comprising

a housing having therein a pocket,

a shaft supported by said housing for pivotal movement relative thereto,

a contact assembly supported by said housing and including a first contact portion, a second contact portions and means for brasing said first and second contact portions toward each other, said biasing means including a spring housed in said pocket such that said spring is surrounded by said housing so that said spring is protected from arcing,

a contact blade supported by said shaft for common movement therewith, and

means for moving said shaft relative to said housing between a closed position wherein said blade extends between said contact portions and an open position w herein said blade is spaced from said contact portions.

5,021,616

SWITCH COVER

Thomas T. Hardt, Missouri City, Tex., assignor to Compaq Computer Corporation, Houston, Tex.

Filed Nov. 3, 1989, Ser. No. 431,337

Int. Cl.^{5} H01H *9/20*

U.S. Cl. 200—43.16 **2 Claims**

1. A switch cover comprising:

an elongate base member having an aperture adapted to circumscribe a switch, outer edges and a recessed track extending along a central portion of a longitudinal axis of said base member;

a slidable member adapted for movement along the longitudinal axis of said base member within said recessed track, said slidable member including:

an end portion adapted to slide over said aperture and thereby protect said switch, and

means for maintaining said slidable member in contact with said base member, said means comprising at least one elongate cantilever spring member further compris-

VOL
1127
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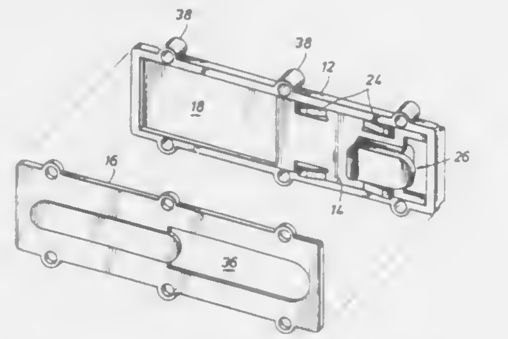
ing an integrally formed part of said slidable member so that said slidable member has a resilient bias to project in a direction opposite from said base member; and

a top member having an aperture adapted to circumscribe said end portion of said slidable member, said top member adapted to contact said base member at the outer edges of said base member thereby permitting said slidable member to move between and relative to said top and base members within said recessed track.



5,021,617
MOTOR VEHICLE TURN SIGNAL CANCELLING DEVICE
Michael H. DeSbong, Lexington, Ind., assignor to The Grote Manufacturing Co., Madison, Ind.
Filed Mar. 5, 1990, Ser. No. 488,127
Int. Cl.⁵ H01H *3/16*
U.S. Cl. 200—61.27 **11 Claims**

1. A motor vehicle turn signal device operated by a turn signal cancelling pin depending from the steering wheel of the motor vehicle comprising:

a frame structure mounted to the vehicle steering column adjacent the steering wheel;

a fixture having oppositely extending first and second arms;

means for pivotally mounting the fixture midway between the first and second arms to the frame structure for pivotal movement in both clockwise and counter-clockwise directions to move the distal end of the second arm into the path of movement of the cancelling pin as the cancelling pin moves with the steering wheel when the fixture is pivoted counter-clockwise, and to move the distal end of the first arm into the path of movement of the cancelling pin as the cancelling pin moves with the steering wheel when the fixture is pivoted clockwise;

a turn signal actuating lever positioned generally transversely of the first and second arms of the fixture;

means for pivotally mounting the turn signal actuating lever between its ends to the frame structure for pivotal movement about a pivot axis parallel to and spaced from the pivot axis of the fixture in both clockwise and counter-clockwise directions;

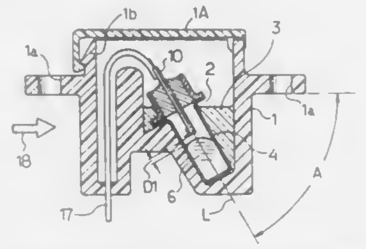
a third arm having its proximal end overlapping the fixture midway between the first and second arms of the fixture and extending outwardly therefrom generally transversely of the first and second arms of the fixture toward the proximal end of the turn signal actuating lever;

means for pivotally mounting the third arm at its proximal end to the frame structure for pivotal movement in both clockwise and counter-clockwise directions about a pivot axis coincidental with the pivotal axis of the fixture;

clutch means interconnecting the proximal end of the third arm and the fixture providing for pivotal movement of the fixture together with pivotal movement of the third arm about the coincidental pivot axis, and for pivotal movement of the fixture relative to the third arm about the coincidental pivot axis above a threshold torque applied to the first and second arms of the fixture by the cancelling pin; and,

means for interconnecting the distal end of the third arm to the adjacent proximal end of the turn signal actuating lever at a location between the pivotal axis of the turn signal actuating lever and the pivotal axis of the third arm such that when the turn signal actuating lever is pivoted in a counter-clockwise direction, the third arm and fixture are caused to pivot in a clockwise direction, and when the turn signal actuating lever is pivoted in a clockwise direction, the third arm and fixture are caused to pivot in a counter-clockwise direction.

5,021,618
ACCELERATION RESPONSIVE SWITCH
Susumu Ubukata, Kabushiki Kaisha Ubukata Seisakusho 4-30, Hosho-cho, Minami-ku, Nagoya-shi, Aichi-ken; Yasukazu Mizutani, and Shigekazu Shibata, both of Nagoya, all of Japan, assignors to Susumu Ubukata, Nagoya, Japan
Filed Feb. 12, 1990, Ser. No. 478,947
Claims priority, application Japan, Feb. 12, 1989, 1-31737
Int. Cl.⁵ H01H *35/14, 29/02*
U.S. Cl. 200—61.47 **6 Claims**



1. An acceleration responsive switch comprising:

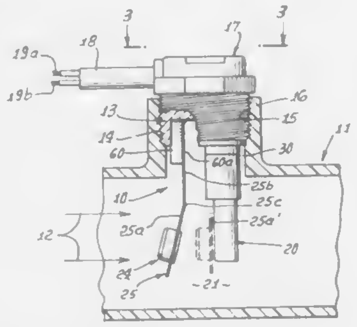
(a) a cylindrical receptacle for containing a predetermined amount of an electrically conductive liquid comprising mercury and further containing an inert gas for preventing the conductive liquid from changing in quality, said receptacle having an open end and being formed from a metallic material non-amalgamating with the mercury of the conductive liquid, said receptacle having a roughened inner surface so that the adhesion of the conductive liquid thereto is reduced and the rolling of the conductive liquid thereon is enhanced;

(b) a casing for holding said receptacle in a state inclined at a predetermined angle relative to a horizontal plane;

(c) a metallic lid member having a hollow interior and an edge portion and hermetically secured, at the edge portion thereof, to the peripheral edge of the open end of said receptacle; and

(d) a pair of electrodes each having one end extended into said receptacle through said lid member such that said one ends of said electrodes are brought into contact with the conductive liquid when a shock acting on said receptacle causes the conductive liquid to move within said receptacle, said electrodes being hermetically retained in the hollow interior of said lid member by an electrically insulative material hermetically sealing the hollow interior of said lid member, said electrodes being substantially symmetrical to each other in said receptacle, said one ends of said respective electrodes to be brought into contact with the conductive liquid each including a generally L-shaped portion which is amalgamated with the mercury of the conductive liquid to thereby serve as a wet portion, each said L-shaped portion projecting in the direction in which said receptacle is inclined, said wet portions being parallel to each other with a distance therebetween determined so that the conductive liquid is prevented from bridging said wet portions, the distance between said wet portions having a value larger than those between each wet portion and the inner surface of said receptacle, whereby an acceleration responsive switch having little deviation in response time on-state holding period and malfunction characteristic is obtained.

5,021,619
FLOW RESPONSIVE SWITCH APPARATUS
Harold D. Hutchinson, Malibu, Calif., assignor to Harwil Corporation, Santa Monica, Calif.
Filed Apr. 2, 1990, Ser. No. 502,811
Int. Cl.⁵ H01H *35/40*
U.S. Cl. 200—81.9 M **11 Claims**



1. In liquid flow switch apparatus connected to ducting wherein liquid flows forwardly, the combination comprising

a) a support body connectible to said ducting,

b) a stem rigidly carried by the body and projecting therefrom into a liquid flow zone in the ducting, and magnetically responsive switch means in the stem,

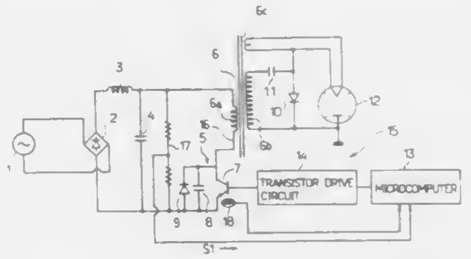
c) a thin cantilevered arm fixedly carried by the body and projecting into said flow zone upstream of said stem and deflectable downstream into direct contact with the stem in response to flow impingement on the arm,

d) and magnetic means carried by the arm to be displaced by said stem deflection into sufficiently close proximity with the stem and said switch means as to effect switch operation,

e) said arm itself being yieldably flexible to provide the only spring force acting to resist arm deflection, and

f) the body supporting a stop shoulder limiting movement of the arm away from the stem, at an arm first position toward which it is yieldably urged in the absence of said flow.

5,021,620
HIGH FREQUENCY HEATING APPARATUS WITH A TEMPERATURE COMPENSATED SWITCHING ELEMENT
Masato Inumada, Seto, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan
Filed Jul. 12, 1990, Ser. No. 551,467
Claims priority, application Japan, Aug. 10, 1989, 1-207185
Int. Cl.⁵ H05B *6/68*
U.S. Cl. 219—10.55 B **2 Claims**



1. A high frequency heating apparatus comprising:

a) rectification means for converting an AC voltage to a DC voltage;

b) inverter means comprising a switching element and inductance coil means, the DC voltage from the rectification means being applied to the inductance coil means through the switching element which is turned on and off such that a high frequency voltage is obtained;

c) a magnetron;

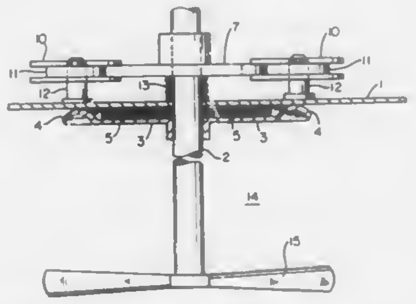
d) a high frequency rectifying circuit for rectifying an AC voltage from the inverter means to a DC voltage and for applying it to the magnetron;

e) control circuit means for controlling the "on" and "off" periods of the switching element so that the anode current of the magnetron is controlled;

f) temperature sensing means for sensing the temperature of the switching element, thereby producing a temperature signal; and

g) compensation means for compensating the "on" and "off" periods of the switching element in response to the temperature signal so that an increase in the magnetron anode current is restrained with an increase of the temperature of the switching element sensed by the temperature sensing means.

5,021,621
MICROWAVE OVEN HAVING INTEGRAL MIXING ASSEMBLY
Martha Demmer, R.D. No. 1, Box 28, and Thomas Talboys, P.O. Box 189, both of Montrose, Pa. 18801
Filed Apr. 17, 1990, Ser. No. 510,179
Int. Cl.⁵ H05B *6/80*
U.S. Cl. 219—10.55 F **10 Claims**



1. A microwave mixer comprising:

a top chamber wall;

a plurality of chamber walls which, in conjunction with said

VOL
1127
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1991
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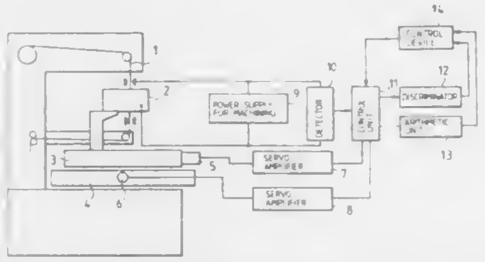
top chamber wall, enclose a cooking cavity, one of said chamber walls having a door allowing for ingress of food;
a means for generating microwaves in said cooking cavity;
a mixer shaft received through said top chamber wall and extending into said cooking cavity, said shaft being capable of rotational movement about its longitudinal axis;
mixing means associated with a portion of said mixer shaft disposed inside said cooking cavity;
a motor having an annular rotatable means;
an annular rotatable means coaxially coupled to said mixer shaft for rotating with said shaft;
a belt means for coupling the rotatable means belonging to the shaft for rotational movement with the rotatable means belonging to the motor; and
means for supporting said mixer shaft to restrict non-rotational movement thereof, including a plurality of reels disposed around the periphery of the annular rotatable means belonging to the mixer shaft, each reel having a hub, at least one reel hub abutting the periphery of said annular rotatable means and at least one other reel hub abutting said belt means around said annular rotatable means, each of said reels being rotatably mounted on a mounting axle, each mounting axle being mounted upright on the outside of the top chamber wall.

5,021,622
WIRE CUT ELECTRICAL DISCHARGE MACHINE

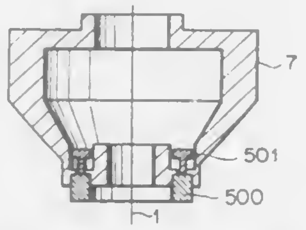
Takuji Magara, and Toshio Suzuki, both of Aichi, Japan. assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
PCT No. PCT/JP87/00814, § 371 Date Aug. 17, 1988, § 102(e) Date Aug. 17, 1988, PCT Pub. No. WO88/03071, PCT Pub. Date May 5, 1988
PCT Filed Oct. 23, 1987, Ser. No. 224,853
Claims priority, application Japan, Oct. 24, 1986, 61-252918; Oct. 24, 1986, 61-252921; Oct. 24, 1986, 61-252922; Oct. 24, 1986, 61-252923; Oct. 24, 1986, 61-252924; Oct. 24, 1986, 61-252925; Oct. 24, 1986, 61-252926; Oct. 24, 1986, 61-252927; Oct. 24, 1986, 61-252947
Int. Cl.⁵ B23H *7/06*
U.S. Cl. 219—69.12 9 Claims



1. A wire cut electrical discharge machine which performs machining by applying a voltage between a wire-form electrode and a workpiece to produce a discharge therebetween, and by causing a relative movement between the wire-form electrode and the workpiece, the improvement comprising:
a first discriminator for discriminating whether a machining position is moving along a circular path at a corner portion of said workpiece or not;
an arithmetic unit for calculating a predetermined amount of correction with respect to a change in an amount of removal;
a control device for correcting a change in an electrode side gap due to the change in said amount of removal in accordance with a signal from said first discriminator and a calculated result of said arithmetic unit; and
a second discriminator for discriminating whether the corner portion to be machined is an incorner portion or an outcorner portion and for providing a discrimination signal to said control device.

5,021,623
MACHINING-LIQUID INJECTION NOZZLE UNIT FOR TRAVELING-WIRE EDM APPARATUS

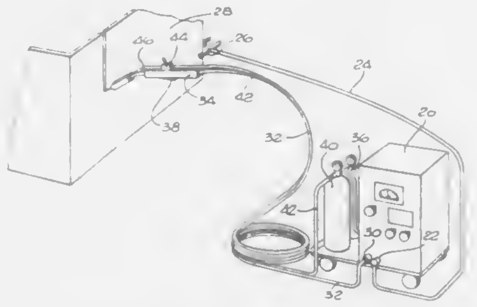
Masato Banzai; Yoshio Shibata, and Toshio Suzuki, all of Aichi, Japan, assignors to Mitsubishi Denki K.K., Tokyo, Japan
Filed Mar. 23, 1990, Ser. No. 498,059
Claims priority, application Japan, Mar. 24, 1989, 1-72665
Int. Cl.⁵ B23H *7/02*
U.S. Cl. 219—69.12 1 Claim



1. A machining-liquid injection nozzle unit for a traveling-wire EDM apparatus, comprising:
a pair of nozzles disposed opposite to each other through a workpiece and serving to inject a machining liquid individually toward said workpiece while permitting insertion of a wire electrode therethrough in the axial direction thereof coincident with injection of the machining liquid;
a piston connected to at least one of said nozzles and serving to produce a predetermined constant pressure toward said workpiece by the machining liquid in said one nozzle; and
a liquid screening member so shaped as to surround the axis of said wire electrode and attached to at least one of said nozzles, said liquid screening member having a low friction coefficient to said workpiece and being so disposed that one end thereof is connected to said piston while the other end thereof is pressed and brought into sliding contact with said workpiece.

5,021,624
CUTTING TOOLS FOR CONVENTIONAL AND MIG ELECTRIC WELDERS

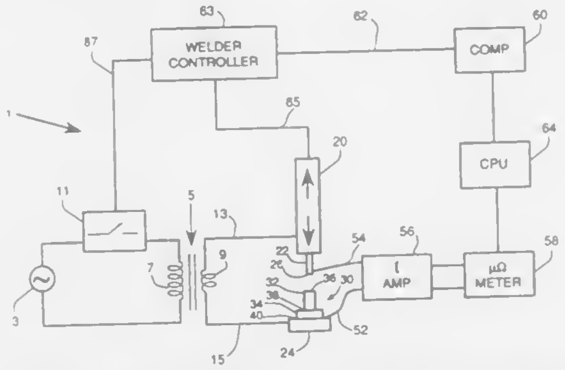
Gene Rogers, 611 Delwood, and Alex H. de Martimprey, 103 Elm St., both of Westwood, Calif. 96137
Filed Apr. 11, 1988, Ser. No. 180,343
Int. Cl.⁵ B23K *9/00*
U.S. Cl. 219—70 10 Claims



1. A method of cutting electrically conducting and oxidizable work pieces comprising the steps of:
(a) connecting one terminal of an electric welder to a work piece;
(b) connecting a second terminal of an electric welder to an electrode in a hand unit;
(c) striking an arc between the electrode in the hand unit and the work piece to locally heat the work piece material to a readily oxidizable temperature;
(d) terminating the arc and directing a stream of oxygen to the region of the work piece heated by the arc, the stream of oxygen being directed from an oxygen nozzle adjacent to and spaced from the electrode; and
(e) cutting the work piece by moving said nozzle such that said stream of oxygen moves along a predetermined path on the work piece, whereby the work piece is cut by the stream of oxygen alone without said arcing electrode.

5,021,625
PRE-RESISTANCE-WELDING RESISTANCE CHECK

Dennis E. Destefan, Broomfield, Colo., and David A. Stompro, Idaho Falls, Id., assignors to United States Department of Energy, Washington, D.C.
Filed Jun. 8, 1989, Ser. No. 362,990
Int. Cl.⁵ B23K *11/25*
U.S. Cl. 219—109 12 Claims

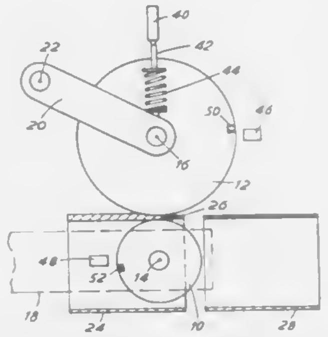


1. A method of preweld testing of an electric resistance welding machine having a first electrode electrically connected to a first terminal of a source of electrical power, a spaced second electrode electrically connected to a second terminal of a source of electrical power, and pressure means for pressing said first electrode towards said second electrode to hold an electrically conductive workpiece set for resistance welding, said method comprising:
measuring across said first and second electrodes the welding machine resistance R_M;
placing a workpiece set in welding position under pressure between said first and second electrodes;
measuring across said first and second electrodes the parallel resistance R_P of R_M and the workpiece set resistance R_W;
calculating R_W; and
comparing R_W with a control value determined from a similar control workpiece set that previously welded properly; wherein a difference between R_W and the control value is an indication that the workpiece set would not weld properly.

5,021,626
RESISTANCE WELDING APPARATUS

Andrew J. Boyd, and Anthony D. Corton, both of Wantage, England, assignors to CMB Foodcan plc, Worcester, England
Filed Jan. 16, 1990, Ser. No. 466,463
Claims priority, application United Kingdom, Feb. 2, 1989, 8902247
Int. Cl.⁵ B23K *11/25*
U.S. Cl. 219—109 13 Claims

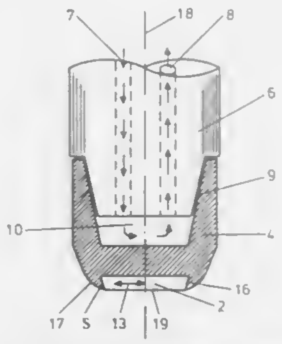
1. Resistance welding apparatus comprising first and second electrode wheel means for forming resistance welds in a series of work-pieces, the first and second electrode wheel means being mounted for displacement relative to each other, displacement sensing means for sensing the relative displacement between the first and second electrode wheel means and for producing an output signal which varies with time as the wheel means rotate, and correction means for processing the output signal to remove or reduce the components in the output signal



which relate to the eccentricity and surface irregularities of at least one of said electrode wheel means.

5,021,627
ELECTRODE FOR RESISTANCE WELDING SURFACE-TREATED SHEETS OF STEEL AND METHOD OF MANUFACTURING SUCH ELECTRODES

Bernhard Bersch; Axel Fuchs, both of Dortmund, Fed. Rep. of Germany, and Ralf Eck, Reutte/Tirol, Austria, assignors to Hoesch Stahl AG, Dortmund, Fed. Rep. of Germany
Filed Feb. 12, 1990, Ser. No. 478,622
Claims priority, application Fed. Rep. of Germany, Feb. 13, 1989, 3904213
Int. Cl.⁵ B23K *35/22*
U.S. Cl. 219—119 14 Claims

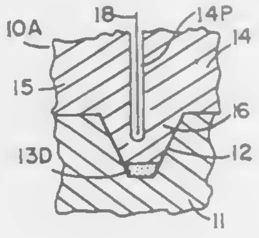


1. An electrode for electric resistance welding of surface-treated steel sheets, comprising: a member of at least copper with a longitudinal axis and having electrical conductivity and substantially high mechanical strength; a substantially high melting-point metal element joined to said member at an interface; said metal element comprising a disk thinner than 4 mm and with a flattened granular structure with grains extending transversely to said longitudinal axis; said metal element having a contact surface with said steel sheets that is free of copper.

VOL
1127
ISS
1
JE
4
1991
UMI

5,021,628
APPARATUS AND METHOD FOR REACTING ON MATTER

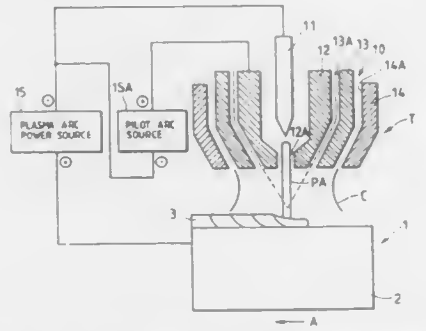
Jerome H. Lemelson, 48 Parkside Dr., Princeton, N.J. 08540
Continuation-in-part of Ser. No. 625,197, Jun. 26, 1984, Pat. No. 4,874,596, which is a continuation of Ser. No. 302,644, Sep. 15, 1981, abandoned, which is a continuation-in-part of Ser. No. 110,477, Feb. 10, 1980, abandoned, which is a continuation of Ser. No. 815,692, Jul. 14, 1977, abandoned, which is a continuation of Ser. No. 547,733, Feb. 6, 1975, abandoned, which is a continuation-in-part of Ser. No. 93,779, Nov. 30, 1980, Pat. No. 4,207,154, said Ser. No. 110,477, is a continuation-in-part of Ser. No. 74,388, Sep. 10, 1979, Pat. No. 4,385,880, and a continuation-in-part of Ser. No. 958,514, Nov. 7, 1978, abandoned. This application Jun. 29, 1989, Ser. No. 372,858
Int. Cl.⁵ B23K *26/00*
U.S. Cl. 219—121.6 32 Claims



1. A method for reacting on matter comprising:
(a) generating an intense radiation beam,
(b) directing said intense radiation beam against a select portion of a tool engaging matter located immediately adjacent said tool, wherein energy of said radiation is conducted through said select portion of said tool and has an intensity sufficient to heat said tool and said matter and to change the physical characteristics of said matter.

5,021,629
ELECTRIC PLASMA ARC POWDER WELDED SLIDE LAYER FOR ROTARY FLUID PUMP VANE

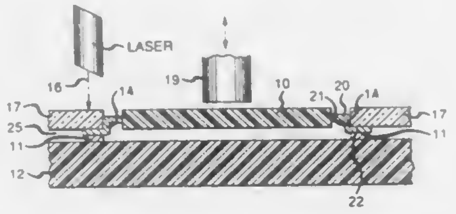
Soichi Shimomura, Yono, Japan, assignor to Nippon Piston Ring Co., Ltd., Tokyo, Japan
Filed Mar. 30, 1989, Ser. No. 330,525
Claims priority, application Japan, Apr. 8, 1988, 63-47935
Int. Cl.⁵ B23K *9/00*
U.S. Cl. 219—121.59 3 Claims



1. A vane for a rotary fluid pump said vane including a roller and a roller housing, comprising:
a base vane body (2) formed of a ferrous material and having one end face; and,
a sliding layer integrally formed over the end face and in sliding contact with the roller, the sliding layer comprising an overlaid welding layer (3) formed of fused alloy powders having high wear resistance, thermal seizure resistance and corrosion resistance, and the overlaid welding layer being formed by electrical plasma arc powder welding and comprising an intermediate metal fused layer (4) integrally formed over the end face and an outer pure alloy layer (5) formed over the metal fused layer, the metal fused layer containing from 5 to 15% of the ferrous material of the base vane body and the remainder comprising the alloy powder material, and the pure alloy layer only containing the alloy powder material.

5,021,630
LASER SOLDERING METHOD AND APPARATUS

John W. Benko, Trenton, and Alexander Coucoulas, Basking Ridge, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.
Filed May 2, 1990, Ser. No. 517,795
Int. Cl.⁵ B23K *26/00*
U.S. Cl. 219—121.64 14 Claims

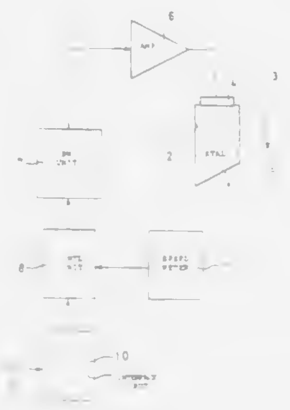


1. A method for surface mounting an electronic device having a plurality of leads extending therefrom in a cantilever fashion to a row of mounting pads on a substrate surface comprising the steps of:
aligning free ends of the leads with the bonding pads such that each lead overlies a bonding pad;
pressing the leads onto the bonding pads with a plate that bridges said plurality of leads so as to force each lead into contact with a corresponding bonding pad;
solder being located between each lead and the bonding pad with which it makes contact;
scanning the plate with a laser beam simultaneously with the pressing step, the plate converting laser beam energy to sufficient heat energy to solder the leads to the bonding pads;
and removing the plate.

5,021,631
SYSTEM FOR MARKING MOVING OBJECTS BY LASER BEAMS

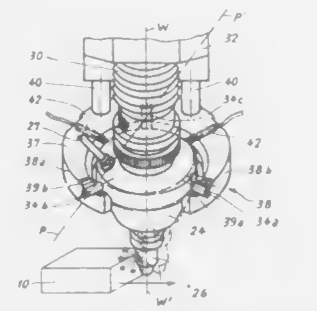
Ramon S. Ravellat, Castellar Del Valles, Spain, assignor to Codilaser S.A., Barcelona, Spain
Filed Jun. 7, 1990, Ser. No. 534,255
Int. Cl.⁵ B23K *26/00*
U.S. Cl. 219—121.68 9 Claims

1. A system for marking moving objects by laser beams, comprising a source emitting laser beams along a path wherein there is inserted in said path an extracavity optical deflector comprising a germanium crystal and a transducer adapted to convert radio frequency signals into sound waves suitable for exciting said germanium crystal, there being also a series of at least five fixed frequency oscillators, the frequency of each oscillator being different from that of the others; an electronic switch situated at the outlet of each oscillator having a switching time of less than 3 microseconds; and a control unit adapted to select at all times one of said switches to connect at any time one of said oscillators to said transducer.



5,021,632
LASER BEAM MACHINING HEAD

Ulrich Hauert, Schnottwil, Switzerland, assignor to Lasag AG, Thun, Switzerland
Filed Sep. 4, 1990, Ser. No. 576,844
Claims priority, application Switzerland, Sep. 5, 1989, 03225/89
Int. Cl.⁵ B23K *26/02*
U.S. Cl. 219—121.83 8 Claims

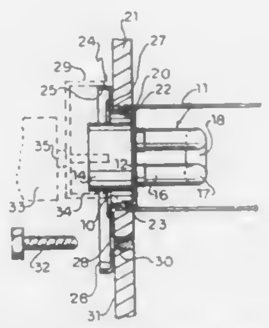


1. A tool for working in a substantially vertical position without contact with a workpiece and which comprises a head constituting at least partially an operating part of the tool, a support for this head rigidly connected to a machine frame, said head comprising three studs resting in three cavities provided in the support to impede displacement of the head in a plane substantially perpendicular to the axis (W, W') of the tool, wherein the cavities are V-shaped recesses extending radially and along competing axes and opening into the proximity of the upper surface of the support.

5,021,633
ENGINE BLOCK HEATER

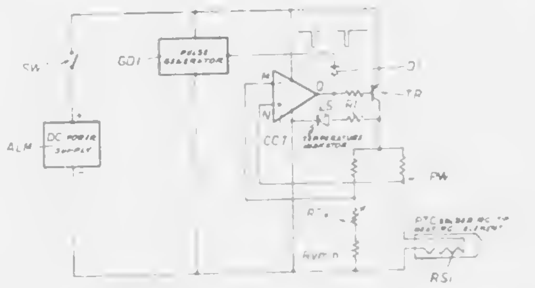
Ron Schaefer, Winnipeg, Canada, assignor to Budd Canada Inc., Winnipeg, Canada
Filed Aug. 22, 1989, Ser. No. 397,112
Claims priority, application Canada, Dec. 14, 1988, 585890
Int. Cl.⁵ B60L *1/02*
U.S. Cl. 219—208 11 Claims

1. An engine block heater for vehicle engines and the like, adapted to be engaged within a cylindrical aperture in the engine block which includes a threaded opening adjacent the aperture, said heater comprising:
a substantially cylindrical body portion adapted to be inserted into a cylindrical aperture in an engine block;
an electrical heating element extending from one side whereby it extends in the engine block;
electrical connector means on the other side thereof operatively connected to said heating element;
a flange plate extending radially from said body portion;
sealing means adapted for sealing said body portion with the cylindrical aperture, said sealing means positioned around said body portion for sealing engagement with a portion of the engine block defining the cylindrical aperture;
and at least one aperture through said flange plate outboard of said cylindrical body portion for receiving a fastener engageable with a threaded opening in the engine block, whereby the fastener cooperates with the flange plate surrounding the aperture to enable mounting of the heater to the engine block.



5,021,634
TEMPERATURE CONTROLLED SOLDERING IRON EMPLOYING A VARIABLE RESISTANCE HEATING ELEMENT FOR TEMPERATURE SENSING

Giovanni Santoro, via campodimele 55, 00189 Rome, and Emmanno Francolini, via Campo Ligure, 19 -00168 Rome, both of Italy
PCT No. PCT/IT87/00091, § 371 Date Jul. 5, 1988, § 102(e) Date Jul. 5, 1988, PCT Pub. No. WO88/03455, PCT Pub. Date May 19, 1988
PCT Filed Nov. 4, 1987, Ser. No. 229,328
Claims priority, application Italy, Nov. 5, 1986, 48621 A/86
Int. Cl.⁵ H05B *1/02;* **B23K** *3/02*
U.S. Cl. 219—241 5 Claims



1. A temperature controlled soldering iron comprising:
a heating element having a resistance which varies as a function of temperature, mounted in close thermal contact with a soldering iron tip;
a Wheatstone resistance bridge including the resistive heating element as one leg thereof;
a DC power supply for supplying power to the bridge and to the heating element therein;
a switch means connected to the bridge and having a control lead for switching on and off current flow through the bridge;
a comparator having two inputs connected to opposite nodes of the bridge and an output connected to the control lead of the switch means, the comparator acting to turn off

VOL
1127
ISS
1
JE
4
1991
UMI

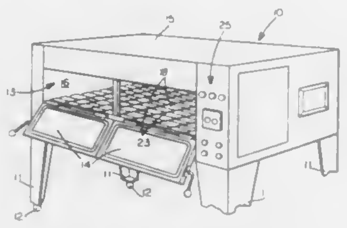
the switch means when the heating element is above the desired temperature as indicated by the relative voltage of the input nodes or to leave on the switch means when the heating element is below the desired temperature; and

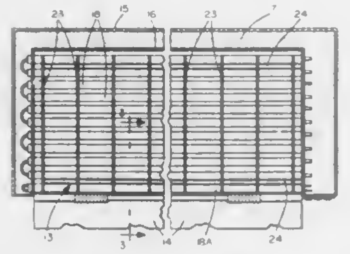
a pulse generator continuously generating brief pulses at prefixed time intervals and connected to the control lead of the switch means to turn on the switch means at the prefixed time intervals regardless of whether the comparator has previously turned off the switch means and then leave control of the switch means to the comparator until the next time interval.

5,021,635
BAKER'S OVEN

John A. Willett, 2 Brewer Street, Clontarf, Queensland, 4019, Australia

Filed Oct. 13, 1989, Ser. No. 420,939
Int. Cl.⁵ A21B *1/00*
U.S. Cl. 219—408 **3 Claims**





1. A baker's oven of the type having a generally rectangular baking compartment accessible by way of a loading door, wherein the heating means for the oven include:

a series of lower and upper passages lining the bottom and top, respectively, of the oven compartment; and

electric heating elements enclosed within the passages and spaced from the walls thereof.

wherein the lower passages and the upper passages in each case consist of a series of parallel rectangular metal tubes, and

wherein the electric heating elements are supported by and slidable through metal chairs in the rectangular metal tubes.

5,021,636
ELECTRICAL COOKING UNIT AND ELECTRICAL COOKING APPARATUS PROVIDED WITH THIS UNIT

Anton J. Bouman, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

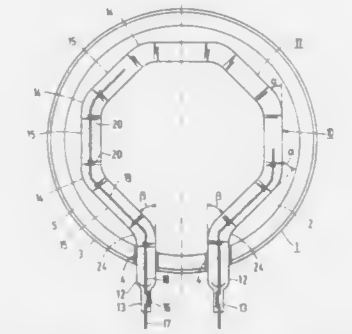
Filed Oct. 28, 1988, Ser. No. 264,490
Claims priority, application Netherlands, Nov. 6, 1987, 8702651
Int. Cl.⁵ H05B *3/74*
U.S. Cl. 219—464 **11 Claims**

1. An electrical cooking unit comprising:

a housing provided with a base wall and side walls extending from the base wall and having at least one opening,

an electrical IR lamp provided with a tubular lamp vessel sealed in a vacuum-tight manner, having first and second end portions extending beside each other and provided with a respective seal, which lamp vessel extends from its first to its second end portion,

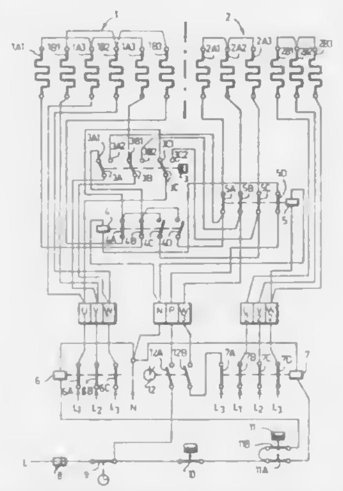
which lamp is arranged in the housing so that its end portions are passed through the at least one opening in its side walls to the exterior, wherein the lamp vessel is bent between the end portions according to an n-gon with substantially equal angles, where n≧6, and the bent portions are interconnected by straight portions.



5,021,637
METHOD OF CONTROLLING THE SUPPLY OF ELECTRIC POWER TO AN ELECTRIC SAUNA HEATER

Reijo Perälä, Hangonkylä, and Antii Kivimaa, Kauniainen, both of Finland, assignors to Oy Helo-Tehtaat Helo-Factories Ltd., Hanko, Finland

Filed Mar. 27, 1990, Ser. No. 499,903
Claims priority, application Finland, Apr. 3, 1989, 891586
Int. Cl.⁵ H05B *1/02*
U.S. Cl. 219—485 **10 Claims**



1. A method of controlling the supply of electric power to an electric sauna heater divided into a stone space containing a heat-storing material and an air duct through which sauna room air is adapted to flow to be separately heated each to a suitable temperature without exceeding a predetermined total power demand, comprising the steps of:

providing in each of the stone space and the air duct one or more groups of one or more heating elements each which, if all are connected to a source of electric power, separately heat the heat-storing material contained in the stone supply and sauna room air flowing in the air duct, respectively, to temperatures suitable for sauna bathing, and which together have a rated wattage which exceeds said predetermined power demand;

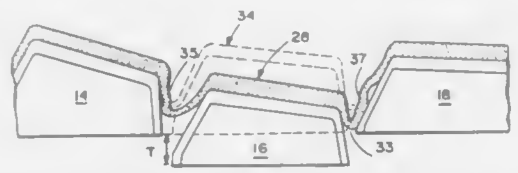
connecting all of said heating elements to a source of electric power capable of delivering only said predetermined total power demand; and

selectively disconnecting from said source of power at least one heating element of one or more of said groups so that the overall power demand of the heater is always less than the total rated wattage of all of said heating elements.

5,021,638
KEYBOARD COVER

Leroy N. Nopper, Irvine; Meryl E. Miller, Rancho Palos Verdes, and James L. Lichte, Riverside, all of Calif., assignors to Lucas Duraltih Corporation, Millville, N.J.

Filed Aug. 27, 1987, Ser. No. 89,812
Int. Cl.⁵ G06C *7/02*
U.S. Cl. 235—145 R **10 Claims**



1. A protective cover for a keyboard assembly having a key array comprising a plurality of keys, a deck portion and an obverse face opposite said key array, said cover comprising:

a shaped membrane corresponding to a general profile and spacing of the key array of the keyboard assembly;

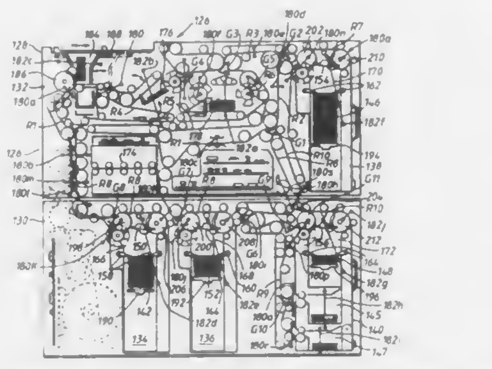
said membrane having integral lateral portions for covering the deck portion of said keyboard assembly and having a tailpiece for at least partially extending over said obverse portion of said keyboard assembly; and

a plate for compressing said tailpiece of said membrane, wherein the keys of said key array have a top surface and four key lateral portions surface and key said general profile of the shaped membrane has corresponding top surface and key lateral portions wherein said corresponding key lateral portions of said membrane each have a dimension which is less than a dimension from said top surface to said deck portion.

5,021,639
AUTOMATIC BANK NOTE TRANSACTION APPARATUS

Junichiro Hara, Tokyo, and Hideaki Miyahara, Kanagawa, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jun. 9, 1989, Ser. No. 363,742
Claims priority, application Japan, Jun. 30, 1988, 63-163925
Int. Cl.⁵ G06F *15/30*
U.S. Cl. 235—379 **3 Claims**



1. An automatic bank note transaction apparatus comprising;

a first and second storing means for storing bank notes;

a bank notes dispensing port for dispensing bank notes;

a first conveying means for conveying individual bank note from the first and second storing means to the bank note dispensing port;

a loading means for loading bank notes into the bank note transaction apparatus;

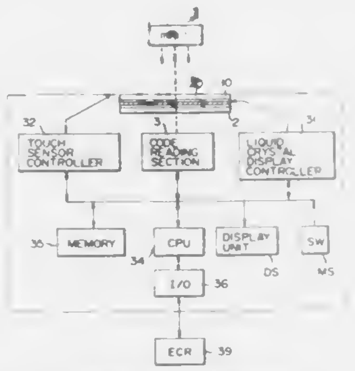
a second conveying means for conveying the bank note from the third storing means to the first and second storing means;

control means responsive to a loading operation signal for causing the second conveying means to alternately convey a predetermined number of the bank notes into the first and second storing means until the first and second storing means are full.

5,021,640
APPARATUS CAPABLE OF BEING OPERATED AS BOTH A BAR CODE READING DEVICE AND A MANUAL KEYBOARD

Hidenori Murol, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Jun. 15, 1989, Ser. No. 366,700
Claims priority, application Japan, Jun. 20, 1988, 63-152029
Int. Cl.⁵ G06K *7/10, 7/00;* **G09G** *3/00;* **H03K** *17/94*
U.S. Cl. 235—462 **10 Claims**



1. A bar code reading device comprising:

a transparent liquid crystal display means for displaying an image of a keyboard in a manual input mode;

a transparent touch sensor means formed on said liquid crystal display means for entering key-in data corresponding to portions thereof which are touched with reference to said image of a keyboard displayed on said liquid crystal display means;

a code reading means for, in a code reading mode, reading a bar code associated with an article by emitting a light beam through a window constituted by said liquid crystal display means and said touch sensor means, and for receiving therethrough a light beam reflected from the bar code; and

control means for selectively setting one of said manual input mode and said code reading mode, and for reading key-in data entered by said touch sensor means.

5,021,641
HAND-HELD BAR CODE SCANNER WITH JOINTLY MOUNTED SCANNING MIRRORS

Jerome Swartz, Setauket; Howard M. Shepard, Great River, both of N.Y., and Eric F. Darkan, San Francisco, Calif., assignors to Symbol Technologies, Inc., Bohemia, N.Y.

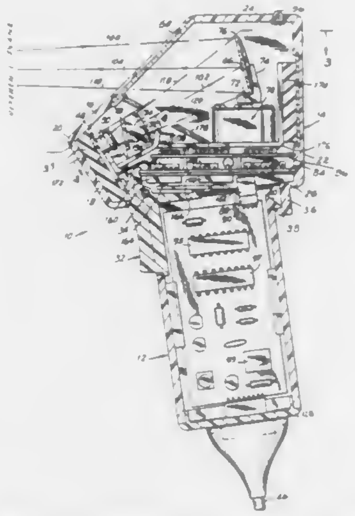
Division of Ser. No. 295,151, Jan. 9, 1989, Pat. No. 4,897,532, which is a continuation of Ser. No. 148,669, Jan. 26, 1988, Pat. No. 4,825,057, which is a division of Ser. No. 706,502, Feb. 28, 1985, abandoned. This application Dec. 21, 1989, Ser. No. 454,144
Int. Cl.⁵ G06K *7/10*
U.S. Cl. 235—467 **46 Claims**

1. A hand-held bar code scanning device for reading bar code symbols, comprising:

(a) a laser light source mounted in the hand-held device for generating a light beam, said light beam being directed along a path toward a bar code symbol located exterior of

VOL
1127
ISS
1
JE
4
1991
UMI

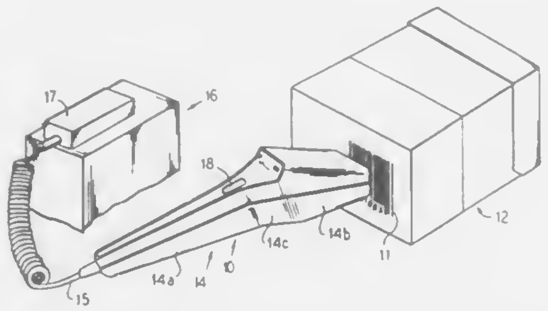
the hand-held device to result in reflected light traveling back to the device;
(b) a scanner in said hand-held device including a moving mirror assembly in said path driven by a motor, said scanner causing said light beam and a field of view for said reflected light to move along a scan line across the bar code symbol;
(c) a sensor mounted in said hand-held device detecting said reflected light via said moving mirror assembly and generating an electrical signal responsive to said reflected light;



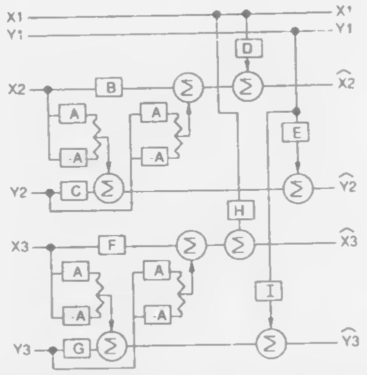
(d) wherein said moving mirror assembly includes a curved mirror for focusing said reflected light on said sensor, and a generally-flat scan mirror different from said curved mirror for scanning said light beam along said scan line, and wherein said scan mirror and curved mirror are jointly supported and driven jointly by said motor;
(e) a housing having a gun-like shape with a barrel portion containing said light source, said scanner and said sensor, the housing having a pistol-grip type of handle, said sensor being mounted in said barrel portion forward of said moving mirror assembly.

5,021,642
INSTANT PORTABLE BAR CODE READER
George E. Chadima, Jr., Cedar Rapids, Iowa, and Vadim Laser, Cincinnati, Ohio, assignors to Norand Corporation, Cedar Rapids, Iowa
Continuation of Ser. No. 335,180, Apr. 7, 1989, abandoned, which is a division of Ser. No. 234,880, Aug. 19, 1988, abandoned, which is a division of Ser. No. 827,286, Feb. 7, 1986, Pat. No. 4,766,300, which is a division of Ser. No. 637,693, Aug. 6, 1984, Pat. No. 4,570,057, which is a continuation of Ser. No. 334,811, Dec. 28, 1981, abandoned. This application May 11, 1990, Ser. No. 523,291
Int. Cl.⁵ G06K *7/10*
U.S. Cl. 235—472 **4 Claims**

1. The method of reading complete lines of bar code information with the use of a portable hand-held reader unit, said method comprising the steps of:
(a) manually positioning the reader unit in a reading relation to respective bar code data carriers having complete lines of bar code information thereon so as to effect bar code reading operations with respect thereto;
(b) manually generating a start signal for each reading operation to be effected;
(c) triggering the supply of intense-light-energy-generating power in response to the start signal, and generating therefrom light energy to effect a reading operation;
(d) directing the generated light energy so as to effect illumination of a complete line of bar code information without requiring movement of the reader unit as a whole, and so as to produce reflected light energy indicative of the complete line of bar code information;
(e) concentrating the reflected light energy so as to produce concentrated reflected light energy of concentrated intensity;
(f) sensing the concentrated reflected light energy of concentrated intensity so as to produce a bar code signal in accordance with the complete line of bar code information; and
(g) automatically insuring the termination of the supply of the intense-light-energy-generating power at the completion of each reading operation without requiring any corresponding manual action by the operator, whereby such intense-light-energy generating power is conserved without requiring operator attention thereto.



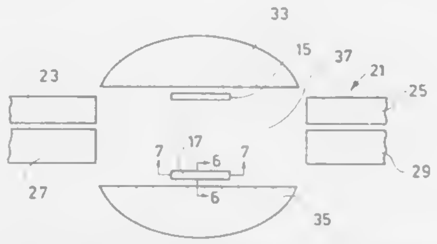
5,021,643
POINTER/TRACKER FOR A PHASED ARRAY LASER SYSTEM
Mark G. Baciak, West Melbourne, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
Filed Mar. 13, 1990, Ser. No. 500,614
Int. Cl.⁵ G01J *1/20;* **G01B** *11/26*
U.S. Cl. 250—201.9 7 Claims



1. A pointer/tracker system for use with a photodetector system and an array of laser telescopes, each of which provide a laser output signal, said array of laser telescopes including a reference telescope which produces a reference output signal with a reference direction towards which all the other laser telescopes are to be dynamically steered by a compensator, said photodetector system receiving a sample of the laser output signals of the laser telescopes and outputs X and Y tilt signals corresponding to the tilt of the laser output signals with respect to an X and Y plane, said X and Y plane being parallel to said array, said pointer/tracker system receiving said X and Y tilt signals and outputting a plurality of X and Y tilt error signals for each of said laser telescopes in said array of laser telescopes to said compensator so that all of the outputs of the laser telescopes in said array of laser telescopes are dynamically pointed and steered in the same direction as that of the

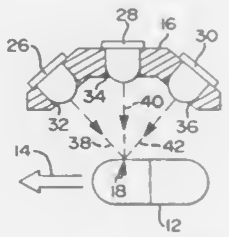
reference output signal of the reference telescope, said pointer/tracker system comprising:
a first and second set of reference terminals which are electrically connected between said photodetector system and said compensator to conduct an X reference signal and a Y reference signal for said reference telescope from said photodetector system to said compensator in an unchanged condition when the direction of the reference telescope is intended to be unchanged; and
a plurality of first and second analog amplifier gain stages each of which are respectively electrically connected to said first and second set of reference terminals of said pointer/tracker system with said photodetector system such that each of said first analog amplifier gain stages receives a sample of said X reference signal and said X tilt signals for a selected laser telescope of said array of laser telescopes and outputs an X tilt error signal to said compensator to cause it to adjust the laser output of the selected laser telescope so that it is aligned in said X plane with the reference output signal, each of said second analog amplifier gain stages receiving a sample of said Y reference signal from said second reference terminal and said Y tilt signals for one of said laser telescopes, and outputting a Y tilt error signal to said compensator to cause it to adjust the laser output of the selected laser telescope so that it is aligned in said Y plane with said reference output signal.

5,021,644
PRESENCE DETECTING APPARATUS AND METHOD FOR AUTOMATIC DOORS
Mark A. Beran, Niwot, and Farrokh Fattahi, Boulder, both of Colo., assignors to BC Research and Development, Inc., Niwot, Colo.
Filed Jan. 8, 1990, Ser. No. 462,131
Int. Cl.⁵ G01V *9/04*
U.S. Cl. 250—221 30 Claims



1. A presence detecting apparatus for detecting the presence of a body in a detection area, said apparatus comprising:
emitter means for substantially synchronously emitting signals to the detection area;
receiver means for receiving at least some of said signals reflected form surfaces present in the detection area;
background compensation means connected with said receiver means for adjusting detection sensitivity of the apparatus to compensate for variations in background conditions in the detection area; and
discriminating means connected with said receiver means and said background compensation means for discriminating when reflected signals received by said receiver means are indicative of a body in the detection area and for providing a detection output responsive thereto, said emitter means and said discriminating means being capable of substantially asynchronous operation.

5,021,645
PHOTOELECTRIC COLOR SENSOR FOR ARTICLE SORTING
Keith O. Satula, Waukesha; Russell P. Schuchmann, Milwaukee, and Eugene F. Duncan, Wauwatosa, all of Wis., assignors to Eaton Corporation, Cleveland, Ohio
Filed Jul. 11, 1989, Ser. No. 378,570
Int. Cl.⁵ G01N *9/04*
U.S. Cl. 250—223 R 18 Claims



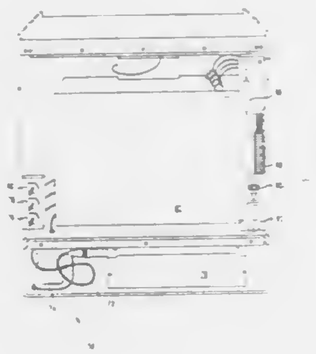
1. A photoelectric color sensor comprising:
at least two light sources disposed in a fixed array focused upon a sensing region, each said source operable to emit light having a limited characteristic range of chromaticity differing from the characteristic range of chromaticity of each other light source;
photosensitive means positionally fixed with respect to said array and region to receive light from each said light source reflected off of a target object within said sensing region and to output a signal in response thereto; and
logic means in circuit with said light sources and photosensitive means operative to sequentially energize said light sources and to receive resultant sample signals from said photosensitive means in response to each said light source energization, said logic means being further operative to generate a resultant signal as a function of said sample signals, to compare said resultant signal with a predetermined reference standard and generate a condition output signal when the difference between said resultant signal and reference standard exceeds a tolerance limit, wherein said reference standard has been established during an earlier test mode operation of said logic means in which a standard color mode operation of said logic means in which sensing region and sequentially illuminated by said light sources, said reference standard and said resultant signal comprising a respective single signal for each said characteristic range of chromaticity.

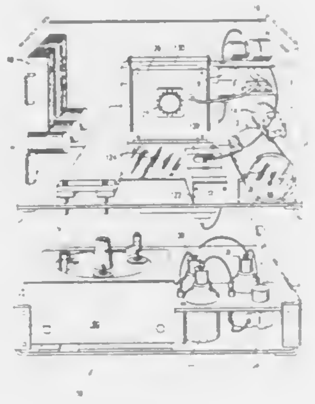
5,021,646
REMOTE OPTICAL PATH FOR CAPILLARY ELECTROPHORESIS INSTRUMENT
Scot R. Weinberger, Reno, and Thomas W. Hoppe, Sparks, both of Nev., assignors to Spectra-Physics, Inc., San Jose, Calif.
Filed Jan. 25, 1990, Ser. No. 470,287
Int. Cl.⁵ H01J *5/16*
U.S. Cl. 250—227.11 5 Claims

1. An optical path for an optical instrument comprising:
a light source;
diffraction means for diffracting light from the light source;
a beam splitter including an entry end for admitting light

VOL 1127 ISS 1 JE 4 1991 UMI

from the diffraction means and including a plurality of optical fibers leading from the entry end to an exit end of the beam splitter;
a sample detector and a reference detector both located adjacent to the exit end of the beam splitter;
wherein a first portion of the optical fibers in the beam splitter transmits light from the entry end of the beam splitter to the sample detector and a second portion of the optical fibers transmits light from the entrance end of the beam splitter to the reference detector, wherein the optical fibers are bifurcated amongst the first and second portions at a point adjacent to the reference detector.





5,021,647
OPTICAL FIBER SENSOR HAVING FUNCTION OF COMPENSATING FOR ALL DRIFTING COMPONENTS

Kyoichi Tatsuno, Yamato, and Toshiya Umeda, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

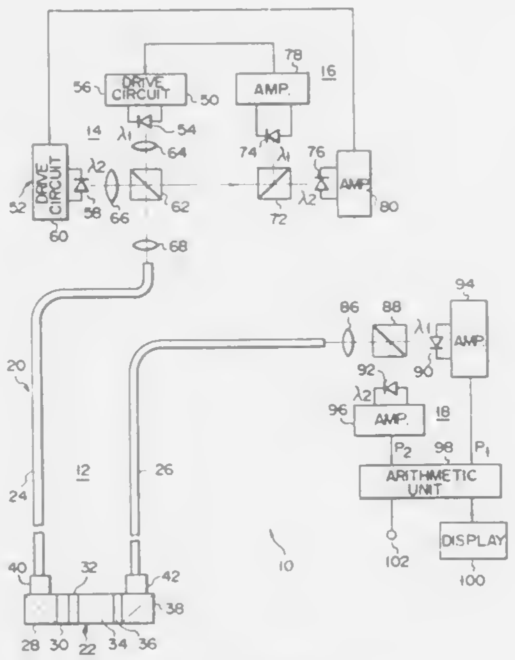
PCT No. PCT/JP88/01006, § 371 Date May 30, 1989, § 102(e) Date May 30, 1989, PCT Pub. No. WO89/03046, PCT Pub. Date Apr. 6, 1989

PCT Filed Sep. 30, 1988, Ser. No. 360,889

Claims priority, application Japan, Sep. 30, 1987, 62-246768; Sep. 21, 1988, 63-236871

Int. Cl.^{5} H01J *5/16;* **G01R** *31/00*

U.S. Cl. 250—227.21 4 Claims



1. An optical fiber sensor comprising:
two light sources for emitting light beams of different wavelengths;
means for maintaining a predetermined ratio between the intensities of the light beams emitted by the light sources;
a single optical path comprising an optical-fiber cable;
means for applying the light beams of different wavelengths emitted from the light sources, to one end of said single optical path;
a detector section provided in the single optical path, and having a light-modulating element and an optical element connected in series, the light-modulating element having its birefringence degree changed in accordance with a physical quantity to be sensed, thereby to modulate polarization states of the light beams passing through the light-modulation element and output the modulated light beams, and the optical element converting the modulated light beams into light beams having intensities corresponding to the polarization states, and outputting the converted light beams from the other end of said single optical path;
means for detecting the intensities of the two light beams emitted from the other end of said single optical path and outputting detected signals;
means for obtaining a difference signal between the detected signals;
means for obtaining a sum signal of the detected signals;
means for dividing the difference signal by the sum signal to obtain a desired signal corresponding to the physical quantity.

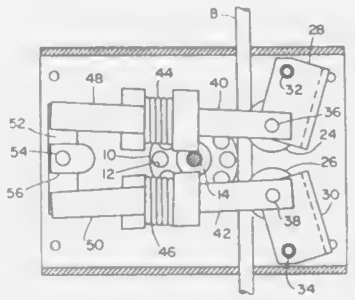
5,021,648
MOTION TRANDUCING THROUGH CONVERSION OF LINEAR MOTION TO CIRCULAR MOTION

Donald R. Jones, Chester, N.H., assignor to Doble Engineering Company, Watertown, Mass.

Filed Feb. 28, 1990, Ser. No. 486,150

Int. Cl.^{5} G01D *5/34*

U.S. Cl. 250—231.13 12 Claims



1. A motion transducer comprising
a rotatable wheel,
a drive assembly for engaging a movable rod in contact with the circumference of said rotatable wheel, in a manner such that linear motion of said movable rod causes rotation of said rotatable wheel, the angular displacement of said rotatable wheel being proportional to linear travel of said rod,
an encoder for measuring said rotation of said rotatable wheel and for encoding information relating to said rotation of said rotatable wheel,
and a shaft, connected to the center of said rotatable wheel, that rotates axially with said rotatable wheel,
said shaft being adapted to be coupled with an end of a rotatable component,
thereby enabling the motion transducer to measure angular motion of a rotatable component as well as linear motion of a rod.

5,021,649
RELIEF DIFFRACTION GRATING ENCODER

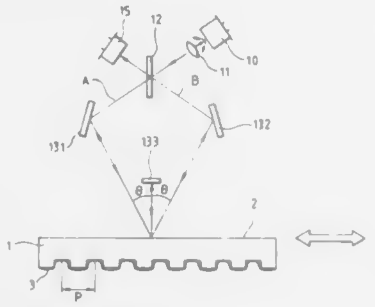
Tetsuharu Nishimura, Kawasaki; Koh Ishizuka, Urawa; Satoshi Ishii, and Masaaki Tsukiji, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1990, Ser. No. 496,259

Claims priority, application Japan, Mar. 28, 1989, 1-77058; Jun. 16, 1989, 1-54168

Int. Cl.^{5} G01D *5/34*

U.S. Cl. 250—231.16 12 Claims



1. An encoder comprising:
a light-transmission substrate;
a relief type diffraction grating formed on one surface of said light-transmission substrate;
a refection film formed on said diffraction grating;
means for radiating a light beam onto said diffraction grating from the other surface of said light-transmission substrate; and
means for detecting interference light formed by diffracted light produced by said diffraction grating upon radiation, and obtaining relative displacement information of said diffraction grating,
wherein when a refractive index of said light-transmission substrate is represented by n, a wavelength of the radiated light beam is represented by λ, and m is an integer ($m \geqq 0$), a depth h of a groove of said relief diffraction grating satisfies the following relation:

$$(\lambda/n)x(m/2+0.199)\leqq h\leqq(\lambda/n)\ x\ \{(m+1)/2-0.199[)]\}.$$

5,021,650
METHOD OF ELECTRONICALLY CORRECTING POSITION ERRORS IN AN INCREMENTAL MEASURING SYSTEM AND MEASURING SYSTEM FOR CARRYING OUT THE METHOD

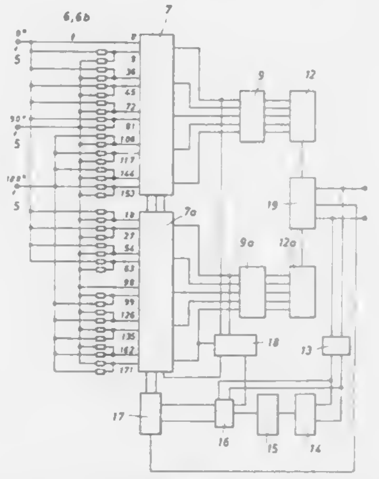
Heinz Rieder, St. Pantaleon, and Max Schwaiger, Ostermiething, both of Austria, assignors to RSF-Elektronik Gesellschaft m.b.H., Tarsdorf, Austria

Filed Mar. 28, 1990, Ser. No. 500,800

Claims priority, application Austria, Mar. 29, 1989, 716/89

Int. Cl.^{5} G01D *5/34*

U.S. Cl. 250—231.16 12 Claims



1. In a method of electronically correcting position errors in the operation of a incremental measuring system, in which
a scanning unit is caused to perform a scanning movement relative to a measuring scale consisting of a multiplicity of scale increments and to scan said scale during said scanning movement to generate basically sinusoidal analog measured-value signal indicating the direction of said scanning movement,
said analog signals are electronically processed in a dividing stage to generate digital countable signals, which represent respective sub-incremental steps, which are substantially as large as fractional parts of one of said scale increments and are initiated at respective phase angles of said analog signals, which phase angles have a spacing which corresponds to said sub-incremental step,
said countable signals are counted in a sense depending on the direction of said scanning movement, and
the resulting counts are electronically evaluated,
the improvement comprising
defining additional phase angles between adjacent ones of said predetermine phase angles and offset from said predetermined phase angles by a predetermined fractional part of the spacing between said predetermined phase angles, and

VOL
1127
ISS
1
JE
4
1991
UMI

evaluating the resulting counts electronically after a correction of said countable signals on the basis of selected ones of said additional offset phase angles whereby corrections are effected in fraction parts of the sub-incremental steps.

5,021,651
MOUNTING FOR A BALL LENS ON A BAR CODE READER WAND HAVING A TAPERED LENS BORE

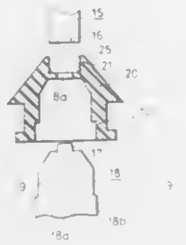
Hiroshi Ishikawa, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Jan. 31, 1990, Ser. No. 473,074

Claims priority, application Japan, May 22, 1989, 1-58092[U]

Int. Cl.^{5} H01J *5/02*

U.S. Cl. 250—239 4 Claims



1. An optical reader comprising
- a casing;
- a light emitting element and a light receiving element accommodated within said casing;
- a bore formed at a portion of the tip of said casing, said bore allowing the passage therethrough of light from said light emitting element;
- a mounting recess formed at a portion of the tip of said casing in communication with said bore; and
- a lens mounted in said mounting recess, wherein said mounting recess has a flat bottom surface, and said bore being tapered so as to be smaller in diameter at a portion thereof at said mounting recess than at any other portion thereof.

5,021,652
DIRECTIONAL GAMMA RAY SPECTROMETER

Dan McCay Arnold, Katy, Tex., assignor to Halliburton Logging Services, Inc., Houston, Tex.

Filed Jan. 11, 1990, Ser. No. 463,587

Int. Cl.^{5} G01V *5/06;* **G01T** *1/20*

U.S. Cl. 250—267 18 Claims

1. A directional gamma ray spectrometer comprising:
- (a) an elongate scintillation device responsive to impinging gamma rays, said device having spaced ends and having an elongate outer surface shaped as a cylinder;
- (b) end located scintillation responsive means for forming output indicative of scintillation events of said device;
- (c) a surrounding sleeve about said device
  - (i) along the length thereof in the form of a single turn helix;
  - (ii) formed of a material attenuating gamma rays to a specified degree; and
  - (iii) having a window formed therein wherein the window encircles to defined a directional radiation bias and wherein the directional bias is a specified range of azimuth.

5,021,653
GEOCHEMICAL LOGGING APPARATUS AND METHOD FOR DETERMINING CONCENTRATIONS OF FORMATION ELEMENTS NEXT TO A BOREHOLE

Brad Roscoe, Pasadena, Tex., and James Grau, Ridgefield, Conn., assignors to Schlumberger Technology Corporation, Houston, Tex.

Filed Feb. 7, 1990, Ser. No. 476,223

Int. Cl.^{5} G01V *5/10*

U.S. Cl. 250—270 38 Claims

1. A method for identifying and determining the concentrations of subsurface formation elements, next to a borehole, including the steps of:
- (1) irradiating the formations with neutrons from a low energy neutron source disposed in a logging tool lowered in the borehole, said neutron source being the only neutron source disposed in the said logging tool;
- (2) and counting the delayed gamma rays resulting from the activation of atoms of at least of a first element by the neutrons emitted by said source;
- (3) deducing from the counts of activation gamma rays the concentration of said first element;
- (4) detecting and counting the prompt gamma rays resulting from the capture of the neutrons emitted by said source by atoms of at least a second element; and
- (5) deducing from the count rates of capture gamma rays the concentration of said second element.

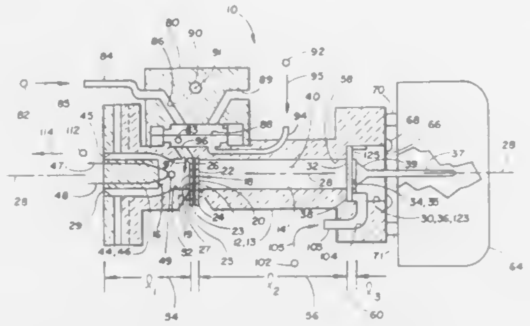
5,021,654
ALL CERAMIC ION MOBILITY SPECTROMETER CELL

Donald N. Campbell, Lake Jackson, Tex.; Glenn E. Spangler, Lutherville; Robert C. Davis, Jr., Westminster; Eugene F. Fafaul, Phoenix, and John P. Carrico, Jr., Baltimore, all of Md., assignors to Environmental Technologies Group, Inc., Baltimore, Md.

Filed Apr. 28, 1989, Ser. No. 344,917

Int. Cl.^{5} H01J *49/40*

U.S. Cl. 250—287 30 Claims



23. An ion mobility spectrometer, comprising:
- a ceramic block defined by a passageway therethrough, said passageway being subdivided into a reaction region and a drift region;
- a shutter grid separating the reaction region from the drift region of said passageway;
- an ionization source coupled to one end of said ceramic block and extending into the reaction region of said passageway;
- an aperture grid arranged proximate to another end of said ceramic block within said passage way;
- a collector inserted into said passageway at said other end of said ceramic block and abutting said aperture grid;
- ceramic retaining means for sealably retaining said collector in said passageway.

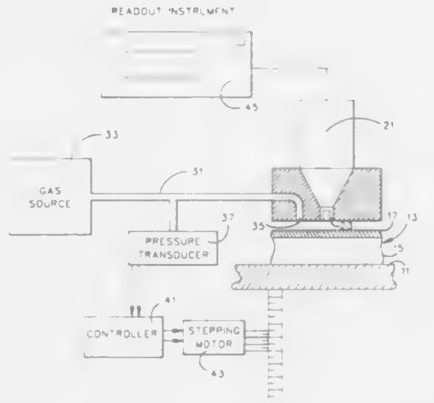
5,021,655
APPARATUS AND METHOD FOR CONTACTLESS MEASUREMENT OF COATING THICKNESS

Thomas P. Weismuller, Orange, and Charles R. Younger, Moreno Valley, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed May 2, 1990, Ser. No. 517,796

Int. Cl.^{5} G01B *15/02;* **G01N** *23/00*

U.S. Cl. 250—308 14 Claims



1. Measuring apparatus for measuring the thickness of a coating on a work piece, comprising:
- a table for receiving and positioning a coated work piece thereon;
- a beta-ray measuring instrument for determining the thickness of the coating on said work piece; and
- an air gauge connected to said measuring instrument for positioning said measuring instrument a first predetermined distance above the surface of said work piece.

5,021,656
METHOD FOR DISPLAYING AUTORADIOGRAPH

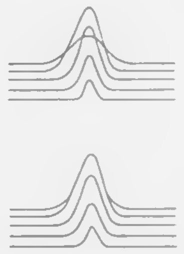
Shinichi Okano, and Makoto Hara, both of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 172,975, Mar. 22, 1988, abandoned, which is a continuation of Ser. No. 898,000, Aug. 19, 1986, abandoned. This application Jun. 29, 1989, Ser. No. 373,613

Claims priority, application Japan, Aug. 19, 1985, 60-181431

Int. Cl.^{5} G01T *1/20*

U.S. Cl. 250—327.2 12 Claims



1. A method for displaying autoradiograph having information on two-dimensional location of bands of radioactively labeled substances in resolved rows on a support medium, which includes the steps of:
- (1) placing the support medium and a stimulable phosphor sheet comprising a stimulable phosphor together to form layers to record the autoradiograph on the phosphor sheet as an energy-stored image;
- (2) irradiating the phosphor sheet with stimulating rays in the manner that the stimulating rays are scanned to traverse each band to form at least two scanning lines on the bands of each resolved row and photoelectrically detecting the autoradiograph as stimulated emission to obtain digital signals corresponding to said autoradiograph and having information on the positions of bands of radioactively labeled substances and radiation intensity at said positions;
- (3) subjecting the digital signals to signal processing to obtain at least two two-dimensional waveforms for one resolved row, which exhibit the positions of the bands along the resolved row and signal levels; and
- (4) displaying the resulting two-dimensional waveforms in parallel at intervals in a direction perpendicular to the resolved rows, in such manner that a waveform hides a waveform arranged on its back side in the area where two waveforms overlap with each other.

VOL
1127
ISS
1
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1991
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5,021,657

THERMAL IMAGER

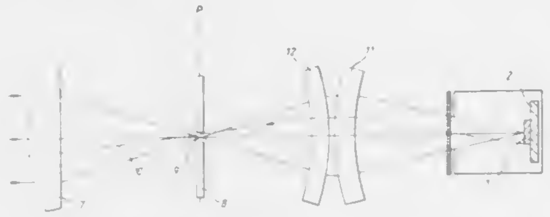
Jonathan P. Kettlewell, Billericay, and Brian F. Smith, Rayleigh, both of United Kingdom, assignors to GEC - Marconi Limited, Stanmore, United Kingdom

Filed May 15, 1989, Ser. No. 351,483

Claims priority, application United Kingdom, May 21, 1988, 8812089

Int. Cl.^{5} G01J *5/06*

U.S. Cl. 250—330 **5 Claims**



1. A thermal imager including a detector mounted on a cooled substrate, an optical system and a field stop which is positioned and is of a suitable size to limit narcissus rays to those which emanate from the detector only.

5,021,658

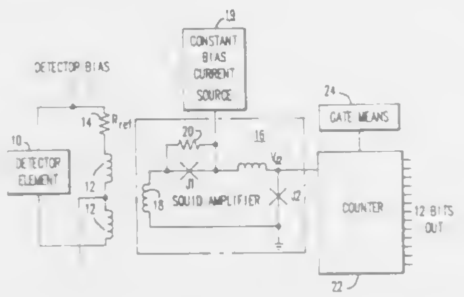
SUPERCONDUCTING INFRARED DETECTOR

Nathan Bluzer, Rockville, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 29, 1989, Ser. No. 373,075

Int. Cl.^{5} H01L *27/14, 27/18*

U.S. Cl. 250—336.2 **3 Claims**



1. An infrared sensor for producing an output which is a function of an infrared light level, said infrared sensor comprising:

- a. a superconducting transformer having a first primary winding, a second primary winding, and a secondary;
- b. a granular high temperature oxide superconductor film connected in series with said first primary winding to provide a first series combination;
- c. a reference resistor connected in series with said second primary winding to provide a second series combination; and
- d. a constant bias current source connected in a manner so that said first series combination and said second series combination are in parallel with respect to said current source and so that currents induced in the secondary from the primary windings as a result of the bias current are in bucking relationship, said current source being controllable to provide a bias current through the high temperature oxide superconductor film which is at least equal to the critical current of the high temperature oxide superconductor film when the infrared light level on the high temperature oxide superconductor film is essentially zero; whereby a increase in infrared light level will cause a drop in current through the high temperature oxide superconductor film and thereby an increase in current through the reference resistor, and as the primary windings are in bucking relationship, the change in current in the secondary is the sum of the absolute values of the changes in current through the high temperature oxide superconductor film and the reference resistor, and thus the current in the secondary of the transformer is a function of the infrared light level on the granular high temperature oxide superconductor film.

5,021,659

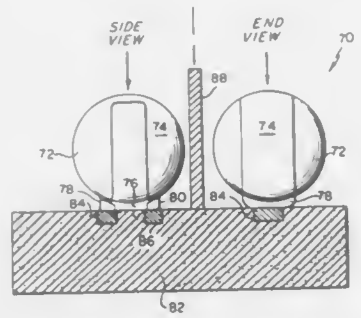
BROADBAND SUPERCONDUCTING DETECTOR USING MICROSPHERE SUBSTRATES

Richard T. Schneider, Alachua, Fla., assignor to Progress Technology Corp., St. Petersburg, Fla.

Continuation-in-part of Ser. No. 137,131, Dec. 23, 1987, Pat. No. 4,894,542. This application Jul. 25, 1989, Ser. No. 384,484

Int. Cl.^{5} H01L *39/00;* **G01J** *5/00*

U.S. Cl. 250—336.2 **16 Claims**



1. A broadband photon detector comprising:

a housing;

a superconducting material such that at least within a given temperature range incident photons increase the temperature of said material and the resistivity of said material varies in accordance with the temperature of said material;

a substrate on which said material is mounted, said substrate and said material further being disposed within said housing and said substrate comprising at least one microsphere having a hollow center;

means for establishing said material at a given temperature within said range using blackbody radiation disposed in said housing;

means for orienting said material so that photons can fall on said superconducting material; and

means for sensing an increase in the resistivity of said material.

5,021,660

PYROELECTRIC INFRARED DETECTOR AND DRIVING METHOD THEREFOR

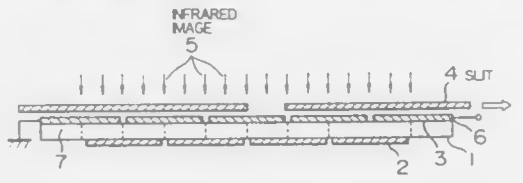
Yoshihiro Tomita, Osaka; Ryoichi Takayama, Suita; Hisahito Ogawa; Koji Nomura, both of Ikoma; Junko Asayama, Suita, and Atsushi Abe, Ikoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 3, 1989, Ser. No. 431,176

Claims priority, application Japan, Nov. 7, 1988, 63-280792

Int. Cl.^{5} H01L *27/146*

U.S. Cl. 250—338.3 **4 Claims**



1. A pyroelectric infrared detector comprising:

a pyroelectric element array having at least one row of pyroelectric elements and a slit member having a slit for interrupting an infrared image which is incident on said pyroelectric element array;

said pyroelectric elements forming one row of said pyroelectric element array being wired so that they are connected in series electrically and adjacent pyroelectric elements generate counter-electromotive forces; and

wherein said slit member is moved in a row direction relative to said pyroelectric element array, thereby to scan the infrared image which is being irradiated on respective pyroelectric elements in succession, thus obtaining information relating to an infrared intensity distribution irradiated on respective pyroelectric elements from time sequential signals produced at both ends of said pyroelectric element array.

5,021,661

TIME-RESOLVED INFRARED SPECTROPHOTOMETER

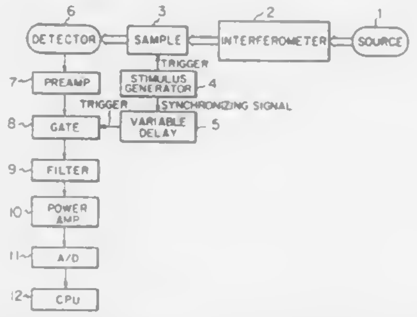
Koji Masutani, Tokyo, Japan, assignor to Jeol Ltd., Tokyo, Japan

Filed Sep. 4, 1990, Ser. No. 577,636

Claims priority, application Japan, Sep. 4, 1989, 1-230209; Dec. 25, 1989, 1-335748

Int. Cl.^{5} G01J *3/45, 3/443*

U.S. Cl. 250—339 **8 Claims**



1. A time-resolved infrared spectrophotometer comprising:

a rapid scan interferometer;

a stimulating means for periodically giving a stimulus to a sample placed in the optical path inside the interferometer;

a delay means producing a trigger signal after a given delay with respect to the application of the stimulus;

a detector detecting the radiation emerging from the interferometer;

a sampling means which converts the output signal from the detector into a discrete form in response to the trigger signal;

a means for detecting the envelope of the output signal from the sampling means; and

a Fourier transform means which Fourier-transforms the output signal from the detecting means to obtain a spectrum.

5,021,662

METHOD AND APPARATUS FOR REAL-TIME IN-LINE MATERIAL MONITORING

Milo R. Johnson, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 19, 1989, Ser. No. 354,523

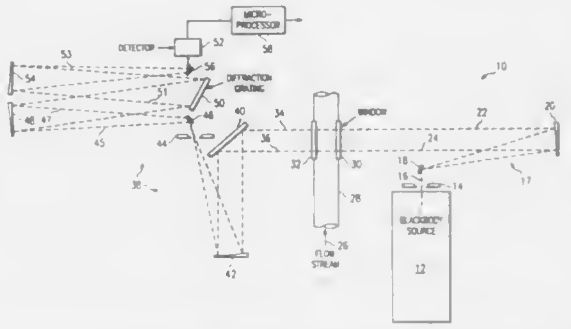
Int. Cl.^{5} G01N *21/35*

U.S. Cl. 250—339 **25 Claims**

1. Apparatus for real-time in-line material monitoring, comprising:

a two dimensional detector array for receiving a transmission spectrum emitted from the material;

SNR circuitry for improving signal-to-noise ratio for said received spectrum by digitally summing multiple replicas of said spectrum detected by said two dimensional array, thereby providing an enhanced spectrum, and



circuitry for comparing said received enhanced spectrum with a stored characteristic spectrum for the material to ensure the material meets a predetermined specification.

5,021,663

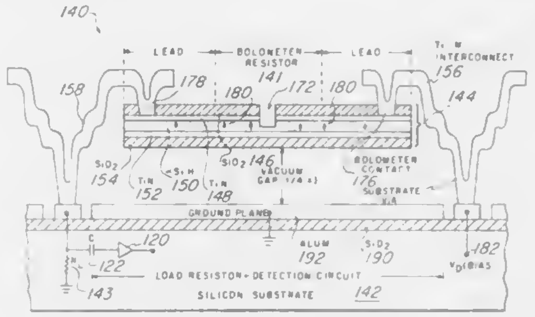
INFRARED DETECTOR

Larry J. Hornbeck, Van Alstyne, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 231,797, Aug. 12, 1988, abandoned. This application Oct. 15, 1990, Ser. No. 597,280

Int. Cl.^{5} G01J *5/20, 5/22, 5/02*

U.S. Cl. 250—349 **31 Claims**



1. An array of bolometers for detecting radiation in a spectral range, comprising:

- (a) a substrate including an array of bolometer circuit elements adjacent a first surface;
- (b) an array of resistors, each of said resistors having leads and spaced from said surface by about one quarter wavelength of the center of said spectral range, said resistor plus leads being formed from a stack including a first conductive layer, a resistive layer, and a second conductive layer with said second conductive layer the closest layer to said surface, each of said resistors further oriented to receive radiation, and located over and electrically connected to a corresponding set of said circuit elements.

5,021,664

METHOD AND APPARATUS FOR CORRECTING THE ENERGY RESOLUTION OF IONIZING RADIATION SPECTROMETERS

Steven M. Hinshaw, Knox County, Tenn., assignor to Tennelec/-Nucleus, Inc., Oak Ridge, Tenn.

Filed Jun. 22, 1990, Ser. No. 542,181

Int. Cl.^{5} G01T *1/16;* **G01J** *5/02*

U.S. Cl. 250—252.1 **14 Claims**

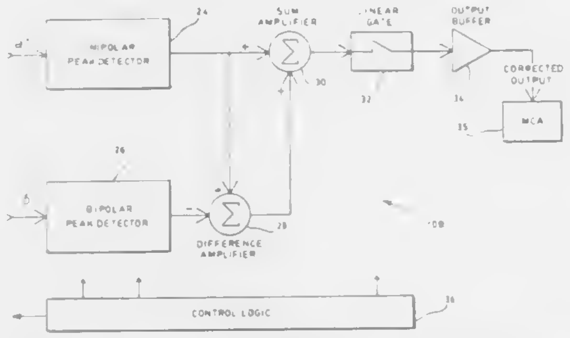
1. A method for achieving correction for ballistic deficit during the analysis of nuclear spectra using an ionizing radiation detector, said ballistic deficit due to the occurrence of charge collection at different locations within said detector, which comprises the following steps:

VOL
1127
ISS
1
JE
4
1991
UMI

deriving output pulses from said detector due to ionizing radiation produced charge collection within said detector, each of said output pulses having a rise time governed by said location of said charge collection within said detector, said ballistic deficit affected by said rise times of said output pulses;

producing two separate pulses from each of said output pulses of said detector in a pulse forming means, said two separate pulses having different peaking times;

feeding said two separate pulses into two separate peak detecting means to produce two stretched pulses;



comparing said two stretched pulses so as to produce a difference signal representing a difference in amplitude between peaks of said two stretched pulses;

adding at least a portion of said difference signal to one of said two stretched pulses to produce a corrected amplitude pulse; and

analyzing a plurality of corrected amplitude pulses in a multichannel analyzer to determine said nuclear spectra that is corrected for said ballistic deficit.

5,021,665

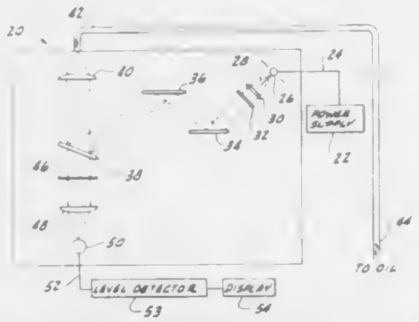
OIL LEVEL MONITOR

Donald P. Ames, 914 Black Twig La., St. Louis, Mo. 63122

Filed Dec. 26, 1989, Ser. No. 457,093

Int. Cl.^{5} G01F *23/28*

U.S. Cl. 250—357.1 **24 Claims**



1. A fluid level monitor for sensing the level of fluid in a reservoir such as for sensing an oil level in an internal combustion engine crankcase containing a quantity of oil, the monitor comprising:

means for generating a light beam having a frequency which will cause fluorescence in the fluid;

means for transmitting the light beam to the reservoir for exciting the fluid in the reservoir to generate fluorescent radiation;

means for receiving the fluorescent radiation emitted by the fluid as a result of the excitation;

means for generating a signal which is a function of the intensity of the received fluorescent radiation;

means, responsive to the intensity signal, for determining the level of fluid in the reservoir; and

means for indicating the determined level of the fluid in the reservoir.

5,021,666

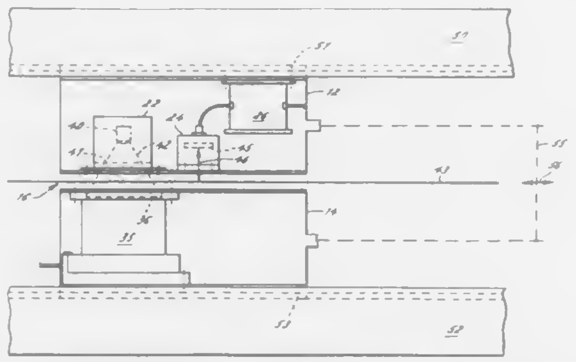
PASS-LINE INDEPENDENT WEB MEASURING METHOD AND APPARATUS

Eric J. Reber, Rockford, Ill., assignor to Barber-Colman Company, Rockford, Ill.

Filed Sep. 14, 1989, Ser. No. 407,417

Int. Cl.^{5} G01T *7/00;* **G01B** *7/04;* **G01N** *23/16*

U.S. Cl. 250—359.1 24 Claims



1. A pass-line independent web measuring device for producing thickness related measurements of a moving web, the measuring device including housing means mounted adjacent the web and establishing a pass-line for the web with respect to the housing means, the measuring device comprising, in combination:

a source of nuclear radiation and a nuclear detector mounted in the housing means in a fixed relationship with respect to each other to direct radiation toward the web and detect radiation from the web;

processor means responsive to a measure of the radiation received by the detector for producing an uncorrected measure relating to web thickness, said measure relating to web thickness being uncorrected with respect to the actual pass-line of the web;

distance measuring means mounted in said housing means, the distance measuring means having output transducer means aimed directly at the web for directing energy at the web and input transducer means aimed directly at the web for receiving at least a portion of the directed energy from the web, and means responsive to the received energy for determining a measure of the distance traveled by said energy between the output transducer, the web and the input transducer to determine the actual web pass-line, the actual web-pass-line relating to the distance between the housing means and the web measured substantially normal to the web; and

means for compensating the uncorrected measure relating to web thickness in accordance with the actual web pass-line determined by the distance measuring means to produce a measure corrected for pass-line relating to web thickness.

5,021,667

MOVABLE CALIBRATION COLLIMATOR AND SYSTEM AND METHOD USING SAME

Sebastian Genna, Belmont, and Andrew P. Smith, Medford, both of Mass., assignors to Digital Scintigraphics, Inc., Cambridge, Mass.

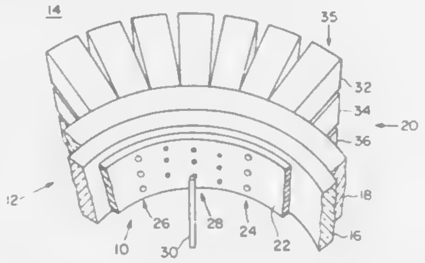
Filed Sep. 30, 1988, Ser. No. 251,653

Int. Cl.^{5} G01T *1/163, 1/167*

U.S. Cl. 250—363.10 **22 Claims**

4. A calibration collimator system for a radionuclide emission tomography camera system for generating a composite image array of a set of closely spaced image positions comprising:

a calibration collimator having a wall which is opaque to radionuclide emissions having a pattern formed from a subset of openings fewer in number and more widely spaced than said composite image array of said set of closely spaced image positions; and



means for moving said collimator in a first direction relative to the camera in incremental steps which offset successive images of said widely spaced subset pattern of openings for generating said composite image array of said set of closely spaced image positions.

5,021,668

ELECTRO-OPTICAL MIDDLE ULTRA-VIOLET SENSORS

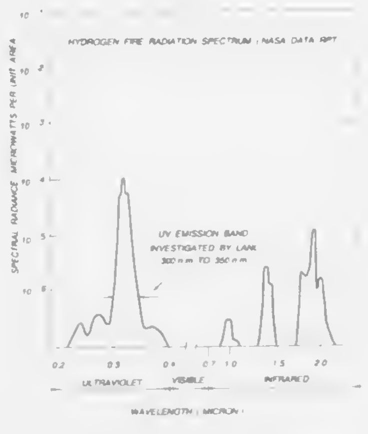
Eli Talmore, and Ami B. Shalom, both of Kiryat Motzkin, Israel, assignors to Technion Research & Development FDN. Ltd., Armament Development Authority, Israel

Filed Jan. 16, 1990, Ser. No. 464,980

Claims priority, application Israel, Jan. 16, 1989, 88958

Int. Cl.^{5} G01J *1/42*

U.S. Cl. 250—372 **4 Claims**



Hydrogen fire radiation spectrum, replotted from data supplied by NASA

1. An electro-optical sensor, for the middle ultra-violet comprising, in combination, an optical filter and an electro-optical detector arranged in cascade characterised by the overall outband response of the sensor (as hereinbefore defined) satisfying the equation:

$F{\bullet}D=K/A$, wherein:

K is in the order of magnitude of 10^{-17};

F is the average filter transmittance outside the solar blind region;

D is the average detector responsivity outside the solar blind region; and

A is the sensor aperture area (in cm^2).

5,021,669

PROCESS AND SYSTEM FOR THE CONTROL OF THE FOCUSING OF A BEAM OF MONOPOLAR CHARGED PARTICLES

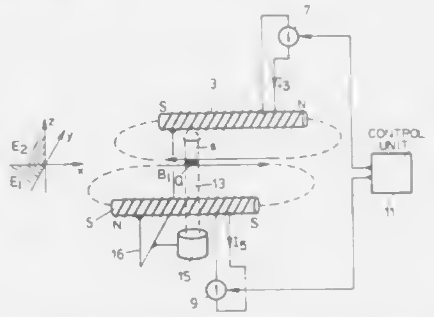
Urs Wegmann, Oberschan, and Albert Koller, Trübbach, both of Switzerland, assignors to Balzers Aktiengesellschaft, Liechtenstein

Filed May 8, 1990, Ser. No. 520,780

Claims priority, application Fed. Rep. of Germany, May 23, 1989, 3916787

Int. Cl.^{5} B23K *15/00;* **H01J** *3/28*

U.S. Cl. 250—396 ML **33 Claims**



1. Process for controlling the focusing of a beam (S) of monopolar charged particles, especially electrons, which beam has a longitudinal axis Z and passes through a first plane (E_1) perpendicular to the axis (Z) of the beam with a beam cross-sectional area (Q), two magnetic flux density fields (B_1, B_2) being applied on opposite sides of a second plane (E_2) containing the axis of the beam (Z) in such a way that, in the area of the second plane, the main vector component of the field lines are essentially parallel to the second plane and the two fields have opposite polarities, the extent of the beam cross-sectional area (Q) being changed in the direction (y) perpendicular to the second plane (E_2) by the control of the two fields, characterized in that the two magnetic flux density fields (B_1, B_2) are generated with field lines essentially parallel to each other over a distance which is considerably greater than the extent of the beam cross-sectional area (Q) parallel to the second plane (E_2).

5,021,670

MULTIPOLE ELEMENT

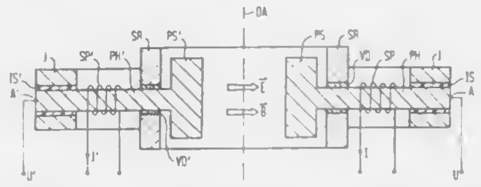
Stephan Lanio, Munich, and Maximilian Haider, Heidelberg, both of Fed. Rep. of Germany, assignors to ICT Integrated Circuit Testing Gesellschaft für Halbleiterprüftechnik mbH, Fed. Rep. of Germany

Filed Jan. 11, 1990, Ser. No. 463,543

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1989, 3901980

Int. Cl.^{5} H01J *29/58, 29/70*

U.S. Cl. 250—396 R **11 Claims**



1. Multipole element with a mounting part (J) carrying mounting elements, with several field-generating elements (PS, PS') which are arranged symmetrically with respect to an axis of symmetry (OA) of the mounting part (J) and are rigidly connected to the latter by said mounting elements (PH, PH') and with a coil system (SP, SP') for magnetic excitation of the field-generating elements (PS, PS'), characterised in that the field-generating elements (PS, PS') are arranged inside a beam tube (SR) for a corpuscular beam, said beam tube (SR) being

VOL
1127
ISS
1
JE
4
1991
UMI

arranged coaxially within the mounting part (J) and having vacuum-tight ducts for mounting elememts (PH, PH').

5,021,671

RADIATION IMAGE STORAGE PANEL

Katsuhiro Kohda, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Nov. 27, 1989, Ser. No. 441,892

Claims priority, application Japan, Nov. 25, 1988, 63-298593

Int. Cl.^{5} G03B *42/08;* **G01T** *1/00*

U.S. Cl. 250—484.1 8 Claims

1. A radiation image storage panel having a phosphor layer comprising a stimulable phosphor and a protective film provided on the phosphor layer via an adhesive layer, wherein at least one of the protective film, the adhesive layer and the phosphor layer contains an ultraviolet light absorbing agent.

5,021,672

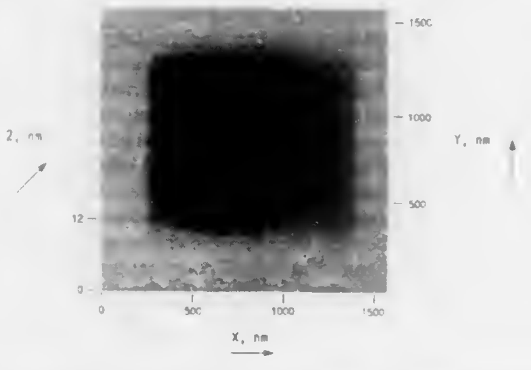
ETCHING OF NANOSCALE STRUCTURES

Bruce A. Parkinson, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 22, 1989, Ser. No. 455,222

Int. Cl.^{5} H01J *37/30*

U.S. Cl. 250—492.2 12 Claims



1. A process for etching a structure using a scanning tunneling microscope comprising scanning the microscope tip over a two dimensional substrate of at least one metal chalcogenide at a voltage of from about −10 to about +10 volts and a current of up to about 2 microamps to generate a continuous controlled ablation of one or more molecular layers of the metal chalcogenide.

5,021,673

WEB TRANSPORT WITH ANTI-SKEW ARRANGEMENT

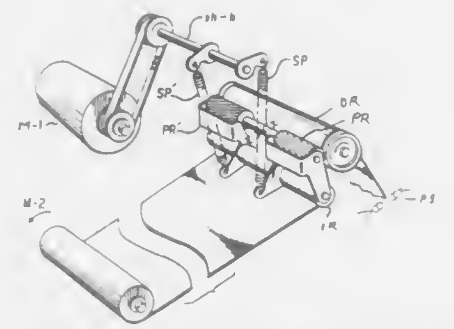
Thomas Dragon, Northville; John Hylan, Birmingham, and Kenneth Berkoben, Plymouth, all of Mich., assignors to Unisys Corp. (Formerly Burroughs Corp.), Detroit, Mich.

Filed Oct. 10, 1989, Ser. No. 419,423

Int. Cl.^{5} G01N *21/86*

U.S. Cl. 250—548 14 Claims

1. In a web-transport arrangement wherein web means are advanced without sidewise-constraint, along a prescribed path,
  a method of detecting and automatically correcting "wander" of the web-means to either side of this path, this method involving:
  disposing at least one edge-sensor means along this path segment whereby to indicate web-wander to the Right or to the Left by outputting respective "Gone-left" or "Gone-Right" signals; rotatably-mounting a pair of spaced, like contact-roller means on prescribed shaft means to each be in similar, moderately-loose contact with said web means for normal advancement thereof along said path; each said contact-roller means being also coupled, through a respective rocker means, to said shaft means, the respective rocker means being spring-biased to be resiliently urged, respectively, against clockwise, or counterclockwise rotation; providing selectively-operated Rotation means coupled to receive said signals; and motive means coupled to selectively rotate said shaft means a few degrees Clockwise or Counterclockwise, according to whether it receives said "Gone-Left" or said "Gone-Right" signals; whereby to so urge a respective one of the roller-means into tighter engagement with said web means, while contemporaneously urging the other roller means oppositely, and so as to less-tightly engage said web means, to thereby tend to correct the wander as it continues to advance the web.



5,021,674

PROCESS FOR DETERMINING THE LOCATION OF EDGES AND PHOTOELECTRONIC SCANNING DEVICE FOR SCANNING EDGES

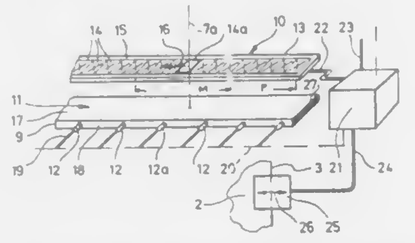
Gerhard Brunner, Augsburg, Fed. Rep. of Germany, assignor to Erhardt & Leimer GmbH, Augsburg, Fed. Rep. of Germany

Filed Jan. 16, 1990, Ser. No. 465,721

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1989, 3900928

Int. Cl.^{5} G01N *21/86*

U.S. Cl. 250—561 21 Claims



1. A process for determining a location of at least one edge of a moving web within a measurement zone extending transversely to a direction of movement of said web, said process comprising the steps of:
  (a) passing said web between a light source and a light-collecting receiver having at least one photocell so that said web partially intercepts light passing from said source in the direction of said receiver and said edge lies in said zone;
  (b) stepping at least one transparent surface zone of a linear array of liquid-crystal light modulators, which is nontransparent to light except for said surface zone and which is disposed between said source and said receiver, across said measurement zone;
  (c) generating at least one signal when light traversing said transparent zone first falls on said receiver or falls on said receiver for a last time upon at said edge in each travel of said surface zone across said measurement zone; and
  (d) determining a location of said surface zone with said measurement zone at an instant of said signal as the location of said edge, thereby evaluating said signal with respect to a location of a light/dark boundary in said measurement zone.

5,021,675

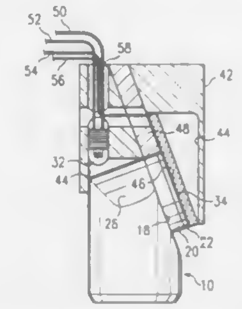
PHOTOELECTRIC MENSURATION DEVICE AND METHOD FOR DETERMINING PDC CUTTER WEAR

John G. Fischer, Irving, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Feb. 5, 1990, Ser. No. 475,011

Int. Cl.^{5} G01N *21/86*

U.S. Cl. 250—561 9 Claims



1. A method of determining the amount of material removed from an irregularly shaped object, said method comprising the steps of:
  providing a light source;
  providing a photocell positioned to receive light from said light source, said photocell having a shape which accommodates the profile of the irregularly shaped object before any material is removed from said irregularly shaped object;
  providing a current-measuring read-out device operatively connected to said photocell to provide an indication of the current output of the photocell;
  calibrating said current-measuring read-out device to display a reading of zero when a standard object whose area is predetermined to represent 0% removal of material is placed against said photocell to block light from said light source;
  calibrating said current-measuring read-out device to display a reading of 100% when a standard object whose area is predetermined to represent 100% removal of material is placed against said photocell to block light from said light source;
  placing an irregularly shaped object having material removed therefrom against said photocell to block the light from said light source by the irregularly shaped object; and
  noting the value of the displayed reading on the current-measuring read-out device, said value of the displayed reading providing an indication of the amount of material removed from said irregularly shaped object.

5,021,676

DOCUMENT-SKEW DETECTION WITH PHOTOSENSORS

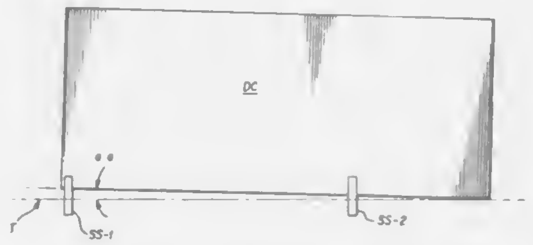
Thomas Dragon, Northville; John Hylan, Birmingham; Robert Reynolds, Milford; Paul McCarthy, Redford; Paul Merchant, Northville, and Kenneth Berkoben, Plymouth, all of Mich., assignors to Unisys Corp., Detroit, Mich.

Filed Oct. 10, 1989, Ser. No. 419,571

Int. Cl.^{5} G01N *21/86, 40/14*

U.S. Cl. 250—561 9 Claims

1. In a document-transport array for advancing prescribed documents along a prescribed path past one or several Process-Stations, in combination therewith, "document-skew" sensing means disposed at one or more of said stations, each said sensing means comprising a spaced pair of like area-photo sensors separated by the approximate document-length along said path and associated irradiation means bracketing the position of documents at said station, whereby each photosensor is arranged and adapted to output a prescribed signal whose magnitude is a measure of the degree to which an intervening document obscures it; and processing means adapted to receive said pairs of signals and indicate the difference therebetween.



5,021,677

LIGHT-SCATTERING-TYPE SMOKE DETECTOR

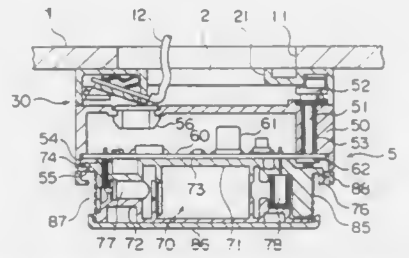
Yoshinori Igarashi; Makoto Yasukawa; Yasuo Ariga; Ichiro Kobayashi, and Satoru Horiuchi, all of Tokyo, Japan, assignors to Nohmi Bosai Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 26, 1990, Ser. No. 515,181

Claims priority, application Japan, May 2, 1989, 1-51617; May 2, 1989, 1-112034; May 12, 1989, 1-53918

Int. Cl.^{5} G01N *15/06*

U.S. Cl. 250—574 6 Claims



1. A light-scattering-type smoke detector comprising a base portion to be secured to a ceiling and having terminal portions provided therein, a cylindrical head part adapted to be dismountably secured to said base part at said terminal portions by a corresponding number of setscrews and provided in the inner periphery with an annular stepped portion and at the lower end portion with a number of hooks, a cylindrical dark box comprising a body portion and a cover portion put one upon another, said body portion integrally provided with a printed circuit board thereon and a projecting flange portion therearound, said printed circuit board being fit into said annular stepped portion and secured to said head part by said setscrews, electrical elements arranged on the upper surface thereof being electrically connected to said terminal portion through said setscrews, said projecting flange engaging with said hooks of said head part, said dark box provided inside thereof with a light projecting element and a light receiving element, a labyrinth means formed at the outer periphery of said dark box so as to allow surrounding air to freely enter therein, but to prevent external light from passing through and a cover means for said detecting portion surrounding said dark box and having air inlets, said cover means detachably mounted to said dark box with hook pieces formed around said cover means engaging with key-shaped claw means formed around said dark box.

VOL
1127
ISS
1
JE
4
1991
UMI

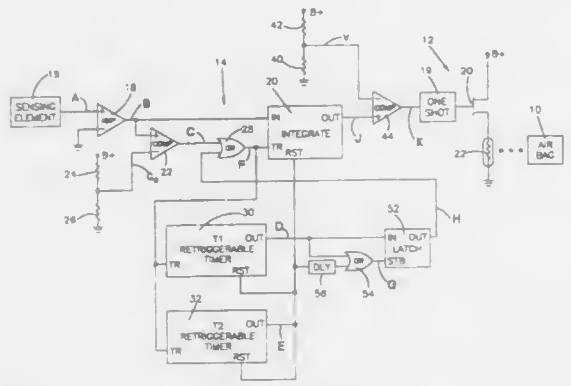
5,021,678
APPARATUS AND METHOD FOR ACTUATING A PASSENGER RESTRAINT SYSTEM IN A PASSENGER VEHICLE

Robert W. Diller, Pasadena, Calif., assignor to TRW Technar Inc., Irwindale, Calif.

Filed Nov. 3, 1989, Ser. No. 431,545

Int. Cl.^{5} B60R *21/32*

U.S. Cl. 307—10.1 **9 Claims**



1. Apparatus for actuating a passenger restraint system in a passenger vehicle, comprising:

- sensor means for providing a vehicle condition signal indicative of a potential deployment condition suitable for actuating said restraint system;
- means for providing a first signal so long as the value of said condition signal exceeds that of a first threshold level;
- integrating means operative in response to said first signal for integrating said condition signal and providing an integrated signal and normally operative to be reset upon termination of said first signal;
- means for providing a trigger signal for actuating said restraint system when the value of said integrated signal exceeds that of a second threshold level;
- means for preventing said integrating means from being reset upon termination of said first signal once said first signal has had a time duration of at least time period T1;
- means for resetting said integrating means after a time period T2 has taken place, wherein T2 has a duration greater than that of time period T1, so that said integrating means continues to integrate said condition signal during the interval between termination of time period T1 and termination of time period T2, even though the value of the condition signal drops below that of the first threshold level during said interval.

5,021,679
POWER SUPPLY AND OSCILLATOR FOR A COMPUTER SYSTEM PROVIDING AUTOMATIC SELECTION OF SUPPLY VOLTAGE AND FREQUENCY

John P. Fairbanks, Sunnyvale, and Andy C. Yuan, Saratoga, both of Calif., assignors to Poqet Computer Corporation, Santa Clara, Calif.

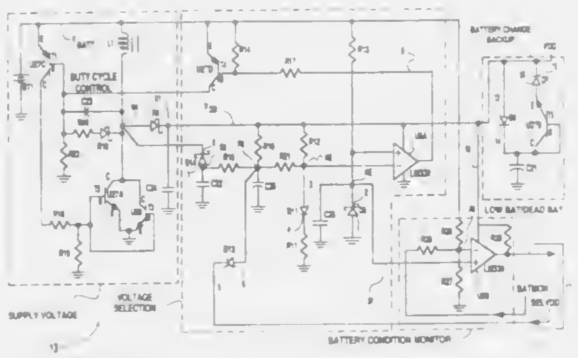
Filed Jun. 30, 1989, Ser. No. 374,514

Int. Cl.^{5} G05F *1/613;* H02J *9/06*

U.S. Cl. 307—66 **15 Claims**

1. A power system for providing a supply voltage to a computer system and automatically establishing the magnitude of said supply voltage responsive to the magnitude of the current being supplied to the computer system, said power system comprising:

- supply voltage circuit means for generating said supply voltage at an output terminal, said supply voltage circuit means including a control terminal for receiving a control signal, and
- voltage selection circuit means including comparator means having first and second input terminals and an output terminal, first circuit means for generating a reference voltage and coupling said reference voltage to said first input terminal of said comparator means, second circuit means for generating a second voltage having a magnitude proportional to said supply voltage and coupling said second voltage to said second input of said comparator means, means coupling the output of said comparator means to said control terminal of said supply voltage circuit means, and current sensing circuit means having an input coupled to said supply voltage circuit means and an output coupled to said second circuit means, said current sensing circuit means operating to generate at its output a voltage having a magnitude proportional to the supply current, whereby for a supply current equal to or less than a predetermined value, the output from said comparator means controls said supply voltage circuit to cause said supply voltage to be a first value, and for supply currents greater than said predetermined value, the output from said comparator means causes said supply voltage to be a second value.



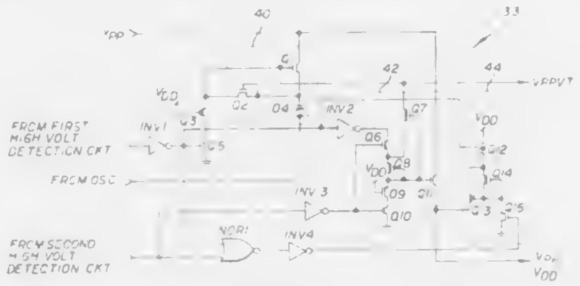
5,021,680
VOLTAGE SUPPLY CIRCUIT FOR PROGRAMMING CIRCUITS OF PROGRAMMABLE LOGIC ARRAYS

Vincent K. Zaw Win, Milpitas, and Andrew K. Chan, Palo Alto, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Jul. 31, 1989, Ser. No. 387,012

Int. Cl.^{5} H03K *5/01, 3/01*

U.S. Cl. 307—243 **17 Claims**


40
33
VPP
42
44
VPPVT
VDD
INV1
INV2
INV3
INV4
NOR1
FROM FIRST HIGH VOLT DETECTION CKT
FROM OSC
FROM SECOND HIGH VOLT DETECTION CKT
Q9
Q10
Q14
Q15

17. A voltage supply circuit for programming circuits of programmable logic arrays comprising:

- voltage charge pump means for providing a first voltage on a first output bus in response to a first supply voltage and an input pulse, said first output voltage being greater than said first supply voltage;
- first means for switching said first supply voltage onto a second output bus in response to a first set of programming signals, said first switching means including a first MOS transistor having a drain terminal connected to a source of said first supply voltage, a source terminal connected to said second output bus and a gate terminal connected to said to said first output bus; and
- second means for switching a second supply voltage onto a second output bus in response to a second set of programming signals, said second switching means including a first depletion mode transistor having a drain terminal connected to a source of a second supply voltage, a source terminal connected to the source terminal of said first MOS transistor, a gate terminal connected to the source and gate terminals of a second depletion mode transistor, the drain of said second depletion mode transistor being connected to the drain terminal of said first depletion mode transistor.

5,021,681
JITER-INVARIANT SWITCHED CAPACITOR PULSE SHAPER

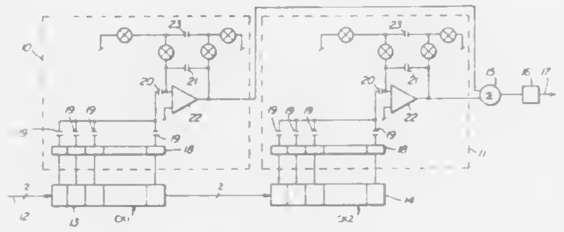
Roger Colbeck, Ottawa, and Peter Gillingham, Kanata, both of Canada, assignors to Mitel Corporation, Kanata, Canada

Filed May 16, 1989, Ser. No. 352,544

Claims priority, application Canada, May 27, 1988, 567997

Int. Cl.^{5} H03K *5/00;* H03B *28/00*

U.S. Cl. 307—261 **9 Claims**



1. A pulse shaper comprising:

(a) means for receiving a digital signal,
(b) at least two switched capacitor pulse shapers,
(c) means for applying successive portions of said digital signal, each portion being less than a baud of said signal, into corresponding ones of said pulse shapers, whereby pulse shapes are produced by the pulse shapers that include at least rising and trailing edges of a pulse,
(d) means for summing the outputs of the pulse shapers in time to form a combined output pulse, and
(e) means for low pass filtering the combined output pulse to form an analog output pulse signal.

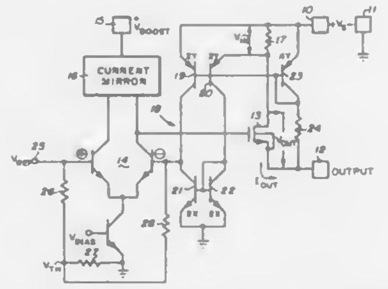
5,021,682
INSTANTANEOUS POWER LIMITING CIRCUIT

Stephen W. Hobrecht, Los Altos, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed May 11, 1989, Ser. No. 350,490

Int. Cl.^{5} H03K *3/01, 3/26*

U.S. Cl. 307—296.8 **7 Claims**



1. A circuit for limiting the power dissipation in a diffused metal oxide semiconductor transistor or DMOST, which passes a current therethrough and develops a voltage thereacross to a safe value, said circuit comprising:

- means for sensing the voltage across said DMOST;
- means for sensing the current passing through said DMOST;
- means for multiplying said voltage by said current to obtain a power dissipation related current; and
- means responsive to said dissipation related current to produce a control voltage that is coupled to said DMOST to limit said power dissipation to a safe value.

5,021,683
CIRCUIT ARRANGEMENT COMPRISING TWO PARALLEL BRANCHES FOR TRANSMITTING A BINARY SIGNAL

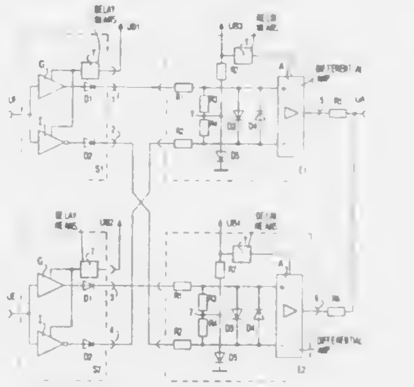
Hans-Robert Schemmel, Nuremberg, Fed. Rep. of Germany, assignor to U.S. Philips Corp., New York, N.Y.

Filed Feb. 12, 1990, Ser. No. 478,793

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1989, 3905689

Int. Cl.^{5} H03K *9/003*

U.S. Cl. 307—441 **6 Claims**



1. Circuit arrangement comprising two parallel connected branches for transmitting a binary signal, an input for applying said binary signal (UE) to each branch, characterized in that each branch comprises a supply means (S1, S2) coupled to the input, each supply means comprising two gates coupled to said input, one of said two gates having an inverted output and another of said two gates having a non-inverted output, each branch further comprises a receiver (E1, E2) that includes a differential amplifier (A), having the non-inverted output of the supply means of the respective branch and the inverted output of the supply means of the other branch connected thereto and wherein operating voltages (UB1, UB2, UB3, UB4) are coupled to the gates and the differential amplifiers through time delay means (T).

5,021,684
PROCESS, SUPPLY, TEMPERATURE COMPENSATING CMOS OUTPUT BUFFER

Bhupendra Ahuja, Phoenix, and Donald Sollars, Tempe, both of Ariz., assignors to Intel Corporation, Santa Clara, Calif.

Filed Nov. 9, 1989, Ser. No. 434,021

Int. Cl.^{5} H03K *17/16*

U.S. Cl. 307—443 **11 Claims**

1. A process, supply and temperature compensating output buffer for a CMOS device comprising:

a) input stage means for receiving and inverting an internal to the CMOS device data input signal, said input signal having a value which is one of the following transition from 0 to 1, or transition from 1 to 0;
b) non-overlap stage means coupled to the input stage means for receiving said inverted input signal, a first tri-state control signal and a second tri-state control signal, said non-overlap stage means for charging a first node to a first voltage and then a second node to the first voltage when said input signal has the value of transition from 0 to 1, and for discharging said second node to a second voltage and then said first node to said second voltage when said input

VOL
1127
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1991
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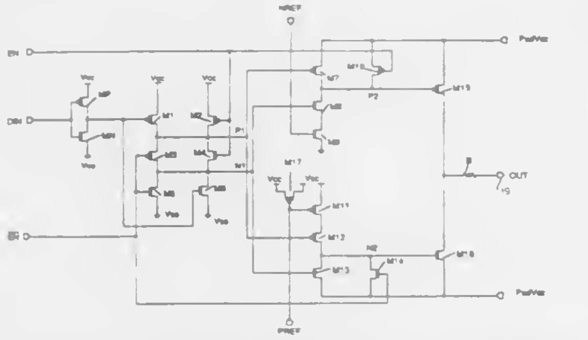
voltage has the value of transition from 1 to 0, wherein said first voltage is greater than said second voltage;

c) predriver stage means coupled to said first and second nodes and said first and second tri-state control signals for controlling the current flow through said first and second nodes and inverting the signals at said first and second nodes to provide corresponding first and second output nodes;



d) bias voltage generator means coupled to said predriver stage means for generating first and second bias voltages used by said predriver stage mean to provide said control of said current flow through said first and second nodes respectively;

e) output stage means coupled to said first and second nodes for generating an output signal corresponding to said data input signal for placement on an output pad of said CMOS device.

5,021,685

INPUT BUFFER CIRCUIT HAVING A RESISTOR FOR REDUCING THROUGH-CURRENT AND A CAPACITOR FOR PREVENTING DELAY

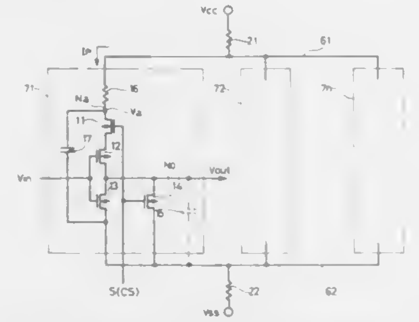
Yuji Kihara, Itami, Japan, assignor to Mitsubishi Denki Kabushika Kaisha, Tokyo, Japan

Filed Apr. 13, 1990, Ser. No. 508,460

Claims priority, application Japan, Apr. 17, 1989, 1-98138

Int. Cl.⁵ H03K *17/14*

U.S. Cl. 307—443 9 Claims



1. An input buffer circuit for semiconductor integrated circuits which can operate in a predetermined operation cycle, comprising:

resistance means and logical gate means connected in series between first supply potential and second supply potential,

said logical gate means operating in response to an input signal; and

capacitance means connected between a connection node of said resistance means and logical gate means, and said second supply potential,

the time constant defined by said resistance means and capacitance means for charging said capacitance means being set to be below a value defined by said operation cycle.

5,021,686

LOGIC CIRCUIT

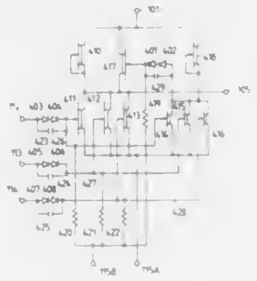
Atsumi Kawata, Hachioji; Hiroyuki Itoh, Kodaira; Hirotoshi Tanaka, Kitatsuru; Kazuhiro Yoshihara, Nishitama, and Hiroki Yamashita, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

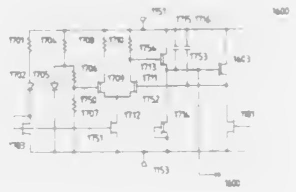
Filed Jan. 25, 1990, Ser. No. 470,322

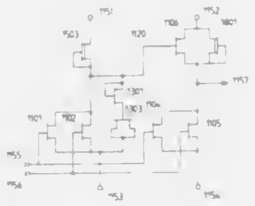
Claims priority, application Japan, Jan. 25, 1989, 1-13903; Aug. 11, 1989, 1-206744

Int. Cl.⁵ H03K *19/003, 19/092, 19/094, 4/58*

U.S. Cl. 307—448 75 Claims







1. A logic circuit for receiving one or more inputs signals and producing a logic operation output based on the inputs, comprising:

at least one input;

a first group of one or more field-effect transistors, each having a gate connected to a respective input to receive one of the input signals, respectively;

a second group of field-effect transistors equal in number to the first group of transistors, and each transistor of said second group of transistors having a gate connected to a respective one of the gates of the first group of transistors to respectively receive one of the input signals;

first load means connected to said first group of transistors and providing the load for said first group of transistors;

second load means connected to said second group of transistors and providing the load for said second group of transistors;

an output connected between said first load means and said first group of transistors to provide the logic operation output of the first group of transistors based upon the input signals applied to said input;

field-effect transistor means for providing current through said output, in parallel with said first load means; and

said field-effect transistor means having a gate controlling the current passing therethrough to said output and being connected between said second group of transistors and said second load means.

5,021,687

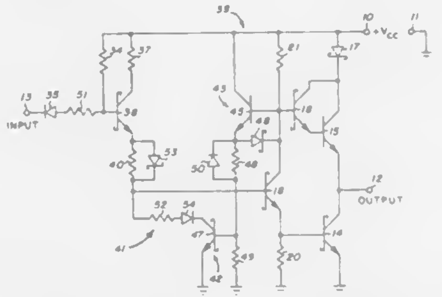
HIGH SPEED INVERTING HYSTERESIS TTL BUFFER CIRCUIT

Roy Yarbrough, Hiram; Ernest D. Haacke, Scaraborough, and Lars G. Jansson, Long Island, all of Me., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Feb. 1, 1990, Ser. No. 473,533

Int. Cl.⁵ H03K *19/003*

U.S. Cl. 307—456 9 Claims



1. A high speed TTL inverter gate circuit having hysteresis in its switching operation, said circuit comprising:

a phase splitter switching transistor having an input base and paraphase outputs coupled to drive an output stage which provides a digital signal output;

an emitter follower transistor input stage having a base coupled to receive digital input signals and an emitter coupled to drive said phase splitter switching transistor base;

an impedance element coupled in series with said emitter follower transistor emitter;

a current source for providing a controlled current; and

switch means for passing said controlled current through said impedance element when said gate output is high and for removing said controlled current from said impedance element when said gate output is low whereby said gate has a higher threshold when said gate output us high and a lower threshold when said gate output is low.

5,021,688

TWO STAGE ADDRESS DECODER CIRCUIT FOR SEMICONDUCTOR MEMORIES

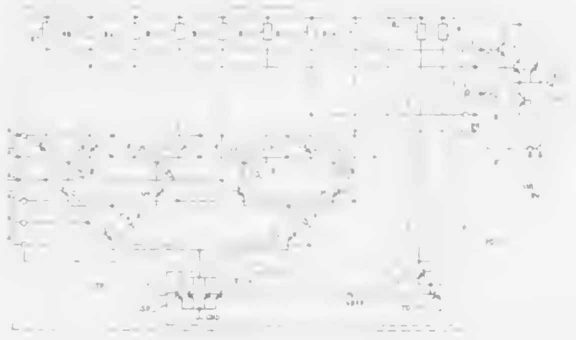
Sylvain Leforestier, Le Chenay, and Dominique Omet, Evry, both of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 5, 1989, Ser. No. 417,362

Claims priority, application France, Oct. 28, 1988, 88 480068

Int. Cl.⁵ H03K *19/086, 17/16, 19/092, 19/003*

U.S. Cl. 307—463 16 Claims



1. A two stage address decoder circuit for decoding a plurality of bits of n input address signals and inverted address signals, comprising:

a first stage biased between a first supply voltage and a second supply voltage, said first stage including at least two precoder circuits, each of which consists of at least one multilevel Differential Cascode Current Switch tree and a constant current source, each precoder respectively decoding first bit groups of an address input signal and generating respective sound bit groups of precoded signals;

a second stage including a plurality of N final decoder circuit driven by at least one pair of said bit groups of said precoded signals and providing N final decoded output signals at output terminals thereat; and

clock generating circuit means for generating at least one first control signal in response thereto, to dynamically activate said N final decoder circuits, said N final decoder circuits each consisting of an OR gate activated by a switched circuit which is triggered under the control of said first control signal.

5,021,689

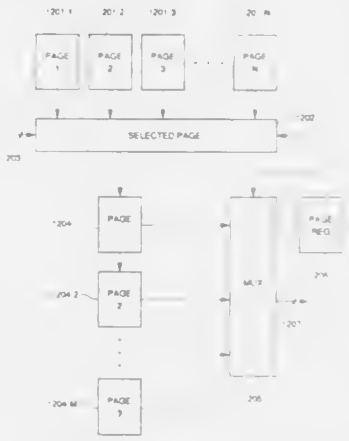
MULTIPLE PAGE PROGRAMMABLE LOGIC ARCHITECTURE

Scott K. Pickett, San Jose; Thomas M. Luich, Campbell, both of Calif., and Arthur L. Swift, IV, Welches, Oreg., assignors to National Semiconductor Corp., Santa Clara, Calif.

Continuation-in-part of Ser. No. 299,047, Jan. 19, 1989, Pat. No. 4,942,319. This application Jan. 16, 1990, Ser. No. 465,376

Int. Cl.⁵ H03K *19/177*

U.S. Cl. 307—465 11 Claims



1. A logic array circuit comprising:

a plurality of L input leads for receiving a plurality of input signals, where L is a first positive integer;

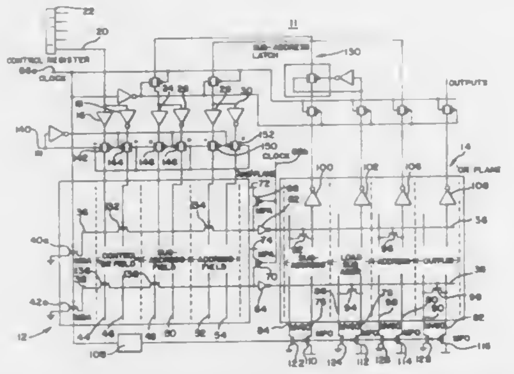
a set of N first logic arrays, where N is a second positive integer greater than or equal to one, each of said N first logic arrays including means for receiving signals related to selected ones of said input signals, a plurality of P output signal leads, a plurality of logic gates for providing P output signals on said P signal leads as a function of said signals related to selected ones of said input signals, where P is a third positive integer associated with that one of said N first logic arrays;

means for storing a first plurality of pages of information defining desired logic configuration patterns; and

first means for downloading said information from a selected one or more of said first plurality of pages to said set of N first logic arrays, thereby configuring said set of N first logic arrays to perform one or more logical functions.

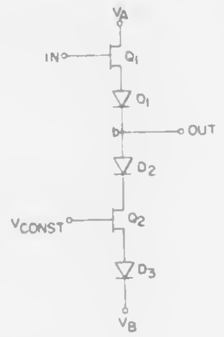
VOL 1127
ISS 1
JE 4
1991
UMI

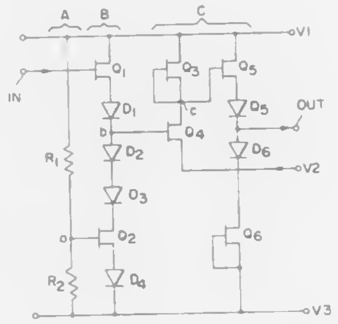
5,021,690
PROGRAMMABLE LOGIC ARRAY APPARATUS
Alfredo R. Linz, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.
Filed Nov. 13, 1989, Ser. No. 434,797
Int. Cl.^{5} H03K *17/04*
U.S. Cl. 307—465 23 Claims

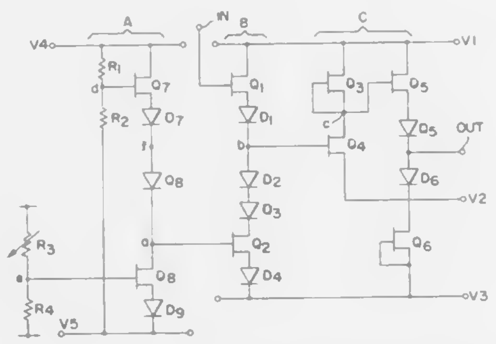


21. An apparatus adaptable for use as a programmable logic array for receiving multi-bit control signals from a signal source and producing resultant output signals logically related to said control signals according to a program, the apparatus comprising:
- a clock means for generating a clock signal;
- an input means for receiving said control signals and producing input signals representative of said control signals;
- a first iteration processing means for effecting a first iteration operation upon said input signals and producing first iteration output signals;
- a second iteration processing means for effecting a second iteration operation upon said first iteration output signals and producing said resultant output signals; and
- a plurality of electrically conductive common lines common to said first iteration processing means and said second iteration processing means;
- said input means comprising a plurality of input cells, at least some of said plurality of input cells receiving respective bits of said control signals;
- said first iteration processing means including a plurality of first signal lines cooperating with said plurality of common lines to define an array of first crosspoints;
- said second iteration processing means including a plurality of second signal lines cooperating with said plurality of common lines to define an array of second crosspoints;
- said plurality of input cells being operatively connected to said plurality of first signal lines, and said resultant output signals being presented by said plurality of second signal lines;
- said first iteration processing means and said second iteration processing means each having first switching means responsive to said clock signal for selectively connecting a voltage source to effect precharging of said plurality of second signal lines and said plurality of common lines;
- said plurality of common lines being operatively connected to a second switching means responsive to said clock signal for connecting said plurality of common lines to ground;
- said first iteration processing means further including a plurality of third switching means for affecting continuity of at least a portion of selected of said plurality of common lines, said plurality of third switching means being serially connected in selected ones of said plurality of common lines and being gated by selected ones of said plurality of first signal lines according to said program, whereby said gating of appropriate of said plurality of third switching means connects predetermined portions of said plurality of common lines to ground;
- each of said plurality of input cells comprising a buffer-pair, one of said buffer-pair being an inverting buffer, each buffer of each said buffer-pair being operatively connected to at least one of said plurality of first signal lines.

5,021,691
LEVEL CONVERSION CIRCUIT HAVING CAPABILITY OF SUPPLYING OUTPUT SIGNAL WITH CONTROLLED LOGICAL LEVEL
Hitoshi Saito, Tokyo, Japan, assignor to NEC Corporation, Japan
Filed Jun. 27, 1989, Ser. No. 372,010
Claims priority, application Japan, Jun. 27, 1988, 63-159668
Int. Cl.^{5} H03K *17/10, 17/16, 17/687, 19/094*
U.S. Cl. 307—475 12 Claims

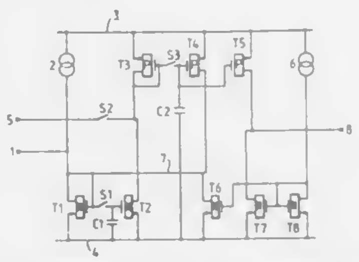






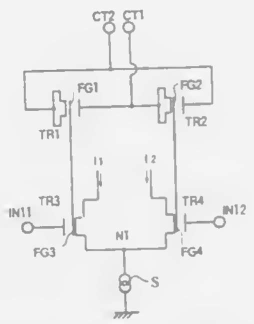
1. A level conversion circuit comprising a logical level conversion part formed by connecting in series at least one diode to a source electrode of a first field-effect transistor having its gate electrode as an input terminal for receiving an input signal to be level-converted, and a current control part formed by connecting in series a second field-effect transistor and at least one diode having element forms identical to those of said logical level conversion part, the gate electrode of said second field-effect transistor receiving a reference voltage, wherein an output terminal is connected to a first power source via said logical level conversion part and is connected to a second power source via said current control part.

5,021,692
INTEGRATOR CIRCUIT
John B. Hughes, Hove, England, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Dec. 4, 1989, Ser. No. 446,518
Claims priority, application United Kingdom, Dec. 8, 1988, 8828666
Int. Cl.^{5} G05F *3/24*
U.S. Cl. 307—490 18 Claims



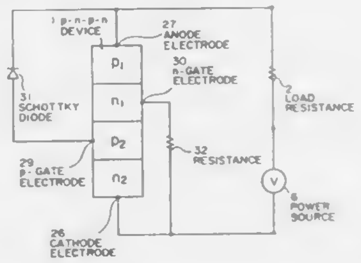
1. A bilinear integrator circuit for sampled signal currents comprising: first and second inputs and an output, means for connecting the first input to an input of a first current memory cell which is arranged to store a current applied in a first portion of each sampling period and to reproduce a current, whose magnitude is dependent on the magnitude of the applied current, at an output of said first current memory cell during a second portion of that or a succeeding sample period, means for connecting the second input to an input of a second current memory cell which is arranged to store a current applied to its input in the second portion of each sampling period and to reproduce at each of a first and second output of the second current memory cell a current, whose magnitude is dependent upon that of the current applied to its input, during the first portion of that or a succeeding sampling period, means for connecting the first output of the second current memory cell to the input of the first current memory cell, means for connecting the output of the first current memory cell to the input of the second current memory cell, and means for connecting the second output of the second current memory cell to the output of the integrator circuit.

5,021,693
CONTROL CIRCUIT FOR FLOATING GATE FOUR-QUADRANT ANALOG MULTIPLIER
Takeshi Shima, Sagamihara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Mar. 28, 1990, Ser. No. 500,309
Claims priority, application Japan, Apr. 5, 1989, 1-84705
Int. Cl.^{5} H03K *5/22, 19/08*
U.S. Cl. 307—494 8 Claims



2. A differential amplification circuit, comprising:
- commonly connecting the normal gate end of a first transistor having a floating gate and the source end and the drain end of a second transistor having a floating gate to a first control input terminal;
- commonly connecting the source end and the drain end of the first transistor and the normal gate end of the second transistor to a second control input terminal;
- commonly connecting the respective source ends of a third and a fourth transistor respectively having floating gates to a first terminal to compose a first differential couple;
- providing a current source between the first terminal and a power source end or an earthed end;
- connecting the floating gates of the first and the third transistor together;
- connecting the floating gates of the second and the fourth transistor together;
- connecting the normal gate end of the third transistor to a first positive input terminal; and
- connecting the normal gate of the fourth transistor to a first negative input terminal.

5,021,694
CIRCUIT FOR DRIVING A GATED P-N-P-N DEVICE
Yoshiharu Toshiro, and Kenichi Kasahara, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan
Filed Mar. 30, 1988, Ser. No. 175,429
Claims priority, application Japan, Mar. 30, 1987, 62-78087; Jul. 8, 1987, 62-171526; Jul. 24, 1987, 62-185926; Sep. 10, 1987, 62-227634
Int. Cl.^{5} H03K *17/72*
U.S. Cl. 307—631 2 Claims



1. A circuit for driving a gated p-n-p-n device comprising,
- a p-n-p-n device in which an impurity density of a semiconductor layer for a p-gate region is higher than that of a semiconductor layer for an n-gate region,
- anode and cathode electrodes respectively provided on anode and cathode regions of said p-n-p-n device,
- a p-gate electrode provided on said p-gate region of said p-n-p-n device,
- a power source means for driving said p-n-p-n device, said power source means being provided in series between said anode and cathode electrodes,
- means having a rectifying property which is provided between said p-gate electrode and said anode electrode, an anode electrode of said means being connected to said p-gate electrode,
- an n-gate electrode provided on said n-gate region of said p-n-p-n device, and
- means having a predetermined resistance value which is provided between said cathode electrode and said n-gate electrode, wherein said means having a predetermined resistance value is a resistor.

VOL
1127
ISS
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1991
UMI

5,021,695
LINEAR MOTOR CAR SYSTEM

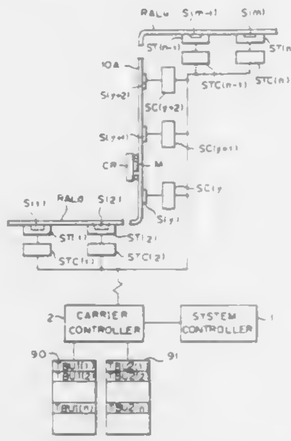
Toshimasa Miyazaki, Yokohama; Yoji Uzawa; Kazuyoshi Okawa, both of Hachioji; Hiroshi Kawashima, Ebina; Kazumasa Moriya, Urawa; Yoshitaka Murakawa, Fuchu; Toshimitsu Kumagai, Kawasaki; Akihiro Nakamura, Kawasaki; Motohiko Itoh, Tokyo, and Tomoyuki Kashiwazaki, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Division of Ser. No. 895,122, Aug. 11, 1986, Pat. No. 4,849,664. This application May 19, 1989, Ser. No. 354,367

Claims priority, application Japan, Aug. 14, 1985, 60-178964; Oct. 15, 1985, 60-227853; Jan. 20, 1986, 61-009503; Jan. 20, 1986, 61-009505; Jan. 31, 1986, 61-019368

Int. Cl.^{5} H02K *41/00*

U.S. Cl. 310—12 7 Claims



1. A method for controlling a linear motor car system having a conveyance path, including a vertical conveyance path, and a carrier with a linear motor for transporting an article, said method comprising the steps of:

(a) moving the carrier on the conveyance path to convey the article by driving the linear motor;

(b) controlling the driving of the linear motor of the carrier by generating only an upward driving force for the linear motor to drive the carrier upward along the vertical conveyance path

(c) discriminating whether the carrier rising along the vertical conveyance path will be able to rise completely through the vertical conveyance path; and

(d) driving the carrier to gradually descend along the vertical conveyance path when it is discriminated in step (c) that the carrier cannot rise completely through the vertical conveyance path.

5,021,696
COOLING FAN WITH REDUCED NOISE FOR VARIABLE SPEED MACHINERY

David A. Nelson, Union Lake, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 14, 1989, Ser. No. 408,154

Int. Cl.^{5} H02K *9/06*

U.S. Cl. 310—62 6 Claims

1. A fan-cooled rotating electrical machinery comprising:

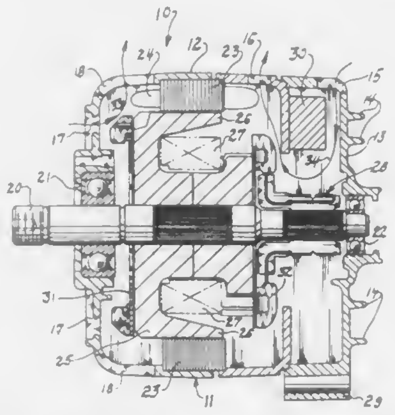
a rotatable shaft;

a rotor connected to said shaft;

a ventilated housing receiving said shaft and said rotor;

a stator received by said housing; and

a fan coupled to said shaft within said housing and having a central axis aligned with said shaft, said fan including a supporting plate and a plurality of blades supported by said supporting plate, each blade extending radially from said central axis and substantially normally from said supporting plate, a plurality of flow channels being defined exclusively by said supporting plate and adjacent blades, said flow channels discharging within said housing, at least a portion of said blades having a height profile which is a function of radial distance from said central axis, said height profile including a tapered segment in which said height profile includes a predetermined height h_1 at a radius r_1 and includes a height h_2 at another radius r_2 which is substantially determined by the formula:



$$h_2=(r_1\times h_1)/r_2.$$

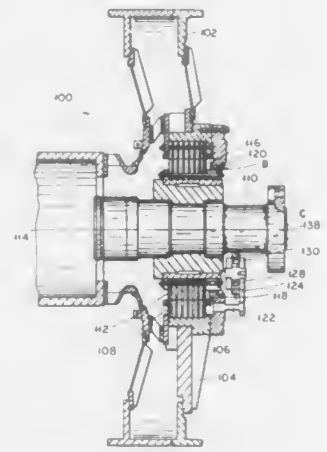
5,021,697
AUXILIARY BEARING DESIGN FOR ACTIVE MAGNETIC BEARINGS

James H. Kralick, Latham, N.Y., assignor to Mechanical Technology Incorporated, Latham, N.Y.

Filed May 24, 1990, Ser. No. 529,877

Int. Cl.^{5} H02K *5/16*; F16C *39/06*

U.S. Cl. 310—90.5 16 Claims



1. A rotating apparatus comprising:

a housing;

a rotor;

magnetic bearing means for rotatably supporting said rotor in said housing;

back-up bearing means for preventing contact between said rotor and said magnetic bearing means, said back-up bearing means including bumper bearing means for resisting an impact on said rotor; and auxiliary bearing means for supporting said rotor in the absence of said impact;

wherein said auxiliary bearing means includes an auxiliary bearing and resilient bearing support means for supporting said auxiliary bearing, said resilient bearing support means bending in the presence of said impact to permit contact between said bumper bearing means and said rotor.

5,021,698
AXIAL FIELD ELECTRICAL GENERATOR

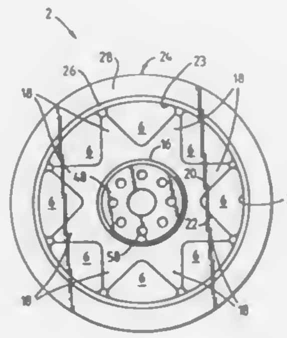
Keith R. Pullen, London; Kevin J. Horton, Ansley; Mohammad R. Etemad, London; Arnoldo Fenocchi, London; Laurence W. Eggleston, London, and Hugh R. Bolton, Epsom, all of England, assignors to Rolls Royce plc, London, England

Continuation of Ser. No. 385,053, Jul. 26, 1989, abandoned. This application Sep. 12, 1990, Ser. No. 581,085

Claims priority, application United Kingdom, Jul. 26, 1988, 8817760

Int. Cl.^{5} H02K *21/24*

U.S. Cl. 310—156 19 Claims



1. An axial field electrical generator capable of operating at very high rotational speeds comprising: at least one permanent magnet disc rotor having a plurality of permanent magnet segments equiangularly spaced apart around a hub, said hub containing notches or pockets to engage said permanent magnets and with which engagement is maintained during operation by means of pre-stressed hoop means encompassing the hub and magnets, said pre-stressed hoop means being formed initially as a push fit and stressed during assembly with the hub and magnets by expansion of the hub by forcedly fitting into a central bore of the hub a relatively tapered boss; and a stator winding spaced a short axial distance from a face of the disc rotor.

5,021,699
INTERDIGITAL TRANSDUCER FOR SURFACE ACOUSTIC WAVE FILTER

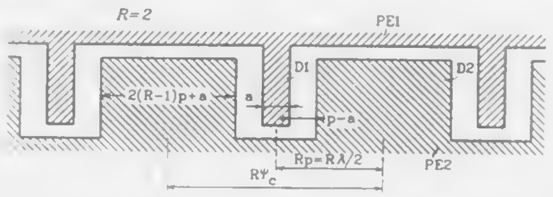
Pierre Dufilie, Le Rouret, France, assignor to Thomson-CSF, Puteaux, France

Filed Oct. 10, 1989, Ser. No. 419,207

Claims priority, application France, Oct. 14, 1988, 88 13536

Int. Cl.^{5} H01L *41/08*

U.S. Cl. 310—313 B 2 Claims



1. A symmetrical, interdigital transducer, capable of propagating an acoustic wave along a given direction having a predetermined central wavelength λ_0, and comprising a first comb having first electrodes or fingers and a second comb having second electrodes or fingers arranged alternately on a substrate, and first and second electrodes having given widths along the direction of propagation of said acoustic wave wherein a center-to-center spacing between a first finger of said first comb and a second finger of said second comb adjacent to said first finger is at least equal to $R\lambda_0/2$, where R is a whole number strictly greater than 1 for the greatest part of the fingers, and wherein the width of the second fingers is at least equal to $2(R-1)p+a$, where a designates said width of the first fingers which are smaller than $\lambda_0/2$ and p is equal to $\lambda/2$.

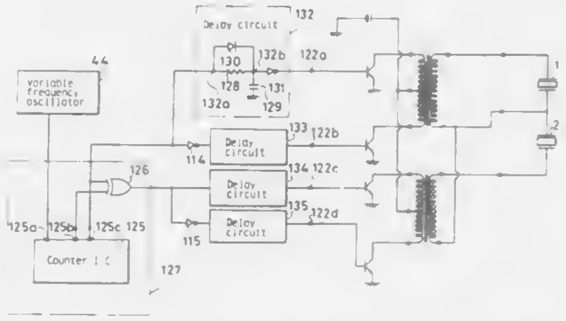
5,021,700
DRIVING APPARATUS FOR ULTRASONIC MOTOR

Kenichiroh Takahashi, Katano; Noriyuki Harao, Ikoma, and Hiromi Tanoue, Kadoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 158,718, Feb. 23, 1988, abandoned. This application Sep. 21, 1989, Ser. No. 410,035

Int. Cl.^{5} H01L *41/08*

U.S. Cl. 310—316 5 Claims



1. An apparatus comprising:

stator means for generating vibration waves in an ultrasonic motor, said stator means including a piezoelectric member having a capacitance;

current detection means for detecting a current I_m corresponding to mechanical vibration of said piezoelectric member, said current I_m being determined by subtracting a capacitance current I_o flowing in said piezoelectric member from a total current I_t flowing in said piezoelectric member;

voltage detection means for detecting a voltage impressed on said piezoelectric member;

phase difference detection means for detecting a phase difference between said current which is detected by said current detection means and said voltage which is detected by said voltage detection means;

variable frequency oscillator means for generating an oscillation signal in response to an output of said phase difference detection means so as to maintain said phase difference constant; and

driving means for driving said piezoelectric member in response to said oscillation signal from said variable frequency oscillator;

wherein said current detection means comprises:

a first resistor connected in series with said piezo electric member so as to make a first series connection,

a capacitor and a second resistor connected in series to form a second series connection, said second series connection being connected in parallel to said first series connection,

an operational amplifier having one input terminal connected to a connecting point between said piezo electric member and said first resistor, and another input terminal connected to a connecting point between said capacitor and said second resistor.

VOL
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5,021,701
PIEZOELECTRIC VIBRATOR MOUNTING SYSTEM FOR A NEBULIZER

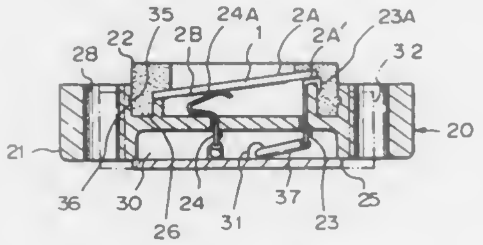
Minoru Takahashi; Tsutomu Kotani, and Shinichi Endo, all of Chiba, Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Oct. 13, 1989, Ser. No. 421,069

Claims priority, application Japan, Oct. 20, 1988, 63-136197[U]; Oct. 31, 1988, 63-141000[U]; Oct. 31, 1988, 63-141001[U]

Int. Cl.^{5} H01L *41/08*

U.S. Cl. 310—345 8 Claims



1. A piezoelectric vibrator mounting system for a nebulizer comprising (**20**):
- an insulating support (**21**);
- an annular projected vibrator support (**27**) integrally formed with the insulating support (**21**);
- a piezoelectric vibrator (**1**) including a plurality of electrodes (**23, 24**) and located on the insulating support (**21**); and
- an elastic annular holder (**22**) having an essentially L-shaped cross section for holding down the periphery of the piezoelectric vibrator (**1**), said elastic annular holder (**22**) being fitted to the insulating support (**21**), a plurality of connecting electrode members (**23, 24**) being mounted on the vibrator support (**27**) and each of the connecting electrode members (**23, 24**) being pressed against the corresponding electrodes (**2B, 2A**) of the piezoelectric vibrator (**1**);
- the distal end surface of the vibrator support (**27**) being inclined so that the vibrator (**1**) is inclined.

5,021,702
ELECTRON BEAM APPARATUS INCLUDING A PLURALITY OF ION PUMP BLOCKS

Motosuke Miyoshi, Fujisawa, and Katsuya Okumura, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

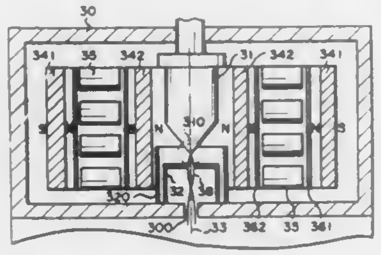
Division of Ser. No. 80,668, Aug. 3, 1987, Pat. No. 4,890,029. This application Aug. 15, 1989, Ser. No. 374,813

Claims priority, application Japan, Aug. 20, 1986, 61-194588

The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.

Int. Cl.^{5} H01J *7/16*

U.S. Cl. 313—7 2 Claims



1. An electron beam apparatus comprising:
- a vacuum chamber;
- an electron gun having an electron beam emitting portion located within the vacuum chamber;
- an ion pump comprising a plurality of ion pump blocks arranged in an array around said electron gun, each of said ion pump blocks comprising cylindrical positive electrodes, negative getter electrodes located one at each side of each of said positive electrodes, and magnetic field creating means for producing, in the area of said positive electrodes, a magnetic field containing magnetic field componets parallel to the longitudinal axis of said electron gun, said electron gun being located at a center region of said array at which the strength of said magnetic field is substantially at a minimum;
- a magnetic shield member located around said electron beam emitting portion of said electron gun; and
- wherein said magnetic field creating means comprises a pair of ring-like magnets between which said positive electrodes and said negative getter electrodes are enclosed.

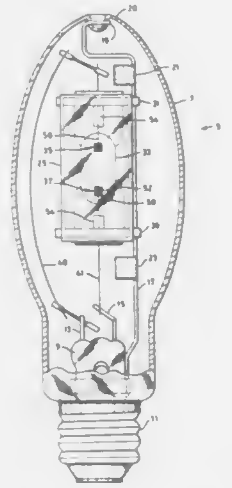
5,021,703
METAL HALIDE LAMP

Edmund M. Passmore, Gloucester, and William M. Keeffe, Rockport, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Jun. 6, 1989, Ser. No. 361,884

Int. Cl.^{5} H01J *61/12, 61/20*

U.S. Cl. 313—25 9 Claims



1. A metal halide discharge lamp comprising:
- an outer sealed glass envelope;
- a pair of electrical conductors sealed into and passing through the glass envelope;
- an arc tube disposed within the outer glass envelope, the arc tube (having a volume of 0.3–2.2 cm^3 and) including a pair of spaced electrodes therein with the electrodes being electrically connected to the electrical conductors such that one electrode is electrically connected to one electrical conductor;
- a chemical fill disposed within the arc tube, said chemical fill consisting essentially of about 12 mg/cm^3 mercury; about 0.1 mg/cm^3 scandium metal; about 1 mg/cm^3 scandium iodide; about 8 mg/cm^3 sodium iodide; about 0.4 mg/cm^3 cesium iodide; 100 torr starting gas; and greater than zero, but less than 0.5% carbon monoxide by volume; and
- a support structure disposed within the outer glass envelope to support the arc tube therein.

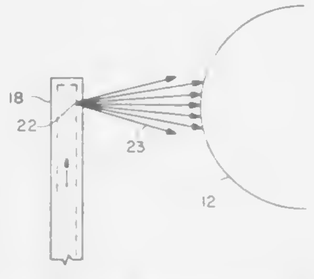
5,021,704
METHOD AND APPARATUS FOR COOLING ELECTROLEDELESS LAMPS

Delroy O. Walker, Hyattsville, Md., and Demetri P. Telionis, Blacksburg, Va., assignors to Fusion Systems Corporation, Rockville, Md.

Filed Feb. 21, 1990, Ser. No. 482,534

Int. Cl.^{5} H01J *7/26, 61/52*

U.S. Cl. 313—35 18 Claims



1. Apparatus for cooling an electrodeless lamp having a lamp envelope which becomes extremely hot during operation, said lamp containing a plasma-forming medium and being mounted within a chamber for containing radiation for energizing said plasma-forming medium, said apparatus comprising:
- means for providing a source of cooling gas under pressure;
- conduit means for carrying said cooling gas from said source of cooling gas into said chamber and in the vicinity of said lamp envelope; and,
- cooling gas outlet port means in a wall of said conduit means, said outlet port means comprising a slotted orifice in said wall, said orifice being oriented for directing a stream of cooling gas toward said lamp envelope.

5,021,705
METHOD OF FABRICATING AN IMAGE PICK-UP TUBE AND TARGET SECTION USED THEREWITH

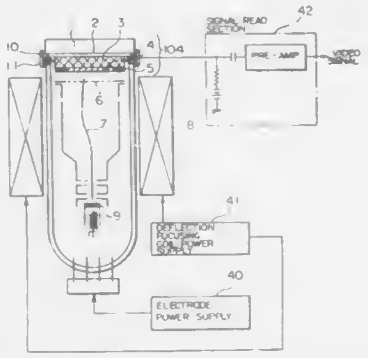
Masanao Yamamoto; Takaaki Unnai; Shigeru Ehata, all of Mobara; Tadaaki Hirai, Koganei; Kenji Sameshima, Hachioji; Eikiyu Hiruma, Komae; Shirou Suzuki, Yokosuka; Kenkichi Tanioka, Tokyo; Junichi Yamazaki, Kawasaki, and Keiichi Shidara, Tama, all of Japan, assignors to Hitachi Ltd. and Nippon Hoso Kyokai, both of Tokyo, Japan

Filed May 24, 1989, Ser. No. 357,513

Claims priority, application Japan, May 27, 1988, 63-128343

Int. Cl.^{5} H01J *31/08;* **B05D** *5/06, 5/12*

U.S. Cl. 313—106 23 Claims



1. An image pick-up tube comprising a target section including at least a conductive film and a photoconductive film on a substrate for photo-electric conversion, and an electron beam scanning system for reading a signal from the target section, wherein at least a part of the surface area outside the effective scanning region of the electron beam scanning side of the target section is formed of a secondary electron emission dampening porous layer.

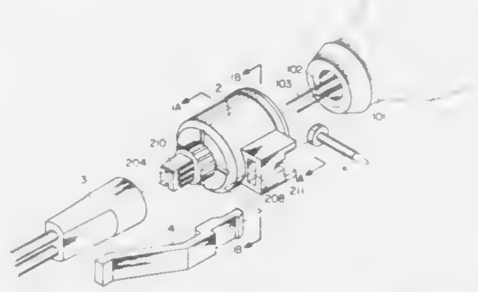
5,021,706
MODIFIED X'MAS LAMP STRUCTURE AND ITS RELATED LAMP BASE

Ming-Hsiung Chen, 7F, 16, Alley 3, Lane 227, Nung-An St., Taipei, Taiwan

Filed Jan. 23, 1989, Ser. No. 299,766

Int. Cl.^{5} H01J *5/56, 5/60*

U.S. Cl. 313—318 2 Claims



1. A X'mas lamp and its related lamp base, including:
- a lamp bulb comprising a top and bottom with a circular concave portion near its bottom and a cylindrical end at its bottom;
- a lamp base made of fire-proof and resilient material, comprising a connecting slot at one end, said connecting slot having a conically circular flange on the inner wall to retain said circularly concave portion of said lamp bulb, a stop member at the bottom of said connecting slot to let the distance from said stop member to said conically circular flange be slightly longer than the total length from said circularly concave portion of said lamp bulb to the extreme bottom end of said lamp bulb, a water-proof ring bumper located adjacent to the stop member, having a soft and resilient ring portion at the top to slightly protrude beyond said stop member, a cylindrical slot located below said water-proof ring bumper for receiving the cylindrical end of said lamp bulb, two power line inlet holes defined in a connecting chamber at the end of lamp base opposite end which receives said lamp bulb arranged in a conical shape, a partition wall between said two power line inlet holes arranged for insertion into said cylindrical slot;
- a socket, for connecting with the connecting member of said lamp base;
- a bracket for mounting on an indentation of said lamp base to match with said socket to form a clamping means, said indentation having a slot;
- a nail provided to match with said lamp base for fixation of the whole assembly with its nail head held in said slot of said indentation of said lamp base;
- said lamp and its related lamp base forming a water-proof lamp assembly for hanging by means of said bracket with said lamp bulb upwardly disposed and for fixation to any place with said lamp bulb downwardly disposed.

5,021,707
COLOR PICTURE TUBE HAVING SHADOW MASK WITH IMPROVED SUPPORT

Richard C. Bander, Lancaster, Pa., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Nov. 17, 1989, Ser. No. 437,577

Int. Cl.^{5} H01J *29/07*

U.S. Cl. 313—402 **2 Claims**

1. In a color picture tube including a rectanglar faceplate panel having two long sides and two short sides, a rectangular

VOL
1127
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1991
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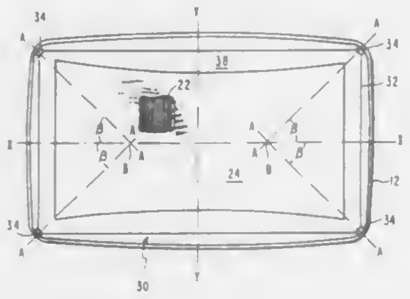
shadow mask being suspended at its four corners by support means within said panel adjacent to a cathodoluminescent screen located on said panel, said tube having three principal axes that are mutually orthogonal to each other, said axes being a longitudinal axis which extends through the center of said tube perpendicularly to the center of said panel, a major axis which passes through the center of said panel paralleling the long sides of said panel, and a minor axis which passes through the center of said panel paralleling the short sides of said panel, each of said support means having a central support axis, the improvement comprising



- the two support axes on each side of said minor axis crossing a plane containing said longitudinal and major axes at a point located between the minor axis and a short side of said panel,
- said screen having an aspect ratio of approximately 16 by 9, and
- each of the support axes forming an angle of about 33 degrees to about 50 degrees with the plane containing said major and longitudinal axes.

5,021,708

CATHODE FOR EMISSION OF ELECTRONS AND ELECTRON TUBE WITH A CATHODE OF THIS TYPE

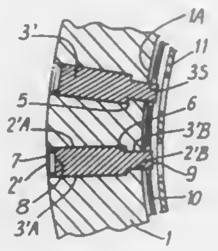
Pierre Nugues, Auneau; Henri Desmur, Sevres, and José Florentin, Paris, all of France, assignors to Thomson-Csf, Puteaux, France

Filed Jun. 27, 1989, Ser. No. 372,823

Claims priority, application France, Jul. 5, 1988, 88 09065

Int. Cl.^{5} H01J *29/04, 29/48*

U.S. Cl. 313—446 **10 Claims**



1. An electron gun comprising one or more grids and a cathode, wherein said cathode has a body made of a metallic or dielectric material which does not emit electrons, having a non-emissive face, elements made of emissive material attached mechanically to said body, each emissive element having an emissive surface, said emissive elements being spaced out from one another according to a determined, desired configuration in such a way that all the beams emitted are particularly suited to a linear beam tube, and wherein said emissive elements are fixed to said body with their emissive surface in relief by a determined value with respect to said non-emissive face of the body, so that said value is sufficient to enable said emissive elements to go beyond a metallic grid placed in the vicinity of but not in mechanical contact with the surface of said body.

5,021,709

SUPPORTING STRUCTURE FOR AN ELECTRON GUN HEATER

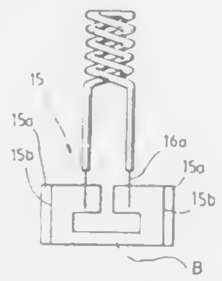
Tae-sik Oh, Suwon, Rep. of Korea, assignor to Samsung Electron Devices Co. Ltd., Rep. of Korea

Filed Jan. 8, 1990, Ser. No. 461,914

Claims priority, application Rep. of Korea, Jun. 5, 1989, 89-7827

Int. Cl.^{5} H01J *29/82, 9/18*

U.S. Cl. 313—456 5 Claims



1. An electron gun heater supporting structure comprising:
- a pair of supporting pieces, each supporting piece being mounted on a different one of two opposing glass beads of an electron gun; and
- a U shaped connecting piece disposed between the pair of supporting pieces for welding the terminals of a heater thereto and for welding at opposing ends to the pair of supporting pieces, said supporting pieces including position determining means for determining the position of the ends of the connecting piece relative to the pair of supporting pieces for welding the connecting piece to the pairs of supporting pieces.

5,021,710

INSECT ATTRACTION LAMP

James D. Nolan, 16 Pickett Ave., Spencer, N.C. 28159

Filed May 2, 1990, Ser. No. 517,726

Int. Cl.^{5} H01J *1/62, 61/35, 61/40;* **H01K** *1/26*

U.S. Cl. 313—489 3 Claims

1. Insect attraction lamp, comprising:
- lamp means for transmitting black light perceptible to insects as an attractant;
- coating means providing said lamp means with a safety coating for containing debris produced upon said lamp being broken and for allowing transmission of said black light therethrough; and
- said coating means including about 99% by weight of plastic coating material, about 0.5% by weight of UV stabilizer and about 0.3% by weight of at least one antioxidant.

5,021,711

QUARTZ LAMP ENVELOPE WITH MOLYBDENUM FOIL HAVING OXIDATION-RESISTANT SURFACE FORMED BY ION IMPLANTATION

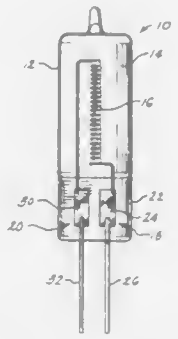
Sandra L. Madden, Lynnfield; Mark D. Beschle, Beverly, and Roy C. Martin, Peabody, all of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Oct. 29, 1990, Ser. No. 608,592

Int. Cl.^{5} H01J *17/18, 61/36, 9/32*

U.S. Cl. 313—623 24 Claims

1. A lamp assembly comprising:
- a quartz lamp envelope that encloses a sealed lamp interior, said lamp envelope including a press seal;
- at least one treated molybdenum foil electrical feedthrough extending through said press seal to said lamp interior, said treated molybdenum foil having an oxidation-inhibiting material embedded in a surface layer thereof by means of an ion implantation process, the thickness of said treated molybdenum foil being no greater than the thickness of said molybdenum foil before being so treated.



5,021,712

APPARATUS FOR COMPENSATING FOR IMAGE ROTATION IN A CRT DISPLAY

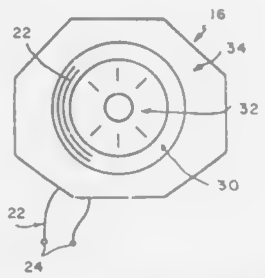
Robert M. Sands, Tyngsboro, and John J. Fitzgerald, Leominster, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 195,401, May 13, 1988, Pat. No. 4,899,082, which is a continuation of Ser. No. 30,459, Mar. 25, 1987, abandoned. This application Nov. 29, 1989, Ser. No. 443,663

The portion of the term of this patent subsequent to Feb. 6, 2007, has been disclaimed.

Int. Cl.^{5} H01J *29/06*

U.S. Cl. 315—8 3 Claims



1. A deflection apparatus for use with a cathode ray tube, said cathode ray tube including an electron gun and a screen, said gun for emitting an electron beam along a path toward said screen, said apparatus for deflecting said beam to form an image on said screen, said apparatus being subject to an external magnetic field that tends to interfere with the deflection of said electron beam, said apparatus comprising:

A. deflection yoke means, said yoke means for attachment to said cathode ray tube, said yoke means having a first end and a second end, said first end including a recessed area.
   1. said yoke means further including a conductive winding having first and second ends, said winding being substantially disposed in said recessed area, said winding oriented substantially transverse to said path; and

B. Control means, said control means coupled to said first and second ends of said winding, said control means for producing a compensation current which is conducted through said winding, said compensation current producing a compensating magnetic field for substantially canceling said external magnetic field.

5,021,713

MAGNETRON

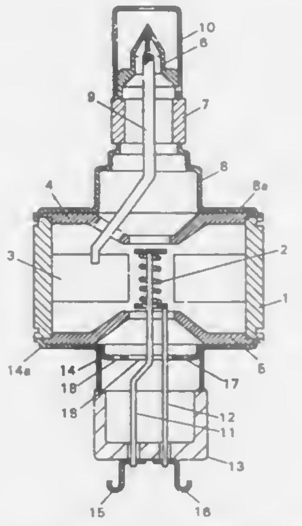
Kaoru Uesawa, and Yoshlo Abe, both of Utsunomiya, Japan, assignors to Matsushita Electronics Corporation, Kadoma, Japan

Filed Apr. 14, 1989, Ser. No. 338,022

Claims priority, application Japan, Apr. 25, 1988, 63-102133; Apr. 27, 1988, 63-104563; May 17, 1988, 63-119596

Int. Cl.^{5} H01J *25/50*

U.S. Cl. 315—39.51 9 Claims



1. A magnetron comprising an anode cylinder, a cathode that is disposed within said anode cylinder, a pair of magnetic pole pieces that are disposed one each over the openings of both ends of said anode cylinder, a stem insulator that seals the openings of one end of said anode cylinder so as to cover said magnetic pole piece at the opening of the end of said anode cylinder with a metal tube, and a pair of cathode supporting bars that pass through said stem insulator in an air tight fashion, wherein said metal tube is provided with a circular metal piece surrounding said cathode supporting bas and said metal piece is provided with a slot for the decay or reflection of fundamental components or any of the harmonic components of oscillating microwaves, said slot has an electrical length that corresponds to about ¼ or ½ of the wavelength of said fundamental components or any of the harmonic components of oscillating microwaves.

5,021,714

CIRCUIT FOR STARTING AND OPERATING FLUORESCENT LAMPS

Dail L. Swanson, and Shannon Edwards, both of Danville, Ill., assignors to Valmont Industries, Inc., Valley, Nebr.

Filed May 10, 1990, Ser. No. 521,377

Int. Cl.^{5} H05B *41/14, 41/36*

U.S. Cl. 315—101 **4 Claims**

1. A circuit for starting and operating one or more fluorescent lamps from an a-c sine wave electrical power source of given frequency, comprising reactive ballast means connected in series with said power source and said lamps and having a non-linear characteristic for producing a plurality of harmonics of said given frequency, a cathode heating transformer comprising a primary winding and secondary windings for connection to the cathodes of said lamps, a capacitor connected in series with said primary winding, means connecting one or both of said series-connected capacitor and primary winding across said lamps, the combined reactance of said capacitor and said primary winding being at least partially in resonance, in cooperation with inductance of said reactive ballast means, over a frequency range simultaneously encompassing a plurality of said harmonics of the given power source

VOL
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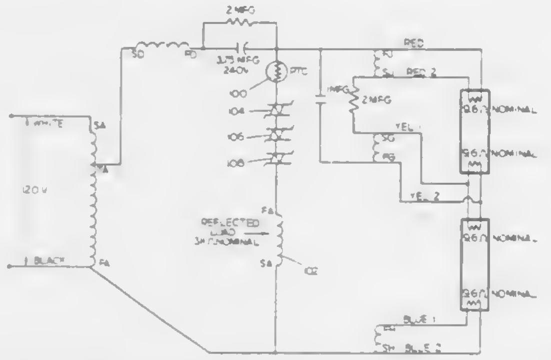
frequency, and a plurality of series connected switches interposed in series with said series-connected capacitor and primary winding, said switches being closed during starting of said lamps to cause said resonance and to cause heating of said cathodes, and said switches being open after starting of and during operation of said lamps.

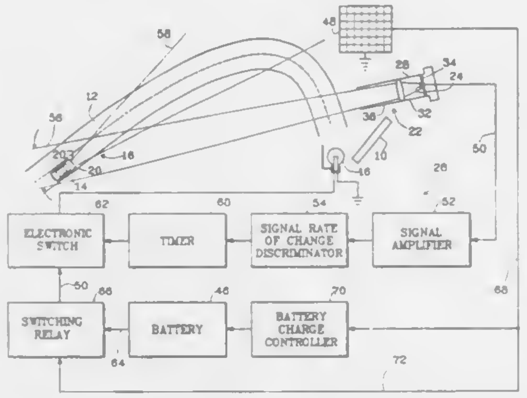


5,021,715
LIGHTING SYSTEM FOR ROADSIDE SIGNS
Norman D. Smith, and Dresden G. Smith, both of 1621 English Dr., San Jose, Calif. 95129-4807

Continuation-in-part of Ser. No. 149,690, Jan. 28, 1988, abandoned. This application Apr. 3, 1989, Ser. No. 332,617

Int. Cl.⁵ B60Q *1/02;* **H05B** *41/36*

U.S. Cl. 315—159 13 Claims



1. A system for illuminating a roadside sign in response to a vehicle passing along the road, comprising a lighting means for illuminating the sign and a telescopic switch means including;

circuit means adapted for transmitting a control signal to actuate the lighting means,

photocell means coupled with the circuit means for initiating the control signal, and

telescopic means providing focused optical communication between the photocell means and a selected portion of the road at a substantially distant location of at least ¼ of a mile whereby light from a vehicle passing along the selected road portion is sensed by the photocell means in order to initiate the control signal for actuating the lighting means,

the telescopic means further comprises a lens means optically associated with the photocell means, the lens means having a defined field of view, and means for focusing the field of view of the lens means on the selected road portion whereby the system is entirely remote from the road,

the telescopic means further comprises means for aiming the lens means to have its field of view coincide with the selected road portion,

the telescopic means further comprises means for shielding the photocell means from extraneous light sources outside of the field of view for the lens means,

the shielding means comprises an elongated tube extending from the lens means and encompassing its field of view,

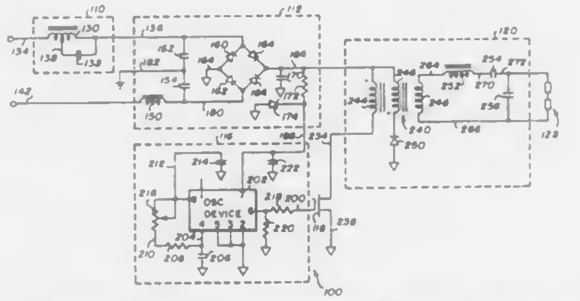
the telescopic switch means further comprises a housing which acts in combination with the lens means to enclose the photocell means.

5,021,716
FORWARD INVERTER BALLAST CIRCUIT
Ronald A. Lesea, Redwood City, Calif., assignor to GTE Products Corporation, Danvers, Mass.

Filed May 18, 1990, Ser. No. 525,591

Int. Cl.⁵ H05B *41/36*

U.S. Cl. 315—219 7 Claims



1. A ballast circuit for driving at least one gaseous discharge lamp (**128**), the ballast circuit comprising in combination:

means (**112**) for developing a DC power-supply potential (**186**) with respect to a circuit common (**236**);

an oscillator (**116**) for generating a high-frequency oscillator signal (**200**);

a line (**234**);

a transistor (**118**) connected to said oscillator (**116**), to said line (**234**), and to said circuit common (**236**), said transistor being configured as a switch responsive to said oscillator generated signal (**200**) and operative to periodically couple said line (**234**) to said circuit common (**236**); and

a current-limiting network (**120**) including,

- a diode (**250**),
- a transformer (**240**) including a transformer primary winding (**244**) connected between said DC power-supply potential (**160**) and said line (**234**), a first, tightly-coupled, transformer secondary winding (**246**) connected in series with said diode (**250**) between said DC power-supply potential (**186**) and said circuit common (**236**), and a second transformer secondary winding (**248**),
- means having inductive reactance at said high frequency (**252**), and
- capacitor means (**256**) connected in series with said inductive reactance means (**252**) across said second transformer secondary winding (**248**) and for connection across said lamp (**128**).

5,021,717
OPERATING SYSTEM FOR MULTIPLE FLUORESCENT LAMPS
Ole K. Nilssen, Caesar Dr. Route 5, Barrington, Ill. 60010

Filed Oct. 2, 1989, Ser. No. 418,744

The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.

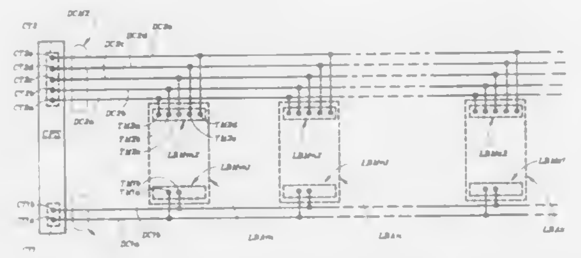
Int. Cl.⁵ H05B *41/14, 41/36*

U.S. Cl. 315—324 28 Claims

1. In a lighting apparatus adapted to be powered from an ordinary electric utility power line, the improvement comprising:

central power supply connectable with said power line and operable to provide at a first output a first AC voltage and at a second output a second AC voltage, said power supply having a control input and being operative to reduce the magnitude of said first AC voltage after having received at said control input a control signal for longer than a certain period of time, said first and second outputs and said control input being connected with a set of central terminals;

a plurality of lamp-ballast assemblies, each such assembly having: i) a set of at least four assembly terminals, ii) a fluorescent lamp means having thermionic cathodes and a pair of main lamp power input terminals, each cathode having a pair of cathode terminals, iii) transformer means connected in circuit between a first pair of said assembly terminals and said cathode terminals, iv) an L–C series-circuit having an inductor means and a capacitor means and being resonant at or near the frequency of said second AC voltage, said L–C series-circuit being connected across a second pair of said assembly terminals, said main lamp power terminals being effectively connected in parallel with said capacitor means, v) voltage-clamping means effectively connected in parallel with said capacitor means and operative to cause clamping of the voltage developing thereacross so as to prevent its magnitude from becoming excessively large, and vi) sensing means conected with the voltage-clamping means and operative to provide said control signal at a control output whenever said voltage-clamping means acts to cause said clamping, said control output being connected with a third pair of said assembly terminals, and



distribution conductor means operative, for each lamp-ballast assembly, to provide connection between said central terminals and said assembly terminals;

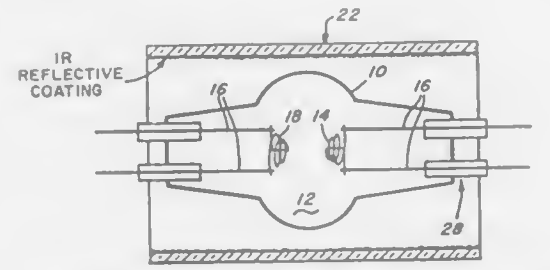
whereby the central power supply is operative to: i) provide cathode heating power to said cathodes, ii) provide lamp operating power to said lamp means, and iii) reduce the magnitude of said first AC voltage if in any one of the plurality of lamp-ballast assemblies said clamping occurs for longer than said certain period of time.

5,021,718
NEGATIVE GLOW DISCHARGE LAMP
Jakob Maya, Brookline, Mass.; Joseph D. Michael, University Heights, Ohio, and Radomir Lagushenko, Brookline, Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Feb. 1, 1990, Ser. No. 473,511

Int. Cl.⁵ H01J *17/00*

U.S. Cl. 315—358 14 Claims



1. In a negative glow discharge lamp including a light transmitting envelope having supported therein electrode means including a cathode for establishing a negative glow discharge in the lamp, the improvement comprises a fill material including a metal-based gas which upon excitation thereof directly emits visible light, said metal having a resonance radiation in the visible part of the spectrum, and means for operating the cathode in a hot mode to provide enhanced electron emission at enhanced electron density.

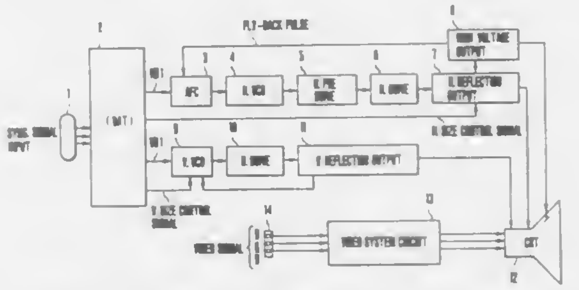
5,021,719
DISPLAY
Ikuya Arai; Kouji Kitou, both of Yokohama, and Michitaka Ohsawa, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 12, 1989, Ser. No. 448,980

Claims priority, application Japan, Dec. 23, 1988, 63-323519

Int. Cl.⁵ H01J *29/70, 29/72*

U.S. Cl. 315—364 6 Claims



1. A display apparatus for displaying pictures carried by at least one of several types of input video signals each containing inherent synchronization signals by automatically displaying a picture with predetermined size and position on a display screen for each type of said input video signal, said inherent synchronization signals are of at least three types with a first type synchronization signal composed of a composite synchronization signal superimposed on a primary color signal, a second type synchronization signal composed of opposite polarity horizontal and vertical synchronization signals and a third type synchronization signal composed of separate horizontal and vertical synchronization signals, said display apparatus comprising:

a horizontal deflection circuit means for controllably performing a horizontal scanning operation;

a vertical deflection circuit means for controllably performing a vertical scanning operation;

synchronization signal processing means for receiving any one of said types of input video signals and for producing horizontal and vertical synchronization signals corresponding to said inherent synchronization signals included in received input video signals, with said synchronization signal processing means including first-type horizontal/-vertical separation means for producing the corresponding horizontal and vertical synchronization signals from said first type synchronization signal, second-type horizontal/vertical separation means for horizontal and vertical synchronization signal separation and polarity-unification for producing the corresponding horizontal and vertical signals from the selected one of the second and the third type synchronization signals, and synchronization detection means for detecting said second type synchronization signal to enable horizontal and vertical signal separation and polarity-unification of said second type synchronization signal and for detecting said third type synchronization signal to enable polarity unification of said third type synchronization signal;

memory means for storing predetermined picture size and position control information, which includes horizontal display size control data, vertical display size control data, horizontal synchronization signal phase control data for determination of horizontal display positions and vertical

VOL 1127
ISS 1
JE 4
1991
UMI

synchronization signal phase control data for determination of vertical display positions, respectively corresponding to horizontal and vertical synchronization signals produced from said types of input video signals;

control processing means responsive to a horizontal frequency and a vertical frequency of the horizontal synchronization signal and the vertical synchronization signal produced by said synchronization signal processing means, for reading the respective size control data and phase control data from said memory means and outputting corresponding control signals to control said horizontal deflection circuit and to control said vertical deflection circuit to display a picture from the received input video signal with a predetermined size and position on said display screen.

5,021,720
DISPLAY APPARATUS OF THE CATHODE RAY TUBE TYPE

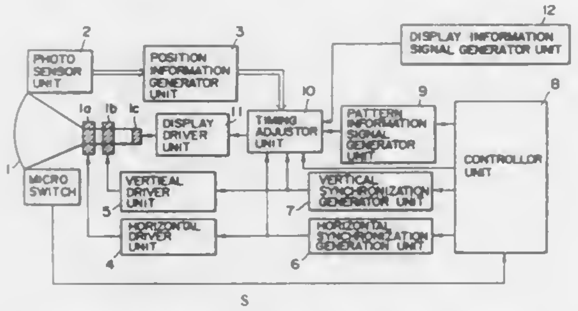
Harutsugu Aimura, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 912,381, Sep. 26, 1986, abandoned. This application Aug. 16, 1989, Ser. No. 394,142

Claims priority, application Japan, Oct. 1, 1985, 60-216252

Int. Cl.^{5} H01J *29/56*

U.S. Cl. 315—370 **20 Claims**


2
3
12
PHOTO SENSOR UNIT
POSITION INFORMATION GENERATOR UNIT
DISPLAY INFORMATION SIGNAL GENERATOR UNIT
10
9
8
1a
1b
1c
11
DISPLAY DRIVER UNIT
TIMING ADJUSTOR UNIT
PATTERN INFORMATION SIGNAL GENERATOR UNIT
CONTROLLOR UNIT
1
MICRO SWITCH
VERTIEAL DRIVER UNIT
VERTICAL SYNCHRONIZATION GENERATOR UNIT
5
7
HORIZONTAL DRIVER UNIT
HORIZONTAL SYNCHRONIZATION GENERATION UNIT
4
6
S

1. A display apparatus of a cathode ray tube comprising:

detecting means for detecting an amount of deviation of an image displayed on a screen of a cathode ray tube from a reference position on said screen, with the deviation being due to the geomagnetism; and

means for adjusting a phase of a signal of display information for a synchronization signal of the cathode ray tube so that the display information is displayed at the reference position on said screen on the basis of the result of the detection by said detecting means.

5,021,721
ELECTRIC POWER STEERING SYSTEM FOR A MOTOR VEHICLE

Saiichiro Oshita; Toyohiko Mouri, and Tsutomu Takahashi, all of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 27, 1989, Ser. No. 441,261

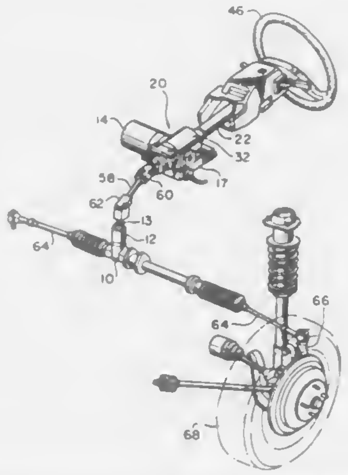
Claims priority, application Japan, Nov. 30, 1988, 63-155849[U]

Int. Cl.^{5} B62D *5/04*

U.S. Cl. 318--432 **6 Claims**

1. An electric power steering system for an automobile having wheels, a steering wheel, a steering shaft operatively connected to said steering wheel, a stub shaft coaxially jointed to an end of said steering shaft, a torsion torque sensor incorporated with said steering shaft and said stub shaft to detect a torsion torque in said steering shaft during a steering operation and to produce a corresponding torsion torque signal, a housing provided to house said torsion torque sensor and to rotatably mount said steering shaft and said stub shaft, an electric motor secured to said housing, a transmission mechanism provided to selectively connect said electric motor with said stub shaft to transmit rotation of said electric motor to said stub shaft, and means for steering said wheels in accordance with rotation of said stub shaft, comprises:

a control unit integrally mounted on and secured to said housing and provided to produce a drive signal to control said electric motor in response to said torsion torque signal; and whereby easy and simple assembling of the system without additional couplers and enhanced reliability is obtained.



5,021,722
COMPOSABLE PROTECTION AND CONTROL APPARATUS FOR MOTORS

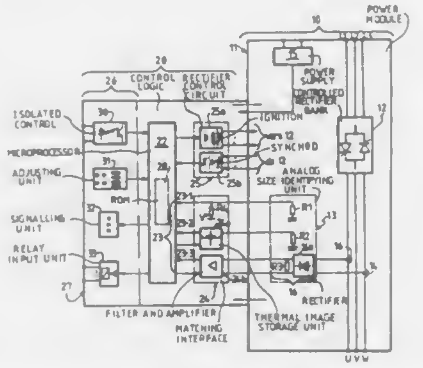
Laurent Llerena, Bougival, and Michel Loiselay, Palaiseau, both of France, assignors to Telemecanique, France

Filed Feb. 20, 1990, Ser. No. 481,535

Claims priority, application France, Feb. 21, 1989, 89 02216

Int. Cl.^{5} H02P *7/00*

U.S. Cl. 318—434 6 Claims



1. A system for supplying a controlled current to alternating current motors of various sizes and working characteristics, said system comprising:

(i) a first case housing including,
  a bank of semiconductor controlled rectifiers;
  input means connecting said bank to mains terminals;
  output means connecting said bank to motor terminals, said output means including current sensors;
  analog size identifying means for generating identifying signals indicative of the size of the motor, and
  power supply circuit means;
(ii) a second case removably secured to said first case, said second case housing including,
  first circuit means for controlling the respective semiconductor controlled rectifiers of said bank as a function of order signals;
  processor means for generating said order signals as a function of said identifying signals, said processor means being connected to said first circuit means, and
  analog-to-digital converter means connecting said size identifying means to said processor means,
  said first circuit means, processor means and analog-to-digital converter means being connected to said power supply cirucit means.

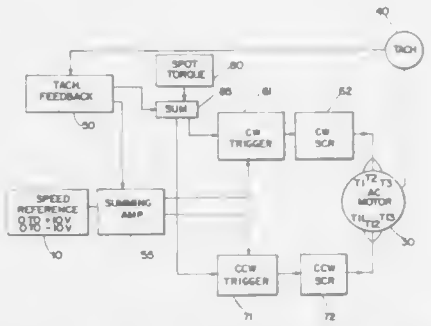
5,021,723
AC MOTOR CONTROL

George A. Ralph, 1140 Detwiler Dr., and Charles R. Holtzinger, 417 N. George St., both of York, Pa. 17404

Filed Apr. 5, 1990, Ser. No. 505,233

Int. Cl.^{5} H02P *3/20*

U.S. Cl. 318—756 1 Claim



1. An AC motor and motor control system comprising:

an AC motor (30) having first and second separate, electrically isolated windings,

wherein said first winding has three winding portions (T1, T2, T3) located therein to generate clockwise rotation of a rotor,

wherein said second winding has three winding portions (T11, T12, T13) located therein to generate counterclockwise rotation of a rotor,

means (40) to measure motor speed and to generate a first signal sent to a feedback station (50),

speed reference control means (10) for generating a second signal indicative of desired motor speed,

first summing means (55) for receiving said first signal and said second signal and for comparing said signals,

wherein said first summing means (55) controls a clockwise trigger (61) and associated clockwise SCR bank (62) to supply a desired voltage and current to said clockwise winding portions (T1, T2, T3)

wherein said first summing means (55) further controls a counter-clockwise trigger (71) and associated clockwise SCR bank (72) to supply a desired voltage and current to said counter-clockwise winding portions (T11, T12, T13),

means wherein said AC motor (30) is controlled without the need for mechanical braking elements or lock-out systems,

a second summing means (85) for receipt of a spot torque signal (80) as the motor (30) slows to near zero, RPM,

said second summing means (85) also receiving a signal from said feedback station (50),

wherein said second summing means (85) is connected to said clockwise trigger (61) and associated SCR bank (62),

wherein said second summing means (85) is further connected in parallel to said counter-clockwise trigger (71) and associated SCR bank (72),

means wherein said clockwise winding portions (T1, T2, T3) and said counter-clockwise winding portions are activated simultaneously via said second summing means (85),

wherein said first summing means (55) receives a DC signal from said feedback station (50) indicative of existing motor (30) speed and a DC signal indicative of desired motor speed from said speed reference control means (10),

wherein said means (40) to measure motor speed and to generate a signal sent to a feedback station (50) comprises a tachometer,

wherein said first summing means (55) for receiving and comparing said signals comprises a summing amplifier,

wherein said second summing means (85) comprises a summing amplifier,

wherein said feedback station (50) comprises a tachometer feedback station means for receiving a signal from said tachometer and for generating a DC signal indicating motor speed to be fed to said first summing means (55).

5,021,724
CONTROLLING APPARATUS FOR INDUCTION MOTOR

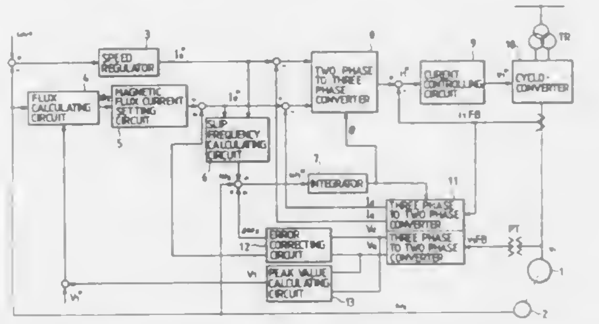
Yasuhiro Hirano; Mitunori Yamashina, both of Hitachi, and Tetsuo Etoh, Takahagi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 7, 1990, Ser. No. 609,760

Claims priority, application Japan, Nov. 25, 1989, 1-305795

Int. Cl.^{5} H02P *5/40*

U.S. Cl. 318—800 7 Claims


3
8
9
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TR
SPEED REGULATOR
TWO PHASE TO THREE PHASE CONVERTER
CURRENT CONTROLLING CIRCUIT
CYCLO-CONVERTER
4
FLUX CALCULATING CIRCUIT
MAGNETIC FLUX CURRENT SETTING CIRCUIT
5
SLIP FREQUENCY CALCULATING CIRCUIT
FB
6
7
INTEGRATOR
11
THREE PHASE TO TWO PHASE CONVERTER
12
ERROR CORRECTING CIRCUIT
THREE PHASE TO TWO PHASE CONVERTER
FB
PT
PEAK VALUE CALCULATING CIRCUIT
13
1
2

1. A controlling apparatus for an induction motor comprising,

an induction motor,

a converter for supplying an electric power to the induction motor,

a detector for detecting a rotational speed of the induction motor,

a means for controlling the converter so as to hold a torque of the induction motor constant while the rotational speed of the induction motor is lower than a predetermined speed and to decrease a secondary magnetic flux of the induction motor according to the rotational speed while the rotational speed of the induction motor is over the predetermined speed, and

a means for varying the secondary magnetic flux according to a terminal voltage of the induction motor so as to hold the terminal voltage a predetermined constant voltage while the rotational speed of the induction motor is higher than the predetermined speed.

5,021,725
CIRCUIT ARRANGEMENT FOR PREVENTING INDUCTIVE INTERFERENCE IN AN ELECTRIC CAR

Yoshiji Jimbo, and Tsutomu Ozawa, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 27, 1989, Ser. No. 441,640

Claims priority, application Japan, Nov. 29, 1988, 63-301300

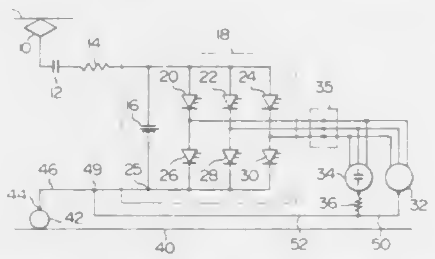
Int. Cl.^{5} H02P *5/00*

U.S. Cl. 318—801 5 Claims

1. A circuit arrangement in an electric car, the electric car including a truck having wheels adapted to be driven on a railway, power receiving means adapted to be connected to a feeder line for receiving DC power from a DC power supply connected to the feeder line, a ground terminal adapted to be connected to the railway through the wheels, a return line connected to the ground terminal, an inverter connected be-

VOL
1127
ISS
1
JE
4
1991
UMI

tween the power receiving means and the return line for converting the DC power received by the power receiving means into AC power and having output means for outputting the AC power, and a motor, the motor having a motor frame mounted on the truck, a rotary shaft mechanically connected to the wheels for driving the wheels, and a stator winding connected to the output means of the inverter to enable the motor to be driven by the AC power outputted by the output means so as to rotate the rotary shaft to drive the wheels, the circuit arrangement being for preventing a high-frequency signal current from being affected by inductive interference due to switching currents of the inverter flowing from switching elements of the inverter to the return line through a capacitance between the motor frame and the stator winding, the circuit arrangement comprising:



an electrically highly conductive conductor connecting the motor frame to the return line, the conductor being insulated from ground potential when the conductor is disconnected from the motor frame and the return line, and having an impedance smaller than an impedance of an electrical path from the motor frame through the wheels to the railway.

5,021,726
PROCESS FOR DRIVING AN ALTERNATING-CURRENT MOTOR AND AN ALTERNATING CURRENT MOTOR WHICH CAN BE DRIVEN IN ACCORDANCE WITH THIS PROCESS

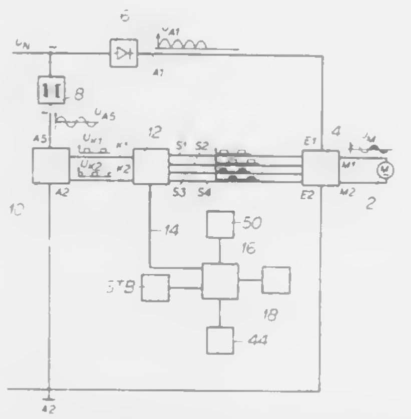
Wilhelm Reinhardt, Schrozberg-Gutbach, and Karl-Heinz Schultz, Ohringen-Cappel, both of Fed. Rep. of Germany, assignors to ebm Elektrobau Mulfingen GmbH & Co., Fed. Rep. of Germany

Filed Dec. 4, 1989, Ser. No. 445,986

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1988, 3841147

Int. Cl.^{5} H02P *7/63*

U.S. Cl. 318—811 **27 Claims**



1 Method for driving an AC motor with speed control, comprising the steps of:

pulse timing an AC motor voltage (U_M) into pulse-width modulatable voltage pulses with a constant clock pulse frequency lying outside the hearing range;

controlling the motor speed by pulse-width modulation of said voltage pulses;

obtaining the AC motor voltage (U_M) indirectly from a sinusoidal AC supply voltage (U_N) by rectifying said supply voltage (U_N) into a pulsating, unsmoothed DC voltage (U_{A1}) having sinusoidal half-waves; and

controlling the polarity reversal of said DC voltage in accordance with the frequency of the AC supply voltage by means of two time overlap-free output signals (U_{K1}, U_{K2}) obtained from said AC supply voltage, so that said motor-voltage (U_M) is essentially composed of the sinusoidal half-waves of said pulsating DC-voltage (U_{A1}).

12. A speed controller for a controllable alternating-current motor with at least one motor winding comprises a supply voltage bridge rectifier circuit, an output stage connected with the rectifier circuit and with electronic switching elements provided in the output stage, wherein the motor winding is connected to one bridge shunt arm of the output stage and with a driver arrangement which is connected with the output stage and which drives the electronic switching elements and with a pulse-width modulator, connected with the switching elements, characterized in that:

the rectifier circuit (6) has outputs (A1, A2) which are connected with inputs (E1, E2) of the output stage (4) so that said rectifier circuit rectifies AC supply voltage and produces an unsmoothed, pulsating Dc voltage (U_{A1}) with sinusoidal half waves is present at the inputs (E1, E2), the driver arrangement (10, 12) drives the electronic switching elements (T3 to T6) in accordance with the frequency of the ac supply voltage in such a way that at the outputs (M1, M2) of the output stage (4), connected with the motor winding (2), a motor AC voltage (U_M) is present which is composed of the sinusoidal half waves of the pulsating direct current voltage (U_{A1}), and wherein a control electrode (G) of one switching element in each (T5; T6) of the switching elements, which are driven in paris, indirectly connected with the pulse-width modulator (16), which synchronizes at a constant, pulse-width modulatable timing frequency, so as to provide selective speed control of the motor.

5,021,727
ELECTRIC POWER SUPPLY SYSTEM FOR MOTOR VEHICLE

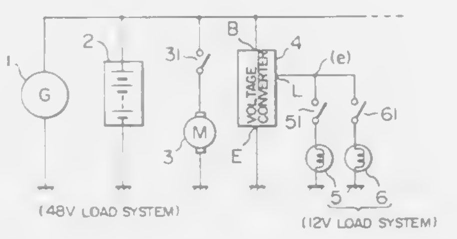
Keiichi Mashino, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 12, 1989, Ser. No. 296,002

Claims priority, application Japan, Jan. 18, 1988, 63-6953

Int. Cl.^{5} H02J *1/00*

U.S. Cl. 322—7 **33 Claims**



1. A power supply system for a motor vehicle equipped with an electric system including a first group of electrical loads having a relatively high rated voltage and a second group of electrical loads having a relatively low rated voltage, comprising:

a generator, provided with a voltage regulator, for producing an output voltage substantially equal to said high rated voltage at an output terminal, said output terminal being connected to said first group of electrical loads;

a switching element interposed between said output terminal of said generator and said second group of electrical loads; and

a duty cycle control circuit for generating a rectangular waveform signal having a predetermined duty ratio for turning on said switching element with a predetermined duty factor.

5,021,728
POWER SOURCE APPARATUS FOR ELECTRONIC EQUIPMENT

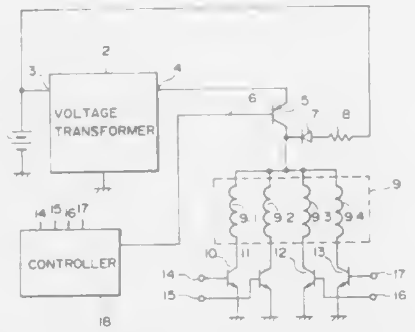
Shoji Sato, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 15, 1989, Ser. No. 437,034

Claims priority, application Japan, Nov. 17, 1988, 63-288831

Int. Cl.^{5} G05F *1/46*

U.S. Cl. 323—272 **15 Claims**



1. A power source apparatus used in electronic equipment, comprising:

a power source for supplying a power source voltage;

voltage transforming means for transforming the power source voltage supplied from said power source into a voltage different from the power source voltage;

driving means driven by one of the voltage output from said voltage transforming means and a voltage obtained directly from the power source voltage, said driving means being settable in one of first and second conditions;

switching means for switching between the voltage output from said voltage transforming means and the voltage obtained directly from the power source voltage and for supplying one of the voltage output from said voltage transforming means and the voltage obtained directly from said power source to said driving means; and

control means for switching said switching means to select the voltage output from said voltage transforming means when said driving means is in the first condition, and for switching said switching means to select the voltage obtained directly from the power source voltage when said driving means is in the second condition.

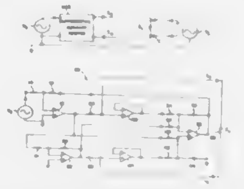
5,021,729
DIFFERENTIAL CURRENT SOURCE

John F. Sutton, Greenbelt, Md., assignor to The United States of America as represented by the Administrator of the Administration National Aeronautics and Space, Washington, D.C.

Filed Oct. 6, 1989, Ser. No. 418,373

Int. Cl.^{5} G05F *1/12*

U.S. Cl. 323—311 **15 Claims**



1. A current source including:

load driving means for driving a voltage-controlled current through a floating load, at any given instant, by equal and opposite potentials, from equal impedance sources included in said means, when said floating load is isolated from any circuit common;

means for connecting said load driving means to said floating load; and,

means for connecting said load driving means to a control voltage to provide said voltage-controlled current through said floating load,

said load driving means further including feedback control means for sensing current in said floating load and for feeding back a signal proportional to said sensed load current to provide, in turn, a current in said load which is independent of the impedance of said load and responsive to said control voltage;

whereby common mode voltages applied to said floating load are insubstantial sources of error.

5,021,730
VOLTAGE TO CURRENT CONVERTER WITH EXTENDED DYNAMIC RANGE

Michael D. Smith, Lewisville, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Filed May 24, 1988, Ser. No. 198,163

Int. Cl.^{5} G05F *3/24*

U.S. Cl. 323—316 **25 Claims**

1. An apparatus for converting a voltage signal at an input terminal to a current signal at an output terminal, comprising:

a first differential amplifier having a negative coupled to said input terminal;

a first transistor and a second transistor, the sources of which are coupled to a first power supply voltage, the gates of which are coupled to an output of said first differential amplifier, the drain of said first transistor being coupled to a positive input of said first differential amplifier, and the drain of said second transistor being coupled to said output terminal; and

a first resistive element coupled between the drain of said first transistor and a reference voltage;

wherein said first transistor and said second transistor have different gate dimensions.

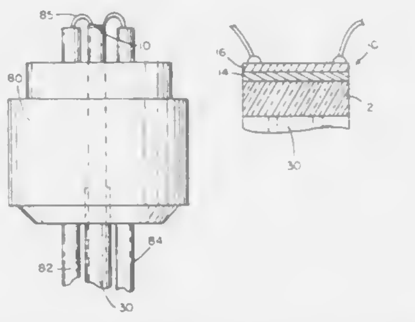
5,021,731
THERMO-OPTICAL CURRENT SENSOR AND THERMO-OPTICAL CURRENT SENSING SYSTEMS

Elric W. Saaski, Bothell, and Dale M. Lawrence, Lynnwood, both of Wash., assignors to Metricor, Inc., Woodinville, Wash.

Filed Feb. 21, 1989, Ser. No. 313,631

Int. Cl.^{5} G01R *5/22;* **G01K** *11/12*

U.S. Cl. 324—96 **23 Claims**



1. A thermo-optical current sensor for measuring the current flowing between a pair of conductors, comprising:

an optical-sensing element having a resistive or semiconducting electrical property and an optical property that is a function of the temperature of said sensing element, said pair of conductors being connected between spaced apart

VOL 1127 ISS 1 JE 4 1991 UMI

locations on said sensing element so that the temperature of said optical-sensing element varies as a function of the current through said conductors and the temperature dependant optical property of said sensing element varies accordingly, the optical dependent property of said optical-sensing element varying over a range as a function of a temperature; and

pickup means for monitoring the temperature dependent optical property of said an optical-sensing element at a stationary area of said sensing element, said pickup means including an optical fiber extending from said stationary area of said sensing element whereby the temperature dependent optical property monitored through pickup means is a function of the current through said conductors, and said pickup means monitor the spectral properties of the optical sensing element.

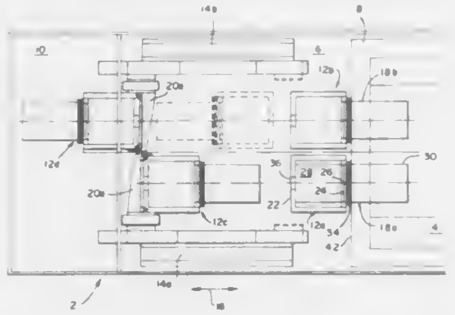
5,021,732
BURN-IN TESTING EQUIPMENT HAVING AN INSTRUMENTATION CONTROL MODULE

Francis J. Fuoco, Commack, and Anthony Linardos, Copaigue, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Continuation of Ser. No. 263,219, Oct. 27, 1988, abandoned. This application Dec. 1, 1989, Ser. No. 443,825

Int. Cl.^{5} G01R *31/02*

U.S. Cl. 324—158 F **16 Claims**



2. System for stress testing electronic components, comprising:
- at least one high temperature section;
- a transfer section having a first end separated from said high temperature section by an interface barrier;
- a storage section adjacent to a second end of said transfer section;
- at least one module including:
  - a carrier card carrying thereon to-be-stress-tested electronic components;
  - a driver card containing electronic circuits for generating signals to activate said electronic components carried on said carrier card;
  - an enclosure for housing said driver card and for providing easy handling and movement of said module;
  - connecting means positioned within one end of said enclosure for mating said carrier card to said driver card;
  - seal means positioned outside of said enclosure and encircling a portion of said carrier card for isolating said connecting means from the environment to which said carrier card is exposed;
- means for grasping said module by said enclosure and moving said module from said storage section adjacent to said transfer section and adjacent to said high temperature section, said grasping and moving means further guiding said carrier card into said high temperature section through a slot in said interface barrier, said enclosure remaining in said adjacent transfer section for effectively urging said seal means against the area of said interface barrier surrounding said slot to substantially prevent heat within said high temperature section from escaping into said transfer section or said enclosure and shield said connecting means from being exposed to the heat from said high temperature section.

5,021,733
BURN-IN APPARATUS

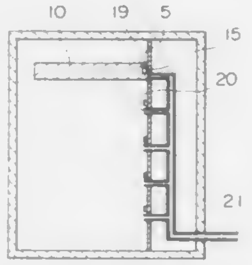
Sachiko Ebihara, and Yasuhiko Fukushima, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jan. 11, 1990, Ser. No. 463,544

Claims priority, application Japan, Nov. 2, 1989, 1-284853

Int. Cl.^{5} G01R *1/00, 1/02*

U.S. Cl. 324—158 F **7 Claims**



1. A burn-in test method comprising:
- placing a plurality of semiconductor devices having bodies and extending leads over respective openings in a hollow burn-in board so that the bodies are peripherally supported by the board;
- holding the semiconductor devices in place over the respective openings by evacuating the hollow burn-in board, thereby electrically connecting the semiconductor devices to electrical conductors disposed on the burn-in board; and
- simultaneously subjecting the semiconductor devices to predetermined environmental conditions and performing electrical tests on the semiconductor devices through the conductors to examine characteristics of the semiconductor devices.

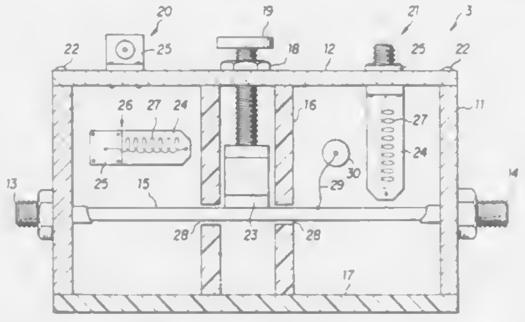
5,021,734
IN-LINE COAXIAL SURGE PROTECTOR AND TEST FIXTURE

John E. B. Tuttle, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 14, 1990, Ser. No. 584,665

Int. Cl.^{5} G01R *31/22*

U.S. Cl. 324—158 F **5 Claims**



1. A Surge Protection Device Test Fixture Comprising:
- a metallic housing having a conducting coverplate;
- said housing having an input coaxial connector and an output coaxial connector mounted thereon;
- a bare conductor connecting the center conductor of the input coaxial connector to the center conductor of the output coaxial connector;
- a non-metallic holder disposed within said housing for holding a surge protection device and positioned so as to allow said surge protection device to make contact with said bare conductor;
- means for providing a conducting path between said conducting coverplate and said surge protection device;
- means for inductively sensing a current through said surge protection device;
- means for inductively sensing a current through said bare conductor;
- means for inductively sensing a current on the outside of said housing.

5,021,735
OPTO-ELECTRONIC BACHOMETER AND POSITION DETECTOR OF AN ELECTRIC MOTOR

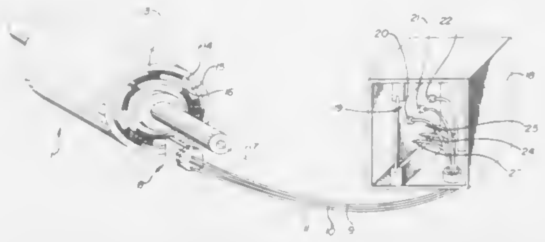
Jürgen Maass, Wiesloch, and Helmut Meyer, Weinheim, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Jan. 10, 1990, Ser. No. 463,239

Claims priority, application Fed. Rep. of Germany, Jan. 10, 1989, 3900464

Int. Cl.^{5} G01P *3/36;* G05B *1/06;* G01D *5/34*

U.S. Cl. 324—175 **17 Claims**



1. Device for determining the rotational speed and position of a rotor of an electric motor having three signal tracks arranged on the rotor, comprising three sensors located at a stator-side if the electric motor for scanning the signal tracks, and an evaluation circuit connected to said sensor, said sensor being sensitive to given stimuli of the signal tracks for alternatively adopting one of three different states which individually produce level of different magnitude; said evaluation circuit including detectors responsive in accordance with said levels, for cutting off levels of given magnitude so that a recognition of the rotor position is derivable from a first and a second one of the three states, and the rotational speed is derivable from the third one of said three states.

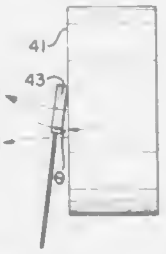
5,021,736
SPEED/POSITION SENSOR CALIBRATION METHOD WITH ANGULAR ADJUSTMENT OF A MAGNETORESISTIVE ELEMENT

Edward M. Gonsalves, Swansea; Stephen B. Offiler; Douglas B. Strott, both of Atleboro, and Steven Beringhause, West Roxbury, all of Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 19, 1989, Ser. No. 409,226

Int. Cl.^{5} G01R *35/00, 33/06;* G01P *3/488;* H05K *13/04*

U.S. Cl. 324—202 **2 Claims**



1. A method of forming a transducer comprising the steps of:
- (a) providing a magnet having a longitudinal axis and an outer surface lying in a plane perpendicular to the axis and having a magnetic field emanating from said surface, the surface having an x and a y axis;
- (b) providing a thin substantially planar magnetoresistive element means responsive to magnetic flux passing therethrough in a predetermined direction to change its electrical resistance as a function of the intensity of said magnetic flux in said predetermined direction, the element means comprising a substrate, wheatstone bridge means disposed on the substrate including four legs coupled together and having two pairs of opposing junctions, each leg having a magnetoresistive film element, one pair of opposing junctions being connected across a voltage source and the other pair providing a voltage output thereacross;
- (c) positioning said magnetoresistive element means offset from said longitudinal axis by a predetermined amount to establish a predetermined bias field in said element; and
- (d) adjusting the angle the magnetoresistive element means makes with the longitudinal axis to compensate for variations in the magnetoresistive element means, the magnet and their assembly to thereby calibrate the transducer so that the said voltage output is centered on a selected level.

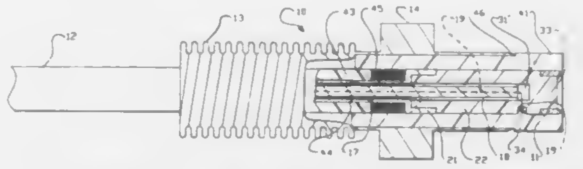
5,021,737
PROXIMITY SENSOR RESISTANT TO AXIAL AND TORSIONAL FORCES

Mark F. Schutts, Reno, Nev., assignor to Bently Nevada Corporation, Minden, Nev.

Filed Mar. 2, 1989, Ser. No. 318,133

Int. Cl.^{5} G01B *7/14;* G01R *33/00;* G01H *11/00;* G01N *9/18*

U.S. Cl. 324—207.11 **5 Claims**



1. A proximity sensor having a metal case with a sensing coil at one end and a coaxial cable extending out of the other end of said case for connecting to an electrical processing unit, the coaxial cable having an outer insulating jacket and a wire braid outer conductor surrounding an inner cylindrical insulator carrying a center conductor, the sensor comprising:
- a metal cylinder having one end with a predetermined inner diameter and an enlarged stepped end;
- a bobbin of insulating material having an internal cavity of a diameter similar to said inner diameter, and having at a closed end spool means for carrying said sensing coil, the other end mating with said enlarged stepped end of said metal cylinder;
- means for permanently interlocking said bobbin and metal cylinder for forming a one-piece unitary structure at said enlarged stepped end to resist axial and torsional forces along the axis of said metal cylinder and said cavity;
- a portion of said coaxial cable including said wire braided outer conductor extending into said metal cylinder with at least said center conductor extending into said cavity of said bobbin;
- means for mechanically adhering said outer conductor to said metal cylinder for resisting axial and torsional forces and for providing an electrical connection for said sensing coil;
- means for connecting said center conductor to said coil including an aperture through said bobbin into said cavity;
- and insulating cylindrical cap means adhered to and covering said interlocking bobbin and metal cylinder said cap means including means for mechanically coupling to said metal case to resist axial and torsional forces.

VOL
1127
ISS
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5,021,738

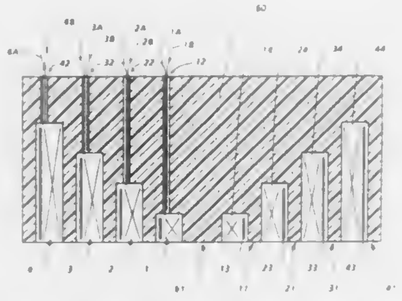
FIELD VARIABLE, ELECTRONICALLY CONTROLLED, NESTED COIL EDDY CURRENT PROBE

Susan N. Vernon, Annandale, Va.; Brian Sircus, and Paul M. Gammell, both of Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 26, 1990, Ser. No. 498,883

Int. Cl.^{5} G01N *27/72, 27/82;* G01R *33/12*

U.S. Cl. 324—232 6 Claims



1. A selectable radii compound ferrite cup core probe for eddy current inspection comprising:

a block of ferrite containing two or more concentric channels on one surface; and

two or more concentric coils corresponding to and residing in said concentric channels in said block of ferrite; and

means for electrical connection of said coils to an impedance measuring device whereby each of said concentric coils may be selectively activated, shorted or left open, such that the compound ferrite cup core exhibits discrete selectable magnetic field inner and outer radii

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5,021,739

SUPERCONDUCTOR TYPE RADIO FREQUENCY WITH ADJUSTABLE INDUCTANCE MAGNETIC FLUX MEASURING CIRCUIT

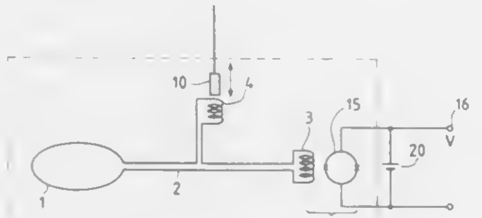
Koichi Yokosawa, Kokubunji, and Hideki Kohno, Tama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 25, 1989, Ser. No. 426,188

Claims priority, application Japan, Nov. 2, 1988, 63-276249

Int. Cl.^{5} G01R *33/035, 33/20*

U.S. Cl. 324—248 9 Claims



1. A magnetic flux measuring circuit for measuring the magnitude of radio-frequency (RF) magnetic flux comprising:

a superconducting loop, said superconducting loop including a pick-up coil for converting said RF magnetic flux into an electric current that flows through said superconducting loop, and an input coil for a superconducting quantum interference device fluxmeter that converts said electric current into a voltage output; and

an inductance adjusting means for adjusting the inductance of said superconducting loop; whereby the magnitude of said voltage output provides measurement of the magnitude of said RF magnetic flux.

5,021,740

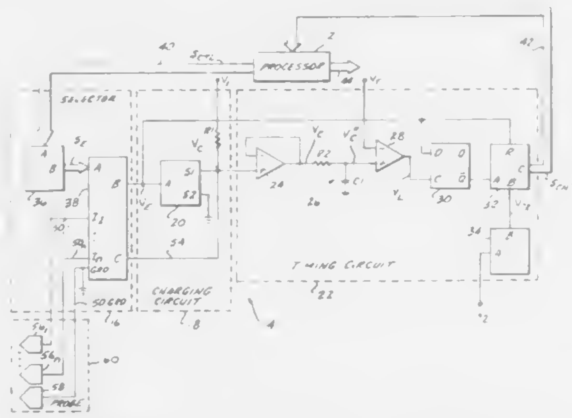
METHOD AND APPARATUS FOR MEASURING THE DISTANCE BETWEEN A BODY AND A CAPACITANCE PROBE

Dennis P. Sarr, Kent, and Patrick L. Anderson, Bellevue, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Mar. 7, 1989, Ser. No. 320,315

Int. Cl.^{5} G01R *27/26*

U.S. Cl. 324—687 14 Claims



1. An apparatus for measuring the distance between a capacitance-type sensing probe and a conductive body comprising:

(a) a capacitance-type sensing probe having a plurality of measuring electrodes and a ground electrode for grounding a conductive body;

(b) selecting means coupled to said capacitance-type sensing probe for selecting one of said plurality of measuring electrodes in said probe, said selected electrode forming a capacitor with the nearby surface of a conductive body when said capacitance-type sensing probe is placed near a surface of the conductive body;

(c) charging means for charging said capacitor associated with said selected electrode from a ground voltage to a capacitor charge voltage when said selected electrode is selected by said selecting means;

(d) timing means including a comparator coupled to said charging means for comparing said capacitor charge voltage to a threshold voltage, said comparator producing a first output when said capacitor charge voltage is less than said threshold voltage and a second output when said capacitor charge voltage is greater than or equal to said threshold voltage; a clock for producing clock pulses; and, a counter coupled to said comparator and to said clock for counting said clock pulses, such that said counter starts counting said clock pulses when said selecting means selects one of said plurality of measuring electrodes, stops counting said clock pulses when said comparator asserts said second signal and produces a digital clock-pulse count signal representative of the number of clock pulses counted; and,

(e) a processor coupled to said selecting means and said counter, said processor issuing control instruction to said selecting means instructing said selecting means to select one of said plurality of measuring electrodes for charging and to couple said selected electrode to said comparator, said processor receiving said clock-pulse count signal from said counter and translating said clock-pulse count signal into a distance value related to the distance between said capacitance-type sensing probe and the nearby surface of the conductive body.

5,021,741

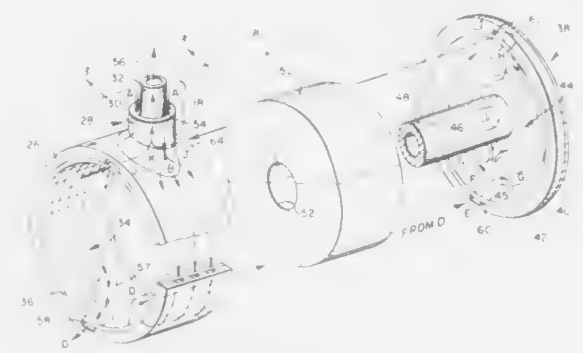
CAST CHARGED PARTICLE DRIFT TUBE

Michael G. Kornely, Jr., Centerport; Douglas Holmes, Shirley, and Robert G. Micich, Bethpage, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Apr. 12, 1990, Ser. No. 507,768

Int. Cl.^{5} H01J *7/24, 61/52*

U.S. Cl. 328—227 8 Claims



1. A drift tube housing comprising:

a cast hollowed cylindrical body of electrical conductive material;

grooves cast in the body interior surface;

a layer formed over the grooves thus forming coolant passages through the body;

cast electrical conductive face plates closing open ends of the body;

grooves cast in the face plate interior surfaces;

a layer formed over the grooves in each face plate thus forming coolant passages through the face plates;

ports formed in the body for connecting the coolant passages of the body and the face plates; and

a concentric cast tube integrally formed with the body for producing two internal concentric coolant passages communicating with the body coolant passages thus providing coolant supply and return for the drift tube while simultaneously serving as a support stem.

5,021,742

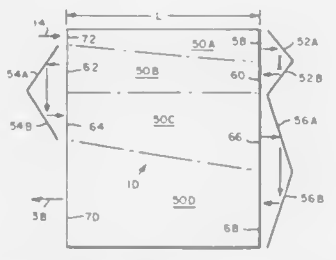
LASER AMPLIFIER

Jonah H. Jacob, Brookline, Mass., assignor to Science Research Laboratory, Inc., Somerville, Mass.

Filed Sep. 19, 1988, Ser. No. 246,445

Int. Cl.^{5} H01S *3/091, 3/04*

U.S. Cl. 330—4.3 22 Claims



1. A laser amplifier comprising:

an energized laser gain medium, said medium having a substantially rectangular shape;

means for applying at least one laser beam to said gain medium;

means for diverging each laser beam applied to said medium said beam continuing to diverge as it passes through the medium; said beam continuing to diverge as it passes through the medium and

means for causing the at least one beam to make only a single pass through and section of said medium with the total number of passes through the medium by the at least one beam being an even number.

5,021,743

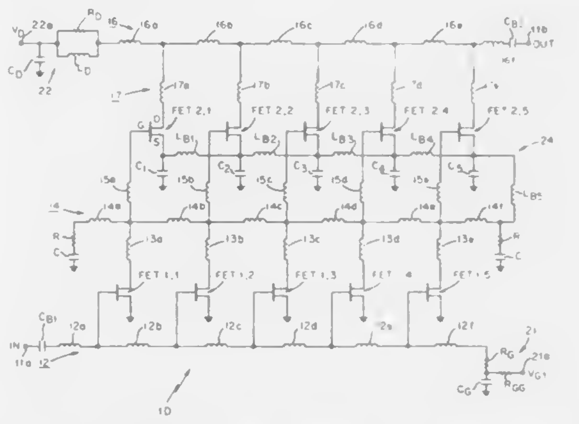
BIASING NETWORKS FOR MATRIX AMPLIFIERS

Shiou L. L. Chu, Bedford; Yusuke Tajima, Acton, and Manfred J. Schindler, Newton, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Nov. 30, 1989, Ser. No. 443,985

Int. Cl.^{5} H03F *3/60*

U.S. Cl. 330—54 18 Claims



1. A radio frequency matrix amplifier comprising:

an input propagation network having a first end coupled to an input terminal of the amplifier;

a first plurality of transistors, each transistor having an input electrode and an output electrode, with the input electrode of each transistor being successively coupled by said input propagation network;

an intermediate propagation network disposed to successively couple the output electrode of each one of the first plurality of transistors;

a second plurality of transistors, each transistors having an input electrode, a reference electrode, and an output electrode with the input electrode of each of the second plurality of transistors being successively coupled by the intermediate propagation network;

an output propagation network having a first end coupled to the output terminal of the circuit and a second end coupled to a bias terminal, being disposed to successively couple the output electrode of each one of the second plurality of transistors; and

means for connecting the first plurality of transistors with the second plurality of transistors in series for D.C. voltage potentials and in cascade for r.f. voltage potentials.

5,021,744

DIFFERENTIAL AMPLIFIER WITH DIFFERENTIAL OR SINGLE-ENDED OUTPUT

Rudy J. Van De Plassche, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 12, 1990, Ser. No. 463,753

Claims priority, application Netherlands, Feb. 14, 1989, 8900348

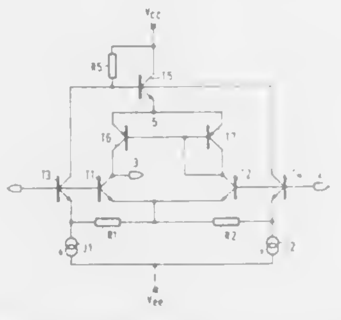
Int. Cl.^{5} H03F *3/45*

U.S. Cl. 330—252 5 Claims

1. A differential amplifier comprising: a first and a second transistor having their collectors coupled to a common terminal by means of a load and having their mutually coupled emitters coupled to a first supply voltage terminal via a first resistor and a first current source and via a second resistor and a second current source, to an emitter of a third transistor via said first resistor, said third transistor having its base coupled to a base of the first transistor and to a first input terminal, said

VOL 1127 ISS 1 JE 4 1991 UMI

mutually coupled emitters being coupled to an emitter of a fourth transistor via said second transistor, said fourth transistor having its base coupled to a base of the second transistor and to a second input terminal, characterized in that collectors



of the third and the fourth transistors are coupled to a second supply-voltage terminal by means of a common third resistor and to a base of a fifth transistor having its emitter coupled to the common terminal and its collector coupled to the second supply voltage terminal.

5,021,745
DIFFERENCE AMPLIFIER CIRCUIT

Kenji Kondou, and Manabu Ando, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Dec. 21, 1989, Ser. No. 454,876

Claims priority, application Japan, Dec. 21, 1988, 63-324184

Int. Cl.⁵ H03F *3/45*

U.S. Cl. 330—253 **6 Claims**

1 A difference amplifier circuit comprising

(a) a first series combination of a first transistor of a first channel conductivity type, a first output node and a second transistor of a second channel conductivity type coupled between a first source of voltage level and a common node, said first and second channel conductivity types being opposite to each other;

(b) a second series combination of a third transistor of said first channel conductivity type, a second output node and a fourth transistor of said second channel conductivity type coupled between said first source of voltage level and said common node in parallel to said first series combination. a small difference in voltage level being supplied between the gate electrodes of said second and fourth transistors for producing a large difference in voltage level between said first and second output nodes;

(c) an activation transistor of said second channel conductivity type coupled between said common node and a second source of voltage level different in voltage level from said first source of voltage level, said activation transistor turning on to provide a conduction path between said common node and said second source of voltage level in the presence of a control signal; and

(d) a channel conductance regulating circuit responsive to said control signal and operative to regulate channel conductances of said first and third transistors for achievement of a target gain, in which said channel conductance regulating circuit is implemented by a third series combination of a fifth transistor of said first channel conductivity type, an output node coupled to the gate electrodes of said first and third transistors and a sixth transistor of said second channel conductivity type coupled between said first source of voltage level and said second source of voltage level, wherein said control signal is supplied to the gate electrodes of said fifth and sixth transistors.

5,021,746
AMPLIFIER OUTPUT STAGE

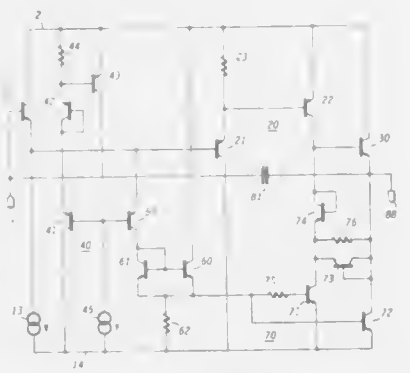
Luong T. Huynh, Epalinges, Switzerland, assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 7, 1989, Ser. No. 447,353

Claims priority, application United Kingdom, Dec. 10, 1988, 8828917

Int. Cl.⁵ H03F *3/26*

U.S. Cl. 330—262 **7 Claims**



1. A push-pull output stage comprising an input terminal; an output terminal for connection to a load, a current sourcing section coupled to the input terminal for sourcing current to the output terminal; a current sinking section for sinking current from the output terminal; a cascode stage driven by a lower impedance driver stage which is coupled to the input terminal for driving the current sinking stage and biasing both the current sinking and sourcing stages; and voltage bias means for biasing the cascode stage.

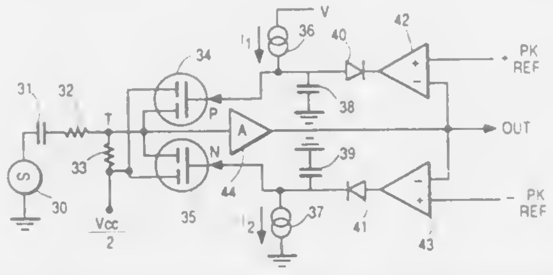
5,021,747
SYMMETRICAL VARIABLE IMPEDANCE APPARATUS EMPLOYING MOS TRANSISTORS

Robert H. Isham, Flemington, and Victor Zazzu, Belle Mead, both of N.J., assignors to Harris Semiconductor Patents, Inc., Melbourne, Fla.

Filed Nov. 22, 1989, Ser. No. 440,187

Int. Cl.⁵ H03G *3/30*

U.S. Cl. 330—284 **20 Claims**



1. Apparatus for providing a linear controllable impedance between first and second terminals comprising:

a P-channel field effect transistor (FET) and an N-channel FET, each FET having a source to drain path and a gate electrode with the source to drain path of each FET connected between said first and second terminals;

first means, including first comparator means responsive to the signal at said first terminal having a first polarity and being greater than a given amplitude, coupled to the gate electrode of said P-FET for applying a first control signal to said gate electrode of said P-FET for controlling the impedance of said P-FET, and

second means, including a second comparator means responsive to the signal at said first terminal having a polarity opposite said first polarity and being greater than a given amplitude, coupled to the gate electode of said N-FET for applying a second control signal to said gate electrode of said N-FET for controlling the impedance of said N-FET, to thereby provide a linear impedance between said first and second terminals.

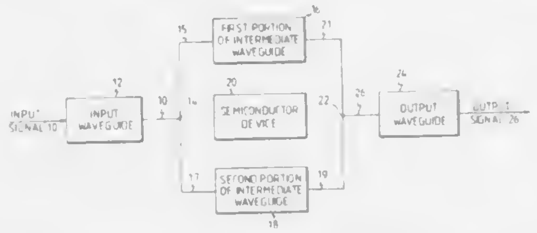
5,021,748
CIRCULAR RING RESONATOR DISTRIBUTIVE ELECTROMAGNETIC SIGNAL PROCESSOR

Kai Chang, and Henry F. Taylor, both of College Station, Tex., assignors to The Texas A & M University System, College Station, Tex.

Filed Oct. 18, 1989, Ser. No. 422,970

Int. Cl.⁵ H03F *3/60*

U.S. Cl. 330—286 **24 Claims**



1. An electromagnetic signal processor comprising:

(a) an input waveguide for receiving input electromagnetic signals;

(b) an output waveguide for transmitting output electromagnetic signals;

(c) an intermediate branched waveguide comprising a plurality of branches electromagnetically coupled together at a first and a second junction, said input and output waveguides being electromagnetically coupled to said intermediate waveguide at said first and second junctions, respectively;

said intermediate waveguide being adapted to receive an input electromagnetic signal from said input waveguide at said first junction, divide said input electromagnetic signal into a plurality of separate signals such that each of said separate signals propagates along one of said branches of said intermediate waveguide, recombine said separate signals into a single output electromagnetic signal at said second junction, and send said output electromagnetic signal to said output waveguide; and

(d) at least one semiconductor device electrically coupled to said intermediate waveguide for processing at least one of said separate signals as said separate signals propagate along said branches of said intermediate waveguide.

5,021,749
SWITCHABLE CAPACITOR LOOP FILTER FOR PHASE LOCKED LOOP

Kenichiro Kasai, and Takeshi Kawasaki, both of Suwa, Japan, assignors to Seiko Epson Corporation, Nagano, Japan

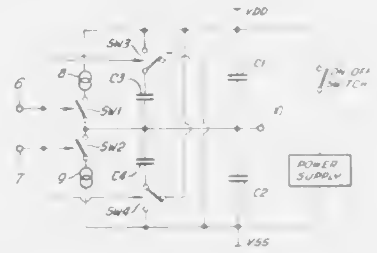
Continuation of Ser. No. 350,349, May 11, 1989, abandoned.

This application Dec. 28, 1989, Ser. No. 456,609

Claims priority, application Japan, May 11, 1988, 63-115216; Jan. 11, 1989, 1-4043

Int. Cl.⁵ H03L *7/10*

U.S. Cl. 331—17 **12 Claims**



11. A filter for supplying a control voltage for a voltage-controlled oscillator in order to selectively increase or decrease the oscillator output frequency, said filter comprising:

a power supply which supplies an output voltage and is capable of being turned on and off; an output node connectable to supply the control voltage for the oscillator; capacitance elements; charging and discharging means; and switchng means operable for connecting said capacitance elements and said charging and discharging means between said power suppoly and said output node in first and second connection patterns for providing, at said output node, a control voltage having a first value which reduces the oscillator output frequency when the first connection pattern is established, a second value which increases the oscillator output frequency when the second connection pattern is established, and a third value, which is between the first and second values and which has a fixed relation to the value of the output voltage, when said power supply is turned on and neither the first connection pattern nor the second connection pattern is established.

5,021,750
CMOS OSCILLATOR

Jürgen Schnabel, Ilsfeld, Fed. Rep. of Germany, assignor to Alcatel N.V., Amsterdam, Netherlands

Filed Apr. 3, 1990, Ser. No. 505.247

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1989, 3910712

Int. Cl.⁵ H03B *5/24*

U.S. Cl. 331—111 **18 Claims**

1. CMOS oscillator comprising:

a differential amplifier having first and second inputs and first and second outputs;

a first switching unit further comprising
  a first switching element having a control input connected to the first output of the differential amplifier and
  a second switching element having a control input connected to the second output of the differential amplifier;

a second switching unit further comprising a third switching element and a fourth switching element;

a first controlled current source;

a second controlled current source;

a capacitor for interconnecting the first controlled current source and the second controlled current source;

a first resistor for connecting the first controlled current source to the first input of the differential amplifier;

a second resistor for connecting the second current source to the second input of the differential amplifier;

a first tap located between the first controlled current source and the first resistor;

VOL
1127
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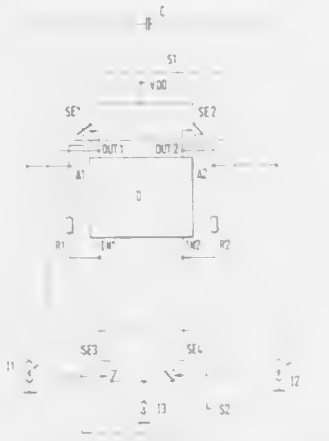
- a second tap located between the second controlled current source and the second resistor;
- a supply-voltage terminal connectable via the switching path of the first switching element to the first tap or via the switching path of the second switching element to the second tap; and



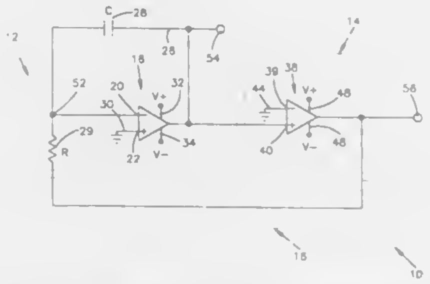
- a third current source connectable to the first input or the second input of the differential amplifier via the switching path of the third switching element or via the switching path of the fourth switching element respectively.

5,021,751
QUADRATURE OSCILLATOR NETWORK
Mitchell Rose, 3718 Silsby Rd., University Hts., Ohio 44118

Filed Feb. 27, 1990, Ser. No. 485,936

Int. Cl.^{5} H03B *5/24, 27/00*

U.S. Cl. 331—135 **12 Claims**



1 A network adapted to function as a quadrature oscillator comprising:
- first circuit means for integrating a waveform and producing a first output which leads said waveform by about 90°, said first circuit means including at least a first input for receiving said waveform;
- second circuit means comprising an op-amp having a first input coupled directly to said first circuit means to receive said first output, and a second input coupled directly to ground, said second circuit means producing a second output lagging said first output by about 90°; and
- first feedback means for feeding back said second output to said first input of said first circuit means.

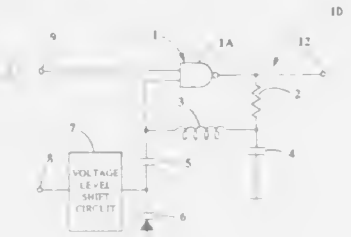
5,021,752
VOLTAGE CONTROLLED OSCILLATOR (VCO)
Kesatoshi Takeuchi, Suwa, Japan, assignor to Seiko Epson Corporation, Japan

Filed Dec. 19, 1989, Ser. No. 453,416

Claims priority, application Japan, Dec. 28, 1988, 63-331877

Int. Cl.^{5} H03B *5/12*

U.S. Cl. 331—177 V **3 Claims**



1. A voltage controlled oscillator operating synchronously with an external sync signal to produce a stable oscillation frequency output of desired frequency comprising.
- a NAND or a NOR circuit having two inputs with one input of said NAND or NOR circuit connected to receive said external sync signal and having an output for said oscillation frequency,
- a resistor having one terminal connected to said output,
- a first capacitor having one terminal connected to the other terminal of said resistor and its other terminal connected to ground,
- a coil having one terminal connected between said resistor and said first capacitor and its other terminal connected to the other input of said NAND or NOR circuit,
- a second capacitor having one terminal connected between said NAND or NOR circuit other input and said coil other terminal,
- a variable capacitance diode means having its anode terminal connected to the other terminal of said second capacitor and its cathode terminal connected directly to ground, and
- input means connected between said second capacitor and said variable capacitance means to both establish a reverse bias on said variable capacitance diode means and vary the voltage applied to said variable capacitance means.

5,021,753
SPLATTER CONTROLLED AMPLIFIER
Ronald H. Chapman, Carol Stream, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

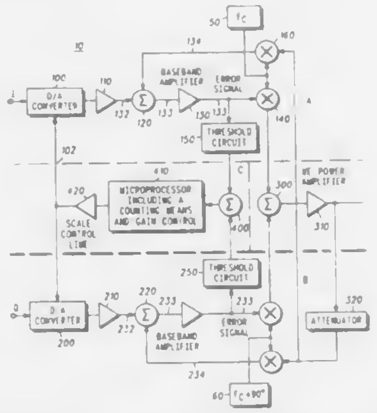
Filed Aug. 3, 1990, Ser. No. 562,360

Int. Cl.^{5} H03C *3/08;* **H04B** *1/04*

U.S. Cl. 332—103 **14 Claims**

1. A feedback amplifier circuit, having controlled adjustment of input signal levels from a signal source according to the rate of occurence of an error signal level excursion beyond a reference level, said amplifier circuit comprised of:
- first amplifier means, having an input and an output, for providing at said output, signals that are substantial amplifications of signals input to said amplifier means;
- feedback element means, having an input and an output, for providing at said output, a signal representative of a signal at said input, said input of said feedback element being coupled to said output node of said amplifier means;
- first summer means, having at least first and second inputs and an output, said first input of said first summer means coupled to said output of said feedback element means, said first summer means producing an error-indication output signal at said output that is substantially equal to the algebraic difference of signals at said first and second inputs, said output of said first summer means being coupled to said input of said amplifier means;

- sampling means, coupled to said output of said first summer means, for providing a first control signal, indicative of error signal levels;
- counting means, coupled to said sampling means, for measuring the rate of occurence of excursions beyond a reference level;



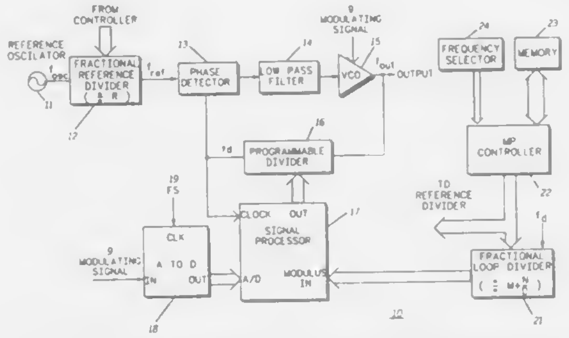
- input level control means having an input that receives an input signal to be amplified by said amplifier circuit, for producing a first intermediate signal at an output that is proportional to said input signal, said input level control means being coupled and responsivie to the output of said counting means, said output of said input level control means being coupled to said second input of said first summer means.

5,021,754
FRACTIONAL-N SYNTHESIZER HAVING MODULATION SPUR COMPENSATION
Wayne P. Shepherd; Darrell E. Davis, both of Sunrise, and Wan F. Tay, Coral Springs, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 16, 1990, Ser. No. 553,472

Int. Cl.^{5} H03C *3/00;* **H03L** *7/197*

U.S. Cl. 332—128 **6 Claims**



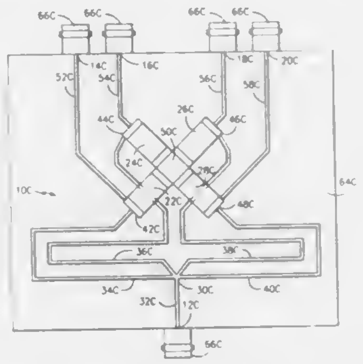
1. A frequency synthesizer for providing a modulated output frequency f_{out} comprising:
- a synthesizer loop including:
  - a voltage controlled oscillator for providing the output frequency f_{out}, said output frequency being $f_{out}=K^* f_{ref}$ where K = the loop divisor;
  - a programmable fractional loop divider for dividing the output frequency f_{out} by a fractional modulus J, said fractional modulus $J=M+N/D$ where:
    - M = integer divisor
    - N = fractional numerator
    - D = fractional denominator; said programmable divider including compensation means for reducing the generated spurs of the frequency synthesizer when N is equal to a non-zero integer,
  - modulation means for varying said modulus in accordance with a modulating signal and providing the loop divisor K;
- a fractional reference divider having a reference divider ratio R for dividing an oscillator frequency and providing a reference frequency f_{ref}; and
- means for selecting a reference divisor R, whereby a non-zero fractional numerator N is produced.

5,021,755
N-WAY SIGNAL SPLITTER WITH ISOLATED OUTPUTS
Warren H. Gustafson, Freebold, N.J., assignor to Radio Frequency Systems, Inc., Marlboro, N.J.

Filed Nov. 8, 1989, Ser. No. 433,141

Int. Cl.^{5} H01P *5/12;* **H03H** *7/48*

U.S. Cl. 333—128 **14 Claims**



1 An electrical circuit for splitting a first radio frequency signal into a plurality of radio frequency signals, comprising:
- a dielectric substrate having first and second surfaces; and,
- means disposed on said first surface for receiving and splitting a first radio frequency signal into at least three radio frequency signals, said means comprising at least three impedance matching transformers and at least three resistive elements having first and second ends, each said resistive element corresponding to one of said transformers, each said impedance matching transformer comprising a line of conductive material of a specific length and impedance value having first and second ends, said first end of each line of conductive material connecting to said first end of each corresponding resistive element at a corresponding connecting point, each connecting point providing to the circuit an output for one of said plurality of radio frequency signals, said second end of each line of conductive material connects to a common junction point, said junction point providing an input to the circuit for said first radio frequency signal, said second end of each resistive element connects at a common point, said resistive elements extending from said common point and a portion of said conductive material of at least one of said impedance matching transformers being disposed beneath and substantially orthogonal to at least one of said resistive elements.

5,021,756
TRANSVERSAL AND RECURSIVE FILTERS USEABLE IN A DIPLEXER
Yusuke Tajima, Acton, and Manfred J. Schindler, Newton, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jan. 3, 1989, Ser. No. 292,712

Int. Cl.^{5} H03H *7/46, 15/00*

U.S. Cl. 333—132 **27 Claims**

24. A diplexer having an input terminal, first and second output terminals and a pair of frequency responses, comprising:
- an input propagation network having a first one of a low pass frequency response, a high pass frequency response, and a bandpass frequency response characteristic and

VOL
1127
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1991
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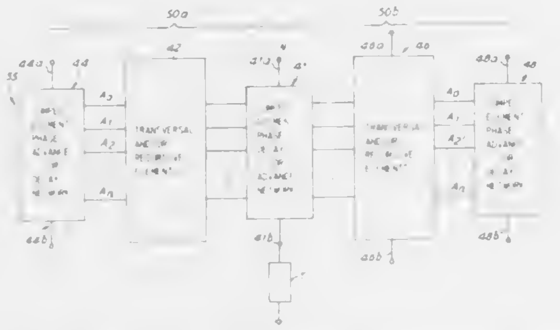
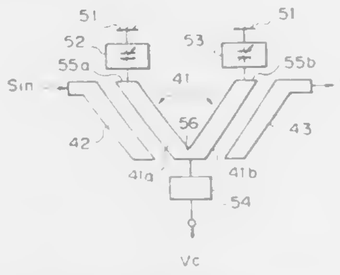
having a first end coupled to the input terminal of the diplexer;
a first output propagation network having a second one of a low pass frequency response, a high pass frequency response, and a bandpass frequency response and having a first end connected to the first output of the diplexer;
a second output propagation network having a third one of a low pass frequency response, a high pass frequency response, and a band pass frequency response and having a first end coupled to the second output terminal of the diplexer;
first weighting means coupled between said input propagation network and said first output propagation network for providing at least one weighted signal path between said input propagation network and said first output propagation network;



second weighting means coupled between said input propagation network and said second output propagation network for providing at least one weighted signal path between said input propagation network and said second output propagation network; and
wherein at least one of said input propagation network and said pair of output propagation networks has a rolloff frequency characteristic which coincides with a rolloff frequency characteristic of one of said pair of frequency responses of the diplexer.

5,021,757
BAND PASS FILTER

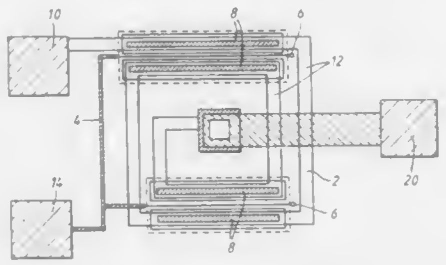
Fumihiko Kobayashi, and Isamu Umino, both nf Otawara, Japan, assignors to Fujitsu Limited, Kawasaki, Japan
Filed Nov. 27, 1989, Ser. No. 441,780
Claims priority, application Japan, Nov. 28, 1988, 63-301247
Int. Cl.^{5} H01P *1/203. 7/08*
U.S. Cl. 333—205 **8 Claims**



1 A band pass filter comprising:
an input side coupling microwave strip line,
an output side coupling microwave strip line,
at least one filter unit, said filter unit having a V-shaped configuration provided by two arms of microwave strip lines having first ends connecting at an apex and second open ends, the two arms facing said input and output side coupling microwave strip lines, respectively, the overall length of said filter unit is λ/2 (λ denotes a wavelength at a frequency which is in a vicinity of an upper limit frequency but is not lower than the upper limit frequency of an operating frequency range), and the overall length of each of the arms is λ/4,
two variable capacity elements, each connected to each second open end of the two arms, and
a high frequency band elimination element connected to the apex of said filter unit through which a control voltage is commonly applied to said two variable capacity elements.

5,021,758
CIRCUIT ARRANGEMENT COMPRISING MESFET SWITCHED SPIRAL INDUCTOR

Anthony A. Lane, Northampton, England, assignor to Siemens Plessey Electronic Systems Limited, Chessington, England
Filed Dec. 6, 1988, Ser. No. 280,466
Int. Cl.^{5} H03H *11/00*
U.S. Cl. 333—245 7 Claims



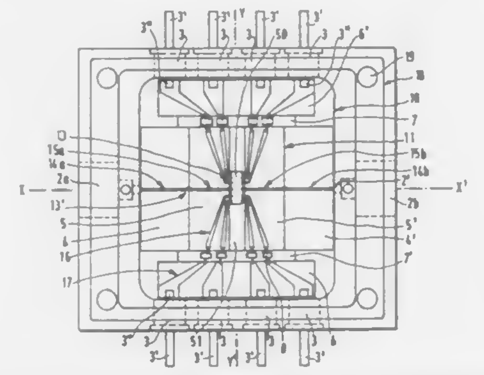
1 A circuit arrangement for switching a spiral inductor in and out of a circuit, comprising:
said spiral inductor comprising two or more turns, a spacing being provided between adjacent turns to define a section;
at least one MESFET having an even number of gates, each gate being mounted on an active GaAs mesa surface, said spiral inductor being electrically coupled in parallel with said MESFET by having each of said gates of said MESFET positioned between adjacent sections or turns of the spiral inductor; and
a control contact pad for receiving an electrical control bias coupled to and for controlling the MESFET, the control bias effective to switch said spiral inductor in and out of the circuit by biasing said gates of said MESFET out of and into a conductive condition, respectively;
wherein at least one of the gates lies between two sections of adjacent turns of the spiral inductor, said two sections of adjacent turns and said at least one gate being mounted on the active GaAs mesa.

5,021,759
PACKAGE FOR VERY HIGH FREQUENCY INTEGRATED CIRCUITS

Patrice Gamand, Yerres, and Jean-Christophe Meunier, Limeil-Brevannes, both of France, assignors to U.S. Philips Corp., New York, N.Y.
Filed Mar. 12, 1990, Ser. No. 492,707
Claims priority, application France, Mar. 17, 1989, 89 03522
Int. Cl.^{5} H01P *1/00*
U.S. Cl. 333—246 **20 Claims**

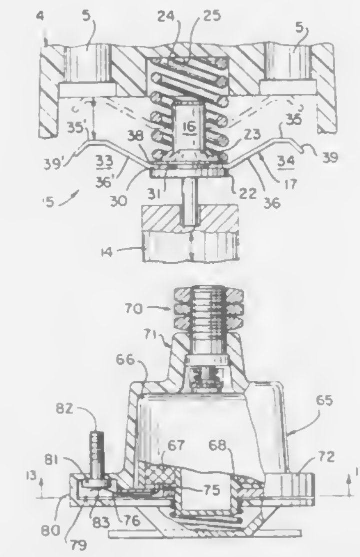
1 A package, for a VHF integrated circuit (50), comprising a housing (1) provided with a recess (10) whose bottom is metallized, and including peripheral connectors (2, 3), a connection device inserted in the recess between an integrated circuit and the connectors, the connection device including a substrate that presents an upper surface provided with microstrip lines (14, 15, 16, 17) to connect studs (20, 30) of the integrated circuit to the connectors (2, 3) of the housing and a metallized lower surface to form a ground plane (12), characterised in that:
the housing comprises two parts fastened to each other, a first peripheral part (1') of the housing accommodating the

connectors (2, 3), a first zone of the connection device (4, 4', 6, 6') and a chamber (11) provided in the recess (10), of which chamber (11) the dimensions are independent of those of the integrated circuit (50) to be protected, and which is suitable for accommodating a second central part (1'') of the housing, the second central part of the housing accommodating the integrated circuit (50) and a second zone (5, 5') of the connection device complementary to the first zone, whose dimensions depend on those of the integrated circuit (50) to be protected, so as to be adjacent to the latter in a manner such that the length of the connecting wires (13) between the microstrip lines (15, 16) and the studs (20, 30) of the integrated circuit is minimized.



5,021,760
SOLENOID SWITCH CONTACT AND MOUNTING ASSEMBLY

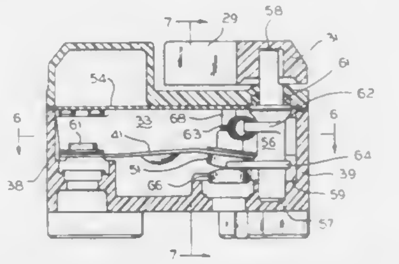
Larry J. Krubsack, Colgate; Allen L. Handy, North Prairie, and John G. Lawton, Milwaukee, all of Wis., assignors to Clum Manufacturing Company, Inc., Hartland, Wis.
Filed Oct. 3, 1989, Ser. No. 415,912
Int. Cl.^{5} H01H *1/12;* **H01F** *15/10*
U.S. Cl. 335—196 **14 Claims**



1. A solenoid switch unit operating in a high vibrational environment, comprising an insulating housing having an inner coil chamber and an outwardly extending contact chamber projecting outwardly of the coil chamber, a coil unit disposed within said chamber and having a magnetic plunger axially mounted for movement toward and away from said contact chamber, a pin-like contact support journalled in said plunger and projecting outwardly into said contact chamber, said contact support having an integral contact ledge located intermediate the length of said support, a strip contact member having a central opening located over said pin abutting said contact ledge, said contact member being a generally winged shaped member and including a base abutting said ledge and with a center opening mating with said pin, said contact base having a width substantially greater than said support and extending outwardly from said center opening to the outer portion of the ledge, said contact member having connecting portions connected to said contact base and extending outwardly therefrom,
a clamp member telescoped over said pin in abutting relation to said base and having an outer peripheral clamping portion having an outer diameter essentially corresponding to the width of said base and thereby fixedly clamping the outer portion of said base to said clamping ledge and restricting deflection of the contact member at the connection to said connecting portions, said contact member being symmetrically formed to the opposite sides of said pin opening and extending outwardly into sliding deflecting engagement with a fixed contact.

5,021,761
HIGH-AMP CIRCUIT BREAKER AND A BISTABLE ELEMENT THEREFOR

Thomas J. Stack, Chicago, and Jacek M. Korczynski, Niles, both of Ill., assignors to Cooper Industries, Inc., Houston, Tex.
Filed Sep. 28, 1989, Ser. No. 414,095
Int. Cl.^{5} H01H *71/16*
U.S. Cl. 337—68 **6 Claims**



1. A high amperage circuit breaker comprising
a pair of spaced terminals being placed in series with the circuit to be protected;
a heat resistant electrical insulating plastic housing defining a body cavity, said body cavity having a base, a front wall, a rear wall and two side walls,
a cover to close said housing;
a rectangular thermally activated bistable mechanical element mounted in said cavity, at least one dimple formed on said bistable element;
a first contact being connected to one of said terminals, said first contact also connected to one end of said bistable element by means wherein the one end of said bistable element always remains stationary with respect to the first contact and in electrical contact with the first contact;
a second electrical contact attached to the other end of said bistable element;
said other end of said bistable element being free to move in a relatively vertical direction;
a third contact electrically connected to said other terminal and being positioned relative to said second contact wherein said second and third contact are normally in electrical contact with each other when the bistable element is in a first position, and said first position being to close the circuit of the circuit breaker;
said bistable element having a predetermined current response to quickly default when there is a predetermined over current, said deflection causing said other end of said bistable element to move from said first position to a

VOL
1127
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second position and to cause said second contact to separate from said third contact by a predetermined distance to open the circuit of the circuit breaker, said circuit breaker being a manual-reset and further comprising

a plastic rotatable shaft having one end rotatably mounted in the said cavity base and the other end extending out of said housing for a predetermined distance,

said shaft other end extending out of said cover for a predetermined distance;

a pair of longitudinally spaced first and second integral bars extending from said rotatable shaft,

said second bar extending a predetermined distance from said first bar and being sized to provide predetermined electrical insulation, said second bar being in contact with the outer surface of said second contact when the electrical circuit is closed,

a spring attached to said first bar and said housing, said spring exerting a rotational force on said plastic shaft to urge the second bar in contact with and toward said second contact;

wherein when said second and third contacts are separated said spring rotates to position said second bar between said second and third contacts and electrically separates said second and third contacts from each other.

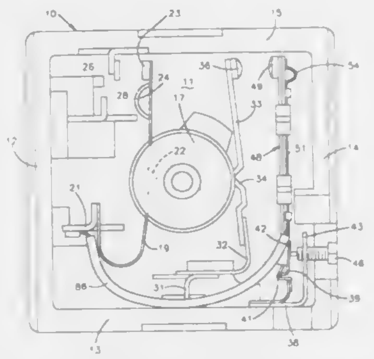
5,021,762
THERMAL CYCLING SWITCH

George L. Hetrick, Mansfield, Ohio, assignor to Robertshaw Controls Company, Inc., Mansfield, Ohio

Filed Aug. 3, 1990, Ser. No. 562,270

Int. Cl.⁵ H01H *61/08, 71/16*

U.S. Cl. 337—103 16 Claims



1 A thermal cycling switch for controlling the cyclic operation of an electrical load from first and second power lines, said load having first and second terminals, means connecting said second terminal to said second power line, a first contact connected to said first power line, a cycling arm having a fixed end connected to said first terminal and a movable end carrying a second contact cyclically engageable with said first contact, said cycling arm comprising a bimetal member extending between said fixed end and said second contact, means electrically insulating said bimetal member from said fixed end, said bimetal member having a high expansion side and a low expansion side, said second contact being on said high expansion side of said bimetal member, a metal strip extending along said low expansion side of said bimetal member and being electrically insulated therefrom, said metal strip being electrically connected to said fixed end and said second contact, and a high resistance heating element in heating relation with said metal strip and being connected at one end to said second contact and at the other end to said second terminal so that said metal strip is heated by said heating element by current in parallel with said load whenever said first and second contacts are in engagement.

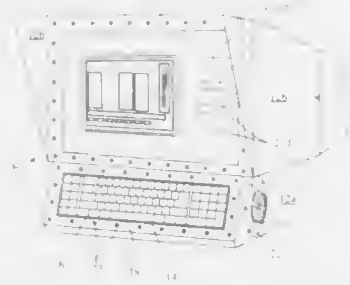
5,021,763
ENVIRONMENT PROTECTED INDUSTRIAL MICROCOMPUTER

Robert F. Obear, 7116 Spada Rd., Snohomish, Wash. 98290

Filed Feb. 1, 1990, Ser. No. 473,441

Int. Cl.⁵ G08B *1/00;* **G06F** *15/02*

U.S. Cl. 340—407 20 Claims



1 An environmentally sealed, EMI suppressed, shock/vibration protected microcomputer workstation for use in extreme operating conditions including exposure to water, corrosive chemicals, mechanical shock, vibration and wide temperature variations, comprising:

an enclosure of stainless steel walls having a base portion and a hood portion rising upward from the base portion, the base portion having a front keyboard receiving casement and the hood portion having a display window receiving casement, the enclosure further including a magnetic disk drive port, fluid ports for circulation of coolant, and conduit and flexible cable ports for electrical interconnects,

a platform disposed in said base portion of said enclosure on which microcomputer electronic boards, magnetic disc drive and input/output connectors are mounted so as to all be contained within said base portion;

omnidirectional, shock-absorbing, vibration damped mounting means attaching said platform to a bottom wall of said base portion of said enclosure, said mounting means including:

a plurality of platform mounting posts disposed at spaced locations in said enclosure base portion, the lower ends of which are anchored to a bottom wall of said enclosure base portion;

lower coil suspension springs, one for each post, coaxially positioned on said posts; at least first and second rails having post receiving openings therein sized to slip over said vertical posts and suspended above the bottom wall of said base portion by said lower coil springs;

upper coil suspension springs, one for each post, coaxially positioned on said plurality of posts above said rails;

adjustable retention means, one for each of said posts, attached adjacent the upper ends of said posts for adjustably compressing said upper and lower coil springs with said rails held captive therebetween; and

dampening means proximate said vertical posts for dampening suspension spring reaction to shock and vibration of said rails and hence said platform relative to said enclosure;

a CRT and CRT frame therefor having a base on which a first pair of CRT mounting pins horizontally project from opposite sides and adjacent the rear of said CRT frame base, and a second pair of CRT mounting pins project horizontally and forwardly, orthogonal to said first pair of pins and arranged adjacent the front of said CRT frame base;

first and second pairs of pin capture and support means mounted on internal wall surfaces of said enclosure in registration with said first and second pairs of CRT mounting pins, respectively, such that said CRT and CRT frame install in said hood portion of said enclosure as a unit by an inward insertion and downward pivoting about said first pair of CRT mounting pins captured in said first pair of pin capture and support means said second pair of CRT mounting pins dropping into said second pair of pin capture and support means so as to secure said CRT and CRT frame within said enclosure;

a transparent CRT window secured and sealed about its perimeter in said window casement of said hood portion of said enclosure; and

a tactile feedback keyboard mounted and sealed in said keyboard receiving casement at the front of said base portion of said enclosure and internal electrical cabling connecting said keyboard to said electronic boards mounted on said platform.

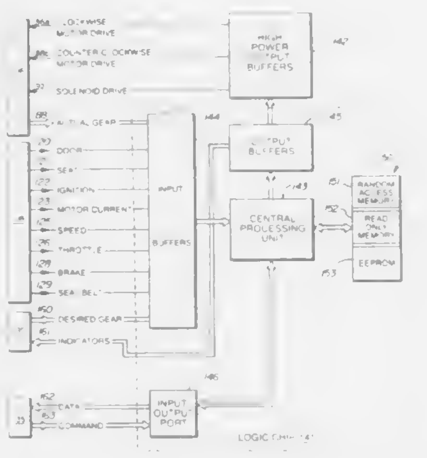
5,021,764
DIAGNOSTICS FOR ELECTRONIC TRANSMISSION CONTROL SYSTEM

Brian Mabee, Sterling Heights, Mich., assignor to Automotive Products (USA) Inc., Auburn Hills, Mich.

Continuation-in-part of Ser. No. 323,825, Mar. 15, 1989. This application Jan. 12, 1990, Ser. No. 464,037

Int. Cl.⁵ G08B *21/00*

U.S. Cl. 340—439 23 Claims



1. An electronic control apparatus for control of an automatic transmission apparatus in a motor vehicle having a plurality of transmission states including a motor adapted for shifting the transmission state, the electronic control apparatus comprising:

an operator input means for generating a desired transmission state signal corresponding to manual operator input;

a transmission state sensing means for generating a present transmission state signal indicative of the state of the automatic transmission; and

a logic control unit connected to the motor, said operator input means and said transmission state sensing means, said logic control unit including

means for determining if said desired transmission state signal differs from said present transmission state signal,

means for controlling the motor to shift the transmission to said desired transmission state when said desired transmission state signal differs from said present transmission state signal,

means for detecting any faults in controlling the motor to shift the transmission to said desired transmission state,

means for storing a fault code corresponding to any detected faults, and

means for generating an operator-perceivable output indicating any stored fault codes in response to a particular input at said operator input means.

5,021,765
SECURITY SYSTEM HAVING DETECTOR MEANS SENSITIVE TO THE PROXIMITY OF AT LEAST ONE DETECTED OBJECT

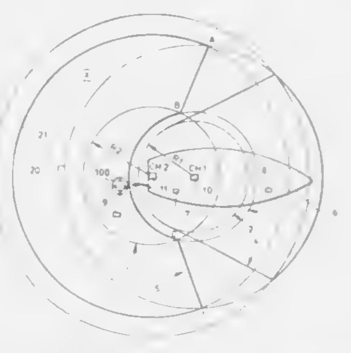
Barry A. Morgan, Tintagel, England, assignor to Transaqua Technology Limited, United Kingdom

Filed May 1, 1989, Ser. No. 346,392

Claims priority, application United Kingdom, May 7, 1988, 8810872

Int. Cl.⁵ G08B *21/00*

U.S. Cl. 340—539 14 Claims



1 A security system having detector means sensitive to the proximity of at least one detected object, the detector means being operable to generate an alarm indication if the detected object is located in a first region in the vicinity of the detector means and inhibited from producing an alarm indication if the detected object is in a second region in the vicinity of the detector means, wherein said detected object is itself sensitive to a physical phenomenon and is operative to cause the production of signals to which the detector is sensitive in response thereto.

5,021,766
INTRUSION DETECTION SYSTEM

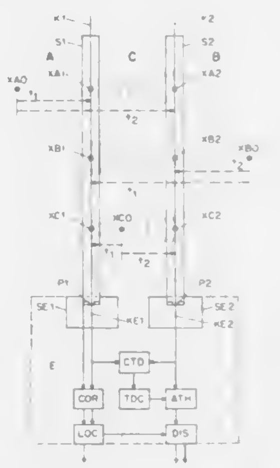
Rudolf Genähr, Männedorf, and Hansjürg Mahler, Hombrechtikon, both of Switzerland, assignors to Cerberus AG, Switzerland

Filed Jun. 28, 1989, Ser. No. 372,317

Claims priority, application Switzerland, Jun. 28, 1988, 0244388

Int. Cl.⁵ G08B *13/20*

U.S. Cl. 340—544 22 Claims



1. A pressure sensitive perimeter intrusion detector comprising at least two pressure sensitive housing members adapted for the transmission of acoustic waves in response to pressure applied to the housing member exteriors, each of said housing members having a first means for detecting said acoustic waves

VOL
1127
ISS
1
JE
4
1991
UMI

and providing a first electric signal and a second means distributed along each of said housing members for detecting pressure applied along each of said housing members and providing a second electric signal having substantially no time delay, whereby said electric signals are transmitted to an evaluation means adapted to produce an alarm signal in response to the detection of an intrusion occurrence

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5,021,767

METHOD AND AN APPARATUS FOR ELECTRONICALLY IDENTIFYING ARTICLES MOVING ALONG A SURFACE

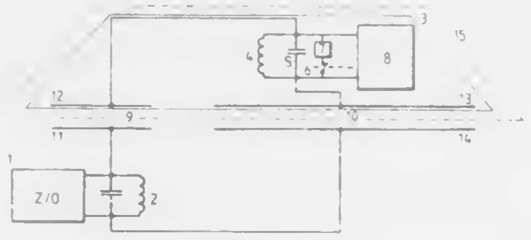
Tallienco W. H. Fockens, and Jan Saeys, both of Eibergen, Netherlands, assignors to N.V. Nederlandsche Apparatenfabriek Nedap, De Groenlo, Netherlands

Filed Oct. 12, 1988, Ser. No. 256,615

Claims priority, application Netherlands, Oct. 12, 1987, 8702426

Int. Cl.^{5} G08B *13/14;* **G06K** *7/08*

U.S. Cl. 340—572 10 Claims



1. A method of identifying through an electronic identification system articles moving along a surface, particularly suitable for identifying metal pallets or containers moving over a loading floor, each article to be identified being provided with an electronic responder comprising a receiver circuit, a switching means connected thereto and control means for the switching means, comprising the steps of: providing the surface with at least two first, substantially platelike, interspaced electrodes electrically insulated relatively to one another, which are interconnected through a transmitter/receiver device of the electronic identification system; connecting the receiver circuit of the responder between at least two second substantially platelike electrodes which are insulated relatively to each other and have an interspace corresponding with the interspace between the first electrodes; energizing the transmitter/-receiver device for generating at a predetermined operating frequency an AC voltage at the first electrodes; and providing the articles with electronic responders which are moved along the surface in such a manner that, at least temporarily, a position is occupied in which the first electrodes are positioned opposite the second electrodes, whereby the opposed electrodes are coupled.

5,021,768

DETECTOR FOR DETECTING RESISTANCE BETWEEN FINGERS

Toshio Kishida, and Chiharu Mori, both of Tsurugashima, Japan, assignors to ITO Co., Ltd., Tokyo, Japan

Filed Jan. 17, 1989, Ser. No. 298,182

Claims priority, application Japan, Aug. 10, 1988, 63-199097

Int. Cl.^{5} G08B *21/00*

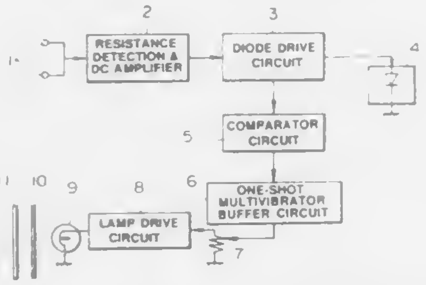
U.S. Cl. 340—573 5 Claims

1. A detector for detecting resistance between fingers to determine the mental condition of a human, said detector comprising:

a. detecting means for detecting resistance between fingers of a human's hand, said resistance varying in response to a variation of said human's mental condition;

b. converting means for converting the variation of said resistance into an electric signal; and

c visual indicator means which is turned on or off by said electric signal, said visual indicator means including a light source, a film and a lens which are disposed linearly in a direction toward the eyes of the human, said film having an arbitrary image thereon and being inserted at a position between said light source and said lens so that said image of film is lighted by said light source and then magnified by said lens, whereby said variation of human's mental condition is indicated by visual inspection of said visual indicator means.


2
3
1
RESISTANCE DETECTION & DC AMPLIFIER
DIODE DRIVE CIRCUIT
4
5
COMPARATOR CIRCUIT
12
11
10
9
8
6
ONE-SHOT MULTIVIBRATOR BUFFER CIRCUIT
LAMP DRIVE CIRCUIT
7

5,021,769

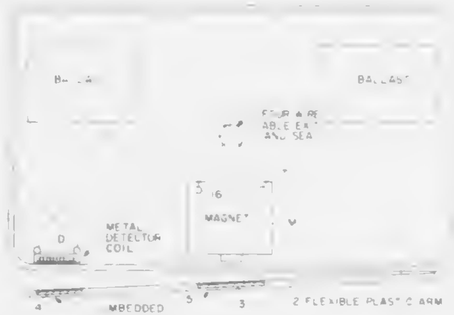
ICE DETECTOR FOR PROTECTING BOATS

George J. Schuellein, 2554 Southand Ave., Oceanside, N.Y. 11572

Filed Apr. 27, 1990, Ser. No. 515,611

Int. Cl.^{5} G08B *21/00*

U.S. Cl. 340—580 2 Claims



1 Ice Detector for Protecting Boats, Docks, Piers and Pilings, comprising;

a water proof hollow float,

an electro-magnet mounted in the float,

a flexible arm rigidly mounted on one side of said float,

a first metal segment mounted in said arm and adapted to be attracted by the magnet,

a metal detector mounted in said float,

a second metal segment mounted in said arm and adapted to come into closer operative proximity with said detector,

whereby ice forming between the wall of the float and the arm will prevent deflection of the arm and will detect the formation of ice.

5,021,770

IMAGE DISPLAY SYSTEM AND DATA INPUT APPARATUS USED THEREIN

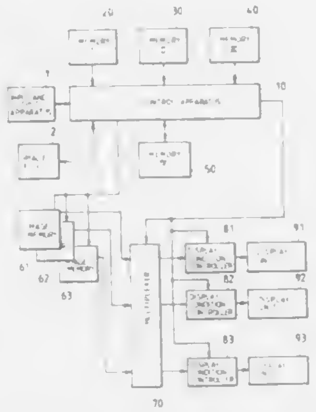
Kazuo Aisaka, Bunkyo, Japan; Akihide Hashizume, Taby, Sweden; Takakazu Huno, Nishitama, Japan; Ryuichi Suzuki, Kokubunji, Japan, and Kazuko Terada, Suginami, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 12, 1988, Ser. No. 217,931

Claims priority, application Japan, Jul. 15, 1987, 62-176735; Jul. 30, 1987, 62-191194

Int. Cl.^{5} G09G *3/02, 1/02;* **H04N** *5/32;* **H05G** *1/64*

U.S. Cl. 340—709 5 Claims



1 An image display system adapted to display X-ray images of the portions of a subject on a plurality of display screens, comprising a first memory adapted to store the relation between the shooting methods for the portion and the ames of the describable regions, a second memory adapted to store the anotomical positional relationship between images obtained by the different shooting methods, a third memory adapted to store the display conditions suited to interpretation of the regions to be inspected, a fourth memory adapted to store for each patient the data on the images to be interpreted such as the shooting method, a multiplexer adapted to assign the images to said plurality of displays screens, and an display condition controller adapted to convert X-ray images into display images, wherein the image for interpretation of the region of interest is selected by the name of the region of interest and said first and fourth memories, the positional relationship for display and the display conditions for the image thus selected are selected from said second and third memories, and the image suited for interpretation of the region of interest is output through said multiplexer and said display condition controller to a plurality of display screens situated at positions suited for diagnosis.

5,021,771

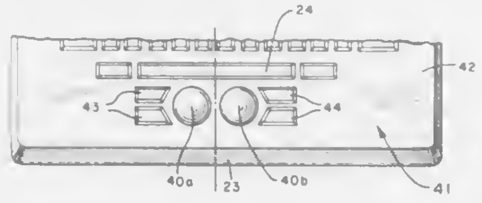
COMPUTER INPUT DEVICE WITH TWO CURSOR POSITIONING SPHERES

Ronald D. Lachman, 7702 W. Davis, Morton Grove, Ill. 60053

Filed Aug. 9, 1988, Ser. No. 204,629

Int. Cl.^{5} G09G *5/08*

U.S. Cl. 340—709 5 Claims



1 An input device for moving a cursor on a computer display screen, said input device comprising

(a) a keyboard, having a plurality of rows of depressible type keys oriented for general operation of said keyboard from an operator side of said keyboard, one of said rows containing home keys to which a user's hands normally return while operating said input device;

(b) a first cursor positioning sphere rotatably mounted on said keyboard between said rows of type keys and said operator side of said keyboard to permit manual rotation of said first sphere by a thumb of the user while the user's fingers remain in contact with said home keys;

(c) first sensing means connected with said first sphere for sensing the rotation thereof, said first sensing means generating first and second output signals corresponding with the magnitude and direction of the sensed rotation with respect to first and second perpendicular axes of said first sphere, respectively;

(d) a second cursor positioning sphere rotatably mounted on said keyboard between said rows of type keys and said operator side of said keyboard to permit manual rotation of said second sphere by a thumb of the user while the user's fingers remain in contact with said home keys;

(e) second sensing means connected with said second sphere for sensing the rotation thereof, said second sensing means generating third and fourth output signals each corresponding with the magnitude and direction of the sensed rotation with respect to first and second perpendicular axes of said second sphere, respectively, said first, second, third, and fourth output signals controlling the position of said cursor on the display screen, respectively, said first, second, and third output signals controlling cursor movement on the display screen along the X, Y, and Z axes, respectively, of the screen.

5,021,772

INTERACTIVE REAL-TIME VIDEO PROCESSOR WITH ZOOM PAN AND SCROLL CAPABILITY

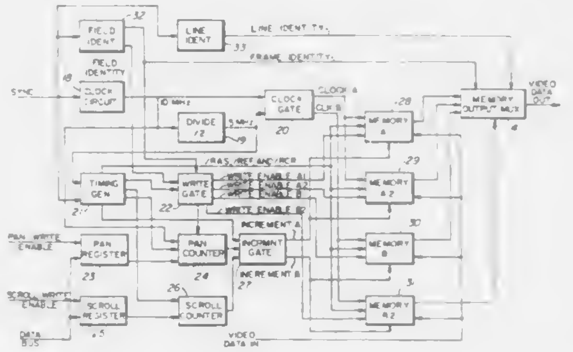
Stephen J. King, 60 Spencer Ave., Toronto, Canada M6K 2J6 , and Lochlan E. Magee, 4174 Wheelwright Crescent, Mississauga, Canada

Continuation of Ser. No. 78,897, Jul. 29, 1987, abandoned. This application Oct. 5, 1989, Ser. No. 462,868

Claims priority, application Canada, Nov. 20, 1986, 523500

Int. Cl.^{5} H04N *9/535*

U.S. Cl. 340—724 17 Claims



1. In an interactive video processor for processing image data corresponding to video scan lines derived form scanning an image, said processor comprising:

sampling means for sampling the image data,

storing means for storing the sampled image data, at a given rate of storage, in successive memory addresses of said storing means,

retrieving means for retrieving the stored image data,

processing means for processing the retrieved image data, and

display means for displaying the image originally scanned;

the improvement comprising pan circuit means for delaying the storage of the sampled image data relative to the start

VOL
1127
ISS
1
JE
4
1991
UMI

of each video scan line by an amount of time appropriate to achieve a desired horizontal displacement of the displayed image, and scroll circuit means for initiating data retrieval at a memory address appropriate to the video scan line which is to appear at the top of the display of the image so as to achieve vertical displacement of the displayed image; and

wherein said retrieving means retrieves the image data at a rate equal to a predetermined fraction of the rate of storage of the image data, and said display means displays the image data corresponding to each video scan line twice so as to produce a display of the image which is effectively magnified by a predetermined factor

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5,021,773

FIBRE OPTIC DISPLAY DEVICE

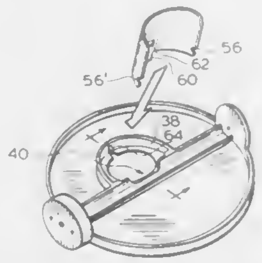
John Browne, Oakville, Canada, assignor to NEI Canada Limited, Rexdale, Canada

Filed Mar. 9, 1989, Ser. No. 321,188

Claims priority, application Canada, Jun. 29, 1988, 570687

Int. Cl.^{5} G09F *3/04*

U.S. Cl. 340—764 **4 Claims**



1. Display device for display in a viewing direction comprising disk assembly including a disk, the assembly being rotable on a generally median axis from rotation between a SET position approximately perpendicular to a viewing direction and a RESET position approximately parallel to the viewing direction,

stops for limiting rotation between said SET and RESET positions,

an aperture in said disk, adjacent but offset from the pivot axis,

a optical fibre terminal located to direct optic radiation through said aperture in the SET position,

a hood mounted on said disk assembly located and shaped to project rearwardly therefrom in the SET position and to occlude in the RESET position and in the viewing direction radiation from the optic fibre terminal,

said hood being concave toward and extending partially around said aperture,

wherein said hood is mechanically attached to said disk assembly,

means for selectively driving said disk between SET and RESET positions,

wherein said hood is formed from a thin sheet of resilient material and said hood and disk are designed so that said bent hood flexes against detents on said disk assembly to be held in position.

5,021,774

METHOD AND CIRCUIT FOR SCANNING CAPACITIVE LOADS

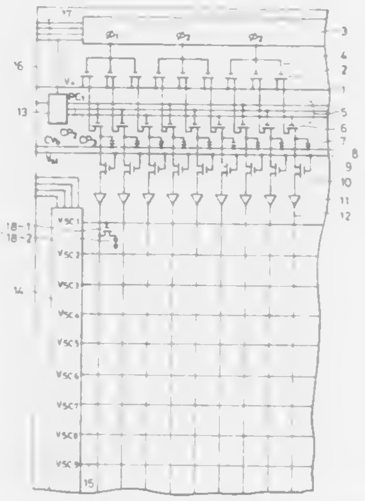
Jun-ichi Ohwada, Hitachi; Masaaki Kitajima; Masayoshi Suzuki, both of Hitachiohta; Masaru Takabatake, and Yoshiharu Nagae, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 142,870, Jan. 11, 1988, abandoned. This application Jan. 17, 1990, Ser. No. 463,823

Claims priority, application Japan, Jan. 9, 1987, 62-1639; Mar. 6, 1987, 62-50077

Int. Cl.^{5} G09G *3/00*

U.S. Cl. 340—811 **12 Claims**



6. A signal circuit for feeding display data signals to a display, comprising:

an input line receiving display data signals;

a signal input sampling circuit connected to said input terminal and comprising,

a first control circuit producing a first plurality of control signals;

a first switching circuit, said first switching circuit being responsive to said first plurality of control signals;

a second control circuit producing a second plurality of control signals;

a second switching circuit, coupled to said first switching circuit and having a plurality of output lines, wherein said display data signals appear at ones of said plurality of output lines in accordance with a timing defined by said first plurality of control signals and said second plurality of control signals;

a hold circuit coupled to each of said plurality of output lines;

a data transfer circuit connected to each of said plurality of output lines; and

a display unit driver coupled to said data transfer circuit;

wherein said first switching circuit comprises n sets of y switching transistors where n and y are integers $\geqq 2$ and wherein,

each switching device has an input terminal, an output terminal, and a control terminal;

the control terminal of each of said y switching devices of one of said n sets of switching devices is coupled to said first control circuit to receive the same one of said first plurality of control signals associated with that set of switching devices;

the input terminal of each of the n×y switching devices is coupled to said input line; and

the display data signals appear at the output terminals of said n×y switching devices with a timing defined by said first plurality of control signals.

5,021,775

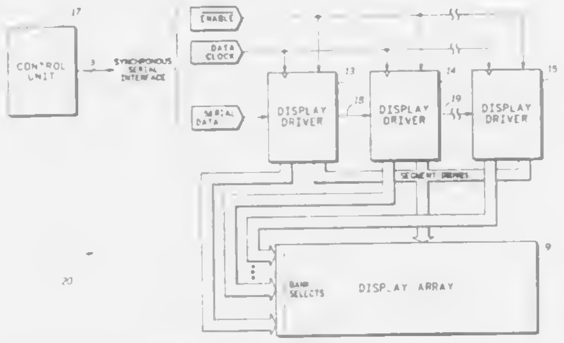
SYNCHRONIZATION METHOD AND CIRCUIT FOR DISPLAY DRIVERS

David C. Babin, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 27, 1989, Ser. No. 316,213

Int. Cl.^{5} G09G *3/00*

U.S. Cl. 340—814 **10 Claims**



1. A method for communicating signals between a plurality of display driver devices comprising the steps of:

(1) cascading the plurality of display driver devices in series wherein each display driver device comprises an output terminal and an input terminal;
(2) receiving serial information at an input terminal of a first predetermined one of the display driver devices;
(3) outputting the serial information at an output terminal of the first predetermined one of the display driver devices; and
(4) sequentially repeating steps (2) and (3) in all remaining cascaded display driver devices, thereby loading data in all of the display driver devices;
(5) generating a control signal in the first predetermined one of the display driver devices;
(6) selecting the control signal rather than the serial information to output at the output terminal of the first predetermined one of the display driver devices;
(7) receiving the control signal at a serial input terminal of a series-coupled display driver device which is adjacent the first predetermined one of the display driver devices;
(8) outputting the control signal at the output terminal of the adjacent series-coupled display driver device; and
(9) sequentially repeating steps (7) and (8) until the control signal is propagated through all remaining series-coupled display driver devices, thereby allowing the loaded data to be displayed by all of the display driver devices.

5,021,776

ELECTRONIC COMBINATION OF LOCK WITH CHANGEABLE ENTRY CODES, LOCK-OUT AND PROGRAMMING CODE

Charles E. Anderson, Mint Hill, and William C. Miller, Monroe, both of N.C., assignors to Yale Security Inc., Monroe, N.C.

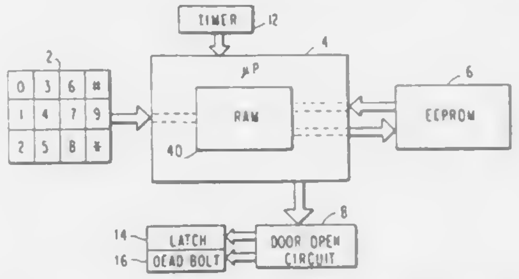
Continuation of Ser. No. 217,028, Jul. 11, 1988, abandoned. This application Aug. 9, 1989, Ser. No. 393,073

Int. Cl.^{5} G06F *7/00*

U.S. Cl. 340—825.31 **4 Claims**

1. An electronic lock for keyless entry comprising:

(a) means for entering a code;
(b) means for storing a set of codes including at least one entry code, at least one lock-out code, and a programming code, wherein said lock-out code is unique with respect to said entry code; and
(c) a control mechanism, connected to the means for entering and the means for storing, and including:
(1) first means, receiving the code from the means for entering and the at least one entry code from the means for storing, for opening the lock for a time period in response to entry of a code corresponding to said at least one entry code;
(2) second means, receiving the code from the means for entering and the at least one lock-out code from the means for storing, and responsive to entry of a code corresponding to said at least one lock-out code, for preventing said first means from opening the lock;
(3) third means, operating independently of any central system and receiving the code from the means for entering and the programming code from the means for storing, for changing the stored entry code to a new entry code in response to entry of two codes corresponding respectively to the programming code and the new entry code, and for changing the stored lock-out code to a new lock-out code in response to entry of three codes corresponding to the programming code, an identifier code, and the new lock-out code; and
(4) fourth means, receiving the code from the means for entering and the programming code from the means for storing, for changing the time period to a new time period in response to entry of three codes corresponding to the programming code, another identifier code, and the new time period.



5,021,777

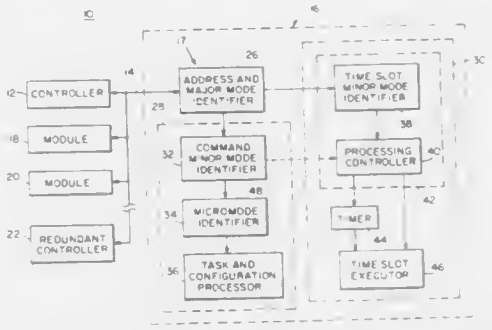
MODE-SELECTABLE COMMUNICATIONS SYSTEM

Ronald Gross, Portsmouth, N.H., and Walter L. Bennett, Andover, Mass., assignors to Transition Technology, Inc., Amesbury, Mass.

Filed Oct. 14, 1988, Ser. No. 258,598

Int. Cl.^{5} H04Q *3/00*

U.S. Cl. 340—825.54 **16 Claims**



1. A mode-selectable communications system for commanding at least one remote module from a controller unit by a command signal having an address and major communications mode command, the system comprising:

a remote module, communicating with the controller unit through a communication link, including:

major mode identifier means for receiving the command signal from the controller unit, for identifying an address pertaining to the remote module, and for identifying a major communications mode for that module as a command response mode or a time slot mode;

command response means, responsive to said major mode

VOL
1127
ISS
1
JE
4
1991
UMI

identifier means, for implementing a task indicated by the identified command response mode; and

time slot response means, responsive to said major mode identifier means, for determining at least one time slot unique to that module and for communicating, based on the identified time slot mode, with the controller unit through the communications link during that time slot, said time slot response means including

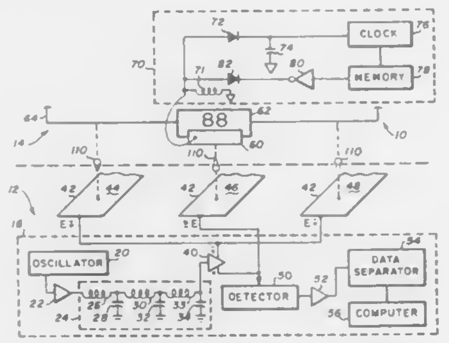
timer means for defining a first preselected timing period;

time slot identifier means, responsive to said major mode identifier means, for selecting a time slot response based on the identified time slot mode and for initializing said timer means; and

means, enabled by said timer means when the timing period expires, for executing the selected time slot response to communicate with the controller unit through the communications link during unique time slot.

5,021,778
CAPACITANCE COUPLED PROXIMITY IDENTIFICATION SYSTEM

Charles A. Walton, 19115 Overlook Rd., Los Gatos, Calif. 95030
Filed Sep. 11, 1989, Ser. No. 405,531
Int. Cl.^{5} H04B *5/00*
U.S. Cl. 340—825.54 **10 Claims**



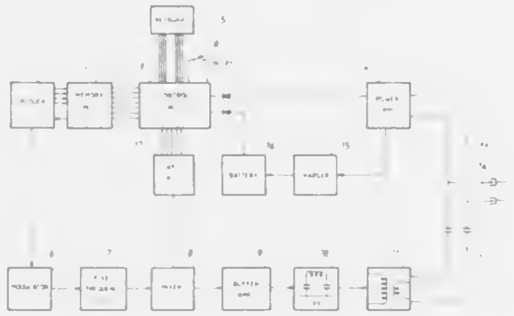
1. A proximity identification system comprising:

a reader section having a reader circuit means connected to a reader antenna, said reader circuit means including an oscillator means connected to said reader antenna for supplying electrical power to said reader antenna to create an electric filed and for detecting an identifier signal, said reader antenna comprising three parallel metal plates with a first of said plates being supplied with electrical power from said reader circuit means, and a second and third of said plates positioned on either side of said first plate and being connected to ground; and

an identifier section having an identifier circuit means connected to an identifier antenna comprising a metal plate for capacitive coupling to said reader antenna, said identifier circuit means for generating an identifier signal responsive to said electric field.

5,021,779
SECURITY DEVICE

Michael Bisak, 32 Sullivan Street, Springvale, Victoria 3171, Australia, assignor to Michael Bisak; Jeffrey Dunn and Walter Cole, all of Victoria, Australia, part interest to each
PCT No. PCT/AU86/00232, § 371 Date Jun. 3, 1987, § 102(e) Date Jun. 3, 1987, PCT Pub. No. WO87/01229, PCT Pub. Date Feb. 26, 1987
Continuation of Ser. No. 64,258, Jun. 3, 1987, abandoned. This PCT application Aug. 14, 1986, Ser. No. 344,555
Claims priority, application Australia, Aug. 14, 1985, PH01976
Int. Cl.^{5} G08C *19/00*
U.S. Cl. 340—825.69 12 Claims



1. A security device for electrical appliances, each said appliance deriving input from an external source electrically connected to said electrical appliance by a conductor, said security device comprising:

encoder-transmitter including

input means for receiving and storing a predetermined security code;

encoding means for scanning said input means to find said stored code, and upon finding said code, receiving and encoding said code to a suitable data signal;

modulating means for receiving and mixing said data signal onto a modulated carrier for continuous transmission; and

transmitting means for continuously transmitting said modulated carrier on the conductor;

at least one receiver-decoder coupled to said electrical appliance, said receiver-decoder including receiving means connected to the conductor for continuously receiving said modulated carrier;

demodulating means for reconverting said modulated carrier to the data signal by demodulating said data signal out of said modulated carrier;

decoding means for receiving said data signal and comparing said data signal to a normal mode code so as to indicate at least one of the following (a) said data signal matches said normal mode code, (b) said data signal is different than said normal mode code, or (c) said data signal is missing from said modulated carrier; and

said modulating means comprises:

a fixed frequency oscillator for providing a frequency for said carrier;

a variable frequency oscillator for providing a frequency associated with the conductor; and

a mixer connected to both oscillators for mixing said two frequencies and for generating said modulated carrier.

5,021,780
BUS PASSENGER ALERTING SYSTEM

Richard F. Fabiano, 6629 Denham Court, SE., Grand Rapids, Mich. 49546, and Robert W. Houskamp, Grand Rapids, Mich., assignors to Richard F. Fabiano, Grand Rapids, Mich.
Filed Sep. 29, 1989, Ser. No. 414,537
Int. Cl.^{5} G08G *1/12*
U.S. Cl. 340—994 **3 Claims**

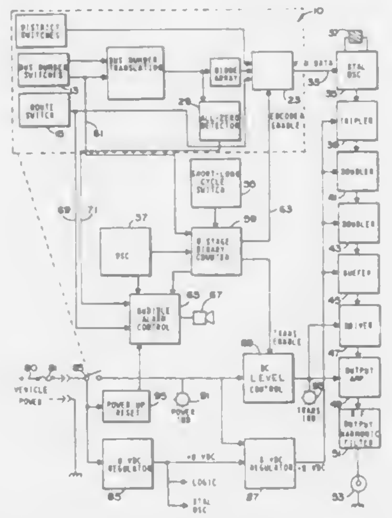
1. A system for alerting a bus passenger that a particular bus

is approaching and that it is time for the passenger to prepare to meet the bus comprising:

a bus;

a transmitter on said bus for sending out a specific bus identification signal derived from district, route and bus identification input data entered into the transmitter by the bus driver before the bus starts out on its route;

said transmitter comprising a signal generator having a plurality of switches for entering district, route and bus number information respectively, said signal generator further including an encoder circuit for generating said specific bus identification signal;



a receiver, which has been preadjusted to receive said specific bus identification signal, for detecting said specific bus identification signal transmitted by said bus when said bus has reached the location along its route where the signal strength of said transmitted signal is sufficiently strong to cause said receiver to detect said signal and provide a passenger alerting signal so that passengers scheduled to ride that particular bus can prepare to meet said bus; wherein said transmitter broadcasts an intermittent signal to limit the possibility of receiver capture; wherein actuation of said encoder circuit in said signal generator is delayed by a variable amount determined by the bus number information switch.

5,021,781
TWO STAGE QUADRATURE INCREMENTAL ENCODER

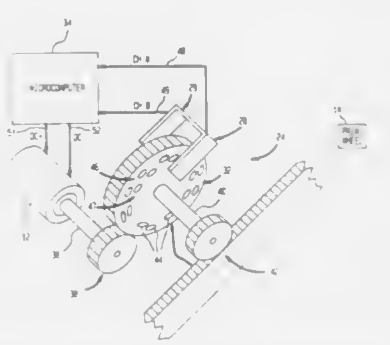
Edilberto I. Salazar, Brookfield, and Gilbert N. Riley, Wilton, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.
Filed Oct. 18, 1989, Ser. No. 423,330
Int. Cl.^{5} H03M *1/22;* G05B *13/00*
U.S. Cl. 341—13 **24 Claims**

1. An incremental position encoder comprising:

a movable element whose movement is to be encoded;

first pulse generating means for providing first and second pulse signals having a number of pulses related to an incremental movement of said movable element, the numbers of pulses in said first and second signals being equal for a given incremental movement of said movable element, the widths of the pulses of said first signal being equal to the widths of corresponding pulses of said signals being substantially out of phase, but not less than by 180°; and

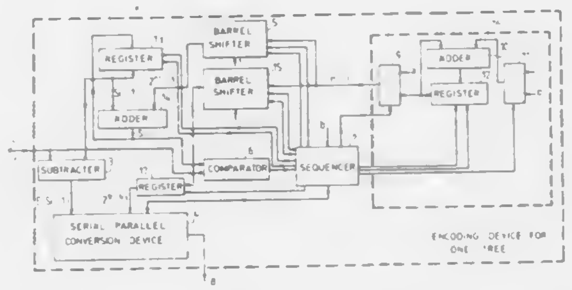
second pulse generating means for providing third signal having number of pulses related to incremental movement of said element, the number of pulses in said third signal being equal to the number of pulses in said first and in said second signals for the same given incremental movement of said element, the widths of the pulses of said third signal being less than the widths of the pulses of said first and second signals, and the pulses of said third signal starting



before the start of corresponding pulses of one of said first and said second signals and ending before the end of the pulses of said one signal.

5,021,782
VARIABLE LENGTH ENCODING METHOD AND VARIABLE LENGTH DECODING METHOD, ENCODING DEVICE AND DECORIDNG DEVICE FOR THE IMPLEMENTATION OF THIS METHOD

Claude Perron, and Philippe Tourtier, both of Rennes, France, assignors to Thomson-CSF, Puteaux, France
PCT No. PCT/ER89/00061, § 371 Date Nov. 30, 1989, § 102(e) Date Nov. 30, 1989, PCT Pub. No. WO89/07863, PCT Pub. Date Aug. 24, 1989
PCT Filed Feb. 17, 1989, Ser. No. 432,763
Claims priority, application France, Feb. 17, 1988, 88 01860
Int. Cl.^{5} H03M *7/40*
U.S. Cl. 341—67 **14 Claims**



1. Variable length encoding method for encoding a series of consecutive, positive or zero, integer values whose probability of occurrence decreases as a function of each value, characterized in that, in order to encode each value E, the method consists in:

determining a first binary word including only bits having a same value, and whose number of bits B is an increasing function of the value to be encoded E, computing the number of bits B according to a predetermined function B(E);

determining a second binary word having a value corresponding to a rank of the value to be encoded E, in a set of values to be encoded arranged in order of decreasing probability, and whose number of bits B' is derived from the function B(E) and from the number of bits B in the first binary word;

constituting a code word by combining the first and second binary words thus determined.

VOL
1127
ISS
1
JE
4
1991
UMI

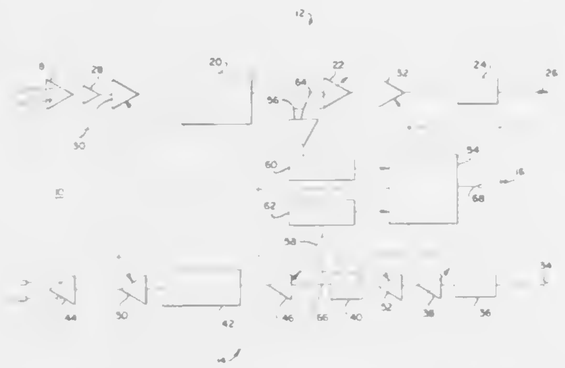
5,021,783
METHOD FOR OPERATING AN APPARATUS FOR FACILITATING COMMUNICATIONS

Alan F. Hendrickson; Herbert M. Chen; Carlin D. Cabler, and Rajiv Hattangadi, all of Austin, Tex., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Sep. 27, 1990, Ser. No. 589,402

Int. Cl.^{5} H03M *1/00*

U.S. Cl. 341—110 2 Claims



1 A method for operating an apparatus for facilitating communications between an analog device and a digital device, said apparatus including a plurality of circuit means for processing signals and a control means for controlling said plurality of circuit means; each of said plurality of circuit means including attenuator means for attenuating signals; said control means including signal burst discrimination means for discriminating utile signals from noise signals, said control means generating a burst indicator when a utile signal is detected; said apparatus being operable in a plurality of stable states, one of said plurality of stable states being an idle state and others of said plurality of stable states being associated with respective ones of said plurality of circuit means; said apparatus also being operable in a plurality of transitional states, said plurality of transitional states accommodating said apparatus changing among said plurality of stable states; said plurality of transitional states including a plurality of up-transition states and a plurality of down-transition states; the method comprising the steps of:

(1) initially establishing said apparatus in said idle state;
(2) evaluating each of said plurality of circuit means by said signal burst discrimination means;
(3) responding to detection of said burst indicator during said evaluation by setting a state indicator to the respective ones of said plurality of up-transition states associated with the respective ones of said plurality of stable states associated with the respective ones of said plurality of circuit means which occasioned said burst indicator;
(4) incrementally adjusting said attenuator means in said plurality of circuit means to lessen attenuation losses in the respective ones of said plurality of circuit means which occasioned said burst indicator and to increase attenuation losses in others of said plurality of circuit means;
(5) repeating step (4) until said attenuator means are at predetermined settings, said predetermined settings being associated with said respective ones of said plurality of stable states extant in said state indicator;
(6) periodically checking for presence of said burst indicator;
(7) on detection of cessation of said burst indicator, setting said state indicator to the respective ones of said plurality of down-transition states associated with the respective ones of said plurality of stable states extant in said state indicator;
(8) incrementally adjusting said attenuator means to redistribute attenuation losses among said plurality of circuit means;
(9) if no burst indicator is detected, continuing step (8) until said apparatus returns to said idle state, then performing steps (2)-(10);
(10) if a burst indicator is detected, repeating steps (3)-(9)

5,021,784
CALIBRATED CURRENT SOURCE WITH RIPPLE REDUCTION

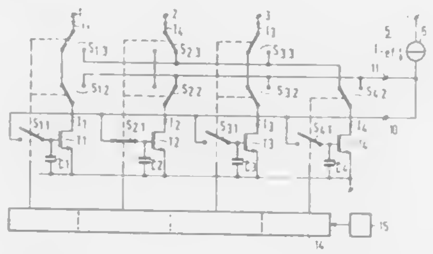
Dirk W. J. Groeneveld, and Hendrikus J. Schouwenaars, both of Eindhoven, Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.

Filed Jul. 2, 1990, Ser. No. 547,901

Claims priority, application Netherlands, Jul. 10, 1989, 8901755

Int. Cl.^{5} H03M *1/10*

U.S. Cl. 341—120 12 Claims



1. A signal-source arrangement comprising.
a group of signal sources for generating substantially identical unit signals,
correction means for reducing mutual deviations in the unit signals from the signal sources by calibrating the signal sources in conformity with a calibration pattern recurring with a specific period, resulting in unit signals comprising similarly shaped spurious signals recurring with said period and having time shifts in conformity with the calibration pattern,
combination means for combining a number of unit signals of a number of signal sources to form an output signal,
wherein at least one of the correction means and the combination means selects unit signals for the output signal in such a way that, relative to the spurious signal of one of the selected unit signals, the time shifts of the spurious signals of the selected unit signals, except for said one of the selected unit signals, have an average value as closely as possible approximating half of said period and have absolute values that differ from each other to a maximal extent.

5,021,785
FLOATING POINT DIGITAL TO ANALOG CONVERTER WITH BIAS TO ESTABLISH RANGE MIDPOINT

Takayuki Kohdaka; Katsuhiko Ishida; Toshiyuki Takahashi, and Takashi Ogata, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Continuation of Ser. No. 115,581, Oct. 23, 1987, abandoned, which is a continuation of Ser. No. 781,767, Sep. 30, 1985, abandoned. This application Jan. 5, 1990, Ser. No. 463,876

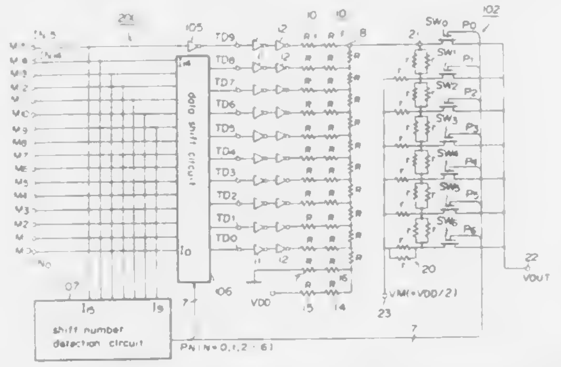
Claims priority, application Japan, Oct. 4, 1984, 59-208749; Jun. 1, 1985, 60-119525

Int. Cl.^{5} H03M *1/70*

U.S. Cl. 341—138 1 Claim

1. A digital-to-analog converter for converting binary input data in fixed-point representation into an analog output signal comprising:

(a) a data converting means for converting said fixed-point binary input data into floating point data composed of a mantissa part whose most significant bit is a sign bit and an exponent part representing a power of two by which the mantissa part is to be magnified, said converting means including means for determining the value of the exponent part in accordance with the absolute value of the binary input data;
(b) digital-to-analog converting means for converting said mantissa part into a first analog signal within a range of single polarity, wherein said digital-to-analog converting means comprises an R-2R resistor ladder network, each 2R resistor of said R-2R resistor ladder network being supplied with a corresponding bit of said mantissa part, and said first analog signal being derived from one terminal end of said R-2R ladder network;
(c) circuit means responsive to said first analog signal to produce a plurality of second analog signals of single polarity whose voltages are 2^{-n} (n=0, 1, 2, 3, . . .) magnifications of said first analog signal, wherein said circuit means comprises a r-2r resistor ladder network directly connected at one terminal end thereof to said one terminal end of said R-2R ladder network for producing said second analog signals;



(d) switch circuit means connected to said circuit means for selectively outputting one of said second analog signals as said analog output signal in accordance with said exponent part of said floating point data; and
(e) bias means for applying a bias voltage to the circuit means to establish the center of the range of the analog output signal, wherein said r-2r resistor ladder network is supplied at one terminal of each 2r resistor thereof with said bias voltage to determine the center of range of said analog output signal.

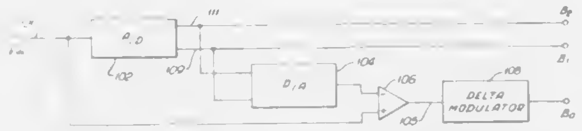
5,021,786
ANALOG TO DIGITAL AND DIGITAL TO ANALOG SIGNAL PROCESSORS

Richard C. Gerdes, 4645 E. Quivira Dr., Tucson, Ariz. 85718

Filed Sep. 15, 1989, Ser. No. 408,086

Int. Cl.^{5} H03M *3/00*

U.S. Cl. 341—143 38 Claims



1. A signal processor for converting a received analog input voltage into a digital representation, the processor comprising:
a first analog to digital converter coupled to receive the analog input voltage and providing a first part of a digital output representation of a predetermined resolution of the analog input voltage;
a resolution error detector responsive to the analog input signal and the first part of the digital output representation and providing a difference signal proportional to the difference between the input analog voltage and the first part of the digital output representation; and
a delta modulator having an output comprising a second part of the digital representation, the delta modulator receiving as the input said difference signal, wherein the output of the signal processor comprises the output of the analog to digital converter and the output of the delta modulator.

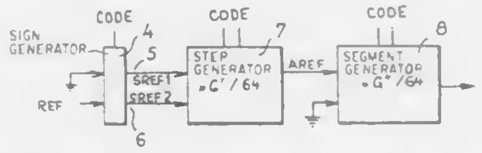
5,021,787
DIGITAL-ANALOG CONVERTER FOR CONVERSION OF LAW A- ENCODED DIGITAL SIGNALS INTO ANALOG SIGNALS

Yves Leduc, Chemin Des Martels, Belgium, assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 7,839, Mar. 26, 1987, abandoned. This application May 3, 1990, Ser. No. 518,375

Int. Cl.^{5} H03M *1/80*

U.S. Cl. 341—150 5 Claims



1. A digital-analog converter for converting digital signals formed of sign bits, of step bits, and of segment bits into analog signals, wherein the digital signals have been encoded by data compression in accordance with Law A, said converter comprising:
sign generator means for receiving the sign bit of the digital signal to be converted, said sign generator means including a reference voltage source and a ground source and having first and second outputs for providing first and second reference signals as selectively derived from said reference voltage source and said ground source in dependence upon the sign bit of said digital signal as received thereby;
step generator means for receiving the step bits of aid digital signal and being coupled to the output of said sign generator means for receiving said first and second reference signals as inputs and providing a step reference signal as a processed reference signal output in dependence upon said step bits of said digital signal as received thereby in conjunction with said first and second outputs from said sign generator means; and
segment generator means for receiving the segment bits of said digital signal, said segment generator means being coupled to the output of the said step generator means for receiving the processed reference signal as output therefrom and being operably connected to said sign generator means only via said step generator means, said segment generator means having an output on which ana analog signal as converted from said digital signal is provided, the output voltage provided as an analog signal at the output of said segment generator means being related to the reference voltage as provided by said reference voltage source of said sign generator means in accordance with the expression:

$$OUTPUT=(+/-).G'.(1/64).G''(1/64).VREF,$$

wherein
$G'=(1,3,5,7. . . 671 \text{ or } 63)$; and
$G''=(1,2,4,8. . . 32\text{or } 64)$ are the gains of the step generator means and of the segment generator means, respectively.

5,021,788
DIGITAL ANALOG CONVERTER

Massaaki Ueki; Toshihiko Masuda, both of Tokyo, and Takashi Kanai, Chiba, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 13, 1990, Ser. No. 479,163

Claims priority, application Japan, Feb. 14, 1989, 1-34570

Int. Cl.^{5} H03M *1/82*

U.S. Cl. 341—152 5 Claims

1. A digital-to-analog converter comprising:
input means for supplying input digital data,

VOL
1127
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1991
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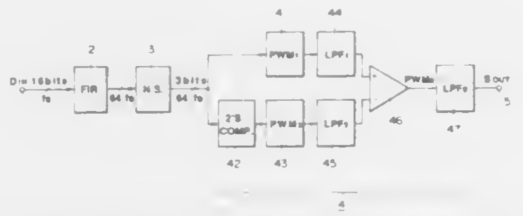
first waveform generating means coupled with the input means to receive said input digital data for generating a first pulse width modulated waveform corresponding with said input digital data,

second waveform generating means coupled with the input means to receive said input digital data for generating a second pulse width modulated waveform corresponding with a 2's complement version of said input digital data,

first low pass filter means for attenuating high frequency components of said first waveform to produce a first filtered waveform,



second low pass filter means for attenuating high frequency components of said second waveform to produce a second filtered waveform,

differential amplifying means coupled with the first low pass filter means to receive the first filtered waveform therefrom and with the second low pass filter means to receive the second filtered waveform therefrom, for producing a differential output waveform based upon said first filtered waveform and said second filtered waveform, and

filter means for attenuating high frequency components of said differential output waveform obtained from said differential amplifying means to produce an analog output signal.

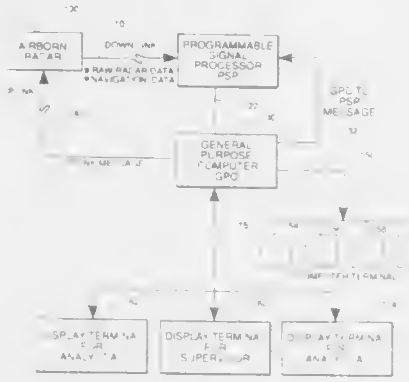
5,021,789
REAL-TIME HIGH RESOLUTION AUTOFOCUS SYSTEM IN DIGITAL RADAR SIGNAL PROCESSORS

Wei H. Shaw, Los Angeles, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jul. 2, 1990, Ser. No. 551,813

Int. Cl.^{5} G01S *13/90*

U.S. Cl. 342—25 **1 Claim**


AIRBORN RADAR
DOWN LINK
RAW RADAR DATA
NAVIGATION DATA
PROGRAMMABLE SIGNAL PROCESSOR PSP
GPC TO PSP MESSAGE
GENERAL PURPOSE COMPUTER GPC
DISPLAY TERMINAL FOR ANALYST A
DISPLAY TERMINAL FOR SUPERVISOR
DISPLAY TERMINAL FOR ANALYST A

1. An autofocus method for use in a system having an airborne synthetic aperture radar, the autofocus process being mechanized in high-speed digital signal processors with control capability from an operating console to change selected processing parameters to perform on-line focusing:

wherein said autofocus method comprises the steps of

(a) selecting range bins which contain the strongest signals, from raw data

$$\{P(t,n)\ t=1,2,\ldots,2^{l_1};\ n=1,2,\ldots,N\}$$

wherein l_1 designates the size of a full aperture and is a positive integer which is one of said selected processing parameters, the number of range bins (J) selected being one of said selected processing parameters;

(b) forming two subapertures designated left (LA) and right (RA) from the first 2^{l_3} pulses and the last 2^{l_3} pulses of raw data in the selected range bins, the subapertures being formed by taking uniformly weighted 2^{l_2}-point fast Fourier transforms separately, $2^{l_2}-2^{l_3}$ 0's being filled before taking the fast Fourier transforms, l_2 and l_3 being among said selected processing parameters, with $l_1 \geqq l_2 \geqq l_3 > 0$ and $l_1 > l_3$, the left aperture and the right aperture each being formed by summing neighboring range bin filter magnitudes within a distance of R range bins, R being one of said selected processing parameters, the elements of the subapertures being magnitudes, with all phase information lost for further processing;

(c) performing correlations of the map formed by the left subaperture and the map formed by the right subaperture to find the drift between them, using not more than a second degree polynomial for only quadratic drift;

(d) measuring the quality of each map correlation by an associated discriminate, selecting from a first discriminant based on the slope of the correlations, and a second discriminant base on a power ratio of maximum correlation value and average filter power, the average filter power being computed by eliminating those filters with the power less than the average power, the elimination being performed either once to get a one-pass average power AVG(s,1), or twice to get a two-pass average power AVG(s,2), the selection of the first discriminant or the second discriminant and the selection of one-pass or two-pass average being under operator control and adjustable in real time;

(e) determining the final drift value using a best estimation of the discriminant from step (d), using either a first method or a second method under the control of the operator with a flag, the first method being selection of a maximum discriminant, and the second method being a least-square approximation;

(f) generating estimated correcting phasors based on the best correlation and correcting the radar data according to the estimated correcting phasors.

5,021,790
MICROWAVE DATE TRANSMISSION APPARATUS

Tomozo Ohta, Ikoma; Hiroshi Nakano, Tenri; Kazutada Higashi, Tenri, and Hirohiko Yamamotn, Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 55,363, May 29, 1987, Pat. No. 4,926,182. This application May 14, 1990, Ser. No. 522,581

Claims priority, application Japan, May 30, 1986, 61-126729; May 30, 1986, 61-126730

Int. Cl.^{5} G01S *13/80*

U.S. Cl. 342—44 **16 Claims**

1. A microwave data transmission apparatus comprising interrogator means including first transceiving means for transmitting modulated microwave signals during a modulation period and non-modulated microwave carrier signals during a non-modulation period and for receiving microwave signals; and

identification tag means including memory means, second transceiving means and control processing means, with built-in power supply means which periodically renders said control means operational upon receipt of a power starting signal transmitted from said interrogator during a first sub-period of said modulation period, for controlling said identification tag,

said control means operable in response to a control signal of a first or second state, transmitted from said interrogator during a second sub-period of said modulation period to

store data transmitted from said interrogator during a third sub-period of said modulation period into said memory means in response to said control signal of said first state, and

read data previously stored in said memory means to modulate said non-modulated microwave carrier signals, transmitted from said interrogator during said non-modulation period, with said stored data for transmission by said second transceiving means back to said interrogator means in response to said control signal of said second state.

5,021,791
RADAR SYSTEMS

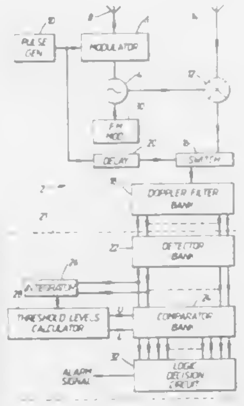
David L. Hurd, Hampshire, England, assignor to GEC-Marconi Limited, Stanmore, England

Filed Oct. 31, 1985, Ser. No. 809,862

Claims priority, application United Kingdom, Nov. 2, 1984, 8427745

Int. Cl.^{5} G01S *13/536*

U.S. Cl. 342—93 **13 Claims**



1. A radar system comprising a radar carrier frequency oscillator for generating a radar carrier signal for transmission to a target, receiving means for receiving a radar carrier signal reflected from the target, mixer means for receiving and mixing the generated and received radar carrier signals to produce a Doppler signal, a Doppler filter bank having a plurality of Doppler filters and arranged to receive Doppler signals produced by the mixer means, alarm means coupled to the Doppler filter bank and having a plurality of Doppler bins and an alarm threshold level circuit for signalling an alarm when the magnitude of a Doppler signal offered thereto from the Doppler filter bank exceeds the alarm threshold level, and frequency modulating means for producing a modulating signal having a peak to peak frequency deviation for frequency modulating the generated radar carrier signal and for frequency modulating any interference signal received by the receiving means such that the bandwidth of the frequency modulated interference signal exceeds the combined bandwidth of a number of the Doppler filters in the Doppler filter bank.

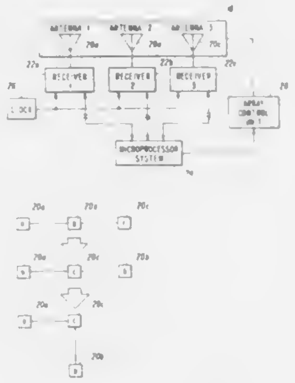
5,021,792
SYSTEM FOR DETERMINING DIRECTION OR ATTITUDE USING GPS SATELLITE SIGNALS

Patrick Y. Hwang, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 12, 1990, Ser. No. 464,271

Int. Cl.^{5} H04B *7/185;* **G01S** *5/02*

U.S. Cl. 342—357 **15 Claims**



1. A method for determining attitude using GPS satellites and an antenna array including a plurality of antennas in which the positions of the antennas within the array may be selectively reconfigured, comprising the steps of:

arranging said antennas in a collinear pattern in which said antennas are spaced apart by known distances;

receiving and phase sampling signals from a plurality of GPS satellites with each of said antennas;

exchanging the positions of a pair of said antennas within said array while maintaining continuous phase tracking:

receiving and phase sampling signals from said plurality of GPS satellites with each of said antennas;

rearranging said antennas in a non-collinear pattern in which said antennas are spaced apart by known distances while maintaining continuous phase tracking;

receiving and phase sampling signals from said plurality of GPS satellites with each of said antennas; and

calculating the attitude of said antenna array based on the phase of said GPS signals received and sampled in the previous steps.

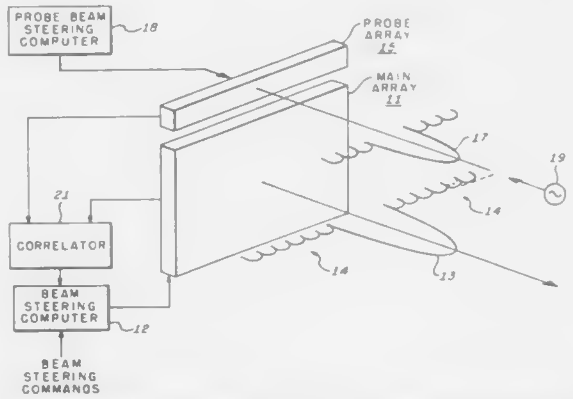
5,021,793
PHASED ARRAY ANTENNA METHOD AND SYSTEM FOR ADAPTIVELY POSITIONING NULLS

John J. Stangel, Mahopac, and John C. Herper, Glen Cove, both of N.Y., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Oct. 18, 1989, Ser. No. 423,080

Int. Cl.^{5} G01S *3/16. 3/28*

U.S. Cl. 342—383 **15 Claims**



1. An apparatus for adaptively positioning nulls at desired

VOL 1127 ISS 1 JE 4 1991 UMI

locations in a beam pattern of an antenna having a main lobe and sidelobes at angular positions determined by a phase function applied to the antenna comprising:

steerable probe antenna means having a predetermined probe beam with a probe beam main lobe and a predetermined probe beam main lobe peak gain for positioning said probe beam main lobe at angular locations of interfering sources at which nulls in said pattern of said antenna are desired; and

phase perturbation means responsive to signals received from said predetermined probe beam and from said beam pattern for establishing phase perturbation functions and applying said phase perturbation functions to said phase function of said antenna to create a perturbated phase function for said antenna that establishes nulls in said beam pattern of said antenna at said angular locations.

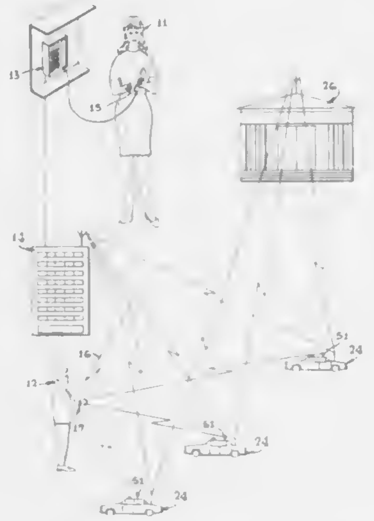
5,021,794
PERSONAL EMERGENCY LOCATOR SYSTEM

Robert A. Lawrence, 1320 S. Santa Fe Ave., Los Angeles, Calif. 90021

Filed Aug. 15, 1989, Ser. No. 394,011

Int. Cl.^{5} G01S *3/02*

U.S. Cl. 342—457 **5 Claims**



1 A telephone-activated personal emergency locator system, comprising:

portable signal generating means adapted to be actuated by an individual interested in locating a lost or abducted person, said signal generating means generating an audible digital pulse-tone signal containing a discrete encoded address for transmission by means of a telephone system;

repeated means effectively connected to said telephone system for receiving audible digital pulus-tone signals transmitted by said telephone system, said repeater means including radio transmitter means for generating and transmitting a radio-frequency initiating signal containing said encoded address upon receipt of a digital pulsetone signal from said signal generating means.

radio transceiver means carried by a person to be located for receiving an initiating signal transmitted by said repeater and transmitting a radio homing signal containing said encoded address in response to said initiating signal; and

radio receiver means for receiving and identifying said homing signal and determining there from the bearing and distance from said receiver to said transceiver.

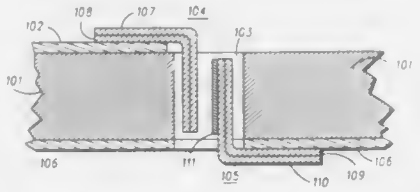
5,021,795
PASSIVE TEMPERATURE COMPENSATION SCHEME FOR MICROSTRIP ANTENNAS

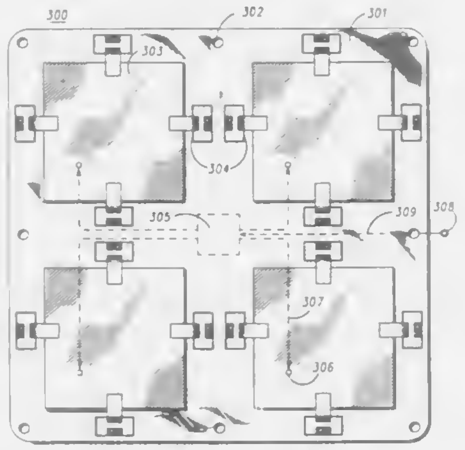
Joseph Masiulis, Elmhurst, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 23, 1989, Ser. No. 370,672

Int. Cl.^{5} H01Q *1/380, 13/080, 9/000*

U.S. Cl. 343—700 MS **2 Claims**





1. For a microstrip patch antenna on a substrate of dielectric material, a method for compensating antenna resonant frequency for changes due to substrate dielectric constant thermal effects, the method comprising:

disposing passive, temperature dependent capacitors about one or more radiating edges of the microstrip patch antenna:

wherein the passive, temperature dependent capacitors comprise bi-metallic strips that move with respect to one another in response to temperature change.

5,021,796
BROAD BAND, POLARIZATION DIVERSITY MONOPULSE ANTENNA

Robert G. Corzine, China Lake; Bruce E. Bolstad, and John S. Johantgen, both of Ridgecrest, all of Calif., assignors to The United States of america as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 15, 1971, Ser. No. 106,883

Int. Cl.^{5} H01Q *1/32, 13/10, 11/10*

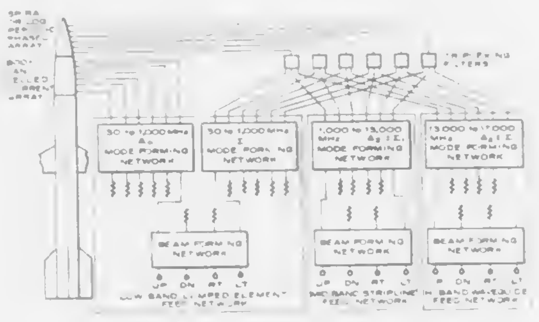
U.S. Cl. 343—712 **4 Claims**

1. A directional receiving antenna system for use in a vehicle for receiving electromagnetic signals comprising;

a radiating structure constructed such that highest frequencies radiate from a point near one end of the structure and progressively lower frequencies radiate closer to the other end of the structure positioned in said vehicle; and

another radiating structure located in said vehicle constructed such that the vehicle body itself forms an efficient radiating structure in the region where antenna aperture is

less than $2/\pi$ wavelengths in diameter; said radiating structures cooperating to provide true continuous multi-


BEAM FORMING NETWORK
BEAM FORMING NETWORK
BEAM FORMING NETWORK
UP DN RT LT
UP DN RT LT
UP DN RT LT
LOW BAND LUMPED ELEMENT FEED NETWORK
MID BAND STRIPLINE FEED NETWORK
HI BAND WAVEGUIDE FEED NETWORK

octave microwave direction finding capability as the receiving antenna system.

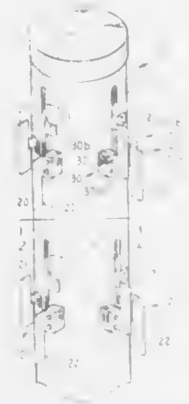
5,021,797
ANTENNA FOR TRANSMITTING ELLIPTICALLY POLARIZED TELEVISION SIGNALS

Geza Dienes, Claremont, Calif., assignor to Andrew Corporation, Orland Park, Ill.

Filed May 9, 1990, Ser. No. 520,890

Int. Cl.^{5} H01Q *13/12*

U.S. Cl. 343—727 **17 Claims**



1 An antenna for elliptically polarized television transmission comprising,

a vertically elongated cylindrical waveguide having a multiplicity of vertically elongated slots, each of which is defined at least in part by associated vertical sides, spaced along the length and around the circumference thereof for radiating horizontally polarized energy,

coupling means for coupling electromagnetic energy from the interior of said waveguide to said slots,

parasitic radiating dipoles mounted on the outer surface of said waveguide adjacent each of said slots for radiating vertically polarized energy, so that the combination of the radiated horizontally and vertically polarized energy produces elliptically polarized energy,

each of said parasitic dipoles comprising a pair of elongated radiating elements, each of said elements spaced from the outer surface of said waveguide along a respective one of the vertical sides of the associated slot and each being at least partially offset relative to the other of said radiating elements in a direction that is parallel to the vertical sides, and

a pair of coupling capacitors on opposite sides of each slot along the vertical sides thereof and connected to the respective radiating elements for coupling electromagnetic energy from the field around the slot into the respective radiating elements.

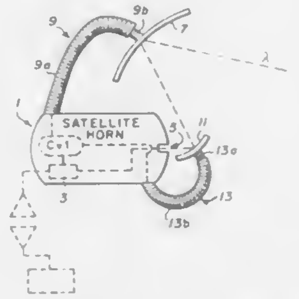
5,021,798
ANTENNA WITH POSITIONABLE REFLECTOR

Shivadev K. Ubhayakar, Rancho Palos Verdes, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Continuation-in-part of Ser. No. 156,256, Feb. 16, 1988, Pat. No. 4,848,179, Ser. No. 156,388, Feb. 16, 1988, and Ser. No. 304,148, Jan. 1, 1989. This application May 1, 1989, Ser. No. 346,445

Int. Cl.^{5} H01Q *3/00*

U.S. Cl. 343—762 **2 Claims**



1. In combination with a satellite, said satellite containing therewithin an RF receiver for receiving control signals from a remote source and having a wall defining an exterior boundary to said satellite, microwave horn means forming a microwave transmission passage through said wall; main reflector means for reflecting incident microwave energy; sub-reflector means for reflecting incident microwave energy; first elongated support means for supporting said main reflector means to said wall in spaced relationship to said sub reflector means and said horn means; second elongated support means for supporting said sub reflector means to said wall in spaced relation to said horn means and said main reflector means, said sub reflector means being positioned to reflect microwave energy between said main reflector mean and said horn means; the improvement wherein at least one of said first and second support means comprises:

a flexidigit robotic manipulator for positioning a reflector means, said flexidigit robotic manipulator comprising:

a multidigit arm, said arm containing a plurality of at least two sections including: a first course manipulator section and a second fine manipulator section, and with said fine manipulator section being coupled to and carried by said course manipulator section, each of which sections is positionable angularly and spatially to a predetermined degree with respect to an adjacent section, and said arm being capable of forming a plurality of curves to position an end thereof at selected locations, whereby said support means is changeable in position; and wherein said course manipulator section comprises further:

a series of at least two platform means; said platform means being spaced apart with one of said platform means including means for holding said fine manipulator section and with each of said platform means having an axis;

position control means for bearing the axial and torsional loads imposed on said platforms and positioning each of said platforms in said series relative to one another, said position control means comprising:

stabilizer means disposed between adjacent ones of said platform means in said series of platform means, each said stabilizer means further comprising:

at least three arm assemblies located spaced essentially evenly about the center of said platform means;

each of said arm assemblies including further: a pair of arms, joint means and a pair of anchor means; each arm in said pair of arms being joined together at one end by said joint means to form an articulated arm with said joint means permitting universal movement between said arms of said arm pair and with the remaining ends of each arm in said pair being movably attached to respective adjacent ones of said platform means by a corresponding one of said associated pair of anchor means with each said anchor

VOL
1127
ISS
1
JE
4
1991
UMI

means being adapted to permit the associated pair of arms to rotate in a plane generally normal to the surface of said adjacent ones of said platform means; and

actuator means spaced from said stabilizer means and being disposed between adjacent ones of said platform means in said series to platform means for moving a platform means relative to an adjacent platform means;

said actuator means being capable of sustaining a longitudinally directed force applied by mechanical loading and being incapable of resisting rotational movement of one of said platform means relative to the adjacent one of said platform means applied by said mechanical loading;

whereby axially directed forces and torsional forces applied to said position control means are separately selectively absorbed, respectively, by said actuator means and by said stabilizer means.

5,021,799

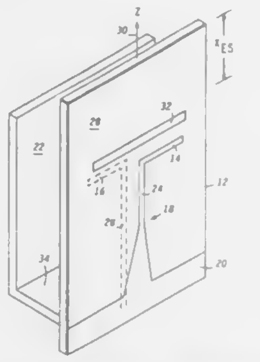
HIGH PERMITIVITY DIELECTRIC MICROSTRIP DIPOLE ANTENNA

Joseph P. Kobus, Phoenix; Ronald F. Kielmeyer, Jr., Chandler, and Arthur Diaz, Scottsdale, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 3, 1989, Ser. No. 374,817

Int. Cl.^{5} H01Q *9/28*

U.S. Cl. 343—795 **3 Claims**



1. A microstrip dipole antenna comprising:

high permitivity dielectric substrate means for supplying a thin antenna substrate, said high dielectric substrate means including a front and a back face;

a plurality of radiating dipole arm means for radiating and receiving electromagnetic signals;

one each of said plurality of radiating dipole arm means coupled to one each of said front and back faces of said high permitivity dielectric substrate means;

microstrip transmission line means coupled to said high permitivity dielectric substrate means;

tapered balun means for supplying unbalanced signals from said microstrip transmission line means to said plurality of radiating dipole means by transforming said unbalanced signals to balanced signals, and said balanced signals to said unbalanced signals;

ground plane means coupled to, and parallel with, said back face of said high dielectric substrate means;

said ground plane means and said back face of said high dielectric substrate means defining a shallow cavity; and

reflector means coupled between and perpendicular to, said ground plane means and said back face of said high dielectric substrate means.

5,021,800

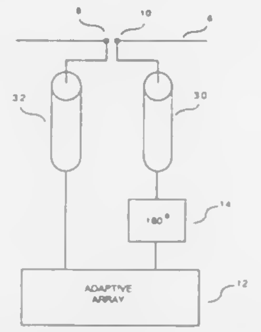
TWO TERMINAL ANTENNA FOR ADAPTIVE ARRAYS

Kenneth Rilling, 1190 Crestline Dr., Cupertino, Calif. 95014

Continuation-in-part of Ser. No. 175,938, Mar. 31, 1988, abandoned. This application Jan. 5, 1990, Ser. No. 462,862

Int. Cl.^{5} H01Q *9/16*

U.S. Cl. 343—820 **30 Claims**



1. An antenna system for reducing by one half the number of antennas required by an adaptive array means to reject interference signals, said system comprising:

at least one antenna array means which includes at least two dipole element means; and

phase shifter means coupled to recieve the output signal of the first terminal of the antenna array means for changing the phase of the output signal;

where the output terminal of the phase shifter means and the second terminal of the antenna array means are each disposed to be coupled to different input terminals of the adaptive array such that direction of arrival phase information is retained;

the said adaptive array means having a number of input terminal pairs that correspond to the number of antenna array means.

5,021,801

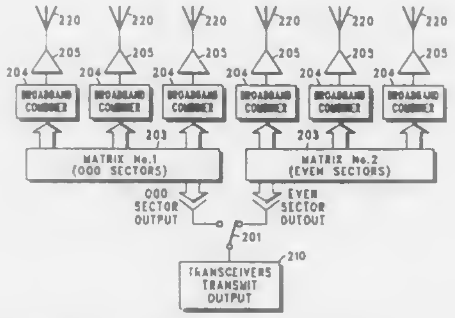
ANTENNA SWITCHING SYSTEM

John M. Smith, Elgin, and Joseph J. Schuler, Schaumburg, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 5, 1989, Ser. No. 402,721

Int. Cl.^{5} H01Q *3/24*

U.S. Cl. 343—876 **8 Claims**


220
205
204
BROADBAND COMBINER
203
MATRIX No.1 (ODD SECTORS)
MATRIX No.2 (EVEN SECTORS)
ODD SECTOR OUTPUT
EVEN SECTOR OUTOUT
201
210
TRANSCEIVERS TRANSMIT OUTPUT

1. An antenna switching system, comprising:

(a) at least one signal transmission source for generating a plurality of radio frequency signals;

(b) means, coupled to the at least one signal transmission source, for switching the plurality of radio frequency signals;

(c) radio frequency combining means, having an input and an output, for combining the plurality of signals from the means for switching, the input of the radio frequency combining means coupled to the means for switching;

(d) amplification means having an input and an output, the input of the amplification means coupled to the output of the radio frequency combining means; and

(e) at least one antenna coupled to the output of the amplification means.

5,021,802

THERMALLY REVERSIBLE SOL-GEL PHASE CHANGE INK OR BUBBLE JET INK

Donald R. Allred, Brookfield, Conn., assignor to Dataproducts Corporation, Woodland Hills, Calif.

Continuation of Ser. No. 158,211, Feb. 19, 1988, abandoned. This application Apr. 28, 1989, Ser. No. 346,371

Int. Cl.^{5} B41J *2/01;* **C09D** *11/02*

U.S. Cl. 346—1.1 8 Claims

1. A method of ink jet printing comprising:

(a) providing a thermally reversible aqueous sol-gel ink which is a gel at ambient temperature and a sol at temperatures between about 40° C.–100° C., said ink comprising:

(i) 90–99.9% by weight aqueous sol-gel medium which medium is substantially free of syneresis; and

(ii) 0.1–10% by weight colorant;

(b) elevating the temperature of said ink to between about 40°–100° C. to cause said ink to form a sol; and

(c) jetting said ink onto a substrate; whereby said ink forms a gel upon cooling on said substrate.

5,021,803

INK JET PARALLEL CUSP PRODUCING SLOT OR EDGE CONFIGURED NOZZLE SYSTEM

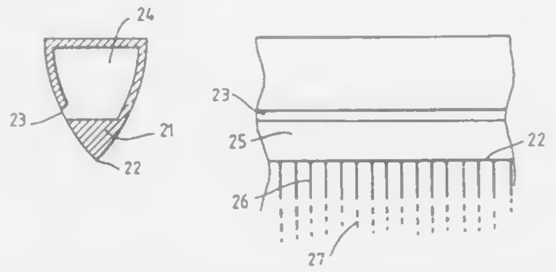
Derek J. Toms, Cheshire, and Ronald A. Coffee, Halsemere, both of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 219,880, Jul. 11, 1988, abandoned, which is a continuation of Ser. No. 819,908, Jan. 21, 1986, abandoned. This application Sep. 27, 1989, Ser. No. 412,603

Claims priority, application United Kingdom, Jan. 18, 1985, 8501353

Int. Cl.^{5} G01D *15/18;* **H05B** *3/00*

U.S. Cl. 346—1.1 **12 Claims**



1. An ink jet printer having a print head for emitting a plurality of continuous ink jets each comprising a stream of moving charged ink drops, comprising:

means for deflecting or not deflecting selected drops or groups of drops from each stream in response to information-carrying signals whereby a receptor surface can be placed to receive the deflected or undeflected drops to provide a record of that information;

a print head elongated slot or an elongated edge portion;

a feeder for continuously supplying ink to the slot or edge portion uniformly along its length; and

means to subject the ink as it flows through the slot or over the edge portion to an electrostatic field sufficient to draw off the ink continuously as an array of parallel cusps extending away from the slot or edge portion thereby to provide one of said continuous ink jets from each cusp.

5,021,804

THERMAL TRANSFER COLOR PRINTER

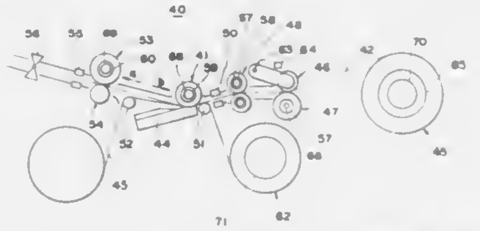
Masaru Nozawa; Chiharu Imaseki, and Kazuyuki Inagaki, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Nov. 10, 1988, Ser. No. 269,600

Claims priority, application Japan, Nov. 13, 1987, 62-174193[U]; Sep. 30, 1988, 63-248500

Int. Cl.^{5} G01D *15/10*

U.S. Cl. 346—76 PH 16 Claims



1. A thermal transfer color printer for feeding an ink film and a recording medium in tight contact with each other between a thermal head and a platen roller, driving the thermal head to transfer ink from the ink film onto the recording medium, and thereafter separating the ink film from the recording medium, comprising:

a thermal head for transferring ink from the ink film onto the recording medium,

a platen roller having elasticity and a surface layer displaying a low coefficient of friction relative to the recording medium,

first transporting means and second transporting means for transporting the recording medium, the first transporting means being positioned upstream from the platen roller with respect to the direction of transport of the recording medium and the second transporting means being positioned downstream from the platen roller with respect to the medium transport direction during the transfer of the ink from the ink film onto the recording medium by the thermal head, and

control means for controlling the operation of the platen roller, the first transporting means and the second transporting means so that the platen roller and the first transporting means are rotatable while the second transporting means is driven during the transfer of the ink from the ink film onto the recording medium by the thermal head.

5,021,805

RECORDING DEVICE WITH SHEET HEATER

Mamoru Imaizumi, Nagoya, and Hikaru Kaga, Ama, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Aug. 28, 1989, Ser. No. 399,835

Claims priority, application Japan, Aug. 30, 1988, 63-215568

Int. Cl.^{5} G01D *15/16*

U.S. Cl. 346—76 R **20 Claims**

1. A recording device employing a recording sheet, comprising a platen member for supporting said recording sheet, a recording head member provided on a carriage member being movable along said platen member, for executing recording operations on said recording sheet, sheet feed means for feeding said recording sheet by one recording line, and heat means for heating a predetermined portion of said recording sheet, said recording device further comprises:

memory means for storing data relating to a period of time required for heating said predetermined portion of said recording sheet till a temperature value of said predetermined portion reaches a predetermined value;

parameter set means for setting a predetermined parameter based upon a period of time having been required for executing recording operations on a certain recording line; and

VOL
1127
ISS
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4
1991
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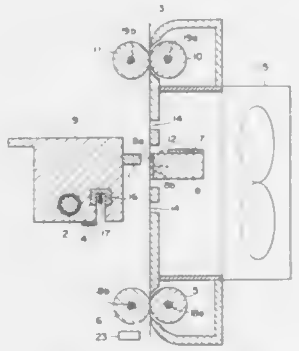
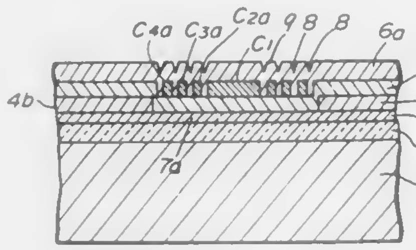
control means for controlling said sheet feed means so as to be operated in a predetermined manner in accordance



with both the data stored in said memory means and the parameter set by said parameter set means.

5,021,806
THERMAL HEAD

Hayami Sugiyama, Matsuzaka, Japan, assignor to Shinko Electric Co., Ltd., Tokyo, Japan
Filed Mar. 21, 1989, Ser. No. 326,625
Int. Cl.^{5} G01D *15/16*
U.S. Cl. 346—76 PH 6 Claims



1. A thermal head for use in thermal printing, comprising:

(a) a substrate having an upper face;

(b) an electrically insulating layer, coated over the upper face of the substrate;

(c) heating means, coated over the insulating layer, for providing heat for printing a dot of a picture;

(d) a protection layer, coated over the heating means; and

(e) dot area control means, formed above the heating means to receive sufficient heat for the printing, for transferring the heat from the heating means upwards for the printing of the dot and for controlling an area of the dot, wherein the dot area control means are composed of a place and at least one elongated curved shaped element.

5,021,807
APPARATUS FOR ELECTROPHOTOGRAPHY REPRESENTING HALF-TONES

Koichi Kinoshita, 34-13, Nishi-Kusabuka-Cho, Shizuoka-Shi, Shizuoka-Ken, Japan
Filed Nov. 2, 1989, Ser. No. 431,465
Claims priority, application Japan, Mar. 2, 1989, 1-50571
Int. Cl.^{5} G01D *9/42, 15/14*
U.S. Cl. 346—108 30 Claims

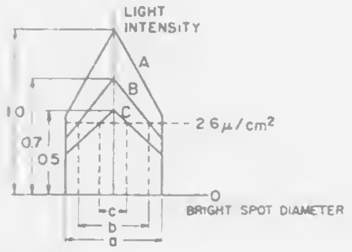
1. Apparatus for electrophotographically representing images in half-tones comprising:

a photoconductor element on which a latent image having a high value of γ of higher than 6 is to be formed;

a source of laser beam;

a driving circuit for driving said source of laser beam in accordance with a picture image information;

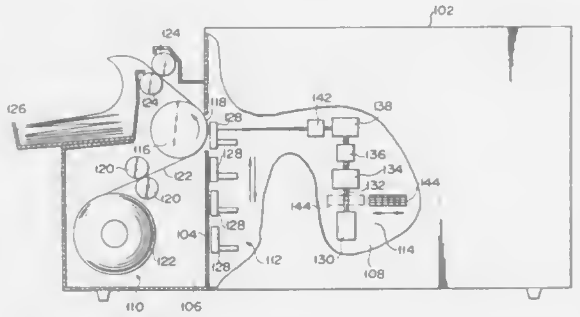
a lens system for projecting said laser beam on a surface of said photoconductor element so as to form said latent image; and means for providing a predetermined light quantity distribution in a bright spot of said laser beam projected upon said photoconductive element,



wherein said lens system comprises a density filter installed in a path of said laser beam, said density filter being constructed such that its laser beam transmissibility decreases from a central portion toward a peripheral portion of said density filter.

5,021,808
LASER ACTUATED RECORDING APPARATUS

Mitsuaki Kohyama, Higashikurume, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Continuation of Ser. No. 235,764, Aug. 23, 1988, abandoned, which is a continuation of Ser. No. 8,535, Jan. 29, 1987, abandoned. This application Oct. 6, 1989, Ser. No. 418,935
Claims priority, application Japan, Feb. 10, 1986, 61-27410; Feb. 10, 1986, 61-27418; Feb. 17, 1986, 61-32509
Int. Cl.^{5} B41J *2/05, 2/21*
U.S. Cl. 346—140 R 14 Claims



1. A laser — actuated recording apparatus comprising:

recording member supporting means for supporting a recording member;

an ink holding unit including a plurality of recording head cartridges, a plurality of ink vessels containing inks, and a plurality of ink supply pipes detachably connecting said ink vessels to said recording head cartridges,

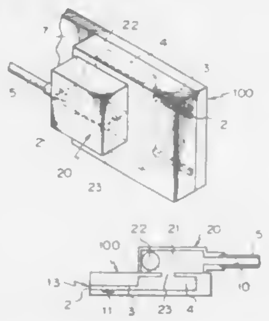
said ink holding unit selectively locating one of said recording head cartridges at a position opposite to said recording member supporting means, and

each of said recording head cartridges forming a layer of ink, supplied from a corresponding one of said ink vessels through a corresponding one of said ink supply pipes, on its opposing surface which is opposite to said recording member supporting means when it is located at the opposing position; and

means for heating the layer of ink on the opposing surface of one of said recording head cartridges to generate a bubble in the layer of ink and causing the ink to fly from one of said recording head cartridges toward the recording member supported by said recording member supporting means by a pressure of the bubble.

5,021,809
INK JET RECORDING DEVICE WITH PRESSURE-FLUCTUATION ABSORPTION

Tsutomu Abe, Isehara; Isao Ebisawa; Kenjiro Watanabe, both of Tokyo, and Seiichiro Karita, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 122,680, Nov. 19, 1987, abandoned. This application Oct. 10, 1989, Ser. No. 418,961
Claims priority, application Japan, Nov. 19, 1986, 61-275808
Int. Cl.^{5} B41J *2/055*
U.S. Cl. 346—140 R 7 Claims



1. An ink jet recording apparatus comprising:

an ink source;

an ink feeding path for feeding ink from said ink source;

a movable carriage; and

an ink jet recording head mounted on said carriage and having

at least one ink discharging opening,

an ink pathway communicating with each said ink discharging opening,

energy generating means disposed along a side wall of each said ink pathway and being actuatable for generating energy used to discharge from said opening ink in said ink pathway,

a first ink chamber for containing ink and supplying it to said ink pathway, said ink chamber having a first wall and a second wall, said first wall substantially coplanar with the ink pathway side wall on which said energy generating means is disposed, and said second wall opposite said first wall, and

a second ink chamber for containing ink and supplying it to said first ink chamber, wherein said second ink chamber is in communication with said ink feeding path and shares said second wall with said first ink chamber and communicates with said first ink chamber through an opening in said second wall, wherein said second ink chamber has therein a flexible space filled with air for absorbing pressure fluctuations created in said first ink chamber by actuation of said energy generating means and by movement of said carriage, thereby preventing such fluctuations from propagating to said ink feeding path.

5,021,810
PRINTING MACHINE

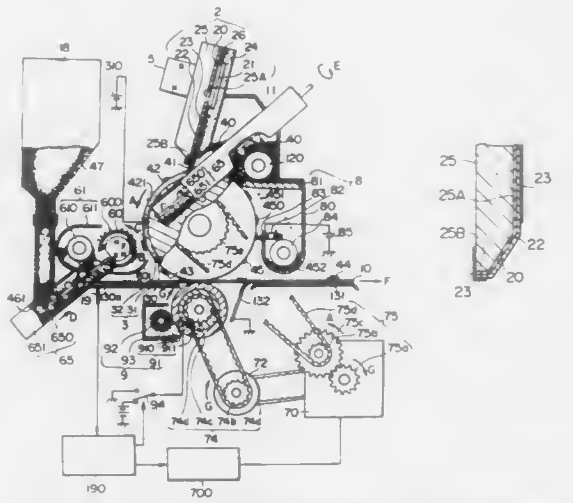
Katsumi Muroi; Kenji Okuna; Hidefumi Otsuka, all of Ibaraki; Kastubumi Ouchi, Chigasaki; Tsutomn Iimura, Tachikawa, and Ryoji Kojima, Katsuta, all of Japan, assignors to Hitachi, Ltd.; Hitachi Koki Co. and Hitachi Metals, Ltd.; all of Tokyo, Japan
Filed Jun. 25, 1990, Ser. No. 542,987
Claims priority, application Japan, Jul. 26, 1989, 01-193353
Int. Cl.^{5} G01D *15/06*
U.S. Cl. 346—155 4 Claims

1. A printing machine comprising,

electronically conductive and magnetically inductive printing toner,

an array of electrode-needles contacting with the toner, each of the electrode-needles arranged apart from the adjacent electrode-needles in the array and individually energized in accordance with a desired printing pattern to electrify the toner communicating electrically with the energized electrode-needle,

recording means including an electrically conductive portion and an insulating surface which extends on the electrically conductive portion and is arranged away from the array of electrode-needles to face thereto and to contact with the toner arranged between the electrode-needles and the insulating surface, the voltage applied to the electrically conductive portion being positive when the voltage applied to the energized electrode-needles is negative or the voltage applied to the electrically conductive portion being negative when the voltage applied to the energized electrode-needles is positive so that the toner electrified by the energized electrode-needle is attracted and attached to the insulating surface by the electrically conductive portion, the insulating surface moving in relation to the array of electrode-needles so that the toner is attached to an area of the insulating surface,



magnetic means for attracting the magnetically inductive printing toner to form the toner chains extending from the array of the electrode-needles to the insulating surface of the recording means, and

transferring means for transferring the toner from the insulating surface to a work piece, wherein

longitudinally extending surfaces of the electrode-needles face to the insulating surfaces to electrify the printing toner arranged between the electrode-needles and the insulating surface and the electrode-needles are bent so that the longitudinally extending surfaces face to the insulating surface in a plurality of directions.

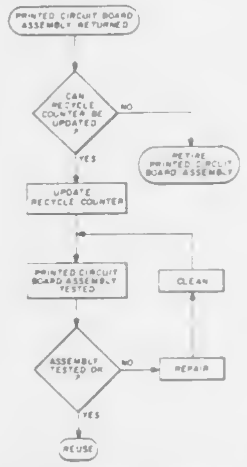
5,021,811
RECYCLEABLE ELEMENT RECYCLE COUNTER AND METHOD

Martin A. Maurinus, and Norbert Koenig, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Jun. 21, 1990, Ser. No. 541,872
Int. Cl.^{5} G03B *15/03, 19/02;* H01R *3/00*
U.S. Cl. 354—76 20 Claims

1. A film pack single-use camera having a recycleable element, wherein the improvement comprises:

VOL 1127 ISS 1 JE 4 1991 UMI

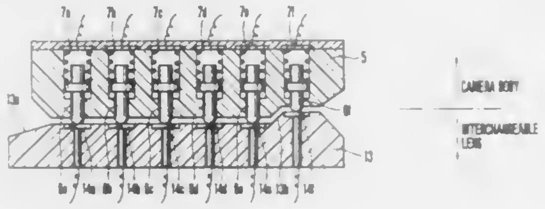
a recycle counter for visually indicating the number of times said recycleable element has been recycled, said recycle counter being disposed on said recycleable element and adapted to be updated each time said element is recycled,


PRINTED CIRCUIT BOARD ASSEMBLY RETURNED
CAN RECYCLE COUNTER BE UPDATED
NO
RETIRE PRINTED CIRCUIT BOARD ASSEMBLY
YES
UPDATE RECYCLE COUNTER
PRINTED CIRCUIT BOARD ASSEMBLY TESTED
CLEAN
ASSEMBLY TESTED OK
NO
REPAIR
YES
REUSE

wherein said recycle counter comprises a range of indicia, wherein each indicia indicates a specific number of times recycled, said range of indicia being from a minimum to a maximum, said maximum representative of the maximum recycleable life of said recycleable element.

5,021,812
CAMERA SYSTEM

Takahiro Kohno, and Hitoshi Narita, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 11, 1989, Ser. No. 419,729
Claims priority, application Japan, Oct. 13, 1988, 63-259198
Int. Cl.⁵ G03B *29/00, 17/00;* **H04N** *5/30, 5/66*
U.S. Cl. 354—76 71 Claims



1. A camera system comprising:

a camera body having a camera-body mount and a plurality of electric connection terminals which are aligned approximately around an optical axis and have their heights in the contacting direction of them arranged to have a stepped difference at least by one step; and

an optical accessory having an optical-accessory mount which is arranged to be coupled with and detached from said camera-body mount by rotating around said optical axis and a plurality of electric connection terminals which are aligned approximately around the optical axis and have their heights in the contacting direction of them arranged to have a stepped difference at least by one step, so that said plurality of electric connection terminals of said optical accessory can be brought into contact with said plurality of electric connection terminals of said camera body when said camera-body mount is coupled with said optical-accessory mount by rotating said mounts relative to each other,

wherein:

at least one of two groups of said electric connection terminals is arranged to be movable in the contacting direction and to be elastically urged to move in the contacting direction;

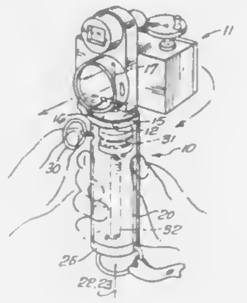
among each of two groups of said electric connection terminals, an electric connection terminal at a non-ground potential and an electric connection terminal at a ground level related to power supply are positioned away from each other with other electric connection terminals related to communication disposed between said electric connection terminals related to power supply;

said stepped difference is set such that one of said electric connection terminals related to power supply which is located in a rear end part with respect to a direction of rotating said optical-accessory mount to be coupled with said camera-body mount is shifted in height in the contacting direction from said electric connection terminals related to communication and the other of said electric connection terminals related to power supply; and

wherein said electric connection terminal at a non-ground potential is not adjacent to and differs in height from any electric connection terminal at a ground level.

5,021,813
MANUALLY OPERATED HANDLE FOR PANORAMIC CAMERA

Richard C. Corrales, 7355 College Ave., Whittier, Calif. 90602
Filed Aug. 29, 1990, Ser. No. 575,397
Int. Cl.⁵ G03B *29/00*
U.S. Cl. 354—82 6 Claims



1. A manually operated handle for panoramic cameras comprising:

a handle body having a central opening, said handle body having a vertical axis;

a rotatable central shaft held by said handle body, said central shaft having a central axis parallel with the vertical axis of said handle body, said central shaft having an upper portion affixable to a panoramic camera and said central shaft having a lower portion within the handle body;

reel means within said handle body affixed to the lower portion of said central shaft, said reel means having an axis of rotation at said central axis of said central shaft;

a first one-way clutch means between the lower portion of said central shaft and said reel means, said first one-way clutch means causing the reel means to turn freely in a first direction with respect to the central shaft but when said reel is turned in a direction opposite to said first direction, it causes the central shaft to turn with the reel means resulting in the turning of the reel in said direction opposite the first direction and turning the central shaft and the panoramic camera with respect to the handle body;

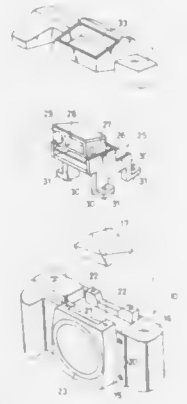
line means wrapped about said reel means and having its inner end affixed to said reel means and extending outwardly from the handle body;

spring means affixed between the handle body and said reel means so that when the reel means is turned in a first direction by the pulling of the line means, the spring means will cause the reel means to turn in the opposite direction when the line means is released;

a second one-way clutch held by said handle body, said second one-way clutch contacting said central shaft and permitting it to turn only in a second direction, whereby when said reel means is moved in a first direction by the pulling of said line means, said reel means turns freely with respect to said central shaft but when said line means is released, the spring means turns the reel means in a direction opposite to said first direction, and said second one-way clutch transmits the rotary motion of said reel means to said central shaft thereby turning said panoramic camera and retracting the line means.

5,021,814
SINGLE-LENS REFLEX CAMERA WITH STROBE INCORPORATED THEREIN

Masao Sato, Fujimi, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 24, 1989, Ser. No. 383,442
Claims priority, application Japan, Jul. 29, 1988, 63-100693[U]
Int. Cl.⁵ G03B *15/03*
U.S. Cl. 354—149.11 17 Claims



1. A single lens reflex camera having a strobe light emitter incorporated therein, said camera comprising a camera body frame having an upper portion and an upper decorative plate attached to said camera body frame, wherein said camera body frame includes, on said upper portion, mounting seats to which said strobe emitter is mounted, said strobe emitter including securing legs positioned to be secured to said corresponding mounting seats of said camera body frame.

5,021,815
VIEWFINDER FOR TELE/PAN CAMERA

Donald M. Harvey, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Feb. 28, 1990, Ser. No. 486,442
Int. Cl.⁵ G03B *13/10*
U.S. Cl. 354—222 9 Claims

1. A photographic camera for taking exposures for use in producing normal, pseudo telephoto and pseudo panoramic prints comprising:

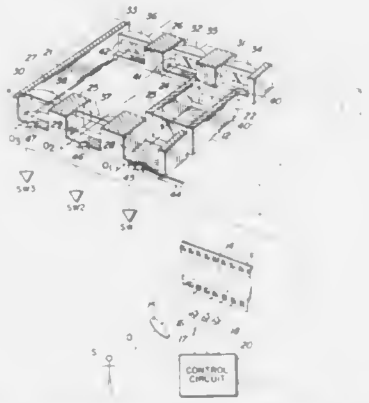
a camera body;

a picture-taking objective lens;

a view finder having lens fixed relative to said camera body;

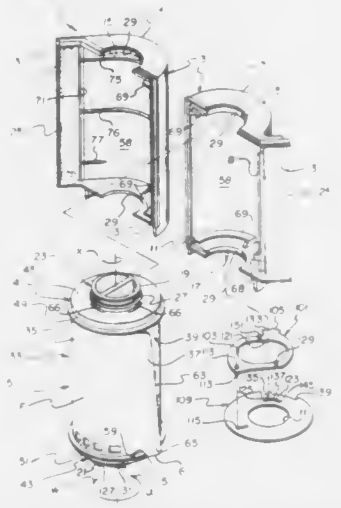
first, second and third eyepiece lenses; and first and second finder objective lenses; said first eyepiece lens being movable into alignment with said fixed lens to present a finder panoramic field of view wider than the possible field of view of said picture-taking lens; said second eyepiece and first finder objective lenses being movable into alignment with said fixed lens to present a finder normal field of view the same as the possible field of view of said picture-taking lens; and said third eyepiece and second finder objective lenses being movable into alignment with said fixed lens to present a finder telephoto field of view narrower than the possible field of view of said picture-taking lens; and

means for encoding an exposure with code indicia representative of a selected one of said finder panoramic, normal and telephoto fields of view, whereby a portion of the exposure corresponding to the selected finder field of view can be identified to produce a corresponding pseudo panoramic, normal or pseudo telephoto print.



5,021,816
CAMERA APPARATUS FOR USE WITH FILM CASSETTE HAVING FILM EXPOSURE STATUS INDICATOR

Daniel M. Pagano, Henrietta, and Stephen H. Miller, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed May 7, 1990, Ser. No. 520,568
Int. Cl.⁵ G03B *17/26*
U.S. Cl. 354—275 4 Claims



1. A photographic camera to be used with a film cassette having a film exposure status indicator normally secured in an unexposed position for providing a visible indication that a filmstrip within the cassette is unexposed and releasable from the unexposed position to permit its movement to an exposed position for providing a visible indication that the filmstrip is exposed, wherein said camera is characterized in that:

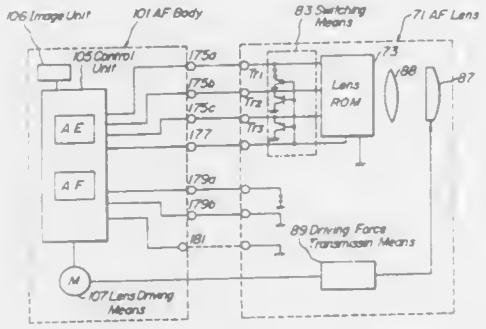
a loading chamber is configured to receive the film cassette with the status indicator secured in the unexposed position; and

release means is located in said loading chamber for releasing the status indicator to permit its movement to the exposed position.

VOL
1127
ISS
1
JE
4
1991
UMI

5,021,817
AUTOMATIC FOCUSING CAMERA

Noboru Suzuki, and Shigeo Toji, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 340,079, Apr. 18, 1989, abandoned, which is a continuation of Ser. No. 148,699, Jan. 26, 1988, Pat. No. 4,853,732. This application Aug. 10, 1990. Ser. No. 565,176
Claims priority, application Japan, Feb. 3, 1987, 62-21713
The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.
Int. Cl.⁵ G03B *13/36*
U.S. Cl. 354—402 14 Claims



1. An autofocus camera that accepts a plurality of lenses, comprising:

a camera body, said camera body having a mode selection switch for selecting a first mode of operation in which when an image of a subject is sharply focused, the shifting of one or more photographic lens elements is stopped and a shutter is ready to be released, or a second mode of operation in which one or more movable photographic lens elements are shifted to follow a subject in such a way that the image of said subject is always kept sharply focused;

means for detecting whether or not said lens, mounted on said camera body, is in a condition incapable of an autofocus operation;

means for generating an enable-signal when said mode selection switch selects said first mode of operation and said lens mounted on said camera body is in a condition incapable of an autofocus operation;

a logic circuit for executing logic operations of said enable-signal and a detection output signal, said detection output signal being derived from a decision means for deciding whether the image of the subject is sharply focused or out-of-focus, said logic circuit producing a shutter driving signal when said image is focused; and

a shutter driving circuit for driving a shutter in response to said shutter driving signal derived from said logic circuit.

5,021,818
MULTI-AREA BRIGHTNESS MEASURING APPARATUS

Osamu Satoh; Isamu Hirai, and Masahiro Nakata, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 7, 1989, Ser. No. 376,623
Claims priority, application Japan, Jul. 8, 1988, 63-170568
Int. Cl.⁵ G03B *7/08*
U.S. Cl. 354—429 44 Claims

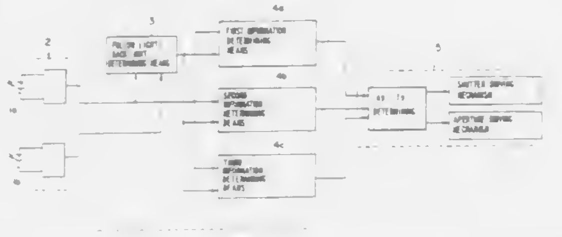
1. A multi-area brightness measuring apparatus of a camera comprising a first brightness measuring sensor which detects a brightness of a center area of a photographing area;

a second brightness measuring sensor which detects a brightness of a circumferential area surrounding the center area;

detecting means for detecting whether the object in the center area is in follow light state or back light state, based on the outputs of the first and second brightness measuring sensors;

first brightness information determining means which operates when the detecting means detects the follow light state to generate an output of a brightness value which is obtained by subtracting a predetermined follow light correcting value corresponding to a brightness value obtained by the output of the first brightness measuring sensor from the brightness value obtained by the output of the first brightness measuring sensor; and,

second brightness information determining means which operates when the detecting means detects the back light state and when a brightness value obtained by the output of the first brightness measuring sensor is below a first predetermined reference brightness value to generate an output of a brightness value which is obtained by adding a predetermined back light correcting value corresponding to the brightness value obtained by the output of the first brightness measuring sensor to the brightness value obtained by the output of the first brightness measuring sensor.


2
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4a
4b
4c
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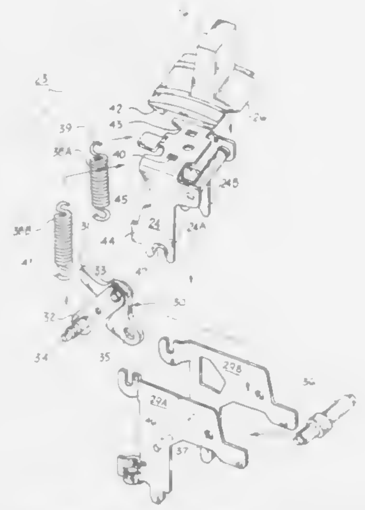
FIRST INFORMATION DETERMINING MEANS
SECOND INFORMATION DETERMINING MEANS
THIRD INFORMATION DETERMINING MEANS

5,021,819
CIRCUIT BREAKER WITH POSITIVE OVER-CENTER ACCELERATION

Andrew M. Candelora, East Haven; Kevin F. Nolan, Woodbury; Gary D. Magnon, Bristol, and Raymond K. Seymour, Plainville, all of Conn., assignors to General Electric Company, New York, N.Y.
Filed Aug. 6, 1990, Ser. No. 563,588
Int. Cl.⁵ H01H *75/00*
U.S. Cl. 335—15 10 Claims



1. A circuit breaker having positive over-center acceleration comprising:

a circuit breaker case and cover;

a pair of contacts within said case arranged for automatic separation upon occurrence of an overcurrent condition within a protected circuit;

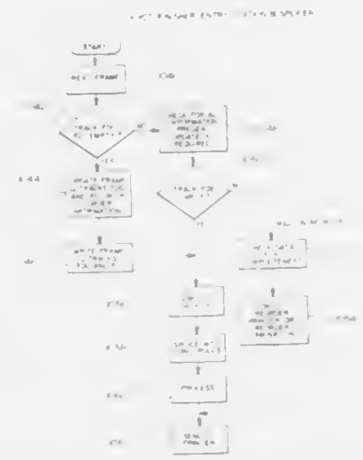
an operating mechanism within said case providing said automatic separation, said operating mechanism including a pair of opposing side frames supporting a handle yoke and an operating handle, said operating handle having ON and OFF positions on said circuit breaker case, said operating handle being arranged for manually moving said contacts between corresponding ON and OFF conditions;

a pair of operating springs within said operating mechanism attached to said handle yoke at one end and to a roller at an opposite end whereby moving said operating handle to said ON position over-centers said operating springs to snappingly drive said contacts to said ON condition; and

accelerator means formed on said handle yoke actively engaging said roller and causing said roller to move in unison with said handle yoke to drive said operating springs over-center.

5,021,820
ORDER ENTRY PROCESS FOR MAGNETICALLY ENCODABLE FILM WITH DEDICATED MAGNETIC TRACKS

Gary L. Robison, Rochester, and Michael L. Wash, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Continuation of Ser. No. 391,695, Aug. 10, 1989, abandoned, which is a continuation of Ser. No. 255,006, Oct. 7, 1988, abandoned. This application Mar. 2, 1990, Ser. No. 488,496
Int. Cl.⁵ G03B *17/24. 27/52*
U.S. Cl. 355—40 1 Claim



1. An order entry method using an operator terminal interface for processing an elongate film strip having successive frames, a virtually transparent magnetic layer and tracks recorded in said magnetic layer, each track being generally associated with a corresponding one of said frames, different ones of said tracks containing data relating to different predetermined data categories, said film strip having a leader wherein lies one or more tracks, said leader tracks having first, second and third fields or sets of fields which are dedicated to the recording, respectively, of customer identification data, order instruction data and reorder instruction data, said method comprising the steps of:

reading data recorded in said first and second fields or sets of fields;

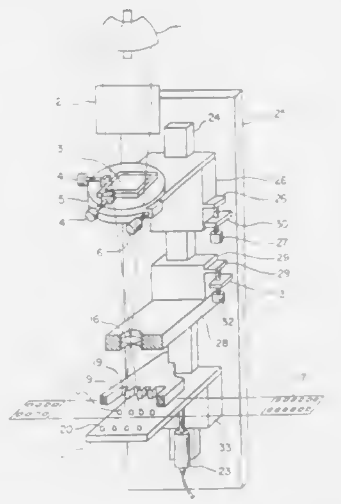
prompting said operator terminal interface to input customer identification data if said first field or set of fields is empty or lacks such data and recording such identification data in said first field or set of fields of said leader;

prompting said operator terminal interface to input order instruction data if said second field or set of fields is empty or lacks such data and recording such instruction data in said second field or set of fields of said leader; and

prompting said operator terminal interface to input reorder instruction data if said second field or set of fields contains data indicating that said film has been processed previously, recording such reorder instructions in said third field or set of fields of said leader, and sorting said film strip for printing without developing.

5,021,821
FILM CIRCUIT SUBSTRATE EXPOSURE APPARATUS

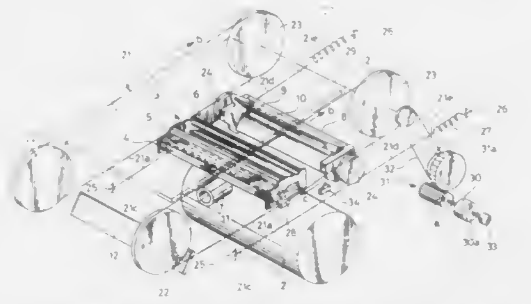
Shigeru Suzuki, Tachikawa, Japan, assignor to Ushio Denki, Tokyo, Japan
Filed Jan. 24, 1990, Ser. No. 469,113
Int. Cl.⁵ G03B *27/32, 27/42, 27/52*
U.S. Cl. 355—53 4 Claims



1. A film circuit substrate exposure apparatus, in which a reticle support, a projection lens and a pressing member for positioning film are mounted in the mentioned order for relative movement on a common linear movement guide.

5,021,822
IMAGE SCANNING APPARATUS HAVING EXPOSURE LAMP LIGHTING ON AT IMPROVED TIMING

Takeshi Morikawa, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan
Filed Aug. 17, 1990, Ser. No. 570,201
Claims priority, application Japan, Aug. 18, 1989, 1-213848
Int. Cl.⁵ G03B *27/72, 9/34*
U.S. Cl. 355—69 23 Claims



1. A copying apparatus in which a plurality of sheets can be continuously copied on a record medium, comprising:

original holding means having a platen for placing an original thereon;

illuminating means for illuminating the original;

image forming means receiving reflected light from the original for reproducing an image of the original on said record medium;

scanning means moving in a first direction for scanning the original and moving in a second direction for returning to a predetermined position;

VOL
1127
ISS
1
JE
4
1991
UMI

magnification specifying means for specifying a copying magnification at which the original is reproduced on said record medium;

projecting means for variable-scale magnifying an image of the original being scanned at said specified magnification to introduce the variable-scale magnified image into said image forming means;

driving means for driving said scanning means and also driving said scanning means to move in said first direction at difference speeds in correspondence with said specified magnification;

first control means for making said illuminating means light on when moving in said second direction and light off when the scanning of the original is terminated; and

second control means for determining based on said specified copying magnification a timing at which said first control means makes said illuminating means light on.

5,021,823

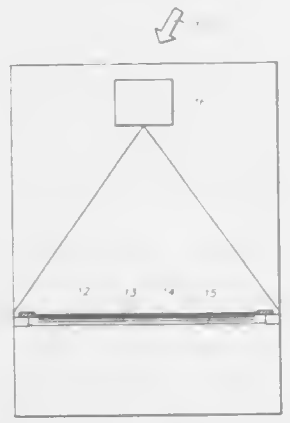
PHOTOGRAPHIC EXPOSURE APPARATUS

Jean Burtin, Mol, Belgium, assignor to AGFA-Gevaert, N.V., Mortsel, Belgium

Filed Oct. 2, 1990, Ser. No. 591,937

Int. Cl.^{5} G03B *27/72, 27/80*

U.S. Cl. 355—69 8 Claims



1. A photographic exposure apparatus, comprising means for holding a transparent image-bearing sheet in tight contact with a radiation-sensitive film, a lamp housing (**16**) with a UV-emitting metal halide discharge lamp (**17**) for carrying out the exposure of the radiation sensitive film to the image-hearing sheet, a shutter (**19**) for closing the lamp housing, an adjustable electric power supply (**31**) for the lamp and control means (**34**) for the power supply and the shutter (**21**), so that the shutter is open and the lamp is operated at full power during exposure of the photographic film and the shutter is closed and the lamp is kept energized at reduced power while the apparatus is in standby condition, between successive exposures, characterized in that the control means (**34**) is arranged for controlling the energizing of the lamp in standby condition in such a way that, in addition to the reduced power, the lamp is intermittently energized at high power during short intervals.

5,021,824

RECORDING APPARATUS HAVING A DETACHABLE RECORDING MATERIAL STORING UNIT

Masato Higashi, and Sadanobu Murasaki, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 7, 1990, Ser. No. 476,830

Claims priority, application Japan, Feb. 8, 1989, 1-29468; Feb. 8, 1989, 1-29469

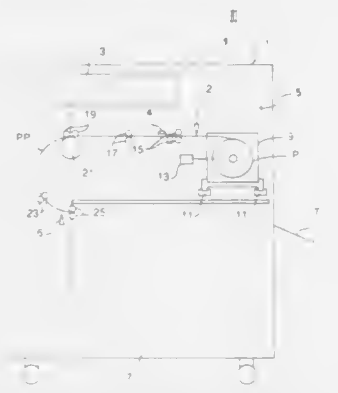
Int. Cl.^{5} G03B *27/58*

U.S. Cl. 355—72 11 Claims

1. A recording apparatus for recording information on a recording material, comprising:

an apparatus body including a recording station;

storing means for storing the recording material therein, said storing means being movable between a first position for supplying the recording material to said recording station and a second position protruding from said apparatus body;



detecting means for detecting a quantity of the recording material stored in said storing means; and

means responsive to said detecting means for moving said storing means from the first position to the second position upon lapse of a predetermined time after said detecting means detects that the quantity of the recording material is less than a predetermined amount.

5,021,825

LATCHING MECHANISM FOR A REMOVABLE PROCESSING CARTRIDGE IN A PHOTOCOPYING DEVICE

Hiroshi Niki, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 57,882, Jun. 2, 1987, Pat. No. 4,868,599. This application Sep. 6, 1989, Ser. No. 403,513

Claims priority, application Japan, Jun. 2, 1986, 61-127806; Sep. 5, 1986, 61-209316

Int. Cl.^{5} G03G *21/00*

U.S. Cl. 355—200 2 Claims

1. An apparatus for forming an image on a recording medium by transferring toner from an image carrier to the recording medium, comprising:

a photosensitive member serving as the image carrier;

developing means, which include toner, for developing an image represented by the toner on the photosensitive member;

transfer means for transferring toner deposited on the photosensitive member to the recording medium whereby the image is formed on the recording medium;

cleaning means for removing and storing excess toner which is not transferred from the photosensitive member to the recording medium;

the transfer means and photosensitive member each having a bottom portion, the bottom portion of the transfer means being positioned substantially above the bottom portion of the photosensitive member and the cleaning means being disposed substantially facing the bottom of the photosensitive member;

cartridge means including at least one handle means and at least two of the photosensitive member, cleaning means and developing means; and

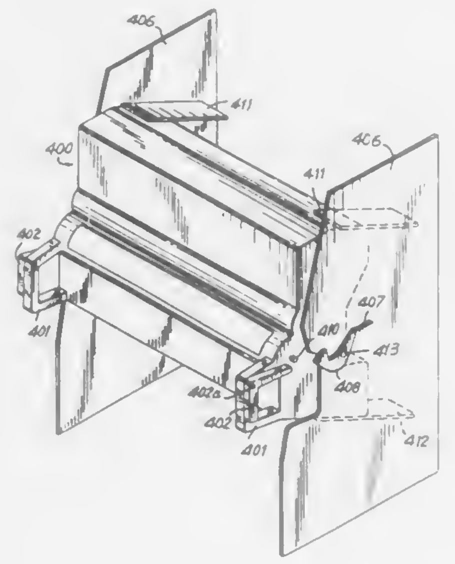
mounting means for releasably mounting said cartridge means on said apparatus and including at least one latch means for releasably retaining said cartridge means on said apparatus;

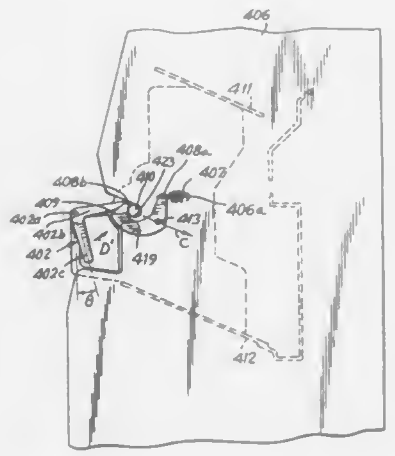
wherein said cartridge means further includes at least one projection extending laterally therefrom and said mounting means further includes at least one support plate formed with a notch for receiving said projection and said latch means being adapted to releasably retain said projection in said notch;

wherein said latch means includes a hook pivotably mounted on said support plate and displaceable between a latch position at which said hook can retain said projection in said notch and an open position at which said projection can pass by said hook, and spring means for biasing said hook to said latch position; and

wherein said hook is formed with a camming surface on the end thereof facing the entrance of the notch and shaped so that engagement of the projection against said camming surface pivotably displaces said hook from its latch position to its open position to permit passage of the projection into the notch, the hook returning to its latch position upon such passage; and

further including lever means having first and second arms and being pivotably mounted on said handle means, said first arm being engaged by the end of said hook upon insertion of said projection into said notch to pivot said lever means in a first direction to a position at which said second arm of said lever means is out of registration with said handle means, the manual displacement of said second arm of said lever means into registration with said handle means displacing said hook to its open position to permit removal of said cartridge means.





5,021,826

ELECTROPHOTOGRAPHIC COPYING MACHINE HAVING A FUNCTION OF JUDGING WHETHER A COPYING OPERATION CAN BE PERFORMED RESPONSIVE TO A REMAINDER AMOUNT OF CONSUMPTIVE PARTS OR MATERIALS

Syuzi Maruta, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 29, 1989, Ser. No. 400,582

Claims priority, application Japan, Aug. 29, 1988, 63-214256

Int. Cl.^{5} G03G *21/00*

U.S. Cl. 355—205 3 Claims

1. An electrophotographic copying machine, wherein copying operation is prohibited when consumption of either one of consumptive parts or materials which are used or consumed upon every copying operation reaches a predetermined value. said copying machine comprising:

image forming means for producing copies of documents, said image forming means being operable under a both sides copying mode in which the front and rear sides of each document are respectively copied;

determination means for determining a remainder number of copes to be obtained until said consumption reaches said predetermined value; and

display means for displaying a reproducible number of documents, said display means displaying a half of the remainder number of copies as the reproducible number of documents when the both sides copying mode is selected in operation.

5,021,827

IMAGE FORMING PROCESS CONTROL METHOD AND APPARATUS

Yutaka Komiya, Tokyo; Katsumi Murakami, Kawasaki, and Tsuneki Inuzuka, Machida, Hisashi Sakamaki, Yokohama, all of Japan, assignors to Cannon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 291,365, Dec. 30, 1988, abandoned, which is a continuation of Ser. No. 193,145, May 5, 1988, abandoned, which is a continuation of Ser. No. 58,327, Jun. 4, 1987, abandoned, which is a division of Ser. No. 771,302, Aug. 30, 1985, Pat. No. 4,671,647, which is a division of Ser. No. 425,706, Sep. 28, 1982, Pat. No. 4,557,587, which is a division of Ser. No. 156,645, Jun. 5, 1980, Pat. No. 4,456,366, which is a continuation of Ser. No. 910,831, May 30, 1978, abandoned. This application Apr. 18, 1990, Ser. No. 512,537

Claims priority, application Japan, May 31, 1977, 52-64528; May 31, 1977, 52-64529; May 31, 1977, 52-64530

Int. Cl.^{5} G03G *15/00*

U.S. Cl. 355—206 11 Claims

1. An image forming apparatus comprising:

means for forming an image on a recording material;

a plurality of detecting means, each disposed at a different area in the apparatus, for detecting improper states of the apparatus and for providing respective signals indicative of the improper states;

control means comprising a first memory for storing a program allowing execution of image formation when no improper state is detected by any of said plurality of detection means, and disabling said image formation upon detection of an improper state in response to a signal from at least one of said plurality of detecting means, wherein said control means controls the operation of the apparatus according to the program and in response to signals from

VOL
1127
ISS
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JE
4
1991
UMI

said detecting means and further comprises a second memory for storing a datum to control the apparatus;

input means for inputting the datum into said second memory as a specific instruction signal; and

means for enabling the operation of said apparatus, despite an occurrence of an improper state, in accordance with the datum inputted by said input means.

5,021,828

COPYING APPARATUS HAVING A CONSUMABLE PART

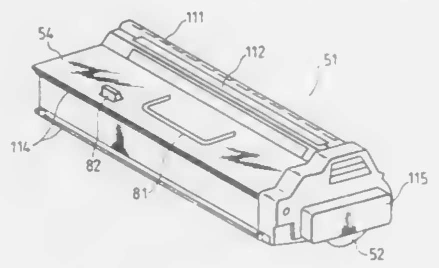
Junichi Yamaguchi; Izumi Takahashi, and Masafumi Matsumoto, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Apr. 4, 1989, Ser. No. 333,144

Claims priority, application Japan, Apr. 15, 1988, 63-91677

Int. Cl.^{5} G03G *21/00*

U.S. Cl. 355—209 **17 Claims**



1. An apparatus for making copies comprising:

a main body;

a consumable part detachably coupled to said main body;

counting means for counting the number of copies made with a specific consumable part coupled to said main body;

state detection means for detecting the level of consumption of said consumable part, and

a life-time decision means for deciding the life-time of said consumable part in response to said state detection means and said counting means.

5,021,829

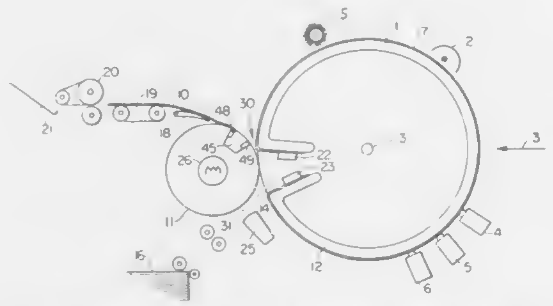
MULTICOLOR IMAGE FORMING APPARATUS AND TRANSFER ROLLER REINDEXING MECHANISM

Kevin M. Johnson, and Clay E. Shoup, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 7, 1990, Ser. No. 519,998

Int. Cl.^{5} G03G *5/00, 21/00*

U.S. Cl. 355—213 **20 Claims**



12. Multicolor image forming apparatus comprising:

a rotatable drum having an axis of rotation, a periphery and a trough in said periphery running generally parallel to said axis of rotation,

a sheet of photoconductive material having opposite ends secured in said trough and wrapped around said periphery,

means for uniformly charging said photoconductive sheet,

means for imagewise exposing said charged photoconductive sheet to create a series of electrostatic images,

means for applying different colored toner to said electrostatic images to create a series of toner images of different color, transfer means for transferring said toner images in registration to a receiving sheet to create a multicolor toner image, said transfer means comprising:

a transfer roller positioned to engage, form a nip with and be rotated by said photoconductive sheet supported by said drum,

means for securing a receiving sheet to a portion of the periphery of said transfer roller for receiving said series of toner images in registration as said roller is repeatedly rotated by engagement of said receiving sheet with the photoconductive sheet on the periphery of said drum,

means independent of said drum for rotating said transfer roller to a predetermined rotational position when said trough in said drum passes through said nip, and

means for maintaining the distance between the axes of the transfer roller and the drum when the trough of said drum is passing through the nip.

5,021,830

ELECTROSTATIC RECORDING APPARATUS

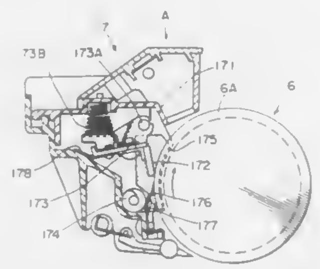
Jun-ichi Koiso, Tokyo, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Jan. 23, 1990, Ser. No. 469,023

Claims priority, application Japan, Jan. 24, 1989, 1-7109[U]

Int. Cl.^{5} G03G *21/00*

U.S. Cl. 355—215 **11 Claims**



1. An electrostatic recording apparatus comprising a cleaning device having a container, said container being provided with a seal member inserted in a groove formed in the circumferential surface of an end portion of a photosensitive drum.

5,021,831

FILTER FOR REMOVING SMOKE AND TONER DUST USED IN ELECTROPHOTOGRAPHIC/ELECTROSTATIC RECORDING APPARATUS

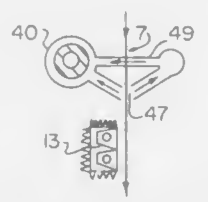
Yoshihiro Tooomoto, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Division of Ser. No. 128,054, Dec. 3, 1987, Pat. No. 4,938,768. This application Feb. 5, 1990, Ser. No. 475,343

The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.

Int. Cl.^{5} G03G *21/00*

U.S. Cl. 355—215 **14 Claims**



14. An air filter for removing smoke and toner dust particles from air, the toner dust particles being both large and fine, having a predetermined average toner particle size of about 10 microns, and being charged with a positive polarity, said air filter having an air inlet side and an air outlet side and comprising:

(a) a first filter unit disposed at the air inlet side of the air filter; and

(b) at least a second filter unit disposed between said first filter unit and said air outlet side;

wherein said first filter unit includes a negatively electrostatically charged fibrous material for attracting the positively charged toner particles, and a fist predetermined porosity greater than about 10 microns for removing a substantial part of the large toner dust particles from the air and for allowing the fine toner dust particles and smoke to pass therethrough; and

wherein said second filter unit includes fibrous material without an electrostatic charge, said uncharged fibrous material having a second predetermined porosity less than about 10 microns for removing the fine toner dust particles and smoke.

5,021,832

ELECTROPHOTOGRAPHIC COPIER HAVING ADDITIONAL INFORMATION RECORDING FUNCTION

Shigenobu Fukushima, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 13, 1989, Ser. No. 406,783

Claims priority, application Japan, Sep. 14, 1988, 63-230253

Int. Cl.^{5} G03G *21/00*

U.S. Cl. 355—218 **12 Claims**

1. An electrophotographic copier having a charger for uniformly charging a photoreceptor, a first mechanism for projecting an original image onto the charged photoreceptor to form an electrostatic latent image corresponding to the original image on the photoreceptor, and a second mechanism for forming an electrostatic latent image corresponding to an electric signal indicative of additional information on the photoreceptor, said second mechanism comprising;

charge retaining means for retaining electric charge of a selected region of said photoreceptor by partially intercepting the original image projected by said first mechanism, said charge retaining means being fixedly provided at a position corresponding to said selected region where said additional information is to be recorded; and

an exposure head operable in a first operating mode for exposing said selected region of said photoreceptor in accordance with said electric signal, and a second operating mode for erasing the charge of said selected region regardless of said electric signal, said exposure head being adjustable to a position for exposing said selected region.

5,021,833

COPYING MACHINE WITH MULTIPLE LIGHT SOURCES

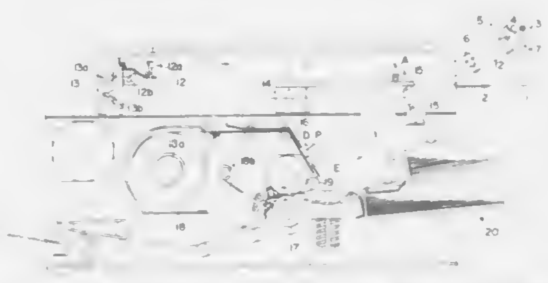
Toshiaki Kobayashi, Tenri; Yoshiaki Ibuchi, Nara, and Naoyuki Kamei, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 11, 1989, Ser. No. 448,730

Claims priority, application Japan, Dec. 13, 1988, 63-314402; Mar. 7, 1989, 1-54546; Apr. 24, 1989, 1-48118[U]

Int. Cl.^{5} G03G *15/04*

U.S. Cl. 355—228 **10 Claims**



1. A copying machine in which light reflected from an original on an original table is directed through a prescribed light path, the light being then reflected by a prescribed mirror disposed in said light path toward a moving photosensitive member, by operating an operating unit including a first light source, said copying machine including:

a slide projector having a slidefilm supporting means which movably supports a slidefilm and a second light source which illuminates the slidefilm, said slide projector being provided in such a way that said mirror and said photosensitive member are positioned in the light path of said second light source,

said mirror being movable to a reflecting position for reflecting the reflected light from the original onto the photosensitive member as well as to a retracted position for allowing the light from the slide projector to be directly projected onto the photosensitive member;

said copying machine further including a detecting means for detecting whether said mirror is in said reflecting position or in said retracted position, the speed of said moving photosensitive member being changed on the basis of the detected result of said detecting means.

5,021,834

WET-TYPE IMAGE FORMATION APPARATUS

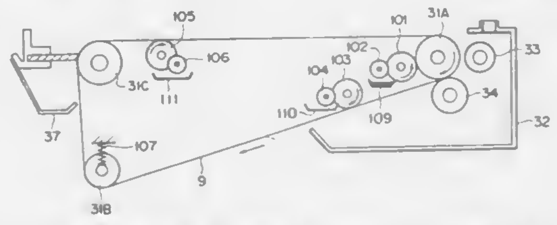
Ichirio Tsuruoka, Tokyo; Katsuhiro Echigo; Manabu Mochizuki, both of Yokohama; Tsuneo Kurotori, Tokyo; Kenzo Ariyama, Yokohama; Kenji Kojima, and Mayumi Miyao, both of Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 17, 1990, Ser. No. 583,441

Claims priority, application Japan, Sep. 20, 1989, 1-244693

Int. Cl.^{5} G03G *15/10*

U.S. Cl. 355—256 **8 Claims**



1. A wet-type image formation apparatus comprising (i) a belt-shaped photoconductor prepared by depositing a photoconductive material on the outer surface of a belt-shaped substrate; (ii) a plurality of pulleys which support and drive said belt-shaped photoconductor; (iii) a charging means capable of

VOL
1127
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imparting an electric charge to said belt-shaped photoconductor; (iv) an exposure means capable of exposing said belt-shaped photoconductor to light images; (v) a development means which is directed to the outer surface of said belt-shaped photoconductor, and is capable of developing a latent electrostatic image into a visible toner image with a liquid developer; (vi) an image transfer means capable of transferring said visible toner image from said belt-shaped photoconductor to a transfer sheet; (vii) a squeeze roller unit positioned between said development means and said image transfer means, comprising (a) a pair of roller-supporting members, in contact with the non-image areas at the opposite sides of said belt-shaped photoconductor and (b) a co-axial roller for which the outer diameter is smaller than that of said roller-supporting member, directed to image areas of said photoconductor with a slight gap between said co-axial roller and said belt-shaped photoconductor; (viii) a cleaning means positioned downstream of said image transfer means along said belt-shaped photoconductor, which comprises a cleaning member in contact with the surface of said belt-shaped photoconductor; and (ix) a liquid developer removing means which is provided inside said belt-shaped photoconductor, capable of removing said liquid developer dropping onto the inner surface of said belt-shaped photoconductor and recovering said liquid developer in a liquid developer reservoir or a development unit.

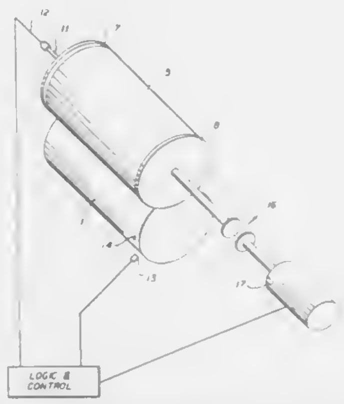
5,021,835
MULTICOLOR IMAGING APPARATUS WITH IMPROVED TRANSFER MEANS

Kevin M. Johnson, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 4, 1990, Ser. No. 532,831

Int. Cl.⁵ G03G *15/16, 15/01*

U.S. Cl. 355—271 6 Claims



1. Multicolor image-forming apparatus comprising:
a moveable image member,
means for moving said image member along an endless path,
means for forming a series of electrostatic images on said image member,
means for applying different color toners to said electrostatic images to form a series of different color toner images,
transfer means for transferring said toner images to a receiving sheet in registration to form a multicolor image on said sheet, said transfer means including
  a transfer roller having a periphery and means for supporting said receiving sheet around a portion of said periphery, leaving a portion of said periphery circumferentially uncovered by said sheet,
  means for urging said roller toward said image member,
  means for preventing engagement of said roller and said image member, said preventing means including means for providing a spacing between said roller and said image member that is less than the thickness of said receiving sheet when compacted between said roller and said image member so that said roller is driven by said image member through said sheet, and
means for rotating said roller independent of said image member when said uncovered portion of the periphery of said roller is facing said member to index said roller for receipt by said receiving sheet of each of said series of images.

5,021,836
METHOD AND DEVICE FOR TRANSFERRING TWO IMAGES TO DIFFERENT SIDES OF A RECEIVING SHEET

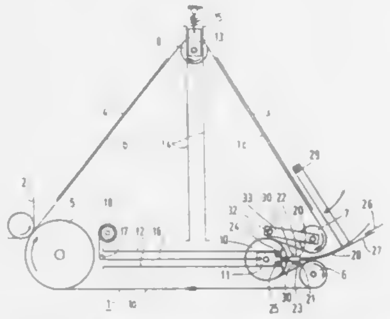
Martin L. van der Sterren, Roermond, and Julius V. C. Graswinckel, Arcen, both of Netherlands, assignors to Oce-Nederland B.V., Netherlands

Filed Apr. 10, 1990, Ser. No. 507,654

Claims priority, application Netherlands, Apr. 13, 1989, 8900921

Int. Cl.⁵ G03G *15/14*

U.S. Cl. 355—281 8 Claims



1. A method of transferring two images to different sides of a receiving sheet, said method comprising forming said images on a moving image support such that one of said images is located behind the other of said images, each of said images thus having a leading edge and a trailing edge relevant to the motion of said image support, said method further comprising forming a loop with said image support to define an image transfer zone, by bringing together a first part of said image support downstream of the location of the leading edge of one of said images and a second part of the image support upstream of the location of the trailing edge of the other of said images, said images being transported substantially simultaneously with a receiving sheet through said image transfer zone for transferring of the images to different sides of said receiving sheet wherein the direction of motion of one of said first image support part and said second image support part is reversed during image transfer.

5,021,837
APPARATUS DISCHARGED SHEET STACKING

Nobutaka Uto, Kanagawa; Masaaki Sato; Kimiaki Hayakawa, both of Yokohama, and Takeshi Honjo, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 24, 1989, Ser. No. 440,677

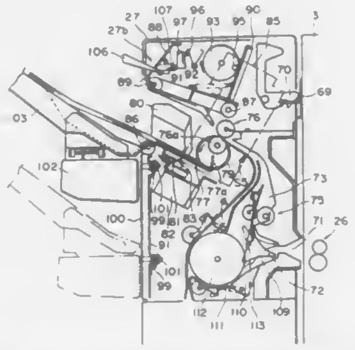
Claims priority, application Japan, Nov. 26, 1988, 63-299922; Nov. 26, 1988, 63-299923

Int. Cl.⁵ G03G *21/00*

U.S. Cl. 355—322 18 Claims

1. A sheet post-processing apparatus, comprising:
a processing tray for stacking sheet materials discharged;
a stack tray, movable substantially vertically for accommodating sheet materials discharged;
first discharging means for discharging, in a processing mode, the sheet materials so that the sheet materials are bridged between said processing tray and said stack tray, and for discharging, in a non-processing mode, the sheet materials so that they are stacked on said stack tray;

processing means for processing the sheet materials stacked on said processing tray; and
second discharging means for discharging from said processing tray the sheet materials processed by said processing means when a processing mode is selected to said stack tray,



wherein said first discharging means includes a first discharging member for discharging the sheet materials to said processing tray, and a second discharging member for discharging the sheet materials to said stack tray, said second discharging member is movable between its operative position and non-operative position.

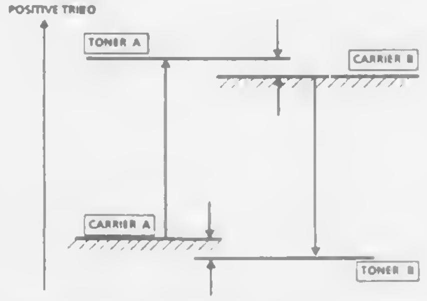
5,021,838
PREFERRED TONER/CARRIER PROPERTIES

Delmer G. Parker, Rochester; William M. Allen, Jr., Webster, and Howard M. Stark, Williamson, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 3, 1989, Ser. No. 389,465

Int. Cl.⁵ G03G *15/01*

U.S. Cl. 355—328 5 Claims



1. Printing apparatus comprising:
means for forming visible images on a charge retentive surface;
said means for forming visible images comprising at least first and second developer structures;
means for moving said charge retentive surface past said first and second developer structures in that order;
first developer material contained in said first developer structure, said first developer material comprising first toner and first carrier particles;
second developer material contained in said second developer structure said second developer material comprising second toner and second carrier particles;
means for removing residual toner from said charge retentive surface;
said first and second carriers having triboelectric properties relative to said first and second toners such that said first and second toners charge to opposite polarities against their respective carriers and such that the degree of charging of said first toner against said second carrier particles and said second toner against said first carrier particles is relatively small and therefore insufficient to change their polarities thereby precluding contamination of said second developer material with said first toner and contamination of said first developer material with said second toner.

5,021,839
FET WITH A SUPER LATTICE CHANNEL

Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

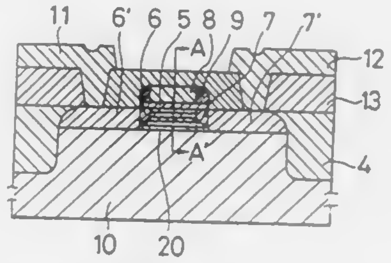
Division of Ser. No. 102,841, Sep. 30, 1987. This application Apr. 25, 1989, Ser. No. 342,854

Claims priority, application Japan, Oct. 8, 1986, 61-240544; Oct. 8, 1986, 61-240545; Oct. 8, 1986, 61-240546

The portion of the term of this patent subsequent to Mar. 13, 2007, has been disclaimed.

Int. Cl.⁵ H01L *29/78, 49/02*

U.S. Cl. 357—4 6 Claims



1. An insulated-gate field effect transistor comprising:
a substrate within which a source a drain region is formed;
a superlattice structure as a channel region placed between said source and drain region, said superlattice structure including alternating crystalline silicon semiconductor and silicon compound layers; and
an insulating layer formed on said superlattice structure,
where said substrate includes a bulk portion in contact with the superlattice structure, said bulk portion being single crystalline semiconductor.

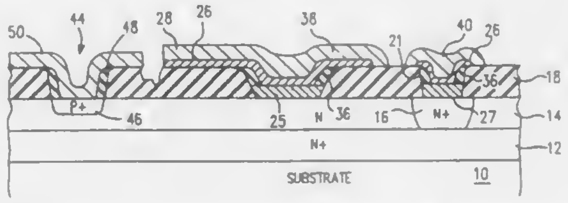
5,021,840
SCHOTTKY OR PN DIODE WITH COMPOSITE SIDEWALL

Francis J. Morris, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 294,962, Jan. 6, 1989, abandoned, which is a continuation of Ser. No. 86,464, Aug. 18, 1987, abandoned. This application Dec. 14, 1989, Ser. No. 449,066

Int. Cl.⁵ H01L *29/48*

U.S. Cl. 357—15 29 Claims



1. A diode disposed on an integrated circuit structure comprising:
(a) a first electrically conductive region of doped semiconductor material of a first conductivity type;
(b) a second electrically conductive region contacting said first region, said first and second regions exhibiting a diode barrier characteristic about the interface of said first and second regions, said second region including an upper surface and a peripheral boundary adjoining said upper surface;
(c) a first insulative layer disposed over said first region and

VOL
1127
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including an opening positioned about said second region, said insulative layer including a side surface portion along the periphery of the opening and a portion overlying portions of said first region, said side portion substantially aligned with the peripheral boundary of said second region;
(d) an electrical contact to the upper surface of said second region; and
(e) a sidewall insulative layer, physically distinct from said first insulative layer, preventing formation of a diode interface between said electrical contact and said first conductive region, said sidewall layer overlying and contacting the surface of said second region remote from said first electrically conductive region, said sidewall layer also abutting the side surface portion of said first insulative layer

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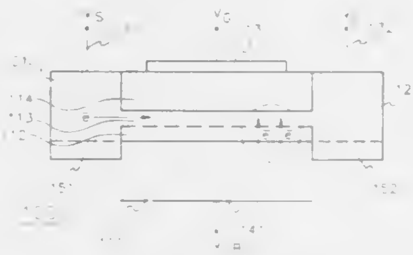
5,021,841
SEMICONDUCTOR DEVICE WITH CONTROLLED NEGATIVE DIFFERENTIAL RESISTANCE CHARACTERISTIC

Jean-Pierre Leburton, and James Kolodzey, both of Urbana, Ill., assignors to University of Illinois, Urbana, Ill.
Filed Oct. 14, 1988, Ser. No. 258,294
Int. Cl.⁵ H01L *29/80*
U.S. Cl. 357—22 **24 Claims**

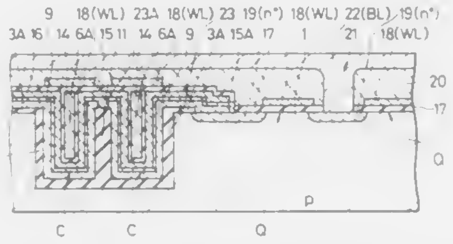


1. A semiconductor device, comprising:
a first layer of relatively small bandgap semiconductor material, said first layer being of a first semiconductor type;
a second layer of said relatively small bandgap semiconductor material formed on said first layer, said second layer being of a second semiconductor type that is opposite said first semiconductor type;
a third layer of said relatively small bandgap semiconductor material formed on said second layer, said third layer being substantially undoped;
a fourth layer of relatively large bandgap semiconductor material of said second semiconductor type formed on said third layer;
a gate electrode formed on said fourth layer
source and drain regions of said second semiconductor type adjacent to respective opposite edges of said second, third and fourth layers; and
source and drain electrodes respectively coupled to said source and drain regions.

5,021,842
TRENCH DRAM CELL WITH DIFFERENT INSULATOR THICKNESSES

Mitsumasa Koyanagi, Higashimurayama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan
Continuation of Ser. No. 13,558, Feb. 11, 1987, abandoned, which is a continuation of Ser. No. 600,904, Apr. 16, 1984, abandoned. This application Oct. 4. 1988, Ser. No. 253,183
Claims priority, application Japan, Apr. 15, 1983, 58-65432
Int. Cl.⁵ H01L *27/108*
U.S. Cl. 357—23.6 **16 Claims**

1. A dynamic random access memory device comprising:
a semiconductor substrate which has a major surface;
memory cells each of which is comprised of a MISFET and a capacitor connected in series with said MISFET, said MISFET comprising a gate electrode, a gate insulator film, and source and drain regions, said capacitor comprising a first conductor layer, a first insulator film formed on said first conductor layer and a second conductor layer formed on said first insulator layer, one of said first or second conductor layers being connected to one of said source or drain regions and being disposed independently for each said capacitor of each said memory cell;
moats which are formed at said major surface of said semiconductor substrate by partly removing said semiconductor substrate, which are provided in correspondence with said capacitors and each of which has its side surface covered with a second insulator film,
wherein each said capacitor is provided on a surface of said second insulator film in said moat with said first conductor film being formed over said second insulator film, wherein said second insulator film has a thickness larger than a thickness of said gate insulator film so that said capacitor is isolated from said substrate by said second insulator film, and
further wherein said first and second conductor layers of said capacitor are formed of polycrystalline silicon film by a deposition process so that said first conductor layer is formed over said second insulator film in said moat, said first insulator film is formed over said first conductor layer in said moat, and said second conductor layer is formed over said first insulator film in said moat;

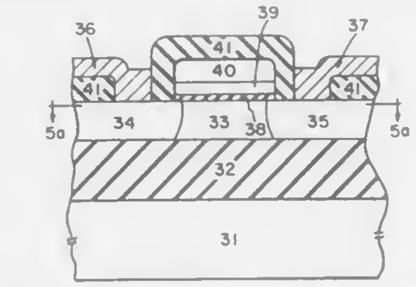


word lines which extend in one direction over said semiconductor substrate, and each of which is connected with the gate electrodes of the MISFETs;
data lines which extend in a direction intersecting said word lines over said semiconductor substrate, and each of which is connected with the others of the source or drain regions of the MISFETs which source or drain regions are not connected to said one of said first or second conductor layers of a capacitor, said memory cells being provided in correspondence with respective data lines; and
a third insulator film which isolates the adjacent memory cells, and which surrounds at least an area where said capacitor is formed, wherein the thickness of said third insulator film is larger than that of said second insulator film.

5,021,843
SEMICONDUCTOR INTEGRATED CIRCUIT

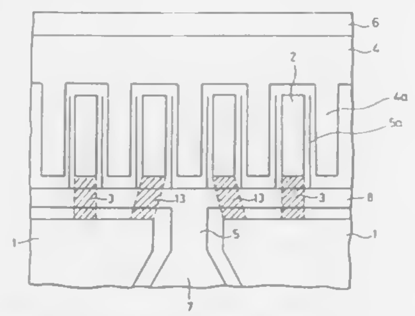
Tadahiro Ohmi, No. 2-1-17-301, Komegabukuro, Sendai-shi, Miyagi-ken, Japan
Continuation-in-part of Ser. No. 90,210, Aug. 27, 1987, Pat. No. 4,907,053, which is a continuation-in-part of Ser. No. 637,406, Aug. 3, 1984, abandoned. This application Jul. 13, 1989, Ser. No. 379,482
Claims priority, application Japan, Aug. 25, 1983, 58-154069
Int. Cl.⁵ H01L *27/01, 27/02*
U.S. Cl. 357—23.1 **8 Claims**

1. A semiconductor integrated circuit comprising an insulated-gate transistor serving as a driving transistor and composed of source and drain regions of one conductivity type and a high impurity concentration, a channel region disposed between said source and drain regions, an insulating layer covering almost the entire surface of said channel region except for portions adjacent to said source and drain regions, at least one portion of said insulating layer being thinner than the remainder of said insulating layer, a gate electrode of a conductive material disposed adjacent said thinner portion of said insulating layer for maintaining said channel region substantially in floating condition, and a high resistivity region disposed adjacent said channel region and electrically connected to said source region, said high resistivity region being of the same conductivity type as said channel region, the resistance R_{cs} of said high resistivity region satisfying the relations of $R_{cs}\text{-}C_{cs} >> \tau_\gamma$ and $R_{cs}\text{-}C_{cs} \leqq \tau$ wherein,
τ = the period of a high frequency pulse voltage supplied to said gate electrode;
τ_γ = the rise time of a high frequency pulse voltage supplied to said gate electrode; and
C_{cs} = the capacitance of the channel and source regions.



5,021,844
SEMICONDUCTOR DEVICE

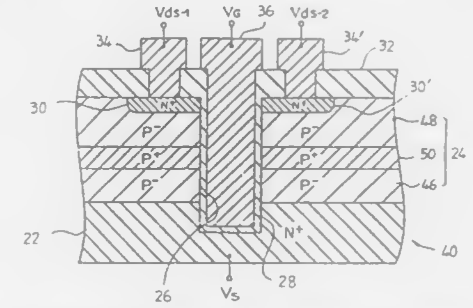
Manabu Wataze, and Takao Sakayori, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 378,703, Jul. 11, 1989, abandoned. This application Jun. 6, 1990, Ser. No. 533,942
Claims priority, application Japan, Jul. 18, 1988, 63-179713
Int. Cl.⁵ H01L *29/10, 23/48*
U.S. Cl. 357—23.3 **7 Claims**



1. A semiconductor device comprising:
a semiconductor substrate;
first and second spaced apart leads disposed on said substrate for providing electrical connections to first electrodes;
a plurality of generally parallel, uniformly spaced first electrodes disposed on said substrate opposite and respectively electrically connected to one of said first and second leads;
a second electrode disposed on said substrate and including a pad portion disposed between said first and second leads and a linear portion disposed between said first electrodes and said first and second leads transverse to said first electrodes; and
connecting portions, each having the shape of a parallelogram and electrically connecting one of said first electrodes to one of said first and second leads, crossing and electrically insulated from the liner portion of said second electrode wherein each of said connecting portions adjacent said pad portion has the shape of a non-rectangular parallelogram and each of said connecting portions not adjacent said pad portion is rectangular.

5,021,845
SEMICONDUCTOR DEVICE AND PROCESS FABRICATION THEREOF

Masashi Hashimoto, Ibaragi, Japan, assignor to Texas Instruments Incorporated, Dallas, Tex.
Continuation of Ser. No. 339,937, Apr. 18, 1989, abandoned, which is a continuation of Ser. No. 259,487, Oct. 18, 1988, abandoned, which is a continuation of Ser. No. 901,091, Aug. 27, 1986, abandoned. This application Jun. 29, 1990, Ser. No. 547,529
Claims priority, application Japan, Aug. 30, 1985, 60-192395
Int. Cl.⁵ H01L *29/10, 29/06, 27/01*
U.S. Cl. 357—23.4 **17 Claims**



13. An insulated-gate field-effect transistor comprising:
a source region of a first conductivity type;
a drain region of the first conductivity type;
an intermediate region of a second conductivity type opposite said first conductivity type, the intermediate region extending between said source region and said drain region and providing a channel region for said transistor;
a gate electrode extending along and separated from said channel region by insulating material;
said intermediate region along its direction of extent from the source region to the drain region having at least three portions which comprise first, second and third portions of said second conductivity type, the third portion having a higher dopant level than and located between the first and second portions;
said first, third and second portions being in contact with each other with said first portion in contact with said source region;
each of said first, third and second portions having two substantially parallel surfaces extending transversely of the direction of extent between said source and drain regions, the dopant levels of each of the first, third and second portions varying continuously from one of said surfaces to the other; and
said third portion having a thickness as measured along the extent of the channel region as provided by said intermediate region of said second conductivity type significantly less than at least one of the first and second portions, and in response to a gate voltage applied to said gate electrode, said third portion initially changing from a depletion state to a weak inversion state and subsequently to a strong inversion state, said weak inversion state supporting limited source-drain current flow determined by said gate voltage.

VOL
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5,021,846
MOS SEMICONDUCTOR DEVICE WITH AN INVERTED U-SHAPED GATE

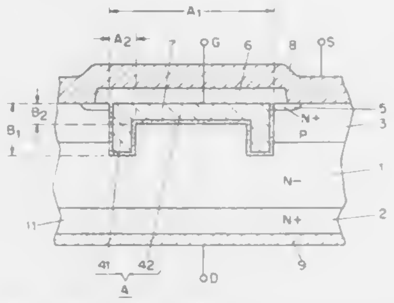
Katsunori Ueno, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Feb. 6, 1990, Ser. No. 475,713

Claims priority, application Japan, Feb. 6, 1989, 1-26945

Int. Cl.^{5} **H01L** *29/10, 29/78, 27/02, 29/04*

U.S. Cl. 357—23.4 9 Claims



1. A metal oxide semiconductor device, having a gate formed in an inverted U-shaped recess with a depth and width of said recess exceeding the limited thickness of the semiconductor layer applied to form said gate, comprising:

a semiconductor substrate having an inverted U-shaped recess formed of an inside channel of a first depth below the surface of said substrate connecting two outside channels whose depth below said surface substantially exceeds said first depth of said inside channel;

an insulative film covering the surface of said recess;

a gate formed by said limited thickness of semiconductor material within said recess in contact with said insulative film and filling said inside and outside channels to substantially said substrate surface;

a base layer formed at the surface of said substrate adjacent to and in contact with said insulative film and having a thickness less than the depth of said outside channels; and

a source layer at the surface of said base layer adjacent to and in contact with said insulative film and having a thickness less than the thickness of said base layer,

whereby a vertical conducting path adjacent to said insulating film is formed upon biasing said gate, and the semiconductor device is enabled to operate with a higher area utilization rate for main current flow.

5,021,847
SPLIT GATE MEMORY ARRAY HAVING STAGGERED FLOATING GATE ROWS AND METHOD FOR MAKING SAME

Boaz Eitan, Sunnyvale, and Reza Kazerounian, Alameda, both of Calif., assignors to WaferScale Integration, Inc., Fremont, Calif.

Continuation-in-part of Ser. No. 762,582, Aug. 2, 1985, Pat. No. 4,868,629, which is a continuation of Ser. No. 610,369, May 15, 1984, Pat. No. 4,639,893. This application Oct. 17, 1988, Ser. No. 258,952

Int. Cl.^{5} **H01L** *29/68, 27/02, 27/10*

U.S. Cl. 357—23.5 22 Claims

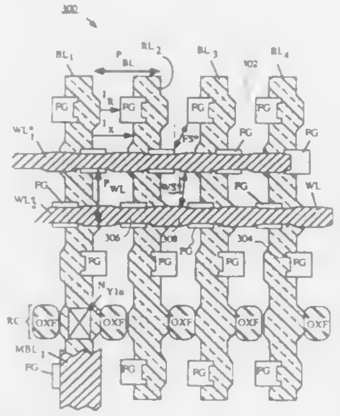
1. An array of erasably programmable read only memory cells (EPROM array) comprising:

a substrate;

a first diffused bit line defined in the substrate to extend in a longitudinal direction, the first diffused bit line having a left edge and an opposed right edge;

first, second and third rows of split gate transistors defined on the substrate, each row of transistors extending in a lateral direction to cross over the first diffused bit line, each split gate transistor including a floating gate,

wherein the second row is interposed between the first and third rows, and the second row is staggered with respect to the first and third rows such that floating gates of the transistors in the second row are not in columnar alignment with floating gates of the transistors in the first and third rows, and



wherein a first floating gate, within the first row, overlaps a first right edge portion of the first diffused bit line and a second floating gate, within the second row, overlaps a first left edge portion of the diffused bit line.

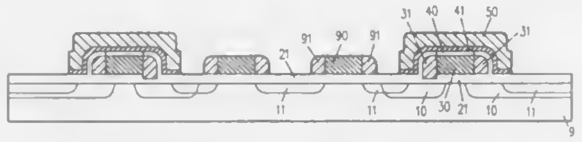
5,021,848
ELECTRICALLY-ERASABLE AND ELECTRICALLY-PROGRAMMABLE MEMORY STORAGE DEVICES WITH SELF ALIGNED TUNNEL DIELECTRIC AREA AND THE METHOD OF FABRICATING THEREOF

Te-Long Chiu, 1188 Spring Hill Way, San Jose, Calif. 95120

Filed Mar. 13, 1990, Ser. No. 492,113

Int. Cl.^{5} **H01L** *27/115, 21/235*

U.S. Cl. 357—23.5 12 Claims



1. A method of constructing a small tunnel dielectric area self aligned to an electrically floating, conductive gate, said method comprising the steps of:

forming a first floating, conductive gate on a first dielectric layer on a semiconductor region;

depositing a second dielectric film over said floating gate,

forming a sealing second dielectric film at the sidewall of said first floating gate by anisotropic etching of said second dielectric film;

introducing impurity into said semiconductor region to form a buried doped region;

forming a tunnel dielectric on said buried doped region;

removing said sealing second dielectric film from the sidewall of said first floating gate;

depositing an add-on conductive film of the same material as said first floating gate over said tunnel dielectric and said floating gate;

forming an add-on floating, conductive gate at the sidewall of said first floating gate by the anisotropic etching of said add-on conductive film, said add-on floating gate being shorted electrically to said first floating gate.

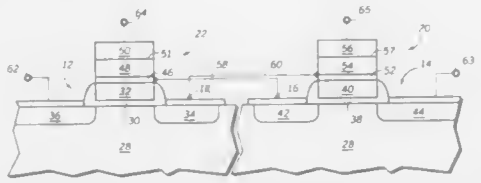
5,021,849
COMPACT SRAM CELL WITH POLYCRYSTALLINE SILICON DIODE LOAD

John R. Pfiester, and Richard W. Mauntel, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 30, 1989, Ser. No. 428,570

Int. Cl.^{5} **H01L** *29/68, 29/90, 29/04;* **G11C** *11/36*

U.S. Cl. 357—23.5 5 Claims



1. A static RAM cell having first and second cross coupled transistors and integral diode loads, the cell comprising:

a semiconductor substrate of first conductivity type having said first and second transistors formed at a surface thereof, each of said first and second transistors having spaced apart source and drain regions of second conductivity type formed in said substrate and separated by a channel region, a gate insulator overlaying said channel region, and a silicon gate electrode of second conductivity type overlaying said gate insulator;

an electrically conductive diffusion barrier overlaying and electrically contacting said silicon gate electrodes;

a diode load structure electrically coupled to each of said first and second transistors, each of said diode load structures comprising a first silicon layer of first conductivity type overlaying and electrically contacting said conductive diffusion barrier and a second silicon layer of second conductivity type overlaying said first silicon layer and having a rectifying junction between said first and second silicon layers;

an electrical interconnection coupling said electrically conductive diffusion barrier overlaying said gate electrode of said first transistor to said drain region of said second transistor; and a second electrical interconnection coupling said electrically conductive diffusion barrier overlaying said gate electrode of said second transistor to said drain region of said first transistor.

5,021,850
SILICON THIN FILM TRANSISTOR

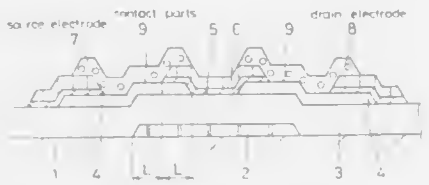
Sakae Tanaka; Yoshiaki Watanabe, both of Tokyo; Katsuo Shirai, Tochigi, and Yoshihisa Ogiwara, Tochigi, all of Japan, assignors to Seikosha Co., Ltd., Tokyo and Nippon Precision Circuits Ltd., Tochigi, both of, Japan

Filed Jul. 10, 1989, Ser. No. 377,873

Claims priority, application Japan, Jul. 13, 1988, 63-174439; Aug. 12, 1988, 63-201445; Sep. 13, 1988, 63-229427

Int. Cl.^{5} **H01L** *29/78, 27/12, 45/00, 49/02*

U.S. Cl. 357—23.7 4 Claims



1. A silicon thin film transistor comprising:

an insulating substrate;

a gate electrode formed on the insulating substrate;

a gate insulating layer formed on said insulating substrate containing said gate electrode;

a pair of first impurity contained silicon layers formed on said gate insulating layer in such a manner as to transversely cross a terminal part of said gate electrode;

an intrinsic silicon layer formed on said pair of first impurity contained silicon layers and on said gate insulating layer between said pair of first impurity contained silicon layers in such a manner as to connect said pair of first impurity contained silicon layers;

a protective insulation layer formed on said intrinsic silicon layer in the same shape as that of said intrinsic silicon layer; and

a source electrode and a drain electrode formed at contact parts of said pair of first impurity contained silicon layers, and further comprising:

a second impurity contained silicon layer containing impurities of a type reverse to that of impurities in said first impurity contained silicon layer, formed between said intrinsic silicon layer and said protective insulating layer and in the same shape as that of said intrinsic silicon layer.

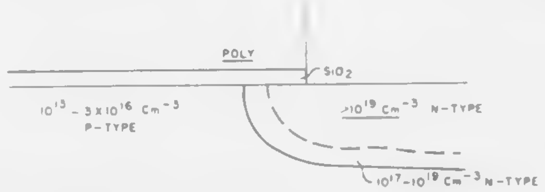
5,021,851
NMOS SOURCE/DRAIN DOPING WITH BOTH P AND AS

Roger A. Haken, Richardson, and David B. Scott, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 191,849, May 3, 1988, abandoned, which is a continuation of Ser. No. 718,818, Apr. 1, 1985, abandoned, which is a continuation of Ser. No. 344,589, Feb. 1, 1982, abandoned. This application Dec. 13, 1989, Ser. No. 453,097

Int. Cl.^{5} **H01L** *29/78, 27/02, 21/265*

U.S. Cl. 357—23.9 11 Claims



1. A MIS transistor comprising:

a semiconductor layer of a first conductivity type;

first and second source/drain regions of an opposite conductivity type each comprising a junction within said layer, said first and second source/drain regions defining a channel region therebetween;

a gate dielectric on said channel; and

a gate on said gate dielectric;

wherein said first source/drain region comprises a core region and a peripheral band, said peripheral band being interposed between said core region and said channel region, said core region including a common portion implanted with two dopant species of the same conductivity type and another portion diffused outwardly from said common portion and having a curved shape defined by the simultaneous diffusion of said two dopants, and said peripheral band including a significant concentration of only one of said two dopant species, said only one dopant consisting essentially of dopant diffused from said core region and said peripheral band having a curved shape defined by the diffusion of said only one dopant during said simultaneous diffusion and which diffusivity is greater than that of said other dopant.

VOL
1127
ISS
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1991
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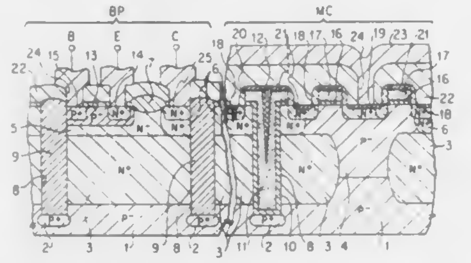
5,021,852
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Shunichi Sukegawa, and Takashi Inui, both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed May 18, 1989, Ser. No. 353,858
Int. Cl.^{5} H01L *29/06, 27/04, 29/72, 27/02*
U.S. Cl. 357—23.11 6 Claims



1. A semiconductor integrated circuit device comprising:

semiconductor substrate means of one conductivity type;

said semiconductor substrate means of said one conductivity type being provided with a plurality of vertical trenches extending thereinto form the top surface thereof and disposed in spaced relationship with respect to each other;

a memory cell including a capacitor and a field-effect transistor provided in one portion of said semiconductor substrate means;

a bipolar transistor provided in another portion of said semiconductor substrate means adjacent to the portion thereof in which said memory cell is disposed;

a buried semiconductor layer of the other conductivity type embedded in said semiconductor substrate means in spaced relation to the top surface thereof and common to the memory cell and the bipolar transistor as provided in said semiconductor substrate means;

the memory cell included in said semiconductor substrate means having at least one of said plurality of vertical trenches, said at least one vertical trench penetrating said buried semiconductor layer of the other conductivity type and bottoming into said semiconductor substrate means of said one conductivity type below said buried semiconductor layer of the other conductivity type;

a liner of insulation material bounding the vertical trench included in the memory cell;

conductive material filling the vertical trench included in the memory cell and spaced from said semiconductor substrate means and said buried semiconductor layer embedded therein by said insulation liner interposed therebetween;

said conductive material, said insulation liner and said buried semiconductor layer defining a trench capacitor of said memory cell in which said conductive material and said buried semiconductor layer are capacitor plates and the insulation liner is a dielectric layer therebetween; and

a pair of vertical trenches of said plurality of vertical trenches being disposed on opposite sides of said bipolar transistor provided in said semiconductor substrate means, each of said pair of vertical trenches being filled with insulation material to electrically isolate said bipolar transistor.

5,021,853
N-CHANNEL CLAMP FOR ESD PROTECTION IN SELF-ALIGNED SILICIDED CMOS PROCESS

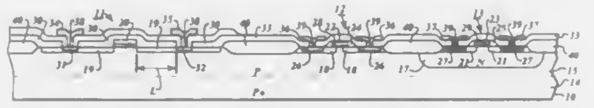
Kaizad R. Mistry, Brighton, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.
Filed Apr. 27, 1990, Ser. No. 515,853
Int. Cl.^{5} H01L *29/06, 29/78, 27/02, 29/04*
U.S. Cl. 357—23.13 9 Claims

1. An integrated circuit device comprising:

(a) at least one transistor having source/drain regions formed in a face of a semiconductor body and having a gate on said face;

(b) sidewall spacers on sidewalls of said gate and formed of a deposited oxide;

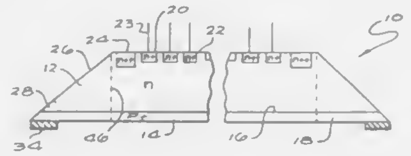
(c) said transistor having source and drain regions in said face and having silicided areas of said face on said source and drain regions, said silicided areas being self-aligned with said sidewall spacers;



(d) an ESD protection device at said face, said protection device including a gate and including source and drain regions of the same type as said source/drain regions of said transistor, and a masking layer of said deposited oxide over said gate and over said source and drain regions adjacent said gate of said protection device, said ESD protection device not having silicided areas at said face on said gate or on said source and drain regions adjacent said gate.

5,021,854
SILICON AVALANCHE PHOTODIODE ARRAY

Gerald C. Huth, Hermosa Beach, Calif., assignor to Xsirius Photonics, Inc., Fullerton, Calif.
Continuation of Ser. No. 128,368, Dec. 3, 1987, abandoned. This application Mar. 26, 1990, Ser. No. 500,230
Int. Cl.^{5} H01L *27/14, 29/90, 31/12*
U.S. Cl. 357—30 14 Claims



1. An avalanche photodiode array comprising:

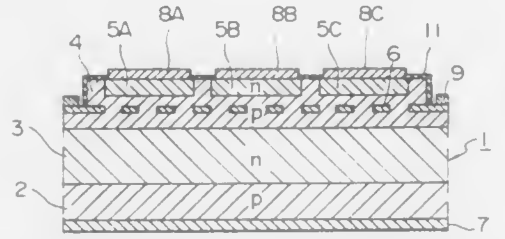
a body of n-type silicon semiconductor material having phosphorus uniformly distributed therein obtained by neutron transmutation doping, whereby the resistivity of said body is about 30–50 ohm-cm, said resistivity throughout at least an active region of said body has a maximum variance of about 0.5%, said body further having a first body surface and a second body surface opposite to said first surface separated by edge surfaces, and a p-n junction between said first and second body surfaces, said second body surface comprising an entrance surface for receiving light image, said edge surfaces being contoured such that cross-sectional area of said body decreases from said first body surface to said second body surface, whereby premature avalanche breakdown is prevented;

a plurality of signal contacts forming an array disposed on one of said first and second body surfaces; and

electrical contact means for reverse biasing said signal contacts.

5,021,855
GATE TURN-OFF THYRISTOR

Saburo Oikawa; Tsutomu Yatsuo, and Yukimasa Satou, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Continuation of Ser. No. 72,052, Jul. 10, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 326,455
Claims priority, application Japan, Jul. 14, 1986, 61-163832
Int. Cl.^{5} H01L *29/74*
U.S. Cl. 357—38 20 Claims



1. A semiconductor gate turn-off thyristor comprising:

a semiconductor body including a four-layer structure of an anode emitter layer, an anode base layer, a cathode base layer and a cathode emitter layer which are laminated successively in that order to form pn junctions between every adjacent two layers, and highly-doped buried means for forming a gage in said cathode base layer, said cathode emitter layer being comprised of a plurality of independent groups each one including at least two spaced-apart segmental regions;

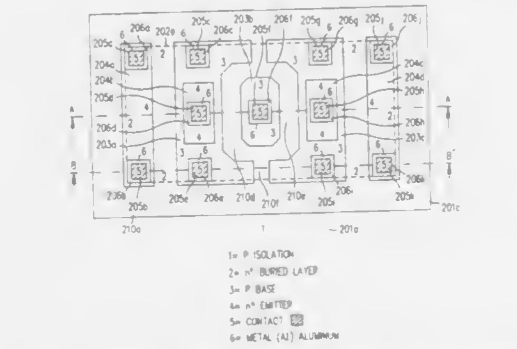
anode electrode means for making ohmic contact with said anode emitter layer;

cathode electrode means including a plurality of cathode electrodes each formed on and being in ohmic contact with said segmental regions, respectively; and

gate electrode means formed so as to be in ohmic contact with said cathode base layer and including an internal arrangement of respective single loop-like gate electrode portions, each single loop-like gate electrode portion being formed and dimensioned to surround only an outer periphery of a corresponding one of said plurality of segmental region groups.

5,021,856
UNIVERSAL CELL FOR BIPOLAR NPN AND PNP TRANSISTORS AND RESISTIVE ELEMENTS

Larry B. Wheaton, Santa Cruz, Calif., assignor to Plessey Overseas Limited, England
Filed Mar. 15, 1989, Ser. No. 323,269
Int. Cl.^{5} H01L *27/02*
U.S. Cl. 357—40 33 Claims



1. A semiconductor cell structure suitable for formation of any one electrical component selected from the group of components consisting of (i) a PNP transistor, (ii) an NPN transistor, (iii) a diode, (iv) a resistor, and (v) a crossunder, comprising:

semiconductor material of a first conductivity type and having a surface;

a semiconductor pocket of a second conductivity type opposite to said first conductivity type formed in said semiconductor material, said semiconductor pocket having a surface coincident with said surface of said semiconductor material;

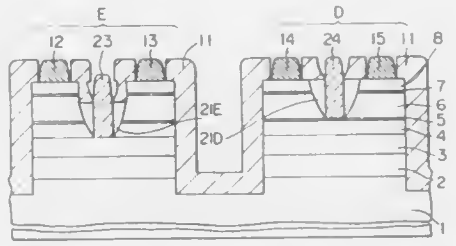
at least two regions of first conductivity type formed laterally spaced from each other in said semiconductor pocket;

at least one region of said second conductivity type formed in one of said at least two regions of first conductivity type; and

a conductive layer overlying but insulated from said semiconductor pocket, said conductive layer being electrically connected to said semiconductor pocket, to said at least two regions of first conductivity, and to said at least one region of second conductivity wherein said conductive layer is selectively removed to leave portions of said conductive layer electrically interconnecting selected ones of said pocket and said regions to thereby form one of said electrical components.

5,021,857
TWO DIMENSIONAL ELECTRON GAS SEMICONDUCTOR DEVICE

Haruyoshi Suehiro, Atsugi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan
Filed Nov. 29, 1989, Ser. No. 442,853
Claims priority, application Japan, Nov. 29, 1988, 63-299559
Int. Cl.^{5} H01L *27/02, 29/161, 29/80, 29/78*
U.S. Cl. 357—42 8 Claims



1. A semiconductor device comprising an enhancement-mode transistor and a depletion-mode transistor and utilizing a two-dimensional carrier gas, comprising:

a semi-insulating substrate;

a first semiconductor layer including a channel layer;

a second semiconductor layer having an electron affinity smaller than that of said first semiconductor layer;

a third semiconductor layer including a threshold voltage adjusting layer for the depletion-mode transistor and having an etch rate larger than that of said second semiconductor layer;

a fourth semiconductor layer including a first etching-stoppable layer;

a fifth semiconductor layer including an ohmic-contactable layer and having an etch rate larger than that of said fourth semiconductor layer;

a sixth semiconductor layer including a second etching-stoppable layer;

and a seventh semiconductor layer including a contact cap layer and having an etch rate larger than that of said sixth semiconductor layer, said first through seventh semiconductor layers being epitaxially and successively formed on said substrate;

source and drain electrodes at least partially lying on said seventh semiconductor layer;

a first gate electrode for the enhancement-mode transistor formed in a first recess extending to said second semiconductor layer;

VOL
1127
ISS
1
JE
4
1991
UMI

a second gate electrode for the depletion-mode transistor formed in a second recess extending to said fourth semiconductor layer,

an eighth semiconductor layer including a third etching-stoppable layer and having an etch rate smaller than that of said fifth semiconductor layer and formed in the fifth semiconductor layer so as to divide said fifth semiconductor layer into an upper portion layer and a lower portion layer thinner than said upper portion layer, said first gate electrode does not contact said fourth through seventh semiconductor layers and said second gate electrode does not contact said eighth semiconductor layer, said upper portion layer, and said sixth and seventh semiconductor layers.

5,021,858

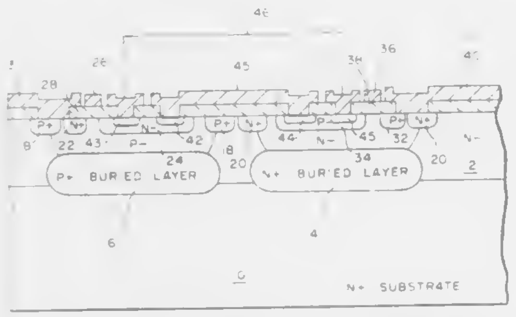
COMPOUND MODULATED INTEGRATED TRANSISTOR STRUCTURE

John H. Hall, 3169 Payne, Apt. #50, San Jose, Calif. 95117

Filed May 25, 1990, Ser. No. 528,950

Int. Cl.^{5} H01L *27/02*

U.S. Cl. 357—42 **5 Claims**



1. An integrated transistor structure comprising

a semiconductor body having a major surface with a first device region of a first conductivity type and a second device region of a second conductivity type therein,

a first device formed in said first device region and including a source region and a drain region of said second conductivity type, said source and drain regions being spaced apart by a channel region, a gate contact between said source and drain regions and insulatively spaced from said first device region, an ohmic contact to said source region, an ohmic contact to said drain region, and a rectifying contact region of first conductivity type in said drain region",

a second device formed in said second device region and including a source region and a drain region of first conductivity type, said source and drain regions being spaced apart by a channel region, a gate contact between said source and drain regions and insulatively spaced from said second device region, an ohmic contact to said source region an ohmic contact to said drain region, and a rectifying contact region of second conductivity type in said drain region",

input connector means interconnecting said gate of said first device and said gate of said second device,

output connector means interconnecting said rectifying contact regions of said first and second devices, and

means interconnecting said ohmic contacts to said drain regions.

5,021,859

HIGH-FREQUENCY AMPLIFYING SEMICONDUCTOR DEVICE

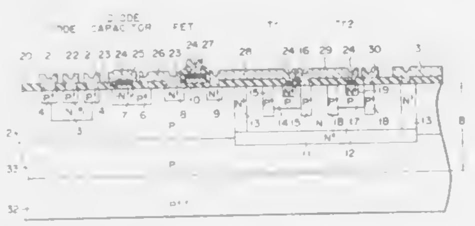
Takahiro Ito, Kawasaki; Bunshiro Yamaki, Fujisawa, and Yoshio Yamamoto, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 9, 1989, Ser. No. 436,056

Claims priority, application Japan, Nov. 10, 1988, 63-284772

Int. Cl.^{5} H01L *27/02*

U.S. Cl. 357—43 **14 Claims**



1. A high-frequency amplifying semiconductor device comprising:

a semiconductor substrate of a first conductivity type which is heavily doped with impurities;

a first epitaxial layer of the first conductivity type formed on said semiconductor substrate of the first conductivity type and containing impurities at a lower concentration than said semiconductor substrate;

a buried layer of a second conductivity type formed in said first epitaxial layer of the first conductivity type and heavily doped with impurities;

a second epitaxial layer of the first conductivity type formed on said buried layer of the second conductivity type and said first epitaxial layer of the first conductivity type and containing impurities at a lower concentration than said semiconductor substrate of the first conductivity type, a portion of said second epitaxial layer above said buried layer being of second semiconductor type;

an MOS field effect transistor formed in said second epitaxial layer of the first conductivity type and having a source electrode connected to a lead frame through a bonding wire;

a diode capacitor formed in said second epitaxial layer of the first conductivity type and connected to said source electrode of said MOS field effect transistor; and

a bipolar transistor formed in said second conductivity type portion of said second epitaxial layer of the first conductivity type.

5,021,860

INTEGRATED DEVICE FOR SHIELDING THE INJECTION OF CHARGES INTO THE SUBSTRATE

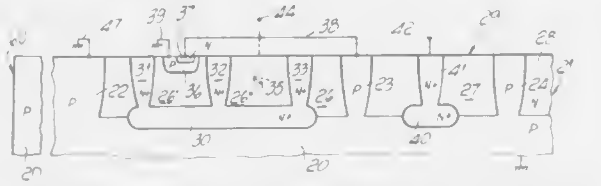
Franco Bertotti, Milan; Paolo Ferrari, Gallarate, and Maria T. Gatti, Milan, all of Italy, assignors to SGS-Thomson Microelectronics S.r.l., Agrate Brianza, Italy

Filed Oct. 11, 1988, Ser. No. 256,008

Claims priority, application Italy, Oct. 15, 1987, 22290 A/87

Int. Cl.^{5} H01L *27/082*

U.S. Cl. 357—48 **5 Claims**



1. An integrated device for shielding injection of charges into a substrate, comprising:

a substrate having a first conductivity type and being connected to a reference potential line,

an epitaxial layer superimposed on said substrate, having a second conductivity type opposite to said first conductivity type and defining a main face of the device, said epitaxial layer and said substrate defining together a junction,

a plurality of isolation regions having said first conductivity type and extending transversely to said epitaxial layer from said main face to said substrate and forming, in said epitaxial layer, at least one isolated flyback pocket connected to a load connection terminal and forming a flyback diode together with said substrate,

a buried layer of said second conductivity type extending between said epitaxial flyback pocket and said substrate along a part of said junction,

a first region of said first conductivity type embedded in said flyback epitaxial pocket at a distance from said isolation regions and having a portion thereof which extends at said main face of the device and is directly connected to said reference potential line,

a second region of said second conductivity type embedded in said first region and having a surface portion thereof extending at said main face of the device, said surface portion of said second region being directly connected to one of said isolation regions, said buried layer, said first region and said second region respectively forming emitter, base and collector regions of a debiasing transistor.

5,021,861

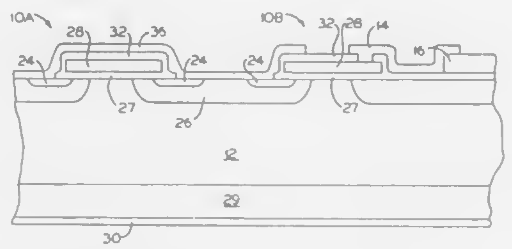
INTEGRATED CIRCUIT POWER DEVICE WITH AUTOMATIC REMOVAL OF DEFECTIVE DEVICES AND METHOD OF FABRICATING SAME

Bantval J. Baliga, Raleigh, N.C., assignor to North Carolina State University, Raleigh, N.C.

Filed May 23, 1990, Ser. No. 527,747

Int. Cl.^{5} H01L *27/02, 27/01, 29/00;* **H03K** *19/173*

U.S. Cl. 357—51 **12 Claims**



1. A power device comprising:

an integrated circuit;

a plurality of individual devices formed in said integrated circuit, electrically connected in parallel, the individual devices each handling a relatively small current so that said plurality of individual devices electrically connected in parallel handle a relatively large current, to thereby provide an integrated circuit power device; and.

a plurality of defect responsive automatic disabling means formed in said integrated circuit, a respective one of which is electrically connected to an associated at least one of said individual devices, each of said defect responsive automatic disabling means being responsive to a defect in the associated individual devices for automatically disabling the associated individual devices;

whereby an operable integrated circuit power device is obtained notwithstanding a defect in the individual power devices thereof.

5,021,862

BEVELED SEMICONDUCTOR SILICON WAFER AND MANUFACTURING METHOD THEREOF

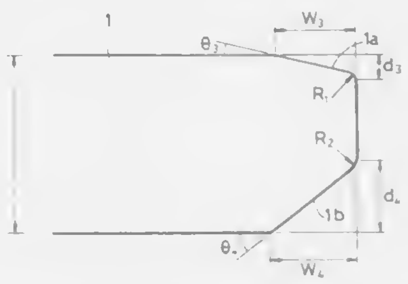
Nobuyoshi Ogino, Musashino, Japan, assignor to Shin-Etsu Handotai Co., Ltd., Tokyo, Japan

Filed Apr. 6, 1990, Ser. No. 505,475

Claims priority, application Japan, Apr. 17, 1989, 1-97749

Int. Cl.^{5} H01L *29/06;* **H01R** *13/02, 13/64*

U.S. Cl. 357—55 **4 Claims**



1. A semiconductor silicon wafer usable for integrated circuits, said wafer comprising first and second beveled portions unsymmetrically formed along circumferential edges of front and back sides respectively of said wafer, wherein a first angle located between a plane containing an inclining surface of the second beveled portion and a plane containing a main surface on the back side of said wafer, said first angle being located adjacent to the main surface on the back side of said wafer and being external to said wafer, is larger than a second angle located between the plane containing an inclining surface of the first beveled portion and a plane of a main surface on the front side of said wafer, said second angle being adjacent to the main surface on the front side of said wafer and being external to said wafer, whereby the circumferential edges of said wafer are prevented from being chipped.

5,021,863

SEMICONDUCTOR QUANTUM EFFECT DEVICE HAVING NEGATIVE DIFFERENTIAL RESISTANCE CHARACTERISTICS

Naoki Yokoyama, and Toshio Fujii, both of Atsugi, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 12, 1989, Ser. No. 405,976

Claims priority, application Japan, Sep. 12, 1988, 63-226450

Int. Cl.^{5} H01L *29/66*

U.S. Cl. 357—57 **7 Claims**

1. A semiconductor quantum effect device having negative differential resistance characteristics comprising:

a composite potential barrier layer including a first potential barrier layer and a second potential barrier layer, said second potential barrier layer having a valance band with a top energy level;

a carrier injection side semiconductor layer in contact with said first potential barrier layer, said carrier injection side semiconductor layer having a conduction band with a bottom energy level; and

a carrier injected side semiconductor layer in contact with said second potential barrier layer, said injected side semiconductor layer having a conduction band with a bottom energy level; p1 each said layer being formed of a semiconductor material, and the respective semiconductor materials forming said composite potential barrier layer, said carrier injection side semiconductor layer and said carrier injected side semiconductor layer are chosen to satisfy the condition that the bottom energy levels of the conduction bands in said carrier injection side semiconductor layer and said carrier injected side semiconductor layer are lower than the top energy level of the valence band in said second potential barrier layer when voltage is

VOL
1127
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1991
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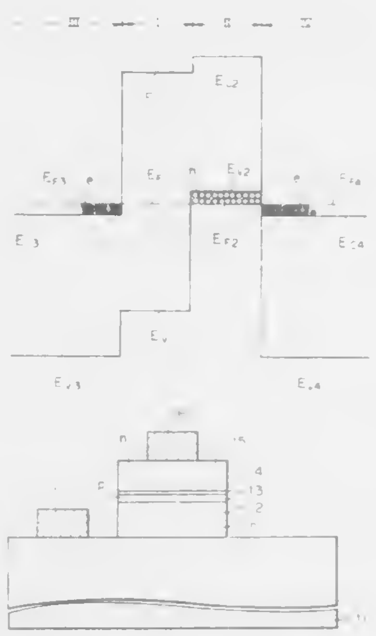
not applied across the semiconductor material elements so that a Fermi level within said second potential barrier



layer is at the same level as a Fermi level within said carrier injected side semiconductor layer

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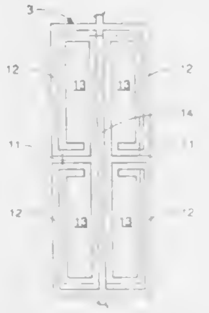
5,021,864
DIE-MOUNTING PADDLE FOR MECHANICAL STRESS REDUCTION IN PLASTIC IC PACKAGES

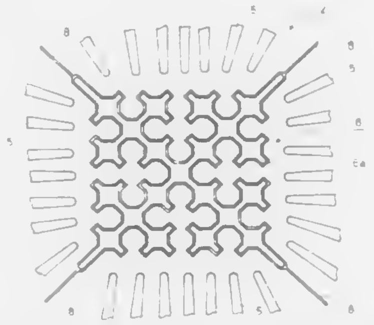
Douglas M. Kelly; Ward D. Parkinson, and Timothy J. Allen, all of Boise, Id., assignors to Micron Technology, Inc., Boise, Ill.
Continuation of Ser. No. 403,894, Sep. 5, 1989, abandoned, which is a continuation of Ser. No. 316,402, Feb. 27, 1989, abandoned. This application Feb. 20, 1990, Ser. No. 483,977
Int. Cl.⁵ H01L *23/48*
U.S. Cl. 357—70 10 Claims



1. A metal die-mounting paddle, for incorporation in a leadframe used for plastic-encapsulated integrated circuit packages, said paddle comprising:
- a support beam;
- a plurality of sub-paddles to which a semiconductor die will be oonded; and
- a coil for each sub-paddle, each of said coils having a first end attached to said support beam, and a second end attached to only one of said sub-paddles, said coils being deformable to allow said sub-paddles to move with respect to one another to compensate for differences in thermal expansion between a semiconductor die mounted on said paddle and the metal from which said paddle is fabricated.

5,021,865
LEAD FRAME FOR SEMICONDUCTOR DEVICE

Ynshiharu Takahashi, and Shuichi Osaka, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 7, 1989, Ser. No. 403,963
Claims priority, application Japan, Sep. 8, 1988, 63-225380
Int. Cl.⁵ H01L *23/48, 23/12*
U.S. Cl. 357—70 10 Claims



1. A lead frame for a semiconductor device, comprising.
- a die bond pad section on the upper surface of which a semiconductor chip is placed and secured; and
- a lead section including a plurality of leads arranged about said die bond pad section,
- wherein said die bond pad section comprises a material having a Peano curve form that is disposed over the die bond pad section such that said semiconductor chip may be placed on the upper surface of the die pad section thus provided

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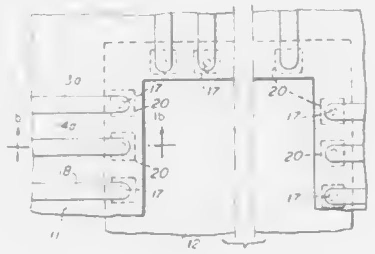
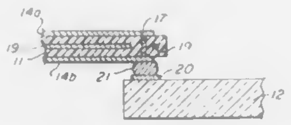
5,021,866
SEMICONDUCTOR INTEGRATED CIRCUIT APPARATUS

Toshio Sudo; Kazutaka Saito, both of Kawasaki, and Chiaki Takubo, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Sep. 28, 1988, Ser. No. 250,183
Claims priority, application Japan, Sep. 28. 1987, 62-243103
Int. Cl.⁵ H01L *23/48*
U.S. Cl. 357—70 14 Claims



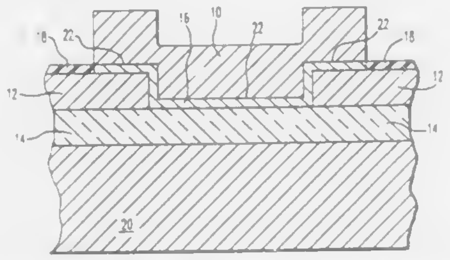


1 A semiconductor integrated circuit apparatus, comprising.
- an insulating film having first and second sides;
- a semiconductor integrated circuit chip having terminal portions and being disposed in parallel alignment with the film;
- first transmission leads formed on said first side of said insulating film and having termini disposed in alignment with the semiconductor terminal portions;

- second transmission leads formed on said second side of said insulating film, each of said second transmission leads having a corresponding first transmission lead and being the same shape as its corresponding first transmission lead and substantially completely overlapping its corresponding first transmission lead; and
- through-hole leads passing through said insulating film and through the termini of corresponding first and second transmission leads and formed at respective terminal portions of said integrated circuit chip and connecting corresponding ones of said first and second transmission leads to one another and to said respectively integrated circuit terminal portions.

5,021,867
REFRACTORY RESISTORS WITH ETCH STOP FOR SUPERCONDUCTOR INTEGRATED CIRCUITS

John X. Przybysz, Penn Hills, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed May 30, 1989, Ser. No. 359,018
The portion of the term of this patent subsequent to Feb. 27, 2007, has been disclaimed.
Int. Cl.⁵ H01L *23/48, 29/00;* **H01C** *1/012;* **B05D** *5/12*
U.S. Cl. 357—71 2 Claims

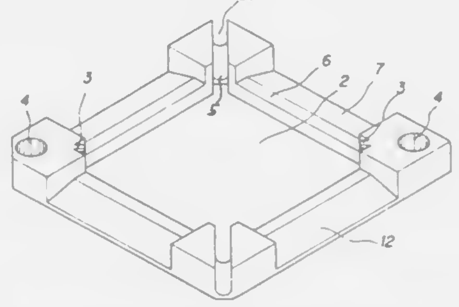


1. A molybdenum resistor configuration for a superconductor integrated circuit; said resistor comprising:
- (a) a support;
- (b) areas of superconductor film covering portions of said support;
- (c) an at least 50 Angstroms thick titanium film on said areas of superconductor film;
- (d) a titanium-molybdenum etch stop interface on said titanium film;
- (e) a molybdenum film on said titanium-molybdenum etch stop interface; and
- (f) a titanium oxide film on said support covering portions of said support and not covered by said areas of superconductor film.

5,021,868
IC CARRIER

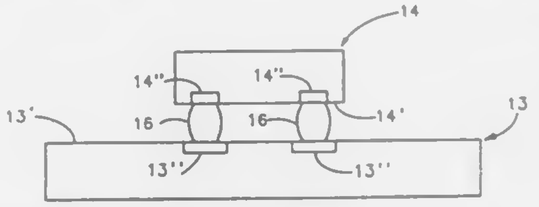
Noriyuki Matsuoka, Tokyo, Japan, assignor to Yamaichi Electric Mfg. Co., Ltd., Tokyo, Japan
Filed Mar. 29, 1990, Ser. No. 501,134
Claims priority, application Japan, Mar. 30, 1989, 1-79092
Int. Cl.⁵ H01L *23/02, 23/12, 23/42, 23/44*
U.S. Cl. 357—74 4 Claims

1. An integrated circuit carrier comprising:
- a continuous annular frame having opposite faces and an opening in the center thereof for accomodating an integrated circuit;
- two diametrically opposed corner portions at the opposite ends of a diagonal hinge line extending diametrically across said frame, said corner portions each having a groove shaped opening therethrough extending along said diagonal hinge line, and each having a thin, flexible hinge portion extending across said groove shaped opening and hingedly joining parts of said corner portions separated by said groove, whereby said frame can be bent around said hinge portions with said diagonal hinge line as an axis of bending; and
- engaging claws integrally formed on said frame on one face thereof and at positions spaced from said corner portions for, when said frame is unbent, engaging an integrated circuit therein for holding the integrated circuit therein, and when said frame is bent around said diagonal hinge line toward the other face, moving away from the position of the integrated circuit for releasing the integrated circuit from said frame.



5,021,869
MONOLITHIC SEMICONDUCTOR CHIP INTERCONNECTION TECHNIQUE AND ARRANGEMENT

Ravindhar K. Kaw, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.
Filed Dec. 27, 1988, Ser. No. 290,496
Int. Cl.⁵ H01L *23/12, 25/08, 25/12*
U.S. Cl. 357—75 4 Claims



1. An integrated circuit, comprising:
- a semiconductor chip having a top surface;
- an incomplete electrical circuit integrated within the semiconductor chip;
- a pair of electrical surface terminations in a contiguous area on the top surface, each such surface termination electrically connected to a separate portion of said incomplete electrical circuit;
- an interconnection chip having a bottom surface sized to fit within the contiguous area;
- a pair of electrically interconnected surface terminations on the bottom surface; and
- means for mounting the interconnection chip on the semiconductor chip within the contiguous area so that each termination on the bottom surface is electrically connected to one of the surface terminations on the top surface, whereby the interconnection chip serves to complete the electrical circuit in the semiconductor chip.

VOL
1127
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1991
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5,021,870

INTERPOLATION OF SCAN LINES FROM VIDEO SIGNALS HAVING INTERLACED SCAN LINES

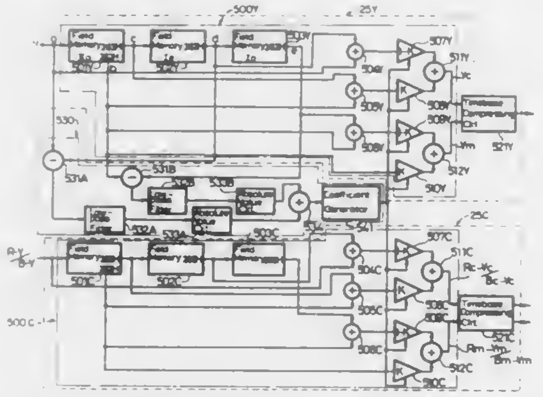
Hisafumi Motoe; Hiroyuki Kawashima, both of Tokyo, and Masaharu Tokuhara, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 14, 1989, Ser. No. 379,943

Claims priority, application Japan, Jul. 19, 1988, 63-179619

Int. Cl.^{5} H04N *11/20, 7/01*

U.S. Cl. 358—11 **34 Claims**



1. A method of generating scan lines of video signals in response to received video signals comprised of conventional scan lines of successive fields, said method comprising the steps of delaying the received video signals to provide a first scan line signal in a given field, the next succeeding scan line signal in that field, an interlaced scan line signal in the next succeeding field and an interlaced scan line signal in the next preceding field; combining the signal values of the next succeeding field interlaced scan line signal and the next preceding field interlaced scan line signal to form a first combined scan line signal; combining the signal values of the first scan line signal in said given field and the next succeeding scan line signal in that field to form a second combined scan line signal; level adjusting each of the first and second combined scan line signals by detecting motion in a video picture represented by the received video signals, and adjusting the relative levels of said first and second combined scan line signals as a function of said detected motion; adding the level adjusted first and second combined scan line signals to produce an interpolated scan line signal intermediate succeeding main scan lines in said given field; and modifying a main scan line signal in said given field as a function of said detected motion.

5,021,871

CONVERSION CIRCUIT FOR REMOVING LINE-BY-LINE PHASE ALTERNATION

Charles Azar, 3773 Matheson Ave., Miami, Fla. 33133, and Fernando V. Rabelo, 8000 W. Drive, Apt. 322, Miami, Fla. 33141

Filed Sep. 12, 1988, Ser. No. 243,259

Int. Cl.^{5} H04N *11/20*

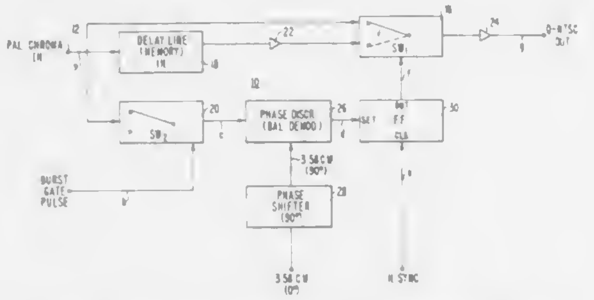
U.S. Cl. 358—11 **7 Claims**

1. A circuit for converting phase alternating chrominance composite signals to unalternating chrominance composite signals, comprising:

means for detecting a first phase of two phase, phase alternating line signals and for generating a control signal based thereon;

means for delaying a chrominance signal associated with said first phase for a predetermined horizontal time period;

means for outputting an undelayed chrominance signal upon application of said control signal and for outputting said chrominance signal delayed by said predetermined horizontal time period, in the absence of said control signal, whereby chrominance information for one line referenced to said first phase is substituted for chrominance information for a second line, referenced to the other said phase.



5,021,872

PHASE LOCKED SUBCARRIER REGENERATOR

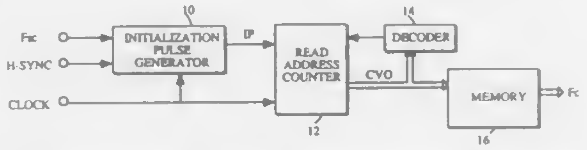
Shinichi Shiratsuchi, Yokohama, Japan, assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Feb. 14, 1990, Ser. No. 479,811

Claims priority, application Japan, May 26, 1989, 1-131715

Int. Cl.^{5} H04N *9/64, 9/66, 11/14*

U.S. Cl. 358—19 **6 Claims**



1. A phase locked frequency signal generator, comprising:

a source of a clock signal;

an initialization pulse generating means coupled to receive a color subcarrier signal which is phase locked to a color burst and a horizontal synchronization signal, and responsive to said clock signal for generating an initialization pulse;

means coupled to receive said initialization pulse and responsive to said clock signal for generating a memory read address signal; and

memory means programmed at respective memory locations with a series of sampled data representing a frequency signal to be generated, the frequency of said frequency signal having a predetermined relationship with the frequency of said clock signal, said memory means being coupled to receive said memory read address signal for generating the frequency signal consisting of said sampled data.

5,021,873

IMAGE SIGNAL PROCESSOR

Takao Abumi, Yaita, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 168,963, Mar. 16, 1988, abandoned. This application Jan. 22, 1990, Ser. No. 465,635

Claims priority, application Japan, Mar. 16, 1987, 62-61897; May 30, 1987, 62-84305

Int. Cl.^{5} H04N *9/64, 5/14*

U.S. Cl. 358—21 R **7 Claims**

1. An image signal processor comprising:

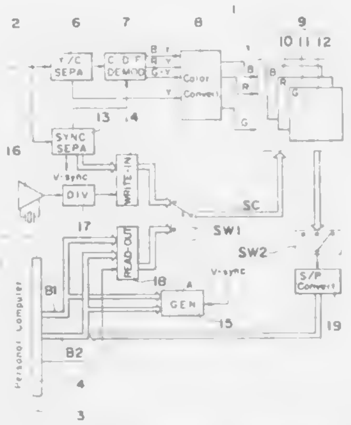
input means for receiving a composite video signal, said composite video signal having a vertical synchronizing signal;

memory means for storing a plurality of image signals representative of a picture during one field period of said composite video signal;

read operating means for generating READ-OUT control signals necessary to read out said plurality of image signals stored in said memory means in response to a READ-OUT command signal;

write operating means for generating WRITE-IN control signals necessary to write said plurality of image signals in said memory means;

switching means, operatively connected to said read operating means and said write operating means, for receiving said READ-OUT control signals and said WRITE-IN control signals and for selecting either said WRITE-IN control signals or said READ-OUT control signals to be outputted to said memory means; and



switching control means for generating a control signal to control the selection of said switching means;

said switching control means receiving said READ-OUT command signal and said vertical synchronizing signal and producing said control signal in response to said READ-OUT command signal and in synchronism with said vertical synchronizing signal.

5,021,874

WHITE BALANCE ADJUSTING DEVICE FOR USE IN A CAMERA

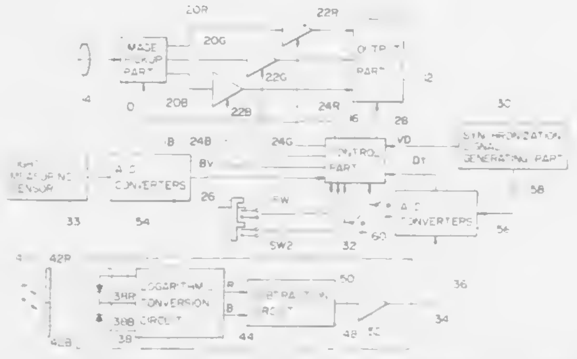
Makoto Tsugita, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 12, 1989, Ser. No. 337,093

Claims priority, application Japan, Apr. 20, 1988, 63-99011

Int. Cl.^{5} H04N *9/04, 9/73*

U.S. Cl. 358—29 **11 Claims**



1. A white balance adjusting apparatus for use in a camera which picks up an image of a field and creates a video signal representing the field, said white balance adjusting apparatus comprising:

color temperature detecting means for detecting the color temperature of said field and outputting a color temperature signal representing said detected color temperature.

light measuring means for detecting the brightness of said field and outputting a light measurement signal representing said detected field brightness;

white balance adjusting means for adjusting the white balance of said video signal; and,

control means, operatively connected to said color temperature detecting means, said light measuring means, and said white balance adjusting means, for receiving output signals of said color temperature detecting means and light measuring means and for controlling said white balance adjusting means in accordance with said output signals,

said control means judging that the weather conditions are fine upon said light measurement signal representing said field brightness being at least equal to a predetermined value and said detected color temperature being greater than a predetermined value equal to the color temperature of the direct light of the sun and thus controlling said white balance adjusting means such that it performs said white balance adjustment in accordance with the predetermined value equal to the color temperature of the direct light of the sun corresponding to the fine weather conditions.

5,021,875

AUTOMATIC WHITE-BALANCE ADJUSTING APPARATUS WITH REDUCED SENSITIVITY TO TRANSIENT LIGHT CONDITIONS

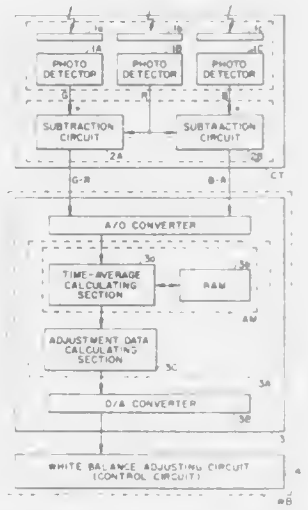
Takashi Iida; Hiroshi Kiten; Toru Ishii, and Takeya Tsukamoto, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 156,028, Feb. 16, 1988, abandoned. This application Jan. 17, 1990, Ser. No. 465,533

Claims priority, application Japan, Feb. 18, 1987, 62-36773; Feb. 18, 1987, 62-36775

Int. Cl.^{5} H04N *9/73*

U.S. Cl. 358—29 C **11 Claims**



1. An automatic white-balance adjusting apparatus comprising:

light measuring means for generating a light measurement value of a scene by receiving light from a light source illuminating said scene;

color temperature detecting means for detecting the color temperature of said light source based on the light measurement value of said scene and generating color temperature data;

averaging means for periodically inputting the color temperature data and calculating a time-average color temperature of said scene by averaging a predetermined number of the inputted color temperature data;

determining means for determining color temperature adjustment data based on said average value; and

VOL
1127
ISS
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1991
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adjusting means for carrying out a white-balance adjustment operation by adjusting the color balance of an image signal based on the color temperature adjustment data.

5,021,876
IMAGE PROCESSING APPARATUS WITH REAL-TIME TEXTURE PROCESSING

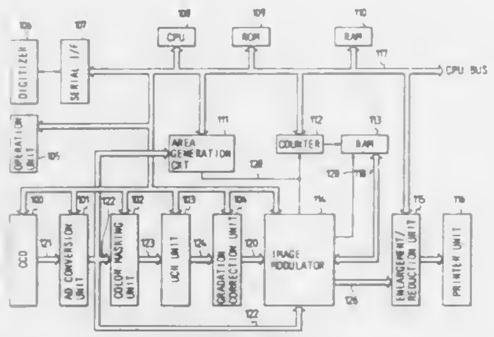
Mitsuru Kurita, Tokyo; Yoshinori Ikeda, Kawasaki; Yasnmichi Suzuki, Tokyo; Koichi Katoh, Yokohama; Hiroyuki Ichikawa, Kawasaki; Toshiyuki Kitamura, Kawasaki, and Toshihiro Kadowaki, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 436,205, Nov. 14, 1989, abandoned. This application Sep. 18, 1990, Ser. No. 587,172

Claims priority, application Japan, Nov. 14, 1988, 63-287093; Nov. 18, 1988, 63-291564; Feb. 14, 1989, 1-35349

Int. Cl.⁵ H04N *1/46*

U.S. Cl. 358—75 **73 Claims**



1. An image processing apparatus comprising:

inputting means for inputting image data;

memory means for storing first image data which is input by said inputting means;

area designating means for designating an area; and

processing means for executing a modulating process on said area of second image data which is input by said inputting means, by using the first image data stored in said memory means.

5,021,877
OPTICAL IMAGE READING APPARATUS CAPABLE OF READING MULTI-COLORED ORIGINAL

Michio Tsuchiya; Shuji Otsuka; Takayuki Matsumoto, all of Nagoya; Eiichi Ohta, Handa; Hakudai Kondo, Nagoya; Suzuyo Murai, Nagoya; Kouzi Takeyama, Nagoya; Mutumi Otobe, Nagoya; Tetsuo Harano, Inazawa; Kouichi Mino, Kashiwa; Hiroya Inagaki, Suginami, and Koji Matsumura, Kashiwa, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi and Nippon Telegraph Corporation, Tokyo, both of, Japan

Filed Oct. 20, 1988, Ser. No. 260,281

Claims priority, application Japan, Oct. 27, 1987, 62-271254; Nov. 6, 1987, 62-170589; Jan. 22, 1988, 63-13159; Apr. 1, 1988, 63-45143; Apr. 1, 1988, 63-81687

Int. Cl.⁵ H04N *1/46*

U.S. Cl. 358—75 **16 Claims**

12. An optical image reading apparatus for photoelectrically reading images formed in at least two colors on a surface of an original having a base color different from said at least two colors, comprising:

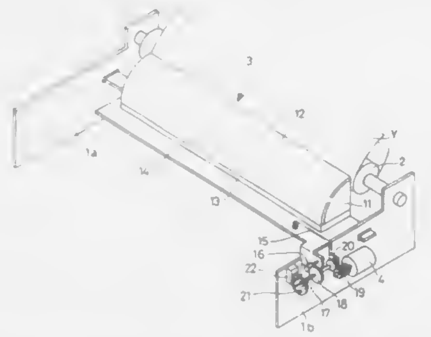
first reading means for obtaining a first image signal for each of a multiplicity of reading spots in a predetermined area on said original, said first image signal having two different levels, one of which corresponds to said base color and the other of which corresponds to said at least two colors;

second reading means for obtaining a second image signal for said each reading spot, said second image signal cooperating with said first image signal to discriminate each of said at least two colors from the other of said at least two colors,

said second reading means having a lower optical sensitivity than said first reading means, and

means to prevent determination of an intermediate color between said base color and one of said at least two colors, as being another of said at least two colors, in a situation where determination of said intermediate color as being said one of said at least two colors is acceptable while the determination of said intermediate color as being said another of said at least two colors is unacceptable;

wherein said first reading means comprises first light source means for emitting first light beams which irradiate said reading spots and which are optically influenced by the colors in said reading spots, and said second reading means comprises second light source means for emitting second light beams which irradiate said reading spots and which are optically influenced by said colors, said first and second reading means comprising photoelectric detecting means for generating said first and second image signals indicative of optical intensities of said first and second light beams which have been optically influenced by said colors in said reading spots, said apparatus further comprising:



a light reflecting surface having a reference reflectance of light;

preliminary irradiation means for irradiating test spots on said light reflecting surface with said first and second light beams, at different times;

adjusting means for adjusting the amplification constants of said photoelectric detecting means for said first and second light beams emitted by said first and second light source means, so that a level of said first and second image signals of said photoelectric detecting means is equal to a predetermined level while said preliminary irradiation means is operating;

memory means for storing the adjusted amplification constant of said phtoelectric detecting means; and

sensitivity lowering means for setting the amplification constant of said photoelectric detecting means for said optically influenced second light beams at a value lower than said adjusted amplification constant stored in said memory means, whereby said second reading means is given a lower optical sensitivity than said first reading means.

5,021,878
ANIMATED CHARACTER SYSTEM WITH REAL-TIME CONTROL

Victor H. Lang, Pueblo, Colo., assignor to Semborg-Recrob, Corp., Lansing, Ill.

Filed Sep. 20, 1989, Ser. No. 410,114

Int. Cl.⁵ H04N *7/18*

U.S. Cl. 358—93 **16 Claims**

1. A system for controlling an animated character, comprising:

an animated character, responsive to a surrounding environment, having:

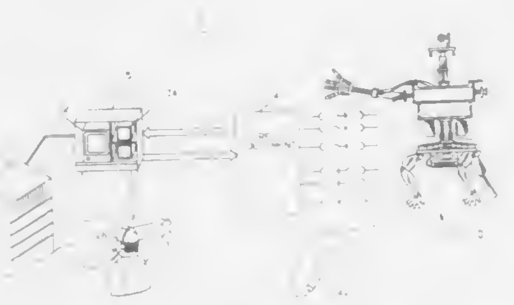
a body including a head and at least one video camera for viewing objects in front of the head,

at least one character microphone, located in proximity to the body, for detecting external sounds, and

movement means, responsive to remotely generated signals, for moving the head with respect to the body;

a speaker co-located with the animated character;

a control station, remotely located from the animated character, including;



visual means, responsive to said at least one video camera, for displaying said objects;

audio means, responsive to said at least one character microphone, for generating the sounds detected thereby;

a station microphone for generating utterances through the speaker; and

control means for generating the remotely controlled signals such that the animated character moves in response to the surrounding environment.

5,021,879
SYSTEM FOR TRANSMITTING VIDEO PICTURES

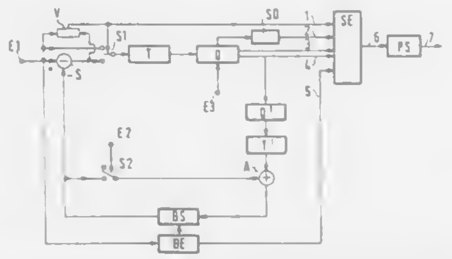
Peter Vogel, Diepersdorf, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 442,475, Nov. 22, 1989, abandoned, which is a continuation of Ser. No. 185,608, Apr. 25, 1988, abandoned. This application Sep. 24, 1990, Ser. No. 590,450

Claims priority, application Fed. Rep. of Germany, May 6, 1987, 3715067; May 7, 1987, 3715147; Aug. 10, 1987, 3726520; Dec. 28, 1987, 3744280

Int. Cl.⁵ H04N *7/18, 7/12*

U.S. Cl. 358—105 **18 Claims**



1. A system for transmitting video pictures by means of a hybrid encoder for encoding the data of an incoming video picture in blocks, the data of the previous video picture being stored in a picture memory of the hybrid encoder and being compared blockwise with the blocks of the incoming video picture, the result of the comparison for each block to be encoded leading to main and side information, the main information comprising data about the elements of a transformed and quantized block and the side information also comprising data about the following block attributes:

a) the transformed and quantized block is the difference block of the original block,

b) the motion vector is zero or not zero,

c) the main information consists of zeros only or does not consist of zeros only,

characterized in that the hybrid encoder combines a plurality of blocks, which represent a coherent section of a video picture, to a macro-block, in that it assigns a macro-attribute to each macro-block, and in that it can be derived from each macro-attribute which side information is either identical or not identical for all sub-blocks of the macro-block.

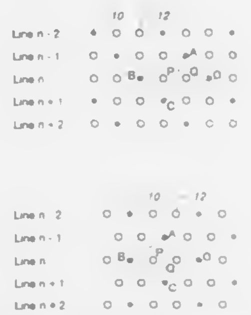
5,021,880
DIGITAL VIDEO SIGNAL COMPRESSION

Alan F. Graves, Kanata; Raymond L. Greenfield, London, and Barry B. Hagglund, Nepean, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jun. 13, 1990, Ser. No. 538,627

Int. Cl.⁵ H04N *7/12*

U.S. Cl. 358—138 **20 Claims**



1. A method of providing a compressed digital video signal comprising the steps of:

providing digital video signal samples at a sampling frequency, the samples representing respective pixels in lines of a video signal;

determining groups each of three successive samples in each video signal line, the groups in adjacent lines being offset from one another;

representing a first sample in each group by a first number of bits;

comparing each of a second and a third sample in each group with magnitudes derived in a predetermined manner from a plurality of adjacent first samples to determine a closest match; and

representing each of the second and third samples in each group by a second number of bits indicative of the closest match, the second number being less than the first number.

5,021,881
MOTION DEPENDENT VIDEO SIGNAL PROCESSING

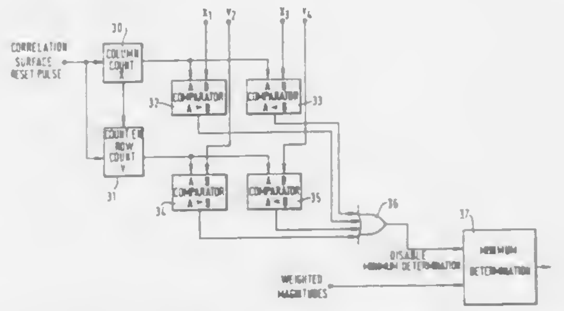
Richard J. A. Avis, and Clive H. Gillard, both of Basingstoke, United Kingdom, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 20, 1990, Ser. No. 512,145

Claims priority, application United Kingdom, Apr. 27, 1989, 8909650

Int. Cl.⁵ H04N *7/01*

U.S. Cl. 358—140 **12 Claims**



1. A motion compensated video standards converter for

VOL
1127
ISS
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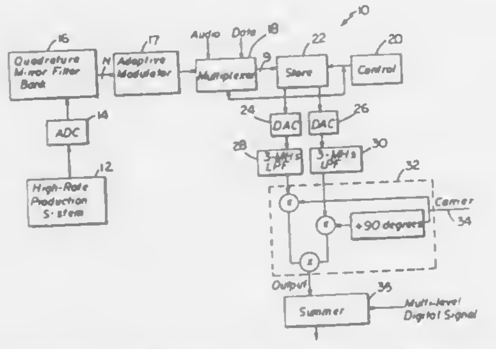
1991
UMI

converting an input video signal having a first standard format to a motion compensated video signal having a second standard format, said converter comprising:

- comparator means for receiving said input video signal having said first standard format and for comparing blocks in a first field or frame of the video signal with a plurality of blocks in the following field or frame of said video signal, said comparator means deriving motion vectors which represent the motion of the content of the respective blocks compared between said first field or frame and said following field or frame by generating a correlation surface for each of said blocks in said first field or frame which represents the difference in magnitude between the content of each of said blocks in said first field or frame and each block in said first field or frame with which each block in said first field or frame has been compared, selecting a minimum in said correlation surface which satisfies predetermined requirements and deriving a motion vector corresponding to said minimum;
- weighting means for weighting the magnitudes of the respective differences of said correlation surface after a preliminary comparison by said comparator means fails to derive a minimum in said correlation surface which satisfies said predetermined requirements and deriving a motion vector from a weighted minimum of said correlation surface which satisfies said predetermined requirements; and
- interpolator means for interpolating said input video signal having said first standard format in dependence on said motion vectors to produce said motion compensated video signal having said second standard format.

5,021,882
DEFINITION TELEVISION SYSTEMS

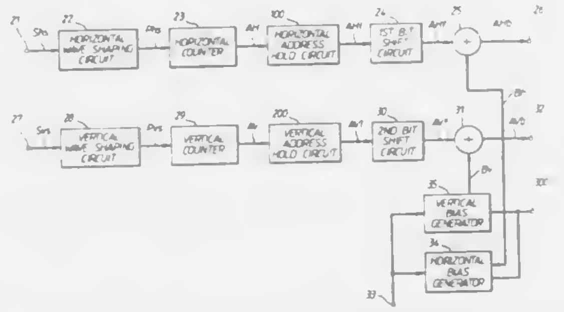
William F. Schreiber, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.
Filed May 24, 1989, Ser. No. 356,133
Int. Cl.⁵ H04N *7/04*
U.S. Cl. 358—141 **5 Claims**



1. A receiver-compatible EDTV system comprising means for adaptively modulating an enhancement signal so as to suppress channel noise and means for transmitting the adaptively-modulated enhancement signal as part of a receiver-compatible signal and outside the usable picture area of the receiver-compatible EDTV system but within at least a portion of the usable picture area of an NTSC system, said receiver-compatible signal carrying an EDTV aspect ratio image.

5,021,883
ADDRESS CONTROL CIRCUIT FOR A VIDEO MEMORY OF A MULTI-IMAGE DISPLAY VIDEO SYSTEM

Noriya Sakamoto, and Susumu Komatsu, both of Kanagawa, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan
Filed Mar. 30, 1989, Ser. No. 330,551
Claims priority, application Japan, Mar. 30, 1988, 63-76959
Int. Cl.⁵ H04N *5/14*
U.S. Cl. 358—160 **7 Claims**

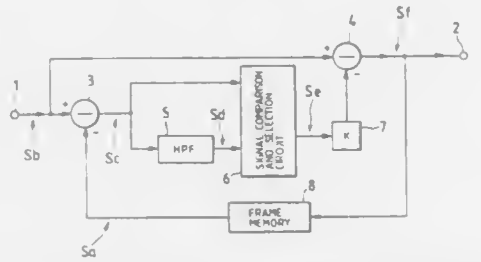

21
22
HORIZONTAL WAVE SHAPING CIRCUIT
23
HORIZONTAL COUNTER
100
HORIZONTAL ADDRESS HOLD CIRCUIT
24
1ST BIT SHIFT CIRCUIT
25
27
28
VERTICAL WAVE SHAPING CIRCUIT
29
VERTICAL COUNTER
200
VERTICAL ADDRESS HOLD CIRCUIT
30
2ND BIT SHIFT CIRCUIT
31
32
35
VERTICAL BIAS GENERATOR
34
HORIZONTAL BIAS GENERATOR
33

1. An address control circuit for a video memory of a multi-image display system comprising:

- means for supplying a video signal;
- a video memory for storing the video signal;
- a holding circuit for selectively holding write addresses of the video memory, and generating a held address value during a blanking period or a current address value during a video image period; and
- a bias generating circuit, responsive to the holding circuit, for positioning address areas of the video memory in which the video signal is stored.

5,021,884
NOISE REDUCER CIRCUIT FOR VIDEO SIGNAL

Hidetoshi Ozaki, and Akira Gokura, both of Tokyo, Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan
Filed Mar. 15, 1990, Ser. No. 493,711
Claims priority, application Japan, Mar. 15, 1989, 1-62573
Int. Cl.⁵ H04N *5/21*
U.S. Cl. 358—167 **5 Claims**

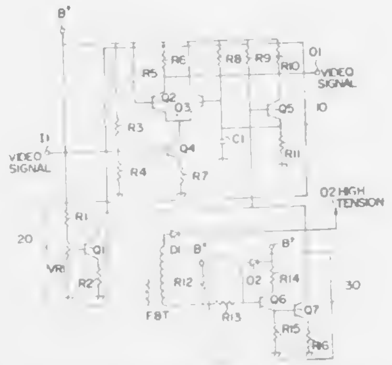


1. A noise reducer circuit for operating on an input video signal (Sb) to obtain a corresponding output video signal (Sf) in which noise components of the input video signal are substantially reduced, comprising:

- means for delaying the output video signal by a fixed time delay to obtain a delayed output video signal (Sa);
- means for subtracting the delayed output video signal (Sa) from the input video signal (Sb) to obtain a difference signal (Sc);
- a high pass filter coupled to receive the difference signal (Sc), for producing a filter output signal (Sd);
- signal amplitude comparison and selection means for determining which of the difference signal (Sc) and the filter output signal (Sd) has a smaller absolute value of amplitude, and for outputting a smaller value signal thus determined, as a selected signal (Se); and
- means for subtracting the selected signal (Se) from the input video signal (Sb) to obtain the output video signal (Sf).

5,021,885
AUTOMATIC BRIGHTNESS LIMITER

Kwang-Seok Kim, Suwon, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Suweon, Rep. of Korea
Filed Jul. 5, 1989, Ser. No. 375,473
Int. Cl.⁵ H04N *5/235, 5/57*
U.S. Cl. 358—168 **1 Claim**

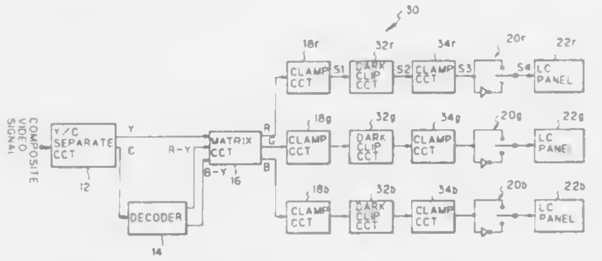


1. An automatic brightness limiter, comprising:

- means for amplifying a video signal and applying an image signal to a next stage,
- contrast adjustment means for adjusting contrast of a screen through active components, and
- control means for automatically controlling image signal level and contrast for a cathode ray tube by controlling said amplifying means and said contrast adjustment means using a high voltage applied to an anode through control components, coupled between said amplifying means and said contrast adjustment means.

5,021,886
VIDEO SIGNAL PROCESSOR FOR A COLOR LIQUID CRYSTAL DISPLAY

Kenji Shibayama, Tokyo, Japan, assignor to Victor Company of Japan, Limited, Yokohama, Japan
Filed Mar. 15, 1990, Ser. No. 493,887
Claims priority, application Japan, Mar. 23, 1989, 1-70946
Int. Cl.⁵ H04N *5/14*
U.S. Cl. 358—170 **6 Claims**

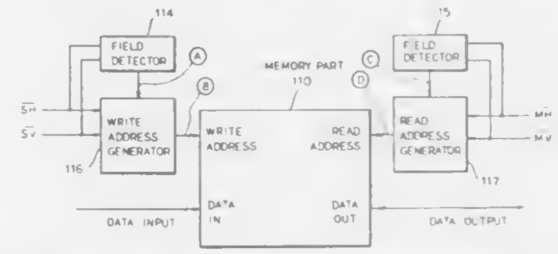


1. A video signal processor for processing a video signal to be fed to liquid crystal (LC) panel means which displays a reproduced picture thereon, comprising:

- clipping means for removing signal components lower than a pedestal level of the video signal to be fed to the LC panel means; and
- clamping means for causing either one of an input signal to and an output signal from said clipping means to coincide with a voltage level of an input voltage which reduces transmittance of the LC panel means to the lowest transmittance.

5,021,887
METHOD AND CIRCUIT FOR COMPOSING STILL IMAGE OF PICTURE-IN-PICTURE

Yung-Jun Park, Suweon, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Kyung, Rep. of Korea
Filed Dec. 13, 1989, Ser. No. 449,793
Int. Cl.⁵ H04N *5/262, 5/272*
U.S. Cl. 358—183 **4 Claims**



1. A circuit for composing a video sub picture for a picture-in-picture (PIP) video display displaying a main picture and a sub picture within said main picture, the circuit comprising:

- addressable memory means for writing and reading-out video image data, said memory means having a video image data input for receiving video image data, a write address input, a read address input and a video image data output;
- writing means operably connected to the write address input of said memory means for writing video data of every second scan line of a video image field data applied to the video image data input of said memory means for storing said video data in said memory means; and
- reading means operably connected with the read address input of said memory means for generating read addresses of said memory means for reading-out stored video data from odd-numbered addresses of said memory means in accordance with a main picture horizontal synchronization signal of a first video field of a main video picture corresponding to a starting point of a first field of a PIP display within said main video picture, for composing a first field of a video sub picture from said read-out video data of said odd-numbered memory addresses, and for reading-out stored video data from even-numbered addresses of said memory means in accordance with a main video picture horizontal synchronization signal of a second video field of said main video picture corresponding to a starting point of a second field of said PIP, for composing a second video field of said video sub picture from said read-out data of said even-numbered memory addresses, whereby the first and second video fields of a video sub picture are composed from video data of a single input video image field.

5,021,888
MINIATURIZED SOLID STATE IMAGING DEVICE

Yuu Kondou, Kanagawa, and Mamoru Izumi, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Dec. 15, 1988, Ser. No. 284,610
Claims priority, application Japan, Dec. 18, 1987, 62-318664; Dec. 18, 1987, 62-318665; Dec. 18, 1987, 62-318666
Int. Cl.⁵ H04N *3/14*
U.S. Cl. 358—213.11 **8 Claims**

1. A solid state imaging device for detecting incident light from a predetermined direction relative to the device, comprising:

- solid state image means including a light incident surface for receiving the incident light and a plurality of side surfaces each of said side surfaces being in a plane which is perpendicular to the plane of said incident light surface; and
- printed circuit board means connected using an electro-con-

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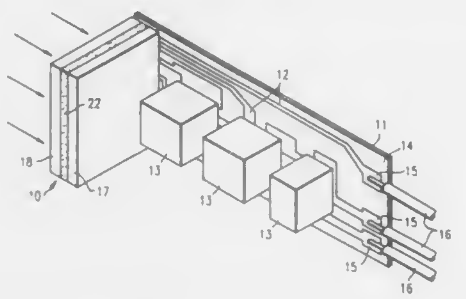
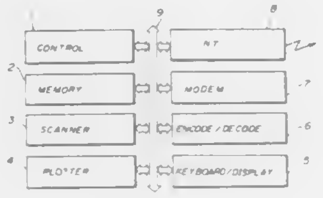
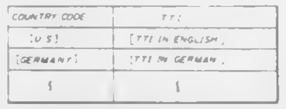
ductive anisotropic film to at least one of said side surfaces of the imaging means, and elongated in back of the light



incident surface and perpendicular to said light incident surface.

5,021,889
FACSIMILE APPARATUS
Kazuhito Yamamoto, Isehara, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed Feb. 14, 1990, Ser. No. 480,125
Claims priority, application Japan, Feb. 20, 1989, 1-38434
Int. Cl.⁵ H04N *7/00*
U.S. Cl. 358—440 **6 Claims**





COUNTRY CODE	TTI
[U S]	[TTI IN ENGLISH]
[GERMANY]	[TTI IN GERMAN]
⋮	⋮

1. A facsimile apparatus adapted for use in a terminal connected to an end of a network for sending a terminal identification information identifying the terminal in which the facsimile apparatus is operating, to another terminal connected to another end of the network together with an image information to be transmitted, comprising:

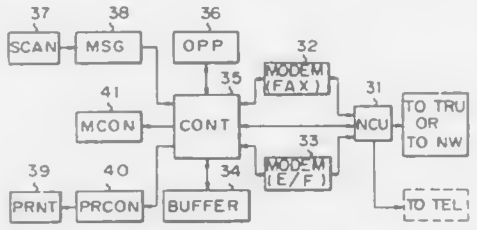
a scanner for reading an image and producing an image information to be transmitted in response thereto;

transmission means given with a destination code designating a destination terminal to which the image information is to be transmitted and sending the image information to the terminal designated by the destination code via the network, said destination code including a country code identifying the country in which the destination terminal belongs;

memory means for storing the terminal identification information in a plurality of different languages used in different countries in combination with corresponding country codes each indicating a country in which the language is used; and

control means for discriminating the country code given to the transmission means and reading out the terminal identification information stored in the memory means in one of the languages in combination with the country code given to the transmission means, said control means adding the terminal identification information thus read out to the image information to be transmitted.

5,021,890
METHOD OF AND APPARATUS FOR FACSIMILE COMMUNICATIONS
Isao Yoshida; Hidetoshi Inoue, and Kanji Arai, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan
Filed Mar. 21, 1989, Ser. No. 326,801
Claims priority, application Japan, Mar. 25, 1988, 63-69594
Int. Cl.⁵ H04M *1/00*
U.S. Cl. 358—405 **7 Claims**



BLOCK DIAGRAM SHOWING A FACSIMILE APPARATUS OF THE PRESENT INVENTION

1. A facsimile signal converting apparatus for use with a facsimile apparatus to communicate with another facsimile apparatus via a network and another facsimile signal converting apparatus, the facsimile apparatus and the another facsimile apparatus being operative with a first communications protocol and at least a portion of the network being disposed between the facsimile apparatus and the another facsimile apparatus, said facsimile signal converting apparatus comprising:

first means for interfacing with the facsimile apparatus using the first communications protocol;

second means for interfacing with the another facsimile signal converting apparatus using a second communications protocol with an error control mode;

adaptive error control means for judging the quality of the network between the facsimile signal converting apparatus and the another facsimile signal converting apparatus, and for selecting the error control mode of the second communication protocol from a plurality of error control modes on the basis of the judged quality; and

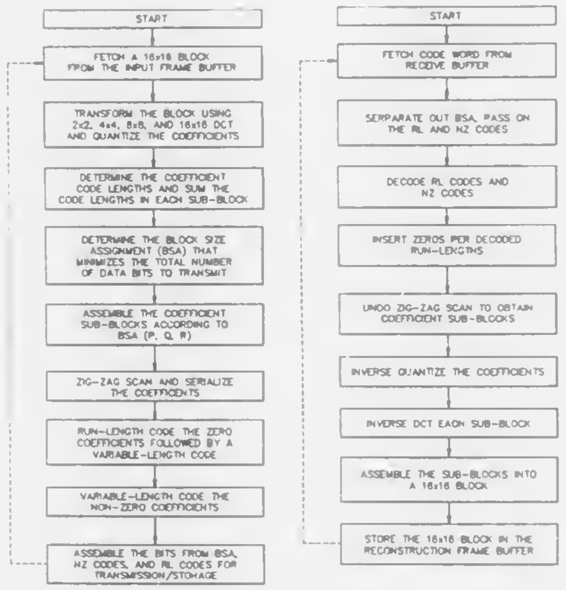
means for converting signals having the first protocol which are received from the facsimile apparatus by the first means to signals having the second protocol for transmission by the second means to the another facsimile signal converting apparatus, and for converting signals having the second protocol which are received from the another facsimile signal converting apparatus by the second means to signals having the first protocol for transmission by the first means to the facsimile signal converting apparatus.

5,021,891
ADAPTIVE BLOCK SIZE IMAGE COMPRESSION METHOD AND SYSTEM
Chong U. Lee, San Diego, Calif., assignor to Qualcomm, Inc., San Diego, Calif.
Filed Feb. 27, 1990, Ser. No. 487,012
Int. Cl.⁵ H04N *1/415*
U.S. Cl. 358—432 **5 Claims**

1. In an image compression system, a sub-system for generating from a block of input pixel data a corresponding composite block of discrete cosine transform (DCT) data, comprising:

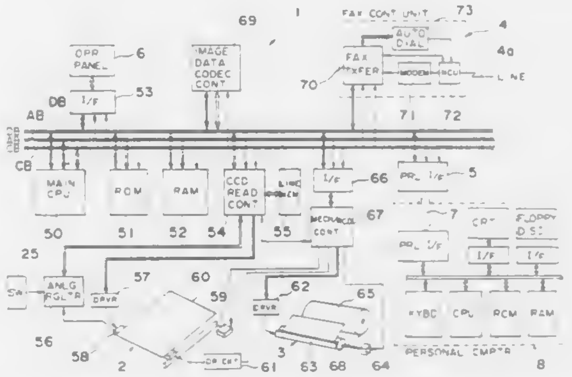
transform means for, receiving an input block of pixel data, performing a discrete cosine transform (DCT) operation on said block of pixel data and on at least one predetermined level of constituent sub-blocks thereof, and providing corresponding block and sub-blocks of DCT coefficient values;

block size assignment means for, receiving said block and each sub-block of DCT coefficient values, determining for each block and each corresponding group of sub-blocks of DCT coefficient values a bit count value corresponding to a number of bits required to respectively encode said block and each corresponding group of sub-blocks of DCT coefficient values according to a predetermined coding format, determining from said bit count values ones of said block and corresponding group of sub-blocks of DCT coefficient values requiring a lesser number of bits to encode according to said coding format, and providing a corresponding selection value; and


START
FETCH A 16x16 BLOCK FROM THE INPUT FRAME BUFFER
TRANSFORM THE BLOCK USING 2x2, 4x4, 8x8, AND 16x16 DCT AND QUANTIZE THE COEFFICIENTS
DETERMINE THE COEFFICIENT CODE LENGTHS AND SUM THE CODE LENGTHS IN EACH SUB-BLOCK
DETERMINE THE BLOCK SIZE ASSIGNMENT (BSA) THAT MINIMIZES THE TOTAL NUMBER OF DATA BITS TO TRANSMIT
ASSEMBLE THE COEFFICIENT SUB-BLOCKS ACCORDING TO BSA (P, Q, R)
ZIG-ZAG SCAN AND SERIALIZE THE COEFFICIENTS
RUN-LENGTH CODE THE ZERO COEFFICIENTS FOLLOWED BY A VARIABLE-LENGTH CODE
VARIABLE-LENGTH CODE THE NON-ZERO COEFFICIENTS
ASSEMBLE THE BITS FROM BSA, NZ CODES, AND RL CODES FOR TRANSMISSION/STORAGE
START
FETCH CODE WORD FROM RECEIVE BUFFER
SERPARATE OUT BSA, PASS ON THE RL AND NZ CODES
DECODE RL CODES AND NZ CODES
INSERT ZEROS PER DECODED RUN-LENGTHS
UNDO ZIG-ZAG SCAN TO OBTAIN COEFFICIENT SUB-BLOCKS
INVERSE QUANTIZE THE COEFFICIENTS
INVERSE DCT EACH SUB-BLOCK
ASSEMBLE THE SUB-BLOCKS INTO A 16x16 BLOCK
STORE THE 16x16 BLOCK IN THE RECONSTRUCTION FRAME BUFFER

selection means for, receiving said selection value and said block and each sub-block of DCT coefficient values, selecting ones of block and sub-blocks of DCT coefficients corresponding to said selection value, and providing an output of a corresponding composite block of DCT coefficient values formed from said selected ones of block and sub-blocks of DCT coefficient values.

5,021,892
IMAGE PROCESSING DEVICE OF MULTIFUNCTIONAL TYPE
Toshiro Kita, Nara; Susnmu Genba, Kyoto; Masato Takemoto, Yamatokoriyama; Takashi Tatsumi, Osaka; Toshiyuki Itoga; Yutaka Iizuka, both of Yamatokoriyama; Satoshi Tominaga, Ikoma; Mikio Higashiyama, Higashiosaka; Akira Tanimoto, Kashihara; Shinji Okamoto, Yamatokoriyama, and Toshihiko Yoshida, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Dec. 26, 1989, Ser. No. 454,441
Claims priority, application Japan, Sep. 30, 1986, 61-234077
Int. Cl.⁵ H04N *1/32*
U.S. Cl. 358—468 **6 Claims**



1. An image processing device of multifunctional type comprising:

a main control portion;

a plurality of units for processing information, each of which is designated as an input unit or an output unit, includes an independent controller and operates independently of the others in response to corresponding instructions issued by said main control portion, said plurality of units being within a single housing; and

a main memory which includes sectionalized areas for storing operational conditions of respective ones of said plurality of units and to which said main control portion has access so as to read data stored in said sectionalized areas corresponding to said plurality of units designated as input and output units and for providing said plurality of units with respective read data to operate independently of each other.

5,021,893
HIGH SPEED TAPE DUPLICATING MACHINE
Robert G. Scheffler, Wheaton, Ill., assignor to Duplitronics, Inc., Wheeling, Ill.
Continuation-in-part of Ser. No. 133,936, Dec. 17, 1987, which is a continuation-in-part of Ser. No. 874, Jan. 6, 1987, abandoned. This application Oct. 4, 1988, Ser. No. 253,067
Int. Cl.⁵ G11B *5/86*
U.S. Cl. 360—15 **9 Claims**

1. A duplicating recorder/reproducer system for duplicating pre-recorded material on magnetic tape having a first side A and a second side B, side A and side B being recorded so that sides A and B can later be played back by moving the magnetic tape in opposite directions, comprising,

(a) means for supplying audio source signals in a digital form,

(b) means responsive to said electronically stored source signals for making a single master library recording of said digital source signals, said master library recording containing information for both sides A and B,

(c) means for generating master library signals from said master library recording by playing back at least a portion

VOL
1127
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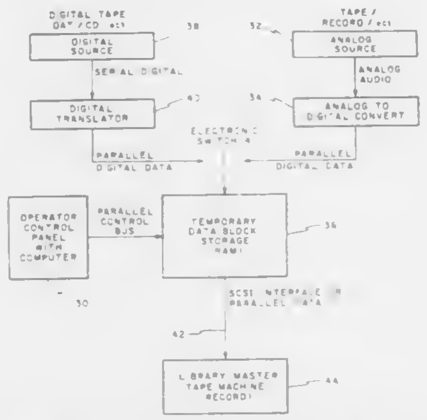
of said master library recording, said signal generating means having a single playback apparatus,

(d) storage means responsive to said playback of at least a portion of said master library recording for electronically storing selected digital signals from said master library recording which include both side A and side B,

(e) said storage means having a unitary large scale electronic memory which stores all of said selected master library signals in volatile memory, and

(f) duplicating means responsive to said electronically stored master library signals for making a plurality of duplicate recordings without requiring any further playback of said master library recording while said signals remain in said storage means, said duplicating means simultaneously reproducing sides A and B so that both side A and side B can be recorded in opposite directions on the magnetic tape by a slave recorder in a single pass,

whereby a plurality of duplicate tape recordings having two sides of material recorded for playback in opposite directions may be made from signals in said storage means, without requiring any mechanical moving parts in said storage means.



5,021,894

RECORDED DATA DEMODULATION CIRCUIT

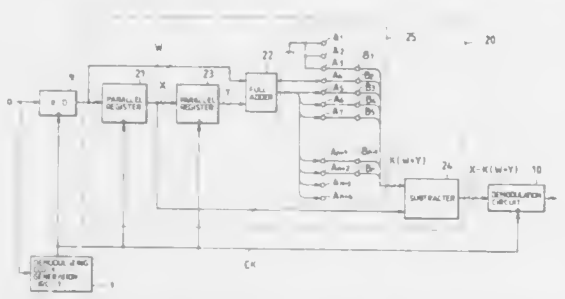
Ryuichi Naito, and Keiji Kinpara, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jan. 2, 1990, Ser. No. 459,419

Claims priority, application Japan, May 30, 1989, 1-136596

Int. Cl.^{5} G11B *5/09, 5/00*

U.S. Cl. 360—46 **2 Claims**



2. A recorded data demodulation circuit comprising:

clock generation means for generating a clock of a predetermined frequency on the basis of clock information in a read signal read from a recording medium;

analog-to-digital conversion means for successively converting sampled values obtained by sampling said read signal into digital data in response to said clock;

first data holding means for holding the output digital data of said analog-to-digital conversion means in response to said clock for a time corresponding to a period of said clock, and for outputting said output data after said holding;

second data holding means for holding the output data of said first data holding means in response to said clock for a time corresponding to the period of said clock, and for outputting said output data after said holding;

addition means for adding the output data of said analog-to-digital conversion means and the output data output from said second data holding means;

multiplying means for obtaining a multiplied value by multiplying at least one of the output data of said addition means by a predetermined value;

data generation means for generating data corresponding to a difference between said multiplied value and the output data of said first data holding means; and

demodulating processing means for demodulating the output data of said data generation means in response to said clock; wherein said multiplying means includes:

a plurality of first terminals having a first subset of said first terminals supplied with a predetermined number of addition output bits from said addition means for forming lower significant bit output data, and having a second subset of said first terminals supplied with a predetermined number of zero bits with bit values of "0", said zero bits being associated with said predetermined number of addition output bits so as to form upper significant bit output data; and

a plurality of second terminals arranged so as to be selectively connectable to any of said first terminals, to include any predetermined number of said zero bits as upper significant bits so as to effect multiplication by a shifting of said addition output bits by said predetermined number of zero bits, wherein data derived from said second terminals are made to be the data obtained by mulitplying said output data of said addition means by said predetermined value.

5,021,895

METHOD AND MAGNETIC HEAD FOR RECORDING SIGNALS MAGNETICALLY

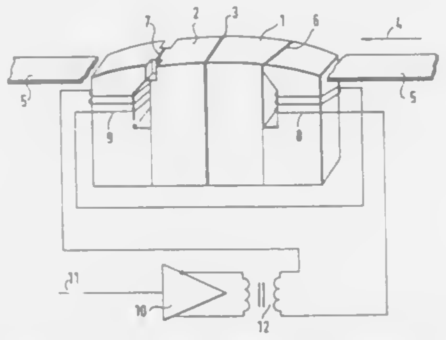
Jürgen Heitmann, Alsbach-Hähnlein, Fed. Rep. of Germany, assignor to BTS Broadcast Television Systems GmbH, Darmstadt, Fed. Rep. of Germany

Filed Dec. 1, 1989, Ser. No. 444,723

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1988, 3842079

Int. Cl.^{5} G11B *5/03*

U.S. Cl. 360—66 **5 Claims**



1. A method of recording signals on a magnetic carrier, in which a leading magnetic head (1) erases a track ahead of a following magnetic recording head (2),

wherein, in accordance with the invention,

said leading magnetic head (1) erases its track by means of a current through its head winding (8) which current also flows through a head winding (9) of said magnetic recording head (2), said recording head (2) overwriting said erased track (13, 14) by recording signals (15) at a different azimuth angle than said leading magnetic head (1).

5,021,896

FAST SEARCH DEVICE IN A MAGNETIC RECORDING AND REPRODUCING DEVICE

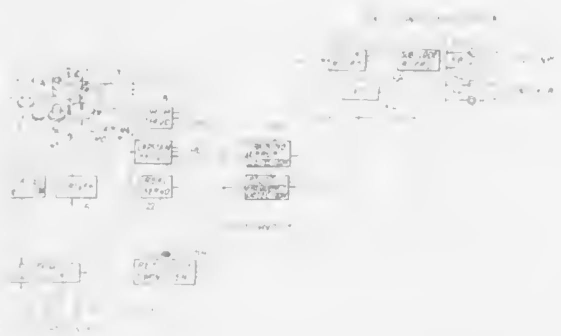
Mamoru Horino, Hamamatsu, Japan, assignor to Yamahe Corporation, Hamamatsu, Japan

Filed Jul. 14, 1988, Ser. No. 219,043

Claims priority, application Japan, Jul. 16, 1987, 62-178088

Int. Cl.^{5} G11B *5/53, 15/467*

U.S. Cl. 360—70 **8 Claims**



1. A magnetic recording and reproducing device comprising:

a rotary head incorporating a rotary drum and a plurality of heads provided in this rotary drum for recording and reproducing an input signal by tracing a magnetic tape;

rotary drum drive means for driving said rotary drum for rotation;

tape reel drive means for driving a tape reel for running a magnetic tape; and

relative speed detection means for detecting relative speed between the magnetic tape and the rotary head,

control means for controlling said rotary drum drive means and said tape reel drive means such that, upon receiving a fast search order, the rotary drum and the tape reel (a) are controlled in such a manner that said rotary drum is driven so that the relative speed substantially becomes a predetermined speed without increasing the tape speed, and (b), after reaching of the relative speed substantially to the predetermined speed, the rotation speed of one of said rotary drum or said tape reel is changed gradually to a speed used during fast searching, and the rotation speed of the other said tape reel or said rotary drum is changed against the change of speed in said rotary drum or said tape reel while maintaining the relative speed substantially at the predetermined speed.

5,021,897

MEMORY SYSTEM FOR RECORDING AND REPRODUCING BLOCK UNIT DATA

Tadashi Yoshino, Neyagawa; Susumu Yamaguchi, Moriguchi; Hitoshi Komae, Osaka; Tetsuo Ishiwata, Suita; Eiji Yamauchi, Neyagawa, and Hiroshi Tanaka, Moriguchi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

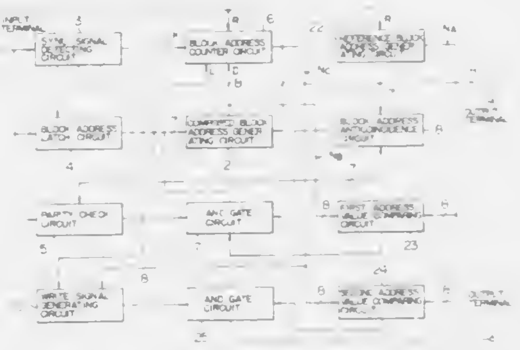
Filed Jun. 7, 1988, Ser. No. 203,107

Claims priority, application Japan, Jun. 12, 1987, 62-147586; Aug. 28, 1987, 62-215806; Oct. 6, 1987, 62-252127

Int. Cl.^{5} G11B *27/10*

U.S. Cl. 360—72.2 **1 Claim**

1. A signal processing system for controlling recording and reproduction of block unit data which is adapted to be recorded at a predetermined position on a track of a magnetic tape and which includes digital data representing an information signal, a synchronizing signal and an address code indicative of an address value of a block unit in which said digital data is contained, said signal processing system comprising: address predicting means for predicting said address code in accordance with a rotational position of a rotary head which reproduces data recorded on the magnetic tape; reading means for reading said address code; address generation means for generating said address value in accordance with said sync signal; composed address value generation means for generating a composed address value on the basis of an output of said reading means and an output of said address generation means; first address value comparison means for comparing said composed address value with said predicted address code value, selection means for outputting said composed address value as an address value for accessing a memory circuit when a comparison error of said first address value comparison means is within a predetermined range; second address value comparison means for comparing the address value outputted from said selection means with said predicted address code value; and writing signal generation means for generating a writing signal for storing said digital data in said memory circuit when a comparison error of said second address value comparison means is within a predetermined range.


INPUT TERMINAL
3
SYNC SIGNAL DETECTING CIRCUIT
BLOCK ADDRESS COUNTER CIRCUIT
6
22
REFERENCE BLOCK ADDRESS GENERATING CIRCUIT
BLOCK ADDRESS LATCH CIRCUIT
COMPOSED BLOCK ADDRESS GENERATING CIRCUIT
BLOCK ADDRESS ANTICOINCIDENCE CIRCUIT
4
2
PARITY CHECK CIRCUIT
AND GATE CIRCUIT
FIRST ADDRESS VALUE COMPARING CIRCUIT
5
7
23
8
WRITE SIGNAL GENERATING CIRCUIT
AND GATE CIRCUIT
SECOND ADDRESS VALUE COMPARING CIRCUIT
OUTPUT TERMINAL

5,021,898

HEAD POSITIONING CONTROL METHOD AND APPARATUS

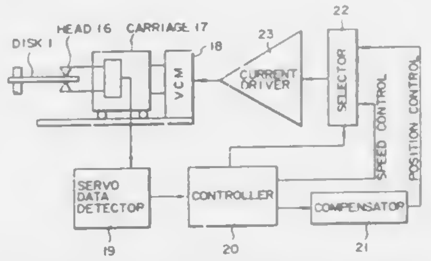
Yuji Sakai, Yokohama, and Toshibiro Sugaya, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 8, 1988, Ser. No. 268,865

Claims priority, application Japan, Nov. 10, 1987, 62-282015

Int. Cl.^{5} G11B *5/55, 21/08*

U.S. Cl. 360—78.04 **15 Claims**



8. A head positioning control apparatus comprising:

position detecting means for detecting a position of a head on a disk-shaped recorded medium based on tracking servo data acquired from said recording medium;

drive means for driving said head to move said head on said recording medium; and

control means having a speed control mode in which said head is moved by controlling a speed of said head and a position control mode in which said head is positioned onto a target track in accordance with position data of said head and for controlling said drive means based on position data detected by said position detecting means, for controlling movement of said head in said speed control mode until said head reaches a first predetermined distance from said target track and for controlling movement

VOL 1127 ISS 1 JE 4 1991 UMI

of said head in said position control mode when said head reaches within said first predetermined distance from said target track, thereby permitting said head to access said target track, said control means including

means for switching said position control mode to said speed control mode upon detection that said head shifts off from said accessed target track by a second predetermined distance or more in said position control mode, and switching said speed control mode to said position control mode upon detection that said head reaches within said first predetermined distance from said accessed target track in said speed control mode.

5,021,899
TAPE LOADING APPARATUS FOR CASSETTE TAPE PLAYER

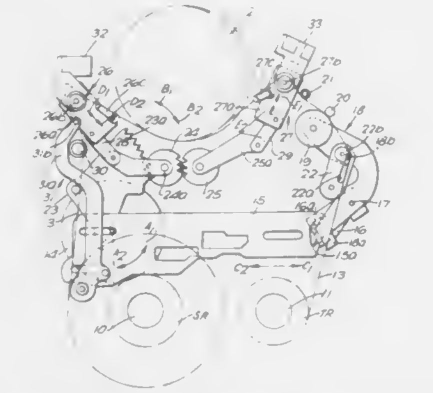
Yoshihiro Kotoda, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Aug. 16, 1989, Ser. No. 394,740

Claims priority, application Japan, Aug. 26, 1988, 63-212053

Int. Cl.^{5} G11B *15/665*

U.S. Cl. 360—85 5 Claims



1. A cassette tape player and tape loading apparatus provided with a rotary head drum mounted on a chassis, the rotary head drum including a magnetic head to reproduce or record data from or onto a tape, comprising:

a control cam rotatably mounted on the chassis;

stoppers disposed on the chassis;

a tape loading mechanism including first and second tape pulling slider means slidably disposed on the chassis for loading the tape onto the rotary head drum during a reproducing or recording operation;

a tape loading drive lever rotatably mounted on the chassis in communication with the control cam, the drive lever including a gear section;

first and second tape loading drive arms rotatably mounted on the chassis;

gear means in communication with the gear section for selectively driving the first and second tape loading drive arms in response to the rotation of the control cam and tape loading drive lever;

link means disposed between each of the first tape pulling slider means and the first tape loading drive arm and the second tape pulling slider means and the second tape loading drive arm for urging the tape pulling slider means against the stopper with a first force during a reproducing or recording operation; and

biasing means operative in cooperation with the link means for applying a second force to the first and second tape pulling slider means to further retain and stabilize the tape pulling slider means against the chassis during the reproducing or recording operation.

5,021,900
TAPE GUIDE DRIVING DEVICE FOR ROTATING HEAD TYPE TAPE PLAYER

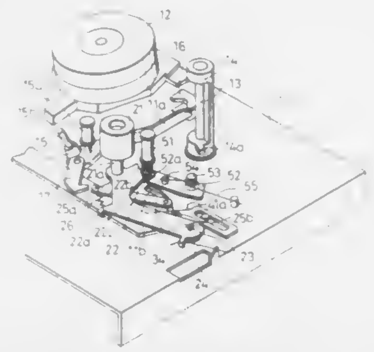
Tatsumaro Yamashita, and Seiichi Nagai, both of Shibata, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Nov. 21, 1989, Ser. No. 439,744

Claims priority, application Japan, Mar. 3, 1989, 1-24630

Int. Cl.^{5} G11B *15/60, 5/027*

U.S. Cl. 360—85 1 Claim



1. In a rotating head type tape player with a rotating head device and a capstan, and a tape feeding member that pulls out a magnetic tape from an inserted cassette pack and moves it to the position at which it is wound on said rotating head device and to the position of a capstan provided on a chassis, a tape guide driving device for a rotating head type tape player is characterized in that there are provided a roller lever supporting the pinch roller and moving the pinch roller from the position opposed to the inside of the tape within a cassette pack to the position close to the capstan, and a guide lever supporting the tape guide and moving the tape guide from the position opposed to the inside of the tape within the cassette pack, said roller lever being provided with a press section pressing the projection provided on said guide lever while the pinch roller comes close to the capstan and a guide section on which a projection of said guide lever slides while the pinch roller rotates from the position close to the capstan to the position at which the pinch roller strikes the capstan, said guide section being formed at a fixed radius to the rotation center of the roller lever and being provided with an elastic member for contacting said projection with this guide section.

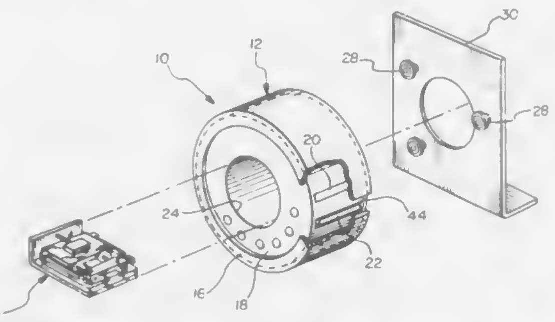
5,021,901
FERRIS WHEEL MAGNETIC TAPE CASSETTE STORAGE AND HANDLING APPARATUS

Ionel Mondocea, Glendale; William J. Ullrich, Glendora, and Frederic F. Grant, Bellflower, all of Calif., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 2, 1989, Ser. No. 360,563

Int. Cl.^{5} G11B *15/68*

U.S. Cl. 360—92 3 Claims



1. In a magnetic tape recorder/player having a cassette receiving station, a magnetic tape cassette storage and handling apparatus comprising:

annular ferris wheel means for storing magnetic tape cassettes, said ferris wheel means being located adjacent to said cassette receiving station of said magnetic tape recorder/player, and having a plurality of compartments circumferentially spaced around said ferris wheel means for receiving individual magnetic tape cassettes, said ferris wheel means further having a central opening;

means for mounting said ferris wheel means for rotation about a horizontal axis;

a magnetic tape cassette handling assembly mounted within said opening of said ferris wheel means; and

means for actuating said handling assembly to unload and load a magnetic tape cassette stored in a compartment into and out of said cassette receiving station of said magnetic tape recorder/player.

5,021,902
TAPE CHANGER FOR LOADING AND UNLOADING A MAGAZINE OF MAGNETIC TAPE CARTRIDGES

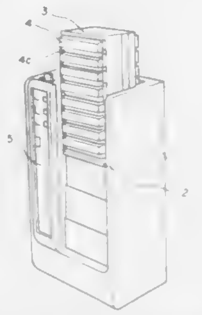
Masatoshi Ishikawa, Odawara; Kozo Fujita, Gotenba, and Shigeyuki Kobata, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 311,343

Claims priority, application Japan, Feb. 17, 1988, 63-32771; Feb. 17, 1988, 63-32772

Int. Cl.^{5} G11B *15/68*

U.S. Cl. 360—92 29 Claims



1. A cartridge-type magnetic tape changer having a magazine that contains a plurality of magnetic tape cartridges supported in said magazine in regularly spaced intervals by cartridge holders, in which the cartridges are sequentially loaded through ann inlet/outlet of the changer into a magnetic tape unit for recording/reproduction of information and thereafter ejected from the magnetic tape unit and loaded back into the magazine, comprising:

lifting means for receiving and guiding said magazine in a first plane of movement adjacent said inlet/outlet to selectively position said cartridge holders and corresponding cartridges in alignment with said inlet/outlet;

lifting driving means for moving said lifting means in said first plane in stepwise movement wherein each step of movement traverses a predetermined distance extending between two successive ones of the cartridge holders in said magazine;

means interconnected with the movement of said lifting driving means for detecting whether a cartridge is supported in a predetermined cartridge holder positioned in alignment with said inlet/outlet of the changer;

means for moving said cartridges in a second plane perpendicular to said first plane when one of said cartridges is in a corresponding one of the cartridge holders positioned in alignment with said inlet/outlet of the tape changer, including loading said one cartridge into said magnetic tape unit and loading said one cartridge back into said one cartridge holder of said magazine after being ejected from said magnetic tape unit; and

said lifting driving means being for driving said lifting means said predetermined distance in said first plane after said moving means loads said one cartridge into said magnetic tape unit and back into sad magazine from said magnetic tape unit, and said lifting means being further for moving said lifting means said predetermined distance when said detecting means detects that any of the cartridge holders positioned in alignment with said inlet/outlet does not have a corresponding one of the cartridges supported therein.

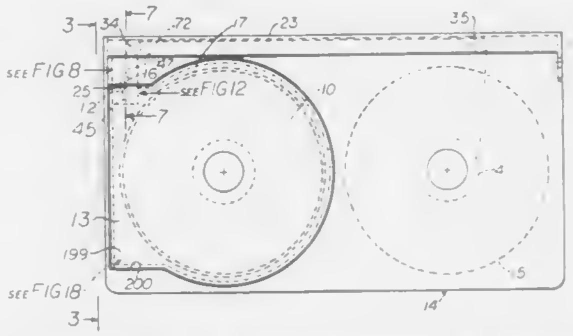
5,021,903
MAGNETIC TAPE CARTRIDGE

Warren D. Novak, Chappaqua, N.Y., assignor to Rank Video Services America, Northbrook, Ill.

Division of Ser. No. 211,545, Jun. 24, 1988, Pat. No. 4,920,436. This application Feb. 5, 1990, Ser. No. 475,409

Int. Cl.^{5} G11B *15/66*

U.S. Cl. 360—96.1 20 Claims



1. A magnetic tape cartridge adapted for use in a magnetic tape cassette in lieu of a tape supply reel, said cassette also having space into which the cartridge may be inserted and from which it may be removed, and a takeup reel for use of said cassette, after reception of said cartridge in said space, in apparatus designed to receive magnetic tape in a two-reel-type cassette for transducing magnetic signals relative thereto, said cassette containing a tape coupling device connected to said takeup reel and having a pin member at said space, the improvement comprising in combination:

a single reel for magnetic tape in said cartridge;

on said single reel in said cartridge; and

means for interconnection of said magnetic tape from said cartridge via said tape coupling device to said takeup reel upon insertion of said cartridge loaded with said magnetic tape into said cassette in lieu of a tape supply reel, including a tubular tape coupling member having a bore adapted to releasably receive said pin member and having a tubular wall encompassing said bore.

5,021,904
TAPE CASSETTE PUSH-OUT DEVICE FOR TAPE RECORDER

Akira Shimizu; Atsushi Kurosawa, and Fumiya Yamada, all of Kawagoe, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 331,210

Claims priority, application Japan, Jun. 23, 1988, 63-153492

Int. Cl.^{5} G11B *15/675*

U.S. Cl. 360—96.5 5 Claims

1. A tape cassette push-out device for a tape recorder comprising:

a holder for holding a tape cassette inserted through a cassette insertion opening;

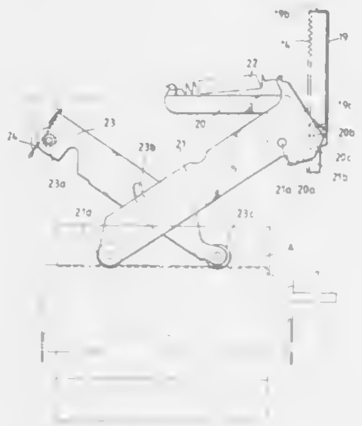
ejecting means for moving said holder from a position of driving of a tape of the tape cassette to a position adjacent said cassette insertion opening; and

a push-out means operable after completion of the operation of said ejecting means so as to push a rear face of the tape cassette to move the tape cassette toward said cassette insertion opening, said push-out means being retractable

VOL
1127
ISS
1
JE
4
1991
UMI

from the rear face of the tape cassette after pushing out the cassette,

wherein said push-out means comprises first and second urging arms pivotally mounted on a frame portion of the tape recorder, said first urging arm having a pin projecting from an intermediate portion thereof, and said second urging arm having a groove formed therethrough for receiving said pin such that said second urging arm is angularly moved in response to angular movement of said first urging arm,



wherein said push-out means further comprises a pivotal arm pivotally mounted on said frame portion and connected to said first urging arm by a resilient means.

5,021,905

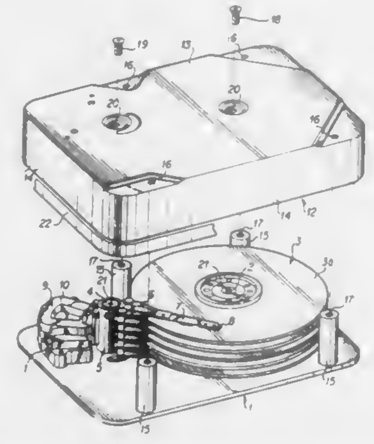
DISK DRIVE ENCLOSURE FOR MINIMIZING STRESSES AND A VIBRATION DAMPING SEAL THEREFOR

Roger R. Sleger, Meridian, Id., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 13, 1989, Ser. No. 434,653

Int. Cl.^{5} G11B *17/02, 33/14*

U.S. Cl. 360—97.02 9 Claims



1. A disk drive enclosure in which stresses are minimized, comprising:

a base having a peripheral portion;

a cover having a peripheral portion;

means connecting said cover to said base and supporting said cover spaced from said base in a position defining a gap between said peripheral portion of said base and said peripheral portion of said cover, and

a viscoelastic material having a pressure sensitive adhesive coating adhesively attached to said base and said cover at each said peripheral portion in a position bridging, closing and sealing said gap.

5,021,906

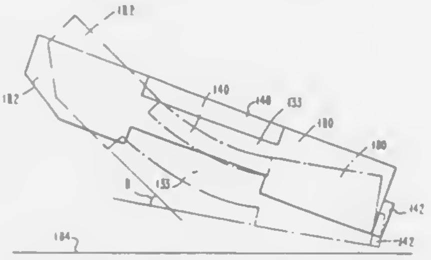
PROGRAMMABLE AIR BEARING SLIDER INCLUDING MAGNETIC READ/WRITE ELEMENT

Shuo H. Chang, Briarcliff Manor; Ferdinand Heodriks, Yorktown Heights; Vijayeshwar D. Khanna, Ossining, and Eric G. Lean, Chappaqna, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1989, Ser. No. 429,890

Int. Cl.^{5} G11B *5/60*

U.S. Cl. 360—103 37 Claims



1. An air bearing slider comprising:

a first region including at least a first pad having at least a first air bearing surface;

a second region including a first rear pad having at least a first air bearing surface; and

a central region, joining said first and second regions, said central region being deformable such that deforming said central region adjusts the relative orientation of said air bearing surfaces.

5,021,907

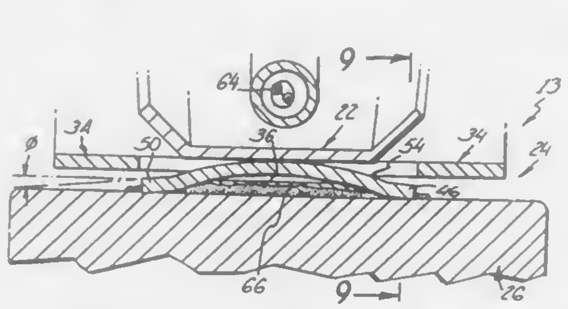
GIMBAL SPRING FOR SUPPORTING A MAGNETIC TRANSDUCER AND MAKING ELECTRICAL CONTACT THEREWITH

Brian S. Zak, Bloomington, Minn., assignor to Seagate Technology, Inc., Scotts Valley, Calif.

Filed Dec. 11, 1989, Ser. No. 448,689

Int. Cl.^{5} G11B *5/48*

U.S. Cl. 360—104 18 Claims



1. In a gimbal spring apparatus of the type having a cantilevered tongue which includes at least one side edge, a planar mounting surface for an adhesive connection to a magnetic disk head slider, and an upper surface having a dimple protrusion for point contact with a load beam, the upper surface being opposite to the mounting surface, an improvement comprising:

tab means extending from the side edge and positioned generally adjacent the dimple, the tab means extending below a geometric plane defined by the planar mounting surface to extend through the adhesive connection for electrical contact with the magnetic disk head slider to provide an electrical discharge path from the magnetic disk head slider to the gimbal spring.

5,021,908

MAGNETIC HEAD COMPONENT MOUNTING SYSTEM

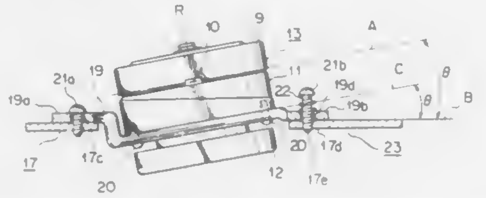
Takao Morimoto, and Yasuyuki Nakanishi, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 17, 1989, Ser. No. 352,944

Claims priority, application Japan, May 30, 1988, 63-133053

Int. Cl.^{5} G11B *00/00*

U.S. Cl. 360—107 6 Claims



1. A magnetic head component mounting system, comprising:

a magnetic head component including a rotatable drum carrying a magnetic head;

a guide plate carrying a tape guiding mechanism for guiding a magnetic tape in proximity to said magnetic head component;

a supporting base supporting said magnetic head component such that a rotational axis of said rotatable drum is oriented at an angle relative to said guide plate, said supporting base and said guide plate having different coefficients of thermal expansion; and

mounting means for mounting said supporting base to said guide plate such that said angle remains constant during thermal expansion or contraction of said supporting base and said guide plate.

5,021,909

YOKE TYPE THIN-FILM MAGNETIC HEAD AND METHOD FOR SUPPRESSING BARKHAUSEN NOISE

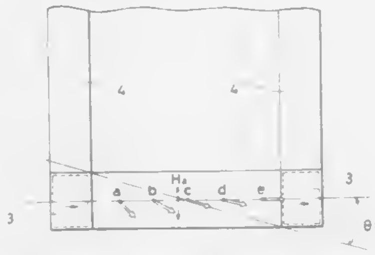
Kengo Shiiba, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 19, 1989, Ser. No. 340,755

Claims priority, application Japan, Apr. 20, 1988, 63-97484

Int. Cl.^{5} G11B *5/127, 5/33*

U.S. Cl. 360—113 16 Claims



1. A yoke thin-film magneto-resistive head comprising:

a magneto-resistive element having a first end and a second end opposite thereto for detecting a first signal magnetic field that occurs in a magnetic recording medium as a resistance change;

a yoke for leading magnetic flux from a head gap to said magneto-resistive element;

DC magnetic field application means for applying a second magnetic field to the longitudinal direction of said magneto-resistive element, the value of said second magnetic field being less than the value of said first signal magnetic field; and

a conductor for applying a third bias magnetic field to said magneto-resistive element in a strip width direction, the easy axis of magnetization of said magneto-resistive element being inclined by more than 20° and not more than 40° to a longitudinal direction of said magneto-resistive element.

5,021,910

BURIED SERVO MAGNETIC HEAD

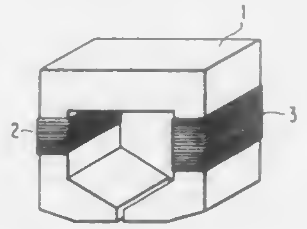
Yoichi Murakami, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Mar. 6, 1990, Ser. No. 488,836

Claims priority, application Japan, Mar. 6, 1989, 1-54271

Int. Cl.^{5} G11B *5/17, 5/596, 21/10*

U.S. Cl. 360—123 8 Claims



1. A buried servo magnetic head using an exclusive continuous low-frequency signal for servo which is recorded in a data surface of a medium, comprising:

a core;

a first coil wound around said core for reading/writing data from or to the medium; and

a second coil wound around said core for reading said low-frequency servo signal, said second coil having a different number of turns than said first coil.

5,021,911

CLEANING CASSETTE

Philip C. O. Kingsbury, Wargrave, United Kingdom, assignor to Automation Facilities Limited, Berkshire, United Kingdom

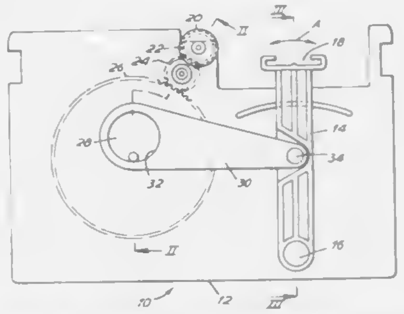
PCT No. PCT/GB88/00483, § 371 Date Dec. 21, 1989, § 102(e) Date Dec. 21, 1989, PCT Pub. No. WO88/10496, PCT Pub. Date Dec. 29, 1988

PCT Filed Jun. 23, 1988, Ser. No. 457,693

Claims priority, application United Kingdom, Jun. 23, 1987, 8714668

Int. Cl.^{5} G11B *5/10, 5/127*

U.S. Cl. 360—128 12 Claims



1. A cleaning cassette for cleaning a record/playback head of a cassette drive device, said cassette comprising:

a casing having a thickness substantially less than its width, said casing presenting a generally planar configuration;

a head wiping element;

a wiper arm having first and second ends, said first end of said wiper arm being supported in said casing by pivotal support means for angular movement of said wiper arm about a first axis perpendicular to said generally planar configuration, said second end of said wiper arm carrying said head wiper element for arcuate movement in a direction of tape travel;

a pick-up wheel having means for facilitating rotational driving of said pick-up wheel by a capstan drive wheel of

VOL
1127
ISS
1
JE
4
1991
UMI

a cassette drive device, said pick-up wheel being supported in said cassette for rotation about a second axis generally parallel to said first axis;
a further wheel supported in said cassette for rotation about a third axis generally parallel to said second axis and having an eccentric portion;
coupling means for interconnecting said pick-up and further wheels so that rotation of said pick-up wheel causes rotation of said further wheel; and
a crank link having a first end pivotally supported on said eccentric portion of said further wheel, and having a second end pivotally supported on said wiper arm at a position between said first and second ends of said wiper arm.

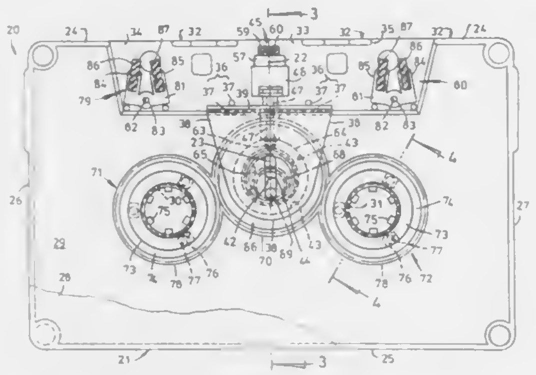
5,021,912
APPARATUS FOR CLEANING THE RECORDING/PLAYING HEAD, CAPSTAN AND PINCH ROLLER OF A CASSETTE TYPE AUDIO RECORDER/PLAYER

Lu Shao-Yung, 4th Floor, No. 542-2, Chung-Cheng Road, Hsin-Dein City, Taipei Hsien, Taiwan

Filed May 10, 1989, Ser. No. 350,120

Int. Cl.^{5} G11B *5/41*

U.S. Cl. 360—128 9 Claims



1. In a tape recorder/player of the type including
(A) a compartment for receiving a cassette in which a magnetic tape is received,
(B) a pair of rotary spaced spindles to drive the tape during a play mode of operation,
(C) a magnetic head having a peripheral surface against which the tape is driven,
(D) at least one capstan having a peripheral surface against which the tape is driven and rotating during the play mode, and
(E) at least one rotatable pinch roller having a peripheral surface against which the tape is driven and movable toward said at least one capstan to form a nip therewith for the tape during the play mode,
an apparatus for cleaning said peripheral surfaces, comprising:
(a) a cassette housing configured to fit, and receivable, within the compartment in a cleaning position, said housing including a generally planar front wall having a head opening through which the head extends into the housing in the cleaning position, a pinch roller opening through which said at least one pinch roller moves into the housing in the cleaning position, said housing further including a capstan opening through which said at least one capstan extends into the housing in the cleaning position;
(b) a head cleaner mounted in the housing for rotation about a first axis extending generally normal to the front wall, and for reciprocating movement in either direction along a second axis extending generally parallel to the front wall, said head cleaner engaging the head in the cleaning position;
(c) a capstan/roller cleaner mounted in the housing for pivoting movement about a third axis normal to both said first and said second axes, said capstan/roller cleaner including a pair of cleaning elements respectively engaging said at least one capstan and pinch roller to clean the peripheral surfaces thereof during rotation of said at least one capstan and pinch roller during the play mode; and
(d) drive means operatively coupled to at least one of the spindles and the head cleaner, for simultaneously rotating the head cleaner about said first axis and reciprocating the head cleaner in either direction along said second axis, to clean the peripheral surface of the head.

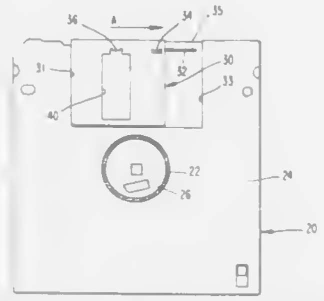
5,021,913
SHUTTER FOR COVERING A WINDOW OPENING IN A CASE THAT CONTAINS A FLEXIBLE DISK

Kenneth Overland, Deerfield, and Robert Lackowski, Mt. Prospect, both of Ill., assignors to Overland Bolling Company, Franklin Park, Ill.

Filed Apr. 24, 1989, Ser. No. 342,040

Int. Cl.^{5} G11B *23/033;* **B65D** *85/30*

U.S. Cl. 360—133 15 Claims



1. A shutter for covering a head window opening in a protective case that encases a flexible disk comprising:
a strip member having a first substantially rectangular portion, a second substantially rectangular portion and an intermediate portion connecting said first and second portions, said first portion having a substantially rectangular opening located therein that is defined by two oppositely positioned first sides and two oppositely positioned second sides, said second portion having a substantially rectangular opening located therein that is defined by two oppositely positioned first sides and two oppositely positioned second sides, one of the first sides of the opening in the first portion being substantially coplanar with one of the first sides of the opening in the second portion and the other first side of the opening in the first portion being substantially coplanar with the other first side of the opening in the second portion, the length of the first portion, second portion and intermediate portion in a direction perpendicular to the first sides of the openings being equal to or less than 1.630 inches.

5,021,914
SUPERCONDUCTING SWITCH AND CURRENT LIMITER USING SUCH A SWITCH

Kazuyuki Tsurunaga, Mizuho; Yoshihisa Masuda, Fuchu; Hiroyuki Okumura, Shiroyama, and Daisuke Ito, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

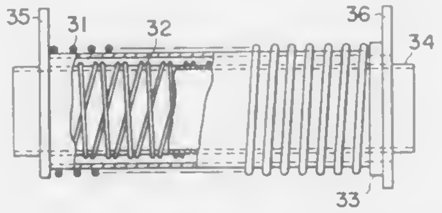
Filed Jul. 13, 1989, Ser. No. 379,117

Claims priority, application Japan, Jul. 13, 1988, 63-174251; Oct. 7, 1988, 63-253315

Int. Cl.^{5} H02H *3/08*

U.S. Cl. 361—19 6 Claims

1. A superconducting switch comprising:
cylindrical core means;
a first superconducting coil wound on the outer peripheral surface of said core means from one side thereof to the other side thereof, and having a first critical current value, wherein when a current above said critical current value flows, the resistance value of said first superconducting coil changes to a first high resistance value in a normal conducting state;
a second superconducting coil wound on the outer peripheral surface of said core means from one side thereof to the other side thereof so as to overlap with said first superconducting coil, and having substantially the same critical current value as that of said first superconducting coil, wherein when a current above said critical current value flows, the resistance value of said second superconducting coil changes to a second high resistance value in a normal conducting state; and
connection means for connecting in parallel said first and second superconducting coils so as to produce magnetomotive forces which are the same in magnitude and are opposite to each other in direction;
said superconducting switch being connected in series with a load in an electric path, wherein when an overcurrent above said critical current value flows in said electric path, said superconducting switch is quenched, so the resistance value thereof changes to resultant resistance value of said first and second high resistance values as a whole;
wherein said first and second superconducting coils have winding directions opposite to each other, said connection means being a set of terminal plates commonly connecting respective ends of said first and second superconducting coils on one side of said core means and on the other side thereof, respectively.



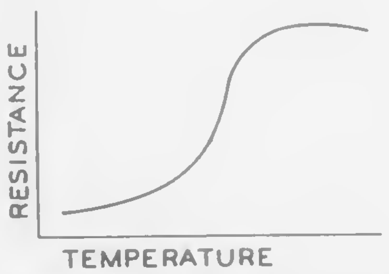
5,021,915
COMBINATION STARTER-PROTECTOR DEVICE AND METHOD OF ASSEMBLING SAME, OVERLOAD PROTECTOR AND METHOD OF ASSEMBLING SAME

Richard A. Wandler, Clinton, Iowa, and Kenneth R. Renkes, Fenton, Ill., assignors to General Electric Company, Fort Wayne, Ind.

Filed Oct. 17, 1989, Ser. No. 422,600

Int. Cl.^{5} H02H *7/08*

U.S. Cl. 361—26 36 Claims



32. An overload protector for use in a combination starter-protector device adapted to be associated in circuit relation with a dynamoelectric machine, the overload protector comprising:
a casing including a sidewall and a base wall defining an open ended recess in said casing, at least one slot in said sidewall intersecting said open ended recess, and another wall extending beyond the sidewall exteriorly of the open ended recess;
a conductive member extending through the at least one slot and including a contact section disposed in said open ended recess at least adjacent said base wall, and a terminal section seated at least in part on said another wall;
means for securing said terminal section against displacement from said another wall;
bimetal switch means disposed within said open ended recess and operable generally for switching between one position engaged in circuit relation with said contact section and another position displaced from said contact section; and
conductive means disposed at least in part within said open ended recess for supporting said bimetal switch means.

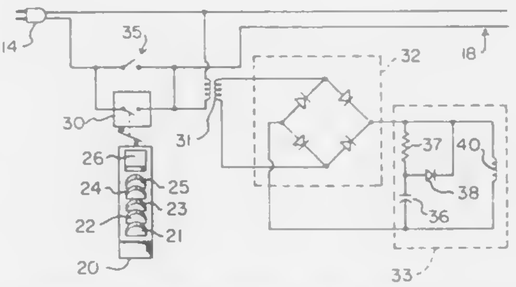
5,021,916
THEFT DETERRING SECURITY SYSTEM FOR ATTACHMENT TO POWERED APPLIANCES

James H. Hubbard, Boulder, Colo., assignor to Ultimate Security, Inc., Denver, Colo.

Filed Mar. 2, 1989, Ser. No. 318,581

Int. Cl.^{5} E05B *49/00*

U.S. Cl. 361—171 15 Claims



1. Apparatus for discouraging unauthorized use or theft of an appliance which is dependent upon power from a primary power source to operate satisfactorily comprising
a source of electrical power suitable for operating the appliance,
an electrical switch means,
mechanical combination lock means operable in response to setting of a predetermined combination of symbols for enabling manual closure of said switch and for blocking manual closure of said switch for any other combination of symbols, and
electrical latch means responsive to closing of said switch for coupling said electrical power source to the appliance, said electrical latch means further responding to loss of the electrical power from said source for disconnecting the appliance from said source;
and said mechanical combination lock means includes elements alignable when said predetermined code is displayed for permitting movement of a manually movable actuator for operating said switch.

5,021,917
CONTROL PANEL POWER ENABLING AND DISABLING SYSTEM FOR AERIAL WORK PLATFORMS

Ronald L. Pike, Waynesboro, and Ronald W. Beckley, State Line, both of Pa., assignors to Kidde Industries, Inc., Iselin, N.J.

Filed Jan. 29, 1990, Ser. No. 471,797

Int. Cl.^{5} H01H *47/18*

U.S. Cl. 361—195 **14 Claims**

1. A control panel enabling and disabling system of an aerial work platform coupled between a source of electrical power and a plurality of motion producing mechanisms, comprising:
a respective plurality of motion controls coupled to said plurality of motion producing mechanisms for applying

VOL
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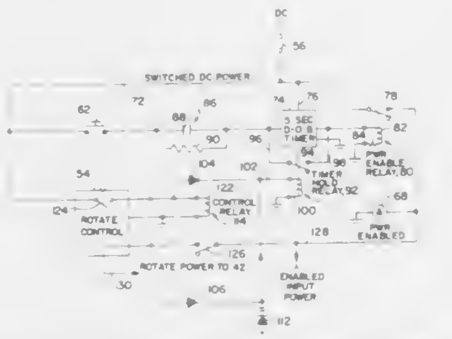
electrical power thereto from said source to command a predetermined motion of said aerial work platform;

first controllable switch means including means for coupling electrical power from said source to said plurality of motion controls;

timer means coupled to said first controllable switch means and including means for providing a continuous circuit therethrough for a predetermined time period upon being activated and thereafter providing an open circuit therethrough unless reactivated prior to the end of said predetermined time;

power enabling switch means coupled to said source of electrical power; circuit means coupled between said power enabling switch means and said timer means for activating said timer means to energize said first controllable switch means once each time said power enabling switch means is actuated; and



second controllable switch means coupled to and being activated by any of said plurality of motion controls and including means coupled to said timer means for holding said timer in a continuous activated state so long as any one of said motion controls is activated to command a motion by a respective motion producing mechanism;

whereby said first controllable switch means enables power for use by said motion producing mechanisms only for said predetermined time period following actuation of said power enabling switch means unless one of said motion controls is thereafter activated.

5,021,918

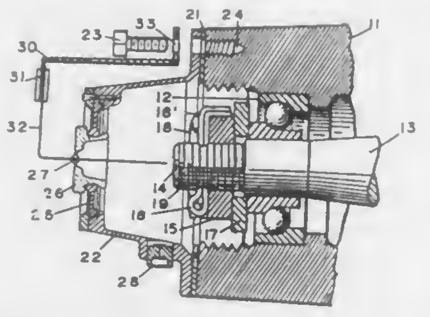
STATIC ELECTRICITY DISCHARGE SUPPRESSOR

Ronald L. Maki, 6156 Barman Rd., Waunakee, Wis. 53597

Filed Jul. 10, 1989, Ser. No. 377,560

Int. Cl.^{5} H05F *3/00*

U.S. Cl. 361—216 4 Claims



1. For installation on an automotive wheel hub, a static electricity discharge suppressor for eliminating interference with reception by a radio in a vehicle, an improvement comprising

(a) an electrically conductive shunt configured to span a portion of a wheel hub assembly from a radially distant fastener on a wheel hub on which said shunt is secured outboard of said hub assembly to said wheel hub and extending along the axis of said wheel hub into contact with axle means mounting said hub, wherein said shunt passes through a hub cap confining lubricant fluid in axial extension.

5,021,919

DEVICE FOR THE GENERATION OF ELECTRICALLY CHARGED AND/OR UNCHARGED PARTICLES

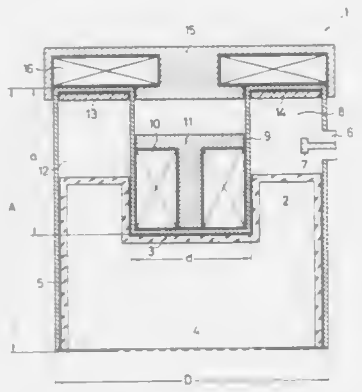
Jurgen Engemann, Wuppertal, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 12, 1989, Ser. No. 420,243

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1988, 3834984

Int. Cl.^{5} H05H *13/00;* **H01J** *15/02, 7/24;* **C23C** *14/35*

U.S. Cl. 361—225 16 Claims



13. In a device for generating electrically charged or uncharged particles comprising an electron cyclotron resonator, the improvement comprising:

means to generate a magnetic field for resonance tuning of said electron cyclotron resonator, wherein said means to generate a magnetic field for resonance tuning comprises at least one object of gyromagnetic material located in a cavity of said electron cyclotron resonator.

5,021,920

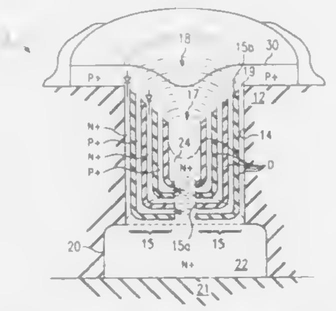
MULTILEVEL INTEGRATED CIRCUIT CAPACITOR AND METHOD OF FABRICATION

Gregory C. Smith, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 30, 1990, Ser. No. 502,461

Int. Cl.^{5} H01G *4/06;* **B01J** *17/00;* **H01L** *23/48*

U.S. Cl. 361—311 11 Claims



1. A multilevel capacitor fabricated as part of a semiconductor device, comprising:

a selected number of interleaved conductive layers alternately of first and second conductivity types, each separated by an interleaved dielectric layer;

said conductive layers interleaved with said dielectric layers forming multilevel capacitor plates;

said multilevel capacitor including at least first and second contact-edge areas, each including adjacent edges of each interleaved conductive and dielectric layer;

a first electrode of the first conductivity type contacting said first contact-edge area at each corresponding edge of the interleaved conductive and dielectric layers; and

a second electrode of the second conductivity type contacting said contact-edge area at each corresponding edge of the interleaved conductive and dielectric layers;

such that, when appropriate bias voltages are placed on said first and second electrodes, each electrode is conductively connected to said interleaved conductive layers of the same conductivity type and junction isolated from said interleaved conductive layers of the other conductivity type, thereby permitting alternate layers to be charged to alternate potentials.

5,021,921

MONOLITHIC CERAMIC CAPACITOR

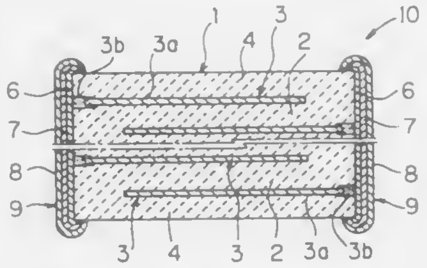
Harunobu Sano, and Yoshiaki Kohno, both of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jul. 6, 1990, Ser. No. 549,215

Claims priority, application Japan, Jul. 7, 1989, 1-176805

Int. Cl.^{5} H01G *4/10, 7/00*

U.S. Cl. 361—321 18 Claims



1. A monolithic ceramic capacitor comprising:

a ceramic laminate having first and second opposite end surfaces and first and second internal electrodes disposed in its interior so as to be opposite to each other and separated by a layer of ceramic material, said first and second internal electrodes being exposed at said first and second end surface, respectively, so as to be accessible for electrical connection; and

first and second external electrodes respectively formed on said first and second end surfaces of said ceramic laminate and electrically connected with said first and second internal electrodes respectively,

said first and second internal electrodes each comprising metal conductor parts and semiconductors parts which are flush with each other, so that said semiconductor parts of said first and second internal electrodes are exposed at said first and second end surfaces and electrically connected with said first and second external electrodes respectively.

5,021,922

PORTABLE PERSONAL COMPUTER

Myron F. Davis, Boca Raton, Fla.; Randall W. Martin, The Woodlands, Tex.; Hideo Nomura, Yokohama, Japan; Richard F. Pollitt, Highland Beach; Ernest Wittner, Baco Raton, both of Fla., and Wataru Yoshikawa, Fujisawa, Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 22, 1989, Ser. No. 441,030

Claims priority, application Japan, Nov. 30, 1988, 63-300808

Int. Cl.^{5} H05K *5/00;* **G06F** *1/00*

U.S. Cl. 361—380 5 Claims

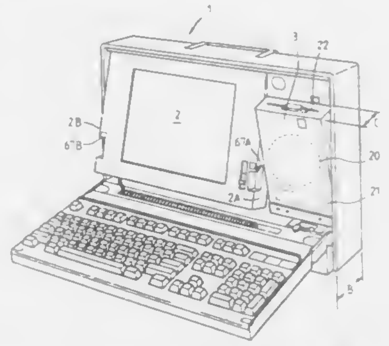
3. A computer, comprising in combination:

a case enclosing a computer, said computer including a supporting frame, a keyboard and a disk drive:

a display device movable between a retracted position and a pulled-out position;

a first member having a first pivot point, said first member being pivotally attached to said frame at said first pivot point;

a second member having a second pivot point, said second member being pivotally attached to said first member at said second pivot point, said second member being attached to said display device; and



a frictional mechanism attached to said first and second members such that said display device can be positioned at variable angles with respect to said case, said frictional mechanism including: a cam surface provided on said second member; a shoe movably attached to said first member; and a first spring having one end fixed to said first member and the other end engaged on said shoe, such that said shoe is frictionally engaged with said cam surface.

5,021,923

CENTRAL CURRENT DISTRIBUTION ARRANGEMENT, ESPECIALLY FOR MOTOR VEHICLES

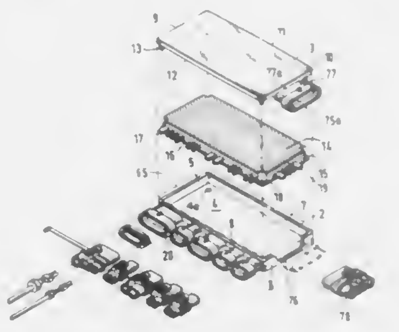
Bernd Zinn, Ennepetal, Fed. Rep. of Germany, assignor to Grote & Hartmann GmbH & Co. KG, Wuppertal, Fed. Rep. of Germany

Filed Nov. 2, 1989, Ser. No. 430,680

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1988, 8814031[U]

Int. Cl.^{5} H02B *1/00, 1/12;* **H05K** *5/06;* **H01R** *13/52*

U.S. Cl. 361—380 19 Claims



1. A central current distribution arrangement, especially for motor vehicles, for connecting electric feed lines with electric components, said arrangement comprising:

a casing having a casing trough and a cover secured to said casing trough;

first coupling arrangements molded on a longitudinal front wall of said casing trough providing a one-piece construction with said casing trough;

openings extending through said first coupling arrangements into an interior of said casing trough;

said cover having a flat plate construction;

at least one third coupling arrangement molded to a trans-

VOL
1127
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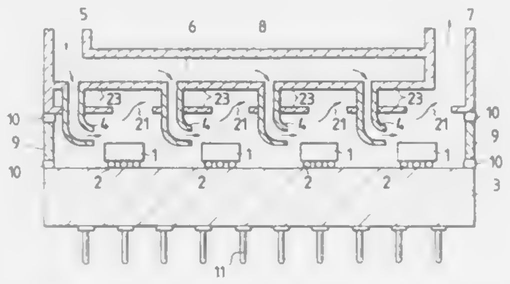
verse side edge of said cover providing a one-piece construction with said cover, a portion of said third coupling arrangement extending below a plane of said flat plate construction of said cover;
a recess provided in a transverse side wall of said casing trough, said portion of said third coupling arrangement positioned within said recess of said casing trough;
a hole extending through said third coupling arrangement into said interior of said casing trough;
a carrier plate positioned in said casing within said interior of said casing trough, said carrier plate fabricated from a plastic material and containing cast-in electric components;
contact lugs electrically connected to said electric components, said contact lugs projecting outward from a longitudinal front edge and outward from a transverse side edge of said carrier plate;
said contact lugs extending into said openings of said first coupling arrangements and into said hole of said third coupling arrangement;
second coupling arrangements provided with first electric contact elements connected to first electric feed lines;
first coupling means for coupling said first coupling arrangements to associated ones of said second coupling arrangements so that said first electric feed lines are connected with associated ones of said contact lugs projecting outward from said longitudinal front edge of said carrier plate;
a fourth coupling arrangement provided with second electric contact elements connected to second electric feed lines;
second coupling means for coupling said third coupling arrangement to said fourth coupling arrangement so that said second electric feed lines are connected with associated ones of said contact lugs projecting outward from said transverse side edge of said carrier plate;
first sealing ring means disposed between said first coupling arrangements and said associated ones of said second coupling arrangements providing a moisture-proof and watertight engagement therebetween;
second sealing ring means disposed between said third coupling arrangement and said fourth coupling arrangement providing a moisture-proof and watertight engagement therebetween;
third sealing ring means disposed between said first electric feed lines and associated ones of said second coupling arrangements providing a moisture-proof and water-tight connection therebetween;
fourth sealing ring means disposed between said second electric feed lines and said fourth coupling arrangement providing a moisture-proof and watertight connection therebetween; and
fifth sealing ring means disposed between said cover and said casing trough providing a moisture-proof and watertight securement therebetween.

5,021,924

SEMICONDUCTOR COOLING DEVICE

Shigekazu Kieda, Ishioka; Tadakatsu Nakajima, Ibaraki; Heikichi Kuwahara, Ibaraki, and Motohiro Sato, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Sep. 14, 1989, Ser. No. 407,159
Claims priority, application Japan, Sep. 19, 1988, 62-232463
Int. Cl.^{5} H05K *7/20*
U.S. Cl. 361—385 **21 Claims**

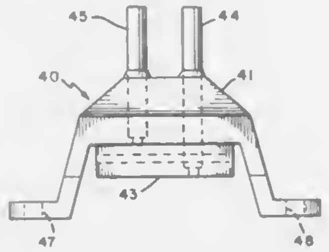
1. A semiconductor cooling device comprising:
a plurality of semiconductor integrated circuits mounted on a module substrate;
a sealing member attached to said module substrate and forming a housing enclosing said plurality of integrated circuits; and
liquid supplying means provided on said sealing member and having a plurality of cooling liquid nozzles respectively associated with each of said individual integrated circuits, wherein said liquid nozzles emit and direct jets of a cooling liquid in a direction substantially in parallel with a back wall surface of the individual integrated circuits.



5,021,925

ELECTRICAL ISOLATOR DEVICE

Thomas F. Soboleski, East Haddam, Conn., assignor to Nuarms, Inc., Meriden, Conn.
Filed Mar. 20, 1990, Ser. No. 496,247
Int. Cl.^{5} H05K *7/20*
U.S. Cl. 361—386 **13 Claims**



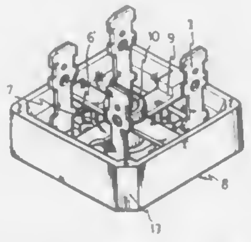
1. An electrical isolator device comprising:
at least one heat sink;
at least one metal stud, wherein said metal stud is disposed on a surface of said heat sink;
at least two diodes, wherein said diodes are disposed on a surface of said heat sink; and
a non-conductive housing which partially encases the diodes, metal stud and heat sink, such that at least the surface of said heat sink on which the diodes and metal stud are disposed is in contact with san nonconductive housing; whereby the surfaces of said heat sink which are not in contact with said non-conductive housing are exposed to the atmosphere to allow dissipation of heat therefrom.

5,021,926

CONSTRUCTION OF BRIDGE RECTIFIERS

Angel Azpeitia Urrestarazu, Legazpia, and Juan M. Areta Salanueva, Izqda, both of Spain, assignors to Fagor S. Coop, Mondragon, Spain
Filed Apr. 4, 1990, Ser. No. 504,532
Claims priority, application Spain, Apr. 5, 1989, 8901195
Int. Cl.^{5} H01L *1/12, 23/36;* **H02B** *1/00*
U.S. Cl. 361—436 **1 Claim**

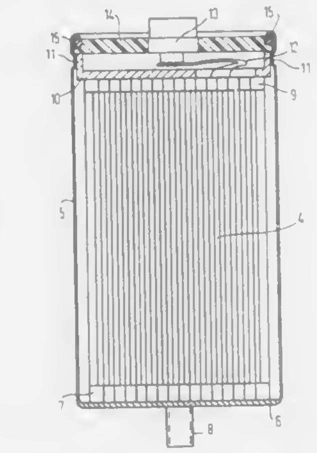
1. Improvements in the construction of bridge rectifiers, of the type comprising a series of rectifier cells duly connected to each other, housed within a cap filled with an epoxy or like resin, essentially characterized in that the said cap comprises a dissipating plate (1) and an electrically insulating frame (8), the structure of such dissipating plate being based on three layers, a lower or external layer (4) made of a material with high heat conduction coefficient, preferably metal, being the largest layer within the dissipating plate (1) as a whole, a middle layer (5) made of electrically insulating material, of little thickness and also of good heat conductivity, and finally a top or internal electro-conducting layer (6), preferably made of copper, where tracks (6′) are defined for the circuit connecting the rectifier cells (2) and the connections (7) and terminals (3) of such bridge to each other, attached to the said tracks by welding with tin, the mouth of the frame (8) housing the dissipating plate (1) having been provided with a perimetral stepping (11) for coupling thereof, and both the frame (8) and the dissipating plate (1) being bevelled (13-14) at one of their corners to define a single relative position of both elements, with the further peculiarity that the frame (8) is provided with internal arms (9) that relate a central and cylindrical hollow core (10), for bridge attachment, to the mid-point of the sides of the frame as such.



5,021,927

COOLING SYSTEM FOR WOUND ELECTROLYTIC CAPACITOR

Wilhelm Schweikert, Heidenheim-Mergelst, and Norbert Will, Heidenheim, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellscaft, Berlin and Munich, Fed. Rep. of Germany
Filed Feb. 20, 1990, Ser. No. 482,019
Claims priority, application European Pat. Off., Mar. 31, 1989, 89105716
Int. Cl.^{5} H01G *9/06*
U.S. Cl. 361—514 **8 Claims**

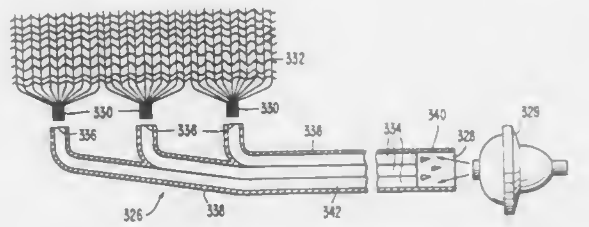


1. An electrical capacitor having self-bearing electrode foils, particularly a wound electrolyte capacitor for high alternating currents which is integrated in a metallic housing and has a metallic heat bridge between the capacitor and the housing, said heat bridge being formed by an electrode metal foil which projects beyond an end face at one end and which makes thermic contact with the floor of the housing, characterized in that a second heat bridge is formed by an electrode metal foil which projects beyond another end and is in thermic contact with a further portion of the housing arranged in the capacitor.

5,021,928

FLAT PANEL ILLUMINATION SYSTEM

Maurice Daniel, 3115 King St., Alexandria, Va. 22302
Continuation-in-part of Ser. No. 731,511, May 5, 1985, Pat. No. 4,715,700, which is a division of Ser. No. 427,155, Sep. 29, 1982, Pat. No. 4,519,017. This application Oct. 8, 1987, Ser. No. 105,829
Int. Cl.^{5} F21V *5/00*
U.S. Cl. 362—32 **38 Claims**

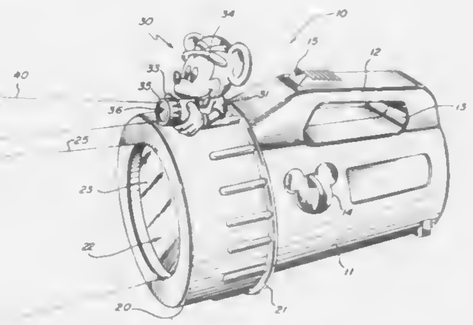


1. A flat panel illumination system comprising at least one light emitting panel means, light conducting cable means connected to said light emitting panel means and operative to transmit light to illuminate said light emitting panel means, each said light conducting cable means having a free end remote from the light emitting panel means to which said light conducting cable means is connected, a light conductive coupling means connected to the free end of each said light conducting cable means, and a light source means including a single elongated light unit to provide light of substantially uniform intensity from said single elongated light unit to a plurality of said light conductive coupling means, said light source means including reflector means for transmitting light along a plurality of paths from said elongated light unit, said reflector means including curved light path defining means operating to define a plurality of light paths curving away from said elongated light unit which receive, confine and transmit light from said elongated light unit, said curved light path defining means operating to cause multiple reflections of light traveling along each curved light path, and each including a light path input substantially equal in width to the length of said elongate light unit to receive light from said elongated light unit, said light path inputs being mounted in spaced relationship around said elongate light unit.

5,021,929

FLASHLIGHT HAVING SECONDARY BEAM

Armen Danielian, Sherman Oaks, Calif., assignor to Mattel, Inc., El Segundo, Calif.
Filed Apr. 20, 1990, Ser. No. 517,781
Int. Cl.^{5} F21V *7/04*
U.S. Cl. 362—32 **8 Claims**



1. A flashlight comprising:
a housing having an interior cavity and first light output opening;
a reflector supported within said housing having an open side directed toward said first output opening;
a light bulb supported within said reflector;

VOL
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1991
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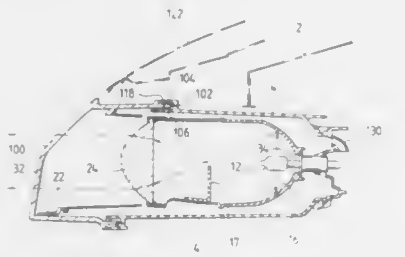
- a battery power source operatively coupled to said light bulb for causing it to emit light;
- a figure extending from said housing defining a second light output opening and an internal passage between said second light output opening and said interior cavity; and
- passive light coupling means for receiving a portion of the light produced by said light bulb and coupling it to said second light output opening to produce a secondary light beam.

5,021,930
AUTOMOTIVE HEADLAMP HAVING REDUCED CHROMATIC ABERRATION

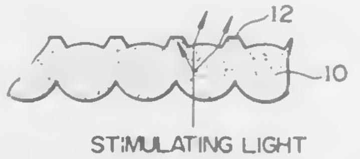
Masaru Yamada, Shizuoka, Japan, assignor to Koito Manufacturing Co., Ltd., Tokyo, Japan
Filed Sep. 11, 1990, Ser. No. 580,746
Claims priority, application Japan, Dec. 28, 1989, 1-338384
Int. Cl.^{5} B60Q *1/00*
U.S. Cl. 362—61 1 Claim



1. An automotive headlamp comprising.
- an elliptical reflector;
- a light source located at a first focal point of said elliptical reflector;
- a condenser lens focused substantially at a second focal point of said elliptical reflector;
- a shade provided in front of said reflector for shielding part of light from said light source; and
- an outer lens provided in front of said condenser lens, said outer lens having an angled portion extending along a vertically middle portion thereof having a radius of curvature smaller than in other portions of said outer lens, said outer lens being positioned such that light from said light source passes through said angled portion.

5,021,931
LENTICULAR LUMINESCENT SCREEN

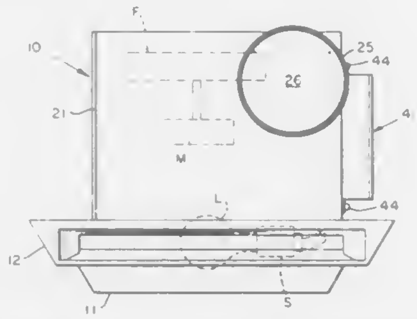
Fumio Matsui, and Yasushi Murata, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan
Filed Feb. 15, 1990, Ser. No. 480,567
Claims priority, application Japan, May 31, 1989, 1-138210
Int. Cl.^{5} F21V *9/16*
U.S. Cl. 362—84 3 Claims



1. A lenticular luminescent screen used for a back or front projection type image display system comprising a base plate made of a mixture of a transparent synthetic resin and a luminescent substance, said luminescent substance being capable of emitting luminescent light when stimulating light is applied thereto, said base plate having at least one surface composed of a plurality of cylindrical convex surfaces extending adjacent and parallel to each other.

5,021,932
SAFETY DEVICE FOR COMBINED VENTILATOR/LIGHT UNIT

Charles W. Ivey, Hope Mills, N.C., assignor to Fasco Industries, Inc., Lake Forest, Ill.
Filed May 17, 1989, Ser. No. 352,895
Int. Cl.^{5} F21V *33/00*
U.S. Cl. 362—96 2 Claims

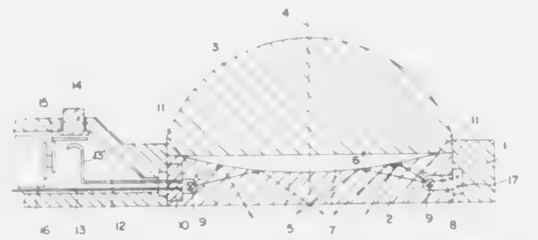


1. A safety device for a combination ventilator/light unit of the type having a housing containing in its lower end a lamp, and in its upper end a ventilator fan and electric motor therefor, comprising
- a first normally closed, temperature responsive switch mounted on said housing,
- means for connecting said first switch across a power supply in series with said lamp and said motor, and operative automatically to disconnect both said lamp and said motor from said power supply when the temperature in said housing exceeds a first predetermined value,
- a second, normally open, temperature responsive switch mounted on said housing in communication with the interior thereof between said lamp and said fan to sense the temperature in said housing adjacent said lamp,
- means connecting said second switch between said fan motor and said lamp, said second switch being operative, when said lamp is energized, automatically to close and energize said fan motor when the temperature in said housing exceeds a second predetermined value lower than said first predetermined value,
- said second switch comprising a thermostat mounted in a metal container extending at one end through a hole in one exterior wall of said housing and having thereon on its opposite end a mounting flange secured against the outside surface of said one exterior wall of said housing,
- said one end of said container being closed to prevent access to the wire leads of said thermostat from the interior of said housing,
- a pair of wire plug receptacles mounted in said one wall of said housing adjacent said thermostat, and
- a cover removably secured to said outside surface of said one wall of said housing and overlying and covering said thermostat and said plugs.

5,021,933
ILLUMINATED MAGNIFYING GLASS

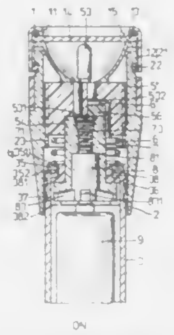
Werner Cordes, Hamburg, Fed. Rep. of Germany, assignor to Aristo Graphic Systeme GmbH & Co. KG, Hamburg, Fed. Rep. of Germany
Filed May 9, 1990, Ser. No. 520,751
Claims priority, application Fed. Rep. of Germany, Sep. 5, 1989, 3915119
Int. Cl.^{5} F21V *33/00;* G02B *27/02*
U.S. Cl. 362—109 20 Claims

1. Illumination apparatus for an optical magnifying device having a magnifying lens section disposed atop a cylindrical lens section, comprising:
- a light emitting device coupled to the cylindrical lens section and adjacent an outer circumferential surface thereof, for emitting light toward an interior of the cylindrical lens section; and
- a surface of the cylindrical lens section facing the magnifying lens section being formed to cause the light emitted from said light emitting device to be substantially totally reflected from said surface and away from the magnifying lens section.



5,021,934
EASY TURNING ON/OFF FLASHLIGHT

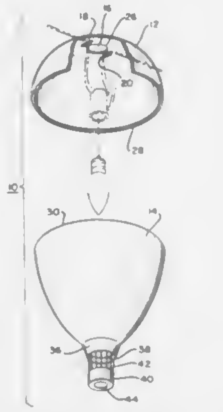
Hsisn-Der Hou, No. 5, Alley 279, Chung Cheng Rd., Yung Kang Hsiang, Tainan Hsien, Taiwan
Filed Aug. 30, 1990, Ser. No. 574,731
Int. Cl.^{5} F21L *15/00*
U.S. Cl. 362—187 4 Claims



1. An easy turning on/off flashlight comprising:
- a lens assembly having a shoulder, a female thread being connected with a male thread of a flashlight head, two O rings, a lens and a conical shaped reflector; said flashlight head having a hollow body, a circular trough and a female thread;
- a bulbholder having a barrel shaped body with an opening at its inner lower portion, a male thread on its outer surface, first and second holes for the insertion of first and second filaments of a bulb, a female thread at its lower inner portion, and a straight trough in said opening under said first hole and extending to its bottom for accepting said first filament an isolator and a restoring spring; said first filament passing through said first hole and being bent and placed in said straight trough and being connected with a foot of said restoring spring and being blocked by said isolator;
- a housing having a catch block securely connected to its top, said catch block having several shallow troughs and several hollow troughs;
- a linking section being shaped as a hollow barrel and having a male thread at its top which is connected to the female thread of said bulbholder, and having several linking members with slants on bottom of each; a conducting spring located inside of said hollow body and in contact with said second filament;
- an engaging section being shaped also like a hollow barrel and having a conducting post at its center, a plate with several engaging members with a slant on top of each; wherein said engaging section is inserted into a bottom portion of said linking section and wherein by changing the connection relations among said shallow troughs and said hollow troughs of said catch block, said slants of said linking members of said linking section and said slants of said engaging members of said engaging section said flashlight is turned "ON" or "OFF"; and wherein the changing of the connection relations is accomplished when said flashlight head is pressed down by a pressing force, said linking members pushing said flashlight head back up when the pressing force is released, said linking members as well as said engaging members will move up and said engaging members will be rotated from either a shallow trough or a hollow trough to a hollow trough or a shallow trough respectively.

5,021,935
DECORATIVE LIGHT SHADE

Lonnie F. Gary, Lubbock, Tex., assignor to Gary Products Group, Inc., Lubbock, Tex.
Filed Nov. 2, 1989, Ser. No. 430,774
Int. Cl.^{5} F21V *3/00*
U.S. Cl. 362—237 10 Claims



1. A decorative light shade assembly adapted for use with a decorative light string having a plurality of decorative bulb and socket assemblies connected by electrical conductors to a common source of electrical power, said decorative shade assembly comprising first and second shade sections molded from a polymeric resin, said first and second shade sections being adapted to be selectively engaged to and disengaged from each other by the application by manual force;
- one of said shade sections further comprising means for receiving one of said decorative bulb and socket assemblies into the interior of said decorative shade assembly while said first and second shade sections are engaged and for frictionally engaging said decorative light string;
- said means comprising an aperture in said shade section adapted to receive at least the socket portion of said decorative bulb and socket assembly, at least two slots in said shade section disposed on opposite sides of said aperture that are each adapted to receive an electrical conductor, and a transverse passageway in said shade section extending between each of said slots and said aperture, said transverse passageway being adapted to permit the movement of said electrical conductor through said transverse passageway by the application of manual force while simultaneously providing sufficient frictional resistance to the movement of said electrical conductor through said transverse passage that the weight of said decorative shade assembly is not sufficient to disengage said decorative shade assembly from said light string whenever said decorative shade assembly is suspended therefrom.

VOL 1127 ISS 1 JE 4 1991 UMI

5,021,936
PWM POWER CONVERTER USING MIXED BIPOLAR AND STATIC INDUCTION TRANSISTORS

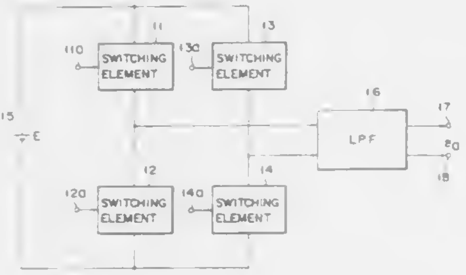
Jun-ichi Nishizawa; Takashige Tamamushi; Koichi Mitamura, all of Sendai; Hiroo Takahashi, Izumi; Kiyoo Mitsui, Sendai; Mitsuo Ikehara, Izumi; Toyota Wako, and Sinpei Maruyama, both of Sendai, all of Japan, assignors to Zaidan Hojin Handotai Kenkyu Sinkokai; Tohoku Electric Power Company, Incorporated and Tsuken Electric Ind. Co., Ltd., all of Sendai, Japan

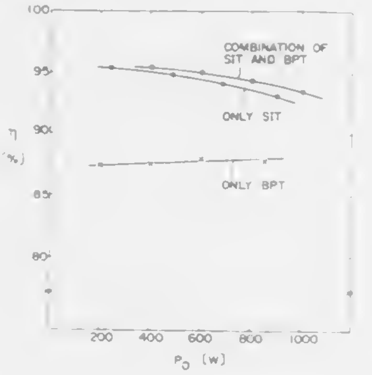
Continuation of Ser. No. 380,516, Jul. 17, 1989, abandoned, which is a continuation of Ser. No. 172,598, Mar. 24, 1988, abandoned. This application Jun. 28, 1990, Ser. No. 545,148

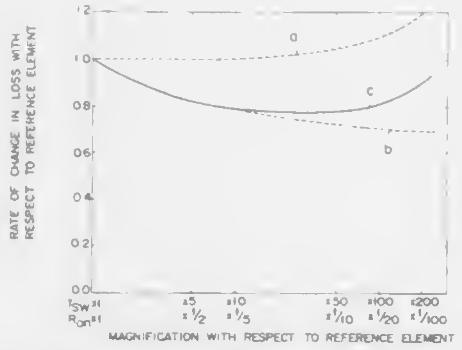
Claims priority, application Japan, Mar. 24, 1987, 62-69639; Mar. 24, 1987, 62-69640; Oct. 6, 1987, 62-252180

Int. Cl.^{5} H02M *7/48*

U.S. Cl. 363—41 4 Claims







1. A PWM power converter comprising:

a plurality of bridge-connected semiconductor switching elements, including predetermined ones of which are switched at low speed and predetermined others which are switched at low speed and predetermined others which are switched at high speed; and

PWM signal generating means for comparing levels of a signal wave and a modulated wave, and generating PWM signals for switching said plurality of semiconductor switching elements, in order,

wherein a bipolar transistor which has a structure with a low ON voltage and a small conduction loss is used for those of said plurality of semiconductor switching elements which are switched at a low speed, and a static induction transistor which has a structure with an ON voltage higher than that of said bipolar transistor, a low switching loss and a capability of high-speed switching, is used for the others of said plurality of semiconductor switching elements which are switched at a high speed, said bipolar transistor having a switching time 10 to 50 times greater than that of the static induction transistor and an ON resistance 1/5 to 1/10 that of the static induction transistor.

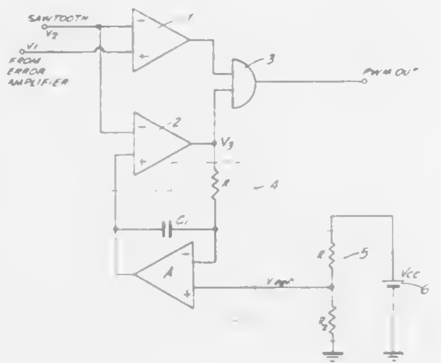
5,021,937
MAXIMUM DUTY CYCLE LIMITING OF PULSE WIDTH MODULATORS

Itzchak Cohen, Dix Hills, N.Y., assignor to Lambda Electronics Inc., Melville, N.Y.

Filed Oct. 18, 1989, Ser. No. 423,236

Int. Cl.^{5} H02M *1/14*

U.S. Cl. 363—41 6 Claims



1. In a power conversion system employing a pulse width modulated (PWM) system control signal, means for accurately and stably setting the maximum duty cycle of said system signal comprising:

(a) means for generating a reference PWM signal having a pre-set duty cycle for establishing said maximum duty cycle; and

(b) means for comparing said reference PWM signal with said PWM system control; signal for producing a resultant PWM system control signal whose duty cycle does not exceed said maximum duty cycle.

5,021,938
TRANSMISSION SYSTEM WITH BACKUP FUNCTION

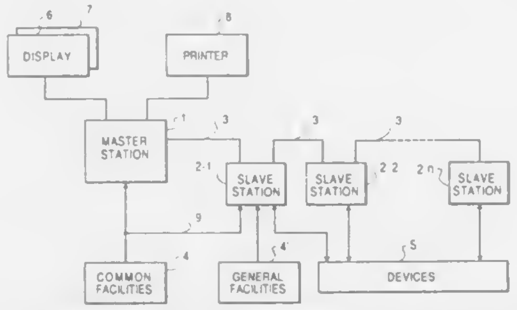
Masahiro Hayakawa, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 9, 1989, Ser. No. 321,202

Claims priority, application Japan, Mar. 15, 1988, 63-061487

Int. Cl.^{5} G06F *11/20*

U.S. Cl. 364—132 17 Claims



1. A transmission system including a master station and a plurality of slave stations, for executing application processing in the slave stations on the basis of instructions provided by the master station and for receiving system common data, said system comprising:

a particular slave station for backup operation of the master station when the master station fails and for normal operation under control of the master station as any of the slave stations;

transmission means for supplying the system common data to the master station and to said particular slave station;

automatic detection means for detecting failure of the master station; and

backup execution means for polling the slave stations other than said particular slave station in place of the master station using the system common data.

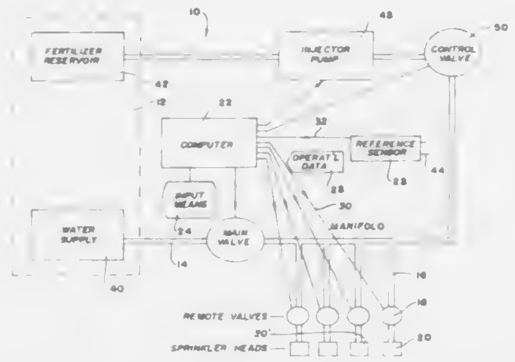
5,021,939
COMPUTERIZED SPRINKLER CONTROL SYSTEM

Rocco J. Pulgiese, Lincoln Park, Mich., assignor to Demaco Mfg. Group, Ltd., Dearborn, Mich.

Filed Mar. 16, 1989, Ser. No. 325,133

Int. Cl.^{5} G05B *11/01;* **B05B** *12/04*

U.S. Cl. 364—143 11 Claims



1. In a computer-controlled irrigation system comprising a reservoir of irrigating fluid, a main supply line, a plurality of lateral supply lines, a plurality of remote valves, and a plurality of sprinkler heads;

a computer having means for providing the computer with a set of initialization data for the system and for each remote valve, the means for providing the computer with a set of initialization data being supplied by an operator;

a plurality of reference sensors installed in an area to be irrigated for sensing moisture level therein, the number of reference sensors being less than the number of remote valves;

means for providing the computer with a set of operational data for each of the plurality of reference sensors, said means for providing the computer with a set of operational data being supplied by the reference sensors, each reference sensor generating a signal indicating actual moisture level for processing by the computer, the computer controlling the plurality of remote valves so that the irrigating fluid is delivered to the sprinkler heads in amounts sufficient to bring the actual moisture level up to a desired moisture level;

wherein the set of initialization data provided by an operator includes a terrain factor for each of the sprinkler heads, the computer controlling each remote value so that the irrigating fluid is delivered to the associated sprinkler head in amounts dependent on the associated terrain factor.

5,021,940
SYNERGETIC AUTOMATIC CONTROL SYSTEM FOR PELLET MILL

George M. Cox, San Antonio; Charles D. Colley, Jr., Converse, and Thomas E. Davis, Jr., San Antonio, all of Tex., assignors to Automatic Control Electronics Company, San Antonio, Tex.

Filed Jan. 12, 1989, Ser. No. 296,493

Int. Cl.^{5} G06F *15/00*

U.S. Cl. 364—148 30 Claims

1. An automatic control system for improving the run time efficiency of a pellet mill that has a means for moistening dry pellet material with moisture in the form of steam and a means for producing pellets composed of dry material and moisture, comprising:

means for measuring the temperature in said pellet mill;

means for measuring the power used by said pellet producing means;

calculating means for repeatedly receiving temperature values from said temperature measuring means and power values from said power measuring means, and for calculating a current dry material input value and a current steam input value, said calculating means deriving said input values from stored data representing the effects of past adjustments to said dry material input and said steam input on said temperature value and said power value;

data storage means for storing past values of said power, said dry material input, and said steam input, for use by said calculating means;

interface means for converting the output of said means for measuring temperature and the output of said means for measuring power into digital signals, and for converting the output of said calculating means into adjustment signals; and

means for adjusting said moistening means and said pellet producing means based on said adjustment signals.

5,021,941
POSITION CONTROL METHOD AND APPARATUS FOR A CLOSED LOOP TYPE NUMERICALLY CONTROLLED MACHINE

Derek G. Ford, Honley, and Scott R. Postlethwaite, Dalton, both of England, assignors to Hepworth Engineering Limited, United Kingdom

Filed Mar. 14, 1989, Ser. No. 323,562

Claims priority, application United Kingdom, Mar. 19, 1988, 8806574

Int. Cl.^{5} G05B *13/02*

U.S. Cl. 364—176 12 Claims

1. A method of compensating for the effect of positioning errors in the positioning of a movable body in a body positioning apparatus having a body drive for positioning said body along a control axis, a body positioning servo actuator means operating said body drive and controlled in response to an analogue position error signal, a position transducer responsive

VOL
1127
ISS
1
JE
4
1991
UMI

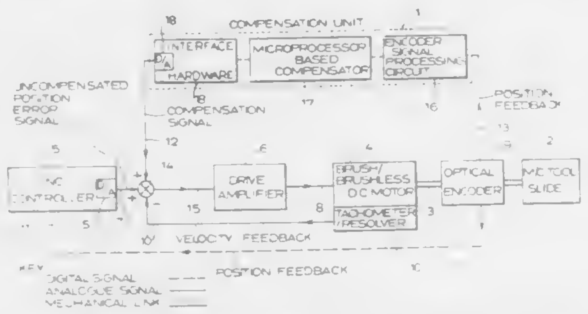
to the position of said body drive, and a digital controller responsive to a position demand signal and to a position feedback signal to produce, through a digital to analogue converter, said analogue position error signal, comprising:

creating a store of calibration data, said calibration data having a look up table of positioning error values of said apparatus corresponding to readings of the output of said position transducer when said apparatus is operated in an uncompensated state wherein no error compensation is made on the basis of said calibration data, said positioning error values being determined by measuring the position of said body along said control axis when said body is positioned by said apparatus operating in said uncompensated state;

monitoring the current output of said position transducer;

deriving an analogue error compensation amount for the body position on the basis of said calibration data by using said look up table to give a pre-recorded positioning error value corresponding to said current output; and

using said analogue error compensation amount to modify the drive signal to said servo.



5,021,942

DATA PROCESSING SYSTEM WITH PACKETS SPECIFYING FUNCTIONS AND ARGUMENTS

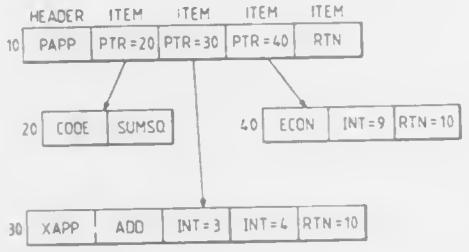
Paul Watson, Haywood; John V. Woods, Handforth, both of Great Britain, and Ian Watson, Stockport, Great Britain, assignors to International Computers Limited, London, England

Filed Jun. 23, 1988, Ser. No. 210,497

Claims priority, application United Kingdom, Jul. 30, 1987, 8718056

Int. Cl.⁵ G06F *9/302, 9/305, 9/32*

U.S. Cl. 364—200 3 Claims



1. A data processing system comprising:

a) a packet memory holding a plurality of packets, each of said packets comprising:

(i) a function field representing a function,

(ii) a number of argument fields, each argument field representing an argument value, or a pointer to another packet,

(iii) a type field indicating one of a plurality of packet types, including a first packet type which denotes that all the arguments of the packet represent argument values, and a second packet type which denotes that at least one of the arguments of the packet represents a pointer to another packet, and

(iv) a state field, indicating one of a plurality of packet states including an active state and a suspended state,

b) first processing means, connected to the packet memory, for processing an active packet of the first packet type from the packet memory, by applying the function represented by the function field of the packet to the argument values represented by the argument fields of the packet, to thereby calculate a result for the packet,

c) second processing means, connected to the packet memory, for processing an active packet of the second packet type from the packet memory by converting it to a suspended packet of the first packet type, and

d) third processing means coupled to the second processing means, for activating each packet pointed to by the argument fields of the packet being processed by the second processing means.

5,021,943

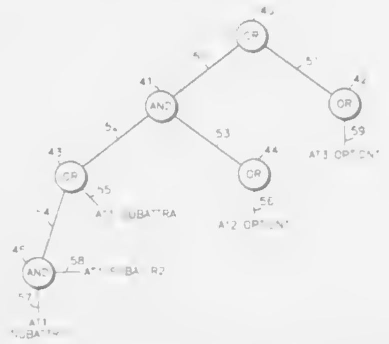
COTENT INDEPENDENT RULE BASED OPTIONS NEGOTIATIONS METHOD

Thomas Grimes, Chandler, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 1, 1988, Ser. No. 226,488

Int. Cl.⁵ G06F *7/04*

U.S. Cl. 364—200 19 Claims



1. A method for attribute definition and distribution by a processor of a plurality of communication system entities, said method for attribute definition and distribution comprising the steps of:

defining at least one attribute in a grammar for said system;

first converting said attributes of said system into a hierarchical tree structure;

selecting a subset of said attributes of said system to represent a particular entity;

second converting said subset of attributes representing said particular entity to a corresponding subset of configuration information; and

transmitting said configuration information of a first entity to a second entity, said configuration information corresponding to an attribute tree;

receiving by said first entity of said system configuration information corresponding to an attribute tree of said second entity;

third converting said configuration information of said first and second entities to corresponding first and second attributes trees; and

comparing said first and said second attribute trees to determine whether common attributes exist between said first and said second attribute trees.

5,021,944

SEMICONDUCTOR MEMORY HAVING REDUNDANCY CIRCUIT FOR RELIEVING DEFECTS

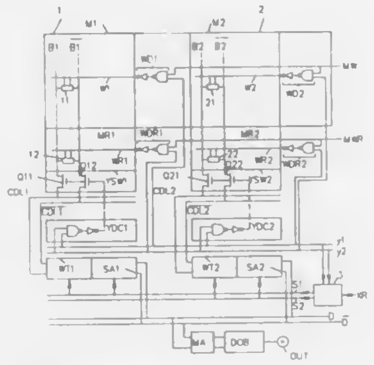
Katsuro Sasaki; Katsuhiro Shimohigashi, and Shoji Hanamura, all of Tokyo, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 6, 1989, Ser. No. 376,245

Claims priority, application Japan, Jul. 8, 1988, 63-168708

Int. Cl.⁵ G11C *7/00, 29/00;* **G06F** *11/00*

U.S. Cl. 365—200 16 Claims



1. A memory comprising:

a first memory array block having a first memory array including a plurality of memory cells and a first spare memory array including a plurality of spare memory cells;

a second memory array block having a second memory array including a plurality of memory cells and a second spare memory array including a plurality of spare memory cells;

first word driver means for selecting a first word line of said first memory array of said first memory array block;

second word driver means for selecting a second word line of said second memory array of said second memory array block;

first spare word driver means for selecting a first spare word line of said first spare memory array of said first memory array block;

second spare word driver means for selecting a second spare word line of said second spare memory array of said second memory array block;

a first sense amplifier for sensing the data read out from said first memory array block;

a second sense amplifier for sensing the data read out from said second memory array block;

a data bus connected to an output of said first sense amplifier and to an output of said second sense amplifier;

a first data line connected between said first memory array block and an input of said first sense amplifier;

a second data line connected between said second memory array block and an input of said second sense amplifier;

first column switch means for transmitting said data on one bit line of a bit line group, connected commonly to said first memory array of said first memory array block and to said first spare memory array of said first memory array block, to said first data line;

second column switch means for transmitting said data on one bit line of a bit line group, connected commonly to said second memory array of said second memory array block and to said second spare memory array of said second spare memory array block, to said second data line;

first column driver means for controlling data transmission of said first column switch means;

second column driver means for controlling data transmission of said second column switch means; and

a control unit for controlling the sense operation of said first sense amplifier and the sense operation of said second sense amplifier; wherein when said first word line driver means selects said first word line of said first memory array of said first memory array block in response to a memory array block selection signal, said second spare word driver means lets said second spare word line of said second spare memory array of said second memory array block be concurrently selected and when said first column driver means permits the data transmission operation of said first column switch means in response to said memory array block selection signal, in response to said memory block selection signal said second column driver means permits the data transmission operation of said second column switch means so that the data from said first memory array of said first memory array block is transmitted to said first data line and the data from said second spare memory array of said second memory array block is concurrently transmitted to said second data line; wherein, during deflect relief, said control unit inhibits the sense operation of said first sense amplifier but permits the sense operation of said second sense amplifier in response to said memory array block selection signal so that the data from said second spare memory array of said second memory array block, that is transmitted to said second data line, is read out to said data bus through said second sense amplifier; and wherein, during defect non-relief, said control unit permits the sense operation of said first sense amplifier but inhibits the sense operation of said second sense amplifier in response to said memory array block selection signal so that the data from said first memory array of said first memory array block, that is transmitted to said first data line, is read out to said data bus through said first sense amplifier.

5,021,945

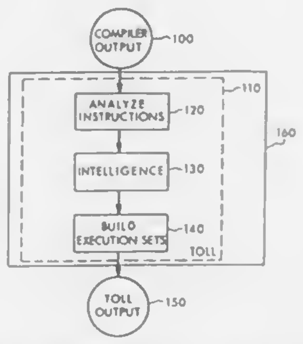
PARALLEL PROCESSOR SYSTEM FOR PROCESSING NATURAL CONCURRENCIES AND METHOD THEREFOR

Gordon E. Morrison, Denver; Christopher B. Brooks, and Frederick G. Gluck, both of Boulder, all of Colo., assignors to MCC Development, Ltd., Boulder, Colo.

Division of Ser. No. 794,221, Oct. 31, 1985, Pat. No. 4,847,755. This application Jun. 26, 1989, Ser. No. 372,247

Int. Cl.⁵ G06F *15/16, 9/38*

U.S. Cl. 364—200 37 Claims



1. A machine implemented method for parallel processing in a plurality of processor elements natural concurrencies in streams of low level instructions contained in programs of a plurality of users, each of the streams having a plurality of single entry-single exit (SESE) basic blocks (BBs), said method comprising the steps of:

statically adding intelligence representing the natural concurrencies existing within the instructions in each basic block of the programs, said step of adding for each program comprising the steps of:

(a) ascertaining resource requirements of each instruction within each basic block to determine the natural concurrencies in each basic block,

(b) identifying logical resource dependencies between instructions,

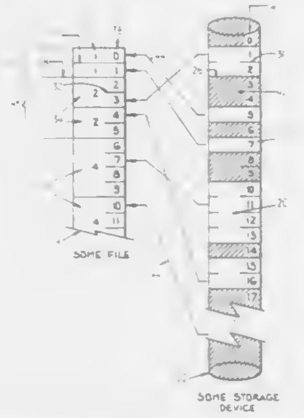
(c) assigning condition code storage (CCs) to groups of

VOL
1127
ISS
1
JE
4
1991
UMI

resource dependent instructions, such that dependent instructions can execute on the same or different processor elements,
(d) determining the earliest possible instruction firing time (IFT) for each of said instruction in each of said plurality of basic blocks,
(e) adding said instruction firing times to each instruction in each of said plurality of basic blocks,
(f) assigning a logical processor number (LPN) to each instruction in each of said basic blocks,
(g) adding said logical processor numbers to each instruction in each of said basic blocks, and
(h) repeating steps (a) through (g) until all basic blocks are processed for each of said programs, and
processing the instructions having the statically added intelligence for executing said programs on a plurality of processor elements (PEs).

5,021,946
MOSTLY CONTIGUOUS FILE ALLOCATION TECHNIQUE INVOLVING FILE EXTENSION

Joseph A. Korty, Coral Springs, Fla., assignor to Modular Computer Systems, Inc., Fort Lauderdale, Fla.
Continuation of Ser. No. 207,875, Jun. 17, 1988, abandoned. This application Aug. 22, 1990, Ser. No. 571,035
Int. Cl.^{5} G06F *13/00, 12/02*
U.S. Cl. 364—200 18 Claims

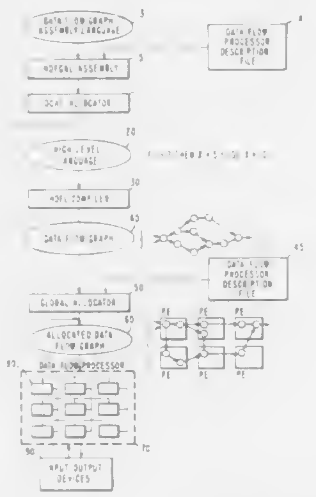


1. A file extension method for data processing files for selecting the sizes and ordering of the extents of a file, each extent including at least one block, wherein the size of an extent starting at a certain file address is an increasing function only of said file address and wherein all extents of the same size are adjacent to each other in the file, the extents being stored at arbitrary locations in a storage device, whereby files are kept contiguous or nearly contiguous as each extent has at least as many blocks as the extent immediately preceeding it.

5,021,947
DATA-FLOW MULTIPROCESSOR ARCHITECTURE WITH THREE DIMENSIONAL MULTISTAGE INTERCONNECTION NETWORK FOR EFFICIENT SIGNAL AND DATA PROCESSING

Michael J. Campbell; Dennis J. Fion; George K. Tucker, all of Los Angeles; Michael D. Vahey, Manhattan Beach, and Rex W. Vedder, Playa del Rey, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.
Continuation of Ser. No. 145,033, Jan. 19, 1988, abandoned, which is a continuation-in-part of Ser. No. 847,087, Mar. 31, 1986, abandoned. This application Jan. 30, 1990, Ser. No. 474,707
Int. Cl.^{5} G06F *15/82*
U.S. Cl. 364—200 12 Claims

1. A method of data-flow multiprocessing for highly efficient data and signal processing, including the steps of:
writing a program of instructions in a high-level language onto a storage medium;
reading said program of instructions from said storage medium into a compiler;
compiling by said compiler said instructions by translating said instructions into a plurality of machine instructions;
inputting a file describing a data-flow processor having multiple processing elements, with an identification scheme for said processing elements being formed in accordance with a three-dimensional array of processing elements, into a global allocator program;
running said global allocator program in order to process said plurality of machine instructions in order to assign said machine instructions to a plurality of said processing elements in said data-flow processor for execution of said machine instructions;
inputting a plurality of data into said data-flow processor in order to execute said program in said data-flow processor; and
executing said machine instructions in said data-flow processor; and
wherein said executing step includes a step of employing a template memory in each of said processing elements for identifying data elements from a plurality of said processing elements for arithmetic operations.

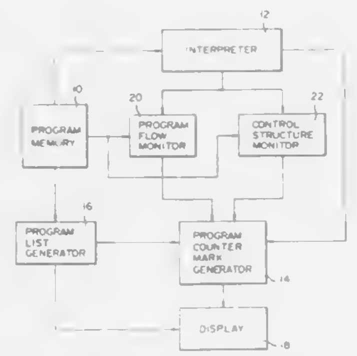

DATA FLOW GRAPH ASSEMBLY LANGUAGE
DATA FLOW PROCESSOR DESCRIPTION FILE
GLOBAL ALLOCATOR
ALLOCATED DATA FLOW GRAPH
INPUT OUTPUT DEVICES

5,021,948
PROGRAM COUNTER DISPLAY DEVICE

Yasuko Nakayama, Kawasaki, and Kazuo Aida, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Mar. 30, 1987, Ser. No. 31,280
Claims priority, application Japan, Mar. 29, 1986, 61-72162
Int. Cl.^{5} G06F *9/455*
U.S. Cl. 364—200 5 Claims

1. A program counter display device simulating an operation of a program counter during an executing of a program, said device comprising:
means for displaying on a screen statements included in a program list for a program which is being executed;
means, responsive to an output of the program counter, for displaying on the screen an arrowlike indicator, the indicator being positioned at a row of the screen on which a statement being executed is displayed, and directed horizontally toward the statement being executed when the output of the program counter is fixed, and shifted and directed vertically toward a statement to be executed next when the output of the program counter is changed;

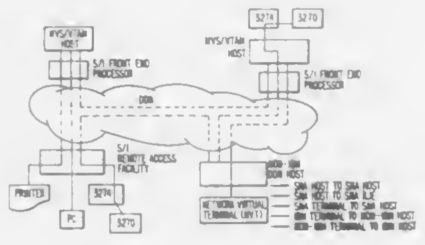
means for detecting a syntax error in the program, relating to an absence of the statement to be executed next; and



means for positioning the indicator to a row of the screen at which no statement is displayed when the syntax error is detected by said detecting means.

5,021,949
METHOD AND APPARATUS FOR LINKING AN SNA HOST TO A REMOTE SNA HOST OVER A PACKET SWITCHED COMMUNICATIONS NETWORK

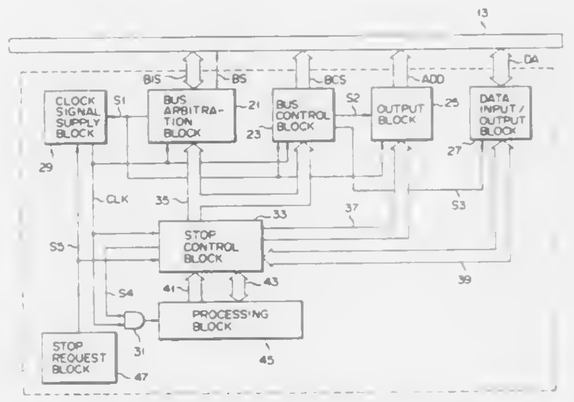
Richard M. Morten, Gaithersburg, and Ted P. Smith, Frederick, both of Md., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Feb. 29, 1988, Ser. No. 161,647
Int. Cl.^{5} H04J *3/24*
U.S. Cl. 364—200 20 Claims



1. A data communications system for establishing a communications path from a first SNA host computer over an IP packet switched network to a second SNA host computer comprising:
a first front end processor having a first SNA interface means coupled to said first SNA host and having a first packet switched interface coupled to said packet switched network, for transferring data and control messages between said first host with an SNA protocol and said packet switched network with a packet switched protocol;
a second front end processor having a second SNA interface means coupled to said second SNA host and having a second packet switched interface coupled to said packet switched network, for transferring data and control messages between said second host with an SNA protocol and said packet switched network with a packet switched protocol;
said first interface means including a first SNA PU4 interface in said first front end processor coupled to said first SNA host, for imbedding SNA protocol information in an IP datagram for messages transmitted from said first host;
said second interface means including a second SNA PU4 interface in said second front end processor coupled to said second SNA host, for extracting said SNA protocol information from said IP datagram for said messages transmitted from said first host and received by said second front end processor.

5,021,950
MULTIPROCESSOR SYSTEM WITH STANDBY FUNCTION

Akihito Nishikawa, Ichikawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Dec. 12, 1985, Ser. No. 808,180
Claims priority, application Japan, Dec. 27, 1984, 59-278231
Int. Cl.^{5} G06F *1/32*
U.S. Cl. 364—200 10 Claims



1. A multiprocessor system having a bus for transmitting data and a plurality of processor modules, each connected to said bus, wherein each of said processor modules comprises:
clock signal supplying means for supplying a clock signal;
operation processing means, connected to said clock signal supplying means, for performing a bus access in response to said clock signal;
stop request means, connected to said clock signal supplying means, for stopping the supplying of the clock signal by said clock signal supplying means to said operation processing means;
memory means, connected to said operation processing means, for storing data indicating a status of the bus access when said stop request means stops the clock signal supply to said operation processing means;
connecting means, connected to said bus, for electrically disconnecting and connecting said processor module from said bus; and
control means, connected to said clock signal supplying means, said operation processing means, said stop request means, said memory means, and said connecting means,
for causing said connecting means to electrically disconnect said processor module from said bus when said stop request means stops the clock signal supply to said operation processing means, and, after the stopping of the clock signal supply is removed by said stop request means.
for causing said connecting means to electrically connect said processor module to said bus,
for prohibiting the clock signal supply for said clock signal supplying means to said operation processing means,
for restarting the bus access based on the status indicating data stored in said memory means, and
for restarting the supplying of the clock signal to said operation processing means when a state of the restarted bus access by said control means coincides with a state of the bus access by said operation processing means when the clock signal supply to said operation processing means was stopped.

VOL
1127
ISS
1
JE
4
1991
UMI

5,021,951

DATA PROCESSOR

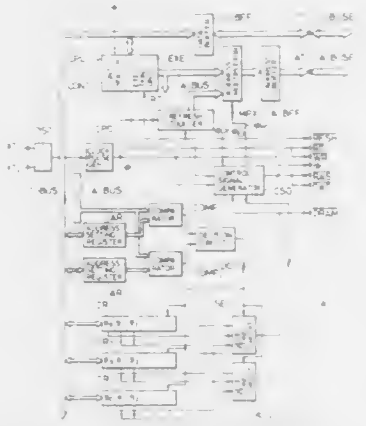
Shiro Baba, Tokorozawa, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 442,304, Nov. 28, 1989, abandoned, which is a continuation of Ser. No. 240,602, Sep. 6, 1988, abandoned, which is a continuation of Ser. No. 799,795, Nov. 20, 1985, abandoned. This application Jul. 25, 1990, Ser. No. 560,230

Claims priority, application Japan, Nov. 26, 1984, 59-248109

Int. Cl.^{5} G06F *13/00*

U.S. Cl. 364—200 21 Claims



1. A microprocessor formed on a single semiconductor substrate to be externally coupled to an external memory device, said microprocessor comprising:

a CPU;

an address bus coupled to said CPU to which an address signal including a plurality of bits is applied, said address signal defining an address in said external memory device;

a data bus coupled to said CPU for inputting and outputting data;

external data terminals coupled to said data bus;

external address terminals coupled to said address bus via address switching means;

first register means for storing address data identifying a boundary between a first address space and a second address space of said external memory device to be coupled to said external data terminals and said external address terminals of said microprocessor, wherein said external memory device includes a first memory having said first address space defining a range of addresses assigned thereto and a second memory having said second address and defining a range of addresses assigned thereto;

second register means for storing attributive data including first means for storing attributive data corresponding to an attribute of said first memory, and

second means for storing attributive data corresponding to an attribute of said second memory;

comparator means coupled to said first register means and said address bus for comparing an address signal of a plurality of bits on said address bus to said address data stored in said first register and for outputting a signal indicating whether said address signal on said address bus designates an address within the first address space;

selecting means coupled to said comparator means and said second register means and responsive to an output of said comparator means for selecting either said attributive data stored in said first means or said attributive data stored in said second means of said second register means and outputting said selected attributive data; and

control means coupled to said selecting means and said address switching means and responsive to said selected attributive data for controlling said address switching means so that said address switching mean delivers said address signal on said address bus to said external address terminals according to an address multiplexing system according to which a first part of said plurality of bits of said address signal and a second part of said plurality of bits of said address signal are delivered to said external address terminals, individually, when said selected attributive data indicates that said external memory device should be address according to said address multiplexing system.

5,021,952

ELECTRONIC ACCOUNT RECORDING DEVICE

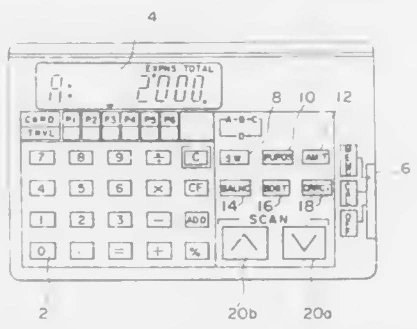
Tosbio Nishimura, Joyo, and Akitaka Morita, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 29,766, Mar. 24, 1987, abandoned. This application May 15, 1989, Ser. No. 353,173

Claims priority, application Japan, Mar. 24, 1986, 61-68129

Int. Cl.^{5} G06F *15/30*

U.S. Cl. 364—406 12 Claims



1 An electronic account recording device for storing a plurality of expense amounts which can include different types of expenses, corresponding to a plurality of item names comprising:

a casing;

a key board on said casing including,

number keys for inputting numbers,

a switch key for selecting an item name from said plurality of item names corresponding to a number inputted,

an amount key for inputting in first memory means a plurality of expense amounts corresponding to the item names selected;

the first memory means being divided into a plurality of memory segments, each of said plurality of memory segments storing one of said plurality of expense amounts and one of said plurality of item names;

scan key means for sequentially scanning the plurality of expense amounts stored in said first memory means;

display means for displaying one of said plurality of item names, numbers and said expense amounts in response to inputs of said number keys and said amount key, and sequentially displaying in response to actuation of said scan key means;

control means for operation in response to an actuation of said scan key means, for sequentially scanning for displaying on said display means said plurality of expense amounts corresponding to one of said plurality of item names; and said control means further operating in response to actuation of said scan key means for sequentially scanning and for displaying on said display means expense amounts corresponding to another of said plurality of items; means operatively connected with said scan key means for displaying on the display means said expense amounts corresponding to said one and another items in sequence; and

compression key means for operating said control means such that said plurality of expense amounts for said one of said plurality of item names are summed and stored in a single memory segment of said plurality of memory segments and each of said plurality of memory segments having said plurality of expense amounts corresponding to said one item name are emptied, so as to provide corresponding vacant memory segments in said first memory means.

5,021,953

TRIP PLANNER OPTIMIZING TRAVEL ITINERARY SELECTION CONFORMING TO INDIVIDUALIZED TRAVEL POLICIES

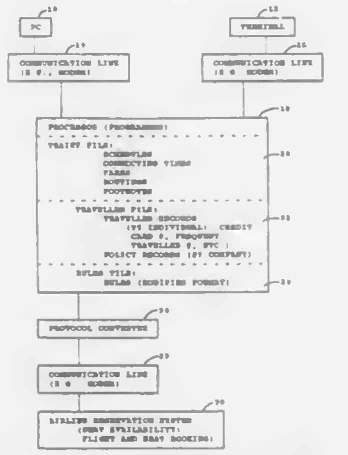
David W. Webber, Old Greenwich, and Sandra E. Kangas, Greenwich, both of Conn., assignors to Travelmation Corporation, Stamford, Conn.

Continuation of Ser. No. 142,843, Jan. 6, 1988, abandoned. This application Mar. 12, 1990, Ser. No. 492,260

Int. Cl.^{5} G06F *15/26*

U.S. Cl. 364—407 2 Claims

MICROFICHE APPENDIX INCLUDED
(5 Microfiche, 930 Pages)



1. A travel planner system for automatically constructing itineraries with available seats for a traveler's trip request which conform to pre-stored reasonableness standards which include a satisfactory check on whether a connecting flight distance exceeds that of a possible direct flight by a preset distance or ratio, finding the fares, including constructing sum-of-segments fares, for each such itinerary which are valid under all the applicable airline tariffs and rules, finding itinerary-with-fare combinations acceptable in terms of cost and convenience to the traveler in accordance with an individualized travel policy of the traveller, and displaying at least some of the itineraries by departure or arrival time, said system comprising:

A. means for storing in machine-readable form:
  1. a tariff file means containing for a selected territory:
    a. the applicable individual direct flight schedules;
    b. the applicable airport minimum connecting times;
    c. the fares for the respective booking classes;
    d. the routings specifying if a particular fare can be used for a particular itinerary; and
    e. footnotes specifying when a particular fare is in effect;
  2. a traveler file means comprising:
    a. a travel policy records each specifying:
      (1) a set of reasonableness standards, including travel constraints pertaining to itineraries which are to be considered unreasonable regardless of cost;
      (2) a set of trip parameter trade-offs between cost and convenience; and
      (3) a set of parameters pertaining to elimination of itinerary-with-fare combinations which are more expensive and/or less convenient by a specified factor compared with the itinerary that provides an optimized combination of low cost and of convenience; and
    b. traveler records each identifying:
      (1) a respective traveler; and
      (2) a policy record applicable to said traveler; and
  3. a rules file means for storing all limitations and combinations of limitations in published airline rules relevant to the traveler, in machine-readable form, applicable to the fares to ensure that a particular fare is valid for a particular itinerary;

B. an entry device for entering travel parameters identifying a trip request, and a display device for displaying itinerary-with-fare combinations;

C. a communication device for connection to an airline booking system providing information on seat availability on specified flights per booking class;

D. a processor coupled to said entry and communication devices and comprising means responsive to said trip request to interrogate said tariff file and said rules file and said traveler file and to automatically communicate as needed with the airline booking system through said communication device, said processor further comprising means for:
  1. using the tariff file to find candidate flights and construct direct and connecting itineraries for said trip which conform to said reasonableness standards;
  2. using the communications device to find seat availability on said candidate flights and eliminating those candidate flights which have no available seats and any connecting itineraries using those flights;
  3. using the tariff file and the rules file to find fares, including constructing sum-of-segments fares, for each remaining itinerary which are both valid and conform to the trip request;
  4. using the traveler file for said traveler to find the itinerary-with-fare combination which gives an optimized combination of low fare and of convenience;
  5. using the traveler file to eliminate itinerary-with-fare combinations which do not comply with the traveler record and the applicable policy record for reasons of cost and/or convenience relative to said optimized itinerary-with-fare combination, to thereby leave one or more itinerary-with-fare combinations which are valid and conform to said traveler file; and
  6. displaying at least some of the remaining itinerary-with-fare combinations arranged by departure or arrival.

5,021,954

SYSTEM AND METHOD OF PROVIDING PASSENGER INGRESS AND EGRESS IN AN AMUSEMENT RIDE

Richard J. Fox, La Canada; Maurice G. Leasure, Sun Valley; Gregory S. Kadorian, Simi Valley; Douglas R. LeBlanc, Tujunga; David L. Harbaugh, La Mirada; James E. Poole, Topanga, all of Calif., and Donald A. Hoffend, Jr., Pittsford, N.Y., assignors to The Walt Disney Company, Burbank, Calif.

Filed Jan. 11, 1988, Ser. No. 141,933

Int. Cl.^{5} G06F *15/28*

U.S. Cl. 364—410 22 Claims

1. A system for providing passenger ingress and egress in an amusement ride of the type utilizing a moveable cabin operating within an enclosure, said system comprising:

a plurality of first ingress doors located on a first surface of said cabin, said ingress doors being aligned with access paths in said cabin;

a plurality of first egress doors located on a second surface of said cabin, said egress doors also being aligned with access paths in said cabin;

a moveable ingress platform having a retracted position outside of the operating envelope of said movable cabin and a deployed position aligned with said first ingress doors when said cabin is in a loading position;

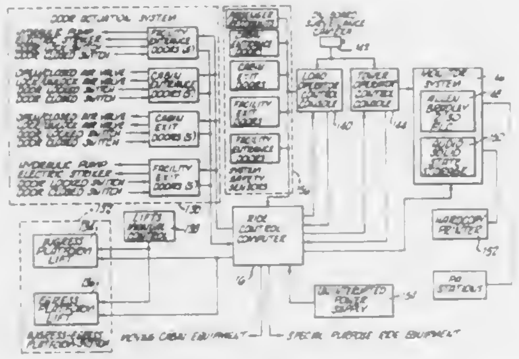
a moveable egress platform having a retracted position outside of the operating envelope of said moveable cabin

VOL
1127
ISS
1
JE
4
1991
UMI

and a deployed position aligned with said first egress doors when said cabin is in said loading position;

a plurality of second ingress doors in said enclosure, said second ingress doors being aligned with said ingress platform when said ingress platform is in its deployed position;

a plurality of second egress doors in said enclosure, said second egress doors being aligned with said egress platform when said egress platform is in its deployed position;



restraint means for restraining said passengers in seats when said cabin is in motion; and

control means for controlling and coordinating actuation of said doors, said platforms and said restraint means to provide a system affording rapid passenger ingress and egress to said cabin after it has come to said loading position and to prevent deployment of said system or release of said restraints when said cabin is in motion.

5,021,955

ELECTRONIC CONTROLLER FOR AUTOMATIC TRANSMISSION

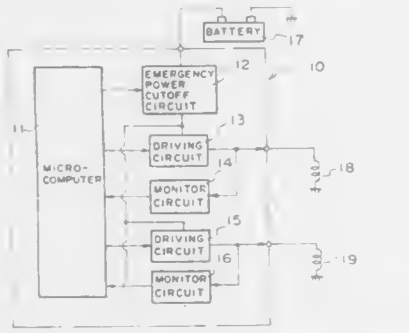
Yasunobu Ito, and Kunihiro Yamada, both of Aichi, Japan, assignors to Aisin AW Kabushiki Kaisha, Japan

Filed Nov. 14, 1988, Ser. No. 270,033

Claims priority, application Japan, Dec. 25, 1987, 62-326787

Int. Cl.^{5} B60K *28/00;* **B60Q** *11/00;* **G05B** *11/01*

U.S. Cl. 364—424.1 5 Claims



1. An electronic controller for an automatic transmission having at least one driving circuit incorporating a switching device for driving a solenoid, at least one monitor circuit for detecting an abnormal state of said switching device, and a control section connected to said driving and monitor circuits, said electronic controller comprising:

an emergency power cutoff circuit interposed between said driving circuit and a power source;

said driving circuit being connected to an output of said emergency power cutoff circuit;

said control section being connected to an output of said monitor circuit, a control input of said driving circuit and a control input of said emergency power cutoff circuit;

wherein, if an abnormality of said switching device of said driving circuit occurs, said monitor circuit detects the abnormality and supplies a detection signal to said control section, and said control section outputs a signal to said emergency power cutoff circuit to cut off the power to said driving circuit and said solenoid.

5,021,956

CONTROL SYSTEMS FOR VEHICLE ENGINES COUPLED WITH AUTOMATIC TRANSMISSIONS

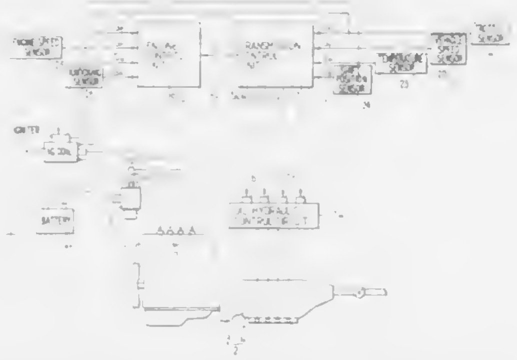
Hiroshi Yoshimura; Kazuo Takemoto, and Toshihiro Yamada, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 18, 1989, Ser. No. 340,134

Claims priority, application Japan, Apr. 25, 1988, 63-100092; Apr. 25, 1988, 63-100094; May 18, 1988, 63-121200

Int. Cl.^{5} B60K *31/04*

U.S. Cl. 364—424.1 14 Claims



1. A control system for a vehicle engine coupled with an automatic transmission, the control system comprising:

controlling means operative to control a controllable subject in the vehicle engine, in accordance with a controlled variable determined for the controllable subject, for varying an engine output of the vehicle engine in response to an operating condition of the vehicle engine and further for reducing the engine output so as to suppress torque shock resulting from a speed change operation carried out in the automatic transmission,

controlled variable setting means for determining said controlled variable in accordance with the operating condition of the vehicle engine and an operating condition of the automatic transmission, and

controlled variable revising means for varying said controlled variable so as to restrict variation in said controllable subject when the speed change operation is carried out in the automatic transmission under a condition in which the controllable subject is controlled to reduce the engine output in response to the operating condition of the vehicle engine.

5,021,957

BRAKE CONTROL APPARATUS IN DIAGONAL BRAKING PRESSURE SUPPLY SYSTEM FOR USE IN MOTOR VEHICLES

Yasuhisa Yoshino, Okazaki; Yoshifumi Kato, Nishikamo; Yukimasa Tamatsu, Nagoya, and Kenji Takeda, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio and Nippondenso Co., Ltd., Kariya, both of, Japan

Filed Nov. 9, 1989, Ser. No. 433,613

Claims priority, application Japan, Nov. 10, 1988, 63-284391

Int. Cl.^{5} B60T *8/32*

U.S. Cl. 364—426.01 8 Claims

1. A brake apparatus for use in a motor vehicle having at least one font-side wheel and at least one rear-side wheel, comprising:

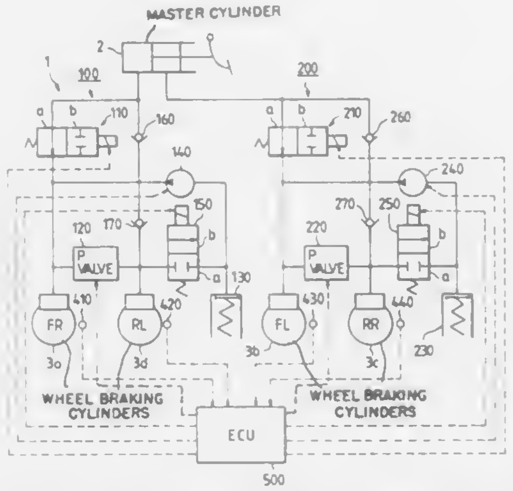
a braking pressure supply system including a master cylinder of said vehicle for generating a braking pressure in response to operation of a braking pedal of said vehicle, front-side and rear-side wheel braking cylinders for applying braking forces to said front -side wheel and rear-side wheel, and first and second supply passage for conducting braking pressure generated by said master cylinder to said front-side and rear-side wheel braking cylinders, respectively.

braking pressure adjusting means, provided in said braking pressure supply system, for adjusting the braking pressure to be applied to said front-side and rear-side wheel braking cylinders in accordance with a drive signal;

first sensor means for sensing a speed of said front-side wheel and generating a first detection signal indicative of the sensed speed of said front-side wheel;

second sensor means for sensing a speed of said rear-side wheel and generating a second detection signal indicative of the sensed speed of said front-side wheel;

proportioning valve means, provided in said second supply passage of said braking pressure supply system, for controlling the braking pressure to be applied to said rear-side wheel braking cylinder in accordance with a control signal so as to vary the ratio of the braking pressure to said rear-side wheel braking cylinder with respect to the braking pressure to be applied to said front-side wheel braking cylinder; and



electronic control means, responsive to said first and second detection signals for producing said control signal and said drive signal, said electronic control means including;

first lock-tendency calculation means for calculating a lock tendency of said front-side wheel on the basis of said first detection signal;

second lock-tendency calculation means for calculating a lock tendency of said rear-side wheel on the basis of said second detection signal;

parameter calculation means coupled to said first and second lock-tendency calculation means for determining a difference between said front-side wheel and rear-side wheel lock tendencies calculated in said first and second lock-tendency calculation means and generating a parameter indicative thereof;

command-value calculation means for calculating a command value by integrating the parameter;

first output means for outputting to said braking pressure adjusting means said drive signal determined in accordance with the lock tendencies calculated by said first and second lock-tendency calculation means; and

second output means for outputting to said proportioning valve means said control signal determined in accordance with the command value.

5,021,958

DEVICE AND METHOD FOR DETERMINING TARGET VALUE OF CONTROLLABLE VARIABLE ASSOCIATED WITH VEHICLE RUNNING STATE

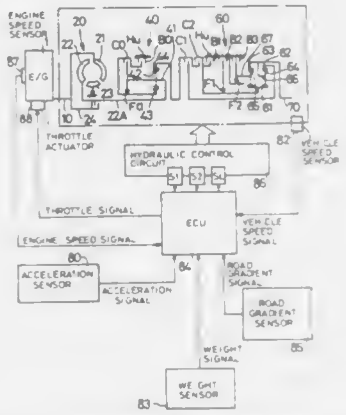
Setsuo Tokoro, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Nov. 16, 1989, Ser. No. 437,083

Claims priority, application Japan, Nov. 18, 1988, 63-291887

Int. Cl.^{5} G06F *7/70;* **G06G** *7/00;* **B60K** *31/00;* **F02D** *1/00*

U.S. Cl. 364—426.04 14 Claims



1. A device for determining a target value of a controllable variable associated with a running state of a motor vehicle, so that the controllable variable is controlled so as to coincide with the determined target value, comprising:

detecting means for detecting a currently required output of an engine of the vehicle;

first determining means for determining a basic value depending upon at least the currently required output of the engine detected by said detecting means, said basic value being used as a basis for determining said target value;

sensing means for sensing at least one parameter representative of a running condition of the vehicle, except the currently required output of the engine;

means for defining a plurality of control rules based on said at least one parameter, said control rules being used for compensating said basic value; and

second determining means for determining a compensation factor based on said plurality of control rules according to a fuzzy set theory, so as to compensate said basic value by the determined compensation factor, for obtaining said target value of said controllable variable.

5,021,959

CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINES

Werner Jundt, Ludwigsburg; Norbert Miller, Abstatt, and Raioer Sommer, Ludwigsburg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/EP87/00735, § 371 Date Jul. 26, 1989, § 102(e) Date Jul. 26, 1989, PCT Pub. No. WO89/04917, PCT Pub. Date Jun. 1, 1989

PCT Filed Nov. 27, 1987, Ser. No. 391,539

Int. Cl.^{5} F02D *41/06*

U.S. Cl. 364—431.05 3 Claims

1. A control device for an internal combustion engine, the control device comprising:

a computer including: a first datablock programmed for operating under starting conditions of the engine; a second datablock programmed for operating under normal operating conditions of the engine; and, a processor for processing engine operating parameters in accordance with data from said first or second datablock;

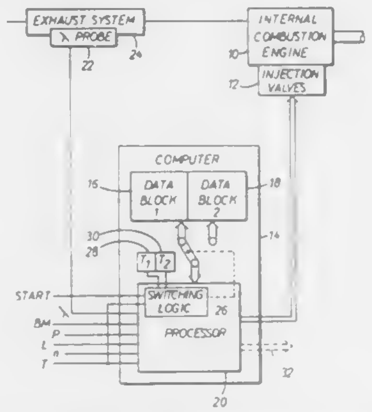
said processor including a switching device responsive to at

VOL
1127
ISS
1
JE
4
1991
UMI

least one operating parameter of the engine for selecting the one of said datablocks to be used;

said switching device being responsive to the temperature (T) of the cooling system for switching over from said first datablock to said second datablock when an upper predetermined temperature (T_2) is exceeded;

said switching device being adapted to switch to said first datablock when the engine is started with the sensed temperature below a lower predetermined temperature (T_1) determined separately from said upper predetermined temperature (T_2) and only switches to the second datablock when the sensed temperature exceeds the upper predetermined temperature (T_2); and,



said switching device also being adapted to switch directly to the second datablock when the engine is started with the sensed temperature above said lower predetermined temperature (T_1).

5,021,960
COMBUSTION FAULT DETECTION APPARATUS AND CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

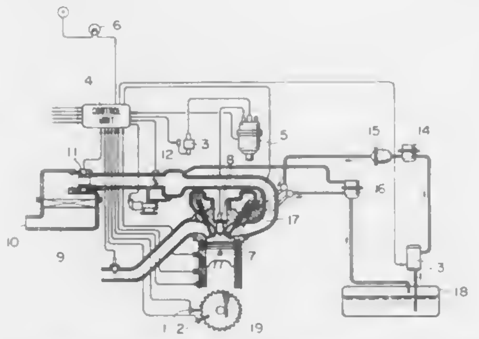
Toshio Manaka, Katsuta, and Masami Shida, Mito, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 4, 1989, Ser. No. 389,736

Claims priority, application Japan, Aug. 8, 1988, 63-195991

Int. Cl.^{5} F01L *1/34*

U.S. Cl. 364—431.01 **13 Claims**



1 A combustion fault detection apparatus for an internal combustion engine having a plurality of cylinders in which pistons are mounted for reciprocation, comprising a sensor for detecting engine rotational conditions; cylinder signal generation means for generating a respective cylinder signal when the piston in each cylinder is located at a predetermined position as indicated by an output of said sensor; inter-cylinder time determining means for determining the time intervals between cylinder signals generated by said cylinder signal generation means; and decision means for detecting a combustion fault including integration means for determining an integration time for each cylinder by integrating the time intervals for respective cylinders, and means for detecting a combustion fault using said integration times for respective cylinders.

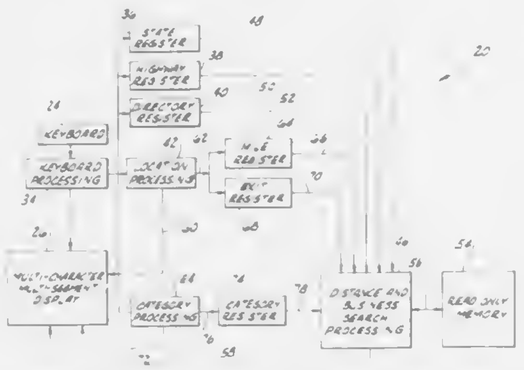
5,021,961
HIGHWAY INFORMATION SYSTEM

Monte Ross, St. Louis; Mark L. Peterson, University City, and Leonard R. Missler, Chesterfield, all of Mo., assignors to Laser Data Technology, Inc., St. Louis, Mo.

Filed Sep. 21, 1989, Ser. No. 410,603

Int. Cl.^{5} G06F *15/50*

U.S. Cl. 364—443 **8 Claims**



1. A data processing device for providing data related to the categories of services available at locations along a highway crossing a boundary of first and second contiguous geographical areas in response to operator input, the device comprising:

a memory;

means for entering in the memory input data identifying a desired service and an origin position along the highway in the first geographical area;

means for storing first and second tables of predetermined data of the categories of services available at selected locations in the first and second geographical areas, respectively, along the highway;

means for determining whether the closest desired service is located in the first or second geographical area;

means, responsive to the means for determining, for selecting the first table if the closest desired service is located in the first geographical area and for selecting the second table if the closest desired service is located in the second geographical area;

means for retrieving from the selected table predetermined data which is a function of the input data; and

means for displaying the retrieved data.

5,021,962
NAVIGATION METHOD FOR VEHICLES WITH ELECTRONIC COMPASS

Reinhard Helldörfer, Igelsdorf; Ulrich Kanzler, Stein; Hans Rauch, Fürth, and Eva Osterkamp, Burgthann, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE87/00479, § 371 Date Jun. 26, 1989, § 102(e) Date Jun. 26, 1989, PCT Pub. No. WO88/05154, PCT Pub. Date Jul. 14, 1988

PCT Filed Oct. 22, 1987, Ser. No. 378,182

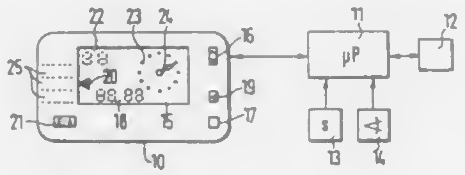
Claims priority, application Fed. Rep. of Germany, Dec. 30, 1986, 3644683

Int. Cl.^{5} G01C *17/38*

U.S. Cl. 364—457 **10 Claims**

1. Method for determining a travel direction of a vehicle having an electronic compass including a magnetometer fixedly mounted in the vehicle and an evaluating circuit which cyclically receives measurement values delivered by the magnetometer, of the magnetic field vector acting on the magnetometer and processes the measurement values to check a

predetermined elliptical locus diagram, and to determine parameters of the travel direction and to correct the locus diagram during a deviation of several successive measurement values (Px, y) from a predetermined part of a permissible range (A) of the locus diagram, comprising the steps of limiting to a predetermined value the rate of change $(\Delta\phi/t)$ of the direction indicated by the compass, in response to a deviation $(\Delta x, y)$ of the measurement values (Px, y) from the elliptical locus diagram (0) and with a simultaneous angle change $(\Delta\phi)$ of the earth's magnetic field vector (H_H); and weighting the limiting value of the rate of change $(\Delta\phi/t)$ of the direction indication in dependence on the duration (t1, t2) of the measurement value deviation.



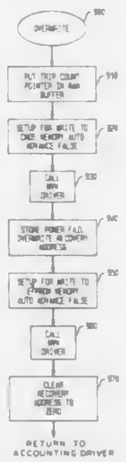
5,021,963
EPM HAVING AN IMPROVEMENT IN ACCOUNTING UPDATE SECURITY

Nanette Brown, Orange, and Sandra J. Peterson, Norwalk, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 30, 1988, Ser. No. 292,181

Int. Cl.^{5} G07B *17/00*

U.S. Cl. 364—464.02 **4 Claims**



1. A method for updating information in a non-volatile memory of a postage meter having a CPU, a ROM, and a non-volatile memory comprising the steps of providing a recovery program in the ROM, said ROM having a starting address for said recovery program, storing in the non-volatile memory prior to a update of non-volatile memory said address in said ROM, updating the information in said non-volatile memory, and clearing said address at the end of said information update, subsequently, upon a power-up of the electronic postage meter, checking said recovery address, and if said address is determined to be good, calling a recovery program at that address to reinitiate the information update process in the event that power was removed from the electronic postage meter during said information update.

5,021,964
FRANKING MACHINE

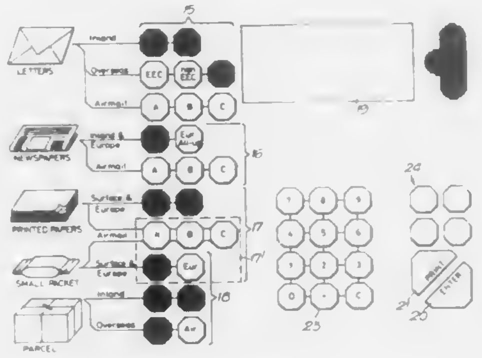
Timothy C. Stubbs, Birmingham, United Kingdom, assignor to GEC Avery Technology Limited, United Kingdom

Filed Mar. 21, 1989, Ser. No. 326,390

Claims priority, application United Kingdom, Apr. 6, 1988, 8808023

Int. Cl.^{5} G07B *17/00*

U.S. Cl. 364—464.03 **4 Claims**



1. A franking machine, comprising:
(a) a weighing pan for weighing articles;
(b) a load cell having an output and coupled to the weighing pan;
(c) printing means for impressing postal franks on the articles;
(d) microprocessor means responsive to the output of the load cell for controlling operation of the printing means; and
(e) input means for manually entering a scale of charges appropriate to the article being weighed and franked, said input means including a keyboard having keys arranged in groups, each group relating to a particular class of mail, at least some of the groups of keys being subdivided into sub-groups representing different postal rates that can be applied to the respective sub-group, each group of keys having an associated pictogram,

whereby the same machine can weigh, calculate the appropriate value of postal charges, and subsequently frank the articles.

5,021,965
METHOD FOR DIGITALLY STORING A SEWING PATTERN FOR AN INDUSTRIAL SEWING MACHINE AND A DEVICE FOR MANUALLY CORRECTING A STORED SEWING PATTERN

Bernd Olbrich, Schwetzingen, Fed. Rep. of Germany, assignor to Frankl & Kirchner GmbH & Co. KG, Schwetzingen/Baden, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 263,722

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 3737078

Int. Cl.^{5} G06F *15/46*

U.S. Cl. 364—470 **3 Claims**

1. A method for digitally sensing and storing a sewing pattern for the sewing of same on a sewing machine;

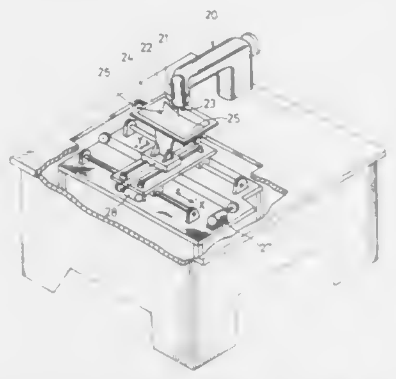
said sewing machine being operable such that a material to be sewn can be placed on a carrier, said carrier being driven by at least two step motors, and being movable in the x and y directions;

the method comprising:
- a. using a scanning device which responds to bright-dark contrast and is disposed at or before the sewing head;
- b. placing on the carrier a sewing pattern sample corresponding to that to be sewn on the material;
- c. displacing the carrier, starting from a null position of its drivable step motors, line by line in x or y direction in

VOL
1127
ISS
1
JE
4
1991
UMI

such a way that the whole sewing pattern sample is scanned; and

d. storing the incremental position data of the step motor working in x and y direction whenever the scanning device detects a bright-dark contrast on the sewing pattern sample corresponding to said sewing pattern to be sewn under program control by said sewing machine.



5,021,966
PROFILE REVISING METHOD

Masaki Seki; Takashi Takegahara, both of Tokyo, and Takeshi Arakaki, Yamanashi, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

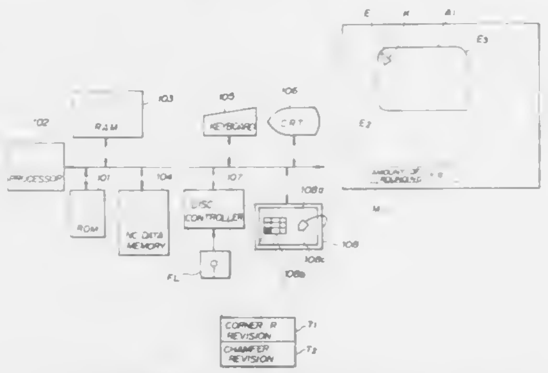
PCT No. PCT/JP88/00904, § 371 Date Apr. 25, 1989, § 102(e) Date Apr. 25, 1989, PCT Pub. No. WO89/02619, PCT Pub. Date Mar. 23, 1989

PCT Filed Sep. 8, 1988, Ser. No. 348,581

Claims priority, application Japan, Sep. 10, 1987, 62-225383

Int. Cl.^{5} G06F *15/46*

U.S. Cl. 364—474.26 3 Claims



1. A profile revising method for revising a corner portion, such as a chamfered or rounded corner portion, of a profile designated by a figure definition statement, characterized by:

- determining whether a chamfered shape or a rounded shape is to be revised when revision of a chamfered shape or rounded shape of a prescribed profile is designated;
- displaying chamfered corner portions in case of revision of a chamfered shape, and rounded corner portions in case of revision of a rounded shape, in a color different from that of other portions of the profile;
- when a prescribed corner portion is designated from the corner portions displayed in the different color, identifying said designated corner portion as being a chamfered corner portion or a rounded corner portion to be revised; and
- revising dimensions of said corner portion or deleting said corner portion in accordance with a dimension revising instruction or deletion instruction.

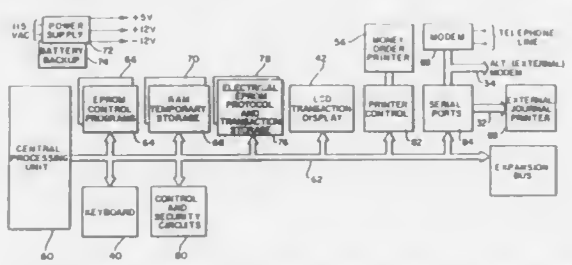
5,021,967
APPARATUS FOR DISPENSING MONEY ORDERS

Lawrence G. Smith, Orlando, Fla., assignor to Republic Money Orders, Inc., Dallas, Tex.

Continuation of Ser. No. 406,979, Sep. 13, 1989, which is a continuation of Ser. No. 121,074, Nov. 16, 1987, Pat. No. 4,870,952, which is a continuation of Ser. No. 60,762, Jun. 8, 1987, Pat. No. 4,812,986, which is a division of Ser. No. 877,539, Oct. 31, 1986, Pat. No. 4,699,532, which is a division of Ser. No. 596,291, Apr. 3, 1984, Pat. No. 4,625,275.

Int. Cl.^{5} G06F *15/30*

U.S. Cl. 364—479 1 Claim



1. A system for issuing negotiable instruments to a purchaser comprising:

- a point-of-sale negotiable instrument dispenser for issuing negotiable instruments at a predetermined location at the request of the purchaser where purchases of items other than negotiable instruments may be made;
- a digital processor associated with the dispenser and having a stored program for controlling the operation of the dispenser including the number of instruments issued in a given period of time and a predetermined total dollar value of the negotiable instruments;
- a memory associated with the digital processor for storing the dispenser transaction data relating to negotiable instruments issued, for storing a security code that authorizes printing of the negotiable instruments, and for maintaining the program for controlling the digital processor;
- a compartment in the dispenser for storing blank negotiable instrument forms;
- a printer in the dispenser for receiving negotiable instrument forms from the compartment and printing alphanumeric indicia thereon upon command from the dispenser; and
- a cash register coupled to the dispenser at the point-of-sale and having a keyboard for transmitting a security code to the digital processor control program authorizing the printing of the negotiable instrument and for sending negotiable instrument transaction instructions to the dispenser for use by the digital processor control program to cause the printer to print a negotiable instrument as requested by the purchaser;
- the cash register further comprising means for receiving stored transaction data from the dispenser.

5,021,968
GRAPHICS-BASED WIRE-CABLE MANAGEMENT SYSTEM

John A. Ferketic, Pittsburgh, Pa., assignor to Robertson-Ceco Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 3,004, Jan. 13, 1987, abandoned. This application Nov. 20, 1989, Ser. No. 440,464

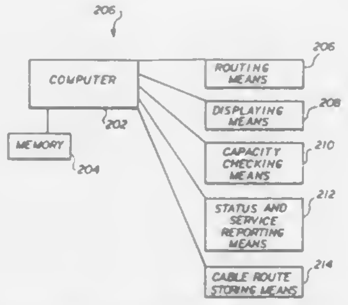
Int. Cl.^{5} G06F *15/20*

U.S. Cl. 364—505 19 Claims

1. A method for managing cable in a building structure using a digital computer comprising the step of inputting into a database of said computer data pertaining to the building structure and the cable, and the computer implemented steps of:

- routing automatically in the building structure a cable having a service through a cable run having a plurality of cables and a fill capacity;

- displaying the route of the cable in the building structure; and
- determining percent fill capacity of the cable run after the routing of the cable through the cable run.



5,021,969
MANIPULATOR OPERATING APPARATUS

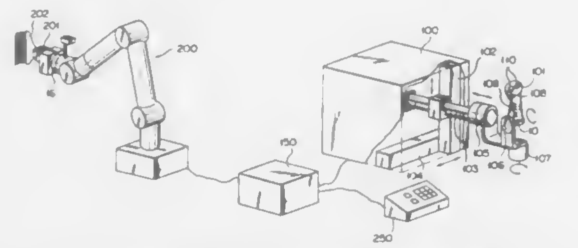
Ryo Okamura, Kawasaki; Shinichiro Nishida, Funabashi, and Makoto Asakura, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 15, 1989, Ser. No. 323,754

Claims priority, application Japan, Mar. 17, 1988, 63-64065

Int. Cl.^{5} G05B *17/02*

U.S. Cl. 364—513 9 Claims



1. A manipulator operation apparatus comprising:

- a rectangular coordinate type operation unit, having an operation handle, for driving a working manipulator interlockingly with actuation of said operation handle, said operation handle having three translation shafts substantially orthogonal to one another and three rotation shafts substantially orthogonal to one another and defining six degrees of freedom for said operation handle;
- handle driving means for driving said operation handle in relation to each of its three translation shafts and three rotation shafts;
- first detecting means, for detecting the force and torque applied to the three translation shafts of said operation handle, and the force and torque applied to the three rotation shafts of said operation handle;
- second detecting means, for detecting the force and torque applied to three translation shafts which are provided in one end portion of said manipulator and are substantially orthogonal to one another, and the force and torque applied to three rotation shafts which are provided in said one end portion of said manipulator and are substantially orthogonal to one another;
- control means for controlling said manipulator in either of a first command control mode or a second command control mode,
- wherein in said first command control mode, said handle driving means is controlled by said control means so as to displace said operation handle by an amount corresponding to the forces and torques detected by said first detecting means; and the three translation shafts and three rotation shafts of said manipulator are driven by a first command signal from said control means representing the amount of displacement of said operation handle;
- and wherein in said second command control mode, said handle driving means is controlled by said control means so as to displace said operation handle at a speed corresponding to the differences determined by a subtraction means, between the forces and torques detected by said first detecting means and values derived from a multiplying means by multiplying with one another predetermined coefficients and the forces and torques detected by said second detecting means; and the three translation shafts and three rotation shafts of said manipulator are driven by a second command signal from said control means representing the position and inclination of said operation handle; and
- mode setting means for switching said first and second command control modes from one to the other.

5,021,970
METHOD AND APPARATUS FOR GENERATING AND APPLYING COMMON TEACHING DATA OF ROBOTS

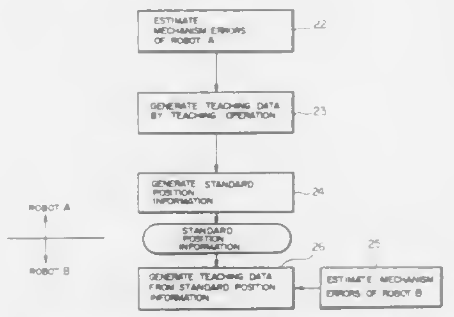
Shunji Mohri, Yokohama, and Akira Ashida, Tokyo, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 4, 1988, Ser. No. 253,154

Claims priority, application Japan, Oct. 5, 1987, 62-249962

Int. Cl.^{5} G06F *15/00*

U.S. Cl. 364—513 13 Claims


ESTIMATE MECHANISM ERRORS OF ROBOT A
22
GENERATE TEACHING DATA BY TEACHING OPERATION
23
GENERATE STANDARD POSITION INFORMATION
24
STANDARD POSITION INFORMATION
ROBOT A
ROBOT B
26
25
GENERATE TEACHING DATA FROM STANDARD POSITION INFORMATION
ESTIMATE MECHANISM ERRORS OF ROBOT B

1. In a system for controlling a plurality of robots, each robot including input/output devices, a servo control section for driving actuators of the robot, a memory, and an arithmetic operating unit coupled with each of said input/output devices, said servo control section, and said memory, a method for generating and commonly applying data to the plurality of robots for executing arithmetic operations of data, said method comprising the steps of:

(a) estimating mechanism errors ΔP which are peculiar to a first robot;

(b) moving said first robot to a first position by using a teaching pendant and obtaining a current position $X(P)$ of said first robot from status data of each actuator as teaching data, said current position corresponding to a command position produced by said teaching pendant;

(c) obtaining as data of a desired position $X(P+\Delta P)$ from said teaching data indicative of a command position $X(P)$ by using said mechanism errors ΔP decided in the step (a) wherein said data of a desired position are standard position information which represent a position orientation for another robot;

(d) determining mechanism errors associated with a second robot; and

(e) arithmetically operating said standard position information and the mechanism errors of said second robot and obtaining corrected command position data $X(P+\Delta P-\Delta P_B)$ for said second robot from said desired position data by using mechanism errors ΔP_B of said second robot, thereby enabling the second robot to be controlled on the basis of the teaching data of the first robot.

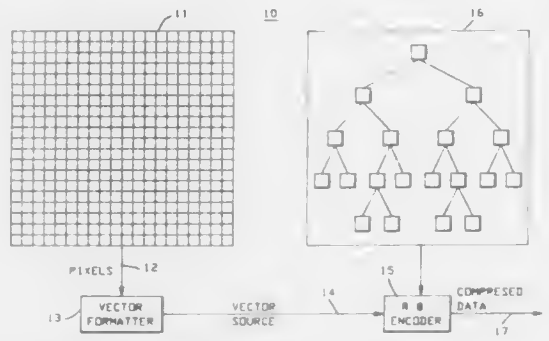
VOL
1127
ISS
1
JE
4
1991
UMI

5,021,971

REFLECTIVE BINARY ENCODER FOR VECTOR QUANTIZATION

Robert A. Lindsay, Bountiful, Utah, assignor to Unisys Corporation, Blue Bell, Pa.

Filed Dec. 7, 1989, Ser. No. 447,314
Int. Cl.^{5} G10L *5/00*
U.S. Cl. 364—513.5 **12 Claims**



1. A reflective binary encoder for vector quantization of a source of formatted digital data, comprising:
- a plurality of identical two-level branch selectors connected in a cascade pipeline array,
- each of said branch selectors having an upper level selector and a lower level selector,
- each of said upper and said lower level selectors being provided with a pair of inputs and a pair of outputs which define an upper level pipeline and a lower level return pipeline,
- means connecting said pairs of outputs of said upper level selectors to corresponding pairs of inputs of ones of said upper level selectors in said pipeline array,
- means connecting said pair of outputs of said lower level selectors to corresponding pairs of inputs of ones of said lower level selectors in said return pipeline array,
- the pair of outputs of said last upper level selector being connected to the pair of inputs of its own lower level selector,
- one of the pair of inputs of said first upper level selector being connected to said source of formatted digital data and the other of said pair of inputs of said first upper level selector being connected to an initialization pointer source, and
- one of the pair of the outputs of said first lower level two branch selector providing a compressed data vector output.

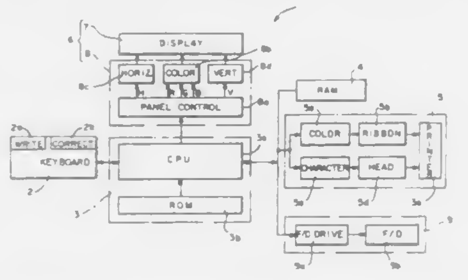
5,021,972

WORD PROCESSOR WITH COLOR DISPLAY MEANS

Toshio Nishi, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 384,873, Jul. 21, 1989, abandoned, which is a continuation of Ser. No. 133,528, Dec. 16, 1987, abandoned. This application Aug. 16, 1990, Ser. No. 568,634
Claims priority, application Japan, Dec. 16, 1986, 61-300407; Dec. 16, 1986, 61-300408; Dec. 16, 1986, 61-300409
Int. Cl.^{5} G06F *15/20*
U.S. Cl. 364—518 **2 Claims**

1. A word processor capable of color-displaying character arrays, comprising
- an input means provided with character input keys for inputting characters, a write-mode setting means and a correct-mode setting means,
- a document memory means for storing inputted character arrays as document data,
- a display means capable of color-displaying character arrays thereon, and
- a processing means for controlling said input means, said document memory means and said display means, said processing means being programmed
- to insert a correction code, when said correct-mode setting means is operated after a cursor is moved to a correction-requiring position within a displayed character array on said display means, at a corresponding position in said document memory means according to said correction-requiring position,
- to cause, if said correction code is detected in said document memory means when a display is being made on said display means, the characters at said correction-requiring position to be displayed in a different color from a normal display color,



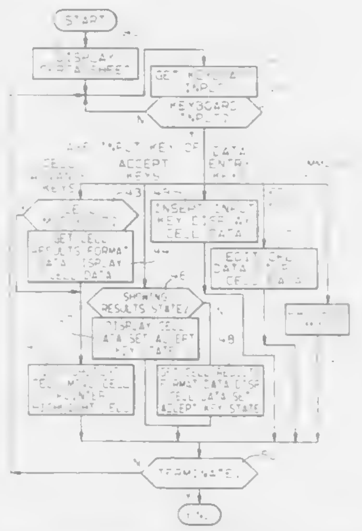
- to display on said display means, if correcting characters are inputted through said input means when a correction-requiring position is displayed in said different color, said correcting characters at said correction-requiring position in a still different color, and
- to change the display on said display means from said different colors to said normal display color when said write-mode setting means is operated.

5,021,973

METHOD FOR ASSISTING THE OPERATOR OF AN INTERACTIVE DATA PROCESSING SYSTEM TO ENTER DATA DIRECTLY INTO A SELECTED CELL OF A SPREADSHEET

Irene H. Hernandez, and Beverly H. Machart, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 819,190, Jan. 16, 1986, abandoned. This application Apr. 14, 1989, Ser. No. 339,852
Int. Cl.^{5} G06F *3/14*
U.S. Cl. 364—518 **6 Claims**



1. A method for assisting the operator of an interactive data processing system executing a spreadsheet application program in editing a displayed spreadsheet, said system including an input device operable by said operator for entering data into said system, a display device having a predetermined number of displayable lines and a predetermined number of displayable columns for displaying information entered into said system and a system processor for controlling said devices and for excuting said spreadsheet application program, said method comprising the steps of;
- (1) displaying a spreadsheet on said display device by running said application program on said processor to depict a plurality of addressable cells arranged in a two dimensional array of addressable horizontal rows, each of which comprises a predefined number of said displayable lines, and addressable vertical columns, each of which comprises a predefined number of said displayable columns, said step of displaying including the further step of,
  - (a) assigning to each said addressable horizontal row and each said addressable vertical column a unique symbol to permit each said cell to be addressed by the two said symbols assigned to said addressable row and column that intersect at said cell;
- (2) selecting one of said addressable cells to be edited, including the further steps of,
  - (a) said operator moving a system cursor to said one selected addressable cell, and
  - (b) indicating to said system that said one said cell is to be selected,
- (3displaying another cursor at a predetermined position within said one selected cell to indicate the display position in said selected cell where a first editing action of said operator will be displayed;
- (4) assigning said one selected cell a first format attribute prior to selecting said one cell,
- (5) performing said editing action by entering characters into said one selected cell with said input device including the further steps of,
  - (a) displaying as normal text each said character that is entered into said system,
  - (b) moving said another cursor to the next adjacent unedited display position in said selected cell after the entry of each said character; and
  - (c) keying in an accept signal after the last said character is entered, and
- (6) converting said characters of data displayed in said text mode into a different representation corresponding to said previously assigned format attribute only after said operator keys in said accept signal.

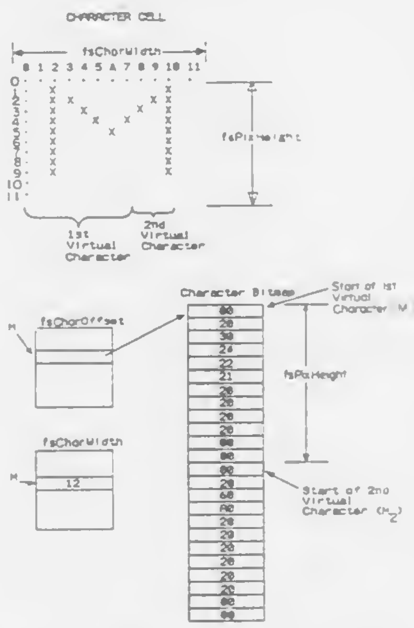
5,021,974

METHOD FOR UPDATING A DISPLAY BITMAP WITH A CHARACTER STRING OR THE LIKE

Anthony C. Pisculli; Walter C. Moore, both of Seattle, and Nathan P. Myrvold, Bellevue, all of Wash., assignors to Microsoft Corporation, Redmond, Wash.

Filed Sep. 13, 1988, Ser. No. 244,222
Int. Cl.^{5} G06F *15/62;* **G09G** *5/36*
U.S. Cl. 364—518 **15 Claims**

1. A method of updating a display bitmap in a column-wise manner to display a string of characters in a selected font with a font height, a bitmap being a matrix of bits defining a display pattern and having an associated width, each character comprising a plurality of virtual characters and having a character width, each virtual character having a virtual character bitmap and a virtual character width, each virtual character bitmap having a height equal to the font height and a width equal to the virtual character width, each character having a character bitmap comprising the virtual character bitmaps for the virtual characters for the character, each virtual character having an associated phase based on the position within a byte in the display bitmap at which the first bit of the virtual character is to be displayed, the display bitmap being logically divided into one-byte wide columns and into scan lines, the method comprising the steps of:
- generating a list having an entry for each virtual character that comprises the characters in the string, the entry containing the phase, the width, and a pointer to the virtual character bitmap; and
- for each column in the display bitmap to be updated with the character string, repeating the steps of:



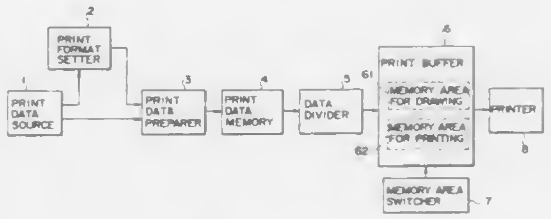
- selecting the column;
- combining the virtual character bitmaps for the virtual characters to be displayed in the selected column based on the phase, the width, and the pointer stored in the list for each character; and
- updating each byte in the selected column to effect the display of a portion of the character string.

5,021,975

PRINTER WITH IMPROVED IMAGE PRINTING FUNCTION

Masami Yamanashi, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Aug. 31, 1990, Ser. No. 576,617
Claims priority, application Japan, Sep. 7, 1989, 1-232406
Int. Cl.^{5} G06K *15/06*
U.S. Cl. 364—519 **7 Claims**



1. A printer apparatus comprising:
- means for providing print data;
- means for dividing said print data into a plurality of child data;
- a print buffer having a first area and a second area, each of said first and second area having a memory capacity equal to or larger than one of said child data;
- control means for expanding one of said child data to said first area, assigning said first area as a printing area and

VOL
1127
ISS
1
JE
4
1991
UMI

said second area as a drawing area after completing the expansion of said one child data, and expanding another one of said child data to said drawing area while the print data of said child data is output from said printing area; and

means for printing the print data output from said printing area on a given print media.

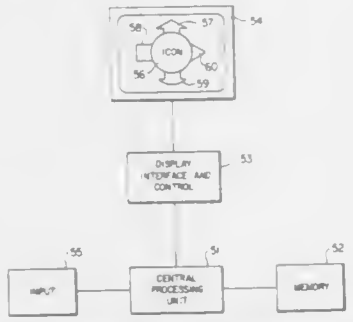
5,021,976
METHOD AND SYSTEM FOR GENERATING DYNAMIC, INTERACTIVE VISUAL REPRESENTATIONS OF INFORMATION STRUCTURES WITHIN A COMPUTER

Alan D. Wexelblat, and Kim M. Fairchild, both of Austin, Tex., assignors to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Nov. 14, 1988, Ser. No. 271,091

Int. Cl.^{5} G06F *3/153*

U.S. Cl. 364—521 30 Claims



1. A system for enabling a user to interact with information contained within an information system, comprising:

means for defining boundaries of the information system containing the information with which the user is to interact;

means for providing a set of mathematical relationships that define a plurality of parameters of potential interest to a user, said mathematical relationships indicating the degree of correlation between the parameters defined by the relationships and segments of information contained within the defined boundaries of the information system;

means for defining a visual display for the user that has a plurality of iconic representations having different visual features, the iconic representations and visual features assuming various conditions out of a range of different possible conditions determined by the segments of information;

means for associating said set of mathematical relationships with said visual display to associate the parameters defined by the mathematical relationships with corresponding iconic representations and visual features of said display; and

means for moving said set of mathematical relationships through the information contained within the boundaries of the information system to produce a visual display for the user in which the iconic representations and visual features of the display assume various conditions in accordance with the degree of correlation between the associated parameters of interest to the user and the segment of information within the information system through which the mathematical relationships are passing.

5,021,977
IMAGE DATA READ OUT SYSTEM IN A DIGITAL IMAGE PROCESSING SYSTEM

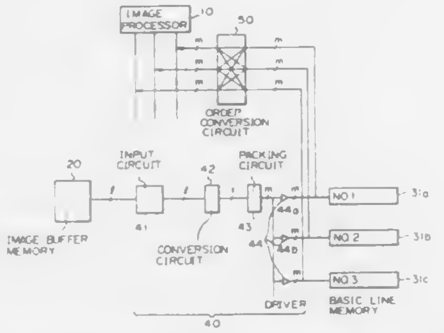
Kazuaki Sakaguchi, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed May 5, 1989, Ser. No. 347,755

Claims priority, application Japan, May 11, 1988, 63-113895

Int. Cl.^{5} G06K *15/00*

U.S. Cl. 364—521 8 Claims



1. An image data read out system in a digital image processing system, comprising:

an image buffer memory for storing image data, a predetermined area of said image buffer memory being defined as a window having a size of n (columns)×m (rows);

an image data processing circuit, operatively connected to said image buffer memory, for sequentially reading out said image data from one of said columns in said image buffer memory, converting a bit structure of said image data from parallel data to serial data, packing said serial data into packed data in predetermined groups of bits, and transferring said packed data to a next stage;

a basic line memory group, operatively connected to said image data processing unit, having n basic line memories, where n corresponds to the number of columns, each of said basic line memories having m line memories, where m corresponds to the number of rows, said image data of one column being stored in one of said basic line memories such that each bit of said image data is shifted one by one at every one of said line memories;

an order conversion circuit, operatively connected to said basic line memory group, for arranging said image data simultaneously read out from each of said basic line memories in accordance with the arrangement of the columns in the image buffer memory; and

a microprocessor, operatively connected to said order conversion circuit and said basic line memory group, for accessing the same address in each of said basic line memories, simultaneously reading out accessed image data from each of said basic line memories, and calculating said accessed image data after arranging said accessed image data in said order conversion circuit.

5,021,978
APPARATUS AND METHOD FOR CONTROLLING FILM DENSITY FOR AN APPARATUS FOR EXPOSING PHOTOGRAPHIC FILM WITH IMAGE DATA

Barry N. Stone, Hartland; Richard C. Rice, Oconomowoc; John E. Lorblecki, Hubertus, and Stanley Bernstein, Milwaukee, all of Wis., assignors to Camtronics, Ltd., Wukesha, Wis.

Filed Apr. 21, 1989, Ser. No. 341,726

Int. Cl.^{5} G03B *27/80;* **G01J** *3/50*

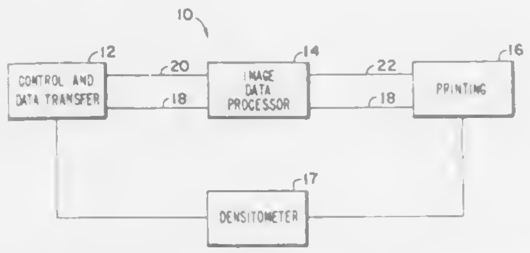
U.S. Cl. 364—525 16 Claims

1. An apparatus for consistently creating an image on photographic film in accordance with a predetermined gradation of film transmittance levels, said apparatus comprising:

(a) light source means, responsive to a drive signal, for generating light so that the exposure of different portions of the film to the light can be varied as a function of the drive signal so as to vary the resulting transmittance level of the portions of the film after the exposed portions of film are developed in order that the image can be formed on the film;

(b) sensing means for sensing the transmittance level of a developed portion of film exposed to at least one preselected value of light exposure and for generating a transmittance level signal representative of the sensed transmittance level; and

(c) means for adjusting the drive signal as a function of the sensed transmittance level so that the range of transmittance levels produced by exposing the film to the light in response to the adjusted drive signal approximates the predetermined gradation of film transmittance levels.



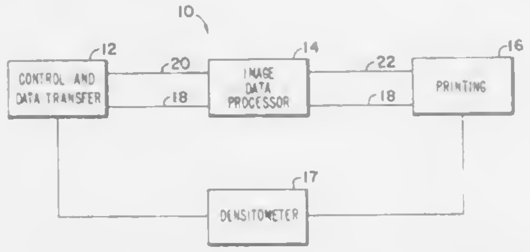
5,021,979
CALIBRATION APPARATUS FOR A LIGHT SOURCE USED FOR EXPOSING PHOTOGRAPHIC FILM WITH IMAGE DATA

Richard C. Rice, Oconomowoc, Wis., assignor to Camtronics, Ltd., Wukesha, Wis.

Filed Apr. 21, 1989, Ser. No. 341,731

Int. Cl.^{5} G03B *27/80;* **G01J** *3/50*

U.S. Cl. 364—525 9 Claims



1. An apparatus for creating an image on photographic film, said apparatus comprising:

(a) light source means, responsive to a drive signal, for providing light so that the exposure of different portions of said film to said light can be varied as a function of said drive signal so as to vary the transmittance of the portions of the film;

(b) means for measuring the exposure intensity of said light and for generating a measured intensity signal representative of the value of said measured intensity;

(c) comparison means for comparing the value of said measured intensity signal with the value of a predetermined desired intensity;

(d) means for generating said drive signal including means for generating said drive signal in a digital form of a predetermined number of bits varying from a most significant bit to a least significant bit;

(e) calibration means for calibrating the value of said measured intensity signal with the value of said predetermined desired intensity signal with the value of said predetermined desired intensity signal by successively approximating the digital signal of said drive signal so as to vary said drive signal until the value of the measured intensity signal approximates the value of said desired intensity signal.

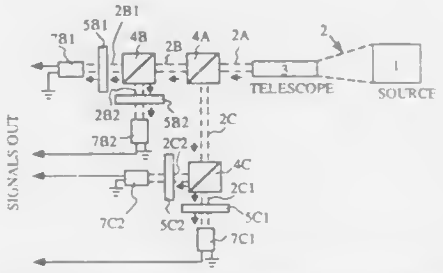
5,021,980
REMOTE MEASUREMENT OF TEMPERATURE

Paul Poenisch, Santa Clara, and Keith Hansen, San Jose, both of Calif., assignors to LSI Logic Corporation, Milpitas, Calif.

Filed Feb. 21, 1989, Ser. No. 313,577

Int. Cl.^{5} G06F *15/42, 15/46, 15/20;* **G01N** *25/00*

U.S. Cl. 364—557 6 Claims



1. With respect to an energy radiating body having an unknown temperature T and an unknown radiative emissivity parameter β, a method for measuring at least one of the temperature T and the radiative emissivity parameter β of the [in two predetermined, adjacent, small wavelength ranges $\lambda_1 \leqq \lambda \leqq \lambda_2$ and $\lambda_3 \leqq \lambda \leqq \lambda_4$ of a thermally] energy radiating body, [of volume V], the method comprising the steps of:

receiving energy radiated from said body at a distance from said body;

measuring a first spectral intensity of the received energy corresponding to a first spectral portion of the received energy, ΔE_{12}, [radiated by the body in the] which is contained within a first wavelength range $\lambda_1 \leqq \lambda \leqq \lambda_2$;

generating a first signal representative of said first spectral intensity; [and forming a first differential $R_{12} = \Delta E_{12}/(\lambda_2 - \lambda_1)V$];

measuring a second spectral intensity of the received energy corresponding to a second spectral portion of the received energy, ΔE_{34}, [radiated by the body in the] which is contained within a second different wavelength range $\lambda_3 \leqq \lambda \leqq \lambda_4$, where the second wavelength range $\lambda_3 \leqq \lambda \leqq \lambda_4$ is chosen to be sufficiently narrow and close to said first wavelength range $\lambda_1 \leqq \lambda \leqq \lambda_2$ such that the radiative emissivity parameter β of the body is substantially the same in both said first and second wavelength ranges;

generating a second signal representative of said second spectral intensity; and

supplying said first and second signals to a signal processing means, said signal processing means being adapted for generating at least one of a first output signal representing the temperature T of said body and a second output signal representing the radiative emissivity parameter β of said body.

5,021,981
THERMAL MEMORY CELL AND THERMAL SYSTEM EVALUATION

Kenneth R. Swartzel; Sudalaimuthu G. Ganesan, both of Raleigh; Richard T. Kuehn, Cary; Raymond W. Hamaker, Raleigh, all of N.C., and Farid Sadeghi, Malden, Mass., assignors to North Carolina State University, Raleigh, N.C.

Filed Dec. 22, 1988, Ser. No. 289,358

Int. Cl.^{5} G01K *5/00, 11/00*

U.S. Cl. 364—557 23 Claims

1. A method for determining a thermal history of an object, said method comprising.

(a) placing in said object, at least two thermal calibration materials having different activation energies; then

(b) exposing said object to a thermal treatment· then

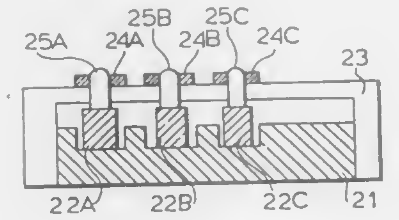
(c) detecting the change in each of said calibration materials caused by said thermal treatment; and then

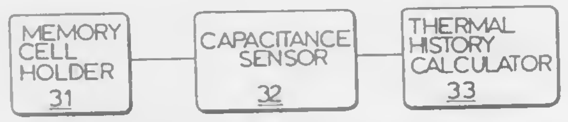
(d) calculating an equivalent point of said thermal treatment from said detected changes.

VOL
1127
ISS
1
JE
4
1991
UMI

7. A metal-insulator-semiconductor (MIS) capacitor useful as a thermal history recording device, comprising:
- a semiconductor substrate;
- an insulating layer on said semiconductor substrate, said insulating layer being non-uniformly doped with mobile charged carriers; and
- a metal layer on said insulating layer, said mobile charged carriers being concentrated at the interface of said insulating layer and metal layer.

9. A calibration device for determining a thermal treatment provided by a food processing apparatus, comprising:
- a food particle; and
- a metal-insulator-semiconductor (MIS) capacitor in said food particle, said MIS capacitor comprising:
- a semiconductor substrate;





- an insulating layer on said semiconductor substrate, said insulating layer being doped with mobile charged carriers; and
- a metal layer on said insulating layer.

12. A thermal memory cell for thermal system evaluation, comprising:
- (a) a support structure;
- (b) a first thermal calibration material comprising a first metal-insulator-semiconductor (MIS) capacitor, connected to said support structure, for detecting a thermal treatment; and
- (c) a second thermal calibration material comprising a second metal-insulator-semiconductor (MIS) capacitor, connected to said support structure, for detecting a thermal treatment; said first MIS capacitor having an activation energy different from said second MIS capacitor.

5,021,982
MOTION BASE CONTROL PROCESS AND PILOT PERCEPTUAL SIMULATOR

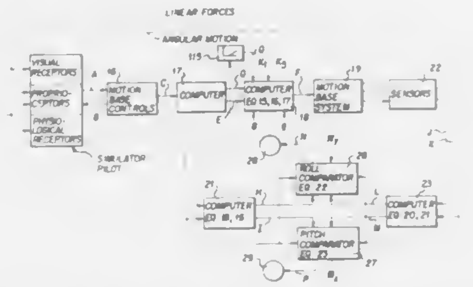
Richard J. Crosbie, Langhorne, and Joseph Colombo, Newtown, both of Pa., assignors to Veda Incorporated, Warminster, Pa.

Filed Dec. 28, 1988, Ser. No. 291,290

Int. Cl.^{5} G09B *9/08*

U.S. Cl. 364—578 **59 Claims**

33. A process for generating angular gimbal motions to control pitch and roll in a motion base system having a cockpit, an arm, a pitch gimbal, a roll gimbal, and a yaw gimbal, and substantially duplicating a pilot perceptions from an aircraft simulation, said process comprising the step of:
- defining a baseline pitch gimbal position and a baseline roll gimbal position according to a position of the yaw gimbal and an orientation of the cockpit; and



- accelerating the arm, thus wherein the pilot perception reflects the baseline pitch and roll gimbal positions.

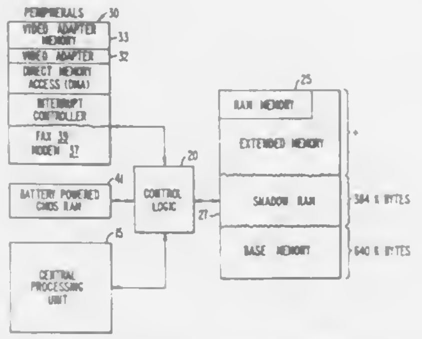
5,021,983
SUSPEND/RESUME APPARATUS AND METHOD FOR REDUCING POWER CONSUMPTION IN BATTERY POWERED COMPUTERS

Au H. Nguyen, Santa Clara, and Aurav R. Gollabinnie, San Jose, both of Calif., assignors to Chips and Technologies, Inc., San Jose, Calif.

Filed Nov. 13, 1989, Ser. No. 434,201

Int. Cl.^{5} G06F *1/00*

U.S. Cl. 364—707 9 Claims



1. A method for reducing power consumption in a battery powered computer comprising at least random access memory ('RAM') main memory, RAM main memory further comprising a shadow RAM memory, central processing unit, On/Off signal monitoring means, peripheral devices with a plurality of registers, video memory, and an On/Off switch, the method comprising the steps of:
- monitoring the switch for an OFF signal;
- storing the contents of the plurality of registers of the central processing unit, the peripheral devices and the contents of the video memory in shadow RAM memory upon receipt of the OFF signal;
- disconnecting the battery power to the entire computer except the RAM and On/Off signal monitoring means after the storing step is completed;
- monitoring the switch using the On/Off signal monitoring means for an ON signal;
- reconnecting the battery power to the entire computer after the ON signal is received by the On/Off signal monitoring means; and
- restoring the computer to the state the computer was in prior to receiving the OFF signal by recalling the contents of the plurality of registers of the central processing unit, the peripheral devices and the contents of video memory from shadow RAM upon receipt of an ON signal.

5,021,984
TICKET ISSUING MACHINES

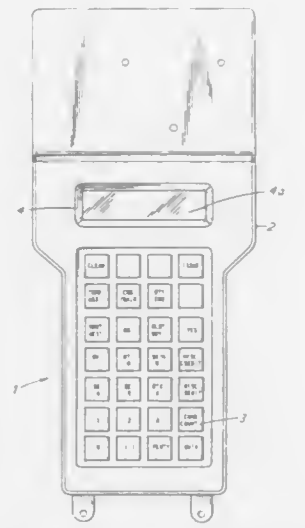
Roger Meade, Newark; Paul Schofield, Camberley, and Michael C. Wright, Harrow, all of England, assignors to Almex Control Systems Limited, Middlesex, England

Continuation of Ser. No. 456,054, Dec. 26, 1989, abandoned, which is a continuation of Ser. No. 82,008, Aug. 5, 1987, abandoned. This application Jul. 23, 1990, Ser. No. 560,492

Claims priority, application United Kingdom, Aug. 8, 1986, 8619188

Int. Cl.^{5} G06F *3/00*

U.S. Cl. 364—709.16 4 Claims



1. A ticket issuing machine operating with at least two particular syntaxes for issuing tickets comprising:
- a keyboard for entering information into the ticket issuing machine including a plurality of keys positioned thereon, at least some of the keys including more than one different identification means indicating different ticket issuing information to be entered into the machine;
- at least one store circuit for storing information relevant to tickets to be issued by the machine;
- means for supplying information to specify the syntax of operation of the ticket issuing machine dependent upon information entered into the machine through the keyboard;
- a printer for printing ticket information on a ticket in accordance with ticket information supplied to the printer by information supply means including the at least one store circuit and ticket information entered into said machine through said keyboard; and
- at least one selection circuit for receiving the information to specify the syntax of operation of the ticket issuing machine and for identifying, based upon the particular syntax, which of the different ticket issuing information corresponding to the different identification means entered into the machine upon depressing a single key of said keys including more than one different identification means is relevant to the particular syntax operation of the machine, whereby the appropriate ticket issuing information corresponding to the particular relevant identification means desired by an operator depressing said single key is automatically entered into the machine and the inappropriate ticket issuing information corresponding to the particular irrelevant identification means not desired by the operator is rejected and not entered into the machine without the operator having to depress an additional key prior to, simultaneously with, or subsequent to depressing said single key.

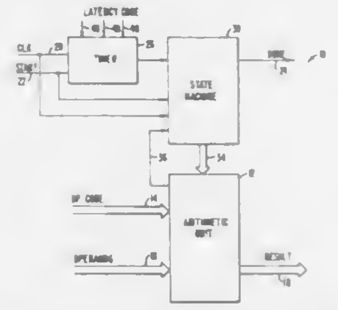
5,021,985
VARIABLE LATENCY METHOD AND APPARATUS FOR FLOATING-POINT COPROCESSOR

Larry Hu, Mountain View; Ting Chuk, San Jose; John McLeod, Sunnyvale; Mark Birman, Santa Clara; Allen Samuels, Milpitas, and George K. Chu, Cupertino, all of Calif., assignors to Weitek Corporation, Sunnyvale, Calif.

Filed Jan. 19, 1990, Ser. No. 467,879

Int. Cl.^{5} G06F *7/38*

U.S. Cl. 364—748 12 Claims



1. An apparatus for performing arithmetic operations on supplied operands and using a clock, comprising:
- arithmetic logic means for performing an arithmetic operation on said operands upon receipt of a provided start signal;
- counter means for producing a done signal a predetermined number of cycles of said clock after said start signal; and
- programmable means, coupled to an input of said counter means, for varying said number of cycles of said clock required to produce said done signal, such that a latency between said start and done signals can be controlled.

5,021,986
TOTAL SUM CALCULATION CIRCUIT CAPABLE OF RAPIDLY CALCULATING A TOTAL SUM OF MORE THAN TWO INPUT DATA REPRESENTED BY A FLOATING POINT REPRESENTATION

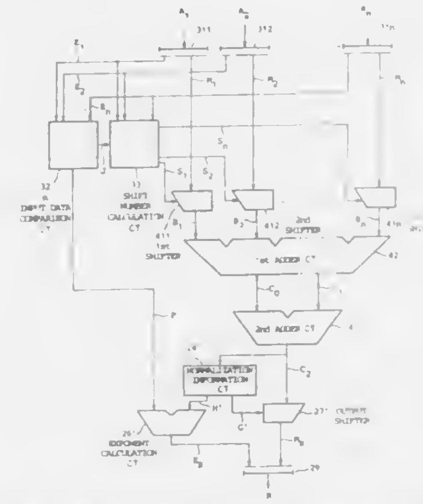
Toshihiko Nakamura, Yamanashi, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 27, 1989, Ser. No. 456,667

Claims priority, application Japan, Dec. 28, 1988, 63-334316

Int. Cl.^{5} G06F *7/38*

U.S. Cl. 364—748 4 Claims



1. A total sum calculation circuit for calculating a total sum of first through n-th input data, where n is an integer greater than two, said first through said n-th input data being represented by a floating point representation and being composed

VOL
1127
ISS
1
JE
4
1991
UMI

of first through n-th exponent parts and first through n-th fraction parts while said total sum is composed of a total sum exponent part and a total sum fraction part, each of said first through said n-th exponent parts and said total sum exponent part being represented by an exponent number of a base number, said total sum calculation circuit comprising:

comparing means for comparing said first through said n-th exponent parts with one another to detect a maximum exponent part from said first through said n-th exponent parts and to produce said maximum exponent part and a comparison result signal representative of which one of said first through said n-th exponent parts is said maximum exponent part;

shift number calculation means supplied with said first through said n-th exponent parts and said comparison result signal for calculating first through n-th shift digit numbers of said first through said n-th exponent parts from said maximum exponent part, said first through said n-th shift digit numbers being for adjusting the exponent numbers of said first through said n-th exponent parts to the exponent number of said maximum exponent part;

first through n-th shifters supplied with said first through said n-th fraction parts and said first through said n-th shift digit numbers for shifting said first through said n-th fraction parts on the basis of said first through said n-th shift digit numbers to produce first through n-th shifted fraction parts shifted by said first through said n-th shift digit numbers, respectively;

summing means for summing said first through said n-th shifted fraction parts to calculate an unnormalized sum;

normalization signal producing means coupled to said summing means for producing first and second information signals representative of information for normalizing said unnormalized sum;

a shifter coupled to said summing means for shifting said unnormalized sum on the basis of said first information signal to produce a normalized sum;

exponent calculation means supplied with said maximum exponent part and said second information signal for calculating an intermediate exponent part; and

means for producing said intermediate exponent part and said normalized sum as said total sum exponent part and said total sum fraction part, respectively.

5,021,987

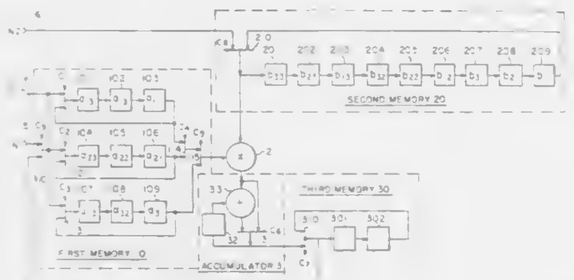
CHAIN-SERIAL MATRIX MULTIPLIERS

David S. K. Chan, Schenectady, and Daniel A. Staver, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 31, 1989, Ser. No. 401,581

Int. Cl.^{5} G06F *15/347*

U.S. Cl. 364—754 38 Claims



1. A chain-serial matrix multiplier comprising:

a first memory for temporarily storing each of a first series of matrices that have m lines of n elements each, successive ones of said first series of matrices being identified by respective consecutive ordinal numbers beginning at zeroeth and ending with p^{th}, where m is an integer at least one, n is an integer at least two, and p is an integer at least two and is equal to the number of matrix multiplications in said chain-serial matrix multiplication;

a second memory for temporarily storing each of a second series of matrices that have n lines of n elements each which n lines are orthogonal to the m lines of n elements in each of said first series of matrices, successive ones of said second series of matrices being identified by successive ordinal numbers beginning with $(p+1)^{th}$ and ending with $2p^{th}$;

initializing means for writing said first memory with the elements of said zeroeth matrix;

means for periodically writing said second memory so as to store the next successive one of said $(p+1)^{th}$ through $2p^{th}$ matrices;

means for reading successive ones of said zeroeth through $(p-1)^{th}$ matrices from said first memory;

means for reading successive ones of said $(p+1)^{th}$ through $2p^{th}$ matrices from said second memory concurrently with reading successive ones of said zeroeth through $(p-1)^{th}$ matrices from said first memory;

means for generating elements of successive ones of said first through p^{th} matrices by matrix multiplying successive ones of said zeroeth through $(p-1)^{th}$ matrices as read from said first memory by respective successive ones of said $(p-1)^{th}$ through $2p^{th}$ matrices as read from said second memory;

a third memory for temporarily storing elements of successive ones of said first through p^{th} matrices for a time after they are generated; and

means for reading the temporarily stored elements of each successive one of said first through p^{th} matrices from said third memory and writing them into said first memory to replace corresponding elements in the preceding matrix stored in said first memory at a time after those corresponding elements are no longer needed by said means for generating.

5,021,988

SEMICONDUCTOR NEURAL NETWORK AND METHOD OF DRIVING THE SAME

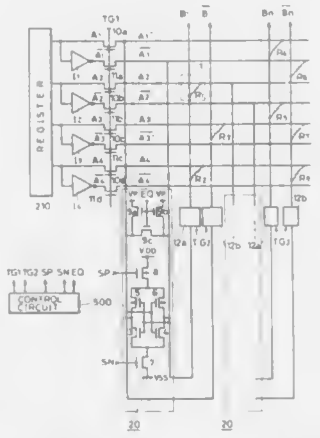
Koichiro Mashiko, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 21, 1989, Ser. No. 410,199

Claims priority, application Japan, Apr. 27, 1989, 1-109716

Int. Cl.^{5} G06F *7/00*

U.S. Cl. 364—807 16 Claims



1. A semiconductor neural network formed by an electronic circuit modeled on a vital nerve net, comprising:

a plurality of data input lines to which input data are transmitted respectively, said plurality of data input lines being arrayed in pairs to form a plurality of data input line pairs to which complementary data are transmitted;

means provided in correspondence to respective ones of said plurality of data input line pairs for differentially amplifying potentials on corresponding said data input line pairs, said differential amplifier means including cross-coupled inverting amplifiers;

a plurality of data output lines arrayed in a direction intersecting with said plurality of data input lines, said plurality of data output lines including a plurality of data output line pairs, said plurality of data output line pairs being provided in correspondence to respective ones of said differential amplifier means to receive outputs of corresponding said differential amplifier means;

a plurality of coupling elements provided at crosspoints of said data input lines and said data output lines for providing for coupling of said data input lines and said data output lines, respective ones of said plurality of coupling elements being programmable in states and providing for coupling of corresponding said data input lines and corresponding said data output lines in accordance with programmed states; and

means for activating said differential amplifier means after transmission of said input data to said data input lines.

5,021,989

DOCUMENT BROWSING APPARATUS WITH CONCURRENT PROCESSING AND RETRIEVEL

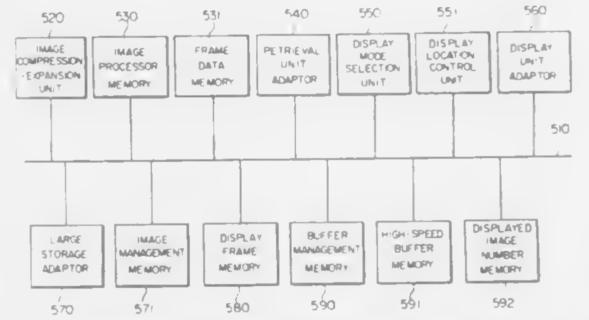
Hiromichi Fujisawa, Tokorozawa; Atsushi Hatakeyama, Kokubunji; Masaaki Fujinawa, Tokyo, and Eiichi Hadano, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 42,703, Apr. 27, 1987, abandoned. This application Oct. 1, 1990, Ser. No. 593,260

Claims priority, application Japan, Apr. 28, 1986, 61-96706; Sep. 10, 1986, 61-211594

Int. Cl.^{5} G06F *3/153*

U.S. Cl. 364—900 12 Claims



1. An apparatus for displaying page images on a display screen, comprising;

large capacity storage means for storing a plurality of document images and page attributes of said documents;

high-speed buffer memory means for temporarily storing said document images having a plurality of pages and said page attributes;

display frame memory means for storing a display frame image;

means for displaying the display frame image in said display frame memory means on a display screen;

image processing means for carrying out image processing on the document image data in said high-speed buffer memory means and storing the processed document image data in said high-speed buffer memory means or said display frame memory means as a display frame image;

control means for controlling said display means and said image processing means such that an operation of accessing said large capacity storage means to read out document image data so as to transfer the data to said high-speed buffer memory means is carried out in parallel with said operation of image processing on other document image data in said high-speed buffer memory means and storing the processed document image data in said high-speed buffer memory means or said display frame memory means;

control signal input means for receiving commands from a user;

means for storing information which corresponds sections of the display frame image to the page attributes, said display frame memory means being divided into a plurality of sections; and

said apparatus displaying sectioned images of said pages of said document images in accordance with said information stored in said means for storing information, each page having attributes corresponding to sections of said display frame memory means, said sectioned images of said pages being displayed on said display screen and said apparatus transforming said sectioned images of said pages into individual page images separated from each other in response to commands received by said control signal input means.

5,021,990

OUTPUT PULSE GENERATING APPARATUS

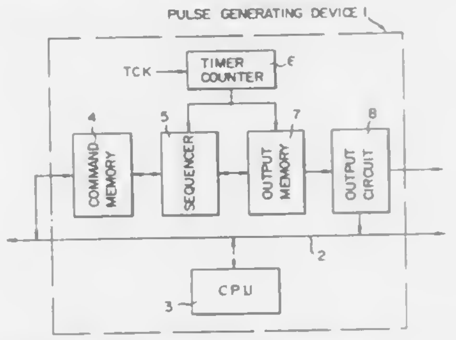
Masayoshi Tachibana, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 20, 1988, Ser. No. 184,401

Claims priority, application Japan, Apr. 30, 1987, 62-106831

Int. Cl.^{5} G06F *13/00;* **H03K** *3/00*

U.S. Cl. 364—900 7 Claims



1. A pulse generating apparatus comprising:

a central processor unit which outputs a command including a time point at which a pulse is generated and a output value at the time point;

a command memory coupled to said central processor unit, for storing commands each of which is output from said processor unit; a time counter for producing a reference time signal denoting a reference time point;

a sequencer coupled to said command memory and said timer counter;

an output memory coupled to said timer counter and said sequencer, for storing said output value of said pulse at said time point by being accessed by said sequencer; and

an output circuit coupled to said central processor unit and said output memory, for reading said output value of said pulse from an address of said output memory corresponding to said reference time point and forming said pulse from said output value read out from said output memory; wherein

said sequencer sequentially reads out the commands stored in said command memory and, when a time difference between the time point included in one of the commands which is read out from said command memory and the reference time point denoted by the reference time point signal input from said time counter is less than a time duration predetermined by the memory capacity of said output memory, said sequencer writes into said output memory the output value read out from said executed command updates the time point set in the command and writes the update time point into said command memory.

VOL
1127
ISS
1
JE
4
1991
UMI

5,021,991

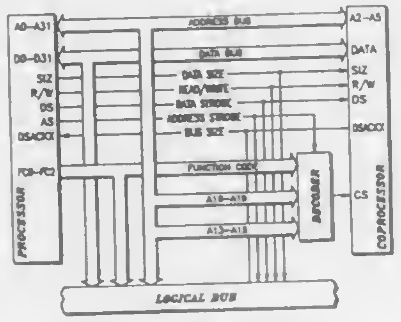
COPROCESSOR INSTRUCTION FORMAT

Douglas B. MacGregor; John Zolnowsky, and David Mothersole, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

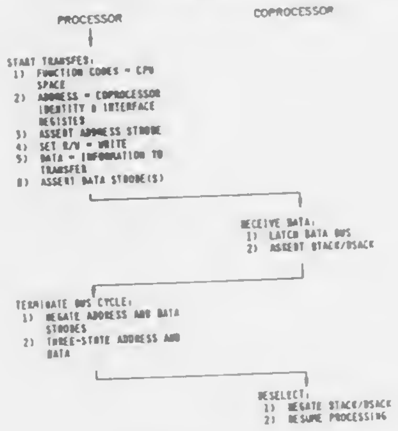
Division of Ser. No. 889,591, Jul. 25, 1986, Pat. No. 4,715,013, Continuation of Ser. No. 485,676, Apr. 18, 1983, abandoned. This application Sep. 18, 1987, Ser. No. 98,442

Int. Cl.^{5} G06F *9/00*

U.S. Cl. 364—900 2 Claims



PROCESSOR – COPROCESSOR SYSTEM BLOCK DIAGRAM



PROCESSOR TO COPROCESSOR TRANSFER

1. In a data processing system responsive to a single stream of instructions, wherein the data processing system comprises:

a general purpose processor adapted to independently decode and execute each of a first predetermined subset of said instructions; and

any of a plurality of special purpose coprocessors each adapted to cooperate with the processor in the independent decoding and execution of each of a respective second predetermined subset of said instructions;

a method for operating said processor comprising the steps of:

receiving each of said instructions comprising said stream of instructions;

detecting in a predetermined operation bit field of each of said received instructions predetermined bit value characteristic of each and every one of said instructions comprising said second subset of said instructions;

providing to said coprocessor from a determined command bit field of each of said detected instructions any of a plurality of predetermined command signal values each of which indicates a predetermined command which must be performed by said coprocessor in support of the execution of said detected instruction by the processor;

receiving from said coprocessor a response to the receipt of said command, said response comprising any of a plurality of response signal values each of which indicates whether a predetermined task must be performed by said processor in support of the performance of said command by said coprocessor; and

performing said task if indicated by said received response signal value.

5,021,992

METHOD OF TRANSLATING DATA FROM KNOWLEDGE BASE TO DATA BASE

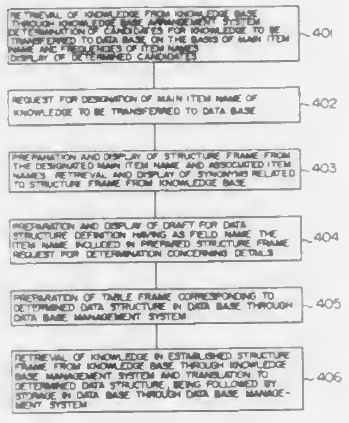
Hidefumi Kondo, Yamato, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 11, 1987, Ser. No. 84,376

Claims priority, application Japan, Aug. 28, 1986, 61-200092

Int. Cl.^{5} G09C *00/00*

U.S. Cl. 364—900 8 Claims


RETRIEVAL OF KNOWLEDGE FROM KNOWLEDGE BASE THROUGH KNOWLEDGE BASE MANAGEMENT SYSTEM DETERMINATION OF CANDIDATES FOR KNOWLEDGE TO BE TRANSFERRED TO DATA BASE ON THE BASIS OF MAIN ITEM NAME AND FREQUENCIES OF ITEM NAMES DISPLAY OF DETERMINED CANDIDATES
401
REQUEST FOR DESIGNATION OF MAIN ITEM NAME OF KNOWLEDGE TO BE TRANSFERRED TO DATA BASE
402
PREPARATION AND DISPLAY OF STRUCTURE FRAME FROM THE DESIGNATED MAIN ITEM NAME AND ASSOCIATED ITEM NAMES. RETRIEVAL AND DISPLAY OF SYNONYMS RELATED TO STRUCTURE FRAME FROM KNOWLEDGE BASE
403
PREPARATION AND DISPLAY OF DRAFT FOR DATA STRUCTURE DEFINITION HAVING AS FIELD NAME THE ITEM NAME INCLUDED IN PREPARED STRUCTURE FRAME REQUEST FOR DETERMINATION CONCERNING DETAILS
404
PREPARATION OF TABLE FRAME CORRESPONDING TO DETERMINED DATA STRUCTURE IN DATA BASE THROUGH DATA BASE MANAGEMENT SYSTEM
405
RETRIEVAL OF KNOWLEDGE IN ESTABLISHED STRUCTURE FRAME FROM KNOWLEDGE BASE THROUGH KNOWLEDGE BASE MANAGEMENT SYSTEM AND TRANSLATION TO DETERMINED DATA STRUCTURE, BEING FOLLOWED BY STORAGE IN DATA BASE THROUGH DATA BASE MANAGEMENT SYSTEM
406

1. A system for translating knowledge of a knowledge base which is comprised of a plurality of sets having the form of one or more item names and one or more item data into a data record of a data base which is described by a form of a table including item names as field names, in a computer system including a processor unit and a terminal device, comprising:

means for determining a subset of said sets of said knowledge to be transferred from said knowledge base to said data base based on appearance frequency of selected item names wherein thc appearance frequency is greater than a preselected limit;

means for retrieving the item data corresponding to said determined subset from said knowledge base and producing data of said data base in the form of the table wherein fields of said table are based on said subset of said item names and records of said table are based on said retrieved item data; and,

means for transferring the data produced based on said retrieved knowledge into said data base.

5,021,993

DEVICE FOR SAVING AND RESTORING REGISTER INFORMATION

Tsukasa Matoba, Kawasaki; Takeshi Aikawa; Mitsuyoshi Okamura, both of Tokyo; Ken-ichi Maeda, Kamakura, and Mitsuo Saito, Yokosuka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 30, 1988, Ser. No. 175,224

Claims priority, application Japan, Mar. 31, 1987, 62-78506

Int. Cl.^{5} G06F *9/00*

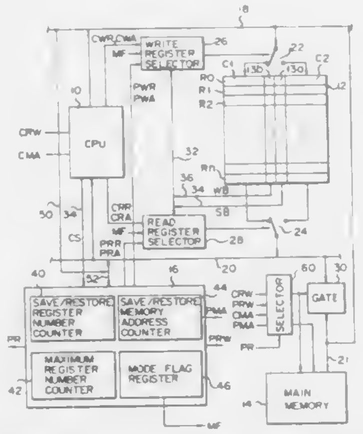
U.S. Cl. 364—900 17 Claims

1. A register device for a central processing unit, comprising:

a register unit having first and second resister sections each of which has an array of a preselected number of register cells, each cell of said first register section being combined with a corresponding cell of said second register section to define a register cell pair, one cell of said register cell pair serving as a backup cell while the other of said register cell pair is being currently selected;

first flag holding means, provided for each of the register cell pairs of said register unit, for holding therein a first flag representing which cell of a certain cell pair is being currently selected to store register information independently of the remaining cell pairs of said register unit;

second flag holding means, provided for each cell pair, for holding therein a second flag representing whether the register information is rewritten after the selected cell is changed between the register cells in the certain cell pair independently of the remaining cell pairs of said register unit; and



controller means, connected to said register unit, said first flag holding means, and said second flag holding means, for, when first register information is to be written in a given register cell pair of said register unit, selecting one of the register cells thereof into which the first register information is stored, wherein, the other cell of the given cell pair remains as a non-selected cell, and for, when the first register information is to be rewritten with second register information in said given cell pair, designating said other cell as a new selected cell and storing the second register information therein and at the same time holding the first register information in said one cell, whereby the first register information is protectedly maintained within said register unit after the first register information is rewritten with the second register information.

5,021,994

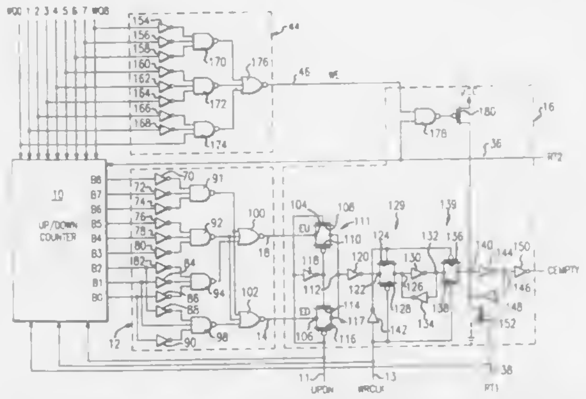
LOOK-AHEAD FLAG GENERATOR

Jy-Der Tai, Plano; Edison Chiu, Richardson; Quang-Dieu An, Dallas, and Te-Chuan Hsu, Arlington, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 11, 1988, Ser. No. 142,374

Int. Cl.^{5} G06F *12/00;* G11C *7/00*

U.S. Cl. 364—900 11 Claims



1. A look-ahead flag generator for generating a look-ahead flag signal when a predetermined value is stored in a counter, comprising:

a counter for storing any of a plurality of values, said values including said predetermined value and a boundary value displaced from said predetermined value by a unit of increment or decrement;

control signal means, coupled to said counter, for generating control signals to said counter causing a boundary value stored in said counter to be changed to said predetermined value;

a predecoder coupled to said counter for decoding said boundary value into a boundary signal;

a latch coupled to said predecoder for storing said boundary signal; and

a signal generator coupled to said latch and said control signal means for generating said look-ahead flag signal in response to said control signals generated to said signal generator by said control signals means and in response to said boundary signal stored in said latch.

5,021,995

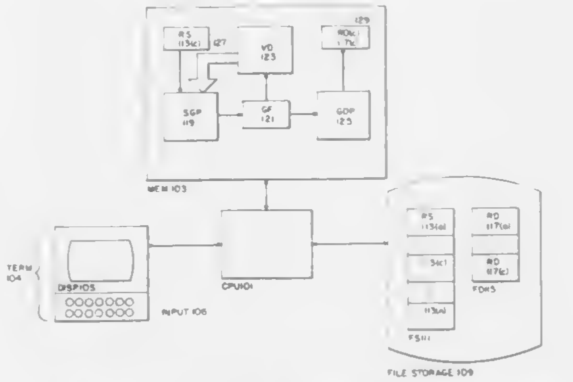
DATA EXCHANGE APPARATUS AND METHODS

Jeanne M. Quint, Manchester, and John M. Pratt, Atkinson, both of N.H., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Dec. 17, 1985, Ser. No. 809,985

Int. Cl.^{5} G06F *3/14*

U.S. Cl. 364—900 62 Claims



1. A digital computer system including a data display apparatus and having access to files for storing items of data, the files belonging to a plurality of file types wherein the file types include a stream file type, a record file type, said digital computer system comprising:

a data viewing apparatus for viewing one or more of the items of data in a file having any one of the plurality of file types, the data viewing apparatus comprising:

(1) generic form production means for reading a logical record containing an item of data from a file and using the contents of the logical record to produce a generic form of the logical record which is non-specific to any of the file types and which represents the contents of the logical record as an arrangement of codes representing displayable characters and

(2) display production means for receiving the generic form of the logical record and producing a display thereof on the data display apparatus; and

a destination file production means for receiving the generic form of the logical record to produce a destination file logical record from contents of the generic form, said destination file logical record having a format proper for the file type of a destination file.

VOL
1127
ISS
1
JE
4
1991
UMI

5,021,996

DEVICE FOR USE IN DEVELOPING AND TESTING A ONE-CHIP MICROCOMPUTER

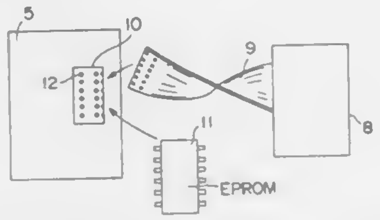
Nobuhisa Watanabe, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 919,148, filed as PCT JP 86/00022 on Jan. 22, 1986, published as WO86/04433 on Jul. 31, 1986, abandoned. This application Jun. 21, 1989, Ser. No. 370,063

Claims priority, application Japan, Jan. 22, 1985, 60-9769

Int. Cl.^{5} G06F *11/00*

U.S. Cl. 364—900 **6 Claims**



1. A universal package for a microcomputer chip detachably mounted on a microcomputer chip final product board for selectively and detachably connecting said microcomputer chip to testing means or to a rewriteable read-only memory, said testing means being used at an early stage to check operation of said microcomputer chip and said rewriteable read-only memory being used at a later stage in developing and evaluating a program stored in a permanent read-only memory to be permanently connected to said microcomputer chip final product board, said package comprising:

a plurality of testing terminals for connection selectively to said testing means and to said rewriteable read-only memory during successive stages of checking the operation of the microcomputer chip and the evaluation of said program presently in the microcomputer chip and to be subsequently stored in said permanent read-only memory; and

switching means connected to said plurality of testing terminals, for establishing a first internal electrical configuration in which a first set of said testing terminals are activated when said rewriteable read-only memory is connected to said testing terminals and a second internal electrical configuration in which a second set of said testing terminals are activated when said testing means is connected to said testing terminals, said first and second sets of activated terminals being different;

wherein said switching means comprises an input terminal and means responsive to a signal applied to said input terminal, said responsive means being constructed so that when said signal has a first value said responsive means establishes said first internal electrical configuration and when said signal has a second value said responsive means establishes said second internal electrical configuration.

5,021,997

TEST AUTOMATION SYSTEM

Kent C. Archie, Warrenville; Owen R. Fonorow, Plainfield; Mary C. McGould, Wheaton; Robert E. McLear, III, Warrenville; Edward C. Read, Bolingbrook; Edwin M. Schaefer, III, North Aurora; Suzanne E. Schwab, Chicago, and Dennis Wodarz, Naperville, all of Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 29, 1986, Ser. No. 912,799

Int. Cl.^{5} G06F *11/34*

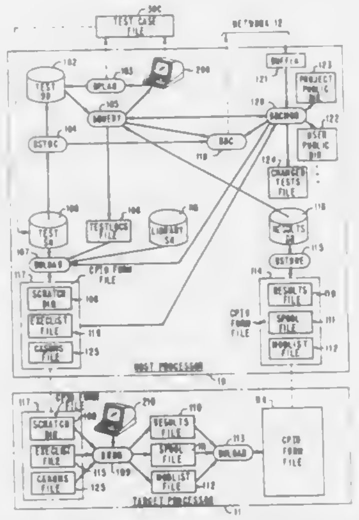
U.S. Cl. 364—900 **21 Claims**

1. A test automation system comprising:

first means for storing test programs that selectively include information descriptive of the stored test programs;

second means connected tot eh first means, responsive to being given descriptions of the stored test programs for storing the descriptions of the stored test programs separate from the test programs;

third means, cooperative with the second means, when activated for determining, from test program descriptions which are stored in the second means, which ones of the stored test programs have predetermined characteristics;



fourth means, connected to the first and the third means, for extracting from the first means those stored test programs which are identified by the third means; and

fifth means when activated for extracting from the test programs stored in the first means any included information that describes the stored test programs for storage of the extracted information as part of the program descriptions in the second means.

5,021,998

SEMICONDUCTOR MEMORY DEVICE WITH LOW-HOUSE PADS FOR ELECTRON BEAM TEST

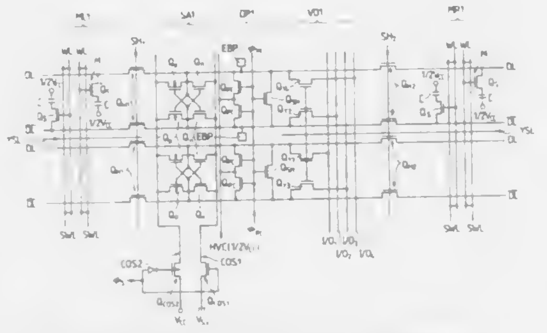
Yukihide Suzuki; Masaya Muranaka, both of Akishima, and Masamichi Ishihara, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi VLSI Engineering, Kodaira, both of, Japan

Filed Apr. 18, 1989, Ser. No. 339,843

Claims priority, application Japan, Apr. 28, 1988, 63-108748

Int. Cl.^{5} G11C *5/02, 8/00, 7/00*

U.S. Cl. 365—51 **15 Claims**



1. A semiconductor memory device comprising:

(a) a semiconductor substrate having a main surface;

(b) a memory array including a plurality of memory cells formed on a first area of said main surface of said semiconductor substrate;

(c) a peripheral circuit formed on a second area of said main surface adjacent to said first area;

(d) a plurality of complementary data line pairs formed over said memory array and being extended from said first area to said second area, wherein each of said complementary data line pairs is formed of a first level conductive layer;

(e) an insulating film formed over said first and second areas so that said insulating film extends over said complementary data line pairs;

(f) a plurality of word lines formed over said memory array and being extended on said insulating film, wherein each said work line is formed of a second level conductive layer which is a relatively higher level layer than that of said complementary data line pair with respect to said main surface of said substrate, and wherein said word lines and said complementary data line pairs couple to said memory cells; and

(g) pad electrodes for measuring potentials of at least one said complementary data line pair by using an electron beam tester, being disposed on said insulating film, wherein said pad electrodes are disposed over said complementary data line pairs which extend in said second area of said main surface, and wherein said pad electrodes are formed of the same level conductive layer as that of said word line respectively and are electrically connected to the corresponding complementary data line pair via contact holes formed in said insulating film.

5,021,999

NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE WITH FACILITY OF STORING TRI-LEVEL DATA

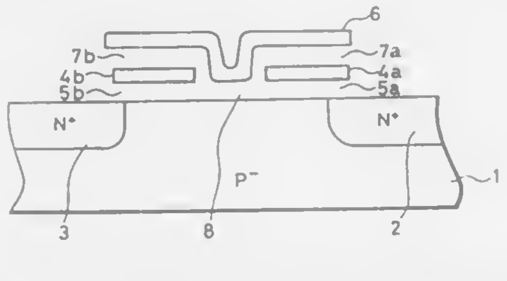
Kenji Kohda; Tsuyoshi Toyama; Nobuaki Ando; Kenji Noguchi, and Shinichi Kobayashi, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1988, Ser. No. 282,456

Claims priority, application Japan, Dec. 17, 1987, 62-322119

Int. Cl.^{5} G11C *7/00, 16/04, 16/06*

U.S. Cl. 365—168 **16 Claims**



6. A non-volatile memory cell for multi-level data storage as recited in claim 1, wherein said first and second conductive layers are configured in shapes which differ from each other.

5,022,000

SEMICONDUCTOR MEMORY DEVICE

Masaaki Terasawa; Hidefumi Mukohda; Yoshikazu Nagai, all of Akishima; Yasunori Ikeda, Kawagoe, and Kazunori Furusawa, Kokubunji, all of Japan, assignors to Hitachi, Ltd. and Hitachi VLSI Engineering Corp., both of Tokyo, Japan

Filed Sep. 6, 1989, Ser. No. 403,372

Claims priority, application Japan, Sep. 6, 1988, 63-223055

Int. Cl.^{5} G11C *11/34*

U.S. Cl. 365—184 **35 Claims**

1. A semiconductor memory device comprising:

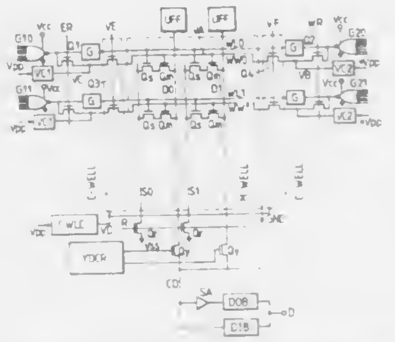
a plurality of memory elements each having a substrate gate supplied with a predetermined first voltage, a pair of electrodes and a gate electrode, wherein a threshold voltage of each of said memory elements is changed in accordance with a potential difference between said gate electrode and said substrate gate;

a plurality of word lines coupled individually to the respective gate electrodes of said memory elements;

switching means having a plurality of first regions coupled to the word lines and a second substrate gate adjacent to the first regions;

voltage generator means for producing a second voltage and a third voltage of mutually different polarities;

selector means coupled to said plurality of word lines through said switching means and for selecting one from said plurality of word lines; and



voltage supply means coupled to said selector means, to said voltage generator means and to said switching means, including means for supplying a voltage, which substantially conforms with one of said second and third voltages, to said word line selected by said selection means, and means for changing the potential of said second substrate gate of said switching means.

5,022,001

METHOD FOR THE PROGRAMMING OF THE MEMORY CELLS OF A MEMORY AND A CIRCUIT TO IMPLEMENT THIS METHOD

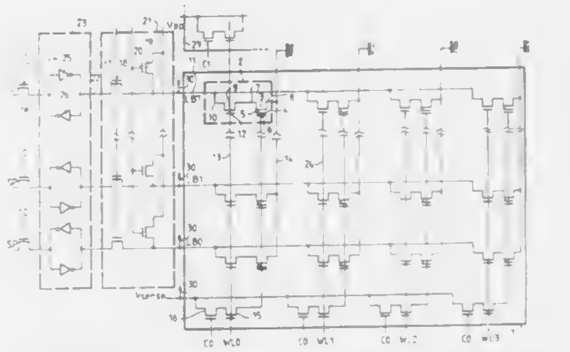
Jacek Kowalski, Trets, France, and Christophe Chevalier, Santa Clara, Calif., assignors to SGS-Thomson Microelectronics S.A., Gentilly, France

Filed Oct. 17, 1988, Ser. No. 258,801

Claims priority, application France, Oct. 19, 1987, 87 14343

Int. Cl.^{5} G11C *17/00*

U.S. Cl. 365—185 **8 Claims**



1. A method for programming cells of a memory, said cells comprising floating gate transistors programmable by electrical field effect, wherein said method comprises:

selecting the cells to be programmed, and then,

programming the selected cells by the application of programming potentials,

wherein said application of programming potentials comprises:

application first of a neutralization signal to the selected cells while

precharging said selected cells by applying first programing potential to said selected cells, then

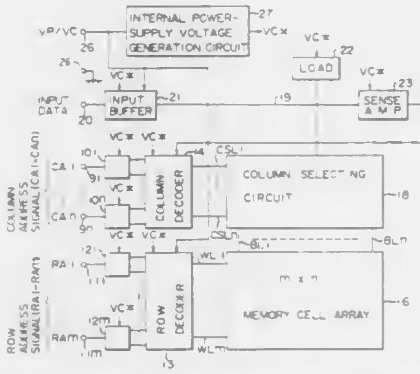
stopping said neutralization signal and

programming said cells by applying second programming potentials to said selected cells.

VOL
1127
ISS
1
JE
4
1991
UMI

5,022,002
PROGRAMMABLE ROM HAVING A REDUCED NUMBER OF POWER SOURCE TERMINALS

Hiroshi Iwahashi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jul. 13, 1988, Ser. No. 218,403
Claims priority, application Japan, Jul. 14, 1987, 62-175056
Int. Cl.^{5} G11C *7/00, 11/40*
U.S. Cl. 365—185 14 Claims



1. A programmable ROM integrated on a single semiconductor chip, comprising:

a single power source supply terminal and a ground potential supply terminal, said power source supply terminal receiving an external first supply potential in a read mode and an external second supply potential in a program mode, the second supply potential being higher than the first supply potential;

internal supply potential generating means, connected to the power source supply terminal, for generating an internal supply potential, the internal supply potential being lower than the second supply potential in the program mode;

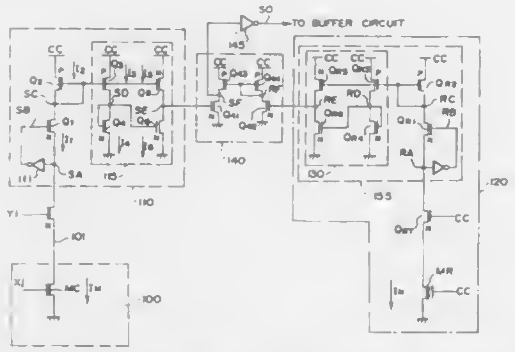
a first type circuit supplied with the internal supply potential so as not to be damaged by the high potential of the second supply potential in the program mode;

a second type circuit supplied with the first and second supply potentials; and

a memory cell array including a plurality of memory cells, each of the memory cells being a CMOS transistor with a floating gate, the memory cell being programmed by the second type circuit, and data stored in the memory cell being detected by a sense amplifier of the first type circuit.

5,022,003
SEMICONDUCTOR MEMORY DEVICE

Takaki Kohno, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan
Filed Apr. 26, 1990, Ser. No. 515,018
Claims priority, application Japan, Apr. 27, 1989, 1-108309
Int. Cl.^{5} G11C *13/00*
U.S. Cl. 365—189.01 9 Claims



1. A semiconductor memory device including a plurality of memory cells organized in a matrix structure and a sense-amplifier circuit for detecting a voltage at a digit line which changes in accordance with the stored information in the memory cell, said sense-amplifier circuit comprising:

a first inverter amplifier having its input coupled to said digit line;

a first field effect transistor having its gate connected to the output of said first inverter amplifier and its source electrically coupled to said digit line;

a second field effect transistor having its source connected to a first power supply terminal and its gate and drain connected to the drain of said first field effect transistor;

a third field effect transistor having its gate connected to the drain of said first field effect transistor and its source connected to said first power supply terminal;

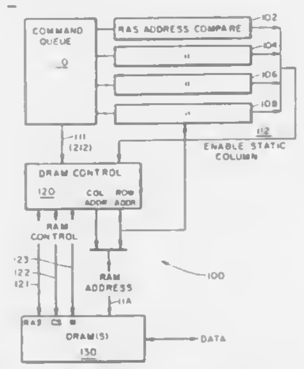
a fourth field effect transistor having its gate and drain connected to the drain of said third field effect transistor and its source connected to a second power supply terminal;

a fifth field effect transistor having its gate connected to the drain of said second field effect transistor, its drain connected to said first power supply terminal and its source connected to one input of a comparison detector; and

a sixth field effect transistor having its gate connected to the drain of said third field effect transistor, its drain connected to the source of said fifth field effect transistor and its source connected to said second power supply terminal.

5,022,004
METHOD AND APPARATUS FOR DRAM MEMORY PERFORMANCE ENHANCEMENT

Jeffrey D. Kurtze, Nashua, N.H., and James Turner, Chelmsford, Mass., assignors to Apollo Computer, Inc., Chelmsford, Mass.
Filed Oct. 28, 1988, Ser. No. 264,270
Int. Cl.^{5} G11C *7/00*
U.S. Cl. 365—189.07 9 Claims



1. A fast memory system, comprising

a static column dynamic random access memory (DRAM);

a command queue for receiving memory commands and providing DRAM address signals in response to said memory commands;

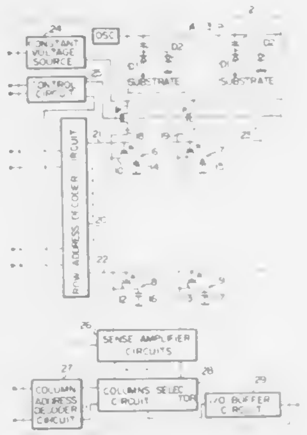
a RAM control means for receiving said DRAM address signals and issuing DRAM control signals to said DRAM, and

address compare means for comparing successive DRAM address signals and providing a RAM control signal to said RAM control mans when a select portion of said DRAM address signals are equal, wherein

the RAM control signal is asserted for a new command without providing a different subsequent row address signal.

5,022,005
SEMICONDUCTOR MEMORY DEVICE HAVING PLURAL BIASING CIRCUITS FOR SUBSTRATE

Shigeji Tohnishi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan
Filed Aug. 10, 1989, Ser. No. 391,891
Claims priority, application Japan, Aug. 10, 1988, 63-200494
Int. Cl.^{5} G11C *7/00*
U.S. Cl. 365—189.09 6 Claims



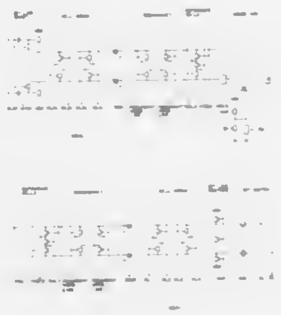
1. A semiconductor memory device fabricated on a semiconductor substrate, comprising:

(a) a plurality of memory cells operative to store data bits in the form of electric charges; and

(b) peripheral circuits provided in association with said memory cells for writing and reading the data bits and including a biasing unit for supplying said semiconductor substrate with a predetermined biasing voltage, in which said biasing unit has a plurality of biasing circuits located in spaced relationship from one another, and in which said biasing circuits cooperate with one another in biasing said semiconductor substrate to said predetermined biasing voltage.

5,022,006
SEMICONDUCTOR MEMORY HAVING BIT LINES WITH ISOLATION CIRCUITS CONNECTED BETWEEN REDUNDANT AND NORMAL MEMORY CELLS

John A. Fifield, Jericho, and Steven W. Tomashot, both of Jericho, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 1, 1988, Ser. No. 175,883
Int. Cl.^{5} G11C *7/00, 11/407*
U.S. Cl. 365—200 4 Claims



1. A semiconductor memory device comprising:

a first array of memory cells organized as a plurality of rows and columns corresponding to wordlines and bit lines, each of the cells of the array being coupled to at least one bit line;

a plurality of sensing means;

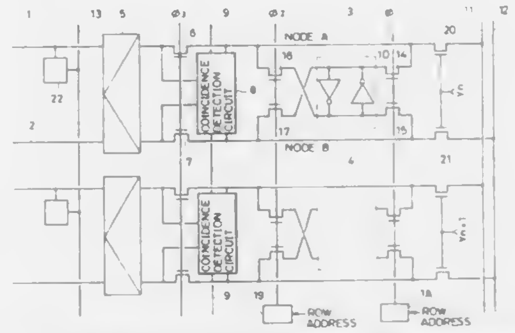
means for coupling each bit line to a respective sensing means;

an array of redundant memory cells, each of the cells of which being coupled to two of said bit lines; and

bit line isolation means disposed in said bit lines between memory cells of the first array and redundant memory cells such that when redundant memory cells are being sensed the memory cells of the first array are isolated from those of the redundant array.

5,022,007
TEST SIGNAL GENERATOR FOR SEMICONDUCTOR INTEGRATED CIRCUIT MEMORY AND TESTING METHOD THEREOF

Kazutami Arimoto; Yoshio Matsuda; Tsukasa Ooishi; Masaki Tsukude, and Kazuyasu Fujishima, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 10, 1990, Ser. No. 506,616
Claims priority, application Japan, Apr. 13, 1989, 1-93716; Mar. 5, 1990, 2-54002
Int. Cl.^{5} G16C *29/00*
U.S. Cl. 365—201 7 Claims



1. A test signal generator for a semiconductor integrated circuit memory having a plurality of bit line pairs, each pair including a first bit line (**3**) and a second bit line (**4**), comprising:

a signal source (**10**) for outputting first and second voltages respectively corresponding to first and second logic levels,

first switching means (**14**, **15**) for selecting said first and second voltages outputted from said signal source and supplying the same to said first and second bit lines, and

second switching means (**16**, **17**) for selecting and inverting said first and second voltages outputted from said signal source and supplying the same to said first and second bit lines.

5,022,008
PROM SPEED MEASURING METHOD

John F. Schreck, and Phat C. Truong, both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed Dec. 14, 1989, Ser. No. 450,711
Int. Cl.^{5} G11C *7/00*
U.S. Cl. 365—201 13 Claims

1. A method for measuring the access speed of a programmable read only memory (PROM) including a matrix of erased memory cells each selectable by an address, said method comprising the steps of:

producing an invalid internal address so that no memory cell is selected;

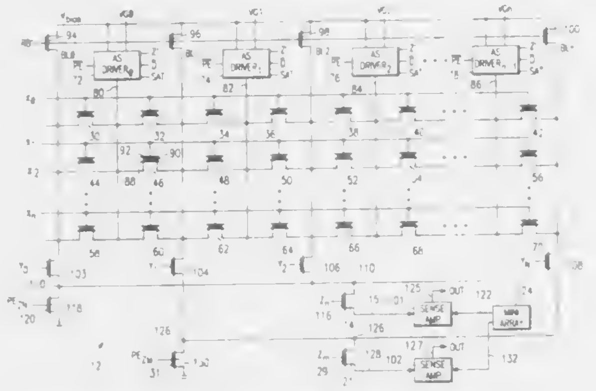
reading a sense level by a level sensing circuit coupled to the matrix;

timing the interval between said invalid internal address producing step and said reading step;

producing a valid address for selecting a predetermined memory cell in the matrix;

VOL 1127 ISS 1 JE 4 1991 UMI

reading the sense level by said level sensing circuit;
timing the interval between said valid address producing step and said reading step; and

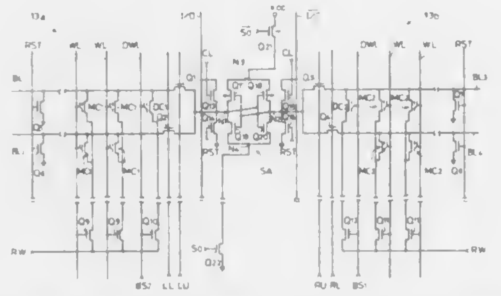


comparing said timed intervals of said invalid internal address and valid address readings; and
recording the longest time interval, said longest time being the access speed of the PROM.

5,022,009

SEMICONDUCTOR MEMORY DEVICE HAVING READING OPERATION OF INFORMATION BY DIFFERENTIAL AMPLIFICATION

Yasushi Terada; Takeshi Nakayama, and Kazuo Kobayasbi, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 14, 1989, Ser. No. 310,116
Claims priority, application Japan, Jun. 2, 1988, 63-136308
Int. Cl.^{5} G11C *7/02, 11/40*
U.S. Cl. 365—210 11 Claims

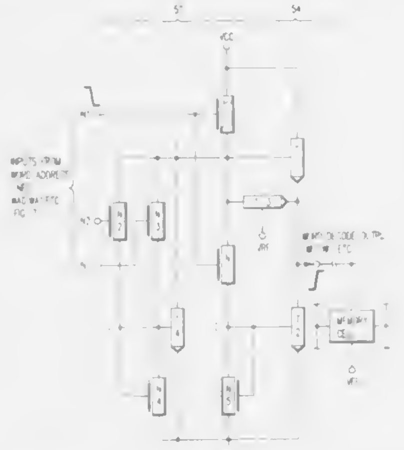


1. A semiconductor memory device in which information are read out by differential amplification, comprising:
at least one first bit line pair comprising a first bit line and a second bit line,
at least one second bit line pair comprising a third bit line and a fourth bit line,
a plurality of memory cells each connected to either one of bit lines in said first bit line pair or said second bit line pair,
a first dummy cell connected to either one of the bit lines in said first bit line pair,
a second dummy cell connected to either one of the bit lines in said second bit line pair,
at least one differential amplifier means having a first terminal and a second terminal for differentially amplifying a potential of said first terminal and a potential of said second terminal,
memory cell selecting means for selecting any of said plurality of memory cells,
dummy cell selecting means for selecting said second dummy cell when a memory cell connected to said first bit line pair is selected by said memory cell selecting means while selecting said first dummy cell when a memory cell connected to asid second bit line pair is selected by said memory cell selecting means, and
swiching means for coupling said first or second bit line connected to a memory cell connected to said first bit line pair to the first terminal of said corresponding differential amplifier means and coupling said third and fourth bit lines to the second terminal of said corresponding differential amplifier means when the memory cell connected to said first bit line pair is selected by said memory cell selecting means, while coupling said third or fourth bit line connected toa memory cell connected to said second bit line pair to the second terminal of said corresponding differential amplifier means and coupling said first and second bit liens to the first terminal of said corresponding differential amplifier means when the memory cell connected to second bit line pair is selected by said memory cell selecting means.

5,022,010

WORD DECODER FOR A MEMORY ARRAY

Yuen H. Chan, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Oct. 30, 1989, Ser. No. 428,793
Int. Cl.^{5} G11C *7/00, 8/00;* **H03K** *19/094*
U.S. Cl. 365—230.06 5 Claims

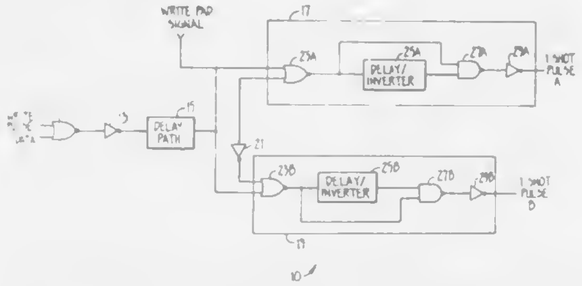


1. A BICMOS word decode circuit for a static random access memory array, comprising:
first and second input field-effect transistors (FETs) of opposite conductivity type connected in series between a first voltage source and second node, having a first node to define the connection of the source and the drain of said first and second input FET's respectively;
a first input terminal connected to control gates of the first and second input FETs;
third and fourth input FETs connected in parallel between the first node and a third node;
second and third input terminals connected to control gates of the third and fourth input FETs, respectively;
a bipolar transistor connected between the first node and a second voltage source, a control terminal of the bipolar transistor being connected to the third node; and
output driving means connected between the first and second voltage sources, having inputs that are connected to the first and second nodes, responsive to the signals at the first and second nodes for producing word decode signals which are a direct function of the signals at the first and second nodes.

5,022,011

APPARATUS AND METHOD FOR REDUCING THE ACCESS TIME AFTER A WRITE OPERATION IN A STATIC MEMORY DEVICE

James D. Allan, Colorado Springs, Colo., assignor to Inova Microelectronics Corporation, Santa Clara, Calif.
Filed Dec. 28, 1989, Ser. No. 457,987
Int. Cl.^{5} G11C *11/40*
U.S. Cl. 365—233 8 Claims



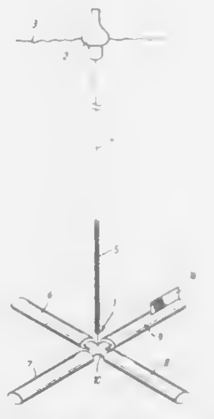
3. An apparatus for storing data wherein the read after write access time is no greater than the read after read access time, comprising:
a static random access memory (SRAM) including at least one memory cell having a write line on which data can be written into said memory cell, and a read line from which data can be read from said memory cell;
at least one data line for transmitting data signals to the at least one memory cell in said SRAM;
at least one address line for selecting said at least one memory cell in said SRAM; and
at least one enable line for enabling said at least one memory cell in said SRAM;
a data buffer connected to said conductive grid for temporarily storing data to be written into said SRAM; and
means connected to said memory cell for monitoring said at least one data line and said write line and for generating a first internal write pulse representing the start of a write cycle in response to a change of state in a write signal on said write line and for generating a second internal write pulse in response to a change of state in a data signal on said at least one data line while said write signal is in a present state.

5,022,012

ACOUSTIC SENSING ARRANGEMENTS

Leslie K. Godfrey, Wiltshire, and Robert P. Lock, Dorset, both of England, assignors to Plessey Overseas Limited, Ilford, England
Filed Mar. 30, 1990, Ser. No. 501,941
Claims priority, application United Kingdom, Mar. 31, 1989, 8907314
Int. Cl.^{5} H04B *1/59*
U.S. Cl. 367—3 19 Claims

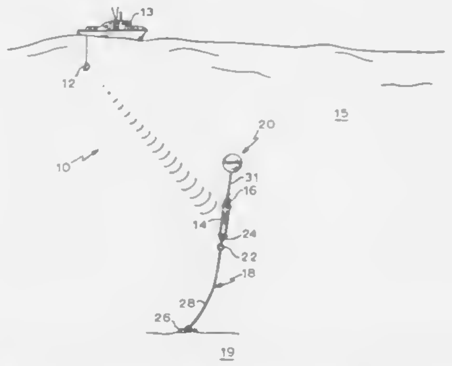
1. An underwater acoustic sensing device including a cable suspended hydrophone support structure comprising:
a plurality of elongated support arms connected together and disposed substantially horizontally; and
hydrophones contained within each support arm for detecting underwater acoustic waves;
each arm having in transverse cross section a maximum horizontal dimension greater than the maximum vertical dimension thereof so that the resistance thereof to horizontal flow is less than the resistance to vertical flow.



5,022,013

UNDERWATER RELEASE APPARATUS, UNDERWATER RELEASE SYSTEM AND METHOD

William Dalton, and Al Billings, both of North Falmouth, Mass., assignors to Datasonics, Inc., Cataumet, Mass.
Filed Mar. 6, 1990, Ser. No. 489,457
Int. Cl.^{5} H04B *1/59;* **B63B** *22/06, 22/26*
U.S. Cl. 367—4 11 Claims



1. In an underwater release system which comprises;
(a) a transmitter.,
(b) a housing having a one and other end;
(c) a receiver in the housing.,
(d) a mooring means to secure the housing at a defined depth;
(e) a buoy means to provide flotation for the housing and receiver means positioning at a defined depth and retrieval;
(f) a ring or securing means to secure the housing to the mooring means, the improvement which comprises;
(g) a housing release means to release the securing means comprising;
  (i) a frame;
  (ii) a plurality of clamping jaws to move between a clamping and a nonclamping position;
  (iii) an inner housing with a bore for a shaft;
  (iv) a shaft means in the bore having a shaft with flow passage way having a one end and other end to permit water in a chamber of the housing, the shaft extending outside of the housing at the one end to move between a release and a nonrelease position;
  (v) coupling means mounted in cooperation with the frame secured to one end of the shaft for movement

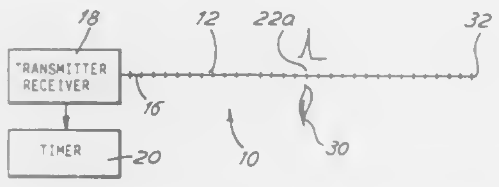
VOL
1127
ISS
1
JE
4
1991
UMI

therewith and to move between a coupling and noncoupling position;
(vi) motor means in the housing.
(vii) drive train means in housing connected to motor means and to the shaft means to move between a release and a nonrelease position;
(viii) switch means to receive switching signals and activate the motor means wherein on command received by the transmitter means and communicated to the switch means the motor means is activated to drive the drive train which drives the shaft from an extended nonrelease engaged position to a nonextended nonengaged position to effect the movement of the coupling means to an uncoupled. unengaged position which permits the clamping jaws to move to a released open position releasing the mooring means to permit the housing so to rise to the surface by the use of the buoy means.

5,022,014

ULTRASONIC TEMPERATURE SENSORS, AND ULTRASONIC WAVEGUIDE CONNECTORS FOR USE THEREWITH

Konrad Kulczyk, Bushey; Malcolm P. Perks, Dereham, and George W. Smith, London, all of England, assignors to Schlumberger Industries Limited, Farnborough, England
Filed Jun. 14, 1989, Ser. No. 366,075
Claims priority, application United Kingdom, Jun. 15, 1988, 8814246; Jun. 15, 1988, 8814465
Int. Cl.^{5} G01S *15/00*
U.S. Cl. 367—87 33 Claims



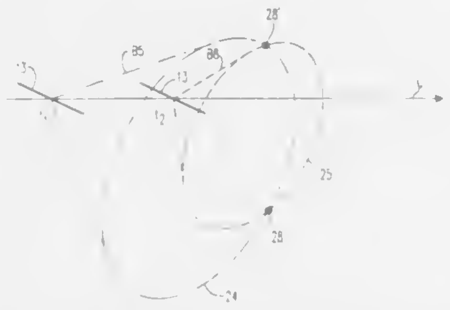
1. A temperature sensor comprising an elongate ultrasonic waveguide, and at least one temperature responsive means which is positioned at a predetermined point along the length of the waveguide and which is responsive to a given temperature change to change the acoustic impedance of the waveguide at that point from a first level to a second level, one of said levels causing at least partial reflection of ultrasonic pulses arriving at the point.

5,022,015

SONAR SYSTEM OF THE TYPE USING HOLLOW CONICAL BEAMS

John E. Gilmour, Pasadena, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed Jun. 4, 1990, Ser. No. 532,824
Int. Cl.^{5} G01S *15/00*
U.S. Cl. 367—124 5 Claims

1. Sonar apparatus comprising:
(a) means for periodically projecting acoustic energy toward a target area under investigation by said sonar apparatus as said sonar apparatus travels along a course line during investigation of said target area;
(b) means for receiving reflected acoustic energy from said target area and including beam former means operable to form a plurality of nested hollow conical receiver beams all having a common cone axis;
(c) means for maintaining said cone axis at a predetermined angle relative to said course line such that said cone axis and said course line are non-coincident; and

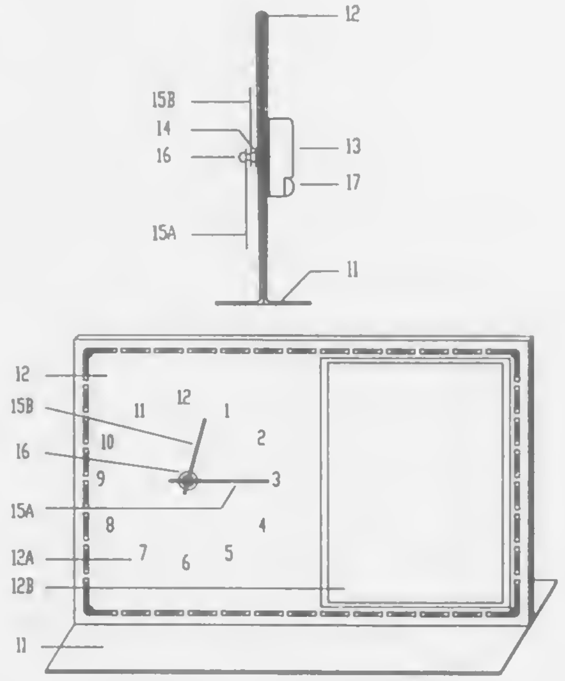


(d) means for recording and comparing acoustic returns from at least two successive acoustic projections and displaying the results of said comparison.

5,022,016

DISPLAY CLOCK

Deborah A. Smith, and Bryan R. Smith, both of 649-90th La. NE., Blaine, Minn. 55434
Filed May 23, 1990, Ser. No. 527,580
Int. Cl.^{5} G04B *19/00, 37/00*
U.S. Cl. 368—223 2 Claims

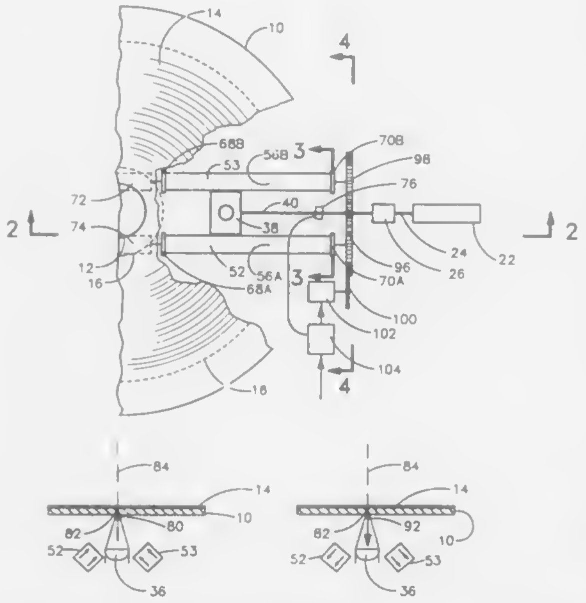


1. A display device comprising:
a sheet of transparent, bendable material bent to define opposing sides with a space therebetween;
an opening formed through both said opposing sides;
means integrally formed from said sheet to define support feet extending from said opposing sides;
an insert corresponding in size to one of said opposing sides having and aperture therethrough, and containing time indicia surrounding said aperture, said insert further including an opening therein for displaying an additional item;
said insert being placed in said space defined between said opposing sides with the aperture aligned with the opening in said opposing sides;
a timepiece mechanism attached to one of said opposing sides and including a shaft means extending through said opening in said opposing sides;
an hour hand and a minute hand attached to said shaft means for indicating time.

5,022,017

MAGNETO OPTIC DATA RECORDING SYSTEM WITH VARIABLE FIELD STRENGTH, ACTUATOR THEREFOR AND METHOD OF PROVIDING

Gerardus L. M. Jansen, Cascade, and Matthew W. Hecht, Louisville, both of Colo., assignors to Laser Magnetic Storage International Company
Continuation-in-part of Ser. No. 188,261, Apr. 29, 1988, Pat. No. 4,962,492. This application Dec. 14, 1988, Ser. No. 284,069
Int. Cl.^{5} G11B *13/04, 11/12*
U.S. Cl. 369—13 15 Claims

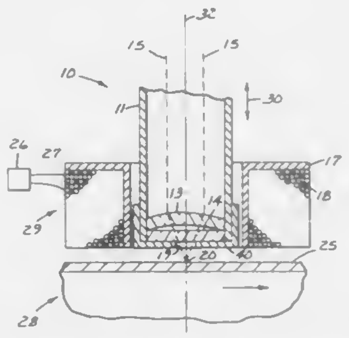


1. A magneto-optic data storage apparatus comprising:
a magneto-optic storage medium lying substantially in a first plane;
first means for producing a resultant magnetic field of variable strength which is substantially perpendicular to said first plane at at least a first portion of said medium, said first means comprising at least first and second permanent magnets, each said permanent magnet rotatable about an axis of rotation which is substantially parallel to said first plane and passes through said permanent magnet to continuously vary the field strength of said resultant magnetic field at said first portion, said first and second permanent magnets being arranged adjacent to each other to combine the individual magnetic fields of said permanent magnets to provide said resultant magnetic field wherein said resultant magnetic field is substantially continuously perpendicular to said first plane during rotation of said magnets; and
second means for heating at least said first portion of said storage medium.

5,022,018

SYSTEM FOR APPLYING A PERPENDICULAR MAGNETIC FIELD TO THE ILLUMINATED SIDE OF A MAGNETO-OPTIC MEDIUM

Peter J. Vogelgesang, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Feb. 16, 1989, Ser. No. 311,457
Int. Cl.^{5} G11B *13/04*
U.S. Cl. 369—13 8 Claims



1. An optical system for reading, recording or erasing information from or to a recording medium having a recording surface, comprising:
a housing having a first end facing said recording medium;
a light source for providing a beam of light through said housing and toward said recording medium;
means within said housing for focusing said beam of light at said recording surface, wherein said focusing means comprises a lens;
a magnetizable material extending across said housing at said first end
an aperture in said magnetizable material of a size and disposed to allow free passage of said beam of light; and
an electromagnet having a coil surrounding said housing and said magnetizable material for providing a magnetic field at said recording surface, wherein said housing is movable toward and away from the recording medium while said electromagnet remains stationary in this direction.

5,022,019

DISK-STORAGE DEVICE

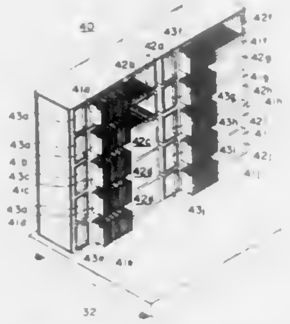
Takeo Motoyoshi, and Katsufusa Tanaka, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan
Filed Nov. 22, 1989, Ser. No. 440,820
Claims priority, application Japan, Nov. 24, 1988, 63-296524
Int. Cl.^{5} G11B *17/22, 15/68*
U.S. Cl. 369—36 5 Claims

1. A disk-storage device of the type which records and reproduces information using a plurality of disks as the recording medium, the disks being contained in cartridges, the disk-storage device comprising:
a plurality of recording/reproducing units for recording and reproducing information on and from said disks;
a plurality of lodging shelves each of which can lodge a plurality of said cartridges;
a lodging frame adapted to lodge said plurality of recording-/reproducing units at predetermined intervals in the vertical and horizontal directions and to likewise lodge said plurality of lodging shelves at predetermined intervals in the vertical and horizontal directions;
a case which lodges said lodging frame containing said

VOL
1127
ISS
1
JE
4
1991
UMI

recording/reproducing units and said lodging shelves and in which a plurality of cartridge-supply/discharge openings for taking in said cartridges from the exterior are arranged at said predetermined intervals; and

a conveying mechanism provided in said case and having a plurality of clutching sections for clutching said cartridges, said clutching sections being arranged at predetermined intervals in the vertical and horizontal directions and adapted to convey said cartridges between said recording/reproducing units, said lodging shelves and said cartridge-supply/discharge openings,



the relative positional relationship between said recording-/reproducing units, said lodging shelves and said cartridge-supply/discharge openings being matched with the relative positional relationship between the clutching sections provided in said conveying mechanism, thereby making it possible to clutch and convey a plurality of cartridges at the same time.

5,022,020

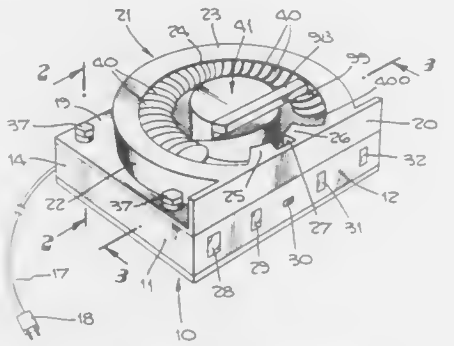
MULTIPLE PLAY COMPACT DISK PLAYER

Kirk Langman, Los Angeles; Kiran Krishnamurti, West Los Angeles, and Kenneth A. Tarlow, Marina del Rey, all of Calif., assignors to Kirk Langman, Los Angeles and Kiran Krishnamurti, West Los Angeles, both of, Calif.

Filed Aug. 14, 1989, Ser. No. 393,585

Int. Cl.^{5} G11B *17/24, 17/22*

U.S. Cl. 369—37 21 Claims



I. A multi-compact disk player comprising:

means for playing back electronic signals recorded on compact disks mounted within said housing having a turntable portion thereon with an aperture therein for receiving a compact disk therein, and a hub adapted to engage a centrally mounted hole in a compact disk when disposed in said turntable portion in a friction-fit manner, said playback means being adapted to move said hub to and from said turntable portion whereby said hub is movable between a first position disposed within the aperture in said turntable portion and, to a second position disposed away from the aperture in said turntable portion;

a magazine adapted to hole a plurality of compact disks being secured to said main housing, said magazine having spacing means interiorly thereof for maintaining a plurality of compact disks therein spaced from on another and slanted from the horizontal so that, when a plurality of compact disks are disposed within said magazine, said spacing means maintains said compact disks both spaced from adjacent compact disks while exposing an upper surface of said slanted compact disks;

said magazine having an open central area with said spacing means disposed in a circular array about said open central area;

rotating means associated with said housing for rotating said playback means;

a cover pivotally connected to said playback means having a compact disk retaining portion adapted to engage a compact disk disposed in said turntable portion and retain said compact disk in said turntable portion when said cover is lowered to a position adjacent said turntable portion;

cover raising and lowering means associated with said housing for selectively raising and lowering said cover; and

a compact disk pick-up arm associated with said cover having compact disk pick-up means at one end thereof adapted to move from a first position adjacent to said magazine and above the exposed surface of a compact disk when placed in said magazine to a second position adjacent said playback means and above said turntable portion whereby said pick-up means can pick up one of said compact disks disposed in said magazine and move the same to said turntable portion.

5,022,021

APPARATUS FOR DETECTING MOVING DIRECTION OF LIGHT BEAM SPOT ILLUMINATED ON OPTICAL INFORMATION RECORDING MEDIUM HAVING TRACKS

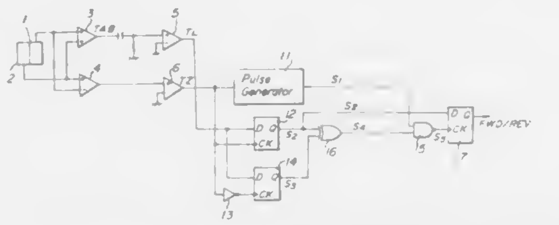
Kenichi Ito, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jan. 24, 1990, Ser. No. 469,336

Claims priority, application Japan, Jan. 27, 1989, 1-16359

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—44.11 7 Claims



1. An apparatus for detecting a moving direction of a light beam spot illuminated on an optical information recording medium having recording tracks formed thereon, said apparatus comprising:

tracking information generating means for generating a pair of tracking information signals representing a position of the light beam spot relative to at least one of said tracks formed on the optical information recording medium;

operating means, responsive to said tracking information signals, for generating (i) two moving direction identifying signals for identifying a moving direction of the light beam spot on the optical information recording medium at different timings of the tracking information signals and (ii) a prohibit signal responsive to said moving direction identifying signals indicating simultaneously opposite moving directions of said light beam spot; and

judging means for generating a moving direction detection signal denoting the moving direction of the light beam spot, said moving direction detection signal (i) corresponding to a given one of said two moving direction identifying signals except when the prohibit signal is present and (ii) being unchanged by a change in said given one of said two moving direction identifying signals when the prohibit signal is present.

5,022,022

SUPPORT STRUCTURE FOR AN OPTICAL PICKUP ELECTRICALLY ADJUSTABLE IN TWO DIRECTIONS

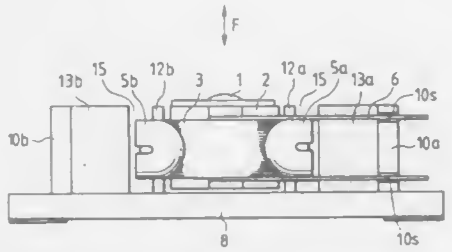
Ikuya Kikuchi, and Ryo Sato, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Dec. 5, 1988, Ser. No. 279,635

Claims priority, application Japan, Dec. 15, 1987, 62-190268

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—44.16 6 Claims



I. A optical pickup, comprising:

optical means for irradiating a recording surface of an optical recording medium with a spotlight beam to thereby read information from said recording surface;

supporting means for movably supporting said optical means so that said optical means is controllably movable in a first direction perpendicular to said recording surface and in a second direction perpendicular to said first direction;

driving means including magnetic circuits having magnetic gas and electrical coils partly located within said magnetic gaps for driving said optical means in said first and second directions;

said supporting means including a magnetic yoke with slits formed in said yoke said yoke forming part of at least one of said magnetic circuits,

electrical insulators fitted within at least one of said slits, and

said supporting means further including flexible supporting members, each of said flexible supporting members having a first end supported by said yoke and a second end supporting said optical means, wherein said first ends are fitted within said slits, with at least one of said first ends being surrounded by said electrical insulators.

5,022,023

DISC DRIVE ARRANGEMENT FOR CD PLAYER AND THE LIKE CAPABLE OF LOADING DIFFERENT SIZE DISCS

Tsutomu Toyoguchi, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jun. 20, 1988, Ser. No. 208,885

Claims priority, application Japan, Jun. 23, 1987, 62-96259[U]; Jun. 30, 1987, 62-163285

Int. Cl.^{5} G11B *33/02, 27/00*

U.S. Cl. 369—77.1 9 Claims

I. In a disc drive for discs of first and second diameters;

a loading slot through which the disc is introduced into the drive;

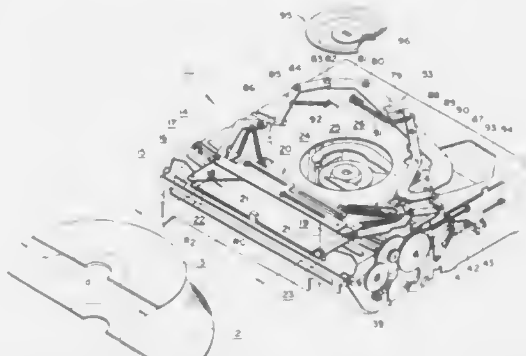
first and second movable disc guides;

a slide arrangement on which the first and second movable disc guides are mounted;

a lock arrangement for selectively locking the first and second movable disc guides in first and second predetermined positions, the first position being suited to guiding discs having a first diameter and the second position suited to guiding discs having a second diameter, the second diameter being larger than the first diameter;

a sensor arrangement responsive to the diameter of the disc being inserted, the sensor arrangement being operatively connected with the lock arrangement for releasing the same from a position suited for discs having a first diameter and permitting the disc guides to be moved to a new second position suited for discs having a second diameter,

a loading roller, the loading roller being disposed in the loading slot, the roller having a central portion and two tapered axial end portions, the central portion having a diameter which is less than that of the axial ends of the roller, the two tapered axial end portions tapering outwardly from the central portion to the ends of the roller; and



a guide plate, the guide plate being disposed in the loading slot and having a concave surface which is juxtaposed to the loading roller, the guide plate being arranged with respect to the loading roller in a manner wherein the disc which is being loaded into the drive is contacted on a first surface by the guide plate and contacted on a second, opposite surface by the loading roller, the arrangement of the guide plate and the loading roller being that the disc is contacted only at the peripheral edge portions thereof.

5,022,024

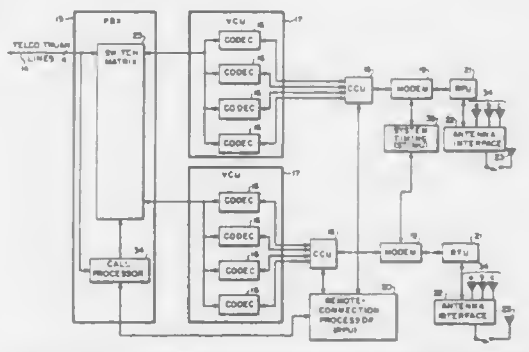
SUBSCRIBER RF TELEPHONE SYSTEM FOR PROVIDING MULTIPLE SPEECH AND/OR DATA SIGNALS SIMULTANEOUSLY OVER EITHER A SINGLE OR A PLURALITY OF RF CHANNELS

Eric Paneth, Givataijm, Israel; Mark J. Handzel, San Diego, Calif.; Steven A. Morley, San Diego, Calif., and Graham M. Avis, San Diego, Calif., assignors to International Mobile Machines Corporation, King of Prussia, Pa.

Continuation of Ser. No. 324,651, Mar. 16, 1989, Pat. No. 4,912,705, which is a continuation of Ser. No. 31,045, Mar. 27, 1987, Pat. No. 4,817,089, which is a continuation of Ser. No. 713,925, Mar. 20, 1985, Pat. No. 4,675,863. This application May 8, 1989, Ser. No. 349,301

Int. Cl.^{5} H04J *4/00*

U.S. Cl. 370—50 10 Claims



1. A system for processing a given plural number of information signals received simultaneously over telephone company trunk lines for simultaneous time division multiplexed transmission over a given radio frequency (RF) channel, comprising

VOL 1127
ISS 1
JE 4
1991
UMI

separate conversion means for respective connection to said trunk lines for converting the information signals received over said trunk lines into digital signal samples;

a given plural number of separate signal low-rate voice coding and compression means for simultaneously compressing the digital signal samples respectively derived from separate ones of the conversion means to provide said given number of separate compressed signals;

M-ary modulation means for modulating the compressed signals;

channel control means connected to the compression means and the modulation means for sequentially combining the compressed signals into a single transmit channel bit stream, with each of the respective compressed signals occupying a repetitive sequential slot position in the transmit channel bit stream associated with a predetermined one of the separate compression means and for causing said M-ary modulation means to dynamically assign spectrally efficient modulation levels to the compressed signals:

an exchange for coupling the respective separate conversion means to indicated ones of the separate compression means;

remote-connection processor means for coupling to said trunk lines and responsive to an incoming call request signal received over one of said trunk lines by providing a slot assignment signal indicating which one of the separate compression means the exchange is to connect to the one of the separate conversion means connected to said one trunk line and thereby assigning to said one trunk line the slot in the transmit channel bit stream associated with the one of the separate compression means that is so connected by the exchange means, wherein the remote-connection processor means maintains a memory of which slots are so assigned and consults said memory upon receipt of a said incoming call request and then provides a said slot assignment signal that effects a said connection to a compression means associated with one the slots that is not assigned to another trunk line;

call processor means connected to the remote-connection processor means and responsive to said slot assignment signal for causing the exchange to complete the connection indicated by said slot assignment signal; and

transmitter means for providing a transmit channel signal for transmission over the given RF channel in response to the transmit channel bit stream.

5,022,025

SELF-ROUTING SWITCH AND ITS ROUTING METHOD

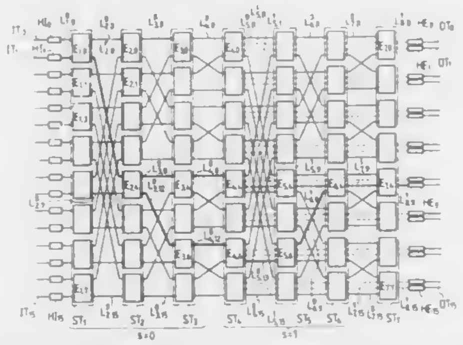
Shigeo Urushidani, Tokorozawa, and Hitoshi Imagawa, Kunitachi, both of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

Filed Feb. 13, 1989, Ser. No. 309,647

Claims priority, application Japan, Feb. 17, 1988, 63-34613; Jan. 9, 1989, 1-1326

Int. Cl.⁵ H04Q *11/04*

U.S. Cl. 370—60 **4 Claims**



1. A self-routing switch in which N input lines and N output lines are accommodated, where $N=2^n$, n being an integer, a plurality of switching stages and first links interconnecting then are arranged between said input lines and said output lines, each of said switching stages includes N/2 switching elements, and a transfer of information data from an arbitrary one of said input lines to a specified one of said output lines via one of said switching elements in each of said switching stages is performed using routing information appended to said information data, said self-routing switch comprising:

routing information inserters provided between said input lines and a first one of said switching stages in a one-to-one correspondence relation to said input lines, for appending said information data with said routing information comprising address information of plural bits indicating a destination address of said information data and judge times information indicating a number of judge times the information data are to be subjected to judgment on selections of outgoing links in the subsequent switching stages;

routing information eliminators provided between a final one of said switching stages and said output lines in a one-to-one corresponding relation to said output lines, for eliminating said routing information appended to said information data transferred thereto;

wherein each of said switching elements of each said switching stage has two first input terminals and two first output terminals corresponding to two of line positions of said output lines and defining two of N first input terminals and two of N first output terminals of said switching stage corresponding to said two line positions, each of said first output terminals of each said switching stage corresponding to one of said line positions is connected via one of said first links to one of said first input terminals of the next switching stage corresponding to one of said line positions selected by a predetermined algorithm;

wherein each said switching element of a predetermined Kth one of said switching stages from the input line side has at least two second output terminals corresponding to two of said line positions, where $1 \leqq K \leqq n$, said switching elements of the $(K+1)$th and subsequent ones of said switching stages each have at least two second input terminals and at least two second output terminals corresponding to two of said line positions, said at least two second input terminals and said at least two second output terminals of each said switching element define two of at least N second input terminals and two of at least N second output terminals of said switching stage corresponding to two of said line positions;

second links for connecting said second output terminals of each of at least said Kth and subsequent switching stages and said second input terminals of the subsequent switching stage at respectively the same line positions;

wherein each of said switching elements in each of all said switching stages includes means for judging, based on the judge times information, which of the first and second output terminals should be selected, for judging, when the first output terminals are selected, which one of the two first output terminals should be selected based on one of the bits of said address information related to the switching stage to which said switch element belongs, for modifying the judge times information, and for transferring the information data through the selected one of the first links to the subsequent stage; and

wherein each of said switching elements in each of at least the Kth and subsequent ones of said switching stages further includes means for judging, when the second output terminals are selected, which one of said at least two second output terminals should be selected base on a predetermined one of the bits of said address information, for modifying the judge times information, and for transferring the information data through the selected second link and the subsequent second links corresponding to the same line position to the second output terminal of the final switching stage corresponding to that same line position.

5,022,026

METHOD OF THROUGHCONNECTING WIDEBAND CONNECTIONS IN A DIGITAL TIME SWITCH MODULE BETWEEN SUBSCRIBERS, AND A DEVICE FOR CARRYING OUT THE METHOD

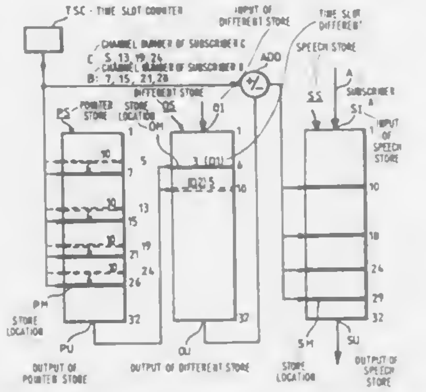
Lars-Göran Petersen, Tumba, and Ulf M. Adamsson, Stockholm, both of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Jun. 14, 1990, Ser. No. 537,707

Claims priority, application Sweden, Jun. 26, 1989, 8902309

Int. Cl.⁵ H04R *11/04*

U.S. Cl. 370—66 10 Claims



1. A method of throughconnecting wideband connections in a digital time switch module between subscribers, said wideband connections each having at least two channels, and said method comprising the steps of:

assigning to the transmitting and the receiving subscribers channel numbers for mutually corresponding pairs of incoming and outgoing channels respectively in the wideband connections;

writing sequentially into a speech store framewise ordered time slots entering the digital time switch module and corresponding to the channel numbers of the transmitting subscriber in a connection;

reading from the speech store sequential framewise ordered time slots corresponding to the channel numbers of the receiving subscriber in said connection;

assigning numerical values to the mutually corresponding pairs of channels in the wideband connection and storing said numerical values in a matrix store;

assigning to the wideband connection between the transmitting and the receiving subscriber an internal address number in the time switch module;

writing the internal address number into a difference store when establishing said wideband connection;

reading out the internal address number from the difference store in accordance with the time slot number of the receiving subscriber when establishing said throughconnection; and

addressing the speech store through the numerical values in the matrix store in accordance with the time slot numbers of the receiving subscriber and the internal address number.

5,022,027

COMMUNICATIONS INTERFACE AND SYSTEM FOR RADIATION RECOVERY OF A MICROPROCESSOR PORTION THEREOF

Jesus A. Rosario, Beltsville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 27, 1982, Ser. No. 382,977

Int. Cl.⁵ G06F *11/00*

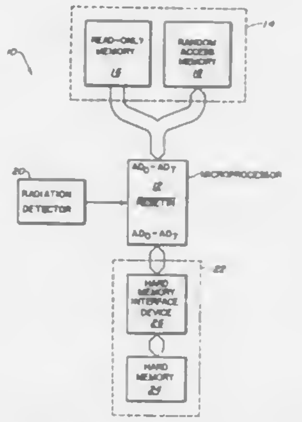
U.S. Cl. 371—12 3 Claims

1. A radiation recovery system configured to allow recovery of control of a normal operational program after radiation of a microprocessor portion thereof by prompt gamma radiation, comprising in combination:

a radiation recovery system memory operatively connected to address/data lines, AD_0–AD_7, of said microprocessor for storing information generated by the normal operational program, for storing the normal operational program and a radiation recovery routine, and for enabling said microprocessor to read the normal operational program and the radiation routine;

a radiation detector operatively connected to the $\overline{\text{RESETIN}}$ line of said microprocessor for sensing a predetermined level of the prompt gamma radiation, and for producing a pulse in response thereto at the $\overline{\text{RESETIN}}$ line; and

a communications interface operatively connected to the address/data lines, AD_0–AD_7, of said microprocessor for storing information that is continuously generated by the normal operational program in cooperation with said microprocessor, for controlling READ, WRITE, and CLEAR operations, and for controlling the handshaking between said communications interface and said microprocessor, said communications interface being configured to include a hard memory for storing, in a two page format, the information that is continuously generated by the normal operational program and used by the radiation recovery routine for subsequent updating of said random access memory, the information stored being that which is necessary for recovery of the normal operational program after radiation, and a hard memory interface device operatively connected between said hard memory and said microprocessor for controlling READ, WRITE, and CLEAR operations of said hard memory, and for controlling the handshaking between said hard memory and said microprocessor.



5,022,028

SOFTWARE VERIFICATION APPARATUS

Edward J. Edmonds, Brooklands, and John G. Curran, Stoneyhurst, both of Ireland, assignors to Elverex Limited, Limerick, Ireland

Filed Mar. 30, 1989, Ser. No. 330,430

Claims priority, application Ireland, Mar. 30, 1988, 956/88

Int. Cl.⁵ G06F *11/00*

U.S. Cl. 371—25.1 9 Claims

1. An apparatus for non-intrusively verifying target software loaded in a target computer comprising:

an input transmission circuit for transmission of external stimuli to the target software;

a recording circuit for recordal of external stimuli transmitted to the target software and for recordal of corresponding output data from the target software;

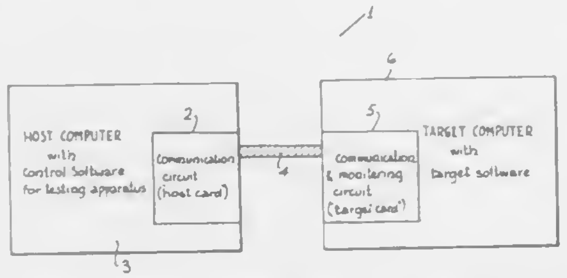
programming means for generating external stimuli for the target software and for generating a set of expected corresponding target software output data;

storage means for storage of generated and recorded target

VOL
1127
ISS
1
JE
4
1991
UMI

software external stimuli as reference external stimuli and for storage of target software generated and recorded output data as a set of reference output data; and

control means having means for directing transmission of the stored reference external stimuli to the target software, means for controlling recording of the corresponding target software output data, and means for comparing the recorded output data with the stored reference output data to provide a verification user output.


1
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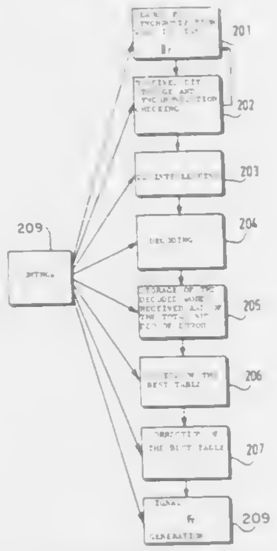
HOST COMPUTER with Control Software for testing apparatus
Communication circuit (host card)
4
Communication & monitoring circuit (target card)
TARGET COMPUTER with target software
3

5,022,029
DATA TRANSMISSION METHOD AND DEVICE

Hervé Guichon, Granges les Valence, France, assignor to Crouzet (Societe Anonyme francaise), Montrouge, France
Filed Feb. 17, 1989, Ser. No. 312,007
Claims priority, application France, Feb. 24, 1988, 88 02218
Int. Cl.^{5} G06F *11/10*
U.S. Cl. 371—38.1 6 Claims



1. A method of transmitting data between a source of data to be transmitted, connected via a transmission channel, and a user circuit for using the data received via the transmission channel, comprising the steps of:

forming words, all having the same number of bits from the data to be transmitted;

forming tables, each comprising a plurality of words to be transmitted; encoding each of the words of each of the tables in accordance with an error detecting and correcting code;

interleaving and temporarily storing the bits from each of the tables;

transmitting the bits of each of the stored tables having ranks of N−1, N−2 ..., N−R, via the transmission channel within a time period required for the formation of a stored table having a rank of N, N being a natural integer;

storing the bits received via said transmission channel to form a succession of receiving tables;

de-interleaving the bits of each of the receiving tables to form received words;

decoding each of the received words to detect and correct errors therein;

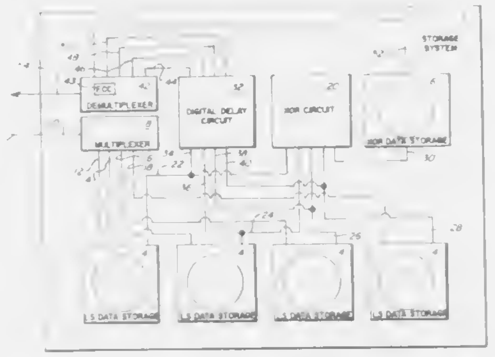
storing the decoded received words of each receiving table and an indication of total errors in each receiving table;

choosing a receiving table designated as best table from among receiving tables having the same rank; and

transmitting the words of the best table to the user circuit.

5,022,030
SKEWED XOR DATA STORAGE PROCESS

Dennis Haugh, Colorado Springs, Colo., assignor to Digital Equipment Corporation, Maynard, Mass.
Filed Mar. 17, 1989, Ser. No. 325,281
Int. Cl.^{5} G06F *11/10*
U.S. Cl. 371—51.1 22 Claims



1. A method of storing and retrieving high speed data information with a plurality of low sped data storage channels comprising the steps of multiplexing a high speed data signal into a selected number of low speed data signals, storing each one of said low speed data signals on a separate data storage channel, retrieving each of said stored low speed data signals from each respective one of said data storage channels, comparing said data in each of said retrieved low speed data signals in an exclusive or (XOR) relationship to form an XOR data signal, and minimizing write process data transfer time comprising the steps of:

storing said XOR data signal on an XOR data storage channel out of synchronization with said corresponding low speed data stored in said low speed data storage channels;

synchronously retrieving said stored low speed data signals from said low speed data storage channels and said stored XOR data signal from said XOR data storage channel; and

demultiplexing said retrieved low speed data signals to restore said high speed data signal.

5,022,031
SEMICONDUCTOR MEMORY COMPRISING AN ON-CHIP ERROR CORRECTION DEVICE, AND INTEGRATED CIRCUIT COMPRISING SUCH A SEMICONDUCTOR MEMORY

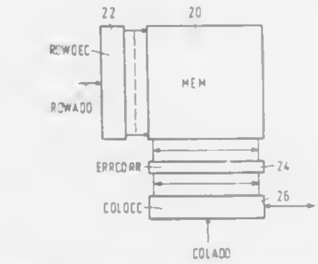
Constant P. M. J. Baggen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Continuation of Ser. No. 235,249, Aug. 22, 1988, abandoned. This application May 22, 1990, Ser. No. 526,968
Claims priority, application Netherlands, Aug. 26, 1987, 8701996
Int. Cl.^{5} G06F *11/10*
U.S. Cl. 371—43 33 Claims

1. A semiconductor memory, comprising:

a memory matrix of rows and columns of memory cells for storing data information and error protective redundant information, wherein the memory matrix comprises a succession of at least two complete patterns in a row direction of n columns each;

error correction means connected to column outputs of the memory matrix for operating according to an (n,k) spatial convolution code, wherein n>k, wherein within a complete pattern the redundant information fills a predetermined fixed fraction (n−k)/n of the pattern, said error correction means comprising, for each complete pattern:

input means connected to a plurality of column outputs of the memory matrix for forming a local presyndrome (am) and at least one subsidiary syndrome symbol;



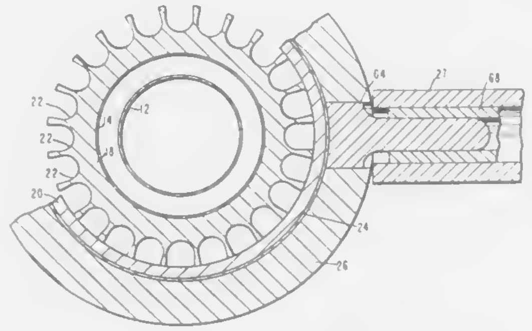
second means connected to the input means for receiving at least one subsidiary syndrome symbol (bm) from a neighboring pattern in a first direction, if present, and for forming a local syndrome by means of the local presyndrome;

combining means connected to the second means for forming, from the local syndrome and at least the one syndrome symbol of a neighboring pattern in a second direction, if present, a modification signal;

modification means connected to the combining means for modifying an information signal under the control of a respective modification signal.

5,022,032
PHASED COUPLED WAVEGUIDE LASER

Kuei-Ru Chien, Cerritos; John H. S. Wang, Rancho Palos Verdes, and James G. Jacobson, Torrance, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.
Filed May 14, 1990, Ser. No. 522,619
Int. Cl.^{5} H01S *3/098*
U.S. Cl. 372—18 14 Claims



1. A phase coupled waveguide laser comprising:

a pair of coaxially disposed cylindrical electrodes;

an annular body of dielectric material having an internal bore disposed between the electrodes and bounded thereby, said annular body of dielectric material having a plurality of symmetrically disposed elongated cavities disposed around the outer periphery thereof;

lasing gas medium disposed in each of the plurality of cavities;

a fully reflective mirror and a partially transmissive mirror closing opposite ends of the cavities;

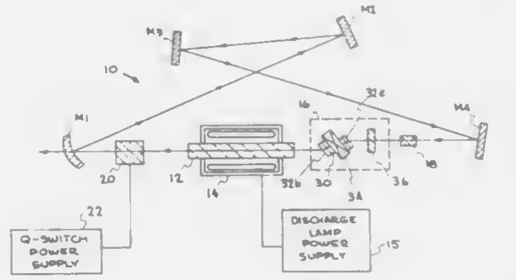
means connected to the electrodes for applying radio frequency lasing energy to the electrodes;

cooling means coupled to the internal bore of the annular body for cooling the cavities, and

coupling means to provide photon coupling between adjacent cavities whereby the laser energy of all waveguides is phase locked together.

5,022,033
RING LASER HAVING AN OUTPUT AT A SINGLE FREQUENCY

Lloyd A. Hackell, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.
Filed Oct. 30, 1989, Ser. No. 428,540
Int. Cl.^{5} H01S *3/11*
U.S. Cl. 372—25 22 Claims



1. A method of operating a laser to obtain an output pulse of laser radiation having a single wavelength, the laser including a resonator, a gain medium positioned in said resonator and a pump source, said method comprising the steps of:

(a), inserting an intracavity loss into the laser resonator, said loss being an amount that permits operation of the laser in the continuous waveform (cw) mode;

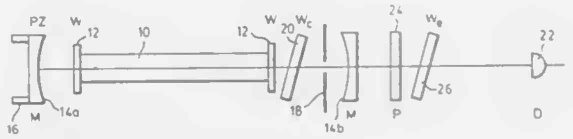
(b), operating the laser in the continuous waveform (cw) mode in said resonator;

(c), storing energy in the gain medium in an amount greater than the amount of energy needed to maintain cw operation;

(d), reducing the intracavity loss provided to said resonator in the step (a) so that excess energy stored in the gain medium in the step (c) is output from said resonator in the form of a pulse having a peak power larger than the cw power.

5,022,034
LASER DEVICE, INCLUDING CONTROL OF POLARIZATION MODE

A. D. May, 436 Palmerston Blvd., Toronto, Ontario, Canada M6G 2N8 , and G. Stephan, 26 Chemin de Quovadis 22, Tregastel, France
Filed Jun. 27, 1989, Ser. No. 371,894
Int. Cl.^{5} H01S *3/10*
U.S. Cl. 372—26 15 Claims



1. A laser device comprising:

a resonant cavity having an optical axis and a first reflection means at one end thereof on said optical axis and a second reflection means at the other end thereof on said optical axis, the second reflection means permitting at least some radiation to pass therethrough;

a gain medium within the resonant cavity, the gain medium and the resonant cavity being substantially quasi-isotropic;

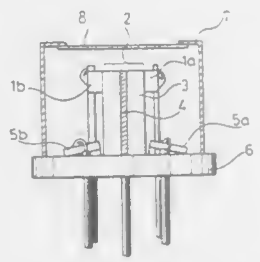
VOL
1127
ISS
1
JE
4
1991
UMI

- a polarizing means disposed on said optical axis outside the resonant cavity;
- a modifying means for modifying at least one of the polarization, frequency, phase and intensity of radiation passing therethrough, located on the optical axis; and
- a third reflection means mounted on the optical axis with the modifying means and the polarizing means located between the second and the third reflection means, to form a feedback section comprising the polarizing means, the modifying means and the third reflection means, the reflectivity of the third reflection means being such that radiation reflected back into the resonant cavity from the third reflection means through the modifying means, the polarization means and the second reflection means provides feedback to the resonant cavity with an intensity substantially less than the intensity of radiation within the resonant cavity, and one of the first reflection means and feedback section enabling radiation to be coupled out of the laser device;

wherein the strength of the anisotropy associated with the feedback into the resonant cavity is greater than any residual anisotropy of the gain medium and resonant cavity but not so great as to cause random behaviour within the device, whereby the feedback section can modify at least one of the polarization, frequency, phase and intensity of radiation fed back into the resonant cavity to effect switching between modes in the resonant cavity which are differentiated by their state of polarization.

5,022,035
SEMICONDUCTOR LASER DEVICE

Kazuyoshi Hasegawa, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan
Filed Feb. 13, 1990, Ser. No. 479,614
Claims priority, application Japan, Mar. 28, 1989, 1-77722
Int. Cl.^{5} H01S *3/045*
U.S. Cl. 372—36 3 Claims

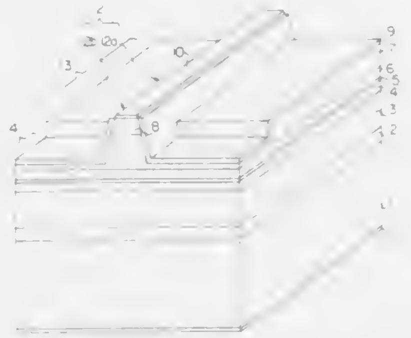


1. A semiconductor laser device comprising:

- a laminated heat sink comprising at least two electrically conductive element mounting portions, each element mounting portion having an element mounting surface, and an electrical and thermal insulator electrically and thermally isolating the element mounting portions from each other, said element mounting portions being laminated with said electrical and thermal insulator therebetween;
- a semiconductor laser element mounted to each of the element mounting surfaces; and
- a light receiving element corresponding to each laser element for monitoring light emitted by the respective laser element disposed proximate the element mounting surface on which the corresponding laser element is mounted.

5,022,036
SEMICONDUCTOR LASER DEVICE

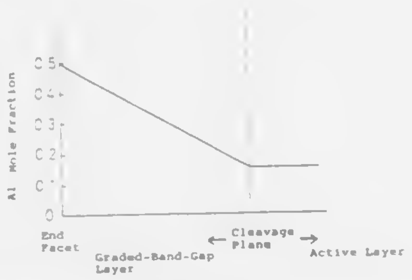
Takahiro Suyama, Tenri; Masafumi Kondo, Nara; Kazuaki Sasaki, Yao; Masahiro Hosoda; Kosei Takahashi, both of Nara, and Toshiro Hayakawa, Yokohama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Dec. 27, 1989, Ser. No. 456,673
Claims priority, application Japan, Dec. 29, 1988, 63-334122; Dec. 29, 1988, 63-334124; Dec. 29, 1988, 63-334128
Int. Cl.^{5} H01S *3/19*
U.S. Cl. 372—45 4 Claims



1. In a semiconductor laser device comprising a semiconductor substrate and a multi-layered crystal structure disposed on said substrate, said multi-layered crystal structure containing a first cladding layer, a quantum-well active layer for laser oscillation, and a second cladding layer with a striped ridge portion for current injection, said multi-layered crystal structure forming at least one facet, wherein the difference in the effective refractive index between the region underneath said striped ridge portion and the adjacent regions thereto is greater in a first region which is adjacent said facet than in a second region which is at a greater distance from said facet than said first region.

5,022,037
SEMICONDUCTOR LASER DEVICE

Hidenori Kawanishi, Nara; Hiroshi Hayashi, Soraku; Taiji Morimoto; Shinji Kaneiwa, both of Nara; Nobuyuki Miyauchi, Yamatokoriyama, and Seiki Yano, Kashihara, all of Japan, assignors to Sharp Kabushiki Kaisha, Japan
Filed Mar. 8, 1990, Ser. No. 489,180
Claims priority, application Japan, Mar. 13, 1989, 1-60422
Int. Cl.^{5} H01S *3/19*
U.S. Cl. 372—49 7 Claims

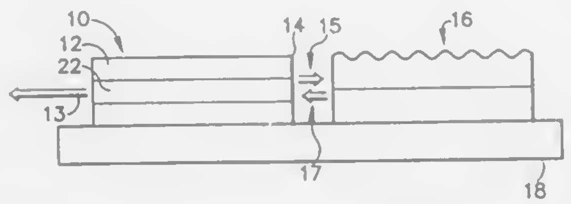


1. A semiconductor laser device which emits laser light from an end facet, comprising:

- a multi-layered structure formed on a semiconductor substrate,
- said multi-layered structure having an active layer for laser oscillation, and a pair of cleavage planes,
- a graded-band-gap layer formed on at least one of said cleavage planes,
- said graded-band-gap layer having a forbidden band gap which increases gradually with an increase in distance form said cleavage plane, and
- the surface of said graded-band-gap layer constituting said end facet.

5,022,038
WAVELENGTH TUNABLE DIODE LASER

Eric M. Bradley, San Diego, Calif., assignor to General Dynamics Corp./Electronics Division, San Diego, Calif.
Filed Dec. 28, 1989, Ser. No. 458,133
Int. Cl.^{5} H01S *3/19*
U.S. Cl. 372—50 5 Claims



1. An apparatus for generating a variable wavelength output optical signal comprising:

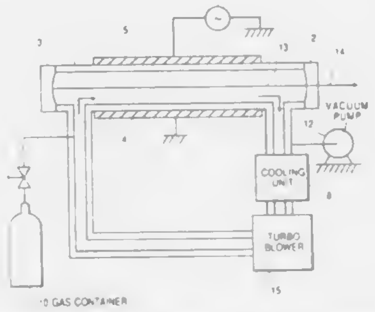
- signal generation means for generating said output optical signal;
- reflective feedback means sharing a common optical axis with said signal generation means, for receiving a portion of said output optical signal and for receiving an electrical tuning signal, said reflective feedback means comprising:
- an optical waveguide formed of electro-optically active material;
- a dielectric layer forming a surface on top of said waveguide and having a corrugated grating topology along a face parallel to the optical axis of said waveguide, wherein striations of said grating are transverse to said optical axis;
- tuning means, comprising first and second electrodes disposed on opposite sides of said waveguide for inducing, in response to said electrical tuning signal, an electrical field through said waveguide transverse to said optical axis;
- whereby said reflective feedback means is responsive to said electrical tuning signal so that a selected spectral component of said output optical signal portion having a certain wavelength is reflected along said optical axis in the direction of said signal generation means; and
- said signal generation means for receiving said selected spectral component and responsive thereto for emitting said output optical signal at said certain wavelength.

5,022,039
GAS LASER OSCILLATOR DEVICE

Norio Karube, Machida, and Tsutomu Funakubo, Fujiyoshida, both of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan
PCT No. PCT/JP89/01005, § 371 Date May 30, 1990, § 102(e) Date May 30, 1990, PCT Pub. No. WO90/04274, PCT Pub. Date Apr. 19, 1990
PCT Filed Sep. 29, 1989, Ser. No. 476,411
Claims priority, application Japan, Oct. 13, 1988, 63-258055; Nov. 26, 1988, 63-298499
Int. Cl.^{5} H01S *3/22*
U.S. Cl. 372—58 13 Claims

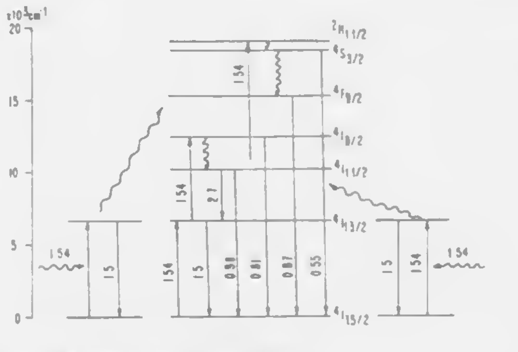
1. A gas laser oscillator device having an electric discharge tube for producing an electric discharge in a laser gas contained in the electric discharge tube for laser excitation, an optical resonator for effecting laser oscillation, and a gas circulating device having a gas blower and a cooling unit for forcibly cooling the laser gas,

- said blower comprises a turbo impeller mounted on a shaft and rotatable in the laser gas and an electric motor for rotating said shaft to drive said turbo impeller, said shaft being supported by bearings provided with a squeezed-film damper filler with grease whereby vibration of the blower is reduced.



5,022,040
UPCONVERSION PUMPED LASERS

Slava A. Pollack, Palos Verdes Estate, and David B. Chang, Tustin, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.
Continuation of Ser. No. 357,240, May 26, 1989, abandoned, which is a continuation-in-part of Ser. No. 183,509, Apr. 14, 1988, abandoned, which is a continuation-in-part of Ser. No. 869,270, May 30, 1986, abandoned. This application Oct. 30, 1990, Ser. No. 607,203
Int. Cl.^{5} H01S *3/09*
U.S. Cl. 372—69 23 Claims



1. A laser arrangement comprising:

- a laser resonator cavity;
- a laser medium, that incorporates lasing ions, disposed within said laser resonator cavity, said laser medium containing upcoverting material which allows for exchange of energy between electrons of lasing ions at a given energy state below a meta-stable initial lasing state so that some of said exchanging electrons are upconverted to energy states at or above the meta-stable initial lasing state; and
- pumping means operably coupled to said laser medium for selectively applying excitation energy to said laser medium said selected excitation energy having only wavelengths which are longer than the wavelength corresponding to the energy difference between said meta-stable initial lasing state and a ground state and having an intensity suitable for elevating electrons from energy levels below said given state to said given state in sufficient numbers to support substantial upconversion and continuous lasing, said pumping means and resulting upconversion being capable of serving as a sole means for pumping said laser medium.

VOL
1127
ISS
1
JE
4
1991
UMI

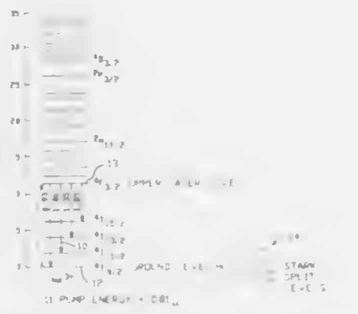
5,022,041
NEAR RESONANT ND^{3+}, SOLID STATE LASER SYSTEM

Ralph R. Jacobs, Fremont, Calif., assignor to Spectra-Physics, San Jose, Calif.

Filed Oct. 6, 1989, Ser. No. 418,287

Int. Cl.^{5} H01S *3/091*

U.S. Cl. 372—70 **15 Claims**



1 An apparatus for amplifying light, comprising:

a gain medium comprising Nd^{3+} ion doped host with a concentration greater than 1×10^{20} ions per cubic centimeter having a ground electronic state an excited electronic state serving as an upper laser level, the ground electronic state and the upper laser level being separated by a transition energy;

pump means, coupled with the gain medium, for supplying pump energy tuned to near the transition energy such that electrons in the ground electronic state are excited directly to the upper laser level; and

means, coupled with the gain medium, for inducing gain in the gain medium at a selected wavelength corresponding to transitions from the upper laser level to the ground electronic state, to produce light with power greater than 100 milliwatts.

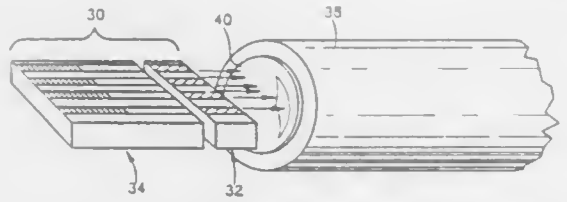
5,022,042
HIGH POWER LASER ARRAY WITH STABLE WAVELENGTH

Eric M. Bradley, San Diego, Calif., assignor to General Dynamics Corp., San Diego, Calif.

Filed Sep. 10, 1990, Ser. No. 580,100

Int. Cl.^{5} H01S *3/08, 3/094*

U.S. Cl. 372—75 **18 Claims**



1 A temperature stabilized diode laser assembly for providing high power output comprising:

a diode laser for emitting a plurality of longitudinal modes within a band of wavelengths, said plurality of longitudinal modes having a spacing; and

a waveguide adjacent to said diode laser, said waveguide comprising a first section and a second section, said first section having a length determined to create a lengthened cavity for said diode laser to decrease said spacing between said plurality of longitudinal modes and a second section having a Bragg grating disposed therein so that output of said laser assembly is a plurality of narrowly spaced longitudinal modes centered at a desired center frequency.

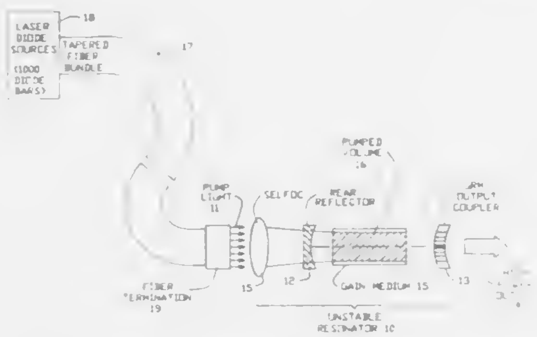
5,022,043
HIGH POWER DIODE-PUMPED SOLID STATE LASER WITH UNSTABLE RESONATOR

Ralph R. Jacobs, Freemont, Calif., assignor to Spectra-Physics, Mountain View, Calif.

Filed Dec. 20, 1989, Ser. No. 455,525

Int. Cl.^{5} H01S *3/08*

U.S. Cl. 372—95 **18 Claims**



11. A laser system comprising:

first optic means for transmitting radiation at a pump wavelength and for reflecting radiation at a cavity wavelength;

second optic means, mounted in relation to the first optic means to form an unstable optical cavity, for partially reflecting radiation at the cavity wavelength to establish a cavity mode and for partially transmitting radiation in the cavity mode to supply laser output;

a trivalent neodymium doped solid state gain medium, mounted within the unstable optical cavity, for providing laser gain for the cavity mode;

a plurality of semiconductor laser sources, each semiconductor laser source in the plurality generating a beam of radiation at the pump wavelength having a characteristic lateral and transverse widths;

a plurality of light transmitting fibers, each light transmitting fiber having an input end and an output end, and being coupled with a corresponding semiconductor laser source,

the input end of each fiber having a cross-section substantially matching the transverse and lateral widths of the beams generated by the corresponding semiconductor laser source, and being coupled to receive the beam of radiation generated by the corresponding semiconductor laser source,

the output ends of the plurality of light transmitting fibers being bundled to deliver the beams coupled into the fibers as a composite light source; and

a terminating mount adjacent to the first optic means and connected to the plurality of light transmitting fibers near the output ends, and a lens mounted between the first optic means and the terminating mount for guiding the composite light source through the first optic means into the gain medium to deliver pump energy.

5,022,044
DIRECTLY HEATABLE CRUCIBLE FOR INDUCTION MELTING FURNACES

Friedrich-Werner Thomas, Gelnhausen, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Aug. 9, 1989, Ser. No. 391,125

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1989, 3904607

Int. Cl.^{5} H05B *6/22*

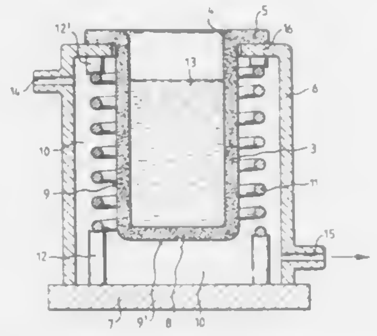
U.S. Cl. 373—151 **7 Claims**

1 An induction furnace for melting a material, comprising

a crucible made of the material to be melted,

a housing surrounding said crucible so that said housing and said crucible form a closed cooling chamber between said housing and said crucible, said housing having inlet means and outlet means for passing coolant through said chamber, and

an induction coil surrounding said crucible in said chamber.



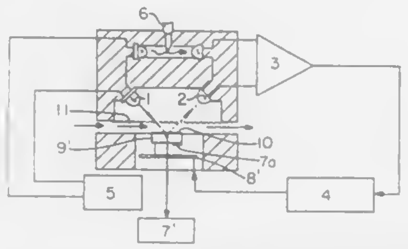
5,022,045
OPTICAL-TYPE, PHASE TRANSITION HUMIDITY-RESPONSIVE DEVICES

Stanley B. Elliott, 7125 Conelly Blvd., Walton Hills, Ohio 44146

Continuation of Ser. No. 312,601, Feb. 17, 1989, abandoned, which is a continuation of Ser. No. 194,345, May 16, 1988, abandoned, which is a continuation of Ser. No. 763,003, Aug. 6, 1985, abandoned. This application Jul. 5, 1990, Ser. No. 547,314

Int. Cl.^{5} G01N *25/12*

U.S. Cl. 374—20 **21 Claims**



1. An optical-type, humidity-responsive device for monitoring ambient humidity comprising (1) a source of illumination providing a light beam, (2) means for providing observable change in humidity comprising a film of a heat-stable, high birefringent, high melting point solid/liquid composition which of itself can rapidly and reversibly sense changes in the ambient humidity, which composition has a hydrated solid anisotropic and translucent salt phase characteristic of a first condition and a liquid isotropic and clear phase characteristic of a second condition, the solid/liquid composition comprising (1) a saturated aqueous salt solution and (2) a hydrated solid salt portion in said solution, said solid hydrated salt portion being maintained concurrently in equilibrium with the salt solution at any ambient humidity, the solid salt being birefringent and translucent and the solution being non-birefringent and optically clear, the rate of evaporation being equal to the rate of condensation at the surface of the film of the salt solution at its transition temperature, the solid/liquid composition's equilibrium being abruptly triggered at a particular level of water vapor pressure and temperature which is characteristic of and indicates a change in the ambient humidity, the salt being an alkali metal salt of an acid selected from a member of the group consisting of aliphatic, keto aliphatic, aliphatic in which at least one hydrogen is replaced by fluorine, hydroxy aliphatic, hydroxyketo aliphatic, and mixtures thereof, (3) means for determining the transition temperature of the solid/-liquid composition at the phase change transition point characteristic of any ambient humidity, (4) means for variably heating said solid/liquid composition film on a substrate to maintain the composition at the transition temperature at which phase change occurs, (5) light detecting means for detecting a visual signal of preselected brightness and intensity resulting from the composition intercepting the beam of light from the source of illumination at the transition temperature, said visual signal changing brightness and intensity in response to the triggering of the composition resulting from a change in the ambient humidity representation of a new ambient humidity and to define a correspondingly different visual signal, (6) means connecting said different visual signal to said heating means to activate the same and to adjustably maintain the composition at the transition temperature characteristic of the new ambient humidity, and (7) means for determining ambient humidity using the transition temperature at said transition point and the known vapor pressure of the salt solution at the transition temperature, and wherein there is a predetermined relationship between the vapor pressure versus temperature equilibrium curve of pure water and that of the saturated salt solution thus defining the particular solvent/liquid composition's equilibrium curve for the phase change sensed in which the saturated aqueous solution of the composition has a vapor pressure in the range of about 0.1 to 17.5 mm of mercury at 20° C., and whereby any equilibrium point of the chemical composition is related to an equivalent dew point of pure water.

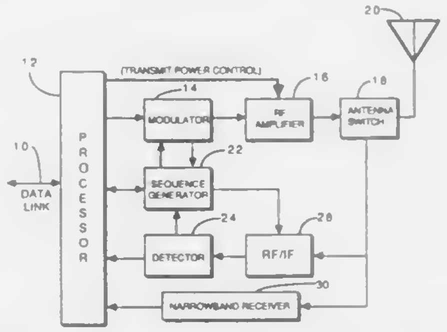
5,022,046
NARROWBAND/WIDEBAND PACKET DATA COMMUNICATION SYSTEM

Robert K. Morrow, Jr., Monument, Colo., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 14, 1989, Ser. No. 338,908

Int. Cl.^{5} H04L *12/56, 27/30*

U.S. Cl. 375—1 **4 Claims**



1. A packet data communication network with a plurality of nodes, employing features of unspread and spread signaling, wherein each node comprises a processor, a data link coupled to the processor for incoming and outgoing data signals, a transmitter comprising a modulator and an RF amplifier, with the modulator coupled to receive signals from the processor and the RF amplifier coupled to receive signals from the modulator and amplify them, means for coupling the RF amplifier to antenna means for propagation, a receiver comprising an RF/IF amplifier unit and a detector, with the RF/IF amplifier unit coupled to the antenna means for receiving signals and the detector coupled between the RF/IF amplifier unit and the processor, and a sequence generator coupled to the processor, to the modulator and to the detector, to provide control signals to and from the processor, control signals to the modulator, control signals to the RF/IF amplifier unit, status signals from the detector, and status signals from the modulator, a transmit power control line from the processor to the RF amplifier;

wherein the sequence generator includes means for outputting a given non-spreading waveform on a given unspread channel for an unspread mode, and means for outputting a given long spreading sequence which is common to all nodes in the network for a spread mode;

wherein the processor includes means for placing data signals from the data link in packet form by providing a data

VOL
1127
ISS
1
JE
4
1991
UMI

portion for each packet and attaching thereto a preamble, header, error control encoding, and any other information required by higher system protocols;

means for checking the unspread channel for activity by the processor sensing signals from the detector for presence or absence of an unspread signal;

wherein the modulator includes means for modulating the signals from the processor under the control of the sequence generator, beginning with transmission of the header of the packet using unspread signaling coupled with a given channel access protocol with said given non-spreading waveform on the given unspread channel, followed by transmission of the data portion of the packet as a spread-spectrum signal with said given long spreading sequence, the time between the end of the unspread signal and the start of spread transmission being identical for all transmitters on the network;

means effective when a node is idle, not receiving a packet, for causing the receiver to monitor a communication channel for unspread signals, with the sequence generator producing said given non-spreading waveform, each unspread signal being checked by the processor to determine if it contains a valid packet header, which means that the signal originated within the network and that no collision of headers occurred, and if the header shows that this particular receiver is not the recipient of the packet, the receiver continues to monitor the unspread channel; otherwise, the receiver switches to the spread mode and attempts to synchronize on the remainder of the packet; whereby since the time between the end of the unspread header and the beginning of the spread signal is known and independent of propagation delay, the receiver can synchronize rapidly on the spread signal;

means in the processor for then converting the packet into a data format and sending it via the data link.

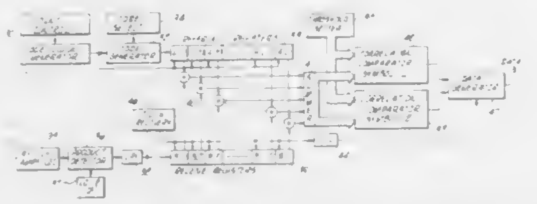
5,022,047

SPREAD SPECTRUM CORRELATOR

Robert C. Dixon, Palmer Lake, and Jeffrey S. Vanderpool, Colorado Springs, both of Colo., assignors to Omnipoint Data Corporation, Boston, Mass.

Filed Aug. 7, 1989, Ser. No. 390,315
Int. Cl.^{5} H04K *1/02*

U.S. Cl. 375—1 **27 Claims**



1. An apparatus for decoding a received spread spectrum signal having a data signal modulated with a PN code, comprising:

threshold setting means for analyzing the pattern and application of the data signal, noise environment, and amount of error correction, and determining upper- and lower-threshold levels;

first reference-sequence-storage means for storing a first pseudo-noise signal;

second reference-sequence-storage means for storing a second pseudo-noise signal;

receive-sequence-storage means for storing the received spread spectrum signal;

first chip-comparison means coupled to said first reference-sequence-storage means and said receive-sequence-storage means, and responsive to the received spread spectrum signal for comparing each chip of the received spread spectrum signal with each respective chip of the first pseudo-noise signal to generate a first plurality of chip-comparison signals;

first summer means coupled to said first chip-comparison means and responsive to the first plurality of chip-comparison signals for adding the first plurality of chip-comparison signals to generate a first correlation signal;

second chip-comparison means coupled to said second reference-sequence-storage means and said receive-sequence-storage means, and responsive to the received spread spectrum signal for comparing each chip of the received spread spectrum signal with each respective chip of the second pseudo-noise signal to generate a second plurality of chip-comparison signals;

second summer means coupled to said second chip-comparison means and responsive to the second plurality of chip-comparison signals for adding the second plurality of chip-comparison signals to generate a second correlation signal; and

comparison means coupled to said first summer means and said second summer means, and responsive to the first correlation signal being greater than the upper-threshold level for generating a first data-symbol signal, responsive to the first correlation signal being less than the lower-threshold level for generating a second data-symbol signal, responsive to the second correlation signal being less than the lower-threshold level for generating a third data-symbol signal, and responsive to the second correlation signal being greater than the upper-threshold level for generating a fourth data-symbol signal.

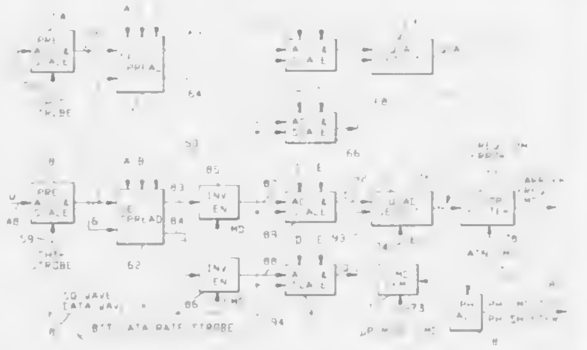
5,022,048

PROGRAMMABLE DIGITAL FREQUENCY-PHASE DISCRIMINATOR

Samuel C. Kingston; Steven T. Barham, both of Salt Lake City, and Harold L. Simonsen, West Valley City, all of Utah, assignors to Unisys Corp., Blue Bell, Pa.

Filed Jul. 26, 1990, Ser. No. 559,016
Int. Cl.^{5} H04L *27/30*

U.S. Cl. 375—1 **11 Claims**



1. A programmable digital frequency-phase discriminator, comprising:

a real (I) data channel for receiving input data,

an imaginary (Q) data channel for receiving input data,

a first programmable despreader coupled to said I data channel and to said Q data channel and having an I data output and a Q data output,

first and second programmable data rate filter means connected to said I data output and said Q data output of said data rate filter means respectively,

quadrant detector means having inputs coupled to the outputs of said first and second data filter means for determining the sign and quadrant phase angle of the largest magnitude I or Q component of data sample input,

a second programmable despreader connected to said I data channel and to said Q data channel and having an I data output and a Q data output,

third and fourth programmable data rate filter means connected to said I data despreader output and said Q data despreader output of said data rate filter means respectively,

independently controlled inverters connected in series in said I data input lines and said Q data input lines to said third and fourth data rate filter means,

quadrant selector means having inputs coupled to the output error signals from said third and said fourth data rate filter means for selection of an error signal output, and

a command generator coupled to said quadrant detector and to said quadrant selector for generating a predetermined selected I data error signal or Q data error signal and for providing either a frequency or phase error output.

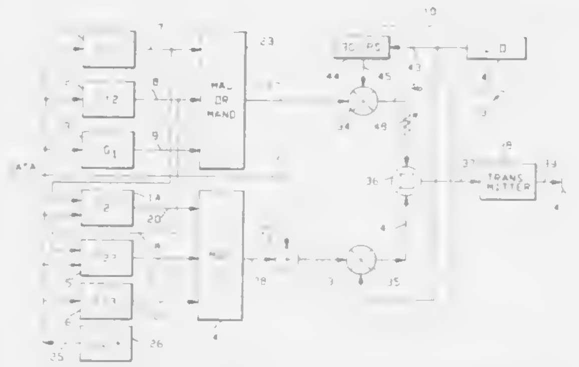
5,022,049

MULTIPLE ACCESS CODE ACQUISITION SYSTEM

Curtis M. Abrahamsoo, North Salt Lake; John W. Zscbeile, Jr., Farmington, and Vaughn L. Mower, Bountiful, all of Utah, assignors to Unisys Corp., Blue Bell, Pa.

Filed Nov. 21, 1989, Ser. No. 440,002
Int. Cl.^{5} H04L *27/30*

U.S. Cl. 375—1 **19 Claims**



1. Apparatus for generating a complex composite code for fast acquisition by multiple users, comprising:

a quadrature channel composite code generator having a plurality of individual component code generators coupled thereto and

means for combining said component codes in a manner which provides a composite code in a quadrature channel having partial correlation between said individual component codes and the combined composite code,

an in-phase channel composite code generator having a plurality of individual component code generators coupled thereto and

means for combining said component codes in a manner which provides a composite code in an in-phase channel ideally having no correlation between said individual component codes and the combined in-phase channel composite code,

means for deriving individual component codes in said in-phase channel from corresponding individual component code generators in said quadrature channel so that the derived individual component codes are in-phase with corresponding individual component codes,

carrier generation means,

modulator means for combining said in-phase channel composite code and said quadrature channel composite code onto said carrier so that said composite codes are combined as a complex carrier modulated code, and

a source of data coupled to one of said composite codes.

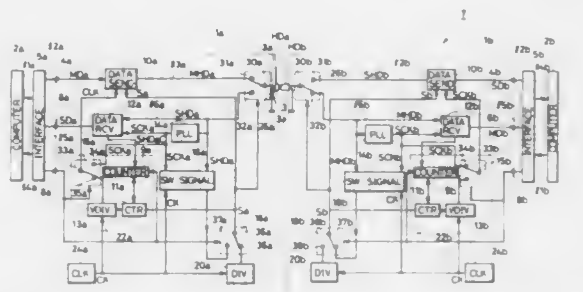
5,022,050

SERIAL DATA COMMUNICATION DEVICE

Takeshi Tanaka, Hiroshima, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 3, 1989, Ser. No. 374,868
Claims priority, application Japan, Jul. 5, 1988, 63-168027
Int. Cl.^{5} H04J *3/00;* **H04L** *5/14*

U.S. Cl. 375—7 **4 Claims**



1. A serial data communication system for bidirectional communication in which serial data having a predetermined constant data length are sent and received alternately for each predetermined constant period between first and second transceiver means through a single signal line;

said first transceiver means comprising

first clock signal generating means for generating clock signals having a variable frequency;

means for determining a remaining constant predetermined period between termination of reception of the serial data from said second transceiver means and termination of said predetermined period;

clock signal frequency determining means responsive to the remaining period determination output from said remaining period determining means for controlling the frequency of the clock signals generated from said first clock signal generating means; and

transmitter means for transmitting the serial data based on the clock signal frequency determined by said clock signal frequency determining means;

said second transceiver means comprising

second clock signal generating means responsive to the received serial data for generating clock signals having the same frequency as the transmit frequency which the received serial data has been transmitted based on; and

transmitter means for transmitting the serial data based on the clock signals from said second signal generating means.

5,022,051

DC-FREE LINE CODE FOR ARBITRARY DATA TRANSMISSION

Douglas Crandall, Berkeley; Steven R. Hessel, Campbell; Thomas Hornak, Portola Valley, all of Calif.; Rasmus Nordby, Horsholm, Denmark; Kent H. Springer, Westford, Mass., and Craig Corsetto, Ijamsville, Md., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 2, 1988, Ser. No. 266,459
Int. Cl.^{5} H04L *25/06, 25/32*

U.S. Cl. 375—19 **18 Claims**

1. A method of encoding data for transmission over a communications link comprising the steps of:

obtaining a plurality of N data bits, where N is a positive integer;

forming a group of bits by including an indicator bit of known value to said N data bits in a predefined location within said group of bits;

determining whether said group of bits has a positive polarity such that said group of bits contains more logical one bits than logical zero bits or whether said group of bits has

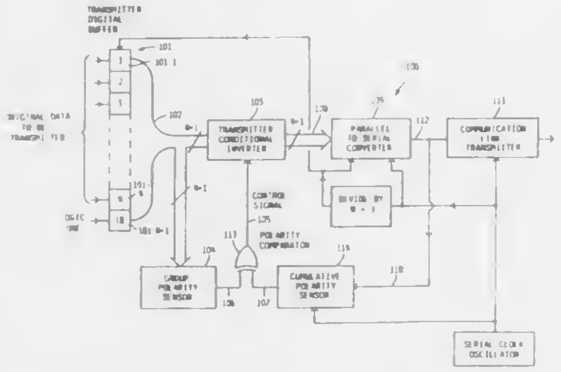
VOL
1127
ISS
1
JE
4
1991
UMI

a negative polarity such that said group of bits contains less logical one bits than logical zero bits;

maintaining a cumulative polarity value of the bits previously transmitted over said communications link, said cumulative polarity value being positive when more logical one bits than logical zero bits have been transmitted and said cumulative polarity value being negative when less logical one bits than logical zero bits have been transmitted, said step of maintaining a cumulative polarity value comprising the steps of:

receiving said group of bits consisting of said plurality of N data bits and said indicator bit;

separating said group of bits into a plurality of subgroups of bits; and


TRANSMITTER DIGITAL BUFFER
101
101 1
1
2
3
105
TRANSMITTER CONDITIONAL INVERTER
PARALLEL TO SERIAL CONVERTER
COMMUNICATION LINK TRANSMITTER
111
CONTROL SIGNAL
DIVIDE BY N + 1
POLARITY COMPARATOR
GROUP POLARITY SENSOR
CUMULATIVE POLARITY SENSOR
SERIAL CLOCK OSCILLATOR
118

for each of said subgroups of bits, incrementing or decrementing said cumulative polarity value by an appropriate number utilizing memory means having address input leads connected to receive each of said subgroups of bits, in sequence, and a data output port for providing an output signal indicating whether said cumulative polarity value should be incremented or decremented, and said appropriate number; and

forming a set of bits to be transmitted by inverting all bits within said group of bits when said group of bits has a polarity which is the same as said cumulative polarity, and not inverting the bits within said group of bits when said group of bits has a polarity which is the opposite of said cumulative polarity.

5,022,052

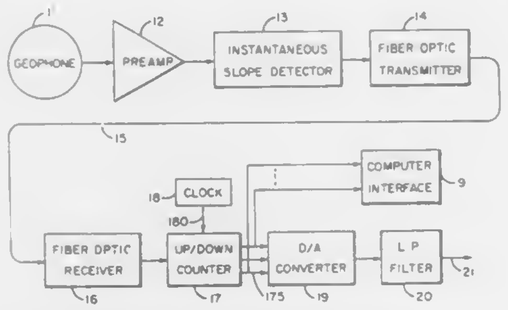
ANALOG SIGNAL BINARY TRANSMISSION SYSTEM USING SLOPE DETECTION

H. Bruce Stephens, Tulsa, Okla., assignor to Seismograph Service Corp., Tulsa, Okla.

Filed Nov. 13, 1987, Ser. No. 121,508

Int. Cl.^{5} H04B *14/04*

U.S. Cl. 375—25 **10 Claims**



1. A signal transmission system comprising:

a source of an input electrical analog signal;

a transmitter comprising:

means for providing a serial train of binary signal levels with changes in said binary signal levels corresponding to changes in slope of said input electrical analog signal;

means, fed by said serial train for providing a binary transmit signal having a carrier frequency modulated by said serial train of binary signal levels;

a receiver;

transmission means for providing said transmit signal to said receiver;

said receiver comprising:

means for detecting said binary transmit signal to provide a received binary signal;

means connected to said detecting means and responsive to said received binary signal for providing a received output signal corresponding to changes in slop of said input electrical analog signal.

5,022,053

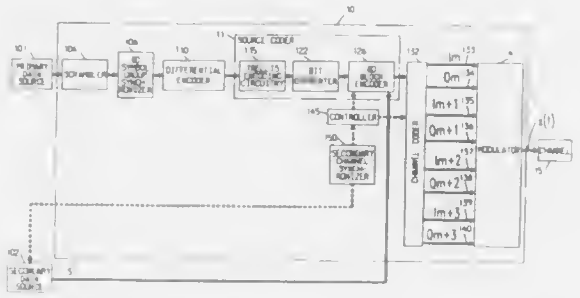
DATA COMMUNICATIONS WITH ALTERNATION OF SIGNALING CONSTELLATIONS

Hong Y. Chung, Eatontown, and Michael D. Rauchwerk, Holmdel, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 10, 1989, Ser. No. 335,257

Int. Cl.^{5} H04J *15/00;* **H04L** *27/34*

U.S. Cl. 375—39 **28 Claims**



1. Apparatus comprising

means for receiving a stream of data bits,

means responsive to one or more of said data bits for applying to a communication channel an individual one channel symbol of a selected one of a predetermined plurality of sets of channel symbols, and

control means for selecting individual ones of said predetermined plurality of sets of channel symbols in repetitive alternation.

5,022,054

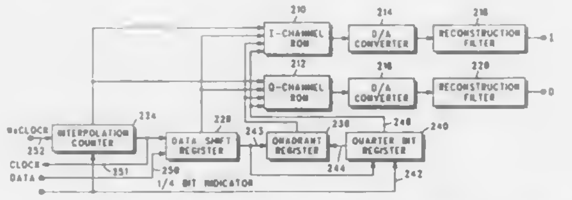
DIGITAL GMSK MODULATOR WITH NON-INTEGER BIT INTERVAL HANDLING

Chih-Fei Wang, Arlington Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 278,080, Nov. 30, 1988, abandoned. This application May 25, 1990, Ser. No. 530,482

Int. Cl.^{5} H03K *7/06;* **H04L** *27/12*

U.S. Cl. 375—64 **14 Claims**



1. A modulation arrangement having at least one preprogrammed memory device which may be selectively addressed so that it generates a representative digital waveform based on an input data stream, a clock signal, and the preprogrammed contents of the memory device, wherein the digital waveform is converted to an analog signal, by a digital-to-analog converter, for radio frequency modulation to provide a modulated carrier, the improvement comprising:

means for selectively addressing the memory device, for specifying the phase of the analog signal, in response to a signal indicative of a noninteger bit interval, whereby the phase continuity of the modulated carrier is maintained.

5,022,055

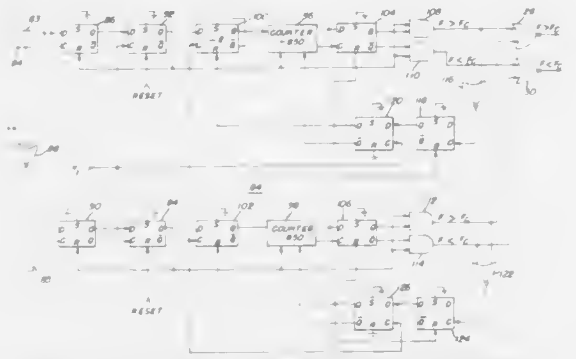
TRUNK DIALING CONVERTER

James H. Leveque, Ellicott City, Md., assignor to AMAF Industries, Inc., Linthicum, Md.

Division of Ser. No. 187,442, Apr. 28, 1988, Pat. No. 4,868,861. This application Jul. 3, 1989, Ser. No. 374,771

Int. Cl.^{5} H04L *27/14*

U.S. Cl. 375—82 **8 Claims**



1 A frequency shift keyed signal detector comprising:

means for converting received FSK signals having a monitored frequency f to square wave signals;

pulse counter means responsive to clock frequency pulses of a predetermined frequency from a clock frequency generator and being triggered by signals corresponding to the leading edge of square wave signals from said converting means for generating a square wave pulse output at the center frequency f_c of the FSK signals received;

first circuit means coupled to said pulse output from said counter means and also to said signals corresponding to the leading edge signals for generating a first and second square wave signal which respectively provide a measure of whether the monitored frequency f of the FSK signal being received is greater than $(f>f_c)$ or less than $(f<f_c)$ said center frequency f_c; and

second circuit means including means for being alternatively triggered by said first and second square wave signals for generating a binary output signal having a first binary value when the FSK signal received is greater than said center frequency and having a second binary value when the FSK signal received is less than said center frequency.

5,022,056

METHOD AND STRUCTURE FOR DIGITAL PHASE SYNCHRONIZATION

Richard D. Henderson, Sunnyvale, and Frederick K. Yin Leung, Cupertino, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Oct. 23, 1989, Ser. No. 425,796

Int. Cl.^{5} H03D *3/24*

U.S. Cl. 375—119 **19 Claims**

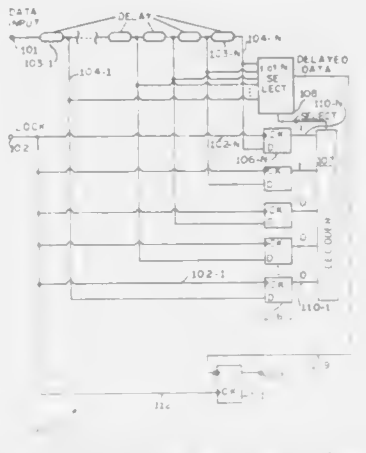
1. A phase synchronization circuit comprising:

an input port for receiving an input signal;

a clock input lead for receiving an input signal;

a plurality of N delay means, each having an associated time delay unrelated to said clock signal, each said delay means not having absolute accuracy requirements with respect to each other or with respect to said clock signal, for providing a plurality of delayed input signals in response to said input signal;

a plurality of N phase detector means, each having an input lead connected to receive an associated one of said delayed input signals, a clock input lead for receiving said clock signal, and an output signal for providing an indication of the phase relation between its associated one of said delayed input signals and said clock signal;



decoder means for receiving said output signals from said phase detector means and in response thereto determining which one of said delayed input signals has a desired phase relationship with said clock signal, said decoder means comprising a plurality of exclusive OR gates, each of said exclusive OR gates having a first input lead connected to receive the output signals of two of said phase detector means; and

selector means for selecting said one of said delayed input signals which has said desired phase relationship with said clock signal.

5,022,057

BIT SYNCHRONIZATION CIRCUIT

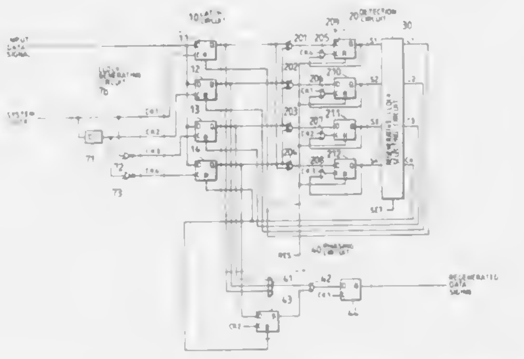
Yumiko Nishi, Tokyo; Yutaka Torii; Norihumi Komatu, both of Yokohama, and Seiichi Takaki, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Communication Systems, Inc., Yokohama, both of, Japan

Filed Mar. 9, 1989, Ser. No. 321,141

Claims priority, application Japan, Mar. 11, 1988, 63-56081; Jun. 22, 1988, 63-152320

Int. Cl.^{5} H03L *7/00*

U.S. Cl. 375—119 **8 Claims**



1. A bit synchronization circuit provided for an individual subscriber's line in a telephone exchange system, comprising:

latch means for receiving a plurality of clocks of different phases from a clock generating circuit provided in com-

VOL
1127
ISS
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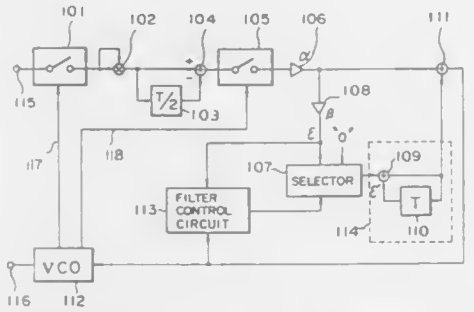
JE
4
1991
UMI

mon to a plurality of bit synchronization circuits in said telephone exchange system, latching an input data signal transmitted thereto through said subscriber's line in response to said plurality of clocks of different phases, and providing latched output signals corresponding to said plurality of clocks of different phases;
detecting means for receiving said latched output signals from said latch means, and comparing said latched output signals to detect a plurality of points at which a variation in phase of said input data signal occurs in a predetermined time period;
regenerative output selecting means for receiving a detecting signal representing whether a variation in phase of said input data signal is detected by said detecting means, and selecting a latched output signal among said plurality of latched output signals provided by said latch means; and
phasing means for phasing said latched output signal selected by said regenerative output selecting means.

5,022,058
TIMING SIGNAL RECOVERY CIRCUIT FOR A DATA TRANSMISSION SYSTEM

Atsushi Yoshida, Tokyo, and Takanao Suzuki, Shizuoka, both of Japan, assignors to NEC Corporation, Japan
Filed Dec. 21, 1989, Ser. No. 454,276
Claims priority, application Japan, Dec. 23, 1988, 63-323715
Int. Cl.^{5} H03D *3/24*
U.S. Cl. 375—120 **11 Claims**

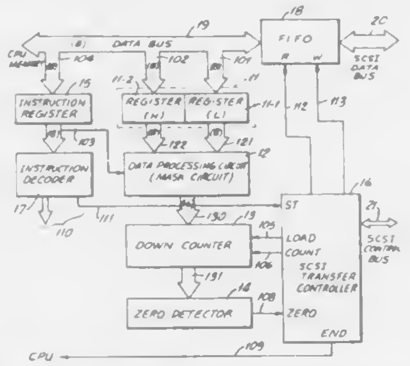


1. A timing signal recovery circuit comprising:
local timing signal generator means for generating a local timing signal;
phase-difference detector means for generating a phase-difference signal V_i representing the phase-difference between a timing signal having the baud-rate of a received signal and said local timing signal;
loop filter means having two transfer functions $H_1(s)$ and $H_2(s)$ for generating a control voltage V_c to control the phase of said local timing signal by smoothing said phase-difference signal V_i by means of a selected one of said two transfer functions; and
control means for generating a selection signal to select one of said two transfer functions of said loop filter in response to said control voltage V_c and said phase-difference signal V_i.

5,022,059
COUNTER CIRCUIT PRESETTABLE WITH A PLURALITY OF COUNT VALUES

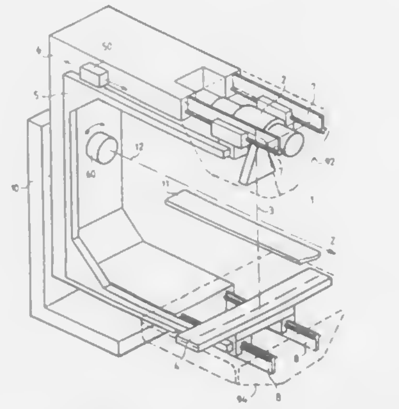
Tomohisa Arai, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan
Filed Jul. 13, 1989, Ser. No. 380,173
Claims priority, application Japan, Jul. 13, 1988, 63-175803; Sep. 20, 1988, 63-237018
Int. Cl.^{5} H03K *21/02*
U.S. Cl. 377—39 **9 Claims**

1. A counter circuit comprising storage means for temporarily storing a count data signal having information on a plurality of count values, a first terminal supplied with a count value control signal, data processing means coupled to said storage means and said first terminal for producing first count value data from said count data signal when said count value control signal assumes a first state and for producing second count value data from said count data signal when said count value control signal assumes a second state, a second terminal supplied with an input signal to be counted, counter means coupled to said data processing means and said second terminal for producing a detection signal when an occurrence time number of said input signal reaches said first or second count value data produced by said data processing means, a utilization circuit coupled to said counter means for utilizing said detection signal, a register for temporarily storing command data for controlling said utilization circuit, said command data consisting of a plurality of bits, and means coupled to said register and said first terminal for supplying said count value control signal to said first terminal in response to a predetermined bit of said command data.



5,022,060
HIGH ACQUISITION RATE TOMOGRAPHY BY TRANSLATIONAL STEP ROTATION

Jacques Trotel, Palaiseau, France, assignor to General Electric CGR SA, Issy les Moulineaux, France
Filed May 2, 1989, Ser. No. 346,599
Claims priority, application France, May 6, 1988, 88 06138
Int. Cl.^{5} A61B *6/00*
U.S. Cl. 378—19 **13 Claims**

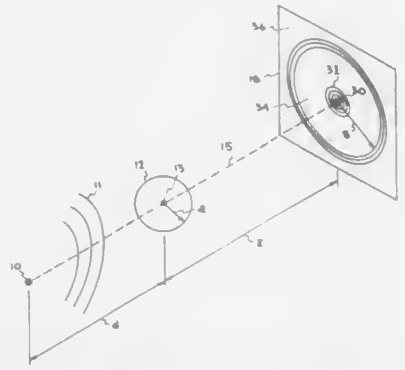


1. A tomography device comprising:
an X-ray tube/multiple detector set provided with an X-ray tube arranged so as to emit radiation towards a multidetector with which it is mechanically associated,
rotating means to make the set rotate on an axis of rotation said axis passing transversally between the tube and the multidetector, a resulting rotation angle of said set having an exploration angular value so necessary for the reconstruction of an image of an object placed between said tube and said multidetector

translation means to cause at least said multidetector to move along this axis of rotation, a length of this translation corresponding to least to a length of a region to be examined of said object
means to process signals given by the multidetector in order to produce images of the interposed object
the rotation means comprise means to make the set rotate a total angle equal to said exploration angular value in such a manner that a mean tangential speed of said multidetector be less than a translation speed of said multidetector and, as a result, that the duration of the total rotation of said set be greater than the necessary duration for the multidetector to translate at least one time over the entire length to be examined,
and means to make the tube transmit during the translation displacement.

5,022,061
AN IMAGE FOCUSING MEANS BY USING AN OPAQUE OBJECT TO DIFFRACT X-RAYS

Gary E. Sommargren, Santa Cruz, and H. Joseph Weaver, Livermore, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.
Filed Apr. 30, 1990, Ser. No. 516,401
Int. Cl.^{5} G21K *1/06, 7/00*
U.S. Cl. 378—84 **29 Claims**

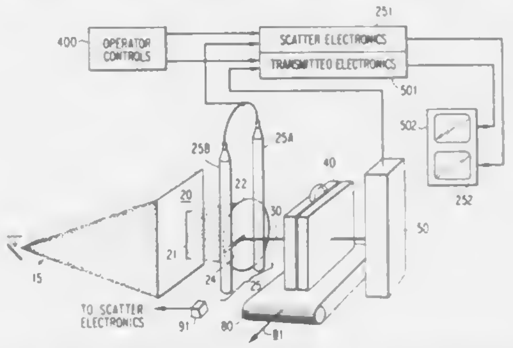


1. An apparatus for imaging x-rays, comprising:
an extended x-ray source which comprises a plurality of x-ray point sources which emit or transmit x-rays;
a diffractive imaging element having an opaque spheric section which has a solid opaque circular cross section which is perpendicular to an axial line which extends through the x-rays source and the opaque spheric section and wherein the diffractive imaging element creates a circular shadow, the center of which contains an image of the extended x-ray source with a large depth of field, and wherein the extended source is on a first side of the diffractive imaging element; and
a screen, on which an image of the extended x-ray source is formed, located on a second side of the diffractive imaging element opposite to the first side of the diffractive imaging element, and wherein the screen is located along the axial line.

5,022,062
AUTOMATIC THREAT DETECTION BASED ON ILLUMINATION BY PENETRATING RADIANT ENERGY USING HISTOGRAM PROCESSING

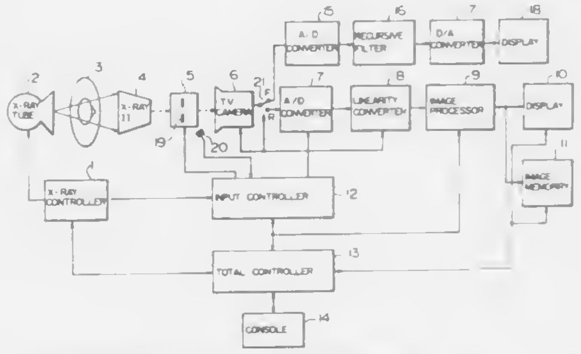
Martin Annis, Cambridge, Mass., assignor to American Science and Engineering, Inc., Cambridge, Mass.
Filed Sep. 13, 1989, Ser. No. 406,333
Int. Cl.^{5} G01N *23/201*
U.S. Cl. 378—86 **20 Claims**

1. A threat detecting system comprising:
an illumination source comprising a flying spot of penetrating radiation,
conveying means for transporting an object to be inspected through an inspection field swept by said flying spot of penetrating radiation,
first radiation detecting means, located between said illumination source and said conveying means, for detecting radiation scattered by an object transported through said inspection field and for developing a sequence of scatter signals representative of a sequence of scattered radiation,
processing means responsive to said sequence of scatter signals for determining whether or not said object poses a threat, said processing means including:
distribution means responsive to said sequence of scatter signals for determining scatter signal intensity distribution,
means for comparing said scatter signal intensity distribution to a characteristic of limiting signal number at each of a plurality of signal intensities, and
alarm means for generating an alarm only if said scatter signal intensity distribution exceeds said characteristic of limiting signal number for an intensity for which said characteristic is defined.



5,022,063
MULTIPLE-MODE SCANNING AND BEAM CURRENT CONTROL X-RAY TV APPARATUS

Hisatake Yokouchi, Tokyo; Yoichi Ooodera, Hachioji; Takakazu Funo, Tokyo, and Masayuki Tsuneoka, Kashiwa, all of Japan, assignors to Hitachi Medical Corporation, Tokyo, Japan
Filed Jan. 23, 1990, Ser. No. 468,692
Claims priority, application Japan, Jan. 25, 1989, 01-013952
Int. Cl.^{5} H05G *1/64;* **H04N** *5/32*
U.S. Cl. 378—99 **17 Claims**



1. A radiographic apparatus comprising:
image conversion means for converting an X-ray image into an optical image;
an image pickup tube disposed to be coupled with said image conversion means for picking up said optical image;
beam scanning control means for selectively performing one

VOL
1127
ISS
1
JE
4
1991
UMI

of a plurality of modes which are included as beam scanning modes for said image pickup tube and between each of said plurality of modes the number of scanning lines per one frame and the frame rate per unit time is different;

mode selection means for designating one of said plurality of modes; and

target voltage control means including setting means for setting a target voltage of said image pickup tube for each of said plurality of modes, said target voltage control means applying to a target of said image pickup tube a target voltage which corresponds to the mode designated by said mode selection means.

5,022,064
X-RAY OPTICAL SYSTEM FORMED BY MULTILAYER REFLECTING MIRRORS FOR REFLECTING X-RAYS OF DIFFERENT WAVELENGTHS

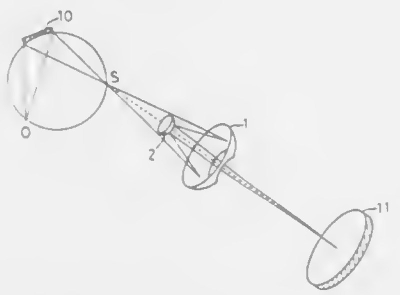
Yoshinori Iketaki, Oume, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 2, 1990, Ser. No. 474,152

Claims priority, application Japan, Feb. 10, 1989, 1-31932

Int. Cl.^{5} G21K *1/00, 7/00*

U.S. Cl. 378—145 17 Claims



1. An X-ray optical system comprising at least two multilayer reflecting mirrors for focusing at a predetermined position X-rays radiated from a ray source, wherein each of said multilayer reflecting mirrors has a mirror surface for reflecting X-rays of different wavelengths, and the wavelengths of the X-rays reflected by one reflecting mirror are substantially the same as the wavelengths of the X-rays reflected by another reflecting mirror.

5,022,065
X-RAY FILM HOLDER

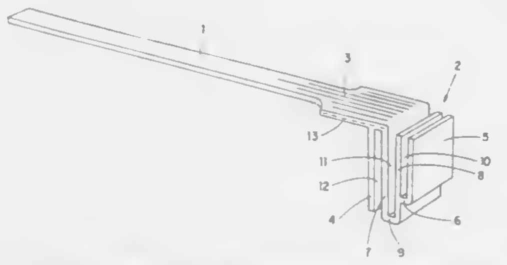
Karin Wijkström, Trastvägen 12, S-230 10, Skanör, Sweden

Filed Nov. 16, 1989, Ser. No. 437,391

Claims priority, application Sweden, Nov. 24, 1988, 8804242

Int. Cl.^{5} A61B *6/14;* **G03B** *42/02, 42/04*

U.S. Cl. 378—168 7 Claims



1. An x-ray film holder for disposition of inter-oral dental X-ray film in the oral cavity of a patient, comprising:

(1) a substantially flat bite portion for securing a portion of the holder in the oral cavity by the bite thereof of a patient so that an occlusion plane of the bite will lie on each side of the flat bite portion;

(2) a handle for manipulating the holder into and in the oral cavity, said handling being connected to said flat bite portion and configured so as to extend outside of the oral cavity when the holder is in place in the oral cavity;

(3) a holder head for holding and positioning the X-ray film in the oral cavity, said holder head being connected to said flat bite portion and being configured so as to be disposable in the oral cavity and said holder head having three separate slots therein, wherein:

(a) a first slot is configured for holding the X-ray film in the bite-wing position where the crowns of teeth and border portions of the bone in both jaws next to the so-positioned film are X-ray imagable by said film;

(b) a second slot is configured for holding X-ray film in the upraised bite-wing position where the crowns of teeth and border portions of the bone in both of the jaws next to the so-called positioned film are X-ray imagable by said film; and

(c) a third slot is configured for holding X-ray film in the apical position where the crowns of teeth, roots of teeth and the associated bone in one jaw only next to the so-positioned film are X-ray imagable by said film.

5,022,066
METHOD OF AND DEVICE FOR FORMING LAYER IMAGES OF AN OBJECT

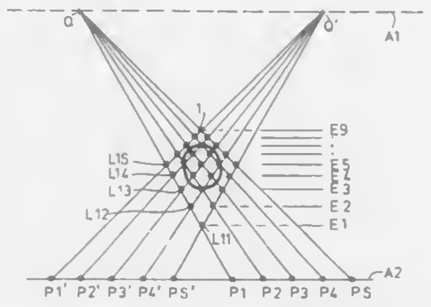
Paul R. Haaker, Hamburg; Erhard P. A. Klotz, Halstenbek; Reiner H. Koppe, Hamburg, and Rolf E. Linde, Haseldorf, all of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.

Filed Nov. 15, 1985, Ser. No. 798,507

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1984, 3442448

Int. Cl.^{5} G06F *15/00*

U.S. Cl. 378—2 5 Claims



1. A method of forming images of layer of an object, said method comprising the steps of:

irradiating the object from a plurality of radiation source positions to form a plurality of separate single-shadow images, each single-shadow image comprising a plurality of shadow-image points, each shadow-image point having an image value proportional to the amount of radiation passing through the object and landing on the shadow-image point;

storing the image value for each of said shadow image points making up such single shadow image in a first memory;

transfering the image values of each of said shadow-image points to a second memory and erasing a third memory;

forming a layer image value from said image value stored in said second memory for each of a plurality of layer image points in each of a plurality of images of different layers of the object, each layer image value being formed from the image values of all shadow-image points geometrically associated with the layer image point;

accumulating each layer image value of said plurality of images of different layers in said third memory to form a correction value for each shadow-image point, each correction value being equal to the sum of the layer image values of all layer image points geometrically associated with the shadow-image point;

forming a modified image value for each shadow-image point, each modified-image value being equal to the difference between the image value of the shadow-image point stored in said first memory and the correction value of the shadow-image point stored in said third memory multiplied by a standardization factor; and

storing a modified layer image value in said second memory for each layer image point, each modified layer image value being formed from the modified image values of all shadow-image points geometrically associated with the layer image point.

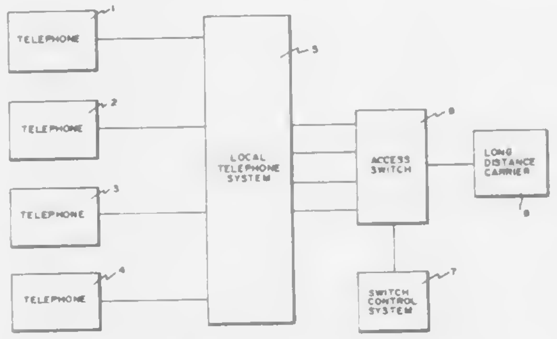
5,022,067
TELEPHONE CALL SECURITY SYSTEM

Fred P. Hughes, Trumbull, Conn., assignor to Millicom Incorporated, New York, N.Y.

Filed Apr. 20, 1990, Ser. No. 512,112

Int. Cl.^{5} H04M *11/00*

U.S. Cl. 379—95 45 Claims



1. A telephone call security system, comprising:

a telephone including tone generation means for generating and transmitting tones representative of a telephone identification serial number when a telephone call is placed from the telephone; and

a control switch device including means for permitting access from said telephone to a restricted access carrier, means for receiving said tones representative of a telephone identification serial number, and identification verification means verifying whether said identification number corresponds to the identification of a telephone from which access to the carrier is permitted;

wherein said control switch device further includes coded signal generation means for generating and transmitting to said telephone a coded sequence of tones subsequent to verification of said identification number, means for receiving from said telephone a reply in which said tones are modified in respect to said coded sequence of tones, and means for verifying whether said reply sequence of tones is valid.

5,022,068
BRANCHED TELEPHONE SYSTEM

Hisashi Fujisaki, and Keiko Shimada, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Mar. 2, 1988, Ser. No. 162,878

Claims priority, application Japan, Mar. 5, 1987, 62-51282

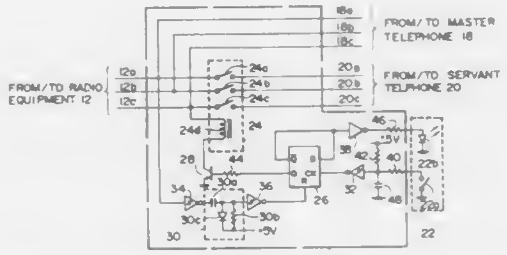
Int. Cl.^{5} H04Q *7/04*

U.S. Cl. 379—62 4 Claims

1. A branched telephone system having a plurality of telephones which are connected to equipment, comprising:

priority setting means responsive to a control signal for establishing a priority set condition in which a particular one of said plurality of telephones is usable and with the other of said plurality of telephones being invalidated in function, said plurality of telephones being usable during conditions other than when said particular one telephone is in said priority set condition;

switch means for manually generating said control signal; and



priority cancelling means for cancelling said priority set condition by detecting a change in an on-hook/off-hook condition of said particular telephone.

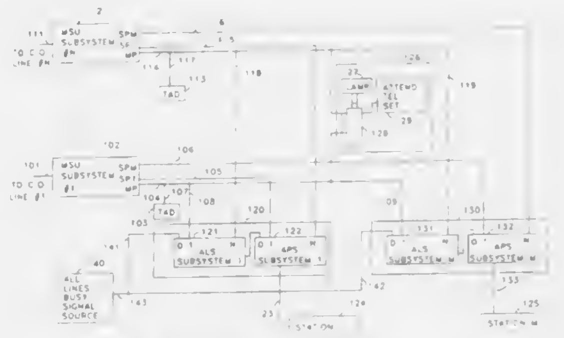
5,022,069
MODULAR AUTOMATIC TELEPHONE SWITCHING SYSTEM

Abraham Y. Chen, 2035 Tripiano Ct., Mountain View, Calif. 94040-3870

Filed Feb. 21, 1989, Ser. No. 312,742

Int. Cl.^{5} H04M *3/22, 3/50, 3/58*

U.S. Cl. 379—67 9 Claims



1. A modular automatic telephone switching system for serving one or more central office lines from a central office and one or more local stations comprising:

one or more master switching units corresponding in number to the number of central office lines to be served by the system and associated with said central office lines on a one for one basis; and wherein

each master switching unit comprises:

a central office port;

a main port;

station port means for connection to local station apparatus; the station port means corresponding in number to the number of local stations served by the telephone switching system;

switching means for selectively interconnecting said central office port, said main port, and said station port means;

interconnecting means for selectively interconnecting said station port means; and

control means for controlling said switching means and said interconnecting means.

VOL
1127
ISS
1
JE
4
1991
UMI

5,022,070
SWITCH-ADJUNCT INTERFACE

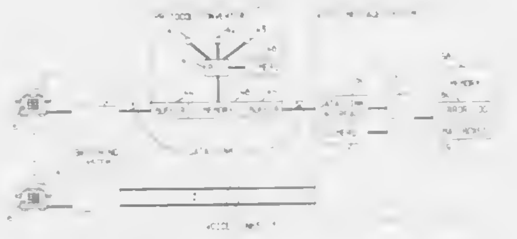
Henry M. Forson, Annandale, Va.; John R. Lothrop; Thomas M. O'Dell, both of Longmont, Colo., and Rick L. Overmyer, Golden, Colo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 486,676, Feb. 27, 1990, Pat. No. 4,980,906. This application Sep. 7, 1990, Ser. No. 579,454

The portion of the term of this patent subsequent to Dec. 25, 2007, has been disclaimed.

Int. Cl.^{5} **H04M** *11/06, 1/64, 1/57*

U.S. Cl. 379—32 37 Claims



1. In a method of communicating via SMSI protocol messages to perform predetermined actions and including the steps of transmitting and receiving SMSI protocol messages on a link at a telecommunication switching system adjunct processor, the improvement comprising the steps of:

receiving on the link at the adjunct processor a digital data message having a format of an SMSI protocol message including a plurality of fields including an end-of-message field marking the end of the message and a pair of delimiter fields surrounding a message ID field and a data field, each delimiter field including an ASCII carriage return character and an ASCII line feed character, the message ID and data fields including ASCII characters identifying the message as one reporting a failure condition; and

stopping the transmitting on the link of valid SMSI protocol messages and causing the adjunct processor to operate in a stand-alone, data link-less, mode of operation, in response to receipt of the failure condition-reporting message.

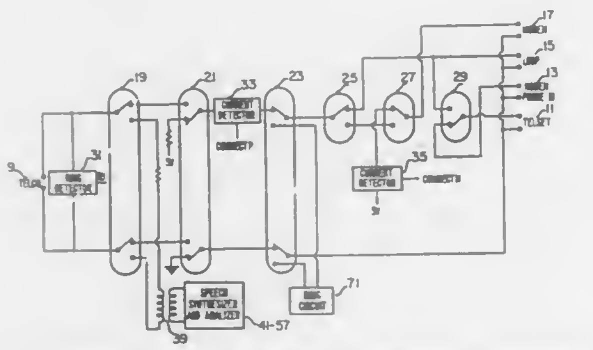
5,022,071
TWO-WAY VOICE & DIGITAL DATA ANALYZER FOR TELEPHONES

Forrest S. Mozer, Berkeley, and Shiu L. F. Chan, Los Altos Hills, both of Calif., assignors to Electronic Speech Systems, Hayward, Calif.

Continuation-in-part of Ser. No. 111,243, Oct. 21, 1987, abandoned. This application Dec. 30, 1988, Ser. No. 292,584

Int. Cl.^{5} **H04M** *11/00*

U.S. Cl. 379—93 20 Claims



1. A telephone switch adapted to be interposed between a telephone line and a digital data machine and a voice phone, the switch comprising:

means adapted to be coupled to the telephone line for receiving an incoming message or sending an outgoing message;

means for analyzing signals of the incoming message including means for determining a periodicity in the incoming signals and means for detecting a non-periodicity in the incoming signals to determine whether the signals are digital data signals or voice signals;

means including an electronic speech synthesizer adapted to generate from digital, compressed speech information signals first and second voice messages; the speech synthesizer generating a second outgoing voice message after a predetermined time interval following the first outgoing message when there is no response to the first message, the second outgoing message requesting the sender to send a voice message;

means for intermittently applying the voice messages to the phone line;

control means operatively coupled with the analyzing means and the speech synthesizer for directing the incoming message to the digital data machine or the voice phone after a voice message has been sent and in response to whether the analyzing means determined that digital data signals or voice signals form the incoming message, the directing means directing the incoming message to the digital data machine as soon as signal periodicity has been detected and to the voice phone as soon as non-periodicity in the incoming signals has been detected;

means for monitoring when the digital data machine or voice phone becomes active in preparation for sending an outgoing message;

means response to the monitoring means for connecting the active data machine or voice phone to the telephone line;

means for determining when the active machine or phone becomes inactive; and

means responsive to the determining means for disconnecting the machine or phone from the telephone line after is has become inactive.

5,022,072
COMMUNICATION APPARATUS

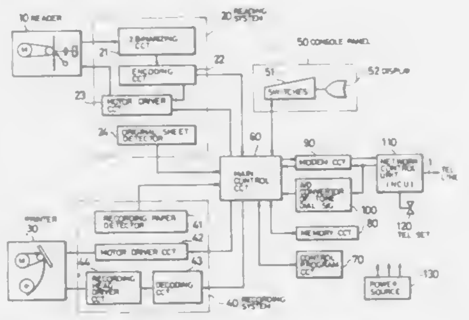
Kenzou Sakakibara, Yokohama; Takehiro Yoshida, and Koichi Matsumoto, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 881,802, Jul. 3, 1986, abandoned. This application Mar. 1, 1990, Ser. No. 490,515

Claims priority, application Japan, Jul. 9, 1985, 60-149331; Aug. 14, 1985, 60-177613; Aug. 14, 1985, 60-177614; Aug. 14, 1985, 60-177615; Oct. 7, 1985, 60-223374

Int. Cl.^{5} **H04M** *11/00;* **H04N** *1/32*

U.S. Cl. 379—100 13 Claims



1. A communication apparatus comprising:

image data communication means for communicating image data;

character data processing means for processing data;

detect means for detecting a calling signal from a destination;

send means for sending a protocol signal for image data communication to the destination in response to detection of the calling signal;

receive means for receiving a dial signal from the destination; and

control means for controlling said image data communication means to perform image data communication upon reception of a response signal from the destination representing an image data communication procedure responsive to the protocol signal, and for controlling said character data process means to process said character data upon reception of a specific signal by said receive means while said receive means is waiting to receive the response signal.

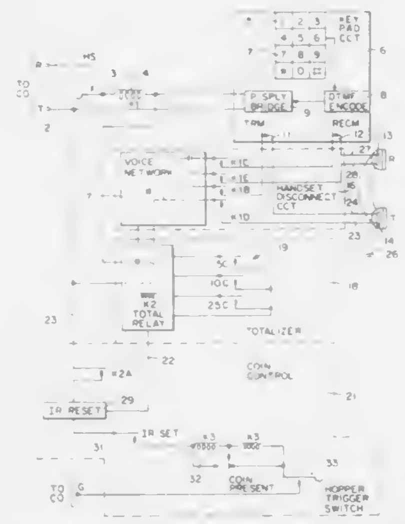
5,022,073
PIN FRAUD AND SHOCK PREVENTION SYSTEM

H. Weaver Jordan, 2189 NW. 53rd St., Fort Lauderdale, Fla. 33309

Filed Apr. 17, 1990, Ser. No. 509,859

Int. Cl.^{5} **H04M** *17/02*

U.S. Cl. 379—145 12 Claims



1. A pin fraud and shock prevention circuit for a pay telephone having a receiver and transmitter, and a tip and ring conductor forming a current loop connecting the pay telephone to a telephone exchange, comprising a current sensor in said ring conductor, a plurality of current switches coupled to said current sensor for connecting said receiver and transmitter to said loop in response to current flowing in said loop.

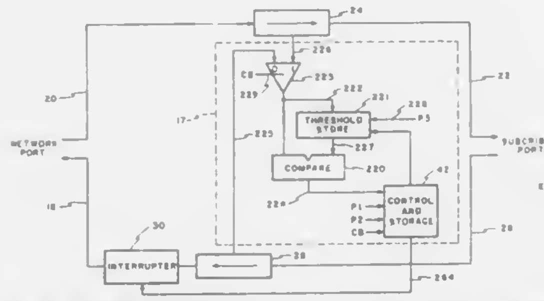
5,022,074
DIGITAL ECHO SUPPRESSOR

David C. Nicholas, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 1, 1985, Ser. No. 750,825

Int. Cl.^{5} **H04M** *1/00*

U.S. Cl. 379—407 4 Claims



1. A digital echo suppression circuit for use in a digital four-wire circuit having a network port and a subscriber port, each network and subscriber port having an input and an output, said digital echo suppression circuit comprising:

first means for establishing a communication channel from the network port input to the subscriber port output having at least a first shift register;

second means for establishing a communication channel from the subscriber port input to the network port output having at least a second shift register in series with a means for interrupting said second channel means;

means for selecting a selected signal from either the first or second shift register means;

threshold means for storing only one said selected signal, said threshold means having a load input and a decrement input;

means for comparing said selected signal with contents of said stored threshold means and outputting a resulting signal;

control means for receiving a first control signal, a second control signal and said resulting signal and having a means for generating a load command to said threshold means;

means for storing said selected signal in said stored threshold means based on the result of said comparison;

means for storing an identity of said selected signal stored in said threshold means;

means for transmitting to said interrupter means a control signal corresponding to said stored identity in response to said load command, said means for interrupting operating to interrupt the second channel means depending on the identity stored in said identity storage means; and

means for reducing said selected signal stored in said threshold storage means over time, said means for selecting having parallel selectors, having a first input operatively connected to a parallel output of said first shift register, and having a second input operatively connected to a parallel output of said second shift register, and having a control input for receiving a switching control signal and having an output, said control means and said storage means having

a first AND gate having a first input for receiving a first digital control signal, having a second input operatively connected to said output of said means for comparing and having an output;

a second AND gate having a second input for receiving a second digital control signal, having a first input operatively connected to said output of said means for comparing and having an output; and

an OR gate having a first input operatively connected to said output of said first AND gate, having a second input operatively connected to said output of said second AND gate and having an output operatively connected to said load input of said threshold means.

5,022,075
MECHANICAL ASSEMBLY FOR ENSURING ELECTRICAL SAFETY IN A TELEPHONE SET OR TERMINAL

Didier Beauval, Tourville Sur Arques, France, assignor to Telic Alcatel, Paris, France

Filed Apr. 12, 1989, Ser. No. 336,473

Claims priority, application France, Apr. 12, 1988, 88 04826

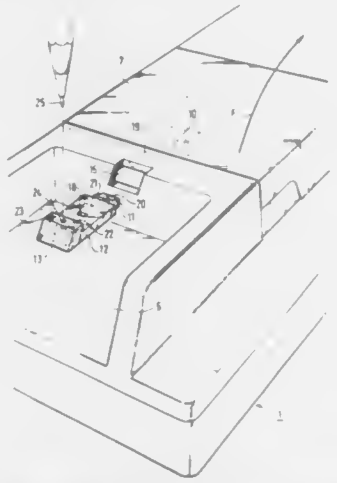
Int. Cl.^{5} **H04M** *1/00;* **H01R** *13/44, 13/62*

U.S. Cl. 379—445 5 Claims

1. A mechanical assembly for ensuring electrical safety in a telephone set having a body (1) with a pivotable cover (7), a top recess adjacent said cover, said assembly comprising a sliding lock within said body for locking the cover (7) in a slidably closed position, said lock having an operating head (13) projectable outside the body (1) and which, in the closed position of the lock, has an end surface which fits flush with a wall of the body (1) so that only smooth surfaces including said

VOL 1127
ISS 1
JE 4
1991
UMI

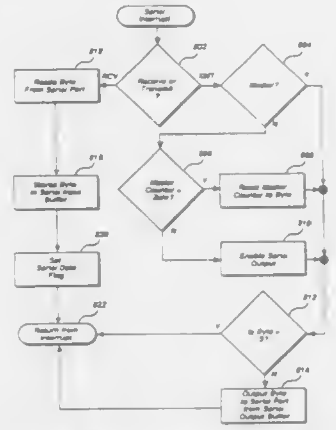
end surface and a top surface (23) are visible with the lock in closed position and said top surface (23) being provided with an aperture (24) accessible by a tip of a tool sized thereto for effecting sliding of the lock between closed and open positions.



5,022,076
REDUNDANT ENCRYPTION PROCESSOR ARRANGEMENT FOR USE IN AN ELECTRONIC FUND TRANSFER NETWORK

Michael J. Rosenow, Issaquah; Scott B. Hamilton, Kirkland, and Thomas M. Bass, Bellevue, all of Wash., assignors to The Exchange System Limited Partnership, Bellevue, Wash.

Filed Dec. 9, 1988, Ser. No. 283,301
Int. Cl.^{5} H04L *9/00*
U.S. Cl. 380—2 **7 Claims**

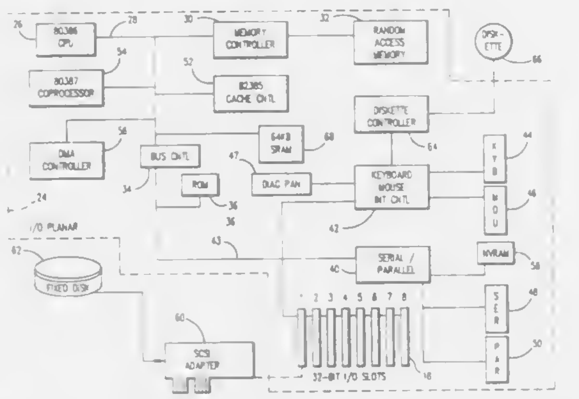


1. A fault tolerant data encryption system, comprising:
a first data encryption means including means for sending, receiving and processing data, said first data encryption including means for generating a periodic pulse;
a second data encryption means including means for sending, receiving and processing data, said second data encryption means including timer means responsive to the periodic pulse generated by said first data encryption means;
means for coupling said means for sending and receiving data of said first and second data encryption means; and
means for disabling said sending means of said first data encryption means and for enabling the sending means of said second data encryption means if said periodic pulse is not deleted by said second data encryption means.

5,022,077
APPARATUS AND METHOD FOR PREVENTING UNAUTHORIZED ACCESS TO BIOS IN A PERSONAL COMPUTER SYSTEM

Richard Bealkowski, Delray Beach; John W. Blackledge, Jr., Boca Raton; Doyle S. Cronk, Boca Raton; Richard A. Dayan, Boca Raton; Jerry D. Dixon, Boca Raton; Scott G. Kinnear, Boca Raton; George D. Kovach, Boca Raton; Andrew B. McNeill, Deerfield Beach, all of Fla.; Matthew S. Palka, Jr., Raleigh, N.C.; Robert Sachsenmaier; Edward I. Wachtel, both of Boca Raton, Fla., and Kevin M. Zyvoloski, Raleigh, N.C., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Aug. 25, 1989, Ser. No. 398,820
Int. Cl.^{5} H04L *9/32*
U.S. Cl. 380—4 **32 Claims**

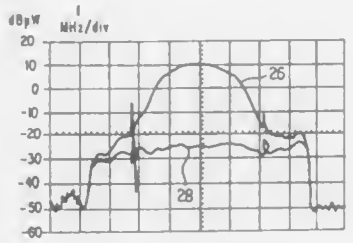


1. An apparatus for protecting BIOS in a personal computer system, the personal computer system having a system processor for executing an operating system, a read only memory, a random access memory, and at least one direct access storage device, said apparatus comprising:
a direct access storage device controller having a protection means for protecting a region of the at least one direct access storage device, said protection means allowing access to the protected region in response to a reset signal;
a master boot record included in the protected region of the at least one direct access storage device, said master boot record including an executable code segment having means for loading information from the at least one direct access storage device;
a first portion of BIOS being included in the read only memory, said first portion of BIOS initializing the system processor and initiating generation of the reset signal to the direct access storage device controller to permit the system processor to access said master boot record in order to load said master boot record into the random access memory;
a remaining portion of BIOS being included in the protected region of the at least one direct access storage device, said remaining portion of BIOS being loaded into the random access memory by the executable code segment in response to said first portion of BIOS transferring control to the executable code segment, the executable code segment transferring control to said remaining portion of BIOS to boot the operating system, said remaining portion of BIOS activating said protection means to prevent access to the protected region of the at least one direct access storage device during normal operations of the operating system.

5,022,078
TELEVISION SIGNAL ENHANCEMENT AND SCRAMBLING SYSTEM

Martin L. Zelenz, DeWitt, N.Y., assignor to Andrew F. Tresness, Syracuse, N.Y.

Filed Mar. 8, 1990, Ser. No. 490,788
Int. Cl.^{5} H04N *7/67*
U.S. Cl. 380—7 **12 Claims**

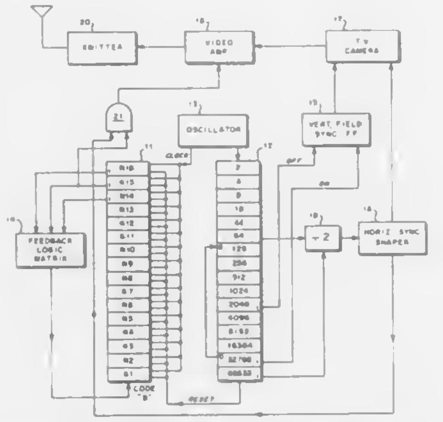


1. A television system comprising:
means for generating a television signal having frequency spaced video and audio carriers;
means for distorting said television signal in the region of said signal between said video and audio carriers by increasing the peak amplitude of the signals in said region by an amount such that said video carrier experiences carrier pinch off, wherein said means for distorting comprises means for increasing the amplitude of said signal in said region as a function of frequency.

5,022,079
LOCK MEANS AND TV SYNC FOR AIR-TO-SURFACE MISSILE

John C. Lockhart, Jr., Oreland, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 31, 1964, Ser. No. 394,389
Int. Cl.^{5} H04N *7/167*
U.S. Cl. 380—14 **6 Claims**

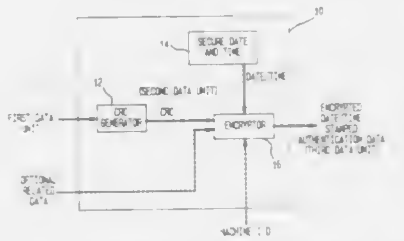


1. A digital code synchronization locking means comprising:
means to receive a first digital code sequence;
means to generate a second digital code sequence substantially similar to said first sequence, said means to generate said second digital code sequence including:
a shift register having an output from a predetermined stage thereof;
a feedback logic matrix connected to said shift register for generating said second digital code sequence;
a binary pulse counter, the last stage of which provides a reset pulse to all the stages of said shift register;
means to detect drift from synchronization of said second code sequence with said first code sequence one stage before said predetermined stage and one stage after said predetermined stage;
a clock oscillator providing clock pulses to all stages of said shift register and to the fist stage of said binary counter; and an oscillator control connected to said clock oscillator and responsive to said means to detect drift for advancing the rate of said clock oscillator upon correlation of said first code sequence with said stage before said predetermined stage and retarding the rate of said clock oscillator upon correlation of said first code sequence with said one stage after said predetermined stage, whereby said second code sequence is maintaged in synchronization with said first code sequence.

5,022,080
ELECTRONIC NOTARY

Robert T. Durst, 83 Harwich Rd., Fairfield, Conn. 06430, and Kevin D. Hunter, 440 Allwyndale Dr., Stratford, Conn. 06497

Filed Apr. 16, 1990, Ser. No. 509,447
Int. Cl.^{5} H04K *1/00, 9/00;* **H04L** *9/00*
U.S. Cl. 380—23 **24 Claims**



1. A method of determining that a first unit of data associated with a first party has not been modified subsequent to a specified point in time, comprising the steps of:
providing the first unit of data;
generating a distinct second unit of data as a function of the first unit of data, the second unit of data being solely determined by an information content of the first unit of data;
generating a first time indication for specifying a point in time, the first time indication being generated with time generation means having a time indication that cannot be changed by the first party; and
encrypting the second unit of data and the generated first time indication to generate a third unit of data.

5,022,081
INFORMATION RECOGNITION SYSTEM

Hitoshi Hirose, Osaka, and Fumio Togawa, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 252,793, Sep. 30, 1988, abandoned. This application Oct. 9, 1990, Ser. No. 593,557

Claims priority, application Japan, Oct. 1, 1987, 62-248727; Oct. 7, 1987, 62-255253

Int. Cl.^{5} G10L *5/00*
U.S. Cl. 381—43 **13 Claims**

1. An information recognition system comprising:

VOL
1127
ISS
1
JE
4
1991
UMI

input means for inputting information;

recognition means for recognizing said information inputted at said input means as at least one group having a plurality of candidate characters;

memory means for storing said groups of said candidate characters, said characters in each said group being arranged in a probability order having a first character of the highest probability and a last character of the lowest probability;

display means for displaying said first characters in each said group of said candidate characters, said display means including coordinate input means for selecting one of said first characters being displayed on said display means; and

character correcting means, responsive to an operator, for replacing said one first character selected by said coordinate input means with one of said candidate characters in said group corresponding to said one first character having the next highest probability order.

5,022,082

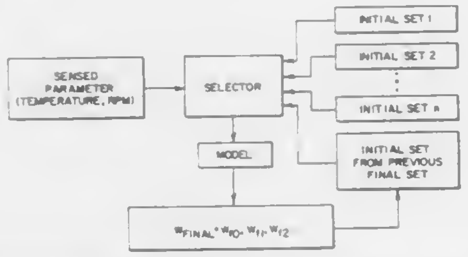
ACTIVE ACOUSTIC ATTENUATION SYSTEM WITH REDUCED CONVERGENCE TIME

Larry J. Eriksson, Madison, and Mark C. Allie, Oregon, both of Wis., assignors to Nelson Industries, Inc., Stoughton, Wis.

Filed Jan. 12, 1990, Ser. No. 464,337

Int. Cl.^{5} G10K *11/16*

U.S. Cl. 381—71 17 Claims


SENSED PARAMETER (TEMPERATURE, RPM)
SELECTOR
INITIAL SET 1
INITIAL SET 2
INITIAL SET n
MODEL
INITIAL SET FROM PREVIOUS FINAL SET
W_FINAL = W_10, W_11, W_12

1. In an acoustic system having an input for receiving an input acoustic wave produced by an acoustic source, and an output for radiating an output acoustic wave, an active attenuation method for attenuating undesirable said output acoustic wave by introducing a cancelling acoustic wave from an output transducer, comprising:

sensing said input acoustic wave with an input transducer and providing an input signal;

sensing the combined said output acoustic wave and said cancelling acoustic wave from said output transducer with an error transducer and providing an error signal;

modeling said acoustic system with an adaptive filter model having a model input from said input transducer and an error input from said error transducer and outputting a correction signal to said output transducer to introduce the cancelling acoustic wave such that said error signal approaches a given value as said adaptive filter model responds to said input signal by updating weights of a coefficient weight vector from an initial nonconverged value in a nonconverged condition of said filter model at turn-on thereof to a converged value in a converged condition of said filter model;

reducing convergence time of said filter model at turn-on thereof by starting said weights at a starting value which is closer to said converged value than said initial nonconverged value is to said converged value, said filter model converging to said input signal in a shorter time as said weights change and are updated from said starting value to said converged value;

selecting said starting value according to a characteristic of said acoustic source.

5,022,083

APPARATUS AND METHOD FOR COMPENSATING COMPONENT AUDIO SIGNALS

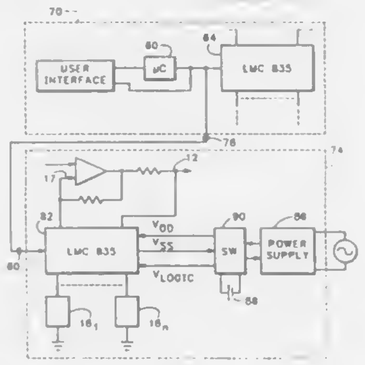
Eugene Rimkelt, 4438 SW. Hewett, Portland, Oreg. 97221, and Richard Schomburg, Rte. 2, Box 444, Hillsboro, Oreg. 97123

Continuation-in-part of Ser. No. 229,616, Aug. 8, 1988, Pat. No. 4,955,058, which is a continuation-in-part of Ser. No. 8,617, Jan. 29, 1987, Pat. No. 4,785,475. This application Jul. 27, 1989, Ser. No. 387,582

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.^{5} H03G *5/00*

U.S. Cl. 381—98 30 Claims



1. Apparatus for compensating an audio signal having a plurality of components, comprising:

amplifier means for amplifying the components of the audio signal, said amplifier means being selectively adjustable in response to date values received thereby,

an input port for receiving data values,

an electronic storage device for storing data values received by way of the input port and applying those data values to the amplifier means, and

power supply terminals for supplying operating current from an external power source to the electronic storage device,

the stored data values being maintained in the apparatus upon interruption of the supply of operating current to the power supply terminals, and the apparatus having no controls that can be manually actuated for selectively adjusting the stored data values.

5,022,084

SPEAKER

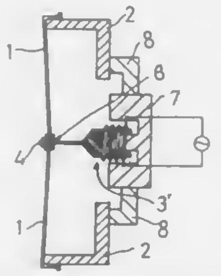
Yasuhiro Shinjo, Shimashidanchi 4-102, 2,654-banchi, Azashimashi, Ginowan-chi, Okinawa-ken, 901-22, Japan

Filed Jan. 30, 1989, Ser. No. 303,800

Claims priority, application Japan, Feb. 26, 1988, 63-45478; Aug. 17, 1988, 63-205437

Int. Cl.^{5} H04R *25/00*

U.S. Cl. 381—202 2 Claims



1. A speaker comprising a diaphragm consisting of an elastic material, and tension means mounting said diaphragm in a stretched configuration such that a state of intrinsic tension

exists within said diaphragm, wherein said diaphragm has a central opening, and further comprising a rigid central member fitted in the central opening of said diaphragm and integrally formed with said diaphragm, converter means, and coupling means interconnecting said rigid central member and said converter means, said tension means comprising tension vesting means for producing said intrinsic tension within said diaphragm through said coupling means and said rigid central member, said tension vesting means comprising spring means providing a pressing force against said coupling means to hold said diaphragm in said state of intrinsic tension through said rigid central member.

5,022,085

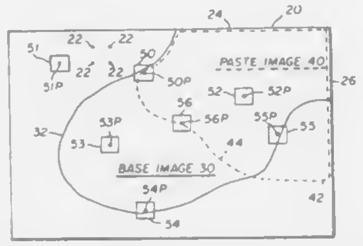
NEIGHBORHOOD-BASED MERGING OF IMAGE DATA

David R. Cok, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 29, 1990, Ser. No. 529,797

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—1 16 Claims



1. For use with an imagery data base in accordance with which an array of pixels of an image display device is controllably energized to display an image, a method of controllably combining first imagery data, associated with a first, overlap image, with second imagery data, associated with a second, base image, so as to effect a smooth blending of said first image along its border with said second image comprising the steps of:

(a) for a respective pixel location (i,j) of said array, defining a window that encompasses a plurality W of pixel locations surrounding said pixel location (i,j);

(b) in response to said respective pixel location (i,j) being contained within said first image, defining a first weighting value F(i,j) in accordance with the ratio of the number NP of pixel locations in said window that are contained within both said first and second images to the number NB of pixel locations in said window that are contained within said second image; and

(c) defining an imagery data value associated with said pixel location (i,j) in accordance with a prescribed combination of said first weighting value and imagery data values contained within said first and second imagery data for said pixel location (i,j).

5,022,086

HANDWRITING APPARATUS FOR INFORMATION COLLECTION BASED ON FORCE AND POSITION

Hewitt D. Crane, Portola Valley, and Robert W. Hammon, San Jose, both of Calif., assignors to SRI International, Inc., Menlo Park, Calif.

Filed Dec. 20, 1988, Ser. No. 287,440

Int. Cl.^{5} G06K *9/62*

U.S. Cl. 382—2 12 Claims

1. An apparatus for gathering and collecting handwritten information based upon force and position of a writing instrument comprising in combination:

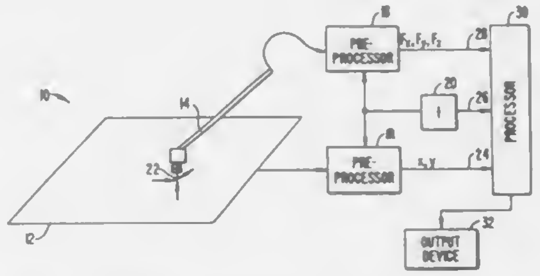
a tablet means for sensing a first position component along a first axis in a Cartesian coordinate system and for sensing a second position component along a second axis in said Cartesian coordinate system transverse to said first axis;

force sensing means within said writing instrument for sensing force generated by the writing instrument about a point at the intersection of said first axis and said second axis, said force being expressible in third, fourth and fifth spatial axes related to orientation of said writing instrument, said force sensing means including:

means for sensing a first force component in said third axis,

means for sensing a second force component in said fourth axis transverse to said third axis, and

means for sensing a third force component in said fifth axis transverse to said third axis and said fourth axis;



means for logging, with respect to time, said first position component, said second position component, said first force component, said second force component and said third force component to produce logged position and force information; and

means responsive to said logged position and force information for combining said logged position and force information to produce output information.

5,022,087

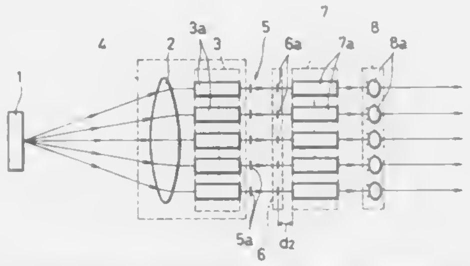
APPARATUS FOR DETECTING PRIMITIVE PATTERNS IN AN IMAGE

Norman A. Peppers, 3619 Hillcrest Dr., Belmont, Calif. 94002; James R. Young, 3433 Cowper St., Palo Alto, Calif. 94306; Gerald A. Pierce, 1028 Eden Bower La., Redwood City, Calif. 94061, and Gregory K. Myers, 473 Melrose Ave., San Francisco, Calif. 94127

Filed May 3, 1988, Ser. No. 189,542

Int. Cl.^{5} G06K *9/74*

U.S. Cl. 382—32 13 Claims



1. An apparatus for detecting basic shapes defined by primitive patterns in an image, comprising:

multiplier means for optically multiplying an image whose primitive patterns are to be extracted to form simultaneously in parallel a plurality of optical pattern images of a substantially identical shape, said multiplier means comprising at least one image formation lens for forming said plurality of optical pattern images;

various types of primitive masks which respectively have various types of primitive patterns comprising basic shapes commonly included in a plurality of images subjected to primitive pattern extraction. the primitive masks being arranged at a position spaced apart by a predetermined distance D from the plurality of optical pattern images in one-to-one correspondence therewith so that beams from all points of each optical pattern image are substantially incident on all points of the corresponding

VOL
1127
ISS
1
JE
4
1991
UMI

primitive pattern, said predetermined distance D being at least 10 μm and satisfying the inequality $D<2d_t(p/(lp)$, where d_t represents a distance between said multiplier means and said optical pattern images and p represents the ratio of the size of said optical pattern images to the size of the aperture of said image formation lens, whereby an optical correlation calculation between said optical pattern image and said primitive pattern is performed instantaneously; and

photodetecting means for detecting the beams which are emitted from the plurality of optical pattern images through the various types of primitive masks, respectively.

5,022,088

IMAGE PROCESSING APPARATUS WITH PROVISION FOR MEMORY OPERATION

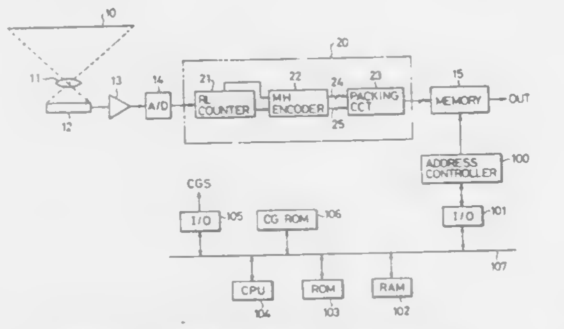
Katsutoshi Hisada, Tokyo, and Hiroshi Nobuta, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 477,121, Feb. 7, 1990, abandoned, which is a continuation of Ser. No. 089,055, Aug. 24, 1987, abandoned, which is a continuation of Ser. No. 610,752, May 16, 1984, abandoned. This application Sep. 10, 1990, Ser. No. 581,205

Claims priority, application Japan, May 24, 1983, 58-90897; May 25, 1983, 58-91969

Int. Cl.^{5} G04K *9/36*

U.S. Cl. 382—41 **20 Claims**



1. An image processing apparatus comprising:

means for sequentially reading a plurality of pages of original images and sequentially generating image data representing each of the original images;

means for compressing the image data so as to form compressed image data, the amount of a page of compressed image data being variable;

memory means capable of storing a plurality of such pages of compressed image data; and

control means for controlling the reading operation of said reading means and the storage operation of said memory means in such a manner that compressed image data of a succeeding page is stored in a memory area following the memory area in which the compressed image data of a preceding page is stored,

wherein said control means is adapted to interrupt storage of the compressed image data into said memory means in a case in which said memory means becomes unavailable for the storage of the compressed image data in the course of the storage of a page of the compressed image data, and wherein said control means causes reading of the same page of original image to be performed again and causes the storage of the compressed image data of the same page in the same memory area to be performed again when said memory means becomes available for the storage of the compressed image data.

5,022,089

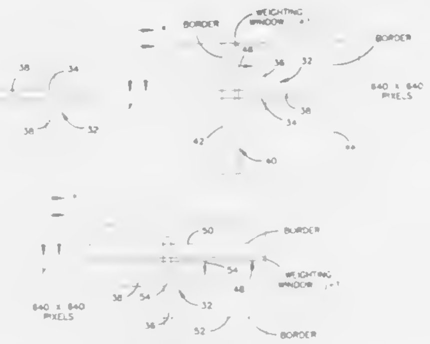
METHOD AND APPARATUS FOR FAST REGISTRATION USING CROSSHAIR REGISTER MARKS

Monti R. Wilson, 7906 W. 99th St., Overland Park, Kans. 66212

Filed Jan. 19, 1990, Ser. No. 467,264

Int. Cl.^{5} G06K *9/32*

U.S. Cl. 382—44 **24 Claims**



1. A method of registering a pair of objects each having a border region presenting spaced apart first and second register marks alignable to effect registration of the objects and each including a pair of mutually perpendicular bars, said method comprising the steps of:

recording a digital picture of each register mark on each object;

assigning to each pixel in each digital picture a numerical value representative of the pixel intensity;

scanning each picture systematically to record the coordinate location of each pixel and the numerical value of each pixel; and

calculating the intensity centroid location of each picture using the pixel locations and numerical values, thereby locating the center of each register mark to determine the translation movement necessary to align the corresponding register mark centers.

5,022,090

DIGITAL IMAGE PROCESSING APPARATUS FOR CORRECTLY ADDRESSING IMAGE MEMORY

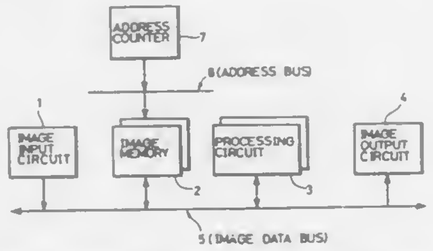
Yasuo Masaki, and Kimitoshi Hori, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 26, 1988, Ser. No. 249,643

Claims priority, application Japan, Sep. 25, 1987, 62-240258

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—49 **7 Claims**



1. A digital image processing apparatus comprising:

an image input circuit for inputting image data;

an image output circuit for outputting image data;

a plurality of image memories for storing image data;

a plurality of processing circuits capable of pipeline processing image data;

an image data bus for transferring image data between each of said circuits in accordance with a transfer clock;

an address counter generating a read address and a write address to be applied to said image memory; and

an address bus for applying the address generated by said address counter to said image memory;

wherein each of said processing circuits is structured such that a delay of n (n is a positive integer) transfer clocks or an integer multiple of n clocks is generated between the input and output data;

said address counter comprises

a read address counter which is counted up at a period of n transfer clocks, and

a delay circuit array having multi stages of delay circuits, each generating a delay of n transfer clocks, cascade connected to generate a plurality of write addresses from a read address inputted to said delay circuit of a first stage; and

said image memory comprises a write address selecting circuit which selects, when a delay time of a write data is Kxn transfer clocks (K is a positive integer), a write address outputted from Kth one of said delay circuits; whereby the delay time of the whole processing circuit becomes the integer multiple of n transfer clocks regardless of the combination of the plurality of processing circuits and that the processing circuits can be freely coupled with each other.

5,022,091

IMAGE PROCESSING TECHNIQUE

Robert C. Carlson, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Feb. 28, 1990, Ser. No. 486,330

Int. Cl.^{5} G06K *9/36*

U.S. Cl. 382—49 **31 Claims**

1. An image processing system comprising:

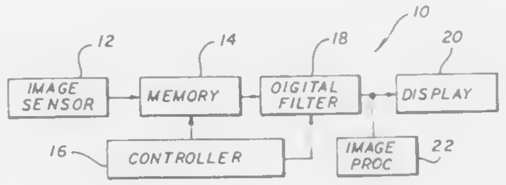
first means for creating a first array of pixels corresponding to an input image, each pixel having an address and a data value;

second means for creating a second array of data values at addresses corresponding to the location of features in said image;

third means for setting said first array as a base level for a data pyramid;

fourth means for modifying said first array at said base level with said second array to create a modified base level in which each location is modified to contain a feature marker if a feature marker is present in a corresponding location of said second array, otherwise, each location contains data from said first array in a corresponding location;

fifth means for filling in the pyramid one level at a time, from the bottom to the top thereof, by creating additional arrays of data values, each additional array providing an additional level in said pyramid, each pixel in each level being either marked as a feature, if any of a predetermined number of associated pixels in the adjacent lower level is marked as a feature, or filled with a data value equal to some function of said associated pixels in said adjacent lower level;



sixth means for replacing the base level of said pyramid with said first array of pixels; and

seventh means for filling the corresponding pixel locations in the adjacent lower level with the value of said pixel in said adjacent upper level, starting at a level above said base level, at each pixel location that is not marked as a feature, until said first array at said base level is modified accordingly to provide an improved output image.

VOL
1127
ISS
1
JE
4
1991
UMI

DESIGN PATENTS

GRANTED JUNE 4, 1991

ERRATA

For CLASS	See PATENT NO.
D03-034	317,359

VOL
1127
ISS
1
JE
4
1991
UMI

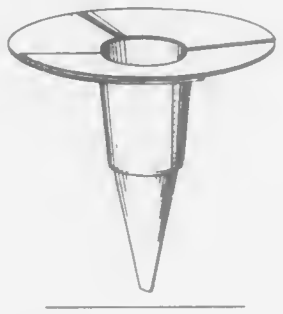
DESIGNS

JUNE 4, 1991

317,222

ADJUSTABLE ICE CREAM CONE HOLDER

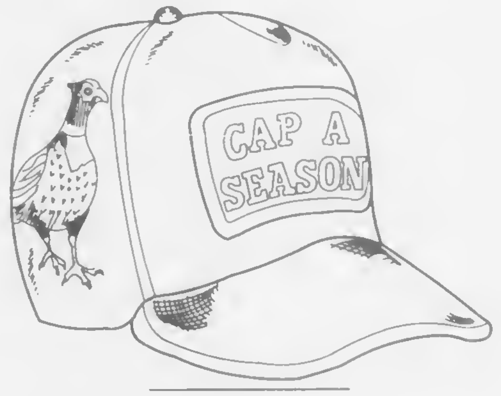
John E. Dodge, 8620 Smart St., Kansas City, Mo. 64125
Filed Apr. 11, 1988, Ser. No. 180,019
Term of patent 14 years
U.S. Cl. D1—102



317,223

CAP

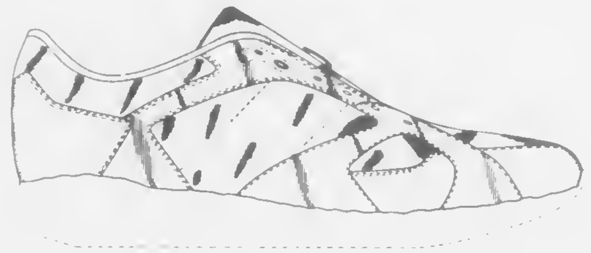
Tommie Copeland, 517 N. Spruce, Colorado Springs, Colo. 80905
Filed Nov. 17, 1987, Ser. No. 121,728
Term of patent 14 years
U.S. Cl. D2—244



317,224

SHOE UPPER

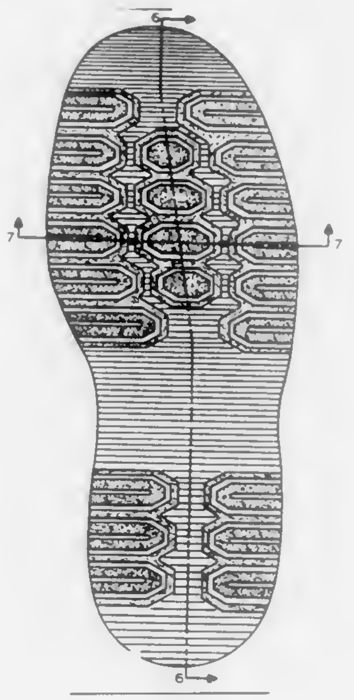
Robert J. Lucas, Lake Oswego, Oreg., assignor to Nike, Inc. and Nike International, Ltd., Beaverton, Oreg.
Filed Jun. 15, 1990, Ser. No. 538,492
Term of patent 14 years
U.S. Cl. D2—314



317,225

TREAD SURFACE AND PERIPHERY OF A FOOTWEAR UNIT SOLE

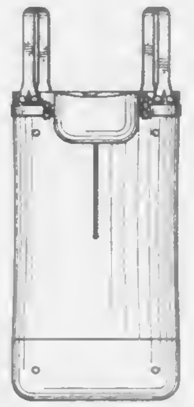
Arnold S. Austin, East Brookfield, Mass., assignor to Quabaug Corporation, North Brookfield, Mass.
Filed Feb. 21, 1989, Ser. No. 312,248
Term of patent 14 years
U.S. Cl. D2—320



317,226

SPORTSMAN'S OUTDOOR BAG

William C. Smith, Jr., R.D. 2 Box 47, Milewood Rd., Verbank, N.Y. 12585, and Ralph F. Antonucci, 119 Meadow Ave., Newburg, N.Y. 12550
Filed Jun. 22, 1988, Ser. No. 210,707
Term of patent 14 years
U.S. Cl. D3—36



VOL 1127 ISS 1 JE 4 1991 UMI

317,227

GOLF BAG

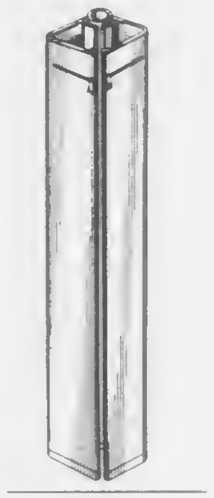
Enrico Fumia, Turin, Italy, assignor to Pininfarina Extra S.r.L., Turin, Italy

Filed Dec. 15, 1987, Ser. No. 133,455

Claims priority, application Italy, Jun. 15, 1987, 53424-B/87

Term of patent 14 years

U.S. Cl. D3—37



317,228

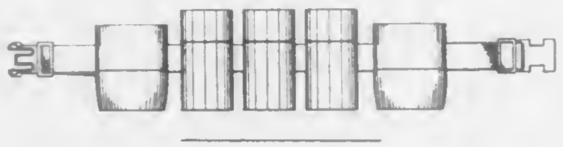
FISHERMAN'S BELT

Frank Stufflebeam, 7393 NW. Beaver Dr., Johnston, Iowa 50131

Filed Oct. 14, 1988, Ser. No. 257,794

Term of patent 14 years

U.S. Cl. D3—104



317,229

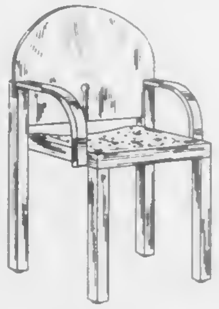
CHAIR

Arno Votteler, Hauptmannsreute 28, 7000 Stuttgart, Fed. Rep. of Germany

Filed Apr. 17, 1990, Ser. No. 510,408

Term of patent 14 years

U.S. Cl. D6—379



317,230

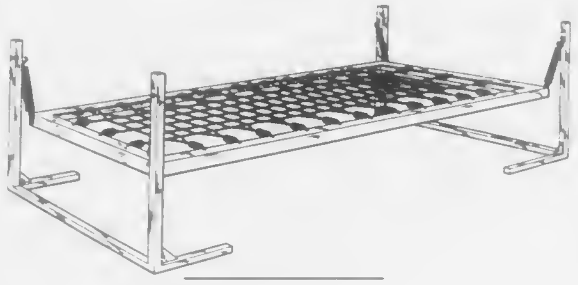
SWINGING BUNK

James R. McCain, and Billy F. Murphy, both of Tucumcari, N. Mex., assignors to M & M Manufacturing, Inc., South Rock Island, N. Mex.

Filed Mar. 24, 1987, Ser. No. 29,595

Term of patent 14 years

U.S. Cl. D6—385



317,231

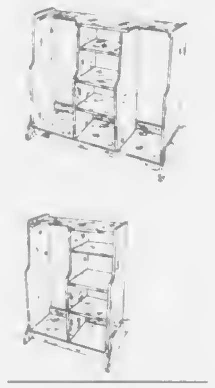
COMBINED SHELF AND GOLF BAG STAND

Bonnie Montgomery, Jamestown, N.C., assignor to Kaddie Stand Corporation, Greensboro, N.C.

Division of Ser. No. 358,840, May 30, 1989, Pat. No. Des. 312,016. This application Aug. 2, 1990, Ser. No. 561,665

Term of patent 14 years

U.S. Cl. D6—397



317,232

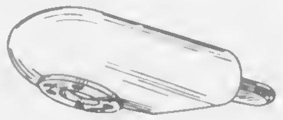
PROTECTIVE END CAP FOR A FURNITURE LEG

Burkhard Vogtherr, Kandern-Holzen, and Manfred Elzenbeck, Steinheim/Murr, both of Fed. Rep. of Germany, assignors to Davis Furniture Industries, Inc., High Point, N.C.

Filed Jun. 13, 1988, Ser. No. 205,786

Term of patent 14 years

U.S. Cl. D6—491



317,233

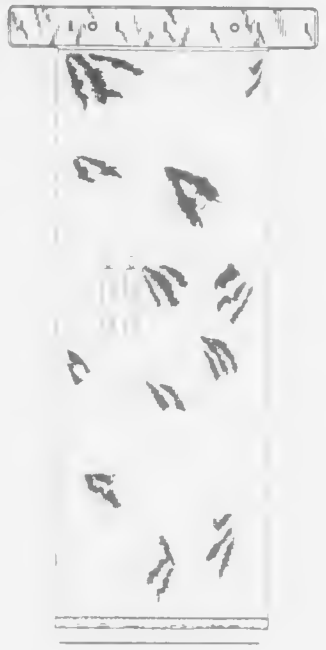
HOLDER FOR DISPLAY AND STORAGE OF JEWELRY

J. Charles Kelly, P.O. Box 24457, Nashville, Tenn. 37202

Continuation-in-part of Ser. No. 55,028, May 27, 1987, abandoned. This application Feb. 13, 1989, Ser. No. 310,085

Term of patent 14 years

U.S. Cl. D6—553



317,234

STORAGE UNIT

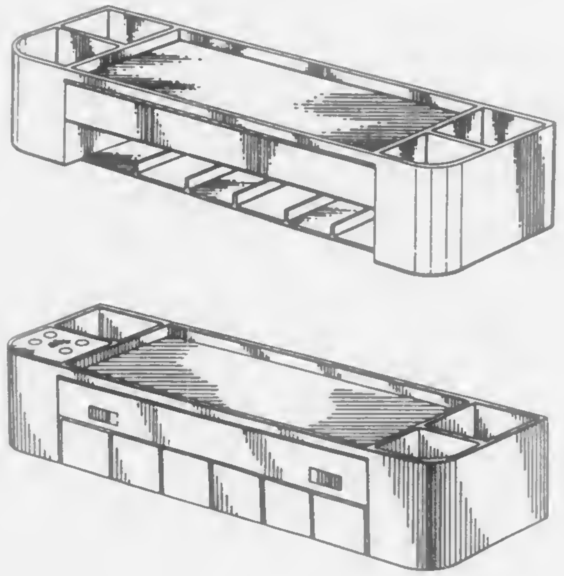
Wolf Ruck, 1720 Lincolnshire Blvd., Mississauga, Ontario, Canada L5E 2S7

Filed Nov. 22, 1989, Ser. No. 440,288

Claims priority, application Canada, Sep. 7, 1989, 07-09-89-3

Term of patent 14 years

U.S. Cl. D6—553



317,235

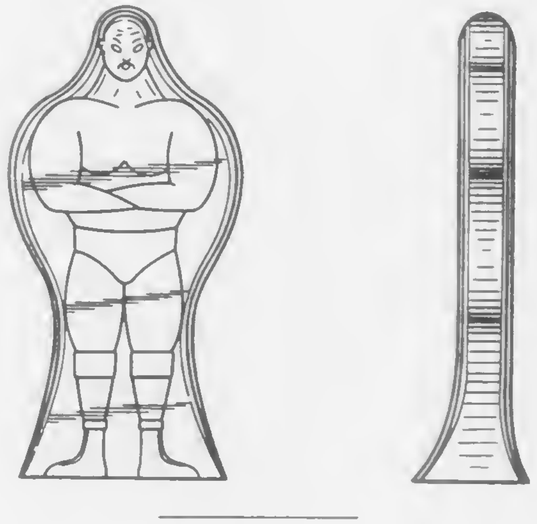
PILLOW

Leonard Rochon, 39 Church Street, Chalk River, Ontario, Canada K0J 1J0

Filed Mar. 20, 1989, Ser. No. 325,505

Term of patent 14 years

U.S. Cl. D6—599



317,236

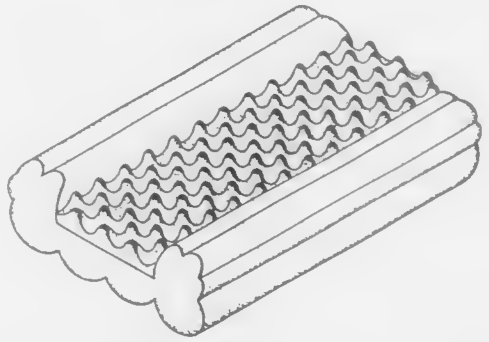
PILLOW

Linda H. Dixon, Ross, Calif., assignor to E.R. Carpenter Company, Inc., Richmond, Va.

Filed Mar. 30, 1989, Ser. No. 330,716

Term of patent 14 years

U.S. Cl. D6—601



VOL
1127
ISS
1
JE
4
1991
UMI

317,237
ELECTRIC COFFEE MAKER

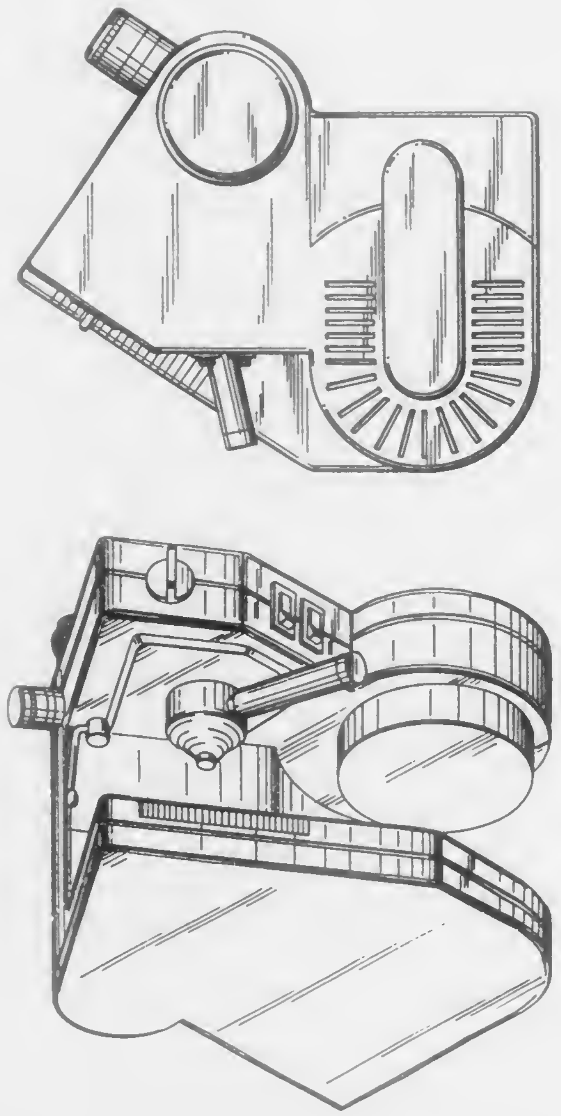
Domingo F. A. Bolivar, Durango Vizcaya, Spain, assignor to Oficina de Investigacion Agrupada, S.A., Guipuzcoa, Spain

Filed Jan. 19, 1988, Ser. No. 145,186

Claims priority, application Spain, Aug. 17, 1987, 113763

Term of patent 14 years

U.S. Cl. D7—309



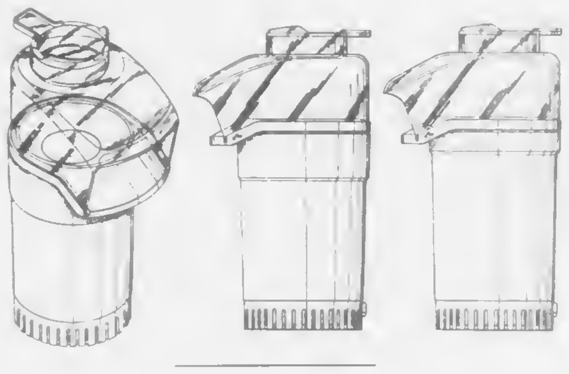
317,238
HOT AIR CORN POPPER

Louis M. Busick, Columbus, Ohio; Marshall B. Johnson, Mechanicsville, and R. Scott Myerly, Richmond, both of Va., assignors to Proctor-Silex, Inc., Glen Allen, Va.

Filed Oct. 3, 1988, Ser. No. 252,869

Term of patent 14 years

U.S. Cl. D7—325



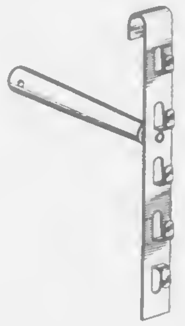
317,239
BARBECUE COVER SUPPORT

Donald W. Croft, 4118 Kane St., San Diego, Calif. 92110

Filed Apr. 29, 1987, Ser. No. 43,998

Term of patent 14 years

U.S. Cl. D7—402



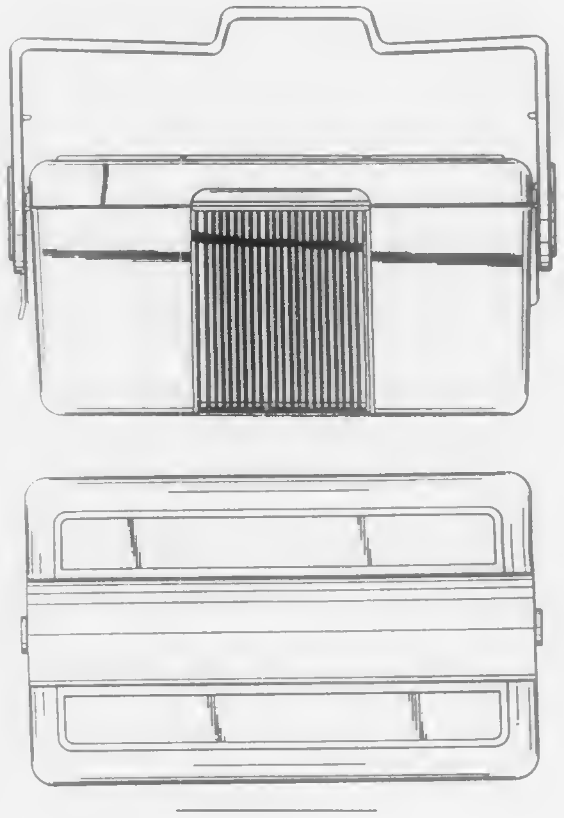
317,240
FOOD STORAGE COOLER

John A. Bridges, Nashville, and Richard D. Booten, Brentwood, both of Tenn., assignors to Aladdin Industries, Inc., Nashville, Tenn.

Filed Jan. 9, 1989, Ser. No. 295,019

Term of patent 14 years

U.S. Cl. D7—605



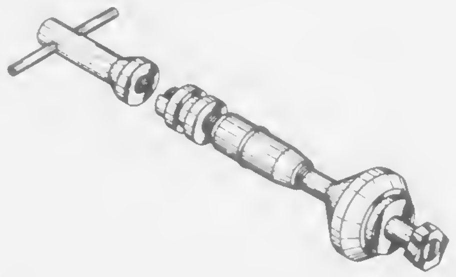
317,241
VALVE GUIDE TOOL

Trevor Lent, Rte. 6, Box 31, Mount Olive, N.C.

Filed Feb. 18, 1988, Ser. No. 156,944

Term of patent 14 years

U.S. Cl. D8—14



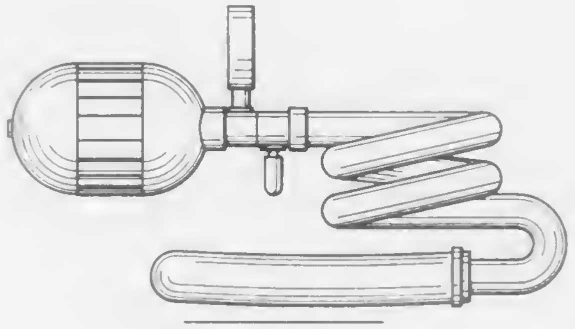
317,242
VALVE STEM SEAL REPLACEMENT TOOL

Alvin Johnson, 69 Maplewood Ave., Atlantic Highlands, N.J. 07716

Filed May 18, 1988, Ser. No. 195,180

Term of patent 14 years

U.S. Cl. D8—14



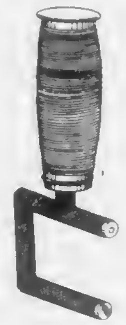
317,243
COMBINED QUICK RELEASE HOLDER AND SLIP RESISTANT GRIP FOR FIRE HOSES

Richard J. Everding, Evansville, and David R. Lancaster, Casper, both of Wyo., assignors to Amoco Corporation, Chicago, Ill.

Division of Ser. No. 73,424, Jul. 15, 1987, Pat. No. Des. 312,377. This application Jul. 10, 1990, Ser. No. 550,712

Term of patent 14 years

U.S. Cl. D8—14



VOL
1127
ISS
1
JE
4
1991
UMI

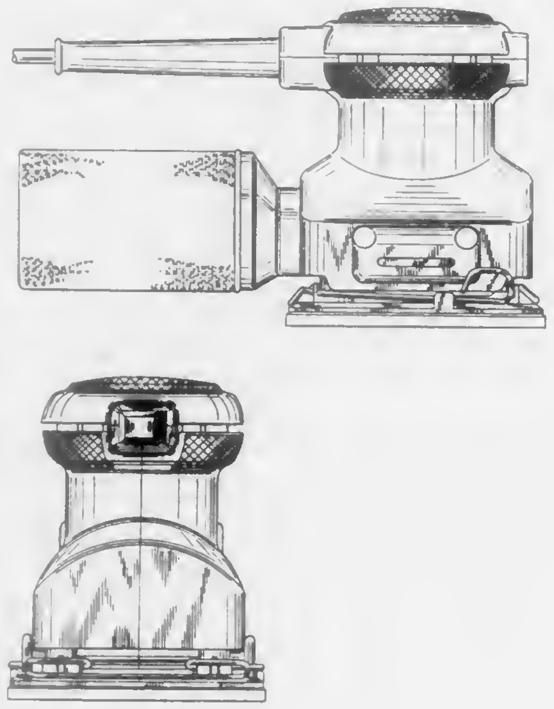
317,244
FINISHING SANDER OR SIMILAR ARTICLE

Roderick F. Bunyea, Westminster, Md., assignor to Black & Decker, Inc., Newark, Del.

Filed Aug. 11, 1988, Ser. No. 231,574

Term of patent 14 years

U.S. Cl. D8—62



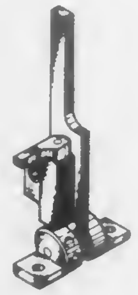
317,245
TOGGLE CLAMP

Dominick J. DeNardo, Jr., 846 Washington St., Royersford, Pa. 19468

Filed Aug. 25, 1988, Ser. No. 236,685

Term of patent 14 years

U.S. Cl. D8—72



317,246
HANDLE FOR SHOPPING BAGS

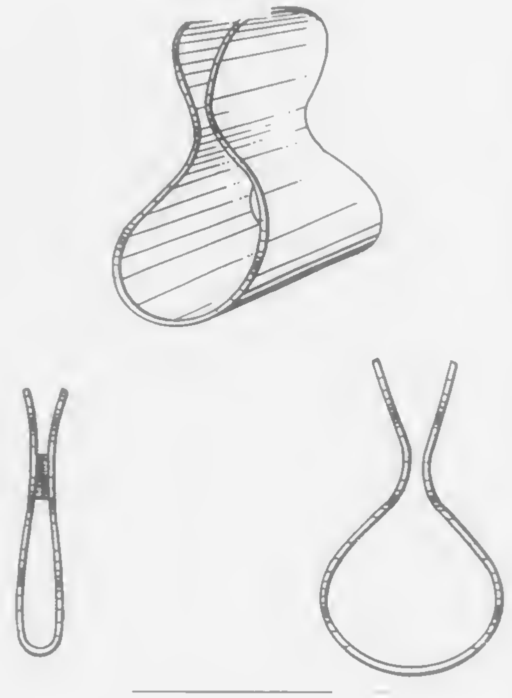
Robert J. Driscoll, Kitchener, Canada, assignor to Roy Cooke & Son Ltd.

Filed Sep. 23, 1988, Ser. No. 248,482

Claims priority, application Canada, Aug. 18, 1988, 18-08-88-15

Term of patent 14 years

U.S. Cl. D8—300



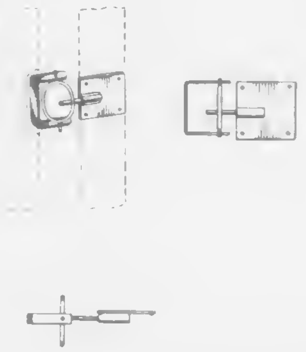
317,247
GATE LATCH

Robert C. Wells, 1705 N. Newcomb, Porterville, Calif. 93257

Filed Feb. 17, 1989, Ser. No. 311,992

Term of patent 14 years

U.S. Cl. D8—336



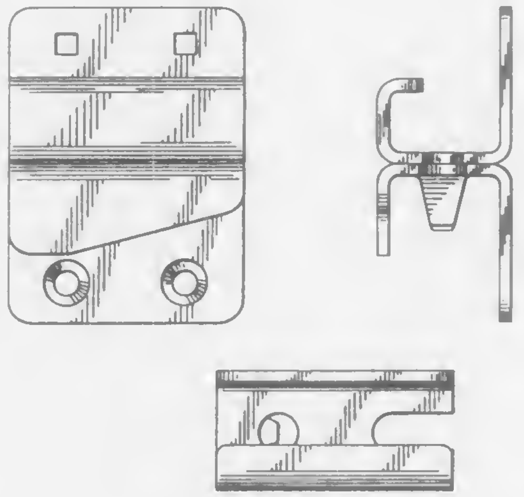
317,248
PADLOCK HASP GUARD

Lloyd R. Poe, 28122 Haria St., Mission Viejo, Calif. 92692

Filed Nov. 25, 1988, Ser. No. 275,540

Term of patent 14 years

U.S. Cl. D8—346



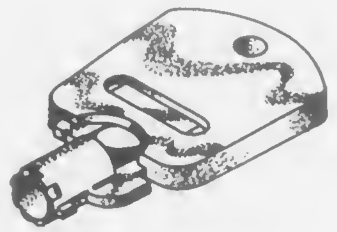
317,249
KEY

Harvey S. Gitlin, Ambler, Pa., assignor to Equipment Systems & Devices, Inc., Dresher, Pa.

Filed Jun. 13, 1989, Ser. No. 365,352

Term of patent 14 years

U.S. Cl. D8—347



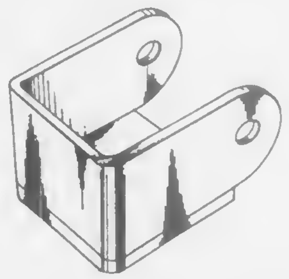
317,250
BRACKET FOR CONCRETE FORMS

Hal C. Shook, Kensington, Ga., and John F. Gourley, Chattanooga, Tenn., assignors to Symons Corporation, Des Plaines, Ill.

Filed Jan. 13, 1989, Ser. No. 296,585

Term of patent 14 years

U.S. Cl. D8—380



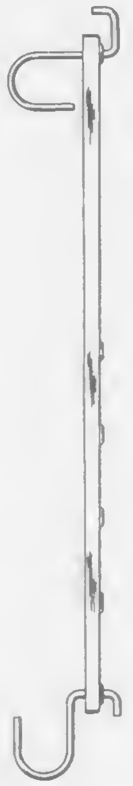
317,251
ADJUSTABLE STRAP

Calvin Liang, 13601 St. Mary's Rd., Silver Spring, Md. 20904

Filed Dec. 20, 1989, Ser. No. 453,495

Term of patent 14 years

U.S. Cl. D8—394



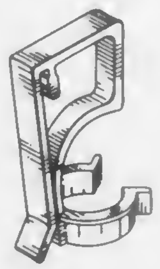
317,252
CHRISTMAS LIGHT CLIP

Donald D. Rumpel, Kellogg, Id., assignor to Kellogg Plastics, Ltd, Smelterville, Id.

Continuation-in-part of Ser. No. 161,671, Feb. 29, 1988, Pat. No. Des. 306,533. This application Nov. 13, 1989, Ser. No. 436,222

Term of patent 14 years

U.S. Cl. D8—395



VOL
1127
ISS
1
JE
4
1991
UMI

317,253

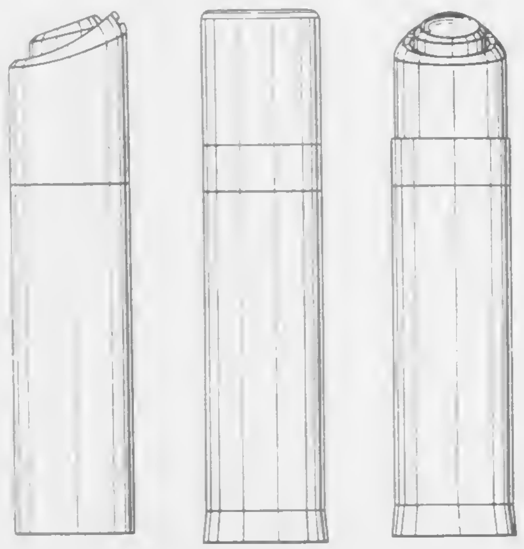
PUMP DISPENSER

Richard H. Seager, Mystic, Conn., assignor to MB Group plc, Reading, England

Filed Oct. 6, 1988, Ser. No. 254,128

Term of patent 14 years

U.S. Cl. D9—300



317,254

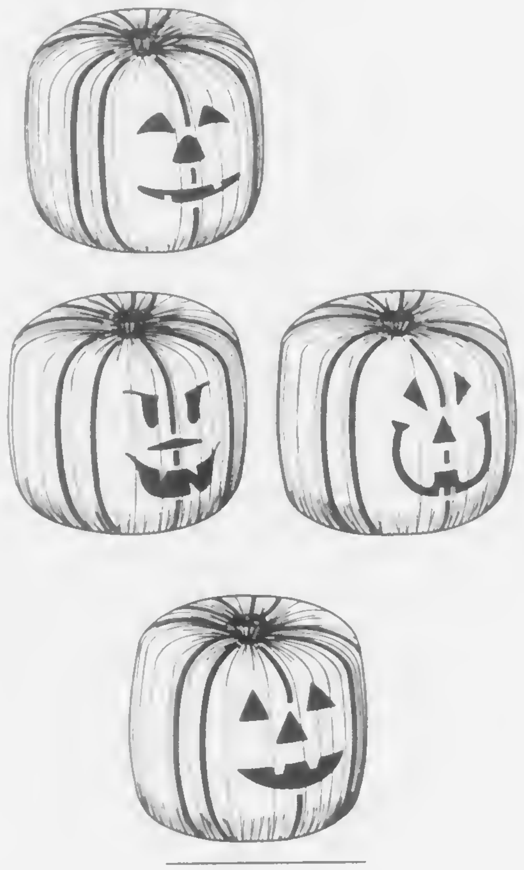
BAG

Anita Dembiczak, and Benson Zinharg, both of Stamford, Conn., assignors to Sun Hill Industries, Inc., Stamford, Conn.

Division of Ser. No. 431,857, Nov. 6, 1989, Pat. No. Des. 310,023. This application Jun. 12, 1990, Ser. No. 537,522

Term of patent 14 years

U.S. Cl. D9—305



317,255

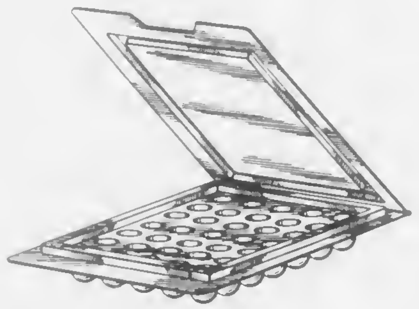
CONTAINER FOR FROZEN FISH FOOD OR THE LIKE

Christopher Turk, 225 W. 15th St., National City, Calif. 92050

Filed Dec. 9, 1988, Ser. No. 281,685

Term of patent 14 years

U.S. Cl. D9—341



317,256

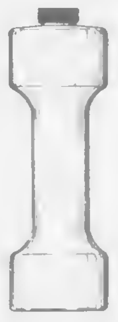
COMBINED BOTTLE AND CAP

Scott Samnels, Scotch Plains, N.J., assignor to The Glemby Company, Inc., Minneapolis, Minn.

Filed Nov. 9, 1988, Ser. No. 269,001

Term of patent 14 years

U.S. Cl. D9—355



317,257

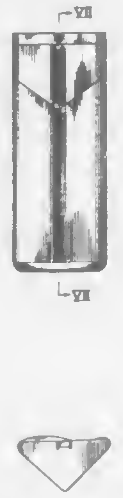
COMBINED BOTTLE AND CLOSURE

Emilio Ambasz, 295 Central Park West, New York, N.Y. 10024

Filed Nov. 1, 1988, Ser. No. 265,666

Term of patent 14 years

U.S. Cl. D9—367



317,258

PERFUME BOTTLE OR THE LIKE

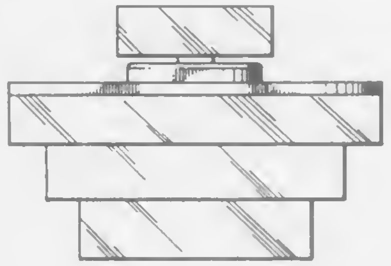
Pierre Dinand, Levallois-Perret, France, assignor to Florbath-Profumi Di Parma S.p.A., Italy

Filed Oct. 14, 1987, Ser. No. 108,413

Claims priority, application France, May 7, 1987, 872747

Term of patent 14 years

U.S. Cl. D9—384



317,259

COMBINED BOTTLE AND CAP

Peter Schmidt, Hamburg, Fed. Rep. of Germany, assignor to Margaret Astor AG, Mainz-Rhein, Fed. Rep. of Germany

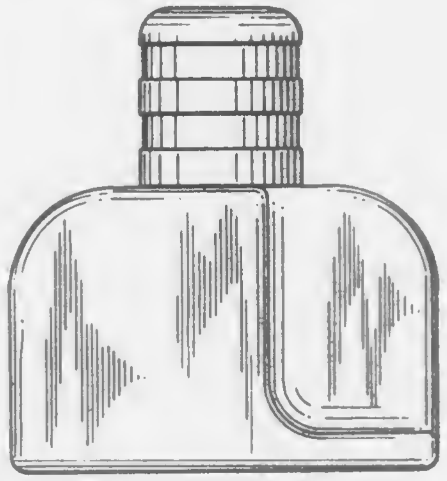
Filed Aug. 10, 1988, Ser. No. 230,576

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1988, 5613

The portion of the term of this patent subsequent to Sep. 4, 2007, has been disclaimed.

Term of patent 14 years

U.S. Cl. D9—409



317,260

PACKAGING CONTAINER

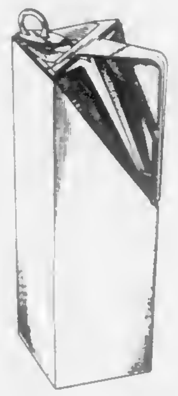
Per Nylander, Jönköping, Sweden, assignor to Roby Teknik AB, Lund, Sweden

Filed Jan. 13, 1988, Ser. No. 143,614

Claims priority, application Sweden, Jul. 13, 1987, 871584; Jul. 13, 1987, 871585; Jul. 13, 1987, 871586; Jul. 13, 1987, 871587; Jul. 13, 1987, 871588; Jul. 13, 1987, 871589; Jul. 13, 1987, 871590; Jul. 13, 1987, 871591; Jul. 13, 1987, 871592; Jul. 13, 1987, 871593

Term of patent 14 years

U.S. Cl. D9—417



VOL
1127
ISS
1
JE
4
1991
UMI

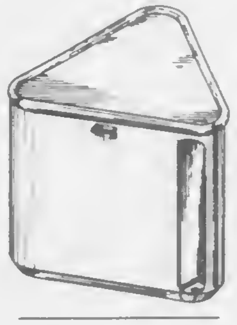
317,261
CONTAINER

Ronald D. Brown, and Margaret A. Brown, both of P.O. Box 309, Pecos, N. Mex. 87552

Filed Apr. 10, 1989, Ser. No. 335,531

Term of patent 14 years

U.S. Cl. D9—430



317,262
PACKAGE

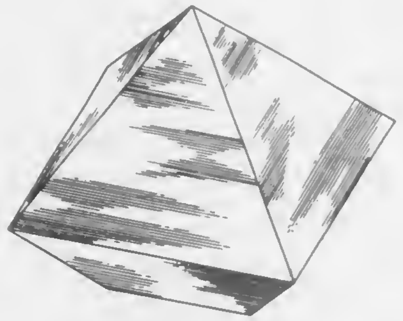
Kristian A. Bluff, Allégade 29, 4., DK-2000 Frederiksberg, Denmark

Filed Oct. 11, 1988, Ser. No. 256,382

Claims priority, application Denmark, Apr. 11, 1988, MA4611988

Term of patent 14 years

U.S. Cl. D9—431



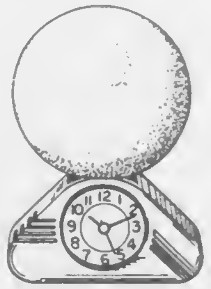
317,263
ALARM CLOCK

Michael L. Rothman, Newton Upper Fall, Mass., assignor to International Precision Products, Inc., Kearny, N.J.

Filed May 18, 1988, Ser. No. 195,167

Term of patent 14 years

U.S. Cl. D10—23



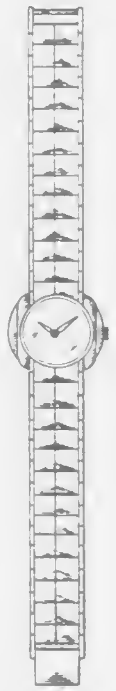
317,264
WRISTWATCH

Wa Ngok Fong, Hong Kong, Hong Kong, assignor to Designtime Company Limited, North Point, Hong Kong

Filed Jan. 20, 1988, Ser. No. 145,487

Term of patent 14 years

U.S. Cl. D10—32



317,265
WRIST-WATCH

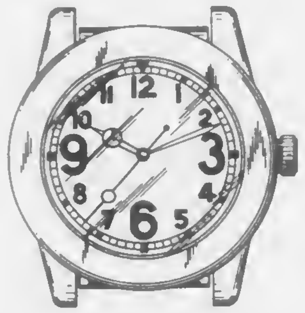
Franco P. Giolla, Milan, Italy, and Dominique M. Pibouleau, Geneva, Switzerland, assignors to Mahara Mhr Montres S.A., Geneva, Switzerland

Filed Jan. 20, 1988, Ser. No. 146,125

Claims priority, application Switzerland, Jul. 23, 1987, 116060

Term of patent 14 years

U.S. Cl. D10—39



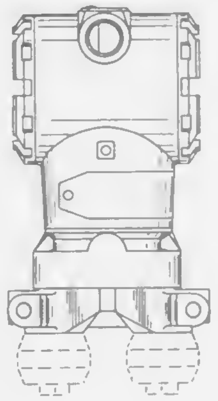
317,266
PRESSURE TRANSMITTER HOUSING

David A. Broden, Chanhassen; David W. Lee, Lakeville; Timothy A. Miller, and Debra K. Zeller, both of Eagan, all of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.

Filed Apr. 22, 1988, Ser. No. 184,695

Term of patent 14 years

U.S. Cl. D10—46



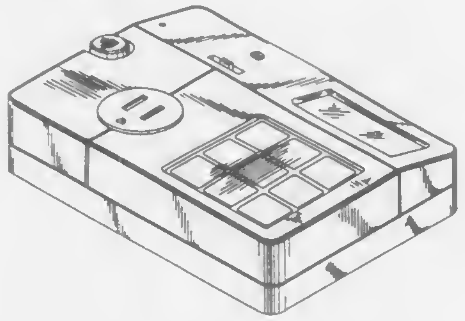
317,267
ELECTRONIC PROGRAMMABLE THERMOSTAT

Vinay Mehta, Germantown, Tenn., assignor to Hunter-Melnor, Inc., Memphis, Tenn.

Filed Mar. 3, 1989, Ser. No. 318,374

Term of patent 14 years

U.S. Cl. D10—50



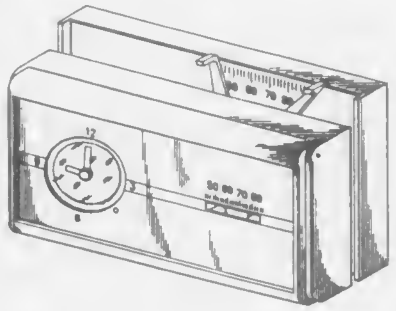
317,268
THERMOSTAT

James A. Odom, Jr., Apple Valley, and Rolf L. Strand, Crystal, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 27, 1989, Ser. No. 316,115

Term of patent 14 years

U.S. Cl. D10—51



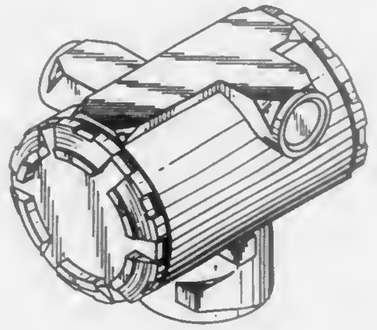
317,269
TEMPERATURE TRANSMITTER HOUSING

Donald W. Selg, Mendota Heights, Minn., assignor to Rosemount Inc., Eden Prairie, Minn.

Filed Feb. 13, 1989, Ser. No. 310,702

Term of patent 14 years

U.S. Cl. D10—52



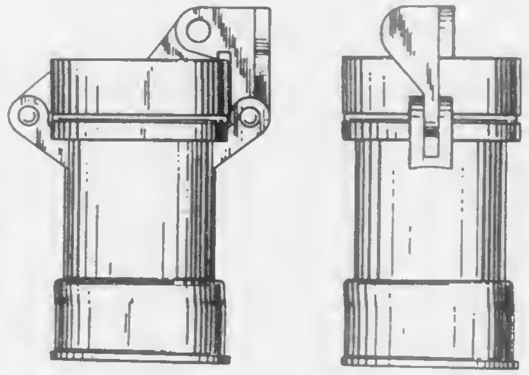
317,270
MONITORING WELL CAP

Jerry C. Hensley, 6374 SW. 22nd Ct., Miramar, Fla. 33023

Continuation-in-part of Ser. No. 194,868, May 17, 1988, Pat. No. 4,881,597. This application Jnn. 2, 1989, Ser. No. 360,712

Term of patent 14 years

U.S. Cl. D10—96



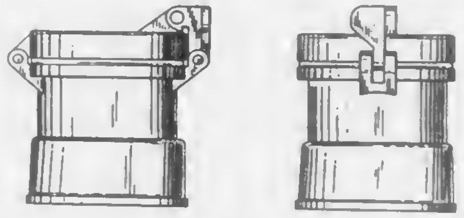
317,271
MONITORING WELL CAP

Jerry C. Hensley, 6374 SW. 22nd Ct., Miramar, Fla. 33023

Continuation-in-part of Ser. No. 194,868, May 17, 1988, Pat. No. 4,881,597. This application Jun. 2, 1989, Ser. No. 360,713

Term of patent 14 years

U.S. Cl. D10—96



VOL
1127
ISS
1
JE
4
1991
UMI

317,272

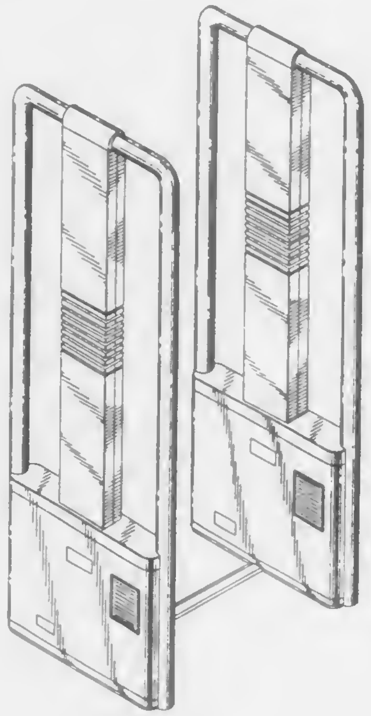
ELECTRONIC ARTICLE SURVEILLANCE UNIT

Roland W. Rubertus, Hudson, Wis.; Roger K. Westerberg, Cottag Grove; Peter J. Zarembo, Shoreview, both of Minn.; Steven P. Belletire, Wheaton, and Gregory J. Foster, Chicago, both of Ill., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 6, 1989, Ser. No. 418,204

Term of patent 14 years

U.S. Cl. D10—106



317,273

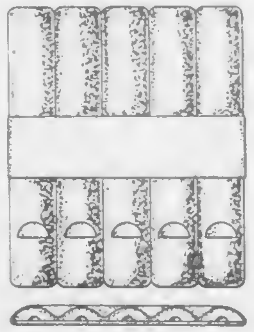
WHISTLE

James J. Kollath, Waunakee, and Mark E. McDonald, Madison, both of Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.

Division of Ser. No. 453,461, Dec. 20, 1989, abandoned. This application Apr. 20, 1990, Ser. No. 511,528

Term of patent 14 years

U.S. Cl. D10—119



317,274

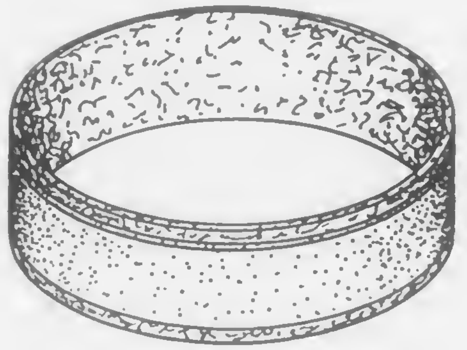
ARMBAND OR THE LIKE

Joseph R. Redina, 1554 Riverview St., Monroe, Mich. 48161

Filed Jan. 12, 1988, Ser. No. 143,147

Term of patent 14 years

U.S. Cl. D11—4



317,275

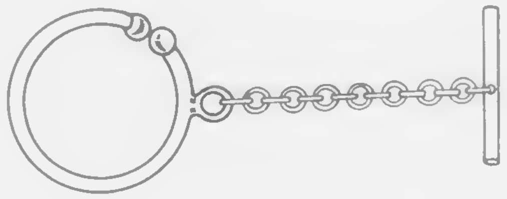
NECKTIE HOLDER

Manual Alvardo López, 340 E. 23rd St., Tucson, Ariz. 85713, assignor to Manuel Alvardo López, Tucson, Ariz.

Filed Sep. 28, 1987, Ser. No. 84,136

Term of patent 14 years

U.S. Cl. D11—202



317,276

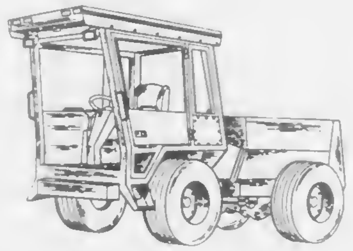
GROUND SERVICE VEHICLE

Eugene A. Sousek, Appleton, Wis., assignor to M-B Company, Inc. of Wisconsin, Chilton, Wis.

Filed Nov. 21, 1988, Ser. No. 274,125

Term of patent 14 years

U.S. Cl. D12—14



317,277

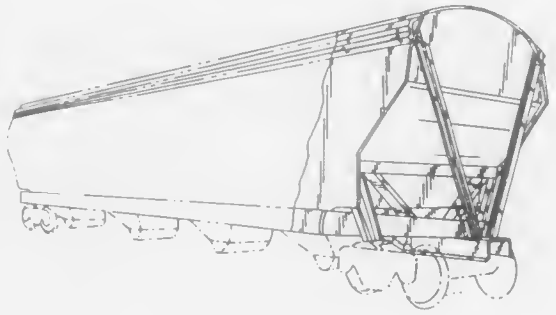
END SEGMENT OF A RAILWAY CAR

John W. Coulborn, Chesterfield, and John A. Krug, St. Charles, both of Mo., assignors to ACF Industries, Incorporated, Earth City, Mo.

Filed Aug. 18, 1987, Ser. No. 86,663

Term of patent 14 years

U.S. Cl. D12—41



317,278

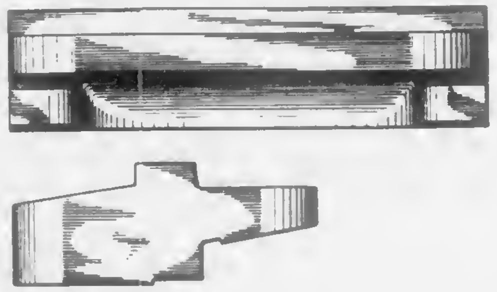
ADJUSTABLE CLAMP FOR SUPPORTING A RAILWAY RAIL

Frank P. Bobb, 3475 Green St., Camp Hill, Pa. 17011

Filed Feb. 21, 1989, Ser. No. 313,271

Term of patent 14 years

U.S. Cl. D12—51



317,279

SUPPORT POST FOR THE SIDE WALLS OF A TRAILER

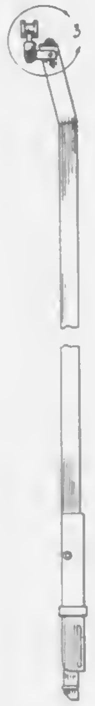
John G. Krueger, Werribee, Australia, assignor to Krueger Transport Equipment Pty. Ltd., Victoria, Australia

Filed Mar. 9, 1988, Ser. No. 166,242

Claims priority, application Australia, Sep. 9, 1987, 3272/87

Term of patent 14 years

U.S. Cl. D12—106



317,280

BABY STROLLER

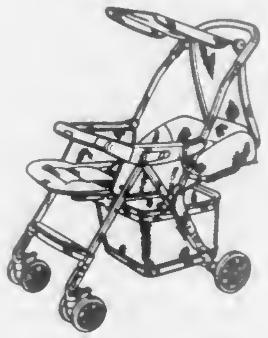
Takehiko Takahashi, and Tomihiro Kaneko, both of Tokyo, Japan, assignors to Combl Co., Ltd., Tokyo, Japan

Filed May 25, 1989, Ser. No. 356,714

Claims priority, application Japan, Jan. 20, 1989, 1-1767

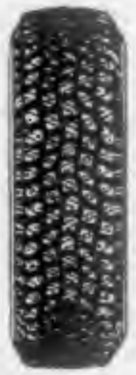
Term of patent 14 years

U.S. Cl. D12—129

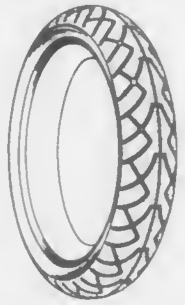


VOL
1127
ISS
1
JE
4
1991
UMI

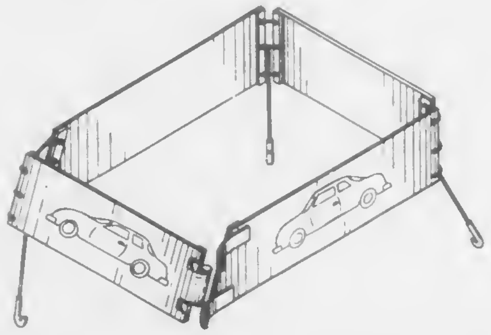
317,281
TIRE
Pentti Eromäki, Nokia, Finland, assignor to Nokia Tyres Limited, Nokia, Finland
Filed Jan. 18, 1989, Ser. No. 298,503
Term of patent 14 years
U.S. Cl. D12—146



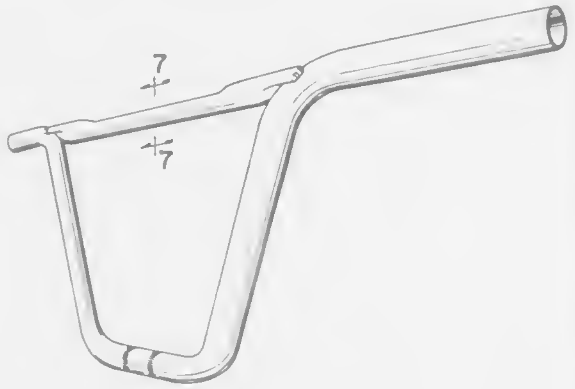
317,282
MOTORCYCLE TIRE
Kazuo Kadomaru, Osaka, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Jan. 31, 1989, Ser. No. 304,108
Claims priority, application Japan, Aug. 4, 1988, 63-31364
Term of patent 14 years
U.S. Cl. D12—147



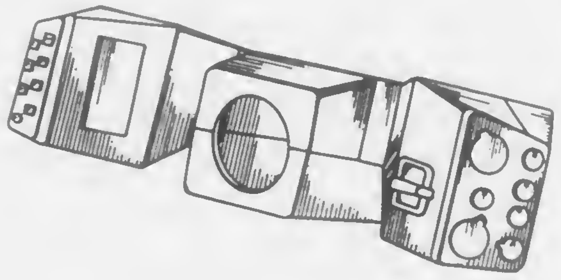
317,283
AUTOMOBILE COVER OR SIMILAR ARTICLE
David L. Gray, 8403 W. Entiat Pl., Kennewick, Wash. 99336
Filed Sep. 14, 1988, Ser. No. 244,255
Term of patent 14 years
U.S. Cl. D12—155



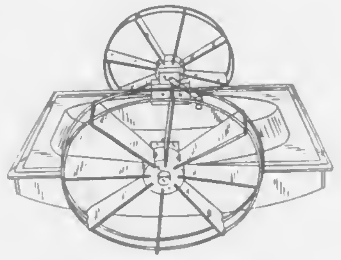
317,284
BICYCLE HANDLEBAR
David K. McMurtrey, Maysville, Ky., assignor to Wald Manufacturing Co., Inc., Maysville, Ky.
Continuation-in-part of Ser. No. 885,432, Jul. 14, 1986. This application Apr. 29, 1987, Ser. No. 43,985
Term of patent 14 years
U.S. Cl. D12—178



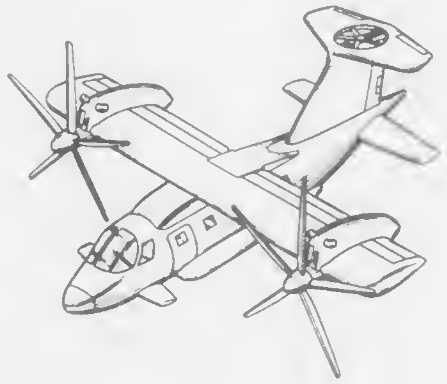
317,285
INDICATOR PANEL FOR A MOTOR VEHICLE
Tai Inoue, Susono, Japan, assignor to Yazaki Corporation, Japan
Filed Apr. 28, 1988, Ser. No. 187,994
Claims priority, application Japan, Oct. 28, 1987, 62-43733
Term of patent 14 years
U.S. Cl. D12—192



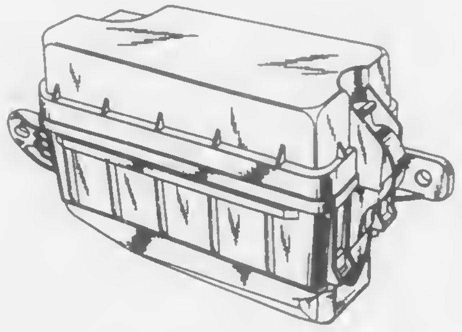
317,286
PADDLEBOAT OR THE LIKE
Joel S. Drake, 5723 Lake St., Glen Arbor, Mich. 49636
Filed Nov. 29, 1989, Ser. No. 443,643
Term of patent 14 years
U.S. Cl. D12—306



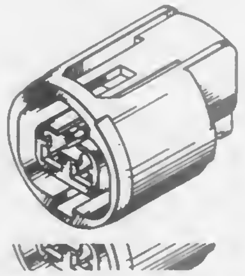
317,287
DUAL MODE AIR VEHICLE
Cecil W. Haga, Arlington, Tex., assignor to Ishida Foundation, Oya, Japan
Filed Apr. 19, 1989, Ser. No. 341,109
Term of patent 14 years
U.S. Cl. D12—344



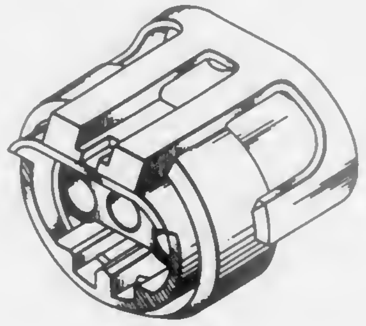
317,288
HOUSING FOR AN ELECTRICAL CONNECTING BOARD FOR USE IN AN AUTOMOBILE
Katsuhiro Kubota, Kosai, Japan, assignor to Yazaki Corporation, Japan
Filed Nov. 9, 1987, Ser. No. 118,623
Claims priority, application Japan, May 8, 1987, 62-017760
Term of patent 14 years
U.S. Cl. D13—133



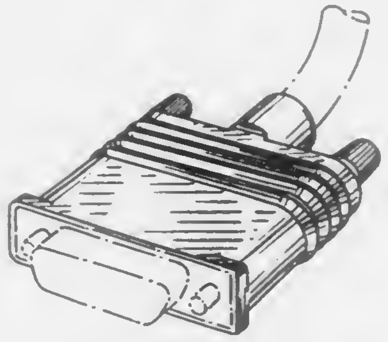
317,289
HOUSING FOR AN ELECTRICAL CONNECTOR
Kiyohito Fukuda; Masanori Tsuji, and Masanori Tsuji, all of Shizuoka, Japan, assignors to Yazaki Corporation, Japan
Filed Jun. 23, 1988, Ser. No. 210,709
Claims priority, application Japan, Dec. 23, 1987, 62-52156
Term of patent 14 years
U.S. Cl. D13—133



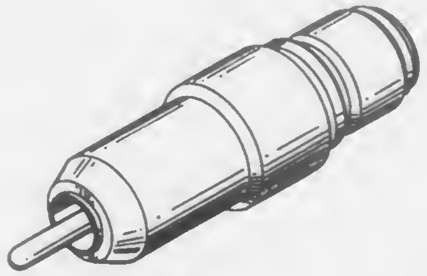
317,290
HOUSING FOR AN ELECTRICAL CONNECTOR
Shigemitsu Inaba; Kiyohito Fukuda, and Masakuni Samejima, all of Shizuoka, Japan, assignors to Yazaki Corporation, Japan
Filed Jun. 23, 1988, Ser. No. 210,710
Claims priority, application Japan, Dec. 24, 1987, 62-52375
Term of patent 14 years
U.S. Cl. D13—133



317,291
CONNECTOR FOR A COMPUTER CABLE
Hartmut Esslinger, Los Gatos, Calif., assignor to NeXT Computer, Inc., Redwood City, Calif.
Filed Jun. 30, 1988, Ser. No. 214,109
Term of patent 14 years
U.S. Cl. D13—133



317,292
ELECTRICAL CONNECTOR
Bruce A. Brisson, 3037 Grass Valley Hwy., Auburn, Calif. 95603
Filed Dec. 1, 1988, Ser. No. 278,928
The portion of the term of this patent subsequent to Jun. 4, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D13—133

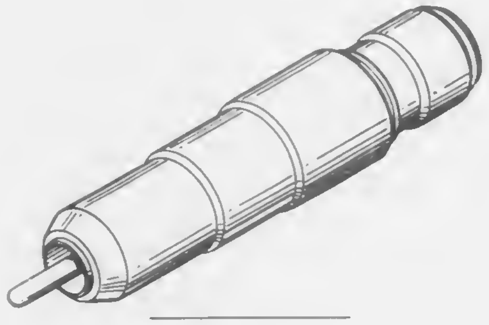


VOL
1127
ISS
1
JE
4
1991
UMI

317,293

ELECTRICAL CONNECTOR

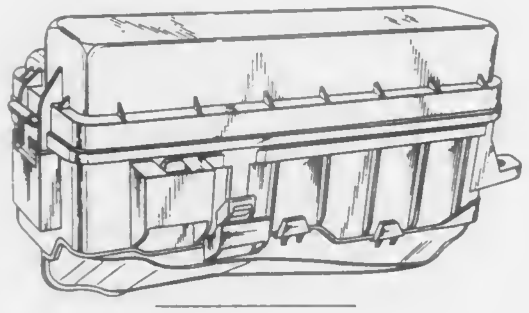
Bruce A. Brisson, 3037 Grass Valley Hwy., Auburn, Calif. 95603
Filed Dec. 1, 1988, Ser. No. 278,930
The portion of the term of this patent subsequent to Jun. 4, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D13—133



317,294

HOUSING FOR AN ELECTRICAL CONNECTOR BOARD

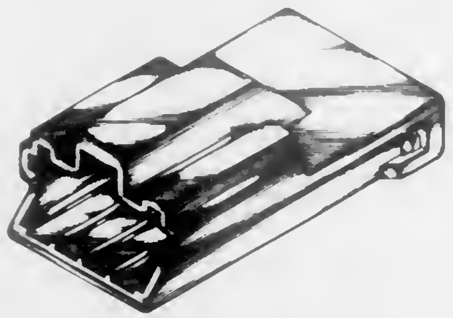
Hideharu Hayashi, Kosai, Japan, assignor to Yazaki Corporation, Japan
Filed Mar. 23, 1988, Ser. No. 172,911
Term of patent 14 years
U.S. Cl. D13—146



317,295

HOUSING FOR AN ELECTRICAL CONNECTOR

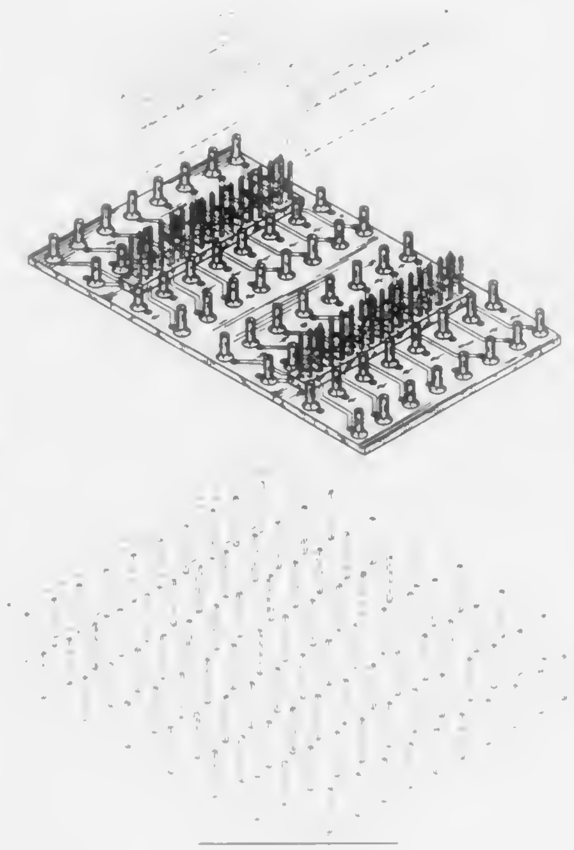
Hitoshi Saito, Gotenba, Japan, assignor to Yazaki Corporation, Japan
Filed Mar. 23, 1988, Ser. No. 172,914
Claims priority, application Japan, Oct. 9, 1987, 62-41085
Term of patent 14 years
U.S. Cl. D13—147



317,296

SWITCH-OVER BLOCK ADAPTER

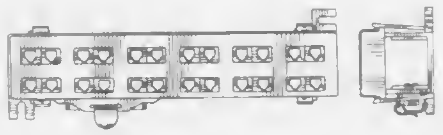
Douglas G. Hard, Rte. 1, Mimosa Rd., Fayetteville, Tenn. 37334
Filed Jun. 20, 1988, Ser. No. 208,566
Term of patent 14 years
U.S. Cl. D13—147



317,297

MODULAR JACK PATCH BLOCK

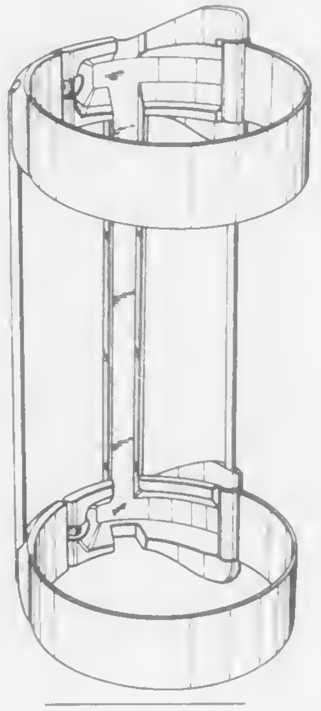
Brian E. Reed, New Hartford, Conn., assignor to The Siemon Company, Watertown, Conn.
Filed Dec. 28, 1988, Ser. No. 291,432
Term of patent 14 years
U.S. Cl. D13—147



317,298

CABLE PROTECTOR

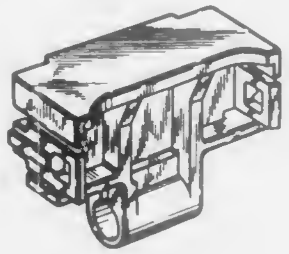
Harald Schmidt, Stavanger; Helge Skurve, and Jan Freyer, both of Hafrsfjord, all of Norway, assignors to Lasalle IPR A/S, Stavanger, Norway
Filed Dec. 15, 1988, Ser. No. 284,483
Claims priority, application Norway, Jun. 22, 1988, 69475
Term of patent 14 years
U.S. Cl. D13—154



317,299

LOCKING MEMBER FOR AN ELECTRICAL CONNECTOR

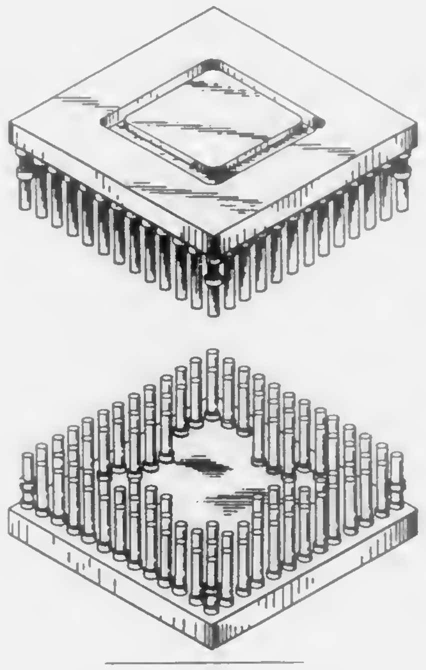
Masaaki Sugiyama; Toshio Suehisa, and Shigeru Iida, all of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan
Filed May 11, 1989, Ser. No. 350,263
Claims priority, application Japan, Nov. 11, 1988, 63-44001
Term of patent 14 years
U.S. Cl. D13—154



317,300

SEMI-CONDUCTOR MOUNTING SUBSTRATE

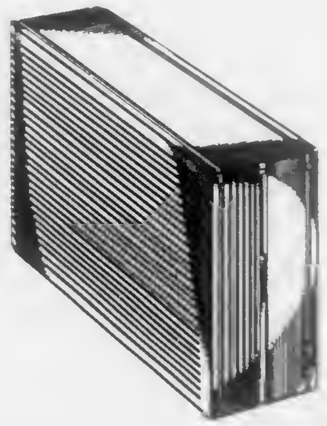
Terutomi Hasegawa, 2-40 Nakagawa-Cho, Ogaki-City, Gifu pref., and Nobumichi Goto, 291, Kami-Shirokane, Seki City Gifu Pref, both of Japan
Filed Jan. 4, 1988, Ser. No. 140,433
Claims priority, application Japan, Jul. 4, 1987, 62-27274
The portion of the term of this patent subsequent to May 14, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D13—182



317,301

PERSONAL COMPUTER HOUSING OR SIMILAR ARTICLE

Gavin R. Ivester, Palo Alto, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.
Filed Aug. 4, 1989, Ser. No. 389,825
Term of patent 14 years
U.S. Cl. D14—102



VOL
1127
ISS
1
JE
4
1991
UMI

317,302
PORTABLE COMPUTER

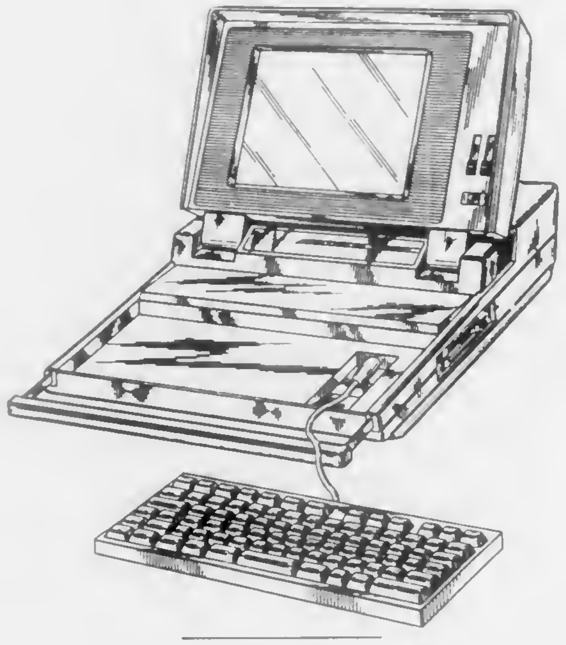
Shinji Shibuya, Kodaira; Nobuo Fukuda, Machida; Yoshihiro Kawakatsu, Sayama; Michiaki Kotsuka, Chiba, and Masaaki Eishima, Narashino, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 7, 1989, Ser. No. 390,690

Claims priority, application Japan, Feb. 22, 1989, 1-6208

Term of patent 14 years

U.S. Cl. D14—106



317,303
TELEVISION RECEIVER

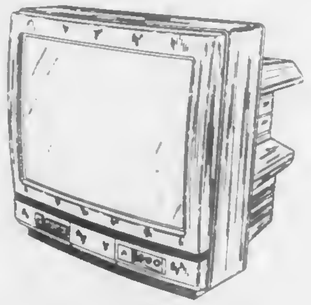
Gary E. Grimes, Eersel, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 9, 1989, Ser. No. 349,473

Claims priority, application World Int. Prop. O., Dec. 9, 1988, DM/012.367

Term of patent 14 years

U.S. Cl. D14—126



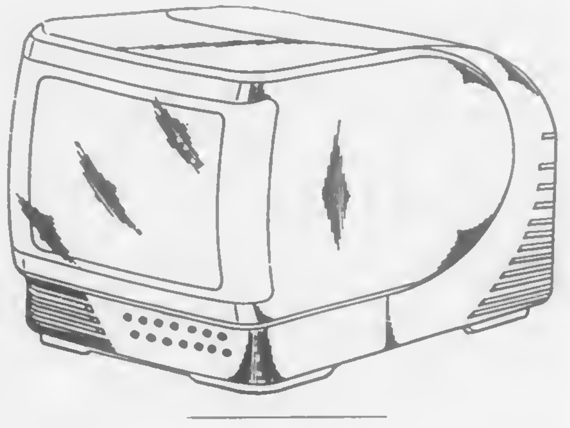
317,304
TELEVISION RECEIVER

Thomas E. Renk, Jr., Indianapolis, Ind., assignor to Thomson Consumer Electronics, Inc., Indianapolis, Ind.

Filed Aug. 14, 1989, Ser. No. 393,325

Term of patent 14 years

U.S. Cl. D14—126



317,305
TELEVISION RECEIVER

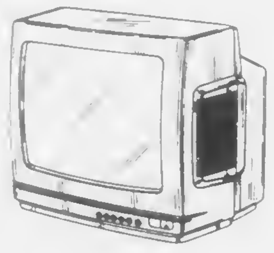
Kaoru Tanaka, Yokohama, and Kimiyoshi Ban, Kasukabe, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 15, 1989, Ser. No. 436,812

Claims priority, application Japan, Jun. 5, 1989, 1-20446

Term of patent 14 years

U.S. Cl. D14—126



317,306
COMBINED LIQUID CRYSTAL TV AND PORTABLE VIDEO CASSETTE RECORDER

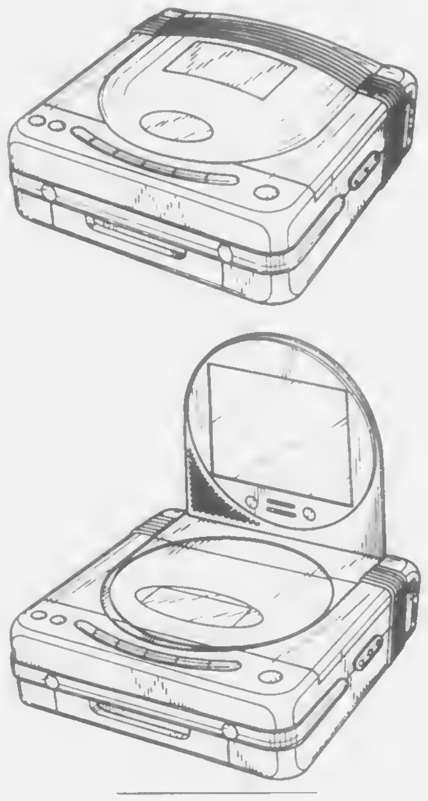
Sa Y. Hong, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

Filed Sep. 5, 1989, Ser. No. 403,153

Claims priority, application Rep. of Korea, Apr. 24, 1989, 5315/1989

Term of patent 14 years

U.S. Cl. D14—129



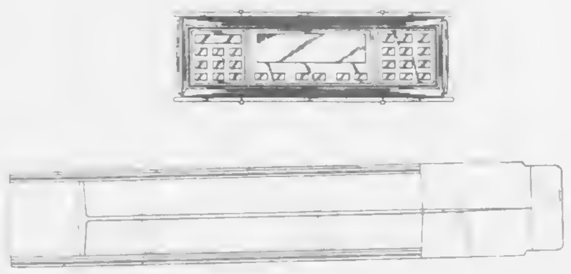
317,307
TWO-WAY RADIO OR SIMILAR ARTICLE

Kaspar Kasparian, and John D. Ide, both of Raleigh, N.C., assignors to Teletec Corporation, Raleigh, N.C.

Division of Ser. No. 31,005, Mar. 27, 1987, Pat. No. D. 312,456. This application Aug. 30, 1990, Ser. No. 574,924

Term of patent 14 years

U.S. Cl. D14—137



317,308
COMBINED TUNER, AMPLIFIER, RECORD PLAYER AND TAPE PLAYER

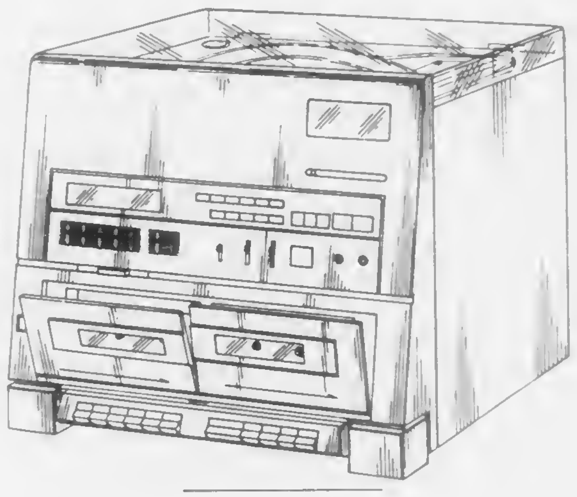
Shinichi Aoki, Yokohama, and Akihiko Konno, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 20, 1988, Ser. No. 196,356

Claims priority, application Japan, Dec. 1, 1987, 62-48887

Term of patent 14 years

U.S. Cl. D14—168



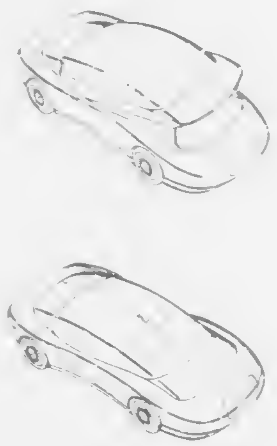
317,309
VIDEO CASSETTE REWINDER

Tsun H. Yeh, No. 476, Ming Hu Road, Hsinchu, Taiwan

Filed Jun. 21, 1989, Ser. No. 369,355

Term of patent 14 years

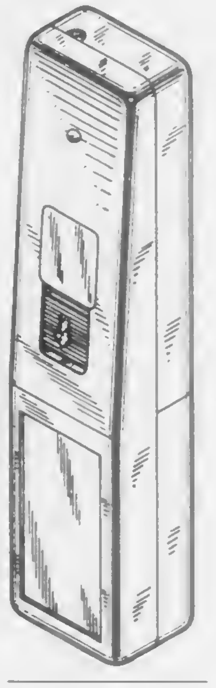
U.S. Cl. D14—217



VOL
1127
ISS
1
JE
4
1991
UMI

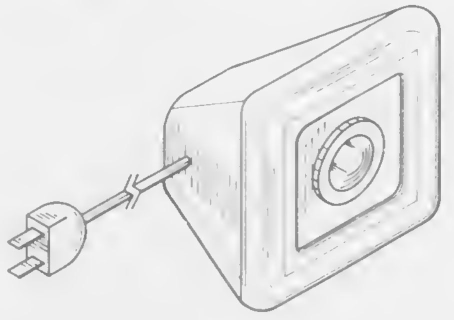
317,310
COMBINED REMOTE CONTROL AND FLASHLIGHT

Frederic W. Schwartz, Providence, R.I., assignor to Cable Electric Products, Inc., Providence, R.I.
Filed Apr. 29, 1988, Ser. No. 188,008
Term of patent 14 years
U.S. Cl. D14—217



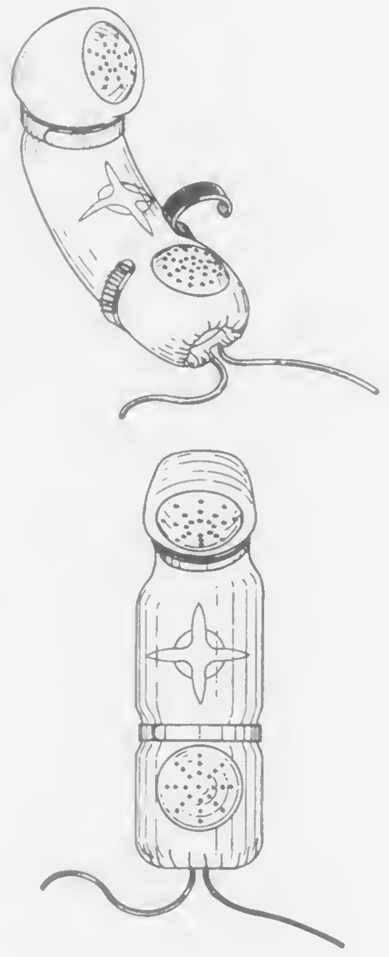
317,311
REMOTE TELEPHONE PROGRAMMER FOR A VCR WITH INFRARED TRANSMITTER

Todd J. Anderson, and Julie A. Anderson, both of 4467 Buffalo Rd., North Chili, N.Y. 14514
Filed Mar. 31, 1988, Ser. No. 176,380
Term of patent 14 years
U.S. Cl. D14—240



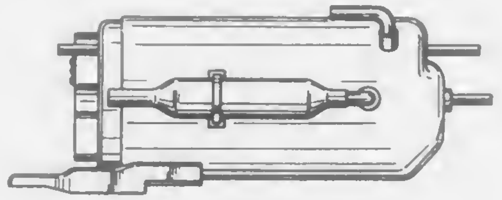
317,312
TELEPHONE COVER

Allen R. Trowbridge, Jr., 49 Main St., Kensington, Conn. 06037
Filed Feb. 14, 1990, Ser. No. 479,750
Term of patent 14 years
U.S. Cl. D14—250



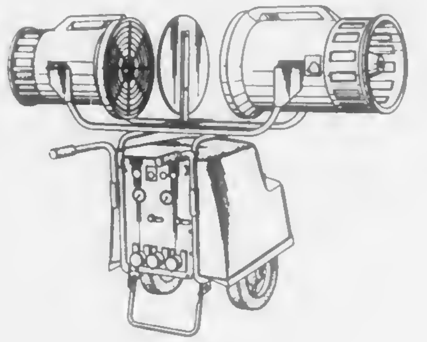
317,313
ROTARY COMPRESSOR

Masatoshi Yoshida; Mamoru Egawa, and Makoto Sugiyama, all of Shizuoka, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan
Filed Feb. 28, 1989, Ser. No. 316,682
Claims priority, application Japan, Sep. 30, 1988, 63-38188
Term of patent 14 years
U.S. Cl. D15—9



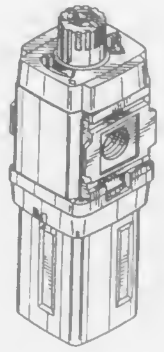
317,314
AGRICULTURAL CHEMICAL SPRAYER

Eiji Yanagi, Chiba, Japan, assignor to Maruyama Mfg. Co., Inc., Tokyo, Japan
Filed Oct. 25, 1988, Ser. No. 262,012
Term of patent 14 years
U.S. Cl. D15—13



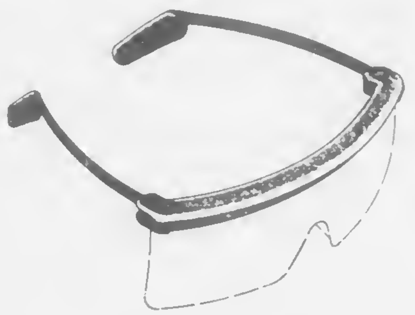
317,315
LUBRICATOR

Kouichi Miyake, Kani; Tatsuaki Aoyama, Ichinomiya, and Hisanobu Niwa, Komaki, all of Japan, assignors to CKD Kabushiki Kaisha, Komaki, Japan
Filed Mar. 30, 1989, Ser. No. 330,738
Claims priority, application Japan, Sep. 30, 1988, 63-38444
Term of patent 14 years
U.S. Cl. D15—150



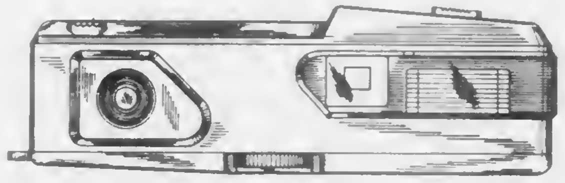
317,316
EYEGLASS FRAME

Smith B. Stanley, New York, N.Y., and Yoram Alroy, Tampa, Fla., assignors to Designer Products Est., Zurich, Switzerland
Filed Aug. 5, 1988, Ser. No. 229,543
Term of patent 14 years
U.S. Cl. D16—102



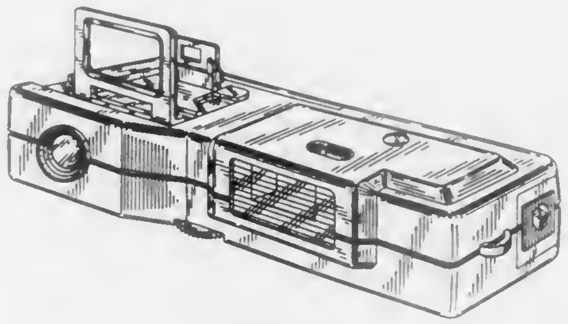
317,317
35 MM CAMERA

Fang-Hsiang Lue, Chung Ho, and Chung-Song Won, Bachaiu, both of Taiwan, assignors to Platon Precision Industries Co., Ltd., Taipen Hsien, Taiwan
Filed Sep. 2, 1988, Ser. No. 241,542
Term of patent 14 years
U.S. Cl. D16—213



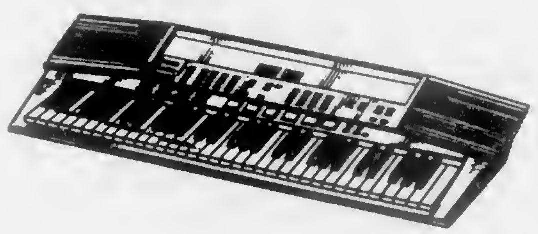
317,318
CAMERA

Yet Chan, Kowloon, Hong Kong, assignor to Achiever Industries Ltd., Kowloon, Hong Kong
Filed Feb. 12, 1988, Ser. No. 155,648
Claims priority, application United Kingdom, Nov. 16, 1987, 1046359
Term of patent 14 years
U.S. Cl. D16—209



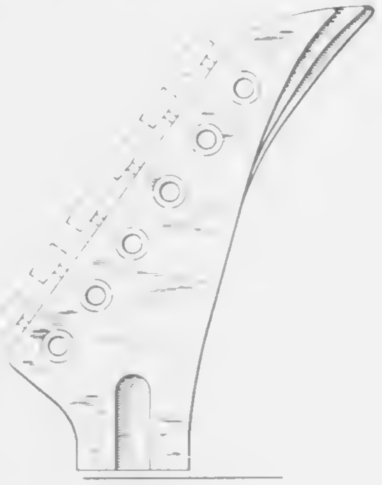
317,319
ELECTRONIC KEYBOARD MUSICAL INSTRUMENT

Ikuro Mine, Hamamatsu, Japan, assignor to Yamaha Corporation, Shizuoka, Japan
Filed May 23, 1989, Ser. No. 355,401
Claims priority, application Japan, Nov. 30, 1988, 63-46983
Term of patent 14 years
U.S. Cl. D17—1

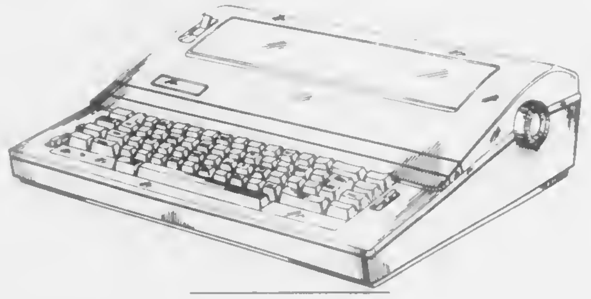


VOL 1127
ISS 1
JE 4
1991
UMI

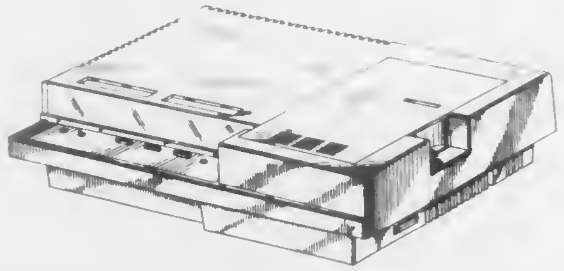
317,320
GUITAR PEGHEAD
Marc Schumann, Los Angeles, Calif., and Michael V. Powers, Meridian, Miss., assignors to Peavey Electronics Corporation, Meridian, Miss.
Filed Dec. 20, 1988, Ser. No. 286,769
Term of patent 14 years
U.S. Cl. D17—20



317,321
TYPEWRITER
Robert L. Kasprzycki, Pompey, N.Y., assignor to Smith Corona Corporation, Cortland, N.Y.
Filed Apr. 17, 1987, Ser. No. 40,653
The portion of the term of this patent subsequent to Nov. 6, 2004 has been disclaimed
Term of patent 14 years
U.S. Cl. D18—1



317,322
THERMAL PRINTER
Michael M. Richardson, Eden Prairie, Minn., and Geoff Ringle, Trenton, N.J., assignors to Kroy Inc., Scottsdale, Ariz.
Filed Jan. 31, 1989, Ser. No. 304,415
Term of patent 14 years
U.S. Cl. D18—13



317,323
TYPE FONT
Robert J. Slimbach, Mountain View, Calif., assignor to Adobe Systems Incorporated, Mountain View, Calif.
Filed Jan. 12, 1989, Ser. No. 296,151
Term of patent 14 years
U.S. Cl. D18—24

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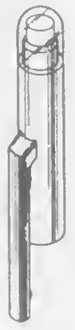
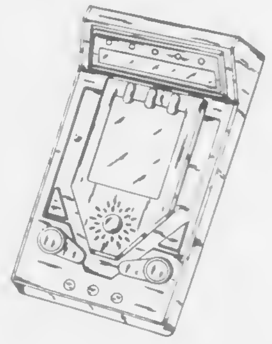
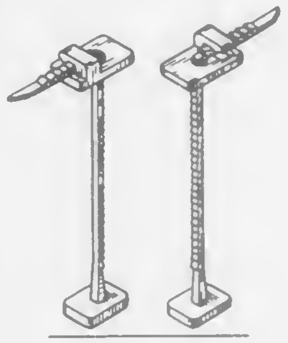
317,324
CAP FOR WRITING TOOLS
C. H. Chuang, Taipei, Taiwan, assignor to Pioneer Industrial Corp., Taipei, Taiwan
Filed Oct. 25, 1988, Ser. No. 262,661
Term of patent 14 years
U.S. Cl. D19—57



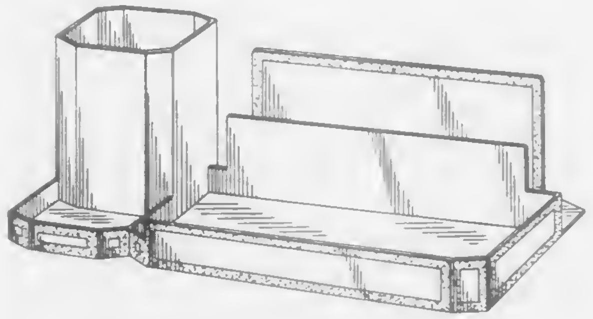
317,325
ELECTRONIC GAME
Doric Fung, Quarry Bay, Hong Kong, assignor to Video Technology Industries, Inc., Wheeling, Ill.
Filed Apr. 15, 1988, Ser. No. 182,320
Claims priority, application United Kingdom, Nov. 6, 1987, 1046113
Term of patent 14 years
U.S. Cl. D19—60



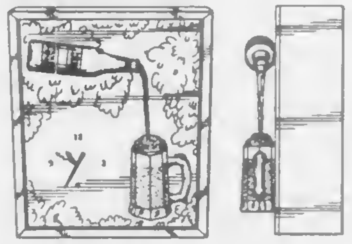
317,326
DOCUMENT HOLDING DEVICE
Abner Berracasa, Pully, Switzerland, assignor to Capitol Trading S.A., Switzerland
Filed Sep. 17, 1987, Ser. No. 98,002
Claims priority, application Switzerland, Apr. 14, 1987, 115848
Term of patent 14 years
U.S. Cl. D19—65



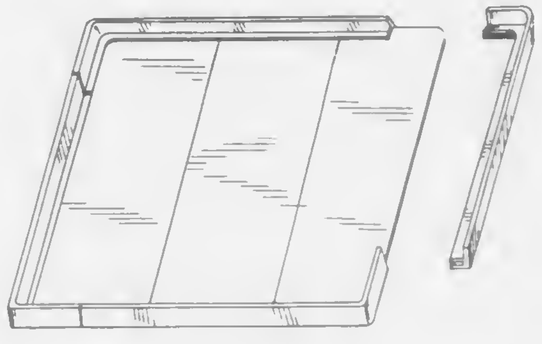
317,327
PRE-INKED STAMP ORGANIZER
Heng G. Kheng, Singapore, Singapore, assignor to Metro Plastic Industry Pte. Ltd., Singapore
Filed Jun. 2, 1988, Ser. No. 201,625
Term of patent 14 years
U.S. Cl. D19—75



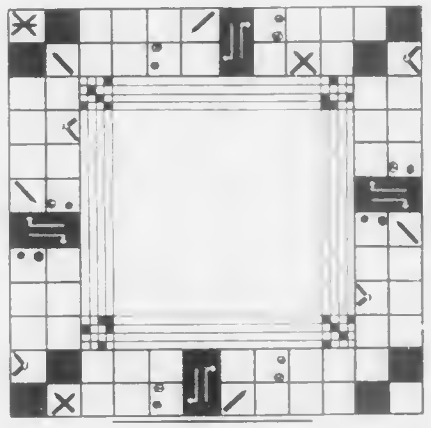
317,328
COMBINED ADVERTISING DISPLAY AND CLOCK
Larry-John L. Laboissiere, 3220 Goodwick Ave., West Covina, Calif. 91792
Filed May 10, 1989, Ser. No. 350,682
Term of patent 14 years
U.S. Cl. D20—20



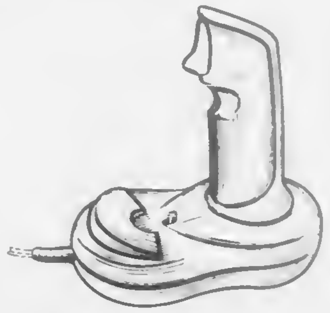
317,329
FOLDABLE TRAY FOR PUZZLE OR THE LIKE
George Annand, 332 Mastin Plz., Ridgewood, N.J. 07450
Filed Oct. 19, 1988, Ser. No. 259,899
Term of patent 14 years
U.S. Cl. D21—14



317,330
GAME BOARD
Donald V. Lee, and Julius Ermis, both of 1718 P St. NW. #402, Washington, D.C. 20036
Filed Jan. 11, 1989, Ser. No. 295,586
Term of patent 14 years
U.S. Cl. D21—25



317,331
JOYSTICK
Wynford Holloway, Cardiff, United Kingdom, assignor to Creative Devices Research Ltd., Gwent, United Kingdom
Filed Jul. 15, 1988, Ser. No. 220,102
Claims priority, application United Kingdom, Jan. 29, 1988, 1048113
Term of patent 14 years
U.S. Cl. D21—48



VOL
1127
ISS
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JE
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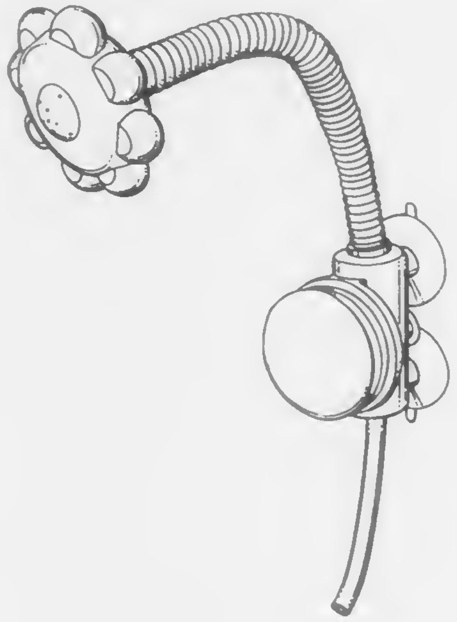
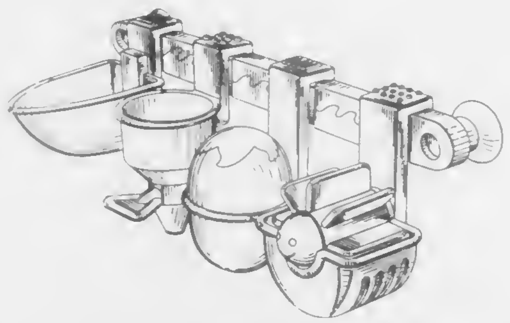
1991
UMI

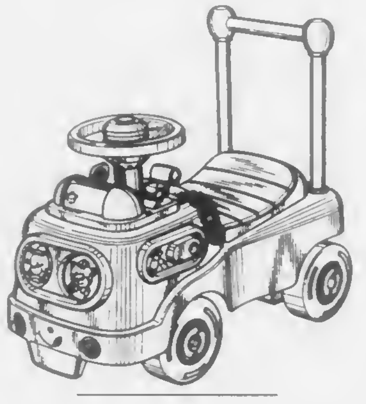
317,332
TOY PUMP SHOWER
David M. Williams, and David W. Schweitzer, both of New York, N.Y., assignors to The Child Growth & Development Corporation, New York, N.Y.
Filed Mar. 22, 1988, Ser. No. 172,903
Term of patent 14 years
U.S. Cl. D21—59



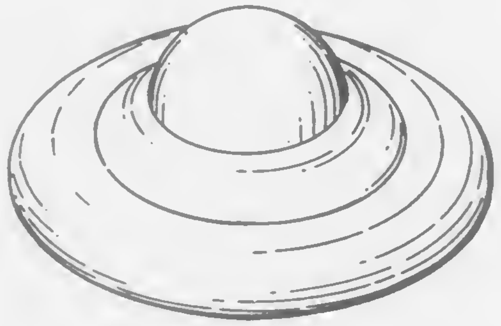
317,333
BATH TOY
Harry S. Thomson, Richmond, and John Pape, Hitchin, both of England, assignors to Monami Products Limited, Richmond, England
Filed Nov. 15, 1988, Ser. No. 272,262
Claims priority, application United Kingdom, Jul. 18, 1988, 1052365
Term of patent 14 years
U.S. Cl. D21—59



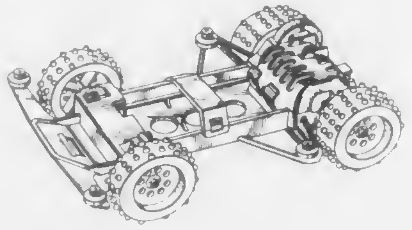
317,334
TOY VEHICLE
Takehiko Takahashi; Yoshiyasu Ishii; Taira Hanashima, and Kazunobu Koike, all of Tokyo, Japan, assignors to Combi Co., Ltd., Tokyo, Japan
Filed Jul. 25, 1989, Ser. No. 384,519
Claims priority, application Japan, Feb. 7, 1989, 1-4022
Term of patent 14 years
U.S. Cl. D21—76



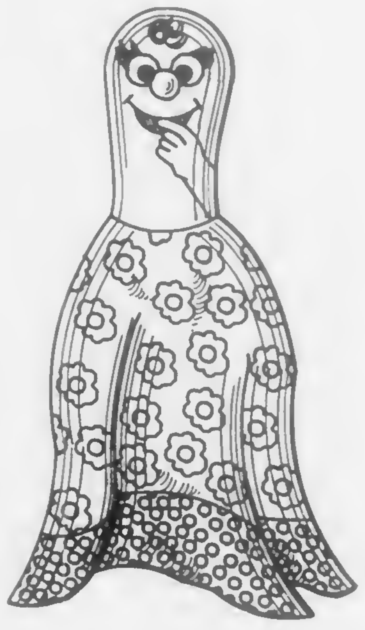
317,335
BALLOON GLIDER
Craig J. Lovik, 8565 Custer School Rd., Custer, Wash. 98240
Filed Mar. 20, 1989, Ser. No. 325,484
Term of patent 14 years
U.S. Cl. D21—84



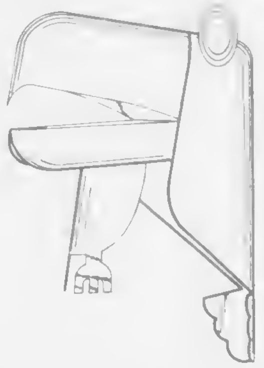
317,336
TOY RACING CAR CHASSIS
Hirotsugu Tsuchiya, Shizuoka, Japan, assignor to Kabushiki Kaisha Tamiya Mokei, Shizuoka, Japan
Filed Aug. 3, 1989, Ser. No. 388,913
Claims priority, application Japan, May 19, 1989, 1-18073
Term of patent 14 years
U.S. Cl. D21—137



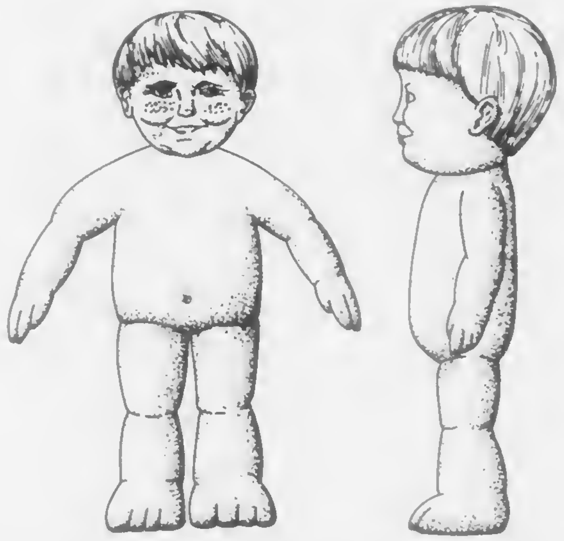
317,337
THUMB PUPPET
Jana M. Parody, 715 Main St., Glen Park, Watertown, N.Y. 13601
Filed Sep. 2, 1988, Ser. No. 240,120
Term of patent 14 years
U.S. Cl. D21—153



317,338
TOY TOUCAN BIRD FIGURE
Jeffrey L. Peyton, P.O. Box C-32000, Richmond, Va. 23261-2000
Filed Sep. 8, 1987, Ser. No. 94,105
Term of patent 14 years
U.S. Cl. D21—160

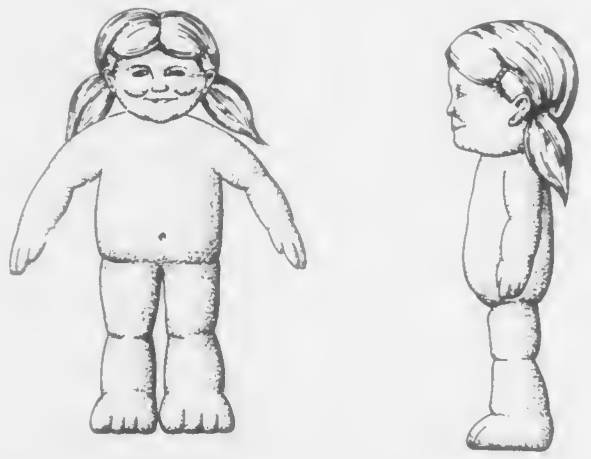


317,339
DOLL OR SIMILAR ARTICLE
Raymond C. Pugh, 1207 Rosecroft Rd., Richmond, Va. 23229
Filed Dec. 16, 1988, Ser. No. 285,223
Term of pateot 14 years
U.S. Cl. D21—166

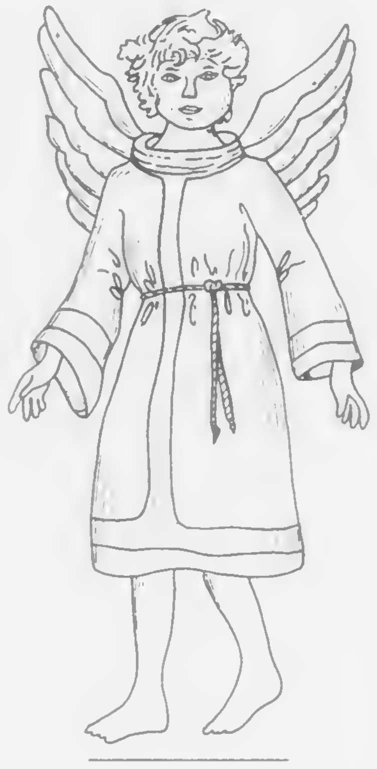


VOL 1127
ISS 1
JE 4
1991
UMI

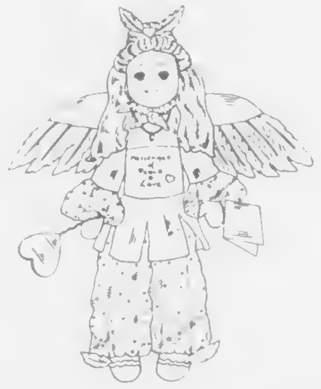
317,340
DOLL OR SIMILAR ARTICLE
Raymond C. Pugh, 1207 Rosecroft Rd., Richmond, Va. 23229
Filed Dec. 16, 1988, Ser. No. 285,224
Term of patent 14 years
U.S. Cl. D21—166



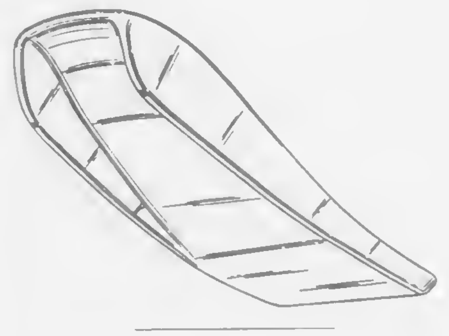
317,341
ANGEL DOLL OR SIMILAR ARTICLE
J. Dolores Cardillo, 77 Salisbury St., Hull, Mass. 02045
Filed Aug. 29, 1988, Ser. No. 237,559
Term of patent 14 years
U.S. Cl. D21—169



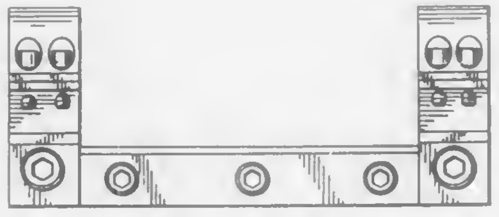
317,342
GIRL DOLL
Doris Warcholik, 481 Highland Ave., Clifton, N.J. 07011
Filed Dec. 5, 1988, Ser. No. 280,251
Term of patent 14 years
U.S. Cl. D21—169



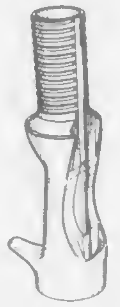
317,343
BODY SURFING BOARD
Garry F. Concannon, 124 Via Mentone, Newport Beach, Calif. 92663
Filed Dec. 16, 1988, Ser. No. 286,482
Term of patent 14 years
U.S. Cl. D21—228



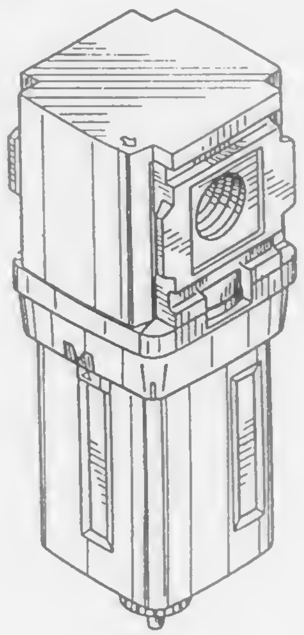
317,344
TELESCOPIC SIGHT MOUNT
Harry R. Klumpp, South Gate, Calif., assignor to Fontaine Industries, Inc., Long Beach, Calif.
Filed Nov. 14, 1988, Ser. No. 270,495
Term of patent 14 years
U.S. Cl. D22—110



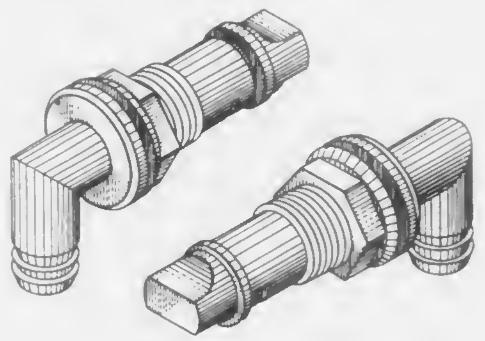
317,345
REEL SEAT FOR FISHING ROD
Mitsuyoshi Oyama, Musashino, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan
Filed Aug. 23, 1988, Ser. No. 235,188
Claims priority, application Japan, Feb. 26, 1988, 63-7777
The portion of the term of this patent subsequent to May 7, 2008, has been disclaimed.
Term of patent 14 years
U.S. Cl. D22—142



317,346
FILTER
Yasuyuki Ito; Tatsuaki Aoyama, both of Ichinomiya, and Hisanobu Niwa, Komaki, all of Japan, assignors to CKD Kabushiki Kaisha, Komaki, Japan
Filed Mar. 30, 1989, Ser. No. 336,742
Claims priority, application Japan, Sep. 30, 1988, 63-38443
Term of patent 14 years
U.S. Cl. D23—209



317,347
AERATOR SPRAY FOR LIVE WELL WATER RENEWAL SYSTEMS
Warwick M. Whitley, II, Panama City, Fla., assignor to Attwood Corporation, Lowell, Mich.
Filed Jun. 13, 1988, Ser. No. 209,472
Term of patent 14 years
U.S. Cl. D23—213



VOL
1127
ISS
1
JE
4
1991
UMI

317,348

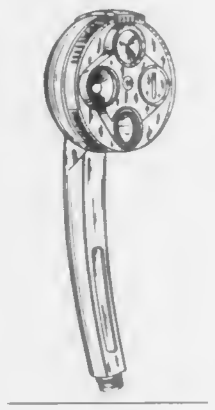
HAND HELD SHOWER HEAD

Francois Geneve; Luc Heiligenstein, and Stephen Melamed, all of Chicago, Ill., assignors to Associated Mills Inc., Chicago, Ill.

Filed Mar. 6, 1989, Ser. No. 320,032

Term of patent 14 years

U.S. Cl. D23—223



317,349

FAUCET SET

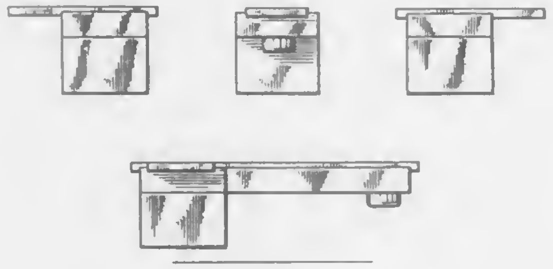
Harvey B. Rodstein, deceased, late of Los Angeles, Calif. by Barbara Rodstein, legal representative , assignor to Harden Industries, Inc., Los Angeles, Calif.

Filed Mar. 7, 1988, Ser. No. 164,733

The portion of the term of this patent subsequent to Jun. 6, 2003, has been disclaimed.

Term of patent 14 years

U.S. Cl. D23—242



317,350

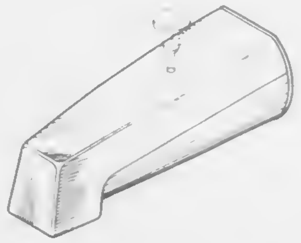
TUB SPOUT

Marvin Freed, Toronto, Canada, assignor to Brass-Craft Manufacturing Company, Southfield, Mich.

Filed Oct. 3, 1988, Ser. No. 252,716

Term of patent 14 years

U.S. Cl. D23—257



317,351

HOSE CLAMP

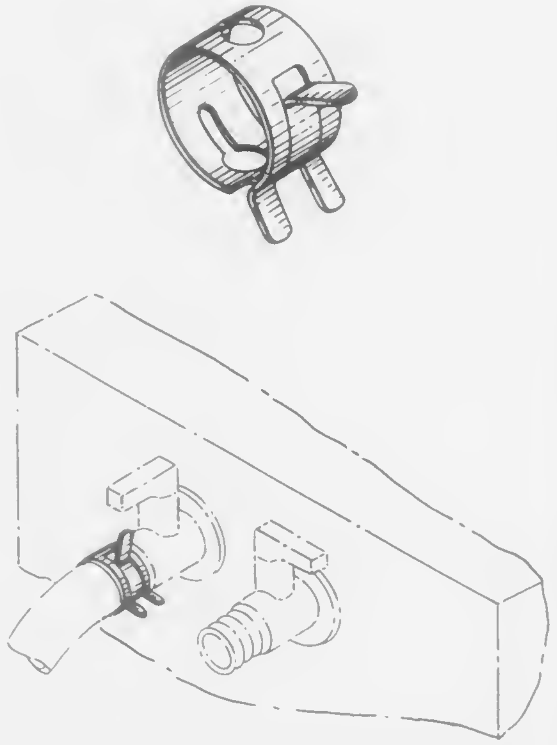
Kazuaki Takeuchi, Ohita, Japan, assignor to Chuoh Hatsujyo Kogyo Co., Ltd., Ohita, Japan

Filed May 3, 1988, Ser. No. 189,558

The portion of the term of this patent subsequent to Jun. 4, 2005, has been disclaimed.

Term of patent 14 years

U.S. Cl. D23—265



317,352

HOSE CLAMP

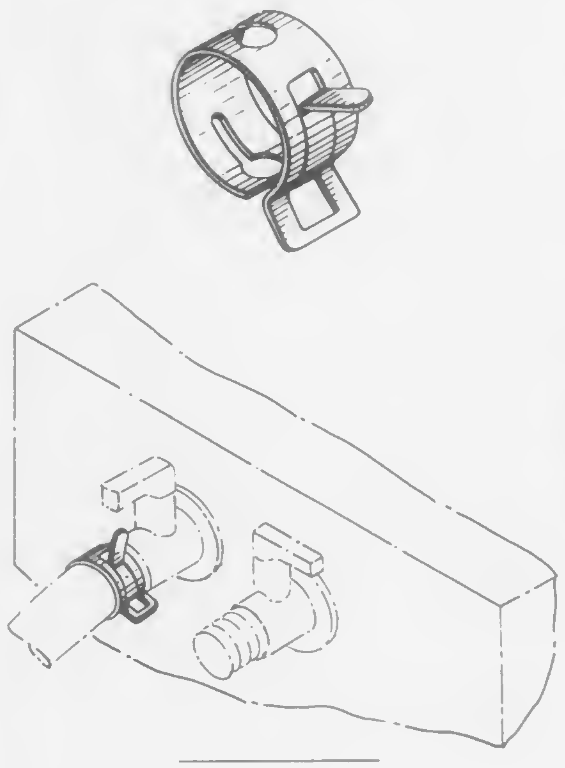
Kazuaki Takeuchi, Ohita, Japan, assignor to Chuoh Hatsujyo Kogyo Co., Ltd., Ohita, Japan

Filed May 3, 1988, Ser. No. 191,651

The portion of the term of this patent subsequent to Jun. 4, 2005, has been disclaimed.

Term of patent 14 years

U.S. Cl. D23—265



317,353

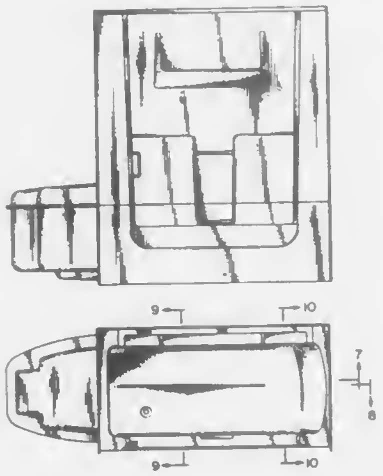
COMBINED BATHTUB AND SHOWER ENCLOSURE

Hermann Cymara, 162 Horton Rd., Newfield, N.Y. 14867

Filed Aug. 14, 1989, Ser. No. 399,752

Term of patent 14 years

U.S. Cl. D23—275



317,354

BATHTUB

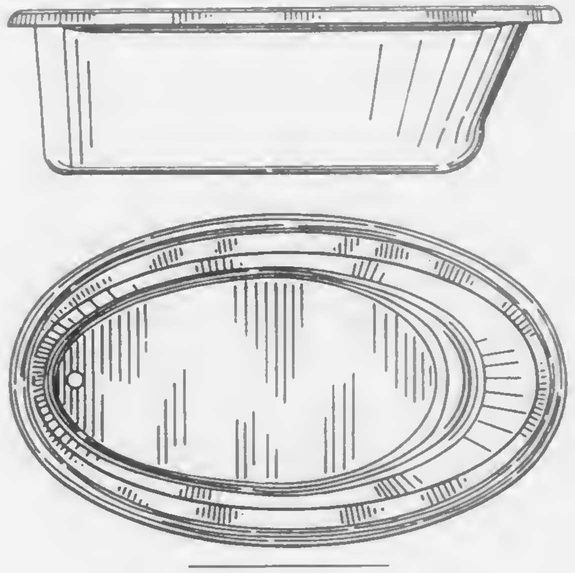
Thomas E. Taylor, 81 Kingscross Drive, King City, Ontario, Canada L0G 1K0

Filed Mar. 21, 1988, Ser. No. 170,462

Claims priority, application Canada, Oct. 9, 1987, 09-10-87-5

Term of patent 14 years

U.S. Cl. D23—281



317,355

BATH TUB

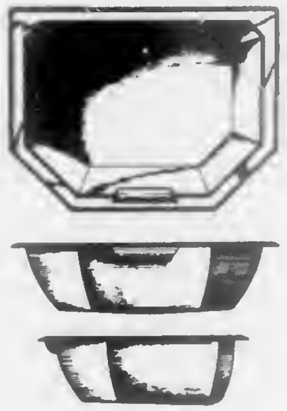
Jean-Claude Delepine, 23, rue Clapeyron, 75008 Paris, France

Filed Aug. 19, 1988, Ser. No. 234,282

Claims priority, application France, Feb. 29, 1988, DM/010 373

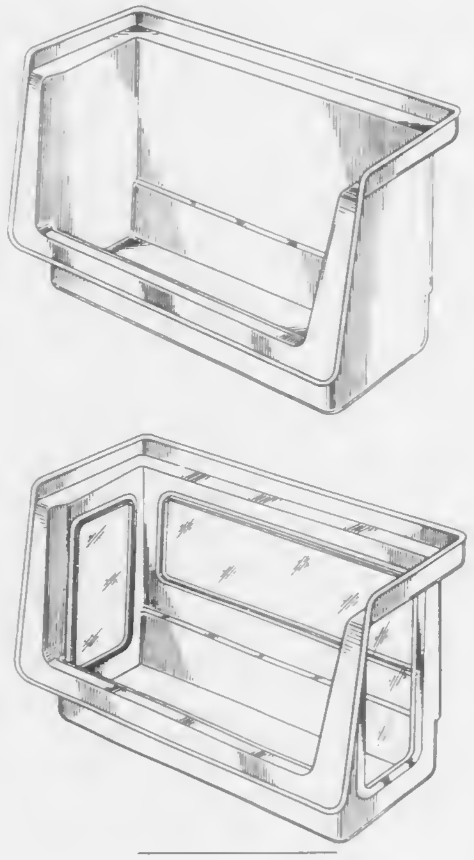
Term of patent 14 years

U.S. Cl. D23—281

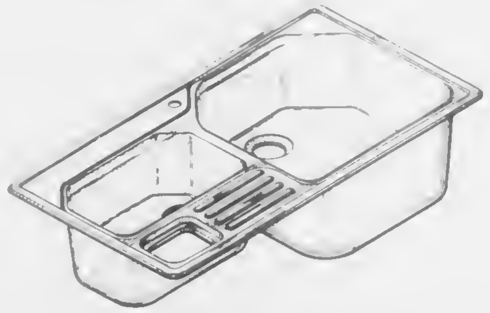


VOL
1127
ISS
1
JE
4
1991
UMI

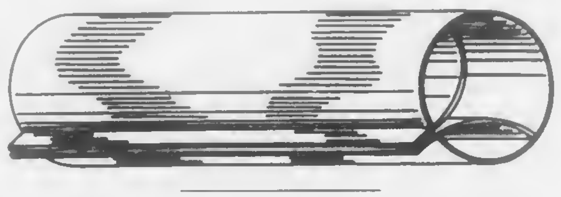
317,356
UTILITY SINK
William L. Ferris, 1758 E. Main St., Kent, Ohio 44240
Filed Oct. 16, 1987, Ser. No. 108,980
Term of patent 14 years
U.S. Cl. D23—284



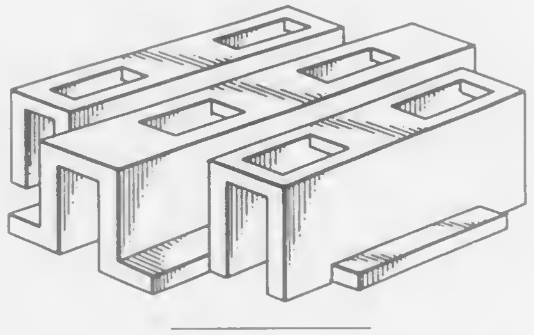
317,357
SINK
Walter Blanc, Oberderdingen, and Uwe Johannböcke, Eppingen, both of Fed. Rep. of Germany, assignors to Blanco GmbH & Co. KG, Oberderdingen, Fed. Rep. of Germany
Filed Feb. 1, 1989, Ser. No. 304,643
Term of patent 14 years
U.S. Cl. D23—290



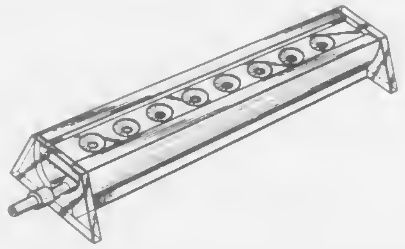
317,358
PLENUM UNIT FOR DISTRIBUTION OF AIR OR WATER
John O. Spendrup, 746 Ouray Ave., Grand Junction, Colo. 81501
Filed May 4, 1988, Ser. No. 190,236
Term of patent 14 years
U.S. Cl. D23—393



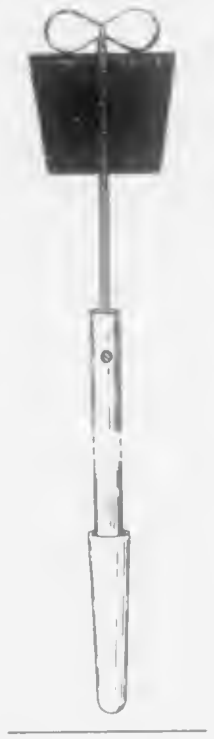
317,359
CATALYST SUPPORT FOR USE IN A CONTACT LENS DISINFECTION UNIT
Kenneth R. Seamons, Marietta, and Peter J. Gillespie, Norcross, both of Ga., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed Jan. 12, 1988, Ser. No. 143,056
Term of patent 14 years
U.S. Cl. D3—34



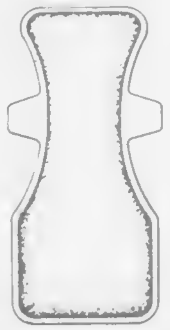
317,360
DISPOSABLE MULTIWELL TESTER
Michael G. Gabridge, Saranac Lake, N.Y. 12983, assignor to BioNorth, Inc., Saranac Lake, N.Y.
Filed Feb. 24, 1987, Ser. No. 18,069
Term of patent 14 years
U.S. Cl. D24—226



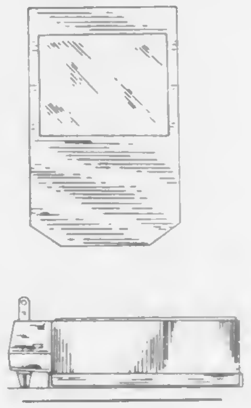
317,361
ENDOMETRIC BRUSH
Nils Stormby, Malmö, Sweden, assignor to Medscand AB, Malmo, Sweden
Filed Dec. 11, 1987, Ser. No. 131,543
Claims priority, application Sweden, Jun. 11, 1987, 87-1358
Term of patent 14 years
U.S. Cl. D24—141



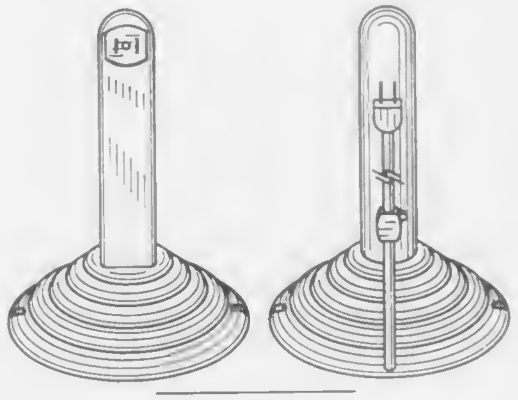
317,362
SANITARY NAPKIN
Patricia Ramacieri, Montreal, Canada, assignor to Johnson & Johnson Inc., Montreal, Canada
Continuation of Ser. No. 242,269, Sep. 12, 1988, abandoned. This application Jul. 25, 1990, Ser. No. 560,458
Term of patent 14 years
U.S. Cl. D24—125



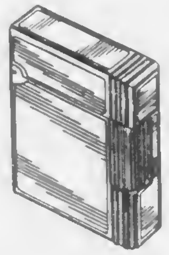
317,363
DECORATIVE LAMP
James D. Welch, 10328 Pinehurst Ave., Omaha, Nebr. 68124
Filed Jul. 29, 1988, Ser. No. 225,953
Term of patent 14 years
U.S. Cl. D26—26



317,364
NIGHT LIGHT SOCKET
Elizabeth A. Cross, 220 Oakwood Ave., Dayton, Ohio 45409
Filed Mar. 2, 1988, Ser. No. 162,854
Term of patent 14 years
U.S. Cl. D26—93



317,365
LIGHTER
Xavier Rousseau, Paris, France, assignor to S. T. Dupont S.A., Paris, France
Filed Jan. 5, 1989, Ser. No. 293,659
Claims priority, application France, Jul. 5, 1988, 88 4369
Term of patent 14 years
U.S. Cl. D27—159



VOL
1127
ISS
1
JE
4
1991
UMI

317,366
HANDLE FOR CURLING IRON

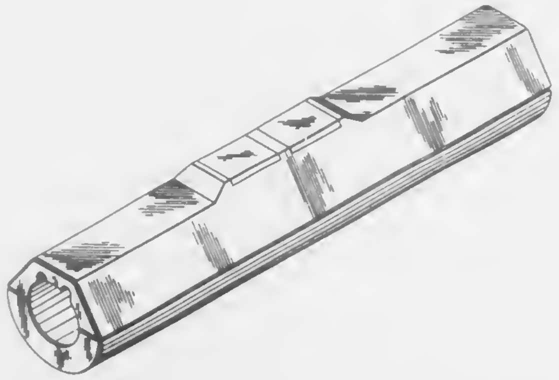
Chi M. Chui, North Point, Hong Kong, assignor to Well Treasure Ind. Ltd., Kwun Tong, Hong Kong

Filed Mar. 15, 1989, Ser. No. 323,992

Claims priority, application United Kingdom, Sep. 15, 1988, 1053560

Term of patent 14 years

U.S. Cl. D28—35



317,367
ELECTRIC NAIL POLISHER

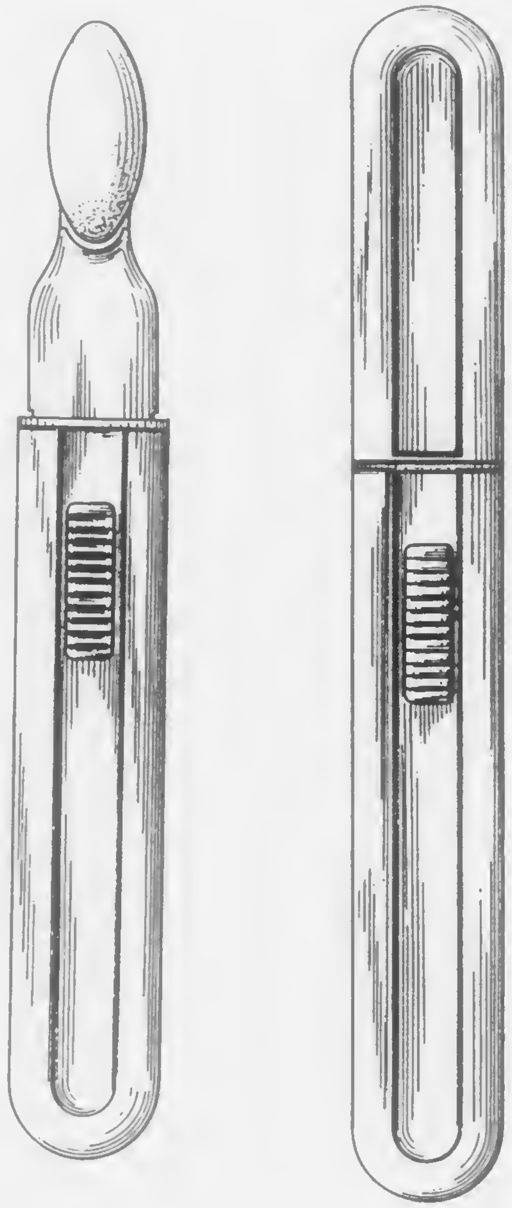
Maki Fujisawa; Misako Takahashi, both of Tokyo; Kazue Tsurui, Abiko; Yuko Urushihara, Tokyo; Moritaka Taniguchi, Tachikawa; Kazuko Kubomura, Tokyo; Chiho Yokota, Yokosuka; Akiko Kubota, Tokyo, and Kiwako Nagai, Fukuoka, all of Japan, assignors to Kyushu Hitachi Maxell, Ltd., Fukuoka, Japan

Filed Jun. 17, 1988, Ser. No. 208,030

Claims priority, application Japan, Dec. 18, 1987, 62-51869

Term of patent 14 years

U.S. Cl. D28—58



317,368
SHOULDER PADS

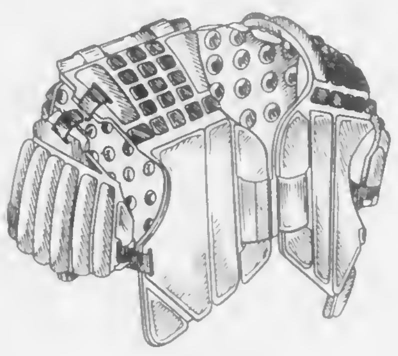
Anthony E. Henson, Harbord, Australia, assignor to Albion Hat & Cap Company Pty. Limited, Chippendale, Australia

Filed Feb. 11, 1988, Ser. No. 154,877

Claims priority, application Australia, Aug. 13, 1987, 2875/87

Term of patent 14 years

U.S. Cl. D29—11



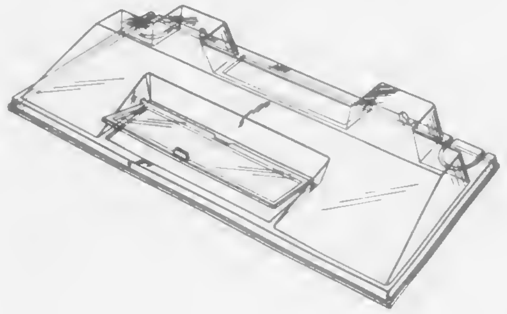
317,369
AQUARIUM LID

Kazutoshi Tominaga, Higashiosakashi, Japan, assignor to Kabushiki Kaisha Tominaga, Jyushi Kogyosbo, Osaka, Japan

Filed May 2, 1989, Ser. No. 346,154

Term of patent 14 years

U.S. Cl. D30—107



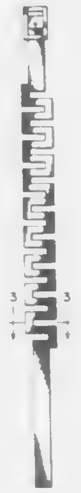
317,370
PET COLLAR OR SIMILAR ARTICLE

Marylee A. Skwirz, 3024 Dyer St., Dallas, Tex. 75205

Division of Ser. No. 161,606, Feb. 29, 1988, Pat. No. Des. 312,712. This application Aug. 22, 1990, Ser. No. 571,422

Term of patent 14 years

U.S. Cl. D30—152



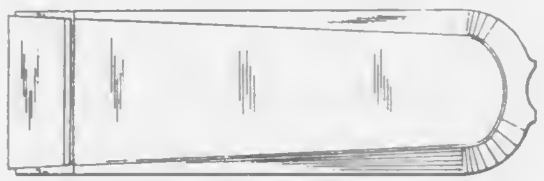
317,371
ANIMAL BATH TUB

Sally J. Haffner, 97 E. Endfield Rd., Feasterville, Pa. 19047

Filed Nov. 13, 1987, Ser. No. 120,513

Term of patent 14 years

U.S. Cl. D30—158



VOL
1127
ISS
1
JE
4
1991
UMI

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 4TH DAY OF JUNE, 1991

NOTE —Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- A Nattermann & Cie GMBH: *See—*
  - Romer, Axel; and Seidel, Jurgen, 5,021,242, Cl. 424-436.000.
- AB SKF: *See—*
  - Hesthamer, Tore; and Tyren, Carl, 5,020,378, Cl. 73-779.000.
- Abadi, Khodabandeh. Method for removal of scale. 5,021,096, Cl. 134-22.140.
- Abb Lummus Crest, Inc.: *See—*
  - Van Driesen, Roger P.; Adams, William R.; Baldasarri, Mario; Caspers, John; and Trimble, Harold, 5,021,147, Cl. 208-152.000.
- Abbasi, Hamid A.: *See—*
  - Khinkis, Mark J.; Abbasi, Hamid A.; Lisauskas, Robert A.; and Itse, Daniel C., 5,020,456, Cl. 110-345.000.
- Abbott, Edward H.: *See—*
  - Hyatt, Robert J.; Abbott, Edward H.; Bush, Robert E.; and Shannon, Francis J., 5,020,964, Cl. 414-751.000.
- Abbott Laboratories: *See—*
  - Borschel, Marlene W.; Benson, John D.; Breen, Merle D.; MacLean, William C., Jr.; Ponder, Debra L.; Strickland, Alan D.; and Treem, William R., 5,021,245. Cl. 426-2.000.
  - Johnson, David K.; and Kline, Steven J., 5,021,567, Cl. 540-470.000.
- Abe, Atsushi: *See—*
  - Tomita, Yoshihiro; Takayama, Ryoichi; Ogawa, Hisahito; Nomura, Koji; Asayama, Junko; and Abe, Atsushi, 5,021,660, Cl. 250-338.300.
- Abe, Kiyoshi: *See—*
  - Hamada, Takeaki; Abe, Kiyoshi; Takei, Hitoshi; and Sato, Kenji, 5,020,169, Cl. 5-10.200.
- Abe, Masahiko: *See—*
  - Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, 5,021,391, Cl. 502-426.000.
- Abe, Susan S.: *See—*
  - Guffey, Timothy B.; Boatman, Donn N.; Abe, Susan S.; Talkington, Sherry R.; and Mijac, Marko D., 5,021,256, Cl. 426-601.000.
- Abe, Tsutomu; Ebisawa, Isao; Watanabe, Kenjiro; and Karita, Seiichiro, to Canon Kabushiki Kaisha. Ink jet recording device with pressure-fluctuation absorption. 5,021,809, Cl. 346-140.00R.
- Abe, Yoshio: *See—*
  - Uesawa, Kaoru; and Abe, Yoshio, 5,021,713, Cl. 315-39.510.
- Abeler, Gerd, to Ciba-Geigy Corporation. Organotin alkoxycarbonylphenyl mercaptides and the use thereof. 5,021,491, Cl. 524-180.000.
- Aberg, Anders B. H.: *See—*
  - Larsson, Owe G. T.; and Aberg, Anders B. H., 5,021,203, Cl. 264-40.300.
- Abrahamson, Curtis M.; Zscheile, John W., Jr.; and Mower, Vaughn L., to Unisys Corp. Multiple access code acquisition system. 5,022,049, Cl. 375-1.000.
- Abumi, Takao, to Sharp Kabushiki Kaisha. Image signal processor. 5,021,873, Cl. 358-21.00R.
- Abysov, Nikolai A.; Bezgodov, Valery A.; Belgorodsky, Vladimir S.; and Plotnikov, Nikolai D. Machine tool for manufacture and dressing of tools and for finish-machining of gear wheels. 5,020,279, Cl. 51-123.00G.
- Accurate Metering Systems, Inc.: *See—*
  - Duback, David W.; and Vogenthaler, James R., 5,021,018, Cl. 445-24.000.
- Ackerman, Patrice K.; and Baker, Anna L., to Boeing Company, The. Process for gelling a sol in fiberformed ceramic insulation. 5,021,369, Cl. 501-95.000.
- Acme Resin Corporation: *See—*
  - Armbruster, David R.; and Pasion, Merlyn C., 5,021,539, Cl. 528-129.000.
- Acushnet Company: *See—*
  - Gendreau, Paul M.; and Cadorniga, Lauro C., 5,020,803, Cl. 273-225.000.
- Adams, Darrell P.: *See—*
  - Buck, Roy V.; and Adams, Darrell P., 5,021,120, Cl. 156-637.000.
- Adams, David R. Carrying case for personal items. 5,020,673, Cl. 206-581.000.
- Adams, George W., Jr. Truck-train system for transporting truck trailers along rails using railway dollies. 5,020,445, Cl. 105-4.100.
- Adams, Thomas P., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Missile launcher. 5,020,412, Cl. 89-1.805.
- Adams, William R.: *See—*
  - Van Driesen, Roger P.; Adams, William R.; Baldasarri, Mario; Caspers, John; and Trimble, Harold, 5,021,147, Cl. 208-152.000.
- Adamsson, Ulf M.: *See—*
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  - Teisseire, Bernard, 5,021,425, Cl. 514-299.000.
- Adrey, Jose ; Berteaux, Daniel; Goalard, Christian; Gueret, Alain, Hamon, Georges; and Nourissat, Christian. Acetabular cup assembly 5,021,062, Cl. 623-22.000.
- ADS Environmental Services, Inc.: *See—*
  - Petroff, Alan M.; and Fullerton, Larry W., 5,020,374, Cl 73-861.250.
- Advanced Cardiovascular Systems, Inc.: *See—*
  - Sharkawy, Ahmed, 5,021,044, Cl. 604-53.000.
- Advanced Micro Devices, Inc.: *See—*
  - Hendrickson, Alan F.; Chen, Herbert M.; Cabler, Carlin D.; and Hattangadi, Rajiv, 5,021,783, Cl. 341-110.000.
  - Linz, Alfredo R., 5,021,690, Cl. 307-465.000.
  - Zaw Win, Vincent K.; and Chan, Andrew K., 5,021,680, Cl 307-243.000.
- Advanced Recycling Technology Ltd.: *See—*
  - Julien, Philippe, 5,020,915, Cl. 366-89.000.
- Aeby, Johann; Mager, Herbert; and Konrad, Eugen, to Wella Aktiengesellschaft. Oxidative hair dye composition based on a gel vehicle and a process to dye hair. 5,021,066, Cl. 8-408.000.
- AEG Westinghouse Transportation Systems, Inc.: *See—*
  - Burg, Thomas J., 5,020,441, Cl. 104-130.000.
  - Burg, Thomas J.; Ziegler, Ronald H.; and Anderson, Robert J., 5,020,442, Cl. 104-130.000.
- Aero Chem Research Lab., Inc.: *See—*
  - Gould, Robert K.; and Dickson, Charles R., 5,021,221, Cl. 422-129.000.
- Aexcel Corporation: *See—*
  - Milgram, Joseph B., Jr.; and Hungerford, P Clark, Jr., 5,021,116, Cl. 156-475.000.
- af Strom, Oscar R. F. Golf training device and method. 5,020,802, Cl. 273-185.00R.
- Agency of Industrial Science and Technology: *See—*
  - Maeda, Yuji, 5,020,388, Cl. 74-479.000.
- Agency of Industrial Science and Technology, Ministry of International Trade & Industry: *See—*
  - Kiyono, Fumio; Saito, Takayuki; and Handa, Keiji, 5,020,724, Cl. 239-102.200.
- Agfa Gevaert Aktiengesellschaft: *See—*
  - Bergthaller, Peter; Kruger, Thomas; Stolzenburg, Rudolf; and Hubner, Dirk, 5,021,330, Cl. 430-544.000.
  - Bergthaller, Peter; Kruger, Thomas; Vetter, Hans; and Odenwalder, Heinrich, 5,021,332, Cl. 430-544.000.
  - Meckl, Heinz; Reuter, Karl-Heinz; and Tromnau, Rudolf, 5,021,326, Cl. 430-399.000.
  - Reuss, Helmut; Mucke, Bruno; Mader, Helmut; and Rockser, Dieter, 5,021,336, Cl. 430-608.000.
  - Vetter, Hans; Odenwalder, Heinrich; Bergthaller, Peter; and Kruger, Thomas, 5,021,331, Cl. 430-544.000.
- AGFA-Gevaert, N.V.: *See—*
  - Burtin, Jean, 5,021,823, Cl. 355-69.000.
  - Vanmaele, Luc J.; and Janssens, Wilhelmus, 5,021,393, Cl 503-227.000.
- Aghajanian, Michael K.; Kantner, Robert C.; and Biel, John P., Jr., to Lanxide Technology Company, LP. Directional solidification of metal matrix composites. 5,020,583, Cl. 164-97.000.
- Aghajanian, Michael K.; Nagelberg, Alan S.; and Kennedy, Christopher R., to Lanxide Technology Company, LP. Method for forming metal matrix composites having variable filler loadings and products produced thereby. 5,020,584, Cl. 164-97.000.
- Agip Petroli S.p.A.: *See—*
  - Koch, Paolo; and Di Serio, Alfonso, 5,021,174, Cl. 252-38.000.
- Agresta, Frank J., to WPM, Inc. Vented faucet system. 5,020,569, Cl. 137-544.000.
- Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, to Tokyo Organic Chemical Industries, Ltd. Carbonaceous adsorbent for removal of pyrogen and method of producing pure water using same. 5,021,391, Cl. 502-426.000.
- Ahrens, Kurt H.: *See—*
  - Buschauer, Armin; Schickaneder, Helmut; Schunack, Walter; Elz, Sigurd; Szelenyi, Istvan; Baumann, Gert; and Ahrens, Kurt H., 5,021,431, Cl. 514-333.000.
- Ahuja, Bhupendra; and Sollars, Donald, to Intel Corporation. Process, supply, temperature compensating CMOS output buffer. 5,021,684, Cl. 307-443.000.
- Aida, Kazuo: *See—*
  - Nakayama, Yasuko; and Aida, Kazuo, 5,021,948, Cl. 364-200.000.
- Aida, Masaaki, to Midori, Co. Ltd. Writing-utensil packed kit assembly. 5,020,662, Cl. 206-214.000.
- Aiga, Masao: *See—*
  - Ishihara, Takashi; Sasaki, Hajime; and Aiga, Masao, 5,021,100, Cl. 136-249.000.

VOL
1127
ISS
1
JE
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1991
UMI

- Aihara, Toshinori, to Atsugi Motor Parts Company, Limited. Variable-delivery vane-type rotary compressor. 5,020,975, Cl. 417-295.000.
- Aikawa, Takeshi: *See—*
  - Matoba, Tsukasa; Aikawa, Takeshi, Okamura, Mitsuyoshi; Maeda, Ken-ichi; and Saito, Mitsuo, 5,021,993, Cl. 364-900.000.
- Aileo, Jackson A.; and Long, Richard J., to Gentex Corporation Earseal for sound-attenuating earcup assembly. 5,020,163, Cl. 2-209.000.
- Aimura, Harutsugu, to Canon Kabushiki Kaisha. Display apparatus of the cathode ray tube type. 5,021,720, Cl. 315-370.000.
- Airka, Tadashi: *See—*
  - Maeda, Tetsuya; Yamamoto, Toshiyuki; Takase, Mituo; Sasaki, Kazuya; Airka, Tadashi; Yokoo, Mamoru; Hashimoto, Rieko; Amemiya, Kouji; and Koshikawa, Sakae, 5,021,458, Cl. 514-655.000.
- Airy, James F.; and Kadavy, Thomas D., to Soma Dynamics Corporation. Physical therapy and exercise apparatus for body limbs. 5,020,795, Cl. 272-129.000.
- Aisaka, Kazuo; Hashizume, Akihide; Huno, Takakazu; Suzuki, Ryuichi; and Terada, Kazuko, to Hitachi, Ltd. Image display system and data input apparatus used therein. 5,021,770, Cl. 340-709.000.
- Aisin AW Co., Ltd.: *See—*
  - Sakai, Satoshi; and Maekawa, Kazuteru, 5,020,903, Cl. 356-28.000.
- Aisin AW Kabushiki Kaisha: *See—*
  - Ito, Yasunobu; and Yamada, Kunihiro, 5,021,955, Cl. 364-424.100.
  - Kuwayama, Yoshinari; Ando, Masahiko; and Hayakawa, Yoichi, 5,020,393, Cl. 74-869.000.
- Aisin Seiki Kabushiki Kaisha: *See—*
  - Fukumoto, Ryoichi, 5,020,838, Cl. 292-201.000.
  - Seko, Hideo, 5,020,490, Cl. 123-188.00S.
- Aitken, Bruce G., to Corning Incorporated. Fluorine-free phosphate glasses. 5,021,366, Cl. 501-45.000.
- Akagawa, Tomohiko: *See—*
  - Ueno, Kouhei; Akagawa, Tomohiko; and Obana, Kazuyoshi, 5,021,226, Cl. 423-554.000.
- Akagi, Toshimichi: *See—*
  - Tashima, Seiji; Okimoto, Haruo; and Akagi, Toshimichi, 5,020,327, Cl. 60-600.000.
- Akahoshi, Haruo: *See—*
  - Suzuki, Yoshihiro; Takada, Toshinari; Suzuki, Masahiro; Akahoshi, Haruo; Nagai, Akira; Takahashi, Akio; Amagi, Shigeo; Narahara, Toshikazu; Wajima, Motoyo; and Kogawa, Kiyonori, 5,021,296, Cl. 428-409.000.
- Akamine, Shinya; and Quate, Calvin F., to Leland Stanford Junior University, The Board of Trustees of the. Microcantilever with integral self-aligned sharp tetrahedral tip. 5,021,364, Cl. 437-228.000.
- Akebono Brake Industry Co., Ltd.: *See—*
  - Maehara, Toshifumi, 5,020,623, Cl. 180-197.000.
- Akebono Research Development Centre Ltd.: *See—*
  - Maehara, Toshifumi, 5,020,623, Cl. 180-197.000.
- Akeno, Hajime: *See—*
  - Kiba, Hiroshi; and Akeno, Hajime, 5,020,472, Cl. 118-668.000.
- Akerley, Arnold J.; and Manning, W. Paul, Jr., to Kendall Company, The. Display hanger package for roll. 5,020,660, Cl. 206-45.140.
- Akin, Frank J.; Klesges, Robert; and Klesges, Lisa, to Plough Inc. Method for aiding cessation of smoking. 5,021,457, Cl. 514-653.000.
- Akiyama, Takaaki; Matsuo, Shuji; Fujii, Masahiro; Kurose, Mitsukazu; Nakamura, Osamu; and Kamijo, Masahiro, to Seiko Epson Corporation. Ribbon guiding mechanism. 5,020,928, Cl. 400-193.000.
- Akiyama, Teruo: *See—*
  - Suzuki, Takashi; and Akiyama, Teruo, 5,021,352, Cl. 436-136.000.
- Aktiebolaget Bofors: *See—*
  - Lindberg, Sven, 5,020,415, Cl. 89-46.000.
- Aktiebolaget Hassle: *See—*
  - Alminger, Tomas B.; Larsson, Hakan S.; Lindberg, Per L.; and Sunden, Gunnel E., 5,021,433, Cl. 514-338.000.
- Akzo N.V.: *See—*
  - Bergfeld, Manfred; Eisenhuth, Ludwig; and Zengel, Hans-Georg, 5,021,603, Cl. 558-237.000.
- Albarella, James P.; and Lin, Nan-Horng, to Miles, Inc. Dithiophenylpyrrole derivative monomers for preparing semi-conducting polymers. 5,021,586, Cl. 548-527.000.
- Albers, Walter F.; and Beckman, James R., to Albers, Walter F. Method and apparatus for simultaneous heat and mass transfer. 5,020,335, Cl. 62-271.000.
- Albers, Walter F.; and Beckman, James R., to Albers, Walter F. Method and apparatus for simultaneous heat and mass transfer utilizing a plurality of gas streams. 5,020,588, Cl. 165-111.000.
- Albizzati, Enrico: *See—*
  - Canova, Luciano; Giannini, Umberto; and Albizzati, Enrico, 5,021,514, Cl. 525-351.000.
- Alcan International Limited: *See—*
  - Thibault, Marc-Andre; Auger, Marc; Gariepy, Bruno; and Gendron, Andre, 5,020,778, Cl. 266-89.000.
- Alcan Rorschach AG: *See—*
  - Zumsteg, Horst, 5,020,955, Cl. 413-8.000.
- Alcatel Business Systems Limited: *See—*
  - Gawler, David A.; Gilham, Dennis T.; and Williams, Thomas D., 5,020,428, Cl. 101-91.000.
- Alcatel N.V.: *See—*
  - Schnabel, Jurgen, 5,021,750, Cl. 331-111.000.
- Alco Industries, Inc.: *See—*
  - McFarland, Glenn E., 5,020,676, Cl. 211-59.400.
- Alcon Laboratories, Inc.: *See—*
  - Parker, Donald A.; and Rogers, Wayne W., 5,020,535, Cl. 606-174.000.
- Aldissi, Mahmoud: *See—*
  - Armes, Steven P., and Aldissi, Mahmoud, 5,021,193, Cl. 252-500.000.
- Alkire, Gerald R.; Dailey, George F.; and Fischer, Mark W., to Westinghouse Electric Corp. Prober for testing generator stator wedge tightness with rotor in place. 5,020,234, Cl. 33-656.000.
- Allan, James D., to Inova Microelectronics Corporation. Apparatus and method for reducing the access time after a write operation in a static memory device. 5,022,011, Cl. 365-233.000
- Allen & Hansburys Limited: *See—*
  - Martin-Smith, Michael, 5,021,429, Cl. 514-331.000.
- Allen, Lisa P.: *See—*
  - Fan, John C.C., Zavracky, Paul M.; Narayan, Jagdish; Allen, Lisa P.; and Vu, Duy-Phach, 5,021,119, Cl. 156-620.710.
- Allen, Michael E., to Dayco Products, Inc. Pulley construction, drive system utilizing the same and methods of making the same. 5,021,034, Cl. 474-174.000.
- Allen, Paul M.; and Unanue, Emil R., to Washington University Method of enhancing peptide immunogenicity. 5,021,551, Cl 530-345.000.
- Allen, Timothy J.: *See—*
  - Kelly, Douglas M.; Parkinson, Ward D.; and Allen, Timothy J., 5,021,864, Cl. 357-70.000.
- Allen, William M., Jr.: *See—*
  - Parker, Delmer G.; Allen, William M , Jr.; and Stark, Howard M., 5,021,838, Cl. 355-328.000.
- Allenson, Stephan J.: *See—*
  - Braden, Michael L.; and Allenson, Stephan J., 5,021,167, Cl 210-708.000.
- Allergan, Inc.: *See—*
  - Burke, James A., 5,021,410, Cl. 514-213.000.
  - Gluchowski, Charles, 5,021,416, Cl. 514-249.000.
- Allie, Mark C.: *See—*
  - Eriksson, Larry J.; and Allie, Mark C., 5,022,082, Cl. 381-71.000.
- Allied Gator, Inc.: *See—*
  - Ramun, John R., 5,020,962, Cl. 414-569.000.
- Allied-Signal Inc.: *See—*
  - Boyd, Gary L., 5,020,932, Cl. 403-30.000.
  - Taig, Alistair G., 5,020,386, Cl. 74-384.000.
  - Thoman, David C.; Briggs, Marvin N.; and Eastman, James M., 5,020,564, Cl. 137-102.000.
- Allred, Donald R., to Dataproducts Corporation. Thermally reversible sol-gel phase change ink or bubble jet ink. 5,021,802, Cl. 346-1.100.
- Allsop, Inc.: *See—*
  - Hoenselaar, John F.; and Clausen, Eivind, 5,020,637, Cl 184-15.100.
- Almex Control Systems Limited: *See—*
  - Meade, Roger; Schofield, Paul; and Wright, Michael C., 5,021,984, Cl. 364-709.160.
- Alminger, Tomas B.; Larsson, Hakan S.; Lindberg, Per L.; and Sunden, Gunnel E., to Aktiebolaget Hassle. Novel pharmacological compounds. 5,021,433, Cl. 514-338.000.
- Alps Electric Co., Ltd.: *See—*
  - Ishikawa, Hiroshi, 5,021,651, Cl. 250-239.000.
  - Sasaki, Makoto; Ebishi, Nobuo; and Yanai, Shinji, 5,021,614, Cl. 200-5.00R.
  - Yamashita, Tatsumaro; and Nagai, Seiichi, 5,021,900, Cl. 360-85.000.
- Alston, Julie M., to Stork Colorproofing B.V. Image reversal process. 5,021,313, Cl. 430-100.000.
- Althaus, Hans; Kuhlmann, Werner; and Spaeth, Werner, to Siemens Aktiengesellschaft. Optical component for accurately locating the end face of an optical waveguide with respect to an optical device. 5,020,873, Cl. 350-96.200.
- Altrichter, Diana M., to Shell Oil Company. Process for the reduction of NO_X in an FCC regeneration system by select control of CO oxidation promoter in the regeneration zone. 5,021,144, Cl. 208-113.000.
- Aluminum Company of America: *See—*
  - Knepp, James E.; Welsh, Robert E.; Miller, James A.; and Miller, Raymond, 5,020,350, Cl. 72-45.000.
  - Varde, Uday M.; Tackie, Michael N.; and Gupta, Rakesh K., 5,021,519, Cl. 525-423.000.
- Alza Corporation: *See—*
  - Barclay, Brian L.; Childers, Jerry D.; Wright, Jeri; Place, Virgil A.; and Wong, Patrick S. L., 5,021,053, Cl. 604-892.100.
- AMAF Industries, Inc.: *See—*
  - Leveque, James H., 5,022,055, Cl. 375-82.000.
- Amagi, Shigeo: *See—*
  - Suzuki, Yoshihiro; Takada, Toshinari; Suzuki, Masahiro; Akahoshi, Haruo; Nagai, Akira; Takahashi, Akio; Amagi, Shigeo; Narahara, Toshikazu; Wajima, Motoyo; and Kogawa, Kiyonori, 5,021,296, Cl. 428-409.000.
- Amand, Yvon: *See—*
  - Deval, Alain; and Amand, Yvon, 5,020,370, Cl. 73-517.0AV.
- Amano, Masataka, to Yazaki Corporation. Waterproof joint for wireharness. 5,021,611, Cl. 174-88.00R.
- Amano, Norihide: *See—*
  - Maeda, Mitsuru; Kodama, Tohru; Asami, Sumio; Amano, Norihide; Kusumi, Takaaki; and Hosono, Hidekazu, 5,021,406, Cl. 514-99.000.
- Amedei, Giuseppe; and Rondelli, Angelo, to Fiatgeotech - Tecnologie Per La Terra S.p.A. Three position fluid-controlled actuator. 5,020,419, Cl. 92-52.000.

- Amemiya, Kouji: *See—*
  - Maeda, Tetsuya; Yamamoto, Toshiyuki; Takase, Mituo; Sasaki, Kazuya; Airka, Tadashi; Yokoo, Mamoru; Hashimoto, Rieko; Amemiya, Kouji; and Koshikawa, Sakae, 5,021,458, Cl. 514-655.000.
- Amemiya, Yoshiya: *See—*
  - Trada, Atsusuke; Amemiya, Yoshiya; Matsuda, Keiichi; and Oshima, Takeshi, 5,021,444, Cl. 514-397.000.
- American Cyanamid *See—*
  - Leone-Bay, Andrea; Peake, Steven L.; and Kaminski, Stanley S., 5,021,540, Cl. 528-183.000.
- American Cyanamid Company: *See—*
  - Daly, Francis P.; Ando, Hiei; Foley, Henry C.; and Jung, Hyun J., 5,021,385, Cl. 502-211.000.
  - Daly, Francis P.; Ando, Hiei; Foley, Henry C.; and Jung, Hyun J., 5,021,392, Cl. 502-439.000.
  - Los, Marinus, 5,021,078, Cl. 71-66.000.
- American Holtzkraft, Inc.: *See—*
  - Apple, Phillip C., 5,020,557, Cl. 135-15.100.
- American Home Products Corporation: *See—*
  - Failli, Amedeo A.; Kreft, Anthony F., III; and Musser, John H., 5,021,576, Cl. 546-174.000.
  - Kinney, William A.; and Lee, Nancy E., 5,021,569, Cl. 540-581.000.
  - Quagliato, Dominick A.; and Deininger, David D., 5,021,418, Cl. 514-249.000.
- American Pembroke, Inc.: *See—*
  - Whitney, Solon G.; and Kleiss, Harold J., 5,021,216, Cl. 521-26.000.
- American Pneumatic Technologies, Inc.: *See—*
  - Neff, Edward R., 5,020,281, Cl. 51-170.0PT.
- American Science and Engineering, Inc.: *See—*
  - Annis, Martin, 5,022,062, Cl. 378-86.000.
- American Standard Inc.: *See—*
  - Balukin, Richard F.; and Reiss, John R., 5,020,862, Cl. 303-15.000.
- Ames, Donald P. Oil level monitor. 5,021,665, Cl. 250-357.100.
- AMF Mares S.p.A.: *See—*
  - Garofalo, Giovanni, 5,020,531, Cl. 128-205.240.
- AMP Incorporated: *See—*
  - Heiney, Francis M., 5,021,004, Cl. 439-317.000.
  - Sharma, Suniti K.; Ventura, Susanna C.; and Narang, Subhash C., 5,021,398, Cl. 505-1.000.
- An, Quang-Dieu: *See—*
  - Tai, Jy-Der; Chiu, Edison; An, Quang-Dieu; and Hsu, Te-Chuan, 5,021,994, Cl. 364-900.000.
- Anderson, Charles E.; and Miller, William C., to Yale Security Inc. Electronic combination of lock with changeable entry codes, lockout and programming code. 5,021,776, Cl. 340-825.310.
- Anderson, David L.: *See—*
  - Peterman, Thomas H.; Anderson, David L.; Hakansson, Jan; and Marovskis, Harijs B., 5,020,304, Cl. 53-458.000.
- Anderson, Ernest R.; Vacco, Dominick; and Dagon, Thomas J., to Eastman Kodak Company. Catalytic destruction of sulfur-oxygen anions. 5,021,163, Cl. 210-661.000.
- Anderson, John W.: *See—*
  - Drake, Kenneth M.; Anderson, John W.; Carr, Lee D.; and Peyton, Fred I., 5,021,157, Cl. 210-248.000.
- Anderson, Patrick L.: *See—*
  - Sarr, Dennis P.; and Anderson, Patrick L., 5,021,740, Cl. 324-687.000.
- Anderson, Robert J.: *See—*
  - Burg, Thomas J.; Ziegler, Ronald H.; and Anderson, Robert J., 5,020,442, Cl. 104-130.000.
- Anderson, Robert K.: *See—*
  - King, Anthony O.; Anderson, Robert K.; Shuman, Richard E.; and Weinstock, Leonard M., 5,021,575, Cl. 546-77.000.
- Andersson, Jan: *See—*
  - Strom, Hans; and Andersson, Jan, 5,020,292, Cl. 52-309.900.
- Ando, Hiei: *See—*
  - Daly, Francis P.; Ando, Hiei; Foley, Henry C.; and Jung, Hyun J., 5,021,385, Cl. 502-211.000.
  - Daly, Francis P.; Ando, Hiei; Foley, Henry C.; and Jung, Hyun J., 5,021,392, Cl. 502-439.000.
- Ando, Manabu: *See—*
  - Kondou, Kenji; and Ando, Manabu, 5,021,745, Cl. 330-253.000.
- Ando, Masahiko: *See—*
  - Kuwayama, Yoshinari; Ando, Masahiko; and Hayakawa, Yoichi, 5,020,393, Cl 74-869.000.
- Ando, Nobuaki: *See—*
  - Kohda, Kenji; Toyama, Tsuyoshi; Ando, Nobuaki; Noguchi, Kenji, and Kobayashi, Shinichi, 5,021,999, Cl. 365-168.000.
- Andrew Corporation: *See—*
  - Dienes, Geza, 5,021,797, Cl. 343-727.000.
- Andronic Devices, Ltd.: *See—*
  - Salvestro, Aldo T.; Bohl, Rainer M.; and Furse, Martin L., 5,020,933, Cl. 403-90.000.
- Angel Echevarria Co., Inc.: *See—*
  - Dotson, Derek P., 5,020,176, Cl. 5-453.000.
- Anheuser-Busch, Incorporated: *See—*
  - Sieben, Roger L.; and Zastrow, Klaus D., 5,021,246, Cl. 426-13.000.
- Annis, Jeffrey R.; and Eggert, Daniel M., to Snap-On Tools Corporation. Self-adjusting pliers with curved handles. 5,020,399, Cl. 81-358.000.
- Annis, Martin, to American Science and Engineering, Inc. Automatic threat detection based on illumination by penetrating radiant energy using histogram processing. 5,022,062, Cl. 378-86.000.
- Anthony, Vivienne M.: *See—*
  - Clough, John M.; Godfrey, Christopher R. A., de Fraine, Paul J., Hutchings, Michael G.; and Anthony, Vivienne M., 5,021,581, Cl. 546-309.000.
- Anzel, Bernard M., to Hughes Aircraft Company. Method for satellite station keeping. 5,020,746, Cl. 244-169.000.
- Aoki, Masafumi: *See—*
  - Ota, Masanori; Aoki, Masafumi; Nakamura, Masashi; Mizusawa, Kenichi; and Kasahara, Kumi, 5,021,186, Cl. 252-186.350.
- Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; Ozawa, Shigeo; Imai, Toshitaka; and Shimada, Takamichi, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for controlling gearshifts in automatic transmission using throttle and engine speed map schedule. 5,020,391, Cl. 74-866.000.
- Aoshika, Takayuki, to Ultima Ltd. Method of securing lighting fixture. 5,020,296, Cl. 52-741.000.
- Aoyagi, Takaaki: *See—*
  - Takeuchi, Tomio; Aoyagi, Takaaki, Hamada, Masa; Naganawa, Hiroshi; and Yoshida, Shigemi, 5,021,549, Cl. 530-330.000.
- Apollo Computer, Inc.: *See—*
  - Kurtze, Jeffrey D.; and Turner, James, 5,022,004, Cl 365-189.070.
- Apple, Phillip C., to American Holtzkraft, Inc. Rotating canopy umbrella. 5,020,557, Cl. 135-15.100.
- Applied Ceramics, Inc.: *See—*
  - Mitchell, Robert L.; and Rhodes, Frank R , Jr., 5,021,373, Cl. 501-119.000.
- Applied Magnetics Corporation: *See—*
  - Aronoff, Michael I.; Matsuzawa, Soichiro; and Terada, Nobuhiro, 5,020,213, Cl. 29-603.000.
- Applied Materials, Inc.: *See—*
  - Groechel, David W.; Taylor, Brad; Henri, John R.; and Obinata, Naomi, 5,021,121, Cl. 156-643.000.
- Arachnid, Inc.: *See—*
  - Martin, John, 5,020,806, Cl. 273-371.000.
- Arai, Hitoshi: *See—*
  - Kanda, Yutaka; Arai, Hitoshi; Kasai, Masaji; and Morimoto, Makoto, 5,021,423, Cl. 514-262.000.
- Arai, Ikuya; Kitou, Kouji; and Ohsawa, Michitaka, to Hitachi, Ltd. Display. 5,021,719, Cl. 315-364.000.
- Arai, Kanji: *See—*
  - Yoshida, Isao; Inoue, Hidetoshi; and Arai, Kanji, 5,021,890, Cl. 358-405.000.
- Arai, Kenji; Mito, Nobuaki; Morita, Kouichi; and Hirata, Naonori, to Sumitomo Chemical Company, Limited. Cyclohexane herbicides. 5,021,579, Cl. 546-302.000.
- Arai, Tomohisa, to NEC Corporation. Counter circuit presettable with a plurality of count values. 5,022,059, Cl. 377-39.000.
- Arai, Yasuyuki: *See—*
  - Nakayama, Shunichi; Kanai, Masashi; and Arai, Yasuyuki, 5,020,972, Cl. 417-37.000.
- Arakaki, Takeshi: *See—*
  - Seki, Masaki; Takegahara, Takashi; and Arakaki, Takeshi, 5,021,966, Cl. 364-474.260.
- Arbach, Gary V.; O'Toole, Terrence R.; and Viehbeck, Alfred, to International Business Machines Corporation. Multilayer structures of different electroactive materials and methods of fabrication thereof. 5,021,129, Cl. 204-15.000.
- Archie, Kent C.; Fonorow, Owen R.; McGould, Mary C.; McLear, Robert E., III; Read, Edward C.; Schaefer, Edwin M., III; Schwab, Suzanne E.; and Wodarz, Dennis, to AT&T Bell Laboratories. Test automation system. 5,021,997, Cl. 364-900.000.
- ARCO Chemical Technology, Inc.: *See—*
  - Gastinger, Robert G.; and Hayes, John E., 5,021,506, Cl 525-63.000.
  - Hostetler, Donald E.; Cannarsa, Michael J.; Kesling, Haven S., Jr ; and Sun, Hsiang-Ning, 5,021,464, Cl. 521-189.000.
- Ardaud, Pierre: *See—*
  - Mignani, Gerard; Ardaud, Pierre; and Trichon, Roger, 5,021,371, Cl. 501-96.000.
- Areta Salanueva, Juan M.: *See—*
  - Azpeitia Urrestarazu, Angel; and Areta Salanueva, Juan M., 5,021,926, Cl. 361-436.000.
- Ariga, Yasuo: *See—*
  - Igarashi, Yoshinori; Yasukawa, Makoto; Ariga, Yasuo; Kobayashi, Ichiro; and Horiuchi, Satoru, 5,021,677, Cl. 250-574.000.
- Arikawa, Junichi, to Laurel Bank Machines Co., Ltd. Bill processing apparatus. 5,020,787, Cl. 271-3.000.
- Arimoto, Kazutami; Matsuda, Yoshio; Ooishi, Tsukasa; Tsukude, Masaki; and Fujishima, Kazuyasu, to Mitsubishi Denki Kabushiki Kaisha. Test signal generator for semiconductor integrated circuit memory and testing method thereof. 5,022,007, Cl. 365-201.000.
- Arimura, Hirofumi: *See—*
  - Mukai, Hiromichi; Horii, Hajime; Tsujikawa, Muneo; Kawabe, Haruhide; Arimura, Hirofumi; and Suyama, Tadakazu, 5,021,339, Cl. 435-69.100.
- Aristo Graphic Systeme GmbH & Co. KG: *See—*
  - Cordes, Werner, 5,021,933, Cl. 362-109.000.
- Ariyama, Kenzo: *See—*
  - Tsuruoka, Ichirio; Echigo, Katsuhiro; Mochizuki, Manabu; Kurotori, Tsuneo; Ariyama, Kenzo; Kojima, Kenji; and Miyao, Mayumi, 5,021,834, Cl. 355-256.000.
- Armand, Michel; Gauthier, Michel; and Muller, Daniel, to Hydro-Quebec; and Societe, Nationale Elf Aquitane. New ion conductive material composed of a salt in solution in a liquid electrolyte. 5,021,308, Cl. 429-194.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Armanet, Raymond: *See—*
  - Mounier-Poulat, Francois; Savoie, Marcel; and Armanet, Raymond, 5,020,824, Cl. 280-686.000.
- Armau, Elise; Drocourt, Daniel; Etienne, Gilles; and Tiraby, Gerard, to Centre National de la Recherche Scientifique (CNRS). Application of antibiotics of the phleomycin family as selection agent in the field of genetic engineering 5,021,344, Cl 435-172 300.
- Armbruster, David R.; and Pasion, Merlyn C., to Acme Resin Corporation. Alkaline benzylic ether phenolic resin binders 5,021,539, Cl. 528-129.000.
- Armes, Steven P.; and Aldissi, Mahmoud, to United States of America, Energy Nonaqueous polypyrrole colloids. 5,021,193, Cl. 252-500.000.
- Armor Equipment Scientifique: *See—*
  - Borie, Gerard, Pellegrin, Jean; and Le Roch, Alain, 5,020,297, Cl 53-127.000.
- Arnold, Dan McCay, to Halliburton Logging Services, Inc. Directional gamma ray spectrometer. 5,021,652, Cl. 250-267.000.
- Aronoff, Michael I., Matsuzawa, Soichiro; and Terada, Nobuhiro, to Applied Magnetics Corporation; and NGK Insulators, Ltd. Method of producing a head core slider 5,020,213, Cl. 29-603.000.
- Arroyo, Candido J.; and Paucke, Walter J., to AT&T Bell Laboratories. Communications cable having microbial resistant water blocking provisions. 5,020,875, Cl. 350-96.230.
- Arvid Machine Tools Ltd.: *See—*
  - Lunn, Garfield R., 5,020,635, Cl 184-6.180.
- Aryscarch Arylan AG: *See—*
  - Benardelli, Giovanni, 5,020,831, Cl. 283-108.000.
- Aryt Optronics Industries Ltd.: *See—*
  - Paz, Ofer, 5,020,906, Cl. 356-138.000.
- Asahi Kasei Kogyo Kabushiki Kaisha. *See—*
  - Takenaka, Koji; and Sato, Eiji, 5,021,283, Cl. 428-116.000.
- Asahi Kogaku Kogyo Kabushiki Kaisha. *See—*
  - Sato, Masao, 5,021,814, Cl. 354-149.110.
  - Satoh, Osamu; Hirai, Isamu; and Nakata, Masahiro, 5,021,818, Cl 354-429.000.
  - Suzuki, Noboru; and Toji, Shigeo, 5,021,817, Cl. 354-402.000.
- Asai, Makoto; Ohyama, Yoshimasa; Tanigawa, Tohru; Shinozaki, Shigeo; and Shiga, Shoji, to Furukawa Electric Co., Ltd., The Copper alloy for electronic instruments. 5,021,105, Cl. 148-433.000.
- Asakura, Makoto: *See—*
  - Okamura, Ryo; Nishida, Shinichiro; and Asakura, Makoto, 5,021,969, Cl. 364-513.000.
- Asami, Shinji; and Ikoma, Tadashi, to Ricoh Company, Ltd. Method and apparatus for arranging papers. 5,020,784, Cl. 270-53.000.
- Asami, Sumio: *See—*
  - Maeda, Mitsuru; Kodama, Tohru; Asami, Sumio; Amano, Norihide; Kusumi, Takaaki; and Hosono, Hidekazu, 5,021,406, Cl 514-99.000.
- Asaoka, Shinichi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Electric drive unit mounted to a vehicle. 5,020,615, Cl. 180-11.000.
- Asayama, Junko: *See—*
  - Tomita, Yoshihiro; Takayama, Ryoichi; Ogawa, Hisahito; Nomura, Koji; Asayama, Junko; and Abe, Atsushi, 5,021,660, Cl 250-338.300.
- Asea Brown Boveri Aktiengesellschaft. *See—*
  - Nienburg, Hans; Harbach, Friedrich; and Stein, Peter, 5,021,376, Cl. 501-153.000.
- Ashida, Akira: *See—*
  - Mohri, Shunji; and Ashida, Akira, 5,021,970, Cl. 364-513.000.
- Askew, James M. A., to Lucas industries PLC. Injection pump having pilot and main injection. 5,020,979, Cl. 417-499.000.
- Asobe, Kunio: *See—*
  - Minegishi, Takeshi; Takabatake, Kiyotugu; and Asobe, Kunio, 5,021,286, Cl. 428-198.000.
- Asoh, Toshiaki: *See—*
  - Masumoto, Mitsuhiko; Kanayama, Satoshi, Asoh, Toshiaki, and Kawahigashi, Teruo, 5,021,541, Cl. 528-196.000.
- Aspa Zurich AG: *See—*
  - Geisseler, Max, 5,021,149, Cl. 209-141.000.
- Assaf, Gad; and Fisher, Uriyel, to Geophysical Engineering Company Method of and means for controlling the condition of air in an enclosure. 5,020,333, Cl. 62-271.000.
- Associated Mills Inc.: *See—*
  - Foster, Robert W., Jr.; and Gentry, Jefferson L., 5,020,517, Cl. 128-33.000.
- Associated Universities, Inc.: *See—*
  - Mease, Ronnie C.; and Srivastava, Suresh C., 5,021,571, Cl. 544-166.000.
- AT&T Bell Laboratories: *See—*
  - Archie, Kent C.; Fonorow, Owen R.; McGould, Mary C.; McLear, Robert E., III; Read, Edward C.; Schaefer, Edwin M., III; Schwab, Suzanne E.; and Wodarz, Dennis, 5,021,997, Cl 364-900.000.
  - Arroyo, Candido J.; and Paucke, Walter J., 5,020,875, Cl. 350-96.230.
  - Atkins, Robert M.; Peterson, George E.; and Tuminaro, Raymond D., 5,021,072, Cl. 65-3.110.
  - Benko, John W.; and Coucoulas, Alexander, 5,021,630, Cl. 219-121.640.
  - Brandle, Charles D., Jr.; Fratello, Vincent J.; Luther, Lars C.; and Slusky, Susan E. G., 5,021,302, Cl. 428-692.000.
  - Chlipala, James D., 5,021,362, Cl. 437-173.000.
  - Chung, Hong Y.; and Rauchwerk, Michael D., 5,022,053, Cl. 375-39.000.
  - Forson, Henry M., Lothrop, John R., O'Dell, Thomas M., and Overmyer, Rick L., 5,022,070, Cl. 379-32.000.
- Atkins, Robert M., Peterson, George E.; and Tuminaro, Raymond D., to AT&T Bell Laboratories. Method for making a carbon-coated and polymer-coated optical fiber. 5,021,072, Cl. 65-3 110.
- Atlantic Richfield Company: *See—*
  - Li, Ying-Hsiao, 5,020,561, Cl 137-13.000.
- Ato, Kazuhiko: *See—*
  - Watanabe, Michihiro; Sato, Kazutaka; Zen, Munetoshi; Ato, Kazuhiko; Watanabe, Yoshinobu; and Taguchi, Sadayoshi, 5,021,194, Cl. 252-518.000.
- Atsugi Motor Parts Company, Limited: *See—*
  - Aihara, Toshinori, 5,020,975, Cl. 417-295 000.
- Au, Van. *See—*
  - Harriott, Sharon M., Au, Van, and Rees, Wayne M., 5,021,187, Cl 252-186.380.
- Aubard, Gilbert G., Grouhel, Agnes G., Junien, Jean-Louis, Roux, Claude P.; and Torossian, Dieran R., to Jouveinal S.A Hydrocortisone-17-oxo-21-thioesters, their preparation and their uses as medicaments. 5,021,408, Cl. 514-179.000.
- Auger, Marc: *See—*
  - Thibault, Marc-Andre; Auger, Marc; Gariepy, Bruno; and Gendron, Andre, 5,020,778, Cl. 266-89.000.
- August Bilstein GmbH & Co. KG. *See—*
  - Huang, Zhen, 5,020,781, Cl. 267-136 000.
- Aurik, Erik A.: *See—*
  - Dessing, Jacobus P. M.; Roodenburg, Pieter J., Aurik, Erik A. and Borgman, Fokko P., 5,020,477, Cl. 119-14.080.
- Austria Metall Aktiengesellschaft: *See—*
  - Harreither, Rupert, 5,021,102, Cl. 148-13.000.
- Auto Transport Equipment Co.: *See—*
  - Provenson, Victor A., 5,020,960, Cl. 414-494.000.
- Automatic Control Electronics Company: *See—*
  - Cox, George M., Colley, Charles D., Jr.; and Davis, Thomas E., Jr 5,021,940, Cl. 364-148.000.
- Automation Facilities Limited. *See—*
  - Kingshury, Philip C. O., 5,021,911, Cl. 360-128.000
- Automotive Products plc: *See—*
  - Barker, David C.; Nix, Richard A., and Leigh-Monstevens, Keith V., 5,020,326, Cl. 60-586.000
- Automotive Products (USA) Inc.: *See—*
  - Mabee, Brian, 5,021,764, Cl. 340-439.000.
- Avis, Graham M.: *See—*
  - Paneth, Eric; Handzel, Mark J.; Morley, Steven A., and Avis, Graham M., 5,022,024, Cl. 370-50.000.
- Avis, Richard J. A.; and Gillard, Clive H., to Sony Corporation. Motion dependent video signal processing. 5,021,881, Cl. 358-140.000.
- Avl Gesellschaft Fur Verbrennungskraftmaschinen und Messtechnik M.B.H. Prof.Dr.Dr.h.c. Hans List *See—*
  - Plohberger, Diethard; Herzog, Peter; Elliott, Keith, Fischer, Christof D.; and Greier, Josef, 5,020,494, Cl. 123-250.000.
- Awada, Yoshihisa: *See—*
  - Mase, Masahiro; Sakagami, Seiji; Okawada, Takeshi; Ueda, Shinjiroo; Awada, Yoshihisa, and Nagaoka, Takashi, 5,020,969, Cl. 415-55.300.
- Ayusawa, Shirou *See—*
  - Sato, Shuichi; Kohayashi, Yoshiharu; and Ayusawa, Shirou, 5,020,462, Cl. 112-302.000.
- Azar, Charles; and Rabelo, Fernando V. Conversion circuit for removing line-by-line phase alternation. 5,021,871, Cl. 358-11.000.
- Azpeitia Urrestarazu, Angel; and Areta Salanueva, Juan M., to Fagor S Coop. Construction of bridge rectifiers. 5,021,926, Cl. 361-436.000.
- Azzerri, Nazzareno; and Giorgi, Leonardo, to Nuova Italsider S.p.A Steel strip for food packaging and process for production thereof 5,021,104, Cl. 148-276.000.
- B. F. Goodrich Company, The: *See—*
  - Vyvoda, Josef C.; and Harvilchuck, James T., 5,021,490, Cl 524-140.000.
- B. R. Products Pty. Limited: *See—*
  - Rawlyk, Bert, 5,020,758, Cl. 248-250.000.
- Baba, Shiro, to Hitachi, Ltd Data Processor. 5,021,951, Cl. 364-200.000.
- Babb, David A.: *See—*
  - Clement, Katherine S., Babb, David A.; and Ezzell, Bobby R., 5,021,602, Cl. 558-230.000.
- Babbs, Frederick W., to Dunlop Cox Limited. Vehicle seat slide mechanism. 5,020,853, Cl. 297-341.000.
- Babcock & Wilcox Company, The: *See—*
  - Berthold, John W., and Reed, Stuart E., 5,020,379, Cl. 73-800.000
- Babczinski, Peter. *See—*
  - Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst, Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,082, Cl. 71-93.000.
- Babin, David C., to Motorola, Inc. Synchronization method and circuit for display drivers. 5,021,775, Cl. 340-814.000.
- Babson, Edward S.; Brophy, Thomas G.; and Porter, Michael R., to Porter Sewing Machines, Inc. Method and apparatus for aligning a fabric ply in a sewing machine. 5,020,460, Cl. 112-262.300.
- Babu, Suryadevara V.; Lu, Neng-hsing; and Nilsen, Carl-Otto. Side source center sink plasma reactor. 5,021,138, Cl. 204-298.330.
- Baciak Mark G., to United States of America, Air Force. Pointer/-tracker for a phased array laser system. 5,021,643, Cl. 250-201.900
- Back-Pedersen, Andreas; Nielsen, Ole B.; and Moller, Hans C., to Danfoss A/S. Flow meter working on the Coriolis principle (II). 5,020,375, Cl. 73-861.380.

- Bader, Josef, to Zahnradfabrik Friedrichshafen AG. Motor-vehicle gear-change transmission. 5,020,385, Cl. 74-333.000.
- Bagga, Madan M., to Ciba-Geigy Corporation. Curable epoxide resin compositions. 5,021,513, Cl. 525-328.800.
- Baggen, Constant P. M. J., to U.S. Philips Corporation. Semiconductor memory comprising an on-chip error correction device, and integrated circuit comprising such a semiconductor memory. 5,022,031, Cl. 371-43.000.
- Bahrani, Abdul S., to Procter & Gamble Company, The. Processes for dehusking psyllium seeds. 5,020,732, Cl. 241-7.000.
- Bailey, Rouse R., Jr.: *See—*
  - Lessig, William R., III; Bailey, Rouse R., Jr.; and Cochran, John R., 5,020,186, Cl. 15-339.000.
- Bainbridge, Peter: *See—*
  - Montague, Peter G.; Lagar, Philip A., and Bainbridge, Peter, 5,021,525, Cl. 526-210.000.
- Baker, Anna L.: *See—*
  - Ackerman, Patrice K.; and Baker, Anna L., 5,021,369, Cl. 501-95.000.
- Baker Hughes Incorporated: *See—*
  - Coronado, Martin P., 5,020,600, Cl. 166-387.000.
- Baker, Stephen R.; and Todd, Alec, to Lilly Industries Limited. Organic compounds and their pharmaceutical use. 5,021,441, Cl. 514-381.000.
- Bald, Wilfried; Feldmann, Hugo; Pabst, Manfred; and Fischer, Rudiger, to SMS Schloemann-Siemag Aktiengesellschaft. Roll arrangement for non-deforming treatment of moving web-type products. 5,021,265, Cl. 427-365.000.
- Baldasarri, Mario: *See—*
  - Van Driesen, Roger P.; Adams, William R.; Baldasarri, Mario; Caspers, John; and Trimble, Harold, 5,021,147, Cl. 208-152.000.
- Baldwin, John J.; Eilon, Gabriel F.; Friedman, Paul A.; and Remy, David C., to Merck & Co., Inc. Method of traeting malaria with cyproheptadine derivatives. 5,021,426, Cl. 514-313.000.
- Baldwin, John J.: *See—*
  - Remy, David C.; Baldwin, John J.; Claremon, David A.; and King, Stella W., 5,021,440, Cl. 514-381.000.
- Bale, Bart, to Spalding & Evenflo Companies, Inc. Disposable nurser shell and hood. 5,020,680, Cl. 215-11.600.
- Bales, Daniel A.: *See—*
  - Miller, Steven M.; and Bales, Daniel A., 5,020,716, Cl. 228-212.000.
- Baliga, Bantval J., to North Carolina State University. Integrated circuit power device with automatic removal of defective devices and method of fabricating same. 5,021,861, Cl. 357-51.000.
- Ball, Lawrence E., to Standard Oil Company, The. Anionic polymeric stabilizers for oil-in-water emulsions. 5,021,526, Cl. 526-240.000.
- Ballard, Scott T. Magnetic building block. 5,021,021, Cl. 446-92.000.
- Ballester-Rodes, Montserrat; Palomo-Nicolau, Francisco E.; and Palomo-Coli, Antonio L., to Centro Marga Para La Investigacion S.A Famotidine polymorphic forms and their preparation process 5,021,582, Cl. 548-197.000.
- Bally Manufacturing Corporation: *See—*
  - Englehardt, William H.; Svilans, Olgerts J.; and Nieto, Augustine, 5,020,794, Cl. 272-129.000.
- Balukin, Richard F.; and Reiss, John R., to American Standard Inc. Penalty brake control system. 5,020,862, Cl. 303-15.000.
- Balzers Aktiengesellschaft: *See—*
  - Wegmann, Urs; and Koller, Albert, 5,021,669, Cl. 250-396.0ML.
- Bandlish, Baldev K., to Sandoz Ltd. Electrochemical process for preparing 4,4'-dinitrostilbene-2,2'-disulfonic acid and the salts thereof 5,021,132, Cl. 204-78.000.
- Banos, Oscar: *See—*
  - Beard, John E.; Spillman, Franklin L.; Banos, Oscar; Showers, David; Fussell, John M.; and LeBlanc, George, 5,020,790, Cl 272-70.000.
- Banzai, Masato; Shibata, Yoshio; and Suzuki, Toshio, to Mitsubishi Denki K.K. Machining-liquid injection nozzle unit for traveling-wire EDM apparatus. 5,021,623, Cl. 219-69.120.
- Baras, David: *See—*
  - Mann, Donaerl B.; and Baras, David, 5,020,515, Cl. 128-26.000.
- Barber-Colman Company: *See—*
  - Reber, Eric J., 5,021,666, Cl. 250-359.100.
- Barchas, Jack D.: *See—*
  - Tecott, Laurence; Barchas, Jack D.; and Eberwine, James, 5,021,335, Cl 435-6.000.
- Barclay, Brian L.; Childers, Jerry D.; Wright, Jeri; Place, Virgil A.; and Wong, Patrick S. L., to Alza Corporation. Oral osmotic device with hydrogel driving member. 5,021,053, Cl. 604-892.100.
- Barfurth, Dieter; Lindzus, Claus; and Nestler, Heinz, to Huels Troisdorf Aktiengesellschaft. Zirconium chelates, their preparation, and their use in printing inks. 5,021,596, Cl. 556-55.000.
- Barham, Steven T.: *See—*
  - Kingston, Samuel C.; Barham, Steven T.; and Simonsen, Harold L., 5,022,048, Cl. 375-1.000.
- Barker, David C.; Nix, Richard A.; and Leigh-Monstevens, Keith V., to Automotive Products plc. Hydraulic control system with prefilled pressurized reservoir. 5,020,326, Cl. 60-586.000.
- Barkley-Harwood Ltd.: *See—*
  - Barkley, Richard D., 5,020,807, Cl. 273-409.000.
- Barkley, Richard D., to Barkley-Harwood Ltd. Projectile board. 5,020,807, Cl. 273-409.000.
- Barlean, Bernard T. Holder for open end wrenches. 5,020,666, Cl. 206-376.000.
- Baroid Technology, Inc.: *See—*
  - Shumate, Thomas G.; and Sokol, Louis P., 5,021,170, Cl. 252-8.515.
- Barret, Thierry; and Rullier, Pierre, to Salomon S.A Slide fastener for sport shoes, particularly for cross-country skiing. 5,020,247, Cl. 36-50.000.
- Bartlett, Edward C. Web tension monitor. 5,020,381, Cl. 73-862 480.
- Base Stock Press, Inc.: *See—*
  - Copham, David L., 5,020,434, Cl. 101-485.000.
- BASF Aktiengesellschaft: *See—*
  - Taubitz, Christof; Hub, Hans-Henning; Ziegler, Walter; and Sadlowski, Juergen, 5,021,508, Cl. 525-133.000.
  - Urban, Dieter; Ladner, Wolfgang; and Paul, Axel, 5,021,345, Cl. 435-180.000.
- BASF Corporation: *See—*
  - Laugal, James A.; Martin, Glenn E.; St. Aubin, Donald L.; and Wold, Gerald G., 5,021,470, Cl. 523-414.000.
- Bass, R. Gerald: *See—*
  - Hergenrother, Paul M.; Connell, John W.; and Bass, R. Gerald, 5,021,518, Cl. 525-422.000.
- Bass, Thomas M.: *See—*
  - Rosenow, Michael J.; Hamilton, Scott B., and Bass, Thomas M., 5,022,076, Cl. 380-2.000.
- Batts, Inc.: *See—*
  - Garrison, Judd, 5,020,705, Cl. 223-96.000.
- Bauder, Richard C., to RCA Licensing Corporation. Color picture tube having shadow mask with improved support. 5,021,707, Cl. 313-402.000.
- Bauer, Klaus: *See—*
  - Koch, Volker; Willms, Lothar; Fuss, Andreas; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,021,578, Cl. 546-296.000.
- Bauer, Peter. Shelf suspension member for double-hung sash windows. 5,020,756, Cl. 248-236.000.
- Baukov, Jury I.: *See—*
  - Shipov, Alexandr G.; Kramarova, Evgenia P.; Orlova, Natalia A.; Baukov, Jury I.; and Ziemelis, Kristap M., 5,021,568, Cl. 540-531.000.
- Baumann, Gert: *See—*
  - Buschauer, Armin; Schickaneder, Helmut, Schunack, Walter; Elz, Sigurd; Szelenyi, Istvan; Baumann, Gert; and Ahrens, Kurt H., 5,021,431, Cl. 514-333.000.
- Baumgartner, Pierre: *See—*
  - Franckowiak, Sigismond; Mikitenko, Paul; Baumgartner, Pierre; and Cohen, Georges, 5,021,143, Cl. 208-70.000
- Bavaria Cargo Technologie GmbH: *See—*
  - Huber, Thomas, 5,020,657, Cl. 198-782.000.
- Baxter International Inc.: *See—*
  - Kersten, Jean; Lombard, Etienne; and Heindrichs, Daniel, 5,020,162, Cl. 2-164.000.
  - Mahoney, Michael R.; Nieman, Wayne H.; McDowell, Douglas J.; and Krapil, Virginia, 5,020,532, Cl. 128-205.240.
- Bay, Steven T.; and Prince, Dan, to DS Research, Inc. Distributed source assembly. 5,020,476, Cl. 118-728.000.
- Bayer Aktiengesellschaft: *See—*
  - Findeisen, Kurt; Lindig, Markus; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,081, Cl. 71-92.000.
  - Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; El-Sayed, Aziz; Muller, Peter-Rolf; and Wandel, Martin, 5,021,488, Cl. 524-116.000.
  - Junge, Bodo; Richter, Bernd; Glaser, Thomas; and Traber, Jorg, 5,021,438, Cl. 514-373.000.
  - Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst, Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,082, Cl. 71-93.000.
  - Mayska, Paul J.; Eckhardt, Volker; Freitag, Dieter; and Idel, Karsten-Josef, 5,021,543, Cl. 528-217.000.
  - Muller, Hanns P.; and Heine, Heinrich, 5,021,536, Cl. 528-73.000.
  - Muller, Klaus-Helmut; Kluth, Joachim; Konig, Klaus; Gassen, Karl-Rudolf; Findeisen, Kurt; Lindig, Markus; Lurssen, Klaus, Santel, Hans-Joachim; and Schmidt, Robert R., 5,021,080, Cl. 71-92.000.
  - Reiff, Helmut; Dieterich, Dieter; and Stepanek, Rene, 5,021,520, Cl. 525-458.000.
  - Serini, Volker; Freitag, Dieter; Idel, Karsten-Josef; Westeppe, Uwe; Grigo, Ulrich; and Paetz, Klaus-Christian, 5,021,542, Cl 528-204.000.
- Bayler, James L.: *See—*
  - Eilowitz, Mark S.; Vataru, Marcel; Bayler, James L.; Labus, Rainer H.; and Lugosi, Laszlo G., 5,021,152, Cl. 210-712.000.
- BC Research and Development, Inc.: *See—*
  - Beran, Mark A.; and Fattahi, Farrokh, 5,021,644, Cl. 250-221.000.
- Bea, Martin: *See—*
  - Giesen, Adolf; Bea, Martin; and Borik, Stefan, 5,020,895, Cl. 350-608.000.
- Beales, Jonathan T., to International Paper Company. Paperboard partition. 5,020,921, Cl. 383-38.000.
- Bealkowski, Richard; Blackledge, John W., Jr.; Cronk, Doyle S.; Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G.; Kovach, George D.; McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., to International Business Machines Corp. Apparatus and method for preventing unauthorized access to BIOS in a personal computer system. 5,022,077, Cl. 380-4.000.
- Beaman, Donald R.: *See—*
  - Pyzik, Aleksander J.; Schwarz, Douglas B.; Rossow, Harold E.; Beaman, Donald R.; and Pyzik, Barbara M., 5,021,372, Cl. 501-97.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Beard, John E.; Spillman, Franklin L., Banos, Oscar, Showers, David, Fussell, John M.; and LeBlanc, George. to Board of Supervisors of Louisiana State University and Agricultural and Mechanical College Powered gait orthosis 5,020,790, Cl. 272-70.000.
- Beatty, Graydon E.: *See—*
  - Dahl, Roger W.; Heil, Ronald W., Jr.; Beatty, Graydon E., and Mower, Morton M., 5,020,544, Cl. 128-784.000.
- Beauval, Didier, to Telic Alcatel. Mechanical assembly for ensuring electrical safety in a telephone set or terminal. 5,022,075, Cl 379-445.000.
- Beck, Charles E. J.. *See—*
  - Gillaspey, William, Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J ; Fujioka, Futoshi; Branco. Anthony G.; Narula, Anubhav; and Boden, Richard M., 5,021,184, Cl. 252-174.110.
- Beck, Joseph C.: *See—*
  - Beck, Louis B.; and Beck, Joseph C., 5,021,274, Cl. 428-41.000.
- Beck, Louis B.; and Beck, Joseph C., to Union Camp Corporation. Detachable coupon for laminated corrugated packaging material and method of manufacture. 5,021,274, Cl. 428-41.000
- Becker, Bruce B.; and Berthiaume, William A., to C. R Bard, Inc. Method and catheter for dilatation of the lacrimal system. 5,021,043, Cl. 604-49.000.
- Becker, Johann A.: *See—*
  - Zell, Werner V.; Becker, Johann A.; Boehm, Detlef M.; Frohlich, August G.; Schade, Detlef; and Goletz, Bernhard R., 5,020,874, Cl. 350-96.200.
- Becker, Samuel R. Boring apparatus and method of modifying concrete blocks. 5,020,945, Cl. 408-1.00R.
- Becker, Udo; Heimburger, Norbert; and Braun, Konrad, to Behringwerke Akitengesellschaft Process for the preparation of factor VIII:C-deficient plasma, and a deficient plasma obtained in this way. 5,021,243, Cl. 424-530.000.
- Beckley, Ronald W : *See—*
  - Pike, Ronald L.; and Beckley, Ronald W., 5,021,917, Cl. 361-195.000.
- Beckman, James R.: *See—*
  - Albers, Walter F.; and Beckman, James R., 5,020,335, Cl. 62-271.000.
  - Albers, Walter F., and Beckman, James R., 5,020,588, Cl. 165-111.000.
- Becton, Dickinson and Company: *See—*
  - Ervin, Klon R., 5,021,351, Cl. 435-297.000.
- Bedford, Peter H., to Bedford, Peter H. Shipping carton and dipsenser for sponge articles. 5,020,670, Cl. 206-499.000.
- Bednarzik, Uwe H. Watering method and apparatus for plants. 5,020,275, Cl. 47-79.000.
- Beecham Group P.L.C.: *See—*
  - Berge, John M.; and Cawthorne, Michael A., 5,021,445, Cl. 514-402.000.
- Beer, Paul D.; and Tite, Elizabeth L., to Imperial Chemical Industries PLC. Redox-active centres. 5,021,592, Cl. 556-1.000.
- Beer, Paul D.; and Keefe, Anthony D., to Serpentix Conveyor Corporation. Redox-responsive anion receptors. 5,021,599, Cl. 556-142.000.
- Begley, William J.; and Chen, Teh-Hsuan, to Eastman Kodak Company. Photographic element comprising a development inhibitor releasing compound having a linking group between the carrier and the inhibitor. 5,021,322, Cl. 430-223.000.
- Begrich, Rainer, to Ciba-Geigy Corporation. Reactive dyes. 5,021,557, Cl. 534-560.000.
- Behringwerke Akitengesellschaft: *See—*
  - Becker, Udo; Heimburger, Norbert; and Braun, Konrad, 5,021,243, Cl. 424-530.000.
- Beigang, Wolfgang, to GKN Automotive AG. Differential unit. 5,021,038, Cl. 475-85.000.
- Belcher, James: *See—*
  - Harpold, Charles W.; and Belcher, James, 5,020,430, Cl. 101-126.000.
- Belcher, Jewell G., Jr.: *See—*
  - Norton, William E.; Belcher, Jewell G., Jr.; Carden, James R.; and West, Thomas W., 5,021,065, Cl. 623-63.000.
- Belgorodsky, Vladimir S.: *See—*
  - Abysov, Nikolai A.; Bezgodov, Valery A.; Belgorodsky, Vladimir S.; and Plotnikov, Nikolai D., 5,020,279, Cl. 51-123.00G.
- Belkus, Paul: *See—*
  - Hoffman, Richard E.; Topping, Richard; Nelson, Tom W.; Murville, Marie L.; and Belkus, Paul, 5,020,563, Cl. 137-75.000.
- Beloit Corporation: *See—*
  - Wedel, Gregory L.; and Roerig, Arnold J., 5,020,238, Cl. 34-16.000.
- Benardelli, Giovanni, to Arysearch Arylan AG. Imprinted product with tamperproof seal method of producing product. 5,020,831, Cl. 283-108.000.
- Benko, John W.; and Coucoulas, Alexander, to AT&T Bell Laboratories. Laser soldering method and apparatus. 5,021,630, Cl. 219-121 o40.
- Bennett. Walter L.: *See—*
  - Gross, Ronald; and Bennett, Walter L., 5,021,777, Cl. 340-825.540.
- Benson, John D.: *See—*
  - Borschel, Marlene W.; Benson, John D.; Breen, Merle D.; MacLean, William C., Jr.; Ponder, Debra L.; Strickland, Alan D.; and Treem, William R., 5,021,245, Cl. 426-2.000.
- Bently Nevada Corporation: *See—*
  - Schutts, Mark E., 5,021,737, Cl. 324-207.110.
- Beran, Mark A.; and Fattahi, Farrokh, to BC Research and Development, Inc. Presence detecting apparatus and method for automatic doors. 5,021,644, Cl. 250-221.000.
- Beremand, Marian N.; VanMiddlesworth, Frank L.; and Plattner, Ronald D., to United States of America, Agriculture. Method for producing trichothecenes. 5,021,343, Cl. 435-119.000.
- Berge, John M., and Cawthorne, Michael A., to Beecham Group P L C Compounds useful for the treatment of hypoglycemia. 5,021,445, Cl 514-402.000.
- Berger, Frank M., Johnson, Howard L.; and DeGraw, Joseph I., Jr., to Berger, Frank M P-alkyl phenoxy alkanols for the treatment of allergic conditions. 5,021,460, Cl. 514-718.000.
- Bergfeld, Manfred, Eisenhuth, Ludwig; and Zengel, Hans-Georg, to Akzo N.V. Thiuram polysulfide production 5,021,603, Cl 558-237.000.
- Bergische Stahl-Industrie. *See—*
  - Potthoff, Heinrich, 5,020,446, Cl. 105-218.100.
- Bergman, Norman J., to Pitney Bowes Inc. Control system for nozzle positioning motor 5,020,473, Cl. 118-669.000.
- Bergner, Arndt, to Hilti Aktiengesellschaft. Device for cutting undercuts. 5,020,613, Cl. 175-273.000.
- Bergqvist, Coral Irene: *See—*
  - Bergqvist, Tonny E., 5,021,108, Cl 156-79.000.
- Bergqvist, Tonny E., to Bergqvist, Coral Irene. Method and apparatus for manufacturing a foamed plastic laminated panel. 5,021,108, Cl. 156-79.000.
- Bergthaller, Peter; Kruger, Thomas; Stolzenburg, Rudolf; and Hubner, Dirk, to Agfa Gevaert Aktiengesellschaft. Colour photographic recording material containing a coupler releasing a photographically active compound. 5,021,330, Cl. 430-544.000.
- Bergthaller, Peter; Kruger, Thomas; Vetter, Hans; and Odenwalder, Heinrich, to Agfa Gevaert Aktiengesellschaft. Color photographic recording material containing a DIR coupler 5,021,332, Cl 430-544.000.
- Bergthaller, Peter *See—*
  - Vetter, Hans; Odenwalder, Heinrich; Bergthaller, Peter; and Kruger, Thomas, 5,021,331, Cl. 430-544.000.
- Beringhause, Steven: *See—*
  - Gonsalves, Edward M.; Offiler, Stephen B.; Strott, Douglas B., and Beringhause, Steven, 5,021,736, Cl. 324-202.000.
- Berkoben, Kenneth. *See—*
  - Dragon, Thomas; Hylan, John; and Berkoben, Kenneth, 5,021,673, Cl. 250-548.000.
  - Dragon, Thomas, Hylan, John; Reynolds, Robert; McCarthy, Paul; Merchant, Paul; and Berkoben, Kenneth, 5,021,676, Cl. 250-561.000.
- Bernheim, Michael: *See—*
  - Kastele, Xaver; Bernheim, Michael; and Rossler, Erich, 5,021,263, Cl. 427-353.000.
  - Kastele, Xaver; Bernheim, Michael; and Rossler, Erich, 5,021,264, Cl. 427-353.000.
- Bernstein, Stanley: *See—*
  - Stone, Barry N.; Rice, Richard C.; Lorbiecki, John E.; and Bernstein, Stanley, 5,021,978, Cl. 364-525.000.
- Berry, Peter B.: *See—*
  - George, Donald A.; Berry, Peter B.; Creps, Bruce W.; and Roles, Geraldine C., 5,020,814, Cl. 280-204.000.
- Bersch, Bernhard; Fuchs, Axel; and Eck, Ralf, to Hoesch Stahl AG Electrode for resistance welding surface-treated sheets of steel and method of manufacturing such electrodes. 5,021,627, Cl. 219-119.000.
- Berteaux, Daniel: *See—*
  - Adrey, Jose ; Berteaux, Daniel; Goalard, Christian, Gueret, Alain; Hamon, Georges; and Nourissat, Christian, 5,021,062, Cl. 623-22.000.
- Bertelson, Peter C. Use of fluid dynamic restrictor for lowering dump truck beds. 5,020,857, Cl. 298-22.00R.
- Berthiaume, William A.: *See—*
  - Becker, Bruce B.; and Berthiaume, William A., 5,021,043, Cl. 604-49.000.
- Berthold, John W.; and Reed, Stuart E., to Babcock & Wilcox Company, The. Microbend fiber optic strain gauge. 5,020,379, Cl. 73-800.000.
- Bertotti, Franco; Ferrari, Paolo; and Gatti, Maria T., to SGS-Thomson Microelectronics S.r.l. Integrated device for shielding the injection of charges into the substrate. 5,021,860, Cl. 357-48.000.
- Bertrand, Steven R.: *See—*
  - Renner, J. John; Palmateer, Steven J.; Petry, John S.; Hoppe, Federick J.; and Bertrand, Steven R., 5,020,820, Cl. 280-439.000.
- Bertus, Brent J.: *See—*
  - Maholland, Michael K.; Fu, Chia-Min; Lowery, Richard E.; Bertus, Brent J.; and Kubicek, Donald H., 5,021,377, Cl. 502-26.000.
- Berty, Jozsef M., to Berty Reaction Engineers, Ltd. Catalyst for the destruction of toxic organic chemicals. 5,021,383, Cl. 502-174.000.
- Berty Reaction Engineers, Ltd.: *See—*
  - Berty, Jozsef M., 5,021,383, Cl. 502-174.000.
- Beschle, Mark D.: *See—*
  - Madden, Sandra L.; Beschle, Mark D.; and Martin, Roy C., 5,021,711, Cl. 313-623.000.
- Beshay, Alphons D. Cement/gypsum composites based cellulose-I. 5,021,093, Cl. 106-731.000.
- Bessinger, Stephen L.; and Nelson, Michael G., to Consolidation Coal Company. Methods and apparatus for maintaining longwall face alignment. 5,020,860, Cl. 299-1.000.
- Bey, Philippe: *See—*
  - Palfreyman, Michael G.; Bey, Philippe; and McDonald, Ian A., 5,021,456, Cl. 514-649.000.
- Bezgodov, Valery A.: *See—*
  - Abysov, Nikolai A.; Bezgodov, Valery A.; Belgorodsky, Vladimir S.; and Plotnikov, Nikolai D., 5,020,279, Cl. 51-123.00G.

- BFGoodrich Company, The: *See—*
  - Garrett, Robert Y., 5,021,529, Cl. 526-304.000.
- Bianchi, Leonard M. Process for improving high-temperature alloys. 5,021,084, Cl. 75-10.130.
- Bibeau, Lauren S.: *See—*
  - McKenna, Ronald J.; Keller, David J., and Bibeau, Lauren S., 5,021,251, Cl. 426-330.500.
- Biel, John P., Jr.: *See—*
  - Aghajanian, Michael K.; Kantner, Robert C.; and Biel, John P., Jr., 5,020,583, Cl. 164-97.000.
- Bienert, Horst; Hirschberger, August; Schleicher, Bernd; Igel, Richard; and Meier, Kurt, to Webasto AG Fahrzeugtechnik. Roof and frame assembly for a motor vehicle and method of forming same. 5,020,850, Cl. 296-223.000.
- Bieringer, Hermann: *See—*
  - Koch, Volker; Willms, Lothar; Fuss, Andreas; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,021,578, Cl. 546-296.000.
- Biggs, Robert T.: *See—*
  - Kapuscinski, Maria M.; Derosa, Thomas F.; Biggs, Robert T.; and Nalesnik, Theodore E., 5,021,177, Cl. 252-51.50R.
- Bigliardi, Achille M.; and Jablonski, Terry R., to Sencion Corporation. Vehicular ignition interlock system. 5,020,628, Cl. 180-272.000.
- Billings, Al: *See—*
  - Dalton, William; and Billings, Al, 5,022,013, Cl. 367-4.000.
- Biomate Co., Ltd.: *See—*
  - Karasawa, Yoshiharu; and Hirohashi, Ken, 5,021,294, Cl. 428-332.000.
- Biometrak Corporation: *See—*
  - Chamoun, Nassib G., 5,020,540, Cl. 128-696.000.
- Biondi, James W.; and Mentelos, Richard A., to Cardiopulmonary Corporation. Circulatory assist method and apparatus. 5,020,516, Cl. 128-30.200.
- Biopool International, Inc.: *See—*
  - Ranby, Mats G.; and Peterson, Hans, 5,021,346, Cl. 435-219.000.
- Birbara, Philip J.; and Genovese, Joseph E., to United Technologies Corporation. Method and apparatus for the safe separation of combustible and/or explosive gaseous mixtures from aqueous solutions. 5,021,070, Cl. 55-46.000.
- Birch, Scott. Bicycle spoke holder. 5,020,706, Cl. 224-39.000.
- Birman, Mark: *See—*
  - Hu, Larry; Chuk, Ting; McLeod, John; Birman, Mark; Samuels, Allen; and Chu, George K., 5,021,985, Cl. 364-748.000.
- Bisak, Michael, to Bisak, Michael; Dunn, Jeffrey; and Cole, Walter, part interest to each. Security device. 5,021,779, Cl. 340-825.690.
- Bitterli, Peter, to Sandoz Ltd. Heterocyclic pigments and dyes. 5,021,573, Cl. 544-284.000.
- Bjerring, Peter: *See—*
  - Bolund, Lars; Jensen, Peter K. A.; and Bjerring, Peter, 5,021,422, Cl. 514-261.000.
- Black Clawson Company, The: *See—*
  - Bliss, Terry L.; Chupka, David E.; McCarthy, Christopher E.; and Walters, Larry J., 5,021,159, Cl. 210-396.000.
- Black & Decker, Inc.: *See—*
  - Kosten, Richard B.; Krasznai, Charles Z.; and Van Deursen, Gary, 5,020,187, Cl. 15-347.000.
  - Lessig, William R., III; Bailey, Rouse R., Jr.; and Cochran, John R., 5,020,186, Cl. 15-339.000.
- Black, Robert E., Jr.; Carson, Don C.; and Van Name, Frederick W., to Thiokol Corporation. Method for improving moisture barrier protection and electrostatic discharge protection of a composite material cased rocket motor. 5,021,270, Cl. 428-34.100.
- Blackburn, Stephen R.; and Jones, Anthony G., to Tioxide Group PLC. Production of nitrogen compounds. 5,021,134, Cl. 204-177.000.
- Blackledge, John W., Jr.: *See—*
  - Bealkowski, Richard; Blackledge, John W., Jr.; Cronk, Doyle S.; Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G.; Kovach, George D.; McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., 5,022,077, Cl. 380-4.000.
- Blank, Norman E.: *See—*
  - Vu, Cung; and Blank, Norman E., 5,021,535, Cl. 528-66.000.
- Blasberg-Oberflachentechnik GmbH: *See—*
  - Metzger, Willi; Schmitz, Manfred; and Schmidt, Karl-Jurgen, 5,021,130, Cl. 204-44.400.
- Blass, Jacob M.: *See—*
  - Gent, John A. G.; and Blass, Jacob M., 5,021,267, Cl. 427-387.000.
- Blazek, Kenneth E.; and Saucedo, Ismael G., to Inland Steel Company. Break-out detection in continuous casting. 5,020,585, Cl. 164-452.000.
- Bliss, Terry L.; Chupka, David E.; McCarthy, Christopher E.; and Walters, Larry J., to Black Clawson Company, The. Apparatus for thickening pulp and paper stock. 5,021,159, Cl. 210-396.000.
- Block, Jacob; and Dolhert, Leonard E., to W. R. Grace & Co.-Conn. Powder containing thallium, calcium, barium and copper. 5,021,400, Cl. 505-1.000.
- Bluege, John, to United Technologies Corporation. Low distortion window for use with high energy lasers. 5,020,880, Cl. 350-319.000.
- Blumberg, Peter M., to United States of America, Health and Human Services. New class of compounds having a variable spectrum of activities for capsaicin-like responses, compositions and uses thereof. 5,021,450, Cl. 514-453.000.
- Blumenkopf, Todd A., to Burroughs Wellcome Co. 2-acetylpyridine 5-[(2-chloroanilino)thiocarbonyl]thiocarbonohydrazone compound and salts thereof. 5,021,437, Cl. 514-357.000.
- Bluzer, Nathan, to Westinghouse Electric Corp. Superconducting infrared detector. 5,021,658, Cl. 250-336.200.
- BMD Badische Maschinenfabrik Durlach GmbH: *See—*
  - Damm, Norbert; and Parr, Thomas, 5,020,582, Cl. 164-37.000.
- Board of Regents, The University of Texas System, The: *See—*
  - Elbein, Alan D.; and Tropea, Joseph E., 5,021,427, Cl. 514-315.000.
- Board of Supervisors of Louisiana State University and Agricultural and Mechanical College: *See—*
  - Beard, John E.; Spillman, Franklin L.; Banos, Oscar; Showers, David; Fussell, John M.; and LeBlanc, George, 5,020,790, Cl. 272-70.000.
- Boardwick, Kathleen E.: *See—*
  - Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., 5,021,184, Cl. 252-174.110.
- Boart International Limited: *See—*
  - Williams, David Stanley, 5,020,612, Cl. 175-234.000.
- Boatman, Donn N.: *See—*
  - Guffey, Timothy B.; Boatman, Donn N.; Abe, Susan S.; Talkington, Sherry R.; and Mijac, Marko D., 5,021,256, Cl. 426-601.000.
- Bobet Materiel: *See—*
  - Termet, Pierre, 5,020,257, Cl. 42-1.120.
- Boden, Eugene P.: *See—*
  - Krabbenhoft, Herman O.; and Boden, Eugene P., 5,021,521, Cl. 525-462.000.
- Boden, Richard M.: *See—*
  - Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., 5,021,184, Cl. 252-174.110.
- Bodine, Robert C., to Capra Resources, Inc. Foot and leg splint device. 5,020,523, Cl. 128-80.00R.
- Boeckmann, Hugo, to Zip-Pak, Inc. Sealing jaw for heat sealable film with zippered section. 5,021,117, Cl. 156-515.000.
- Boehler Ges m.b.H.: *See—*
  - Karagoz, Sadi; Hribernik, Bruno; Stamberger, Johann; Puber, Josef; Jeglitsch, Franz; Fischmeister, Hellmut; Matzer, Franz; Locker, Claus-Dieter; Kudielka, Elfriede; and Jager, Heimo, 5,021,085, Cl. 75-239.000.
- Boehm, Detlef M.: *See—*
  - Zell, Werner V.; Becker, Johann A.; Boehm, Detlef M.; Frohlich, August G.; Schade, Detlef; and Goletz, Bernhard R., 5,020,874, Cl. 350-96.200.
- Boehringer Mannheim Italia, S.p.A.: *See—*
  - Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo; and Tognella, Sergio, 5,021,436, Cl. 514-356.000.
- Boeing Company, The: *See—*
  - Ackerman, Patrice K.; and Baker, Anna L., 5,021,369, Cl. 501-95.000.
  - Gorges, Frederick J., 5,020,861, Cl. 301-108.00R.
  - Kim, Namsoo P.; and Stanbery, Billy J., 5,021,099, Cl. 136-249.000.
  - Miles, Larry N.; Drinnen, Cecil A.; Hackler, David W.; Bogart, Tom L.; Macklin, Arnold D.; Sharpsteen, Ben E.; Hyles, Truett M.; and Stephens, Herschel M., 5,020,714, Cl. 228-15.100.
  - Orgun, Munir; Pappu, Venkata R.; and Toledo, Alfredo A., Jr., 5,020,747, Cl. 244-187.000.
  - Sarr, Dennis P.; and Anderson, Patrick L., 5,021,740, Cl. 324-687.000.
  - Wirth, David J.; Zaragoza, Mike M.; and Rosner, Jon, 5,020,677, Cl. 211-113.000.
- Boerboom, Everett: *See—*
  - Kovacik, Paul J.; Davidson, Charles R.; Lindsay, Kevin B.; Lundberg, Darrel V.; Mulder, Cameron A.; and Boerboom, Everett, 5,021,074, Cl. 65-40.000.
- Bogart, Tom L.: *See—*
  - Miles, Larry N.; Drinnen, Cecil A.; Hackler, David W.; Bogart, Tom L.; Macklin, Arnold D.; Sharpsteen, Ben E.; Hyles, Truett M.; and Stephens, Herschel M., 5,020,714, Cl. 228-15.100.
- Bogner, Martin, to GEZE Sport International GmbH. Binding coupled ski boot shaft delatching device. 5,020,823, Cl. 280-634.000.
- Bohl, Rainer M.: *See—*
  - Salvestro, Aldo T.; Bohl, Rainer M.; and Furse, Martin L., 5,020,933, Cl. 403-90.000.
- Bohlmann, Rolf: *See—*
  - Strehlke, Peter; Bohlmann, Rolf; and Henderson, David, 5,021,434, Cl. 514-341.000.
- Bohm, Horst: *See—*
  - Schlapp, Albert; Grimm, Rainer; and Bohm, Horst, 5,020,849, Cl. 296-221.000.
- Boissevain, Mathew G.; Boissevain. Tobias J.; and Foskett, Anthony D., to Measurex Corporation. Cross-directional steam application apparatus. 5,020,469, Cl. 118-67.000.
- Boissevain, Tobias J.: *See—*
  - Boissevain, Mathew G.; Boissevain, Tobias J.; and Foskett, Anthony D., 5,020,469, Cl. 118-67.000.
- Bolstad, Bruce E.: *See—*
  - Corzine, Robert G.; Bolstad, Bruce E.; and Johantgen, John S., 5,021,796, Cl. 343-712.000.
- Bolton, Hugh R.: *See—*
  - Pullen, Keith R.; Horton, Kevin J.; Etemad, Mohammad R.; Fenocchi, Arnoldo; Eggleston, Laurence W.; and Bolton, Hugh R., 5,021,698, Cl. 310-156.000.
- Bolund, Lars; Jensen, Peter K. A.; and Bjerring, Peter, to Senetek PLC. Method and composition for treating hyperproliferative skin diseases using 6-aminopurine cytokinins. 5,021,422, Cl. 514-261.000.
- Bombardier Inc.: *See—*
  - Bostelmann, Willy, 5,021,198, Cl. 261-44.300

VOL
1127
ISS
1
JE
4
1991
UMI

- Bompard, Bruno; and Lamarie, Jean-Paul, to Brochier S.A. Laminated material reinforced by a multi-dimensional textile structure and method for producing the same. 5,021,281, Cl. 428-116.000.
- Bongers & Deimann: *See—*
  - Nederbragt, Jacob A., 5,020,640, Cl. 187-89.000.
- Boni, Renzo: *See—*
  - Gianna, Roberto; De Gregoriis, Enrico; and Boni, Renzo, 5,021,338, Cl. 435-68.100.
- Bonnett, Roy E., to Ford Motor Company. Reinforcing insert for convertible vehicle. 5,020,846, Cl. 296-186.000.
- Borden, Inc.: *See—*
  - McKenna, Ronald J.; Keller, David J.; and Bibeau, Lauren S., 5,021,251, Cl. 426-330.500.
- Borgman, Fokko P.: *See—*
  - Dessing, Jacobus P. M.; Roodenburg, Pieter J.; Aurik, Erik A.; and Borgman, Fokko P., 5,020,477, Cl. 119-14.080.
- Borie, Gerard; Pellegrin, Jean; and Le Roch, Alain, to Armor Equipment Scientifique. Apparatus for filling petri dishes. 5,020,297, Cl. 53-127.000.
- Borik, Stefan: *See—*
  - Giesen, Adolf; Bea, Martin; and Borik, Stefan, 5,020,895, Cl. 350-608.000.
- Borschel, Marlene W.; Benson, John D.; Breen, Merle D.; MacLean, William C., Jr.; Ponder, Debra L.; Strickland, Alan D.; and Treem, William R., to Abbott Laboratories. Infant formula containing a soy polysaccharide fiber source. 5,021,245, Cl. 426-2.000.
- Bortz, Robert W.; Garwood, William E.; Le, Quang N.; and Wong, Stephen S., to Mobil Oil Corporation. Turbine oil production. 5,021,142, Cl. 208-58.000.
- Bosselin, Bruno: *See—*
  - Schapira, Joseph; Pecheur, Jacques; Vincent, Jacques; Schild, Jacques; and Bosselin, Bruno, 5,021,083, Cl. 71-105.000.
- Bostelmann, Willy, to Bombardier Inc. Carburetor with high altitude compensator. 5,021,198, Cl. 261-44.300.
- Botes, Hendrik P. Shuttering for use in building construction. 5,020,769, Cl. 249-44.000.
- Bouillard, Gerard; and Chauffriat, Henri, to Rhone-Poulenc Chimie. Waterproofing/shaping of quarried building materials. 5,021,262, Cl. 427-289.000.
- Bouman, Anton J., to U.S. Philips Corporation. Electrical cooking unit and electrical cooking apparatus provided with this unit. 5,021,636, Cl. 219-464.000.
- Bowater Packaging Limited: *See—*
  - Revell, Kenneth M., 5,021,298, Cl. 428-458.000.
- Bowman, Harold M. Process for making a manhole cover support having enhanced grip. 5,021,261, Cl. 427-286.000.
- Bowser, Arthur J.: *See—*
  - Ziegler, David E.; and Bowser, Arthur J., 5,020,741, Cl. 244-134.00D.
- Boyd, Andrew J.; and Corton, Anthony D., to CMB Foodcan plc. Resistance welding apparatus. 5,021,626, Cl. 219-109.000.
- Boyd, Gary L., to Allied-Signal Inc. High temperature ceramic/metal joint structure. 5,020,932, Cl. 403-30.000.
- Boyle, John M.: *See—*
  - Mathur, Mahendra P.; Fu, Yuan C.; Ekmann, James M.; and Boyle, John M., 5,020,457, Cl. 110-345.000.
- BP Chemicals Limited: *See—*
  - Filipelli, Michel C. H., 5,020,943, Cl. 406-195.000.
- Braddick, Britt O.; and Langer, Michael, to Texas Iron Works, Inc. Arrangement and method for conducting substance and lock therefor. 5,020,597, Cl. 166-291.000.
- Braden, Michael L.; and Allenson, Stephan J., to Nalco Chemical Company. Method for separating liquid from water using amine containing polymers. 5,021,167, Cl. 210-708.000.
- Bradley, Eric M., to General Dynamics Corp./Electronics Division. Wavelength tunable diode laser. 5,022,038, Cl. 372-50.000.
- Bradley, Eric M., to General Dynamics Corp. High power laser array with stable wavelength. 5,022,042, Cl. 372-75.000.
- Bradshaw, Larry R.: *See—*
  - Harris, Godfrey; Noell, Ralph B.; and Bradshaw, Larry R., 5,020,815, Cl. 280-246.000.
- Braeger, Horst, to Nordischer Maschinenbau Rud. Baader GmbH & Co. KG. Apparatus for the skinning of fish. 5,021,023, Cl. 452-127.000.
- Branco, Anthony G.: *See—*
  - Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., 5,021,184, Cl. 252-174.110.
- Brandle, Charles D., Jr.; Fratello, Vincent J.; Luther, Lars C.; and Slusky, Susan E. G., to AT&T Bell Laboratories. Bismuth-iron garnets with large growth-induced magnetic anisotropy. 5,021,302, Cl. 428-692.000.
- Brattan, Keith, to Imperial Chemical Industries PLC. Sieve plate for effecting gas-liquid contact and structure containing sieve plate. 5,021,199, Cl. 261-114.100.
- Braun, Charles W.: *See—*
  - Grey, Thaddeus J.; Braun, Charles W.; and Palmer, Dwight O., 5,020,505, Cl. 123-571.000.
- Braun, Konrad: *See—*
  - Becker, Udo; Heimburger, Norbert; and Braun, Konrad, 5,021,243, Cl. 424-530.000.
- Braun, Stephen A.; O'Neill, Michael J.; Polak, David C.; and Cutshall, Donald L., to Deere & Company. Self-propelled steerable walk behind mower linkage. 5,020,308, Cl. 56-11.300.
- Breen, Merle D.: *See—*
  - Borschel, Marlene W.; Benson, John D.; Breen, Merle D.; MacLean, William C., Jr.; Ponder, Debra L.; Strickland, Alan D.; and Treem, William R., 5,021,245, Cl. 426-2.000.
- Breger, Guy. Process of multicolor printing by laser. 5,021,112, Cl. 156-305.000.
- Bremer, Carsten: *See—*
  - Vanaschen, Luc; Kuster, Hans-Werner; and Bremer, Carsten, 5,021,075, Cl. 65-287.000.
- Bremer, John D. Coin computer with integral coin indicia. 5,021,027, Cl. 453-58.000.
- Briggs, Marvin N.: *See—*
  - Thoman, David C.; Briggs, Marvin N.; and Eastman, James M., 5,020,564, Cl. 137-102.000.
- Brinlee, Charles P. Adjustable form tool head. 5,020,407, Cl. 83-530.000.
- Brinson, Edward P.: *See—*
  - Evans, Alfred J.; Chen, Grant K.; May, Dennis J.; and Brinson, Edward P., 5,020,298, Cl. 53-138.200.
- Bristol-Myers Squibb Co.: *See—*
  - Meanwell, Nicholas A., 5,021,415, Cl. 514-242.000.
- Brochier S.A.: *See—*
  - Bompard, Bruno; and Lamarie, Jean-Paul, 5,021,281, Cl. 428-116.000.
- Brokenshire, Daniel A.; Bryant, Ronald W.; Farjami, Javad; and Brown, Gary L., to Tektronix, Inc. Method and apparatus for generating a binocular viewing model automatically adapted to a selected image. 5,020,878, Cl. 350-133.000.
- Bronicki, Lucien Y., to Ormat Turbines (1965) Ltd. Silencer for geothermal power plant and method for using the same. 5,020,328, Cl. 60-641.500.
- Brooks, Christopher B.: *See—*
  - Morrison, Gordon E.; Brooks, Christopher B.; and Gluck, Frederick G., 5,021,945, Cl. 364-200.000.
- Brophy, Sean P.; and Stephens, Richard D., to Williams International Corporation. Multiple fluid speed systems. 5,020,314, Cl. 60-39.141.
- Brophy, Thomas G.: *See—*
  - Babson, Edward S.; Brophy, Thomas G.; and Porter, Michael R., 5,020,460, Cl. 112-262.300.
- Brosi, Thomas; Hess, Werner; Moser, Winfried; and Schneider, Hermann, to Robert Bosch GmbH. Process for determining and evaluating the combustion pressure of an internal combustion engine. 5,020,360, Cl. 73-115.000.
- Brother Kogyo Kabushiki Kaisha: *See—*
  - Funamoto, Masaya; and Kobayashi, Akira, 5,020,929, Cl. 400-639.100.
  - Imaizumi, Mamoru; and Kaga, Hikaru, 5,021,805, Cl. 346-76.00R.
  - Kobayashi, Tetuo; and Imaeda, Mikio, 5,021,291, Cl. 428-319.900.
  - Niikawa, Takeshi, 5,020,927, Cl. 400-121.000.
  - Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, 5,021,877, Cl. 358-75.000.
- Brow, Richard K.; and Watkins, Randall D., to United States of America, Energy. High expansion, lithium corrosion resistant sealing glasses. 5,021,307, Cl. 429-184.000.
- Brown, Gary L.: *See—*
  - Brokenshire, Daniel A.; Bryant, Ronald W.; Farjami, Javad; and Brown, Gary L., 5,020,878, Cl. 350-133.000.
- Brown, Jim W. Bladed projectile. 5,020,438, Cl. 102-517.000.
- Brown, Nanette; and Peterson, Sandra J., to Pitney Bowes Inc. EPM having an improvement in accounting update security. 5,021,963, Cl 364-464.020.
- Brown, Richard K.; and Stichman, Robert W., to Wyo-Ben, Inc. Grouting composition. 5,021,094, Cl. 106-803.000.
- Brown, Steven G.: *See—*
  - Burkinshaw, Brian D.; and Brown, Steven G., 5,021,055, Cl 606-82.000.
- Browne, John, to NEI Canada Limited. Fibre optic display device 5,021,773, Cl. 340-764.000.
- Browning Arms Company: *See—*
  - Larson, Marlow W., 5,020,507, Cl. 124-25.600.
- Bru-Magniez, Nicole; Nicolai, Eric; and Teulon, Jean-Marie, to Laboratoires UPSA. Noval benzimidazole and azabenzimiazole derivatives which are thromboxane receptor antagonists, their methods of preparation and pharmaceutical compositions in which they are present 5,021,443, Cl. 514-394.000.
- Bruce, Ian: *See—*
  - Fleet, George W. J.; and Bruce, Ian, 5,021,562, Cl. 536-53.000.
- Bruey, Francis J., to Clorox Company, The. Gel insecticidal compositions. 5,021,237, Cl. 424-43.000.
- Brunel, Andre , to Robert Bosch GmbH. Distributor fuel injection pump for internal combustion engines. 5,020,493, Cl. 123-198.0DB.
- Brunner, Gerhard, to Erhardt & Leimer GmbH. Process for determining the location of edges and photoelectronic scanning device for scanning edges. 5,021,674, Cl. 250-561.000.
- Brunnert, Eberhard, to Julius Blum Gesellschaft m.b.H. Closing device for a drawer arranged in a furniture body. 5,020,868, Cl. 312-319.000.
- Bruno, John. Storage/carrying devices for transport of hypodermic needle/syringe assemblies to bedside use and ultimate disposal. 5,020,665, Cl. 206-366.000.
- Brunson, Welton K.: *See—*
  - Hubbard, Vance M.; and Brunson, Welton K., 5,020,533, Cl. 128-206.230.
- Bryan, Thomas C.: *See—*
  - Howard, Richard T.; Dabney, Richard W.; and Bryan, Thomas C., 5,020,876, Cl. 350-102.000.

- Bryant, Ronald W.: *See—*
  - Brokenshire, Daniel A.; Bryant, Ronald W.; Farjami, Javad, and Brown, Gary L., 5,020,878, Cl. 350-133.000.
- Bticino S.r.l.: *See—*
  - Calderara, Ennio; and Carabelli, Gianmaria, 5,020,997, Cl. 439-137.000.
- BTS Broadcast Television Systems GmbH: *See—*
  - Heitmann, Jurgen, 5,021,895, Cl. 360-66.000.
- Buch, Holger M., to Hoechst Aktiengesellschaft. Water-soluble fiber reactive dyes. 5,021,558, Cl. 534-618.000.
- Buchman, James E.; and Vanden Heuvel, Gregory J., to Reynolds Consumer Products, Inc. Roll inserter. 5,020,302, Cl. 53-430.000.
- Buck, Roy V.; and Adams, Darrell P. Process for etching patterned substrates. 5,021,120, Cl. 156-637.000.
- Buckberg, Gerald D.; and Todd, Robert J., to Research Medical, Inc. Retrograde venous cardioplegia catheters and methods of use and manufacture. 5,021,045, Cl. 604-53.000.
- Buckholtz, Dwight A., to Medtronic, Inc. Blood pump drive system. 5,021,048, Cl. 604-151.000.
- Buckland, Paul R.: *See—*
  - Leyshon, Llewellyn J.; Buckland, Paul R.; and Burns, Paul A., 5,021,333, Cl. 430-551.000.
- Buckley, Alan: *See—*
  - Khanarian, Garo; Stamatoff, James B., and Buckley, Alan, 5,021,268, Cl. 427-430.100.
- Budd Canada Inc.: *See—*
  - Schaefer, Ron, 5,021,633, Cl. 219-208.000.
- Budo, Sadayoshi: *See—*
  - Tochinai, Chiaki. Kohara, Tadanao; Budo, Sadayoshi; Masuda, Hiroaki; and Yoshida, Takayoshi, 5,021,499, Cl. 524-487.000.
- Buffers AB: *See—*
  - Marcelius, Peter, 5,020,947, Cl. 410-70.000.
- Bulin, Dennis G.; and James, Joseph P., to Zeagle Systems, Inc. Buoyancy compensator with detachable shoulder section. 5,020,941, Cl. 405-186.000.
- Bull, David W. Body positioning device. 5,020,197, Cl. 27-21.100.
- Bullen, John V.; and Walters, David K., to Ethyl Petroleum Additives, Limited. Friction modifier. 5,021,176, Cl. 252-51.50A.
- Bunch, Phillip C.; and Dickerson, Robert E., to Eastman Kodak Company. Radiographic screen/film assemblies with improved detection quantum efficiencies. 5,021,327, Cl. 430-496.000.
- Bunick, Frank J.; Luo, Shiuh J.; Shaw, James J.; and Hellman, Stephen R , to Warner-Lambert Company. Method of making a savory flavor granule and a free flowing savory flavor granule. 5,021,249, Cl. 426-96.000.
- Burdulis, Albert G., Jr.: *See—*
  - Hofmann, Aaron A.; and Burdulis, Albert G., Jr., 5,021,056, Cl. 606-86.000.
- Burg, Thomas J., to AEG Westinghouse Transportation Systems, Inc. Electric coupling for rotary guideway switch 5,020,441, Cl. 104-130.000.
- Burg, Thomas J.; Ziegler, Ronald H., and Anderson, Robert J., to AEG Westinghouse Transportation Systems, Inc. Guideway station for a rotary guideway switch. 5,020,442, Cl. 104-130.000.
- Burk, Mark J., to Du Pont de Nemours, E. I , and Company. Optically pure 1,4-diols. 5,021,131, Cl. 204-59.00R.
- Burke, James A., to Allergan, Inc. Combinations of selective alpha-adrenergic agonists and antagonists useful in lowering intraocular pressure. 5,021,410, Cl. 514-213.000.
- Burkinshaw, Brian D.; and Brown, Steven G., to Intermedics Orthopedics, Inc. Patellar clamp and surgical saw guide. 5,021,055, Cl. 606-82.000.
- Burklin, Werner. Sieve drum for sieving out waste or the like. 5,021,150, Cl. 209-245.000.
- Burley Design Cooperative: *See—*
  - George, Donald A.; Berry, Peter B.; Creps, Bruce W.; and Roles, Geraldine C., 5,020,814, Cl. 280-204.000.
- Burn Tubes Limited. *See—*
  - Lewis, Peter J.; and Povey, Reginald, 5,020,935, Cl. 403-391.000.
- Burndy Corporation: *See—*
  - Noschese, Rocco J., 5,021,002, Cl. 439-352.000.
- Burnett, Donald R., to United States of America, Navy. High contact blind hole thermocouple plug. 5,021,098, Cl. 136-201.000.
- Burns, Clay A. Method and apparatus for exercising the knee while correcting for tibial subluxation. 5,020,797, Cl. 272-143.000.
- Burns, Paul A.; and Harder, John W., to Eastman Kodak Company. Photographic material and process comprising a pyrazolotriazole coupler. 5,021,325, Cl. 430-387.000.
- Burns, Paul A.: *See—*
  - Leyshon, Llewellyn J.; Buckland, Paul R.; and Burns, Paul A., 5,021,333, Cl. 430-551.000.
- Burris Company, Inc.: *See—*
  - Glover, Larry A.; McCarty, John P.; and Burris, Donald J., deceased, 5,020,892, Cl. 350-537.000.
- Burris, Donald J., deceased: *See—*
  - Glover, Larry A.; McCarty, John P.; and Burris, Donald J., deceased, 5,020,892, Cl. 350-537.000.
- Burris, Shirley C., United Bank of Greeley, co-personal representatives: *See—*
  - Glover, Larry A.; McCarty, John P.; and Burris, Donald J., deceased, 5,020,892, Cl. 350-537.000.
- Burroughs Wellcome Co.: *See—*
  - Blumenkopf, Todd A., 5,021,437, Cl. 514-357.000.
- Burroway, Gary L.; Magoun, George F.; and Gujarathi, Ramesh N., to Goodyear Tire & Rubber Company, The. Syndiotactic 1,2-polybutadiene latex. 5,021,381, Cl. 502-117.000.
- Burstell, Helmut: *See—*
  - Koch, Volker; Willms, Lothar; Fuss, Andreas, Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,021,578, Cl. 546-296.000.
- Burtin, Jean, to AGFA-Gevaert, N.V Photographic exposure apparatus. 5,021,823, Cl. 355-69.000.
- Buschauer, Armin; Schickaneder, Helmut; Schunack, Walter; Elz, Sigurd; Szelenyi, Istvan; Baumann, Gert; and Ahrens, Kurt H., to Heumann Pharma GmbH & Co. Imidazolyl alkyl guanidine derivatives, processes for their preparation and pharmaceutical preparations containing these compounds. 5,021,431, Cl. 514-333.000.
- Bush, Harry. Portable hazardous waste pallet structure. 5,020,667, Cl 296-386.000.
- Bush, Mike; Hatton, Norman; and Mellor, Keith, deceased (by Mellor, Bernadette L., administratrix), to Reliable Plastics Engineering Company. Ratchet assembly. 5,020,648, Cl. 192-46.000.
- Bush, Robert E.: *See—*
  - Hyatt, Robert J.; Abbott, Edward H.; Bush, Robert E.; and Shannon, Francis J., 5,020,964, Cl. 414-751.000.
- Butelman, Federico, to Etablissement Texcontor. Complexes of iron or other metals with sulphonated derivatives of chitosan. 5,021,561, Cl 536-20.000.
- Butkus, Anthony K., to Norton Company. Chrome oxide refractory composition. 5,021,375, Cl. 501-132.000.
- Butler Manufacturing Company: *See—*
  - Hadfield, Robert W., 5,021,608, Cl. 174-48.000.
- Buttrick, Walter J : *See—*
  - Roth, Michael C.; and Buttrick, Walter J., 5,020,719, Cl. 229-122.100.
- Buytenhek, Cornelis: *See—*
  - Machin, David, Naik, Appaya, Buytenhek, Cornelis, and van de Pas, Johannes C., 5,021,195, Cl. 252-545.000.
- Byrne, James B., Jr., to Vitreoretinal Development, Inc. Corneal expulsive hemorrhage instrument. 5,021,057, Cl. 606-107.000.
- C. R. Bard, Inc.: *See—*
  - Becker, Bruce B.; and Berthiaume, William A., 5,021,043, Cl. 604-49.000.
- Cabler, Carlin D.: *See—*
  - Hendrickson, Alan F.; Chen, Herbert M.; Cabler, Carlin D., and Hattangadi, Rajiv, 5,021,783, Cl. 341-110.000.
- Cadorniga, Lauro C.: *See—*
  - Gendreau, Paul M.; and Cadorniga, Lauro C., 5,020,803, Cl 273-225.000.
- Caines, R. Scott, to Rudy, Dolores R., a part interest Robotic fluid-actuated muscle analogue. 5,021,064, Cl. 623-26.000.
- Calderara, Ennio; and Carabelli, Gianmaria, to Bticino S.r.l. Safety device for shielding off the receptacles of an electric current tap. 5,020,997, Cl. 439-137.000.
- California Pellet Mill Company: *See—*
  - de Almeida Thompson, Eduardo C.; and Taveira, Joao P., 5,020,695, Cl. 222-185.000.
- Calltharp, Glen R., to JMO Holding, Inc. Method for the treatment of wastewater. 5,021,161, Cl. 210-614.000.
- Calspan Corporation: *See—*
  - Russo, Anthony L., 5,020,546, Cl. 128-849.000.
- Camaggi, Giovanni: *See—*
  - Colle, Roberto; Camaggi, Giovanni; Ratti, Giuseppina, Garavaglia, Carlo; and Mirenna, Luigi, 5,021,442, Cl. 514-383.000.
- Campbell, Donald N.; Spangler, Glenn E.; Davis, Robert C., Jr.; Fafaul. Eugene F.; and Carrico, John P., Jr.. to Environmental Technologies Group, Inc. All ceramic ion mobility spectrometer cell. 5,021,654, Cl. 250-287.000.
- Campbell, Michael J.; Finn, Dennis J.; Tucker, George K.; Vahey, Michael D.; and Vedder, Rex W., to Hughes Aircraft Company. Data-flow multiprocessor architecture with three dimensional multistage interconnection network for efficient signal and data processing. 5,021,947, Cl. 364-200.000.
- Campbell, Scott S.: *See—*
  - Joshi, Ashok V.; Syammach, Mustafa B.; and Campbell, Scott S., 5,021,137, Cl. 204-242.000.
- Camtronics, Ltd.: *See—*
  - Rice, Richard C., 5,021,979, Cl. 364-525.000.
  - Stone, Barry N.; Rice, Richard C.; Lorbiecki, John E.; and Bernstein, Stanley, 5,021,978, Cl. 364-525.000.
- Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
  - Farnworth, Brian; and Crow, Rita M., 5,021,280, Cl. 428-102.000.
- Candelora, Andrew M.; Nolan, Kevin F.; Magnon, Gary D.; and Seymour, Raymond K., to General Electric Company. Circuit breaker with positive over-center acceleration. 5,021,819, Cl. 335-15.000.
- Candor, James T. Apparatus and method for removing liquid from liquid bearing material. 5,021,136, Cl. 204-182.100.
- Canevarolo, Sebastiao V., Jr.: *See—*
  - Vellego, Geni; Filipini, Cesar A.; Filho, Pedro I P.; Canevarolo Sebastiao V., Jr.; and Serra, Oswaldo A., 5,021,397, Cl 505-1.000.
- Cannarsa, Michael J.: *See—*
  - Hostetler, Donald E.; Cannarsa, Michael J.; Kesling, Haven S., Jr.; and Sun, Hsiang-Ning, 5,021,464, Cl. 521-189.000.
- Cannondale Corporation: *See—*
  - D'Aluisio, Christopher; and Graham, David, 5,020,819, Cl. 280-288.000.
- Cano, Rolando M. Protective disposable hand covering. 5,020,160, Cl. 2-159.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Canon Kabushiki Kaisha: *See—*
  - Abe, Tsutomu; Ebisawa, Isao; Watanabe, Kenjiro; and Karita, Seiichiro, 5,021,809, Cl. 346-140.00R.
  - Aimura, Harutsugu, 5,021,720, Cl. 315-370.000
  - Fukui, Tetsuro; Katayama, Masato; Mouri, Akihiro; Isaka, Kazuo; Kagami, Kenji, and Suzuki, Masao, 5,021,321, Cl. 430-201.000.
  - Hisada, Katsutoshi; and Nobuta, Hiroshi, 5,022,088, Cl. 382-41.000.
  - Kohno, Takahiro; and Narita, Hitoshi, 5,021,812, Cl. 354-76.000.
  - Komiya, Yutaka; Murakami, Katsumi; and Inuzuka, Tsuneki, 5,021,827, Cl. 355-206.000.
  - Kurita, Mitsuru; Ikeda, Yoshinori; Suzuki, Yasumichi; Katoh, Koichi; Ichikawa, Hiroyuki; Kitamura, Toshiyuki; and Kadowaki, Toshihiro, 5,021,876, Cl. 358-75.000.
  - Matsuda, Hiroshi; Kawada, Haruki; Sakai, Kunihiro; Takimoto, Kiyoshi; Kawade, Hisaaki; Yanagisawa, Yoshihiro; and Morikawa, Yuko, 5,020,881, Cl. 350-333.000.
  - Nishimura, Tetsuharu; Ishizuka, Koh; Ishii, Satoshi; and Tsukiji, Masaaki, 5,021,649, Cl. 250-231.160.
  - Sakakibara, Kenzou; Yoshida, Tarehiro; and Matsumoto, Koichi, 5,022,072, Cl. 379-100.000.
  - Sashida, Minoru; Yanagi, Masaaki; Okitsu, Katsuhiko; and Higuchi, Hirokazu, 5,020,900, Cl. 353-26.00R.
  - Sato, Shoji, 5,021,728, Cl. 323-272.000.
  - Uto, Nobutaka; Sato, Masaaki; Hayakawa, Kimiaki; and Honjo, Takeshi, 5,021,837, Cl. 355-322.000.
  - Washisu, Koichi; Ohnuki, Ichiro; and Nagata, Toru, 5,020,369, Cl. 73-517.00A.
- Canova, Luciano; Giannini, Umberto; and Albizzati, Enrico, to Vedril S.p.A. Imidized acrylic polymers and process for their preparation. 5,021,514, Cl. 525-351.000.
- Cao, Chi-Thuan; Erban, Andreas; Janetzke, Helmut; Cordes, Henning; Schulz, Alfred; and Matuschek, Wolfgang, to Robert Bosch GmbH. Control system for an internal combustion engine. 5,020,501, Cl. 123-489.000.
- Capacity of Texas, Inc.: *See—*
  - Renner, J. John; Palmateer, Steven J.; Petry, John S.; Hoppe, Federick J.; and Bertrand, Steven R., 5,020,820, Cl. 280-439.000.
- Capone, Carmine K. Ball catching toy. 5,020,158, Cl. 2-19.000.
- Capra Resources, Inc.: *See—*
  - Bodine, Robert C., 5,020,523, Cl. 128-80.00R.
- Capron, Andre: *See—*
  - Montreuil, Jean; Spik, Genevieve; Capron, Andre; Dissous, Colette; and Grzych, Jean-Marie, 5,021,560, Cl. 536-1.100.
- Carabelli, Gianmaria: *See—*
  - Calderara, Ennio; and Carabelli, Gianmaria, 5,020,997, Cl. 439-137.000.
- Carbon Fuels Corporation: *See—*
  - Meyer, Lee G.; and Cavaliere, Gerald F., 5,021,148, Cl. 208-431.000.
- Carden, James R.: *See—*
  - Norton, William E.; Belcher, Jewell G., Jr.; Carden, James R.; and West, Thomas W., 5,021,065, Cl. 623-63.000.
- Cardena', Carlo. Transformable earring. 5,020,339, Cl. 63-13.000.
- Cardiac Pacemakers, Inc.: *See—*
  - Dahl, Roger W.; Heil, Ronald W., Jr.; Beatty, Graydon E.; and Mower, Morton M., 5,020,544, Cl. 128-784.000.
- Cardinali, Franco; Longobardi, Maria G.; Viscomi, Giuseppe C.; and Ziggiotti, Alessandra, to Eniricerche S.p.A.; and Sclavo S.p.A. New silylating agent for the preparation of chromatographic supports. 5,021,600, Cl. 556-411.000.
- Cardine, Patrice, to Rockwell Automotive Body Systems-France. Mechanism for linking an opening handle to a push pin for the lock of a vehicle door. 5,020,841, Cl. 292-336.300.
- Cardiopulmonary Corporation: *See—*
  - Biondi, James W.; and Mentelos, Richard A., 5,020,516, Cl. 128-30.200.
- Carl Freudenberg, Firma: *See—*
  - Freudenberg, Ulrich; and Freudenberg, Tillman, 5,020,782, Cl. 267-140.100.
- Carl-Zeiss-Stiftung: *See—*
  - Weyrauch, Adolf; Dorband, Bernd; and Schlipf, Ferdinand, 5,020,894, Cl. 350-587.000.
- Carlson, Robert C., to Hughes Aircraft Company. Image processing technique. 5,022,091, Cl. 382-49.000.
- Carr, Albert A.; and Wiech, Norbert L., to Merrell Dow Pharmaceuticals Inc. Novel chemical compounds for the prophylactic treatment of migraine. 5,021,428, Cl. 514-317.000.
- Carr, Lee D.: *See—*
  - Drake, Kenneth M.; Anderson, John W.; Carr, Lee D.; and Peyton, Fred I., 5,021,157, Cl. 210-248.000.
- Carrico, John P., Jr.: *See—*
  - Campbell, Donald N.; Spangler, Glenn E.; Davis, Robert C., Jr.; Fafaul, Eugene F.; and Carrico, John P., Jr., 5,021,654, Cl. 250-287.000.
- Carson, Don C.: *See—*
  - Black, Robert E., Jr.; Carson, Don C.; and Van Name, Frederick W., 5,021,270, Cl. 428-34.100.
- Cartasegna, Silvestro: *See—*
  - Puydak, Robert C.; Hazelton, Donald R.; Cartasegna, Silvestro; and Dogniez, Leonard, 5,021,500, Cl. 524-525.000.
- Carter, Austin L., Jr.: *See—*
  - Langevin, Eric T.; Carter, Austin L., Jr.; Van Kleeck, Michael J.; and Taylor, Bruce E., 5,020,245, Cl. 34-155.000.
- Carver, George C.: *See—*
  - St. Angelo, Stephen, Jr.; Carver, George C.; Patterson, David W.; and Fremont, Owen K., 5,020,278, Cl. 49-490.000.
- Casio Computer Co., Ltd.: *See—*
  - Sasaki, Hiroyuki, 5,020,410, Cl. 84-602.000.
- Caspers, John: *See—*
  - Van Driesen, Roger P.; Adams, William R., Baldasarri, Mario; Caspers, John; and Trimble, Harold, 5,021,147, Cl. 208-152.000.
- Cassidy, Benjamin J., to International Paper Company. Lock set tray. 5,020,717, Cl. 229-114.000.
- Casteel, Larry, to Liberty Industries, Inc. Wipe down method for stretch wrapping devices. 5,020,300, Cl. 53-399.000.
- Castel, Yvon, to Institut Francais du Petrole. Measuring method and device for determining a pumping characteristic or a parameter of a fluid. 5,020,359, Cl. 73-61.00R.
- Castillo, Rene. Process of making cheese croquettes. 5,021,255, Cl. 426-582.000.
- Caston, Hoite C. Hand grip for a sequential card pack display device 5,020,899, Cl. 352-99.000
- Castricum, Wilhelmus P. H., to Spiro America Inc. Apparatus for flattening irregular circumferential surfaces in spirally formed pipe 5,020,351, Cl. 72-70.000.
- Cataldo, Victor: *See—*
  - Lockwood, Harry F.; Stern, Margaret B.; Tabasky, Marvin; and Cataldo, Victor, 5,021,363, Cl. 437-200.000.
- Cater, Miro S., to RJS Industries, Inc. Atomizing fluid dispenser two 5,020,696, Cl. 222-321.000.
- Cavaliere, Gerald F.: *See—*
  - Meyer, Lee G.; and Cavaliere, Gerald F., 5,021,148, Cl. 208-431.000.
- Cawte, Daniel C., to Meadowside Pty. Ltd. Fuze. 5,020,435, Cl 102-275.100.
- Cawthorne, Michael A.: *See—*
  - Berge, John M.; and Cawthorne, Michael A., 5,021,445, Cl 514-402.000.
- Cells, Paul L.: *See—*
  - Patnaik, Prabodh K.; and Cells, Paul L., 5,021,598, Cl. 556-77.000.
- Cellular IC: *See—*
  - Evans, Jack; and Morley, Christopher R., 5,020,765, Cl. 248-539.000.
- Centre National de la Recherche Scientifique (CNRS): *See—*
  - Armau, Elise; Drocourt, Daniel; Etienne, Gilles; and Tiraby, Gerard, 5,021,344, Cl. 435-172.300.
- Centro Marga Para La Investigacion S.A.: *See—*
  - Ballester-Rodes, Montserrat; Palomo-Nicolau, Francisco E., and Palomo-Coli, Antonio L., 5,021,582, Cl. 548-197.000.
- Ceramatec, Inc.: *See—*
  - Joshi, Ashok V.; Syammach, Mustafa B.; and Campbell, Scott S., 5,021,137, Cl. 204-242.000.
- Cerberus AG: *See—*
  - Genahr, Rudolf; and Mahler, Hansjurg, 5,021,766, Cl. 340-544.000.
- Cerny, Peter W.: *See—*
  - Patzschke, Hans-Peter; Cerny, Peter W.; Saatweber, Dietrich; and Hendrikx, Georg H. L., 5,021,502, Cl. 524-591.000.
- Chabbert, Jean-Paul, to Societe Laboratoires 3M Sante. Cast cutter and method. 5,020,226, Cl. 30-390.000.
- Chadima, George E., Jr.; and Laser, Vadim, to Norand Corporation. Instant portable bar code reader. 5,021,642, Cl. 235-472.000.
- Chamoun, Nassib G., to Biometrak Corporation. Cardiac biopotential analysis system and method. 5,020,540, Cl. 128-696.000.
- Chan, Andrew K.: *See—*
  - Zaw Win, Vincent K.; and Chan, Andrew K., 5,021,680, Cl. 307-243.000.
- Chan, David S. K.; and Staver, Daniel A., to General Electric Company. Chain-serial matrix multipliers. 5,021,987, Cl. 364-754.000.
- Chan, Shiu L. F.: *See—*
  - Mozer, Forrest S.; and Chan, Shiu L. F., 5,022,071, Cl. 379-93.000.
- Chan, Yuen H., to International Business Machines Corporation. Word decoder for a memory array. 5,022,010, Cl. 365-230.060.
- Chang, David B.: *See—*
  - Pollack, Slava A.; and Chang, David B., 5,022,040, Cl. 372-69.000.
- Chang, Kai; and Taylor, Henry F., to Texas A & M University System, The. Circular ring resonator distributive electromagnetic signal processor. 5,021,748, Cl. 330-286.000.
- Chang, Shuo H.; Hendriks, Ferdinand; Khanna, Vijayeshwar D.; and Lean, Eric G., to International Business Machines Corporation. Programmable air bearing slider including magnetic read/write element. 5,021,906, Cl. 360-103.000.
- Chang, Yong-Hong. Folding billiard table. 5,020,799, Cl. 273-3.00C.
- Chang, Yu M. Locking mechanism for an automatic shifter bar. 5,020,390, Cl. 74-608.000.
- Chapman, Ronald H., to Motorola, Inc. Splatter controlled amplifier. 5,021,753, Cl. 332-103.000.
- Chapple, Andrew P., to Unilever Patent Holdings B.V. Catalyst. 5,021,145, Cl. 208-120.000.
- Charlesworth Overseas Limited: *See—*
  - Gutierrez, Felipe, 5,020,581, Cl. 162-103.000.
- Chattha, Mohinder S.; Watkins, William L. H.; and Gandhi, Haren S., to Ford Motor Company. Three-way catalyst for automotive emission control and method of making the catalyst. 5,021,389, Cl. 502-303.000.
- Chauffriat, Henri: *See—*
  - Bouillard, Gerard; and Chauffriat, Henri, 5,021,262, Cl. 427-289.000.
- ChemStation International, Inc.: *See—*
  - Homan, George F., 5,020,917, Cl. 366-161.000.
- Chen, Abraham Y. Modular automatic telephone switching system. 5,022,069, Cl. 379-67.000.

- Chen, Catherine S. H.; and Rodewald, Paul G., to Mobil Oil Corporation. Acylation of lower olefin oligomers. 5,021,178, Cl. 252-52.00R.
- Chen, Dennis. Shock damping and absorbing racket. 5,020,800, Cl. 273-73.00G.
- Chen, Grant K.: *See—*
  - Evans, Alfred J.; Chen, Grant K.; May, Dennis J.; and Brinson, Edward P., 5,020,298, Cl. 53-138.200
- Chen, Herbert M.: *See—*
  - Hendrickson, Alan F.; Chen, Herbert M., Cabler, Carlin D., and Hattangadi, Rajiv, 5,021,783, Cl. 341-110.000.
- Chen, King P. Saddle support device for a bicycle. 5,020,851, Cl. 297-195.000.
- Chen, Ming-Hsiung. Modified X'mas lamp structure and its related lamp base. 5,021,706, Cl. 313-318.000.
- Chen, Ming P., to First Glorious Enterprise Co., Ltd. Gas fuel lighter. 5,020,990, Cl. 431-274.000.
- Chen, T. C. Exercise bicycle for exercising arms and legs. 5,020,792, Cl 272-72.000.
- Chen, Teh-Hsuan: *See—*
  - Begley, William J.; and Chen, Teh-Hsuan, 5,021,322, Cl 430-223.000.
- Chen, Tsae S.: *See—*
  - Kavnatsky, Zara M.; and Chen, Tsae S., 5,021,172, Cl. 252-32.70E.
- Cheng, Peter S. C. Multi-level holder of sheet materials. 5,020,251, Cl. 40-152.100.
- Cheng, Pi-Yen. Decorative string control box. 5,020,996, Cl. 439-76.000.
- Chesapeak Display & Packaging Company: *See—*
  - Roth, Michael C.; and Buttrick, Walter J., 5,020,719, Cl 229-122.100.
- Chesebrough-Pond's, Inc.: *See—*
  - Pettengill, Edwin R., 5,020,694, Cl 222-137.000.
- Chevakin, Ivan V.: *See—*
  - Pesin, Abram I.; and Chevakin, Ivan V., 5,020,859, Cl. 299-21.000.
- Chevalier, Christophe: *See—*
  - Kowalski, Jacek; and Chevalier, Christophe, 5,022,001, Cl. 365-185.000.
- Chiao, Wen B.: *See—*
  - Stanley, Henry; Davis, Irwin; and Chiao, Wen B., 5,021,507, Cl. 525-127.000.
- Chiba City & Tsukishima Kikai Kubushiki Kaisha: *See—*
  - Takashi, Ishida; Ueda, Yoshikazu; Kubota, Teruji; Igarashi, Misao; Tanaka, Norichika; and Kamijo, Yasuhiko, 5,020,455, Cl. 110-342.000.
- Chien, Kuei-Ru; Wang, John H. S.; and Jacobson, James G., to Hughes Aircraft Company. Phased coupled waveguide laser. 5,022,032, Cl. 372-18.000.
- Childers, Jerry D.: *See—*
  - Barclay, Brian L.; Childers, Jerry D., Wright, Jeri; Place, Virgil A.; and Wong, Patrick S. L., 5,021,053, Cl. 604-892.100.
- Children's Medical Center Corporation, The: *See—*
  - Folkman, Judah; and Ingber, Donald, 5,021,404, Cl. 514-26.000.
- Chin, Arthur A., to Mobil Oil Corporation. Reducing NO_x emissions with group IIIB compounds. 5,021,146, Cl. 208-122.000.
- Chips and Technologies, Inc.: *See—*
  - Nguyen, Au H.; and Gollabinnie, Aurav R., 5,021,983, Cl. 364-707.000.
- Chisso Corporation: *See—*
  - Kikuchi, Makoto; Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Takeshita, Fusayuki; and Furukawa, Kenji, 5,021,190, Cl. 252-299.610.
  - Saito, Shinichi; Ushioda, Makoto; Inoue, Hiromichi; Miyazawa, Kazutoshi; and Ohno, Kouji, 5,021,191, Cl. 252-299.610.
  - Sawada, Shinichi; Matsushita, Tetsuya; Isoyama, Toyoshiro; and Saito, Hideo, 5,021,189, Cl. 252-299.610.
- Chiu, Edison: *See—*
  - Tai, Jy-Der; Chiu, Edison; An, Quang-Dieu; and Hsu, Te-Chuan, 5,021,994, Cl. 364-900.000.
- Chiu, Te-Long. Electrically-erasable and electrically-programmable memory storage devices with self aligned tunnel dielectric area and the method of fabricating thereof. 5,021,848, Cl. 357-23.500.
- Chlipala, James D., to AT&T Bell Laboratories. Laser link blowing in integrateed circuit fabrication. 5,021,362, Cl. 437-173.000.
- Chonan, Mitsugi: *See—*
  - Ishikawa, Hideyuki; Chonan, Mitsugi; Tachibana, Fusao; and Kurosu, Shinichi, 5,020,484, Cl. 123-73.0AD.
- Christensen, Burton G.; and Ratcliff, Ronald W., to Merck & Co. Inc. 6- and 6,6-disubstituted-3-substituted-1-azabicyclo(3.2.0)hept-2-en-7-one-2-carboxylic acids. 5,021,566, Cl. 540-302.000.
- Christiansen, Christian M., to Enkotec A/S. Method of machining an oblong workpiece and a machine for performing the method. 5,020,353, Cl. 72-187.000.
- Christianson, Rollin C., to United States of America, National Aeronautics and Space Administration. Variable orifice flow regulator. 5,020,774, Cl. 251-129.150.
- Chu, George K.: *See—*
  - Hu, Larry; Chuk, Ting; McLeod, John; Birman, Mark; Samuels, Allen; and Chu, George K., 5,021,985, Cl. 364-748.000.
- Chu, Shiou L. L.; Tajima, Yusuke; and Schindler, Manfred J., to Raytheon Company. Biasing networks for matrix amplifiers. 5,021,743, Cl. 330-54.000.
- Chuk, Ting: *See—*
  - Hu, Larry; Chuk, Ting; McLeod, John; Birman, Mark; Samuels, Allen; and Chu, George K., 5,021,985, Cl. 364-748.000.
- Chung, Hong Y.; and Rauchwerk, Michael D., to AT&T Bell Laboratories. Data communications with alternation of signaling constellations. 5,022,053, Cl. 375-39.000.
- Chupka, David E.: *See—*
  - Bliss, Terry L.; Chupka, David E.; McCarthy, Christopher E.; and Walters, Larry J., 5,021,159, Cl. 210-396.000.
- Ciba-Geigy Corporation: *See—*
  - Abeler, Gerd, 5,021,491, Cl. 524-180.000.
  - Bagga, Madan M., 5,021,513, Cl. 525-328.800.
  - Begrich, Rainer, 5,021,557, Cl. 534-560.000.
  - Galbo, James P.; and Seltzer, Raymond, 5,021,481, Cl 524-99.000.
  - Galbo, James P., 5,021,483, Cl. 529-100.000.
  - Galbo, James P., 5,021,486, Cl. 524-100.000.
  - Galbo, James P., 5,021,577, Cl. 546-188.000.
  - Gugumus, Francois, 5,021,485, Cl. 524-100.000.
  - Gunther, Peter; Wirth, Hermann O.; and Endlich, Wilhelm, 5,021,474, Cl. 524-14.000.
  - Hung, William M.; and Su, Kai C., 5,021,068, Cl. 8-507.000.
  - Kastele, Xaver; Bernheim, Michael, and Rossler, Erich, 5,021,263, Cl. 427-353.000.
  - Kastele, Xaver; Bernheim, Michael; and Rossler, Erich, 5,021,264, Cl 427-353.000.
  - Ksander, Gary M., 5,021,430, Cl. 514-332.000.
  - Piraino, Anthony J.; and Saris, Steven D., 5,021,448, Cl 514-415.000.
  - Ravichandran, Ramanathan; and Galbo, James P., 5,021,478, Cl 524-91.000.
  - Ravichandran, Ramanathan; and Pastor, Stephen D., 5,021,479, Cl. 524-96.000.
  - Ravichandran, Ramanathan, 5,021,480, Cl. 524-99.000.
- Ciminelli, Joseph M. Combination vehicle parking place locator coin and keyholder. 5,020,468, Cl. 116-318.000.
- Cipra, Jan: *See—*
  - Malmgren, Robert C.; Cipra, Jan; and Umlauf, Edward L., 5,020,936, Cl. 404-32.000.
- Claas Ohg: *See—*
  - Kersting, Hermann; and Piesch, Franz, 5,021,028, Cl. 460-85.000
- Claremon, David A.: *See—*
  - Remy, David C.; Baldwin, John J.; Claremon, David A.; and King, Stella W., 5,021,440, Cl. 514-381.000.
- Clark, Kenneth G.: *See—*
  - Knight, Walter E.; Clark, Kenneth G.; and Gauntt, David L., 5,021,489, Cl. 524-140.000.
- Clark, Leslie: *See—*
  - Cowlin, Simon; Clark, Leslie; Dennis, Timothy; and Gunawardena, Charith, 5,020,675, Cl. 209-538.000.
- Clausen, Eivind: *See—*
  - Hoenselaar, John F.; and Clausen, Eivind, 5,020,637, Cl. 184-15.100.
- Clement, Katherine S.; Babb, David A.; and Ezzell, Bobby R., to Dow Chemical Company, The. Reactive compounds containing perfluorocyclobutane rings. 5,021,602, Cl. 558-230.000.
- Cloeren Company, The: *See—*
  - Cloeren, Peter F.; and Linam, Richard L., 5,020,984, Cl. 425-141.000.
- Cloeren, Peter F.; and Linam, Richard L., to Cloeren Company, The. Apparatus for adjusting die lip gap. 5,020,984, Cl. 425-141.000.
- Clorox Company, The: *See—*
  - Bruey, Francis J., 5,021,237, Cl. 424-43.000.
- Clough, John M.; Godfrey, Christopher R. A.; de Fraine, Paul J.; Hutchings, Michael G.; and Anthony, Vivienne M., to Imperial Chemical Industries PLC. Fungicides. 5,021,581, Cl. 546-309.000.
- Clubb, Clyde N.: *See—*
  - Foster, Bruce W.; Clubb, Clyde N.; and Stuart, Richard K., Jr., 5,021,257, Cl. 427-2.000.
- Clum Manufacturing Company, Inc.: *See—*
  - Krubsack, Larry J.; Handy, Allen L.; and Lawton, John G., 5,021,760, Cl. 335-196.000.
- CMB Foodcan plc: *See—*
  - Boyd, Andrew J.; and Corton, Anthony D., 5,021,626, Cl. 219-109.000.
  - Cochran, Michael A.; Folland, Rickworth; Nicholas, James W.; and Robinson, Melvin E. R., 5,021,515, Cl 525-371.000.
  - Vokins, Ian M., 5,020,303, Cl. 53-432.000.
- CNG Research Company: *See—*
  - Hise, Ralph E.; and Cook, W. Jeffrey, 5,021,232, Cl. 423-574.00R
- Coblentz, David L., to General Engineering Company. Flexible pipe saddle. 5,020,832, Cl. 285-197.000.
- Coburn, Robert W., to General Dynamics Corp., Air Defense Systems Div. Booster retarding apparatus. 5,020,436, Cl. 102-377.000.
- Coca-Cola Company, The: *See—*
  - Rudick, Arthur G.; and Gupta, Ashis S., 5,021,219, Cl. 422-112.000.
- Cochran, John R.: *See—*
  - Lessig, William R., III; Bailey, Rouse R., Jr.; and Cochran, John R., 5,020,186, Cl. 15-339.000.
- Cochran, Michael A.; Folland, Rickworth; Nicholas, James W.; and Robinson, Melvin E. R., to CMB Foodcan plc. Packaging. 5,021,515, Cl. 525-371.000.
- Codilaser S.A.: *See—*
  - Ravellat, Ramon S., 5,021,631, Cl. 219-121.680.
- Coffee, Ronald A.: *See—*
  - Toms, Derek J.; and Coffee, Ronald A., 5,021,803, Cl. 346-1.100.
- Cogent Limited: *See—*
  - Gent, John A. G.; and Blass, Jacob M., 5,021,267, Cl. 427-387.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Cohen, Georges: *See—*
  - Franckowiak, Sigismond. Mikitenko, Paul; Baumgartner, Pierre; and Cohen, Georges, 5,021,143, Cl. 208-70.000.
- Cohen, Itzchak, to Lambda Electronics Inc. Maximum duty cycle limiting of pulse width modulators. 5,021,937, Cl 363-41.000.
- Cok, David R., to Eastman Kodak Company. Neighborhood-based merging of image data. 5,022,085, Cl. 382-1.000.
- Colbeck, Roger; and Gillingham, Peter, to Mitel Corporation. Jiter-invariant switched capacitor pulse shaper. 5,021,681, Cl. 307-261.000.
- Cole, Edward F.: *See—*
  - Leachman, Frank A., Jr., and Cole, Edward F., 5,020,315, Cl. 60-39.281.
- Cole, John B.: *See—*
  - Evans, Peter G.; and Cole, John B., 5,020,368, Cl. 73-439.000.
- Cole, Walter: *See—*
  - Bisak, Michael, 5,021,779, Cl. 340-825.690.
- Colle, Roberto; Camaggi, Giovanni; Ratti, Giuseppina; Garavaglia, Carlo; and Mirenna, Luigi, to Presidenza del Consiglio Dei Ministri. Fungicide azolyl-derivatives. 5,021,442, Cl. 514-383.000.
- Colley, Charles D., Jr.: *See—*
  - Cox, George M.; Colley, Charles D., Jr; and Davis, Thomas E., Jr, 5,021,940, Cl. 364-148.000.
- Collins, Imack L.: *See—*
  - Desent, Nash S.; and Collins, Imack L., 5,020,223, Cl. 30-276.000.
- Collins, Richard B.: *See—*
  - Tartaglia, Peter A., Collins, Richard B; and Smolen, Robert S., 5,020,571, Cl. 137-625.300.
- Colombo, Joseph: *See—*
  - Crosbie, Richard J.; and Colombo, Joseph, 5,021,982, Cl. 364-578.000.
- Colorado State University Research Foundation: *See—*
  - Schroeder, Herbert A., 5,021,531, Cl. 527-400.000.
- Coltec Industries Inc.: *See—*
  - Sweet, David H.; Greenberg, Charles E.; Lappos, Nicholas D., Walsh, David M.; and Meisner, Richard P., 5,020,316, Cl. 60-39.282.
- Combs, Milton E.: *See—*
  - Combs, Milton E., III, 5,020,268, Cl 43-43.130.
- Combs, Milton E., III, to Combs, Milton E. Automatic line release with deep diving planer. 5,020,268, Cl. 43-43.130.
- Combustion Engineering, Inc.: *See—*
  - Hellewell, Todd D.; Grusha, John; and McCartney, Michael S., 5,020,454, Cl. 110-264.000.
- Compagnie Francaise De Produits Industriels: *See—*
  - Schapira, Joseph; Pecheur, Jacques; Vincent, Jacques, Schild, Jacques; and Bosselin, Bruno, 5,021,083, Cl. 71-105.000.
- Compao Computer Corporation: *See—*
  - Hardt, Thomas T.; and Gluskoter, Steven D., 5,020,768, Cl. 248-678.000.
- Compaq Computer Corporation. *See—*
  - Hardt, Thomas T., 5,021,616, Cl. 200-43.160.
- Comprex AG: *See—*
  - Fridez, Jean-Daniel; and Gerharz, Gabriele, 5,021,388, Cl. 502-261.000.
- Comte, Marie-Iherese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, to Rhone-Poulenc Sante. Derivatives of (AZA)naphthalenesultam, their preparation and compositions containing them. 5,021,420, Cl. 514-253.000.
- Connell, John W.: *See—*
  - Hergenrother, Paul M.; Connell, John W.; and Bass, R. Gerald, 5,021,518, Cl. 525-422.000.
- Conoco Specialty Products: *See—*
  - Kalnins, Charles M., 5,021,165, Cl. 210-703.000.
- Conroy, Brian K.: *See—*
  - Martin, Shirley J.; McDaniel, Max P.; Conroy, Brian K.; and Martin, Joel L., 5,021,379, Cl. 502-102.000.
- Consolidation Coal Company: *See—*
  - Bessinger, Stephen L.; and Nelson, Michael G., 5,020,860, Cl 299-1.000.
- Conti, Paolo: *See—*
  - Gariboldi, Franco; and Conti, Paolo, 5,020,340, Cl. 66-125.000.
- Continental Plastics, Inc.: *See—*
  - Dutt, Herbert V., 5,020,682, Cl. 215-253.000.
  - Dutt, Herbert V., 5,020,686, Cl. 220-276.000.
- Continental Products Company: *See—*
  - Rowell, Richard T., 5,021,290, Cl. 428-319.300.
- Contractor, Rashmikant M., to E.I. Du Pont de Nemours and Company. Vapor phase catalytic oxidation of butane to maleic anhydride. 5,021,588, Cl. 549-259.000.
- Cook, Mark A., to United States of America, Air Force. Portable ammunition counter. 5,020,414, Cl 89-33.160.
- Cook, W. Jeffrey: *See—*
  - Hise, Ralph E.; and Cook, W. Jeffrey, 5,021,232, Cl. 423-574.00R.
- Cooper Industries, Inc.: *See—*
  - Stack, Thomas J.; and Korczynski, Jacek M., 5,021,761, Cl. 337-68.000.
- Cooper Power Systems, Inc.: *See—*
  - Muench, Frank J.; and McFarlin, William B., 5,021,615, Cl. 200-11.0TC.
- Cope, Jonathan C.; Grady, Michael F.; and Pitman, Willard W., to Valley Grain Products, Inc. Food product cooker. 5,020,426, Cl. 99-353.000.
- Copham, David L., to Base Stock Press, Inc. Base stock for series checks and the like and a method or printing the same. 5,020,434, Cl. 101-485.000.
- Cordes, Henning: *See—*
  - Cao, Chi-Thuan; Erban, Andreas; Janetzke, Helmut; Cordes, Henning, Schulz, Alfred; and Matuschek, Wolfgang, 5,020,501, Cl 123-489.000.
- Cordes, Werner, to Aristo Graphic Systeme GmbH & Co KG. Illuminated magnifying glass. 5,021,933, Cl. 362-109.000.
- Cornett, Mark J. *See—*
  - Olsen, J. H., Harvey, Thomas L., Cornett, Mark J, and Galatis, Demetre, 5,020,641, Cl. 187-95.000.
- Corning Incorporated. *See—*
  - Aitken, Bruce G., 5,021,366, Cl. 501-45.000.
  - Frost, Rodney I.; and Paisley, Robert J., 5,021,204, Cl 264-60.000.
- Coronado, Martin P., to Baker Hughes Incorporated. Method and apparatus for chemical treatment of subterranean well bores. 5,020,600, Cl. 166-387.000.
- Corrales, Richard C. Manually operated handle for panoramic camera 5,021,813, Cl. 354-82.000.
- Corsetto, Craig: *See—*
  - Crandall, Douglas; Hessel, Steven R.; Hornak, Thomas; Nordby, Rasmus; Springer, Kent H.; and Corsetto, Craig, 5,022,051, Cl. 375-19.000.
- Corton, Anthony D.. *See—*
  - Boyd, Andrew J., and Corton, Anthony D., 5,021,626, Cl 219-109.000.
- Corzine, Robert G.; Bolstad, Bruce E.; and Johantgen, John S., to United States of America, Navy. Broad band, polarization diversity monopulse antenna. 5,021,796, Cl. 343-712.000.
- Cotter, Jonathan P., to Power Components, Inc. Combined valve modular control panel. 5,020,570, Cl 137-596.120.
- Coucoulas, Alexander: *See—*
  - Benko, John W., and Coucoulas, Alexander, 5,021,630, Cl 219-121.640.
- Cowan, Kenneth M.; and Hale, Arthur H., to Shell Oil Company Process for cementing a well 5,020,598, Cl. 166-293.000.
- Cowlin, Simon; Clark, Leslie; Dennis, Timothy; and Gunawardena, Charith, to Lockwood Graders (UK) Limited. Apparatus for sorting conveyed articles. 5,020,675, Cl. 209-538.000.
- Cox, George M.; Colley, Charles D., Jr.; and Davis, Thomas E., Jr., to Automatic Control Electronics Company. Synergetic automatic control system for pellet mill. 5,021,940, Cl. 364-148.000.
- Cox, Michael. Wall mounting plate. 5,021,009, Cl. 439-538.000.
- Crabb, Richard; Robinson, McDonald; Hawkins, Mark R.; Goodwin, Dennis L.; and Ferro, Armand P., to Epsilon Technology, Inc. Substrate handling and transporting apparatus. 5,020,475, Cl 118-719.000.
- Craig, Gary C.: *See—*
  - Rhue, Frederick F.; Franks, William D.; and Craig, Gary C., 5,021,297, Cl. 428-430.000.
- Crandall, Douglas; Hessel, Steven R.; Hornak, Thomas; Nordby, Rasmus; Springer, Kent H.; and Corsetto, Craig, to Hewlett-Packard Company. DC-free line code for arbitrary data transmission 5,022,051, Cl. 375-19.000.
- Crane, Hewitt D.; and Hammon, Robert W., to SRI International, Inc Handwriting apparatus for information collection based on force and position. 5,022,086, Cl. 382-2.000.
- Crano, John C.; Kwiatkowski, Patricia L.; and Hurditch, Rodney J., to PPG Industries, Inc. Method for preparing variable-light transmittance article. 5,021,196, Cl. 252-586.000.
- Crawley, Graham C.: *See—*
  - Pilgrim, William R.; Young, Derek W.; Tait, Brian S.; Crawley, Graham C.; Edwards, Philip N.; and Hill, George B., 5,021,414. Cl. 514-237.500.
- Creps, Bruce W.: *See—*
  - George, Donald A.; Berry, Peter B.; Creps, Bruce W.; and Roles, Geraldine C., 5,020,814, Cl. 280-204.000.
- Crews, Everett, to Westvaco Corporation. Polyimide/polyamide derivatives of diels-alder/ene adducts of phenol-modified rosin esters 5,021,538, Cl. 528-129.000.
- Crist, Lawrence E. Hot melt glue spraying device. 5,020,723, Cl 239-11.000.
- Cronk, Doyle S.: *See—*
  - Bealkowski, Richard; Blackledge, John W., Jr.; Cronk, Doyle S.; Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G.; Kovach, George D.; McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., 5,022,077, Cl. 380-4.000.
- Crosbie, Richard J.; and Colombo, Joseph, to Veda Incorporated Motion base control process and pilot perceptual simulator. 5,021,982, Cl. 364-578.000.
- Crossley, Jimmy L. Ice-cream ejector. 5,020,698, Cl. 222-386.000.
- Croucher, Melvin D.: *See—*
  - Mayo, James D.; Drappel, Stephen; Duff, James M.; Croucher, Melvin D.; and Lennon, John M., 5,021,318, Cl. 430-124.000.
- Crouzet (Societe Anonyme francaise): *See—*
  - Guichon, Herve, 5,022,029, Cl. 371-38.100.
- Crow, Rita M.: *See—*
  - Farnworth, Brian; and Crow, Rita M., 5,021,280, Cl. 428-102.000.
- Cruver, Michael, to Formost Packaging Machines, Inc. Article group-segregating apparatus and method. 5,020,655, Cl. 198-419.300.
- CTB, Inc.: *See—*
  - Rust, Marcus D.; Wilson, Jeffrey L.; and Towne, Harmon L., 5,020,246, Cl. 34-236.000.
- Cueli, Peter. Novel UV curable polyacrylate/solvent compositions. 5,021,466, Cl. 522-75.000.
- Cummins Engine Company, Inc.: *See—*
  - Rix, David M., 5,020,203, Cl. 29-255.000.

- Cummins, Ralph L.: *See—*
  - Novotny, Randall J.; and Cummins, Ralph L., 5,020,734, Cl. 241-119.000.
- Curran, John G.: *See—*
  - Edmonds, Edward J.; and Curran, John G., 5,022,028, Cl. 371-25.100.
- Currey, Lesley B. Outboard motor support. 5,021,016, Cl. 440-113.000.
- Curtindale, Edward G.: *See—*
  - Falcoff, Monte L.; and Curtindale, Edward G., 5,020,845, Cl. 296-37.700.
- Cutshall, Donald L.: *See—*
  - Braun, Stephen A.; O'Neill, Michael J.; Polak, David C.; and Cutshall, Donald L., 5,020,308, Cl. 56-11.300.
- Cytogam, Inc.: *See—*
  - Spaulding, Glenn F., 5,021,244, Cl. 424-561.000.
- Dabney, Richard W.: *See—*
  - Howard, Richard T.; Dabney, Richard W.; and Bryan, Thomas C., 5,020,876, Cl. 350-102.000.
- Daeges, Johannes, to Siemens Aktiengesellschaft. Piezoelectric lubricating device for a bearing. 5,020,636, Cl 184-6.260.
- Dagon, Thomas J.: *See—*
  - Anderson, Ernest R.; Vacco, Dominick; and Dagon, Thomas J., 5,021,163, Cl. 210-661.000.
- Dahl, Roger W.; Heil, Ronald W., Jr.; Beatty, Graydon E.; and Mower, Morton M., to Cardiac Pacemakers, Inc. Low energy defibrillation electrode. 5,020,544, Cl. 128-784.000.
- Dai Nippon Insatsu Kabushiki Kaisha: *See—*
  - Kanto, Jumpei; Saito, Hitoshi; Eguchi, Hiroshi; and Nakamura, Masayuki, 5,021,394, Cl. 503-227.000.
- Dai, Pei-Shing E.; and Holst, Edward H., to Texaco Inc. Control of sox emission. 5,021,228, Cl. 423-244.000.
- Daikin Industries, Ltd.: *See—*
  - Kubo, Motonobu; Inukai, Hiroshi; and Kitahara, Takahiro, 5,021,316, Cl. 430-108.000.
  - Ohmori, Akira; and Inukai, Hiroshi, 5,021,501, Cl. 524-544.000.
  - Ohmori, Akira; and Inukai, Hiroshi, 5,021,527, Cl. 526-245.000.
- Dailey, George F.: *See—*
  - Alkire, Gerald R.; Dailey, George F; and Fischer, Mark W., 5,020,234, Cl. 33-656.000.
- Dainippon Pharmaceutical Co., Ltd.: *See—*
  - Hino, Katsuhiko; Kai, Naoki; Sakamoto, Masato; Kon, Tatsuya; Oka, Makoto; Furukawa, Kiyoshi; and Ochi, Yoshiaki, 5,021,421, Cl. 514-254.000.
- Dainippon Screen Mfg. Co., Ltd.: *See—*
  - Mimasaka, Masahiro; and Hirai, Hiroyuki, 5,020,200, Cl 29-25.010.
- Daiwa Seiko, Inc.: *See—*
  - Yamaguchi, Nobuyuki, 5,020,738, Cl. 242-298.000.
- Dalgety Produce, Inc.: *See—*
  - Fischer, Rich; Silva, Richard; and Welton, Henry P., 5,021,254, Cl 426-482.000.
- Dallas, David; and Watkins, David R. Coil dispenser for coiled nails. 5,020,663, Cl. 206-338.000.
- Dallas Semiconductor Corporation: *See—*
  - Smith, Michael D., 5,021,730, Cl. 323-316.000.
- Dalman, Austin L. Hydraulic door construction. 5,020,580, Cl. 160-213.000.
- Dalton, William; and Billings, Al, to Datasonics, Inc. Underwater release apparatus, underwater release system and method. 5,022,013, Cl. 367-4.000.
- D'Aluisio, Christopher; and Graham, David, to Cannondale Corporation. Replaceable derailleur hanger. 5,020,819, Cl. 280-288.000.
- Daly, Francis P.; Ando, Hiei; Foley, Henry C.; and Jung, Hyun J., to American Cyanamid Company. Catalyst comprising a titania-zirconia support and supported catalyst prepared by a process. 5,021,385, Cl. 502-211.000.
- Daly, Francis P.; Ando, Hiei; Foley, Henry C.; and Jung, Hyun J., to American Cyanamid Company. High porosity titania-zirconia catalyst support prepared by a process. 5,021,392, Cl. 502-439.000.
- Damm, Norbert; and Parr, Thomas, to BMD Badische Maschinenfabrik Durlach GmbH. Method and apparatus for compacting foundry molding material in a foundry mold. 5,020,582, Cl. 164-37.000.
- Danfoss A/S: *See—*
  - Back-Pedersen, Andreas; Nielsen, Ole B.; and Moller, Hans C., 5,020,375, Cl. 73-861.380.
- D'Angelo, Joseph J.; and D'Angelo, Joseph J., Jr. Web feeding, cutting and dispensing machine 5,020,403, Cl. 83-171.000.
- D'Angelo, Joseph J., Jr.: *See—*
  - D'Angelo, Joseph J.; and D'Angelo, Joseph J., Jr, 5,020,403, Cl 83-171.000.
- Daniel, Maurice. Flat panel illumination system. 5,021,928, Cl. 362-32.000.
- Danielian, Armen, to Mattel, Inc. Flashlight having secondary beam. 5,021,929, Cl. 362-32.000.
- Darkan, Eric F.: *See—*
  - Swartz, Jerome; Shepard, Howard M.; and Darkan, Eric F., 5,021,641, Cl. 235-467.000.
- Darr, Richard C., to Plastipak Packaging, Inc. Container including unitary blow molded bottle having drain-back dispensing spout and plastic insert. 5,020,692, Cl. 222-109.000.
- Dart Manufacturing Company: *See—*
  - Gentry, William T.; and Kogutt, Samuel M., 5,020,269, Cl. 43-54.100.
- Dataproducts Corporation: *See—*
  - Allred, Donald R., 5,021,802, Cl. 346-1.100.
- Datasonics, Inc.: *See—*
  - Dalton, William; and Billings, Al, 5,022,013, Cl. 367-4.000.
- Datta, Sudhin, to Exxon Chemical Patents Inc. Transition metal catalyst composition for olefin polymerization. 5,021,595, Cl. 556-42.000.
- Dave, Rakhal: *See—*
  - Lichtman, Jeffrey W.; Pepose, Jay S.; and Dave, Rakhal, 5,020,891, Cl. 350-527.000.
- Davenport, Clyde F. Multi-purpose water pressure plunger. 5,020,166, Cl. 4-255.000.
- Davico, Claudio: *See—*
  - Vercesi, Piercarlo; Davico, Claudio; and Giorgini, Gerardo, 5,020,896, Cl. 350-636.000.
- David, Claire; and Magnier, Claude, to Rhone-Poulenc Chimie. Colloidal dispersions of cerium (IV) compound. 5,021,192, Cl. 252-313.100
- Davidson, Alegra G.: *See—*
  - Davidson, Eugene P.; and Davidson, Alegra G., 5,020,949, Cl. 411-7.000.
- Davidson, Charles R.: *See—*
  - Kovacik, Paul J.; Davidson, Charles R.; Lindsay, Kevin B.; Lundberg, Darrel V.; Mulder, Cameron A., and Boerboom, Everett, 5,021,074, Cl. 65-40.000.
- Davidson, Eugene P.; and Davidson, Alegra G Controlled-torque fastener. 5,020,949, Cl. 411-7.000.
- Davis, Darrell E.: *See—*
  - Shepherd, Wayne P.; Davis, Darrell E.; and Tay, Wan F., 5,021,754, Cl. 332-128.000.
- Davis, Gregg M.; and Roche, David E., to Valentine Research, Inc. Method and apparatus for mounting radar detector. 5,020,754, Cl. 248-206.300.
- Davis, Irwin: *See—*
  - Stanley, Henry; Davis, Irwin; and Chiao, Wen B., 5,021,507, Cl. 525-127.000.
- Davis, Myron F.; Martin, Randall W.; Nomura, Hideo; Pollitt, Richard F.; Wittner, Ernest; and Yoshikawa, Wataru, to International Business Machines Corporation. Portable personal computer. 5,021,922, Cl. 361-380.000.
- Davis, Richard E.; and Glant, Michael D., to DLP, Inc. Apparatus for transporting specimen slides. 5,021,218, Cl 422-104.000.
- Davis, Robert C., Jr.: *See—*
  - Campbell, Donald N.; Spangler, Glenn E.; Davis, Robert C., Jr., Fafaul, Eugene F.; and Carrico, John P, Jr., 5,021,654, Cl 250-287.000.
- Davis, Thomas E., Jr.: *See—*
  - Cox, George M.; Colley, Charles D., Jr.; and Davis, Thomas E., Jr., 5,021,940, Cl. 364-148.000.
- Dawson-Ekeland, Kari R.; and Stringfield, Richard T., to Dow Chemical Company, The. Decaffeination of liquid medium. 5,021,253, Cl. 426-422.000.
- Dayan, Richard A.: *See—*
  - Bealkowski, Richard; Blackledge, John W., Jr., Cronk, Doyle S.; Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G.; Kovach, George D.; McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., 5,022,077, Cl. 380-4.000.
- Dayco Products, Inc.: *See—*
  - Allen, Michael E., 5,021,034, Cl. 474-174.000.
- De La Rocha, Daniel D. Lipstick applicator. 5,020,553, Cl. 132-320.000.
- de Almeida Thompson, Eduardo C.; and Taveira, Joao P., to California Pellet Mill Company. Apparatus for controlling the discharge of material from a storage tank. 5,020,695, Cl. 222-185.000.
- Debaes, Johnny, to N.V. Michel Van de Wiele. Control mechanism for the selection of weft yarns in rapier looms. 5,020,573, Cl. 139-453.000.
- Deblasi, Janet M.; and Delfino, Michelangelo, to North American Philips Corp. Signetics Division. Semiconductor fabrication process using sacrificial oxidation to reduce tunnel formation during tungsten deposition. 5,021,358, Cl. 437-57.000.
- De Boer, Johannes A. G. Illuminated sign system 5,020,252, Cl. 40-564.000.
- De Bue, Marina: *See—*
  - Toma, Salvatore; De Bue, Marina; Mele, Antonio, and Grandi, Guido, 5,021,340, Cl. 435-69.100.
- Deere & Company: *See—*
  - Braun, Stephen A.; O'Neill, Michael J.; Polak, David C.; and Cutshall, Donald L., 5,020,308, Cl. 56-11.300.
  - MacDonald, Donald J.; Miller, James A.; and Eagles, Derek M., 5,020,324, Cl. 60-430.000.
  - Peck, Donald R., 5,020,604, Cl. 172-177.000.
- de Fraine, Paul J.: *See—*
  - Clough, John M.; Godfrey, Christopher R A.; de Fraine, Paul J., Hutchings, Michael G.; and Anthony, Vivienne M., 5,021,581, Cl. 546-309.000.
- Degenfelder, Joseph R.; and Sikorski, James F. Proportional electromagnetic flow valve. 5,020,772, Cl. 251-30.020.
- DeGraw, Joseph I., Jr.: *See—*
  - Berger, Frank M.; Johnson, Howard L.; and DeGraw, Joseph I., Jr., 5,021,460, Cl. 514-718.000.
- De Gregoriis, Enrico: *See—*
  - Gianna, Roberto; De Gregoriis, Enrico; and Boni, Renzo, 5,021,338, Cl. 435-68.100.
- de Groot, Peter, to Perkin-Elmer Corporation, The. Multimode laser diode system for range measurement. 5,020,901, Cl. 356-5.000.
- Degussa Aktiengesellschaft: *See—*
  - Deller, Klaus; Klingel, Reinhard; and Krause, Helmfried, 5,021,378, Cl. 502-62.000.
  - Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, 5,021,092, Cl. 106-451.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Deininger, David D.: *See—*
  - Quagliato, Dominick A.; and Deininger, David D., 5,021,418, Cl. 514-249.000.
- Delaware Capital Formation, Inc.: *See—*
  - Evans, Alfred J.; Chen, Grant K.; May, Dennis J.; and Brinson, Edward P., 5,020,298, Cl. 53-138.200.
- Delco Electronics Corporation: *See—*
  - Henderson, Mark F.; and Schlais, John R., 5,021,356, Cl. 437-45.000.
- Delfino, Michelangelo: *See—*
  - Deblasi, Janet M.; and Delfino, Michelangelo, 5,021,358, Cl. 437-57.000.
- Deller, Klaus; Klingel, Reinhard; and Krause, Helmfried, to Degussa Aktiengesellschaft. Molded articles based on pyrogenically prepared silicon dioxide, process for their production and their use. 5,021,378, Cl. 502-62.000.
- Dellinger, Henry P. Aerator for lawns and the like. 5,020,602, Cl. 172-21.000.
- De Lucca, George V.; Kezar, Hollis S., III; and O'Brien, John P., to Du Pont de Nemours, E. I., and Company. High strength fibers from chitin derivatives. 5,021,207, Cl. 264-186.000.
- Delyle, Inc.: *See—*
  - Hellickson, Harold M., 5,020,159, Cl 2-158.000.
- Demaco Mfg. Group, Ltd.: *See—*
  - Pulgiese, Rocco J., 5,021,939, Cl. 364-143 000.
- de Martimprey, Alex H.: *See—*
  - Rogers, Gene; and de Martimprey, Alex H., 5,021,624, Cl. 219-70.000.
- Demmer, Martha; and Talboys, Thomas. Microwave oven having integral mixing assembly. 5,021,621, Cl. 219-10.55F.
- Demski, Felix. Holder for a fishing hook, line, leader or sinker. 5,020,264, Cl. 43-25.200.
- Demuth, Robert; Hefti, Walter; Keller, Urs; and Hanselmann, Daniel, to Rieter Machine Works, Ltd. Bearing unit, especially for use in a bobbin tube and package support. 5,020,924, Cl. 384-536.000.
- Dennis, Timothy: *See—*
  - Cowlin, Simon; Clark, Leslie; Dennis, Timothy; and Gunawardena, Charith, 5,020,675, Cl. 209-538.000.
- Derosa, Thomas F.: *See—*
  - Kapuscinski, Maria M.; Derosa, Thomas F.; Biggs, Robert T.; and Nalesnik, Theodore E., 5,021,177, Cl. 252-51.50R.
- Desair, Eugene. Tool for aligning the connecting of an exhaust manifold to an engine block. 5,020,204, Cl. 29-271.000.
- Desent, Nash S.; and Collins, Imack L., to White Consolidated Industries, Inc. Simplified bump-feed type cutting head assembly for flexible line trimmers. 5,020,223, Cl. 30-276.000.
- DeShong, Michael H., to Grote Manufacturing Co., The. Motor vehicle turn signal cancelling device. 5,021,617, Cl. 200-61.270.
- Desmur, Henri: *See—*
  - Nugues, Pierre; Desmur, Henri; and Florentin, Jose , 5,021,708, Cl. 313-446.000.
- Desrochers, Michel J.; Jean, Michel; and Drouin, Michel P., to Domtar Inc. Exploded bark products. 5,021,122, Cl. 162-150.000.
- Dessertine, Pauline L., to Texax-Glynn Corporation. Inhaler device with counter/timer means. 5,020,527, Cl. 128-200.230.
- Dessing, Jacobus P. M.; Roodenburg, Pieter J.; Aurik, Erik A.; and Borgman, Fokko P., to Multinorm B.V. Automatic milking device and method of operation thereof. 5,020,477, Cl. 119-14.080.
- Destefan, Dennis E.; and Stompro, David A., to United States of America, Energy. Pre-resistance-welding resistance check. 5,021,625, Cl. 219-109.000.
- Deutschmann, Herbert, to MTU Friedrichshafen. Device for cooling a charged piston internal-combustion engine. 5,020,482, Cl. 123-41.290.
- Deval, Alain; and Amand, Yvon, to Societe D'Applications Generales D'Electricite et de Mecanique Sagem. Vibrating beam force-frequency transducer and pendulous accelerator comprising application thereof. 5,020,370, Cl. 73-517.0AV.
- Devil, societe anonyme: *See—*
  - DeVille, Paul, 5,020,631, Cl. 181-249.000.
- DeVille, Paul, to Devil, societe anonyme. Modular silencer. 5,020,631, Cl. 181-249.000.
- Dewitt, John R.; and Neer, Jay H., to International Business Machines Corporation. Personal computer with connector assembly having integral retainer. 5,020,999, Cl. 439-328.000.
- Dey, Thomas W.; Granger, Edward M.; Vandenberg, Donald E.; Pitek, John G.; and Humbel, William D., to Eastman Kodak Company. Application of the Foucault knife-edge test to a segmented optic. 5,020,905, Cl. 356-124.000.
- Dhong, Sang H.; Hwang, Wei; and Lu, Nicky C., to International Business Machines Corporation. Method of fabricating cross-point lightly-doped drain-source trench transistor. 5,021,355, Cl. 437-35.000.
- Diamant Boart Craelius AB: *See—*
  - Oden, Anders; and Jonsson, Gunnar, 5,020,608, Cl. 175-21.000.
- Diatech S.A.: *See—*
  - Goldstein, Israel, 5,021,552, Cl. 530-356.000.
- Diaz, Arthur: *See—*
  - Kobus, Joseph P.; Kielmeyer, Ronald F., Jr.; and Diaz, Arthur, 5,021,799, Cl. 343-795.000.
- Dicker, Ira B.; and Hertler, Walter R., to Du Pont de Nemours, E. I., and Company. Initiator for group transfer polymerization. 5,021,524, Cl. 526-190.000.
- Dickerson, Robert E.: *See—*
  - Bunch, Phillip C.; and Dickerson, Robert E., 5,021,327, Cl. 430-496.000.
- Dickinson, Albert B., to Robbins, Edward S., III Process for forming an extrusion-blow molded ultrathin container using a heat generating pinch off arrangement. 5,021,209, Cl. 264-540.000.
- Dickson, Charles R.: *See—*
  - Gould, Robert K.; and Dickson, Charles R., 5,021,221, Cl 422-129.000.
- Die Tetra Pak Rausing & Co.: *See—*
  - Reil, Wilhelm, 5,020,986, Cl. 425-437.000.
- Diem, Hoang G.: *See—*
  - Jung, Gerard; Mugnier, Jacques; Dommergues, Yvon; and Diem, Hoang G., 5,021,350, Cl. 435-243.000.
- Dienes, Geza, to Andrew Corporation. Antenna for transmitting elliptically polarized television signals. 5,021,797, Cl. 343-727.000.
- Diepenhorst, Pieter C.: *See—*
  - Nouws, Jacobus A. M.; Kool, Pieter; and Diepenhorst, Pieter C., 5,021,594, Cl. 556-38.000.
- Diesel Kiki Co., Ltd.: *See—*
  - Nakajima, Nobuyuki; Yamaguchi, Toshio; and Kawashima, Yuji, 5,020,976, Cl. 417-295.000.
- Dieterich, Dieter: *See—*
  - Reiff, Helmut; Dieterich, Dieter, and Stepanek, Rene , 5,021,520, Cl. 525-458.000.
- Digital Equipment Corporation: *See—*
  - Haugh, Dennis, 5,022,030, Cl. 371-51.100.
  - Mistry, Kaizad R., 5,021,853, Cl. 357-23.130.
  - Sands, Robert M.; and Fitzgerald, John J , 5,021,712, Cl 315-8.000
- Digital Scintigraphics, Inc.: *See—*
  - Genna, Sebastian; and Smith, Andrew P., 5,021,667, Cl 250-363.100.
- Dillard, Thomas E.: *See—*
  - Sylvia, Robert E., and Dillard, Thomas E., 5,020,400, Cl 81-484.000.
- Diller, Robert W., to TRW Technar Inc. Apparatus and method for actuating a passenger restraint system in a passenger vehicle 5,021,678, Cl. 307-10.100.
- DiMatteo, Paul; and Segnini, Robert, to Nova Technologies, Inc Patient transfer arrangement. 5,020,171, Cl. 5-91.00R.
- Director-General of National Institute of Health: *See—*
  - Yasui, Kotaro; Kojima, Asato; Yasuda, Atsushi; and Sato, Takanori, 5,021,347, Cl. 435-235.000.
- Director General of the Agency of Industrial Science and Technology *See—*
  - Ichimura, Kunihiro; Tochizawa, Noriaki; and Kikuchi, Hideo, 5,021,505, Cl. 525-59.000.
- Di Serio, Alfonso: *See—*
  - Koch, Paolo; and Di Serio, Alfonso, 5,021,174, Cl. 252-38.000.
- Dissous, Colette: *See—*
  - Montreuil, Jean; Spik, Genevieve; Capron, Andre; Dissous, Colette; and Grzych, Jean-Marie, 5,021,560, Cl. 536-1.100.
- Diversified Chemical Technologies, Inc.: *See—*
  - Kavnatsky, Zara M.; and Chen, Tsae S., 5,021,172, Cl. 252-32.70E.
- Dixon, Jerry D.: *See—*
  - Bealkowski, Richard; Blackledge, John W., Jr.; Cronk, Doyle S.; Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G.; Kovach, George D.; McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., 5,022,077, Cl. 380-4.000.
- Dixon, Robert C.; and Vanderpool, Jeffrey S., to Omnipoint Data Corporation. Spread spectrum correlator. 5,022,047, Cl. 375-1.000.
- DLP, Inc.: *See—*
  - Davis, Richard E.; and Glant, Michael D., 5,021,218, Cl. 422-104.000.
- D'Mannco, Inc.: *See—*
  - Mann, Donaerl B.; and Baras, David, 5,020,515, Cl. 128-26.000.
- Doan, Frank W.; and Weckman, Robert L., to 529900 Ontario Ltd. Safety lock. 5,020,342, Cl. 70-14.000.
- Doan, Trung T.: *See—*
  - Lowrey, Tyler A.; Durcan, Dermot M.; Doan, Trung T.; Haller, Gordon A.; and Tuttle, Mark E., 5,021,353, Cl. 437-34.000.
- Dobay, Laszlo: *See—*
  - Fodor, Tamas; Fischer, Janos; Dobay, Laszlo; Trischler, Ferenc; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Szporny, Laszlo, and Hajos, Gyorgy, 5,021,597, Cl. 556-69.000.
- Doble Engineering Company: *See—*
  - Jones, Donald R., 5,021,648, Cl. 250-231.130.
- Dr. Wolman GmbH: *See—*
  - Goettsche, Reimer, 5,021,459, Cl. 514-663.000.
- Dogniez, Leonard: *See—*
  - Puydak, Robert C.; Hazelton, Donald R.; Cartasegna, Silvestro; and Dogniez, Leonard, 5,021,500, Cl. 524-525.000.
- Dolhert, Leonard E.: *See—*
  - Block, Jacob; and Dolhert, Leonard E., 5,021,400, Cl. 505-1.000
- Dommergues, Yvon: *See—*
  - Jung, Gerard; Mugnier, Jacques; Dommergues, Yvon; and Diem, Hoang G., 5,021,350, Cl. 435-243.000.
- Domtar Inc.: *See—*
  - Desrochers, Michel J.; Jean, Michel; and Drouin, Michel P., 5,021,122, Cl. 162-150.000.
- Donado, Rafael A., to Institute of Gas Technology. Molten carbonate fuel cell start-up process. 5,021,303, Cl. 429-16.000.
- Donelson, Harlan J. Grain spreading device for grain bins. 5,020,701, Cl. 222-494.000.
- Donohue, Patrick T. Modular digital traction system. 5,020,524, Cl. 128-84.00C.

- Dooley, Thomas J *See—*
  - Jargiello, Paul A.; and Dooley, Thomas J., 5,021,324, Cl. 430-331.000.
- Dorband, Bernd: *See—*
  - Weyrauch, Adolf, Dorband, Bernd, and Schlipf, Ferdinand, 5,020,894, Cl 350-587.000.
- Dotson, Derek P., to Angel Echevarria Co., Inc. Control system for fluid-filled beds. 5,020,176, Cl. 5-453.000.
- Dougherty, Thomas K.; and Giants, Thomas W., to Hughes Aircraft Company. Aromatic polyimide silanol compounds, precursors and polymers thereof. 5,021,585, Cl. 548-406.000
- Dow Chemical Company, The: *See—*
  - Clement, Katherine S.; Babb, David A . and Ezzell, Bobby R , 5,021,602, Cl. 558-230.000.
  - Dawson-Ekeland, Kari R.; and Stringfield, Richard T., 5,021,253, Cl. 426-422.000.
  - Hoffman, Ronald J., and Hart, Cindy S., 5,021,368, Cl 501-92.000.
  - Jezic, Zdravko P., 5,021,288, Cl 428-224 000
  - Lysenko, Zenon, 5,021,580, Cl. 546-307.000.
  - McGarry, Frederick J., 5,021,258, Cl 427-35.000.
  - McGraw, Philip W., 5,021,180, Cl. 252-68 000
  - Pyzik, Aleksander J , Schwarz, Douglas B., Rossow, Harold E , Beaman, Donald R., and Pyzik, Barbara M., 5,021,372, Cl. 501-97.000.
  - Treybig, Duane S , 5,021,471, Cl. 523-414.000.
  - Vinogradoff, Anna P., and Kleschick, William A , 5,021,591, Cl. 544-281.000
- Dow Corning Corporation: *See—*
  - Klimisch, Helen M., 5,021,405, Cl. 514-63 000.
- Dowell Schlumberger Incorporated *See—*
  - Muller, Laurent, and Randermann, Ervin, 5,020,592, Cl. 166-187.000.
- Dowler, Robert L.: *See—*
  - Malecki, Richard L.; Irick, W T . and Dowler, Robert L., 5,020,361, Cl. 73-118.100.
- Dragon, Thomas; Hylan, John; and Berkoben, Kenneth, to Unisys Corp. (Formerly Burroughs Corp.). Web transport with anti-skew arrangement. 5,021,673, Cl. 250-548.000.
- Dragon, Thomas; Hylan, John; Reynolds, Robert, McCarthy, Paul; Merchant, Paul; and Berkoben, Kenneth, to Unisys Corp. Document-skew detection with photosensors. 5,021,676, Cl 250-561.000.
- Drake, Kenneth M.; Anderson, John W., Carr, Lee D.; and Peyton, Fred I. Filtration, drainage, and drying apparatus for deliquification of sludges. 5,021,157, Cl 210-248 000.
- Drappel, Stephen: *See—*
  - Mayo, James D.; Drappel, Stephen; Duff, James M , Croucher, Melvin D.; and Lennon, John M., 5,021,318, Cl. 430-124 000.
- Dreger, Geoffrey, to Intools, Limited. Screw driving socket. 5,020,954, Cl. 411-403.000.
- Dresher, Incorporated: *See—*
  - Timm, Robert, 5,020,172, Cl. 5-200.100.
- Dresser Industries, Inc.: *See—*
  - Fischer, John G., 5,021,675, Cl. 250-561.000.
  - Macey, Christopher L., 5,021,374, Cl. 501-120.000.
- Dresser-Rand Company: *See—*
  - Dussourd, Jules L.; Singh, Pawan J.; and Miller, J. C., 5,020,970, Cl. 415-115.000.
- Dreyer, John F., Jr. Bedstead storage box 5,020,173, Cl. 5-308.000.
- Drinnen, Cecil A.: *See—*
  - Miles, Larry N., Drinnen, Cecil A , Hackler, David W.; Bogart, Tom L.; Macklin, Arnold D.; Sharpsteen, Ben E.; Hyles, Truett M.; and Stephens, Herschel M., 5,020,714, Cl 228-15.100.
- Drocourt, Daniel: *See—*
  - Armau, Elise; Drocourt, Daniel; Etienne, Gilles; and Tiraby, Gerard, 5,021,344, Cl. 435-172.300.
- Droge, David A ; Lyerly, Jeffrey B., Mott, William E.; Whitehead, Lance W.; and Yenik, Matthew G , to International Business Machines Corporation. Drive up teller machine. 5,020,789, Cl. 271-225.000.
- Drouet, Xavier; Goossens, Dominique; and Rouger, Philippe, to Foundation Centre National De Transfusion Sanguine. Culture medium containing human albumin, process for the preparation of an injectable product from this medium, product obtained and its use, and composition obtained. 5,021,349, Cl. 435-240.310.
- Drouin, Michel P : *See—*
  - Desrochers, Michel J.; Jean, Michel; and Drouin, Michel P., 5,021,122, Cl. 162-150.000.
- Druliner, Joe D.; Horowitz, Harold S.; McLain, Stephan J ; and Sleight, Arthur W , to Du Pont de Nemours, E. I., and Company. Process for making superconductors and their precursors. 5,021,395, Cl. 505-1.000.
- DS Research, Inc.: *See—*
  - Bay, Steven T.; and Prince, Dan, 5,020,476, Cl. 118-728.000.
- Duback, David W.; and Vogenthaler, James R., to Accurate Metering Systems, Inc. Method for making a panel assembly. 5,021,018, Cl. 445-24.000.
- Duda, Robert W. Expansion joint for covered panels. 5,020,294, Cl. 52-573.000.
- Duff, James M.: *See—*
  - Mayo, James D.; Drappel, Stephen; Duff, James M.; Croucher, Melvin D.; and Lennon, John M., 5,021,318, Cl. 430-124.000.
- Dufilie, Pierre, to Thomson-CSF. Interdigital transducer for surface acoustic wave filter. 5,021,699, Cl 310-313.00B.
- Dugan, Carol S *See—*
  - Wilson, Craig A.; Olson, Kurt G., Koren, Jeffrey G., Longhini, Debra M., Dugan, Carol S.; and Jozwiak, Edward L., Jr , 5,021,135, Cl. 204-180.800.
- Dukes, John R., to Process Automation Business, Inc. Method and apparatus for measuring characteristics of a multilayer product 5,020,356, Cl. 73-1.00B.
- Duncan, Eugene F.: *See—*
  - Satula, Keith O.; Schuchmann, Russell P., and Duncan, Eugene F , 5,021,645, Cl. 250-223.00R
- Dunlop Cox Limited: *See—*
  - Babbs, Frederick W., 5,020,853, Cl. 297-341 000
- Dunn, Jeffrey: *See—*
  - Bisak, Michael, 5,021,779, Cl 340-825.690.
- Dunn, Mark M Chain lumper. 5,020,396, Cl. 81-15 800
- Dunn, William C.; and Langley, Stuart T , to Motorola, Inc Monolithic diffraction spectrometer. 5,020,910, Cl 356-328.000.
- Duplitronics, Inc. *See—*
  - Scheffler, Robert G., 5,021,893, Cl 360-15.000
- Du Pont de Nemours, E. I., and Company *See—*
  - Burk, Mark J., 5,021,131, Cl. 204-59.00R
  - De Lucca, George V.; Kezar, Hollis S , III; and O'Brien, John P , 5,021,207, Cl. 264-186.000.
  - Dicker, Ira B.; and Hertler, Walter R., 5,021,524, Cl. 526-190.000.
  - Druliner, Joe D.; Horowitz, Harold S.; McLain, Stephan J., and Sleight, Arthur W., 5,021,395, Cl. 505-1.000.
  - Gorrafa, Adly A., 5,020,199, Cl. 28-273.000.
  - Huang, Hua-Feng, and Plorde, Donald E., 5,021,293, Cl. 428-328.000.
  - Lewis, Milton A., Jr.; Mason, Jeffrey S., Swinford, Carson B , and Wiseman, Timothy R., Sr., 5,020,161, Cl. 2-164.000
  - Parkinson, Bruce A., 5,021,672, Cl. 250-492 200.
  - Smeltz, Kenneth C., 5,021,171, Cl. 252-8.551.
  - Sweeny, Wilfred, 5,021,123, Cl. 162-157.300.
  - Wheland, Robert C., 5,021,516, Cl 525-403.000.
- DuPuy, Richard E.; Liebenrood, John D., and McCaughan, Leon, to Smiths Industries Aerospace & Defense Systems Incorporated Method of operating an electrooptic modulator 5,020,872, Cl. 350-96.140.
- Durairaj, Bojayan; Peterson, Alex, Jr., Lamars, Robert M , and Hood, Richard T., to Indspec Chemical Corporation. Rubber compounding resin. 5,021,522, Cl. 525-502.000.
- Durcan, Dermot M : *See—*
  - Lowrey, Tyler A.; Durcan, Dermot M , Doan, Trung T.; Haller, Gordon A., and Tuttle, Mark E., 5,021,353, Cl. 437-34.000.
- Durst, Robert T.; and Hunter, Kevin D Electronic notary 5,022,080, Cl. 380-23.000.
- Dussourd, Jules L.; Singh, Pawan J.; and Miller, J C , to Dresser-Rand Company. Fluid-handling, bladed rotor. 5,020,970, Cl. 415-115.000.
- Dutt, Herbert V., to Continental Plastics, Inc Closure system 5,020,682, Cl. 215-253.000.
- Dutt, Herbert V., to Continental Plastics, Inc Closure for a resealable container. 5,020,686, Cl. 220-276.000.
- Dyer, Peter A., to United States of America, Air Force. Ballistic protective insert for use with soft body armor by female personnel. 5,020,157, Cl. 2-2.500.
- E.I Du Pont de Nemours and Company: *See—*
  - Contractor, Rashmikant M., 5,021,588, Cl. 549-259.000.
- Eagles, Derek M.: *See—*
  - MacDonald, Donald J.; Miller, James A., and Eagles, Derek M , 5,020,324, Cl. 60-430.000.
- Eastcott, Peter D., to General Electric Canada Inc. Clutch or brake inching arrangement. 5,020,649, Cl. 192-48 100
- Eastman, James M.: *See—*
  - Thoman, David C.; Briggs, Marvin N ; and Eastman, James M , 5,020,564, Cl. 137-102.000.
- Eastman Kodak Company: *See—*
  - Anderson, Ernest R.; Vacco, Dominick; and Dagon, Thomas J , 5,021,163, Cl. 210-661.000.
  - Begley, William J.; and Chen, Teh-Hsuan, 5,021,322, Cl 430-223.000.
  - Bunch, Phillip C.; and Dickerson, Robert E., 5,021,327, Cl. 430-496.000.
  - Burns, Paul A.; and Harder, John W., 5,021,325, Cl. 430-387.000.
  - Cok, David R., 5,022,085, Cl. 382-1.000.
  - Dey, Thomas W.; Granger, Edward M.; Vandenberg, Donald E., Pitek, John G.; and Humbel, William D , 5,020,905, Cl. 356-124.000.
  - Fagerburg, David R.; Rule, Mark; Watkins, Joseph J.; and Lawrenee, Paul B., 5,021,546, Cl. 528-389.000.
  - Foster, Bruce W.; Clubb, Clyde N.; and Stuart, Richard K., Jr., 5,021,257, Cl. 427-2.000.
  - Harvey, Donald M., 5,021,815, Cl. 354-222.000.
  - Johnson, Kevin M.; and Shoup, Clay E., 5,021,829, Cl. 355-213.000.
  - Johnson, Kevin M., 5,021,835, Cl. 355-271.000.
  - Leyshon, Llewellyn J.; Buckland, Paul R., and Burns, Paul A., 5,021,333, Cl. 430-551.000.
  - Light, Ronald R.; and Seymour, Robert W , 5,021,289, Cl. 428-285.000.
  - Maurinus, Martin A.; and Koenig, Norbert, 5,021,811, Cl 354-76.000.
  - Minnick, Larry A., 5,021,495, Cl. 524-410.000.
  - Mondocea, Ionel; Ullrich, William J.; and Grant, Frederic F., 5,021,901, Cl. 360-92 000.
  - Pagano, Daniel M ; and Miller, Stephen H . 5,021,816, Cl 354-275.000.

VOL
1127
ISS
1
JE
4
1991
UMI

Puckette, Thomas A., 5,021,380, Cl. 502-107.000.
Robison, Gary L.; and Wash, Michael L., 5,021,820, Cl. 355-40 000
Szajewski, Richard P.; and Taber, Terry R., 5,021,555, Cl 430-544.000.
Easybagger Inc.: *See—*
Larkin, Patrick J., 5,020,751, Cl. 248-99 000.
Eaton Corporation: *See—*
Nagao, Makoto, 5,020,618, Cl 180-132.000.
Satula, Keith O.; Schuchmann, Russell P., and Duncan, Eugene F., 5,021,645, Cl. 250-223.00R.
Eaton-Kenway, Inc.: *See—*
Liston, Sergay D., 5,020,957, Cl 414-279 000.
Ebata, Yasuhiko: *See—*
Nakatsuno, Eiji; Himeno, Yasunori; Ebata, Yasuhiko; and Nagano, Masatosi, 5,020,332, Cl. 62-157.000.
Eberwine, James: *See—*
Tecott, Laurence; Barchas, Jack D; and Eberwine, James, 5,021,335, Cl. 435-6.000.
Ebihara, Sachiko; and Fukushima, Yasuhiko, to Mitsubishi Denki Kabushiki Kaisha. Burn-in apparatus. 5,021,733, Cl. 324-158.00F.
Ebisawa, Isao: *See—*
Abe, Tsutomu; Ebisawa, Isao; Watanabe, Kenjiro; and Karita, Seiichiro, 5,021,809, Cl 346-140.00R.
Ebishi, Nobuo: *See—*
Sasaki, Makoto; Ebishi, Nobuo; and Yanai, Shinji, 5,021,614, Cl. 200-5.00R.
ebm Elektrobau Mulfingen GmbH & Co.: *See—*
Reinhardt, Wilheilm; and Schultz, Karl-Heinz, 5,021,726, Cl. 318-811.000.
Echigo, Katsuhiro: *See—*
Tsuruoka, Ichiro; Echigo, Katsuhiro; Mochizuki, Manabu; Kurotori, Tsuneo; Ariyama, Kenzo; Kojima, Kenji; and Miyao, Mayumi, 5,021,834, Cl. 355-256.000.
Eck, Ralf: *See—*
Bersch, Bernhard; Fuchs, Axel; and Eck, Ralf, 5,021,627, Cl. 219-119.000.
Eckhardt, Volker: *See—*
Mayska, Paul J.; Eckhardt, Volker; Freitag, Dieter; and Idel, Karsten-Josef, 5,021,543, Cl. 528-217.000.
Eda, Hiroyuki: *See—*
Iwai, Ichiro; and Eda, Hiroyuki, 5,021,106, Cl. 148-437.000.
Edelmann, Rolf: *See—*
Kauer, Harald, Overlach, Knud; Edelmann, Rolf; and Gassner, Siegfried, 5,020,236, Cl. 33-700.000.
Edmonds, Edward J.; and Curran, John G., to Elverex Limited. Software verification apparatus. 5,022,028, Cl. 371-25.100.
Edmundson, Paul G.; and Merritt, Terry. Listening enhancement device. 5,020,629, Cl. 181-136.000.
Edwards, Harper, McNew & Company: *See—*
Edwards, John W.; Harper, Daniel R.; and McNew, Quinton B., 5,020,865, Cl. 305-35.0EB.
Edwards, John W.; Harper, Daniel R.; and McNew, Quinton B., to Edwards, Harper, McNew & Company. Endless drive track joint assembly. 5,020,865, Cl. 305-35.0EB.
Edwards, Joseph. Insulated stocking. 5,020,164, Cl. 2-239.000.
Edwards, Philip N.: *See—*
Pilgrim, William R.; Young, Derek W.; Tait, Brian S.; Crawley, Graham C.; Edwards, Philip N.; and Hill, George B., 5,021,414, Cl. 514-237.500.
Edwards, Shannon: *See—*
Swanson, Dail L.; and Edwards, Shannon, 5,021,714, Cl. 315-101.000.
EG&G Sealol, Inc.: *See—*
Mullaney, John J., 5,020,809, Cl. 277-81.00S.
Eggeling, Richard L.: *See—*
Lyon, Leland H.; and Eggeling, Richard L., 5,020,610, Cl. 175-135.000.
Eggert, Daniel M.: *See—*
Annis, Jeffrey R.; and Eggert, Daniel M., 5,020,399, Cl. 81-358.000.
Eggleston, Laurence W.: *See—*
Pullen, Keith R.; Horton, Kevin J.; Etemad, Mohammad R.; Fenocchi, Arnoldo; Eggleston, Laurence W.; and Bolton, Hugh R., 5,021,698, Cl. 310-156.000.
Eguchi, Hiroshi: *See—*
Kanto, Jumpei; Saito, Hitoshi; Eguchi, Hiroshi; and Nakamura, Masayuki, 5,021,394, Cl. 503-227.000.
Eguchi, Tamiyuki; and Tsunomori, Michito, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Process for preparing uniform discoid particles. 5,021,201, Cl. 264-9.000.
Ehata, Shigeru: *See—*
Yamamoto, Masanao; Unnai, Takaaki; Ehata, Shigeru; Hirai, Tadaaki; Sameshima, Kenji; Hiruma, Eikiyu; Suzuki, Shirou; Tanioka, Kenkichi; Yamazaki, Junichi; and Shidara, Keeichi, 5,021,705, Cl. 313-106.000.
Ehrenfeld, Udo. Agent and product for the diagnosis and treatment of tumors and for the treatment of weaknesses of the cellular and humoral immune defense. 5,021,234, Cl. 424-1.100.
Eilon, Gabriel F.: *See—*
Baldwin, John J.; Eilon, Gabriel F.; Friedman, Paul A.; and Remy, David C., 5,021,426, Cl. 514-313.000.
Eilowitz, Mark S.; Vataru, Marcel; Bayler, James L.; Labus, Rainer H.; and Lugosi, Laszlo G., to Wynn Oil Company. Engine coolant flush-filtering externally of engine with ion precipitation. 5,021,152, Cl. 210-712.000.
Eisai Co., Ltd.. *See—*
Ida, Katsumi; Ikeuchi, Takayuki, and Kayano, Masanori, 5,021,570, Cl. 514-681.000.
Eisenhuth, Ludwig. *See—*
Bergfeld, Manfred; Eisenhuth, Ludwig, and Zengel, Hans-Georg, 5,021,603, Cl. 558-237.000
Eisermann, Armin, to Schulte-Schlagbaum Aktiengesellschaft Permutation lock, particularly for storage compartments. 5,020,346, Cl 70-279.000.
Eitan, Boaz; and Kazerounian, Reza, to WaferScale Integration, Inc Split gate memory array having staggered floating gate rows and method for making same. 5,021,847, Cl 357-23.500.
Eitner, Joseph G., Jr.; and Tice, Robert J., Jr., to Wellcome Foundation Limited, The. Metering and dispensing system. 5,020,689, Cl 222-1.000.
Ekmann, James M : *See—*
Mathur, Mahendra P.; Fu, Yuan C.; Ekmann, James M.; and Boyle, John M , 5,020,457, Cl. 110-345.000.
Ekstedt, Edward E.; and Taylor, Jack R., to General Electric Company. Fuel delivery system. 5,020,329, Cl. 60-737.000.
Elbein, Alan D.; and Tropea, Joseph E., to Board of Regents, The University of Texas System, The. Novel pyrrolizidine alkaloid 5,021,427, Cl. 514-315.000.
Electro-Voice, Inc.: *See—*
Gunness, David W., 5,020,630, Cl. 181-192.000.
Electronic Speech Systems: *See—*
Mozer, Forrest S.; and Chan, Shiu L. F., 5,022,071, Cl 379-93 000
Elf France: *See—*
Germanaud, Laurent, and Nouguier, Robert, 5,021,175, Cl 252-46.600.
Elfverson, Sven; Skogward, Kenneth; and Hermansson, Bengt, to Scandmec Plast AB. Liquid level sensor. 5,020,366, Cl. 73-313.000
Eli Lilly and Company: *See—*
Thompson, William W., 5,021,554, Cl. 530-399.000.
Wirth, David D., 5,021,564, Cl. 540-225.000.
Ellinghaus, Wolfgang: *See—*
Kosak, Dietmar; Ellinghaus, Wolfgang; Feldmann, Hugo; and Engel, Georg, 5,020,354, Cl. 72-225.000.
Elliott, Keith: *See—*
Plohberger, Diethard; Herzog, Peter; Elliott, Keith; Fischer, Christof D.; and Greier, Josef, 5,020,494, Cl. 123-250.000.
Elliott, Stanley B. Optical-type, phase transition humidity-responsive devices. 5,022,045, Cl. 374-20.000.
Ellis, Lamar. Vacuum adapter plate. 5,020,420, Cl. 92-59.000.
Elman, Boris S.: *See—*
Melman, Paul; Elman, Boris S.; Koteles, Emil S.; and Jagannath, Chirravuri, 5,021,360, Cl. 437-81.000.
Elmes, Alfred R.; Hammond, Kevin; and Sherrington, David C., to Unilever Patent Holdings B.V. Porous material and its preparation 5,021,462, Cl. 521-63.000.
El-Sayed, Aziz: *See—*
Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; El-Sayed, Aziz, Muller, Peter-Rolf; and Wandel, Martin, 5,021,488, Cl 524-116.000.
Elser, Wilhelm: *See—*
Langerbeins, Klaus; Klesse, Wolfgang, Tessmer, Dieter; Elser, Wilhelm; and Geyer, Hans-Juergen, 5,021,469, Cl. 523-201.000.
Elverex Limited: *See—*
Edmonds, Edward J. and Curran, John G., 5,022,028, Cl 371-25.100.
Elz, Sigurd: *See—*
Buschauer, Armin; Schickaneder, Helmut, Schunack, Walter; Elz, Sigurd; Szelenyi, Istvan; Baumann, Gert; and Ahrens, Kurt H., 5,021,431, Cl. 514-333.000.
Ema, Taiji: *See—*
Taguchi, Masao; and Ema, Taiji, 5,021,357, Cl. 437-52.000.
Emert, Jacob: *See—*
Waddoups, Malcolm; and Emert, Jacob, 5,021,173, Cl. 252-35.000.
Emhart Industries, Inc.: *See—*
Hart, LeRoy; and Miller, Theodore H . deceased, 5,020,343, Cl. 70-143.000.
Emmons, William D.: *See—*
Larson, Gary R.; Emmons, William D : and Kalyanaraman, Palaiyur S., 5,021,511, Cl. 525-295.000.
Endlich, Wilhelm: *See—*
Gunther, Peter; Wirth, Hermann O.; and Endlich, Wilhelm, 5,021,474, Cl. 524-14.000.
Endo, Shinichi: *See—*
Takahashi, Minoru; Kotani, Tsutomu; and Endo, Shinichi, 5,021,701, Cl. 310-345.000.
Endo, Shunzo: *See—*
Iizuka, Yo; Kashiwadate, Ken; Endo, Shunzo; Hosokawa, Toshio; Katto, Takayuki; Mizuno, Toshiya; and Katase, Kenichi, 5,021,523, Cl. 525-537.000.
Endo, Takashi: *See—*
Kimura, Kazumasa; Komamiya, Akira; and Endo, Takashi, 5,020,715, Cl. 228-102.000.
Engel, Georg: *See—*
Kosak, Dietmar; Ellinghaus, Wolfgang; Feldmann, Hugo; and Engel, Georg, 5,020,354, Cl. 72-225.000.
Engel, John W. Single handle applicator. 5,020,182, Cl. 15-145.000.
Engemann, Jurgen, to Leybold Aktiengesellschaft. Device for the generation of electrically charged and/or uncharged particles. 5,021,919, Cl. 361-225.000.

Englehardt, William H.; Svilans, Olgerts J.; and Nieto, Augustine, to Bally Manufacturing Corporation Motor control for an exercise machine simulating a weight stack. 5,020,794, Cl. 272-129.000.
Enichem Synthesis S.p.A.: *See—*
Gianna, Roberto; De Gregoriis, Enrico; and Boni, Renzo, 5,021,338, Cl. 435-68.100.
Enichem Synthesis SpA: *See—*
Mizia, Franco; Rivetti, Franco; and Romano, Ugo, 5,021,590, Cl. 549-438.000.
Eniricerche S.p.A.: *See—*
Cardinali, Franco; Longobardi, Maria G.; Viscomi, Giuseppe C.; and Ziggiotti, Alessandra, 5,021,600, Cl. 556-411.000.
Gianna, Roberto; De Gregoriis, Enrico; and Boni, Renzo, 5,021,338, Cl. 435-68.100.
Toma, Salvatore; De Bue, Marina; Mele, Antonio; and Grandi, Guido, 5,021,340, Cl. 435-69.100.
Enkotec A/S: *See—*
Christiansen, Christian M., 5,020,353, Cl. 72-187.000.
Enomoto, Masao: *See—*
Masai, Naruhito, Enomoto, Masao; Kojima, Atsuyuki; Masumori, Hiroaki; Hara, Nobuyuki; Hara, Youichi; and Morooka, Shigeaki, 5,021,435, Cl. 514-342.000.
Enomoto, Ryo, to Ibiden Co. Ltd. Adhesive for electroless plating and method of preparation of circuit board using this adhesive. 5,021,472, Cl. 523-427.000.
Ensell, Graham: *See—*
Wall, Peter; Pickard, Robert S.; Ensell, Graham, and Leong, David, 5,020,376, Cl. 73-866.500.
Environmental Technologies Group, Inc.: *See—*
Campbell, Donald N.; Spangler, Glenn E.; Davis, Robert C., Jr., Fafaul, Eugene F.; and Carrico, John P., Jr., 5,021,654, Cl. 250-287.000.
Enzytech, Inc.: *See—*
Stark, Leonard E.; and Gross, Akiva T , 5,021,248, Cl. 426-96.000.
Epp, Roman A.: *See—*
Jentsch, Gunter, 5,021,182, Cl. 252-102.000.
Epsilon Technology, Inc.: *See—*
Crabb, Richard; Robinson, McDonald; Hawkins, Mark R.; Goodwin, Dennis L.; and Ferro, Armand P., 5,020,475, Cl. 118-719.000.
Epstein, David L. Eye bottle. 5,020,526, Cl. 128-200.140.
Era, Susumu; Iwasaki, Kishiro; Yokokura, Hisao; Hanawa, Yasuo; Kondo, Katsumi; Nakada, Tadao; Kitamura, Teruo; and Mukoh, Akio, to Hitachi, Ltd. Ferroelectric liquid crystal device. 5,020,883, Cl. 350-350.00S.
Erban, Andreas: *See—*
Cao, Chi-Thuan; Erban, Andreas; Janetzke, Helmut; Cordes, Henning; Schulz, Alfred; and Matuschek, Wolfgang, 5,020,501, Cl 123-489.000.
Erhardt & Leimer GmbH. *See—*
Brunner, Gerhard, 5,021,674, Cl. 250-561.000.
Eriksson, Larry J.; and Allie, Mark C., to Nelson Industries, Inc. Active acoustic attenuation system with reduced convergence time. 5,022,082, Cl. 381-71.000.
Ernst, Richard J.; Paul, Sigismund; Sevald, Frederick G.; and Olma, Marian, to Illinois Tool Works Inc. Dosage control for adhesive dispenser. 5,020,693, Cl. 222-137.000.
Ervin, Klon R., to Becton, Dickinson and Company Petri dish 5,021,351 Cl. 435-297.000.
Escher, Sina: *See—*
Morris, Anthony F.; Naef, Regula; Escher, Sina; and Velluz, Alain, 5,021,402, Cl. 512-11.000.
Estabrook, Lee C.: *See—*
Somoza, Carlos, and Estabrook, Lee C., 5,020,731, Cl 241-1.000.
ETA SA Fabriques d'Ebauches: *See—*
Loth, Eric; and Walder, Pierre-Alain, 5,021,101, Cl. 148-11.50C
Etablissement Texcontor: *See—*
Butelman, Federico, 5,021,561, Cl. 536-20.000.
Etablissements Arrive S.A.: *See—*
Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; Leclere, Jean; and Romand, Paul, 5,021,024, Cl. 452-149.000.
Etemad, Mohammad R.: *See—*
Pullen, Keith R.; Horton, Kevin J.; Etemad, Mohammad R., Fenocchi, Arnoldo; Eggleston, Laurence W., and Bolton, Hugh R., 5,021,698, Cl. 310-156.000.
Etherington, Suzanne M. Sheet bedding construction. 5,020,177, Cl. 5-496.000.
Ethyl Corporation: *See—*
Shin, Kju H.; and Hale, Paul S., 5,021,169, Cl. 549-255.000.
Ethyl Petroleum Additives, Limited: *See—*
Bullen, John V., and Walters, David K., 5,021,176, Cl. 252-51.50A.
Etienne, Gilles: *See—*
Armau, Elise; Drocourt, Daniel; Etienne, Gilles; and Tiraby, Gerard, 5,021,344, Cl. 435-172.300.
Etoh, Tetsuo: *See—*
Hirano, Yasuhiro; Yamashina, Mitunori; and Etoh, Tetsuo, 5,021,724, Cl. 318-800.000.
Euron S.p.A.: *See—*
Koch, Paolo; and Di Serio, Alfonso, 5,021,174, Cl. 252-38.000.
Evans, Alfred J.; Chen, Grant K.; May, Dennis J.; and Brinson, Edward P., to Delaware Capital Formation, Inc. Continuously rotating platform with multiple mounted double clippers for continuously forming link product. 5,020,298, Cl. 53-138.200.
Evans, Douglas: *See—*
Kensey, Kenneth; Nash, John; and Evans, Douglas, 5,021,059, Cl. 606-213.000.
Evans Industries, Inc.: *See—*
Raj, Joseph T., 5,020,848, Cl. 296-210.000.
Evans, Jack; and Morley, Christopher R., to Cellular IC. U-shaped antenna mounting assembly. 5,020,765, Cl. 248-539.000.
Evans, Peter G.; and Cole, John B., to Shell Oil Company. Method and system measuring a vertical density profile of a fluid. 5,020,368, Cl 73-439.000.
Evensen, Harold A.: *See—*
Hamar, Douglas J.; Jayaraman, Gopal; Granroth, Richard, Whipple, Robert L.; and Evensen, Harold A., 5,020,286, Cl. 52-585.000.
Evensen, Torstein: *See—*
Lindblom, Lars; and Evensen, Torstein, 5,020,779, Cl. 266-112.000.
Evercoat Kabushiki Kaisha: *See—*
Shibahara, Kenji; and Houchin, Norio, 5,020,829, Cl. 283-62.000.
Everest & Jennings, Inc.: *See—*
Nesterick, Elaine M.; Reynolds, Robert W.; MacKay, Spencer L., and Graham, Cleve A., 5,020,624, Cl. 180-210.000.
EVG Entwicklungs -u Verwertungs-Gesellschaft m b.H.: *See—*
Grabuschnig, Josef; Scherr, Rudolf; Ritter, Klaus; and Ritter, Gerhard, 5,020,575, Cl. 140-112.000.
Ewing, John; Olson, Dan; and Preston, Walter P., to Zimmer, Inc Ankle distraction apparatus. 5,020,525, Cl. 128-84.00R
Excelermatic Inc.: *See—*
Kraus, Charles E., 5,020,384, Cl. 74-200.000.
Exchange System Limited Partnership, The: *See—*
Rosenow, Michael J.; Hamilton, Scott B ; and Bass, Thomas M . 5,022,076, Cl. 380-2.000.
Extrudiplast Investments, S.A.: *See—*
Strassheimer, Herbert, 5,020,683, Cl 215-354 000.
Exxon Chemical Company: *See—*
Puydak, Robert C.; Hazelton, Donald R.; Cartasegna, Silvestro; and Dogniez, Leonard, 5,021,500, Cl. 524-525.000.
Exxon Chemical Patents Inc.: *See—*
Datta, Sudhin, 5,021,595, Cl. 556-42.000.
Huybrechts, Diana K C., 5,021,607, Cl. 568-311.000.
Keller, Robert C.; and Kuhnhein, Marc R., 5,021,509, Cl. 525-221.000.
Malpass, Gerald D., Jr., 5,021,382, Cl. 502-117.000.
Waddoups, Malcolm; and Emert, Jacob, 5,021,173, Cl. 252-35.000.
Exxon Research and Engineering Company: *See—*
Tochinai, Chiaki; Kohara, Tadanao; Budo, Sadayoshi; Masuda, Hiroaki; and Yoshida, Takayoshi, 5,021,499, Cl. 524-487.000.
Ezaki, Masami: *See—*
Hatanaka, Hiroshi; Ezaki, Masami, Tsujii, Eisaku; Okamoto, Masanori; Shigematsu, Nobuharu; Okuhara, Masakuni; and Takase, Shigehiro, 5,021,240, Cl. 424-118.000.
Ezer, Elemer: *See—*
Fodor, Tamas; Fischer, Janos; Dobay, Laszlo; Trischler, Ferenc; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Szporny, Laszlo; and Hajos, Gyorgy, 5,021,597, Cl. 556-69.000
Ezzell, Bobby R.: *See—*
Clement, Katherine S.; Babb, David A.; and Ezzell, Bobby R., 5,021,602, Cl. 558-230.000.
Fabiano, Richard F.; and Houskamp, Robert W., to Fabiano, Richard F. Bus passenger alerting system. 5,021,780, Cl. 340-994.000.
Faccia, Tiziano. Mixer trailer for fibrous products. 5,020,918, Cl 366-279.000.
Faessen, Robert P.: *See—*
Vercoulen, Gerardus C. P.; Faessen, Robert P., Pennings, Marcel L. M.; and van der Meij, Arnold B. M H., 5,021,314, Cl. 430-106.000.
Fafaul, Eugene F.: *See—*
Campbell, Donald N.; Spangler, Glenn E., Davis, Robert C., Jr . Fafaul, Eugene F.; and Carrico, John P., Jr., 5,021,654, Cl 250-287.000.
Fagerburg, David R.; Rule, Mark; Watkins, Joseph J.; and Lawrence, Paul B., to Eastman Kodak Company. Copoly(phenylene sulfide). 5,021,546, Cl. 528-389.000.
Fagor S. Coop: *See—*
Azpeitia Urrestarazu, Angel; and Areta Salanueva, Juan M., 5,021,926, Cl. 361-436.000.
Failli, Amedeo A.; Kreft, Anthony F., III; and Musser, John H., to American Home Products Corporation 2-Anilino phenylacetic acid derivatives. 5,021,576, Cl. 546-174.000.
Fairbanks, John P.; and Yuan, Andy C., to Poqet Computer Corporation. Power supply and oscillator for a computer system providing automatic selection of supply voltage and frequency. 5,021,679, Cl 307-66.000.
Fairchild, Jeffery N.: *See—*
Heitz, Steven A.; Fairchild, Jeffery N.; and Readman, John, 5,020,923, Cl. 384-99.000.
Fairchild, Kim M.: *See—*
Wexelblat, Alan D.; and Fairchild, Kim M., 5,021,976, Cl 364-521.000.
Falcoff, Monte L.; and Curtindale, Edward G., to United Technologies Automotive. Overhead console with drop-down compartment. 5,020,845, Cl. 296-37.700.
Fan, John C.C.; Zavracky, Paul M.; Narayan, Jagdish; Allen, Lisa P.; and Vu, Duy-Phach, to Kopin Corporation. Zone-melting recrystallization process. 5,021,119, Cl. 156-620.710.
Fan, Sung-Hsing. Automobile mat. 5,021,277, Cl. 428-76.000.
Fanning, Alan W.: *See—*
Hunsbedt, Anstein; and Fanning, Alan W., 5,021,211, Cl. 376-299.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Fanuc Ltd.: *See—*
  - Fujimoto, Akihiko, 5,020,210, Cl. 29-568.000.
  - Seki, Masaki; Takegahara, Takashi; and Arakaki, Takeshi, 5,021,966, Cl. 364-474.260.
- Fanuc Ltd: *See—*
  - Karube, Norio; and Funakubo, Tsutomu, 5,022,039, Cl 372-58.000.
- Fargeaud, Daniel; and Tarrade, Gerard, to Pass & Seymour, Inc. Cable clamp for electrical connector. 5,021,006, Cl. 439-469.000.
- Farjami, Javad: *See—*
  - Brokenshire, Daniel A.; Bryant, Ronald W.; Farjami, Javad, and Brown, Gary L., 5,020,878, Cl. 350-133.000.
- Farnworth, Brian; and Crow, Rita M., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Waterproof sweat-transmitting clothing insulation. 5,021,280, Cl. 428-102.000.
- Farrier, Ernest G.; Harris, James L.; Norman, Alan B.; Resce, James L.; Sensabaugh, Andrew J., Jr.; and Shannon, Michael D., to R. J. Reynolds Tobacco Company. Smoking article with improved fuel element. 5,020,548, Cl. 131-194.000.
- Fasco Industries, Inc.: *See—*
  - Ivey, Charles W., 5,021,932, Cl. 362-96.000.
- Fattahi, Farrokh: *See—*
  - Beran, Mark A.; and Fattahi, Farrokh, 5,021,644, Cl. 250-221.000.
- Faulkner, William G. Flat top conveyor. 5,020,656, Cl. 198-494.000.
- Faust, Karl-Volker, to Paul Hettich GmbH & Co. Drawer runner for drawers preferably made of plastic. 5,020,869, Cl. 312-341.100.
- Febr. Hennig GmbH: *See—*
  - Hennig, Kurt, 5,021,271, Cl. 428-36.200.
- Feinberg, Andrew S. Dental floss dispenser and applicator. 5,020,554, Cl 132-323.000.
- Feldmann, Hugo; Schlanzke, Claus; and Svejovsky, Ulrich, to Sms Schloemann-Siemag Aktiengesellschaft. Process for heating a semi-finished product produced by continuous casting or deformation. 5,020,208, Cl. 29-527.700.
- Feldmann, Hugo: *See—*
  - Bald, Wilfried; Feldmann, Hugo; Pabst, Manfred; and Fischer, Rudiger, 5,021,265, Cl. 427-365.000.
  - Kosak, Dietmar; Ellinghaus, Wolfgang; Feldmann, Hugo; and Engel, Georg, 5,020,354, Cl. 72-225.000.
- Fenocchi, Arnoldo: *See—*
  - Pullen, Keith R.; Horton, Kevin J , Etemad, Mohammad R.; Fenocchi, Arnoldo; Eggleston, Laurence W.; and Bolton, Hugh R., 5,021,698, Cl. 310-156.000.
- Ferguson, George, to Filtercold Corporation. Apparatus and method for dispensing purified and carbonated liquids. 5,021,250, Cl. 426-231.000.
- Ferketic, John A., to Robertson-Ceco Corporation. Graphics-based wire-cable management system. 5,021,968, Cl. 364-505.000.
- Fernandez Fernandez, Maria I.; Hotten, Terrence M.; and Tupper, David E., to Lilly S.A.; and Lilly Industries Limited. Organic compounds and their use as pharmaceuticals 5,021,449, Cl. 514-422.000.
- Ferrari, Paolo: *See—*
  - Bertotti, Franco; Ferrari, Paolo; and Gatti, Maria T., 5,021,860, Cl. 357-48.000.
- Ferro, Armand P.: *See—*
  - Crabb, Richard; Robinson, McDonald, Hawkins, Mark R.; Goodwin, Dennis L.; and Ferro, Armand P., 5,020,475, Cl. 118-719.000.
- Fest, Christa: *See—*
  - Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochein; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,082, Cl. 71-93.000.
- Fiatgeotech - Tecnologie Per La Terra S.p.A · *See—*
  - Amedei, Giuseppe; and Rondelli, Angelo, 5,020,419, Cl. 92-52.000.
- Field, Bruce F., to Tennant Company. Offsetting the course of a laser guided vehicle. 5,020,620, Cl. 180-169.000.
- Fifield, John A.; and Tomashot, Steven W , to International Business Machines Corporation. Semiconductor memory having bit lines with isolation circuits connected between redundant and normal memory cells. 5,022,006, Cl. 365-200.000.
- Filho, Pedro I. P.: *See—*
  - Vellego, Geni; Filipini, Cesar A., Filho, Pedro I P.; Canevarolo, Sebastiao V., Jr.; and Serra, Oswaldo A., 5,021,397, Cl. 505-1.000.
- Filho, Waldemiro M.: *See—*
  - Terry, Dennis C.; Filho, Waldemiro M , and Turechek, John J., 5,021,282, Cl. 428-116.000.
- Filipelli, Michel C. H., to BP Chemicals Limited. Pipe for the pneumatic transport of polymer particles. 5,020,943, Cl. 406-195.000.
- Filipini, Cesar A.: *See—*
  - Vellego, Geni; Filipini, Cesar A.; Filho, Pedro I P.; Canevarolo, Sebastiao V., Jr.; and Serra, Oswaldo A., 5,021,397, Cl. 505-1.000.
- Filotex· *See—*
  - Viaud, Andre , 5,021,007, Cl. 439-497.000.
- Filter Materials Ltd.: *See—*
  - Hill, Michael; and Nichols, Walter A., 5,020,198, Cl. 28-250.000.
- Filtercold Corporation· *See—*
  - Ferguson, George, 5,021,250, Cl. 426-231.000.
- Findeisen, Kurt; Lindig, Markus; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, to Bayer Aktiengesellschaft. Herbicidal substituted triazoles. 5,021,081, Cl. 71-92.000.
- Findeisen, Kurt: *See—*
  - Muller, Klaus-Helmut; Kluth, Joachim; Konig, Klaus; Gassen, Karl-Rudolf; Findeisen, Kurt; Lindig, Markus; Lurssen, Klaus; Santel, Hans-Joachim; and Schmidt, Robert R., 5,021,080, Cl 71-92.000.
- Finn, Dennis J.: *See—*
  - Campbell, Michael J.; Finn, Dennis J.; Tucker, George K.; Vahey, Michael D.; and Vedder, Rex W , 5,021,947, Cl. 364-200.000.
- Firmenich SA: *See—*
  - Morris, Anthony F.; Naef, Regula; Escher, Sina; and Velluz, Alain, 5,021,402, Cl. 512-11.000.
- First Choice Distributors, Inc.: *See—*
  - Gunderson, Robert A.; Koffski, Leonard E.; and Gunderson, Gary W., 5,020,634, Cl. 182-184.000.
- First Glorious Enterprise Co., Ltd.: *See—*
  - Chen, Ming P., 5,020,990, Cl. 431-274.000
- Fischer, Christof D.: *See—*
  - Plohberger, Diethard; Herzog, Peter; Elliott, Keith; Fischer, Christof D.; and Greier, Josef, 5,020,494, Cl. 123-250.000.
- Fischer, Janos: *See—*
  - Fodor, Tamas; Fischer, Janos; Dobay, Laszlo; Trischler, Ferenc; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Szporny, Laszlo, and Hajos, Gyorgy, 5,021,597, Cl. 556-69.000
- Fischer, John G., to Dresser Industries, Inc. Photoelectric mensuration device and method for determining PDC cutter wear. 5,021,675, Cl 250-561.000.
- Fischer, Mark W.: *See—*
  - Alkire, Gerald R.; Dailey, George F.; and Fischer, Mark W 5,020,234, Cl. 33-656.000.
- Fischer, Rich; Silva, Richard, and Welton, Henry P., to Dalgety Produce, Inc. Method for peeling garlic. 5,021,254, Cl. 426-482.000.
- Fischer, Rudiger: *See—*
  - Bald, Wilfried; Feldmann, Hugo; Pabst, Manfred: and Fischer Rudiger, 5,021,265, Cl. 427-365.000.
- Fischmeister, Hellmut: *See—*
  - Karagoz, Sadi; Hribernik, Bruno; Stamberger, Johann, Puber, Josef; Jeglitsch, Franz; Fischmeister, Hellmut; Matzer, Franz, Locker, Claus-Dieter; Kudielka, Elfriede; and Jager, Heimo, 5,021,085, Cl. 75-239.000.
- Fisher, Uriyel: *See—*
  - Assaf, Gad; and Fisher, Uriyel, 5,020,333, Cl. 62-271.000.
- Fiskars Oy Ab· *See—*
  - Gosselin, Robert G.; and Wallace, Edward M., 5,020,222, Cl. 30-251.000.
- Fissmann, Hans-Joachim: *See—*
  - Mayer, Wolfgang; Sturm, wolfram; Fissmann, Hans-Joachim, Kotitschke, Gerhard; Zurn, Georg; Kade, Werner; and Kugler, Georg, 5,020,242, Cl. 34-115.000.
- Fitzgerald, John J.· *See—*
  - Sands, Robert M.; and Fitzgerald, John J , 5,021,712, Cl. 315-8.000
- Fleet, George W. J.; and Bruce, Ian, to Monsanto Company Method for azide displacement of α-triflates of 1,5-lactones. 5,021,562, Cl. 536-53.000.
- Fleissner, Gerold, to Fleissner Maschinenfabrik AG. Sieve drum device with screen cover. 5,020,241, Cl. 34-115.000.
- Fleissner Maschinenfabrik AG: *See—*
  - Fleissner, Gerold, 5,020,241, Cl. 34-115.000.
- Flexible Steel Lacing Company: *See—*
  - Fullard, Brian W., 5,020,209, Cl. 29-564.800.
- Floren, Carl E.; Weller, Mike; and Logman, Timothy M., to Mueller Co. Corrosion resistance for fire hydrant stem safety coupling. 5,020,934, Cl. 403-306.000.
- Florentin, Jose : *See—*
  - Nugues, Pierre; Desmur, Henri; and Florentin, Jose , 5,021,708, Cl. 313-446.000.
- Flowtec AG: *See—*
  - Keita, Mamadi, 5,020,380, Cl. 73-861.370.
- Fockens, Tallienco W. H., and Saeys, Jan, to N.V. Nederlandsche Apparatenfabriek Nedap. Method and an apparatus for electronically identifying articles moving along a surface. 5,021,767, Cl 340-572.000.
- Fodor, Tamas; Fischer, Janos; Dobay, Laszlo; Trischler, Ferenc; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Szporny, Laszlo; and Hajos, Gyorgy, to Richter Gedeon Vegyeszeti Gyar Rt. Novel acrylic acid salts, a process for their preparation, pharmaceutical compositions containing them and their use in the medicine. 5,021,597, Cl 556-69.000.
- Foggini Progetti S.r.l.. *See—*
  - Vercesi, Piercarlo; Davico, Claudio, and Giorgini, Gerardo, 5,020,896, Cl. 350-636.000.
- Foley, Henry C. *See—*
  - Daly, Francis P.; Ando, Hiei; Foley, Henry C.; and Jung, Hyun J , 5,021,385, Cl. 502-211.000.
  - Daly, Francis P.; Ando, Hiei; Foley, Henry C.; and Jung, Hyun J , 5,021,392, Cl. 502-439.000.
- Folkman, Judah; and Ingber, Donald, to Children's Medical Center Corporation, The. Angiostatic collagen modulators. 5,021,404, Cl. 514-26.000.
- Folland, Rickworth: *See—*
  - Cochran, Michael A.; Folland, Rickworth; Nicholas, James W., and Robinson, Melvin E. R., 5,021,515, Cl 525-371.000.
- Fonorow, Owen R.: *See—*
  - Archie, Kent C.; Fonorow, Owen R.; McGould, Mary C., McLear, Robert E., III; Read, Edward C.; Schaefer, Edwin M., III; Schwab, Suzanne E.; and Wodarz, Dennis, 5,021,997, Cl. 364-900.000.
- Ford, Derek G.; and Postlethwaite, Scott R., to Hepworth Engineering Limited. Position control method and apparatus for a closed loop type numerically controlled machine. 5,021,941, Cl 364-176.000.

- Ford Motor Company: *See—*
  - Bonnett, Roy E., 5,020,846, Cl. 296-186.000.
  - Chattha, Mohinder S.; Watkins, William L. H., and Gandhi, Haren S., 5,021,389, Cl. 502-303.000.
  - Hrovat, Davorin D., 5,020,622, Cl. 180-197.000.
  - Hyatt, Robert J.; Abbott, Edward H.; Bush, Robert E.; and Shannon, Francis J., 5,020,964, Cl. 414-751.000.
  - Nelson, David A., 5,021,696, Cl. 310-62.000.
- Ford Products Corporation: *See—*
  - Pooyan, Samad, 5,020,480, Cl. 122-249.000.
- Formost Packaging Machines, Inc.: *See—*
  - Cruver, Michael, 5,020,655, Cl. 198-419.300.
- Forson, Henry M.; Lothrop, John R.; O'Dell, Thomas M.; and Overmyer, Rick L., to AT&T Bell Laboratories. Switch-adjunct interface. 5,022,070, Cl. 379-32.000.
- Forte, Jerry K. Shelved computer stand. 5,020,449, Cl. 108-92.000.
- Foskett, Anthony D.: *See—*
  - Boissevain, Mathew G.; Boissevain, Tobias J.; and Foskett, Anthony D., 5,020,469, Cl. 118-67.000.
- Foster, Bruce W.; Clubb, Clyde N.; and Stuart, Richard K., Jr., to Eastman Kodak Company. Hot-melt adhesive composition. 5,021,257, Cl. 427-2.000.
- Foster, Robert W., Jr.; and Gentry, Jefferson L., to Associated Mills Inc. Back massager for use in home or auto. 5,020,517, Cl. 128-33.000.
- Foster Wheeler Energy Corporation: *See—*
  - Novotny, Randall J.; and Cummins, Ralph L., 5,020,734, Cl. 241-119.000.
- Foundation Centre National De Transfusion Sanguine: *See—*
  - Drouet, Xavier; Goossens, Dominique; and Rouger, Philippe, 5,021,349, Cl. 435-240.310.
- Fountoulakis, Jimmy M.: *See—*
  - Sesin, David F.; Liesch, Jerrold M., Fountoulakis, Jimmy M.; Masurekar, Prakash S.; Kaplan, Louis, and Wichmann, Carol F., 5,021,403, Cl. 514-9.000.
- Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S.; LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., to Walt Disney Company, The. System and method of providing passenger ingress and egress in an amusement ride. 5,021,954, Cl. 364-410.000.
- Frances, Jean-marc; and Metz, Francois, to Rhone-Poulenc Chimie. Novel polyorganosiloxanes comprising propanaldehyde functional groups. 5,021,601, Cl. 556-436.000.
- Franckowiak, Sigismond; Mikitenko, Paul; Baumgartner, Pierre, and Cohen, Georges, to Institut Francais du Petrole. Process of fractionation and extraction of hydrocarbons allowing obtaining a cut of increased octane index and a kerosene of improved smoke point 5,021,143, Cl. 208-70.000.
- Francolini, Emmanno: *See—*
  - Santoro, Giovanni; and Francolini, Emmanno, 5,021,634, Cl 219-241.000.
- Frankel, Gail B., to Kel-Gar, Inc. Handle support assembly. 5,020,755, Cl. 248-215.000.
- Frankl & Kirchner GmbH & Co. KG. *See—*
  - Olbrich, Bernd, 5,021,965, Cl. 364-470.000.
- Franklin, Robert E.; and Hill, Philip L., IV. Arrangement for raising or lowering boats or the like. 5,020,463, Cl. 114-230.000.
- Franks, William D.: *See—*
  - Rhue, Frederick F.; Franks, William D.; and Craig, Gary C., 5,021,297, Cl. 428-430.000.
- Fratangelo, John J.; and Spector, George. War game 5,020,805, Cl. 273-255.000.
- Fratello, Vincent J.: *See—*
  - Brandle, Charles D., Jr.; Fratello, Vincent J.; Luther, Lars C.; and Slusky, Susan E. G., 5,021,302, Cl. 428-692.000.
- Freitag, Dieter: *See—*
  - Mayska, Paul J.; Eckhardt, Volker; Freitag, Dieter; and Idel, Karsten-Josef, 5,021,543, Cl. 528-217.000.
  - Serini, Volker; Freitag, Dieter; Idel, Karsten-Josef; Westeppe, Uwe; Grigo, Ulrich; and Paetz, Klaus-Christian, 5,021,542, Cl. 528-204.000.
- Fremont, Owen K.: *See—*
  - St. Angelo, Stephen, Jr.; Carver, George C.; Patterson, David W.; and Fremont, Owen K., 5,020,278, Cl. 49-490.000.
- French, Andrew B. Escalator advertising. 5,020,256, Cl. 40-661.000.
- Freudenberg, Tillman: *See—*
  - Freudenberg, Ulrich; and Freudenberg, Tillman, 5,020,782, Cl. 267-140.100.
- Freudenberg, Ulrich; and Freudenberg, Tillman, to Carl Freudenberg, Firma. Hydraulically damped rubber bearing having a flexibly expandable waveguide. 5,020,782, Cl. 267-140.100.
- Frey, Kenny C.: *See—*
  - Spears, Kevin A.; Stafford, Clinton J.; Frey, Kenny C.; and Wall, Daniel P., 5,020,518, Cl. 128-52.000.
- Frias, Ann: *See—*
  - Hambly, Pauline; and Frias, Ann, 5,021,020, Cl 446-73.000.
- Fridez, Jean-Daniel; and Gerharz, Gabriele, to Comprex AG. Process for applying a catalyst layer composed of noble metals and/or noble-metal compounds to a carrier made of ceramic material. 5,021,388, Cl. 502-261.000.
- Friedman, Paul A.: *See—*
  - Baldwin, John J.; Eilon, Gabriel F.; Friedman, Paul A.; and Remy, David C., 5,021,426, Cl. 514-313.000.
- Frigerio, Marco: *See—*
  - Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo; and Tognella, Sengio, 5,021,436, Cl. 514-356.000.
- Frisinger, Bruce L.: *See—*
  - Zeigler, Henry J.; and Frisinger, Bruce L., 5,020,952, Cl 411-113.000.
- Fritsch, Rudolf P. Apparatus for continuously treating liquids, emulsions and the like. 5,020,916, Cl. 366-97.000.
- Frohlich, August G.: *See—*
  - Zell, Werner V.; Becker, Johann A.; Boehm, Detlef M.; Frohlich, August G.; Schade, Detlef; and Goletz, Bernhard R., 5,020,874, Cl. 350-96.200.
- Frost, Rodney I.; and Paisley, Robert J., to Corning Incorporated. Method for selectively charging honeycomb structures. 5,021,204, Cl. 264-60.000.
- Frye, Richard D. Mirrored device for eye drop users 5,020,897, Cl 350-638.000
- Fu, Chia-Min: *See—*
  - Maholland, Michael K.; Fu, Chia-Min; Lowery, Richard E.; Bertus, Brent J.; and Kubicek, Donald H., 5,021,377, Cl 502-26.000.
- Fu, Yuan C.: *See—*
  - Mathur, Mahendra P.; Fu, Yuan C.; Ekmann, James M.; and Boyle, John M., 5,020,457, Cl. 110-345.000.
- Fuchs, Axel: *See—*
  - Bersch, Bernhard; Fuchs, Axel; and Eck, Ralf, 5,021,627, Cl. 219-119.000.
- Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; El-Sayed, Aziz; Muller, Peter-Rolf; and Wandel, Martin, to Bayer Aktiengesellschaft Flameproofed, non-dripping polyamide moulding compositions. 5,021,488, Cl. 524-116.000.
- Fuji Electric Co., Ltd.: *See—*
  - Kitagawa, Seizou, 5,021,310, Cl. 430-85.000
  - Ueno, Katsunori, 5,021,846, Cl. 357-23.400.
- Fuji Jukogyo Kabushiki Kaisha: *See—*
  - Ishikawa, Hideyuki; Chonan, Mitsugi; Tachibana, Fusao; and Kurosu, Shinichi, 5,020,484, Cl. 123-73.0AD.
  - Kanasashi, Yusuke, 5,020,503, Cl. 123-520.000.
  - Kodama, Yukio, 5,020,626, Cl. 180-233.000.
  - Morikawa, Koji, 5,020,504, Cl. 123-531.000.
  - Morimoto, Yoshihiko, 5,020,392, Cl. 74-866.000
  - Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 5,020,617, Cl. 180-79.100.
  - Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 5,021,721, Cl. 318-432.000.
  - Watanabe, Hideo, 5,020,485, Cl. 123-73.00C.
  - Watanabe, Kenzo, 5,020,488, Cl. 123-90.160.
- Fuji Photo Film Co., Ltd.: *See—*
  - Kakimi, Fujio, 5,021,319, Cl. 430-138.000.
  - Kato, Eiichi; and Ishii, Kazuo, 5,021,311, Cl. 430-96.000.
  - Kawagishi, Toshio; Ohkawa, Atsuhiro; and Ichijima, Seiji, 5,021,329, Cl. 430-543.000.
  - Kohda, Katsuhiro, 5,021,671, Cl. 250-484.100.
  - Koya, Keizo, 5,021,334, Cl. 430-562.000.
  - Nakagoshi, Isao, 5,020,669, Cl. 206-466.000.
  - Okano, Shinichi; and Hara, Makoto, 5,021,656, Cl. 250-327.200.
  - Sato, Takehiko, 5,021,140, Cl. 204-416.000.
  - Takahashi, Osamu, 5,021,328, Cl. 430-502.000.
  - Tsugita, Makoto, 5,021,874, Cl. 358-29.000.
  - Yamamoto, Soichiro, 5,021,323, Cl. 430-292.000.
  - Yoda, Akira, 5,021,312, Cl. 430-97.000
- Fuji Seimitsu Mfg. Co , Ltd.: *See—*
  - Wada, Takeji, 5,020,953, Cl. 411-247.000.
- Fuji Xerox Co., Ltd.: *See—*
  - Yamaguchi, Junichi; Takahashi, Izumi; and Matsumoto, Masafumi, 5,021,828, Cl. 355-209.000.
- Fujibayashi, Kenji: *See—*
  - Terada, Atsusuke; Iizuka, Yoshio; Wachi, Kazuyuki; and Fujibayashi, Kenji, 5,021,413, Cl. 514-227.500.
- Fujii, Kiyoshi; Kitamura, Haruo; Takahashi, Shigeru; and Shimizu, Norio, to Honda Giken Kogyo Kabushiki Kaisha. Powered snowplow. 5,020,250, Cl. 37-257.000.
- Fujii, Masahiro: *See—*
  - Akiyama, Takaaki; Matsuo, Shuji; Fujii, Masahiro; Kurose, Mitsukazu; Nakamura, Osamu; and Kamijo, Masahiro, 5,020,928, Cl 400-193.000.
- Fujii, Toshio: *See—*
  - Yokoyama, Naoki; and Fujii, Toshio, 5,021,863, Cl. 357-57.000.
- Fujimoto, Akihiko, to Fanuc Ltd. Automatic tool changer for a machine tool. 5,020,210, Cl. 29-568.000.
- Fujimoto, Shinji; and Takada, Yukiyoshi, to Kabushiki Kaisha Daikin Seisakusho. Lock-up damper device for torque converter. 5,020,647, Cl. 192-3.290.
- Fujimura, Mitsuaki: *See—*
  - Ohe, Tatsuya; and Fujimura, Mitsuaki, 5,021,285, Cl. 428-195.000.
- Fujinawa, Masaaki: *See—*
  - Fujisawa, Hiromichi; Hatakeyama, Atsushi; Fujinawa, Masaaki, and Hadano, Eiichi, 5,021,989, Cl 364-900.000.
- Fujioka, Futoshi: *See—*
  - Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M , 5,021,184, Cl. 252-174.110.
- Fujioka, Keiji: *See—*
  - Yamahira, Yoshiya; Fujioka, Keiji; Sato, Shigeji; and Takada, Yoshihiro, 5,021,241, Cl. 424-426.000.
- Fujisaki, Hisashi; and Shimada, Keiko, to NEC Corporation. Branched telephone system. 5,022,068, Cl 379-62.000.

VOL 1127
ISS 1
JE 4
1991
UMI

- Fujisawa, Hiromichi, Hatakeyama, Atsushi, Fujinawa, Masaaki, and Hadano, Eiichi, to Hitachi, Ltd. Document browsing apparatus with concurrent processing and retrievel. 5,021,989, Cl. 364-900.000.
- Fujisawa Pharmaceutical Co., Ltd.: *See—*
  - Hatanaka, Hiroshi; Ezaki, Masami; Tsujii, Eisaku; Okamoto, Masanori; Shigematsu, Nobuharu; Okuhara, Masakuni; and Takase, Shigehiro, 5,021,240, Cl. 424-118.000.
- Fujishima, Kazuyasu: *See—*
  - Arimoto, Kazutami, Matsuda, Yoshio; Ooishi, Tsukasa; Tsukude, Masaki; and Fujishima, Kazuyasu, 5,022,007, Cl. 365-201.000.
- Fujita, Kozo: *See—*
  - Ishikawa, Masatoshi; Fujita, Kozo; and Kobata, Shigeyuki, 5,021,902, Cl. 360-92.000.
- Fujita, Nobuhiko; Itozaki, Hideo; Tanaka, Saburo; Yazu, Shuji; and Jodai, Tetsuji, to Sumitomo Electric Industries, Ltd. Oxygen plasma treatment for producing high Tc oxide superconducting material. 5,021,396, Cl. 505-1.000.
- Fujita, Satoru: *See—*
  - Kimura, Akira; Tomita, Osamu; Tomimoto, Tetsuji, Fujita, Satoru; and Kanemoto, Masami, 5,020,786, Cl. 270-95.000.
- Fujita, Yuuji; Sezume, Tadashi; Kitano, Kitsusho; Narukawa, Kiyotada; Mikami, Takashi; Kawamura, Tetsuya; Sato, Shigeru; Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao, to Tonen Sekiyukagaku Kabushiki Kaisha; and Toyota Jidosha Kabushiki Kaisha. Thermoplastic polyolefin-polycarbonate composition. 5,021,504, Cl. 525-57.000.
- Fujitsu Limited: *See—*
  - Hayakawa, Masahiro, 5,021,938, Cl. 364-132.000.
  - Kobayashi, Fumihiko; and Umino, Isamu, 5,021,757, Cl. 333-205.000.
  - Miyazaki, Toshimasa; Uzawa, Yoji; Okawa, Kazuyoshi; Kawashima, Hiroshi; Moriya, Kazumasa; Murakawa, Yoshitaka; Kumagai, Toshimitsu; Nakamura, Akihiro; Itoh, Motohiko; and Kashiwazaki, Tomoyuki, 5,021,695, Cl. 310-12.000.
  - Nakajima, Kazuo, 5,021,224, Cl. 422-248.000.
  - Sakaguchi, Kazuaki, 5,021,977, Cl. 364-521.000.
  - Suehiro, Haruyoshi, 5,021,857, Cl 357-42.000.
  - Taguchi, Masao; and Ema, Taiji, 5,021,357, Cl. 437-52.000.
  - Tonomoto, Yoshihiro, 5,021,831, Cl. 355-215.000.
  - Yokoyama, Naoki; and Fujii, Toshio, 5,021,863, Cl. 357-57.000.
- Fujiwara, Hideo: *See—*
  - Kamezaki, Hisamitsu; Suenaga, Masashi; Saito, Osamu; Iuchi, Shin-ichiro; Watanabe, Hitoshi; Fujiwara, Hideo; and Tuburaya, Yoshitane, 5,021,276, Cl. 428-64.000.
- Fukui, Hiroaki: *See—*
  - Miwa, Kishio; Fukui, Hiroaki; and Noma, Fumiaki, 5,021,284, Cl. 428-166.000.
- Fukui, Tetsuro; Katayama, Masato; Mouri, Akihiro; Isaka, Kazuo; Kagami, Kenji; and Suzuki, Masao, to Canon Kabushiki Kaisha Photosensitive member and multi-color image forming method 5,021,321, Cl. 430-201.000.
- Fukumoto, Ryoichi, to Aisin Seiki Kabushiki Kaisha. Luggage-door lock device. 5,020,838, Cl. 292-201.000.
- Fukushi, Yukiharu: *See—*
  - Nakaya, Michihiko; Fukushi, Yukiharu; Kodaka, Kenji; Ooka, Masayuki; Shiraishi, Shirou; Nakamura, Masahiko; and Numata, Satoshi, 5,021,412, Cl. 514-223.800.
- Fukushima, Shigenobu, to Minolta Camera Kabushiki Kaisha Electrophotographic copier having additional information recording function 5,021,832, Cl. 355-218.000.
- Fukushima, Toshio: *See—*
  - Hattori, Mitsutaka; Yoshimi, Toshiaki; and Fukushima, Toshio, 5,020,565, Cl. 137-207.000.
- Fukushima, Yasuhiko: *See—*
  - Ebihara, Sachiko; and Fukushima, Yasuhiko, 5,021,733, Cl. 324-158.00F.
- Fullard, Brian W., to Flexible Steel Lacing Company. Belt lacing and cutter assembly. 5,020,209, Cl. 29-564.800.
- Fullerton, Larry W.: *See—*
  - Petroff, Alan M.; and Fullerton, Larry W, 5,020,374, Cl. 73-861.250.
- Funakubo, Tsutomu: *See—*
  - Karube, Norio; and Funakubo, Tsutomu, 5,022,039, Cl. 372-58.000.
- Funamoto, Masaya; and Kobayashi, Akira, to Brother Kogyo Kabushiki Kaisha. Paper feed device. 5,020,929, Cl. 400-639.100.
- Fundacao Universidade Sao Carlos e Universidade de Sao Paulo: *See—*
  - Vellego, Geni; Filipini, Cesar A.; Filho, Pedro I. P.; Canevarolo, Sebastiao V., Jr.; and Serra, Oswaldo A., 5,021,397, Cl. 505-1.000.
- Funo, Takakazu: *See—*
  - Yokouchi, Hisatake; Onodera, Yoichi; Funo, Takakazu; and Tsuneoka, Masayuki, 5,022,063, Cl. 378-99.000.
- Fuoco, Francis J.; and Linardos, Anthony, to Grumman Aerospace Corporation. Burn-in testing equipment having an instrumentation control module. 5,021,732, Cl. 324-158.00F.
- Furse, Martin L.: *See—*
  - Salvestro, Aldo T.; Bohl, Rainer M.; and Furse, Martin L., 5,020,933, Cl. 403-90.000.
- Furukawa Electric Co., Ltd., The: *See—*
  - Asai, Makoto; Ohyama, Yoshimasa; Tanigawa, Tohru; Shinozaki, Shigeo; and Shiga, Shoji, 5,021,105, Cl. 148-433.000.
- Furukawa, Kenji: *See—*
  - Kikuchi, Makoto; Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Takeshita, Fusayuki; and Furukawa, Kenji, 5,021,190, Cl. 252-299.610.
- Furukawa, Kiyoshi. *See—*
  - Hino, Katsuhiko; Kai, Naoki; Sakamoto, Masato; Kon, Tatsuya Oka, Makoto; Furukawa, Kiyoshi; and Ochi, Yoshiaki, 5,021,421, Cl. 514-254.000.
- Furusawa, Kazunori. *See—*
  - Terasawa, Masaaki; Mukohda, Hidefumi; Nagai, Yoshikazu; Ikeda, Yasunori; and Furusawa, Kazunori, 5,022,000, Cl. 365-184.000
- Furutani, Akihiro; Okada, Junichi; and Tanimoto, Tomoaki, to Kabushiki Kaisha Yasakawa Denki Seisakusho. Method of and apparatus for controlling magnetic levitation. 5,020,444, Cl. 104-284 000
- Furuzawa, Akihiro: *See—*
  - Kanazawa, Hirotaka; Ohmura, Hiroshi, Tomoda, Atsuri, Furuzawa, Akihiro; Nakashima, Takashi; and Hideshima, Masao, 5,020,619, Cl. 180-140.000.
- Fusion Systems Corporation: *See—*
  - Walker, Delroy O.; and Telionis, Demetri P., 5,021,704, Cl 313-35.000.
- Fuss, Andreas. *See—*
  - Koch, Volker, Willms, Lothar; Fuss, Andreas, Bauer, Klaus, Bieringer, Hermann; and Burstell, Helmut, 5,021,578, Cl. 546-296.000.
- Fussell, John M : *See—*
  - Beard, John E.; Spillman, Franklin L.; Banos, Oscar; Showers, David, Fussell, John M ; and LeBlanc, George, 5,020,790, Cl 272-70.000.
- G-H Systems, Inc.: *See—*
  - Haws, Ray C., 5,021,153, Cl. 210-221.200.
- Gabel, Detlef, to United States of America, Energy. Thiourea derivatives, methods of their preparation and their use in neutron capture therapy of malignant melanoma 5,021,572, Cl 544-229.000
- Galatis, Demetre: *See—*
  - Olsen, J H.; Harvey, Thomas L.; Cornett, Mark J.; and Galatis, Demetre, 5,020,641, Cl. 187-95.000.
- Galbo, James P.; and Seltzer, Raymond, to Ciba-Geigy Corporation. N-hydrocarbyloxy hindered amine light stabilizers with phosphorus moieties. 5,021,481, Cl. 524-99 000.
- Galbo, James P., to CIBA-GEIGY Corporation Hindered amine derivatives of S-triazine-tricarboxylic acid 5,021,483, Cl 529-100.000.
- Galbo, James P., to Ciba-Geigy Corporation Hindered amine-substituted malonic acid derivatives of s-triazine. 5,021,486, Cl 524-100.000.
- Galbo, James P., to Ciba-Geigy Corporation Polysubstituted n-hydrocarbyloxy hindered amine light stabilizers. 5,021,577, Cl 546-188.000.
- Galbo, James P.: *See—*
  - Ravichandran, Ramanathan; and Galbo, James P., 5,021,478, Cl 524-91.000.
- Gamand, Patrice; and Meunier, Jean-Christophe, to U.S Philips Corp. Package for very high frequency integrated circuits. 5,021,759, Cl 333-246.000.
- Gammell, Paul M : *See—*
  - Vernon, Susan N.; Sircus, Brian, and Gammell, Paul M., 5,021,738, Cl. 324-232.000.
- Gandhi, Haren S.: *See—*
  - Chattha, Mohinder S.; Watkins, William L. H.; and Gandhi, Haren S., 5,021,389, Cl. 502-303.000.
- Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo; and Tognella, Sengio, to Boehringer Mannheim Italia, S.p.A. 2-thiomethyl-substituted-1,4-dihydropyridines, and pharmaceutical compositions containing same and antihypertensive properties. 5,021,436, Cl. 514-356.000.
- Gandy, Kenneth A. Novelty squirting straw. 5,021,019, Cl. 272-27.00B.
- Ganesan, Sudalaimuthu G.: *See—*
  - Swartzel, Kenneth R.; Ganesan, Sudalaimuthu G.; Kuehn, Richard T.; Hamaker, Raymond W.; and Sadeghi, Farid, 5,021,981, Cl 364-557.000.
- Ganz, Gilbert J Saddle connection for balloons. 5,021,022, Cl. 446-220.000.
- Garavaglia, Carlo: *See—*
  - Colle, Roberto; Camaggi, Giovanni; Ratti, Giuseppina; Garavaglia, Carlo; and Mirenna, Luigi, 5,021,442, Cl. 514-383.000.
- Garbe, James E.; and Mitra, Smarajit, to Minnesota Mining and Manufacturing Company. Polysiloxane-grafted copolymer topical binder composition with novel hydrophilic monomers and method of coating therewith. 5,021,477, Cl. 424-70.000.
- Garcia, Gervasio B. Automobile anti-theft device. 5,020,344, Cl. 70-245.000.
- Garcia, Warren W., to Gold Ribbon Concepts, Inc. Ribbon loudspeaker. 5,021,613, Cl. 179-115.00V.
- Gariboldi, Franco; and Conti, Paolo, to Lambda S.r.l. Circular textile machine for simultaneously forming a plurality of tubular knitted articles such as panty-hose (tights) and the like. 5,020,340, Cl. 66-125.000.
- Gariepy, Bruno: *See—*
  - Thibault, Marc-Andre; Auger, Marc; Gariepy, Bruno; and Gendron, Andre, 5,020,778, Cl. 266-89.000.
- Garnick, Marc, to Genetics Institute, Inc. Use of M-CSF to improve lipoprotein cholesterol profiles. 5,021,239, Cl. 424-85.100.
- Garofalo, Giovanni, to AMF Mares S.p.A. Automatic regulator for breathing apparatus. 5,020,531, Cl. 128-205.240.
- Garrett, Robert Y., to BFGoodrich Company, The. Formaldehyde-free, self-curing interpolymers and articles prepared therefrom. 5,021,529, Cl. 526-304.000.

- Garriott, Owen K. *See—*
  - von Bun, Friedrich O , and Garriott, Owen K , 5,020,743, Cl 244-159.000.
- Garrison, Judd, to Batts, Inc. Article gripping means and method of making same. 5,020,705, Cl. 223-96.000.
- Gartner, Klaus W.; Uyeda, Alan K., and Phillips, Peter J., to La Gard, Inc. Self-locking electronic lock. 5,020,345, Cl. 70-277.000.
- Garwood, William E. *See—*
  - Bortz, Robert W.; Garwood, William E., Le, Quang N , and Wong, Stephen S., 5,021,142, Cl. 208-58 000
- Gary, Lonnie F., to Gary Products Group, Inc. Decorative light shade 5,021,935, Cl. 362-237.000.
- Gary Products Group, Inc : *See—*
  - Gary, Lonnie F., 5,021,935, Cl 362-237 000.
- Gas Fired Products: *See—*
  - Horne, Frank L., 5,020,721, Cl. 236-20 00R
- Gas Research Institute: *See—*
  - Hoffman, Richard E., Topping, Richard; Nelson, Tom W , Murville, Marie L.; and Belkus, Paul, 5,020,563, Cl. 137-75.000.
  - Talbert, Sherwood G.; and Jakob, Frank E., 5,020,320, Cl 62-238.700.
  - Wilkinson, William H., 5,020,334, Cl 62-271.000.
- Gassen, Karl-Rudolf. *See—*
  - Muller, Klaus-Helmut, Kluth, Joachim; Konig, Klaus, Gassen, Karl-Rudolf; Findeisen, Kurt, Lindig, Markus; Lurssen, Klaus, Santel, Hans-Joachim; and Schmidt, Robert R., 5,021,080, Cl. 71-92.000.
- Gassner, Siegfried. *See—*
  - Kauer, Harald, Overlach, Knud; Edelmann, Rolf, and Gassner, Siegfried, 5,020,236, Cl. 33-700.000.
- Gastinger, Robert G , and Hayes, John E , to ARCO Chemical Technology, Inc. Polyol polyacrylate dispersants. 5,021,506, Cl 525-63.000.
- Gatti, Maria T. *See—*
  - Bertotti, Franco, Ferrari, Paolo; and Gatti, Maria T , 5,021,860, Cl. 357-48.000.
- Gauert, Rolf; and Hansli, Werner, to Honeywell Regelsysteme GmbH Ring laser gyro comprising rotary oscillation apparatus. 5,020,911, Cl 356-350.000.
- Gauntt, David L.: *See—*
  - Knight, Walter E , Clark, Kenneth G., and Gauntt, David L., 5,021,489, Cl. 524-140.000.
- Gauthier, Daniel. Skyline-suspended carriage for heavy load pulling. 5,020,443, Cl. 104-230.000.
- Gauthier, Michel: *See—*
  - Armand, Michel. Gauthier, Michel, and Muller, Daniel, 5,021,308, Cl. 429-194.000.
- Gautier, Pieter A., Geuze, Maarten M , Mastenbroek, Barend; and Petrus, Leonardus, to Shell Oil Company. Continuous polymerization of Co/olefin in plurality of reactors in series. 5,021,547, Cl. 528-392.000.
- Gawler, David A.; Gilham, Dennis T , and Williams, Thomas D., to Alcatel Business Systems Limited Printed stamp machine 5,020,428, Cl. 101-91.000.
- Gay, Walter A., to Olin Corporation. Oxidized activated carbon and its use in removal of aromatic compounds from aqueous solutions. 5,021,164, Cl. 210-694.000.
- Gebraeder Welger GmbH & Co. KG *See—*
  - Matthies, Hans J., 5,020,311, Cl. 56-432 000.
- GEC Avery Technology Limited *See—*
  - Stubbs, Timothy C., 5,021,964, Cl. 364-464.030
- GEC-Marconi Limited: *See—*
  - Hurd, David L., 5,021,791, Cl. 342-93 000.
  - Kettlewell, Jonathan P.; and Smith, Brian F , 5,021,657, Cl. 250-330.000.
- Geha-Werke GmbH *See—*
  - Strohmeyer, Willi, 5,020,733, Cl. 241-100.000.
- Geisseler, Max, to Aspa Zurich AG. Process and device for processing granulated materials. 5,021,149, Cl. 209-141.000.
- Gelman Sciences, Inc.: *See—*
  - Wolpert, Stephen M , 5,021,160, Cl. 210-500.350.
- Genahr, Rudolf; and Mahler, Hansjurg, to Cerberus AG Intrusion detection system. 5,021,766, Cl. 340-544.000.
- Genha, Susumu: *See—*
  - Kita, Toshiro; Genba, Susumu; Takemoto, Masato; Tatsumi, Takashi; Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi; Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji; and Yoshida, Toshihiko, 5,021,892, Cl. 358-468.000.
- Gendreau, Paul M.; and Cadorniga, Lauro C., to Acushnet Company Golf ball and method of making same. 5,020,803, Cl. 273-225.000
- Gendron, Andre: *See—*
  - Thibault, Marc-Andre; Auger, Marc; Gariepy, Bruno; and Gendron, Andre, 5,020,778, Cl. 266-89.000.
- General Dynamics Corp.: *See—*
  - Bradley, Eric M., 5,022,042, Cl. 372-75.000.
- General Dynamics Corp., Air Defense Systems Div : *See—*
  - Coburn, Robert W., 5,020,436, Cl. 102-377.000.
- General Dynamics Corp./Electronics Division: *See—*
  - Bradley, Eric M., 5,022,038, Cl. 372-50.000.
- General Electric Canada Inc.: *See—*
  - Eastcott, Peter D., 5,020,649, Cl. 192-48.100.
- General Electric CGR SA: *See—*
  - Trotel, Jacques, 5,022,060, Cl. 378-19.000.
- General Electric Company: *See—*
  - Candelora, Andrew M.; Nolan, Kevin F.; Magnon, Gary D., and Seymour, Raymond K., 5,021,819, Cl. 335-15.000.
  - Chan, David S. K , and Staver, Daniel A , 5,021,987, Cl. 364-754.000.
  - Ekstedt, Edward E.; and Taylor, Jack R., 5,020,329, Cl. 60-737 000.
  - Gonzalez, Raphael A., and Kelly, Ronald W . 5,020,217, Cl 29-882.000.
  - Hunsbedt, Anstein; and Fanning, Alan W., 5,021,211, Cl 376-299.000.
  - Krabbenhoft, Herman O.; and Boden, Eugene P , 5,021,521, Cl. 525-462.000.
  - Schwarzschild, Marc, 5,020,744, Cl. 244-164 000.
  - Singh, Raj N., and Morrison, William A., 5,021,367, Cl. 501-88 000
  - Stetson, Jr. John B., 5,020,745, Cl. 244-165.000.
  - Vdoviak, John W., 5,020,318, Cl. 60-226.100.
  - Wandler, Richard A.; and Renkes, Kenneth R., 5,021,915, Cl 361-26.000.
- General Engineering Company: *See—*
  - Coblentz, David L., 5,020,832, Cl 285-197 000.
- General Motors Corporation: *See—*
  - Grey, Thaddeus J., Braun, Charles W , and Palmer, Dwight O., 5,020,505, Cl 123-571.000.
  - Reddy, S Raghuma, 5,021,071, Cl. 55-58 000.
  - St Angelo, Stephen, Jr., Carver, George C , Patterson, David W , and Fremont, Owen K., 5,020,278, Cl. 49-490.000
  - Short, William T., 5,021,278, Cl. 428-76.000
  - Vaz, Nuno A.; and Smith, George W., 5,021,188, Cl. 252-299 500
- Genetics Institute, Inc.: *See—*
  - Garnick, Marc, 5,021,239, Cl. 424-85.100
- Genna, Sebastian; and Smith, Andrew P., to Digital Scintigraphics, Inc Movable calibration collimator and system and method using same 5,021,667, Cl. 250-363.100
- Genovese, Joseph E.: *See—*
  - Birbara, Philip J., and Genovese, Joseph E., 5,021,070, Cl. 55-46.000.
- Gent, John A G.; and Blass, Jacob M , to Cogent Limited. Treatment of cords, threads and filaments. 5,021,267, Cl 427-387.000
- Gentex Corporation: *See—*
  - Aileo, Jackson A.; and Long, Richard J , 5,020,163, Cl. 2-209.000.
- Gentry, Jefferson L : *See—*
  - Foster, Robert W., Jr.; and Gentry, Jefferson L., 5,020,517, Cl. 128-33.000.
- Gentry, William T.; and Kogutt, Samuel M . to Dart Manufacturing Company. Fishing bait organizer. 5,020,269, Cl. 43-54 100.
- Geophysical Engineering Company: *See—*
  - Assaf, Gad; and Fisher, Uriyel, 5,020,333, Cl. 62-271.000.
- George, Donald A.; Berry, Peter B.; Creps, Bruce W.; and Roles, Geraldine C., to Burley Design Cooperative. Collapsible bicycle trailer. 5,020,814, Cl. 280-204.000.
- George, Eric R.: *See—*
  - Machado, Joseph M . and George, Eric R., 5,021,496, Cl. 524-417.000.
- George, Philip C., to Volvo GM Heavy Truck Corporation. Three-point seat belt. 5,020,856, Cl. 297-483.000.
- George, Philip C.: *See—*
  - Lindberg, Kenneth M., Spykerman, David J.; George, Philip C.; and Mersman, Wesley D , 5,020,855, Cl. 297-391.000.
- Gerber Garment Technology, Inc.: *See—*
  - Wolfson, Lawrence S , Pearl, Kevin A., and Moskwa, Russell M , 5,020,405, Cl. 83-374.000.
- Gerdes, Richard C. Analog to digital and digital to analog signal processors. 5,021,786, Cl. 341-143.000.
- Gerharz, Gabriele: *See—*
  - Fridez, Jean-Daniel, and Gerharz, Gabriele, 5,021,388, Cl. 502-261.000.
- Gerlach, Al. Adjustable tie down apparatus and method. 5,020,192, Cl 24-136.00R.
- Germanaud, Laurent; and Nouguier, Robert, to Elf France. Additives to lubricating oils having extreme pressure, antiwear and antioxidant effects, process for preparation thereof and lubricating compositions containing said additives. 5,021,175, Cl. 252-46.600.
- Gesing, Ernst: *See—*
  - Kirsten, Rolf; Kluth, Joachim; Fest, Christa, Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,082, Cl. 71-93.000.
- Geuze, Maarten M.: *See—*
  - Gautier, Pieter A.; Geuze, Maarten M., Mastenbroek, Barend, and Petrus, Leonardus, 5,021,547, Cl. 528-392.000.
- Gevins, Alan S.: *See—*
  - Morgan, Nelson H.; and Gevins, Alan S , 5,020,538, Cl 128-653.00R.
- Geyer, Hans-Juergen: *See—*
  - Langerbeins, Klaus; Klesse, Wolfgang; Tessmer, Dieter; Elser, Wilhelm; and Geyer, Hans-Juergen, 5,021,469, Cl. 523-201.000.
- GEZE Sport International GmbH. *See—*
  - Bogner, Martin, 5,020,823, Cl. 280-634.000.
- Giacobbe, Robert A.; Tkacz, Jan S.; Masurekar, Prakash S.; Kaplan, Louis; and Sosa, Margaret S., to Merck & Co., Inc. Antibiotic agent produced by the cultivation of *Zalerion* microorganism in the presence of mannitol. 5,021,341, Cl. 435-71.100.
- Gianna, Roberto; De Gregoriis, Enrico; and Boni, Renzo, to Eniricerche S.p.A.; and Enichem Synthesis S.p.A. Enzyme extract from germinated sorghum for hydrolysis of protein material. 5,021,338, Cl. 435-68.100.
- Giannini, Umberto: *See—*
  - Canova, Luciano; Giannini, Umberto; and Albizzati, Enrico, 5,021,514, Cl. 525-351.000.

VOL 1127 ISS 1 JE 4 1991 UMI

- Giants, Thomas W.: *See—*
  - Dougherty, Thomas K.; and Giants, Thomas W., 5,021,585, Cl 548-406.000.
- Gibson, Harry V.; and Jois, Yajnanarayana H. R., to Virginia Tech Intellectual Properties, Inc. Formation of Reissert compound of bisbenzimidazole. 5,021,583, Cl. 548-328.000.
- Gichner Systems Group, Inc.. *See—*
  - McIlwraith, George, 5,020,866, Cl. 312-265.400.
- Giesa, Paula A.; Hilleman, Maurice R.; and Provost, Philip J., to Merck & Co., Inc. Attenuated hepatitis A virus. 5,021,348, Cl. 435-237.000.
- Giesen, Adolf; Bea, Martin; and Borik, Stefan. Laser mirror head 5,020,895, Cl. 350-608.000.
- Gilbert, Lloyd. Traction system. 5,020,614, Cl. 180-9.210.
- Gilham, Dennis T.: *See—*
  - Gawler, David A.; Gilham, Dennis T ; and Williams, Thomas D., 5,020,428, Cl. 101-91.000.
- Gill, James A., to Sans. Gas. Inc. Method to prevent gas intrusion into wellbores during setting of cements. 5,020,594, Cl. 166-250.000.
- Gillard, Clive H.: *See—*
  - Avis, Richard J. A.; and Gillard, Clive H., 5,021,881, Cl. 358-140.000.
- Gillard, John W.: *See—*
  - Guindon, Yvan; Yoakim, Christiane; Gillard, John W.; and Girard, Yves, 5,021,447, Cl. 514-411.000.
- Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., to International Flavors & Fragrances Inc. Adamantane derivatives, compositions of matter containing same, processes for preparing said adamantane derivatives and said compositions, and organoleptic and deodorancy uses of said adamantane derivatives and said compositions. 5,021,184, Cl. 252-174.110.
- Gillingham, Peter: *See—*
  - Colbeck, Roger; and Gillingham, Peter, 5,021,681, Cl. 307-261.000.
- Gilmour, John E., to Westinghouse Electric Corp. Sonar system of the type using hollow conical beams. 5,022,015, Cl. 367-124.000.
- Gimelli & Co. AG: *See—*
  - Scherer, Benjamin, 5,020,179, Cl. 15-22.100.
- Giorgi, Leonardo: *See—*
  - Azzerri, Nazzareno; and Giorgi, Leonardo, 5,021,104, Cl. 148-276.000.
- Giorgini, Gerardo: *See—*
  - Vercesi, Piercarlo; Davico, Claudio; and Giorgini, Gerardo, 5,020,896, Cl. 350-636.000.
- Girard, Yves: *See—*
  - Guindon, Yvan; Yoakim, Christiane; Gillard, John W.; and Girard, Yves, 5,021,447, Cl. 514-411.000.
- GKN Automotive AG: *See—*
  - Beigang, Wolfgang, 5,021,038, Cl. 475-85.000.
- Glant, Michael D.: *See—*
  - Davis, Richard E.; and Glant, Michael D, 5,021,218, Cl. 422-104.000.
- Glaser, Thomas: *See—*
  - Junge, Bodo; Richter, Bernd; Glaser, Thomas; and Traber, Jorg, 5,021,438, Cl. 514-373.000.
- Glover, Larry A.; McCarty, John P.; and Burris, Donald J., deceased (by Burris, Shirley C., United Bank of Greeley, co-personal representatives), to Burris Company, Inc. Aperture control for telescopic gunsight. 5,020,892, Cl. 350-537.000.
- Gluchowski, Charles, to Allergan, Inc. Method for using (2-imidazolin-2-ylamino) quinoxalines to reduce or maintain intraocular pressure. 5,021,416, Cl. 514-249.000.
- Gluck, Frederick G.: *See—*
  - Morrison, Gordon E.; Brooks, Christopher B.; and Gluck, Frederick G., 5,021,945, Cl. 364-200.000.
- Gluskoter, Steven D.: *See—*
  - Hardt, Thomas T.; and Gluskoter, Steven D., 5,020,768, Cl. 248-678.000.
- Gneiss, Heinz, to Robert Bosch GmbH Flow rate meter. 5,020,365, Cl. 73-204.270.
- Goalard, Christian: *See—*
  - Adrey, Jose ; Berteaux, Daniel; Goalard, Christian; Gueret, Alain; Hamon, Georges; and Nourissat, Christian, 5,021,062, Cl. 623-22.000.
- Gobin, Phil L. Resuscitation device with filter. 5,020,529, Cl. 128-202.280.
- Godat, Jean: *See—*
  - Krzywdziak, Alain; Parmenon, Daniel; and Godat, Jean, 5,020,700, Cl. 222-487.000.
- Godau, Claus: *See—*
  - Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus; and Manz Albrecht, 5,021,473, Cl. 523-451.000.
- Godfrey, Christopher R. A.: *See—*
  - Clough, John M.; Godfrey, Christopher R. A.; de Fraine, Paul J.; Hutchings, Michael G.; and Anthony, Vivienne M., 5,021,581, Cl. 546-309.000.
- Godfrey, Leslie K.; and Lock, Robert P., to Plessey Overseas Limited. Acoustic sensing arrangements. 5,022,012, Cl. 367-3.000.
- Goettsche, Reimer, to Dr. Wolman GmbH. Wood preservatives. 5,021,459, Cl. 514-663.000.
- Goi, Kouichi, to Laurel Bank Machines Co., Ltd. Coin receiving and dispensing machine. 5,021,026, Cl. 453-40.000.
- Gokura, Akira: *See—*
  - Ozaki, Hidetoshi; and Gokura, Akira, 5,021,884, Cl. 358-167.000.
- Gold Ribbon Concepts, Inc.: *See—*
  - Garcia, Warren W., 5,021,613, Cl. 179-115.00V.
- Goldfarb, Ivan J : *See—*
  - Wang, Chyi-Shan; Goldfarb, Ivan J.; and Helminiak, Thaddeus E., 5,021,517, Cl. 525-417.000.
- Goldman, Dov B., to Olin Hunt Sub I Corp. Method for making magnetic particles having improved conductivity and their use in electrostatographic printing applications. 5,021,315, Cl. 430-106.600.
- Goldstein, Israel, to Diatech S.A. Process for manufacturing organized collagen structures, particularly of human origin, and organized collagen structures corresponding thereto. 5,021,552, Cl. 530-356.000.
- Goletz, Bernhard R.: *See—*
  - Zell, Werner V.; Becker, Johann A.; Boehm, Detlef M.; Frohlich, August G.; Schade, Detlef; and Goletz, Bernhard R., 5,020,874, Cl. 350-96.200.
- Gollabinnie, Aurav R.: *See—*
  - Nguyen, Au H.; and Gollabinnie, Aurav R., 5,021,983, Cl 364-707.000.
- Gonsalves, Edward M.; Offiler, Stephen B.; Strott, Douglas B ; and Beringhause, Steven, to Texas Instruments Incorporated. Speed/position sensor calibration method with angular adjustment of a magnetoresistive element. 5,021,736, Cl. 324-202.000.
- Gonzalez, Raphael A.; and Kelly, Ronald W., to General Electric Company. Methods for fabricating an electrical contact. 5,020,217, Cl. 29-882.000.
- Good, David M.; and Stephens, Eugene S., to Voxcom, Inc. Hang tab for hanging object on single or double wire hanger. 5,020,761, Cl 248-317.000.
- Goodbody, Jonathan: *See—*
  - Whellock, John G.; and Goodbody, Jonathan, 5,021,069, Cl. 44-622.000.
- Goodwin, Dennis L.: *See—*
  - Crabb, Richard; Robinson, McDonald; Hawkins, Mark R.; Goodwin, Dennis L.; and Ferro, Armand P., 5,020,475, Cl. 118-719.000.
- Goodyear Tire & Rubber Company, The: *See—*
  - Burroway, Gary L.; Magoun, George F.; and Gujarathi, Ramesh N., 5,021,381, Cl. 502-117.000.
  - Sandstrom, Paul H.; Wideman, Lawson G.; and Segatta, Thomas J., 5,021,492, Cl. 524-274.000.
  - Sandstrom, Paul H., 5,021,493, Cl. 524-347.000.
- Goossens, Dominique: *See—*
  - Drouet, Xavier; Goossens, Dominique; and Rouger, Philippe, 5,021,349, Cl. 435-240.310.
- Gopalsami, Nachappa; and Raptis, Apostolos C., to United States of America, Energy. Method and apparatus for millimeter-wave detection of thermal waves for materials evaluation. 5,020,920, Cl. 374-57.000.
- Gorges, Frederick J., to Boeing Company, The. Aircraft wheel hubcap. 5,020,861, Cl. 301-108.00R.
- Gorrafa, Adly A., to Du Pont de Nemours, E. I., and Company. Air texturing jet. 5,020,199, Cl. 28-273.000.
- Gosselin, Robert G.; and Wallace, Edward M., to Fiskars Oy Ab. Variable force compound action leverage tool. 5,020,222, Cl. 30-251.000.
- Gottlieb, Marvin: *See—*
  - Niioka, Yoshio, 5,021,205, Cl. 264-69.000.
- Gottschalk, Peter J. Bicycle drawn trailer. 5,020,813, Cl. 280-204.000.
- Gould, Robert K.; and Dickson, Charles R., to Aero Chem Research Lab., Inc. Apparatus for producing high purity silicon from flames of sodium and silicon tetrachloride. 5,021,221, Cl. 422-129.000.
- Government Innovators, Inc.: *See—*
  - Pickrell, John W., 5,020,844, Cl. 294-86.400.
- Grabuschnig, Josef; Scherr, Rudolf; Ritter, Klaus; and Ritter, Gerhard, to EVG Entwicklungs -u Verwertungs-Gesellschaft m.b.H. Method and installation for feeding longitudinal elements to a welding machine for grates or gratings. 5,020,575, Cl. 140-112.000.
- Grady, Michael F.: *See—*
  - Cope, Jonathan C.; Grady, Michael F.; and Pitman, Willard W., 5,020,426, Cl. 99-353.000.
- Graham, Cleve A.: *See—*
  - Nesterick, Elaine M.; Reynolds, Robert W.; MacKay, Spencer L., and Graham, Cleve A., 5,020,624, Cl. 180-210.000.
- Graham, David: *See—*
  - D'Aluisio, Christopher; and Graham, David, 5,020,819, Cl. 280-288.000.
- Grandi, Guido: *See—*
  - Toma, Salvatore; De Bue, Marina; Mele, Antonio; and Grandi, Guido, 5,021,340, Cl. 435-69.100.
- Granger, Edward M.: *See—*
  - Dey, Thomas W.; Granger, Edward M.; Vandenberg, Donald E.; Pitek, John G.; and Humbel, William D., 5,020,905, Cl. 356-124.000.
- Granroth, Richard: *See—*
  - Hamar, Douglas J.; Jayaraman, Gopal; Granroth, Richard; Whipple, Robert L.; and Evensen, Harold A., 5,020,286, Cl. 52-585.000.
- Grant, Frederic F.: *See—*
  - Mondocea, Ionel; Ullrich, William J.; and Grant, Frederic F., 5,021,901, Cl. 360-92.000.
- Grant, Louis A., Jr., to Louis A. Grant, Inc. Cleaning apparatus for a process vessel. 5,020,183, Cl. 15-246.500.
- Grassi, Angelo: *See—*
  - Monfardini, Alessio; and Grassi, Angelo, 5,021,054, Cl. 606-54.000.
- Graswinckel, Julius V. C.: *See—*
  - van der Sterren, Martin L.; and Graswinckel, Julius V. C., 5,021,836, Cl. 355-281.000.

- Grau, James: *See—*
  - Roscoe, Brad; and Grau, James, 5,021,653, Cl. 250-270.000.
- Graves, Alan F.; Greenfield, Raymond L.; and Hagglund, Barry B., to Northern Telecom Limited. Digital video signal compression. 5,021,880, Cl. 358-138.000.
- Graves Spray Supply, Inc.: *See—*
  - Smith, James E., 5,020,727, Cl. 239-526.000.
- Gray, Steven J. Binocular kaleidoscope. 5,020,870, Cl. 350-4.100.
- Green Cross Corporation: *See—*
  - Mukai, Hiromichi; Horii, Hajime; Tsujikawa, Muneo; Kawabe, Haruhide; Arimura, Hirofumi; and Suyama, Tadakazu, 5,021,339, Cl. 435-69.100.
- Green, William P. Soap holder. 5,020,753, Cl. 248-176.000.
- Greenberg, Charles E.: *See—*
  - Sweet, David H.; Greenberg, Charles E.; Lappos, Nicholas D., Walsh, David M.; and Meisner, Richard P., 5,020,316, Cl 60-39.282.
- Greene, Bruce M.; and Unnasch, Thomas R., to University Hospitals of Cleveland. Expression cDNA clones encoding antigens of *onchocerca volvulus.* 5,021,342, Cl. 435-91.000.
- Greene, John F., Jr. Apparatus for selectively releasing a bowstring of an archery bow. 5,020,508, Cl. 124-35.200.
- Greenfield, Raymond L.: *See—*
  - Graves, Alan F.; Greenfield, Raymond L.; and Hagglund, Barry B , 5,021,880, Cl. 358-138.000.
- Greenslade, Joe E. Internal thread gage. 5,020,230, Cl. 33-199.00R.
- Greenspan, Alexander, to Super Stream, Inc. Rotatable assembly 5,020,971, Cl. 416-204.00A
- Gregorio, Manuel Z.: *See—*
  - Schwartz, Russell J.; and Gregorio, Manuel Z., 5,021,090, Cl. 106-23.000.
- Greier, Josef: *See—*
  - Plohberger, Diethard; Herzog, Peter; Elliott, Keith; Fischer, Christof D.; and Greier, Josef, 5,020,494, Cl. 123-250.000.
- Grey, Thaddeus J.; Braun, Charles W.; and Palmer, Dwight O., to General Motors Corporation. Exhaust gas recirculation valve assembly. 5,020,505, Cl. 123-571.000.
- Gries, Heinz; Rosenberg, Douwe; Weinmann, Hanns-Joachim; Speck, Ulrich; Mutzel, Wolfgang; Hoyer, Georg-Alexander; and Pfeiffer, Heinrich, deceased (by Pfeiffer, Brigitte, executrix), to Schering Aktiengesellschaft. Method of enhancing NMR imaging using chelated paramagnetic ions bound to biomolecules. 5,021,236, Cl. 424-9.000.
- Grigo, Ulrich: *See—*
  - Serini, Volker; Freitag, Dieter; Idel, Karsten-Josef; Westeppe, Uwe; Grigo, Ulrich; and Paetz, Klaus-Christian, 5,021,542, Cl. 528-204.000.
- Grimes, Thomas, to Motorola, Inc. Cotent independent rule based options negotiations method. 5,021,943, Cl. 364-200.000.
- Grimm, Rainer: *See—*
  - Schlapp, Albert; Grimm, Rainer; and Bohm, Horst, 5,020,849, Cl. 296-221.000.
- Groechel, David W.; Taylor, Brad; Henri, John R.; and Obinata, Naomi, to Applied Materials, Inc. Process for RIE etching silicon dioxide. 5,021,121, Cl. 156-643.000.
- Groeneveld, Dirk W. J.; and Schouwenaars, Hendrikus J., to U S Philips Corporation. Calibrated current source with ripple reduction. 5,021,784, Cl. 341-120.000.
- Grogor, Bruno: *See—*
  - Wurl, Ernst; Hafner, Alfred; Paulsen, Jurgen, Marienfeld, Peter, and Grogor, Bruno, 5,020,914, Cl. 366-79.000.
- Grollier, Jean F., to L'Oreal. Composition for dyeing keratinous fibres employing an indole dye and at least one para-phenylenediamine disubstituted on one of the amino groups and process employing it. 5,021,067, Cl. 8-409.000.
- Grome, Donald C.; Lundstedt, Kurt H., and Olson, William, to Illinois Tool Works Inc. Door closure mechanism. 5,020,189, Cl. 16-286.000.
- Gross, Akiva T.: *See—*
  - Stark, Leonard E.; and Gross, Akiva T., 5,021,248, Cl. 426-96.000.
- Gross, David R.; and Valenzky, Robert J., to J. M. Smucker Company, The. Method and apparatus for dehydrating fruit. 5,020,237, Cl. 34-1.000.
- Gross, Ronald; and Bennett, Walter L., to Transition Technology, Inc. Mode-selectable communications system. 5,021,777, Cl. 340-825.540
- Grote & Hartmann GmbH & Co. KG *See—*
  - Zinn, Bernd, 5,021,923, Cl. 361-380.000.
- Grote Manufacturing Co., The: *See—*
  - DeShong, Michael H., 5,021,617, Cl. 200-61.270.
- Grouhel, Agnes G.: *See—*
  - Aubard, Gilbert G.; Grouhel, Agnes G.; Junien, Jean-Louis. Roux, Claude P.; and Torossian, Dieran R., 5,021,408, Cl. 514-179.000.
- Grumman Aerospace Corporation: *See—*
  - Fuoco, Francis J.; and Linardos, Anthony, 5,021,732, Cl. 324-158.00F.
  - Kornely, Michael G., Jr.; Holmes, Douglas; and Micich, Robert G., 5,021,741, Cl. 328-227.000.
  - Manitt, Philip J.; Thomas, Vincent F.; and McAllister, William J., 5,020,364, Cl. 73-147.000.
  - Williams, Stuart J., 5,020,576, Cl. 140-149.000.
- Grusha, John: *See—*
  - Hellewell, Todd D.; Grusha, John; and McCartney, Michael S., 5,020,454, Cl. 110-264.000.
- Grzych, Jean-Marie: *See—*
  - Montreuil, Jean; Spik, Genevieve; Capron, Andre; Dissous, Colette; and Grzych, Jean-Marie, 5,021,560, Cl. 536-1.100.
- GTE Laboratories Incorporated: *See—*
  - Melman, Paul; Elman, Boris S.; Koteles, Emil S., and Jagannath, Chirravuri, 5,021,360, Cl. 437-81.000.
- GTE Products Corporation: *See—*
  - Lesea, Ronald A., 5,021,716, Cl. 315-219.000.
  - Ludwig, David C.; and Penkunas, Joseph J., 5,021,208, Cl. 264-344.000.
  - Madden, Sandra L.; Beschle, Mark D., and Martin, Roy C., 5,021,711, Cl. 313-623.000.
  - Maya, Jakob; Michael, Joseph D.; and Lagushenko, Radomir, 5,021,718, Cl. 315-358.000.
  - Passmore, Edmund M.; and Keeffe, William M., 5,021,703, Cl 313-25.000.
  - Vanderpool, Clarence D.; and Kim, Tai K., 5,021,133, Cl 204-86.000.
  - Wright, John O., 5,021,010, Cl. 439-578.000.
- GTE Valenite Corporation: *See—*
  - Pawlik, James A., 5,020,944, Cl. 407-42.000.
- Gual, Dominique; and Gual, Georges. Wind motor module made by assembling a parabolic-flow turbine between a base and a dome 5,020,967, Cl. 415-4.400.
- Gual, Georges: *See—*
  - Gual, Dominique; and Gual, Georges, 5,020,967, Cl. 415-4.400.
- Gueremy, Claude: *See—*
  - Comte, Marie-Iherese; Gueremy, Claude; Malleron, Jean-Luc, Mignani, Serge; Peyronel, Jean-Francois, and Truchon, Alain, 5,021,420, Cl. 514-253.000.
- Gueret, Alain: *See—*
  - Adrey, Jose ; Berteaux, Daniel; Goalard, Christian; Gueret, Alain; Hamon, Georges; and Nourissat, Christian, 5,021,062, Cl. 623-22.000.
- Guerret, Jean-Louis, to L'Oreal. Method for manufacturing a make-up brush. 5,020,551, Cl. 132-200.000.
- Guffey, Timothy B.; Boatman, Donn N.; Abe, Susan S.; Talkington, Sherry R.; and Mijac, Marko D., to Procter & Gamble Company, The. Shortening compositions containing polyol polyesters. 5,021,256, Cl. 426-601.000.
- Gugumus, Francois, to Ciba-Geigy Corporation Light stabilizer combination. 5,021,485, Cl. 524-100.000.
- Guichon, Herve , to Crouzet (Societe Anonyme francaise). Data transmission method and device. 5,022,029, Cl 371-38.100.
- Guilbaud, Daniel: *See—*
  - Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; Leclere, Jean; and Romand, Paul, 5,021,024, Cl. 452-149.000.
- Guilhem, Jean C.: *See—*
  - Perroud, Bruno G.; Rouquayrol, Claude J., and Guilhem, Jean C., 5,020,730, Cl. 239-745.000.
- Guindon, Yvan; Yoakim, Christiane; Gillard, John W.; and Girard, Yves, to Merck Frosst Canada, Inc. Tetrahydrocarbazole 1-alkanoic acids and pharmaecutical compositions. 5,021,447, Cl. 514-411.000.
- Gujarathi, Ramesh N.: *See—*
  - Burroway, Gary L.; Magoun, George F., and Gujarathi, Ramesh N., 5,021,381, Cl. 502-117.000.
- Gullett, Brian K., to United States of America, Environmental Protection Agency. Reduction of chlorinated organics in the incineration of wastes. 5,021,229, Cl. 423-245.300.
- Gunawardena, Charith: *See—*
  - Cowlin, Simon; Clark, Leslie; Dennis, Timothy, and Gunawardena, Charith, 5,020,675, Cl. 209-538.000.
- Gunderson, Gary W.: *See—*
  - Gunderson, Robert A.; Koffski, Leonard E , and Gunderson, Gary W., 5,020,634, Cl. 182-184.000.
- Gunderson, Robert A.; Koffski, Leonard E.; and Gunderson, Gary W., to First Choice Distributors, Inc. Support bracket. 5,020,634, Cl 182-184.000.
- Gunness, David W., to Electro-Voice, Inc. Loudspeaker and horn therefor. 5,020,630, Cl. 181-192.000.
- Gunther, Martin, to Hewlett-Packard Company. Measuring probe 5,020,537, Cl. 128-634.000.
- Gunther, Peter; Wirth, Hermann O.; and Endlich, Wilhelm, to Ciba-Geigy Corporation. Latent hardeners for melamine resin moulding compositions. 5,021,474, Cl. 524-14.000.
- Gunze Ltd.: *See—*
  - Tanaka, Akihiro; Ohsima, Tetsuhiro; and Sakamoto, Takumi, 5,021,036, Cl. 474-237.000.
- Gupta, Ashis S.: *See—*
  - Rudick, Arthur G.; and Gupta, Ashis S , 5,021,219, Cl. 422-112.000
- Gupta, Rakesh K.: *See—*
  - Varde, Uday M.; Tackie, Michael N ; and Gupta, Rakesh K , 5,021,519, Cl. 525-423.000.
- Gurit-Essex AG: *See—*
  - Schreiber, Herbert; and Saur, Wolfgang, 5,021,484, Cl. 524-100.000.
- Gustafson, Warren H., to Radio Frequency Systems, Inc N-way signal splitter with isolated outputs. 5,021,755, Cl. 333-128.000.
- Gutierrez, Felipe, to Charlesworth Overseas Limited Process for inserting rigid segments in security paper. 5,020,581, Cl. 162-103.000.
- Gutsche, Guenter E. Method and apparatus for water harvesting. 5,020,307, Cl. 56-8.000.
- Gwin, Dennis L., Van Scotter, Keith T.; and Montgomery, Ron L., to Union Camp Corporation. Drum washer having liquid collecting means. 5,021,126, Cl. 162-263.000.
- H-S Precision, Inc.: *See—*
  - Houghton, Thomas M., 5,020,260, Cl. 42-75.020.
- Haacke, Ernest D.: *See—*
  - Yarbrough, Roy; Haacke, Ernest D., and Jansson, Lars G , 5,021,687, Cl. 307-456.000.

VOL 1127
ISS 1
JE 4
1991
UMI

- Haaker. Paul R.; Klotz, Erhard P. A., Koppe, Reiner H.; and Linde, Rolf E., to U.S. Philips Corp. Method of and device for forming layer images of an object. 5,022,066, Cl. 378-2.000.
- Hackell, Lloyd A., to United States of America, Energy. Ring laser having an output at a single frequency 5,022,033, Cl. 372-25.000.
- Hackler, David W.: *See—*
  - Miles, Larry N.; Drinnen, Cecil A , Hackler, David W.; Bogart, Tom L.; Macklin, Arnold D.; Sharpsteen, Ben E.; Hyles, Truett M.; and Stephens, Herschel M , 5,020,714, Cl. 228-15.100.
- Hadano, Eiichi: *See—*
  - Fujisawa, Hiromichi; Hatakeyama, Atsushi; Fujinawa, Masaaki. and Hadano, Eiichi, 5,021,989, Cl. 364-900.000
- Haden Schweitzer Corporation: *See—*
  - West, Kenneth J.; and Slater, Andrew, 5,020,470, Cl. 118-326.000.
- Hadfield, Robert W., to Butler Manufacturing Company Activating undercarpet cable from infloor conductors. 5,021,608, Cl. 174-48.000.
- Haegeman, Johny H. Mixer/aerator for waste water. 5,021,154, Cl. 210-221.200.
- Hafner, Alfred: *See—*
  - Wurl, Ernst; Hafner, Alfred, Paulsen, Jurgen; Marienfeld, Peter: and Grogor, Bruno, 5,020,914, Cl. 366-79.000.
- Hagan, John. *See—*
  - Walter, Gerard S.; and Hagan, John, 5,021,014, Cl 439-798.000.
- Hagedorn, Myrna L.: *See—*
  - Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anuhhav; and Boden, Richard M , 5,021,184, Cl. 252-174 110.
- Hagerup, Carl F. Radei—a beam compass 5,020,227, Cl 33-27.030.
- Hagglund, Barry B.: *See—*
  - Graves, Alan F.; Greenfield, Raymond L., and Hagglund, Barry B , 5,021,880, Cl. 358-138.000.
- Hagi, Mitsuharu: *See—*
  - Kobayashi, Motonobu; Kinoshita, Futoru, Hagi, Mitsuharu; Inoue, Akira; and Uno, Terushige. 5,021,227, Cl. 423-212.000.
- Hagiwara, Isao: *See—*
  - Takeda. Mutsuhiko; Mizukami, Masamichi; Norisue, Yasumasa, Hagiwara, Isao; and Zaima, Fumiya, 5,021,197, Cl. 260-399 000.
- Haider, Maximilian. *See—*
  - Lanio, Stephan; and Haider, Maximilian, 5,021,670, Cl 250-396 00R.
- Haines, Neil R.; and Morgan, Kim, to John Lysaght (Australia) Limited. Cladding layer. 5,020,295, Cl. 52-630.000.
- Hajjar. Victor J Modular wall. 5,020,290, Cl. 52-242.000.
- Hajos, Gyorgy: *See—*
  - Fodor, Tamas; Fischer, Janos; Dobay, Laszlo; Trischler, Ferenc; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Szporny, Laszlo; and Hajos, Gyorgy, 5,021,597, Cl. 556-69.000
- Hajos, Zoltan G.; Kanojia, Ramesh M., and Press, Jeffery B , to Ortho Pharmaceutical Corporation 6-substituted purinyl piperazine derivatives. 5,021,574, Cl. 544-276.000.
- Hakansson, Jan: *See—*
  - Peterman, Thomas H ; Anderson, David L., Hakansson, Jan; and Marovskis, Harijs B., 5,020,304, Cl. 53-458.000.
- Haken, Roger A ; and Scott, David B., to Texas Instruments Incorporated. NMOS source/drain doping with both P and As. 5,021,851, Cl. 357-23.900.
- Hale, Arthur H.: *See—*
  - Cowan, Kenneth M . and Hale. Arthur H., 5,020,598, Cl. 166-293.000.
- Hale, Paul S.: *See—*
  - Shin, Kju H.; and Hale, Paul S., 5,021,169, Cl. 549-255.000.
- Halford, James; and Reed, William B., to Halford, James. Straw spreader for a combine harvester and method of spreading. 5,021,030, Cl. 460-111.000.
- Hall, John H. Compound modulated integrated transistor structure. 5,021,858, Cl. 357-42.000.
- Haller, Gordon A.: *See—*
  - Lowrey, Tyler A.; Durcan, Dermot M.; Doan, Trung T.; Haller, Gordon A.; and Tuttle, Mark E., 5,021,353, Cl. 437-34.000.
- Halliburton Logging Services, Inc.: *See—*
  - Arnold, Dan McCay, 5,021,652, Cl. 250-267.000.
- Hamada, Masa: *See—*
  - Takeuchi, Tomio; Aoyagi, Takaaki; Hamada, Masa; Naganawa, Hiroshi; and Yoshida, Shigemi, 5,021,549, Cl. 530-330.000.
- Hamada, Takeaki; Abe, Kiyoshi; Takei, Hitoshi; and Sato, Kenji, to Sanwa Shutter Corporation. Elevation bed. 5,020,169, Cl. 5-10.200.
- Hamakawa, Yoshihiro; Okamoto, Hiroaki; and Hattori, Yutaka, to Nippon Soken, Inc.; Nippondenso Co., Ltd.; and Hamakawa, Yoshihiro. Method of forming microcrystalline silicon-containing silicon carbide film. 5,021,103, Cl. 148-33.000.
- Hamaker, Raymond W.: *See—*
  - Swartzel, Kenneth R.; Ganesan, Sudalaimuthu G.; Kuehn, Richard T.; Hamaker, Raymond W.; and Sadeghi, Farid, 5,021,981, Cl. 364-557.000.
- Hamar, Douglas J.; Jayaraman, Gopal; Granroth, Richard; Whipple, Robert L.; and Evensen, Harold A., to Portage Holding, Inc. Portable sectional flooring system with post support. 5,020,286, Cl. 52-585.000.
- Hambly, Pauline; and Frias, Ann. Flat toy doll and flat toy doll and folio system. 5,021,020, Cl. 446-73.000.
- Hamilton, Herman O.: *See—*
  - Odor, Louis; and Hamilton, Herman O., 5,020,606, Cl. 173-163.000.
- Hamilton, Scott B.: *See—*
  - Rosenow, Michael J.; Hamilton, Scott B.; and Bass, Thomas M., 5,022,076, Cl. 380-2.000.
- Hammon, Robert W.. *See—*
  - Crane, Hewitt D ; and Hammon, Robert W . 5,022,086, Cl 382-2.000.
- Hammond, John M *See—*
  - Petropoulos, Mark, and Hammond. John M., 5,021,109, Cl 156-137.000.
- Hammond, Kevin: *See—*
  - Elmes, Alfred R ; Hammond, Kevin, and Sherrington, David C , 5,021,462, Cl. 521-63.000
- Hamon, Georges: *See—*
  - Adrey, Jose ; Berteaux, Daniel, Goalard, Christian, Gueret, Alain, Hamon, Georges; and Nourissat, Christian, 5,021,062, Cl 623-22.000.
- Hanamura, Shoji: *See—*
  - Sasaki, Katsuro; Shimohigashi, Katsuhiro; and Hanamura, Shnji, 5,021,944, Cl. 365-200.000.
- Hanawa, Yasuo: *See—*
  - Era, Susumu; Iwasaki, Kishiro; Yokokura, Hisao; Hanawa, Yasuo. Kondo, Katsumi; Nakada, Tadao; Kitamura, Teruo; and Mukoh. Akio, 5,020,883, Cl. 350-350.00S.
- Handa, Keiji: *See—*
  - Kiyono, Fumio, Saito, Takayuki; and Handa, Keiji, 5,020,724, Cl 239-102.200.
- Handjani, Rose-Marie· *See—*
  - Vanlerberghe, Guy; and Handjani, Rose-Marie, 5,021,200, Cl. 264-4.300.
- Handy, Allen L.: *See—*
  - Krubsack, Larry J.; Handy, Allen L.; and Lawton, John G , 5,021,760, Cl 335-196.000.
- Handzel, Mark J.: *See—*
  - Paneth, Eric; Handzel, Mark J.; Morley, Steven A . and Avis, Graham M , 5,022,024, Cl. 370-50 000
- Hanna, Marie R.: *See—*
  - Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.. Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G ; Narula, Anubhav; and Boden, Richard M. 5,021,184, Cl. 252-174.110.
- Hanselmann, Daniel: *See—*
  - Demuth, Robert; Hefti, Walter, Keller, Urs. and Hanselmann, Daniel, 5,020,924, Cl 384-536.000.
- Hansen, Keith. *See—*
  - Poenisch, Paul; and Hansen, Keith, 5,021,980, Cl. 364-557.000.
- Hansli, Werner: *See—*
  - Gauert, Rolf; and Hansli, Werner, 5,020,911, Cl 356-350.000
- Hanyu, Susumu; and Kato, Kenji, to Janome Sewing Machine Company Limited. Lower thread amount display device of sewing machine. 5,020,461, Cl 112-278.000.
- Hara, Junichiro; and Miyahara, Hideaki, to Kabushiki Kaisha Toshiba Automatic bank note transaction apparatus. 5,021,639, Cl 235-379.000.
- Hara, Makoto: *See—*
  - Okano, Shinichi; and Hara, Makoto, 5,021,656, Cl 250-327.200.
- Hara, Nobuyuki: *See—*
  - Masai, Naruhito; Enomoto, Masao; Kojima, Atsuyuki, Masumori, Hiroaki: Hara, Nobuyuki; Hara, Youichi, and Morooka. Shigeaki, 5,021,435, Cl. 514-342.000.
- Hara, Yoshinori: *See—*
  - Wada, Keisuke; Hara, Yoshinori; and Sasaki, Koushi, 5,021,589, Cl 549-325.000.
- Hara, Youichi: *See—*
  - Masai, Naruhito; Enomoto, Masao; Kojima. Atsuyuki, Masumori, Hiroaki; Hara, Nobuyuki; Hara, Youichi; and Morooka. Shigeaki, 5,021,435, Cl. 514-342.000.
- Harada, Setsuo; Nagaoka, Akinobu; Itoh, Katsumi; and Terao, Shinji, to Takeda Chemical Industries, Ltd Cerebral function ameliorating agents related to Tan-950 A. 5,021,439, Cl. 514-380 000.
- Harano, Tetsuo: *See—*
  - Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki, Ohta. Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, 5,021,877, Cl. 358-75.000.
- Harao, Noriyuki: *See—*
  - Takahashi, Kenichiroh; Harao, Noriyuki; and Tanoue, Hiromi, 5,021,700, Cl. 310-316.000.
- Harbach, Friedrich: *See—*
  - Nienburg, Hans; Harbach, Friedrich; and Stein, Peter, 5,021,376, Cl. 501-153.000.
- Harbaugh, David L.: *See—*
  - Fox, Richard J.; Leasure, Maurice G., Kadorian, Gregory S., LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., 5,021,954, Cl. 364-410.000.
- Harco Graphic Products, Inc.: *See—*
  - Harpold, Charles W.; and Belcher, James, 5,020,430, Cl. 101-126.000.
- Harder, John W.: *See—*
  - Burns, Paul A.; and Harder, John W., 5,021,325, Cl. 430-387.000.
- Hardt, Thomas T.; and Gluskoter, Steven D., to Compao Computer Corporation Stabilizing apparatus with extensible legs for computer system tower unit. 5,020,768, Cl. 248-678.000.
- Hardt, Thomas T., to Compaq Computer Corporation. Switch cover 5,021,616, Cl. 200-43.160.
- Harima Chemicals, Inc.: *See—*
  - Kono, Masanao; Hasegawa, Yoshihiro; Nishi, Yasutaka; Irie, Hisao; Mizuta, Tatsuji; and Ohara, Shinsuke, 5,021,269, Cl. 427-436.000.
- Harmony Products, Inc.: *See—*
  - Moore, William P., 5,021,077, Cl. 71-17.000.

  - Moore, William P., 5,021,247, Cl. 426-69.000.
- Harpe, Joseph A. Mailbox holder. 5,020,720, Cl. 232-39.000.
- Harper, Daniel R.: *See—*
  - Edwards, John W.; Harper, Daniel R.; and McNew, Quinton B., 5,020,865, Cl. 305-35.0EB.
- Harpold, Charles W.; and Belcher, James, to Harco Graphic Products, Inc. Printer. 5,020,430, Cl. 101-126.000.
- Harreither, Rupert, to Austria Metall Aktiengesellschaft. Method of making a band for a band press. 5,021,102, Cl. 148-13.000.
- Harrell, Danny H. Reversible plow. 5,020,603, Cl. 172-131.000.
- Harriott, Sharon M.; Au, Van; and Rees, Wayne M., to Lever Brothers Company, Division of Conopco, Inc. Copper diamine complexes and their use as bleach activating catalysts. 5,021,187, Cl. 252-186.380.
- Harris Corporation: *See—*
  - Young, William R.; Rivoli, Anthony L.; and Wiles, William W., Jr., 5,021,359, Cl 437-21.000.
- Harris, Godfrey; Noell, Ralph B.; and Bradshaw, Larry R., to Scott Orthotic Labs, Inc. Self-propelled, steerable wheelchair. 5,020,815, Cl. 280-246.000.
- Harris. James L.: *See—*
  - Farrier, Ernest G.; Harris, James L.; Norman, Alan B., Resce, James L.; Sensabaugh, Andrew J., Jr.; and Shannon, Michael D., 5,020,548, Cl. 131-194.000.
- Harris, John L. Flush tank water saver. 5,020,167, Cl 4-325.000.
- Harris Semiconductor Patents, Inc.: *See—*
  - Isham, Robert H.; and Zazzu, Victor, 5,021,747, Cl. 330-284.000.
- Hart, Cindy S.: *See—*
  - Hoffman, Ronald J.; and Hart, Cindy S., 5,021,368, Cl 501-92.000.
- Hart, George R.; and Nehoda, Charles J., to Hickok Electrical Instrument Company. Fuel injection system tester. 5,020,362, Cl 73-119.00A.
- Hart, LeRoy; and Miller, Theodore H., deceased (by Miller, Cecilia B., administratrix), to Emhart Industries, Inc. Lockset having improved actuator. 5,020,343, Cl. 70-143.000.
- Hartig, Klaus; and Seiler, Reiner, to Leybold Aktiengesellschaft. Cathode sputtering apparatus. 5,021,139, Cl. 204-298.090.
- Hartmann, Rudolf: *See—*
  - Schroder, Bernd; Hartmann, Rudolf; and Thate, Helmut, 5,020,783, Cl. 267-273.000.
- Hartwell Corporation: *See—*
  - Poe, L. Richard, 5,020,835, Cl 292-127.000.
- Hartzell Propeller Inc.: *See—*
  - Ziegler, David E.; and Bowser, Arthur J., 5,020,741, Cl. 244-134.00D.
- Harvey, Donald M., to Eastman Kodak Company. Viewfinder for tele/pan camera. 5,021,815, Cl. 354-222.000.
- Harvey, Thomas L.: *See—*
  - Olsen, J. H.; Harvey, Thomas L.; Cornett, Mark J.; and Galatis, Demetre, 5,020,641, Cl. 187-95.000.
- Harvilchuck, James T.: *See—*
  - Vyvoda, Josef C.; and Harvilchuck, James T., 5,021,490, Cl. 524-140.000.
- Harwil Corporation: *See—*
  - Hutchinson, Harold D., 5,021,619, Cl. 200-81.90M.
- Hasegawa, iichi: *See—*
  - Kuzuta, Nobuyuki; Hasegawa, iichi; and Kimura, Teiyu, 5,020,879, Cl. 350-162.170.
- Hasegawa, Kazuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser device. 5,022,035, Cl. 372-36.000.
- Hasegawa, Yoshihiro: *See—*
  - Kono, Masanao; Hasegawa, Yoshihiro; Nishi, Yasutaka; Irie, Hisao; Mizuta, Tatsuji; and Ohara, Shinsuke, 5,021,269, Cl. 427-436.000.
- Hashimoto, Masashi, to Texas Instruments Incorporated. Semiconductor device and process fabrication thereof. 5,021,845, Cl. 357-23.400.
- Hashimoto, Rieko: *See—*
  - Maeda, Tetsuya; Yamamoto, Toshiyuki; Takase, Mituo; Sasaki, Kazuya; Airka, Tadashi; Yokoo, Mamoru; Hashimoto, Rieko; Amemiya, Kouji; and Koshikawa, Sakae, 5,021,458, Cl. 514-655.000.
- Hashizume, Akihide: *See—*
  - Aisaka, Kazuo; Hashizume, Akihide; Huno, Takakazu; Suzuki, Ryuichi; and Terada, Kazuko, 5,021,770, Cl. 340-709.000.
- Haslim, Leonard A., to United States of America, National Aeronautics and Space Administration. Airborne rescue system. 5,020,742, Cl. 244-137.200.
- Hasselquist, Paul B.: *See—*
  - Kovacevic, Nebojsa; and Hasselquist, Paul B., 5,020,357, Cl. 73-1.00B.
- Hatakeyama, Atsushi: *See—*
  - Fujisawa, Hiromichi; Hatakeyama, Atsushi; Fujinawa, Masaaki; and Hadano, Eiichi, 5,021,989, Cl. 364-900.000.
- Hatanaka, Hiroshi; Ezaki, Masami; Tsujii, Eisaku; Okamoto, Masanori; Shigematsu, Nobuharu; Okuhara, Masakuni; and Takase, Shigehiro, to Fujisawa Pharmaceutical Co., Ltd. WS7622A, B, C and D substances, derivatives thereof, processes for preparation thereof and use thereof. 5,021,240, Cl. 424-118.000.
- Hatano, Masakatsu; Murayama, Masayoshi; Shima, Kenji; and Ito, Masumi, to Mitsubishi Kasei Corporation. Process for producing crystalline oxide of vanadium-phosphorus system and catalyst containing the crystalline oxide. 5,021,384, Cl. 502-209.000.
- Hatano, Masaru; and Sugiyama, Tsukasa, to Mita Industrial Co., Ltd. Paper feeding device. 5,020,788, Cl. 271-126.000.
- Hatta, Susumu, to Tachi-S Co., Ltd. Power seat for automobile. 5,020,762, Cl. 248-394.000.
- Hattangadi, Rajiv: *See—*
  - Hendrickson, Alan F.; Chen, Herbert M., Cabler, Carlin D.; and Hattangadi, Rajiv, 5,021,783, Cl. 341-110.000
- Hatton, John H. Liquid hydrocarbon absorbent composition and method. 5,021,390, Cl. 502-401.000.
- Hatton, Norman: *See—*
  - Bush, Mike; Hatton, Norman; and Mellor, Keith, deceased, 5,020,648, Cl. 192-46.000.
- Hattori, Mitsutaka; Yoshimi, Toshiaki; and Fukushima, Toshio, to Inax Corporation. Water hammer absorber. 5,020,565, Cl. 137-207.000
- Hattori, Yutaka: *See—*
  - Hamakawa, Yoshihiro; Okamoto, Hiroaki; and Hattori, Yutaka. 5,021,103. Cl. 148-33.000.
- Hauert, Ulrich, to Lasag AG. Laser beam machining head. 5,021,632, Cl. 219-121.830.
- Haugh, Dennis, to Digital Equipment Corporation Skewed XOR data storage process. 5,022,030, Cl. 371-51.100.
- Haupt, Eugene J., to White Consolidated Industries, Inc. Semiautomatic string trimmer head. 5,020,224, Cl. 30-276.000.
- Hawkins, Mark R.: *See—*
  - Crabb, Richard; Robinson, McDonald; Hawkins, Mark R.; Goodwin, Dennis L.; and Ferro, Armand P., 5,020,475, Cl. 118-719.000.
- Haws, Ray C., to G-H Systems, Inc. Combined apparatus for removing grit and grease from sewage. 5,021,153, Cl. 210-221.200.
- Hayakawa, Kimiaki: *See—*
  - Uto, Nobutaka; Sato, Masaaki; Hayakawa, Kimiaki; and Honjo, Takeshi, 5,021,837, Cl. 355-322.000.
- Hayakawa, Masahiro, to Fujitsu Limited. Transmission system with backup function. 5,021,938, Cl. 364-132.000.
- Hayakawa, Toshiro: *See—*
  - Suyama, Takahiro; Kondo, Masafumi; Sasaki, Kazuaki; Hosoda. Masahiro; Takahashi, Kosei; and Hayakawa, Toshiro, 5,022,036, Cl. 372-45.000.
- Hayakawa, Yoichi: *See—*
  - Kuwayama, Yoshinari; Ando, Masahiko; and Hayakawa, Yoichi, 5,020,393, Cl. 74-869.000.
- Hayashi, Fumio: *See—*
  - Yamada, Akio; and Hayashi, Fumio, 5,020,968, Cl. 415-36.000.
- Hayashi, Hiroshi: *See—*
  - Kawanishi, Hidenori; Hayashi, Hiroshi; Morimoto, Taiji; Kaneiwa. Shinji; Miyauchi, Nobuyuki; and Yano, Seiki, 5,022,037, Cl. 372-49.000.
- Hayashi, Kenji: *See—*
  - Kosaka, Kenji; Kimura, Hiroshi; Suzuki, Akihiro; and Hayashi, Kenji, 5,020,785, Cl. 270-053.000.
- Hayashi, Nobuyuki: *See—*
  - Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, 5,021,563, Cl. 540-128.000.
- Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, to Hitachi Chemical Company, Ltd.; and Hitachi, Ltd. Metal naphthalocyanine derivative and process for producing the same. 5,021,563, Cl. 540-128.000.
- Hayes, John E.: *See—*
  - Gastinger, Robert G.; and Hayes, John E., 5,021,506, Cl. 525-63.000.
- Hayes, S. Kyle; Meyers, John E.; and Lozier, Antony J., to Zimmer, Inc. Sagittal approximator. 5,020,519, Cl. 128-69.000.
- Hazelton, Donald R.: *See—*
  - Puydak, Robert C.; Hazelton, Donald R.; Cartasegna, Silvestro; and Dogniez, Leonard, 5,021,500, Cl 524-525.000.
- Hecht, Matthew W.: *See—*
  - Jansen, Gerardus L. M.; and Hecht, Matthew W., 5,022,017, Cl 369-13.000.
- Heckele, Helmut, to Richard Wolf GmbH. Endoscope for nasal surgery. 5,020,514, Cl. 128-4.000.
- Hefti, Walter: *See—*
  - Demuth, Robert; Hefti, Walter; Keller, Urs; and Hanselmann, Daniel, 5,020,924, Cl. 384-536.000.
- Hegarty, David. Multi-positionable support stand with movable center of gravity. 5,020,763, Cl. 248-454.000.
- Heidelberger Druckmaschinen AG: *See—*
  - Jeschke, Willi, 5,020,432, Cl. 101-350.000.
  - Jeschke, Willi; and Rodi, Anton, 5,020,433, Cl. 101-425.000.
  - Maass, Jurgen; and Meyer, Helmut, 5,021,735, Cl. 324-175.000.
- Heidenreich, David C.; and Nichols, Keith A., to Power Transmission Technology. Torque limiting clutch having set torque range over its useful life. 5,020,650, Cl. 192-56.00R.
- Heil, Ronald W., Jr.: *See—*
  - Dahl, Roger W.; Heil, Ronald W., Jr.; Beatty, Graydon E.; and Mower, Morton M., 5,020,544, Cl. 128-784.000.
- Heimburger, Norbert: *See—*
  - Becker, Udo; Heimburger, Norbert; and Braun, Konrad, 5,021,243, Cl. 424-530.000.
- Heindrichs, Daniel: *See—*
  - Kersten, Jean; Lombard, Etienne; and Heindrichs, Daniel, 5,020,162, Cl. 2-164.000.
- Heine, Heinrich: *See—*
  - Muller, Hanns P.; and Heine, Heinrich, 5,021,536, Cl. 528-73.000.
- Heiney, Francis M., to AMP Incorporated. Secondary latch for pin connector. 5,021,004, Cl. 439-317.000.
- Heitmann, Jurgen, to BTS Broadcast Television Systems GmbH Method and magnetic head for recording signals magnetically. 5,021,895, Cl. 360-66.000.

VOL 1127
ISS 1
JE 4
1991
UMI

Heitz, Steven A., Fairchild, Jeffery N., and Readman, John, to Sundstrand Corporation. Transmission/gearbox vibration damping system. 5,020,923, Cl 384-99.000.

Helldorfer, Reinhard; Kanzler, Ulrich; Rauch, Hans; and Osterkamp, Eva, to Robert Bosch GmbH. Navigation method for vehicles with electronic compass. 5,021,962, Cl. 364-457.000.

Hellewell, Todd D.; Grusha, John; and McCartney, Michael S., to Combustion Engineering, Inc. Clustered concentric tangential firing system. 5,020,454, Cl. 110-264.000.

Hellickson, Harold M., to Delyle, Inc. Protective article for handling and containing waste materials. 5,020,159, Cl. 2-158.000.

Hellman, Stephen R.: *See—*
Bunick, Frank J.; Luo, Shiuh J., Shaw, James J.; and Hellman, Stephen R., 5,021,249, Cl. 426-96.000.

Hellriegel, Edmund, to Huels Troisdorf Aktiengesellschaft. Vehicle with vehicle door and door gasket 5,020,277, Cl. 49-400.000.

Helminiak, Thaddeus E.: *See—*
Wang, Chyi-Shan; Goldfarb, Ivan J.; and Helminiak, Thaddeus E., 5,021,517, Cl. 525-417.000.

Helms, Bernd, to W Kordes' Sohne Rosenschulen GmbH & Co KG Method and machine for baling shrubs and bushes 5,020,301, Cl 53-399.000.

Hemsath, Klaus H., to Indugas, Inc. Enhanced oil recovery system with a radiant tube heater. 5,020,596, Cl. 166-272.000.

Henault, Claude, to Procedes Vernet. Heat motor. 5,020,325, Cl. 60-528.000.

Henderson, David: *See—*
Strehlke, Peter; Bohlmann, Rolf; and Henderson, David, 5,021,434, Cl. 514-341.000.

Henderson, Mark F.; and Schlais, John R., to Delco Electronics Corporation. Method of making MOSFET depletion device. 5,021,356, Cl. 437-45.000.

Henderson, Richard D.; and Yin Leung, Frederick K., to National Semiconductor Corporation. Method and structure for digital phase synchronization. 5,022,056, Cl. 375-119.000.

Hendrickson, Alan F.; Chen, Herbert M.; Cabler, Carlin D.; and Hattangadi, Rajiv, to Advanced Micro Devices, Inc. Method for operating an apparatus for facilitating communications. 5,021,783, Cl. 341-110.000.

Hendriks, Ferdinand: *See—*
Chang, Shuo H.; Hendriks, Ferdinand, Khanna, Vijayeshwar D., and Lean, Eric G., 5,021,906, Cl 360-103.000.

Hendrikx, Georg H. L.: *See—*
Patzschke, Hans-Peter; Cerny, Peter W.; Saatweber, Dietrich; and Hendrikx, Georg H. L., 5,021,502, Cl. 524-591.000.

Henkel Corporation: *See—*
Zehler, Eugene R.; and Schnur, Nicholas E., 5,021,179, Cl. 252-54.600.

Henkel Kommanditgesellschaft auf Aktien: *See—*
Hollenberg, Detlef; Schneider, Hans, and Weihrauch, Georg, 5,020,552, Cl. 132-265.000.

Hennig, Kurt, to Febr. Hennig GmbH Bellows. 5,021,271, Cl 428-36.200.

Henri, John R.: *See—*
Groechel, David W.; Taylor, Brad; Henri, John R.; and Obinata, Naomi, 5,021,121, Cl. 156-643.000.

Hepworth Engineering Limited. *See—*
Ford, Derek G.; and Postlethwaite, Scott R., 5,021,941, Cl. 364-176.000.

Herberts Gesellschaft mit beschrankter Haftung: *See—*
Patzschke, Hans-Peter; Cerny, Peter W.; Saatweber, Dietrich; and Hendrikx, Georg H L., 5,021,502, Cl. 524-591.000.

Hercog, Milan; and Kubelka, Axel, to Kastinger Skiboot GmbH Ski boot 5,020,248, Cl. 36-120.000.

Hercules Incorporated: *See—*
Minn, James, 5,021,548, Cl. 530-216.000.
Schwark, Joanne M., 5,021,533, Cl. 528-21.000.

Hergenrother, Paul M.; Connell, John W.; and Bass, R. Gerald, to United States of America, National Aeronautics and Space Administrations. Ethynyl terminated imidothioethers and resins therefrom. 5,021,518, Cl. 525-422.000.

Herman, Richard G.: *See—*
Klier, Kamil; Herman, Richard G.; and Vedage, Gamimi A., 5,021,233, Cl. 423-656.000.

Hermann, Peter. Apparatus for the optical detection of flaws, in particular cracks in transparent objects. 5,020,908, Cl. 356-239.000.

Hermansson, Bengt: *See—*
Elfverson, Sven; Skogward, Kenneth; and Hermansson, Bengt, 5,020,366, Cl. 73-313.000.

Hernandez, Irene H.; and Machart, Beverly H., to International Business Machines Corporation. Method for assisting the operator of an interactive data processing system to enter data directly into a selected cell of a spreadsheet. 5,021,973, Cl 364-518.000.

Herper, John C.: *See—*
Stangel John J.; and Herper, John C., 5,021,793, Cl. 342-383.000.

Herrema, Robert T.; and Windemuller, Steven C. Landscape edging system. 5,020,272, Cl. 47-33.000.

Herrington, Fox J.; and St. Phillips, Eric A., to Mobil Oil Corporation. Leakproof zipper with slider. 5,020,194, Cl. 24-400.000.

Hertler, Walter R.: *See—*
Dicker, Ira B.; and Hertler, Walter R., 5,021,524, Cl. 526-190.000.

Herzog, Peter: *See—*
Plohberger, Diethard; Herzog, Peter; Elliott, Keith; Fischer, Christof D.; and Greier, Josef, 5,020,494, Cl. 123-250.000.

Hess, Werner: *See—*
Brosi, Thomas; Hess, Werner; Moser, Winfried, and Schneider, Hermann, 5,020,360, Cl 73-115.000

Hessel, Steven R.: *See—*
Crandall, Douglas; Hessel, Steven R.; Hornak, Thomas, Nordby Rasmus, Springer, Kent H.; and Corsetto, Craig, 5,022,051, Cl 375-19.000.

Hessenthaler, Geroge D. Jig for aligning cutter blades to a cutter head 5,020,228, Cl. 33-628.000.

Hesthamer, Tore; and Tyren, Carl, to AB SKF. Device for non-contact measuring of stresses in a bar-shaped body. 5,020,378, Cl 73-779.000.

Hetrick, George L., to Robertshaw Controls Company, Inc. Thermal cycling switch. 5,021,762, Cl. 337-103.000.

Heumann Pharma GmbH & Co.: *See—*
Buschauer, Armin; Schickaneder, Helmut; Schunack, Walter, Elz, Sigurd; Szelenyi, Istvan; Baumann, Gert; and Ahrens, Kurt H., 5,021,431, Cl. 514-333.000.

Hewlett-Packard Company: *See—*
Crandall, Douglas; Hessel, Steven R.; Hornak, Thomas, Nordby, Rasmus; Springer, Kent H., and Corsetto, Craig, 5,022,051, Cl. 375-19.000.
Gunther, Martin, 5,020,537, Cl. 128-634.000.
Kaw, Ravindhar K., 5,021,869, Cl 357-75.000.
Mansingh, Vivek, 5,020,586, Cl. 165-80.300.
Sleger, Roger R., 5,021,905, Cl. 360-97.020.

Hibi, Toshifumi, to Nissan Motor Co., Ltd. Ratio change control for transmission. 5,021,031, Cl. 474-18.000.

Hickok Electrical Instrument Company: *See—*
Hart, George R.; and Nehoda, Charles J., 5,020,362, Cl 73-119.00A.

Hida, Junichi, to Hoshizaki Electric Co., Ltd. Ice making machine 5,020,336, Cl. 62-344.000.

Hidaka, Masataka: *See—*
Kataoka, Yoshiyuki; Sumida, Isao; Hidaka, Masataka, and Naitoh, Masanori, 5,021,212, Cl. 376-283.000.

Hideshima, Masao: *See—*
Kanazawa, Hirotaka; Ohmura, Hiroshi; Tomoda, Atsuo; Furuzawa, Akihiro; Nakashima, Takashi; and Hideshima, Masao, 5,020,619, Cl. 180-140.000.

Higashi, Kazutada: *See—*
Ohta, Tomozo; Nakano, Hiroshi; Higashi, Kazutada; and Yamamoto, Hirohiko, 5,021,790, Cl. 342-44.000.

Higashi, Masato; and Murasaki, Sadanobu, to Minolta Camera Kabushiki Kaisha. Recording apparatus having a detachable recording material storing unit. 5,021,824, Cl. 355-72.000.

Higashiyama, Mikio: *See—*
Kita, Toshiro; Genba, Susumu; Takemoto, Masato; Tatsumi, Takashi; Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi; Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji, and Yoshida, Toshihiko, 5,021,892, Cl. 358-468.000.

Higuchi, Hirokazu: *See—*
Sashida, Minoru; Yanagi, Masaaki; Okitsu, Katsuhiko; and Higuchi, Hirokazu, 5,020,900, Cl. 353-26.00R.

Higuchi, Hisashi: *See—*
Sasaki, Katsuhiko; and Higuchi, Hisashi, 5,020,406, Cl. 83-397.000.

Hijikata, Kenji: *See—*
Nakane, Toshio; Naka, Michiro; Konuma, Hiroaki; and Hijikata, Kenji, 5,021,295, Cl. 428-379.000.
Nakane, Toshio; Naka, Michiro; Konuma, Hiroaki; and Hijikata, Kenji, 5,021,545, Cl. 528-272.000.

Hill, George B.: *See—*
Pilgrim, William R.; Young, Derek W.; Tait, Brian S.; Crawley, Graham C.; Edwards, Philip N.; and Hill, George B., 5,021,414, Cl. 514-237.500.

Hill, James R., to Mestek, Inc. Rotating blade damper with blade lock and stop mechanism. 5,020,423, Cl. 98-1.000.

Hill, Michael; and Nichols, Walter A., to Filter Materials Ltd. Crimped textile fibers and stuffer box apparatus and methods for crimping textile fibers. 5,020,198, Cl. 28-250.000.

Hill, Philip L., IV: *See—*
Franklin, Robert E.; and Hill, Philip L., IV, 5,020,463, Cl. 114-230.000.

Hillaert, Rik: *See—*
van Bogaert, Philippe; and Hillaert, Rik, 5,020,574, Cl 139-188.00R.

Hilleman, Maurice R.: *See—*
Giesa, Paula A.; Hilleman, Maurice R.; and Provost, Philip J., 5,021,348, Cl. 435-237.000.

Hilti Aktiengesellschaft: *See—*
Bergner, Arndt, 5,020,613, Cl. 175-273.000.

Himeno, Yasunori: *See—*
Nakatsuno, Eiji; Himeno, Yasunori; Ebata, Yasuhiko; and Nagano, Masatosi, 5,020,332, Cl. 62-157.000.

Himes, Glenn R.: *See—*
Sanders, Andrea; and Himes, Glenn R., 5,021,113, Cl. 156-334.000.

Hino, Katsuhiko; Kai, Naoki; Sakamoto, Masato; Kon, Tatsuya; Oka, Makoto; Furukawa, Kiyoshi; and Ochi, Yoshiaki, to Dainippon Pharmaceutical Co., Ltd. 2-(1-Piperazinyl)-4-phenylcycloalkanopyridine derivatives, processes for the production thereof, and pharmaceutical composition containing the same. 5,021,421, Cl. 514-254.000.

Hinshaw, Steven M., to Tennelec/Nucleus, Inc. Method and apparatus for correcting the energy resolution of ionizing radiation spectrometers. 5,021,664, Cl. 250-252.100.

Hirabayashi, Shigeru: *See—*
Maebo, Kunji; and Hirabayashi, Shigeru, 5,020,451, Cl. 110-189.000.

Hirai, Hiroyuki: *See—*
Mimasaka, Masahiro; and Hirai, Hiroyuki, 5,020,200, Cl. 29-25.010.

Hirai, Isamu: *See—*
Satoh, Osamu; Hirai, Isamu; and Nakata, Masahiro, 5,021,818, Cl. 354-429.000.

Hirai, Tadaaki: *See—*
Yamamoto, Masanao; Unnai, Takaaki; Ebata, Shigeru; Hirai, Tadaaki; Sameshima, Kenji; Hiruma, Eikiyu; Suzuki, Shirou; Tanioka, Kenkichi; Yamazaki, Junichi; and Shidara, Keeichi, 5,021,705, Cl. 313-106.000.

Hirakawa Iron Works, Ltd.: *See—*
Suesada, Yasuhiko; Moriyama, Takashi; Sugioka, Junichi; and Tahara, Hiroshi, 5,020,479, Cl. 122-235.110.

Hirano, Yasuhiro; Yamashina, Mitunori; and Etoh, Tetsuo, to Hitachi, Ltd Controlling apparatus for induction motor. 5,021,724, Cl 318-800.000.

Hirata, Eiji: *See—*
Tanaka, Nobuhiro; Tawara, Hirotoshi; and Hirata, Eiji, 5,020,965, Cl. 414-786.000.

Hirata, Naonori: *See—*
Arai, Kenji; Mito, Nobuaki; Morita, Kouichi; and Hirata, Naonori, 5,021,579, Cl. 546-302.000.

Hirayama, Yuzo: *See—*
Kinoshita, Jun'ichi; Suzuki, Nobuo; Morinaga, Motoyasu; Hirayama, Yuzo; and Nakamura, Masaru, 5,021,361, Cl 437-129.000.

Hirohashi, Ken: *See—*
Karasawa, Yoshiharu, and Hirohashi, Ken, 5,021,294, Cl 428-332.000.

Hirose Electric Co., Ltd.: *See—*
Ishioka, Hideyuki, 5,020,216, Cl. 29-753.000.
Kawanami, Norihide; Kobayashi, Fumio; and Mitani, Ikujiro, 5,021,011, Cl. 439-582.000.

Hirose, Hitoshi; and Togawa, Fumio, to Sharp Kabushiki Kaisha Information recognition system. 5,022,081, Cl 381-43.000.

Hirschberger, August: *See—*
Bienert, Horst; Hirschberger, August; Schleicher, Bernd; Igel, Richard; and Meier, Kurt, 5,020,850, Cl. 296-223.000.

Hirschmann, Klaus: *See—*
Schnaibel, Eberhard; Junginger, Erich; and Hirschmann, Klaus, 5,020,363, Cl. 73-119.00A.

Hiruma, Eikiyu: *See—*
Yamamoto, Masanao; Unnai, Takaaki; Ebata, Shigeru; Hirai, Tadaaki; Sameshima, Kenji; Hiruma, Eikiyu; Suzuki, Shirou; Tanioka, Kenkichi; Yamazaki, Junichi; and Shidara, Keeichi, 5,021,705, Cl. 313-106.000.

Hisada, Katsutoshi; and Nobuta, Hiroshi, to Canon Kabushiki Kaisha Image processing apparatus with provision for memory operation. 5,022,088, Cl. 382-41.000.

Hisanaga, Tetsuo: *See—*
Kamiunten, Shoji; and Hisanaga, Tetsuo, 5,020,373, Cl. 73-861.220.

Hise, Ralph E.; and Cook, W. Jeffrey, to CNG Research Company. Sulfur recovery process. 5,021,232, Cl. 423-574.00R.

Hitachi: *See—*
Muroi, Katsumi; Okuna, Kenji; Otsuka, Hidefumi; Ouchi, Kastubumi; Iimura, Tsutomu; and Kojima, Ryoji, 5,021,810, Cl. 346-155.000.

Hitachi Chemical Company, Ltd.: *See—*
Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, 5,021,563, Cl. 540-128.000.

Hitachi Communication Systems, Inc.: *See—*
Nishi, Yumiko; Torii, Yutaka; Komatu, Norihumi; and Takaki, Seiichi, 5,022,057, Cl. 375-119.000.

Hitachi Koki Co.: *See—*
Muroi, Katsumi; Okuna, Kenji; Otsuka, Hidefumi; Ouchi, Kastubumi; Iimura, Tsutomu; and Kojima, Ryoji, 5,021,810, Cl. 346-155.000.

Hitachi, Ltd.: *See—*
Aisaka, Kazuo, Hashizume, Akihide; Huno, Takakazu; Suzuki, Ryuichi; and Terada, Kazuko, 5,021,770, Cl. 340-709.000.
Arai, Ikuya; Kitou, Kouji; and Ohsawa, Michitaka, 5,021,719, Cl. 315-364.000.
Baba, Shiro, 5,021,951, Cl. 364-200.000.
Era, Susumu; Iwasaki, Kishiro; Yokokura, Hisao; Hanawa, Yasuo; Kondo, Katsumi; Nakada, Tadao; Kitamura, Teruo; and Mukoh, Akio, 5,020,883, Cl. 350-350.00S.
Fujisawa, Hiromichi; Hatakeyama, Atsushi; Fujinawa, Masaaki; and Hadano, Eiichi, 5,021,989, Cl. 364-900.000.
Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, 5,021,563, Cl. 540-128.000.
Hirano, Yasuhiro; Yamashina, Mitunori; and Etoh, Tetsuo, 5,021,724, Cl. 318-800.000.
Ishikawa, Masatoshi; Fujita, Kozo; and Kobata, Shigeyuki, 5,021,902, Cl. 360-92.000.
Jimbo, Yoshiji; and Ozawa, Tsutomu, 5,021,725, Cl. 318-801.000.
Kataoka, Yoshiyuki; Sumida, Isao; Hidaka, Masataka; and Naitoh, Masanori, 5,021,212, Cl. 376-283.000.
Kawata, Atsumi; Itoh, Hiroyuki; Tanaka, Hirotoshi; Yoshihara, Kazuhiro; and Yamashita, Hiroki, 5,021,686, Cl. 307-448.000.
Kieda, Shigekazu; Nakajima, Tadakatsu; Kuwahara, Heikichi; and Sato, Motohiro, 5,021,924, Cl. 361-385.000.
Kondo, Hidefumi, 5,021,992, Cl. 364-900.000.
Koyanagi, Mitsumasa, 5,021,842, Cl. 357-23.600.
Manaka, Toshio; and Shida, Masami, 5,021,960, Cl. 364-431.010
Mase, Masahiro; Sakagami, Seiji; Okawada, Takeshi; Ueda, Shinjiroo; Awada, Yoshihisa; and Nagaoka, Takashi, 5,020,969, Cl. 415-55.300.
Mashino, Keiichi, 5,020,491, Cl. 123-192.00R.
Mashino, Keiichi, 5,021,727, Cl. 322-7.000.
Mohri, Shunji; and Ashida, Akira, 5,021,970, Cl. 364-513.000.
Muroi, Katsumi; Okuna, Kenji; Otsuka, Hidefumi; Ouchi, Kastubumi; Iimura, Tsutomu; and Kojima, Ryoji, 5,021,810, Cl. 346-155.000.
Nishi, Yumiko; Torii, Yutaka; Komatu, Norihumi; and Takaki, Seiichi, 5,022,057, Cl. 375-119.000.
Ohwada, Jun-ichi; Kitajima, Masaaki; Suzuki, Masayoshi; Takabatake, Masaru; and Nagae, Yoshiharu, 5,021,774, Cl. 340-811.000.
Oikawa, Saburo; Yatsuo, Tsutomu; and Satou, Yukimasa, 5,021,855, Cl. 357-38.000.
Saito, Hiroshi; Suzuki, Yasumichi; Sasabe, Shunji, and Nakajima, Kazuhiro, 5,021,114, Cl. 156-345.000.
Sasaki, Katsuro; Shimohigashi, Katsuhiro; and Hanamura, Shoji, 5,021,944, Cl. 365-200.000.
Suzuki, Yoshihiro; Takada, Toshinari; Suzuki, Masahiro; Akahoshi, Haruo; Nagai, Akira; Takahashi, Akio; Amagi, Shigeo; Narahara, Toshikazu; Wajima, Motoyo; and Kogawa, Kiyonori, 5,021,296, Cl. 428-409.000.
Suzuki, Yukihide; Muranaka, Masaya; and Ishihara, Masamichi, 5,021,998, Cl. 365-51.000.
Terasawa, Masaaki; Mukohda, Hidefumi; Nagai, Yoshikazu; Ikeda, Yasunori; and Furusawa, Kazunori, 5,022,000, Cl. 365-184.000.
Tsuruoka, Shigeo; Takahashi, Ken; Miyoshi, Tadahiko; and Tokuda, Hiroatsu, 5,020,214, Cl. 29-611.000.
Watanabe, Michihiro; Sato, Kazutaka; Zen, Munetoshi; Ato, Kazuhiko; Watanabe, Yoshinobu, and Taguchi, Sadayoshi, 5,021,194, Cl. 252-518.000.
Yamamoto, Masanao; Unnai, Takaaki; Ebata, Shigeru; Hirai, Tadaaki; Sameshima, Kenji; Hiruma, Eikiyu, Suzuki, Shirou; Tanioka, Kenkichi; Yamazaki, Junichi; and Shidara, Keeichi, 5,021,705, Cl. 313-106.000.
Yokosawa, Koichi; and Kohno, Hideki, 5,021,739, Cl. 324-248.000.

Hitachi Maxell, Ltd.: *See—*
Kamezaki, Hisamitsu; Suenaga, Masashi; Saito, Osamu; Iuchi, Shin-ichiro; Watanabe, Hitoshi; Fujiwara, Hideo; and Tuburaya, Yoshitane, 5,021,276, Cl. 428-64.000.

Hitachi Medical Corporation: *See—*
Yokouchi, Hisatake; Onodera, Yoichi; Funo, Takakazu; and Tsuneoka, Masayuki, 5,022,063, Cl. 378-99.000.

Hitachi VLSI Engineering: *See—*
Suzuki, Yukihide; Muranaka, Masaya, and Ishihara, Masamichi, 5,021,998, Cl. 365-51.000.

Hitachi VLSI Engineering Corp.: *See—*
Terasawa, Masaaki; Mukohda, Hidefumi; Nagai, Yoshikazu; Ikeda, Yasunori; and Furusawa, Kazunori, 5,022,000, Cl. 365-184.000.

Hiuke, Takashi, to Procter & Gamble Company, The. Disposable absorbent article having improved barrier leg cuffs. 5,021,051, Cl. 604-385.200.

Hoaglan, Anna M., to International Design/Manufacturing, Inc. Convertible child carrier. 5,020,709, Cl. 224-151.000.

Hobart Corporation: *See—*
Treiber, Fritz F., 5,020,305, Cl. 53-500.000.

Hobrecht, Stephen W., to National Semiconductor Corporation. Instantaneous power limiting circuit. 5,021,682, Cl. 307-296.800.

Hobrock, Lowell M.: *See—*
Orler, Anthony J.; Hobrock, Lowell M.; and Lippey, Barret, 5,020,887, Cl. 350-409.000.

Hodlewsky, William G., to Rexnord Corporation. Conveyor chain assembly. 5,020,659, Cl. 198-853.000.

Hoechst Aktiengesellschaft: *See—*
Buch, Holger M., 5,021,558, Cl. 534-618.000.
Koch, Volker; Willms, Lothar; Fuss, Andreas; Bauer, Klaus, Bieringer, Hermann; and Burstell, Helmut, 5,021,578, Cl. 546-296.000.
Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus; and Manz, Albrecht, 5,021,473, Cl. 523-451.000.
Springer, Hartmut; and Reiher, Uwe, 5,021,559, Cl. 534-638.000.

Hoechst Celanese Corporation: *See—*
Mueller, Werner H.; Khanna, Dinesh N.; and Hupfer, Bernd, 5,021,320, Cl. 430-192.000.

Hoefler, Raphael A. Disposable dust pan and method. 5,020,185, Cl. 15-257.100.

Hoeh, James A. Testing apparatus for strand pelletizing operation. 5,020,404, Cl. 83-298.000.

Hoenselaar, John F.; and Clausen, Eivind, to Allsop, Inc. Bicycle chain lubricating and cleaning apparatus and method. 5,020,637, Cl. 184-15.100.

Hoesch Stahl AG: *See—*
Bersch, Bernhard; Fuchs, Axel; and Eck Ralf, 5,021,627, Cl. 219-119.000.

Hoffend, Donald A., Jr.: *See—*
Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S.; LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., 5,021,954, Cl. 364-410.000.

Hoffman-La Roche Inc.: *See—*
McLane, John A.; and Uskokovic, Milan R., 5,021,451, Cl. 514-460.000.

Hoffman, Richard E.; Topping, Richard; Nelson, Tom W.; Murville, Marie L.; and Belkus, Paul, to Gas Research Institute. Connector set. 5,020,563, Cl. 137-75.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Hoffman, Ronald J., and Hart, Cindy S., to Dow Chemical Company, The. Novel ceramic-metal compounds. 5,021,368, Cl. 501-92.000.
- Hoffmann-La Roche Inc.: *See—*
  - Hunkeler, Walter; Kyburz, Emilio; and Meier, Marc, 5,021,411, Cl. 514-220.000.
- Hofmann, Aaron A.; and Burdulis, Albert G., Jr., to Intermedics Orthopedics, Inc. Upper tibial osteotomy system 5,021,056, Cl. 606-86.000.
- Hofmann, Eberhard, to Robert Bosch GmbH. Fuel injection pump for internal combustion engines. 5,020,981, Cl. 417-501.000.
- Hokkaido Pipeline Industrial Co., Ltd.: *See—*
  - Tamaki, Masaru, 5,021,095, Cl. 134-21.000.
- Holko, Kenneth H. Process for joining or coating carbon-carbon composite components. 5,021,107, Cl. 156-89.000.
- Hollenberg, Detlef; Schneider, Hans; and Weihrauch, Georg, to Henkel Kommanditgesellschaft auf Aktien. Expandable hair curler. 5,020,552, Cl. 132-265.000.
- Holmes, Douglas: *See—*
  - Kornely, Michael G., Jr.; Holmes, Douglas; and Micich, Robert G., 5,021,741, Cl. 328-227.000.
- Holodnak, Richard S.: *See—*
  - Riley, Gilbert N.; Holodnak, Richard S.; and Malin, Richard A., 5,020,429, Cl. 101-93.000.
- Holst, Edward H.: *See—*
  - Dai, Pei-Shing E.; and Holst, Edward H., 5,021,228, Cl. 423-244.000.
- Holtzinger, Charles R.: *See—*
  - Ralph, George A.; and Holtzinger, Charles R., 5,021,723, Cl. 318-756.000.
- Homan, George F., to ChemStation International, Inc. Cleaning solution mixing and metering system. 5,020,917, Cl. 366-161 000.
- Honda Giken Kogyo Kabushiki Kaisha: *See—*
  - Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; Ozawa, Shigeo; Imai, Toshitaka; and Shimada, Takamichi, 5,020,391, Cl. 74-866.000.
  - Fujii, Kiyoshi, Kitamura, Haruo; Takahashi, Shigeru, and Shimizu, Norio, 5,020,250, Cl. 37-257.000.
- Honeywell Inc.: *See—*
  - Martin, Ronald L., 5,020,235, Cl. 33-668.000.
  - Peterson, Scott M., 5,020,988, Cl. 431-51.000.
- Honeywell Regelsysteme GmbH: *See—*
  - Gauert, Rolf; and Hansli, Werner, 5,020,911, Cl. 356-350.000.
- Honjo, Takeshi: *See—*
  - Uto, Nobutaka; Sato, Masaaki; Hayakawa, Kimiaki; and Honjo, Takeshi, 5,021,837, Cl. 355-322.000.
- Hood, Richard T.: *See—*
  - Durairaj, Bojayan; Peterson, Alex, Jr.; Lamars, Robert M., and Hood, Richard T., 5,021,522, Cl. 525-502.000.
- Hoogovens Groep B.V.: *See—*
  - Molenaar, Ronald N.; and Van der Hoeff, Joseph A. M., 5,020,992, Cl. 432-248.000.
- Hopkins, John W., to Textron, Inc. Leaf shredder attachment for a mower bagging system. 5,020,309, Cl. 56-13.300.
- Hoppe, Federick J.: *See—*
  - Renner, J. John; Palmateer, Steven J.; Petry, John S.; Hoppe, Federick J.; and Bertrand, Steven R., 5,020,820, Cl. 280-439.000.
- Hoppe, Thomas W.: *See—*
  - Weinberger, Scot R.; and Hoppe, Thomas W., 5,021,646, Cl. 250-227.110.
- Hori, Kimitoshi: *See—*
  - Masaki, Yasuo; and Hori, Kimitoshi, 5,022,090, Cl. 382-49.000.
- Hori, Takahiro: *See—*
  - Kitagawa, Akio; Hori, Takahiro; and Nakamura, Yuji, 5,021,260, Cl. 427-140.000.
- Horii, Hajime: *See—*
  - Mukai, Hiromichi; Horii, Hajime; Tsujikawa, Muneo; Kawabe, Haruhide; Arimura, Hirofumi; and Suyama, Tadakazu, 5,021,339, Cl. 435-69.100.
- Horikawa, Yoshihito: *See—*
  - Yokoi, Takeshi; and Horikawa, Yoshihito, 5,020,539, Cl. 128-662.060.
- Horino, Mamoru, to Yamaha Corporation. Fast search device in a magnetic recording and reproducing device. 5,021,896, Cl. 360-70.000.
- Horiuchi, Satoru: *See—*
  - Igarashi, Yoshinori; Yasukawa, Makoto; Ariga, Yasuo; Kobayashi, Ichiro; and Horiuchi, Satoru, 5,021,677, Cl. 250-574.000.
- Hornak, Thomas: *See—*
  - Crandall, Douglas; Hessel, Steven R.; Hornak, Thomas; Nordby, Rasmus; Springer, Kent H.; and Corsetto, Craig, 5,022,051, Cl. 375-19.000.
- Hornbeck, Larry J., to Texas Instruments Incorporated. Infrared detector. 5,021,663, Cl. 250-349 000.
- Horne, Frank L., to Gas Fired Products. Rapid recovery gas hot water heater 5,020,721, Cl. 236-20.00R.
- Horowitz, Harold S.: *See—*
  - Druliner, Joe D.; Horowitz, Harold S.; McLain, Stephan J.; and Sleight, Arthur W., 5,021,395, Cl. 505-1.000.
- Horton, Kevin J.: *See—*
  - Pullen, Keith R.; Horton, Kevin J.; Etemad, Mohammad R.; Fenocchi, Arnoldo; Eggleston, Laurence W.; and Bolton, Hugh R., 5,021,698, Cl. 310-156.000.
- Hoshizaki Electric Co., Ltd.: *See—*
  - Hida, Junichi, 5,020,336, Cl. 62-344.000.
- Hosiden Electronics Co., Ltd.: *See—*
  - Shibano, Yasuji, 5,021,012, Cl. 439-610.000.
- Hosoda, Masahiro: *See—*
  - Suyama, Takahiro; Kondo, Masafumi; Sasaki, Kazuaki; Hosoda, Masahiro; Takahashi, Kosei; and Hayakawa, Toshiro, 5,022,036, Cl. 372-45.000.
- Hosokawa, Toshio: *See—*
  - Iizuka, Yo; Kashiwadate, Ken; Endo, Shunzo, Hosokawa, Toshio, Katto, Takayuki; Mizuno, Toshiya; and Katase, Kenichi, 5,021,523, Cl. 525-537.000.
- Hosono, Hidekazu: *See—*
  - Maeda, Mitsuru; Kodama, Tohru; Asami, Sumio; Amano, Norihide; Kusumi, Takaaki; and Hosono, Hidekazu, 5,021,406, Cl 514-99.000.
- Hostetler, Donald E.; Cannarsa, Michael J.; Kesling, Haven S., Jr., and Sun, Hsiang-Ning, to Arco Chemical Technology, Inc Formation of discrete polyalkylene carbonate particles by solvent/non-solvent precipitation. 5,021,464, Cl. 521-189.000.
- Hotten, Terrence M.: *See—*
  - Fernandez Fernandez, Maria I.; Hotten, Terrence M., and Tupper, David E., 5,021,449, Cl. 514-422.000.
- Hou, Hsisn-Der. Easy turning on/off flashlight 5,0[illegible]1,934, Cl 362-187.000.
- Hou, Jack. Ornamental display assembly 5,020,409, Cl 84-95 200
- Houchin, Norio: *See—*
  - Shibahara, Kenji; and Houchin, Norio, 5,020,829, Cl. 283-62.000
- Houghton, Thomas M., to H-S Precision, Inc. Take-down rifle 5,020,260, Cl. 42-75.020.
- Houskamp, Robert W.: *See—*
  - Fabiano, Richard F.; and Houskamp, Robert W., 5,021,780, Cl 340-994.000.
- Hovis, Keith W., to Phillips Petroleum Company. Transfer of catalyst 5,021,223, Cl. 422-198.000.
- Howard, Richard S. Needle sheath holder with seepage precluding engagement zones. 5,021,049, Cl. 604-192.000.
- Howard, Richard T.; Dabney, Richard W.; and Bryan, Thomas C., to United States of America, National Aeronautics and Space Administration. Standard remote manipulator system docking target augmentation for automated docking. 5,020,876, Cl. 350-102.000.
- Howmedica, Gmbh: *See—*
  - Tager, Karl H., 5,021,063, Cl. 623-23.000.
- Hoya Corporation: *See—*
  - Ishibai, Isao; and Otsu, Hitonobu, 5,020,888, Cl. 350-432.000.
- Hoyer, Georg-Alexander: *See—*
  - Gries, Heinz; Rosenberg, Douwe; Weinmann, Hanns-Joachim, Speck, Ulrich; Mutzel, Wolfgang; Hoyer, Georg-Alexander; and Pfeiffer, Heinrich, deceased, 5,021,236, Cl. 424-9.000.
- Hozumi, Toyoharu: *See—*
  - Tahara, Eiichi; Ochiai, Atsushi; Yokozaki, Hiroshi; Hozumi, Toyoharu; and Kyo, Eikai, 5,021,553, Cl. 530-387.000.
- Hribernik, Bruno: *See—*
  - Karagoz, Sadi; Hribernik, Bruno; Stamberger, Johann; Puber, Josef; Jeglitsch, Franz; Fischmeister, Hellmut; Matzer, Franz, Locker, Claus-Dieter; Kudielka, Elfriede; and Jager, Heimo, 5,021,085, Cl. 75-239.000.
- Hrovat, Davorin D., to Ford Motor Company. Multiple feedback loop control method and system for controlling wheel slip. 5,020,622, Cl. 180-197.000.
- Hsu, Hsyh-Min; and Yee, Ian Y. K., to Microelectronics & Computer Technology Corp. Spray pyrolysis process for preparing superconductive films. 5,021,399, Cl. 505-1.000.
- Hsu, Te-Chuan: *See—*
  - Tai, Jy-Der; Chiu, Edison; An, Quang-Dieu; and Hsu, Te-Chuan, 5,021,994, Cl. 364-900.000.
- Hu, Larry; Chuk, Ting; McLeod, John; Birman, Mark; Samuels, Allen, and Chu, George K., to Weitek Corporation. Variable latency method and apparatus for floating-point coprocessor. 5,021,985, Cl 364-748.000.
- Huang, Alvin S.; Nicholson, Myron D.; and Ramagopal, Rama, to Viskase Corporation. Vindicia containing food manufacturing method. 5,021,252, Cl. 426-412.000.
- Huang, Clark. Toilet seat raising apparatus. 5,020,165, Cl. 4-251.000.
- Huang, Hua-Feng; and Plorde, Donald E., to Du Pont de Nemours, E. I., and Company. Composite material containing microwave susceptor material. 5,021,293, Cl. 428-328.000.
- Huang, Jerry T. Dental prophylaxis angle. 5,020,994, Cl. 433-126.000.
- Huang, Sheng-Fu. Automatic umbrella having stable extending and folding structure. 5,020,558, Cl. 135-24.000.
- Huang, Zhen, to August Bilstein GmbH & Co. KG Controls for a semiactive chassis. 5,020,781, Cl. 267-136.000.
- Hub, Hans-Henning: *See—*
  - Taubitz, Christof; Hub, Hans-Henning; Ziegler, Walter; and Sadlowski, Juergen, 5,021,508, Cl. 525-133.000.
- Hubbard, James H., to Ultimate Security, Inc. Theft deterring security system for attachment to powered appliances. 5,021,916, Cl 361-171.000.
- Hubbard, Vance M.; and Brunson, Welton K., to Tecnol, Inc. Face mask with liquid and glare resistant visor. 5,020,533, Cl. 128-206.230.
- Huber, Thomas, to Bavaria Cargo Technologie GmbH. Drive roller unit. 5,020,657, Cl. 198-782.000.
- Huber, Werner; and Spiegel, Guenter, to Robert Bosch GmbH. Apparatus having a control motor for intervention into a force transmission device. 5,020,496, Cl. 123-399.000.
- Hubner, Dirk: *See—*
  - Bergthaller, Peter; Kruger, Thomas; Stolzenburg, Rudolf; and Hubner, Dirk, 5,021,330, Cl. 430-544.000.

- Huels Troisdorf Aktiengesellschaft: *See—*
  - Barfurth, Dieter; Lindzus, Claus; and Nestler, Heinz, 5,021,596, Cl. 556-55.000.
  - Hellriegel, Edmund, 5,020,277, Cl. 49-400.000.
- Hughes Aircraft Company: *See—*
  - Anzel, Bernard M., 5,020,746, Cl 244-169.000.
  - Campbell, Michael J.; Finn, Dennis J.; Tucker, George K.; Vahey, Michael D.; and Vedder, Rex W., 5,021,947, Cl. 364-200.000.
  - Carlson, Robert C., 5,022,091, Cl 382-49.000.
  - Chien, Kuei-Ru; Wang, John H. S.; and Jacobson, James G., 5,022,032, Cl. 372-18.000.
  - Dougherty, Thomas K.; and Giants, Thomas W., 5,021,585, Cl. 548-406.000.
  - Oaks, Richard W., 5,020,413, Cl. 89-1.814
  - Orler, Anthony J.; Hobrock, Lowell M.; and Lippey, Barret, 5,020,887, Cl. 350-409.000.
  - Pollack, Slava A.; and Chang, David B., 5,022,040, Cl. 372-69.000.
- Hughes, Fred P., to Millicom Incorporated. Telephone call security system. 5,022,067, Cl. 379-95.000.
- Hughes, John B., to U.S. Philips Corporation. Integrator circuit. 5,021,692, Cl. 307-490.000.
- Hughes, John R.; and Sutherin, Mark S., to United Rotary Brush Corporation. Rotary tube broom packaging 5,020,664, Cl 206-361.000.
- Humbel, William D.: *See—*
  - Dey, Thomas W.; Granger, Edward M.; Vandenberg, Donald E.; Pitek, John G.; and Humbel, William D., 5,020,905, Cl. 356-124.000.
- Hung, William M.; and Su, Kai C., to Ciba-Geigy Corporation. Tinted contact lens and method of manufacture thereof: reactive dye and quaternary phosphonium salt. 5,021,068, Cl. 8-507.000.
- Hungerford, P. Clark, Jr.: *See—*
  - Milgram, Joseph B., Jr.; and Hungerford, P. Clark, Jr., 5,021,116, Cl. 156-475.000.
- Hunkeler, Walter; Kyburz, Emilio; and Meier, Marc, to Hoffmann-La Roche Inc. Imidazodiazepine derivatives. 5,021,411, Cl 514-220.000.
- Huno, Takakazu: *See—*
  - Aisaka, Kazuo; Hashizume, Akihide; Huno, Takakazu; Suzuki, Ryuichi; and Terada, Kazuko, 5,021,770, Cl. 340-709.000.
- Hunsbedt, Anstein; and Fanning, Alan W., to General Electric Company. Liquid metal cooled nuclear reactors with passive cooling system. 5,021,211, Cl. 376-299.000.
- Hunt, William G. Pipe repair clip. 5,020,572, Cl. 138-99.000.
- Hunter, Kevin D.: *See—*
  - Durst, Robert T.; and Hunter, Kevin D., 5,022,080, Cl. 380-23.000.
- Hunter, William J.: *See—*
  - Kuykendall, Larry D.; and Hunter, William J., 5,021,076, Cl. 71-7.000.
- Hupfer, Bernd: *See—*
  - Mueller, Werner H.; Khanna, Dinesh N., and Hupfer, Bernd, 5,021,320, Cl. 430-192.000.
- Hurd, David L., to GEC-Marconi Limited Radar systems. 5,021,791, Cl. 342-93.000.
- Hurditch, Rodney J.: *See—*
  - Crano, John C.; Kwiatkowski, Patricia L.; and Hurditch, Rodney J., 5,021,196, Cl. 252-586.000.
- Hurlimann, Peter. Telescopically extendable and retractable arm. 5,020,323, Cl. 60-413.000.
- Hutchings, Michael G.: *See—*
  - Clough, John M.; Godfrey, Christopher R. A.; de Fraine, Paul J.; Hutchings, Michael G.; and Anthony, Vivienne M., 5,021,581, Cl. 546-309.000.
- Hutchinson, Harold D., to Harwil Corporation. Flow responsive switch apparatus. 5,021,619, Cl. 200-81.90M.
- Huth, Gerald C., to Xsirius Photonics, Inc. Silicon avalanche photodiode array. 5,021,854, Cl. 357-30.000.
- Huybrechts, Diana K. C., to Exxon Chemical Patents Inc. Oxidation of saturated hydrocarbon chains. 5,021,607, Cl. 568-311.000.
- Huynh, Luong T., to Motorola, Inc. Amplifier output stage. 5,021,746, Cl. 330-262.000.
- Huynh, Nichol. Wheel alignment tool. 5,020,231, Cl 33-203.180.
- Hwang, Patrick Y., to Rockwell International Corporation. System for determining direction or attitude using GPS satellite signals. 5,021,792, Cl. 342-357.000.
- Hwang, Wei: *See—*
  - Dhong, Sang H.; Hwang, Wei; and Lu, Nicky C., 5,021,355, Cl. 437-35.000.
- Hyatt, Robert J.; Abbott, Edward H., Bush, Robert E.; and Shannon, Francis J., to Ford Motor Company. Method and apparatus for robotic transfer of workpieces. 5,020,964, Cl. 414-751.000.
- Hydro-Quebec: *See—*
  - Armand, Michel; Gauthier, Michel, and Muller, Daniel, 5,021,308, Cl. 429-194.000.
- Hylan, John: *See—*
  - Dragon, Thomas; Hylan, John; and Berkoben, Kenneth, 5,021,673, Cl. 250-548.000.
  - Dragon, Thomas; Hylan, John; Reynolds, Robert; McCarthy, Paul; Merchant, Paul; and Berkoben, Kenneth, 5,021,676, Cl 250-561.000.
- Hyles, Truett M.: *See—*
  - Miles, Larry N.; Drinnen, Cecil A.; Hackler, David W.; Bogart, Tom L.; Macklin, Arnold D.; Sharpsteen, Ben E.; Hyles, Truett M.; and Stephens, Herschel M., 5,020,714, Cl. 228-15.100.
- Ibe, Hiroyuki, to Shin-Etsu Handotai Company, Limited. Axis offset measuring device. 5,020,907, Cl. 356-153.000.
- Ibiden Co. Ltd.: *See—*
  - Enomoto, Ryo, 5,021,472, Cl. 523-427.000.
- IBP Pietzsch GmbH: *See—*
  - Schroder, Bernd; Hartmann, Rudolf; and Thate, Helmut, 5,020,783, Cl. 267-273.000.
- Ibuchi, Yoshiaki: *See—*
  - Kobayashi, Toshiaki; Ibuchi, Yoshiaki; and Kamei, Naoyuki, 5,021,833, Cl. 355-228.000.
- Ichihashi, Mitsuyoshi: *See—*
  - Kikuchi, Makoto; Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Takeshita, Fusayuki; and Furukawa, Kenji, 5,021,190, Cl. 252-299.610.
- Ichijima, Seiji: *See—*
  - Kawagishi, Toshio; Ohkawa, Atsuhiro; and Ichijima, Seiji, 5,021,329, Cl. 430-543.000.
- Ichikawa, Hiroshi: *See—*
  - Ishikawa, Toshikatsu; Teranishi, Haruo; Ichikawa, Hiroshi; and Mitsuno, Shiro, 5,021,370, Cl. 501-95.000.
- Ichikawa, Hiroyuki: *See—*
  - Kurita, Mitsuru; Ikeda, Yoshinori; Suzuki, Yasumichi; Katoh, Koichi; Ichikawa, Hiroyuki; Kitamura, Toshiyuki; and Kadowaki, Toshihiro, 5,021,876, Cl. 358-75.000.
- Ichimura, Kunihiro; Tochizawa, Noriaki; and Kikuchi, Hideo, to Director General of the Agency of Industrial Science and Technology; and Toyo Gosei Kogyo Co., Ltd. Photosensitive poly(vinyl alcohol) derivative. 5,021,505. Cl. 525-59.000.
- ICT Integrated Circuit Testing Gesellschaft fur Halbleiterpruftechnik mbH: *See—*
  - Lanio, Stephan; and Haider, Maximilian, 5,021,670, Cl 250-396.00R.
- Ida, Katsumi; Ikeuchi, Takayuki; and Kayano, Masanori, to Eisai Co., Ltd. Aqueous solution containing fat-soluble vitamin K. 5,021,570, Cl. 514-681.000.
- Idel, Karsten-Josef: *See—*
  - Mayska, Paul J.; Eckhardt, Volker; Freitag, Dieter; and Idel, Karsten-Josef, 5,021,543, Cl. 528-217.000.
  - Serini, Volker; Freitag, Dieter; Idel, Karsten-Josef; Westeppe, Uwe; Grigo, Ulrich; and Paetz, Klaus-Christian, 5,021,542, Cl 528-204 000.
- Idema, Gert. Tool for obliquely severing flower stems. 5,020,408, Cl 83-446.000.
- Idemitsu Kosan Co., Ltd.: *See—*
  - Kanamori, Hideo, 5,021,181, Cl. 252-75.000.
- Igarashi, Misao: *See—*
  - Takashi, Ishida; Ueda, Yoshikazu; Kubota, Teruji; Igarashi, Misao; Tanaka, Norichika; and Kamijo, Yasuhiko, 5,020,455, Cl 110-342.000.
- Igarashi, Yoshiaki: *See—*
  - Oshima, Mitsuaki; Izaki, Masataka; Kajino, Jirou; Igarashi, Yoshiaki; and Mitani, Hiroshi, 5,020,890, Cl. 350-500.000.
- Igarashi, Yoshinori; Yasukawa, Makoto; Ariga, Yasuo; Kobayashi, Ichiro; and Horiuchi, Satoru, to Nohmi Bosai Kabushiki Kaisha. Light-scattering-type smoke detector. 5,021,677, Cl. 250-574.000.
- Igel, Richard: *See—*
  - Bienert, Horst; Hirschberger, August; Schleicher, Bernd; Igel, Richard; and Meier, Kurt, 5,020,850, Cl. 296-223.000.
- Ihara, Ryoseki, to Kabushiki Kaisha Ihara Kogyo. Belt fitting engagement rail. 5,020,948, Cl. 410-105.000.
- Iida, Katsumi; Sakurai, Yoshihiko; Takano, Akihiko; Yamaguchi, Hideo; and Yano, Teruaki, to Zexel Corporation, and Mazda Motor Corporation. Apparatus for controlling an automotive air-conditioner. 5,020,424, Cl. 98-2.010.
- Iida, Takashi; Kiten, Hiroshi; Ishii, Toru; and Tsukamoto, Takeya, to Minolta Camera Kabushiki Kaisha. Automatic white-balance adjusting apparatus with reduced sensitivity to transient light conditions 5,021,875, Cl. 358-29.00C.
- Iimura, Tsutomu: *See—*
  - Muroi, Katsumi; Okuna, Kenji; Otsuka, Hidefumi; Ouchi, Kastubumi; Iimura, Tsutomu; and Kojima, Ryoji, 5,021,810, Cl. 346-155.000.
- Iizuka, Yo; Kashiwadate, Ken; Endo, Shunzo; Hosokawa, Toshio; Katto, Takayuki; Mizuno, Toshiya; and Katase, Kenichi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Polymer alloy of polyarylene thioether and a process for producing the same. 5,021,523, Cl 525-537.000.
- Iizuka, Yoshio: *See—*
  - Terada, Atsusuke; Iizuka, Yoshio; Wachi, Kazuyuki, and Fujibayashi, Kenji, 5,021,413, Cl. 514-227.500.
- Iizuka, Yutaka: *See—*
  - Kita, Toshiro; Genba, Susumu; Takemoto, Masato; Tatsumi, Takashi; Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi; Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji; and Yoshida, Toshihiko, 5,021,892, Cl. 358-468.000.
- Ijiri, Masaaki: *See—*
  - Kubota, Akinori; Ijiri, Masaaki; and Kobayashi, Michihito, 5,020,982, Cl. 425-42.000.
- Ikeda, Yasunori: *See—*
  - Terasawa, Masaaki; Mukohda, Hidefumi; Nagai, Yoshikazu; Ikeda, Yasunori; and Furusawa, Kazunori, 5,022,000, Cl. 365-184.000.
- Ikeda, Yoshinori: *See—*
  - Kurita, Mitsuru; Ikeda, Yoshinori; Suzuki, Yasumichi; Katoh, Koichi; Ichikawa, Hiroyuki; Kitamura, Toshiyuki; and Kadowaki, Toshihiro, 5,021,876, Cl. 358-75.000.
- Ikegami Tsushiniki Co. Ltd.: *See—*
  - Kosaka, Kenji; Kimura, Hiroshi; Suzuki, Akihiro; and Hayashi, Kenji, 5,020,785, Cl. 270-053.000.

VOL 1127
ISS 1
JE 4
1991
UMI

- Ikehara, Mitsuo: *See—*
  - Nishizawa, Jun-ichi; Tamamushi, Takashige; Mitamura, Koichi, Takahashi, Hiroo; Mitsui, Kiyoo; Ikehara, Mitsuo; Wako, Toyota; and Maruyama, Sinpei, 5,021,936, Cl. 363-41.000.
- Iketaki, Yoshinori, to Olympus Optical Co., Ltd. X-ray optical system formed by multilayer reflecting mirrors for reflecting X-rays of different wavelengths. 5,022,064, Cl. 378-145.000.
- Ikeuchi, Takayuki: *See—*
  - Ida, Katsumi; Ikeuchi, Takayuki; and Kayano, Masanori, 5,021,570, Cl. 514-681.000.
- Ikeya, Kiyokazu; and Yagi, Masanori, to Texas Instruments Incorporated. Test socket. 5,020,998, Cl. 439-266.000.
- Ikoma, Tadashi: *See—*
  - Asami, Shinji; and Ikoma, Tadashi, 5,020,784, Cl. 270-53.000.
- Illinois Tool Works Inc.: *See—*
  - Ernst, Richard J., Paul, Sigismund; Sevald, Frederick G.; and Olma, Marian, 5,020,693, Cl. 222-137.000.
  - Grome, Donald C.; Lundstedt, Kurt H.; and Olson, William, 5,020,189, Cl. 16-286.000.
  - Marco, Leslie S., 5,020,661, Cl. 206-150.000.
- Imaeda, Mikio: *See—*
  - Kobayashi, Tetuo; and Imaeda, Mikio, 5,021,291, Cl. 428-319.900.
- Imagawa, Hitoshi: *See—*
  - Urushidani, Shigeo; and Imagawa, Hitoshi, 5,022,025, Cl 370-60.000.
- Imahase, Tomotoshi: *See—*
  - Meki, Naoto; Nishida, Kazue; and Imahase, Tomotoshi, 5,021,446, Cl. 514-407.000.
- Imai, Kyoiti; and Ishida, Tateo, to Nissin Chemical Industry Co., Ltd Magnetic recording medium and magnetic coating composition therefo. 5,021,292, Cl. 428-323.000.
- Imai, Toshitaka: *See—*
  - Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; Ozawa, Shigeo; Imai, Toshitaka; and Shimada, Takamichi, 5,020,391, Cl. 74-866.000.
- Imaizumi, Mamoru; and Kaga, Hikaru, to Brother Kogyo Kabushiki Kaisha. Recording device with sheet heater. 5,021,805, Cl. 346-76.00R.
- Imaseki, Chiharu. *See—*
  - Nozawa, Masaru; Imaseki, Chiharu. and Inagaki, Kazuyuki, 5,021,804, Cl. 346-76.0PH.
- IMED Corporation: *See—*
  - Richmond, Frank M.; Vanderveen, Timothy, and Kimes, Rick, 5,020,562, Cl. 137-15.000.
- Imperial Chemical Industries PLC: *See—*
  - Beer, Paul D.; and Tite, Elizabeth L., 5,021,592, Cl. 556-1.000.
  - Brattan, Keith, 5,021,199, Cl. 261-114.100.
  - Clough, John M.; Godfrey, Christopher R. A., de Fraine, Paul J., Hutchings, Michael G.; and Anthony, Vivienne M., 5,021,581, Cl 546-309.000.
  - Padget, John C.; and Pears, David A., 5,021,544, Cl. 528-272.000.
  - Pilgrim, William R.; Young, Derek W.; Tait, Brian S.; Crawley, Graham C.; Edwards, Philip N.; and Hill, George B., 5,021,414, Cl. 514-237.500.
  - Toms. Derek J.; and Coffee, Ronald A., 5,021,803, Cl. 346-1.100.
- Inaba, Shigemitsu. *See—*
  - Ohtaka, Kazuto; and Inaba, Shigemitsu, 5,021,003, Cl. 439-357.000.
- Inagaki, Hiroya: *See—*
  - Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, 5,021,877, Cl. 358-75.000.
- Inagaki, Kazuyuki: *See—*
  - Nozawa, Masaru; Imaseki, Chiharu; and Inagaki, Kazuyuki, 5,021,804, Cl. 346-76.0PH
- Inax Corporation: *See—*
  - Hattori, Mitsutaka; Yoshimi, Toshiaki, and Fukushima, Toshio, 5,020,565, Cl. 137-207.000.
  - Ito, Takeshi; Murata, Kazushige; and Kohmura, Kuniyoshi, 5,020,983, Cl. 425-85.000.
- Index-Werke KG: *See—*
  - Link, Helmut F.; and Trautmann, Gunther, 5,020,402, Cl 82-124.000.
- Indspec Chemical Corporation: *See—*
  - Durairaj, Bojayan, Peterson, Alex, Jr., Lamars, Robert M. and Hood, Richard T., 5,021,522, Cl. 525-502.000.
- Indugas, Inc.: *See—*
  - Hemsath, Klaus H., 5,020,596, Cl. 166-272.000.
- Ingber, Donald. *See—*
  - Folkman, Judah; and Ingher, Donald, 5,021,404, Cl. 514-26.000.
- Inger, Siegfried; and Schroeders, Manfred, to Palitex Project Company GmbH. Transport device for packages and/or tubes thereof 5,020,735, Cl. 242-1.000.
- Ingerscil-Rand Company: *See—*
  - Lyon, Leland H., and Eggeling, Richard L., 5,020,610, Cl 175-135.000.
- Inland Steel Company: *See—*
  - Blazek, Kenneth E.; and Saucedo, Ismael G., 5,020,585, Cl. 164-452.000.
- Innotag Inc.: *See—*
  - Proulx, Serge L., 5,020,567, Cl. 137-315.000.
- Inoue, Akira: *See—*
  - Kobayashi, Motonobu; Kinoshita, Futoru; Hagi, Mitsuharu; Inoue, Akira; and Uno, Terushige, 5,021,227, Cl. 423-212.000.
- Inoue, Hidetoshi: *See—*
  - Yoshida, Isao; Inoue, Hidetoshi; and Arai, Kanji. 5,021,890, Cl 358-405.000.
- Inoue, Hiromichi: *See—*
  - Saito, Shinichi; Ushioda, Makoto; Inoue, Hiromichi; Miyazawa, Kazutoshi; and Ohno, Kouji, 5,021,191, Cl 252-299.610
- Inova Microelectronics Corporation. *See—*
  - Allan, James D., 5,022,011, Cl. 365-233.000.
- Insinooritoiinisto Pesmel Oy: *See—*
  - Maki-Rahkola, Jari; Kononen, Juhani; and Surakka, Jorma. 5,020,961, Cl. 414-495.000.
- Institut Francais du Petrole: *See—*
  - Castel, Yvon, 5,020,359, Cl. 73-61.00R.
  - Franckowiak, Sigismond, Mikitenko, Paul, Baumgartner, Pierre and Cohen, Georges, 5,021,143, Cl. 208-70.000.
- Institute of Gas Technology: *See—*
  - Donado, Rafael A., 5,021,303, Cl. 429-16.000.
  - Khinkis, Mark J.; Abbasi, Hamid A., Lisauskas, Robert A.; and Itse Daniel C., 5,020,456, Cl. 110-345.000.
- Integrity Health Systems Corporation: *See—*
  - Spears, Kevin A.; Stafford, Clinton J.; Frey, Kenny C., and Wall, Daniel P., 5,020,518, Cl. 128-52.000
- Intel Corporation: *See—*
  - Ahuja, Bhupendra; and Sollars, Donald, 5,021,684, Cl 307-443.000
- Intermedics Orthopedics, Inc.: *See—*
  - Burkinshaw, Brian D.; and Brown, Steven G., 5,021,055, Cl 606-82.000.
  - Hofmann, Aaron A., and Burdulis, Albert G., Jr., 5,021,056, Cl 606-86.000.
- International Business Machines Corporation: *See—*
  - Arbach, Gary V.; O'Toole, Terrence R., and Viehbeck, Alfred, 5,021,129, Cl 204-15.000.
  - Bealkowski, Richard; Blackledge, John W., Jr.; Cronk, Doyle S Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G.; Kovach, George D., McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., 5,022,077, Cl. 380-4.000
  - Chan, Yuen H., 5,022,010, Cl 365-230.060.
  - Chang, Shuo H., Hendriks, Ferdinand, Khanna, Vijayeshwar D and Lean, Eric G., 5,021,906, Cl. 360-103.000.
  - Davis, Myron F.; Martin, Randall W.; Nomura, Hideo, Pollitt, Richard F., Wittner, Ernest, and Yoshikawa, Wataru, 5,021,922, Cl 361-380.000.
  - Dewitt, John R., and Neer, Jay H., 5,020,999, Cl. 439-328.000
  - Dhong, Sang H., Hwang, Wei; and Lu, Nicky C., 5,021,355, Cl 437-35.000.
  - Droge, David A., Lyerly, Jeffrey B., Mott, William E., Whitehead, Lance W., and Yenik, Matthew G., 5,020,789, Cl. 271-225.000
  - Fifield, John A., and Tomashot, Steven W., 5,022,006, Cl 365-200.000.
  - Hernandez, Irene H.; and Machart, Beverly H., 5,021,973, Cl 364-518.000.
  - Kirchner, Peter D.; Warren, Alan C.; Woodall, Jerry M. and Wright, Steven L., 5,021,365, Cl. 437-237.000.
  - Leforestier, Sylvain; and Omet, Dominique, 5,021,688, Cl 307-463.000.
  - Morten, Richard M., and Smith, Ted P., 5,021,949, Cl 364-200.000
  - Smith, Normand C., 5,020,244, Cl 34-155.000.
- International Computers Limited *See—*
  - Watson, Paul; Woods, John V.; and Watson, Ian, 5,021,942, Cl 364-200.000.
- International Design/Manufacturing, Inc *See—*
  - Hoaglan, Anna M., 5,020,709, Cl. 224-151.000.
- International Flavors & Fragrances Inc.: *See—*
  - Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R., Boardwiek, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G., Narula, Anubhav; and Boden, Richard M., 5,021,184, Cl. 252-174.110.
- International Fuel Cells Corp.: *See—*
  - Singelyn, James D., 5,021,259, Cl. 427-115.000.
- International Mobile Machines Corporation: *See—*
  - Paneth, Eric; Handzel, Mark J.; Morley, Steven A., and Avis, Graham M., 5,022,024, Cl. 370-50.000.
- International Paper Company: *See—*
  - Beales, Jonathan T., 5,020,921, Cl. 383-38.000.
  - Cassidy, Benjamin J., 5,020,717, Cl. 229-114.000.
- International Soil Systems, Inc.: *See—*
  - Malmgren, Robert C.; Cipra, Jan; and Umlauf, Edward L., 5,020,936, Cl. 404-32.000.
- Intools, Limited: *See—*
  - Dreger, Geoffrey, 5,020,954, Cl. 411-403.000.
- Inui, Takashi: *See—*
  - Sukegawa, Shunichi; and Inui, Takashi, 5,021,852, Cl. 357-23.110
- Inukai, Hiroshi: *See—*
  - Kubo, Motonobu; Inukai, Hiroshi; and Kitahara, Takahiro, 5,021,316, Cl. 430-108.000.
  - Ohmori, Akira; and Inukai, Hiroshi, 5,021,501, Cl. 524-544.000.
  - Ohmori, Akira; and Inukai, Hiroshi, 5,021,527, Cl. 526-245.000.
- Inumada, Masato, to Kabushiki Kaisha Toshiba. High frequency heating apparatus with a temperature compensated switching element. 5,021,620, Cl. 219-10.55B.
- Inuzuka, Tsuneki: *See—*
  - Komiya, Yutaka; Murakami, Katsumi; and Inuzuka, Tsuneki, 5,021,827, Cl. 355-206.000.
- Inventio AG: *See—*
  - Michel, Aime, 5,020,639, Cl. 187-1.00R.

- Inck, W. T.: *See—*
  - Malecki, Richard L., Inck, W. T.; and Dowler, Robert L., 5,020,361, Cl. 73-118.100.
- Ine, Hisao: *See—*
  - Kono, Masanao; Hasegawa, Yoshihiro; Nishi, Yasutaka, Ine, Hisao; Mizuta, Tatsuji; and Ohara, Shinsuke, 5,021,269, Cl. 427-436.000.
- Irrifrance-Cofadsi: *See—*
  - Perroud, Bruno G., Rouquayrol, Claude J.; and Guilhem, Jean C., 5,020,730, Cl. 239-745.000.
- Isaka, Kazuo: *See—*
  - Fukui, Tetsuro; Katayama, Masato; Mouri, Akihiro; Isaka, Kazuo; Kagami, Kenji; and Suzuki, Masao, 5,021,321, Cl. 430-201.000.
- Isayev, Avraam I., to University of Akron. Composite thermoplastic elastomer blend and process for preparing the same. 5,021,475, Cl. 524-30.000.
- Isham, Robert H.; and Zazzu, Victor, to Harris Semiconductor Patents, Inc. Symmetrical variable impedance apparatus employing MOS transistors. 5,021,747, Cl. 330-284.000.
- Ishibai, Isao; and Otsu, Hitonobu, to Hoya Corporation. Aspherical glass lens element suitable for a collimator lens. 5,020,888, Cl. 350-432.000.
- Ishida, Katsuhiko: *See—*
  - Kohdaka, Takayuki; Ishida, Katsuhiko; Takahashi, Toshiyuki; and Ogata, Takashi, 5,021,785, Cl. 341-138.000.
- Ishida, Masahiko: *See—*
  - Mohri, Hidemasa; Tobita, Michiaki; and Ishida, Masahiko, 5,021,272, Cl. 428-40.000.
- Ishida, Tateo: *See—*
  - Imai, Kyoiti; and Ishida, Tateo, 5,021,292, Cl 428-323.000.
- Ishiguro, Katsusuke; and Yokoyama, Nobuyoshi, to Paloma Kogyo Kabushiki Kaisha. Pulse combustion device 5,020,987, Cl. 431-1.000.
- Ishihara, Masamichi: *See—*
  - Suzuki, Yukihide; Muranaka, Masaya, and Ishihara, Masamichi, 5,021,998, Cl. 365-51.000.
- Ishihara, Takashi; Sasaki, Hajime; and Aiga, Masao, to Mitsubishi Denki Kabushiki Kaisha. Tandem solar cell. 5,021,100, Cl. 136-249.000.
- Ishii, Kazuo: *See—*
  - Kato, Eiichi; and Ishii, Kazuo, 5,021,311, Cl. 430-96.000.
- Ishii, Satoshi: *See—*
  - Nishimura, Tetsuharu; Ishizuka, Koh; Ishii, Satoshi, and Tsukiji, Masaaki, 5,021,649, Cl. 250-231.160.
- Ishii, Toru: *See—*
  - Iida, Takashi; Kiten, Hiroshi; Ishii, Toru; and Tsukamoto, Takeya, 5,021,875, Cl. 358-29.00C.
- Ishikawa, Hideyuki; Chonan, Mitsugi; Tachibana, Fusao; and Kurosu, Shinichi, to Fuji Jukogyo Kabushiki Kaisha. Lubricating system for a two-cycle engine. 5,020,484, Cl. 123-73.0AD.
- Ishikawa, Hiroshi, to Alps Electric Co., Ltd. Mounting for a ball lens on a bar code reader wand having a tapered lens bore. 5,021,651, Cl. 250-239.000.
- Ishikawa, Masatoshi; Fujita, Kozo; and Kobata, Shigeyuki, to Hitachi, Ltd. Tape changer for loading and unloading a magazine of magnetic tape cartridges. 5,021,902, Cl. 360-92.000.
- Ishikawa, Toshikatsu; Teranishi, Haruo; Ichikawa, Hiroshi; and Mitsuno, Shiro, to Nippon Carbon Co, Limited. Ceramic fibers and a process for producing the same. 5,021,370, Cl. 501-95.000.
- Ishikawajima-Harima Heavy Industries Co., Ltd.: *See—*
  - Maebo, Kunji; and Hirabayashi, Shigeru, 5,020,451, Cl. 110-189.000.
  - Yamada, Akio; and Hayashi, Fumio, 5,020,968, Cl. 415-36.000.
- Ishioka, Hideyuki, to Hirose Electric Co., Ltd. Apparatus for loading cable on connector. 5,020,216, Cl. 29-753.000.
- Ishiwata, Tetsuo: *See—*
  - Yoshino, Tadashi; Yamaguchi, Susumu; Komae, Hitoshi; Ishiwata, Tetsuo; Yamauchi, Eiji; and Tanaka, Hiroshi, 5,021,897, Cl. 360-72.200.
- Ishizuka, Koh: *See—*
  - Nishimura, Tetsuharu; Ishizuka, Koh; Ishii, Satoshi; and Tsukiji, Masaaki, 5,021,649, Cl. 250-231.160.
- Iskra, Michael J., to Weyerhaeuser Company. Absorbent panel structure. 5,021,050, Cl. 604-379.000.
- Isoyama, Toyoshiro: *See—*
  - Sawada, Shinichi; Matsushita, Tetsuya; Isoyama, Toyoshiro; and Saito, Hideo, 5,021,189, Cl. 252-299.610.
- Isuzu Motors Limited. *See—*
  - Sasa, Yuki, 5,020,645, Cl. 192-0.090.
- Itagaki, Akinari: *See—*
  - Sugita, Toshikazu; and Itagaki, Akinari, 5,021,532, Cl. 528-15.000.
- Itagaki, Takafumi, to Tamatoshi Industries Limited. Decorative panel assembly. 5,020,293, Cl. 52-314.000.
- ITO Co., Ltd.: *See—*
  - Kishida, Toshio; and Mori, Chiharu, 5,021,768, Cl. 340-573.000.
- Ito, Daisuke: *See—*
  - Tsurunaga, Kazuyuki; Masuda, Yoshihisa; Okumura, Hiroyuki; and Ito, Daisuke, 5,021,914, Cl. 361-19.000.
- Ito, Kenichi, to Olympus Optical Co., Ltd. Apparatus for detecting moving direction of light beam spot illuminated on optical information recording medium having tracks. 5,022,021, Cl. 369-44.110.
- Ito, Masayuki: *See—*
  - Sawa, Natsuo; Masuda, Takeshi; Miura, Shozo; Kano, Naoki; Kamagata, Kazuo; and Ito, Masayuki, 5,021,584, Cl. 548-335.000.
- Ito, Masumi: *See—*
  - Hatano, Masakatsu; Murayama, Masayoshi; Shima, Kenji; and Ito, Masumi, 5,021,384, Cl. 502-209.000.
- Ito, Michiaki: *See—*
  - Ueda, Masami; and Ito, Michiaki, 5,020,767, Cl. 248-638.000.
- Ito, Takahiro; Yamaki, Bunshiro; and Yamamoto, Yoshio, to Kabushiki Kaisha Toshiba. High-frequency amplifying semiconductor device 5,021,859, Cl. 357-43.000.
- Ito, Takeshi; Murata, Kazushige; and Kohmura, Kuniyoshi, to Inax Corporation. Divisible slip-casting molds. 5,020,983, Cl. 425-85.000.
- Ito, Tatsuo: *See—*
  - Yoshida, Hiroshi; Saito, Sotoshi; and Ito, Tatsuo, 5,020,206, Cl. 29-408.000.
- Ito, Yasunobu; and Yamada, Kunihiro, to Aisin AW Kabushiki Kaisha Electronic controller for automatic transmission. 5,021,955, Cl 364-424.100.
- Itoga, Toshiyuki: *See—*
  - Kita, Toshiro; Genba, Susumu; Takemoto, Masato; Tatsumi, Takashi; Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi; Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji; and Yoshida, Toshihiko, 5,021,892, Cl 358-468.000.
- Itoh, Hiroyuki: *See—*
  - Kawata, Atsumi; Itoh, Hiroyuki; Tanaka, Hirotoshi; Yoshihara, Kazuhiro; and Yamashita, Hiroki, 5,021,686, Cl. 307-448.000.
- Itoh, Katsumi: *See—*
  - Harada, Setsuo; Nagaoka, Akinobu; Itoh, Katsumi; and Terao, Shinji, 5,021,439, Cl. 514-380.000.
- Itoh, Motohiko: *See—*
  - Miyazaki, Toshimasa; Uzawa, Yoji; Okawa, Kazuyoshi; Kawashima, Hiroshi; Moriya, Kazumasa; Murakawa, Yoshitaka; Kumagai, Toshimitsu; Nakamura, Akihiro; Itoh, Motohiko, and Kashiwazaki, Tomoyuki, 5,021,695, Cl. 310-12.000.
- Itozaki, Hideo: *See—*
  - Fujita, Nobuhiko; Itozaki, Hideo; Tanaka, Saburo; Yazu, Shuji; and Jodai, Tetsuji, 5,021,396, Cl. 505-1.000.
- Itse, Daniel C.: *See—*
  - Khinkis, Mark J.; Abbasi, Hamid A.; Lisauskas, Robert A.; and Itse, Daniel C., 5,020,456, Cl. 110-345.000.
- Iuchi, Shin-ichiro: *See—*
  - Kamezaki, Hisamitsu; Suenaga, Masashi; Saito, Osamu; Iuchi, Shin-ichiro; Watanabe, Hitoshi; Fujiwara, Hideo; and Tuburaya, Yoshitane, 5,021,276, Cl. 428-64.000.
- Ivey, Charles W., to Fasco Industries, Inc. Safety device for combined ventilator/light unit. 5,021,932, Cl. 362-96.000.
- Iwahashi, Hiroshi, to Kabushiki Kaisha Toshiba. Programmable ROM having a reduced number of power source terminals. 5,022,002, Cl. 365-185.000.
- Iwai, Ichiro; and Eda, Hiroyuki, to Showa Aluminum. Brazeable aluminum alloy sheet and process of making same. 5,021,106, Cl. 148-437.000.
- Iwakabe, Yasushi: *See—*
  - Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, 5,021,563, Cl. 540-128.000.
- Iwaki, Yoshihisa: *See—*
  - Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; Ozawa, Shigeo; Imai, Toshitaka; and Shimada, Takamichi, 5,020,391, Cl. 74-866.000.
- Iwasaki, Atsushi; Mizuishi, Koji; and Oda, Michiaki, to Shin-Etsu Handotai Co., Ltd. Isolation valve used in a single crystal pulling apparatus. 5,020,775, Cl. 251-215.000.
- Iwasaki, Kishiro: *See—*
  - Era, Susumu; Iwasaki, Kishiro; Yokokura, Hisao; Hanawa, Yasuo; Kondo, Katsumi; Nakada, Tadao; Kitamura, Teruo; and Mukoh, Akio, 5,020,883, Cl. 350-350.00S.
- Izaki, Masataka: *See—*
  - Oshima, Mitsuaki; Izaki, Masataka; Kajino, Jirou; Igarashi, Yoshiaki; and Mitani, Hiroshi, 5,020,890, Cl. 350-500.000.
- Izawa, Taketoshi: *See—*
  - Nakano, Yoshimasa; Sugawara, Michiharu; Uetsuki, Setsuyoshi; Izawa, Taketoshi; Kawaguchi, Tomoyuki; and Wada, Akira, 5,021,419, Cl. 514-253.000.
- Izumi, Mamoru: *See—*
  - Kondou, Yuu; and Izumi, Mamoru, 5,021,888, Cl. 358-213.110.
- J. F. Walton & Co., Inc.: *See—*
  - Walton, James, 5,020,188, Cl. 15-406.000.
- J. M. Smucker Company, The: *See—*
  - Gross, David R.; and Valenzky, Robert J., 5,020,237, Cl. 34-1.000.
- J. M. Voith GmbH: *See—*
  - Mayer, Wolfgang; Sturm, wolfram; Fissmann, Hans-Joachim, Kotitschke, Gerhard; Zurn, Georg; Kade, Werner; and Kugler, Georg, 5,020,242, Cl. 34-115.000.
- Jablonski, Terry R.: *See—*
  - Bigliardi, Achille M.; and Jablonski, Terry R., 5,020,628, Cl 180-272.000.
- Jackman, Joseph R.: *See—*
  - Luydkx, Leon A.; Jackman, Joseph R.; Robison, James W., Jr.; and Young, James H., 5,021,086, Cl. 75-315.000.
- Jackson, Richard L.: *See—*
  - Robinson, Keith M.; Mao, Simon J. T.; Parker, Roger A.; and Jackson, Richard L., 5,021,461, Cl. 514-731.000.
- Jacob, Jonah H., to Science Research Laboratory, Inc. Laser amplifier 5,021,742, Cl. 330-4.300.
- Jacobs, Ralph R., to Spectra-Physics. Near resonant Nd^{3+}, solid state laser system. 5,022,041, Cl. 372-70.000.
- Jacobs, Ralph R., to Spectra-Physics. High power diode-pumped solid state laser with unstable resonator. 5,022,043, Cl. 372-95.000.
- Jacobsen, Finn, to Kamyr AB. Stabilizing pressure and flow conditions in a screening apparatus. 5,020,178, Cl. 8-156.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Jacobson, James G *See—*
  - Chien, Kuei-Ru; Wang, John H S and Jacobson, James G., 5,022,032, Cl. 372-18.000.
- Jagannath, Chirravuri: *See—*
  - Melman, Paul; Elman, Boris S., Koteles, Emil S., and Jagannath, Chirravuri, 5,021,360, Cl. 437-81.000.
- Jagenberg Aktiengesellschaft: *See—*
  - Thievessen, Karl, 5,020,736, Cl. 242-58 300.
- Jager, Arnold, and Jager, Claudius, to Jager, Arnold. Connection arrangement to provide in endless band. 5,020,658, Cl. 198-844 200.
- Jager, Claudius: *See—*
  - Jager, Arnold, and Jager, Claudius, 5,020,658, Cl. 198-844.200.
- Jager, Heimo: *See—*
  - Karagoz, Sadi; Hribernik, Bruno; Stamberger, Johann; Puber, Josef; Jeglitsch, Franz; Fischmeister, Hellmut, Matzer, Franz, Locker, Claus-Dieter; Kudielka, Elfriede; and Jager, Heimo, 5,021,085, Cl. 75-239.000.
- Jakob, Frank E.: *See—*
  - Talbert, Sherwood G, and Jakob, Frank E, 5,020,320, Cl. 62-238.700.
- James, Jimmie J. Liquid pouring spout. 5,020,702, Cl 222-529 000.
- James, Joseph P.: *See—*
  - Bulin, Dennis G., and James, Joseph P., 5,020,941, Cl 405-186 000.
- Janetzke, Helmut *See—*
  - Cao, Chi-Thuan; Erban, Andreas, Janetzke, Helmut, Cordes, Henning; Schulz, Alfred; and Matuschek, Wolfgang, 5,020,501, Cl. 123-489.000.
- Janome Sewing Machine Company Limited: *See—*
  - Hanyu, Susumu; and Kato, Kenji, 5,020,461, Cl. 112-278.000.
- Jansen, Gerardus L. M.; and Hecht, Matthew W., to Laser Magnetic Storage International Company. Magneto optic data recording system with variable field strength, actuator therefor and method of providing. 5,022,017, Cl. 369-13.000.
- Janssens, Wilhelmus *See—*
  - Vanmaele, Luc J; and Janssens, Wilhelmus, 5,021,393, Cl. 503-227.000.
- Jansson, Lars G.: *See—*
  - Yarbrough, Roy; Haacke, Ernest D., and Jansson, Lars G, 5,021,687, Cl. 307-456.000.
- Jansz, Just J. C.; and Santing, Gerhardus, to Shell Oil Company Production of chlorine and sodium sulphate. 5,021,231, Cl. 423-506.000.
- Japan Atomic Energy Research Institute: *See—*
  - Takeda, Tatsuoki; and Miyamoto, Goro, 5,020,886, Cl. 350-409.000.
- Japan Aviation Electronics Industry Limited: *See—*
  - Okada, Kenichi; Tanigawa, Shu, and Nishino, Masashi, 5,020,913, Cl 356-350.000.
- Japan Oxygen, Co., Ltd : *See—*
  - Suzuki, Takashi; and Akiyama, Teruo, 5,021,352, Cl. 436-136.000.
- Japan Tobacco Inc.: *See—*
  - Uchiyama, Kensuke; Uematsu, Hiromi; Takeuchi, Manabu; and Kobari, Masao, 5,020,550, Cl. 131-296.000.
- Jargiello, Paul A.; and Dooley, Thomas J., to Polychrome Corporation. Printing plate protectant. 5,021,324, Cl. 430-331.000.
- Jayaraman, Gopal: *See—*
  - Hamar, Douglas J., Jayaraman, Gopal; Granroth, Richard; Whipple, Robert L.; and Evensen, Harold A. 5,020,286, Cl 52-585.000.
- Jean, Michel *See—*
  - Desrochers, Michel J.; Jean, Michel, and Drouin, Michel P., 5,021,122, Cl. 162-150.000
- Jeglitsch, Franz: *See—*
  - Karagoz, Sadi; Hribernik, Bruno; Stamberger, Johann; Puber, Josef; Jeglitsch, Franz; Fischmeister, Hellmut; Matzer, Franz; Locker, Claus-Dieter; Kudielka, Elfriede; and Jager. Heimo, 5,021,085, Cl. 75-239.000.
- Jennings, Ralph L. Woodworking apparatus. 5,020,578, Cl. 144-145.00R.
- Jensen, Peter K. A : *See—*
  - Bolund, Lars; Jensen, Peter K A, and Bjerring, Peter, 5,021,422, Cl. 514-261.000.
- Jentsch, Gunter, to Epp, Roman A.; and Luderschmidt, Wolfgang Bacteriocidal washing agents containing a per-compound and a TAED:PAG mixture. 5,021,182, Cl. 252-102.000.
- Jeol Ltd.: *See—*
  - Masutani, Koji, 5,021,661, Cl. 250-339.000.
- Jeschke, Willi, to Heidelberger Druckmaschinen AG. Device for metering ink in offset printing presses. 5,020,432, Cl. 101-350.000.
- Jeschke, Willi; and Rodi, Anton, to Heidelberger Druckmaschinen AG. Device for cleaning a plate cylinder and/or a blanket cylinder of an offset printing machine, and method of operating the device. 5,020,433, Cl. 101-425.000.
- Jeter, John D. Acceleration compensating system. 5,020,609, Cl. 175-48.000.
- Jezic, Zdravko P., to Dow Chemical Company, The. Microfibers of syndiotactic vinyl aromatic polymers, nonwoven mats of the microfibers. 5,021,288, Cl. 428-224.000.
- Jidosha Kiki Co., Ltd.: *See—*
  - Koji, Hatanaka; and Takashi, Aota, 5,020,489, Cl. 123-145.00A.
- Jiles, Stephen L. Universal plastic-pipe tool. 5,020,401, Cl. 82-113.000.
- Jimbo, Yoshiji; and Ozawa, Tsutomu, to Hitachi, Ltd Circuit arrangement for preventing inductive interference in an electric car 5,021,725, Cl. 318-801.000.
- JMO Holding, Inc.: *See—*
  - Calltharp, Glen R., 5,021,161, Cl. 210-614.000.
- Jobe, Benjamin L., to Jogler, Inc. Liquid sight monitor with multi-contact insert. 5,020,810, Cl. 277-207.00A.
- Jodai, Tetsuji *See—*
  - Fujita, Nobuhiko; Itozaki, Hideo; Tanaka, Saburo. Yazu, Shuji, and Jodai, Tetsuji, 5,021,396, Cl. 505-1.000.
- Joffe, Edward J Cable spacer. 5,021,612, Cl 174-146.000.
- Jogler, Inc.. *See—*
  - Jobe, Benjamin L., 5,020,810, Cl 277-207.00A
- Johantgen, John S.. *See—*
  - Corzine, Robert G.; Bolstad, Bruce E.; and Johantgen, John S. 5,021,796, Cl. 343-712.000.
- John Lysaght (Australia) Limited: *See—*
  - Haines, Neil R.; and Morgan, Kim, 5,020,295, Cl 52-630.000.
- Johnson, David K.; and Kline, Steven J., to Abbott Laboratories 8-Hydroxyquinoline chelating agents. 5,021,567, Cl 540-470.000.
- Johnson, Howard L.: *See—*
  - Berger, Frank M, Johnson, Howard L.; and DeGraw, Joseph I, Jr., 5,021,460, Cl. 514-718.000.
- Johnson, Jesse D. Seed germinating device and method of use 5,020,273, Cl. 47-61.000.
- Johnson, Kevin M.; and Shoup, Clay E., to Eastman Kodak Company Multicolor image forming apparatus and transfer roller reindexing mechanism. 5,021,829, Cl. 355-213.000.
- Johnson, Kevin M., to Eastman Kodak Company. Multicolor imaging apparatus with improved transfer means. 5,021,835, Cl. 355-271.000
- Johnson, Milo R., to Texas Instruments Incorporated. Method and apparatus for real-time in-line material monitoring. 5,021,662, Cl 250-339.000.
- Johnson Mtthey PLC *See—*
  - Murrer, Barry A; and Schwartz, David A, 5,021,409, Cl 514-183.000.
- Jois, Yajnanarayana H R.. *See—*
  - Gibson, Harry V., and Jois, Yajnanarayana H R, 5,021,583, Cl 548-328.000.
- Jones, Anthony G.. *See—*
  - Blackburn, Stephen R.; and Jones, Anthony G., 5,021,134, Cl 204-177.000.
- Jones, Darrell R Method and apparatus for heating the ground, roads or the like. 5,020,510, Cl 126-271.100.
- Jones, Donald R., to Doble Engineering Company. Motion tranducing through conversion of linear motion to circular motion 5,021,648, Cl 250-231 130.
- Jonsson, Gunnar *See—*
  - Oden, Anders; and Jonsson, Gunnar, 5,020,608, Cl. 175-21.000
- Jordan, H. Weaver. Pin fraud and shock prevention system 5,022,073, Cl. 379-145.000.
- Joshi, Ashok V., Syammach, Mustafa B.; and Campbell, Scott S, to Ceramatec, Inc. Ceramic solid electrolyte based electrochemical oxygen concentrator cell. 5,021,137, Cl. 204-242.000.
- Joshua, Henry; Wilson, Kenneth E.; Schwartz, Michael S., Lee, Ta J, and Stokker, Gerald E., to Merck & Co., Inc. 3-keto HMG-CoA reductase inhibitors 5,021,453, Cl 514-510.000.
- Jouveinal S.A.: *See—*
  - Aubard, Gilbert G, Grouhel, Agnes G.; Junien, Jean-Louis; Roux, Claude P.; and Torossian, Dieran R., 5,021,408, Cl. 514-179.000.
- Jow, Warren. Food cover for providing both closed and full open positions and including side panels, an off-site mountable hinge and mirror image front and back panels 5,020,684, Cl 220-4 240
- Jozwiak, Edward L., Jr.: *See—*
  - Wilson, Craig A.; Olson, Kurt G.; Koren, Jeffrey G., Longhini, Debra M.; Dugan, Carol S.; and Jozwiak, Edward L, Jr. 5,021,135, Cl. 204-180.800.
- Jud, Volker *See—*
  - Moritz, Werner; Jud, Volker; and Wisser, Georg, 5,020,313, Cl 59-78.100.
- Julien, Philippe, to Advanced Recycling Technology Ltd Extrusion screw for thermoplastic matter. 5,020,915, Cl. 366-89.000.
- Julius Blum Gesellschaft m.b.H.: *See—*
  - Brunnert, Eberhard, 5,020,868, Cl. 312-319.000.
- Jundt, Werner; Miller, Norbert; and Sommer, Rainer, to Robert Bosch GmbH. Control device for internal combustion engines 5,021,959, Cl. 364-431.050.
- Jung, Gerard; Mugnier, Jacques; Dommergues, Yvon; and Diem, Hoang G., to Rhone-Poulenc Industries. Process for inclusion of mycorrhizae and actinorhizae in a matrix. 5,021,350, Cl. 435-243.000
- Jung, Hyun J.: *See—*
  - Daly, Francis P., Ando, Hiei; Foley, Henry C.; and Jung, Hyun J, 5,021,385, Cl. 502-211.000.
  - Daly, Francis P.; Ando, Hiei; Foley, Henry C.; and Jung, Hyun J., 5,021,392, Cl. 502-439.000.
- Junge, Bodo; Richter, Bernd; Glaser, Thomas; and Traber, Jorg, to Bayer Aktiengesellschaft. 1,3,4,5-tetrahydrobenz(c,d)indoles 5,021,438, Cl. 514-373.000.
- Junginger, Erich: *See—*
  - Schnaibel, Eberhard; Junginger, Erich; and Hirschmann, Klaus, 5,020,363, Cl. 73-119.00A.
- Junien, Jean-Louis: *See—*
  - Aubard, Gilbert G.; Grouhel, Agnes G., Junien, Jean-Louis; Roux, Claude P.; and Torossian, Dieran R., 5,021,408, Cl. 514-179.000.
- Kabelschlepp Gesellschaft mit beschrankter Haftung: *See—*
  - Moritz, Werner; Jud, Volker; and Wisser, Georg, 5,020,313, Cl. 59-78.100.
- Kabumoto, Tsutomu *See—*
  - Miwa, Yoshiyuki; Kodama, Hiroshi; Murasugi, Skinya; Shikae, Sadao; Nakagawa, Masaya; and Kabumoto, Tsutomu, 5,020,842, Cl. 294-2.000.
- Kabushiki Kaisha Challenge Five: *See—*
  - Shibahara, Kenji; and Houchin, Norio, 5,020,829, Cl. 283-62.000.

- Kabushiki Kaisha Daikin Seisakusho: *See—*
  - Fujimoto, Shinji; and Takada, Yukiyoshi, 5,020,647, Cl. 192-3.290.
  - Koshimo, Masahiko, 5,020,646, Cl. 192-3.250.
- Kabushiki Kaisha Ihara Kogyo: *See—*
  - Ihara, Ryoseki, 5,020,948, Cl. 410-105.000.
- Kabushiki Kaisha Plantec: *See—*
  - Katsui, Seizo, 5,020,453, Cl. 110-255.000.
- Kabushiki Kaisha Shinkawa: *See—*
  - Kimura, Kazumasa; Komamiya, Akira; and Endo, Takashi, 5,020,715, Cl. 228-102.000.
- Kabushiki Kaisha Toshiba: *See—*
  - Hara, Junichiro; and Miyahara, Hideaki, 5,021,639, Cl. 235-379.000.
  - Inumada, Masato, 5,021,620, Cl. 219-10.55B.
  - Ito, Takahiro; Yamaki, Bunshiro; and Yamamoto, Yoshio, 5,021,859, Cl. 357-43.000.
  - Iwahashi, Hiroshi, 5,022,002, Cl. 365-185.000.
  - Kinoshita, Jun'ichi; Suzuki, Nobuo; Morinaga, Motoyasu; Hirayama, Yuzo; and Nakamura, Masaru, 5,021,361, Cl. 437-129.000.
  - Kohyama, Mitsuaki, 5,021,808, Cl. 346-140.00R.
  - Kondou, Yuu; and Izumi, Mamoru, 5,021,888, Cl 358-213.110.
  - Kotoda, Yoshihiro, 5,021,899, Cl. 360-85.000.
  - Matoba, Tsukasa; Aikawa, Takeshi; Okamura, Mitsuyoshi; Maeda, Ken-ichi; and Saito, Mitsuo, 5,021,993, Cl 364-900.000.
  - Miyoshi, Motosuke; and Okumura, Katsuya, 5,021,702, Cl. 313-7.000.
  - Nakayama, Yasuko, and Aida, Kazuo, 5,021,948, Cl. 364-200.000.
  - Nishikawa, Akihito, 5,021,950, Cl. 364-200.000.
  - Okamura, Ryo; Nishida, Shinichiro; and Asakura, Makoto, 5,021,969, Cl. 364-513.000.
  - Sakai, Yuji; and Sugaya, Toshihiro, 5,021,898, Cl. 360-78.040.
  - Sakamoto, Noriya; and Komatsu, Susumu, 5,021,883, Cl 358-160.000.
  - Shima, Takeshi, 5,021,693, Cl. 307-494.000.
  - Sudo, Toshio; Saito, Kazutaka; and Takubo, Chiaki, 5,021,866, Cl 357-70.000.
  - Tachibana, Masayoshi, 5,021,990, Cl. 364-900.000.
  - Tatsuno, Kyoichi; and Umeda, Toshiya, 5,021,647, Cl. 250-227.210.
  - Tsurunaga, Kazuyuki; Masuda, Yoshihisa; Okumura, Hiroyuki; and Ito, Daisuke, 5,021,914, Cl. 361-19.000.
  - Ueda, Masami; and Ito, Michiaki, 5,020,767, Cl. 248-638.000.
  - Yamashita, Youji, and Kojima, Masakatu, 5,021,225, Cl. 422-249.000.
- Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
  - Asaoka, Shinichi, 5,020,615, Cl. 180-11.000.
- Kabushiki Kaisha Yasakawa Denki Seisakusho: *See—*
  - Furutani, Akihiro; Okada, Junichi; and Tanimoto, Tomoaki, 5,020,444, Cl. 104-284.000.
- Kabushiki Kaisha Zero One: *See—*
  - Sasaki, Hiroshi; and Nishiya, Makoto, 5,021,214, Cl 420-504 000.
- Kadavy, Thomas D.: *See—*
  - Airy, James F.; and Kadavy, Thomas D., 5,020,795, Cl. 272-129.000.
- Kade, Werner: *See—*
  - Mayer. Wolfgang; Sturm, wolfram; Fissmann, Hans-Joachim; Kotitschke, Gerhard; Zurn, Georg; Kade, Werner; and Kugler, Georg, 5,020,242, Cl. 34-115.000.
- Kadono, Masaru: *See—*
  - Michijima, Masashi; Kadono, Masaru; and Yamamoto, Tatsushi, 5,020,212, Cl. 29-603.000.
- Kadorian, Gregory S.: *See—*
  - Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S; LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., 5,021,954, Cl. 364-410.000.
- Kadowaki, Toshihiro: *See—*
  - Kurita, Mitsuru; Ikeda, Yoshinori; Suzuki, Yasumichi; Katoh, Koichi; Ichikawa, Hiroyuki; Kitamura, Toshiyuki and Kadowaki, Toshihiro, 5,021,876, Cl 358-75.000.
- Kaga, Hikaru: *See—*
  - Imaizumi, Mamoru; and Kaga, Hikaru, 5,021,805, Cl. 346-76.00R.
- Kagami, Kenji: *See—*
  - Fukui, Tetsuro; Katayama, Masato; Mouri, Akihiro; Isaka, Kazuo; Kagami, Kenji; and Suzuki, Masao, 5,021,321, Cl 430-201.000.
- Kager, Alfred: *See—*
  - Smith, Raleigh A.; and Kager, Alfred, 5,020,671, Cl. 206-534.000.
- Kahn, Marvin L.: *See—*
  - Kirkpatrick, Paul A.; and Kahn, Marvin L., 5,020,175, Cl 5-448.000.
- Kahonen, Antti: *See—*
  - Turtinen, Pekka; and Kahonen, Antti, 5,021,124, Cl. 162-199.000.
- Kai, Naoki: *See—*
  - Hino, Katsuhiko; Kai, Naoki; Sakamoto, Masato; Kon, Tatsuya; Oka, Makoto; Furukawa, Kiyoshi; and Ochi, Yoshiaki, 5,021,421, Cl. 514-254.000.
- Kajimoto, Nobuyuki: *See—*
  - Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 5,021,503, Cl. 524-706.000.
- Kajino, Jirou: *See—*
  - Oshima, Mitsuaki; Izaki, Masataka; Kajino, Jirou; Igarashi, Yoshiaki; and Mitani, Hiroshi, 5,020,890, Cl. 350-500.000.
- Kaken Pharmaceutical Co., Ltd.: *See—*
  - Maeda, Tetsuya; Yamamoto, Toshiyuki; Takase, Mituo; Sasaki, Kazuya; Airka, Tadashi; Yokoo, Mamoru; Hashimoto, Rieko; Amemiya, Kouji; and Koshikawa, Sakae, 5,021,458, Cl. 514-655.000.
- Kakimi, Fujio, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide, reducing agent, polymerizable compound and a fluorine atom-containing compound. 5,021,319, Cl. 430-138.000.
- Kaku, Shinji: *See—*
  - Yamauchi, Kosaku; Muramatsu, Akihiko; and Kaku, Shinji, 5,020,625, Cl. 180-219.000.
- Kalb, Alfred, to Mauser-Werke GmbH Container tension ring closure. 5,020,839, Cl. 292-256.690.
- Kalbach, Albert L. Outboard motor stand apparatus 5,020,708, Cl. 224-42.320.
- Kalnins, Charles M., to Conoco Specialty Products. Oil and water separating system with hydrocyclone and floatation device 5,021,165, Cl. 210-703.000.
- Kalus, Dieter: *See—*
  - Rieger, Ulrich; and Kalus, Dieter, 5,020,437, Cl. 102-489.000.
- Kalyanaraman, Palaiyur S.: *See—*
  - Larson, Gary R.; Emmons, William D., and Kalyanaraman, Palaiyur S., 5,021,511, Cl. 525-295.000.
- Kamagata, Kazuo: *See—*
  - Sawa, Natsuo; Masuda, Takeshi; Miura, Shozo; Kano, Naoki; Kamagata, Kazuo; and Ito, Masayuki, 5,021,584, Cl 548-335.000.
- Kamei, Naoyuki: *See—*
  - Kobayashi, Toshiaki; Ibuchi, Yoshiaki; and Kamei, Naoyuki, 5,021,833, Cl. 355-228.000.
- Kamezaki, Hisamitsu; Suenaga, Masashi; Saito, Osamu; Iuchi, Shinichiro; Watanabe, Hitoshi; Fujiwara, Hideo; and Tuburaya, Yoshitane, to Hitachi Maxell, Ltd. Optical data recording medium and manufacturing method thereof 5,021,276, Cl 428-64.000.
- Kamijo, Masahiro: *See—*
  - Akiyama, Takaaki; Matsuo. Shuji; Fujii, Masahiro; Kurose, Mitsukazu; Nakamura, Osamu, and Kamijo, Masahiro, 5,020,928, Cl 400-193.000.
- Kamijo, Yasuhiko: *See—*
  - Takashi, Ishida; Ueda, Yoshikazu; Kubota, Teruji, Igarashi, Misao; Tanaka, Norichika; and Kamijo, Yasuhiko, 5,020,455, Cl. 110-342.000.
- Kaminski, Stanley S.: *See—*
  - Leone-Bay, Andrea; Peake, Steven L., and Kaminski, Stanley S., 5,021,540, Cl. 528-183.000.
- Kamiunten, Shoji; and Hisanaga, Tetsuo, to Yamatake-Honeywell Co., Ltd. Composite flow meter. 5,020,373, Cl. 73-861.220.
- Kamyr AB: *See—*
  - Jacobsen, Finn, 5,020,178, Cl. 8-156.000.
- Kamyr, Inc.: *See—*
  - Meredith, Michael D., 5,021,127, Cl. 162-237.000.
  - Phillips, Joseph R.; Weston, John D.; and Meredith, Michael D., 5,021,125, Cl. 162-232.000.
- Kanai, Masashi: *See—*
  - Nakayama, Shunichi; Kanai, Masashi; and Arai, Yasuyuki, 5,020,972, Cl. 417-37.000.
- Kanai, Takashi: *See—*
  - Ueki, Massaaki; Masuda, Toshihiko; and Kanai, Takashi, 5,021,788, Cl. 341-152.000.
- Kanamori, Hideo, to Idemitsu Kosan Co., Ltd. Water-glycol hydraulic fluid. 5,021,181, Cl. 252-75.000.
- Kanasashi, Yusuke, to Fuji Jukogyo Kabushiki Kaisha. Air-fuel ratio control system for automotive engines. 5,020,503, Cl. 123-520.000.
- Kanaya, Shigeo, to Myotoku Ltd. Intermittent rotation drive apparatus utilizing air pressure. 5,020,383, Cl. 74-128 000.
- Kanayama, Satoshi: *See—*
  - Masumoto, Mitsuhiko; Kanayama, Satoshi; Asoh, Toshiaki, and Kawahigashi, Teruo, 5,021,541, Cl. 528-196.000.
- Kanazawa, Hirotaka; Ohmura, Hiroshi; Tomoda, Atsuo; Furuzawa, Akihiro; Nakashima, Takashi; and Hideshima, Masao, to Mazda Motor Corporation. Rear wheel steering device for a vehicle. 5,020,619, Cl. 180-140.000.
- Kanda, Yutaka; Arai, Hitoshi; Kasai, Masaji; and Morimoto, Makoto, to Kyowa Hakko Kogyo Kabushiki Kaisha. Mitomycin derivatives and intermediates therefor. 5,021,423, Cl. 514-262.000.
- Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
  - Eguchi, Tamiyuki; and Tsunomori, Michito, 5,021,201, Cl 264-9.000.
- Kaneiwa, Shinji: *See—*
  - Kawanishi, Hidenori; Hayashi, Hiroshi; Morimoto, Taiji; Kaneiwa, Shinji; Miyauchi, Nobuyuki; and Yano, Seiki, 5,022,037, Cl. 372-49.000.
- Kaneko, Yukihiro: *See—*
  - Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, 5,021,391, Cl. 502-426.000.
- Kanemoto, Masami: *See—*
  - Kimura, Akira; Tomita, Osamu; Tomimoto, Tetsuji; Fujita, Satoru; and Kanemoto, Masami, 5,020,786, Cl. 270-95.000.
- Kanemura, Yoshinobu: *See—*
  - Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 5,021,503, Cl. 524-706.000.
- Kangas, Sandra E.: *See—*
  - Webber, David W.; and Kangas, Sandra E., 5,021,953, Cl. 364-407.000.
- Kanno, Isao, to Sanshin Kogyo Kabushiki Kaisha Warning system for marine propulsion engine. 5,020,492, Cl. 123-198.00D.
- Kano, Naoki: *See—*
  - Sawa, Natsuo; Masuda, Takeshi; Miura, Shozo; Kano, Naoki; Kamagata, Kazuo; and Ito, Masayuki, 5,021,584, Cl. 548-335.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Kanojia, Ramesh M.: *See—*
  - Hajos, Zoltan G.; Kanojia, Ramesh M., and Press, Jeffery B., 5,021,574, Cl. 544-276.000.
- Kansai Electronic Power Company Inc., The: *See—*
  - Suesada, Yasuhiko; Moriyama, Takashi; Sugioka, Junichi; and Tahara, Hiroshi, 5,020,479, Cl. 122-235.110.
- Kansai Paint Co., Ltd.: *See—*
  - Yamamoto, Kenji; and Tadayoshi, Hiraki, 5,021,530, Cl. 526-323.200.
- Kantner, Robert C.: *See—*
  - Aghajanian, Michael K.; Kantner, Robert C.; and Biel, John P., Jr., 5,020,583, Cl. 164-97.000.
- Kanto, Jumpei; Saito, Hitoshi; Eguchi, Hiroshi; and Nakamura, Masayuki, to Dai Nippon Insatsu Kabushiki Kaisha Heat transfer sheet. 5,021,394, Cl. 503-227.000.
- Kanzaki Paper Manufacturing Co., Ltd.: *See—*
  - Kimura, Akira; Tomita, Osamu; Tomimoto, Tetsuji; Fujita, Satoru, and Kanemoto, Masami, 5,020,786, Cl. 270-95.000.
- Kanzler, Ulrich: *See—*
  - Helldorfer, Reinhard; Kanzler, Ulrich; Rauch, Hans; and Osterkamp, Eva, 5,021,962, Cl. 364-457.000.
- Kao Corporation: *See—*
  - Tanaka, Nobuhiro; Tawara, Hirotoshi; and Hirata, Eiji, 5,020,965, Cl. 414-786.000.
- Kaplan, Louis: *See—*
  - Giacobbe, Robert A.; Tkacz, Jan S.; Masurekar, Prakash S.; Kaplan, Louis; and Sosa, Margaret S., 5,021,341, Cl. 435-71.100.
  - Sesin, David F.; Liesch, Jerrold M.; Fountoulakis, Jimmy M.; Masurekar, Prakash S.; Kaplan, Louis; and Wichmann, Carol F., 5,021,403, Cl. 514-9.000.
- Kaplan, Morris: *See—*
  - Stephenson, William K.; and Kaplan, Morris, 5,021,498, Cl. 524-484.000.
- Kapuscinski, Maria M.; Derosa, Thomas F.; Biggs, Robert T.; and Nalesnik, Theodore E., to Texaco Inc. Dispersant-antioxidant multifunctional viscosity index improver. 5,021,177, Cl. 252-51.50R.
- Karagoz, Sadi; Hribernik, Bruno; Stamberger, Johann; Puber, Josef, Jeglitsch, Franz; Fischmeister, Hellmut; Matzer, Franz; Locker, Claus-Dieter; Kudielka, Elfriede; and Jager, Heimo, to Boehler Ges m.b.H. High speed tool steel produced by powder metallurgy. 5,021,085, Cl. 75-239.000.
- Karasawa, Yoshiharu; and Hirohashi, Ken, to Biomate Co., Ltd. Plastic slides for microscopes. 5,021,294, Cl. 428-332.000.
- Karita, Seiichiro: *See—*
  - Abe, Tsutomu; Ebisawa, Isao; Watanabe, Kenjiro; and Karita. Seiichiro, 5,021,809, Cl. 346-140.00R.
- Kars, Jelte: *See—*
  - Reinalda, Donald; and Kars, Jelte, 5,021,387, Cl. 502-260.000.
- Karst, Siegfried; Uhrich, Wilfried, and Zickwolf, Rolf, to Richard Wolf, GmbH. Biconvex rod lens. 5,020,893, Cl. 350-573.000.
- Karube, Norio; and Funakubo, Tsutomu, to Fanuc Ltd. Gas laser oscillator device. 5,022,039, Cl. 372-58.000.
- Kasahara, Kenichi: *See—*
  - Toshiro, Yoshiharu; and Kasahara, Kenichi, 5,021,694, Cl. 307-631.000.
- Kasahara, Kumi: *See—*
  - Ota, Masanori; Aoki, Masafumi; Nakamura, Masashi; Mizusawa, Kenichi; and Kasahara, Kumi, 5,021,186, Cl. 252-186.350.
- Kasai, Kenichiro; and Kawasaki, Takeshi, to Seiko Epson Corporation. Switchable capacitor loop filter for phase locked loop. 5,021,749, Cl 331-17.000.
- Kasai, Masaaki: *See—*
  - Miyake, Sanae; Kasai, Masaaki; Yamazaki, Sakae; and Murashita, Takato, 5,020,220, Cl. 30-2.000.
- Kasai, Masaji: *See—*
  - Kanda, Yutaka; Arai, Hitoshi; Kasai, Masaji; and Morimoto, Makoto, 5,021,423, Cl. 514-262.000.
- Kashiwadate, Ken: *See—*
  - Iizuka, Yo; Kashiwadate, Ken; Endo, Shunzo; Hosokawa, Toshio; Katto, Takayuki; Mizuno, Toshiya, and Katase, Kenichi, 5,021,523, Cl. 525-537.000.
- Kashiwazaki, Tomoyuki: *See—*
  - Miyazaki, Toshimasa; Uzawa, Yoji; Okawa, Kazuyoshi; Kawashima, Hiroshi; Moriya, Kazumasa; Murakawa, Yoshitaka, Kumagai, Toshimitsu; Nakamura, Akihiro; Itoh, Motohiko; and Kashiwazaki, Tomoyuki, 5,021,695, Cl. 310-12.000.
- Kastele, Xaver; Bernheim, Michael; and Rossler, Erich, to Ciba-Geigy Corporation. Aqueous textile treatment agent and crease resist finishing of textile material. 5,021,263, Cl. 427-353.000.
- Kastele, Xaver; Bernheim, Michael; and Rossler, Erich, to Ciba-Geigy Corporation. Aqueous textile treatment agent and crease resist finishing of textile material. 5,021,264, Cl. 427-353.000.
- Kastinger Skiboot GmbH: *See—*
  - Hercog, Milan; and Kubelka, Axel, 5,020,248, Cl. 36-120.000.
- Kataoka, Yoshiyuki; Sumida, Isao; Hidaka, Masataka; and Naitoh, Masanori, to Hitachi, Ltd. Primary containment vessel with outer pool. 5,021,212, Cl. 376-283.000.
- Katase, Kenichi: *See—*
  - Iizuka, Yo; Kashiwadate, Ken; Endo, Shunzo, Hosokawa, Toshio; Katto, Takayuki; Mizuno, Toshiya, and Katase, Kenichi, 5,021,523, Cl. 525-537.000.
- Katayama, Masato: *See—*
  - Fukui, Tetsuro; Katayama, Masato; Mouri, Akihiro; Isaka, Kazuo; Kagami, Kenji; and Suzuki, Masao, 5,021,321, Cl. 430-201.000.
- Kato, Akira: *See—*
  - Nishio, Hiroaki; Kato, Akira; Sato, Michitaka, and Watanabe, Kenji, 5,021,213, Cl. 419-36.000.
- Kato, Eiichi; and Ishii, Kazuo, to Fuji Photo Film Co., Ltd Electrophotographic photoreceptor. 5,021,311, Cl. 430-96.000.
- Kato, Kenji: *See—*
  - Hanyu, Susumu; and Kato, Kenji, 5,020,461, Cl. 112-278.000.
- Kato, Yoshifumi: *See—*
  - Yoshino, Yasuhisa; Kato, Yoshifumi; Tamatsu, Yukimasa, and Takeda, Kenji, 5,021,957, Cl. 364-426.010.
- Katoh, Koichi: *See—*
  - Kurita, Mitsuru; Ikeda, Yoshinori, Suzuki, Yasumichi; Katoh, Koichi; Ichikawa, Hiroyuki; Kitamura, Toshiyuki; and Kadowaki, Toshihiro, 5,021,876, Cl. 358-75.000.
- Katsui, Seizo, to Kabushiki Kaisha Plantec. Vertical incinerator 5,020,453, Cl. 110-255.000.
- Katto, Takayuki: *See—*
  - Iizuka, Yo; Kashiwadate, Ken; Endo, Shunzo; Hosokawa, Toshio, Katto, Takayuki; Mizuno, Toshiya; and Katase, Kenichi, 5,021,523, Cl. 525-537.000.
- Kauer, Harald; Overlach, Knud; Edelmann, Rolf; and Gassner, Siegfried, to Pietzsch AG. Method of measuring the distance between the axles or wheels of a vehicle, and device for doing so. 5,020,236, Cl 33-700.000.
- Kavlico Corporation: *See—*
  - Park, Kyong, 5,020,377, Cl. 73-718.000.
- Kavnatsky, Zara M.; and Chen, Tsae S., to Diversified Chemical Technologies, Inc. Paint compatible pre-lubricant. 5,021,172, Cl. 252-32.70E.
- Kaw, Ravindhar K., to Hewlett-Packard Company. Monolithic semiconductor chip interconnection technique and arrangement 5,021,869, Cl. 357-75.000.
- Kawabe, Haruhide: *See—*
  - Mukai, Hiromichi; Horii, Hajime; Tsujikawa, Muneo; Kawabe, Haruhide; Arimura, Hirofumi, and Suyama, Tadakazu, 5,021,339, Cl. 435-69.100.
- Kawada, Haruki: *See—*
  - Matsuda, Hiroshi; Kawada, Haruki; Sakai, Kunihiro; Takimoto, Kiyoshi; Kawade, Hisaaki; Yanagisawa, Yoshihiro; and Morikawa, Yuko, 5,020,881, Cl. 350-333.000.
- Kawade, Hisaaki: *See—*
  - Matsuda, Hiroshi; Kawada, Haruki; Sakai, Kunihiro; Takimoto, Kiyoshi; Kawade, Hisaaki; Yanagisawa, Yoshihiro; and Morikawa, Yuko, 5,020,881, Cl. 350-333.000.
- Kawagishi, Toshio; Ohkawa, Atsuhiro; and Ichijima, Seiji, to Fuji Photo Film Co., Ltd. Silver halide photographic material containing a dye precursor residue. 5,021,329, Cl. 430-543.000.
- Kawaguchi, Tomoyuki: *See—*
  - Nakano, Yoshimasa; Sugawara, Michiharu; Uetsuki, Setsuyoshi, Izawa, Taketoshi; Kawaguchi, Tomoyuki; and Wada, Akira. 5,021,419, Cl. 514-253.000.
- Kawahigashi, Teruo: *See—*
  - Masumoto, Mitsuhiko; Kanayama, Satoshi, Asoh, Toshiaki, and Kawahigashi, Teruo, 5,021,541, Cl. 528-196.000.
- Kawakami, Yoshikazu: *See—*
  - Yokoo, Toru; Kobane, Takashi; Seki, Akihiko; Yamakawa, Yasuhiro; and Kawakami, Yoshikazu, 5,020,877, Cl. 350-128.000.
- Kawamura, Mitsuyoshi: *See—*
  - Matsuura, Tooru; Kawamura, Mitsuyoshi; and Narita, Yoshinori. 5,020,319, Cl. 60-321.000.
- Kawamura, Tetsuya: *See—*
  - Fujita, Yuuji; Sezume, Tadashi; Kitano, Kitsusho; Narukawa, Kiyotada; Mikami, Takashi; Kawamura, Tetsuya; Sato, Shigeru; Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao, 5,021,504, Cl. 525-57.000.
- Kawanami, Norihide; Kobayashi, Fumio; and Mitani, Ikujiro, to Hirose Electric Co., Ltd. Connector for coaxial cable. 5,021,011, Cl 439-582.000.
- Kawanishi, Hidenori; Hayashi, Hiroshi; Morimoto, Taiji; Kaneiwa, Shinji; Miyauchi, Nobuyuki; and Yano, Seiki, to Sharp Kabushiki Kaisha. Semiconductor laser device. 5,022,037, Cl. 372-49.000.
- Kawasaki, Akihisa, to Sumitomo Electric Industries, Ltd. Method of drawing-up a single crystal using a double-crucible apparatus and double-crucible apparatus and double-crucible apparatus therefor 5,021,118, Cl. 156-607.000.
- Kawasaki, Masahiro; Ohbuchi, Yukio; Maeda, Yoshiaki; and Sato, Susumu, to Nippon Polyurethane Industry Co., Ltd. Thermosetting urethane elastomer. 5,021,534, Cl. 528-60.000.
- Kawasaki Steel Corporation: *See—*
  - Nakakoji, Hisatada; Nakajima, Seiji; Yasuda, Akira; and Kumura, Hajime, 5,021,301, Cl. 428-659.000.
- Kawasaki, Takeshi: *See—*
  - Kasai, Kenichiro; and Kawasaki, Takeshi, 5,021,749. Cl. 331-17.000.
- Kawashima, Hiroshi. *See—*
  - Miyazaki, Toshimasa; Uzawa, Yoji; Okawa, Kazuyoshi, Kawashima, Hiroshi; Moriya, Kazumasa; Murakawa, Yoshitaka, Kumagai, Toshimitsu; Nakamura, Akihiro; Itoh, Motohiko; and Kashiwazaki, Tomoyuki, 5,021,695, Cl. 310-12.000.
  - Ohara, Osamu; Kawashima, Hiroshi; and Takata, Hiroshi, 5,020,440, Cl. 104-127.000.
- Kawashima, Hiroyuki: *See—*
  - Motoe, Hisafumi; Kawashima, Hiroyuki; and Tokuhara, Masaharu, 5,021,870, Cl. 358-11.000.

- Kawashima, Yuji *See—*
  - Nakajima, Nobuyuki; Yamaguchi, Toshio; and Kawashima, Yuji, 5,020,976, Cl. 417-295.000.
- Kawata, Atsumi; Itoh, Hiroyuki; Tanaka, Hirotoshi; Yoshihara, Kazuhiro; and Yamashita, Hiroki, to Hitachi, Ltd. Logic circuit. 5,021,686, Cl. 307-448.000.
- Kayano, Masanori: *See—*
  - Ida, Katsumi; Ikeuchi, Takayuki; and Kayano, Masanori, 5,021,570, Cl. 514-681.000.
- Kayatani, Tooru: *See—*
  - Sato, Kyokuichi; Kayatani, Tooru; and Kenmotsu, Toru, 5,020,685, Cl 220-203.000.
- Kazerounian, Reza: *See—*
  - Eitan, Boaz; and Kazerounian, Reza, 5,021,847, Cl. 357-23.500.
- Keefe, Anthony D.: *See—*
  - Beer, Paul D.; and Keefe, Anthony D., 5,021,599, Cl 556-142.000.
- Keeffe, William M : *See—*
  - Passmore, Edmund M.; and Keeffe, William M., 5,021,703, Cl. 313-25.000.
- Keen, Robert E. Postoperative cryokinetic therapy apparatus and method 5,020,536, Cl. 128-402.000
- Keita, Mamadi, to Flowtec AG Mass flow operating by the coriolis principle. 5,020,380, Cl. 73-861 370.
- Kel-Gar, Inc.. *See—*
  - Frankel, Gail B , 5,020,755, Cl 248-215.000.
- Keller, David J : *See—*
  - McKenna, Ronald J.; Keller, David J., and Bibeau, Lauren S., 5,021,251, Cl 426-330.500.
- Keller, Robert C.; and Kuhnhein, Marc R., to Exxon Chemical Patents Inc. Butyl rubber compositions having improved adhesion to polyester. 5,021,509, Cl. 525-221.000.
- Keller, Urs: *See—*
  - Demuth, Robert; Hefti, Walter; Keller, Urs; and Hanselmann, Daniel, 5,020,924, Cl. 384-536.000.
- Kelley, Jerry S. Pouch for reusable hot/cold packs for medical usage. 5,020,711, Cl 224-222.000.
- Kelly, Douglas M.; Parkinson, Ward D.; and Allen, Timothy J , to Micron Technology, Inc. Die-mounting paddle for mechanical stress reduction in plastic IC packages. 5,021,864, Cl. 357-70.000.
- Kelly, Ronald W.: *See—*
  - Gonzalez, Raphael A.; and Kelly, Ronald W., 5,020,217, Cl. 29-882.000.
- Kelly, Timothy A. Spring rod hingeless ventilator. 5,020,425, Cl. 98-2.180.
- Kelly, William W., to Stanadyne Automotive Corp. Hole type fuel injector and injection method 5,020,500, Cl. 123-467.000.
- Kendall Company, The: *See—*
  - Akerley, Arnold J.; and Manning, W Paul, Jr , 5,020,660, Cl 206-45.140.
- Kenmotsu, Toru. *See—*
  - Sato, Kyokuichi; Kayatani, Tooru; and Kenmotsu, Toru, 5,020,685, Cl. 220-203.000.
- Kennedy, Christopher R.: *See—*
  - Aghajanian, Michael K.; Nagelberg, Alan S.; and Kennedy, Christopher R., 5,020,584, Cl. 164-97.000.
- Kennefick, Thomas M., and Portillo, Frank, Jr Hand breading apparatus. 5,020,427, Cl. 99-494.000.
- Kensey, Kenneth; Nash, John; and Evans, Douglas, to Kensey Nash Corporation. Plug device with pulley for sealing punctures in tissue and methods of use. 5,021,059, Cl. 606-213.000.
- Kensey Nash Corporation: *See—*
  - Kensey, Kenneth; Nash, John; and Evans, Douglas, 5,021,059, Cl. 606-213.000.
- Kent, Keith. Garment hanger with rotating projections to introduce garments within. 5,020,704, Cl. 223-96.000.
- Kersten, Jean; Lombard, Etienne; and Heindrichs, Daniel, to Baxter International Inc. Glove. 5,020,162, Cl. 2-164.000.
- Kersting, Hermann; and Piesch, Franz, to Claas Ohg. Harvester thresher with chopper. 5,021,028, Cl. 460-85.000.
- Kesling, Haven S., Jr.: *See—*
  - Hostetler, Donald E.; Cannarsa, Michael J.; Kesling, Haven S., Jr.. and Sun, Hsiang-Ning, 5,021,464, Cl 521-189.000.
- Kettlewell, Jonathan P.; and Smith, Brian F., to GEC - Marconi Limited. Thermal imager. 5,021,657, Cl. 250-330.000.
- Kezar, Hollis S., III: *See—*
  - De Lucca, George V.; Kezar, Hollis S., III; and O'Brien, John P , 5,021,207, Cl. 264-186.000.
- Khanarian, Garo; Stamatoff, James B.; and Buckley, Alan, to United States of America, Air Force. Method of making asymmetric Langmuir-Blodgett films. 5,021,268, Cl. 427-430.100.
- Khanna, Dinesh N.: *See—*
  - Mueller, Werner H.; Khanna, Dinesh N.; and Hupfer, Bernd, 5,021,320, Cl. 430-192.000.
- Khanna, Vijayeshwar D.: *See—*
  - Chang, Shuo H.; Hendriks, Ferdinand; Khanna, Vijayeshwar D., and Lean, Eric G., 5,021,906, Cl. 360-103.000.
- Khinkis, Mark J.; Abbasi, Hamid A.; Lisauskas, Robert A.; and Itse, Daniel C , to Institute of Gas Technology. Process and apparatus for emissions reduction from waste incineration. 5,020,456, Cl. 110-345.000.
- Kiba, Hiroshi; and Akeno, Hajime, to Mazda Motor Corporation Wax coating device. 5,020,472, Cl. 118-668.000.
- Kidde Industries, Inc.: *See—*
  - Pike, Ronald L.; and Beckley, Ronald W , 5,021,917, Cl. 361-195.000.
- Kieda, Shigekazu; Nakajima, Tadakatsu, Kuwahara, Heikichi, and Sato, Motohiro, to Hitachi, Ltd. Semiconductor cooling device 5,021,924, Cl. 361-385.000.
- Kielmeyer, Ronald F., Jr : *See—*
  - Kobus, Joseph P.; Kielmeyer, Ronald F., Jr.; and Diaz, Arthur, 5,021,799, Cl. 343-795.000.
- Kihara, Yuji, to Mitsubishi Denki Kabushika Kaisha. Input buffer circuit having a resistor for reducing through-current and a capacitor for preventing delay. 5,021,685, Cl. 307-443.000.
- Kiker, Donald E. Pallet dispenser/accumulator. 5,020,966, Cl. 414-797.500.
- Kikuchi, Hideo: *See—*
  - Ichimura, Kunihiro; Tochizawa, Noriaki; and Kikuchi, Hideo, 5,021,505, Cl. 525-59.000.
- Kikuchi, Ikuya; and Sato, Ryo, to Pioneer Electronic Corporation. Support structure for an optical pickup electrically adjustable in two directions. 5,022,022, Cl. 369-44.160.
- Kikuchi, Makoto; Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Takeshita, Fusayuki; and Furukawa, Kenji, to Chisso Corporation. Ferroelectric liquid crystal composition. 5,021,190, Cl. 252-299 610.
- Kim, Jae-Duck. Ornamental stickers necessitating no separate cutting process and the manufacturing method thereof 5,021,275, Cl 428-42.000.
- Kim, Kwang-Seok, to SamSung Electronics Co., Ltd. Automatic brightness limiter. 5,021,885, Cl. 358-168.000.
- Kim, Namsoo P.; and Stanbery, Billy J., to Boeing Company, The Solar cell interconnection and packaging using tape carrier. 5,021,099, Cl. 136-249.000.
- Kim, Tai K.: *See—*
  - Vanderpool, Clarence D., and Kim, Tai K , 5,021,133. Cl. 204-86.000.
- Kimes, Rick: *See—*
  - Richmond, Frank M , Vanderveen, Timothy, and Kimes, Rick, 5,020.562, Cl. 137-15.000.
- Kimpel, Alvin A.: *See—*
  - Owens, Brian S.; and Kimpel, Alvin A., 5,020,776, Cl. 251-327.000
- Kimura, Akira; Tomita, Osamu; Tomimoto, Tetsuji; Fujita, Satoru; and Kanemoto, Masami, to Kanzaki Paper Manufacturing Co., Ltd. Paper inserting apparatus. 5,020,786, Cl 270-95.000
- Kimura, Hiroshi: *See—*
  - Kosaka, Kenji; Kimura, Hiroshi, Suzuki, Akihiro; and Hayashi, Kenji, 5,020,785, Cl. 270-053.000.
- Kimura, Kazumasa, Komamiya, Akira; and Endo, Takashi, to Kabushiki Kaisha Shinkawa. Bonding method. 5,020,715, Cl. 228-102 000
- Kimura, Teiyu: *See—*
  - Kuzuta, Nobuyuki; Hasegawa, iichi; and Kimura, Teiyu, 5,020,879, Cl. 350-162.170.
- Kimura, Toshio: *See—*
  - Minoda, Takeshi; Todo, Akira; Kimura, Toshio; and Kurishu, Masayoshi, 5,020,207, Cl. 29-527.400.
- King, Anthony O.; Anderson, Robert K.; Shuman, Richard E.; and Weinstock, Leonard M., to Merck & Co., Inc. Method for introducing a 1,2 double bond into azasteroids. 5,021,575, Cl. 546-77.000.
- King, Stella W.: *See—*
  - Remy, David C.; Baldwin, John J.; Claremon, David A., and King, Stella W., 5,021,440, Cl. 514-381 000.
- King, Stephen J.; and Magee, Lochlan E. Interactive real-time video processor with zoom pan and scroll capability. 5,021,772, Cl 340-724.000.
- Kingsbury, Philip C. O., to Automation Facilities Limited. Cleaning cassette. 5,021,911, Cl. 360-128.000.
- Kingston, Samuel C.; Barham, Steven T.; and Simonsen, Harold L., to Unisys Corp. Programmable digital frequency-phase discriminator 5,022,048, Cl. 375-1.000.
- Kinjo, Noriyuki: *See—*
  - Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, 5,021,563, Cl. 540-128.000.
- Kinnear, Scott G.: *See—*
  - Bealkowski, Richard; Blackledge, John W., Jr., Cronk, Doyle S.; Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G.; Kovach, George D.; McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., 5,022,077, Cl. 380-4.000.
- Kinney, William A.; and Lee, Nancy E., to American Home Products Corporation. 4-azatricyclo[4.3.1 1(3,8)]undecylarylpiperazines with anxiolytic activity. 5,021,569, Cl 540-581.000.
- Kinoshita, Futoru: *See—*
  - Kobayashi, Motonobu; Kinoshita, Futoru; Hagi, Mitsuharu; Inoue, Akira; and Uno, Terushige, 5,021,227, Cl. 423-212.000.
- Kinoshita, Jun'ichi; Suzuki, Nobuo; Morinaga, Motoyasu; Hirayama, Yuzo; and Nakamura, Masaru, to Kabushiki Kaisha Toshiba. Method for making a field effect transistor integrated with an opto-electronic device. 5,021,361, Cl. 437-129.000.
- Kinoshita, Koichi. Apparatus for electrophotography representing half-tones. 5,021,807, Cl. 346-108.000.
- Kinpara, Keiji: *See—*
  - Naito, Ryuichi; and Kinpara, Keiji, 5,021,894, Cl. 360-46.000.
- Kirchner, Peter D.; Warren, Alan C.; Woodall, Jerry M.; and Wright, Steven L., to International Business Machines Corporation. Compound semiconductor interface control using cationic ingredient oxide to prevent fermi level pinning. 5,021,365, Cl 437-237.000.
- Kirkpatrick, Paul A.; and Kahn, Marvin L. Multicompartment cushion comprising recyclable plastic bottles. 5,020,175, Cl. 5-448.000.
- Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner,

VOL
1127
ISS
1
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1991
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- Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, to Bayer Aktiengesellschaft. Herbicidal substituted sulphonylaminoazoles. 5,021,082, Cl. 71-93.000.
- Kishida, Toshio; and Mori, Chiharu, to ITO Co., Ltd. Detector for detecting resistance between fingers. 5,021,768, Cl. 340-573.000.
- Kishikawa, Kenjiro; Nishihara, Yoshitaka, and Okudaira, Masayuki, to Toppan Printing Co., Ltd. Pouring plug for liquid container 5,020.690, Cl. 222-83.000.
- Kiska, Stanley A.: *See—*
  - Sulecki, Richard P.; and Kiska, Stanley A., 5,020,757, Cl 248-238.000.
- Kiss, Akos: *See—*
  - Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, 5,021,092, Cl 106-451.000.
- Kita, Toshiro; Genba, Susumu. Takemoto, Masato; Tatsumi, Takashi, Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi; Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji; and Yoshida, Toshihiko, to Sharp Kabushiki Kaisha. Image processing device of multifunctional type. 5,021,892, Cl. 358-468.000.
- Kitagawa, Akio; Hori, Takahiro; and Nakamura, Yuji, to Nissan Chemical Industries, Ltd. Method of preventing the deterioration of a hardened cement-based mass. 5,021,260, Cl. 427-140.000.
- Kitagawa, Seizou, to Fuji Electric Co., Ltd. Electrophotographic photoreceptor. 5,021,310, Cl 430-85.000.
- Kitahara, Takahiro: *See—*
  - Kubo, Motonobu; Inukai, Hiroshi, and Kitahara, Takahiro. 5,021,316, Cl. 430-108.000.
- Kitajima, Masaaki: *See—*
  - Ohwada, Jun-ichi; Kitajima, Masaaki, Suzuki, Masayoshi; Takabatake, Masaru; and Nagae, Yoshiharu, 5,021,774, Cl. 340-811.000
- Kitamura, Haruo: *See—*
  - Fujii, Kiyoshi; Kitamura, Haruo; Takahashi, Shigeru; and Shimizu. Nerio, 5,020,250, Cl. 37-257.000.
- Kitamura, Koichiro, to Kitamura Machinery Co., Ltd Machine tool. 5,020,201, Cl. 29-27.00C.
- Kitamura Machinery Co., Ltd. *See—*
  - Kitamura, Koichiro, 5,020,201, Cl 29-27.00C.
- Kitamura, Teruo: *See—*
  - Era, Susumu; Iwasaki, Kishiro; Yokokura, Hisao; Hanawa, Yasuo; Kondo, Katsumi; Nakada, Tadao, Kitamura. Teruo; and Mukoh, Akio, 5,020,883, Cl. 350-350.00S
- Kitamura, Toshiyuki: *See—*
  - Kurita, Mitsuru; Ikeda, Yoshinori; Suzuki, Yasumichi; Katoh, Koichi; Ichikawa, Hiroyuki, Kitamura, Toshiyuki; and Kadowaki, Toshihiro. 5,021,876. Cl 358-75.000.
- Kitano, Kitsusho: *See—*
  - Fujita, Yuuji, Sezume, Tadashi, Kitano. Kitsusho; Narukawa, Kiyotada; Mikami, Takashi; Kawamura, Tetsuya; Sato, Shigeru; Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao. 5,021,504, Cl. 525-57.000.
- Kiten, Hiroshi: *See—*
  - Iida, Takashi; Kiten, Hiroshi; Ishii, Toru; and Tsukamoto, Takeya, 5.021,875, Cl. 358-29 00C
- Kitou, Kouji: *See—*
  - Arai, Ikuya; Kitou, Kouji, and Ohsawa, Michitaka, 5,021,719. Cl. 315-364.000
- Kits van Heyningen, Martin A., and Randall, Robert C., to KVH Industries, Inc. Rangefinder with heads-up display. 5,020,902, Cl. 356-21.000.
- Kivimaa, Antti: *See—*
  - Perala, Reijo; and Kivimaa, Antti, 5,021,637, Cl. 219-485.000.
- Kiyomoto, Masayuki: *See—*
  - Yokoshima, Minoru; Ohkubo, Tetsuo; and Kiyomoto, Masayuki, 5,021,467, Cl. 522-96.000.
- Kiyono, Fumio; Saito, Takayuki; and Harda, Keiji, to Agency of Industrial Science and Technology, Ministry of International Trade & Industry. Nozzle for water jet cutting. 5,020,724, Cl. 239-102.200.
- Klein, Herbert H., to Unarco Industries, Inc. Structural rack. 5,020,678, Cl. 211-191.000.
- Kleinschmit, Peter: *See—*
  - Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, 5,021,092, Cl 106-451.000.
- Kleiss, Harold J.: *See—*
  - Whitney, Solon G.; and Kleiss, Harold J., 5,021,216, Cl. 521-26.000.
- Klemarczyk, Philip, to Loctite Corporation. Thermally stabilized acrylic adhesive compositions and novel methacrylated maleimide compounds useful therein. 5,021,487, Cl 524-104.000.
- Kleschick, William A: *See—*
  - Vinogradoff, Anna P.; and Kleschick. William A, 5,021,591, Cl 544-281.000.
- Klesges, Lisa: *See—*
  - Akin, Frank J.; Klesges, Robert; and Klesges, Lisa, 5,021,457. Cl. 514-653.000.
- Klesges, Robert: *See—*
  - Akin, Frank J., Klesges, Robert; and Klesges, Lisa, 5,021,457, Cl 514-653.000.
- Klesse, Wolfgang: *See—*
  - Langerbeins, Klaus; Klesse, Wolfgang, Tessmer, Dieter; Elser, Wilhelm; and Geyer, Hans-Juergen, 5,021,469, Cl. 523-201.000.
- Klier, Kamil; Herman, Richard G.; and Vedage, Gamimi A., to Lehigh University. Water gas shift reaction with alkali-doped catalyst. 5,021,233, Cl. 423-656.000.
- Klimisch, Helen M., to Dow Corning Corporation Emollient durability enhancing siloxanes. 5,021,405, Cl. 514-63.000.
- Kline, Steven J.: *See—*
  - Johnson, David K.; and Kline, Steven J., 5,021,567, Cl. 540-470.000.
- Klingel, Reinhard: *See—*
  - Deller, Klaus; Klingel, Reinhard; and Krause, Helmfried. 5,021,378, Cl. 502-62.000.
- Klinkau Besitzgesellschaft mbH: *See—*
  - Stanik, Reimund, 5,021,155, Cl. 210-231.000
- Klotz, Erhard P. A.: *See—*
  - Haaker, Paul R.; Klotz, Erhard P. A.; Koppe, Reiner H, and Linde, Rolf E., 5,022,066, Cl. 378-2.000
- Kluth, Joachim: *See—*
  - Kirsten, Rolf; Kluth, Joachim; Fest, Christa, Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R., and Strang. Harry, 5,021,082, Cl. 71-93.000.
  - Muller, Klaus-Helmut; Kluth, Joachim; Konig, Klaus, Gassen, Karl-Rudolf; Findeisen, Kurt; Lindig, Markus; Lurssen, Klaus, Santel, Hans-Joachim; and Schmidt, Robert R., 5,021,080, Cl 71-92.000.
- Knepp, James E.; Welsh, Robert E.; Miller, James A., and Miller, Raymond, to Aluminum Company of America. Apparatus and method for lubricating and cooling in a draw and iron press 5,020,350, Cl. 72-45.000.
- Knight, Walter E.; Clark, Kenneth G.; and Gauntt, David L., to United States of America, Navy. Corrosion-inhibiting coating composition 5,021,489, Cl. 524-140.000.
- Knorr-Bremse AG: *See—*
  - Podlesak, Heinz, 5,020,421, Cl. 92-137.000.
- Ko-pack Corporation: *See—*
  - Kobayashi, Junichi, 5,021,110, Cl. 156-249.000.
- Ko-Pack (UK) Limited. *See—*
  - Kobayashi, Junichi, 5,021,273, Cl. 428-40.000.
- Kobane, Takashi: *See—*
  - Yokoo, Toru; Kobane, Takashi; Seki, Akihiko; Yamakawa. Yasuhiro; and Kawakami, Yoshikazu. 5,020,877, Cl 350-128 000.
- Kobari, Masao: *See—*
  - Uchiyama, Kensuke; Uematsu, Hiromi; Takeuchi, Manabu. and Kobari, Masao, 5,020,550, Cl. 131-296.000.
- Kobata, Shigeyuki: *See—*
  - Ishikawa, Masatoshi; Fujita, Kozo; and Kobata, Shigeyuki, 5,021,902, Cl. 360-92.000.
- Kobayashi, Akira: *See—*
  - Funamoto, Masaya; and Kobayashi, Akira, 5,020,929, Cl 400-639 100.
- Kobayashi, Fumihiko; and Umino, Isamu, to Fujitsu Limited. Band pass filter. 5,021,757, Cl. 333-205.000.
- Kobayashi, Fumio: *See—*
  - Kawanami, Norihide; Kobayashi, Fumio; and Mitani, Ikujiro. 5,021,011, Cl. 439-582.000.
- Kobayashi, Hiroshi; and Shimizu, Masaaki, to SDS Biotech K K Trifluorobenzene compounds. 5,021,605, Cl. 558-425.000.
- Kobayashi, Ichiro: *See—*
  - Igarashi, Yoshinori; Yasukawa, Makoto; Ariga, Yasuo; Kobayashi, Ichiro; and Horiuchi, Satoru, 5,021,677, Cl. 250-574.000.
- Kobayashi, Junichi, to Ko-pack Corporation. Process for manufacturing self-adhesive multilayers label. 5,021,110, Cl. 156-249.000.
- Kobayashi, Junichi, to Ko-Pack (UK) Limited Method and apparatus for making labels. 5,021,273, Cl. 428-40.000.
- Kobayashi, Kazuo: *See—*
  - Terada, Yasushi; Nakayama, Takeshi; and Kobayashi. Kazuo, 5,022,009, Cl. 365-210.000.
- Kobayashi, Michihito: *See—*
  - Kubota, Akinori; Ijiri, Masaaki. and Kobayashi, Michihito, 5,020,982, Cl. 425-42.000.
- Kobayashi, Motonobu; Kinoshita, Futoru; Hagi, Mitsuharu; Inoue, Akira; and Uno, Terushige, to Nippon Shokubai Kagaku Kogyo Co. Ltd. Method of removing nitrogen oxides in exhaust gases from a diesel engine. 5,021,227, Cl. 423-212.000.
- Kobayashi, Shinichi: *See—*
  - Kohda, Kenji; Toyama, Tsuyoshi; Ando, Nobuaki; Noguchi, Kenji, and Kobayashi, Shinichi, 5,021,999, Cl. 365-168.000.
- Kobayashi, Tetuo; and Imaeda, Mikio, to Brother Kogyo Kabushiki Kaisha. Multiple-time ink-bearing medium for thermal printing 5,021,291, Cl. 428-319 900.
- Kobayashi, Toshiaki; Ibuchi, Yoshiaki; and Kamei, Naoyuki, to Sharp Kabushiki Kaisha. Copying machine with multiple light sources 5,021,833, Cl. 355-228.000.
- Kobayashi, Yoshiharu: *See—*
  - Sato, Shuichi; Kobayashi. Yoshiharu, and Ayusawa, Shirou, 5,020,462. Cl. 112-302.000.
- Kobus. Joseph P.; Kielmeyer. Ronald F., Jr.; and Diaz, Arthur. to Motorola, Inc. High permitivity dielectric microstrip dipole antenna 5,021,799, Cl. 343-795.000.
- Koch, Paolo; and Di Serio, Alfonso, to Euron S.p.A.; and Agip Petroli S.p.A. Compounds useful as detergent additives for lubricants and lubricating compositions. 5,021,174, Cl. 252-38.000.
- Koch, Volker; Willms, Lothar; Fuss, Andreas; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, to Hoechst Aktiengesellschaft. Certain perfluoroloweralkoxy-2-pyridyloxy propionates having herbicidal activity. 5,021,578, Cl. 546-296.000.
- Kodaka, Kenji: *See—*
  - Nakaya, Michihiko; Fukushi, Yukiharu; Kodaka, Kenji; Ooka, Masayuki; Shiraishi, Shirou; Nakamura, Masahiko; and Numata, Satoshi, 5,021,412, Cl. 514-223.800.
- Kodama, Hiroshi: *See—*
  - Miwa, Yoshiyuki; Kodama, Hiroshi; Murasugi, Skinya; Shikae, Sadao; Nakagawa, Masaya; and Kabumoto, Tsutomu. 5,020.842, Cl. 294-2.000.

- Kodama, Tohru: *See—*
  - Maeda, Mitsuru; Kodama, Tohru: Asami, Sumio; Amano, Norihide; Kusumi, Takaaki; and Hosono, Hidekazu, 5.021,406, Cl. 514-99.000.
- Kodama, Yukio, to Fuji Jukogyo Kabushiki Kaisha. Power transmitting system for a four-wheel drive vehicle. 5,020,626, Cl. 180-233.000.
- Koenig, Norbert: *See—*
  - Maurinus, Martin A.; and Koenig, Norbert, 5,021,811, Cl 354-76.000.
- Koffski, Leonard E.: *See—*
  - Gunderson, Robert A.; Koffski, Leonard E., and Gunderson, Gary W., 5,020,634, Cl. 182-184.000.
- Kogawa, Kiyonori: *See—*
  - Suzuki, Yoshihiro; Takada, Toshinari; Suzuki, Masahiro; Akahoshi, Haruo; Nagai, Akira; Takahashi. Akio; Amagi, Shigeo; Narahara, Toshikazu; Wajima, Motoyo; and Kogawa, Kiyonori, 5,021,296, Cl. 428-409.000.
- Kogutt, Samuel M.: *See—*
  - Gentry, William T.; and Kogutt, Samuel M., 5,020,269, Cl 43-54.100.
- Kohara, Tadanao: *See—*
  - Tochinai, Chiaki; Kohara, Tadanao; Budo, Sadayoshi, Masuda, Hiroaki; and Yoshida, Takayoshi, 5,021,499, Cl. 524-487.000.
- Kohda, Katsuhiro, to Fuji Photo Film Co., Ltd. Radiation image storage panel. 5,021,671, Cl. 250-484.100.
- Kohda, Kenji; Toyama, Tsuyoshi; Ando, Nobuaki; Noguchi, Kenji; and Kobayashi, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Nonvolatile semiconductor memory device with facility of storing trilevel data. 5,021,999, Cl. 365-168.000.
- Kohdaka, Takayuki; Ishida, Katsuhiko; Takahashi, Toshiyuki; and Ogata, Takashi, to Yamaha Corporation. Floating paint digital to analog converter with bias to establish range midpoint. 5,021,785, Cl. 341-138.000.
- Kohmura, Kuniyoshi: *See—*
  - Ito, Takeshi; Murata, Kazushige; and Kohmura, Kuniyoshi, 5,020,983, Cl. 425-85.000.
- Kohno, Hideki: *See—*
  - Yokosawa, Koichi, and Kohno, Hideki, 5,021,739, Cl. 324-248.000.
- Kohno, Takahiro; and Narita, Hitoshi, to Canon Kabushiki Kaisha. Camera system. 5,021,812, Cl. 354-76.000.
- Kohno, Takaki, to NEC Corporation. Semiconductor memory device. 5,022,003, Cl. 365-189.010.
- Kohno, Yoshiaki: *See—*
  - Sano, Harunobu; and Kohno, Yoshiaki, 5,021,921, Cl. 361-321.000.
- Kohyama, Mitsuaki, to Kabushiki Kaisha Toshiba. Laser actuated recording apparatus 5,021,808, Cl. 346-140.00R.
- Koiso, Jun-ichi; and Ohmura, Atsuo, to Konica Corporation. Image recording apparatus having toner reservoir. 5,020,697, Cl. 222-325.000.
- Koiso, Jun-ichi, to Konica Corporation. Electrostatic recording apparatus. 5,021,830, Cl. 355-215.000.
- Koito Manufacturing Co., Ltd.: *See—*
  - Yamada, Masaru, 5,021,930, Cl. 362-61.000.
- Koivunen, Erkki A.: *See—*
  - Lamminen, Olli; and Koivunen, Erkki A., 5,020,556, Cl. 134-112.000.
- Koji, Hatanaka; and Takashi, Aota, to Jidosha Kiki Co., Ltd. Interconnecting arrangement for diesel engine preheating apparatus. 5,020,489, Cl. 123-145.00A.
- Kojima, Asato: *See—*
  - Yasui, Kotaro; Kojima, Asato; Yasuda, Atsushi; and Sato, Takanori, 5,021,347, Cl. 435-235.000.
- Kojima, Atsuyuki: *See—*
  - Masai, Naruhito; Enomoto, Masao; Kojima, Atsuyuki; Masumori, Hiroaki; Hara, Nobuyuki; Hara, Youichi; and Morooka, Shigeaki, 5,021,435, Cl. 514-342.000.
- Kojima, Kenji: *See—*
  - Tsuruoka, Ichirio; Echigo, Katsuhiro; Mochizuki, Manabu; Kurotori, Tsuneo; Ariyama, Kenzo; Kojima, Kenji; and Miyao, Mayumi, 5,021,834, Cl. 355-256.000.
- Kojima, Masakatu: *See—*
  - Yamashita, Youji; and Kojima, Masakatu, 5,021,225, Cl. 422-249.000.
- Kojima, Ryoji: *See—*
  - Muroi, Katsumi; Okuna, Kenji; Otsuka, Hidefumi; Ouchi, Kastubumi; Iimura, Tsutomu; and Kojima, Ryoji, 5,021,810, Cl. 346-155.000.
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  - Watakabe, Hidenori, 5,020,312, Cl. 57-200.000.
- Koller, Albert: *See—*
  - Wegmann, Urs; and Koller, Albert, 5,021,669, Cl. 250-396.0ML.
- Kolodzey, James: *See—*
  - Leburton, Jean-Pierre; and Kolodzey, James, 5,021,841, Cl. 357-22.000.
- Komae, Hitoshi: *See—*
  - Yoshino, Tadashi; Yamaguchi, Susumu; Komae, Hitoshi; Ishiwata, Tetsuo; Yamauchi, Eiji; and Tanaka, Hiroshi, 5,021,897, Cl. 360-72.200.
- Komamiya, Akira: *See—*
  - Kimura, Kazumasa; Komamiya, Akira; and Endo, Takashi, 5,020,715, Cl. 228-102.000.
- Komatsu, Susumu: *See—*
  - Sakamoto, Noriya; and Komatsu, Susumu, 5,021,883, Cl. 358-160.000.
- Komatu, Norihumi: *See—*
  - Nishi, Yumiko; Torii, Yutaka; Komatu, Norihumi; and Takaki, Seiichi, 5,022,057, Cl. 375-119.000.
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  - Hino, Katsuhiko; Kai, Naoki; Sakamoto, Masato; Kon, Tatsuya; Oka, Makoto; Furukawa, Kiyoshi; and Ochi, Yoshiaki, 5,021,421, Cl. 514-254.000.
- Kondo, Hakudai: *See—*
  - Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, 5,021,877, Cl. 358-75.000.
- Kondo, Hidefumi, to Hitachi, Ltd. Method of translating data from knowledge base to data base. 5,021,992, Cl. 364-900.000.
- Kondo, Hiroyuki: *See—*
  - Suzuki, Ryoichi; Kondo, Hiroyuki; and Mizunuma, Susumu, 5,020,509, Cl. 126-263.000.
- Kondo, Katsumi: *See—*
  - Era, Susumu; Iwasaki, Kishiro; Yokokura, Hisao; Hanawa, Yasuo, Kondo, Katsumi; Nakada, Tadao; Kitamura, Teruo; and Mukoh, Akio, 5,020,883, Cl. 350-350.00S.
- Kondo, Masafumi: *See—*
  - Suyama, Takahiro; Kondo, Masafumi; Sasaki, Kazuaki; Hosoda, Masahiro; Takahashi, Kosei; and Hayakawa, Toshiro, 5,022,036, Cl. 372-45.000.
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- Konica Corporation: *See—*
  - Koiso, Jun-ichi; and Ohmura, Atsuo, 5,020,697, Cl. 222-325.000.
  - Koiso, Jun-ichi, 5,021,830, Cl. 355-215.000.
  - Matsubara, Akitoshi; Takahashi, Jiro; Takagiwa, Hiroyuki; and Masaki, Hiroya, 5,021,317, Cl. 430-110.000.
- Konig, Friedrich: *See—*
  - Konig, Reinhard; and Konig, Friedrich, 5,021,097, Cl. 134-25.500.
- Konig, Klaus: *See—*
  - Muller, Klaus-Helmut; Kluth, Joachim; Konig, Klaus; Gassen, Karl-Rudolf; Findeisen, Kurt; Lindig, Markus; Lurssen, Klaus; Santel, Hans-Joachim; and Schmidt, Robert R., 5,021,080, Cl. 71-92.000.
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- Kononen, Juhani: *See—*
  - Maki-Rahkola, Jari; Kononen, Juhani; and Surakka, Jorma, 5,020,961, Cl. 414-495.000.
- Konrad, Eugen: *See—*
  - Aeby, Johann; Mager, Herbert; and Konrad, Eugen, 5,021,066, Cl. 8-408.000.
- Konuma, Hiroaki: *See—*
  - Nakane, Toshio; Naka, Michiro; Konuma, Hiroaki; and Hijikata, Kenji, 5,021,295, Cl. 428-379.000.
  - Nakane, Toshio; Naka, Michiro; Konuma, Hiroaki; and Hijikata, Kenji, 5,021,545, Cl. 528-272.000.
- Kool, Pieter: *See—*
  - Nouws, Jacobus A. M.; Kool, Pieter; and Diepenhorst, Pieter C., 5,021,594, Cl. 556-38.000.
- Kopin Corporation: *See—*
  - Fan, John C.C.; Zavracky, Paul M.; Narayan, Jagdish; Allen, Lisa P.; and Vu, Duy-Phach, 5,021,119, Cl. 156-620.710.
- Koppe, Reiner H.: *See—*
  - Haaker, Paul R.; Klotz, Erhard P. A.; Koppe, Reiner H.; and Linde, Rolf E., 5,022,066, Cl. 378-2.000.
- Korczynski, Jacek M.: *See—*
  - Stack, Thomas J.; and Korczynski, Jacek M., 5,021,761, Cl. 337-68.000.
- Koren, Jeffrey G.: *See—*
  - Wilson, Craig A.; Olson, Kurt G.; Koren, Jeffrey G.; Longhini, Debra M.; Dugan, Carol S.; and Jozwiak, Edward L., Jr., 5,021,135, Cl. 204-180.800.
- Kornely, Michael G., Jr.; Holmes, Douglas; and Micich, Robert G., to Grumman Aerospace Corporation. Cast charged particle drift tube. 5,021,741, Cl. 328-227.000.
- Korty, Joseph A., to Modular Computer Systems, Inc. Mostly contiguous file allocation technique involving file extension. 5,021,946, Cl. 364-200.000.
- Kosak, Dietmar; Ellinghaus, Wolfgang; Feldmann, Hugo; and Engel, Georg, to SMS Schloemann-Siemag Aktiengesellschaft. Compact rolling mill for rolling structural steel. 5,020,354, Cl. 72-225.000.
- Kosaka, Kenji; Kimura, Hiroshi; Suzuki, Akihiro; and Hayashi, Kenji, to Ikegami Tsushiniki Co. Ltd. Sheet finisher. 5,020,785, Cl. 270-053.000.
- Koshikawa, Sakae: *See—*
  - Maeda, Tetsuya; Yamamoto, Toshiyuki; Takase, Mituo; Sasaki, Kazuya; Airka, Tadashi; Yokoo, Mamoru; Hashimoto, Rieko;

VOL
1127
ISS
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Amemiya, Kouji; and Koshikawa, Sakae, 5,021,458, Cl. 514-655.000.

- Koshimo, Masahiko, to Kabushiki Kaisha Daikin Seisakusho. Torque converter device. 5,020,646, Cl. 192-3.250.
- Kosten, Richard B.; Krasznai, Charles Z.; and Van Deursen, Gary, to Black & Decker, Inc. Filter assembly for a vacuum cleaner. 5,020,187, Cl. 15-347.000.
- Kotani, Tsutomu: *See—*
  - Takahashi, Minoru; Kotani, Tsutomu; and Endo, Shinichi, 5,021,701, Cl. 310-345.000
- Koteles, Emil S.: *See—*
  - Melman, Paul; Elman, Boris S.; Koteles, Emil S.; and Jagannath, Chirravuri, 5,021,360, Cl. 437-81.000.
- Kotitschke, Gerhard: *See—*
  - Mayer, Wolfgang; Sturm, wolfram; Fissmann, Hans-Joachim, Kotitschke, Gerhard; Zurn, Georg; Kade, Werner; and Kugler, Georg, 5,020,242, Cl. 34-115.000.
- Kotoda, Yoshihiro, to Kabushiki Kaisha Toshiba Tape loading apparatus for cassette tape player. 5,021,899, Cl. 360-85.000.
- Kovacevic, Nebojsa; and Hasselquist, Paul B., to N K. Biotechnical Engineering Company. Calibration stand for sensor. 5,020,357, Cl. 73-1.00B.
- Kovach, George D.: *See—*
  - Bealkowski, Richard; Blackledge, John W , Jr., Cronk, Doyle S., Dayan, Richard A.; Dixon, Jerry D , Kinnear, Scott G.; Kovach, George D.; McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., 5,022,077, Cl. 380-4.000.
- Kovacik, Paul J.; Davidson, Charles R ; Lindsay, Kevin B.; Lundberg, Darrel V.; Mulder, Cameron A , and Boerboom, Everett, to PPG Industries, Inc. Method of and apparatus for joining edges of glass sheets, one of which has an electroconductive coating and the article made thereby. 5,021,074, Cl. 65-40.000.
- Kowalski, Jacek; and Chevalier, Christophe, to SGS-Thomson Microelectronics S.A. Method for the programming of the memory cells of a memory and a circuit to implement this method. 5,022,001, Cl 365-185.000.
- Koya, Keizo, to Fuji Photo Film Co., Ltd. Light-sensitive element for the diffusion transfer process. 5,021,334, Cl. 430-562.000.
- Koyanagi, Mitsumasa, to Hitachi, Ltd. Trench DRAM cell with different insulator thicknesses. 5,021,842, Cl 357-23.600.
- Kozma, Matthew L., to Packaging Industries Group, Inc. Method for making multicolored resin material and product thereof. 5,021,463, Cl. 521-143.000.
- Kozuka, Hajime: *See—*
  - Yagi, Tadashi; Noguchi, Masahiko; Kozuka, Hajime; Morishita, Mitsuharu; and Onishi, Masayoshi, 5,020,616, Cl. 180-79.100.
- Krabbenhoft, Herman O.; and Boden, Eugene P., to General Electric Company Process of reacting branched thermoplastic polycarbonate with polyhydric phenol having more than two hydroxy groups. 5,021,521, Cl. 525-462.000.
- Kralick, James H , to Mechanical Technology Incorporated. Auxiliary bearing design for active magnetic bearings. 5,021,697, Cl. 310-90.500.
- Kramarova, Evgenia P.: *See—*
  - Shipov, Alexandr G.; Kramarova, Evgenia P ; Orlova, Natalia A , Baukov, Jury I., and Ziemelis, Kristap M., 5,021,568, Cl 540-531.000.
- Kramer, Peter: *See—*
  - Sauer, Hans; and Kramer, Peter, 5,021,306, Cl. 429-94.000.
- Krapil, Virginia: *See—*
  - Mahoney, Michael R., Nieman, Wayne H , McDowell, Douglas J , and Krapil, Virginia, 5,020,532, Cl. 128-205.240.
- Krasznai, Charles Z.: *See—*
  - Kosten, Richard B.; Krasznai, Charles Z., and Van Deursen, Gary, 5,020,187, Cl. 15-347.000.
- Kraus, Charles E., to Excelermatic Inc. Infinitely variable traction roller transmission. 5,020,384, Cl. 74-200.000.
- Kraus, Willibald, to TRW United Carr GmbH & Co. Band element for binding and holding of objects. 5,020,749, Cl. 248-74 300.
- Krause, Helmfried: *See—*
  - Deller, Klaus; Klingel, Reinhard, and Krause, Helmfried, 5,021,378, Cl. 502-62.000.
- Krauss-Maffei AG: *See—*
  - Schiele, Herbert, 5,021,158, Cl. 210-326.000.
- Kreft, Anthony F., III *See—*
  - Failli, Amedeo A.; Kreft, Anthony F., III, and Musser, John H , 5,021,576, Cl. 546-174.000.
- Krieg, David F Combination ice package and expandable cooler. 5,020,337, Cl. 62-464.000.
- Krishnamurti, Kiran: *See—*
  - Langman, Kirk; Krishnamurti, Kiran; and Tarlow, Kenneth A., 5,022,020, Cl. 369-37.000.
- Krstic, Vladimir D. Method of making silicon carbide. 5,021,230, Cl. 423-345.000.
- Krubsack, Larry J., Handy, Allen L.; and Lawton, John G., to Clum Manufacturing Company, Inc. Solenoid switch contact and mounting assembly. 5,021,760, Cl. 335-196.000.
- Kruger, Hermann, to Volkswagen. Internal combustion engine with load-responsive valve control for combustion chamber scavenging. 5,020,487, Cl. 123-90.150.
- Kruger, Thomas: *See—*
  - Bergthaller, Peter; Kruger, Thomas; Stolzenburg, Rudolf; and Hubner, Dirk, 5,021,330, Cl. 430-544.000.
  - Bergthaller, Peter; Kruger, Thomas; Vetter, Hans; and Odenwalder, Heinrich, 5,021,332, Cl. 430-544.000.
  - Vetter, Hans, Odenwalder, Heinrich; Bergthaller, Peter, and Kruger, Thomas, 5,021,331, Cl. 430-544.000.
- Krzywdziak, Alain; Parmenon, Daniel; and Godat, Jean. Lid provided with a variable-flow pouring spout and with an improved vent device, particularly for cans of base color for automobile coachwork 5,020,700, Cl. 222-487.000
- Ksander, Gary M , to Ciba-Geigy Corporation. Certain N-substituted butyramide derivatives. 5,021,430, Cl. 514-332.000.
- Kubelka, Axel: *See—*
  - Hercog, Milan; and Kubelka, Axel, 5,020,248, Cl. 36-120.000.
- Kubicek, Donald H.: *See—*
  - Maholland, Michael K.; Fu, Chia-Min; Lowery, Richard E , Bertus, Brent J.; and Kubicek, Donald H., 5,021,377, Cl 502-26.000
- Kubo, Motonobu; Inukai, Hiroshi; and Kitahara, Takahiro, to Daikin Industries, Ltd. Coated carriers for developing electrostatic images 5,021,316, Cl. 430-108.000.
- Kubota, Akinori; Ijiri, Masaaki; and Kobayashi, Michihito, to Sumitomo Rubber Industries Limited. Apparatus for vulcanizing elastomer product 5,020,982, Cl. 425-42 000
- Kubota Corp. *See—*
  - Oshima, Hiroshi; and Okura, Hideo, 5,020,310, Cl 56-17 200.
- Kubota, Teruji: *See—*
  - Takashi, Ishida; Ueda, Yoshikazu; Kubota, Teruji, Igarashi, Misao Tanaka, Norichika; and Kamijo, Yasuhiko, 5,020,455, Cl 110-342.000.
- Kudielka, Elfriede *See—*
  - Karagoz, Sadi; Hribernik, Bruno; Stamberger, Johann, Puber, Josef; Jeglitsch, Franz; Fischmeister, Hellmut, Matzer Franz Locker, Claus-Dieter; Kudielka, Elfriede; and Jager, Heimo, 5,021,085, Cl. 75-239.000.
- Kuecha, Georg: *See—*
  - Richter, Karl-Heinz, Kurz, Hubert; and Kuecha, Georg, 5,021,039, Cl. 493-14.000.
- Kuehn, Richard T . *See—*
  - Swartzel, Kenneth R., Ganesan, Sudalaimuthu G , Kuehn, Richard T ; Hamaker, Raymond W , and Sadeghi, Farid, 5,021,981, Cl 364-557.000.
- Kugler, Georg: *See—*
  - Mayer, Wolfgang; Sturm, wolfram, Fissmann, Hans-Joachim, Kotitschke, Gerhard; Zurn, Georg; Kade, Werner, and Kugler Georg, 5,020,242, Cl. 34-115.000.
- Kuhlmann, Werner: *See—*
  - Althaus, Hans; Kuhlmann, Werner; and Spaeth, Werner, 5,020,873, Cl. 350-96.200.
- Kuhn, Peter H. A N , to Sara Lee/DE N.V Dispenser with reduction transmission. 5,020,930, Cl. 401-146.000.
- Kuhnhein, Marc R.: *See—*
  - Keller, Robert C , and Kuhnhein, Marc R., 5,021,509, Cl 525-221.000.
- Kulczyk, Konrad, Perks, Malcolm P.; and Smith, George W , to Schlumberger Industries Limited. Ultrasonic temperature sensors, and ultrasonic waveguide connectors for use therewith 5,022,014, Cl 367-87.000.
- Kumagai, Toshimitsu *See—*
  - Miyazaki, Toshimasa, Uzawa, Yoji; Okawa, Kazuyoshi, Kawashima, Hiroshi; Moriya, Kazumasa; Murakawa, Yoshitaka, Kumagai, Toshimitsu; Nakamura, Akihiro; Itoh, Motohiko, and Kashiwazaki, Tomoyuki, 5,021,695, Cl. 310-12.000.
- Kumura, Hajime: *See—*
  - Nakakoji, Hisatada; Nakajima, Seiji; Yasuda, Akira; and Kumura, Hajime, 5,021,301, Cl. 428-659.000.
- Kuneguchi, Kenmei: *See—*
  - Nakatsukasa, Keichiroh, and Kuneguchi, Kenmei, 5,020,771, Cl 251-30.020.
- Kunreuther, Steven J Assembly of attachments and device for attaching same. 5,020,713, Cl. 227-67.000.
- Kunze, Harry A., to Mine Safety Appliances Company Connector 5,020,193, Cl. 24-323.000.
- Kurachi, Yoshiya: *See—*
  - Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya, Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, 5,021,391, Cl. 502-426.000.
- Kureha Kagaku Kogyo Kabushiki Kaisha. *See—*
  - Iizuka, Yo; Kashiwadate, Ken, Endo, Shunzo; Hosokawa, Toshio, Katto, Takayuki; Mizuno, Toshiya, and Katase, Kenichi, 5,021,523, Cl. 525-537.000.
- Kurishu, Masayoshi. *See—*
  - Minoda, Takeshi; Todo, Akira; Kimura, Toshio, and Kurishu, Masayoshi, 5,020,207, Cl. 29-527.400.
- Kurita, Mitsuru; Ikeda, Yoshinori; Suzuki, Yasumichi, Katoh, Koichi, Ichikawa, Hiroyuki; Kitamura, Toshiyuki; and Kadowaki, Toshihiro, to Canon Kabushiki Kaisha. Image processing apparatus with realtime texture processing. 5,021,876, Cl. 358-75.000.
- Kurosawa, Atsushi: *See—*
  - Shimizu, Akira; Kurosawa, Atsushi; and Yamada, Fumiya, 5,021,904, Cl. 360-96.500.
- Kurose, Mitsukazu *See—*
  - Akiyama, Takaaki; Matsuo, Shuji; Fujii, Masahiro; Kurose, Mitsukazu; Nakamura, Osamu; and Kamijo, Masahiro, 5,020,928, Cl 400-193.000.
- Kurosu, Shinichi: *See—*
  - Ishikawa, Hideyuki; Chonan, Mitsugi; Tachibana, Fusao; and Kurosu, Shinichi, 5,020,484, Cl. 123-73.0AD.

- Kurotori, Tsuneo: *See—*
  - Tsuruoka, Ichirio; Echigo, Katsuhiro; Mochizuki, Manabu; Kurotori, Tsuneo; Ariyama, Kenzo; Kojima, Kenji; and Miyao, Mayumi, 5,021,834, Cl. 355-256.000.
- Kurtze, Jeffrey D.; and Turner, James, to Apollo Computer, Inc. Method and apparatus for DRAM memory performance enhancement. 5,022,004, Cl. 365-189.070.
- Kurz, Hubert: *See—*
  - Richter, Karl-Heinz; Kurz, Hubert; and Kuecha, Georg, 5,021,039, Cl. 493-14.000.
- Kuster, Hans-Werner: *See—*
  - Vanaschen, Luc; Kuster, Hans-Werner, and Bremer, Carsten, 5,021,075, Cl. 65-287.000.
- Kusumi, Takaaki: *See—*
  - Maeda, Mitsuru; Kodama, Tohru; Asami, Sumio; Amano, Norihide; Kusumi, Takaaki; and Hosono, Hidekazu, 5,021,406, Cl. 514-99.000.
- Kusz, Maximillian, to Owens-Illinois Closure Inc. Child resistant closure. 5,020,681, Cl. 215-220.000.
- Kuwahara, Heikichi: *See—*
  - Kieda, Shigekazu; Nakajima, Tadakatsu; Kuwahara, Heikichi; and Sato, Motohiro, 5,021,924, Cl. 361-385.000.
- Kuwata, Satoshi; and Ohkawara, Takashi, to Shin-Etsu Chemical Co., Ltd. Composition for protecting nonporous surfaces from water. 5,021,089, Cl. 106-2.000.
- Kuwayama, Yoshinari; Ando, Masahiko; and Hayakawa, Yoichi, to Aisin AW Kabushiki Kaisha. Hydraulic controller for an automatic transmission. 5,020,393, Cl. 74-869.000.
- Kuyama, Hiroshi: *See—*
  - Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, 5,021,391, Cl. 502-426.000.
- Kuykendall, Larry D., and Hunter, William J., to United States of America, Agriculture. Enhancement of nitrogen fixation with *Bradyrhizobium japonicum* mutants. 5,021,076, Cl. 71-7.000.
- Kuzuta, Nobuyuki; Hasegawa, iichi; and Kimura, Teiyu, to Shimadzu Corporation. Flexible replica grating. 5,020,879, Cl. 350-162.170.
- KVH Industries, Inc.: *See—*
  - Kits van Heyningen, Martin A.; and Randall, Robert C., 5,020,902, Cl. 356-21.000.
- Kwiatkowski, Patricia L.: *See—*
  - Crano, John C.; Kwiatkowski, Patricia L.; and Hurditch, Rodney J., 5,021,196, Cl. 252-586.000.
- Kyburz, Emilio: *See—*
  - Hunkeler, Walter; Kyburz, Emilio; and Meier, Marc, 5,021,411, Cl. 514-220.000.
- Kyo, Eikai: *See—*
  - Tahara, Eiichi; Ochiai, Atsushi; Yokozaki, Hiroshi; Hozumi, Toyoharu; and Kyo, Eikai, 5,021,553, Cl. 530-387.000.
- Kyowa Hakko Kogyo Kabushiki Kaisha. *See—*
  - Kanda, Yutaka; Arai, Hitoshi; Kasai, Masaji; and Morimoto, Makoto, 5,021,423, Cl. 514-262.000.
- La Gard, Inc.: *See—*
  - Gartner, Klaus W.; Uyeda, Alan K.; and Phillips, Peter J., 5,020,345, Cl. 70-277.000.
- Labbe, Robert F.; and Rettmer, Rebecca L., to University of Washington, The Board of Regents of the. Process for enhancing wound healing. 5,021,452, Cl. 514-474.000.
- Labedan, Jean-Denis: *See—*
  - Stephan, Gerard; and Labedan, Jean-Denis, 5,020,925, Cl. 384-569.000.
- Laboratoires UPSA: *See—*
  - Bru-Magniez, Nicole; Nicolai, Eric; and Teulon, Jean-Marie, 5,021,443, Cl. 514-394.000.
- Laboratories Incorporated: *See—*
  - Lockwood, Harry F.; Stern, Margaret B.; Tabasky, Marvin; and Cataldo, Victor, 5,021,363, Cl. 437-200.000.
- Labus, Rainer H.: *See—*
  - Eilowitz, Mark S.; Vataru, Marcel; Bayler, James L.; Labus, Rainer H.; and Lugosi, Laszlo G., 5,021,152, Cl. 210-712.000.
- Lachman, Ronald D. Computer input device with two cursor positioning spheres. 5,021,771, Cl. 340-709.000.
- Lackowski, Robert: *See—*
  - Overland, Kenneth; and Lackowski, Robert, 5,021,913, Cl. 360-133.000.
- Ladner, Wolfgang: *See—*
  - Urban, Dieter; Ladner, Wolfgang; and Paul, Axel, 5,021,345, Cl. 435-180.000.
- Ladouceur, Harold A., to Multifastener Corporation. Riveting fastener with improved torque resistance. 5,020,950, Cl. 411-107.000.
- Lagar, Philip A.: *See—*
  - Montague, Peter G.; Lagar, Philip A.; and Bainbridge, Peter, 5,021,525, Cl. 526-210.000.
- Lagushenko, Radomir: *See—*
  - Maya, Jakob; Michael, Joseph D.; and Lagushenko, Radomir, 5,021,718, Cl. 315-358.000.
- Lai, Chenmin. Umbrella cover construction. 5,020,559, Cl. 135-33.200.
- Lamarie, Jean-Paul: *See—*
  - Bompard, Bruno; and Lamarie, Jean-Paul, 5,021,281, Cl. 428-116.000.
- Lamars, Robert M.: *See—*
  - Durairaj, Bojayan; Peterson, Alex, Jr.; Lamars, Robert M.; and Hood, Richard T., 5,021,522, Cl. 525-502.000.
- Lambda Electronics Inc.: *See—*
  - Cohen, Itzchak, 5,021,937, Cl. 363-41.000.
- Lambda S.r.l.: *See—*
  - Gariboldi, Franco; and Conti, Paolo, 5,020,340, Cl. 66-125.000.
- Lammers, James B., to Scott & Fetzer Company, The. Air compressor shroud. 5,020,973, Cl. 417-243.000.
- Lamminen, Olli; and Koivunen, Erkki A., to 501 Peerless Pump Company. Vehicle wash apparatus with spinning nozzles. 5,020,556, Cl. 134-112.000.
- Lammon, Mark A.: *See—*
  - Payne, Roy D.; and Lammon, Mark A , 5,020,355, Cl. 72-407.000
- Landa, Issac J. "In-line" spectral reference method for spectrometers 5,020,909, Cl. 356-300.000.
- Lane, Anthony A., to Siemens Plessey Electronic Systems Limited Circuit arrangement comprising MESFET switched spiral inductor 5,021,758, Cl. 333-245.000.
- Lang, Gary D.: *See—*
  - Rhoades, George D.; and Lang, Gary D., 5,020,330, Cl. 62-63.000
- Lang, Victor H., to Semborg-Recrob, Corp. Animated character system with real-time control. 5,021,878, Cl. 358-93.000.
- Langer, Michael: *See—*
  - Braddick, Britt O.; and Langer, Michael, 5,020,597, Cl. 166-291.000.
- Langerbeins, Klaus; Klesse, Wolfgang; Tessmer, Dieter; Elser, Wilhelm; and Geyer, Hans-Juergen, to Rohm GmbH Binder for aqueous gloss paints. 5,021,469, Cl. 523-201.000.
- Langevin, Eric T.; Carter, Austin L., Jr.; Van Kleeck, Michael J ; and Taylor, Bruce E., to Thermo Electron Web Systems, Inc. Steam shower vacuum apparatus. 5,020,245, Cl 34-155.000.
- Langford, Frederick. Coupleable flotation apparatus forming lines and arrays. 5,020,465, Cl. 114-345.000.
- Langley, Stuart T.: *See—*
  - Dunn, William C.; and Langley, Stuart T., 5,020,910, Cl 356-328.000.
- Langman, Kirk; Krishnamurti, Kiran; and Tarlow, Kenneth A., to Langman, Kirk; and Krishnamurti, Kiran. Multiple play compact disk player. 5,022,020, Cl. 369-37.000.
- Lanio, Stephan; and Haider, Maximilian, to ICT Integrated Circuit Testing Gesellschaft fur Halbleiterpruftechnik mbH. Multipole element. 5,021,670, Cl. 250-396.00R.
- Lanxide Technology Company, LP: *See—*
  - Aghajanian, Michael K.; Kantner, Robert C.; and Biel, John P., Jr , 5,020,583, Cl. 164-97.000.
  - Aghajanian, Michael K.; Nagelberg, Alan S.; and Kennedy, Christopher R., 5,020,584, Cl. 164-97.000.
- Lappos, Nicholas D.: *See—*
  - Sweet, David H.; Greenberg, Charles E.; Lappos, Nicholas D , Walsh, David M.; and Meisner, Richard P., 5,020,316, Cl. 60-39.282.
- LaRaja, Raymond D.: *See—*
  - Rothenberg, Robert E.; LaRaja, Raymond D.; and Odom, John W., 5,020,543, Cl. 128-760.000.
- Larkin, Patrick J., to Easybagger Inc. Garbage bag and utility holder. 5,020,751, Cl. 248-99.000.
- Larson, Gary R.; Emmons, William D.; and Kalyanaraman, Palaiyur S., to Rohm and Haas Company. Polymer compositions derived from acryloxyalkylcyanoacetamides. 5,021,511, Cl. 525-295.000.
- Larson, Marlow W., to Browning Arms Company. Compound archery bow. 5,020,507, Cl. 124-25.600.
- Larsson, Hakan S.: *See—*
  - Alminger, Tomas B.; Larsson, Hakan S.; Lindberg, Per L.; and Sunden, Gunnel E., 5,021,433, Cl. 514-338.000.
- Larsson, Owe G. T.; and Aberg, Anders B. H., to Toolvac Engineering AB. Method for regulation the pressure of a liquid contained in mold pores which communicate with a mold cavity. 5,021,203, Cl. 264-40.300.
- Lasag AG: *See—*
  - Hauert, Ulrich, 5,021,632, Cl. 219-121.830.
- Laser Data Technology, Inc.: *See—*
  - Ross, Monte; Peterson, Mark L.; and Missler, Leonard R., 5,021,961, Cl. 364-443.000.
- Laser Magnetic Storage International Company: *See—*
  - Jansen, Gerardus L. M.; and Hecht, Matthew W., 5,022,017, Cl. 369-13.000.
- Laser, Vadim: *See—*
  - Chadima, George E., Jr.; and Laser, Vadim, 5,021,642, Cl. 235-472.000.
- Lau, Werner, to Red Baron (Oil Tools Rental) Limited, The. Drilling tool. 5,020,599, Cl. 166-301.000.
- Laugal, James A.; Martin, Glenn E.; St. Aubin, Donald L.; and Wold, Gerald G., to BASF Corporation. Flexible aryl alkyl epoxy resins, their amine resin derivatives and their use in electrodeposition coatings. 5,021,470, Cl. 523-414.000.
- Laurel Bank Machines Co., Ltd.: *See—*
  - Arikawa, Junichi, 5,020,787, Cl. 271-3.000.
  - Goi, Kouichi, 5,021,026, Cl. 453-40.000.
- Lawlis, G. Frank. Therapeutic device for treating back pain. 5,020,520, Cl. 128-71.000.
- Lawrence, Dale M.: *See—*
  - Saaski, Elric W.; and Lawrence, Dale M., 5,021,731, Cl. 324-96.000.
- Lawrence, Paul B.: *See—*
  - Fagerburg, David R.; Rule, Mark; Watkins, Joseph J.; and Lawrence, Paul B., 5,021,546, Cl. 528-389.000.
- Lawrence, Robert A. Personal emergency locator system. 5,021,794, Cl. 342-457.000.
- Lawton, John G.: *See—*
  - Krubsack, Larry J.; Handy, Allen L.; and Lawton, John G., 5,021,760, Cl. 335-196.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Lawton-Wall, Jennylyn. Vitamin composition for treatment of flea infestation in animals. 5,021,424, Cl. 514-276.000.
- Le, Quang N.: *See—*
  - Bortz, Robert W.; Garwood, William E.; Le, Quang N.; and Wong, Stephen S., 5,021,142, Cl. 208-58.000.
- Leachman, Frank A., Jr.; and Cole, Edward F., to United Technologies Corporation. Multiple function fuel valve and system. 5,020,315, Cl. 60-39.281.
- Lean, Eric G.: *See—*
  - Chang, Shuo H.; Hendriks, Ferdinand; Khanna, Vijayeshwar D.; and Lean, Eric G., 5,021,906, Cl. 360-103.000.
- Leasure, Maurice G.: *See—*
  - Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S.; LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., 5,021,954, Cl. 364-410.000.
- LeBlanc, Douglas R.: *See—*
  - Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S., LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., 5,021,954, Cl. 364-410.000.
- LeBlanc, George: *See—*
  - Beard, John E.; Spillman, Franklin L., Banos, Oscar; Showers, David; Fussell, John M.; and LeBlanc, George, 5,020,790, Cl. 272-70.000.
- Leburton, Jean-Pierre; and Kolodzey, James, to University of Illinois. Semiconductor device with controlled negative differential resistance characteristic. 5,021,841, Cl. 357-22.000.
- Leclere, Jean: *See—*
  - Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; Leclere, Jean; and Romand, Paul, 5,021,024, Cl. 452-149.000.
- Leduc, Yves, to Texas Instruments Incorporated. Digital-analog converter for conversion of law A- encoded digital signals into analog signals. 5,021,787, Cl. 341-150.000.
- Lee, Chong U., to Qualcomm, Inc. Adaptive block size image compression method and system. 5,021,891, Cl. 358-432.000.
- Lee, Ling H., to WAGI Partnership. Fabric softener dispenser. 5,020,240, Cl. 34-60.000.
- Lee, Miko. Tumbler pin lock system. 5,020,349, Cl. 70-491.000.
- Lee, Nancy E.: *See—*
  - Kinney, William A.; and Lee, Nancy E., 5,021,569, Cl. 540-581.000.
- Lee, Ta J.: *See—*
  - Joshua, Henry; Wilson, Kenneth E.; Schwartz, Michael S.; Lee, Ta J.; and Stokker, Gerald E., 5,021,453, Cl. 514-510.000.
- Leedy, Glenn J. Method of making a flexible tester surface for testing integrated circuits. 5,020,219, Cl. 29-846.000.
- Leforestier, Sylvain; and Omet, Dominique, to International Business Machines Corporation. Two stage address decoder circuit for semiconductor memories. 5,021,688, Cl. 307-463.000.
- Lehigh University: *See—*
  - Klier, Kamil; Herman, Richard G.; and Vedage, Gamimi A., 5,021,233, Cl. 423-656.000.
- Leib, Roger K., to Rober K. Leib. Wheelchair. 5,020,817, Cl 280-250.100.
- Leigh-Monstevens, Keith V.: *See—*
  - Barker, David C.; Nix, Richard A.; and Leigh-Monstevens, Keith V., 5,020,326, Cl. 60-586.000.
- Leishman, Layne S., to Product Research and Development. Post driver and methodology. 5,020,605, Cl. 173-1.000.
- Leland Stanford Junior University, The Board of Trustees of the: *See—*
  - Akamine, Shinya; and Quate, Calvin F., 5,021,364, Cl. 437-228.000.
  - Tecott, Laurence; Barchas, Jack D.; and Eberwine, James, 5,021,335, Cl. 435-6.000.
- Lemelson, Jerome H. Apparatus and method for reacting on matter. 5,021,628, Cl. 219-121.600.
- Lennon, John M.: *See—*
  - Mayo, James D.; Drappel, Stephen; Duff, James M.; Croucher, Melvin D.; and Lennon, John M., 5,021,318, Cl 430-124.000.
- Lennox Industries Inc.: *See—*
  - Mongia, Manmohan; and Meade, Shelby J., 5,020,587, Cl 165-82.000.
- Leon, Robert L.: *See—*
  - Tuft, Richard H.; and Leon, Robert L., 5,020,773, Cl. 251-129.120.
- Leonard, Douglas R. Scraping tool kit. 5,020,181, Cl. 15-105.000.
- Leone-Bay, Andrea; Peake, Steven L.; and Kaminski, Stanley S., to American Cyanamid. Polyimides from diaminobenzotrifluorides. 5,021,540, Cl. 528-183.000.
- Leong, David: *See—*
  - Wall, Peter; Pickard, Robert S.; Ensell, Graham; and Leong, David, 5,020,376, Cl. 73-866.500.
- Le Roch, Alain: *See—*
  - Borie, Gerard; Pellegrin, Jean; and Le Roch, Alain, 5,020,297, Cl. 53-127.000.
- Leroy, Dominique. Ski and safety binding assembly. 5,020,821, Cl. 280-603.000.
- Lesea, Ronald A., to GTE Products Corporation. Forward inverter ballast circuit. 5,021,716, Cl. 315-219.000.
- Lessig, William R., III; Bailey, Rouse R., Jr.; and Cochran, John R., to Black & Decker Inc. Vacuum cleaners. 5,020,186, Cl. 15-339.000.
- Leu, James M. Hollow ended four-way socket wrench. 5,020,398, Cl. 81-124.400.
- LeVahn, Bruce A., to Minnesota Scientific, Inc. Clamping device for use on a retractor support. 5,020,195, Cl. 24-514.000.
- Levandoski, Ronald R. Dental articulator. 5,020,993, Cl. 433-65.000.
- Leveque, James H., to AMAF Industries, Inc. Trunk dialing converter. 5,022,055, Cl. 375-82.000.
- Lever Brothers Company: *See—*
  - Machin, David; Naik, Appaya; Buytenhek, Cornelis; and van de Pas, Johannes C., 5,021,195, Cl. 252-545.000.
- Lever Brothers Company, Division of Conopco, Inc.: *See—*
  - Harriott, Sharon M.; Au, Van; and Rees, Wayne M., 5,021,187, Cl 252-186.380.
  - Sams, Bernard, 5,020,699, Cl. 222-450.000.
- Levy, Guy. Surgical treatment method and instrument. 5,020,995, Cl 433-215.000.
- Levy, Stuart B., to Tufts College, Trustees of. Tetracycline activity enhancement. 5,021,407, Cl. 514-154.000.
- Lewis, Milton A., Jr.; Mason, Jeffrey S.; Swinford, Carson B.; and Wiseman, Timothy R., Sr., to Du Pont de Nemours, E. I., and Company. Waterproof glove for protective coveralls. 5,020,161, Cl 2-164.000.
- Lewis, Peter J.; and Povey, Reginald, to Burn Tubes Limited Connector. 5,020,935, Cl. 403-391.000.
- Leybold Aktiengesellschaft: *See—*
  - Engemann, Jurgen, 5,021,919, Cl. 361-225.000.
  - Hartig, Klaus; and Seiler, Reiner, 5,021,139, Cl. 204-298.090.
  - Rupp, Hartwig; and Stenzel, Otto, 5,021,299, Cl. 428-585.000.
  - Strasser, Wilhelm, 5,020,218, Cl. 29-890.035.
  - Thomas, Friedrich-Werner, 5,022,044, Cl. 373-151.000.
- Leyshon, Llewellyn J.; Buckland, Paul R.; and Burns, Paul A., to Eastman Kodak Company. Color photographic element, compounds and process. 5,021,333, Cl. 430-551.000.
- Li, Ying-Hsiao, to Atlantic Richfield Company. Drag reduction method for gas pipelines. 5,020,561, Cl. 137-13.000.
- Liberty Diversified Industries: *See—*
  - Thorud, Stanley R.; and Miller, LeRoy, 5,020,674, Cl. 206-600 000
- Liberty Industries, Inc.: *See—*
  - Casteel, Larry, 5,020,300, Cl. 53-399.000.
- Liberty Technology Center, Inc.: *See—*
  - Tuft, Richard H.; and Leon, Robert L., 5,020,773, Cl 251-129.120
- Lichte, James L.: *See—*
  - Nopper, Leroy N.; Miller, Meryl E.; and Lichte, James L., 5,021,638, Cl 235-145.00R.
- Lichter, Robert J. Apparatus for mounting a safe in a floor. 5,020,450, Cl. 109-50.000.
- Lichtman, Jeffrey W.; Pepose, Jay S., and Dave, Rakhal, to Washington University. Single aperture confocal scanning biomicroscope and kit for converting single lamp biomicroscope thereto. 5,020,891, Cl. 350-527.000.
- Lie, Liat-Chaw; and Suen, Huang K. Display board assembly 5,020,253, Cl. 40-576.000.
- Liebenrood, John D.: *See—*
  - DuPuy, Richard E.; Liebenrood, John D., and McCaughan, Leon. 5,020,872, Cl. 350-96.140.
- Liesch, Jerrold M.: *See—*
  - Sesin, David F.; Liesch, Jerrold M.; Fountoulakis, Jimmy M. Masurekar, Prakash S.; Kaplan, Louis; and Wichmann, Carol F. 5,021,403, Cl. 514-9.000.
- Light, Ronald R.; and Seymour, Robert W., to Eastman Kodak Company. Reinforced polymeric sheet material. 5,021,289, Cl 428-285.000.
- Lilly Industries Limited: *See—*
  - Baker, Stephen R.; and Todd, Alec, 5,021,441, Cl. 514-381.000.
  - Fernandez Fernandez, Maria I.; Hotten, Terrence M.; and Tupper. David E., 5,021,449, Cl. 514-422.000.
- Lilly S.A.: *See—*
  - Fernandez Fernandez, Maria I.; Hotten, Terrence M , and Tupper. David E., 5,021,449, Cl. 514-422.000.
- Lin, Jui C., to Taiwan Fu Hsing Industry Co., Ltd Tubular door lock with plate shaped bolt actautor. 5,020,837, Cl. 292-169.130
- Lin, Nan-Horng: *See—*
  - Albarella, James P.; and Lin, Nan-Horng, 5,021,586, Cl 548-527.000.
- Linam, Richard L.: *See—*
  - Cloeren, Peter F.; and Linam, Richard L., 5,020,984. Cl 425-141.000.
- Linardos, Anthony: *See—*
  - Fuoco, Francis J.; and Linardos, Anthony, 5,021,732, Cl. 324-158.00F.
- Lindberg, Kenneth M.; Spykerman, David J., George, Philip C.; and Mersman, Wesley D., to Prince Corporation. Adjustable headrest 5,020,855, Cl. 297-391.000.
- Lindberg, Per L.: *See—*
  - Alminger, Tomas B.; Larsson, Hakan S.; Lindberg, Per L., and Sunden, Gunnel E., 5,021,433, Cl. 514-338.000.
- Lindberg, Sven, to Aktiebolaget Bofors. Tanks. 5,020,415. Cl 89-46.000.
- Lindblom, Lars; and Evensen, Torstein. Method and an apparatus in hot-dip galvanizing. 5,020,779, Cl. 266-112.000.
- Linde, Rolf E.: *See—*
  - Haaker, Paul R.; Klotz, Erhard P. A.; Koppe, Reiner H.; and Linde, Rolf E., 5,022,066, Cl. 378-2.000.
- Linder, Ernst; Rembold, Helmut; and Wier, Manfred, to Robert Bosch GmbH. Fuel injection apparatus. 5,020,498, Cl. 123-450.000.
- Linder, Ernst; and Rembold, Helmut, to Robert Bosch GmbH. Fuel injection nozzle for internal combustion engines. 5,020,728, Cl 239-533.120.
- Lindig, Markus: *See—*
  - Findeisen, Kurt; Lindig, Markus; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,081. Cl. 71-92.000.
  - Muller, Klaus-Helmut; Kluth, Joachim; Konig, Klaus; Gassen, Karl-Rudolf; Findeisen, Kurt; Lindig, Markus; Lurssen, Klaus; Santel, Hans-Joachim; and Schmidt, Robert R., 5,021,080, Cl. 71-92.000.

- Lindsay, Kevin B.: *See—*
  - Kovacik, Paul J.; Davidson, Charles R.; Lindsay, Kevin B.; Lundberg, Darrel V.; Mulder, Cameron A.; and Boerboom, Everett, 5,021,074, Cl. 65-40.000.
- Lindsay, Robert A., to Unisys Corporation. Reflective binary encoder for vector quantization. 5,021,971, Cl. 364-513.500.
- Lindzus, Claus: *See—*
  - Barfurth, Dieter; Lindzus, Claus; and Nestler, Heinz, 5,021,596, Cl. 556-55.000.
- Link, Helmut F.; and Trautmann, Gunther, to Index-Werke KG. Method and apparatus for machining both sides of workpieces. 5,020,402, Cl. 82-124.000.
- Linz, Alfredo R., to Advanced Micro Devices, Inc. Programmable logic array apparatus. 5,021,690, Cl. 307-465.000.
- Lippey, Barret: *See—*
  - Orler, Anthony J.; Hobrock, Lowell M.; and Lippey, Barret, 5,020,887, Cl. 350-409.000.
- Liquid Carbonic Corporation: *See—*
  - Rhoades, George D.; and Lang, Gary D., 5,020,330, Cl 62-63.000.
- Lisauskas, Robert A.: *See—*
  - Khinkis, Mark J.; Abbasi, Hamid A.; Lisauskas, Robert A.; and Itse, Daniel C., 5,020,456, Cl. 110-345.000.
- Lishman, Fred W. Moisture sensitive self-watering planter. 5,020,261, Cl. 47-79.000.
- Liston, Sergay D., to Eaton-Kenway, Inc. Mast to base connection for a storage and retrieval machine. 5,020,957, Cl. 414-279.000.
- Litton Systems, Inc.: *See—*
  - Pavlath, George A., 5,020,912, Cl. 356-350.000.
- Liu, Jack. Pistol lighter 5,020,989, Cl. 431-125.000.
- Liu, Wan-Tien. Vertical type smokeless exhauster. 5,020,511, Cl. 126-299 00R.
- Lizell, Magnus B., to Monroe Auto Equipment Company. Method and apparatus for absorbing mechanical shock. 5,020,825, Cl. 280-707.000.
- Llerena, Laurent; and Loiselay, Michel, to Telemecanique. Composable protection and control apparatus for motors. 5,021,722, Cl. 318-434.000.
- Lo, Hsi-Chuan. Apparatus for killing insects. 5,020,270, Cl. 43-112.000.
- Loane, R. Joel Ski exercising apparatus. 5,020,793, Cl. 272-97.000
- Lock, Robert P.: *See—*
  - Godfrey, Leslie K.; and Lock, Robert P., 5,022,012, Cl. 367-3.000.
- Locker, Claus-Dieter: *See—*
  - Karagoz, Sadi; Hribernik, Bruno; Stamberger, Johann; Puber, Josef, Jeglitsch, Franz; Fischmeister, Hellmut; Matzer, Franz. Locker, Claus-Dieter; Kudielka, Elfriede; and Jager, Heimo, 5,021,085, Cl. 75-239.000.
- Lockett, Stephen. Laundry chute. 5,020,651, Cl. 193-25.00R.
- Lockhart, John C., Jr., to United States of America, Navy. Lock means and TV sync for air-to-surface missile. 5,022,079, Cl. 380-14.000.
- Lockheed Missiles & Space Company, Inc.: *See—*
  - Mercado, Romeo I.; and Robb, Paul N., 5,020,889, Cl. 350-463.000.
- Lockwood Graders (UK) Limited: *See—*
  - Cowlin, Simon; Clark, Leslie; Dennis, Timothy; and Gunawardena, Charith, 5,020,675, Cl. 209-538.000.
- Lockwood, Harry F.; Stern, Margaret B.; Tabasky, Marvin; and Cataldo, Victor, to Laboratories Incorporated. Method of selectively producing conductive members on a semiconductor surface. 5,021,363, Cl. 437-200.000.
- Loctite Corporation: *See—*
  - Klemarczyk, Philip, 5,021,487, Cl. 524-104.000.
- Loctite (Ireland) Ltd.: *See—*
  - Woods, John G.; and Rooney, John M., 5,021,512, Cl. 525-328.200.
- Loevinger, Richard P. Tank car discharge valve heating unit. 5,020,447, Cl. 105-451.000.
- Logan, Karl P., to One Way Out, Inc. Key safe apparatus. 5,020,347, Cl. 70-389.000.
- Logman, Timothy M.: *See—*
  - Floren, Carl E.; Weller, Mike; and Logman, Timothy M., 5,020,934, Cl. 403-306.000.
- Loiselay, Michel: *See—*
  - Llerena, Laurent; and Loiselay, Michel, 5,021,722, Cl. 318-434.000.
- Lombard, Etienne: *See—*
  - Kersten, Jean; Lombard, Etienne; and Heindrichs, Daniel, 5,020,162, Cl. 2-164.000.
- Long, Richard J.: *See—*
  - Aileo, Jackson A.; and Long, Richard J., 5,020,163, Cl 2-209.000.
- Longhini, Debra M.: *See—*
  - Wilson, Craig A.; Olson, Kurt G ; Koren, Jeffrey G.; Longhini, Debra M.; Dugan, Carol S.; and Jozwiak, Edward L., Jr., 5,021,135, Cl. 204-180.800.
- Longobardi, Maria G : *See—*
  - Cardinali, Franco; Longobardi, Maria G ; Viscomi, Giuseppe C.; and Ziggiotti, Alessandra, 5,021,600, Cl. 556-411.000.
- Lorbiecki, John E.: *See—*
  - Stone, Barry N.; Rice, Richard C.; Lorbiecki, John E.; and Bernstein, Stanley, 5,021,978, Cl. 364-525.000.
- Lord, Carter K. Exhaust powered waste processing unit. 5,020,321. Cl. 60-317.000.
- L'Oreal: *See—*
  - Grollier, Jean F., 5,021,067, Cl. 8-409.000.
  - Guerret, Jean-Louis, 5,020,551, Cl. 132-200.000.
- Los, Marinus, to American Cyanamid Company. 2-(2-imidazolin-2-yl)pyridines and quinolines, process and intermediates for the preparation thereof, and use of said compounds as herbicidal agents. 5,021,078, Cl. 71-66.000.
- Loth, Eric; and Walder, Pierre-Alain, to ETA SA Fabriques d'Ebauches. Method of manufacture of a copper watch case 5,021,101, Cl. 148-11.50C.
- Lothrop, John R.: *See—*
  - Forson, Henry M.; Lothrop, John R.; O'Dell, Thomas M.; and Overmyer, Rick L., 5,022,070, Cl. 379-32.000.
- Louis A. Grant, Inc.: *See—*
  - Grant, Louis A., Jr., 5,020,183, Cl. 15-246.500.
- Louisiana State University: *See—*
  - Portier, Ralph J., 5,021,088, Cl. 75-736.000.
- Lowery, Richard E.: *See—*
  - Maholland, Michael K.; Fu, Chia-Min; Lowery, Richard E.; Bertus, Brent J.; and Kubicek, Donald H., 5,021,377, Cl. 502-26.000.
- Lowrey, Tyler A ; Durcan, Dermot M.; Doan, Trung T.; Haller, Gordon A.; and Tuttle, Mark E., to Micron Technology, Inc. Split-polysilicon CMOS process incorporating self-aligned silicidation of conductive regions. 5,021,353, Cl. 437-34.000.
- Lozier, Antony J.: *See—*
  - Hayes, S. Kyle; Meyers, John E.; and Lozier, Antony J., 5,020,519, Cl. 128-69.000.
- LSI Logic Corporation: *See—*
  - Poenisch, Paul; and Hansen, Keith, 5,021,980, Cl 364-557.000.
- Lu, Jieh-Shan. Nipple assembly with alarm buzzer and body temperature indicator (II). 5,021,060, Cl. 606-234.000.
- Lu, Neng-hsing: *See—*
  - Bahu, Suryadevara V.; Lu, Neng-hsing; and Nilsen, Carl-Otto, 5,021,138, Cl. 204-298.330.
- Lu, Nicky C.: *See—*
  - Dhong, Sang H., Hwang, Wei; and Lu, Nicky C., 5,021,355, Cl. 437-35.000.
- Lucas, Charles E. Crane hook latch with sliding lock bar 5,020,843, Cl 294-82.210.
- Lucas Duraltih Corporation: *See—*
  - Nopper, Leroy N.; Miller, Meryl E., and Lichte, James L., 5,021,638, Cl. 235-145.00R.
- Lucas industries PLC: *See—*
  - Askew, James M. A., 5,020,979, Cl. 417-499.000.
- Lucas, Timothy S. Standing wave compressor 5,020,977, Cl. 417-322.000.
- Lucas Weinschel Inc.: *See—*
  - Ramirez, Ronald A., 5,021,001, Cl. 439-349.000.
- Luderschmidt, Wolfgang: *See—*
  - Jentsch, Gunter, 5,021,182, Cl. 252-102.000.
- Ludwig, David C.; and Penkunas, Joseph J., to GTE Products Corporation. Method for removal of paraffin wax based binders from green articles. 5,021,208, Cl. 264-344.000.
- Lugosi, Laszlo G.: *See—*
  - Eilowitz, Mark S.; Vataru, Marcel; Bayler, James L.; Labus, Rainer H.; and Lugosi, Laszlo G., 5,021,152, Cl. 210-712.000.
- Luich, Thomas M.: *See—*
  - Pickett, Scott K.; Luich, Thomas M.; and Swift, Arthur L., IV, 5,021,689, Cl. 307-465.000.
- Lundberg, Darrel V.: *See—*
  - Kovacik, Paul J.; Davidson, Charles R.; Lindsay, Kevin B.; Lundberg, Darrel V.; Mulder, Cameron A ; and Boerboom, Everett, 5,021,074, Cl. 65-40.000.
- Lundstedt, Kurt H.: *See—*
  - Grome, Donald C.; Lundstedt, Kurt H., and Olson, William, 5,020,189, Cl. 16-286.000.
- Lunn, Garfield R., to Arvid Machine Tools Ltd Rotary shaft and lubricating system therefor. 5,020,635, Cl. 184-6.180
- Luo, Shiuh J.: *See—*
  - Bunick, Frank J.; Luo, Shiuh J.; Shaw, James J ; and Hellman. Stephen R., 5,021,249, Cl. 426-96.000.
- Lurssen, Klaus: *See—*
  - Muller, Klaus-Helmut; Kluth, Joachim; Konig, Klaus; Gassen, Karl-Rudolf; Findeisen, Kurt; Lindig, Markus; Lurssen, Klaus; Santel, Hans-Joachim; and Schmidt, Robert R., 5,021,080, Cl 71-92.000.
- Luther, Lars C.: *See—*
  - Brandle, Charles D., Jr.; Fratello, Vincent J.; Luther, Lars C.; and Slusky, Susan E. G., 5,021,302, Cl. 428-692.000.
- Lutz, David W. Apparatus for loading and unloading objects. 5,020,382, Cl. 74-89.200.
- Luydkx, Leon A.; Jackman, Joseph R.; Robison, James W., Jr.; and Young, James H., to Reactive Metals and Alloys Corporation. Iron desulfurization additive and method for introduction into hot metal. 5,021,086, Cl. 75-315.000.
- Lyerly, Jeffrey B.: *See—*
  - Droge, David A.; Lyerly, Jeffrey B.; Mott, William E.; Whitehead, Lance W.; and Yenik, Matthew G., 5,020,789, Cl. 271-225.000.
- Lyon, Leland H.; and Eggeling, Richard L., to Ingersoll-Rand Company. Removable filter fluid flow shutoff apparatus. 5,020,610, Cl 175-135.000.
- Lysenko, Zenon, to Dow Chemical Company, The. Polybenzoxazoles having pendant methyl groups. 5,021,580, Cl 546-337.000.
- M J. Vine Enterprises Pty. Ltd.: *See—*
  - Vine, Martin B., 5,020,352, Cl. 72-84.000.
- Maass, Jurgen; and Meyer, Helmut, to Heidelberger Druckmaschinen AG. Opto-electronic bachometer and position detector of an electric motor. 5,021,735, Cl. 324-175.000.
- Mabee, Brian, to Automotive Products (USA) Inc. Diagnostics for electronic transmission control system. 5,021,764, Cl. 340-439.000.
- Macchiarulo, Vincenzo; Robecchi, Edoardo; and Ruffini, Alberto, to Pirelli Trasmissioni Industriali S.p.A. Tensioning device for flexible driving belts. 5,021,032, Cl 474-138.000.

VOL
1127
ISS
1
JE
4
1991
UMI

MacDonald, Donald J.; Miller, James A.; and Eagles, Derek M., to Deere & Company. Charge flow priority circuit. 5,020,324, Cl. 60-430.000.

Macey, Christopher L., to Dresser Industries, Inc. Dead-burned magnesite and magnesia-alumina spinel refractory composition. 5,021,374, Cl. 501-120.000.

MacGregor, Douglas B.; Zolnowsky, John; and Mothersole, David, to Motorola, Inc. Coprocessor instruction format. 5,021,991, Cl. 364-900.000.

Machado, Joseph M.; and George, Eric R., to Shell Oil Company. Filled polyketone blend. 5,021,496, Cl. 524-417.000.

Machart, Beverly H.: *See—*

  Hernandez, Irene H.; and Machart, Beverly H., 5,021,973, Cl. 364-518.000.

Machin, David; Naik, Appaya; Buytenhek, Cornelis; and van de Pas, Johannes C., to Lever Brothers Company. Structured aqueous detergent compositions containing salting-out electrolytes and surfactants and methods of forming them. 5,021,195, Cl. 252-545.000.

Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus; and Manz, Albrecht, to Hoechst Aktiengesellschaft. Process for enhancing the electrostatic chargeability of powder coatings or powders, and the use thereof for surface-coating solid objects. 5,021,473, Cl. 523-451.000.

MacKay, Spencer L.: *See—*

  Nesterick, Elaine M.; Reynolds, Robert W.; MacKay, Spencer L.; and Graham, Cleve A., 5,020,624, Cl. 180-210.000.

Mackey, Edward R. Pressurized cork-removal apparatus for wine bottles and other containers. 5,020,395, Cl. 81-3.200.

Macklin, Arnold D.: *See—*

  Miles, Larry N.; Drinnen, Cecil A.; Hackler, David W.; Bogart, Tom L.; Macklin, Arnold D.; Sharpsteen, Ben E.; Hyles, Truett M.; and Stephens, Herschel M., 5,020,714, Cl. 228-15.100.

MacLean, William C., Jr.: *See—*

  Borschel, Marlene W.; Benson, John D.; Breen, Merle D.; MacLean, William C., Jr.; Ponder, Debra L.; Strickland, Alan D.; and Treem, William R., 5,021,245, Cl. 426-2.000.

MacMillan Bloedel Limited: *See—*

  Miller, George B.; and Sanderson, John G., 5,020,243, Cl. 34-119.000.

Madden, Sandra L.; Beschle, Mark D.; and Martin, Roy C., to GTE Products Corporation. Quartz lamp envelope with molybdenum foil having oxidation-resistant surface formed by ion implantation. 5,021,711, Cl. 313-623.000.

Mader, Helmut: *See—*

  Reuss, Helmut; Mucke, Bruno; Mader, Helmut; and Rockser, Dieter, 5,021,336, Cl. 430-608.000.

Maebo, Kunji; and Hirabayashi, Shigeru, to Ishikawajima-Harima Heavy Industries Co., Ltd. Fluidized-bed combustion furnace. 5,020,451, Cl. 110-189.000.

Maeda, Ken-ichi: *See—*

  Matoba, Tsukasa; Aikawa, Takeshi; Okamura, Mitsuyoshi; Maeda, Ken-ichi; and Saito, Mitsuo, 5,021,993, Cl. 364-900.000.

Maeda, Mitsuru; Kodama, Tohru; Asami, Sumio; Amano, Norihide; Kusumi, Takaaki; and Hosono, Hidekazu, to Suntory Limited. 2-pyranone derivative and process for production thereof. 5,021,406, Cl. 514-99.000.

Maeda, Tetsuya; Yamamoto, Toshiyuki; Takase, Mituo; Sasaki, Kazuya; Airka, Tadashi; Yokoo, Mamoru; Hashimoto, Rieko; Amemiya, Kouji; and Koshikawa, Sakae, to Kaken Pharmaceutical Co., Ltd. Amine derivatives and fungicides containing the same. 5,021,458, Cl. 514-655.000.

Maeda, Yoshiaki: *See—*

  Kawasaki, Masahiro; Ohbuchi, Yukio; Maeda, Yoshiaki; and Sato, Susumu, 5,021,534, Cl. 528-60.000.

Maeda, Yuji, to Agency of Industrial Science and Technology; and Ministry of International Trade & Industry. Wire guide apparatus for wire-driven mechanism. 5,020,388, Cl. 74-479.000.

Maehara, Toshifumi, to Akebono Brake Industry Co., Ltd.; and Akebono Research Development Centre Ltd. Traction control system. 5,020,623, Cl. 180-197.000.

Maekawa, Kazuteru: *See—*

  Sakai, Satoshi; and Maekawa, Kazuteru, 5,020,903, Cl. 356-28.000.

Magara, Takuji; and Suzuki, Toshio, to Mitsubishi Denki Kabushiki Kaisha. Wire cut electrical discharge machine. 5,021,622, Cl. 219-69.120.

Magee, Lochlan E.: *See—*

  King, Stephen J.; and Magee, Lochlan E., 5,021,772, Cl. 340-724.000.

Mager, Herbert: *See—*

  Aeby, Johann; Mager, Herbert; and Konrad, Eugen, 5,021,066, Cl. 8-408.000.

Magnier, Claude: *See—*

  David, Claire; and Magnier, Claude, 5,021,192, Cl. 252-313.100.

Magnon, Gary D.: *See—*

  Candelora, Andrew M.; Nolan, Kevin F.; Magnon, Gary D.; and Seymour, Raymond K., 5,021,819, Cl. 335-15.000.

Magoun, George F.: *See—*

  Burroway, Gary L.; Magoun, George F.; and Gujarathi, Ramesh N., 5,021,381, Cl. 502-117.000.

Mahler, Hansjurg: *See—*

  Genahr, Rudolf; and Mahler, Hansjurg, 5,021,766, Cl. 340-544.000.

Maholland, Michael K.; Fu, Chia-Min; Lowery, Richard E.; Bertus, Brent J.; and Kubicek, Donald H., to Phillips Petroleum Company. Demetallization and passivation of spent cracking catalysts. 5,021,377, Cl. 502-26.000.

Mahoney, Michael R.; Nieman, Wayne H.; McDowell, Douglas J.; and Krapil, Virginia, to Baxter International Inc. Exhalation valve for respiratory circuit. 5,020,532, Cl. 128-205.240.

Mahulikar, Deepak: *See—*

  Winter, Joseph; Mahulikar, Deepak; and Mandigo, Frank N., 5,020,439, Cl. 102-518.000.

Maki-Rahkola, Jari; Kononen, Juhani; and Surakka, Jorma, to Insinooritoimisto Pesmel Oy. Transfer car. 5,020,961, Cl. 414-495.000

Maki, Ronald L. Static electricity discharge suppressor. 5,021,918, Cl. 361-216.000.

Makita Electric Works, Ltd.: *See—*

  Sasaki, Katsuhiko; and Higuchi, Hisashi, 5,020,406, Cl. 83-397.000.

Makow, David M. Electro-optic animated displays and indicators. 5,020,882, Cl. 350-335.000.

Malecki, Richard L.; Irick, W. T.; and Dowler, Robert L., to Navistar International Transportation Corp. Engine overspeed sensing and readout. 5,020,361, Cl. 73-118.100.

Malin, Richard A.: *See—*

  Riley, Gilbert N.; Holodnak, Richard S.; and Malin, Richard A., 5,020,429, Cl. 101-93.000.

Malleron, Jean-Luc: *See—*

  Comte, Marie-Therese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, 5,021,420, Cl. 514-253.000.

Mallinckrodt, Inc.: *See—*

  Mertens, John, 5,021,220, Cl. 424-1.100.

  Pipes, David W., 5,021,235, Cl. 424-1.100.

Malmgren, Robert C.; Cipra, Jan; and Umlauf, Edward L., to International Soil Systems, Inc. Animal running surface. 5,020,936, Cl. 404-32.000.

Malpass, Gerald D., Jr., to Exxon Chemical Patents Inc. Diene activated ziegler transition metal catalyst components for ethylene polymerization. 5,021,382, Cl. 502-117.000.

Manaka, Toshio; and Shida, Masami, to Hitachi, Ltd. Combustion fault detection apparatus and control system for internal combustion engine. 5,021,960, Cl. 364-431.010.

Mandigo, Frank N.: *See—*

  Winter, Joseph; Mahulikar, Deepak; and Mandigo, Frank N., 5,020,439, Cl. 102-518.000.

Manitt, Philip J.; Thomas, Vincent F.; and McAllister, William J., to Grumman Aerospace Corporation. Wind tunnel model positioning device. 5,020,364, Cl. 73-147.000.

Mann, Donaerl B.; and Baras, David, to D'Mannco, Inc. Inflatable hand splint. 5,020,515, Cl. 128-26.000.

Mannesmann AG: *See—*

  Wurl, Ernst; Hafner, Alfred; Paulsen, Jurgen; Marienfeld, Peter; and Grogor, Bruno, 5,020,914, Cl. 366-79.000.

Manning, W. Paul, Jr.: *See—*

  Akerley, Arnold J.; and Manning, W. Paul, Jr., 5,020,660, Cl. 206-45.140.

Mansingh, Vivek, to Hewlett-Packard Company. Air-cooled heat exchanger for electronic circuit modules. 5,020,586, Cl. 165-80.300.

Manville Corporation: *See—*

  Schuster, Richard L., 5,020,668, Cl. 206-427.000.

Manz, Albrecht: *See—*

  Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus; and Manz, Albrecht, 5,021,473, Cl. 523-451.000.

Mao, Simon J. T.: *See—*

  Robinson, Keith M.; Mao, Simon J. T.; Parker, Roger A.; and Jackson, Richard L., 5,021,461, Cl. 514-731.000.

Marcelius, Peter, to Buffers AB. Automatic locking system. 5,020,947, Cl. 410-70.000.

Marco, Leslie S., to Illinois Tool Works Inc. Carrier stock with tear-open tabs. 5,020,661, Cl. 206-150.000.

Margrif Design Corporation: *See—*

  Marsden, John, 5,020,956, Cl. 414-138.100.

Marienfeld, Peter: *See—*

  Wurl, Ernst; Hafner, Alfred; Paulsen, Jurgen; Marienfeld, Peter; and Grogor, Bruno, 5,020,914, Cl. 366-79.000.

Marion, Laura E. Bicycle seat. 5,020,852, Cl. 297-200.000.

Marotta Scientific Controls, Inc.: *See—*

  Tartaglia, Peter A.; Collins, Richard B.; and Smolen, Robert S., 5,020,571, Cl. 137-625.300.

Marovskis, Harijs B.: *See—*

  Peterman, Thomas H.; Anderson, David L.; Hakansson, Jan; and Marovskis, Harijs B., 5,020,304, Cl. 53-458.000.

Marriott, Arthur R., to Physio-Control Corporation. Apparatus for sensing lead and transthoracic impedances. 5,020,541, Cl. 128-723.000.

Marsden, John, to Margrif Design Corporation. Open hopper barge unloading system. 5,020,956, Cl. 414-138.100.

Martin, Christopher V. Electric motor powered skateboard with integral brakes. 5,020,621, Cl. 180-181.000.

Martin, Glenn E.: *See—*

  Laugal, James A.; Martin, Glenn E.; St. Aubin, Donald L.; and Wold, Gerald G., 5,021,470, Cl. 523-414.000.

Martin, James A.: *See—*

  Viscovich, Paul W.; and Martin, James A., 5,020,589, Cl. 165-112.000.

Martin, Joel L.: *See—*

  Martin, Shirley J.; McDaniel, Max P.; Conroy, Brian K.; and Martin, Joel L., 5,021,379, Cl. 502-102.000.

Martin, John, to Arachnid, Inc. Multiple target electronic dart game. 5,020,806, Cl. 273-371.000.

Martin Marietta Corporation: *See—*

  Zeigler, Henry J.; and Frisinger, Bruce L., 5,020,952, Cl. 411-113.000.

Martin, Randall W.: *See—*

  Davis, Myron F.; Martin, Randall W.; Nomura, Hideo; Pollitt, Richard F.; Wittner, Ernest; and Yoshikawa, Wataru, 5,021,922, Cl. 361-380.000.

Martin, Ronald L., to Honeywell Inc. Layout device for wall mounted item. 5,020,235, Cl. 33-668.000.

Martin, Roy C.: *See—*

  Madden, Sandra L.; Beschle, Mark D.; and Martin, Roy C., 5,021,711, Cl. 313-623.000.

Martin, Shirley J.; McDaniel, Max P.; Conroy, Brian K.; and Martin, Joel L., to Phillips Petroleum Company. Olefin polymerization. 5,021,379, Cl. 502-102.000.

Martin-Smith, Michael, to Allen & Hansburys Limited. Pharmacologically active aminoalkylphenyl compounds and their use. 5,021,429, Cl. 514-331.000.

Martinetto, Cosimo *See—*

  Pell, Donald M., and Martinetto, Cosimo, 5,020,534, Cl. 128-207.150.

Martino, Gary T.; and Nowak, Frank A., Jr., to National Starch and Chemical Investment Holding Corporation. Water-based two-phase aerosol hairsprays. 5,021,238, Cl. 424-47.000.

Maruta, Syuzi, to Minolta Camera Kabushiki Kaisha. Electrophotographic copying machine having a function of judging whether a copying operation can be performed responsive to a remainder amount of consumptive parts or materials. 5,021,826, Cl. 355-205.000.

Maruyama, Nobuyuki: *See—*

  Sawaragi, Yoshiatsu; and Maruyama, Nobuyuki, 5,021,215, Cl. 420-584.100.

Maruyama, Sinpei: *See—*

  Nishizawa, Jun-ichi; Tamamushi, Takashige; Mitamura, Koichi; Takahashi, Hiroo; Mitsui, Kiyoo; Ikehara, Mitsuo; Wako, Toyota; and Maruyama, Sinpei, 5,021,936, Cl. 363-41.000.

Masai, Naruhito; Enomoto, Masao; Kojima, Atsuyuki; Masumori, Hiroaki; Hara, Nobuyuki; Hara, Youichi; and Morooka, Shigeaki, to Sumitomo Pharmaceuticals Company, Limited. Certain pyridylthiazolidin-4-one having anti-ulcer activity. 5,021,435, Cl 514-342.000.

Masaki, Hiroya: *See—*

  Matsubara, Akitoshi; Takahashi, Jiro, Takagiwa, Hiroyuki; and Masaki, Hiroya, 5,021,317, Cl. 430-110.000.

Masaki, Yasuo; and Hori, Kimitoshi, to Minolta Camera Kabushiki Kaisha. Digital image processing apparatus for correctly addressing image memory. 5,022,090, Cl. 382-49.000

Mase, Masahiro; Sakagami, Seiji; Okawada, Takeshi, Ueda, Shinjiroo; Awada, Yoshihisa; and Nagaoka, Takashi, to Hitachi, Ltd. Turbo vacuum pump. 5,020,969, Cl. 415-55.300.

Mashiko, Koichiro, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor neural network and method of driving the same. 5,021,988, Cl 364-807.000.

Mashino, Keiichi, to Hitachi, Ltd Method and apparatus for controlling power generation in internal combustion engines 5,020,491, Cl 123-192.00R.

Mashino, Keiichi, to Hitachi, Ltd Electric power supply system for motor vehicle. 5,021,727, Cl. 322-7.000.

Masiulis, Joseph, to Motorola, Inc. Passive temperature compensation scheme for microstrip antennas. 5,021,795, Cl. 343-700.0MS.

Mason, Jeffrey S.: *See—*

  Lewis, Milton A., Jr.; Mason, Jeffrey S., Swinford, Carson B., and Wiseman, Timothy R., Sr., 5,020,161, Cl. 2-164.000.

Massachusetts Institute of Technology: *See—*

  Schreiber, William F., 5,021,882, Cl. 358-141.000.

Mastenbroek, Barend. *See—*

  Gautier, Pieter A.; Geuze, Maarten M., Mastenbroek, Barend; and Petrus, Leonardus, 5,021,547, Cl. 528-392.000.

Masuda, Hiroaki. *See—*

  Tochinai, Chiaki; Kohara, Tadanao; Budo, Sadayoshi, Masuda, Hiroaki; and Yoshida, Takayoshi, 5,021,499, Cl. 524-487.000.

Masuda, Takeshi: *See—*

  Sawa, Natsuo; Masuda, Takeshi, Miura, Shozo; Kano, Naoki; Kamagata, Kazuo; and Ito, Masayuki, 5,021,584, Cl. 548-335.000.

Masuda, Toshihiko: *See—*

  Ueki, Massaaki; Masuda, Toshihiko, and Kanai, Takashi, 5,021,788, Cl. 341-152.000.

Masuda, Yoshihisa: *See—*

  Tsurunaga, Kazuyuki; Masuda, Yoshihisa; Okumura, Hiroyuki; and Ito, Daisuke, 5,021,914, Cl. 361-19.000.

Masumori, Hiroaki: *See—*

  Masai, Naruhito; Enomoto, Masao; Kojima, Atsuyuki; Masumori, Hiroaki; Hara, Nobuyuki; Hara, Youichi; and Morooka, Shigeaki, 5,021,435, Cl. 514-342.000.

Masumoto, Mitsuhiko; Kanayama, Satoshi; Asoh, Toshiaki; and Kawahigashi, Teruo, to Mitsubishi Gas Chemical Co., Ltd. Polycarbonate resin from bis(hydroxy benzoyl oxy-tetra oxa spiro) cpd. 5,021,541, Cl. 528-196.000.

Masurekar, Prakash S.: *See—*

  Giacobbe, Robert A.; Tkacz, Jan S.; Masurekar, Prakash S.; Kaplan, Louis; and Sosa, Margaret S., 5,021,341, Cl. 435-71.100.

  Sesin, David F.; Liesch, Jerrold M.; Fountoulakis, Jimmy M.; Masurekar, Prakash S.; Kaplan, Louis; and Wichmann, Carol F., 5,021,403, Cl. 514-9.000.

Masutani, Koji, to Jeol Ltd. Time-resolved infrared spectrophotometer. 5,021,661, Cl. 250-339.000.

Mathew, Jacob, to Petrolite Corporation. Synthesis of N,3,4-trisubstituted-3-azoline-2-ones. 5,021,587, Cl. 548-543.000.

Mathur, Mahendra P.; Fu, Yuan C.; Ekmann, James M.; and Boyle, John M., to United States of America, Energy. Destruction of acid gas emissions. 5,020,457, Cl. 110-345.000.

Matoba, Tsukasa; Aikawa, Takeshi; Okamura, Mitsuyoshi; Maeda, Ken-ichi; and Saito, Mitsuo, to Kabushiki Kaisha Toshiba. Device for saving and restoring register information. 5,021,993, Cl. 364-900.000.

Matsubara, Akitoshi; Takahashi, Jiro; Takagiwa, Hiroyuki; and Masaki, Hiroya, to Konica Corporation. Electrostatic latent image developer with toner particles surface treated with a polysiloxane having ammonium salt functional groups. 5,021,317, Cl. 430-110.000.

Matsubara, Kenichi: *See—*

  Sakamoto, Kiyoaki; Matsubara, Kenichi; Nakahara, Yasuhiro; and Nomura, Masaki, 5,021,162, Cl. 210-635.000

Matsuda, Hiroshi; Kawada, Haruki; Sakai, Kunihiro; Takimoto, Kiyoshi; Kawade, Hisaaki; Yanagisawa, Yoshihiro; and Morikawa, Yuko, to Canon Kabushiki Kaisha. Light modulating device with optical switching unit of laminated insulating and conductive layers. 5,020,881, Cl. 350-333.000.

Matsuda, Keiichi: *See—*

  Trada, Atsusuke; Amemiya, Yoshiya; Matsuda, Keiichi; and Oshima, Takeshi, 5,021,444, Cl. 514-397.000.

Matsuda, Yoshio: *See—*

  Arimoto, Kazutami; Matsuda, Yoshio; Ooishi, Tsukasa; Tsukude, Masaki; and Fujishima, Kazuyasu, 5,022,007, Cl. 365-201.000.

Matsui, Fumio; and Murata, Yasushi, to Pioneer Electronic Corporation. Lenticular luminescent screen. 5,021,931, Cl. 362-84.000.

Matsumoto, Koichi: *See—*

  Sakakibara, Kenzou; Yoshida, Tarehiro; and Matsumoto, Koichi, 5,022,072, Cl. 379-100.000.

Matsumoto, Masafumi: *See—*

  Yamaguchi, Junichi; Takahashi, Izumi, and Matsumoto, Masafumi, 5,021,828, Cl. 355-209.000.

Matsumoto, Takayuki: *See—*

  Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, 5,021,877, Cl. 358-75.000.

Matsumura, Koji: *See—*

  Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji. 5,021,877, Cl. 358-75.000.

Matsuo, Shuji: *See—*

  Akiyama, Takaaki; Matsuo, Shuji, Fujii, Masahiro; Kurose, Mitsukazu; Nakamura, Osamu; and Kamijo, Masahiro, 5,020,928, Cl 400-193.000.

Matsuoka, Noriyuki, to Yamaichi Electric Mfg. Co., Ltd. IC carrier 5,021,868, Cl. 357-74.000.

Matsushita Electric Industrial Co., Ltd.: *See—*

  Nakagawa, Fujio; and Wada, Masami, 5,020,211, Cl. 29-596.000.

  Nakatsuno, Eiji; Himeno, Yasunori; Ebata, Yasuhiko; and Nagano, Masatosi. 5,020,332, Cl. 62-157.000.

  Oshima, Mitsuaki; Izaki, Masataka; Kajino, Jirou; Igarashi, Yoshiaki; and Mitani, Hiroshi, 5,020,890, Cl. 350-500.000.

  Takahashi, Kenichiroh; Harao, Noriyuki; and Tanoue, Hiromi, 5,021,700, Cl. 310-316.000.

  Tomita, Yoshihiro; Takayama, Ryoichi; Ogawa, Hisahito; Nomura, Koji; Asayama, Junko; and Abe, Atsushi, 5,021,660, Cl 250-338.300.

  Yoshino, Tadashi; Yamaguchi, Susumu; Komae, Hitoshi; Ishiwata, Tetsuo; Yamauchi, Eiji, and Tanaka, Hiroshi, 5,021,897, Cl. 360-72.200.

Matsushita Electronics Corporation: *See—*

  Uesawa, Kaoru; and Abe, Yoshio, 5,021,713, Cl. 315-39.510.

Matsushita, Tetsuya: *See—*

  Sawada, Shinichi; Matsushita, Tetsuya; Isoyama, Toyoshiro; and Saito, Hideo, 5,021,189, Cl. 252-299.610.

Matsuura, Tooru; Kawamura, Mitsuyoshi, and Narita, Yoshinori, to NGK Spark Plug Co., Ltd. Hollow heat-resisting body assembly for internal combustion engine. 5,020,319 Cl. 60-321.000.

Matsuzawa, Soichiro: *See—*

  Aronoff, Michael I.; Matsuzawa, Soichiro; and Terada, Nobuhiro, 5,020,213, Cl. 29-603.000.

Mattel, Inc.: *See—*

  Danielian, Armen, 5,021,929, Cl. 362-32.000.

Matthews, Carl S. Bucket for excavating beneath buried utility lines 5,020,249, Cl. 37-103.000.

Matthies, Hans J., to Gebrueder Welger GmbH & Co. KG. Method and a device for producing highly compressed cylindrical bales from loose stalk material. 5,020,311, Cl. 56-432.000

Matuschek, Wolfgang: *See—*

  Cao, Chi-Thuan; Erban, Andreas; Janetzke, Helmut; Cordes, Henning; Schulz, Alfred; and Matuschek, Wolfgang, 5,020,501, Cl. 123-489.000.

Matuz, Judit: *See—*

  Fodor, Tamas; Fischer, Janos; Dobay, Laszlo; Trischler, Ferenc; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Szporny, Laszlo; and Hajos, Gyorgy, 5,021,597, Cl. 556-69.000.

Matzener, Jorg. Breakdown signal device. 5,020,466, Cl. 116-63.00P

Matzer, Franz: *See—*

  Karagoz, Sadi; Hribernik, Bruno; Stamberger, Johann; Puber, Josef; Jeglitsch, Franz; Fischmeister, Hellmut; Matzer, Franz; Locker, Claus-Dieter; Kudielka, Elfriede; and Jager, Heimo, 5,021,085, Cl. 75-239.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Mauntel, Richard W.: *See—*
  - Pfiester, John R.; and Mauntel, Richard W., 5,021,849, Cl. 357-23.500.
- Maurinus, Martin A.; and Koenig, Norbert, to Eastman Kodak Company. Recycleable element recycle counter and method. 5,021,811, Cl. 354-76.000.
- Mauser-Werke GmbH: *See—*
  - Kalb, Alfred, 5,020,839, Cl. 292-256.690.
- Mauser-Werke Obernourf GmbH. *See—*
  - Schwarz, Volker; and Mayer, Manfred, 5,020,229, Cl. 33-199.00R.
- Maximilian Janser: *See—*
  - Michelberger, Stefan, 5,020,458, Cl. 112-7.000.
- May, A. D.; and Stephan, G. Laser device, including control of polarization mode. 5,022,034, Cl. 372-26.000.
- May, Dennis J.: *See—*
  - Evans, Alfred J.; Chen, Grant K.; May, Dennis J.; and Brinson, Edward P., 5,020,298, Cl. 53-138.200.
- Maya, Jakob; Michael, Joseph D.; and Lagushenko, Radomir, to GTE Products Corporation. Negative glow discharge lamp. 5,021,718, Cl. 315-358.000.
- Mayer, Manfred: *See—*
  - Schwarz, Volker; and Mayer, Manfred, 5,020,229, Cl. 33-199.00R.
- Mayer, Wolfgang; Sturm, wolfram; Fissmann, Hans-Joachim; Kotitschke, Gerhard; Zurn, Georg; Kade, Werner; and Kugler, Georg, to J. M. Voith GmbH. Guide roll for a porous belt. 5,020,242, Cl. 34-115.000.
- Mayo, James D.; Drappel, Stephen; Duff, James M.; Croucher, Melvin D.; and Lennon, John M., to Xerox Corporation. Process for forming secure images. 5,021,318, Cl. 430-124.000.
- Mayr, Robert S. Hot water tank bracket assembly. 5,020,760, Cl. 248-313.000.
- Mayska, Paul J.; Eckhardt, Volker; Freitag, Dieter; and Idel, Karsten-Josef, to Bayer Aktiengesellschaft. Process for the production of bifunctional OH-terminated polyphenylene oxides with dipolar aprotic solvent. 5,021,543, Cl. 528-217.000.
- Mazda Motor Corporation: *See—*
  - Iida, Katsumi; Sakurai, Yoshihiko; Takano, Akihiko; Yamaguchi, Hideo; and Yano, Teruaki, 5,020,424, Cl. 98-2.010.
  - Kanazawa, Hirotaka; Ohmura, Hiroshi; Tomoda, Atsuo; Furuzawa, Akihiro; Nakashima, Takashi; and Hideshima, Masao, 5,020,619, Cl. 180-140.000.
  - Kiba, Hiroshi; and Akeno, Hajime, 5,020,472, Cl. 118-668.000.
  - Tashima, Seiji; Okimoto, Haruo; and Akagi, Toshimichi, 5,020,327, Cl. 60-600.000.
  - Yoshimura, Hiroshi; Takemoto, Kazuo; and Yamada, Toshihiro, 5,021,956, Cl. 364-424.100.
- McAllister, William J.: *See—*
  - Manitt, Philip J.; Thomas, Vincent F.; and McAllister, William J., 5,020,364, Cl. 73-147.000.
- McArthur, Malcolm J., to Sundstrand Corporation. Emergency power unit oxidizing gas bottle heating apparatus. 5,020,317, Cl. 60-39.511
- MCC Development, Ltd.: *See—*
  - Morrison, Gordon E.; Brooks, Christopher B.; and Gluck, Frederick G., 5,021,945, Cl. 364-200.000.
- McCarthy, Christopher E.: *See—*
  - Bliss, Terry L.; Chupka, David E.; McCarthy, Christopher E.; and Walters, Larry J., 5,021,159, Cl. 210-396.000
- McCarthy, Paul: *See—*
  - Dragon, Thomas; Hylan, John; Reynolds, Robert; McCarthy, Paul; Merchant, Paul; and Berkoben, Kenneth, 5,021,676, Cl. 250-561.000.
- McCartney, Michael S.: *See—*
  - Hellewell, Todd D.; Grusha, John; and McCartney, Michael S., 5,020,454, Cl. 110-264.000.
- McCarty, John P.: *See—*
  - Glover, Larry A.; McCarty, John P.; and Burris, Donald J., deceased, 5,020,892, Cl. 350-537.000.
- McCaughan, Leon: *See—*
  - DuPuy, Richard E.; Liebenrood, John D.; and McCaughan, Leon, 5,020,872, Cl. 350-96.140.
- McDaniel, Max P.: *See—*
  - Martin, Shirley J.; McDaniel, Max P.; Conroy, Brian K.; and Martin, Joel L., 5,021,379, Cl. 502-102.000.
- McDonald, Ian A.: *See—*
  - Palfreyman, Michael G.; Bey, Philippe; and McDonald, Ian A., 5,021,456, Cl. 514-649.000.
- McDonnell Douglas Corporation: *See—*
  - Murphy, Kenny P., 5,020,884, Cl. 350-354.000.
- McDowell, Douglas J.: *See—*
  - Mahoney, Michael R.; Nieman, Wayne H.; McDowell, Douglas J.; and Kranil, Virginia, 5,020,532, Cl. 128-205.240.
- McFarland, Glenn E., to Alco Industries, Inc. Stacking pipe protector. 5,020,676, Cl. 211-59.400.
- McFarlin, William B.: *See—*
  - Muench, Frank J.; and McFarlin, William B., 5,021,615, Cl. 200-11.0TC.
- McGarry, Frederick J., to Dow Chemical Company, The. Method of coating fibers with metal or ceramic material. 5,021,258, Cl. 427-35.000.
- McGould, Mary C.: *See—*
  - Archie, Kent C.; Fonorow, Owen R.; McGould, Mary C.; McLear, Robert E., III, Read, Edward C.; Schaefer, Edwin M., III; Schwab, Suzanne E.; and Wodarz, Dennis, 5,021,997, Cl. 364-900.000.
- McGraw, Philip W., to Dow Chemical Company, The. Polyglycol lubricants for refrigeration compressors. 5,021,180, Cl. 252-68.000.
- McIlwraith, George, to Gichner Systems Group, Inc. Enclosure for housing electronic components. 5,020,866, Cl. 312-265.400.
- McKee, Charles S. Method for relieving headaches and apparatus for practicing the same. 5,021,058, Cl. 606-204.000.
- McKenna, Ronald J.; Keller, David J.; and Bibeau, Lauren S., to Borden, Inc. Process for preserving lemon juice utilizating a non-sulfite preservative. 5,021,251, Cl. 426-330.500.
- McLain, Stephan J.: *See—*
  - Druliner, Joe D.; Horowitz, Harold S.; McLain, Stephan J., and Sleight, Arthur W., 5,021,395, Cl. 505-1.000.
- McLane, John A.; and Uskokovic, Milan R., to Hoffman-La Roche Inc. Method for inhibiting hyperproliferative diseases. 5,021,451, Cl 514-460.000.
- McLear, Robert E., III: *See—*
  - Archie, Kent C.; Fonorow, Owen R.; McGould, Mary C., McLear, Robert E., III, Read, Edward C.; Schaefer, Edwin M., III, Schwab, Suzanne E.; and Wodarz, Dennis, 5,021,997, Cl 364-900.000.
- McLeod, John: *See—*
  - Hu, Larry; Chuk, Ting; McLeod, John; Birman, Mark, Samuels, Allen; and Chu, George K., 5,021,985, Cl. 364-748.000.
- McLeod, Roderick D. Back pressure plug tool. 5,020,590, Cl 166-77.000.
- McMahan, Robert K., Jr. Dynamic laser speckle profilometer and method. 5,020,904, Cl. 356-35.500.
- McManus, James A. Portable serving and storage cabinet 5,020,867, Cl 312-314.000.
- McMillan, Mark B. Apparatus and method for repairing vehicle heater cores. 5,020,577, Cl. 141-98.000.
- McNeill, Andrew B.: *See—*
  - Bealkowski, Richard; Blackledge, John W., Jr.; Cronk, Doyle S., Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G.; Kovach, George D.; McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., 5,022,077, Cl. 380-4.000.
- McNew, Quinton B.: *See—*
  - Edwards, John W.; Harper, Daniel R.; and McNew, Quinton B., 5,020,865, Cl. 305-35.0EB.
- McQuillen, Albert L., Jr.; McQuillen, Michael; and McQuillen, Mark, to Serusteel, Inc. Stationary top plate for a sliding gate valve and method of manufacture thereof. 5,020,703, Cl. 222-590.000.
- McQuillen, Mark: *See—*
  - McQuillen, Albert L., Jr.; McQuillen, Michael; and McQuillen, Mark, 5,020,703, Cl. 222-590.000.
- McQuillen, Michael: *See—*
  - McQuillen, Albert L., Jr.; McQuillen, Michael, and McQuillen, Mark, 5,020,703, Cl. 222-590.000.
- Mead Corporation, The: *See—*
  - Moor, Marc L., 5,020,828, Cl. 281-29.000.
- Meade, Roger; Schofield, Paul; and Wright, Michael C., to Almex Control Systems Limited. Ticket issuing machines. 5,021,984, Cl 364-709.160.
- Meade, Shelby J.: *See—*
  - Mongia, Manmohan, and Meade, Shelby J., 5,020,587, Cl 165-82.000.
- Meadowside Pty. Ltd.: *See—*
  - Cawte, Daniel C., 5,020,435, Cl. 102-275.100.
- Meanwell, Nicholas A., to Bristol-Myers Squibb Co. Triazine carboxylic acids and esters. 5,021,415, Cl. 514-242.000.
- Mease, Ronnie C.; and Srivastava, Suresh C., to Associated Universities, Inc. Cyclohexyl EDTA monoanhydride. 5,021,571, Cl 544-166.000.
- Measurex Corporation: *See—*
  - Boissevain, Mathew G.; Boissevain, Tobias J.; and Foskett, Anthony D., 5,020,469, Cl. 118-67.000.
- Mechanical Technology Incorporated: *See—*
  - Kralick, James H., 5,021,697, Cl. 310-90.500.
- Meckl, Heinz, Reuter, Karl-Heinz; and Tromnau, Rudolf, to Agfa Gevaert Aktiengesellschaft. Process for rapidly processing a color photography material 5,021,326, Cl. 430-399.000.
- Medtronic, Inc.: *See—*
  - Buckholtz, Dwight A., 5,021,048, Cl. 604-151.000.
- Meier, Kurt: *See—*
  - Bienert, Horst; Hirschberger, August; Schleicher, Bernd, Igel, Richard; and Meier, Kurt, 5,020,850, Cl. 296-223.000.
- Meier, Marc: *See—*
  - Hunkeler, Walter; Kyburz, Emilio; and Meier, Marc, 5,021,411, Cl 514-220.000.
- Meisner, Richard P.: *See—*
  - Sweet, David H.; Greenberg, Charles E.; Lappos, Nicholas D.; Walsh, David M.; and Meisner, Richard P., 5,020,316, Cl 60-39.282.
- Meki, Naoto; Nishida, Kazue; and Imahase, Tomotoshi, to Sumitomo Chemical Company. Pyrazole compounds, insecticidal and acaricidal compositions and use. 5,021,446, Cl. 514-407.000.
- Mele, Antonio: *See—*
  - Toma, Salvatore; De Bue, Marina; Mele, Antonio; and Grandi, Guido, 5,021,340, Cl. 435-69.100.
- Mellor, Bernadette L., administratrix: *See—*
  - Bush, Mike; Hatton, Norman; and Mellor, Keith, deceased, 5,020,648, Cl. 192-46.000.
- Mellor, Keith, deceased: *See—*
  - Bush, Mike; Hatton, Norman; and Mellor, Keith, deceased, 5,020,648, Cl. 192-46.000.
- Melman, Paul; Elman, Boris S.; Koteles, Emil S.; and Jagannath, Chirravuri, to GTE Laboratories Incorporated. Method of farbicating highly lattice mismatched quantum well structures. 5,021,360, Cl. 437-81.000.

- Mentelos, Richard A.: *See—*
  - Biondi, James W.; and Mentelos, Richard A., 5,020,516, Cl. 128-30.200.
- Mercado, Romeo I.; and Robb, Paul N., to Lockheed Missiles & Space Company, Inc. Color-corrected optical systems. 5,020,889, Cl. 350-463.000.
- Merchant, Paul: *See—*
  - Dragon, Thomas; Hylan, John; Reynolds, Robert; McCarthy, Paul; Merchant, Paul; and Berkoben, Kenneth, 5,021,676, Cl. 250-561.000.
- Merck & Co., Inc.: *See—*
  - Baldwin, John J.; Eilon, Gabriel F.; Friedman, Paul A.; and Remy, David C., 5,021,426, Cl. 514-313.000.
  - Christensen, Burton G.; and Ratcliff, Ronald W., 5,021,566, Cl. 540-302.000.
  - Giacobbe, Robert A.; Tkacz, Jan S.; Masurekar, Prakash S.; Kaplan, Louis; and Sosa, Margaret S., 5,021,341, Cl. 435-71.100.
  - Giesa, Paula A.; Hilleman, Maurice R.; and Provost, Philip J., 5,021,348, Cl. 435-237.000.
  - Joshua, Henry; Wilson, Kenneth E.; Schwartz, Michael S.; Lee, Ta J.; and Stokker, Gerald E., 5,021,453, Cl. 514-510.000.
  - King, Anthony O.; Anderson, Robert K.; Shuman, Richard E.; and Weinstock, Leonard M., 5,021,575, Cl. 546-77.000.
  - Ratcliffe, Ronald W.; and Woods, Mary F., 5,021,565, Cl. 540-302.000.
  - Remy, David C.; Baldwin, John J.; Claremon, David A.; and King, Stella W., 5,021,440, Cl. 514-381.000.
  - Sesin, David F.; Liesch, Jerrold M.; Fountoulakis, Jimmy M., Masurekar, Prakash S.; Kaplan, Louis; and Wichmann, Carol F., 5,021,403, Cl. 514-9.000.
- Merck Frosst Canada, Inc.: *See—*
  - Guindon, Yvan; Yoakim, Christiane; Gillard, John W.; and Girard, Yves, 5,021,447, Cl. 514-411.000.
- Meredith, Michael D., to Kamyr, Inc. Extended delignification in pressure diffusers. 5,021,127, Cl. 162-237.000.
- Meredith, Michael D.: *See—*
  - Phillips, Joseph R.; Weston, John D.; and Meredith, Michael D., 5,021,125, Cl. 162-232.000.
- Merrell Dow Pharmaceuticals Inc.: *See—*
  - Carr, Albert A.; and Wiech, Norbert L., 5,021,428, Cl. 514-317.000
  - Palfreyman, Michael G.; Bey, Philippe; and McDonald, Ian A., 5,021,456, Cl. 514-649.000.
  - Robinson, Keith M.; Mao, Simon J. T.; Parker, Roger A.; and Jackson, Richard L., 5,021,461, Cl. 514-731.000.
- Merritt, Terry: *See—*
  - Edmundson, Paul G.; and Merritt, Terry, 5,020,629, Cl. 181-136.000.
- Mersman, Wesley D.: *See—*
  - Lindberg, Kenneth M.; Spykerman, David J.; George, Philip C.; and Mersman, Wesley D., 5,020,855, Cl. 297-391.000.
- Mertens, John, to Mallinckrodt, Inc. Kit for preparing radiodiagnostic examination compositions. 5,021,220, Cl. 424-1.100.
- Messerschmitt-Boelkow-Blohm GmbH: *See—*
  - Rieger, Ulrich; and Kalus, Dieter, 5,020,437, Cl. 102-489.000.
- Mestek, Inc.: *See—*
  - Hill, James R., 5,020,423, Cl. 98-1.000.
- Meszaros, William A. Hand supported berry receptacle. 5,020,710, Cl. 224-219.000.
- Metricor, Inc.: *See—*
  - Saaski, Elric W.; and Lawrence, Dale M., 5,021,731, Cl. 324-96.000.
- Metz, Francois: *See—*
  - Frances, Jean-marc; and Metz, Francois, 5,021,601, Cl. 556-436.000.
- Metzger, Willi; Schmitz, Manfred; and Schmidt, Karl-Jurgen, to Blasberg-Oberflachentechnik GmbH. Aqueous acidic solutions for the electrodeposition of tin and lead/tin alloys. 5,021,130, Cl. 204-44.400.
- Meunier, Jean-Christophe: *See—*
  - Gamand, Patrice; and Meunier, Jean-Christophe, 5,021,759, Cl. 333-246.000.
- Meyer, Helmut: *See—*
  - Maass, Jurgen; and Meyer, Helmut, 5,021,735, Cl. 324-175.000.
- Meyer, Lee G.; and Cavaliere, Gerald F., to Carbon Fuels Corporation. Method of refining coal by short residence time partial liquefaction to produce petroleum substitutes and chemical feedstocks. 5,021,148, Cl. 208-431.000.
- Meyers, John E.: *See—*
  - Hayes, S. Kyle; Meyers, John E.; and Lozier, Antony J., 5,020,519, Cl. 128-69.000.
- Michael, Joseph D.: *See—*
  - Maya, Jakob; Michael, Joseph D.; and Lagushenko, Radomir, 5,021,718, Cl. 315-358.000.
- Michel, Aime, to Inventio AG. Method of, and apparatus for, absorbing vibrations in cars of high-speed elevators. 5,020,639, Cl. 187-1.00R.
- Michelberger, Stefan, to Maximilian Janser. Sewing machine, particularly for edging or hemming materials. 5,020,458, Cl. 112-7.000.
- Michijima, Masashi; Kadono, Masaru; and Yamamoto, Tatsushi, to Sharp Corporation. Method of manufacturing a magnetic head. 5,020,212, Cl. 29-603.000.
- Michny, Robert S., to National Refrigeration Products, Inc. Refrigerant reclamation system. 5,020,331, Cl. 62-77.000.
- Micich, Robert G.: *See—*
  - Kornely, Michael G., Jr.; Holmes, Douglas; and Micich, Robert G., 5,021,741, Cl. 328-227.000.
- Microelectronics & Computer Technology Corp.: *See—*
  - Hsu, Hsyh-Min; and Yee, Ian Y. K., 5,021,399, Cl. 505-1.000.
  - Wexelblat, Alan D.; and Fairchild, Kim M., 5,021,976, Cl. 364-521.000.
- Micron Technology, Inc.: *See—*
  - Kelly, Douglas M.; Parkinson, Ward D.; and Allen, Timothy J., 5,021,864, Cl. 357-70.000.
  - Lowrey, Tyler A.; Durcan, Dermot M., Doan, Trung T.; Haller, Gordon A.; and Tuttle, Mark E., 5,021,353, Cl. 437-34.000.
  - Tuttle, Mark E., 5,020,283, Cl. 51-209.0DL.
- Microsoft Corporation: *See—*
  - Pisculli, Anthony C.; Moore, Walter C.; and Myrvold, Nathan P., 5,021,974, Cl. 364-518.000.
- Midland Manufacturing Corp.: *See—*
  - White, John J., 5,020,367, Cl. 73-319.000.
- Midori, Co. Ltd.: *See—*
  - Aida, Masaaki, 5,020,662, Cl. 206-214.000.
- Mignani, Gerard; Ardaud, Pierre; and Trichon, Roger, to Rhone-Poulenc Chimie. Low carbon/high purity boron nitride. 5,021,371, Cl. 501-96.000.
- Mignani, Serge: *See—*
  - Comte, Marie-Iherese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, 5,021,420, Cl. 514-253.000.
- Mijac, Marko D.: *See—*
  - Guffey, Timothy B.; Boatman, Donn N.; Abe, Susan S.; Talkington, Sherry R.; and Mijac, Marko D., 5,021,256, Cl. 426-601.000.
- Mikami, Takashi: *See—*
  - Fujita, Yuuji; Sezume, Tadashi; Kitano, Kitsusho; Narukawa, Kiyotada; Mikami, Takashi; Kawamura, Tetsuya, Sato, Shigeru; Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao, 5,021,504, Cl. 525-57.000.
- Mikitenko, Paul: *See—*
  - Franckowiak, Sigismond; Mikitenko, Paul; Baumgartner, Pierre; and Cohen, Georges, 5,021,143, Cl. 208-70.000.
- Milberger, Lionel J., to Vetcogray Inc. Latch ring for connecting tubular members. 5,020,593, Cl. 166-208.000.
- Miles, Inc.: *See—*
  - Albarella, James P.; and Lin, Nan-Horng, 5,021,586, Cl. 548-527.000.
- Miles, Larry N.; Drinnen, Cecil A.; Hackler, David W.; Bogart, Tom L.; Macklin, Arnold D.; Sharpsteen, Ben E.; Hyles, Truett M.; and Stephens, Herschel M., to Boeing Company, The. Method and press apparatus for manufacturing. 5,020,714, Cl. 228-15.100.
- Milgram, Joseph B., Jr.; and Hungerford, P. Clark, Jr., to Aexcel Corporation. Labeling machine. 5,021,116, Cl. 156-475.000.
- Miller, Cecilia B., administratrix: *See—*
  - Hart, LeRoy; and Miller, Theodore H., deceased, 5,020,343, Cl. 70-143.000.
- Miller, George B.; and Sanderson, John G., to MacMillan Bloedel Limited. Dryer syphon. 5,020,243, Cl 34-119.000.
- Miller, J. C.: *See—*
  - Dussourd, Jules L.; Singh, Pawan J.; and Miller, J. C., 5,020,970, Cl. 415-115.000.
- Miller, James A.: *See—*
  - Knepp, James E.; Welsh, Robert E.; Miller, James A.; and Miller, Raymond, 5,020,350, Cl. 72-45.000.
  - MacDonald, Donald J.; Miller, James A.; and Eagles, Derek M., 5,020,324, Cl. 60-430.000.
- Miller, LeRoy: *See—*
  - Thorud, Stanley R.; and Miller, LeRoy, 5,020,674, Cl. 206-600.000.
- Miller, Meryl E.: *See—*
  - Nopper, Leroy N.; Miller, Meryl E.; and Lichte, James L., 5,021,638, Cl. 235-145.00R.
- Miller, Norbert: *See—*
  - Jundt, Werner; Miller, Norbert; and Sommer, Rainer, 5,021,959, Cl. 364-431.050.
- Miller, Raymond: *See—*
  - Knepp, James E.; Welsh, Robert E.; Miller, James A.; and Miller, Raymond, 5,020,350, Cl. 72-45.000.
- Miller, Stephen H.: *See—*
  - Pagano, Daniel M.; and Miller, Stephen H., 5,021,816, Cl. 354-275.000.
- Miller, Steven M.; and Bales, Daniel A., to United Technologies Corporation. Integrated brazing fixture for brazing titanium. 5,020,716, Cl. 228-212.000.
- Miller, Theodore H., deceased: *See—*
  - Hart, LeRoy; and Miller, Theodore H., deceased, 5,020,343, Cl. 70-143.000.
- Miller, Warren C. Inhalation therapy device. 5,020,530, Cl. 128-203.280.
- Miller, William C.: *See—*
  - Anderson, Charles E.; and Miller, William C., 5,021,776, Cl. 340-825.310.
- Millicom Incorporated: *See—*
  - Hughes, Fred P., 5,022,067, Cl. 379-95.000.
- Mimasaka, Masahiro; and Hirai, Hiroyuki, to Dainippon Screen Mfg. Co., Ltd. Apparatus for treating a wafer surface. 5,020,200, Cl. 29-25.010.
- Mimura, Noritaka, to Nihon Biso Co., Ltd. Window-pane cleaning device. 5,020,180, Cl. 15-103.000.
- Mine Safety Appliances Company: *See—*
  - Kunze, Harry A., 5,020,193, Cl. 24-323.000.
- Minegishi, Takeshi; Takabatake, Kiyotugu; and Asobe, Kunio, to NHK Spring Co., Ltd. Cushion material and method of manufacturing the same. 5,021,286, Cl. 428-198.000.
- Ministry of International Trade & Industry: *See—*
  - Maeda, Yuji, 5,020,388, Cl. 74-479.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Minn, James, to Hercules Incorporated. Sodium hydroxymethane sulfonate to improve the color stability of rosin resins. 5,021,548, Cl. 530-216.000.
- Minnesota Mining and Manufacturing Company: *See—*
  - Garbe, James E.; and Mitra, Smarajit, 5,021,477, Cl. 424-70.000
  - Swenson, Douglas A., 5,021,111, Cl. 156-264.000.
  - Vogelgesang, Peter J., 5,022,018, Cl. 369-13.000.
- Minnesota Scientific, Inc.: *See—*
  - LeVahn, Bruce A., 5,020,195, Cl. 24-514.000.
- Minnick, Larry A., to Eastman Kodak Company. Polyester molding composition having improved flame resistant. 5,021,495, Cl 524-410.000.
- Mino, Kouichi: *See—*
  - Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, 5,021,877, Cl. 358-75.000.
- Minoda, Takeshi; Todo, Akira; Kimura, Toshio; and Kurishu, Masayoshi, to Mitsui Petrochemical Industries, Ltd. Process for producing magnetic hub. 5,020,207, Cl. 29-527.400.
- Minolta Camera Kabushiki Kaisha: *See—*
  - Fukushima, Shigenobu, 5,021,832, Cl. 355-218.000.
  - Higashi, Masato; and Murasaki, Sadanobu, 5,021,824, Cl. 355-72.000.
  - Iida, Takashi; Kiten, Hiroshi; Ishii, Toru; and Tsukamoto, Takeya, 5,021,875, Cl. 358-29.00C
  - Maruta, Syuzi, 5,021,826, Cl. 355-205.000.
  - Masaki, Yasuo; and Hori, Kimitoshi, 5,022,090, Cl. 382-49.000.
  - Morikawa, Takeshi, 5,021,822, Cl 355-69.000.
  - Nozawa, Masaru; Imaseki, Chiharu; and Inagaki, Kazuyuki, 5,021,804, Cl. 346-76.0PH.
  - Treadway, Patrick P., 5,020,448, Cl. 108-42.000.
- Minuto, Paul G. Wrench. 5,020,397, Cl. 81-58.100.
- Mirenna, Luigi: *See—*
  - Colle, Roberto; Camaggi, Giovanni; Ratti, Giuseppina; Garavaglia, Carlo; and Mirenna, Luigi, 5,021,442, Cl. 514-383.000.
- Missler, Leonard R.: *See—*
  - Ross, Monte; Peterson, Mark L.; and Missler, Leonard R., 5,021,961, Cl. 364-443.000.
- Mistry, Kaizad R., to Digital Equipment Corporation. N-channel clamp for ESD protection in self-aligned silicided CMOS process. 5,021,853, Cl. 357-23.130.
- Mita Industrial Co., Ltd.: *See—*
  - Hatano, Masaru; and Sugiyama, Tsukasa, 5,020,788, Cl. 271-126.000.
- Mitamura, Koichi: *See—*
  - Nishizawa, Jun-ichi; Tamamushi, Takashige; Mitamura, Koichi, Takahashi, Hiroo; Mitsui, Kiyoo; Ikehara, Mitsuo; Wako, Toyota; and Maruyama, Sinpei, 5,021,936, Cl. 363-41.000.
- Mitani, Hiroshi: *See—*
  - Oshima, Mitsuaki; Izaki, Masataka; Kajino, Jirou; Igarashi, Yoshiaki; and Mitani, Hiroshi, 5,020,890, Cl. 350-500.000.
- Mitani, Ikujiro: *See—*
  - Kawanami, Norihide; Kobayashi, Fumio; and Mitani, Ikujiro, 5,021,011, Cl. 439-582.000.
- Mitchell, Robert L.; and Rhodes, Frank R., Jr., to Applied Ceramics, Inc. Porous cordierite compositions with improved thermal expansion characteristics. 5,021,373, Cl. 501-119.000.
- Mitel Corporation: *See—*
  - Colbeck, Roger; and Gillingham, Peter, 5,021,681, Cl. 307-261.000.
- Mito, Nobuaki: *See—*
  - Arai, Kenji; Mito, Nobuaki; Morita, Kouichi; and Hirata, Naonori, 5,021,579, Cl. 546-302.000.
- Mitra, Smarajit: *See—*
  - Garbe, James E.; and Mitra, Smarajit, 5,021,477, Cl. 424-70.000.
- Mitsubishi Denki Kabushika Kaisha: *See—*
  - Kihara, Yuji, 5,021.685, Cl. 307-443.000.
- Mitsubishi Denki K.K.: *See—*
  - Banzai, Masato; Shibata, Yoshio; and Suzuki, Toshio, 5,021,623, Cl. 219-69.120.
  - Yagi, Tadashi; Noguchi, Masahiko; Kozuka, Hajime; Morishita, Mitsuharu; and Onishi, Masayoshi, 5,020,616, Cl. 180-79.100.
- Mitsubishi Denki Kabushiki Kaisha: *See—*
  - Arimoto, Kazutami; Matsuda, Yoshio; Ooishi, Tsukasa; Tsukude, Masaki; and Fujishima, Kazuyasu, 5,022,007, Cl. 365-201.000.
  - Ebihara, Sachiko; and Fukushima, Yasuhiko, 5,021,733, Cl 324-158.00F.
  - Hasegawa, Kazuyoshi, 5,022,035, Cl. 372-36.000.
  - Ishihara, Takashi; Sasaki, Hajime; and Aiga, Masao, 5,021,100, Cl 136-249.000.
  - Kohda, Kenji; Toyama, Tsuyoshi; Ando, Nobuaki; Noguchi, Kenji; and Kobayashi, Shinichi, 5,021,999, Cl. 365-168.000.
  - Magara, Takuji; and Suzuki, Toshio, 5,021,622, Cl. 219-69.120.
  - Mashiko, Koichiro, 5,021,988, Cl. 364-807.000.
  - Morimoto, Takao; and Nakanishi, Yasuyuki, 5,021,908, Cl. 360-107.000.
  - Motoyoshi, Takeo; and Tanaka, Katsufusa, 5,022,019, Cl. 369-36.000.
  - Ozawa, Masayuki, 5,020,506, Cl. 123-631.000.
  - Takahashi, Yoshiharu; and Osaka, Shuichi, 5,021,865, Cl. 357-70.000.
  - Tanaka, Toshio, 5,020,474, Cl. 118-725.000.
  - Terada, Yasushi; Nakayama, Takeshi; and Kobayashi, Kazuo, 5,022,009, Cl. 365-210.000.
  - Tsuji, Shintaro, 5,020,642, Cl. 187-124.000.
  - Wataze, Manabu; and Sakayori, Takao, 5,021,844, Cl. 357-23.300.
- Mitsubishi Gas Chemical Company, Inc. *See—*
  - Takeda, Mutsuhiko; Mizukami, Masamichi; Norisue, Yasumasa, Hagiwara, Isao; and Zaima, Fumiya, 5,021,197, Cl. 260-399.000
- Mitsuhishi Gas Chemical Co., Ltd.: *See—*
  - Masumoto, Mitsuhiko; Kanayama, Satoshi; Asoh, Toshiaki, and Kawahigashi, Teruo, 5,021,541, Cl. 528-196.000.
- Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
  - Miwa, Yoshiyuki; Kodama, Hiroshi; Murasugi, Skinya, Shikae, Sadao; Nakagawa, Masaya, and Kabumoto, Tsutomu, 5,020,842, Cl. 294-2.000.
- Mitsubishi Kasei Corporation: *See—*
  - Hatano, Masakatsu; Murayama, Masayoshi; Shima, Kenji; and Ito, Masumi, 5,021,384, Cl. 502-209.000.
  - Wada, Keisuke; Hara, Yoshinori; and Sasaki, Koushi, 5,021.589, Cl 549-325.000.
- Mitsui, Kiyoo: *See—*
  - Nishizawa, Jun-ichi; Tamamushi, Takashige; Mitamura, Koichi, Takahashi, Hiroo; Mitsui, Kiyoo; Ikehara, Mitsuo, Wako, Toyota; and Maruyama, Sinpei, 5,021,936, Cl 363-41.000
- Mitsui Petrochemical Industries, Ltd.: *See—*
  - Minoda, Takeshi; Todo, Akira; Kimura, Toshio; and Kurishu, Masayoshi, 5,020,207, Cl. 29-527.400.
  - Ohe, Tatsuya; and Fujimura, Mitsuaki, 5,021,285, Cl. 428-195.000
- Mitsui Toatsu Chemicals, Inc.: *See—*
  - Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki, Miura, Tohru; Kanemura, Yoshinobu, and Sasagawa, Katsuyoshi, 5,021,503, Cl. 524-706.000.
  - Nakaya, Michihiko; Fukushi, Yukiharu; Kodaka, Kenji, Ooka, Masayuki; Shiraishi, Shirou; Nakamura, Masahiko; and Numata, Satoshi, 5,021,412, Cl. 514-223.800
- Mitsuno, Shiro: *See—*
  - Ishikawa, Toshikatsu, Teranishi, Haruo; Ichikawa, Hiroshi, and Mitsuno, Shiro, 5,021,370, Cl. 501-95.000.
- Miura, Shozo: *See—*
  - Sawa, Natsuo; Masuda, Takeshi; Miura, Shozo; Kano, Naoki, Kamagata, Kazuo; and Ito, Masayuki. 5,021,584, Cl. 548-335.000.
- Miura, Tohru: *See—*
  - Nagata, Teruyuki, Okazaki, Koju; Kajimoto, Nobuyuki, Miura, Tohru; Kanemura, Yoshinohu; and Sasagawa, Katsuyoshi, 5,021,503, Cl. 524-706.000.
- Miwa, Kishio; Fukui, Hiroaki; and Noma, Fumiaki, to Toray Industries, Inc. Electroconductive integrated substrate and process for producing the same. 5,021,284, Cl. 428-166.000.
- Miwa, Yoshiyuki; Kodama, Hiroshi; Murasugi, Skinya; Shikae, Sadao, Nakagawa, Masaya; and Kabumoto, Tsutomu, to Waseda University, and Mitsubishi Jukogyo Kabushiki Kaisha. Instrument for inoculating bulb scales. 5,020,842, Cl. 294-2.000.
- Miyahara, Hideaki: *See—*
  - Hara, Junichiro; and Miyahara, Hideaki, 5,021,639, Cl. 235-379.000.
- Miyake, Sanae; Kasai, Masaaki; Yamazaki, Sakae; and Murashita, Takato, to Terumo Kabushiki Kaisha. Device for opening film-like closure. 5,020,220, Cl. 30-2.000.
- Miyamoto, Goro: *See—*
  - Takeda, Tatsuoki; and Miyamoto, Goro, 5,020,886, Cl. 350-409.000
- Miyao, Mayumi: *See—*
  - Tsuruoka, Ichirio; Echigo, Katsuhiro; Mochizuki, Manabu, Kurotori, Tsuneo; Ariyama, Kenzo; Kojima, Kenji; and Miyao, Mayumi, 5,021,834, Cl. 355-256.000.
- Miyashita, Akira: *See—*
  - Nohira, Hiroyuki; Takaya, Hidemasa; and Miyashita, Akira, 5,021,593, Cl. 556-20.000.
- Miyauchi, Nobuyuki: *See—*
  - Kawanishi, Hidenori; Hayashi, Hiroshi; Morimoto, Taiji; Kaneiwa, Shinji; Miyauchi, Nobuyuki, and Yano, Seiki, 5,022,037, Cl 372-49.000.
- Miyazaki, Toshimasa; Uzawa, Yoji; Okawa, Kazuyoshi; Kawashima, Hiroshi; Moriya, Kazumasa; Murakawa, Yoshitaka; Kumagai, Toshimitsu; Nakamura, Akihiro; Itoh, Motohiko; and Kashiwazaki, Tomoyuki, to Fujitsu Limited. Linear motor car system. 5,021,695, Cl. 310-12.000.
- Miyazawa, Kazutoshi: *See—*
  - Saito, Shinichi, Ushioda, Makoto; Inoue, Hiromichi; Miyazawa, Kazutoshi; and Ohno, Kouji, 5,021,191, Cl. 252-299.610.
- Miyoshi, Motosuke; and Okumura, Katsuya, to Kabushiki Kaisha Toshiba. Electron beam apparatus including a plurality of ion pump blocks. 5,021,702, Cl. 313-7.000.
- Miyoshi, Tadahiko: *See—*
  - Tsuruoka, Shigeo; Takahashi, Ken; Miyoshi, Tadahiko; and Tokuda, Hiroatsu, 5,020,214, Cl. 29-611.000.
- Mizia, Franco; Rivetti, Franco; and Romano, Ugo, to Enichem Synthesis SpA. Process for producing N-alkyl-carhamates. 5,021,590, Cl. 549-438.000.
- Mizuishi, Koji: *See—*
  - Iwasaki, Atsushi; Mizuishi, Koji; and Oda, Michiaki, 5,020,775, Cl. 251-215.000.
- Mizukami, Masamichi: *See—*
  - Takeda, Mutsuhiko; Mizukami, Masamichi; Norisue, Yasumasa, Hagiwara, Isao; and Zaima, Fumiya, 5,021,197, Cl. 260-399.000.
- Mizuno, Toshiya: *See—*
  - Iizuka, Yo; Kashiwadate, Ken; Endo, Shunzo; Hosokawa, Toshio; Katto, Takayuki; Mizuno, Toshiya; and Katase, Kenichi, 5,021,523, Cl. 525-537.000.
- Mizunuma, Susumu: *See—*
  - Suzuki, Ryoichi; Kondo, Hiroyuki; and Mizunuma, Susumu, 5,020,509, Cl. 126-263.000.

- Mizusawa, Kenichi: *See—*
  - Ota, Masanori; Aoki, Masafumi; Nakamura, Masashi; Mizusawa, Kenichi; and Kasahara, Kumi, 5,021,186, Cl. 252-186.350.
- Mizuta, Tatsuji: *See—*
  - Kono, Masanao; Hasegawa, Yoshihiro; Nishi, Yasutaka; Irie, Hisao; Mizuta, Tatsuji; and Ohara, Shinsuke, 5,021,269, Cl. 427-436.000
- Mizutani, Yasukazu: *See—*
  - Ubukata, Susumu; Mizutani, Yasukazu; and Shibata, Shigekazu, 5,021,618, Cl. 200-61.470.
- Moberg, Clifford A. Combination of mold and alloy core pin. 5,020,770, Cl. 249-111.000.
- Mobil Oil Corporation: *See—*
  - Bortz, Robert W.; Garwood, William E., Le, Quang N.; and Wong, Stephen S., 5,021,142, Cl. 208-58.000.
  - Chen, Catherine S. H.; and Rodewald, Paul G., 5,021,178, Cl. 252-52.00R.
  - Chin, Arthur A., 5,021,146, Cl. 208-122.000.
  - Herrington, Fox J.; and St. Phillips, Eric A., 5,020,194, Cl 24-400.000.
  - Owen, Hartley, 5,021,222, Cl. 422-144.000
  - Rubin, Mae K., 5,021,141, Cl. 208-46.000.
- Mochizuki, Manabu: *See—*
  - Tsuruoka, Ichirio; Echigo, Katsuhiro; Mochizuki, Manabu; Kurotori, Tsuneo; Ariyama, Kenzo; Kojima, Kenji; and Miyao, Mayumi, 5,021,834, Cl. 355-256.000.
- Modular Computer Systems, Inc.: *See—*
  - Korty, Joseph A., 5,021,946, Cl. 364-200.000.
- Mohri, Hidemasa; Tobita, Michiaki; and Ishida, Masahiko, to Taiho Industries Co., Ltd. Overhead projector sheet for printing by thermal transfer printing and method of printing the same. 5,021,272, Cl. 428-40.000.
- Mohri, Shunji; and Ashida, Akira, to Hitachi, Ltd. Method and apparatus for generating and applying common teaching data of robots. 5,021,970, Cl. 364-513.000.
- Molenaar, Ronald N.; and Van der Hoeff, Joseph A. M., to Hoogovens Groep B.V. Shaft furnace. 5,020,992, Cl. 432-248.000.
- Molinaro, John R.; Pawlak, Joseph A.; and Schwartz, Willis T., to Occidental Chemical Corporation. Process for the preparation and recovery of oxydiphthalic anhydrides. 5,021,168, Cl. 549-241.000.
- Moller, Hans C.: *See—*
  - Back-Pedersen, Andreas; Nielsen, Ole B.; and Moller, Hans C., 5,020,375, Cl. 73-861.380.
- Monacelli, Umberto. Pneumatic powered fastener device. 5,020,712, Cl. 227-8.000.
- Monahan, James G. Self-biasing honing tool. 5,020,284, Cl. 51-338.000.
- Mondocea, Ionel; Ullrich, William J.; and Grant, Frederic F., to Eastman Kodak Company. Ferris wheel magnetic tape cassette storage and handling apparatus. 5,021,901, Cl. 360-92.000.
- Monfardini, Alessio; and Grassi, Angelo, to Ortomedical S.r.l. Extrafocal fixing apparatus for transosteal syndesis of strains and compressions in orthopedics and traumatology. 5,021,054, Cl. 606-54.000.
- Mongia, Manmohan; and Meade, Shelby J., to Lennox Industries Inc. Fully floating tube bundle. 5,020,587, Cl. 165-82.000.
- Monroe Auto Equipment Company: *See—*
  - Lizell, Magnus B., 5,020,825, Cl. 280-707.000.
- Monsanto Company: *See—*
  - Fleet, George W. J.; and Bruce, Ian, 5,021,562, Cl. 536-53.000.
- Montague, Peter G., Lagar, Philip A.; and Bainbridge, Peter, to National Starch and Chemical Investment Holding Corporation. Process for the manufacture of polymers. 5,021,525, Cl. 526-210.000.
- Montgomery, Ron L.: *See—*
  - Gwin, Dennis L.; Van Scotter, Keith T.; and Montgomery, Ron L., 5,021,126, Cl. 162-263 000.
- Montreuil, Jean; Spik, Genevieve; Capron, Andre; Dissous, Colette; and Grzych, Jean-Marie. Immunogenic fraction active against bilharzioses, its preparation, and immunizing compositions containing it. 5,021,560, Cl. 536-1.100.
- Mooney Chemicals, Inc.: *See—*
  - Patnaik, Prabodh K.; and Cells, Paul L., 5,021,598, Cl. 556-77.000.
- Moor, Marc L., to Mead Corporation, The. Heat-sealed die cut binder. 5,020,828, Cl. 281-29.000.
- Moore, Walter C.: *See—*
  - Pisculli, Anthony C.; Moore, Walter C.; and Myrvold, Nathan P., 5,021,974, Cl. 364-518.000.
- Moore, William P., to Harmony Products, Inc. High integrity natural nitrogenous granules for agriculture. 5,021,077, Cl. 71-17.000.
- Moore, William P., to Harmony Products, Inc. High integrity natural nitrogenous granules for agriculture. 5,021,247, Cl. 426-69.000.
- Morgan, Alan K.; and Schamburger, Timothy R. Check valve sub. 5,020,611, Cl. 175-215.000.
- Morgan, Barry A., to Transaqua Technology Limited. Security system having detector means sensitive to the proximity of at least one detected object. 5,021,765, Cl. 340-539.000.
- Morgan, Kim: *See—*
  - Haines, Neil R.; and Morgan, Kim, 5,020,295, Cl. 52-630.000.
- Morgan, Nelson H.; and Gevins, Alan S., to SAM Techology, Inc. Low noise magnetoencephalogram system and method. 5,020,538, Cl. 128-653 00R.
- Mori, Chiharu: *See—*
  - Kishida, Toshio; and Mori, Chiharu, 5,021,768, Cl. 340-573.000.
- Mori, Shigeru: *See—*
  - Takarada, Mitsuhiko; Sato, Kazuharu; Yamamoto, Kenji; and Mori, Shigeru, 5,021,091, Cl. 106-287.160.
- Morikawa, Koji, to Fuji Jukogyo Kabushiki Kaisha. Fuel injection control system for a two-cycle engine. 5,020,504, Cl. 123-531.000.
- Morikawa, Takeshi, to Minolta Camera Kabushiki Kaisha. Image scanning apparatus having exposure lamp lighting on at improved timing. 5,021,822, Cl. 355-69.000.
- Morikawa, Yuko: *See—*
  - Matsuda, Hiroshi; Kawada, Haruki; Sakai, Kunihiro; Takimoto, Kiyoshi; Kawade, Hisaaki; Yanagisawa, Yoshihiro; and Morikawa, Yuko, 5,020,881, Cl. 350-333.000.
- Morimoto, Makoto: *See—*
  - Kanda, Yutaka; Arai, Hitoshi; Kasai, Masaji; and Morimoto, Makoto, 5,021,423, Cl. 514-262.000.
- Morimoto, Okihiro: *See—*
  - Ohara, Shinji; Morimoto, Okihiro; and Suemura, Nobumasa, 5,021,497, Cl. 524-436.000.
- Morimoto, Taiji: *See—*
  - Kawanishi, Hidenori; Hayashi, Hiroshi; Morimoto, Taiji; Kaneiwa, Shinji; Miyauchi, Nobuyuki; and Yano, Seiki, 5,022,037, Cl. 372-49.000.
- Morimoto, Takao; and Nakanishi, Yasuyuki, to Mitsubishi Denki Kabushiki Kaisha. Magnetic head component mounting system. 5,021,908, Cl. 360-107.000.
- Morimoto, Yoshihiko, to Fuji Jukogyo Kabushiki Kaisha. Transmission ratio control system for a continuously variable transmission. 5,020,392, Cl. 74-866.000.
- Morinaga, Motoyasu: *See—*
  - Kinoshita, Jun'ichi; Suzuki, Nobuo; Morinaga, Motoyasu; Hirayama, Yuzo; and Nakamura, Masaru, 5,021,361, Cl. 437-129.000.
- Morishita, Mitsuharu: *See—*
  - Yagi, Tadashi; Noguchi, Masahiko; Kozuka, Hajime; Morishita, Mitsuharu; and Onishi, Masayoshi, 5,020,616, Cl. 180-79.100.
- Morita, Akitaka: *See—*
  - Nishimura, Toshio; and Morita, Akitaka, 5,021,952, Cl 364-406.000.
- Morita, Katsuhisa: *See—*
  - Takiyama, Eiichiro; and Morita, Katsuhisa, 5,021,465, Cl. 522-60.000.
- Morita, Kouichi: *See—*
  - Arai, Kenji; Mito, Nobuaki; Morita, Kouichi; and Hirata, Naonori, 5,021,579, Cl. 546-302.000.
- Moritz, Werner; Jud, Volker; and Wisser, Georg, to Kabelschlepp Gesellschaft mit beschrankter Haftung. Guide or feeder chain for guiding power lines. 5,020,313, Cl. 59-78.100.
- Moriya, Kazumasa: *See—*
  - Miyazaki, Toshimasa; Uzawa, Yoji; Okawa, Kazuyoshi; Kawashima, Hiroshi; Moriya, Kazumasa; Murakawa, Yoshitaka; Kumagai, Toshimitsu; Nakamura, Akihiro; Itoh, Motohiko; and Kashiwazaki, Tomoyuki, 5,021,695, Cl. 310-12.000.
- Moriyama, Takashi: *See—*
  - Suesada, Yasuhiko; Moriyama, Takashi; Sugioka, Junichi; and Tahara, Hiroshi, 5,020,479, Cl. 122-235.110.
- Morley, Christopher R.: *See—*
  - Evans, Jack; and Morley, Christopher R., 5,020,765, Cl. 248-539.000.
- Morley, Steven A.: *See—*
  - Paneth, Eric; Handzel, Mark J.; Morley, Steven A.; and Avis, Graham M., 5,022,024, Cl. 370-50.000.
- Morooka, Shigeaki: *See—*
  - Masai, Naruhito; Enomoto, Masao; Kojima, Atsuyuki; Masumori, Hiroaki; Hara, Nobuyuki; Hara, Youichi; and Morooka, Shigeaki, 5,021,435, Cl. 514-342.000.
- Morris, Anthony F.; Naef, Regula; Escher, Sina; and Velluz, Alain, to Firmenich SA. Cyclic ethers and their utilization as perfuming or flavoring ingredients. 5,021,402, Cl. 512-11.000.
- Morris, Francis J., to Texas Instruments Incorporated. Schottky or PN diode with composite sidewall. 5,021,840, Cl. 357-15.000.
- Morrison, Gordon E.; Brooks, Christopher B.; and Gluck, Frederick G., to MCC Development, Ltd. Parallel processor system for processing natural concurrencies and method therefor. 5,021,945, Cl. 364-200.000.
- Morrison, William A.: *See—*
  - Singh, Raj N.; and Morrison, William A., 5,021,367, Cl. 501-88.000.
- Morrow, Robert K., Jr., to United States of America, Air Force. Narrowband/wideband packet data communication system. 5,022,046, Cl. 375-1.000.
- Morten, Richard M.; and Smith, Ted P., to International Business Machines Corporation. Method and apparatus for linking an SNA host to a remote SNA host over a packet switched communications network. 5,021,949, Cl. 364-200.000.
- Morton, Douglas H. Process and apparatus for treating molten aluminum to add hydrogen gas. 5,021,087, Cl. 75-678.000.
- Moser, Winfried: *See—*
  - Brosi, Thomas; Hess, Werner; Moser, Winfried; and Schneider, Hermann, 5,020,360, Cl. 73-115.000.
- Moskwa, Russell M.: *See—*
  - Wolfson, Lawrence S.; Pearl, Kevin A.; and Moskwa, Russell M., 5,020,405, Cl. 83-374.000.
- Mossberg, Alan I. Firearm lock. 5,020,259, Cl. 42-70.110.
- Mothersole, David: *See—*
  - MacGregor, Douglas B.; Zolnowsky, John; and Mothersole, David, 5,021,991, Cl. 364-900.000.
- Motion Control Industries, Inc.: *See—*
  - Redenbarger, Philip D., 5,020,643, Cl. 188-196.00M.
- Motoe, Hisafumi; Kawashima, Hiroyuki; and Tokuhara, Masaharu, to Sony Corporation. Interpolation of scan lines from video signals having interlaced scan lines. 5,021,870, Cl. 358-11.000.

VOL
1127
ISS
1
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1991
UMI

- Motorola, Inc.: *See—*
  - Babin, David C., 5,021,775, Cl. 340-814.000.
  - Chapman, Ronald H., 5,021,753, Cl. 332-103.000.
  - Dunn, William C.; and Langley, Stuart T., 5,020,910, Cl. 356-328.000.
  - Grimes, Thomas, 5,021,943, Cl. 364-200.000.
  - Huynh, Luong T., 5,021,746, Cl. 330-262.000.
  - Kobus, Joseph P.; Kielmeyer, Ronald F., Jr.; and Diaz, Arthur, 5,021,799, Cl. 343-795.000.
  - MacGregor, Douglas B.; Zolnowsky, John; and Mothersole, David, 5,021,991, Cl. 364-900.000.
  - Masiulis, Joseph, 5,021,795, Cl. 343-700.0MS.
  - Pfiester, James R., 5,021,354, Cl. 437-34.000.
  - Pfiester, John R.; and Mauntel, Richard W., 5,021,849, Cl. 357-23.500.
  - Shepherd, Wayne P.; Davis, Darrell E.; and Tay, Wan F., 5,021,754, Cl. 332-128.000.
  - Smith, John M.; and Schuler, Joseph J., 5,021,801, Cl. 343-876.000.
  - Wang, Chih-Fei, 5,022,054, Cl. 375-64.000.
- Motoyoshi, Takeo; and Tanaka, Katsufusa, to Mitsubishi Denki Kabushiki Kaisha. Disk-storage device. 5,022,019, Cl. 369-36.000.
- Mott, William E.: *See—*
  - Droge, David A.; Lyerly, Jeffrey B.; Mott, William E.; Whitehead, Lance W.; and Yenik, Matthew G., 5,020,789, Cl. 271-225.000.
- Mounier-Poulat, Francois; Savoie, Marcel; and Armanet, Raymond, to Renault Vehicules Industriels. Device for mounting a composite material leaf spring. 5,020,824, Cl. 280-686.000.
- Mouri, Akihiro: *See—*
  - Fukui, Tetsuro; Katayama, Masato; Mouri, Akihiro; Isaka, Kazuo; Kagami, Kenji; and Suzuki, Masao, 5,021,321, Cl. 430-201.000.
- Mouri, Toyohiko: *See—*
  - Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 5,020,617, Cl. 180-79.100.
  - Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 5,021,721, Cl. 318-432.000.
- Movern, John B. Restricted use hypodermic syringe. 5,021,047, Cl. 604-110.000.
- Mower, Morton M.: *See—*
  - Dahl, Roger W.; Heil, Ronald W., Jr.; Beatty, Graydon E.; and Mower, Morton M., 5,020,544, Cl. 128-784.000.
- Mower, Vaughn L.: *See—*
  - Abrahamson, Curtis M.; Zscheile, John W., Jr.; and Mower, Vaughn L., 5,022,049, Cl. 375-1.000.
- Mozer, Forrest S.; and Chan, Shiu L. F., to Electronic Speech Systems. Two-way voice & digital data analyzer for telephones. 5,022,071, Cl. 379-93.000.
- MTU Friedrichshafen: *See—*
  - Deutschmann, Herbert, 5,020,482, Cl. 123-41.290.
- Muan, Arnulf; and Najjar, Mitri S., to Texaco Inc. Compositions involving V_2O_3-ZRO_2-TIO_2 . 5,021,386, Cl. 502-248.000.
- Mucke, Bruno: *See—*
  - Reuss, Helmut; Mucke, Bruno; Mader, Helmut; and Rockser, Dieter, 5,021,336, Cl. 430-608.000.
- Muegerl, Gerard J., to Universal Cooperatives, Inc. Anti-lift and anti-twist hinge. 5,020,190, Cl. 16-380.000.
- Mueller Co.: *See—*
  - Floren, Carl E.; Weller, Mike; and Logman, Timothy M., 5,020,934, Cl. 403-306.000.
- Mueller, Werner H.; Khanna, Dinesh N.; and Hupfer, Bernd, to Hoechst Celanese Corporation. Polyamide containing the hexafluoroisopropylidene group with O-quinone diazide in positive working photoresist. 5,021,320, Cl. 430-192.000.
- Muench, Frank J.; and McFarlin, William B., to Cooper Power Systems, Inc. On/off loadbreak switch. 5,021,615, Cl. 200-11.0TC.
- Mugnier, Jacques: *See—*
  - Jung, Gerard; Mugnier, Jacques; Dommergues, Yvon; and Diem, Hoang G., 5,021,350, Cl. 435-243.000.
- Mukai, Hiromichi; Horii, Hajime; Tsujikawa, Muneo; Kawabe, Haruhide, Arimura, Hirofumi; and Suyama, Tadakazu, to Green Cross Corporation. Yeast promoter truncated GAP-DH. 5,021,339, Cl. 435-69.100.
- Mukoh, Akio: *See—*
  - Era, Susumu; Iwasaki, Kishiro; Yokokura, Hisao; Hanawa, Yasuo; Kondo, Katsumi; Nakada, Tadao; Kitamura, Teruo; and Mukoh, Akio, 5,020,883, Cl. 350-350.00S.
- Mukohda, Hidefumi: *See—*
  - Terasawa, Masaaki; Mukohda, Hidefumi, Nagai, Yoshikazu; Ikeda, Yasunori; and Furusawa, Kazunori, 5,022,000, Cl. 365-184.000.
- Mulder, Cameron A.: *See—*
  - Kovacik, Paul J.; Davidson, Charles R.; Lindsay, Kevin B.; Lundberg, Darrel V.; Mulder, Cameron A.; and Boerboom, Everett, 5,021,074, Cl. 65-40.000.
- Mulholland Designs, Inc.: *See—*
  - Mulholland, Lawrence K., 5,020,816, Cl. 280-250.100.
- Mulholland, Lawrence K., to Mulholland Designs, Inc. Adjustable frame wheelchair. 5,020,816, Cl. 280-250.100.
- Mullaney, John J., to EG&G Sealol, Inc. High-speed easy-maintenance split seal. 5,020,809, Cl. 277-81.00S.
- Muller, Daniel: *See—*
  - Armand, Michel; Gauthier, Michel; and Muller, Daniel, 5,021,308, Cl. 429-194.000.
- Muller, Friedemann: *See—*
  - Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; El-Sayed, Aziz; Muller, Peter-Rolf; and Wandel, Martin, 5,021,488, Cl. 524-116.000.
- Muller, Hanns P.; and Heine, Heinrich, to Bayer Aktiengesellschaft. Storage stable resin reaction mixtures, and the preparation and use thereof. 5,021,536, Cl. 528-73.000.
- Muller, Klaus-Helmut; Kluth, Joachim; Konig, Klaus; Gassen, Karl-Rudolf; Findeisen, Kurt; Lindig, Markus; Lurssen, Klaus; Santel, Hans-Joachim; and Schmidt, Robert R., to Bayer Aktiengesellschaft. Herbicidal substituted 4-amino-5-alkylthio-1,2,4-triazol-3-ones. 5,021,080, Cl. 71-92.000.
- Muller, Klaus-Helmut: *See—*
  - Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,082, Cl. 71-93.000.
- Muller, Laurent; and Randermann, Ervin, to Dowell Schlumberger Incorporated. Tool for treating subterranean wells. 5,020,592, Cl. 166-187.000.
- Muller, Peter-Rolf: *See—*
  - Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; El-Sayed, Aziz, Muller, Peter-Rolf; and Wandel, Martin, 5,021,488, Cl. 524-116.000.
- Multifastener Corporation: *See—*
  - Ladouceur, Harold A., 5,020,950, Cl. 411-107.000.
- Multinorm B.V.: *See—*
  - Dessing, Jacobus P. M.; Roodenburg, Pieter J.; Aurik, Erik A., and Borgman, Fokko P., 5,020,477, Cl. 119-14.080.
- Murai, Suzuyo: *See—*
  - Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi, Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, 5,021,877, Cl. 358-75.000.
- Murakami, Katsumi: *See—*
  - Komiya, Yutaka; Murakami, Katsumi; and Inuzuka, Tsuneki, 5,021,827, Cl. 355-206.000
- Murakami, Yoichi, to NEC Corporation. Buried servo magnetic head 5,021,910, Cl. 360-123.000.
- Murakawa, Yoshitaka: *See—*
  - Miyazaki, Toshimasa; Uzawa, Yoji; Okawa, Kazuyoshi; Kawashima, Hiroshi; Moriya, Kazumasa; Murakawa, Yoshitaka, Kumagai, Toshimitsu; Nakamura, Akihiro; Itoh, Motohiko; and Kashiwazaki, Tomoyuki, 5,021,695, Cl. 310-12.000.
- Muramatsu, Akihiko: *See—*
  - Yamauchi, Kosaku; Muramatsu, Akihiko; and Kaku, Shinji, 5,020,625, Cl. 180-219.000.
- Muranaka, Masaya: *See—*
  - Suzuki, Yukihide; Muranaka, Masaya; and Ishihara, Masamichi, 5,021,998, Cl. 365-51.000.
- Murasaki, Sadanobu: *See—*
  - Higashi, Masato; and Murasaki, Sadanobu, 5,021,824, Cl 355-72.000.
- Murashita, Takato: *See—*
  - Miyake, Sanae; Kasai, Masaaki; Yamazaki, Sakae; and Murashita, Takato, 5,020.220, Cl. 30-2.000.
- Murasugi, Skinya: *See—*
  - Miwa, Yoshiyuki; Kodama, Hiroshi; Murasugi, Skinya, Shikae, Sadao; Nakagawa, Masaya; and Kabumoto, Tsutomu, 5,020,842, Cl. 294-2.000.
- Murata, Kazushige: *See—*
  - Ito, Takeshi; Murata, Kazushige; and Kohmura, Kuniyoshi, 5,020,983, Cl. 425-85.000.
- Murata Manufacturing Co., Ltd.: *See—*
  - Sano, Harunobu; and Kohno, Yoshiaki, 5,021,921, Cl 361-321.000.
- Murata, Yasushi: *See—*
  - Matsui, Fumio; and Murata, Yasushi, 5,021,931, Cl. 362-84.000.
- Murayama, Masayoshi: *See—*
  - Hatano, Masakatsu; Murayama, Masayoshi; Shima, Kenji; and Ito, Masumi, 5,021,384, Cl. 502-209.000.
- Murdoch, Rashirl J. Skateboard bridle. 5,020,827, Cl. 280-816.000.
- Muroi, Hidenori, to Tokyo Electric Co., Ltd. Apparatus capable of being operated as both a bar code reading device and a manual keyboard. 5,021,640, Cl 235-462.000.
- Muroi, Katsumi; Okuna, Kenji; Otsuka, Hidefumi; Ouchi, Kastubumi, Iimura, Tsutomu; and Kojima, Ryoji, to Hitachi, Ltd.; Hitachi Koki Co.; and Hitachi. Printing machine. 5,021,810, Cl 346-155.000.
- Murphy, Kenny P., to McDonnell Douglas Corporation. Optical cell 5,020,884, Cl. 350-354.000.
- Murrer, Barry A.; and Schwartz, David A., to Johnson Mtthey PLC Antiviral cyclic polyamines. 5,021,409, Cl. 514-183.000.
- Murville, Marie L.: *See—*
  - Hoffman, Richard E.; Topping, Richard; Nelson, Tom W., Murville, Marie L.; and Belkus, Paul, 5,020,563, Cl. 137-75.000.
- Murya, Inc.: *See—*
  - Rybak, David T., 5,020,452, Cl. 110-241 000.
- Musser, John H.: *See—*
  - Failli, Amedeo A.; Kreft, Anthony F., III; and Musser, John H., 5,021,576, Cl. 546-174.000.
- Mustakallio, Kimmo K., to Orion-Yhtma Oy. Cleansing-agent composition and its use. 5,021,185, Cl. 252-142.000.
- Mutzel, Wolfgang: *See—*
  - Gries, Heinz; Rosenberg, Douwe; Weinmann, Hanns-Joachim; Speck, Ulrich; Mutzel, Wolfgang; Hoyer, Georg-Alexander; and Pfeiffer, Heinrich, deceased, 5,021,236, Cl. 424-9 000
- Myers, Gregory K.: *See—*
  - Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; and Myers, Gregory K., 5,022,087, Cl. 382-32.000.

- Myers, Phillip R. Method and apparatus for permitting medical personnel to attend to a patient situated in a hazardous location remote therefrom. 5,020,528, Cl. 128-202.130.
- Myotoku Ltd.: *See—*
  - Kanaya, Shigeo, 5,020,383, Cl. 74-128.000.
- Myres, Michael J. Two stage fluid valve assembly. 5,020,726, Cl 239-525.000.
- Myrvold, Nathan P.: *See—*
  - Pisculli, Anthony C.; Moore, Walter C.; and Myrvold, Nathan P., 5,021,974, Cl. 364-518.000.
- N. K Biotechnical Engineering Company: *See—*
  - Kovacevic, Nebojsa; and Hasselquist, Paul B., 5,020,357, Cl 73-1.00B.
- Nadella: *See—*
  - Stephan, Gerard, and Labedan, Jean-Denis, 5,020,925, Cl 384-569.000.
- Naef, Regula: *See—*
  - Morris, Anthony F.; Naef, Regula; Escher, Sina; and Velluz, Alain, 5,021,402, Cl. 512-11.000.
- Nagae, Yoshiharu: *See—*
  - Ohwada, Jun-ichi, Kitajima, Masaaki; Suzuki, Masayoshi; Takabatake, Masaru; and Nagae, Yoshiharu, 5,021.774, Cl 340-811.000.
- Nagai, Akira: *See—*
  - Suzuki, Yoshihiro, Takada, Toshinari; Suzuki, Masahiro; Akahoshi, Haruo; Nagai, Akira; Takahashi, Akio; Amagi, Shigeo; Narahara, Toshikazu; Wajima, Motoyo; and Kogawa, Kiyonori, 5,021,296, Cl. 428-409.000.
- Nagai, Seiichi: *See—*
  - Yamashita, Tatsumaro; and Nagai, Seiichi, 5,021,900, Cl 360-85.000.
- Nagai, Yoshikazu: *See—*
  - Terasawa, Masaaki; Mukohda, Hidefumi; Nagai, Yoshikazu; Ikeda, Yasunori; and Furusawa, Kazunori, 5,022,000, Cl. 365-184.000.
- Naganawa, Hiroshi: *See—*
  - Takeuchi, Tomio; Aoyagi, Takaaki; Hamada, Masa; Naganawa, Hiroshi; and Yoshida, Shigemi, 5,021.549, Cl. 530-330.000.
- Nagano, Masashi, to Shimano Industrial Company, Ltd. Lever shifting device for a bicycle. 5,020,387, Cl. 74-475.000.
- Nagano, Masatosi: *See—*
  - Nakatsuno, Eiji; Himeno, Yasunori; Ebata, Yasuhiko; and Nagano, Masatosi, 5,020,332, Cl. 62-157.000.
- Nagao, Makoto, to Eaton Corporation. Full hydraulic power steering apparatus. 5,020,618, Cl. 180-132.000.
- Nagaoka, Akinobu: *See—*
  - Harada, Setsuo; Nagaoka, Akinobu; Itoh, Katsumi; and Terao, Shinji, 5,021,439, Cl. 514-380.000.
- Nagaoka, Takashi: *See—*
  - Mase, Masahiro; Sakagami, Seiji; Okawada, Takeshi; Ueda, Shinjiroo; Awada, Yoshihisa, and Nagaoka, Takashi, 5,020,969, Cl. 415-55.300.
- Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, to Mitsui Toatsu Chemicals, Inc. Resin for plastic lens having high-refractive index, lens comprising the resin, and method for preparation of the lens. 5,021,503, Cl. 524-706.000.
- Nagata, Toru: *See—*
  - Washisu, Koichi; Ohnuki, Ichiro; and Nagata, Toru, 5,020,369, Cl. 73-517 00A.
- Nagelberg, Alan S.: *See—*
  - Aghajanian, Michael K.; Nagelberg, Alan S., and Kennedy, Christopher R., 5,020,584, Cl. 164-97.000.
- Naik, Appaya: *See—*
  - Machin, David; Naik, Appaya; Buytenhek, Cornelis; and van de Pas, Johannes C., 5,021,195, Cl. 252-545.000.
- Naito, Ryuichi; and Kinpara, Keiji, to Pioneer Electronic Corporation Recorded data demodulation circuit. 5,021,894, Cl. 360-46.000.
- Naitoh, Masanori: *See—*
  - Kataoka, Yoshiyuki; Sumida, Isao; Hidaka, Masataka; and Naitoh, Masanori, 5,021,212, Cl. 376-283.000.
- Najjar, Mitri S.: *See—*
  - Muan, Arnulf; and Najjar, Mitri S., 5,021,386, Cl. 502-248.000.
- Naka, Michiro: *See—*
  - Nakane, Toshio; Naka, Michiro; Konuma, Hiroaki; and Hijikata, Kenji, 5,021,295, Cl. 428-379.000.
  - Nakane, Toshio; Naka, Michiro; Konuma, Hiroaki; and Hijikata, Kenji, 5,021,545, Cl. 528-272.000.
- Nakada, Tadao: *See—*
  - Era, Susumu; Iwasaki, Kishiro; Yokokura, Hisao; Hanawa, Yasuo; Kondo, Katsumi; Nakada, Tadao; Kitamura, Teruo; and Mukoh, Akio, 5,020,883, Cl. 350-350.00S.
- Nakagawa, Fujio; and Wada, Masami, to Matsushita Electric Industrial Co., Ltd. Method for manufacturing a yoke for a stepping motor. 5,020,211, Cl. 29-596.000.
- Nakagawa, Masaya: *See—*
  - Miwa, Yoshiyuki; Kodama, Hiroshi; Murasugi, Skinya; Shikae, Sadao; Nakagawa, Masaya; and Kabumoto, Tsutomu, 5,020,842, Cl. 294-2.000.
- Nakagoshi, Isao, to Fuji Photo Film Co., Ltd. Photographic film package. 5,020,669, Cl. 206-466.000.
- Nakahara, Yasuhiro: *See—*
  - Sakamoto, Kiyoaki; Matsubara, Kenichi; Nakahara, Yasuhiro; and Nomura, Masaki, 5,021,162, Cl. 210-635.000.
- Nakai, Tetsuo: *See—*
  - Nakamura, Tsutomu; and Nakai, Tetsuo, 5,020,394, Cl. 76-108.600.
- Nakajima, Kazuhiro: *See—*
  - Saito, Hiroshi; Suzuki, Yasumichi; Sasabe, Shunji; and Nakajima, Kazuhiro, 5,021,114, Cl. 156-345.000.
- Nakajima, Kazuo, to Fujitsu Limited. Apparatus for growing multicomponents compound semiconductor crystals. 5,021,224, Cl. 422-248.000.
- Nakajima, Nobuyuki; Yamaguchi, Toshio; and Kawashima, Yuji, to Diesel Kiki Co., Ltd. Variale capacity vane compressor. 5,020,976, Cl. 417-295.000.
- Nakajima, Seiji: *See—*
  - Nakakoji, Hisatada; Nakajima, Seiji; Yasuda, Akira; and Kumura, Hajime, 5,021,301, Cl. 428-659.000.
- Nakajima, Tadakatsu: *See—*
  - Kieda, Shigekazu; Nakajima, Tadakatsu; Kuwahara, Heikichi; and Sato, Motohiro, 5,021,924, Cl. 361-385.000.
- Nakajima, Tohru: *See—*
  - Yamanaka, Tsutomu; Seki, Toshio; Nakajima, Tohru; and Yaoka, Osamu, 5,021,432, Cl. 514-337.000.
- Nakakoji, Hisatada; Nakajima, Seiji, Yasuda, Akira; and Kumura, Hajime, to Kawasaki Steel Corporation. Method of producing a steel sheet plated with Zn-Mg alloy superior both in plating adhesion and corrosion resistance, and steel sheet plated with the same. 5,021,301, Cl. 428-659.000.
- Nakamura, Akihiro: *See—*
  - Miyazaki, Toshimasa; Uzawa, Yoji; Okawa, Kazuyoshi; Kawashima, Hiroshi; Moriya, Kazumasa; Murakawa, Yoshitaka, Kumagai, Toshimitsu; Nakamura, Akihiro; Itoh, Motohiko; and Kashiwazaki, Tomoyuki, 5,021,695, Cl 310-12.000.
- Nakamura, Masahiko: *See—*
  - Nakaya, Michihiko; Fukushi, Yukiharu; Kodaka, Kenji; Ooka, Masayuki; Shiraishi, Shirou; Nakamura, Masahiko; and Numata, Satoshi, 5,021,412, Cl. 514-223.800.
- Nakamura, Masaru: *See—*
  - Kinoshita, Jun'ichi; Suzuki, Nobuo; Morinaga, Motoyasu, Hirayama, Yuzo; and Nakamura, Masaru, 5,021,361, Cl 437-129.000.
- Nakamura, Masashi: *See—*
  - Ota, Masanori; Aoki, Masafumi; Nakamura, Masashi, Mizusawa, Kenichi; and Kasahara, Kumi, 5,021,186, Cl. 252-186.350
- Nakamura, Masayuki: *See—*
  - Kanto, Jumpei; Saito, Hitoshi; Eguchi, Hiroshi, and Nakamura, Masayuki, 5,021,394, Cl. 503-227.000.
- Nakamura, Osamu: *See—*
  - Akiyama, Takaaki; Matsuo, Shuji, Fujii, Masahiro; Kurose, Mitsukazu; Nakamura, Osamu; and Kamijo, Masahiro, 5,020,928, Cl 400-193.000.
- Nakamura, Toshihiko, to NEC Corporation. Total sum calculation circuit capable of rapidly calculating a total sum of more than two input data represented by a floating point representation. 5,021,986, Cl. 364-748.000.
- Nakamura, Tsutomu; and Nakai, Tetsuo, to Sumitomo Electric Industries, Ltd. Polycrystal diamond fluted tool and a process for the production of the same 5,020,394, Cl. 76-108 600.
- Nakamura, Yuji: *See—*
  - Kitagawa, Akio; Hori, Takahiro; and Nakamura, Yuji, 5,021,260, Cl. 427-140.000.
- Nakane, Shigeru, to Techno-Bio Co., Ltd. Sodium chloride in novel crystal form and aqueous solution containing the same. 5,021,079, Cl. 71-68.000.
- Nakane, Toshio; Naka, Michiro; Konuma, Hiroaki; and Hijikata, Kenji, to Polyplastics Co., Ltd. Flame-retardant halogenated polyester resin composition and electric wire coated with the same. 5,021,295, Cl 428-379.000.
- Nakane, Toshio; Naka, Michiro; Konuma, Hiroaki; and Hijikata, Kenji, to Polyplastics Co., Ltd. Flame-retardant halogenated copolyester and electric wire coated with the same. 5,021,545, Cl. 528-272.000.
- Nakanishi, Yasuyuki: *See—*
  - Morimoto, Takao; and Nakanishi, Yasuyuki, 5,021,908, Cl. 360-107.000.
- Nakano, Hiroshi: *See—*
  - Ohta, Tomozo; Nakano, Hiroshi; Higashi, Kazutada; and Yamamoto, Hirohiko, 5,021,790, Cl. 342-44.000.
- Nakano, Yoshimasa; Sugawara, Michiharu; Uetsuki, Setsuyoshi; Izawa, Taketoshi; Kawaguchi, Tomoyuki; and Wada, Akira, to Otsuka Pharmaceutical Co., Ltd. Novel pyrazinoxide compound of NF-1616-904 and a pharmaceutical composition containing the same. 5,021,419, Cl. 514-253.000.
- Nakashima, Takashi: *See—*
  - Kanazawa, Hirotaka; Ohmura, Hiroshi; Tomoda, Atsuo; Furuzawa, Akihiro; Nakashima, Takashi; and Hideshima, Masao, 5,020,619, Cl. 180-140.000.
- Nakata, Masahiro: *See—*
  - Satoh, Osamu; Hirai, Isamu; and Nakata, Masahiro, 5,021,818, Cl. 354-429.000.
- Nakatsukasa, Keiichiroh; and Kuneguchi, Kenmei, to Ranco Japan Ltd Proportional control valve. 5,020,771, Cl. 251-30.020.
- Nakatsuno, Eiji; Himeno, Yasunori; Ebata, Yasuhiko; and Nagano, Masatosi, to Matsushita Electric Industrial Co., Ltd. Air conditioner and a drive apparatus therefor. 5,020,332, Cl. 62-157.000.
- Nakaya, Michihiko; Fukushi, Yukiharu; Kodaka, Kenji; Ooka, Masayuki; Shiraishi, Shirou; Nakamura, Masahiko; and Numata, Satoshi, to Mitsui Toatsu Chemicals, Inc. Thiadiazines, and insecticidal and acaricidal preparations. 5,021,412, Cl. 514-223.800.
- Nakayama, Shunichi; Kanai, Masashi; and Arai, Yasuyuki, to Sanden Corporation. Method and apparatus for preventing the no-load operation of a pump for a liquid supply system. 5,020,972, Cl. 417-37.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Nakayama, Takeshi: *See—*
  - Terada, Yasushi; Nakayama, Takeshi; and Kobayashi, Kazuo, 5,022,009, Cl. 365-210.000.
- Nakayama, Yasuko; and Aida, Kazuo, to Kabushiki Kaisha Toshiba. Program counter display device. 5,021,948, Cl. 364-200.000.
- Nalco Chemical Company: *See—*
  - Braden, Michael L.; and Allenson, Stephan J., 5,021,167, Cl. 210-708.000.
  - Stephenson, William K.; and Kaplan, Morris, 5,021,498, Cl. 524-484.000.
- Nalesnik, Theodore E.: *See—*
  - Kapuscinski, Maria M.; Derosa, Thomas F.; Biggs, Robert T.; and Nalesnik, Theodore E., 5,021,177, Cl. 252-51.50R.
- Nann, Eugen, to Simon Nann KG, Fabrik fuer Spannwerkzeuge. Tool chuck coolant system. 5,020,946, Cl. 409-136.000.
- Narahara, Toshikazu: *See—*
  - Suzuki, Yoshihiro; Takada, Toshinari; Suzuki, Masahiro; Akahoshi, Haruo; Nagai, Akira; Takahashi, Akio; Amagi, Shigeo; Narahara, Toshikazu; Wajima, Motoyo; and Kogawa, Kiyonori, 5,021,296, Cl. 428-409.000.
- Narang, Saran A.: *See—*
  - Wong, Patrick T. T.; Narang, Saran A.; and Sung, Wing L., 5,021,337, Cl. 435-29.000.
- Narang, Subhash C.: *See—*
  - Sharma, Suniti K.; Ventura, Susanna C.; and Narang, Subhash C., 5,021,398, Cl. 505-1.000.
- Narayan, Jagdish: *See—*
  - Fan, John C.C.; Zavracky, Paul M.; Narayan, Jagdish; Allen, Lisa P.; and Vu, Duy-Phach, 5,021,119, Cl. 156-620.710.
- Narita, Hitoshi: *See—*
  - Kohno, Takahiro; and Narita, Hitoshi, 5,021,812, Cl. 354-76.000.
- Narita, Yoshinori: *See—*
  - Matsuura, Tooru; Kawamura, Mitsuyoshi; and Narita, Yoshinori, 5,020,319, Cl. 60-321.000.
- Narukawa, Kiyotada: *See—*
  - Fujita, Yuuji; Sezume, Tadashi; Kitano, Kitsusho; Narukawa, Kiyotada; Mikami, Takashi; Kawamura, Tetsuya; Sato, Shigeru; Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao, 5,021,504, Cl. 525-57.000.
- Narula, Anubhav: *See—*
  - Gillaspey, William; Hagedorn, Myrna L.; Hanna, Marie R.; Boardwick, Kathleen E.; Beck, Charles E. J.; Fujioka, Futoshi; Branco, Anthony G.; Narula, Anubhav; and Boden, Richard M., 5,021,184, Cl. 252-174.110.
- Nash, John: *See—*
  - Kensey, Kenneth; Nash, John; and Evans, Douglas, 5,021,059, Cl. 606-213.000.
- Nashif, Ahid D. Apparatus and method for reducing vehicular fuel pump noise. 5,020,978, Cl. 417-363.000.
- National Refrigeration Products, Inc.: *See—*
  - Michny, Robert S., 5,020,331, Cl. 62-77.000.
- National Research Council of Canada: *See—*
  - Wong, Patrick T. T.; Narang, Saran A.; and Sung, Wing L., 5,021,337, Cl. 435-29.000.
- National Semiconductor Corporation: *See—*
  - Henderson, Richard D.; and Yin Leung, Frederick K., 5,022,056, Cl. 375-119.000.
  - Hobrecht, Stephen W., 5,021,682, Cl. 307-296.800.
  - Pickett, Scott K.; Luich, Thomas M.; and Swift, Arthur L., IV, 5,021,689, Cl. 307-465.000.
  - Scheibner, Harry J., 5,021,000, Cl. 439-342.000.
  - Yarbrough, Roy; Haacke, Ernest D.; and Jansson, Lars G., 5,021,687, Cl. 307-456.000.
- National Starch and Chemical Investment Holding Corporation: *See—*
  - Martino, Gary T.; and Nowak, Frank A., Jr., 5,021,238, Cl. 424-47.000.
  - Montague, Peter G.; Lagar, Philip A.; and Bainbridge, Peter, 5,021,525, Cl. 526-210.000.
  - Stanley, Henry; Davis, Irwin; and Chiao, Wen B., 5,021,507, Cl. 525-127.000.
- Navistar International Transportation Corp.: *See—*
  - Malecki, Richard L.; Irick, W. T.; and Dowler, Robert L., 5,020,361, Cl. 73-118.100.
- NEC Corporation: *See—*
  - Arai, Tomohisa, 5,022,059, Cl. 377-39.000.
  - Fujisaki, Hisashi; and Shimada, Keiko, 5,022,068, Cl. 379-62.000.
  - Kohno, Takaki, 5,022,003, Cl. 365-189.010.
  - Kondou, Kenji; and Ando, Manabu, 5,021,745, Cl. 330-253.000.
  - Murakami, Yoichi, 5,021,910, Cl. 360-123.000.
  - Nakamura, Toshihiko, 5,021,986, Cl. 364-748.000.
  - Saito, Hitoshi, 5,021,691, Cl. 307-475.000.
  - Tohnishi, Shigeji, 5,022,005, Cl. 365-189.090.
  - Toshiro, Yoshiharu; and Kasahara, Kenichi, 5,021,694, Cl. 307-631.000.
  - Yoshida, Atsushi; and Suzuki, Takanao, 5,022,058, Cl. 375-120.000.
- Nederbragt, Jacob A., to Bongers & Deimann. Elevator brake. 5,020,640, Cl. 187-89.000.
- Neer, Jay H.: *See—*
  - Dewitt, John R.; and Neer, Jay H., 5,020,999, Cl. 439-328.000.
- Neff, Edward R., to American Pneumatic Technologies, Inc. High speed rotary hand tool with adjustable head coupling. 5,020,281, Cl. 51-170.0PT.
- Negron, William. Baseball home run contest game. 5,020,801, Cl. 273-89.000.
- Nehoda, Charles J.: *See—*
  - Hart, George R.; and Nehoda, Charles J., 5,020,362, Cl. 73-119.00A.
- NEI Canada Limited *See—*
  - Browne, John, 5,021,773, Cl. 340-764.000.
- Nelson, Clifford P. Pipe chamfer and deburring tool. 5,020,221, Cl 30-169.000.
- Nelson, David A., to Ford Motor Company. Cooling fan with reduced noise for variable speed machinery. 5,021,696, Cl. 310-62.000.
- Nelson Industries, Inc.: *See—*
  - Eriksson, Larry J.; and Allie, Mark C., 5,022,082, Cl. 381-71.000.
- Nelson, Linden D.: *See—*
  - Scungio, Robert A., 5,020,348, Cl. 70-456.00R.
- Nelson, Michael G.: *See—*
  - Bessinger, Stephen L.; and Nelson, Michael G., 5,020,860, Cl 299-1.000.
- Nelson, Thomas E. Thermal insulation jacket. 5,020,481, Cl. 122-494.000.
- Nelson, Thomas E., to Soltech, Inc. Acoustical partition and method of making same. 5,020,632, Cl. 181-290.000.
- Nelson, Tom W.: *See—*
  - Hoffman, Richard E.; Topping, Richard; Nelson, Tom W.; Murville, Marie L.; and Belkus, Paul, 5,020,563, Cl. 137-75.000
- NeoRx Corporation: *See—*
  - Srinivasan, Ananthachari, 5,021,556, Cl. 534-10.000.
- Nesterick, Elaine M.; Reynolds, Robert W.; MacKay, Spencer L.; and Graham, Cleve A., to Everest & Jennings, Inc. Power drive scooter 5,020,624, Cl. 180-210.000.
- Nestler, Heinz: *See—*
  - Barfurth, Dieter; Lindzus, Claus; and Nestler, Heinz, 5,021,596, Cl. 556-55.000.
- Neuhalfen, Mark, to Wilson Sporting Goods Co. Baseball catcher's chest protector. 5,020,156, Cl. 2-2.000.
- Newport Corporation: *See—*
  - Terry, Dennis C.; Filho, Waldemiro M.; and Turechek, John J., 5,021,282, Cl. 428-116.000.
- NGK Insulators, Ltd.: *See—*
  - Aronoff, Michael I.; Matsuzawa, Soichiro; and Terada, Nobuhiro, 5,020,213, Cl. 29-603.000.
  - Otagiri, Tadashi; Shirai, Masahiro; Ohara, Minoru; and Suzuki, Go, 5,021,287, Cl. 428-212.000.
- NGK Spark Plug Co., Ltd.: *See—*
  - Kojima, Takao; Yamano, Masaru; and Sawada, Toshiki, 5,020,499, Cl. 123-479.000.
  - Matsuura, Tooru; Kawamura, Mitsuyoshi; and Narita, Yoshinori, 5,020,319, Cl. 60-321.000.
- Nguyen, Au H.; and Gollabinnie, Aurav R., to Chips and Technologies, Inc. Suspend/resume apparatus and method for reducing power consumption in battery powered computers. 5,021,983, Cl. 364-707.000.
- NHK Spring Co., Ltd.: *See—*
  - Minegishi, Takeshi; Takabatake, Kiyotugu; and Asobe, Kunio, 5,021,286, Cl. 428-198.000.
- Nichiryo Co., Ltd.: *See—*
  - Oshikubo, Yuju, 5,021,217, Cl. 422-100.000.
- Nicholas, David C., to Rockwell International Corporation. Digital echo suppressor. 5,022,074, Cl. 379-407.000.
- Nicholas, James W.: *See—*
  - Cochran, Michael A.; Folland, Rickworth; Nicholas, James W., and Robinson, Melvin E. R., 5,021,515, Cl. 525-371.000.
- Nichols, Keith A.: *See—*
  - Heidenreich, David C.; and Nichols, Keith A., 5,020,650, Cl. 192-56.00R.
- Nichols, Walter A.: *See—*
  - Hill, Michael; and Nichols, Walter A., 5,020,198, Cl. 28-250.000.
- Nicholson, Myron D.: *See—*
  - Huang, Alvin S.; Nicholson, Myron D.; and Ramagopal, Rama, 5,021,252, Cl. 426-412.000.
- Nicolai, Eric: *See—*
  - Bru-Magniez, Nicole; Nicolai, Eric; and Teulon, Jean-Marie, 5,021,443, Cl. 514-394.000.
- Nielsen, Ole B.: *See—*
  - Back-Pedersen, Andreas; Nielsen, Ole B.; and Moller, Hans C., 5,020,375, Cl. 73-861.380.
- Nieman, Wayne H.: *See—*
  - Mahoney, Michael R.; Nieman, Wayne H.; McDowell, Douglas J.; and Krapil, Virginia, 5,020,532, Cl. 128-205.240.
- Nienburg, Hans; Harbach, Friedrich; and Stein, Peter, to Asea Brown Boveri Aktiengesellschaft. Method for preparing a ceramic suspension. 5,021,376, Cl. 501-153.000.
- Nieto, Augustine: *See—*
  - Englehardt, William H.; Svilans, Olgerts J.; and Nieto, Augustine, 5,020,794, Cl. 272-129.000.
- Nihon Biso Co., Ltd.: *See—*
  - Mimura, Noritaka, 5,020,180, Cl. 15-103.000.
- Niikawa, Takeshi, to Brother Kogyo Kabushiki Kaisha. Grouping of dot data in a multiple column dot-matrix printer. 5,020,927, Cl. 400-121.000.
- Niioka, Yoshio, to Niioka, Yoshio; and Gottlieb, Marvin. Concrete manufacturing process. 5,021,205, Cl. 264-69.000.
- Niki, Hiroshi, to Seiko Epson Corporation. Latching mechanism for a removable processing cartridge in a photocopying device. 5,021,825, Cl. 355-200.000.
- Nilsen, Carl-Otto: *See—*
  - Babu, Suryadevara V.; Lu, Neng-hsing; and Nilsen, Carl-Otto, 5,021,138, Cl. 204-298.330.

- Nilssen, Ole K. Operating system for multiple fluorescent lamps. 5,021,717, Cl. 315-324.000.
- Nippon Air Brake Co.: *See—*
  - Tanaka, Ryuichi, 5,020,864, Cl. 303-113.000.
- Nippon Carbon Co, Limited: *See—*
  - Ishikawa, Toshikatsu, Teranishi, Haruo; Ichikawa, Hiroshi; and Mitsuno, Shiro, 5,021,370, Cl. 501-95.000.
- Nippon Hoso Kyokai: *See—*
  - Yamamoto, Masanao; Unnai, Takaaki; Ehata, Shigeru, Hirai, Tadaaki, Sameshima, Kenji, Hiruma, Eikiyu; Suzuki, Shirou; Tanioka, Kenkichi; Yamazaki, Junichi, and Shidara, Keeichi, 5,021,705, Cl. 313-106.000.
- Nippon Kayaku Kabushiki Kaisha: *See—*
  - Yokoshima, Minoru; Ohkubo, Tetsuo; and Kiyomoto, Masayuki, 5,021,467, Cl. 522-96.000.
- Nippon Piston Ring Co., Ltd.: *See—*
  - Shimomura, Soichi, 5,021,629, Cl. 219-121.590.
- Nippon Polyurethane Industry Co., Ltd · *See—*
  - Kawasaki, Masahiro; Ohbuchi, Yukio; Maeda, Yoshiaki, and Sato, Susumu, 5,021,534, Cl. 528-60.000.
- Nippon Precision Circuits Ltd.: *See—*
  - Tanaka, Sakae; Watanabe, Yoshiaki; Shirai, Katsuo; and Ogiwara, Yoshihisa, 5,021,850, Cl. 357-23.700.
- Nippon Shokubai Kagaku Kogyo Co., Ltd. *See—*
  - Kobayashi, Motonobu; Kinoshita, Futoru; Hagi, Mitsuharu; Inoue, Akira; and Uno, Terushige, 5,021,227, Cl. 423-212.000.
- Nippon Soken, Inc.: *See—*
  - Hamakawa, Yoshihiro; Okamoto, Hiroaki; and Hattori, Yutaka, 5,021,103, Cl. 148-33.000.
  - Yoshino, Yasuhisa; Kato, Yoshifumi; Tamatsu, Yukimasa; and Takeda, Kenji, 5,021,957, Cl. 364-426.010.
- Nippon Steel Corporation: *See—*
  - Suzuki, Ryoichi; Kondo, Hiroyuki, and Mizunuma, Susumu, 5,020,509, Cl. 126-263.000.
- Nippon Telegraph Corporation: *See—*
  - Tsuchiya, Michio; Otsuka, Shuji, Matsumoto, Takayuki; Ohta, Eiichi, Kondo, Hakudai, Murai, Suzuyo; Takeyama, Kouzi, Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, 5,021,877, Cl. 358-75.000.
- Nippon Telegraph and Telephone Corporation: *See—*
  - Urushidani, Shigeo; and Imagawa, Hitoshi, 5,022,025, Cl 370-60.000.
- Nippon Zeon Co., Ltd.: *See—*
  - Yasui, Kotaro, Kojima, Asato; Yasuda, Atsushi, and Sato, Takanori, 5,021,347, Cl 435-235.000.
- Nippondenso Co., Ltd.: *See—*
  - Hamakawa, Yoshihiro; Okamoto, Hiroaki; and Hattori, Yutaka, 5,021,103, Cl 148-33.000.
  - Yoshino, Yasuhisa; Kato, Yoshifumi; Tamatsu, Yukimasa; and Takeda, Kenji, 5,021,957, Cl. 364-426.010.
- Nishi, Toshio, to Sharp Kabushiki Kaisha. Word processor with color display means. 5,021,972, Cl. 364-518.000.
- Nishi, Yasutaka: *See—*
  - Kono, Masanao; Hasegawa, Yoshihiro, Nishi, Yasutaka; Irie, Hisao, Mizuta, Tatsuji; and Ohara, Shinsuke, 5,021,269, Cl 427-436.000.
- Nishi, Yumiko; Torii, Yutaka; Komatu, Norihumi; and Takaki, Seiichi, to Hitachi, Ltd.; and Hitachi Communication Systems, Inc. Bit synchronization circuit. 5,022,057, Cl 375-119.000.
- Nishibayashi, Seitaro. Continuous washing apparatus. 5,020,555, Cl 134-65.000.
- Nishida, Kazue: *See—*
  - Meki, Naoto; Nishida, Kazue; and Imahase, Tomotoshi, 5,021,446, Cl. 514-407.000.
- Nishida, Shinichiro: *See—*
  - Okamura, Ryo; Nishida, Shinichiro; and Asakura, Makoto, 5,021,969, Cl. 364-513.000.
- Nishihara, Yoshitaka: *See—*
  - Kishikawa, Kenjiro; Nishihara, Yoshitaka, and Okudaira, Masayuki, 5,020,690, Cl. 222-83.000.
- Nishikawa, Akihito, to Kabushiki Kaisha Toshiba. Multiprocessor system with standby function. 5,021,950, Cl. 364-200.000.
- Nishikawa, Yutaka, to Toa Corporation. Method of and apparatus for forming and transporting mud clogs. 5,020,858, Cl. 299-8.000.
- Nishimura, Akira, to Sumitomo Electric Industries, Ltd. Optical fiber wiring apparatus. 5,020,871, Cl. 350-96.100.
- Nishimura, Tetsuharu; Ishizuka, Koh; Ishii, Satoshi; and Tsukiji, Masaaki, to Canon Kabushiki Kaisha Relief diffraction grating encoder. 5,021,649, Cl. 250-231.160.
- Nishimura, Toshio; and Morita, Akitaka, to Sharp Kabushiki Kaisha Electronic account recording device. 5,021,952, Cl. 364-406.000.
- Nishino, Masashi: *See—*
  - Okada, Kenichi; Tanigawa, Shu; and Nishino, Masashi, 5,020,913, Cl. 356-350.000.
- Nishio, Hiroaki; Kato, Akira; Sato, Michitaka; and Watanabe, Keiji, to NKK Corporation. Method of casting powder. 5,021,213, Cl. 419-36.000.
- Nishio, Takeyoshi: *See—*
  - Fujita, Yuuji; Sezume, Tadashi; Kitano, Kitsusho; Narukawa, Kiyotada; Mikami, Takashi, Kawamura, Tetsuya, Sato, Shigeru; Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao, 5,021,504, Cl. 525-57.000.
- Nishiya, Makoto: *See—*
  - Sasaki, Hiroshi; and Nishiya, Makoto, 5,021,214, Cl. 420-504.000.
- Nishizawa, Jun-ichi; Tamamushi, Takashige; Mitamura, Koichi; Takahashi, Hiroo; Mitsui, Kiyoo; Ikehara, Mitsuo; Wako, Toyota; and Maruyama, Sinpei, to Zaidan Hojin Handotai Kenkyu Sinkokai; Tohoku Electric Power Company, Incorporated; and Tsuken Electric Ind. Co., Ltd. PWM power converter using mixed bipolar and static induction transistors. 5,021,936, Cl 363-41.000.
- Nissan Chemical Industries, Ltd.: *See—*
  - Kitagawa, Akio; Hori, Takahiro; and Nakamura, Yuji, 5,021,260, Cl. 427-140.000.
  - Ota, Masanori; Aoki, Masafumi; Nakamura, Masashi, Mizusawa, Kenichi; and Kasahara, Kumi, 5,021,186, Cl 252-186.350
- Nissan Motor Co., Ltd.: *See—*
  - Hibi, Toshifumi, 5,021,031, Cl 474-18.000.
- Nissin Chemical Industry Co., Ltd.: *See—*
  - Imai, Kyoiti; and Ishida, Tateo, 5,021,292, Cl 428-323.000
- Nissin Food Products Co., Ltd.: *See—*
  - Suzuki, Ryoichi; Kondo, Hiroyuki, and Mizunuma, Susumu, 5,020,509, Cl. 126-263.000.
- Nitto Seiki Co., Ltd.: *See—*
  - Suzuki, Ryoichi; Kondo, Hiroyuki; and Mizunuma, Susumu, 5,020,509, Cl. 126-263.000.
- Nix, Richard A.: *See—*
  - Barker, David C.; Nix, Richard A., and Leigh-Monstevens, Keith V., 5,020,326, Cl. 60-586.000.
- NKK Corporation: *See—*
  - Nishio, Hiroaki; Kato, Akira, Sato, Michitaka, and Watanabe, Keiji, 5,021,213, Cl. 419-36.000.
- Nobuta, Hiroshi: *See—*
  - Hisada, Katsutoshi; and Nobuta, Hiroshi, 5,022,088, Cl. 382-41.000
- Noell, Ralph B.: *See—*
  - Harris Godfrey; Noell, Ralph B.; and Bradshaw, Larry R., 5,020,815, Cl. 280-246.000.
- Noguchi, Kenji: *See—*
  - Kohda, Kenji; Toyama, Tsuyoshi; Ando, Nobuaki, Noguchi, Kenji and Kobayashi, Shinichi, 5,021,999, Cl. 365-168.000.
- Noguchi, Masahiko: *See—*
  - Yagi, Tadashi; Noguchi, Masahiko; Kozuka, Hajime; Morishita, Mitsuharu; and Onishi, Masayoshi, 5,020,616, Cl. 180-79.100.
- Nohira, Hiroyuki, Takaya, Hidemasa; and Miyashita, Akira, to Takasago International Corporation. Ruthenium-optically active phosphine complex. 5,021,593, Cl. 556-20.000.
- Nohmi Bosai Kabushiki Kaisha: *See—*
  - Igarashi, Yoshinori; Yasukawa, Makoto; Ariga, Yasuo; Kobayashi, Ichiro; and Horiuchi, Satoru, 5,021,677, Cl. 250-574.000
- Nolan, James D. Insect attraction lamp. 5,021,710, Cl 313-489.000.
- Nolan, Kevin F.: *See—*
  - Candelora, Andrew M.; Nolan, Kevin F., Magnon, Gary D., and Seymour, Raymond K., 5,021,819, Cl. 335-15.000.
- Noma, Fumiaki: *See—*
  - Miwa, Kishio; Fukui, Hiroaki; and Noma, Fumiaki, 5,021,284, Cl. 428-166.000
- Nomura, Hideo: *See—*
  - Davis, Myron F.; Martin, Randall W., Nomura, Hideo; Pollitt, Richard F.; Wittner, Ernest; and Yoshikawa, Wataru, 5,021,922, Cl. 361-380.000.
- Nomura, Koji: *See—*
  - Tomita, Yoshihiro; Takayama, Ryoichi; Ogawa, Hisahito; Nomura, Koji; Asayama, Junko; and Abe, Atsushi, 5,021,660, Cl. 250-338.300.
- Nomura, Masaki: *See—*
  - Sakamoto, Kiyoaki; Matsubara, Kenichi, Nakahara, Yasuhiro; and Nomura, Masaki, 5,021,162, Cl. 210-635.000.
- Nomura, Takao: *See—*
  - Fujita, Yuuji; Sezume, Tadashi, Kitano, Kitsusho; Narukawa, Kiyotada; Mikami, Takashi, Kawamura, Tetsuya; Sato, Shigeru, Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao, 5,021,504, Cl. 525-57.000.
- Nopper, Leroy N.; Miller, Meryl E., and Lichte, James L., to Lucas Duraltih Corporation Keyboard cover 5,021,638, Cl. 235-145.00R
- Norand Corporation: *See—*
  - Chadima, George E., Jr., and Laser, Vadim, 5,021,642, Cl 235-472.000.
- Nordby, Rasmus: *See—*
  - Crandall, Douglas; Hessel, Steven R.; Hornak, Thomas; Nordby, Rasmus; Springer, Kent H., and Corsetto, Craig, 5,022,051, Cl 375-19.000.
- Nordischer Maschinenbau Rud Baader GmbH & Co. KG: *See—*
  - Braeger, Horst, 5,021,023, Cl. 452-127.000.
- Norisue, Yasumasa: *See—*
  - Takeda, Mutsuhiko; Mizukami, Masamichi; Norisue, Yasumasa; Hagiwara, Isao; and Zaima, Fumiya, 5,021,197, Cl. 260-399.000.
- Normalair-Garrett (Holdings) Limited: *See—*
  - Searle, Robin H. J., 5,020,974, Cl. 417-246.000.
- Norman, Alan B.: *See—*
  - Farrier, Ernest G.; Harris, James L.; Norman, Alan B.; Resce, James L.; Sensabaugh, Andrew J., Jr.; and Shannon, Michael D., 5,020,548, Cl. 131-194.000.
- North American Philips Corp. Signetics Division *See—*
  - Deblasi, Janet M.; and Delfino, Michelangelo, 5,021,358, Cl. 437-57.000.
- North Carolina State University: *See—*
  - Baliga, Bantval J., 5,021,861, Cl. 357-51.000.
  - Swartzel, Kenneth R.; Ganesan, Sudalaimuthu G., Kuehn, Richard T.; Hamaker, Raymond W.; and Sadeghi, Farid, 5,021,981, Cl. 364-557.000.
- Northern Telecom Limited: *See—*
  - Graves, Alan F.; Greenfield, Raymond L., and Hagglund, Barry B., 5,021,880, Cl. 358-138.000.
- Norton Company: *See—*
  - Butkus, Anthony K., 5,021,375, Cl. 501-132.000.

VOL
1127
ISS
1
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1991
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Norton, William E.; Belcher, Jewell G., Jr.; Carden, James R.; and West, Thomas W., to United States of America, Administrator, National Aeronautics and Space Administration. Rotationally actuated prosthetic helping hand. 5,021,065, Cl. 623-63.000.
Noschese, Rocco J., to Burndy Corporation. Snap-lock electrical connector with quick release. 5,021,002, Cl. 439-352.000.
Nouguier, Robert: *See—*
Germanaud, Laurent; and Nouguier, Robert, 5,021,175, Cl. 252-46.600.
Nourissat, Christian: *See—*
Adrey, Jose ; Berteaux, Daniel; Goalard, Christian; Gueret, Alain; Hamon, Georges; and Nourissat, Christian, 5,021,062, Cl. 623-22.000.
Nouws, Jacobus A. M.; Kool, Pieter; and Diepenhorst, Pieter C., to Pennwalt France S.A. Enhanced reduction and inhibition of ETU content in alkylenebisdithiocarbamates. 5,021,594, Cl. 556-38.000.
Nova Technologies, Inc.: *See—*
DiMatteo, Paul; and Segnini, Robert, 5,020,171, Cl. 5-81.00R.
Novak, Warren D., to Rank Video Services America. Magnetic tape cartridge. 5,021,903, Cl. 360-96.100.
Novoa, Fernando. Auxiliary mass damper for slender flexible element subject to vibration. 5,020,644, Cl. 188-378.000.
Novotny, Jan. Method and apparatus for constructing rammed earth walls with integral cement jackets. 5,021,202, Cl. 264-33.000.
Novotny, Randall J.; and Cummins, Ralph L., to Foster Wheeler Energy Corporation. Pulverizer having rotatable table with replaceable air port segments. 5,020,734, Cl. 241-119.000.
Nowak, Frank A., Jr.: *See—*
Martino, Gary T.; and Nowak, Frank A., Jr., 5,021,238, Cl. 424-47.000.
Nozawa, Masaru; Imaseki, Chiharu; and Inagaki, Kazuyuki, to Minolta Camera Kabushiki Kaisha. Thermal transfer color printer. 5,021,804, Cl. 346-76.0PH.
Nozel, Richard J.; and Trombley, Ulric W. Compound hinged tire carrier. 5,020,707, Cl. 224-42.210.
Nuarms, Inc.: *See—*
Soboleski, Thomas F., 5,021,925, Cl. 361-386.000.
Nuckols, Charles E. Weighted fishing lure. 5,020,265, Cl. 43-42.390.
Nugues, Pierre; Desmur, Henri; and Florentin, Jose , to Thomson-Csf. Cathode for emission of electrons and electron tube with a cathode of this type. 5,021,708, Cl. 313-446.000
Numata, Satoshi: *See—*
Nakaya, Michihiko; Fukushi, Yukiharu; Kodaka, Kenji; Ooka, Masayuki; Shiraishi, Shirou; Nakamura, Masahiko; and Numata, Satoshi, 5,021,412, Cl. 514-223.800.
Numata, Shunichi: *See—*
Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, 5,021,563, Cl. 540-128.000.
Nuova Italsider S.p.A.: *See—*
Azzerri, Nazzareno; and Giorgi, Leonardo, 5,021,104, Cl. 148-276.000.
N.V. Michel Van de Wiele: *See—*
Debaes, Johnny, 5,020,573, Cl. 139-453.000.
N V Nederlandsche Apparatenfabriek Nedap: *See—*
Fockens, Tallienco W. H.; and Saeys, Jan, 5,021,767, Cl. 340-572.000.
Nye, Norman H. Container shell and method of producing same. 5,020,691, Cl. 222-95.000.
O M Industrial Co., Ltd.: *See—*
Sato, Kyokuichi; Kayatani, Tooru; and Kenmotsu, Toru, 5,020,685, Cl. 220-203.000.
O Pinomaa KY: *See—*
Pinomaa, Olli, 5,021,476, Cl. 524-77.000.
Oaks, Richard W., to Hughes Aircraft Company Thermal beacon ignitor circuit. 5,020,413, Cl. 89-1.814
Obana, Kazuyoshi: *See—*
Ueno, Kouhei; Akagawa, Tomohiko; and Obana, Kazuyoshi, 5,021,226, Cl. 423-554.000.
Obear, Robert F. Environment protected industrial microcomputer. 5,021,763, Cl. 340-407.000.
Obinata, Naomi: *See—*
Groechel, David W.; Taylor, Brad; Henri, John R.; and Obinata, Naomi, 5,021,121, Cl. 156-643.000.
O'Brien, John P.: *See—*
De Lucca, George V.; Kezar, Hollis S., III; and O'Brien, John P., 5,021,207, Cl. 264-186.000.
Occidental Chemical Corporation: *See—*
Molinaro, John R.; Pawlak, Joseph A., and Schwartz, Willis T., 5,021,168, Cl. 549-241.000.
Oce-Nederland B.V.: *See—*
van der Sterren, Martin L.; and Graswinckel, Julius V. C., 5,021,836, Cl. 355-281.000.
Vercoulen, Gerardus C. P.; Faessen, Robert P.; Pennings, Marcel L. M.; and van der Meij, Arnold B. M. H., 5,021,314, Cl. 430-106.000.
Ochi, Yoshiaki: *See—*
Hino, Katsuhiko; Kai, Naoki; Sakamoto, Masato; Kon, Tatsuya; Oka, Makoto; Furukawa, Kiyoshi; and Ochi, Yoshiaki, 5.021,421, Cl. 514-254.000.
Ochiai, Atsushi: *See—*
Tahara, Eiichi; Ochiai, Atsushi, Yokozaki, Hiroshi; Hozumi, Toyoharu; and Kyo, Eikai, 5,021,553, Cl. 530-387.000.
Oda, Michiaki: *See—*
Iwasaki, Atsushi; Mizuishi, Koji; and Oda, Michiaki, 5,020,775, Cl. 251-215.000.
O'Dell, Thomas M . *See—*
Forson, Henry M.; Lothrop, John R.; O'Dell, Thomas M.; and Overmyer, Rick L., 5,022,070, Cl. 379-32.000.
Oden, Anders; and Jonsson, Gunnar, to Diamant Boart Craelius AB Device for boring holes in the ground. 5,020,608, Cl. 175-21.000.
Odenwalder, Heinrich: *See—*
Bergthaller, Peter; Kruger, Thomas; Vetter, Hans; and Odenwalder, Heinrich, 5,021,332, Cl. 430-544.000.
Vetter, Hans; Odenwalder, Heinrich; Bergthaller, Peter; and Kruger, Thomas, 5,021,331, Cl. 430-544.000.
Odom, John W.: *See—*
Rothenberg, Robert E.; LaRaja, Raymond D.; and Odom, John W 5,020,543, Cl. 128-760.000.
Odor, Louis; and Hamilton, Herman O., to Rockwell International Corporation. Reciprocating rotary tool driver. 5,020,606, Cl 173-163.000.
Offiler, Stephen B.: *See—*
Gonsalves, Edward M.; Offiler, Stephen B.; Strott, Douglas B ; and Beringhause, Steven, 5,021,736, Cl. 324-202.000.
Ogata, Takashi: *See—*
Kohdaka, Takayuki; Ishida, Katsuhiko; Takahashi, Toshiyuki; and Ogata, Takashi, 5,021,785, Cl. 341-138.000.
Ogawa, Hisahito: *See—*
Tomita, Yoshihiro; Takayama, Ryoichi; Ogawa, Hisahito; Nomura, Koji; Asayama, Junko; and Abe, Atsushi, 5,021,660, Cl 250-338.300.
Ogino, Keizo: *See—*
Agui, Wataru; Tamura, Shuji, Kuyama, Hiroshi; Kurachi, Yoshiya, Abe, Masahiko, Kaneko, Yukihiro; and Ogino, Keizo, 5,021,391, Cl. 502-426.000.
Ogino, Nobuyoshi, to Shin-Etsu Handotai Co., Ltd. Beveled semiconductor silicon wafer and manufacturing method thereof. 5,021,862, Cl. 357-55.000.
Ogiwara, Yoshihisa: *See—*
Tanaka, Sakae; Watanabe, Yoshiaki; Shirai, Katsuo; and Ogiwara, Yoshihisa, 5,021,850, Cl. 357-23.700.
Oh, Tae-sik, to Samsung Electron Devices Co. Ltd. Supporting structure for an electron gun heater. 5,021,709, Cl. 313-456.000.
Ohara, Minoru. *See—*
Otagiri, Tadashi; Shirai, Masahiro; Ohara, Minoru; and Suzuki, Go, 5,021,287, Cl. 428-212.000.
Ohara, Osamu; Kawashima, Hiroshi, and Takata, Hiroshi, to Yamaha Hatsudoki Kabushiki Kaisha. Conveyor with pivotally damped workpiece carrier. 5,020,440, Cl. 104-127.000.
Ohara, Shinji; Morimoto, Okihiro; and Suemura, Nobumasa, to Ube Industries, Ltd. Polyarylene sulfide resin composition. 5,021,497, Cl 524-436.000.
Ohara, Shinsuke: *See—*
Kono, Masanao; Hasegawa, Yoshihiro; Nishi, Yasutaka; Irie, Hisao; Mizuta, Tatsuji; and Ohara, Shinsuke, 5,021,269, Cl. 427-436.000
Ohbuchi, Yukio: *See—*
Kawasaki, Masahiro; Ohbuchi, Yukio; Maeda, Yoshiaki; and Sato, Susumu, 5,021,534, Cl. 528-60.000.
Ohe, Tatsuya; and Fujimura, Mitsuaki, to Mitsui Petrochemical Industries, Ltd. Non-woven fabric sheet for agricultural use. 5,021,285, Cl. 428-195.000.
Ohkawa, Atsuhiro: *See—*
Kawagishi, Toshio; Ohkawa, Atsuhiro; and Ichijima, Seiji, 5,021,329, Cl. 430-543.000.
Ohkawara, Takashi: *See—*
Kuwata, Satoshi; and Ohkawara, Takashi, 5,021,089, Cl. 106-2.000.
Ohkubo, Tetsuo: *See—*
Yokoshima, Minoru; Ohkubo, Tetsuo; and Kiyomoto, Masayuki, 5,021,467, Cl. 522-96.000.
Ohmi, Tadahiro. Semiconductor integrated circuit. 5,021,843, Cl. 357-23.100.
Ohmori, Akira; and Inukai, Hiroshi, to Daikin Industries, Ltd. Fluorine-containing water-repellent oil-repellent composition. 5,021,501, Cl. 524-544.000.
Ohmori, Akira; and Inukai, Hiroshi, to Daikin Industries, Ltd. Fluorine-containing water-repellent oil-repellent composition. 5,021,527, Cl. 526-245.000.
Ohmura, Atsuo: *See—*
Koiso, Jun-ichi; and Ohmura, Atsuo, 5,020,697, Cl. 222-325.000.
Ohmura, Hiroshi: *See—*
Kanazawa, Hirotaka; Ohmura, Hiroshi; Tomoda, Atsuo; Furuzawa, Akihiro; Nakashima, Takashi; and Hideshima, Masao, 5,020,619, Cl. 180-140.000.
Ohno, Kouji: *See—*
Saito, Shinichi; Ushioda, Makoto; Inoue, Hiromichi; Miyazawa, Kazutoshi; and Ohno, Kouji, 5,021,191, Cl. 252-299.610
Ohnuki, Ichiro: *See—*
Washisu, Koichi; Ohnuki, Ichiro; and Nagata, Toru, 5,020,369, Cl. 73-517.00A.
Ohsawa, Michitaka: *See—*
Arai, Ikuya; Kitou, Kouji; and Ohsawa, Michitaka, 5,021,719, Cl. 315-364.000.
Ohsima, Tetsuhiro: *See—*
Tanaka, Akihiro; Ohsima, Tetsuhiro; and Sakamoto, Takumi, 5,021,036, Cl. 474-237.000.
Ohta, Eiichi: *See—*
Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, 5,021,877, Cl. 358-75.000.

Ohta, Tomozo; Nakano, Hiroshi; Higashi, Kazutada; and Yamamoto, Hirohiko, to Sharp Kabushiki Kaisha. Microwave date transmission apparatus. 5,021,790, Cl. 342-44.000.
Ohtaka, Kazuto; and Inaba, Shigemitsu, to Yazaki Corporation. Apparatus for confirming fitting of electric connector. 5,021,003, Cl. 439-357.000.
Ohwada, Jun-ichi; Kitajima, Masaaki; Suzuki, Masayoshi; Takabatake, Masaru; and Nagae, Yoshiharu, to Hitachi, Ltd. Method and circuit for scanning capacitive loads. 5,021,774, Cl. 340-811.000.
Ohyama, Yoshimasa: *See—*
Asai, Makoto; Ohyama, Yoshimasa; Tanigawa, Tohru; Shinozaki, Shigeo; and Shiga, Shoji, 5,021,105, Cl. 148-433.000.
Oikawa, Saburo; Yatsuo, Tsutomu; and Satou, Yukimasa, to Hitachi, Ltd. Gate turn-off thyristor. 5,021,855, Cl. 357-38.000.
Oka, Makoto: *See—*
Hino, Katsuhiko; Kai, Naoki; Sakamoto, Masato; Kon, Tatsuya; Oka, Makoto; Furukawa, Kiyoshi; and Ochi, Yoshiaki, 5,021,421, Cl. 514-254.000.
Okada, Junichi: *See—*
Furutani, Akihiro; Okada, Junichi; and Tanimoto, Tomoaki, 5,020,444, Cl. 104-284.000.
Okada, Kenichi; Tanigawa, Shu; and Nishino, Masashi, to Japan Aviation Electronics Industry Limited. Fiber optic gyro with temperature compensated phase ramp. 5,020,913, Cl. 356-350.000.
Okada, Minoru, to Osaka Taiyu Co., Ltd. Device for clamping container. 5,020,963, Cl. 414-607.000.
Okajima, Hiroshi; and Sudo, Susumu, to Sankyo Rikagaku Co., Ltd.; and Takekawa Tekko Kabushiki Kaisha. Grinding tool and method of making the same. 5,020,282, Cl. 51-206.00R.
Okajima, Tomoki, to Pioneer Electronic Corporation. Mounting structure for mounting an instrument on a supporting member of a motor vehicle. 5,020,748, Cl. 248-27.100.
Okamoto, Hiroaki: *See—*
Hamakawa, Yoshihiro; Okamoto, Hiroaki; and Hattori, Yutaka, 5,021,103, Cl. 148-33.000.
Okamoto, Masanori: *See—*
Hatanaka, Hiroshi; Ezaki, Masami, Tsujii, Eisaku; Okamoto, Masanori; Shigematsu, Nobuharu; Okuhara, Masakuni; and Takase, Shigehiro, 5,021,240, Cl. 424-118.000.
Okamoto, Shinji: *See—*
Kita, Toshiro; Genba, Susumu; Takemoto, Masato; Tatsumi, Takashi, Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi; Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji, and Yoshida, Toshihiko, 5,021,892, Cl. 358-468 000.
Okamura, Mitsuyoshi: *See—*
Matoba, Tsukasa; Aikawa, Takeshi; Okamura, Mitsuyoshi; Maeda, Ken-ichi; and Saito, Mitsuo, 5,021,993, Cl. 364-900.000.
Okamura, Ryo; Nishida, Shinichiro; and Asakura, Makoto, to Kabushiki Kaisha Toshiba. Manipulator operating apparatus. 5,021,969, Cl. 364-513.000.
Okano, Shinichi; and Hara, Makoto, to Fuji Photo Film Co., Ltd. Method for displaying autoradiograph. 5,021,656, Cl. 250-327.200.
Okawa, Kazuyoshi: *See—*
Miyazaki, Toshimasa; Uzawa, Yoji; Okawa, Kazuyoshi; Kawashima, Hiroshi; Moriya, Kazumasa; Murakawa, Yoshitaka; Kumagai, Toshimitsu; Nakamura, Akihiro; Itoh, Motohiko; and Kashiwazaki, Tomoyuki, 5,021,695, Cl. 310-12.000.
Okawada, Takeshi: *See—*
Mase, Masahiro; Sakagami, Seiji; Okawada, Takeshi; Ueda, Shinjiroo; Awada, Yoshihisa; and Nagaoka, Takashi, 5,020,969, Cl. 415-55.300.
Okazaki, Koju: *See—*
Nagata, Teruyuki; Okazaki, Koju, Kajimoto, Nobuyuki: Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 5,021,503, Cl. 524-706.000.
Oki Electric Industry Co., Ltd.: *See—*
Yoshida, Isao; Inoue, Hidetoshi; and Arai, Kanji, 5,021,890, Cl. 358-405.000.
Okimoto, Haruo: *See—*
Tashima, Seiji; Okimoto, Haruo; and Akagi, Toshimichi, 5,020,327, Cl. 60-600.000.
Okitsu, Katsuhiko: *See—*
Sashida, Minoru; Yanagi, Masaaki; Okitsu, Katsuhiko; and Higuchi, Hirokazu, 5,020,900, Cl. 353-26.00R.
Okudaira, Masayuki: *See—*
Kishikawa, Kenjiro; Nishihara, Yoshitaka; and Okudaira, Masayuki, 5,020,690, Cl. 222-83.000.
Okuhara, Masakuni: *See—*
Hatanaka, Hiroshi; Ezaki, Masami; Tsujii, Eisaku: Okamoto, Masanori; Shigematsu, Nobuharu; Okuhara, Masakuni; and Takase, Shigehiro, 5,021,240, Cl. 424-118.000.
Okumura, Hiroyuki: *See—*
Tsurunaga, Kazuyuki; Masuda, Yoshihisa; Okumura, Hiroyuki; and Ito, Daisuke, 5,021,914, Cl. 361-19.000.
Okumura, Katsuya: *See—*
Miyoshi, Motosuke; and Okumura, Katsuya, 5,021,702, Cl. 313-7.000.
Okuna, Kenji: *See—*
Muroi, Katsumi; Okuna, Kenji; Otsuka, Hidefumi, Ouchi, Kastubumi; Iimura, Tsutomu, and Kojima, Ryoji, 5,021,810, Cl. 346-155.000.
Okura, Hideo: *See—*
Oshima, Hiroshi; and Okura, Hideo, 5,020,310, Cl. 56-17.200.
Olbrich, Bernd, to Frankl & Kirchner GmbH & Co. KG. Method for digitally storing a sewing pattern for an industrial sewing machine and a device for manually correcting a stored sewing pattern. 5,021,965, Cl. 364-470.000.
Olin Corporation: *See—*
Gay, Walter A., 5,021,164, Cl. 210-694.000.
Stoops, Billie J., 5,021,206, Cl. 264-155.000.
Winter, Joseph; Mahulikar, Deepak; and Mandigo, Frank N., 5,020,439, Cl. 102-518.000.
Olin Hunt Sub I Corp.: *See—*
Goldman, Dov B., 5,021,315, Cl. 430-106 600.
Olma, Marian: *See—*
Ernst, Richard J.; Paul, Sigismund; Sevald, Frederick G.; and Olma, Marian, 5,020,693, Cl. 222-137.000.
Olsen, J. H.; Harvey, Thomas L.; Cornett, Mark J.; and Galatis, Demetre, to Otis Elevator Company. Method and apparatus for erecting hydraulic elevator rails. 5,020,641, Cl. 187-95.000.
Olson, Dan: *See—*
Ewing, John; Olson, Dan; and Preston, Walter P . 5,020,525, Cl. 128-84.00R.
Olson, Kurt G.: *See—*
Wilson, Craig A.; Olson, Kurt G.; Koren, Jeffrey G.; Longhini, Debra M.; Dugan, Carol S.; and Jozwiak, Edward L., Jr., 5,021,135, Cl. 204-180.800.
Olson, William: *See—*
Grome, Donald C.; Lundstedt, Kurt H , and Olson, William, 5,020,189, Cl. 16-286.000.
Olympus Optical Co., Ltd.: *See—*
Iketaki, Yoshinori, 5,022,064, Cl. 378-145.000.
Ito, Kenichi, 5,022,021, Cl. 369-44.110.
Yokoi, Takeshi; and Horikawa, Yoshihito, 5,020,539, Cl. 128-662.060.
Omet, Dominique: *See—*
Leforestier, Sylvain; and Omet, Dominique, 5,021,688, Cl. 307-463.000.
Omnipoint Data Corporation: *See—*
Dixon, Robert C.; and Vanderpool, Jeffrey S., 5,022,047, Cl 375-1.000.
Ondrasik, V. John. Wheeled grocery cart 5,020,811, Cl. 280-33.993
One Way Out, Inc.: *See—*
Logan, Karl P., 5,020,347, Cl. 70-389 000.
O'Neill, Michael J.: *See—*
Braun, Stephen A.; O'Neill, Michael J . Polak, David C.; and Cutshall, Donald L., 5,020,308 Cl. 56-11.300
Onishi, Masayoshi: *See—*
Yagi, Tadashi; Noguchi, Masahiko; Kozuka, Hajime; Morishita, Mitsuharu; and Onishi, Masayoshi, 5,020,616, Cl. 180-79 100.
Onodera, Yoichi: *See—*
Yokouchi, Hisatake; Onodera, Yoichi; Funo, Takakazu; and Tsuneoka, Masayuki, 5,022,063, Cl. 378-99.000.
Ooishi, Tsukasa: *See—*
Arimoto, Kazutami; Matsuda, Yoshio; Ooishi, Tsukasa; Tsukude, Masaki; and Fujishima, Kazuyasu. 5,022,007, Cl. 365-201.000.
Ooka, Masayuki: *See—*
Nakaya, Michihiko; Fukushi, Yukiharu; Kodaka, Kenji; Ooka, Masayuki; Shiraishi, Shirou; Nakamura, Masahiko; and Numata, Satoshi, 5,021,412, Cl. 514-223.800.
Ooyama, Nobumi: *See—*
Utsunomiya, Kazuhiro; Ooyama, Nobumi; and Sakaba, Hideo, 5,021,210, Cl. 376-247.000.
O'Reilly, Gerard. Grinding tool and spacer assembly for use therein. 5,020,280, Cl. 51-168.000.
Orgun, Munir; Pappu, Venkata R.; and Toledo, Alfredo A., Jr., to Boeing Company, The. Method and apparatus for controlling flare engagement height in automatic landing systems. 5,020,747, Cl 244-187.000.
Orion-Yhtma Oy: *See—*
Mustakallio, Kimmo K., 5,021,185, Cl 252-142.000.
Orler, Anthony J.; Hobrock, Lowell M.; and Lippey, Barret, to Hughes Aircraft Company. Conformally doped optical elements 5,020,887, Cl. 350-409.000.
Orlova, Natalia A.: *See—*
Shipov, Alexandr G.; Kramarova, Evgenia P.; Orlova, Natalia A., Baukov, Jury I.; and Ziemelis, Kristap M., 5,021,568, Cl. 540-531.000.
Ormat Turbines (!965) Ltd.: *See—*
Bronicki, Lucien Y., 5,020,328, Cl. 60-641 500.
Ortho Pharmaceutical Corporation: *See—*
Hajos, Zoltan G.; Kanojia, Ramesh M ; and Press, Jeffery B , 5,021,574, Cl. 544-276.000.
Ortomedical S.r.l.: *See—*
Monfardini, Alessio; and Grassi, Angelo, 5,021,054, Cl. 606-54.000.
Osaka, Shuichi: *See—*
Takahashi, Yoshiharu; and Osaka, Shuichi, 5,021,865, Cl. 357-70.000.
Osaka Taiyu Co., Ltd.: *See—*
Okada, Minoru, 5,020,963, Cl. 414-607.000.
Oshikubo, Yuju, to Nichiryo Co., Ltd. Multipipet. 5,021,217, Cl 422-100.000.
Oshima, Hiroshi; and Okura, Hideo, to Kubota Corp. Lawn mower 5,020,310, Cl. 56-17.200.
Oshima, Mitsuaki; Izaki, Masataka, Kajino, Jirou; Igarashi, Yoshiaki, and Mitani, Hiroshi, to Matsushita Electric Industrial Co., Ltd Camera apparatus with fluctuation suppressing means. 5,020,890, Cl. 350-500.000.
Oshima, Takeshi: *See—*
Trada, Atsusuke; Amemiya, Yoshiya; Matsuda, Keiichi; and Oshima, Takeshi, 5,021,444, Cl. 514-397 000.

VOL
1127
ISS
1
JE
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1991
UMI

- Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, to Fuji Jukogyo Kabushiki Kaisha. Method and apparatus for checking torque sensor in electric power steering system for vehicle. 5,020,617, Cl. 180-79.100.
- Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, to Fuji Jukogyo Kabushiki Kaisha. Electric power steering system for a motor vehicle. 5,021,721, Cl. 318-432.000.
- Osterkamp, Eva: *See—*
  - Helldorfer, Reinhard; Kanzler, Ulrich; Rauch, Hans; and Osterkamp, Eva, 5,021,962, Cl. 364-457.000.
- Ota, Masanori; Aoki, Masafumi; Nakamura, Masashi; Mizusawa, Kenichi; and Kasahara, Kumi, to Nissan Chemical Industries, Ltd. Chloroisocyanuric acid composition having storage stability 5,021,186, Cl 252-186.350.
- Otagiri, Tadashi; Shirai, Masahiro; Ohara, Minoru; and Suzuki, Go, to NGK Insulators, Ltd Ceramic green sheets. 5,021,287, Cl 428-212.000.
- Otis Elevator Company: *See—*
  - Olsen, J. H.; Harvey, Thomas L.; Cornett, Mark J., and Galatis, Demetre, 5,020,641, Cl. 187-95.000.
  - Sansevero, Frank; Seehausen, Klaus; and Rivera, James A , 5,020,654, Cl. 198-328.000.
- Otobe, Mutumi: *See—*
  - Tsuchiya, Michio; Otsuka, Shuji, Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, 5,021,877, Cl 358-75.000.
- O'Toole, Terrence R.: *See—*
  - Arbach, Gary V.; O'Toole, Terrence R., and Viehbeck, Alfred, 5,021,129, Cl. 204-15.000.
- Otsu, Hitonobu: *See—*
  - Ishihai, Isao; and Otsu, Hitonobu, 5,020,888, Cl. 350-432.000.
- Otsuka, Hidefumi: *See—*
  - Muroi, Katsumi; Okuna, Kenji, Otsuka, Hidefumi; Ouchi, Kastuhumi; Iimura, Tsutomu; and Kojima, Ryoji, 5,021,810, Cl. 346-155.000.
- Otsuka Pharmaceutical Co., Ltd.: *See—*
  - Nakano, Yoshimasa; Sugawara, Michiharu; Uetsuki, Setsuyoshi; Izawa, Taketoshi; Kawaguchi, Tomoyuki; and Wada, Akira, 5,021,419, Cl. 514-253.000.
- Otsuka, Shuji: *See—*
  - Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya, and Matsumura, Koji, 5,021,877, Cl 358-75.000.
- Ott, Arthur, to Wellington Leisure Products, Inc. Water sports board with adjustable binder plates. 5,021,017, Cl. 441-70.000.
- Ott, Karl-Heinz: *See—*
  - Fuhr, Karl; Muller, Friedemann, Ott, Karl-Heinz; El-Sayed, Aziz; Muller, Peter-Rolf; and Wandel, Martin, 5,021,488, Cl. 524-116.000.
- Ouchi, Kastubumi: *See—*
  - Muroi, Katsumi; Okuna, Kenji; Otsuka, Hidefumi; Ouchi, Kastuhumi: Iimura, Tsutomu; and Kojima, Ryoji, 5,021,810, Cl. 346-155.000.
- Overlach, Knud: *See—*
  - Kauer, Harald; Overlach, Knud; Edelmann, Rolf; and Gassner, Siegfried, 5,020,236, Cl. 33-700.000.
- Overland Bolling Company: *See—*
  - Overland, Kenneth, and Lackowski, Robert, 5,021,913, Cl. 360-133.000.
- Overland, Kenneth; and Lackowski, Robert, to Overland Bolling Company. Shutter for covering a window opening in a case that contains a flexible disk 5,021,913, Cl. 360-133.000.
- Overmyer, Rick L.: *See—*
  - Forson, Henry M.; Lothrop, John R., O'Dell, Thomas M . and Overmyer, Rick L., 5,022,070, Cl. 379-32.000.
- Owen, Hartley, to Mobil Oil Corporation Resid cracking apparatus. 5,021,222, Cl. 422-144.000.
- Owens, Brian S.; and Kimpel, Alvin A., to Warman International, Inc. Split seat gate valve. 5,020,776, Cl. 251-327.000.
- Owens-Illinois Closure Inc.: *See—*
  - Kusz, Maximillian, 5,020,681, Cl. 215-220.000.
- Oxford, Stuart G. All-terrain wheelchair. 5,020,818, Cl. 280-250.100.
- Oy Helo-Tehtaat Helo-Factories Ltd.: *See—*
  - Perala, Reijo; and Kivimaa, Antii, 5,021,637, Cl. 219-485.000.
- Ozaki, Hidetoshi; and Gokura, Akira, to Victor Company of Japan, Ltd. Noise reducer circuit for video signal. 5,021,884, Cl. 358-167.000.
- Ozawa, Masayuki, to Mitsubishi Denki Kabushiki Kaisha. Engine igniter. 5,020,506, Cl. 123-631.000.
- Ozawa, Shigeo: *See—*
  - Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; Ozawa, Shigeo; Imai, Toshitaka; and Shimada, Takamichi, 5,020,391, Cl. 74-866.000.
- Ozawa, Tsutomu: *See—*
  - Jimbo, Yoshiji; and Ozawa, Tsutomu, 5,021,725, Cl. 318-801.000.
- Pabst, Manfred: *See—*
  - Bald, Wilfried; Feldmann, Hugo; Pabst, Manfred; and Fischer, Rudiger, 5,021,265, Cl. 427-365.000.
- Packaging Industries Group, Inc.: *See—*
  - Kozma, Matthew L., 5,021,463, Cl. 521-143.000.
- Padget, John C.; and Pears, David A., to Imperial Chemical Industries PLC. Polyester polymers and aqueous dispersions thereof. 5,021,544, Cl. 528-272.000.
- Paetz, Klaus-Christian *See—*
  - Serini, Volker; Freitag, Dieter; Idel, Karsten-Josef; Westeppe, Uwe, Grigo, Ulrich; and Paetz, Klaus-Christian, 5,021,542, Cl 528-204.000.
- Pagano, Daniel M , and Miller, Stephen H., to Eastman Kodak Company Camera apparatus for use with film cassette having film exposure status indicator. 5,021,816, Cl. 354-275.000
- Paisley, Robert J.: *See—*
  - Frost, Rodney I.; and Paisley, Robert J., 5,021,204, Cl 264-60.000
- Palfreyman, Michael G.; Bey, Philippe; and McDonald, Ian A , to Merrell Dow Pharmaceuticals Inc. Inhibitors of lysyl oxidase 5,021,456, Cl. 514-649.000.
- Palitex Project Company GmbH *See—*
  - Inger, Siegfried; and Schroeders, Manfred, 5,020,735, Cl. 242-1.000
- Palka, Matthew S., Jr.: *See—*
  - Bealkowski, Richard; Blackledge, John W., Jr., Cronk, Doyle S , Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G , Kovach, George D.; McNeill, Andrew B., Palka, Matthew S , Jr , Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M , 5,022,077, Cl. 380-4.000.
- Pallini, Joseph W., Jr , to Vetco Gray Inc. Alignment device for a tension leg platform tendon top connector 5,020,942, Cl 405-224.000.
- Palmateer, Steven J : *See—*
  - Renner, J. John; Palmateer, Steven J.; Petry, John S., Hoppe, Federick J.; and Bertrand, Steven R., 5,020,820, Cl 280-439.000
- Palmer, David G., to Pure Water, Inc. Water distillation system and method with controls. 5,021,128, Cl. 203-1.000.
- Palmer, Dwight O.: *See—*
  - Grey, Thaddeus J.; Braun, Charles W., and Palmer, Dwight O , 5,020,505, Cl. 123-571.000
- Paloma Kogyo Kabushiki Kaisha: *See—*
  - Ishiguro, Katsusuke, and Yokoyama, Nobuyoshi, 5,020,987, Cl 431-1.000.
- Palomo-Coli, Antonio L : *See—*
  - Ballester-Rodes, Montserrat; Palomo-Nicolau, Francisco E , and Palomo-Coli, Antonio L., 5,021,582, Cl. 548-197.000.
- Palomo-Nicolau, Francisco E.: *See—*
  - Ballester-Rodes, Montserrat; Palomo-Nicolau, Francisco F , and Palomo-Coli, Antonio L., 5,021,582, Cl. 548-197.000.
- Panach, Rafael B.; and Royo, Rafael B. Ninety degree turn fastener 5,020,196, Cl. 24-590.000.
- Paneth, Eric; Handzel, Mark J.; Morley, Steven A.; and Avis, Graham M., to International Mobile Machines Corporation. Subscriber RF telephone system for providing multiple speech and/or data signals simultaneously over either a single or a plurality of RF channels 5,022,024, Cl. 370-50.000.
- Pantera Armory, Inc.: *See—*
  - Tripp, Fred D., 5,020,416, Cl. 89-14.300.
- Paperboard Industries Corporation: *See—*
  - Zimmermann, John, 5,020,718, Cl. 229-117.220.
- Pappu, Venkata R.: *See—*
  - Orgun, Munir; Pappu, Venkata R., and Toledo, Alfredo A , Jr , 5,020,747, Cl. 244-187.000.
- Park, Kyong, to Kavlico Corporation. Low pressure transducer using metal foil diaphragm. 5,020,377, Cl. 73-718.000.
- Park, Yung-Jun, to SamSung Electronics Co., Ltd. Method and circuit for composing still image of picture-in-picture. 5,021,887, Cl. 358-183.000.
- Parker, Delmer G.; Allen, William M., Jr.; and Stark, Howard M., to Xerox Corporation. Preferred toner/carrier properties. 5,021,838, Cl. 355-328.000.
- Parker, Donald A.; and Rogers, Wayne W., to Alcon Laboratories, Inc Handpiece drive apparatus for powered surgical scissors. 5,020,535, Cl. 606-174.000.
- Parker, Roger A.: *See—*
  - Robinson, Keith M.; Mao, Simon J. T.; Parker, Roger A.; and Jackson, Richard L., 5,021,461, Cl. 514-731.000.
- Parkinson, Bruce A., to Du Pont de Nemours, E. I., and Company Etching of nanoscale structures. 5,021,672, Cl. 250-492.200.
- Parkinson, Ward D.: *See—*
  - Kelly, Douglas M.; Parkinson, Ward D ; and Allen, Timothy J , 5,021,864, Cl. 357-70.000.
- Parmenon, Daniel: *See—*
  - Krzywdziak, Alain; Parmenon, Daniel, and Godat, Jean, 5,020,700, Cl. 222-487.000.
- Parr, Thomas: *See—*
  - Damm, Norbert, and Parr, Thomas, 5,020,582, Cl. 164-37.000
- Pasion, Merlyn C.: *See—*
  - Armbruster, David R.; and Pasion, Merlyn C., 5,021,539, Cl. 528-129.000.
- Pass & Seymour, Inc.: *See—*
  - Fargeaud, Daniel; and Tarrade, Gerard, 5,021,006, Cl. 439-469.000.
- Passmore, Edmund M.; and Keeffe, William M., to GTE Products Corporation. Metal halide lamp. 5,021,703, Cl. 313-25.000.
- Pastor, Stephen D.: *See—*
  - Ravichandran, Ramanathan; and Pastor, Stephen D., 5,021,479, Cl. 524-96.000.
- Patnaik, Prabodh K.; and Cells, Paul L., to Mooney Chemicals, Inc. Process for making bismuth carboxylates. 5,021,598, Cl. 556-77.000
- Patterson, David W.: *See—*
  - St. Angelo, Stephen, Jr.; Carver, George C.; Patterson, David W ; and Fremont, Owen K., 5,020,278, Cl. 49-490.000.
- Patzschke, Hans-Peter; Cerny, Peter W.; Saatweber, Dietrich; and Hendrikx, Georg H. L., to Herberts Gesellschaft mit beschrankter

Haftung Aqueous electrodeposition lacquer coating composition. 5,021,502, Cl. 524-591.000.

- Paucke, Walter J.: *See—*
  - Arroyo, Candido J., and Paucke, Walter J., 5,020,875, Cl. 350-96.230.
- Paul, Axel: *See—*
  - Urban, Dieter; Ladner, Wolfgang, and Paul, Axel, 5,021,345, Cl. 435-180.000.
- Paul Hettich GmbH & Co.: *See—*
  - Faust, Karl-Volker, 5,020,869, Cl 312-341.100.
- Paul, Sigismund: *See—*
  - Ernst, Richard J.; Paul, Sigismund, Sevald, Frederick G , and Olma, Marian, 5,020,693, Cl. 222-137.000.
- Paulsen, Jurgen: *See—*
  - Wurl, Ernst; Hafner, Alfred, Paulsen, Jurgen; Marienfeld, Peter, and Grogor, Bruno, 5,020,914, Cl 366-79.000.
- Pavlath, George A., to Litton Systems, Inc. Fiber optic rotation sensing system and method for basing a feedback signal outside of a legion of instability. 5,020,912, Cl. 356-350.000.
- Pawlak, Joseph A.: *See—*
  - Molinaro, John R.; Pawlak, Joseph A.; and Schwartz, Willis T , 5,021,168, Cl. 549-241.000.
- Pawlik, James A., to GTE Valenite Corporation. Indexable insert for roughing and finishing. 5,020,944, Cl. 407-42.000.
- Payne, Jay M.: *See—*
  - Payne, Susan M ; and Payne, Jay M., 5,020,338, Cl. 63-12.000.
- Payne, Roy D.; and Lammon, Mark A. Method and apparatus for securing first and second members. 5,020,355, Cl. 72-407.000.
- Payne, Susan M.; and Payne, Jay M Earring post for pierced ears. 5,020,338, Cl. 63-12.000.
- Paz, Ofer, to Aryt Optronics Industries Ltd Boresight module. 5,020,906, Cl 356-138.000.
- Peake, Steven L.: *See—*
  - Leone-Bay, Andrea; Peake, Steven L., and Kaminski, Stanley S., 5,021,540, Cl. 528-183.000.
- Pearl, Kevin A.: *See—*
  - Wolfson, Lawrence S.; Pearl, Kevin A ; and Moskwa, Russell M., 5,020,405, Cl. 83-374.000.
- Pears, David A.: *See—*
  - Padget, John C.; and Pears, David A., 5,021,544, Cl. 528-272.000.
- Pecheur, Jacques: *See—*
  - Schapira, Joseph; Pecheur, Jacques; Vincent, Jacques, Schild, Jacques; and Bosselin, Bruno, 5,021,083, Cl 71-105.000.
- Peck, Donald R., to Deere & Company. Dual tillage implement 5,020,604, Cl. 172-177.000.
- Pell, Donald M.; and Martinetto, Cosimo. Endotracheal tube apparatus and method. 5,020,534, Cl 128-207.150.
- Pellegrin, Jean: *See—*
  - Borie, Gerard; Pellegrin, Jean; and Le Roch, Alain, 5,020,297, Cl. 53-127.000.
- Pena, Louis T. Camera mount for rifle scopes. 5,020,262, Cl. 42-106.000.
- Penetti, Romolo, to Speno International S.A. Device for the precise transverse positioning for a member displaceable along a rail of a railway track with respect to said rail. 5,020,371, Cl. 73-636.000.
- Penkunas, Joseph J.: *See—*
  - Ludwig, David C.; and Penkunas, Joseph J., 5,021,208, Cl. 264-344.000.
- Pennings, Marcel L. M : *See—*
  - Vercoulen, Gerardus C. P.; Faessen, Robert P.; Pennings, Marcel L. M.; and van der Meij, Arnold B. M. H., 5,021,314, Cl. 430-106.000.
- Pennwalt France S.A.: *See—*
  - Nouws, Jacobus A. M.; Kool, Pieter; and Diepenhorst, Pieter C., 5,021,594, Cl. 556-38.000.
- Pepose, Jay S.: *See—*
  - Lichtman, Jeffrey W.; Pepose, Jay S.; and Dave, Rakhal, 5,020,891, Cl. 350-527.000.
- Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; and Myers, Gregory K. Apparatus for detecting primitive patterns in an image. 5,022,087, Cl. 382-32.000.
- Perala, Reijo; and Kivimaa, Antii, to Oy Helo-Tehtaat Helo-Factories Ltd. Method of controlling the supply of electric power to an electric sauna heater. 5,021,637, Cl. 219-485.000.
- Perkin-Elmer Corporation, The: *See—*
  - de Groot, Peter, 5,020,901, Cl. 356-5.000.
- Perks, Malcolm P.: *See—*
  - Kulczyk, Konrad; Perks, Malcolm P.; and Smith, George W., 5,022,014, Cl. 367-87.000.
- Perron, Claude; and Tourtier, Philippe, to Thomson-CSF. Variable length encoding method and variable length decoding method, encoding device and decoridng device for the implementation of this method. 5,021,782, Cl. 341-67.000.
- Perroud, Bruno G.; Rouquayrol, Claude J.; and Guilhem, Jean C., to Irrifrance-Cofadsi. Automatic irrigation machine including a drum driven by a hydraulic actuator, and a computer for regulating the actuator rate. 5,020,730, Cl. 239-745.000.
- Persson, Elerth. Sound and vibration damper. 5,020,766, Cl. 248-559.000.
- Pesin, Abram I.; and Chevakin, Ivan V., to Spetsializirovanny Trest PO Remontu Promyshlennykh Zdany I Sorruzheny Predpriyaty Chernoi Metallurgii Tsentrainogo Raiona "Tsentremetallurgremont". Apparatus for disintegrating monolythic entities. 5,020,859, Cl. 299-21.000.
- Peterman, Thomas H.; Anderson, David L.; Hakansson, Jan; and Marovskis, Harijs B., to Tetra Pak Holdings & Finance S.A. Method and apparatus for loading and stacking crates. 5,020,304, Cl. 53-458.000.
- Petersen, Lars-Goran; and Adamsson, Ulf M., to Telefonaktiebolaget L M Ericsson. Method of throughconnecting wideband connections in a digital time switch module between subscribers, and a device for carrying out the method. 5,022,026, Cl 370-66.000.
- Peterson, Alex, Jr.: *See—*
  - Durairaj, Bojayan; Peterson, Alex, Jr., Lamars, Robert M , and Hood, Richard T., 5,021,522, Cl. 525-502.000
- Peterson, George E.: *See—*
  - Atkins, Robert M.; Peterson, George E., and Tuminaro, Raymond D., 5,021,072, Cl 65-3.110
- Peterson, Hans: *See—*
  - Ranby, Mats G.; and Peterson, Hans, 5,021,346, Cl 435-219.000
- Peterson, Mark L.: *See—*
  - Ross, Monte; Peterson, Mark L., and Missler, Leonard R , 5,021,961, Cl. 364-443.000.
- Peterson, Sandra J.: *See—*
  - Brown, Nanette; and Peterson, Sandra J , 5,021,963, Cl 364-464.020.
- Peterson, Scott M., to Honeywell Inc. Intermittent pilot type hurner control with a single control relay. 5,020,988, Cl. 431-51.000.
- Petroff, Alan M.; and Fullerton, Larry W., to ADS Environmental Services, Inc. Velocity measurement system 5,020,374, Cl 73-861.250.
- Petrolite Corporation: *See—*
  - Mathew, Jacob, 5,021,587, Cl. 548-543.000.
- Petropoulos, Mark; and Hammond, John M., to Xerox Corporation Method of preparing a multilayered belt. 5,021,109, Cl. 156-137.000.
- Petrus, Leonardus: *See—*
  - Gautier, Pieter A.; Geuze, Maarten M.; Mastenbroek, Barend, and Petrus, Leonardus, 5,021,547, Cl. 528-392.000.
- Petry, John S.: *See—*
  - Renner, J. John; Palmateer, Steven J.; Petry, John S.; Hoppe, Federick J.; and Bertrand, Steven R., 5,020,820, Cl. 280-439.000
- Pettengill, Edwin R., to Chesebrough-Pond's, Inc. Multi-cavity dispensing container. 5,020,694, Cl. 222-137.000.
- Peyronel, Jean-Francois: *See—*
  - Comte, Marie-Iherese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois, and Truchon, Alain, 5,021,420, Cl. 514-253.000.
- Peyton, Fred I.: *See—*
  - Drake, Kenneth M.; Anderson, John W ; Carr, Lee D.; and Peyton, Fred I., 5,021,157, Cl. 210-248.000.
- Pfeiffer, Brigitte, executrix: *See—*
  - Gries, Heinz; Rosenberg, Douwe; Weinmann, Hanns-Joachim; Speck, Ulrich; Mutzel, Wolfgang; Hoyer, Georg-Alexander; and Pfeiffer, Heinrich, deceased, 5,021,236, Cl. 424-9.000.
- Pfeiffer, Heinrich, deceased: *See—*
  - Gries, Heinz; Rosenberg, Douwe; Weinmann, Hanns-Joachim, Speck, Ulrich; Mutzel, Wolfgang; Hoyer, Georg-Alexander; and Pfeiffer, Heinrich, deceased, 5,021,236, Cl. 424-9.000.
- Pfiester, James R., to Motorola, Inc. Process for manufacturing a semiconductor device. 5,021,354, Cl. 437-34.000.
- Pfiester, John R.; and Mauntel, Richard W., to Motorola, Inc. Compact SRAM cell with polycrystalline silicon diode load. 5,021,849, Cl 357-23.500.
- Phillips, Edward D. Aquatic exercise device. 5,020,791, Cl. 372-71.000.
- Phillips, Joseph R.; Weston, John D.; and Meredith, Michael D., to Kamyr, Inc. Pistonless accumulator. 5,021,125, Cl. 162-232.000.
- Phillips, Peter J.: *See—*
  - Gartner, Klaus W.; Uyeda, Alan K., and Phillips, Peter J., 5,020,345, Cl. 70-277.000.
- Phillips Petroleum Company: *See—*
  - Hovis, Keith W., 5,021,223, Cl. 422-198.000.
  - Maholland, Michael K.; Fu, Chia-Min; Lowery, Richard E., Bertus, Brent J.; and Kubicek, Donald H., 5,021,377, Cl 502-26.000.
  - Martin, Shirley J.; McDaniel, Max P.; Conroy, Brian K.; and Martin, Joel L., 5,021,379, Cl. 502-102.000.
- Phillips, Robert D. Paperboard container having leak preventative raised sealing scores. 5,021,040, Cl 493-133.000.
- Physio-Control Corporation: *See—*
  - Marriott, Arthur R., 5,020,541, Cl. 128-723.000.
- PIC ANOL N V., naamloze vennootschap: *See—*
  - van Bogaert, Philippe; and Hillaert, Rik, 5,020,574, Cl 139-188.00R.
- Pickard, Robert S.: *See—*
  - Wall, Peter; Pickard, Robert S.; Ensell, Graham; and Leong, David, 5,020,376, Cl. 73-866.500.
- Pickett, Scott K.; Luich, Thomas M.; and Swift, Arthur L., IV, to National Semiconductor Corp. Multiple page programmable logic architecture. 5,021,689, Cl. 307-465.000.
- Pickrell, John W., to Government Innovators, Inc. Gripping apparatus. 5,020,844, Cl. 294-86.400.
- Pierce, Gerald A.: *See—*
  - Peppers, Norman A.; Young, James R.; Pierce, Gerald A.; and Myers, Gregory K., 5,022,087, Cl. 382-32.000.
- Piesch, Franz: *See—*
  - Kersting, Hermann; and Piesch, Franz, 5,021,028, Cl. 460-85.000.
- Pietruszka, Rita D.: *See—*
  - Stark, Charles J.; and Pietruszka, Rita D., 5,021,537, Cl. 528-106.000.
- Pietzsch AG: *See—*
  - Kauer, Harald; Overlach, Knud; Edelmann, Rolf; and Gassner, Siegfried, 5,020,236, Cl. 33-700.000.
- Pigeau, Roger R.; and Schuster, Fred. Attachment for box making machine. 5,021,041, Cl. 493-177.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Pike, Ronald L.; and Beckley, Ronald W., to Kidde Industries, Inc. Control panel power enabling and disabling system for aerial work platforms. 5,021,917, Cl. 361-195.000.
- Pilgrim, William R.; Young, Derek W.; Tait, Brian S.; Crawley, Graham C.; Edwards, Philip N.; and Hill, George B., to Imperial Chemical Industries PLC. Phenol derivatives. 5,021,414, Cl. 514-237.500.
- Pinkerton, Dennis. Valveless, positive displacement pump including hinge for angular adjustment. 5,020,980, Cl. 417-500.000.
- Pinomaa, Olli, to O Pinomaa KY. Dyeable pavement material 5,021,476, Cl. 524-77.000.
- Pioneer Electronic Corporation: *See—*
  - Kikuchi, Ikuya; and Sato, Ryo, 5,022,022, Cl. 369-44.160.
  - Matsui, Fumio; and Murata, Yasushi, 5,021,931, Cl. 362-84.000.
  - Naito, Ryuichi; and Kinpara, Keiji, 5,021,894, Cl. 360-46.000.
  - Okajima, Tomoki, 5,020,748, Cl. 248-27.100.
  - Shimizu, Akira; Kurosawa, Atsushi; and Yamada, Fumiya, 5,021,904, Cl. 360-96.500.
  - Yokoo, Toru; Kobane, Takashi; Seki, Akihiko; Yamakawa, Yasuhiro; and Kawakami, Yoshikazu, 5,020,877, Cl. 350-128.000.
- Pipes, David W., to Mallinckrodt, Inc. Preparation of rhenium phosphonate therapeutic agents for bone cancer without purification. 5,021,235, Cl. 424-1.100.
- Piraino, Anthony J.; and Saris, Steven D., to Ciba-Geigy Corporation. Method of reducing serum uric acid and/or increasing renal uric acid clearance with thromboxane synthetase inhibitor inhibitor and/or thromboxane receptor antagonist. 5,021,448, Cl. 514-415.000.
- Pirelli S.A. Cia. Indl. Brasileira: *See—*
  - Vellego, Geni; Filipini, Cesar A.; Filho, Pedro I. P.; Canevarolo, Sebastiao V., Jr.; and Serra, Oswaldo A., 5,021,397, Cl. 505-1.000.
- Pirelli Trasmissioni Industriali S.p.A.: *See—*
  - Macchiarulo, Vincenzo; Robecchi, Edoardo; and Ruffini, Alberto, 5,021,032, Cl. 474-138.000.
- Pisculli, Anthony C.; Moore, Walter C.; and Myrvold, Nathan P., to Microsoft Corporation. Method for updating a display bitmap with a character string or the like. 5,021,974, Cl. 364-518.000.
- Pitek, John G.: *See—*
  - Dey, Thomas W.; Granger, Edward M.; Vandenberg, Donald E., Pitek, John G.; and Humbel, William D., 5,020,905, Cl. 356-124.000.
- Pitman, Willard W.: *See—*
  - Cope, Jonathan C.; Grady, Michael F.; and Pitman, Willard W., 5,020,426, Cl. 99-353.000.
- Pitney Bowes Inc.: *See—*
  - Bergman, Norman J., 5,020,473, Cl. 118-669.000.
  - Brown, Nanette; and Peterson, Sandra J., 5,021,963, Cl. 364-464.020.
  - Riley, Gilbert N; Holodnak, Richard S., and Malin, Richard A., 5,020,429, Cl. 101-93.000.
  - Salazar, Edilberto I.; and Riley, Gilbert N., 5,021,781, Cl 341-13.000.
- Place, Virgil A.: *See—*
  - Barclay, Brian L; Childers, Jerry D., Wright, Jeri; Place, Virgil A; and Wong, Patrick S. L., 5,021,053, Cl. 604-892.100.
- Plapp, Gunther, to Robert Bosch GmbH Fuel-metering system for internal combustion engines. 5,020,495, Cl. 123-326.000
- Plastipak Packaging, Inc.: *See—*
  - Darr, Richard C., 5,020,692, Cl 222-109.000.
- Plattner, Ronald D.: *See—*
  - Beremand, Marian N.; VanMiddlesworth, Frank L.; and Plattner, Ronald D., 5,021,343, Cl. 435-119.000.
- Plessey Overseas Limited: *See—*
  - Godfrey, Leslie K.; and Lock, Robert P., 5,022,012, Cl. 367-3.000.
  - Wheaton, Larry B., 5,021,856, Cl. 357-40.000.
- Plohberger, Diethard; Herzog, Peter; Elliott, Keith; Fischer, Christof D.; and Greier, Josef, to Avl Gesellschaft Fur Verbrennungskraftmaschinen und Messtechnik M.B.H. Prof.Dr.Dr.h.c. Hans List. Method and device for feeding fuel into the combustion chamber of an internal combustion engine. 5,020,494, Cl. 123-250.000.
- Plorde, Donald E.: *See—*
  - Huang, Hua-Feng; and Plorde, Donald E., 5,021,293, Cl. 428-328.000.
- Plotnikov, Nikolai D.: *See—*
  - Abysov, Nikolai A.; Bezgodov, Valery A.; Belgorodsky, Vladimir S.; and Plotnikov, Nikolai D, 5,020,279, Cl. 51-123.00G.
- Plough Inc.: *See—*
  - Akin, Frank J.; Klesges, Robert; and Klesges, Lisa, 5,021,457, Cl. 514-653.000.
- Plusa, Janusz: *See—*
  - Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; Leclere, Jean; and Romand, Paul, 5,021,024, Cl. 452-149.000.
- Podlesak, Heinz, to Knorr-Bremse AG Working cylinder without piston rod. 5,020,421, Cl. 92-137.000.
- Poe, L. Richard, to Hartwell Corporation. Rod end lock. 5,020,835, Cl. 292-127.000.
- Poenisch, Paul; and Hansen, Keith, to LSI Logic Corporation. Remote measurement of temperature. 5,021,980, Cl. 364-557.000.
- Polak, David C.: *See—*
  - Braun, Stephen A.; O'Neill, Michael J.; Polak, David C.; and Cutshall, Donald L., 5,020,308, Cl. 56-11.300.
- Pollack, Slava A; and Chang, David B., to Hughes Aircraft Company. Upconversion pumped lasers. 5,022,040, Cl. 372-69.000.
- Pollitt, Richard F.: *See—*
  - Davis, Myron F.; Martin, Randall W.; Nomura, Hideo; Pollitt, Richard F.; Wittner, Ernest; and Yoshikawa, Wataru, 5,021,922, Cl. 361-380.000.
- Polychrome Corporation: *See—*
  - Jargiello, Paul A.; and Dooley, Thomas J, 5,021,324, Cl 430-331.000.
- Polyplastics Co., Ltd.: *See—*
  - Nakane, Toshio; Naka, Michiro; Konuma, Hiroaki, and Hijikata, Kenji, 5,021,295, Cl. 428-379.000.
  - Nakane, Toshio; Naka, Michiro; Konuma, Hiroaki, and Hijikata, Kenji, 5,021,545, Cl. 528-272.000.
- Ponder, Debra L.: *See—*
  - Borschel, Marlene W.; Benson, John D.; Breen, Merle D.; MacLean, William C., Jr.; Ponder, Debra L.; Strickland, Alan D, and Treem, William R., 5,021,245, Cl. 426-2.000.
- Poole, James E.: *See—*
  - Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S LeBlanc, Douglas R., Harbaugh, David L.; Poole, James E., and Hoffend, Donald A., Jr., 5,021,954, Cl. 364-410.000.
- Pooyan, Samad, to Ford Products Corporation. Arrangement for securing and sealing a coil assembly to a boiler 5,020,480, Cl 122-249.000.
- Poqet Computer Corporation: *See—*
  - Fairbanks, John P.; and Yuan, Andy C., 5,021,679, Cl. 307-66.000
- Portage Holding, Inc.: *See—*
  - Hamar, Douglas J.; Jayaraman, Gopal; Granroth, Richard, Whipple, Robert L.; and Evensen, Harold A., 5,020,286, Cl 52-585.000.
- Porter, Michael R: *See—*
  - Babson, Edward S.; Brophy, Thomas G.; and Porter, Michael R., 5,020,460, Cl. 112-262.300.
- Porter Sewing Machines, Inc.: *See—*
  - Babson, Edward S.; Brophy, Thomas G.; and Porter, Michael R., 5,020,460, Cl. 112-262.300.
- Portier, Ralph J., to Louisiana State University. Biohydrometallurgical processing of ores, and microorganisms therefor. 5,021,088, Cl 75-736.000.
- Portillo, Frank, Jr. *See—*
  - Kennefick, Thomas M., and Portillo, Frank, Jr., 5,020,427, Cl 99-494.000.
- Postlethwaite, Scott R. *See—*
  - Ford, Derek G.; and Postlethwaite, Scott R., 5,021,941, Cl 364-176.000.
- Potthoff, Heinrich, to Bergische Stahl-Industrie. Three-dimensional single-wheel suspension for wheels of railed vehicles 5,020,446, Cl. 105-218.100.
- Pouyer, Joseph E. Method and apparatus for construction of perdurable artificial roads. 5,020,937, Cl. 404-35.000.
- Povey, Reginald. *See—*
  - Lewis, Peter J.; and Povey, Reginald, 5,020,935, Cl 403-391.000.
- Powell, Robert A Folding chair constructed of sheet material 5,020,854, Cl 297-377.000.
- Power Components, Inc.: *See—*
  - Cotter, Jonathan P., 5,020,570, Cl. 137-596.120.
- Power, Patrick J. Hot popcorn microwave vending machine 5,020,688, Cl. 221-150.00A.
- Power Reactor and Nuclear Fuel Development Corporation. *See—*
  - Utsunomiya, Kazuhiro; Ooyama, Nobumi; and Sakaba, Hideo, 5,021,210, Cl. 376-247.000.
- Power Transmission Technology: *See—*
  - Heidenreich, David C.; and Nichols, Keith A., 5,020,650, Cl. 192-56.00R.
- PPG Industries, Inc.: *See—*
  - Crano, John C.; Kwiatkowski, Patricia L.; and Hurditch, Rodney J., 5,021,196, Cl. 252-586.000.
  - Kovacik, Paul J., Davidson, Charles R.; Lindsay, Kevin B; Lundberg, Darrel V.; Mulder, Cameron A.; and Boerboom, Everett, 5,021,074, Cl. 65-40.000.
  - Rhue, Frederick F.; Franks, William D.; and Craig, Gary C, 5,021,297, Cl. 428-430.000.
  - Wilson, Craig A.; Olson, Kurt G.; Koren, Jeffrey G.; Longhini, Debra M.; Dugan, Carol S.; and Jozwiak, Edward L., Jr. 5,021,135, Cl. 204-180.800.
- Pratt, John M.: *See—*
  - Quint, Jeanne M, and Pratt, John M, 5,021,995, Cl. 364-900.000
- Presidenza del Consiglio Dei Ministri: *See—*
  - Colle, Roberto; Camaggi, Giovanni; Ratti, Giuseppina; Garavaglia, Carlo, and Mirenna, Luigi, 5,021,442, Cl. 514-383.000.
- Press, Jeffery B.: *See—*
  - Hajos, Zoltan G.; Kanojia, Ramesh M.; and Press, Jeffery B. 5,021,574, Cl. 544-276.000.
- Preston, Walter P.: *See—*
  - Ewing, John; Olson, Dan; and Preston, Walter P., 5,020,525, Cl. 128-84.00R.
- Prince Corporation: *See—*
  - Lindberg, Kenneth M, Spykerman, David J.; George, Philip C. and Mersman, Wesley D., 5,020,855, Cl. 297-391.000.
- Prince, Dan: *See—*
  - Bay, Steven T.; and Prince, Dan, 5,020,476, Cl. 118-728.000.
- Printmark Industries, Inc.: *See—*
  - Sloot, Alexander, 5,020,931, Cl. 402-79.000.
- Procedes Vernet: *See—*
  - Henault, Claude, 5,020,325, Cl. 60-528.000.
- Process Automation Business, Inc.: *See—*
  - Dukes, John R., 5,020,356, Cl. 73-1.00B
- Procter & Gamble Company, The: *See—*
  - Bahrani, Abdul S., 5,020,732, Cl. 241-7.000.
  - Guffey, Timothy B.; Boatman, Donn N.; Abe, Susan S.; Talkington, Sherry R.; and Mijac, Marko D., 5,021,256, Cl. 426-601.000.

  - Hiuke, Takashi, 5,021,051, Cl. 604-385.200.
- Product Research and Development: *See—*
  - Leishman, Layne S., 5,020,605, Cl. 173-1.000.
- Progress Technology Corp.: *See—*
  - Schneider, Richard T., 5,021,659, Cl. 250-336.200.
- Prost, Michel, to Spiral Recherche et Developpement. Use of a folinic acid substance as a platelet aggregation inhibitor. 5,021,417, Cl. 514-249.000.
- Proulx, Serge L., to Innotag Inc. Drainage valve having a flexible flap with an edge taper. 5,020,567, Cl. 137-315.000.
- Provenson, Victor A., to Auto Transport Equipment Co. Boat haul vehicle. 5,020,960, Cl. 414-494.000.
- Provost, Philip J.. *See—*
  - Giesa, Paula A.; Hilleman, Maurice R.; and Provost, Philip J., 5,021,348, Cl. 435-237.000.
- Przybysz, John X., to Westinghouse Electric Corp. Refractory resistors with etch stop for superconductor integrated circuits. 5,021,867, Cl 357-71.000.
- Puber, Josef: *See—*
  - Karagoz, Sadi; Hribernik, Bruno; Stamberger, Johann; Puber, Josef; Jeglitsch, Franz; Fischmeister, Hellmut; Matzer, Franz; Locker, Claus-Dieter; Kudielka, Elfriede; and Jager, Heimo, 5,021,085, Cl. 75-239.000.
- Puckette, Thomas A., to Eastman Kodak Company. Catalyst for preparation of biaryl compounds. 5,021,380, Cl. 502-107.000.
- Pulgiese, Rocco J., to Demaco Mfg. Group, Ltd. Computerized sprinkler control system. 5,021,939, Cl. 364-143.000.
- Pullen, Keith R.; Horton, Kevin J.; Etemad, Mohammad R.; Fenocchi, Arnoldo; Eggleston, Laurence W.; and Bolton, Hugh R., to Rolls Royce plc. Axial field electrical generator. 5,021,698, Cl. 310-156.000.
- Pure Water, Inc.: *See—*
  - Palmer, David G., 5,021,128, Cl. 203-1.000.
- Puydak, Robert C.; Hazelton, Donald R.; Cartasegna, Silvestro; and Dogniez, Leonard, to Exxon Chemical Company. Dynamically vulcanized alloys of crystalline polyolefin resin and halobutyl rubber material. 5,021,500, Cl. 524-525.000.
- Pyzik, Aleksander J.; Schwarz, Douglas B.; Rossow, Harold E.; Beaman, Donald R.; and Pyzik, Barbara M., to Dow Chemical Company, The. Method of preparing a self-reinforced silicon nitride ceramic of high fracture toughness. 5,021,372, Cl 501-97.000.
- Pyzik, Barbara M.: *See—*
  - Pyzik, Aleksander J.; Schwarz, Douglas B.; Rossow, Harold E.; Beaman, Donald R.; and Pyzik, Barbara M., 5,021,372, Cl. 501-97.000.
- Quagliato, Dominick A.; and Deininger, David D., to American Home Products Corporation. Antihypertensive benzopyran compounds. 5,021,418, Cl. 514-249.000.
- Qualcomm, Inc.: *See—*
  - Lee, Chong U., 5,021,891, Cl. 358-432.000.
- Quate, Calvin F.: *See—*
  - Akamine, Shinya; and Quate, Calvin F., 5,021,364, Cl. 437-228.000.
- Queen's University at Kingston: *See—*
  - Wevers, Henk W.; and Rudan, John F., 5,021,061, Cl. 623-20.000.
- Quint, Jeanne M.; and Pratt, John M., to Wang Laboratories, Inc. Data exchange apparatus and methods. 5,021,995, Cl. 364-900.000.
- R. D. Werner Co., Inc.: *See—*
  - Sulecki, Richard P.; and Kiska, Stanley A., 5,020,757, Cl. 248-238.000.
- R. J Reynolds Tobacco Company: *See—*
  - Farrier, Ernest G; Harris, James L.; Norman, Alan B.; Resce, James L.; Sensabaugh, Andrew J., Jr.; and Shannon, Michael D., 5,020,548, Cl. 131-194.000.
- Rabelo, Fernando V.: *See—*
  - Azar, Charles; and Rabelo, Fernando V., 5,021,871, Cl. 358-11.000.
- Radio Frequency Systems, Inc.: *See—*
  - Gustafson, Warren H., 5,021,755, Cl. 333-128.000.
- Raj, Joseph T., to Evans Industries, Inc. Customizing automobile bodies. 5,020,848, Cl 296-210.000.
- Ralph, George A.; and Holtzinger, Charles R. AC motor control. 5,021,723, Cl. 318-756.000.
- Ramagopal, Rama: *See—*
  - Huang, Alvin S.; Nicholson, Myron D.; and Ramagopal, Rama, 5,021,252, Cl. 426-412.000.
- Ramirez, Ronald A., to Lucas Weinschel Inc. Multiple use electrical connector having planar exposed surface. 5,021,001, Cl. 439-349.000.
- Ramun, John R., to Allied Gator, Inc. Apparatus for dismantling buildings. 5,020,962, Cl. 414-569.000.
- Ranby, Mats G.; and Peterson, Hans, to Biopool International, Inc. Solid phase reactant for inhibition and removal of serine proteases and method of use. 5,021,346, Cl. 435-219.000.
- Ranco Japan Ltd.: *See—*
  - Nakatsukasa, Keiichiroh; and Kuneguchi, Kenmei, 5,020,771, Cl. 251-30.020.
- Randall, Robert C.: *See—*
  - Kits van Heyningen, Martin A.; and Randall, Robert C., 5,020,902, Cl. 356-21.000.
- Randermann, Ervin: *See—*
  - Muller, Laurent; and Randermann, Ervin, 5,020,592, Cl. 166-187.000.
- Rangel, Louis R. Emergency escape device. 5,020,633, Cl. 182-70.000.
- Rank Video Services America: *See—*
  - Novak, Warren D., 5,021,903, Cl. 360-96.100.
- Raptis, Apostolos C.: *See—*
  - Gopalsami, Nachappa; and Raptis, Apostolos C., 5,020,920, Cl. 374-57.000.
- Rasmussen, Francis R. Vortex diver. 5,020,267, Cl. 43-43.130.
- Ratcliff, Ronald W.: *See—*
  - Christensen, Burton G.; and Ratcliff, Ronald W., 5,021,566, Cl. 540-302.000.
- Ratcliffe, Ronald W.; and Woods, Mary F., to Merck & Co., Inc. Novel 2-substituted alkyl carbapenem antibacterials. 5,021,565, Cl. 540-302.000.
- Ratelband, Johannes B. Screen adapted to be placed in front of a hearth fire or other source of radiant heat. 5,020,513, Cl. 126-544.000.
- Ratti, Giuseppina: *See—*
  - Colle, Roberto; Camaggi, Giovanni; Ratti, Giuseppina; Garavaglia, Carlo; and Mirenna, Luigi, 5,021,442, Cl. 514-383.000.
- Rauch, Hans: *See—*
  - Helldorfer, Reinhard; Kanzler, Ulrich; Rauch, Hans; and Osterkamp, Eva, 5,021,962, Cl. 364-457.000.
- Rauchwerk, Michael D.: *See—*
  - Chung, Hong Y.; and Rauchwerk, Michael D., 5,022,053, Cl. 375-39.000.
- Raudat, John L., to Standard-Knapp, Inc. Continuous motion packer for feeding containers into end-to-end packing cases. 5,020,306, Cl 53-534.000.
- Ravellat, Ramon S., to Codilaser S.A. System for marking moving objects by laser beams. 5,021,631, Cl. 219-121.680.
- Ravichandran, Ramanathan; and Galbo, James P., to Ciba-Geigy Corporation. Compounds containing both UV-absorber and 1-hydrocarbyloxy hindered amine moieties and stabilized compositions. 5,021,478, Cl. 524-91.000.
- Ravichandran, Ramanathan; and Pastor, Stephen D., to Ciba-Geigy Corporation. Substituted hydroxylamine ester stabilizers. 5,021,479, Cl. 524-96.000.
- Ravichandran, Ramanathan, to Ciba-Geigy Corporation. Azo free radical initiators containing hindered amine moieties with low basicity. 5,021,480, Cl. 524-99.000.
- Rawlyk, Bert, to B. R. Products Pty. Limited Shelf bracket. 5,020,758, Cl. 248-250.000.
- Raytheon Company: *See—*
  - Chu, Shiou L. L.; Tajima, Yusuke; and Schindler, Manfred J., 5,021,743, Cl. 330-54.000.
  - Stacey, William F., 5,021,300, Cl. 428-620.000.
  - Tajima, Yusuke; and Schindler, Manfred J., 5,021,756, Cl. 333-132.000.
- RCA Licensing Corporation: *See—*
  - Bauder, Richard C., 5,021,707, Cl. 313-402.000.
  - Shiratsuchi, Shinichi, 5,021,872, Cl. 358-19.000.
- Reactive Metals and Alloys Corporation: *See—*
  - Luydkx, Leon A.; Jackman, Joseph R.; Robison, James W., Jr.; and Young, James H., 5,021,086, Cl. 75-315.000.
- Read, Edward C.: *See—*
  - Archie, Kent C.; Fonorow, Owen R.; McGould, Mary C.; McLear, Robert E., III; Read, Edward C.; Schaefer, Edwin M., III; Schwab, Suzanne E.; and Wodarz, Dennis, 5,021,997, Cl 364-900.000.
- Readman, John: *See—*
  - Heitz, Steven A.; Fairchild, Jeffery N.; and Readman, John, 5,020,923, Cl. 384-99.000.
- Reber, Eric J., to Barber-Colman Company. Pass-line independent web measuring method and apparatus. 5,021,666, Cl. 250-359.100.
- Red Baron (Oil Tools Rental) Limited, The: *See—*
  - Lau, Werner, 5,020,599, Cl. 166-301.000.
- Reddy, S. Raghuma, to General Motors Corporation. Vehicle fuel tank pressure control method. 5,021,071, Cl. 55-58.000.
- Redenbarger, Philip D., to Motion Control Industries, Inc. Floating friction brake. 5,020,643, Cl. 188-196.00M
- Reed, Stuart E.: *See—*
  - Berthold, John W.; and Reed, Stuart E., 5,020,379, Cl. 73-800.000.
- Reed, William B.: *See—*
  - Halford, James; and Reed, William B., 5,021,030, Cl. 460-111.000.
- Rees, Wayne M.: *See—*
  - Harriott, Sharon M.; Au, Van; and Rees, Wayne M., 5,021,187, Cl. 252-186.380.
- Reiff, Helmut; Dieterich, Dieter; and Stepanek, Rene, to Bayer Aktiengesellschaft. Crosslinked polyurethane-polyurea powders, a process for their production and their use as fillers in two-component polyurethane coating compositions. 5,021,520, Cl. 525-458.000.
- Reiher, Uwe: *See—*
  - Springer, Hartmut; and Reiher, Uwe, 5,021,559, Cl. 534-638.000.
- Reil, Wilhelm, to Die Tetra Pak Rausing & Co. Apparatus for conveying a sleeve which is closed at one end out of a processing station and into transporter means. 5,020,986, Cl. 425-437.000.
- Reinalda, Donald; and Kars, Jelte, to Shell Oil Company. Catalyst for the preparation of hydrocarbons from carbon monoxide and hydrogen. 5,021,387, Cl. 502-260.000.
- Reinhardt, Wilheilm; and Schultz, Karl-Heinz, to ebm Elektrobau Mulfingen GmbH & Co. Process for driving an alternating-current motor and an alternating current motor which can be driven in accordance with this process. 5,021,726, Cl. 318-811.000.
- Reiss, John R.: *See—*
  - Balukin, Richard F.; and Reiss, John R., 5,020,862, Cl. 303-15.000.
- Reliahle Plastics Engineering Company: *See—*
  - Bush, Mike; Hatton, Norman; and Mellor, Keith, deceased, 5,020,648, Cl. 192-46.000.
- Rembold, Helmut: *See—*
  - Linder, Ernst; Rembold, Helmut; and Wier, Manfred, 5,020,498, Cl. 123-450.000.
  - Linder, Ernst; and Rembold, Helmut, 5,020,728, Cl. 239-533.120.

VOL 1127
ISS 1
JE 4
1991
UMI

- Remy, David C., Baldwin, John J., Claremon, David A.; and King, Stella W., to Merck & Co., Inc. Imidazole compounds and their use as transglutaminase inhibitors. 5,021,440, Cl. 514-381.000.
- Remy, David C.. *See—*
  - Baldwin, John J.; Eilon, Gabriel F.; Friedman, Paul A., and Remy, David C., 5,021,426, Cl. 514-313.000.
- Renault Vehicules Industriels: *See—*
  - Mounier-Poulat, Francois; Savoie, Marcel; and Armanet, Raymond, 5,020,824, Cl. 280-686.000.
- Renkes, Kenneth R.: *See—*
  - Wandler, Richard A.; and Renkes, Kenneth R., 5,021,915, Cl. 361-26.000.
- Renner, J. John; Palmateer, Steven J , Petry, John S.; Hoppe, Federick J , and Bertrand, Steven R., to Capacity of Texas, Inc Tractor suspension. 5,020,820, Cl 280-439 000.
- Republic Money Orders, Inc.: *See—*
  - Smith, Lawrence G., 5,021,967, Cl. 364-479 000.
- Resce, James L.: *See—*
  - Farner, Ernest G.; Harris, James L.; Norman, Alan B., Resce, James L.; Sensabaugh, Andrew J , Jr., and Shannon, Michael D., 5,020,548, Cl. 131-194.000.
- Research Medical, Inc.: *See—*
  - Buckberg, Gerald D., and Todd, Robert J., 5,021,045, Cl. 604-53.000.
- Resnick, Michael; and Saebeler, Walter, to X-Print, Inc. Die cutting apparatus with impressible coating. 5,021,042, Cl 493-404 000.
- Rettmer, Rebecca L.: *See—*
  - Labbe, Robert F.; and Rettmer, Rebecca L., 5,021,452, Cl. 514-474.000.
- Retzloff, James G.; and Sanders, Gerald W , to Viking Corporation Concealed sprinkler assembly. 5,020,601, Cl. 169-37.000.
- Reuss, Helmut; Mucke, Bruno; Mader, Helmut; and Rockser, Dieter, to Agfa Gevaert Aktiengesellschaft. Color photographic material 5,021,336, Cl. 430-608.000
- Reuter, Karl-Heinz: *See—*
  - Meckl, Heinz; Reuter, Karl-Heinz; and Tromnau, Rudolf, 5,021,326, Cl. 430-399.000.
- Revell, Kenneth M , to Bowater Packaging Limited. High barrier metallized film. 5,021,298, Cl. 428-458 000.
- Rexnord Corporation: *See—*
  - Hodlewsky, William G , 5,020,659, Cl. 198-853.000
- Reynolds Consumer Products, Inc.: *See—*
  - Buchman, James E.; and Vanden Heuvel, Gregory J . 5,020,302, Cl 53-430.000.
- Reynolds, Robert *See—*
  - Dragon, Thomas; Hylan, John, Reynolds, Robert; McCarthy, Paul; Merchant, Paul, and Berkoben, Kenneth, 5,021,676, Cl. 250-561.000.
- Reynolds, Robert W : *See—*
  - Nesterick, Elaine M , Reynolds, Robert W , MacKay, Spencer I , and Graham, Cleve A , 5,020,624, Cl. 180-210.000
- Rhoades, George D , and Lang, Gary D , to Liquid Carbonic Corporation. CO_2 food freezer 5,020,330, Cl. 62-63.000.
- Rhodes, Frank R., Jr. *See—*
  - Mitchell, Robert L., and Rhodes, Frank R , Jr , 5,021,373, Cl. 501-119.000.
- Rhone-Poulenc Chimie. *See—*
  - Bouillard, Gerard; and Chauffriat Henri, 5,021,262, Cl 427-289.000.
  - David, Claire; and Magnier, Claude, 5,021,192, Cl. 252-313.100.
  - Frances, Jean-marc, and Metz, Francois, 5,021,601, Cl. 556-436.000
  - Mignani, Gerard; Ardaud, Pierre; and Trichon, Roger, 5,021,371, Cl. 501-96.000.
- Rhone-Poulenc Industries *See—*
  - Jung, Gerard; Mugnier, Jacques; Dommergues, Yvon, and Diem, Hoang G., 5,021,350, Cl 435-243.000.
- Rhone-Poulenc Sante: *See—*
  - Comte, Marie-Therese; Gueremy, Claude, Malleron, Jean-Luc Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, 5,021,420, Cl 514-253.000.
- Rhue, Frederick F.; Franks, William D.; and Craig, Gary C , to PPG Industries, Inc. Process for coating plastic substrates with powder coating compositions. 5,021,297, Cl. 428-430.000.
- Rice, Richard C., to Camtronics, Ltd. Calibration apparatus for a light source used for exposing photographic film with image data. 5,021,979, Cl. 364-525.000.
- Rice, Richard C.: *See—*
  - Stone, Barry N.; Rice, Richard C., Lorbiecki, John E., and Bernstein, Stanley, 5,021,978, Cl. 364-525.000.
- Richard Wolf GmbH: *See—*
  - Heckele, Helmut, 5,020,514, Cl. 128-4.000.
  - Karst, Siegfried; Uhrich, Wilfried; and Zickwolf, Rolf, 5,020,893, Cl. 350-573.000.
- Richards, Marvin D. Tossing ring. 5,020,808, Cl. 273-425.000.
- Richmond, Frank M.; Vanderveen, Timothy; and Kimes, Rick, to IMED Corporation. Multiline check valve assembly. 5,020,562, Cl. 137-15.000.
- Richter, Bernd: *See—*
  - Junge, Bodo; Richter, Bernd; Glaser, Thomas; and Traber, Jorg, 5,021,438, Cl. 514-373.000.
- Richter Gedeon Vegyeszeti Gyar Rt.: *See—*
  - Fodor, Tamas; Fischer, Janos; Dobay, Laszlo; Trischler, Ferenc; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Szporny, Laszlo, and Hajos, Gyorgy, 5,021,597, Cl. 556-69.000.
- Richter, Karl-Heinz; Kurz, Hubert, and Kuecha, Georg, to Vereinigte Papierwarenfabriken GmbH. Apparatus for manufacturing air cushion dispatch packages 5,021,039, Cl 493-14.000.
- Rick, Jens O Gas seal revolver 5,020,258, Cl. 42-65 000
- Ricoh Company, Ltd.: *See—*
  - Asami, Shinji; and Ikoma, Tadashi, 5,020,784, Cl 270-53 000
  - Shibaguchi, Takashi, 5,020,885, Cl 350-355.000.
  - Tsuruoka, Ichirio; Echigo, Katsuhiro; Mochizuki, Manabu Kurotori, Tsuneo; Ariyama, Kenzo, Kojima, Kenji; and Miya Mayumi, 5,021,834, Cl. 355-256.000.
  - Yamamoto, Kazuhito, 5,021,889, Cl 358-440 000
- Riebel, Hans-Jochem: *See—*
  - Kirsten, Rolf; Kluth, Joachim, Fest, Christa, Gesing, Ernst; Muller, Klaus-Helmut, Riebel, Hans-Jochem; Babczinski, Peter, Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R , and Strang Harry, 5,021,082, Cl. 71-93.000.
- Rieder, Heinz; and Schwaiger, Max, to RSF-Elektronik Gesellschaft m b.H Method of electronically correcting position errors in an incremental measuring system and measuring system for carrying out the method. 5,021,650, Cl. 250-231.160
- Rieger, Ulrich; and Kalus, Dieter, to Messerschmitt-Boelkow-Blohm GmbH Ammunition shell forming a stack of multiple projectiles 5,020,437, Cl 102-489.000.
- Rieter Machine Works, Ltd.: *See—*
  - Demuth, Robert; Heftı, Walter, Keller, Urs, and Hanselmann, Daniel, 5,020,924, Cl. 384-536.000
- Riley, Gilbert N.; Holodnak, Richard S.; and Malin, Richard A , to Pitney Bowes Inc. Die protection assembly for preventing fraudulent printing by an electronic postage meter 5,020,429, Cl. 101-93 000
- Riley, Gilbert N.. *See—*
  - Salazar, Edilberto I.; and Riley, Gilbert N , 5,021,781, Cl 341-13.000.
- Rilling, Kenneth Two terminal antenna for adaptive arrays 5,021,80 Cl. 343-820.000.
- Rimkeit, Eugene; and Schomburg, Richard. Apparatus and method for compensating component audio signals. 5,022,083, Cl 381-98 000
- Ritter, Gerhard: *See—*
  - Grabuschnig, Josef; Scherr, Rudolf, Ritter, Klaus and Ritter Gerhard, 5,020,575, Cl 140-112.000
- Ritter, Klaus. *See—*
  - Grabuschnig, Josef; Scherr, Rudolf, Ritter, Klaus, and Ritter, Gerhard, 5,020,575, Cl. 140-112.000.
- Rivera, James A.: *See—*
  - Sansevero, Frank, Seehausen, Klaus, and Rivera, James A 5,020,654, Cl. 198-328.000.
- Rivetti, Franco. *See—*
  - Mizia, Franco, Rivetti, Franco; and Romano, Ugo, 5,021,590, Cl 549-438.000.
- Rivoli, Anthony L.: *See—*
  - Young, William R.; Rivoli, Anthony L , and Wiles, William W , Jr , 5,021,359, Cl. 437-21.000.
- Rix, David M., to Cummins Engine Company, Inc. Fuel injector installation and removal tool for an internal combustion engine 5,020,203, Cl. 29-255.000.
- Rizzi, John J ; and Smith, Joseph J , to Westinghouse Electric Corporation. Adjustable pedestal for tables and the like 5,020,752 Cl 248-162.100.
- RJS Industries, Inc.: *See—*
  - Cater, Miro S , 5,020,696, Cl 222-321 000.
- Roach, Jack B. Fluid jet apparatus. 5,020,729, Cl. 239-600 000
- Robb, Paul N : *See—*
  - Mercado, Romeo I ; and Robb, Paul N , 5,020,889, Cl 350-463.000
- Robbins, Edward S., III: *See—*
  - Dickinson, Albert B., 5,021,209, Cl. 264-540.000
- Robecchi, Edoardo: *See—*
  - Macchiarulo, Vincenzo; Robecchi, Edoardo, and Ruffini, Alberto, 5,021,032, Cl. 474-138 000
- Rober K. Leib: *See—*
  - Leib, Roger K , 5,020,817, Cl 280-250.100.
- Robert Bosch GmbH: *See—*
  - Brosi, Thomas; Hess, Werner; Moser, Winfried, and Schneider, Hermann, 5,020,360, Cl. 73-115.000.
  - Brunel, Andre , 5,020,493, Cl. 123-198.0DB
  - Cao, Chi-Thuan; Erban, Andreas; Janetzke, Helmut; Cordes, Henning; Schulz, Alfred; and Matuschek, Wolfgang, 5,020,501, Cl 123-489.000.
  - Gneiss, Heinz, 5,020,365, Cl 73-204.270.
  - Helldorfer, Reinhard; Kanzler, Ulrich; Rauch, Hans, and Osterkamp, Eva, 5,021,962, Cl. 364-457.000.
  - Hofmann, Eberhard, 5,020,981, Cl. 417-501.000.
  - Huber, Werner; and Spiegel, Guenter, 5,020,496, Cl 123-399 000
  - Jundt, Werner; Miller, Norbert; and Sommer, Rainer, 5,021,959, Cl 364-431.050.
  - Linder, Ernst; Rembold, Helmut; and Wier, Manfred, 5,020,498, Cl. 123-450.000.
  - Linder, Ernst; and Rembold, Helmut, 5,020,728, Cl 239-533.120.
  - Plapp, Gunther, 5,020,495, Cl. 123-326.000.
  - Schnaibel, Eberhard; Junginger, Erich; and Hirschmann, Klaus, 5,020,363, Cl. 73-119.00A.
  - Wild, Ernst, 5,020,502, Cl. 123-489.000.
- Roberts, John W. Disposable receptacle for collecting and transporting loose debris. 5,020,184, Cl. 15-257.500.
- Roberts, Kenneth P., to Square D Company Strain relief connection. 5,021,610, Cl. 174-65.00R.
- Robertshaw Controls Company: *See—*
  - Sigler, Kent K., 5,020,389, Cl. 74-553.000.

- Robertshaw Controls Company, Inc.: *See—*
  - Hetrick, George L., 5,021,762, Cl. 337-103.000.
- Robertson-Ceco Corporation: *See—*
  - Ferketic, John A., 5,021,968, Cl. 364-505.000.
- Robinson, Keith M.; Mao, Simon J. T.; Parker, Roger A.; and Jackson, Richard L., to Merrell Dow Pharmaceuticals Inc. Method of treating diabetes mellitus with bisphenol derivatives. 5,021,461, Cl. 514-731.000.
- Robinson, McDonald: *See—*
  - Crabb, Richard; Robinson, McDonald; Hawkins, Mark R.; Goodwin, Dennis L.; and Ferro, Armand P., 5,020,475, Cl. 118-719.000.
- Robinson, Melvin E. R.: *See—*
  - Cochran, Michael A.; Folland, Rickworth; Nicholas, James W.; and Robinson, Melvin E. R., 5,021,515, Cl. 525-371.000.
- Robison, Gary L.; and Wash, Michael L., to Eastman Kodak Company. Order entry process for magnetically encodable film with dedicated magnetic tracks. 5,021,820, Cl. 355-40.000.
- Robison, James W., Jr.: *See—*
  - Luydkx, Leon A.; Jackman, Joseph R.; Robison, James W., Jr.; and Young, James H., 5,021,086, Cl. 75-315.000.
- Roche, David E.: *See—*
  - Davis, Gregg M.; and Roche, David E., 5,020,754, Cl. 248-206.300.
- Rockser, Dieter: *See—*
  - Reuss, Helmut; Mucke, Bruno; Mader, Helmut; and Rockser, Dieter, 5,021,336, Cl. 430-608.000.
- Rockwell Automotive Body Systems-France: *See—*
  - Cardine, Patrice, 5,020,841, Cl. 292-336.300.
- Rockwell-Golde GmbH: *See—*
  - Schlapp, Albert; Grimm, Rainer; and Bohm, Horst, 5,020,849, Cl. 296-221.000.
- Rockwell International Corporation: *See—*
  - Hwang, Patrick Y., 5,021,792, Cl. 342-357.000.
  - Nicholas, David C., 5,022,074, Cl. 379-407.000.
  - Odor, Louis; and Hamilton, Herman O., 5,020,606, Cl. 173-163.000.
  - Weismuller, Thomas P.; and Younger, Charles R., 5,021,655, Cl. 250-308.000.
- Rodel, Robin F. Card holder. 5,020,255, Cl. 40-654.000.
- Rodewald, Paul G.: *See—*
  - Chen, Catherine S. H.; and Rodewald, Paul G., 5,021,178, Cl. 252-52.00R.
- Rodi, Anton: *See—*
  - Jeschke, Willi; and Rodi, Anton, 5,020,433, Cl. 101-425.000.
- Rodrigues, Augusto R. Brailing system for commercial fishing boats. 5,020,464, Cl. 114-255.000.
- Roerig, Arnold J.: *See—*
  - Wedel, Gregory L.; and Roerig, Arnold J., 5,020,238, Cl. 34-16.000.
- Rogers, Gene; and de Martimprey, Alex H. Cutting tools for conventional and MIG electric welders. 5,021,624, Cl. 219-70.000.
- Rogers, Wayne W.: *See—*
  - Parker, Donald A.; and Rogers, Wayne W., 5,020,535, Cl. 606-174.000.
- Rohm GmbH: *See—*
  - Langerbeins, Klaus; Klesse, Wolfgang; Tessmer, Dieter; Elser, Wilhelm; and Geyer, Hans-Juergen, 5,021,469, Cl. 523-201.000.
- Rohm and Haas Company: *See—*
  - Larson, Gary R.; Emmons, William D.; and Kalyanaraman, Palaiyur S., 5,021,511, Cl. 525-295.000.
  - Sharma, Ashok K., 5,021,454, Cl. 514-541.000.
- Roles, Geraldine C.: *See—*
  - George, Donald A.; Berry, Peter B.; Creps, Bruce W.; and Roles, Geraldine C., 5,020,814, Cl. 280-204.000.
- Rolls-Royce Motor Cars Limited: *See—*
  - Tuff, Grant J., 5,020,372, Cl. 73-730.000.
- Rolls Royce plc: *See—*
  - Pullen, Keith R.; Horton, Kevin J.; Etemad, Mohammad R.; Fenocchi, Arnoldo; Eggleston, Laurence W.; and Bolton, Hugh R., 5,021,698, Cl. 310-156.000.
- Romand, Paul: *See—*
  - Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; Leclere, Jean; and Romand, Paul, 5,021,024, Cl. 452-149.000.
- Romano, Ugo: *See—*
  - Mizia, Franco; Rivetti, Franco; and Romano, Ugo, 5,021,590, Cl. 549-438.000.
- Romer, Axel; and Seidel, Jurgen, to A. Nattermann & Cie GMBH Solid drug preparations containing micronized crystals of ebselen. 5,021,242, Cl. 424-436.000.
- Rondelli, Angelo: *See—*
  - Amedei, Giuseppe; and Rondelli, Angelo, 5,020,419, Cl. 92-52.000.
- Roodenburg, Pieter J.: *See—*
  - Dessing, Jacobus P. M.; Roodenburg, Pieter J.; Aurik, Erik A.; and Borgman, Fokko P., 5,020,477, Cl. 119-14.080.
- Rooney, John M.: *See—*
  - Woods, John G.; and Rooney, John M., 5,021,512, Cl. 525-328.200.
- Rosario, Jesus A., to United States of America, Navy. Communications interface and system for radiation recovery of a microprocessor portion thereof. 5,022,027, Cl. 371-12.000.
- Roscoe, Brad; and Grau, James, to Schlumberger Technology Corporation. Geochemical logging apparatus and method for determining concentrations of formation elements next to a borehole. 5,021,653, Cl. 250-270.000.
- Rose, Mitchell. Quadrature oscillator network. 5,021,751, Cl. 331-135.000.
- Rosenberg, Douwe: *See—*
  - Gries, Heinz; Rosenberg, Douwe; Weinmann, Hanns-Joachim; Speck, Ulrich; Mutzel, Wolfgang; Hoyer, Georg-Alexander; and Pfeiffer, Heinrich, deceased, 5,021,236, Cl. 424-9.000.
- Rosenow, Michael J.; Hamilton, Scott B.; and Bass, Thomas M., to Exchange System Limited Partnership, The. Redundant encryption processor arrangement for use in an electronic fund transfer network. 5,022,076, Cl. 380-2.000.
- Rosner, Jon: *See—*
  - Wirth, David J.; Zaragoza, Mike M.; and Rosner, Jon, 5,020,677, Cl. 211-113.000.
- Ross, Monte; Peterson, Mark L.; and Missler, Leonard R., to Laser Data Technology, Inc. Highway information system. 5,021,961, Cl. 364-443.000.
- Rossler, Erich: *See—*
  - Kastele, Xaver; Bernheim, Michael; and Rossler, Erich, 5,021,263, Cl. 427-353.000.
  - Kastele, Xaver; Bernheim, Michael; and Rossler, Erich, 5,021,264, Cl. 427-353.000.
- Rossmann, Charles; and Rossmann, Tatiana. Method of measuring skin sensitivity to electrical stimulation. 5,020,542, Cl 128-741.000.
- Rossmann, Tatiana: *See—*
  - Rossmann, Charles; and Rossmann, Tatiana, 5,020,542, Cl 128-741.000.
- Rossow, Harold E.: *See—*
  - Pyzik, Aleksander J.; Schwarz, Douglas B.; Rossow, Harold E., Beaman, Donald R.; and Pyzik, Barbara M., 5,021,372, Cl. 501-97.000.
- Roth, Michael C.; and Buttrick, Walter J., to Chesapeak Display & Packaging Company. Dispensing container. 5,020,719, Cl. 229-122.100.
- Rothenberg, Robert E.; LaRaja, Raymond D.; and Odom, John W. Venous access catheter for removing a culture. 5,020,543, Cl. 128-760.000.
- Rouger, Philippe: *See—*
  - Drouet, Xavier; Goossens, Dominique; and Rouger, Philippe, 5,021,349, Cl. 435-240.310.
- Rouquayrol, Claude J.: *See—*
  - Perroud, Bruno G.; Rouquayrol, Claude J.; and Guilhem, Jean C., 5,020,730, Cl. 239-745.000.
- Roux, Claude P.: *See—*
  - Aubard, Gilbert G.; Grouhel, Agnes G.; Junien, Jean-Louis; Roux, Claude P.; and Torossian, Dieran R., 5,021,408, Cl. 514-179.000.
- Rowan, Larry. Mobile assault logistic kinetmatic engagement device. 5,020,411, Cl. 89-1.110.
- Rowell, Richard T., to Continental Products Company. Vinyl based coatings for foamed materials. 5,021,290, Cl. 428-319.300.
- Royo, Rafael B.: *See—*
  - Panach, Rafael B.; and Royo, Rafael B., 5,020,196, Cl. 24-590.000.
- RSF-Elektronik Gesellschaft m.b.H.: *See—*
  - Rieder, Heinz; and Schwaiger, Max, 5,021,650, Cl. 250-231.160.
- Rubin, Mae K., to Mobil Oil Corp. Synthesis of crystalline ZSM-12 type structure. 5,021,141, Cl. 208-46.000.
- Rudan, John F.: *See—*
  - Wevers, Henk W.; and Rudan, John F., 5,021,061, Cl. 623-20.000.
- Rudick, Arthur G.; and Gupta, Ashis S., to Coca-Cola Company, The. Gas generator for a carbonated drink dispenser. 5,021,219, Cl. 422-112.000.
- Rudy, Dolores R.: *See—*
  - Caines, R. Scott, 5,021,064, Cl. 623-26.000.
- Ruf, Hermann. Bed for immobile patients. 5,020,170, Cl. 5-61.000.
- Ruffini, Alberto: *See—*
  - Macchiarulo, Vincenzo; Robecchi, Edoardo; and Ruffini, Alberto, 5,021,032, Cl. 474-138.000.
- Ruka, Roswell J.; and Spengler, Charles J., to Westinghouse Electric Corp. Modified cermet fuel electrodes for solid oxide electrochemical cells. 5,021,304, Cl. 429-30.000.
- Rule, Mark: *See—*
  - Fagerburg, David R.; Rule, Mark; Watkins, Joseph J.; and Lawrence, Paul B., 5,021,546, Cl. 528-389.000.
- Rullier, Pierre: *See—*
  - Barret, Thierry; and Rullier, Pierre, 5,020,247, Cl. 36-50.000.
- Rupp, Hartwig; and Stenzel, Otto, to Leybold Aktiengesellschaft. Composite casting for adding lithium to molten alloys. 5,021,299, Cl. 428-585.000.
- Russo, Anthony L., to Calspan Corporation. Casualty wrap with integral medical access chamber. 5,020,546, Cl. 128-849.000.
- Rust, Marcus D.; Wilson, Jeffrey L.; and Towne, Harmon L., to CTB, Inc. Grain drying system. 5,020,246, Cl. 34-236.000.
- Rybak, David T., to Murya, Inc. Thermal remediation apparatus and method. 5,020,452, Cl. 110-241.000.
- Saaski, Elric W.; and Lawrence, Dale M., to Metricor, Inc. Thermo-optical current sensor and thermo-optical current sensing systems. 5,021,731, Cl. 324-96.000.
- Saatweber, Dietrich: *See—*
  - Patzschke, Hans-Peter; Cerny, Peter W.; Saatweber, Dietrich; and Hendrikx, Georg H. L., 5,021,502, Cl. 524-591.000.
- Sachsenmaier, Robert: *See—*
  - Bealkowski, Richard; Blackledge, John W., Jr.; Cronk, Doyle S.; Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G.; Kovach, George D.; McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., 5,022,077, Cl. 380-4.000.

VOL
1127
ISS
1
JE
4
1991
UMI

Sadeghi, Farid: *See—*

Swartzel, Kenneth R.; Ganesan, Sudalaimuthu G.; Kuehn, Richard T.; Hamaker, Raymond W.; and Sadeghi, Farid, 5,021,981, Cl. 364-557.000.

Sadlowski, Juergen: *See—*

Taubitz, Christof; Hub, Hans-Henning; Ziegler, Walter; and Sadlowski, Juergen, 5,021,508, Cl. 525-133.000.

Saebeler, Walter: *See—*

Resnick, Michael; and Saebeler, Walter, 5,021,042, Cl. 493-404.000.

Saeys, Jan: *See—*

Fockens, Tallienco W. H.; and Saeys, Jan, 5,021,767, Cl. 340-572.000.

Saghy, Katalin: *See—*

Fodor, Tamas; Fischer, Janos; Dobay, Laszlo; Trischler, Ferenc; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Szporny, Laszlo; and Hajos, Gyorgy, 5,021,597, Cl. 556-69.000.

St. Angelo, Stephen, Jr.; Carver, George C.; Patterson, David W.; and Fremont, Owen K., to General Motors Corporation. Apparatus and method of a robot for installing weather stripping in a door or like opening and vehicle produced thereof. 5,020,278, Cl. 49-490.000.

St. Aubin, Donald L.: *See—*

Laugal, James A.; Martin, Glenn E.; St. Aubin, Donald L.; and Wold, Gerald G., 5,021,470, Cl. 523-414.000.

Saint-Gobain Vitrage International: *See—*

Vanaschen, Luc; Kuster, Hans-Werner, and Bremer, Carsten, 5,021,075, Cl. 65-287.000.

St. Phillips, Eric A.: *See—*

Herrington, Fox J.; and St. Phillips, Eric A., 5,020,194, Cl. 24-400.000.

Saito, Hideo: *See—*

Sawada, Shinichi; Matsushita, Tetsuya; Isoyama, Toyoshiro; and Saito, Hideo, 5,021,189, Cl. 252-299.610.

Saito, Hiroshi; Suzuki, Yasumichi; Sasabe, Shunji; and Nakajima, Kazuhiro, to Hitachi, Ltd. Apparatus for treating material by using plasma. 5,021,114, Cl. 156-345.000.

Saito, Hitoshi, to NEC Corporation. Level conversion circuit having capability of supplying output signal with controlled logical level. 5,021,691, Cl. 307-475.000.

Saito, Hitoshi: *See—*

Kanto, Jumpei; Saito, Hitoshi; Eguchi, Hiroshi; and Nakamura, Masayuki, 5,021,394, Cl. 503-227.000.

Saito, Kazutaka: *See—*

Sudo, Toshio; Saito, Kazutaka; and Takubo, Chiaki, 5,021,866, Cl. 357-70.000.

Saito, Mitsuo: *See—*

Matoba, Tsukasa; Aikawa, Takeshi; Okamura, Mitsuyoshi; Maeda, Ken-ichi; and Saito, Mitsuo, 5,021,993, Cl. 364-900.000.

Saito, Osamu: *See—*

Kamezaki, Hisamitsu; Suenaga, Masashi; Saito, Osamu; Iuchi, Shin-ichiro; Watanabe, Hitoshi; Fujiwara, Hideo; and Tuburaya, Yoshitane, 5,021,276, Cl. 428-64.000.

Saito, Shinichi; Ushioda, Makoto; Inoue, Hiromichi; Miyazawa, Kazutoshi; and Ohno, Kouji, to Chisso Corporation. Optically active-2-alkoxy-propyl ether and liquid crystal composition. 5,021,191, Cl. 252-299.610.

Saito, Sotoshi: *See—*

Yoshida, Hiroshi; Saito, Sotoshi; and Ito, Tatsuo, 5,020,206, Cl. 29-408.000.

Saito, Takayuki: *See—*

Kiyono, Fumio; Saito, Takayuki; and Handa, Keiji, 5,020,724, Cl. 239-102.200.

Sakaba, Hideo: *See—*

Utsunomiya, Kazuhiro; Ooyama, Nobumi; and Sakaba, Hideo, 5,021,210, Cl. 376-247.000.

Sakagami, Seiji: *See—*

Mase, Masahiro; Sakagami, Seiji; Okawada, Takeshi; Ueda, Shinjiroo; Awada, Yoshihisa; and Nagaoka, Takashi, 5,020,969, Cl. 415-55.300.

Sakaguchi, Kazuaki, to Fujitsu Limited. Image data read out system in a digital image processing system. 5,021,977, Cl. 364-521.000.

Sakai, Kunihiro: *See—*

Matsuda, Hiroshi; Kawada, Haruki; Sakai, Kunihiro; Takimoto, Kiyoshi; Kawade, Hisaaki; Yanagisawa, Yoshihiro; and Morikawa, Yuko, 5,020,881, Cl. 350-333.000.

Sakai, Satoshi; and Maekawa, Kazuteru, to Aisin AW Co., Ltd. Optical correlation-type velocity measurement apparatus. 5,020,903, Cl. 356-28.000.

Sakai, Yuji; and Sugaya, Toshihiro, to Kabushiki Kaisha Toshiba. Head positioning control method and apparatus. 5,021,898, Cl. 360-78.040.

Sakakibara, Kenzou; Yoshida, Tarehiro; and Matsumoto, Koichi, to Canon Kabushiki Kaisha. Communication apparatus. 5,022,072, Cl. 379-100.000.

Sakamoto, Kiyoaki; Matsubara, Kenichi; Nakahara, Yasuhiro; and Nomura Masaki, to Tosoh Corporation. Method for forming a gel bed in a column for liquid chromatography and an axially adjustable-type column device used for this method. 5,021,162, Cl. 210-635.000.

Sakamoto, Masato: *See—*

Hino, Katsuhiko; Kai, Naoki; Sakamoto, Masato; Kon, Tatsuya; Oka, Makoto; Furukawa, Kiyoshi; and Ochi, Yoshiaki, 5,021,421, Cl. 514-254.000.

Sakamoto, Noriya; and Komatsu, Susumu, to Kabushiki Kaisha Toshiba. Address control circuit for a video memory of a multi-image display video system. 5,021,883, Cl. 358-160.000.

Sakamoto, Takumi: *See—*

Tanaka, Akihiro; Ohsima, Tetsuhiro; and Sakamoto, Takumi, 5,021,036, Cl. 474-237.000.

Sakayori, Takao: *See—*

Wataze, Manabu; and Sakayori, Takao, 5,021,844, Cl. 357-23.300

Sakurai, Yoshihiko: *See—*

Iida, Katsumi; Sakurai, Yoshihiko; Takano, Akihiko; Yamaguchi, Hideo; and Yano, Teruaki, 5,020,424, Cl. 98-2.010.

Salazar, Edilberto I.; and Riley, Gilbert N., to Pitney Bowes Inc. Two stage quadrature incremental encoder. 5,021,781, Cl. 341-13.000.

Salomon S.A.: *See—*

Barret, Thierry; and Rullier, Pierre, 5,020,247, Cl. 36-50.000.

Salort, Guy J. External apparatus for motor handicaps of at least one upper limb. 5,020,521, Cl. 128-77.000.

Salvatore, Gene. Animal restraining device. 5,020,478, Cl. 119-98.000

Salvestro, Aldo T.; Bohl, Rainer M.; and Furse, Martin L., to Andronic Devices, Ltd. Locking mechanism for medical devices. 5,020,933, Cl 403-90.000.

SAM Techology, Inc.. *See—*

Morgan, Nelson H.; and Gevins, Alan S., 5,020,538, Cl. 128-653.00R.

Sameshima, Kenji: *See—*

Yamamoto, Masanao; Unnai, Takaaki; Ehata, Shigeru, Hirai, Tadaaki; Sameshima, Kenji; Hiruma, Eikiyu; Suzuki, Shirou, Tanioka, Kenkichi; Yamazaki, Junichi; and Shidara, Keeichi, 5,021,705, Cl. 313-106.000.

Sams, Bernard, to Lever Brothers Company, Division of Conopco, Inc Dispensing containers. 5,020,699, Cl. 222-450.000.

Samsung Electron Devices Co. Ltd.: *See—*

Oh, Tae-sik, 5,021,709, Cl. 313-456.000.

SamSung Electronics Co., Ltd.: *See—*

Kim, Kwang-Seok, 5,021,885, Cl. 358-168.000.

Park, Yung-Jun, 5,021,887, Cl. 358-183.000.

Samuels, Allen: *See—*

Hu, Larry; Chuk, Ting; McLeod, John; Birman, Mark, Samuels, Allen; and Chu, George K., 5,021,985, Cl. 364-748.000.

Sanden Corporation: *See—*

Nakayama, Shunichi; Kanai, Masashi; and Arai, Yasuyuki, 5,020,972, Cl. 417-37.000.

Shimizu, Kazuo, 5,020,653, Cl 194-317.000.

Sanders, Andrea; and Himes, Glenn R., to Shell Oil Company Tie layer composition and laminated structures containing same. 5,021,113, Cl 156-334.000.

Sanders, Gerald W · *See—*

Retzloff, James G.; and Sanders, Gerald W., 5,020,601, Cl 169-37.000.

Sanderson, John G.: *See—*

Miller, George B.; and Sanderson, John G., 5,020,243, Cl 34-119.000.

Sandoz Ltd.: *See—*

Bandlish, Baldev K., 5,021,132, Cl. 204-78.000.

Bitterli, Peter, 5,021,573, Cl. 544-284.000.

Sands, Robert M.; and Fitzgerald, John J., to Digital Equipment Corporation. Apparatus for compensating for image rotation in a CRT display. 5,021,712, Cl. 315-8.000.

Sandstrom, Paul H.; Wideman, Lawson G.; and Segatta, Thomas J., to Goodyear Tire & Rubber Company, The. Rubber compositions containing a mixture of alkyl esters of rosin acid. 5,021,492, Cl 524-274.000.

Sandstrom, Paul H., to Goodyear Tire & Rubber Company, The Rubber composition and tire with component(s) thereof 5,021,493, Cl. 524-347.000.

Sandvik AB: *See—*

Sundstrom, Erik, 5,021,033, Cl. 474-152.000.

Sankyo Company Limited: *See—*

Terada, Atsusuke; Iizuka, Yoshio; Wachi, Kazuyuki; and Fujibayashi, Kenji, 5,021,413, Cl 514-227.500.

Trada, Atsusuke; Amemiya, Yoshiya; Matsuda, Keiichi; and Oshima, Takeshi, 5,021,444, Cl. 514-397.000.

Sankyo Rikagaku Co., Ltd.: *See—*

Okajima, Hiroshi; and Sudo, Susumu, 5,020,282, Cl 51-206.00R

Sano, Harunobu; and Kohno, Yoshiaki, to Murata Manufacturing Co., Ltd. Monolithic ceramic capacitor. 5,021,921, Cl. 361-321.000.

Sans. Gas. Inc.: *See—*

Gill, James A., 5,020,594, Cl. 166-250.000.

Sansevero, Frank; Seehausen, Klaus; and Rivera, James A., to Otis Elevator Company. Curved escalator step chain turnaround zone. 5,020,654, Cl. 198-328.000.

Sanshin Kogyo Kabushiki Kaisha: *See—*

Kanno, Isao, 5,020,492, Cl. 123-198.00D.

Watanabe, Eifu, 5,020,483, Cl. 123-52.0MV.

Santel, Hans-Joachim: *See—*

Findeisen, Kurt; Lindig, Markus; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,081, Cl. 71-92.000.

Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,082, Cl. 71-93.000.

Muller, Klaus-Helmut; Kluth, Joachim; Konig, Klaus; Gassen, Karl-Rudolf; Findeisen, Kurt; Lindig, Markus; Lurssen, Klaus, Santel, Hans-Joachim; and Schmidt, Robert R., 5,021,080, Cl. 71-92.000.

Santing, Gerhardus: *See—*

Jansz, Just J. C.; and Santing, Gerhardus, 5,021,231, Cl. 423-506.000.

Santoro, Giovanni; and Francolini, Emmanno. Temperature controlled soldering iron employing a variable resistance heating element for temperature sensing. 5,021,634, Cl. 219-241.000.

Sanwa Shutter Corporation: *See—*

Hamada, Takeaki; Abe, Kiyoshi; Takei, Hitoshi; and Sato, Kenji, 5,020,169, Cl. 5-10.200.

Sara Lee/DE N.V.: *See—*

Kuhn, Peter H. A. N., 5,020,930, Cl. 401-146.000.

Saris, Steven D.: *See—*

Piraino, Anthony J.; and Saris, Steven D., 5,021,448, Cl. 514-415.000.

Sarkozi, Jeff. Self adjustable, neck support pillow. 5,020,174, Cl. 5-437.000.

Sarr, Dennis P.; and Anderson, Patrick L., to Boeing Company, The. Method and apparatus for measuring the distance between a body and a capacitance probe. 5,021,740, Cl. 324-687.000.

Sasa, Yuki, to Isuzu Motors Limited. Vehicle clutch control system. 5,020,645, Cl. 192-0.090.

Sasabe, Shunji: *See—*

Saito, Hiroshi; Suzuki, Yasumichi; Sasabe, Shunji; and Nakajima, Kazuhiro, 5,021,114, Cl. 156-345.000.

Sasagawa, Katsuyoshi: *See—*

Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 5,021,503, Cl. 524-706.000.

Sasaki, Hajime: *See—*

Ishihara, Takashi; Sasaki, Hajime; and Aiga, Masao, 5,021,100, Cl. 136-249.000.

Sasaki, Hiroshi; and Nishiya, Makoto, to Kabushiki Kaisha Zero One. Ag alloy of high discolouration resistance. 5,021,214, Cl. 420-504.000.

Sasaki, Hiroyuki, to Casio Computer Co., Ltd. Sound generation package and an electronic musical instrument connectable thereto. 5,020,410, Cl. 84-602.000.

Sasaki, Katsuhiko; and Higuchi, Hisashi, to Makita Electric Works, Ltd Miter saw. 5,020,406, Cl. 83-397.000.

Sasaki, Katsuro; Shimohigashi, Katsuhiro; and Hanamura, Shoji, to Hitachi, Ltd. Semiconductor memory having redundancy circuit for relieving defects. 5,021,944, Cl. 365-200.000.

Sasaki, Kazuaki: *See—*

Suyama, Takahiro; Kondo, Masafumi; Sasaki, Kazuaki; Hosoda, Masahiro; Takahashi, Kosei; and Hayakawa, Toshiro, 5,022,036, Cl. 372-45.000.

Sasaki, Kazuya: *See—*

Maeda, Tetsuya, Yamamoto, Toshiyuki; Takase, Mituo; Sasaki, Kazuya; Airka, Tadashi; Yokoo, Mamoru; Hashimoto, Rieko; Amemiya, Kouji; and Koshikawa, Sakae, 5,021,458, Cl. 514-655.000.

Sasaki, Koushi: *See—*

Wada, Keisuke; Hara, Yoshinori; and Sasaki, Koushi, 5,021,589, Cl. 549-325.000.

Sasaki. Makoto; Ebishi, Nobuo; and Yanai, Shinji, to Alps Electric Co., Ltd. Power seat device. 5,021,614, Cl. 200-5.00R.

Sashida, Minoru; Yanagi, Masaaki, Okitsu, Katsuhiko; and Higuchi, Hirokazu, to Canon Kabushiki Kaisha. Film feeding apparatus. 5,020,900, Cl. 353-26.00R.

Sato, Eiji: *See—*

Takenaka, Koji; and Sato, Eiji, 5,021,283, Cl. 428-116.000.

Sato, Kazuharu: *See—*

Takarada, Mitsuhiko; Sato, Kazuharu; Yamamoto, Kenji; and Mori, Shigeru, 5,021,091, Cl. 106-287.160.

Yamaya, Masaaki; Sato, Kazuharu; and Takahashi, Masayuki, 5,021,266, Cl. 427-379.000.

Sato, Kazutaka: *See—*

Watanabe, Michihiro; Sato, Kazutaka; Zen, Munetoshi; Ato, Kazuhiko; Watanabe, Yoshinobu; and Taguchi, Sadayoshi, 5,021,194, Cl 252-518.000.

Sato, Kenji: *See—*

Hamada, Takeaki; Abe, Kiyoshi; Takei, Hitoshi; and Sato, Kenji, 5,020,169, Cl. 5-10.200.

Sato, Kyokuichi; Kayatani, Tooru; and Kenmotsu, Toru, to O M Industrial Co., Ltd. Filler neck cap with pressure valve. 5,020,685, Cl. 220-203.000.

Sato, Masaaki: *See—*

Uto, Nobutaka; Sato, Masaaki; Hayakawa, Kimiaki; and Honjo, Takeshi, 5,021,837, Cl. 355-322.000.

Sato, Masao, to Asahi Kogaku Kogyo Kabushiki Kaisha. Single-lens reflex camera with strobe incorporated therein. 5,021,814, Cl. 354-149.110.

Sato, Michitaka: *See—*

Nishio, Hiroaki; Kato, Akira; Sato, Michitaka; and Watanabe, Keiji, 5,021,213, Cl. 419-36.000.

Sato, Motohiro: *See—*

Kieda, Shigekazu; Nakajima, Tadakatsu; Kuwahara, Heikichi; and Sato, Motohiro, 5,021,924, Cl. 361-385.000.

Sato, Ryo: *See—*

Kikuchi, Ikuya; and Sato, Ryo, 5,022,022, Cl. 369-44.160.

Sato, Shigeji: *See—*

Yamahira, Yoshiya; Fujioka, Keiji; Sato, Shigeji; and Takada, Yoshihiro, 5,021,241, Cl. 424-426.000.

Sato, Shigeru: *See—*

Fujita, Yuuji; Sezume, Tadashi; Kitano, Kitsusho; Narukawa, Kiyotada; Mikami, Takashi; Kawamura, Tetsuya; Sato, Shigeru; Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao, 5,021,504, Cl. 525-57.000.

Sato, Shoji, to Canon Kabushiki Kaisha. Power source apparatus for electronic equipment. 5,021,728, Cl. 323-272.000.

Sato, Shuichi; Kobayashi, Yoshiharu; and Ayusawa, Shirou, to SSMC Inc. Slackened needle thread assuring unit. 5,020,462, Cl. 112-302.000.

Sato, Susumu: *See—*

Kawasaki, Masahiro; Ohbuchi, Yukio; Maeda, Yoshiaki; and Sato, Susumu, 5,021,534, Cl. 528-60.000.

Sato, Takanori: *See—*

Yasui, Kotaro; Kojima, Asato; Yasuda, Atsushi; and Sato, Takanori, 5,021,347, Cl. 435-235.000.

Sato, Takehiko, to Fuji Photo Film Co., Ltd. Ion-selective electrode. 5,021,140, Cl. 204-416.000.

Satoh, Osamu; Hirai, Isamu; and Nakata, Masahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Multi-area brightness measuring apparatus. 5,021,818, Cl. 354-429.000.

Satou, Yukimasa: *See—*

Oikawa, Saburo; Yatsuo, Tsutomu; and Satou, Yukimasa, 5,021,855, Cl. 357-38.000.

Satula, Keith O.; Schuchmann, Russell P.; and Duncan, Eugene F., to Eaton Corporation. Photoelectric color sensor for article sorting. 5,021,645, Cl. 250-223.00R.

Saucedo, Ismael G.: *See—*

Blazek, Kenneth E.; and Saucedo, Ismael G., 5,020,585, Cl. 164-452.000.

Saud, Abel. Soap composition. 5,021,183, Cl. 252-108.000.

Sauer, Hans; and Kramer, Peter, to Varta Batterie Aktiengesellschaft. Spiral-wound galvanic cell. 5,021,306, Cl. 429-94.000.

Saur, Wolfgang: *See—*

Schreiber, Herbert; and Saur, Wolfgang, 5,021,484, Cl. 524-100.000.

Savoie, Marcel: *See—*

Mounier-Poulat, Francois; Savoie, Marcel; and Armanet, Raymond, 5,020,824, Cl. 280-686.000.

Sawa, Natsuo; Masuda, Takeshi; Miura, Shozo; Kano, Naoki; Kamagata, Kazuo; and Ito, Masayuki, to Shikoku Chemicals Corporation. Process for preparation of 1-benzylimidazole compound. 5,021,584, Cl. 548-335.000.

Sawada, Shinichi; Matsushita, Tetsuya; Isoyama, Toyoshiro; and Saito, Hideo, to Chisso Corporation. Liquid crystal composition. 5,021,189, Cl. 252-299.610.

Sawada, Toshiki: *See—*

Kojima, Takao; Yamano, Masaru; and Sawada, Toshiki, 5,020,499, Cl. 123-479.000.

Sawaragi, Yoshiatsu; and Maruyama, Nobuyuki, to Sumitomo Metal Industries, Ltd. High-strength, heat-resistant steel with improved formability and method thereof. 5,021,215, Cl. 420-584 100.

Sayama Kako Co., Ltd.: *See—*

Shishido, Shigenari, 5,020,830, Cl. 283-101.000.

Scales, Michael J. Block-formed revetment system for controlling soil erosion. 5,020,938, Cl. 405-16.000.

Scandmec Plast AB: *See—*

Elfverson, Sven; Skogward, Kenneth; and Hermansson, Bengt, 5,020,366, Cl. 73-313.000.

Schaale, Klaus; Schoenberger, Hermann; and Sperl, Johann, to Webasto AG Fahrzeugtechnik. Heating device operated by means of liquid fuel. 5,020,991, Cl. 431-319.000.

Schade, Detlef: *See—*

Zell, Werner V.; Becker, Johann A.; Boehm, Detlef M., Frohlich, August G.; Schade, Detlef; and Goletz, Bernhard R., 5,020,874, Cl. 350-96.200.

Schaefer, Edwin M., III: *See—*

Archie, Kent C.; Fonorow, Owen R.; McGould, Mary C.; McLear, Robert E., III; Read, Edward C.; Schaefer, Edwin M., III; Schwab, Suzanne E.; and Wodarz, Dennis, 5,021,997, Cl. 364-900.000.

Schaefer, Ron, to Budd Canada Inc. Engine block heater. 5,021,633, Cl. 219-208.000.

Schallner, Otto: *See—*

Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,082, Cl. 71-93.000.

Schamburger, Timothy R.: *See—*

Morgan, Alan K.; and Schamburger, Timothy R., 5,020,611, Cl 175-215.000.

Schapira, Joseph; Pecheur, Jacques; Vincent, Jacques; Schild, Jacques; and Bosselin, Bruno, to Compagnie Francaise De Produits Industriels. Stable aqueous or aqueous alcoholic dispersion based on derivatives of oxynil, herbicidal composition comprised thereof and selective herbicidal treatment comprising the use of the said herbicidal composition. 5,021,083, Cl. 71-105.000.

Scheffler, Robert G., to Duplitronics, Inc. High speed tape duplicating machine. 5,021,893, Cl. 360-15.000.

Scheibner, Harry J., to National Semiconductor Corporation. Zero insertion force socket with low inductance and capacitance. 5,021,000, Cl. 439-342.000.

Schemmel, Hans-Robert, to U.S. Philips Corp. Circuit arrangement comprising two parallel branches for transmitting a binary signal. 5,021,683, Cl. 307-441.000.

Scherer, Benjamin, to Gimelli & Co. AG. Electric toothbrush. 5,020,179, Cl. 15-22.100.

Scherer, Peter J. Tangle free manually engageable device. 5,021,008, Cl. 439-504.000.

Schering Aktiengesellschaft: *See—*

Gries, Heinz; Rosenberg, Douwe; Weinmann, Hanns-Joachim, Speck, Ulrich; Mutzel, Wolfgang; Hoyer, Georg-Alexander; and Pfeiffer, Heinrich, deceased, 5,021,236, Cl. 424-9.000.

Strehlke, Peter; Bohlmann, Rolf; and Henderson, David, 5,021,434, Cl. 514-341.000.

Schering Berlin Polymers Inc.: *See—*

Wozniak, Don S., 5,021,482, Cl. 524-100.000.

VOL 1127
ISS 1
JE 4
1991
UMI

- Schering Corporation: *See—*
  - Townsley, Malcolm, 5,020,898, Cl 351-160.00R.
- Scherr, Rudolf: *See—*
  - Grabuschnig, Josef; Scherr, Rudolf, Ritter, Klaus; and Ritter, Gerhard, 5,020,575, Cl. 140-112.000.
- Schickaneder, Helmut. *See—*
  - Buschauer, Armin; Schickaneder, Helmut; Schunack, Walter; Elz, Sigurd; Szelenyi, Istvan, Baumann, Gert; and Ahrens, Kurt H., 5,021,431, Cl. 514-333.000.
- Schiele, Herbert, to Krauss-Maffei AG. Process and apparatus for the separation of mixtures of substances. 5,021,158, Cl. 210-326.000.
- Schild, Jacques: *See—*
  - Schapira, Joseph; Pecheur, Jacques; Vincent, Jacques; Schild, Jacques; and Bosselin, Bruno, 5,021,083, Cl. 71-105.000.
- Schimko, Reinhold, to Universal Maschinenfabrik Dr Rudolf Schieber GmbH. Braking device on the thread guide box of a flat bed knitting machine. 5,020,341, Cl. 66-126.00R.
- Schindler, Manfred J.: *See—*
  - Chu, Shiou L. L.; Tajima, Yusuke: and Schindler, Manfred J., 5,021,743, Cl. 330-54.000.
  - Tajima, Yusuke; and Schindler, Manfred J., 5,021,756, Cl. 333-132.000.
- Schirmer, Henry G., to W. R. Grace & Co.-Conn. Bone puncture resistant bag. 5,020,922, Cl 383-119.000.
- Schlais, John R.: *See—*
  - Henderson, Mark F.; and Schlais, John R., 5,021,356, Cl. 437-45.000.
- Schlanzke, Claus: *See—*
  - Feldmann, Hugo; Schlanzke, Claus; and Svejovsky, Ulrich, 5,020,208, Cl. 29-527.700.
- Schlapp, Albert; Grimm, Rainer; and Bohm, Horst, to Rockwell-Golde GmbH. Sliding-lifting roof for automobiles. 5,020,849, Cl. 296-221.000.
- Schleicher, Bernd: *See—*
  - Bienert, Horst; Hirschberger, August, Schleicher, Bernd; Igel, Richard; and Meier, Kurt, 5,020,850, Cl. 296-223.000.
- Schlipf, Ferdinand: *See—*
  - Weyrauch, Adolf; Dorband, Bernd, and Schlipf, Ferdinand, 5,020,894, Cl. 350-587.000.
- Schlumberger Industries Limited: *See—*
  - Kulczyk, Konrad; Perks, Malcolm P.; and Smith, George W., 5,022,014, Cl. 367-87.000.
- Schlumberger Technology Corporation: *See—*
  - Roscoe, Brad; and Grau, James, 5,021,653, Cl 250-270.000.
- Schmidt, Karl-Jurgen: *See—*
  - Metzger, Willi; Schmitz, Manfred: and Schmidt, Karl-Jurgen, 5,021,130, Cl. 204-44.400.
- Schmidt, Robert R.: *See—*
  - Findeisen, Kurt; Lindig, Markus; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,081, Cl. 71-92.000.
  - Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 5,021,082, Cl. 71-93.000.
  - Muller, Klaus-Helmut; Kluth, Joachim; Konig, Klaus; Gassen, Karl-Rudolf; Findeisen, Kurt; Lindig, Markus; Lurssen, Klaus; Santel, Hans-Joachim; and Schmidt, Robert R., 5,021,080, Cl. 71-92.000.
- Schmitz, Manfred: *See—*
  - Metzger, Willi; Schmitz, Manfred: and Schmidt, Karl-Jurgen, 5,021,130, Cl. 204-44.400.
- Schnabel, Jurgen, to Alcatel N.V. CMOS oscillator. 5,021,750, Cl. 331-111.000.
- Schnaibel, Eberhard; Junginger, Erich; and Hirschmann, Klaus, to Robert Bosch GmbH. Method for determining atmospheric air pressure in pressure-controlled fuel injection systems. 5,020,363, Cl. 73-119.00A.
- Schneider, Hans: *See—*
  - Hollenberg, Detlef; Schneider, Hans; and Weihrauch, Georg, 5,020,552, Cl. 132-265.000.
- Schneider, Hermann: *See—*
  - Brosi, Thomas; Hess, Werner; Moser, Winfried; and Schneider, Hermann, 5,020,360, Cl. 73-115.000.
- Schneider, Richard T., to Progress Technology Corp. Broadband superconducting detector using microsphere substrates. 5,021,659, Cl. 250-336.200.
- Schnur, Nicholas E.: *See—*
  - Zehler, Eugene R.; and Schnur, Nicholas E., 5,021,179, Cl. 252-54.600.
- Schoenberger, Hermann: *See—*
  - Schaale, Klaus; Schoenberger, Hermann; and Sperl, Johann, 5,020,991, Cl. 431-319.000.
- Schofield, Paul: *See—*
  - Meade, Roger; Schofield, Paul; and Wright, Michael C., 5,021,984, Cl. 364-709.160.
- Schomburg, Richard: *See—*
  - Rimkeit, Eugene; and Schomburg, Richard, 5,022,083, Cl. 381-98.000.
- Schouwenaars, Hendrikus J.: *See—*
  - Groeneveld, Dirk W. J.; and Schouwenaars, Hendrikus J., 5,021,784, Cl. 341-120.000.
- Schreck, John F.; and Truong, Phat C., to Texas Instruments Incorporated. PROM speed measuring method. 5,022,008, Cl. 365-201.000.
- Schreiber, Herbert; and Saur, Wolfgang, to Gurit-Essex AG. Fire retardant curable 1-oxa-3-aza tetraline (also termed "3,4-dihydro-1,3-benzoxazine") derived resin composition. 5,021,484, Cl. 524-100.000.
- Schreiber, William F., to Massachusetts Institute of Technology Definition television systems. 5,021,882, Cl. 358-141.000.
- Schroder, Bernd; Hartmann, Rudolf; and Thate, Helmut, to IBP Pietzsch GmbH Torsional spring. 5,020,783, Cl. 267-273.000.
- Schroeder, Herbert A., to Colorado State University Research Foundation. Method for recovering and using lignin in adhesive resins by extracting demethylated lignin. 5,021,531, Cl. 527-400.000.
- Schroeders, Manfred: *See—*
  - Inger, Siegfried; and Schroeders, Manfred, 5,020,735, Cl. 242-1.000
- Schuchmann, Russell P.: *See—*
  - Satula, Keith O.; Schuchmann, Russell P.; and Duncan, Eugene F 5,021,645, Cl. 250-223.00R.
- Schuellein, George J Ice detector for protecting boats. 5,021,769, Cl 340-580.000.
- Schuler, Joseph J *See—*
  - Smith, John M.; and Schuler, Joseph J., 5,021,801, Cl. 343-876.000
- Schulte-Schlagbaum Aktiengesellschaft: *See—*
  - Eisermann, Armin, 5,020,346, Cl. 70-279.000
- Schultz, Karl-Heinz: *See—*
  - Reinhardt, Wilheilm; and Schultz, Karl-Heinz, 5,021,726, Cl 318-811.000.
- Schulz, Alfred: *See—*
  - Cao, Chi-Thuan; Erban, Andreas; Janetzke, Helmut, Cordes, Henning; Schulz, Alfred; and Matuschek, Wolfgang, 5,020,501, Cl 123-489.000.
- Schunack, Walter: *See—*
  - Buschauer, Armin; Schickaneder, Helmut; Schunack, Walter; Elz, Sigurd; Szelenyi, Istvan; Baumann, Gert; and Ahrens, Kurt H., 5,021,431, Cl. 514-333.000.
- Schuster, Fred: *See—*
  - Pigeau, Roger R.; and Schuster, Fred, 5,021,041, Cl. 493-177.000.
- Schuster, Richard L., to Manville Corporation. Sleeve-type carrier with integral alignment feature. 5,020,668, Cl. 206-427.000.
- Schutts, Mark E., to Bently Nevada Corporation. Proximity sensor resistant to axial and torsional forces. 5,021,737, Cl. 324-207.110.
- Schwab, Suzanne E.: *See—*
  - Archie, Kent C.; Fonorow, Owen R.; McGould, Mary C.; McLear, Robert E., III; Read, Edward C.; Schaefer, Edwin M., III. Schwab, Suzanne E.; and Wodarz, Dennis, 5,021,997, Cl. 364-900.000.
- Schwaiger, Max: *See—*
  - Rieder, Heinz; and Schwaiger, Max, 5,021,650, Cl. 250-231.160.
- Schwark, Joanne M., to Hercules Incorporated. Crosslinkable poly(thio)ureasilazane composition containing a free radical generator 5,021,533, Cl. 528-21.000.
- Schwartz, David A.: *See—*
  - Murrer, Barry A.; and Schwartz, David A., 5,021,409, Cl. 514-183.000.
- Schwartz, Michael S.: *See—*
  - Joshua, Henry; Wilson, Kenneth E.; Schwartz, Michael S.; Lee, Ta J.; and Stokker, Gerald E., 5,021,453, Cl. 514-510.000.
- Schwartz, Russell J.; and Gregorio, Manuel Z., to Sun Chemical Corporation. Water-based diarylide pigment compositions. 5,021,090, Cl 106-23.000.
- Schwartz, Willis T.: *See—*
  - Molinaro, John R.; Pawlak, Joseph A.; and Schwartz, Willis T. 5,021,168, Cl. 549-241.000.
- Schwarz, Douglas B.: *See—*
  - Pyzik, Aleksander J.; Schwarz, Douglas B.; Rossow, Harold E.; Beaman, Donald R.; and Pyzik, Barbara M., 5,021,372, Cl 501-97.000.
- Schwarz, Robert A., to Sundstrand Corporation. Accumulator blowback hydraulic circuit. 5,020,322, Cl. 60-404.000.
- Schwarz, Volker; and Mayer, Manfred, to Mauser-Werke Obernourf GmbH. Apparatus and method for measuring screw threads. 5,020,229, Cl. 33-199.00R.
- Schwarzschild, Marc, to General Electric Company. Method for acquiring three-axis earth pointing attitude for an initially spinning spacecraft. 5,020,744, Cl. 244-164.000.
- Schweikert, Wilhelm; and Will, Norbert, to Siemens Aktiengesellscaft. Cooling system for wound electrolytic capacitor. 5,021,927, Cl. 361-514.000.
- Science Research Laboratory, Inc.: *See—*
  - Jacob, Jonah H., 5,021,742, Cl. 330-4.300.
- Sclavo S.p.A.: *See—*
  - Cardinali, Franco; Longobardi, Maria G.; Viscomi, Giuseppe C., and Ziggiotti, Alessandra, 5,021,600, Cl. 556-411.000.
- Scott, David B.: *See—*
  - Haken, Roger A.; and Scott, David B., 5,021,851, Cl. 357-23.900.
- Scott & Fetzer Company, The: *See—*
  - Lammers, James B., 5,020,973, Cl. 417-243.000.
- Scott Orthotic Labs, Inc.: *See—*
  - Harris, Godfrey; Noell, Ralph B.; and Bradshaw, Larry R., 5,020,815, Cl. 280-246.000.
- Scungio, Robert A., to Nelson, Linden D. Key ring. 5,020,348, Cl. 70-456.00R.
- SDS Biotech K.K.: *See—*
  - Kobayashi, Hiroshi; and Shimizu, Masaaki, 5,021,605, Cl. 558-425.000.
- Seagate Technology, Inc.: *See—*
  - Zak, Brian S., 5,021,907, Cl. 360-104.000.
- Searle, Robin H. J., to Normalair-Garrett (Holdings) Limited. Fluid compressors. 5,020,974, Cl. 417-246.000.
- Seehausen, Klaus: *See—*
  - Sansevero, Frank; Seehausen, Klaus; and Rivera, James A., 5,020,654, Cl. 198-328.000.

- Segatta, Thomas J.: *See—*
  - Sandstrom, Paul H; Wideman, Lawson G, and Segatta, Thomas J., 5,021,492, Cl. 524-274.000.
- Segnini, Robert: *See—*
  - DiMatteo, Paul; and Segnini, Robert, 5,020,171, Cl. 5-81.00R.
- Sehl, Douglas, to Ski-Ease Limited Partnership, The. Tow-line winding device. 5,020,737, Cl. 242-86.500.
- Seidel, Jurgen: *See—*
  - Romer, Axel, and Seidel, Jurgen, 5,021,242, Cl. 424-436.000.
- Seiko Epson Corporation: *See—*
  - Akiyama, Takaaki; Matsuo, Shuji; Fujii, Masahiro; Kurose, Mitsukazu; Nakamura, Osamu; and Kamijo, Masahiro, 5,020,928, Cl. 400-193.000.
  - Kasai, Kenichiro; and Kawasaki, Takeshi, 5,021,749, Cl. 331-17.000.
  - Niki, Hiroshi, 5,021,825, Cl. 355-200.000.
  - Takeuchi, Kesatoshi, 5,021,752, Cl. 331-177.00V.
- Seikosha Co., Ltd.: *See—*
  - Tanaka, Sakae; Watanabe, Yoshiaki, Shirai, Katsuo; and Ogiwara, Yoshihisa, 5,021,850, Cl. 357-23.700.
- Seiler, Reiner. *See—*
  - Hartig, Klaus; and Seiler, Reiner, 5,021,139, Cl. 204-298.090.
- Seiriki, Ryohei. Article dispensing apparatus having integral coin receiving case and article discharge mechanism. 5,020,652, Cl 194-229.000.
- Seismograph Service Corp.: *See—*
  - Stephens, H. Bruce, 5,022,052, Cl. 375-25.000.
- Seizert, Robert D., to Solvay Automotive, Inc Fabric reinforcement for plastic fuel tanks. 5,020,687, Cl. 220-645.000.
- Sejus Corporation: *See—*
  - Wilhelm, Joseph R., 5,020,926, Cl. 400-54.000.
- Seki, Akihiko: *See—*
  - Yokoo, Toru, Kobane, Takashi; Seki, Akihiko; Yamakawa, Yasuhiro; and Kawakami, Yoshikazu, 5,020,877, Cl. 350-128.000.
- Seki, Masaki; Takegahara, Takashi; and Arakaki, Takeshi, to Fanuc Ltd. Profile revising method. 5,021,966, Cl. 364-474.260
- Seki, Toshio: *See—*
  - Yamanaka, Tsutomu; Seki, Toshio; Nakajima, Tohru; and Yaoka, Osamu, 5,021,432, Cl. 514-337.000.
- Seko, Hideo, to Aisin Seiki Kabushiki Kaisha. Valve seat arrangement. 5,020,490, Cl. 123-188.00S.
- Seltzer, Raymond *See—*
  - Galbo, James P.; and Seltzer, Raymond, 5,021,481, Cl. 524-99.000.
- Semborg-Recrob, Corp.: *See—*
  - Lang, Victor H., 5,021,878, Cl. 358-93.000.
- Semiconductor Energy Laboratory Co., Ltd. *See—*
  - Yamazaki, Shunpei, 5,021,839, Cl. 357-4.000.
- Sencion Corporation: *See—*
  - Bigliardi, Achille M.; and Jablonski, Terry R., 5,020,628, Cl. 180-272.000.
- Sendoykas, Jack J. Piston lock for power cylinders. 5,020,418, Cl. 92-17.000.
- Senetek PLC: *See—*
  - Bolund, Lars; Jensen, Peter K. A.; and Bjerring, Peter, 5,021,422, Cl. 514-261.000.
- Sensabaugh, Andrew J., Jr.: *See—*
  - Farrier, Ernest G.; Harris, James L.; Norman, Alan B.; Resce, James L.; Sensabaugh, Andrew J., Jr.; and Shannon, Michael D., 5,020,548, Cl. 131-194.000.
- Sentivan, Robert R. Lug-removing pneumatic impact-gun air blast-deflector. 5,020,607, Cl 173-171.000.
- Serini, Volker; Freitag, Dieter; Idel, Karsten-Josef; Westeppe, Uwe; Grigo, Ulrich; and Paetz, Klaus-Christian, to Bayer Aktiengesellschaft. Polycarbonate of polysubstituted cyclohexylidene bisphenols. 5,021,542, Cl. 528-204.000.
- Serpentix Conveyor Corporation: *See—*
  - Beer, Paul D., and Keefe, Anthony D., 5,021,599, Cl. 556-142.000.
- Serra, Oswaldo A.: *See—*
  - Vellego, Geni; Filipini, Cesar A., Filho, Pedro I. P.; Canevarolo, Sebastiao V., Jr.; and Serra, Oswaldo A., 5,021,397, Cl. 505-1.000.
- Serusteel, Inc.: *See—*
  - McQuillen, Albert L., Jr.; McQuillen, Michael; and McQuillen, Mark, 5,020,703, Cl. 222-590.000.
- Sesin, David F.; Liesch, Jerrold M.; Fountoulakis, Jimmy M.; Masurekar, Prakash S.; Kaplan, Louis; and Wichmann, Carol F., to Merck & Co., Inc. Antibiotic agents. 5,021,403, Cl. 514-9.000.
- Sevald, Frederick G.: *See—*
  - Ernst, Richard J.; Paul, Sigismund; Sevald, Frederick G.; and Olma, Marian, 5,020,693, Cl. 222-137.000.
- Seymour, Raymond K.: *See—*
  - Candelora, Andrew M.; Nolan, Kevin F.; Magnon, Gary D.; and Seymour, Raymond K., 5,021,819, Cl. 335-15.000.
- Seymour, Robert W.: *See—*
  - Light, Ronald R.; and Seymour, Robert W., 5,021,289, Cl. 428-285.000.
- Sezume, Tadashi: *See—*
  - Fujita, Yuuji; Sezume, Tadashi; Kitano, Kitsusho; Narukawa, Kiyotada; Mikami, Takashi; Kawamura, Tetsuya; Sato, Shigeru; Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao, 5,021,504, Cl. 525-57.000.
- SGS-Thomson Microelectronics S.r.l.: *See—*
  - Bertotti, Franco; Ferrari, Paolo; and Gatti, Maria T., 5,021,860, Cl. 357-48.000.
- SGS-Thomson Microelectronics S A.. *See—*
  - Kowalski, Jacek; and Chevalier, Christophe, 5,022,001, Cl. 365-185.000.
- Shalom, Ami B.: *See—*
  - Talmore, Eli; and Shalom, Ami B., 5,021,668, Cl. 250-372.000.
- Shannon, Francis J: *See—*
  - Hyatt, Robert J.; Abbott, Edward H.; Bush, Robert E., and Shannon, Francis J., 5,020,964, Cl. 414-751.000.
- Shannon, Michael D.: *See—*
  - Farrier, Ernest G.; Harris, James L.; Norman, Alan B.; Resce, James L.; Sensabaugh, Andrew J., Jr.; and Shannon, Michael D., 5,020,548, Cl. 131-194.000.
- Shao-Yung, Lu. Apparatus for cleaning the recording/playing head, capstan and pinch roller of a cassette type audio recorder/player 5,021,912, Cl. 360-128.000.
- Sharkawy, Ahmed, to Advanced Cardiovascular Systems, Inc. Catheter for even distribution of therapeutic fluids. 5,021,044, Cl. 604-53.000.
- Sharma, Ashok K., to Rohm and Haas Company. Benzoylaminoalkanoic acids and esters. 5,021,454, Cl 514-541.000.
- Sharma, Suniti K.; Ventura, Susanna C.; and Narang, Subhash C., to AMP Incorporated. Method of forming patterned oxide superconducting films. 5,021,398, Cl. 505-1.000.
- Sharp, Bruce R. Double walled fibrous reinforced resinous storage tanks with common rib supports. 5,020,358, Cl. 73-49.200.
- Sharp Corporation: *See—*
  - Michijima, Masashi; Kadono, Masaru, and Yamamoto, Tatsushi, 5,020,212, Cl. 29-603.000.
- Sharp Kabushiki Kaisha: *See—*
  - Abumi, Takao, 5,021,873, Cl. 358-21.00R.
  - Hirose, Hitoshi; and Togawa, Fumio, 5,022,081, Cl 381-43.000.
  - Kawanishi, Hidenori; Hayashi, Hiroshi; Morimoto, Taiji; Kaneiwa, Shinji, Miyauchi, Nobuyuki; and Yano, Seiki, 5,022,037, Cl. 372-49.000.
  - Kita, Toshiro; Genba, Susumu; Takemoto, Masato; Tatsumi, Takashi; Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi, Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji; and Yoshida, Toshihiko, 5,021,892, Cl 358-468.000.
  - Kobayashi, Toshiaki; Ibuchi, Yoshiaki; and Kamei, Naoyuki, 5,021,833, Cl. 355-228.000.
  - Nishi, Toshio, 5,021,972, Cl. 364-518.000.
  - Nishimura, Toshio; and Morita, Akitaka, 5,021,952, Cl 364-406.000.
  - Ohta, Tomozo; Nakano, Hiroshi; Higashi, Kazutada; and Yamamoto, Hirohiko, 5,021,790, Cl. 342-44.000.
  - Shiiba, Kengo, 5,021,909, Cl. 360-113.000.
  - Suyama, Takahiro; Kondo, Masafumi; Sasaki, Kazuaki; Hosoda, Masahiro; Takahashi, Kosei; and Hayakawa, Toshiro, 5,022,036, Cl. 372-45.000.
  - Tanaka, Takeshi, 5,022,050, Cl. 375-7.000.
  - Yoshikai, Tamio, 5,020,471, Cl. 118-653.000.
- Sharpsteen, Ben E.: *See—*
  - Miles, Larry N.; Drinnen, Cecil A; Hackler, David W.; Bogart, Tom L.; Macklin, Arnold D.; Sharpsteen, Ben E.; Hyles, Truett M.; and Stephens, Herschel M., 5,020,714, Cl. 228-15.100.
- Shaw, James J.: *See—*
  - Bunick, Frank J.; Luo, Shiuh J.; Shaw, James J.; and Hellman, Stephen R., 5,021,249, Cl. 426-96.000.
- Shaw, Wei H., to United States of America, Air Force. Real-time high resolution autofocus system in digital radar signal processors. 5,021,789, Cl. 342-25.000.
- Shell Oil Company: *See—*
  - Altrichter, Diana M., 5,021,144, Cl. 208-113.000.
  - Cowan, Kenneth M.; and Hale, Arthur H., 5,020,598, Cl 166-293.000.
  - Evans, Peter G.; and Cole, John B., 5,020,368, Cl. 73-439.000.
  - Gautier, Pieter A.; Geuze, Maarten M.; Mastenbroek, Barend, and Petrus, Leonardus, 5,021,547, Cl. 528-392.000.
  - Jansz, Just J. C.; and Santing, Gerhardus, 5,021,231, Cl. 423-506.000.
  - Machado, Joseph M.; and George, Eric R., 5,021,496, Cl. 524-417.000.
  - Reinalda, Donald; and Kars, Jelte, 5,021,387, Cl. 502-260.000.
  - Sanders, Andrea; and Himes, Glenn R., 5,021,113, Cl. 156-334.000.
  - Stark, Charles J.; and Pietruszka, Rita D., 5,021,537, Cl. 528-106.000.
  - Wong, Pui K., 5,021,528, Cl. 526-280.000.
- Shepard, Howard M.: *See—*
  - Swartz, Jerome; Shepard, Howard M., and Darkan, Eric F., 5,021,641, Cl. 235-467.000.
- Shepherd, Wayne P.; Davis, Darrell E.; and Tay, Wan F., to Motorola. Inc. Fractional-N synthesizer having modulation spur compensation. 5,021,754, Cl. 332-128.000.
- Sheppard, Paul G. Illuminated sign system having tensioning means. 5,020,254, Cl. 40-603.000.
- Sherrington, David C.: *See—*
  - Elmes, Alfred R.; Hammond, Kevin; and Sherrington, David C., 5,021,462, Cl. 521-63.000.
- Shibaguchi, Takashi, to Ricoh Company, Ltd. Optical element. 5,020,885, Cl. 350-355.000.
- Shibahara, Kenji; and Houchin, Norio, to Kabushiki Kaisha Challenge Five; and Evercoat Kabushiki Kaisha. Two-way communication sheets in the form of double post card, double letter sheet, and the like. 5,020,829, Cl. 283-62.000.
- Shibano, Yasuji, to Hosiden Electronics Co., Ltd. Multipin connector 5,021,012, Cl. 439-610.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Shibata, Shigekazu: *See—*
    - Ubukata, Susumu; Mizutani, Yasukazu; and Shibata, Shigekazu, 5,021,618, Cl. 200-61.470.
- Shibata, Yoshio: *See—*
    - Banzai, Masato; Shibata, Yoshio; and Suzuki, Toshio, 5,021,623, Cl. 219-69.120.
- Shibayama, Kenji, to Victor Company of Japan, Limited. Video signal processor for a color liquid crystal display. 5,021,886, Cl. 358-170.000.
- Shibuya, Yasuo, to Tokyo Kikai Seisakusho, Ltd. Guide roller apparatus for rotary press. 5,020,431, Cl. 101-228.000.
- Shida, Masami: *See—*
    - Manaka, Toshio; and Shida, Masami, 5,021,960, Cl. 364-431.010.
- Shidara, Keeichi: *See—*
    - Yamamoto, Masanao; Unnai, Takaaki; Ehata, Shigeru; Hirai, Tadaaki; Sameshima, Kenji; Hiruma, Eikiyu; Suzuki, Shirou; Tanioka, Kenkichi; Yamazaki, Junichi; and Shidara, Keeichi, 5,021,705, Cl. 313-106.000
- Shiga, Shoji: *See—*
    - Asai, Makoto; Ohyama, Yoshimasa; Tanigawa, Tohru; Shinozaki, Shigeo; and Shiga, Shoji, 5,021,105, Cl 148-433.000.
- Shigematsu, Nobuharu: *See—*
    - Hatanaka, Hiroshi; Ezaki, Masami; Tsujii, Eisaku; Okamoto, Masanori; Shigematsu, Nobuharu; Okuhara, Masakuni; and Takase, Shigehiro, 5,021,240, Cl. 424-118.000.
- Shih, Chun-Jih. Scooter body open frame of loop form with a lateral beam joining longitudinal, laterally spaced side bars. 5,020,847, Cl 296-204.000
- Shiiba, Kengo, to Sharp Kabushiki Kaisha. Yoke type thin-film magnetic head and method for suppressing Barkhausen noise. 5,021,909, Cl. 360-113.000.
- Shikae, Sadao: *See—*
    - Miwa, Yoshiyuki; Kodama, Hiroshi; Murasugi, Skinya; Shikae, Sadao; Nakagawa, Masaya; and Kabumoto, Tsutomu, 5,020,842, Cl. 294-2.000.
- Shikoku Chemicals Corporation: *See—*
    - Sawa, Natsuo; Masuda, Takeshi; Miura, Shozo; Kano, Naoki; Kamagata, Kazuo; and Ito, Masayuki, 5,021,584, Cl. 548-335.000.
- Shima, Kenji: *See—*
    - Hatano, Masakatsu; Murayama, Masayoshi; Shima, Kenji; and Ito, Masumi, 5,021,384, Cl. 502-209.000.
- Shima, Takeshi, to Kabushiki Kaisha Toshiba. Control circuit for floating gate four-quadrant analog multiplier. 5,021,693, Cl. 307-494.000.
- Shimada, Keiko: *See—*
    - Fujisaki, Hisashi; and Shimada, Keiko, 5,022,068, Cl. 379-62.000.
- Shimada, Takamichi: *See—*
    - Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; Ozawa, Shigeo; Imai, Toshitaka; and Shimada, Takamichi, 5,020,391, Cl. 74-866.000.
- Shimadzu Corporation: *See—*
    - Kuzuta, Nobuyuki; Hasegawa, Iichi; and Kimura, Teiyu, 5,020,879, Cl. 350-162.170.
- Shimano Industrial Company, Ltd.: *See—*
    - Nagano, Masashi, 5,020,387, Cl. 74-475.000.
- Shimizu, Akira; Kurosawa, Atsushi; and Yamada, Fumiya, to Pioneer Electronic Corporation. Tape cassette push-out device for tape recorder. 5,021,904, Cl. 360-96.500.
- Shimizu, Kazuo, to Sanden Corporation. Device for discriminating between coins. 5,020,653, Cl. 194-317.000.
- Shimizu, Masaaki: *See—*
    - Kobayashi, Hiroshi; and Shimizu, Masaaki, 5,021,605, Cl. 558-425.000.
- Shimizu, Norio: *See—*
    - Fujii, Kiyoshi; Kitamura, Haruo; Takahashi, Shigeru; and Shimizu, Norio, 5,020,250, Cl. 37-257.000.
- Shimizu, Takaaki: *See—*
    - Takita, Masatoshi; and Shimizu, Takaaki, 5,021,073, Cl. 65-18.100.
- Shimohigashi, Katsuhiro: *See—*
    - Sasaki, Katsuro; Shimohigashi, Katsuhiro; and Hanamura, Shoji, 5,021,944, Cl. 365-200.000.
- Shimomura, Soichi, to Nippon Piston Ring Co., Ltd. Electric plasma arc powder welded slide layer for rotary fluid pump vane. 5,021,629, Cl. 219-121.590.
- Shin-Etsu Chemical Co., Ltd.: *See—*
    - Kuwata, Satoshi; and Ohkawara, Takashi, 5,021,089, Cl. 106-2.000.
    - Sugita, Toshikazu; and Itagaki, Akinari, 5,021,532, Cl. 528-15.000.
    - Takarada, Mitsuhiko; Sato, Kazuharu; Yamamoto, Kenji; and Mori, Shigeru, 5,021,091, Cl. 106-287.160.
    - Takita, Masatoshi; and Shimizu, Takaaki, 5,021,073, Cl. 65-18.100.
    - Yamaya, Masaaki; Sato, Kazuharu, and Takahashi, Masayuki, 5,021,266, Cl. 427-379.000.
- Shin-Etsu Handotai Company, Limited: *See—*
    - Ibe, Hiroyuki, 5,020,907, Cl. 356-153.000.
    - Iwasaki, Atsushi; Mizuishi, Koji; and Oda, Michiaki, 5,020,775, Cl. 251-215.000.
    - Ogino, Nobuyoshi, 5,021,862, Cl. 357-55.000.
- Shin, Kju H.; and Hale, Paul S., to Ethyl Corporation. Alkenyl succinic anhydrides process. 5,021,169, Cl. 549-255.000.
- Shinjo, Yasuhiro. Speaker. 5,022,084, Cl. 381-202.000.
- Shinko Electric Co., Ltd.: *See—*
    - Sugiyama, Hayami, 5,021,806, Cl. 346-76.0PH.
- Shinozaki, Shigeo: *See—*
    - Asai, Makoto; Ohyama, Yoshimasa; Tanigawa, Tohru; Shinozaki, Shigeo; and Shiga, Shoji, 5,021,105, Cl. 148-433.000.
- Shipov, Alexandr G.; Kramarova, Evgenia P.; Orlova, Natalia A.; Baukov, Jury I.; and Ziemelis, Kristap M. Lactam-1-acetic acid carbalkoxymethyl esters and method for preparing same. 5,021,568, Cl. 540-531.000.
- Shirai, Katsuo: *See—*
    - Tanaka, Sakae; Watanabe, Yoshiaki; Shirai, Katsuo; and Ogiwara, Yoshihisa, 5,021,850, Cl. 357-23.700.
- Shirai, Masahiro. *See—*
    - Otagiri, Tadashi; Shirai, Masahiro; Ohara, Minoru; and Suzuki, Go, 5,021,287, Cl. 428-212.000.
- Shiraishi, Shirou: *See—*
    - Nakaya, Michihiko; Fukushi, Yukiharu; Kodaka, Kenji; Ooka, Masayuki; Shiraishi, Shirou; Nakamura, Masahiko; and Numata, Satoshi, 5,021,412, Cl. 514-223.800.
- Shiratsuchi, Shinichi, to RCA Licensing Corporation. Phase locked subcarrier regenerator. 5,021,872, Cl. 358-19.000.
- Shishido, Shigenari, to Sayama Kako Co., Ltd Sealed card 5,020,830, Cl. 283-101.000.
- Shoop, John C., to Sullair Corporation. Fuel supply system for portable engine driven equipment. 5,020,566, Cl. 137-265.000.
- Shore, James B. Oil tool coupling device. 5,020,591, Cl. 166-55 000.
- Short, William T., to General Motors Corporation. Thermoformable multihued laminate films and processes. 5,021,278, Cl 428-76.000.
- Shoup, Clay E.: *See—*
    - Johnson, Kevin M.; and Shoup, Clay E., 5,021.829, Cl 355-213 000
- Showa Aluminum: *See—*
    - Iwai, Ichiro; and Eda, Hiroyuki, 5,021,106, Cl. 148-437 000
- Showa Highpolymer Co., Ltd · *See—*
    - Takiyama, Eiichiro; and Morita, Katsuhisa, 5,021.465, Cl 522-60.000.
- Showers, David: *See—*
    - Beard, John E.; Spillman, Franklin L.; Banos, Oscar; Showers, David; Fussell, John M.; and LeBlanc, George, 5,020,790, Cl 272-70.000.
- Shuman, Richard E.: *See—*
    - King, Anthony O.; Anderson, Robert K.; Shuman, Richard E.; and Weinstock, Leonard M., 5,021,575, Cl. 546-77.000.
- Shumate, Thomas G.; and Sokol, Louis P., to Baroid Technology, Inc Oil-based well bore fluids and gellants therefor 5,021,170, Cl 252-8.515.
- Sieben, Roger L.; and Zastrow, Klaus D., to Anheuser-Busch, Incorporated. Step mashing process for producing low alcohol beer 5,021,246, Cl. 426-13.000.
- Sieber, Alexander: *See—*
    - Macholdt, Hans-Tobias; Sieber, Alexander; Godau, Claus, and Manz, Albrecht, 5,021,473, Cl. 523-451.000.
- Siemens Aktiengesellscaft· *See—*
    - Schweikert, Wilhelm; and Will, Norbert, 5,021,927, Cl 361-514.000.
- Siemens Aktiengesellschaft. *See—*
    - Althaus, Hans; Kuhlmann, Werner; and Spaeth, Werner, 5,020,873, Cl. 350-96.200.
    - Daeges, Johannes, 5,020,636, Cl. 184-6.260
- Siemens-Pacesetter, Inc.: *See—*
    - Soukup, Thomas M., 5,020,545, Cl. 128-785.000.
- Siemens Plessey Electronic Systems Limited: *See—*
    - Lane, Anthony A., 5,021,758, Cl. 333-245.000.
- Sigler, Kent K., to Robertshaw Controls Company Control device having push to turn selector means and method of making the same 5,020,389, Cl. 74-553.000.
- Signorini, Alberto. Nursing apparatus 5,020,679, Cl. 215-11 100.
- Sikorski, James F.: *See—*
    - Degenfelder, Joseph R.; and Sikorski, James F., 5,020,772, Cl 251-30.020.
- Silva, Richard: *See—*
    - Fischer, Rich; Silva, Richard; and Welton, Henry P., 5,021,254, Cl 426-482.000.
- Simon Nann KG, Fabrik fuer Spannwerkzeuge· *See—*
    - Nann, Eugen, 5,020,946, Cl. 409-136.000.
- Simonsen, Harold L.: *See—*
    - Kingston, Samuel C.; Barham, Steven T.; and Simonsen, Harold L., 5,022,048, Cl. 375-1.000.
- Sims, James O Piston/cylinder assembly. 5,020,422, Cl. 92-146.000.
- Singelyn, James D., to International Fuel Cells Corp. Method of applying a continuous thermoplastic coating with one coating step 5,021,259, Cl. 427-115.000.
- Singer, Roy E., to Wenger Manufacturing, Inc. Air suspension enrober 5,020,239, Cl. 34-57.00R.
- Singh, Pawan J.: *See—*
    - Dussourd, Jules L.; Singh, Pawan J.; and Miller, J. C., 5,020,970, Cl. 415-115.000.
- Singh, Raj N.; and Morrison, William A., to General Electric Company. Fiber-containing composite. 5,021,367, Cl. 501-88.000.
- Sircus, Brian: *See—*
    - Vernon, Susan N.; Sircus, Brian; and Gammell, Paul M., 5,021,738, Cl. 324-232.000.
- Ski-Ease Limited Partnership, The: *See—*
    - Sehl, Douglas, 5,020,737, Cl. 242-86.500.
- Skogward, Kenneth: *See—*
    - Elfverson, Sven; Skogward, Kenneth; and Hermansson, Bengt, 5,020,366, Cl. 73-313.000.
- Slater, Andrew: *See—*
    - West, Kenneth J.; and Slater, Andrew, 5,020,470, Cl. 118-326.000.
- Sleger, Roger R., to Hewlett-Packard Company. Disk drive enclosure for minimizing stresses and a vibration damping seal therefor. 5,021,905, Cl. 360-97.020.

- Sleight, Arthur W.: *See—*
    - Druliner, Joe D.; Horowitz, Harold S.; McLain, Stephan J.; and Sleight, Arthur W., 5,021,395, Cl. 505-1.000.
- Slenker, Stephen. Flexible conductor connector. 5,021,005, Cl. 439-421.000.
- Sloan, Albert H., to Subaqueous Services, Inc. Dump truck for receiving draining and disposing of dredged material. 5,021,156, Cl. 210-241.000.
- Sloot, Alexander, to Printmark Industries, Inc. Shaped index card 5,020,931, Cl. 402-79.000.
- Slusky, Susan E. G.: *See—*
    - Brandle, Charles D., Jr.; Fratello, Vincent J.; Luther, Lars C.; and Slusky, Susan E. G., 5,021,302, Cl. 428-692.000.
- Smeltz, Kenneth C., to Du Pont de Nemours, E. I., and Company. Organotitanium compositions useful for cross-linking. 5,021,171, Cl. 252-8.551.
- Smith, Andrew P.: *See—*
    - Genna, Sebastian; and Smith, Andrew P., 5,021,667, Cl. 250-363.100.
- Smith, Brian F.: *See—*
    - Kettlewell, Jonathan P.; and Smith, Brian F, 5,021,657, Cl. 250-330.000.
- Smith, Bryan R.: *See—*
    - Smith, Deborah A.; and Smith, Bryan R., 5,022,016, Cl. 368-223.000.
- Smith, David G. Fastener assembly. 5,020,951, Cl. 411-107.000.
- Smith, Deborah A.; and Smith, Bryan R. Display clock. 5,022,016, Cl. 368-223.000.
- Smith, Dresden G.: *See—*
    - Smith, Norman D; and Smith, Dresden G., 5,021,715, Cl. 315-159.000.
- Smith, George W.: *See—*
    - Kulczyk, Konrad; Perks, Malcolm P.; and Smith, George W., 5,022,014, Cl. 367-87.000.
    - Vaz, Nuno A.; and Smith, George W., 5,021,188, Cl. 252-299.500.
- Smith, Gregory C., to Texas Instruments Incorporated. Multilevel integrated circuit capacitor and method of fabrication. 5,021,920. Cl. 361-311.000.
- Smith, James E., to Graves Spray Supply, Inc. Spray nozzle trigger operated supply valve. 5,020,727, Cl. 239-526.000.
- Smith, John M.; and Schuler, Joseph J., to Motorola, Inc. Antenna switching system. 5,021,801, Cl. 343-876.000.
- Smith, Joseph J.: *See—*
    - Rizzi, John J.; and Smith, Joseph J., 5,020,752, Cl. 248-162.100.
- Smith, Lawrence G., to Republic Money Orders, Inc. Apparatus for dispensing money orders. 5,021,967, Cl. 364-479.000.
- Smith, Lawrence R. Water-ballasted oil spill containment boom. 5,020,940, Cl. 405-63.000.
- Smith, Michael D., to Dallas Semiconductor Corporation. Voltage to current converter with extended dynamic range. 5,021,730, Cl. 323-316.000.
- Smith, Norman D.; and Smith, Dresden G Lighting system for roadside signs. 5,021,715, Cl. 315-159.000.
- Smith, Normand C., to International Business Machines Corporation. Method and apparatus for drying liquid on printed media 5,020,244, Cl. 34-155.000.
- Smith, Pok N. Vehicle liquid drip catching system. 5,020,638, Cl. 184-106.000.
- Smith, Raleigh A.; and Kager, Alfred. Method and apparatus for optimum self-examination of breasts by users of birth control pills. 5,020,671, Cl. 206-534 000.
- Smith, Ted P.: *See—*
    - Morten, Richard M.; and Smith, Ted P., 5,021,949, Cl. 364-200.000.
- Smiths Industries Aerospace & Defense Systems Incorporated: *See—*
    - DuPuy, Richard E.; Liebenrood, John D.; and McCaughan, Leon, 5,020,872, Cl. 350-96.140
- Smolen, Robert S.: *See—*
    - Tartaglia, Peter A.; Collins, Richard B.; and Smolen, Robert S., 5,020,571, Cl. 137-625.300.
- SMS Schloemann-Siemag Aktiengesellschaft: *See—*
    - Bald, Wilfried; Feldmann, Hugo; Pabst, Manfred; and Fischer, Rudiger, 5,021,265, Cl. 427-355.000.
    - Feldmann, Hugo; Schlanzke, Claus; and Svejovsky, Ulrich, 5,020,208, Cl. 29-527.700.
    - Kosak, Dietmar; Ellinghaus, Wolfgang; Feldmann, Hugo; and Engel, Georg, 5,020,354, Cl. 72-225.000.
- Snap-On Tools Corporation: *See—*
    - Annis, Jeffrey R.; and Eggert, Daniel M., 5,020,399, Cl. 81-358.000.
    - Wridt, Gerald A., 5,020,205, Cl. 29-275.000.
- Snyder, Thomas S.; Stoltz, Richard A.; and Wagner, George R., to Westinghouse Electric Corp. Integrated production of superconductor insulation for chemical vapor deposition of nickel carbonyl. 5,021,401, Cl. 505-1.000.
- Soboleski, Thomas F., to Nuarms, Inc. Electrical isolator device. 5,021,925, Cl. 361-386.000.
- Societe Anonyme dite: L'Oreal: *See—*
    - Vanlerberghe, Guy; and Handjani, Rose-Marie, 5,021,200, Cl. 264-4.300.
- Societe D'Applications Generales D'Electricite et de Mecanique Sagem: *See—*
    - Deval, Alain; and Amand, Yvon, 5,020,370, Cl. 73-517.0AV.
- Societe Laboratoires 3M Sante: *See—*
    - Chabbert, Jean-Paul, 5,020,226, Cl. 30-390.000.
- Societe, Nationale Elf Aquitane: *See—*
    - Armand, Michel; Gauthier, Michel; and Muller, Daniel, 5,021,308, Cl. 429-194.000.
- Sokol, Louis P.: *See—*
    - Shumate, Thomas G.; and Sokol, Louis P., 5,021,170, Cl. 252-8.515.
- Sollars, Donald: *See—*
    - Ahuja, Bhupendra; and Sollars, Donald, 5,021,684, Cl 307-443.000.
- Soltech, Inc.: *See—*
    - Nelson, Thomas E., 5,020,632, Cl. 181-290.000
- Solvay Automotive, Inc.: *See—*
    - Seizert, Robert D., 5,020,687, Cl. 220-645.000.
- Soma Dynamics Corporation: *See—*
    - Airy, James F.; and Kadavy, Thomas D., 5,020,795, Cl 272-129.000
- Sommargren, Gary E.; and Weaver, H Joseph, to United States of America, Energy. An image focusing means by using an opaque object to diffract x-rays. 5,022,061, Cl. 378-84.000.
- Sommer, Rainer: *See—*
    - Jundt, Werner; Miller, Norbert; and Sommer, Rainer, 5,021,959, Cl. 364-431.050.
- Somoza, Carlos; and Estabrook, Lee C., to Thiokol Corporation. Process for reducing acidity of unrecrystallized explosives by wet grinding. 5,020,731, Cl. 241-1.000.
- Sonoco Products Company: *See—*
    - Vrooman, Carll D.; and Wilfong, Harry B., Jr, 5,020,750, Cl 248-97.000.
- Sony Corporation: *See—*
    - Avis, Richard J. A.; and Gillard, Clive H, 5,021,881, Cl. 358-140.000.
    - Motoe, Hisafumi; Kawashima, Hiroyuki; and Tokuhara, Masaharu, 5,021,870, Cl. 358-11.000.
    - Toyoguchi, Tsutomu, 5,022,023, Cl. 369-77.100.
    - Ueki, Massaaki; Masuda, Toshihiko; and Kanai, Takashi, 5,021,788, Cl. 341-152.000.
    - Watanabe, Nobuhisa, 5,021,996, Cl. 364-900.000.
- Sosa, Margaret S.: *See—*
    - Giacobbe, Robert A.; Tkacz, Jan S.; Masurekar, Prakash S.; Kaplan, Louis; and Sosa, Margaret S., 5,021,341, Cl. 435-71.100.
- Soth, Henry J., to Universal Instruments Corporation. Adjustable shutter for containment of electrical components in tape feeders. 5,020,959, Cl. 414-416.000.
- Soukup, Thomas M., to Siemens-Pacesetter, Inc. Cardiac lead assembly and method of attaching a cardiac lead assembly. 5,020,545, Cl. 128-785.000.
- Southwest Research Institute: *See—*
    - Stecklein, Gary L.; and Wendel, Glenn R., 5,020,826, Cl. 280-707.000.
- Spaeth, Werner: *See—*
    - Althaus, Hans; Kuhlmann, Werner; and Spaeth, Werner, 5,020,873, Cl. 350-96.200.
- Spalding & Evenflo Companies, Inc.: *See—*
    - Bale, Bart, 5,020,680, Cl. 215-11.600.
- Spangler, Glenn E.: *See—*
    - Campbell, Donald N.; Spangler, Glenn E.; Davis, Robert C., Jr.; Fafaul, Eugene F.; and Carrico, John P., Jr., 5,021,654, Cl. 250-287.000.
- Spaulding, Glenn F., to Cytogam, Inc. Sex-associated membrane antibodies and their use for increasing the probability that offspring will be of a desired sex. 5,021,244, Cl. 424-561.000.
- Spears, Kevin A.; Stafford, Clinton J.; Frey, Kenny C.; and Wall, Daniel P., to Integrity Health Systems Corporation. Travelling roller massage apparatus. 5,020,518, Cl. 128-52.000.
- Speck, Ulrich: *See—*
    - Gries, Heinz; Rosenberg, Douwe; Weinmann, Hanns-Joachim, Speck, Ulrich; Mutzel, Wolfgang; Hoyer, Georg-Alexander; and Pfeiffer, Heinrich, deceased, 5,021,236, Cl. 424-9.000.
- Spector, George: *See—*
    - Fratangelo, John J.; and Spector, George, 5,020,805, Cl. 273-255.000.
- Spectra-Physics: *See—*
    - Jacobs, Ralph R., 5,022,041, Cl. 372-70.000.
    - Jacobs, Ralph R., 5,022,043, Cl. 372-95.000.
- Spectra-Physics, Inc.: *See—*
    - Weinberger, Scot R.; and Hoppe, Thomas W., 5,021,646, Cl. 250-227 110.
- Speer, Dietrich; Kiss, Akos; and Kleinschmit, Peter, to Degussa Aktiengesellschaft. Method for the preparation of gray-green pigments based on zirconium silicate/vanadium compounds and sodium compound. 5,021,092, Cl. 106-451.000.
- Spengler, Charles J.: *See—*
    - Ruka, Roswell J.; and Spengler, Charles J., 5,021,304, Cl. 429-30.000.
- Speno International S.A.: *See—*
    - Penetti, Romolo, 5,020,371, Cl. 73-636.000.
- Sperl, Johann: *See—*
    - Schaale, Klaus; Schoenberger, Hermann; and Sperl, Johann, 5,020,991, Cl. 431-319.000.
- Spetsializirovanny Trest PO Remontu Promyshlennykh Zdany I Sorruzheny Predpriyaty Chernoi Metallurgii Tsentrainogo Raiona "Tsentremetallurgremont": *See—*
    - Pesin, Abram I.; and Chevakin, Ivan V., 5,020,859, Cl. 299-21.000.
- Spiegel, Guenter: *See—*
    - Huber, Werner; and Spiegel, Guenter, 5,020,496, Cl. 123-399.000.
- Spik, Genevieve: *See—*
    - Montreuil, Jean; Spik, Genevieve; Capron, Andre; Dissous, Colette; and Grzych, Jean-Marie, 5,021,560, Cl. 536-1.100.

VOL
1127
ISS
1
JE
4
1991
UMI

- Spillman, Franklin L. *See—*
  - Beard, John E.; Spillman, Franklin L. Banos, Oscar; Showers, David, Fussell, John M. and LeBlanc, George, 5,020,790, Cl 272-70.000.
- Spinelli, Silvano: *See—*
  - Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo, and Tognella, Sengio, 5,021,436, Cl. 514-356.000.
- Spiral Recherche et Developpement *See—*
  - Prost, Michel, 5,021,417, Cl. 514-249.000.
- Spiro America Inc.: *See—*
  - Castricum, Wilhelmus P. H., 5,020,351, Cl. 72-70.000.
- Springer, Hartmut; and Reiher, Uwe, to Hoechst Aktiengesellschaft. Water-soluble azo compounds containing a fiber-reactive group of the vinylsulfone series, suitable as dyestuffs. 5,021,559, Cl 534-638.000.
- Springer, Kent H.. *See—*
  - Crandall, Douglas, Hessel, Steven R., Hornak, Thomas; Nordby, Rasmus, Springer, Kent H., and Corsetto, Craig, 5,022,051, Cl 375-19.000.
- Spykerman, David J.: *See—*
  - Lindberg, Kenneth M., Spykerman, David J.; George, Philip C., and Mersman, Wesley D., 5,020,855, Cl. 297-391.000.
- Square D Company: *See—*
  - Roberts, Kenneth P., 5,021,610, Cl 174-65.00R
- SRI International, Inc.: *See—*
  - Crane, Hewitt D.; and Hammon, Robert W., 5,022,086, Cl. 382-2.000.
- Srinivasan, Ananthachari, to NeoRx Corporation Method of radiolabeling chelating compounds comprising sulfur atoms with metal radionuclides. 5,021,556, Cl. 534-10.000
- Srivastava, Suresh C.: *See—*
  - Mease, Ronnie C., and Srivastava, Suresh C., 5,021,571, Cl. 544-166.000
- SSMC Inc.: *See—*
  - Sato, Shuichi; Kobayashi, Yoshiharu: and Ayusawa, Shirou, 5,020,462, Cl. 112-302.000
- Stacey, William F., to Raytheon Company Solder back contact 5,021,300, Cl. 428-620.000.
- Stack, Thomas J.; and Korczynski, Jacek M., to Cooper Industries, Inc High-amp circuit breaker and a bistable element therefor. 5,021,761, Cl. 337-68.000.
- Stafford, Clinton J.: *See—*
  - Spears, Kevin A., Stafford, Clinton J., Frey, Kenny C., and Wall, Daniel P., 5,020,518, Cl. 128-52.000.
- Stamatoff, James B. *See—*
  - Khanarian, Garo; Stamatoff, James B., and Buckley, Alan, 5,021,268, Cl. 427-430.100.
- Stamberger, Johann: *See—*
  - Karagoz, Sadi, Hribernik, Bruno; Stamberger, Johann; Puber, Josef; Jeglitsch, Franz, Fischmeister, Hellmut; Matzer, Franz, Locker, Claus-Dieter; Kudielka, Elfriede, and Jager, Heimo, 5,021,085, Cl. 75-239.000.
- Stamicarbon B.V.: *See—*
  - Vroomans, Hubertus J., 5,021,510, Cl. 525-285.000
- Stanadyne Automotive Corp.: *See—*
  - Kelly, William W., 5,020,500, Cl 123-467.000
- Stanbery, Billy J.: *See—*
  - Kim, Namsoo P.; and Stanbery, Billy J., 5,021,099, Cl. 136-249.000.
- Standard-Knapp, Inc.: *See—*
  - Raudat, John L., 5,020,306, Cl. 53-534.000.
- Standard Oil Company, The: *See—*
  - Ball, Lawrence E., 5,021,526, Cl. 526-240.000
- Stangel John J., and Herper, John C., to Unisys Corporation. Phased array antenna method and system for adaptively positioning nulls. 5,021,793, Cl. 342-383.000.
- Stanik, Reimund, to Klinkau Besitzgesellschaft mbH Membrane filter plate. 5,021,155, Cl. 210-231.000.
- Stanley, Henry; Davis, Irwin; and Chiao, Wen B., to National Starch and Chemical Investment Holding Corporation. Arcylic modified reactive urethane hot melt adhesive compositions. 5,021,507, Cl. 525-127.000.
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  - Vago, Otto Z.; and Wenczl, Ernest, 5,020,512, Cl 126-350.00R.
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  - Chan, David S. K.; and Staver, Daniel A., 5,021,987, Cl 364-754.000.
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  - Nienburg, Hans; Harbach, Friedrich, and Stein, Peter, 5,021,376, Cl. 501-153.000
- Stellrecht, Ewald A. Splitting tool 5,020,225, Cl. 30-308.100.
- Stenzel, Otto. *See—*
  - Rupp, Hartwig; and Stenzel, Otto, 5,021,299, Cl. 428-585.000.
- Stepanek, Rene : *See—*
  - Reiff, Helmut; Dieterich, Dieter; and Stepanek, Rene, 5,021,520, Cl. 525-458.000.
- Stephan, G *See—*
  - May, A D.; and Stephan, G., 5,022,034, Cl. 372-26.000.
- Stephan, Gerard; and Labedan, Jean-Denis, to Nadella. Prestressed rolling radial bearing and its application particularly to automobile suspensions. 5,020,925, Cl. 384-569.000.
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  - Good, David M. and Stephens, Eugene S., 5,020,761, C 248-317.000.
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- Stephens, Herschel M.: *See—*
  - Miles, Larry N., Drinnen, Cecil A., Hackler, David W., Bogart Tom L.; Macklin, Arnold D., Sharpsteen, Ben E., Hyles, Truett M.; and Stephens, Herschel M., 5,020,714, Cl. 228-15.100
- Stephens, Richard D.: *See—*
  - Brophy, Sean P., and Stephens, Richard D., 5,020,314, Cl 60-39.141
- Stephenson, William K.; and Kaplan, Morris, to Nalco Chemical Company. Asphaltene dispersants - inhibitors. 5,021,498, Cl. 524-484.0
- Stern, Margaret B.: *See—*
  - Lockwood, Harry F.; Stern, Margaret B.; Tabasky, Marvin, and Cataldo, Victor, 5,021,363, Cl 437-200.000.
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- Stewart, Edward T Compact vacuum therapy system 5,020,522, C 128-79.000.
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  - Brown, Richard K., and Stichman, Robert W., 5,021,094, Cl 106-803.000.
- Stokker, Gerald E.. *See—*
  - Joshua, Henry; Wilson, Kenneth E.; Schwartz, Michael S., Lee, Ta J., and Stokker, Gerald E., 5,021,453, Cl. 514-510.000
- Stoltz, Richard A. *See—*
  - Snyder, Thomas S.; Stoltz, Richard A.; and Wagner, George R 5,021,401, Cl 505-1.000.
- Stolzenburg, Rudolf: *See—*
  - Bergthaller, Peter; Kruger, Thomas; Stolzenburg, Rudolf, and Hubner, Dirk, 5,021,330, Cl. 430-544.000
- Stompro, David A.: *See—*
  - Destefan, Dennis E.; and Stompro, David A., 5,021,625, Cl 219-109.000.
- Stone, Barry N., Rice, Richard C.; Lorbiecki, John E., and Bernstein, Stanley, to Camtronics, Ltd. Apparatus and method for controlling film density for an apparatus for exposing photographic film with image data. 5,021,978, Cl. 364-525.000.
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- Stork Colorproofing B.V.: *See—*
  - Alston, Julie M., 5,021,313, Cl. 430-100.000.
- Strang, Harry: *See—*
  - Findeisen, Kurt; Lindig, Markus; Santel, Hans-Joachim, Schmidt Robert R.; and Strang, Harry, 5,021,081, Cl. 71-92.000.
  - Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst, Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter, Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R., and Strang, Harry, 5,021,082, Cl. 71-93.000.
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- Strassheimer, Herbert, to Extrudiplast Investments, S.A. Plastic closure. 5,020,683, Cl. 215-354.000.
- Strehlke, Peter; Bohlmann, Rolf; and Henderson, David, to Schering Aktiengesellschaft. N-substituted imidazoles, as well as their use in pharmaceutical agents. 5,021,434, Cl. 514-341.000.
- Strickland, Alan D.: *See—*
  - Borschel, Marlene W.; Benson, John D., Breen, Merle D.; MacLean, William C., Jr., Ponder, Debra L., Strickland, Alan D., and Treem, William R., 5,021,245, Cl. 426-2.000.
- Stringfield, Richard T.: *See—*
  - Dawson-Ekeland, Kari R.; and Stringfield, Richard T., 5,021,25 Cl. 426-422.000.
- Strock, Alvin E. Protective body appliance. 5,020,547, Cl 128-891.000
- Strohmeyer, Willi, to Geha-Werke GmbH. Document shredder with one or more trays for stacks of paper in continuous form. 5,020,733, Cl. 241-100.000.
- Strom, Hans; and Andersson, Jan, to Svensk Dorrteknik AB Door construction. 5,020,292, Cl. 52-309.900.
- Strong, Donald E., to Strong Manufacturing Automatic infeed control 5,020,579, Cl. 144-176.000.
- Strong Manufacturing: *See—*
  - Strong, Donald E., 5,020,579, Cl. 144-176.000.
- Strott, Douglas B. *See—*
  - Gonsalves, Edward M., Offiler, Stephen B.; Strott, Douglas B., and Beringhause, Steven 5,021,736, Cl. 324-202.000.
- Stuart, Richard K., Jr. *See—*
  - Foster, Bruce W.; Clubb, Clyde N.; and Stuart, Richard K., Jr 5,021,257, Cl. 427-2.000.
- Stubbs, Timothy C., to GEC Avery Technology Limited Franking machine. 5,021,964, Cl. 364-464.030.
- Sturm, wolfram. *See—*
  - Mayer, Wolfgang; Sturm, wolfram; Fissmann, Hans-Joachim, Kotitschke, Gerhard; Zurn, Georg; Kade, Werner; and Kugler, Georg, 5,020,242, Cl. 34-115.000.
- Su, Frank Easily openable tubular latch. 5,020,836, Cl. 292-165.000
- Su, Kai C.: *See—*
  - Hung, William M.; and Su, Kai C., 5,021,068, Cl. 8-507.000.

- Subaqueous Services, Inc.: *See—*
  - Sloan, Albert H., 5,021,156, Cl. 210-241.000.
- Sudo, Susumu: *See—*
  - Okajima, Hiroshi; and Sudo, Susumu, 5,020,282, Cl. 51-206.00R.
- Sudo, Toshio; Saito, Kazutaka; and Takubo, Chiaki, to Kabushiki Kaisha Toshiba. Semiconductor integrated circuit apparatus. 5,021,866, Cl. 357-70.000.
- Suehiro, Haruyoshi, to Fujitsu Limited. Two dimensional electron gas semiconductor device. 5,021,857, Cl. 357-42.000.
- Suemura, Nobumasa: *See—*
  - Ohara, Shinji; Morimoto, Okihiro; and Suemura, Nobumasa, 5,021,497, Cl. 524-436.000.
- Suen, Huang K.: *See—*
  - Lie, Liat-Chaw; and Suen, Huang K., 5,020,253, Cl. 40-576.000.
- Suenaga, Masashi: *See—*
  - Kamezaki, Hisamitsu; Suenaga, Masashi; Saito, Osamu; Iuchi, Shin-ichiro; Watanabe, Hitoshi; Fujiwara, Hideo; and Tuburaya, Yoshitane, 5,021,276, Cl. 428-64.000.
- Suesada, Yasuhiko; Moriyama, Takashi; Sugioka, Junichi; and Tahara, Hiroshi, to Kansai Electronic Power Company Inc., The; and Hirakawa Iron Works, Ltd. Watertube boiler and its method of combustion. 5,020,479, Cl. 122-235.110.
- Sugawara, Michiharu: *See—*
  - Nakano, Yoshimasa; Sugawara, Michiharu; Uetsuki, Setsuyoshi; Izawa, Taketoshi; Kawaguchi, Tomoyuki; and Wada, Akira, 5,021,419, Cl. 514-253.000.
- Sugaya, Toshihiro: *See—*
  - Sakai, Yuji; and Sugaya, Toshihiro, 5,021,898, Cl. 360-78.040.
- Sugimoto, Tsugio: *See—*
  - Umehara, Kazuhiro; and Sugimoto, Tsugio, 5,020,497, Cl. 123-418.000.
- Sugioka, Junichi: *See—*
  - Suesada, Yasuhiko; Moriyama, Takashi; Sugioka, Junichi; and Tahara, Hiroshi, 5,020,479, Cl. 122-235.110.
- Sugita, Toshikazu; and Itagaki, Akinari, to Shin-Etsu Chemical Co., Ltd. One end-reactive organopolysiloxane compound. 5,021,532, Cl. 528-15.000.
- Sugiyama, Hayami, to Shinko Electric Co., Ltd. Thermal head. 5,021,806, Cl. 346-76.0PH.
- Sugiyama, Mizuho, to Toyota Jidosha Kabushiki Kaisha. Four-wheel steering system in wheeled vehicle. 5,020,812, Cl. 280-91.000.
- Sugiyama, Tsukasa: *See—*
  - Hatano, Masaru; and Sugiyama, Tsukasa, 5,020,788, Cl. 271-126.000.
- Sukegawa, Shunichi; and Inui, Takashi, to Texas Instruments Incorporated. Semiconductor integrated circuit device. 5,021,852, Cl. 357-23.110.
- Sulecki, Richard P.; and Kiska, Stanley A., to R. D. Werner Co., Inc. Ladder jack clamping devices. 5,020,757, Cl. 248-238.000.
- Sullair Corporation: *See—*
  - Shoop, John C., 5,020,566, Cl. 137-265.000.
- Sumida, Isao: *See—*
  - Kataoka, Yoshiyuki; Sumida, Isao; Hidaka, Masataka; and Naitoh, Masanori, 5,021,212, Cl. 376-283.000.
- Sumitomo Chemical Company: *See—*
  - Meki, Naoto; Nishida, Kazue; and Imahase, Tomotoshi, 5,021,446, Cl. 514-407.000.
- Sumitomo Chemical Company, Limited: *See—*
  - Arai, Kenji; Mito, Nobuaki; Morita, Kouichi; and Hirata, Naonori, 5,021,579, Cl. 546-302.000.
- Sumitomo Electric Industries, Ltd.: *See—*
  - Fujita, Nobuhiko; Itozaki, Hideo; Tanaka, Saburo; Yazu, Shuji; and Jodai, Tetsuji, 5,021,396, Cl. 505-1.000.
  - Kawasaki, Akihisa, 5,021,118, Cl. 156-607.000.
  - Nakamura, Tsutomu; and Nakai, Tetsuo, 5,020,394, Cl. 76-108.600.
  - Nishimura, Akira, 5,020,871, Cl. 350-96.100.
  - Yoshino, Masato, 5,020,863, Cl. 303-96.000.
- Sumitomo Metal Industries, Ltd.: *See—*
  - Sawaragi, Yoshiatsu; and Maruyama, Nobuyuki, 5,021,215, Cl. 420-584.100.
- Sumitomo Pharmaceuticals Company, Limited: *See—*
  - Masai, Naruhito; Enomoto, Masao; Kojima, Atsuyuki; Masumori, Hiroaki; Hara, Nobuyuki; Hara, Youichi; and Morooka, Shigeaki, 5,021,435, Cl. 514-342.000.
  - Yamahira, Yoshiya; Fujioka, Keiji; Sato, Shigeji; and Takada, Yoshihiro, 5,021,241, Cl. 424-426.000.
- Sumitomo Rubber Industries Limited: *See—*
  - Kubota, Akinori; Ijiri, Masaaki; and Kobayashi, Michihito, 5,020,982, Cl. 425-42.000.
- Sun Chemical Corporation: *See—*
  - Schwartz, Russell J.; and Gregorio, Manuel Z., 5,021,090, Cl. 106-23.000.
- Sun, Hsiang-Ning: *See—*
  - Hostetler, Donald E.; Cannarsa, Michael J.; Kesling, Haven S., Jr.; and Sun, Hsiang-Ning, 5,021,464, Cl. 521-189.000.
- Sunden, Gunnel E.: *See—*
  - Alminger, Tomas B.; Larsson, Hakan S.; Lindberg, Per L.; and Sunden, Gunnel E., 5,021,433, Cl. 514-338.000.
- Sundstrand Corporation: *See—*
  - Heitz, Steven A.; Fairchild, Jeffery N.; and Readman, John, 5,020,923, Cl. 384-99.000.
  - McArthur, Malcolm J., 5,020,317, Cl. 60-39.511.
  - Schwarz, Robert A., 5,020,322, Cl. 60-404.000.
- Sundstrom, Erik, to Sandvik AB. Drive sprocket for chain saws. 5,021,033, Cl. 474-152.000.
- Sung, Wing L.: *See—*
  - Wong, Patrick T. T.; Narang, Saran A.; and Sung, Wing L., 5,021,337, Cl. 435-29.000.
- Suntory Limited: *See—*
  - Maeda, Mitsuru; Kodama, Tohru; Asami, Sumio; Amano, Norihide; Kusumi, Takaaki; and Hosono, Hidekazu, 5,021,406, Cl. 514-99.000.
- Suomi, Verner K., to Wisconsin Alumni Research Foundation. Heat flow sensing apparatus and method. 5,020,919, Cl. 374-29.000.
- Super Stream, Inc.: *See—*
  - Greenspan, Alexander, 5,020,971, Cl. 416-204.00A.
- Surakka, Jorma: *See—*
  - Maki-Rahkola, Jari; Kononen, Juhani; and Surakka, Jorma, 5,020,961, Cl. 414-495.000.
- Sutherin, Mark S.: *See—*
  - Hughes, John R.; and Sutherin, Mark S., 5,020,664, Cl. 206-361.000.
- Sutton, John F., to United States of America, Administration National Aeronautics and Space. Differential current source. 5,021,729, Cl. 323-311.000.
- Suyama, Tadakazu: *See—*
  - Mukai, Hiromichi; Horii, Hajime; Tsujikawa, Muneo; Kawabe, Haruhide; Arimura, Hirofumi; and Suyama, Tadakazu, 5,021,339, Cl. 435-69.100.
- Suyama, Takahiro; Kondo, Masafumi; Sasaki, Kazuaki; Hosoda, Masahiro; Takahashi, Kosei; and Hayakawa, Toshiro, to Sharp Kabushiki Kaisha. Semiconductor laser device. 5,022,036, Cl. 372-45.000.
- Suzuki, Akihiro: *See—*
  - Kosaka, Kenji; Kimura, Hiroshi; Suzuki, Akihiro; and Hayashi, Kenji, 5,020,785, Cl. 270-053.000.
- Suzuki, Go: *See—*
  - Otagiri, Tadashi; Shirai, Masahiro; Ohara, Minoru; and Suzuki, Go, 5,021,287, Cl. 428-212.000.
- Suzuki Jidosha Kogyo Kabushiki Kaisha: *See—*
  - Umehara, Kazuhiro; and Sugimoto, Tsugio, 5,020,497, Cl. 123-418.000.
  - Yamauchi, Kosaku; Muramatsu, Akihiko; and Kaku, Shinji, 5,020,625, Cl. 180-219.000.
- Suzuki Manufacturing Co., Ltd.: *See—*
  - Yuyama, Kohsuke, 5,020,459, Cl. 112-178.000.
- Suzuki, Masahiro: *See—*
  - Suzuki, Yoshihiro; Takada, Toshinari; Suzuki, Masahiro; Akahoshi, Haruo; Nagai, Akira; Takahashi, Akio; Amagi, Shigeo; Narahara, Toshikazu; Wajima, Motoyo; and Kogawa, Kiyonori, 5,021,296, Cl. 428-409.000.
- Suzuki, Masao: *See—*
  - Fukui, Tetsuro; Katayama, Masato; Mouri, Akihiro; Isaka, Kazuo; Kagami, Kenji; and Suzuki, Masao, 5,021,321, Cl. 430-201.000.
- Suzuki, Masayoshi: *See—*
  - Ohwada, Jun-ichi; Kitajima, Masaaki; Suzuki, Masayoshi; Takabatake, Masaru; and Nagae, Yoshiharu, 5,021,774, Cl. 340-811.000.
- Suzuki, Noboru; and Toji, Shigeo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Automatic focusing camera. 5,021,817, Cl. 354-402.000.
- Suzuki, Nobuo: *See—*
  - Kinoshita, Jun'ichi; Suzuki, Nobuo; Morinaga, Motoyasu, Hirayama, Yuzo; and Nakamura, Masaru, 5,021,361, Cl. 437-129.000.
- Suzuki, Ryoichi; Kondo, Hiroyuki; and Mizunuma, Susumu, to Nippon Steel Corporation; Nissin Food Products Co., Ltd.; and Nitto Seiki Co., Ltd. Heating element. 5,020,509, Cl. 126-263.000.
- Suzuki, Ryuichi: *See—*
  - Aisaka, Kazuo; Hashizume, Akihide; Huno, Takakazu; Suzuki, Ryuichi; and Terada, Kazuko, 5,021,770, Cl. 340-709.000.
- Suzuki, Shigeru, to Ushio Denki. Film circuit substrate exposure apparatus. 5,021,821, Cl. 355-53.000.
- Suzuki, Shirou: *See—*
  - Yamamoto, Masanao; Unnai, Takaaki; Ehata, Shigeru; Hirai, Tadaaki; Sameshima, Kenji; Hiruma, Eikiyu; Suzuki, Shirou; Tanioka, Kenkichi; Yamazaki, Junichi; and Shidara, Keeichi, 5,021,705, Cl. 313-106.000.
- Suzuki, Takanao: *See—*
  - Yoshida, Atsushi; and Suzuki, Takanao, 5,022,058, Cl. 375-120.000.
- Suzuki, Takashi; and Akiyama, Teruo, to Japan Oxygen, Co., Ltd. Method for quantifying oxygen. 5,021,352, Cl. 436-136.000.
- Suzuki, Toshio: *See—*
  - Banzai, Masato; Shibata, Yoshio; and Suzuki, Toshio, 5,021,623, Cl. 219-69.120.
  - Magara, Takuji; and Suzuki, Toshio, 5,021,622, Cl. 219-69.120.
- Suzuki, Yasumichi: *See—*
  - Kurita, Mitsuru; Ikeda, Yoshinori; Suzuki, Yasumichi; Katoh, Koichi; Ichikawa, Hiroyuki; Kitamura, Toshiyuki; and Kadowaki, Toshihiro, 5,021,876, Cl. 358-75.000.
  - Saito, Hiroshi; Suzuki, Yasumichi; Sasabe, Shunji; and Nakajima, Kazuhiro, 5,021,114, Cl. 156-345.000.
- Suzuki, Yoshihiro; Takada, Toshinari; Suzuki, Masahiro; Akahoshi, Haruo; Nagai, Akira; Takahashi, Akio; Amagi, Shigeo; Narahara, Toshikazu; Wajima, Motoyo; and Kogawa, Kiyonori, to Hitachi, Ltd. Circuit board and process for producing the same. 5,021,296, Cl. 428-409.000.
- Suzuki, Yukihide; Muranaka, Masaya; and Ishihara, Masamichi, to Hitachi, Ltd.; and Hitachi VLSI Engineering. Semiconductor memory device with low-house pads for electron beam test. 5,021,998, Cl. 365-51.000.
- Svejovsky, Ulrich: *See—*
  - Feldmann, Hugo; Schlanzke, Claus; and Svejovsky, Ulrich, 5,020,208, Cl. 29-527.700.

VOL
1127
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Svensk Dorrteknik AB: *See—*
Strom, Hans; and Andersson, Jan, 5,020,292, Cl. 52-309.900.

Svilans, Olgerts J.: *See—*
Englehardt, William H.; Svilans, Olgerts J.; and Nieto, Augustine, 5,020,794, Cl. 272-129.000.

Swanson, Dail L.; and Edwards, Shannon, to Valmont Industries, Inc. Circuit for starting and operating fluorescent lamps. 5,021,714, Cl. 315-101.000.

Swartz, Jerome; Shepard, Howard M.; and Darkan, Eric F., to Symbol Technologies, Inc. Hand-held bar code scanner with jointly mounted scanning mirrors. 5,021,641, Cl. 235-467.000.

Swartzel, Kenneth R.; Ganesan, Sudalaimuthu G.; Kuehn, Richard T.; Hamaker, Raymond W.; and Sadeghi, Farid, to North Carolina State University. Thermal memory cell and thermal system evaluation. 5,021,981, Cl. 364-557.000.

Sweeny, Wilfred, to Du Pont de Nemours, E. I., and Company. Process for producing paper from a poly(paraphenylene terephthalamide) fibrous gel. 5,021,123, Cl. 162-157.300.

Sweet, David H.; Greenberg, Charles E.; Lappos, Nicholas D., Walsh, David M.; and Meisner, Richard P., to Coltec Industries Inc. Helicopter control with multiple schedule rotor speed decay anticipator. 5,020,316, Cl. 60-39.282.

Swensen, William B. Method to protect glass in doors and windows from scratches, abrasion, and painting processes. 5,020,288, Cl. 52-202.000.

Swenson, Douglas A., to Minnesota Mining and Manufacturing Company. Apparatus and method for applying heat-sensitive adhesive tape to a web moving at high speed. 5,021,111, Cl. 156-264.000.

Swift, Arthur L., IV: *See—*
Pickett, Scott K.; Luich, Thomas M.; and Swift, Arthur L., IV, 5,021,689, Cl. 307-465.000.

Swinford, Carson B.: *See—*
Lewis, Milton A., Jr.; Mason, Jeffrey S.; Swinford, Carson B.; and Wiseman, Timothy R., Sr., 5,020,161, Cl. 2-164.000.

Syammach, Mustafa B.: *See—*
Joshi, Ashok V.; Syammach, Mustafa B.; and Campbell, Scott S., 5,021,137, Cl. 204-242.000.

Syken, Jeffrey M. Measuring instrument. 5,020,233, Cl. 33-465.000.

Sylvia, Robert E.; and Dillard, Thomas E., to United States of America, Navy. Wing folding tool. 5,020,400, Cl. 81-484.000.

Symbol Technologies, Inc.: *See—*
Swartz, Jerome; Shepard, Howard M.; and Darkan, Eric F., 5,021,641, Cl. 235-467.000.

Szajewski, Richard P.; and Taber, Terry R., to Eastman Kodak Company. Color photographic material. 5,021,555, Cl 430-544.000.

Szelenyi, Istvan: *See—*
Buschauer, Armin; Schickaneder, Helmut; Schunack, Walter; Elz, Sigurd; Szelenyi, Istvan; Baumann, Gert; and Ahrens, Kurt H., 5,021,431, Cl. 514-333.000.

Szporny, Laszlo: *See—*
Fodor, Tamas; Fischer, Janos; Dobay, Laszlo; Trischler, Ferenc; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Szporny, Laszlo; and Hajos, Gyorgy, 5,021,597, Cl. 556-69.000.

Tabasky, Marvin: *See—*
Lockwood, Harry F.; Stern, Margaret B.; Tabasky, Marvin; and Cataldo, Victor, 5,021,363, Cl. 437-200.000.

Taber, Terry R.: *See—*
Szajewski, Richard P.; and Taber, Terry R., 5,021,555, Cl. 430-544.000.

Tachi-S Co., Ltd.: *See—*
Hatta, Susumu, 5,020,762, Cl. 248-394.000.

Tachibana, Fusao: *See—*
Ishikawa, Hideyuki; Chonan, Mitsugi; Tachibana, Fusao; and Kurosu, Shinichi, 5,020,484, Cl. 123-73.0AD

Tachibana, Masayoshi, to Kabushiki Kaisha Toshiba. Output pulse generating apparatus. 5,021,990, Cl. 364-900.000.

Tackie, Michael N.: *See—*
Varde, Uday M.; Tackie, Michael N; and Gupta, Rakesh K., 5,021,519, Cl. 525-423.000.

Tadayoshi, Hiraki: *See—*
Yamamoto, Kenji; and Tadayoshi, Hiraki, 5,021,530, Cl 526-323.200.

Tager, Karl H., to Howmedica, Gmbh. Joint socket member for a joint prosthesis. 5,021,063, Cl. 623-23.000.

Taguchi, Masao; and Ema, Taiji, to Fujitsu Limited. Method of making a dram cell with stacked capacitor. 5,021,357, Cl. 437-52.000.

Taguchi, Sadayoshi: *See—*
Watanabe, Michihiro; Sato, Kazutaka; Zen, Munetoshi; Ato, Kazuhiko; Watanabe, Yoshinobu; and Taguchi, Sadayoshi, 5,021,194, Cl. 252-518.000.

Tahara, Eiichi; Ochiai, Atsushi, Yokozaki, Hiroshi; Hozumi, Toyoharu; and Kyo, Eikai, to Wakunaga Seiyaka Kabushiki Kaisha. Anti-human adenocarcinoma antigen specific monoclonal antibody. 5,021,553, Cl. 530-387.000.

Tahara, Hiroshi: *See—*
Suesada, Yasuhiko; Moriyama, Takashi; Sugioka, Junichi; and Tahara, Hiroshi, 5,020,479, Cl. 122-235.110.

Tai, Jy-Der; Chiu, Edison; An, Quang-Dieu, and Hsu, Te-Chuan, to Texas Instruments Incorporated. Look-ahead flag generator. 5,021,994, Cl. 364-900.000.

Tai, Seiji: *See—*
Hayashida, Shigeru; Tai, Seiji; Hayashi, Nobuyuki; Iwakabe, Yasushi; Kinjo, Noriyuki; and Numata, Shunichi, 5,021,563, Cl. 540-128.000.

Taig, Alistair G., to Allied-Signal Inc. Reversing mechanism for a motor drive. 5,020,386, Cl. 74-384.000.

Taiho Industries Co., Ltd.: *See—*
Mohri, Hidemasa; Tobita, Michiaki; and Ishida, Masahiko, 5,021,272, Cl. 428-40.000.

Tait, Brian S.: *See—*
Pilgrim, William R.; Young, Derek W.; Tait, Brian S.; Crawley, Graham C.; Edwards, Philip N.; and Hill, George B., 5,021,414, Cl. 514-237.500.

Taiwan Fu Hsing Industry Co., Ltd.: *See—*
Lin, Jui C., 5,020,837, Cl. 292-169.130.

Tajima, Yusuke; and Schindler, Manfred J., to Raytheon Company Transversal and recursive filters useable in a diplexer. 5,021,756, Cl 333-132.000.

Tajima, Yusuke: *See—*
Chu, Shiou L. L.; Tajima, Yusuke; and Schindler, Manfred J., 5,021,743, Cl. 330-54.000.

Takabatake, Kiyotugu: *See—*
Minegishi, Takeshi; Takabatake, Kiyotugu; and Asobe, Kunio, 5,021,286, Cl. 428-198.000.

Takabatake, Masaru: *See—*
Ohwada, Jun-ichi; Kitajima, Masaaki; Suzuki, Masayoshi; Takabatake, Masaru; and Nagae, Yoshiharu, 5,021,774, Cl. 340-811.000

Takada, Toshinari: *See—*
Suzuki, Yoshihiro; Takada, Toshinari; Suzuki, Masahiro; Akahoshi, Haruo; Nagai, Akira; Takahashi, Akio; Amagi, Shigeo, Narahara, Toshikazu; Wajima, Motoyo; and Kogawa, Kiyonori, 5,021,296, Cl. 428-409.000.

Takada, Yoshihiro: *See—*
Yamahira, Yoshiya; Fujioka, Keiji; Sato, Shigeji, and Takada, Yoshihiro, 5,021,241, Cl. 424-426.000.

Takada, Yukiyoshi: *See—*
Fujimoto, Shinji; and Takada, Yukiyoshi, 5,020,647, Cl. 192-3.290

Takagiwa, Hiroyuki: *See—*
Matsubara, Akitoshi; Takahashi, Jiro; Takagiwa, Hiroyuki, and Masaki, Hiroya, 5,021,317, Cl. 430-110.000.

Takahashi, Akio: *See—*
Suzuki, Yoshihiro; Takada, Toshinari; Suzuki, Masahiro; Akahoshi, Haruo; Nagai, Akira; Takahashi, Akio; Amagi, Shigeo; Narahara, Toshikazu; Wajima, Motoyo; and Kogawa, Kiyonori, 5,021,296, Cl. 428-409.000.

Takahashi, Hiroo: *See—*
Nishizawa, Jun-ichi; Tamamushi, Takashige, Mitamura, Koichi, Takahashi, Hiroo; Mitsui, Kiyoo; Ikehara, Mitsuo; Wako, Toyota; and Maruyama, Sinpei, 5,021,936, Cl. 363-41.000.

Takahashi, Izumi: *See—*
Yamaguchi, Junichi; Takahashi, Izumi; and Matsumoto, Masafumi, 5,021,828, Cl. 355-209.000.

Takahashi, Jiro: *See—*
Matsubara, Akitoshi; Takahashi, Jiro, Takagiwa, Hiroyuki, and Masaki, Hiroya, 5,021,317, Cl. 430-110.000.

Takahashi, Ken: *See—*
Tsuruoka, Shigeo; Takahashi, Ken; Miyoshi, Tadahiko; and Tokuda, Hiroatsu, 5,020,214, Cl. 29-611.000.

Takahashi, Kenichiroh; Harao, Noriyuki; and Tanoue, Hiromi, to Matsushita Electric Industrial Co., Ltd. Driving apparatus for ultrasonic motor. 5,021,700, Cl. 310-316.000.

Takahashi, Kosei: *See—*
Suyama, Takahiro; Kondo, Masafumi; Sasaki, Kazuaki; Hosoda, Masahiro; Takahashi, Kosei; and Hayakawa, Toshiro, 5,022,036, Cl. 372-45.000.

Takahashi, Masayuki: *See—*
Yamaya, Masaaki; Sato, Kazuharu, and Takahashi, Masayuki, 5,021,266, Cl. 427-379.000.

Takahashi, Minoru; Kotani, Tsutomu; and Endo, Shinichi, to TDK Corporation. Piezoelectric vibrator mounting system for a nebulizer 5,021,701, Cl. 310-345.000.

Takahashi, Osamu, to Fuji Photo Film Co., Ltd. Silver halide color photographic materials. 5,021,328, Cl. 430-502.000.

Takahashi, Shigeru: *See—*
Fujii, Kiyoshi; Kitamura, Haruo; Takahashi, Shigeru; and Shimizu, Norio, 5,020,250, Cl. 37-257.000.

Takahashi, Toshiyuki: *See—*
Kohdaka, Takayuki; Ishida, Katsuhiko; Takahashi, Toshiyuki, and Ogata, Takashi, 5,021,785, Cl. 341-138.000.

Takahashi, Tsutomu: *See—*
Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 5,020,617, Cl. 180-79.100.
Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 5,021,721, Cl. 318-432.000.

Takahashi, Yoshiharu; and Osaka, Shuichi, to Mitsubishi Denki Kabushiki Kaisha. Lead frame for semiconductor device. 5,021,865, Cl 357-70.000.

Takaki, Seiichi: *See—*
Nishi, Yumiko; Torii, Yutaka; Komatu, Norihumi; and Takaki, Seiichi, 5,022,057, Cl. 375-119.000.

Takano, Akihiko: *See—*
Iida, Katsumi; Sakurai, Yoshihiko; Takano, Akihiko; Yamaguchi, Hideo; and Yano, Teruaki, 5,020,424, Cl. 98-2.010.

Takarada, Mitsuhiko; Sato, Kazuharu; Yamamoto, Kenji; and Mori, Shigeru, to Shin-Etsu Chemical Co., Ltd. Hard coating compositions. 5,021,091, Cl. 106-287.160.

Takasago International Corporation: *See—*
Nohira, Hiroyuki; Takaya, Hidemasa, and Miyashita, Akira, 5,021,593, Cl. 556-20.000.

Takase, Mituo: *See—*
Maeda, Tetsuya; Yamamoto, Toshiyuki; Takase, Mituo; Sasaki, Kazuya; Airka, Tadashi; Yokoo, Mamoru; Hashimoto, Rieko, Amemiya, Kouji; and Koshikawa, Sakae, 5,021,458, Cl. 514-655.000.

Takase, Shigehiro: *See—*
Hatanaka, Hiroshi; Ezaki, Masami; Tsujii, Eisaku; Okamoto, Masanori; Shigematsu, Nobuharu; Okuhara, Masakuni; and Takase, Shigehiro, 5,021,240, Cl. 424-118.000.

Takashi, Aota: *See—*
Koji, Hatanaka; and Takashi, Aota, 5,020,489, Cl. 123-145.00A.

Takashi, Ishida; Ueda, Yoshikazu; Kubota, Teruji; Igarashi, Misao; Tanaka, Norichika; and Kamijo, Yasuhiko, to Chiba City & Tsukishima Kikai Kubushiki Kaisha. System for treating waste material in a molten state. 5,020,455, Cl. 110-342.000.

Takata, Hiroshi: *See—*
Ohara, Osamu; Kawashima, Hiroshi, and Takata, Hiroshi, 5,020,440, Cl. 104-127.000.

Takaya, Hidemasa: *See—*
Nohira, Hiroyuki; Takaya, Hidemasa; and Miyashita, Akira, 5,021,593, Cl. 556-20.000.

Takayama, Ryoichi: *See—*
Tomita, Yoshihiro; Takayama, Ryoichi; Ogawa, Hisahito; Nomura, Koji; Asayama, Junko; and Abe, Atsushi, 5,021,660, Cl. 250-338.300.

Takeda Chemical Industries, Ltd.: *See—*
Harada, Setsuo; Nagaoka, Akinobu; Itoh, Katsumi; and Terao, Shinji, 5,021,439, Cl. 514-380.000.

Takeda, Kenji: *See—*
Yoshino, Yasuhisa; Kato, Yoshifumi; Tamatsu, Yukimasa; and Takeda, Kenji, 5,021,957, Cl. 364-426.010.

Takeda, Mutsuhiko; Mizukami, Masamichi; Norisue, Yasumasa, Hagiwara, Isao; and Zaima, Fumiya, to Mitsubishi Gas Chemical Company, Inc. Process for production of sulfonium compounds. 5,021,197, Cl. 260-399.000.

Takeda, Tatsuoki; and Miyamoto, Goro, to Japan Atomic Energy Research Institute. Fresnel lens type complex reflection system having a lens function. 5,020,886, Cl. 350-409.000.

Takegahara, Takashi: *See—*
Seki, Masaki; Takegahara, Takashi; and Arakaki, Takeshi, 5,021,966, Cl. 364-474.260.

Takei, Hitoshi: *See—*
Hamada, Takeaki; Abe, Kiyoshi, Takei, Hitoshi; and Sato, Kenji, 5,020,169, Cl. 5-10.200.

Takekawa Tekko Kabushiki Kaisha: *See—*
Okajima, Hiroshi; and Sudo, Susumu, 5,020,282, Cl. 51-206.00R.

Takemoto, Kazuo: *See—*
Yoshimura, Hiroshi; Takemoto, Kazuo; and Yamada, Toshihiro, 5,021,956, Cl. 364-424.100.

Takemoto, Masato: *See—*
Kita, Toshiro; Genba, Susumu; Takemoto, Masato; Tatsumi, Takashi; Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi; Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji; and Yoshida, Toshihiko, 5,021,892, Cl. 358-468.000.

Takenaka, Koji; and Sato, Eiji, to Asahi Kasei Kogyo Kabushiki Kaisha. Woven fabric having multi-layer structure and composite material comprising the woven fabric. 5,021,283, Cl. 428-116.000.

Takeshita, Fusayuki: *See—*
Kikuchi, Makoto; Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Takeshita, Fusayuki; and Furukawa, Kenji, 5,021,190, Cl. 252-299.610.

Takeuchi, Kesatoshi, to Seiko Epson Corporation. Voltage controlled oscillator (VCO). 5,021,752, Cl. 331-177.00V.

Takeuchi, Manabu: *See—*
Uchiyama, Kensuke; Uematsu, Hiromi; Takeuchi, Manabu; and Kobari, Masao, 5,020,550, Cl. 131-296.000.

Takeuchi, Tomio; Aoyagi, Takaaki; Hamada, Masa; Naganawa, Hiroshi; and Yoshida, Shigemi, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Physiologically active substances, probestin and prostatin and production thereof. 5,021,549, Cl. 530-330.000.

Takeyama, Kouzi: *See—*
Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, 5,021,877, Cl. 358-75.000.

Takimoto, Kiyoshi: *See—*
Matsuda, Hiroshi; Kawada, Haruki; Sakai, Kunihiro; Takimoto, Kiyoshi; Kawade, Hisaaki; Yanagisawa, Yoshiniro; and Morikawa, Yuko, 5,020,881, Cl. 350-333.000.

Takita, Masatoshi; and Shimizu, Takaaki, to Shin-Etsu Chemical Co., Ltd. Method of manufacturing synthetic silica glass. 5,021,073, Cl. 65-18.100.

Takiyama, Eiichiro; and Morita, Katsuhisa, to Showa Highpolymer Co., Ltd. Photocurable resin composition and method of producing decorative material using the same. 5,021,465, Cl. 522-60.000.

Takubo, Chiaki: *See—*
Sudo, Toshio; Saito, Kazutaka; and Takubo, Chiaki, 5,021,866, Cl. 357-70.000.

Talbert, Sherwood G.; and Jakob, Frank E., to Gas Research Institute. Engine driven heat pump system. 5,020,320, Cl. 62-238.700.

Talboys, Thomas: *See—*
Demmer, Martha; and Talboys, Thomas, 5,021,621, Cl. 219-10.55F.

Talkington, Sherry R.: *See—*
Guffey, Timothy B; Boatman, Donn N.; Abe, Susan S.; Talkington, Sherry R.; and Mijac, Marko D., 5,021,256, Cl. 426-601.000.

Talmore, Eli; and Shalom, Ami B., to Technion Research & Development FDN. Ltd., Armament Development Authority. Electro-optical middle ultra-violet sensors. 5,021,668, Cl. 250-372.000.

Tamaki, Masaru, to Hokkaido Pipeline Industrial Co., Ltd. Process for removing asbestos and the device for removing the same. 5,021,095, Cl. 134-21.000.

Tamamushi, Takashige: *See—*
Nishizawa, Jun-ichi; Tamamushi, Takashige; Mitamura, Koichi; Takahashi, Hiroo; Mitsui, Kiyoo; Ikehara, Mitsuo; Wako, Toyota; and Maruyama, Sinpei, 5,021,936, Cl. 363-41.000.

Tamatoshi Industries Limited: *See—*
Itagaki, Takafumi, 5,020,293, Cl. 52-314.000

Tamatsu, Yukimasa: *See—*
Yoshino, Yasuhisa; Kato, Yoshifumi; Tamatsu, Yukimasa; and Takeda, Kenji, 5,021,957, Cl. 364-426.010.

Tamura, Shuji: *See—*
Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, 5,021,391, Cl. 502-426.000.

Tanaka, Akihiro; Ohsima, Tetsuhiro; and Sakamoto, Takumi, to Gunze Ltd. Seamless semiconductive belt. 5,021,036, Cl. 474-237.000.

Tanaka, Hiroshi: *See—*
Yoshino, Tadashi; Yamaguchi, Susumu; Komae, Hitoshi; Ishiwata, Tetsuo; Yamauchi, Eiji; and Tanaka, Hiroshi, 5,021,897, Cl 360-72.200.

Tanaka, Hirotoshi: *See—*
Kawata, Atsumi; Itoh, Hiroyuki; Tanaka, Hirotoshi; Yoshihara, Kazuhiro; and Yamashita, Hiroki, 5,021,686, Cl. 307-448.000.

Tanaka, Katsufusa: *See—*
Motoyoshi, Takeo; and Tanaka, Katsufusa, 5,022,019, Cl. 369-36.000.

Tanaka Matthey Co., Ltd.: *See—*
Watanabe, Michihiro; Sato, Kazutaka; Zen, Munetoshi; Ato, Kazuhiko; Watanabe, Yoshinobu; and Taguchi, Sadayoshi, 5,021,194, Cl. 252-518.000.

Tanaka, Nobuhiro; Tawara, Hirotoshi; and Hirata, Eiji, to Kao Corporation. Method for shifting goods and apparatus therefor. 5,020,965, Cl. 414-786.000.

Tanaka, Norichika: *See—*
Takashi, Ishida; Ueda, Yoshikazu; Kubota, Teruji; Igarashi, Misao; Tanaka, Norichika; and Kamijo, Yasuhiko, 5,020,455, Cl. 110-342.000.

Tanaka, Ryuichi, to Nippon Air Brake Co. Braking system for vehicle 5,020,864, Cl. 303-113.000.

Tanaka, Saburo: *See—*
Fujita, Nobuhiko; Itozaki, Hideo; Tanaka, Saburo, Yazu, Shuji; and Jodai, Tetsuji, 5,021,396, Cl. 505-1.000.

Tanaka, Sakae; Watanabe, Yoshiaki; Shirai, Katsuo; and Ogiwara, Yoshihisa, to Seikosha Co., Ltd.; and Nippon Precision Circuits Ltd. Silicon thin film transistor. 5,021,850, Cl. 357-23.700.

Tanaka, Takeshi, to Sharp Kabushiki Kaisha. Serial data communication device. 5,022,050, Cl. 375-7.000.

Tanaka, Toshio, to Mitsubishi Denki Kabushiki Kaisha Apparatus for vapor phase epitaxial growth. 5,020,474, Cl 118-725.000.

Tanigawa, Shu: *See—*
Okada, Kenichi; Tanigawa, Shu; and Nishino, Masashi, 5,020,913, Cl. 356-350.000.

Tanigawa, Tohru: *See—*
Asai, Makoto; Ohyama, Yoshimasa; Tanigawa, Tohru; Shinozaki, Shigeo; and Shiga, Shoji, 5,021,105, Cl. 148-433.000.

Tanimoto, Akira: *See—*
Kita, Toshiro; Genba, Susumu; Takemoto, Masato; Tatsumi, Takashi; Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi; Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji; and Yoshida, Toshihiko, 5,021,892, Cl. 358-468.000.

Tanimoto, Tomoaki: *See—*
Furutani, Akihiro; Okada, Junichi; and Tanimoto, Tomoaki, 5,020,444, Cl. 104-284.000.

Tanioka, Kenkichi: *See—*
Yamamoto, Masanao; Unnai, Takaaki; Ehata, Shigeru; Hirai, Tadaaki; Sameshima, Kenji; Hiruma, Eikiyu; Suzuki, Shirou; Tanioka, Kenkichi; Yamazaki, Junichi; and Shidara, Keeichi, 5,021,705, Cl. 313-106.000.

Tanoue, Hiromi: *See—*
Takahashi, Kenichiroh; Harao, Noriyuki; and Tanoue, Hiromi, 5,021,700, Cl. 310-316.000.

Tarlow, Kenneth A.: *See—*
Langman, Kirk; Krishnamurti, Kiran; and Tarlow, Kenneth A., 5,022,020, Cl. 369-37.000.

Tarrade, Gerard: *See—*
Fargeaud, Daniel; and Tarrade, Gerard, 5,021,006, Cl. 439-469.000.

Tartaglia, Peter A.; Collins, Richard B.; and Smolen, Robert S., to Marotta Scientific Controls, Inc. Noise-reducing valve construction. 5,020,571, Cl. 137-625.300.

Tashima, Seiji; Okimoto, Haruo; and Akagi, Toshimichi, to Mazda Motor Corporation. Air supply control systems for turbocharged internal combustion engines. 5,020,327, Cl. 60-600.000.

Tatsumi, Takashi: *See—*
Kita, Toshiro; Genba, Susumu; Takemoto, Masato; Tatsumi, Takashi; Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi; Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji; and Yoshida, Toshihiko, 5,021,892, Cl. 358-468.000.

Tatsuno, Kyoichi; and Umeda, Toshiya, to Kabushiki Kaisha Toshiba. Optical fiber sensor having function of compensating for all drifting components. 5,021,647, Cl. 250-227.210.

Taubitz, Christof; Hub, Hans-Henning; Ziegler, Walter; and Sadlowski, Juergen, to BASF Aktiengesellschaft. Thermoplastic molding materials consisting of polyesters and polycarbonates and having a good low-temperature impact strength. 5,021,508, Cl. 525-133.000.

VOL
1127
ISS
1
JE
4
1991
UMI

Taveira, Joao P.: *See—*

de Almeida Thompson, Eduardo C., and Taveira, Joao P., 5,020,695, Cl. 222-185.000.

Tawara, Hirotoshi: *See—*

Tanaka, Nobuhiro; Tawara, Hirotoshi, and Hirata, Eiji, 5,020,965, Cl. 414-786.000.

Tay, Wan F.: *See—*

Shepherd, Wayne P.; Davis, Darrell E; and Tay, Wan F., 5,021,754, Cl. 332-128.000

Taylor, Brad: *See—*

Groechel, David W.; Taylor, Brad; Henri, John R., and Obinata, Naomi, 5,021,121, Cl. 156-643.000.

Taylor, Bruce E.: *See—*

Langevin, Eric T.; Carter, Austin L., Jr., Van Kleeck, Michael J., and Taylor, Bruce E., 5,020,245, Cl. 34-155.000.

Taylor, Henry F.: *See—*

Chang, Kai; and Taylor, Henry F., 5,021,748, Cl 330-286.000.

Taylor, Jack R.: *See—*

Ekstedt, Edward E.; and Taylor, Jack R., 5,020,329, Cl. 60-737.000.

Taylor, Julian S. Unitized disc flow control assembly for a restrictor valve. 5,020,568, Cl. 137-316.000.

TDK Corporation: *See—*

Takahashi, Minoru; Kotani, Tsutomu; and Endo, Shinichi, 5,021,701, Cl. 310-345.000.

Technion Research & Development FDN. Ltd., Armament Development Authority: *See—*

Talmore, Eli; and Shalom, Ami B., 5,021,668, Cl. 250-372.000.

Techno-Bio Co., Ltd.: *See—*

Nakane, Shigeru, 5,021,079, Cl. 71-68.000.

Tecnol, Inc.: *See—*

Hubbard, Vance M., and Brunson, Welton K., 5,020,533, Cl 128-206.230.

Tecott, Laurence; Barchas, Jack D.; and Eberwine, James, to Leland Stanford Junior University, The Board of Trustees of the. In situ transcription in cells and tissues. 5,021,335, Cl. 435-6.000.

Teisseire, Bernard, to Adir et Compagnie. Use of 2-azabicycloi[2.2.2]octane-3-carboxylic acid derivatives for the treatment of arteritis. 5,021,425, Cl. 514-299.000.

Tektronix, Inc.: *See—*

Brokenshire, Daniel A.; Bryant, Ronald W.; Farjami, Javad; and Brown, Gary L., 5,020,878, Cl. 350-133.000.

Telefonaktiebolaget L M Ericsson. *See—*

Petersen, Lars-Goran; and Adamsson, Ulf M., 5,022,026, Cl. 370-66.000.

Telemecanique: *See—*

Llerena, Laurent; and Loiselay, Michel, 5,021,722, Cl. 318-434.000.

Telic Alcatel: *See—*

Beauval, Didier, 5,022,075, Cl. 379-445.000.

Telionis, Demetri P.: *See—*

Walker, Delroy O.; and Telionis, Demetri P., 5,021,704, Cl. 313-35.000.

Tennant Company: *See—*

Field, Bruce F., 5,020,620, Cl. 180-169.000.

Tennelec/Nucleus, Inc.: *See—*

Hinshaw, Steven M., 5,021,664, Cl. 250-252.100.

Terada, Atsusuke; Iizuka, Yoshio; Wachi, Kazuyuki; and Fujibayashi, Kenji, to Sankyo Company Limited. Analgesic thiomorpholins their preparation, and pharmaceutical compositions containing them. 5,021,413, Cl. 514-227.500.

Terada, Kazuko: *See—*

Aisaka, Kazuo; Hashizume, Akihide; Huno, Takakazu; Suzuki, Ryuichi; and Terada, Kazuko, 5,021,770, Cl. 340-709.000.

Terada, Nobuhiro: *See—*

Aronoff, Michael I.; Matsuzawa, Soichiro; and Terada, Nobuhiro, 5,020,213, Cl. 29-603.000.

Terada, Yasushi; Nakayama, Takeshi; and Kobayashi, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Simiconductor memory device having reading operation of information by differential amplification. 5,022,009, Cl. 365-210.000.

Teranishi, Haruo: *See—*

Ishikawa, Toshikatsu; Teranishi, Haruo; Ichikawa, Hiroshi; and Mitsuno, Shiro, 5,021,370, Cl. 501-95.000.

Terao, Shinji: *See—*

Harada, Setsuo; Nagaoka, Akinobu; Itoh, Katsumi; and Terao, Shinji, 5,021,439, Cl. 514-380.000.

Terasawa, Masaaki; Mukohda, Hidefumi; Nagai, Yoshikazu; Ikeda, Yasunori; and Furusawa, Kazunori, to Hitachi, Ltd.; and Hitachi VLSI Engineering Corp. Semiconductor memory device. 5,022,000, Cl. 365-184.000.

Terashima, Kanetsugu: *See—*

Kikuchi, Makoto; Terashima, Kanetsugu; Ichihashi, Mitsuyoshi; Takeshita, Fusayuki; and Furukawa, Kenji, 5,021,190, Cl. 252-299.610.

Terayama, Satoshi: *See—*

Aoki, Takashi; Terayama, Satoshi; Iwaki, Yoshihisa; Ozawa, Shigeo; Imai, Toshitaka; and Shimada, Takamichi, 5,020,391, Cl. 74-866.000.

Termet, Pierre, to Bobet Materiel. Percussion safety device. 5,020,257, Cl. 42-1.120.

Terry, Dennis C.; Filho, Waldemiro M.; and Turechek, John J., to Newport Corporation. Honeycomb table manufacture and clean-room compatible honeycomb tables. 5,021,282, Cl. 428-116.000.

Terumo Kabushiki Kaisha: *See—*

Miyake, Sanae; Kasai, Masaaki; Yamazaki, Sakae; and Murashita, Takato, 5,020,220, Cl. 30-2.000.

Tervola, Pentti J. Stepless transmission with steering 5,021,037, Cl 475-25.000.

Tessmer, Dieter: *See—*

Langerbeins, Klaus, Klesse, Wolfgang; Tessmer, Dieter; Elser, Wilhelm; and Geyer, Hans-Juergen, 5,021,469, Cl 523-201.000

Tetra Pak Holdings & Finance S.A.: *See—*

Peterman, Thomas H.; Anderson, David L., Hakansson, Jan, and Marovskis, Harijs B., 5,020,304, Cl. 53-458.000.

Teulon, Jean-Marie: *See—*

Bru-Magniez, Nicole; Nicolai, Eric, and Teulon, Jean-Marie, 5,021,443, Cl. 514-394.000.

Texaco Inc.: *See—*

Dai, Pei-Shing E., and Holst, Edward H., 5,021,228, Cl 423-244.000.

Kapuscinski, Maria M.; Derosa, Thomas F., Biggs, Robert T., and Nalesnik, Theodore E., 5,021,177, Cl. 252-51.50R.

Muan, Arnulf; and Najjar, Mitri S., 5,021,386, Cl 502-248.000.

Texas A & M University System, The: *See—*

Chang, Kai; and Taylor, Henry F., 5,021,748, Cl. 330-286.000.

Texas Instruments Incorporated: *See—*

Gonsalves, Edward M.; Offiler, Stephen B.; Strott, Douglas B., and Beringhause, Steven, 5,021,736, Cl. 324-202.000.

Haken, Roger A., and Scott, David B., 5,021,851, Cl 357-23.900

Hashimoto, Masashi, 5,021,845, Cl. 357-23.400.

Hornbeck, Larry J., 5,021,663, Cl. 250-349.000.

Ikeya, Kiyokazu; and Yagi, Masanori, 5,020,998, Cl. 439-266.000

Johnson, Milo R., 5,021,662, Cl. 250-339.000.

Leduc, Yves, 5,021,787, Cl. 341-150.000.

Morris, Francis J., 5,021,840, Cl. 357-15.000.

Schreck, John F.; and Truong, Phat C., 5,022,008, Cl 365-201.000

Smith, Gregory C., 5,021,920, Cl. 361-311.000.

Sukegawa, Shunichi; and Inui, Takashi, 5,021,852, Cl. 357-23.110

Tai, Jy-Der; Chiu, Edison; An, Quang-Dieu; and Hsu, Te-Chuan, 5,021,994, Cl. 364-900.000.

Texas Iron Works, Inc.: *See—*

Braddick, Britt O.; and Langer, Michael, 5,020,597, Cl 166-291.000.

Texax-Glynn Corporation: *See—*

Dessertine, Pauline L., 5,020,527, Cl. 128-200.230.

Textron, Inc.: *See—*

Hopkins, John W., 5,020,309, Cl. 56-13.300.

Thate, Helmut: *See—*

Schroder, Bernd; Hartmann, Rudolf; and Thate, Helmut, 5,020,783, Cl. 267-273.000.

Thermo Electron Web Systems, Inc.: *See—*

Langevin, Eric T.; Carter, Austin L., Jr.; Van Kleeck, Michael J., and Taylor, Bruce E., 5,020,245, Cl. 34-155.000.

Thibault, Marc-Andre; Auger, Marc; Gariepy, Bruno; and Gendron, Andre, to Alcan International Limited. Apparatus for stirring molten metal. 5,020,778, Cl. 266-89.000.

Thievessen, Karl, to Jagenberg Aktiengesellschaft. Device for connecting strips of material. 5,020,736, Cl. 242-58.300.

Thiokol Corporation: *See—*

Black, Robert E., Jr.; Carson, Don C.; and Van Name, Frederick W., 5,021,270, Cl. 428-34.100.

Somoza, Carlos; and Estabrook, Lee C., 5,020,731, Cl. 241-1.000.

Thoman, David C.; Briggs, Marvin N.; and Eastman, James M., to Allied-Signal Inc. Doser system for regulating pressure in a control chamber of a test stand. 5,020,564, Cl. 137-102.000.

Thomas, Friedrich-Werner, to Leybold Aktiengesellschaft. Directly heatable crucible for induction melting furnaces. 5,022,044, Cl 373-151.000.

Thomas, Hugh O. Pitch control trimming system for canard design aircraft. 5,020,740, Cl. 244-93.000.

Thomas Jefferson University: *See—*

Zeiger, Allen R., 5,021,550, Cl. 530-334.000.

Thomas, Vincent F.: *See—*

Manitt, Philip J.; Thomas, Vincent F.; and McAllister, William J., 5,020,364, Cl. 73-147.000.

Thompson, William W., to Eli Lilly and Company. Process for protein particle size reduction using a fluid-energy mill. 5,021,554, Cl. 530-399.000.

Thomson-CSF: *See—*

Dufilie, Pierre, 5,021,699, Cl. 310-313.00B.

Nugues, Pierre; Desmur, Henri; and Florentin, Jose, 5,021,708, Cl 313-446.000.

Perron, Claude; and Tourtier, Philippe, 5,021,782, Cl. 341-67.000.

Thorud, Stanley R.; and Miller, LeRoy, to Liberty Diversified Industries. Collapsible container and pallet assembly. 5,020,674, Cl 206-600.000.

Tice, Robert J., Jr.: *See—*

Eitner, Joseph G., Jr.; and Tice, Robert J., Jr., 5,020,689, Cl. 222-1.000.

Timken Company, The: *See—*

Zhou, Rao-Sheng, 5,021,035, Cl. 475-183.000.

Timm, Robert, to Dresher, Incorporated. Foldable side rail member 5,020,172, Cl. 5-200.100.

Tioxide Group PLC: *See—*

Blackburn, Stephen R.; and Jones, Anthony G., 5,021,134, Cl. 204-177.000.

Tiraby, Gerard: *See—*

Armau, Elise; Drocourt, Daniel; Etienne, Gilles; and Tiraby, Gerard, 5,021,344, Cl. 435-172.300.

Tite, Elizabeth L.: *See—*

Beer, Paul D.; and Tite, Elizabeth L., 5,021,592, Cl. 556-1.000.

Tkacz, Jan S.: *See—*

Giacobbe, Robert A., Tkacz, Jan S., Masurekar, Prakash S.; Kaplan, Louis; and Sosa, Margaret S., 5,021,341, Cl 435-71.100.

Toa Corporation: *See—*

Nishikawa, Yutaka, 5,020,858, Cl. 299-8.000

Tobita, Michiaki: *See—*

Mohri, Hidemasa; Tobita, Michiaki; and Ishida, Masahiko, 5,021,272, Cl 428-40.000.

Tochinai, Chiaki; Kohara, Tadanao; Budo, Sadayoshi, Masuda, Hiroaki; and Yoshida, Takayoshi, to Exxon Research and Engineering Company. Hot melt adhesive containing improved hydrocarbon tackifier resin. 5,021,499, Cl. 524-487.000.

Tochizawa, Noriaki: *See—*

Ichimura, Kunihiro; Tochizawa, Noriaki; and Kikuchi, Hideo, 5,021,505, Cl. 525-59.000.

Todd, Alec: *See—*

Baker, Stephen R.; and Todd, Alec, 5,021,441, Cl 514-381.000.

Todd, Robert J.: *See—*

Buckberg, Gerald D., and Todd, Robert J., 5,021,045, Cl. 604-53.000.

Todo, Akira: *See—*

Minoda, Takeshi; Todo, Akira, Kimura, Toshio; and Kurishu, Masayoshi, 5,020,207, Cl 29-527.400.

Tofanetti, Odoardo: *See—*

Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo; and Tognella, Sergio, 5,021,436, Cl. 514-356.000.

Tugawa, Fumio: *See—*

Hirose, Hitoshi; and Togawa, Fumio, 5,022,081, Cl. 381-43.000.

Tognella, Sengio: *See—*

Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo; and Tognella, Sergio, 5,021,436, Cl. 514-356.000.

Tohnishi, Shigeji, to NEC Corporation. Semiconductor memory device having plural biasing circuits for substrate. 5,022,005, Cl. 365-189.090.

Tohoku Electric Power Company, Incorporated: *See—*

Nishizawa, Jun-ichi; Tamamushi, Takashige; Mitamura, Koichi; Takahashi, Hiroo; Mitsui, Kiyoo; Ikehara, Mitsuo; Wako, Toyota; and Maruyama, Sinpei, 5,021,936, Cl. 363-41.000.

Tuji, Shigeo: *See—*

Suzuki, Noboru; and Toji, Shigeo, 5,021,817, Cl. 354-402.000.

Tokita, Noboru, to Uniroyal Goodrich Tire Company, The. Joining reinforced elastomeric sheet material. 5,021,115, Cl. 156-406.600.

Tokoro, Setsuo, to Toyota Jidosha Kabushiki Kaisha. Device and method for determining target value of controllable variable associated with vehicle running state. 5,021,958, Cl. 364-426.040.

Tokuda, Hiroatsu: *See—*

Tsuruoka, Shigeo; Takahashi, Ken; Miyoshi, Tadahiko; and Tokuda, Hiroatsu, 5,020,214, Cl. 29-611.000.

Tokuhara, Masaharu: *See—*

Motoe, Hisafumi; Kawashima, Hiroyuki, and Tokuhara, Masaharu, 5,021,870, Cl. 358-11.000.

Tokyo Electric Co., Ltd.: *See—*

Muroi, Hidenori, 5,021,640, Cl. 235-462.000.

Yamanashi, Masami, 5,021,975, Cl. 364-519.000.

Tokyo Kikai Seisakusho, Ltd.: *See—*

Shibuya, Yasuo, 5,020,431, Cl. 101-228.000.

Tokyo Metropolitan Institute for Neuroscience: *See—*

Yasui, Kotaro; Kojima, Asato; Yasuda, Atsushi; and Sato, Takanori, 5,021,347, Cl. 435-235.000.

Tokyo Organic Chemical Industries, Ltd.: *See—*

Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, 5,021,391, Cl. 502-426.000.

Toledo, Alfredo A., Jr.: *See—*

Orgun, Munir; Pappu, Venkata R.; and Toledo, Alfredo A., Jr., 5,020,747, Cl. 244-187.000.

Toma, Salvatore; De Bue, Marina; Mele, Antonio; and Grandi, Guido, to Enircerche S.p.A. Cloning vector, molecules of recombinant DNA, *bacillus subtilis* strains transformed with the said molecules and methods for the expression of heterologous genes and the production and secretion of proteins coded by the said genes. 5,021,340, Cl. 435-69.100.

Tomashot, Steven W.: *See—*

Fifield, John A.; and Tomashot, Steven W., 5,022,006, Cl. 365-200.000.

Tomimoto, Tetsuji: *See—*

Kimura, Akira; Tomita, Osamu; Tomimoto, Tetsuji; Fujita, Satoru; and Kanemoto, Masami, 5,020,786, Cl. 270-95.000.

Tominaga, Satoshi: *See—*

Kita, Toshiro; Genba, Susumu; Takemoto, Masato; Tatsumi, Takashi; Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi; Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji; and Yoshida, Toshihiko, 5,021,892, Cl. 358-468.000.

Tomita, Osamu: *See—*

Kimura, Akira; Tomita, Osamu; Tomimoto, Tetsuji; Fujita, Satoru; and Kanemoto, Masami, 5,020,786, Cl. 270-95.000.

Tomita, Yoshihiro; Takayama, Ryoichi; Ogawa, Hisahito; Nomura, Koji; Asayama, Junko; and Abe, Atsushi, to Matsushita Electric Industrial Co., Ltd. Pyroelectric infrared detector and driving method therefor. 5,021,660, Cl. 250-338.300.

Tomoda, Atsuo: *See—*

Kanazawa, Hirotaka; Ohmura, Hiroshi; Tomoda, Atsuo; Furuzawa, Akihiro; Nakashima, Takashi; and Hideshima, Masao, 5,020,619, Cl. 180-140.000.

Toms, Derek J.; and Coffee, Ronald A., to Imperial Chemical Industries PLC. Ink jet parallel cusp producing slot or edge configured nozzle system. 5,021,803, Cl 346-1.100.

Tonen Sekiyukagaku Kabushiki Kaisha: *See—*

Fujita, Yuuji; Sezume, Tadashi; Kitano, Kitsusho; Narukawa, Kiyotada; Mikami, Takashi; Kawamura, Tetsuya, Sato, Shigeru; Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao, 5,021,504, Cl. 525-57.000.

Tonomoto, Yoshihiro, to Fujitsu Limited. Filter for removing smoke and toner dust used in electrophotographic/electrostatic recording apparatus. 5,021,831, Cl. 355-215.000.

Toolvac Engineering AB: *See—*

Larsson, Owe G. T.; and Aberg, Anders B. H., 5,021,203, Cl. 264-40.300.

Toppan Printing Co., Ltd.: *See—*

Kishikawa, Kenjiro; Nishihara, Yoshitaka, and Okudaira, Masayuki, 5,020,690, Cl. 222-83.000.

Topping, Richard: *See—*

Hoffman, Richard E.; Topping, Richard; Nelson, Tom W.; Murville, Marie L.; and Belkus, Paul, 5,020,563, Cl. 137-75.000.

Toray Industries, Inc.: *See—*

Miwa, Kishio; Fukui, Hiroaki; and Noma, Fumiaki, 5,021,284, Cl 428-166.000.

Torii, Yutaka. *See—*

Nishi, Yumiko; Torii, Yutaka; Komatu, Norihumi, and Takaki, Seiichi, 5,022,057, Cl. 375-119.000.

Torossian, Dieran R.: *See—*

Aubard, Gilbert G.; Grouhel, Agnes G., Junien, Jean-Louis; Roux, Claude P.; and Torossian, Dieran R., 5,021,408, Cl. 514-179.000.

Torpey, Patrick. Method and an apparatus for extracting a liquid from a sludge. 5,021,166, Cl. 210-709.000.

Torres, Carlos M. Laminate bending device. 5,020,985, Cl. 425-384.000.

Toshiba Silicone Co., Ltd: *See—*

Toya, Masanori, 5,021,494, Cl. 524-404.000.

Toshiro, Yoshiharu; and Kasahara, Kenichi, to NEC Corporation. Circuit for driving a gated p-n-p-n device. 5,021,694, Cl. 307-631.000.

Tosoh Corporation: *See—*

Sakamoto, Kiyoaki; Matsubara, Kenichi; Nakahara, Yasuhiro; and Nomura, Masaki, 5,021,162, Cl. 210-635.000.

Tourtier, Philippe: *See—*

Perron, Claude; and Tourtier, Philippe, 5,021,782, Cl. 341-67.000.

Towne, Harmon L.: *See—*

Rust, Marcus D.; Wilson, Jeffrey L.; and Towne, Harmon L., 5,020,246, Cl. 34-236.000.

Townsley, Malcolm, to Schering Corporation. Contact lens for correction of astigmatism. 5,020,898, Cl. 351-160.00R

Toya, Masanori, to Toshiba Silicone Co., Ltd. Thermal conductive silicone composition. 5,021,494, Cl. 524-404.000.

Toyama, Tsuyoshi: *See—*

Kohda, Kenji; Toyama, Tsuyoshi; Ando, Nobuaki, Noguchi, Kenji; and Kobayashi, Shinichi, 5,021,999, Cl 365-168.000.

Toyo Gosei Kogyo Co., Ltd.: *See—*

Ichimura, Kunihiro; Tochizawa, Noriaki, and Kikuchi, Hideo, 5,021,505, Cl. 525-59.000.

Toyoguchi, Tsutomu, to Sony Corporation. Disc drive arrangement for CD player and the like capable of loading different size discs. 5,022,023, Cl. 369-77.100.

Toyota Jidosha Kabushiki Kaisha: *See—*

Fujita, Yuuji; Sezume, Tadashi; Kitano, Kitsusho; Narukawa, Kiyotada; Mikami, Takashi; Kawamura, Tetsuya; Sato, Shigeru; Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao, 5,021,504, Cl. 525-57.000.

Sugiyama, Mizuho, 5,020,812, Cl. 280-91.000.

Tokoro, Setsuo, 5,021,958, Cl. 364-426.040.

Traber, Jorg: *See—*

Junge, Bodo; Richter, Bernd; Glaser, Thomas; and Traber, Jorg, 5,021,438, Cl. 514-373.000.

Trada, Atsusuke; Amemiya, Yoshiya; Matsuda, Keiichi, and Oshima, Takeshi, to Sankyo Company Limited. Thianaphthene derivatives. 5,021,444, Cl. 514-397.000.

Transaqua Technology Limited: *See—*

Morgan, Barry A., 5,021,765, Cl. 340-539.000.

Transition Technology, Inc.: *See—*

Gross, Ronald; and Bennett, Walter L., 5,021,777, Cl. 340-825.540.

Trautmann, Gunther: *See—*

Link, Helmut F.; and Trautmann, Gunther, 5,020,402, Cl. 82-124.000.

Travelmation Corporation: *See—*

Webber, David W.; and Kangas, Sandra E., 5,021,953, Cl. 364-407.000.

Treadway, Patrick P., to Minolta Camera Kabushiki Kaisha. Shelf structures for use in moving vehicles. 5,020,448, Cl. 108-42.000.

Treem, William R.: *See—*

Borschel, Marlene W.; Benson, John D.; Breen, Merle D.; MacLean, William C., Jr.; Ponder, Debra L.; Strickland, Alan D.; and Treem, William R., 5,021,245, Cl. 426-2.000.

Treiber, Fritz F., to Hobart Corporation. Package plattering device and method. 5,020,305, Cl. 53-500.000.

Tresness, Andrew F.: *See—*

Zelenz, Martin L., 5,022,078, Cl. 380-7.000.

Treybig, Duane S., to Dow Chemical Company, The. Modified epoxy resin compositions. 5,021,471, Cl. 523-414.000.

Trichon, Roger: *See—*

Mignani, Gerard; Ardaud, Pierre; and Trichon, Roger, 5,021,371, Cl. 501-96.000.

Trimble, Harold: *See—*

Van Driesen, Roger P.; Adams, William R.; Baldasarri, Mario; Caspers, John; and Trimble, Harold, 5,021,147, Cl. 208-152.000.

VOL 1127
ISS 1
JE 4
1991
UMI

- Tripp, Fred D., to Pantera Armory, Inc. Muzzle brake for firearms. 5,020,416, Cl. 89-14.300.
- Trischler, Ferenc: *See—*
  - Fodor, Tamas; Fischer, Janos; Dobay, Laszlo; Trischler, Ferenc; Ezer, Elemer; Matuz, Judit; Saghy, Katalin; Szporny, Laszlo; and Hajos, Gyorgy, 5,021,597, Cl. 556-69.000.
- Trombley, Ulric W.: *See—*
  - Nozel, Richard J.; and Trombley, Ulric W., 5,020,707, Cl. 224-42.210.
- Tromnau, Rudolf: *See—*
  - Meckl, Heinz; Reuter, Karl-Heinz; and Tromnau, Rudolf, 5,021,326, Cl. 430-399.000.
- Tropea, Joseph E.: *See—*
  - Elbein, Alan D.; and Tropea, Joseph E., 5,021,427, Cl. 514-315.000.
- Trotel, Jacques, to General Electric CGR SA. High acquisition rate tomography by translational step rotation. 5,022,060, Cl. 378-19.000.
- Truchon, Alain: *See—*
  - Comte, Marie-Iherese; Gueremy, Claude; Malleron, Jean-Luc; Mignani, Serge; Peyronel, Jean-Francois; and Truchon, Alain, 5,021,420, Cl. 514-253.000.
- Truong, Phat C.: *See—*
  - Schreck, John F.; and Truong, Phat C., 5,022,008, Cl. 365-201.000.
- TRW Inc.: *See—*
  - Ubhayakar, Shivadev K., 5,021,798, Cl. 343-762.000.
- TRW Technar Inc.: *See—*
  - Diller, Robert W., 5,021,678, Cl. 307-10.100.
- TRW United Carr GmbH & Co.: *See—*
  - Kraus, Willibald, 5,020,749, Cl. 248-74.300.
- Tsai, Huo-Lu. Method of an apparatus for manufacturing a keyboard. 5,020,215, Cl. 29-622.000.
- Tsuchiya, Michio; Otsuka, Shuji; Matsumoto, Takayuki; Ohta, Eiichi; Kondo, Hakudai; Murai, Suzuyo; Takeyama, Kouzi; Otobe, Mutumi; Harano, Tetsuo; Mino, Kouichi; Inagaki, Hiroya; and Matsumura, Koji, to Brother Kogyo Kabushiki Kaisha; and Nippon Telegraph Corporation. Optical image reading apparatus capable of reading multi-colored original. 5,021,877, Cl. 358-75.000.
- Tsugita, Makoto, to Fuji Photo Film Co., Ltd. White balance adjusting device for use in a camera. 5,021,874, Cl. 358-29.000.
- Tsuji, Shintaro, to Mitsubishi Denki Kabushiki Kaisha. Group-supervisory apparatus for elevator system. 5,020,642, Cl. 187-124.000.
- Tsujii, Eisaku: *See—*
  - Hatanaka, Hiroshi; Ezaki, Masami; Tsujii, Eisaku; Okamoto, Masanori; Shigematsu, Nobuharu; Okuhara, Masakuni; and Takase, Shigehiro, 5,021,240, Cl. 424-118.000.
- Tsujikawa, Muneo: *See—*
  - Mukai, Hiromichi; Horii, Hajime; Tsujikawa, Muneo; Kawabe, Haruhide; Arimura, Hirofumi; and Suyama, Tadakazu, 5,021,339, Cl. 435-69.100.
- Tsukamoto, Takeya: *See—*
  - Iida, Takashi; Kiten, Hiroshi; Ishii, Toru; and Tsukamoto, Takeya, 5,021,875, Cl. 358-29.00C.
- Tsuken Electric Ind. Co., Ltd.: *See—*
  - Nishizawa, Jun-ichi; Tamamushi, Takashige; Mitamura, Koichi; Takahashi, Hiroo; Mitsui, Kiyoo; Ikehara, Mitsuo; Wako, Toyota; and Maruyama, Sinpei, 5,021,936, Cl. 363-41.000.
- Tsukiji, Masaaki: *See—*
  - Nishimura, Tetsuharu; Ishizuka, Koh; Ishii, Satoshi; and Tsukiji, Masaaki, 5,021,649, Cl. 250-231.160.
- Tsukude, Masaki: *See—*
  - Arimoto, Kazutami; Matsuda, Yoshio; Ooishi, Tsukasa; Tsukude, Masaki; and Fujishima, Kazuyasu, 5,022,007, Cl. 365-201.000.
- Tsuneoka, Masayuki: *See—*
  - Yokouchi, Hisatake; Onodera, Yoichi; Funo, Takakazu; and Tsuneoka, Masayuki, 5,022,063, Cl. 378-99.000.
- Tsunomori, Michito: *See—*
  - Eguchi, Tamiyuki; and Tsunomori, Michito, 5,021,201, Cl. 264-9.000.
- Tsurunaga, Kazuyuki; Masuda, Yoshihisa; Okumura, Hiroyuki; and Ito, Daisuke, to Kabushiki Kaisha Toshiba. Superconducting switch and current limiter using such a switch. 5,021,914, Cl. 361-19.000.
- Tsuruoka, Ichirio; Echigo, Katsuhiro; Mochizuki, Manabu; Kurotori, Tsuneo; Ariyama, Kenzo; Kojima, Kenji; and Miyao, Mayumi, to Ricoh Company, Ltd. Wet-type image formation apparatus. 5,021,834, Cl. 355-256.000.
- Tsuruoka, Shigeo; Takahashi, Ken; Miyoshi, Tadahiko; and Tokuda, Hiroatsu, to Hitachi, Ltd. Method of manufacturing a hot wire air flow meter. 5,020,214, Cl. 29-611.000.
- Tsuruta, Yasuo. Irrigation method and apparatus. 5,020,939, Cl. 405-36.000.
- Tuburaya, Yoshitane: *See—*
  - Kamezaki, Hisamitsu; Suenaga, Masashi; Saito, Osamu; Iuchi, Shin-ichiro; Watanabe, Hitoshi; Fujiwara, Hideo; and Tuburaya, Yoshitane, 5,021,276, Cl. 428-64.000.
- Tucker, George K.: *See—*
  - Campbell, Michael J.; Finn, Dennis J.; Tucker, George K.; Vahey, Michael D.; and Vedder, Rex W., 5,021,947, Cl. 364-200.000.
- Tuff, Grant J., to Rolls-Royce Motor Cars Limited. Pressure measurement devices. 5,020,372, Cl. 73-730.000.
- Tuft, Richard H.; and Leon, Robert L., to Liberty Technology Center, Inc. Actuator assembly with permanently mounted monitoring system. 5,020,773, Cl. 251-129.120.
- Tufts College, Trustees of: *See—*
  - Levy, Stuart B., 5,021,407, Cl. 514-154.000.
- Tuminaro, Raymond D.: *See—*
  - Atkins, Robert M.; Peterson, George E.; and Tuminaro, Raymond D., 5,021,072, Cl. 65-3.110.
- Tupper, David E.: *See—*
  - Fernandez Fernandez, Maria I.; Hotten, Terrence M.; and Tupper, David E., 5,021,449, Cl. 514-422.000.
- Turbeville, Rob. Walker having wheels and brakes. 5,020,560, Cl. 135-67.000.
- Turechek, John J.: *See—*
  - Terry, Dennis C.; Filho, Waldemiro M.; and Turechek, John J., 5,021,282, Cl. 428-116.000.
- Turner, James: *See—*
  - Kurtze, Jeffrey D.; and Turner, James, 5,022,004, Cl. 365-189.070.
- Turner, William C. Battery terminal seal. 5,021,305, Cl. 429-65.000.
- Turrell, James A. Tool to clip together sheet metal ends. 5,020,202, Cl. 29-243.560.
- Turtinen, Pekka; and Kahonen, Antti, to Valmet Paper Machinery Inc. Double doctor for a paper machine and method for adjustment of same. 5,021,124, Cl. 162-199.000.
- Tuttle, John E. B., to United States of America, Army. In-line coaxial surge protector and test fixture. 5,021,734, Cl. 324-158.00F.
- Tuttle, Mark E., to Micron Technology, Inc. Polishing pad with uniform abrasion. 5,020,283, Cl. 51-209.0DL.
- Tuttle, Mark E.: *See—*
  - Lowrey, Tyler A.; Durcan, Dermot M.; Doan, Trung T.; Haller, Gordon A.; and Tuttle, Mark E., 5,021,353, Cl. 437-34.000.
- Tuttobene, Philip. Article vending machine. 5,020,958, Cl. 414-281.000.
- Tyren, Carl: *See—*
  - Hesthamer, Tore; and Tyren, Carl, 5,020,378, Cl. 73-779.000.
- Ube Industries, Ltd.: *See—*
  - Ohara, Shinji; Morimoto, Okihiro; and Suemura, Nobumasa, 5,021,497, Cl. 524-436.000.
- Ubhayakar, Shivadev K., to TRW Inc. Antenna with positionable reflector. 5,021,798, Cl. 343-762.000.
- Ubukata, Susumu; Mizutani, Yasukazu; and Shibata, Shigekazu, to Ubukata, Susumu. Acceleration responsive switch. 5,021,618, Cl. 200-61.470.
- Uchiyama, Kensuke; Uematsu, Hiromi; Takeuchi, Manabu; and Kobari, Masao, to Japan Tobacco Inc. Apparatus for expanding material of an agricultural origin. 5,020,550, Cl. 131-296.000.
- Ueda, Masami; and Ito, Michiaki, to Kabushiki Kaisha Toshiba. Motor mounting structure for washing machines. 5,020,767, Cl. 248-638.000
- Ueda, Shinjiroo: *See—*
  - Mase, Masahiro; Sakagami, Seiji; Okawada, Takeshi; Ueda, Shinjiroo; Awada, Yoshihisa; and Nagaoka, Takashi, 5,020,969, Cl. 415-55.300.
- Ueda, Yoshikazu: *See—*
  - Takashi, Ishida; Ueda, Yoshikazu; Kubota, Teruji; Igarashi, Misao; Tanaka, Norichika; and Kamijo, Yasuhiko, 5,020,455, Cl. 110-342.000.
- Ueki, Massaaki; Masuda, Toshihiko; and Kanai, Takashi, to Sony Corporation. Digital analog converter. 5,021,788, Cl. 341-152.000.
- Uematsu, Hiromi: *See—*
  - Uchiyama, Kensuke; Uematsu, Hiromi; Takeuchi, Manabu; and Kobari, Masao, 5,020,550, Cl. 131-296.000.
- Ueno, Katsunori, to Fuji Electric Co., Ltd. MOS semiconductor device with an inverted U-shaped gate. 5,021,846, Cl. 357-23.400.
- Ueno, Kouhei; Akagawa, Tomohiko; and Obana, Kazuyoshi. Method of producing fibrous magnesium oxysulfate of granular form. 5,021,226, Cl. 423-554.000.
- Uesawa, Kaoru; and Abe, Yoshio, to Matsushita Electronics Corporation. Magnetron. 5,021,713, Cl. 315-39.510.
- Uetsuki, Setsuyoshi: *See—*
  - Nakano, Yoshimasa; Sugawara, Michiharu; Uetsuki, Setsuyoshi; Izawa, Taketoshi; Kawaguchi, Tomoyuki; and Wada, Akira, 5,021,419, Cl. 514-253.000.
- Uhrich, Wilfried: *See—*
  - Karst, Siegfried; Uhrich, Wilfried; and Zickwolf, Rolf, 5,020,893, Cl. 350-573.000.
- Uke, Alan K. Snorkel strap. 5,020,191, Cl. 24-3.00R.
- Ullmann, Martin. Expander type exercising apparatus. 5,020,796, Cl. 272-143.000.
- Ullrich, William J.: *See—*
  - Mondocea, Ionel; Ullrich, William J.; and Grant, Frederic F., 5,021,901, Cl. 360-92.000.
- Ultima Ltd.: *See—*
  - Aoshika, Takayuki, 5,020,296, Cl. 52-741.000.
- Ultimate Security, Inc.: *See—*
  - Hubbard, James H., 5,021,916, Cl. 361-171.000.
- Umeda, Toshiya: *See—*
  - Tatsuno, Kyoichi; and Umeda, Toshiya, 5,021,647, Cl. 250-227.210.
- Umehara, Kazuhiro; and Sugimoto, Tsugio, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Method for controlling ignition timing of an engine for marine vessels. 5,020,497, Cl. 123-418.000.
- Umino, Isamu: *See—*
  - Kobayashi, Fumihiko; and Umino, Isamu, 5,021,757, Cl. 333-205.000.
- Umlauf, Edward L.: *See—*
  - Malmgren, Robert C.; Cipra, Jan; and Umlauf, Edward L., 5,020,936, Cl. 404-32.000.
- Unanue, Emil R.: *See—*
  - Allen, Paul M.; and Unanue, Emil R., 5,021,551, Cl. 530-345.000.
- Unarco Industries, Inc.: *See—*
  - Klein, Herbert H., 5,020,678, Cl. 211-191.000.
- Underhill, Kenneth R. Method of wrapping round bales. 5,020,299, Cl. 53-399.000.
- Unger, Paul T. Partitioned poppet valve mechanism seprating inlet and exhaust tracts. 5,020,486, Cl. 123-79.00R.

- Unilever Patent Holdings B.V.: *See—*
  - Chapple, Andrew P., 5,021,145, Cl. 208-120.000.
  - Elmes, Alfred R.; Hammond, Kevin; and Sherrington, David C., 5,021,462, Cl. 521-63.000.
- Union Camp Corporation: *See—*
  - Beck, Louis B.; and Beck, Joseph C., 5,021,274, Cl. 428-41.000.
  - Gwin, Dennis L.; Van Scotter, Keith T.; and Montgomery, Ron L., 5,021,126, Cl. 162-263.000.
- Union Financiere pour le Developpement de L'Economie Cerealiere - Unigrains: *See—*
  - Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; Leclere, Jean; and Romand, Paul, 5,021,024, Cl. 452-149.000.
- Union Oil Company of California: *See—*
  - Van Slyke, Donald C., 5,020,595, Cl. 166-272.000.
- Uniroyal Goodrich Tire Company, The: *See—*
  - Tokita, Noboru, 5,021,115, Cl. 156-406.600.
- Unisys Corp.: *See—*
  - Abrahamson, Curtis M.; Zscheile, John W., Jr.; and Mower, Vaughn L., 5,022,049, Cl. 375-1.000.
  - Dragon, Thomas; Hylan, John; Reynolds, Robert; McCarthy, Paul; Merchant, Paul; and Berkoben, Kenneth, 5,021,676, Cl. 250-561.000.
  - Kingston, Samuel C.; Barham, Steven T.; and Simonsen, Harold L., 5,022,048, Cl. 375-1.000.
  - Lindsay, Robert A., 5,021,971, Cl. 364-513.500.
  - Stangel John J.; and Herper, John C., 5,021,793, Cl. 342-383.000.
- Unisys Corp. (Formerly Burroughs Corp.): *See—*
  - Dragon, Thomas; Hylan, John; and Berkoben, Kenneth, 5,021,673, Cl. 250-548.000.
- United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
  - Adams, Thomas P., 5,020,412, Cl. 89-1.805.
- United Rotary Brush Corporation: *See—*
  - Hughes, John R.; and Sutherin, Mark S., 5,020,664, Cl. 206-361.000.
- United States of America
  - Administration National Aeronautics and Space: *See—*
    - Sutton, John F., 5,021,729, Cl. 323-311.000.
  - Administrator, National Aeronautics and Space Administration: *See—*
    - Norton, William E.; Belcher, Jewell G., Jr.; Carden, James R.; and West, Thomas W., 5,021,065, Cl. 623-63.000.
  - Agriculture: *See—*
    - Beremand, Marian N.; VanMiddlesworth, Frank L.; and Plattner, Ronald D., 5,021,343, Cl. 435-119.000.
    - Kuykendall, Larry D.; and Hunter, William J., 5,021,076, Cl. 71-7.000.
  - Air Force: *See—*
    - Baciak, Mark G., 5,021,643, Cl. 250-201.900.
    - Cook, Mark A., 5,020,414, Cl. 89-33.160.
    - Dyer, Peter A., 5,020,157, Cl. 2-2.500.
    - Khanarian, Garo; Stamatoff, James B.; and Buckley, Alan, 5,021,268, Cl. 427-430.100.
    - Morrow, Robert K., Jr., 5,022,046, Cl. 375-1.000.
    - Shaw, Wei H., 5,021,789, Cl. 342-25.000.
    - Wang, Chyi-Shan; Goldfarb, Ivan J.; and Helminiak, Thaddeus E., 5,021,517, Cl. 525-417.000.
  - Army: *See—*
    - Tuttle, John E. B., 5,021,734, Cl. 324-158.00F.
  - Energy: *See—*
    - Armes, Steven P.; and Aldissi, Mahmoud, 5,021,193, Cl. 252-500.000.
    - Brow, Richard K.; and Watkins, Randall D., 5,021,307, Cl. 429-184.000.
    - Destefan, Dennis E.; and Stompro, David A., 5,021,625, Cl. 219-109.000.
    - Gabel, Detlef, 5,021,572, Cl. 544-229.000.
    - Gopalsami, Nachappa; and Raptis, Apostolos C., 5,020,920, Cl. 374-57.000.
    - Hackell, Lloyd A., 5,022,033, Cl. 372-25.000.
    - Mathur, Mahendra P.; Fu, Yuan C.; Ekmann, James M.; and Boyle, John M., 5,020,457, Cl. 110-345.000.
    - Sommargren, Gary E.; and Weaver, H. Joseph, 5,022,061, Cl. 378-84.000.
  - Environmental Protection Agency: *See—*
    - Gullett, Brian K., 5,021,229, Cl. 423-245.300.
  - Health and Human Services: *See—*
    - Blumberg, Peter M., 5,021,450, Cl. 514-453.000.
  - National Aeronautics and Space Administration: *See—*
    - Christianson, Rollin C., 5,020,774, Cl. 251-129.150.
    - Haslim, Leonard A., 5,020,742, Cl. 244-137.200.
    - Howard, Richard T.; Dabney, Richard W.; and Bryan, Thomas C., 5,020,876, Cl. 350-102.000.
    - Vairo, Daniel M.; and Whipple, Raymond D., 5,020,739, Cl. 244-75.00R.
    - von Bun, Friedrich O.; and Garriott, Owen K., 5,020,743, Cl. 244-159.000.
  - National Aeronautics and Space Administrations: *See—*
    - Hergenrother, Paul M.; Connell, John W.; and Bass, R. Gerald, 5,021,518, Cl. 525-422.000.
  - Navy: *See—*
    - Burnett, Donald R., 5,021,098, Cl. 136-201.000.
    - Corzine, Robert G.; Bolstad, Bruce E.; and Johantgen, John S., 5,021,796, Cl. 343-712.000.
    - Knight, Walter E.; Clark, Kenneth G.; and Gauntt, David L., 5,021,489, Cl. 524-140.000.
    - Lockhart, John C., Jr., 5,022,079, Cl. 380-14.000.
    - Rosario, Jesus A., 5,022,027, Cl. 371-12.000.
    - Sylvia, Robert E.; and Dillard, Thomas E., 5,020,400, Cl. 81-484.000.
    - Vernon, Susan N.; Sircus, Brian; and Gammell, Paul M., 5,021,738, Cl. 324-232.000.
- U.S. Philips Corporation: *See—*
  - Baggen, Constant P. M. J., 5,022,031, Cl. 371-43.000.
  - Bouman, Anton J., 5,021,636, Cl. 219-464.000.
  - Gamand, Patrice; and Meunier, Jean-Christophe, 5,021,759, Cl. 333-246.000.
  - Groeneveld, Dirk W. J.; and Schouwenaars, Hendrikus J., 5,021,784, Cl. 341-120.000.
  - Haaker, Paul R.; Klotz, Erhard P. A.; Koppe, Reiner H.; and Linde, Rolf E., 5,022,066, Cl. 378-2.000.
  - Hughes, John B., 5,021,692, Cl. 307-490.000.
  - Schemmel, Hans-Robert, 5,021,683, Cl. 307-441.000.
  - Van De Plassche, Rudy J., 5,021,744, Cl. 330-252.000.
  - Vogel, Peter, 5,021,879, Cl. 358-105.000.
  - Zell, Werner V.; Becker, Johann A.; Boehm, Detlef M.; Frohlich, August G.; Schade, Detlef; and Goletz, Bernhard R., 5,020,874, Cl. 350-96.200.
- United Technologies Automotive: *See—*
  - Falcoff, Monte L.; and Curtindale, Edward G., 5,020,845, Cl. 296-37.700.
- United Technologies Corporation: *See—*
  - Birbara, Philip J.; and Genovese, Joseph E., 5,021,070, Cl. 55-46.000.
  - Bluege, John, 5,020,880, Cl. 350-319.000.
  - Leachman, Frank A., Jr.; and Cole, Edward F., 5,020,315, Cl. 60-39.281.
  - Miller, Steven M.; and Bales, Daniel A., 5,020,716, Cl. 228-212.000.
- Universal Cooperatives, Inc.: *See—*
  - Muegerl, Gerard J., 5,020,190, Cl. 16-380.000.
- Universal Instruments Corporation: *See—*
  - Soth, Henry J., 5,020,959, Cl. 414-416.000.
- Universal Maschinenfabrik Dr. Rudolf Schieber GmbH: *See—*
  - Schimko, Reinhold, 5,020,341, Cl. 66-126.00R.
- University College Cardiff Consultants Limited: *See—*
  - Wall, Peter; Pickard, Robert S.; Ensell, Graham; and Leong, David, 5,020,376, Cl. 73-866.500.
- University Hospitals of Cleveland: *See—*
  - Greene, Bruce M.; and Unnasch, Thomas R., 5,021,342, Cl. 435-91.000.
- University of Akron: *See—*
  - Isayev, Avraam I., 5,021,475, Cl. 524-30.000.
- University of Illinois: *See—*
  - Leburton, Jean-Pierre; and Kolodzey, James, 5,021,841, Cl. 357-22.000.
- University of Washington, The Board of Regents of the: *See—*
  - Labbe, Robert F.; and Rettmer, Rebecca L., 5,021,452, Cl. 514-474.000.
- Unnai, Takaaki: *See—*
  - Yamamoto, Masanao; Unnai, Takaaki; Ehata, Shigeru; Hirai, Tadaaki; Sameshima, Kenji; Hiruma, Eikiyu; Suzuki, Shirou; Tanioka, Kenkichi; Yamazaki, Junichi; and Shidara, Keeichi, 5,021,705, Cl. 313-106.000.
- Unnasch, Thomas R.: *See—*
  - Greene, Bruce M.; and Unnasch, Thomas R., 5,021,342, Cl. 435-91.000.
- Uno, Terushige: *See—*
  - Kobayashi, Motonobu; Kinoshita, Futoru; Hagi, Mitsuharu; Inoue, Akira; and Uno, Terushige, 5,021,227, Cl. 423-212.000.
- Urban, Dieter; Ladner, Wolfgang; and Paul, Axel, to BASF Aktiengesellschaft. Immobilzation of lipase for resolving racemates of esters of racemic alcohols. 5,021,345, Cl. 435-180.000.
- Urushidani, Shigeo; and Imagawa, Hitoshi, to Nippon Telegraph and Telephone Corporation. Self-routing switch and its routing method. 5,022,025, Cl. 370-60.000.
- Ushio Denki: *See—*
  - Suzuki, Shigeru, 5,021,821, Cl. 355-53.000.
- Ushioda, Makoto: *See—*
  - Saito, Shinichi; Ushioda, Makoto; Inoue, Hiromichi; Miyazawa, Kazutoshi; and Ohno, Kouji, 5,021,191, Cl 252-299.610.
- Usick, Cliff. Grain saver attachment for the straw walker of a combine. 5,021,029, Cl. 460-85.000.
- Uskokovic, Milan R.: *See—*
  - McLane, John A.; and Uskokovic, Milan R., 5,021,451, Cl. 514-460.000.
- Utah Medical Products, Inc.: *See—*
  - Wallace, William D., 5,021,046, Cl. 604-97.000.
- Uto, Nobutaka; Sato, Masaaki; Hayakawa, Kimiaki; and Honjo, Takeshi, to Canon Kabushiki Kaisha. Apparatus discharged sheet stacking. 5,021,837, Cl. 355-322.000.
- Utsunomiya, Kazuhiro; Ooyama, Nobumi; and Sakaba, Hideo, to Power Reactor and Nuclear Fuel Development Corporation. Anomaly diagnosis system for a nuclear reactor core. 5,021,210, Cl. 376-247.000.
- Uyeda, Alan K.: *See—*
  - Gartner, Klaus W.; Uyeda, Alan K.; and Phillips, Peter J., 5,020,345, Cl. 70-277.000.
- Uzawa, Yoji: *See—*
  - Miyazaki, Toshimasa; Uzawa, Yoji; Okawa, Kazuyoshi; Kawashima, Hiroshi; Moriya, Kazumasa; Murakawa, Yoshitaka; Kumagai, Toshimitsu; Nakamura, Akihiro; Itoh, Motohiko; and Kashiwazaki, Tomoyuki, 5,021,695, Cl. 310-12.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Vacco, Dominick: *See—*
  - Anderson, Ernest R.; Vacco, Dominick; and Dagon, Thomas J., 5,021,163, Cl. 210-661.000.
- Vago, Otto Z.; and Wenczl, Ernest, to State Industries, Inc. Water heater construction and method of heating water. 5,020,512, Cl. 126-350.00R.
- Vahey, Michael D.: *See—*
  - Campbell, Michael J.; Finn, Dennis J.; Tucker, George K.; Vahey, Michael D.; and Vedder, Rex W., 5,021,947, Cl. 364-200.000.
- Vairo, Daniel M.; and Whipple, Raymond D., to United States of America, National Aeronautics and Space Administration. Selectable towline spin chute system. 5,020,739, Cl. 244-75.00R.
- Valentine Research, Inc.: *See—*
  - Davis, Gregg M.; and Roche, David E., 5,020,754, Cl. 248-206.300.
- Valenzky, Robert J.: *See—*
  - Gross, David R.; and Valenzky, Robert J., 5,020,237, Cl. 34-1.000.
- Valley Grain Products, Inc.: *See—*
  - Cope, Jonathan C.; Grady, Michael F.; and Pitman, Willard W., 5,020,426, Cl. 99-353.000.
- Valmet Paper Machinery Inc.: *See—*
  - Turtinen, Pekka; and Kahonen, Antti, 5,021,124, Cl. 162-199.000.
- Valmont Industries, Inc.: *See—*
  - Swanson, Dail L.; and Edwards, Shannon, 5,021,714, Cl. 315-101.000.
- Vanaschen, Luc; Kuster, Hans-Werner; and Bremer, Carsten, to Saint-Gobain Vitrage International. Device for tempering by contact of glazings. 5,021,075, Cl. 65-287.000.
- van Bogaert, Philippe; and Hillaert, Rik, to PIC ANOL N.V., naamloze vennootschap. Mechanism for mounting a part on a loom sley. 5,020,574, Cl. 139-188.00R.
- Vandenberg, Donald E.: *See—*
  - Dey, Thomas W.; Granger, Edward M.; Vandenberg, Donald E.; Pitek, John G.; and Humbel, William D., 5,020,905, Cl. 356-124.000.
- Vanden Heuvel, Gregory J.: *See—*
  - Buchman, James E.; and Vanden Heuvel, Gregory J., 5,020,302, Cl. 53-430.000.
- van de Pas, Johannes C.: *See—*
  - Machin, David; Naik, Appaya; Buytenhek, Cornelis; and van de Pas, Johannes C., 5,021,195, Cl. 252-545.000.
- Van De Plassche, Rudy J., to U.S. Philips Corporation. Differential amplifier with differential or single-ended output. 5,021,744, Cl. 330-252.000.
- Van der Hoeff, Joseph A. M.: *See—*
  - Molenaar, Ronald N.; and Van der Hoeff, Joseph A. M., 5,020,992, Cl. 432-248.000.
- van der Meij, Arnold B. M. H.: *See—*
  - Vercoulen, Gerardus C. P.; Faessen, Robert P.; Pennings, Marcel L. M.; and van der Meij, Arnold B. M. H., 5,021,314, Cl. 430-106.000.
- Vanderpool, Clarence D.; and Kim, Tai K., to GTE Products Corporation. Electrolytic method for producing ammonium paratungstate from cemented tungsten carbide. 5,021,133, Cl. 204-86.000.
- Vanderpool, Jeffrey S.: *See—*
  - Dixon, Robert C.; and Vanderpool, Jeffrey S., 5,022,047, Cl. 375-1.000.
- van der Sterren, Martin L.; and Graswinckel, Julius V. C., to Oce-Nederland B.V. Method and device for transferring two images to different sides of a receiving sheet. 5,021,836, Cl. 355-281.000.
- Vanderveen, Timothy: *See—*
  - Richmond, Frank M.; Vanderveen, Timothy; and Kimes, Rick, 5,020,562, Cl. 137-15.000.
- Van Deursen, Gary: *See—*
  - Kosten, Richard B.; Krasznai, Charles Z.; and Van Deursen, Gary, 5,020,187, Cl. 15-347.000.
- Van Driesen, Roger P.; Adams, William R.; Baldasarri, Mario; Caspers, John; and Trimble, Harold, to Abb Lummus Crest, Inc. Solid addition and withdrawal. 5,021,147, Cl. 208-152.000.
- Van Kleeck, Michael J.: *See—*
  - Langevin, Eric T.; Carter, Austin L., Jr.; Van Kleeck, Michael J.; and Taylor, Bruce E., 5,020,245, Cl. 34-155.000.
- Vanlerberghe, Guy; and Handjani, Rose-Marie, to Societe Anonyme dite: L'Oreal. Process for the production of aqueous dispersions of lipid spheres. 5,021,200, Cl. 264-4.300.
- Vanmaele, Luc J.; and Janssens, Wilhelmus, to Agfa-Gevaert, N.V. Cyan dyes in dye-donor elements for thermal dye transfer. 5,021,393, Cl. 503-227.000.
- VanMiddlesworth, Frank L.: *See—*
  - Beremand, Marian N.; VanMiddlesworth, Frank L.; and Plattner, Ronald D., 5,021,343, Cl. 435-119.000.
- Van Name, Frederick W.: *See—*
  - Black, Robert E., Jr.; Carson, Don C.; and Van Name, Frederick W., 5,021,270, Cl. 428-34.100.
- Van Patten, Blaine: *See—*
  - Van Patten, Norman; and Van Patten, Blaine, 5,020,467, Cl. 116-210.000.
- Van Patten, Norman; and Van Patten, Blaine. Balloon signalling system. 5,020,467, Cl. 116-210.000.
- Van Scotter, Keith T.: *See—*
  - Gwin, Dennis L.; Van Scotter, Keith T.; and Montgomery, Ron L., 5,021,126, Cl. 162-263.000.
- Van Slyke, Donald C., to Union Oil Company of California. Carbon dioxide-steam co-injection tertiary oil recovery process. 5,020,595, Cl. 166-272.000.
- Varde, Uday M.; Tackie, Michael N.; and Gupta, Rakesh K., to Aluminum Company of America. Epoxy-polyimide blend for low temperature cure, high-performance resin system and composites. 5,021,519, Cl. 525-423.000.
- Varta Batterie Aktiengesellschaft: *See—*
  - Sauer, Hans; and Kramer, Peter, 5,021,306, Cl. 429-94.000.
- Vataru, Marcel: *See—*
  - Eilowitz, Mark S.; Vataru, Marcel; Bayler, James L.; Labus, Rainer H.; and Lugosi, Laszlo G., 5,021,152, Cl. 210-712.000.
- Vaz, Nuno A.; and Smith, George W., to General Motors Corporation Polymer dispersed liquid crystal films formed by electron beam curing. 5,021,188, Cl. 252-299.500.
- Vdoviak, John W., to General Electric Company. Aircraft engine frame construction. 5,020,318, Cl. 60-226.100.
- Veda Incorporated: *See—*
  - Crosbie, Richard J.; and Colombo, Joseph, 5,021,982, Cl 364-578.000.
- Vedage, Gamimi A.: *See—*
  - Klier, Kamil; Herman, Richard G.; and Vedage, Gamimi A., 5,021,233, Cl. 423-656.000.
- Vedder, Rex W.: *See—*
  - Campbell, Michael J.; Finn, Dennis J.; Tucker, George K.; Vahey, Michael D.; and Vedder, Rex W., 5,021,947, Cl. 364-200.000.
- Vedril S.p.A.: *See—*
  - Canova, Luciano; Giannini, Umberto; and Albizzati, Enrico, 5,021,514, Cl. 525-351.000.
- Vellego, Geni; Filipini, Cesar A.; Filho, Pedro I. P.; Canevarolo, Sebastiao V., Jr.; and Serra, Oswaldo A., to Pirelli S.A. Cia. Indl Brasileira; and Fundacao Universidade Sao Carlos e Universidade de Sao Paulo. Synthesis of ceramic superconductor CPO from xenotyme. 5,021,397, Cl. 505-1.000.
- Velluz, Alain: *See—*
  - Morris, Anthony F.; Naef, Regula, Escher, Sina; and Velluz, Alain, 5,021,402, Cl. 512-11.000.
- Ventura, Susanna C.: *See—*
  - Sharma, Suniti K.; Ventura, Susanna C.; and Narang, Subhash C., 5,021,398, Cl. 505-1.000.
- Vercesi, Piercarlo; Davico, Claudio; and Giorgini, Gerardo, to Foggini Progetti S.r.l. Reversible electromechanical device for remotely controlling the orientation of the reflecting surface of rear-view mirrors for motor vehicles. 5,020,896, Cl. 350-636.000.
- Vercoulen, Gerardus C. P.; Faessen, Robert P.; Pennings, Marcel L. M.; and van der Meij, Arnold B. M. H., to Oce-Nederland B.V. Colored magnetically attractable toner powder. 5,021,314, Cl. 430-106.000.
- Vereinigte Papierwarenfabriken GmbH: *See—*
  - Richter, Karl-Heinz; Kurz, Hubert; and Kuecha, Georg, 5,021,039, Cl. 493-14.000.
- Vernon, Susan N.; Sircus, Brian; and Gammell, Paul M., to United States of America, Navy. Field variable, electronically controlled, nested coil eddy current probe. 5,021,738, Cl. 324-232.000.
- Vetco Gray Inc.: *See—*
  - Pallini, Joseph W., Jr., 5,020,942, Cl. 405-224.000.
- Vetcogray Inc.: *See—*
  - Milberger, Lionel J., 5,020,593, Cl. 166-208.000.
- Vetter, Hans; Odenwalder, Heinrich; Bergthaller, Peter; and Kruger, Thomas, to Agfa Gevaert Aktiengesellschaft. Color photographic recording material containing a DIR coupler. 5,021,331, Cl 430-544.000.
- Vetter, Hans: *See—*
  - Bergthaller, Peter; Kruger, Thomas; Vetter, Hans; and Odenwalder, Heinrich, 5,021,332, Cl. 430-544.000.
- Viaud, Andre , to Filotex. Screened flat electric cable having a plurality of parallel conductors. 5,021,007, Cl. 439-497.000.
- Victor Company of Japan, Ltd.: *See—*
  - Ozaki, Hidetoshi; and Gokura, Akira, 5,021,884, Cl. 358-167.000.
  - Shibayama, Kenji, 5,021,886, Cl. 358-170.000.
- Viehbeck, Alfred: *See—*
  - Arbach, Gary V.; O'Toole, Terrence R.; and Viehbeck, Alfred, 5,021,129, Cl. 204-15.000.
- Viking Corporation: *See—*
  - Retzloff, James G.; and Sanders, Gerald W., 5,020,601, Cl. 169-37.000.
- Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; Leclere, Jean; and Romand, Paul, to Etablissements Arrive S.A.; and Union Financiere pour le Developpement de L'Economie Cerealiere - Unigrains. Cutting up fowl. 5,021,024, Cl. 452-149.000.
- Vincent, Jacques: *See—*
  - Schapira, Joseph; Pecheur, Jacques; Vincent, Jacques; Schild, Jacques; and Bosselin, Bruno, 5,021,083, Cl. 71-105.000.
- Vine, Martin B., to M. J. Vine Enterprises Pty. Ltd. Roller screening apparatus. 5,020,352, Cl. 72-84.000.
- Vinogradoff, Anna P.; and Kleschick, William A., to Dow Chemical Company, The. Pyrazolo[1,5-a]pyrimidine-2-sulfide compounds. 5,021,591, Cl. 544-281.000.
- Virginia Tech Intellectual Properties, Inc.: *See—*
  - Gibson, Harry V.; and Jois, Yajnanarayana H. R., 5,021,583, Cl. 548-328.000.
- Viscomi, Giuseppe C.: *See—*
  - Cardinali, Franco; Longobardi, Maria G.; Visconi, Giuseppe C.; and Ziggiotti, Alessandra, 5,021,600, Cl. 556-411.000.
- Viscovich, Paul W.; and Martin, James A., to Westinghouse Electric Corp. System for removing uncondensed products from a steam turbine condenser. 5,020,589, Cl. 165-112.000.
- Viskase Corporation: *See—*
  - Huang, Alvin S.; Nicholson, Myron D.; and Ramagopal, Rama, 5,021,252, Cl. 426-412.000.

- Vitreoretinal Development, Inc.: *See—*
  - Byrne, James B., Jr., 5,021,057, Cl. 606-107.000.
- Vogel, Peter, to U.S Philips Corporation. System for transmitting video pictures. 5,021,879, Cl. 358-105.000.
- Vogelgesang, Peter J., to Minnesota Mining and Manufacturing Company. System for applying a perpendicular magnetic field to the illuminated side of a magneto-optic medium. 5,022,018, Cl 369-13.000.
- Vogenthaler, James R.: *See—*
  - Duback, David W.; and Vogenthaler, James R., 5,021,018, Cl 445-24.000.
- Vokins, Ian M., to CMB Foodcan plc. Machine for filling containers with a food product. 5,020,303, Cl. 53-432.000.
- Volkswagen: *See—*
  - Kruger, Hermann, 5,020,487, Cl. 123-90.150.
- Volvo GM Heavy Truck Corporation: *See—*
  - George, Philip C., 5,020,856, Cl. 297-483.000.
- von Bun, Friedrich O.; and Garriott, Owen K., to United States of America, National Aeronautics and Space Administration. Nano-G research laboratory for a spacecraft. 5,020,743. Cl. 244-159.000.
- Voxcom, Inc.: *See—*
  - Good, David M.; and Stephens, Eugene S., 5,020,761, Cl. 248-317.000.
- Vrooman, Carll D.; and Wilfong, Harry B., Jr , to Sonoco Products Company. System for automatic consecutive opening and dispensing thermoplastic grocery or retail product bags. 5,020,750, Cl. 248-97.000.
- Vroomans, Hubertus J., to Stamicarbon B.V Graft-modified linear low-density polyethylenes, process for their preparation and the application thereof. 5,021,510, Cl 525-285.000.
- Vu, Cung; and Blank, Norman E., to W. R. Grace & Co.-Conn. Castor oil based polyurethane for underbody coatings and the like. 5,021,535, Cl. 528-66.000.
- Vu, Duy-Phach: *See—*
  - Fan, John C.C.; Zavracky, Paul M.; Narayan, Jagdish; Allen, Lisa P.; and Vu, Duy-Phach, 5,021,119, Cl. 156-620.710.
- Vyvoda, Josef C.; and Harvilchuck, James T., to B. F. Goodrich Company, The. Internally plasticized polyvinyl halide compositions and articles prepared therefrom. 5,021,490, Cl. 524-140.000.
- W. Kordes' Sohne Rosenschulen GmbH & Co KG: *See—*
  - Helms, Bernd, 5,020,301, Cl. 53-399.000.
- W. R. Grace & Co.-Conn.: *See—*
  - Block, Jacob; and Dolhert, Leonard E., 5,021,400, Cl. 505-1.000.
  - Schirmer, Henry G., 5,020,922, Cl. 383-119.000.
  - Vu, Cung; and Blank, Norman E., 5,021,535, Cl. 528-66.000.
- Wachi, Kazuyuki: *See—*
  - Terada, Atsusuke; Iizuka, Yoshio; Wachi, Kazuyuki; and Fujibayashi, Kenji, 5,021,413, Cl. 514-227.500.
- Wachtel, Edward I.: *See—*
  - Bealkowski, Richard; Blackledge, John W., Jr.; Cronk, Doyle S.; Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G.; Kovach, George D.; McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., 5,022,077, Cl. 380-4.000.
- Wada, Akira: *See—*
  - Nakano, Yoshimasa; Sugawara, Michiharu; Uetsuki, Setsuyoshi; Izawa, Taketoshi; Kawaguchi, Tomoyuki; and Wada, Akira, 5,021,419, Cl. 514-253.000.
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- Wada, Masami: *See—*
  - Nakagawa, Fujio; and Wada, Masami, 5,020,211, Cl. 29-596.000.
- Wada, Takeji, to Fuji Seimitsu Mfg. Co., Ltd. Lock nut. 5,020,953, Cl. 411-247.000.
- Waddoups, Malcolm; and Emert, Jacob, to Exxon Chemical Patents, Inc. Friction modified oleaginous concentrates of improved stability. 5,021,173, Cl. 252-35.000.
- WaferScale Integration, Inc.: *See—*
  - Eitan, Boaz; and Kazerounian, Reza, 5,021,847, Cl. 357-23.500.
- WAGI Partnership: *See—*
  - Lee, Ling H., 5,020,240, Cl. 34-60.000.
- Wagner, George R.: *See—*
  - Snyder, Thomas S.; Stoltz, Richard A.; and Wagner, George R., 5,021,401, Cl. 505-1.000.
- Wagner, Richard C. Method and machine for making food patties. 5,021,025, Cl. 452-174.000.
- Wajima, Motoyo: *See—*
  - Suzuki, Yoshihiro; Takada, Toshinari; Suzuki, Masahiro; Akahoshi, Haruo; Nagai, Akira; Takahashi, Akio; Amagi, Shigeo; Narahara, Toshikazu; Wajima, Motoyo; and Kogawa, Kiyonori, 5,021,296, Cl. 428-409.000.
- Wako, Toyota: *See—*
  - Nishizawa, Jun-ichi; Tamamushi, Takashige; Mitamura, Koichi; Takahashi, Hiroo; Mitsui, Kiyoo; Ikehara, Mitsuo; Wako, Toyota; and Maruyama, Sinpei, 5,021,936, Cl. 363-41.000.
- Wakunaga Seiyaka Kabushiki Kaisha: *See—*
  - Tahara, Eiichi; Ochiai, Atsushi; Yokozaki, Hiroshi; Hozumi, Toyoharu; and Kyo, Eikai, 5,021,553, Cl. 530-387.000.
- Walder, Pierre-Alain: *See—*
  - Loth, Eric; and Walder, Pierre-Alain, 5,021,101, Cl. 148-11.50C.
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- Wall, Daniel P.: *See—*
  - Spears, Kevin A.; Stafford, Clinton J.; Frey, Kenny C.; and Wall, Daniel P., 5,020,518, Cl. 128-52.000.
- Wall, Peter; Pickard, Robert S.; Ensell, Graham; and Leong, David, to University College Cardiff Consultants Limited. Microenvironmental sensors. 5,020,376, Cl. 73-866.500.
- Wallace, Edward M.: *See—*
  - Gosselin, Robert G.; and Wallace, Edward M., 5,020,222, Cl. 30-251.000.
- Wallace, William D., to Utah Medical Products, Inc Medical pressure sensing and display system. 5,021,046, Cl. 604-97.000.
- Walsh, David M.: *See—*
  - Sweet, David H.; Greenberg, Charles E.; Lappos, Nicholas D , Walsh, David M., and Meisner, Richard P , 5,020,316, Cl 60-39.282.
- Walt Disney Company, The: *See—*
  - Fox, Richard J.; Leasure, Maurice G.; Kadorian, Gregory S.; LeBlanc, Douglas R.; Harbaugh, David L.; Poole, James E.; and Hoffend, Donald A., Jr., 5,021,954, Cl. 364-410.000.
- Walter, Gerard S ; and Hagan, John. Bus bar assembly 5,021,014, Cl. 439-798.000.
- Walters, David K.: *See—*
  - Bullen, John V.; and Walters, David K., 5,021,176, Cl. 252-51.50A
- Walters, Larry J.: *See—*
  - Bliss, Terry L.; Chupka, David E.; McCarthy, Christopher E.; and Walters, Larry J., 5,021,159, Cl. 210-396.000.
- Walton, Charles A. Capacitance coupled proximity identification system. 5,021,778, Cl. 340-825.540.
- Walton, James, to J. F. Walton & Co., Inc. Duct cleaning apparatus. 5,020,188, Cl. 15-406.000.
- Wandel, Martin: *See—*
  - Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; El-Sayed, Aziz; Muller, Peter-Rolf; and Wandel, Martin, 5,021,488, Cl. 524-116.000.
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- Wang, John H. S.: *See—*
  - Chien, Kuei-Ru; Wang, John H. S.; and Jacobson, James G , 5,022,032, Cl. 372-18.000.
- Wang, June-Chi. Propulsion mechanism for a boat 5,021,015, Cl. 440-13.000.
- Wang Laboratories, Inc.: *See—*
  - Quint, Jeanne M.; and Pratt, John M., 5,021,995, Cl. 364-900.000.
- Wardall, Thad E. Accessory tool for anglers. 5,020,833, Cl. 289-17.000.
- Wardell, Marvin H. Selectively controllable sprinkler system for lawns, yards, gardens and the like. 5,020,722, Cl. 239-1.000.
- Warman International, Inc.: *See—*
  - Owens, Brian S.; and Kimpel, Alvin A., 5,020,776, Cl. 251-327.000.
- Warner-Lambert Company: *See—*
  - Bunick, Frank J.; Luo, Shiuh J.; Shaw, James J.; and Hellman, Stephen R., 5,021,249, Cl. 426-96.000.
- Warren, Alan C.: *See—*
  - Kirchner, Peter D.; Warren, Alan C.; Woodall, Jerry M.; and Wright, Steven L., 5,021,365, Cl. 437-237.000.
- Waseda University: *See—*
  - Miwa, Yoshiyuki; Kodama, Hiroshi; Murasugi, Skinya; Shikae, Sadao; Nakagawa, Masaya; and Kabumoto, Tsutomu, 5,020,842, Cl. 294-2.000.
- Wash, Michael L.: *See—*
  - Robison, Gary L.; and Wash, Michael L., 5,021,820, Cl. 355-40.000.
- Washington University: *See—*
  - Allen, Paul M.; and Unanue, Emil R., 5,021,551, Cl. 530-345.000.
  - Lichtman, Jeffrey W.; Pepose, Jay S.; and Dave, Rakhal, 5,020,891, Cl. 350-527.000.
- Washisu, Koichi; Ohnuki, Ichiro; and Nagata, Toru, to Canon Kabushiki Kaisha. Image stabilizing optical device 5,020,369, Cl. 73-517.00A.
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  - Kamezaki, Hisamitsu; Suenaga, Masashi; Saito, Osamu; Iuchi, Shin-ichiro; Watanabe, Hitoshi; Fujiwara, Hideo; and Tuburaya, Yoshitane, 5,021,276, Cl. 428-64.000.
- Watanabe, Keiji: *See—*
  - Nishio, Hiroaki; Kato, Akira; Sato, Michitaka; and Watanabe, Keiji, 5,021,213, Cl. 419-36.000.
- Watanabe, Kenjiro: *See—*
  - Abe, Tsutomu; Ebisawa, Isao; Watanabe, Kenjiro; and Karita, Seiichiro. 5,021,809, Cl. 346-140.00R.
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- Watanabe, Michihiro; Sato, Kazutaka; Zen, Munetoshi; Ato, Kazuhiko; Watanabe, Yoshinobu; and Taguchi, Sadayoshi, to Hitachi, Ltd.; and

VOL
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- Tanaka Matthey Co., Ltd. Thick film resistor material and thermal head obtained therefrom. 5,021,194, Cl. 252-518.000.
- Watanabe, Nobuhisa, to Sony Corporation. Device for use in developing and testing a one-chip microcomputer. 5,021,996, Cl. 364-900.000.
- Watanabe, Yoshiaki: *See—*
  - Tanaka, Sakae; Watanabe, Yoshiaki, Shirai, Katsuo; and Ogiwara, Yoshihisa, 5,021,850, Cl. 357-23.700.
- Watanabe, Yoshinobu: *See—*
  - Watanabe, Michihiro; Sato, Kazutaka, Zen, Munetoshi; Ato, Kazuhiko; Watanabe, Yoshinobu, and Taguchi, Sadayoshi, 5,021,194, Cl. 252-518.000.
- Wataze, Manabu; and Sakayori, Takao, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device. 5,021,844, Cl 357-23.300.
- Watkins, David R.: *See—*
  - Dallas, David; and Watkins, David R., 5,020,663, Cl 206-338.000.
- Watkins, Joseph J.: *See—*
  - Fagerburg, David R.; Rule, Mark; Watkins, Joseph J.; and Lawrence, Paul B., 5,021,546, Cl. 528-389.000.
- Watkins, Randall D.: *See—*
  - Brow, Richard K.; and Watkins, Randall D., 5,021,307, Cl 429-184.000.
- Watkins, William L. H.: *See—*
  - Chattha, Mohinder S.; Watkins, William L. H.; and Gandhi, Haren S., 5,021,389, Cl. 502-303.000.
- Watson, Ian: *See—*
  - Watson, Paul; Woods, John V.; and Watson, Ian, 5,021,942, Cl. 364-200.000.
- Watson, Paul; Woods, John V.; and Watson, Ian, to International Computers Limited. Data processing system with packets specifying functions and arguments. 5,021,942, Cl. 364-200.000.
- Watts, Lucille M. Basket grass container. 5,020,672, Cl. 206-575.000.
- Weaver, H Joseph: *See—*
  - Sommargren, Gary E.; and Weaver, H. Joseph, 5,022,061, Cl 378-84.000.
- Webasto AG Fahrzeugtechnik: *See—*
  - Bienert, Horst; Hirschberger, August; Schleicher, Bernd; Igel, Richard; and Meier, Kurt, 5,020,850, Cl. 296-223.000.
  - Schaale, Klaus; Schoenberger, Hermann; and Sperl, Johann, 5,020,991, Cl. 431-319.000.
- Webber, David W.; and Kangas, Sandra E., to Travelmation Corporation. Trip planner optimizing travel itinerary selection conforming to individualized travel policies. 5,021,953, Cl. 364-407.000.
- Weber, Earl P. Holder for extension cords or the like. 5,020,759, Cl. 248-309.200.
- Weckman, Robert L.: *See—*
  - Doan, Frank W.; and Weckman, Robert L., 5,020,342, Cl. 70-14.000.
- Wedel, Gregory L.; and Roerig, Arnold J., to Beloit Corporation. Vacuum guide roll apparatus. 5,020,238, Cl. 34-16.000.
- Weedman, Gail H. Psychology game. 5,020,804, Cl. 273-249.000.
- Wegmann, Urs; and Koller, Albert, to Balzers Aktiengesellschaft. Process and system for the control of the focusing of a beam of monopolar charged particles. 5,021,669, Cl. 250-396.0ML.
- Weihrauch, Georg: *See—*
  - Hollenberg, Detlef; Schneider, Hans; and Weihrauch, Georg, 5,020,552, Cl. 132-265.000.
- Weinberger, Scot R.; and Hoppe, Thomas W., to Spectra-Physics, Inc. Remote optical path for capillary electrophoresis instrument. 5,021,646, Cl. 250-227.110.
- Weinmann, Hanns-Joachim: *See—*
  - Gries, Heinz; Rosenberg, Douwe; Weinmann, Hanns-Joachim; Speck, Ulrich; Mutzel, Wolfgang; Hoyer, Georg-Alexander; and Pfeiffer, Heinrich, deceased, 5,021,236, Cl. 424-9.000.
- Weinstock, Leonard M.: *See—*
  - King, Anthony O.; Anderson, Robert K.; Shuman, Richard E.; and Weinstock, Leonard M., 5,021,575, Cl. 546-77.000.
- Weismuller, Thomas P.; and Younger, Charles R., to Rockwell International Corporation. Apparatus and method for contactless measurement of coating thickness. 5,021,655, Cl. 250-308.000.
- Weitek Corporation: *See—*
  - Hu, Larry; Chuk, Ting; McLeod, John; Birman, Mark; Samuels, Allen; and Chu, George K., 5,021,985, Cl. 364-748.000.
- Wella Aktiengesellschaft: *See—*
  - Aeby, Johann; Mager, Herbert; and Konrad, Eugen, 5,021,066, Cl 8-408.000.
- Wellcome Foundation Limited, The: *See—*
  - Eitner, Joseph G., Jr.; and Tice, Robert J., Jr., 5,020,689, Cl. 222-1.000.
- Weller, Mike: *See—*
  - Floren, Carl E.; Weller, Mike; and Logman, Timothy M., 5,020,934, Cl. 403-306.000.
- Wellington Leisure Products, Inc.: *See—*
  - Ott, Arthur, 5,021,017, Cl. 441-70.000.
- Welsh, Robert E.: *See—*
  - Knepp. James E.; Welsh, Robert E.; Miller, James A.; and Miller, Raymond, 5,020,350, Cl. 72-45.000.
- Welton, Henry P.: *See—*
  - Fischer, Rich; Silva, Richard; and Welton, Henry P., 5,021,254, Cl. 426-482.000.
- Wenczl, Ernest: *See—*
  - Vago, Otto Z.; and Wenczl, Ernest, 5,020,512, Cl. 126-350.00R.
- Wendel, Glenn R.: *See—*
  - Stecklein, Gary L.; and Wendel, Glenn R., 5,020,826, Cl. 280-707.000.
- Wenger Manufacturing, Inc.: *See—*
  - Singer, Roy E., 5,020,239, Cl. 34-57.00R.
- Werner, William A Fish actuated ice fishing signaling device and method of using it. 5,020,263, Cl. 43-17.000.
- West, Kenneth J.; and Slater, Andrew, to Haden Schweitzer Corporation Wet scrubber apparatus and paint spraybooth in combination with wet scrubber apparatus. 5,020,470, Cl 118-326.000.
- West, Thomas W.: *See—*
  - Norton, William E.; Belcher, Jewell G., Jr.; Carden, James R , and West, Thomas W., 5,021,065, Cl 623-63.000.
- Westeppe, Uwe: *See—*
  - Serini, Volker; Freitag, Dieter; Idel, Karsten-Josef, Westeppe Uwe; Grigo, Ulrich; and Paetz, Klaus-Christian, 5,021,542, Cl 528-204.000.
- Westinghouse Electric Corp.: *See—*
  - Alkire, Gerald R.; Dailey, George F.; and Fischer, Mark W., 5,020,234, Cl. 33-656.000.
  - Bluzer, Nathan, 5,021,658, Cl. 250-336.200.
  - Gilmour, John E., 5,022,015, Cl. 367-124.000.
  - Przybysz, John X., 5,021,867, Cl. 357-71.000.
  - Rizzi, John J.; and Smith, Joseph J., 5,020,752, Cl. 248-162 100
  - Ruka, Roswell J.; and Spengler, Charles J., 5,021,304, Cl 429-30.000.
  - Snyder, Thomas S ; Stoltz, Richard A.; and Wagner, George R , 5,021,401, Cl. 505-1.000.
  - Viscovich, Paul W.; and Martin, James A , 5,020,589, Cl 165-112.000.
- Weston, John D.: *See—*
  - Phillips, Joseph R.; Weston, John D.; and Meredith, Michael D , 5,021,125, Cl. 162-232.000.
- Westvaco Corporation: *See—*
  - Crews, Everett, 5,021,538, Cl. 528-129.000.
- Wevers, Henk W.; and Rudan, John F., to Queen's University at Kingston. Prosthetic patello-femoral joint. 5,021,061, Cl. 623-20.000.
- Wexelblat, Alan D.; and Fairchild, Kim M., to Microelectronics and Computer Technology Corporation. Method and system for generating dynamic, interactive visual representations of information structures within a computer. 5,021,976, Cl. 364-521.000.
- Weyer, Paul P. Rotary servo actuator with internal valve. 5,020,417, Cl 91-375.00R.
- Weyerhaeuser Company: *See—*
  - Iskra, Michael J., 5,021,050, Cl. 604-379.000.
- Weyrauch, Adolf; Dorband, Bernd; and Schlipf, Ferdinand, to Carl-Zeiss-Stiftung. Eyepiece and lens cap for a sighting telescope 5,020,894, Cl. 350-587.000.
- Wheaton, Larry B., to Plessey Overseas Limited. Universal cell for bipolar NPN and PNP transistors and resistive elements. 5,021,856, Cl. 357-40.000.
- Wheland, Robert C., to Du Pont de Nemours, E. I., and Company. Poly(perfluoroether)acyl peroxides. 5,021,516, Cl. 525-403.000.
- Whellock, John G.; and Goodbody, Jonathan. Method of effecting a bioreaction. 5,021,069, Cl. 44-622.000.
- Whipple, Raymond D.: *See—*
  - Vairo, Daniel M., and Whipple, Raymond D., 5,020,739, Cl 244-75.00R
- Whipple, Robert L.: *See—*
  - Hamar, Douglas J.; Jayaraman, Gopal; Granroth, Richard; Whipple, Robert L.; and Evensen, Harold A., 5,020,286, Cl 52-585.000.
- White Consolidated Industries, Inc.: *See—*
  - Desent, Nash S.; and Collins, Imack L., 5,020,223, Cl. 30-276.000.
  - Haupt, Eugene J., 5,020,224, Cl. 30-276.000.
- White, John J., to Midland Manufacturing Corp. Tank-level gauge 5,020,367, Cl. 73-319.000.
- Whiteford, Carlton L. Illuminated level. 5,020,232, Cl. 33-348.200.
- Whitehead, Lance W.: *See—*
  - Droge, David A.; Lyerly, Jeffrey B.; Mott, William E.; Whitehead, Lance W.; and Yenik, Matthew G., 5,020,789, Cl. 271-225.000.
- Whitener, Gary. Edge protector with enhanced gripping member. 5,021,279, Cl. 428-100.000.
- Whitney, Solon G.; and Kleiss, Harold J., to American Pembroke, Inc. Method of removing and crystallizing cation resin absorbed calcium and magnesium. 5,021,216, Cl. 521-26.000.
- Wichmann, Carol F.: *See—*
  - Sesin, David F.; Liesch, Jerrold M.; Fountoulakis, Jimmy M , Masurekar, Prakash S.; Kaplan, Louis; and Wichmann, Carol F., 5,021,403, Cl. 514-9.000.
- Wideman, Lawson G.: *See—*
  - Sandstrom, Paul H.; Wideman, Lawson G.; and Segatta, Thomas J , 5,021,492, Cl. 524-274.000.
- Wiech, Norbert L.: *See—*
  - Carr, Albert A.; and Wiech, Norbert L., 5,021,428, Cl 514-317.000
- Wier, Manfred: *See—*
  - Linder, Ernst; Rembold, Helmut; and Wier, Manfred, 5,020,498, Cl. 123-450.000.
- Wiesler, Dorothy. Battery cable connector. 5,021,013, Cl. 439-755.000.
- Wijkstrom, Karin. X-ray film holder. 5,022,065, Cl. 378-168.000.
- Wild, Ernst, to Robert Bosch GmbH. Method and control device for controlling the amount of fuel for an internal combustion engine. 5,020,502, Cl. 123-489.000.
- Wiles, William W., Jr.: *See—*
  - Young, William R.; Rivoli, Anthony L.; and Wiles, William W., Jr., 5,021,359, Cl. 437-21.000.
- Wilfong, Harry B., Jr.: *See—*
  - Vrooman, Carll D.; and Wilfong, Harry B., Jr., 5,020,750, Cl. 248-97.000.
- Wilhelm, Joseph R., to Sejus Corporation. Printer mounting arrangement. 5,020,926, Cl. 400-54.000.

- Wilkerson, Gary C. Solution for neutralizing caustic effects of alkaline cementitious materials on human skin. 5,021,455, Cl. 514-574.000.
- Wilkinson, William H., to Gas Research Institute. Localized air dehumidification system. 5,020,334, Cl. 62-271.000.
- Will, Norbert: *See—*
  - Schweikert, Wilhelm; and Will, Norbert, 5,021,927, Cl. 361-514.000.
- Willett, John A. Baker's oven. 5,021,635, Cl. 219-408.000.
- Williams, David Stanley, to Boart International Limited. Wire line core drilling apparatus. 5,020,612, Cl. 175-234.000.
- Williams International Corporation: *See—*
  - Brophy, Sean P.; and Stephens, Richard D., 5,020,314, Cl. 60-39.141.
- Williams, Stuart J., to Grumman Aerospace Corporation. Wire twisting machine for electrical harnesses. 5,020,576, Cl. 140-149.000.
- Williams, Thomas D.: *See—*
  - Gawler, David A.; Gilham, Dennis T.; and Williams, Thomas D., 5,020,428, Cl. 101-91.000.
- Williamson, John G Off-shore fishing lure. 5,020,266, Cl. 43-42.390.
- Willms, Lothar: *See—*
  - Koch, Volker; Willms, Lothar; Fuss, Andreas; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,021,578, Cl. 546-296.000.
- Wilson, Craig A.; Olson, Kurt G.; Koren, Jeffrey G.; Longhini, Debra M.; Dugan, Carol S.; and Jozwiak, Edward L., Jr., to PPG Industries, Inc. Method for treatment of electrodeposition bath. 5,021,135, Cl. 204-180.800.
- Wilson, Jeffrey L.: *See—*
  - Rust, Marcus D.; Wilson, Jeffrey L.; and Towne, Harmon L., 5,020,246, Cl. 34-236.000.
- Wilson, Kenneth E.: *See—*
  - Joshua, Henry; Wilson, Kenneth E.; Schwartz, Michael S.; Lee, Ta J.; and Stokker, Gerald E., 5,021,453, Cl. 514-510.000.
- Wilson, Monti R. Method and apparatus for fast registration using crosshair register marks. 5,022,089, Cl. 382-44.000.
- Wilson Sporting Goods Co.: *See—*
  - Neuhalfen, Mark, 5,020,156, Cl. 2-2.000.
- Windemuller, Steven C.: *See—*
  - Herrema, Robert T.; and Windemuller, Steven C., 5,020,272, Cl. 47-33.000.
- Winter, Clarence P. Gate latch. 5,020,840, Cl. 292-264.000.
- Winter, Joseph; Mahulikar, Deepak; and Mandigo, Frank N., to Olin Corporation. Projectile having improved baseplug. 5,020,439, Cl. 102-518.000.
- Wirth, David D., to Eli Lilly and Company. Process for preparing ceftazidime pentahydrate. 5,021,564, Cl. 540-225.000.
- Wirth, David J.; Zaragoza, Mike M.; and Rosner, Jon, to Boeing Company, The. Common rack system for anodizing and painting large parts. 5,020,677, Cl. 211-113.000.
- Wirth, Hermann O.: *See—*
  - Gunther, Peter; Wirth, Hermann O.; and Endlich, Wilhelm, 5,021,474, Cl. 524-14.000.
- Wisconsin Alumni Research Foundation: *See—*
  - Suomi, Verner K., 5,020,919, Cl. 374-29.000.
- Wiseman, Timothy R., Sr.: *See—*
  - Lewis, Milton A., Jr.; Mason, Jeffrey S.; Swinford, Carson B.; and Wiseman, Timothy R., Sr., 5,020,161, Cl. 2-164.000.
- Wisser, Georg: *See—*
  - Moritz, Werner; Jud, Volker; and Wisser, Georg, 5,020,313, Cl. 59-78.100.
- Wittke, Rudolp H. Four-wheel drive tractor. 5,020,627, Cl. 180-234.000.
- Wittner, Ernest: *See—*
  - Davis, Myron F.; Martin, Randall W.; Nomura, Hideo; Pollitt, Richard F.; Wittner, Ernest; and Yoshikawa, Wataru, 5,021,922, Cl. 361-380.000.
- Wodarz, Dennis: *See—*
  - Archie, Kent C.; Fonorow, Owen R.; McGould, Mary C.; McLear, Robert E., III; Read, Edward C.; Schaefer, Edwin M., III; Schwab, Suzanne E.; and Wodarz, Dennis, 5,021,997, Cl. 364-900.000.
- Wojcik, Tadeusz P. Smokeless ashtray with controlled combustion chambers. 5,020,549, Cl. 131-231.000.
- Wold, Gerald G.: *See—*
  - Laugal, James A.; Martin, Glenn E.; St. Aubin, Donald L.; and Wold, Gerald G., 5,021,470, Cl. 523-414.000.
- Wolfson, Lawrence S.; Pearl, Kevin A.; and Moskwa, Russell M., to Gerber Garment Technology, Inc. Apparatus with moveable pins for spreading and cutting layups of sheet material. 5,020,405, Cl. 83-374.000.
- Wolpert, Stephen M., to Gelman Sciences, Inc. Strongly acidic microporous membranes for cation exchange. 5,021,160, Cl. 210-500.350.
- Wong, Patrick S. L.: *See—*
  - Barclay, Brian L.; Childers, Jerry D.; Wright, Jeri; Place, Virgil A.; and Wong, Patrick S. L., 5,021,053, Cl. 604-892.100.
- Wong, Patrick T. T.; Narang, Saran A.; and Sung, Wing L., to National Research Council of Canada. Non-intrusive process for monitoring the production of recombinant proteins. 5,021,337, Cl. 435-29.000.
- Wong, Pui K., to Shell Oil Company. Crosslinked bisphenol containing arylcyclobutene alkyl ethers and cured compositions therefrom. 5,021,528, Cl. 526-280.000.
- Wong, Robert K. W. Plant hanger. 5,020,274, Cl. 47-67.000.
- Wong, Stephen S.: *See—*
  - Bortz, Robert W.; Garwood, William E.; Le, Quang N.; and Wong, Stephen S., 5,021,142, Cl. 208-58.000.
- Wood, Marsha B. Inflatable handicapped chair. 5,020,168, Cl. 4-573.000.
- Woodall, Jerry M.: *See—*
  - Kirchner, Peter D.; Warren, Alan C.; Woodall, Jerry M.; and Wright, Steven L., 5,021,365, Cl. 437-237.000.
- Woodings Industrial Corporation: *See—*
  - Woodings, Robert T., 5,020,780, Cl. 266-271.000.
- Woodings, Robert T., to Woodings Industrial Corporation. Quick connect-disconnect coupling for blast furnace tap hole drill bit. 5,020,780, Cl. 266-271.000.
- Woods, John G.; and Rooney, John M., to Loctite (Ireland) Ltd. Thiol-/ene compositions. 5,021,512, Cl. 525-328.200.
- Woods, John V.: *See—*
  - Watson, Paul; Woods, John V.; and Watson, Ian, 5,021,942, Cl. 364-200.000.
- Woods, Mary F.: *See—*
  - Ratcliffe, Ronald W.; and Woods, Mary F., 5,021,565, Cl. 540-302.000.
- Woods, Ray A. Structural building components incorporating integrated hyperbolic paraboloid elements. 5,020,287, Cl. 52-81.000.
- Wozniak, Don S., to Schering Berlin Polymers Inc. Adhesion and paintability improvements in PVC plastisols at low bake temperatures. 5,021,482, Cl. 524-100.000.
- WPM, Inc.: *See—*
  - Agresta, Frank J., 5,020,569, Cl. 137-544.000.
- Wridt, Gerald A., to Snap-on Tools Corporation. Freeze plug installer head and tool kit including same. 5,020,205, Cl. 29-275.000.
- Wright, Jeri: *See—*
  - Barclay, Brian L.; Childers, Jerry D.; Wright, Jeri; Place, Virgil A.; and Wong, Patrick S. L., 5,021,053, Cl. 604-892.100.
- Wright, John O., to GTE Products Corporation. Soldered connector for a shielded coaxial cable. 5,021,010, Cl. 439-578.000.
- Wright, Michael C.: *See—*
  - Meade, Roger; Schofield, Paul; and Wright, Michael C., 5,021,984, Cl. 364-709.160.
- Wright, Steven L.: *See—*
  - Kirchner, Peter D.; Warren, Alan C.; Woodall, Jerry M.; and Wright, Steven L., 5,021,365, Cl. 437-237.000.
- Wrightman, Ronald A. In log joint and machine for forming log joint. 5,020,289, Cl. 52-233.000.
- Wulf, Elmer B.; and Wulf, Mark E. Ski boot and ski boot-binding. 5,020,822, Cl. 280-613.000.
- Wulf, Mark E.: *See—*
  - Wulf, Elmer B.; and Wulf, Mark E., 5,020,822, Cl. 280-613.000.
- Wurl, Ernst; Hafner, Alfred; Paulsen, Jurgen; Marienfeld, Peter; and Grogor, Bruno, to Mannesmann AG. Process for removing the screw from the screw cylinder of a screw-type injection molding machine and a screw-type molding machine of correspondence configuration. 5,020,914, Cl. 366-79.000.
- Wynn Oil Company: *See—*
  - Eilowitz, Mark S.; Vataru, Marcel; Bayler, James L.; Labus, Rainer H.; and Lugosi, Laszlo G., 5,021,152, Cl. 210-712.000.
- Wyo-Ben, Inc.: *See—*
  - Brown, Richard K.; and Stichman, Robert W., 5,021,094, Cl. 106-803.000.
- X-Print, Inc.: *See—*
  - Resnick, Michael; and Saebeler, Walter, 5,021,042, Cl. 493-404.000.
- Xerox Corporation: *See—*
  - Mayo, James D.; Drappel, Stephen; Duff, James M.; Croucher, Melvin D.; and Lennon, John M., 5,021,318, Cl. 430-124.000.
  - Parker, Delmer G.; Allen, William M., Jr.; and Stark, Howard M., 5,021,838, Cl. 355-328.000.
  - Petropoulos, Mark; and Hammond, John M., 5,021,109, Cl. 156-137.000.
  - Yu, Robert C. U., 5,021,309, Cl. 430-58.000.
- Xsirius Photonics, Inc.: *See—*
  - Huth, Gerald C., 5,021,854, Cl. 357-30.000.
- Yagi, Masanori: *See—*
  - Ikeya, Kiyokazu; and Yagi, Masanori, 5,020,998, Cl. 439-266.000.
- Yagi, Tadashi; Noguchi, Masahiko; Kozuka, Hajime; Morishita, Mitsuharu; and Onishi, Masayoshi, to Mitsubishi Denki K.K. Power steering apparatus. 5,020,616, Cl. 180-79.100.
- Yale Security Inc.: *See—*
  - Anderson, Charles E.; and Miller, William C., 5,021,776, Cl. 340-825.310.
- Yamada, Akio; and Hayashi, Fumio, to Ishikawajima-Harima Heavy Industries Co., Ltd. System for controlling the rotating speed of a pneumatically driven spindle. 5,020,968, Cl. 415-36.000.
- Yamada, Fumiya: *See—*
  - Shimizu, Akira; Kurosawa, Atsushi; and Yamada, Fumiya, 5,021,904, Cl. 360-96.500.
- Yamada, Kunihiro: *See—*
  - Ito, Yasunobu; and Yamada, Kunihiro, 5,021,955, Cl. 364-424.100.
- Yamada, Masaru, to Koito Manufacturing Co., Ltd. Automotive headlamp having reduced chromatic aberration. 5,021,930, Cl. 362-61.000.
- Yamada, Toshihiro: *See—*
  - Yoshimura, Hiroshi; Takemoto, Kazuo; and Yamada, Toshihiro, 5,021,956, Cl. 364-424.100.
- Yamaguchi, Hideo: *See—*
  - Iida, Katsumi; Sakurai, Yoshihiko; Takano, Akihiko; Yamaguchi, Hideo; and Yano, Teruaki, 5,020,424, Cl. 98-2.010.
- Yamaguchi, Junichi; Takahashi, Izumi; and Matsumoto, Masafumi, to Fuji Xerox Co., Ltd. Copying apparatus having a consumable part. 5,021,828, Cl. 355-209.000.
- Yamaguchi, Nobuyuki, to Daiwa Seiko, Inc. Fishing reel anti-reverse mechanism. 5,020,738, Cl. 242-298.000.

VOL
1127
ISS
1
JE
4
1991
UMI

Yamaguchi, Susumu: *See—*
Yoshino, Tadashi; Yamaguchi, Susumu, Komae, Hitoshi; Ishiwata, Tetsuo; Yamauchi, Eiji, and Tanaka, Hiroshi, 5,021,897, Cl 360-72.200.
Yamaguchi, Toshio: *See—*
Nakajima, Nobuyuki; Yamaguchi, Toshio; and Kawashima, Yuji, 5,020,976, Cl. 417-295.000.
Yamaha Corporation: *See—*
Horino, Mamoru, 5,021,896, Cl. 360-70.000.
Kohdaka, Takayuki; Ishida, Katsuhiko; Takahashi, Toshiyuki; and Ogata, Takashi, 5,021,785, Cl. 341-138.000.
Yamaha Hatsudoki Kabushiki Kaisha: *See—*
Ohara, Osamu; Kawashima, Hiroshi; and Takata, Hiroshi, 5,020,440, Cl. 104-127.000.
Yamahira, Yoshiya; Fujioka, Keiji; Sato, Shigeji; and Takada, Yoshihiro, to Sumitomo Pharmaceuticals Company, Limited. Long-term sustained-release preparation. 5,021,241, Cl. 424-426.000.
Yamaichi Electric Mfg. Co., Ltd.: *See—*
Matsuoka, Noriyuki, 5,021,868, Cl. 357-74.000.
Yamakawa, Yasuhiro: *See—*
Yokoo, Toru; Kobane, Takashi; Seki, Akihiko; Yamakawa, Yasuhiro; and Kawakami, Yoshikazu, 5,020,877, Cl. 350-128.000.
Yamaki, Bunshiro: *See—*
Ito, Takahiro; Yamaki, Bunshiro, and Yamamoto, Yoshio, 5,021,859, Cl. 357-43.000.
Yamamoto Co., Ltd.: *See—*
Yamamoto, Tadayuki, 5,020,764, Cl. 248-529.000.
Yamamoto, Hirohiko: *See—*
Ohta, Tomozo; Nakano, Hiroshi; Higashi, Kazutada; and Yamamoto, Hirohiko, 5,021,790, Cl. 342-44.000.
Yamamoto, Kazuhito, to Ricoh Company, Ltd. Facsimile apparatus. 5,021,889, Cl. 358-440.000.
Yamamoto, Kenji; and Tadayoshi, Hiraki, to Kansai Paint Co., Ltd Finely divided gelled polymer and process for producing the same. 5,021,530, Cl. 526-323.200.
Yamamoto, Kenji: *See—*
Takarada, Mitsuhiko; Sato, Kazuharu; Yamamoto, Kenji; and Mori, Shigeru, 5,021,091, Cl. 106-287.160.
Yamamoto, Masanao; Unnai, Takaaki; Ehata, Shigeru; Hirai, Tadaaki; Sameshima, Kenji; Hiruma, Eikiyu; Suzuki, Shirou; Tanioka, Kenkichi, Yamazaki, Junichi; and Shidara, Keeichi, to Hitachi Ltd.; and Nippon Hoso Kyokai Method of fabricating an image pick-up tube and target section used therewith. 5,021,705, Cl. 313-106.000.
Yamamoto, Soichiro, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide, reducing agent and polymerizable compound. 5,021,323, Cl. 430-292.000.
Yamamoto, Tadayuki, to Yamamoto Co., Ltd Pole ballasting device 5,020,764, Cl. 248-529.000.
Yamamoto, Tatsushi: *See—*
Michijima, Masashi; Kadono, Masaru; and Yamamoto, Tatsushi, 5,020,212, Cl. 29-603.000.
Yamamoto, Toshiyuki: *See—*
Maeda, Tetsuya; Yamamoto, Toshiyuki; Takase, Mituo; Sasaki, Kazuya; Airka, Tadashi, Yokoo, Mamoru; Hashimoto, Rieko; Amemiya, Kouji; and Koshikawa, Sakae, 5,021,458, Cl. 514-655.000.
Yamamoto, Yoshio: *See—*
Ito, Takahiro; Yamaki, Bunshiro; and Yamamoto, Yoshio, 5,021,859, Cl. 357-43.000.
Yamanaka, Tsutomu; Seki, Toshio; Nakajima, Tohru; and Yaoka, Osamu, to Yoshitomi Pharmaceutical Industries, Ltd. Benzopyran compound and its pharmaceutical use. 5,021,432, Cl. 514-337.000.
Yamanashi, Masami, to Tokyo Electric Co., Ltd. Printer with improved image printing function. 5,021,975, Cl. 364-519.000.
Yamano, Masaru: *See—*
Kojima, Takao, Yamano, Masaru; and Sawada, Toshiki, 5,020,499, Cl. 123-479.000.
Yamashina, Mitunori: *See—*
Hirano, Yasuhiro; Yamashina, Mitunori; and Etoh, Tetsuo, 5,021,724, Cl. 318-800.000.
Yamashita, Hiroki: *See—*
Kawata, Atsumi; Itoh, Hiroyuki; Tanaka, Hirotoshi; Yoshihara, Kazuhiro; and Yamashita, Hiroki, 5,021,686, Cl. 307-448.000.
Yamashita, Tatsumaro; and Nagai, Seiichi, to Alps Electric Co., Ltd. Tape guide driving device for rotating head type tape player. 5,021,900, Cl 360-85.000.
Yamashita, Youji; and Kojima, Masakatu, to Kabushiki Kaisha Toshiba. Crystal pulling apparatus and crystal pulling method using the same. 5,021,225, Cl. 422-249.000.
Yamatake-Honeywell Co., Ltd.: *See—*
Kamiunten, Shoji; and Hisanaga, Tetsuo, 5,020,373, Cl 73-861 220
Yamauchi, Eiji: *See—*
Yoshino, Tadashi; Yamaguchi, Susumu, Komae, Hitoshi; Ishiwata, Tetsuo; Yamauchi, Eiji; and Tanaka, Hiroshi, 5,021,897, Cl. 360-72.200.
Yamauchi, Kosaku; Muramatsu, Akihiko; and Kaku, Shinji, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Motor bicycle provided with article accommodating apparatus. 5,020,625, Cl. 180-219.000.
Yamaya, Masaaki; Sato, Kazuharu; and Takahashi, Masayuki, to Shin-Etsu Chemical Co., Ltd Primer composition. 5,021,266, Cl 427-379.000.
Yamazaki, Junichi: *See—*
Yamamoto, Masanao; Unnai, Takaaki; Ehata, Shigeru; Hirai, Tadaaki; Sameshima, Kenji; Hiruma, Eikiyu; Suzuki, Shirou; Tanioka, Kenkichi; Yamazaki, Junichi; and Shidara, Keeichi, 5,021,705, Cl 313-106.000.
Yamazaki, Sakae: *See—*
Miyake, Sanae; Kasai, Masaaki; Yamazaki, Sakae; and Murashita, Takato, 5,020,220, Cl. 30-2.000.
Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd FET with a super lattice channel. 5,021,839, Cl. 357-4 000.
Yanagi, Masaaki: *See—*
Sashida, Minoru; Yanagi, Masaaki; Okitsu, Katsuhiko; and Higuchi, Hirokazu, 5,020,900, Cl. 353-26.00R
Yanagisawa, Yoshihiro: *See—*
Matsuda, Hiroshi; Kawada, Haruki; Sakai, Kunihiro; Takimoto, Kiyoshi; Kawade, Hisaaki; Yanagisawa, Yoshihiro, and Morikawa, Yuko, 5,020,881, Cl 350-333.000.
Yanai, Shinji: *See—*
Sasaki, Makoto; Ebishi, Nobuo; and Yanai, Shinji, 5,021,614, Cl 200-5.00R.
Yane, Daryl J. Plastic impeller pump and filtration unit for semi-conductor etching system. 5,021,151, Cl. 210-167.000.
Yang, Mang M. Spinning top game kit 5,020,798, Cl. 273-440 000.
Yano, Seiki: *See—*
Kawanishi, Hidenori; Hayashi, Hiroshi; Morimoto, Taiji; Kaneiwa, Shinji; Miyauchi, Nobuyuki; and Yano, Seiki, 5,022,037, Cl 372-49.000.
Yano, Teruaki: *See—*
Iida, Katsumi; Sakurai, Yoshihiko; Takano, Akihiko; Yamaguchi, Hideo; and Yano, Teruaki, 5,020,424, Cl 98-2.010
Yaoka, Osamu: *See—*
Yamanaka, Tsutomu; Seki, Toshio; Nakajima, Tohru; and Yaoka, Osamu, 5,021,432, Cl. 514-337.000.
Yarbrough, Roy; Haacke, Ernest D.; and Jansson, Lars G., to National Semiconductor Corporation High speed inverting hysteresis TTL buffer circuit. 5,021,687, Cl 307-456.000.
Yasuda, Akira: *See—*
Nakakoji, Hisatada; Nakajima, Seiji; Yasuda, Akira; and Kumura, Hajime, 5,021,301, Cl. 428-659.000.
Yasuda, Atsushi: *See—*
Yasui, Kotaro; Kojima, Asato; Yasuda, Atsushi; and Sato, Takanori, 5,021,347, Cl. 435-235.000.
Yasui, Kotaro; Kojima, Asato; Yasuda, Atsushi; and Sato, Takanori, to Nippon Zeon Co., Ltd.; Director-General of National Institute of Health; and Tokyo Metropolitan Institute for Neuroscience. Recombinant vaccinia virus expressing E-protein of Japanese encephalitis virus. 5,021,347, Cl 435-235.000.
Yasukawa, Makoto: *See—*
Igarashi, Yoshinori; Yasukawa, Makoto; Ariga, Yasuo; Kobayashi, Ichiro; and Horiuchi, Satoru, 5,021,677, Cl. 250-574.000.
Yatsuo, Tsutomu: *See—*
Oikawa, Saburo; Yatsuo, Tsutomu; and Satou, Yukimasa, 5,021,855, Cl. 357-38.000.
Yazaki Corporation: *See—*
Amano, Masataka, 5,021,611, Cl. 174-88.00R
Ohtaka, Kazuto; and Inaba, Shigemitsu, 5,021,003, Cl. 439-357.000.
Yazu, Shuji: *See—*
Fujita, Nohuhiko; Itozaki, Hideo; Tanaka, Saburo; Yazu, Shuji, and Jodai, Tetsuji, 5,021,396, Cl. 505-1.000.
Yee, Ian Y. K : *See—*
Hsu, Hsyh-Min; and Yee, Ian Y K., 5,021,399, Cl. 505-1 000.
Yenik, Matthew G.: *See—*
Droge, David A., Lyerly, Jeffrey B.; Mott, William E., Whitehead, Lance W.; and Yenik, Matthew G., 5,020,789, Cl. 271-225.000.
Yin Leung, Frederick K : *See—*
Henderson, Richard D., and Yin Leung, Frederick K , 5,022,056, Cl. 375-119.000.
Yoakim, Christiane: *See—*
Guindon, Yvan; Yoakim, Christiane; Gillard, John W , and Girard, Yves, 5,021,447, Cl. 514-411.000.
Yocum, David C. High lift jack. 5,020,777, Cl. 254-95.000.
Yoda, Akira, to Fuji Photo Film Co., Ltd. Apparatus and method for controlling the quantity of developer delivered to a film processing head. 5,021,312, Cl. 430-97.000.
Yokoi, Takeshi; and Horikawa, Yoshihito, to Olympus Optical Co., Ltd. Ultrasonic endoscope apparatus. 5,020,539, Cl. 128-662.060.
Yokoi, Toshio: *See—*
Fujita, Yuuji; Sezume, Tadashi; Kitano, Kitsusho; Narukawa, Kiyotada; Mikami, Takashi; Kawamura, Tetsuya; Sato, Shigeru; Nishio, Takeyoshi; Yokoi, Toshio; and Nomura, Takao, 5,021,504, Cl. 525-57.000.
Yokokura, Hisao: *See—*
Era, Susumu; Iwasaki, Kishiro; Yokokura, Hisao; Hanawa, Yasuo, Kondo, Katsumi; Nakada, Tadao; Kitamura, Teruo; and Mukoh, Akio, 5,020,883, Cl. 350-350.00S.
Yokoo, Mamoru: *See—*
Maeda, Tetsuya, Yamamoto, Toshiyuki; Takase, Mituo; Sasaki, Kazuya; Airka, Tadashi; Yokoo, Mamoru; Hashimoto, Rieko; Amenuya, Kouji; and Koshikawa, Sakae, 5,021,458, Cl 514-655.000.
Yokoo, Toru; Kobane, Takashi; Seki, Akihiko; Yamakawa, Yasuhiro; and Kawakami, Yoshikazu, to Pioneer Electronic Corp. Rear projection screen. 5,020,877, Cl. 350-128.000.
Yokosawa, Koichi; and Kohno, Hideki, to Hitachi, Ltd. Superconductor type radio frequency with adjustable inductance magnetic flux measuring circuit. 5,021,739, Cl. 324-248.000.
Yokoshima, Minoru, Ohkubo, Tetsuo; and Kiyomoto, Masayuki, to Nippon Kayaku Kabushiki Kaisha. Photocurable di-(meth)acrylic acid ester resin coating composition. 5,021,467, Cl. 522-96.000.
Yokouchi, Hisatake; Onodera, Yoichi; Funo, Takakazu; and Tsuneoka, Masayuki, to Hitachi Medical Corporation. Multiple-mode scanning and beam current control x-ray TV apparatus. 5,022,063, Cl. 378-99.000.

Yokoyama, Naoki; and Fujii, Toshio, to Fujitsu Limited. Semiconductor quantum effect device having negative differential resistance characteristics. 5,021,863, Cl. 357-57 000.
Yokoyama, Nobuyoshi: *See—*
Ishiguro, Katsusuke; and Yokoyama, Nobuyoshi, 5,020,987, Cl. 431-1.000.
Yokozaki, Hiroshi: *See—*
Tahara, Eiichi; Ochiai, Atsushi; Yokozaki, Hiroshi; Hozumi, Toyoharu; and Kyo, Eikai, 5,021,553, Cl. 530-387.000.
Yoshida, Atsushi; and Suzuki, Takanao, to NEC Corporation. Timing signal recovery circuit for a data transmission system. 5,022,058, Cl. 375-120.000.
Yoshida, Hiroshi; Saito, Sotoshi; and Ito, Tatsuo, to Yoshida Kogyo K. K. Method of manufacturing slide fastener chain bearing patterns. 5,020,206, Cl. 29-408.000.
Yoshida, Isao; Inoue, Hidetoshi; and Arai, Kanji, to Oki Electric Industry Co., Ltd. Method of and apparatus for facsimile communications. 5,021,890, Cl. 358-405.000.
Yoshida Kogyo K K.: *See—*
Yoshida, Hiroshi; Saito, Sotoshi; and Ito, Tatsuo, 5,020,206, Cl 29-408.000.
Yoshida, Shigemi: *See—*
Takeuchi, Tomio; Aoyagi, Takaaki, Hamada, Masa; Naganawa, Hiroshi; and Yoshida, Shigemi, 5,021,549, Cl. 530-330.000.
Yoshida, Takayoshi: *See—*
Tochinai, Chiaki; Kohara, Tadanao; Budo, Sadayoshi; Masuda, Hiroaki; and Yoshida, Takayoshi, 5,021,499, Cl. 524-487.000.
Yoshida, Tarehiro: *See—*
Sakakibara, Kenzou; Yoshida, Tarehiro; and Matsumoto, Koichi, 5,022,072, Cl. 379-100.000.
Yoshida, Toshihiko: *See—*
Kita, Toshiro; Genba, Susumu; Takemoto, Masato; Tatsumi, Takashi; Itoga, Toshiyuki; Iizuka, Yutaka; Tominaga, Satoshi; Higashiyama, Mikio; Tanimoto, Akira; Okamoto, Shinji; and Yoshida, Toshihiko, 5,021,892, Cl. 358-468.000.
Yoshihara, Kazuhiro: *See—*
Kawata, Atsumi; Itoh, Hiroyuki; Tanaka, Hirotoshi; Yoshihara, Kazuhiro; and Yamashita, Hiroki, 5,021,686, Cl. 307-448.000.
Yoshikai, Tamio, to Sharp Kabushiki Kaisha. Developing unit. 5,020,471, Cl 118-653.000.
Yoshikawa, Wataru: *See—*
Davis, Myron F.; Martin, Randall W.; Nomura, Hideo; Pollitt, Richard F.; Wittner, Ernest; and Yoshikawa, Wataru, 5,021,922, Cl. 361-380.000.
Yoshimi, Toshiaki: *See—*
Hattori, Mitsutaka; Yoshimi, Toshiaki; and Fukushima, Toshio, 5,020,565, Cl. 137-207.000.
Yoshimura, Hiroshi; Takemoto, Kazuo; and Yamada, Toshihiro, to Mazda Motor Corporation. Control systems for vehicle engines coupled with automatic transmissions. 5,021,956, Cl. 364-424.100.
Yoshino, Masato, to Sumitomo Electric Industries, Ltd. Antilock control device. 5,020,863, Cl. 303-96.000.
Yoshino, Tadashi; Yamaguchi, Susumu; Komae, Hitoshi; Ishiwata, Tetsuo; Yamauchi, Eiji; and Tanaka, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Memory system for recording and reproducing block unit data. 5,021,897, Cl. 360-72.200.
Yoshino, Yasuhisa; Kato, Yoshifumi; Tamatsu, Yukimasa; and Takeda, Kenji, to Nippon Soken, Inc.; and Nippondenso Co., Ltd. Brake control apparatus in diagonal braking pressure supply system for use in motor vehicles. 5,021,957, Cl. 364-426.010.
Yoshitomi Pharmaceutical Industries, Ltd.: *See—*
Yamanaka, Tsutomu; Seki, Toshio; Nakajima, Tohru; and Yaoka, Osamu, 5,021,432, Cl. 514-337.000.
Young, Derek W.: *See—*
Pilgrim, William R.; Young, Derek W., Tait, Brian S.; Crawley, Graham C.; Edwards, Philip N.; and Hill, George B., 5,021,414, Cl. 514-237.500.
Young, James H.: *See—*
Luydkx, Leon A.; Jackman, Joseph R.; Robison, James W., Jr.; and Young, James H., 5,021,086, Cl. 75-315.000.
Young, James R.: *See—*
Peppers, Norman A.; Young, James R.; Pierce, Gerald A., and Myers, Gregory K., 5,022,087, Cl. 382-32.000.
Young, William R.; Rivoli, Anthony L.; and Wiles, William W., Jr., to Harris Corporation. Radiation hardened complementary transistor integrated circuits. 5,021,359, Cl. 437-21.000.
Younger, Charles R.: *See—*
Weismuller, Thomas P.; and Younger, Charles R., 5,021,655, Cl. 250-308.000.
Yu, Robert C. U., to Xerox Corporation. Multilayered photoreceptor with anti-curl containing particulate organic filler. 5,021,309, Cl. 430-58.000.
Yuan, Andy C.: *See—*
Fairbanks, John P.; and Yuan, Andy C., 5,021,679, Cl. 307-66.000.
Yuyama, Kohsuke, to Suzuki Manufacturing Co., Ltd. Blind stitch sewing machine and blind stitching method. 5,020,459, Cl. 112-178.000.
Zahnradfabrik Friedrichshafen AG: *See—*
Bader, Josef, 5,020,385, Cl. 74-333.000.
Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See—*
Takeuchi, Tomio; Aoyagi, Takaaki; Hamada, Masa; Naganawa, Hiroshi; and Yoshida, Shigemi, 5,021,549, Cl. 530-330.000.
Zaidan Hojin Handotai Kenkyu Sinkokai: *See—*
Nishizawa, Jun-ichi; Tamamushi, Takashige; Mitamura, Koichi; Takahashi, Hiroo; Mitsui, Kiyoo; Ikehara, Mitsuo; Wako, Toyota; and Maruyama, Sinpei, 5,021,936, Cl. 363-41.000.
Zaima, Fumiya: *See—*
Takeda, Mutsuhiko; Mizukami, Masamichi; Norisue, Yasumasa, Hagiwara, Isao; and Zaima, Fumiya, 5,021,197, Cl. 260-399.000.
Zak, Brian S., to Seagate Technology, Inc. Gimbal spring for supporting a magnetic transducer and making electrical contact therewith. 5,021,907, Cl. 360-104.000.
Zaragoza, Mike M.: *See—*
Wirth, David J.; Zaragoza, Mike M.; and Rosner, Jon, 5,020,677, Cl. 211-113.000.
Zastrow, Klaus D.: *See—*
Sieben, Roger L.; and Zastrow, Klaus D., 5,021,246, Cl. 426-13 000.
Zavracky, Paul M.: *See—*
Fan, John C.C.; Zavracky, Paul M.; Narayan, Jagdish; Allen, Lisa P.; and Vu, Duy-Phach, 5,021,119, Cl. 156-620.710.
Zaw Win, Vincent K.; and Chan, Andrew K , to Advanced Micro Devices, Inc. Voltage supply circuit for programming circuits of programmable logic arrays. 5,021,680, Cl. 307-243.000.
Zazzu, Victor: *See—*
Isham, Robert H.; and Zazzu, Victor, 5,021,747, Cl. 330-284 000.
Zeagle Systems, Inc.: *See—*
Bulin, Dennis G.; and James, Joseph P., 5,020,941, Cl. 405-186.000.
Zehler, Eugene R.; and Schnur, Nicholas E., to Henkel Corporation Lubrication for refrigerant heat transfer fluids. 5,021,179, Cl 252-54.600.
Zeiger, Allen R., to Thomas Jefferson University Method for preventing deletion sequences in solid phase synthesis. 5,021,550, Cl 530-334.000.
Zeigler, Henry J.; and Frisinger, Bruce L., to Martin Marietta Corporation. Rivetless nut plate and fastener. 5,020,952, Cl. 411-113.000.
Zelenz, Martin L., to Tresness, Andrew F. Television signal enhancement and scrambling system. 5,022,078, Cl. 380-7.000.
Zell, Werner V.; Becker, Johann A.; Boehm, Detlef M., Frohlich, August G.; Schade, Detlef; and Goletz, Bernhard R., to U.S. Philips Corp. Method of and device for feeding a plurality of optical waveguides into a clamping device. 5,020,874, Cl. 350-96.200.
Zen, Munetoshi: *See—*
Watanabe, Michihiro; Sato, Kazutaka; Zen, Munetoshi; Ato, Kazuhiko; Watanabe, Yoshinobu; and Taguchi, Sadayoshi, 5,021,194, Cl. 252-518.000.
Zengel, Hans-Georg: *See—*
Bergfeld, Manfred; Eisenhuth, Ludwig, and Zengel, Hans-Georg, 5,021,603, Cl. 558-237.000.
Zexel Corporation: *See—*
Iida, Katsumi; Sakurai, Yoshihiko; Takano, Akihiko; Yamaguchi, Hideo; and Yano, Teruaki, 5,020,424, Cl. 98-2.010.
Zhou, Rao-Sheng, to Timken Company, The. Traction drive unit. 5,021,035, Cl. 475-183.000.
Zickwolf, Rolf: *See—*
Karst, Siegfried; Uhrich, Wilfried; and Zickwolf, Rolf, 5,020,893, Cl. 350-573.000.
Ziegler, David E.; and Bowser, Arthur J., to Hartzell Propeller Inc. Aircraft propeller with improved electrically de-icer leads. 5,020,741, Cl. 244-134.00D.
Ziegler, Ronald H.: *See—*
Burg, Thomas J.; Ziegler, Ronald H.; and Anderson, Robert J , 5,020,442, Cl. 104-130.000.
Ziegler, Walter: *See—*
Taubitz, Christof; Hub, Hans-Henning, Ziegler, Walter; and Sadlowski, Juergen, 5,021,508, Cl. 525-133.000.
Ziemelis, Kristap M.: *See—*
Shipov, Alexandr G.; Kramarova, Evgenia P.; Orlova, Natalia A.; Baukov, Jury I.; and Ziemelis, Kristap M., 5,021,568, Cl. 540-531.000.
Ziggiotti, Alessandra: *See—*
Cardinali, Franco; Longobardi, Maria G.; Viscomi, Giuseppe C., and Ziggiotti, Alessandra, 5,021,600, Cl. 556-411.000.
Zilkha, Uri. Window gate construction. 5,020,834, Cl. 292-74.000.
Zimmer, Inc.: *See—*
Ewing, John; Olson, Dan; and Preston, Walter P., 5,020,525, Cl. 128-84.00R.
Hayes, S. Kyle; Meyers, John E.; and Lozier, Antony J., 5,020,519, Cl. 128-69.000.
Zimmermann, John, to Paperboard Industries Corporation. Severable connection between a handle and an divider panel of a carton. 5,020,718, Cl. 229-117.220.
Zinn, Bernd, to Grote & Hartmann GmbH & Co. KG. Central current distribution arrangement, especially for motor vehicles. 5,021,923, Cl. 361-380.000.
Zip-Pak, Inc.: *See—*
Boeckmann, Hugo, 5,021,117, Cl. 156-515 000.
Zittell, Frank F. Wooden movable louver shutters. 5,020,276, Cl. 49-87.000.
Zolnowsky, John: *See—*
MacGregor, Douglas B.; Zolnowsky, John; and Mothersole, David, 5,021,991, Cl. 364-900.000.
Zscheile, John W., Jr.: *See—*
Abrahamson, Curtis M.; Zscheile, John W., Jr.; and Mower, Vaughn L., 5,022,049, Cl. 375-1.000.
Zumsteg, Horst, to Alcan Rorschach AG. Method of manufacturing a closure unit made of sheet metal or plating and container having a closure unit obtained thereby. 5,020,955, Cl. 413-8.000.

VOL
1127
ISS
1
JE
4
1991
UMI

Zurn, Georg: *See—*
Mayer, Wolfgang; Sturm, wolfram; Fissmann, Hans-Joachim; Kotitschke, Gerhard; Zurn, Georg; Kade, Werner; and Kugler, Georg, 5,020,242, Cl. 34-115.000.

Zyvoloski, Kevin M.: *See—*
Bealkowski, Richard; Blackledge, John W., Jr.; Cronk, Doyle S.; Dayan, Richard A.; Dixon, Jerry D.; Kinnear, Scott G.; Kovach, George D.; McNeill, Andrew B.; Palka, Matthew S., Jr.; Sachsenmaier, Robert; Wachtel, Edward I.; and Zyvoloski, Kevin M., 5,022,077, Cl. 380-4.000.

501 Peerless Pump Company: *See—*
Lamminen, Olli; and Koivunen, Erkki A., 5,020,556, Cl 134-112.000.

529900 Ontario Ltd.: *See—*
Doan, Frank W.; and Weckman, Robert L., 5,020,342, Cl 70-14.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 4TH DAY OF JUNE, 1991

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Asami, ken; Ohashi, Kaoru; Onuma, Toshio; and Buma, Shuuichi, to Toyota Jidosha Kabushiki Kaisha. Rear wheel suspension controller. Re. 33,601, Cl. 280-707.000.

Bauer, Peter. Fluidic oscillator and spray-forming output chamber. Re. 33,605, Cl. 239-589.100.

Buma, Shuuichi: *See—*
Asami, ken; Ohashi, Kaoru; Onuma, Toshio; and Buma, Shuuichi, Re. 33,601, Cl. 280-707.000.

Chicago Rawhide Manufacturing Co.: *See—*
Christiansen, Keith W., Re. 33,603, Cl. 425-117.000.

Christiansen, Keith W., to Chicago Rawhide Manufacturing Co. Apparatus for manufacturing seal components. Re. 33,603, Cl. 425-117.000.

Cornell Research Foundation, Inc.: *See—*
Timmons, Michael B., Re. 33,600, Cl. 236-49.300.

Gillett, John B.; and Miraglia, John A., to International Business Machines Corporation. Connector mechanisms. Re. 33,604, Cl. 439-62.000.

International Business Machines Corporation: *See—*
Gillett, John B.; and Miraglia, John A., Re. 33,604, Cl. 439-62.000

Miraglia, John A.: *See—*
Gillett, John B.; and Miraglia, John A., Re. 33,604, Cl. 439-62.000.

Ohashi, Kaoru: *See—*
Asami, ken; Ohashi, Kaoru; Onuma, Toshio; and Buma, Shuuichi, Re. 33,601, Cl. 280-707.000.

Onuma, Toshio: *See—*
Asami, ken; Ohashi, Kaoru; Onuma, Toshio; and Buma, Shuuichi, Re. 33,601, Cl. 280-707.000.

Sargent Industries, Inc.: *See—*
Smith, Fred T., Re. 33,602, Cl. 414-525.400.

Smith, Fred T., to Sargent Industries, Inc. Refuse collection apparatus Re. 33,602, Cl. 414-525.400.

Timmons, Michael B., to Cornell Research Foundation, Inc. Environmental control system for poultry houses. Re. 33,600, Cl 236-49.300

Toyota Jidosha Kabushiki Kaisha: *See—*
Asami, ken; Ohashi, Kaoru; Onuma, Toshio; and Buma, Shuuichi, Re. 33,601, Cl. 280-707.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Ahlborn, George H.: *See—*
Roller, Kent G.; Ahlborn, George H.; and Brown, Richard E., B1 3,778,308, Cl. 428-421.000.

Annoot, Ira R., to Houston Geophysical Products, Inc. Double-plug seismic connector. B1 4,445,741, 6-4-91, Cl. 439-290.000.

Ball Brothers Research Corporation: *See—*
Roller, Kent G.; Ahlborn, George H.; and Brown, Richard E., B1 3,778,308, Cl. 428-421.000.

Baraff, David R.; Serinken, Nur M.; Streater, Richard W.; Miner, Carla J.; Boynton, Robert J.; MacLaurin, Blair K.; and Westwood, William D., to Northern Telecom Limited. Displays controlled by MIM switches of small capacitance. B1 4,413,883, 6-4-91, Cl. 350-334.000.

Boynton, Robert J.: *See—*
Baraff, David R.; Serinken, Nur M.; Streater, Richard W.; Miner, Carla J.; Poynton, Robert J.; MacLaurin, Blair K.; and Westwood, William D., B1 4,413,883, Cl. 350-334.000.

Brown, Richard E.: *See—*
Roller, Kent G.; Ahlborn, George H.; and Brown, Richard E., B1 3,778,308, Cl. 428-421.000.

Gallay S.A.: *See—*
Le Bret, Lucien F.; and Saada, Robert, B1 4,697,972, Cl. 413-6.000.

Hall, Gaddis G. Cable clamp. B1 4,383,668, 6-4-91, Cl. 248-63.000.

Houston Geophysical Products, Inc.: *See—*
Annoot, Ira R., B1 4,445,741, Cl. 439-290.000.

Kamatics Corp.: *See—*
Orkin, Stanley S., B1 4,717,268, Cl. 384-280.000.

Le Bret, Lucien F.; and Saada, Robert, to Gallay S.A. Method for seaming end closures to a container body. B1 4,697,972, 6-4-91, Cl. 413-6.000.

MacLaurin, Blair K.: *See—*
Baraff, David R.; Serinken, Nur M.; Streater, Richard W.; Miner, Carla J.; Boynton, Robert J.; MacLaurin, Blair K.; and Westwood, William D., B1 4,413,883, Cl. 350-334.000.

Miner, Carla J.: *See—*
Baraff, David R.; Serinken, Nur M.; Streater, Richard W.; Miner, Carla J.; Boynton, Robert J.; MacLaurin, Blair K.; and Westwood, William D., B1 4,413,883, Cl. 350-334.000.

Northern Telecom Limited: *See—*
Baraff, David R.; Serinken, Nur M.; Streater, Richard W.; Miner, Carla J.; Boynton, Robert J.; MacLaurin, Blair K.; and Westwood, William D., B1 4,413,883, Cl. 350-334.000.

Orkin, Stanley S., to Kamatics Corp. Bearing construction. B1 4,717,268, 6-4-91, Cl. 384-280.000.

Roller, Kent G.; Ahlborn, George H.; and Brown, Richard E., to Ball Brothers Research Corporation. Magnetic storage device coating and process. B1 3,778,308, 6-4-91, Cl. 428-421.000.

Saada, Robert: *See—*
Le Bret, Lucien F.; and Saada, Robert, B1 4,697,972, Cl. 413-6.000.

Serinken, Nur M.: *See—*
Baraff, David R.; Serinken, Nur M.; Streater, Richard W.; Miner, Carla J.; Boynton, Robert J.; MacLaurin, Blair K.; and Westwood, William D., B1 4,413,883, Cl. 350-334.000.

Streater, Richard W.: *See—*
Baraff, David R.; Serinken, Nur M.; Streater, Richard W.; Miner, Carla J.; Boynton, Robert J.; MacLaurin, Blair K.; and Westwood, William D., B1 4,413,883, Cl. 350-334.000.

Swisher, James. Lock and key system of the plunger type. B1 4,426,860, 6-4-91, Cl. 70-34.000.

Westwood, William D.: *See—*
Baraff, David R.; Serinken, Nur M.; Streater, Richard W.; Miner, Carla J.; Boynton, Robert J.; MacLaurin, Blair K.; and Westwood, William D., B1 4,413,883, Cl. 350-334.000.

LIST OF DESIGN PATENTEES

ACF Industries, Incorporated: *See—*
Coulborn, John W.; and Krug, John A., 317,277, Cl. D12-41.000.

Achiever Industries Ltd.: *See—*
Chan, Yet, 317,318, Cl. D16-209.000.

Adobe Systems Incorporated: *See—*
Slimbach, Robert J., 317,323, Cl. D18-24.000.

Aladdin Industries, Inc.: *See—*
Bridges, John A.; and Booten, Richard D., 317,240, Cl. D7-605.000.

Albion Hat & Cap Company Pty. Limited: *See—*
Henson, Anthony E., 317,368, Cl. D29-11.000.

Alroy, Yoram: *See—*
Stanley, Smith B.; and Alroy, Yoram, 317,316, Cl. D16-102.000.

Alvárdo Lopez, Manual, to Alvardo Lopez, Manuel. Necktie holder. 317,275, 6-4-91, Cl. D11-202.000.

Alvardo Lopez, Manuel: *See—*
Alvardo Lopez, Manual, 317,275, Cl. D11-202.000.

Ambasz, Emilio. Combined bottle and closure. 317,257, 6-4-91, Cl. D9-367.000.

Amoco Corporation: *See—*
Everding, Richard J.; and Lancaster, David R., 317,243, Cl D8-14.000.

Anderson, Julie A.: *See—*
Anderson, Todd J.; and Anderson, Julie A., 317,311, Cl. D14-240.000.

Anderson, Todd J.; and Anderson, Julie A. Remote telephone programmer for a VCR with infrared transmitter. 317,311, 6-4-91, Cl. D14-240.000.

Annand, George. Foldable tray for puzzle or the like. 317,329, 6-4-91, Cl. D21-14.000.

Antonucci, Ralph F.: *See—*
Smith, William C., Jr.; and Antonucci, Ralph F., 317,226, Cl. D3-36.000.

Aoki, Shinichi; and Konno, Akihiko, to Kabushiki Kaisha Toshiba. Combined tuner, amplifier, record player and tape player. 317,308, 6-4-91, Cl. D14-168.000.

Aoyama, Tatsuaki: *See—*
Ito, Yasuyuki; Aoyama, Tatsuaki; and Niwa, Hisanobu, 317,346, Cl. D23-209.000.
Miyake, Kouichi; Aoyama, Tatsuaki; and Niwa, Hisanobu, 317,315, Cl. D15-150.000.

Apple Computer, Inc.: *See—*
Ivester, Gavin R., 317,301, Cl. D14-102.000.

Associated Mills Inc.: *See—*
Geneve, Francois; Heiligenstein, Luc; and Melamed, Stephen, 317,348, Cl. D23-223.000.

Attwood Corporation: *See—*
Whitley, Warwick M., II, 317,347, Cl. D23-213.000.

Austin, Arnold S., to Quabaug Corporation. Tread surface and periphery of a footwear unit sole. 317,225, 6-4-91, Cl. D2-320.000.

Ban, Kimiyoshi: *See—*
Tanaka, Kaoru; and Ban, Kimiyoshi, 317,305, Cl. D14-126.000.

Belletire, Steven P.: *See—*
Rubertus, Roland W.; Westerberg, Roger K.; Zarembo, Peter J.; Belletire, Steven P.; and Foster, Gregory J., 317,272, Cl. D10-106.000.

Berracasa, Abner, to Capitol Tradeing S.A. Document holding device. 317,326, 6-4-91, Cl. D19-65.000.

BioNorth, Inc.: *See—*
Gabridge, Michael G., 317,360, Cl. D24-226.000.

Black & Decker, Inc.: *See—*
Bunyea, Roderick F., 317,244, Cl. D8-62.000.

Blanc, Walter; and Johannbocke, Uwe, to Blanco GmbH & Co. KG. Sink. 317,357, 6-4-91, Cl. D23-290.000.

Blanco GmbH & Co. KG: *See—*
Blanc, Walter; and Johannbocke, Uwe, 317,357, Cl. D23-290.000.

Bluff, Kristian A. Package. 317,262, 6-4-91, Cl. D9-431.000.

Bobb, Frank P. Adjustable clamp for supporting a railway rail. 317,278, 6-4-91, Cl. D12-51.000.

Bolivar, Domingo F. A., to Oficina de Investigacion Agrupada, S.A. Electric coffee maker. 317,237, 6-4-91, Cl. D7-309.000.

Booten, Richard D.: *See—*
Bridges, John A.; and Booten, Richard D., 317,240, Cl. D7-605.000.

Brass-Craft Manufacturing Company: *See—*
Freed, Marvin, 317,350, Cl. D23-257.000.

Bridges, John A.; and Booten, Richard D., to Aladdin Industries, Inc. Food storage cooler. 317,240, 6-4-91, Cl. D7-605.000.

Brisson, Bruce A. Electrical connector. 317,292, 6-4-91, Cl. D13-133.000.

Brisson, Bruce A. Electrical connector. 317,293, 6-4-91, Cl. D13-133.000.

Broden, David A.; Lee, David W.; Miller, Timothy A.; and Zeller, Debra K., to Rosemount Inc. Pressure transmitter housing. 317,266, 6-4-91, Cl. D10-46.000.

Brown, Margaret A.: *See—*
Brown, Ronald D.; and Brown, Margaret A., 317,261, Cl. D9-430.000.

Brown, Ronald D.; and Brown, Margaret A. Container. 317,261, 6-4-91, Cl. D9-430.000.

Bunyea, Roderick F., to Black & Decker, Inc. Finishing sander or similar article. 317,244, 6-4-91, Cl. D8-62.000.

Busick, Louis M.; Johnson, Marshall B.; and Myerly, R. Scott, to Proctor-Silex, Inc. Hot air corn popper. 317,238, 6-4-91, Cl. D7-325.000.

Cable Electric Products, Inc.: *See—*
Schwartz, Frederic W., 317,310, Cl. D14-217.000.

Capitol Tradeing S.A.: *See—*
Berracasa, Abner, 317,326, Cl. D19-65.000.

Cardillo, J. Dolores. Angel doll or similar article. 317,341, 6-4-91, Cl D21-169.000.

Chan, Yet, to Achiever Industries Ltd. Camera. 317,318, 6-4-91, Cl. D16-209.000.

Child Growth & Development Corporation, The: *See—*
Williams, David M.; and Schweitzer, David W., 317,332, Cl. D21-59.000.

Chuang, C. H., to Pioneer Industrial Corp. Cap for writing tools. 317,324, 6-4-91, Cl. D19-57.000.

Chui, Chi M., to Well Treasure Ind. Ltd. Handle for curling iron. 317,366, 6-4-91, Cl. D28-35.000.

Chuoh Hatsuijyo Kogyo Co., Ltd.: *See—*
Takeuchi, Kazuaki, 317,351, Cl. D23-265.000.

Chuoh Hatsujyo Kogyo Co., Ltd.: *See—*
Takeuchi, Kazuaki, 317,352, Cl. D23-265.000.

Ciba-Geigy Corporation: *See—*
Seamons, Kenneth R.; and Gillespie, Peter J., 317,359, Cl. D3-34.000.

CKD Kabushiki Kaisha: *See—*
Ito, Yasuyuki; Aoyama, Tatsuaki; and Niwa, Hisanobu, 317,346, Cl. D23-209.000.
Miyake, Kouichi; Aoyama, Tatsuaki; and Niwa, Hisanobu, 317,315, Cl. D15-150.000.

Combi Co., Ltd.: *See—*
Takahashi, Takehiko, and Kaneko, Tomihiro, 317,280, Cl. D12-129.000.
Takahashi, Takehiko; Ishii, Yoshiyasu; Hanashima, Taira, and Koike, Kazunobu, 317,334, Cl. D21-76.000.

Concannon, Garry F. Body surfing board. 317,343, 6-4-91, Cl. D21-228.000.

Copeland, Tommie. Cap. 317,223, 6-4-91, Cl. D2-244.000.

Coulborn, John W.; and Krug, John A., to ACF Industries, Incorporated. End segment of a railway car. 317,277, 6-4-91, Cl. D12-41.000.

Creative Devices Research Ltd.: *See—*
Holloway, Wynford, 317,331, Cl. D21-48.000.

Croft, Donald W. Barbecue cover support. 317,239, 6-4-91, Cl. D7-402.000.

Cross, Elizabeth A. Night light socket. 317,364, 6-4-91, Cl. D26-93.000.

Cymara, Hermann. Combined bathtub and shower enclosure. 317,353, 6-4-91, Cl. D23-275.000.

Daiwa Seiko, Inc.: *See—*
Oyama, Mitsuyoshi, 317,345, Cl. D22-142.000.

Davis Furniture Industries, Inc.: *See—*
Vogtherr, Burkhard; and Elzenbeck, Manfred, 317,232, Cl. D6-491.000.

Delepine, Jean-Claude. Bath tub. 317,355, 6-4-91, Cl. D23-281.000.

Dembiczak, Anita; and Zinbarg, Benson, to Sun Hill Industries, Inc. Bag. 317,254, 6-4-91, Cl. D9-305.000.

DeNardo, Dominick J., Jr. Toggle clamp. 317,245, 6-4-91, Cl. D8-72.000.

Designer Products Est.: *See—*
Stanley, Smith B.; and Alroy, Yoram, 317,316, Cl. D16-102.000.

Designtime Company Limited: *See—*
Fong, Wa Ngok, 317,264, Cl. D10-32.000.

Dinand, Pierre, to Florbath-Orofumi Di Parma S.p.A. Perfume bottle or the like. 317,258, 6-4-91, Cl. D9-384.000.

Dixon, Linda H., to E.R. Carpenter Company, Inc. Pillow. 317,236, 6-4-91, Cl. D6-601.000.

Dodge, John E. Adjustable ice cream cone holder. 317,222, 6-4-91, Cl. D1-102.000.

Drake, Joel S. Paddleboat or the like. 317,286, 6-4-91, Cl. D12-306.000.

Driscoll, Robert J., to Roy Cooke & Son Ltd. Handle for shopping bags. 317,246, 6-4-91, Cl. D8-300.000.

E.R. Carpenter Company, Inc.: *See—*
Dixon, Linda H., 317,236, Cl. D6-601.000.

Egawa, Mamoru: *See—*
Yoshida, Masatoshi; Egawa, Mamoru; and Sugiyama, Makoto, 317,313, Cl. D15-9.000.

Eishima, Masaaki: *See—*
Shibuya, Shinji; Fukuda, Nobuo; Kawakatsu, Yoshihiro; Kotsuka, Michiaki; and Eishima, Masaaki, 317,302, Cl. D14-106.000.

Elzenbeck, Manfred: *See—*
Vogtherr, Burkhard; and Elzenbeck, Manfred, 317,232, Cl. D6-491.000.

Equipment Systems & Devices, Inc.: *See—*
Gitlin, Harvey S., 317,249, Cl. D8-347.000.

Ermis, Julius: *See—*
Lee, Donald V.; and Ermis, Julius, 317,330, Cl. D21-25.000.

Eromaki, Pentti, to Nokia Tyres Limited. Tire. 317,281, 6-4-91, Cl. D12-146.000.

Esslinger, Hartmut, to NeXT Computer, Inc. Connector for a computer cable. 317,291, 6-4-91, Cl. D13-133.000.

Everding, Richard J.; and Lancaster, David R., to Amoco Corporation. Combined quick release holder and slip resistant grip for fire hoses. 317,243, 6-4-91, Cl. D8-14.000.

VOL
1127
ISS
1
JE
4
1991
UMI

Ferris, William L. Utility sink. 317,356, 6-4-91, Cl D23-284.000.

Florbath-Orofumi Di Parma S.p.A.: *See—*
Dinand, Pierre, 317,258, Cl. D9-384.000.

Fong, Wa Ngok, to Designtime Company Limited Wristwatch. 317,264, 6-4-91, Cl. D10-32.000.

Fontaine Industries, Inc.: *See—*
Klumpp, Harry R., 317,344, Cl. D22-110.000.

Foster, Gregory J.: *See—*
Rubertus, Roland W.; Westerberg, Roger K.; Zarembo, Peter J.; Belletire, Steven P.; and Foster, Gregory J., 317,272, Cl. D10-106.000.

Freed, Marvin, to Brass-Craft Manufacturing Company. Tub spout. 317,350, 6-4-91, Cl. D23-257.000.

Freyer, Jan: *See—*
Schmidt, Harald; Skurve, Helge; and Freyer, Jan, 317,298, Cl. D13-154.000.

Fujisawa, Maki; Takahashi, Misako; Tsurui, Kazue; Urushihara, Yuko; Taniguchi, Moritaka; Kubomura, Kazuko; Yokota, Chiho; Kubota, Akiko; and Nagai, Kiwako, to Kyushu Hitachi Maxell, Ltd. Electric nail polisher. 317,367, 6-4-91, Cl. D28-58.000.

Fukuda, Kiyohito; Tsuji, Masanori; and Tsuji, Masanori, to Yazaki Corporation. Housing for an electrical connector 317,289, 6-4-91, Cl. D13-133.000.

Fukuda, Kiyohito: *See—*
Inaba, Shigemitsu; Fukuda, Kiyohito; and Samejima, Masakuni, 317,290, Cl. D13-133.000.

Fukuda, Nobuo: *See—*
Shibuya, Shinji; Fukuda, Nobuo; Kawakatsu, Yoshihiro; Kotsuka, Michiaki; and Eishima, Masaaki, 317,302, Cl. D14-106.000.

Fumia, Enrico, to Pininfarina Extra S.r.L. Golf bag. 317,227, 6-4-91, Cl. D3-37.000.

Fung, Doric, to Video Technology Industries, Inc. Electronic game. 317,325, 6-4-91, Cl. D19-60.000.

Gabridge, Michael G., to BioNorth, Inc. Disposable multiwell tester. 317,360, 6-4-91, Cl. D24-226.000.

Geneve, Francois; Heiligenstein, Luc; and Melamed, Stephen, to Associated Mills Inc. Hand held shower head. 317,348, 6-4-91, Cl. D23-223.000.

Gillespie, Peter J.: *See—*
Seamons, Kenneth R.; and Gillespie, Peter J., 317,359, Cl. D3-34.000.

Giolla, Franco P.; and Pibouleau, Dominique M., to Mahara Mhr Montres S.A. Wrist-watch. 317,265, 6-4-91, Cl. D10-39.000.

Gitlin, Harvey S., to Equipment Systems & Devices, Inc. Key. 317,249, 6-4-91, Cl. D8-347.000.

Glemby Company, Inc., The: *See—*
Samuels, Scott, 317,256, Cl. D9-355.000.

Gold Star Co., Ltd.: *See—*
Hong, Sa Y., 317,306, Cl. D14-129.000.

Goto, Nobumichi: *See—*
Hasegawa, Terutomi; and Goto, Nobumichi, 317,300, Cl. D13-182.000.

Gourley, John F.: *See—*
Shook, Hal C.; and Gourley, John F., 317,250, Cl. D8-380.000.

Gray, David L. Automobile cover or similar article. 317,283, 6-4-91, Cl. D12-155.000.

Grimes, Gary E., to U.S. Philips Corporation. Television receiver. 317,303, 6-4-91, Cl. D14-126.000.

Haffner, Sally J. Animal bath tub. 317,371, 6-4-91, Cl. D30-158.000.

Haga, Cecil W., to Ishida Foundation. Dual mode air vehicle. 317,287, 6-4-91, Cl. D12-344.000.

Hanashima, Taira: *See—*
Takahashi, Takehiko; Ishii, Yoshiyasu; Hanashima, Taira; and Koike, Kazunobu, 317,334, Cl. D21-76.000.

Hard, Douglas G. Switch-over block adapter. 317,296, 6-4-91, Cl. D13-147.000.

Harden Industries, Inc.: *See—*
Rodstein, Harvey B., deceased, 317,349, Cl. D23-242.000.

Hasegawa, Terutomi; and Goto, Nobumichi. Semi-conductor mounting substrate. 317,300, 6-4-91, Cl. D13-182.000.

Hayashi, Hideharu, to Yazaki Corporation. Housing for an electrical connector board. 317,294, 6-4-91, Cl. D13-146.000.

Heiligenstein, Luc: *See—*
Geneve, Francois; Heiligenstein, Luc; and Melamed, Stephen, 317,348, Cl. D23-223.000.

Hensley, Jerry C. Monitoring well cap. 317,270, 6-4-91, Cl. D10-96.000.

Hensley, Jerry C. Monitoring well cap. 317,271, 6-4-91, Cl. D10-96.000.

Henson, Anthony E., to Albion Hat & Cap Company Pty. Limited. Shoulder pads. 317,368, 6-4-91, Cl. D29-11.000.

Hitachi, Ltd.: *See—*
Shibuya, Shinji; Fukuda, Nobuo; Kawakatsu, Yoshihiro; Kotsuka, Michiaki; and Eishima, Masaaki, 317,302, Cl. D14-106.000.

Holloway, Wynford, to Creative Devices Research Ltd. Joystick. 317,331 6-4-91, Cl. D21-48.000.

Honeywell Inc.: *See—*
Odom, James A., Jr.; and Strand, Rolf L., 317,268, Cl. D10-51.000.

Hong, Sa Y., to Gold Star Co., Ltd. Combined liquid crystal TV and portable video cassette recorder. 317,306, 6-4-91, Cl. D14-129.000.

Hunter-Melnor, Inc.: *See—*
Mehta, Vinay, 317,267, Cl. D10-50.000.

Ide, John D.: *See—*
Kasparian, Kaspar; and Ide, John D., 317,307, Cl. D14-137.000.

Iida, Shigeru: *See—*
Sugiyama, Masaaki; Suehisa, Toshio; and Iida, Shigeru, 317,299, Cl. D13-154.000.

Inaba, Shigemitsu; Fukuda, Kiyohito; and Samejima, Masakuni, to Yazaki Corporation. Housing for an electrical connector. 317,290, 6-4-91, Cl. D13-133.000.

Inoue, Tai, to Yazaki Corporation. Indicator panel for a motor vehicle 317,285, 6-4-91, Cl. D12-192.000.

International Precision Products, Inc.: *See—*
Rothman, Michael L., 317,263, Cl. D10-23.000.

Ishida Foundation: *See—*
Haga, Cecil W., 317,287, Cl. D12-344.000.

Ishii, Yoshiyasu: *See—*
Takahashi, Takehiko; Ishii, Yoshiyasu; Hanashima, Taira; and Koike, Kazunobu, 317,334, Cl. D21-76.000.

Ito, Yasuyuki; Aoyama, Tatsuaki; and Niwa, Hisanobu, to CKD Kabushiki Kaisha. Filter. 317,346, 6-4-91, Cl. D23-209.000.

Ivester, Gavin R., to Apple Computer, Inc. Personal computer housing or similar article. 317,301, 6-4-91, Cl. D14-102.000.

Johannbocke, Uwe: *See—*
Blanc, Walter; and Johannbocke, Uwe, 317,357, Cl. D23-290.000.

Johnson, Alvin. Valve stem seal replacement tool. 317,242, 6-4-91, Cl. D8-14.000.

Johnson & Johnson Inc.: *See—*
Ramacieri, Patricia, 317,362, Cl. D24-125.000.

Johnson, Marshall B.: *See—*
Busick, Louis M.; Johnson, Marshall B.; and Myerly, R Scott, 317,238, Cl. D7-325.000.

Kabushiki Kaisha Tamiya Mokei: *See—*
Tsuchiya, Hirotsugu, 317,336, Cl. D21-137.000.

Kabushiki Kaisha Tominaga, Jyushi Kogyosho: *See—*
Tominaga, Kazutoshi, 317,369, Cl. D30-107.000.

Kabushiki Kaisha Toshiba: *See—*
Aoki, Shinichi; and Konno, Akihiko, 317,308, Cl. D14-168.000.
Tanaka, Kaoru; and Ban, Kimiyoshi, 317,305, Cl. D14-126.000.
Yoshida, Masatoshi; Egawa, Mamoru; and Sugiyama, Makoto, 317,313, Cl. D15-9.000.

Kaddie Stand Corporation: *See—*
Montgomery, Bonnie, 317,231, Cl. D6-397.000.

Kadomaru, Kazuo, to Sumitomo Rubber Industries, Ltd. Motorcycle tire. 317,282, 6-4-91, Cl. D12-147.000.

Kaneko, Tomihiro: *See—*
Takahashi, Takehiko; and Kaneko, Tomihiro, 317,280, Cl D12-129.000.

Kasparian, Kaspar; and Ide, John D., to Teletec Corporation. Two-way radio or similar article. 317,307, 6-4-91, Cl. D14-137.000.

Kasprzycki, Robert L., to Smith Corona Corporation. Typewriter. 317,321, 6-4-91, Cl. D18-1.000.

Kawakatsu, Yoshihiro: *See—*
Shibuya, Shinji; Fukuda, Nobuo; Kawakatsu, Yoshihiro; Kotsuka, Michiaki; and Eishima, Masaaki, 317,302, Cl. D14-106.000.

Kellogg Plastics, Ltd: *See—*
Rumpel, Donald D., 317,252, Cl. D8-395.000.

Kelly, J. Charles. Holder for display and storage of jewelry. 317,233, 6-4-91, Cl. D6-553.000.

Kheng, Heng G., to Metro Plastic Industry Pte. Ltd. Pre-inked stamp organizer. 317,327, 6-4-91, Cl. D19-75.000.

Klumpp, Harry R., to Fontaine Industries, Inc. Telescopic sight mount. 317,344, 6-4-91, Cl. D22-110.000.

Koike, Kazunobu: *See—*
Takahashi, Takehiko; Ishii, Yoshiyasu; Hanashima, Taira; and Koike, Kazunobu, 317,334, Cl. D21-76.000.

Kollath, James J.; and McDonald, Mark E., to Oscar Mayer Foods Corporation. Whistle. 317,273, 6-4-91, Cl. D10-119.000.

Konno, Akihiko: *See—*
Aoki, Shinichi; and Konno, Akihiko, 317,308, Cl. D14-168.000.

Kotsuka, Michiaki: *See—*
Shibuya, Shinji; Fukuda, Nobuo; Kawakatsu, Yoshihiro; Kotsuka, Michiaki; and Eishima, Masaaki, 317,302, Cl. D14-106.000.

Kroy Inc.: *See—*
Richardson, Michael M.; and Ringle, Geoff, 317,322, Cl. D18-13.000.

Krueger, John G., to Krueger Transport Equipment Pty. Ltd. Support post for the side walls of a trailer. 317,279, 6-4-91, Cl. D12-106.000.

Krueger Transport Equipment Pty. Ltd.: *See—*
Krueger, John G., 317,279, Cl. D12-106.000.

Krug, John A.: *See—*
Coulborn, John W.; and Krug, John A., 317,277, Cl. D12-41.000.

Kubomura, Kazuko: *See—*
Fujisawa, Maki; Takahashi, Misako; Tsurui, Kazue; Urushihara, Yuko; Taniguchi, Moritaka; Kubomura, Kazuko; Yokota, Chiho; Kubota, Akiko; and Nagai, Kiwako, 317,367, Cl. D28-58.000.

Kubota, Akiko: *See—*
Fujisawa, Maki; Takahashi, Misako; Tsurui, Kazue; Urushihara, Yuko; Taniguchi, Moritaka; Kubomura, Kazuko; Yokota, Chiho; Kubota, Akiko; and Nagai, Kiwako, 317,367, Cl. D28-58.000.

Kubota, Katsuhiro, to Yazaki Corporation. Housing for an electrical connector board for use in an automobile. 317,288, 6-4-91, Cl. D13-133.000.

Kyushu Hitachi Maxell, Ltd.: *See—*
Fujisawa, Maki; Takahashi, Misako; Tsurui, Kazue; Urushihara, Yuko; Taniguchi, Moritaka; Kubomura, Kazuko; Yokota, Chiho; Kubota, Akiko; and Nagai, Kiwako, 317,367, Cl. D28-58.000.

Laboissiere, Larry-John L. Combined advertising display and clock. 317,328, 6-4-91, Cl. D20-20.000.

Lancaster, David R.: *See—*
Everding, Richard J.; and Lancaster, David R., 317,243, Cl. D8-14.000.

Lasalle IPR A/S. *See—*
Schmidt, Harald; Skurve, Helge, and Freyer, Jan, 317,298, Cl D13-154.000.

Lee, David W . *See—*
Broden, David A ; Lee, David W . Miller, Timothy A.; and Zeller, Debra K., 317,266, Cl. D10-46.000.

Lee, Donald V ; and Ermis, Julius. Game board. 317,330, 6-4-91, Cl. D21-25.000.

Lent, Trevor Valve guide tool. 317,241, 6-4-91, Cl. D8-14.000.

Liang, Calvin Adjustable strap. 317,251, 6-4-91, Cl. D8-394.000.

Lovik, Craig J. Balloon glider 317,335, 6-4-91, Cl. D21-84.000.

Lucas, Robert J., to Nike, Inc.; and Nike International, Ltd. Shoe upper. 317,224, 6-4-91, Cl. D2-314.000.

Lue, Fang-Hsiang; and Won, Chung-Song, to Platon Precision Industries Co., Ltd. 35 mm camera. 317,317, 6-4-91, Cl. D16-213.000.

M-B Company, Inc. of Wisconsin: *See—*
Sousek, Eugene A., 317,276, Cl. D12-14.000.

M & M Manufacturing, Inc.: *See—*
McCain, James R.; and Murphy, Billy F., 317,230, Cl D6-385.000.

Mahara Mhr Montres S.A.: *See—*
Giolla, Franco P.; and Pibouleau, Dominique M., 317,265, Cl. D10-39.000.

Margaret Astor AG: *See—*
Schmidt, Peter, 317,259, Cl. D9-409.000.

Maruyama Mfg. Co., Inc.: *See—*
Yanagi, Eiji, 317,314, Cl. D15-13.000.

MB Group plc: *See—*
Seager, Richard H., 317,253, Cl. D9-300.000.

McCain, James R.; and Murphy, Billy F., to M & M Manufacturing, Inc Swinging bunk. 317,230, 6-4-91, Cl. D6-385.000.

McDonald, Mark E.: *See—*
Kollath, James J.; and McDonald, Mark E., 317,273, Cl. D10-119.000.

McMurrey, David K., to Wald Manufacturing Co., Inc. Bicycle handlebar. 317,284, 6-4-91, Cl. D12-178.000.

Medscand AB: *See—*
Stormby, Nils, 317,361, Cl. D24-141.000.

Mehta, Vinay, to Hunter-Melnor, Inc. Electronic programmable thermostat. 317,267, 6-4-91, Cl. D10-50.000.

Melamed, Stephen: *See—*
Geneve, Francois; Heiligenstein, Luc; and Melamed, Stephen, 317,348, Cl. D23-223.000.

Metro Plastic Industry Pte. Ltd.: *See—*
Kheng, Heng G., 317,327. Cl. D19-75.000.

Miller, Timothy A : *See—*
Broden, David A.; Lee, David W.; Miller, Timothy A.; and Zeller, Debra K., 317,266, Cl. D10-46.000.

Mine, Ikuro, to Yamaha Corporation. Electronic keyboard musical instrument. 317,319, 6-4-91, Cl. D17-1.000.

Minnesota Mining and Manufacturing Company: *See—*
Rubertus, Roland W.; Westerberg, Roger K.; Zarembo, Peter J.; Belletire, Steven P.; and Foster, Gregory J., 317,272, Cl. D10-106.000

Miyake, Kouichi; Aoyama, Tatsuaki; and Niwa, Hisanobu, to CKD Kabushiki Kaisha. Lubricator. 317,315, 6-4-91, Cl. D15-150.000.

Monami Products Limited: *See—*
Thomson, Harry S.; and Pape, John, 317,333, Cl. D21-59.000.

Montgomery, Bonnie, to Kaddie Stand Corporation. Combined shelf and golf bag stand. 317,231, 6-4-91, Cl. D6-397.000.

Murphy, Billy F.: *See—*
McCain, James R.; and Murphy, Billy F., 317,230, Cl. D6-385.000.

Myerly, R. Scott: *See—*
Busick, Louis M.; Johnson, Marshall B.; and Myerly, R. Scott, 317,238, Cl. D7-325.000.

Nagai, Kiwako: *See—*
Fujisawa, Maki; Takahashi, Misako; Tsurui, Kazue; Urushihara, Yuko; Taniguchi, Moritaka; Kubomura, Kazuko; Yokota, Chiho; Kubota, Akiko; and Nagai, Kiwako, 317,367, Cl. D28-58.000.

NeXT Computer, Inc.: *See—*
Esslinger, Hartmut, 317,291, Cl. D13-133.000.

Nike, Inc.: *See—*
Lucas, Robert J., 317,224, Cl. D2-314.000.

Nike International, Ltd : *See—*
Lucas, Robert J., 317,224, Cl. D2-314.000.

Niwa, Hisanobu: *See—*
Ito, Yasuyuki; Aoyama, Tatsuaki, and Niwa, Hisanobu, 317,346, Cl. D23-209.000.
Miyake, Kouichi; Aoyama, Tatsuaki; and Niwa, Hisanobu, 317,315, Cl. D15-150.000.

Nokia Tyres Limited: *See—*
Eromaki, Pentti, 317,281, Cl. D12-146.000.

Nylander, Per, to Roby Teknik AB Packaging container. 317,260, 6-4-91, Cl. D9-417.000.

Odom, James A., Jr.; and Strand, Rolf L., to Honeywell Inc. Thermostat. 317,268, 6-4-91, Cl. D10-51.000.

Oficina de Investigacion Agrupada, S.A.: *See—*
Bolivar, Domingo F. A., 317,237, Cl. D7-309.000.

Oscar Mayer Foods Corporation. *See—*
Kollath, James J.; and McDonald, Mark E., 317,273, Cl. D10-119.000.

Oyama, Mitsuyoshi, to Daiwa Seiko, Inc Reel seat for fishing rod. 317,345, 6-4-91, Cl. D22-142.000.

Pape, John: *See—*
Thomson, Harry S.; and Pape, John, 317,333, Cl. D21-59.000.

Parody, Jana M. Thumb puppet 317,337, 6-4-91, Cl D21-153.000.

Peavey Electronics Corporation: *See—*
Schumann, Marc; and Powers, Michael V , 317,320, Cl. D17-20.000.

Peyton, Jeffrey L. Toy toucan bird figure. 317,338, 6-4-91, Cl. D21-160.000.

Pibouleau, Dominique M : *See—*
Giolla, Franco P.; and Pibouleau, Dominique M , 317,265, Cl D10-39.000.

Pininfarina Extra S.r.L.: *See—*
Fumia, Enrico, 317,227, Cl. D3-37.000.

Pioneer Industrial Corp.: *See—*
Chuang, C. H., 317,324, Cl. D19-57.000.

Platon Precision Industries Co., Ltd.: *See—*
Lue, Fang-Hsiang; and Won, Chung-Song, 317,317, Cl. D16-213.000.

Poe, Lloyd R. Padlock hasp guard. 317,248, 6-4-91, Cl. D8-346.000.

Powers, Michael V.: *See—*
Schumann, Marc; and Powers, Michael V., 317,320, Cl D17-20.000.

Proctor-Silex, Inc.: *See—*
Busick, Louis M.; Johnson, Marshall B., and Myerly, R Scott, 317,238, Cl. D7-325.000

Pugh, Raymond C. Doll or similar article. 317,339, 6-4-91, Cl. D21-166.000.

Pugh, Raymond C. Doll or similar article. 317,340, 6-4-91, Cl D21-166.000.

Quabaug Corporation: *See—*
Austin, Arnold S., 317,225, Cl. D2-320.000.

Ramacieri, Patricia, to Johnson & Johnson Inc. Sanitary napkin. 317,362, 6-4-91, Cl. D24-125.000.

Redina, Joseph R. Armband or the like. 317,274, 6-4-91, Cl. D11-4.000.

Reed, Brian E., to Siemon Company, The. Modular jack patch block. 317,297, 6-4-91, Cl. D13-147.000.

Renk, Thomas E., Jr., to Thomson Consumer Electronics, Inc. Television receiver. 317,304, 6-4-91, Cl. D14-126.000.

Richardson, Michael M.; and Ringle, Geoff, to Kroy Inc. Thermal printer. 317,322, 6-4-91, Cl. D18-13.000.

Ringle, Geoff: *See—*
Richardson, Michael M.; and Ringle, Geoff, 317,322, Cl. D18-13.000.

Roby Teknik AB: *See—*
Nylander, Per, 317,260, Cl. D9-417.000.

Rochon, Leonard. Pillow. 317,235, 6-4-91, Cl. D6-599.000.

Rodstein, Barbara, legal representative: *See—*
Rodstein, Harvey B., deceased, 317,349, Cl. D23-242.000.

Rodstein, Harvey B., deceased (by Rodstein, Barbara, legal representative), to Harden Industries, Inc. Faucet set. 317,349, 6-4-91, Cl. D23-242.000.

Rosemount Inc.: *See—*
Broden, David A.; Lee, David W.; Miller, Timothy A.; and Zeller, Debra K., 317,266, Cl. D10-46.000.
Selg, Donald W., 317,269, Cl. D10-52.000.

Rothman, Michael L., to International Precision Products, Inc. Alarm clock. 317,263, 6-4-91, Cl. D10-23.000.

Rousseau, Xavier, to S. T. Dupont S.A. Lighter. 317,365, 6-4-91, Cl D27-159.000.

Roy Cooke & Son Ltd.: *See—*
Driscoll, Robert J., 317,246, Cl. D8-300.000.

Rubertus, Roland W.; Westerberg, Roger K.; Zarembo, Peter J.; Belletire, Steven P.; and Foster, Gregory J., to Minnesota Mining and Manufacturing Company. Electronic article surveillance unit. 317,272, 6-4-91, Cl. D10-106.000.

Ruck, Wolf. Storage unit. 317,234, 6-4-91, Cl. D6-553.000.

Rumpel, Donald D., to Kellogg Plastics, Ltd Christmas light clip. 317,252, 6-4-91, Cl. D8-395.000.

S. T. Dupont S.A.: *See—*
Rousseau, Xavier, 317,365, Cl. D27-159.000.

Saito, Hitoshi, to Yazaki Corporation. Housing for an electrical connector. 317,295, 6-4-91, Cl. D13-147.000.

Samejima, Masakuni: *See—*
Inaba, Shigemitsu; Fukuda, Kiyohito; and Samejima, Masakuni. 317,290, Cl. D13-133.000.

Samuels, Scott, to Glemby Company, Inc., The. Combined bottle and cap. 317,256, 6-4-91, Cl. D9-355.000.

Schmidt, Harald; Skurve, Helge; and Freyer, Jan, to Lasalle IPR A/S Cable protector. 317,298, 6-4-91, Cl. D13-154.000.

Schmidt, Peter, to Margaret Astor AG. Combined bottle and cap. 317,259, 6-4-91, Cl. D9-409.000.

Schumann, Marc; and Powers, Michael V., to Peavey Electronics Corporation. Guitar peghead. 317,320, 6-4-91, Cl D17-20.000.

Schwartz, Frederic W., to Cable Electric Products, Inc. Combined remote control and flashlight. 317,310, 6-4-91, Cl. D14-217.000.

Schweitzer, David W.: *See—*
Williams, David M.; and Schweitzer, David W., 317,332, Cl. D21-59.000.

Seager, Richard H., to MB Group plc. Pump dispenser. 317,253, 6-4-91, Cl. D9-300.000.

Seamons, Kenneth R.; and Gillespie, Peter J., to Ciba-Geigy Corporation. Catalyst support for use in a contact lens disinfection unit. 317,359, 6-4-91, Cl. D3-34.000.

Selg, Donald W., to Rosemount Inc. Temperature transmitter housing. 317,269, 6-4-91, Cl. D10-52.000.

Shibuya, Shinji; Fukuda, Nobuo; Kawakatsu, Yoshihiro; Kotsuka, Michiaki; and Eishima, Masaaki, to Hitachi, Ltd. Portable computer. 317,302, 6-4-91, Cl. D14-106.000.

VOL
1127
ISS
1
JE
4
1991
UMI

- Shook, Hal C.; and Gourley, John F., to Symons Corporation Bracket for concrete forms. 317,250, 6-4-91, Cl. D8-380.000.
- Siemon Company, The: *See—*
  - Reed, Brian E., 317,297, Cl. D13-147.000.
- Skurve, Helge: *See—*
  - Schmidt, Harald, Skurve, Helge; and Freyer, Jan, 317,298, Cl. D13-154.000.
- Skwirz, Marylee A Pet collar or similar article. 317,370, 6-4-91, Cl. D30-152.000.
- Slimbach, Robert J., to Adobe Systems Incorporated. Type font. 317,323, 6-4-91, Cl. D18-24.000.
- Smith Corona Corporation: *See—*
  - Kasprzycki, Robert L., 317,321, Cl. D18-1.000.
- Smith, William C., Jr.; and Antonucci, Ralph F. Sportsman's outdoor bag. 317,226, 6-4-91, Cl. D3-36.000.
- Sousek, Eugene A., to M-B Company, Inc. of Wisconsin Ground service vehicle. 317,276, 6-4-91, Cl. D12-14.000.
- Spendrup, John O. Plenum unit for distribution of air or water. 317,358, 6-4-91, Cl. D23-393.000.
- Stanley, Smith B.; and Alroy, Yoram, to Designer Products Est. Eyeglass frame. 317,316, 6-4-91, Cl. D16-102.000.
- Stormby, Nils, to Medscand AB. Endometric brush. 317,361, 6-4-91, Cl. D24-141.000.
- Strand, Rolf L.: *See—*
  - Odom, James A., Jr.; and Strand, Rolf L., 317,268, Cl. D10-51.000.
- Stufflebeam, Frank. Fisherman's belt. 317,228, 6-4-91, Cl. D3-104.000.
- Suehisa, Toshio: *See—*
  - Sugiyama, Masaaki; Suehisa, Toshio; and Iida, Shigeru, 317,299, Cl. D13-154.000.
- Sugiyama, Makoto: *See—*
  - Yoshida, Masatoshi; Egawa, Mamoru; and Sugiyama, Makoto, 317,313, Cl. D15-9.000.
- Sugiyama, Masaaki; Suehisa, Toshio; and Iida, Shigeru, to Yazaki Corporation. Locking member for an electrical connector. 317,299, 6-4-91, Cl. D13-154.000.
- Sumitomo Rubber Industries, Ltd.: *See—*
  - Kadomaru, Kazuo, 317,282, Cl. D12-147 000.
- Sun Hill Industries, Inc.: *See—*
  - Dembiczak, Anita; and Zinbarg, Benson, 317,254, Cl. D9-305.000.
- Symons Corporation: *See—*
  - Shook, Hal C.; and Gourley, John F., 317,250, Cl. D8-380.000.
- Takahashi, Misako: *See—*
  - Fujisawa, Maki; Takahashi, Misako; Tsurui, Kazue; Urushihara, Yuko; Taniguchi, Moritaka; Kubomura, Kazuko; Yokota, Chiho; Kubota, Akiko; and Nagai, Kiwako, 317,367, Cl. D28-58.000.
- Takahashi, Takehiko; and Kaneko, Tomihiro, to Combi Co., Ltd. Baby stroller. 317,280, 6-4-91, Cl. D12-129.000.
- Takahashi, Takehiko; Ishii, Yoshiyasu; Hanashima, Taira; and Koike, Kazunobu, to Combi Co., Ltd Toy vehicle. 317,334, 6-4-91, Cl. D21-76.000.
- Takeuchi, Kazuaki, to Chuoh Hatsuijyo Kogyo Co., Ltd. Hose clamp. 317,351, 6-4-91, Cl. D23-265.000.
- Takeuchi, Kazuaki, to Chuoh Hatsujyo Kogyo Co., Ltd. Hose clamp. 317,352, 6-4-91, Cl. D23-265.000.
- Tanaka, Kaoru; and Ban, Kimiyoshi, to Kabushiki Kaisha Toshiba. Television receiver. 317,305, 6-4-91, Cl. D14-126.000.
- Taniguchi, Moritaka: *See—*
  - Fujisawa, Maki; Takahashi, Misako; Tsurui, Kazue; Urushihara, Yuko; Taniguchi, Moritaka; Kubomura, Kazuko; Yokota, Chiho; Kubota, Akiko; and Nagai, Kiwako, 317,367, Cl. D28-58.000.
- Taylor, Thomas E. Bathtub. 317,354, 6-4-91, Cl. D23-281.000.
- Teletec Corporation: *See—*
  - Kasparian, Kaspar; and Ide, John D., 317,307, Cl. D14-137.000.
- Thomson Consumer Electronics, Inc.: *See—*
  - Renk, Thomas E., Jr., 317,304, Cl. D14-126.000.
- Thomson, Harry S.; and Pape, John, to Monami Products Limited. Bath toy. 317,333, 6-4-91, Cl. D21-59.000.
- Tominaga, Kazutoshi, to Kabushiki Kaisha Tominaga, Jyushi Kogyosho. Aquarium lid. 317,369, 6-4-91, Cl. D30-107.000.
- Trowbridge, Allen R., Jr. Telephone cover. 317,312, 6-4-91, Cl. D14-250.000.
- Tsuchiya, Hirotsugu, to Kabushiki Kaisha Tamiya Mokei. Toy racing car chassis. 317,336, 6-4-91, Cl. D21-137.000.
- Tsuji, Masanori: *See—*
  - Fukuda, Kiyohito; Tsuji, Masanori; and Tsuji, Masanori, 317,289, Cl. D13-133.000.
  - Fukuda, Kiyohito; Tsuji, Masanori; and Tsuji, Masanori, 317,289, Cl. D13-133.000.
- Tsurui, Kazue: *See—*
  - Fujisawa, Maki; Takahashi, Misako; Tsurui, Kazue; Urushihara, Yuko; Taniguchi, Moritaka; Kubomura, Kazuko; Yokota, Chiho. Kubota, Akiko; and Nagai, Kiwako, 317,367, Cl. D28-58 000.
- Turk, Christopher. Container for frozen fish food or the like. 317,255, 6-4-91, Cl. D9-341.000.
- U.S. Philips Corporation: *See—*
  - Grimes, Gary E., 317,303, Cl. D14-126.000.
- Urushihara, Yuko: *See—*
  - Fujisawa, Maki; Takahashi, Misako; Tsurui, Kazue; Urushihara, Yuko; Taniguchi, Moritaka; Kubomura, Kazuko; Yokota, Chiho. Kubota, Akiko; and Nagai, Kiwako, 317,367, Cl. D28-58.000
- Video Technology Industries, Inc.: *See—*
  - Fung, Doric, 317,325, Cl. D19-60.000.
- Vogtherr, Burkhard; and Elzenbeck, Manfred, to Davis Furniture Industries, Inc. Protective end cap for a furniture leg. 317,232, 6-4-91, Cl. D6-491.000.
- Votteler, Arno. Chair 317,229, 6-4-91, Cl. D6-379 000.
- Wald Manufacturing Co., Inc.: *See—*
  - McMurtrey, David K., 317,284, Cl. D12-178.000
- Warcholik, Doris. Girl doll. 317,342, 6-4-91, Cl. D21-169.000
- Welch, James D. Decorative lamp 317,363, 6-4-91, Cl D26-26 000
- Well Treasure Ind. Ltd.: *See—*
  - Chui, Chi M., 317,366, Cl. D28-35.000.
- Wells, Robert C. Gate latch. 317,247, 6-4-91. Cl D8-336.000.
- Westerberg, Roger K.: *See—*
  - Rubertus, Roland W.; Westerberg, Roger K.; Zarembo, Peter J. Belletire, Steven P.; and Foster, Gregory J., 317,272, Cl. D10-106.000.
- Whitley, Warwick M , II, to Attwood Corporation. Aerator spray for live well water renewal systems. 317,347, 6-4-91, Cl. D23-213.000.
- Williams, David M.; and Schweitzer, David W., to Child Growth & Development Corporation, The. Toy pump shower. 317,332, 6-4-91, Cl. D21-59.000.
- Won, Chung-Song: *See—*
  - Lue, Fang-Hsiang; and Won, Chung-Song, 317,317, Cl. D16-213.000.
- Yamaha Corporation: *See—*
  - Mine, Ikuro, 317,319, Cl. D17-1.000.
- Yanagi, Eiji, to Maruyama Mfg. Co., Inc. Agricultural chemical sprayer. 317,314, 6-4-91, Cl. D15-13.000.
- Yazaki Corporation: *See—*
  - Fukuda, Kiyohito; Tsuji, Masanori; and Tsuji, Masanori, 317,289, Cl. D13-133.000.
  - Hayashi, Hideharu, 317,294, Cl. D13-146.000.
  - Inaba, Shigemitsu; Fukuda, Kiyohito; and Samejima, Masakuni, 317,290, Cl. D13-133.000.
  - Inoue, Tai, 317,285, Cl. D12-192.000.
  - Kubota, Katsuhiro, 317,288, Cl. D13-133.000.
  - Saito, Hitoshi, 317,295, Cl. D13-147.000.
  - Sugiyama, Masaaki; Suehisa, Toshio; and Iida, Shigeru, 317,299. Cl. D13-154.000.
- Yeh, Tsun H. Video cassette rewinder. 317,309, 6-4-91, Cl. D14-217.000.
- Yokota, Chiho: *See—*
  - Fujisawa, Maki; Takahashi, Misako; Tsurui, Kazue; Urushihara. Yuko; Taniguchi, Moritaka; Kubomura, Kazuko; Yokota, Chiho. Kubota, Akiko; and Nagai, Kiwako, 317,367, Cl. D28-58.000.
- Yoshida, Masatoshi; Egawa, Mamoru; and Sugiyama, Makoto, to Kabushiki Kaisha Toshiba. Rotary compressor. 317,313, 6-4-91, Cl D15-9.000.
- Zarembo, Peter J.: *See—*
  - Rubertus, Roland W.; Westerberg, Roger K.; Zarembo, Peter J. Belletire, Steven P.; and Foster, Gregory J., 317,272, Cl. D10-106.000.
- Zeller, Debra K.: *See—*
  - Broden, David A.; Lee, David W.; Miller, Timothy A ; and Zeller, Debra K., 317,266, Cl. D10-46.000.
- Zinbarg, Benson: *See—*
  - Dembiczak, Anita; and Zinbarg, Benson, 317,254, Cl. D9-305.000

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- Bear Creek Gardens, Inc.. *See—*
  - Warriner, William A., 7,542, Cl. 18.000.
- Conard-Pyle Company, The: *See—*
  - Meilland, Alain A., 7,541, Cl. 15.000.
- DeRuiter's Nieuwe Rozen B.V.: *See—*
  - Nielsen, Ove, 7,540, Cl. 10.000.
- Eggli, Jules. *Sequoia sempervirens* tree named 'Egglii Prostrata'. 7,547, 6-4-91, Cl. 50.000.
- Lamont, Gregory P , to Ornamental Native Australian Plants Pty Ltd. Leschenaultia hybrid variety 'Ultraviolet'. 7,543, 6-4-91, Cl. 68.000.
- Lamont, Gregory P., to Ornamental Native Australian Plants Pty Ltd. *Anigozanthos* hybrid variety 'Firefly'. 7,544, 6-4-91, Cl. 68.000.
- Lamont, Gregory P., to Ornamental Native Australian Plants Pty Ltd. *Leschenaultia formosa* variety 'Flamingo' . 7,545, 6-4-91, Cl. 68.000.
- Lamont, Gregory P., to Ornamental Native Australian Plants Pty Ltd. *Leschenaultia formosa* variety 'Starburst' . 7,546, 6-4-91, Cl. 68 000.
- Meilland, Alain A., to Conard-Pyle Company, The. Rose plant — Meilvar variety. 7,541, 6-4-91, Cl. 15.000.
- Nielsen, Ove, to DeRuiter's Nieuwe Rozen B.V. New miniature rose plant named Ruinielov. 7,540, 6-4-91, Cl. 10.000.
- Ornamental Native Australian Plants Pty Ltd: *See—*
  - Lamont, Gregory P., 7,543, Cl. 68.000.
  - Lamont, Gregory P., 7,544, Cl. 68.000.
  - Lamont, Gregory P., 7,545, Cl. 68.000.
  - Lamont, Gregory P., 7,546, Cl. 68.000.
- Warriner, William A., to Bear Creek Gardens, Inc. Rose plant Barbara Bush. 7,542, 6-4-91, Cl. 18.000.

LIST OF STATUTORY INVENTION REGISTRATIONS

APPLICANTS TO WHOM

STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE 4TH DAY OF JUNE, 1991

- Arai, Fuminori: *See—*
  - Kato, Keiko; Arai, Fuminori; and Katsuyama, Harumi, H930, Cl. 435-14.000.
- Carlon, Hugh R., to United States of America, Army. Accelerated fabric drying and decontaminating apparatus and method. H923, 6-4-91, Cl. 34-1.000.
- Chimenti, Dale E., to United States of America, Air Force. Signal analysis in leaky Lamb wave NDE technique. H924, 6-4-91, Cl. 73-644.000.
- Feldman, Lyudmila; and Messer, Marilyn K. Method for forming images and lamination of such images to a non-reactive substrate. H931, 6-4-91, Cl. 430-138.000.
- Fuji Photo Film Co., Ltd.: *See—*
  - Kato, Keiko; Arai, Fuminori; and Katsuyama, Harumi, H930, Cl. 435-14.000.
- Gallegos. Francisco F. Liquid compressing gas system. H928, 6-4-91, Cl. 417-395.000.
- Honn, James J.: *See—*
  - Kreta, Stephen J.; and Honn, James J., H929, Cl. 439-325.000.
- Kato, Keiko; Arai, Fuminori; and Katsuyama, Harumi, to Fuji Photo Film Co., Ltd. Dry-type glucose analyzing element. H930, 6-4-91, Cl. 435-14.000.
- Katsuyama, Harumi: *See—*
  - Kato, Keiko; Arai, Fuminori; and Katsuyama, Harumi, H930, Cl. 435-14.000.
- Kreta, Stephen J.; and Honn, James J., to United States of America, Navy. Latch for detachably securing electronic cards along orthogonal loading axes. H929, 6-4-91, Cl. 439-325.000.
- Mahtook, Raymond A., to United States of America, Army. Rimfire blank adaptor kit for M16 rifles. H926, 6-4-91, Cl. 89-128.000.
- Messer, Marilyn K.: *See—*
  - Feldman, Lyudmila; and Messer, Marilyn K., H931, Cl. 430-138.000.
- Miller, Donald, to United States of America, Army. Post burn hydrogen light gas cartridge. H927, 6-4-91, Cl. 102-440.000.
- Sayles, David C., to United States of America, Army. Encapsulated signal illumination flare composition. H925, 6-4-91, Cl. 86-12.000.
- United States of America
  - Air Force: *See—*
    - Chimenti, Dale E., H924, Cl. 73-644.000.
  - Army: *See—*
    - Carlon, Hugh R., H923, Cl. 34-1.000.
    - Mahtook, Raymond A., H926, Cl. 89-128.000.
    - Miller, Donald, H927, Cl. 102-440.000.
    - Sayles, David C., H925, Cl. 86-12.000.
  - Navy: *See—*
    - Kreta, Stephen J.; and Honn, James J., H929, Cl. 439-325.000.

VOL
1127
ISS
1
JE
4
1991
UMI

CLASSIFICATION OF PATENTS

ISSUED JUNE 4, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2	
[illegible]	5,020,156
2 5	5,020,157
19	5,020,158
[illegible]	5,020,159
59	5,020,160
64	5,020,161
	5,020,162
[illegible]	5,020,163
239	5,020,164
CLASS 4	
251	5,020,165
255	5,020,166
325	5,020,167
573	5,020,168
CLASS 5	
[illegible]	5,020,169
61	5,020,170
[illegible] R	5,020,171
[illegible]	5,020,172
308	5,020,173
437	5,020,174
448	5,020,175
453	5,020,176
496	5,020,177
CLASS 8	
156	5,020,178
408	5,021,066
409	5,021,067
[illegible]	5,021,068
CLASS 15	
22 1	5,020,179
[illegible]	5,020,180
[illegible]	5,020,181
[illegible]	5,020,182
246 5	5,020,183
257 1	5,020,185
257 5	5,020,184
339	5,020,186
347	5,020,187
406	5,020,188
CLASS 16	
286	5,020,189
[illegible]	5,020,190
CLASS 24	
3 R	5,020,191
136 R	5,020,192
323	5,020,193
400	5,020,194
514	5,020,195
590	5,020,196
CLASS 27	
21 1	5,020,197
CLASS 28	
250	5,020,198
273	5,020,199
CLASS 29	
25 01	5,020,200
27 C	5,020,201
243 56	5,020,202
255	5,020,203
271	5,020,204
275	5,020,205
408	5,020,206
527 4	5,020,207
527 7	5,020,208
564 8	5,020,209
568	5,020,210
596	5,020,211
603	5,020,212
	5,020,213
611	5,020,214
622	5,020,215
753	5,020,216
846	5,020,219
882	5,020,217
890 035	5,020,218
CLASS 30	
2	5,020,220
169	5,020,221
251	5,020,222
276	5,020,223
	5,020,224
308 1	5,020,225
390	5,020,226
CLASS 33	
27 03	5,020,227
199 R	5,020,229
	5,020,230
203 18	5,020,231
348.2	5,020,232
465	5,020,233
628	5,020,228
656	5,020,234
668	5,020,235
700	5,020,236
CLASS 34	
1	5,020,237
16	5,020,238
57 R	5,020,239
60	5,020,240
115	5,020,241
	5,020,242
119	5,020,243
155	5,020,244
	5,020,245
236	5,020,246
CLASS 36	
50	5,020,247
120	5,020,248
CLASS 37	
103	5,020,249
257	5,020,250
CLASS 40	
152.1	5,020,251
564	5,020,252
576	5,020,253
603	5,020,254
654	5,020,255
661	5,020,256
CLASS 42	
1 12	5,020,257
65	5,020,258
70.110	5,020,259
75.02	5,020,260
106	5,020,262
CLASS 43	
17	5,020,263
25.2	5,020,264
42.39	5,020,265
	5,020,266
43 13	5,020,267
	5,020,268
54 1	5,020,269
112	5,020,270
CLASS 44	
622	5,021,069
CLASS 47	
27	5,020,271
33	5,020,272
61	5,020,273
67	5,020,274
79	5,020,261
	5,020,275
CLASS 49	
87	5,020,276
400	5,020,277
490	5,020,278
CLASS 51	
123 G	5,020,279
168	5,020,280
170 PT	5,020,281
206 R	5,020,282
209 DL	5,020,283
338	5,020,284
CLASS 52	
81	5,020,287
202	5,020,288
233	5,020,289
242	5,020,290
309.9	5,020,292
314	5,020,293
573	5,020,294
585	5,020,286
630	5,020,295
741	5,020,296
CLASS 53	
127	5,020,297
138 2	5,020,298
399	5,020,299
	5,020,300
	5,020,301
430	5,020,302
432	5,020,303
458	5,020,304
500	5,020,305
534	5,020,306
CLASS 55	
46	5,021,070
58	5,021,071
CLASS 56	
8	5,020,307
11 3	5,020,308
13 3	5,020,309
17 2	5,020,310
432	5,020,311
CLASS 57	
200	5,020,312
CLASS 59	
78 1	5,020,313
CLASS 60	
39 141	5,020,314
39.281	5,020,315
39 282	5,020,316
39 511	5,020,317
226 1	5,020,318
317	5,020,321
321	5,020,319
404	5,020,322
413	5,020,323
430	5,020,324
528	5,020,325
586	5,020,326
600	5,020,327
641 5	5,020,328
737	5,020,329
CLASS 62	
63	5,020,330
77	5,020,331
157	5,020,332
238 7	5,020,320
271	5,020,333
	5,020,334
	5,020,335
344	5,020,336
464	5,020,337
CLASS 63	
12	5,020,338
13	5,020,339
CLASS 65	
3 11	5,021,072
18 1	5,021,073
40	5,021,074
287	5,021,075
CLASS 66	
125	5,020,340
126 R	5,020,341
CLASS 70	
14	5,020,342
34	B1 4,426,860
143	5,020,343
245	5,020,344
277	5,020,345
279	5,020,346
389	5,020,347
456 R	5,020,348
491	5,020,349
CLASS 71	
7	5,021,076
17	5,021,077
66	5,021,078
68	5,021,079
92	5,021,080
	5,021,081
93	5,021,082
105	5,021,083
CLASS 72	
45	5,020,350
70	5,020,351
84	5,020,352
187	5,020,353
225	5,020,354
407	5,020,355
CLASS 73	
1 B	5,020,356
	5,020,357
49 2	5,020,358
61 R	5,020,359
115	5,020,360
118 1	5,020,361
119 A	5,020,363
119.00 A	5,020,362
147	5,020,364
204 27	5,020,365
313	5,020,366
319	5,020,367
439	5,020,368
517 A	5,020,369
517 AV	5,020,370
636	5,020,371
718	5,020,377
730	5,020,372
779	5,020,378
800	5,020,379
861 22	5,020,373
861 25	5,020,374
861 37	5,020,380
861 38	5,020,375
862 48	5,020,381
866 5	5,020,376
CLASS 74	
89 2	5,020,382
128	5,020,383
200	5,020,384
333	5,020,385
384	5,020,386
475	5,020,387
479	5,020,388
553	5,020,389
608	5,020,390
866	5,020,391
	5,020,392
869	5,020,393
CLASS 75	
10 13	5,021,084
239	5,021,085
315	5,021,086
678	5,021,087
736	5,021,088
CLASS 76	
108 6	5,020,394
CLASS 81	
3.2	5,020,395
15 8	5,020,396
58.1	5,020,397
124 4	5,020,398
358	5,020,399
484	5,020,400
CLASS 82	
113	5,020,401
124	5,020,402
CLASS 83	
171	5,020,403
298	5,020,404
374	5,020,405
397	5,020,406
446	5,020,408
530	5,020,407
CLASS 84	
95.2	5,020,409
602	5,020,410
CLASS 89	
1.11	5,020,411
1.805	5,020,412
1.814	5,020,413
14 3	5,020,416
33.16	5,020,414
46	5,020,415
CLASS 91	
375 R	5,020,417
CLASS 92	
17	5,020,418
52	5,020,419
59	5,020,420
137	5,020,421
146	5,020,422
CLASS 98	
1	5,020,423
2.01	5,020,424
2.18	5,020,425
CLASS 99	
353	5,020,426
494	5,020,427
CLASS 101	
91	5,020,428
93	5,020,429
126	5,020,430
228	5,020,431
350	5,020,432
425	5,020,433
485	5,020,434
CLASS 102	
275.1	5,020,435
377	5,020,436
489	5,020,437
517	5,020,438
518	5,020,439
CLASS 104	
127	5,020,440
130	5,020,441
	5,020,442
230	5,020,443
284	5,020,444
CLASS 105	
4 1	5,020,445
218 1	5,020,446
451	5,020,447
CLASS 106	
2	5,021,089
23	5,021,090
287 16	5,021,091
451	5,021,092
731	5,021,093
803	5,021,094
CLASS 108	
42	5,020,448
92	5,020,449
CLASS 109	
50	5,020,450
CLASS 110	
189	5,020,451
241	5,020,452
255	5,020,453
264	5,020,454
342	5,020,455
345	5,020,456
	5,020,457
CLASS 112	
7	5,020,458
178	5,020,459
262.3	5,020,460
278	5,020,461
302	5,020,462
CLASS 114	
230	5,020,463
255	5,020,464
345	5,020,465
CLASS 116	
63 P	5,020,466
210	5,020,467
318	5,020,468
CLASS 118	
67	5,020,469
326	5,020,470
653	5,020,471
668	5,020,472
669	5,020,473
719	5,020,475
725	5,020,474
728	5,020,476
CLASS 119	
14.08	5,020,477
98	5,020,478
CLASS 122	
235 11	5,020,479
249	5,020,480
494	5,020,481
CLASS 123	
41 29	5,020,482
52 MV	5,020,483
73 AD	5,020,484
73 C	5,020,485
79 R	5,020,486
90 15	5,020,487
90 16	5,020,488
145 A	5,020,489
188 S	5,020,490
192 R	5,020,491
198 D	5,020,492
198 DB	5,020,493
250	5,020,494
326	5,020,495
399	5,020,496
418	5,020,497
450	5,020,498
467	5,020,500
479	5,020,499
489	5,020,501
	5,020,502
520	5,020,503
531	5,020,504
571	5,020,505
631	5,020,506
CLASS 124	
25 6	5,020,507
35 2	5,020,508
CLASS 126	
263	5,020,509
271.1	5,020,510
299 R	5,020,511
350 R	5,020,512
544	5,020,513
CLASS 128	
4	5,020,514
26	5,020,515
30 2	5,020,516
33	5,020,517
52	5,020,518
69	5,020,519
71	5,020,520
77	5,020,521
79	5,020,522
80 R	5,020,523
84 C	5,020,524
84 R	5,020,525
200.14	5,020,526
200 23	5,020,527
202 13	5,020,528
202 28	5,020,529
203.28	5,020,530
205 24	5,020,531
	5,020,532
206 23	5,020,533
207 15	5,020,534
402	5,020,536
634	5,020,537
653 R	5,020,538
662.06	5,020,539
696	5,020,540
723	5,020,541
741	5,020,542
760	5,020,543
784	5,020,544
785	5,020,545
849	5,020,546
891	5,020,547
CLASS 131	
194	5,020,548
231	5,020,549
296	5,020,550
CLASS 132	
200	5,020,551
265	5,020,552
320	5,020,553
323	5,020,554
CLASS 134	
21	5,021,095

VOL
1127
ISS
1
JE
4
1991
UMI

22 14	5,021,096
25 5	5,021,097
65	5,020,555
112	5,020,556

CLASS 135

15.1	5,020,557
24	5,020,558
33.2	5,020,559
67	5,020,560

CLASS 136

201	5,021,098
249	5,021,099
	5,021,100

CLASS 137

13	5,020,561
15	5,020,562
75	5,020,563
102	5,020,564
207	5,020,565
265	5,020,566
315	5,020,567
316	5,020,568
544	5,020,569
596 12	5,020,570
625 3	5,020,571

CLASS 138

99	5,020,572

CLASS 139

188 R	5,020,574
453	5,020,573

CLASS 140

112	5,020,575
149	5,020,576

CLASS 141

98	5,020,577

CLASS 144

145 R	5,020,578
176	5,020,579

CLASS 148

11 5 C	5,021,101
13	5,021,102
33	5,021,103
276	5,021,104
433	5,021,105
437	5,021,106

CLASS 156

79	5,021,108
89	5,021,107
137	5,021,109
249	5,021,110
264	5,021,111
305	5,021,112
334	5,021,113
345	5,021,114
406 6	5,021,115
475	5,021,116
515	5,021,117
607	5,021,118
620.71	5,021,119
637	5,021,120
643	5,021,121

CLASS 160

213	5,020,580

CLASS 162

103	5,020,581
150	5,021,122
157 3	5,021,123
199	5,021,124
232	5,021,125
237	5,021,127
263	5,021,126

CLASS 164

37	5,020,582
97	5,020,583
	5,020,584
452	5,020,585

CLASS 165

80.3	5,020,586
82	5,020,587
111	5,020,588
112	5,020,589

CLASS 166

55	5,020,591
77	5,020,590
187	5,020,592
208	5,020,593
250	5,020,594
272	5,020,595
	5,020,596
291	5,020,597
293	5,020,598
301	5,020,599
387	5,020,600

CLASS 169

37	5,020,601

CLASS 172

21	5,020,602
131	5,020,603
177	5,020,604

CLASS 173

1	5,020,605
163	5,020,606
171	5,020,607

CLASS 174

48	5,021,608
65 R	5,021,610
88 R	5,021,611
146	5,021,612

CLASS 175

21	5,020,608
48	5,020,609
135	5,020,610
215	5,020,611
234	5,020,612
273	5,020,613

CLASS 179

115 V	5,021,613

CLASS 180

9 21	5,020,614
11	5,020,615
79 1	5,020,616
	5,020,617
132	5,020,618
140	5,020,619
169	5,020,620
181	5,020,621
197	5,020,622
	5,020,623
210	5,020,624
219	5,020,625
233	5,020,626
234	5,020,627
272	5,020,628

CLASS 181

136	5,020,629
192	5,020,630
249	5,020,631
290	5,020,632

CLASS 182

70	5,020,633
184	5,020,634

CLASS 184

6 18	5,020,635
6.26	5,020,636
15 1	5,020,637
106	5,020,638

CLASS 187

1 R	5,020,639
89	5,020,640
95	5,020,641
124	5,020,642

CLASS 188

196 M	5,020,643
378	5,020,644

CLASS 192

0.09	5,020,645
3.25	5,020,646
3.29	5,020,647
46	5,020,648
48.1	5,020,649
56 R	5,020,650

CLASS 193

25 R	5,020,651

CLASS 194

229	5,020,652
317	5,020,653

CLASS 198

328	5,020,654
419.3	5,020,655
494	5,020,656
782	5,020,657
844.2	5,020,658
853	5,020,659

CLASS 200

5 R	5,021,614
11 TC	5,021,615
43.16	5,021,616
61.27	5,021,617
61.47	5,021,618
81.9 M	5,021,619

CLASS 203

1	5,021,128

CLASS 204

15	5,021,129

44 4	5,021,130
59 R	5,021,131
78	5,021,132
86	5,021,133
177	5,021,134
180.8	5,021,135
182 1	5,021,136
242	5,021,137
298.09	5,021,139
298.33	5,021,138
416	5,021,140

CLASS 206

45.14	5,020,660
150	5,020,661
214	5,020,662
338	5,020,663
361	5,020,664
366	5,020,665
376	5,020,666
386	5,020,667
427	5,020,668
466	5,020,669
499	5,020,670
534	5,020,671
575	5,020,672
581	5,020,673
600	5,020,674

CLASS 208

46	5,021,141
58	5,021,142
70	5,021,143
113	5,021,144
120	5,021,145
122	5,021,146
152	5,021,147
431	5,021,148

CLASS 209

141	5,021,149
245	5,021,150
538	5,020,675

CLASS 210

167	5,021,151
221.2	5,021,153
	5,021,154
231	5,021,155
241	5,021,156
248	5,021,157
326	5,021,158
396	5,021,159
500.35	5,021,160
614	5,021,161
635	5,021,162
661	5,021,163
694	5,021,164
703	5,021,165
708	5,021,167
709	5,021,166
712	5,021,152

CLASS 211

59 4	5,020,676
113	5,020,677
191	5,020,678

CLASS 215

11 1	5,020,679
11.6	5,020,680
220	5,020,681
253	5,020,682
354	5,020,683

CLASS 219

10.55 B	5,021,620
10.55 F	5,021,621
69 12	5,021,622
	5,021,623
70	5,021,624
109	5,021,625
	5,021,626
119	5,021,627
121.59	5,021,629
121.6	5,021,628
121.64	5,021,630
121 68	5,021,631
121.83	5,021,632
208	5,021,633
241	5,021,634
408	5,021,635
464	5,021,636
485	5,021,637

CLASS 220

4.24	5,020,684
203	5,020,685
276	5,020,686
645	5,020,687

CLASS 221

150 A	5,020,688

CLASS 222

1	5,020,689
83	5,020,690

95	5,020,691
109	5,020,692
137	5,020,693
	5,020,694
185	5,020,695
321	5,020,696
325	5,020,697
386	5,020,698
450	5,020,699
487	5,020,700
494	5,020,701
529	5,020,702
590	5,020,703

CLASS 223

96	5,020,704
	5,020,705

CLASS 224

39	5,020,706
42.21	5,020,707
42 32	5,020,708
151	5,020,709
219	5,020,710
222	5,020,711

CLASS 227

8	5,020,712
67	5,020,713

CLASS 228

15 1	5,020,714
102	5,020,715
212	5,020,716

CLASS 229

114	5,020,717
117.22	5,020,718
122 1	5,020,719

CLASS 232

39	5,020,720

CLASS 235

145 R	5,021,638
379	5,021,639
462	5,021,640
467	5,021,641
472	5,021,642

CLASS 236

20 R	5,020,721
49.3	Re.33,600

CLASS 239

1	5,020,722
11	5,020,723
102 2	5,020,724
154	5,020,725
525	5,020,726
526	5,020,727
533.12	5,020,728
589.1	Re.33,605
600	5,020,729
745	5,020,730

CLASS 241

1	5,020,731
7	5,020,732
100	5,020,733
119	5,020,734

CLASS 242

1	5,020,735
58.300	5,020,736
86.5	5,020,737
298	5,020,738

CLASS 244

75 R	5,020,739
93	5,020,740
134 D	5,020,741
137.2	5,020,742
159	5,020,743
164	5,020,744
165	5,020,745
169	5,020,746
187	5,020,747

CLASS 248

27 1	5,020,748
63	B1 4,383,668
74 3	5,020,749
97	5,020,750
99	5,020,751
162.1	5,020,752
176	5,020,753
206.3	5,020,754
215	5,020,755
236	5,020,756
238	5,020,757
250	5,020,758
309.2	5,020,759
313	5,020,760
317	5,020,761
394	5,020,762
454	5,020,763
529	5,020,764

539	5,020,765
559	5,020,766
638	5,020,767
678	5,020,768

CLASS 249

44	5,020,769
111	5,020,770

CLASS 250

201 9	5,021,643
221	5,021,644
223 R	5,021,645
227 11	5,021,646
227 21	5,021,647
231.13	5,021,648
231 16	5,021,649
	5,021,650
239	5,021,651
252 1	5,021,664
267	5,021,652
270	5,021,653
287	5,021,654
308	5,021,655
327 2	5,021,656
330	5,021,657
336.2	5,021,658
	5,021,659
338 3	5,021,660
339	5,021,661
	5,021,662
349	5,021,663
357.1	5,021,665
359.1	5,021,666
363 10	5,021,667
372	5,021,668
396 ML	5,021,669
396 R	5,021,670
484 1	5,021,671
492.2	5,021,672
548	5,021,673
561	5,021,674
	5,021,675
	5,021,676
574	5,021,677

CLASS 251

30.02	5,020,771
	5,020,772
129 12	5,020,773
129 15	5,020,774
215	5,020,775
327	5,020,776

CLASS 252

8.515	5,021,170
8.551	5,021,171
32.7 E	5,021,172
35	5,021,173
38	5,021,174
46.6	5,021,175
51 5 A	5,021,176
51 5 R	5,021,177
52 R	5,021,178
54 6	5,021,179
68	5,021,180
75	5,021,181
102	5,021,182
108	5,021,183
142	5,021,185
174.11	5,021,184
186.35	5,021,186
186.38	5,021,187
299.5	5,021,188
299.61	5,021,189
	5,021,190
	5,021,191
313.1	5,021,192
500	5,021,193
518	5,021,194
545	5,021,195
586	5,021,196

CLASS 254

95	5,020,777

CLASS 260

399	5,021,197

CLASS 261

44 3	5,021,198
114 1	5,021,199

CLASS 264

4 3	5,021,200
9	5,021,201
33	5,021,202
40.3	5,021,203
60	5,021,204
69	5,021,205
155	5,021,206
186	5,021,207
344	5,021,208
540	5,021,209

CLASS 266

89	5,020,778
112	5,020,779

271	5,020,780

CLASS 267

136	5,020,781
140 1	5,020,782
273	5,020,783

CLASS 270

53	5,020,784
95	5,020,786
053	5,020,785

CLASS 271

3	5,020,787
126	5,020,788
225	5,020,789

CLASS 272

27 B	5,021,019
70	5,020,790
72	5,020,792
97	5,020,793
129	5,020,794
	5,020,795
143	5,020,796
	5,020,797

CLASS 273

3 C	5,020,799
73 G	5,020,800
89	5,020,801
185 R	5,020,802
225	5,020,803
249	5,020,804
255	5,020,805
371	5,020,806
409	5,020,807
425	5,020,808
440	5,020,798

CLASS 277

81 S	5,020,809
207 A	5,020,810

CLASS 280

33.993	5,020,811
91	5,020,812
204	5,020,813
	5,020,814
246	5,020,815
250 1	5,020,816
	5,020,817
	5,020,818
288	5,020,819
439	5,020,820
603	5,020,821
613	5,020,822
634	5,020,823
686	5,020,824
707	Re.33,601
	5,020,825
	5,020,826
816	5,020,827

CLASS 281

29	5,020,828

CLASS 283

62	5,020,829
101	5,020,830
108	5,020,831

CLASS 285

197	5,020,832

CLASS 289

17	5,020,833

CLASS 292

74	5,020,834
127	5,020,835
165	5,020,836
169.13	5,020,837
201	5,020,838
256.69	5,020,839
264	5,020,840
336.3	5,020,841

CLASS 294

2	5,020,842
82.21	5,020,843
86.4	5,020,844

CLASS 296

37.7	5,020,845
186	5,020,846
204	5,020,847
210	5,020,848
221	5,020,849
223	5,020,850

CLASS 297

195	5,020,851
200	5,020,852
341	5,020,853
377	5,020,854
391	5,020,855
483	5,020,856

CLASS 298

22 R	5,020,857

CLASS 299

1	5,020,860
8	5,020,858
21	5,020,859

CLASS 301

108 R	5,020,861

CLASS 303

15	5,020,862
96	5,020,863
113	5,020,864

CLASS 305

35 EB	5,020,865

CLASS 307

10 1	5,021,678
66	5,021,679
243	5,021,680
261	5,021,681
296 8	5,021,682
441	5,021,683
443	5,021,684
	5,021,685
448	5,021,686
456	5,021,687
463	5,021,688
465	5,021,689
	5,021,690
475	5,021,691
490	5,021,692
494	5,021,693
631	5,021,694

CLASS 310

12	5,021,695
62	5,021,696
90 5	5,021,697
156	5,021,698
313 B	5,021,699
316	5,021,700
345	5,021,701

CLASS 312

265 4	5,020,866
314	5,020,867
319	5,020,868
341 1	5,020,869

CLASS 313

7	5,021,702
25	5,021,703
35	5,021,704
106	5,021,705
318	5,021,706
402	5,021,707
446	5,021,708
456	5,021,709
489	5,021,710
623	5,021,711

CLASS 315

8	5,021,712
39 51	5,021,713
101	5,021,714
159	5,021,715
219	5,021,716
324	5,021,717
358	5,021,718
364	5,021,719
370	5,021,720

CLASS 318

432	5,021,721
434	5,021,722
756	5,021,723
800	5,021,724
801	5,021,725
811	5,021,726

CLASS 322

7	5,021,727

CLASS 323

272	5,021,728
311	5,021,729
316	5,021,730

CLASS 324

96	5,021,731
158 F	5,021,732
	5,021,733
	5,021,734
175	5,021,735
202	5,021,736
207 11	5,021,737
232	5,021,738
248	5,021,739
687	5,021,740

CLASS 328

227	5,021,741

CLASS 330

4 3	5,021,742

54	5,021,743
252	5,021,744
253	5,021,745
262	5,021,746
284	5,021,747
286	5,021,748

CLASS 331

17	5,021,749
111	5,021,750
135	5,021,751
177 V	5,021,752

CLASS 332

103	5,021,753
128	5,021,754

CLASS 333

	5,021,755
132	5,021,756
205	5,021,757
245	5,021,758
246	5,021,759

CLASS 335

15	5,021,819
196	5,021,760

CLASS 337

68	5,021,761
103	5,021,762

CLASS 340

407	5,021,763
439	5,021,764
539	5,021,765
544	5,021,766
572	5,021,767
573	5,021,768
580	5,021,769
709	5,021,770
	5,021,771
724	5,021,772
764	5,021,773
811	5,021,774
814	5,021,775
825.31	5,021,776
825 54	5,021,777
	5,021,778
825 69	5,021,779
994	5,021,780

CLASS 341

13	5,021,781
67	5,021,782
110	5,021,783
120	5,021,784
138	5,021,785
143	5,021,786
150	5,021,787
152	5,021,788

CLASS 342

25	5,021,789
44	5,021,790
93	5,021,791
357	5,021,792
383	5,021,793
457	5,021,794

CLASS 343

700 MS	5,021,795
712	5,021,796
727	5,021,797
762	5,021,798
795	5,021,799
820	5,021,800
876	5,021,801

CLASS 346

1.1	5,021,802
	5,021,803
76 PII	5,021,804
	5,021,806
76 R	5,021,805
108	5,021,807
140 R	5,021,808
	5,021,809
155	5,021,810

CLASS 350

4 1	5,020,870
96 1	5,020,871
96 14	5,020,872
96.20	5,020,873
	5,020,874
96.23	5,020,875
102	5,020,876
128	5,020,877
133	5,020,878
162.17	5,020,879
319	5,020,880
333	5,020,881
334	B1 4,413,883
335	5,020,882
350 S	5,020,883
354	5,020,884

355	5,020,885
409	5,020,886
	5,020,887
432	5,020,888
463	5,020,889
500	5,020,890
527	5,020,891
537	5,020,892
573	5,020,893
587	5,020,894
608	5,020,895
636	5,020,896
638	5,020,897

CLASS 351

160 R	5,020,898

CLASS 352

99	5,020,899

CLASS 353

26 R	5,020,900

CLASS 354

76	5,021,811
	5,021,812
82	5,021,813
149.11	5,021,814
222	5,021,815
275	5,021,816
402	5,021,817
429	5,021,818

CLASS 355

40	5,021,820
53	5,021,821
69	5,021,822
	5,021,823
72	5,021,824
200	5,021,825
205	5,021,826
206	5,021,827
209	5,021,828
213	5,021,829
215	5,021,830
	5,021,831
218	5,021,832
228	5,021,833
256	5,021,834
271	5,021,835
281	5,021,836
322	5,021,837
328	5,021,838

CLASS 356

5	5,020,901
21	5,020,902
28	5,020,903
35 5	5,020,904
124	5,020,905
138	5,020,906
153	5,020,907
239	5,020,908
300	5,020,909
328	5,020,910
350	5,020,911
	5,020,912
	5,020,913

CLASS 357

4	5,021,839
15	5,021,840
22	5,021,841
23 1	5,021,843
23.11	5,021,852
23 13	5,021,853
23.3	5,021,844
23 4	5,021,845
	5,021,846
23 5	5,021,847
	5,021,848
	5,021,849
23 6	5,021,842
23 7	5,021,850
23 9	5,021,851
30	5,021,854
38	5,021,855
40	5,021,856
42	5,021,857
	5,021,858
43	5,021,859
48	5,021,860
51	5,021,861
55	5,021,862
57	5,021,863
70	5,021,864
	5,021,865
	5,021,866
71	5,021,867
74	5,021,868
75	5,021,869

CLASS 358

11	5,021,870
	5,021,871
19	5,021,872
21 R	5,021,873

29	5,021,874
29 C	5,021,875
75	5,021,876
	5,021,877
93	5,021,878
105	5,021,879
138	5,021,880
140	5,021,881
141	5,021,882
160	5,021,883
167	5,021,884
168	5,021,885
170	5,021,886
183	5,021,887
213.11	5,021,888
405	5,021,890
432	5,021,891
440	5,021,889
468	5,021,892

CLASS 360

15	5,021,893
46	5,021,894
66	5,021,895
70	5,021,896
72 2	5,021,897
78 04	5,021,898
85	5,021,899
	5,021,900
92	5,021,901
	5,021,902
96.1	5,021,903
96 5	5,021,904
97.02	5,021,905
103	5,021,906
104	5,021,907
107	5,021,908
113	5,021,909
123	5,021,910
128	5,021,911
	5,021,912
133	5,021,913

CLASS 361

19	5,021,914
26	5,021,915
171	5,021,916
195	5,021,917
216	5,021,918
225	5,021,919
311	5,021,920
321	5,021,921
380	5,021,922
	5,021,923
385	5,021,924
386	5,021,925
436	5,021,926
514	5,021,927

CLASS 362

32	5,021,928
	5,021,929
61	5,021,930
84	5,021,931
96	5,021,932
109	5,021,933
187	5,021,934
237	5,021,935

CLASS 363

41	5,021,936
	5,021,937

CLASS 364

132	5,021,938
143	5,021,939
148	5,021,940
176	5,021,941
200	5,021,942
	5,021,943
	5,021,945
	5,021,946
	5,021,947
	5,021,948
	5,021,949
	5,021,950
	5,021,951
406	5,021,952
407	5,021,953
410	5,021,954
424.1	5,021,955
	5,021,956
426.01	5,021,957
426.04	5,021,958
431.01	5,021,960
431.05	5,021,959
443	5,021,961
457	5,021,962
464 02	5,021,963
464.03	5,021,964
470	5,021,965
474 26	5,021,966
479	5,021,967
505	5,021,968
513	5,021,969
	5,021,970
513 5	5,021,971

518	5,021,972
	5,021,973
	5,021,974
519	5,021,975
521	5,021,976
	5,021,977
525	5,021,978
	5,021,979
557	5,021,980
	5,021,981
578	5,021,982
707	5,021,983
709.16	5,021,984
748	5,021,985
	5,021,986
754	5,021,987
807	5,021,988
900	5,021,989
	5,021,990
	5,021,991
	5,021,992
	5,021,993
	5,021,994
	5,021,995
	5,021,996
	5,021,997

CLASS 365

51	5,021,998
168	5,021,999
184	5,022,000
185	5,022,001
	5,022,002
189 01	5,022,003
189 07	5,022,004
189 09	5,022,005
200	5,021,944
	5,022,006
201	5,022,007
	5,022,008
210	5,022,009
230.06	5,022,010
233	5,022,011

CLASS 366

79	5,020,914
89	5,020,915
97	5,020,916
161	5,020,917
279	5,020,918

CLASS 367

3	5,022,012
4	5,022,013
87	5,022,014
124	5,022,015

CLASS 368

223	5,022,016

CLASS 369

13	5,022,017
	5,022,018
36	5,022,019
37	5,022,020
44 11	5,022,021
44 16	5,022,022
77 1	5,022,023

CLASS 370

50	5,022,024
60	5,022,025
66	5,022,026

CLASS 371

12	5,022,027
25.1	5,022,028
38.1	5,022,029
43	5,022,031
51 1	5,022,030

CLASS 372

18	5,022,032
25	5,022,033
26	5,022,034
36	5,022,035
45	5,022,036
49	5,022,037
50	5,022,038
58	5,022,039
69	5,022,040
70	5,022,041
71	5,020,791
75	5,022,042
95	5,022,043

CLASS 373

151	5,022,044

CLASS 374

20	5,022,045
29	5,020,919
57	5,020,920

CLASS 375

1	5,022,046
	5,022,047
	5,022,048

	5,022,049
7	5,022,050
19	5,022,051
25	5,022,052
39	5,022,053
64	5,022,054
82	5,022,055
119	5,022,056
	5,022,057
120	5,022,058

CLASS 376

247	5,021,210
283	5,021,212
299	5,021,211

CLASS 377

39	5,022,059

CLASS 378

2	5,022,066
19	5,022,060
84	5,022,061
86	5,022,062
99	5,022,063
145	5,022,064
168	5,022,065

CLASS 379

32	5,022,070
62	5,022,068
67	5,022,069
93	5,022,071
95	5,022,067
100	5,022,072
145	5,022,073
407	5,022,074
445	5,022,075

CLASS 380

2	5,022,076
4	5,022,077
7	5,022,078
14	5,022,079
23	5,022,080

CLASS 381

43	5,022,081
71	5,022,082
98	5,022,083
202	5,022,084

CLASS 382

1	5,022,085
2	5,022,086
32	5,022,087
41	5,022,088
44	5,022,089
49	5,022,090
	5,022,091

CLASS 383

38	5,020,921
119	5,020,922

CLASS 384

99	5,020,923
280	B1 4,717,268
536	5,020,924
569	5,020,925

CLASS 400

54	5,020,926
121	5,020,927
193	5,020,928
639 1	5,020,929

CLASS 401

146	5,020,930

CLASS 402

79	5,020,931

CLASS 403

30	5,020,932
90	5,020,933
306	5,020,934
391	5,020,935

CLASS 404

32	5,020,936
35	5,020,937

CLASS 405

16	5,020,938
36	5,020,939
63	5,020,940
186	5,020,941
224	5,020,942

CLASS 406

195	5,020,943

CLASS 407

42	5,020,944

CLASS 408

1 R	5,020,945

VOL 1127
ISS 1
JE 4
1991
UMI

CLASSIFICATION OF PATENTS

CLASS 409	
136	5,020,946
CLASS 410	
70	5,020,947
105	5,020,948
CLASS 411	
7	5,020,949
107	5,020,950
	5,020,951
113	5,020,952
247	5,020,953
403	5,020,954
CLASS 413	
6	B1 4,697,972
8	5,020,955
CLASS 414	
138 1	5,020,956
279	5,020,957
281	5,020,958
416	5,020,959
494	5,020,960
495	5,020,961
525 4	Re 33,602
569	5,020,962
607	5,020,963
751	5,020,964
786	5,020,965
797 5	5,020,966
CLASS 415	
4 4	5,020,967
36	5,020,968
55 3	5,020,969
115	5,020,970
CLASS 416	
204 A	5,020,971
CLASS 417	
37	5,020,972
243	5,020,973
246	5,020,974
295	5,020,975
	5,020,976
322	5,020,977
363	5,020,978
499	5,020,979
500	5,020,980
501	5,020,981
CLASS 419	
36	5,021,213
CLASS 420	
504	5,021,214
584 1	5,021,215
CLASS 422	
100	5,021,217
104	5,021,218
112	5,021,219
129	5,021,221
144	5,021,222
198	5,021,223
248	5,021,224
249	5,021,225
CLASS 423	
212	5,021,227
244	5,021,228
245 3	5,021,229
345	5,021,230
506	5,021,231
554	5,021,226
574 R	5,021,232
656	5,021,233
CLASS 424	
1 1	5,021,220
	5,021,234
	5,021,235
9	5,021,236
43	5,021,237
47	5,021,238
70	5,021,477
85 1	5,021,239
118	5,021,240
426	5,021,241
436	5,021,242
530	5,021,243
561	5,021,244
CLASS 425	
42	5,020,982
85	5,020,983
117	Re 33,603
141	5,020,984
384	5,020,985
437	5,020,986
CLASS 426	
2	5,021,245
13	5,021,246
69	5,021,247
96	5,021,248
	5,021,249
231	5,021,250
330 5	5,021,251
412	5,021,252
422	5,021,253
482	5,021,254
582	5,021,255
601	5,021,256
CLASS 427	
2	5,021,257
35	5,021,258
115	5,021,259
140	5,021,260
286	5,021,261
289	5,021,262
353	5,021,263
	5,021,264
365	5,021,265
379	5,021,266
387	5,021,267
430 1	5,021,268
436	5,021,269
CLASS 428	
34 1	5,021,270
36 2	5,021,271
40	5,021,272
	5,021,273
41	5,021,274
42	5,021,275
64	5,021,276
76	5,021,277
	5,021,278
100	5,021,279
102	5,021,280
116	5,021,281
	5,021,282
	5,021,283
166	5,021,284
195	5,021,285
198	5,021,286
212	5,021,287
224	5,021,288
285	5,021,289
319 3	5,021,290
319.9	5,021,291
323	5,021,292
328	5,021,293
332	5,021,294
379	5,021,295
409	5,021,296
421	B1 3,778,308
430	5,021,297
458	5,021,298
585	5,021,299
620	5,021,300
659	5,021,301
692	5,021,302
CLASS 429	
16	5,021,303
30	5,021,304
65	5,021,305
94	5,021,306
184	5,021,307
194	5,021,308
CLASS 430	
58	5,021,309
85	5,021,310
96	5,021,311
97	5,021,312
100	5,021,313
106	5,021,314
106.6	5,021,315
108	5,021,316
110	5,021,317
124	5,021,318
138	5,021,319
192	5,021,320
201	5,021,321
223	5,021,322
292	5,021,323
331	5,021,324
387	5,021,325
399	5,021,326
496	5,021,327
502	5,021,328
543	5,021,329
544	5,021,330
	5,021,331
	5,021,332
	5,021,555
551	5,021,333
562	5,021,334
608	5,021,336
CLASS 431	
1	5,020,987
51	5,020,988
125	5,020,989
274	5,020,990
319	5,020,991
CLASS 432	
248	5,020,992
CLASS 433	
65	5,020,993
126	5,020,994
215	5,020,995
CLASS 435	
6	5,021,335
29	5,021,337
68 1	5,021,338
69 1	5,021,339
	5,021,340
71 1	5,021,341
91	5,021,342
119	5,021,343
172.3	5,021,344
180	5,021,345
219	5,021,346
235	5,021,347
237	5,021,348
240 31	5,021,349
243	5,021,350
297	5,021,351
CLASS 436	
136	5,021,352
CLASS 437	
21	5,021,359
34	5,021,353
	5,021,354
35	5,021,355
45	5,021,356
52	5,021,357
57	5,021,358
81	5,021,360
129	5,021,361
173	5,021,362
200	5,021,363
228	5,021 364
237	5,021,365
CLASS 439	
62	Re 33,604
76	5,020,996
137	5,020,997
266	5,020,998
290	B1 4,445,741
317	5,021,004
328	5,020,999
342	5,021,000
349	5,021,001
352	5,021,002
357	5,021,003
421	5,021,005
469	5,021,006
497	5,021,007
504	5,021,008
538	5,021,009
578	5,021,010
582	5,021,011
610	5,021,012
755	5,021,013
798	5,021,014
CLASS 440	
13	5,021,015
113	5,021,016
CLASS 441	
70	5,021,017
CLASS 445	
24	5,021,018
CLASS 446	
73	5,021,020
92	5,021,021
220	5,021,022
CLASS 452	
127	5,021,023
149	5,021,024
174	5,021,025
CLASS 453	
40	5,021,026
58	5,021,027
CLASS 460	
85	5,021,028
	5,021,029
111	5,021,030
CLASS 474	
18	5,021,031
138	5,021,032
152	5,021,033
174	5,021,034
237	5,021,036
CLASS 475	
25	5,021,037
85	5,021,038
183	5,021,035
CLASS 493	
14	5,021,039
133	5,021,040
177	5,021,041
404	5,021,042
CLASS 501	
45	5,021,366
88	5,021,367
92	5,021,368
95	5,021,369
	5,021,370
96	5,021,371
97	5,021,372
119	5,021,373
120	5,021,374
132	5,021,375
153	5,021,376
CLASS 502	
26	5,021,377
62	5,021,378
102	5,021,379
107	5,021,380
117	5,021,381
	5,021,382
174	5,021,383
209	5,021,384
211	5,021,385
248	5,021,386
260	5,021,387
261	5,021,388
303	5,021,389
401	5,021,390
426	5,021,391
439	5,021,392
CLASS 503	
227	5,021,393
	5,021,394
CLASS 505	
1	5,021,395
	5,021,396
	5,021,397
	5,021,398
	5,021,399
	5,021,400
	5,021,401
CLASS 512	
11	5,021,402
CLASS 514	
9	5,021,403
26	5,021,404
63	5,021,405
99	5,021,406
154	5,021,407
179	5,021,408
183	5,021,409
213	5,021,410
220	5,021,411
223.8	5,021,412
227.5	5,021,413
237.5	5,021,414
242	5,021,415
249	5,021,416
	5,021,417
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253	5,021,419
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254	5,021,421
261	5,021,422
262	5,021,423
276	5,021,424
299	5,021,425
313	5,021,426
315	5,021,427
317	5,021,428
331	5,021,429
332	5,021,430
333	5,021,431
337	5,021,432
338	5,021,433
341	5,021,434
342	5,021,435
356	5,021,436
357	5,021,437
373	5,021,438
380	5,021,439
381	5,021,440
	5,021,441
383	5,021,442
394	5,021,443
397	5,021,444
402	5,021,445
407	5,021,446
411	5,021,447
415	5,021,448
422	5,021,449
453	5,021,450
460	5,021,451
474	5,021,452
510	5,021,453
541	5,021,454
574	5,021,455
649	5,021,456
653	5,021,457
655	5,021,458
663	5,021,459
681	5,021,570
718	5,021,460
731	5,021,461
CLASS 521	
26	5,021,216
63	5,021,462
143	5,021,463
189	5,021,464
CLASS 522	
60	5,021,465
75	5,021,466
96	5,021,467
CLASS 523	
201	5,021,469
414	5,021,470
	5,021,471
427	5,021,472
451	5,021,473
CLASS 524	
14	5,021,474
30	5,021,475
77	5,021,476
91	5,021,478
96	5,021,479
99	5,021,480
	5,021,481
100	5,021,482
	5,021,484
	5,021,485
	5,021,486
104	5,021,487
116	5,021,488
140	5,021,489
	5,021,490
180	5,021,491
274	5,021,492
347	5,021,493
404	5,021,494
410	5,021,495
417	5,021,496
436	5,021,497
484	5,021,498
487	5,021,499
525	5,021,500
544	5,021,501
591	5,021,502
706	5,021,503
CLASS 525	
57	5,021,504
59	5,021,505
63	5,021,506
127	5,021,507
133	5,021,508
221	5,021,509
285	5,021,510
295	5,021,511
328 2	5,021,512
328 8	5,021,513
351	5,021,514
371	5,021,515
403	5,021,516
417	5,021,517
422	5,021,518
423	5,021,519
458	5,021,520
462	5,021,521
502	5,021,522
537	5,021,523
CLASS 526	
190	5,021,524
210	5,021,525
240	5,021,526
245	5,021,527
280	5,021,528
304	5,021,529
323.2	5,021,530
CLASS 527	
400	5,021,531
CLASS 528	
15	5,021,532
21	5,021,533
60	5,021,534
66	5,021,535
73	5,021,536
106	5,021,537
129	5,021,538
	5,021,539
183	5,021,540
196	5,021,541
204	5,021,542
217	5,021,543
272	5,021,544
	5,021,545
389	5,021,546
392	5,021,547
CLASS 529	
100	5,021,483
CLASS 530	
216	5,021,548
330	5,021,549
334	5,021,550
345	5,021,551
356	5,021,552
387	5,021,553
399	5,021,554
CLASS 534	
10	5,021,556
560	5,021,557
618	5,021,558
638	5,021,559
CLASS 536	
1 1	5,021,560
20	5,021,561
53	5,021,562
CLASS 540	
128	5,021,563
225	5,021,564
302	5,021,565
	5,021,566
470	5,021,567
531	5,021,568
581	5,021,569
CLASS 544	
166	5,021,571
229	5,021,572
276	5,021,574
281	5,021,591
284	5,021,573
CLASS 546	
77	5,021,575
174	5,021,576
188	5,021,577
296	5,021,578
302	5,021,579
307	5,021,580
309	5,021,581
CLASS 548	
197	5,021,582
328	5,021,583
335	5,021,584
406	5,021,585
527	5,021,586
543	5,021,587
CLASS 549	
241	5,021,168
255	5,021,169
259	5,021,588
325	5,021,589
438	5,021,590
CLASS 556	
1	5,021,592
20	5,021,593
38	5,021,594
42	5,021,595
55	5,021,596
69	5,021,597
77	5,021,598
142	5,021,599
411	5,021,600
436	5,021,601
CLASS 558	
230	5,021,602
237	5,021,603
425	5,021,605
CLASS 568	
311	5,021,607
CLASS 604	
49	5,021,043
53	5,021,044
	5,021,045
97	5,021,046
110	5,021,047
151	5,021,048
192	5,021,049
379	5,021,050
385 2	5,021,051
892 1	5,021,053
CLASS 606	
54	5,021,054
82	5,021,055
86	5,021,056
107	5,021,057
174	5,020,535
204	5,021,058
213	5,021,059
234	5,021,060
CLASS 623	
20	5,021,061
22	5,021,062
23	5,021,063
26	5,021,064
63	5,021,065

CLASSIFICATION OF DESIGNS

D1—	102	317,222
D2—	244	317,223
	314	317,224
	320	317,225
D3—	34	317,359
	36	317,226
	37	317,227
	104	317,228
D6—	379	317,229
	385	317,230
	397	317,231
	491	317,232
	553	317,233
		317,234
	599	317,235
	601	317,236
D7—	309	317,237
	325	317,238
	402	317,239
	605	317,240
D8—	14	317,241
		317,242
		317,243
	62	317,244
	72	317,245
	300	317,246
	336	317,247
	346	317,248
	347	317,249
	380	317,250
	394	317,251
	395	317,252
D9—	300	317,253
	305	317,254
	341	317,255
	355	317,256
	367	317,257
	384	317,258
	409	317,259
	417	317,260
	430	317,261
	431	317,262
D10—	23	317,263
	32	317,264
	39	317,265
	46	317,266
	50	317,267
	51	317,268
	52	317,269
	96	317,270
		317,271
	106	317,272
	119	317,273
D11—	4	317,274
	202	317,275
D12—	14	317,276
	41	317,277
	51	317,278
	106	317,279
	129	317,280
	146	317,281
	147	317,282
	155	317,283
	178	317,284
	192	317,285
	306	317,286
	344	317,287
D13—	133	317,288
		317,289
		317,290
		317,291
		317,292
		317,293
	146	317,294
	147	317,295
		317,296
		317,297
	154	317,298
		317,299
	182	317,300
D14—	102	317,301
	106	317,302
	126	317,303
		317,304
		317,305
	129	317,306
	137	317,307
	168	317,308
	217	317,309
		317,310
	240	317,311
	250	317,312
D15—	9	317,313
	13	317,314
	150	317,315
D16—	102	317,316
	209	317,318
	213	317,317
D17—	1	317,319
	20	317,320
D18—	1	317,321
	13	317,322
	24	317,323
D19—	57	317,324
	60	317,325
	65	317,326
	75	317,327
D20—	20	317,328
D21—	14	317,329
	25	317,330
	48	317,331
	59	317,332
		317,333
	76	317,334
	84	317,335
	137	317,336
	153	317,337
	160	317,338
	166	317,339
		317,340
	169	317,341
		317,342
	228	317,343
D22—	110	317,344
	142	317,345
D23—	209	317,346
	213	317,347
	223	317,348
	242	317,349
	257	317,350
	265	317,351
		317,352
	275	317,353
	281	317,354
		317,355
	284	317,356
	290	317,357
	393	317,358
D24—	125	317,362
	141	317,361
	226	317,360
D26—	26	317,363
	93	317,364
D27—	159	317,365
D28—	35	317,366
	58	317,367
D29—	11	317,368
D30—	107	317,369
	152	317,370
	158	317,371

CLASSIFICATION OF PLANTS

P —	10	7,540
	15	7,541
	18	7,542
	50	7,547
	68	7,543
		7,544
		7,545
		7,546

STATUTORY INVENTION REGISTRATIONS

34—	1	H923
73—	644	H924
86—	12	H925
89—	128	H926
102—	440	H927
417—	395	H928
430—	138	H931
435—	14	H930
439—	325	H929

VOL
1127
ISS
1
JE
4
1991
UMI

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 5,020,374
5,020,422
5,020,438
5,020,876
5,020,966
5,021,057
5,021,065
5,021,209
4,383,668
02 5,020,227
04 5,020,260
5,020,335
5,020,413
5,020,475
5,020,588
5,020,621
5,020,844
5,020,910
5,020,932
5,021,096
5,021,244
5,021,684
5,021,786
5,021,799
5,021,943
05 5,021,016
5,021,058
5,021,274
06 Re.33,602
5,020,174
5,020,176
5,020,185
5,020,191
5,020,192
5,020,213
5,020,219
5,020,224
5,020,267
5,020,274
5,020,317
5,020,345
5,020,377
5,020,401
5,020,411
5,020,420
5,020,426
5,020,436
5,020,445
5,020,448
5,020,450
5,020,464
5,020,469
5,020,476
5,020,523
5,020,532
5,020,535
5,020,538
5,020,586
5,020,595
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VOL
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	5,020,678		5,020,395		5,022,016		5,021,006		5,020,978		5,021,522
	5,020,693		5,020,460		5,022,018		5,021,008		5,021,035		5,021,550
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	5,020,923		5,020,797		5,021,034		5,021,163		5,021,136		5,021,917
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	5,021,042		5,021,119		5,021,551		5,021,251		5,021,183	43	5,020,344
	5,021,117		5,021,239		5,021,587		5,021,309		5,021,196	44	5,020,348
	5,021,206		5,021,258		5,021,665		5,021,322		5,021,232		5,020,809
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	5,021,252		5,021,360	30	5,020,870		5,021,327		5,021,256		5,021,320
	5,021,303		5,021,363		5,021,094		5,021,355		5,021,261	45	5,020,166
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	5,021,666		5,021,463		5,021,128		5,021,453		5,021,383		5,021,538
	5,021,714		5,021,667	32	5,020,407		5,021,460		5,021,428	46	5,020,447
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	5,021,893		5,021,756		5,022,004		5,021,555		5,021,517		5,021,495
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	5,022,054		5,022,013		5,020,294		5,021,641		5,021,598	48	5,020,160
18	5,020,190		5,022,062		5,020,403		5,021,697		5,021,751		5,020,168
	5,020,203	26	5,020,258		5,020,465		5,021,732		5,021,762		5,020,182
	5,020,246		5,020,263		5,020,527		5,021,741		5,022,045		5,020,230
	5,020,361		5,020,264		5,020,571		5,021,769	40	5,020,231		5,020,262
	5,020,519		5,020,272		5,020,607		5,021,793		5,020,249		5,020,269
	5,020,542		5,020,273		5,020,665		5,021,811		5,020,287		5,020,355
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	5,020,585		5,020,314		5,020,734		5,021,820		5,020,843		5,020,520
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	5,021,019		5,020,404		5,020,970		5,021,838		5,021,379		5,020,545
	5,021,356		5,020,418		5,021,027		5,021,903		5,022,052		5,020,554
	5,021,441		5,020,430		5,021,072		5,021,906	41	5,020,510		5,020,561
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	5,021,564		5,020,556		5,021,142		5,021,987		5,020,814		5,020,591
	5,021,586		5,020,570		5,021,146		5,022,010		5,020,872		5,020,592
	5,021,617		5,020,579		5,021,147		5,022,078		5,020,878		5,020,593
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	5,020,337		5,020,614		5,021,178	37	5,020,298		5,021,126		5,020,597
	5,020,604		5,020,622		5,021,187		5,020,309		5,022,083		5,020,598
	5,020,627		5,020,630		5,021,221		5,020,347	42	5,020,163		5,020,600
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	5,020,714		5,020,950		5,021,418		5,021,229		5,020,441		5,020,826
	5,021,161		5,020,951		5,021,424		5,021,437		5,020,442		5,020,937
	5,022,089		5,021,071		5,021,430		5,021,610		5,020,457		5,020,940
21	5,020,244		5,021,160		5,021,466		5,021,710		5,020,478		5,020,942
	5,020,481		5,021,172		5,021,500		5,021,776		5,020,546		5,020,984
	5,020,632		5,021,188		5,021,507		5,021,861		5,020,557		5,021,021
22	5,020,223		5,021,218		5,021,509		5,021,932		5,020,703		5,021,044
	5,020,609		5,021,253		5,021,565		5,021,981		5,020,725		5,021,055
	5,020,668		5,021,278		5,021,566	39	5,020,157		5,020,745		5,021,113
	5,020,731		5,021,288		5,021,574		5,020,237		5,020,757		5,021,153
	5,020,790		5,021,368		5,021,575		5,020,300		5,020,773		5,021,157
	5,020,956		5,021,372		5,021,576		5,020,305		5,020,780		5,021,165
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23	5,021,687		5,021,470		5,021,628		5,020,334		5,020,959		5,021,180
24	Re.33,605		5,021,580		5,021,630		5,020,356		5,020,993		5,021,228
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	5,020,743		5,021,780		5,021,086		5,020,525		5,021,074		5,021,423
	5,020,756		5,021,939		5,021,193		5,020,596		5,021,133		5,021,427
	5,020,832	27	5,020,173		5,021,307		5,020,606		5,021,135		5,021,471
	5,020,909		5,020,195	36	Re.33,600		5,020,650		5,021,141		5,021,496
	5,021,001		5,020,239		Re.33,604		5,020,663		5,021,208		5,021,498
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	5,021,351		5,020,357		5,020,194		5,020,680		5,021,293		5,021,537
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	5,021,658		5,020,544		5,020,505		5,020,711		5,021,362		5,021,653
	5,021,704		5,020,620		5,020,543		5,020,732		5,021,374		5,021,654
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	5,022,027		5,020,813		5,020,801		5,020,791		5,021,448		5,021,690
	5,022,055		5,020,988		5,020,805		5,020,828		5,021,454		5,021,730
25	5,020,188		5,021,048		5,020,834		5,020,917		5,021,489		5,021,748

	5,021,775	49	5,020,164	50	5,020,181		5,021,583		5,020,861		5,020,238
	5,021,783		5,020,228		5,022,006		5,021,734		5,021,050		5,020,302
	5,021,840		5,020,396	51	5,020,161		5,021,738		5,021,099		5,020,308
	5,021,845		5,020,467		5,020,261		5,021,928		5,021,369		5,020,399
	5,021,849		5,020,507		5,020,400		5,022,070		5,021,452		5,020,659
	5,021,851		5,020,577		5,020,425	53	5,020,189		5,021,556		5,020,770
	5,021,852		5,020,673		5,020,463		5,020,288		5,021,731		5,020,776
	5,021,920		5,020,777		5,020,528		5,020,417		5,021,740		5,020,919
	5,021,935		5,020,957		5,020,610		5,020,541		5,021,763		5,021,615
	5,021,940		5,021,046		5,020,739		5,020,637		5,021,974		5,021,645
	5,021,973		5,021,056		5,020,977		5,020,655		5,022,076		5,021,760
	5,021,976		5,021,137		5,021,077		5,020,666	54	5,020,860		5,021,918
	5,021,991		5,021,971		5,021,247		5,020,677		5,021,608		5,021,978
	5,021,994		5,022,048		5,021,386		5,020,747	55	5,020,205		5,021,979
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	4,445,741										

DESIGN PATENTS

04	317,275		317,349	18	317,304		317,277		317,353		317,240
06	317,236	08	317,223	19	317,228	31	317,363		317,360		317,267
	317,239		317,358	21	317,284	34	317,242	37	317,231		317,296
	317,247	09	317,253	24	317,244		317,256		317,241	48	317,287
	317,248		317,254		317,251		317,329		317,307		317,370
	317,255		317,297	25	317,225		317,342	39	317,238	51	317,338
	317,291		317,312		317,263	35	317,230		317,356		317,339
	317,292	11	317,330		317,341		317,261		317,364		317,340
	317,293	12	317,270	26	317,274	36	317,226	41	317,224	53	317,283
	317,301		317,271		317,286		317,257	42	317,245		317,335
	317,320		317,347	27	317,266		317,311		317,249	55	317,272
	317,323	13	317,250		317,268		317,316		317,278		317,273
	317,328		317,359		317,269		317,321		317,371		317,276
	317,343	16	317,252		317,322		317,332	44	317,310	56	317,243
	317,344	17	317,348	29	317,222		317,337	47	317,233		

PLANT PATENTS

06	7,542		7,547								

STATUTORY INVENTION REGISTRATIONS

01	H925	24	H923								
06	H928		H929	34	H926		H927	39	H924		H931

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1991

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U.S. DEPARTMENT OF COMMERCE
Robert A. Mosbacher, *Secretary*
PATENT AND TRADEMARK OFFICE
Harry F. Manbeck, Jr., *Commissioner*

VOL
1127

ISS
2

JE
11

1991

UMI

Vol 1127 Number 2

OFFICIAL GAZETTE
of the
UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

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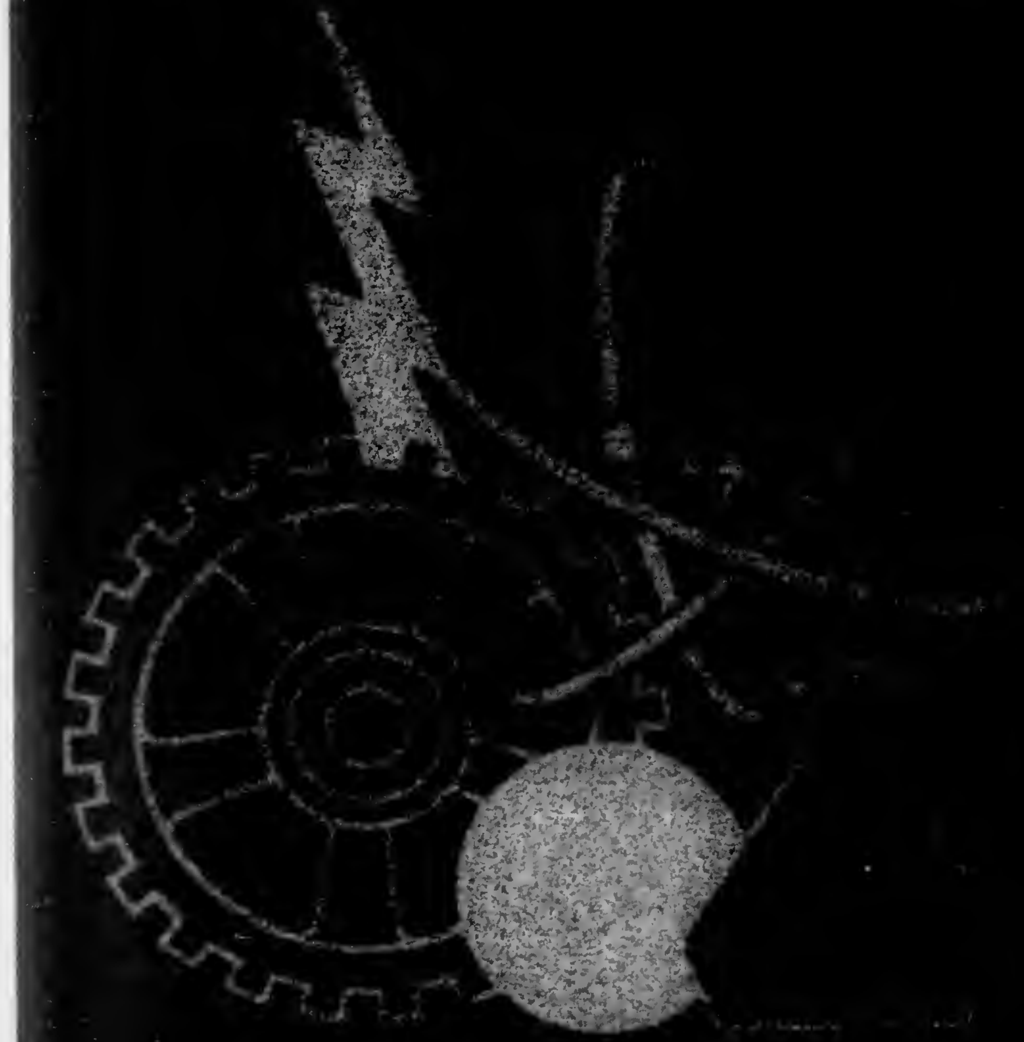
PATENTS
June 11, 1991



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VOL
1127

ISS
2

JE
11

1991

UMI

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

June 11, 1991 Volume 1127 Number 2

CONTENTS

Page

Patent and Trademark Office Notices
- Patent Cooperation Treaty (PCT) Information ..... 1127 OG 30
- Notice of Maintenance Fees Payable ..... 1127 OG 30
- Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees ..... 1127 OG 31
- Notification of Acceptance of Delayed Payment of Maintenance Fee ..... 1127 OG 33
- Reissue Applications Filed ..... 1127 OG 34
- Requests for Reexaminations Filed ..... 1127 OG 34
- Errata ..... 1127 OG 34
- Facsimile Transmission ..... 1127 OG 34
- Patents Available for License or Sale ..... 1127 OG 34
- Patent Certificates of Correction ..... 1127 OG 36
- Special Boxes for Mail ..... 1127 OG 37

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries ..... 1127 OG 38

Patent Examining Corps ..... 1127 OG 40

Reexaminations 691

Reissue Patents Granted (33,606) 695

Plant Patents Granted (7,548) 698

Patents Granted
- General and Mechanical (5,022,092) 699
- Chemical (5,022,891) 977
- Electrical (5,023,394) 1119

Design Patents Granted (317,372) 1313

Index of Patentees ..... PI 1

Indices of Reissue, Reexamination, Design and Plant Patents ..... PI 76

Classification of
- Patents (Including Reissues and Reexaminations) ..... PI 83
- Designs, and Plants Applications ..... PI 87

Geographical Index of Residence of Inventors
- Patents (Including Reissues and Reexaminations) ..... PI 89
- Designs and Plant Applications ..... PI 91

Change of Address Form and Subscription Order Form ..... PI 93

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VOL
1127
ISS
2
JE
11
1991
UMI

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1126 O.G. 2 on May 7, 1991.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the amount of the fee in German marks and the exchange rate of the U.S. dollar in relation to the German mark as of Jan. 3, 1991, and was announced in the *Official Gazette* at 1122 O.G. 564 on Jan. 1, 1991.

International fees were changed on March 1, 1991 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss franc and were announced in the *Official Gazette* at 1122 O.G. 629 on Jan. 22, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1492.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	559.00
Basic Supplemental fee (for each page over 30)	11.00
Designation fee per country or region for the first 10 national or regional offices	135.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	171.00

U.S. National Stage fees	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

April 11, 1991

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner
of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on June 7, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,748,690 through 4,750,217
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on June 5, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,451,931 through 4,453,270
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant...$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant...$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))..$415.00
By other than a small entity......................................$830.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f))..$835.00
By other than a small entity....................................$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982...$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f))..$60.00
By other than a small entity......................................$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.................................$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED MARCH 31, 1991
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,377,875	06/255,885	3/29/83
4,377,877	06/304,805	3/29/83
4,377,880	06/239,228	3/29/83
4,377,898	06/238,146	3/29/83
4,377,917	06/274,775	3/29/83
4,377,919	06/314,552	3/29/83
4,377,920	06/236,293	3/29/83
4,377,921	06/289,121	3/29/83
4,377,925	06/239,401	3/29/83
4,377,938	06/333,882	3/29/83
4,377,939	06/270,268	3/29/83
4,377,942	06/261,646	3/29/83
4,377,961	06/254,003	3/29/83
4,377,963	06/287,267	3/29/83
4,377,981	06/258,702	3/29/83
4,377,984	06/243,448	3/29/83
4,377,985	06/290,466	3/29/83
4,377,987	06/316,836	3/29/83
4,377,988	06/305,272	3/29/83
4,378,004	06/237,347	3/29/83
4,378,011	06/242,699	3/29/83
4,378,016	06/283,610	3/29/83
4,378,021	06/235,654	3/29/83
4,378,027	06/249,316	3/29/83
4,378,038	06/264,104	3/29/83
4,378,039	06/254,992	3/29/83
4,378,040	06/273,762	3/29/83
4,378,050	06/302,858	3/29/83
4,378,051	06/218,245	3/29/83
4,278,052	06/253,900	3/29/83
4,378,065	06/377,459	3/29/83
4,378,069	06/256,081	3/29/83
4,378,077	06/226,169	3/29/83
4,378,078	06/278,215	3/29/83
4,378,083	06/265,389	3/29/83
4,378,105	06/221,258	3/29/83
4,378,132	06/235,144	3/29/83
4,378,134	06/312,424	3/29/83
4,378,137	06/252,541	3/29/83
4,378,151	06/263,132	3/29/83
4,378,157	06/251,047	3/29/83
4,378,163	06/343,640	3/29/83
4,378,177	06/274,626	3/29/83
4,378,186	06/215,640	3/29/83
4,378,193	06/267,357	3/29/83
4,378,199	06/322,357	3/29/83
4,378,204	06/359,647	3/29/83
4,378,208	06/273,113	3/29/83
4,378,209	06/297,486	3/29/83
4,378,218	06/293,385	3/29/83
4,378,221	06/225,648	3/29/83
4,378,263	06/228,359	3/29/83
4,378,266	06/288,143	3/29/83
4,378,275	06/327,054	3/29/83
4,378,278	06/306,442	3/29/83
4,378,279	06/297,908	3/29/83
4,378,280	06/353,342	3/29/83
4,378,281	06/277,190	3/29/83
4,378,282	06/277,192	3/29/83
4,378,285	06/237,755	3/29/83
4,378,295	06/218,844	3/29/83
4,378,302	06/217,267	3/29/83
4,378,319	06/316,488	3/29/83
4,378,327	06/359,649	3/29/83
4,378,336	06/341,946	3/29/83
4,378,342	06/249,355	3/29/83
4,378,343	06/366,414	3/29/83
4,378,349	06/425,441	3/29/83
4,378,350	06/425,486	3/29/83
4,378,351	06/425,487	3/29/83
4,378,360	06/254,372	3/29/83
4,378,362	06/232,138	3/29/83
4,378,366	06/295,255	3/29/83
4,378,368	06/318,093	3/29/83
4,378,372	06/350,451	3/29/83
4,378,379	06/272,365	3/29/83
4,378,385	06/244,256	3/29/83
4,378,391	06/269,872	3/29/83
4,378,406	06/249,191	3/29/83
4,378,412	06/298,304	3/29/83
4,378,421	06/219,074	3/29/83
4,378,424	06/324,491	3/29/83
4,378,425	06/292,234	3/29/83
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VOL
1127
ISS
2
JE
11
1991
UMI

Patent Number	Serial Number	Issue Date
4,378,445	06/292,901	3/29/83
4,378,453	06/366,017	3/29/83
4,378,456	06/301,988	3/29/83
4,378,461	06/301,102	3/29/83
4,378,473	06/232,266	3/29/83
4,378,475	06/354,108	3/29/83
4,378,478	06/296,628	3/29/83
4,378,487	06/236,197	3/29/83
4,378,488	06/266,365	3/29/83
4,378,489	06/264,921	3/29/83
4,378,507	06/218,348	3/29/83
4,378,534	06/249,532	3/29/83
4,378,536	06/272,220	3/29/83
4,378,545	06/239,866	3/29/83
4,378,581	06/267,425	3/29/83
4,378,600	06/259,911	3/29/83
4,378,603	06/219,765	3/29/83
4,653,121	06/685,720	3/31/87
4,653,122	06/867,530	3/31/87
4,653,125	06/852,026	3/31/87
4,653,126	06/661,421	3/31/87
4,653,127	06/762,386	3/31/87
4,653,131	06/759,335	3/31/87
4,653,142	06/874,277	3/31/87
4,653,145	06/805,357	3/31/87
4,653,148	06/820,986	3/31/87
4,653,149	06/817,400	3/31/87
4,653,151	06/803,251	3/31/87
4,653,152	06/706,216	3/31/87
4,653,155	06/772,368	3/31/87
4,653,161	06/804,453	3/31/87
4,653,185	06/798,381	3/31/87
4,653,188	06/838,832	3/31/87
4,653,201	06/817,466	3/31/87
4,653,210	06/706,877	3/31/87
4,653,213	06/716,748	3/31/87
4,653,218	06/827,524	3/31/87
4,653,219	06/746,379	3/31/87
4,653,221	06/795,522	3/31/87
4,653,222	06/847,668	3/31/87
4,653,226	06/790,895	3/31/87
4,653,228	06/722,847	3/31/87
4,653,237	06/584,731	3/31/87
4,653,243	06/691,929	3/31/87
4,653,244	06/819,763	3/31/87
4,653,248	06/794,099	3/31/87
4,653,249	06/782,817	3/31/87
4,653,251	06/830,164	3/31/87
4,653,269	06/795,709	3/31/87
4,653,273	06/780,961	3/31/87
4,653,274	06/789,451	3/31/87
4,653,281	06/757,088	3/31/87
4,653,282	06/651,216	3/31/87
4,653,289	06/758,295	3/31/87
4,653,290	06/877,891	3/31/87
4,653,292	06/737,707	3/31/87
4,653,295	06/767,815	3/31/87
4,653,299	06/817,127	3/31/87
4,653,319	06/765,115	3/31/87
4,653,321	06/742,328	3/31/87
4,653,327	06/863,146	3/31/87
4,653,343	06/691,275	3/31/87
4,653,355	06/711,784	3/31/87
4,653,358	06/745,216	3/31/87
4,653,369	06/628,722	3/31/87
4,653,375	06/765,856	3/31/87
4,653,376	06/652,730	3/31/87
4,653,377	06/837,105	3/31/87
4,653,381	06/785,081	3/31/87
4,653,385	06/777,681	3/31/87
4,653,388	06/404,856	3/31/87
4,653,400	06/751,701	3/31/87
4,653,401	06/867,937	3/31/87
4,653,405	06/780,946	3/31/87
4,653,407	06/700,405	3/31/87
4,653,414	06/728,762	3/31/87
4,653,417	06/708,726	3/31/87
4,653,420	06/811,771	3/31/87
4,653,425	06/852,300	3/31/87
4,653,433	06/750,735	3/31/87
4,653,444	06/750,083	3/31/87
4,653,459	06/794,119	3/31/87
4,653,464	06/615,584	3/31/87
4,653,465	06/891,388	3/31/87
4,653,467	06/735,680	3/31/87
4,653,468	06/818,247	3/31/87
4,653,482	06/735,159	3/31/87
4,653,483	06/681,857	3/31/87
4,653,492	06/701,111	3/31/87
4,653,494	06/811,279	3/31/87
4,653,496	06/697,341	3/31/87
4,653,511	06/658,405	3/31/87
4,653,534	06/843,129	3/31/87
4,653,540	06/699,730	3/31/87
4,653,543	06/797,596	3/31/87
4,653,545	06/846,959	3/31/87
4,653,551	06/811,515	3/31/87
4,653,556	06/835,648	3/31/87
4,653,557	06/764,214	3/31/87
4,653,558	06/839,377	3/31/87
4,653,563	06/654,103	3/31/87
4,653,566	06/790,617	3/31/87
4,653,574	06/774,376	3/31/87
4,653,578	06/681,858	3/31/87
4,653,582	06/736,703	3/31/87
4,653,588	06/786,301	3/31/87
4,653,590	06/666,424	3/31/87
4,653,593	06/752,453	3/31/87
4,653,597	06/804,722	3/31/87
4,653,599	06/742,566	3/31/87
4,653,608	06/796,972	3/31/87
4,653,614	06/766,108	3/31/87
4,653,615	06/302,532	3/31/87
4,653,618	06/834,113	3/31/87
4,653,631	06/408,807	3/31/87
4,653,636	06/734,471	3/31/87
4,653,643	06/848,937	3/31/87
4,653,646	06/820,243	3/31/87
4,653,649	06/773,468	3/31/87
4,653,650	06/790,326	3/31/87
4,653,652	06/694,771	3/31/87
4,653,667	06/665,348	3/31/87
4,653,679	06/835,621	3/31/87
4,653,687	06/761,484	3/31/87
4,653,697	06/730,183	3/31/87
4,653,699	06/729,778	3/31/87
4,653,702	06/805,951	3/31/87
4,653,705	06/235,910	3/31/87
4,653,706	06/760,102	3/31/87
4,653,711	06/800,755	3/31/87
4,653,712	06/840,437	3/31/87
4,653,713	06/885,195	3/31/87
4,653,714	06/797,622	3/31/87
4,653,717	06/726,674	3/31/87
4,653,723	06/758,170	3/31/87
4,653,733	06/799,286	3/31/87
4,653,734	06/686,204	3/31/87
4,653,736	06/706,925	3/31/87
4,653,747	06/749,811	3/31/87
4,653,749	06/695,087	3/31/87
4,653,751	06/709,594	3/31/87
4,653,752	06/796,205	3/31/87
4,653,755	06/840,202	3/31/87
4,653,763	06/828,888	3/31/87
4,653,764	06/828,509	3/31/87
4,653,766	06/830,216	3/31/87
4,653,768	06/844,172	3/31/87
4,653,770	06/767,366	3/31/87
4,653,771	06/792,053	3/31/87
4,653,778	06/745,049	3/31/87
4,653,783	06/757,997	3/31/87
4,653,786	06/770,781	3/31/87
4,653,787	06/762,786	3/31/87
4,653,789	06/836,085	3/31/87
4,653,797	06/797,612	3/31/87
4,653,816	06/787,440	3/31/87
4,653,817	06/807,696	3/31/87
4,653,818	06/708,066	3/31/87

Patent Number	Serial Number	Issue Date
4,653,827	06/800,220	3/31/87
4,653,835	06/836,147	3/31/87
4,653,844	06/651,005	3/31/87
4,653,847	06/237,177	3/31/87
4,653,855	06/658,870	3/31/87
4,653,875	06/667,810	3/31/87
4,653,885	06/777,283	3/31/87
4,653,907	06/743,675	3/31/87
4,653,913	06/745,737	3/31/87
4,653,925	06/768,573	3/31/87
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4,654,816	06/621,035	3/31/87
4,654,850	06/688,206	3/31/87
4,654,855	06/720,465	3/31/87
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NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE
(35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

VOL
1127
ISS
2
JE
11
1991
UMI

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,542,700	06/457,835	9/24/85	1/14/83	11/13/90
4,607,567	06/565,989	8/26/86	12/27/83	4/22/91
4,696,492	06/749,414	9/29/87	6/27/85	4/29/91
4,559,041	06/624,298	12/17/85	6/25/84	3/27/91

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,569,943, Re. S. N. 07/693,107, Filed Apr. 22, 1991, Cl. 514/562, PHYSIOLOGICALLY ACTIVE SUBSTANCE P-23924, ITS PRODUCTION AND USE, Hisayoshi Okazaki, et al., Owner of Record: *Takeda Chemical Industries, Ltd., Osaka, Japan*, Attorney or Agent: Michael R. Davis, Ex. Gp.: 125

4,672,922, Re. S. N. 07/692,900, Filed Apr. 29, 1991, Cl. 123/41, AIR-COOLED OVERHEAD-VALVE ENGINE, Tetsuaki Shirai, Owner of Record: *Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan*, Attorney or Agent: Donald J. Brott, Ex. Gp.: 342

4,693,563, Re. S. N. 07/610,004, Filed Nov. 7, 1990, Cl. 350/350S, FERRO-ELECTRIC LIQUID CRYSTAL ELECTROOPTICAL DEVICE, Takamasa Harada, et al., Owner of Record: *Seiko Instruments & Electronics Ltd., Tokyo, Japan*, Attorney or Agent: Bruce L. Adams, Ex. Gp.: 254

4,802,320, Re. S. N. 07/652,833, Filed Feb. 6, 1991, Cl. 52/585, RETAINING WALL BLOCK, Paul J. Forsberg, Owner of Record: *Keystone Retaining Wall Systems, Inc., Edina, Minn.*, Attorney or Agent: David N. Fronek, Ex. Gp.: 354

4,805,930, Re. S. N. 07/658,760, Filed Feb. 20, 1991, Cl. 280/739, PRESSURE REGULATION DEVICE FOR VEHICLE SAFETY AIR BAG, Juichiro Takada, Owner of Record: *Inventor*, Attorney or Agent: Thomas R. Nesbitt, Ex. Gp.: 314

4,825,759, Re. S. N. 07/619,318, Filed Nov. 28, 1990, Cl. 99/307, ADC COFFEE MAKER, Donald C. Grome, et al., Owner of Record: *Proctor-Silex, Inc., Glen Allen, Va.*, Attorney or Agent: Roger S. Dybvig, Ex. Gp.: 242

4,826,179, Re. S. N. 07/693,009, Filed Apr. 29, 1991, Cl. 273/428, PROJECTILE TOY, Michael L. Callaghan, Owner of Record: *Inventor*, Attorney or Agent: Pierre C. Van Rysselberghe, Ex. Gp.: 334

4,826,725, Re. S. N. 07/695,003, Filed May 2, 1991, Cl. 428/375, MANUFACTURE DF LOW DENSITY SINTERED POLYTETRAFLOURETHYLENE ARTICLES, Norman R. Harlow, Owner of Record: *Carlisle Corporation, Buchanan, N.Y.*, Attorney or Agent: Clement H. Luken, Ex. Gp.: 154

4,846,458, Re. S. N. 07/689,670, Filed Apr. 23, 1991, Cl. 272, UPPER BODY EXERCISE APPARATUS, Lanny L. Potts, Owner of Record: *TriTech, Inc., North Xanthus, Okla.*, Attorney or Agent: Richard L. Hughes, Ex. Gp.: 332

4,943,712, Re. S. N. 07/693,905, Filed May 1, 1991, Cl. 250/221, MOTION DETECTOR, Richard L. Wilder, et al., Owner of Record: *The Brinkmann Corporation, Dallas, Tex.*, Attorney or Agent: James A. DeLand, Ex. Gp.: 255

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,565,351, Reexam. No. 90/002,328, Requested Apr. 25, 1991, Cl. 254/134.3FT, METHOD FOR INSTALLNG CABLE USING AN INNER DUCT, Allen C. Conti, et al., Owner of Record: *Arnco Corporation, Elyria, Ohio*, Attorney or Agent: Pearne, Gordon, McCoy & Granger, Cleveland, Ohio, Ex. Gp.: 323, Requester: Owner

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Errata

"All reference to Patent No. 4,981,498 to Benjamin Bikson et al. of Mass. for 'PROCESS FOR DEHYDRATION OF GASES AND COMPOSITE PERMEABLE MEMBRANES THEREFOR', appearing in the Official Gazette of Jan. 1, 1991 should be deleted since no patent was granted."

"All reference to Reexamination Certificate No. B1 4,742,142 (1420th) appearing in the Official Gazette of Feb. 26, 1991 should be deleted since no reexamination certificate has been granted."

New Numbers for Filing of Certain Trademark Papers and Authorizations to Charge Deposit Accounts by Facsimile Transmission

On February 12, 1991, the Trademark Examining Operation (TMEO) and the Office of the Assistant Commissioner for Trademarks implemented a pilot program to study the feasibility of accepting certain trademark documents by facsimile transmission (fax). See the *Trademark Official Gazette* notice at 1123 TMOG 18 (Feb. 12, 1991) regarding documents which may now be filed by fax transmission, documents which are excluded from fax transmission and the requirements for filing by fax in connection with this program.

The fax number for transmitting documents to the TMEO has changed. For the purpose of accepting documents which are permitted to be filed by fax with the TMEO, three fax machines are now located in the Trademark Services Division of the Office. Their fax numbers are as follows:

(703) 308-9096
(703) 308-9097
(703) 308-9098

The fax machines in the Trademark Services Division are the only machines in the Trademark Examining Operation designated for the aceceptance of documents which are permitted to be filed by fax. Therefore, in order to file relevant documents by fax with the TMEO, one of the above numbers must be used.

The fax number for the Office of the Assistant Commissioner for Trademarks, (703) 557-8263, is unchanged.

May 9, 1991

JEFFREY M. SAMUELS
Assistant Commissioner
for Trademarks

Patents Availible for License or Sale

4,702,704 "TETRAHEDRAL CONDON STEREO TABLE", Leonard R. Svensson, Birch, Stewart, Kolasch & Birch. P.O. Box 747, Falls Church, Va. 22046

4,934,631 AMPHIBIOUS LIGHTER-THAN-AIR TYPE VEHICLE, Lou Birbas, 2164 West 2000 North St. George, Utah 84770

4,935,850 SWITCH DISPLAY ENCODER APPARATUS, J. R. Smith Jr., 2804 Dubarry #1502, Gautier, Miss. 39553

4,989,281 ADJUSTABLE BED FOR A TRUCK-TRAILER SYSTEM, Daniel Lee Christaensen, 4660 N. US 33, Ligonier, Ind. 46767

4,992,072 FLUTTERING TOY, William B. Leigh, 986 So. Main St., Cedar City, Utah 84720

4,998,675 "SOLID WASTE PROCESSING UNIT", John H. Mohrman, 3 Willow Street, POB 280, Middleport, Pa. 17953-0280

4,999,857 "TOILET SEWAGE TREATMENT UNIT", John H. Mohrman, 3 Willow Street, POB 280, Middleport, Pa. 17953-0280

5,003,850 SCREWDRIVER, WITH HOLDING SLEEVE, James J. Harkins, 300 N. River Rd., #310, Manchester, N.H. 03104

5,003,895 EMBROIDERY PANTOGRAPH ASSEMBLY, Lev Talanker, 14445 Geneva Lopp, 6H, Brooklyn, N.Y. 11239

5,005,611 APPARATUS AND METHOD FOR MODIFYING CABLES AND PRODUCTS THEREOF, Jack Hecker, 223 Johnson Drive, Duncanville, Tex. 75116

5,009,196 CAT RESTRAINER, Ruby Ybarra Young, 1802 West Lane, Kerrville, Tex. 78028

5,011,349 "TAILGATE MOUNTED CARGO RETAINING DEVICE", Glenn McAndrews, 402 E. Warren St., Lebanon, Ohio 45036

5,023,595 MAIL ARRIVAL SIGNAL SYSTEM, Charles S. Bennett, P.O. Box 1531, Mercer Island, Wash. 98040

VOL
1127
ISS
2
JE
11
1991
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PATENT NOTICES

Certificates of Correction For Week of June 11, 1991

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Disclaimers

4,411,919—*Henry B. Thompson*, Duncan, S.C. MEAT ADHERING COOK-IN PACKAGING. Patent dated Oct. 25, 1983. Disclaimer filed Apr. 1, 1991, by the assignee, W. R. Grace & Co.

Hereby enters this disclaimer to claims 1-11 of said patent.

4,658,450—*Martin S. Thompson*, Bickley, England. MULTI-POSITION BED. Patent dated Apr. 21, 1987. Disclaimer filed Feb. 25, 1991, by the assignee, Egerton Hospital Equipment Limited.

Hereby enters this disclaimer to claims 1 and 3 of said patent.

4,879,309—*Ronald J. Doll*, Maplewood; *Bernard R. Neustadt*, West Orange, both of N. J. MERCAPTO-ACYLAMINO ACIDS AS ANTIHYPERTENSIVES. Patent dated Nov. 7, 1989. Disclaimer filed Apr. 8, 1991, by the assignee, Schering Corp.

Hereby enters this disclaimer to all claims of said patent.

4,898,894—*George E. Melber*, Depew; *Leon Wolinski*, Checktowage, both of N. Y. FILM FORMING BINDERS CONTAINING LOW DENSITY COMPOSITE OPACIFERS. Patent dated Feb. 6, 1990. Disclaimer filed Jan. 11, 1990, by the assignee, Pierce and Stevens Corporation.

The term of this patent subsequent to June 27, 2006, has been disclaimed.

4,976,662—*Joseph P. Miranti, Jr.*, Nixa, Mo. ENDLESS POWER TRANSMISSION BELT CONSTRUCTION AND METHOD OF MAKING THE SAME. Patent dated Dec. 11, 1990. Disclaimer filed Mar. 4, 1991, by the assignee, Dayco Products, Inc.

The term of this patent subsequent to May 23, 2006, has been disclaimed.

4,913,976—*Mark L. Brooks; Keith E. Wilson*, both of Wabash, Ind. COHESIVE BONDING PROCESS FOR FORMING A LAMINATE OF A WEAR RESISTANT THERMOPLASTIC AND A WEATHER RESISTANT RUBBER. Patent dated Apr. 3, 1990. Disclaimer filed Feb. 25, 1991, by the assignee, GenCorp Inc.

Hereby enters this disclaimer to claim 8 of said patent.

4,994,441—*Jean-Richard Neeser*, Lausanne, Switzerland. DENTAL ANTI-PLAQUE AND ANTI-CARIES AGENT. Patent dated Feb. 19, 1991. Disclaimer filed Nov. 19, 1990. by the assignee, Nestec S.A.

The term of this patent subsequent to Feb. 12, 2008, has been disclaimed.

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VOL
1127
ISS
2
JE
11
1991
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VOL
1127
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11
1991
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Patents	Numbers 3,808,604 to 3,813,693 inclusive
Plant Patents	3,541 to 3,560 inclusive

REEXAMINATIONS

JUNE 11, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification, matter printed in italics indicates additions made by reexamination

B1 Re. 33,090 (1487th)
ISOTHERMIC PROTECTIVE BOOT

Ramon Berguer, West Bloomfield, Mich., assignor to Lunax Corporation, New Baltimore, Mich.

Reexamination Request No. 90/002,001, Apr. 16, 1990.
Reexamination Certificate for Reissue Patent Re. 33,090, issued Oct. 17, 1989, Ser. No. 199,921, May 27, 1988.
Int. Cl.^{5} A43B *1/02, 1/10, 7/14*
U.S. Cl. 36—9 R

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1-18** were previously cancelled.

Claims **20** and **22** are cancelled.

Claims **19**, **21** and **23** are determined to be patentable as amended.

New claims **24** and **25** are added and determined to be patentable.

19. An isothermic protective boot having a foot-receiving part and a contiguous leg-receiving part adapted to extend up to at least the lower portion of the calf of a lower extremity of a patient, said boot having a complete inner lining of relatively soft, non-allergenic material, [said boot also having a layer of relatively soft, flexible, compressible isothermic protective material throughout the full extent of both its parts,] *said boot having a complete outer cover of relatively soft, non-allergenic material, said boot having between said inner lining and said outer cover first and second layers of relatively soft, flexible, compressible isathermic protective material extending throughout the full extent of both its parts*, a body of flexible, compressible weight-bearing material *between said first and second layers* along at least a portion of the back of said leg-receiving part in a position to extend along the heel cord of the patient such that when the patient is lying on his back the weight-bearing surface of the extremity of the patient will be over the heel cord and lower aspect of the calf thus relieving the bottom of the heel of any substantial weight bearing, said boot being sufficiently flexible to afford the patient at least limited ambulation, the exterior of said boot being soft and devoid of hard surfaces and sharp edges to preclude injury to the patient's other extremity, said boot having confronting edges at the front permitting said boot to be opened along said confronting edges to apply and remove said boot, said boot being adapted to cover and protect the lower calf portion and foot of the patient from the rear of the boot around the sides thereof to said confronting edges at the front of the boot, and releasable fastening means for the front of said boot adapted to provide a connection between said confronting edges.

B1 4,214,616 (1488th)
THREE DELIMBING APPARATUS

Maurice J. Brisson, Laval, Canada, assignor to Weyerbaeuser Company, Tocoma, Wash.

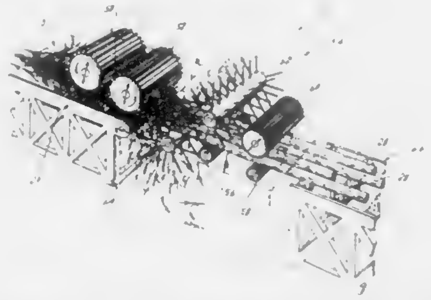
Reexamination Request No. 90/002,193, Nov. 5, 1990.
Reexamination Certificate for Patent No. 4,214,616, issued Jul. 29, 1980, Ser. No. 904,807, May 11, 1978.
Claims priority, application Canada, Feb. 16, 1978, 297048
Int. Cl.^{5} B27L *1/00*
U.S. Cl. 144—2 Z

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1**, **10** and **12** are determined to be patentable as amended.

Claims **2-9**, **11** and **13-16**, dependent on an amended claim, are determined to be patentable.

10. A tree delimbing apparatus comprising:
housing means having enclosing walls with openings therein defining an inlet for receiving a plurality *of* trees to be delimbed, an outlet for discharging said tree delimbed and an opened base for evacuating limb debris;
means for conveying horizontally and longitudinally in a side-by-side arrangement said trees through said housing means said means for conveying including *power driven* infeed means adjacent said inlet for advancing trees to said inlet, roller support means mounted inside said housing means below the feed line of said trees through said housing means for supporting and advancing said trees in said housing means, and *power driven* pressure roller means mounted in said housing means and above said feed line of said trees through said housing and cooperating with said roller support means for advancing said trees through said housing means;
rotatable delimbing means, mounted in said housing means, including *plural* drum means *each* mounted for rotation about an axis extending both horizontally and transversely to the direction of conveyance of said trees *and adjacently disposed above and below the trees being conveyed through said housing*, and a plurality of flexible delimbing flails attached to *each* said drum means and extendible under centrifugal force to detach leaves and branches from said trees when conveyed through said housing means, and
a rotatable branch folding means located outside said housing means and extending over said infeed means for folding said branches prior to entry of said trees in said housing means.



B1 4,424,551 (1489th)
HIGHLY-RELIABLE FEED THROUGH/FILTER CAPACITOR AND METHOD FOR MAKING SAME

Robert A. Stevenson, Canyon Country, and Albert W. Dey, Burbank, both of Calif., assignors to AVX Corporation, New York, N.Y.

Reexamination Request No. 90/001,983, Apr. 3, 1990.
Reexamination Certificate for Patent No. 4,424,551, issued Jan. 3, 1984, Ser. No. 342,497, Jan. 25, 1982.
Int. Cl.^{5} H01G *4/42, 4/22*
U.S. Cl. 361—302

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

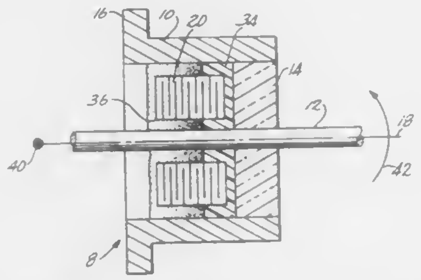
VOL
1127
ISS
2
JE
11
1991
UMI

The patentability of claims **1-13** and **15-21** is confirmed.

Claim **14** is determined to be patentable as amended.

New claims **22** and **23** are added and determined to be patentable.

16. A capacitor comprising:
a canister having first and second mutually insulated electrically conductive interior surfaces;
a capacitive structure having a plurality of pairs of spaced apart electrically conductive plates, a first electrically conductive bus connecting one plate of each pair together to the exclusion of the other plate of each pair, and a second electrically conductive bus connecting the other plate of each pair together to the exclusion of the one plate, the capacitive structure lying in the canister to define a first gap therebetween and so the second bus is adjacent to the second surface of the canister to define a second gap therebetween;
a first mass of connecting material bridging the first gap, the first mass comprising a cured thermoset in sufficent concentration to establish an electrical connection between the first bus and the first surface; and
a second mass of connecting material bridging the second gap, the second mass comprising a cured thermoset and conductive particles suspended in the thermoset in sufficient concentration to establish an electrical connection between the second bus and the second surface, the first and second masses being insulated from each other, at least one mass having an uneven concentration of conductive particles in the connecting material.



B1 4,745,468 (1490th)

SYSTEM FOR EVALUATION AND RECORDING OF RESPONSES TO BROADCAST TRANSMISSIONS

Henry Von Kohorn, 215 Rocky Rapids Rd., Stamford, Conn. 06903

Reexamination Request No. 90/002,058, Jun. 18, 1990.

Reexamination Certificate for Patent No. 4,745,468, issued May 17, 1988, Ser. No. 837,827, Mar. 10, 1986.

Int. Cl.^{5} H04H *9/00*

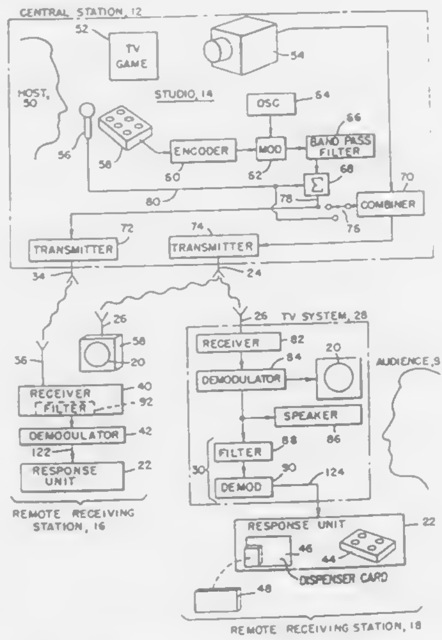
U.S. Cl. 358—84

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1, 3, 4, 5, 9, 10, 17** and **19** are determined to be patentable as amended.

Claims **2, 6, 7, 8, 11, 12, 13, 14, 15, 16, 18** and **20**, dependent on an amended claim, are determined to be patentable.

1. A system for broadcasting task-setting program signals from a central site to a plurality of receiving stations at remote sites, and for responding to said program signals at said receiving stations, said system comprising:
means at said central site for transmitting a program signal;
means at each of said receiving stations for presenting a program transmitted by said program signal to an audience, said program being a television program;
means at said central site for transmitting an instructional signal incorporating predetermined response criteria;
means at said central site for encoding said instructional signal, said encoding means being suitable for operation by a conductor of said television program, said instructional-signal transmitting means including means for modulating encoded instructional signals upon a voice channel of said television program;
means at each of said receiving stations responsive to said instructional signal for storing said predetermined response criteria;
means at each of said receiving stations for entering a response by members of said audience to a situation presented in said program;
means at each of said receiving stations for comparing said audience response to said predetermined response criteria;
means coupled to said comparing means for scoring said audience response; and
demodulation means at said receiving station coupled to said predetermined response criteria storing means for extracting said instructional signal from said voice channel of said transmitted program signal; and wherein
said scoring means includes means for timing the response of said audience;
said entering means includes buffer storing means for storing said audience response, said buffer storing means outputting the audience response to said comparison means;
said scoring means includes means for designating a mode of scoring individual ones of said audience responses in response to said instructional signal; and wherein
said instructional signal can be generated to activate said designating means of said scoring means independently of a transmission of the program signal *wherein said program and said instructional signals provide information of said task-setting program signals, said information comprising at least one question which is either a single-part question or a multiple-part question, said information further comprising scoring criteria; and*
said information has been determined prior to operation of said entering means for an entering of a response.



B1 4,886,167 (1491st)

COMPACT, CORE-WOUND PAPER PRODUCT

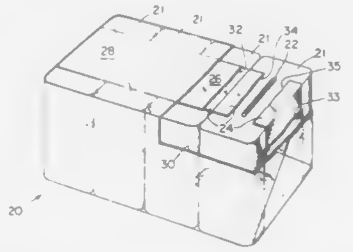
Donald D. Dearwester, Hamilton, Ohio, assignor to Procter & Gamble Company, Cincinnati, Ohio.

Reexamination Request No. 90/002,086, Jul. 9, 1990.

Reexamination Certificate for Patent No. 4,886,167, issued Dec. 12, 1989, Ser. No. 338,782, Apr. 14, 1989.

Int. Cl.^{5} B65D *85/67*

U.S. Cl. 206—389



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **9** and **11-13** is confirmed.

Claims **1-8** and **10** are cancelled.

[1. A paper product comprising a unidirectionally compression loaded, core-wound roll of paper and compression constraining means, said roll of paper comprising a core and a length of paper wound thereon, said core being substantially flat and said product having a somewhat obround shape, said product being susceptible to being shaped by a user so that said product has a generally round cross section and so that said core has an open tubular shape.]

B1 Des. 307,059 (1486th)

RECESSED LIGHTING FIXTURE

Donald D. Szymanek, Westlake Village, Calif., assignor to Thin-Lite Corporation, Camarillo, Calif.

Reexamination Request Nos. 91/002,191, Nov. 2, 1990 and 90/002,259, Jan. 22, 1991.

Reexamination Certificate for Patent No. Des. 307,059, issued Apr. 3, 1990, Ser. No. 886,749, Jul. 18, 1986.

U.S. Cl. D26—74

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of the claim is confirmed.

VOL
1127
ISS
2
JE
11
1991
UMI

REISSUES

JUNE 11, 1991

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,606
METHOD OF FABRICATING A POWER TRANSMISSION BELT AND APPARATUS THEREFOR

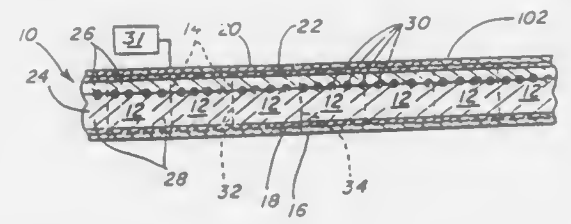
Yoshihiko Kamiyama, Kobe; Misao Fukuda, Miki, and Akihiro Nagata, Komaki, all of Japan, assignors to Mitsuboshi Belting Ltd., Japan

Original No. 4,782,575, dated Nov. 8, 1988, Ser. No. 27,304, Mar. 18, 1987. Application for reissue Dec. 26, 1989, Ser. No. 457,155

Claims priority, application Japan, Mar. 25, 1986, 61-67824

Int. Cl.^{5} B23P *17/00*

U.S. Cl. 29—411 **37 Claims**



1. A method of forming power transmission V-belts comprising the steps of:

providing a belt sleeve;

dividing said belt sleeve into a plurality of belt preforms defining opposite side portions and a back surface;

situating individual belt preforms around a pair of spaced pulleys;

driving the belt preforms on the spaced pulleys; [and]

seriatim forming V-belts from said preforms by simultaneously cutting said side portions of the individual belt preforms as the belt preforms are being driven about the pulleys to define opposite converging side surfaces of the V-belt *by moving first and second cutter blades towards each other so that the first and second cutter blades tend to wedge the belt preforms situated around the pulleys away from the pulleys; and*

limiting movement of the belt preforms from wedging by the first and second cutter blades so that the first and second cutter blades consistently cut the side portions of the belt preforms.

Re. 33,607
AUTO-PLAYING APPARATUS

Keiji Yuzawa, Tokyo; Naoaki Matsumoto, Tachikawa; Takehiko Kayahara, Sayama; Naofumi Tateishi, Oome, and Makoto Fukuda, Sayama, all of Japan, assignors to Casio Computer Co. Ltd., Tokyo, Japan

Original No. 4,624,171, dated Nov. 25, 1986, Ser. No. 821,521, Jan. 23, 1986. Continuation of Ser. No. 275,439, Nov. 23, 1988, abandoned, which is a continuation of Ser. No. 597,168, Apr. 5, 1984, abandoned. Application for reissue Jan. 30, 1990, Ser. No. 473,119

Claims priority, application Japan, Apr. 13, 1983, 58-63732

Int. Cl.^{5} G10F *1/00;* **G10H** *1/42, 7/00*

U.S. Cl. 84—609 **11 Claims**

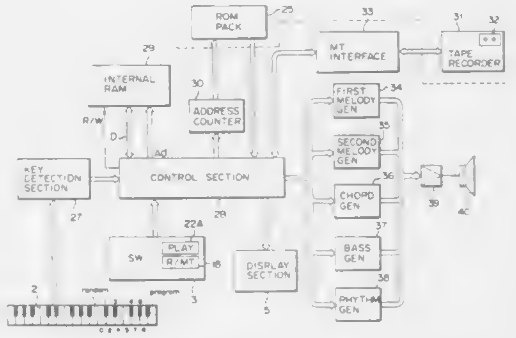
10. An auto-playing apparatus of the kind including a case containing electronic circuitry, comprising:

means for storing electrical signals in digital form related to music data corresponding to a plurolity of music pieces, and respective musical number data corresponding to each of said plurality of music pieces;

a keyboard with keys corresponding, respectively, to a plurality of pitches to enable execution of a manual play;

a switch means for selectively designating one of a manual play and an automatic play, said automatic play being performed in accordance with the music data stored in said storing means, some of the keys in said keyboard, when said switch means designates the automatic play, being set to operate as designating keys for selectively designating musical number data corresponding to the plurality of the music pieces which are stored in said storing means;

a memory means, coupled to said switch means and said designating keys of said keyboard, for storing musical number data in response to operation of said designating keys in said keyboard when said switch means designates the automatic play;



control means, coupled to said music data storing means and said memory means, for reading the music data in said storing means corresponding to the musical number data in said memory means and for outputting the music data: and

reproducing means, coupled to said control means, soid keyboard and said switch means, for reproducing, when said switch means designates the manual play, the music corresponding to the keys of said keyboard and for reproducing, when said switch means designotes the automatic play, the music in accordance with the music data outputted by said control means.

Re. 33,608
HOLLOW STACKABLE PLASTIC PRODUCTS

Jens O. Sorensen, Rancho Santa Fe, Calif., assignor to Primtec, Rancho Santa Fe, Calif.

Original No. 4,657,141, dated Apr. 14, 1987, Ser. No. 820,874, Jan. 16, 1986. Continuation of Ser. No. 643,844, Aug. 23, 1980, abandoned, which is a division of Ser. No. 424,493, Sep. 27, 1982, Pat. No. 4,467,994. Application for reissue Apr. 12, 1989, Ser. No. 336,830

Int. Cl.^{5} B65D *1/42*

U.S. Cl. 206—519 **7 Claims**

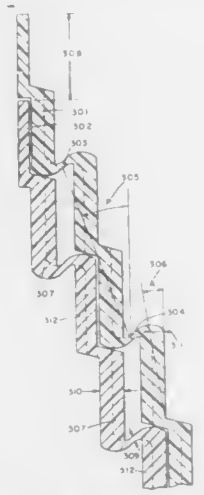
1. A molded thin-walled hollow, [stackable] plastic product, having an open top, a closed bottom and side walls;

wherein the side walls include [a series of circumferential strips,] *at least one perimetric strip joining an upper side wall section and a lower side wall section,* with the upper [of two adjacent] wall [sections] *section* having a minimum [diameter] *cross-sectional area* greater than a maximum [diameter] *cross-sectional area* of the [lowe adjacent] *lower* side wall section to thereby define a [circumferential] *perimetric* ridge at the bottom of [each] *the* upper wall section;

wherein the [circumferential] *perimetric* strip joining [a pair of] said upper and lower wall sections is a [circumferential] *perimetric* isthmus having an isthmus distance which is the minimum thickness of said strip defining the isthmus, that is significantly shorter than the predominant thickness of the adjacent wall sections; and

VOL
1127
ISS
2
JE
11
1991
UMI

wherein said isthmus is aligned at an acute angle with respect to each of the wall sections joined by said isthmus,



with the juncture of the isthmus and the upper wall section being closer to the bottom of the product than the juncture of the isthmus and the lower wall section.

Re. 33,609
PRODUCTION OF POLYURETHANE MOLDINGS BY THE REACTION INJECTION MOLDING PROCESS

Neil H. Nodelman, Pittsburgh, Pa., assignor to Mobay Corporation, Pittsburgh, Pa.

Original No. 4,792,576, dated Dec. 20, 1988, Ser. No. 76,827, Jul. 23, 1987. Application for reissue Mar. 31, 1989, Ser. No. 331,874

Int. Cl.^{5} B29C *45/14;* **C08G** *18/28;* **C08J** *9/04*

U.S. Cl. **264—53** **12 Claims**

1. A process for the production of polyurethane moldings by reacting a reaction mixture comprising
   - (a) an organic polyisocyanate
   - (b) a compatible polyol blend comprising
     - (i) at least one polyether polyol having an hydroxyl functionality of from 2 to 8, and a molecular weight of from [350] 360 to [below 1800] *670,* and
     - (ii) at least one hydroxyl functional organic material containing from 2 to 8 hydroxyl groups and having a molecular weight below 350, components (i) and (ii) being used in a weight ratio of component (b)(i) to (b)(ii) of from about 10:1 to about 1:10, and
     - (iii) no more than 45% by weight based on the weight of component (b) of an active hydrogen containing compound having a molecular weight of 1800 or more,

said reaction mixture being processed as a one-shot system by the RIM process at an isocyanate index of from about 70 to about 130.

Re. 33,610
SPRING-LOADED HINGE ASSEMBLY FOR VEHICLE ACCESSORIES

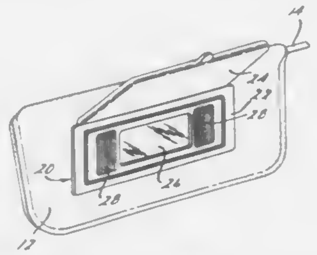
Mark Lobanoff, Bloomfield Hills, and James A. Gavagan, Centerline, both of Mich., assignors to Takata Inc., Auburn Hills, Mich.

Original No. 4,715,644, dated Dec. 29, 1987, Ser. No. 910,129, Sep. 22, 1986. Application for reissue Dec. 28, 1989, Ser. No. 458,186

Int. Cl.^{5} B60J *3/00*

U.S. Cl. **296—97.5** **24 Claims**

17. A spring-loaded hinge assembly for interconnecting an accessory door with an accessory housing structure for a vehicle, said hinge assembly comprising: pivot means pivotally interconnecting the door with the housing structure for relative rotational movement of the door and the housing structure with respect to one another about a longitudinally-extending axis; a cam member protruding in a generally lateral direction from one of the door or the housing structure for relative rotational movement therewith; said cam member having at least one dwell portion thereon; leaf spring means on the other of the door or the housing structure, said leaf spring means being resiliently deflectably engageable by said cam member for exerting a resilient biasing force on said cam member; and support means interconnected with one of the door or the housing structure for supporting said leaf spring means in a direction generally opposite the direction of said engagement of said leaf spring means by said cam member, said support means supporting said leaf spring means at least at two spaced-apart support locations thereon, said cam member deflectably engaging said leaf spring means at a medial location thereon between said spaced-apart support locations during at least a portion of said relative rotational movement of the door and the housing structure, said leaf spring means tending to maintain the door and the housing structure in a predetermined relative rotational orientation with respect to one another when engaged by said dwell portion of said cam member.



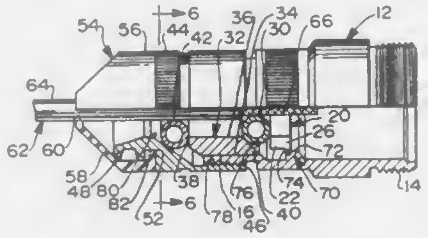
Re. 33,611
ENVIRONMENTALLY SEALED GROUNDING BACKSHELL WITH STRAIN RELIEF

Leonard H. Michaels, Warrenville, and Robert A. Miller, Woodridge, both of Ill., assignors to Molex Incorporated, Lisle, Ill.

Original No. 4,857,015, dated Aug. 15, 1989, Ser. No. 214,074, Jul. 1, 1988. Application for reissue Apr. 26, 1990, Ser. No. 515,160

Int. Cl.^{5} H01R *13/648*

U.S. Cl. **439—610** **34 Claims**



28. A backshell assembly for strain relief mounting to a cable, comprising:
- *first and second members assembled for relative longitudinal movement and defining an axial passage through the assembly for receiving said cable;*
- *a resilient ring between said members about the axial passage;*
- *means for engaging one side of the ring to compress the ring and grip the cable in response to longitudinal connecting movement of said members toward each other; and*
- *variable means mounted on one of said members for engaging an opposite side of the ring, the variable means being positionally adjustable axially on said one member to vary the distance the ring can resiliently move radially and thereby accommodate cables of varying diameters.*

Re. 33,615
SUBSTITUTED BENZOYL UREAS

Kobus Wellinga; Rudolf Mulder, both of Weep, Netherlands, assignors to Duphar International Research B.V., Netherlands

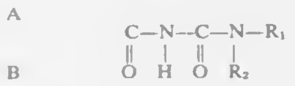
Original No. 3,933,908 dated Jan. 20, 1976, Ser. No. 354,393, Apr. 25, 1973. Application for reissue Jun. 6, 1984, Ser. No. 617,160

Continuation of Ser. No. 115,174, Jan. 25, 1980, abandoned, which is a division of Ser. No. 143,668, May 14, 1971, Pat. No. 3,748,356

Int. Cl.^{5} C07C *273/00*

U.S. Cl. **564—44** **26 Claims**

1. A compound of the formula



$$\begin{array}{lccccccccc} A & & & & & & & & & \\ & \mathrm{C} & - & \mathrm{N} & - & \mathrm{C} & - & \mathrm{N} & - & \mathrm{R_1} \\ & \| & & | & & \| & & | & & \\ B & \mathrm{O} & & \mathrm{H} & & \mathrm{O} & & \mathrm{R_2} & & \end{array}$$

wherein
- A and B are each moieties selected from the group consisting of hydrogen and halogen with the proviso that A and B do not both represent hydrogen, R_1 is a moiety selected from the group consisting of hydrogen and lower alkyl and R_2 is a moiety selected from the group consisting of phenyl, halogen substituted phenyl and halogenated alkyl substituted phenyl, with the provision that the compound is not an N-(2-monohalobenzoyl)N'-(3,4-dichlorophenyl) urea and is not a compound selected from the group consisting of
- N-(2,6-dichlorobenzoyl)-N'-(4-chlorophenyl) urea,
- N-(2,6-dichlorobenzoyl)-N'-(4-fluorophenyl) urea,
- N-(2,6-dichlorobenzoyl)-N'-(4-bromophenyl) urea,
- N-(2,6-dichlorobenzoyl)-N'-(4-iodophenyl) urea,
- N-(2,6-dichlorobenzoyl)-N'-(methyl)-N'-(4-bromophenyl) urea,
- N-(2,6-dichlorobenzoyl)-N'-(ethyl)-N'-(4-bromophenyl) urea,
- N-(2,6-dichlorobenzoyl)-N'-(methyl)-N'-(4-chlorophenyl) urea,
- N-(2,6-dichlorobenzoyl)-N'-(ethyl)-N'-(4-chlorophenyl) urea,
- N-(2,6-dichlorobenzoyl)-N'-(4-chlorophenyl) urea,
- N-(2,6-dichlorobenzoyl)-N'-(4-bromophenyl) urea,
- N-(2,6-dichlorobenzoyl)-N'-(4-fluorophenyl) urea, and
- N-(2,6-dichlorobenzoyl)-N'-(methyl)-N'-(4-chloropyenyl) urea,

VOL
1127
ISS
2
JE
11
1991
UMI

PLANT PATENTS

GRANTED JUNE 11, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,548

ROSE PLANT NAMED DEVICIO

Stanley G. Marciel, Aptos, Calif., assignor to DeVor Nurseries, Inc., Watsonville, Calif.

Filed Dec. 18, 1989, Ser. No. 456,849

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—20 1 Claim

1. The new and distinct variety of greenhouse rose plant substantially as herein shown and described, characterized in particular by its continuous and profuse production of relatively large flowers having Tyrian Purple outer petals and Rose Bengal colored inside petals and florets, the plant itself having a free branching growth habit and abundant production of foliage.

7,549

ROSE PLANT NAMED MARMALADE MIST

Walter Lammerts, Livermore, Calif., assignor to DeVor Nurseries, Inc., Watsonville, Calif.

Filed Mar. 19, 1990, Ser. No. 495,900

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—20 1 Claim

1. A new and distinct variety of rose plant, substantially as herein shown and described, characterized by its profuse and continuous production of very large flowers of a generally Delft Rose color; and by its vigorous upright and free branching growth habit with abundant foliage as a garden rose plant.

7,550

APRICOT CV. SUAPRITWO

John H. Weinberger, and Timothy P. Sheehan, both of Fresno, Calif., assignors to Sun World, Inc., Indio, Calif.

Division of Ser. No. 385,767, Jul. 26, 1989, abandoned, which is a continuation of Ser. No. 146,334, Jan. 21, 1988, abandoned. This application Mar. 12, 1990, Ser. No. 493,086

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—39 1 Claim

1. A new variety of apricot cv. Suapritwo, the variety being particularly distinguished and characterized by its early ripening dessert quality fruit of medium to large size and having an unusually large amount of exterior red color in the form of a bright red blush; its delicately flavored fruit with low acidity; and its relatively firm, slow softening fruit fresh which provides good shipping and handling qualities, essentially as illustrated and described herein.

7,551

CHINESE ELM TREE NAMED 'EMER I'

Michael M. Glenn, Athens, Ga., assignor to Tree Introductions, Inc., Monroe, Ga.

Filed Apr. 10, 1989, Ser. Nc. 335,671

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—51 1 Claim

1. A new and distinct variety of Elm as herein described and illustrated, primarily characterized by growth habit, leathery lustrous dark-green foliage, denisty of canopy, exfoliating bark, ease of vegetative propagation and resistance to leaf scorch, Dutch Elm Disease and Elm Leaf Beetle.

7,552

CHINESE ELM TREE NAMED 'EMER II'

Michael M. Glenn, Athens; John H. Barbour, Atlanta, and Michael A. Dirr, Watkinsville, all of Ga., assignors to Tree Introductions, Inc., Monroe, Ga.

Filed Apr. 10, 1989, Ser. No. 336,003

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—51 1 Claim

1. A new and distinct variety of elm as herein described and illustrated, primarily characterized by growth habit, superb exfoliating bark, ease of vegetative propagation and resistance to leaf scorch, dieback symptoms, cold weather, Dutch Elm Disease and Elm Leaf Beetle.

7,553

DOUGLAS-FIR TREE "TORQUIS" VARIETY

Stephen P. Wells, Moscow, Id., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 20, 1989, Ser. No. 341,088

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—30 1 Claim

1. A new and distinct variety of Douglas-fir, *Pseudotsuga menziesii*, substantially as shown herein and described, characterized particularly by generally upright growth with a curving, twisting, non-directional, at times corkscrew-like pattern to stem and branches, and smaller than average size, while retaining the foliage color and foliage character of a normal Douglas-fir.

7,554

PAGODATREE 'HALKA'

Chester J. Halka, Englishtown, N.J., assignor to J. Frank Schmidt & Son Co., Boring, Oreg.

Filed Oct. 26, 1989, Ser. No. 427,304

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—51 1 Claim

1. A new and distinct variety of Japanese pagodatree, substantially as herein shown and described, characterized particularly as to novelty by a high percentage of branches on two year old trees of a desired caliper, a growth rate and foliage size between that of seedling and the Regent pagodatree variety, leaflets with a length to width ratio higher than that of seedling and Regent pagodatrees, numerous small lenticels, and leaves with heavily pubescent undersides.

7,555

WAX MYRTLE NAMED LANE

Randall L. Brackin, P.O. Box 2127, Selma, Ala. 36701

Filed Dec. 18, 1989, Ser. No. 451,981

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—51 1 Claim

1 A new and distinct Wax Myrtle cultivar, substantially as herein shown and described, distinguished by its deeply serrated leaf shape a yellow-green mid-rib and resistance to leaf spot disease.

PATENTS

GRANTED JUN. 11, 1991

ERRATA

For CLASS	See PATENT NO.
4-233	5,022,097
4-233	5,022,098
452-115	5,022,120
33-413	5,022,158
62-271	5,022,241
418-257	5,022,842
534-618	5,023,274
558-160	5,023,312
524-166	5,023,313
544-132	5,023,357
355-283	5,023,464
365-203	5,023,465
514-064	5,023,513
342-368	5,023,634
364-508	5,023,845
365-113	5,023,859

VOL
1127

ISS
2

JE
11

1991

UMI

PATENTS

GRANTED JUNE 11, 1991

GENERAL AND MECHANICAL

5,022,092
MOTORCYCLIST'S JACKET WITH A REAR HELMET-CARRYING POUCH

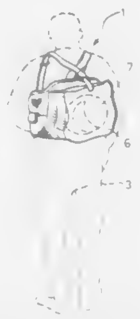
Carlo Bombrini, Bologna, Italy, assignor to C.P. Company S.p.A., Italy

Filed Apr. 13, 1989, Ser. No. 337,698

Claims priority, application Italy, Apr. 21, 1988, 53083/88[U]

Int. Cl.^{5} A41D *1/00, 1/04*

U.S. Cl. 2—94 8 Claims



1. A jacket (1) for motorcyclists comprising a waistcoat including a band (2) intended to be wrapped around a trunk of a user (3), the band (2) including a central rear part (4) intended to be situated in correspondence with the back of the user (3), two end flaps (5) closable together at the front of the user, and a pair of adjustable braces (14) associated with the band (2), the jacket (1) being further provided with a rear pouch (6) connected to the central part (4) of the band (2), of a size suitable for storing a motorcyclist's helmet (7).

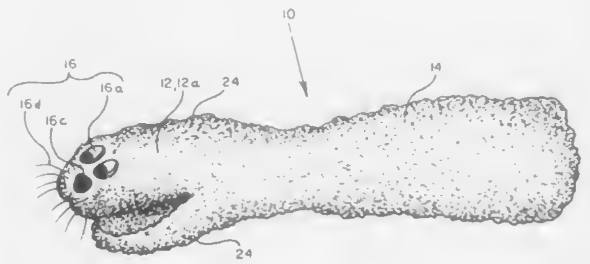
5,022,093
KITTEN MITTEN

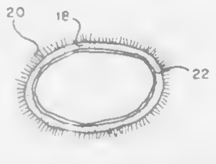
Roger E. Hall, P.O. Box 1217, Elon College, N.C. 27244

Filed Jul. 18, 1989, Ser. No. 381,596

Int. Cl.^{5} A41D *19/00*

U.S. Cl. 2—158 11 Claims





1. A kitten mitten for protecting a human hand and an arm, comprising:

(a) a hand covering portion for receiving said hand and protecting against animal inflicted related injuries;

(b) an elongated arm covering portion connected to and extending from said hand covering portion for receiving said arm and protecting against animal inflicted related injuries;

(c) said hand covering portion and said elongated arm covering portion being made of a protective material selected from the group consisting of heavy denim, rawhide, leather and vinyl, said protective material having an outer surface and an inner surface;

(d) a soft outer covering, encasing said outer surface of said protective material, made or material selected from the group consisting of felt, fur, simulated fur, and terrycloth;

(e) a nonporous material lining said inner surface of said protective material; and

(f) means attached to said outer covering for simulation and animation of said kitten mitten.

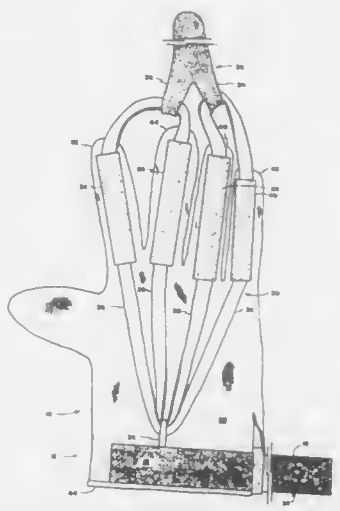
5,022,094
GRIPPING GLOVE

Noel J. Hames, 2908 Wimberly Dr., Apt. 6, Decatur, Ala. 35806, and Richard D. Ransom, 1619 Nuby Rd., Hartselle, Ala. 35640

Filed May 30, 1989, Ser. No. 358,598

Int. Cl.^{5} A41D *19/00*

U.S. Cl. 2—161 A 10 Claims



1. A glove for retention of a user's hand in secured snug-fitting relation around an object, said glove comprising:

a body having back and inner sides, a wrist portion, and extending thumb and finger portions, said inner side including a palm area; and

securing means cooperating with said finger portions and said body for retention of said finger portions in secured relation around said object for snug-fitting relation thereof in said palm responsive to a gripped relation of said object by user's hand, said securing means including:

a strap having a first end having eyelet means thereon, said strap disposed in extending relation from said finger portions for secured relation with said body,

strap attaching means including a cord member disposed in loosely secured relation with said body and slidably attached to and extending from each said finger portion, said cord member extending through said eyelet means for secured relation with said strap, and

a cord retaining member secured to said back portion of said body for the loosely secured relation of said cord thereto, said cord member being continuous and passing loosely, in folded relation, through said cord retaining member, said folded relation providing a cord member having four

VOL
1127
ISS
2
JE
11
1991
UMI

strand portions, each strand portion being slidably attached to a respective finger portion with a loop portion between adjacent inner and outer finger portions.

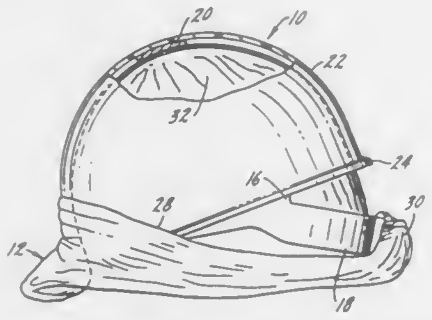
5,022,095
DISPOSABLE LINER FOR HARD HATS

Richard L. Fleury, Chicago, Ill., assignor to GKR Industries, Inc., Alsip, Ill.

Filed Jun. 21, 1989, Ser. No. 369,611

Int. Cl.^{5} A42C *5/00*

U.S. Cl. 2—190 **12 Claims**



7. In combination with a hard hat of the type which includes an outer shell of generally rigid material and an inner support framework, said framework including an annular retention band for engaging the wearer's head,

a disposable liner comprising a concavely shaped sheet having a top and elongated downwardly extending sides, said sheet being made of generally flaccid material, said sides defining a lower edge, at least a portion of said lower edge being gathered and held by resiliently stretchable retaining means, and said retaining means acting to retain said liner in resilient engagement with at least a portion of lower edge of said hard hat, said liner being easily removable from said hard hat by disengagement of said resilient retaining means from said lower edge, said liner covering substantially all interior surfaces of said hard hat, preventing contact between any portion of said framework and the wearer's head.

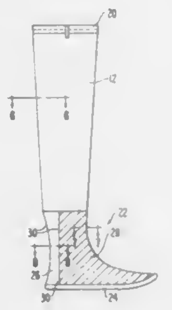
5,022,096
WATERPROOF BREATHABLE WADER

David J. Pacanowsky, Elkton, Md., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Jan. 18, 1990, Ser. No. 467,069

Int. Cl.^{5} A41D *1/06*

U.S. Cl. 2—227 **7 Claims**



1. A multicomponent, waterproof, wader comprising:

(a) waterproof, breathable, non-elastic, non-stretch right and left panels, each panel having a shape of a legging with an upper and lower region and front and rear region;

(b) the upper regions of the right and left panels joined together at a seam;

(c) the front and back regions of each legging panel joined together at an interior seam forming right and left pant legs;

(d) a waterproof and breathable sock attached to the lower region of each pant leg at a seam and wherein each sock has a waterproof, breathable stretchable vamp region;

(e) and means for supporting the wader on a person wearing it; wherein substantially all seams in said wader are sealed with a waterproof material.

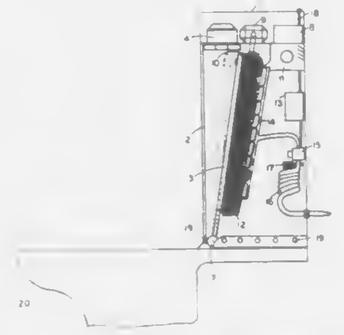
5,022,097
AUTOMATED TOILET SEAT CLEANING SYSTEM

Pavo Pusic, Moluntska 6, Dubrovnik, Yugoslavia 50000

Continuation of Ser. No. 261,990, Oct. 25, 1988, abandoned. This application Feb. 20, 1990, Ser. No. 481,805

Int. Cl.^{5} A47K *13/00*

U.S. Cl. 4—233 **8 Claims**



1. An automated toilet seat closing system comprising:

a system housing mounted on a toilet bowl including a liquid-tight door and driving means mounted on a frame for opening and closing said door, said door laterally driven into said housing in a retracted position and back into closed position by the driving means under the frame over rotating cylinders located in the bottom of a housing wall;

a movable toilet seat and electrical means for lifting and lowering said toilet seat, said toilet seat lifted into a vertical position and lowered into a resting horizontal position by said electrical means around a support frame mounted on a rear end of said toilet seat;

a plurality of rotating brushes for cleaning said toilet seat and electrical means for operating said brushes, said brushes mounted for rotation about horizontal axes inside said system housing and operated by said electrical means;

a liquid delivery means for spraying a liquid on said toilet seat, said liquid delivery means including a liquid heating means for heating said liquid, a disinfectant storing means for storing said liquid, and an electromagnetic means for initiating and stopping the flow of said liquid, all enclosed within said system housing;

an air delivery means for drying said toilet seat, said air delivery means including an air heating means and air blowing means all enclosed within said system housing;

means for removing said sprayed liquid from within said system housing;

means for automatically activating and controlling driving of said liquid-tight door, lifting and lowering of said toilet seat, rotating of said brushes, opening and closing of said electromagnetic means, heating of said liquid, and heating and blowing of said air.

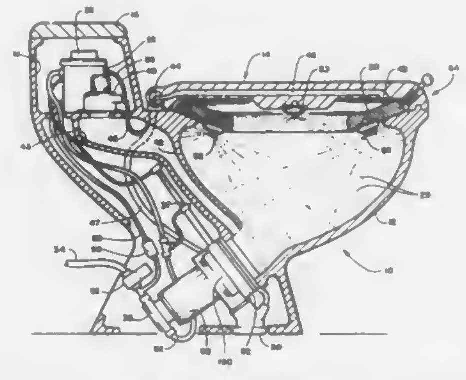
5,022,098
AUTOMATIC, SELF-CLEANING, WATER SAVING, TOILET SYSTEM

Richard Brower, 14324 Marianopolis Way, San Diego, Calif. 92129

Filed Nov. 2, 1989, Ser. No. 430,273

Int. Cl.^{5} A47K *13/00*

U.S. Cl. 4—233 **7 Claims**



1. A toilet having improved efficiency, convenience and sanitation which comprises:

a bowl;

a seat partially covering the upper surface of said bowl;

a lid movable between a down position engaging said seat and sealing the bowl interior and an up position away from said seat permitting use of said toilet;

air extraction means including an air pump adapted to receive air from within said bowl and selectively direct said air through a first tube to an outside vent or to a second tube exiting in said bowl when said lid is up during toilet use;

flushing means for directing a variable quantity of water under pressure into said bowl;

a plurality of rotating spray means for spraying water across said seat and interior surface of said bowl during flushing;

means for removing any contents from said bowl and reducing solids to small particles during flushing;

a heater to heat air passing through said air pump and means to activate said heater when air is directed through said second tube;

means for directing heated air across said seat and said bowl interior upon completion of flushing to dry said bowl and seat and to warm said seat;

a rotary valve means connected to said lid adapted to receive air from said air pump and movable between a first position corresponding to the lid up position for directing air to said vent and a second position corresponding to the lid down position for directing air through said second tube toward said seat and bowl interior; and

exhaust means to direct said heated air to and external vent.

5,022,099
RADIATION HELMET

Charles A. Walton, 19115 Overlook Rd., Los Gatos, Calif. 95030

Filed Feb. 2, 1990, Ser. No. 474,450

Int. Cl.^{5} A42B *1/06*

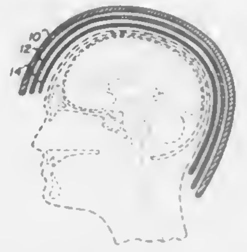
U.S. Cl. 2—410 **4 Claims**

1. A radiation helmet for wearing by a dental patient comprising, in combination:

a helmet for wearing about the head of an individual and shaped to allow exposure of said wearer's jaw area and an X-ray of the wearer's teeth; and

a liner constructed of X-ray opaque material positioned within the helmet to protect said wearer's head covered by the liner from X-ray radiation;

whereby external X-ray radiation is inhibited from reaching the head and internal organs of the head of a wearer while permitting X-ray pictures of said wearer's jaw area and teeth.



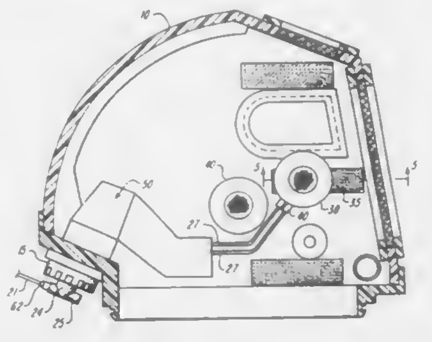
5,022,100
APPARATUS AND METHOD FOR UNDERWATER ACOUSTIC RECEIVING SYSTEM INSTALLATION IN DIVING HELMET

Normand Belanger, Tiverton, R.I., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 28, 1990, Ser. No. 590,266

Int. Cl.^{5} A42B *1/24*

U.S. Cl. 2—422 **15 Claims**



7. An underwater acoustic receiving system installation in a diving helmet, comprising:

an underwater diving helmet having at least one removable mixed gas blanking cap, said at least one cap having an outerside and an underside, said at least one cap further having a hole extending from said outerside through to said underside;

a waterproof connector mounted in and positioned partially through said hole to said underside of said mixed gas blanking cap, said waterproof connector comprising, a solid member having a seat for mounting said waterproof connector onto said outerside of said cap and providing therewith a watertight seal around said hole, a female plug-receptacle fixedly mounted in a portion of said solid member and having at least two prepositioned contacts for electrically interconnecting with a male plug from an acoustic receiving system, said female plug-receptacle conformed to said male plug such that the insertion of said male plug expels water from said female plug-receptacle, at least two wires electrically connected to corresponding contacts in said female plug-receptacle and embedded in said solid member from said electrical connection at said plug-receptacle through said solid member of said receptacle located on said underside of said cap; and

an earphone electrically connected to said at least two wires.

VOL
1127
ISS
2
JE
11
1991
UMI

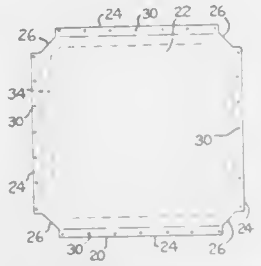
5,022,101
THERMAL COVER FOR A SPA

Jeffrey E. Gosselin, and Lisa A. Gosselin, both of 20 Mountain Trail, East Hampton, Conn. 06424

Filed Feb. 7, 1990, Ser. No. 476,320

Int. Cl.^{5} E04H *4/00;* **A47K** *3/02*

U.S. Cl. 4—498 2 Claims



1. A flexible cover for a spa, wherein the spa comprises an upstanding annular water-containment tub wall, a horizontal outwardly radiating rim wall extending from the upper edge of said tub wall, and an external flange extending downwardly from the outer peripheral edge of said rim wall: said cover comprising a flexible sheet adapted to extend over the tub space and onto the rim wall, a plural number of flap structures extending from outer edge areas of said cover sheet at spaced points therealong, said flap structures being formed as integral extensions of said cover sheet for positionment against the outer edge of said rim wall and the outer surface of said external flange; and a series of fasteners carried on each flap structure for releasable securing the flexible cover on the spa; each flap structure having two side edges extending away from said sheet; edge areas of said sheet between adjacent ones of the flap structures being cut away at acute angles to the side edges of the flap structures so that the cover fits tightly against the upper face of the horizontal rim wall around the entire perimeter of the spa; said flexible sheet and associated flap structures being a three layer laminated sheet structure comprised of canvas, an impervious plastic film adhered to the lower face of the canvas, and a thermally-reflective film adhered to the lower face of the plastic film.

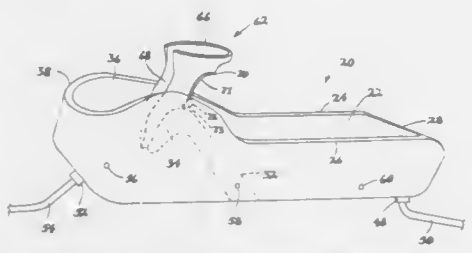
5,022,102
INFLATABLE BATHING DEVICES

Maria Louvaris, 241 Hillandale Ct., Bloomingdale, Ill. 60108

Continuation-in-part of Ser. No. 357,018, May 24, 1989, abandoned. This application Jun. 6, 1990, Ser. No. 534,032

Int. Cl.^{5} A45D *19/06;* **A47K** *3/64*

U.S. Cl. 4—516 19 Claims



1. In combination, an air inflatable bathing device and a shampoo cap, said bathing device comprising integrally connected inflatable walls of flexible material forming a bathtub and shampoo bowl, said walls including an inflatable bottom wall, inflatable side wall means connected to and extending upwardly from around the periphery of said bottom wall to form a tub-shaped enclosure therewith, and an inflatable backrest wall connected to said bottom wall and side wall means and separating said tub-shaped enclosure into a bathtub on one side of said backrest wall and a shampoo bowl on the opposite side; and air valve means for inflating said bathing device to form said bathtub and shampoo bowl and for deflating said bathing device to lie flat, said shampoo cap comprising an integral and air inflatable shampoo cap of flexible material including an inflatable upstanding upper wall defining a basin for generally surrounding the top of a person's head, said basin having open upper, lower and rearward ends to expose and provide access to the person's hair for shampooing; an inflatable runoff water guide extending downwardly from said open rearward end of said basin for receiving and conveying wash water away from said basin; means for generally sealingly attaching said shampoo cap to the person's head; and air valve means for inflating said basin and runoff water guide to form said shampoo cap and for deflating the same to lie flat.

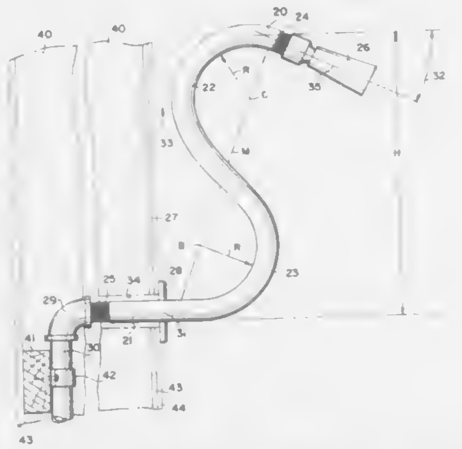
5,022,103
SHOWER ARM EXTENSION

Kenneth B. Faist, Tallahassee, Fla., assignor to Thomas E. Quick, Tallahassee, Fla.

Filed May 26, 1989, Ser. No. 357,207

Int. Cl.^{5} A47K *3/22*

U.S. Cl. 4—596 4 Claims



1. A shower arm extension adapted to be connected to a water pipe connection behind a vertical wall of a shower comprising a single, integral, rigid, attractive, elongated, cylindrical water pipe having a central portion and an upper end portion and a lower end portion, said upper end portion having a free end with external pipe threads onto which a threaded shower head is attachable, said lower end portion having a free end with external threads to be fitted into an internally threaded pipe coupling within a wall of a shower, said lower end portion being substantially straight and horizontally extending to a point generally midway of the entire horizontal distance between said free ends of said upper and lower end portions, said free end of said upper portion being substantially straight and having a longitudinal axis disposed downwardly from a horizontal plane from about 15° to about 45°, said central portion having a pair of generally equal and spaced bends and a substantially straight portion therebetween to define a substantially S-shaped central portion, said bends being connected respectively to said upper and lower end portions with all said portions being in a substantially vertical plane when said extension is installed in a shower, said shower arm extension configured such that where installed in a vertical shower wall said lower end portion extends horizontally outwardly through a passageway in a vertical shower wall, said extension being turned about a longitudinal axis of said lower end portion to cause said external threads to engage an internally threaded pipe coupling within a vertical wall of a shower without an upper one of said bends of said central portion of said upper end portion touching a vertical wall or a ceiling defining a shower, said upper end being located closely adjacent a wall defining a shower when said lower end portion is connected to an internally threaded pipe coupling, said extension extending horizontally outwardly from an internally threaded pipe coupling proceeding upwardly in said lower bend and said straight portion toward a wall of a shower in which an internally threaded coupling is located and proceeding upwardly in said upper bend to said upper straight portion extending outwardly and disposed downwardly from said horizontal plane.

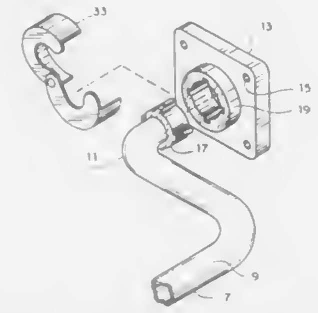
5,022,104
SHOWER CURTAIN SUPPORT

Cedric C. Miller, 4439 Pembrook Village Dr., Alexandria, Va. 22309, assignor to Cedric C. Miller and Janice L. Ferguson, both of Alexandria, Va.

Filed Jul. 31, 1990, Ser. No. 560,771

Int. Cl.^{5} A47K *3/22*

U.S. Cl. 4—558 2 Claims



1. A shower curtain support for suspending a conventional shower curtain across a shower stall opening defined by opposed parallel end walls, including:

continuous supporting rod means for integral, one-piece construction, having S-shaped ends, for slidably mounting said shower curtain in suspending relationship, said S-shaped ends having terminal end portions, said terminal end portions of said S-shaped ends carrying spider means for complemental reception by spider plate means for effecting discrete fixed dispositions of said rod means in radially indexed orientations, of four orientations 90° apart, relative to bracket means, said S-shaped ends carrying said spider means in longitudinally reciprocable relationship; and

bracket means on said end walls for supporting said rod means, said bracket means having said spider plate means, said spider plate means complementally receiving said spider means carried by said terminal end portions of said S-shaped ends for effecting adjustable fixed dispositions of said rod means in radial indexing orientations, of four orientations 90° apart, relative to said bracket means.

5,022,105
MOBILE LIFT-ASSISTED PATIENT TRANSPORT DEVICE FOR FIELD USE

Michael Catoe, 1282 St. Peter's Church Rd., Lexington, S.C. 29072

Continuation-in-part of Ser. No. 389,867, Aug. 4, 1989, abandoned. This application Mar. 26, 1990, Ser. No. 498,940

Int. Cl.^{5} A61G *1/02, 7/00*

U.S. Cl. 5—11 9 Claims

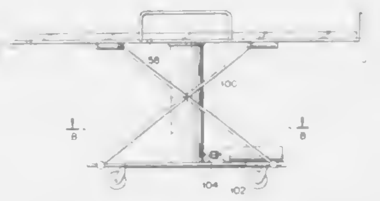
6. A lift-assisted mobile device for transporting patients from one location to another, comprising:

a patient supporting frame for supporting a patient;

an undercarriage for supporting said patient supporting frame, said undercarriage including a rectangular frame having a first portion and a second portion slidably connected to said first portion so as to move horizontally relative to one another, two arms connected between said first and second portions and disposed in parallel with said first and second portions and a scissors linkage having two legs and each leg having a first end connected to said patient supporting frame and a second end connected to said first and second portions, respectively, for connecting said rectangular frame to said patient supporting frame in a manner such that vertical movement of said patient supporting frame relative to said rectangular frame produces corresponding horizontal movement of said portions of said rectangular frame relative one another between a first position where said patient supporting frame is adjacent said undercarriage and a second position where said patient supporting frame is remote from said undercarriage; and

lift-assisting means disposed between said first and second portions of said rectangular frame and connected to said arms for causing said first and second portions to move horizontally relative to one another and thereby cause said patient supporting frame to move vertically with respect to said rectangular frame, wherein when said patient supporting frame is in said second position, said first and second portions are disposed in an inner position with respect to one another and when said patient supporting frame is in said first position, said first and second positions are extended outwardly with respect to one another, said lift-assisting means comprising a collapsible air bag connected vertically between said rectangular frame and said patient supporting frame, a tank of compressed air for actuating said bag in response to depression of said switch, and at least one tension spring biasing said two portions of said rectangular frame to move horizontally towards and away from one another; and

at least one switch operably connected to said lift-assisting means adapted to be depressed by an operator to actuate said lift-assisting means, whereby manual height adjustment of said patient supporting frame relative to said rectangular frame is avoided, wherein depression of said switch causes said patient supporting frame to be raised or lowered when said undercarriage is resting on a supporting surface and causes said undercarriage to be raised or lowered when said undercarriage is not resting on a supporting surface.



5,022,106
INVALID HOISTS

Derek J. Richards, Gloucester, England, assignor to Arjo Mecanaids Limited, Gloucester, England

Filed Jan. 9, 1990, Ser. No. 462,463

Int. Cl.^{5} A61G *7/10*

U.S. Cl. 5—86 13 Claims

1. An invalid hoist for raising inform or disabled persons from a sitting to a generally standing position, the hoist comprising a seat, a carrier movable along the mast, a U-shaped lifting member which is connected at its closed end to an upper end of the mast for pivotable movement about a horizontal axis and what at its open part provides laterally spaced attachment points for the attachment of a body sling, a U-shaped strut pivotably connected at its closed end to the carrier and at its

VOL
1127
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1991
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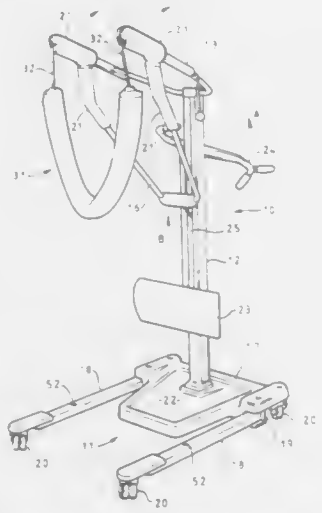
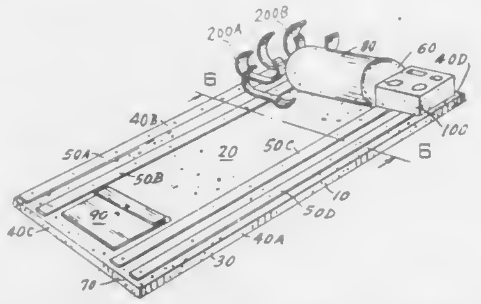
open part to the open part of the lifting member, and operating means for raising and lowering the carrier along the mast to



thereby move the attachment points along an arcuate path, the operating means being self-locking at any chosen position.

5,022,107
BEACH MATTRESS

Richard A. Knotts, 1301 NW. 77 Way, Pembroke Pines, Fla. 33024
Filed Nov. 16, 1989, Ser. No. 437,342
Int. Cl.^{5} A47G *9/06*
U.S. Cl. 5—419 2 Claims

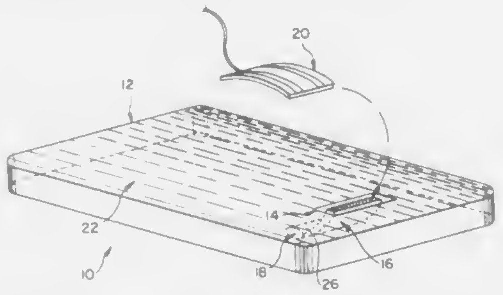


1. A portable mattress member adapted for holding a person thereon in either a reclining position or other position, such member comprising a rectangularly-shaped member having an upper surface and a lower surface, and wherein said mattress member has an attached member with a plurality of indentations into the depth of such attached member said indentation formed to hold objects therein, said mattress member having a plurality of fastener strips on the upper surface thereof, and wherein said mattress member has a plurality of mating straps on one portion of said upper surface thereof which are structured to be tied together to hold objects thereon.

5,022,108
WATERBED MATTRESS WITH HEATER PAD POCKET

Lynn D. Larson, 1052 N. Lakeshore Dr., Lincoln, Nebr. 68528
Filed Oct. 9, 1990, Ser. No. 594,077
Int. Cl.^{5} A47C *27/08*
U.S. Cl. 5—422 10 Claims

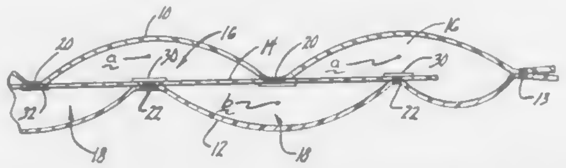
1. A waterbed mattress adapted to increase the heating efficiency of a waterbed heater mat, said mattress comprising,
- top, bottom, head, foot and opposite side walls interconnected to define a fluid tight chamber,
- a heater mat receiving opening through one wall of said mattress,
- a heater mat receiving pocket situated within said mattress and having opposite closed and open ends,
- the open end of said pocket being registered with said opening and operatively sealed to the periphery thereof such that said mat may be inserted into and removed from said



pocket through said opening without exposure to fluid within the mattress,
- said pocket adapted to collapse against opposite surfaces of a heater mat inserted therein in response to fluid pressure within the mattress whereby both surfaces of a heater mat are in heat transfer relation with fluid in the mattress by thermal conduction through said pocket.

5,022,109
INFLATABLE BLADDER

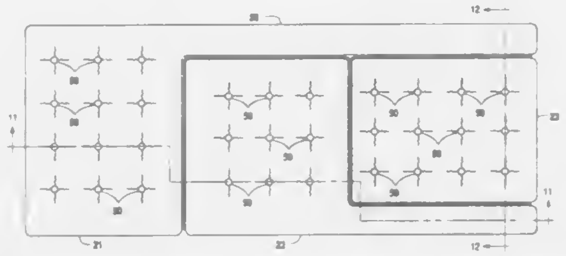
Robert W. Pekar, Florence, Mass., assignor to Dielectrics Industries, Chicopee, Mass.
Filed Jun. 11, 1990, Ser. No. 535,655
Int. Cl.^{5} A47C *27/08*
U.S. Cl. 5—449 8 Claims



1. Inflatable bladder comprising superimposed upper and lower, outer sheets of heat-sealable synthetic plastic material sealed together about their peripheral edge portions, an intermediate layer, also of heat-sealable material, interposed between the upper and lower sheets and sealed thereto at spaced locations on opposite surfaces thereof to form a plurality of air cells disposed on opposite sides of the intermediate layer and forming the outer surfaces of said bladder, said intermediate layer having coating of a barrier material at pretermined sites on the surfaces thereof, said sites being located opposite the spaced locations at which the intermediate layer is sealed to the outer sheets, said barrier material comprising a composition which is bonded to the intermediate layer and inhibits heat-sealing of said intermediate layer at the coated sites such that said cells may be formed by simultaneously heat-sealing together the intermediate layer and said upper and lower sheets at said spaced locations, but not at the coated sites.

5,022,110
LOW AIR LOSS MATTRESS

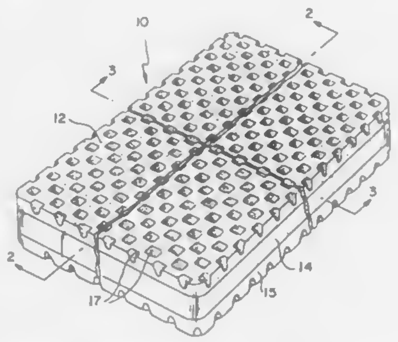
Glenn C. Stroh, Marion, Tex., assignor to Kinetic Concepts, Inc., San Antonio, Tex.
Filed Apr. 17, 1989, Ser. No. 338,943
Int. Cl.^{5} A61G *7/04*
U.S. Cl. 5—455 25 Claims



23. An inflatable patient support mattress overlay comprising:
- a plurality of air cushions forming an integral patient support mattress overlay when inflated, said cushions including at least three separately inflatable cushions which generally correspond to the head, body and leg portions of a patient supported thereon, a first of said three cushions being located adjacent a longitudinal end of said mattress overlay and being separately inflatable by means of an air inlet located at said longitudinal end, a second of said three cushions being separately inflatable by means of an air inlet located at said longitudinal end adjacent a first lateral side of the first of said three cushions and a third of said three cushions being separately inflatable by means of an air inlet located at said longitudinal end adjacent a second lateral side of said first of said three cushions, the second lateral side of said first cushion being opposite the first lateral side of said first cushion.

5,022,111
PRESSURE REDUCTION MATTRESS

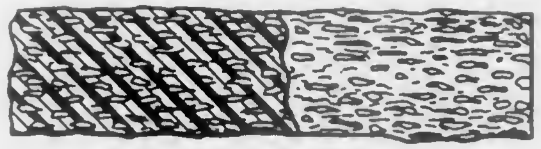
William G. Fenner, Sr., Richmond, Va., assignor to E. R. Carpenter Company, Inc., Richmond, Va.
Filed Jun. 29, 1990, Ser. No. 545,522
Int. Cl.^{5} A47C *27/15*
U.S. Cl. 5—481 20 Claims



20. A mattress, comprising:
- a first layer of foam material having a density value and an indentation load deflection value;
- a second layer of foam material secured to said first layer and having a density value and an indentation load deflection value;
- a third layer of foam material secured to said second layer and having a density value and an indentation load deflection value;
- said indentation load deflection value of said first and said third layer being lower than the indentation load deflection value of said second layer; and
- said density value of said first and said third layer being higher than the density value of said second layer.

5,022,112
PAINT BRUSH WITH MICROCELLULAR SYNTHETIC BRISTLES

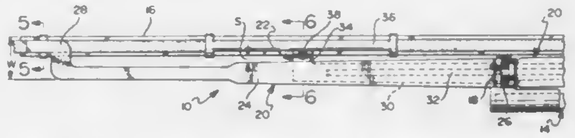
Fredrick B. Burns, South Milwaukee, Wis., assignor to Newell Operating Company, Freeport, Ill.
Division of Ser. No. 80,948, Aug. 3, 1987, Pat. No. 4,937,141. This application Apr. 5, 1988, Ser. No. 177,610
Int. Cl.^{5} A46B *9/06*
U.S. Cl. 15—159 A 4 Claims



1. A brush, said brush comprising,
- firstly, a plurality of bristles, at least a portion of said bristles being homogeneous unitary synthetic brush bristles,
- said synthetic bristles being composed of a material selected from the group consisting of (a) a synthesized polymer, (b) a co-polymer, (c) an alloy, or mixture of synthetic polymers, said synthetic bristle having a wall structure of cellular configuration, said synthetic bristle having a non-uniform shape, and said synthetic bristle further having a scale-like surface finish,
- secondly, handle means, and
- thirdly, means for securing the plurality of bristles to the handle means.

5,022,113
COMPACT SIDE MOUNTED WIPER

Thadius F. Jozefczak, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Mar. 16, 1990, Ser. No. 494,294
Int. Cl.^{5} B60S *1/04*
U.S. Cl. 15—250.42 2 Claims



1. In a vehicle wiper system having a wiper arm with a side pivot axis and a generally straight wiper blade with a predetermined end to end length, a compact blade to arm mounting assembly, comprising,
- a pair of generally straight primary beams, each approximately half the length of said blade and pivoted to said wiper arm axis, each primary beam further having a straight main body and a blade mounting hook that is laterally offset from its main body and aligned with the hook of the other primary beam so as to support said wiper blade near the blade ends in proximate parallel relation to the side of said primary beams with a small side gap there between,
- and, a pair of generally straight secondary beams, each approximately half the length of said primary beams and pivoted independently to said wiper arm axis, each secondary beam further having a straight main body oriented coextensive to a respective primary beam main body and a blade mounting flange that is laterally offset from its main body and located in said side gap, so as to provide intermediate support to said wiper blade within a laterally compact area.

VOL
1127
ISS
2
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1991
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DEVICE FOR SUCTIONING UP AND REMOVING A CONTAMINATED LIQUID

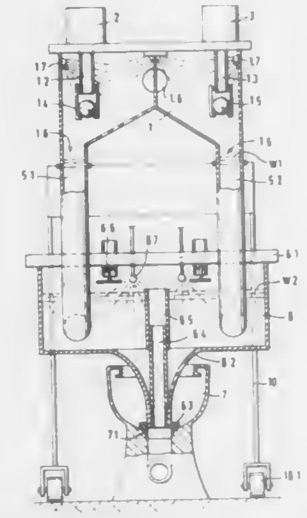
Horst Kauffeldt, Bachstr. 150, and Thomas Kauffeldt, Kyffhauser Str. 27, both of, 4000 Dusseldorf, Fed. Rep. of Germany

Filed Mar. 7, 1989, Ser. No. 320,013

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1988, 3808124

Int. Cl.⁵ A47L *5/38*

U.S. Cl. 15—353 — 13 Claims



1. In a device for suctioning up and removing a contaminated liquid, especially dirty water, with a vacuumized tank having a top and a bottom, at least one vacuum connection at the top that communicates with a suction fan and a suction connection that communicates with a supply hose and at least one outlet at the bottom that can be closed off to prevent air from entering from outside, the improvement comprising: an outlet mechanism downstream of the outlet and controlled by the pressure of the air in the vacuumized tank that keeps the liquid flowing out through the outlet continuously even when there is a vacuum in the vacuumized tank, wherein the outlet mechanism comprises a column of liquid in a pipe downstream of the outlet that is high enough to ensure that the sum of the hydrostatic pressure it generates and the pressure of the air in the vacuumized tank is at least as high as the pressure of the outside air and a closure mechanism at an outer end of the pipe that opens in the direction of flow and wherein the closure member comprises a siphon.

5,022,115

INTAKE NOZZLE ASSEMBLY FOR A LIQUID BATH VACUUM CLEANER

Gary A. Kasper, Cadillac, Mich., assignor to Rexair, Inc., Cadillac, Mich.

Filed Jan. 19, 1990, Ser. No. 467,746

Int. Cl.⁵ A47L *9/18*

U.S. Cl. 15—353 — 9 Claims

1. A vacuum cleaner system comprising:

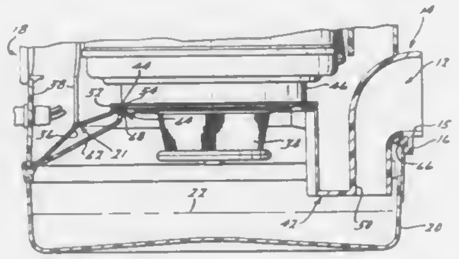
a vacuum canister assembly having a lower surface and a side surface;

intake means for ingesting dust and dirt particulate entrained air therethrough, said intake means forming a port within a portion of said vacuum canister assembly, said port defining openings on said side and lower surfaces of said vacuum canister assembly;

said port of said intake means including a lowermost tubular end portion protruding outwardly of said lower surface of said vacuum canister;

pan means for containing a filtering agent in an interior area thereof, said pan means having lower, side and upper surfaces and being removably connected to said lower surface of said vacuum canister assembly, said upper surface of said pan means having an opening operable to receive therethrough a portion of said lowermost tubular end portion of said port, said portion of said lowermost tubular end portion extending to a point near a surface of said filtering agent to thereby enable said dust and dirt entrained air being ingested through said intake means to enter said interior area of said pan means; and

wherein said opening facilitates cleaning of said interior area of said pan means when said pan means is detached from said vacuum canister assembly.



5,022,116

HINGE BRACKET ASSEMBLY

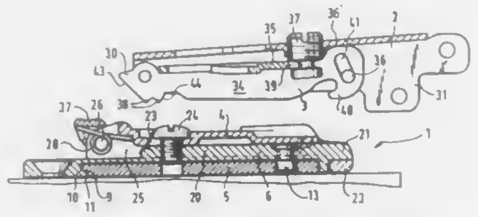
Luciano Salice, Carimate, Italy, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Jun. 14, 1989, Ser. No. 365,569

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1988, 3821946; Dec. 8, 1988, 3841405

Int. Cl.⁵ E05D *7/04*

U.S. Cl. 16—258 — 13 Claims



1. A hinge bracket assembly comprising a hinge bracket and a mounting plate for securing the bracket to a furniture part, the mounting plate including a baseplate and a first intermediate plate, the base plate being provided with a track for the intermediate plate for longitudinally slidably mounting the intermediate plate on the baseplate, a clamp screw which is screwed into the baseplate and extends through a slot in the intermediate plate to secure the plates together, the intermediate plate being provided at one end with a spring-loaded detent lever, which is pivoted on a transverse axis, the intermediate plate being provided at an opposite end with pivot means, the hinge bracket having a hooklike portion hooking same on the pivot means for pivotal movement to a position in which the hinge bracket is resiliently locked to the intermediate plate by engagement of the detent lever with an engaging part of the hinge bracket.

5,022,117

CABINET HINGE WITH CLOSING MECHANISM

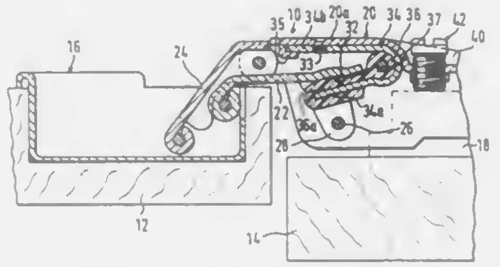
Karl Lautenschläger, Reinheim, and Gerhard W. Lautenschläger, Brensbach, both of Fed. Rep. of Germany, assignors to Karl Lautenschläger GmbH & Co. KG, Reinheim, Fed. Rep. of Germany

Filed Apr. 12, 1990, Ser. No. 508,773

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1989, 39124940

Int. Cl.⁵ E05D *11/10*

U.S. Cl. 16—288 — 6 Claims



1. A hinge for a cabinet door comprising: a door-related hinge part in the form of a cup to be set in a recess in the door, and a carcase-related hinge part in the form of an elongated supporting arm of inverted U-shaped cross section, an inner and an outer hinge link pivotally connecting said hinge parts to each other, each hinge link having a first end journalled in the cup and a second end journalled on the supporting arm, a closing mechanism provided at the second end of the inner hinge link which is nearer the interior of the cabinet when the door is closed, said closing mechanism including a cam surface corotationally formed on said inner hinge link, a substantially U-shaped leaf spring having a first, resiliently deformable leg lying with bias on said cam surface, said leaf spring also having a second leg held within the U-shaped cross section of said supporting arm, and a bridging section joining said two legs, said second end of said inner hinge link having two parallel ears formed by bending at right angles margins of said inner hinge link, said cam surface being located between said ears, the bias of said leaf spring biasing said first leg being toward said second leg.

5,022,118

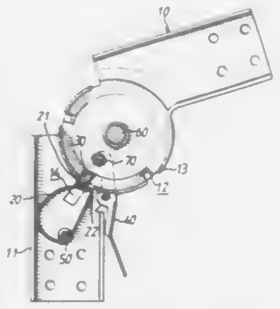
LADDER JOINT WITH ENGAGEMENT SPRING MEMBER

Chang Wan-Li, Taipei, Taiwan, assignor to Wan Dean Industry Co., Taiwan

Filed Jun. 25, 1990, Ser. No. 542,771

Int. Cl.⁵ E05D *11/10*

U.S. Cl. 16—327 — 1 Claim



1. In a ladder joint comprising the combination of:

a fixed member having an adjustment slot, a rivet hole and an aperture;

a release latch pivotally mounted to the rivet hole of the fixed member; and

a movable member having a plurality of fixing slots position evenly around an outer periphery thereof, and having a plurality of respective protuberances on said outer periphery each adjacent to a corresponding fixing slot; the improvement comprising a means for effecting a change in angular position between said fixed member and said movable member comprising:

an engagement spring member having a hooking piece at one curved end thereof, an extended edge at the other end thereof, and a pair of securement loops at an intermediate portion thereof for mounting to the aperture of the fixed member; and

a substantially rectangular slug having a recess on a side thereof for receiving said hooking piece and being disposed in the adjustment slot of the fixed member, said slug being movable by said curved end of aid engagement spring member, upon a sideward movement of said extended edge caused by contact with one of the protuberances of the movable member, to slide into one of said plurality of fixing slots of the movable member to prevent a relative rotation between the fixed and movable members.

5,022,119

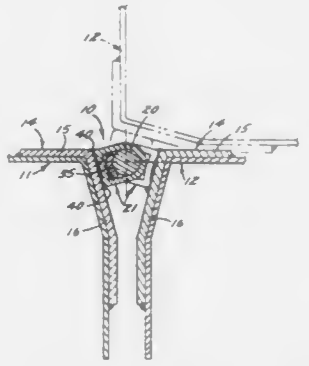
HEAVY DUTY HINGE

James E. McCanse, 949 Etnyre Terrace Rd., Oregon, Ill. 61061

Filed Oct. 4, 1989, Ser. No. 416,862

Int. Cl.⁵ E05D *5/02*

U.S. Cl. 16—387 — 10 Claims



1. A hinge ear for receiving a cylindrical hinge pin and comprising a one piece tubular component having an arcuate section with an arcuately concave interior surface and an arcuately convex exterior surface, said arcuate section extending through a span of about 180 degrees and having two end portions, two substantially parallel and substantially straight sections formed integrally with the end portions of said arcuate section and having substantially straight interior surfaces which extend substantially tangentially from the interior surface of said arcuate section adjacent the end portions thereof, a bridge section formed integrally with said straight sections and having an interior surface which extends substantially perpendicular to the interior surfaces of said straight sections, and a separate insert fixed within said component adjacent said bridge section and having an arcuately concave surface which faces the concave interior surface of said arcuate section and which coacts therewith to define a substantially cylindrical bearing surface for said hinge pin.

5,022,120

APPARATUS FOR REMOVING OIL BAG FROM FOWL

Grover S. Harben, III, 3319 Edgewater Ter., Gainesville, Ga. 30501

Filed Oct. 30, 1989, Ser. No. 429,088

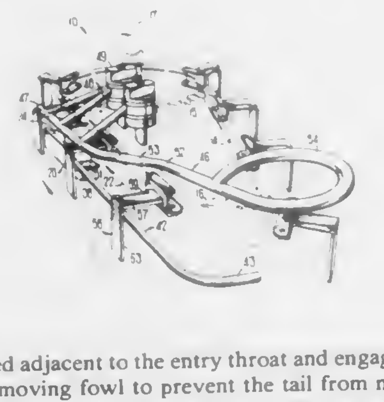
Int. Cl.⁵ A22C *21/00*

U.S. Cl. 452—115 — 13 Claims

1. Apparatus for removing the oil bag from fowl moving along a predetermined path, comprising:

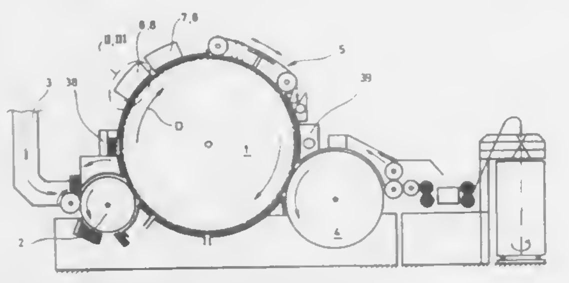
VOL
1127
ISS
2
JE
11
1991
UMI

cutting means disposed in certain relation to the path and defining an entry throat for receiving the oil bag of a fowl moving along the path, the cutting means comprising
a pair of sides mutually converging from the entry throat for receiving the oil bag of an oncoming fowl which approaches the throat along a first side thereof, and
a knife to cut the oil bag from the fowl; and guide means disposed adjacent to the entry throat and engaging the tail of the moving fowl to prevent the tail from moving into the entry throat, so that the tail is not cut as the oil bag enters the entry throat to be removed from the fowl by the knife, the guide means including a member at one side of the throat and having a guide surface extending across the path in front of the throat to engage the tail of an oncoming fowl and displace the tail from the entry throat.



5,022,121
CARDING MACHINE OR SCRIBBLER WITH TRANSVERSELY MOVING CARDING ELEMENT SETS

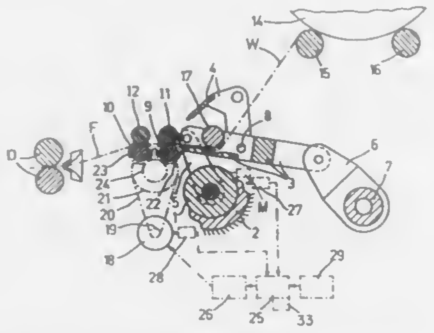
Hans Rutz, Winterthur, Switzerland, assignor to Hollingsworth GmbH, Neubulach, Fed. Rep. of Germany
PCT No. PCT/EP88/00875, § 371 Date Jul. 24, 1989, § 102(e) Date Jul. 24, 1989, PCT Pub. No. WO89/02941, PCT Pub. Date Apr. 6, 1989
PCT Filed Sep. 30, 1988, Ser. No. 375,449
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3733094
Int. Cl.⁵ D01G *15/08*
U.S. Cl. 19—102 **27 Claims**



1. A carding machine, comprising:
a carding drum; and
at least one carding element set cooperating with said carding drum wherein said at least one carding element set is connected to a reciprocating drive mechanism capable of generating reciprocation amplitudes of up to 50 mm, said carding element set including a plurality of carding elements cooperating with said carding drum and mounted for movement transversely of a direction of rotation of said carding drum for removing foreign matter from fibre fleece, said carding elements cooperating with a first exhauster device and each including a respective card cloth and being mounted for reciprocating movement transversely of the direction of rotation of said carding drum.

5,022,122
COMBING MACHINE

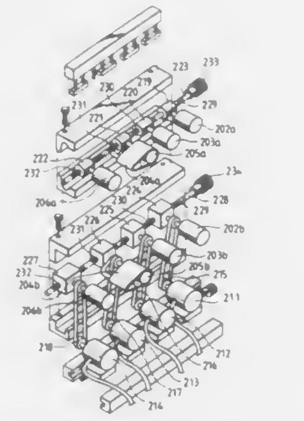
Heinz Clement, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland
Filed Dec. 22, 1989, Ser. No. 455,293
Claims priority, application Switzerland, Dec. 23, 1988, 04784/88
Int. Cl.⁵ D01G *19/16*
U.S. Cl. 19—225 **18 Claims**



10. A combing machine comprising
a plurality of detaching rollers for a plurality of combing heads disposed in longitudinally aligned manner;
means mechanically coupling said rollers to each other; and
at least one electric motor directly connected to at least one of said rollers for rotating said rollers in unison.

5,022,123
DRAFT MECHANISM HAVING ROLLER PAIRS CONNECTED TO DRAFT RATIO CONTROLLED MOTORS BY TIMING BELTS

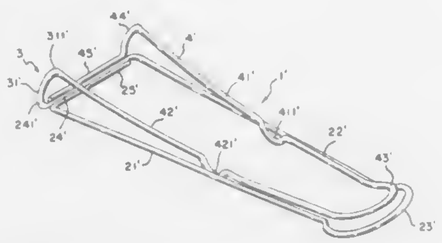
Yutaka Ueda, Nara; Hideshi Mori, Joyo, and Manzo Tanaka, Oumihachiman, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan
Filed Sep. 28, 1989, Ser. No. 413,987
Claims priority, application Japan, Sep. 29, 1988, 63-245425; Jun. 16, 1989, 1-70690[U]
Int. Cl.⁵ D01H *5/32, 5/44, 5/34*
U.S. Cl. 19—260 **12 Claims**



1. A draft mechanism having a series of roller pairs each comprising a bottom roller and a top roller, wherein said roller pairs have respective bottom rollers separately connected to the output shafts of motors through respective timing belts, and said draft mechanism comprises a motor controller having a memory device for storing rotational speeds of the individual motors beforehand and adapted to control the respective motors according to signals supplied from said memory device.

5,022,124
CLIP DEVICE

Chwen-Chaur Ylin, No. 20, Fu Hsin Hsin Tsun, Kuo Kunag Li, Hwa Lian City, Hwa Lian Hsien, Taiwan, China
Filed Mar. 20, 1990, Ser. No. 497,006
Int. Cl.⁵ B42F *1/00*
U.S. Cl. 24—67.9 **2 Claims**

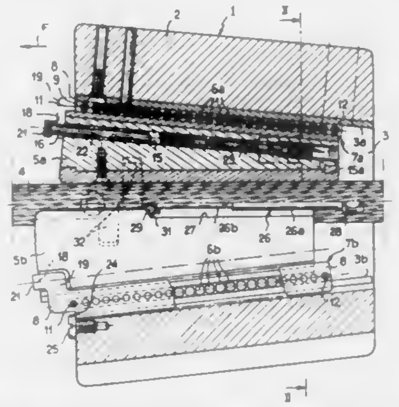


1. A clip device comprising:
a first clipping member (2'), said first clipping member having a first rod member (21'), as second rod member (22'), a rounded portion (23') intermediate said first and second rod members (21', 22') of said first clipping member, a first transverse rod member (24') and a second transverse rod member (25') connected to the ends of said first and second rod members (21', 22');
a bending member (3') having an arc portion (31') connected by one end to one end of said first transverse rod (24') of said first clipping member; and
a second clipping member (4'), having a first rod member (41'), a second rod member (42'), a transverse rod member (45') and a round head portion (43') intermediate said first and second rod members (41', 42') of said second clipping member, said second clipping member being connected to a second end of said bending member (3'), said second clipping member further comprising an arc portion (44') which is identical with said arc portion (31') of said bending member (3') and to which said transverse rod (45') of said second clipping member is connected, said first transverse rod member (24') and a second transverse rod member (25') of said first clipping member and said transverse rod (45') of said second clipping member resting in proximity.

5,022,125
CLAMPING ASSEMBLY WITH SELF-CLAMPING JAWS, IN PARTICULAR FOR A LINEAR HYDRAULIC WINCH

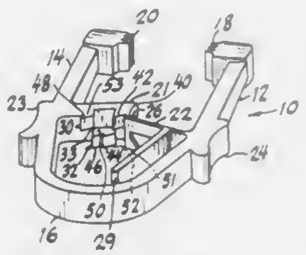
David Biass, Geneva, Switzerland, assignor to Cibeles International, Inc., Panama
Filed Apr. 11, 1990, Ser. No. 507,982
Claims priority, application France, Apr. 20, 1989, 89 05256
Int. Cl.⁵ F16G *11/00*
U.S. Cl. 24—136 R **4 Claims**

1. A clamping assembly with self-clamping jaws, said assembly comprising:
(a) a body having an elongate passage which, in use receives an elongated object to be clamped, said passage having two mutually facing surfaces with at least one of said surfaces being inclined to the longitudinal axis of said passage;
(b) a pair of jaws, at least one of which is wedge-shaped, said jaws being mounted to move generally longitudinally in said passage between a first position in which the jaws clamp said object and a second position in which they release the object;
(c) a set of rollers disposed between each jaw and a respective one of the two mutually facing surfaces of said passage to form a rolling path for the associated jaw, the rollers in each set being supported and rotatably mounted at their ends in a mounting frame capable of sliding movement relative to the corresponding jaw and relative to said body in a direction parallel to the longitudinal direction of the movement of the corresponding jaw; and
(d) a helical compression spring interposed between each jaw and the mounting frame of the associated set of rollers, each spring bearing at one end against the associated jaw to urge it towards its first position and at its other end against an opposing thrust surface provided at one end of said mounting frame to urge the mounting frame into contact with an abutment provided on said body,
(e) and wherein each jaw includes a cylindrical hole whose axis lies parallel to the rolling path defined by the set of rollers associated with the jaw, and the helical compression spring is disposed inside the said cylindrical hole.



5,022,126
ONE-PIECE PLASTIC TOWEL CLAMP

Tommy G. Davis, Athens, Tex., assignor to Edward Weck Incorporated, Princeton, N.J.
Filed Apr. 13, 1990, Ser. No. 509,940
Int. Cl.⁵ A44B *21/00*
U.S. Cl. 24—543 **4 Claims**

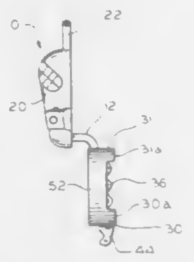


1. In a one-piece, molded, resilient towel clamp having two substantially straight arms and an arcuately shaped flexible portion connecting said arms, each of said arms having a jaw on the end thereof and said arcuate portion being effective to yieldingly maintain said jaws in a predetermined spaced relationship, a rack having two spaced parallel toothed members extending inwardly from one of said arms with the teeth thereon facing said arcuate portion, a locking member extending inwardly from the other of said arms and having a hook at the end thereof in alignment with and facing said rack teeth and having a guiding lug on the end thereof positioned to pass between said toothed members to maintain alignment between said rack and said locking member and to prevent twisting of said jaws under stress, said hook being adapted to mesh with one of said rack teeth once the jaws are forced inwardly against the pressure of said arcuate portion to thereby maintain said jaws in a clamping relationship, the improvement comprising:
the teeth on one of said parallel toothed members being alternatingly disposed relative to the teeth on the other of said parallel toothed members such that the inner surfaces

VOL
1127
ISS
2
JE
11
1991
UMI

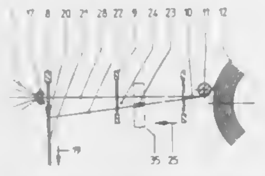
of all teeth unobstructedly face in a direction generally transverse to the plane of said clamp, said locking member extending transversely a distance substantially equal to the distance between the outer surfaces of said teeth such that said locking member will engage, at any one time, the teeth of only one of said parallel members.

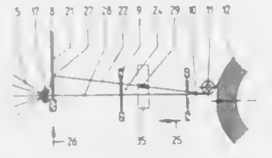
5,022,127
SHOELACE LOCKING DEVICE
Joseph Ang, Garden City, N.Y., assignor to Hope Industries, Inc., New York, N.Y.
Filed Dec. 20, 1989, Ser. No. 448,245
Int. Cl.^{5} F16G *11/00*
U.S. Cl. 24—712.2 **7 Claims**



1. A device for securing a shoelace knot of a shoe, comprising:
- a base, said base having means for securing it to said shoelace and upwardly facing means for receiving said knot;
- a separable foundation embedded in said base for providing rigidity therefor;
- an elastic hinge affixed to said base;
- a cover affixed to said hinge for overlapping said base and concealing said knot within said upwardly facing receiving means; and
- latching means for securing said cover to said base.

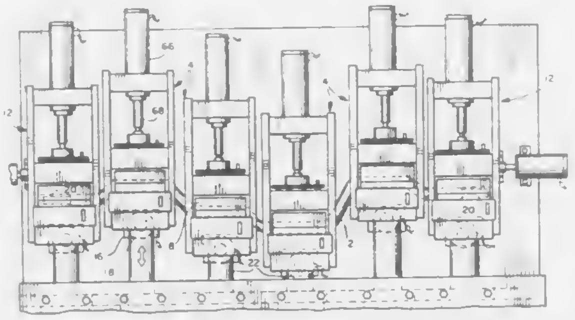
5,022,128
METHOD AND DEVICE FOR YARN DIVISION ON A WARPING MACHINE
Markus Beerli, Gossau; Manfred Bollen; Jakob Iten, both of Oberuzwil; Gerhard Koslowski, Uzwil; Willy Probst, Gossau, and Edwin Wildi, Niederuzwil, all of Switzerland, assignors to Benninger AG, Uzwil, Switzerland
Filed Nov. 9, 1989, Ser. No. 433,786
Claims priority, application Switzerland, Nov. 10, 1988, 4165/88
Int. Cl.^{5} D02H *9/02*
U.S. Cl. 28—191 **20 Claims**





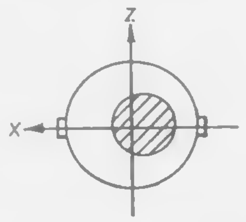
1. Method of maintaining yarn division established by a cross reed on a warping machine comprising inserting a flexible separating element, for demarkation of divided yarn strips, between the yarn strips opened to form a shed, wherein the flexible separating element comprises two parallel individual segments and is inserted over one divided strip into the shed, and subsequently joining the segments together on outside edges of the divided yarn strip.

5,022,129
CRANKSHAFT-FORMING APPARATUS AND METHOD
Elvin O. Gentry, 1419 Towanda Street, Bloomington, Ill. 61701
Filed Sep. 25, 1989, Ser. No. 412,045
Int. Cl.^{5} B21K *1/08;* **B21D** *17/02*
U.S. Cl. 29—6.01 **12 Claims**



1. An apparatus for forming multiple throws in a crankshaft from a metal rod having a longitudinal axis, comprising:
- a pair of holding units for holding ends of the metal rod at locations near the rod ends;
- means for moving the holding units axially as the axial distance between the rod ends is shortened as the throws are formed;
- means for heating the metal rod to a temperature sufficient to permit its deformation;
- a plurality of forming heads having clamping means for clamping said metal rod at precise locations therealong between said holding units;
- bearing means for mounting the heads for pivoting about a first central axis and for pivoting about a second axis perpendicular to the central axis;
- means for independently moving the forming heads both axially and transversely to the longitudinal axis in any direction 360° thereabout; and
- adjusting means for adjusting the angular position of the clamping means with respect to the longitudinal axis so that the throws formed by the forming heads are aligned parallel to the longitudinal axis, including means for pivoting the forming heads on the bearing means about the central axis and the second axis.

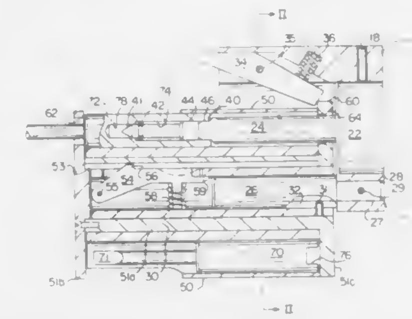
5,022,130
METHOD OF MANUFACTURING CRYSTAL RESONATORS HAVING LOW ACCELERATION SENSITIVITY
Errol P. EerNisse, Salt Lake City; Roger W. Ward, Park City, and O. Lew Wood, Murray, all of Utah, assignors to Quartztronics, Inc., Salt Lake City, Utah
Division of Ser. No. 218,282, Jul. 13, 1988, Pat. No. 4,935,658, which is a continuation-in-part of Ser. No. 103,670, Oct. 2, 1987, Pat. No. 4,837,475. This application Dec. 26, 1989, Ser. No. 456,554
Int. Cl.^{5} H01L *41/22*
U.S. Cl. 29—25.35 **18 Claims**



1. In a process of manufacturing crystal resonators in which the gamma vector magnitude and direction, and the location of the active region of vibration, are generally the same for each

resonator manufactued, a method of reducing the gamma vector and thus the acceleration sensitivity comprising
- producing a first resonator having a piezoelectric crystal, and excitation means for causing said crystal to resonate with an active region of vibration,
- providing support structure for the crystal, measuring at least one component of the gamma vector of said first resonator, determining a resonator mass modification required to reduce at least one component of the gamma vector and thus the acceleration sensitivity, and altering the proceses to change the mass of each resonator produced in accordance with the determined required modification.

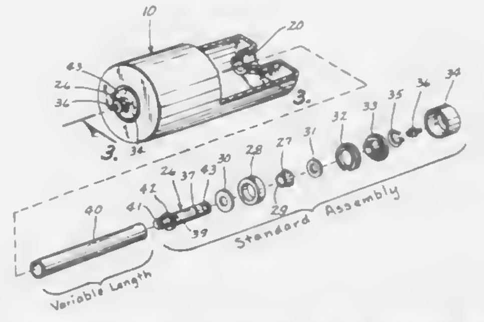
5,022,131
TOOL BIT SELECTION DEVICE
Edwin L. Hobbs, 3 La Salle Dr., Moraga, Calif. 94556
Filed May 7, 1990, Ser. No. 519,636
Int. Cl.^{5} B23Q *3/157;* **B23B** *45/00*
U.S. Cl. 29—40 **8 Claims**



1. A drill motor accessory comprising:
- a) at least one tool bit having a driven end adapted with spindle engagement means,
- b) a drive spindle having an axis of rotation and means to engage, align, support and drive said tool bit on said drive spindle,
- c) cylinder having chambers therein and including means for aligning said tool bit with respect to said drive spindle, means associated with said cylinder for confining said tool bit within a chamber of said cylinder except when said chamber continuing said tool bit is aligned with said drive spindle, said chambers allowing radial and axial movement of said tool bit in a chamber,
- d) and a support means on said drill motor for rotatably supporting said chambered cylinder, said support means including means for aligning said chambered cylinder with said axis of rotation of said drive spindle to permit compliance of said tool bit to said drive spindle in pitch, yaw, roll and radial offset,
- c) whereby said support means and said chambered cylinder are adapted to permit movement of said tool bit into alignment with said drive spindle and axial engagement of said drive spindle with said spindle engagement means of said tool bit to align, support and drive said tool bit on said drive spindle.

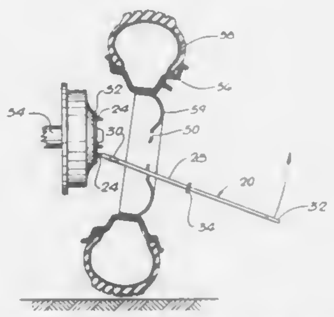
5,022,132
APPARATUS FOR ROTATABLY MOUNTING IDLERS AND PULLEYS OF VARIOUS SIZES
Karl C. Valster, and Allen V. Reicks, both of Pella, Iowa, assignors to Precision Pulley, Inc., Pella, Iowa
Filed Dec. 26, 1989, Ser. No. 456,174
Int. Cl.^{5} B21B *13/02*
U.S. Cl. 29—116.1 **8 Claims**

1. Apparatus used in conjunction with a conveyor belt, comprising:
- hollow rotatable means having a longitudinal axis, a radial periphery and two ends, for engaging an underside of said conveyor belt, said hollow rotatable means being adapted to rotate about said longitudinal axis;
- a first bearing assembly;
- first cylindrical chamber means disposed external to and on one end of said rotatable means for reception of said first bearing assembly;
- a second bearing assembly;
- second cylindrical chamber means disposed external to and on the other end of said rotatable means for reception of said second bearing assembly;
- a first stub shaft disposed in said first bearing assembly, said first stub shaft having an inner end and an outer end;
- a second stub shaft disposed in said second bearing assembly, said second stub shaft having an inner end and an outer end;
- an elongated member having a predetermined length located within said hollow rotatable means;



- first attachment means on one end of said elongated member for forming a rigid attachment of said one end of said elongated member with said inner end of said first stub shaft such that said stub shaft is received within and in direct contact with said elongated member; and
- second attachment means on the other end of said elongated member for forming a rigid attachment of said other end of said elongated member with said inner end of said second stub shaft such that said second stub shaft is received within and in direct contact with said elongated member, whereby the length of said elongated member can be chosen depending upon the length of said rotatable means while at the same time identical standard bearing assemblies and stub shafts can be used for rotatable means of various sizes.

5,022,133
WHEEL MOUNTING TOOL
James B. Weitekamp, R.R. 1, Box 62, Harvel, Ill. 62538
Filed Aug. 31, 1990, Ser. No. 575,599
Int. Cl.^{5} B25B *27/14*
U.S. Cl. 29—273 **7 Claims**



1. A wheel mounting tool for a wheel assembly including a hub with a plurality of bolt studs having threads of a first diameter and a wheel with a plurality of bolt holes of a second diameter larger than said first diameter registerable with the

VOL
1127
ISS
2
JE
11
1991
UMI

bolt studs to receive the bolt studs therethrough, said tool comprising:

- an elongated straight shank;
- a cylindrical open-ended socket on at least one end of the shank having an inside cylindrical surface with a diameter larger than said first diameter and an outside cylindrical surface with a diameter smaller than said second diameter;
- connecting means comprising a plurality of internal thread segments extending circumferentially around the inside cylindrical surface of the socket oriented at the pitch angle of the threads on the bolt studs and having an inside diameter larger than said first diameter enabling the socket to be telescopically assembled onto and removed from the bolt studs by relative axial movement; and
- said connecting means being engageable into the space between the bolt stud threads at the pitch angle thereof when the socket and a corresponding bolt stud are coaxially aligned to thereby maintain an effective connection between the socket and threads during mounting of the wheel.

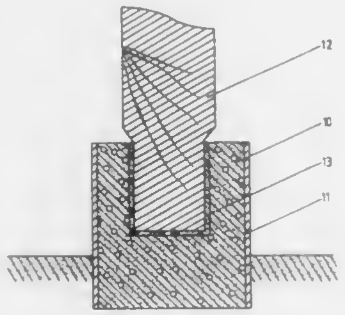
5,022,134
METHOD OF REPAIRING/REPLACING A POLE AND ASSOCIATED POLE REPLACEMENT SYSTEM

Ross J. George, Victoria, Australia, assignor to Austpole Industries Limited, Australia

Continuation of Ser. No. 449,071, Nov. 3, 1989, abandoned, which is a continuation of Ser. No: 147,599, Jan. 22, 1988, abandoned, which is a continuation of Ser. No. 915,386, Oct. 6, 1986, abandoned. This application Aug. 21, 1990, Ser. No. 569,739

Int. Cl.^{5} B23P *6/00*

U.S. Cl. 29—402.08 **13 Claims**



1. A method of providing a replacement base for a pole, including the steps of:

- fixing a major portion of a tube or pipe vertically in the ground,
- introducing into the tube a quantity of hardenable concrete or other substantially incompressible material, said quantity being less than the volume of the tube and totally located within the tube, the material and tube or pipe defining a performed, open cavity to receive an end of a pole, and
- allowing the material to set or consolidate as necessary, and
- after the material has set or consolidated sufficiently to support the pole, locating the end of the pole in the cavity.

5,022,135
METHOD OF MANUFACTURING A FLUID CONDUIT HAVING EXTERIOR DETAIL

Donald E. Miller, and Milan A. Virsik, both of Adrian, Mich., assignors to Brazeway, Inc., Adrian, Mich.

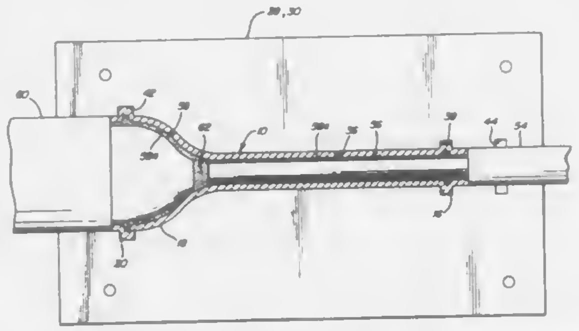
Continuation of Ser. No. 129,225, Dec. 7, 1987, abandoned. This application Apr. 12, 1990, Ser. No. 512,002

Int. Cl.^{5} B21D *26/02, 39/08;* **B23P** *17/00*

U.S. Cl. 29—421.1 **10 Claims**

1. A process for manufacturing a metal conduit having one or more exterior surface details from an extruded hollow conduit blank, which does not exhibit the detail, comprising the steps of:

- providing a die having an interior hollow which essentially defines the exterior geometry of the conduit with the detail and having core entry openings at the opposite ends of said hollow;
- placing the conduit blank in the hollow of the die with the respective ends of the conduit blank proximate the respective core entry openings;
- sealing the entry openings by causing one core, having a leading end surface conforming essentially to the interior geometry of at least a portion of the finished conduit, to sealingly enter one entry opening and advance into the hollow to move said leading end surface into engagement with one end of the blank and causing another core to sealingly enter the other entry opening;
- admitting a predetermined quantity of an essentially incompressible fluid into the interior of the blank while maintaining the entry openings sealed and thereafter;
- further advancing said one core leading end surface into said hollow to further advance said leading end thereof into the blank to gradually define a continuous fluid filled volume equal to the volume of the fluid quantity and simultaneously to cause non-elastic flow of the material of the blank into the volume between the fluid filled blank volume and the interior hollow of the die.



5,022,136
METHOD AND A DEVICE FOR REMOVING AN ELONGATE SHRINK-FITTED CORE MADE OF A TOUGH MATERIAL FROM A HOLE

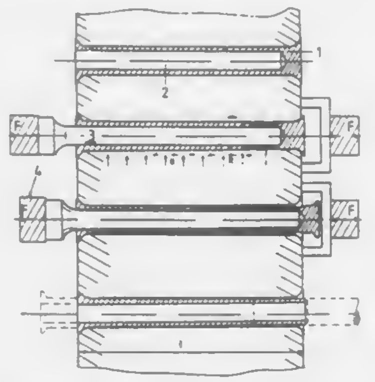
Dieter Tremmel, Nuremberg, Fed. Rep. of Germany, assignor to GEC Alsthom SA, Paris, France

Filed Aug. 9, 1989, Ser. No. 390,951

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1988, 3827036

Int. Cl.^{5} B23P *19/02*

U.S. Cl. 29—426.4 **7 Claims**



1. A method of removing an elongate shrink-fitted metal core such as a bolt from a hole extending through an object, comprising:

- cutting an axial bore in said metal core as coaxially as possible;
- subjecting the core to a force up to the plastic deformation range of said core, thereby plastically deforming said core;
- loading said core, after the plastic deformation has begun, at a relatively low speed up to a maximum stress of between 95% and 97% of its rupture strength such that said core shrinks radially; and
- axially removing the core from the hole.

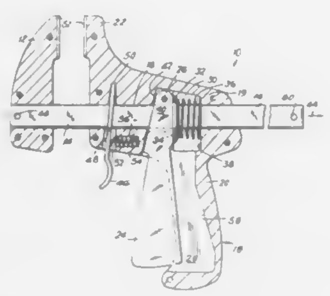
5,022,137
METHOD OF OPERATING A QUICK-ACTION BAR CLAMP

Joseph A. Sorensen, and Dwight L. Gatzemeyer, both of Lincoln, Nebr., assignors to Petersen Manufacturing Co., Inc.

Division of Ser. No. 234,173, Aug. 19, 1988, Pat. No. 4,926,722. This application Dec. 14, 1989, Ser. No. 450,837

Int. Cl.^{5} B23Q *5/34*

U.S. Cl. 29—559 **11 Claims**



1. A method of operation of a clamp, said clamp comprising:

- a slide bar, a movable jaw being mounted to said slide bar, and a fixed jaw opposing said movable jaw,
- support means for supporting said slide bar; said fixed jaw and a handgrip extending outwardly from said support means in opposite directions, said fixed jaw having at least a forward portion facing said movable jaw,
- receiving means situated at the junction between said forward portion of the fixed jaw and said support means, a braking lever pivotable at said receiving means and having an engaging portion extending outwardly from said support means,
- one-way drive means for releasably engaging and, when engaged, for advancing said slide bar and movable jaw, and
- a trigger handle pivotably mounted to said support means, said engaging portion of said braking lever is positioned forwardly of said trigger handle in the direction of the movable jaw, wherein said method comprises the following steps:
  - (a) positioning said clamp within one hand of a user so that said handgrip is received by a palm of said one hand;
  - (b) placing a workpiece between said fixed and movable jaws when said jaws are spread apart;
  - (c) advancing said movable jaw toward said fixed jaw by pressing and releasing said trigger handle by at least one finger of the hand thereby clamping said workpiece between said movable and fixed jaws; and
  - (d) releasing said workpiece from said jaws by pressing said engaging portion of said braking lever by at least one finger of the hand other than a thumb;

whereby said braking lever and the trigger handle are selectively operable by the same hand in such a manner that said at least one finger is positioned on the engaging portion of the braking lever to actuate the braking lever, while the other fingers of the same hand encircle and contain the trigger handle and the handgrip.

5,022,138
FLAT CABLE TERMINATING APPARATUS

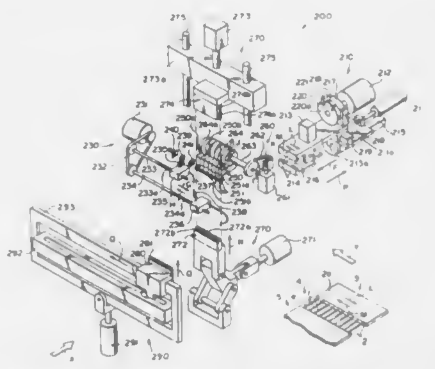
Hiromi Tanaka, Machida, and Tadashi Osaka, Kanagawa, both of Japan, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 5, 1990, Ser. No. 461,520

Claims priority, application Japan, Jun. 2, 1988, 63-136003

Int. Cl.^{5} H01R *43/04*

U.S. Cl. 29—564.8 **6 Claims**



1. An apparatus for preparing an end of a flat electrical cable for aligning, cutting and bending electrical conductors of the cable for electrical connection to electrical contacts of an electrical connector, characterized in that:

- a clamp (10) including a base (11), a movable clamping section (12) in which the flat cable (5) is to be mounted is positioned on the base (11), and a locking section (13) for locking the clamping section (12) in position on the base (11);
- a clamp-positioning device (100) including a sensing member (102) for sensing a first conductor (1*c*) of exposed conductors (1) of the cable (5) between a jacket (2) and front end jacket (2*a*), a lock release device (110) for releasing the locking section (13), and a clamp-moving device (120) which is operated if the first conductor (1*c*) is not in alignment with said sensing member (102) to move the clamping section (12) along the base (11) after the locking section (13) has been released by said lock release device (110) until the first conductor (1*c*) is in alignment with said sensing member (102) whereafter the lock release device (110) permits the locking section (13) to lock the clamping section (12) on the base (11); and
- a conductor-aligning, cutting and bending device (200) including a conductor-aligning device (210) for clamping onto the front end jacket (2*a*), a conductor-detecting device (230) for detecting the first conductor (1*c*), said conductor-aligning device (210) being operated if the first conductor (1*c*) is out of alignment with said conductor-detecting device (230) to move the front end jacket (2*a*) until the first conductor (1*c*) is detected by the conductor-detecting device (230), a comb member (250) having teeth (251), a comb-moving device (260) for moving the comb members (250) so that the conductors (1) are positioned between the teeth (251) thereby spacing and aligning the conductors (1), and a conductor-cutting and bending device (270) for cutting the conductors (1) and bending the conductors (1*b*).

5,022,139
METHOD OF INSERTING A STATOR WINDING INTO A STATOR

Niels D. Jensen, Bjerringbro, Denmark, assignor to Grundfos International A/S, Bjerringbro, Fed. Rep. of Germany

Continuation of Ser. No. 350,946, May 12, 1989, abandoned. This application Jul. 6, 1990, Ser. No. 549,630

Claims priority, application Denmark, Jun. 16, 1988, 2672

Int. Cl.^{5} H02K *15/06*

U.S. Cl. 29—596 **1 Claim**

1. A method of inserting a stator winding into a stator having

VOL
1127
ISS
2
JE
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1991
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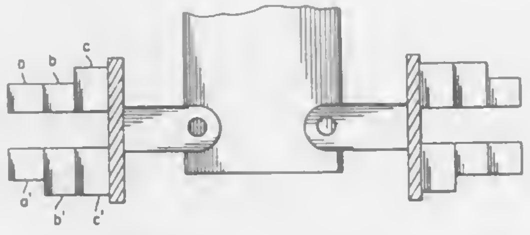
an even number of slots wherein each phase of the stator winding has a plurality of coils and each coil has a plurality of turns and some of the windings are spread across a plurality of slots such that some of the slots receive winding portions of several different coils of each phase comprising the steps of



winding a coil including several coil portions about a mandrel having at least three step-formed portions, each of said step-formed portions having a plurality of winding surfaces lying along the same curved surface, inserting said coil portions into the longitudinal slots of a coil holder and inserting said coil portions into said stator from said coil holder.

5,022,140

METHOD OF MANUFACTURING MAGNETIC HEAD

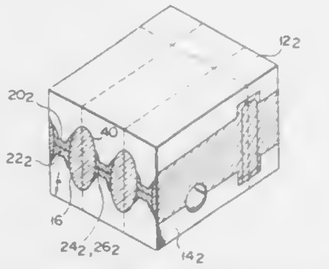
Shoji Tsutaki; Kazuyoshi Fuse, and Toshihiko Ohta, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 8, 1990, Ser. No. 490,407

Claims priority, application Japan, Mar. 10, 1989, 1-59409; Sep. 20, 1989, 1-242026

Int. Cl.^{5} G11B *5/42*

U.S. Cl. 29—603 **18 Claims**



1. A method of manufacturing a magnetic head comprising the steps of:

sequentially forming a metal magnetic layer and a non-magnetic layer on at least one of a pair of magnetic core means in which predetermined track widths are to be formed on a predetermined pitch;

removing at least said non-magnetic layer formed outside said track widths while leaving said track widths formed in one of said magnetic core means;

bonding said magnetic core means such that said track widths of one magnetic core means from which said metal magnetic layer and said non-magnetic layer are removed and the other magnetic core means oppose each other, and forming a gap having said metal magnetic layer at at least one surface thereof; and

cutting, on a predetermined pitch, said pair of magnetic core means bonded to form said gap therebetween.

5,022,141

METHOD FOR MANUFACTURING MULTITURN THIN FILM COIL

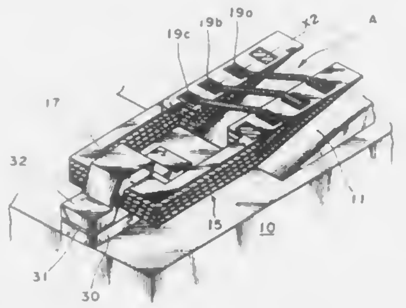
Yuji Nagata, Yao; Toshio Fukazawa, Kyoto; Kumiko Wada, Kawanishi, and Yoshihiro Tosaki, Ibaraki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 18, 1990, Ser. No. 539,738

Claims priority, applicatioo Japan, Jun. 16, 1989, 1-155350; Jul. 3, 1989, 1-172236

Int. Cl.^{5} G11B *5/42*

U.S. Cl. 29—603 **8 Claims**



1. A method for manufacturing a thin film multiturn coil comprising the steps of:

forming a base structure having a substrate and a base member in a given area on the upper surface of said substrate, the upper side of said base member having a substantially predetermined gradient relative to the upper surface of said substrate;

forming a loop-shaped laminate on said substrate and said base member, said laminated having a plurality of conducting layers and insulating layers laminated alternately, and having a discontinuity at said base member, the part of said said laminate on said base member having the layers thereof at substantially the same gradient as the gradient of said base member relative to said substrate;

removing the upper portion of end sections of said loop-shaped laminate on opposite sides of said discontinuity at said base member so as to expose end faces of each conducting layer and each insulating layer; and

mounting electrically conductive members between the exposed end faces of individual conducting layers on opposite sides of said discontinuity to form said conducting layers into a multiturn coil.

5,022,142

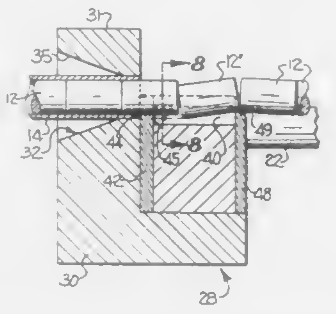
APPARATUS AND METHOD FOR LOADING PELLETS INTO FUEL RODS

Wade H. Widener, Cayce, S.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 14, 1986, Ser. No. 839,485

Int. Cl.^{5} B23P *19/00*

U.S. Cl. 29—723 **7 Claims**



1. An apparatus for feeding a column of aligned cylindrical pellets along a longitudinal path of travel and while identifying a pellet of improper size, and comprising

guide surface means adapted for supporting a plurality of serially arranged and longitudinally oriented cylindrical pellets, and such that the pellets are adapted to be slideably and longitudinally advanced along said guide surface means to define an advancing column of pellets, and

pellet segregation means positioned adjacent one end of said guide surface means for permitting each advancing pellet having a cross-sectional diameter equal to a predetermined minimum diameter to advance thereacross while permitting each advancing pellet having a cross-sectional diameter less than the predetermined minimum diameter to drop to a level below the level of the remaining pellets in the advancing column, said pellet segregation means including a pair of laterally separated and longitudinally extending parallel guide rails adapted to support the advancing stream of pellets therebetween, and with the guide rails being laterally separated a predetermined distance so as to support each pellet of said predetermined minimum diameter while permitting a pellet of undersize diameter to drop therebetween to a level below the level of the remaining pellets in the column, and further including lateral shoulder means for precluding the further longitudinal advance of each such dropped pellet and the trailing pellets in the associated column, said lateral shoulder means being disposed adjacent and below the downstream end of said guide rails and at a level such that the advancing pellets of predetermined minimum diameter pass freely above said shoulder means while any undersize pellet which was dropped below the level of the remaining pellets is engaged by said shoulder means.

5,022,143

WINDOW FRAME FINISHING INSTALLATION

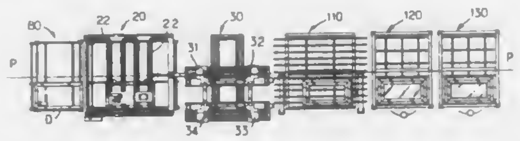
Jean-Jacques Kautt, Strasbourg, France, assignor to Ferco International Usine de Ferrures de Batiment, Sarrebourg, France

Filed May 29, 1990, Ser. No. 529,547

Claims priority, application France, Jun. 1, 1989, 89 07240

Int. Cl.^{5} B23P *21/00*

U.S. Cl. 29—783 **17 Claims**



1. An apparatus for the manufacture of window frame assemblies from unequipped opening frames and unequipped fixed frames comprising:

(a) first receiving means for receiving said unequipped fixed frames;

(b) first fitting means for automatically fitting said unequipped fixed frames with hardware and seals;

(c) second receiving means for receiving said unequipped opening frames;

(d) second fitting means for automatically fitting said unequipped opening frames with hardware and seals; and

(e) assembly means for assembling opening frames equipped with hardware and seals to fixed frames equipped with hardware and seals.

5,022,144

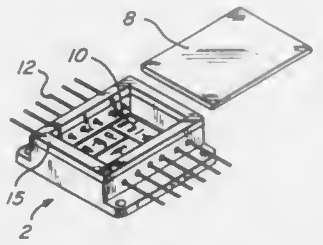
METHOD OF MANUFACTURE POWER HYBRID MICROCIRCUIT

Prem R. Hingorany, Broomfield, Colo., assignor to Explosive Fabricators, Inc., Louisville, Colo.

Filed Mar. 2, 1989, Ser. No. 318,157

Int. Cl.^{5} H01R *43/00*

U.S. Cl. 29—854 **10 Claims**



1. The method of manufacturing a high power hybrid microcircuit package including:

explosively bonding a seal ring to the top walls of a metallurgically hard, elastic, high thermally conductive base member having upstanding side walls together defining an interior volume, said bonding being accomplished so that the base member is not softened in the explosive process.

5,022,145

METHOD OF CONSTRUCTING A GAS TURBINE

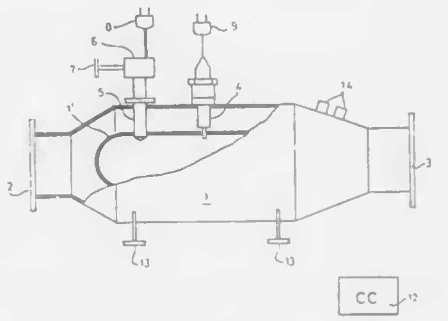
Michael Brawerman, deceased, late of Ramat Aviv, Tel Aviv by Emilia Orian, executrix , and Itamar Orian, both of 13, Rav Ashi Street, Tel Aviv, all of Israel

Continuation-in-part of Ser. No. 122,514, Nov. 17, 1987, abandoned, which is a continuation of Ser. No. 853,878, Apr. 21, 1986, abandoned. This application Jul. 31, 1989, Ser. No. 387,275

Claims priority, application Israel, Apr. 19, 1985, 74973

Int. Cl.^{3} B23P *15/00*

U.S. Cl. 29—88.8 **6 Claims**



1. A method of fabricating a gas turbine arrangement at the ultimate customer's worksite as obtained from the manufacturer of the component elements, said method comprising the steps of

(a) providing a first module for receiving compressed air, receiving fuel, mixing compressed air and fuel and igniting the mixture to thereby produce hot air and combustion products and exhaust same;

(b) providing a second module for receiving inlet air, transferring hot air and combustion products energy to inlet air received in said second module to compress said inlet air, and exhausting compressed air;

(c) providing a third module for supplying fuel to said first module and electrical power to said first module fo: ignition of said mixture;

(d) providing a fourth module for controlling starting of said arrangement, stopping of said arrangement, supply of fuel to said first module and supply of electrical power to said first module for ignition of said mixture;

VOL
1127
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2
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1991
UMI

(e) selectively interconnecting together by removably mounted conduit means each of said first, second, third and fourth modules for forming a gas generator which supplies compressed air or combustion products, said first, second, third and fourth modules being separated and spaced from one another and interacting only by said conduit means and arranged in a plurality of different geometrical relations by removal of said conduit means, rearrangement of said modules and reattachment of said conduit means to the same or different modules to form a preselected arrangement selected from arrangements including hot gas generator arrangements and air compressor arrangements.

5,022,146

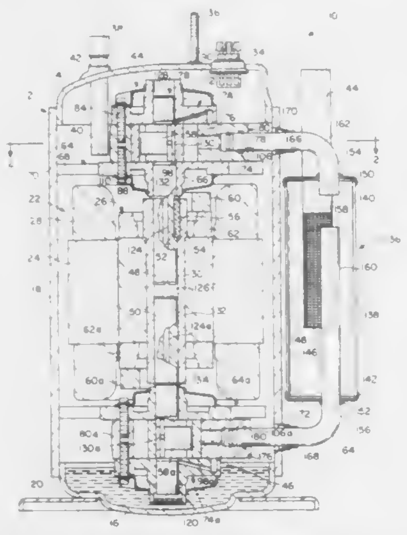
TWIN ROTARY COMPRESSOR WITH SUCTION ACCUMULATOR

Edwin L. Gannaway, Adrian, and Arturo L. Ortiz, Tecumseh, both of Mich., assignors to Tecumseh Products Company, Tecumseh, Mich.

Division of Ser. No. 400,784, Aug. 30, 1989, Pat. No. 4,971,529. This application Jun. 28, 1990, Ser. No. 547,682

Int. Cl.^{5} H01R *43/00;* **F04C** *29/08*

U.S. Cl. 29—888.02 **5 Claims**



1. A method of assembling a multi-unit hermetic compressor, wherein the spacing between a pair of compressors within a housing is subject to model design variation, each of said pair of compressors having a fluid inlet, comprising the steps of:
providing a pair of spaced apertures in said housing substantially adjacent to said fluid inlets;
providing telescopic accumulator means, including a vessel and a pair of conduits at least one of which is slidably engaged within an opening in said vessel, for supplying gas refrigerant to said pair of compressors, said pair of conduits being located at axially opposed ends of said vessel, each of said pair of conduits having at its distal end away from said vessel a fluid outlet;
adjusting said telescopic accumulator means until said pair of fluid outlets are substantially aligned with said pair of apertures; and
inserting said distal ends of said pair of conduits through said apertures so that said pair of fluid outlets matingly engage said pair of fluid inlets, respectively, to establish fluid communication therebetween, and said pair of conduits support said vessel axially parallel to said housing.

5,022,147

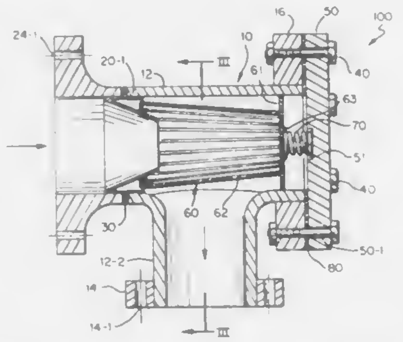
METHOD OF ASSEMBLING A SUCTION STRAINER

Paul F. Murphy, and Brian M. Marriott, both of York, Pa., assignors to Carrier Corporation, Syracuse, N.Y.

Division of Ser. No. 321,042, Mar. 9, 1989, Pat. No. 4,946,598. This application Jun. 22, 1990, Ser. No. 542,344

Int. Cl.^{5} B01D *35/00*

U.S. Cl. 29—890.148 3 Claims



1. A method of assembling a suction strainer assembly comprising the steps of:
on a tee having a crossarm with a first and second end and a bore therein and a perpendicular branch with a first and a second end and a bore therein which forms an intersection with said crossarm bore at said second end of said perpendicular branch, welding an attachment means to said second end of said crossarm and an attachment means to said first end of said perpendicular branch;
placing a seat means having an outer cylindrical portion with radial projections and having a first and second end and an inner frustoconical portion integral with said first end of said cylindrical portion and defining a converging flow path in the direction of said second end of said cylindrical portion into said first end of said crossarm bore such that said second end of said cylindrical portion is within said crossarm bore to the extent permitted by said radial projections;
placing an attachment means over said first end of said cylindrical portion to the extent permitted by said projections whereby said attachment means placed over said first end of said cylindrical portion and said first end of said crossarm are separated by a space defined by said projections;
welding said attachment means placed over said first end of said cylindrical portion, said cylindrical portion and said first end of said tee together at the locus of said space defined by said projections.

5,022,148

METHOD FOR EXPLOSIVELY WELDING A SLEEVE INTO A HEAT EXCHANGER TUBE

Joel G. Feldstein, Plain Township, and David E. Merker, Minerva, both of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

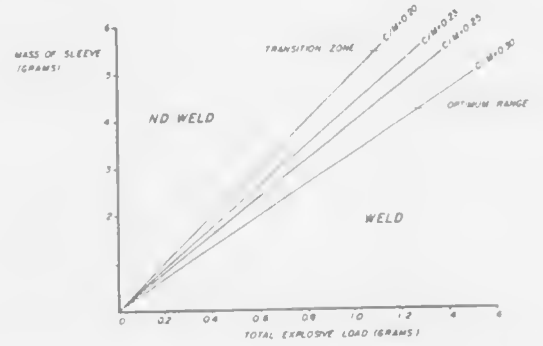
Continuation of Ser. No. 335,014, Apr. 7, 1989, abandoned, which is a division of Ser. No. 108,386, Oct. 13, 1987, abandoned. This application Apr. 16, 1990, Ser. No. 511,821

Int. Cl.^{5} B21D *26/08*

U.S. Cl. 29—890.031 11 Claims

1. A method of explosively welding a sleeve to an inner surface of a tube, comprising the steps of:
providing the sleeve with an end portion having a tapering wall thickness and an outside diameter which tapers inwardly from the inner surface of the tube toward an end of said end portion of the sleeve;
positioning the end portion of the sleeve inside the tube at a location remote of external mechanical support for the tube;
positioning a cup containing an explosive charge inside the

end portion of the sleeve, said cup having a frustoconical center portion which tapers with increasing cross-sectional area toward the end of said end portion of the sleeve, thereby reducing and shaping the explosive charge;



centering the end portion of the sleeve in the tube leaving an annular stand-off distance between the sleeve and the tube; and
detonating the explosive charge thereby expanding the end portion of the sleeve and welding the end portion of the sleeve to the tube.

5,022,149

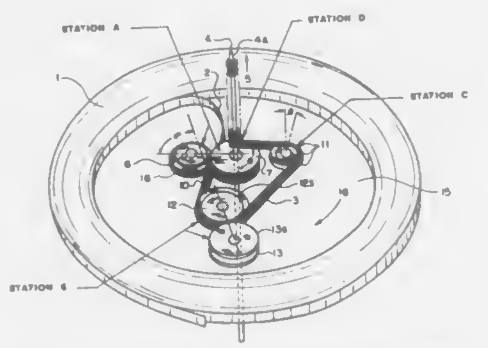
METHOD AND APPARATUS FOR MAKING A LOOPED FIN HEAT EXCHANGER

Roy W. Abbott, 450 N. Hubbard La., Louisville, Ky. 40207

Division of Ser. No. 93,860, Sep. 8, 1987, which is a continuation-in-part of Ser. No. 767,801, Aug. 21, 1985, abandoned. This application Aug. 7, 1990, Ser. No. 563,425

Int. Cl.^{5} B21D *53/02*

U.S. Cl. 29—890.048 **12 Claims**



1. A method of making a looped fin heat transfer device comprising the steps of:
[a] providing an elongate ribbon of thermally conductive material;
[b] transversely lancing and forming said ribbon into an intermediate configuration having a pair of imperforate opposing side portions interconnected by a lanced web portion; and
[c] stretching said imperforate side portions of said intermediate configuration to reform the same into a subsequent configuration comprising an integrally formed chain of looped fins, said chain comprising an integrally formed chain of looped fins, said chain comprising a mounting flange reformed from each of said imperforate opposing side portions at each edge of said chain and a plurality of fins between said mounting flanges, each of said fins comprising leg members extending outwardly from each of said mounting flanges and a bridge section connecting said leg members at the distal end of said leg members.

5,022,150

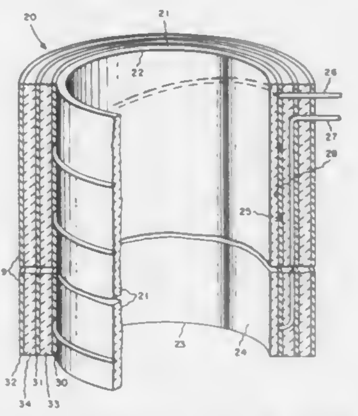
METHOD FOR PRODUCING HEAT TRANSFER TUBE WITH INSITU HEATER

Milivoj K. Brun, Ballston Lake; Marcus P. Boron, Schenectady; Steven A. Miller, Amsterdam; Lawrence E. Szala, and Paul S. Svec, both of Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 428,079, Oct. 27, 1989, Pat. No. 4,978,039. This application Jul. 30, 1990, Ser. No. 559,750

Int. Cl.^{5} B23P *15/26*

U.S. Cl. 29—890.053 19 Claims



1. A process for producing an integral transfer tube useful for transfer of molten metal comprised of a high density tube, a continuous elongated heating element and a continuous multi-layered shell with a maximum density of about 80% of theoretical and wherein at least about 75 weight % of said shell is comprised of polycrystalline phase, said heating element being comprised of a heating spaced wound portion and two end portions spaced from said wound portion wherein the wound portion is in direct contact with the outer surface wall of said high density tube and wherein at least a sufficient amount of said end portions are exposed for electrical attachment, said shell, which having a thermal conductivity at least about 10% lower than that of said high density tube comprises the following steps:
(a) providing a high density polycrystalline hollow tube comprised of ceramic oxide, said high density tube having two open ends and a density of at least about 90% of its theoretical density;
(b) providing a continuous elongated heating element comprised of a metal or metal alloy having a melting point higher than 700° C. and at least 200° C. higher than the operating temperature of said transfer tube;
(c) forming a structure comprised of said high density tube and said heating element wherein said wound portion of said heating element is in direct contact with said outer wall of said high density tube and said end portions extend therefrom sufficiently exposing at least a sufficient amount thereof from said transfer tube for electrical attachment;
(d) plugging both open ends of said high density tube with solid polymeric material which thermally decomposes at an elevated temperature below about 800° C.;
(e) forming an alkaline aqueous slurry having a solids content ranging from about 45% to about 60% by volume of the total volume of said slurry, said solids content being comprised of particles of slurry-forming size of ceramic oxide, solid polymer which thermally decomposes at an elevated temperature below 800° C. and colloidal silica, said ceramic oxide ranging from about 93% to about 96% by weight of said solids content, said polymer ranging from zero to about 2% by weight of said solids content, and said colloidal silica ranging from about 3% to about 6% by weight of said solids content, said slurry having a pH ranging from about 9 to 12, said slurry having a specific gravity at about 20° C. ranging from about 2.2 g/cc

VOL
1127
ISS
2
JE
11
1991
UMI

to about 2.7 g/cc and a viscosity at about 20° C. ranging from about 9 to about 15 seconds as measured with a No. 4 Zahn cup;

(f) dipping said plugged tube with its wound portion of said heating element into said slurry;

(g) recovering said plugged tube from said slurry, forming a wet coating of slurry on the exposed outer surface wall of said tube and on said wound portion of said heating element leaving no significant portion thereof exposed;

(h) contacting the resulting wet coated tube with coarse ceramic oxide particles forming a coating thereof on said wet coating of slurry leaving no significant portion thereof exposed, said coarse ceramic oxide particles being of a size which forms said coating thereof on said wet coating of slurry, the average size of said coarse ceramic oxide particles being significantly larger than the average size of the ceramic oxide particles in said slurry, said ceramic oxide particles permitting production of said polycrystalline phase;

(i) drying the resulting coated tube to permit said silica particles to combine with water to produce a dimensionally stable silica gel which binds the ceramic oxide particles;

(j) dipping the resulting dry coated tube into said slurry to coat said tube;

(k) recovering the coated tube from said slurry forming a wet coating of slurry on the coating of coarse ceramic oxide particles leaving no significant portion of said coating of coarse ceramic oxide particles exposed, said coarse ceramic oxide particles being of a size which enables formation of said wet coating of slurry thereon;

(l) drying the resulting coated tube to permit said silica particles to combine with water producing a dimensionally stable silica gel, said silica gel thermally decomposing at an elevated temperature to silica;

(m) firing the resulting coated tube to produce said transfer tube, said firing being carried out in an atmosphere or a partial vacuum which has no significant deleterious effect thereon, said heating element being a solid in said process;

(n) before step (m) removing any shell material from said amount of said end portions of said heating element used for electrical attachment; and

(o) before or after step (m) providing said high density tube with ends free of any shell material.

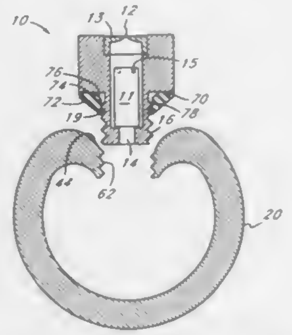
5,022,151
METHOD OF MAKING AN AEROSOL NOZZLE ASSEMBLY

J. Frank Sorenson, Redlands, Calif., assignor to Baumac International, Mentone, Calif.

Continuation of Ser. No. 302,026, Jan. 25, 1989, abandoned. This application Jan. 19, 1990, Ser. No. 474,201

Int. Cl.^{5} B21D *53/00*

U.S. Cl. 29—890.143 **14 Claims**



1. A method of attaching a nozzle in a sidewall of a rigid metal pipe in an aerosol-generating system where said nozzle has a body with a threaded exterior and a very small interior atomizing orifice, and where said pipe has thin walls but which are capable of handling high liquid pressure of an aerosol-generating system; said method comprising the steps of:

drilling a pilot hole in the wall of said metal pipe;

deforming the pilot hole with a punch so that its diameter is permanently increased to a predetermined size and the metal edges of said pilot hole are deformed into the interior of said pipe to form a collar of a length substantially greater than the thickness of the pipe;

removing said punch to yield a hole having a diameter which is substantially said predetermined size;

tapping threads in the collar so that the threads extend a length which is substantially greater than the thickness of the pipe; and

screwing a threaded atomizing nozzle into the threads of said collar wherein the relationship between the diameter and the pitch of the threads on the nozzle and in the collar, and in the diameter and wall thickness of said pipe is such that threads could not be formed directly in the pipe sidewalls simply by said drilling and tapping steps sufficient to reliably hold said nozzle in position in the pipe when the pipe and nozzle are subjected to the high-liquid pressure used in an aerosol-generating system.

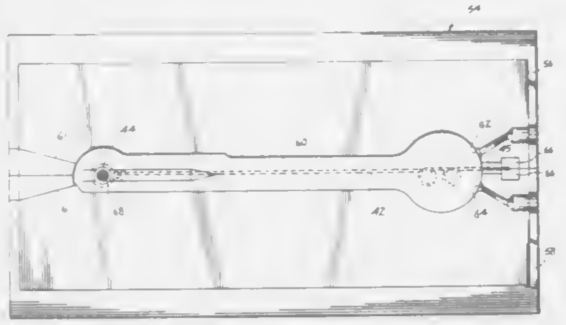
5,022,152
METHOD FOR MAKING IMPROVED SUPPORT ARMS FOR GOLF SWING TRAINING AIDS

William K. Tai, E. 14725 Terra Verde Ct., Veradale, Wash. 99037

Division of Ser. No. 458,780, Dec. 29, 1989, Pat. No. 4,955,612. This application Jun. 29, 1990, Ser. No. 546,588

Int. Cl.^{5} B29G *45/14*

U.S. Cl. 29—897 1 Claim



1. A method of making a solid mass elongated rigid radial support arm for mounting relative to a base of a golf-swing practicing apparatus, the support arm having opposed longitudinal ends, one of such opposed longitudinal ends comprising an integrally formed solid mass golf-ball sized object for hitting by a golfer to cause the support arm to rotate relative to the base, the other of the longitudinal ends having a hollow tube extending tansversely across the support arm, the support arm including a central reinforcing rod extending along a substantial longitudinal length thereof, the central reinforcing rod having opposed first and second longitudinal rod ends, the second rod end engaging the hollow tube to restrict any tendency of the central reinforcing rod to move longitudinally relative to the tube, the method comprising:

providing a mold having an elongated internal cavity of a shape which corresponds to the finished external shape of the finished rigid support arm;

placing the central reinforcing rod and tube engaged thereby within the cavity, the first rod end upon placement extending externally from the cavity;

securing the first rod end from movement relative to the cavity;

sliding a shaft into the hollow tube, and securing the shaft from subsequent movement, to restrict movement of the second rod end relative to the cavity;

injecting a flowable molding material into the cavity after the first rod end has been secured from movement relative to the cavity;

allowing the injected molding material to harden;

cutting the externally extending first end of the reinforcing rod flush with an adjacent external surface of the rigid support arm; and

moving the rigid support arm and shaft relative to one another after the injected molding material has sufficiently hardened to remove the shaft from the support tube.

5,022,153
SHAVING APPARATUS

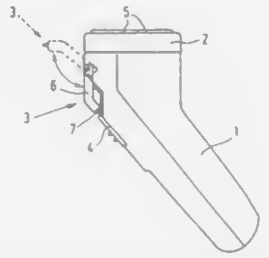
Sint Baron, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 536,905, Jun. 12, 1990, abandoned. This application Dec. 13, 1990, Ser. No. 626,325

Claims priority, application Netherlands, Jul. 7, 1989, 8901739

Int. Cl.^{5} B26B *19/06*

U.S. Cl. 30—34.1 5 Claims



1. A shaving apparatus comprising a housing having a shaving part for short hairs and a trimmer for long hairs which can be rotated with respect to the housing, the housing comprising an operating member which is coupled to the trimmer via a connection element, one end of the connection element being journalled in the trimmer so as to be rotatable, an "over-center" mechanism being present between the trimmer and the connection element and comprising a resilient element at one component, which resilient element engages a cam of the other component.

5,022,154
REAPER RAZOR

Wayne A. Johnson, P.O. Box 3400, Corpus Christi, Tex. 78463

Filed Oct. 1, 1990, Ser. No. 591,043

Int. Cl.^{5} B26B *19/42*

U.S. Cl. 30—34.2 **11 Claims**

1. A razor comprising

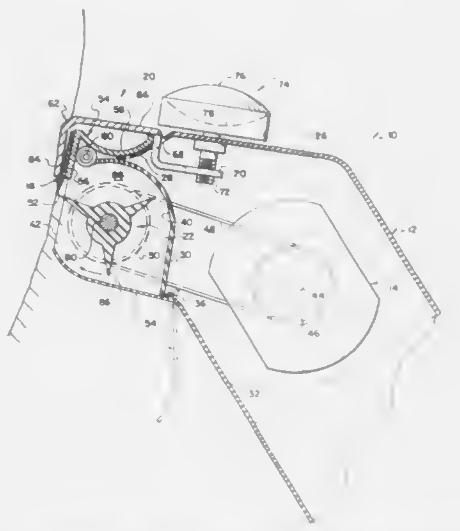
a housing having an electric motor therein;

a blade having a straight sharpened edge;

a reaper member having a body and plurality of blades projecting therefrom;

means mounting the reaper member for rotation about an axis parallel to the blade edge, the axis being spaced from the blade a distance substantially equal to the length of the reaper blades as measured from the axis;

means drivably rotating the reaper member about the axis; and



means mounting the blade for adjustable movement toward and away from the axis of rotation.

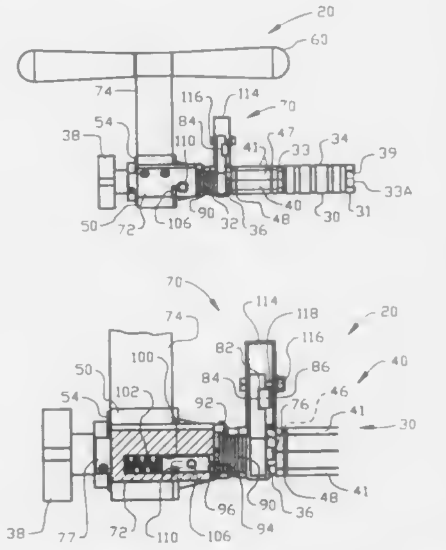
5,022,155
HOSE TRIMMING APPARATUS

Wayne B. Hockett, Tampa, Fla., assignor to Continuous Hose Co., Boynton Beach, Fla.

Filed Dec. 4, 1989, Ser. No. 445,963

Int. Cl.^{5} B23D *21/06*

U.S. Cl. 30—93 **10 Claims**



1. An improved host trimming apparatus for trimming a flexible hose, the hose having an internal bore encompassed by a sidewall, comprising in combination:

a support member adapted to be at least partially inserted within the internal bore of the hose;

a centering support secured to said support member for centering said support within the internal bore of the hose;

securing means including an expandable means disposed on said support member;

means for expanding said expandable means within the internal bore of the hose for securing said support member to the hose;

VOL
1127
ISS
2
JE
11
1991
UMI

said support member defining an undercut between said centering support and said expandable means;

a cutting element rotatably mounted relative to said support member with said cutting element being aligned with said undercut; and

means for rotating said cutting element relative to said support member enabling said cutting element to sever the sidewall of the hose adjacent said undercut as said cutting element is rotated relative to said support member with said centering support and said expandable means supporting the sidewall of the hose immediately adjacent said undercut to inhibit flexing of the sidewall of the hose when said cutting element is severing the sidewall of the hose.

5,022,156

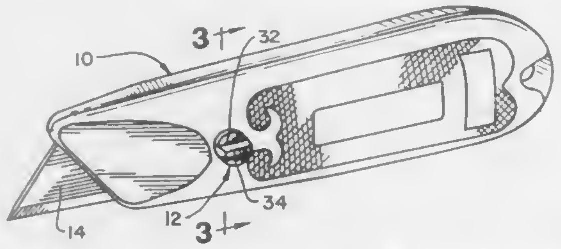
HANDLE FASTENER ASSEMBLY AND METHOD OF MAKING SAME

Nicholas Kallens, 20 Cahuilla Hills Dr., Palm Springs, Calif. 92262, and Steven Gabbay, Palm Springs, Calif., assignors to Nicholas Kallens, Palm Springs, Calif.

Filed Aug. 10, 1990, Ser. No. 565,500

Int. Cl.⁵ B26B *5/00, 29/00*

U.S. Cl. 30—125 **19 Claims**



1. In a tool holder assembly having a pair of mating handle parts which close together to hold a tool therebetween and which have spaced apart segments to form a compartment therebetween, the impovement being a releasable handle fastener assembly, comprising:

a pair of aligned mounting holes respectively located in said pair of mating handle parts at said compartment forming segments, respectively;

an elongate shaft assembly mounted to one of said mating handle parts including

a shaft slideably extending through the mounting hole in one of said handle parts and having a spring retainer cap on one end of the shaft on an outer side of the one mating handle part, and a means for establishing a preselected distance along said shaft from said spring retainer cap,

a bias spring interposed between the cap and the outer side of the one handle part for resiliently biasing the shaft for sliding movement of the cap in a direction away from the outer side of the one handle part,

a retainer cooperating with said preselected distance establishing means for mounting thereof to the shaft at a preselected distance from the spring retainer cap to block sliding movement of the shaft in a direction away from the outer side of the one handle part in response to the resilient biasing of the shaft caused by said bias spring and to establish a preselected compression force on said bias spring associated with said preselected distance, and

a cross member at an end of the shaft opposite the spring retaining cap and extending laterally away from the shaft; and

a cross member slot extending transversely of the mounting hole in the other handle part for receipt of the cross member therethrough when aligned therewith, said cross member overlying an outer surface of the other handle part to block removal of the shaft, which shaft extends between said retainer and the other handle part, when moved to an angular position of nonalignment with the cross member slot.

5,022,157

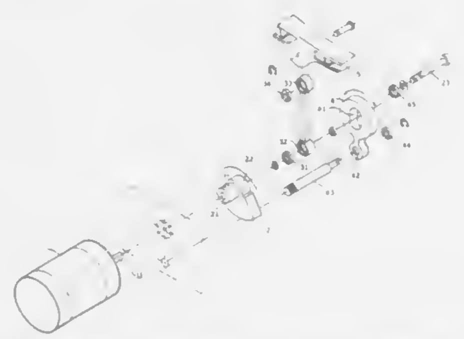
TRANSMISSION MECHANISM FOR SCROLL SAWING MACHINE

Andy Chang, No. 38, Juan Liau Rd., Fong Yuan, Taichung, Taiwan

Filed Jul. 30, 1990, Ser. No. 559,312

Int. Cl.⁵ B23D *49/04*

U.S. Cl. 30—394 **1 Claim**



1. A transmission mechanism for a scroll sawing machine, comprising:

a motor having a transmission shaft;

a substantially sector-shaped upper counter weight having a seat portion projection therefrom at one side for fastening said transmission shaft and an eccentric hole at an opposite side;

a rocker arm being an elongated element having an upper mounting hole at one end and a lower mounting hole at an opposite end;

a horizontal counter weight formed of a relatively bigger upper sector block portion with a hole thereon and a relatively smaller lower sector block portion with a hole thereon for the insertion therethrough to secure said horizontal counter weight to a machine table;

a lock bolt inserted through the hole on said upper sector block portion of said horizontal counter weight and said lower mounting hole of said rocker arm and fastened in said eccentric hole of said upper counter weight;

a swing arm coupled with said upper mounting hole of said rocker arm to carry a scroll saw blade to operate;

characterized in that the rotation of said transmission shaft of said motor drives said upper counter weight to rotate and said rocker arm and swing arm to move up and down so as to eliminate any possible vertical and horizontal shock waves.

5,022,158

WALL MARKING LAYOUT DEVICE

Bruce R. Beyer, 451 Aldine St., St. Paul, Minn. 55104

Continuation-in-part of Ser. No. 358,253, Mar. 30, 1989, Pat. No. 4,921,507. This application Apr. 30, 1990, Ser. No. 516,545

Int. Cl.⁵ B44D *3/38;* **B43L** *7/00*

U.S. Cl. 33—413 **5 Claims**

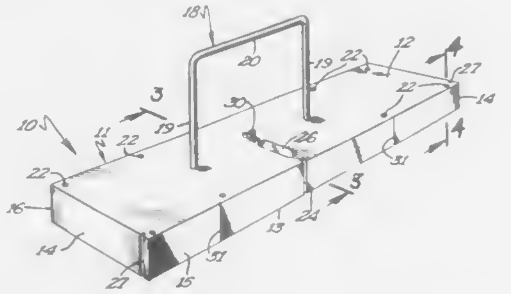
1. A layout tool for snapping various types of layout chalk lines on a work area surface, such as construction sites or the like, comprising

an elongate, generally rectangular shaped body formed of a dense material and including a substantially flat lower surface, front surface, rear surface, opposed end surfaces and an upper surface, said front surface having a vertical groove therein extending through the transverse vertical center line plane of the body,

a U-shaped handle, means detachably securing said handle to said body whereby said handle projects upwardly from said body,

a plurality of anchoring pins adjustably secured to said body and projecting downwardly therefrom, each of said anchoring pins having a pointed lower end and being vertically adjustable relative to said body and penetrating the surface upon which the body is positioned,

an attachment element on the upper surface of said body adjacent the transverse center line plane thereof for anchoring one end of a chalk line,



an opening through the body located between the attachment element and said vertical groove, and a transverse groove in the lower surface of the body communicating with said vertical groove and said opening and accommodating a chalk line therein which extends from the attachment element through the opening to thereby permit a chalk line to be pulled tight and snapped to form a layout line chalk on the surface of a work area.

5,022,159

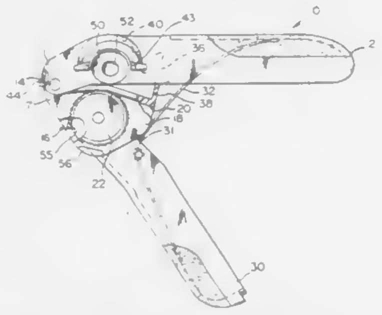
HAND-HELD CAN OPENER

Christopher C. Cressman, and David A. Holcomb, both of Seattle, Wash., assignors to Chef'N Corporation, Seattle, Wash.

Filed Nov. 29, 1989, Ser. No. 443,487

Int. Cl.⁵ B67B *7/46*

U.S. Cl. 30—418 **18 Claims**



1. A hand-held can opener, comprising:

a scissor handle;

a grip block, said scissor handle being pivotally mounted on said grip block, said grip block having a can rim feed wheel and a latch;

a one-way clutch connected between the feed wheel and the scissor handle for rotating the feed wheel in one direction only with each pivotal swing of the scissor handle;

a grip handle pivotally secured to the grip block but not to the scissor handle and having a freely rotatable cutter and a keeper releasably lockingly engageable by said latch for locking the feed wheel adjacent to the cutter; and

a return spring for separating the scissor handle and the grip handle for allowing oscillation of the pivotal movement of the scissor handle by a repetitive squeezing motion.

5,022,160

HAND-OPERATED POWER TOOL

Steven E. Sharpe, Dannatt House, 81 Brigg Road, Barton-on-Humber, South Humberside, DN18 5DX; Garry Brewin, 27 Beckhill, Barton-on-Humber, South Humberside, DN18 5HQ, and Richard Sharpe, Widband, Elm Lane, North End, Goxhill, Barrow-on-Humber, South Humberside, DN19 7JU, all of England

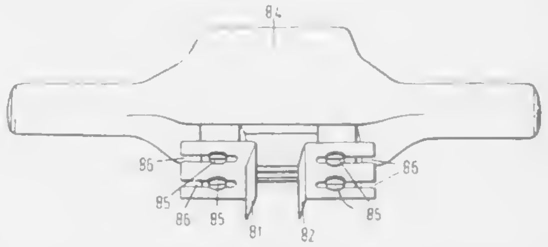
PCT No. PCT/GB88/01052, § 371 Date Jun. 5, 1990, § 102(e) Date Jun. 5, 1990, PCT Pub. No. WO89/05220, PCT Pub. Date Jun. 15, 1989

PCT Filed Dec. 5, 1988, Ser. No. 476,400

Claims priority, application United Kingdom, Dec. 5, 1987, 8728517

Int. Cl.⁵ B27C *1/10, 5/10*

U.S. Cl. 30—475 **14 Claims**



1. A power tool comprising a cylindrical cutter block, drive means to rotatably drive the cutter block about its central axis, at least one cutting blade mounted in the cutter block parallel to the central axis thereof, and front and rear sole plates on which the power tool is supported, in use, against a workpiece, the front and rear sole plates being spaced from each other to define an elongate slot therebetween parallel to the central axis of the cutter block through which the cutting blades each extend as the cutter block is rotated, and being curved about the central axis of the cutter block wherein a guide member is releasably secured to the housing at one end of the elongate slot and is adjustable to partially cover the elongate slot and thereby to vary the effective length of the cutter blades which are exposed therethrough.

5,022,161

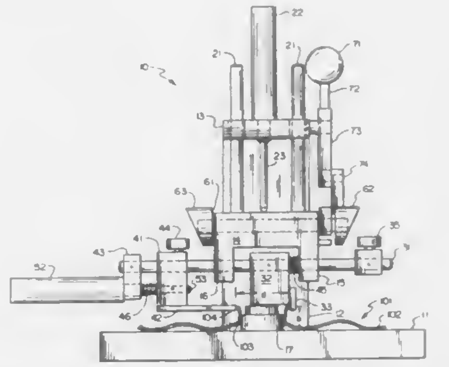
PLATE FIN COLLAR GAUGING APPARATUS

Kenneth P. Gray, E. Syracuse, and Michael L. McDonough, Jamesville, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Aug. 27, 1990, Ser. No. 572,572

Int. Cl.⁵ G01B *5/02*

U.S. Cl. 33—548 **2 Claims**



1. An apparatus for measuring the height and diameter of a collar in a generally planar plate, said collar being a generally cylindrical extrusion extending perpendicularly from the surface of said plate and having an outer diameter and a collar outer end, comprising:

VOL
1127
ISS
2
JE
11
1991
UMI

a base having a mount pin to receive and position said plate for measurement of said collar when said plate is placed on said base with said collar extending upward;

a support post fixed to said base;

a hanger fixed to said support post;

a vertical shaft slideably mounted in said hanger;

a carriage having a first leg and a second leg and fixed to said vertical shaft so that said carriage can be displaced vertically with respect to said hanger and said base;

a first indicator fixed to said hanger and having a vertical indicator probe contacting said carriage so that vertical displacement of said carriage with respect to said hanger results in a similar displacement of said vertical indicator probe;

a horizontal shaft slideably mounted through said first and second legs of said carriage;

a measuring block fixed to said horizontal shaft between said carriage first and second legs, said measuring block mounted so that a lower surface of said measuring block will contact said plate fin outer end when said carriage is displaced downward;

a first measuring blade projecting downward from said measuring block on a side of said block proximate to said carriage first leg;

a blade block slideably mounted on said horizontal shaft outside said carriage first leg;

a roller mount fixed to said horizontal shaft outside said carriage first leg;

a second indicator fixed to said horizontal shaft outside said carriage second leg by means of an indicator block and having a horizontal gauge probe contacting said blade block so that displacement of said blade block with respect to said indicator block results in a similar displacement of said horizontal indicator probe;

a second measuring blade mounted on said blade block and extending toward said first measuring blade;

a rotatable cam shaft having a first and a second rotation limit mounted horizontally in said carriage;

a first cam fixed to said cam shaft outside said carriage first leg;

a second cam fixed to said cam shaft outside said carriage second leg;

a first cam follower mounted on said roller mount so as to engage said first cam and to urge said roller mount, said measuring block and said first measuring blade outwardly away from said blade block and said second measuring blade when said cam shaft is rotated from said first to said second rotation limit;

a second cam follower mounted on said roller mount so as to engage said second cam and to urge said blade block and said second measuring blade away from said measuring block and said first measuring blade when said cam shaft is rotated from said first to said second rotation limit;

a first means for urging said measuring block and said first measuring blade horizontally toward said blade block and said second measuring blade;

a second means for urging said blade block and second measuring blade horizontally toward said measuring block and first measuring blade;

a cam link attached to said cam shaft;

a rotatable handle having a load position and a measure position;

a handle shaft connecting said handle to a lift lever mounted on said hanger; and

a lift link connecting said cam link to said lift lever so that

as said handle is moved from said measure position toward said load position, said cam link first rotates said cam shaft from said first to said second rotation limit, causing said first and second measuring blades to be urged away from each other through the interrelated actions of said first and second cams and cam followers, said roller block, said measuring block and said blade block until said cam shaft reaches said second rotation limit, then, as said handle is moved further toward said load position, said carriage, together with all members of said apparatus mounted to said carriage, is upwardly displaced so as to allow placement of said plate on said base for measurement, and

as said handle is moved from said load position to said measure position, said carriage, together with all members of said apparatus mounted to said carriage, is downwardly displaced until said measuring block contacts said collar outer end, producing an output from said vertical indicator that is translatable into a measure of the height of said outer end from said surface, then, as said handle is moved further toward said measure position, said cam link rotates said cam shaft from said second to said first rotation limit, causing said first and second measuring blades to be urged toward each other through the interrelated actions of said first and second urging means, said first and second cams and cam followers, said roller block, said measuring block and said blade block, until said first and second measuring blades contact opposite sides of said collar outer diameter, producing an output from said horizontal indicator that is translatable to a measure of said outer diameter of said collar.

5,022,162

GENERAL PURPOSE MEASURING IMPLEMENT USABLE IN THE FIELD, AND ITS DATA TRANSFER METHOD

Henrik Luikko, Helsinki, Finland, assignor to Thomesto Oy, Helsinki, Finland

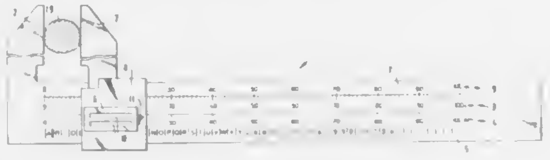
PCT No. PCT/FI88/00020, § 371 Date Aug. 9, 1989, § 102(e) Date Aug. 9, 1989, PCT Pub. No. WO88/06278, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 9, 1988, Ser. No. 382,697

Claims priority, application Finland, Feb. 10, 1987, 870533

Int. Cl.^{5} G01B *3/20*

U.S. Cl. 33—784 **14 Claims**



1. A method of recording data, comprising the steps of:

providing a measuring instrument having a memory, a programmable recording unit coupled to the memory, a movable element, a sensor for detecting the position of the movable element, and a single activating means coupled to the recording unit;

programming the recording unit so it selectively operates in first and second program portions responsive to actuation of the activating means to store values in the memory whereby the recording unit interprets the output of the sensor as a measurement value when operating in the first program portion and as an alphanumeric value when operating in the second program portion;

actuating the activating means a first time when operating in one of the first and second program portions to cause the recording unit to store a first value in the memory; and

actuating the activating means a second time when operating in the other of the first and second program portions to store a second value in the memory.

5,022,163

METHOD AND DEVICE FOR DRAWING A WEB THROUGH A GROUP OF DRYING CYLINDERS

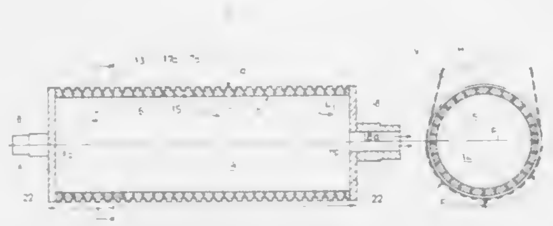
Heikki Ilvespää, Jyväskylä; Allan Liedes, Palokka, and Olavi Viitanen, Jyväskylä, all of Finland, assignors to Valmet Paper Machinery Inc., Finland

Filed Mar. 9, 1989, Ser. No. 320,985

Claims priority, application Finland, Mar. 9, 1988, 881106

Int. Cl.^{5} F26B *5/00*

U.S. Cl. 34—23 **10 Claims**



1. Method for guiding a web through a group of drying cylinders having at least one heated cylinder and having at least one leading cylinder or roll, with the web being passed around the cylinders, comprising the steps of

providing the leading cylinder or roll with holes passing through a mantle thereof and fitting the holes in the mantle to open at one end into an interior space within the cylinder or roll mantle and at an opposite end into grooves provided upon an outer face of the mantle, and

applying a negative or suction pressure to an inner face of the mantle to generate free flow of air into the cylinder or roll interior from an outer area surrounding the mantle through the holes,

whereby the negative or suction pressure is transmitted from inside the roll or cylinder to the grooves provided in the outer mantle face and a adhesion force is applied to the web through the grooves.

5,022,164

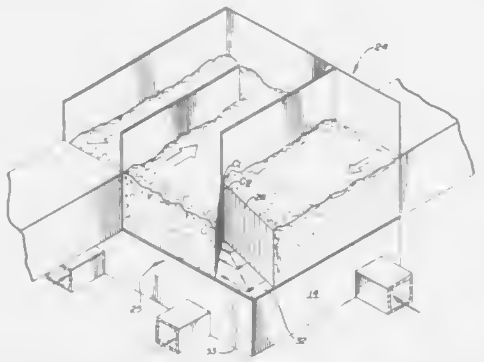
FLUID BED DRYER

Ove Hansen, and C. Douglas Thrasher, both of Columbia, Md., assignors to A/S Niro Atomizer, Soeborg, Denmark

Filed Nov. 29, 1989, Ser. No. 442,817

Int. Cl.^{5} F26B *17/00*

U.S. Cl. 134—57 B **13 Claims**



1. A fluid bed dryer for processing a particulate material comprising:

a housing providing a series of chambers with adjacent ones of said chambers separated by a longitudinally extending common wall and connected by a turn-around section to provide a serpentine path leading from an entrance end of a first one of said chambers to an exit end of a last one of said series of chambers,

each turn-around section being open at one end of one of said common walls to the adjacent chambers separated by said common wall and serving to receive and turn particulate material distributed across the width of one of said chambers through an arcuate path of 180° and deliver said material to the other said chamber,

each of said chambers and turn-around sections having a base including at least one bottom plate with a plurality of gas introduction openings distributed across each plate and oriented to introduce gas into said chamber in a specific direction to fluidize and move a particulate material in said direction,

said gas introduction openings in each of said chambers being oriented to uniformly fluidize and move said particulate material in a direction parallel to said common wall and said gas introduction openings in each turn-around section being oriented to successively receive and turn incremental vertical columns of said particulate material with each incremental vertical column of said particulate material received and turned successively in accordance with the distance each incremental vertical column is spaced from said common wall,

a plenum chamber for providing pressurized gas beneath each bottom plate, and

a source of pressurized gas connected to each said plenum chamber.

5,022,165

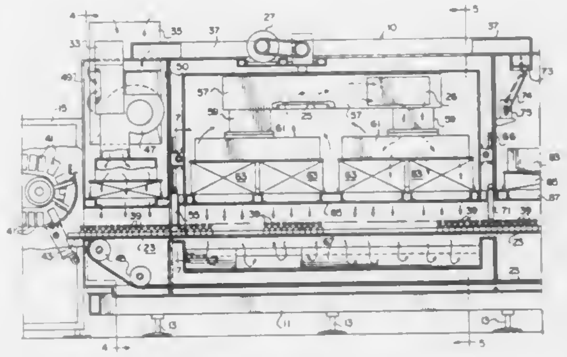
STERILIZATION TUNNEL

Frank Beswick, Phoenixville, Pa., assignor to The West Company, Incorporated, Phoenixville, Pa.

Filed Jun. 29, 1990, Ser. No. 546,587

Int. Cl.^{5} F26B *19/00*

U.S. Cl. 34—62 **15 Claims**



1. Apparatus for sterilizing objects, comprising:

an enclosed chamber having an inlet and an outlet, and including walls defining and separately enclosing a preheat zone, a sterilization zone and cooling zone respectively between said inlet and said outlet;

conveyor means for conveying objects along a path from said inlet through said zones to said outlet;

said preheat zone including exhaust means for discharging air from said apparatus, said exhaust means including temperature sensor means for adjusting the amount of exhaust air based upon the temperature in said preheat zone; and

said cooling zone including recirculating means for directing air from said cooling zone to said exhaust means, and regulating means to control the amount of air directed by said recirculating means based upon air pressure in said cooling zone.

VOL
1127

ISS
2

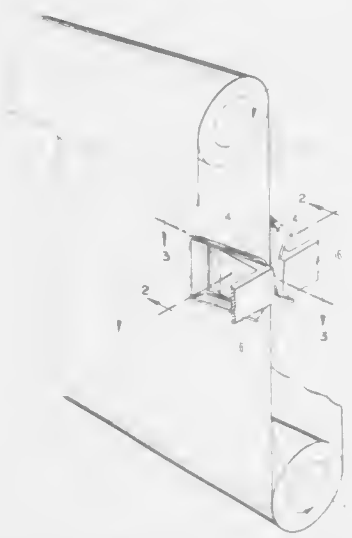
JE
11

1991

UMI

5,022,166
FLUTTER SUPPRESSION AIR FOILS

Dong D. Nguyen, and Marvin L. Harris, both of Lawrenceville, N.J., assignors to Union Camp Corporation, Wayne, N.J.
Filed Jun. 7, 1990, Ser. No. 534,798
Int. Cl.^{5} F26B *13/20*
U.S. Cl. 34—120 19 Claims



1. A non-contact apparatus for reducing web edge region flutter caused, in part, by flowing air on said web in an open draw in which at least a central portion of said web is stretched, said flutter including an amplitude and frequency, said apparatus comprising:

a pair of air foils disposed proximate to a pair of opposing planar surfaces of said web-edge region, each of said air foils having at least a first convex surface facing said web and disposed in contact with said flowing air for producing a venturi effect which reduces at least said flutter amplitude in said open draw

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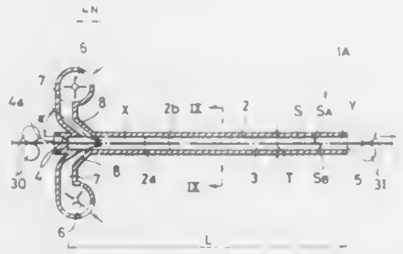
5,022,167
PHOTOSENSITIVE MATERIAL DRYING APPARATUS

Takashi Nakamura, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Sep. 5, 1989, Ser. No. 402,367
Claims priority, application Japan, Sep. 5, 1988, 63-221796; Nov. 14, 1988, 63-287445; Jun. 16, 1989, 1-153653
Int. Cl.^{5} F26B *13/00*
U.S. Cl. 34—160 20 Claims



1. An apparatus for drying a silver halide color photosensitive material in the form of a web, comprising

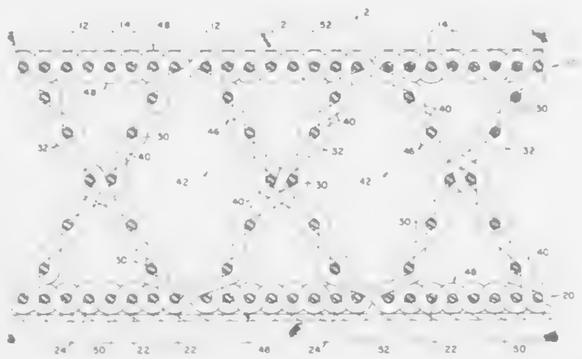
a housing defining an interior space having longitudinal, transverse and height dimensions, said interior space having a slit-shaped transverse cross section in which the height dimension is substantially smaller than the transverse dimension, and

fan means connected to said housing for blowing drying gas into the interior space to dry the photosensitive web while the photosensitive web is being transferred through the interior space in a longitudinal direction,

wherein said housing is a generally elongated box-shaped housing having upper and lower walls, said housing has entrance and exit openings at longitudinally opposed ends wherein the photosensitive web enters said housing through the entrance opening and leaves said housing through the exit opening, said fan means includes at least one pair of nozzles attached to the upper and lower walls of said housing, said one pair of nozzles being adjacent to the entrance opening for introducing the drying gas into the interior space, whereby the drying gas passes through the interior space in parallel flow with the photosensitive web, a ratio of L/L_N of housing entire length L to total nozzle blowing opening longitudinal distance L_N is at least 30 and the difference in relative humidity between the drying gases in said interior space at the beginning and the end of drying is controlled to at least 30% RH.

5,022,168
FOOTWEAR INSERT

John Jeppson, III, 94 Lake Rd., Brookfield, Mass. 01506, and Joseph P. Herlihy, 92 Middleton Rd., Boxford, Mass. 01921
Continuation-in-part of Ser. No. 389,373, Aug. 4, 1989. This application Jun. 20, 1990, Ser. No. 540,681
Int. Cl.^{5} A43B *13/40*
U.S. Cl. 36—43 17 Claims



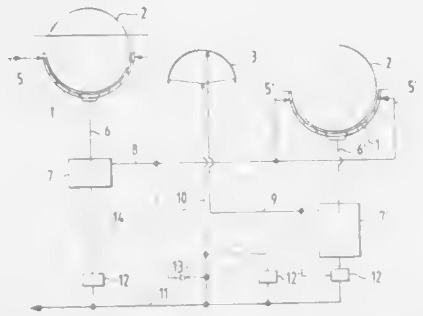
1. A footwear insert comprising a first fabric layer comprising first strands extending widthwise of said insert and second strands extending lengthwise of said insert and interwoven with said first strands, a second fabric layer comprising third strands extending widthwise of said insert and fourth strands extending lengthwise of said insert and interwoven with said third strands, fifth strands extending widthwise of said insert and disposed between said first and third strands and forming walls transverse to said first and second layers, and sixth strands extending lengthwise of said insert and interwoven with said first, third and fifth strands, said sixth strands forming loops substantially larger in size than loops formed by said second and fourth strands, said first and second layers and said walls forming voids bound in part by said sixth strands, said insert being configured and adapted for use in conjunction with a sole of a shoe.

5,022,169
APPARATUS FOR IRONING LAUNDRY

Jorn M. Jensen, Bern, Switzerland, assignor to Jensen Holding AG, Burgdorf, Switzerland
Filed Feb. 22, 1990, Ser. No. 483,022
Claims priority, application Netherlands, Feb. 23, 1989, 8900457
Int. Cl.^{5} D06F *65/10, 65/00*
U.S. Cl. 38—56 14 Claims

1. An apparatus for ironing laundry comprising:

a series of semi-circular dished beds each comprising an inner wall, an outer wall and an interspace therebetween, each of said dished beds comprising receiving means for receiving a heating medium in the interspace thereof, and outlet means for discharging said heating medium from the interspace thereof, such that said heating medium passes through said interspace from the feed means to the outlet means; and

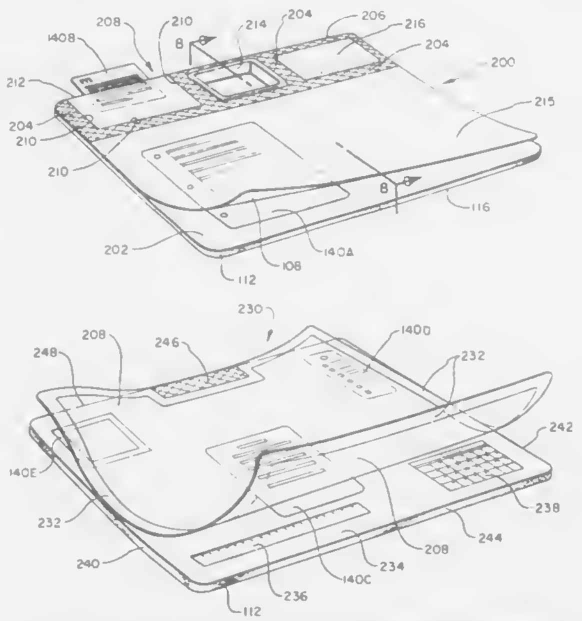


corresponding rotatably driven rollers, wherein a surface of each of said rollers is opposed to the inner wall of each of said dished beds in said series;

wherein the outlet means of a first dished bed in said series is directly connected to the feed means of a following dished bed in said series.

5,022,170
WORK SURFACE INFORMATION DISPLAY PAD

V. Dean House, Orem, Utah, assignor to Data Pad Corporation, Orem, Utah
Continuation-in-part of Ser. No. 15,945, Feb. 18, 1987. This application Dec. 21, 1987, Ser. No. 135,653
Int. Cl.^{5} B43M *3/00*
U.S. Cl. 40—358 8 Claims



1. A pad for use on a work surface to display visual information on sheet material to a user of the work surface and to afford the user of the work surface a substitute work surface upon which to perform tasks, the pad comprising:

(a) a flexible base layer having upper and lower surfaces and being made of a resilient sponge material, said lower surface of said base layer configured to rest against and be non-destructively removable from the work surface;

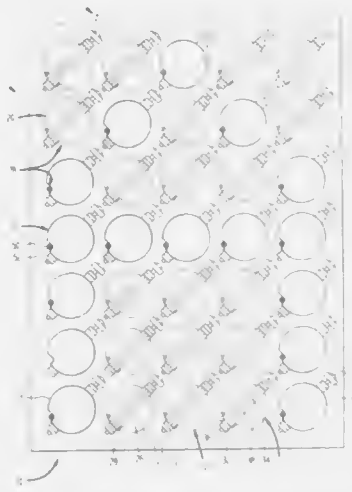
(b) a gripping surface on said lower surface of said base layer textured to functionally hold said pad in place on the work surface;

(c) a flexible cover comprising a single thin transparent layer upheld by and congruent with said base layer, said cover having an upper surface configured to serve as the substitute work surface and on the opposite side therefrom a lower surface resting against said upper surface of said base layer to removably retain the sheet material between said base layer and said cover with visual information on the sheet material being visible through said cover to the user of the work station; and

(d) an attachment site between said base layer and said cover at at least a portion of an edge of said base layer at which said lower surface of said cover is bonded directly to said upper surface of said base layer, partial portions of the periphery of said cover other than at said attachment site being capable due to the flexibility of said cover of being repeatedly and non-destructively lifted away from said upper surface of said base layer while said lower surface of said base layer rests against the work surface and while other portions of said periphery of said cover remain in contact with said upper surface of said base layer thereby to permit the user to selectively insert, rearrange, and remove the sheet material between said cover and said base layer.

5,022,171
MATRIX DISPLAY ASSEMBLY HAVING MULTIPLE POINT LIGHTING

Roy Norfolk, Umatilla, Fla., and Arnold Lazarus, Sayville, N.Y., assignors to The Staver Company Inc., Bay Shore, N.Y.
Continuation-in-part of Ser. No. 399,257, Aug. 28, 1989, Pat. No. 4,974,353. This application Jul. 16, 1990, Ser. No. 552,935
Int. Cl.^{5} G09F *9/30*
U.S. Cl. 40—447 11 Claims



1. A graphic character matrix display assembly, comprising:

a support providing a nonreflecting background for said display;

a multiplicity of display units mounted on said support in an array for cooperatively displaying said character;

each of said display units comprising:

a flat non-apertured display a symmetry having axis a light reflecting side and a nonreflecting opposite side, and having a radial cutout at its periphery;

motive means on said support for rotating said display element substantially along the axis of symmetry of said display element between a light reflecting display position exposing said light reflective side and a reversed position exposing said nonreflecting side;

an illumination means carried by said support adjacent said display element and arranged to project said light beam forward of said display position through a cutout and to project an outline of said display element, when said disk is in said display position, said display element having an

VOL
1127
ISS
2
JE
11
1991
UMI

imperforate edge to block said light beam when said display element is in said reversed position;

whereby said character is displayed in ambient reflected light when certain ones of said disks are in said display position, and whereby said character is displayed in the absence of said ambient light by said projected light beams and by silhouettes of said certain disks by said light beams.

5,022,172
DISPLAY APPARATUS FOR AN AUTOMATIC VENDING MACHINE

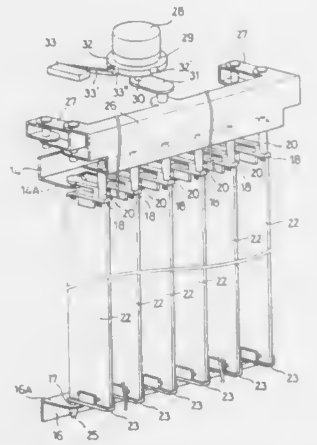
Tsugio Kawahara, Saitama; Hiromasa Harashima, Gunma; Shunji Ubukata, Gunma; Kazuo Kameda, Gunma; Hirobito Moriya, and Yoshibisa Inamura, both of Saitama, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Mar. 18, 1988, Ser. No. 169,893

Claims priority, application Japan, Mar. 19, 1987, 62-64763; Apr. 2, 1987, 62-82031; Jun. 25, 1987, 62-159252; Jun. 29, 1987, 62-161529

Int. Cl.⁵ G09F *11/02*

U.S. Cl. 40—503 23 Claims



1. An automatic vending machine provided with a display apparatus, comprising:

a sample room for exhibiting samples of articles of trade which is covered by a transparent window panel fitted in a front door of said vending machine,

a display plate having a display figure formed thereon, said plate being located on a rear wall of said sample room,

a plurality of vertical elongate display strips, which are arranged side by side at desired intervals, said strips being located adjacent to said display plate and being rotatable about their own vertical axes so that when said display strips rotate together at the same time, either front faces or rear faces, of said display strips take their positions substantially parallel to said display plate, said faces including front faces and rear faces which cooperate with each other to produce an associated composite display figure that fully covers the display figure of said display plate,

driving means for rotating all the display strips at the same time about their own vertical axes,

control means for controlling the movement of said display strips to temporarily hold the display strips in a position where a face of each strip is substantially perpendicular to said display plate and in a position where either the front face or the rear face of each strip is substantially parallel to said display plate, said driving means rotating said display strips in response to said control means so that the display figure of said plate and the composite display figures to be produced by the front and rear faces of said display strips may be intermittently seen at predetermined time-intervals through said transparent window panel, each of said display strips being rotatable into a position substantially parallel to said display plate, further comprising detecting means responsive to opening said front door for generating a detection signal, said control means comprising means responsive to said detection signal when each of said display strips is free of said position substantially parallel to said display plate for operating said drive means to rotate each of said display strips until said display strips take such a parallel position, each of said display strips having a rearward edge, and

means for suspending said display strips so that said display strips are rotatable about a vertical axis adjacent to said rearward edge and so that a lower end of each of said display strips is kept free from contacting a floor of the sample room to enable a length of said strip to expand or contract in proportion to a change in temperature.

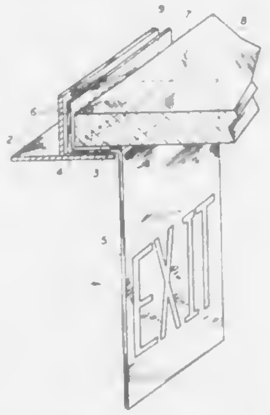
5,022,173
SUSPENDED CEILING GRID SIGN WITH LOCKING, CANTILEVERED/COUNTERBALANCED BRACKET

Brian E. Pfeiffer, Pittsburgh, Pa., assignor to Pittsburgh Tag Company, Pittsburgh, Pa.

Filed Mar. 26, 1990, Ser. No. 498,851

Int. Cl.⁵ G09F *7/22*

U.S. Cl. 40—617 22 Claims



1. A sign for attachment to a grid rail of a suspended tile ceiling comprising:

a first vertical member having an upper edge and being capable of accommodating a sign;

a horizontal flange having a rail edge and an outer edge, said outer edge being connected to the upper edge of the first vertical member, said horizontal flange being substantially perpendicular to the first vertical member, and whereby the horizontal flange is capable of resting on a ledge of the grid rail; and

a second vertical member having a lower edge, said lower edge being connected to the rail edge of the horizontal flange, said second vertical member extending upwardly from and substantially perpendicular to the horizontal flange, and whereby the second vertical member is capable of resting against an end of a ceiling tile so as to provide cantilevered support for the first vertical member.

5,022,174
RAILROAD CAR IDENTIFICATION PLATE HOLDER

Todd A. Goff, 7030 Lario Dr., Topeka, Kans. 66618

Filed Nov. 13, 1989, Ser. No. 435,981

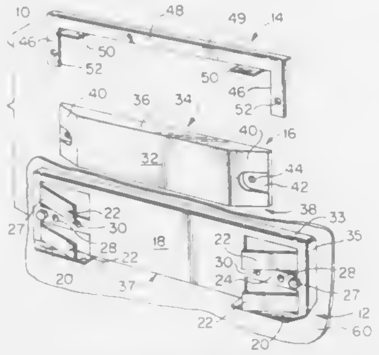
Int. Cl.⁵ G09F *3/20*

U.S. Cl. 40—649 5 Claims

1. A device for securing an encoded identification tag to an enclosure adapted to be moved from one location to another, the identification tag including a horizontally elongated body having spaced substantially parallel front and back faces, spaced substantially parallel top and bottom edges, and side edges extending obliquely to the front and back faces, such that the tag is substantially trapezoidal in a cross-sectional plane substantially parallel to the edges, said device comprising:

a base frame member adapted to be secured to said enclosure, said base frame member having a substantially planar main section elongated along a longitudinal axis and adapted to be opposed to the back face of the tag, said base frame member being adapted to lie with said main section in a substantially vertical plane with said longitudinal axis substantially horizontal and having first and second longitudinal ends and top and bottom sides;

first and second base sections, each of said base sections being connected to said base frame member in proximity to an associated one of said ends and in proximity to said bottom side, and extending outwardly from said main section to thereby support the tag against downward movement, and said base sections being spaced from each other along said longitudinal axis to define a continuous open area between said base sections for unobstructed visual access to a portion of the bottom edge of the tag, said portion substantially corresponding to a majority of the length of the tag;



a top frame member removably mounted on said base frame member;

first and second top sections, each of said top sections being connected to said top frame member in proximity to an associated one of said ends of said base frame member and in proximity to said top side, and extending outwardly of said main section to thereby support the tag against upward movement, and said top sections being spaced from each other along said longitudinal axis to define a continuous open area between said top sections for unobstructed visual access to a portion of the top edge of the tag, said portion of the top edge substantially corresponding to a majority of the length of the tag; and

means mounted on said base frame member, proximate said ends of said base frame member, for supporting the tag against movement in the direction of said longitudinal axis and against movement normal to and outwardly of said main section, said means being spaced along said longitudinal axis to define an open area between said means for unobstructed visual access to at least a majority of the front face of the tag.

5,022,175
SAFETY ARRANGEMENT FOR FIREARMS

Ockert P. H. Oncke, 53 Stewart Street, Goodwood 7460, and Sarel B. Van der Merwe, 4 Vredenberg Road, Bothasig 7405, both of South Africa

Filed Jan. 29, 1990, Ser. No. 471,523

Claims priority, application South Africa, Jan. 31, 1989, 89/0743

Int. Cl.⁵ F41A *17/04*

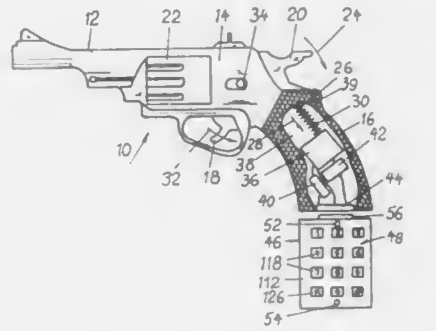
U.S. Cl. 42—70.11 6 Claims

1. A safety arrangement for selectively disabling a firearm, the firearm including a handle, a trigger, a hammer, and a barrel, the hammer, in an unlocked condition, being movable into a functional position for being actuable by the trigger for striking a cartridge causing firing of a bullet and, in a locked condition, being mechanically locked so that is cannot be actuated by the trigger for causing firing of a bullet, the arrangement including:

(a) a control unit mountable in the handle and being adapted in the locked condition to lock the hammer mechanically against actuation by the trigger and, in the unlocked condition, to unlock the hammer to be actuable by the trigger for firing;

(b) an electronic decoder unit mountable in the handle and being adapted to decode input signals received from a keypad unit and, after decoding of such input signals, to provide corresponding output signals;

(c) an electronic driver stage mountable in the handle and being adapted on receipt of output signals from the electronic decoder unit, to cause corresponding operation of the control unit for locking and unlocking the hammer as the case may be;



(d) a keypad unit provided separately from the handle and having a number of key buttons, the key buttons being adapted on operation thereof to provide input signals to the electronic decoder unit when the keypad unit is electrically coupled thereto;

(e) connection means associated with the keypad unit for electrically connecting a battery thereto; and

(f) first coupling means on the handle of the firearm and associated second coupling means on the keypad unit for removably electrically coupling the electronic decoder unit and the electronic driver stage to the key buttons of the keypad unit.

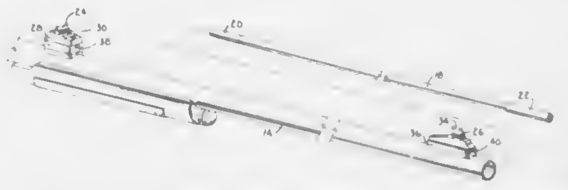
5,022,176
GUN BARREL RAMROD HOLDER

Phillip E. Frigon, R.R. 1, Box 109A, and Robert D. Rott, 1516 First St., both of Clay Center, Kans. 67432

Filed Jan. 8, 1990, Ser. No. 461,982

Int. Cl.⁵ F41C *27/00*

U.S. Cl. 42—90 11 Claims



1. Apparatus for temporarily storing a ramrod on a firearm having a barrel, said apparatus comprising:

a pair of sight elements cooperating to provide a sight for guiding the aim of the firearm;

means for mounting said sight elements on the barrel at spaced apart locations thereon, said mounting means including spaced apart mounting elements on the barrel; and

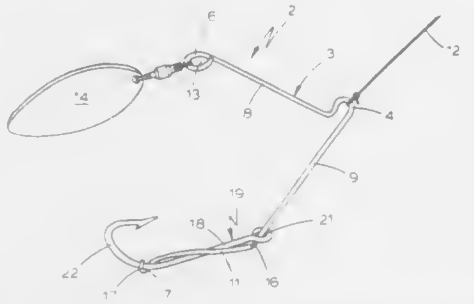
means on each of said mounting elements for receiving and holding the ramrod in a manner allowing selective removal of the ramrod.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,177

FISHING LURE HARNESS STRUCTURE

Thomas R. Gibson, 1204 Woodgate Dr., Kirkwood, Mo. 63122
Filed Nov. 13, 1989, Ser. No. 435,055
Int. Cl.^{5} A01K *85/00*
U.S. Cl. 43—42.11 **11 Claims**

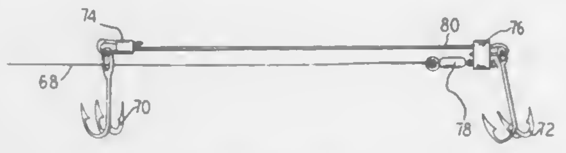


10. Convertible harness structure for fishing lures comprising:
- an elongated, integral and flexible corrosion resistant metallic wire body including a first bend intermediate the extremities of said wire body to provide a first loop of generally U-shaped configuration with short and long legs extending at a general right angle from the opposite ends of said first loop with said short leg and a portion of said long leg adjacent said first loop being in a substantially common plane with said first loop and with each other, said first loop serving to accommodate the tied end of a fishing line;
- a second bend at the extremity of said short leg of said wire body of encircling configuration to provide an eye in a substantially common plane with side short leg adjacent thereto, said eye serving to accommodate a spinner lure;
- a third bend in said long leg of said wire body of generally two right angle step configuration to divide said long leg so that said portion adjacent said first loop serves as an intermediate leg and said remaining portion of said long leg serves as a second leg extending in a generally common direction with said first leg and at an angle thereto to form said overall wire body into a generally U-shaped configuration with said second leg being in a plane offset from the common plane determining said first and intermediate legs, said second leg having a fourth offset bend at the extremity thereof of generally U-shaped configuration, said third and fourth bends being preselectively spaced from each other a distance compatible with the length of the shank of a preselected hook whereby said shank can be intertwined with said second leg with the hook eye engaging in said third bend and the base of said hook nesting in said U-shaped fourth bend.

5,022,178

FISHING RIG

Donald P. Carlson, Box 67, Valley View Rd., Townsend, Wis. 54175
Filed May 9, 1985, Ser. No. 732,138
Int. Cl.^{5} A01K *83/06*
U.S. Cl. 43—44.82 **17 Claims**

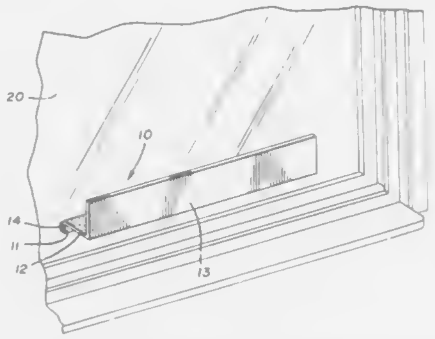


1. A fishing rig comprising: a leader;
- first and second hooks mounted spaced apart on said leader for relative movement towards one another when said first hook is set and tension is applied to said leader; and
- a bending member mounted between said first and second hooks, said bending member bending into a loop as said first and second hooks move toward one another along an arcuate path.

5,022,179

INSECT TRAPPING DEVICE

Earle L. Olson, Medina, Ohio, assignor to Olson Products, Inc., Medina, Ohio
Filed Jan. 8, 1990, Ser. No. 461,829
Int. Cl.^{5} A01M *1/14*
U.S. Cl. 43—114 9 Claims



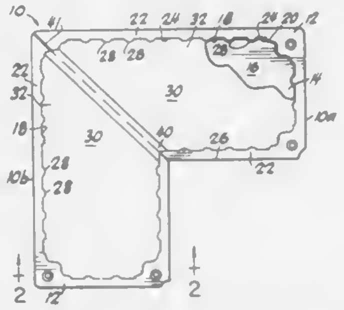
8. An insect trapping device for mounting on a support surface, comprising:
- (a) an elongate body having opposed first and second surfaces including:
  - (1) a first elongate section for attachment to the support surface;
  - (2) a second elongate section contiguous with said first section and disposed in a plane substantially normal to the plane of said first section and the support surface when said first section is attached thereto, and
  - (3) a third elongate section contiguous with said second section and disposed in a plane substantially normal to the plane of said second section and substantially parallel with that of said first section and to the plane of the support surface;
- (b) said first section projecting in a first direction with respect to the plane of said second section and said third section projecting in a second direction with respect thereto;
- (c) support surface engaging means disposed on said first first section for engaging the support surface; and
- (d) a quantity of insect attracting adhesive disposed on said first surface of said second section.

5,022,180

RODENT TRAP

Victor Albanese, 2222 63rd St., Brooklyn, N.Y. 11204
Continuation-in-part of Ser. No. 186,442, Apr. 26, 1988, abandoned. This application Sep. 11, 1989, Ser. No. 405,037
Int. Cl.^{5} A01M *1/14, 23/00*
U.S. Cl. 43—114 5 Claims

1. A trap for vermin which comprises:
- two tray elements;
- each of said tray elements including an indented portion;
- a wall element extending within at least one indented portion to divide the at least one indented portion into at least two section;
- a bait material contained in one of the at least two sections;
- a layer of pressure sensitive adhesive material contained in the other of the at least two sections and the other indented portion;
- a common flange area integral with each of said tray elements to connect said tray elements to one another;
- said common flange area being arranged so that the two tray elements are co-planar and form a 90° angle therebetween; and

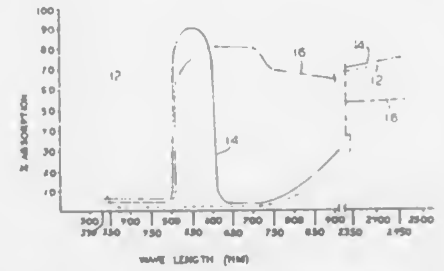


- wherein the one of the at least two sections containing the bait material is arranged adjacent an outer corner A of the two tray elements.

5,022,181

METHOD AND APPARATUS FOR USE IN PLANT GROWTH PROMOTION AND FLOWER DEVELOPMENT

Eric Longstaff, Fulton County, Ga., assignor to R. E. I., Inc., Alpharetta, Ga.
Continuation of Ser. No. 60,749, Jun. 10, 1987, abandoned. This application Dec. 14, 1989, Ser. No. 450,593
Int. Cl.^{5} A01G *9/22*
U.S. Cl. 47—31 **28 Claims**



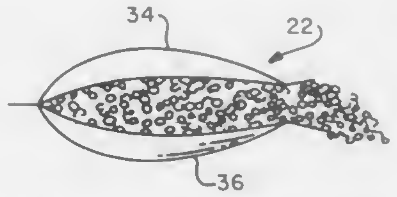
1. A sunscreening article for the growth promotion of green plants, comprising a plurality of separate screens, a first of said screens comprising first agent means for absorbing at least 80% of the naturally occurring auxin inactivating UV radiation of wavelengths in the range 290–340 nm, and a second of said screens comprising second agent means for preventing transmittal through said second of said screens of at least 50% of the non-photosynthetically useful and growth retarding green/yellow and infra-red light of wavelengths in the ranges 510 to 610 nm and 800 to 2500 nm, respectively, said first screen and said second screen each allowing transmittal therethrough of at least 80% of wavelengths in the range 340–510 nm, said second screen allowing transmittal therethrough of at least 50% of wavelengths in the range 610–710 nm.

5,022,182

AGRICULTURAL PROCESSES AND PRODUCTS

Neil C. Anderson, Chemainus, Canada, assignor to Promac Industries, Ltd., Duncan, Canada
Filed Aug. 22, 1988, Ser. No. 235,116
Int. Cl.^{5} A01G *7/06;* **C05G** *3/00*
U.S. Cl. 47—48.5 **5 Claims**

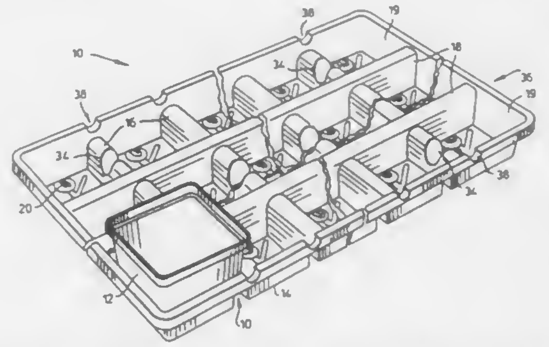
1. A system for making nutrients and moisture available to seedlings, said system comprising: a receptacle composed of a material that is permeable to water, a plant nutrient source in said receptacle, said receptacle having a burst strength and a moisture absorbing composition in said receptacle, the burst strength of said receptacle and the amount and absorptivity of said moisture absorbing composition being so related that the absorption by said composition of an effective amount of moisture will result in said receptacle rupturing and releasing said plant nutrients and said moisture absorbing composition to a seed or seedling.



5,022,183

FLOWER POT CARRYING TRAY WITH RESTRAINING MEANS FOR PLURAL POTS

Lothar E. Bohlmann, Toronto, Canada, assignor to Kord Products Limited, Brampton, Canada
Filed Oct. 31, 1989, Ser. No. 429,324
Int. Cl.^{5} A01G *9/02*
U.S. Cl. 47—86 **19 Claims**



1. A tray for retaining a plurality of individual flower pots in a planar side by side relationship, each pot having a pot bottom and drain holes formed in the bottom thereof, the tray comprising:
- a planar bottom wall for supporting each bottom individually of said plurality of pots;
- planar restraining means formed in the bottom wall for restraining the pots from movement parallel to the plane of the bottom wall; and
- a plurality of spaced-apart protrusions formed in the bottom wall, each protrusion being located to register with a pot drain hole of an individual pot, each protrusion having a transverse lip adapted to overlie a bottom of a respective pot and restrain transverse movement of the respective pot relative to the plane of the bottom wall.

7. A tray for retaining a plurality of individual flower pots in a planar side by side relationship, each pot having a pot bottom and drain holes formed in the bottom thereof, the tray comprising:
- a planar bottom wall for supporting each bottom individually of said plurality of pots;
- planar restraining means formed in the bottom wall for restraining the pots from movement parallel to the plane of the bottom wall, including a plurality of intersecting dividing walls each formed in the bottom wall, which are perpendicular relative to each other and which define discrete sections for a plurality of flower pots;
- a plurality of spaced-apart protrusions formed in the bottom wall, each protrusion being located to register with a pot drain hole of an individual pot, each protrusion having a transverse lip adapted to overlie a bottom of a respective pot and restrain transverse movement of the respective pot relative to the plane of the bottom wall, and wherein

VOL
1127
ISS
2
JE
11
1991
UMI

said plurality of protrusions are located such that each discrete section has at least one protrusion located therein.

5,022,184

MANUAL WINDOW REGULATOR

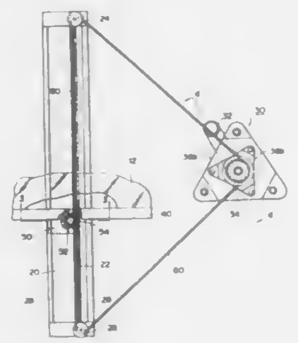
Kengo Yamamura, Inasa; Tutomu Saito, Toyohashi, and Youji Higuchi, Okazaki, all of Japan, assignors to ASMO Co., Ltd., Shizuoka, Japan

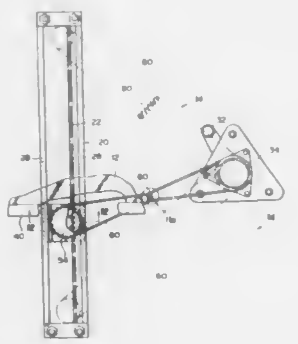
Filed Apr. 21, 1989, Ser. No. 341,557

Claims priority, application Japan, Apr. 25, 1988, 63-103401

Int. Cl.⁵ E05F *11/48*

U.S. Cl. 49—352 **16 Claims**





1. A manual window regulator for driving a window glass by a manual rotational force exerted on a handle to thereby open and close a window, comprising:
- a rack fixed to extend in the direction of movement of said window glass;
- a pinion rotatably carried by said window glass and held in meshing engagement with said rack;
- driving means rotatable in accordance with the rotation of said handle;
- driven means rotatable as a unit with said pinion;
- loop-type transmission means for transmitting the rotation of said driving means to said driven means;
- guide means for guiding said pinion to enable said pinion to move along said rack in meshing engagement with said rack; and
- a clutch for preventing said window glass from being driven by a force which is generated by means other than said handle, while allowing said window glass to move in response to a force which is produced by the rotation of said handle, wherein said clutch is disposed to act between said pinion and said driven means.

5,022,185

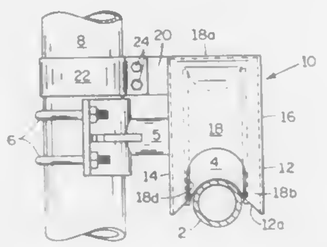
GATE PULLEY GUARD

Dean K. Oatman, P.O. Box 475, Adkins, Tex. 78101

Filed Jan. 25, 1990, Ser. No. 470,301

Int. Cl.⁵ E05D *15/06*

U.S. Cl. 49—425 **2 Claims**



1. In a slidable gate construction having a horizontally disposed gate support rod guided by a pulley rotatably mounted on a horizontal stub shaft secured to a fixed vertical post, the improvement comprising:
- a rigid safety housing having an open bottom, horizontally spaced, vertical side walls with semi-circular top portions and a transverse wall secured to the peripheries of said side walls, said housing being mountable in surrounding relation to the upper peripheral portions of said pulley;
- the vertical portions of said transverse wall having downwardly facing semi-circular notches in their lower ends surrounding said gate support rod; and
- means for rigidly mounting said safety housing to said fixed vertical post, whereby said safety housing prevents inadvertent finger engagement between said pulley and said gate rod, said means for rigidly mounting said safety guard comprising a projection formed on the vertical side wall of said safety guard intermediate said pulley and said fixed vertical post; and
- clamping band means for surrounding said fixed vertical post and bolted securement to said projection.

5,022,186

TIRE UNIFORMITY CORRECTION

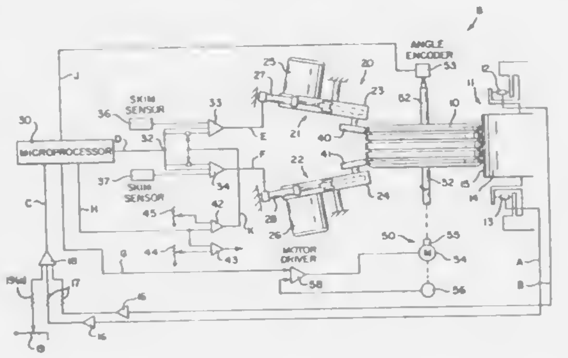
Clarence L. Rogers, Jr., Hartville, Ohio, assignor to the Uniroyal Goodrich Tire Company, Akron, Ohio

Filed Nov. 8, 1985, Ser. No. 796,676

The portion of the term of this patent subsequent to Jun. 11, 2004, has been disclaimed.

Int. Cl.⁵ B24B *49/00*

U.S. Cl. 51—165 R **17 Claims**



1. A tire uniformity correction apparatus comprising:
- means for detecting a radial force variation generated by a rotating tire;
- actuatable means for removing material from the outer periphery of the tire, said material removing means being actuatable as a function of the radial force detected by said detecting means; and
- means for limiting rotation of the tire to a speed no greater than about 30 revolutions per minute during actuation of said material removing means.

5,022,187

DEVICE FOR REGULATING THE GRINDING WEIGHT FOR AN OPHTHALMIC GLASS GRINDING MACHINE

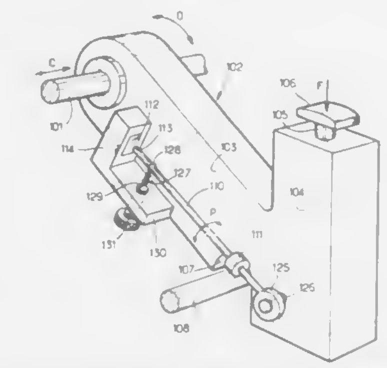
Raynald G. M. Longuet, Amfreville la Campagne, and Jean-Yves F. P. Pecot, Caudebec les Elbeuf, both of France, assignors to Briot International, Pont de l'Arche, France

Filed Aug. 17, 1990, Ser. No. 568,765

Claims priority, application France, Sep. 27, 1989, 89 12645

Int. Cl.⁵ B24B *49/00*

U.S. Cl. 51—165.74 **10 Claims**



1. Device for regulating a glass grinding weight in a machine for grinding ophthalmic glasses, said device comprising a first shaft, a rail parallel to said first shaft, a carriage mounted to be slidable and pivotable on said first shaft, an arm connected to the carriage, a sensor mounted on said arm, a rod for actuating said sensor mounted on said arm, said arm bearing against said rail through said actuating rod, a roller interposed between said rail and said actuating rod and rotatively mounted on said actuating rod, said rod having a first end and a second end opposed to said first end, a pivot pin pivotally mounting said first end of said rod on said arm, said pivot pin being parallel to said shaft and disposed in the vicinity of said rail, said sensor being mounted on said arm and being cooperative with one of said ends of said rod, said device further comprising a system for balancing force applied to said rod by said roller.

5,022,188

CLAMPING FIXTURE FOR DETACHABLY FIXING A TOOL, IN PARTICULAR A DISC

Erich Borst, Leinfelden-Echterdingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE87/00560, § 371 Date Jun. 14, 1989, § 102(e) Date Jun. 14, 1989, PCT Pub. No. WO88/04976, PCT Pub. Date Jul. 14, 1988

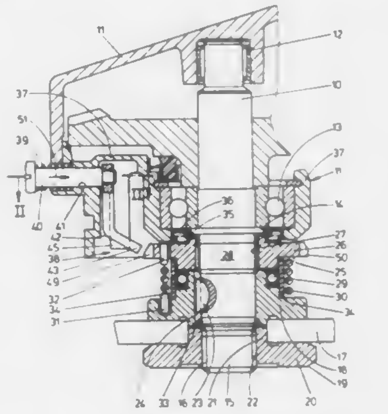
PCT Filed Dec. 5, 1987, Ser. No. 372,349

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1986, 3644441

Int. Cl.⁵ B24B *45/00*

U.S. Cl. 51—168 **18 Claims**

1. A clamping fixture for detachably fixing a discs-like tool to a driven spindle having a threaded portion with an external coarse thread, said clamping fixture comprising a flange for applying a clamping force to the tool, said flange being axially displaceable relative to the driven spindle and coupled with the driven spindle in a torque transmitting relationship; a supporting element for supporting said flange and displaceable relative to said spindle to prevent said flange from applying a clamping force to said tool, said supporting element comprising an annular nut member displaceably mounted on the spindle adjacent an end of said flange which is remote from the tool, and having a coarse thread to be screwed onto the threaded portion with an external coarse thread of the spindle; a torsion spring for directly coupling said annular nut member with said flange and having opposite ends connected to said annular nut member and said flange, respectively; and a locking device including a locking member for preventing rotation of said annular nut member upon actuation of said locking device.



5,022,189

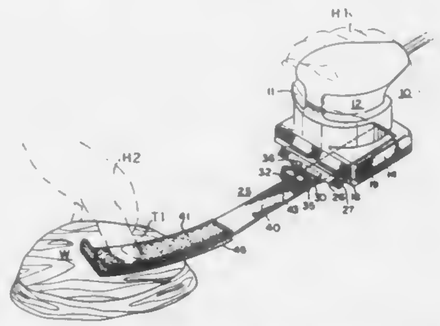
SANDER EXTENSION DEVICE

Earl W. Saul, One Silver Ave., Glassboro, N.J. 08028

Filed Mar. 12, 1990, Ser. No. 492,078

Int. Cl.⁵ B24B *23/04*

U.S. Cl. 51—170 TL **2 Claims**



1. A sander extension device for attachement to a sander of the type which sander is engaged by one hand of a user and has a motor driven pad which moves in an oscillating or vibratory motion with clamps to retain a strip of sandpaper for sanding surfaces of an object, which device permits of sanding intricate surfaces of the object at a distance from the sander and which comprises
- a mounting bracket for attachment and retention to said pad by said clamps
- resilient strip means having a top and a bottom surface engaged with said bracket,
- means engaged with said strip means to cause it to conform to said surface to be sanded,
- said means to conform includes cushioning material on said top surface for engagement by at least one finger of the other hand of the user, and
- cushioning material on said bottom surface of said strip means, and
- a strip of sandpaper secured to said bottom surface of said cushioning material.

VOL
1127
ISS
2
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1991
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5,022,190

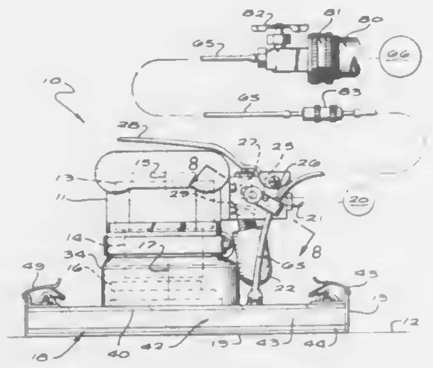
WET SANDING TOOL

Alma A. Hutchins, Pasadena, Calif., assignor to Hutchins Manufacturing Company, Pasadena, Calif.

Continuation of Ser. No. 294,197, Jan. 6, 1989, abandoned. This application Aug. 30, 1990, Ser. No. 577,046

Int. Cl.⁵ B24B *23/02*

U.S. Cl. 51.170 MT **9 Claims**



1. A portable abrading tool comprising:

a tool body to be held and manipulated by a user;

a head mounted to said body for movement relative thereto;

a motor carried by said body and operable to move said head relative to the body to abrade a work surface;

said head including a deformable cushion having an essentially flat undersurface against which a sheet of abrading material is held and through which force is applied to said sheet for pressing it against a work surface;

said head including a backing plate more rigid than said deformable cushion and which extends across an upper side thereof and contains a first opening and a second opening;

an orbital drive mechanism powered by said motor and projecting downwardly toward said head, and including a first element driven rotatively by the motor about a first axis and a second element connected eccentrically to said first element for relative rotation about a second axis offset from the first axis to produce orbital movement of the second element;

a boot having a flexible essentially tubular side wall extending downwardly between said body and said head and disposed about said orbital drive mechanism;

said boot having a bottom wall extending generally horizontally at a location vertically between said plate and said second element of the orbital drive mechanism;

a fastener extending upwardly through said first opening in said rigid backing plate and through an opening in said bottom wall of the boot and connected threadedly to said second element of the orbital drive mechanism to attach said head to said second element and said bottom wall of the boot for orbital movement of the head and said bottom wall of the boot with the second element;

said deformable cushion of the head containing a pattern of water passages leading through the interior of said cushion at locations offset from and at different sides of said fastener and leading to a plurality of spaced bottom openings in said undersurface of the cushion at different sides of the fastener communicating with spaced openings in said abrasive sheet; and

means for delivering water under pressure into said passages in the cushion for flow therethrough to said plurality of spaced openings in said undersurface of the cushion to discharge therefrom downwardly through said spaced openings in the abrasive sheet to said work surface;

said means including a water inlet line connected to said backing plate at the exterior of said boot and delivering water under pressure through said second opening in the plate into said passages for flow through said passages to the work surface, with said boot forming a seal preventing access of the water to said drive mechanism.

5,022,191

POLISHING PLATE

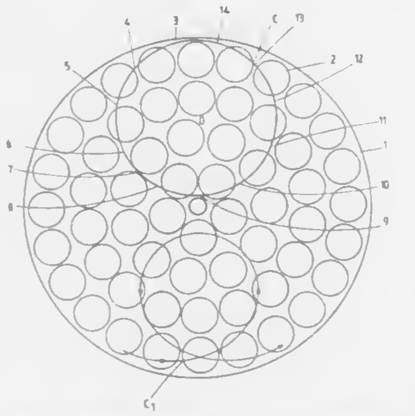
Georges H. G. Broido, Collonges Sous Saleves, France, assignor to Lam-Plan S.A., France

Filed Nov. 13, 1989, Ser. No. 434,846

Claims priority, application France, Nov. 22, 1988, 88 13919

Int. Cl.⁵ B24B *1/00*

U.S. Cl. 51—209 DL **15 Claims**



1. A circular polishing plate for use in conjunction with an abrasive suspension and having a center a radius and a plane surface on which appear flush soft and hard parts, wherein more than half of arcs cut in the soft parts by any one of a plurality of imaginary circles, whose radii are equal to 9/20ths of the radius of the plate and whose centers are at a distance from that of the plate equal to half the radius of the plate, have a length between 0.5 and 8 mm and wherein the hard parts are not abrasive.

5,022,192

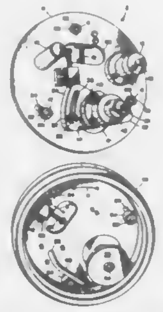
CONDUIT GRINDING APPARATUS

Henry D. Nachbar, Ballston Lake, and Alfred S. Korytkowski, Scotia, both of N.Y., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 3, 1990, Ser. No. 504,152

Int. Cl.⁵ B24B *15/00*

U.S. Cl. 51—241 A **14 Claims**



1. A grinding apparatus for grinding the interior of a conduit, the apparatus comprising:

faceplate means for positioning on a conduit aperture;

cam means on said faceplate means for rotatably mounting said faceplate means with said conduit aperture, said cam means being mounted on said faceplate means for contacting an interior portion of said conduit;

locking means for selectively locking said faceplate means in a predetermined position at said conduit aperture; and

grinding means movably mounted on said faceplate means for grinding an interior portion of said conduit; said grinding means being movable in a substantially radial direction relative to said faceplate means whereby said grinding means can be fixed to said faceplate means at a predetermined position and said faceplate means can be rotated about said conduit aperture to rotate said grinding means about its axis to grind the inner circumference of said conduit, and said faceplate means can be locked at a second predetermined position at said conduit aperture and said grinding means can be radially moved relative to said faceplate means to grind an interior portion of a conduit.

5,022,193

METHOD OF AUTOMATICALLY GAUGING ARTICLES OF GRANITE, HARD STONES AND THE LIKE OF DISIRED THICKNESS, WITH DISCONTINUOUS MOTION

Luca Toncelli, Bassano del Grappa, Italy, assignor to Breton S.p.A., Treviso, Italy

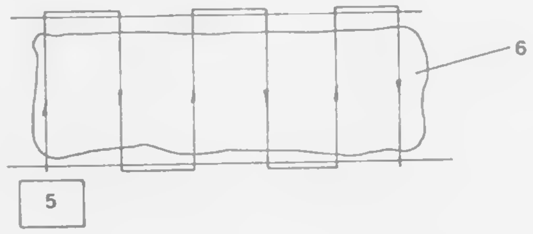
Continuation of Ser. No. 239,782, Sep. 2, 1988, abandoned. This application Mar. 6, 1990, Ser. No. 489,268

Claims priority, application Italy, Sep. 15, 1987, 85599 A/87

The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.

Int. Cl.⁵ B24B *7/06*

U.S. Cl. 51—283 R **1 Claim**



1. In a method of gauging a slab of granite or hard stone by advancing said slab on a conveyor belt and subjecting said slab to a chuck carrying a diamond covered tool, said chuck being capable of inverting the direction of its motion, said tool carrying out a transversal and alternating motion with respect to the direction of advance of the slab, the improvement which consists of the steps of:

1) said chuck moving only in a direction perpendicular to the direction of advance of the slab;

2) advancing said slab on said conveyor belt in a discontinuous manner and while the slab is still, gauging a first band of said slab along the entire width thereof by causing the chuck and the tool carried thereon to perform a motion which is transversal to the direction of advance of the slab, wherein said tool has a width equal to the width of the slab and has an axis of rotation which is parallel or perpendicular to the direction of advance of said slab;

3) then halting said gauging and advancing the belt of a distance equal to the width of said slab and inverting the motion of the chuck, 4) gauging a second band of the slab parallel to said first band while the slab is still, whereby said chuck operates on a second band of said slab, said second band being parallel to said first band, and repeating said steps (1), (2) and (3) and (4) whereby said tool performs a fret-shaped path.

5,022,194

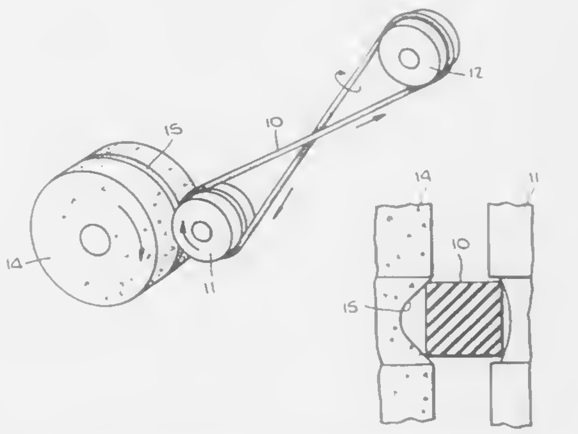
METHOD AND APPARATUS FOR FINISHING ELASTIC O-RING GASKETS

Frederick A. Schumacher, Wyckoff, N.J., assignor to Glebar Company, Inc., Franklin Lakes, N.J.

Filed Feb. 14, 1990, Ser. No. 480,082

Int. Cl.⁵ B24B *5/18*

U.S. Cl. 51—290 **32 Claims**



15. Apparatus for finishing an endless length of feed stock to uniform circular cross-section, comprising:

grinding means formed with a grinding surface for grinding the endless length of feed stock;

a regulator and a remote regulator for supporting the endless length of feed stock, said regulator having a dished surface set back a distance from the surface of said regulator.

means for urging the regulator and the remote regulator toward said grinding means to bring a portion of said feed stock against said grinding surface; and

means for rotating said regulators to advance the feed stock lengthwise at predetermined speed;

whereby the feed stock is rotated about its longitudinal axis while it is being so advanced.

5,022,195

METHOD AND APPARATUS FOR MACHINING CENTERING CHAMFERS

Camille M. Cattelain, Franconville, and Francis Girard, Viroflay, both of France, assignors to Societe Anonyme Dite Hispano-Suiza, Saint-Cloud, France

Filed May 17, 1989, Ser. No. 352,986

Claims priority, application France, May 17, 1988, 88 06590

Int. Cl.⁵ B24B *5/08*

U.S. Cl. 51—290 **6 Claims**

1. A method of machining interior centering chamfers on interior ends of a hollow shaft such that the chamfers are concentric about a reference axis comprising the steps of:

(a) attaching a generally annular rolling path element to the hollow shaft adjacent each end;

(b) rotating the assembly of step a) about a generally longitudinally extending first axis;

(c) adjusting the lateral positions of the rolling path elements such that their respective centers are coincident with the first axis;

(d) further adjusting the lateral positions of the rolling path elements to compensate for any eccentricities of the hollow shaft;

(e) fastening the rolling path elements in their further adjusted positions such that their centers lie on a reference axis; and,

(f) placing the assembly of step d) in a machining device so

VOL
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1991
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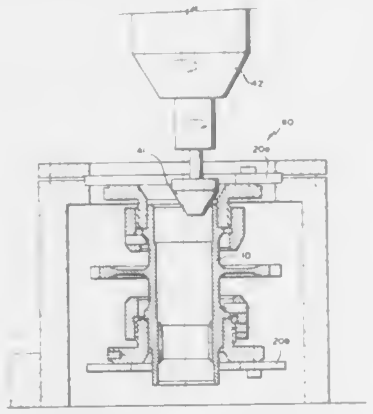
that its position is located by a rolling path element such that a chamfer formed on the end of the hollow shaft by



the machining device is concentric about the reference axis.

5,022,196

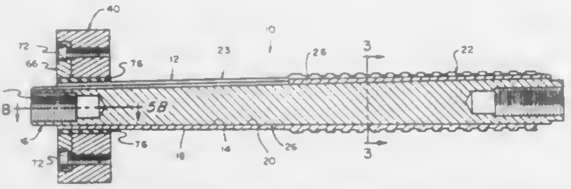
EXPANDABLE HONING TOOL

John J. Schimweg, St. Charles; Robert M. Sunnen, Frontenac, and Rickey K. Wilken, St. Clair, all of Mo., assignors to Sunnen Products Company, St. Louis, Mo.

Filed Sep. 30, 1987, Ser. No. 102,658

Int. Cl.^{5} B24B *9/02*

U.S. Cl. 51—338 23 Claims



1. A honing mandrel adjustable during a honing operation and rotatable about an axis of rotation comprising an elongated substantially tubular member having inner and outer surfaces, said inner surface being conically tapered over substantially the length thereof, said outer surface including a portion having abrasive particles attached thereto, means adjacent one end of said tubular member for attaching to a rotatable member for rotation therewith, means through one side of said tubular member extending the full length thereof to permit expansion or contraction of the diameter of said tubular member substantially uniformly along the length thereof during a honing operation, an elongated expander member positioned extending through said tubular member and having an outer surface conically tapered over substantially the length thereof, the outer surface of said expander member being tapered at the same taper rate as the conical taper of the inner surface of said tubular member such that the inner surface of said tubular member is in surface-to-surface contact with the outer surface of said expander member, means to prevent relative rotational movement between said tubular member and said expander member, and other means on the mandrel for attaching to means to produce relative axial movement between said tubular member and said expander member during rotation thereof to change the diameter of said tubular member during a honing operation.

5,022,197

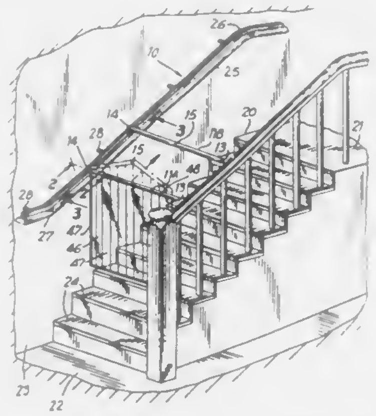
STAIRWAY SAFETY BARS

Joel Aragona, 328 W. 89th St., New York, N.Y. 10024

Filed Dec. 26, 1989, Ser. No. 457,096

Int. Cl.^{5} B66B *9/00*

U.S. Cl. 52—29 11 Claims



1. A stairway safety device comprising: a track, and means to mount the track so that the track is parallel to the plane of the stairway, said track being formed with a slot;

a pair of bars, said bars being in spaced parallel disposition and being parallel to the stairs and disposed in the plane of the stairway, said space between the bars permitting a user to be disposed therebetween;

said track comprising means for mounting the bars for sliding movement within the track and means for restricting the movement of one of the bars when the bar is moved downwardly;

whereby the user in ascending or descending the stairs, steps between the bars and grips the bar forward in the direction of ascent or descent, the moves the bar in the respective direction of ascent or descent along the plane of the stairway and the bars slide within the track, and where the user in losing his balance causes a bar to move downwardly to engage the means for restricting movement, so that the bar is restricted from further movement to prevent the user from falling down the stairs.

5,022,198

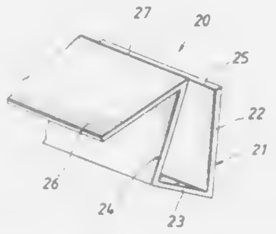
STAIR EDGE IDENTIFIER

J. Donald Lower, 12126 Overcup Dr., Houston, Tex. 77024

Filed Sep. 10, 1990, Ser. No. 580,160

Int. Cl.^{5} E04B *1/00*

U.S. Cl. 52—105 7 Claims



1. An identifier strip member adapted to the positioned on the front of a stair step having a vertically arranged, rectangular metal bar at the front side thereof, comprising; a channel member made of a resilient plastic material, said member having front portion with a general "U" shape that includes front, rear and bottom walls, and a rear portion that is substantially planar and joined to the upper edge of said rear wall, said rear wall inclining upward toward said front wall so that the respective upper edges of said front and rear walls must be spread apart to position said member on the front bar of said step, the spreading apart of said edges causing said front and rear walls to firmly grip said bar to retain said member thereon, said front wall being plainly visible from the front of said stair step and said rear portion being plainly visible from above said stair step to thereby provide a user of the stairs with a clear identification of the front edge of each stair step.

5,022,199

CONSTRUCTION APPARATUS AND CONSTRUCTION METHOD

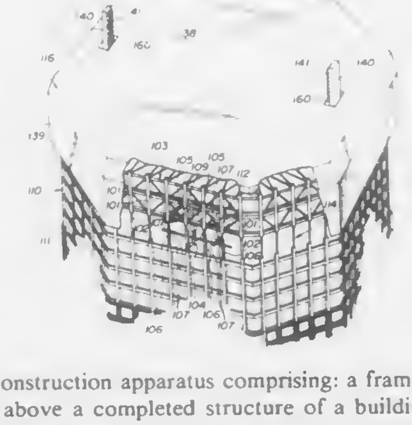
Shuji Horii, Shinagawa, and Hiroshi Teraoku, Niiza, both of Japan, assignors to Ohbayashi Corporation, Osaka, Japan

Filed Sep. 5, 1989, Ser. No. 402,811

Claims priority, application Japan, Sep. 5, 1988, 63-222048; Sep. 5, 1988, 63-222049; Jul. 27, 1989, 1-192680

Int. Cl.^{5} E04H *12/34*

U.S. Cl. 52—123.1 28 Claims



1. A construction apparatus comprising: a framework constructed above a completed structure of a building so as to form a working space over the completed structure; and extension columns provided on the framework, capable of extending downward to support the framework above the completed structure so that the working space may be formed between the framework and the completed structure and capable of being contracted to provide space for installing permanent columns on the completed structure.

5,022,200

INTERLOCKING SECTIONS FOR PORTABLE FLOORS AND THE LIKE

Kermit H. Wilson, Edina, and Warren Skistad, Madison Lake, both of Minn., assignors to Sico Incorporated, Minneapolis, Minn.

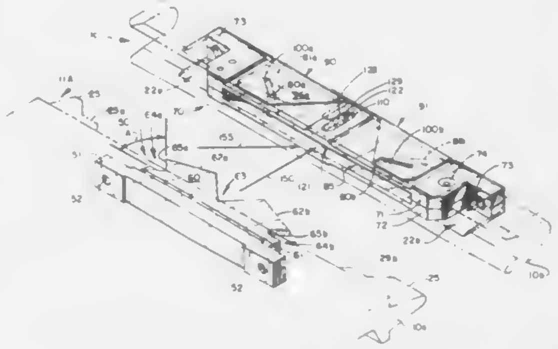
Division of Ser. No. 216,818, Jul. 8, 1988, abandoned. This application Nov. 29, 1989, Ser. No. 442,837

Int. Cl.^{5} E04B *2/82*

U.S. Cl. 52—127.9 12 Claims

1. A floor section adapted for edge-to-edge connection with other similar floor sections to form a temporary extended floor surface, comprising:

a generally planar rectangular core member plastic molded material encapsulating said core and forming edges around the rectangular floor section, each of said edges having recesses formed therein for receiving locking members, two of said edges having tongue portions formed therein and extending therealong, and the other two edges having complementary groove portions formed therein, and male-type locking members attached in two of said recesses, and complementary female locking members secured in the other two of said recesses, wherein said male and female lock members are configured to engage and automatically lock when said edges of said sections are fitted together, whereby a plurality of said floor sections can be secured in edge-to-edge relationship with said tongues and grooves and said male and female lock members in engagement with one another, respectively.



5,022,201

APPARATUS FOR ACCELERATING RESPONSE TIME OF ACTIVE MASS DAMPER EARTHQUAKE ATTENUATOR

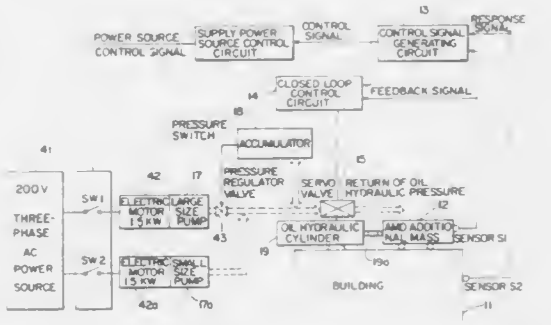
Takuji Kobori; Mitsuo Sakamoto; Toshikazu Yamada; Isao Nishimura, all of Tokyo; Koji Ishii, and Jun Tagami, both of Chofu, all of Japan, assignors to Kajima Corporation, Tokyo, Japan

Filed Apr. 25, 1989, Ser. No. 343,085

Claims priority, application Japan, Apr. 26, 1988, 63-102940; Apr. 26, 1988, 63-102941; Apr. 26, 1988, 63-102942; Apr. 26, 1988, 63-102943

Int. Cl.^{5} E04H *9/02*

U.S. Cl. 52—167 DF 25 Claims



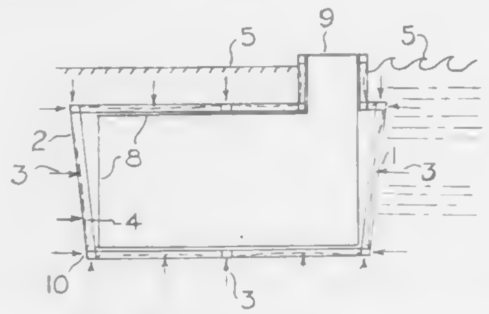
1. Apparatus for suppressing vibrations of a building, comprising: a source of electric energy; a first high capacity electric motor connected to said source of electric energy; a first high capacity hydraulic pump drivingly connected to said first electric motor; a pressure regulator valve connected to said first hydraulic pump; a second low capacity electric motor connected to said source of electric energy with said first electric motor; a second low capacity hydraulic pump drivingly connected to said second electric motor; an hydraulic cylinder and piston; an hydraulic servo valve connected to said hydraulic cylinder, said first and second hydraulic pumps being connected in parallel to said hydraulic serve valve; an hydraulic fluid accumulator connected to said hydraulic servo valve; means for pressurizing and recirculating hydraulic fluid in said hydraulic fluid accumulator by said second hydraulic pump; a source of hydraulic fluid connected to said first hydraulic pump; a shiftable mass; said hydraulic cylinder being connected to said shiftable mass; said piston being connected to said building; means to sense vibration of said building and to generate a signal responsive thereto; means to sense vibration of said shiftable mass and to generate a signal responsive

VOL
1127
ISS
2
JE
11
1991
UMI

thereto; means to compare said signals and to generate signals responsive thereto to actuate said hydraulic servo valve, to actuate said accumulator, to actuate said hydraulic cylinder and piston to shift said mass, to actuate said first electric motor and said first hydraulic pump, and to actuate said pressure regulator valve to connect said first hydraulic pump to said hydraulic servo valve.

5,022,202
HIGH STRENGTH POST FRAMED ENCLOSURE

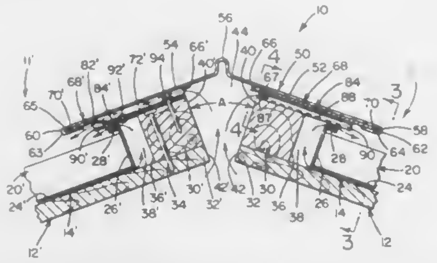
Alfred E. Johnson, Jr., 9812 Satterfield Dr., Little Rock, Ark. 72205
Continuation of Ser. No. 214,596, Jun. 24, 1988. This application Jul. 2, 1990, Ser. No. 520,844
Int. Cl.⁵ E02D *27/00*
U.S. Cl. 52—169.6 3 Claims



1. An enclosure capable of withstanding high exterior pressures comprising a lightweight water-tight outer shell, a rigid structural steel frame cage placed inside said outer shell and interior walls located inside said steel frame, the outer shell is not directly affixed or bonded to the steel frame whereby exterior pressures cause deflection of the outer shell to press against the steel frame allowing the outer shell and steel frame to function as a composite unit that is of sufficient strength to prevent deformation of the interior walls.

5,022,203
VENT RIDGE ASSEMBLY

Thomas J. Boyd, Wellsburg, W. Va., assignor to The Louis Berkman Company, Steubenville, Ohio
Filed Jul. 27, 1990, Ser. No. 559,160
Int. Cl.⁵ F24F *7/00*
U.S. Cl. 52—199 21 Claims

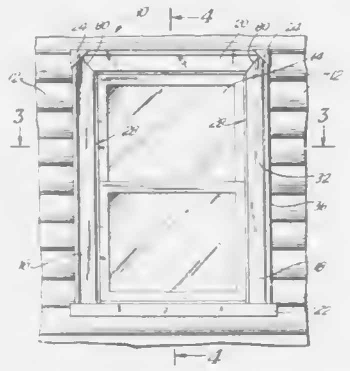


1. A vent ridge assembly for a metal roof, comprising: first and second adjacent roof sections each having a longitudinally extending edge spaced from the other, each of said roof sections comprising:
- a roof substrate;
- a batten overlying and extending along said longitudinally extending edge of said substrate;
- one or more roofing panels overlying said roof substrate and spaced from said batten;
- a plate overlying said batten, said plate having one longitudinal edge extending along the length of said batten and a second opposing longitudinal edge overlying said one or more roofing panels;
- sheet metal means between said plate and said batten, extending longitudinally along the length of said batten, for venting air and water vapor from beneath said metal roof; and

a ridge cap overlying and connected to the plates of said first and second roof sections.

5,022,204
WINDOW AND DOOR TRIM FOR USE WITH SIDING

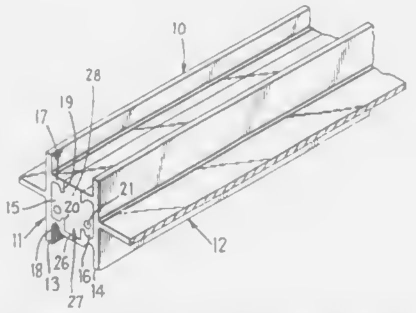
Carl E. Anderson, c/o Alum-A-Pole Corporation, 2589 Richmond Ter., Staten Island, N.Y. 10303
Filed Apr. 5, 1989, Ser. No. 333,461
Int. Cl.⁵ E06B *1/04*
U.S. Cl. 52—211 23 Claims



1. A window and door trim for use with siding, comprising:
- elongated composite panels connectable to a window or door casing at two sides and a top thereof,
- each panel including a facing strip, and a receiving strip, the receiving strip having a pair of walls forming a substantially L-shaped configuration and a folded hem formed at a junction between said walls,
- said hem forming at least one receiving slot, one of said walls being attachable to a front face of said casing, and another of said walls extending along an inside face of said casing when the trim is attached to the casing,
- said facing strip being substantially L-shaped and having a shorter leg insertable into said receiving slot to secure said facing strip with respect to said casing and a longer leg for overlying said one wall and the front face of said casing so that when the siding is installed, an inner end of said siding is enclosed between said receiving strip and said facing strip.

5,022,205
THERMAL BARRIER EXTRUSIONS

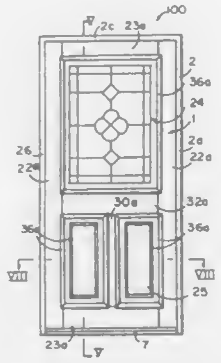
Jeffrey R. Ford, Oshtemo Township, Kalamazoo County, Mich., assignor to Azon Systems, Inc., Kalamazoo, Mich.
Filed Jan. 22, 1990, Ser. No. 467,956
Int. Cl.⁵ E04C *1/40*
U.S. Cl. 52—309.16 17 Claims



1. An architectural component, comprising: elongate, spaced, parallel, first and second frame members each made of a material with a high thermal conductivity; a thermal barrier member extending between said frame members and made of a material with a low thermal conductivity; interconnecting means which includes cooperating structure on said first frame member and said barrier member for substantially rigidly interconnecting said first frame member and said barrier member, and which includes cooperating structure on said second frame member and said barrier member for substantially rigidly interconnecting said second frame member and said barrier member, said interconnecting means restraining movement of each said frame member relative to said barrier member; and an elongate backbone member substantially embedded in said barrier member and having at spaced locations therealong a plurality of first portions which are each in direct contact with said first frame member at spaced locations along said first frame member, said backbone member having between each adjacent pair of said first portions a second portion which is free of engagement with said first frame member.

5,022,206
ENTRY DOOR SYSTEM

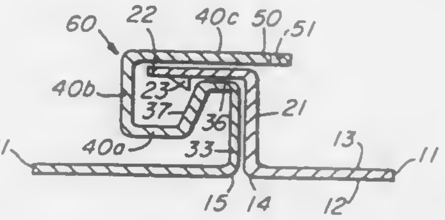
Edward L. Schield, Medford; Myron D. Reeves, Ladysmith; Marjorie A. Nehiba, and Lyn W. Hartl, both of Medford, all of Wis., assignors to Weather Shield Mfg., Inc., Medford, Wis.
Filed Jan. 19, 1990, Ser. No. 468,859
Int. Cl.⁵ E06B *3/70*
U.S. Cl. 52—455 22 Claims



1. A door entry system comprising a plurality of decorative panels, at least one of said panels being a door and at least one of the other panels being a decorative side panel located along the side of said door; a frame about all of said panels; each of said panels comprising:
- spaced metallic skin members; stile members secured to the side peripheral edges of said skin members; rail members secured to the top and bottom edges of said skin members; an opening cut in said skin members at an upper portion thereof and spaced from said stile member and said top rail member; a glass unit mounted in said opening; rigid insulation material located in the space between said skin members and said stile and rail members; at least one raised panel assembly secured to the exterior surface of at least one of said skin members below and spaced from said stile member, bottom rail member and said glass unit; said raised panel assembly including a wood base panel element secured to said one skin member and a raised panel element secured to the face of said wood base panel opposite said one skin member; wooden stile facing pieces extending vertically along the vertical edges of said panel and secured to said exterior surface between the vertical edges of said panel and the glass unit and the raised panel assembly; wooden rail facing pieces extending horizontally along the top and bottom edges of said panel from one to the other of said stile facing pieces and secured to said exterior surface between said glass unit and top edge of said panel and between said raised panel assemblies and bottom edge of said panel; a wooden center rail extending horizontally between said stile facing pieces and filling the space between said glass unit and raised panel assembly; molding beads secured to said raised panel elements and base panel element around the periphery of said raised panel elements; and molding beads secured to said base panel element, said stile facing pieces, said bottom rail pieces, and said center rail around the periphery of said base panel elements.

5,022,207
BUILDING PANEL HAVING LOCKING FLANGE AND LOCKING RECEPTACLE

G. Robert Hartnett, Peoria, Ill., assignor to Aluminum Company of America, Pittsburgh, Pa.
Filed Jan. 2, 1990, Ser. No. 459,944
Int. Cl.⁵ E04C *2/20, 2/30*
U.S. Cl. 52—537 16 Claims



1. A building panel made from a synthetic polymer and configured for interlocking engagement with adjacent panels, said building panel comprising:
- (a) a principal portion having a front surface and first and second lateral end portions;
- (b) a locking flange extending from said first lateral end portion and comprising:
  - (1) a leg extending rearwardly of said principal portion;
  - (2) a locking tab extending laterally outward of said leg rearward of said principal portion; and,
  - (3) a locking lug extending frontward from said locking tab; and
- (c) a locking receptacle extending from said second lateral end portion and, comprising:
  - (1) an arm extending rearward of said principal portion, said arm comprising a connecting piece extending from said second lateral end portion and an elbow extending from said connecting piece, said elbow comprising a first portion extending laterally inward and a second portion extending frontward of said first portion;
  - (2) a flap comprising a leg extending laterally inward from said second portion, a connector extending rearwardly from said leg, and a wing extending from said connector laterally outward, said wing being in a parallel relationship with said leg, said flap and said second portion defining a locking notch for receiving a locking lug from an adjacent panel, said flap and said first portion defining a passageway narrower than said locking tab and locking lug for retention of the locking tab in said locking notch; and
  - (3) a fastening strip extending rearwardly of said wing and laterally outward from said flap, said fastening strip defining a fastening slot.

VOL
1127
ISS
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1991
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5,022,208

BUTT JOINTS FOR PANELS AND/OR SECTIONS

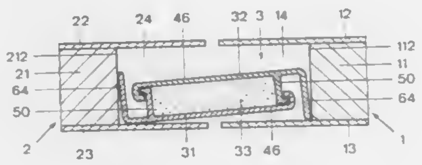
Rainer Ehrat, Schaffhausen; Urs Deubelbeiss, Windisch, and Willy Kölliker, Hägendorf, all of Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Sep. 13, 1989, Ser. No. 406,782

Claims priority, application Switzerland, Sep. 19, 1988, 3488/88; Mar. 23, 1989, 1090/88

Int. Cl.^{5} E04C *3/30*

U.S. Cl. 52—586 **14 Claims**



1. Butt joint for panels which comprises: two panels having abutting ends and panel surfaces; grooves in said panels having a space therein running along the abutting ends and having groove walls; a connecting element in said space comprising tensed, interlocking expansion sections having a flat outside surface and wherein the tensed interlocking expansion sections can be introduced into said grooves with room for play, wherein said expansion sections can be displaced towards the panel surfaces and adhesively bonded to the corresponding groove walls, said connecting element including at least one releasable, tensed spring element between said expansion sections and operative to displace the interlocking expansion sections towards said panel surfaces to provide a butt joint having a uniform external appearance.

5,022,209

METHOD FOR CONSTRUCTION OF BUILDING AND JOINT APPARATUS FOR CONSTRUCTION MEMBERS

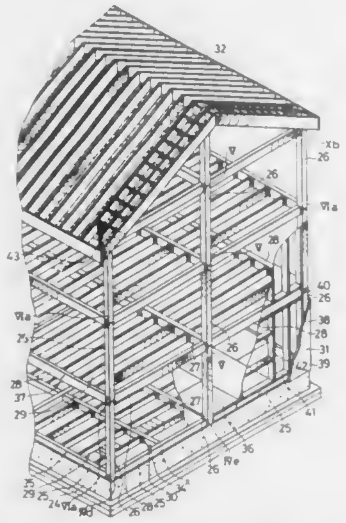
Kazuyoshi Kimura, Sagae, Japan, assignor to Shelter Home Co. Ltd., Yamagata, Japan

Filed Dec. 29, 1987, Ser. No. 139,796

Claims priority, application Japan, Mar. 20, 1987, 62-064382; Mar. 20, 1987, 62-064391

Int. Cl.^{5} E04B *1/26*

U.S. Cl. 52—646 **38 Claims**



1. A process for constructing a building on a foundation, comprising connecting construction members including at least one longitudinal construction member and at least one lateral construction member, said longitudinal and lateral construction members being made of timber, with a joint apparatus, comprising

- providing a basic joint member including at least first and second application joint members;
- said basic joint member comprising
  - first and second plate portions, each of said first and second plate portions having an outer face and an inner face, with the inner face of said first and second plate portions facing each other and spaced apart a predetermined distance,
  - an intermediate plate portion extending between and having both of its ends fixed to a substantially central portion of the inner faces to connect said first and second side plate portions,
  - means forming first apertures located in said intermediate plate portion for insertion of clamping means which comprise a bolt-nut assembly,
  - a lateral end plate portion having portions secured to said first and second side plate portions and said intermediate plate portion, and
  - said basic joint member having an H-shaped lateral cross-section defining a space in which an end portion of said at least one first longitudinal construction member is inserted;
- said first application joint member comprises a first coupling plate portion having means forming second apertures for insertion of clamping means which comprise a bolt-nut assembly,
  - said first coupling plate portion having one end fixed to a substantially central portion of the outer face of one of said first or second side plate portions and extending substantially parallel to said intermediate plate portion and capable of coupling said at least one lateral construction member;
  - said second application joint member comprising a third side plate portion including means forming third apertures for insertion of clamping means which comprise a bolt-nut assembly, a second coupling plate portion having an end portion secured to a substantially central portion of said third side plate and having means forming fourth apertures for insertion of clamping means which comprise a bolt-nut assembly for coupling a second lateral construction member,
  - said third side plate portion is mounted to abut said at least one first longitudinal construction member fitted in said basic joint member, and to extend substantially parallel to said intermediate plate portion located in an end portion of said first longitudinal construction member, with said second coupling plate extending substantially parallel to said first and second side plate portions, and extending orthogonally to the first lateral construction member; and
  - attaching and clamping said at least one lateral construction member to said first coupling plate, attaching and clamping said at least one longitudinal construction member to said intermediate plate portion, and attaching and clamping said third side plate portion to said at least one first longitudinal construction member.

5,022,210

CONSTRUCTION SYSTEMS AND ELEMENTS THEREOF

Christopher R. Scott, 6518 Avenida Wilfredo, La Jolla, Calif. 92037

Continuation-in-part of Ser. No. 333,705, Apr. 3, 1989, which is a division of Ser. No. 16,364, Feb. 19, 1987, Pat. No. 4,817,356, which is a division of Ser. No. 578,285, Feb. 8, 1984, abandoned.

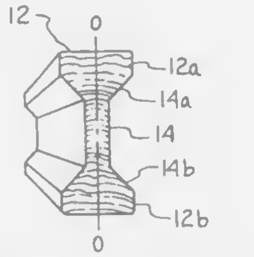
This application Dec. 29, 1989, Ser. No. 458,779

The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

Int. Cl.^{5} E04C *3/30*

U.S. Cl. 52—729 **2 Claims**

1. A construction element having a predetermined length and having a cross-sectional profile comprising a first flange portion and a second flange portion, said first and second flange portions being of essentially identical predetermined thickness and essentially identical predetermined width, said first and second flange portions being parallel to one another relative to their thickness dimension and interconnected by a central integral web portion comprising a uniform thickness section having a predetermined thickness about one third of that of one of said flange portions, a first transition section having a width about equal to that of said first flange portion and connecting said first flange portion and said uniform thickness section and having a thickness tapering from that of said first flange portion to that of said uniform thickness section, and a second transition section having a width about equal to that of said second flange portion and connecting said second flange portion and said uniform thickness section and having a thickness tapering from that of said second flange portion to that of said uniform thickness section, said uniform thickness section having a predetermined width about equal to three times the width of one of said flange portions, said central web portions defining a groove having a width approximately equal to the combined widths of said first and second flange portions to allow interlocking of a plurality of said elements like a jigsaw puzzle.



5,022,211

CONSTRUCTION SYSTEMS AND ELEMENTS THEREOF

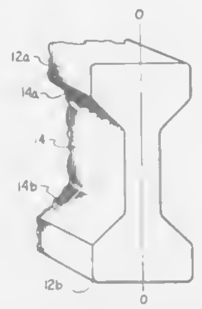
Christopher R. Scott, 1039 Silverade, La Tolla, Calif. 92037

Division of Ser. No. 16,364, Feb. 19, 1987, Pat. No. 4,817,356.

This application Apr. 3, 1989, Ser. No. 333,705

Int. Cl.^{5} E04C *3/30*

U.S. Cl. 52—729 **14 Claims**



7. A construction element having a predetermined length and having a cross-sectional profile comprising a first flange portion and a second flange portion, said first and second flange portions being of essentially identical predetermined thickness and essentially identical predetermined width, said first and second flange portions being parallel to one another relative to their thickness dimension and interconnected by a central integral web portion of predetermined width and of a thickness about one third of that of said flange portions, said width of said web portion being about equal to the sum of the widths of said flange portions.

5,022,212

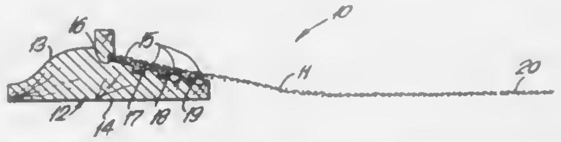
MOLDING STRUCTURE

Thomas Lippolt, 3574 Centerview Ave., Wantagh, N.Y. 11793

Filed Aug. 28, 1989, Ser. No. 399,695

Int. Cl.^{5} E04C *2/38*

U.S. Cl. 52—815 **2 Claims**



1. A molding structure for utilization in conjunction with the finishing of two adjacent surfaces comprising;

- (a) a molding member defining through its entire length parallel indent cuts formed along a common surface thereof as well as a keyway cut additionally being parallel to said indent cuts;
- (b) a mesh member structurally affixed to that portion of said molding member that has formed within its surface said indent cuts, said mesh member having one of its exposed edges positioned partially within said keyway cut;
- (c) bonding means capable of structurally bonding said mesh member to said molding member by contacting said mesh member, said indent cuts and said keyway cut.

5,022,213

MACHINE FOR WRAPPING SUBSTANTIALLY PARALLELEPIPED COMMODITIES

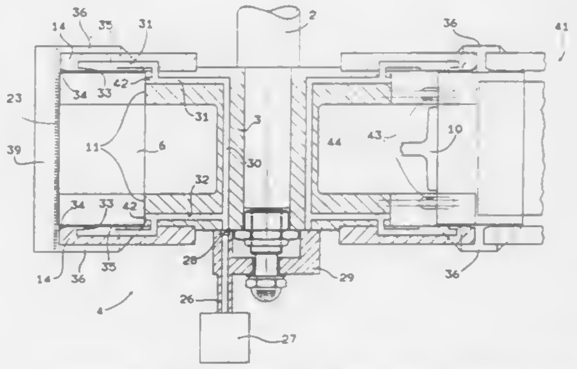
Fiorenzo Draghetti, Medicina, and Antonio Gamberini, Bologna, both of Italy, assignors to G.D. Societa Per Azioni, Bologna, Italy

Filed Mar. 6, 1990, Ser. No. 489,050

Claims priority, application Italy, Mar. 7, 1989, 3369 A/89

Int. Cl.^{5} B65B *11/32*

U.S. Cl. 53—234 **4 Claims**



1. A machine for wrapping a succession of substantially parallelepiped commodities, comprising:

- a rotatable head, affording a plurality of radial pockets each of which, in use, accommodates a single commodity partially wrapped in a sheet of wrapping material located between the respective commodity and the respective pocket leaving portions of said commodity unwrapped;
- respective suction clamping means associated with each said pocket having suction gripping vents for clamping only said unwrapped portions of said commodity in position with the respective pocket during transfer of the respective pocket from a point of entry into said head, to a point of exit from said head, in such a way as to disallow movement of the respective commodity internally of the respective pocket and prevent any relative movement of the respective commodity and the respective sheet of wrapping material.

VOL
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1991
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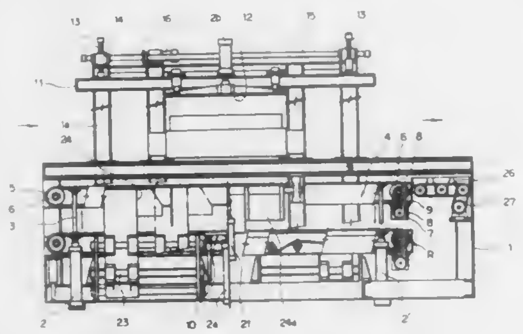
5,022,214
PACKAGING MACHINE WITH BOX-FLAP FOLDING DEVICE

Man U. Kim, Suwon, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Continuation of Ser. No. 262,591, Oct. 26, 1988, abandoned.
This application Oct. 22, 1990, Ser. No. 601,044
Int. Cl.^{5} B65B *5/00, 7/20;* **B31B** *3/52*
U.S. Cl. 53—242 **4 Claims**



1. A box flap folding device, comprising:

means for vertically lifting a product to be entered into a box straight up into the box to a pre-determined height;

control means to limit the vertical travel of the box during the lifting up of a product into the box;

holding means to provide opposing later forces to opposite sides of the box for supporting the box and the product therein after the product has been lifted into the box to the predetermined height;

side flap folding means for folding lower side flaps of said box;

front and rear flap folding means for folding lower front and rear flaps of said box; and

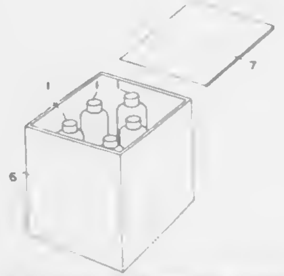
means for supporting the side flaps folded by said side flap folding means;

wherein said supporting means is so contructed as to prevent the folded side flaps from becoming unfolded during the operation of said front and rear flap folding means.

5,022,215
METHOD AND APPARATUS FOR STORING AND TRANSPORTING A SOLUTION OF PERACETIC ACID

Lauri Santasalo, Helsinki, Finland, assignor to Sterilinja Oy, Finland

Filed May 4, 1990, Ser. No. 518,783
Claims priority, application Finland, May 5, 1989, 892166
Int. Cl.^{5} B65B *7/28, 61/02, 5/06;* **B67B** *3/00*
U.S. Cl. 53—420 **3 Claims**



1. A method of storing, in a manner suitable for transport, solutions of peracetic acid or solutions with similar properties, said method comprising the steps of:

filling one or more open containers with said peracetic acid;

closing the respective openings of said containers with respective plugs;

boring a microscopic hole in said respective plugs such that gas formed by decomposition of said peracetic acid can escape from said container;

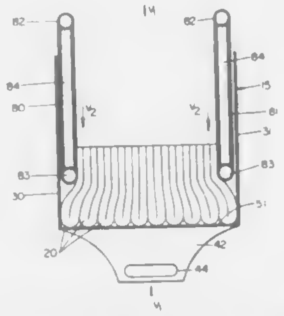
placing said one or more containers having been filled with peracetic acid and closed with said respective plugs having said microscopic holes bored therein into an open vessel; and

closing said vessel with a cover which opens when a predetermined gaseous pressure within said vessel has been reached.

5,022,216
METHOD AND APPARATUS FOR MAKING EASY OPEN FLEXIBLE BAG FILLED WITH COMPRESSED FLEXIBLE ARTICLES

Delmar R. Muckenfuhs, Middletown, and James C. Baird, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 333,204, Apr. 4, 1989, Pat. No. 4,934,535.
This application Dec. 6, 1989, Ser. No. 446,964
Int. Cl.^{5} B65B *5/06, 39/12, 63/02*
U.S. Cl. 53—438 **8 Claims**



1. A method for making an easy open substantially rectangular bag of compressed flexible articles, said flexible articles being arranged in a stack and held in compression in a direction substantially parallel to their thickness, said method comprising the steps of:

(a) partially erecting a flexible bag to form a substantially rectangular cross-section comprising a front and a back panel connected to one another by means of a pair of opposed end panels, said partially erected flexible bag having a top panel secured about its periphery to said front, back and end panels, said flexible bag having an easy open device comprising a substantially continuous line of weakness located partially within one of said end panels and partially within the adjacent top panel, said substantially continuous line of weakness defining a predetermined portion of said end panel to be separated from the remainder of said end panel and an unobstructed removable tear initiating point in said top panel, said partially erected flexible bag further having an open bottom end;

(b) forming a stack of flexible articles oriented so that the substantially planar surface of said articles is aligned substantially parallel to the end panels of said bag and the outermost peripheral edges of the articles contained in said stack are aligned substantially parallel to the front, back and top panels of said bag;

(c) compressing said stack of flexible articles between a pair of opposed knife belt assemblies in a direction substantially parallel to the thickness of said articles contained in said stack until said knife belt assemblies and said stack of compressed articles can be inserted through the open bottom end of said partially erected bag without causing interference between the outermost surfaces of said knife belt assemblies and the innermost surfaces of the adjacent end panels of said partially erected bag;

(d) inserting said knife belt assemblies into the open bottom end of said partially erected flexible bag;

(e) simultaneously driving the opposed knife belts associated with said knife belt assemblies in a direction which advances said stack of compressed articles into contact with the innermost surface of said top panel of said partially erected flexible bag;

(f) completely retracting said knife belt assemblies from the open end of said partially erected flexible bag at a first velocity V_1, while simultaneously driving the knife belts associated with said knife belt assemblies at a second velocity V_2 which is equal to or greater than said first velocity V_1 to maintain said stack of compressed articles in intimate contact with the innermost surface of said top panel of said partially erected flexible bag as said stack is released from said knife belts and said knife belt assemblies are retracted from said bag; and

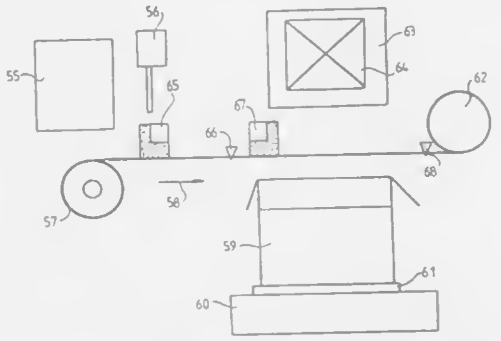
(g) folding said open bottom end of said partially erected, filled flexible bag to form a closed bottom panel adjacent said stack of compressed flexible articles; and

(h) securing said bottom panel in a closed position to complete said bag.

5,022,217
PACKAGING METHOD, PACKAGING BOLSTER, AND PACKAGING LINE

Jean-Claude Vilas Boas, Sannois, and Andre Fromion, L'Hay les Roses, both of France, assignors to Bull, S.A., Paris, France

Filed Nov. 7, 1989, Ser. No. 433,005
Claims priority, application France, Nov. 14, 1988, 88 14767
Int. Cl.^{5} B65B *55/20*
U.S. Cl. 53—472 **17 Claims**



1. A method for packaging at least one product in a container, with bolstering means being interposed between the container and the product, comprising producing the bolstering means at least in part "on demand" at a packaging site in a continuous manner in the form of a support strip of indefinite length, interposing the bolstering means between the container and at least one product brought in proximity with said bolstering means, and inserting the product into the container to effect the interposition of the bolstering means between the internal walls of the container and the packaged product.

5,022,218
DEVICE FOR FILLING OUTERS WITH FILLED BAGS

Bouwe Prakken, Spijkerlaan 9, 3471 EG Kamerik, Netherlands

Filed Mar. 29, 1990, Ser. No. 501,127
Claims priority, application Netherlands, Mar. 29, 1989, 8900771
Int. Cl.^{5} B65B *63/02*
U.S. Cl. 53—529 **6 Claims**

1. Apparatus for filling outers with filled bags comprising:

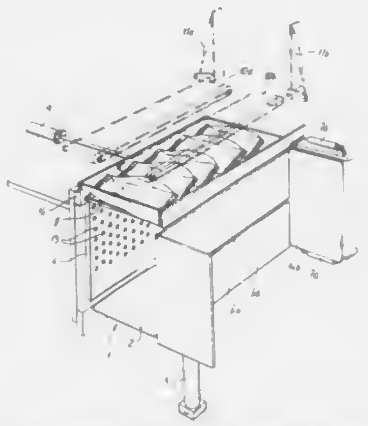
a cassette (1) having a bottom plate (2), a first side wall (4) and a second side wall comprising at least one door (6*a*, 6*b*),

a cover plate (8) at the top side of the cassette for supporting a row of bags,

means (9) for moving said cover plate laterally between a position covering the top side of the cassette and a free position,

a retaining element (16) next to said cover plate for retaining a row of bags above the cassette (1) when the cover plate moves to said free position,

means (3) for moving said bottom plate up and down in order to shift said bottom plate (2) in stages from a position at the top of the cassette to a bottom position and in order to make it possible for the bottom plate to be pressed upward to compress the stack of bags between the said bottom plate and the said cover plate,



means (5) for pushing one (4) of said first and second side walls of the cassette in the direction of the other (6*a*, 6*b*) of said first and second side walls,

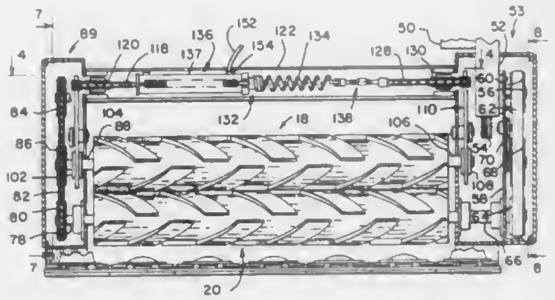
means (7*a*, 7*b*) for moving said doors (6*a*, 6*b*) between a closed position and an open position,

and means (12) for moving tilted outers to a position facing said other side wall (6*a*, 6*b*).

5,022,219
CONDITIONER ROLLER PRESSURE RELEASE SYSTEM FOR MOWER CONDITIONER

Randal Knurr, Kewaskum, and Wilbur Groeneveld, West Bend, both of Wis., assignors to Gehl Company, West Bend, Wis.

Filed May 1, 1990, Ser. No. 517,249
Int. Cl.^{5} A01D *82/00*
U.S. Cl. 56—16.4 **21 Claims**



1. For a device including a pair of rollers forming a nip through which material passes, in which one of said rollers is mounted to a pivotable mounting plate so as to be movable toward and away from the other of said rollers, a system for biasing the movable one of said rollers against the other one of said rollers, comprising:

a spring;

connecting means extending between and interconnecting one end of said spring and said mounting plate;

an adjustment assembly connected to the other end of said spring, said adjustment assembly including means for moving said spring between an extended position and a retracted position for adjusting the biasing force exerted by said spring on the movable one of said rollers; and

remote actuating means for actuating said adjustment assem-

VOL 1127 ISS 2 JE 11 1991 UMI

bly from a location removed from said adjustment assembly.

5,022,220
MULCHER

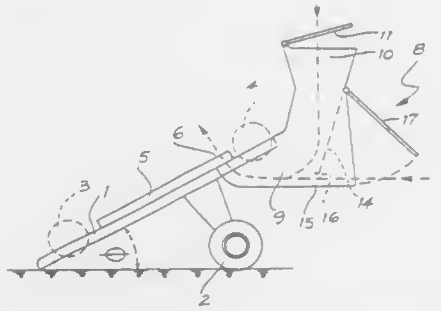
Edward Du Moulin, 16 Frazer Street, Collaroy, New South Wales, 2097, Australia

Continuation-in-part of Ser. No. 453,568, Dec. 20, 1989, Pat. No. 4,969,321, which is a continuation of Ser. No. 47,372, May 6, 1987, Pat. No. 4,912,917. This application Jun. 5, 1990, Ser. No. 533,612

Claims priority, application Australia, May 9, 1986, PH5816; Dec. 10, 1986, PH9424

Int. Cl.^{5} A01D *34/63*

U.S. Cl. 56—16.9 6 Claims



1. A mulching arrangement comprising a base plate an upper surface of which is adapted to mount mulching means; and including a feed hopper attached thereto and being adapted to receive vegetable matter to be converted to mulch; an aperture being provided in said base plate; means being provided to allow said base plate to be held in position above and at an inclined angle relative to, ground surface; said hopper including at least one feed inlet therein and an elongate base and feed passage; said feed hopper base being substantially planar and inclined downwardly at an angle relative to said ground surface; said feed passage extending into a mouth which communicates with said base plate; said feed passage being so formed and mounted relative to said base plate, that on operation of a said mulching means, a vibratory moment is imparted therefrom to said feed hopper; the arrangement being such that vegetable matter is fed into said feed hopper through at least one feed inlet; said vibration imparted to said feed passage and the base of said feed hopper, combined with said downwardly inclined base of said feed hopper, enhancing passage of said vegetable matter therethrough and inhibiting or preventing clogging of vegetable matter as it passes over the base of said feed hopper and through said feed passage; said vegetable matter thereafter being drawn through the mouth of said feed passage by suction generated by operation of said mulching means, to enter a cutting/mulching zone of said mulching means and to be thereafter discharged therefrom.

5,022,221
LAWN RAKE WITH IMPROVED SPRING ANCHORING

David R. Bonnes, Westerville, and Philip J. Male, Columbus, both of Ohio, assignors to The Union Fork and Hoe Company, Columbus, Ohio

Filed Mar. 30, 1990, Ser. No. 501,771

Int. Cl.^{5} A01D *7/00*

U.S. Cl. 56—400.17 16 Claims

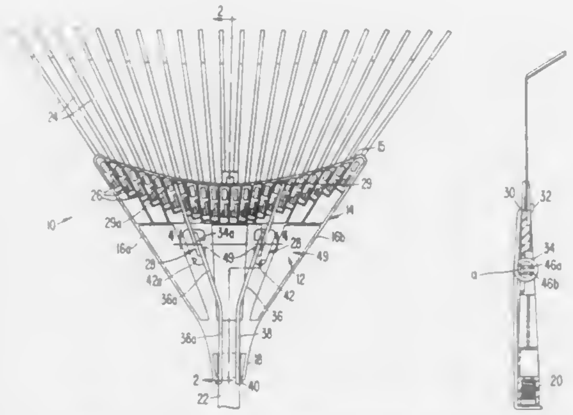
1. A lawn rake comprising:

a rake head assembly including a rake head body assembly, a plurality of deflectable tines held in spaced relationship to each other by said head body assembly and a handle receiving portion formed in said body for a rake handle;

a rake handle coupled to said handle receiving portion of said body;

said head body assembly including anchoring means formed intermediate said head body assembly; and

stiffening means including first and second end portion means coupled respectively to and between said rake head body assembly and said handle, said stiffening means including intermediate spring means anchored to said anchoring means and cooperating therewith for diffusing the forces caused by deflection of said tines whereby at least a portion of the deflection forces are diffused to said anchoring means by said intermediate spring means.



5,022,222
PROCESS AND DEVICE FOR PIECING YARN TO AN OPEN-END SPINNING DEVICE

Karl Rupert; Walter Mayer, and Hubert Lochbronner, all of Ingolstadt, Fed. Rep. of Germany, assignors to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 255,468, Oct. 11, 1988, abandoned. This application May 18, 1990, Ser. No. 526,530

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1987, 3734565

Int. Cl.^{5} D01H *4/50*

U.S. Cl. 57—263 41 Claims

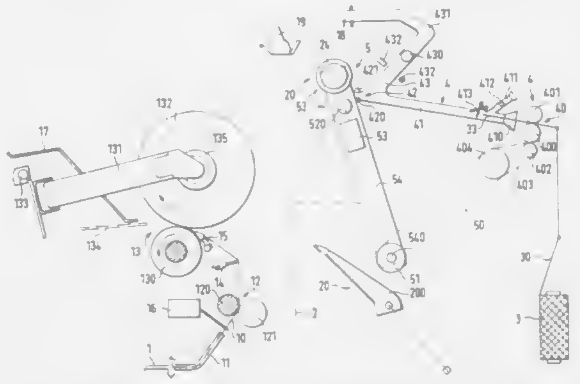
1. A process for piecing yarn on an open-end spinning machine which has machine draw-off rollers, a spinning device, and a yarn winding device and in which yarn from either the winding device bobbin would up during the spinning process or from a special piecing bobbin is fed back into the spinning device over the same back-feeding path, comprising the steps of:

(a) grasping the end of the special piecing yarn from said special piecing bobbin with a pair of auxiliary rollers mounted on the end of a pivotable lever and pivoting said lever to move said end of said piecing yarn to a point near the beginning of the back-feeding path and in proximity with said winding device wherein one of the auxiliary rollers is positioned so that it can drive the winding bobbin;

(b) moving said piecing yarn end with a back-feeding device from said point back to said spinning device along a predetermined path which coincides with the same back-feeding path of yarn drawn off the bobbin on said winding device;

(c) piecing said piecing yarn end in said spinning device;

(d) using the auxiliary rollers to subject said pieced yarn to a controlled draw-off effect at a draw-off speed less than the normal draw-off speed of the machine draw-off rollers during spinning operations;



(e) increasing said draw-off speed of the auxiliary rollers to the normal draw-off speed and subjecting said pieced yarn to normal draw-off effects only after the normal draw-off speed is attained;

(f) trimming said pieced yarn with the piecing joint; and

(g) transferring said trimmed yarn to an empty tube located in the winding device.

5,022,223
METHOD OF AND APPARATUS FOR AUTOMATICALLY EXCHANGING BOBBINS AT A FLYER

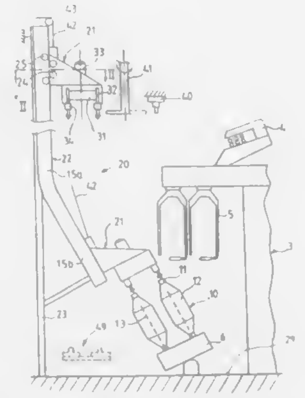
Jose Mena, Bülach, Switzerland, assignor to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed Sep. 14, 1989, Ser. No. 407,410

Claims priority, application Switzerland, Sep. 23, 1988, 03546/88; Jun. 22, 1989, 02322/89

Int. Cl.^{5} D01H *9/04*

U.S. Cl. 57—267 4 Claims



1. A method of automatically replacing full bobbins by empty bobbins at a roving frame, said method comprising the steps of:

moving all of the full bobbins present at the roving frame from a substantially vertical operating position to an inclined position;

moving a plural number of empty bobbins equal to the number of all of said full bobbins from a substantially vertical position into an inclined position;

lifting all of said full bobbins in their inclined position to doff all of said full bobbins;

lowering all of the plural number of empty bobbins in their inclined position and bringing all of said plural number of empty bobbins into a substantially vertical operating position;

said step of lifting all of said full bobbins and said steps of moving and lowering all of said plural number of empty bobbins, entailing the use of a doffing and donning apparatus separate from the roving frame;

said step of lifting all of said full bobbins from their inclined position entailing the step of jointly withdrawing all of said full bobbins which have been moved into their inclined position, out of their inclined position by means of a carrier of said doffing and donning apparatus;

said step of lowering all of said plural numbers of empty bobbins in their inclined position entailing the step of jointly bringing all of said plural number of empty bobbins from their substantially vertical position into their inclined position by means of said carrier of said doffing and donning apparatus;

during said step of jointly bringing all of said plural number of empty bobbins from their substantially vertical position into their inclined position by means of said carrier, lowering all of said plural number of empty bobbins out of a substantially vertical transport-starting position along a substantially vertical path of motion and storing all of said plural number of empty bobbins at an interim storing location;

bringing the empty carrier from said interim storing location into an inclined path of motion to receive all of said full bobbins in their inclined position;

during said step of jointly withdrawing all of said full bobbins which have been moved into their inclined position, out of their inclined position by means of said carrier, storing all of said full bobbins at said interim storing location;

engaging all of said plural number of empty bobbins at said interim storing location by means of said carrier and bringing all of said plural number of empty bobbins from said interim storing location into their inclined position; and

engaging all of said full bobbins at said interim storing location by means of said carrier and lifting all of said full bobbins from said interim storing location into a substantially vertical discharge position.

5,022,224
ACCELERATION CONTROL WITH DUCT PRESSURE LOSS COMPENSATION

Jesse W. Smith, Stuart, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed May 30, 1989, Ser. No. 359,451

Int. Cl.^{5} F02C *9/28*

U.S. Cl. 60—39.161 8 Claims

1. An acceleration control for a gas turbine engine for controlling the acceleration mode of said engine, said engine having a compressor subject to stall, a burner for generating engine working fluid medium, a turbine powered by said engine working fluid medium for driving said compressor, a fan, a bypass duct for flowing the air discharging from said fan, fuel control means responsive to engine operating parameters for controlling the flow of fuel to said burner, said acceleration control comprising means for establishing a stall margin for said compressor including means responsive to compressor rotor speed for establishing a first signal simulating a compressor stall limit indicative of the ratio of the pressure of said burner and the pressure, at another station in said engine, means responsive to actual burner pressure for generating a second signal and means responsive to said first signal and said second signal for adjusting said fuel control means to limit the

VOL
1127
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2
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11
1991
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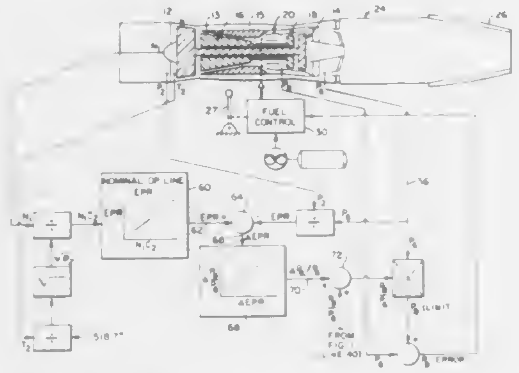
flow of fuel to said burner, in combination with means for compensating for duct pressure losses, said compensation means includes a function generator generating a third signal



indicative of engine pressure ratio as a function of compressor rotor speed, comparing means for providing a signal indicative of the difference between said third signal and actual engine pressure ratio for modifying said first signal.

5,022,225

AIR-FUEL RATIO FEEDBACK CONTROL SYSTEM INCLUDING AT LEAST DOWNSTREAM-SIDE AIR FUEL RATIO SENSOR

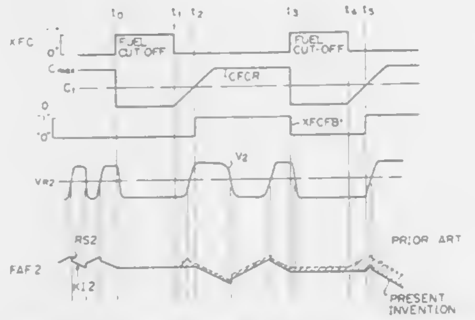
Hiroshi Sawada, Gotenba; Tatehito Ueda; Kiyoshi Nakanishi, both of Susono, and Takayuki Demura, Mishima, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Division of Ser. No. 163,871, Mar. 3, 1988, Pat. No. 4,964,271. This application Mar. 23, 1990, Ser. No. 497,703

Claims priority, application Japan, Mar. 6, 1987, 62-050325; Mar. 6, 1987, 62-050326

Int. Cl.^{5} F02D *41/14*

U.S. Cl. 60—274 **18 Claims**



1. A method of controlling an air-fuel ratio in an internal combustion engine having a catalyst converter for removing pullutants in the exhaust gas thereof and a downstream-side air-fuel ratio sensor disposed downstream of said catalyst converter, for detecting concentration of a specific component in the exhaust gas, comprising the steps of:

sensing air-fuel ratio feedback control conditions for said downstream-side air-fuel ratio sensor;

determining whether or not all the air-fuel ratio feedback control conditions for said downstream-side air-fuel ratio sensor are satisfied;

controlling the air-fuel ratio of said engine by an open loop control so that it is brought close to an air-fuel ratio, when at least one of the air-fuel ratio feedback control conditions for said downstream-side air-fuel ratio sensor is not satisfied;

controlling the air-fuel ratio of said engine by an open loop control so that it is brought close to the stoichiometric air-fuel ratio while prohibiting control of said air-fuel ratio of said engine in accordance with the output of said downstream-side air-fuel ratio sensor for a period after all of the air-fuel ratio feedback control conditions for said downstream-side air-fuel ratio sensor are satisfied; and

controlling the air-fuel ratio of said engine in accordance with the output of said downstream-side air-fuel ratio sensor so that it is brought close to the stoichiometric air-fuel ratio after said period has passed,

said period being determined by an addition of a transport delay period of the exhaust gas and a delay period due to the O_2 storage effect.

5,022,226

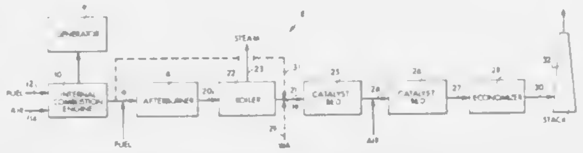
LOW NO_x COGENERATION PROCESS AND SYSTEM

Ronald D. Bell, Austin, Tex., assignor to Radian Corporation, Austin, Tex.

Continuation-in-part of Ser. No. 252,690, Oct. 3, 1988, Pat. No. 4,930,305. This application Mar. 26, 1990, Ser. No. 499,165

Int. Cl.^{5} F01N *3/18*

U.S. Cl. 60—274 **17 Claims**



1. A process for low NO_x cogeneration to produce electricity and useful heat, which comprises:

providing fuel and oxygen to an internal combustion engine connected to drive an electric generator, to thereby generate electricity;

recovering from said engine an exhaust stream at a temperature of about 500° to 1000° F. which includes from about 6 to 15% oxygen;

adding to said exhaust stream sufficient fuel to create a fuel-rich mixture, the quantity of fuel being sufficient to react with the available oxygen and reduce the NO_x in said exhaust stream;

providing said fuel-enriched exhaust stream to a thermal reactor and reacting therein said fuel, NO_x and available oxygen, to provide a heated oxygen-depleted stream;

cooling said oxygen-depleted stream by passing same through a heat exchanger;

adding conversion oxygen to said cooled stream from said heat exchanger, and passing the cooled oxygen-augmented stream over a first catalyst bed under overall reducing conditions, the quantity of conversion oxygen added being in stoichiometric excess of the amount of NO_x, but less than the amount of combustibles; whereby the NO_x is first oxidized to NO_2, and then the NO_2 is reduced by the excess combustibles;

adding air to the resulting stream from said first catalyst bed to produce a cooled stream having a stoichiometric excess of oxygen; and

passing said stream over an oxidizing catalyst bed to oxidize remaining excess combustible, to thereby provide an effluent stream having environmentally safe characteristics.

5,022,227

PIPE CARRYING HOT GASES FOR AN INTERNAL-COMBUSTION ENGINE

Hans Sudmanns, Friedrichshafen, Fed. Rep. of Germany, assignor to Mtu Motoren-und Turbinen-Union Friedrichshafen GmbH, Friedrichshafen, Fed. Rep. of Germany

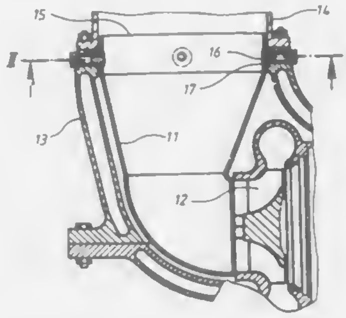
PCT No. PCT/DE88/00697, § 371 Date Aug. 22, 1989, § 102(e) Date Aug. 22, 1989, PCT Pub. No. WO89/05911, PCT Pub. Date Jun. 29, 1989

PCT Filed Nov. 9, 1988, Ser. No. 423,409

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743851

Int. Cl.^{5} F01N *7/00*

U.S. Cl. 60—320 **6 Claims**



1. An exhaust pipe for an internal combustion engine, the exhaust pipe having a thin-walled construction, a normal cross-sectional area in a cold condition and being gas-tightly surrounded by a liquid-cooled covering which is spaced by a distance from the exhaust pipe; fastening means for elongating the normal cross-sectional area of the exhaust pipe and for attaching the exhaust pipe only to the covering in only one cross-sectional plane; the fastening means being attached to the exhaust pipe in its cold condition at said cross-sectional plane and being operated to pull out the exhaust pipe at that plane to elongate the cross-sectional area while maintaining the attachment to the covering.

5,022,228

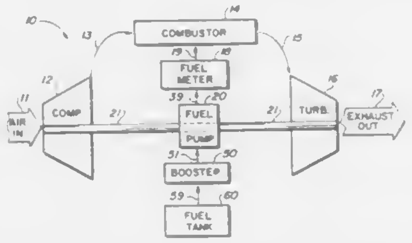
OVER THE SHAFT FUEL PUMPING SYSTEM

Jay N. Hoopes, Tempe; Christopher D. Eick, Phoenix, and John R. Williamson, Scottsdale, all of Ariz., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Division of Ser. No. 289,957, Dec. 22, 1988, Pat. No. 4,989,411. This application Sep. 13, 1990, Ser. No. 581,960

Int. Cl.^{5} F02C *1/00*

U.S. Cl. 60—734 **5 Claims**



1. A high speed rotary liquid pump, adapted to be driven by a shaft in the core of a gas turbine engine, comprising a rotatable impeller having a plurality of straight blades extending radially from an annular hub, said hub having a central aperture of sufficient size to engage said shaft for rotation therewith; a pump housing surrounding said impeller and defining a generally annular pump cavity for receiving said rotatable impeller;

said housing also defining an annular fluid inlet aperture leading axially into said cavity adjacent said hub, a shield member axially adjacent said aperture and disposed between fluid entering said aperture and said shaft, whereby circumferential swirl of said fluid due to contact with said shaft is minimized, and at least one fluid outlet passage extending tangentially from the periphery of said cavity adjacent the tips of said blades.

5,022,229

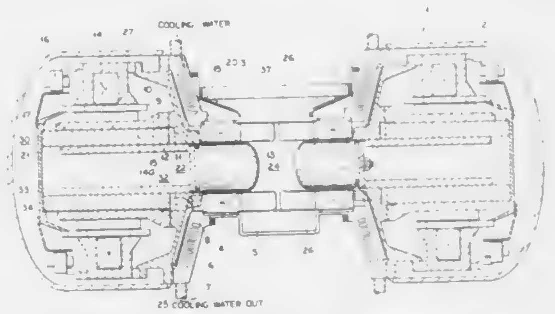
STIRLING FREE PISTON CRYOCOOLERS

Nicholas G. Vitale, Albany, N.Y., assignor to Mechanical Technology Incorporated, Latham, N.Y.

Filed Feb. 23, 1990, Ser. No. 484,216

Int. Cl.^{5} F25B *9/00*

U.S. Cl. 62—6 **13 Claims**



1. A stirling free piston cryocooler, comprising:

two opposed cyrocooler piston assemblies having a common expansion space therebetween, each said piston assembly including a power cylinder having a cylindrical shape, a large bore forming a cylinder and a small bore, a power piston having a cylindrical shape, an inner bore and an outer diameter, said outer diameter being adapted to slide with close clearance within said large bore of said power piston cylinder, and a displacer piston having a cylindrical shape and being adapted to slide into said inner bore of said power piston with close clearance;

a linear drive motor for actuating linear reciprocating motion of said piston assembly;

a bearing spin motor for rotating said power piston; and

a thermodynamic assembly including a cold head adjacent said expansion space and at least one regenerator and at least one expansion space heat exchanger located between said expansion space and said at least one regenerator.

5,022,230

METHOD AND APPARATUS FOR RECLAIMING A REFRIGERANT

James J. Todack, 14407 Sycamore Lake Rd., Houston, Tex. 77062

Filed May 31, 1990, Ser. No. 531,211

Int. Cl.^{5} F25B *45/00*

U.S. Cl. 62—77 **16 Claims**

9. The method of reclaiming a refrigerant through a closed process preventing release of the refrigerant to the environment comprising,

withdrawing the refrigerant from a refrigeration system and into a boiler,

lowering the pressure in the boiler by suction sufficiently to vaporize the refrigerant at a temperature of between approximately 10° F. and −15° F. while insufficient to vaporize oil, most acids, and most of the water,

removing the vaporized refrigerant from the boiler and compressing the vaporized refrigerant increasing the temperature,

passing the heated vaporized refrigerant in a heat exchange

VOL
1127
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1991
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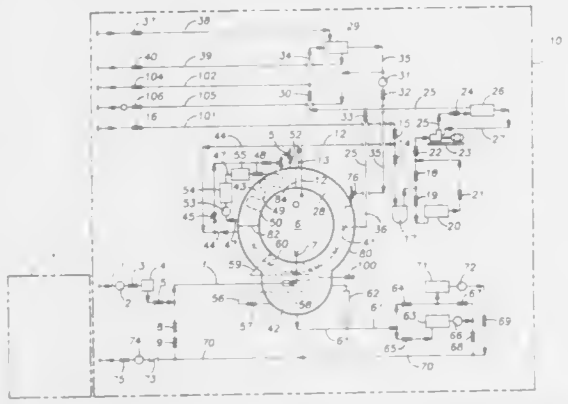
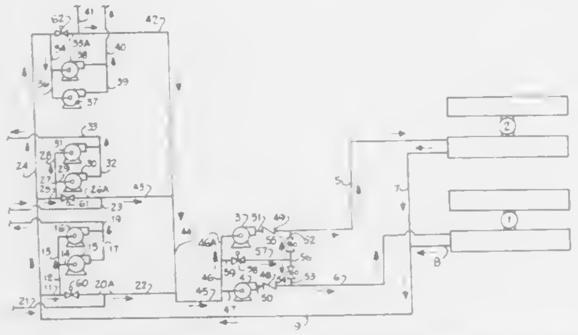
relationship with the boiler heating the boiler and condensing the vaporized refrigerant, and



recharging the refrigeration system with the condensed refrigerant.

5,022,231
PUMP OPTIMIZATION

George Martinez, Jr., P.O. Box 1141, Gonzales, La. 70737
Filed Feb. 26, 1990, Ser. No. 484,541
Int. Cl.^{5} F25D *17/02*
U.S. Cl. 62—99 **2 Claims**



2. A method for saving energy in a chilled water air conditioning system employing secondary pumps for supply chilled water and primary pumps for return chilled water, comprising:

a. directing all of said supply chilled water to said secondary pumps,

b. pumping all of said supply chilled water through said secondary pumps,

c. turning said primary pumps off, and

d. by-passing said return chilled water around said primary pumps.

5,022,232
AUTOMATIC AIR CONDITIONING SYSTEM WITH VARIABLE DISPLACEMENT COMPRESSOR FOR AUTOMOTIVE VEHICLES

Hideyuki Sakamoto, and Toshimitsu Nose, both of Kanagawa, Japan, assignors to Nissan Motor Company, Ltd., Japan
Filed Mar. 30, 1989, Ser. No. 330,502
Claims priority, application Japan, Mar. 31, 1988, 63-81997
Int. Cl.^{5} B60H *1/32*
U.S. Cl. 62—133 **8 Claims**

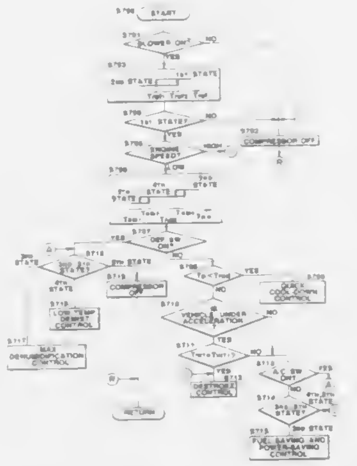
1. An automatic air conditioning system for automotive vehicles with a variable displacement compressor comprising:

discharge changing means capable of changing the discharge volume of refrigerant discharged from said compressor;

first detecting means for detecting a first physical quantity indicative of the cooling requirements of an evaporator of said automatic air conditioning system, said first detecting means generating a first signal representative of said physical quantity;

second detecting means for detecting acceleration condition of the automotive vehicle, said second detecting means generating a second signal representative of the acceleration conditions;

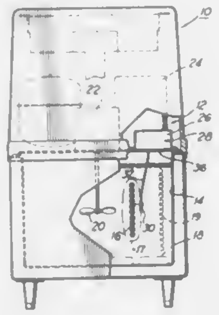
determining means for determining whether said cooling requirements are satisfied on the basis of the first signal representative of said physical quantity and its preset value, said determining means generating a third signal indicating whether the cooling requirements are satisfied; and



control means for controlling said discharge changing means in such a manner that the discharge volume of refrigerant discharged from said compressor is decreased only when said control means determines on the basis of the second and third signals from said second detecting means and said determining means that both of the vehicle acceleration conditions and said cooling requirements are satisfied.

5,022,233
ICE BANK CONTROL SYSTEM FOR BEVERAGE DISPENSER

Jonathan Kirschner, Powder Springs; William F. Stembridge, College Park; W. Frank Stembridge, III, East Point, and Douglas A. Deeds, College Park, all of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.
Continuation-in-part of Ser. No. 115,935, Nov. 2, 1987, abandoned. This application Sep. 1, 1989, Ser. No. 402,205
Int. Cl.^{5} F25C *1/00*
U.S. Cl. 62—138 **6 Claims**



1. An ice bank control system for a beverage dispenser comprising:

(a) a refrigeration system including a compressor, a compressor motor, an ice water tank filled with water up to a water level, and ice bank building evaporator coils located in said tank below said water level;

(b) a single solid state temperature sensor including a thermistor mounted in said tank completely below said water level and adjacent to but spaced apart from one of said coils and in contact with an ice bank built by said evaporator coils;

(c) a control circuit including a microprocessor connected to said thermistor solely by an electrical lead for controlling the thickness of the ice bank;

(d) said microprocessor including a memory having a reference value stored therein which reference value represents the resistance of said thermistor at a selected temperature;

(e) said control circuit including means for calculating the resistance of said thermistor and for then comparing said calculated value to said reference value;

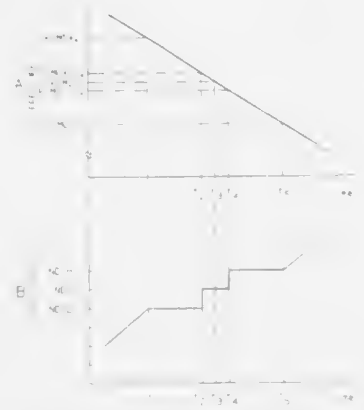
(f) said control circuit including means for turning off said compressor motor when the difference between said calculated value and said reference value exceeds a first preselected value and for subsequently turning said compressor motor back on when said difference falls to a second preselected value;

(g) said control circuit including means for varying said first preselected value; and

(h) said varying means including means for using a lower temperature during the first pulldown and a higher temperature on all subsequent pulldowns.

5,022,234
CONTROL METHOD FOR A VARIABLE DISPLACEMENT AIR CONDITIONING SYSTEM COMPRESSOR

Ronald J. Goubeaux, Lockport, and Joseph L. Spurney, Rochester, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.
Filed Jun. 4, 1990, Ser. No. 533,303
Int. Cl.^{5} F25B *1/00*
U.S. Cl. 62—228.5 **12 Claims**



1. In an automotive air conditioning system including a refrigerant compressor having a capacity determined in accordance with the pressure in a control chamber thereof, and a control valve in communication with inlet and outlet ports of the compressor for effecting a ratiometric control of the pressure in said control chamber, control apparatus comprising:

means for measuring the value of a specified system parameter;

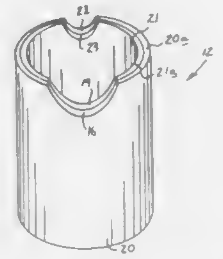
means defining a fine control range of values in relation to a desired value of said specified system parameter and a deadband range of values within said fine control range;

closed-loop control means effective when the measured value is outside said fine control range for operating the control valve at a setting determined at least in proportion to the difference between the measured and desired values; and

open-loop control means effective when the measured value is within said fine control range for operating the control valve at (1) a first predetermined setting designed to change the capacity of the compressor in a direction to decrease the specified system parameter when the measured value is above said deadband range, (2) at a second predetermined setting designed to change the capacity of the compressor in a direction to increase the specified system parameter when the measured value is below said deadband range, and (3) at a third predetermined setting designed to maintain the current capacity of the compressor if the measured value is within said deadband range.

5,022,235
BEVERAGE COOLER APPARATUS

Tovey L. Grissom, Rte. i #13, Box 616, Bedford, Ind. 47421
Filed Jun. 5, 1989, Ser. No. 361,996
Int. Cl.^{5} F25D *3/08*
U.S. Cl. 62—457.4 **I Claim**



1. A beverage cooler apparatus for securement of a beverage container therein wherein said beverage container is of a predetermined height, said apparatus comprising,

a first cylindrical cup-shaped support defined by a first cylindrical wall formed to a first floor defining a first internal configuration, and

a second cylindrical cup-shaped support receivable within said first cup-shaped support defined by a second cylindrical wall formed to a second floor with an external configuration equal to said first internal configuration, and

the first and second cup-shaped supports each including a respective first and second top edge, and

a first drinking recess formed downwardly from said first top edge through said first cylindrical wall, and

a second drinking recess formed downwardly from said second top edge through said second cylindrical wall, and

the first and second drinking recesses each defined by a first depth and the first and second drinking recesses aligned with one another when the second cup-shaped support is positioned within the first cup-shaped support, and

the second cup-shaped support defined by a height substantially equal to the predetermined height of said beverage container, and

wherein the first cup-shaped support is formed of a rigid insulative material, and the second cup-shaped support is formed of a flexible insulative material, and

further including a first finger recess formed downwardly from the first top edge within the first cup-shaped support through said first cylindrical wall, and a second finger recess formed downwardly from said top edge through said second cylindrical wall, and the first and second cylindrical recess diametrically opposed to the respective first and second recess when the second cup-shaped support is positioned within the first cup-shaped support, and the first and second cylindrical recess are aligned with one another when the second cup-shaped support is positioned within the first cup-shaped support, and the first and second finger recess are of a second depth less than the first depth, and

further including a cylindrical sponge defined by an external

VOL
1127
ISS
2
JE
11
1991
UMI

diameter equal to the internal diameter of the second cup-shaped support and of a thickness substantially less than that of the predetermined height, and the sponge is replaceably mounted onto the floor of the second cup-shaped support and formed of a moisture absorbent material, and

further including a cylindrical sponge insert formed of a cylindrical sponge external configuration substantially equal to an internal configuration defined by the second cup-shaped support, and the cylindrical sponge insert of a height defined between a lowermost portion of the second drinking recess and the second floor of the second cup-shaped support, and the cylindrical sponge insert formed of a compressible moisture absorbent material, and

further including a replaceable refrigerant insert selectively positionable within the second cup-shaped support or the cylindrical sponge insert.

5,022,236

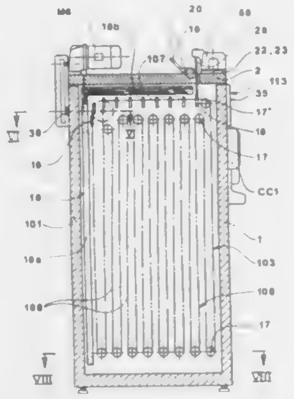
STORAGE APPARATUS, PARTICULARLY WITH AUTOMATIC INSERTION AND RETRIEVAL

Hermann Knippscheer, Baldwin, N.Y., and Daniel D. Richard, Sedona, Ariz., assignors to Cryo-Cell International, Inc., Baldwin, N.Y.

Division of Ser. No. 389,543, Aug. 4, 1989, Pat. No. 4,969,336, and a continuation-in-part of Ser. No. 455,170, Dec. 22, 1989. This application Feb. 20, 1990, Ser. No. 482,239

Int. Cl.^{5} F25D *5/10*

U.S. Cl. 62—529 **3 Claims**



1. A container installable at least partially in a storage chamber for holding cooling fluid, said container having at least a portion with a substantially L-shaped cross-section with a pair of hollow substantially planar leg members extending orthogonally with respect to one another, one of said leg members having an open upper side.

5,022,237

ATTACHMENT APPARATUS TO REMOVABLY RETAIN A CHARM ON A BRACELET WITHOUT OBSTRUCTING THE VIEW OF GEMSTONES ON THE BRACELET

Thea B. Monderer, Los Angeles, and Ruben Flores, Hawthorne, both of Calif., assignors to Superior Diamond Corporation, Los Angeles, Calif.

Filed Feb. 6, 1990, Ser. No. 475,953

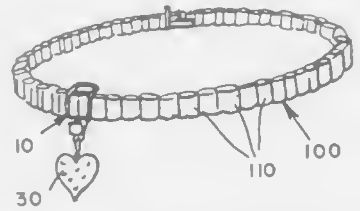
Int. Cl.^{5} A44C *25/00*

U.S. Cl. 63—23 **9 Claims**

1. An apparatus for retaining a charm on a segment of given length of a bracelet, where the bracelet segment has a top surface with ornament and a bottom surface with an opening, comprising:

a. a bridge member generally configured by two substantially U-shaped frames, where each U-shaped frame has a first longitudinal wall and a second longitudinal wall, each having a first end and a second end and connected by a transverse wall at their second ends, and the two U-shaped frames are connected spaced apart in parallel by a first cross bar at the two respective first ends of the two first longitudinal walls and a second cross bar at the two respective first ends of the two second longitudinal walls, such that the space between the two U-shaped frames is about the same as the length of the bracelet segment;

b. a thin elongated clasp member having an inner surface and a flat outer surface and a first end and a second end, and rotatably attached to the first cross bar of said bridge member at its first end, and further comprising a first mating means at its inner surface adjacent to its second end, such that when rotated into a closing position the inner surface of the clasp member lies flush against the four respective first ends of the two first and two second longitudinal walls and parallel to the two transverse walls of said bridge member;



c. a mating member affixed to and transversely extending from the second cross bar of said bridge member, and further comprising a second mating means; and

d. a retaining means affixed to said bridge member for retaining a charm, such that the charm is supported to hang from said bridge member;

e. whereby when said bridge member is placed over the bracelet segment such that the two transverse walls of said bridge member are adjacent to the top surface of the bracelet segment, said clasp member can be rotated into the closing position to be adjacent to the bottom surface of the bracelet segment, and the first mating means of said clasp member can be locked with the second mating means of said mating member, to thereby retain the apparatus on the bracelet segment while the charm hangs from the apparatus and the ornament on the top surface of the bracelet segment is visible between the two transverse walls of said bridge member of the apparatus.

5,022,238

SETTING FOR FINE AND COSTUME JEWELRY

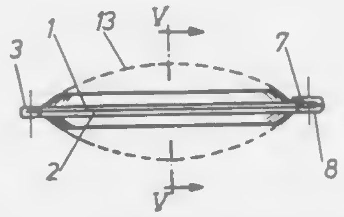
Hassan J. German, En Llop, I 46002, Valencia, Spain

Continuation of Ser. No. 232,439, Aug. 15, 1988, abandoned. This application Aug. 17, 1990, Ser. No. 569,230

Claims priority, application Spain, Oct. 22, 1987, 8703263[U]

Int. Cl.^{5} A44C *17/02*

U.S. Cl. 63—26 **4 Claims**



1. A setting for the mounting of stones and the like in fine and costume jewelry, comprising:

first and second frame means, each said frame means formed by first and second elongated peripheral sidewalls surrounding an opening, and each having first and second ends, a length between said first and second ends of said first frame means approximating a length between said first and second ends of said second frame means;

each frame means having a face and a back opposite said face, each respective sidewall of each said frame means extending from a respective face and sloping laterally outwardly to a respective back;

a bridge formed between said first ends of said first and second frame means, said first frame means adapted to be folded about an axis passing through said bridge such that said back of said first frame means is opposed to said back of said second frame means, said first and second frame means mating along their lengths for securing conmensurately a shaped stone therebetween such that the stone can be seen through the openings; and

first and second tab means mounted on said second ends of said frame means, respective first and second for locking said first and second frame means together secured within said frames.

5,022,239

YARN EXCHANGE DEVICE FOR A FLAT-BED KNITTING MACHINE

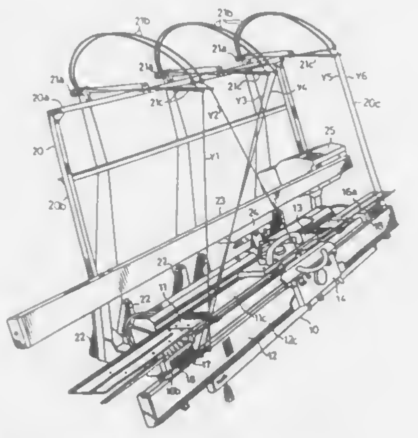
Hiroshi Kitazawa, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed May 30, 1990, Ser. No. 530,806

Claims priority, application Japan, May 30, 1989, 1-138576

Int. Cl.^{5} D04B *15/52*

U.S. Cl. 66—127 **6 Claims**



1. A flat bed knitting machine comprising:

a longitudinally elongated needle bed having a knitting section for holding a multiplicity of needles, the needle bed having first and second sides;

a plurality of yarn guide collars each adapted to hold a yarn;

a carriage slidably mounted on the needle bed for longitudinal movement relative to the needle bed;

a pair of collar support racks for detachably holding a plurality of said collars, the collar support racks being disposed on opposite sides of the knitting section; and

collar support means carried by the carriage for detachably holding a selected one of said collars, the collar support means having first and second transfer positions, wherein a selected collar may be exchanged between said collar support means and a first one of said collar support racks in the first transfer position and the selected collar may be exchanged between the collar support means and a second one of said collar support racks in the second transfer position.

5,022,240

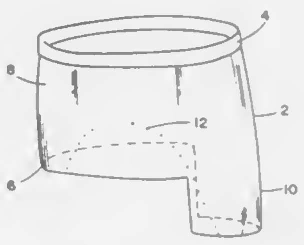
GARMENT BLANK AND BRIEF

Eliezer Peleg, New York, N.Y., assignor to Sara Lee Corporation, Winston-Salem, N.C.

Filed Feb. 7, 1989, Ser. No. 307,887

Int. Cl.^{5} A41B *9/02*

U.S. Cl. 66—177 **15 Claims**



1. A circular knit blank for use in the manufacture of panties or briefs comprising:

(a) a tubular knit body having 360° courses;

(b) a course at the bottom of said body having pressed off contiguous stitches for a given number of degrees around said course, and

(c) a single panel knit to said course and extending around the remainder of the degrees around said course, said panel having parallel sides along respective wales uniformly extending from the pressed off contiguous stitches..

5,022,241

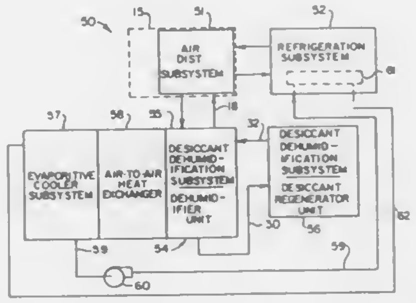
RESIDENTIAL HYBRID AIR CONDITIONING SYSTEM

William H. Wilkinson, Columbus, Ohio, assignor to Gas Research Institute, Chicago, Ill.

Filed May 4, 1990, Ser. No. 519,116

Int. Cl.^{5} F25D *23/00*

U.S. Cl. 62—271 **4 Claims**


50
15
51
52
AIR DIST SUBSYSTEM
REFRIGERATION SUBSYSTEM
18
57
58
55
32
EVAPORATIVE COOLER SUBSYSTEM
AIR-TO-AIR HEAT EXCHANGER
DESICCANT DEHUMID-IFICATION SUBSYSTEM
DEHUMID-IFIER UNIT
DESICCANT DEHUMID-IFICATION SUBSYSTEM
DESICCANT REGENERATOR UNIT
30
56
62
59
54
60

1. A hybrid air conditioning system which handles the system combined sensible heat load and latent heat load associated with a building enclosed space, and which comprises:

a. a building air distribution subsystem which flows recirculated air from and to the building enclosed space and which provides the combined sensible heat load and latent heat load to the system;

b. a refrigeration subsystem having an evaporator element and receiving said air distribution subsystem recirculated air for the transfer of sensible heat to said evaporator element,

c. a desiccant dehumidification subsystem having a dehumidifier unit and a desiccant regenerator unit cooperating with said dehumidifier unit through a flow of recirculated desiccant solution, receiving at least a portion of said air distribution subsystem recirculated air and any included make-up atmospheric air for the transfer of contained moisture to said desiccant solution by mass transfer with an attendant latent heat load, and receiving reject heat

VOL
1127
ISS
2
JE
11
1991
UMI

from said refrigeration subsystem for desiccant solution regeneration purposes;

d. an evaporative cooler subsystem receiving flows of cooling water and atmospheric air external to the building enclosed space; and

e. air-to-air heat exchanger means cooperatively coupling said evaporative cooler subsystem to said desiccant dehumidification in heat transfer relation, and comprising an array of spaced-apart heat transfer plates,

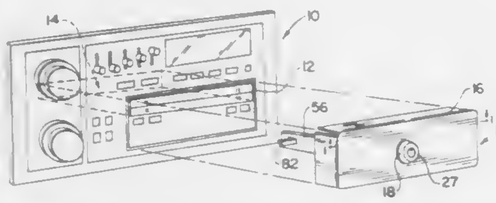
said air-to-air heat exchanger means transferring heat across said heat transfer plates from films of said desiccant solution to films of said cooling water with said evaporative cooler subsystem cooling water to the atmosphere external to said building enclosed space.

5,022,242
ADJUSTABLE LOCK FOR A CASSETTE TAPE PLAYER

Darius A. Povilaitis, Lemont, Ill., assignor to Calibro Corporation, Lemont, Ill.

Filed Aug. 15, 1990, Ser. No. 567,621
Int. Cl.⁵ B65D *55/14*

U.S. Cl. 70—14 7 Claims



1. An adjustable lock for deterring the theft and unauthorized use of a cassette tape player having tape drive gears and a play head comprising:

a housing mountable outside of a tape slot accessing a tape receiving chamber in a case of the cassette tape player, the housing when mounted having a recess facing the cassette tape player, the recess being defined by a front wall and side walls of the housing, the front wall being large enough to prevent insertion of the housing into the tape receiving chamber;

a hook extending rearwardly and laterally outwardly of the housing with a free end being insertable into one end of the tape slot for engaging an inside wall of the tape receiving chamber;

a locking means mounted on the front wall of the housing extending into the recess, the locking means being operatively accessible from outside the housing;

a bolt having an engaging and a non-engaging end, the engaging end being laterally retractably extendable from the housing and insertable into the end of the tape slot opposite the free end of the hook for engaging an inside wall of the tape receiving chamber when extended;

means attaching the bolt to the locking means so that when the locking means is in an unlocked position the bolt is in a retracted position and when the locking means is in a locked position the bolt is in a laterally extended position;

means guiding the bolt to engage the inside wall of the tape receiving chamber opposite the free end of the hook when the bolt is in a laterally extended position and to release the inside wall when the bolt is in a retracted position;

means for adjusting the depth at which the free end of the hook may be inserted into the tape receiving chamber for engaging the inside wall of the tape receiving chamber; and

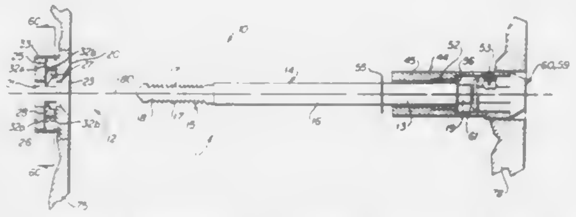
means for adjusting the depth at which the bolt may be laterally extended into the tape receiving chamber for engaging the inside wall of the tape receiving chamber.

5,022,243
LATCHING SYSTEM

Donald Embry, Daviess County, Ky; Woodrow C. Stillwagon, Fulton County, Ga., assignors to Star Lock Company, Norcross, Ga.

Filed Sep. 6, 1989, Ser. No. 403,665
Int. Cl.⁵ E05B *67/36*

U.S. Cl. 70—34 32 Claims



1. Latching apparatus for releasably latching a first door element, such as a vending machine door, or the like, and a second door element, such as a vending machine frame, or the like, said apparatus comprising:

a post member defining, at least, a multi-surfaced latching portion, which latching portion includes at least one axially extending notched surface and at least one axially extending smooth surface alternately disposed about the circumference of said post member;

a latching assembly comprising a passage for accepting said latching portion of said post member therein, and a latch means for effecting a grip on said notched surface when said latching portion of said post member is within said passage, thus resisting removal of said latching portion of said post member from said passage of said latching assembly; and

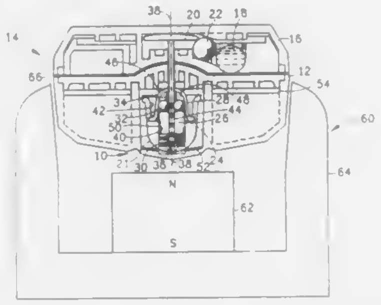
a releasing means for releasing said grip between said notched surface and said latch means, thus facilitating removal of said latching portion of said post member from said passage of said latching assembly.

5,022,244
PIN-CLUTCH MECHANISM FOR THEFT-DETERRENT DEVICE

Lincoln H. Charlot, Jr., St. Petersburg, Fla., assignor to Security Tag Systems, Inc., St. Petersburg, Fla.

Filed May 29, 1990, Ser. No. 529,940
Int. Cl.⁵ B65D *55/10*

U.S. Cl. 70—57.1 15 Claims



1. A clutch mechanism for restraining a pin from longitudinal movement, comprising

a ferromagnetic anvil having an axial bore for axially receiving a pin;

receiving means axially aligned with the anvil for axially receiving a said pin that is axially received by the bore of the anvil, wherein the anvil is longitudinally movable along its bore axis with respect to the receiving means;

biasing means for forcing the anvil toward a first end of the receiving means;

clutching means engaging the anvil and forced by the anvil toward the first end of the receiving means when the anvil is forced toward the first end of the receiving means by the biasing means, with the clutching means being disposed to apply radial pressure against said pin to firmly clutch the pin and thereby restrain said pin from longitudinal movement when the clutching means are forced toward the first end of the receiving means; and

means separate from said receiving means and disposed axially in relation to the anvil for diffusing magnetic flux applied axially to the anvil by means external to the mechanism so as to prevent less than a predetermined amount of said axially applied magnetic flux from overcoming the biasing means and forcing the anvil to move away from the first end of the receiving means;

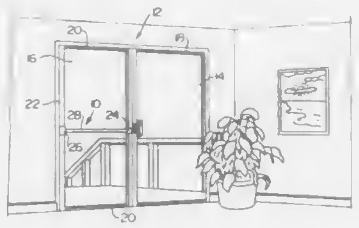
wherein the anvil is disposed between the receiving means and the diffusing means.

5,022,245
LOCKING DEVICE FOR SLIDING DOORS AND THE LIKE

William D. Jordan, and Deborah A. Jordan, both of 7121 Honey La., St. Louis, Mo. 63129

Filed Feb. 26, 1990, Ser. No. 484,265
Int. Cl.⁵ E05B *65/00*

U.S. Cl. 70—94 14 Claims



1. A lock device for locking a sliding member relative to a stationary member, the sliding members including frames, the device comprising:

a bracket for attaching to the frame of the sliding member, the bracket including a first member secured to the bracket and a second member rotatably connected to the first member, and means for securing the second member to the first member, wherein the first member is generally U-shaped having a first end including an aperture and a second end including a pin; and

a bar member having one end adapted to be supported by the first member and to be secured in place by the second member when the securing means secures the second member to the first member, the bar member extending outwardly from the bracket to the frame of the stationary member to prevent sliding movement of the sliding member.

5,022,246
AUTOMOBILE STEERING LOCK

Song M. Wang, No. 61, Lane 668, Yuh-Nurng Road, Tainan, Taiwan

Filed Jun. 12, 1990, Ser. No. 536,742
Int. Cl.⁵ B60R *25/02*

U.S. Cl. 70—209 2 Claims

1. An antitheft device for attachment to a steering wheel of an automobile comprising:

(a) an elongated body member having:

(i) an integrally formed first tubular member having an open end and a closed end defining a first elongated passageway extending along its axis from the open end to the closed end;

(ii) a second tubular member having an open end and a closed end and defining a second elongated passageway extending opposite to the first elongated passageway along its axis from its open end to its closed end; and

(iii) a first hook adapted to engage said steering wheel from the inside thereof with said closed end of said first tubular member extending a substantial distance beyond a periphery of said steering wheel;

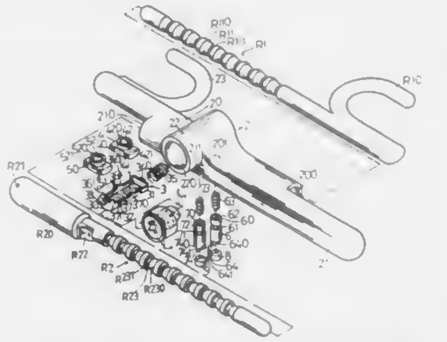
(b) a first elongated rod member having an inner end and an outer end, said inner end adapted to extend in a telescopic manner within said first elongated passageway of said first tubular member, said outer end of said first rod member being formed with a second hook adapted to engage said steering wheel from the inside thereof, said first rod member further defining a plurality of spaced annular notches, each notch being defined by a vertical side wall perpendicular to the axis of the elongated rod member and a sloped side wall;

(c) a second elongated rod member having an inner end and an outer end, said inner end adapted to extend in a telescopic manner within said second passageway of said second tubular member, said second rod member further defining a plurality of spaced annular notches, each notch being defined by a vertical side wall perpendicular to its longitudinal axis and a slope side wall;

(d) a housing means integrally formed in a mid portion of the body member and defining a passageway transverse to and communicating with the elongated passageway in the first and second tubular members;

(e) a lock retained in the housing means and having a locking member with an inner end formed with a slanting portion;

(f) an actuating member slidably fitted in the transverse passageway of the housing means and formed with an arcuate front wall, a rear wall spaced from and opposed to the front wall and having:



(i) means for engaging one end of a first spring which normally biases the actuating member toward the lock with the arcuate front wall of the actuating member abutting the inner end of the locking member;

(ii) a bottom formed with two slots; and

(iii) parallel rails extending from the front wall to the rear wall formed with raised slopes at mid and front portions thereof;

(g) positioning members defining grooves adapted to slidably engage the rails of the actuating member and the raised slopes as the actuating member is shifted from a first position into a second position and having retaining means;

(h) locating means adapted to be retained in the positioning members by the retaining means thereof, the locating means having tenon ends engaging respectively the notches of the first and second rod members when the actuating member is located in its first position and disengaging respectively the notches of the first and second rod members as the actuating member is located in its second position, the tenon ends having vertical side walls for abutting vertical side walls of the notches of the first and second rod members and sloped side walls for abutting the sloped side walls of the notches of the first and second rod members; and

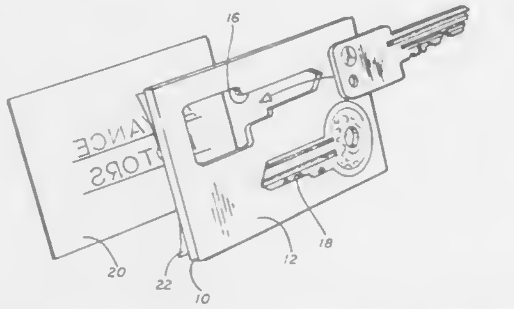
(i) second spring means normally biasing the tenon ends of the locating means toward the notches of the first and second rod members.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,247

HOLDER FOR SPARE SET OF KEYS

J. Frederick Beck, 5246 Myrtle Wood, Sarasota, Fla. 34235
Filed Nov. 24, 1989, Ser. No. 440,702
Int. Cl.⁵ A44B *15/00*
U.S. Cl. 70—456 R **8 Claims**

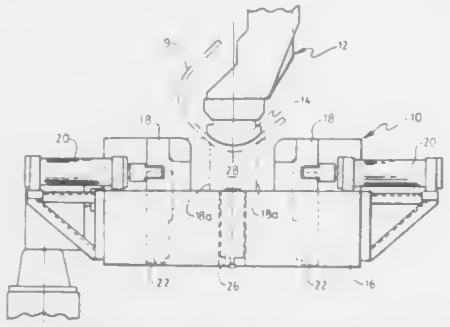


1. A key holder arrangement for a spare key, with which advertising in the form of a selected business card may be effectively used, said arrangement comprising a planar base member approximately the size of a typical business card, and of a thickness approximately the thickness of a key, said base member having opposing faces thereon, and a cutout therein, said cutout being of a size closely conforming to the key to be received, such that a key can be inserted into said cutout, and be frictionally retained therein, one of said faces being coated with a pressure sensitive adhesive, a backer sheet normally residing on said pressure sensitive adhesive, to prevent said base member from adhering to an extraneous object, said planar base member in combination with a selected business card, such that upon said backer sheet being peeled away from the adhesive, the placement of the backside of a business card in contact with the adhesive can be accomplished, and in careful alignment with said base member.

5,022,248

PRESS BRAKE APPARATUS WITH POWERED ADJUSTABLE FEMALE DIE JAWS

Gene R. Brooks, Bolingbrook, and Terrence T. Hiland, Marseilles, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.
Filed Oct. 12, 1990, Ser. No. 596,440
Int. Cl.⁵ B21D *5/02*
U.S. Cl. 72—21 **5 Claims**



1. An apparatus for bending flat plate material into different angular shapes, said apparatus having a frame and a vertically reciprocable ram thereon to which horizontally elongated punches of different cross sectional contours are adapted to be singly and removably secured for movement therewith, a horizontally adjustable elongated female die mounted on said frame below the ram with elongated jaws on either side of the punch to support the plate, said jaws forming an opening centered below and along the elongated punches, the opening being operative in concert with the punch to form the flat plate into different angular shapes, the improvement comprising:

means for reciprocably moving the jaws to adjust them to selected spaced positions to change said opening;

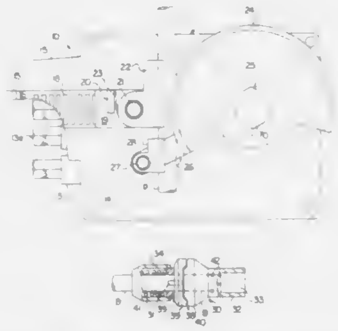
a rotary shim mounted between the frame and each jaw, each rotary shim having a plurality of adjacent lands disposed in parallel planes; and

means for rotating each rotary shim to present a selected land to provide a stop between the frame and the respective jaw at the selected various positions of the jaw.

5,022,249

PORTABLE MANUALLY-CONTROLLED THREE-SPEED PIPE-BENDING MACHINE

Alessandro Caporusso, and Mario Caporusso, both of Via Pantanelle 21, Piedimonte San Germano, Frosinone, Italy
Filed Jun. 2, 1989, Ser. No. 363,406
Claims priority, application Italy, Jun. 17, 1988, 48094 A/88
Int. Cl.⁵ B21D *7/04*
U.S. Cl. 72—149 **3 Claims**



1. A portable manually-controlled pipe-bending machine designed for operation at three different speeds, with a driving device including a coupling making use of driving torque produced by torque-generating means and having means for automatic disengaging of pipe-bending members of the machine when a resisting torque on the members is developed which is greater than the driving torque on the members, comprising:

a) a speed reducer assembly (60) comprising gear wheels meshing with each other and having torque inputs comprising sockets (13*a*) rotatable on three parallel axes (1, 2, 3), said gear wheels being such that selective rotation of said sockets (13*a*) at the same angular velocity selectively produces three different speeds of rotation of one of said pipe-bending members;

b) a transmission mechanism comprising a gear train that transmits the rotating motion of a gear wheel (62) of said speed reducer assembly (60) to a gear wheel (67) of said transmission mechanism to turn a shaft (25) integral with said one pipe-bending member (24) of said pipe-bending machine (10), said axes being perpendicular to said shaft (25);

c) said driving device (30) being separate from the machine but adapted to be connected with any selected one of said sockets (13*a*), said driving device (30) including a coupling (38) made up of coaxially connected sector elements (39, 40) mounted on a common driving shaft (B) which extends through holes passing through said sector elements (39, 40) of said coupling (38) and through a hole passing through an oblong bell cap (34′) which is coaxial with said sector elements (39, 40) and surrounds said common driving shaft (B) and which in turn houses a cylindrical coil compression spring (41′) which surrounds said common driving shaft (B) and whose ends rest respectively on shoulders consisting of an edge of a protrusion (39′) of one said coupling element (39) and an inner bottom of said bell cap (34′), means for adjusting the amount of compression of said spring (41′) by changing a distance between said shoulders;

d) the other said coupling element (40) having a protrusion

(32) having a blind hole shaped to engage selectively and non-rotatably each said socket (13*a*);

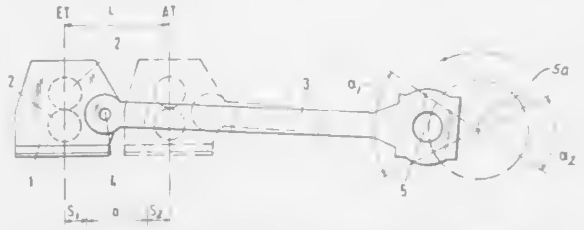
e) said common driving shaft (B) being freely rotatable within said other coupling element (40) and being held in a fixed axial position with respect to said auxiliary device (30) by means of a guide ring (42′) in said other coupling element (40), said elements (39, 40) of said coupling (30) being disengageable from each other by translatory motion of said one coupling element (39) on said common shaft (B), there being a key (31) and keyway between said one coupling element (39) and said common shaft (B) permitting said translatory motion of said one coupling element (39) while causing said element (39) to rotate together with said common shaft (B);

whereby said adjusting of the amount of compression of said spring (41′) adjusts the amount of said greater resisting torque at which said pipe-bending members disengage.

5,022,250

METHOD OF PILGRIM STEP ROLLING

Josef Gerretz, Viersen, and Horst Stinnertz, Willich, both of Fed. Rep. of Germany, assignors to Mannesmann AG, Düsseldorf, Fed. Rep. of Germany
Filed Mar. 18, 1988, Ser. No. 170,283
Claims priority, application Fed. Rep. of Germany, Mar. 18, 1987, 3708943
Int. Cl.⁵ B21D *7/00*
U.S. Cl. 72—214 **2 Claims**



1. In a method of pilgrim step rolling of elongated stock, including the steps of imparting an advancing or rotating motion to the stock by a roll stand reciprocating in cycles along a path between two dead center positions and rolling the stock by rolls mounted in the roll stand; the improvement wherein the step of imparting motion comprises the steps of

applying a first motion component of constant speed to the stock throughout each reciprocating cycle; and

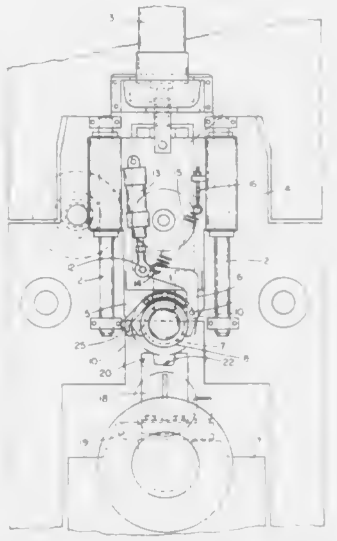
superposing a second motion component of varying speed on the first motion component preponderantly along path zones adjoining each dead center position.

5,022,251

FAST COUPLING FOR ROLLER REPLACEMENT

Luigi Negrussi, Sartirana Lomellina, Italy, assignor to Sted Engineering S.r.l., Italy
Filed Nov. 2, 1989, Ser. No. 430,807
Int. Cl.⁵ B21B *31/08*
U.S. Cl. 72—239 **6 Claims**

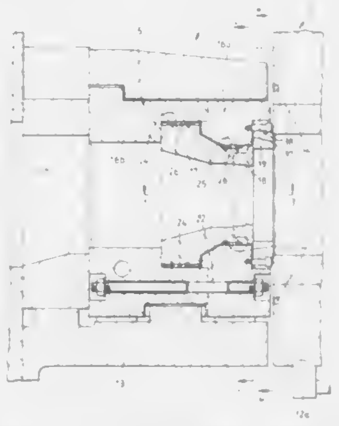
1. In a machine having rollers (9), said machine having a side structure (4), a fast coupling system for the replacement of said rollers, said coupling system being fixed to said side structure, said coupling system comprising a pair of vertical slides (1) fixed to said side structure, a pair of lateral tracks (2), said slides sliding along said tracks, a pair of first pistons (3) actuating said slides to move along said tracks, a fixed jaw and a movable jaw at the bottom of each of said slides, said jaws being aligned and forming a circular seat, said seat being open in the lower part thereof to form an opening regulated by said movable jaw, each of said rollers having a supporting pin, each of said pins having at one end an idle bush and a first collar (7), said seat having a horizontal diameter and being shaped to form an upper semicircumference and two opposite circular sectors (10) along the lower semicircumference, said sectors projecting beyond said horizontal diameter, said first collar engaging in said circular seat; said roller having a second collar (21) fixed at its end, said side structure having a base, two flippable brackets (18) fixed to said base on the side of said structure of said machine and aligned with said second collar.



5,022,252

EXTRUDING APPARATUS FOR EXTRUDING STEPPED PRODUCTS

Keith R. Wellman, Wimborne; Robert L. Crellin, Workington, and William L. Ostle, Maryport, all of England, assignors to Alcan International Limited, Canada
Filed Feb. 20, 1990, Ser. No. 481,331
Claims priority, application United Kingdom, Feb. 20, 1989, 8903815
Int. Cl.⁵ B21C *25/08, 25/02*
U.S. Cl. 72—260 **5 Claims**



1. An extruding apparatus comprising a die block in one end of which is formed a recess for receiving a major die, a major die having a front or upstream face and a rear face mounted in said recess, a sectional holder for a minor die, a minor die carried by said sectional holder and having a front face and a rear face formed in two or more sections, which die sections jointly define the full periphery of the die aperture of the minor die, the sections of the holder being adapted to locate the respective sections of the minor die in aligned relative positions and in axial abutment with the downstream or rear face of the major die, said sections of the holder for the minor die being mounted in the die block for movement selectively to bring the minor die sections into said aligned relative positions and to

VOL
1127
ISS
2
JE
11
1991
UMI

separate the minor die sections and move them outward away from each other and from a line of extrusion extending through said major die, and means for so moving the said sections of the holder.

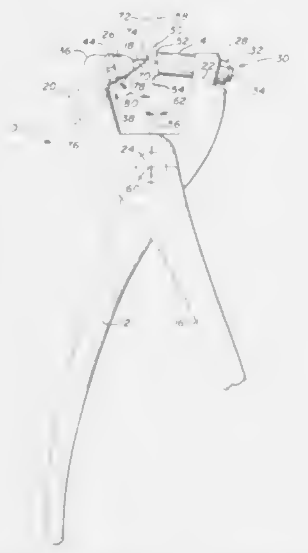
5,022,253
HAND-HELD PUNCH PLIERS

Rocco Parlatore, Everett, Mass., assignor to Mass-Tex Company, Ltd., Mansfield, Tex.

Filed Sep. 9, 1986, Ser. No. 905,764

Int. Cl.⁵ B21D *31/02*

U.S. Cl. 72—325 2 Claims



1. A hand-held punch pliers for simultaneously punching and connecting overlapping sheet metal such as at the corners of overlapping ceiling tile grids comprising:
- a die handle;
- a hollow die affixed to said die handle;
- a punch handle;
- a punch affixed to said punch handle and sized for insertion along an arcuate path into said hollow die;
- a joint means for pivotably connecting said die handle to said punch handle such that said die and punch are movable in arcuate paths about said joint into and out of punching engagement by manually squeezing and releasing said handles;
- a die jaw integrally formed at one end of said die handle;
- means for connecting said die to said die jaw;
- a punch jaw integrally formed at one end of said punch handle; and
- means for connecting said punch to said punch jaw;

wherein said hollow die comprises:
- a tubular die body having an open die end sized for receiving said punch as it is moved in said arcuate path about said joint;
- a die base portion through which said die is replaceably connected to said die jaw; and
- a die face formed around said open end of said tubular die body toward said punch for abutment against said sheet metal being punched and having a radially outwardmost point of contact and a radially inwardmost point of contact;

wherein said die face is formed at an angle in the range of about zero to ten degrees as measured between a first imaginary line drawn through the center of said joint and said radially outwardmost point on said die face and a second imaginary line which passes through said outwardmost point of contact on said die face and through said radially inwardmost point of contact on said die face where a ten degree angle results in a gap between said inwardmost point of contact and said first imaginary line;

wherein said punch comprises:
- solid cylindrical punch body having a punch end corresponding sized smaller than said tubular die body portion for non-binding entry into said die as it is moved in said arcuate path about said joint;
- a punch base portion for replaceably attaching said punch to said punch jaw; and a face formed at said punch end for making a semicircular shaped cut in said sheet metal to be punched which semicircle is more than 180° but less than 360° and for bending the sheet metal plug formed by said cut substantially at an imaginary cord on the uncut sheet metal between the ends of said semicircular shaped cut.

5,022,254
METHOD AND DEVICE FOR THE MANUFACTURE OF CAN BODIES BY EXTENSION, INCLUDING EXPANSION OF THE DIAMETER AND REDUCTION OF THE THICKNESS OF THE SHEET METAL, STARTING OUT FROM A CAN BODY WITH SMALLER DIAMETER, MADE OF THICKER SHEET METAL

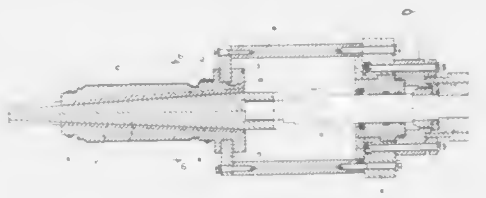
Antonio H. Kramer, Rua Zeferey, 1439, Jundiaí, Sao Paulo, Brazil

Filed Aug. 1, 1989, Ser. No. 387,840

Claims priority, application Brazil, Aug. 9, 1988, 8804178

Int. Cl.⁵ B21D *41/02*

U.S. Cl. 72—393 3 Claims



1. A device for manufacturing a can body by expansion of a cylindrical blank, comprising a substantially cylindrical expansion device for fitting inside the blank and including means for effecting radial expansion of the expansion device against the inside of the blank, the expansion device being of a predetermined length to expand the blank in a region intermediate the opposite ends of the blank, wherein the means for effecting radial expansion of the expansion device comprises an elongate frusto-conical central shaft, mounted at one end to a support member, and a plurality of elongate expansion blades arranged circumferentially around the central shaft, and held in position around the central shaft by spring means at the opposite ends of the blades, the central shaft being capable of lengthwise reciprocal movement relative to the expansion blades, the shaft and the blades being guided during said relative movement by mutually engaging longitudinally extending formations on the shaft and the blades, respectively, such that during movement of the shaft in one direction, the blades are expanded radially outwardly against the bias of the spring means and during movement of the shaft in the opposite direction, the blades are retracted radially inwardly by the spring means, and wherein the support member forms part of a cylindrical housing which includes a hydraulic piston attached to one end of the central shaft, for effecting the reciprocal movement thereof and the other end of the shaft projecting through an annular end wall of the housing and the expansion blades surrounding the shaft at a location which is outside the housing, the expansion blades having formations on their ends facing the cylindrical housing which collectively form a circular head having a channel extending around its periphery which engages with the annular end wall of the housing to permit the said radial expansion and retraction of the blades.

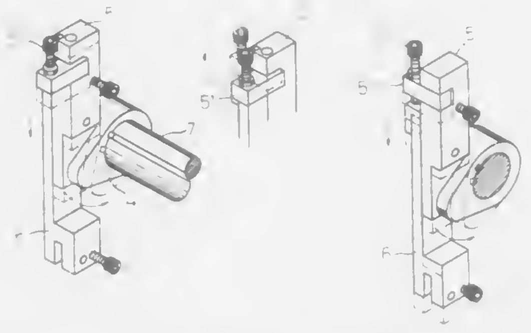
5,022,255
STRUCTURE OF PUNCH FOR VENETIAN BLIND MANUFACTURE

Liu Chia Pang, No. 301, Kuang Fu Rd., Chu Nan Village, Miaoli County, Taiwan

Filed May 2, 1990, Ser. No. 518,504

Int. Cl.⁵ B21J *7/46*

U.S. Cl. 72—444 2 Claims



1. A punch for venetian blind manufacture comprising:
- a stand;
- a casing and cover casing secured to said stand, said casing and cover casing having aligned through openings for passage therethrough of a cam shaft, said casing and cover casing forming an internal chamber;
- an eccentric cam keyed to said cam shaft for rotative displacement of said eccentric cam responsive to a rotation of said cam shaft, said eccentric cam having a cam dowel fixedly secured to a projecting portion of said eccentric cam, said eccentric cam located within said internal chamber;
- a vertically directed upper guide block having an upper guide block slot for receipt of said cam dowel for reciprocally displacing said upper guide block responsive to a rotative displacement of said eccentric cam;
- a horizontally directed adjusting seat member extending from said vertically directed upper guide block, said adjusting seat member being rotatable about a vertical axis;
- said vertically directed upper guide block having a guide block dowel secured to a face of said upper guide block;
- a lower vertically directed guide block having an elongated vertical slot formed therein for receipt of said guide block dowel, said adjusting seat member for (1) contiguously interfacing with a top surface of said lower guide block for linearly displacing said lower guide block responsive to a rotative displacement of said eccentric cam when said adjusting seat member is in a first position, and (2) for being displaced from said top surface of said lower guide block for independent displacement of said upper guide block with respect to said lower guide block when said adjusting seat member is rotated to a second position.

5,022,256
CLAMPING DEVICE

Jan van der Meulen, Eefde, Netherlands, assignor to Machinefabriek Wila B.V., Lochem, Netherlands

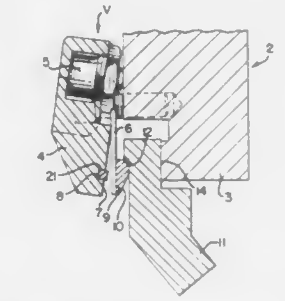
Filed Sep. 29, 1989, Ser. No. 414,777

Claims priority, application Netherlands, Sep. 29, 1988, 8802402

Int. Cl.⁵ B21D *37/14*

U.S. Cl. 72—481 **8 Claims**

1. A clamping device for clamping at least one article comprising:
- clamping means mounted to a support structure comprising first and second clamping jaws movable toward and away from one another;
- pressure means associated with the support structure for pressing the first and second clamping jaws together;
- a resilient strip positioned between the first and second clamping jaws and mounted to the first clamping jaw, the resilient strip having a first surface facing the first clamping jaw and a second surface facing the second clamping jaw, a portion of the resilient strip being separated from the first clamping jaw when the strip is not under stress; and
- locking means positioned between the clamping jaws and mounted to the second surface of the resilient strip, the locking means comprising at least one locking element for coaction with the article, the locking element comprises a locking member having an upper edge for coaction with a locking projection on an article such that the locking projection on the article can be hooked over the upper edge of the locking member to prevent release of the article.



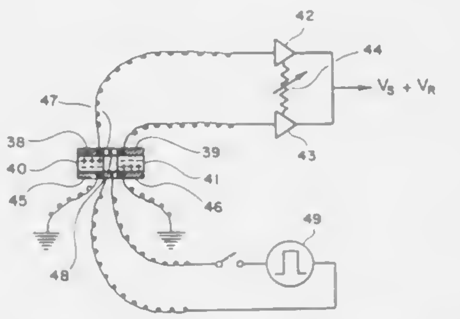
5,022,257
IMPULSE SENSOR WITH AMPLITUDE CALIBRATION MEANS

Hyok S. Lew, 7890 Oak St., Arvada, Colo. 80005

Continuation-in-part of Ser. No. 296,662, Jan. 13, 1989, Pat. No. 4,910,994. This application Mar. 23, 1990, Ser. No. 497,903

Int. Cl.⁵ G01F *25/00*

U.S. Cl. 73—3 **11 Claims**



1. An apparatus for detecting impulse comprising in combination:
- a) a container vessel including a cavity with a deflective wall on one side and a force receiving member extending from said deflective wall;
- b) a pair of planar Piezo electric elements disposed within said cavity on a plane adjacent and generally parallel to said deflective wall respectively on two opposite sides of a reference plane generally perpendicular to the deflective wall and pressed against the deflective wall, wherein each side of the combination of said pair of planar Piezo electric elements includes a middle electrode straddling the reference plane and in common contact with the pair of planar Piezo electric elements, and two side electrodes respectively disposed on two opposite sides of the reference plane and respectively in contact with the pair of planar Piezo electric elements;
- c) electronic circuit means for combining a first electrical signal from one side electrode disposed on one side of the reference plane and a second electrical signal from an-

VOL
1127
ISS
2
JE
11
1991
UMI

other side electrode disposed on the other side of the reference plane opposite to said one side, wherein electrical signal generated by a mechanical impulse perpendicular to the deflective wall is cancelled between said first and second electrical signals and electrical signal generated by a mechanical impulse perpendicular to the reference plane and experienced by the force receiving member is obtained;

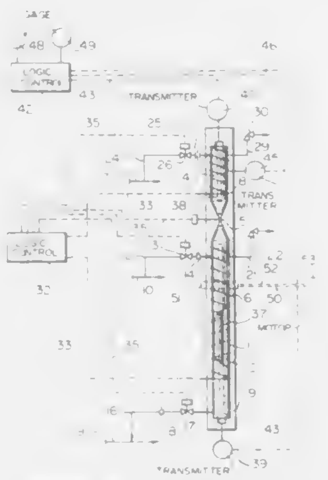
d) means for imposing a pulsed input electrical potential difference of known amplitude across the two middle electrodes respectively disposed on two opposite sides of the combination of said first and second planar Piezo electric elements; and

e) means for determining ratio of amplitude of pulsed output electrical potential generated by said pulsed input electrical potential difference and supplied from at least one of said one and another side electrodes to the known amplitude of said pulsed input electrical potential difference as a calibration standard in determining amplitude of the mechanical impulse experienced by the force receiving member from amplitude of output electrical signal from said electronic circuit means.

5,022,258
GAS GAGE WITH ZERO NET GAS FLOW
Gardner P. Wilson, 587 South Hill Ave., Pasadena, Calif. 91106
Filed May 7, 1990, Ser. No. 520,031
Int. Cl.^{5} G01B *13/08*
U.S. Cl. 73—37.5 **17 Claims**

1. An instrument for measuring a gap between it and an opposing surface, comprising:
- a gas conduit having an inlet and an outlet;
- a sensing orifice in the outlet intended to be directed toward said opposing surface;
- a gas pump connected to said inlet, said gas pump applying to said gas conduit an alternating pressure to cause puffs of gas to exit said sensing orifice, and to be drawn back into said sensing orifice in a continuously alternating operation;
- a sensor in fluid communication to said conduit responsive to a physical property of the gas responsive to a condition determined by the gap size; and
- circuit means responsive to said sensor to provide a signal respective to said physical property.

5,022,259
AUTOMATED VAPOUR PRESSURE ANALYZER
William L. Lee, P.O. Box 519, Bruderheim, Alberta T0B-0S0; Alexander McLean, 152 Garland Crescent, Sherwood Park, Alberta T8A-2R6, and Ronald E. Daye, 1619 Cayuga Dr. N.W., Calgary, Alberta T2LON2, all of Canada
Filed Apr. 20, 1990, Ser. No. 511,758
Int. Cl.^{5} G01N *7/16*
U.S. Cl. 73—64.20 **10 Claims**

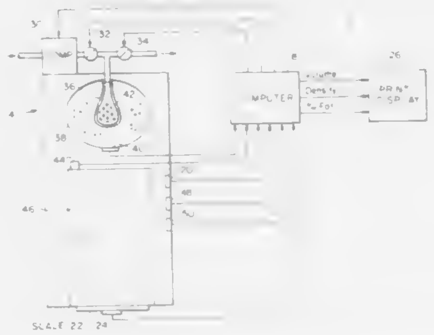


1. An automated vapor pressure measuring apparatus, comprising: casing means defining a first liquid sample chamber and a second vapor decompression chamber; first valve between said first and second chambers; first inlet means for introducing a liquid sample into said first chamber; first drain means for draining said second chamber; purge or atmospheric means for introducing a gas into said first and second chambers; heating means for heating said casing means and consequently the contents of said first and second chambers; first probe means for measuring the temperature in said first chamber; second probe means for measuring the temperature in said second chamber; pressure measuring means for measuring the vapor pressure in said first and second chamber; and programmable control means for controlling said first valve, said first inlet means, said first drain means, said purge or atmospheric means and said heating means, and for monitoring said first and second probe means and said pressure measuring means whereby automatically to perform the steps of introducing a liquid sample into said first chamber, depressuring said liquid sample into said second chamber, heating said sample, measuring the vapor pressure in said first and second chambers, and discharging the vapor-liquid sample from said first and second chambers to automatically measure vapor pressure of a liquid sample.

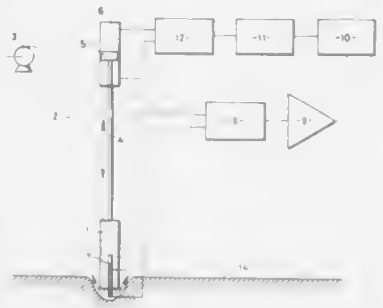
5,022,261
ANEROID VOLUME DETERMINING SYSTEM
Jason Wolfson, 6 Greenwood Village, Easton, Mass. 02356, and William Wolfson, 188 Pelham Island Rd., Wayland, Mass. 01778
Filed Jan. 4, 1990, Ser. No. 460,747
Int. Cl.^{5} G01F *17/00*
U.S. Cl. 73—149 **17 Claims**

1. An aneroid volume determining system comprising:
- an airtight chamber for holding a subject whose volume is to be detected;
- a volume adjuster including an inflatable container for varying the pressure in said chamber;
- means for sensing including a pressure transducer for sensing the pressure in said chamber in the deflated and inflated states of said container; and
- control means including means for calculating the volume of

the subject in response to the detection, by said means for sensing, of the pressure in said chamber with and without the subject present in said chamber, and which control means provides control signals to said volume adjuster for automatically controlling the inflation and deflation of said container.

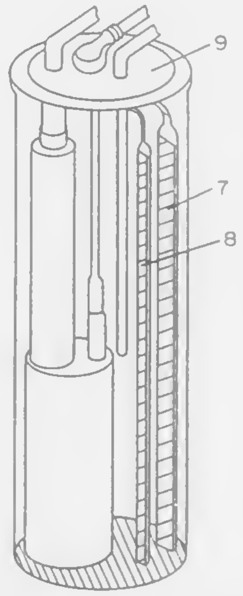


5,022,262
PROCESS AND APPARATUS FOR DETERMINING THE ERODABILITY OF SOIL, IN PARTICULAR SOIL BELONGING TO THE UNDERWATER FLOOR
Cornelis H. Hulsbergen, Dollardstraat 5, 8303 LG Emmeloord, and Romke Bijker, Koningsdam 1, 3011 TN Rotterdam, both of Netherlands, assignors to Cornelis H. Hulsbergen and Romke Bijker, both of, Netherlands
Filed Aug. 3, 1989, Ser. No. 389,272
Claims priority, application Netherlands, Aug. 9, 1988, 8801989
Int. Cl.^{5} G01W *1/00*
U.S. Cl. 73—170 A **9 Claims**



1. Process for determining the erodability of soil, in particular soil belonging to the underwater floor, comprising installing a vertically displaceable spray nozzle above the floor, producing a water flow onto or over the soil by means of said spray nozzle, which flow forms a pit in the soil by erosion of the soil, systematically lowering the spray nozzle by means of displacement means in a manner such that said nozzle follows the descending pit floor, determining the speed at which the spray nozzle follows the pit floor and deriving the erodability at various depths from the relationship between said speed and the flow rate of the water flow, characterized in that a quantity which is a function of the distance between the bottom end of the spray nozzle and the floor of the pit is measured with a sensor fitted to the spray nozzle, and in that said quantity is used to regulate a servo system which controls said displacement means of the spray nozzle in a manner such that said distance between the bottom end of the spray nozzle and the floor of the pit remains essentially constant.

5,022,263
THERMAL FUEL LEVEL DETECTOR
Eiichi Uriu, Hirakata; Koji Nishida, Kawanishi, and Munehiro Tabata, Ibaraki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
PCT No. PCT/JP88/00997, § 371 Date Aug. 2, 1989, § 102(e) Date Aug. 2, 1989, PCT Pub. No. WO89/03021, PCT Pub. Date Apr. 6, 1989
PCT Filed Sep. 30, 1988, Ser. No. 362,400
Claims priority, application Japan, Oct. 2, 1987, 62-250117; Jun. 7, 1988, 63-140017; Jun. 7, 1988, 63-140019; Jun. 22, 1988, 63-153933
Int. Cl.^{5} G01F *23/24*
U.S. Cl. 73—295 **18 Claims**



1. A thermal fuel level detector for detecting a level of fuel remaining in a fuel tank, comprising:
- a substrate;
- a self-heating temperature sensing resistor means formed on said substrate and having a relatively large temperature resistance coefficient and a relatively small resistance value, for detecting its resistance value as a function of its temperature, and self-heating temperature sensing resistor means being adapted to be dipped in said fuel remaining in said fuel tank;
- a temperature compensating temperature sensing resistor means formed on said substrate and having a temperature resistance coefficient substantially equal to a temperature resistance coefficient of said self-heating temperature sensing resistor means and a relatively large resistance value, said temperature compensating sensing resistor means being adapted to be dipped in said fuel to detect an atmospheric temperature within said fuel tank and a temperature of said fuel; and
- an electrical circuit means connected to both said self-heating temperature sensing resistor means and said temperature compensating temperature sensing resistor means for compensating said resistance value detected by said self-heating temperature sensing resistor means for variations in atmospheric temperature and in said temperature of said fuel, whereby a change in said resistance value of said self-heating temperature sensing resistor means responsive to cooling caused by heat of vaporization on a portion thereof which is dipped in said fuel is detected as a differential output voltage which provides an indication of said level of fuel remaining in said fuel tank.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,264
INSTRUMENT FOR MEASURING ACCELERATIONS, PARTICULARLY GRAVITATION COMPONENTS FOR GONIOMETRY

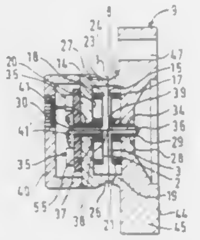
Siegfried T. Stauber, Zürich, Switzerland, assignor to Wyler AG, Winterthur, Switzerland

Filed Nov. 8, 1989, Ser. No. 434,437

Claims priority, application Switzerland, Nov. 7, 1988, 04125/88

Int. Cl.⁵ H01G *7/00*

U.S. Cl. 73—382 R **13 Claims**



1. An instrument for measuring acceleration, comprising:

a circular, metallic deflection part having a hole defined through its center;

two electrode plates having a hole defined through their centers;

a common casing having two parts, said deflection part held in a spring-elastic, membrane-like spaced manner between said two electrode plates and said deflection part and said two electrode plates in turn being placed between said two parts of said common casing, said deflection part and said electrode plates forming two adjacent capacitors;

an electrical connecting wire; and

electronic means for measuring acceleration in response to changes in capacitance of said capacitors;

wherein said capacitors are electrically connected to said electronic means, and said electrical connecting wire is passed in a contact-free manner through said central hole in said deflection part and through holes in both electrode plates, said wire connecting the electrode plate more remote from the electronic means to the electronic means.

5,022,265
METHOD AND APPARATUS FOR LEAK TESTING FLUID CONDUCTING FREEZE-DRYING APPARATUS

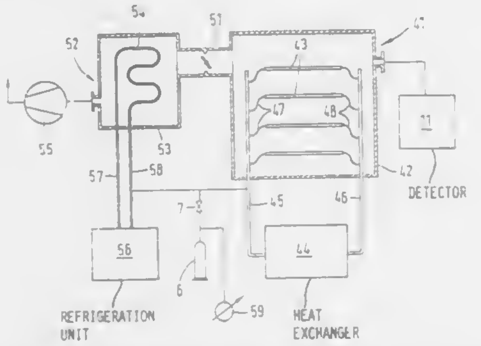
Günter Voss, Much, Fed. Rep. of Germany, assignor to Finn-Aqua, Hurth, Fed. Rep. of Germany

Continuation of Ser. No. 175,800, Mar. 31, 1988, Pat. No. 4,918,975. This application Mar. 20, 1990, Ser. No. 496,526

Claims priority, application European Pat. Off., Mar. 31, 1987, 87104737.9

Int. Cl.⁵ G01M *3/22*

U.S. Cl. 73—40.7 **10 Claims**



1. A freeze-drying apparatus comprising a freeze-drying chamber, a double-walled product shelf disposed within the freeze-drying chamber, a conduit system partially disposed within the freeze-drying chamber and attached to the product shelf for temperature regulation thereof, a heat-exchange fluid contained in the conduit system, a test gas reservoir connected to the conduit system outside of the freeze-drying chamber, and a test gas specific detector connected to the chamber for detecting test gas introduced into the freeze-drying chamber from the heat-exchange fluid through a leak in the conduit system.

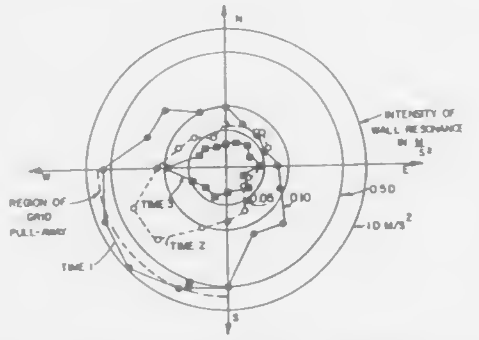
5,022,266
PASSIVE ACOUSTICS PROCESS TO MONITOR FLUIDIZED BED FLOW

George D. Cody, Princeton, N.J.; Eugene R. Elzinga, Jr., Marquette, Mich., and Charles L. Baker, Jr., Morris Plains, N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Mar. 2, 1989, Ser. No. 318,102

Int. Cl.⁵ G01N *29/00*

U.S. Cl. 73—579 **5 Claims**



1. A method for the non-intrusive determination of flow anisotropy through a two phase fluid bed in a structure comprising:

(a) measuring wall vibrations of said structure and then determining the power spectrum as a function of frequency, said wall vibrations taken at several first positions circumferentially about the structure,

(b) determining the area of the power spectrum which includes a resonance peak for each of said first positions.

(c) correlating a change in said area between adjacent fi positions of the power spectrum with flow anisotro through the cross-section of said structure bounded by th circumference including said several first positions.

5,022,267
BEARING ROLLER GAUGE

Charles W. Shattuck, Goshen; Joseph J. Lestinsky, Torrington, and Michael W. Gerardi, New Hartford, all of Conn., assignors to The Torrington Company, Torrington, Conn.

Filed Jan. 16, 1990, Ser. No. 465,288

Int. Cl.⁵ G01M *13/04;* **G01B** *5/28*

U.S. Cl. 73—593 **6 Claims**

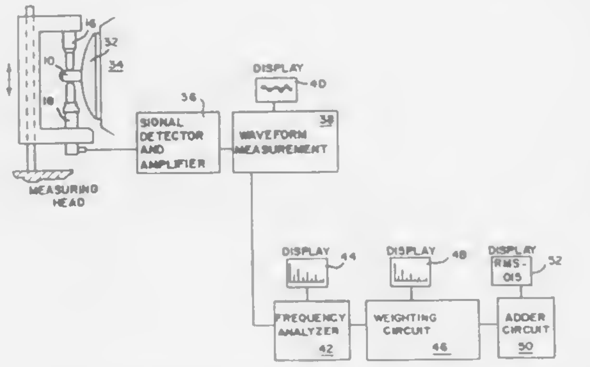
1. A roller gauge comprising:

means for rotating a roller;

mechanical-to-electrical transducer means for measuring the diametral variation around the circumference of the roller and converting the diametral variations of the roller into electrical signals which are a function of said diametral variation; and

an electrical signal conversion system for converting the electrical signals from said mechanical-to-electrical transducer means into a meaningful indication of the diametral variations of the roller, the electrical signal conversion system having a frequency analyzer for dividing the electrical signals from said mechanical-to-electrical transducer means into component frequencies and having

a weighting circuit which receives the signals from the frequency analyzer and weights the received signals such that the weighted component frequencies are proportional to the predicted effect on roller noise of the component frequencies.



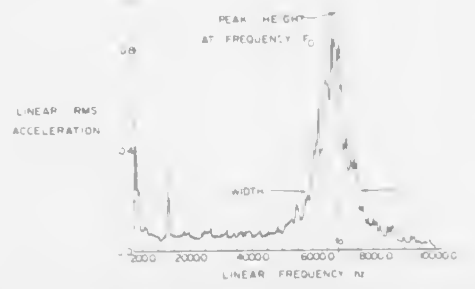
5,022,268
PASSIVE ACOUSTICS SYSTEM TO MONITOR FLUIDIZED BED SYSTEMS

H. Alan Wolf, Franklin Lakes, N.J., and David L. Chu, Baton Rouge, La., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed May 22, 1989, Ser. No. 355,540

Int. Cl.⁵ G01N *9/24*

U.S. Cl. 73—602 **10 Claims**



1. A vibrational analysis system for converting acoustical vibratory energy of a fluidized bed system for processing material into process related information comprising:

a. a sensor for transforming vibratory energy of said fluidized bed system into electrical signals as a function of time;
b. an amplifier to increase the level of said electrical signals;
c. a data collector for converting said electrical signals from a function of time into a function of frequency;
d. a computer;
e. means to transfer said electrical signals from said data collector to said computer in which said electrical signals are algorithmically converted to process related information wherein said electrical signals are analyzed by determining band-limited acceleration; bandwidth, peak height, peak frequency, and number of peaks, and
f. means for presenting said process related information,
g. means for statistically comparing said process related information with other process related information obtained by said system either concurrently or at a previous time.

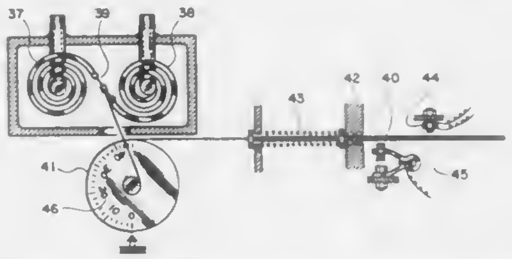
5,022,269
RESONANCE FREQUENCY POSITION SENSOR

Hyok S. Lew, 7890 Oak St., Arvada, Colo. 80005

Filed Dec. 26, 1989, Ser. No. 456,723

Int. Cl.⁵ G01L *11/00, 13/02*

U.S. Cl. 73—702 **13 Claims**



13. A device for measuring pressure comprising in combination:

a) a first deformable pressure receiving member receiving a first pressure, said first pressure creating a deformation of said first deformable pressure receiving member in a first direction;
b) a second deformable pressure receiving member receiving a second pressure, said second pressure creating a deformation of said second pressure receiving member in a second direction generally opposite to said first direction;
c) a linkage means linking a deformable portion of said first deformable pressure receiving member and a deformable portion of said second deformable pressure receiving member to one another;
d) a vibrating element with a displaceable member having a resonance frequency of natural vibration that is a function of position of said displaceable member, wherein said displaceable member is coupled to the displacement of said linkage, whereby the displacement of said linkage means is determined from the resonance frequency; and
e) means for inducing the natural vibration of said vibrating element, and means for detecting the resonance frequency of the natural vibration as a measure of differential value between said first and second pressures.

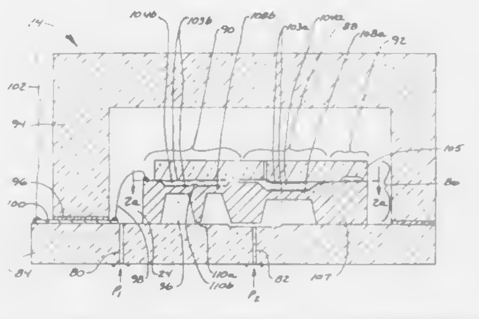
5,022,270
EXTENDED MEASUREMENT CAPABILITY TRANSMITTER HAVING SHARED OVERPRESSURE PROTECTION MEANS

Stanley E. Rud, Jr., Eden Prairie, Minn., assignor to Rosemount Inc., Eden Prairie, Minn.

Filed May 29, 1990, Ser. No. 530,024

Int. Cl.⁵ G01L *7/08, 9/12, 19/04*

U.S. Cl. 73—706 **12 Claims**



1. A transmitter sensing at least one applied pressure and providing output representative of the applied pressure, comprising:

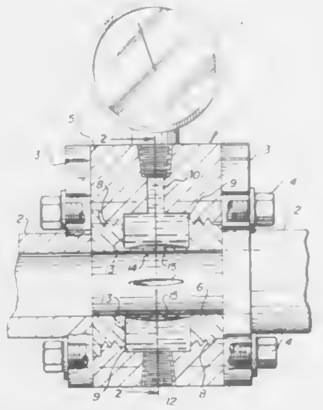
a pressure sensor having an output and at least one inlet and sensing pressures within a first pressure measurement range;

a pressure sensor having an output and at least one inlet and

VOL
1127
ISS
2
JE
11
1991
UMI

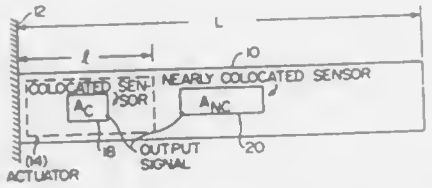
sensing pressures within a first pressure measurement range;
overpressure protection means for coupling the applied pressure to the pressure sensor inlet including means for containing a volume of substantially incompressible isolator fluid leading to the pressure inlet, the applied pressure causing a movable member to act on the isolator fluid as applied pressure changes, the overpressure protection means including a chamber which changes in volume as applied pressure changes to permit the movable member to contact a stop, limiting further increase in fluid pressure acting at the sensor inlet when the applied pressure exceeds a preselected limit;
at least one additional pressure sensor sensing pressures within an additional pressure measurement range and having an additional sensor output and a pressure inlet open to the volume of isolator fluid so that the overpressure protection means is shared by both pressure sensors; and
electronics means for combining the sensor outputs for conversion to the transmitter output.

5,022,271
PRESSURE SENSING DEVICE FOR PIPES
Dewey Hannon, Jr., 1308 Stevens St., Amory, Miss. 38821
Filed Dec. 12, 1989, Ser. No. 448,849
Int. Cl.⁵ G01L *7/02*
U.S. Cl. 73—730 4 Claims



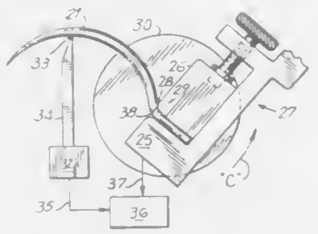
1. A pressure sensing device for sensing pressures within a pipeline, said pressure sensing device comprising an outer housing member and an inner replaceable cartridge member, said outer housing member having a central bore therein and at least one passageway extending through the outer housing member and adapted to receive a pressure gauge in said passageway, said inner replaceable cartridge having a central aperture therethrough of uniform diameter and comprising a thin circular pressure sensing wall in the central portion of the cartridge with rigid enlarged end flanges integrally formed with the pressure sensing wall, said inner replaceable cartridge adapted to slide within the central bore of the outer housing member, means for securing the inner replaceable cartridge within the bore of the outer housing member, the outer face of the thin circular pressure sensing wall together with the inner surface of the flanges on the replaceable cartridge and the inner face of the outer housing member forming a chamber, whereby pressures within a pipeline may be sensed by the thin walled pressure sensor and transmitted through fluid in the chamber to the pressure gauge and whereby the cartridge member including the integrally formed thin circular pressure sensing wall may be readily slid out of the outer housing member as a single unit in a particular direction of travel, removed and replaced within the outer housing member.

5,022,272
LOCALLY COMPENSATED DEFORMATION SENSOR
Allen J. Bronowicki, Laguna Niguel, and Todd L. Mendenball, Redondo Beach, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.
Filed Dec. 14, 1989, Ser. No. 450,714
Int. Cl.⁵ G01B *7/16*
U.S. Cl. 73—772 12 Claims



1. A deformation sensing system for use in measuring the deformation of a structural member subject to deformation by an actuator, the deformation sensing device comprising:
a collocated sensor positioned on the structural member in a region of influence of an actuator operating on the structural member;
a nearly collocated sensor positioned on the structural member outside the region of influencc of the actuator; and
means for combining output signals generated by the collocated sensor and the nearly collocated sensor in such a way as to yield a composite signal whose magnitude is approximately proportional to the average strain over the entire structural member.

5,022,273
APPARATUS AND METHOD FOR TESTING THE BENDING STRENGTH OF NEEDLES
Alfred G. Evans, Torrington, Conn., assignor to United States Surgical Corporation, Norwalk, Conn.
Filed Jun. 11, 1990, Ser. No. 535,849
Int. Cl.⁵ G01N *3/20*
U.S. Cl. 73—849 34 Claims

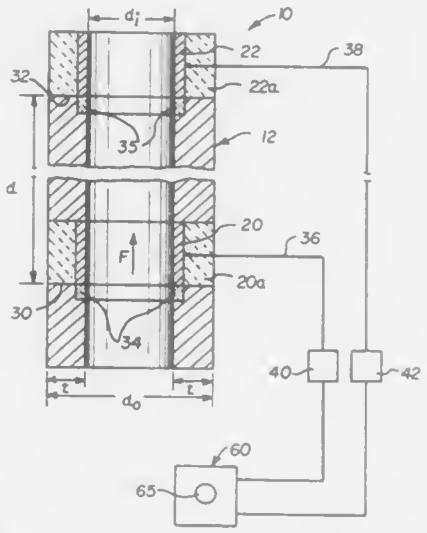


1. Apparatus for determining the bending strength of a needle which comprises:
a) means to releasably grip the needle at one end portion;
b) means to rotate the needle gripping means and the needle;
c) means positioned within the rotatable path of the needle so as to engage the needle at a predetermined location; and
d) means to provide signal means in dependence upon forces applied to said needle engaging means by said needle.

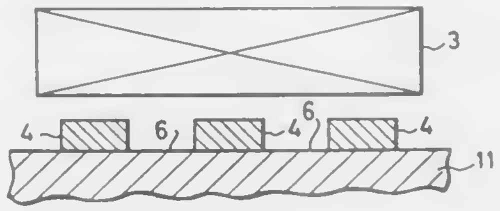
5,022,274
HIGH TEMPERATURE PARTICLE VELOCITY METER AND ASSOCIATED METHOD
George E. Xlinzing; Luis A. Borzone, both of Pittsburgh, and Wen-Ching Yang, Export, all of Pa., assignors to University of Pittsburgh, Pittsburgh, Pa.
Filed Jan. 22, 1990, Ser. No. 468,367
Int. Cl.⁵ G01F *1/56, 1/708*
U.S. Cl. 73—861.04 34 Claims

1. A device for measuring the particle velocity of a pneumatically transported high temperature material comprising:

pipeline means for holding said high temperature material;
a first electrically conducting portion disposed on the inner surface of said pipeline means, said first electrically conducting portion having an upstream end and a downstream end;
a first electrically non-conducting portion disposed on the inner surface of said pipeline, said first electrically non-conducting portion positioned adjacent to said upstream end of said first electrically conducting portion, to create a first triboelectric charge when said high temperature material contacts said first electrically non-conducting portion, said first triboelectric charge being discharged when said material subsequently contacts said first electrically conducting portion;
a second electrically conducting portion disposed on the inner surface of said pipeline and spaced apart form said first electrically conducting portion, said second electrically conducting portion having an upstream end and a downstream end;
a second electrically non-conducting portion disposed on the inner surface of said pipeline, said second electrically non-conducting portion positioned adjacent said upstream end of said second electrically conducting portion to create a second triboelectric charge when said high temperature material contacts said second electrically non-conducting portion, said second triboelectric charge being discharged when said material subsequently contacts said second electrically conducting portion;
first signal generating means to receive said first triboelectric charge;
first conductor means to carry said first triboelectric charge from said first electrically conducting portion to said first signal generating means;
second signal generating means to receive said second triboelectric charge;
second conductor means to carry said second triboelectric charge from said second electrically conducting portion to said second signal generating means;
said first signal generating means converting said first triboelectric charge from said first electrically conducting portion into a first electronic signal;
said second signal generating means converting said second triboelectric charge from said second electrically conducting portion into a second electronic signal; and
means for calculating the particle velocity of said high temperature material based on said first electronic signal and said second electronic signal.

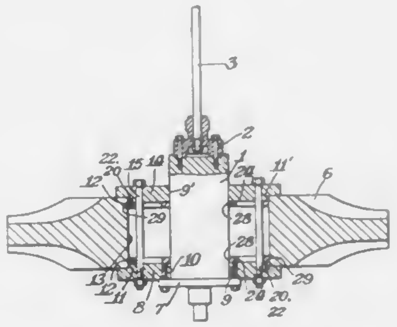


5,022,275
STRAIN MEASURING DEVICE EMPLOYING MAGNETOSTRICTION AND HAVING A MAGNETIC SHIELDING LAYER
Hiroshi Satoh, and Yoshihiko Utsui, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 12, 1989, Ser. No. 336,812
Claims priority, application Japan, Jun. 15, 1988, 63-147281; Jun. 29, 1988, 63-162807
Int. Cl.⁵ G01L *3/10;* **G01B** *7/24;* **G01R** *33/18;* **H01B** *12/06*
U.S. Cl. 73—862.36 11 Claims



1. A strain measuring device comprising:
a passive member of soft magnetic and magnetostrictive material with high permeability which varies as a function of an external force;
a magnetic shielding layer covering selected portions of the surface of said passive member for shielding said selected covered portions of the surface of said passive member from external magnetic influence, such that those portions of said passive member which are not covered by said magnetic shielding layer remain exposed to external magnetic influence; and
a permeability detection means positioned around said passive member for subjecting those portions of said passive member not covered by said magnetic shielding layer to magnetic flux and for detecting changes of magnetic permeability in those portions of the surface of said passive member not covered by said magnetic shielding layer, caused by strain produced by the external force.

5,022,276
DEVICE FOR HOLDING A ROTOR
Dieter Thelen, Darmstadt, Fed. Rep. of Germany, assignor to Carl Schenck AG, Fed. Rep. of Germany
Filed May 26, 1987, Ser. No. 54,324
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1987, 8701379
Int. Cl.⁵ G01M *15/00*
U.S. Cl. 73—865.3 2 Claims



1. A device for holding a rotor having an axial bore hole on a spin arbor of a rotor spin testing machine, comprising axially spaced apart first and second clamping elements with axial freedom therebetween constructed and arranged to engage the rotor and centrally align the rotor with the spin arbor, at least one centering element positioned between the exterior of the spin arbor and the interior surface of the axial bore hole of the

VOL
1127
ISS
2
JE
11
1991
UMI

rotor and centered with respect to the spin arbor, the centering element having a body with several circumferential areas arranged along the outer circumference thereof, separation slots separating the circumference into the circumferential areas, each separation slot forming a though hole radially extending through the body of the centering element, each circumferential area including a springly radially deformable centering surface portion engaging the interior surface of the rotor bore hold throughout the rotor spin test for centering the rotor to the spin arbor even when the size of the axial bore hole slightly expands, the centering element being in the form of a sleeve having an annular protrusion with several circumferential areas that engage the interior surface of the axial bore hole of the rotor, the annular protrusion having a diameter slightly larger than the diameter of the axial bore hole of the rotor whereby the sleeve centering element is pretensioned when operatively positioned, and separation slots extending through the annular protrusion to thereby divide the protrusion into the radially deformable centering portions.

2. A device for holding a rotor having an axial bore hole on a spin arbor of a rotor spin testing machine, comprising axially spaced apart first and second clamping elements with axial freedom therebetween constructed and arranged to engage the rotor and centrally align the rotor with the spin arbor, at least two centering elements positioned between the exterior of the spin arbor and the interior surface of the axial bore hole of the rotor and centered with respect to the spin arbor, each of the centering elements having a body with several circumferential areas arranged along the outer circumference thereof, separation slots separating the circumference into the circumferential areas, each separation slot forming a through hole radially extending through the body of the centering element, each circumferential area including a springy radially deformable centering surface portion engaging the interior surface of the rotor bore hold throughout the rotor spin test for centering the rotor to the spin arbor even when the size of the axial bore hold slightly expands.

5,022,277

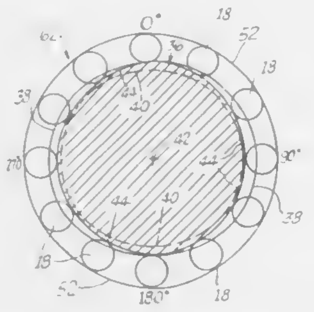
SCREW AND NUT MACHINE

James E. Shaffer, Maitland, Fla., assignor to Consolier Industries, Inc., Riviera Beach, Fla.

Filed Aug. 22, 1989, Ser. No. 397,107

Int. Cl.^{5} F16H *25/22*

U.S. Cl. 74—424.8 NA **45 Claims**



1. A machine for translating rotational motion about an axis to motion parallel to said axis comprising:

a first member having a helical thread;

a plurality of rolling elements; and

a second member having a plurality of non circular tracks for containing said rolling elements around said first member, a common point of each rolling element contained in each track being oriented along a single plane, one of said first or second members being rotatable to cause the axial movement of the other of said first or second members.

5,022,278

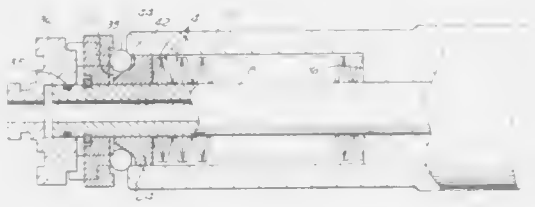
DRAW BAR MECHANISM

David E. DeCaussin, Northridge, Calif., assignor to Fadal Engineering Co., Inc., No. Hollywood, Calif.

Filed Mar. 27, 1990, Ser. No. 499,721

Int. Cl.^{5} B23B *31/10*

U.S. Cl. 74—110 12 Claims



1. A draw bar of the type for operating a collet chuck comprising:

an elongated tube member having an axis and a conical surface at a first end of the tube member;

an elongated rod member coaxially disposed within said elongated tube member and axially moveable along a stroke between a first position and a second position, said first position corresponding to locking of the collet chuck and said second position corresponding to release of the collet chuck;

a sleeve member coaxially disposed between said tube member and said rod member having a plurality of inclined passageways extending radially therethrough;

a plurality of balls, one disposed within each of said passageways;

a spider member axially retained on said rod member having a plurality of radially projecting bearing surfaces facing said sleeve member for engagement with said balls;

spring means for biasing said sleeve member axially towards said first end of said tube member such that said balls are urged by contact within said inclined passageways outwardly into contact with said conical surface of said sleeve member and axially into contact with said bearing surfaces of said spider member;

whereby a biasing force of said spring means is amplified and transmitted through cooperative engagement of said sleeve member, said balls, said spider member and said rod member, to urge said rod member towards said first position.

5,022,279

RACK AND PINION STEERING DEVICE

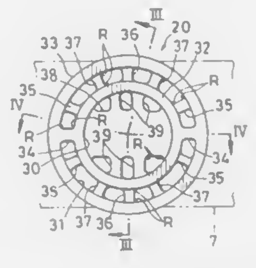
Hiroshi Ueno; Shoji Hatabu, and Hirokazu Arai, all of Osaka, Japan, assignors to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Nov. 2, 1989, Ser. No. 430,464

Claims priority, application Japan, Nov. 8, 1988, 63-145812[U]; Nov. 8, 1988, 63-145814[U]

Int. Cl.^{5} F16H *1/04;* B62D *3/12*

U.S. Cl. 74—422 6 Claims



1. A rack and pinion steering device wherein a housing has accommodated therein a hollow cylindrical rack guide made of synthetic resin and pressed against a rack bar by a spring for guiding the rack bar and preloading the rack relative to the pinion, the rack guide being formed in its one end face with a guide groove for guiding the rack bar, the device being characterized in that the rack guide is a double cylinder having an inner cylindrical portion and an outer cylindrical portion, said inner cylindrical portion having a circular spring accommodating cavity and an annular groove between said inner and outer cylindrical portions and concentric with said spring accommodating cavity, a plurality of ribs in said annular groove between said inner and outer cylindrical portions, said ribs extending diametrically of said cylindrical portions and including a pair of ribs extending parallel to said guide groove and additional ribs spaced circumferential therefrom, the inner cylindrical portion having an end face extending at least flush with an end face of said outer cylindrical portion, at least said ribs extending parallel to said guide groove each having an end face flush with an end face of said inner cylindrical portion.

5,022,280

NOVIKOV GEARING

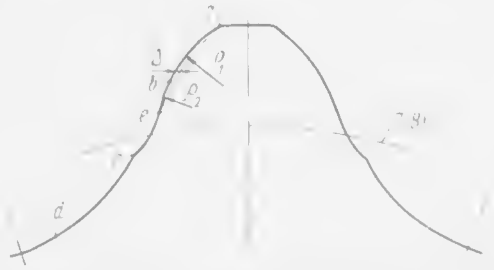
Leonid S. Boiko, ulitsa Deputatskaya, 6, kv. 26, Kiev; Viktor I. Korotkin, prospekt Stachki, 193/2, kv. 73, Rostov-na-Donu; Viktor Y. Veretennikov, ulitsa Repina, 19, kv. 12, Izhevsk; Efim G. Roslivker, prospekt Budennovsky, 72, kv. 51, Rostov-na-Donu; Roman V. Fedyakin, ulitsa Izumrudnaya, 13, korpus 1, kv. 242; Viktor A. Chesnokov, Petrovsko-Razumovskaya alleya, 26, kv. 30, both of Moscow; Anatoly S. Yakovlev, ulitsa Komsomolskaya, 198, kv. 8, Orel; Jury D. Kharitonov, ulitsa Sodruzhestva, 37, kv. 173, Rostov-na-Donu; Valery M. Fei, ulitsa Vyborgskaya, 31-37a, kv. 33, and Emma N. Galichenko, ulitsa Gogolevskaya, 37/2, kv. 55, both of Kiev, all of U.S.S.R.

PCT No. PCT/SU88/00074, § 371 Date Nov. 28, 1989, § 102(e) Date Nov. 28, 1989, PCT Pub. No. WO89/09354, PCT Pub. Date Oct. 5, 1989

PCT Filed Mar. 29, 1988, Ser. No. 445,732

Int. Cl.^{5} F16H *55/08*

U.S. Cl. 74—462 1 Claim



1. A Novikov gearing comprising at least two gear elements with the teeth of each element consisting of an addendum whose profile in a normal section is described by a convex curve, a dedendum and a fillet interconnecting the two, characterized in that a part (be) of the fillet (6) adjoining the addendum (4) has a convex profile in the normal section, a radius of curvature (ρ_2) of this section being smaller than the radius of a curvature (ρ_1) of the addendum (4).

5,022,281

ARRANGEMENT FOR PRESELECTING AND SHIFTING A MOTOR VEHICLE GEAR SHIFT TRANSMISSION

Helmut Heizmann, Stuttgart, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany

Filed Sep. 15, 1989, Ser. No. 408,112

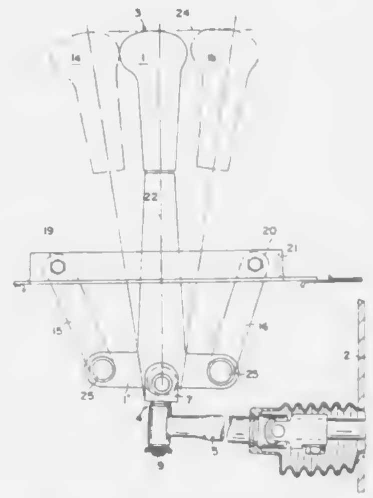
Claims priority, application Fed. Rep. of Germany, Sep. 15, 1988, 3831310

Int. Cl.^{5} G05G *1/04;* F16H *59/10*

U.S. Cl. 74—473 R 4 Claims

1. An arrangement for preselecting and shifting a motor vehicle gear shift transmission, having a gear shift lever which is provided at its upper end with a grip and is guided in the area of its lower end by a joint square which comprises at least two rocker devices pivoted at the vehicle frame and a coupling device by means of which the rocker devices are pivotally connected, a shift rod being pivotally connected to the lower end of the gear shift lever which engages in the gear shift transmission, wherein a crosspiece of the gear shift lever forms the coupling device of the joint square, and wherein the rocker devices are pivotally connected at both sides of the crosspiece; and

wherein the rocker devices extend at an acute angle with respect to one another and their longitudinal centerlines intersect in proximity of the longitudinal center line of the gear shift lever.



5,022,282

TILT STEERING APPARATUS

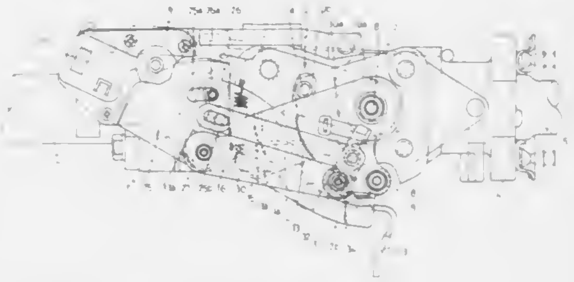
Masumi Nishikawa, Toyoake, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed Mar. 24, 1989, Ser. No. 328,241

Claims priority, application Japan, Mar. 24, 1988, 63-70208; Mar. 24, 1988, 63-70209

Int. Cl.^{5} B62D *1/18*

U.S. Cl. 74—493 7 Claims



1. A tilt steering apparatus comprising:

a fixed bracket;

a movable bracket pivotally mounted to the fixed bracket by a center pin;

a ratchet coupled to the movable bracket;

a pawl lever rotatably mounted on the center pin;

a pawl movable relative to the fixed bracket and meshed with the ratchet for regulating the position thereof, the pawl also being pivotally mounted directly to the pawl lever;

tilt lever means rotatably mounted on the center pin for controlling engagement between the ratchet and the pawl;

first biasing means disposed between the fixed bracket and the movable bracket for biasing the movable bracket to an away-position;

VOL
1127
ISS
2
JE
11
.
1991
UMI

stopper means provided on the fixed bracket and operatively engaging the ratchet for regulating the movement of the movable bracket at said away-position;

second biasing means disposed between the tilt-operating lever and the pawl lever for urging the pawl lever to rotate in one direction;

a hook lever means pivotally mounted to the fixed bracket and engaged with the pawl lever for preventing pawl lever rotation in one direction;

gear means associated with the fixed bracket for rotating the hook lever to separate the hook lever from the pawl lever so that the movable bracket may be transferred to said away-position by the first biasing means, said gear means including a pin located adjacent the center of rotation of said gear;

drive means for driving the gear means;

a lock lever rotatably mounted on the fixed bracket and rotatable in accordance with pawl lever rotation;

locking means, mounted to the fixed bracket and coupled to the lock lever to rotate therewith, for holding the ratchet with the stopper means, thereby preventing the movement of the movable bracket at its away-position; and

a link means operatively coupling said gear pin and said lock lever.

5,022,283

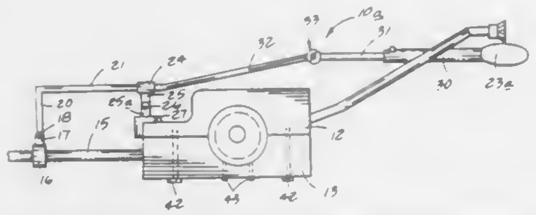
TURN SIGNAL AUXILIARY LEVER APPARATUS

Mark R. Deslandes, R.F.D. #2 Box 119, North Troy, Vt. 05859

Filed Mar. 26, 1990, Ser. No. 500,532

Int. Cl.^{5} G05G *1/04*

U.S. Cl. 74—523 2 Claims



1. A turn signal auxiliary lever apparatus for mounting to a steering column housing, the steering column housing including a gear shift lever directed in a rightward orientation relative to the housing and a turn signal lever directed in a leftward orientation relative to the steering column housing, the apparatus comprising,

an upper housing for overlying the steering column housing, and

a lower housing for underlying the steering column housing wherein the upper and lower housings are securable together to receive the steering column housing therebetween, and

a first collar for surroundingly and slidably receiving the turn signal indicator lever, with the first collar including a first flange directed orthogonally and upwardly relative to the first collar, with a first pivot axle orthogonally directed through the first flange, and

an elongate actuation lever defined by a first leg segment, a second leg segment, and a third leg segment, wherein each leg segment is angularly oriented relative to one another, and the first leg segment includes a lower terminal end receiving the first pivot axle therethrough, and

the third leg segment extends above and beyond the upper housing in a rightward orientation to be adjacent the gear shift lever, and

wherein the first leg segment is orthogonally and integrally jointed to the second leg segment, the second leg segment including a forward terminal end jointed to the third leg segment, and a second collar fixedly and surroundingly clamping the second leg segment adjacent its forward terminal end, wherein the second collar includes an upper flange directed downwardly from the second collar and pivotally joined to a lower flange, the upper and lower flanges joined together including a second axle pivotally directed through the upper and lower flanges, and the lower flange orthogonally mounted to an "L" shaped housing mount, the "L" shaped housing mount fixedly secured to an upper surface of the upper housing, and

wherein the second leg segment is joined at the third leg segment at an obtuse included angle therebetween, and

wherein the third leg segment includes a forward third leg shaft pivotally joined to a rear third leg shaft, the rear third leg shaft integrally joined to the forward end of the second leg segment at a rear terminal end of the rear third leg shaft, and a forward end of the rear third leg shaft pivotally joined at a rear terminal end of the forward third leg shaft, including a rotatable coupling, and

wherein the rotatable coupling includes a first cylindrical coupling member diametrically aligned with the forward end of the rear third leg shaft, and the rotatable coupling further includes a second cylindrical coupling member diametrically and integrally joined to a rear terminal end of the forward third leg shaft, and the first and second cylindrical coupling members each including confronting serrated teeth, the serrated teeth arranged in a radial array about interior confronting surfaces of the respective first and second cylindrical coupling members, and

wherein the first cylindrical coupling member includes a first threaded central aperture coaxially directed therethrough aligned with a smooth central aperture formed coaxially through the second cylindrical coupling member, and a threaded shaft threadedly received within the first threaded central aperture, and the threaded shaft including an enlarged head defined by a diameter greater than a further diameter defined by the threaded shaft, wherein the large head overlies an exterior surface of the second cylindrical coupling member, and wherein the threaded shaft is received within the first threaded central aperture, and

wherein the forward third leg shaft further includes a sleeve telescopingly received thereon, the sleeve includes a series of aligned apertures directed through a wall defined by the sleeve, and a spring-biased detent mounted on the forward third leg shaft selectively directed within one of the aligned series of spaced apertures to permit relative repositioning of the sleeve.

5,022,284

AUTOMATIC TRANSMISSION CONTROL SYSTEM

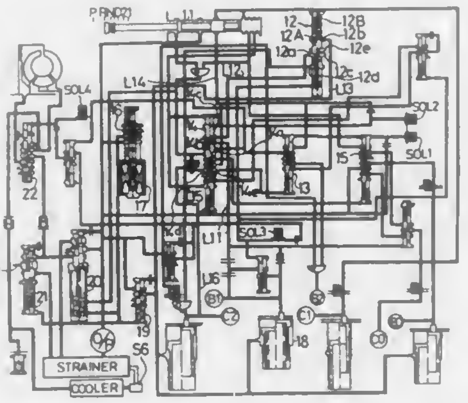
Masato Shimei, Odaka, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Sep. 25, 1990, Ser. No. 587,790

Claims priority, application Japan, Sep. 30, 1989, 01-253749

Int. Cl.^{5} B60K *41/18*

U.S. Cl. 74—844 3 Claims



1. An automatic transmission shift control device, comprising,

a first multiple element friction engaging device,

a second multiple element friction engaging device engaged for an up-shift of the transmission when said first multiple element friction engaging device is released from engagement,

a shift timing valve having a spool movable to a plurality of positions, a return spring and a port, the spool being moved so that an engaging oil pressure of said first multiple element friction engaging device is quickly reduced when a force transmitted by an engaging oil pressure of said second multiple element friction engaging device supplied to said timing valve is greater than the force transmitted by an accumulator back pressure modulated by said return spring and throttle pressure from a throttle valve,

a throttle valve operating means controlling said throttle valve to modulate said throttle pressure,

an oil temperature sensing means disposed in an oil control circuit of said transmission control device, and

a control means operating said throttle valve operating means so that said accumulator back pressure modulated by said throttle pressure is less than that provided when the oil temperature is under a predetermined value as compared to when the oil temperature sensed by said oil temperature sensing means is greater than said predetermined value.

5,022,285

TRANSIENT REDUCTION RATIO CONTROL DURING SHIFT BETWEEN TWO MODE OPERATIONS

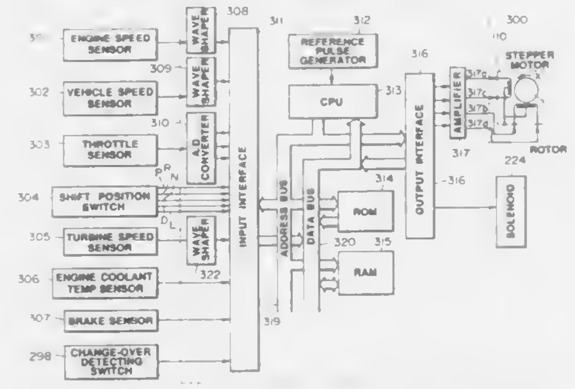
Yutaka Suzuki, Atsugi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 16, 1989, Ser. No. 437,227

Claims priority, application Japan, Nov. 16, 1988, 63-287843

Int. Cl.^{5} B60K *41/12*

U.S. Cl. 74—866 10 Claims



1. A control apparatus for a continuously variable transmission for a motor vehicle including an engine, the continuously variable transmission being shiftable in reduction ratio in accordance with one of a plurality of predetermined schedules including a first predetermined schedule and a second predetermined schedule, the control apparatus comprising:

means for controlling a reduction ratio of the continuously variable transmission in accordance with the first predetermined schedule when use of the first predetermined schedule is demanded;

said controlling means being operative to control the reduction ratio in accordance with a predetermined function of time that has passed since the instant when a change has been made from a demand for use of the first predetermined schedule to a demand for use of the second predetermined schedule until a predetermined condition is satisfied;

said controlling means being operative to control the reduction ratio in accordance with the second predetermined schedule after said predetermined condition is satisfied when use of the second predetermined schedule is demanded.

5,022,286

SYSTEM FOR AND METHOD OF CONTROLLING SHIFTING IN GEAR POSITION IN AUTOMATIC TRANSMISSION

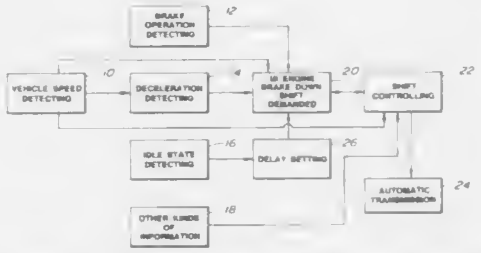
Satoshi Takizawa, Yokosuka, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 11, 1989, Ser. No. 336,431

Claims priority, application Japan, Apr. 11, 1988, 63-87390; Apr. 11, 1988, 63-87391

Int. Cl.^{5} B60K *41/06*

U.S. Cl. 74—866 10 Claims



1. A method of controlling shifting in gear position in an automatic transmission for an automotive vehicle when the vehicle is subjected to deceleration, wherein the automatic transmission is downshifted and conditioned in engine brake running state after predetermined conditions have been met, the predetermined conditions including absence of a power demand by a driver of the automotive vehicle, the method comprising the steps of:

determining whether or not there is a presence of the power demand after the predetermined conditions have been met; and

releasing the automatic transmission from the engine brake running state upon expiration of a predetermined delay time beginning with determination of the presence of the power demand by said determining step.

5,022,287

METHOD OF CONTROLLING CLUTCH OF CONTINUOUSLY VARIABLE TRANSMISSION SYSTEM

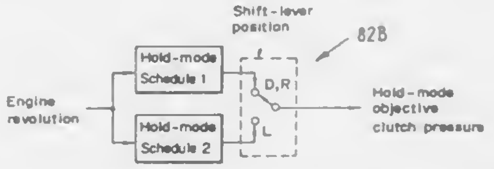
Katsuaki Murano; Sadayuki Hirano; Yoshinori Yamashita, all of Shizuoka; Takumi Tatsumi, and Hiroaki Yamamoto, both of Hyogo, all of Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka and Mitsubishi Denki Kabushiki Kaisha, Tokyo, both of, Japan

Filed Aug. 8, 1988, Ser. No. 229,909

Claims priority, application Japan, Aug. 10, 1987, 62-199412

Int. Cl.^{5} B60K *41/14, 41/22*

U.S. Cl. 74—866 11 Claims



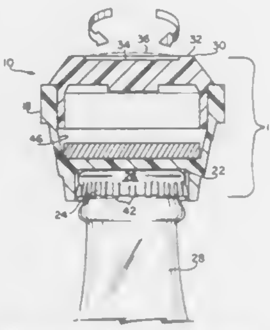
1. A method of controlling a progressively engageable fluid actuated clutch of a continuously variable transmission which has a plurality of operational modes, including a hold mode, and which is provided in a vehicle having an engine drivingly coupled to said transmission, having a shift selector movable to a plurality of positions including first and second positions each selecting vehicle motion in a common direction and having an accelerator pedal movable to and from a deactuated position, comprising the steps of: causing said transmission to

VOL
1127
ISS
2
JE
11
1991
UMI

operate in said hold mode in response to a set of predetermined operational conditions, selecting for said hold mode a target clutch pressure as a function of engine speed and shift lever position, and feedback controlling actual fluid pressure for said clutch based on said target pressure in said hold mode.

5,022,288
CRIMPED CAP REMOVAL AND RETURN ASSIST DEVICE

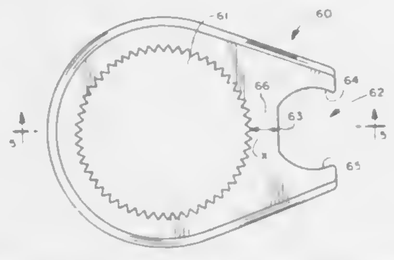
Harry Taktakian, 1030 Medford Rd., Pasadena, Calif. 91107, assignor to Harry Taktakian, Pasadena, Calif.
Filed Oct. 9, 1990, Ser. No. 595,273
Int. Cl.^{5} B67B *7/18*
U.S. Cl. 81—3.4 12 Claims



1. Crimped cap removal and return assist device comprising a body having oppositely tapered upper and lower conical portions and a protruding circular midrib therebetween, said lower conical portion being truncated and defining an outwardly open cylindrical pocket adapted to non-slippingly grip the ridges of a crimped-on bottle cap for rotation on or off a bottle, said upper conical portion being truncated to define a transverse boss, said midrib being of greater diameter than said lower conical portion pocket and adapted to be gripped by a user's hand for rotating said body in the cap-engaged condition of said pocket, said upper conical portion boss being adapted and arranged to support the user's hand between the thumb and index finger thereof for application of increased hand pressure to said body while rotating the same for removal or return of said cap.

5,022,289
RATCHET TOOL WITH FLATTENED POCKET

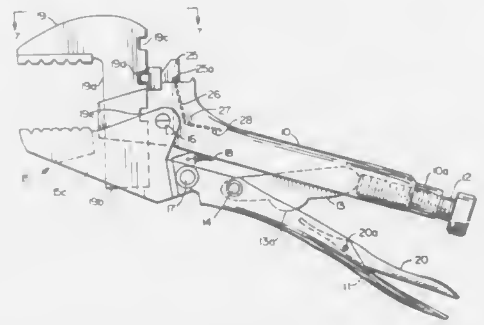
James K. Butzen, Grayslake, Ill., assignor to Snap-on Tools Corporation, Kenosha, Wis.
Filed Aug. 16, 1990, Ser. No. 568,234
Int. Cl.^{5} B25B *13/46*
U.S. Cl. 81—57.39 6 Claims



1. A ratchet tool comprising an elongated housing, a drive body carried by said housing, a ratchet ring including a toothed surface and a pocket, pawl means on said body and including a toothed surface engaging the toothed surface of said ring, said pocket having front and rear ends and substantially semi-cylindrical side surfaces, said pocket having a mouth at said rear end and a substantially planar wall at said front end, a bar in said pocket and including substantially semi-cylindrical side surfaces respectively mating with the semi-cylindrical side surfaces of said pocket, and drive means mounted in said housing and having an eccentric pin in operative engagement with said bar.

5,022,290
ADJUSTABLE LOCKING WRENCH

Thomas F. Duffy, Box 320, R.D. 1, Owego, N.Y. 13827
Continuation of Ser. No. 7,516, Jan. 28, 1987, abandoned, which is a continuation of Ser. No. 833,557, Feb. 27, 1986, abandoned.
This application Sep. 17, 1990, Ser. No. 583,500
Int. Cl.^{5} B24B *7/04*
U.S. Cl. 81—355 7 Claims



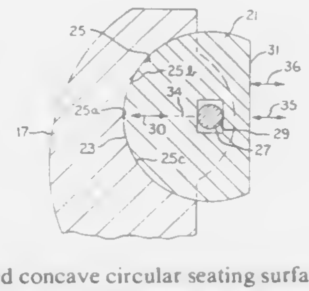
1. A locking wrench, comprising, in combination: a first handle member having a guide slot, said guide slot extending through a first end of said first handle member with four mutually interconnected side portions bounding said guide slot; a first jaw member having an elongated shank and a jaw pad portion extending from one end of said shank, said jaw pad portion having a jaw face and said elongated shank being slidably mounted in said guide slot, said shank being continuously bounded on four sides by said mutually interconnected side portions, which continuously bound said guide slot; a second jaw member pivotally mounted on said first handle member; a second handle member pivotally connected to said second jaw member; a link having its ends pivotally engaging said first and second handle members, with means for continuously adjusting the point at which one of the ends of said link pivotally engages one of said handle members; and releasable locking means carried on said first handle member for engaging said shank to allow said jaw face to be indexed to and fixed at a plurality of predetermined discrete spaced-apart positions outwardly from and beyond said guide slot while said shank remains at all times continuously bounded and supported by said mutually interconnected side portions, and to allow said first jaw member to be slidingly removed from said first handle member and replaced by a different jaw member having a shank of different length, said second jaw member having a recess into which the other end of said shank may extend.

5,022,291
PLIERS HAVING A PIVOTAL JAW

Corey L. McBain, 27 Mt. Herman Rd., Scotts Valley, Calif. 95073
Filed Aug. 6, 1990, Ser. No. 563,515
Int. Cl.^{5} B25B *7/02*
U.S. Cl. 81—424 3 Claims

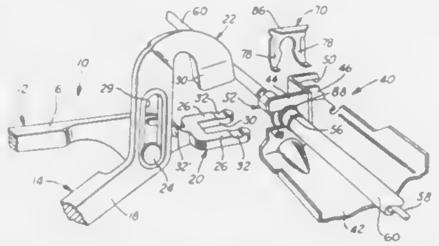
1. A pliers comprising two elongated crossing handle members pivotally connected at intermediate points along their length dimensions to form two opposed work-encircling arm structures and two opposed hand-engageable actuators; a jaw structure carried on each work-encircling arm structure; at least one of said jaw structures being pivotably connected to the associated arm structure; said one jaw structure having a relatively large diameter convex circular seating surface thereon; the arm structure associated with said one jaw structure having a relatively large diameter concave circular seating

surface slidably engaged with the circular seating surface on said one jaw structure; each jaw structure having a work-engagement surface; the work-engagement surface on said one jaw structure being formed as a straight chord surface relative to said concave circular seating surface; an elongated parallel-walled slot extending through said one jaw structure parallel to the associated work-engagement surface; a circular pivot pin extending transversely through said slot, said circular pin having its opposite ends anchored to the associated arm structure; said circular pin having its axis located on the center point of the associated concave circular seating surface; the diameter of said circular pin being the same as the minor width dimension of the associated slot, whereby said one jaw structure is prevented from shifting on the pin in a direction transverse to the longitudinal axis of the slot; the diameters of the two large diameter circular seating surfaces being the same; the circular pin being oriented so that the two circular seating surfaces are in close sliding frictional engagement, wherein said one jaw structure maintains a given position in the absence of any force applied to its work-engagement surface.



5,022,292
TOOL FOR INSTALLATION OF CLIP

Russell C. Hammer, Milford; Gregory J. Silage, Clemens, and Casimir P. Pietron, Royal Oak, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.
Filed Apr. 3, 1990, Ser. No. 503,577
Int. Cl.^{5} B25B *7/02*
U.S. Cl. 81—426 1 Claim



1. In a pliers-like hand tool for securing a cable conduit fitting, having fore and aft cylindrical conduit portions, in a laterally extending open-ended slot of an attachment flange of a gear shift base by means of a U-shaped spring sheet steel clip, said clip having a substantially planar base formed with a central downwardly slotted semi-circular opening defining a pair of legs, said clip base upper portion formed with a rearwardly facing transversely extending right-angled flange, said clip semi-circular opening adapted for locking engagement on an annular notch of said fitting intermediate a raised washer on said conduit and an opposed face of said attachment flange, said hand tool having first and second lever members which cross over each other at a pivot, said first lever member having a lower jaw portion and a handle portion and said second lever member having an upper jaw portion and a handle portion with each said jaw and handle portion on either side of the pivot, the improvement in said jaw portions comprising:

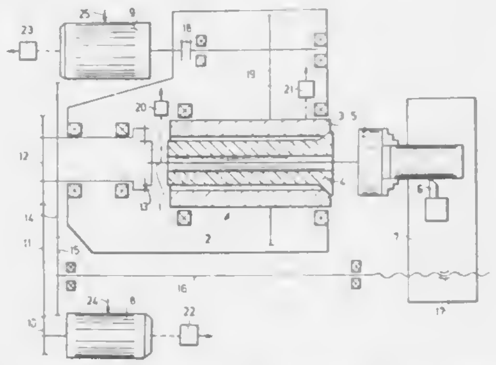
said first lever member lower jaw portion in the form of a U-shaped anvil having a pair of horizontally disposed prongs defining a rectangular-shaped notch of predetermined width therebetween, each said prong formed with an upwardly facing arcuate concave depression therein, said depressions having their centers of curvature aligned on a common longitudinal axis, each said depression having a pre-determined radius of curvature adapted for seating an associated fore and aft fitting cylindrical conduit portion therein, such that each said conduit fore and aft portion having the principal axis thereof aligned on said common longitudinal axis;

said second lever member upper jaw portion in the form of an die member formed with a longitudinally extending downwardly facing right-angled cut-out, said cut-out defined by a flank portion and a shoulder portion intersecting at right angles such that with said flank portion oriented in a vertically disposed transversely extending plane the projection of which intersects said common longitudinal axis at a right angle;

with said cable conduit positioned in said attachment flange slot and said clip having its legs in initial press fit straddled relation on said fitting annular notch in flush contact with the aft face of said attachment flange, and with said upper and lower jaws open such that each said prong depression receives its associated fore and aft conduit portion therein, whereby with said cut-out flank and shoulder portions in gripping nested engagement with said clip right-angled bent flange such that upon squeezing said handle portions toward each other enabling said upper jaw to be initially moved downwardly toward said lower jaw, wherein the movement of said upper jaw downwardly to its closed position causing said clip to be forced downwardly with sufficient closing force enabling said clip central opening to be locked in a spring biased concentric manner on said fitting notch fixedly securing said cable fore and aft conduit fittings on said gear shift base.

5,022,293
METHOD AND WORKING MACHINE FOR PRODUCING SURFACES OF NON-CIRCULAR BUT REGULAR CROSS SECTIONS

Jozsef Farkas, Budapest; Sandor Vekony; Sandorne Vekony, both of Miskolc; Erno Csovak, and Sandor Fodor, both of Budapest, all of Hungary, assignors to Innofinance Altalanos Innovacios Penzintezet, Budapest, Hungary
PCT No. PCT/HU87/00019, § 371 Date Apr. 21, 1989, § 102(e) Date Apr. 21, 1989, PCT Pub. No. WO88/08346, PCT Pub. Date Nov. 3, 1988
PCT Filed Apr. 24, 1987, Ser. No. 301,758
Int. Cl.^{5} B23B *5/44*
U.S. Cl. 82—1.11 6 Claims



1. A method for producing a workpiece with surfaces of non-circular but regular cross section, comprising

(a) rotating a workpiece having an axis of symmetry about a first axis which is said axis of symmetry;
(b) simultaneously rotating said workpieces so that said first axis revolves about a second axis spaced from and parallel to said first axis;
(c) providing a mechanically independent relationship be-

VOL
1127
ISS
2
JE
11
1991
UMI

tween the rotation of the workpiece about said first axis and the rotation of the workpiece so that first axis revolves about said second eccentric axis;
(d) providing an electronic control for maintaining said relationship between said rotations;
(e) entering data into said electronic control for influencing the relationship of said rotation and revolution according to a cross-section to be machined on said workpiece;
(f) monitoring and feeding-back data of said rotation and revolution into said electronic control for providing the desired cross-section to be machined on the workpiece; and
(g) applying a machining tool to the workpiece to machine on the workpiece said desired cross-section upon rotation and revolution of the workpiece.

5,022,294
CUTTING APPARATUS FOR A NONCIRCULAR CROSS SECTION

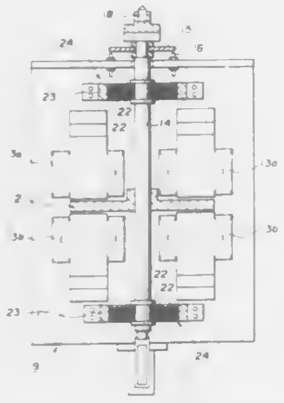
Tosbiro Higuchi, Yokohama; Hazime Izumi, Kawagoe, and Minoru Tanaka, Kitamoto, all of Japan, assignors to Izumi Industries, Ltd., Saitama, Japan

Filed Apr. 17, 1989, Ser. No. 338,841

Claims priority, application Japan, Aug. 9, 1988, 63-197251

Int. Cl.^{5} B23B *5/24, 21/00*

U.S. Cl. 82—18 **1 Claim**



1. A cutting apparatus for forming a noncircular cross section on a workpiece that is mounted on a main shaft, said apparatus including a tool advancing and retreating means which comprises:

a central shaft which is disposed substantially perpendicular to the main shaft, a tool being adapted to be fixed to one end of said central shaft;

journal means for supporting said central shaft so that said central shaft can be displaced in its axial direction but cannot be rotated, said journal means including a plurality of cross-shaped first leaf springs which are laminated to one another and which each have a centrally located bore extending therethrough, said central shaft extending through the centrally located bore in each of said first leaf springs and being secured to each of said first leaf springs, said first leaf springs being mounted within and secured to a first holder which is secured to said mount near one end of the central shaft, and including a plurality of cross-shaped second leaf springs which are laminated to one another and which each have a centrally located bore extending therethrough, said central shaft extending through the centrally located bore in each of said second leaf springs and being secured to each of said second leaf springs, said second leaf springs being mounted within and secured to a second holder which is secured to said mount near an opposite end of the central shaft;

a movable plate fixed to said central shaft;

electromagnets positioned opposite to each other such that said movable plate is interposed between said electromagnets with a predetermined clearance therebetween;

means for detecting a rotational angle of said main shaft;

a displacement sensor for detecting longitudinal displacement of said central shaft;

a speed sensor for detecting a speed of said longitudinal displacement of said central shaft; and

means for controlling an electric current passing through said electromagnets on the basis of output signals from said rotational angle detecting means, from said displacement sensor, and from said speed sensor, respectively.

5,022,295
METHOD AND APPARATUS FOR MAINTAINING THE CUTTING CONDITIONS OF A ROTARY PUNCH CONSTANT

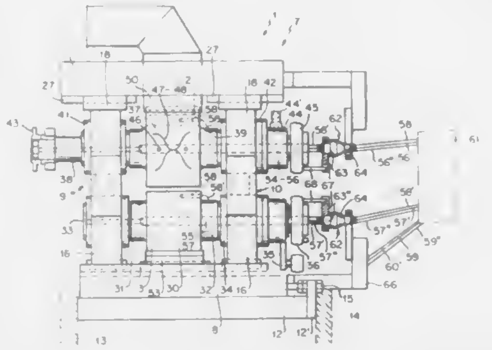
Kurt Stemmler, Neuweid, Fed. Rep. of Germany, assignor to Winkler & Dunnebier Maschinenfabrik und Eisengiesserei KG, Neuwied, Fed. Rep. of Germany

Continuation of Ser. No. 239,693, Sep. 2, 1988, abandoned. This application Nov. 22, 1989, Ser. No. 442,477

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1987, 3730392

Int. Cl.^{5} B26D *7/10;* **B26F** *3/10;* **B41F** *33/00*

U.S. Cl. 83—16 **23 Claims**



1. A method of maintaining constant a set of cutting conditions at a rotary punch for producing profiled and straight cuts on moving webs or flat individual articles of foil or paper particularly for manufacturing hygiene products, envelopes, flat bags or the like, by means of a rotating cutting tool having a longitudinal bore and a working outer periphery and a fixed or rotating opposing tool having a longitudinal bore and a working outer periphery which are arranged within a frame, wherein a cutting edge or edges are on said working outer periphery of said cutting tool and describe a cylindrical envelope and hit the opposing tool at the instant of the cut and wherein under operating conditions the rotary punch operating temperature dependent on the product and on the environment results, said method comprising

monitoring in a bore near to said working outer periphery of said cutting and opposing tools and controlling the heating of the rotary punch by thermal conduction to an adjustable and predeterminable constant temperature, by means of heat sources, coaxially disposed in said longitudinal bores, said constant temperature being no less than the rotary punch operating temperature which results under operating conditions;

adjusting the space of the cylindrical envelope described between the cutting tool and the opposing tool so as to set the cutting conditions thereof;

maintaining the rotary punch at said temperature;

wherein the opposing tool is heated and the heating of the cutting tool and the opposing tool is by means of integrated heating elements coaxially disposed in said longitudinal bores and the temperature is monitored by means of integrated heat sensors in a bore near to said working outer periphery of said cutting and opposing tools; and

wherein the temperature is controlled by a common, stationary control device which is connected with all the heating elements and temperature sensors.

5,022,296
METHOD AND APPARATUS FOR THE AUTOMATIC MANUFACTURE OF PORTIONS OF A GIVEN LENGTH OF STRIP MATERIAL HAVING A REPETITIVELY PATTERNED SURFACE

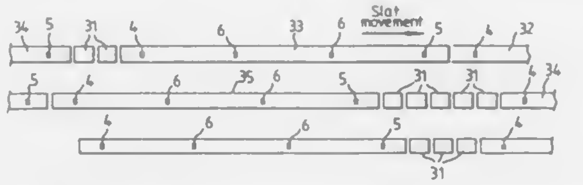
Francois R. Eschauzier, Hendrik Ido Ambacht, and Guy H. Lim, Rotterdam, both of Netherlands, assignors to Hunter Douglas International N.V., Willemstad, Netherlands

Filed Jan. 12, 1990, Ser. No. 464,471

Claims priority, application United Kingdom, Jan. 13, 1989, 8900771; Mar. 17, 1989, 8906238

Int. Cl.^{5} B26D *5/20*

U.S. Cl. 83—27 **22 Claims**



10. A strip material cutting apparatus for cutting portions of a given length of strip material from a supply of strip material having a patterned surface, with the pattern being repetitive in the longitudinal direction of the strip material, said apparatus comprising:

feed means for feeding said strip material;

interrupting means for interrupting feeding of said strip material;

cut-off means for cutting said strip material into portions;

means for separating undesired portions;

removing means for removing desired portions for further handling;

control means connected to said interrupting means, said cut-off means and said removing means, said control means being effective to control said interrupting means, said cut-off means and said removing means so as to cut first sections of a first predetermined length from said strip of material and remove said first sections for further handling and to cut variable amounts from said strip material to be separated as undesired portions, to provide a controlled positioning of the repetitive pattern along the length of the cut first sections; and

a plurality of punch dies used for punching holes in said strip material and wherein said control means is further adapted to control each said punch die to punch holes in said first sections.

5,022,297
METHOD AND APPARATUS FOR PREPARING SHEET STACKS

William J. Hommes, Hockessin, Del., and Alfred J. Schmidt, Augsburg, Fed. Rep. of Germany, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 25, 1990, Ser. No. 528,360

Int. Cl.^{5} B26D *7/02*

U.S. Cl. 83—35 **28 Claims**

3. An apparatus for automatically rounding corners of one or more stacks of sheets, each of the stacks having at least a first and a second substantially straight edge that meet to define a first corner comprising:

a first rotatable assembly including:

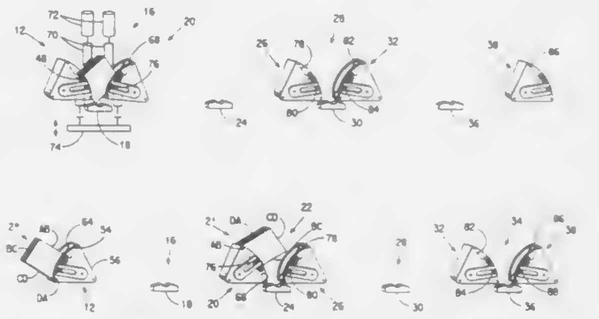
a first device rotatable about an axis, the first device having a first surface for contacting the first edge of a first one of the stacks;

first means for holding the first edge of the first stack in contact with the first surface;

first means for moving the first device from a stack loading position to a first cutting position;

a second rotatable assembly including:

a second device rotatable about an axis, the second device having a second surface for contacting the second edge of the first stack;



second means for holding the second edge of the first stack in contact with the second surface;

second means for rotating the second device from the first cutting position to a second position; and

a first cutter positioned to cut off the first corner of the first stack in a rounded fashion when the first edge is on the first surface and the second edge is on the second surface and the first corner is directed substantially downward.

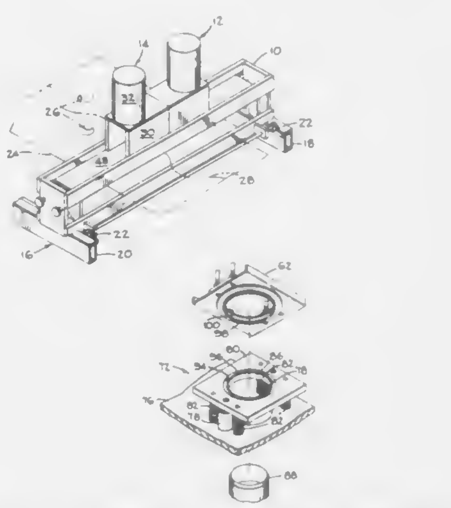
5,022,298
ROTARY HANDLE CUTOUT WITH HEATED KNIFE

Ronald L. Lotto, Bonduel, Wis., assignor to FMC Corporation, Chicago, Ill.

Filed Sep. 27, 1988, Ser. No. 250,017

Int. Cl.^{5} B26D *7/02*

U.S. Cl. 83—509 **6 Claims**



1. In a bag making machine for manufacturing plastic bags with holes provided therein from a web of plastic material, said bag making machine having a rotary hole cutting apparatus, including a pair of pressure rollers mounted on a shaft perpendicular to a vertically disposed rotatable shaft and a cutting knife which will contact the bottom of said web of plastic material when said rollers contact the top of said web of plastic material, the improvement comprising:

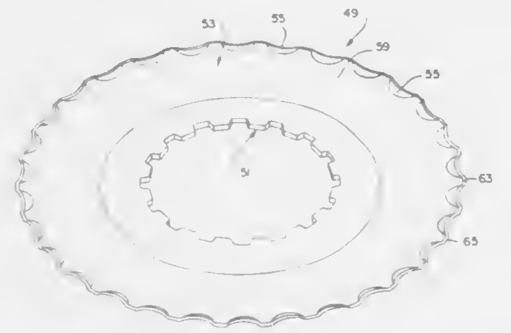
a pusher plate, mounted for reciprocal motion above said web of plastic material movable to a position in contact with said web whereby said web may be deflected down-

VOL
1127
ISS
2
JE
11
1991
UMI

wardly from the normal plane of web repose, said pusher plate having a projecting lip directed for engagement with said web;
a stripper plate, urged to a position of repose by spring means below said web, said stripper plate including a circumferential groove surrounding a large aperture in said stripper plate, said circumferential groove retaining a rubber ring means in registration with said projecting lip of said pusher plate.

5,022,299
METHOD OF MAKING A KNIFE HAVING A SCALLOPED CUTTING EDGE

Robert R. Fischer, Michigan City, and W. James Fischer, Valparaiso, both of Ind., assignors to Urschel Laboratories Incorporated, Valparaiso, Ind.
Division of Ser. No. 109,518, Oct. 19, 1987, Pat. No. 4,891,885. This application Aug. 24, 1989, Ser. No. 398,643
Int. Cl.⁵ B23D *35/00*
U.S. Cl. 83—676 **8 Claims**

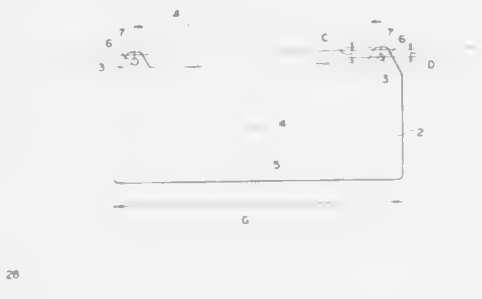


1. An improved knife blade having a scalloped cutting edge comprising:
a) a blade portion including opposed first and second planar surfaces terminating in an edge portion;
b) the edge portion including a plurality of scallops formed therein; and
c) the cross-sectional configuration of each scallop including a first side that extends inwardly of and is concave with respect to the first planar surface and a second side that protrudes outwardly of and is convex with respect to the second planar surface; wherein the unscalloped blade edge portion and portions only of the convex sides of the scallops are beveled to define a sharpened cutting edge and to leave protruding convex portions at the blade edge portion.

5,022,300
JIG FOR USE WITH PUNCH PRESS

Miyuki Yamashita, Tokyo, Japan, assignor to Hirakawa Kogyosha Co., Ltd, Tokyo, Japan
Filed Nov. 9, 1989, Ser. No. 434,033
Claims priority, application Japan, Nov. 10, 1988, 63-284344
Int. Cl.⁵ B23Q *1/00;* B26D *5/00*
U.S. Cl. 83—743 **4 Claims**

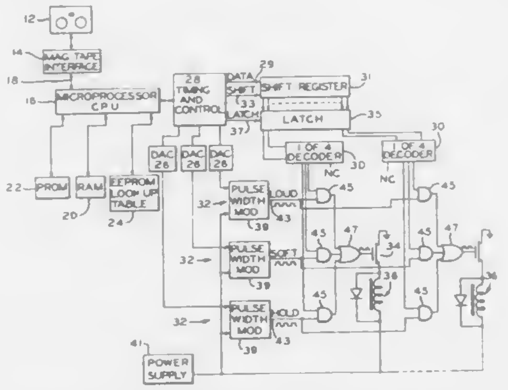
1. A jig for use with a punch press for perforating a press plate which has been formed with at least one reference opening within a process camera with reference to the position of an image photographed on the press plate, said jig comprising:
a pin for fitting engagement with the reference opening in the press plate;
a reference end surface for being held against a reference surface of the punch press to position the press plate in a first direction in which the press plate is inserted into the punch press, while said pin is being fitted in the reference opening; and



positioning means for interfitting engagement with positioning means of the punch press to position the press plate in a second direction normal to said first direction.

5,022,301
MULTIPLEXED MULTIPLE INTENSITY REPRODUCING PIANO

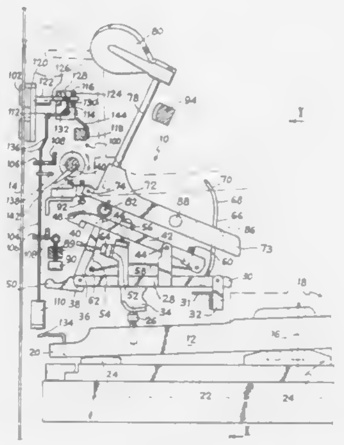
Wayne L. Stahnke, 11434 McCune Ave., Los Angeles, Calif. 90066
Filed Sep. 8, 1989, Ser. No. 404,739
Int. Cl.⁵ G10H *1/46, 7/00*
U.S. Cl. 84—21 **15 Claims**



11. A method for playback on a reproducing piano a sequence of notes from a stream of data representing a musical performance, wherein said piano comprises a plurality of key means corresponding to respective notes, and the stream of data includes data representing the identity, intensity and sequence of notes from the musical performance, said method comprising the steps of:
reading data representing the sequence of notes from the stream of data;
dividing said sequence of notes into a plurality of consecutive segments;
sorting the notes to be reproduced in each segment into a plurality of groups according to intensity;
calculating a representative intensity for each of said groups; and
driving each key means corresponding to the notes to be reproduced in the segment with a predetermined drive to reproduce each note at the representative intensity of the respective group.

5,022,302
DAMPER MECHANISM FOR UPRIGHT PIANO

Vincent Guyon, 9, rue Joseph Demaistre, 75018 Paris, France
Filed Feb. 20, 1990, Ser. No. 481,226
Claims priority, application France, Feb. 22, 1989, 89 02309
Int. Cl.⁵ G10C *3/18*
U.S. Cl. 84—255 **12 Claims**

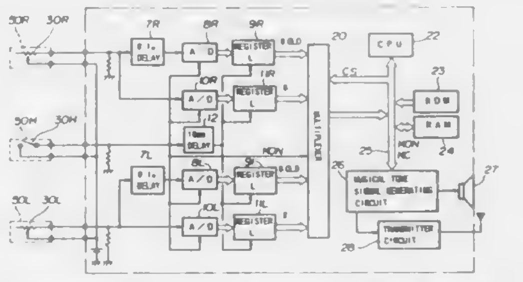


1. A damper mechanism for use in an upright piano, the upright piano provided with a plurality of strings disposed in a vertical plane, a plurality of moveable keys, each associated with one of the strings, and further, each key provided with an actuating end and a hand operatable end, the piano also provided with a plurality of pedals, including a sostenuto pedals, and a plurality of hammers, each hammer interposed between a single key and a single string, each of the hammers provided with a mechanism controlling a movement of hammer based upon striking the hand operatable end of its associated key, said damper mechanism associated with each of the strings, each individual damper mechanism comprising:
a damper wood;
a damper felt mounted on said damper wood;
a guide stem having a first end connected to said damper wood and directionally adjusted perpendicularly to the plane of the strings, said guide stem additionally provided with a second end;
a block containing a bore therein, said block provided on a fixed support, said block allowing said second end of said guide stem to move reciprocally within said bore; and
a damper guide having an upper end connected with said block and a lower end provided above and in proximity with the actuating end of only the keys for reciprocally moving said guide stem in response to the movement of the key, and independent upon the movement of the hammer.

5,022,303
MUSICAL TONE CONTROL APPARATUS EMPLOYING PREDICTED ANGULAR DISPLACEMENT

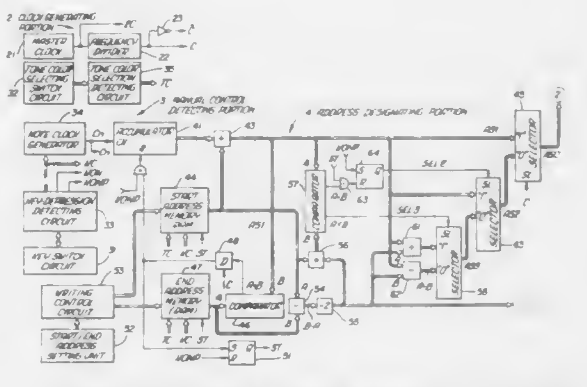
Hideo Suzuki, and Masao Sakama, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan
Filed May 15, 1989, Ser. No. 352,096
Claims priority, application Japan, May 18, 1988, 63-121491
Int. Cl.⁵ G10H *1/32*
U.S. Cl. 84—600 **7 Claims**

2. A musical tone control apparatus comprising:
(a) angle detecting means for detecting a bending angle of a player's joint portion to thereby generate a detection signal corresponding to said bending angle of the player's joint portion;
(b) operating means, responsive to an operation of a player, for designating a tone-generation timing;
(c) delay means for delaying said detection signal by a predetermined delay time;
(d) first means for temporarily holding said detection signal delayed by said delay means as old angle information;
(e) second means for temporarily holding said detection signal directly outputted from said angle detecting means as present angle information; and
(f) control means for detecting a motion of said player's joint portion based on said old angle information and said present angle information to thereby estimate a future bending angle of the player's joint portion, so that said control means generates musical tone control data based on said future bending angle of the player's joint,
whereby a musical tone is to be generated at said tone-generation timing based on said musical tone control data.



5,022,304
MUSICAL TONE SIGNAL GENERATING APPARATUS

Kazuo Masaki, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan
Filed Apr. 20, 1989, Ser. No. 341,122
Claims priority, application Japan, Apr. 21, 1988, 63-98925
Int. Cl.⁵ G10H *7/00*
U.S. Cl. 84—607 **13 Claims**


2 CLOCK GENERATING PORTION
MASTER CLOCK
FREQUENCY DIVIDER
TONE COLOR SELECTING SWITCH CIRCUIT
TONE COLOR SELECTION DETECTING CIRCUIT
3 MANUAL CONTROL DETECTING PORTION
4 ADDRESS DESIGNATING PORTION
NOTE CLOCK GENERATOR
ACCUMULATOR
KEY DEPRESSION DETECTING CIRCUIT
KEY SWITCH CIRCUIT
START ADDRESS MEMORY
END ADDRESS MEMORY
COMPARATOR
WRITING CONTROL CIRCUIT
START/END ADDRESS SETTING UNIT
SELECTOR
SELECTOR
SELECTOR

1. A musical tone signal generating apparatus comprising:
(a) memory means for storing musical tone waveform data indicative of plural cycles of a musical tone waveform, said musical tone waveform being divided into several segments each designated by a front address and an end address, wherein a reading operation of said memory means is controlled by designating addresses;
(b) first reading means for repeatedly reading out said musical tone waveform data of a predetermined segment from said memory means by repeatedly designating addresses between said front and end address corresponding to said predetermined segment, so that said musical tone waveform data read by said first reading means is outputted as first musical tone waveform data;
(c) second reading means for repeatedly reading out said musical tone waveform data of said predetermined segment by shifting designation timings of the addresses between said front and end addresses corresponding to said predetermined segment with a predetermined shifting time, so that said musical tone waveform data read by said

VOL
1127
ISS
2
JE
11
1991
UMI

second reading means is outputted as second musical tone waveform data; and

(d) mixing means for mixing said first musical tone waveform data and said second musical tone waveform data together by a mixing rate,

whereby a musical tone signal is generated in response to mixed musical tone waveform data outputted from said mixing means.

5,022,305

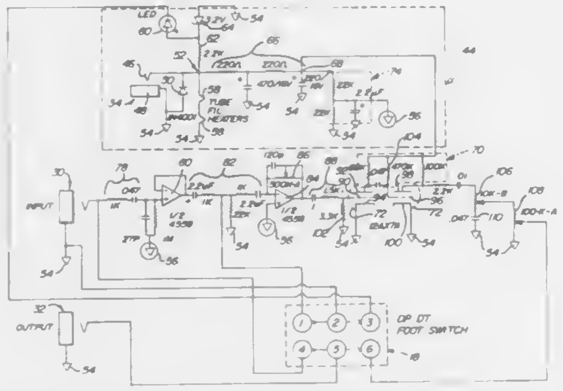
TUBE OVERDRIVE PEDAL OPERABLE USING LOW VOLTAGE DC BATTERY ELMINATOR

Brent K. Butler, 1050 S. Lewiston Way, Aurora, Colo. 80017

Filed Apr. 20, 1989, Ser. No. 340,858

Int. Cl.^{5} G10H *1/32, 1/46*

U.S. Cl. 84—711 **24 Claims**



17. In an electrical musical instrument sound modification device comprising:
- a case having a footpedal disposed thereon;
- an electronic signal modification circuit disposed in said case and operably coupled to said footpedal;
- said electronic signal modification circuit comprising at least one vacuum tube device having a biasing circuit coupled thereto;
- said biasing circuit being coupled to a jack disposed on said case;
- a DC power supply disposed in a package separate from said case and having a plug for detachable insertion in said jack for supplying DC power to said biasing circuit;
- said vacuum tube device having a filament heater for operating said filament a predetermined heater voltage and wherein said DC power supply delivers current to said biasing means at a voltage not substantially greater than said predetermined heater voltage.

5,022,306

METHOD OF EJECTING AN INTERCEPTOR MISSILE FROM ITS SILO

David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 10, 1977, Ser. No. 779,404

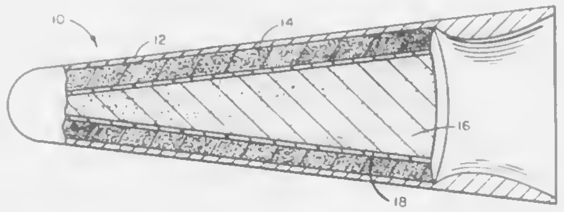
Int. Cl.^{5} F41F *3/04;* **F02K** *9/00;* **F42B** *15/10*

U.S. Cl. 89—1.8 **2 Claims**

1. A method of ejecting an interceptor missile from the silo in which it is stored in a pre-launch mode, said method comprising:

(i) providing said interceptor missile with a solid propellant booster motor comprised of an ultrahigh-burning rate booster solid propellant grain encased in a booster motor case, said ultrahigh-burning rate booster solid propellant grain containing an embedded fuse or a combination of fuses of a metal-oxidant composition that has a burning rate range well above that of said ultrahigh-burning rat booster solid propellant grain said embedded fuse or a combination of fuses having a cylindrical cross-section, and encased in a sheathing material comprised of a composite, graphite filament-reinforced epoxy resin; said embedded fuse or a combination of fuses designed to a predetermined exterior contour which is the same as the exterior contour of the mandrel which would normally be used to provide the contour to the internal perforation of the booster solid propellant grain; said ultrahigh-burning rate booster solid propellant grain formed by casting around said fuse or a combination of fuses which are longitudinally positioned in said booster motor case, an uncured booster propellant formulation and curing the propellant formulation to yield said ultrahigh-burning rate booster solid propellant grain;

(ii) positioning an ignition means for said embedded fuse or a combination of fuses to provide for aft-end ignition;



(iii) igniting said embedded fuse or a combination of said fuses by aft-end ignition to rapidly create by a burning process proceeding from the aft end to forward end of said embedded fuse or a combination of fuses, an internal perforation in the center of said ultrahigh-burning rate booster solid propellant grain, said burning of said embedded fuse or a combination of fuses proceeding at burning rate which is well in excess of the ablation rate of said sheathing material of said fuse or a combination of fuses to enable said sheathing material to be fully consumed during the burning process to thereby expose a surface of said ultrahigh-burning rate booster solid propellant grain at the time said burning process of said fuse or a combination of fuses nears completion; and

(iv) allowing said exposed surface of said ultrahigh-burning rate booster solid propellant grain to commence burning to thereby provide the propulsive force to boost said ballistic interceptor missile from its storage silo.

5,022,307

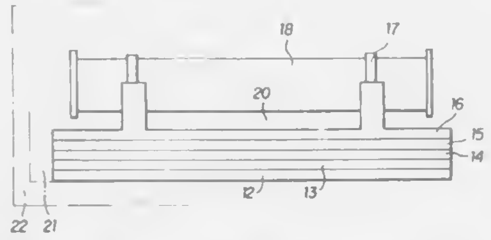
LIGHT WEIGHT ATTENUATOR OF BLAST AND SHOCK FROM DETONATING MUNITIONS

Gould Gibbons, Jr., Finksburg; Jerry L. Watson, Darlington, and William Lawrence, Edgewood, all of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 12, 1989, Ser. No. 449,207

Int. Cl.^{5} F41H *5/04, 5/16*

U.S. Cl. 89—36.02 **17 Claims**



1. A light weight composite shield for protecting the walls of an ammunition stowage compartment, wherein said shield is in a layered, sandwich configuration comprising
- a first layer of energy absorbing rubber;
- followed by a pusher plate layer;
- a crush element layer; and
- a second layer of energy absorbing rubber wherein said pusher plate layer is composed of Kevlar ®.

5,022,308

AMMUNITION MAGAZINE FOR A COMBAT VEHICLE

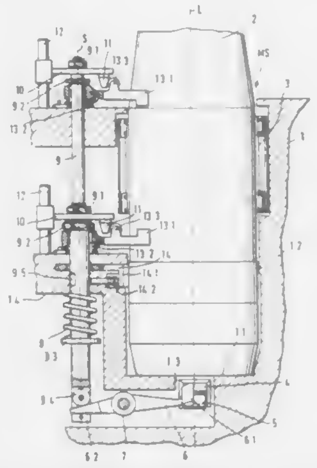
Henrich Heldman, Kassel, and Erich Wallwey, Vellmar, both of Fed. Rep. of Germany, assignors to Wegmann & Co. GmbH, Kassel, Fed. Rep. of Germany

Filed Jul. 5, 1990, Ser. No. 548,037

Claims priority, application Fed. Rep. of Germany, Jul. 7, 1989, 3922318

Int. Cl.^{5} F41A *9/13*

U.S. Cl. 89—45 **7 Claims**



1. An ammunition magazine for a combat vehicle, comprising: a floor; means forming a plurality of magazine shafts in the floor, each having a longitudinal axis and each including a base plate at a bottom thereof for stowing shells with a base of the shell against the base plate and the shells upright and perpendicular to the floor; an ammunition positioner having an arm with a pivoting pickup at one end for removing the shells from the magazine shafts; and a shell holder for securing the shells in each magazine shaft comprising at least two pairs of tongs-like shell-securing arms that at least partly surround an outer wall of the shell, a stationary guide resting against the outer wall of the shell opposite the shell-securing arms, means mounting the shell-securing arms one above the other for pivoting movement toward the longitudinal axis of the magazine shaft about a pivot axis parallel to the longitudinal axis of the magazine shaft and outside the magazine shaft, means resiliently biasing the shell securing arms into a closing position against the outer wall, a mechanism for locking the shell-securing arms closed and a mechanism for unlocking the locking mechanism in response to a component on the positioner arm when the shell is grasped as the pickup removes it.

5,022,309

VARIABLE FREQUENCY CONTROL FOR PERCUSSION ACTUATOR

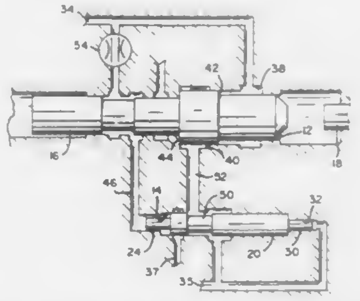
Paul B. Campbell, Roanoke, Va., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Division of Ser. No. 394,885, Aug. 17, 1989. This application Sep. 26, 1990, Ser. No. 588,407

Int. Cl.^{5} F01L *25/02*

U.S. Cl. 91—285 **6 Claims**

1. A frequency control for a piston comprising:
- a housing having a piston bore and a valve bore formed therein;
- a piston being axially disposed within said piston bore;
- a valve being axially disposed within said valve bore;
- a first piston biasing means for biasing the piston in a first direction;
- a second piston biasing means for overcoming the bias of the first piston biasing means to move the piston in a second direction;
- a first valve biasing means for biasing the valve in a third direction;



- a second valve biasing means for overcoming the bias of the first valve biasing means to move the valve in a fourth direction;
- a valve actuating means for actuating the second valve biasing means when the piston is extended in the second direction;
- a piston actuating means for actuating the second piston biasing means when the valve is extended in the fourth direction; and
- an orifice means in a high pressure passage adjacent the valve bore for controlling the rate of response of said valve.

5,022,310

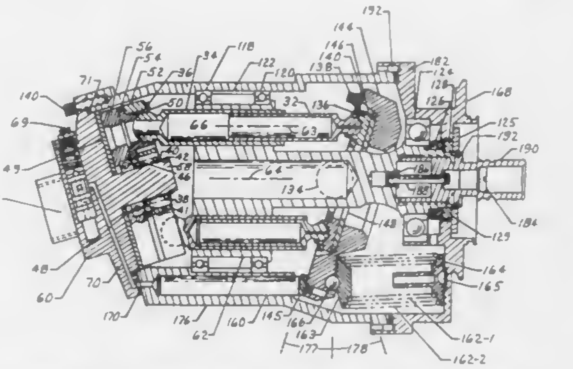
FLUID POWER TRANSMISSION

Robert M. Stewart, and Carlene M. Stewart, both of 325 Baypark Dr., Brandon, Miss. 39042

Filed Mar. 7, 1989, Ser. No. 320,760

Int. Cl.^{5} F01B *3/00*

U.S. Cl. 91—501 **14 Claims**



1. A fluid power mechanical valving device comprising;

(a) a plurality of tubular shaped fluid conduits arrayed in a circumferential manner to rotate around a common longitudinal axis, each said tubular shaped fluid conduit has sufficient longitudinal hollow cavity for fluid to flow through from end to end,

(b) a sliding fluid conduit bearing means, disposed in a swivel manner, at one end of each said tubular shaped fluid conduit,

(c) a fluid transfer valve plate which is engaged, in sliding contact, by said sliding fluid conduit bearing means for

VOL
1127
ISS
2
JE
11
1991
UMI

transferring fluid to and from fluid passages of said valve plate; axial load from said tubular shaped fluid conduit acts on said bearing means to urge said valve plate to abut a surface of a corresponding plate, in sliding contact, to achieve efficient transfer to fluid between said fluid passages of said valve plate, and ports located on said surface of said corresponding plate,

(d) a sub-assembly enclosure means that grasps said sliding fluid conduit bearings in such a way as to permit limited lateral movement of said bearings on said valve plate surface and also limit axial movement of said bearings,

(e) a torque means which transmits rotational energy to said sub-assembly, by grasping and rotating said tubular shaped fluid conduits about a longitudinal axis, which causes rotational contact between said bearing means and a member of said sub-assembly enclosure means,

(f) whereby a valving device occurs based on the overall cooperation between said rotating tubular fluid conduits, said sliding fluid conduit bearing means, said fluid transfer valve plate, said sub-assembly enclosure means and said torque means.

5,022,311

COMPACT FLUID ACTUATED WORKING CYLINDER WITH SPRING LOADED TENSIONING MEMBER

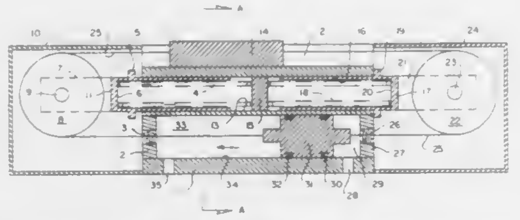
Norbert Fortmann, Hanover; Helmut Gottling, Isernhagen; Hans F. Meyer, Gehrden; Rudolf Moller, Gehrden, and Gerhard Scharnowski, Gehrden, all of Fed. Rep. of Germany, assignors to WABCO Westinghouse Steuerungstechnik GmbH & Co., Hanover, Fed. Rep. of Germany

Filed Mar. 20, 1990, Ser. No. 496,252

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1989, 3909344

Int. Cl.^{5} F01B *9/00*

U.S. Cl. 92—137 **17 Claims**



1. A fluid actuated working cylinder having a cam driven by a piston through a flexible tension member, comprising:

a) a first housing bore provided in a cylinder housing, the first housing bore longitudinally oriented in the cylinder housing, the piston being slidably mounted within said first housing bore;

b) a guide provided on the cylinder housing, upon which the cam is guided longitudinally to the cylinder housing;

c) a plurality of deflection devices resiliently mounted opposite each other on said cylinder housing, each having a deflection element and a deflection support mounted thereon, the deflection support slidably mounted within an additional housing bore of the cylinder housing and urged outwardly from the cylinder housing, the additional housing bore adapted to accept at least part of the deflection support and the deflection element adapted to engage the flexible tension member such that the tension member is under tension.

5,022,312

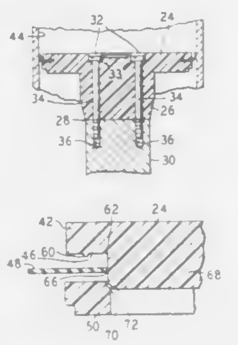
PLASTIC PISTON HEAD ASSEMBLY

Roy J. Rozek, Plymouth, and Mark O'Connell, Cedar Grove, both of Wis., assignors to Thomas Industries, Sheboygan, Wis.

Filed Jan. 26, 1990, Ser. No. 470,806

Int. Cl.^{5} F16J *9/00*

U.S. Cl. 92—240 **6 Claims**



1. A piston comprising:

a main cylindrical body having a top surface with an edge, a bottom edge, and a vertical side;

a flange extending radially and horizontally from said edge of said top of said main body;

a centrally disposed boss extending downwardly from an underside of said main body, said boss being less in diameter than said main body;

a circumferential notch provided in said bottom edge;

an annular cup seal engaged against said underside of said flange, said cup seal having an outer diameter greater than that of said flange; and

an annular retainer ring sonically welded to said underside of said flange so as to secure said cup seal therebetween.

5,022,313

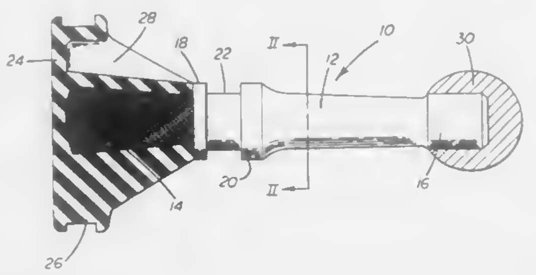
COMPOSITE PISTON ASSEMBLY FOR AUTOMOTIVE AIR CONDITIONING COMPRESSOR

Kimball C. Shontz, E. Amherst; Michael A. Gavlak, Grand Island, and David M. Ebbing, Clarence Center, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 8, 1990, Ser. No. 461,711

Int. Cl.^{5} F16J *9/00;* **B23P** *19/02*

U.S. Cl. 92—248 **3 Claims**



1. A composite piston for an automotive air conditioning compressor, comprising:

a metallic shank having a distal end and a proximal end;

a plastic piston head attached to said distal end of said metallic shank, said piston head having a plurality of radial gussets to provide reinforcement;

a metallic ball attached to said proximal end of said metallic shank;

a first collar on said metallic shank attached to said resilient head, said first collar assisting in the assembly of said resilient head on said metallic shank; and

a second collar intermediate said first collar and said metallic ball, said second collar assisting in the assembly of said metallic ball on said metallic shank,

whereby is provided a lightweight piston for efficient operation.

5,022,314

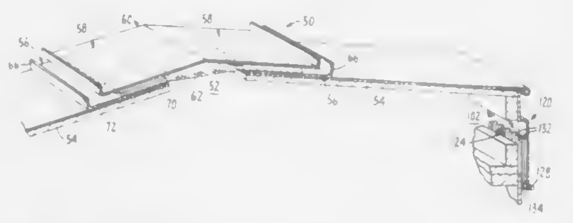
ROOF VENTILATING APPARATUS

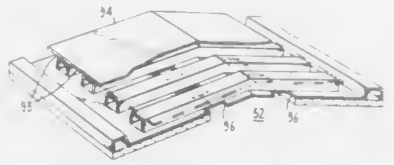
Richard L. Waggoner, Riverside, Calif., assignor to Alumax Inc., Norcross, Ga.

Filed May 24, 1989, Ser. No. 356,337

Int. Cl.^{5} F24F *7/00, 7/02*

U.S. Cl. 98—32 **23 Claims**





7. For ventilating a space within a building through a roof having a roof ridge gap transversely extending across the roof along an axis that defines a ridge of the roof and that divides the roof into a first side and a second side, a ridge cap ventilator comprising:

a ventilating member configured for receipt over the roof ridge gap and for receipt by the first and second roof sides, said ventilating member provided with sloping opposed sides which meet to form a cap ridge and with a plurality of raised ribs alternating with troughs, the ribs extending downward along the opposed sides from the cap ridge, each raised rib forming a channel when in contact with the roof and having an open first end and an open second end in communication with outside air; and

means for preventing outside air from blowing directly into the apertures of the ribs.

5,022,315

SMALL ELECTRIC HOUSEHOLD UTENSIL FOR THE PRODUCTION OF FOODS BY MIXING BY STIRRING

Leo Bertram, Stolberg, Fed. Rep. of Germany; Hugo Schemmann, Schaesberg, Netherlands, and Romuald L. Bukoschek, Klagenfurt, Austria, assignors to U.S. Philips Corporation, New York, N.Y.

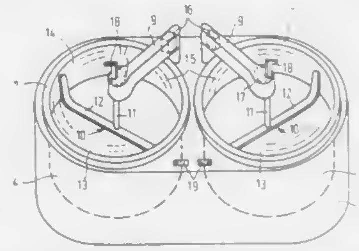
Filed Jul. 14, 1989, Ser. No. 380,179

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824821

Int. Cl.^{5} A23G *9/00*

U.S. Cl. 99—348 **12 Claims**

1. A small electric household utensil for the production of foods by mixing by stirring from original components which are slightly liquid at the start of work, in the preparation of which foods the production temperature deviates from the ambient temperature, the temperature change in the original components which is required during the production process being achieved by means of a thermal energy dispenser, the thermal energy dispenser (6) bringing the inner wall (4*a*) of a pot shaped container (4, 24) to the production temperature; and a stirring tool (10) intermixing the components during the production process, wherein at least two pot-shaped containers (4, 24) are arranged in a common surrounding container (3), thermal energy dispensers (6) being in contact with each of the containers (4, 24) and comprising means by which the operating temperatures of said dispensers are maintained independent of one another; an individual stirring tool (10) being associated with each pot-shaped containing (4, 24), the speed, necessary for mixing, of the respective stirring tool (10) in relation to the respective pot-shaped container (4, 24) being achieved by means of independent drive devices (9, 28) with their respective motors (16).



5,022,316

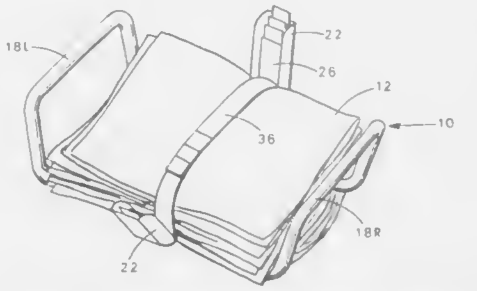
NEWSPAPER BUNDLER WITH RECYCLABLE STRAPS

John Hellwig, 2838 Woolsey St., Berkeley, Calif. 94705

Filed Aug. 24, 1989, Ser. No. 398,387

Int. Cl.^{5} B65B *13/18*

U.S. Cl. 100—34 **20 Claims**



1. A bundler for bundling a stack of sheets of material, said bundler comprising:

a cradle for holding a stack of sheets of material, each sheet having at least one pair of opposing edges, said cradle having a bottom section for supporting said stack and a plurality of opposing sides extending up from said bottom section and facing each other for guiding and aligning said one pair of opposing edges of said sheets of said stack when they are piled individually into said cradle,

at least one elongated bundling strap,

said strap having a center section and two end sections,

said center section sized to extend across said bottom of said cradle,

each of said end sections being demarcated from said center section by a pair of respective first fold lines which are transverse to the direction of elongation of said strap,

each end section comprising (a) a first portion extending up from one side of said center section to a second fold line which is transverse to the direction of elongation of said strap, (b) a second portion extending down from said second fold line to a third fold line which is transverse to the direction of elongation of said strap, and (c) a third portion extending up from said third fold line to a free end,

each of said two opposing sides of said cradle comprising holder means for holding said bundling strap, said holder means comprises a pocket having a top opening facing generally away from said bottom section of said cradle,

VOL
1127
ISS
2
JE
11
1991
UMI

said second and third portions of each of said end sections of said bundling strap being inserted into a respective pocket.

5,022,317

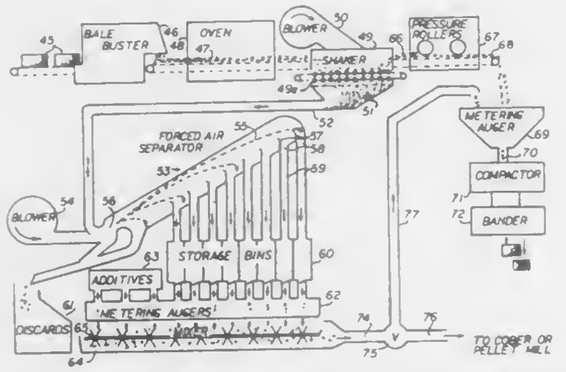
FODDER CONDITIONING PROCESS

Kenneth J. Williams, 12 W. McCabe Rd., El Ceotro, Calif. 92243

Continuation-in-part of Ser. No. 440,796, Nov. 24, 1989. This application Feb. 16, 1990, Ser. No. 481,043

Int. Cl.^{5} B30B *13/00*

U.S. Cl. 100—35 11 Claims



1. A process for conditioning fodder for storage and shipment which comprises the steps of:
  pasteurizing said fodder;
  sifting out loose small particles from sprig-like elements of said pasteurized fodder;
  separating said loose particles into separate batched according to their respective densities including grouping into a heavy batch, particles having a density at least equal to the density of dry dirt;
  discarding said heavy batch;
  combining some of the remaining batches with said sprig-like elements; and
  packing said combination into compact bales.

5,022,318

APPARATUS FOR ADJUSTING THE ROLL GAP BETWEEN COOPERATING ROLLS

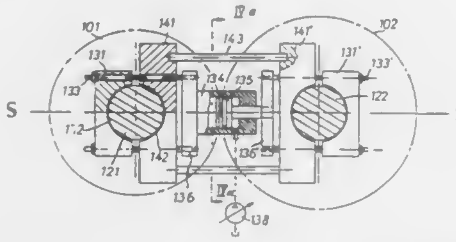
Güother Alich, Bernhofstrasse 51, 8134 Adliswil, Switzerland

Filed Jul. 13, 1989, Ser. No. 379,120

Claims priority, application Switzerland, Jul. 16, 1988, 2689/88

Int. Cl.^{5} B30B *3/04*

U.S. Cl. 100—47 15 Claims



1. Apparatus for adjusting the roll gap between cooperating rolls of a rolling stand, with each roll having a roll journal and defining an axis; comprising
  adjusting means for controlling the roll gap between the rolls and including a bearing shell half mounted outwardly relative to the roll gap on each roll journal and adjusting elements acting upon said bearing shell halves of said adjusting means, said adjusting means exerting upon said roll journals a first force; and
  support means including a bearing shell half for supporting each roll journal and a plurality of support elements extending between said bearing shell halves of said support means, said bearing shell halves of said support means being arranged inwardly between said roll journals, said adjusting means and said support means defining an autonomous and closed adjusting and supporting system, with said support means exerting upon said roll journals a second force opposing the first force exerted by said adjusting means, whereby the first and second forces act in a common radial plane extending perpendicular to said axes of said rolls.

5,022,319

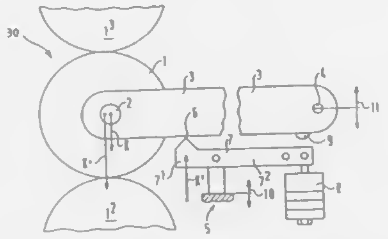
APPARATUS FOR NEUTRALIZING OVERHANGING LOADS

Mario Biondetti, Schio, Italy, assignor to Sulzer-Escher Wyss GmbH, Ravensburg, Fed. Rep. of Germany

Filed Apr. 12, 1989, Ser. No. 336,489

Int. Cl.^{5} B30B *3/04*

U.S. Cl. 100—170 4 Claims



1. An apparatus for neutralizing respective overhanging loads at a roll of a calender which is to be downwardly opened, which apparatus is supported at a stand of the calender, provided at each of two sides of the roll and presses against respective roll suspensions in a predetermined position of the roll with a compensating force which compensates for the respective overhanging loads, comprising:
  means for generating and setting the compensating force which compensates for the overhanging loads of the roll, said means for generating and setting said compensating force including displaceable means, said displaceable means including a piston-cylinder unit having a head of liquid which is supported by means of a gas cushion;
  said roll assuming an operative position during operation of the calender;
  said roll being downwardly displaced into an inoperative position downward of said operative position upon opening of said calender;
  said roll, during said downward displacement into said inoperative position, generating a downward force which opposes and is greater than said compensating force;
  said means for generating and setting said compensating force being coupled to a respective side of said roll and acted upon by said greater downward force generated by said roll upon opening of the calender, for permitting said downward displacement of said roll into said inoperative position without external control action;
  stop means; and
  said travel of the related roll into said inoperative position being limited by said stop means.

5,022,320

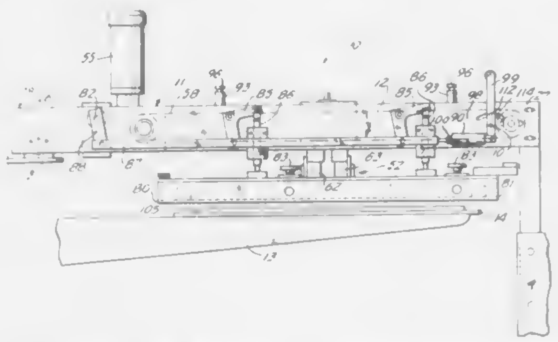
ADJUSTABLE PARALLEL MOTION LINKAGE SYSTEM FOR SCREEN PRINTER

Sandor Szarka, Franklin Lks., N.J., assignor to Precision Screen Machines, Inc., Hawthorne, N.J.

Filed May 15, 1989, Ser. No. 351,579

Int. Cl.^{5} B41F *15/08, 15/14*

U.S. Cl. 101—123 9 Claims



1. A printing head assembly for a screen printing machine comprising:
  a frame;
  a carriage assembly attached to and supported by said frame; and
  a parallel motion linkage attached to said carriage assembly and adapted to hold a framed screen unit, said parallel motion linkage comprising an adjustement means for the parallel adjustment of the position of the screen unit by a single manipulation,
  said parallel motion linkage comprising a pair of parallel members for holding the screen unit, said members comprising adjustable means for positioning and locking in the screen unit,
  said parallel motion linkage further comprising an actuation means for selectably vertically translating said members a fixed distance between a raised position and a lowered position, and wherein said adjustment means is connected to said actuation means and functions to shift the position of said actuation means so that the raised and lowered positions are each vertically shifted the same distance.

5,022,321

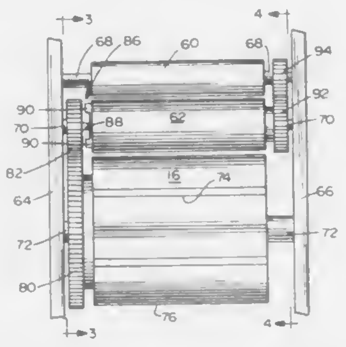
DISTRIBUTION ROLLER DRIVE SYSTEM FOR PRINTING OR DUPLICATING MACHINES

Stanley Witczak, Chicago, Ill., assignor to AM International, Inc., Chicago, Ill.

Filed Oct. 13, 1989, Ser. No. 421,557

Int. Cl.^{5} B41F *7/24*

U.S. Cl. 101—142 4 Claims



1. In a printing, duplicating or like machine, comprising:
  a printing couple including a rotatably driven master cylinder having a longitudinal gap within which master clamping means are disposed;
  a moisture system having at least a distribution roller and a form roller for distributing moisture to the master cylinder, the distributor roller being in surface contact with the form roller which, in turn, is in surface driven contact with the master cylinder;
  first gear train means, including lost motion means, between the master cylinder and the form roller for rotating the form roller only during an interval of a revolution of the master cylinder when the surface of the form roller is juxtaposed in the gap of the master cylinder; and
  second gear train means between the form roller and the distributor roller for rotating the distributor roller continuously at the same surface speed as the form roller.

5,022,322

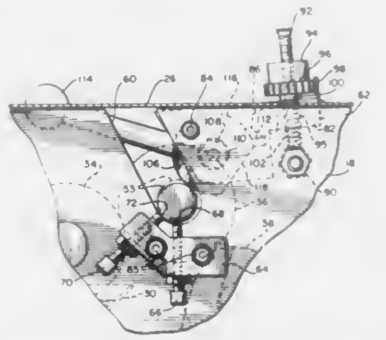
METERING ROLLER CONTROL APPARATUS

James J. Keller, 4023 Glenridge Road, Dallas, Tex. 75220

Filed Apr. 18, 1990, Ser. No. 510,727

Int. Cl.^{5} B41F *7/40*

U.S. Cl. 101—148 17 Claims



1. In a liquid metering apparatus having a stationary shaft, a metering roller surrounding the stationary shaft and a liquid pick-up roller engaging the metering roller, whereby liquid is metered through the nip between the two rollers as they rotate together, a system for controlling the metering of liquid comprising:
  (a) fulcrum and force application means associated with each end of the stationary shaft for producing bending moments biasing the central portion of the stationary shaft in a direction generally toward the fluid pick-up roller;
  (b) at least one bearing engaging the stationary shaft adjacent the interior of the metering roller, and engaging the rotatable inwardly facing surface of the metering roller; and
  (c) adjustment means for selectively adjusting the bending moments produced by the fulcrum and force application means;
  wherein the fulcrum and force application means includes a fulcrum directly supporting the stationary shaft near each end, and means for applying a force directly to the shaft at a point inwardly along the shaft from each fulcrum, and each fulcrum comprises first and second screws oriented at an acute angle with ends adjacent to receive and support the stationary shaft therebetween, each screw being adjustable to change the support point for the shaft in the direction of the screw axis.

5,022,323

PRINTING TOY SEWING MACHINE

Douglas A. Schultheis, Cumberland, R.I., assignor to Hasbro, Inc., Pawtucket, R.I.

Filed Dec. 20, 1989, Ser. No. 453,769

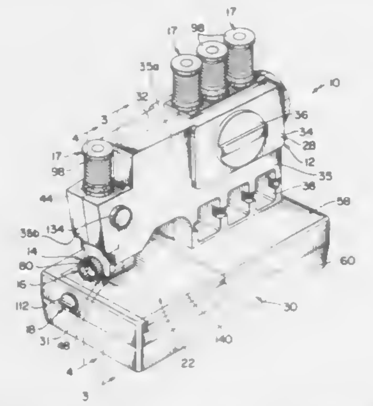
Int. Cl.^{5} A63H *33/30;* B41F *17/00*

U.S. Cl. 101—219 8 Claims

1. A toy sewing machine comprising:
  (a) body means defining a simulated sewing machine body, said body means including a base portion having a simu-

VOL
1127
ISS
2
JE
11
1991
UMI

lated sewing station thereon and an upper body portion, said upper body portion including an upwardly extending portion extending upwardly from said base portion at a location which is spaced from said simulated sewing station, an upper support portion extending from said upwardly extending portion in upwardly spaced relation to said base portion to a point above said simulated sewing station and a head portion on said upper support portion above said simulated sewing station; and



(b) printing means located at said sewing station for applying a printed image to a piece of sheet material passing through said sewing station.

5,022,324

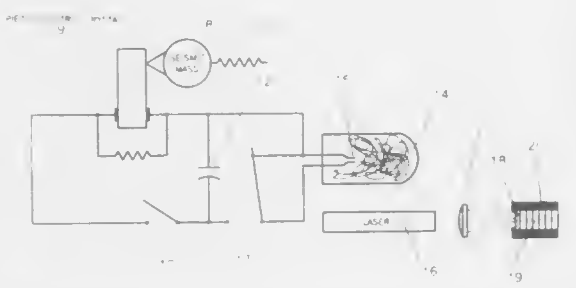
PIEZOELECTRIC CRYSTAL POWERED IGNITION DEVICE

John H. Rice, Jr., Keyser, W. Va., assignor to Hercules Incorporated, Wilmington, Del.

Filed Jun. 6, 1989, Ser. No. 362,125

Int. Cl.^{5} F42C *19/00*

U.S. Cl. 102—201 **21 Claims**



14. A device for ignition of a pyrotechnic material, comprising:

(a) piezoelectric means for providing a high voltage electrical pulse in response to mechanical energy;

(b) a pyro flash lamp which has an outer glass envelope surrounding a shred or foil of zirconium and compressed oxygen, has pins coated with a pyrotechnic mixture which pass through the glass envelope and form a spark gap within the glass envelope, emits a flash of light in response to a high voltage pulse on the order of 10,000 or more volts, and has a light output of not less than 3800 Lumin-Seconds with peak light occurring in less than 10 milliseconds after ignition; and

(c) a ruby, neodymium glass or neodymium YAG solid state laser capable of emitting a light beam sufficient to ignite a pyrotechnic material, in response to said flash of light.

5,022,325

FUZE FOR BOMBLET PROJECTILE

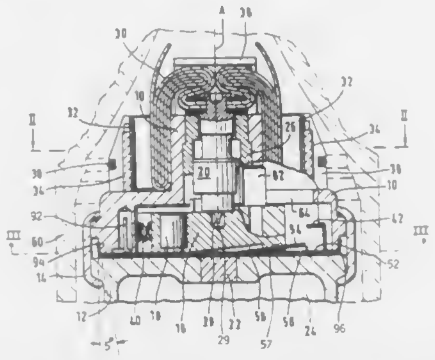
Gerhard Skowasch, Gelsenkirchen; Udo Sabranski, Willich; Jürgen Funk, and Siegfried Quick, both of Düsseldorf, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Jul. 30, 1990, Ser. No. 559,936

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1989, 3925238

Int. Cl.^{5} F42B *12/58;* **F42C** *14/06, 15/22, 15/34*

U.S. Cl. 102—226 **17 Claims**



1. In a fuze for an explosive projectile, particularly a submunition projectile (bomblet), including: a fuze housing; a primary firing pin mounted in said housing for axial displacement in the longitudinal direction; a detonation charge carried by a slide disposed in said housing adjacent said primary firing pin, said slide being mounted in said housing for displacement in a direction transverse to said longitudinal direction of said housing, and to its center longitudinal axis, between a safety position, wherein said detonation charge is not aligned with said primary firing pin, and an armed position, wherein said detonation charge is aligned with said primary firing pin; the improvement comprising: safety means, responsive to centrifugal forces acting on the said fuze, for permitting movement of said slide toward said armed position, and for preventing further movement of said slide toward said armed position beyond an intermediate position, wherein said detonation charge is likewise not aligned with said primary firing pin, if said slide is not in said armed position once a given said centrifugal force is no longer present, said safety means including a first safety pin slidingly mounted in a first opening which is disposed in a side wall of said fuze housing adjacent a first side surface of said slide and which extends transverse to said displacement direction of said slide and to said longitudinal direction, a spring fastened to said housing and urging said first safety pin in a direction toward said first side surface of said slide, and a first recess formed in said first side surface of said slide and into which a first end of said first safety pin can extend, said first recess being an elongated groove extending along said first side surface and having a trailing edge positioned to prevent movement of said slide beyond said intermediate position when engaged by a circumferential surface of said safety pin adjacent said first end.

5,022,326

ASYNCHRONOUS EXPLOSIVE LOGIC SAFING DEVICE

Denis A. Silvia, Aberdeen, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 20, 1982, Ser. No. 380,204

Int. Cl.^{5} F42D *1/04;* **F42B** *3/10*

U.S. Cl. 102—275.9 **16 Claims**

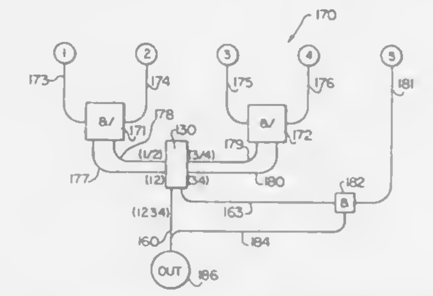
1. An explosive logic AND gate yielding an explosive output signal when supplied with input signals from first and second detonators, comprising:

delay path means receiving input signals from the first and second detonators;

first logic switch means in series with the delay path means, said first logic switch means capable of being set by a control signal from the first detonator;

second logic switch means in series with the first switch means, said second logic switch means capable of being set by a control signal from the second detonator; and

output means in series with the second logic switch means;



whereby, when the first and second detonators initiate detonation signals, said signals are propagated both as input signals to the delay path means and as control signals to set the first and second logic switch means and allow propagation of the input signals out of the delay path means, through the first and second logic switch means to the output means; and whereby when one detonator fails to initiate, the input signal is extinguished in the logic switch means.

5,022,327

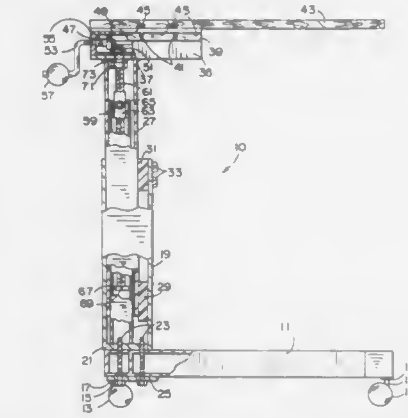
CRANK TOP OVERBED TABLE

Robert A. Solomon, Kalamazoo, Mich., assignor to Bissell Healthcare/Bissell Am Fab, Inc., Kalamazoo, Mich.

Filed Jul. 5, 1990, Ser. No. 548,375

Int. Cl.^{5} A47B *9/00*

U.S. Cl. 108—147 **11 Claims**



1. An overbed table having a safety table top comprising:

a table top capable of extending horizontally over a bed;

a frame for supporting said table top;

a drive mechanism resting on said frame for controllably moving said table top upwardly and downwardly relative to said frame;

said table top being free to move upwardly relative to said frame, while being maintained in its horizontal orientation by said frame, upon the application of an upward force directly to said table top regardless of the position of said table top determined by said drive mechanism.

5,022,328

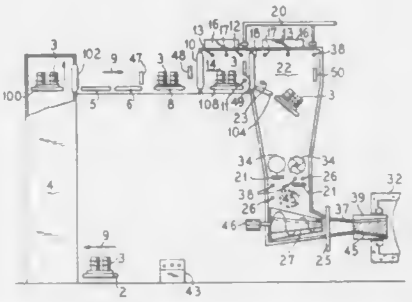
SHREDDER/COMPACTOR AUGER SYSTEM

James C. Robertson, Mabelvale, Ark., assignor to Ensco, Inc., Little Rock, Ark.

Filed Aug. 16, 1990, Ser. No. 568,082

Int. Cl.^{5} F23K *1/00*

U.S. Cl. 110—232 **24 Claims**



1. An apparatus for burning a combustible material, comprising:

a kiln;

an airlock chamber; and

shredding and conveying apparatus for shredding and conveying combustible material and having enclosure means operatively coupled between said kiln and said airlock chamber,

and means for controlling the oxygen content of said enclosure means

whereby combustible material is shredded and conveyed into said kiln in an atmosphere whose oxygen content is maintained below a preselected level.

5,022,329

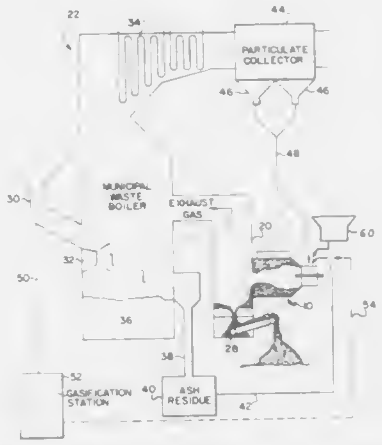
CYCLONE FURNACE FOR HAZARDOUS WASTE INCINERATION AND ASH VITRIFICATION

John M. Rackley, and Stanley J. Vecci, both of Alliance, Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Sep. 12, 1989, Ser. No. 406,393

Int. Cl.^{5} F23B *7/00*

U.S. Cl. 110—234 **9 Claims**



1. An apparatus for vitrifying inorganic material in a waste containing organic and inorganic substances, comprising:

a boiler having at least one burner for incinerating a fuel and recovering heat of combustion gases produced therefrom;

a cyclone furnace separately fired attached to said boiler for receiving ash from said boiler and converting the ash into a vitreous slag; and

means for introducing the waste into said cyclone furnace

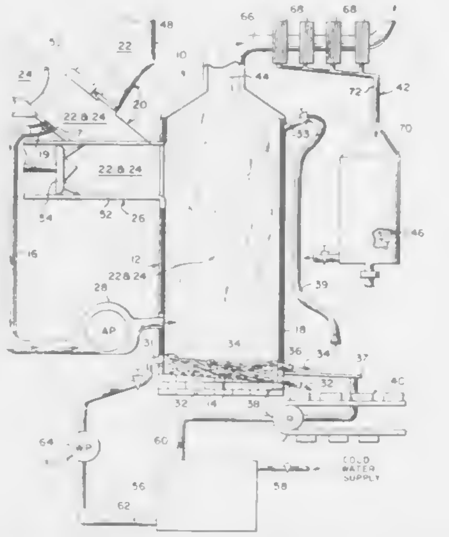
VOL
1127
ISS
2
JE
11
1991
UMI

for destruction of the organic and vitrification of the inorganic substances.

5,022,330
GARBAGE MELTER

Stephen K. Burgher, 7266 Amboy Rd., Staten Island, N.Y. 10307, and George Spector, 233 Broadway, New York, N.Y. 10007

Filed Sep. 12, 1990, Ser. No. 582,659
Int. Cl.^{5} F23G *5/00*
U.S. Cl. 110—235 **2 Claims**

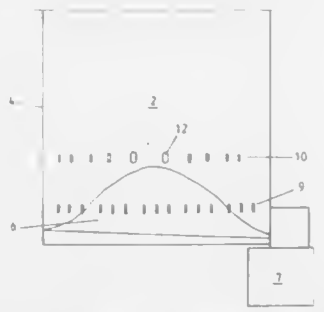


1. A garbage burning and melting apparatus comprising:
(a) a modified blast furnace having channeled side walls and a sloping fire brick bottom floor;
(b) a first chamber for mixing coal and garbage together;
(c) a second chamber for holding and loading the mixed coal and garbage from said first chamber into said blast furnace for burning;
(d) a hot air pump fluidly extending between said second chamber and said blast furnace for removing obnoxious odors from said second chamber and forcing a blast of hot air into said furnace at the low end of said blast furnace to produce the intense heat needed to burn the coal and garbage above the bottom floor;
(e) means for cooling the side walls of said blast furnace with cool water entering an inlet pipe and exiting an outlet pipe in said blast furnace;
(f) means for washing molten slag outside said blast furnace after the slag and lava leave through exit ports at the low sides of the bottom floor;
(g) a conveyor located at the exit ports for conveying the molten slag and lava by-products away from said blast furnace for distribution;
(h) means for filtering the exhausted gases from the top of said blast furnace to remove powdered ash therefrom in combination with scrubbers;
(i) said first chamber includes a pair of sloping intersecting conduits in which one said conduit carries the coal therein and the other conduit carries the garbage therein to mixed together;
(j) said second chamber includes a tank for holding the mixed coal and garbage and ram rod for loading the mixed coal and garbage into said blast furnace; and
(k) said washing means includes a water reservoir having two inlet pipes and an outlet pipe, whereby the first inlet pipe is connected to a cold water supply, while the second inlet pipe is provided for carrying water that exits through the outlet pipe from said blast furnace back into said water reservoir; and a water pump fluidly connected between the outlet pipe of said water reservoir and the inlet pipe in said blast furnace so as to cool the side walls of said blast furnace.

5,022,331
METHOD AND APPARATUS FOR INTRODUCING COMBUSTION AIR INTO A FURNACE

Liisa I. Simonen, Marietta, Ga., assignor to A. Ahlstrom Corporation, Finland, Finland

Filed Apr. 6, 1990, Ser. No. 505,696
Claims priority, application Finland, Apr. 10, 1989, 891685
Int. Cl.^{5} F23L *15/00*
U.S. Cl. 110—297 17 Claims

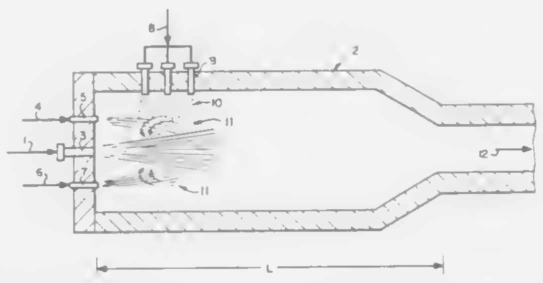


1. A method of introducing combustion air in air jet form to a furnace having a plurality of walls from a plurality of air ports arranged at a substantially similar level in different walls of the furnace, comprising the steps of: introducing combustion air into the furnace in air jet form from at least two opposing furnace walls, said jets having at least two different sizes such that penetration of the air jets increases from corners of the furnace towards centers of the said at least two opposing furnace walls.

5,022,332
COMBUSTION METHOD FOR IMPROVED ENDOTHERMIC DISSOCIATION

Maynard G. Ding, Yorktown Heights, N.Y., assignor to Union Carbide Industrial Gases Technology Corporation, Danbury, Conn.

Filed Aug. 15, 1990, Ser. No. 567,786
Int. Cl.^{5} F23G *7/04*
U.S. Cl. 110—346 19 Claims

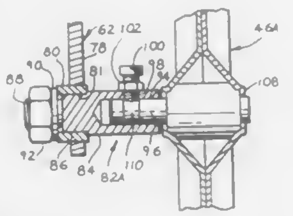


1. A method for treating contaminated acid comprising:
(a) providing fuel into a combustion zone and, spaced therefrom, providing oxidant into the combustion zone, said oxidant having an oxygen contratoin of at least 25 percent and a velocity sufficient to cause a recirculation flow within the combustion zone;
(b) combusting fuel and oxidant within the combustion zone to produce heat and to form combustion reaction products;
(c) providing acid to the combustion zone and applying heat from the combustion zone to the acid to endothermically dissociate the acid to produce an oxygen-containing dissociation product; and
(d) recirculating combustion reaction products within the recirculation flow into the combustion reaction of the oxidant and fuel to dilute the combustion reaction and thus carry out the combustion reaction at a lower peak flame temperature, and to enhance the application of heat to the acid for the endothermic dissociation.

5,022,333
UNIVERSAL PRESS WHEEL ARM ASSEMBLY

J. Michael McClure, and Eric Johnson, both of Salina, Kans., assignors to Great Plains Manufacturing Incorporated, Salina, Kans.

Filed Sep. 25, 1989, Ser. No. 411,869
Int. Cl.^{5} A01C *5/06;* **A01B** *35/28, 29/06;* **B60B** *37/10*
U.S. Cl. 111—194 **1 Claim**

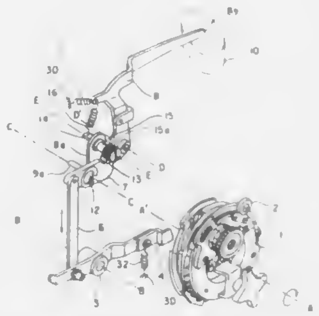


1. In combination:
a frame;
at least one planting unit secured to the frame for movement therewith, the planting unit including a ground-engaging opener for preparing a seed-receiving furrow in the soil along an imaginary line defined by the path of travel of the opener, and means for intermittently depositing seeds in the furrow prepared by the opener;
an arm displaced from the opener in a direction along the path of travel of the opener;
a first press wheel having an axis of rotation and presenting a first width in the direction of the axis of rotation, the first width defining a first center plane bisecting the first width;
a first adapter for use in mounting the first press wheel to the arm in preselected spaced relationship thereto with the first center plane aligned with the imaginary line defined by the path of travel of the opener;
a second press wheel having an axis of rotation and presenting a second width different from the first width in the direction of the axis of rotation, the second width defining a second center plane bisecting the second width;
a second adapter for use in mounting the second press wheel to the arm in preselected space relationship thereto with the second center plane aligned with the imaginary line defined by the path of travel of the opener;
the first adapter including a first elongated body having first and second axial ends, first connection means located adjacent the first axial end of the first body for releasably connecting the first body to the arm, and first mounting means located adjacent the second axial end of the first body for releasably mounting the first press wheel on the first body, the connection means and mounting means being separated from one another by a first predetermined distance adapted to position the first press wheel with the first center plane substantially co-planar with the imaginary line when the first press wheel and first adapter are supported on the arm,
the second adapter including a second elongated body having first and second axial ends, second connection means located adjacent the first axial end for releasably connecting the second body to the arm, and second mounting means located adjacent the second axial end for releasably mounting the second press wheel on the second body, the connection means and mounting means being separated from one another by a second predetermined distance different from the first predetermined distance and adapted to position the second press wheel with the first center plane of the second press wheel substantially co-planar with the imaginary line defined by the path of travel of the opener when the second press wheel and second adapter are supported on the arm,
whereby the first press wheel and adapter, and the second press wheel and adapter are selectively positionable on the arm in place of one another.

5,022,334
PRESSER BAR LIFTER IN A BUTTON PERFORATING SEWING MACHINE

Katsuo Hiratsuka; Yoshiyuki Odaka, and Takayuki Sakamoto; all of Tochigi, Japan, assignors to SSMC Inc., Edison, N.J.

Filed Jul. 17, 1989, Ser. No. 380,402
Claims priority, application Japan, Aug. 18, 1988, 63-108609[U]
Int. Cl.^{5} D05B *29/00*
U.S. Cl. 112—238 **4 Claims**



1. A presser bar lifter in a button perforating sewing machine comprising:
a pattern wheel fixed to a pattern wheel axis supported by a bed body of said sewing machine and rotatable through one revolution about the pattern wheel axis for each stiching operation cycle, said wheel having a projection positioned at a periphery thereof also rotatable through one revolution for each stitching operation;
a stop lever fixing lever supported by the bed body and having a central portion swingably supported by an axis parallel with the pattern wheel axis; one end to be kicked by the projection of the pattern wheel;
a connecting member having one end connected to another end of the stop lever fixing lever;
a first presser bar lifter having a middle portion swingably supported by a cutting axis parallel with the pattern wheel axis, one end connected to another end of the connecting member, the first presser bar lifter being always urged clockwise by a spring, extended between the stop lever fixing lever and the body, via the stop lever fixing lever and the connecting member;
a second presser bar lifter having a middle portion swingably supported at a side of the bed body by an axis parallel with the pattern wheel axis, one end defining an operation arm so as to be positioned at a lifting position by an urging force of a spring extended between the bed body and the second presser bar lifter, the other end provided with a folded projection inclined at a side of the operation arm and having a through hole;
a stepped screw having a knurled thumb at a peripheral surface thereof rotatably inserted in the through hole of the folded projection and a small diameter screw portion at a tip end thereof;
a lever shifting member screwed into the small diameter screw portion of the folded projection and having a projecting roller normally positioned in a recess of the second presser bar lever;
a presser bar lifter cam fixed to the cutting axis for swingably fixing the first presser bar lifter and having a projection;
the lever shifting member being engaged with the first

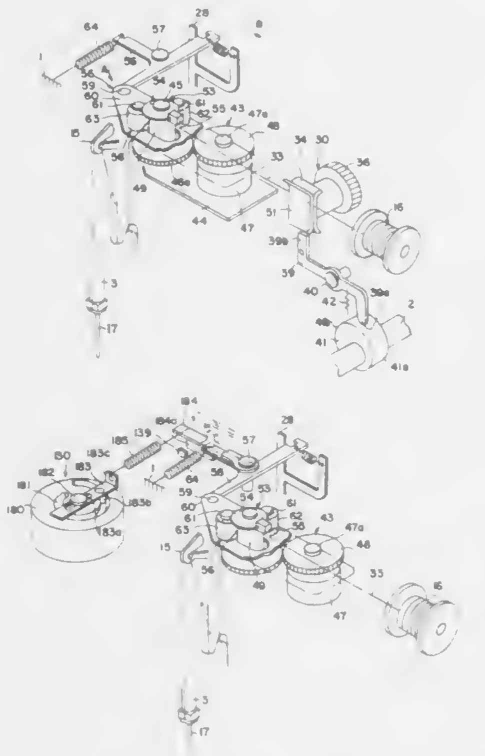
VOL
1127
ISS
2
JE
11
1991
UMI

presser bar lifter at one swingable position for transmitting the swingable movement of the first presser bar lifter to the second presser bar lifter and engaged with the projection of the presser bar lifter cam at another swingable position for transmitting the swingable movement of the presser bar lifter cam to the second presser bar lifter.

5,022,335
UPPER THREAD SUPPLYING DEVICE IN SEWING MACHINE

Susumu Hanyu; Noboru Kasuga; Mikio Koike; Kazumasa Hara; Mitsuru Nishijima, and Akiyoshi Sasano, all of Tokyo, Japan, assignors to Janome Sewing Machine Industry Co., Ltd., Tokyo, Japan

Filed Oct. 26, 1989, Ser. No. 427,292
Claims priority, application Japan, Oct. 28, 1988, 63-270789
Int. Cl.^{5} D05B *47/04*
U.S. Cl. 112—255 6 Claims



1. An upper thread supplying device used in combination with a sewing machine having an upper thread supply source, a vertically reciprocating needle carrying an upper thread supplied from the upper thread supply source, loop taker means cooperating with the needle to form a stitch by interlocking the upper thread with a lower thread carried by the loop taker means and an upper thread take-up lever operated in synchronism with reciprocation of the needle, which comprises:

tension applying means for applying tension to the upper thread, said tension applying means being arranged between said upper thread supply source and said upper thread take-up lever and operated intermittently in synchronism with reciprocation of the needle;

upper thread supplying means for drawing the upper thread out of said upper thread supply source when said tension applying means is not operative;

operating means for determining a theoretical amount of the upper thread which is required for forming a desired stitch on a theoretical basis with stitch condition data inputted thereto, and also for determining a practical amount of the upper thread by deducting a specific amount from the theoretical amount, the practical amount of the upper thread being outputted therefrom; and

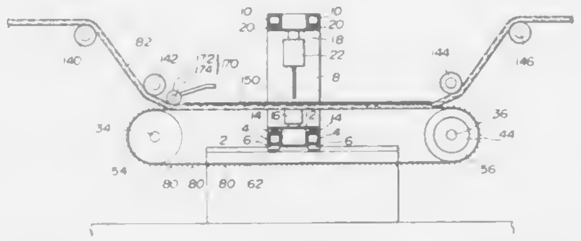
control means operated in response to the output from said operating means for actuating said upper thread supplying means, thereby supplying the practical amount of the upper thread,

said take-up lever pulling an additional amount of the upper thread, which is a difference between the practical amount supplied by said upper thread supply means and an amount actually required for completing the stitch, said additional amount being supplied from said upper thread supply source through said tension applying device which is now made operative to apply a predetermined tension to the upper thread, during ascent of said upper thread take-up lever.

5,022,336
PIN TYPE CONVEYOR FABRIC FEEDING APPARATUS FOR A SEWING MACHINE

Yukio Iwase, Utsunomiya, Japan, assignor to Prince Sewing Machine Co., Ltd., Tokyo, Japan

Filed Apr. 26, 1989, Ser. No. 343,348
Int. Cl.^{5} D05B *35/00*
U.S. Cl. 112—304 6 Claims



1. An apparatus for feeding a sewing machine with textile fabrics, the apparatus comprising:

two sets of rotary wheels disposed at opposite sides of the sewing machine;

a pair of loop members wrapped respectively around the two sets of wheels so that elements of each of the loop members can move around the respective sets of wheels with at least one section of their path being horizontal, and spaced from and parallel to the horizontal section of the path of the other loop member's elements;

drive means, drivingly connected to one of each set of wheels, for driving the elements of the loop member synchronously with those of the other so that, within the horizontal sections of the paths, the loop member's elements are moved in the same direction;

a pair of holding means, mounted respectively on the loop members, for holding opposite side hems of the fabric to hold the fabric between the pair of holding means at the respective horizontal sections of the loop paths, each of the holding means including a plurality of spike members disposed around the corresponding loop member, the spike members being pointed upward when the spike members are in the corresponding horizontal section, so as to pierce the corresponding side hem of the fabric horizontally disposed;

adjusting means for adjusting the space between the horizontal sections of the paths so as to stretch or slacken the fabric held by the pair of holding means;

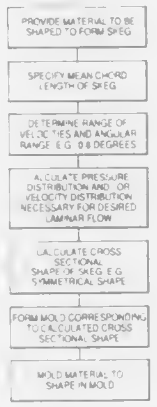
a first suspension means for suspending the textile fabric in such a manner that the fabric extends between the first suspension means and the horizontal section of the loop path, the suspension means being disposed at a level above the horizontal section of the fabric feeding apparatus; and

a pair of covers which respectively cover over the pair of horizontal sections of the loop paths, the covers holding the fabric in contact with the spike members to hold the fabric.

5,022,337
LIFT PRODUCING DEVICE EXHIBITING LOW DRAG AND REDUCED VENTILATION POTENTIAL AND METHOD FOR PRODUCING THE SAME

Richard A. Caldwell, 115 Wimico Dr., Indian Harbour Beach, Fla. 32937

Filed Apr. 17, 1989, Ser. No. 339,491
Int. Ct.^{5} B63B *35/79*
U.S. Cl. 114—39.2 10 Claims


PROVIDE MATERIAL TO BE SHAPED TO FORM SKEG
SPECIFY MEAN CHORD LENGTH OF SKEG
DETERMINE RANGE OF VELOCITIES AND ANGULAR RANGE E.G. 0-8 DEGREES
CALCULATE PRESSURE DISTRIBUTION AND/OR VELOCITY DISTRIBUTION NECESSARY FOR DESIRED LAMINAR FLOW
CALCULATE CROSS SECTIONAL SHAPE OF SKEG E.G. SYMMETRICAL SHAPE
FORM MOLD CORRESPONDING TO CALCULATED CROSS SECTIONAL SHAPE
MOLD MATERIAL TO SHAPE IN MOLD

1. A method for producing a lift producing device having opposed first and second major surfaces joined at a longitudinally extending leading edge and at a longitudinally extending trailing edge, at least a portion of said trailing edge being spaced from said leading edge by a predetermined mean chord length, said lift producing device being adapted to be connected to a vehicle and to provide lift to said vehicle when said vehicle is moved relative to a first fluid medium within a range of predetermined velocities, each of said velocities having a direction inclined from a plane extending through said leading edge and said trailing edge within a predetermined angular range, said first fluid medium having a first density, and viscosity and being in contact with a second fluid medium adjacent said vehicle, said second fluid medium having a second density different from said first density, and said first fluid medium being under a high pressure adjacent said first major surface of said lift producing device and being under a low pressure adjacent said second major surface of said lift producing device, said method comprising:

providing a material capable of being shaped;

specifying and predetermined mean chord length of said lift producing device;

determining said range of predetermined velocities and said predetermined angular range;

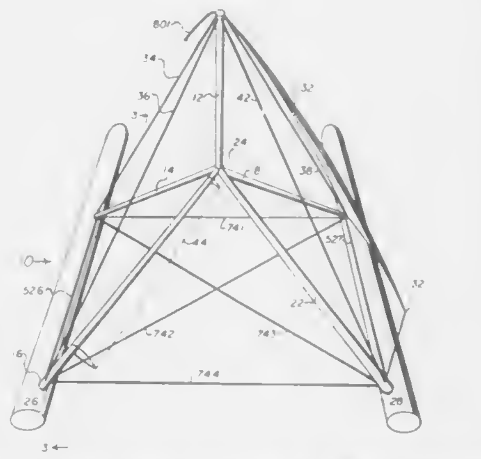
based on said predetermined mean chord length, said range of predetermined velocities, said predetermined angular range, said first density and said viscosity of said first fluid medium, determining at least one of a pressure distribution and a velocity distribution along said predetermined mean chord length such that said first fluid medium will exhibit attached laminar flow along said lift producing device for a portion of said predetermined mean chord length from said leading edge toward said trailing edge, will not form a laminar separation bubble adjacent said second major surface of said lift producing device and no turbulent separation occurs adjacent said second major surface of said lift producing device for substantially all of said predetermined mean chord length from said leading edge toward said trailing edge; wherein said at least one of pressure distribution and velocity distribution is determined such that said first fluid medium will exhibit attached laminar flow along said lift producing device for approximately the longest portion of said mean chord length possible while still exhibiting no turbulent separation adjacent said second major surface of said lift producing device for substantially all of said predetermined chord length from said leading edge toward said trailing edge;

calculating a cross-sectional shape which will generate said at least one of pressure distribution and velocity distribution when said vehicle is moved relative to said first fluid medium at a velocity within said range of predetermined velocities and an angle within said predetermined angular range; and

shaping said material to form said lift producing device having said predetermined mean chord length and said cross-sectional shape.

5,022,338
CONFIGURABLE WIND POWERED VESSEL

John R. Rosenberger, 133 Hayes Place, Centerport, N.Y.
Continuation-in-part of Ser. No. 15,911, Feb. 18, 1987, Pat. No. 4,757,777. This application Dec. 28, 1987, Ser. No. 137,930
Int. Cl.^{5} B63B *1/14*
U.S. Cl. 114—39.10 12 Claims



1. A high strength waterborne sailing vessel comprising:

(a) an elongated port aft spar, an elongated starboard aft spar, an elongated forward port spar, an elongated forward starboard spar, and an elongated mast, each of said spars and said mast having a juncture end, a distal end, and a distal end region adjacent the distal end, a connecting means for attaching the juncture ends of the spars to one another to form a common juncture so that said spars project outwardly and downwardly from said juncture, so that the ends of said spars define the vertices of a pyramid, said mast projects upwardly from said juncture, and the distal ends of said spars and mast define the vertices of a pyramid; and

(b) a stay means for connecting the distal end region of said mast to the distal end regions of each of said spars; and

(c) a starboard stay means for connecting the distal end regions of the starboard spars to each other; and

(d) a port stay means for connecting the distal end regions of the port spars to each other; and

(e) a stay means for connecting the distal end regions of the forward spars to each other; and

(f) a stay means connecting the distal end regions of the aft spars to each other; and

(g) a water support means for supporting the vessel proximal to the surface of the water; and

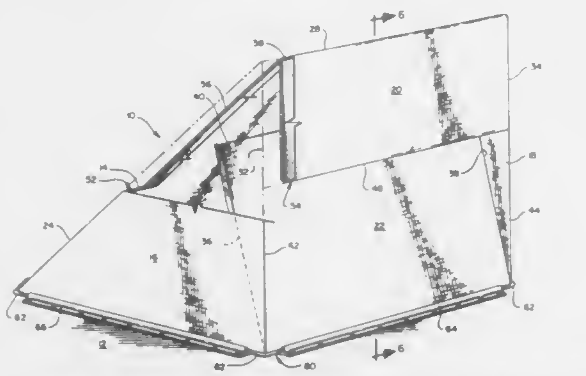
(h) a propulsion means for propelling the vessel along the surface of the water.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,339

VENTILATOR FOR ATTACHMENT TO DECK HATCHES

Kermit L. Baskin, P.O. Box 197, Long Valley, N.J. 07853
Filed Feb. 21, 1990, Ser. No. 465,398
Int. Cl.⁵ B63B *19/06*
U.S. Cl. 114—211 **14 Claims**



1. A ventilator for attachment to a deck hatch having a hatch cover which opens to uncover a hatch opening so that the interior of said ventilator is in communication with said hatch opening, said ventilator comprising:

a rigid top panel configured so that when said ventilator is attached to said deck hatch, a lower edge of said top panel is adjacent said deck and first and second side edges of said top panel extend upwardly from said deck to an upper edge of said top panel which is a spaced distance above said deck;

first and second side panels, each said side edge of said top panel having a said side panel attached thereto, each said side panel being configured to extend downwardly from a said upwardly extending side edge of said top panel to a lower edge which is adjacent to said deck;

an outer front panel having an upper edge attached to said upper edge of said top panel, said outer front panel being configured to extend downwardly from said upper edge of said top panel which is a spaced distance above said deck to a lower edge which is also a spaced distance above said deck; and

an inner front panel configured to extend upwardly from a lower edge which is adjacent to said deck to an upper edge which is no lower than said lower edge of said outer front panel which is a spaced distance above said deck, and so that said upper edge of said inner front panel is displaced inwardly from said lower edge of said outer front panel so as to from a gap between said inner and outer front panels which permits the flow of air into said interior of said ventilator, but which eliminates any direct path by which rain might enter said hatch opening via said ventilator.

5,022,340

PORTABLE MECHANICAL BURGLAR ALARM

Budrick S. Caraba, 276 N. El Camino Real #189, Oceanside, Calif. 92054
Filed Nov. 15, 1989, Ser. No. 436,693
Int. Cl.⁵ G08B *13/08*
U.S. Cl. 116—77 **20 Claims**

1. A portable mechanical burglar alarm actuated by relative movement of first and second structural members, comprising:

a base plate;

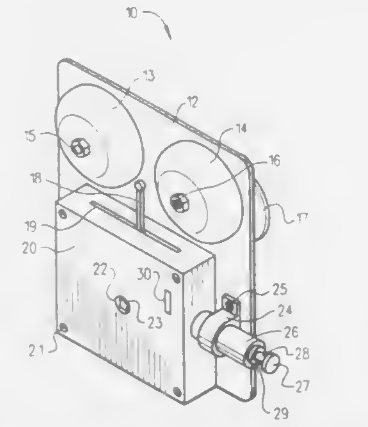
at least one suction cup on a back surface of said base plate for mounting said base plate on a first structural member;

a pair of bells secured in aligned spaced relation on a front surface of said base plate;

a pivotal clapper arm disposed between said bells;

a spring powered bell ringing mechanism operably connected to said clapper arm for striking said arm in an alternating manner against each of said bells;

trigger means mounted on said base plate for actuating said ringing mechanism in response to relative movement between the first and the second structural member; and

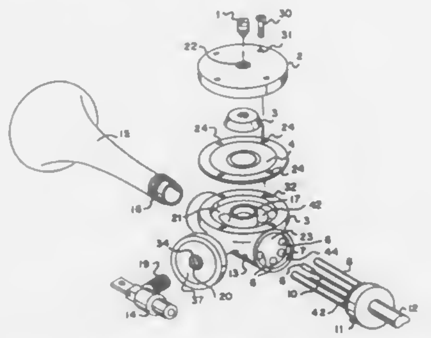


means coacting with said trigger means for preventing unauthorized resetting of said trigger means.

5,022,341

HORN

Stanley J. Eveanowsky, Jr., 724 Jackson Ave., Magnolia, N.J. 08049, and Mark J. Whitley, 232 Washington Ave., Pitman, N.J. 08071
Filed Oct. 15, 1990, Ser. No. 597,174
Int. Cl.⁵ G10K *9/04, 9/22*
U.S. Cl. 116—142 FP **14 Claims**

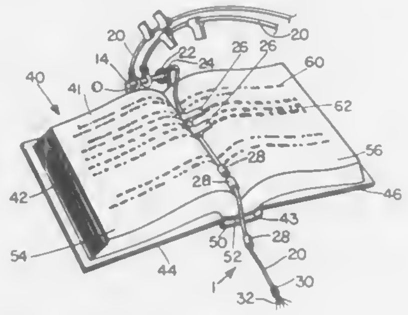


1. A horn apparatus consisting of a housing to which is attached a sound emitting element, said housing to containing a sound generating mechanism; said housing to having means for attaching means to activate said sound generating mechanism; said housing also containing electrical means to heat said housing, sound generating mechanism and sound emitting element, wherein said electrical heating means in said housing consists of at least one electrically energized heating cartridge inserted into said housing in a channel provided therefor in said housing; said housing further containing an electrical switching means to turn said heating means on and off, wherein said electrical switching means further includes a temperature sensor enabling said electrical switching means to automatically turn said heating means on and off at predetermined temperatures as sensed by said temperature sensor; and electrical energy means to energize said heating and switching means.

5,022,342

BOOKMARK APPARATUS

Alton B. Davis, 413 S. 9th St., Klamath Falls, Oreg. 97601
Filed Aug. 13, 1990, Ser. No. 565,971
Int. Cl.⁵ B42D *9/00*
U.S. Cl. 116—236 **9 Claims**



1. Bookmark apparatus including:

a plurality of strings;

two moveable place markers on each string;

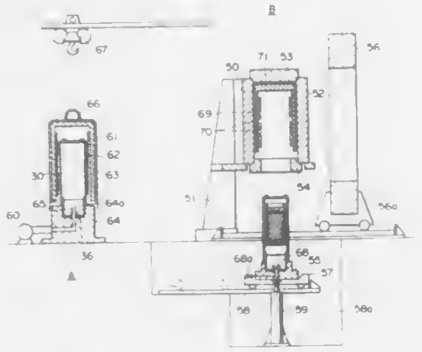
at least one moveable reference marker bead on each string; and

anchor means interconnected with the strings for securing the strings to the book.

5,022,343

IMPREGNATING CARBONIZING PROCESS AND APPARATUS

Takao Fujikawa, and Takahiko Ishii, both of Kobe, Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan
Filed Jul. 3, 1989, Ser. No. 374,782
Claims priority, application Japan, Jul. 5, 1988, 63-167344
Int. Cl.⁵ B05D *3/02*
U.S. Cl. 118—47 **2 Claims**

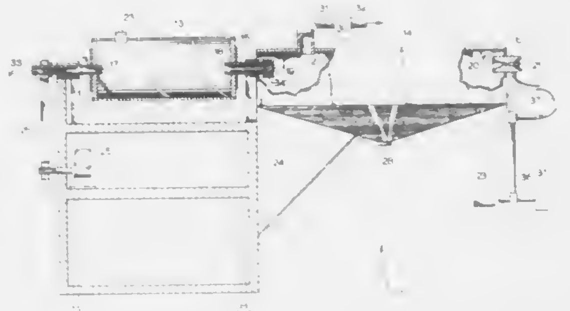


1. An impregnating carbonizing apparatus, comprising a reduced pressure impregnating station, a high pressure impregnating carbonizing station, and a specimen case adapted to be supplied successively to said reduced pressure impregnating station and said high pressure impregnating carbonizing station and adapted to receive therein a porous shaped body of carbon and a block of impregnant, said specimen case having a gas admitting valve which is opened to admit gas of the outside of said specimen case into the inside of said specimen case when a predetermined difference in pressure is caused between the outside and the inside of said specimen case, said specimen case further having a gas discharging opening for discharging internal gas of said specimen case therethrough, said reduced pressure impregnating station including a bell-shaped furnace which is opened at a lower portion thereof so that said specimen case can be contained therein, a support table for supporting said specimen case thereon, and a pressure reducing means communicated with said gas discharging opening of said specimen case for discharging internal gas of said specimen case therethrough to lower the internal pressure of said specimen case, said high pressure impregnating carbonizing station including a high pressure vessel, a pair of upper and lower lids for closing openings at the opposite ends of said high pressure vessel, a heat insulating layer disposed in said high pressure vessel, a high pressure heating means disposed on the inner side of said heat insulating layer, and a control valve communicated with said gas discharging opening of said specimen case for lowering the internal pressure of said specimen case at a controlled rate.

5,022,344

METHOD AND APPARATUS FOR APPLYING PARTICULATE MATTER TO A CABLE CORE

Dieter E. Kundis, Hickory, N.C., assignor to Siecor Corporation, Hickory, N.C.
Filed Mar. 13, 1989, Ser. No. 322,343
Int. Cl.⁵ B05C *5/00, 19/00*
U.S. Cl. 118—56 **6 Claims**



1. An apparatus for coating a cable core with particulate matter comprising first and second chambers each of which have entrance and exit coaxially-lined ports, said first chamber being rotatable, said exit port of said second chamber containing an air wipe comprised of a cable passageway having a longitudinal axis in communication with the interior and exterior of said second chamber, and a plurality of air passageways in communication with said cable passageway, said air passageways each having a longitudinal axis disposed at an acute angle to the cable passageway so that gas forced through said air passageways is forced into the second chamber.

5,022,345

BIRD TOYS

LeRoy E. Bolivar, and Sharyn L. Bolivar, both of Redondo Beach, Calif., assignors to Thee Birdie Bordello, El Segundo, Calif.
Filed Feb. 16, 1990, Ser. No. 480,871
Int. Cl.⁵ A01K *31/00*
U.S. Cl. 119—29 **22 Claims**

1. A bird toy for exotic birds comprising:

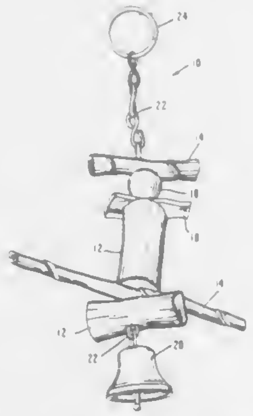
(a) a suspending medium having a top portion and a bottom portion;

(b) at least one piece of wood of intermediate hardness suspending from said suspending medium, said piece of wood adapted for chewing by an exotic bird;

(c) a plurality of elements suspended from said suspending medium, said elements selected from the group consisting of a bell, at least one length of hemp, at least one strip of rawhide, at least one length of hemp, at least one plastic baby toy, and at least one bead, said at least one piece of wood and each of said elements positioned in a linear

VOL
1127
ISS
2
JE
11
1991
UMI

fashion on said suspending medium, such that each is suspended one below the other; and



(d) means for attaching said top portion in a position to permit a bird to have access thereto.

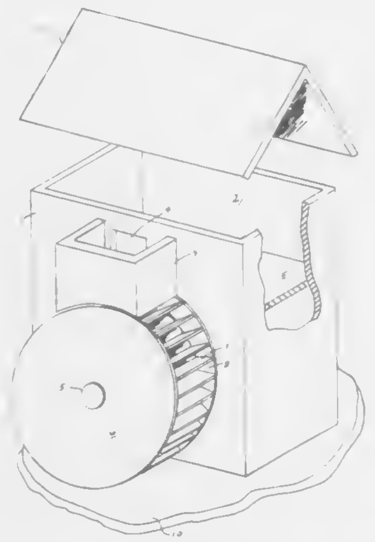
5,022,346
BIRDFEEDER ARRANGEMENTS

John M. Robertson, Louisville, Ky., assignor to Louisville Stoneware Inc., Louisville, Ky.

Filed Feb. 6, 1989, Ser. No. 306,156

Int. Cl.^{5} A01K *39/00*

U.S. Cl. 119—52.2 **1 Claim**



1. Birdfeeder arrangement for feeding birds including an enclosure of selected configuration defining a generally vertical hopper, to receive granular material where said hopper has at least one opening means located below the top of said hopper so granular material placed in hopper flows through said hopper; second receptacle means located outwardly from said hopper to receive granular material from said opening means and having a second opening; rotary feed means is provided for rotation about a horizontal axis having compartments around the periphery thereof wherein said compartments are adapted to receive granular material from said second opening and where the said granular material is received in said compartments so that the weight of said granular material tends to turn said rotary feed means about said axis and where portions of said granular material which extend above said compartments engage the side of said second receptacle to prevent free rotation of said wheel.

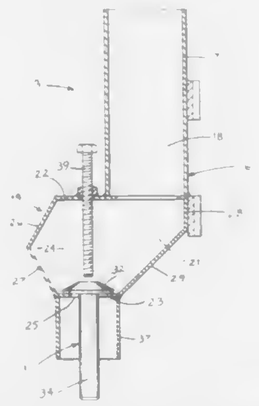
5,022,347
DRY FEED DISPENSING DEVICE FOR HOGS

James R. DenBleyker, Holland Township, Ottawa County, Mich., assignor to Big Dutchman Cyclone, Inc., Holland, Mich.

Filed Jan. 8, 1990, Ser. No. 462,133

Int. Cl.^{5} A01K *5/00*

U.S. Cl. 119—54 **17 Claims**



13. A device for dispensing dry feed to animals, such as hogs, comprising:

a hollow upright housing defining therein an interior storage chamber for dry feed, said housing having an upright side wall structure and a bottom wall provided with a feed discharge opening which opens downwardly therethrough;

animal-actuatable closure means supported on said housing and normally maintained in a closed position for closing off said discharge opening to prevent discharge of feed therethrough, said closure means including a closure member having an enlarged platelike head disposed within said housing above said bottom wall for normally closing off said discharge opening, and an elongate animal-contactable actuator fixed to said platelike head and projecting vertically downwardly therefrom through said discharge opening, said actuator projecting downwardly a substantial distance below said discharge opening and terminating at a free end, said actuator being positioned so as to be contacted by the animal and pushed sidewardly to effect tilting of the closure member relative to the housing to permit dispensing of feed through the discharge opening; and

said platelike head having an annular free edge which is adapted to contact an upper surface of said bottom wall in surrounding relationship to the discharge opening when the closure means is in said closed position, said platelike head defining on the inside thereof a downwardly-opening cavity which extends upwardly and inwardly from said annular free edge and which is in constant downward communication with said discharge opening so that the platelike head can scoop dry feed from the interior storage chamber toward the discharge opening when the closure means is tiltably moved from an open position toward the closed position.

5,022,348
LIVESTOCK FEEDER WITH TRAVELING HOPPER

Gerald J. Bruecker, and Robert W. Smith, both of Kaukauna, Wis., assignors to Badger Northland Inc., Kaukauna, Wis.

Filed Oct. 30, 1989, Ser. No. 428,963

Int. Cl.^{5} A01K *5/02*

U.S. Cl. 119—57.6 **16 Claims**

1. A livestock feeding apparatus to provide a continuous flow of feed to an elongated bunk, comprising:

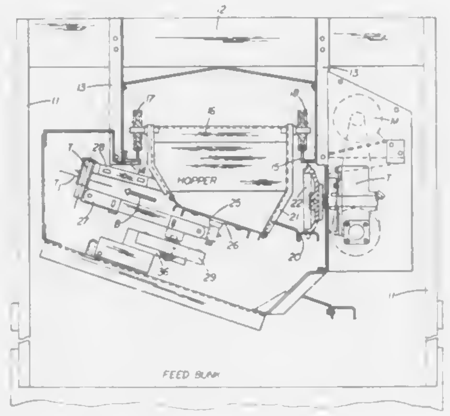
an elongated frame over said bunk;

rail means extending along said frame;

an elongated hopper of approximately one-half the length of said frame and supported thereon;

a gate along substantially the full length and width of the bottom of said hopper to retain the feed;

means for driving the hopper along a path of travel between overlapping dump stations adjacent the two ends of the frame, and



means for actuating said gate to travel along a single sliding path during opening and closing;

whereby the feed is efficiently delivered to the bunk at the dump stations with a clean cut-off and substantially no feed in between.

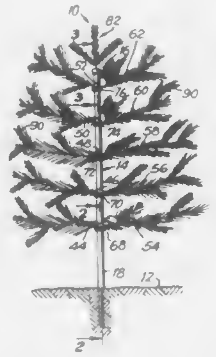
5,022,349
BIRD FEEDER TREE

William C. Bryant, Bell Arthur, N.C., and Robert K. Lowe, Hermitage, Tenn., assignors to Empire Brushes, Inc., Greenville, N.C.

Filed Mar. 19, 1990, Ser. No. 495,431

Int. Cl.^{5} A01K *39/00*

U.S. Cl. 119—57.8 **20 Claims**



1. A bird feeder tree, comprising:

(a) an artificial tree trunk extending along a trunk axis and having a tubular side wall bounding an internal bird feed compartment;

(b) means for supporting the tree trunk in a generally upright orientation;

(c) means for filling bird feed into the compartment for containment therein;

(d) a plurality of feeding ports, each extending radially from the compartment through the side wall to the exterior of the tree trunk;

(e) a plurality of artificial tree branches, each having a stem with artificial leaves thereon, each stem having a mounting portion; and

(f) a plurality of branch holder rings spaced apart of one another along, and secured to and around, the tree trunk, each ring having a plurality of mounting apertures in which respective mounting portions of the respective stems are received to hold the branches generally radially outwardly of the tree trunk, each ring being positioned adjacent at least one of the feeding ports to support a bird perched on a tree branch held by a respective ring to feed on the contained bird feed through said at least one feeding port.

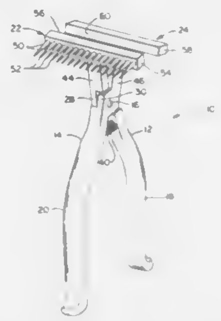
5,022,350
HORSE MANE GROOMING DEVICE

David B. Sequist, P.O. Box 1357, Stowe, Vt. 05672

Filed Jul. 9, 1990, Ser. No. 550,114

Int. Cl.^{5} A01K *13/00*

U.S. Cl. 119—85 **10 Claims**



1. A grooming device for combing and pulling horse manes and the like comprising a pair of coactive handle members and a pivot joint therebetween, each member having a hand grip portion and a jaw portion, one jaw portion having transversely extending comb means and a first elongated clamping member, the other jaw portion having a second elongated clamping member coextensive with said first member for receiving therebetween strands of hair transversely to said elongated members, said first and second clamping members being operative in response to relative movement of said hand grip portions for movement toward each other into an operation position clamping said transversely extending strands of hair therebetween for pulling in a direction generally parallel to said hand grip portions.

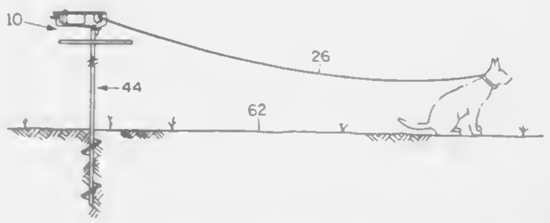
5,022,351
CONVERTIBLE TETHERING SYSTEM

Thomas E. Daniels, 1630 Babcock, Suite 130, San Antonio, Tex. 78229

Filed Apr. 23, 1990, Ser. No. 512,819

Int. Cl.^{5} A01K *3/00*

U.S. Cl. 119—124 **8 Claims**



1. A tethering system for mobile and stationary use comprising:

a portable leash cartridge having a casing, a leash extending therefrom, and cartridge means for retracting said leash within said cartridge;

a housing for holding said leash cartridge, said housing having a cartridge opening for receiving and removing said leash cartridge and a leash cord opening for allowing

VOL
1127
ISS
2
JE
11
1991
UMI

a leash cord to pass from said cartridge through said housing;

securing means for removably securing said leash cartridge within said housing, said securing means comprising:

a door member pivotally attached to said housing and being oriented, sized and shaped to at least partially obstruct said cartridge opening when said door member is in a closed position, said door member having a hole passing therethrough;

a post member extending from a portion of said housing and having an exterior end at its distant most terminus from said portion of said housing, said post member being positioned and sized for extending into said hole in said door member but not extending beyond the outer surface of said door member;

a disk member having a diameter substantially equivalent to the diameter of said post member, said disk being rotatably attached to said post member at a point off-center from the center of said exterior end of said post member whereby said disk member rotates eccentrically relative to said post member and is completely superimposed over said exterior end of said post member in only a very narrow range of rotation, said disk member at all other positions serving to hold said door member in a closed position when said post member extends into said hole and through said door member and said disk member is rotated to partially overlie a portion of said door member adjacent to said post member; and

anchoring means for removably anchoring said housing in a fixed location, said housing being pivotally mounted to said anchoring means wherein said cartridge is useful for mobile restraint of an animal on said leash, and when maintained within said housing by said securing means, is useful for tethering an animal on said leash at a fixed location without becoming entangled.

5,022,352

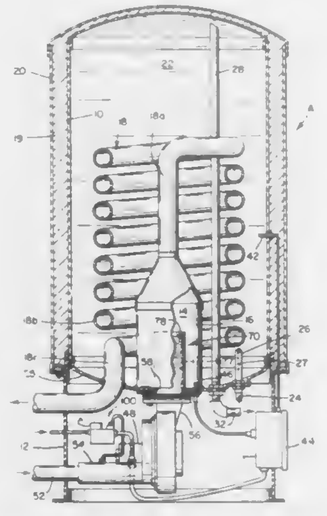
BURNER FOR FORCED DRAFT CONTROLLED MIXTURE HEATING SYSTEM USING A CLOSED COMBUSTION CHAMBER

Robert E. Osborne, Gray, and Tonie R. Frazier, Elizabethton, both of Tenn., assignors to Mor-Flo Industries, Inc., Cleveland, Ohio

Filed May 31, 1990, Ser. No. 531,060

Int. Cl.^{5} F22B *5/00*

U.S. Cl. 122—17 44 Claims



1. A tubular metal burner for a heating apparatus comprising an inner tube having an axis, a top end and a bottom end, and a concentric outer tube having an axis, a top end and a bottom end, said tube axes being substantially vertical;

said bottom end of said inner tube being open, said inner tube top end being closed and said inner tube having large perforations which vary in size distributed in a plurality of zones over the length of said inner tube and including middle zone containing smaller perforations than those in the others of said zones whereby there is provided a uniform flow of combustion gases to said outer tube; and

said bottom end of said outer tube being open, said outer tube top being closed and said outer tube having very small perforations relative to the perforations in said inner tube over the length of said outer tube whereby there exists a balanced distribution of combustion gases on the surface of said outer tube.

5,022,353

VARIABLE-CYCLE ENGINE

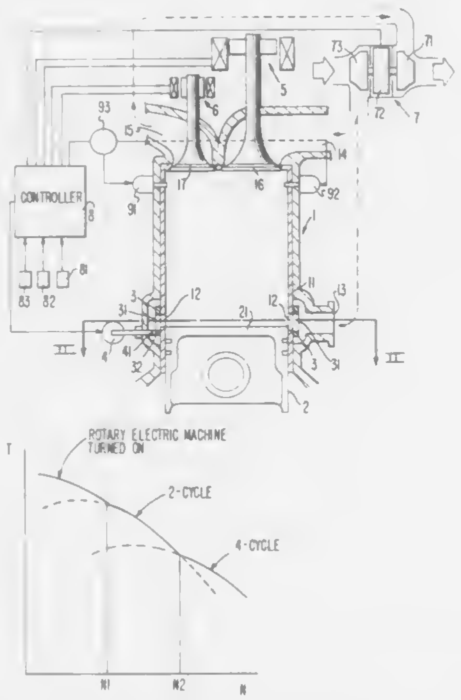
Hideo Kamamura, Kanagawa, Japan, assignor to Isuzu Ceramics Research Institute Co., Ltd., Kanagawa, Japan

Filed Apr. 26, 1990, Ser. No. 514,884

Claims priority, application Japan, Apr. 26, 1989, 1-106583; May 1, 1989, 1-112507; May 1, 1989, 1-112509

Int. Cl.^{5} F02B *69/06*

U.S. Cl. 123—21 9 Claims



1. A variable-cycle engine selectively operable in different cycle modes depending on the rotational speed thereof, comprising:

a cylinder having a first intake port and an exhaust port which are defined in an upper portion thereof;

a piston reciprocally fitted in said cylinder and having a piston head surface, said cylinder also having a second intake port defined in a cylindrical wall thereof and positioned such that the second intake port corresponds in position to the piston head surface when said piston is positioned near the bottom dead center thereof;

an intake valve for opening and closing said first intake port;

an exhaust valve for opening and closing said exhaust port;

a sleeve valve slidably fitted over said cylinder and angularly movable around said cylinder, for opening and closing said second intake port;

intake valve actuator means for actuating said intake valve to open and close said first intake port;

exhaust valve actuator means for actuating said exhaust valve to open and close said exhaust port;

sleeve valve actuator means for angularly moving said sleeve valve to open and close said second intake port;

supercharging means for supplying intake air under pressure through at least said second intake port into said cylinder;

two fuel injection nozzles alternately operable to inject fuel into said cylinder each time the engine makes one revolution;

injection timing varying means for inactivating one of said two fuel injection nozzles; and

cycle mode selecting means for detecting the rotational speed of the engine, and for activating said exhaust valve actuator means, inactivating said intake valve actuator means and said injection timing varying means, and activating said sleeve valve actuator means to open said second intake port, thereby operating the engine in a two-cycle mode, when the detected rotational speed is lower than a predetermined speed, and for activating said intake valve actuator means, said exhaust valve actuator means, and said injection timing varying means, and inactivating said sleeve valve actuator means to close said second intake port, thereby operating the engine in a four-cycle mode, when the detected rotational speed is higher than said predetermined speed.

5,022,354

COOLING SYSTEM FOR V-TYPE ENGINE

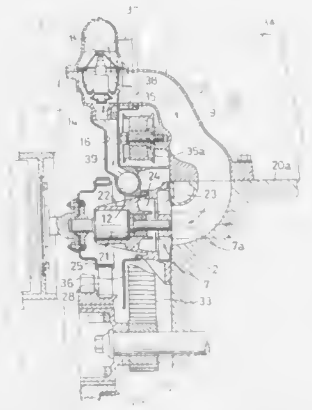
Junichi Okita, Iwakuni, and Toshikazu Kurokawa, Hiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 11, 1990, Ser. No. 580,375

Claims priority, application Japan, Sep. 23, 1989, 1-110953[U]; Sept. 23, 1989, 1-110954[U]

Int. Cl.^{5} F01P *7/14*

U.S. Cl. 123—41.1 10 Claims



1. A cooling system for a V-type, internal combustion engine, comprising:

an engine body having elongated first and second cylinder banks set at an angle relative to each other to define a V-shaped space therebetween, each said cylinder bank having an inlet port and an outlet port formed in a front end thereof;

a radiator, having inlet and outlet conduits extending between said radiator and said engine body, for cooling coolant introduced therein through said inlet conduit;

a water pump, having an inlet port, disposed in front of said engine body for circulating said coolant, leaving said radiator through said outlet conduit, through said engine body;

a communication passage disposed in front of said front ends of said first and second cylinder banks so as to communicate each outlet port with said inlet conduit;

a thermostat installed in downstream part of said outlet conduit and located above said communication passage in front of said engine body;

a bypass passage communicating said communication passage with said outlet conduit at said downstream part; and

a suction passage extending so as to communicate said downstream part and said inlet port with each other, said suction passage comprising an external passage, constituting an upstream portion thereof, disposed in said V-shaped space, and an internal passage, constituting a downstream portion thereof, formed in said engine body below said V-shaped space.

5,022,355

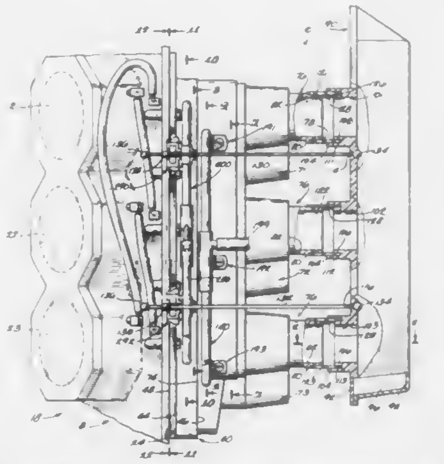
INTERNAL COMBUSTION ENGINE

Henry C. Billingsley, Kenosha, Wis., and Glenn R. Belec, Gurnee, Ill., assignors to Outboard Motor Corporation, Waukegan, Ill.

Filed Apr. 23, 1990, Ser. No. 512,951

Int. Cl.^{5} F23K *5/00;* **F02B** *29/02*

U.S. Cl. 123—52 MB 22 Claims



1. An internal combustion engine comprising an engine block including first and second cylinders and first and second combustion air passages for respectively supplying combustion air to said first and second cylinders, a first carburetor communicating with said first combustion air passage, having therein a first opening, and including a first fuel supply passageway communicating with said first opening, a second carburetor communicating with said second combustion air passage, having therein a second opening, and including a second fuel supply passageway communicating with said second opening, and a fuel manifold including an integral, one piece first manifold portion comprising an elongated portion defining a first main passageway having a closed end and an opposite open end, and a first nipple portion defining a first nipple passageway communicating between said first opening and said first main passageway and extending transversely to said first main passageway, and an integral, one piece second manifold portion comprising an elongated portion defining a second main passageway having a closed end and an opposite open end communicating with said open end of said first main passageway, and a second nipple portion defining a second nipple passageway communicating between said second opening and said second main passageway and extending transversely to said second main passageway.

VOL
1127
ISS
2
JE
11
1991
UMI

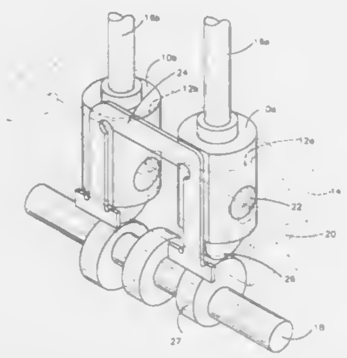
5,022,356
ROLLER VALVE LIFTER WITH ANTI-ROTATION MEMBER

Edward J. Morel, Jr., Medina, and Joe W. Morel, Rocky River, both of Ohio, assignors to Gear Company of America, Inc., Cleveland, Ohio

Filed Oct. 5, 1990, Ser. No. 593,091

Int. Cl.^{5} F01L *1/14*

U.S. Cl. 123—90.5 12 Claims



1. For use in an internal combustion engine having open-ended cylindrical bores in which valve lifters reciprocate, and a cam shaft with cams that reciprocate the lifters, and an oil passage communicating between adjacent cylindrical bores intermediate the ends of the bores and parallel to the cam shaft: a valve lifter having a body that is in major part cylindrical and in minor part non-cylindrical or of a different cylindrical curvature than the major part, the minor part extending parallel to the cylindrical axis of the major part the full axial length of the body and the major cylindrical part being of a size sufficient to obturate the oil passage, a roller cam follower supported for rotation in one end of the body about an axis transverse to the cylindrical axis, and a passage through the body parallel to the axis of rotation of the roller, opening only through the major cylindrical part of the body and of a size that overlaps the oil passage during reciprocation of the lifter in the bore.

5,022,357
CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

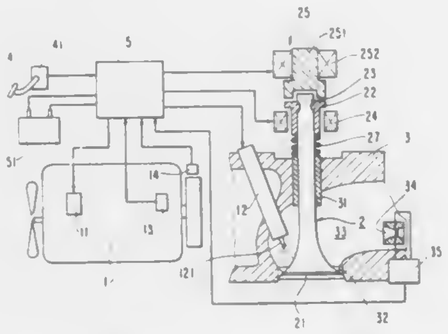
Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Dec. 26, 1989, Ser. No. 456,724

Claims priority, application Japan, Dec. 28, 1988, 63-334964

Int. Cl.^{5} F01L *9/04, 1/34*

U.S. Cl. 123—90.11 5 Claims



1. A control system for controlling an internal combustion engine having intake and exhaust valves and a fuel supply unit for supplying fuel into an intake port which is openable and closable by the intake valve, said intake valve being the sole means of controlling the amount of charge from atmosphere into the combustion chamber, said control system comprising:

- electromagnetic actuator means for selectively opening and closing the intake and exhaust valves;
- a fuel injection nozzle for injecting fuel from the fuel supply unit into the intake port;
- an engine load sensor for detecting a load on the internal combustion engine;
- a crankshaft angle sensor for detecting an angular position of a crankshaft of the internal combustion engine;
- first calculating means for calculating timings to open the intake and exhaust valves based on detected signals from said engine load sensor and said crankshaft angle sensor;
- second calculating means for calculating an amount of opening of the intake valve to introduce an amount of intake air which achieves a stoichiometric air-fuel ratio corresponding to the load on the internal combustion engine based on a detected signal from said engine load sensor;
- third calculating means for calculating an amount of fuel to be injected and a timing to inject fuel based on detected signals from said engine load sensor and said crankshaft angle sensor;
- first control means for applying drive signals to said electromagnetic actuator mans based on the openings and timings calculated by said first and second calculating means; and
- second control means for applying a control signal to the fuel supply unit based on the amount and timing calculated by said third calculating means.

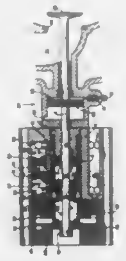
5,022,358
LOW ENERGY HYDRAULIC ACTUATOR

William E. Richeson, Fort Wayne, Ind., assignor to North American Philips Corporation, New York, N.Y.

Filed Jul. 24, 1990, Ser. No. 557,377

Int. Cl.^{5} F15B *13/044;* **F01L** *9/02*

U.S. Cl. 123—90.12 20 Claims



1. An asymmetrical bistable hydraulically powered actuator mechanism reciprocable between each of two stable positions and comprising:

- a replenishable source of high pressure hydraulic fluid, a power piston having a pair of opposed faces and positioned closely adjacent the source of high pressure fluid, and a control valve for selectively supplying high pressure fluid to one of the power piston faces thereby causing translation of a portion of the mechanism which includes the power piston in one direction;
- resilient means which is compressed during translation of the mechanism portion in said one direction, compression of the resilient means slowing the mechanism portion translation in said one direction;
- means for temporarily preventing reversal of the direction of translation of the mechanism portion when the motion of that portion slows to a stop; and
- hydraulic damping means for slowing motion of the mechanism portion as it nears either of its stable positions.

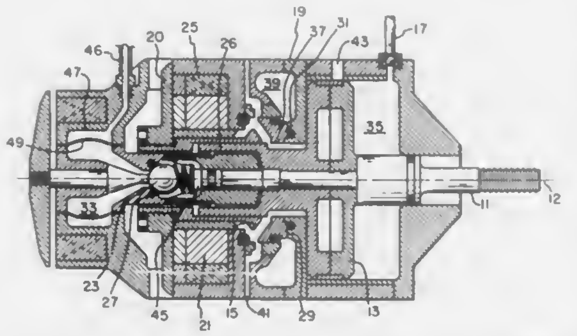
5,022,359
ACTUATOR WITH ENERGY RECOVERY RETURN

Frederick L. Erickson, and William E. Richeson, both of Fort Wayne, Ind., assignors to North American Philips Corporation, New York, N.Y.

Filed Jul. 24, 1990, Ser. No. 557,370

Int. Cl.^{5} F01L *9/04, 9/02*

U.S. Cl. 123—90.14 24 Claims



1. An asymmetrical bistable pneumatically powered actuator mechanism comprising:

- a replenishable source of compressed air for causing translation of a portion of the mechanism in one direction;
- a chamber in which air is compressed during translation of the mechanism portion in said one direction, compression of the air slowing the mechanism portion translation in said one direction;
- means for temporarily preventing reversal of the direction of translation of the mechanism portion when the motion of that portion slows to a stop.

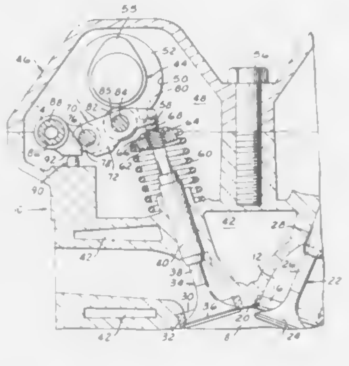
5,022,360
VALVE ACTUATOR FOR OVERHEAD CAMSHAFT ENGINE

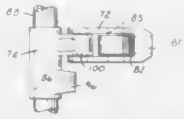
Ludwik Cholewczynski, Windsor, Canada, assignor to Chrysler Corporation, Highland Park, Mich.

Filed Oct. 15, 1990, Ser. No. 597,237

Int. Cl.^{5} F01L *1/18*

U.S. Cl. 123—90.27 10 Claims





1. An improved overhead camshaft type cylinder head for an engine with a multi-piece valve actuation apparatus, comprising: a cylinder head assembly having opposite sides, the cylinder head adapted to be secured to the engine along one of the opposite sides; a valve cover member secured to the other of the opposite sides of the cylinder head; an elongated camshaft supported for rotation by the cylinder head assembly in substantial parallelism with the one side, the camshaft having eccentric lobe portions; a valve associated with each lobe portion of the camshaft, each valve having an elongated stem portion with an axis extending substantially normal to the axis of the camshaft and with an end surface spaced from the camshaft; the multi-piece valve actuation apparatus including an adjusting member having an apertured body portion and first and second arms which extend radially therefrom, the first arm defining a contact surface thereon; the apparatus further including an elongated finger follower member with first and second ends, one of which defines a surface for engaging the end of the valve; means connecting the second arm of the adjusting member and the second end of the finger follower permitting the members to pivot with respect to one another; an extendable lash adjuster carried by the cylinder head and engaging the contact surface of the adjusting member whereby extension of the lash adjuster against the contact surface moves the second arm of the adjusting member and the connected second end of the finger follower toward the camshaft; means on the finger follower member to slidingly engage an associated camshaft lobe whereby the aforesaid movement of the finger follower pivots the finger follower member about the end of the valve stem and moves it into engagement with the cam lobe.

5,022,361
VALVE-LASH ADJUSTMENT SYSTEM

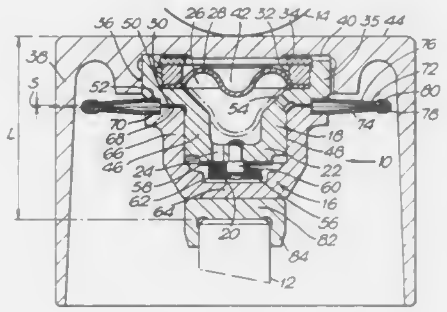
Jan Schut, Luxembourg, Luxembourg, assignor to General Motors Corporation, Detroit, Mich.

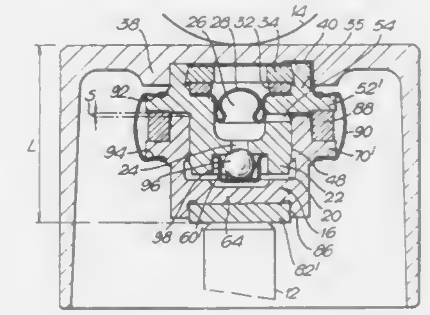
Filed Oct. 31, 1990, Ser. No. 607,943

Claims priority, application United Kingdom, Nov. 11, 1989, 8925541

Int. Cl.^{5} F01L *1/24*

U.S. Cl. 123—90.55 17 Claims





1. A valve-lash adjustment system for use in a motor vehicle engine which is designed to be positioned between a free end of a valve stem of a spring-loaded valve of the engine and a movable cam surface so as to compensate, when the engine is operating, for any valve lash generated between said valve and said movable cam surface due to thermal expansion/contraction and/or mechanical tolerances between said valve and associated engine components, wherein said system includes a hydraulic valve-lash adjuster assembly which comprises a

VOL
1127
ISS
2
JE
11
1991
UMI

reciprocably movable cylinder body, a piston slidably mounted in said cylinder body to define therebetween a high-pressure, variable-volume chamber filled with hydraulic fluid, a resilient biasing means which biases said piston away from said cylinder body, and a one-way valve-controlled passage in said piston connecting said high-pressure chamber to a low-pressure chamber which contains hydraulic fluid and is located within a tappet housing, which tappet housing contains said hydraulic valve-lash adjuster assembly and includes a contact surface engageable with said movable cam surface, said hydraulic valve-lash adjuster assembly being capable of adjusting the overall length thereof during engine operation to substantially eliminate said valve lash, the valve-lash adjustment system including a load-carrying spacer means adjacent the hydraulic valve-lash adjuster assembly which is interposed between said hydraulic valve-lash adjuster assembly and either said free end of the valve stem or said movable cam surface, the thickness of said load-carrying spacer means being such as to compensate substantially for said mechanical tolerances between said valve and said associated engine components, so that, during engine operation, said hydraulic valve-lash adjuster assembly adjusts the overall length thereof within a limited range of distances required to compensate for said thermal expansion/contraction between the valve and said associated engine components, and, in the event of a failure in supply of hydraulic fluid to said hydraulic valve-lash adjuster assembly, said hydraulic valve-lash adjuster assembly will only decrease in overall length by an amount falling within said limited range of distances.

5,022,362

IGNITION TIMING CONTROLLING APPARATUS FOR INTERNAL COMBUSTION ENGINE

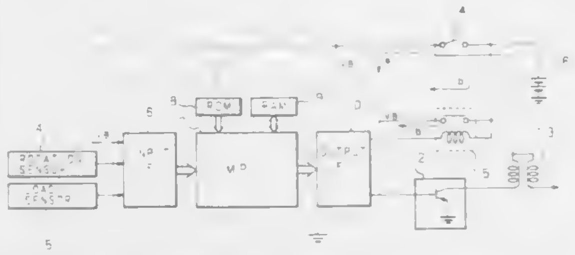
Wataru Fukui, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 7, 1990, Ser. No. 489,628

Claims priority, application Japan, Mar. 8, 1989, 1-53874

Int. Cl.^{5} F02P *5/15*

U.S. Cl. 123—146.5 D **2 Claims**



1. An ignition timing controlling apparatus for an internal combustion engine, comprising:

switching means for switching on and off an electric current for igniting said internal combustion engine;

state detecting means for detecting closed and open states of said switching means;

control means for outputting an ignition control signal which controls ignition timing of said internal combustion engine;

means for supplying said electric current to said control means when said switching means is in a closed state, and for shutting off said electric current being supplied to said control means after a predetermined duration by the ignition control signal from said control means when said switching means is in an open state; and

means for stopping the output of said ignition control signal from said control means when said state detecting means detects the open state of said switching means.

5,022,363

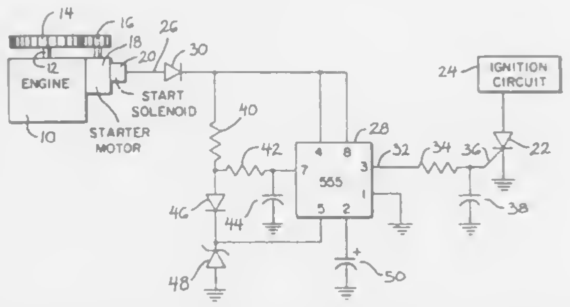
POSITIVE STARTING CIRCUIT

Richard E. Staerzl, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Division of Ser. No. 288,729, Dec. 22, 1988, Pat. No. 4,951,620. This application Aug. 20, 1990, Ser. No. 569,565

Int. Cl.^{5} F02P *9/00*

U.S. Cl. 123—179 BG **5 Claims**



1. A positive starting circuit for a multi-cylinder two-cycle internal combustion engine subject to starter kick-out during initial cranking of the engine due to a residual combustible charge in a cylinder which is ignited by an ignition circuit and causes kick-out of the starter, wherein the following cylinder does not have a combustible charge and the engine ceases running, thus requiring re-engagement of the starter to start the engine, said positive starting circuit comprising a kill switch coupled to said ignition circuit and having a first state disabling ignition and a second state enabling ignition, initiating means responsive to initial cranking of said engine and triggering said kill switch to said first state, delay means responsive to said initiating means to initiate a delay interval and triggering said kill switch to said second state at the end of said delay interval, such that ignition of residual combustible charge in a cylinder is prevented upon initial cranking, wherein said delay interval is chosen to be long enough to permit sufficient combustible charge to be developed in the remaining cylinders before ignition is enabled, wherein said kill switch comprises a semiconductor switch having a control terminal controlling the conduction state thereof between said first and second states, said delay means comprises a timing circuit connected between said semiconductor switch and said initiating means, wherein said timing circuit comprises a monostable multivibrator having an output connected to said control terminal of said semiconductor switch, said monostable multivibrator having a first input responsive to said initiating means to immediately drive said output to a first state which triggers said semiconductor switch to its said first state, said monostable multivibrator having a second input responsive to said initiating means to begin said delay interval, at the end of which said output of said monostable multivibrator switches to a second state triggering said semiconductor switch to its second state, wherein said monostable multivibrator has a third input responsive to said initiating means, said third input having a voltage regulator connected thereto, and wherein said second input of said monostable multivibrator has a charging capacitor connected thereto, and wherein said initiating means applied voltage to said second input of said monostable multivibrator to charge said capacitor an also applies voltage to said third input of said monostable multivibrator which is regulated by said voltage regulator to provide a reference voltage at said third input, such that the voltage at said second input of said monostable multivibrator rises as said capacitor charges and when the voltage at said second input rises above said reference voltage at said third input as regulated by said voltage regulator, said output of said monostable multivibrator switches to its said second state.

5,022,364

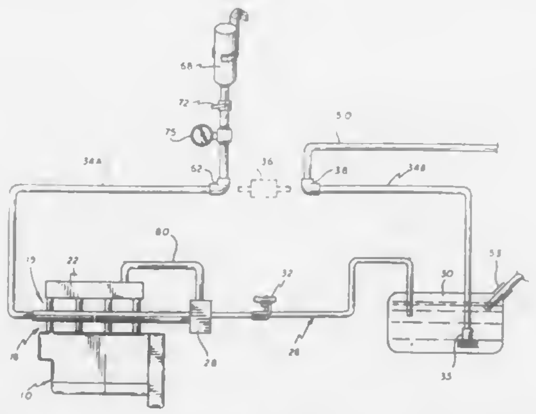
FUEL INJECTOR CLEANING METHOD AND APPARATUS

Claude F. Phillips, Fairfield, Ill., assignor to UIS, Inc., New York, N.Y.

Filed Feb. 6, 1990, Ser. No. 475,917

Int. Cl.^{5} F02B *77/00*

U.S. Cl. 123—198 A **4 Claims**



1. The method of cleaning the fuel injector system of an internal combustion engine of the kind having:

an engine space with a fuel injector system for said engine;

an area isolated from any heated or moving components of said engine space;

said isolated area having therein a fuel tank with communication therefrom to said fuel injector system through a filter having upstream and downstream connector means from a fuel pump to said fuel injector system;

and having a fuel return line to said tank therein;

wherein said method comprises in said isolated area:

preventing return flow to said tank;

disconnecting and removing the filter from the upstream and downstream connector means thereof;

shunting the output of said fuel pump to said tank;

connecting a source of cleaning fluid to said fuel injector system via said upstream and downstream connector means;

whereby effecting flow from a source of cleaning fluid to said fuel injector system.

5,022,365

ACCESSORY DRIVE ARRANGEMENT FOR V-TYPE ENGINE

Yoshihiro Nariyama, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

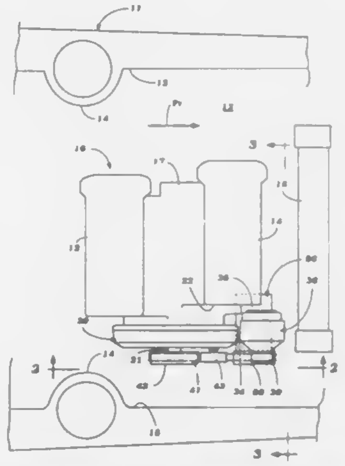
Filed Aug. 30, 1989, Ser. No. 400,495

Claims priority, application Japan, Aug. 31, 1988, 63-219495

Int. Cl.^{5} F02B *77/00*

U.S. Cl. 123—198 R **6 Claims**

1. In an internal combustion engine having a crankcase, banks of cylinders connected to said crankcase and disposed at an angle to each other, one of said banks being staggered relative to the other of said banks so that one end of said one bank is spaced from a plane containing the corresponding end of the other of said banks, at least one camshaft associated with each cylinder banks, driving means at the one end of said engine for driving said camshafts from said engine, a first accessory for said engine positioned externally thereof an in the area ahead of said one end of said one cylinder bank and extending beyond said plane toward said one end to be located in the staggered area of said engine, a secondary accessory positioned beneath said one cylinder bank and adjacent said crankcase, and means for driving said accessories from said engine.



5,022,366

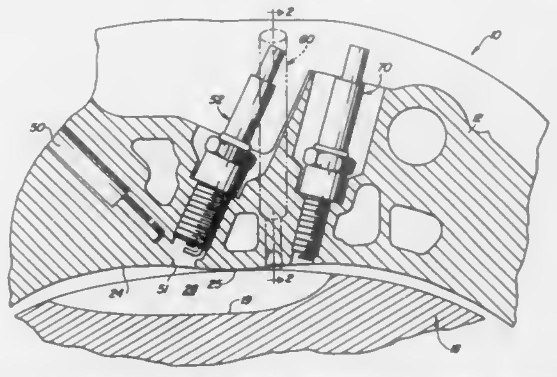
ROTARY ENGINE WITH DUAL SPARK PLUGS AND FUEL INJECTORS

John Abraham, Wayne, and Frediano V. Bracco, Princeton, both of N.J., assignors to John Deere Technologies International, Inc., Moline, Ill.

Filed Sep. 18, 1989, Ser. No. 408,572

Int. Cl.^{5} F02B *53/10*

U.S. Cl. 123—205 **2 Claims**



1. In a stratified charge rotary combustion engine having a housing having a running surface surrounding a working chamber, the running surface having a two-lobed profile, the lobes forming a junction in a top-dead-center region of the housing, a rotor mounted for rotation in the working chamber, a fuel injection and ignition system placed in the top-dead center region, the fuel injection and ignition system comprising:

a pilot fuel injector for injecting fuel into the working chamber;

a first spark plug located upstream of the pilot fuel injector for igniting fuel injected by the pilot fuel injector, the pilot fuel injector and the first spark plug being located on a downstream side of the junction;

a main fuel injector for injecting fuel into the working chamber, the ignited pilot fuel acting to ignite fuel injected by the main injector; and

a second spark plug located upstream of the main fuel injector and located upstream of the junction for igniting fuel-/air mixture in the working chamber, the main injector

VOL
1127
ISS
2
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11
1991
UMI

being positioned generally between the first and second spark plugs.

5,022,367
ENGINE BRAKE SYSTEM OF A TWO-CYCLE ENGINE FOR A MOTOR VEHICLE

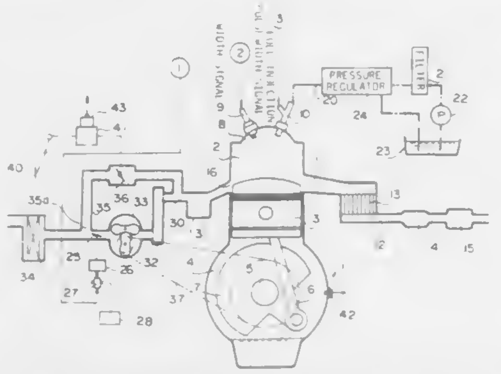
Koji Morikawa, Musashino, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 3, 1990, Ser. No. 562,485

Claims priority, application Japan, Aug. 29, 1989, 1-222704

Int. Cl.⁵ F02D *9/06*

U.S. Cl. 123—324 6 Claims



1. An engine brake system of a two-cycle engine for a motor vehicle, the engine having at least one cylinder, a scavenge port, an intake passage communicated with said scavenge port, and a scavenge pump provided in said intake passage and driven by a crankshaft of the engine for supplying intake air to the cylinder, the system comprising:
- an engine brake valve provided in said intake passage adjacent said scavenge pump;
- an actuator for operating said engine brake valve;
- detector means for detecting deceleration of the vehicle and for producing a deceleration signal;
- means responsive to the deceleration signal for operating said actuator for closing said engine brake valve so as to increase load on the engine.

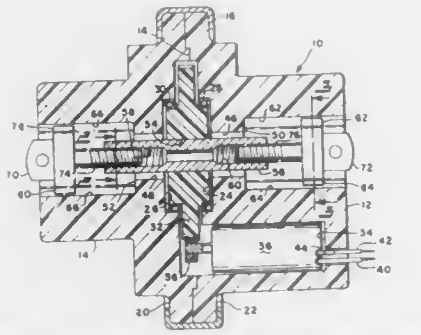
5,022,368
THROTTLE CABLE INTERVENTION SERVOACTUATOR

Andrew A. Kenny, Roselle, and Daniel C. Stahly, Elmhurst, both of Ill., assignors to Eaton Corporation, Cleveland, Ohio

Filed Sep. 7, 1989, Ser. No. 404,017

Int. Cl.⁵ F02D *11/10*

U.S. Cl. 123—342 12 Claims



1. A throttle cable intervention servoactuator comprising:

(a) housing means;

(b) motor means including speed reducing means disposed on said housing means and operated upon energization by an electrical control signal;

(c) an input member movably disposed on said housing means, said input member adapted for connection to a vehicle accelerator pedal tension link;

(d) an output member movably disposed on said housing means, said output member adapted for connection to a vehicle engine throttle tension link;

(e) a connector link having said input member threadedly connected to one end thereof and said output member threadedly connected to the opposite end thereof, said connector disposed in said housing and movable with respect thereto in the direction of said tension;

(f) adjustment means drivingly connecting said speed reducing means to said connector link for rotation thereof, said adjustment means operable upon energization of said motor means to rotate said connector link to change the effective length of said connector link with respect to the connection to said input and output member, wherein said connector link is freely slidably disposed through said adjustment means.

5,022,369
THROTTLE CONTROL APPARATUS

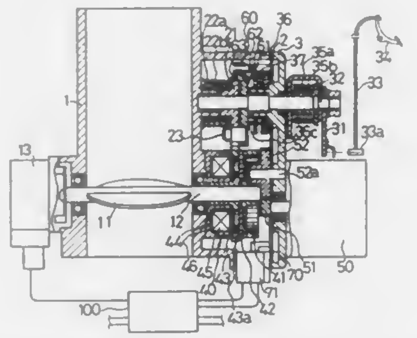
Tadashi Terazawa, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jan. 26, 1990, Ser. No. 470,687

Claims priority, application Japan, Jan. 31, 1989, 1-022190

Int. Cl.⁵ F02D *9/08*

U.S. Cl. 123—399 5 Claims



1. A throttle control apparatus having throttle opening and closing means for opening and closing a throttle valve, biasing means for biasing said throttle opening and closing means in the throttle valve closing direction, an accelerator actuating mechanism, driving means for driving said throttle opening and closing means in the throttle valve opening and closing directions independently of said accelerator actuating mechanism, a driving source coupled to said driving means to drive said driving means in response to operation of said accelerator actuating mechanism, and clutch means for connecting and disconnecting said throttle opening and closing means and said driving means, wherein the improvement comprises:
- first detecting means for outputting a signal corresponding to a degree of accelerator actuation provided by said accelerator actuating mechanism;
- second detecting means for outputting a signal corresponding to a degree of opening of said throttle valve; and
- control means for driving said clutch means to disconnect said throttle opening and closing means and said driving means from each other when the output signal from said first detecting means indicates a degree of accelerator actuation not greater than a predetermined degree of accelerator actuation and the output signal from said second detecting means is a predetermined angle greater than the degree of opening of said throttle valve corresponding to the degree of accelerator actuation not greater than the predetermined degree of accelerator actuation.

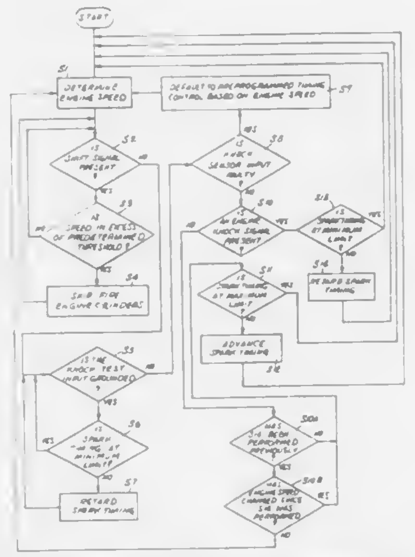
5,022,370
IGNITION SYSTEM FOR MARINE PROPULSION DEVICE

Arthur R. Ferguson, Northbrook, and David E. Rawlings, Palatine, both of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed May 15, 1989, Ser. No. 351,772

Int. Cl.⁵ F02P *5/145, 9/00, 17/00*

U.S. Cl. 123—425 17 Claims



1. A control system for an internal combustion engine, said control system comprising means for receiving an input signal from an engine speed sensor, means for receiving an input signal from an engine knock sensor, means for advancing the spark timing of the internal combustion engine until a knock signal is received from the knock sensor, and means operative in response to receipt of a knock signal from the knock sensor for retarding the spark timing of the internal combustion engine until the spark timing reaches a value at which a knock signal is no longer received from the knock sensor and for thereafter maintaining the spark timing substantially at said value until the signal received from the engine speed sensor indicates a change in engine speed.

9. An electronic ignition system for an internal combustion engine having an even number of cylinders, said ignition system comprising means for receiving an electronic shift shift signal from a means for selectively moving the internal combustion engine into and out of a drive condition, means for receiving an electronic signal representative of engine speed, and means operative in response to receipt of the shift signal and operative only when the speed signal indicates a speed in excess of a predetermined threshold for selectively skipping, during a firing sequence, the firing of half of the engine cylinders, and for firing, in a successive firing sequence, cylinders that were skipped in the previous firing sequence.

12. A control system for an internal combustion engine, said control system comprising means for receiving an input signal from an engine speed sensor, means for receiving an input signal from an engine knock sensor, means for controlling the spark timing of the internal combustion engine in response to the input signal from the engine speed sensor and the input signal from the engine knock sensor, means for determining if the input signal from the engine knock sensor is faulty, and means for controlling the spark timing of the internal combustion engine solely in response to the input signal from the engine speed sensor, exclusive of the input signal from the engine knock sensor, if the input signal from the engine knock sensor is determined to be faulty.

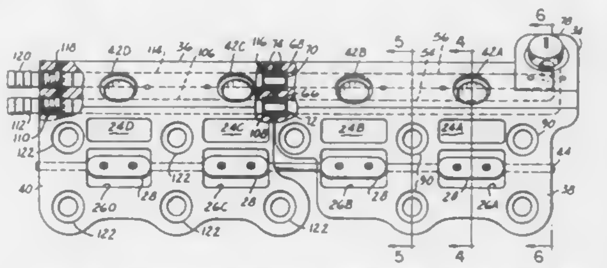
5,022,371
MOLDED PLASTIC FUEL RAIL FOR AN INTERNAL COMBUSTION ENGINE

Paul D. Daly, Troy, Mich., assignor to Siemens-Bendix Automotive Electronics L.P., Auburn Hills, Mich.

Filed Sep. 29, 1989, Ser. No. 414,885

Int. Cl.⁵ F02M *55/02*

U.S. Cl. 123—468 15 Claims



1. For an internal combustion engine having at least four cylinders, a pressurized fuel source, an air intake manifold, and a cylinder head having an air intake passageway for each cylinder, a fuel rail comprising:
- a high temperature plastic first fuel rail block;
- means for attaching said first fuel rail block to the engine cylinder head;
- at least two air conduits provided in said first fuel rail block, each of said at least two air conduits providing for communication of the engine air intake manifold to a respective one of the air intake passageways of the engine cylinder head;
- at least two injector wells provided in said first fuel rail block, a respective fuel injector valve disposed in each respective one of said at least two injector wells, each of said at least two injector wells being associated with a respective one of said at least two air conduits and having an outlet port in communication with the respective air conduit, each of said at least two fuel injector wells supporting the respective fuel injector valve at a predetermined angle relative to the respective air conduit to cause the respective fuel injector valve to inject fuel directly into the respective air intake passageway;
- a pressure regulator well provided in said first fuel rail block, a fuel pressure regulator disposed in said pressure regulator well, said fuel pressure regulator having an inlet port and an outlet port;
- a first fuel delivery rail provided in said first fuel rail block, said first fuel delivery rail having an inlet port for receiving fuel from the engine pressurized fuel source and an outlet port in communication with said inlet port of said fuel pressure regulator, said first fuel delivery rail being in communication with said at least two injector wells to supply fuel to the fuel injectors disposed therein;
- a first fuel return rail provided in said first fuel rail block, said first fuel return rail having an inlet port and an outlet port, said outlet port of said first fuel return rail being in communication with the outlet port of said fuel pressure regulator;
- a high temperature plastic second fuel rail block;
- means for attaching said second fuel rail block to the engine cylinder head;
- at least two further air conduits provided in said second fuel rail block, each of said at least two further air conduits providing for the communication of the engine air intake manifold to a respective further one of the air intake passageways of the cylinder head;
- at least two further injector wells provided in said second fuel rail block, a respective further fuel injector valve disposed in each respective one of said at least two further injector wells, each of said at least two further injector wells being associated with a respective one of said at least two further air conduits and having an outlet port in communication with the respective further air conduit,

VOL
1127
ISS
2
JE
11
1991
UMI

each of said at least two further injector wells supporting the respective further fuel injector valve at a predetermined angle relative to the respective further air conduit to cause the fuel injected by the respective further fuel injector valve to be injected directly into the respective further air intake passageway;

a second fuel delivery rail provided in said second fuel rail block in communication with said at least two further injector wells, said second fuel delivery rail having an inlet port for connection to the engine pressurized fuel source and also having an outlet port;

means fluid-connecting said outlet port of said second fuel delivery rail to said inlet port of said first fuel delivery rail;

a second fuel return rail provided in said second fuel rail block, said second fuel return rail having an outlet port for return fuel leaving the fuel rail and also having an inlet port; and

means fluid-connecting said inlet port of said second fuel return rail to said outlet port of said first fuel return rail;

wherein at least a portion of said fuel delivery rail of one of said fuel rail blocks and at least a portion of said fuel return rail of said one of said fuel rail blocks comprise respective troughs, and including cover plate means closing said troughs such that said portions of said fuel delivery rail and of said fuel return rail of said one of said fuel rails blocks are cooperatively defined by said troughs and said cover plate means.

5,022,372

FUEL DELIVERY RAIL ASSEMBLY

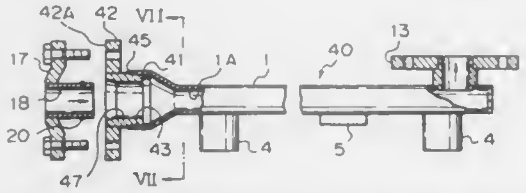
Izumi Imura, Shizuoka; Tatsubiko Uesugi, and Tosbiaki Yoshimura, both of Numazu, all of Japan, assignors to Usui Kokusai Sangyo Kaisha Ltd., Shizuoka, Japan

Filed Mar. 15, 1989, Ser. No. 323,783

Claims priority, application Japan, Mar. 15, 1988, 63-33158; Apr. 4, 1988, 63-44794

Int. Cl.^{5} F02M *55/02*

U.S. Cl. 123—469 7 Claims



1. A fuel delivery rail assembly for an internal combustion engine, comprising:

an elongated conduit having a fuel passage defined therethrough and having a rectangular hollow cross section along substantially its entire length;

a plurality of sockets attached to an extending perpendicularly from said elongated conduit, one end of each of said plurality of sockets being in fluid communication with said fuel passage and the other end of each of said plurality of sockets being adapted to receive a tip of a fuel injector;

a fuel inlet pipe having a circular hollow cross section smaller than that of said elongated conduit, one end portion of said fuel inlet pipe being received in one end portion of said elongated conduit and secured thereby by brazing; and

wherein said one end portion of said elongated conduit defines a transformation portion which decreases gradually and smoothly in cross sectional area from a location where it meets said rectangular hollow cross section to an extreme end of said elongated conduit where it defines a circular hollow cross section which has an inside diameter substantially equal to an outside diameter of said fuel inlet pipe.

5,022,373

FUEL INJECTION CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE

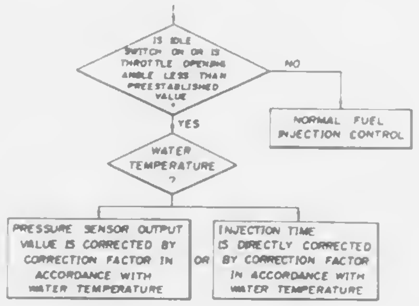
Yoshiyuki Kobayashi, Hamamatsu, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Jan. 18, 1990, Ser. No. 467,037

Claims priority, application Japan, Jan. 31, 1989, 1-21527

Int. Cl.^{5} F02D *41/04*

U.S. Cl. 123—488 4 Claims


IS IDLE SWITCH ON OR IS THROTTLE OPENING ANGLE LESS THAN PREESTABLISHED VALUE ?
NO
NORMAL FUEL INJECTION CONTROL
YES
WATER TEMPERATURE ?
PRESSURE SENSOR OUTPUT VALUE IS CORRECTED BY CORRECTION FACTOR IN ACCORDANCE WITH WATER TEMPERATURE
OR
INJECTION TIME IS DIRECTLY CORRECTED BY CORRECTION FACTOR IN ACCORDANCE WITH WATER TEMPERATURE

1. In a fuel injection control apparatus for an internal combustion engine having a fuel injection valve, a throttle valve positioned in an inlet passage, a bypass passage communicating with said inlet passage downstream of said throttle valve, means for admitting ambient air into said bypass passage, and means for calculating a normally desired amount of fuel to be injected into said inlet passage by said fuel injection valve based on the air pressure in said bypass passage, said bypass passage pressure being used as an approximation of the pressure in said inlet passage downstream of said throttle valve, the improvement wherein said calculating means includes compensation means for compensating for differences between the air pressure in said bypass passage and the air pressure in said downstream part of said inlet passage by calculating an adjusted amount of fuel to be injected which differs from said normally desired amount.

5,022,374

METHOD FOR SEQUENTIALLY INJECTING FUEL

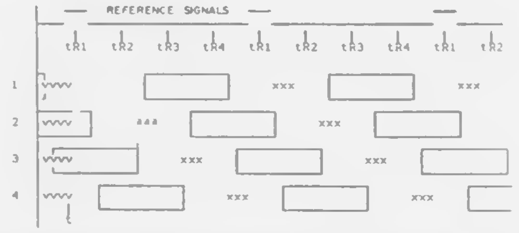
Helmut Denz, Stuttgart; Klemens Grieser, Ditzingen; Jürgen Stock, Hochdorf/Enz; Rudolf Moz, Möglingen, and Winifred Uttenweiler, Filderstadt, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart

Filed Jul. 12, 1990, Ser. No. 551,410

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1989, 3923478

Int. Cl.^{5} F02D *41/06, 41/34*

U.S. Cl. 123—490 3 Claims



1. A sequential fuel-injection method wherein each of a plurality of injection valves is driven to supply respective preinjections when the method is started, the method comprising the steps of:

determining a first injection end time point at which the preinjections end;

determining a first intake end time point at which, after the method has been started, a signal appears for the first time which can be evaluated as a signal that indicates the end of the induction operation;

determining the particular cylinder for which the first intake end time point applies; and,

when the first injection end time point lies ahead of the first intake end time point, driving the injection valve for said particular cylinder so as to cause the fuel quantity to be injected that was computed for the sequential injection; or,

when the first injection end time point lies after the first intake end time point, driving the injection valve for that cylinder whose induction cycle follows the induction cycle of the particular cylinder so as to cause the fuel quantity to be injected that was computed for the sequential injection.

5,022,375

SUPERCHARGING DEVICE OF AN ENGINE

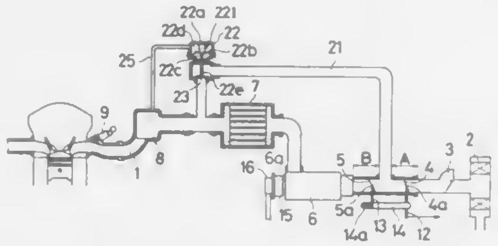
Tsuyoshi Goto; Kouichi Hatamura, and Shinji Seike, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Mar. 31, 1989, Ser. No. 331,382

Claims priority, application Japan, Mar. 31, 1988, 63-79892

Int. Cl.^{5} F02B *33/00*

U.S. Cl. 123—564 23 Claims



1. A supercharging device of an engine, said device comprising:

an air intake passage for supplying intake air to the engine,

a mechanical supercharger which is provided in said air intake passage and is driven by an output shaft of the engine,

a switching means which switches said mechanical supercharger from a connected state to a non-connected state in response to the output shaft of the engine,

a bypass provided in said air intake passage in such a fashion that it bypasses said mechanical supercharger,

a main throttle valve provided in said air intake passage upstream of a joint with said bypass on an intake side of said supercharger, and

a sub-throttle valve provided in said air intake passage between said joint with said bypass on said intake side of said supercharger and said mechanical supercharger,

said sub-throttle valve further throttling a flow rate of intake air by a fixed amount in addition to throttling of the flow rate of intake air by said main throttle valve when said mechanical supercharger is switched from the non-connected state to the connected state and after such switchover opening in response to one of an increase of required output of the engine or a time lag.

5,022,376

OIL SEPARATOR FOR CRANKCASE FUMES

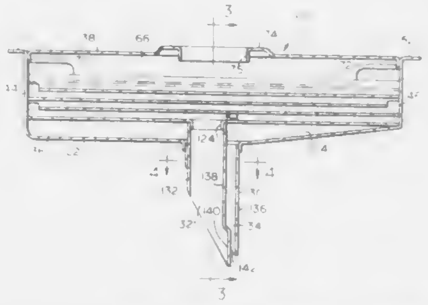
Sharon J. Hudson, Jr., Lambertville, Mich., and James D. Taylor, Toledo, Ohio, assignors to Cooper Industries, Inc., Houston, Tex.

Filed Mar. 26, 1990, Ser. No. 498,542

Int. Cl.^{5} F02M *25/00*

U.S. Cl. 123—572 29 Claims

1. A device for separating oil from the crankcase fumes of an internal combustion engine during engine operation, said device comprising: a separator canister having a top, a bottom and peripheral side walls joining said top to said bottom, oil separating baffle means in said canister, a fume outlet in the top thereof, and an elongated tubular assembly in the bottom thereof, said tubular assembly defining a fume inlet passageway and a parallel oil return passageway, said tubular assembly being longer on one side than on the opposite side due to the geometry of its distal end, said return oil passageway being on said longer side.



5,022,377

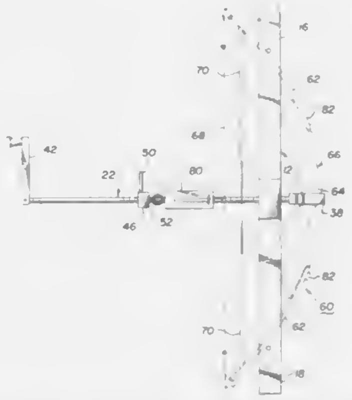
PORTABLE BOW PRESS

Richard L. Stevens, Rte. 1, Box 134, Pickton, Tex. 75471

Filed Jan. 8, 1990, Ser. No. 461,917

Int. Cl.^{5} F41B *5/00*

U.S. Cl. 124—23.1 21 Claims



9. A portable bow press for a compound-type bow which includes at least a handle portion, two longitudinally elongated limbs extending in generally opposite directions from said handle portion and a bow string, said portable bow press comprising:

a first elongated member of predetermined length lying generally in a first plane and having a central portion, a first end portion and a second end portion;

a second elongated member of predetermined length having a first portion and a second portion;

means formed in said central portion of said first elongated member to engage said second elongated member for movement of said second elongated member in a second plane generally perpendicular to said first plane, said movement being relative to said first elongated member;

means formed on said second elongated member to coact with said means formed in said central portion to allow movement of said second elongated member along said second plane relative to said first elongated member;

means removably mounted on said first portion of said second elongated member and structured to engage the handle portion of the compound-type bow; and

a sleeve member mounted on said second elongated member and structured to coact with said means formed on said second elongated member to allow relative movement between said sleeve member and said second elongated member, said sleeve member further including means for

VOL
1127
ISS
2
JE
11
1991
UMI

removably holding one end of a scales means while the other end of the scales means is attached to the bow string of the compound-type bow while said means removably mounted on said first portion of said second elongated member is in engagement with the handle portion of the compound-type bow;

whereby movement of said second elongated member in a first direction toward said first elongated member will cause the scales means to indicate the pounds of draw of the compound-type bow so that adjustment of the draw may be made if desired.

5,022,378

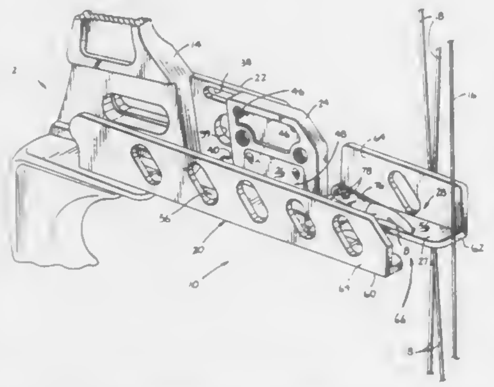
ARROW REST/OVERDRAWN APPARATUS FOR AN ARCHERY BOW

Nolin C. Rhodehouse, Idaho Falls, Id.; Terry G. Martin, and George T. Newbold, both of Walla Walla, Wash., assignors to Martin Archery, Inc., Walla Walla, Wash.

Continuation-in-part of Ser. No. 349,517, May 9, 1989, abandoned. This application Jan. 2, 1990, Ser. No. 459,992

Int. Cl.^{5} F41B *5/00*

U.S. Cl. 124—44.5 32 Claims



1. An arrow rest apparatus for mounting to a riser portion of an archery bow to support an arrow aft of the riser portion, the archery bow having a drawstring which is adapted to have an at-rest position and to travel upon release from a full-draw rearward location to a forwardmost location, the archery bow having a draw length, the arrow rest apparatus comprising:

a body having a longitudinal length, the body length being significantly less than the draw length;

bow mounting means for mounting the body relative to the riser portion of an archery bow;

arrow support means on the body for supporting an arrow at a singular predetermined support location aft of the bow riser portion throughout drawing, holding and releasing of an arrow, the singular predetermined support location being stationary with respect to the riser portion throughout drawing, holding and releasing of an arrow and being located between the drawstring full-draw rearward location and the forwardmost location, the arrow support means being removably mounted to the body for replacement;

the arrow support means and body comprising passage means for allowing movement of the drawstring forwardly through and past the singular predetermined support location when the drawstring is released, the passage means being rearwardly open to enable drawing of the bowstring rearwardly beyond both the body and the arrow support means; and

adjustable mounting means for enabling selective positioning of the singular predetermined support location forward and rearward relative to the bow riser.

5,022,379

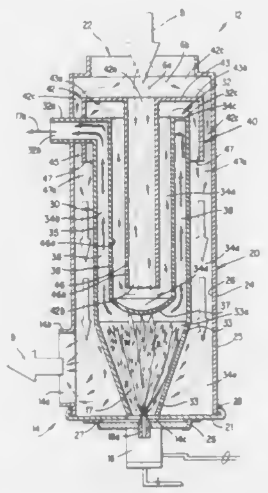
COAXIAL DUAL PRIMARY HEAT EXCHANGER

James C. Wilson, Jr., 28251 Georgetown Rd., Salem, Ohio 44460

Filed May 14, 1990, Ser. No. 523,064

Int. Cl.^{5} F24H *3/00*

U.S. Cl. 126—116 R 10 Claims



1. A heat exchange device for heating a fluid comprising:

a housing member having a shell portion, a fluid input aperture defined by a fluid input end of said shell portion, an output end cover plate sealably attached to said shell portion at an end opposite said fluid input end and with a burner assembly aperture defined therein, a fluid output portal radially directed and disposed at said output end;

a coaxial heat exchange member having an outer shell portion, a truncated portion defining a combustion chamber therein with a combustion chamber input portal, said truncated portion contiguous with said outer shell portion, an inner shell portion having an arcuate surface, a fluid aperture at an end opposite said arcuate surface, said inner shell and said arcuate surface defining a first heat exchange region within said inner shell and said inner shell disposed within said outer shell in spaced relationship so as to create, along with said truncated portion and a combustion gas output end cover, said combustion chamber and a combustion gas space, said combustion gas space being an annulus defined by an inner surface of said outer shell portion and an outer surface of said inner shell portion, and which space is in gas communication with a combustion gas exhaust portal, said coaxial heat exchange member disposed within said housing member such that; said combustion chamber input portal is aligned with and proximate to said burner assembly aperture and; said coaxial heat exchange member outer shell portion, said housing member shell portion, said output end cover plate and said truncated portion in combination defines a fourth and a fifth heat exchange volume; and

a fluid flow directing member in spaced relationship with said coaxial heat exchange member, having an outer and an inner shell in spaced relation said inner shell disposed within said first heat exchange region so as to define a first and a second heat exchange volume from said first heat exchange region, said first volume being the region defined by said arcuate surface and an output end of said inner shell of said fluid flow directing member, said output end opposite a fluid input end, said fluid input end having an end cover affixed to said outer shell and defining a first fluid opening aligned and in flow communication with a first fluid flow space defined by said inner shell, said end cover and said outer shell disposed, relative to said housing member shell portion to define a second fluid flow space, and relative to said coaxial heat exchange member outer shell portion and said combustion gas output end cover, a third heat exchange volume said housing member, said coaxial heat exchange member and said fluid flow directing member, in combination defining a fluid flow path from said fluid input aperture to said fluid output portal and said combustion chamber and said combustion gas space separate from said fluid flow path.

5,022,380

OVEN WITH DOUBLE DOOR

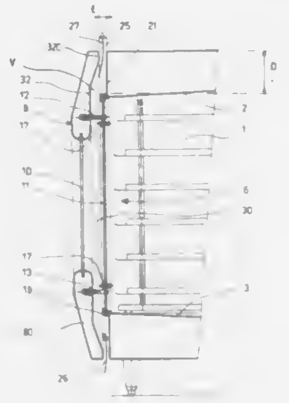
Jacques Faurel, Meythet, and Raymond Violi, Marlens, both of France, assignors to Societe Cooperative de Production Bourgeois, Faverges, France

Filed Nov. 17, 1989, Ser. No. 438,577

Claims priority, application France, Nov. 17, 1988, 88 15208

Int. Cl.^{5} F23M *7/00;* **F24C** *1/00*

U.S. Cl. 126—190 13 Claims



1. An enclosure such as an oven having a first edge, a front face, and an opening which can be closed by a hinged door, said door comprising:

a rigid outer wall hinged along a first side to the first edge of the enclosure including:
- (a) an inner face,
- (b) means for engaging the enclosure to selectively lock the outer wall in the closed position,
- (c) a peripheral portion forming a protective flange whose edge is opposite the front face of the enclosure, and
- (d) edges which define passages between the outer wall and the front face of the enclosure;

a rigid continuous inner plate, whose dimensions are slightly greater than the opening of the enclosure and smaller than the outer wall so that the peripheral portion of the outer wall extends beyond the contour of the inner plate, adapted so as to fit completely over the enclosure opening and sealingly close it in the closed position, movably disposed so as to be able to move away from the inner face of the outer wail;

means for connecting the inner plate to the outer wall with a space defined therebetween, the connecting means comprising:
- (a) at least two guide rods fixed perpendicularly to the inner plate at one of their ends and slidingly housed in corresponding passages in the outer wall,
- (b) resilient means for urging the rods and the inner plate away from the outer wall and applying the inner plate against the front face of the enclosure in the closed position, and
- (c) means for stopping relative movement of the inner plate towards or away from the outer wall between two relative limit positions by limiting movement of the rods,

whereby the passages between the outer wall and the front face of the enclosure permit natural air convection in the space formed between the outer wall and the inner plate to guide and cool the outgoing steam when the gas pressure prevailing inside the enclosure is sufficient to move the inner plate towards the outer wall against the resilient means;

a seal providing sealing between the inner plate and the front face of the enclosure in the closed position; and

a connection between the inner plate and the connecting means which does not allow the passage of steam between the inside and outside of the enclosure.

5,022,381

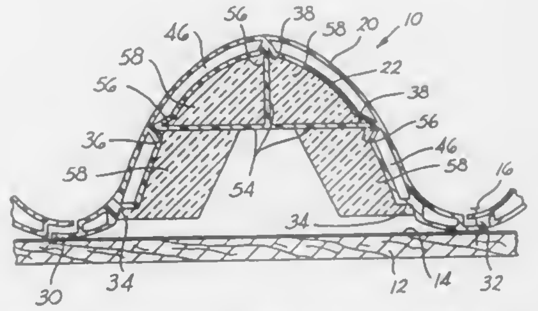
BARREL-SHAPED SOLAR ROOFING ELEMENT AND METHOD FOR ITS ASSEMBLY

Joseph Allegro, Inner Solar Roof System, Inc., 731 NE. 69th St., Boca Rotan, Fla. 33487

Continuation-in-part of Ser. No. 408,727, Sep. 18, 1989, Pat. No. 4,953,537. This application Mar. 22, 1990, Ser. No. 497,308

Int. Cl.^{5} F24J *2/04*

U.S. Cl. 126—432 17 Claims



1. A solar roofing system comprising in combination:

a set of shingles comprising lower and upper flat plastic sheet members of extruded plastic spaced apart and sealed together to form fluid flow paths forming solar energy conversion means, the upper sheet of which is transparent to solar energy,

interconnecting and overlapping structure for joining shingles together including structure for nailing through overlapped shingles into a roof surface, and

means for interconnecting the solar energy conversion means comprising a flow path between said lower and upper plastic sheets for circulation of a liquid that may store heat when subjected to solar energy from a plurality of said shingles into a network for collecting accumulated solar energy.

5,022,382

ENDOSCOPE

Hiroshi Ohshoji; Fumio Ohshima, and Satoshi Matsuo, all of Tochigi, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 23, 1989, Ser. No. 355,748

Claims priority, application Japan, May 25, 1988, 63-127600

Int. Cl.^{5} A61B *1/00*

U.S. Cl. 128—4 4 Claims

3. An endoscope comprising:

a scope for internally observing an object or person;

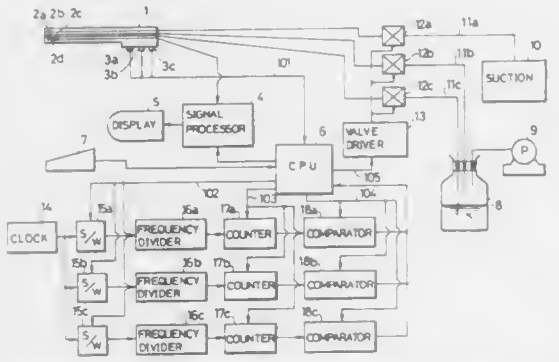
any or all of a sucking apparatus, a liquid supply apparatus and a gas supply apparatus operatively contained within the scope;

VOL
1127
ISS
2
JE
11
1991
UMI

a switch means associated with each apparatus to signal its on-off condition;

counter means for measuring and storing the length of time each apparatus has been continuously functioning;

a comparator for comparing each length of time with a predetermined duration of time; and



a switch circuit for terminating the operation of each apparatus which has been functioning continuously for a time equal to or greater than the predetermined duration of time.

5,022,383
WINDING TYPE ENDOSCOPE APPARATUS

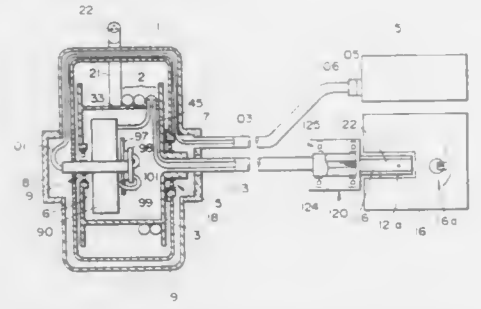
Katsunori Sakiyama, Hachioji; Tomoaki Sato, Higashiyamato, and Teruo Eino, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Division of Ser. No. 369,589, Jun. 21, 1989, which is a continuation-in-part of Ser. No. 146,982, Jan. 20, 1988, abandoned. This application Jul. 20, 1990, Ser. No. 554,992

Claims priority, application Japan, Jan. 20, 1987, 62-011009; Jul. 6, 1987, 62-104075; Jul. 31, 1987, 62-118366; Dec. 17, 1987, 62-322606; Jul. 5, 1988, 63-168170

Int. Cl.^{5} A61B *1/04. 1/06*

U.S. Cl. 128—6 **19 Claims**



1. A winding type endoscope apparatus comprising:

an elongate flexible insertable part having a base end and a tip part and including an observing window in the tip part;

a winding member to which said insertable part is fitted at the base end and which is rotatable to wind up and house said insertable part;

an image means provided in the tip part of said insertable part for receiving light from an object incident from said observing window and imaging the object image;

a driving circuit for feeding said imaging means with driving pulses for driving said imaging means; and

a signal processing circuit for processing a picture image signal output from said imaging means to be a video signal,

wherein at least said driving circuit is fitted to said winding member and rotates with the winding member.

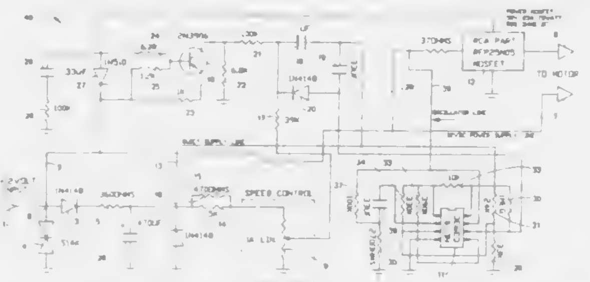
5,022,384
VIBRATING/MASSAGE CHAIR

Jack Freels, and David Milton, both of Sacramento, Calif., assignors to Capitol Systems, Sacramento, Calif.

Filed May 14, 1990, Ser. No. 522,976

Int. Cl.^{5} A61H *1/00;* **H03K** *3/06*

U.S. Cl. 128—33 **17 Claims**



1. A chair-like article of furniture for providing vibrational sensation to a user, comprising:

(a) an upper furniture back portion providing support for the user's upper torso;

(b) a lower furniture seat portion providing support for the user's lower torso, said upper furniture back portion and said lower furniture seat portion operatively coupled to generally define a chair;

(c) a plurality of electric motor vibration sources located within said upper furniture back portion and said lower furniture seat portion;

(d) a motor driving circuit means for supplying both pulse-width modulation and voltage regulation/stabilization while providing necessary voltage to control said electric motor vibration sources said motor driving circuit means including a comparator; and

(e) a speed control external to said motor driving circuit and operatively coupled thereto allowing variation in vibrational frequency of said electric motor vibration sources connected to said motor driving circuit.

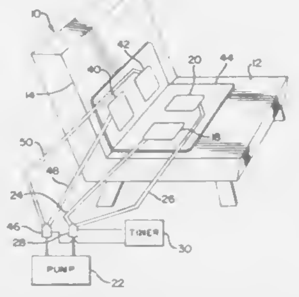
5,022,385
ERGONOMIC ANTI-FATIGUE SEATING DEVICE AND METHOD

Richard D. Harza, 655 Sheridan Rd., Winnetka, Ill. 60093

Filed Nov. 2, 1989, Ser. No. 430,806

Int. Cl.^{5} A61H *1/00*

U.S. Cl. 128—33 **58 Claims**



1. An ergonomic anti-fatigue device for moving the hips and lower midsection of a person seated in a seating apparatus having a seat section, the device comprising:

inflatable compartment means comprising inflatable right and left compartments located on the seat section of the seating apparatus such that when the person is seated on the seat section said inflatable right compartment is located directly under the right hip of the person and said inflatable left compartment is located directly under the left hip of the person; and

inflation and control means for inflating first one of said inflatable left and right compartments and then the other, thereby alternately lifting first one hip of the person and then the other hip, whereby motion and stimulation are translated to the person in a similar fashion to the motion and stimulation imparted to the person through walking.

52. A method for moving the hips and lower midsection of a person seated in a seating apparatus, comprising the steps of,

providing right and left movable compartments such that when the person is seated on the seating apparatus said movable right compartment is located directly under the right hip of the person, and said movable left compartment is located directly under the left hip of the person, each of said movable right and left compartments having a rest position;

providing movement means connected to each of said movable right and left compartments for moving said movable right and left compartments; and

moving first one of said movable right and left compartments upward against the person and then back to said rest position, then moving the other of said movable right and left compartments upward against the person and then back to said rest position, thereby alternately lifting first one hip of the person and then the other hip of the person, whereby motion and stimulation are translated to the person in a similar fashion to the motion and stimulation imparted to the person through walking.

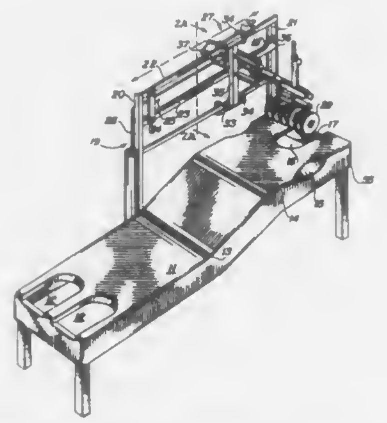
5,022,386
PORTABLE MASSAGE TABLE

Casemiro A. Kuniskis, 2328 E. Van Buren, Suite 125, Phoenix, Ariz. 85006

Filed Aug. 24, 1990, Ser. No. 571,712

Int. Cl.^{5} A61H *15/00*

U.S. Cl. 128—57 **8 Claims**



1. A massaging machine comprising:

a table for horizontally supporting a person to be massaged thereon,

a vertically positioned frame mounted adjacent one side of said table,

said frame comprising a horizontally positioned track having an elevating ramp at one end thereof,

a trolley means mounted on said frame for movement horizontally therealong,

a motor means pivotally mounted on said trolley means and comprising a rotatable shaft connected to a sprocket which is engageable with said track for rotation therealong in one direction upon rotation of said shaft,

roller means connected to said trolley means and comprising an arm extending laterally across said table and a plurality of rollers mounted on said arm for engaging the contour of a person lying thereon when said trolley means is moving along said track in said one direction upon energization of said motor means,

latch means having an arm and catch one of which is mounted on said motor means and the other on said trolley means for engagement when said sprocket rides up said ramp of said track causing said motor means to pivot relative to said trolley means,

said motor means when latched to said trolley means elevating said sprocket off of said track,

weighted cable means connected to said motor means for moving said trolley means above and along said track and elevated above the contour of said person in a second direction under the action of gravity after engagement of the arm and catch of said latch means, and

means for unlatching said latch means when said trolley means reaches said other end of said track,

thereby causing said sprocket means to engage said track and said motor means to drive said sprocket along said track in said one direction and said roller means over the contour of the person lying on said table.

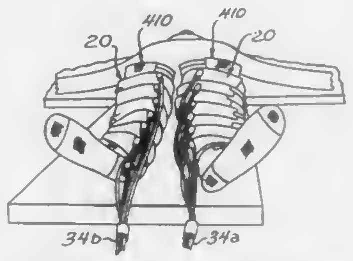
5,022,387
ANTIEMBOLISM STOCKING USED IN COMBIANTION WITH AN INTERMITTENT PNEUMATIC COMPRESSION DEVICE

James H. Hasty, Glenview, Ill., assignor to The Kendall Company, Mansfield, Mass.

Continuation of Ser. No. 94,368, Sep. 18, 1987, abandoned. This application Oct. 20, 1989, Ser. No. 424,842

Int. Cl.^{5} A61H *9/00*

U.S. Cl. 128—64 **6 Claims**



1. A device for applying compressive pressures against a patient's limb, comprising in combination:

a stocking having a circumferential elastic boot portion which applied a compressive pressure against the limb which pressure decreases from the ankle to a top of the stocking;

an elongated pressure sleeve for enclosing a length of the patient's limb over the stocking, said sleeve having a plurality of separate fluid pressured chambers progressively arranged longitudinally along the sleeve from a lower portion of the limb to an upper portion of the limb proximal the patient's heart relative to said lower portion;

means for forming a plurality of fluid pressure pulses; and

means for connecting the pressure pulses to chambers in the sleeve such that a compressive pressure is applied against the patient's limb by a sleeve which pressure decreases from the lower to upper limb portions.

5,022,388
PATIENT TABLE APPARATUS

Robert T. Harter, Billings, Mo., assignor to Health Care Manufacturing, Inc., Springfield, Mo.

Filed Aug. 18, 1989, Ser. No. 395,647

Int. Cl.^{5} A61F *5/00;* **A61G** *7/05*

U.S. Cl. 128—74 **1 Claim**

1. A patient table apparatus having a pad for supporting a patient with at least two sections, a lower body section which will tilt with respect to an upper body section about an axis transverse to said pad, which apparatus comprises:

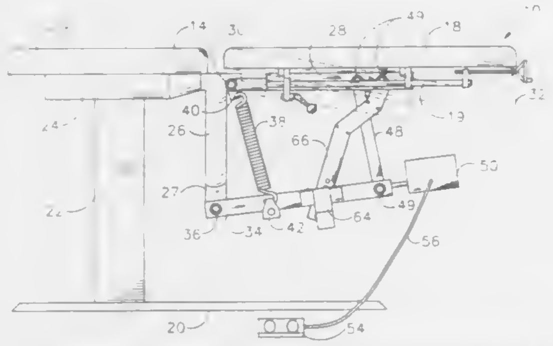
a. adjustable spring means to impart an upward force on said lower body section against the force of gravity on the patient;

VOL
1127
ISS
2
JE
11
1991
UMI

b. motor means to extend or retract said spring means;

c. control means to control said motor means whereby the amount of said upward force on said lower body section may be increased or decreased; and

d. means to lock said lower body section in place in a selected position with respect to said upper body section,



said means including a lock bar pivotally attached at one end to said upper body section, a spring loaded pin adapted to engage with at least one opening near the opposite end of said lock bar, foot-operated pedal means to retract said pin from said lock bar, and a foot depressible wedge to retain said pin in retracted position from said lock bar.

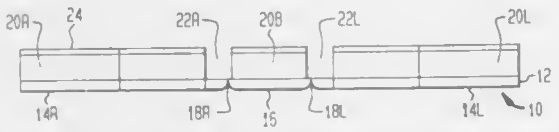
5,022,389
NASAL SPLINT DEVICE

Louis G. Brennan, Stockton, Calif., assignor to Cornucopia Medical Products, Inc., Stockton, Calif.

Filed May 25, 1990, Ser. No. 528,823

Int. Cl.^{5} A61F *5/00, 5/04, 9/00*

U.S. Cl. 128—76 C **21 Claims**



1. A nasal splint device for retaining a traumatized nose after surgery or injury comprising:

a flexible inner splint portion adapted for direct application to nasal skin, including a planar sheet of semi-rigid polymer material having opposing lateral portions and a central bridge portion defined by a pair of substantially parallel outer surface grooves for articulation of the inner splint portion and having elongated cutouts defining a lower dorsal portion of the central bridge portion and lateral portions;

a compressible polymeric foam inner layer attached to the inner planar sheet material and coextensive with the lateral portions and bridge portion, with a pair of inner foam recesses substantially coextensive with the parallel outer surface grooves;

a tacky layer of medical-grade adhesive overlying the inner surface of the foam for direct application to the nasal skin; said flexible inner splint portion, foam layer and tacky adhesive layer forming an integral splint member adaptable to individual nasal application by trimming to fit;

a splint stabilizer member comprising a thin sheet of malleable metal with a matching stabilizer bridge portion and lateral wing portions forming a T-shape, wherein the stabilizer bridge portion is sufficiently large to overlie a major part of the lower dorsal portion of the lower dorsal portion of the central bridge portion of the integral splint member;

adhesive means for attaching the stabilizer bridge portion adjacent the lateral wing portions of the splint stabilizer member to the inner splint portion between the outer grooves along the central bridge portion, thereby permitting articulation of the flexible inner splint portion during application.

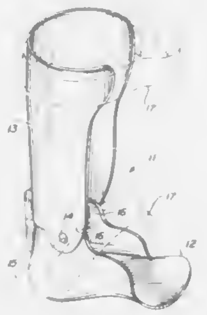
5,022,390
ORTHOTIC DEVICE FOR LIMITING LIMB NOTION AT A JOINT

Stacey A. Whiteside, 6810 S. Carney Ave., Tempe, Ariz. 85283

Filed May 11, 1990, Ser. No. 522,314

Int. Cl.^{5} A61F *5/00*

U.S. Cl. 128—80 H **10 Claims**



6. An orthotic device for a limb joint, said device comprising first and second members, said first member being thermoformed of plastic sheet material the inner surface of which substantially conforms to that portion of the anatomy to one side of the joint, said second member being thermoformed of plastic sheet material the inner surface of which substantially conforms to that portion of the anatomy to the other side of the joint, a pivotal connection between said first and second members, said pivotal connection having an axis adapted to substantially correspond to an axis of motion of the joint, an abutment carried by said first member, said first member being thermoformed closely about said abutment to hold said abutment in place with its surface substantially flush with adjoining inner surface regions of the first member, an adjustable stop carried by said second member engageable with said abutment for limiting pivotal movement between said first member and said second member, a mounting block carried by said second member, said second member being thermoformed closely about said mounting block to hold said block in place with its inner surface substantially flush with adjoining inner surface regions of said second member, and an adjusting member threadably received in said mounting block and adapted to adjust said stop.

5,022,391
KNEE ORTHOSIS

William K. Weidenburner, 9903 Melgar Dr., Whittier, Calif. 90603

Filed Jun. 5, 1989, Ser. No. 361,320

Int. Cl.^{5} A61F *5/00*

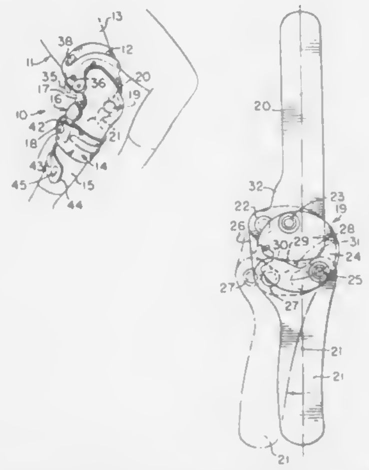
U.S. Cl. 128—80 F **18 Claims**

1. An improved knee orthosis of the type having a femoral shell having a medial femoral upright and a lateral femoral upright affixed thereto, a tibial shell having a medial tibial upright and a lateral tibial upright affixed thereto, and means for hinging the medial uprights together, and means for hinging the lateral uprights together, and straps to hold the shells in place, each brace having a medial hinge and a lateral hinge wherein the improvement comprises:

a medial hinge and a lateral hinge, each of said hinges having a pair of femoral pins comprising an anterior femoral pin and a posterior femoral pin, said pair of femoral pins being affixed to the femoral upright near the base thereof, a pair of tibial pins comprising an anterior tibial pin and a posterior tibial pin, said pair of tibial pins being affixed to said tibial upright near the top thereof, a first link plate affixed to said anterior femoral pin and to said anterior tibial pin, and a second link plate affixed to said posterior femoral pin and to the posterior tibial pin and said femoral upright and said tibial upright being co-planar and said anterior and posterior femoral pins being substantially horizontal when said tibial and femoral links are about vertical thereby preventing anterior tibial excursion.

14. An improved knee orthosis of the type having a femoral shell having a medial femoral upright and a lateral femoral upright affixed thereto, a tibial shell having a medial tibial upright and a lateral tibial upright affixed thereto, and means for hinging the medial uprights together, and means for hinging the lateral uprights together, and straps to hold the shells in place, each brace having a medial hinge and a lateral hinge, said improved knee orthosis being placed on the knee of a wearer having a femur and a tibia wherein the improvement comprises:

the tibial shell has a C-shaped portion to which the tibial uprights are attached, and a spiral portion extends downwardly and spirally from one end of the C-shaped portion subtending at least about 360° from the hinge from which it extends and ends at a terminus adjacent the tibia of the wearer and strap means affixed to said C-shaped portion, said strap means encircling the wearer's tibia and also surrounding the terminus of the C-shaped portion.



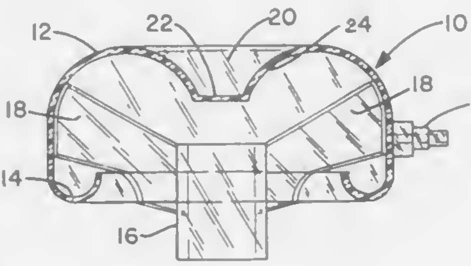
5,022,392
APPARATUS FOR SECRETION DEFLECTION DURING INTUBATION

Joseph D. Yeakel, 3954 Saint Edmund Ave., NW., Canton, Ohio 44718

Continuation of Ser. No. 276,022, Nov. 22, 1988, abandoned. This application Oct. 1, 1990, Ser. No. 593,264

Int. Cl.^{5} A61M *16/00*

U.S. Cl. 128—202.28 **8 Claims**



1. Apparatus for secretion deflection, comprising:

a generally hemispherical shroud having a gutter circumferentially encompassing an open bottom edge thereof; and

a tubular member having first and second open ends, said first open end being received within said shroud and being axially aligned with said shroud; said tubular member being interconnected with said shroud by struts to hold said tube stationary relative said shroud, and said tubular member not passing completely through said shroud.

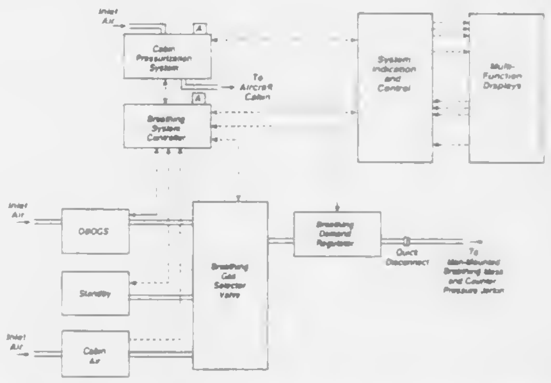
5,022,393
APPARATUS FOR WARNING A PILOT OF LIFE-SUPPORT SYSTEM FAILURES

Michael B. McGrady, Federal Way, and Jon K. Robinson, Bellevue, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 14, 1988, Ser. No. 257,625

Int. Cl.^{5} A62B *7/00*

U.S. Cl. 128—205.23 **26 Claims**


Inlet Air
A
Cabin Pressurization System
To Aircraft Cabin
A
Breathing System Controller
System Indication and Control
Multi-Function Displays
Inlet Air
OBOGS
Breathing Gas Selector Valve
Breathing Demand Regulator
Quick Disconnect
To Man-Mounted Breathing Mask and Counter Pressure Jerkin
Standby
Inlet Air
Cabin Air

18. An apparatus for maintaining the life-support systems of the cabin of an aircraft and for warning the pilot of the aircraft of any life-support failures, said apparatus comprising:

a cabin pressure sensor for determining the ambient air pressure of the cabin of the aircraft and providing a cabin pressure signal indicative of the determined cabin air pressure;

a cabin altitude sensor for determining the altitude of the aircraft cabin and for providing a cabin altitude signal indicative of the determined cabin altitude;

a pressurization system responsive to the cabin pressure and cabin altitude signals for determining a desired cabin pressure and maintaining the cabin air pressure substantially at the desired value;

a cabin oxygen sensor for determining the concentration of oxygen in the air of the cabin and for providing a cabin oxygen signal indicative of the concentration of oxygen in the cabin air;

a breathing mask adapted to be positioned on the face of the pilot of the aircraft to provide oxygen to the pilot;

first and second oxygen sources for providing oxygen to the cabin of the aircraft, said first oxygen source being adapted to generate concentrated oxygen from air outside the cabin and to provide a first oxygen source signal indicative of the operational status of said first oxygen source and said second oxygen source being adapted to provide concentrated oxygen from a quantity of stored oxygen and to provide a second oxygen source signal indicative of the quantity of oxygen available to the pilot;

a breathing gas selector valve coupled to receive oxygen from said first oxygen source, said second oxygen source and the cabin, said breathing gas selector valve being responsive to a breathing control signal for providing oxygen to said breathing mask from either said first oxygen source, said second oxygen source or ambient air from the cabin;

a breathing system controller responsive to the cabin pressure, cabin altitude and cabin oxygen signals and responsive to the first and second oxygen source signals for providing the breathing control signal; and

a multifunctional display responsive to a display signal for

VOL
1127
ISS
2
JE
11
1991
UMI

providing first and second quantity indicators for indicating the altitude of the cabin and the amount of oxygen remaining in said second oxygen source, respectively, sad multifunctional display being further responsive to the display signal for providing a cabin pressure indicator and first and second oxygen indicators wherein said cabin pressure and said first and second oxygen indicators may each be provided in first, second and third color formats, as determined by the display signal, and wherein each format indicates a different status of said cabin pressure and said first and second oxygen indicators;

a display controller coupled to monitor the status of the cabin pressure, cabin altitude and cabin oxygen signals and said first and second oxygen source signals to provide the display signal, said display controller being adapted to provide the display signal such that the cabin pressure indicator is provided in the first color format when the cabin pressure signal and the cabin altitude signal indicator the difference between the effective cabin altitude and the desired cabin altitude is greater than a first predetermined constant, to provide the cabin pressure indicator in the second color format when the cabin pressure signal and the cabin altitude signal indicate the difference between the effective cabin altitude and the desired cabin altitude is greater than a second predetermined constant and to provide the cabin pressure indicator when the cabin pressure signal and the cabin altitude signal indicate the difference between the effective cabin altitude and the desired cabin altitude is greater than a third predetermined constant, said display controller being adapted to provide the display signal such that said first quantity indicator to indicate the effective altitude of said cabin when the cabin pressure signal and the cabin altitude signal indicate the difference between the effective cabin altitude and the desired cabin altitude is greater than the second predetermined constant and when the breathing control signal provided by said breathing system controller controls said breathing gas selector valve to supply cabin air to said breathing mask, said display controller being adapted to provide the display signal such that said second quantity indicator is provided when the breathing control signal controls the breathing selector valve to supply oxygen from said second oxygen source to said breathing mask and when cabin air is provided to said breathing mask and the cabin pressure signal and the cabin altitude signal indicate the difference between the effective cabin altitude and the desired cabin altitude is greater than the first predetermined constant, said display controller being adapted to provide the display signal such that said first oxygen indicator is provided in the first color format when cabin air is provided to said breathing mask and when the cabin pressure signal and the cabin altitude signal indicate the difference between the effective cabin altitude and the desired cabin altitude is less than the first predetermined constant, to provide said first oxygen indicator n the second color format when oxygen is provided to said breathing mask from said second oxygen source and when cabin air is provided to said breathing mask and the cabin pressure signal and the cabin altitude signal indicate the difference between the effective cabin altitude and the desired cabin altitude is greater than the first predetermined constant but less than the second predetermined variable and to provide said first oxygen indicator in the third color format when cabin air is provided to said breathing mask and when the cabin pressure signal and the cabin altitude signal indicate the difference between the effective cabin altitude and the desired cabin altitude is greater than the third predetermined constant, said display controller being further adapted to provide the display signal such that said second oxygen indicator is provided in the second color format when oxygen is provided to said breathing mask from said second oxygen source and when the second oxygen source signal indicates the quantity of oxygen remaining is below a predetermined quantity and to provide said second oxygen indicator when cabin air is provided to said breathing mask and when the cabin pressure signal and the cabin altitude signal indicate the difference between the effective cabin altitude and the desired cabin altitude is greater than the first predetermined constant.

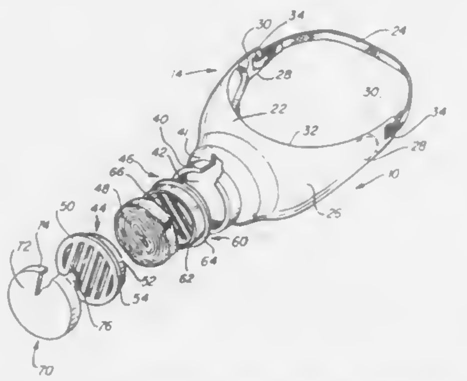
5,022,394
HEAT AND MOISTURE EXCHANGER DEVICE FOR TRACHEOSTOMY PATIENTS

Mark A. Chmielinski, Troy, Mich., assignor to HomeCare of Dearborn, Dearborn, Mich.

Continuation of Ser. No. 255,520, Oct. 11, 1988, abandoned. This application Jan. 12, 1990, Ser. No. 463,851

Int. Cl.^{5} A62B *19/00;* **A61M** *16/04*

U.S. Cl. 128—207.14 **6 Claims**



1. A device for humidifying and heating gas inspired from the atmosphere for use by a patient having a tracheostomy, said device comprising:

a collar having a front portion and a flange defining a chamber, said front portion having an aperture opposite the tracheostomy, said aperture being coaxial with the tracheostomy said flange sealingly engaging the neck of the patient;

means for securing said collar to the neck of the patient;

a replaceable cartridge removably mounted in said aperture of said collar, said cartridge having a heat and moisturizing member spaced apart from the tracheostomy and coaxial with the tracheostomy whereby heat and moisture collected from air expired from the patient are communicated to air inhaled by the patient, said cartridge being mounted within said collar adjacent said tracheostomy whereby said collar provides a compact profile which may be easily covered by the patient;

said cartridge having a pair of spaced apart radially extending flanges, said pair of flanges engaging said collar adjacent said aperture whereby said cartridge is removably mounted within said aperture for replacement with a similar cartridge;

wherein said collar has a nipple in communication with said chamber, said nipple adapted to be connected to a hose communicating oxygen from a supply of oxygen to said chamber for inspiration by a patient wearing said collar.

5,022,395
IMPLANTABLE CARDIAC DEVICE WITH DUAL CLOCK CONTROL OF MICROPROCESSOR

Renold J. Russie, New Brighton, Minn., assignor to Cardiac Pacemakers, Inc., St. Paul, Minn.

Filed Jul. 7, 1989, Ser. No. 376,511

Int. Cl.^{5} A61N *1/362*

U.S. Cl. 128—419 PG **16 Claims**

1. An implantable microprocessor cardiac based device comprising:

microprocessor means for determining one of a plurality of cardiac treatment therapies;

external clock means for continuously generating a clock signal of a first frequency;

auxiliary clock means for generating a clock signal of a second frequency for controlling said microprocessor means, said auxiliary clock means being capable of assuming an active state for generating said clock signal of said second frequency, and an inactive state whereby no clock signal is generated;

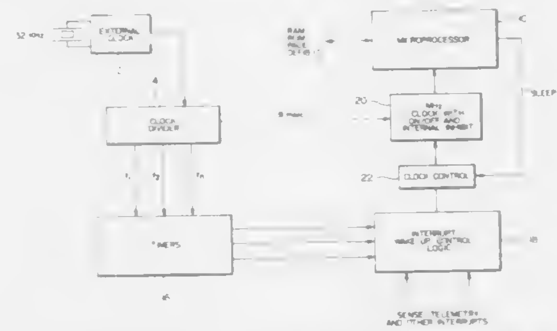
interrupt decision means for setting the state of said auxiliary clock means;

clock control means for triggering said auxiliary clock means to assume one of said active or inactive states under control of said interrupt decision means and said microprocessor means;

a plurality of timer means capable of producing as output, time-out signals to said interrupt decision means and said microprocessor means;

clock divider means for receiving as input said clock signal of said first frequency and generating as output a plurality of clock signals at a plurality of different frequencies to said plurality of timer means; and

means to synchronize said external clock means and said auxiliary clock means so that said plurality of timer means are in a stable state when the microprocessor means reads said time-out signals.



5,022,396
CATHETER FOR SIMULTANEOUSLY MEASURING MONOPHASIC ACTION POTENTIAL AND ENDOCARDIAC CAVITY PRESSURE

Hideto Watanabe, No. 6-21, Nishinagaehonmachi, Toyama-shi, Toyama-ken, Japan

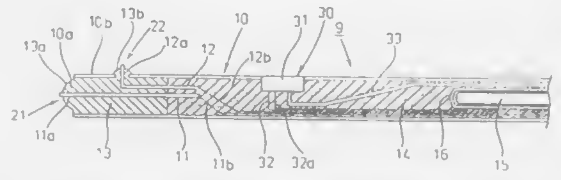
Filed Dec. 12, 1989, Ser. No. 448,921

Claims priority, application Japan, Dec. 19, 1988, 63-163543[U]

The portion of the term of this patent subsequent to May 8, 2007, has been disclaimed.

Int. Cl.^{5} A61B *5/0402;* **A61N** *1/05*

U.S. Cl. 128—642 **2 Claims**



1. A catheter for simultaneously measuring action potentials of myocardiac cells and endocardiac cavity pressure in a heart, said catheter comprising:

a catheter body for guided insertion into said endocardiac cavity and being brought into contact with an endocardiac surface having myocardiac cells, said catheter body including a distal section and a rear section, said distal section having a front enclosing surface and a peripheral surface;

first and second electrodes, said first electrode being provided to said front enclosing surface and said second electrode being provided to said peripheral surface, said first and second electrodes being disposed in said distal section of said catheter body so that when said catheter body is guided into said endocardiac cavity, said first electrode is brought into contact with an endocardiac surface, and said second electrode is disposed in said endocardiac cavity;

a pressure transducer disposed in said peripheral surface of said distal section of said catheter body and being capable of measuring said endocardiac cavity pressure when said catheter body is disposed within said endocardiac cavity, and producing as output an electrical pressure signal corresponding to said measured endocardiac cavity pressure;

lead wires connected to said first electrode, second electrode and pressure transducer respectively, and extending out from said rear section of said catheter body, so as to transfer said measured action potential and electrical pressure signals outwardly from said rear section of said catheter body;

a pair of pacing electrodes provided to said peripheral surface of said distal section of said catheter body; and

pacing lead wires connected to said pacing electrodes in said catheter body and extending out from said rear section of said catheter body.

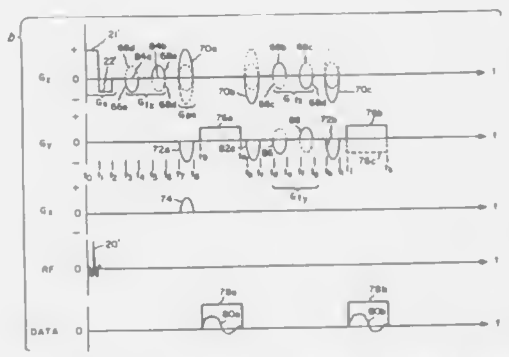
5,022,397
MULTIPLE-ECHO NMR ANGIOGRAPHY WITH MULTIPLE-VELOCITY IMAGES

Charles L. Dumoulin, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 497,369, Mar. 22, 1990, abandoned, which is a division of Ser. No. 235,144, Aug. 23, 1988, abandoned, which is a division of Ser. No. 13,592, Feb. 11, 1987, Pat. No. 4,796,635. This application Jan. 31, 1991, Ser. No. 649,245

Int. Cl.^{5} A61B *5/055*

U.S. Cl. 128—653 AF **3 Claims**



1. A method for acquiring a plurality of nuclear magnetic resonance (NMR) angiographic images of flowing material in at least a selected portion of a sample, comprising the steps of:

(a) immersing the sample in a main static magnetic field;

(b) nutating, in the initial part of each of a first sequence and a second sequence of a sequential pair of imaging sequences for each of a multiplicity S of regions of said selected sample portion, the spins of all nuclei of a selected species;

(c) applying, prior to each of a plurality N of response acquisition time intervals, a pair of alternating-polarity flow-encoding signal pulses in a first magnetic field gradient impressed upon the sample, in a first direction selected to establish one axis of each of the NMR angiographic projection images, to cause a resulting NMR response echo signal from the spin of a moving nucleus to differ from the NMR response echo signal resulting from the spin of a substantially stationary nucleus; all of the pulse pairs in the flow-encoding signal having the same polarity of first

VOL 1127
ISS 2
JE 11
1991
UMI

pulses and each of the flow-encoding pulses in the first sequence of each pair having a polarity opposite to the polarity of the like-positioned flow-encoding pulse in the second sequence of each pair, said first direction being a flow-encoding direction;

(d) acquiring, responsive to a readout magnetic field gradient impressed upon the sample in a second direction, substantially orthogonal to the first direction, a set of data from the NMR response echo signal evoked, from at least the sample portion, in each different one of N response data acquisition time intervals of each of the first and second sequences;

(e) subtracting the data in each j-th one, where $1 \leqq j \leqq N$, of the NMR response signal data sets acquired in a selected one of the first and second sequences, from the data in the like-numbered j-th data set of the remaining one of the first and second sequences, to generate a j-th one of N difference data sets from which response data obtained from stationary nuclei has been substantially removed; and

(f) generating, responsive to all difference data sets, a plurality of angiographic projection images, each lying in a plane having a preselected relationship with respect to the first and second directions, and displaying from each of the N resulting difference data sets an angiographic image having information about a sample portion fluid flow velocity different from the velocity information displayable from any other one of the remaining difference data sets.

5,022,398

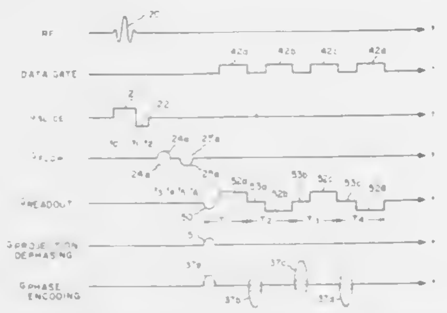
MULTIPLE-ECHO NMR ANGIOGRAPHY FOR ENHANCEMENT OF SIGNAL-TO NOISE RATIO

Charles L. Dumoulin, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 235,144, Aug. 23, 1988, abandoned, which is a division of Ser. No. 13,592, Feb. 11, 1987, Pat. No. 4,796,635. This application Mar. 22, 1990, Ser. No. 497,288

Int. Cl.^{5} A61B *5/035*

U.S. Cl. 128—653 AF 3 Claims



1 A method for acquiring at least one nuclear magnetic resonance (NMR) angiographic image of flowing material in at least a selected portion of a sample comprising the steps of:

(a) immersing the sample in a main static magnetic field;

(b) nutating, in the initial part of each of a first sequence and a second of a sequential pair of imaging sequences for each of a multiplicity S of regions of said selected sample portion, the spins of all nuclei of a selected species;

(c) applying a pair of alternating-polarity flow-encoding signal pulses in a first magnetic field gradient impressed upon the sample, in a first direction selected to establish one axis of the NMR angiographic projection image, to cause a resulting NMR response echo signal from the spin of a moving nucleus to differ from the NMR response echo signal resulting from the spin of a substantially stationary nucleus; each of the flow-encoding pulses in the first sequence of each pair having a polarity opposite to the polarity of the like-positioned flow-encoding pulse in the second sequence of each pair;

(d) acquiring, responsive to a readout magnetic field gradient impressed upon the sample in a second direction, substantially orthogonal to the first direction, a set of data from the NMR response echo signal evoked, from at least the sample portion, in each different one of a plurality M of response data acquisition time intervals of each of the first and second sequences, and including the substeps of: obtaining all M of the response data sets in each sequence for a single common readout second direction; and summing the data values for all M response data sets in each sequence to obtain a single summed data set for that common second direction and that sequence;

(e) subtracting the summed data set from one of the first and second sequences from the summed data set from the other sequence of the sequence pair, to generate the difference data set for that pair; and

(f) generating, responsive to all difference data sets, each of at least one angiographic projection image, each lying in a plane having a preselected relationship with respect to the first and second directions.

5,022,399

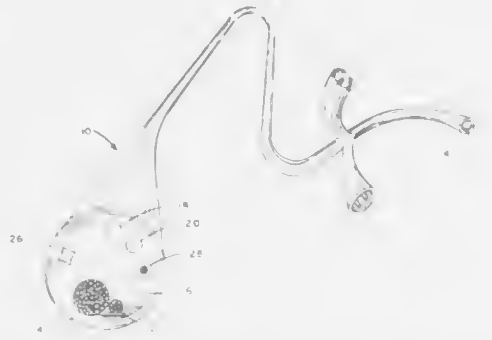
VENOSCOPE

Ken P. Biegeleisen, 91 Hudson Ave., Irvington, N.Y. 10533

Filed May 10, 1989, Ser. No. 350,061

Int. Cl.^{5} A61B *8/06*

U.S. Cl. 128—662.06 40 Claims



1. A venoscope comprising:

a flexible catheter having a proximal end, a distal end, and a plurality of passages extending therebetween;

means for directing a treatment fluid from a fluid source to the distal end of the catheter through at least a first of said passages;

means for viewing areas adjacent the distal end of the catheter through a second of said passages;

means extending through another of said passages for guiding the distal end of said catheter through veins of a patient; and

means for ultrasonically monitoring blood flow in areas adjacent the distal end of the catheter.

5,022,400

LARGE TIME BANDWIDTH ECHOGRAPHIC SIGNAL PROCESSOR

Glenn A. Walters, 917 Seph Way, Escondido, Calif. 92027

Filed Feb. 8, 1988, Ser. No. 153,322

Int. Cl.^{5} A61B *8/00*

U.S. Cl. 128—661.09 9 Claims

1. An echography system that provides simultaneous, non-ambiguous measurements of an echo's amplitude, range and velocity utilizing a pseudo-random, stepped frequency waveform, said system comprising:

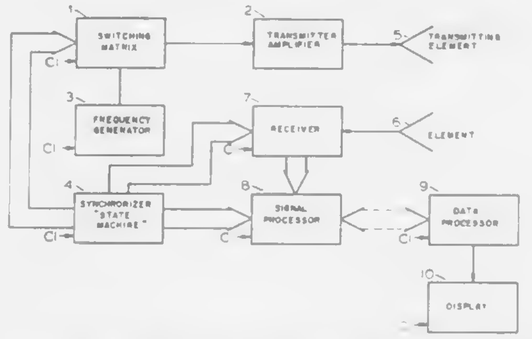
transmitter means for generating and transmitting the step frequency waveform;

receiver means for receiving echoes from impedence discontinuities within the signal path of the step frequency waveform;

means for channelizing the echos from differing frequency steps of the stepped frequency waveform;

state machine means to maintain coherency between the step frequency waveform and corresponding echo waveform;

algorithm means for extracting the Doppler frequency shift introduced in the received frequency steps by echo source velocity and for deriving a velocity measurement;



accessible storage means to coherently add successive echoes of received step frequency having common Doppler frequencies and transit periods;

means to vectorally add echoes of like velocity and transit period from all step frequencies to obtain a pulse compressed signal and derive a fine range measurement;

means of storing successive measurements of echo's magnitude, range and velocity.

5,022,401

APPARATUS FOR POSITIONING A MEASURING ELEMENT

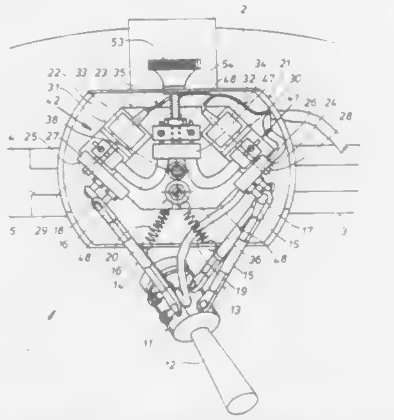
Alec Eden, Überlingen, Fed. Rep. of Germany, assignor to Eden Medizinische Elektronik GmbH, Überlingen, Fed. Rep. of Germany

Filed Jan. 17, 1990, Ser. No. 466,045

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1989, 3921957

Int. Cl.^{5} A61B *10/00*

U.S. Cl. 128—662.03 13 Claims



1. In an apparatus for positioning a measuring element, such as a Doppler signal emitter or receiver, for determining the position of a blood vessel and/or the direction in which the blood flows in this blood vessel, with said measuring element being pivotably mounted, via two parallelogram-type linkage systems that are disposed at an angle to one another, in such a way as to be movable in a random manner, the improvement wherein:

said linkage systems have lever arms free ends that are respectively supported on a common carrier plate including a respective pivotably mounted intermediate member therewith;

a respective arresting mechanism is operatively associated with each of said intermediate members; and

means for actuating said arresting mechanisms separately.

5,022,402

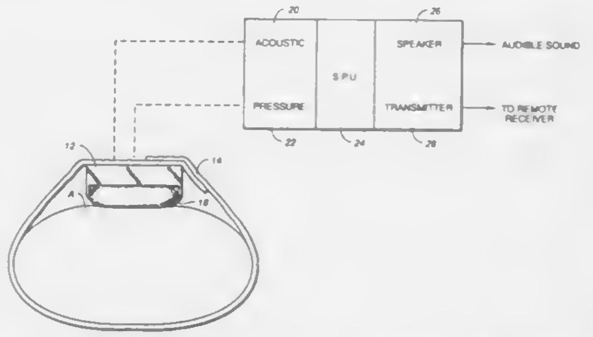
BLADDER DEVICE FOR MONITORING PULSE AND RESPIRATION RATE

Daniel L. Schieberl, 108 Eighth St., Santa Rosa, Calif. 95401, and Greg Luzaich, 1555 Copperhill Pkwy., Santa Rosa, Calif. 95403

Filed Dec. 4, 1989, Ser. No. 445,181

Int. Cl.^{5} A61B *5/02*

U.S. Cl. 128—671 8 Claims



1. A medical monitoring device for monitoring the pulse and respiration rate of an individual, said device comprising:

a bladder member having means conditioned for placement against and contact with the body of said individuals, said bladder member including attached acoustic sensor means for detection o the heartbeat sounds of said individual, and delivery of a pulse signal when such heartbeat sounds are detected, said bladder member further including attached pressure sensor means for detection of the bodily expansion during respiration by the indivdual, and delivery of a respiration signal when such bodily expansion is detected;

signal processing means for receiving said pulse signal delivered by said acoustic sensor and said respiration signal delivered by said pressure sensor, said signal processing means conditioned to time the repetitive receipt of each of said pulse signal and said respiration signal, said signal processing means further conditioned to deliver an alarm signal when either of said pulse signal or said respiration signal is not received within a predetermined time;

speaker means for generation of an audible alarm upon receipt of said alarm signal from said signal processing means;

transmitter means for transmission of a radio alarms signal upon receipt of said alarm from said signal processing means; and

remote alarm means for receipt of said radio alarm signal from said transmitter means, and generation of a remote audible alarm upon such receipt.

5,022,403

AUTOMATIC BLOOD PRESSURE MEASURING DEVICE AND METHOD WITH CUFF SIZE DETERMINATION

John LaViola, Orange, Conn., assignor to CAS Medical Systems, Inc., Branford, Conn.

Filed Mar. 11, 1987, Ser. No. 24,662

Int. Cl.^{5} A61B *5/02*

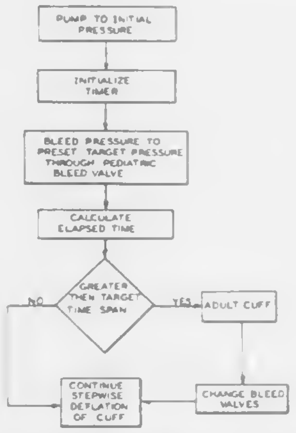
U.S. Cl. 128—680 1 Claim

1. An automatic blood pressure measuring device of the non-invasive oscillometric type, said device comprising:

(a) a cuff (for girdling an appendage of a subject whose blood pressure is to be measured);

VOL
1127
ISS
2
JE
11
1991
UMI

(b) pump means operably connected to said cuff for inflating the latter;
(c) first and second valve means operably connected to said cuff for bleeding air therefrom in stepwise fashion, said first valve means being (adapted for use with a pediatric size cuff), and said second valve means being (adapted for use with an adult size cuff);
(d) microprocessor means operably connected to said pump means and connected to said first and second valve means for controlling operation of the device, said microprocessor means being operable to initiate inflation of said cuff to a predetermine initial pressure, and said microprocessor means further being operable to activate said first valve means to deflate said cuff from said initial pressure to a first calculated lower pressure;


PUMP TO INITIAL PRESSURE
INITIALIZE TIMER
BLEED PRESSURE TO PRESET TARGET PRESSURE THROUGH PEDIATRIC BLEED VALVE
CALCULATE ELAPSED TIME
GREATER THEN TARGET TIME SPAN
NO
YES
ADULT CUFF
CONTINUE STEPWISE DEFLATION OF CUFF
CHANGE BLEED VALVES

(e) pressure sensor means operably connected to said microprocessor means to signal said microprocessor means when said first calculated lower pressure is reached in said cuff;
(f) said microprocessor means including means to determine the lapsed time between actuation of said first valve means and reception of a signal from said pressure sensor means indicative that cuff pressure has reached said first calculated lower pressure, and said microprocessor also including means for comparing said lapsed time with a target time span; and
(g) means for closing said first valve means and opening said second valve means when said lapsed time is greater than said target time span, whereby continuation of the blood pressure measurement cycle will be via said second valve means.

5,022,404
CARDIAC MONITORING METHOD AND APPARATUS

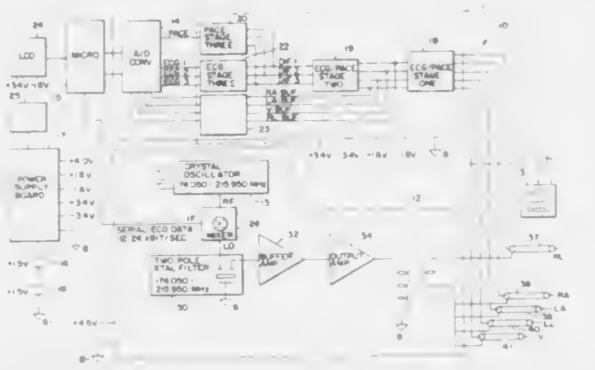
Curtis R. Hafner, Cedarburg, Wis., assignor to Marquette Electronics. Inc., Milwaukee, Wis.

Filed Oct. 16, 1989, Ser. No. 422,119

Int. Cl.^{5} A61B *5/0402*

U.S. Cl. 128—696 **54 Claims**

1. A patient monitoring system including a patient monitor having at least four lead means adapted to be coupled to different locations on a patient for sensing individual ECG voltage signals, at least two differential means, switching means in circuit between said lead means and said differential means and operative for simultaneously coupling selected different groups of said ECT voltage signals to each of said differential means, each of said differential means being operative for simultaneously generating a differential signal functionally related to the difference between the preselected ones of said ECG voltage signals in said different groups sensed by the lead means connected thereto, control means coupled to said lead means and to said switching means and being responsive to a failure of one or more of said lead means for setting said switching means to couple different preselected groups of the ECT voltage signals to each of the differential means, the patient monitor including lead fail indicia, said control means being operative to activate the lead fail indicia upon the failure of one or more leads, transmitting means for transmitting RF signals to a display unit remote from the patient monitor, converter means connected to the differential means for receiving lead group signals therefrom, said converter means also being connected to said control means for providing modulating signals representative of the lead group signals, said control means providing said modulating signals to said transmitting means, said transmitting means including RF signal generating means for generating a carrier signal and modulating means connected to receive said carrier signal and said modulating signals and being operative to modulate the carrier signal with said modulating signals and for transmitting the same to said remote unit, whereby the remote display unit may continuously display all of the lead group differential signals, said control means being responsive to a failure in one or more of said lead means for actuating said switching means to disconnect the failed lead from any of the differential means to which it is connected and for connecting an unfailed lead to said differential means to form a different lead pair group with the other unfailed lead previously connected to the said differential means whereby at least two lead pair group differential signals can continuously be transmitted and displayed by the remote unit regardless of the occurrence of a failed lead.



5,022,405
STETHOSCOPE FOR USE IN NUCLEAR MAGNETIC RESONANCE DIAGNOSTICS

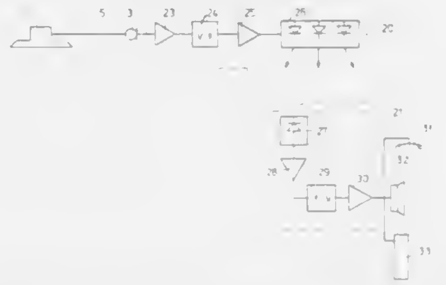
J. Bertil W. Hök, Västerås, Sweden, and Valerie Bythell, London, England, assignors to Hok Instrument AB, Västerås, Sweden

Filed May 20, 1988, Ser. No. 196,232

Claims priority, application Sweden, May 25, 1987, 8702160

Int. Cl.^{5} A61B *7/02*

U.S. Cl. 128—715 **9 Claims**



1. A stethoscope system for monitoring a patient in conjunction with investigations using an NMR magnet, said system comprising:
an NMR magnet having a patient accommodating tunnel which in operation contains electric and magnetic fields;
a bell chest piece positioned within said tunnel and adapted to be placed on the patient's skin in order to pick up audible heart and breathing sounds;
a microphone positioned outside of said tunnel;
a flexible hollow tube of dielectric material with a first and a second end, said first end being connected to said bell chest piece and said second end being connected to said microphone, said microphone being adapted to convert said audible heart and breathing sounds into electrical signals;
an optical transmitter positioned outside of said tunnel and electrically connected to said microphone and adapted to convert said electrical signals into corresponding optical signals, and
receiver means for receiving said optical signals in order to allow monitoring of the patient by observers.

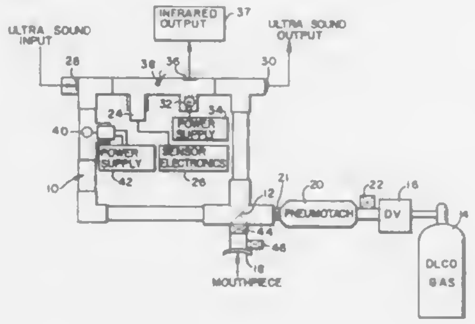
5,022,406
MODULE FOR DETERMINING DIFFUSING CAPACITY OF THE LUNGS FOR CARBON MONOXIDE AND METHOD

Harold W. Tomlinson, 57 Commonwealth Dr., Glenmont, N.Y. 12077

Continuation-in-part of Ser. No. 226,562, Aug. 1, 1988, abandoned, which is a continuation of Ser. No. 916,306, Oct. 7, 1986, abandoned. This application Dec. 22, 1989, Ser. No. 455,263

Int. Cl.^{5} A61B *5/08*

U.S. Cl. 128—719 **23 Claims**



1. An apparatus for determining the various parameters related to the interaction of human lungs with one or more specified gases, comprising:
a sample chamber;
means within the chamber for sensing the gaseous components of the contents of the chamber;
mixing means within the chamber for mixing the gaseous components of the contents of the chamber;
a mouthpiece connected into said sample chamber for input of gases expired from the lungs of a patient under test;
a test gas input connection attached at one end to the sample chamber and having means for connection with a source of standard test gas containing a predetermined concentration of one or more specified gases and valve means, including a demand valve, for allowing test gas to flow from the source through the sample chamber to the mouthpiece by its own pressure or on demand when the patient inspires through the mouthpiece;
mouthpiece valve means between the mouthpiece and the sample chamber for opening to enable the standard test gas to flow to the mouthpiece through at least a portion of the sample chamber, closing entirely for a predetermined breath hold period and then opening to enable expired gases to be breathed out into the sample chamber;
rebreath valve means between the mouthpiece and the mouthpiece valve means for connecting the mouthpiece to the atmosphere to allow normal breathing by the patient whereby the air inspired and the gases expired do not come from or go into the sample chamber when the rebreath valve means is open and the mouthpiece valve means is closed;
a gas volume measuring device between the test gas input connection and the sample chamber to measure the gas volume entering and exiting the sample chamber;
an exhaust valve between the gas volume measuring device and the test gas input connection to control exit of gases from the sample chamber; and
pneumotach valve means between the sample chamber and the exhaust valve for allowing connection of the chamber to the exhaust valve, whereby, by opening and closing the mouthpiece, rebreath and pneumotach valve means and exhaust valve, sequential portions of the expired gases can pass through the exhaust valve, be trapped and held in the chamber for mixing and measurement of its gaseous constituents by the mixing and sensing means within the chamber, respectively, and be passed to the atmosphere without entering the chamber, so that in addition to gas volume measurement as the gases leave the chamber, measurement may be made of expired gaseous constituents related to lung effectiveness using the sensing means within the chamber.

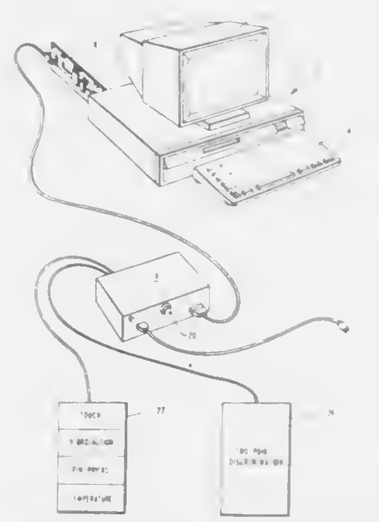
5,022,407
APPARATUS FOR AUTOMATED TACTILE TESTING

Kenneth W. Horch; John H. Fisher, both of Salt Lake City, and Barry L. Evans, Murray, all of Utah, assignors to Topical Testing, Inc., Salt Lake City, Utah

Filed Jan. 24, 1990, Ser. No. 469,280

Int. Cl.^{5} A61B *5/00*

U.S. Cl. 128—739 **25 Claims**



1. An apparatus for automatically testing the tactile sensory response of a patient, the apparatus comprising;
first tactile stimulation means for cutaneous stimulation of the patient;
second tactile stimulation means for cutaneous stimulation of the patient;
control means for accurately controlling the amplitude and time course of stimulus administered by operation of the first tactile stimulation means and the second tactile stimulation means such that stimuli of precise predetermined amplitude and time course are administered; and
computer means for recording the patient's responses to said first and the second tactile stimulation means for cutaneous stimulation of the patient and for generating additional stimuli in response to the record of the patient's response to said stimuli.

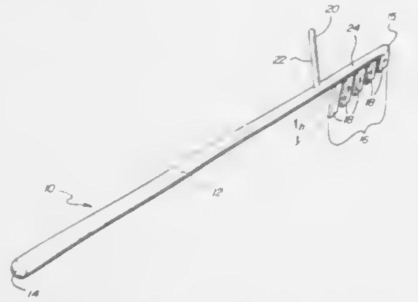
VOL
1127
ISS
2
JE
11
1991
UMI

5,022,408

COMBINATION EXO/ENDOCERVICAL SAMPLER

Reza S. Mohajer, 3115 W. Shore Dr., Orchard Lake, Mich. 48033

Filed Apr. 23, 1990, Ser. No. 512,840
Int. Cl.^{5} A61B *10/00*
U.S. Cl. 128—756 **13 Claims**



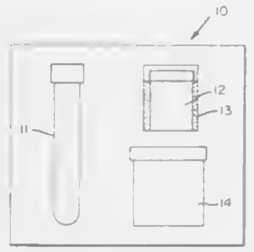
1. A combination exo-endocervical sampler comprising:
an elongated handle portion having a free end;
a plurality of flexible flags each of said flags having a length "L", a height "H" and a width "W" such that W is less than L or H, said flags disposed in a mutually coplanar row at an end of the handle portion opposite said free end and projecting therefrom at an acute angle for insertion into the endocervical canal; and
an exocervical filament disposed at a location on said handle portion medial of said row and proximate thereto, said filament having a length substantially greater than the length of any of said flags and having sufficient stiffness to act as a stop when the sampler is inserted.

5,022,409

ORAL RINSE IMMUNOGLOBULIN COLLECTION KIT FOR IMMUNOASSAY AND METHOD THEREOF

Andrew S. Goldstein, Portland; Thomas R. Thieme, Independence, and Stefan Gavojdea, Tigard, all of Oreg., assignors to Epitope, Inc., Beaverton, Oreg.

Filed Sep. 21, 1989, Ser. No. 410,401
Int. Cl.^{5} A61B *5/00*
U.S. Cl. 128—760 **10 Claims**



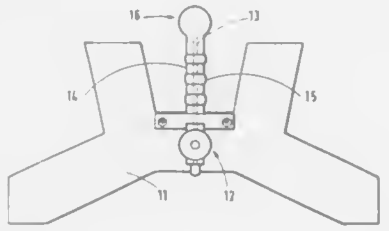
1. A method of collecting immunoglobulins for immunological testing comprising the steps of:
(a) rinsing the oral cavity of a patient with a pharmaceutically acceptable hypertonic solution, wherein the hypertonic solution is in an effective concentration to recover a high concentration of immunoglobulin, and
(b) collecting a specimen of the hypertonic solution after rinsing for analysis by immunological testing.

5,022,410

NON-INVASIVE MONITORING OF CARDIAC OUTPUT

Peter R. Hall, Dyfed, Wales; Jack Trebearne, London, England; Dawood Parker, and Paul Clancy, both of Wales, Wales, assignors to Abbey Biosystems Limited, Swansea, Wales

Filed Oct. 4, 1988, Ser. No. 253,007
Claims priority, application United Kingdom, Oct. 8, 1987, 8723621
Int. Cl.^{5} A61B *5/02, 8/00*
U.S. Cl. 128—695 **13 Claims**



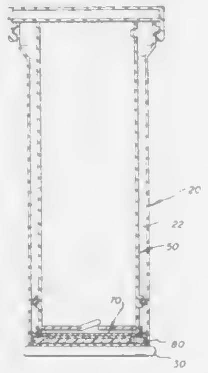
1. A device for monitoring a function of the body comprising
a selectively lockable flexible elongate arm including a series of inter-engaging segments each of which has a cylindrical bore therethrough, and a continuous cable threaded through the respective bores of said segments,
a tensioning device mounted at one end of said cable for selectively tensioning said segments with respect to said cable so as to fix the relative position of the segments,
a biomedical sensing transducer adapted to be placed in contact with the body and mounted on one end of said flexible elongate arm, and
a mounting device, having at least one surface for engaging an exterior region of the body in stable disposition, connected to the other end of said flexible elongate arm.

5,022,411

MODULAR FLUID TESTING DEVICE

Raouf A. Guirguis, Rockville, Md., assignor to La Mina Ltd., British Virgin Isls.

Continuation-in-part of Ser. No. 408,547, Sep. 18, 1989. This application Nov. 22, 1989, Ser. No. 440,117
Int. Cl.^{5} A61B *5/00*
U.S. Cl. 128—771 **24 Claims**



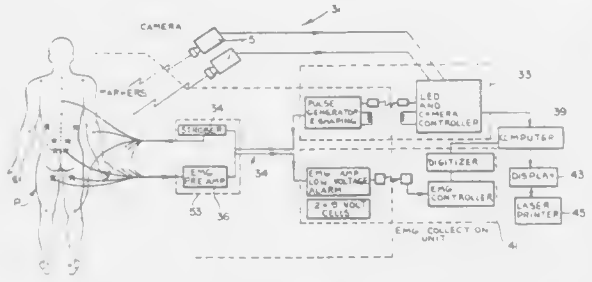
1. An apparatus for testing biological fluid for the presence of specific antigens comprising a tubular container adapted to receive a biological fluid, piston means slidably mounted in said tubular container, said piston means including valve means allowing fluid to flow therethrough, a testing assembly removably mounted to and transported by said piston means, said testing assembly comprising a base member support means, and immobilized ligand means mounted on said base member.

5,022,412

CONNECTION KIT FOR SKIN-MARKERS AND ELECTRODES

Serge Gracovetsky, St Lambert, and Rudolf U. Frost, Montreal, both of Canada, assignors to Diagnospine Research Inc., Montreal, Canada

Filed Sep. 21, 1988, Ser. No. 247,360
Claims priority, application Canada, Oct. 5, 1987, 548628
Int. Cl.^{5} A61B *5/103*
U.S. Cl. 128—781 **8 Claims**



1. A connection kit for use with an equipment for non-invasive evaluation of the flexibility of the spine of a patient, said equipment comprising a plurality of separate, dot-sized skin-markers each consisting of at least one LED attachable to the skin of the back of the patient and a set of surface electrodes for measuring the electromyographic (EMG) activities of the patient while he is performing a given exercice, said kit comprising:
a) a connection box electrically connectable to a monitoring equipment in such a manner as to let the patient free to move in the given area, said connection box (a) incorporating an EMG-amplifier and transmitter provided with a 25-pin connector outlet and a strober provided with two 25-pin connector outlets,
h) a harness to be worn by the patient, said harness comprising a chest-piece and means on the chest piece to detachably mount the connection box (a);
c) a set of primary conductor cables each having one end electrically connectable to the connection box and at least one other end provided with a connecting plug; said set of primary cables including:
one primary Y-shaped EMG multi-wired conductor cable having its one end provided with a 25-pin connector connectable to the outlet of the EMG-amplifier and transmitter and its two other ends each provided with a 8-contact plug, said one primary EMG conductor cable also including a grounding wire directly connectable to the patient skin; and
two primary skin-marker conductor cables each having an outlet divided into three multi-wired branches, the one end of each of said primary skin-marker conductor cables being provided with a 25-pin connector connectable to one of the outlets of the strober, each of the other ends of said primary skin-marker conductors being provided with a 8-contact connecting plug;
d) means for detachably fixing each of said other ends of said primary cables (a) at a given height onto the patient's back; and
e) another set of secondary conductor cables, said other set including,
two secondary EMG conductor cables each having an outlet divided into four bi-wired branches, the one end of each of said secondary EMG conductor cables being provided with a 8-contact plug connectable to the corresponding plug of one of the other ends of the primary EMG conductor cables, each of the other end of said secondary EMG conductor cables being provided with a pair of terminal clamps for fixation to an EMG surface-electrode; and
six secondary skin-marker conductor cables each having an outlet divided into four bi-wired branches, the one end of each of said secondary skin-marker conductor cables being provided with a 8-contact plug connectable to the corresponding plug of one of the other ends of the primary skin-marker conductor cables, each of the other ends of said secondary skin-marker conductor cables being electrically connected to at least one Led to energize the same.

5,022,413

INTRALENTICULAR CATARACT SURGICAL PROCEDURE

Joseph Spina, Jr., 767 Woodlea Rd., Rosemont, Pa. 19109, and Michael K. Weibel, 120 Gallows Hill Rd., West Redding, Conn. 06896

Filed Apr. 21, 1988, Ser. No. 184,333
Int. Cl.^{5} A61B *19/00*
U.S. Cl. 128—898 **44 Claims**

1. In a method for treating the lens of an eye in vivo for the removal of lenticular tissue from the lens capsule containing said tissue by introducing within said lens capsule a lenticular tissue dispersing agent, allowing dispersion of said lenticular tissue to occur, and evacuating dispersed lenticular tissue from said lens capsule, the improvement which comprises treating said lenticular tissue by exposure to laser energy, thereby to promote disruption of cellular adhesion in, and dissemination of said dispersing agent through said lenticular tissue, said dispersing agent effecting dispersion of said laser-treated tissue.

5,022,414

TISSUE SEPARATOR METHOD

George H. Muller, Ann Arbor, Mich., assignor to Joseph J. Berke, Detroit, a part interest; A.I.R. Foundation, Ann Arbor and Detroit Neurosurgical Foundation, Detroit, all of, Mich.

Continuation-in-part of Ser. No. 582,971, Nov. 21, 1983, Pat. No. 4,709,697, which is a continuation of Ser. No. 214,006, Dec. 9, 1980, abandoned, which is a continuation-in-part of Ser. No. 103,206, Dec. 13, 1979, Pat. No. 4,357,940. This application Jun. 16, 1986, Ser. No. 874,445
Int. Cl.^{5} A61B *17/00*
U.S. Cl. 128—898 **24 Claims**

1. A method of use of a tissue separator having a tip which floats relative to the rest of the tissue separator comprising the step of directing a fluid medium under pressure from the tissue separator at the tissue while floating the tip of the tissue separator relative to the rest of the tissue separator on the fluid medium.

5,022,415

MACHINE FOR SIMULTANEOUSLY MANUFACTURING TWO CONTINUOUS CIGARETTE RODS

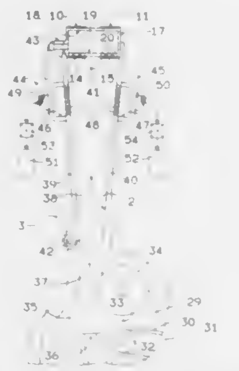
Bruno Belvederi, S.Martino Di Monte S.Pietro; Franco Ghini, and Davide Dall'Osso, both of Bologna, all of Italy, assignors to G.D. Societa per Azioni, Bologna, Italy

Filed Dec. 6, 1989, Ser. No. 446,976
Claims priority, application Italy, Dec. 6, 1988, 3693 A/88
Int. Cl.^{5} A24C *5/18*
U.S. Cl. 131—84.1 **8 Claims**

1. A machine (**1**) for simultaneously manufacturing two continuous cigarette rods (**5,6**), whereby a continuous stream of shredded tobacco particles is fed to the bottom end of conveying means by which said stream is fed onto a pair of parallel suction conveyors (**10,11**) traveling in a given direction, for the formation on each said conveyor of a layer of tobacco (**55,56**) of given thickness; characterized by the fact that said conveying means comprises an upright (**3**) defining internally a single upflow channel (**38**) extending through the entire cross section of said upright (**3**) for conveying a single stream of shredded tobacco defined laterally by two spaced apart walls (**39,40**) extending in the traveling direction of said conveyors (**10,11**),

VOL
1127
ISS
2
JE
11
1991
UMI

closed at the top by said two suction conveyors (**10,11**) and by a separating member (**41**) located between the same, and also comprising pneumatic means (**44,45**) for regulating the tobacco stream fed onto said conveyors (**10,11**).



5,022,416

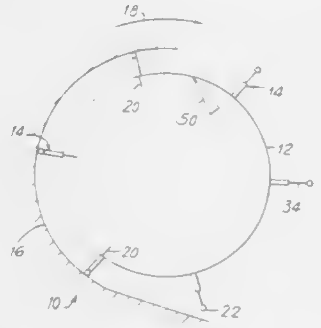
SPRAY CYLINDER WITH RETRACTABLE PINS

John Watson, Doswell, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Feb. 20, 1990, Ser. No. 481,949

Int. Cl.^{5} A24B *3/10, 3/12, 3/18*

U.S. Cl. 131—305 **10 Claims**



1. A rotating spray cylinder usable for such purposes as blending, steam-conditioning, drying, and applying flavorants to tobacco placed within it comprising:
   - a plurality of retractable pins mounted on the wall of the cylinder; and
   - means for alternately extending and retracting each pin into and out of the interior of the cylinder as the cylinder rotates in order to help convey the material within the cylinder while the pin is extended.

5,022,417

INDIVIDUALIZED FLOSSING MOUTHPIECE ASSEMBLY AND METHOD OF PREPARING AND USING SAME

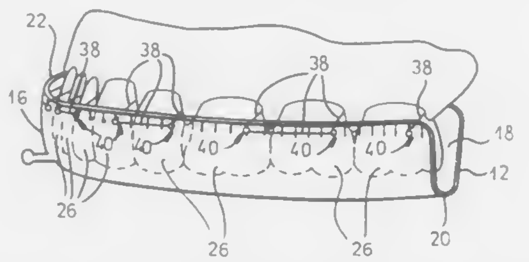
Peter D. Cimini, 120 Northwood Rd., Newington, Conn. 06111

Filed May 29, 1990, Ser. No. 529,469

Int. Cl.^{5} A61C *15/00*

U.S. Cl. 132—323 **18 Claims**

1. An individualizable flossing mouthpiece for use in simultaneously flossing a plurality of spaces between adjacent pairs of teeth, said mouthpiece being a channel shaped member including an outer wall portion, an inner wall portion and a web portion joining said wall portions, said wall portions having a gap therebetween and extending from said web portion to free edges and being curved in plan view, said mouthpiece being sized and shaped to receive a set of teeth loosely in said gap, said outer wall portion and said inner wall portion being provided respectively with outer and inner series of identical closely spaced slots adapted to receive dental floss therein, each said slot of said outer series having an open end in open communication with said free edge of said outer wall portion and each said slot of said inner series having an open end in open communication with said free edge of said inner wall portion, the distance between adjacent ones of said slots of said outer and inner series being less than the width of an average tooth.



5,022,418

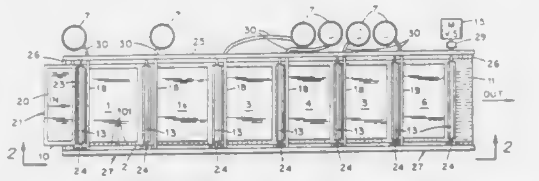
METHOD AND APPARATUS FOR PROCESSING AND TRANSPORTING SHEET MATERIALS

Quentin D. Vaughan, IV, Knoxville, Tenn., assignor to Visicon, Inc., Powell, Tenn.

Division of Ser. No. 236,032, Aug. 24, 1988, abandoned, which is a division of Ser. No. 114,561, Oct. 29, 1987, Pat. No. 4,945,934. This application Sep. 28, 1989, Ser. No. 413,747

Int. Cl.^{5} B08B *3/04*

U.S. Cl. 134—64 R **3 Claims**



1. Apparatus for transporting and processing a sheet material with a flowable process substance on opposite sides of said sheet material simultaneously comprising:
   - at least one source of flowable process substance;
   - a first pliable web having a multiplicity of protrusions defined on at least one surface thereof, said protrusions being spaced apart from one another in a substantially uniform distribution over said one surface and defining interstices therebetween for receiving said flowable process substance therein, said interstices being in fluid communication with adjacent interstices thereby defining fluid communication channels over substantially the entire area of said surface;
   - a second pliable web having a multiplicity of protrusions defined on at least one surface thereof, said protrusions being spaced apart from one another in a substantially uniform distribution over said one surface and defining interstices therebetween for receiving said flowable process substance therein, said interstices being in fluid communication with adjacent interstices thereby defining fluid communication channels over substantially the entire area of said surface, said webs being disposed in surface-to-surface relationship with their respective protrusions facing each other to define a path therebetween along which said sheet material can move;
   - means delivering a controlled volume of said flowable process substance to each of said webs, said volume being sufficient to substantially fill said interstices of each web; and
   - means transporting said sheet material in surface-to-surface contact with, relative to, and between said webs with said protrusions of said webs in contact with opposite surfaces of said sheet material whereby said sheet material is caused to contact said process substance disposed in said interstices and said process substance is caused to flow within and between said interstices and said process substance in said reservoirs is agitated thereby transferring process substance which has contacted said sheet material away from said sheet material and causing such process substance to be mixed with other process substance in said reservoirs.

5,022,419

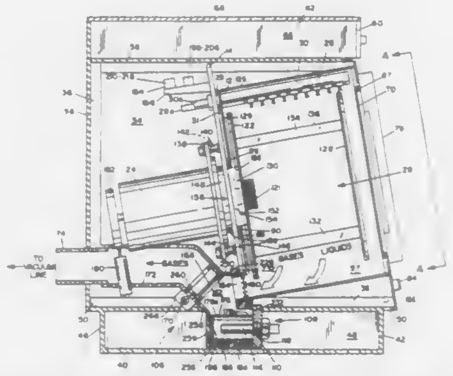
RINSER DRYER SYSTEM

Raymon F. Thompson, and Aleksander Owczarz, both of Kalispell, Mont., assignors to Semitool, Inc., Kalispell, Mont.

Filed Apr. 27, 1987, Ser. No. 42,951

Int. Cl.^{5} B08B *3/02*

U.S. Cl. 134—102 **44 Claims**



39. A semiconductor processor for processing semiconductor wafers, substrates, disks and similar units, comprising:
   - a housing;
   - a mounting plate received within the housing;
   - motor means for rotatably driving a rotatable shaft;
   - a rotor received within the housing, the rotor being adapted for holding at least one of the units for processing;
   - rotor mounting means for mounting the rotor to the rotatable shaft for rotation therewith at a location forward of the mounting plate;
   - at least one nozzle spray manifold means extending forward of the mounting plate and positioned radially of the rotor for spraying the at least one unit received by the rotor;
   - a detachable bowl detachably mounted to the mounting plate in a manner allowing ready removal of the bowl from the housing, the bowl when so mounted being positioned about the shaft, the nozzle spray manifold means, and the rotor; the bowl including drain means for draining fluid therefrom;
   - securing means for detachably securing the bowl relative to the mounting plate;
   - first sealing means interposed between the bowl and the mounting plate for creating a substantially fluid tight seal therebetween when the bowl is mounted to the mounting plate for preventing fluid from leaking to within the housing; and
   - a door for sealing the bowl.

5,022,420

LAWN MOWER SHADE APPARATUS

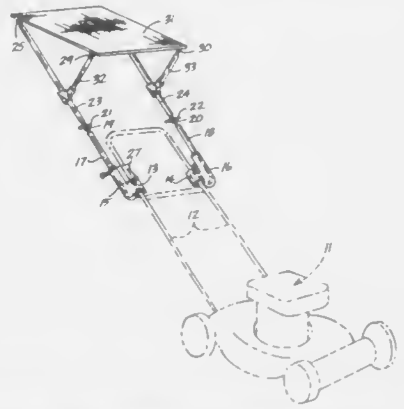
Walter L. Brim, 2825 S. Washington Ave. #256, Titusville, Fla. 32780

Filed Jul. 19, 1990, Ser. No. 554,566

Int. Cl.^{5} E04H *15/06*

U.S. Cl. 135—88 **1 Claim**

1. A lawn mower shade apparatus in combination with a lawn mower wherein the lawn mower includes spaced handle rods, and
   - the apparatus includes a first "U" shaped mount and a second "U" shaped mount with each "U" shaped mount mounted to a respective handle rod of the lawn mower, and
   - each "U" shaped mount includes a fastener directed through each first and second "U" shaped mount to secure an associated rod therewithin, and
   - the first and second "U" shaped mount each respectively include a respective first and second sleeve, the first and second sleeve arranged coaxially parallel to and offset relative each respective first and second "U" shaped mount, and
   - each respective first and second sleeve includes a framework mounted to the first and second sleeve, and
   - the framework including a canopy overlying the framework, and
   - wherein the framework includes a first and second support rod, the first and second support rod respectively telescopingly received within the first and second sleeve, and the first and second sleeve including a sleeve fastener to selectively secure the first and second support rod relative to the first and second sleeve, and
   - wherein the first and second support rod each include a rear terminal and spaced from the respective first and second sleeve, and the rear terminal end of the first support rod includes a first pivot connection and the second support rod includes a second pivot connection mounted to the rear terminal end of the second support rod, and further including a first and second canopy rod with a forward end of the first canopy rod mounted to the first pivot connection and at a forward end of the second canopy rod mounted to the second pivot connection to permit pivotment of the first canopy rod relative to the first support rod and pivotment of the second canopy rod relative to the second support rod, and
   - wherein the framework further includes a third pivot connection mounted to a rear terminal end of the first canopy rod and a fourth pivot connection mounted to a rear terminal end of the second canopy rod, and the third pivot connection simultaneously mounted pivotally to the canopy framework wherein the third and fourth pivot connections are mounted to rear corner portions of the canopy framework, and a fifth and sixth pivot connection mounted to forward corner portions of the canopy framework, and a third canopy rod mounted to the fifth pivot connection and a fourth canopy rod mounted to the sixth pivot connection at upper terminal ends of the respective third and fourth canopy rods, and a lower terminal end of the third canopy rod including a first "U" shaped slider, and a lower terminal end of the fourth canopy rod including a second "U" shaped slider, the third "U" shaped slider selectively securable to the second "U" shaped slider selectively securable to the second canopy rod, and
   - wherein each "U" shaped slider includes spring biased legs to selectively engage a respective first and second canopy



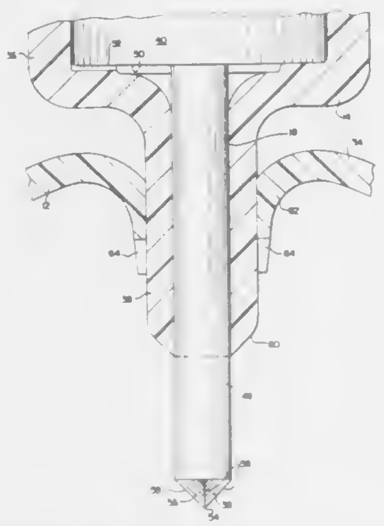
VOL
1127
ISS
2
JE
11
1991
UMI

rod by the respective first and second "U" shaped slider, and

wherein the canopy framework includes a canopy mounted and fixedly secured interiorly of the canopy framework and directed coextensively therewithin.

5,022,421
FLUID CONNECTION METHOD AND ASSEMBLY

Dwight N. Johnson, 6327 Chorlito Dr., Carlsbad, Calif. 92008
Filed Jan. 26, 1990, Ser. No. 471,229
Int. Cl.^{5} F16K *43/00, 51/00*
U.S. Cl. 137—15 11 Claims



1. A method for assembling a fluid connection between a conduit having a wall and a fluid connector having a smoothly tapered hollow nose without threads, said method comprising the steps of:

mounting the fluid connector on a tool having a punch pin with a sharp, pointed tip extending through and beyond the hollow nose;

moving the tool in a first increment of movement toward the conduit to pierce the conduit wall with the pointed tip of the tool and force the punch pin through the conduit wall in order to make a hole in the wall without dislodging material from the wall;

advancing the tool in a second increment of movement toward the conduit to push the hollow nose through the conduit wall with a force imparted substantially only by the tool in order to enlarge the hole in the wall while inserting the nose into the interior of the conduit and to form a seal between the nose portion and the enlarged hole;

supporting the interior of the nose with the punch pin during said advancing step; and;

retracting the tool away from the conduit to withdraw the punch pin from the fluid connector in order to leave the connector in place on the conduit with the nose extending through the enlarged hole.

5,022,422
BALL VALVE

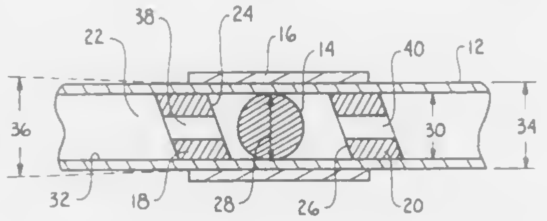
Giorgio di Palma, Ramona, Calif., assignor to IMED Corporation, San Diego, Calif.
Filed Jul. 30, 1990, Ser. No. 559,641
Int. Cl.^{5} F16K *31/00*
U.S. Cl. 137—15 5 Claims

1. A method for externally controlling fluid flow through a deformable tube which comprises the steps of:

(a) positioning a ball within the lumen of said tube;

(b) bonding a resilient sheath to said tube in the vicinity of said ball;

(c) positioning a first hollow insert and a second hollow insert in the lumen of said tube respectively upstream and

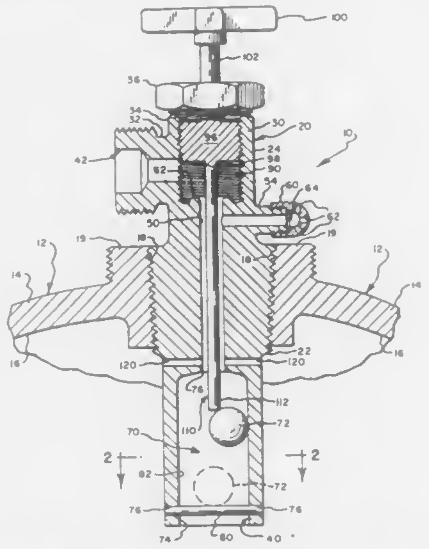


downstream of said ball to respectively limit upstream and downstream movement of said ball; and

(d) mechanically deforming said sheath to allow selective fluid flow past said ball.

5,022,423
SAFETY VALVE

Franklin J. Britt, 3744 Hartland Rd., Gasport, N.Y. 14067
Filed Apr. 11, 1990, Ser. No. 508,282
Int. Cl.^{5} F16K *17/40, 24/04;* **F17C** *13/12*
U.S. Cl. 137—68.1 9 Claims



1. A combination safety and service valve for a high pressure tank, said valve comprising:

a body having a sealing portion positioned within the tank and an external portion positioned externally of the tank, said sealing portion including an inlet port and an outlet port, said body having a flow passage extending between said inlet and outlet ports so that a portion of said flow passage is provided by said sealing portion and another portion of said flow passage is provided by said external portion of said body, said portion of said flow passage provided by said sealing portion including a chamber, said chamber having an inlet end and an outlet end, said outlet end having a valve seat positioned within the tank opening between an inlet and an outlet of the tank opening;

a valve element being loosely received by said chamber and adapted to engage said valve seat to thereby close said flow passage, said valve element being of such size that when the fluid pressure at said chamber inlet end is higher than the fluid pressure at said chamber outlet end, said valve element is biased into sealing engagement with said valve seat of said chamber and substantially all of said valve element being disposed within the tank opening between said inlet and said outlet of the tank opening;

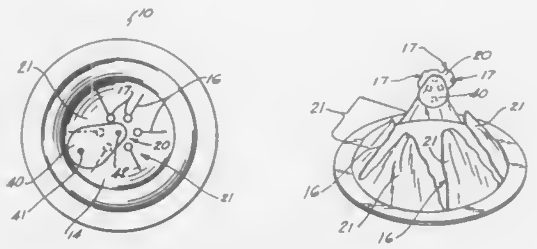
an actuatable valve member connected to said external portion of said body for opening and closing said flow passage;

stop means associated with said valve member for preventing said valve element from engaging said valve seat in all open positions of said valve member until said external portion of said body is severed from said sealing portion; and

bleed passage means in said sealing portion of said body for placing said tank in fluid communication with said flow passage between said valve seat and said valve member, said bleed passage means allowing release of pressure in said tank in a safe manner if said external portion of said body is severed from said sealing portion.

5,022,424
TENSION LOADED COMPOSITE RUPTURE DISK

John W. Reynolds, Bixby; Bobby H. Burton, and Jerry W. Kays, both of Tulsa, Okla., assignors to Oklahoma Safety Equipment Co., Broken Arrow, Okla.
Filed Oct. 2, 1990, Ser. No. 591,565
Int. Cl.^{5} F16K *17/40*
U.S. Cl. 137—68.1 10 Claims



1. A composite rupture disk, comprising:

a) an annular top disk section having a central portion and a plurality of circumferentially spaced, radial slits, each terminating a distance from the central portion, leaving a generally circular, uncut center having a size that determines at least in part, the burst pressure of the disk apparatus, the slits forming therebetween a plurality of disk petals with sharp edges that can separate upon rupture;

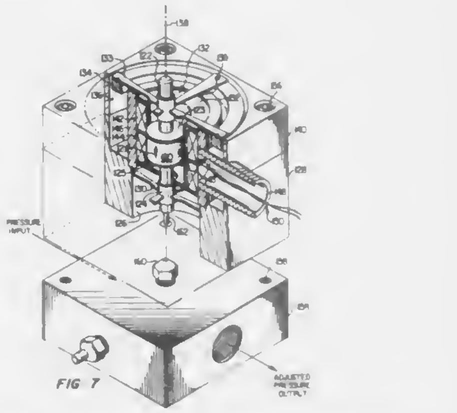
b) an annular, uncut bottom disk seal member that can load the top disk section during use;

c) a slit-slot annular disk member positioned between the top section and disk seal member forming a protective interface therebetween so that the sharp edges can not mechanically damage the uncut bottom disk seal member; and

d) means defining a tensile load carrying member that increases the thickness of the disk along at least one petal and extending from the top section central portion to the top section periphery, for securing the center of the top section to one of the petals of the top disk after disk rupture so that the center is not lost in the flow stream passing through the ruptured disk.

5,022,425
SENSITIVE ELECTRICAL TO MECHANICAL TRANSDUCER

Robert C. Prescott, N. Marshfield, Mass., and Robert J. Robinson, Derry, N.H., assignors to Dresser Industries Inc., Dallas, Tex.
Division of Ser. No. 289,224, Dec. 23, 1988, Pat. No. 4,926,896. This application Mar. 28, 1990, Ser. No. 500,524
Int. Cl.^{5} G05D *16/00*
U.S. Cl. 137—82 19 Claims



1. An electrical to mechanical transducer, comprising:

a body structure having a bore therein;

a winding fixed within the bore of said body, said winding being centered about an axis and providing a magnetic field when energized;

a permanent magnet mounted for movement along a direction parallel to said axis in response to an influence by the magnetic field;

a first flexible guide support for supporting said magnet with respect to said body to allow slight axial movement;

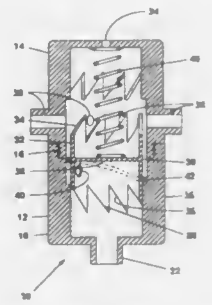
a second flexible guide support for providing support with respect to said magnet;

a counterbalance attached to said second flexible guide support at a periphery thereof, said second guide support being mounted so that axial vibrational movement of said magnet is offset by corresponding axial vibrational movement of said counterbalance to result in no net movement of the magnet due to axial vibrational forces; and

an arm mounted for movement in association with said magnet to provide a mechanical output.

5,022,426
PRESSURE OPERATED SEQUENCING VALVE

Andrew P. Fischer, 1110 Elm Ave., Modesto, Calif. 95351
Filed Jul. 5, 1990, Ser. No. 548,570
Int. Cl.^{5} F16K *11/07*
U.S. Cl. 137—119 10 Claims



1. A sequencing valve comprising:

a generally cylindrical housing having at least one inlet port entering adjacent one end of said housing and having a

VOL
1127
ISS
2
JE
11
1991
UMI

plurality of outlet ports spaced evenly about the periphery of said housing adjacent the opposite end from said inlet port,
- a generally cylindrical piston located within said housing and slideable between a raised position and a lower position, said piston having an opening formed in the side wall thereof positioned to communicate with said outlet ports when said piston is in its raised position and having a wall closing said piston above said opening,
- sealing means carried by said piston to permit fluid from said opening to flow only to one adjacent outlet port,
- resilient means normally urging said piston to its lower position, and
- stepping means responsive to movement of said piston to its raised and lower positions to rotate said opening to advance to the next adjacent outlet port.

5,022,427

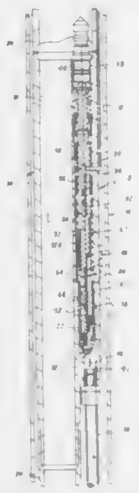
ANNULAR SAFETY SYSTEM FOR GAS LIFT PRODUCTION

Ronald K. Churchman, Carrollton; Michael W. Meaders, and Nam Van Le, both of Lewisville, all of Tex., assignors to Otis Engineering Corporation, Carrollton, Tex.

Filed Mar. 2, 1990, Ser. No. 487,398

Int. Cl.^{5} F04F *1/20*

U.S. Cl. 137—155 12 Claims



1. A lift gas safety valve assembly comprising, in combination:
- a valve body having a longitudinal bore defining a lift gas flow passage, said valve body being intersected by a first opening therethrough defining a lift gas inlet port and being intersected by a second opening therethrough defining a lift gas discharge port, and having a valve seat formed on said valve body in flow registration with, the lift gas flow passage;
- a surface controllable power actuator assembly attached to said valve body, said power actuator assembly including a valve stem disposed within said lift gas flow passage for extension and retraction relative to said valve seat in response to the application and removal of a control signal to said actuator assembly, and a discharge annulus being formed in said valve body intermediate said valve stem and said valve body; and,
- a compound valve closure assembly mounted onto said valve body for selectively interrupting and establishing fluid communication between said lift gas flow passage and said lift gas discharge port, said compound valve closure assembly including a primary valve closure member, an auxiliary valve closure member and a bypass flow conductor defining a bypass flow passage through said primary valve closure member, said primary valve closure member being mounted onto said valve stem for movement from a seated position on said valve seat to an unseated position in response to retraction and extension of said valve stem, respectively, and said auxiliary valve closure member being mounted on said valve stem for movement from a seated position on said primary valve closure member in which said bypass flow passage is closed, to an unseated position in which said bypass flow passage is opened in response to retraction and extension of said valve stem, respectively.

5,022,428

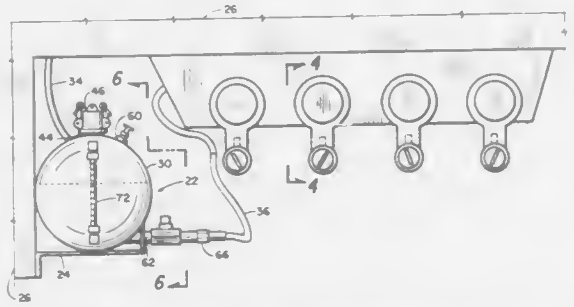
ADDITIVE INJECTION SYSTEM

Edward J. Vilines, Tulsa, Okla., assignor to Aviation Petroleum Inc., Joplin, Mo.

Filed Jul. 3, 1990, Ser. No. 548,150

Int. Cl.^{5} B67D *5/04*

U.S. Cl. 137—209 9 Claims



1. An apparatus for injecting a chemical additive fluid into a major fluid flow stream flowing through a loading line, comprising:
- a source of the major fluid flowing through the loading line in communication with the loading line, the major fluid comprising fuel fluid,
- a reservoir for treated fluid comprising a fuel tank mounted on a transport component, the treated fluid comprising a portion of the major fluid with a portion of chemical additive fluid added thereto,
- the loading line attached to the reservoir for treated fluid for providing means for transferring fluid from the source of the major fluid to the reservoir for treated fluid,
- a high pressure container for the chemical additive fluid, the container having
  - an inlet for loading chemical additive fluid,
  - an outlet providing means for communication of the container with the loading line, and
  - an air inlet providing means for communication of the container with an air pressure supply to provide pressurization of the container for driving chemical additive fluid into the loading line at a higher pressure than the pressure of the major fluid flow stream, the air inlet including
    - an air pressure regulator,
    - an air pressure shutoff valve, and
- the air pressure supply includes an air supply line in communication with the air inlet of the container, and the air supply line includes an air filter.

5,022,429

VALVE ASSEMBLY FOR PLUMBING FIXTURE

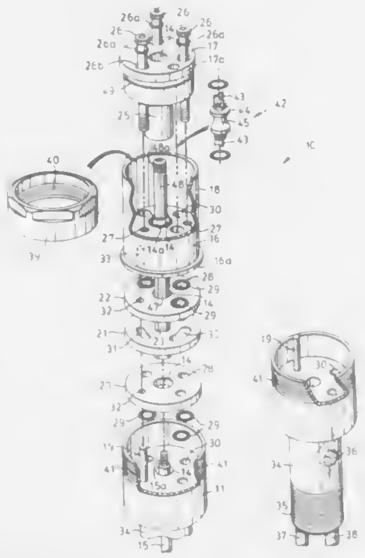
Pietro Rollini, Novara, Italy, and Domenic Luisi, Woodbridge, Canada, assignors to Rubinet Brass Canada Limited, Woodbridge, Canada

Continuation of Ser. No. 295,080, Jan. 9, 1989, abandoned. This application Oct. 5, 1989, Ser. No. 417,437

Claims priority, application Canada, Dec. 20, 1988, 586402

Int. Cl.^{5} E03C *1/01;* F16K *11/02*

U.S. Cl. 137—218 20 Claims



10. A diverter valve assembly for mounting on a plumbing fixture comprising:
- a body having a fluid inlet and corresponding flow paths and a plurality of fluid outlets and corresponding flow paths,
- a single operating means mounted in said body for rotational and reciprocal axial movement for fluid flow and drain control, which on rotational movement permits selective flow of fluid from said fluid inlet to at least one of said fluid outlets and on reciprocal axial movement opens and closes a waste drain in the fixture;
- valve means for fluid flow control comprising at least three vertically aligned, stacked discs in said body, at least one of said discs being rotatable by said operating means relative to the other discs; and
- apertures in said discs which are alignable in respective positions of relative rotation of said discs to provide selective flow paths for fluid flow from said inlet to at least one of said outlets.

5,022,430

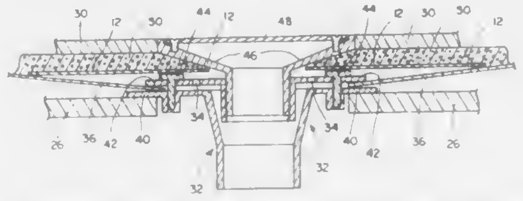
DRAINAGE DISK FOR PROTECTING WEEP CHANNELS OF MASONRY FLOOR DRAIN CONSTRUCTION

Lonnie C. Degooyer, 349 E. 5600 South, Murray, Utah 84107

Filed Jan. 9, 1990, Ser. No. 462,574

Int. Cl.^{5} F16L *5/00*

U.S. Cl. 137—362 7 Claims



1. A drainage disk for placement around a drain opening in a floor of the type comprising a mortar layer, wherein the drainage disk is positioned between the floor pan and the mortar which is laid over the floor pan, said drainage disk comprising
- a disk-shaped piece of relatively thin sheet material;
- a central opening in the disk-shaped piece;
- a plurality of elongate valleys depressed in said disk-shaped piece, said valleys having inner and outer ends, with the valleys extending radially outwardly from the central opening in said disk-shaped piece; and
- a plurality of sharp pointed projections extend inwardly a uniform distance toward the center of said opening from the inner ends of said valleys to form a serrated periphery for the central opening in said disk-shaped piece.

5,022,431

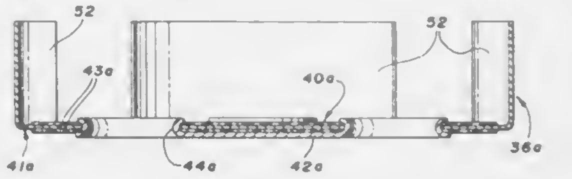
EXHAUST GAS RECIRCULATION VALVE ASSEMBLY

Thaddeus J. Grey; Raymond E. Kirton, both of Rochester; George A. English, Spencerport; Michael D. Liggett, Rochester; Karen M. Meyer, Avon, and Charles J. Barker, Rochester, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 415,932, Sep. 27, 1989, abandoned. This application Mar. 26, 1990, Ser. No. 498,584

Int. Cl.^{5} F16L *7/00*

U.S. Cl. 137—375 7 Claims

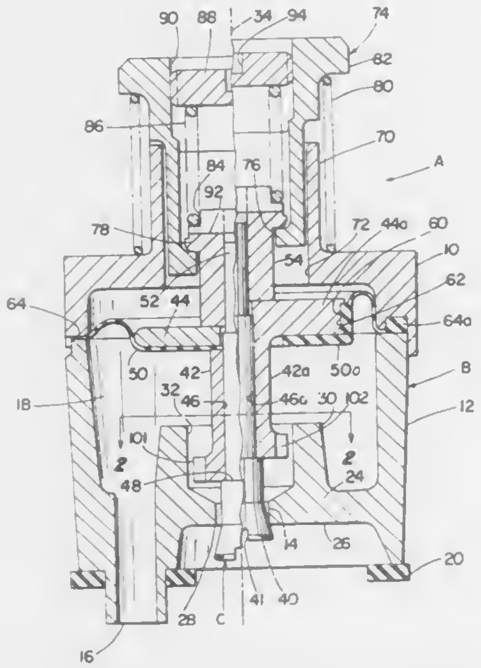


1. An exhaust gas recirculation valve assembly comprising:
- a base having an exhaust gas chamber with an inlet opening, an outlet opening, and a valve seat surrounding one of said openings;
- a cover closing said exhaust gas chamber, said cover having upper and lower surfaces with an opening generally aligned with said valve seat;
- a heat deflector assembly disposed between said lower surface of said cover and said exhaust gas chamber to lower the temperature of said cover, said heat deflector assembly comprising an insulative gasket member seated in face-to-face relationship with said lower surface of said cover exposed to said exhaust gas chamber, and extending beyond said chamber to form a seal between said cover and said base, and a heat deflector member fixedly attached, in face-to-face engagement, to the lower surface of said gasket member exposed to said exhaust gas chamber and having a perimeter configuration corresponding to the interior of said exhaust gas chamber and not extending beyond said chamber, said assembly having an opening generally aligned with said valve seat;
- a valve stem extending through said cover opening;
- a valve member mounted adjacent said valve seat at a first end of said valve stem; and
- an actuator operable on a second end of aid valve stem to operate said valve stem reciprocably into and out of engagement with said valve seat;
- said heat deflector member useful to reduce heat transfer from said exhaust gas chamber to said gasket member and to prevent impingement of exhaust gases, flowing through said exhaust gas chamber, on said insulative gasket member.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,432
BUBBLER VALVE

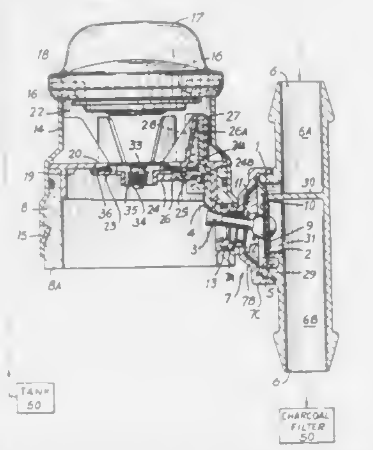
Brian W. Engelbach, Columbus, Ohio, assignor to Therm-O-Disc, Incorporated, Mansfield, Ohio
Filed Mar. 3, 1989, Ser. No. 318,253
Int. Cl.⁵ G05D *16/08*
U.S. Cl. 137—495 7 Claims



1. A valve including a valve housing having inlet and outlet ports therein, said inlet port having an inlet pressure side and an opposite side, said inlet port being integral with said valve housing and having a seat adjacent said inlet pressure side, poppet means movable into and out of engagement with said seat for selectively closing and opening said inlet port, said poppet means and said seat being cooperative with one another for completely blocking flow through said inlet port when said poppet means is in engagement with said seat, said poppet means being positioned for movement toward said seat responsive to inlet pressure acting thereon, first yieldable biasing means for biasing said poppet means into engagement with said seat, manually operable means for releasing the biasing force of said first biasing means on said poppet means, second yieldable biasing means for biasing said poppet means off said seat responsive to release of the biasing force of said first biasing means, both of said first and second yieldable biasing means being located on said opposite side of said inlet port, a pressure chamber between said inlet and outlet ports, pressure responsive means connected with said poppet means and being responsive to the pressure in said pressure chamber for adjusting the position of said poppet means relative to said seat, the position of said poppet means responsive to pressure in said pressure chamber being completely independent of and being completely unaffected by said first yieldable biasing means when the biasing force of said first yieldable biasing means on said poppet means is released by operation of said manually operable means so that only said second yieldable biasing means applies force to said poppet means in said open position thereof, said pressure responsive means including a diaphragm and said valve including a guide sleeve on said opposite side of said inlet port, and said pressure responsive means having guide means thereon cooperating with said guide sleeve for guiding movement of said pressure responsive means and of said poppet means.

5,022,433
SHUT-OFF VALVE

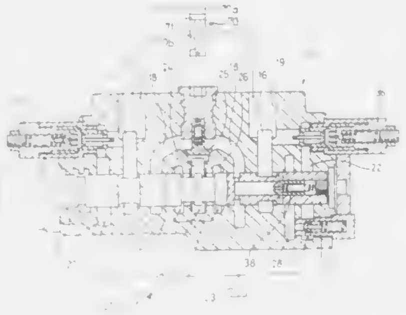
Jaroslav Jansky, Rosenheim, and Angelika B. M. Temmesfeld, Raubling, both of Fed. Rep. of Germany, assignors to Temtech Fahrzeugtechnik Entwicklungsgesellschaft MBH, Fed. Rep. of Germany
Filed Jun. 9, 1989, Ser. No. 364,241
Claims priority, application Fed. Rep. of Germany, Jun. 9, 1988, 3819689
Int. Cl.⁵ B65B *31/06;* **F16K** *24/00*
U.S. Cl. 137—588 8 Claims



1. A shut-off valve in a gas line leading to a fuel tank of a motor vehicle, comprising: a valve seat and a valve body which is movable by means of the opening and closing movement of a fuel tank lock; said valve body including a flexible diaphragm which is pretensioned against the valve seat; an actuating lever having a free end being fastened at the side of the diaphragm remote of the valve seat, the free end of the actuating lever communicating with a tappet which is movable transversely relative to the longitudinal axis of the actuating lever and is coupled with the fuel tank lock; said valve seat being enclosed by an annular space which can be completely covered by the diaphragm, wherein the annular space communicating with a branch of the gas line and the interior space of the valve seat communicates with another branch of the gas line.

5,022,434
DIRECTIONAL CONTROL VALVE

Toshiaki Tsukimoto, Zama, Japan, assignor to Toshiba Machine Co., Ltd., Tokyo, Japan
Filed Jan. 24, 1990, Ser. No. 469,187
Claims priority, application Japan, Jan. 27, 1989, 1-7659[U]
Int. Cl.⁵ F15B *13/04*
U.S. Cl. 137—596.2 1 Claim

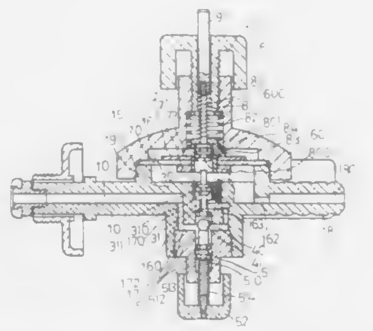


1. In a directional control valve including a casing having a bore therein, a pair of inlet/outlet passages connected to a pair of inlet/outlet apertures, a U-shaped supply passage disposed between said inlet/outlet passages, a pair of reservoir passages between which said inlet/outlet passages are disposed and a plunger which has a plurality of land portions separated by grooves which in at least one position of said plunger establish communication between said passages, said plunger being reciprocally movable in said bore into which said inlet/outlet passages, said U-shaped passage and said reservoir passages open, such that a fluid passed through said inlet/outlet apertures, said inlet/output passages, said U-shaped supply passage and said reservoir passages is controlled in response to a reciprocating motion of said plunger;

the improvement which comprises a sub-reservoir external to the plunger through which one of said inlet/outlet passages communicates with one of said reservoir passages, said sub-reservoir being provided with an inlet which opens into said bore and an outlet, said sub-reservoir communicating with only one of said land portions in a neutral position of said plunger, and one-way valve means through which said outlet of the sub-reservoir communicates with said one of said reservoir passages and one of said inlet/outlet passages, said one-way valve means being used for controlling the fluid transmitted from said sub-reservoir from said one of said inlet/outlet passages communicating with said sub-reservoir when said plunger is moved longitudinally toward one of said inlet/outlet apertures used as an outlet aperture.

5,022,435
GAS REGULATOR WITH SAFETY DEVICE

Tsay Jaw-Shiunn, No. 40, Niu-Chou Tzu, Ling-Nan Village, Dung-Shan Hsiang, Tainan Hsien, Taiwan
Filed Aug. 24, 1990, Ser. No. 571,986
Int. Cl.⁵ F16K *17/20*
U.S. Cl. 137—613 1 Claim



1. A regulator comprising:

a main body having a circumferential side wall and a partition plate defining an upper recess and a lower recess within the main body;

a stud member attached to lower portion of the side wall of the main body to define an inlet chamber in the lower recess;

an inlet pipe attached to the side wall of the main body and defining an inlet passage communicating the inlet chamber;

a diaphram made of flexible material and mounting on top of the main body to define an outlet chamber in the upper recess;

a cap member mounting on top of the main body to secure the diaphram in position;

an outlet pipe attached to the main body and defining an outlet passage communicating the outlet chamber;

a first passage vertically formed in the partition plate to intercommunicate the inlet and outlet chambers and having an entrance at lower end;

a rubber ring attached to the entrance of the first passage;

a second passage having a vertical portion bent at a lower end to communicate the first passage and intercommunicating the inlet and outlet chambers through the entrance of the first passage;

a third passage extending through the stud member and vertically in alignment with the first passage;

a first knob member having a shank extending into the third passage and rotatably maintained in position by means of a thread engagement for a height adjustment relative to the rubber ring;

a steel ball locating in the inlet chamber and resting on top of the shank of the first knob member under the rubber ring;

a piston member slidably mounting in the first passage and adapted to be pressed to move downwardly with a lower end thereof extending through the rubber ring;

a normally-closed valve fitting in the second passage and adapted to be pressed to open;

a plate member attached to bottom of the diaphram; a second knob member having a shank extending through the cap member and rotatably maintained in position by means of a thread engagement for adjustably pressing the diaphram to deform to press the valve to open with the plate member;

a fourth passage sequentially formed in the plate member, the diaphram and the shank of the second knob member vertically in alignment with the first passage;

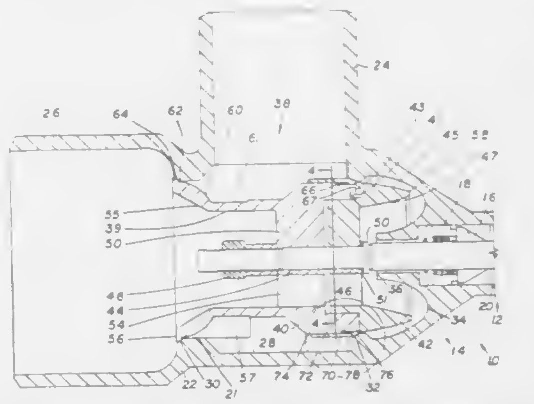
an actuating post fitting in the fourth passage and adapted to be pressed to push the piston member to move downwardly;

a pressure gauge having an inlet end communicating the inlet chamber of the main body; and

a flow rate gauge having an inlet end communicating the second passage in the main body.

5,022,436
BALANCED DUAL POPPET VALVE

Larry A. Portolese, Granger, Ind., assignor to Allied-Signal Inc., Morristown, N.J.
Filed Jan. 30, 1990, Ser. No. 472,527
Int. Cl.⁵ F16K *1/44*
U.S. Cl. 137—625.35 4 Claims



1. In a fluid flow control device having a housing with a cavity therein connected to a source of fluid under pressure through an entrance port and an outlet port connected to a fluid system, a valve means located in said cavity and an actuator for moving the valve means within said cavity to control the flow of fluid between the entrance port and outlet port in accordance with an operator input, the improvement in the valve means comprising:

a cylindrical body having a peripheral surface with a first curved section adjacent a first end and a second curved section adjacent a second end, a center hub with a series of radial spokes connected to the cylindrical body and a plurality of guide bearings located adjacent said first end to maintain said cylindrical body in substantially axial alignment within said cavity, said actuator being connected to said center hub to move said first and second

VOL
1127
ISS
2
JE
11
1991
UMI

curved sections with respect to first and second seats on said housing to allow a first quantity of fluid to flow directly between said first curved surface and first seat and a second quantity of fluid to flow between said second curved surface and second seat and through the interior of the cylindrical body, said first and second quantity of fluids thereafter being combined for distribution to said outlet port, said fluid in siad cavity acting on substantially the same area of the peripheral surface of the cylindrical body and the first and second ends of the cylindrical body to create a balance force such that the input from the actuator controls the location of the first and second curved surfaces with respect to the first and second seats, said first and second curved surfaces being a segment of a parabola to obtain a variable flow rate of non-turbulent fluid from the entrance port to the outlet port with linear movement of the cylindrical body in said housing by the actuator.

5,022,437

HOLLOW PLUG FOR BLOCKING A HEAT EXCHANGER TUBE

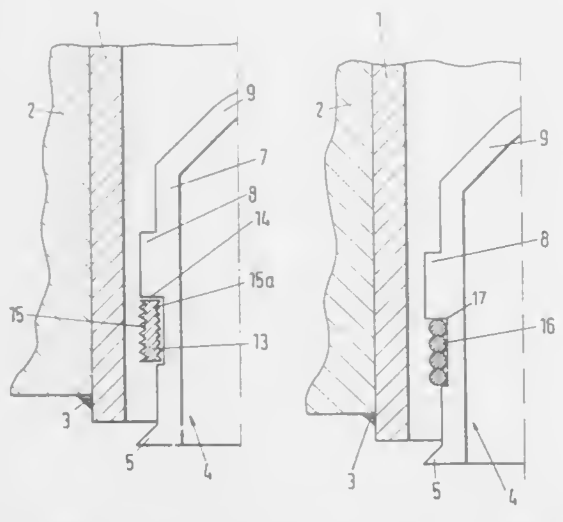
Franz Pötz, and Dieter Daum, both of Heppenheim, Fed. Rep. of Germany, assignors to Brown Boveri Reaktor GmbH, Mannheim, Fed. Rep. of Germany

Continuation of Ser. No. 191,215, May 6, 1988, abandoned. This application Dec. 11, 1989, Ser. No. 453,066

Claims priority, application Fed. Rep. of Germany, May 15, 1987, 3716328

Int. Cl.^{5} F16L *55/00*

U.S. Cl. 138—89 **9 Claims**



1. Hollow plug for blocking a heat exchanger tube of a heat exchanger disposed in a tube plate, comprising a body having an expansion zone being expanded into a frictional connection with the heat exchanger tube and being fixed relative to the heat exchanger tube during operation of the hollow plug and the heat exchanger, an outer surface in said expansion zone having a first part with a relatively greater surface hardness and a second part with a relatively lesser surface hardness, said first part having a greater surface hardness than the heat exchanger tube, said second part having a lesser surface hardness than the heat exchanger tube, and said first part having a relief pattern.

5,022,438

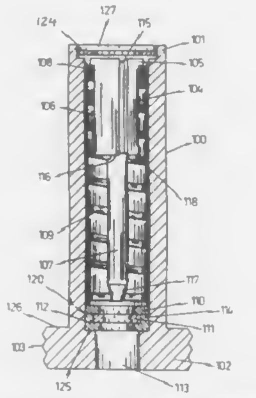
FLUIDS RATE OF FLOW SAVING OR LIMITING DEVICE

Cesar Faraon-Chaul, Av. Industriales No. 20 Zona Industrial, Cuautitlá; Izcalli, Mexico

Filed Aug. 20, 1990, Ser. No. 570,197

Int. Cl.^{5} G05D *7/01*

U.S. Cl. 138—42 **5 Claims**



1. In a fluids rate of flow saving or limiting device which comprises a tubular fitting having an inlet end and an outlet end, said inlet end having a slightly larger inner diameter than said tubular fitting, to form a first shoulder between said inlet end and said tubular fitting, a rigid washer fixed on said first shoulder to serve as a shutter stop, said outlet end having a larger outer diameter than said tubular fitting and being provided with external threads and a smaller inner diameter to form a second shoulder between said tubular fitting and said outlet end; a needle type shutter comprising an upper cylindrical body portion having a radially outwardly extending flange on the top thereof, and a lower cylindrical body portion having a needle shaped end at the bottom thereof, said lower cylindrical body portion being of a diameter smaller than said upper cylindrical body portion to form a third shoulder therebetween, and a spring having its upper end bearing against an O-ring of soft material inserted between said spring and the flange of the shutter to dampen the strike of said spring against said flange, and its lower end bearing on a flow restricting washer assembly supported on said second shoulder; a plurality of projections on said third shoulder adapted to abut against the surface of said flow restricting washer assembly when the shutter is pushed by the fluid downwardly so as to provide a corresponding plurality of slots between each pair of said projections for allowing the passage of said fluid therethrough at a restricted flow rate; and at least one surface groove longitudinally provided on the surface of said upper cylindrical body portion of the shutter and extending the full length thereof to provide a free non-clogging passage for the fluid from said inlet end through said shutter to said outlet end of said tubular fitting, the improvement which comprises a flow restricting washer assembly supported on said second shoulder and comprising a soft washer of an elastomeric or plastics material, having an opening with a diameter suitable to permit the free passage therethrough of said lower body portion of said shutter, said soft washer being housed within a housing of rigid material having a bottom provided with an orifice of a diameter smaller than the diameter of said soft washer, a cylindrical wall extending upwardly of said bottom to a distance sufficient to constitute a cavity for receiving therewithin said soft washer and a lid to cover said cavity and having an orifice to the same diameter as said bottom, whereby said soft washer will be sandwiched and fixed between said lid and said bottom of said housing and will project radially inwardly of said rigid lid and said bottom of said housing to a distance sufficient to dampen a rattling action of said shutter against the inner walls of said housing, said soft washer being fixed within said housing such that dislodgement thereof by high pressure fluid is avoided.

5,022,439

CLOTH ROLLER REPLACING SYSTEM FOR LOOM

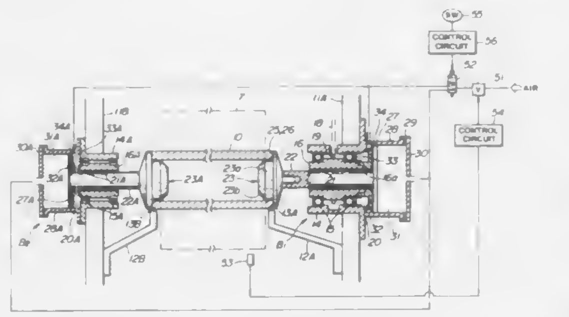
Tadashi Yano, Tokorozawa, and Takatsugu Kato, Tokyo, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jun. 1, 1989, Ser. No. 359,789

Claims priority, application Japan, Jul. 20, 1988, 63-180838; Feb. 10, 1989, 1-14061[U]

Int. Cl.^{5} D03D *49/20*

U.S. Cl. 139—1 R **24 Claims**



1. In a loom, a system for replacing a cloth roller for said loom with another one, said system comprising:
- a first rotatable shaft whose axis is generally aligned with an axis of said cloth roller;
- a first engaging member fixedly connected to a first end section of said first rotatable shaft, said first engaging member being coaxial with said first rotatable shaft and engageable with a first end section of said cloth roller;
- actuator means for axially moving said first rotatable shaft so that said first engaging member is selectively engaged with and disengaged from said cloth roller first end section;
- a second rotatable shaft whose axis is generally aligned with the axis of said cloth roller, said second rotatable shaft being axially movable by said actuator means;
- a second engaging member fixedly connected to a first end section of said second rotatable shaft, said second engaging member being coaxial with said second rotatable shaft and engageable with a second end section of said cloth roller, said second engaging member being selectively engaged with and disengaged from said cloth roller second end section upon axial movement of said second rotatable shaft; and
- means for rotatably driving said first rotatable shaft around an axis of said first rotatable shaft in a timed relation to an operation of the loom.

5,022,440

BRUSH DEVICE FOR REMOVING A BEAT-UP WEFT

Petr Velechovsky, Liberec, Czechoslovakia, assignor to Elitex Koncern Textilniho Strojirenstvi, Czechoslovakia

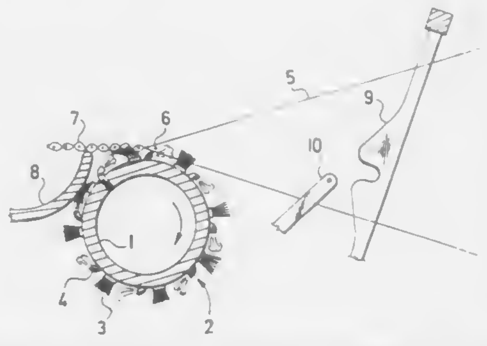
Filed Aug. 31, 1989, Ser. No. 400,990

Claims priority, application Czechoslovakia, Sep. 1, 1988, 5885-88

Int. Cl.^{5} D03D *47/30, 49/00*

U.S. Cl. 139—116.2 **5 Claims**

1. A device for removing an inserted-and-beat-up weft on weaving machines, the device comprising:
- a rotary stripping brush including, on an exterior periphery thereof, agitation hairs for urging an inserted-and-beat-up weft away from a grip of a shed;
- the rotary stripping brush further including gaseous feed jets on the exterior periphery of the brush for urging, in cooperation with the brush hairs, the inserted-and-beat-up weft away from the grip of the shed, the gaseous feed jets having outlet orifices oriented tangentially to the exterior periphery of the brush.



5,022,441

PAPERMAKER'S DOUBLE LAYER FABRIC WITH HIGH WARP AND WEFT VOLUME PER REPEAT

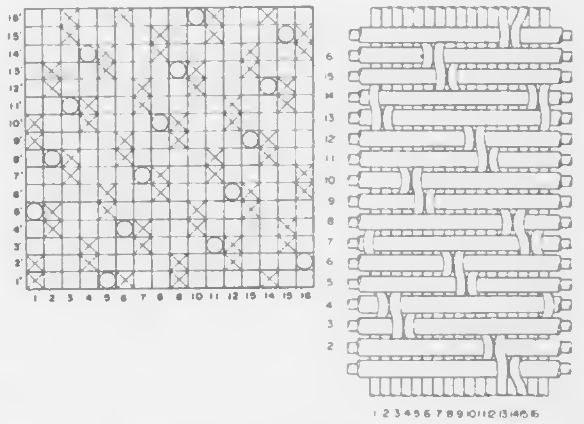
Takuo Tate, Hachiouji; Taketoshi Watanabe, and Hiroyuki Nagura, both of Inagi, all of Japan, assignors to Nippon Filcon Co., Ltd., Ikejiri, Japan

Filed Jun. 21, 1989, Ser. No. 369,452

Claims priority, application Japan, Jun. 27, 1988, 63-156692; Jun. 27, 1988, 63-156693; Jul. 6, 1988, 63-166989; Nov. 25, 1988, 63-296003; Nov. 25, 1988, 63-296004; Nov. 25, 1988, 63-296005

Int. Cl.^{5} D03D *13/00*

U.S. Cl. 139—383 A **20 Claims**



1. A papermakers' double layer type fabric comprising in one repeat a warp layer, said warp layer having an upper surface and a lower surface, said warp layer consisting of n×2 of warps wherein n is an integer of at least 7, and n×2 of wefts wherein n is as defined above arranged on said upper surface of said warp layer as the upper surface wefts and n×2 of wefts wherein n is as defined above arranged under the lower surface

VOL
1127
ISS
2
JE
11
1991
UMI

of said warp layer as the lower surface wefts, the lower surface wefts consisting of polyester yarns and polyamide yarns, the lower surface polyamide wefts and the lower surface polyester wefts being each interlaced once in one repeat with a warp, wherein said lower surface polyamide wefts are of larger diameter than said lower surface polyester wefts.

5,022,442

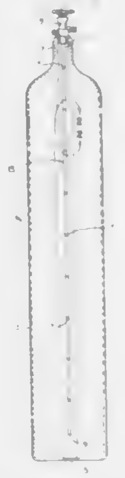
APPARATUS AND METHOD FOR HIGH PRESSURE GAS MIXING

Robert E. Bird, St. Louis, Mo., assignor to Acetylene Gas Company, St. Louis, Mo.

Filed Mar. 20, 1989, Ser. No. 325,769

Int. Cl.^{5} B65B *3/04*

U.S. Cl. 141—100 **1 Claim**



1. A pressurized cylinder for use in the mixing of a pair of high pressure gases under predetermined pressure, including a gas cylinder, a valve regulator sealed in an opening at one end of said cylinder, an elongated copper filling tube extending within said cylinder and being attached by silver soldering at one end to said valve regulator, said elongated filling tube termiating at a free end spaced upwardly but proximate to a bottom end of said cylinder, said elongated filling tube having longitudinally spaced transverse openings along the length thereof to facilitate intermixing of gases, said cylinder disposed for reception and containing oxygen and nitrogen gases therein as injected into said cylinder under pressure, said transverse openings extending through opposite sides of said elongated filling tube, said spaced transverse openings are at different circumferentially spaced locations along the length of said elongated filling tube, said elongated filling tube having a 5/16 inch outside diameter, said transverse openings being approximately ⅛ inch in diameter, said transverse openings being spaced approximately five inches from one another along the length of said elongated filing tube, wherein said high pressure gases being injected at predetermined volume sequentially into said pressurized cylinder, said oxygen being injected up to approximately 21% of the capacity of the cylinder under a pressure of approximately 600 psi, and said nitrogen subsequently being injected into the cylinder to a volume of approximately 79% and under a pressure of approximately 2200 to 2600 psi, wherein said intermixed gases within the pressurized cylinder being mixed therein and available for application without requiring any additional mixing or rolling of the pressurized cylinder once filled.

5,022,443

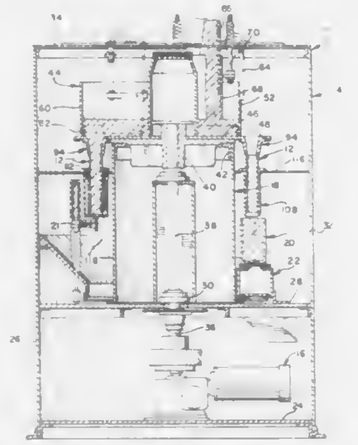
MEASURING FLASK CONSTRUCTION FOR USE IN A FILLING MACHINE

Graeme W. Warner, Hinsdale, Ill., assignor to John R. Nalbach Engineering Co., Inc., Cicero, Ill.

Continuation-in-part of Ser. No. 322,417, Mar. 10, 1989, Pat. No. 4,915,146, whicb is a continuation-in-part of Ser. No. 167,389, Mar. 14, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 488,623

Int. Cl.^{5} B65B *1/22*

U.S. Cl. 141—129 **16 Claims**



1. In an apparatus for filling like containers with a like measured amount of divided matter including; a filling turret, said filling turret having a rotatable portion, a drive connected to said rotatable portion, said rotatable portion being rotated in a circular path by said drive, said filling turret including a filling tank, said filling tank having a rotatable floor connected to said drive, said rotatable floor rotating with said rotatable portion of the filling turret, a plurality of measuring flasks arranged in a circle concentric with the circle of rotation of said rotatable portion of the filling turret, each of said measuring flasks of said plurality of measuring flasks connected to said rotatable floor of the filling tank for receiving divided matter from the filling tank and measuring the amount of said matter; the improvement comprising; each of said measuring flasks including a transition body having one end connected to the rotatable floor and an opposite end extending downward, an elongated open ended tube having one end connected to said opposite end of the transition body and the other end of the tube extending downward, said tube having a cylindrical interior surface, said transition body having a funnel-like transition interior surface, said transition interior surface being a surface of revolution, said surface of revolution is generated by a line including an arc of a circle, and said transition interior surface having a reduced portion adjacent to the tube aligned with the upper end of the cylindrical interior surface and the remainder of the transition interior surface extending outward and upward from the reduced portion.

5,022,444

APPARATUS FOR FILLING PREDETERMINED QUANTITIES OF MATERIAL INTO CONTAINERS

Thomas D. Kendall, 525 Wells Road, Bristol, Great Britain BS14 9AL , and Peter T. Baddet, Slough, Great Britain, assignors to Thomas D. Kendall and Margaret J. Kendall, both of, England

Filed Sep. 15, 1989, Ser. No. 407,552

Claims priority, application United Kingdom, Sep. 20, 1988, 8822109

Int. Cl.^{5} B65B *3/04*

U.S. Cl. 141—248 **11 Claims**

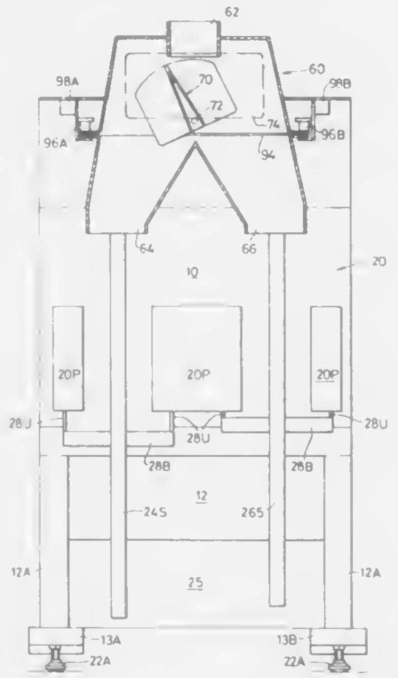
1. Apparatus for filling containers with predetermined quantities of materials in which respective containers at two container support positions are fed alternately with said material, comprising:

a material guide arrangement including two alternative outlets to supply the material to the containers at the two said container support positions, and diverter means for directing the material first to one of said alternative outlets and then to the other of said outlets and vice versa, in each case until the respective predetermined quantity of material has been delivered therethrough;

a generally vertical main frame having a front frame portion;

a pair of container support frames each supported on said main frame and each extending generally vertically at a respective one of said container support positions, the two container support frames being disposed side by side forwardly of the front frame portion;

for each said container support frame respective upper and lower support arms pivotally mounted on said main frame front frame portion and pivotally joined to upper and lower positions on the respective support frame to form parallelogram linkages for said support frames, formed by the respective support frame, the main frame front frame portion, and the associated upper and lower support arms;



respective counterbalance means for each said support frame coupled to at least one of the upper and lower support arms associated therewith and disposed rearwardly of said main frame front frame portion, including means for adjusting the weight setting thereof, for raising the support frames until the counterbalance means are overbalanced by the weight of the material fed into the container at the container position associated with the respective support frame;

operative means at an upper end of each of said support frames acting upon associated means on said diverter means, said operative means and said associated means being disposed forwardly of said main frame front frame portion, for mechanically changing the position of said diverter means when the weight of the material in the container being filled at the one container support position overbalances the associated counterbalance means, and causes the respective support frame to move downwardly, thus commencing the feeding of said material into the container at the other said container support position.

5,022,445

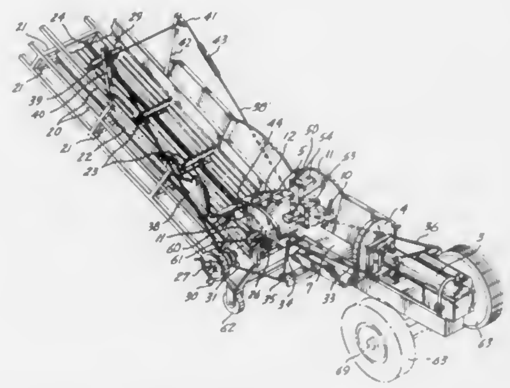
LOG SPLITTER AND EXIT CONVEYOR

William H. Holestine, 474B Prairie La., Sedro Woolley, Wash. 98284

Filed Aug. 22, 1990, Ser. No. 572,077

Int. Cl.^{5} B27L *7/00*

U.S. Cl. 144—193 A **15 Claims**



1. In a log splitter having a reciprocating ram for driving a block through a splitting blade to split the block into smaller pieces, the improvement comprising an exit conveyor including movable power-driven means for conveying the split pieces away from the area of the blade assembly, and means interconnecting said power-driven means with said ram for transmitting force from movement of said ram to said power-driven means to move said power-driven means.

5,022,446

COMPRESSION LOG DEBARKING APPARATUS

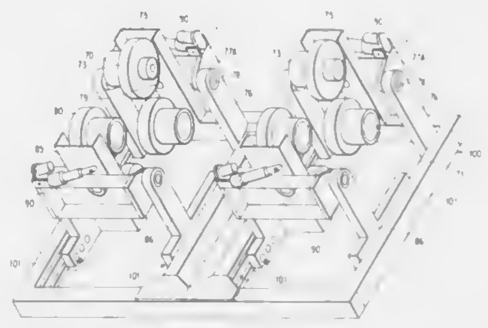
Robin Wingate-Hill, Curtin, and Ian J. MacArthur, Melba, both of Australia, assignors to Commonwealth Scientific and Industrial Research Organisation, Australia

Continuation-in-part of Ser. No. 260,551, Oct. 20, 1988, abandoned. This application Dec. 27, 1989, Ser. No. 457,902

Claims priority, application Australia, Dec. 20, 1987, PI4967

Int. Cl.^{5} B27L *3/00*

U.S. Cl. 144—208 F **14 Claims**



1. Apparatus for the compression debarking of logs comprising:

(a) a first set of rollers and at least one further set of rollers, said sets of rollers being mounted in spaced apart relationship, each set of rollers defining an aperture through which a log may pass as it transverses the apparatus; each set of rollers comprising:

(i) a first roller and a second roller mounted for rotation about respective, spaced apart, parallel axles supported in a bogie-like arrangement by a first support member, said first support member being moveable relative to a support frame and to a log positioned in said aperture, to enable said first and second rollers to apply pressure to the log; and

VOL
1127
ISS
2
JE
11
1991
UMI

(ii) at least one further roller but not more than two further rollers, said at least one further roller being mounted for rotation about a respective axle supported by a second support member which is fixed in relation to said support frame, said at least one further roller applying pressure to the log as a consequence of the pressure applied to the log by the first and second rollers;

(b) motor means to drive at least said first and second rollers of each set in the same direction of rotation about their respective axles;

(c) respective movement means associated with each set of rollers to cause its associated first support member to move the respective first and second rollers towards and away from the log and to apply pressure thereto; and

(d) cutting means adapted to cut through the bark of the log.

5,022,447
SAFEGUARD APPARATUS FOR CUTTER OF JOINT PLANER

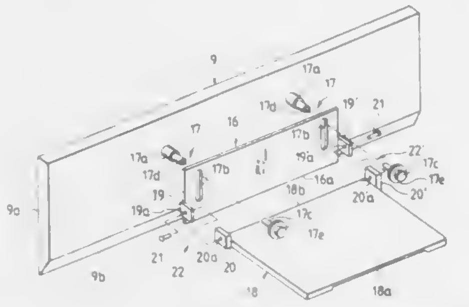
Juzaburo Moaobe, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan

Filed Feb. 20, 1990, Ser. No. 481,991

Claims priority, application Japan, Feb. 21, 1989, 1-19928[U]

Int. Cl.⁵ B27G *19/00;* B27C *1/12*

U.S. Cl. 144—251 R **17 Claims**



1. A safeguard apparatus for a joint planer including a table defining a plane, a cutter head and at least one safeguard, comprising:

a pair of bars, supported by the joint planer, horizontally arranged over and slideable parallel to the plane of the table, each bar including a respective fulcrum, the fulcrum having a common axis;

a fence having a guide surface and a rear, the fence including a pair of guide members, each guide member lying in a plane parallel to one of the slideable bars and pivotably contacting the respective fulcrum to allow the angle of the guide surface relative to the plane of the table to vary, and each guide member being slideable relative to the respective fulcrum to allow the closest distance between the plane of the table and the guide surface to be invariant when the angle of the guide surface relative to the plane of the table varies; and

means having a bottom surface for covering the cutter head; means, including a slide attachment coupled to the fence, for connecting the covering means to the rear of the fence, the slide attachment being oriented for sliding in a plane orthogonal to the plane of the table.

5,022,448
PNEUMATIC TIRE INCLUDING LATERAL TREAD GROOVES WITH A BRIDGE THEREACROSS

Kiyoshi Ochiai, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed May 17, 1989, Ser. No. 352,894

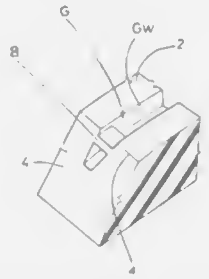
Int. Cl.⁵ B60C *11/08*

U.S. Cl. 152—209 R **13 Claims**

1. A pneumatic tire having a tread provided with lateral grooves extending parallel or aslant to the axial direction of the tire,

each of said lateral grooves being provided with a bridge member extending between the opposed groove sidewalls thereof to join the groove sidewalls to each other,

said bridge having a thickness t not less than 0.1 times and not more than 0.4 times the lateral groove depth d in the radial direction of the tire,



said bridge being spaced apart from the groove bottom so that the height h of the bridge bottom from said groove bottom is not less than said thickness t of the bridge in the radial direction of the tire, and

the length 1b of the bridge at the bottom thereof in the longitudinal direction of the lateral groove being not less than 0.05 times and not more than 0.35 times the length 1g of the lateral groove in the longitudinal direction.

5,022,449
NONSKID DEVICE FOR AUTOMOBILE TIRES HAVING ANNULAR ELASTIC BUFFER MEMBERS

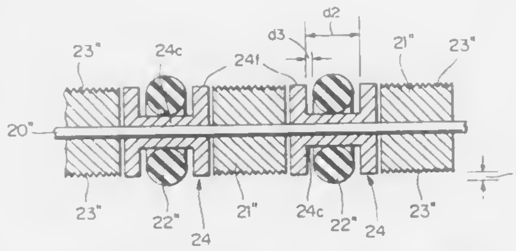
Masuo Koda, 5-1, Imaizumidai, 6-chome, Kamakura-shi, Kanagawa, Japan 247

Continuation-in-part of Ser. No. 265,801, filed as PCT JP88/00102 on Feb. 4, 1988, published as WO88/06105 on Aug. 25, 1988, abandoned. This application Feb. 16, 1990, Ser. No. 481,763

Claims priority, application Japan, Feb. 10, 1987, 62-17199

Int. Cl.⁵ B60C *27/20, 27/08*

U.S. Cl. 152—226 **10 Claims**



1. A slip-preventing device adapted to be releasably wound around the circumference of a vehicle tire, comprising a plurality of members mounted on a metallic portion of the slip-preventing device which would otherwise come in contact with a road surface, said plurality of members including rigid nonskid members and spool members alternately disposed on said metallic portion, and further including annular elastic bodies supported on said spool members, with said annular elastic bodies being buffer members and having outer diameters greater than a thickness of said nonskid members so as to project radially outward with respect to said nonskid members.

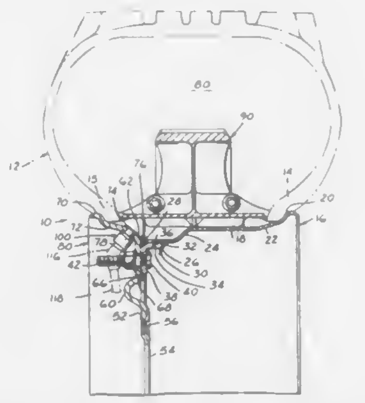
5,022,450
SAFETY TIRE AND TAKE-APART WHEEL CONSTRUCTION

J. Bruce Weeks, Eaton Rapids, Mich., assignor to Motor Wheel Corporation, Lansing, Mich.

Filed Nov. 6, 1989, Ser. No. 432,163

Int. Cl.⁵ B60B *25/04;* B60C *17/04*

U.S. Cl. 152—381.6 **11 Claims**



1. A wheel rim and disc assembly for use in a safety tire and wheel assembly which includes a pneumatic tubeless tire, said wheel rim and disc assembly comprising:

an inboard rim part including a rim base and an inboard tire bead retaining flange integrally carried at an inboard edge of said rim part, said inboard rim part having a generally cylindrical band terminating at an outboard free edge of said rim base remote from said inboard flange of said inboard rim part,

a wheel mounting ring having an outer marginal axially extending flange telescoped into and secured to said cylindrical band, said ring having a radially inwardly extending flange having an outer surface extending generally co-planar with said inboard rim part free edge,

a demountable outboard rim part comprising a central wheel mounting portion and an outboard tire bead retaining flange integrally projecting from an outboard edge of said wheel mounting portion,

annular resilient sealing means disposed between an outboard first sealing surface of said wheel mounting ring, an inboard second sealing surface of said outboard rim part and a radially inwardly facing third sealing surface of said rim base band free edge of said inboard rim part,

and means for axially clamping said outboard rim part on said inboard rim part with said sealing means being captured in compression between said aforementioned three sealing surfaces so as to seal against air leakage from the internal cavity of a tire mounted on said wheel rim and disc assembly,

said wheel rim and disc assembly having air bleed means normally sealed from the tire cavity by said sealing means, said clamping means being constructed and adapted to engage and exert clamping stress on said outboard rim part over a range of relative movement therebetween in the axial direction of said inboard rim part which is sufficient to permit loss of sealing pressure at said sealing means prior to loss of clamping engaging at said clamping means to thereby permit air leakage past said sealing means through said air bleed means to atmosphere within said range of relative movement,

said first, second and third sealing surfaces when juxtaposed to sealably compress said sealing means thereby defining an annular cavity which in radial cross-section generally defines a triangle, said sealing means being bodily movable along said mounting ring first cavity air pressure upon mutual separation of said second sealing surface of said outboard rim part from said mounting ring and inboard rim part third sealing surface in response to said relative separational movement of said rim parts.

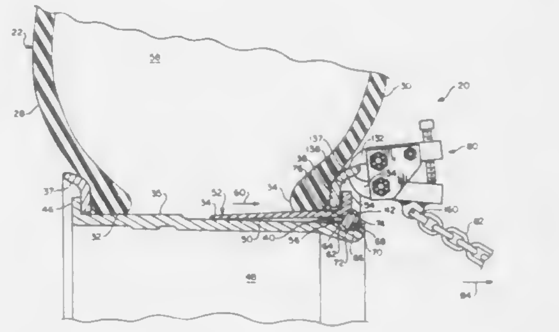
5,022,451
APPARATUS AND METHODS FOR PROMOTING THE INFLATION OF TIRES

William D. Fenderson, 2004 Badger Rd., North Pole, Ak. 99705-5404

Filed Sep. 1, 1989, Ser. No. 402,906

Int. Cl.⁵ B60C *25/06*

U.S. Cl. 157—1 **5 Claims**



1. The combination of tire rim, a tire mounted on said rim, and means including gripper devices at equally spaced intervals around said rim for facilitating the inflation of said tire:

a. said rim including an annular bead seat; a first flange ring at an inner end of said seat; a sealing ring surrounding said bead seat at an outer end thereof; a bead seat ring having a radially extending flange at an outer end thereof, said bead seat ring being slidingly mounted on, and in telescoping relationship to, said bead seat; and a second flange ring trapped on said bead seat ring so that said second flange ring closely abuts said radially extending flange at said outer end of said bead seat ring, said second flange ring having a curved outer lip which projects in an outward direction;

b. said tire having an inner bead butted against said first flange ring and an outer bead on said bead seat ring;

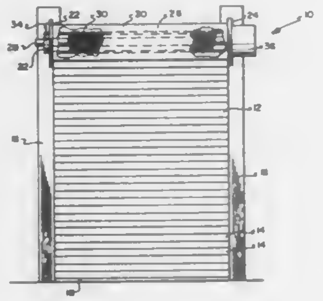
c. each of said gripper devices comprising: a pair of parallel, spaced apart supports; a first, elongated jaw so fixed between and to said supports as to form therewith a rigid assembly in which said first jaw and said supports are immobilized relative to each other, said first jaw having at an inner end thereof means for engaging an outer side of said lip of said second flange ring; a second, elongated jaw, said second jaw having at an inner end thereof means for engaging an inner side of said lip of said second flange ring; means mounting said second jaw between said supports in spaced relationship to said first jaw and for rotation about a pivot axis extending from one to the other of said supports; and means for biasing said second jaw about said pivot axis towards said first jaw to clamp said lip of said second flange ring between said inner end of said first jaw and said inner end of said second jaw and thereby secure said device to said second flange ring, each said gripper device being configured so that said device is free to move together with said bead seat ring and said second flange ring to which said device is secured as said bead seat ring is slid telescopically on said bead seat from an inner position in which said bead seat ring is displaced inwardly from said sealing ring at said outer end of said bead seat to an outer position in which said bead seat ring is positioned over said sealing ring; and

d. said means for facilitating the inflation of said tire further including force transmitting means assembled to said gripper devices and adapted to displace said second flange ring and said bead seat ring telescopically relative to said bead seat from said inner position to said outer position so

VOL
1127
ISS
2
JE
11
1991
UMI

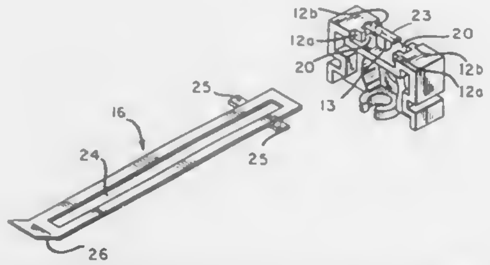
as to: (a) seat said bead seat ring over said sealing ring, and (b) allow said tire to expand outwardly without interference as said tire is inflated with air.

5,022,452
ROLLING FIRE DOOR
Jere S. Burrell, 337 E. Steels Corners Rd., Cuyahoga Falls, Ohio 44223
Filed Dec. 8, 1989, Ser. No. 447,804
Int. Cl.⁵ B01D *1/22, 1/14*
U.S. Cl. 160—7 **12 Claims**



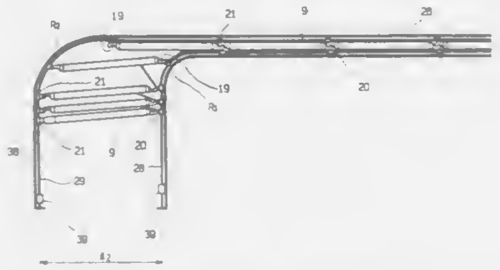
1. A rolling fire door, comprising:
a curtain of a plurality of interconnected slats;
a pair of tracks receiving said curtain along lateral edges thereof;
a tube traversing said pair of tracks at a top end thereof and interconnected to said curtain, rotation of said tube in a first direction raising said curtain in said pair of tracks, and rotation of said tube in a second direction allowing said curtain to be lowered in said pair of tracks; and
control means, comprising a hydraulic pump connected to and driven by said tube for restricting and regulating a rate of descent of said curtain within said pair of tracks under its own weight and a flow control valve interposed in a flow path of said hydraulic pump, said flow control valve restricting flow through said flow path and thereby providing a load on said hydraulic pump and restricting rotation of said tube, said control means being adjustable to regulate said load, and further comprising a bypass valve within said flow path, said bypass valve being in shunt with said flow control valve, said hydraulic pump becoming free wheeling upon actuation of said bypass valve.

5,022,453
SLIDING LINK SYSTEM FOR VERTICAL BLINDS
David P. Rozon, Russell, Canada, assignor to 139088 Canada Ltee, Quebec, Canada
Filed Feb. 15, 1990, Ser. No. 480,624
Claims priority, application Canada, Feb. 17, 1989, 591393
Int. Cl.⁵ E06B *9/30*
U.S. Cl. 160—168.1 **9 Claims**



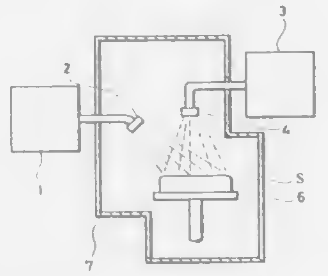
1. In a vertical blind arrangement having an elongate blind head and vane carriages adapted to traverse said blind head, an arrangement of sliding clips for adjustably spacing said carriages, each clip having a slot defined by longitudinally extending side portions and transverse end portions and slidably engaging a first of said carriages with said side portions disposed on opposite sides of a post on said first carriage, and means to fixedly engage a second carriage in alternate positions so as to provide alternate effective slot lengths, said means comprising the combination of said post, tabs, extending laterally from said clip near one end thereof, and inwardly projecting members on said second carriage whereby, in a first, maximally-extended position, the clip is retained by engagement of said post with an end portion at said one end of said clip and by engagement of said tabs with said members; whereas, in a second position, the clip is retained by engagement of said tabs with said projecting members.

5,022,454
MULTI-PANEL COLLAPSIBLE DOOR ASSEMBLY HAVING A DOOR STORAGE SYSTEM
Mitsuru Kobayashi, Komagane, and Keishirou Hori, Ina, both of Japan, assignors to Toyo Exterior Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 31, 1989, Ser. No. 429,365
Claims priority, application Japan, Aug. 31, 1989, 1-225051
Int. Cl.⁵ E05D *15/00*
U.S. Cl. 160—202 **5 Claims**



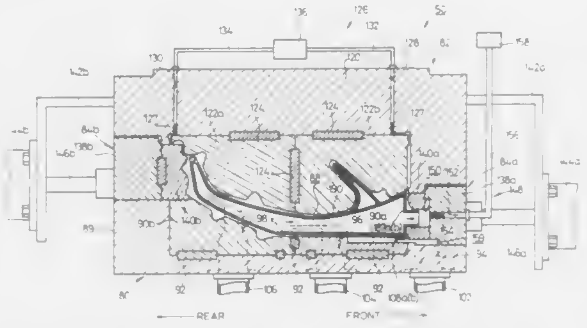
1. A collapsible door assembly comprising:
a horizontally extending longitudinal guide rail including an outer rail member and an inner rail member parallel and in close proximity to said outer rail member;
a plurality of individual door panels that are serially connected, each said door panel having first and second horizontally spaced rollers directed toward respective opposite sides of said panel;
said panels being supported by said guide rail with said first roller of each panel guided by said outer rail member and with said second roller of each panel guided by said inner rail member, whereby said panels are movable along said guide rail; and
a storage means at a first end of said guide rail for storing said panels in adjacent parallel alignment, said storage means comprising continuations of said outer and inner rail members curving therefrom at separate spaced locations along said guide rail, each said continuation including a curved portion in the form of an arc defining a quarter of a circle and a rectilinear portion extending perpendicular to said guide rail, said curved portion of said continuation of said outer rail member having a radius of curvature greater than that of said curved portion of said continuation of said inner rail member, and said rectilinear portions being spaced by a distance less than the distance between said first and second rollers of said panels.

5,022,455
METHOD OF PRODUCING ALUMINUM BASE ALLOY CONTAINING SILICON
Yoshinobu Takeda; Yusuke Odani; Tetsuya Hayashi; Toshihiko Kaji, and Yoshiaki Itoh, all of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan
Filed Jul. 30, 1990, Ser. No. 559,634
Claims priority, application Japan, Jul. 31, 1989, 1-199968; Aug. 24, 1989, 1-218231
Int. Cl.⁵ B22D *23/00*
U.S. Cl. 164—46 5 Claims



1. A method of producing an aluminum base alloy containing silicon, comprising the steps of:
melting an aluminum alloy;
spraying said molten aluminum alloy from a nozzle;
spraying solid particles of silicon by gas jet simultaneously with said spraying of said aluminum alloy; and
depositing and cooling both said sprayed aluminum alloy and said sprayed solid particles of silicon.

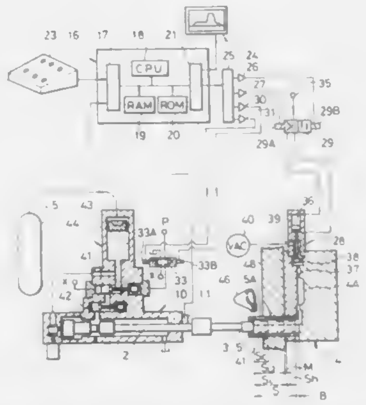
5,022,456
BODY FRAME, AND PRODUCTION PROCESS AND APPARATUS THEREOF
Yoshikazu Kanzawa; Yasushi Fujikake; Osami Ito; Shuho Ito; Hironobu Oikawa; Makoto Otsubo; Iwao Morikawa; Yuichi Shiratori, and Kiyoshi Tsukada, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 23, 1990, Ser. No. 497,890
Claims priority, application Japan, Mar. 25, 1989, 1-72886; Mar. 25, 1989, 1-72887; Apr. 6, 1989, 1-88316
Int. Cl.⁵ B22D *18/04, 18/06*
U.S. Cl. 164—119 6 Claims



1. A process for the production of a body frame, comprising the steps of:
arranging a mold in such a manner that a predetermined portion of a cavity, which corresponds to a head tube in the mold, is located at the lower part, a prescribed portion of the cavity, which corresponds to a rear frame, is located at the upper part, and the portion corresponding to down tubes is directed upward;
pouring a molten metal into the mold through a sprue communicating with the predetermined cavity portion corresponding to the head tube by a low-pressure casting method in such manner that the molten metal is directed to the cavity portions corresponding to the rear frame and down tubes from the head tube portion; and
solidifying the molten metal so as to form integrally a body frame for a motor bicycle, which comprises the head tube, main frame and down tubes and is hollow.

3. An apparatus for the production of a body frame, which comprises:
a cavity corresponding to a body frame for a motor bicycle, which comprises a head tube, a main frame and down tubes, is hollow and has an integral structure, and defined in a mold in such a manner that the portions corresponding to the down tubes become upward and the cavity becomes gradually higher from the portion corresponding to the front of the body frame toward the portion corresponding to the rear; and
a plurality of sprues communicating with the upper rear portion of the cavity via the lower front portion thereof, and connected to a teeming device for charging a molten metal into the cavity by a low-pressure casting method.

5,022,457
CASTING CONTROL SYSTEM OF DIE CAST MACHINE
Norihiro Iwamoto; Hiroyuki Tsuboi, and Toshihiko Kaneko, all of Zama, Japan, assignors to Toshiba Machine Co., Ltd., Tokyo, Japan
Filed Jan. 30, 1989, Ser. No. 303,236
Claims priority, application Japan, Jan. 30, 1988, 63-19998; Jun. 27, 1988, 63-158285
Int. Cl.⁵ B22D *17/00*
U.S. Cl. 164—155 9 Claims



1. A casting control system of a die cast machine, comprising:
position detecting means for detecting a stroke position of an injection plunger;
arithmetic processing means for measuring a speed increase inflexion point of said injection plunger from a detection signal output from said position detecting means, the speed increase inflexion point thus measured being processed in a predetermined manner to obtain a high speed injection real start position, and a signal to close a breathing valve is output at a stroke position coinciding with said high speed injection real start position plus or minus a predetermined variable value, and a signal to open the breathing valve is output at a stroke position where said injection plunger closes a molten metal feeding port; and
input means for inputting predetermined data into said arithmetic unit.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,458

CONTROLLING THE POSITION OF LIQUID METAL IN A VESSEL

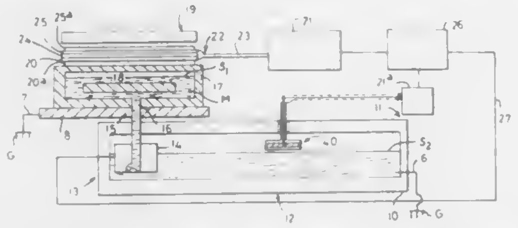
Robert A. Smith, Newbury, United Kingdom, assignor to Cosworth Casting Processes Limited, Worcester, United Kingdom

Filed Jan. 8, 1990, Ser. No. 462,026

Claims priority, application United Kingdom, Jan. 10, 1989, 8900492

Int. Cl.^{5} B22D *17/32*

U.S. Cl. 164—457 **24 Claims**



1. A method of controlling the position of liquid metal in a mould cavity comprising the steps of feeding molten metal to the mould cavity, sensing the position of a surface of the metal in the cavity by a managing means responsive to electrical capacitance between said surface and a signal plate disposed externally of the liquid metal and adjacent to said surface, controlling the rate at which the molten metal is fed into the cavity in accordance with a control signal produced by said managing means so as to achieve a predetermined filling regime (as herein defined) governed by the position of said surface in the cavity.

8. An apparatus for controlling the position of liquid metal in a mould cavity comprising means to feed molten metal to the mould cavity, means to sense the position of a surface of the metal within the mould cavity including an electrical circuit in which the surface of the metal constitutes one plate of a capacitor and a signal plate disposed externally of the liquid metal and adjacent to said surface constitutes a second plate of the capacitor and the circuit including managing means to sense the electrical capacitance subsisting between the surface and the signal plate, fluid flow control means to control the rate at which the molten metal is fed into the cavity in accordance with a control signal produced by said managing means so as to achieve a predetermined filling regime governed by the position of said surface.

5,022,459

FLEXIBLE HOSE HEAT EXCHANGER CONSTRUCTION WITH COMBINATION LOCATING AND THAWING WIRE

Daniel T. Chiles, 1972 S. Oak Grove, Springfield, Mo. 65802, and Richard M. Chiles, 5000 Shady Oaks Dr., Springfield, Mo. 65804

Filed Dec. 6, 1988, Ser. No. 280,543

Int. Cl.^{5} F24D *3/00, 13/04;* **F16L** *55/00*

U.S. Cl. 165—11.1 **1 Claim**

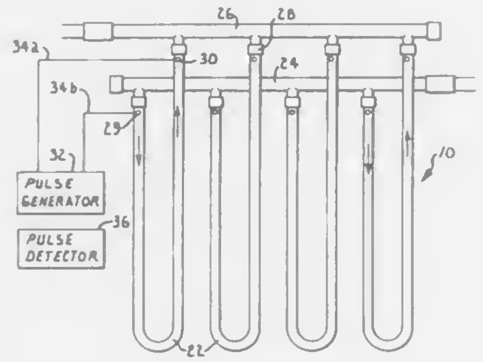
1. In a structural slab, a heat exchange arrangement comprising:

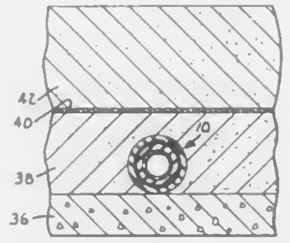
a multiple layer flexible hose embedded in said slab and presenting a conduit for flow of heat exchange fluid therethrough for effecting heat exchange with the slab;

an electrically conductive metal wire extending the length of the hose;

a pair of terminals connected with said wire and situated at locations accessible from the exterior of the slab to permit application of electrical current to the wire;

means for applying an electrical locating signal to said terminals to apply the locating signal to the wire in a manner to permit detection of the location of the wire from the exterior of the slab; and





means for applying electrical current to said terminals at a level to effect heating of said wire sufficient to thaw the heat exchange fluid from a frozen state.

5,022,460

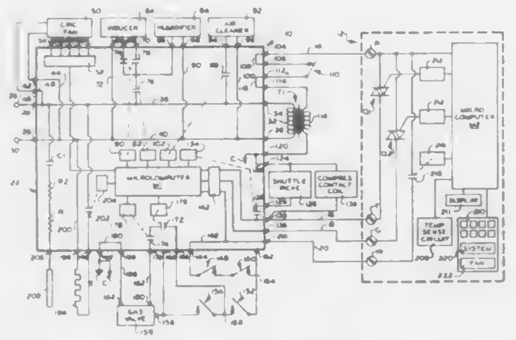
CONTROL OF STAGED HEATING AND COOLING APPARATUS BY A FOUR-WIRE THERMOSTAT

Bernard T. Brown, St. Louis County, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Feb. 9, 1990, Ser. No. 478,240

Int. Cl.^{5} F25B *29/00;* **G05D** *23/00*

U.S. Cl. 165—12 **6 Claims**



1. In a system for controlling heating and cooling apparatus wherein the heating and cooling apparatus include a circulator fan and wherein at least one of the heating and cooling apparatus is two-stage,

a control module in said heating and cooling apparatus;

a thermostat;

fan control means in said thermostat for selectively effecting a demand or no demand for continuous operation of said circulator fan; and

means for directly connecting said thermostat to said control module consisting of four wires,

a first one of said wires being effective to provide a common power connection between said thermostat and said control module,

a second one of said wires being effective to provide an enabling signal to said control module to control first-stage operation of said heating apparatus,

a third one of said wires being effective to provide an enabling signal to said control module to control first-stage operation of said cooling apparatus,

a fourth one of said wires being effective to provide, in response to said fan control means, an enabling signal to said control module to control operation of said circulator fan, and also to provide an enabling signal to said control module to control second-stage operation of said two-stage apparatus.

5,022,461

RAPID ACTION COUPLING SYSTEM FOR A HEAT EXCHANGER FLUID TANK

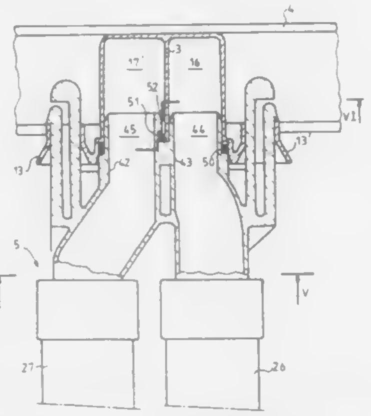
Michel Potier, Rambouillet, and Gilles Briet, Gueugnon, both of France, assignors to Valeo Thermique Moteur, Le Mesnil-Saint-Denis and Hutchinson, Paris, both of, France

Filed Sep. 15, 1989, Ser. No. 408,101

Claims priority, application France, Sep. 15, 1988, 88 12048

Int. Cl.^{5} F28F *9/02*

U.S. Cl. 165—76 **16 Claims**



1. A heat exchanger fluid tank with a fluid inlet chamber and a fluid outlet chamber (16, 17) formed therein, and a rapid action coupling system for simultaneous coupling of the fluid inlet chamber and the fluid outlet chamber to an external circuit; a partition (3) within the fluid tank between and separating said inlet and outlet chambers, adjacent inlet and outlet openings (1, 2) in the fluid tank one in each of the two chambers respectively, said coupling system including a coupling device (5) attachable to the fluid tank and cast en bloc with at least two fluid passages (26, 27), the two fluid passages communicating respectively with the two openings in the fluid tank upon attachment of the coupling device to the fluid tank, said partition (3) of the fluid tank being substantially planar over its entire length, and the inlet and outlet openings (1, 2) being disposed one on each side of the plane of the partition (3), while being in proximity with said partition.

5,022,462

FLEXIBLE FINNED HEAT EXCHANGER

Ephraim B. Flint, Garrison; Kurt R. Grebe, Beacon; Peter A. Gruber, Mohegan Lake, and Arthur R. Zingher, White Plains, all of N.Y., assignors to International Business Machines Corp., New York, N.Y.

Division of Ser. No. 161,880, Feb. 29, 1988, Pat. No. 4,964,458, which is a continuation-in-part of Ser. No. 858,318, Apr. 30, 1986, Pat. No. 4,730,666. This application Mar. 12, 1990, Ser. No. 492,601

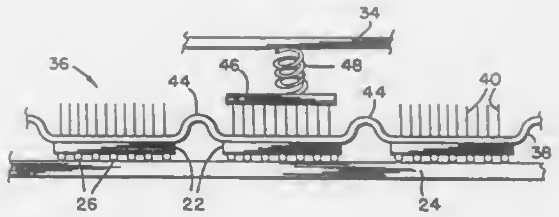
Int. Cl.^{5} F28F *7/00*

U.S. Cl. 165—80.4 **23 Claims**

1. A circuit assembly including a set of circuit chips, there being at least one chip in said set of chips, said assembly comprising:

a heat exchanger for transferring heat from said set of circuit chips to a fluid coolant, said heat exchanger being formed of a flexible sheet of thermally conductive material sufficiently large to cover the set of chips and sufficiently flexible to conform to individual orientations of the chips to make thermal contact therewith, and a set of thermally conductive fins upstanding from said sheet, said fins being oriented in the direction of a desired flow of coolant for guiding the coolant among the fins for extraction of heat therefrom;

a layer of thermally conductive grease disposed on a surface of each chip of said set of chips, said layers of grease being interposed between said sheet and each of said chips, each said layers having a thickness less than approximately one mil;



a substrate for holding said chips in fixed positions relative to each other;

means for connecting circuit elements of said chips to said substrate; and

means coupled between said heat exchanger and said substrate for prestressing said grease layers and said connecting means said prestressing means pressing against said fins at ends thereof distant from said substrate.

5,022,463

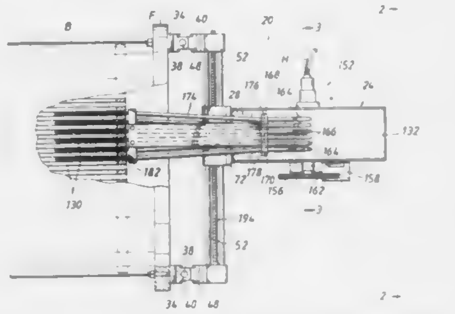
MULTI-HOSE FLEXIBLE LANCE TUBE CLEANING SYSTEM

Thomas B. Boisture, Baytown, Tex., assignor to Ohmstede Mechanical Services, Inc., Baytown, Tex.

Continuation-in-part of Ser. No. 490,776, Mar. 8, 1990. This application Nov. 1, 1990, Ser. No. 607,524

Int. Cl.^{5} F22B *9/08*

U.S. Cl. 165—95 **11 Claims**



1. A multi-lance cleaning apparatus for cleaning the interior of heat exchanger tubes comprising:

a spool;

means for rotating said spool;

a plurality of tubular flexible lances, each said flexible lance being adapted to fit within a heat exchanger tube, each said flexible lance wrapping on said spool and having a first end in communication with a fluid source and a second end adapted to enter a heat exchanger tube;

means for supplying high pressure fluid to said flexible lances;

means for supporting and positioning said spool substantially adjacent the open ends of the heat exchanger tubes;

means for supporting and guiding said flexible lances in

VOL
1127
ISS
2
JE
11
1991
UMI

substantial alignment with the heat exchanger tubes to be cleaned; and

means for advancing said flexible lances into and along the interior of the heat exchanger tubes.

5,022,464

CONDENSER

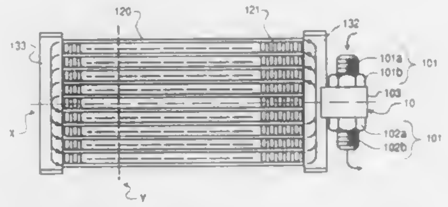
Hisao Aoki, Maebashi, and Toru Yamaguchi, Isesaki, both of Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Jul. 10, 1989, Ser. No. 377,251

Claims priority, application Japan, Jul. 9, 1988, 63-90503[U]

Int. Cl.^{5} F28F *9/10;* F28D *7/06*

U.S. Cl. 165—176 15 Claims



10. In a condenser comprising a first header pipe having at least one closed end, a second header pipe having at least one closed end, at least one tube connected to and communicating with each of said header pipes, and at least one fin set operatively connected to said at least one tube, an improvement comprising:

means operatively connected to said first header pipe for permitting a fluid to flow into and out of said condenser from a single opening on one of said header pipes, and

wherein said means includes a main body having a single cavity divided by a plate to define an inlet portion having a longitudinal axis and an outlet portion having a longitudinal axis, and wherein said condenser has a vertical axis and a horizontal axis, and the longitudinal axes of said inlet and outlet portions are substantially parallel to said vertical axis of said condenser.

5,022,465

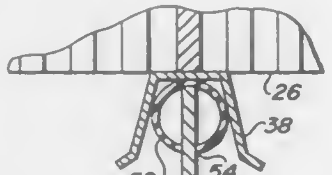
RADIATOR BAFFLE GASKET

William F. Baines, 5743 W. Clarendon, Phoenix, Ariz. 85031

Filed Dec. 26, 1989, Ser. No. 456,538

Int. Cl.^{5} F28F *9/02*

U.S. Cl. 165—176 4 Claims



1. A gasket for sealing a baffle plate positioned between opposite walls of the top or bottom tank of a multi-pass radiator having a radiator core, said baffle plate being the principal means for directing coolant through said core, and wherein an elongated channel member is secured to an end of said core and facing into one of said tanks, said channel member being adapted to receive a portion of said baffle plate, said gasket comprising an elongated, center section adapted to be received in said channel member and having generally flattened end sections integral with said center section and being adapted to be received in the flange area of said tank, said center section having an elongated slot running the length of said center section and extending into the interior of said center section to receive a free edge and portion of said baffle plate.

5,022,466

METHOD FOR STEAM FLOODING PROFILE CONTROL

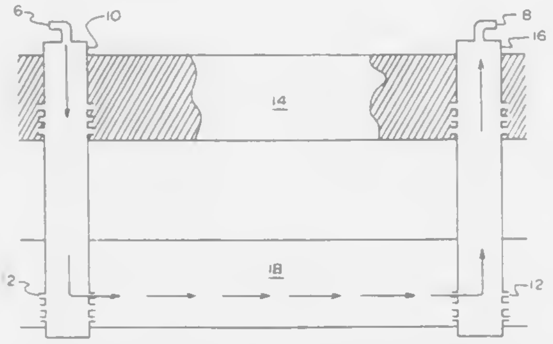
Paul Shu, Cranbury, N.J., and Winston R. Shu, Dallas, Tex., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 292,795, Jan. 3, 1989, Pat. No. 4,940,091. This application May 2, 1990, Ser. No. 517,890

Claims priority, application Canada, Dec. 11, 1989, 292795

Int. Cl.^{5} E21B *33/138, 43/24*

U.S. Cl. 166—263 18 Claims



1. A method for minimizing well recompletions in a formation having multiple intervals of hydrocarbonaceous fluids comprising:

a) penetrating said formation with at least one injector well and one spaced apart producer well where fluid communication exists between said wells at an upper interval but not at a lower interval between said wells;

b) heating by steam injection the upper interval via said injector well to a temperature above about 300° F. sufficient to cause a temperature activated aqueous gellable mixture to form a solid gel which mixture contains

 i) a water dispersible polymer,

 ii) a phenolic compound, and

 iii) an aldehyde producing compound which upon reaching a temperature above about 300° F. decomposes to yield an aldehyde and form a phenolic resin in situ in combination with the phenolic compound sufficient to gel the polymer;

c) terminating steam injection into the upper interval upon reaching said temperature having removed hydrocarbonaceous fluids from said upper interval;

d) injecting thereafter into said upper interval the temperature activated gellable mixture which mixture enters said upper interval heated to said temperature, where it is heated to a temperature sufficient to cause a solid gel to form and close pores in said heated zone regardless of the permeability of said zone;

e) perforating the injector well and producer wells at a lower interval so as to provide for fluid communication between said wells; and

f) injecting steam into said injector well which by-passes the upper interval and enters the lower interval thereby removing hydrocarbonaceous fluids therefrom via said producer well.

5,022,467

POLYMER CONTAINING PENDANT SILYL ETHER GROUPS USEFUL IN ENHANCED OIL RECOVERY USING CO_2 FLOODING

Cyrus A. Irani, Houston, Tex.; Thomas V. Harris, Benicia, Calif., and Wayne R. Pretzer, Wheaton, Ill., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 73,791, Jul. 14, 1987, Pat. No. 4,913,235, which is a continuation-in-part of Ser. No. 58,690, Jun. 3, 1987, abandoned, which is a continuation of Ser. No. 910,041, Sep. 22, 1986, abandoned, which is a continuation of Ser. No. 749,479, Jun. 27, 1985, abandoned. This application Dec. 23, 1987, Ser. No. 138,268

The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.

Int. Cl.^{5} E21B *43/22*

U.S. Cl. 166—273 9 Claims

1. In a method for recovering oil from an underground oil-bearing earth formation penetrated by an injection well and a producing well, in which method carbon dioxide is injected into said formation to displace oil towards said producing well from which oil is produced to the surface, the improvement comprising injecting into said formation carbon dioxide, the viscosity of which is increased at least three-fold by the presence of a sufficient amount of a polymer containing pendant groups selected from the group consisting of silyl ether groups and polydialkylsiloxane groups and a sufficient amount of a cosolvent to form a solution of said polymer in said carbon dioxide, wherein the minimum solubility parameter of said polymer is reduced to 6.85 $(cal/cc)^{\frac{1}{2}}$ or less by control of the number of pendant groups and by the selection of said pendant groups.

5,022,468

AUTOMATIC SPRINKLER ACTIVATOR

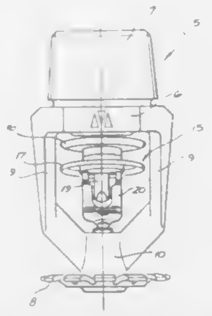
Barry F. Byrne, Killarney Heights, Australia, assignor to Wormald International Limited, Crows Nest, Australia

Filed Oct. 13, 1989, Ser. No. 420,957

Claims priority, application Australia, Oct. 18, 1988, PJ1046

Int. Cl.^{5} A62C *37/08*

U.S. Cl. 169—40 10 Claims



1. A heat responsive activator for an automatic sprinkler head, having a valve member for arresting the flow of fluid therefrom, comprising lever means to retain, in a standby condition, said valve member in a closed condition, a control assembly, having axially displaceable parts, engageable with said lever means to retain said control assembly in its standby condition, and a fusible solder annulus functioning to maintain said control assembly in its axially expanded condition, said solder annulus reacting when subjected to a predetermined temperature to permit axial contraction of said parts to thereby release said lever, together with said control assembly, from said sprinkler head, said control assembly including a post engageable with valve member and the lever means, and a retaining member about the post and engaging, in the operative condition, the lever means so as to apply pressure to the solder annulus, and wherein the solder annulus is positioned about the post and the retaining member is displaceable along the post to effect release of the lever means and control assembly from the sprinkler head when the solder annulus reacts to the predetermined temperature.

5,022,469

EXHAUST MEANS FOR PNEUMATIC POWER TOOL

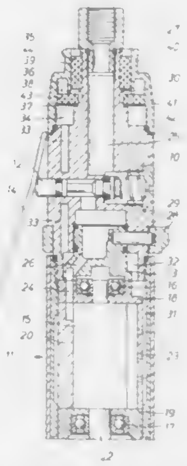
Sven P. J. Westerberg, Saltsjöbaden, Sweden, assignor to Atlas Copco Tools Aktiebolag, Stockholm, Sweden

Filed Jan. 5, 1990, Ser. No. 461,403

Claims priority, application Sweden, Jan. 16, 1989, 8900137

Int. Cl.^{5} B23B *45/00*

U.S. Cl. 173—170 5 Claims



1. Sound depressing exhaust means for a pneumatic power tool having a substantially cylindrical housing **(10)** having a longitudinal axis, and a vane motor **(11)** which is disposed within said housing **(10)** and which has an exhaust port means **(23)** for expelling exhaust from the vane motor **(11)**, the sound depressing exhaust means comprising:

an annular casing **(41)** surrounding a portion of said housing **(10)**;

at least first, second and third expansion chambers **(31-32, 34, 36)** arranged in series with said exhaust port means **(23)** and being arranged in series in the downstream direction of exhaust flow relative to said exhaust port means **(23)**, and said expansion chambers **(31-32, 34, 36)** communicating with said exhaust port means **(23)**, one of said expansion chambers **(36)** being a last expansion chamber in the direction of said exhaust flow;

wherein said third expausion chamber in the down steam exhaust flow direction contains a high frequency sound absorbing element therein

at least two exhaust flow restrictions **(37, 30)** each communicating with and following in the downstream direction of said exhaust flow. one of said expansion chambers; and

an outlet passage means **(39)** comprising a tube shaped entrance portion **(38)** extending in the axial direction of said substantially cylindrical housing **(10)** and said tube shaped entrance portion extending into said last one **(36)** of said expansion chambers, for thereby forming a sound trap.

5,022,470

AUTONOMOUS RAPID THERMAL ICE PENETRATING METHOD AND SYSTEM

James K. Andersen, and James W. White, both of Arnold, Md., assignors to Ocean Systems Research, Inc., Annapolis, Md.

Filed Jun. 28, 1989, Ser. No. 372,664

Int. Cl.^{5} E21B *7/14, 7/18*

U.S. Cl. 175—14 19 Claims

1. An ice penetrator system including in combination container means for containing a modified low thrust rocket engine having a nozzle, a source of rocket fuel and rocket fuel ignition means for controllably igniting the rocket engine;

VOL
1127
ISS
2
JE
11
1991
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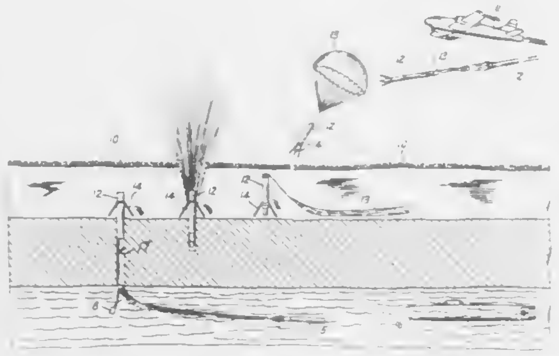
rapid automatically operating self-righting means supported on said container means for rapidly and reliably automatically orientating said container means and the rocket engine nozzle in a desired orientation relative to the ice surface with the container means resting on and above or below the ice surface prior to actuation of the self-righting means; and



rocket engine ignition control means for automatically activating the rocket fuel ignition means upon the container means obtaining a desired orientation relative to the ice surface.

5,022,471

DEVIATED WELLBORE DRILLING SYSTEM AND APPARATUS

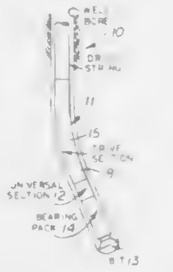
William C. Maurer, and William J. McDonald, both of Houston, Tex., assignors to Maurer Engineering, Inc., Houston, Tex.

Filed Jan. 8, 1990, Ser. No. 461,741

The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.⁵ E21B *7/08*

U.S. Cl. 175—75 12 Claims



1. A system of apparatus for the drilling of a deviated wellbore into the earth comprising;

a drill string extending into a well bore in the earth,

a fluid operated drill motor and drill bit operatively secured on the bottom end of said drill string,

said drill motor being connected at its upper end to said drill string and at its lower end to said drill bit for rotating said drill bit independently of rotation of said drill string,

said drill motor having a tubular drive section housing with the longitudinal axis of its upper end angularly displaced from the longitudinal axis of its lower end for directing the axis of rotation of said drill bit such that it is angularly displaced from the axis of said drill string for effecting a curved path for said wellbore,

said motor comprises a rubber stator in said housing and a steel rotor rotatable therein,

said stator fits the angular configuration of said housing, and

said drill motor drive section housing directs the axis of said drill bit to effect a curved path having a radius of curvature of from approximately 10 to approximately 1,000 feet relative to a vertical or near vertical wellbore,

the flexibility of said rotor and compressibility of said stator permitting rotation of said rotor without undue binding.

5,022,472

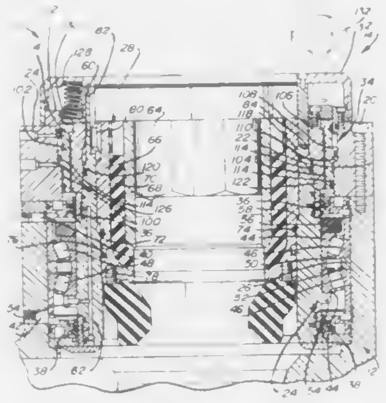
HYDRAULIC CLAMP FOR ROTARY DRILLING HEAD

Thomas F. Bailey, and John E. Campbell, both of Houston, Tex., assignors to MASX Energy Services Group, Inc., Houston, Tex.

Filed Nov. 14, 1989, Ser. No. 436,523

Int. Cl.⁵ E21B *33/03*

U.S. Cl. 175—195 22 Claims



1. A rotary drilling head comprising:

a spool body; and

an upper drive assembly mounted to said spool body, said drive assembly including drive means adapted for rotation within said spool body, a bearing assembly disposed between said drive means and said spool body, a drive bushing matingly received within said drive means and adapted to receive a kelly drive member and hydraulically operated clamp means for selectively locking said drive bushing against axial displacement within said drive means, said clamp means being remotely controlled to selectively clamp said drive bushing within said drive means;

said clamp means including an annular cylinder formed in said upper drive assembly and a hydraulically displaced piston ring slidably received within said annular cylinder, said piston selectively cooperating with at least one locking ball retractably engageable with said drive bushing to prevent axial displacement of said drive bushing within said upper drive assembly, said piston slidably displaceable between an unlocked position and a locked position.

5,022,473

ADJUSTABLE FISHING JAR

William T. Taylor, c/o Razorback Oil Tools, P.O. Box 267, Houma, La. 70361-0267

Continuation-in-part of Ser. No. 299,227, Jan. 23, 1989, Pat. No. 4,919,219. This application Jul. 3, 1989, Ser. No. 374,752

The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.

Int. Cl.⁵ E21B *31/107*

U.S. Cl. 175—299 12 Claims

1. An improvement in an impact down hole jar apparatus including (1) an operating mandrel reciprocatively mounted within a housing body; (2) a compression type impact spring mounted in precompression within said body between a fixed impact spring seat and a moveable impact spring seat; (3) a compression type recocking spring mounted in precompression within said body between a fixed recocking spring seat and a freely moveable recocking spring seat; and (4) an adjustable impact release latch means connected between said mandrel and said body and between said moveable impact spring seat sand said moveable recocking spring seat; (5) said adjustable impact release latch means comprising;

(a) a mandrel operating lug formed by said mandrel as a land around said mandrel;

(b) a first lug support sleeve and a second lug support sleeve urged into abutment against said moveable impact spring seat by said recocking spring and moveable rococking spring seat;

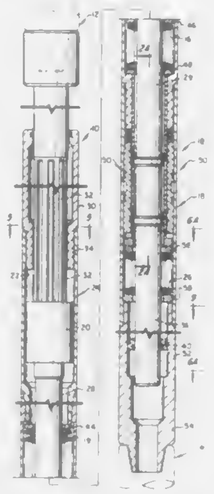
(c) latching lug means including a plurality of arcuately shaped and radially moveable latching lugs longitudinally supported between said first lug support sleeve and said second lug support sleeve;

(d) said latching lugs being longitudinally moveable by said mandrel operating lug when radially confined toward said mandrel and being free of said mandrel operating lug when radially extended away from said mandrel;

(e) an impact compression adjustment sleeve threadly connected within said body for unconfined longitudinal movement within said body responsive to unconfined rotational adjustment of said sleeve within said body;

(f) a latching lug land disposed between a first latching release groove and a second latching release groove formed in the inner wall of said adjustment sleeve;

(g) said latching lug land radially confining said latching lug means toward said mandrel when longitudinally positioned to radially abut said latching lug means;



(h) said first latching release groove and said second latching release groove permitting radial expansion of said latching lug means to be free of said mandrel operating lug where said adjustment sleeve is longitudinally positioned to permit radial release of said latching lug means away from said mandrel operating lug;

(i) said mandrel operating lug, said latching lug means, said latching lug land and said compression adjustment sleeve being concentrically disposed together in a common longitudinal location within said housing body;

(j) said mandrel operating lug operating to carry said latching lug means and said first support sleeve to move said moveable impact spring seat and thereby compress said impact spring until said latching lugs are moved off said latching lug land and then to release said first support sleeve and said moveable impact spring seat when said latching lugs are moved into said first release groove, thereby suddenly releasing said impact spring from compression and returning said latching lug means to said latching lug land; and

(k) said mandrel operating lug operating further to carry said latching lug means and said moveable support sleeve to move said moveable recocking spring seat and compress said recocking spring until said latching lugs are moved off said latching lug land and then to release said second support sleeve and said moveable recocking seat when said latching lugs are moved into said lower release groove, thereby releasing said recocking spring from compression and returning said latching lug means to said latching lug land and thereby recocking said apparatus.

5,022,474

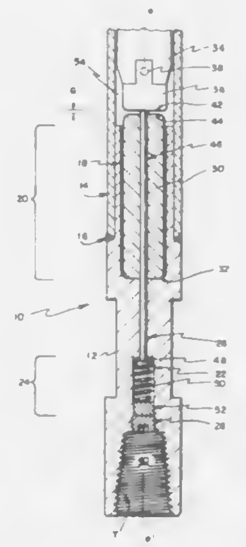
MULTIPLE BLOW PERCUSSION DRILL ASSEMBLY WITH RAPID FIELD MAINTENANCE AND ADJUSTMENT CAPABILITY

Allen E. Bardwell, 900 Shenandoah Shores Rd., Front Royal, Va. 22360

Filed Mar. 12, 1990, Ser. No. 492,476

Int. Cl.⁵ E21B *4/08*

U.S. Cl. 175—299 19 Claims



1. A multiple blow percussion drill assembly for carrying a drill bit comprising:

(a) an elongated tubular housing having first and second vertically displaced longitudinal chambers interconnected by a vertical axial passageway of narrow bore, and further having an aperture at its lower extremity including means for retaining said drill bit and means for accessing said second chamber;

(b) said first chamber positioned at an upper portion of said housing for containing one or more movable impact energy transfer components;

(c) said second chamber positioned at a lower portion of said housing for containing components for controlling the operation of said impact energy transfer components;

(d) a narrow lifting element positioned within said passageway for transferring an upwardly biasing force from at least one of said control components in said second chamber to at least one of said impact energy transfer components in said first chamber;

(e) whereby upon actuating said accessing means, said control components may be readily removed for maintenance.

11. A method of improving the maintainability of a multiple blow percussion drill assembly comprising the steps of:

(a) providing an elongated tubular drill assembly housing having a vertically disposed longitudinal axis and having a first longitudinal chamber located above a second smaller longitudinal chamber;

(b) providing an axial passageway having a longitudinal extent substantially greater than its transverse extent between the first and second chambers, said transverse extent further being substantially lesser than the transverse extent of said first and second chambers;

(c) providing one or more impact energy transfer means within said first chamber and providing helical spring

VOL
1127
ISS
2
JE
11
1991
UMI

control means within said second chamber for controlling in part said impact energy transfer means via said axial passageway;

(d) providing access means to said second chamber via an opening in the lower extremity of said housing thereby allowing ready access to the control means for maintenance without the need to disassemble in whole or in part said impact energy transferring means within said first chamber.

5,022,475

MEASURING EQUIPMENT

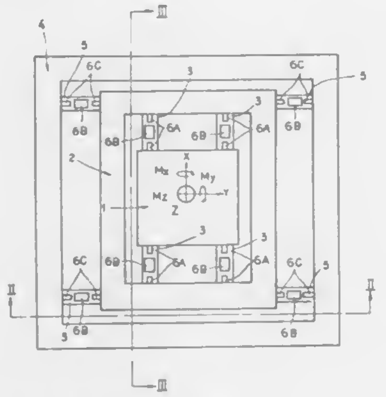
Akira Sato, Saitama; Kazuaki Hama, Tokyo; Makoto Nakao, Tokyo; Junichi Misawa, Tokyo, and Hiroyuki Suzuki, Kanagawa, all of Japan, assignors to Bridgestone Corporation and Misawa Shokai Co., Ltd., both of Tokyo, Japan

Filed Dec. 12, 1989, Ser. No. 449,673

Claims priority, application Japan, Dec. 19, 1988, 63-319971

Int. Cl.^{5} G01G *3/14;* G01L *5/16, 122*

U.S. Cl. 177—211 7 Claims



1. Measuring apparatus, comprising:

a load receiving plate to which a load is to be applied;

an inner frame enclosing said load receiving plate;

at least four inner beams coupling two opposite sides of said load receiving plate to two opposite sides of said inner frame;

an outer frame enclosing said inner frame;

at least four outer beams coupling two opposite sides of said outer frame to two opposite sides of said inner frame in directions perpendicular to said inner beams; whereby said load receiving plate and inner frame are supported by said outer frame; and

bending strain gauges provided on said inner and outer beams at end portions thereof;

strains of said beams, when a load is applied to said load receiving plate, being detected by said strain gauges, and electrically processed and amplified to measure the load.

5,022,476

WHEELCHAIR

Rolf-Dieter Weege, Kalletal, Fed. Rep. of Germany, assignor to Wilhelm Meyer GmbH & Co., K.G., Fed. Rep. of Germany

Continuation-in-part of Ser. No. 222,128, Jul. 18, 1988, abandoned. This application Oct. 20, 1989, Ser. No. 424,597

Int. Cl.^{5} A61G *5/04;* B62D *5/04*

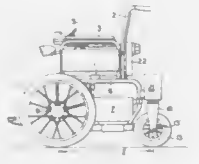
U.S. Cl. 180—6.5 4 Claims

1. In a wheelchair having at least one electrically driven drive wheel, one pair of power-steered steering wheels each of which swivels independently of each other around an essentially perpendicular steering axis, and a manually-operated control and steering element, the improvement comprising:

a separate steering motor for each steering wheel to adjust the steering angle of the steering wheels about its steering axis,

said steering element comprising a mechanical-electrical steering angle generator which produces an electrical steering signal dependent on the angular position of said steering element,

an electrical control device which receives said electrical steering signal, thereby controlling both said steering motors for the adjustment of the steering angle of the steering wheels by producing an adjustment signal for each steering wheel which is inversely proportional to the curve of the turning radius of each said steering wheel.



5,022,477

SYSTEM AND METHOD FOR CONTROLLING THE GROUND SPEED AND ENHANCING THE MANEUVERABILITY OF AN OFF-ROAD VEHICLE

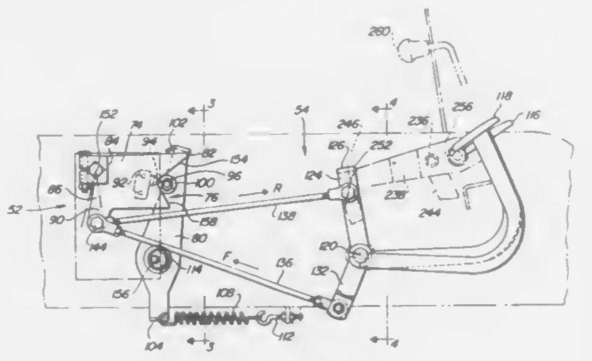
Lee J. Wanie, Horicon, Wis., assignor to Deere & Company, Moline, Ill.

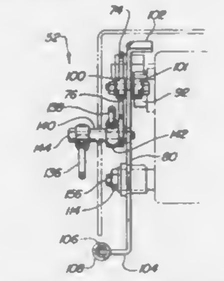
Division of Ser. No. 216,689, Jul. 7, 1988, Pat. No. 4,883,137, which is a division of Ser. No. 901,716, Aug. 27, 1986, Pat. No. 4,759,417. This application Sep. 22, 1989, Ser. No. 411,421

The portion of the term of this patent subsequent to Jul. 26, 2005, has been disclaimed.

Int. Cl.^{5} B60K *23/00;* B62D *1/00*

U.S. Cl. 180—6.34 1 Claim





1. A mechanism for controlling the ground speed of a maneuverable off-road vehicle having an operator seat, an engine and a hydrostatic transmission having a swash plate comprising:

means operatively connected to said transmission for precisely locating an initial neutral position of said hydrostatic transmission;

means operatively connected to said transmission and said precisely locating means for selectively driving said vehicle in either a forward or a reverse direction, said driving means including at least two right-foot operated control pedals operatively connected to said transmission, one of said pedals for controlling the forward ground speed and the second of said pedals for controlling the reverse ground speed, the forward control pedal being operatively connected with a shaft by a bushing means, including a first arm, a first adjustable connecting rod means operatively connected to said first arm at one end portion and to said precisely locating means at an opposite end position, said reverse pedal also being operatively connected to said shaft, a second arm operatively connected with said shaft by a hub means, and a second adjustable connecting rod means interconnecting said second arm at one end portion and said precisely locating means an opposite end portion and spaced laterally from said first adjustable connecting rod means opposite end portion by a spacer means;

means operatively connected to said foot operated control pedals for automatically returning said transmission to said initial neutral position;

means operatively connected to said vehicle for selectively stopping said vehicle;

means operatively connected to said stopping means for selectively slowing the ground speed of said vehicle thereby enhancing said vehicle's maneuverability;

means operatively connected to said transmission, said driving means and said stopping means for selectively maintaining said swash plate in a constant position while said vehicle is moving in said forward direction; and

means operatively connected to said maintaining means for selectively disengaging said maintaining means.

5,022,478

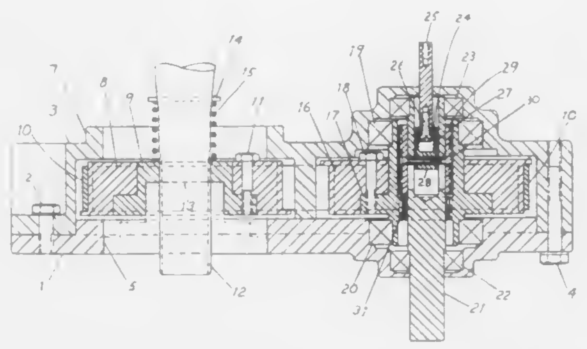
POWER TAKE-OFF FOR FOUR WHEEL DRIVE VEHICLES

Dirck T. Hartmann, 4121 Morning Star Dr., Huntington Beach, Calif. 92649

Filed May 1, 1990, Ser. No. 517,209

Int. Cl.^{5} B60K *17/28*

U.S. Cl. 180—53.1 2 Claims



1. In a four wheel drive vehicle including a transmission with a splined shaft, a transfer case, and an adapter located between said transmission and said transfer case and bolted to said transmission and said transfer case for their mutual alignment and support, an improved power take-off which replaces said adapter and comprises:

a power take-off housing and a mating cover with said housing and said cover bolted together and bolted to said transmission and to said transfer case for their mutual alignment and support;

a first sprocket located within said power take-off housing and fixed on said splined transmission shaft for rotation therewith;

a first pair of ball bearings with outer races of said first pair of ball bearings fixed in said power take-off housing and said mating cover respectively;

a driven shaft held centered and axially captive within said first pair of ball bearings;

a central hole through said driven shaft with a short segment of internal spline located within said central hole;

a second sprocket fixed on said driven shaft for rotation therewith;

a toothed belt driving said second sprocket from said first sprocket;

a second pair of ball bearings with outer races of said second pair of ball bearings fixed in said power take-off housing and said mating cover respectively;

an output shaft held centered and axially captive within inner races of said second pair of ball bearings with the axis of rotation of said output shaft aligned along the axis of rotation of said driven shaft;

a drive ring torsionally fixed on said output shaft but axially moveable relative to said output shaft;

an external spline on said drive ring; and

positioning means for moving said drive ring into and out of engagement with said internal spline located in said central hole through said driven shaft.

5,022,479

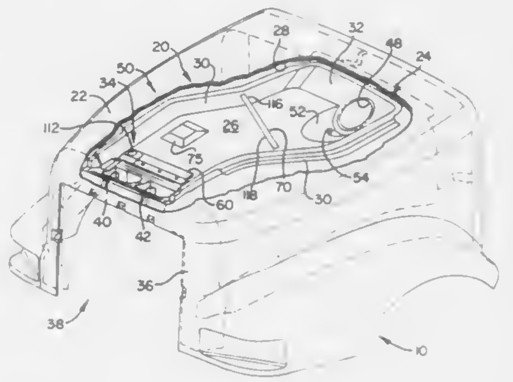
MOTOR VEHICLE ENGINE AIR INTAKE SYSTEM INCLUDING MOISTURE ELIMINATION APPARATUS

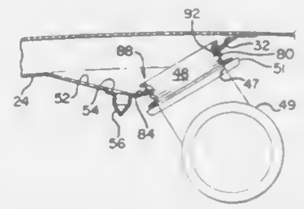
David M. Kiser, and James H. King, both of Fort Wayne, Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.

Filed Feb. 16, 1990, Ser. No. 468,405

Int. Cl.^{5} B60K *13/02, 13/06*

U.S. Cl. 180—68.3 28 Claims





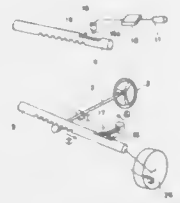
1. An engine air intake system comprising structure forming an elongate, shallow, rectangular duct which is mounted depending from an inner surface of a vehicle hood and extending horizontally therefrom, said hood surface forming a top surface of said duct, said rectangular duct including a forward ambient air inlet and a rear air outlet adapted to engage an engine air intake, baffle means fixedly attached in said duct between said inlet and said outlet for eliminating moisture from an air stream flowing therebetween, and drain means secured

VOL
1127
ISS
2
JE
11
1991
UMI

to a bottom surface in said duct between said forward air inlet and said rear outlet for removing said moisture from said duct.

5,022,480
STEERING SAFETY MECHANISM

Hidemitsu Inagaki; Mutsumi Kawamoto, and Satoru Tanaka, all of Anjo, Japan, assignors to Aisin AW Co., Ltd., Japan
Filed Jul. 10, 1989, Ser. No. 377,061
Claims priority, application Japan, Oct. 26, 1988, 63-271904
Int. Cl.^{5} B62D *5/04*
U.S. Cl. 180—79.1 15 Claims

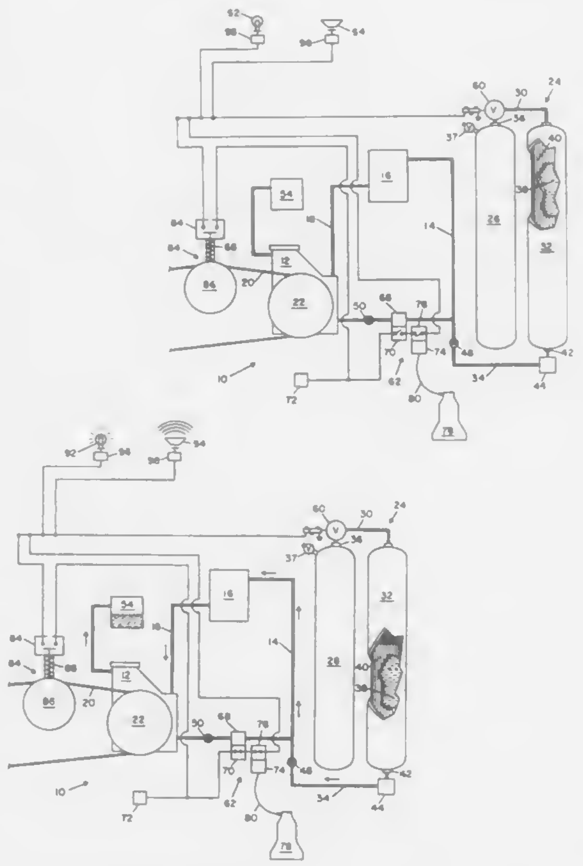


1. A steering safety mechanism for an automotive vehicle, comprising:
- a steering shaft and a steering wheel connected to said steering shaft for turning said steering shaft;
- a steering rack connected to a ground-engaging wheel for turning said ground engaging wheel responsive to the turning of the steering shaft;
- steering limiting means for mechanically engaging said rack to prevent further rotation of said steering shaft in one direction while permitting rotation of said steering shaft in the opposite direction; and
- steering limiting control means for selectively activating said steering limiting means to mechanically engage said steering rack responsive to vehicle velocity.

5,022,481
EMERGENCY POWER STEERING BACKUP APPARATUS AND METHOD

Daniel C. Carter, 102 W. Davis, Luling, Tex. 78648
Continuation of Ser. No. 472,038, Jan. 30, 1990, abandoned. This application Dec. 6, 1990, Ser. No. 623,270
Int. Cl.^{5} B62D *5/06*
U.S. Cl. 180—133 16 Claims

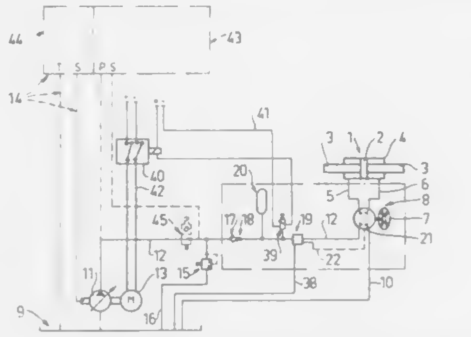
1. An emergency power steering backup apparatus for vehicles having a fluid operated power steering unit, said apparatus comprising:
- A. emergency power steering fluid supply means connected to the power steering unit and adapted to be activated for temporarily providing power steering fluid to the power steering unit for operating said power steering unit; and
- B. activating means for receiving an activating signal and for releasing the emergency power steering fluid supply so as to flow to the power steering unit in response to the activating signal; and
- C. sensor means for sensing the pressure of the fluid supplied to the vehicle's power steering unit in normal operation and the speed of the vehicle, and for providing the activating signal capable of operating the activating means when the sensed fluid pressure drops below a minimum value while the sensed vehicle speed is above a certain predetermined minimum speed.



5,022,482
HYDRAULIC STEERING SYSTEM FOR ELECTRICALLY DRIVEN MOTOR VEHICLES

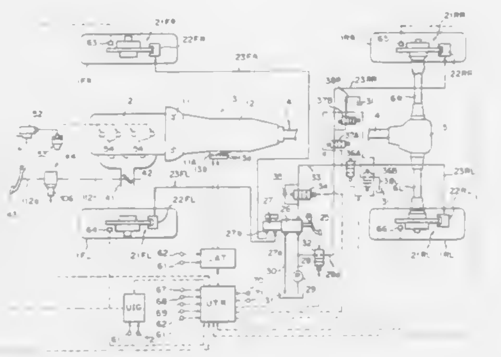
Bo Andersson, Skellefteå, and Anders Holmgren, Ursviken, both of Sweden, assignors to Bahco Hydrauto AB, Skellefteå, Sweden
Filed Aug. 11, 1989, Ser. No. 392,297
Claims priority, application Sweden, Aug. 23, 1988, 8802957
Int. Cl.^{5} B62D *5/00*
U.S. Cl. 180—133 5 Claims

1. A hydraulic steering system for electrically driven vehicles and machines including a hydraulic double-acting piston-cylinder steering device, and a control unit which controls said piston-cylinder device and which is actuable by a steering member, said control unit being connected to a hydraulic pump which is driven by a motor, and to a tank, and being provided with a control signal outlet which delivers control signals to maintain and to interrupt the supply of hydraulic steering fluid to the steering piston-cylinder device, wherein a accumulator is provided in a hydraulic connection between the pump and the control unit between a control valve and a check valve which when closed prevent hydraulic fluid from flowing from the accumulator, said control valve being located downstream of the accumulator and opening in response to a control signal delivered from the control unit in the form of a pressure increase, irrespective of the accumulator pressure and the pump pressure, so as to permit hydraulic fluid to flow to the steering piston-cylinder device from the accumulator, said steering system including means for starting the motor of the pump in response to a pressure decrease in said hydraulic connection between said control valve and said check valve to thereby maintain a requisite hydraulic flow for steering purposes to the steering piston-cylinder device through the action of said pump.



5,022,483
SLIP CONTROL SYSTEM FOR A VEHICLE

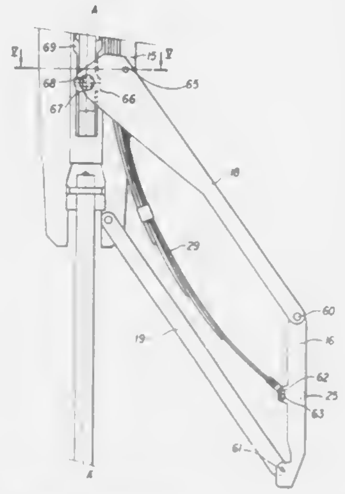
Toshiaki Tsuyama; Kazutoshi Nobumoto; Fumio Kageyama; Akira Sone, and Makoto Kawamura, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan
Filed Jun. 26, 1990, Ser. No. 543,551
Claims priority, application Japan, Jun. 29, 1989, 1-167992
Int. Cl.^{5} B60K *31/00*
U.S. Cl. 180—197 37 Claims



1. A slip control system of a vehicle having a load adjusting means for adjusting a load of an engine and a slip control means for reducing torque to be generated by the engine by controlling the load adjusting means prior to operation of an accelerator when a driven wheel slips to a large extent, wherein:
- a control-unreactive region setting means for setting a control-unreactive region is provided so as to allow the load adjusting means to ensure a given amount of operation of the accelerator nearby a maximum opening angle of the accelerator prior to slip control by the slip control means;
- an engine control means is provided for controlling the engine on the basis of a predetermined condition so as to change the torque to be generated by the engine without control of the load adjusting means; and
- a correction means for correcting a control value of the engine control means in a direction of reducing the torque to be generated by the engine in the control-unreactive region.

5,022,484
LOGGING METHOD AND APPARATUS USING A SONDE EQUIPPED WITH MEASURING PADS

Pascal Panetta, Vanves, and Jacques Tromelin, Longjumeau, both of France, assignors to Schlumberger Technology Corporation, New York, N.Y.
Division of Ser. No. 415,856, Sep. 8, 1982, Pat. No. 4,614,250. This application May 16, 1986, Ser. No. 864,629
Claims priority, application France, Sep. 9, 1981, 81 17065
The portion of the term of this patent subsequent to Sep. 30, 2006, has been disclaimed.
Int. Cl.^{5} G01V *1/40*
U.S. Cl. 181—102 12 Claims



8. Logging sonde comprising:
- a body member;
- four main arms articulated on the body member and distributed regularly around said body member, each pair of opposite arms being constrained to remain symmetrical with respect to the axis of the sonde;
- a secondary arm associated with each main arm, articulated on the body member,
- a measuring pad connected to the ends of each said main arm and its respective associated secondary arm in a parallelogram configuration, the pads being constrained to remain parallel to the axis of the sonde;
- first resilient means for urging the pads against the borehole wall, said first resilient means comprising a leaf spring associated with each pad, each of said leaf springs having one end fixed to the body member and the other end connected to the respective pad;
- second resilient means, comprising two spring members mounted to the body member, each of which acts on a pair of opposite pads through the associated main arms to urge said pads against the borehole wall;
- means for overcoming the action of said first and second resilient means and for retracting the pads against the body member;
- and means for adjusting the force provided by said two spring members.

5,022,485
METHOD AND APPARATUS FOR DETONATION OF DISTRIBUTED CHARGES

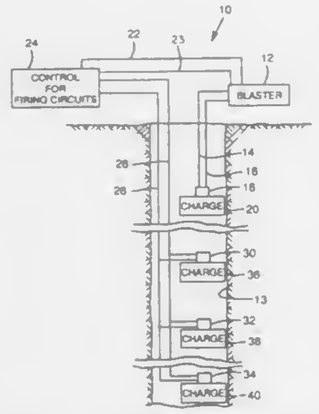
Donald K. Mitchell, 915 E. Apache, Tulsa, Okla. 74106
Continuation-in-part of Ser. No. 337,958, Apr. 13, 1989, Pat. No. 4,991,684. This application Mar. 27, 1990, Ser. No. 500,139
Int. Cl.^{5} G01V *1/06;* E21B *7/00;* F42D *3/06*
U.S. Cl. 181—106 20 Claims

1. A method of geophysical exploration wherein a seismic wave is passed through a bore hole for sequentially detonating a plurality of explosive charges disposed within said bore hole

VOL
1127
ISS
2
JE
11
1991
UMI

at spaced intervals, and wherein each of said charges is fired by the discharge of a charged capacitor associated therewith, said method comprising the steps of:

connecting a plurality of electronic switches so as to control the completion of the respective discharge circuits of said capacitors;
initiating a seismic wave;
arming the switches substantially simultaneously with the step of initiating the seismic wave;



causing the seismic wave to successively strike a plurality of electro-acoustic sensors connected respectively to said switches, each of said switches completing its capacitor discharge circuit responsive to a signal generated by its associated sensor; and
disarming the switches associated with any undetonated charges remaining in the borehole immediately after the seismic wave passes the sensor associated with each undetonated charge.

5,022,486

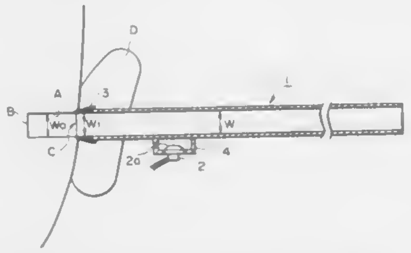
SOUND REPRODUCING APPARATUS

Masayoshi Miura, Chiba; Kiyofumi Inanaga; Hiroyuki Sogawa, both of Kanagawa, and Yasuhiro Iida, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 20, 1989, Ser. No. 409,929

Int. Cl.⁵ A61B *7/02*

U.S. Cl. 181—132 **53 Claims**



1. A sound reproducing apparatus, comprising:
an acoustic tube having first and second ends and having substantially a same inside diameter as that of an external acoustic meatus,
a loudspeaker unit mounted to said acoustic tube intermediate its first and second ends and such that a sound radiating surface thereof is directed to one side of said acoustic tube, and
said acoustic tube having its first end formed as an auricular attachment section and having its second end formed as a non-sound-reflecting end.

5,022,487

STETHOSCOPE

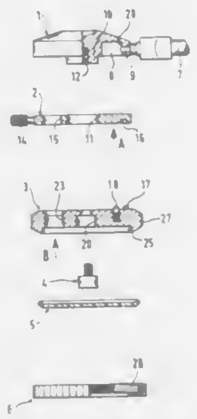
Ulrich Kirchner, Narkgröningen, Fed. Rep. of Germany, assignor to Kirchner & Wilhelm GmbH & Co., Asperg, Fed. Rep. of Germany

Filed Jan. 10, 1990, Ser. No. 462,799

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1989, 8900402[U]

Int. Cl.⁵ H04R *25/00*

U.S. Cl. 181—137 **6 Claims**



1. A stethoscope comprising a housing base member and a plate-shaped base member connected to the housing base member, the housing base member having a central bearing pin, a housing cover being rotatably mounted on the central bearing pin between the housing base member and the plate-shaped base member, the housing cover defining a sound inlet opening, means for limiting the relative rotation of the plate-shaped base member and the housing cover, the limiting means comprising a circular arc-shaped receiving means and a stop member engaging in the receiving means, the housing base member defining a reverberation chamber and a transverse bore in communication with the reverberation chamber, a connecting tubing connected to binaurals being attached to the housing base member and acoustically connected to the sound inlet opening of the housing cover through the transverse bore and the reverberation chamber in the housing base member, wherein the plate-shaped base member has two sound outlet openings which are offset in direction of rotation, the openings having diameters, wherein the two sound outlet openings have different diameters, wherein the sound outlet openings are alignable with the sound inlet opening by relative rotation of the housing cover and the plate-shaped base member, and wherein the diameter of the larger sound outlet opening of the plate-shaped base member corresponds essentially to the diameter of the sound inlet opening of the housing cover.

5,022,488

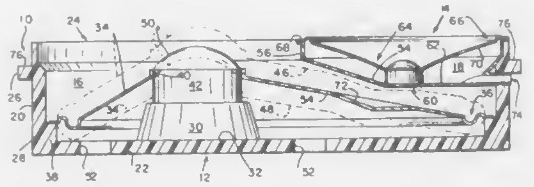
TRANSDUCER ENCLOSURE

William N. House, Bloomington, Ind., assignor to Harman International Industries, Incorporated, Northridge, Calif.

Filed Sep. 18, 1989, Ser. No. 409,006

Int. Cl.⁵ H05K *5/00*

U.S. Cl. 181—156 **9 Claims**



1. An enclosure for mounting two tranducers (12, 14), the enclosure (10) including a wall (20, 22) defining an enclosure (10) interior, the enclosure (10) further including means for defining at least partially within the enclosure (10) interior a wall (54 and/or 56) for dividing the enclosure (10) interior into a first portion (16) and a second portion (18), means (52) provided in the enclosure (10) wall (20 and/or 22) for venting one of the first (16) and second (18) portions outside the enclosure (10), and means (74) provided in the enclosure (10) wall (20 and/or 22) for venting the other of the first (16) and second (18) portions outside the enclosure (10), the enclosure (10) further comprising means (38) for mounting a transducer (12) perimetral edge, the transducer (12) perimetral edge mounting means extending inwardly from the enclosure wall (20 and/or 22) into the enclosure (10) interior, the means (52) for venting one of the first (16) and second (18) enclosure portions being provided between the transducer (12) perimetral edge mounting means (38) and a back of the enclosure (10).

5,022,489

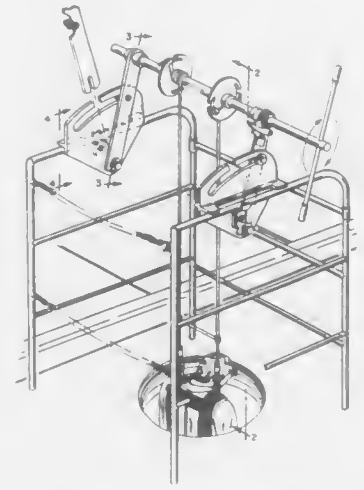
HOISTING APPARATUS FOR A MANHOLE

Charles J. Sauber, Virgil, Ill., assignor to Sauber Mfg. Co., Virgil, Ill.

Filed Jun. 15, 1990, Ser. No. 538,982

Int. Cl.⁵ A62B *1/16, 35/00;* **B66C** *23/18*

U.S. Cl. 182—3 **10 Claims**



1. A hoisting apparatus for a manhole adapted to be fastened to a guardrail of a manhole, the hoisting apparatus comprising:
a horizontal rotatable shaft adapted to extend across a manhole opening and be vertically spaced above the manhole;
means affixed to the shaft for winding up retrieving line;
bracket means adjacent opposite ends of the shaft for rotatably supporting the shaft;
clamping means for mounting the bracket means to the manhole guardrail;
driving means adjacent one end of the shaft for rotatably driving the shaft and line retrieving means; and
said bracket means enabling the shaft to be positioned over the manhole.

5,022,490

SAFETY BASE FOR SCAFFOLDING

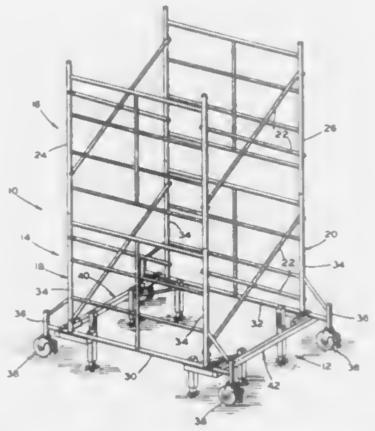
Steven J. Wyse, Archbold, Ohio, assignor to Bil-Jax, Inc., Archbold, Ohio

Filed Feb. 6, 1990, Ser. No. 475,904

Int. Cl.⁵ E04G *5/02*

U.S. Cl. 182—17 **13 Claims**

1. A safety base component for a scaffold, said component comprising a main elongate rigid member of a length sufficient to extend between end frame members of the scaffold, safety legs located near end portions of said component, short, elongate rigid members affixed to the ends of said main rigid member and extending outwardly therefrom in a common direction, additional safety legs located at outer end portions of said



short rigid members, and attaching means at end portions of said component to enable said component to be detachably connected to lower portions of the scaffold.

5,022,491

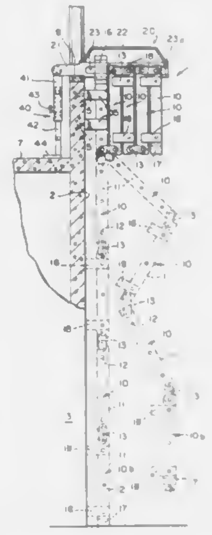
COLLAPSIBLE FIRE ESCAPE LADDER

Joseph Gill, 95 Shelley Ave., Staten Island, N.Y. 10314

Filed Aug. 9, 1990, Ser. No. 564,845

Int. Cl.⁵ E06C *9/10, 9/14*

U.S. Cl. 182—95 **14 Claims**



1. A collapsible escape ladder fixedly attachable to a vertical wall of a building and the like comprising
a plurality of ladder sections comprising paired uprights and a plurality of ladder rungs, said ladder sections being pivotally attached at respective ends thereof, a first end ladder section being fixedly attached to the vertical wall, a second end ladder section having a counterweight attached thereto, said ladder sections having inwardly disposed retention posts attached at the pivot points between adjacent ladder sections, said first end ladder section having inwardly disposed retention posts attached at the upper ends of the respective uprights; and
ladder retention means slidably attached to the uprights of said first end ladder section which slidably engage the retention posts of said ladder sections when said ladder sections are sequentially folded adjacent to said first end

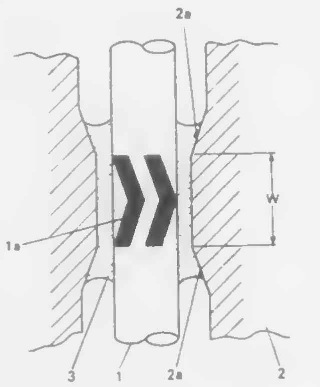
VOL
1127
ISS
2
JE
11
1991
UMI

ladder section to secure the folded ladder in place and selectively release said ladder sections when slidably retracted from said retention posts.

5,022,492
FLUID-BEARING APPARATUS

Hideaki Ohno; Takao Yoshitugu, both of Osaka; Chuuryoh Yoshida, Amagasaki, and Hideo Matsumoto, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 17, 1989, Ser. No. 339,324
Claims priority, application Japan, Apr. 20, 1988, 63-97029
Int. Cl.^{5} F16C *32/06*
U.S. Cl. 184—5 2 Claims

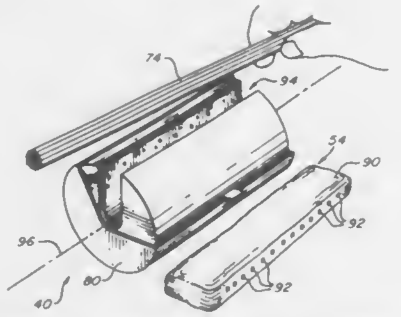


1. A fluid-bearing apparatus comprising a shaft, a sleeve that receives said shaft therein, dynamic pressure-generating grooves that are formed either on said shaft or on said sleeve, and a fluid lubricant that is oil, grease, or the like, wherein a single-component composition is used as the base oil of said lubricant, said single-component composition being one selected from the group consisting of trimethylolpropane-triheptylate, trimethylolpropanetrioctanate, and trimethyolpropane-trinonanate.

5,022,493
METHOD AND APPARATUS FOR LUBRICATING CABLES

William E. Buckelew, 546 Manchester Ct., Piscataway, N.J. 08854

Filed May 24, 1990, Ser. No. 528,222
Int. Cl.^{5} F16N *7/00*
U.S. Cl. 184—16 14 Claims



1. Apparatus for lubricating cables to be pulled through a conduit, comprising:

a canister having an outer body with ends, and a slot extending from an exterior surface of said canister and through a portion of each end to a longitudinal position within said canister, said ends having central openings to accommodate the passage of said cable through said canister;

lubricant dispensing means lining said slot and adapted to dispense lubricant onto the portion of a cable in said slot as said cable is moved through said canister;

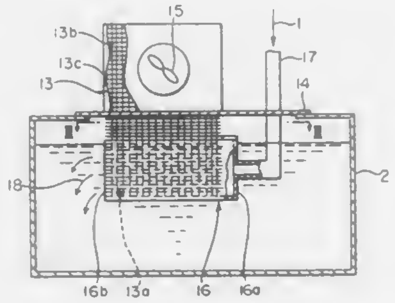
removable insert means adapted to be placed in said slot after cables to be lubricated are placed in said slot; and

means for sealing said canister with said insert in place, such that said canister with said lubricant dispensing means surrounds an inserted cable portion.

5,022,494
HEAT EXCHANGER FOR OIL

Hisaaki Yamakage; Kenhachiro Nomura; Tadayoshi Maruyama; Kenji Kataoka, and Nobuyuki Yamashita, all of Kobe, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 43,806, Apr. 29, 1987, abandoned. This application Dec. 4, 1989, Ser. No. 443,847
Claims priority, application Japan, May 7, 1986, 61-106058; Jun. 23, 1986, 61-96387[U]; Jun. 23, 1986, 61-147407
Int. Cl.^{5} F01M *5/00;* F28D *15/02*
U.S. Cl. 184—104.1 16 Claims



1. A heat exchanger for cooling hot oil from a machine comprising:

an oil tank providing a reservoir for cool oil;

a heat pipe having a heat absorbing portion and a heat dissipating portion, said heat pipe containing a working fluid which vaporizes within said heat pipe at a temperature between room temperature and the temperature of said hot oil from said machine;

means for cooling said heat dissipating portion;

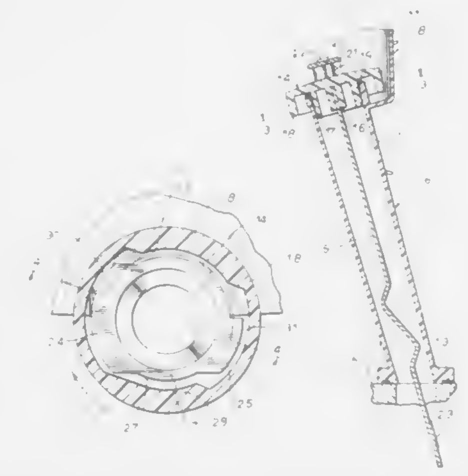
an oil guide which surrounds the lower end of said heat absorbing portion, said oil guide being immersed in cool oil and having an intake end through which hot oil can be introduced, a discharge end which opens onto the inside of said oil tank, said intake end and said discharge end being disposed on opposite sides of the lower end of said heat absorbing portion, and walls which extend between the intake end and the discharge end and which have an open portion through which the heat pipe extends and edges at the open portion that cooperate with the lower end of said heat absorbing portion to isolate the intake end of the oil guide from the reservoir of cool oil except through the discharge end so that oil which is introduced into said intake end must flow past said heat absorbing portion before exiting from said discharge end; and

means for supplying hot oil from said machine to said intake end of said oil guide.

5,022,495
OIL FILL TUBE ASSEMBLY

Stephen J. Lavender, Milwaukee, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed Feb. 20, 1990, Ser. No. 481,215
Int. Cl.^{5} F16N *21/00*
U.S. Cl. 184—105.1 13 Claims

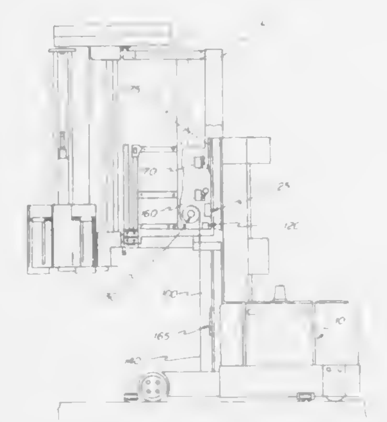


1. An oil fill tube assembly for an internal combustion engine, comprising a tube having a lower end communicating with the crankcase of the engine and having an open upper end, a cap member to enclose said upper end and having a peripheral flange, a dipstick member connected to the cap member and extending downwardly within said tube, sealing means on the underside of the cap member and disposed to engage the upper end of said tube, a pair of locking lugs extending radially outward from the upper end of the tube, said lugs being spaced circumferentially to provide gaps therebetween of unequal circumferential dimension, a pair of locking elements on said flange, said locking elements having unequal circumferential dimensions and being constructed and arranged to register with the gaps when said cap member is installed in said tube, means to be engaged by an operator for rotating said cap member to thereby move said locking elements beneath said locking lugs to a locking position and provide a connection between said cap member and said tube, and indicia on an outer surface of one of said members and arranged relative to said locking elements such that said indicia will face in a predetermined direction when said locking elements are in the locking position.

5,022,496
SLOWDOWN DURING STAGING OF A TURRET STOCKPICKER

Kim A. Klopfleisch, St. Marys, and Tim A. Wellman, Coldwater, both of Ohio, assignors to Crown Equipment Corporation, New Bremen, Ohio

Filed Dec. 5, 1989, Ser. No. 446,224
Int. Cl.^{5} B66B *9/20*
U.S. Cl. 187—9 E 6 Claims



5. In a materials handling vehicle including a power unit, a telescoping mast comprising inner and outer sections, a platform assembly, and means for raising and lowering the platform, the improvement comprising

means for sensing the position of the platform with respect to the mast, and

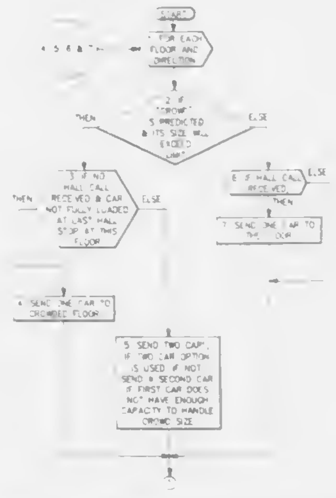
means responsive to said sensing means for slowing the rate of movement of the platform immediately before and during any staging and immediately before reaching the upper or lower limit of travel, and

means for resuming the rate of platform movement after staging.

5,022,497
"ARTIFICIAL INTELLIGENCE" BASED CROWD SENSING SYSTEM FOR ELEVATOR CAR ASSIGNMENT

Kandasamy Thanagavelu, Avon, Conn., assignor to Otis Elevator Company, Farmington, Conn.

Continuation-in-part of Ser. No. 209,744, Jun. 21, 1988, Pat. No. 4,838,384. This application Mar. 3, 1989, Ser. No. 318,295
Int. Cl.^{5} B66B *1/18*
U.S. Cl. 187—124 11 Claims


START
FOR EACH FLOOR AND DIRECTION
THEN
ELSE
3 IF NO HALL CALL RECEIVED & CAR NOT FULLY LOADED AT LAST HALL STOP AT THIS FLOOR
THEN
ELSE
6 IF HALL CALL RECEIVED
ELSE
THEN
7 SEND ONE CAR TO THE FLOOR
4 SEND ONE CAR TO CROWDED FLOOR
5 SEND TWO CARS IF TWO CAR OPTION IS USED IF NOT SEND A SECOND CAR IF FIRST CAR DOES NOT HAVE ENOUGH CAPACITY TO HANDLE CROWD SIZE

1. In an elevator dispatching system, a method of controlling the number of elevator cars to be sent to a predetermined floor landing, said method comprising the steps of:

obtaining historical information of passenger arrival rates at a predetermined floor, said historical covering at least a predetermined time interval;

determining, based on said historical information, a passenger arrival rate at the predetermined floor for said predetermined time interval;

predicting, based on said determined passenger arrival rate, a crowd size at the predetermined floor for said predetermined time interval;

comparing said predicted crowd size with a predetermined crowd size threshold;

generating a crowd signal when said predicted crowd size exceeds said predetermined crowd size threshold; and

controlling the number of elevator cars to be sent to the predetermined floor landing based on said generated crowd signal.

5,022,498
METHOD AND APPARATUS FOR CONTROLLING A GROUP OF ELEVATORS USING FUZZY RULES

Kenji Sasaki; Kenji Yokota; Hiroshi Hattori, and Nobuyuki Sata, all of Osaka, Japan, assignors to Fujitec Co., Ltd., Osaka, Japan

Filed Jan. 30, 1989, Ser. No. 302,987
Claims priority, application Japan, Feb. 1, 1988, 63-21589
Int. Cl.^{5} B66B *1/18*
U.S. Cl. 187—127 18 Claims

6. An elevator group control apparatus for controlling a plurality of elevator cars that service a plurality of floors, in which fuzzy rule groups are applied to a hall call when an elevator call is placed and an optimum elevator car is assigned

VOL
1127
ISS
2
JE
11
1991
UMI

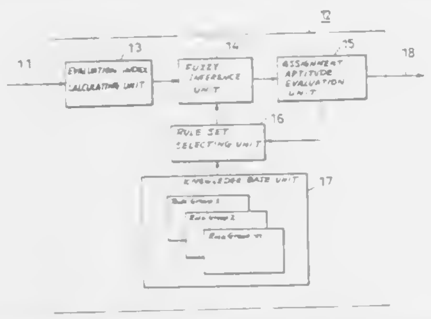
to proceed to a floor from which said hall call originates based upon the application of said fuzzy rule groups, comprising:

a knowledge base unit for storing a plurality of predetermined rule groups to which priority orders are given;

a rule set selection unit for successively selecting rule groups according to said priority orders;

an evaluation index calculation unit for calculating evaluation indexes in response to a traffic information signal when said hall call occurs;

a fuzzy inference unit for obtaining a conformance degree of each elevator car for each rule group based upon said evaluation indexes and a membership function, and for obtaining, based upon said degree of conformance, an assignment aptitude value for each elevator car for each rule group; and



an assignment aptitude evaluation unit for single step advancing selection operations of said rule set selecting unit at a time when at least one elevator car, in addition to said optimum elevator car, has an assignment aptitude value for a current rule group that differs from said optimum assignment aptitude value of said optimum elevator car by no more than a predetermined threshold value, and for stopping said selection operation of said rule set selecting unit when the difference in said assignment aptitude value for said current rule group is greater than said predetermined threshold value, thereby providing an assignment signal for selecting an elevator car having an optimum assignment aptitude value, and assigning said elevator car having said optimum assignment aptitude value to proceed to said floor from which said hall call originates.

5,022,499
AXIALLY SLIT PRESSURE CYLINDER WITH BRAKE MEANS

Gunnar Lundqvist, Millingsnäsgard, Sweden, assignor to Hygrama Ag, Switzerland

Filed Feb. 28, 1990, Ser. No. 486,126

Claims priority, application Fed. Rep. of Germany, Feb. 28, 1989, 3906211

Int. Cl.⁵ B65H *59/10*

U.S. Cl. 188—67 **11 Claims**

1. A pressure cylinder comprising:

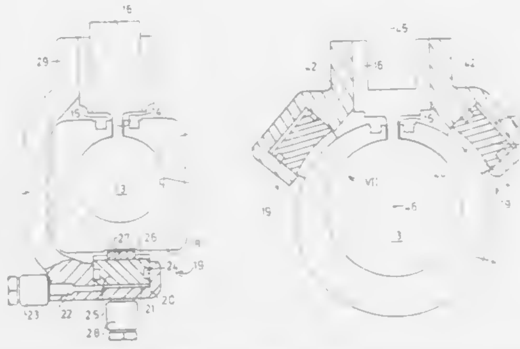
a terminally closed tubular casing having a sealed elongated slot, the tubular casing having an outer surface;

a sealed piston longitudinally displaceably guided in an interior of said casing;

a force transfer element extending from said piston through the elongated slot;

at least one brake mechanism fixed to the force transfer element, said brake mechanism providing a recess defining a brake cylinder;

a brake piston disposed in said recess and movable by fluid pressure, the brake piston being movable in a direction substantially radial to the casing and having a lining surface facing the outer surface of the casing; and



a brake lining attached to said lining surface and having a brake area for removably contacting the outer surface of the casing.

5,022,500
DISC BRAKE CALIPER

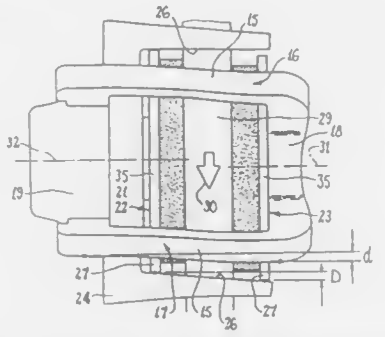
Nui Wang, Croyden, Australia, assignor to Brake and Clutch Industries Australia Pty. Ltd., East Bentleigh, Australia

Filed Sep. 8, 1989, Ser. No. 404,579

Claims priority, application Australia, Sep. 14, 1988, PJ0418

Int. Cl.⁵ F16D *55/00, 55/18, 65/38*

U.S. Cl. 188—73.31 **16 Claims**



1. A disc brake assembly engageable with a disc rotatably mounted on a vehicle, comprising,

an anchor bracket adapted to be mounted in fixed relation on a motor vehicle,

a caliper comprising a bridge and a cylinder, said bridge having an inboard portion and an outboard portion on opposite sides of the disc, said inboard and outboard portions being connected by a central portion,

said cylinder mounted to said inboard portion,

a piston slidably mounted in said cylinder,

inboard and outboard friction pad assemblies having planar faces adapted to be brought into frictional contact with opposite faces of the disc,

the rigidity of the central portion being such that the outboard portion of said caliper is resiliently deflectable relative to said inboard portion in a direction transverse to the axis of said cylinder and parallel to the direction of movement of said disc at the region where said friction pad assemblies are adapted to engage said disc, the rigidity of the caliper in a plane perpendicular to said deflectable direction being sufficient to substantially prevent said pads moving out of parallel with each other under braking conditions.

5,022,501
HYDRAULIC TYPE VEHICLE HEIGHT ADJUSTING DEVICE FOR ATTACHMENT TO VEHICLE SHOCK ABSORBER

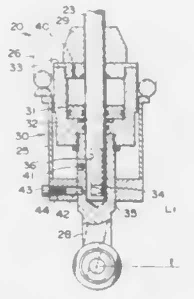
Yasuyuki Hayashi, Fukuroi, and Shigenobu Abe, Hamamatsu, both of Japan, assignors to Kabushiki Kaisha Showa Seisakusho, Japan

Filed Sep. 19, 1989, Ser. No. 409,463

Claims priority, application Japan, Sep. 21, 1988, 63-122787[U]

Int. Cl.⁵ F16F *5/00*

U.S. Cl. 188—300 **3 Claims**



1. A hydraulic shock absorber for a vehicle comprising a cylinder, a piston slidably fitted within said cylinder, a piston rod connected to said piston and extending out of one end of the cylinder, a first spring bearing engaged with the piston rod, a second spring bearing coupled to said cylinder, a suspension spring interposed between said spring bearings, said shock absorber being attached between a body portion and an axle of said vehicle through a piston rod-member and a cylinder-member, wherein said piston rod-member comprises said first spring bearing, a mounting member for mounting the shock absorber to one of the axle and the body portion, said mounting member being movable in the axial direction relative to said first spring bearing, and mechanical locking means to lock the relative positions between said mounting member and said first spring bearing.

5,022,502
TEE ANCHOR FOR DUO SERVO DRUM BRAKES

Ronald L. Shellhause, Vandalia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

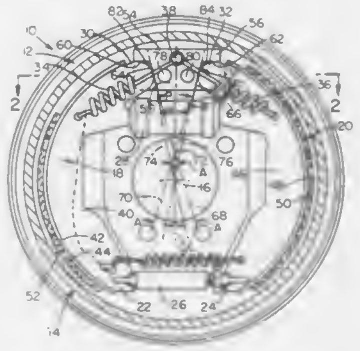
Filed Jul. 3, 1989, Ser. No. 375,322

Int. Cl.⁵ F16D *51/52*

U.S. Cl. 188—333 **7 Claims**

1. In a dual servo drum brake having a rotatable drum to be braked, said drum having an axis of rotation, said brake also having a primary and a secondary brake shoe assembly, a brake shoe anchor for one pair of adjacent ends of said brake shoe assemblies, means when actuated moving said brake shoe assemblies into engagement with said drum, and brake shoe retractor springs for retracting said brake shoe assemblies when said moving means is released and continually urging said brake shoe ends toward engagement with said anchor, the improvement comprising:

said brake shoe anchor being T-shaped with a keystone body section and a crossbar section extending across and laterally beyond one end of said keystone body section, said keystone body section having opposite first and second side surfaces and said crossbar section having first and second side ledge surfaces joining with said opposite side surfaces and extending laterally therefrom, said first and second side ledge surfaces and said first and second opposite side surfaces respectively cooperating to form a first anchor pocket with said first surfaces and a second anchor pocket with said second surfaces, said primary and secondary brake shoe assemblies respectively having a primary shoe end and a secondary shoe end, each of said shoe ends being formed to provide an edge surface, said edge surfaces of said primary shoe end and said secondary shoe end respectively being in force transmittable exclusive



two parallel line contact with said surfaces defining said first and second anchor pockets with the brake assembly in its released position, one of said shoe ends being generally rounded and continuing in said exclusive two parallel line force transmittable contact when the brake assembly is applied and is transmitting brake force from said one shoe end to said anchor, said side ledge in contact with said one shoe end preventing said one shoe end from moving outwardly toward said drum, and said keystone body side surface, which is in contact with said shoe end receiving brake force from said one shoe end, receiving said brake force at such an angle thereto as to encourage movement of said one shoe end inwardly of said brake shoe assembly towards the center of rotation of said drum without substantial restriction.

5,022,503
ELECTRICALLY ACTUATED WHEEL HUB CLUTCH APPARATUS

Hideaki Wakabayasbi, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jul. 19, 1989, Ser. No. 381,947

Claims priority, application Japan, Jul. 29, 1988, 63-099770[U]

Int. Cl.⁵ B60K *23/08*

U.S. Cl. 192—0.02 R **14 Claims**

1. An electrically actuated wheel hub clutch apparatus, comprising:

an axle shaft and a wheel hub mounted for rotation about a common axis, the wheel hub being rotatable relative to the axle shaft about the axis;

clutch means selectively movable to a first position for selectively interconnecting the wheel hub and the axle shaft for rotation and to a second position for disengaging the wheel hub from the axle shaft for freewheeling rotation about the axis;

electrically powered means for actuating said clutch means between the first and second positions;

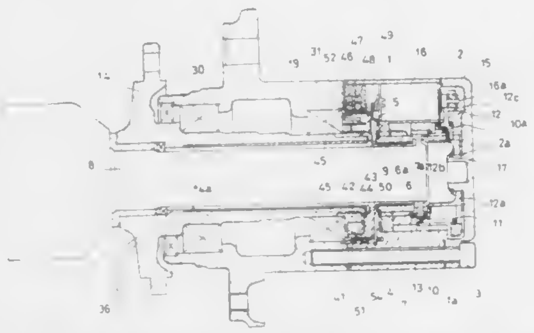
a slip ring holder containing at least one slip ring;

a brush holder containing at least one brush arranged in

VOL
1127
ISS
2
JE
11
1991
UMI

contact with the at least one slip ring for relative rotation therebetween about the axis;

the slip ring and brush comprising portions of an electric circuit for conducting electric power to the electrically powered means from a location externally of said apparatus; and



retaining means radially overlapping and extending along at least one side face of the at least one brush and the at least one slip ring for preventing axial disengagement between the at least one slip ring and the at least one brush that results from forces transmitted through the wheel hub.

5,022,504
COLUMN SHIFT WITH SAFETY DEVICE

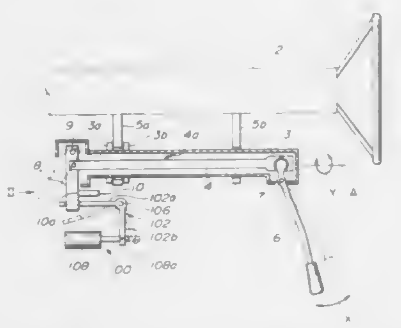
Satoshi Kobayashi, Hiratsuka, Japan, assignor to Nissan Motor Co., Ltd., No. 2, Yokohama, Japan

Filed Jun. 15, 1990, Ser. No. 538,449

Claims priority, application Japan, Jul. 25, 1989, 1-193678

Int. Cl.^{5} B60K *41/24*

U.S. Cl. 192—4 A **6 Claims**



1. A column shift for use with a motor vehicle having an automatic transmission, comprising:

an elongate hollow member supported by a fixed member of the motor vehicle, said hollow member being rotatable about a longitudinal axis thereof;

link means for linking said hollow member to a hydraulically operated controller of the transmission;

a control rod axially movably received in said elongate hollow member;

a shift lever having one end articulated with one end of said control rod, said shift lever being pivotally connected to said elongate hollow member;

a position lever pivotally connected to the other end of said control rod, said position lever having one end pivotally connected to said hollow member;

a position plate secured to a fixed member of said motor vehicle and having a stepped edge to which a free end portion of said position lever being engageable;

a lock lever movable between a first position wherein said lock lever locks said position lever when the latter assumes a given position of said stepped edge and a second position wherein the lock lever unlocks said position lever; and

an electric actuator for moving said lock lever between said first and second positions.

5,022,505
ONE-WAY CLUTCH FOR TRANSMITTING ONLY ROTATION OF FIRST MEMBER TO SECOND MEMBER

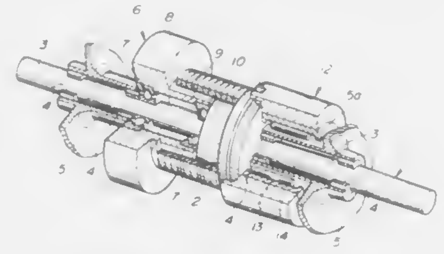
Shinichi Io, Kanagawa, Japan, assignor to Atsugi Unisia Corporation, Kanagawa, Japan

Filed Oct. 30, 1989, Ser. No. 429,004

Claims priority, application Japan, Oct. 28, 1988, 63-272803; Nov. 11, 1988, 63-147461[U]; Jan. 6, 1989, 64-903

Int. Cl.^{5} F16D *67/02, 41/20, 47/04*

U.S. Cl. 192—12 BA **16 Claims**



1. A clutch comprising:

a first rotatable member;

a second rotatable member provided for rotational movement relative to said first rotatable member;

engaging means for engaging between said first and second rotatable members, said engaging means including a coil spring wound over said first and second rotatable members, the coil spring being deformed according to rotation of said second rotatable member in one direction so as to be reduced in diameter so as to fasten together said first and second rotatable members to form a connection therebetween; and

means including a third rotatable member connected to a part of said coil spring and a one-way brake element disposed between the third rotatable member and the first rotatable member, the one-way brake element allowing said third rotatable member to rotate in a release direction of said coil spring and preventing the third rotatable member from rotating in a winding direction of said coil spring to allow said first rotatable member to rotate independently of said second rotatable member.

5,022,506
DOUBLE SYNCHRONIZER HAVING INTEGRATED AXIAL LOCKING MEANS

Chrétien Philippe, Croissy, France, assignor to Automobiles Peugeot, Paris and Automobiles Citroen, Neuilly S/Seine, both of, France

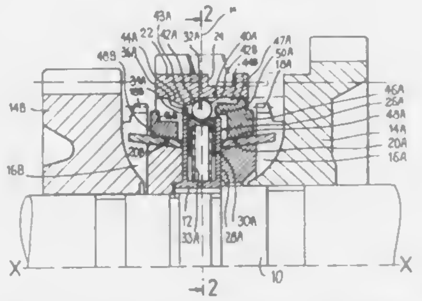
Filed Dec. 29, 1989, Ser. No. 459,377

Claims priority, application France, Dec. 30, 1988, 88 17529

Int. Cl.^{5} F16D *23/06*

U.S. Cl. 192—53 G **4 Claims**

1. Double synchronizer for two gear pinions, said double synchronizer comprising a shaft, a hub which is fixed to the shaft and has a common axis with the shaft, the two gear pinions being freely rotatively mounted on the shaft axially on each side of the hub and associated with a respective synchronizer of the double synchronizer, a control sleeve having a median plane perpendicular to said axis and axially slidably mounted relative to the hub for the purpose of occupying a plurality of axial positions, locking means defining said axial positions of the sleeve and comprising a plurality of inner axially extending stepped tracks on the sleeve, and a plurality of push means including balls and extending radially of said axis in a common median plane perpendicular to said axis, means for elastically biasing each of the balls of the push means outwardly relative to said axis so as to cause each ball to cooperate with a respective one of the inner axial stepped tracks, each synchronizer of the double synchronizer further comprising an intermediate friction ring connected to rotate with the sleeve, axially movable between the hub and the associated gear pinion and defining a conical friction surface, a surface on said associated gear pinion which is complementary to and cooperative with the conical friction surface defined by the intermediate friction ring when the intermediate friction ring is axially urged toward said associated gear pinion, driving means for urging the intermediate friction ring toward said associated gear pinion and comprising an arming ramp formed in each of the respective tracks for engaging the respective ball, each synchronizer of said double synchronizer further comprising dog clutch teeth which are respectively provided on the associated gear pinion and in the vicinity of a corresponding axial end of the sleeve and which are cooperative for coupling the associated gear pinion with the sleeve when the sleeve occupies a corresponding end axial engagement position, said push means comprising two series of push means evenly and alternately spaced apart around said axis, each series of said two series of push means being associated with the respective synchronizer of the respective one of the two gear pinions, an abutment being provided on the hub for each ball of each of said two series of the push means and cooperative with the respective ball for opposing any movement of the ball axially of the hub in a direction away from the associated gear pinion, each axial track including a planar portion extending from the median plane of the sleeve in a direction toward the associated gear pinion, an arming step portion delimiting said planar portion axially in a direction away from said associated gear pinion and toward the other gear pinion, the arming step portion defining said arming ramp which is inclined in a direction toward said axis and an inverse engagement ramp which is cooperative with the respective ball for axially immobilizing the sleeve in said corresponding end axial engagement position corresponding to said coupling of the associated gear pinion with the sleeve, said driving means further comprising for each ball a connection member for ensuring a transmission of a thrust force exerted by the sleeve on each ball to a respective friction ring cooperative with the associated gear pinion wherein said connection member is an axial lug which is connected to the respective friction ring and has a free end cooperative with the respective confronting ball.



5,022,507
ANTI-FLOWBACK CHECK VALVE FOR A VISCOUS FLUID CLUTCH

Lawrence C. Kennedy, Kettering, and Harvey J. Lambert, West Milton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 16, 1990, Ser. No. 553,017

Int. Cl.^{5} F16D *31/00*

U.S. Cl. 192—58 B **4 Claims**

1. A viscous fluid clutch assembly comprising:

(a) a clutch plate rotatably driven by an input shaft;

(b) housing means having a hollow interior rotatably mounted on the input shaft;

(c) a shear zone disposed between the clutch plate and the housing means;

(d) a pump plate mounted internally in the housing means for dividing the interior of the housing means into a fluid reservoir and a working chamber, wherein the shear zone is disposed in the working chamber;

(e) discharge orifices provided in the pump plate for returning fluid from the working chamber to the fluid reservoir;

(f) a discharge channel provided in the housing means for receiving fluid exiting from each discharge orifice and directing the fluid to an inner portion of the fluid reservoir; and

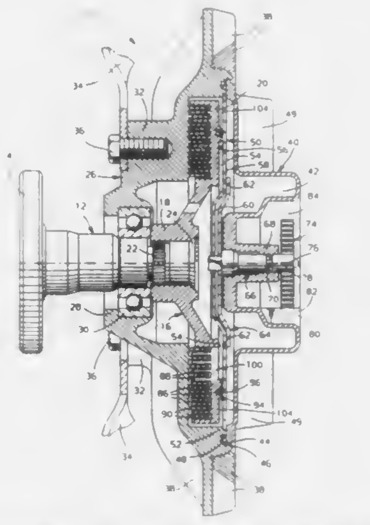
(g) check valve means provided in each discharge channel to prevent migration of fluid from the reservoir into the discharge channel, the check valve means comprising a pressure-responsive check valve having

(i) a resilient body;

(ii) a chamber provided in the body having an inlet in communication with the discharge channel; and

(iii) a pair of angled side walls in the chamber terminating in a normally-closed outlet in communication with the reservoir,

whereby when a predetermined fluid pressure is reached in the discharge channel, the side walls are forced apart to open the outlet, and when the fluid pressure falls below the predetermined level, the side walls return to their original position to close the outlet.



5,022,508
CLUTCH COVER ASSEMBLY

Yoshinobu Fukuda, Neyagawa, Japan, assignor to Kubushiki Kaisha Daikin Seisakusho, Osaka, Japan

PCT No. PCT/JP89/00713, § 371 Date Mar. 29, 1990, § 102(e) Date Mar. 29, 1990, PCT Pub. No. WO90/01642, PCT Pub. Date Feb. 22, 1990

PCT Filed Jul. 14, 1989, Ser. No. 469,468

Claims priority, application Japan, Aug. 12, 1988, 63-107050[U]

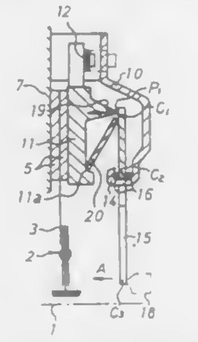
Int. Cl.^{5} F16D *13/50*

U.S. Cl. 192—70.27 **1 Claim**

1. A clutch cover assembly having a pressure plate connected to a clutch cover through a resilient strap plate, a flat-shape driven plate to which clutch disc facings are secured, a diaphragm spring for exerting a pressing load on said pressure plate supported by said clutch cover and contacting said pressure plate in such a manner that said diaphragm spring is separated therefrom in an axial direction, a cushion loaded coned disc spring compressively installed between said diaphragm spring and said pressure plate, the cushion loading of said coned disc spring being set smaller than said pressing load of

VOL
1127
ISS
2
JE
11
1991
UMI

said diaphragm spring at the time of clutch engagement and larger than a reaction force of said resilient strap plate, thereby said coned disc spring exerts a pressing load between said pressure plate and said diaphragm spring as said clutch is disengaged to disengage said diaphragm spring from said pressure plate at the time of clutch releasing operation, the reaction force of said resilient strap plate moving said pressure plate away from said drive plate.



5,022,509
SEMIAUTOMATIC SHIFTER FOR A MOTOR VEHICLE

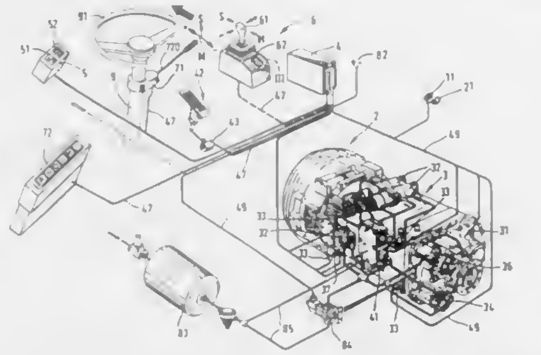
Klaus Schweiger, Friedrichshafen, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Fed. Rep. of Germany

Filed Mar. 6, 1990, Ser. No. 489,940

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1989, 3907151

Int. Cl.^{5} B60K *41/02, 41/28*

U.S. Cl. 192—73 4 Claims



1. In combination with a motor-vehicle engine having an output member connected via a clutch to the input member of a multiratio transmission in turn having an output member connected to a load, a shifting system comprising:

respective sensor means for detecting the speeds of the engine-output, transmission-input, and transmission-output members and for generating outputs corresponding thereto;

respective clutch and transmission actuators for operating the clutch and shifting the transmission;

respective clutch and transmission sensors for detecting the settings of the clutch and transmission and generating outputs corresponding thereto;

a shifter element displaceable between an actuated position and an unactuated position;

a selector element displaceable between a drive position, neutral position, and reverse position;

a double-display having a current-setting part and an ideal-setting part;

control means connected to and receiving the outputs from the sensor means and connected to the display, actuators, and elements for

displaying on the current-setting part the current setting of the transmission,

displaying on the ideal-setting part a transmission setting calculated to be ideal based at least on engine characteristics and transmission output speed,

resetting the transmission by means of its actuator to the ideal setting when same is different from the current setting, the selector element is in the drive position, and the shifter element is displaced into the actuated position, and

disengaging and engaging the clutch by means of its actuator on any transmission speed change and engaging the clutch by means of its actuator on startup of the motor vehicle from halt; and

an accelerator pedal connected to the control means and supplying same with an input corresponding to desired road speed; and

a kickdown switch connected to the pedal and to the control means for automatically shifting the transmission down at least one gear on full depression of the pedal.

5,022,510

Patent Not Issued For This Number

5,022,511
SYSTEM FOR EQUALLY SPACING AND TRANSFERRING ITEMS FROM A FIRST TO A SECOND CONVEYOR

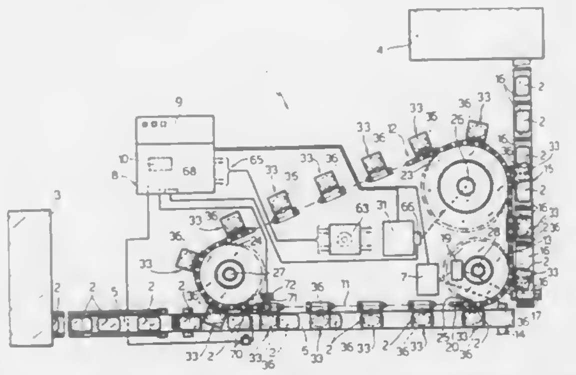
Giordano Gorrieri, Pianoro; Ivo Balestra; Luciano Nannini, both of Casalecchio di Reno, and Alberto Mondani, Bologna, all of Italy, assignors to Azionaria Costruzioni Macchine Automatiche A.C.M.A. S.p.A., Italy

Filed Nov. 30, 1989, Ser. No. 444,008

Claims priority, application Italy, Nov. 30, 1988, 3679 A/88

Int. Cl.^{5} B65G *47/26*

U.S. Cl. 198—460 40 Claims



1. A system (1) for picking up randomly-spaced items (2) off first conveyor means (6) and transferring the same in equally-spaced manner on to second conveyor means (15), said system (1) comprising:

third conveyor means (12) traveling between said first (6) and said second (15) conveyor means, and a series of pick-up means (33) assigned to said third conveyor means (12), and wherein the speed of said third conveyor means (12) differs from that of said first conveyor means (6);

characterised by the fact that it comprises an electronic control system (8) comprising processing means (10) for determining a position wherein at least one of said pick-up means (33) corresponds with one of said items (2), and for accordingly enabling said pick-up means (33) for lifting said item (2) off said first conveyor means (6);

said processing means (10) also providing for subsequently disabling said pick-up means (33) for transferring said item (2) in controlled, equally-spaced manner on to said second conveyor means (15);

first means (70) for detecting passage of said item (2) on said first conveyor means (6) in a predetermined position on said system (1) and for supplying a first signal to said processing means (10); and

second means for detecting passage of said pick-up means (33) in a predetermined position on said system (1) and for supplying a second signal to said processing means (10).

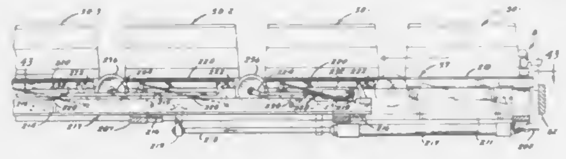
5,022,512
AUTOMATIC MATCHPLATE MOLDING SYSTEM

William A. Hunter, Inverness, Ill., assignor to Hunter Automated Machinery Corporation, Schaumburg, Ill.

Division of Ser. No. 352,057, May 15, 1989, Pat. No. 4,890,664, which is a division of Ser. No. 33,177, Apr. 1, 1987, Pat. No. 4,840,218. This application Oct. 11, 1989, Ser. No. 420,017

Int. Cl.^{5} B65G *19/00*

U.S. Cl. 198—718 5 Claims



1. A conveyor for advancing molds from a mold making apparatus to a mold handling apparatus, said conveyor comprising a pair of parallel rails extending from the mold making apparatus to the mold handling apparatus, said rails having a predetermined number of stations in which a corresponding number of molds may rest in equally spaced relation with one another along said rails, mold indexing shoes located between said rails and spaced equally from one another along the rails, the number shoes being at least one less than the number of stations, means for shifting each shoe through an active stroke from an upstream station to an adjacent downstream station and then through a return stroke back to the upstream station, means for biasing said shoes upwardly from a lowered position in which the shoes are located beneath the rails, to an active position in which the shoes are at least flush with the rails and toward a raised position in which the shoes are located above the rails, said shoes engaging the undersides of any molds on the rails when said shoes are in said active positions, said biasing means urging said shoes upwardly against the bottoms of such molds so as to urge said molds upwardly, said biasing means normally holding said shoes in said active positions when said shoes are shifted through said active stroke whereby each shoe normally indexes the overlying mold along said rails from an upstream station to an adjacent downstream station, means for moving said shoes to said lowered positions when each shoe is shifted back to is upstream station whereby the shoes move free of the overlying molds during said return stroke, and a wheel movable with the downstream end of each shoe and operable during said active stroke to roll beneath a mold in the immediately adjacent downstream station thereby to shift such shoe to said lowered position if the mold in the immediately adjacent downstream station does not move along said rails during said active stroke.

5,022,513
DRIVE ROLLER UNIT

Thomas Huber, Iffeldorf, Fed. Rep. of Germany, assignor to Bavaria Cargo Technologie GmbH, Fed. Rep. of Germany

Filed Apr. 10, 1990, Ser. No. 507,274

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1989, 3938338

Int. Cl.^{5} B65G *13/02*

U.S. Cl. 198—782 7 Claims

1. A drive roller unit for driving an article on a conveyor track comprising:

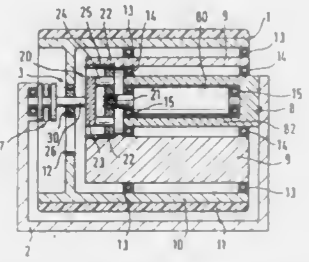
a base (2);

a guide body (9) having circular-cylindrical outside peripheral surface means;

a drive roller (1) which is substantially in the form of a hollow circular cylinder and which is rotatably mounted on said outside peripheral surface means of the guide body in concentric relationship therewith;

an electric motor means (8) operable to drive the drive roller (1) in rotation and comprising first and second motor elements (80, 82) of which one is arranged concentrically within the other, which are rotatable relative to each other and between which the torque of the electric motor means (8) acts in operation of the unit, the first motor element (82) being rigidly and non-rotatably connected to the base (2) and the second motor element (80) being mounted rotatably with respect to the base (2), the drive roller (1) and the guide body (9);

a planetary transmission (20) and a transmission (3) operatively disposed between the electric motor means (8) and the drive roller (1), the electric motor means (8), the guide body (9), the planetary transmission (20) and the transmission arrangement (3) being arranged in the interior of the drive roller (1), the planetary transmission (20) including a sun gear (21) which is coupled to the second rotatable motor element (80), a crown wheel (25) which is coupled to the guide body (9), and a planet wheel carrier (23) coupled to an output shaft (26), and the transmission arrangement (3) including a drive gear (30) coupled to the output shaft (26) of the planetary transmission and having its axis of rotation arranged stationarily with respect to the base (2), the outside peripheral surface means of the guide body (9) being disposed eccentrically with respect to said axis of rotation of the drive gear (30), and the transmission arrangement (3) further including an internal gear ring means (12) disposed at the inside of the drive roller (1) non-rotatably relative thereto and in concentric relationship therewith and meshing with said drive gear (30) which is eccentric with respect to the gear ring means (12) to drive same in the same direction;



and means mounting the guide body (9) rotatably with respect to the electric motor means (8),

the assembly being adapted by virtue of rotational movement of said guide body (9) to move said drive roller (1) relative to the base (2) between a lower rest position and an upper drive position in which the drive roller is adapted to engage with the underside of a said article to be driven which is disposed above the unit.

5,022,514
CONVEYOR FRAME ASSEMBLY

Lars C. Lofberg, Astorp, Sweden, assignor to Nestec S.A., Vevey, Switzerland

Continuation of Ser. No. 259,876, Oct. 19, 1988, abandoned. This application Jun. 8, 1990, Ser. No. 536,000

Claims priority, application European Pat. Off., Oct. 23, 1987, 87115603

Int. Cl.^{5} B65G *23/44*

U.S. Cl. 198—813 4 Claims

1. A conveyor assembly for enabling removal of an endless belt trained about rollers fixed to axles comprising:

a conveyor frame having two parallel stationary plates extending longitudinally from a first end to a second end;

a first axle connected transversely to the first end of each of the stationary plates;

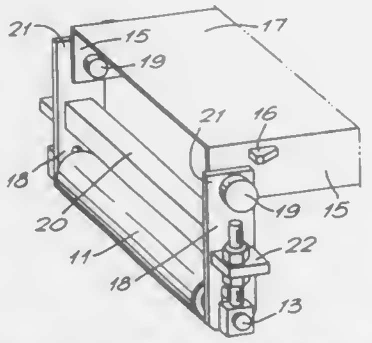
a first roller fitted to the first axle;

VOL
1127
ISS
2
JE
11
1991
UMI

a second axle;

a second roller fitted to the second axle;

two elongated rotatable plates, each of which is connected by a pivot linkage to the second end of a respective one of the stationary plates and each of which has a slot at an end away from the pivot linkage which receives the second axle, the rotatable plates being connected to the stationary plates at an offset position with respect to a straight line extending between the first and second axles when the rotatable plates and stationary plates are in rectilinear relationship, so that the distance between the axles is at a maximum when a straight line extending between the axles also passes through a rotation center of the plates when the plates are rotated out of rectilinear relationship;



an endless conveyor belt trained around the rollers of the first and second axles;

means integral to each rotatable plate for adjusting belt tension, each means being connected to the second axle; and

means integral to each of the stationary plates and cooperating with belt tension for maintaining the rotatable plates in a rectilinear relationship with the stationary plates.

5,022,515

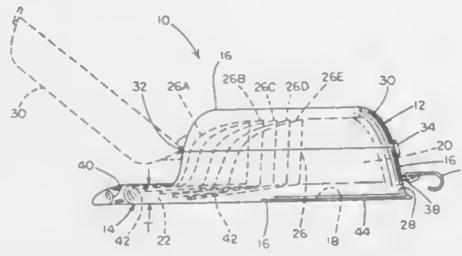
HAT CONTAINER

Anthony Agostine, Rte. 2, Box 39, Seymour, Wis. 54165

Filed Nov. 6, 1989, Ser. No. 432,172

Int. Cl.⁵ A45C *11/02;* B65D *85/18*

U.S. Cl. 206—8 14 Claims



1. A hat storage container, for receiving a plurality of hats, each hat having a main body portion having a length and a width, and a bill, the hats being adapted to folding a rear segment of the main body portion forwardly into a front segment of the main body portion, thereby collapsing the main body portion, the collapsed main body portion having a convex front surface and a correspondingly concave rear surface, the concave rear surface of a collapsed main body portion of a first forwardly disposed hat being thus adapted to receive the convex front surface of a main body portion of a second rearwardly disposed hat, the leading edge of the bill on the second rearwardly disposed hat being disposed rearwardly of, and below, the leading edge of the bill on the first forwardly disposed hat, whereby the collapsed main body portions of the hats so disposed are arranged front-to-rear, and wherein the bills of the hats are thus arranged in a shingled array, said hat storage container comprising a container body and a container bill, the combination of said container body and said container bill enclosing a space, and comprising:

(a) a main body chamber defined by said container body, said main body chamber having a length and a width, the width of the inside of said main body chamber being dimensioned to receive the widths of the main body portions of the hats, said length of said main body chamber being longer than the length of the main body portion of one of the hats when collapsed, and being dimensioned to receive a plurality of the hats wherein the main body portions of the hats have been collapsed, front to rear, and the convex front surface of a rearwardly disposed hat is received by the concave rear surface of the next forwardly disposed hat, whereby the main body portions of the hats so disposed are arranged front-to-rear, and wherein the bills of the hats are thus arranged in a front-to-rear shingled array; and

(b) a bill-receiving chamber cooperatively shaped like the bills of the hats, and dimensioned to receive the front-to-rear shingled array of bills corresponding to the collapsed arrangement of main body portions of the plurality of hats in the main body chamber, wherein the leading edge of the bill on a rearwardly disposed hat is disposed rearwardly of, and below, the leading edge of the bill on the next forwardly disposed hat.

5,022,516

SUBSTANTIALLY RECTANGULAR STORAGE CONTAINER, IN PARTICULAR FOR FLAT ARTICLES

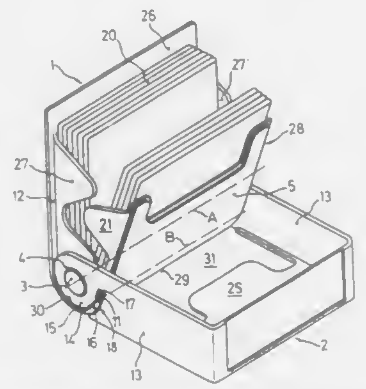
Otfried Urban, Wiesbaden, and Dieter Koob, Worms, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 11, 1988, Ser. No. 154,012

Claims priority, applicatioo Fed. Rep. of Germany, Feb. 14, 1987, 8702289[U]

Int. Cl.⁵ B65D *85/30, 85/57*

U.S. Cl. 206—45.13 15 Claims



1. A substantially rectangular storage container for articles, in particular flat articles, comprising two parts, namely a bottom part, consisting of a base wall bordered on two sides by side walls of the bottom part, and a lid part, consisting of a lid wall at least partly bordered at the sides by side walls of the lid part, and a hinge device between the bottom part and lid part, for pivotal movement therebetween about a pivot axis, the lid part being provided with a pocket formed from the side walls of the lid part, a base wall of the pocket and a front wall, the latter being coupled to the lid part so that it can be swiveled into or out of a substantially parallel position with respect to the lid wall, and the side walls of the bottom part each having an arcuate guide for at least one guide element mounted on each of the side walls of the lid part, wherein the lid part together with the pocket are produced as a single piece, at least one bending axis being provided parallel to the pivot axis of the container parts, and in the front wall or the base wall of the pocket, and the arcuate guide ends in a tangential part, and at least one guide element on the side walls of the lid part is in the form of an arcuate edge portion having at the front end thereof an elongate guide element with an flexible front portion, wherein there is a cut-out portion between the elongate guide element and the side arcuate edge portion enabling flexing of the flexible front portion, at least one bending axis (B) extending into the cut-out portion, the arcuate edge remaining in the arcuate part of the arcuate guide of the bottom part in order to guide the lid part, and the elongate guide element, on entering the said tangential part of the arcuate guide, causing the front wall of the pocket to swivel out into its open position.

5,022,517

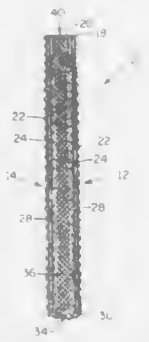
BAR SOAP WRAP

Abel G. Benitez, 3431 Oakdale, #1610, San Antonio, Tex. 78229

Filed Oct. 9, 1990, Ser. No. 594,295

Int. Cl.⁵ B65D *30/06;* A47L *13/17*

U.S. Cl. 206—77.1 3 Claims



1. A wrap for bar soap comprising:

a first and a second side wall each of said side walls further comprising an outer layer, an intermediate layer, and an inner layer, said inner layer further comprising a multiplicity of overlapping layers of nylon netting having a lattice network, said intermediate layer being of soft, foam cushion composition and attached to said outer and said inner layers along the outer periphery of said intermediate layer;

said side walls spaced apart and connected along two side edges and a bottom edge by a side member having an inner layer and outer layer, said inner layer comprising a multiplicity of overlapping layers of nylon netting having a lattice network, said side member having a means for ventilating the interior of said wrap;

said side walls spaced apart along a top edge to form an opening for insertion and removal of said bar soap, said opening further comprising a means for releasably closing said opening.

5,022,518

STORAGE CONTAINER FOR PRECIOUS COINS, MEDALS, BARS AND SIMILAR PIECES

Norman W. Therrien, P.O. Box 83, Dalton, Mass. 01226

Filed Apr. 24, 1990, Ser. No. 513,627

Int. Cl.⁵ B65D *85/62, 8/04;* A45C *1/00*

U.S. Cl. 206—0.82 3 Claims

1. A new and improved storage container for precious coins, medals, bars, and other similar precious items, comprising,

a bottom housing structure for receiving said precious items;

a top housing structure removably positionable on said bottom housing structure for protectively covering said precious items contained therein;

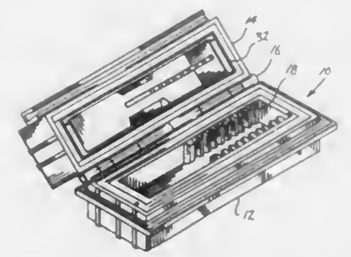
hinge means interconnecting said bottom housing structure and top housing structure; and

locking means for securely positioning said top housing structure in engagement with said bottom housing structure, and

wherein said locking means comprises an elongated locking strip engageable with respective edges of said bottom housing structure and said top housing structure, and

wherein said elongated locking strip includes a trapezoidally-shaped slot for engaging said respective edges of said housing structure and said top housing structure, and

wherein said respective edges of said bottom housing structure and said top housing structure define a trapezoidally shaped lip which is positionable within the trapezoidally shaped slot formed in said elongated locking strip, and



further including integral separators positioned in said bottom housing structure, said separators serving to receive and securely position said precious items within said bottom housing structure, and

wherein said separators are of a trapezoidal shape whereby said precious items come into contact with said separators along one or more surface points of said precious items, thereby to prevent damage to planar surfaces associated with said precious items.

5,022,519

FLEXIBLE DISK JACKET

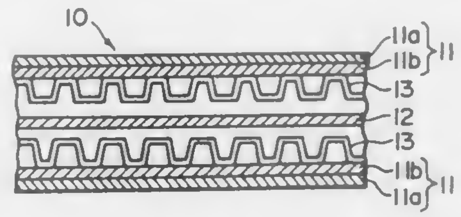
Masakazu Iwasa; Kazuhiko Morita, and Toshio Kawamata, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 10, 1984, Ser. No. 659,435

Claims priority, application Japan, Oct. 21, 1983, 58-197194

Int. Cl.⁵ B65D *85/30*

U.S. Cl. 206—313 6 Claims



1. A flexible disk jacket for accommodating for rotation a flexible disk formed by folding and bonding a plastic sheet into a bag-like shape, said plastic sheet comprising an outer layer and an inner layer bonded together, said outer and inner layers respectively consisting of at least one plastic layer, said outer layer being colored and having heat sealability and heat resistance properties, and said inner layer having heat sealability and antistatic properties.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,520

SLIDER LOCKING DEVICE OF DIGITAL AUDIO TAPE CARTRIDGE

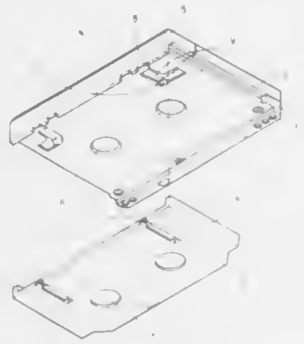
Ryu M. Yeol, Chungnam; Ryu D. Ki, Seoul; Yun D. Kyun, Chungnam; An J. Kyu, Chungnam; Hong S. Kuk, Chungnam; Hong C. Euy, Chungnam, and Ryu S. Sun, Chungnam, all of Rep. of Korea, assignors to SKC Limited, Kyungki, Rep. of Korea

Filed Nov. 14, 1989, Ser. No. 436,482

Claims priority, application Rep. of Korea, Dec. 7, 1988, 8820194

Int. Cl.⁵ B65D *85/02;* **A44B** *19/00*

U.S. Cl. 206—315.1 **15 Claims**



1. A slider locking device comprising:
an upper shell;
a lower shell associated with said upper shell, said lower shell having a generally planer base and defining therein an elastically deformable locking piece, said elastically deformable locking piece having two ends integrated with the base of said lower shell;
a locking projection formed generally in the middle part of said elastically locking piece; and
a slider slidably received in the upper and lower shells, said slider defining in its surface two openings, wherein when said slider is moved into a closed position in said upper and lower shells, said projection engages one of said two openings and when said slider is moved into an open position in said upper and lower shells said projection engages the other of said two openings.

5,022,521

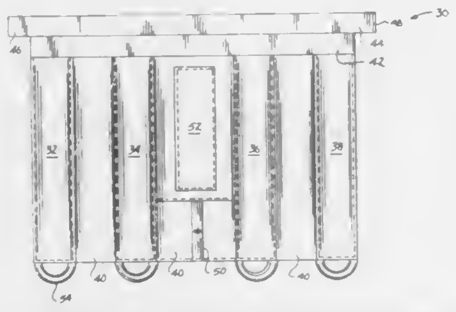
FLEXIBLE MEDICAL IMPLEMENT UTILITY POUCH

Beverly A. Kane, 35 Copley Ter., Apt. 3, Springfield, Mass. 01107-1707

Filed May 4, 1990, Ser. No. 519,174

Int. Cl.⁵ B65D *85/00*

U.S. Cl. 206—370 **8 Claims**



1. A new and improved medical implement retaining pouch comprising,
flexible pouch means for storage of medical implements;
medical implement retaining pockets attached to said pouch means;
first securing means for selectively attaching said pouch means to a supporting surface; and
second securing means for selectively attaching said pouch means to said supporting surface, and
wherein said flexible pouch means is manufactured from a disposable material, and
further including at least one semi-rigid loop for receiving cords and tubing, and
wherein said at least one semi-rigid loop is positioned along a bottom edge of said flexible pouch means.

5,022,522

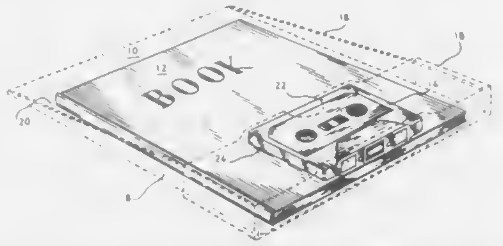
BOOK AND SOUND RECORDING HOLDER

Kimberly C. Kennedy, 2317 Fair Dr., Knoxville, Tenn. 37918

Filed Apr. 6, 1990, Ser. No. 505,507

Int. Cl.⁵ B65D *85/672;* **B42D** *3/00*

U.S. Cl. 206—387 **5 Claims**



1. A holder for a book and sound recording such as a tape cassette, comprising:
wall means defining a first compartment for receving and holding said book for storage and a further compartment for holding said sound recording proximate the lower portion of said book held in said first compartment, wherein said sound recording is held by said further compartment juxtaposed against said book so that both said book and said recording media are mutually prevented by friction therebetween from easily falling out of said first and further compartments.

5,022,523

METHOD OF PREPARING A SHIPMENT PACKAGE OF PRINTED PRODUCTS ARRIVING IN AN IMBRICATED FORMATION AND PACKAGE OBTAINED THEREBY

Werner Honegger, Tann-Rüti, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

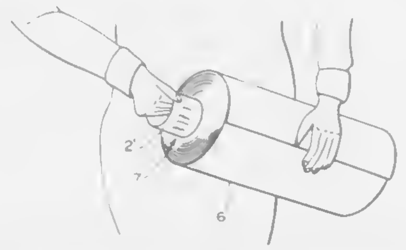
Continuation-in-part of Ser. No. 59,851, Jun. 8, 1987, Pat. No. 4,844,256, which is a continuation-in-part of Ser. No. 818,356, Jan. 13, 1986, Pat. No. 4,688,368, and a continuation of Ser. No. 525,679, Aug. 23, 1983, abandoned. This application May 8, 1989, Ser. No. 349,073

Claims priority, application Switzerland, Sep. 2, 1982, 5212/82

The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.

Int. Cl.⁵ B65B *13/02, 63/04*

U.S. Cl. 206—390 **9 Claims**



8. A coreless, self-contained ready-for-shipment package of printed products formed by winding-up an imbricated formation of printed products, said package comprising:
a product package roll defining a center and wound-up from said printed products;
said product package roll, when in a completely wound-up state, possesses a predetermined circumferential length and contains a multitude of printed products greater than two printed products;
a holding element extending around said product package roll and holding the same together;
said holding element having an inner end portion which overlaps an outer end portion of the product package roll;
said holding element having a length exceeding said circumferential length of said product package roll; and
said holding element comprising an outer end portion overlapping and interconnected to said inner end portion; and
said printed products being individually removable from said center of said product package roll and without entraining a further printed product during such removal operation.

5,022,524

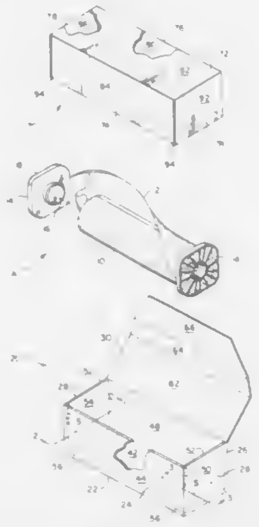
LIGHT-TIGHT PACKAGE

Ralph E. Grady, Loveland, Colo., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 16, 1990, Ser. No. 552,644

Int. Cl.⁵ B65D *81/30*

U.S. Cl. 206—395 **5 Claims**



1. A light-tight package for securely containing a light-sensitive article, said package comprising:
a closable and openable rectanguloid inner box adapted to enclose the light-sensitive article, said inner box having a bottom wall, front and rear walls, opposite end walls, and, when closed, a top wall, said inner-box walls being formed from a first sheet of corrugated paperboard including:
a rectangular bottom-wall panel defined by longitudinal front and rear score lines and transverse opposite end score lines;
a rectangular front-wall outer panel defined by said bottom-wall-panel front score line, a longitudinal front-wall score line, and transverse opposite end score lines;
a front-wall inner panel defined by said front-wall score line, a longitudinal front-wall edge, and transverse opposite end edges;
a rectangular rear-wall panel defined by said bottom-wall-panel rear score line, a longitudinal rear-wall score line, and transverse opposite end score lines;
rectangular opposite-end-wall outer panels defined by said bottom-wall-panel opposite end score lines respectively, transverse opposite-end-wall outer-panel score lines respectively, and longitudinal opposite-end-wall outer-panel front and rear edges;
opposite-end-wall top panels defined by said opposite-end-wall outer-panel score lines respectively, transverse opposite-end-wall top-panel score lines respectively, and opposite-end-wall top-panel front and rear edges;
opposite-end-wall inner panels defined by said opposite-end-wall top-panel score lines respectively, transverse opposite-end-wall inner-panel score lines respectively, and longitudinal opposite-end-wall inner-panel front and rear edges;
opposite-end-wall inner-panel end flaps defined by said opposite-end-wall inner-panel score lines respectively, transverse opposite end-flap end edges respectively, and substantially longitudinal opposite end-flap front and rear edges;
opposite-end-wall intermediate front partial panels defined by said front-wall outer-panel opposite end score lines respectively, transverse opposite front-partial-panel end edges respectively, and longitudinal opposite front-partial-panel bottom and top edges;
opposite-end-wall intermediate rear partial panels defined by said rear-wall-panel opposite end score lines respectively, transverse opposite rear-partial-panel end edges respectively, and longitudinal opposite rear-partial-panel bottom and top edges;
a rectangular top-wall lid panel defined by said rear-wall score line, a longitudinal top-wall-lid score line, and transverse opposite end edges;
a substantially rectangular top-wall tucker panel defined by said top-wall-lid score line, a longitudinal top-wall-tucker score line, and transverse opposite end edges; and
a top-wall tucker-flap panel defined by said top-wall-tucker score line, a longitudinal top-wall-tucker edge, and opposite end edges;
said bottom-wall panel as defined by said front and rear score lines and said opposite end score lines thereof forming said inner-box bottom wall;
said front-wall outer and inner panels being folded about said bottom-wall-panel front score line and said front-wall score line, respectively, into adjacent confronting relation with each other to form said inner-box front wall;
said rear-wall panel being folded about said bottom-wall-panel rear score line into spaced confronting relation with said folded front-wall inner panel to form said inner-box rear wall;
said opposite-end-wall intermediate front partial panels being folded about said front-wall outer-panel opposite end score lines, respectively, into spaced confronting relation with each other;
said opposite-end-wall intermediate rear partial panels being folded about said rear-wall-panel opposite end score lines, respectively, into spaced confronting relation with each other;
said opposite-end-wall outer panels being folded about said bottom-wall-panel opposite end score lines, respectively, into adjacent confronting relation with said folded opposite-end-wall intermediate front and rear partial panels;
said opposite-end-wall top panels being folded about said opposite-end-wall outer-panel score lines, respectively, into adjacent confronting relation with said folded opposite-end-wall intermediate front- and rear-partial-panel top edges;
said opposite-end-wall inner panels being folded about said opposite-end-wall top-panel score lines, respectively, into adjacent confronting relation with said folded opposite-end-wall intermediate front and rear partial panels;
said opposite-end-wall inner-panel end flaps being folded about said opposite-end-wall inner-panel score lines, respectively, into adjacent confronting relation with

VOL
1127
ISS
2
JE
11
1991
UMI

opposite end portions of said bottom-wall panel respectively;

said opposite-end-wall outer, intermediate, inner, and top panels, so folded, together forming said inner-box opposite end walls respectively; and

said top-wall lid panel being folded about said rear-wall score line, said top-wall tucker panel being folded about said top-wall-lid score line, and said top-wall tucker-flap panel being bent about said top-wall-tucker score line, so as to place opposite end portions of said top-wall lid panel in adjacent confronting relation with said folded opposite-end-wall top panels, respectively, and said top-wall tucker and tucker-flap panels in adjacent confronting relation with said folded front-wall inner panel, to thereby form said inner-box top wall and close said inner box; and

a bottomless rectanguloid outer box adapted to enclose the inner box, said outer box having a top wall, front and rear walls, and opposite end walls, said outer-box walls being formed from a second sheet of corrugated paperboard including:

a rectangular top-wall section defined by longitudinal front and rear score lines and transverse opposite end score lines;

a rectangular front-wall outer section defined by said top-wall-section front score line, a longitudinal front-wall score line, and transverse opposite end score lines;

a front-wall inner section defined by said front-wall score line, a longitudinal front-wall edge, and transverse opposite end edges;

a rectangular rear-wall outer section defined by said top-wall-section rear score line, a longitudinal rear-wall score line, and transverse opposite end score lines;

a rear-wall inner section defined by said rear-wall score line, a longitudinal rear-wall edge, and transverse opposite end edges;

rectangular opposite-end-wall outer sections defined by said top-wall-section opposite end score lines respectively, transverse opposite-end-wall outer-section score lines respectively, and longitudinal opposite-end-wall outer-section front and rear edges;

opposite-end-wall bottom sections defined by said opposite-end-wall outer-section score lines respectively, transverse opposite-end-wall bottom-section score lines respectively, and opposite-end-wall bottom-section front and rear edges;

opposite-end-wall inner sections defined by said opposite-end-wall bottom-section score lines respectively, transverse opposite-end-wall inner-section end edges respectively, and longitudinal opposite-end-wall inner-section front and rear edges;

opposite-end-wall intermediate front partial sections defined by said front-wall outer-section opposite end score lines respectively, transverse opposite front-partial-section end edges respectively, and longitudinal opposite front-partial-section top and bottom edges;

opposite-end-wall intermediate rear partial sections defined by said rear-wall outer-section opposite end score lines respectively, transverse opposite rear-partial-section end edges respectively, and longitudinal opposite rear-partial-section top and bottom edges;

said top-wall section as defined by said front and rear score lines and said opposite end score lines thereof forming said outer-box top wall;

said front-wall outer and inner sections being folded about said top-wall-section front score line and said front-wall score line, respectively, into adjacent confronting relation with each other to form said outer-box front wall;

said rear-wall outer and inner sections being folded about said top-wall-section rear score line and said rear-wall score line, respectively, into adjacent confronting relation with each other to form said outer-box rear wall in spaced confronting relation with said outer-box front wall;

said opposite-end-wall intermediate front partial sections being folded about said front-wall outer-section opposite end score lines, respectively, into spaced confronting relation with each other;

said opposite-end-wall intermediate rear partial sections being folded about said rear-wall outer-section opposite end score lines, respectively, into spaced confronting relation with each other;

said opposite-end-wall outer sections being folded about said top-wall-section opposite end score lines, respectively, into adjacent confronting relation with said folded opposite-end-wall intermediate front and rear partial sections;

said opposite-end-wall bottom sections being folded about said opposite-end-wall outer-section score lines, respectively, into adjacent confronting relation with said folded opposite-end-wall intermediate front- and rear-partial-section bottom edges; and

said opposite-end-wall inner sections being folded about said opposite-end-wall bottom-section score lines, respectively, into adjacent confronting relation with said folded opposite-end-wall intermediate front and rear partial sections;

said opposite-end-wall outer, intermediate, inner, and bottom sections, so folded, together forming said outer-box opposite end walls respectively;

said inner and outer boxes being configured and dimensioned so that, when said inner box is closed with its top wall facing upward, and said outer box is superposed thereover with its top wall facing upward, said outer box is slidable downward in telescoping fashion closely around said inner box, with said front and rear walls and said opposite end walls of said boxes disposed in corresponding adjacent confronting relation to one another, thereby forming said light-tight package for securely containing the light-sensitive article when enclosed within said inner box.

5,022,525

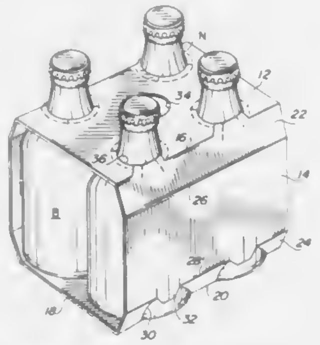
WRAP-AROUND CARRIER WITH ADJUSTABLE BOTTLE NECK OPENINGS

Richard L. Schuster, Monroe, La., assignor to Manville Forest Products Corporation, Denver, Colo.

Filed Apr. 25, 1990, Ser. No. 514,789

Int. Cl.⁵ B65D *65/24*

U.S. Cl. 206—434 9 Claims



1. A wrap-around carrier for containing bottles having a neck the circumference of which is of a predetermined contour and may vary between a predetermined minimum dimension and a predetermined maximum dimension, comprising:

a top panel;

side panels connected to the top panel along fold lines;

the top panel containing openings for receiving the necks of the bottles;

the openings having arcuate edge portions substantially corresponding in shape to the transverse contour of the bottle necks;

the openings being of a size such that the arcuate edge portions thereof engage an associated bottle neck of minimum circumferential dimension; and

arcuate fold lines in the top panel located radially outwardly of the openings, each arcuate edge portion being connected to an associated arcuate fold line by slits to form a flap which folds upwardly during relative movement of an associated bottle neck having a circumference greater than the minimum circumferential dimension but not greater than the maximum circumferential dimension so that the openings are able to receive and engage such a bottle neck.

5,022,526

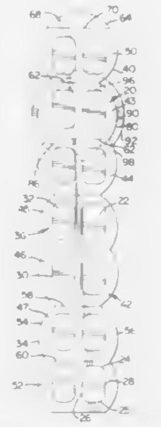
LABEL-CONTAINING PACKAGE ASSEMBLY

Lynn B. Crum, Naperville, Ill., assignor to American Labelmark Company, Chicago, Ill.

Filed Apr. 2, 1990, Ser. No. 503,224

Int. Cl.⁵ B65D *71/40*

U.S. Cl. 206—459 9 Claims



1. A composite label-containing package assembly, comprising:

an array of labels for attachment to pharmaceutical bottles ad other surfaces;

a package comprising a closure member for substantially enclosing said labels, said package being movable from a folded closed position to an expanded open position for access and removal of said labels, said package comprising a foldable accordion-like leaflet upon which said pressure sensitive labels are releasably mounted;

said foldable leaflet comprising a stackable, complementary, hingeably connected array of panel members with intermediate inner panels and outer flaps including a top flap providing a protective cover and top for the package when said package is in said closed position, said cover having a main body portion and an outwardly extending portion comprising a manually graspable tab for facilitating opening and closing of said cover, said panels having a substantially similar complementary size and shape;

said panels including a first panel hingeably connected to said cover for providing a bottom with an underside of said package when said package is in said closed position;

a substantially planar base having a top surface and a bottom surface with adhesive thereon for releasably connecting said base to a closure cap, bottle, or other support surface;

first adhesive for connecting said top surface of said base to the underside of said first panel providing said back of said packaging; and

second adhesive means for releasably connecting and sealing said tab to said base when said package is in said closed position.

4. A composite label-containing package assembly, comprising:

an array of labels;

a package comprising a closure member for substantially enclosing said labels;

a base;

connecting means for closing said package to said base;

closure means for closing said package;

said package including a flexible panel and label-securing means for releasably connecting said labels to said panel; and

said flexible panel means being connected to said closure member and comprising folded sheets.

5. A composite label-containing package assembly, comprising:

a set of pressure sensitive labels for attachment to pharmaceutical bottles and other surfaces;

a foldable package for substantially enclosing said labels, said package being movable from a folded closed position to an expanded open position for access and removal of said labels, said package comprising a foldable accordion-like leaflet upon which said pressure sensitive labels are releasably mounted;

said foldable leaflet comprising a stackable, complementary, hingeably connected array of panel members with intermediate inner panels and outer flaps including a top flap providing a protective cover and top for the package when said package is in said closed position, said cover having a main body portion and an outwardly extending portion comprising a manually graspable tab for facilitating opening and closing of said cover, said panels having a substantially similar complementary size and shape;

said panels including a first panel hingeably connected to said cover for providing a bottom of said package when said package is in said closed position, said first panel comprising said bottom having an underside, and said cover and bottom of said package cooperating with each other to provide a closure member;

a substantially planar base having a top surface and a bottom surface;

a first adhesive strip attached to said top surface of said base for connecting said base to the underside of said first panel providing said back of said package;

a second adhesive strip attached to said top surface of said base and spaced from first adhesive strip for releasably connecting and sealing said tab to said base when said package is in said closed position; and

said bottom surface of said base having an adhesive portion for releasably connecting said base to a support surface selected from the group consisting of an elongated web, a closure cap of a pharmaceutical bottle, a container, and a support member.

5,022,527

BOOK CONTAINER

Robert O. Braeutigam, Chalfont, Pa., assignor to FMC Corporation

Filed May 8, 1990, Ser. No. 520,418

Int. Cl.⁵ D65D *81/26, 81/04, 85/62*

U.S. Cl. 206—522 **7 Claims**

1. A means for holding books during transport and treatment with a liquid comprising:

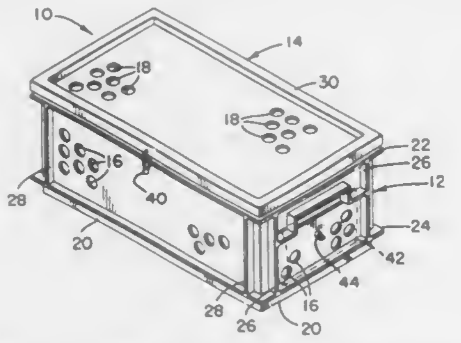
a container having a bottom and opposed sides for accepting a plurality of books;

said sides having openings to permit the flow of liquid and vapors therethrough; and

first means carried by one of said sides and being moved between a first position in which the books are pressed against each other and the side opposite said one side to

VOL
1127
ISS
2
JE
11
1991
UMI

urge said container and books to move as a unit and a second position in which said books are free to separate to facilitate the escape of moisture from, and the penetration of treatment liquid into, said books.



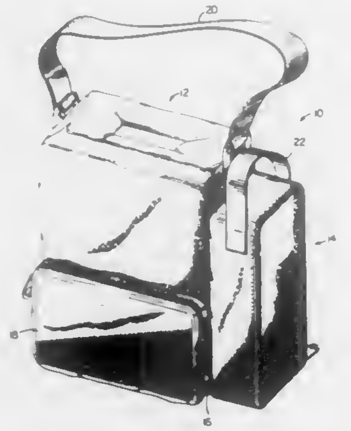
5,022,528
BAGS FOR STORING ELECTRONIC RECORDING DEVICES AND LIQUID CONTAINERS

Steven Savoy, North Andover, Mass., assignor to Posso Corporation, Kerrville, Tex.

Filed Apr. 12, 1990, Ser. No. 508,846

Int. Cl.^{5} **A45C** *11/20, 13/26*

U.S. Cl. 206—545 9 Claims



1. A bag for separately storing a plurality of electronic recording devices, and a plurality of liquid containers; comprising;

an insulated box, for storing the liquid containers, formed from a first base, four insulated walls, formed of insulating material having a waterproof inner surface, extending from and fixedly connected to said base, and a first flap, pivotally fixed to the end of one said insulated wall distant from said first base, said first flap in a first position adapted to provide access to said box for insertion and removal of the liquid containers, and in a second position adapted to prevent the liquid containers from falling from said box; and, fixed thereto,

a storage case, for storing the electronic recording devices, formed from a second base, four walls extending from and fixedly connected to said second base, and a second flap pivotally fixed to one said wall distant from said second base, said second flap in a first position adapted to provide access to said box for insertion or removal of the electronic recording devices, and in a second position adapted to prevent the electronic recording devices from falling from said case; said case further including separators for separately snugly engaging the electronic recording devices and allowing their easy insertion and removal.

5,022,529
CASING FOR COMPACT

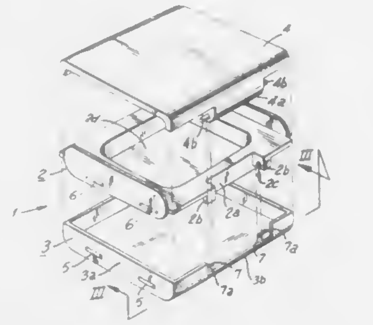
Seong I Kang, Kwangmyong, Rep. of Korea, assignor to Pacific Chemical Co., Ltd., Seoul, Rep. of Korea

Filed May 16, 1990, Ser. No. 523,989

Claims priority, application Rep. of Korea, Sep. 25, 1989, 89-13866

Int. Cl.^{5} **B65D** *69/00, 43/16*

U.S. Cl. 206—581 6 Claims



1. A casing for compact comprising:

a lid having an elongated projection formed at the rear of the lid, said elongated projection including two integral pin portions at both ends thereof;

an upper body having a recess for engaging with said elongated projection of the lid at its rear, and two shoulders formed at both sides of said recess, each of said shoulders including a retaining groove for surrounding a part of the circumference of said pin portion in the assembled state; and

a lower body being assembled with said upper body to form a casing main body, and having projecting pieces, at the end of each of which a retaining groove is provided, for forming a pivot retaining bore for said pin portion of the lid with said retaining groove of the upper body in assembled state.

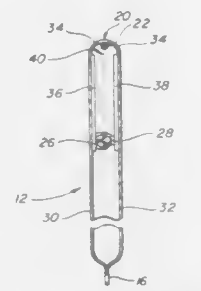
5,022,530
MODIFIED ZIPPER ELEMENTS FOR EASY OPEN CONTAINERS

Larry M. Zieke, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 13, 1989, Ser. No. 421,255

Int. Cl.^{5} **B65D** *33/34*

U.S. Cl. 206—618 42 Claims



1. An easy-open flexible container comprising:

a sealed bag body of thermoplastic film, said sealed bag body including opposing first and second side walls which meet to form at least one edge of said sealed bag body;

means for tearing said thermoplastic film attached to said sealed bag body generally along one of said edges where said opposing first and second said walls meet, said means for tearing comprising a tear strip of thermoplastic material;

first and second extended bases of thermoplastic material disposed on said opposing first and second side walls of said bag body, respectively, in spaced relationship from said tear strip; and

at least one first and at least one second interlocking zipper elements disposed on said first and second extended bases, respectively, generally towards the ends of said first and second extended bases farthest from said means for tearing;

the ends of said first and second extended bases nearest said tear strip defining boundaries beyond which said thermoplastic film may not be torn with said tear strip, thereby inhibiting damage to said zipper elements upon opening said container.

5,022,531
PACK-COMPRISING BUNDLE PROCESSING APPARATUS WITH PACK COUNTING MEANS

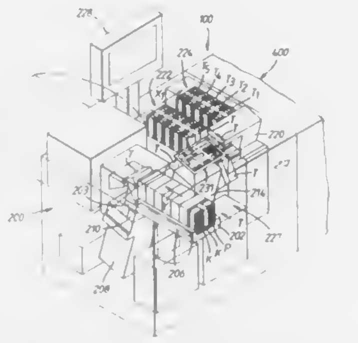
Shigeo Horino; Hideo Omura; Nobusato Maruyama, all of Tokyo; Yoshiaki Ashikawa, Kanagawa; Masatoshi Shioya, Kanagawa; Toshiyuki Miyano, Kanagawa, and Jiro Wakou, Kanagawa, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Mar. 2, 1989, Ser. No. 318,228

Claims priority, application Japan, Mar. 29, 1988, 63-75171

Int. Cl.^{5} **B07C** *5/00*

U.S. Cl. 209—552 7 Claims



1. A bundle processing apparatus comprising:

means for receiving a plurality of bundles, wherein each bundle includes a number of packs and each pack includes a plurality of paper sheets;

intermediate means for conveying the bundles away from said means for receiving;

means for counting the number of packs included in each bundle conveyed by said intermediate means for conveying;

means for detecting a length of each bundle;

means for stacking a bundle when the number of packs counted by said means for counting is equal to a predetermined number and the length detected by said detecting means is equal to a predetermined length;

means for rejecting a bundle when the number of packs counted by said means for counting is not equal to said predetermined number or the length detected by said detecting means is not equal to the predetermined length; and

means for storing stacked bundles in a storage box.

5,022,532
UNIT FOR GRADING PRODUCE, SUCH AS FRUITS

Carmelo D'Urso, Le Chesnay, France, assignor to Xeda International, Le Chesnay, France

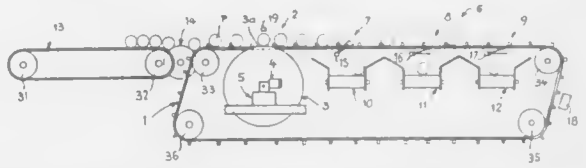
PCT No. PCT/FR88/00133, § 371 Date Jan. 11, 1989, § 102(e) Date Jan. 11, 1989, PCT Pub. No. WO88/06928, PCT Pub. Date Sep. 22, 1988

PCT Filed Mar. 10, 1988, Ser. No. 283,995

Claims priority, application France, Mar. 11, 1987, 87 03344

Int. Cl.^{5} **B07C** *5/18, 5/28;* **G01G** *21/00*

U.S. Cl. 209—564 28 Claims



1. An apparatus for grading produce, comprising:

transporting means for transporting the produce, said transporting means comprising two parallel elements and produce receptacles operatively connected to said parallel elements for receiving produce, each of said receptacles having a lower opening;

a weighing station comprising a produce carrying means for carrying and supporting the produce as it is being weighed, a motor operatively connected to said produce carrying means to drive said produce carrying means and a weighing means for supporting said produce carrying means and said motor and for weighing said produce, said produce carrying means including a section which projects through said lower opening in each of said receptacles as they pass thereover so as to carry the produce as it passes through the weighing station;

means for removing the produce as a function of the weight of the produce; and

a grading station comprising a plurality of ejection stations, each of which includes a means for ejecting the produce from said transporting means into said removing means.

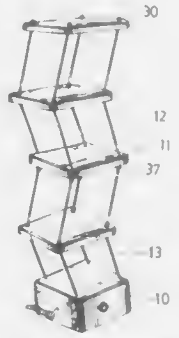
5,022,533
MOVING DISPLAY RACK

Yung-Chi Lin, No. 127, Shih Chia Tung Hsiang, East District, Taichung, Taiwan

Filed Nov. 8, 1989, Ser. No. 433,252

Int. Cl.^{5} **A47F** *3/08*

U.S. Cl. 211—1.5 4 Claims



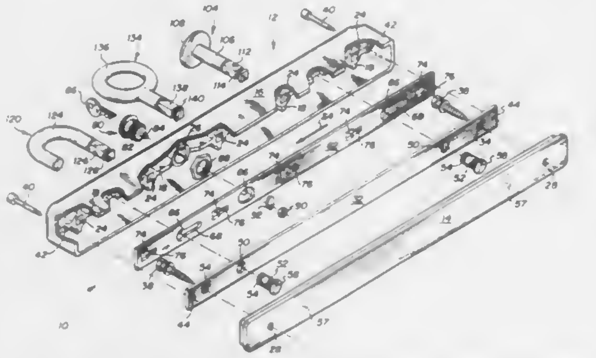
1. A moving display rack comprising, a base, drive means supported by said base, a plurality of elongated vertically extending generally bow shaped link rods each of which includes an upper end, a lower end and an intermediate portion, said intermediate portion being offset horizontally with respect to said upper and lower ends, the lower ends of each of said rods being rotatable supported by said base, means drivingly interconnecting said drive means with one of said rods to define a rotatable driven rod, a first bearing board intercon-

VOL
1127
ISS
2
JE
11
1991
UMI

nected between and supported at said upper ends of said rods with said upper ends being rotatable with respect to said first bearing board, a second bearing board interconnected between and supported at the intermediate portions of said rods with said intermediate portions being rotatable with respect to said second bearing board, fastening means for retaining said bearing boards in position longitudinally of said rods, so that rotation of said rotatable driven rod will cause horizontal movement of said second bearing board supported at the intermediate portion thereof, and such horizontal movement of said second bearing board carries the intermediate portions of the remaining rods through a similar horizontal movement to cause rotation of said remaining rods.

5,022,534
GUN LOCKING DEVICE

Charles C. Briggs, 403 S. Bell, Big Spring, Tex. 74720
Filed Feb. 6, 1990, Ser. No. 475,685
Int. Cl.^{5} A47F *7/00*
U.S. Cl. 211—4 **7 Claims**

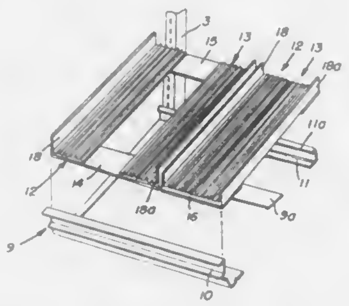


1. A security rack for weapons having trigger guards, barrels or stock grips comprising:

a housing assembly including a cover with an aperture;
an elongated slide bar longitudinally slidably mounted within said housing assembly for movement between an open position and a closed position;
said slide bar including an aperture selectively alignable with said cover aperture in said slide bar open position;
a locking pin including a shaft having first and second ends, said first end including means for engaging the weapon and said second end includes a notch for passing through said cover aperture and said slide bar aperture when said apertures are aligned in said slide bar open position, and for engaging said slide bar aperture when said cover aperture and slide bar aperture are misaligned in said closed position to thereby prevent removal of said locking pin from said housing assembly; and
locking means for engaging said slide bar and accessible through said cover for moving said slide bar between said open and closed positions thereby allowing insertion and removal of said locking pin from said housing assembly in said open position and locking of said locking pin to said slide bar in said closed position thereby preventing removal of the weapon from the security rack;
wherein said shaft is square shaped in cross-sectional area and said aperture in said housing and said aperture in said slide bar are square shaped, thereby preventing rotation of said locking pin in said housing assembly.

5,022,535
GRAVITY FEED SHELF

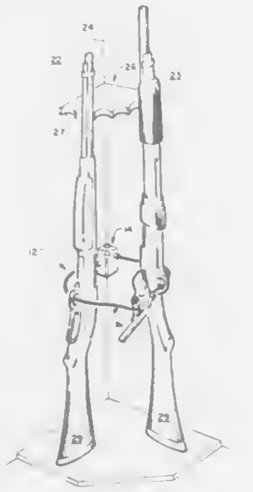
William S. Spamer, Roswell, Ga., assignor to The Mead Corporation, Dayton, Ohio
Filed May 1, 1990, Ser. No. 517,366
Int. Cl.^{5} A47F *5/00*
U.S. Cl. 211—59.2 **11 Claims**



1. A gravity feed shelf comprising a tilted support frame, a plurality of tracks of different widths arranged in side by side relation and fixedly secured to said frame so that articles on said tracks move downwardly and forwardly in opposition to the friction between the articles and tracks due solely to the force of gravity, each track including at least one support plate and a pair of plastic elements, each of said plastic elements including a base strip secured atop said support plate and a side strip secured to one side edge of said base strip and in perpendicular relation thereto to form a structure of L-shaped cross section, said plastic elements being arranged with the opposite edge of each of said base strips which is remote from said one side edge thereof being disposed adjacent each other to form an article track, said side strips comprising the sides of each of said tracks, the outer side strip of the outer tracks of the shelf defining the outer side extremities of the shelf, and holding means including a transverse flange overlying the rear of said tracks.

5,022,536
FIREARM LOCKING SYSTEM

William J. Pierson, 1517 Fairglen Rd., El Cajon, Calif. 92071
Filed Jan. 8, 1990, Ser. No. 461,971
Int. Cl.^{5} A47F *7/00*
U.S. Cl. 211—4 **8 Claims**



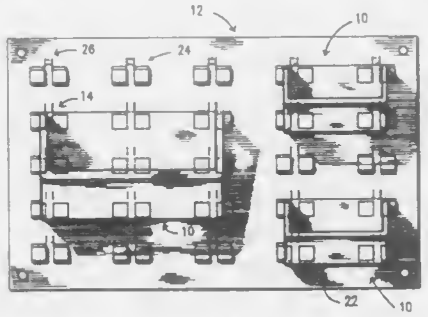
1. A firearm locking system comprising:

a first horizontally oriented eyebolt, said eyebolt having a closed loop and an externally threaded shank, said threaded shank for being detachably threaded into vertical wall studs located in the corner of a room;

a block shaped anchor housing having a top wall, a bottom wall, and a plurality of upright walls;
a cable assembly comprising a predetermined length of cable having a loop formed at both of its opposite ends;
an aperture formed in the top wall of said anchor housing for removably receiving a locking pin;
a cavity formed in at least one of the upright walls of said anchor housing and it is in communication with said locking pin aperture, an upper socket and a lower socket;
said upper socket being formed in one of the upright walls of said block shaped anchor housing for removably receiving one of the loops formed at the end of said cable;
said lower socket being formed in another of the upright walls of said block shaped anchor housing for removably receiving one of the loops formed at the end of said cable;
a vertically oriented locking pin having a top end and a bottom end, the bottom end of said locking pin being removably inserted into the closed loop end of said eyebolt and also the loops on the end of said cable; and
means for locking said locking pin in said block shaped anchor housing.

5,022,537
BIN LOCKING SYSTEM

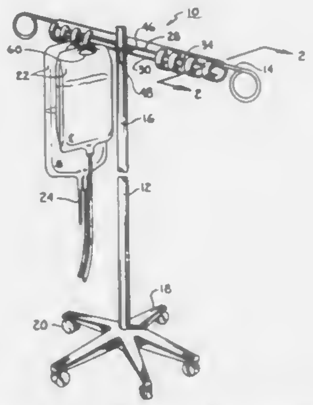
Kenneth R. Henriquez, 4924 N. Chariton Ave., Tampa, Fla. 33603
Filed Aug. 28, 1989, Ser. No. 399,014
Int. Cl.^{5} A47F *5/00*
U.S. Cl. 211—88 **12 Claims**



1. A bin lock system including a storage panel to detachably mount a plurality of storage bins thereon, each of said plurality of storage bins includes a rear wall having a corresponding flexible attachment member affixed thereto and said storage panel includes a plurality of bin receiving members and bin retaining members disposed in spaced relationship relative to each other such that when at least a portion of said flexible attachment member is mounted on at least one of said plurality of bin receiving members, each said bin retaining member is disposed to selectively engage one of said plurality of storage bins to secure said storage bin on said storage panel, each said flexible attachment member comprising a corresponding attachment element disposed in spaced relationship relative to said corresponding rear wall of each of said plurality of storage bins by a corresponding spacer and said bin receiving member comprises a receiving element disposed in spaced relationship relative to said storage panel by a corresponding spacer to cooperatively form a retainer groove therebetween to receive at least a portion of said attachment element therein and each said bin retaining member comprising a corresponding bin retaining element including a lower inclined camming surface having a corresponding line of contact formed thereon to selectively engage said flexible attachment members when each of said storage bins is in the uppermost position to secure each of said plurality of storage bins laterally and vertically on the storage panel whereby each of said plurality of storage bins is mounted on and removed from to said corresponding bin receiving member and said corresponding bin retaining member by vertical movement therebetween.

5,022,538
I.V. BAG ORGANIZER

Frank M. Richmond, Harvard, Ill., and Timothy Vanderveen, Poway, Calif., assignors to Fisher Scientific Company, Pittsburgh, Pa.
Filed Nov. 28, 1989, Ser. No. 441,960
Int. Cl.^{5} A47F *7/00*
U.S. Cl. 211—113 **20 Claims**

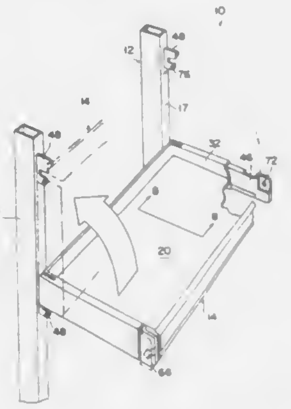


1. An apparatus for organizing and hanging a plurality of I.V. bags at spaced apart locations on an I.V. pole, of the type having a horizontal support bar connected to a vertical support member, comprising:

a back having a top edge and a bottom edge;
a plurality of resilient loops integrally attached to said bottom edge, said loops being biased to extend from said bottom edge and overlap said top edge to create a substantially hollow tubular-shaped member positionable about said support bar;
a span extending along said back; and
means for securing said span to said vertical support member.

5,022,539
TWO-WAY TRAY DISPLAY

Tatsuo Rushing, Denville, N.J., and Christopher Kidd, New York, N.Y., assignors to Marlboro Marketing, Inc., New York, N.Y.
Filed Jan. 5, 1990, Ser. No. 460,677
Int. Cl.^{5} A47F *3/14*
U.S. Cl. 211—133 **11 Claims**



1. A two-way display for supporting merchandise, comprising:

a two sided tray having a first means for supporting merchandise on one side thereof and a second means for supporting merchandise on the opposite side thereof, said tray having a rear edge and a front edge,
a bracket pivotably connected at a first portion of said

VOL
1127
ISS
2
JE
11
1991
UMI

bracket to said tray proximate said rear edge, a second portion of said bracket including means for attachment to a support structure,

said tray being pivotable between a first position and a second position relative to said bracket, in said first position said first means for supporting merchandise being in position to support merchandise, and in said second position said second means for supporting merchandise being in position to support merchandise, and

means for releasable locking connection of said tray to said support structure when said tray is in said second pivoted position.

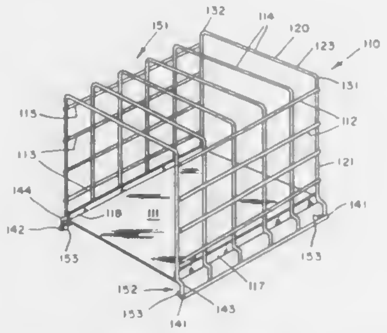
5,022,540
STACKABLE WIRE CUBES FOR USE IN A MODULAR DISPLAY RACK

Kenneth E. Vail, Sr., 2560 Lomitas Way, Covina, Calif. 91724, and Kenneth E. Vail, Jr., 758 Level Ave., Covina, Calif. 91723

Filed Aug. 17, 1990, Ser. No. 569,075

Int. Cl.^{5} A47F *5/00*

U.S. Cl. 211—181 1 Claim



1. A stackable wire cube comprising:

a. a first set of a first plurality of elongated members each of which is formed from a steel wire;

b. a second set of a first plurality of elongated members each of which is formed from a steel wire;

c. a second plurality of inverted U-shaped members each of which is formed from a steel wire and has a first side portion with a first top end and a first bottom end, a second side portion with a second top end and a second bottom end and a top portion which is adjacent to said first and second top ends of said first and second side portions, prior to having been formed into said inverted U-shaped members said steel wires were disposed parallel to and spaced apart from each other a particular distance so that said first and second sets of elongated members are disposed parallel to, coaxially aligned with and spaced apart from each other a particular distance and are mechanically coupled to said first and second side portions, respectively, of said inverted U-shaped members to form vertical rows and horizontal columns of criss-crossing steel wires wherein said steel wires at said first and second top ends are bent to form said inverted U-shaped members and at said first and second bottom ends are bent to form an offset; and

d. a base which is formed out of sheet metal is mechanically coupled to said U-shaped members at said first and second bottom ends to form said stackable wire cube.

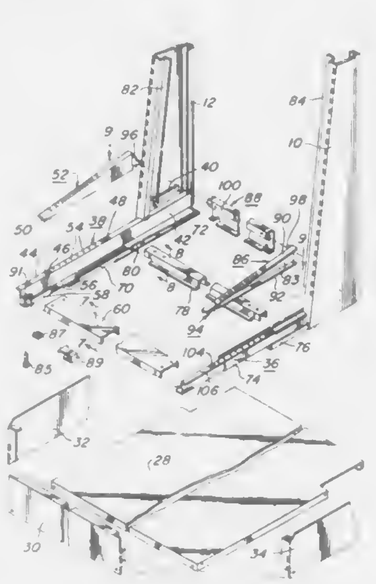
5,022,541
MERCHANDISING GONDOLA WITH CONVERTIBLE BASE

O. Timothy White, Carnesville, Ga., assignor to The Mead Corporation, Atlanta, Ga.

Filed Sep. 1, 1989, Ser. No. 402,055

Int. Cl.^{5} A47B *57/00*

U.S. Cl. 211—186 15 Claims



1. In a merchandising gondola kit, an improved base structure comprising base shelf support means having at least two spaced upper surfaces, a base shelf movably supportable directly on said upper surfaces, the base shelf having an article-supporting surface which is substantially horizontal when the base shelf is directly supported by said upper surfaces, and means interposable between the base shelf support means and the base shelf for alternatively supporting said base shelf on the base shelf support means with its article-supporting surface in an inclined condition, the interposable means comprising first and second wedge-shaped elements supportable respectively on said spaced-upper surfaces of the base shelf support means, said wedge-shaped elements being stowable underneath the base shelf when the base shelf is directly supported on said upper surfaces of the base shelf support means, in which the means interposable between the base shelf support means and the base shelf further comprises brace means for connecting the wedge shaped elements to each other and supporting the wedge shaped elements against tilting, in which the base shelf support means comprises two substantially parallel, spaced elements, said upper surfaces being surfaces respectively of said spaced elements, in which the brace means is in the form of a channel of a size capable of receiving both of the wedge-shaped elements, in which the spaced elements of the base shelf support means respectively include means for supporting opposite ends of the brace means, and in which brace means, with the wedge-shaped elements received therein, are stowable between said spaced elements, with the opposite ends of the brace means supported by the respective base shelf support means, when the base shelf is directly supported on said upper surfaces of the base shelf support means.

5,022,542
CRANE LEG CONNECTION

Dale A. Beier, New Berlin, Wis., assignor to Harnischfeger Corporation, Brookfield, Wis.

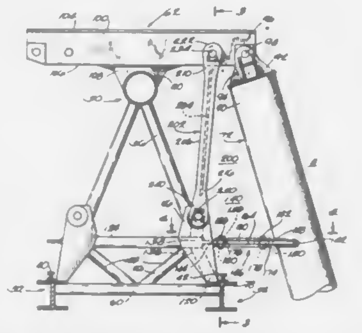
Filed Dec. 9, 1988, Ser. No. 281,723

Int. Cl.^{5} B66C *5/02*

U.S. Cl. 212—219 8 Claims

1. In a crane including a truss frame having a plurality of spaced-apart chords extending in the direction of the length of

the frame, a plurality of angular laces connecting at least two of the chords, and at least one leg having first and second facing leg members supporting the frame and extending from the frame downward and away from each other and away from the frame in a direction transverse to the length of the frame, the combination comprising: a support beam mounted on and connected to the frame and having an end extending transversely of the length of the frame, at least the first leg member having an upper end pivotally connected to the end of the support beam about an axis in the direction of the length of the frame;



reinforcing means affixed to at least one of said plurality of angular laces for providing a location for connecting the first leg member to the frame;

a frame anchor arm rigidly affixed to said reinforcing means and having an end extending toward said first leg member;

a leg anchor arm rigidly affixed to said first leg member and having an end extending toward the frame anchor arm; and

link means between and pivotally connected to the frame and leg anchor arm for permitting movement of the first leg member in directions transverse of and in the direction of the length of the frame.

5,022,543
POSITIONING GEAR FOR MOVING A LOAD SUSPENDED BY AT LEAST ONE CABLE OF A LIFTING SYSTEM IN THE VERTICAL DIRECTION

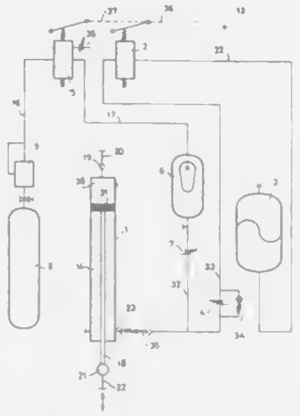
Gijsbert Versteeg, Nunspeet, Netherlands, assignor to Vervako B.V., Heusden, Netherlands

Filed Sep. 23, 1988, Ser. No. 248,381

Claims priority, application Netherlands, Sep. 24, 1987, 8702283

Int. Cl.^{5} B66C *13/40, 23/79, 7/00*

U.S. Cl. 212—271 2 Claims



1. Positioning device adapted to be incorporated as a controllable coupling element between a load and a hoisting cable of a crane, said coupling element comprising a hydraulic cylinder;

a single acting piston movably mounted within said cylinder and having a rod protruding out of one end of said cylinder, the space in said cylinder existing between said piston and said one end of said cylinder varying as said piston is moved, said cylinder having an opening communicating with said space for the supply and the discharge of a pressurized hydraulic fluid;

means for connecting said cylinder to said hoisting cable, means for connecting said rod to a load so that said load can be raised or lowered relative to said hoisting cable;

a first hydraulic conduit with first and second ends and coupled at one of its said ends to said cylinder opening;

a hydro-pneumatic transformer coupled to the other end of said first hydraulic conduit;

gas coupling lines;

a source of pressurized gas coupled to said transformer through said gas coupling lines, a first controllable valve arranged in said gas coupling lines between said source and said transformer, said valve being movable to a first position for allowing gas to flow from said gas source to said transformer for raising said load, and a second position for shutting off said gas flow from said source, said valve also being movable to a third position for venting the hydro-pneumatic transformer to the atmosphere;

a second hydraulic conduit having a first end coupled to said first hydraulic conduit and having a second end;

a hydro-pneumatic reservoir coupled to said second end of said second hydraulic conduit;

a second controllable valve arranged in said second hydraulic conduit, said second valve being movable between an open position for permitting fluid flow in said second conduit and a closed position for preventing fluid flow in said second conduit; and

means for controlling said first and second valves.

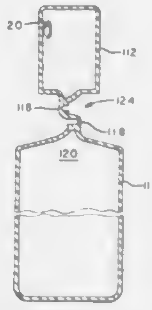
5,022,544
SEALED BOTTLE

Dennis L. Dundas, Dover; Eugene L. Moore; Paul M. Oles, both of York, and Milton Briggs, Dallastown, all of Pa., assignors to Graham Engineering Corporation, York, Pa.

Division of Ser. No. 382,775, Jul. 19, 1989, Pat. No. 4,948,356. This application Oct. 18, 1989, Ser. No. 423,056

Int. Cl.^{5} B65D *1/02*

U.S. Cl. 215—31 13 Claims



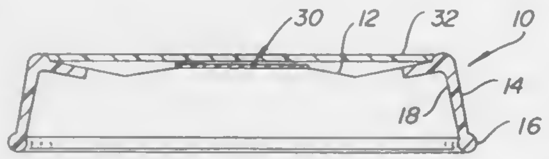
9. A blow molded bottle comprising an integral body of thermoplastic resin, said body having a hollow interior surrounded by an imperforate wall and a seal neck having a pair of spaced apart welded seals joining the plastic at opposite sides of the seal neck and located at spaced locations along the length of the seal neck, and a third seal located between said pair of seals, each seal independently closing the interior of the body.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,545
TAMPER EVIDENT CLOSURE

Daniel M. Carson, Danbury, Conn., assignor to Continental White Cap, Inc., Northbrook, Ill.

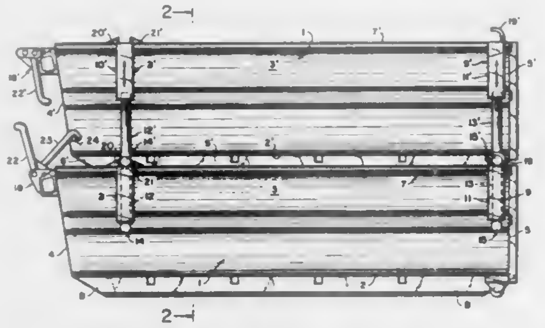
Filed Aug. 3, 1990, Ser. No. 562,551
Int. Cl.^{5} B65D *55/02*
U.S. Cl. 215—230 **8 Claims**



1. A tamper evident closure comprising a closure including an end panel having incorporated therein a tamper indicating button, an external coating on said button including rupturable capsules containing a colorant, said closure being improved by a layer of translucent material carried by said end panel and overlying said button, said translucent layer forming a wall against which said button will effect striking of said capsules to effect rupture of said capsules, and there being scattered among said capsules spacers of a greater height than said capsules for preventing accidental rupture of said capsules.

5,022,546
CONTAINER FOR THE STORAGE AND TRANSPORT OF, IN PARTICULAR, BULK MATERIALS SUCH AS CONSTRUCTION DEBRIS, RUBBISH, INDUSTRIAL WASTE AND THE LIKE

Normann Bock, Syke-Barrien, Fed. Rep. of Germany, assignor to Edelhoff M.S.T.S. GmbH, Iserlohn, Fed. Rep. of Germany
PCT No. PCT/DE88/00405, § 371 Date Mar. 9, 1989, § 102(e) Date Mar. 9, 1989
PCT Filed Jul. 1, 1988, Ser. No. 347,884
Claims priority, application Fed. Rep. of Germany, Jul. 10, 1987, 3722889
Int. Cl.^{5} B65D *21/02*
U.S. Cl. 220—4.03 **15 Claims**



1. A container for the loading of bulk materials, such as construction debris, rubbish, industrial waste and capable of interstackability and of nesting, said container comprising upper longitudinal edges;

said container having two outwardly slanting sides and having glide elements enabling it to slide supported along the upper longitudinal edges of the container immediately below it in a stack;

said upper longitudinal edges comprising longitudinal guides, said container having a lower section and an upper section;

wherein there are four glide elements with there being two respective glide elements, positioned one behind the other in a longitudinal direction, on said two outwardly slanting sides, and said glide elements are supported on said upper longitudinal edges;

four positioning adjusting elements with there being one on which each of said four glide elements is arranged;

four receptacle locking means mounted on the container with their being one for securing each of said positioning elements in an adjustable, movable position on the container, said four receptacle locking means being located with two respective receptacle means vertically positioned one behind the other in the longitudinal direction on said two outwardly slanting sides of said container; and

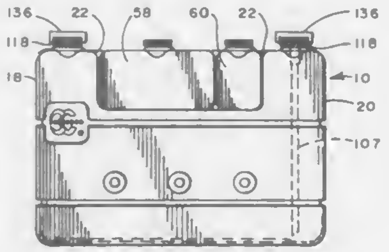
for achieving said interstackability, said glide elements being adjustable vertically downwardly by being provided on the container in such a way that when in their vertically downward position in the lower section of the container, the guide elements are positioned over the respective upper longitudinal edge of the container located immediately below it in the stack; and,

for achieving nesting of said containers, said glide elements being adjustable vertically upwardly.

5,022,547
MULTIPLE FLUID CONTAINER ASSEMBLY

Charles W. Spangler, Miami; George G. Dominick, Miramar, both of Fla.; Edward A. Ross, Tuckerton, N.J., and Darrell D. Fish, Baltimore, Md., assignors to Coulter Electronics, Inc., Hialeah, Fla.

Filed Jul. 22, 1988, Ser. No. 223,126
Int. Cl.^{5} B65D *69/00*
U.S. Cl. 220—234 **12 Claims**

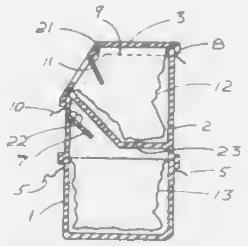


1. A fluid container assembly comprising: one large and at least two small fluid containers all having external walls, one of said external walls of said large container having a wall portion with an orthogonally shaped depression for receiving therein said two small containers in nested relation to said large container; whereby, when said two small containers are nested in said depression said external walls of said large and small containers are flush; retaining means for retaining said small containers within said depression against accidental dislodgement therefrom; said large container having a generally flat top surface with fluid filler openings at opposite ends thereof; each of said small containers having a fluid filler opening in a top surface; all said fluid filler openings of said containers being aligned with each other and in tandem relationship, parallel to said top surface of said large container.

5,022,548
SEPARATION AND DISPOSAL OF MEDICAL AND DENTAL BIOLOGICAL WASTE

Anthony D. Stakis, 218 Hoodridge Dr., Pittsburgh, Pa. 15234
Filed Jan. 25, 1990, Ser. No. 470,227
Int. Cl.^{5} B65D *21/02*
U.S. Cl. 220—23.83 **1 Claim**

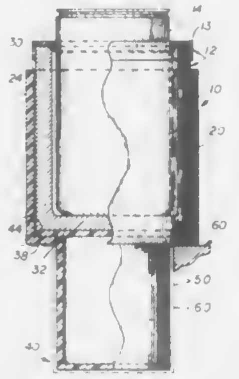
1. A receptacle (for segregating biological and nonbiological wastes in a health profession office or the like) comprising (a) a base module container having an open top with a peripheral ledge for receiving a nesting center module container (b) a center module container having an open top with a peripheral ledge for receiving a nesting lid module, said center module container having a skirt of a size and shape adapted to rest on said peripheral ledge of said base module container and including a generally horizontal partition, said center module container having also a normally closed spring-loaded door providing access to a space below said partition and (c) a lid module having an open base of a size and shape adapted to rest on said peripheral ledge of said center module container and having also a normally closed spring-loaded access door, said base module container having a plastic bag therein retained in place at its top by said peripheral ledge of said base module container and said center module container nesting therein, and said center module container having a plastic bag therein retained in place at its top by said peripheral ledge of said center module container and said lid module container nesting therein.



5,022,549
COLLAPSIBLE BEVERAGE COOLER HOLDER

Commodore E. Beaver, 211 Frank St., Council Bluffs, Iowa 51503

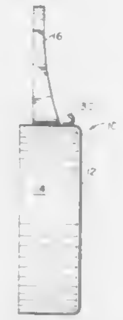
Filed Aug. 9, 1990, Ser. No. 564,640
Int. Cl.^{5} B65D *25/28*
U.S. Cl. 220—85 H **5 Claims**



1. A collapsible beverage can and insulator holder, for holding an insulation jacket containing a beverage container comprising: a jacket receiver having a jacket-receiving upwardly opening chamber, said jacket having an upstanding side wall means on at least a plurality of sides of said chamber and capable of retaining a cylindrical cooler from falling over to one side, said receiver having at its bottom an anchor-receiving opening extending vertically therethrough and opening into said chamber, a retaining flange means inwardly extending from said jacket side wall means, an anchor having a lower portion slidably extending through said anchor-receiving opening, said anchor having an upper portion having a catch protruding horizontally therefrom, said anchor being slidable in said chamber, said catch being above and adapted to engage said retaining flange means to retain said anchor from passing downwardly out of said receiver whereby when said anchor is held from tipping over by insertion into an upwardly opening recess in a large object then the engagement of said catch with said retainer will keep said receiver from tipping over whereby support is given to said jacket and to a beverage container therein.

5,022,550
COOKING UTENSIL WITH NESTED LID

Peter R. Ruiz, 9231 S. Winchester Ave., Chicago, Ill. 60620
Filed May 7, 1990, Ser. No. 519,772
Int. Cl.^{5} B65D *25/28*
U.S. Cl. 220—94 R **8 Claims**

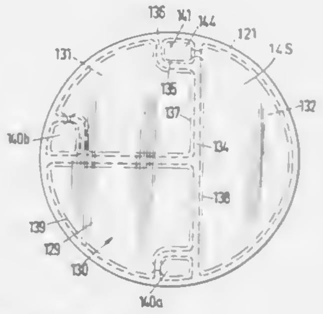


1. A cooking utensil comprising a container having a bottom portion and an open top portion, a cover adapted to removably extend over said open top portion of said container, and releasably engageable attachment means extending from respective parts of said container and cover for releasably hanging said cover from said container flat against one of said portions of said container, said releasably engageable attachment means comprising a hook extending from one of said parts of said container and cover and an eyelet extending from said other part of said container and cover, said hook being releasably engageable with said eyelet to enable hanging of said cover from said container and facilitating storage of the container and cover together.

5,022,551
EASY-OPEN PACKAGE WITH COVER TAB

Günter Hexel, Braunschweig, Fed. Rep. of Germany, assignor to Schmalbach-Lubeca AG, Braunschweig, Fed. Rep. of Germany

Filed Jan. 11, 1990, Ser. No. 463,370
Claims priority, application Fed. Rep. of Germany, Jan. 19, 1989, 3901507; Feb. 1, 1989, 3902912
Int. Cl.^{5} B65D *17/34*
U.S. Cl. 220—270 **5 Claims**



1. A package comprising:

a vessel formed with a rim and at least one rib together forming an upwardly open compartment having a periphery, and

an upwardly open pocket also having a periphery and separated at a location from the compartment by the rib;

a cover foil covering the compartment and pocket, engaging the rim all around the compartment and all around the pocket, and formed with an endless weakened tear line running along and within the periphery of the compartment except at the location, and over the rib at the location, the foil being subdivided by the rib into a tearout tab overlying the pocket and a tearout section overlying the

VOL 1127 ISS 2 JE 11 1991 UMI

compartment, a section of the foil including a web extending over the rib and interconnecting the tab and section;
a rim bond securing the foil to the vessel along and immediately outside of the tear line; and
a web bond securing the foil at the web to the vessel along the rib, the web bond being substantially weaker than the rim bond.

5,022,552

METHOD FOR PRODUCING OF A CLOSURE FOR A CONTAINER, CLOSURE, CONTAINER AS WELL AS THREADED RING

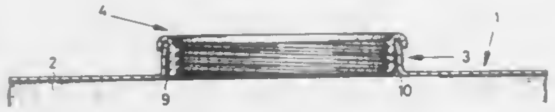
Herman P. Kars, Uithoorn, Netherlands, assignor to Koninklijke Emballage Industrie van Leer B.V., Amstelveen, Netherlands

Filed Jul. 26, 1989, Ser. No. 385,668

Claims priority, application Netherlands, Jul. 28, 1988, 8801900

Int. Cl.^{5} B65D *41/04*

U.S. Cl. 220—288 1 Claim



1. A plug opening construction for a container comprising a circular cylindrical collar integral with and of the same thickness as the container material extending outwardly from a surface of said container, said collar having a circular outer end surface and being tapered outwardly therefrom toward said surface of the container, and
an internally threaded plug-receiving ring formed of material thicker than the container material assembled within said collar, said ring having an integral circumferential bead extending laterally beyond and downwardly around the outer surface of said collar for forming a circumferential groove at least as wide as the thickness of the collar material in which the outer end surface of said collar is received for supporting said ring on said collar, the outer surface of said ring being untapered and with the inner surface of said collar defining a tapered annular space between said ring and said collar, said bead being laser welded to said collar only along said outer end surface of said collar, the location of said weld in cooperation with said tapered annular space providing for flexibility against breakage of said collar and ring in the event of impact.

5,022,553

TEMPORARY DIAPER STORAGE CONTAINER

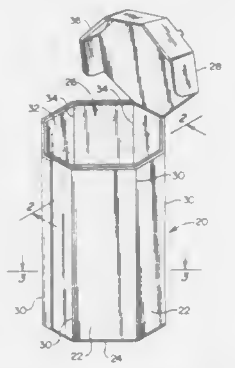
Jeffrey S. Pontius, 10690 Royalton Rd., Amanda, Ohio 43102

Filed May 29, 1990, Ser. No. 529,506

Int. Cl.^{5} B65D *90/04*

U.S. Cl. 220—410 10 Claims

1. An improved container for temporary storage of soiled diapers comprising in combination;
a) an outer shell provided with side walls including inner and outer surfaces, a bottom wall, and an opening having a closable cover spaced from said bottom wall;
b) a liner removably mounted within said outer shell in force transmitting contact with the inner surfaces of said side walls of said outer shell and defining an open, centrally disposed space within said container to receive a selected capacity of said diapers, said liner impregnated with an amount of odor-adsorbing material effective to adsorb a substantial amount of noxious gaseous materials associated with soiled diapers.



5,022,554

PAPER TABLEWARE WITH METALLIZED LAYER

William B. Heeter, Appleton, and Katherine F. Hickey, Oshkosh, both of Wis., assignors to Chesapeake Consumer Products Company, Appleton, Wis.

Filed Feb. 5, 1990, Ser. No. 474,916

Int. Cl.^{5} B65D *5/56*

U.S. Cl. 220—456 7 Claims

1. Paper tableware such as paper plates and paper cups, comprising in combination:
(1) a paper substrate;
(2) a light-transmitting plastic film joined to the substrate including a first surface and a second surface, and a vacuum deposited metal coating on the first surface of the plastic film; and
(3) a light-transmitting barrier topcoating over the second surface of the plastic film.

5,022,555

COMPLY SYSTEM

George Greenbaum, 1005 N. Caribe Ave., Tucson, Ariz. 85710

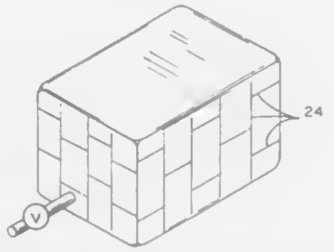
Continuation-in-part of Ser. No. 403,674, Sep. 6, 1989. This application Jul. 30, 1990, Ser. No. 559,311

Int. Cl.^{5} B65D *90/04*

U.S. Cl. 220—401 15 Claims

1. A container which comprises:
a liner having longitudinal members compressively secured together by a first carrier film;
at least one water-permeable barrier film overlying the liner;
a second carrier film overlying the barrier film to form a shell;
reinforcing members secured to the shell;

a third carrier film to secure the members to the shell to form the container;



means to introduce a liquid into the container; and
means to remove the liquid from the container.

5,022,556

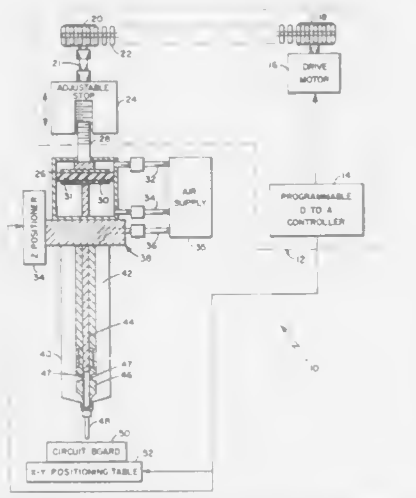
PROGRAMMABLE VOLUME DISPENSING APPARATUS

George G. Dency, Shrewsbury, and Marius A. Caramiciu, Dracut, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Oct. 25, 1989, Ser. No. 427,412

Int. Cl.^{5} B05C *5/00*

U.S. Cl. 222—1 9 Claims



1. A programmable volume dispensing apparatus comprising:
means for storing a fluid;
means coupled to said storing means for dispensing a specific volume of said fluid from said storing means;
means coupled to said dispensing means for selecting said specific volume of said fluid in accordance with a programmed control signal;
programmable control means coupled to said selecting means for generating said programmed control signal, said specific volume of each fluid dispensed being variable in accordance with the programming of said programmable control means;
said selecting means comprises a drive motor means coupled to said programmable control means; and
chain and sprocket means having a first sprocket coupled to said drive motor means and a second sprocket coupled to said dispensing means.

5,022,557

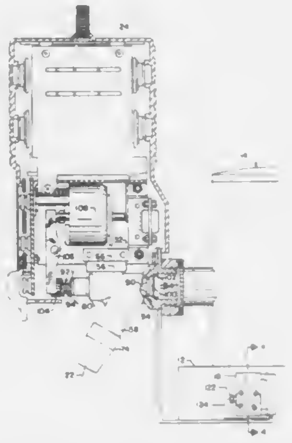
COMPUTERIZED BEVERAGE DISPENSING SYSTEM

Charles S. Turner, 12323 Creekspan, Dallas, Tex. 75243

Continuation-in-part of Ser. No. 281,846, Dec. 8, 1988, Pat. No. 4,979,641, which is a continuation-in-part of Ser. No. 87,258, Aug. 19, 1987, abandoned. This application Sep. 20, 1989, Ser. No. 410,313

Int. Cl.^{5} B67D *5/08*

U.S. Cl. 222—54 11 Claims



1. A computerized beverage dispensing system comprising:
a first connector means for connection to a pressurized source of beverage;
a flow meter means connected to the first connector means and having a preselected passageway length for providing a substantially increased pressure difference for measuring differential pressures of the beverage flowing there through and outputting signals representative thereof;
a faucet means connected to the flow meter means including walls forming a passageway for dispensing the beverage;
a valve assembly means connected to the faucet means for opening and closing the passageway;
an electromechanical valve assembly actuator means connected to the valve assembly means for operating the valve assembly means; and
a programmable controller including a first means connected to the flow meter means for receiving the differential pressure signals, second means responsive to the differential pressure signals for generating quantity amounts of the beverage for a duration necessary to dispense a preselected amount of the beverage and a third means for connecting a cut off signal to the electromechanical valve assembly actuator means when the preselected amount of beverage has been poured for controlling the valve assembly means to dispense the preselected amount of beverage through the faucet means.

5,022,558

ARRANGEMENT FOR THE SUPPLY AND METERED DISPENSING OF LIQUIDS

Karlheinz Faerber, Giegerweg 1, 7928 Gien/Gen Brenz; Anton Deininger, Vogstrasse 20, 8887 Bach Hagel; George Plester, Rheinstrasse 79 18 ; Manfred Guenther, Elfriedenstrasse 14 d, both of 4300 Essen 1 , and Georg Troska, Erlenstrasse 23, 4352 Herten, all of Fed. Rep. of Germany

Filed May 3, 1988, Ser. No. 189,827

Int. Cl.^{5} B65D *35/56*

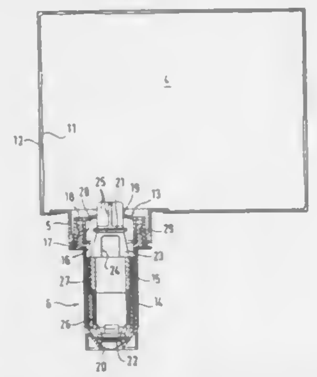
U.S. Cl. 222—105 23 Claims

1. An apparatus for the metered dispensing of beverage concentrates from a storage container having a discharge opening located in the bottom of the container when in a dispensing position, comprising:
a dosing chamber assembly including a chamber housing having only two openings including an input opening

VOL
1127
ISS
2
JE
11
1991
UMI

communicating with the discharge opening of the container and an output opening, whereby the chamber housing defines a predetermined volume for metering a beverage concentrate;

a sliding control valve displaceable in the chamber housing of said dosing chamber assembly to alternately open and close the input and output openings of the chamber housing, wherein said input opening of said chamber housing is disposed at the top thereof concentric with the longitudinal axis thereof, and said sliding control valve includes a tubular slide opening and a disc which seals off the entire chamber housing from the interior of said bag when said input opening is closed thereby, and guide ribs extending upwardly from said disc into the input opening of said chamber housing, said guide ribs slidably engaging walls of said input opening;



said container including a gas-impermeable and substantially flexible bag disposed within a substantially dimensionally stable outer shell; and

socket means having a first open end coupled to both said bag and said shell and a second open end for receiving said dosing chamber assembly.

5,022,559

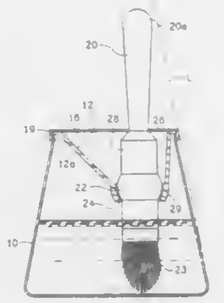
LIQUID DISPENSING CONTAINER

Duane R. Condon, 2330 Raymond Ave., Ramona, Calif. 92065

Filed Feb. 20, 1990, Ser. No. 482,269

Int. Cl.^{5} B67D *1/16*

U.S. Cl. 222—109 **10 Claims**



1. An apparatus for dispensing liquids or viscous fluids, comprising:

an upwardly-opening container having a mouth that communicates with an interior;

a downwardly converging well having an upper end that extends across substantially an entire width of the mouth and having a portion defining a hole extending through a lower end thereof so that the well communicates with the interior of the container;

elongated applicator means adapted to be inserted through the hole in the well and having an upper handle portion, a lower applicator and an enlarged intermediate portion with a lower rounded end configured to engage the portion of the well defining the hole to cover the same; and

cap means removeably mounted over the mouth of the container and having an opening therethrough sized to expose a substantial portion of the upper end of the well and including portions defining a clasp recess sized positioned for receiving the handle portion of the applicator means so that it can be releasably snapped into the recess with the intermediate portion therebelow, the distance between a bottom of the clasp recess and the portion of the well defining the hole being less than a length of the intermediate portion such that the cap means provides a compression force on the intermediate portion to press the intermediate portion against the well, whereby the interior of the container will be sealed to thereby minimize the escape of vapors from the interior of the container and spillage of the contents of the container will be prevented if the container is accidentally tipped over.

5,022,560

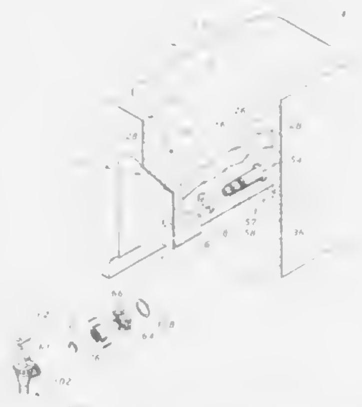
SPIGOT AND WRENCH COMBINATION FOR A BEVERAGE DISPENSER

William P. Campbell, 2103 Bayside Dr., Corona del Mar, Calif. 92625

Filed Jun. 9, 1989, Ser. No. 363,702

Int. Cl.^{5} B67D *5/60*

U.S. Cl. 222—131 **22 Claims**



1. A spigot in removable combination with a faucet for externally dispensing beverages from within a walled container comprising:

said spigot for passing through an opening of said walled container, said spigot having threads;

spigot securement means having threads for interconnecting with said threads of said spigot and to secure said spigot onto said walled container;

said spigot securement means having exterior engagement means for interengaging engagement means on a connector means whereby said connector means can rotate said spigot securement means on said spigot threads;

said faucet mounted for removable connection to said spigot; and,

said connector means adapted both for removable attachment to said spigot and for removable attachment to said faucet, and used for removable connection of said spigot onto said container by gripping said engagement means on said securement means with said connector means engagement means for rotation of said securement means around said spigot.

5,022,561

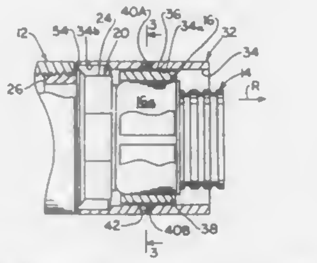
ANTI-THEFT NOZZLE LOCK

Russ La Gasse, 12220 Grevillea, Hawthorne, Calif. 90250, and Lance Lopez, 24425 Ridgewood Rd., Murrieta, Calif. 92362

Filed Apr. 2, 1990, Ser. No. 503,381

Int. Cl.^{5} B67D *5/00*

U.S. Cl. 222—153 **7 Claims**



1. Anti-theft apparatus for resisting the removal of a fuel dispensing nozzle from a hose wherein the hose has a front hose end, a ferrule with a substantially cylindrical outer surface mounted to the front hose end, and a fitting rotatably mounted on the ferrule and having a nut portion and a forwardly-projecting threaded end, and wherein nozzle removal is normally accomplished by unscrewing the fitting from the nozzle, comprising:

a tube having an inside diameter large enough to fit around said nut portion and around said ferrule and long enough to lie simultaneously around both of them;

a plurality of spacers, each comprising a segment of a hollow cylinder having an outside diameter substantially equal to the inside diameter of said tube at a location around said ferrule, and each having an inside diameter substantially equal to the outside diameter of said ferrule, each of said spacers extending by no more than 180° about the axis of the cylinder;

said tube having a plurality of threaded through holes;

a plurality of set screws which screw into said tube holes and which have inner ends that press against the outside of said spacers to press them firmly against said ferrule.

5,022,562

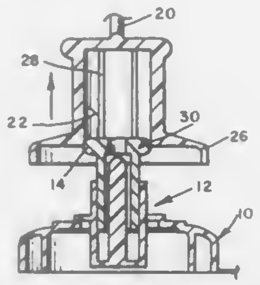
COMBINATION PROTECTIVE CAP AND VALVE OPENER

Jeffry L. Lurkis, 7626 Willow Glen Rd., Los Angeles, Calif. 90046, and Stanley B. Solomon, 29 Misty Acres Rd., Rolling Hills Estates, Calif. 90274

Filed Jul. 11, 1989, Ser. No. 378,802

Int. Cl.^{5} B67D *5/06*

U.S. Cl. 222—182 **4 Claims**



1. A protective cap for use in combination with a bottle having an upper surface, and a poppet valve assembly mounted on said upper surface, said poppet valve assembly including a valve plunger projecting upwardly therefrom above said upper surface and vertically movable between a raised open position and a lowered closed position for respectively permitting and preventing dispensing of a liquid within said bottle through said poppet valve assembly, said protective cap comprising:

a generally cylindrical cap member having an upper closed end and a lower open end, said cap member having an inner diametric size for frictionally engaging a portion of said poppet plunger when said poppet plunger is received into said cap member;

a shoulder flange projecting radially outwardly from said lower open end of said cap member, said shoulder flange including a seal lip disposed generally at the outer periphery thereof and turned in a direction for engaging said upper surface of said bottle when said plunger is received into said cap member;

tether means for flexibly connecting said protective cap to said bottle; and

pull ring means projecting generally upwardly from said upper end of said cap member, whereby said protective cap is manipulatable in a one-handed operation while holding said bottle with the same hand to lift said cap member by pulling upwardly on said pull ring means so that said cap member frictionally engages said poppet plunger and moves said poppet plunger from said closed position to said open position and then separates from said poppet plunger, and to move said poppet plunger from said open position to said closed position by pressing said cap member onto and over said poppet plunger to frictionally engage said poppet plunger and to move said shoulder flange to a position with said seal lip engaging said bottle upper surface about said poppet valve assembly.

5,022,563

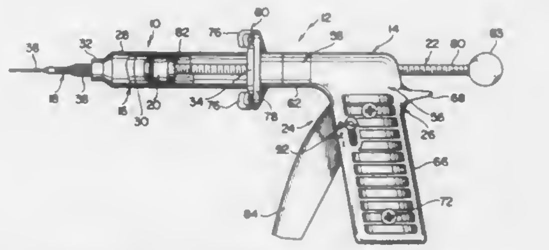
DISPENSER-GUN ASSEMBLY FOR VISCOUS FLUIDS AND DISPENSER THEREFOR

Michael Marchitto, Cumberland, and Steven F. Lord, Rumford, both of R.I., assignors to Electron Fusion Devices, Inc., East Providence, R.I.

Filed Jan. 10, 1990, Ser. No. 463,278

Int. Cl.^{5} B67D *5/42*

U.S. Cl. 222—327 **27 Claims**



1. A dispenser for a viscous fluid comprising:

a) an elongated molded tubular barrel member having an elongated cylindrical chamber therein for containing said fluid, said chamber having opposite first and second ends and having a predetermined length, said chamber having a zero draft throughout said predetermined length;

b) nozzle means defining a dispensing nozzle having a reduced dispensing aperture therein, said nozzle means communicating with the first end of said chamber for receiving said fluid therefrom and for dispensing said fluid through said aperture when pressure is applied to said fluid; and

c) a piston element slidably received in said chamber, said piston element being made of a thermoplastic material such that the frictional resistance between the piston element and the barrel member is substantially reduced, said piston element being operative for applying pressure to said fluid for dispensing said fluid through said aperture when pressure is applied to said piston element in a direction toward said first end, said piston element having a circular front end wall portion, and a tubular skirt portion extending rearwardly from said front end wall portion, said skirt portion including an annular front wiping lip adjacent said front end wall portion, said front wiping lip

VOL
1127
ISS
2
JE
11
1991
UMI

being received in said chamber with an interference fit of between 0.002 inches and 0.007 inches, said skirt portion further including an annular rear wiping lip spaced rearwardly from said front wiping lip.

5,022,564

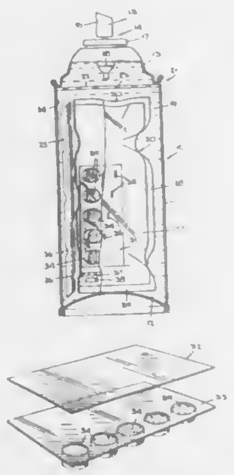
REGULATED PRESSURIZED DISPENSER AND METHOD

Ellis M. Reyner, New Brunswick, N.J., assignor to Joy Research, Incorporated, New Brunswick, N.J.

Continuation-in-part of Ser. No. 21,617, Mar. 2, 1987, Pat. No. 4,909,420, which is a continuation-in-part nf Ser. No. 671,048, Nov. 13, 1984, Pat. No. 4,646,946, which is a continuation-in-part of Ser. No. 413,498, Sep. 2, 1982, abandoned. This application Mar. 16, 1990, Ser. No. 494,831

Int. Cl.^{5} B65D *83/14*

U.S. Cl. 222—386.5 15 Claims



1. In an aerosol type dispenser, internal expulsion means for developing and maintaining gaseous dispensing pressure ranging substantially between predetermined maximum and minimum pressure levels for a product within a container of the dispenser, said expulsion means comprising an enclosed fluid impermeable, flexible closed pouch disposed within said dispenser and having a pair of facing wall members, a plurality of pocket members disposed within said pouch in spaced relation to one another and affixed to the interior of a first of said pair of facing wall members of said pouch, a predetermined quantity of a first component of a two-component gas generation system disposed within each of said pocket members, closure members associated with the interior of the second of said pair of said facing wall members of said pouch closing each of said pocket members and releasably adhering to their contacting surfaces, thereby forming a plurality of closed pocket members each containing a predetermined quantity of said first component of said two-component gas generation system, a predetermined quantity of a second component of said two-component gas generation system disposed within said pouch and externally of said closed pocket members, said second component of said two-component gas generation system includes an ingredient in a frozen state when deposited in said pouch and which subsequently liquifies after placed in said pouch, starting delay device carrying a predetermined quantity of said first component disposed within said pouch in contact with said predetermined quantity of said second component of said two-component gas generation system for causing the initial generation of gas after a prescribed period of time, said closed pocket members being sequentially separable from their respective closure members to empty their contents into admixture with said second componet and to react and generate more gas as said pouch expands due to dispensing said product, said product being dispensed disposed externally of said pouch within said container,

a plurality of identifiable pairs of spots, each comprising two identifiable member spots, and one member spot is located on said first and the other member spot is located on said second of said facing wall members of said pouch,

each of said plurality of closed pocket members having a first extension of a predetermined length extending from the edge of its pocket member and is affixed at its end to said first facing wall member of said pouch at one identifiable member spot of an identifiable pair of spots of said plurality of identifiable pairs of spots, and a second extension member of a predetermined length extending from the edge of each closure member closing a respective pocket member of said plurality of closed pocket members is affixed at its end to said second facing wall member of said pouch at the other identifiable member spot of said identifiable pair of spots,

whereby as the product is dispensed, the pouch expands and its said first and second facing wall members move away from each other under pressure, thus causing the distance between said ends of said first and second extension members of each of said closed pocket members affixed to said first and second facing wall members of said pouch to exceed the total predetermined lengths of said first and second extension members of said closed pocket members, thereby, causing sequential separation of each of said pocket members from their respective closure members according to a predetermined sequence and serial opening of each of said closed pocket members, which discharge their contents sequentially and generate additional predetermined quantities of pressurizing gas each time the internal pressure within said dispenser drops to a predetermined minimum pressure level,

whereby said pouch increases in size to a predetermined capacity each time the internal pressure within said dispenser drops from predetermined maximum to predetermined minimum pressure levels,

whereby dispensing said product from said dispenser causes the internal pressure therein to alternate continuously between said predetermined minimum and maximum pressure levels, and

whereby the coordination of said range of predetermined maximum and minimum pressure levels with, the lengths of the extension members of each of said pocket and closure members of said plurality of closed pocket members, the quantity of said first component enclosed within each of said pocket members and in the starting delay device, the order of sequence of the opening of each of said closed pocket members, and the quantity of said second component deposited within said pouch is necessary for dispensing said product within the range of predetermined maximum and minimum pressure levels.

5,022,565

SOFT DRINK DISPENSER

Oded E. Sturman, Newbure Park; Benjamin Grill, Northridge, and Walter L. Harrison, Newhall, all of Calif., assignors to Kineret Engineering, Newhall, Calif.

Continuation of Ser. No. 209,879, Jun. 22, 1988, abandoned. This application Jan. 31, 1990, Ser. No. 473,099

Int. Cl.^{5} B65D *83/00*

U.S. Cl. 222—396 7 Claims

1. A portable dispenser for maintaining carbonation in and dispensing carbonated drinks from carbonated beverage containers comprising:

a dispenser body assembly including means for sealably coupling to the open top of a beverage container;

cartridge holding means for retaining a source of CO_2 to said dispenser body assembly;

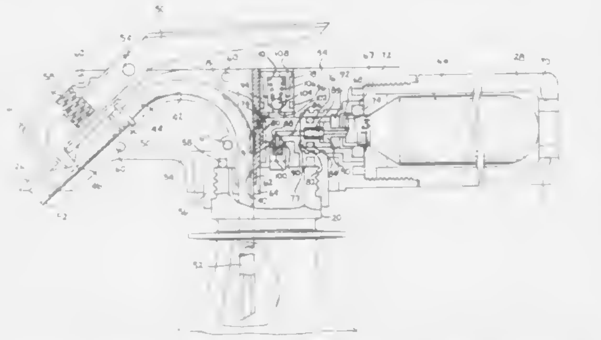
said dispenser body assembly including pressure regulating means in said body assembly for regulating the flow of CO_2 from a CO_2 cartridge in said cartridge holding means to a beverage container coupled thereto to maintain CO_2 pressure in the beverage container, said pressure regulating means having;

a first opening in said dispenser body assembly extending therethrough within the means for sealably coupling to the open top of a beverage container;

a second opening in said dispenser body means communicating between said cartridge holding means and said first opening;

communication means within said second opening and extending into said first opening to define a valve seat facing said means for sealably coupling to the top of beverage container, said communication means being a means for communicating CO_2 in a CO_2 cartridge in said cartridge holding means to said valve seat; and

regulator means within said first opening in said dispenser body means and sealably movable with respect thereto in response to forces thereon, said regulator means having a portion thereof reaching around the portion of said communication means extending into said first opening to define a valve closure member between said valve seat and said means for sealably coupling to the open top of a beverage container, said regulator means being a means for controlling the flow of CO_2 into a beverage container coupled to said dispenser body assembly responsive to the approximate force balance between the pressure in a beverage container encouraging said regulator means in a direction to encourage said valve closure member against said valve seat, and the pressure in a CO_2 cartridge as communicated to said valve seat encouraging said valve closure member away from said valve seat;



tube means having first and second ends and being supported in and sealed with respect to said dispenser body assembly, said tube means extending through said body assembly by a predetermined distance in the region of said means for coupling to the open top of a container, whereby said first end of said tube means will be adjacent to the bottom of a beverage container to which said body assembly may be coupled, said tube means being curved within said body assembly through an angle exceeding 90 degrees without any sharp bends therein, said second end of said tube means being disposed adjacent a complimentary opening in said body assembly therefor, whereby said second end of said tube means will project downward as a dispensing spout when said body assembly is coupled to an upright beverage container, said tube means having a substantially uniform first inner diameter for at least most of its length, said tube means being free of any step changes in its inner diameter, said tube means being flexible at least adjacent said second end thereof;

a dispensing lever means supported on said dispenser body assembly and rotatable between a closed position engaging said tube means adjacent said second end thereof and pinching the same against a cooperative surface of said dispenser body assembly to prevent flow therethrough, and an open position not pinching said tube means to allow free flow therethrough; and,

spring means for yieldably encouraging said dispensing lever means to said closed position.

5,022,566

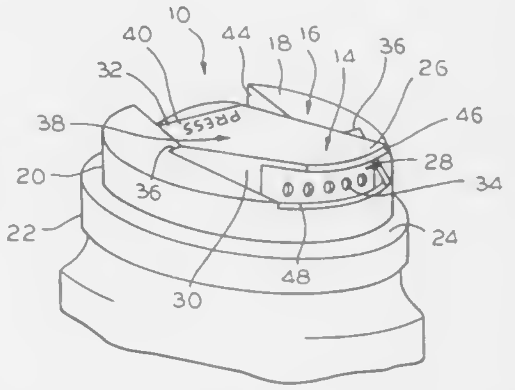
PRESS-OPEN SIDE DISPENSING CLOSURE

John S. Song, Evanston, and Richard W. Hofman, Chicago, both of Ill., assignors to Magenta Corporation, Chicago, Ill.

Filed Feb. 26, 1990, Ser. No. 485,294

Int. Cl.^{5} B67D *3/00*

U.S. Cl. 222—480 7 Claims



5. A one-piece molded plastic press-open side dispensing closure for a container comprising:

a body having a top end wall,

a skirt bounding said top wall and said skirt having internal means to attach said closure to the container;

a relatively large aperture formed in said top wall to permit dispensing of a non-liquid product carried in the container;

a press-open dispensing lid pivotally connected to said top wall to open and close said aperture,

said dispensing aperture formed in said lid being substantially the same shape as said dispensing lid,

a top surface of said top wall and a top surface of said dispensing lid being substantially in the same plane when said dispensing lid is in a closed position,

said pivotal dispensing lid having a front dispensing section and a rear press-open section;

said front dispensing section having a curved front end and two diverging sides diverging from said front end to outer ends of a pair of living hinges positioned diametrically opposite each other,

said rear press-open section having a pair of converging lid sides converging from inner ends of said hinges to a rear end of the press-open section,

a flexible curved seal end wall extending from the rear end of the press-open section,

said seal end wall being biased to flex in a direction towards said top surface of said lid,

said flexible seal end wall being of a predetermined length and normally being in sealing engagement with a corresponding portion of said dispensing aperture,

a pair of side walls depending from said top wall into the dispensing aperture adjacent said rear press-open section converging side walls,

an arcuate dispensing wall extending downwardly from the under surface of the dispensing lid for a predetermined distance,

a plurality of dispensing orifices formed in said dispensing wall,

a pair of dispensing curved walls extending downwardly for a predetermined distance from said diverging side walls,

said curved side walls also extending from said arcuate dispensing wall, and

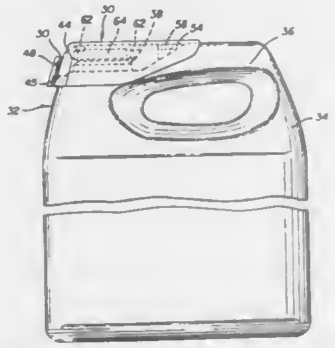
a flexible cantilevered seal positioned adjacent to and in sealing contact with said arcuate dispensing wall.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,567

FUNNEL AND INTEGRATED FUNNEL/CONTAINER PACKAGE

John S. Frazer, P.O. Box 885, Barnegat Light, N.J. 08006
Filed Apr. 18, 1989, Ser. No. 339,771
Int. Cl.^{5} B65D *83/00, 25/40*
U.S. Cl. 222—475 **12 Claims**



11. A package for flowable material, comprising:
(a) an upright container having a top with a handle thereon, a spout which defines an opening through the top remote from the handle, and a removable closure for the spout and the opening;
(b) a funnel removably mountable to the top to overlie the handle and the closure, the funnel having a U-shaped cross-section and comprising
  (i) a base,
  (ii) sidewalls extending along and connected to the base,
  (iii) a rear wall connected to the sidewalls and the base, the rear wall having an outer lateral extension and a selectively removable portion, removal of which portion provides a passageway through the rear wall of the extension communicating with the funnel, and
  (iv) a feature on the lateral extension which is engageable with the inside surface of the spout;
(c) T-shaped means on the top of the container and parallel arm means with facing projections within the funnel for snapping together to selectively secure the funnel in the overlying relationship with the handle and the closure; and
(d) means on the funnel for engaging the periphery of the removable closure to align the funnel therewith when the funnel is secured in the overlying relationship with the handle and the closure.

5,022,568

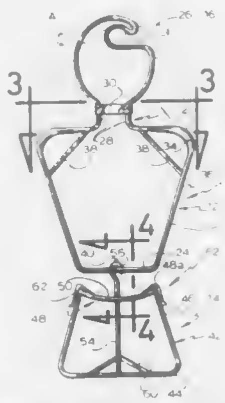
Patent Not Issued For This Number

5,022,569

GARMENT HANGER FOR SIMULTANEOUSLY DISPLAY OF UPPER AND LOWER BODY COVERING GARMENTS INTERCHANGEABLY

Josette Beaulieu, 480 St. Joseph Street, Ste-Brigitte-des-Saults, Canada J0C 1E0
Filed Feb. 14, 1990, Ser. No. 479,993
Int. Cl.^{5} A47G *25/16, 25/28, 25/48, 25/14*
U.S. Cl. 223—88 **17 Claims**

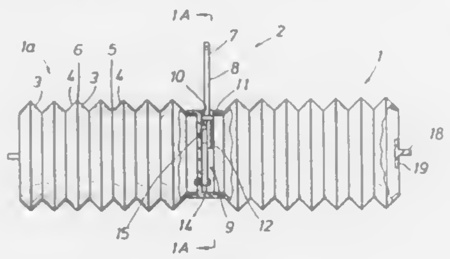
1. A garment hanger to display together separate upper body-covering garments and lower body-covering garments, comprising: an upper part forming a hook section for engaging a support and a body section shaped to form shoulder zones and a waist zone, and a lower part including a planar U-shape member defining a bight portion and a pair of upstanding legs, an elongated loop member defining an opening therethrough, said loop member extending across and secured at its ends to the upper ends of said legs and disposed in a plane generally normal to the plane of said U-shaped member, and a suspension rod upstanding from and fixed to said bight portion, intermediate said legs and generally in the plane thereof, said suspension rod freely extending through, spacedly from and above said loop member, and hook means at the upper end of said suspension rod to detachably suspend said lower part from said waist zone of said upper part.



5,022,570

COLLAPSIBLE GARMENT HANGER WITH CORRUGATED TUBING

Roger L. Watford, 2126 Wilderness Point, Kingwood, Tex. 77339
Filed Jan. 2, 1990, Ser. No. 459,462
Int. Cl.^{5} A47G *25/40, 25/14*
U.S. Cl. 223—94 **17 Claims**



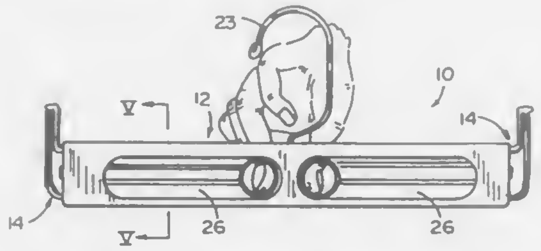
1. A garment hanger comprising:
at least one integrally formed tubular element and a hook for hanging the tubular element from a support, said tubular element including a plurality of connected corrugations formed by alternating first and second circumferential walls joined together base to base about circumferentially extending hinges and apex to apex about circumferentially extending hinges, said tubular element being at least partially collapsible, whereby at least two walls of the tubular element are side by side.

5,022,571

INTERNAL GARMENT HANGER WITH TENSIONING SPRINGS AND STRAPS

Russell O. Blanchard, Zeeland, Mich., assignor to Batts, Inc., Zeeland, Mich.
Filed Dec. 5, 1989, Ser. No. 446,049
Int. Cl.^{5} A47G *25/48, 25/62, 25/14, 25/44*
U.S. Cl. 223—95 **21 Claims**

9. An internal garment hanger adapted to retain a garment by a waistband, said hanger comprising:
an elongated body defining an open end, said body further defining a longitudinally extending slot;
an elongated slide having a garment engaging end and an opposite end which defines an aperture, said slide having an elongated slot, said slide extending into said open end of said body;
resilient means extending between said body and said opposite end of said slide and within said slot of said slide for resiliently biasing said slide out of said open end of said body; and
stop means on said slide for stopping outward movement of the slide with respect to said body, and
wherein said resilient means comprises:

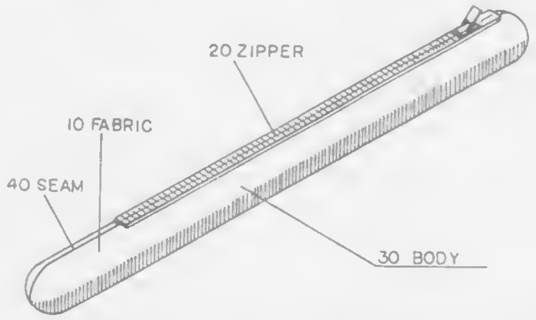


a cap, said cap being positioned within said slot of said slide and being joined to said slide by a severable bridge; and
a spring having an end connected to said cap and an end connected to said slide, said cap dimensioned to be received within the open end of said body and wherein inward movement of the slide with respect to said body severs said bridge.

5,022,572

PROTECTIVE COVER FOR PORTABLE BICYCLE TIRE PUMPS

Steven W. Brown, 4005 Orangedale, Montrose, Calif. 91020
Filed Mar. 13, 1990, Ser. No. 492,602
Int. Cl.^{5} B62J *11/02, 23/00;* **F04B** *39/00*
U.S. Cl. 224—30 R **5 Claims**



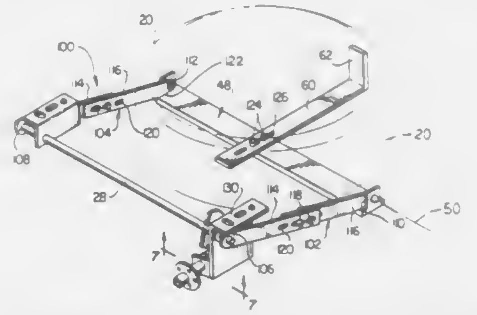
1. A protective cover and portable bicycle tire pump adapted to be attached to a bicycle frame, said cover comprising:
a. a piece of fabric or synthetic material in the shape of a tubular cylinder that closely conforms to the external configuration of the pump,
b. a reclosable device affixed lengthwise into the cylinder, and
c. a grommet pressed into each end of the cylinder.

5,022,573

SPARE TIRE RACK

Ronnie Barknuskie, Mexia, Tex., assignor to Dutton-Lainson Company, Hastings, Nebr.
Continuation-in-part of Ser. No. 169,490, Mar. 17, 1988, Pat. No. 4,884,729. This application Jul. 13, 1989, Ser. No. 379,416
The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.
Int. Cl.^{5} B62D *43/00*
U.S. Cl. 224—42.21 **17 Claims**

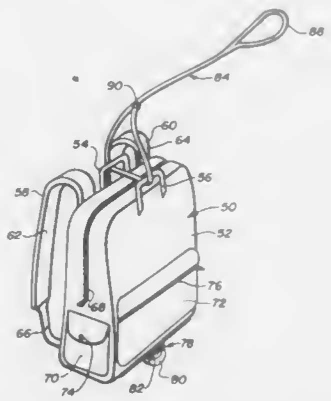
1. A spare tire rack for holding a spare tire on a vehicle having parallel frame members, comprising:
a first bracket mounted to a first of said frame members;
a second bracket mounted to the other of said frame members,
a movable section including:
(a) a rod pivotally supported between said first and second brackets for pivotal motion about a horizontal axis;
(b) a first arm having an inner end and an outer end, said first arm secured at its inner end to the rod proximate the first bracket, the first arm formed of an inner piece, an outer piece and means to adjustable secure the pieces together to establish a first selected distance between the inner and outer end of the first arm;
(c) a second arm having an inner end and an outer end, said second arm secured at its inner end to the rod proximate the second bracket, the second arm formed of an inner piece, an outer piece and means to adjustably secure the pieces together to establish a second selected distance between the inner end and outer end of the second arm;
(d) a cross piece pivotally connected between said first and second arms at the outer ends thereof for limited pivotal motion, and for supporting a spare tire, a stop formed on at least one of said arms to limit the motion of the spare tire resting on the cross piece; and
means for pivoting said movable section between a storage position proximate the parallel frame members and a release position, the cross piece pivoting against the stop proximate the storage position to store the tire horizontally, said cross piece pivoting relative to said first and second arms as the movable section moves to the release position to provide easy access to the spare tire.



5,022,574

UTILITY BAG

Jeffrey Cesari, 9996 Woodfern St., Philadelphia, Pa. 19115
Filed Apr. 4, 1990, Ser. No. 505,357
Int. Cl.^{5} A45C *5/14, 13/00, 13/26*
U.S. Cl. 224—153 **10 Claims**



1. A multi-purpose utility bag comprising:
a bag member, said bag member having a base portion, front, back, and side portions and a top portion, all being constructed of flexible material, said bag member having a closure mechanism proximate to said top portion, and further being provided with handles proximate to the top portion of said bag member, and adjustable shoulder

VOL
1127
ISS
2
JE
11
1991
UMI

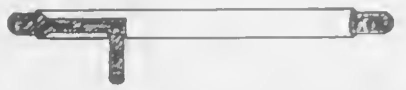
straps proximate to the back portion of said bag member, said shoulder straps being provided with padding for at least a portion of their length to provide greater comfort when the bag is carried on the shoulders of a user;

a support member itself having a base portion and a back portion formed from one integral piece of material bent into an "L"-shape, and integrated into said bag member such that the base portion of said support member is substantially co-extensive and co-terminus with the base portion of said bag member and the back portion of said support member is substantially co-extensive and co-terminus with the back portion of said bag member, said support member providing firm support for said bag member at least in the area of said base portion and said back portion of said bag member; and,

a non-linear array of load-bearing, rotatable castors fixedly attached to the base portion of said support member and extending through the flexible material of the base portion of said bag member, permitting the utility bag to sit upright and roll across a flat surface upon said castors.

5,022,575
SIDE-HANDLE BATON RACK

Mack P. McDonald, 27801 Teal Rd., Montague, Calif. 96064
Filed Feb. 13, 1990, Ser. No. 479,646
Int. Cl.^{5} B60R *7/00*
U.S. Cl. 224—273 **1 Claim**

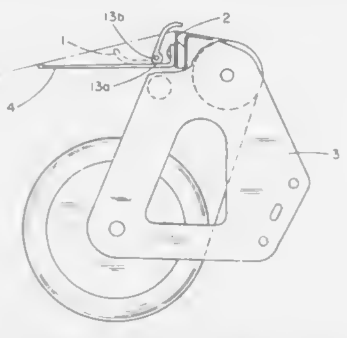


1. A baton holder for a side handle baton having an elongated baton shaft having a first outside diameter and a short side handle which is disposed perpendicular to the elongated baton shaft and having a second outside diameter, said baton holder comprising: an elongated holder having first and second ends, an inner diameter sized to receive said first outside diameter of said baton shaft, and a longitudinal axis extending therethrough, said first end having an opening for receiving said baton shaft; a longitudinally extending slot in said holder adapted to receive said side handle for longitudinal movement of said baton within said holder, said slot having a first end connected with said opening and a second end; and a laterally extending slot in said holder adapted to receive said side handle for rotational movement of said baton within said holder, said laterally extending slot extending from said second end of said longitudinally extending slot.

5,022,576
LEVER-OPERATED PROTECTIVE COVER FOR A SAW TOOTH-SHAPED CUTTER

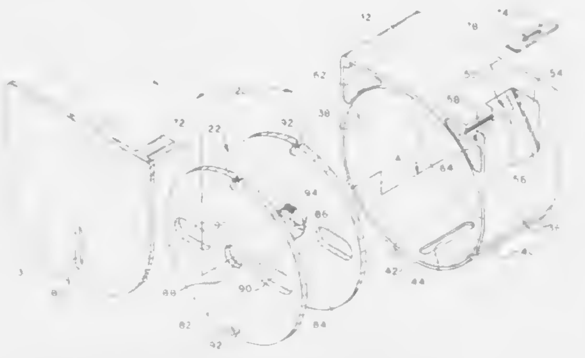
Jin-Huoo Jenq, No. 16, Lane 399, Section 3, Jong-Shan Road, Tan-Tzu Taichung, Taiwan
Filed Jan. 13, 1989, Ser. No. 297,083
Int. Cl.^{5} B26F *3/02;* **B65H** *35/07*
U.S. Cl. 225—20 **2 Claims**

1. A protective cover plate (1) adapted to cooperate with a tape dispenser having two frame plates (3) set at a predetermined distance, a roller rotatably disposed between said frame plates, a cutter (2) positioned downstream of said roller, and an elastic guide plate (4) extending in a direction downstream from said cutter, a portion of the tape to be dispensed normally passing over said roller and beyond said guide plate, said cover plate comprising in combination a lever having a curved plate (11) serving as a handle and including a pivotable base (13) normally in contact with said elastic guide plate (4) of the tape dispenser, said curved plate being as wide as said cutter but narrower than the distance between said frame plates, a part of said base having in cross section a V-shaped configuration formed by two legs converging into a round apex facing away from said handle, said legs of said V-shaped part subtending a predetermined angle of about 90 degrees, two pins substantially extending on respective opposite sides of said base, each of said frame plates having an orifice, each of said pins being adapted to pass through each of said orifices, whereby, when said pins of said protective cover are inserted into said holes, they form a pivoting axis, said protective cover is pivotably disposed on said tape dispenser around said pivoting axis and said protective occupies a first stable non-operative position at a predetermined distance from said cutter, so as to protect a user from said cutter, and by pivoting said protective cover with sufficient force in a direction away from said cutter whereby pressure is applied on said protective cover, so as to overcome the pressure exerted by the elastic guide plate onto said apex of said V-shaped base portion, said protective cover is dislodged to a second operative position to permit cutting of the tape.



5,022,577
LINE STORAGE AND DISPENSING CARTRIDGE

Richard A. Fike, 62 S. Lake, Madison, Ohio 44057
Filed Mar. 5, 1990, Ser. No. 487,850
The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.
Int. Cl.^{5} B26D *7/00;* **B65D** *85/04*
U.S. Cl. 225—47 **6 Claims**



1. A cord dispensing cartridge comprising:

a rigid, shatter-proof, generally U-shaped plastic housing, said housing including:

first and second housing sections having inner and outer surfaces, which housing sections are ultrasonically welded to each other and define a cord holding cavity of cylindrical shape and a plurality of separate, smaller, air-tight flotation cavities within said plastic housing;

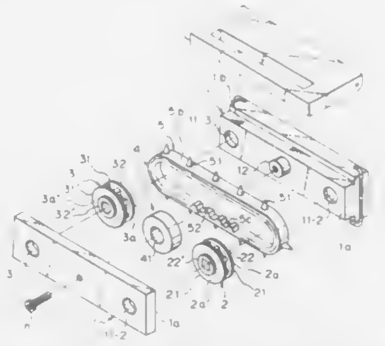
a spool having two flat, circular flange portions connected by a small-diameter stem portion totally enclosed within said housing, said spool dimensioned to occupy substantially the entire space defined by said cylindrical cavity;

a predetermined length of high-strength nylon cord machine wound in dense-packed fashion about said stem portion of said spool; and,

blade means operable to sever said nylon cord, said blade means being stationary and fixedly mounted to said housing by being wedged between said first housing section and said second housing section with a cutting edge oriented inwardly toward said housing and disposed within said outer surface of said housing.

5,022,578
SHEET FEEDER FOR FEEDING CONTINUOUS PRINT PAPER HAVING SPROCKET HOLES

Ryoukei Ohsaki, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan
Filed May 5, 1988, Ser. No. 190,677
Claims priority, application Japan, May 15, 1987, 62-71636
Int. Cl.^{5} B65H *20/20;* **G03B** *11/00*
U.S. Cl. 226—74 **8 Claims**



1. A sheet feeder for feeding continuous printing paper having sprocket holes, said feeder comprising:

a pair of opposed frames having securing means for securing the frames to one another, said securing means including a projection extending from one of said frames toward the other of said frames, and each of said frames having an upper surface extending along the entire length thereof;

a drive gear rotatably supported between said pair of frames for being driven;

a guide gear rotatably supported between said pair of frames and spaced from said drive gear;

an endless pin tractor belt extending around said drive and said guide gears so as to have an upper run and a lower run,

said endless pin tractor belt also having an outer circumferential surface, a plurality of pins extending from the outer circumferential surface for engaging continuous printing paper in sprocket holes thereof, an inner circumferential surface, and a series of teeth extending from the inner circumferential surface and sequentially engaged by said drive gear as said drive gear is driven to drive said pin tractor belt;

a guide roller disposed between said drive gear and said guide gear, interposed between said upper and said lower runs of said pin tractor belt, rotatably supported on said projection, and having an outer circumferential surface contacting the teeth of said pin tractor belt for being rotated by said pin tractor belt to facilitate smooth rotation of said pin tractor belt around said drive and said guide gears,

said guide roller consisting of a roller having a constant outer diameter as taken along the entire axial length thereof,

said drive gear, said guide gear and said guide roller supporting said tractor pin belt with the outer circumferential surface at said upper run thereof disposed in a plane lying above the entire said upper surfaces of said pair of frames,

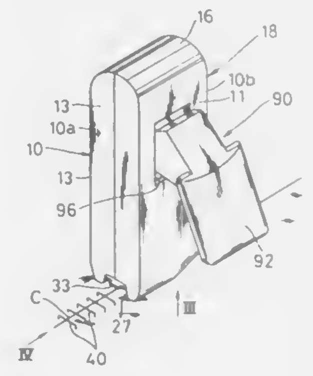
wherein when printing paper is supported by said pin tractor belt on the outer circumferential surface at the upper run thereof, the paper is out of contact with said frames; and

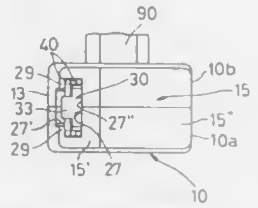
a cover for covering the upper surfaces of said frames, and a wire spring connected to said cover for openably supporting said cover on one of said frames,

said wire spring including a central portion and a pair of ends bent from said central portion and engaging said cover, said central portion having a bend at the middle thereof and engaging a lowest surface of said one of said frames for urging the cover against an uppermost surface of said one of said frames.

5,022,579
SURGICAL STAPLER

Kanji Matsutani, Tochigi, and Masatoshi Fukuda, Utsunomiya, both of Japan, assignors to Matsutani Seisakusho Co., Ltd., Takanezawa, Japan
Filed Aug. 3, 1989, Ser. No. 389,353
Claims priority, application Japan, Aug. 9, 1988, 63-197262; Oct. 14, 1988, 63-257340; Nov. 25, 1988, 63-297380
Int. Cl.^{5} A61B *17/068*
U.S. Cl. 227—177 **11 Claims**





1. A surgical stapler comprising:

(a) an elongated body;

(b) an anvil mounted on a distal end portion of said body;

(c) means for supporting a number of staples disposed in contiguous relation to one another and for guiding said staples toward said anvil;

(d) means for urging said staples, supported on said support and guide means, toward said anvil;

(e) a ram mounted on said body so as to be movable toward and away from said anvil along a straight path extending along a longitudinal axis of said body, a leading one of said staples being disposed in said path and being disposed between said ram and said anvil;

(f) a lever pivotally connected at its proximal end to a proximal end portion of said body so as to be pivotally movable toward and away from said body, said lever having a manipulating portion at its distal end portion for pivotally moving said lever; and

(g) means for converting the pivotal movement of said lever into a rectilinear movement of said ram along said path; said converting means moving said ram toward said anvil when said lever is pivotally moved toward said body, so that said ram cooperates with said anvil to deform opposite ends of said leading staple toward each other; said lever acting on said converting means at a mid portion of said lever disposed intermediate the proximal end of said lever and said manipulating portion, so that a force greater than a force applied to said manipulating portion can be applied to said ram through the leverage of said lever, in which said body comprises a tubular portion of a gener-

VOL
1127
ISS
2
JE
11
1991
UMI

ally rectangular cross-section having a pair of generally parallel, opposed first and second side walls, and a pair of generally parallel, opposed third and fourth side walls, and distal end wall closing a distal end of said tubular portion; there being provided an opening formed through a corner portion of said body where said first side wall and said distal end wall are joined together; said anvil being disposed in the vicinity of said opening; the opposite ends of said staple deformed by said ram and said anvil extending outwardly from said body through said opening; said deformed staple being discharged from said body through said opening; said support and guide means extending along said distal end wall; said path of movement of said ram extending along said first side wall; the axis of pivotal movement of said lever being disposed perpendicular to said first and second side walls; there being provided another opening formed through said third side wall; the proximal end portion of said lever being disposed within said body; and said lever extending outwardly from said body through said another opening.

5,022,580
VERNIER STRUCTURE FOR FLIP CHIP BONDED DEVICES

David J. Pedder, Oxon, Great Britain, assignor to Plessey Overseas Limited, Ilford, England

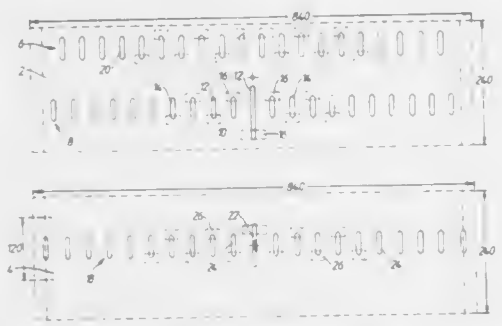
PCT No. PCT/GB89/00282, § 371 Date Nov. 30, 1989, § 102(e) Date Nov. 30, 1989, PCT Pub. No. WO89/08926, PCT Pub. Date Sep. 21, 1989

PCT Filed Mar. 16, 1989, Ser. No. 435,477

Claims priority, application United Kingdom, Mar. 16, 1988, 8806232; May 16, 1988, 8811529

Int. Cl.^{5} H05K *3/34*

U.S. Cl. 228—56.3 7 Claims



1. A flip-chip solder bonding structure comprising first and second components each comprising a substrate having on one surface an array of solderable pads, selected pads having solder bumps deposited thereon, and each surface having a plurality of alignment marks formed thereon whereby when the components are positioned face to face, the arrays register with one another to enable a solder bond to be formed and the respective pluralities of alignment marks may be inspected to assess their relative positions in order to determine the accuracy of the solder bond, the solderable pads and the alignment marks on each surface being formed during the same processing stage as metallised regions and wherein solder bumps are applied to the metallised regions forming the alignment marks.

5,022,581
WELDING PARTS HAVING DIFFERENT THERMAL EXPANSION

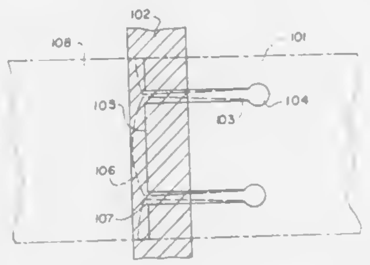
Gero Zimmer, Rolling Hills Etd., Calif., assignor to Productech Inc., Rolling Hills Esatades, Calif.

Filed May 4, 1990, Ser. No. 518,930

Claims priority, application Fed. Rep. of Germany, May 5, 1989, 3914862

Int. Cl.^{5} B23K *33/00*

U.S. Cl. 228—164 13 Claims



1. A method of joining one part to another at a joining line extending along joining edges of the parts to be joined, comprising:

forming a plurality of mechanical slots in the joining edge of at least one part, each slot extending at substantially 90 degrees to the joining line from an outer end of the slot at the joining edge, to an inner end of the slot spaced from the joining edge;

heating the parts adjacent the joining edges thereof to initiate joining of the joining edges; and

allowing the joining edges to cool to form the joining line, expanded material of at least one part extending into the slots and the joining line extending across at least some of the slots at the outer ends thereof.

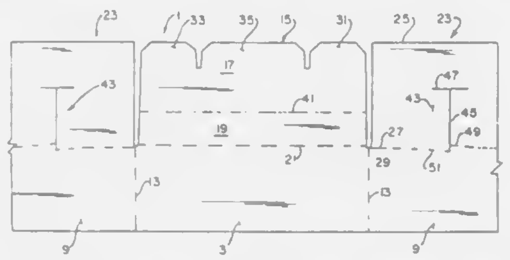
5,022,582
CORRUGATED BOX FLAP LOCKING FEATURE FOR PRODUCE AND THE LIKE

Karl M. Ritter, Carol Stream, Ill., assignor to Jefferson Smurfit Corporation, St. Louis, Mo.

Filed Nov. 15, 1990, Ser. No. 613,287

Int. Cl.^{5} B65D *5/10*

U.S. Cl. 229—157 14 Claims



1. A blank for forming a carton with a locking bottom closure comprising

portions for forming a pair of opposing end walls;

portions for forming a pair of opposing side walls generally normal to said end walls;

a major closure flap hingedly connected to each said side wall portion, said major closure flap including a fixed end hingedly adjacent said side wall portion, a free end remote from said fixed end, and tab means at said free end;

a minor closure flap connected to each said end wall portion, said minor closure flap including tab receiving means for receiving said major closure flap tab means; and

a hinged line between said end wall portion and said minor closure flap for hingedly connecting said minor closure flap to said end wall, said hinge line including means for opening said tab receiving means to facilitate insertion of said tab means in said tab receiving means.

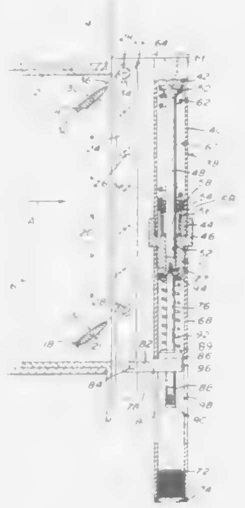
5,022,583
REGISTER BLADE MOVER

Jean-Marie Bruens, 2081 René Gauthier, Varennes, Canada J3X 1R3

Filed Jul. 16, 1990, Ser. No. 552,464

Int. Cl.^{5} G05D *23/12*

U.S. Cl. 236—49.5 8 Claims



1. A temperature-responsive actuator mechanism for operatively controlling and adjusting within a predetermined temperature range the orientation of a set of parallel louver slats which are pivotally hinged to a common peripheral frame forming a register at the exit of an air duct of an air-conditioning system, said actuator mechanism comprising:

(a) a ram adapted to be fixed to said frame in the path of the air flowing out of said register and defining a sealed inner chamber and a reciprocatable operating rod;

(b) a mixture of several compounds with progressively-higher melting points within said temperature range, said mixture located in and filling said inner chamber, said mixture progressively expanding and responsive to temperature increase of the supply air out of said duct in said temperature range and acting on said operating rod to move the same away from said sealed chamber;

(c) return biasing means, biasing said operating rod towards said sealed inner chamber;

(d) an arm carried by said operating rod; and

(e) motion-converting means, connected to said arm and adapted to be connected to said slats to convert reciprocating motion of said operating rod into rotational motion of said slats;

wherein, when duct air flow temperature increases, the expansion of the mixture in said ram inner chamber, forcibly biases said operating rod to move out of said sealed inner chamber, against the bias of said return biasing means, and when the duct air flow temperature decreases producing contraction of the mixture, said return biasing means causes said operating rod to move into sealed inner chamber.

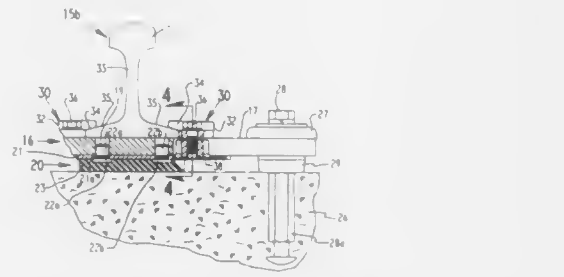
5,022,584
RAIL-FASTENING FOR RAILS

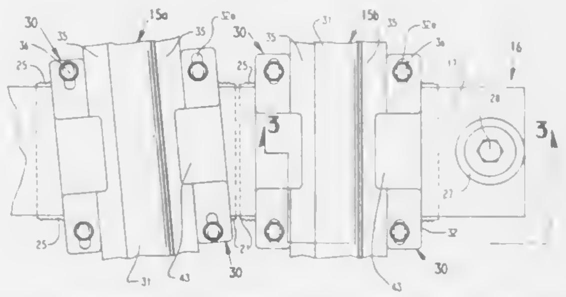
James W. Sherrick, Edinboro, Pa., assignor to Lord Corporation, Erie, Pa.

Filed Dec. 27, 1988, Ser. No. 289,952

Int. Cl.^{5} E01B *9/38*

U.S. Cl. 238—282 16 Claims





6. A rail fastener for fastening two closely spaced rails to a support structure comprising:

a rigid track plate for spanning and attachment to said rails and being disposed overlaying said support structure; a fastener pad connected to said rigid track plate for supporting said track plate upon said support structure comprising,

a rigid member,

a resilient member affixed to said rigid member and interposed between said rigid member and said support structure for isolating and damping vibrations of each rail, and an adjustable fastening means for securing said fastener pad to said track plate;

a means to secure said rails to said track plate;

and a means to secure said track plate to said support structure; wherein said rail fastener fastens closely spaced rails to the support structure securing the rails from lateral and longitudinal movement.

5,022,585
AUTOMATIC CHEMIGATION

Donald A. Burgess, Shoreham, N.Y., assignor to Automated Chemical Management, Inc., Shoreham, N.Y.

Filed Jan. 17, 1989, Ser. No. 297,373

Int. Cl.^{5} B05B *7/30*

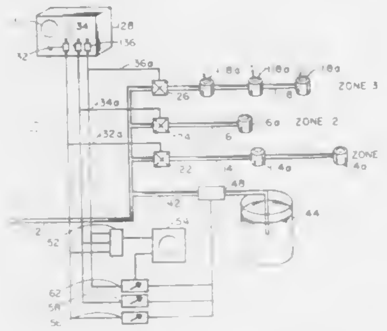
U.S. Cl. 239—70 12 Claims

1. An arrangement for automatically introducing a chemical into a plurality of zones in a biological system comprising:

a. a water supply system having a main water supply line, a plurality of headers for delivering water to each of said zones directly from said main supply line, normally closed on/off water flow valve means in each of said headers to permit upon actuation flow of water into the respective header, and timer means for each of said water flow valve means for actuating its respective water flow valve means

VOL
1127
ISS
2
JE
11
1991
UMI

at selected staggered intervals and for establishing a length of time each said water flow valve means is open to permit flow of water into its respective zone;
b. a source of liquefied chemical for said biological system;
c. means for delivering said chemical from said source into said system when water is flowing; and

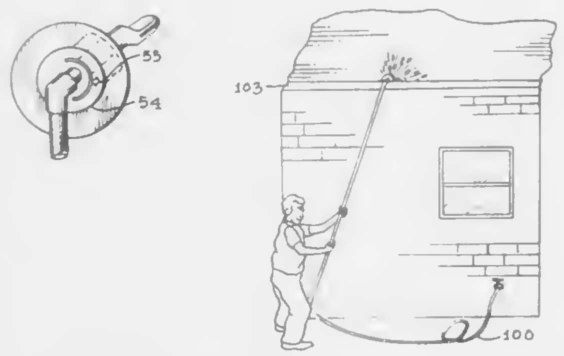


d. said delivering means including control means for controlling a maximum duration of delivery of chemicals to said system from said source and separate normalizing means for each of said headers for selectively establishing a fraction of said duration during which said chemical is delivered to each of said headers.

5,022,586

GUTTER CLEANING DEVICE

William R. Putnam, 6701 SE. 74th, Portland, Oreg. 97206
Filed Jan. 19, 1990, Ser. No. 467,442
Int. Cl.^{5} B08B *9/00;* **B05B** *9/08*
U.S. Cl. 239—71 4 Claims

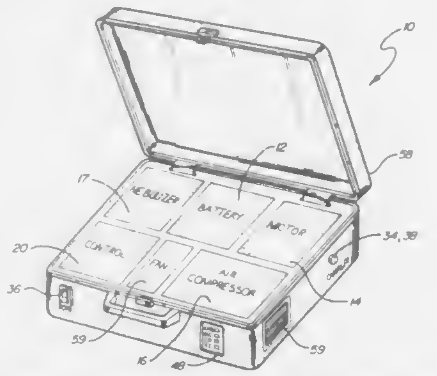


1. A gutter cleaning device adapted to be connected to a conventional garden hose to flush debris from a gutter wherein the device comprises:
an adjustable handle unit operatively secured on the lower end to said conventional garden hose and having an upper end;
an elbow unit operatively secured to the upper end of the adjustable handle unit and comprising an elbow connection member having: a handle insertion portion on one end which is dimensioned to frictionally engage the upper end of the handle unit; and, a nozzle support tube on the other end;
a nozzle unit comprising a generally elongated nozzle member including a shaft portion dimensioned to be rotatably disposed on said nozzle support tube of the elbow unit; and, a spray head portion formed on the free end of the nozzle member; and,
a wheel unit comprising a large diameter outer wheel member and smaller diameter inner cylindrical hub member wherein the outer wheel member serves as a guide as the device rolls along the side of the gutter, and the hub member supports the device as the hub member traverses the top of the gutter; wherein, the wheel member and the hub member are operatively and rotatably disposed on said elongated nozzle member.

5,022,587

BATTERY POWERED NEBULIZER

Peter A. Hochstein, 2966 River Valley Dr., Troy, Mich. 48098
Filed Jun. 7, 1989, Ser. No. 362,570
Int. Cl.^{5} B67D *5/08*
U.S. Cl. 239—72 17 Claims



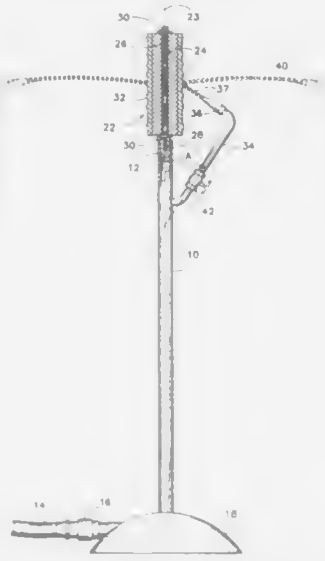
1. A nebulizer assembly, said assembly comprising: power supply means (12) for supplying power; generating means (18) for producing fog; control means (20) connected between said power supply means (12) and said generating means (18) for switching power to said generating means (18) to produce a predetermined volume of fog; said control means (20) including pulsing means (22) for receiving said power and transmitting a series of pulses of power to said generating means (18) to establish an average power producing said predetermined volume of fog, and feedback means (26) for providing feedback to said pulsing means (22) of the output of said generating means (18).

5,022,588

WATER TOY HAVING UMBRELLA SPRAY PATTERN

Gerald A. Haase, 1005 Country Club Rd., Lake Oswego, Oreg. 97034
Filed Dec. 26, 1989, Ser. No. 456,567
Int. Cl.^{5} B05B *3/04*
U.S. Cl. 239—211 12 Claims

1. A water toy comprising:
(a) an elongate, hollow, upright closed end column;
(b) means for connecting said column to a source of pressurized water;
(c) a cylindrical deflector having an outer surface that is substantially continuous mounted on said column, said deflector having a substantially vertical axis about which it is rotatable relative to said column; and
(d) nozzle means for spraying water from said column against said outer surface of said deflector in a stream that is directed upwardly at an acute angle with respect to said axis along a vertical plane that does not pass through said axis.



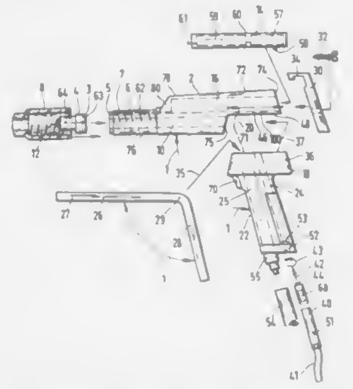
5,022,589

Patent Not Issued For This Number

5,022,590

SPRAY GUN FOR ELECTROSTATIC SPRAY COATING

Karl Buschor, St. Gallen, Switzerland, assignor to Ransburg-Gema AG, St. Gallen, Switzerland
Filed Feb. 5, 1990, Ser. No. 475,108
Claims priority, application Fed. Rep. of Germany, Feb. 14, 1989, 3904437
Int. Cl.^{5} B05B *5/25, 15/00*
U.S. Cl. 239—708 17 Claims

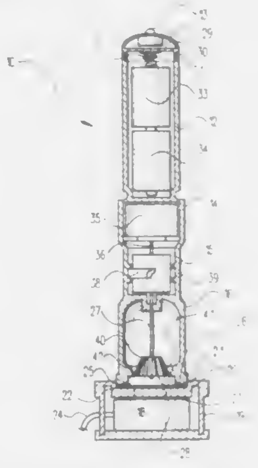


1. Spray gun for electrostatic spray coating of articles with coating material, specifically with coating powder, with a fun barrel (2), a gun grip (18) and a fluid line (26) carrying the coating material and extending through channels of the gun grip (18) and of the gun barrel (2) and extending curved at approximately the same angle as the gun grip to the gun barrel, characterized in that the gun grip (18) and the fun barrel (2) are two bodies which are detachably connected with each other, in that the fluid line (26) is a stiff tube with two tubular shanks (27, 28) which at said angle extend obliquely to each other, and in that one tubular shank (28) is removably inserted in a channel (25) of the gun grip (18) while the other tubular shand (27) is removably inserted in a first channel (10) of the gun barrel (2), each from the bordering side of the gun grip (18) and the gun barrel (2),
in that the gun barrel (2) includes a rear end (74, 75), in that the rear end (74, 75) of the gun barrel (2) is in its length so graduated that its rear end features at the bottom a recess (20),
in that a first channel (10) is located is located in a lower barrel part (76) of the gun barrel (2), which due to the recess is shorter than an upper barrel part (78) of the gun barrel (2),
in that a second channel (16) with a voltage generator (14) is located in the upper barrel part (78), which equal to the length of the recess (20) protrudes rearwardly beyond the lower barrel part (76),
in that a transformer (57) of the voltage generator (14) with in a second channel (16) extends with at least one-half of its length rearward beyond the first channel (10),
in that a part (36) of the gun grip (18) is fitted in the recess (20), of the gun barrel (2), that is situated rearwardly below,
in that a third channel (24) extending through the gun grip (18) is straight for receiving an electrical connector (40), and
in that connecting elements (46, 50) for electrical connection of a primary side of the voltage generator (14) are relative to an inner end of the third channel (24) so arranged that they will automatically make contact with electrical contacts (44) that are located on the end of the connector (40) away from a voltage supply cable (41), as the connector (40) is passed, from outside, through the third channel (24), for which purpose the connector (40) is rod-shaped and stiff.

5,022,591

CORDLESS PEPPER MILL

Robert L. Sanders, P.O. Box 674, Bay City, Tex. 77414
Filed Nov. 27, 1989, Ser. No. 441,296
Int. Cl.^{5} A47J *42/06*
U.S. Cl. 241—169.1 1 Claim



1. A cordless pepper mill, comprising:
an elongated housing having a bottom end;
a plurality of slits in said bottom end for discharging pepper flakes;
a mill in said housing for grinding pepper corns into pepper flakes;
said mill being frusto conical in shape and having larger and smaller diameter ends, said larger diameter end of said mill directed toward said bottom end of said housing and said smaller diameter end of said mill directed away from said bottom end of said housing, such that said mill tapers in diameter inwardly away from said bottom end of said housing;
means mounting said mill for rotation with a minimum clearance within an oppositely tapering frusto conical seat;
said seat having a smaller diameter end directed toward said bottom end of said housing and a larger diameter end

VOL
1127
ISS
2
JE
11
1991
UMI

directed away from said bottom end of said housing, such that said seat tapers inwardly in diameter toward said bottom end of said housing;
said mill having a plurality of circumferentially spaced alternating trapezoidal lands and trapezoidal flutes;
said lands and said flutes each having a flat trapezoidal face and two flat trapezoidal side walls, said side walls forming a right angle with said faces;
said trapezoidal flutes tapering in depth from a maximum depth adjacent said smaller diameter end of said mill to a minimum depth adjacent said larger diameter end of said mill;
said trapezoidal lands and said trapezoidal flutes tapering in width from a largest width adjacent said larger diameter end of said mill to a smallest width adjacent said smaller diameter end of said mill;
a motor in said housing;
a gear reduction unit connected to a rotary output shaft of said motor;
a rotary output shaft of said gear reduction unit connected to said mill;
a rechargeable battery in said housing for driving said motor;
a switch mounted on an exterior top end of said housing and spring biased to an off position for selectively connecting said battery to said motor;
a recharging unit for recharging said battery;
cooperating electrical contacts on said recharging unit and on said housing; and
said recharging unit having a top surface provided with a cylindrical recess and said housing having a cylindrical end portion dimensioned for frictional engagement within said recess.

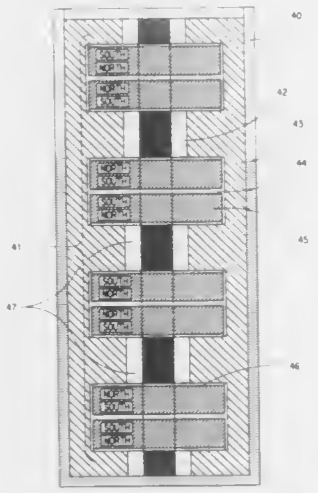
5,022,592
MAGNETIC MEDIA MILL

Howard Zakheim, Bala Cynwyd; Peter M. Clinton, Media, both of Pa.; James D. Goldschneider, Newark, Del.; Christopher A. Kasmer, Lawrenceville, N.J.; Markus Zahn, Lexington, Mass., and Charles L. Hoffmeyer, Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 346,877, May 3, 1989, abandoned. This application Jul. 9, 1990, Ser. No. 549,822

Int. Cl.^{5} B02C *17/16*

U.S. Cl. 241—172 **24 Claims**



1. In a media mill of the type comprising a magnetizable container, a rotatable multi-polar magnetic agitator within the magnetizable container, the multi-polar magnetic agitator having a central shaft and a plurality of impellers on the shaft at least some of the impellers being magnetic, and magnetizable media within the container, wherein the media particles are sufficiently magnetized by the magnetic agitator so that grinding efficiency is improved and the media particles are present in such quantity as to provide a media volume of at least about 25%.

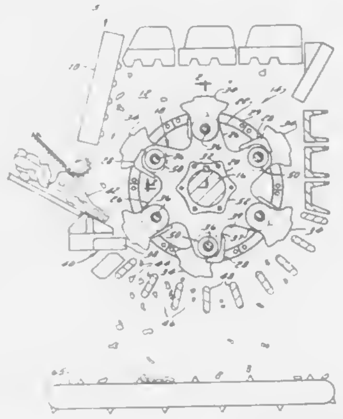
5,022,593
HEAVY DUTY SPIDER ASSEMBLY FOR A HAMMERMILL

John C. Stelk, Bettendorf, Iowa, assignor to Sivyer Steel Corporation, Bettendorf, Iowa

Continuation of Ser. No. 321,771, Mar. 10, 1989, abandoned. This application Jul. 16, 1990, Ser. No. 554,139

Int. Cl.^{5} B02C *13/28*

U.S. Cl. 241—194 **10 Claims**



1. A heavy duty hammermill having a fragmentizing chamber and a hammer assembly mounted for rotary motion in said chamber,
said hammer assembly coacts with a cutting comb and circumferentially spaced grate bars to fragmentize material fed into the chamber of the hammermill, the hammer assembly including:
a drive shaft mounted for rotary motion in the chamber;
a plurality of spiders mounted on the shaft; and an end disc mounted on said shaft at each end of said spiders, each spider having six equally radially spaced arms,
a hammer pin opening at the outer end of each arm and corresponding openings in each of said end discs;
spacer members mounted on said shaft between said spiders and said end discs;
a number of tie rod openings in each of said spiders located at equally spaced distances from the axis of the drive shaft each of said spiders including a hub portion having a radius approximately equal to the length from a tie rod opening to the drive shaft axis plus half the difference between the length from a hammer pin opening to the drive shaft axis and the length from a tie rod opening to the drive shaft axis, a hammer pin mounted in each row of spider arms, and a number of freely swinging hammers mounted for rotary motion on said hammer pins in the spaces formed by said spacer members between said spiders;
said hammers rotating freely about the pins in an orbit sufficiently close to the comb to fragmentize heavy material.

5,022,594
MINCER KNIFE HEAD

Anatoly M. Gordon, ulitsa Kirova, 8, kv. 29, Voronezh, U.S.S.R.; Eduard L. Fedorov, ulitsa Ju. Yanonisa, II, kv. 9, Voronezh, U.S.S.R., and Anatoly F. Grachev, Moskovsky prospekt, 56, kv. 39, Voronezh, U.S.S.R.

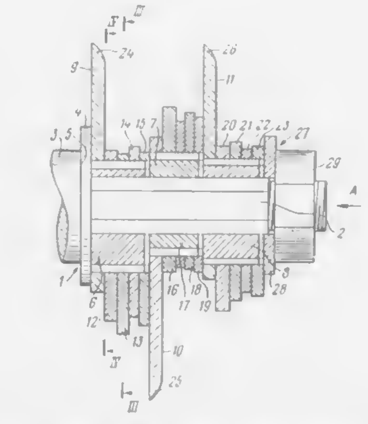
PCT No. PCT/SU89/00159, § 371 Date Feb. 16, 1990, § 102(e) Date Feb. 16, 1990, PCT Pub. No. WO89/12503, PCT Pub. Date Dec. 28, 1989

PCT Filed Jun. 15, 1989, Ser. No. 460,904

Claims priority, application U.S.S.R., Jun. 21, 1988, 4445404; Jun. 22, 1988, 4447159

Int. Cl.^{5} B02C *18/16*

U.S. Cl. 241—282.2 **7 Claims**



1. A mincer knife head comprising a shaft (1) having an elongated axis, said shaft carrying, consecutively arranged thereon along said axis, a support bushing (4), a plurality of main bushings (6, 7, 8), and a fixing member (27), said main bushings being held in place between said support bushing and said fixing member, a least one knife (9, 10, 11) mounted on each of said main bushings, and at least one balancing disk (12 . . . 23) mounted one each on each of said main bushings, each of said balancing disks being eccentric with respect to the elongated axis of said shaft.

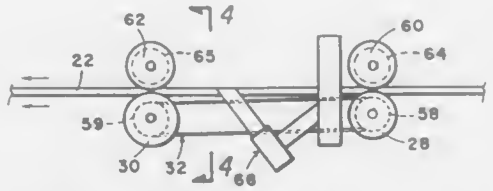
5,022,595
TENSIONING DEVICE

R. G. Goekler, 17813 E. 93rd St. North, Owasso, Okla. 74055

Continuation of Ser. No. 426,537, Oct. 24, 1989, abandoned, which is a continuation of Ser. No. 199,124, May 26, 1988, abandoned. This application Jul. 26, 1990, Ser. No. 559,372

Int. Cl.^{5} B65H *81/08*

U.S. Cl. 242—7.23 **9 Claims**



1. A tensioning device for removing a strip of material from a material source and applying the strip of material under a desired tension onto an outside surface of a material user, comprising:
a housing;
a first and a second roller mounted in the housing immediately adjacent each other, the first and second rollers mounted adjustably in the housing relative to the material source and the material user,
the first roller non-slidingly contacting a portion of the strip of material,
the second roller mounted in the housing between the first roller and the material user, the second roller non-slidingly contacting a portion of the strip of material,
interconnection means simultaneously rotating the first and second rollers in a manner that the surface of the first roller travels at a slower tangential velocity than the surface of the second roller,
a mounting upon which the housing is mounted in a manner to permit the rollers to be adjusted about their axes,
support means rotatably and adjustably supporting the material source and the housing,
revolving means revolving the support means around the outside surface of the material user, and
advancement means advancing the support means relative to the length of the material user.

5,022,596
METHOD AND APPARATUS FOR DETECTING THE FEED PROPERTIES OF FEED BOBBINS

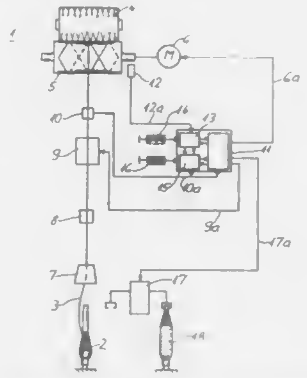
Edmund Wey, Nettetal; Hans Grecksch, Monchen-Gladbach; Albert T. Pesch, Monchen-Gladbach; Herbert Knors, Monchen-Gladbach; Wilhelm Zitzen, Monchen-Gladbach, and Manfred Marquardt, Duisburg-Hamborn, all of Fed. Rep. of Germany, assignors to W. Schlafhorst AG & Co., Mönchengladbach, Fed. Rep. of Germany

Filed Dec. 18, 1989, Ser. No. 455,492

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1988, 3842381

Int. Cl.^{5} B65H *63/00, 54/22*

U.S. Cl. 242—36 **9 Claims**



1. Method for detecting feed bobbins having feed properties that do not correspond to a predetermined quality when winding feed bobbins onto cross-wound bobbins in an automatic bobbin winding machine, which comprises
measuring the winding speed,
counting yarn breaks before a predetermined threshold speed is reached for forming a yarn break count,
detecting the quality of a given feed bobbin by comparing the yarn break count with a predetermined number and determining that the given feed bobbin has not attained a predetermined quality if the yarn break count reaches the predetermined number, and
rejecting the given feed bobbin and continuing the winding process with a new feed bobbin if the predetermined quality is not attained.

5,022,597
SHEET WINDING APPARATUS

Nicholas L. Morizzo, Newport Richey, Fla., assignor to Krantz America, Inc., Charlotte, N.C.

Filed Sep. 27, 1989, Ser. No. 413,478

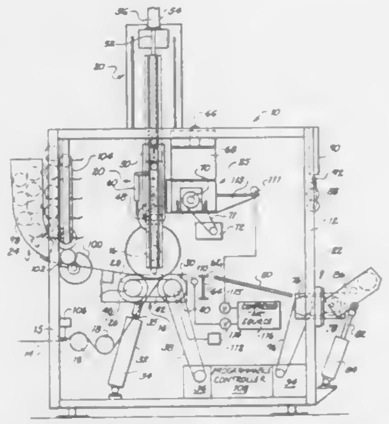
Int. Cl.^{5} B65H *19/30, 18/22*

U.S. Cl. 242—56 R **20 Claims**

1. Apparatus for winding a traveling sheet of continuous-length material onto a supporting core, said apparatus compris-

VOL
1127
ISS
2
JE
11
1991
UMI

ing a pair of winding rollers rotatably mounted in spaced axially parallel relation, means for moving one said winding roller relative to the other said winding roller between an operative winding position wherein said one winding roller is disposed relatively horizontally adjacent the other said winding roller for cooperatively supporting the core peripherally between said winding rollers and a discharge position wherein said one winding roller is disposed at a sufficiently increased vertical spacing relative to the other said winding roller in comparison to the operative winding position to cause ejection of the core gravitationally from said winding rollers, means for rotatably driving at least one of said winding rollers for driving rotation of the core to progressively wind the traveling sheet of material about the core, means for receiving and supporting the core at a spacing from said winding rollers upon ejection of the core, and means operable following ejection of the core for shear cutting the sheet of material transversely across its length at a location intermediate said winding rollers and said receiving and supporting means.



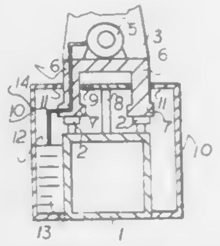
5,022,598
ROLL-HANDLING MACHINE FOR WEB MATERIAL

Armin Hutzenlaub, Wiehl, and Burkhard Kaul, Erkrath, both of Fed. Rep. of Germany, assignors to Kampf GmbH & Co. Maschinenfabrik, Wiehl, Fed. Rep. of Germany

Filed Jan. 10, 1990, Ser. No. 463,024

Int. Cl.^{5} B65H *16/06, 19/12*

U.S. Cl. 242—68.4 15 Claims



1. A coil machine having at least one station adapted to receive a coil of a web, said station comprising:

a traverse;

a pair of rectilinear guides formed on said traverse;

a pair of coil-receiving arms mounted on said guides and receiving a coil of said web between them, said arms each having a coil slide shiftable along said traverse, each of said slides being formed with a respective sliding foot riding on each of said guides and a respective leg formed with each of said feet extending away from the respective foot; and

enclosure means extending along said traverse at least around said guides, receiving said feet and at least partly defining slots extending along said guides through which said feet pass for limiting release of contaminants from regions of engagement of said feet with said guides, and said enclosure means including a support mounted on said traverse between said guides and a cover plate on said support at least substantially bridging a space between said legs.

5,022,599
CONTROLLER FOR A WINDING MACHINE

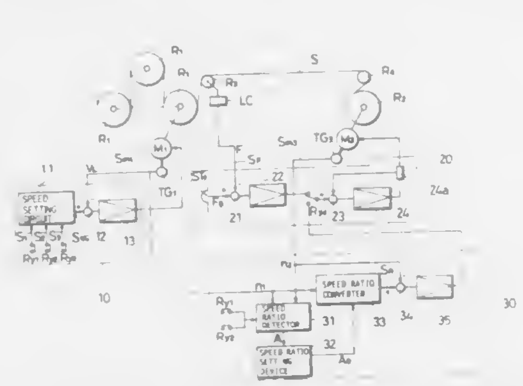
Kiyoshi Nakade, Komatsu, Japan, assignor to Tsudakoma Kogyo Kabushiki Kaisha, Kanazawa, Japan

Filed Jun. 12, 1989, Ser. No. 364,317

Claims priority, application Japan, Jun. 13, 1988, 63-145333

Int. Cl.^{5} B65H *59/38, 77/00*

U.S. Cl. 242—75.51 11 Claims



1. A controller for a winding machine, for controlling the tension of work running from a feed roller to a winding beam, comprising:

a feed roller control unit for controlling the rotating speed of a feed motor for driving the feed roller to control operation speeds of said winding machine; and

a winding beam control unit for controlling the rotating speed of a winding motor for driving the winding beam to control the tension of the work being wound;

said winding beam control unit comprising a tension control unit and a speed ratio control unit;

said tension control unit controlling the rotating speed of the winding motor for matching a detected tension of the work to a set tension of the work; and

said speed ratio control unit controlling the rotating speed of the winding motor for adjusting said winding motor speed to a value of a detected rotating speed of the feed motor multiplied by a speed ratio between respective rotating speeds of the feed motor and the winding motor during a stationary operation of the winding machine.

5,022,600
WINDER-UNWINDER FOR OPTICAL FIBRE CABLES

Floréal Blanc, Verrieres le Buisson, and Jacques Lordet, Des Fosses, both of France, assignors to Commissariat A L'Energie Atomique, Paris, France

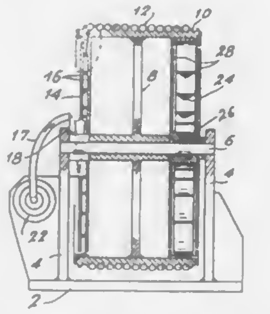
Continuation of Ser. No. 352,855, May 16, 1989, abandoned. This application Aug. 20, 1990, Ser. No. 569,519

Claims priority, application France, May 16, 1988, 88 06534

Int. Cl.^{5} B65H *75/48*

U.S. Cl. 242—107.1 8 Claims

1. A winder-unwinder for optical fiber cables, comprising a support (2), a drum (8) having a winding zone for an optical fiber cable (12) with a plurality of optical fibers, said drum (8) being mounted in rotary manner on a shaft mounted on the fixed support (2), the main optical cable (12) having an end (12*b*) fixed to the winding zone of said rotary drum, an optical compensation cable (14) spirally wound within the drum (8) and having one end fixed to said drum (8) and connected to the end (12*b*) of the main optical cable (12) and one end mounted on a fixed part (18) of the support, said optical compensation cable having a spirally wound first portion which is guided by first and second substantially parallel and relatively axially displaced radial walls supported by said support, having a second portion connected to said first portion which is wound around a fixed cylindrical core mounted on said shaft, and having a third portion which is connected to said support and to said second portion, wherein said first radial wall is connected to said core, said second radial wall has an aperture which forms a substantially annular gap with said core, said second portion of said optical compensation cable traverses said annular gap, the ends of said second portion of said optical compensation cable are relatively axially displaced, and said optical fiber compensation, cable (14) is a constituted by a flat cable formed by several optical fibers which are in contact and joined to each other to form a row.



5,022,601
LOCKING MECHANISM FOR WEBBING RETRACTOR

Tosio Saitou; Kenji Matsui; Keiichi Tamura; Shinji Mori, and Shingo Izuchi, all of Aichi, Japan, assignors to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan

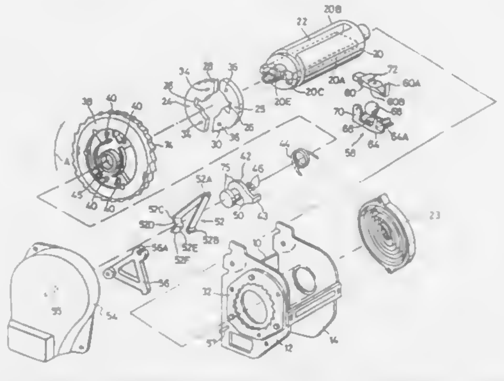
Continuation of Ser. No. 741,809, Jun. 6, 1985, Pat. No. 4,729,523. This application Aug. 6, 1987, Ser. No. 82,287

Claims priority, application Japan, Jun. 11, 1984, 59-086496; Aug. 6, 1984, 59-120834; Aug. 6, 1984, 59-120835; Aug. 9, 1984, 59-122267

The portion of the term of this patent subsequent to Mar. 8, 2005, has been disclaimed.

Int. Cl.^{5} B60R *22/38, 22/40*

U.S. Cl. 242—107.4 A 15 Claims



1. A lock mechanism employed in a webbing retractor which has a takeup shaft adapted to wind up an occupant restraining webbing thereof, means for biasing the takeup shaft in the webbing windup direction, and a frame having a pair of leg plates for rotatably supporting said takeup shaft and having an internally toothed rachet wheel formed on one of the plates, which comprises:

(a) lock means including rock ring which is disposed in coaxial relation to and operatively connected with said webbing takeup shaft, said lock ring being relatively movable with respect to the takeup shaft by a selected angle of relative rotation;

(b) lock members each having a pawl at an outer one end for engaging with the internally toothed ratchet wheel, said lock members loosely mounted on an axle of said takeup shaft and slidably disposed on said lock ring;

(c) acceleration sensing means disposed on said frame, including an actuator adapted to engage with said lock ring when a vehicular emergency occurs thereby to prevent the rotation of said takeup shaft in the webbing wind-off direction;

(d) limiting means disposed coaxially with said takeup shaft and including a frictional contact means for frictionally transmitting the rotational force to said limiting means by frictional contact to cause said limiting means to pivot with said takeup shaft, and being relatively movable with respect to said takeup shaft when said acceleration sensing means is not engaged with said lock means at or above a predetermined torque;

(e) a torsion coil spring coaxially disposed between said takeup shaft and said lock ring for urging said lock ring to the webbing wind-off direction, said lock ring being driven by way of said torsion coil spring along with said takeup shaft when said shaft rotates such that said lock members will not engage said internally toothed ratchet wheel until said lock ring rotates said selected angle relative to said takeup shaft;

(f) means for releasing engagement between said acceleration sensing means and said lock means by pivotal movement of said limiting means, said releasing means being disposed on said limiting means and abutting against said actuator when the takeup shaft rotates in the webbing wind-up direction, thus causing said actuator to be released from said lock ring; and

(g) means for stopping pivotal movement of said limiting means to limit the distance of movement of said releasing means,

wherein said lock means causes said lock members to engage with said internally toothed ratchet wheel and to prevent the rotation of said takeup shaft in the webbing wind-off direction when a vehicular emergency occurs, said lock ring rotates relative to the takeup shaft toward the webbing wind-off direction by the urging of said torsion coil spring when said actuator is released from said lock ring under rough-road conditions, such that said webbing is prevented from being gradually wound up onto said takeup shaft when the vehicle is running so as to avoid any undesirable tightening of said webbing against the body of the occupant of the vehicle.

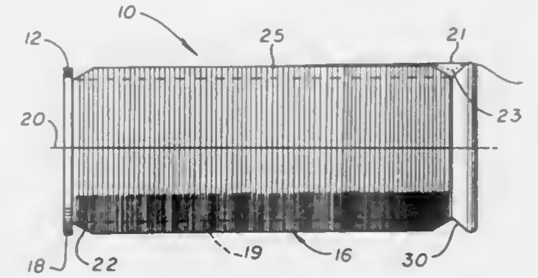
5,022,602
FIBER DISPENSER

Gregory LoStracco, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 23, 1989, Ser. No. 425,768

Int. Cl.^{5} B65H *55/00, 49/02*

U.S. Cl. 242—159 8 Claims



1. A fiber dispenser comprising:

a first cylindrical section having a constant diameter along the longitudinal axis thereof;

a ring mounted on an end of said cylindrical section, said ring being coaxial with said cylindrical section; and

VOL
1127
ISS
2
JE
11
1991
UMI

means for adjusting the diameter of said ring.

5,022,603

COIL OF VERY LONG OPTICAL FIBRE USABLE ON A WIRE-GUIDED MISSILE

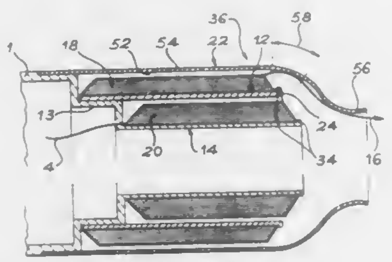
Michel Maree, Gif sur Yvette, and Patrick Moreau, Antony, both of France, assignors to Societe Nationale Industrielle et Aerospatiale, France

Filed Mar. 21, 1990, Ser. No. 496,920

Claims priority, application France, Mar. 22, 1989, 89 03752

Int. Cl.^{5} B65H *55/00, 49/02;* **F42B** *13/56*

U.S. Cl. 242—167 **9 Claims**



1. A coil for a long optical fibre comprising:
(a) a main cylindrical support;
(b) at least one supplementary cylindrical support placed within and concentric with the main cylindrical support;
(c) a long optical fibre having: a first fibre part wound in layer-by-layer form on the main cylindrical support and having an inner layer thereof wound directly onto and in contact with the main cylindrical support and an outer layer thereof on the winding of said first part; and a second fibre part wound in layer-by-layer form on said supplementary cylindrical support and having an inner layer thereof wound directly onto and in contact with the supplementary cylindrical support and an outer layer thereof on the winding of the second fibre part, the fibre of the outer layer of the second fibre part being directly connected to the fibre of the inner layer of the first fibre part.

5,022,604

REEL SERVO DEVICE FOR VIDEO CASSETTE RECORDER IN DIRECT DRIVE REEL SYSTEM

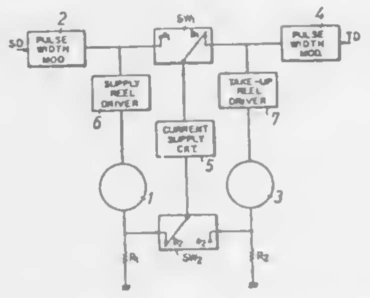
Jae H. Shin, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

Continuation of Ser. No. 41,238, Apr. 22, 1987, abandoned. This application Dec. 15, 1988, Ser. No. 285,297

Claims priority, application Rep. of Korea, Apr. 22, 1986, 5437/1986

Int. Cl.^{5} B65H *16/10*

U.S. Cl. 242—203 **3 Claims**



1. A reel servo device for a video cassette recoder having a supply reel and take-up reel with a direct drive reel system, comprising:
- a supply reel motor for driving the supply reel of the video cassette;
- a take-up reel motor for driving the take-up reel of the video cassette;
- supply reel motor driving means for driving said supply reel motor in response to a supply reel drive signal, said supply reel drive signal causing a rewind operation;
- take-up reel motor driving means for driving said take-up reel motor in response to a take-up reel drive signal, said-take-up reel drive signal causing a fast forward operation;
- drive control signal means for setting a first direction of rotation of said supply and take-up reel motors when rewinding and for setting a second direction of rotation when fast forwarding;
- detecting means for detecting an amount of current flowing through a driven motor and producing a detection signal corresponding thereto;
- generating means for producing an output current signal proportional to said detection signal; and
- switching means for applying said output current signal to the reel motor driving means of a non-driven motor to drive said non-driven motor with a current proportional to said output current signal, thereby evenly distributing an increased load between said supply reel motor and said take-up reel motor and preventing excessive current flow through said supply reel motor and said take-up reel motor.

5,022,605

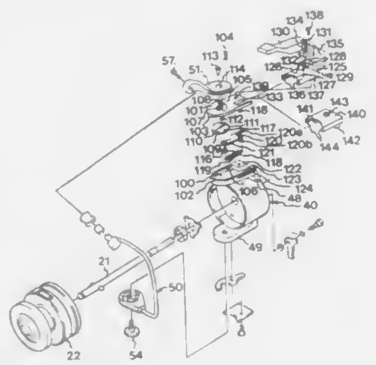
DETACHABLE TRIGGER MECHANISM IN AN OPEN-FACE FISHING REEL OF THE FIXED-SPOOL TYPE

Karl L. Carlsson, Asarum, Sweden, assignor to ABU Garcia Produktion AB, Svangsta, Sweden

Filed Feb. 8, 1990, Ser. No. 477,018

Int. Cl.^{5} A01K *89/01*

U.S. Cl. 242—233 **4 Claims**



1. A trigger mechanism in an open-face fishing reel of the fixed-spool type having a housing, a rotor mounted on said housing, a line spool coaxial with said rotor and adapted to oscillate in the axial direction, and a bail mechanism having a bail for winding a line onto said line spool, two attachments arranged on said rotor substantially diametrically opposite each other, and two mounting elements carrying said bail and being so rotatably mounted on a respective one of said attachments that said bail is pivotable about a bail axis substantially at right angles to the axis of said rotor, between a folded-in line-winding position and a folded-out position in which said bail is released of the line, a one of said attachments being designed so as to form an open chamber and having a cover plate detachably mounted over said chamber and supporting the corresponding mounting element on its side facing away from said chamber, said trigger mechanism comprising
- a support element releasably mounted on said one attachment;
- a trigger pivotally mounted on said support element about a pivot axis at right angles to the rotor axis and to the bail axis, to be pivoted between a first position and a second position, said support element and said trigger being detachable as a unit from said one attachment;
- driver means eccentrically engaging the mounting element carried by said cover plate through a slot in the cover plate; and
- cam means provided on said trigger in order, during pivotal movement of the trigger from said first position to said second position and in cooperation with said driver means, to rotate said mounting element from its position of rotation corresponding to the folded-in line-winding position of said bail, to its position of rotation corresponding to said folded-out position of said bail.

5,022,606

CLICK SOUND GENERATOR FOR FISHING REEL

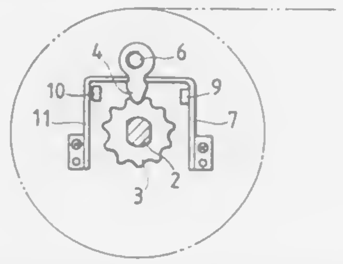
Hiroshi Hashimoto, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan

Filed Oct. 2, 1989, Ser. No. 416,231

Claims priority, application Japan, Nov. 7, 1988, 63-145216[U]

Int. Cl.^{5} A01K *89/015*

U.S. Cl. 242—307 **7 Claims**



1. A click sound generator for a fishing reel comprising:
- a spool rotably mounted on a side plate, said spool being for winding a fishing line thereon;
- a clicking toothed gear secured to said spool and rotated with said spool;
- a clicking claw arranged in engagement with said clicking toothed gear to generate a click sound;
- first spring means mounted on said side plate and comprising a leaf spring for applying a first resilient biasing force to said clicking claw only when said fishing line is unwound from said spool, and stop means spaced from the spring mounting and arranged at one side of said clicking claw for defining a neutral position of said clicking claw in which said clicking claw is unbiased by said leaf spring, wherein movement of said leaf spring in a direction of movement of said resilient biasing force is restricted by said stop means when said stop means comes into contact with said leaf spring; and
- second spring means for applying a second resilient force, weaker than said first resilient force, to said clicking claw only when said fishing line is wound on said spool, said second spring means being arranged at the other side of said clicking claw.

5,022,607

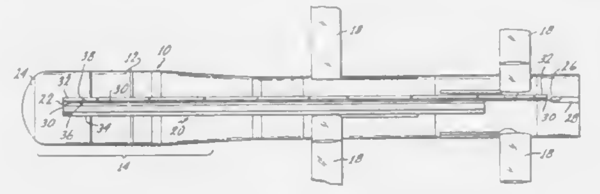
BEND LIMITING STIFF LEADER AND RETAINER SYSTEM

Daniel K. Schotter, Tucsnn, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Nov. 18, 1988, Ser. No. 273,310

Int. Cl.^{5} F41G *7/32*

U.S. Cl. 244—3.12 **20 Claims**



1. An apparatus for coupling a fiberoptic lead to a moving object launched from a predetermined location comprising:
- retainer means attached to said object and adapted to the shape of said object, said fiberoptic lead being disposed within said retainer means, said retainer means for confining said fiberoptic lead within a predetermined longitudinal space defined by said retainer means, said retainer means comprising a generally O-shaped channel and two opposing overhanging arms, said lead being disposed within one overhanging arm along the longitudinal length of said channel to a forward end of said channel, said lead being bent across said C-shaped channel to said other opposing arm and extended from and through an outward opening of said channel for fixed attachment to said predetermined location and;
- tape means for temporarily securing said fiberoptic lead within said retainer means, said tape means for releasing said lead from said retainer means as said object moves and as said lead is extended between said moving object and said predetermined location,
- whereby bending of said lead is controlled and breakage is avoided.

5,022,608

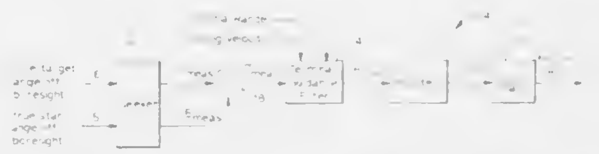
LIGHTWEIGHT MISSILE GUIDANCE SYSTEM

Norman E. Beam, Charlottesville, Va., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jan. 8, 1990, Ser. No. 462,181

Int. Cl.^{5} F41G *7/36*

U.S. Cl. 244—3.18 **10 Claims**



1. A lightweight missile terminal guidance system comprising:
- seeker means for providing a first signal indicative of a first angle between a line-of-sight from said missile to a target and a longitudinal axis extending through said missile and for providing a second signal indicative of a second angle between said longitudinal axis extending through said missile and a line-of-sight between said missile and a celestial body;
- processing means for computing the line-of-sight angle between the line-of-sight from the missile to the target and the line-of-sight from the missile to the celestial body from said first and second angles;
- terminal guidance means for computing and providing acceleration commands from said line-of-sight angle; and
- propulsion means for changing a velocity vector of said missile in response to said acceleration commands.

5,022,609

LANDING GEAR

Robert J. Cranston, La Crescenta, Calif., assignor to Lockheed Corporation, Calabasas, Calif.

Filed Jan. 10, 1990, Ser. No. 463,072

Int. Cl.^{5} B64C *25/26*

U.S. Cl. 244—102 R **8 Claims**

1. A retractable landing gear for an aircraft comprising:
- a main strut having a first end pivotally attached to the aircraft and a second end having a wheel assembly attached thereto, said main strut rotatable about a pivot axis through an angle defined by the extended and retracted positions; a drag strut having first and second ends, said first end pivotally attached to the aircraft and said second end pivotally attached to the main strut, said drag strut

VOL
1127
ISS
2
JE
11
1991
UMI

including upper and lower strut members pivotally attached together at an intermediate point, said intermediate point located angularly from the pivot axis of the main strut at an angle that is one half the angle rotated by the main strut from the extended position to the retracted position;

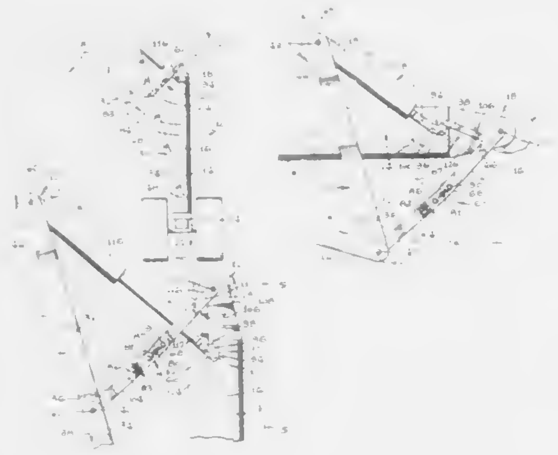
an over center uplock and downlock linkage for locking said main strut in either the extended or retracted position comprising:

a first link having first and second ends, said first end pivotally attached to the aircraft, having an axis of rotation coincident with said rotational axis of said main strut; and

a second link having first and second ends, said first end pivotally attached to said drag strut at said intermediate point and pivotally attached at said second end to said second end of said first link; and

means to actuate said over center downlock and uplock linkage prior to rotation of said main strut; and

means to rotate said main strut back and forth from said extended and retracted positions.



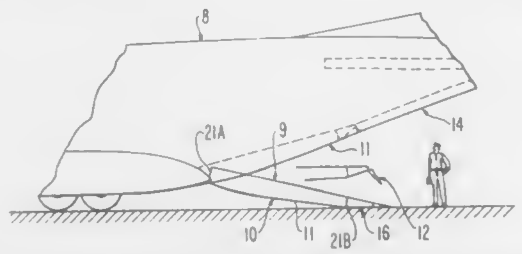
5,022,610
RETRACTING RAMP TOE

Thomas R. Ensign, Wichita, Kans., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 9, 1990, Ser. No. 462,726

Int. Cl.⁵ B64C *1/22*

U.S. Cl. 244—118.3 **10 Claims**



1. A ramp toe system for use with a ramp of an aircraft, said ramp having internal and external surfaces and being pivotally attached at one end to said aircraft for selective movement between a closed position wherein said eternal surface generally conforms to an outside skin of said aircraft and an open position wherein the other end of said ramp generally is disposed to contact a surface supporting said aircraft, said ramp toe system comprising:

a ramp extension having a proximal end fixed to the other end of said ramp and extending therefrom to a distal end, said ramp extension having an inside surface generally co-planar with the internal surface of said ramp, and an outside surface convergingly extending from said proximal end to said distal end;

a ramp toe having first and second opposed ends and first and second opposed surfaces, said first surface convergingly extending from said first end to said second end, the first end of said ramp toe being pivotally attached to said distal end of said ramp extension for selective movement between a stored position wherein said first surface is generally contiguous with the outside surface of said ramp extension and said second surface is generally co-planar with the external surface of said ramp so as to generally conform with the outside skin of the aircraft, and an extended position wherein said first surface is disposed to be generally contiguous with the aircraft support surface and said second surface is generally co-planar with the inside surface of said ramp extension; and

means for selectively moving said ramp toe between said stored and extended positions.

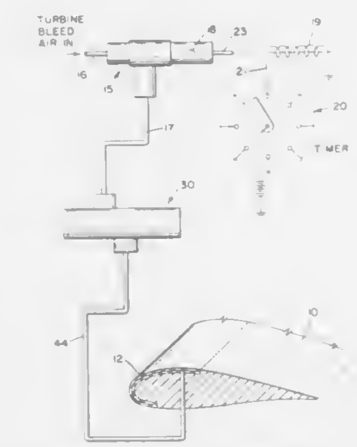
5,022,611
DE-ICER

Norbert A. Weisend, Jr., Cuyahoga Falls, and Paul G. Tritt, Norton, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Jan. 9, 1990, Ser. No. 462,210

Int. Cl.⁵ B64D *15/16, 15/00*

U.S. Cl. 244—134 A **6 Claims**



6. A pressure limiter valve for regulating the inflation and deflation of inflatable tubes of a pneumatic deicer; said valve having a housing with a central chamber; said housing having an inlet port and an outlet port connected to said chamber with said inlet port selectively connectable to a pressure source or a vacuum; said outlet port connected to said tubes of a deicer; an annular shoulder in said chamber defining an aperture; said inlet port and said outlet port being located on opposite sides of said annular shoulder; piston means moveable in said chamber between a first position and a second position, said piston means having a piston head with spaced operating faces; one of said faces operative in said first position to seat on said annular shoulder to close off said orifice; said other face of said piston head having a first operative surface and a second operative surface; an opening in said piston head communicating with a passageway that extends into said piston head and opens into and on said first operative surface; said opening communicating with said inlet port when said piston means is in said first position or said second position, biasing means mounted in said chamber to bias said piston means into said second position which places said first operative surface in sole communication with said passageway and said inlet and outlet ports, and said second and first surfaces being in sole communication with said inlet means when the force on said first surface of said piston head is slightly greater than said force of said biasing means.

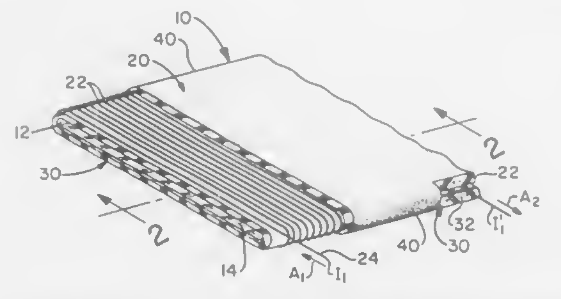
5,022,612
ELECTRO-EXPULSIVE BOOTS

Berle D. Berson, 1410 N. Grand Ave. Apt. A, Covina, Calif. 91724

Filed Mar. 13, 1989, Ser. No. 322,024

Int. Cl.⁵ B64D *15/18*

U.S. Cl. 244—134 D **6 Claims**



1. An elastomeric boot to convert electrical input energy to a mechanical output force comprising in combination:

an elastomeric ply which defines a first member;

an elastomeric ply which defines a second member in juxtaposition with respect to the first member and both members have interconnected peripheral edges to enclose a space which separates the two members;

a release membrane within the space between the two members to maintain the separate integrity of each of the members; and

an electrically-conductive wire embedded within the elastomeric material comprising each of the members, said wire oriented such as to pass helically from the first member, through the peripheral edge between the members, and into the second member in a continuous manner between the two members such that multiple contiguous segments of the electrically-conductive wire are evident within each of the members wherein the application of a particular magnitude electrical current pulse to the conductive wire generates an electromagnetic force which is in a first direction and additive between contiguous conductor segments within the first member and the same current generates an electromagnetic force which is in a second direction and additive between contiguous conductor segments within the second member, said opposing forces effecting an electro-expulsive separation between the two members in accordance with the existence of the current pulse.

5,022,613
AC AND BATTERY BACKUP SUPPLY FOR A RAILROAD CROSSING GATE

Richard V. Peel, Upland, Calif., assignor to Safetran Systems Corporation, Minneapolis, Minn.

Filed Apr. 26, 1990, Ser. No. 514,980

Int. Cl.⁵ B61L *29/22;* **H05B** *37/04*

U.S. Cl. 246—125 **4 Claims**

1. A crossing lights controller for effecting operation of the crossing lights during normal train operating conditions and during a controller failure mode including,

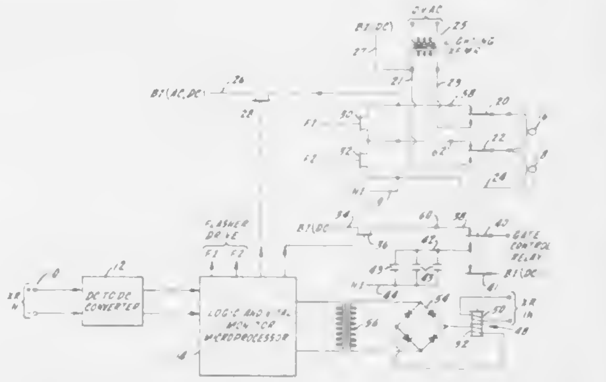
a train sensing input providing one signal condition when the approach of a train is sensed and another signal condition when no train is sensed,

a lights control circuit which has power supplied thereto to operate the lights in a flashing condition when the train sensing input indicates the approach of a train,

a solid state logic and monitor circuit connected to said input and lights control circuit, said logic and monitor circuit applying and removing power to said light control circuit in accordance with the signals at said input,

a source of both AC and DC power, independent of the power to operate the lights in a flashing condition when the train sensing input indicates the approach of a train,

and a fail-safe relay connected to said logic and monitor circuit and said lights control circuit, which relay automatically connects said independent source of AC and DC power to operate the lights in the event no power is supplied to the fail-safe relay.



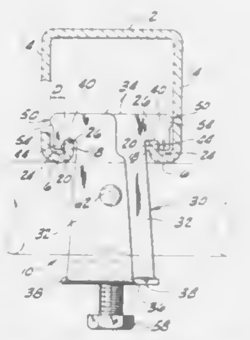
5,022,614
ONE PIECE CONDUIT CLIP

Eric R. Rinderer, Highland, Ill., assignor to B-Line Systems, Inc., Highland, Ill.

Filed Aug. 17, 1989, Ser. No. 394,931

Int. Cl.⁵ F16L *3/00*

U.S. Cl. 248—62 **54 Claims**



1. A clip for securing conduit and the like to channel framing of the type comprising a pair of side flanges having outer margins formed with inwardly directed hook-shaped lips defining a slot therebetween extending lengthwise of the channel, each lip having a first lateral surface facing said slot, a second lateral surface facing a respective flange and spaced therefrom to define a recess therebetween extending lengthwise of the channel, and an inner edge, said clip comprising,

a one-piece generally U-shaped clip member having a pair of legs with free ends,

a single foot at the free end of each leg, the two feet on said legs extending laterally outwardly from respective legs in opposite directions,

toes projecting from the feet spaced laterally from respec-

VOL
1127
ISS
2
JE
11
1991
UMI

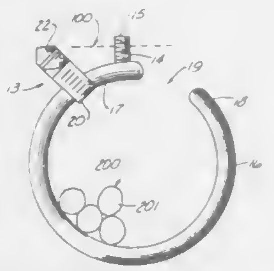
tive legs to define notches between the toes and respective legs, and

anti-swing means at the free end of each foot,

said clip member being adapted to be inserted feet first through said slot of the channel from the outside of the channel to a position in which the feet of the clip member are adjacent the lips of the channel with the toes of the feet received in respective recesses of the channel and with the lips of the channel received in the notches between the toes and the legs of the clip members,

said toes being formed for engagement with said second lateral surfaces of respective lips and said anti-swing means being formed for engagement with respective flanges of the channel to prevent substantial swinging of the clip member relative to the channel in side-to-side direction with respect to the channel.

5,022,615
COMMUNICATION WIRE SUPPORT APPARATUS
Thomas L. Parks, 10804 St. Anton Cir., Glen Allen, Va. 23060
Filed May 17, 1990, Ser. No. 524,724
Int. Cl.^{5} F16L *3/08*
U.S. Cl. 248—74.1 1 Claim



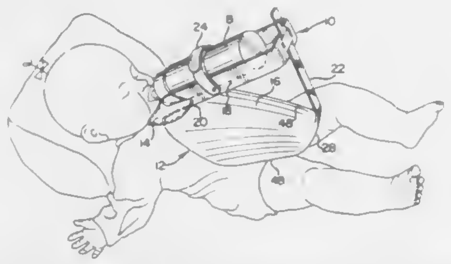
1. A communication wire support apparatus for supporting a bundle of cables wherein the apparatus consists of:

a securing unit including a fastening member;

a ring unit including a generally resilient C-shaped ring member having a free end and a captive end operatively connected to said fastening member wherein said free end said captive end define a ring opening; whereby, said free end is dimensioned to overlap said captive end in an offset manner and

an auxiliary locking unit including a clamp member forming a closed loop and adjustment means for varying the size of the closed loop to bring the clamp member into tight frictional engagement with the overlapping free and captive ends of the ring member.

5,022,616
SYSTEM FOR BOTTLE FEEDING AN INFANT
John Kordecki, 515 Olive Street, Hoffman Estates, Ill. 60194
Filed Jul. 17, 1989, Ser. No. 382,475
Int. Cl.^{5} A47D *15/00*
U.S. Cl. 248—106 18 Claims



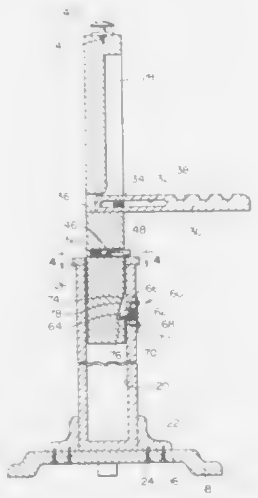
1. A bottle prop for supporting a bottle in a position for feeding an infant from the bottle comprising:

a base adapted to rest on the infant;

a bottle holding means attached to the base for holding a bottle and, to the base;

a slot operatively associated with the bottle prop for frictionally engaging a bib so that the bib is held in substantially horizontal position.

5,022,617
COLLAPSIBLE VALET
Robert M. Henderson, P.O. Box 770, Lamarque, Tex. 77568
Filed Nov. 15, 1989, Ser. No. 436,637
Int. Cl.^{5} A47G *29/00*
U.S. Cl. 248—125 1 Claim



1. A collapsible valet comprising a tubular upstanding standard, support means at the lower end of the standard for engaging a supporting surface, a vertically extendable and retractable post telescoped into the tubular standard and extending from the upper end thereof, mans on said post engaging the standard to hold the post in extended position, means interconnecting the standard and post to limit the upward movement of the post towards extended position to prevent the post from exiting from the upper end of the tubular standard, and collapsible means adjacent the under end of the post and extending laterally therefrom when in operative position to support articles of clothing, accessories and the like therefrom, said means to hold the post in extended position including a spring biased radial pin mounted in a radial bore in said post and movable from a position flush with the post when the post in interiorly of the tubular standard and moving outwardly into overlying supporting engagement with the upper end of the tubular standard when the pin moves above the upper end of the standard, wherein said means limiting the upward movement of the post including a spring biased pin mounted adjacent the upper end of the tubular standard but spaced below the upper end thereof, said pin having an inclined inner end, said post including a recess having a substantially horizontal bottom wall and an inclined inner wall extending from the inner edge of the bottom wall to the outer surface of the post at the upper end of the recess with the pin having a corresponding inclination on the inner end thereof whereby the inner end of the spring biased pin will enter the recess and engage the bottom wall thereof to limit upward movement of the post and present the post from being removed from the tubular standard, said means adjacent the upper end of the post to support articles of clothing including an elongated support arm, said post including a laterally opening groove receiving the arm when the arm is in collapsed, vertical position, means pivotally and slidably supporting one end of the arm from the post for movement of the arm from a vertically collapsed position to a horizontal, laterally extending position, said means supporting the arm from the post including a transverse pin extending across the groove in the post, said arm including a longitudinal slot adjacent one end thereof receiving said pin, said post including a lateral opening extending therethrough in communication with the groove and in alignment with the pin to receive one end of the arm when pivoted to horizontal position and moved axially into the opening thereby supporting the arm securely in horizontal position, said transverse pin being adjacent the lower end of the groove with the support arm extending upwardly therefrom when the support arm is positioned in the groove whereby the upper end of the support arm can pivot downwardly and outwardly by gravity when the post is extended with the arm being stopped in horizontal position by the pin and bottom wall of the groove to enable inward movement of the horizontal arm until the inner end thereof enters the opening to securely retain the arm in position and shorten the length thereof which is cantilever supported by the post and tubular standard, said support means at the lower end of the standard including laterally extending support members extending radially from the tubular standard in circumferentially spaced relation, one of said laterally extending members being positioned in alignment with the support arm when the support arm is in horizontal position, another of said laterally extending support members extending radially in opposed relation to the support arm when the support arm is in horizontal position, the laterally extending support member extending oppositely from the support arm being shorter than said one laterally extending support member thereby reducing the floor area occupied by the collapsible valet in the area thereof opposite said one laterally extending support arm thus enabling articles of clothing to be supported on the support arm in overlying relation to said one laterally extending support member thereby enabling the collapsible valet to be positioned adjacent a wall surface and also reduce hazards to persons approaching the collapsible valet from the area having the shorter support member extending therefrom, said tubular standard and post being of square, transverse, cross-sectional configuration, the angle of inclination of the recess in the post and the inner end of the spring biased pin enabling the post to be telescoped into the tubular standard without manually releasing the pin with the spring biased pin providing frictional engagement with the post, said support arm being moved into the groove by upward pivoting movement as the post telescopes into the tubular standard when the support arm has been moved radially outwardly to enable the transverse pin to serve as a pivot point for the supporting arm.

5,022,618
MAILBOX SUPPORT APPARATUS
Michael E. Barrett, Gainesville, Ga.; Thomas C. Laughon, and Roy V. Nicholson, both of Hickory, N.C., assignors to McCalla/Lackey Products Corporation, Hickory, N.C.
Filed Feb. 8, 1990, Ser. No. 477,246
Int. Cl.^{5} A47G *23/02*
U.S. Cl. 248—146 9 Claims

1. A mailbox support apparatus comprising:

a ground mount stake;

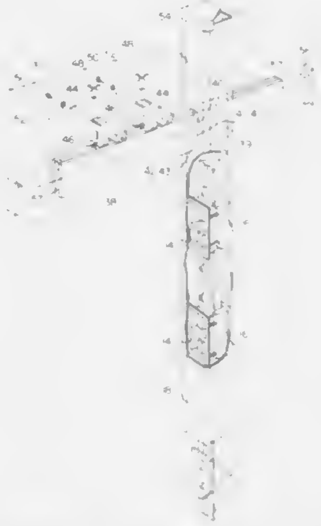
a hollow post member of greater diameter than said ground mount stake, said hollow post member having a first open end and a second open end remote from and parallel to said first open end;

spacer members detachably mountable upon said ground mount stake and sized to provide a pressure fit of said hollow post member upon said ground mount stake when said ground mount stake with said spacer members mounted thereon is longitudinally inserted into the first open end of said hollow post member;

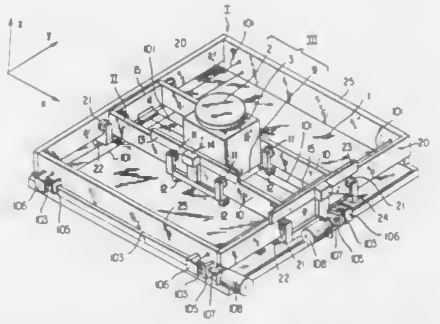
a mounting plate;

means for attaching said mounting plate to said second open end of said hollow post member; and

means for attaching said mounting plate to a bottom of a mailbox.



5,022,619
POSITIONING DEVICE OF TABLE FOR SEMICONDUCTOR WAFERS
Sakae Mamada, Komae, Japan, assignor to Tokyo Aircraft Instrument Co., Ltd., Komae, Japan
Filed Oct. 26, 1989, Ser. No. 431,171
Claims priority, application Japan, Dec. 9, 1988, 63-160567[U]; Dec. 9, 1988, 63-160568[U]; Dec. 9, 1988, 63-312483
Int. Cl.^{5} F16M *11/04*
U.S. Cl. 248—178 3 Claims



1. A positioning device for a table movable in three mutually orthogonal directions, on which a semiconductor wafer is disposed at an inspection position comprising:

pneumeatic stage supporting means for supporting the table, said stage supporting means being movable in a first and second of the three directions;

wire moving means for moving the stage supporting means in the first and second direction; and

fine resolution lifting means for moving the table in a third of the three directions;

wherein said pneumatic stage supporting means comprises:

a bed plate;

a first frame including two guide plates for guiding the pneumatic stage supporting means in the first direction;

a second frame having two guide plates and slides which inject air against the guide plates of the first frame from the sides and against the bed plate vertically from above, respectively; and

a moving stage having slides which inject air against the

VOL
1127
ISS
2
JE
11
1991
UMI

guide plates of the second frame from the sides and against the bed plate vertically from above, respectively.

5,022,620

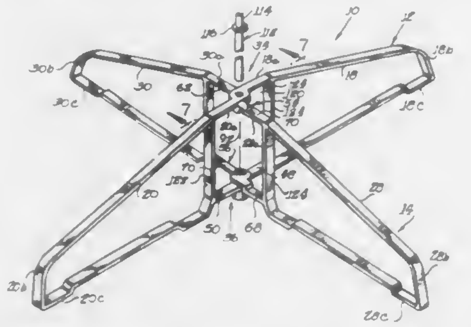
MOLDED MERCHANDISE DISPLAY BASE

George B. Scott, 1339 Washington St., P.O. Box 186, Des Plaines, Ill. 60016

Filed Jul. 17, 1989, Ser. No. 381,055

Int. Cl.⁵ F16M *11/32*

U.S. Cl. 248—188.6 **3 Claims**



1. A collapsible support base for receiving an end of an elongated shaft so as to support portions of the shaft extending beyond the base,

said collapsible support base comprising:
- a pair of cross members made of plastic and being interfitted with each other to swing between a collapsed position and an open position,
- each cross member including a pair of upper and a pair of lower opposed leg portions, the lower legs having outer ends for engaging the floor and for supporting the base and elongated shaft, inner ends on the upper and lower leg portions,
- the opposed leg portions being spaced from each other,
- detent means on the collapsible support base to detent the cross members in an open position to support the shaft,
- upper and lower cross bars spanning the inner ends of the opposed leg portions,
- hub portions at the center of the cross bars on each of the cross members for mating rotational engagement and having openings therein to receive the elongated shaft,
- upright frame members extending between the upper and lower leg portions to make the cross members more rigid for supporting a load thereon,
- the cross bars defining upper and lower sides of a central opening and the upright frame members defining opposite sides of a central opening,
- said cross bars spanning the opening,
- said cross bars being deflectable with the cross members adapted to be interfitted upon insertion of a leg portion of one cross bar between the upright frame members of the other cross member and deflecting the cross bars to engage the hub portion on the inserted cross bar inside of the hub portion on the outer cross member.

5,022,621

MULTI-HOOKS BRACKET FOR CANTILEVERLY SUPPORTING OFFICE EQUIPMENT

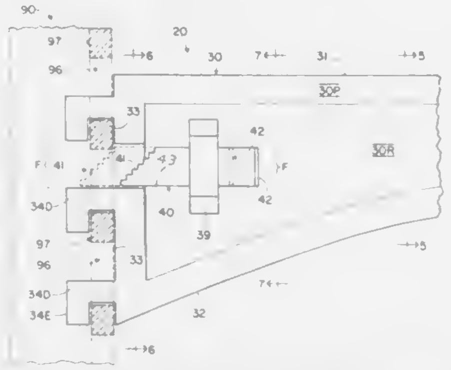
Thomas A. Quest, 906 S.117th Ct., Omaha, Nebr. 68154

Filed May 9, 1990, Ser. No. 521,025

Int. Cl.⁵ A47B *57/00*

U.S. Cl. 248—225.2 **4 Claims**

1. For a multi-hooks bracket adapted to hookably attach into vertically spaced and vertically elongated apertures of a multi-apertured column whereby the hookably attached bracket is adapted to cantileverly support office equipment, an improved multi-hooks bracket structure that is resistant to upward dislodgement from the multi-apertured column, said improved bracket structure comprising:
- (A) a generally horizontally extending arm having a periphery comprising a substantially horizontally upper-edge adapted to support office equipment thereat and also comprising an upright rear-side;
- (B) a plurality of vertically spaced hooks arrayed along an upright first-plane, each hook extending horizontally rearwardly and then downwardly from the arm rear-side whereby each hook is adapted to extend into and partially occupy the height of a vertically elongate aperture of a said multi-apertured column; and



- (C) a horizontally elongate lock located along said first-plane and at the arm rear-side, said lock having an elevation between consecutive bracket hooks and being horizontally reciprocatably associated with said arm so as to move along the horizontal portion of a said consecutive hook toward the unoccupied height remainder of a said partially occupied column aperture, and said lock having an inclined notchably serrated rear-end contour adapted to removably securely plug-into said column aperture unoccupied height remainder to thereby prevent upward dislodgement of said bracket from a said multi-apertured column.

5,022,622

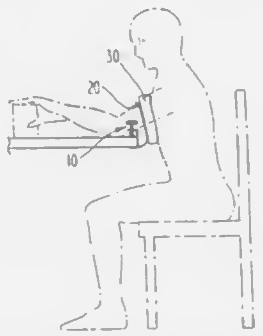
SUPPORT FOR THE BODY OF A WORKER

Lester P. Schaevitz, 431 Latches La., Merion Station, Pa. 19066

Filed Jan. 12, 1990, Ser. No. 464,294

Int. Cl.⁵ A47B *96/00*

U.S. Cl. 248—231.7 **8 Claims**



1. A support for the body of a worker comprising;
- a pad means for receiving a body portion thereon;
- a spring means disposed in a generally linear manner and having a front end and a back end with said back end terminating in a clamp means; and,
- a retaining means connected to said front end of said spring means for adjustably holding said pad means to said front end of said spring means.

5,022,623

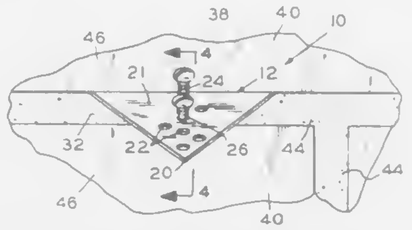
HANGING DEVICE FOR BRICK WALLS

Christopher J. Laarman, 1022 S.W. 11th St., Corvallis, Oreg. 97333

Filed Nov. 23, 1990, Ser. No. 617,664

Int. Cl.⁵ F16M *13/00*

U.S. Cl. 248—231.9 **12 Claims**



1. A hanging device, in combination with a brick wall or the like having a recessed mortar joint, wherein, within a crevice thus formed, an upper brick adjoins mortar at an upper mortar line, the hanging device comprising:
- a. a plate member having an upper mortar line contacting edge and at least two holes formed at different distances from said upper mortar line contacting edge of the plate member;
- b. a first elongated member formed to threadingly engage one said hole which is formed more closely to said upper mortar line contacting edge of the plate member;
- c. a second elongated member formed to threadingly engage another said hole which is formed more distantly from said upper mortar line contacting edge of the plate member.

5,022,624

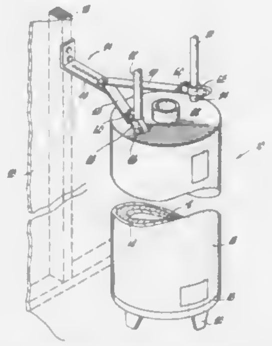
ADJUSTABLE SUPPORT FOR HOT WATER TANKS, OR THE LIKE

Joe A. Hill, 3161 Via Alicante Dr., La Jolla, Calif. 92037

Filed Feb. 6, 1990, Ser. No. 475,866

Int. Cl.⁵ E04G *3/00*

U.S. Cl. 248—274 **4 Claims**



1. Apparatus for securing a water heater, or the like, having a housing and a pair of mutually spaced nipples extending upwardly therefrom to an adjacent building structure, said apparatus comprising:
- a support bracket defined by a generally L-shaped member having angularly displaced legs, one of which legs contains a plurality of longitudinally spaced holes;
- means received by the other of said legs for attaching said support bracket to said building structure;
- arm means including a pair of angularly disposed extension arms each containing a bore at one end for selective registration with one of said support bracket holes and at the other end mounting nipple-securing means including an angle bracket connected to said extension arms and including a bolt-connected clamp having means for securing one of said nipples.

5,022,625

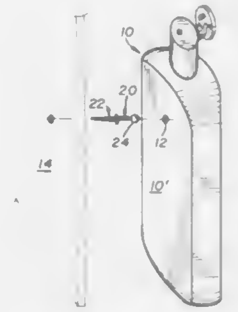
SELECTIVELY-REMOVABLE, WALL-MOUNTABLE CONTAINER

Lothar Klinkhardt, 4998 Martindale St. NE., Prior Lake, Minn. 55372

Filed Jan. 19, 1990, Ser. No. 467,554

Int. Cl.⁵ A47K *5/00*

U.S. Cl. 248—309.2 **8 Claims**



1. In a container for storing contents therein, and for dispensing the contents therefrom, said container comprising a forward-facing surface, a rearward-facing surface, a first side-facing surface, a second side-facing surface, a lower surface, and a dispensing mouth, the improvement comprising:
- one of said surfaces of said container comprising a first cooperating means for permitting the removable mounting of said container to a vertical wall surface; and
- a vertical surface to which said container is mounted;
- mounting means for securement to said vertical support surface for removably mounting said container to said vertical surface, said mounting means comprising means for attachment to said vertical surface, and second cooperating means capable of being removably coupled with said first cooperating means, whereby said container may be removably supported by said vertical surface;
- one of said first and second cooperating means comprising a female member, and the other of said first and second cooperating means comprising a male member for removable insertion into said female member;
- said female member being a substantially concave-shaped recessed cutout, and said male member being a substantially convex-shaped surface member; said concave-shaped recessed cutout being provided on an upper portion, and approximately in a center section of said one surface, said male and female members being force-fitted together, said mounting means supporting said container in the air, said lower surface of said container being suspended freely in the air and spaced above a horizontal support surface, such that said convex-shaped surface member is the support for said container.

5,022,626

VEHICLE ACCESSORY STAND

Richard J. Nozel, 354 Edith Dr., West St. Paul, Minn. 55118; Ulric W. Trombley, R.R. #1, Chisago City, Minn. 55013, and Gerald M. Brust, 361 Ponderosa Dr., Post Falls, Id. 83854

Filed Apr. 16, 1990, Ser. No. 509,517

Int. Cl.⁵ A47K *1/08*

U.S. Cl. 248—311.2 **7 Claims**

1. An automotive accessory stand comprising:
- (a) a vertical stanchion having a non-circular cross sectional shape;
- (b) an accessory attachment plate secured to an upper end of said stanchion; and
- (c) coupler means including means for securing the coupler

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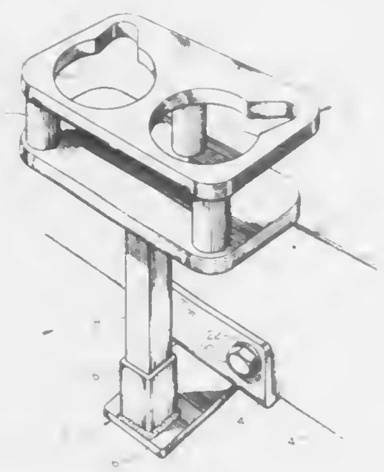
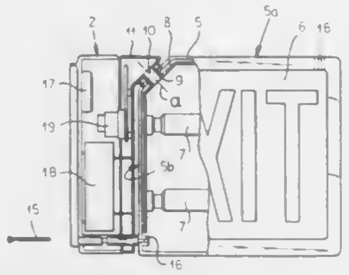
means to a vehicle seat frame and having a collar portion including a bore having a mating cross sectional shape to



the stanchion for receiving and supporting the stanchion in non-rotative indexed relation to a vehicle seat.

5,022,627
SIGN PROJECTING FROM VERTICAL WALLS OR HORIZONTAL BEAMS

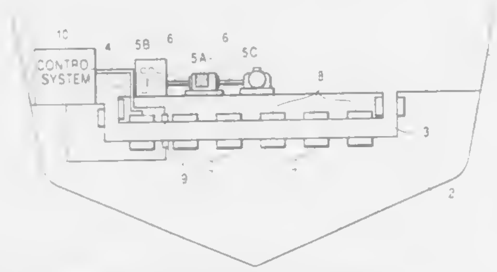
Gian Pietro Beghelli, Monteveglio, Italy, assignor to G.P.B. Beghelli S.R.L., Monteveglio, Italy
Filed Dec. 14, 1989, Ser. No. 450,824
Claims priority, application Italy, Dec. 20, 1988, 3706 A/88
Int. Cl.^{5} F16M *13/00*
U.S. Cl. 248—558 **4 Claims**



1. A sign assembly comprising:
a support member rotatable about a pivot axis between a first position and a second position thereof and provided with a first and second side formed with respective surfaces inclined to one another;
a prismatic sign body operatively connected with the supporting member, the sign body being formed with:
a front side and a top side formed with respective outer faces lying in respective first and second planes intersecting one another and forming a dihedral angel having a bisector, and
a bevel side bridging the first and second sides and formed with a flat outer surface lying at a right angle to the bisector, the outer flat surface of the bevel side being complementary with the surface of the first side of the support member in the first and second positions thereof;
hinge means for rotatably connecting the support member and the sign body mounted on the first side of the support member and including a pivot member extending along the pivot axis perpendicular to the surfaces of the first side of the support member and of the bevel side of the sign body, the surface of the second side of the support member being complementary with the outer surface of the front side in the first position and with the outer surface of the top side in the second position of the support member; and
fastening means for rigidly connecting the support member and the sign body in the first and second positions of the support member upon rotating thereof about the pivot axis.

5,022,628
MOUNTING FOR MACHINERY

Frederick A. Johnson, Sevenoaks, and Malcolm A. Swinbanks, Cambridge, both of United Kingdom, assignors to GEC - Marconi Limited, Middlesex, United Kingdom
Filed Jul. 7, 1989, Ser. No. 376,550
Claims priority, application United Kingdom, Jul. 7, 1988, 8816188
Int. Cl.^{5} F16F *15/03;* **F16M** *7/00;* **B63H** *21/30*
U.S. Cl. 248—638 **7 Claims**



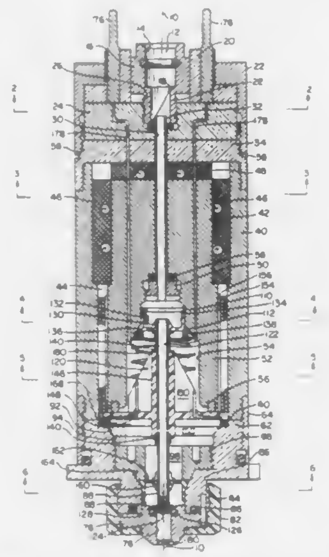
1. A mounting for machinery, comprising:
a flexible raft for mounting items of machinery;
electromagnetic means, including an array of electromagnets disposed for supporting, in operation, said raft and the items of machinery mounted on said raft;
sensing means, including an array of sensing elements, arranged for sensing dynamic properties of said raft at different places on said raft; and
control means connected to said electromagnetic means and to said sensing means controlling said array of electromagnets in dependence of signals received from said sensing means so that the electromagnets in said array of electromagnets support said raft for maintaining the items of machinery mounted on said raft in a substantially fixed positional relationship to one another.

5,022,629
VALVE CONSTRUCTION

Edward C. Tibbals, Jr., Jamestown, N.C., assignor to Interface, Inc., LaGrange, Ga.
Continuation of Ser. No. 140,546, Jan. 4, 1988, Pat. No. 4,848,725. This application Jun. 27, 1989, Ser. No. 372,267
The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.
Int. Cl.^{5} F16K *31/08*
U.S. Cl. 251—129.02 **17 Claims**

1. A valve assembly for control of fluid flow, comprising:
(a) a fluid inlet;
(b) a fluid outlet having an associated valve seat;
(c) a pair of fixed magnetic pole elements positioned coaxial with a predetermined axis;
(d) means for generating substantially constant magnetic flux between the pair of pole elements;
(e) a valve stem supported by a first elastically deformable diaphragm and displaceable along the predetermined axis between a first position, in which the valve stem forms a seal with the valve seat to prevent fluid from reaching the fluid outlet, and a second position remote from the valve seat;
(f) an armature assembly mounted on the valve stem and comprising a coil capable of passing current produced by the generated magnetic flux, for displacing the valve stem between the first and second positions; and

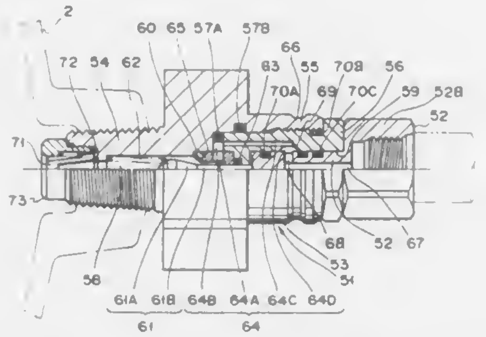
in which the elastically deformable diaphragm comprises a base plate portion, a hub portion encircling the valve stem, and



a peripheral flange portion sealed with a bore defining a portion of the channel through which fluid flows.

5,022,630
PIPE CONNECTOR FOR A HIGH-PRESSURE FLUID PIPE

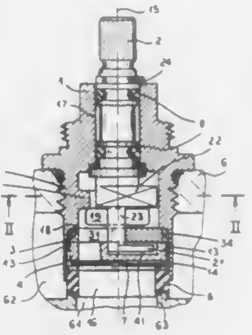
Yoshikazu Kobayashi, and Takeaki Ooshio, both of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan
Filed Jul. 3, 1990, Ser. No. 547,205
Int. Cl.^{5} F16L *37/28*
U.S. Cl. 251—149.6 **15 Claims**



1. A pipe connector for a high-pressure fluid pipe, which is detachably connected to a high-pressure fluid source, comprising:
a socket having a first end portion connected to the high-pressure fluid source; a second end portion; a socket housing connecting the first and second end portions together and including a valve chamber located at a first end portion and a plug hole located at a second end portion; a valve seat disposed in the valve chamber; and a valve body having a valve stem portion movable in the valve chamber between a position at which the valve body engages with the valve seat and a position located away from the valve seat; and
a plug having a cylindrical front end portion which can be inserted into the plug hole; and a fluid passage capable of communicating with the pipe, said plug being adapted to press the valve stem portion and move the valve body to the position located away from the valve seat when the plug is inserted through the second end portion into the plug hole, wherein
said socket housing includes communication means for allowing communication between the valve chamber and a front region of the plug hole when the valve body moves to the position located away from the valve seat, said communication means including an axial passage which extends through the socket housing in parallel to the valve stem portion; a first radial passage which opens into the valve chamber at a position closer to the plug hole than the valve seat and which allows the axial passage to communicate with the front region of the plug hole; and wherein
said plug includes an end wall which axially closes a distal end of the cylindrical front end portion inserted into the plug hole; and at least one through-hole which communicates with the fluid passage at a position axially corresponding to the first radial passage located on a plug hole side when the cylindrical front end portion is inserted into the plug hole; and further wherein
one of said plug and socket includes a plurality of seal rings which prevent the high-pressure fluid from leaking through the plug hole and the outer wall of the cylindrical front end portion.

5,022,631
FLOW-CONTROL AND SHUTOFF VALVE

Friedrich Wagner, Endingen, and Walter Grau, Mahlberg, both of Fed. Rep. of Germany, assignors to Friedrich Grohe Armaturenfabrik GmbH & Co., Hemer, Fed. Rep. of Germany
Filed Oct. 18, 1990, Ser. No. 599,707
Claims priority, application Fed. Rep. of Germany, Oct. 20, 1989, 3934976
Int. Cl.^{5} F16K *3/02*
U.S. Cl. 251—185 **12 Claims**



1. A valve comprising:
a housing forming a compartment traversed by an axis and having a radially opening outlet port and an axially open inlet port, whereby fluid can flow through the compartment in a flow direction from the inlet port to the outlet port;
a valve plate fixed in the housing and formed relative to the flow direction with a flat upstream face and with an axially throughgoing valve orifice opening at the face;
a control plate in the housing formed relative to the flow direction with a flat downstream face riding on the valve-plate face, an axially throughgoing control orifice opening at the face, and with an axially open and radially elongated socket on the face adjacent the respective orifice, the control plate being pivotal on the valve plate about the axis for alignment of the orifices and flow through the valve from the inlet port to the outlet port and for misalignment of the orifices for restricted flow from the inlet port to the outlet port; and
a valve stem rotatable in the housing about the axis, projecting through the valve-plate orifice, and formed with a foot projecting radially from the axis, fitting in the socket, and rotationally coupling the stem and the control plate.

VOL
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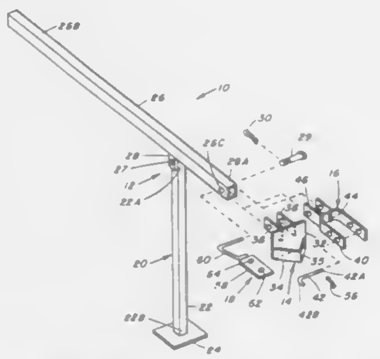
5,022,632
POST PULLING APPARATUS WITH INTERCHANGEABLE WORKING HEADS FOR PULLING DIFFERENT TYPES OF POSTS

Mark E. Beideck, 903 E. 15th St., McCook, Nebr. 69001
Filed Jul. 27, 1990, Ser. No. 559,192
Int. Cl.^{5} B25B *1/04*
U.S. Cl. 254—30 **18 Claims**



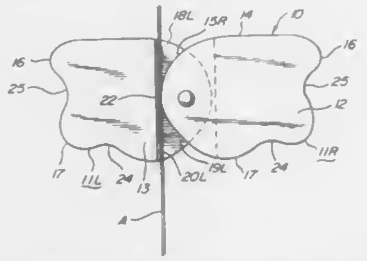
1. A post pulling apparatus for pulling different types of posts, comprising:

(a) a universal actuating device repetitively operable through a succession of work-producing strokes of movement; and

(b) a plurality of different working heads for pulling different types of posts, said different working heads being interchangeable with one another in a connected relation with said universal actuating device, said different working heads having respective spaced portions for engaging the different types of posts corresponding to said different working heads at two locations spaced from one another axially along and on opposite sides of the posts in order to lift the different types of posts during each work-producing stroke of movement of said actuating device, said spaced portions of each different working head being of different geometrical configuration than said spaced portions of the other different working heads.

5,022,633
ONE-HANDED CAM ACTION FISH TAPE PULLER

Edward L. Lopes, 466 N. Richard, Orange, Calif. 92667
Filed Nov. 15, 1989, Ser. No. 436,892
Int. Cl.^{5} B65H *59/00*
U.S. Cl. 254—134.3 FT **4 Claims**



1. A tool for gripping a thin strip of material comprising;

(a) first and second handle members each having opposed front and rear wall surfaces connected together by an irregular polygonal perimeter wall extending perpendicular to said front and rear wall surfaces,

said perimeter wall having indent means on an outer portion and on a lower portion thereof for engagement by a human finger, said perimeter wall having a generally convex edge on an inner portion thereof opposed to said outer portion of said perimeter wall,

a notch cut through said convex edge and said rear wall surface, said notch being defined by a flat wall lying parallel to said front and rear wall surfaces and an inner anvil wall lying perpendicular to said flat wall;

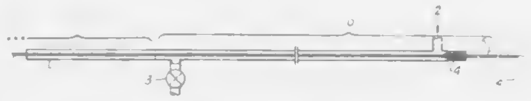
(b) pivot means joining said first and second handle members with said convex edge of said first handle member lying adjacent said inner anvil wall of said second handle member, said flat walls of said first and second handle members being in slidable contact, said pivot means being located eccentrically with respect to said convex edges of said first and second handle members,

wherein pivoting said handle members in a plane parallel to said front and rear wall surfaces of said handle members reduces the spacing between the convex edge of each handle member and its adjacent anvil wall,

whereby a thin strip of material may be engaged, gripped, and pulled, all while holding said tool in the palm of a human hand.

5,022,634
OPTICAL FIBRE INSTALLATION

Peter J. Keeble, Ipswich, England, assignor to British Telecommunications public limited company, United Kingdom
PCT No. PCT/GB88/00221, § 371 Date Aug. 21, 1989, § 102(e) Date Aug. 21, 1989, PCT Pub. No. WO88/07693, PCT Pub. Date Oct. 6, 1988
PCT Filed Mar. 23, 1988, Ser. No. 399,533
Claims priority, applicatioo United Kingdom, Mar. 23, 1987, 8706803
Int. Cl.^{5} B66F *3/24*
U.S. Cl. 254—134.4 **21 Claims**



1. Apparatus for installing a transmission line in a passageway by means of viscous drag of a fluid, so that the transmission line extends between a transmission line inlet to the passageway and a transmission line outlet remote from the inlet, the apparatus comprising:

fluid inlet means for admitting fluid to the passageway at sufficient pressure to advance the transmission line along the passageway by viscous drag forces generated between the transmission line and fluid passing relative thereto, and

fluid outlet means downstream from the fluid inlet means, but a substantial distance upstream of the transmission line outlet,

said fluid outlet means being adapted to discharge a portion of the admitted fluid from the passageway, but, in use of the apparatus, for sufficient fluid to remain to continue to advance the transmission line along the passageway by means of viscous drag forces until it reaches the transmission line outlet.

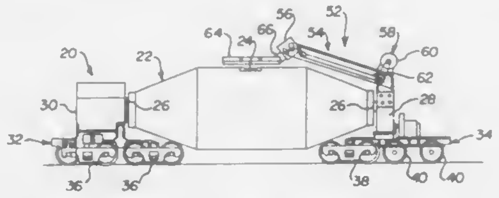
5,022,635
REMOVEABLE COVER FOR A HOT METAL TRANSFER CAR

Ricky R. Scriven, Allen Park, Mich., assignor to Tri-Star Manufacturing & Service, Inc., Oakmont, Pa.
Filed Dec. 29, 1989, Ser. No. 459,062
Int. Cl.^{5} C21B *3/10*
U.S. Cl. 266—165 **6 Claims**

1. Apparatus for removably covering the pouring mouth of a hot metal transfer car to conserve heat in the transfer car, comprising:

a track having a first track section, the first track section having a first end and a second end, the first end adapted to be supported by a hot metal transfer car, the hot metal transfer car having a pouring mouth, the first track section extending upwardly from its first end towards its second end, and having a second track section extending downwardly away from the second end of the first track section toward the pouring mouth;

a carriage moveably supported on the track;

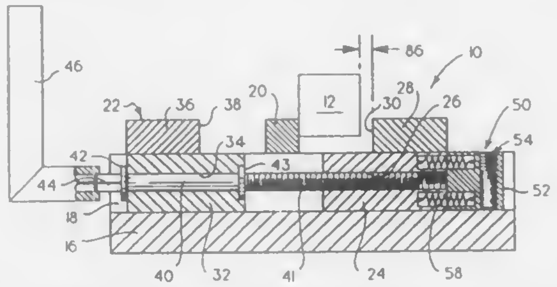


drive means operatively engaged with the carriage for moving the carriage on the track; and

a pouring mouth cover having a handling arm slidably connected with the carriage.

5,022,636
WORKHOLDING APPARATUS

George R. Swann, Gibsonia, Pa., assignor to Chick Machine Tool Inc., Warrendale, Pa.
Filed Mar. 26, 1990, Ser. No. 499,246
Int. Cl.^{5} B25B *1/20*
U.S. Cl. 269—43 **3 Claims**



1. Apparatus for holding a first and a second workpiece for machining operations, comprising:

a. an extended base member;

b. a central jaw member immovably attached to said base member;

c. a first slide member mounted on said base member for sliding movement toward and away from one side of said central jaw member, said first slide having a longitudinal threaded bore therein, said first slide member supporting a first jaw adapted for holding a first workpiece between said first jaw and said one side of said central jaw member;

d. a second slide member mounted on said base member for sliding movement toward and away from the other side of said central jaw member, said second slide member having a longitudinal bore therethrough, said second slide member supporting a second jaw adapted for holding a second workpiece between said second jaw and the other side of said central jaw member;

e. a screw shaft extending longitudinally between said first and second slide members, one end of said screw shaft being threadedly received in the threaded bore in said first slide member, said screw shaft including means for engaging said second slide member so as to cause its movement relative to said central jaw member, the other end of said screw shaft including means for accepting the input of rotary motion to said screw shaft; and

f. means for selectively biasing one of said slide members toward said central jaw member, comprising:

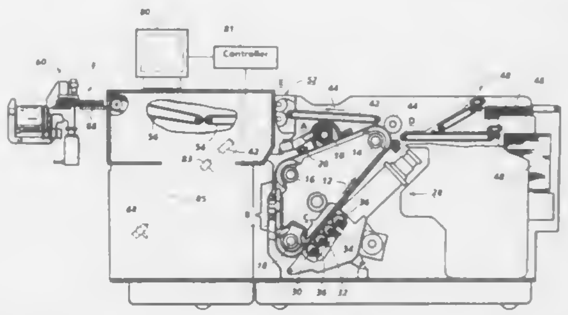
(1) a block member mounted on said base member adjacent to the other of said slide members on the side thereof opposite from said central jaw member;

(2) spring means connecting said block member to said other of said slide members so as to normally urge said other of said slide members toward said block member;

(3) said block member including means for releasably securing said block member to said base member so that said block member may travel with said other of said slide members or be secured to said base member such that when said block member is secured to said base member, the movement of said other of said slide members away from the block member causes the spring means to bias said one slide member toward said central jaw member to retain a workpiece between the jaw corresponding to said one slide member and said fixed jaw member.

5,022,637
FINISHING APPARATUS FOR USE WITH ELECTRONIC PRINTERS

Robert A. Coons, Jr., Holcomb, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Oct. 27, 1989, Ser. No. 427,545
Int. Cl.^{5} B42B *2/00*
U.S. Cl. 270—53 **3 Claims**



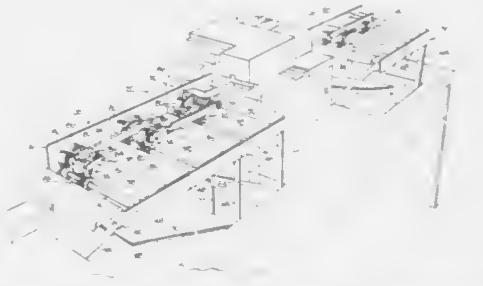
1. A method for finishing copy set output from computer or input terminal generated data imaged page one thorough the last page (1-N) of a document and placing a staple or staples in the copy set in proper orientation, comprising the steps of:

receiving copy sheets in a finisher apparatus 1-N and facedown; and

stapling the complete copy set with a stapler that is inverted with respect to normal positioning, such that the copy set is stapled from the bottom thereof.

5,022,638
ENVELOPE TRANSPORTING ALIGNING AND STACKING MODULE

Edward M. Ifkovits, Jr., New Fairfield, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.
Continuation of Ser. No. 342,422, Apr. 24, 1989, abandoned. This application Sep. 10, 1990, Ser. No. 581,155
Int. Cl.^{5} B65H *5/00*
U.S. Cl. 271—2 **13 Claims**



1. A transport deck module for transporting aligning and diverting envelopes, comprising:

a housing frame, said housing frame including a registration wall;

a roller assembly secured to said housing frame for trans-

VOL
1127
ISS
2
JE
11
1991
UMI

porting the envelopes across the transport deck module and for aligning the envelopes against said registration wall;

a pivotable deck panel, pivotably secured to said housing and situated downstream and adjacent said roller assembly;

a fixed deck panel secured to said housing and situated downstream and adjacent said pivotable deck panel; and

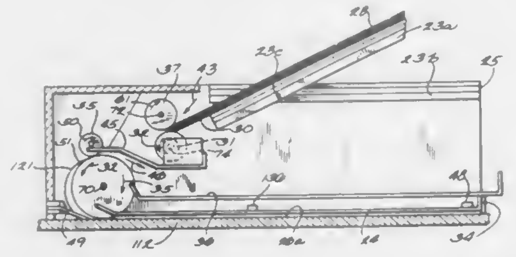
means for coupling a fixed panel side of said module to a roller assembly side of a similar transport deck module whereby a continuous transport deck comprising a plurality of transport deck modules for transporting, aligning and diverting the envelopes is formed.

5,022,639

DOCUMENT FEEDER WITH IMPROVED RECYCLABLE DOCUMENT CONTROL

R. Clark DuBois, 332 Wakeman Rd., Fairfield, Conn. 06430
Continuation-in-part of Ser. No. 172,978, Mar. 28, 1988, which is a continuation of Ser. No. 800,758, Nov. 22, 1985, abandoned.
This application Jul. 28, 1988, Ser. No. 182,592
Int. Cl.^{5} B65H *5/06*

U.S. Cl. 271—3 1 Claim



1. An automatic document feeder for a document copier having an image glass and a copy light, said document feeder arranged to be supported above the image glass and including:

a first document support member for supporting a stack of documents face-up thereon, and

a second document support member for receiving the documents thereon face-up after having been copied, and

means for removing a document from the first document support, passing it in one direction at a predetermined speed through a guide path and placing it face down on the image glass of the copier, and

feed rollers for moving the document along the image glass to a stop, whereupon the document comes to a halt while the feed rollers continue to rotate until the document is aligned against the stop, and

means for removing said document from the image glass after having been copies, passing it in the opposite direction through the aforesaid guide path substantially at the same pre-determined speed and placing it face up in the second document support member, and

including a light sensing means and a programmable counter which are located to sense the copier light and to continue copying the stacked sheet until the number set in the counter has been reached, regardless of the number of sheets in the stack.

5,022,640

AUTO-DUPLEX/SIMPLEX FEEDER MODULE

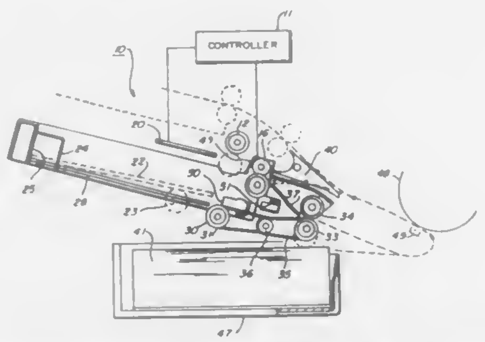
Greco, Jr. Robert L., Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Oct. 28, 1985, Ser. No. 791,807
Int. Cl.^{5} B65H *5/22*

U.S. Cl. 271—31 23 Claims

1. A self-contained multi-purpose feeder module adapted for insertion into a printer for either top or bottom sheet feeding for simplex or duplex copying, comprising:

a housing having an input and two output openings positioned in one end portion of said housing adapted for insertion into the printer;

a first feed means positioned within said housing and including upper and lower cooperating feed rolls for driving sheets into said housing after they have been copied, and



wherein said lower rolls of said feed rolls are adapted to also feed sheets out of one of said output openings of said housing when top sheet feeding is required; and

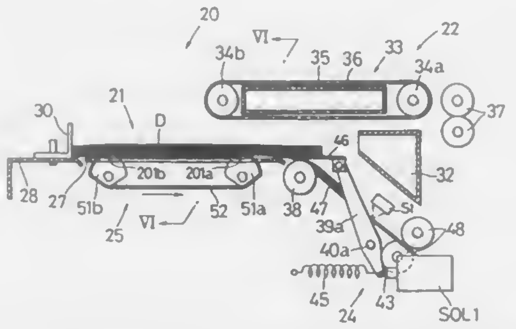
second feed means for feeding sheets from said housing through the other of said output openings when bottom sheet feeding is required.

5,022,641

RECIRCULATING FEEDER OF SHEETS

Naofumi Okada, Tenri, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Jan. 24, 1990, Ser. No. 469,206
Claims priority, application Japan, Jan. 31, 1989, 1-23396
Int. Cl.^{5} B65H *5/22*

U.S. Cl. 271—3.1 9 Claims



1. A recirculating feeder of sheets having storing means for storing a stack of sheets, for supplying the sheets from an upper side in a stacking direction and for restoring the sheets supplied from a downstream side in the stacking direction, the recirculating feeder comprising:

restoring means being disposed near a lower end in the stacking direction of the storing means near an upstream side in a restoring direction of the storing means for conveying the sheets into the storing means upon returning of the sheets; and

a driving member being disposed at the upstream side in the restoring direction relative to the restoring means, the driving member being set closer to the stacking direction of the restoring means when the sheet is close to the restoring means when restoring the sheets, otherwise the driving member is set further from the restoring means, the driving member comprises;

a rotatable lever piece,

a drive unit for rotating and driving the lever piece, and

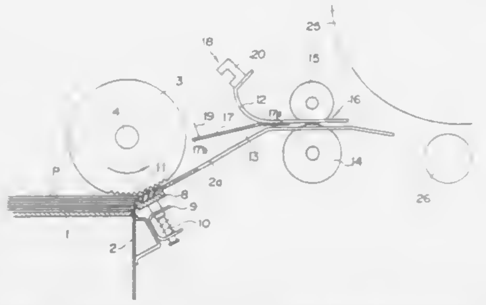
a plate part slidable in response to rotation of the lever piece, the plate part being inserted between the sheet and the restoring means when approaching the restoring means.

5,022,642

SHEET FEEDING DEVICE FOR A IMAGE DEVELOPING AND PROCESSING MACHINE

Takanori Hasegawa, and Hideo Negishi, both of Tokyo, Japan, assignors to Riso Kagaku Corporation, Japan
Filed Jul. 27, 1989, Ser. No. 385,362
Claims priority, application Japan, Jul. 29, 1988, 63-191225
Int. Cl.^{5} B65H *3/06*

U.S. Cl. 271—10 2 Claims



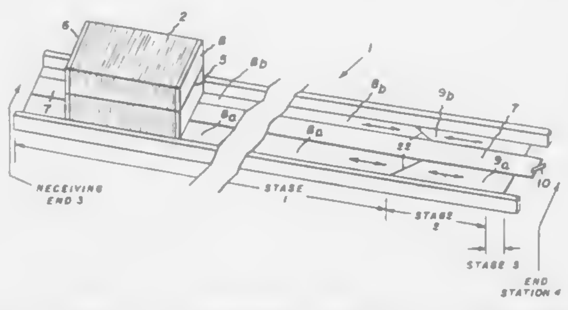
1. A sheet feeding device for an image developing and processing machine comprising a sheet feeding base on which a plurality of sheets are stacked, a selectively driven sheet feeding roller for taking up and feeding a plurality of sheets one by one from said stack, and a register roller means for transporting the sheet to an image developing and processing device at a predetermined timing, fixed upper and lower guide plates, a movable sheet guide member provided between said sheet feeding roller and said register roller means which is adapted to be displaced by the curving deformation of a sheet between said sheet feeding roller and said register roller means in the direction of the growing of said curving deformation, said movable sheet guide member being positioned between said upper and lower plates, wherein the upstream end of said upper guide plate is bent away from said lower guide plate and wherein at least the leading end of said movable sheet guide member is adapted to be elastically bent away from said lower guide plate.

5,022,643

UNIVERSAL SIGNATURE FEEDER/CONVEYOR

William L. Crawford, Madison Hts., and James M. Morton, Goode, both of Va., assignors to CBM Systems Inc., Evington, Va.
Filed Jan. 16, 1990, Ser. No. 466,056
Int. Cl.^{5} B65H *1/02, 5/04*

U.S. Cl. 271—267 18 Claims



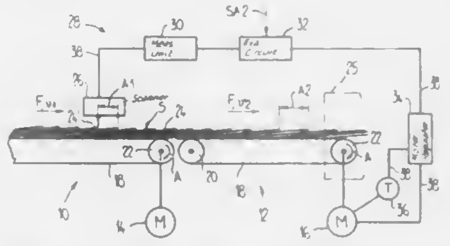
6. Apparatus for manipulating signatures wherein tightly packed signatures stacked on edge are converted into a succession of discrete signatures stacked on edge for movement toward an end station comprising a conveyor, said conveyor comprising first and second stages, means for tightening signatures comprising said first stage, said first stage comprising first means operable for moving signatures while stacked on edge in discrete walking steps of sequentially progressively smaller length along a first path for delivery to said second stage, means for loosening said delivered stream of signatures comprising said second stage, said second stage comprising second means operable for moving said signatures while stacked on edge in discrete walking steps of length greater than said smaller lengths along a second path for movement toward said end station.

5,022,644

METHOD AND APPARATUS FOR FORMING AN IMBRICATED FORMATION OF PRINTED PRODUCTS ARRIVING IN AN IMBRICATED STREAM

Norbert Bürge, Wald, Switzerland, assignor to Ferag AG, Hinwil, Switzerland
Filed Jan. 12, 1989, Ser. No. 345,306
Claims priority, application Switzerland, Jan. 13, 1988, 102/88
Int. Cl.^{5} B65H *5/34*

U.S. Cl. 271—270 17 Claims



1. A method of controlling outfeed imbrication pitch between respective products of an imbricated stream of printed products such as newspapers, periodicals, and magazines, comprising the steps of:

infeeding the imbricated stream of printed products at a first infeed imbrication pitch;

scanning the products of the infed imbricated stream of printed products;

said step of scanning said products of the infed imbricated stream entails generating a time dependent signal indicative of the first imbrication pitch in the infed imbricated stream of printed products;

generating a signal related to a desired value of the outfeed imbrication pitch;

combining the time dependent signal and the signal related to the desired value of the outfeed imbrication pitch and thereby generating a signal related to a reference conveying velocity value;

outfeeding an imbricated formation of printed products; and

utilizing the signal related to said reference conveying velocity value for controlling the outfeed imbrication pitch by controlling the conveying velocity of the outfed imbricated formation.

5,022,645

DISENGAGEABLE COUPLING USABLE IN A SHEET TRANSPORT MECHANISM

Michael H. Green, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Nov. 25, 1988, Ser. No. 275,989
Int. Cl.^{5} B65H *5/02*

U.S. Cl. 271—276 4 Claims

1. A disengageable coupling, for drivingly coupling first and second shafts which shafts are totally separable, one of the shafts which shafts are totally separable, one of the shafts driving the other shaft through said coupling, said coupling comprising:

a cylindrical first component fixed to an end of said first shaft for rotation therewith,

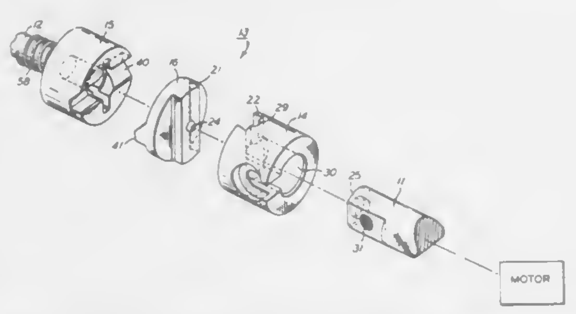
a cylindrical second component coupled to said first component and having a free end opposite said first component,

a cylindrical third component rotationally fixed to the end of

VOL
1127
ISS
2
JE
11
1991
UMI

the second shaft and having a free end facing said second component,

said second and third components having mating clutch surfaces associated with their free ends which surfaces are totally disengageable solely by relative axial movement of said shafts, and when engaged will transmit rotary force from one of said shafts to the other but which will permit some radial sliding movement of said second component with respect to said third component, and



said first and second components having coupling surfaces which include a projection on one surface and a complementary channel in the other surface which projection and channel include complementary interlocking surfaces which prohibit axial and rotary motion of said second component with respect to said first component, but permit limited radial movement of said second component with respect to said first component.

5,022,646

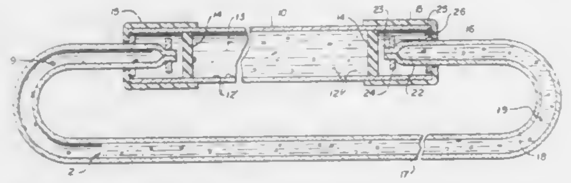
FLUID FILLED JUMPING STICK

Brian D. Kessler, Youngstown, Ohio, assignor to Maui Toys, Inc., Youngstown, Ohio

Filed Nov. 30, 1989, Ser. No. 443,405

Int. Cl.^{5} A63B *5/20*

U.S. Cl. 272—75 **18 Claims**



10. A jumping stick having a rigid tubular center section and a tubular flexible jumping section, said rigid center section and said flexible loop being connected together end-to-end to form a closed hoop, the improvement comprising:

said tubular flexible jumping section having a hollow center and formed of transparent or translucent plastic, a liquid partially filling said hollow center, and a plurality of decorative particles in said hollow center, wherein said decorative particles are moved by said liquid; and

means for rotatably connecting the ends of said tubular flexible jumping section to said rigid tubular center section, said means comprising a cap mounted on each end of said rigid center section, each said cap having a hole in its end for receiving said flexible jumping section, means for allowing rotation of said flexible jumping section with respect to said rigid center section, said caps mounted on the ends of said rigid center section each forming a handle for a jump rope configuration when said caps are removed from said rigid center section.

5,022,647

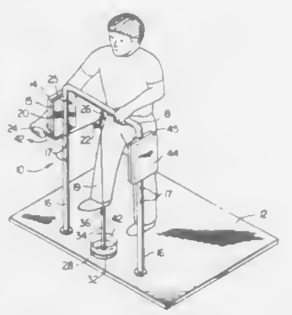
UPPER TORSO AND LIMB EXERCISING DEVICE

Garland J. Fulcher, 14007 Highmark Sq., Dallas, Tex. 75240

Continuation of Ser. No. 354,474, May 19, 1989, abandoned. This application Aug. 1, 1990, Ser. No. 561,276

Int. Cl.^{5} A63B *21/06*

U.S. Cl. 272—117 **19 Claims**



I. Apparatus for exercising comprising:

a support frame having an upright member attached to a transverse top member;

a variable weight disposed relative to said support frame;

a substantially vertical rest member having two substantially planar surfaces, one of which surfaces being directly secured in a substantially parallel configuration to said upright member for engaging a selected region of a user's body;

a pulley sheave movably and swivellingly mounted on said top member; and

a flexible cord passing over said movably and swivellingly mounted pulley sheave and coupled to said weight at the lower end thereof, the upper end of said cord being adapted to be grasped by the user's fingers along the palm of said user's hand for drawing said cord across said pulley to raise and lower said weight and exercise said user's upper torso and limb.

5,022,648

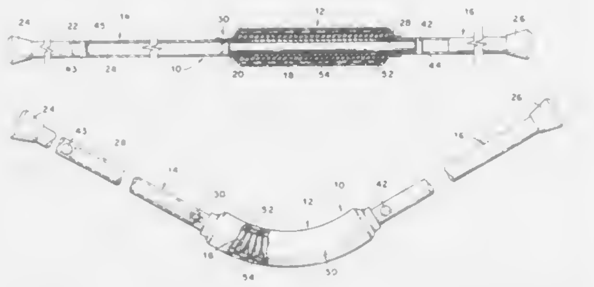
AEROBIC WAND

Steed Travis, Rte. 6, Box 73D, Maryville, Tenn. 37801

Filed Jul. 3, 1990, Ser. No. 547,920

Int. Cl.^{5} A63B *21/02*

U.S. Cl. 272—137 **24 Claims**



1. An aerobic device comprising:

a pair of elongated tubular means oriented in a longitudinally spaced apart end-to-end relationship in a longitudinal plane;

spring means positioned between and affixed to adjacently disposed end portions of each of the elongated tubular means for providing a biased flexural pivot point for each of the tubular means disposed on opposite sides of the spring means; and

selectively movable means supported by the elongated tubular means for contacting said spring means to inhibit the pivoting of the tubular means about the flexural pivot point.

5,022,649

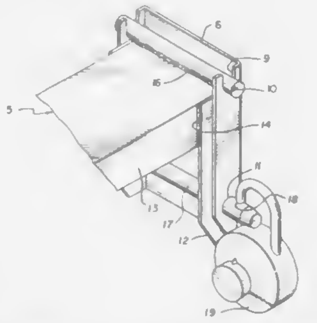
QUICK CHANGE DEVICE FOR A BASKETBALL HOOP

Barry H. Traub, Dunwoody, Ga., and Emile Leoni, Brampton, Canada, assignors to Select Service & Supply Co., Inc., Atlanta, Ga.

Filed Aug. 18, 1989, Ser. No. 395,844

Int. Cl.^{5} A63B *63/08*

U.S. Cl. 273—1.5 R **21 Claims**



1. A quick change device for holding a basketball hoop comprising a combination:

a board mounting plate having flanges on each vertical side of said plate, said flanges extending in the direction of said hoop;

a hoop mounting member comprising a horizontal spacing member, and a vertical rim mounting channel which is fixed to said hoop horizontal spacing member; and

means for attaching said vertical rim mounting channel to said mounting plate flanges.

5,022,650

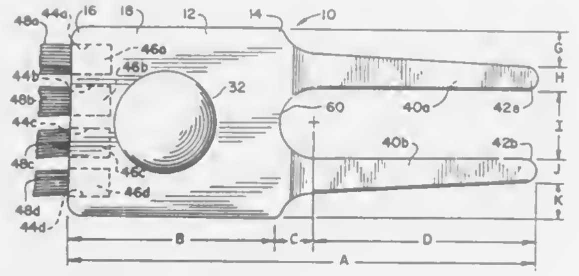
GOLF TOOL

Michael F. Madock, River Forest, Ill., assignor to KT Products, Inc., LaGrange Park, Ill.

Filed Apr. 23, 1990, Ser. No. 512,471

Int. Cl.^{5} A63B *57/00;* A47L *13/00*

U.S. Cl. 273—32 A **11 Claims**



1. A golf tool, comprising:

a main body having first and second opposite ends;

a pair of tines disposed on the first end of the main body and immovable with respect to the main body, the tines extending from the main body in a first direction; and

a row of bristles forming a brush for cleaning golf equipment fixed on the second end of the main body opposite the first end, the bristles extending generally from the main body in a second direction 180° opposite the first direction.

5,022,651

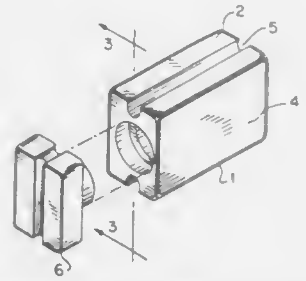
EXERCISE AND TRAINING TENSIONING DEVICE FOR SPORTING RACQUETS

Michael A. Barone, 4 Bonaire Blvd., Delray, Fla. 33446

Filed May 24, 1989, Ser. No. 356,829

Int. Cl.^{5} A63B *49/00*

U.S. Cl. 273—73 D **2 Claims**



1. The combination of a hand held sporting racquet having strings and a device for changing the vibrations of the striking surface of the sporting racquet, said device comprising a housing of one or more rigid materials having a cut-out mounting groove along the periphery of the housing so as to have said housing engage a set of adjacent strings when inserted between strings on the striking surface of the sporting racquet, wherein said housing comprises a cover element, a body element and a spring element inside the body element in which the cover element and body element can be compressed toward each other while being inserted between the strings on the striking surface of the sporting racquet and then expanded upon release so that the adjacent strings fit within said cut-out mounting grove along the periphery of said housing.

5,022,652

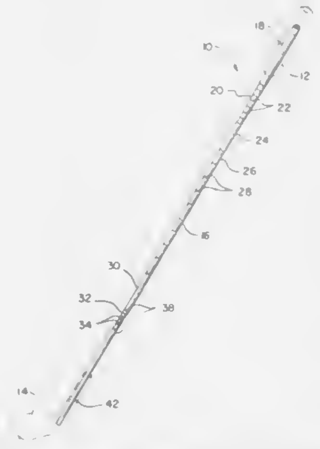
LIGHTWEIGHT STEEL GOLF SHAFT

Frank Fenton, South Hadley, Mass., assignor to Spalding & Evenflo Companies, Tampa, Fla.

Continuation of Ser. No. 335,335, Apr. 10, 1989, abandoned. This application Sep. 24, 1990, Ser. No. 590,440

Int. Cl.^{5} A63B *53/12*

U.S. Cl. 273—80 B **9 Claims**



8. A golf club comprising a butt section with a grip thereon,

VOL
1127
ISS
2
JE
11
1991
UMI

a tip section with a head thereon and, therebetween, a shaft formed in a generally cylindrical configuration with a tip end and a butt end, the shaft having a central aperture extending axially the entire length thereof with three longitudinally stepped regions along each of which a series of axial steps are defined, one of said regions forming a central region between the other two stepped regions and directly between each of two said stepped regions is defined an unstepped region greater in axial length than the axial length between steps, of the stepped regions in order to form a stepped shaft pattern, the stepped shaft pattern being continuously decreasing in diameter externally and internally from the butt end to the tip end, the steps of the central region being spaced from each other along the longitudinal axis of the shaft by a distance which is greater than the distance between the steps of the other sets.

5,022,653
ELECTRONIC POKER GAME

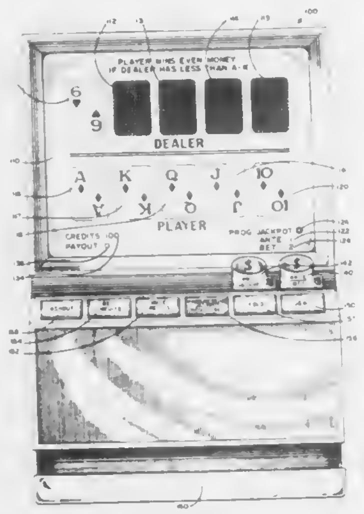
James P. Suttle, Las Vegas, Nev., and Daniel A. Jones, Louisville, Ky., assignors to Caribbean Stud Enterprises, Inc., Las Vegas, Nev.

Continuation-in-part of Ser. No. 182,374, Apr. 18, 1988. This application Jul. 13, 1988, Ser. No. 218,152

The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.

Int. Cl.^{5} A63F *1/00*

U.S. Cl. 273—85 CP **11 Claims**



1. A method of playing a poker game displayed on an electronic device comprising the steps of:

a) a player inserting a second token into the electronic device to be eligible to play the poker game displayed on the electronic device,

b) a player inserting a second token to be eligible to participate in a progressive jackpot, the second token being inserted prior to beginning the pay of a hand of the poker game, which second token is allocated to a progressive jackpot separate from an allocation of the first token,

c) electronically displaying to the player a poker hand comprising a predetermined number of cards, and

d) the player winning a predetermined amount of the progressive jackpot if the player's hand comprises a predetermined poker hand combination.

5,022,654
LIQUID FILLED DEVICE FOR PLAYING A GAME OF CHANCE

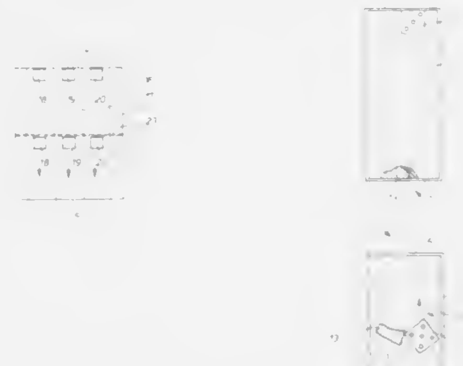
Leo Berger, Zürich, Switzerland, assignor to Idea + Invent AG, Switzerland

Filed Jun. 9, 1989, Ser. No. 364,007

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1988, 8807618[U]

Int. Cl.^{5} A63F *9/04*

U.S. Cl. 273—145 CA **6 Claims**



1. A game of chance including a dice box having a container, comprising:

the container including a lid (2,3) on each the upper and the lower side, and filled with a supporting liquid,

at least one die (12) and at least one obstacle (13) in the container,

the die (12) being of less density than the liquid and thereby constituting a floating body,

the obstacle (13) being of greater density than the liquid and thereby constituting a sinking body, and

the die and obstacle on rising and sinking respectively coming into mutual contact and thereby causing turning of the die.

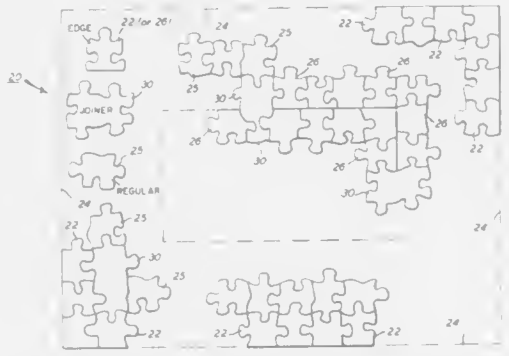
5,022,655
JIGSAW PUZZLE AND TECHNIQUE

Karen E. Meyer, 130 C Brebeuf Dr., Penfield, N.Y. 14526

Filed Aug. 16, 1989, Ser. No. 394,667

Int. Cl.^{5} A63F *9/10*

U.S. Cl. 273—157 R **8 Claims**



1. A jigsaw puzzle composed of pieces adapted to interfit in orthogonal columns and rows, said puzzle including:

a plurality of outer straight edge pieces defining the perimeter of said puzzle;

a plurality of interior traditional pieces with wholly irregular convex and concave curved features; and

a plurality of interior straight edge pieces defining an interior polygon within said perimeter to increase the numerical proportion of straight edge pieces to said interior traditional pieces in said puzzle and, thereby, the difficulty of said puzzle.

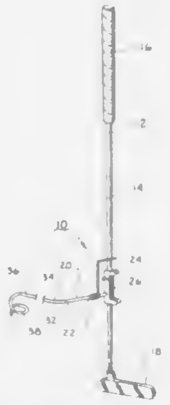
5,022,656
TRAINING DEVICE FOR PUTTING

Ralph Tiller, 1534 Old Creek Ct., Cardiff, Calif. 92007

Filed Feb. 23, 1990, Ser. No. 484,425

Int. Cl.^{5} A63B *69/36*

U.S. Cl. 273—186 A **5 Claims**



1. A training device for improving a golfer's putting stroke to hit a golf ball in an intended line of travel for use in combination with a putter having a shaft and a putting head with a face, comprising:

a base rigidly attachable to said shaft adjacent said head;

a slender rigid bar rigidly attached to said base which extends in a rearward direction perpendicular to the face, and having a free end; and

an elastic line having one end attached to said free end, and a second end attachable to a stationary object which is positioned in a vertical plane which lies on the intended line of travel.

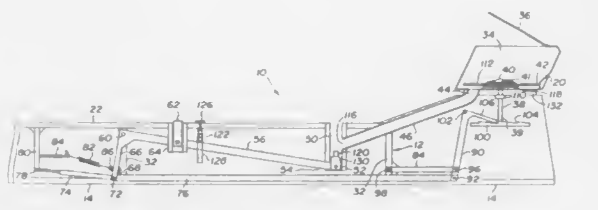
5,022,657
GOLF PRACTICE TEE APPARATUS

Joseph P. Bussiere; Richard A. Bussiere; Paul L. Bussiere; Daniel J. Bussiere, all of Edmonton, and Christopher Lindop, Alberta, all of Canada, assignors to 373470 Alberta Ltd., Edmonton, Canada

Filed Sep. 10, 1990, Ser. No. 579,692

Int. Cl.^{5} A63B *57/00*

U.S. Cl. 273—201 **7 Claims**



1. An automatic golf tee comprising:

a user activated depressible tee movable from a first position to a second position;

means actuable by a user for actuating said tee;

a golf ball dispenser having a lower surface;

a golf ball sized hole formed in the lower surface of the golf ball dispenser;

a chute attached to the golf ball dispenser below said hole in said lower surface for supplying balls to the tee;

a flexible rotating disc having a plurality of openings arranged circumferentially about the disc, the flexible rotating disc being rotatably disposed above and adjacent to the lower surface of the golf ball dispenser, such that rotation of the flexible disc to sequentially align said opening in said disc with the hole in the golf ball dispenser allows a golf ball in the golf ball dispenser to enter the chute; and

means connecting said means actuable by a user and said rotating disc for sequentially rotating the flexible disc in response to movement of the tee from the first position to the second position.

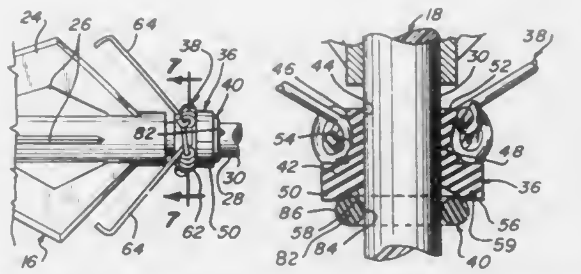
5,022,658
ARROW PENETRATOR BRAKE ASSEMBLY

Jerald E. Burkhart, 1121 Cedar, Pratt, Kans. 67124

Filed Dec. 19, 1989, Ser. No. 452,305

Int. Cl.^{5} F42B *6/04*

U.S. Cl. 273—416 **7 Claims**



4. An arrow penetrator brake assembly mountable on a main arrow shaft of a hunting bow assembly to initially impede and then stop forward motion of a projected hunting arrow assembly on contacting an object, comprising:

(a) a main support bushing member mounted about and moveable axially on said main arrow shaft;

(b) a gripper spring assembly mounted on said main support bushing member and extended laterally thereof and operable to contact the object to impede forward motion after penetration of said hunting arrow assembly into the object;

(c) a brake control member mounted on said main support bushing member and engagable with said main arrow shaft to provide a frictional contact therewithin and a controlled impedance to rearward motion on said main arrow shaft when striking the object;

(d) said main support bushing member having a main body with a central opening to receive said main arrow shaft therethrough, a spring retainer section to receive said gripper spring assembly therein to retain same thereon, and a rear section having a tapered side wall integral with said central opening; and

(e) said tapered side wall at an angular relationship to said central opening and said main arrow shaft and operable to

VOL
1127
ISS
2
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11
1991
UMI

receive said brake control member therein to provide an impedance against forward movement of said main arrow shaft relative to said main support bushing member which contacts the object through said gripper spring assembly.

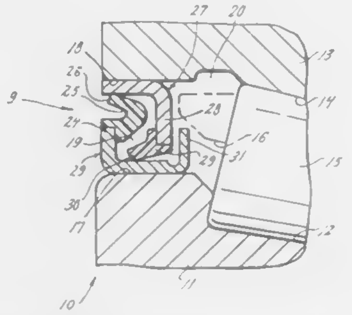
5,022,659
SEAL ASSEMBLY FOR ANTIFRICTION BEARINGS

Dennis L. Otto, Malvern, Ohio, assignor to The Timken Company, Canton, Ohio

Continuation-in-part of Ser. No. 289,722, Dec. 27, 1988, abandoned. This application Dec. 22, 1989, Ser. No. 455,758

Int. Cl.⁵ F16J *15/32*

U.S. Cl. 277—1 **7 Claims**



1. A seal assembly having an annular configuration adapted for use in antifriction tapered roller bearings having cups and cones with interposed tapered rolling elements having limited axial freedom of movement, the seal assembly forming a barrier for the exclusion of contaminants and the retention of lubricants during both rotational and axial movement, said seal assembly comprising:

- (a) a pair of annular cases in radially spaced relation with one of said cases having a radially directed flange in axially spaced relation to a radially directed flange on the other one of said cases, and said cases having axially directed surfaces for engaging on the bearing cup and cone respectively;
- (b) a seal element carried by each of said radially directed case flanges; and
- (c) each seal element having a lip directed in the same axial direction and slidably engaged in line contact against the axially directed surface on the radially opposite one of said annular cases, and said seal elements and annular cases being spaced apart to define and enclose a single cavity in said seal assembly between said pair of annular cases in which said seal elements are directly exposed to each other in said cavity.

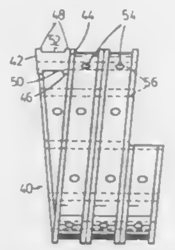
5,022,660
LANTERN RING COIL

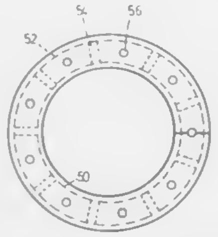
Joseph R. Dunford, 88 Ridge Ave., Waverley, Nova Scotia, Canada B0N 2S0 ; George Champlin, 218 Green St., Stoneham, Mass. 02180, and Milton Sylvia, R.R. #2, Lyn, Ontario, Canada K0E 1M0

Filed Nov. 30, 1989, Ser. No. 443,361

Int. Cl.⁵ F16J *15/18*

U.S. Cl. 277—9 **9 Claims**





1. A length of plastic material formed into a helix and from which a shorter portion may be cut for use as a lantern ring adjacent a shaft in rotating or reciprocating equipment, said material having: a generally H-shaped cross-section defined by continuous axially spaced side walls extending between radially inner and outer edges thereof and by radially inner and outer surfaces spaced inwardly from the inner and outer edges respectively; a plurality of generally radially extending holes passing through said material between said outer surface and said inner surface and spaced apart along said length of material; and a plurality of generally axially extending holes passing through said material between one side wall and the other side wall and spaced apart along said length of material, each such axially extending hole being generally centrally located between adjacent pairs of said radially extending holes.

5,022,661
LAMINATE TYPE MANIFOLD GASKET

Hidetaka Nakasone, Omiya, Japan, assignor to Ishikawa Gasket Co., Ltd., Tokyo, Japan

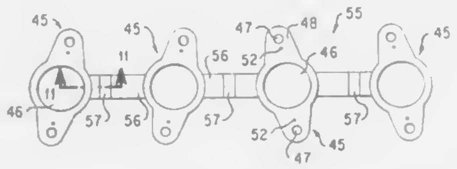
Continuation of Ser. No. 54,354, May 26, 1987, abandoned, which is a continuation-in-part of Ser. No. 835,905, Mar. 4, 1986, Pat. No. 4,728,110. This application Mar. 13, 1989, Ser. No. 323,232

Claims priority, application Japan, Jan. 13, 1986, 61-2871

The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.

Int. Cl.⁵ F16J *15/08*

U.S. Cl. 277—213 **4 Claims**



1. A manifold gasket assembly for an internal combustion engine adapted to be placed between a manifold and a cylinder head to surround exhaust holes for exhaust fluid passages, comprising:

- a plurality of laterally spaced gasket structures connected to each other, each gasket structure including at least one first plate having a first hole corresponding to the exhaust hole, a second plate situated adjacent to the first plate and having a second hole corresponding to the exhaust hole, and sealing means for sealing between the first and second plates, and
- at least one connecting member integrally formed with the second plate for connecting two consecutively spaced gasket structures, said connecting member having a buffer member in the middle between said two consecutively spaced gasket structures, said buffer member being spaced radially outwardly from said first and second holes and from said first plate and from said sealing means of said two consecutive gasket structures, said buffer member being expandable in the direction of the gasket structures due to expansion of the engine by heat to minimize deformation to said two consecutive gasket structure so that when the engine having the gasket assembly therein is operated, the gasket structures can remain securely situated in position with each other without being affected by expansion of the adjacent pasts of the engine by heat.

5,022,662
GASKET WITH A FLUID HOLE REGULATION DEVICE

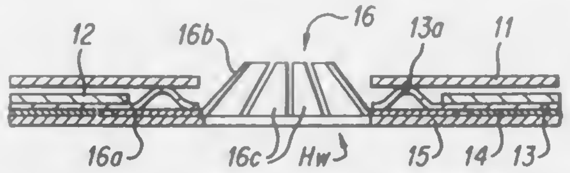
Hisashi Yasui, Tokyo, Japan, assignor to Ishikawa Gaset Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 340,653, Apr. 20, 1989. This application Aug. 1, 1990, Ser. No. 561,987

Claims priority, application Japan, Apr. 20, 1988, 63-53124

Int. Cl.⁵ F16J *15/08*

U.S. Cl. 277—235 B **4 Claims**



1. A gasket for an internal combustion engine with at least one fluid hole, comprising:

- a main body adapted to be installed in the engine and having at least one first hole communicating with the fluid hole of the engine; and
- a fluid hole regulation device installed in the first hole of the main body, said fluid hole regulation device including a second hole, and a plurality of strips arranged so that a size of the second hole changes according to a temperature of the engine, at least a bending rotation of each strip being made of a shape memory alloy so that each strip bends to enlarge the size of the second hole when the temperature of water circulating through the engine increases beyond a predetermined temperature and to return to a first position when the temperature of water circulating through the engine decreases beyond a predetermined temperature.

5,022,663
METAL GASKET OR JOINT PROVIDED WITH AN EXTREMELY HIGH UNIT-AREA PRESSURE

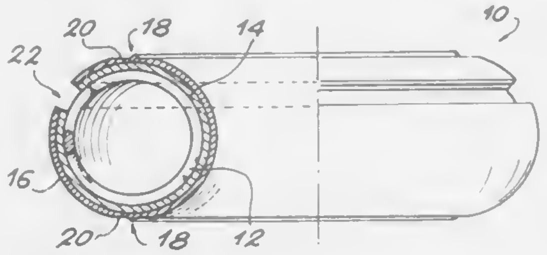
Jean Fages, Pierrelatte; Raymond de Villepoix, Donzere; Claude Abbes, Saint Etienne, and Christian Rouaud, Bourg Saint Andeol, all of France, assignors to Commissariat a l3 Energie Atomique, Paris, France

Filed Aug. 28, 1989, Ser. No. 398,982

Claims priority, application France, Sep. 8, 1988, 88 11727

Int. Cl.⁵ F16J *15/08*

U.S. Cl. 277—236 **5 Claims**



1. Metal gasket which comprises:

- an elastic metal core casing presenting when at rest a section with the shape of a circle,
- a spring embedded in said metal core casing, and
- at least one outer metallic casing in which is embedded the metal core casing and on which are formed two diametrical projecting portions symmetrically disposed with respect to a median plane of symmetry of said gasket, said projecting portions having peripheral edges including means for sealed contact with two opposite surfaces under the effect of a predetermined gripping power, wherein the outer casing comprises a metallic material and wherein a peripheral edge of each of the projecting sections has a width of at most about 0.05 mm after said gripping power has been applied wherein the outer casing and metal core casing each have a peripheral opening oriented towards an outside portion of the gasket which is offset with respect to said median plane of symmetry of said gasket by an angle of between about 15° and about 40°.

5,022,664
METAL GASKET FOR JOINT STRUCTURE

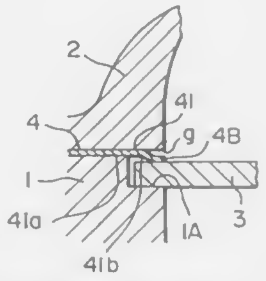
Taizo Kitada; Yoshiaki Danno, both of Kyoto; Masahiko Takagi, Kusatsu; Toshihiko Uchida, Otsu, and Yutaka Yamamoto, Toyonaka, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Toyonaka, Japan

Filed Apr. 19, 1989, Ser. No. 340,205

Claims priority, application Japan, Apr. 19, 1988, 63-52643[U]

Int. Cl.⁵ F16J *15/08*

U.S. Cl. 277—236 **24 Claims**



1. A metal gasket for sealing a joint structure composed of a set of first, second and third joint members, the first and second joint members defining first and second holes therethrough, respectively and disposed in confronting relation so as to align the first and second holes with each other, the first joint member having, in a surface thereof facing the second joint member, a recess adjacent to an edge portion of the first hole, an outer peripheral portion of the third joint member being fitted in the recess of the first joint member and being clamped between the first and second joint members as the first and second joint members are tightened, wherein said metal gasket has an opening substantially equal in size to the first and second holes of the first and second joint members and is adapted to be disposed between confronting surfaces of the first and second joint members so as to align said opening with the first and second holes of the first and second joint members, said metal gasket further having, in an edge portion of said opening adapted to be disposed adjacent to the recess of the first joint member, a stepped portion defined by first and second bends formed to contact the first and second joint members, respectively; and said stopped portion being formed so that as the first and second joint members are tightened, said first and second bends deform so as to cause the edge portion of said metal gasket to sealingly engage and retain said third joint member, said edge portion being spaced from said second member.

5,022,665
WORKPIECE SUPPORT TOOL

Gordon E. Hines, Ann Arbor; Leonard J. Salenbien, Saline, and Vernon J. Burzan, Ann Arbor, all of Mich., assignors to Hines Industries, Inc., Ann Arbor, Mich.

Continuation-in-part of Ser. No. 153,751, Feb. 8, 1988, abandoned. This application Sep. 22, 1989, Ser. No. 410,945

Int. Cl.⁵ B23B *31/00*

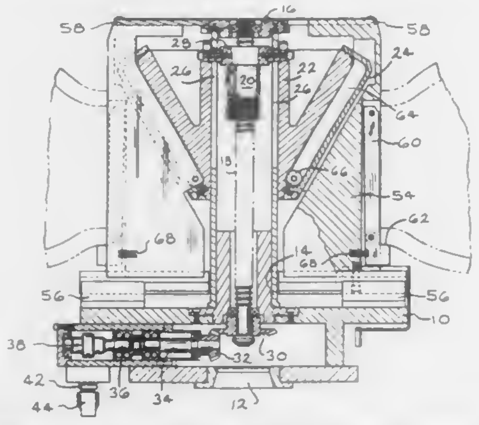
U.S. Cl. 279—2 R **2 Claims**

1. A workpiece support tool for engaging a workpiece having a specified inner diameter comprising, in combination:

- a plurality of jaw members having an engagement surface disposed in equidistant radial amounts from the axial centerline of said support tool;
- a ball screw positioned along the axial centerline of such tool and a ball nut engaged for movement on said ball screw;

VOL
1127
ISS
2
JE
11
1991
UMI

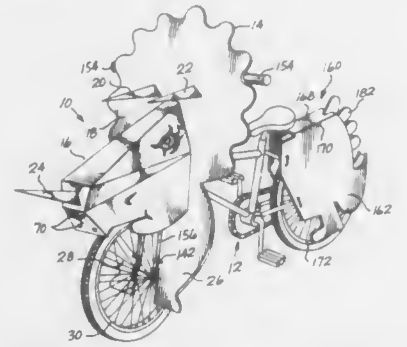
an inclined member engaged with said ball nut and having a slide surface in communication with each of said jaw members, said slide surface having an inclined aperture extending the length of said slide surface and each jaw member having a fixed pin for engaging with said aperture of said slide surface, whereby rotation of said ball screw



imparts movement to said ball nut and said inclined member wherein such communication between said slide surface and said jaw members cause said jaw members and said engagement surfaces to move solely in equidistant radial amounts to form an outer surface diameter of a specified radius intended to mate with such inner diameter of such workpiece.

5,022,666
FACADE FOR CHILD'S PLAY VEHICLE

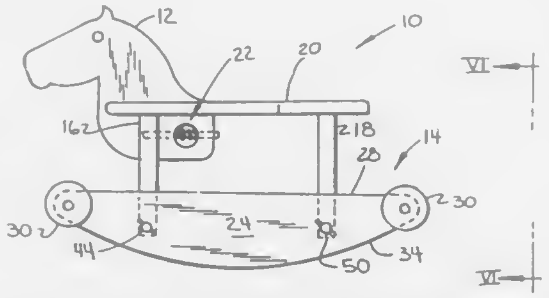
Gregory L. Simon, 17302 33rd Ave. S., Seattle, Wash. 98188
Continuation of Ser. No. 335,126, Apr. 5, 1989, abandoned. This application Nov. 2, 1990, Ser. No. 607,751
Int. Cl.⁵ A63G *19/00*
U.S. Cl. 280—1.16 15 Claims



1. A facade for use with and attachment to a velocipede, to provide with said velocipede a simulated appearance of an ambulant object such as an animal or vehicle, comprising:
a planar first member attachable to a forward portion of the velocipede, said first member having a front surface extending laterally of the velocipede and having a distinctive perimeter shape;
a planar second member folded into a three-dimensional form and attached to a central portion of said first member to project forwardly from its front surface;
said second member having a base area including an edge portion where it is attached to said first member;
said first member being of an area larger than said base area and having a planar border portion extending outwardly beyond said base area;
at least one of said first and second members including an open portion positioned to receive a portion of said velocipede;
said distinctive perimeter shape of said planar first member providing an anterior outline shape of the simulated object;
said three-dimensional form of said folded second member presenting a side profile of a portion of said simulated object; and
said distinctive perimeter shape and planar border portion of said planar first member with said folded second member and its location of attachment to the planar first member providing a visual appearance of a three-dimensional form portion of the simulated object, such that, in cooperation with the placement of the facade on the velocipede, said velocipede is made to simulate the appearance of said other ambulant object.

5,022,667
MULTIPLE CONFIGURATION SEATING DEVICE

Robert K. Gillson, P.O. Box 8, Pillager, Minn. 56473
Filed Oct. 11, 1989, Ser. No. 419,736
Int. Cl.⁵ A63G *17/00*
U.S. Cl. 280—1.188 20 Claims



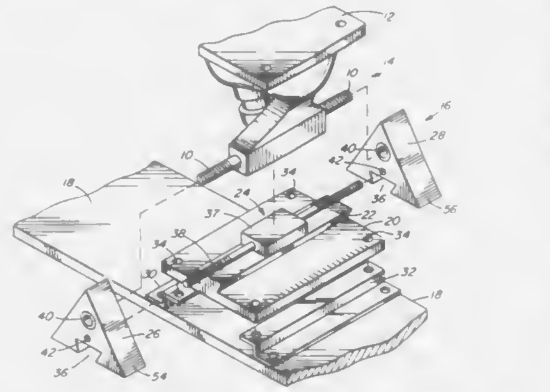
1. A multiple configuration seating device, comprising
(a) a seat having a width and a length:
(b) a base having a pair of elongate runners which are transversely spaced apart from each other;
(c) a pair of opposed sides on each runner, a first of said sides having ground contact means for supporting said seat in a fixed attitude, a second of said sides having a convex rocker surface for rocking support of said seat;
(d) pivot means pivotally connecting and securing said seat to said base for enabling said seat to be pivoted in between said runners and past one end of said base while said seat is secured to said base; and
(e) lock means for locking said seat in a first position facing said first runner sides for configuration of said device as a rocker, and in a second position facing said second runner sides for configuration of said device as a fixed attitude seat.

5,022,668
SKATEBOARD AXLE MOUNTING APPARATUS

Bradley T. Kenny, Box 1891, Mackenzie, B.C., Canada V0J 2C0, assignor to Bradley Thomas Kenny, Mackenzie, Canada
Filed Apr. 23, 1990, Ser. No. 512,922
Int. Cl.⁵ B62B *19/04*
U.S. Cl. 280—7.14 4 Claims

1. A skateboard axle mounting apparatus for attaching a ground engaging accessory to a skateboard axle comprising:

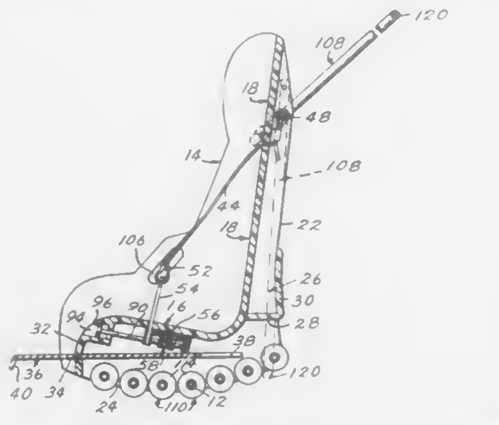
a planar base plate;
a guide block extending transversely across the width of said base plate, said guide block having an upper surface, a lower surface, and diverging walls extending from said lower surface to said upper surface, thereby providing said guide block with a dovetail-shaped cross-section, the lower surface of said guide block being secured to an upper surface of said base plate;
an anchor block attached to the upper surface of said guide block, said anchor block having an anchor stud extending transversely from opposite sides thereof;



a pair of vertical end plates, each end plate having an upper bore hole adapted to receive a respective end of said skateboard axle, a lower bore hole adapted to receive a respective end of said anchor stud, and a dove-tail shaped slot adapted to slidably receive a respective end of said guide block;
fastener means for releasably securing each end plate to a respective end of said skateboard axle and said anchor stud; and
mounting means for releasably securing a ground engaging accessory to said base plate.

5,022,669
CHILD TRAVEL SEAT

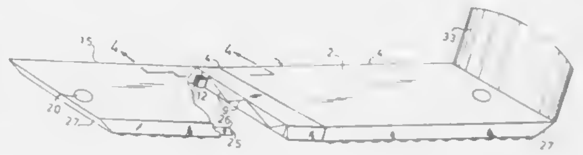
Preston Johnson, 73-418 Pinyon St., Palm Desert, Calif. 92260
Filed Jun. 26, 1990, Ser. No. 543,444
Int. Cl.⁵ B62B *7/12*
U.S. Cl. 280—30 18 Claims

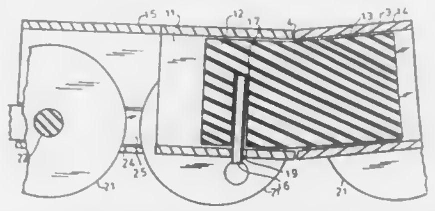


1. A child's travel seat selectively convertible to use as a stroller and comprising opposed vertical sides with forward and rear edge portions defining the front and rear of the travel seat, a seat portion extending rearwardly relative to the front of said travel seat, and a back portion extending upwardly from said seat portion, said seat and back portions extending between and mounted to said sides, said sides depending below said seat portion and terminating in lower edges, said sides below said seat portion defining a base, at least three wheel assemblies mounted within said base at a fixed height relative to said lower edges, said wheel assemblies each including at least one roller with a ground engageable periphery having a portion thereof below said lower edges, and handle means adjustably fixed to said sides upwardly spaced from said seat portion for movement between a collapsed position immediately adjacent said back portion, and an extended position projecting outwardly at an angle to said back portion, said wheel assemblies extending between and mounting to said opposed sides, said wheel assemblies being in parallel spaced lateral alignment with each other along an arc extending rearward relative to the front of said travel seat for an engagement of selected wheel means with a flat support surface upon a forward to rearward rocking of said travel seat, said side lower edges being convex and define low arcs, the engagement of said wheel assemblies with said opposed sides being at equal heights above said convex lower edges to define said arc of said laterally aligned wheel assemblies.

5,022,670
SEPARABLE CREEPER HAVING A NON-PLANAR SUPPORT SURFACE

James L. Cote, 645 Monte Pinet, RR 3 St., Calixte, P.Q. Jokizo, Canada, and Roy E. Bowling, 1355 Harlan St., Lakewood, Colo. 80214
Continuation-in-part of Ser. No. 209,180, Jun. 20, 1988, abandoned. This application Dec. 15, 1989, Ser. No. 456,443
Int. Cl.⁵ B25H *5/00*
U.S. Cl. 280—32.6 6 Claims





1. A rolling platform for supporting a user in a substantially horizontal position while providing rolling means for rolling over irregular surfaces while also providing means for maneuvering on a smooth surface with only four wheels in contact with said smooth surface, said platform comprising:
(a) a long narrow panel means having a longitudinal axis, a top and bottom for supporting a user's weight while supported at locations separated by a distance of at least fourteen inches, said panel means having two long sides parallel to said longitudinal axis and two short sides connected to said long sides, said short sides terminating in rigidly connected sloping ends wherein said top extends over said bottom to facilitate sliding over elevated surfaces;
(b) two rows of wheels, each of said rows of wheels rotatably connected to one of said long sides, with said wheels extending below said bottom, wherein said rows of wheels are comprised of a first portion of wheels aligned in a first plane and a second portion of wheels aligned in a second plane, said first plane and said second plane arranged at a first angle of less than 180 degrees to one another wherein said platform is supported by two wheels, one from each row, from said first portion and two wheels, one from

VOL
1127
ISS
2
JE
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1991
UMI

each row, from said second portion resting upon a plane surface for ease of maneuverability on said smooth surface said planes meeting at a line transverse to said longitudinal axis; and

(c) in which said first portion of wheels are attached to a first segment of said platform and said second portion of wheels are attached to a second segment of said platform and said first segment and said second segment are removably attached to one another by a joint means for ease of handling, wherein said top of said panel means is comprised of two planar surfaces abutting one another at said first angle.

5,022,671

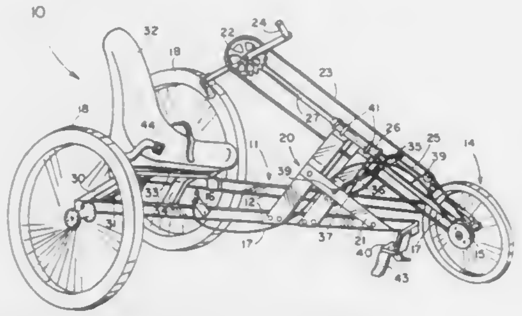
HAND PEDALLED TRICYCLE WITH IMPROVED STEERING

Allan B. Jones, Jr., 974 Pinson Blvd., Rockledge, Fla. 32955

Filed Jan. 25, 1990, Ser. No. 470,313

Int. Cl.^{5} B62K *21/10*

U.S. Cl. 280—250 **8 Claims**



1. A hand operated tricycle comprising:

an essentially horizontal frame;

a straight fork assembly rotatably mounted to a front end of said frame;

a front wheel supported by said fork assembly;

a hand crank mounted at an upper end of said fork assembly and operatively connected to said front wheel for propelling said tricycle, said hand crank also for rotating said fork assembly to steer said tricycle;

a pair of tension springs attached between said fork assembly and said frame for maintaining said fork assembly centered with respect to a longitudinal axis of said frame;

a cable attached across each of said tension springs for limiting the degree of rotation of said fork assembly; and

a rear axle attached at a rear end of same frame at right angles to said longitudinal axis, said axle supporting a wheel at each outer end thereof.

5,022,672

THEFTPROOF QUICK-RELEASE TYPE CLAMPING ASSEMBLY FOR MOUNTING BICYCLE PART

Mamoru Kawai, Matsumoto, Japan, assignor to Sansin Engineering, Inc., Nagano, Japan

Continuation of Ser. No. 337,044, Apr. 12, 1989, abandoned. This application Jul. 11, 1990, Ser. No. 550,818

Claims priority, application Japan, Apr. 27, 1988, 63-107065

Int. Cl.^{5} B62K *25/02*

U.S. Cl. 280—281.1 **4 Claims**

1. A theft proof quick-release type clamping assembly for mounting a bicycle part comprising:

a tie rod having one end screwed to an end nut, said rod being provided at the other end with an enlarged head which is formed with a cam hole extending therethrough transversely of said rod,

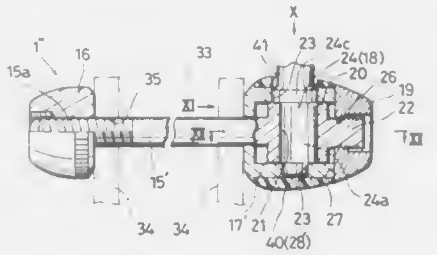
a hollow presser member fitted around said enlarged head and movable relative thereto axially of said rod toward and away from said and nut,

a lever mounted to said presser member and pivotable about a pivotal axis between a clamping position and a releasing position, said lever having a cam portion received within said cam hole and eccentric relative to said pivotal axis for moving said presser member by said cam portion relative to said enlarged head axially of said rod in response to pivotal movement of said lever,

lock means provided separately from said lever and operable for limiting axial movement of said presser member away from said end nut when said lever is pivoted to said clamping position, and

removal facilitating means for allowing removal of said lever from said presser member without using any tool when said lock means is operated to limit axial movement of said presser member away from said nut,

wherein said lever has a shaft portion formed with an annular flange rotatably fitted in a shaft receiving hole of said presser member, said removal facilitating means comprising an annular engaging member rotatably fitted around said presser member, said engaging member being formed with a lever passage opening which engages said flange of said shaft portion in one rotational position of said engaging member but allowing passage of said flange in another rotational position of said engaging member.



5,022,673

WHEEL SUSPENSION SYSTEM FOR AUTOMOBILES

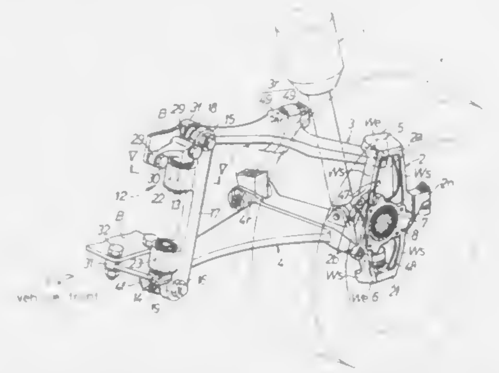
Yousuke Sekino, and Masaaki Minakawa, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 1, 1990, Ser. No. 473,527

Claims priority, application Japan, Feb. 3, 1989, 1-24915; Jun. 5, 1989, 1-142579

Int. Cl.^{5} B60G *7/00*

U.S. Cl. 280—673 **7 Claims**



1. A wheel suspension system for automobiles comprising:

a control arm having a pair of front and rear inner ends and an outer end which is connected to a knuckle rotatably supporting a wheel, the inner ends being pivotally mounted to a vehicle body, wherein at least one of the inner ends of the control arm is comprised of bifurcated arms arranged longitudinally of the vehicle body, one of said bifurcated arms being rectilinearly integrally connected with the other inner end through a connection, and a bolt for supporting the bifurcated arms at opposite ends being carried at a middle portion thereof on the vehicle body through a rubber bush.

5,022,674

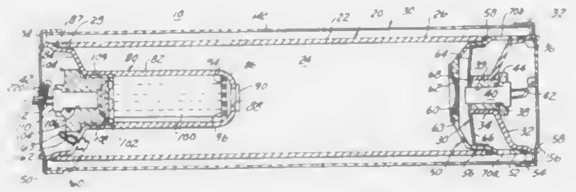
DUAL PYROTECHNIC HYBRID INFLATOR

Richard L. Frantom, Richmond; Robert J. Bishop, Washington; Robert Kremer; Klaus Ocker, both of Fraser, all of Mich.; Roy Brown, Hot Springs, Ark.; James Rose, Fairfax, Va.; Donald Renfroe, Haymarket, Va., and Teresa Bazel, Annandale, Va., assignors to Bendix Atlantic Inflator Company, Troy, Mich.

Filed Apr. 5, 1990, Ser. No. 505,289

Int. Cl.^{5} B60R *21/26*

U.S. Cl. 280—741 **17 Claims**



1. An inflator for an air cushion or bag comprising:

a hollow, cylindrical sleeve having first and second ends;

first means for enclosing the first end of the sleeve;

second means for enclosing the second end (28) of the sleeve, the sleeve, and first and second means comprising a pressure vessel for storing a quantity of pressurized inert gas used to inflate the air bag;

the first means comprises an initiator housing assembly comprising a manifold adapted to be secured to the sleeve at the first end including a flat edge first orifice, a first frangible member comprising a first rupturable disk secured about the first orifice, wherein one side of the disk is exposed to the stored gas; the manifold further including first flow control means, positioned remote from the pressure vessel for regulating the flow of inflation gas as it exits the pressure vessel and a pyrotechnic first actuator means for breaking the first frangible member wherein the initiator housing assembly, includes an initiator housing secured to the manifold assembly remote from the gas in the pressure vessel, the initiator housing comprises a hollow, necked-down portion, the first actuator means is removably received in the housing and closely spaced to the disk so that upon activation of the pyrotechnic actuator means the disk is ruptured by a shock wave to initiate flow of the inflation gas through the first orifice and first flow control means.

5,022,675

AIR BAG AND FOLDING TECHNIQUE

Daniel G. Zelenak, Jr., Rochester, and Michael J. Watson, Clarkston, both of Mich., assignors to Allied-Signal Inc., Morristown, N.J.

Filed Nov. 30, 1989, Ser. No. 444,068

Int. Cl.^{5} B60R *21/16*

U.S. Cl. 280—743 **14 Claims**

1. Method of folding an air bag (20) having a main panel **20** defining a top (26),front (24), and bottom (28) portions and side panels **44***a*, *b*) the top and bottom portions defining a neck **30** narrower than the front portion; comprising the steps of:

1.1 laying bag with bottom portion (28) of main panel (22) flat and as fully extended as possible;

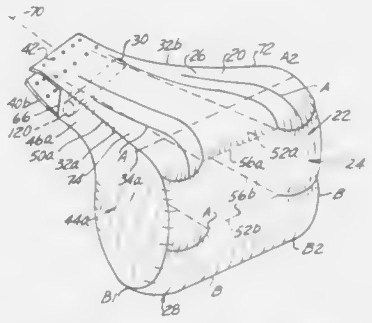
1.2 flattening the front portion (24) of the main panel (20) to over the flattened bottom portion to form a first lateral extending fold (80) between the bottom (28) and front portions (24) of the bag;

1.3 maintaining a portion of the front panel (24), proximate the bottom panel (28), relatively flat and folding over the front portion proximate the top portion to define a second lateral fold (82) between a top portion and the front portion with the top portion flattened and extended as fully as possible,

1.4 aligning edges (86) of opposing top and bottom portions;

1.5 placing bag material towards a centerline (70) of bag to form on each side of the bag (20) first (90) and second (92) exterior fore-aft folds and a first interior fold (94);

1.6 moving the first interior fold out to the aligned edges, between the first and second fore-aft folds, to form a third fore-aft fold (94');



1.7 defining on the top (26) and bottom (28) portions of the air bag (20) respective sets of top and bottom fold lines (100*a*,*b*), the lateral spacing being approximately equal in dimension to the neck portion (30);

1.8 moving the first, second and third fore-aft folds and associated air bag material, toward the bag centerline and placing same between and aligned with a respective set of top and bottom fold lines forming a top fold (102) and bottom fold (104).

5,022,676

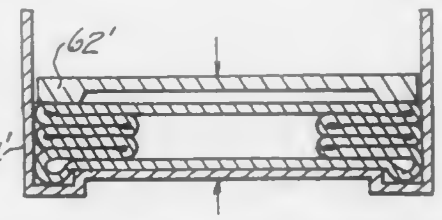
AIR BAG ASSEMBLY AND METHOD THEREFOR

William E. Rogerson, and Sean P. Donovan, both of Rochester Hills, Mich., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jan. 25, 1990, Ser. No. 471,247

Int. Cl.^{5} B60R *21/20*

U.S. Cl. 280—743 **22 Claims**



1. An air bag or cushion (60), comprising flexible material, defining a first volume when inflated by inflation gas, a second volume when in a non-inflated initially folded configuration having at least two proximately positioned folds in the material, and a folded, non-inflated reduced volume configuration, the reduced volume configuration achieved by loading the initially folded configuration to simultaneously compress the at least two folds.

5,022,677

MOTOR VEHICLE SEAT FEATURING TWO SEAT BELTS

Roberto Barbiero, Formegine, Italy, assignor to Ferrari S.P.A. Esercizio Fabbriche Automobile E, Modena, Italy

Filed Dec. 22, 1989, Ser. No. 454,965

Claims priority, application Italy, Dec. 23, 1988, 53642 B/88

Int. Cl.^{5} B60R *22/06*

U.S. Cl. 280—801 **2 Claims**

1. A motor vehicle seat having an inner side and an outer side, said vehicle seat including a seat portion (1) securable to

VOL
1127
ISS
2
JE
11
1991
UMI

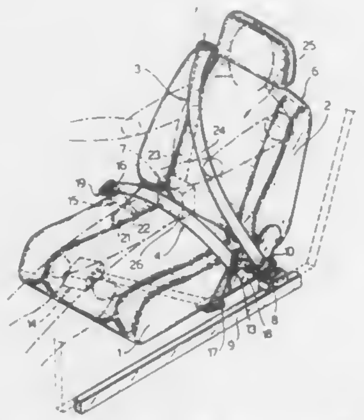
inner and outer side plates (18, 21) and having an underneath surface, and a seatback (2) adjustably mounted on said seat portion (1), said seatback (2) having a top portion (6) and a rear surface, said vehicle seat being mountable with said outer side adjacent a longitudinal bottom rail (9), said vehicle seat being fitted with a two seat belt system, comprising in combination:

(a) a first eyelet (5) secured to said top portion (6) on said inner side;

(b) a first winding device (7) carried by said seatback (2) secured to said rear surface on said inner side;

(c) a shoulder belt (3) slidable through said first eyelet (5), said shoulder belt (3) having one end connected to said first winding device (7), and partially wound by said first winding device (7);

(d) a carriage (8) securable to the other end (10) of said shoulder belt (3) and automatically movable lengthwise along said rail (9) between a forward position and a rearward position;



(e) a second winding device (14) carried by said seat portion (1) secured to said underneath surface, a second eyelet (13) carried by the outer one (18) of said side plates (18, 21);

(f) a third eyelet (17) secured to an outer edge of said underneath surface;

(g) a lap belt (4) sliding through said second and third eyelets (13, 17), said lap belt (4) having one end connected to said second winding device (14), said lap belt (4) being partially wound by said second winding device (14), the other end (16) of said lap belt (4) being provided with a connecting and locking member (20); and

(h) retaining means secured to the inner one (21) of said side plates (18, 21) and said retaining means including a housing for connecting and locking said member (20) when inserted therein.

5,022,678

SKI SLEEVE

Timothy N. Mayfield, 4605 SW. 54th Pl., Portland, Oreg. 97221
Continuation of Ser. No. 310,694, Feb. 15, 1989, abandoned.
This application Jul. 16, 1990, Ser. No. 552,349
Int. Cl.^{5} A63C *11/02*
U.S. Cl. 280—815 **4 Claims**

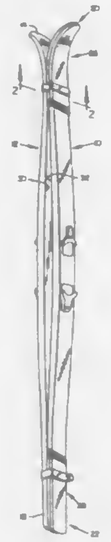
1. A pair of ski sleeves for removably connecting together a first ski and a second ski and protecting their respective bottom surfaces from damage, comprising:

a first hollow, flexible, elongate sleeve body for closely receiving an uptuned forward end of the first ski, including an open end sized to fit over the upturned forward end of the first ski and a closed end opposite the open end, and which, when fitted over the first ski with the forward end inserted into the sleeve abutting the closed sleeve end, encloses a forward portion of the first ski thereby covering a portion of the first ski bottom surface which would otherwise contact a second ski bottom surface when the skis are positioned with their bottom surfaces adjacent parallel, and facing each other;

a first elongated strap, joined at one end to the first sleeve body with the other end defining a free end, the strap stretchable to a length sufficient to extend around the second adjacent and parallel ski and overlap the first sleeve by a predetermined distance;

means for removably attaching the free end of the first strap to the first sleeve body to connect the first and second skis together;

a second hollow, flexible, elongate sleeve body for closely receiving a rearward end of the first ski, including an open end sized to fit over the rearward end of the first ski and a closed end opposite the open end, and which, when fitted with the rearward end inserted into the sleeve abutting the closed sleeve end, enclose a forward portion of the first ski thereby covering a portion of the first ski bottom surface which would otherwise contact the bottom surface of the second ski when the skis are positioned with their bottom surfaces adjacent, parallel and facing each other;



a second elongated strap, joined at one end to the second sleeve body with the other end defining a free end, the second strap stretchable to a length sufficient to extend around the second adjacent and parallel ski and overlap the second sleeve by a predetermined distance;

means for removably attaching the free end of the second strap to the second sleeve body to connect the first and second skis together;

the first and second sleeves sized so that, in use, a central portion of the first ski remains uncovered; and

the first and second ski sleeves fittable over said respective end portions of only the first ski so that the second ski remains substantially uncovered.

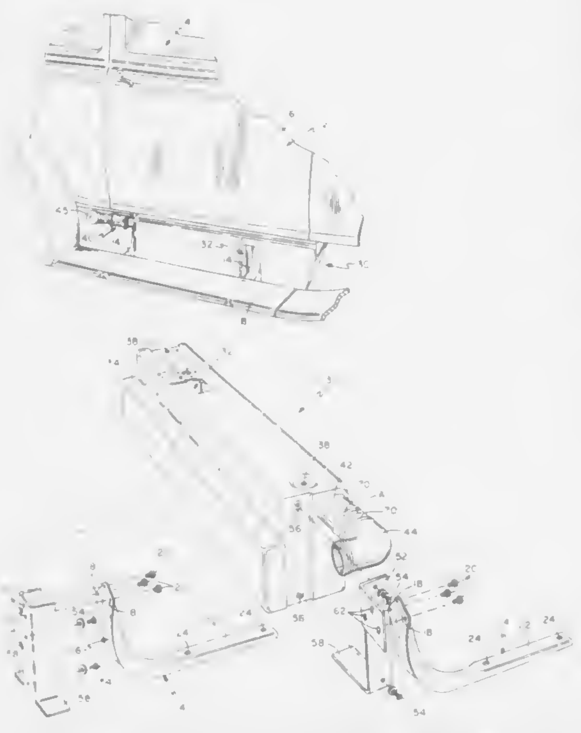
5,022,679

VEHICLE GAS TANK

John A. Pazik, 5333 Perry Ave. North, Minneapolis, Minn. 55429
Filed May 31, 1990, Ser. No. 531,124
Int. Cl.^{5} B60P *7/06;* B60R *3/00*
U.S. Cl. 280—833 **17 Claims**

1. An improved saddle tank for a vehicle having a running board secured to a frame member of the vehicle by at least one running board bracket, wherein the running board bracket is generally L-shaped having a generally vertical leg secured to the frame member and a generally horizontal leg on top of which the running board is carried, which comprises:

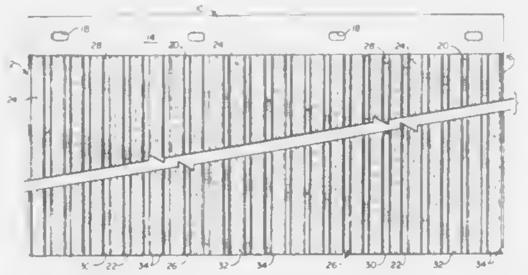
attachment means on the saddle tank cooperable with the running board bracket for clamping the saddle tank between the frame member and the generally vertical leg of the running board bracket to hold the saddle tank in place on the frame member with the running board bracket attached to the frame member.



5,022,680

SPRAY-SUPPRESSANT SPLASH GUARD FOR VEHICLES

Louis E. Eklund, Jr., Muskegon, Mich., assignor to Fleet Engineers, Inc., Muskegon, Mich.
Continuation of Ser. No. 394,630, Aug. 16, 1989, abandoned, which is a continuation of Ser. No. 108,793, Oct. 16, 1987, abandoned. This application Nov. 26, 1990, Ser. No. 617,941
Int. Cl.^{5} B62B *9/14*
U.S. Cl. 280—851 5 Claims

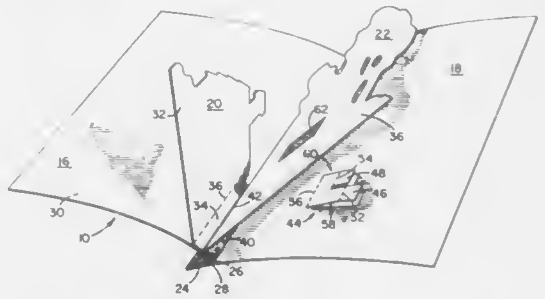


1. In a splash guard for deflecting spray thrown by a wheel of a vehicle, the splash guard comprising a panel having a splash surface and a plurality of parallel elongate ribs, each of the ribs projecting outwardly from the splash surface to terminate in a distal edge spaced from the splash surface, the panel being adapted to depend from a body of a vehicle in a position whereby the splash surface will confront a rearward portion of a wheel of the vehicle and the ribs will be vertically oriented with the distal edges of the ribs spaced from the rearward wheel portion, the improvement wherein each of at least a plurality of the ribs is provided with a pair of elongate baffles equal in width and extending oppositely from the distal edge of said rib and toward the splash surface, each of the baffles having an inner surface confronting the spray surface and an outer surface opposite the inner surface, the baffles extending from alternate ones of the plurality of ribs being narrower in width that the baffles extending from the others of the plurality of ribs, whereby spray thrown by a wheel of a vehicle and striking the outer surface of the baffles will be directed toward the splash surface, and a portion of spray thrown by a wheel of a vehicle and rebounding from the splash surface will strike the inner surface of the baffles.

5,022,681

PAPER POP-UP DEVICES AND METHOD OF MAKING THE SAME

Ib Penick, Palatine, Ill., assignor to Christopher Crowell, Old Lyme, Conn.
Filed Sep. 21, 1989, Ser. No. 410,358
Int. Cl.^{5} A63H *33/38;* B42D *1/00*
U.S. Cl. 281—15.11 22 Claims



1. A pop-up device comprising:

(A) a base piece which includes a front cover and a back cover, each having a lateral edge which lies generally along a common line along which said covers can be folded between an open position and a closed superimposed position;

(B) a plurality of pop-up elements, each hingedly attached to said front cover along a hinge line spaced away from said common line, at least one of said pop-up elements having means forming a feedthrough aperture therein extending therethrough; and

(C) tab means for spacing said pop-up elements from one another and from said back cover when said front cover and said back cover are in said open position, said tab means having a first portion attaching between said back cover and one of said pop-up elements, and having a second portion extending through said at least one feedthrough aperture and attaching between said back cover and the remainder of said pop-up elements.

5,022,682

BOOK WITH TRANSPARENT PAGES WITH MIRRORED IMAGES ON FRONT AND BACK

Betsy J. Desmond, 39 Bartlett St., Apt. 5, Beverly Farms, Mass. 01915
Filed Sep. 25, 1990, Ser. No. 587,986
Int. Cl.^{5} B42D *5/00*
U.S. Cl. 281—38 5 Claims

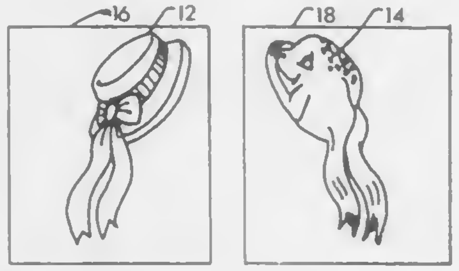
1. An illustrated book comprising:

a plurality of opaque sheets with illustrations thereon;

at least one transparent sheet positioned between two of said plurality of opaque sheets, said transparent sheet including illustrations on each face of said transparent sheet, said

VOL
1127
ISS
2
JE
11
1991
UMI

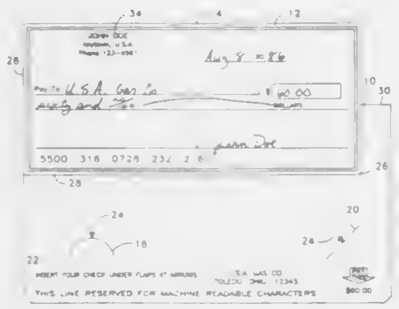
illustration on a front face of said transparent sheet being of a size and shape that is in register with the size and



shape of said illustration on a rear face of said transparent sheet.

5,022,683
CHECK INSERT AND ENVELOPE

William P. Barbour, 8021 Nicky Crt., Laurel, Md. 20707
Filed Sep. 26, 1989, Ser. No. 412,512
Int. Cl.⁵ B42D *15/00*
U.S. Cl. 283—58 **11 Claims**



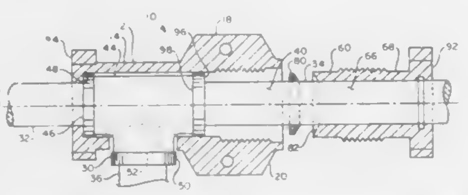
1. A remittance containing envelope having a personal check preprinted with address identification information and a bill on an unfolded single sheet adapted for automated processing, a dimension of the bill in at least one direction being larger than the corresponding dimension of the check and the two dimensions of the bill being substantially equal to the corresponding dimensions of the envelope;

said envelope containing a window at a location where a return address is positioned;

means for affixing said check on said bill so that when the bill and check are properly inserted in the envelope, the address identification information on the check is visible through said window as a return address for the envelope.

5,022,684
BNB CLAMP

James F. Eagon, 19802 Mero Rd., Snohomish, Wash. 98290
Filed Apr. 30, 1990, Ser. No. 516,684
Int. Cl.⁵ F16L *25/00*
U.S. Cl. 285—12 **10 Claims**



1. A clamp for sealing leaks occurring between a pipe and a flanged tee pipe fitting having a branch leg or the like comprising: a body longitudinally divided into two portions and having a cavity adapted to at least partially enclose the pipe fitting, the cavity including opposing entrances, an aperture intermediate the entrances adapted to permit extension of the branch leg therethrough an internally threaded section;

means for joining the two body portions about the fitting;

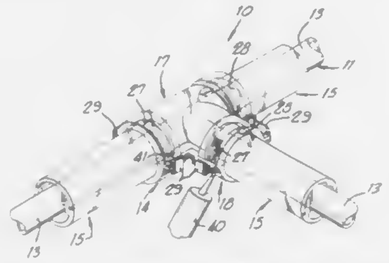
means connected to the body for retaining the fitting;

packing means; and

a bolt longitudinally divided into two portions and adapted to engage the threaded section of the cavity for compressing the packing means against the flange.

5,022,685
SECONDARY CONTAINMENT SYSTEM AND METHOD

Hal Stiskin, 19400 Cypress Point Dr., Northridge, Calif. 91326; Joseph M. Hogan, 30715 Lindsay Canyon Dr., and Thomas A. Jones, 26847 Chuckwagon Pl., both of Canyon Country, Calif. 91351
Filed Aug. 21, 1989, Ser. No. 396,222
Int. Cl.⁵ F16L *55/00*
U.S. Cl. 285—45 **66 Claims**



36. For use in a secondary containment system for a primary pipe system, in combination with secondary containment joints having pipe sockets of generally circular cross-sectional shape, a secondary containment pipe comprising two side-by-side pipe elements fitted together on opposite sides of a central dividing plane and each having:

an elongated body of generally semi-circular cross-sectional shape with two side edges extending along said plane and abutting against the side edges of the other pipe element,

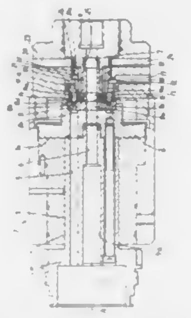
latching means including interfitting tongue-and-groove elements along the edges of said pipe elements, sized and shaped for a snap-latching fit for latching said pipe elements together,

means defining a continuous sealing passage between opposed surfaces of said pipe elements along each pair of abutting edges, and injection port means to receive adhesive sealing cement for filling said sealing passages to seal the interior of the pipe and adhesively secure said pipe elements together.

5,022,686
ROTATING UNION FOR TWO DIFFERENT FLUIDS

Helmut Heel, Lengenwang; Karl Bauch, Kempten; Bartholomäus Reisacher, Untrasried, and Stefan Wörner, Kempten, all of Fed. Rep. of Germany, assignors to Ott Maschinentechnik GmbH, Kempten, Fed. Rep. of Germany
Filed Nov. 2, 1989, Ser. No. 430,737
Claims priority, application Fed. Rep. of Germany, Nov. 11, 1988, 3838303
Int. Cl.⁵ F16L *39/04*
U.S. Cl. 285—134 **9 Claims**

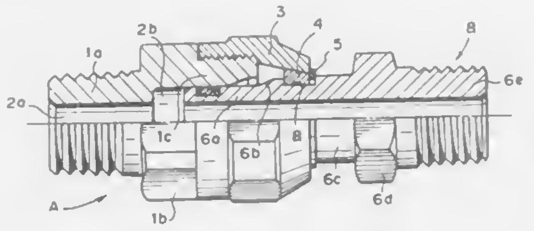
1. In a rotating union for first and second different fluids, which rotary union includes a stationary housing having a hollow shaft mounted rotatably therein and comprising a central throughflow channel therein for the first fluid and at least one second throughflow channel parallel thereto for the second fluid, two separate inlet channels in the housing being provided for the first and second fluids and a slide ring packing assembly provided between the inlet channels and the hollow shaft and arranged coaxially with an axis of rotation of the hollow shaft and through which the first and second fluids are supplied separately to the throughflow channels, the slide ring packing assembly including a common slide ring for conducting the first and second fluids which is connected at an interface with the inner end of the hollow shaft and comprises a central bore and several axial passages arranged in a circle concentric to the axis of rotation, and a central slide ring in the housing, as well as a concentric slide ring concentrically surrounding the central slide ring, each being held non-relatively rotatably in concentric piston-like slide ring supports and axially displaceable in associated cylinder chambers in the housing, and the respective opposing sliding surfaces are biased axially together independently of each other under spring pressure and the pressure of the respective fluid, the improvement wherein the concentric slide ring comprises several axial passages which are arranged in a circle concentric to the axis



of rotation and connected to an inlet channel for the second fluid via a cylinder chamber for an outer one of the slide ring supports carrying the concentric slide ring, wherein at least one of the common slide ring and the concentric slide ring in the region of the axial passages in the respective sliding surface is provided with an annular groove connecting the axial passages to each other, wherein between the outer circumference of the central slide ring and the inner circumference of the concentric slide ring there is provided an annular chamber extending as far as the sliding surface on the common slide ring, wherein the housing further includes a third cylinder chamber in which is reciprocally slidably mounted an annular piston, wherein the annular chamber communicates with the third cylinder chamber, and wherein in the housing are provided a third inlet channel and an outlet channel which communicate with the third cylinder chamber.

5,022,687
PIPE COUPLING

Toshiki Ariga, Kawasaki, Japan, assignor to Yokohama Aeroquip Corporation, Tokyo, Japan
Filed Sep. 18, 1989, Ser. No. 408,244
Int. Cl.⁵ F16L *39/00*
U.S. Cl. 285—321 **2 Claims**



1. A pipe coupling comprising:

a female coupling member having an inner end face and including an axial bore extending therethrough, the axial bore having an enlarged bore portion extending axially from the inner end face of the female coupling member and having an inner tapered surface adjacent to the end face,

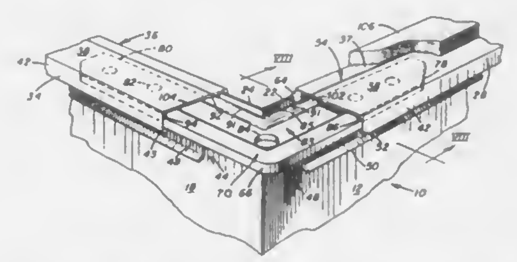
a cap-like retainer removably mounted on the female coupling member and having an inner tapered converging surface and an end face,

an elastic split cotter ring disposed within a space defined by the inner tapered surface of the cap-like retainer and having an outer tapered surface complementary to a portion of the inner tapered surface of the retainer, and

a male coupling member including a cylindrical portion complementary to and adapted to fit into the enlarged bore portion of the female coupling member, the cylindrical portion having an enlarged diameter portion, an outer tapered surface on the cylindrical portion of the male coupling member and complementary to the inner tapered surface of the enlarged bore portion for engaging and expanding the cotter ring when the cylindrical portion of the male coupling member is inserted through the cap-like retainer into the enlarged bore portion of the female coupling member, and an annular groove having a bottom surface formed in the enlarged diameter portion adjacent the outer tapered surface for receiving the cotter ring when it rides past the outer tapered surface, the cotter ring being moved relative to the cap-like retainer so as to bring its outer tapered surface into tight engagement with the inner tapered surface of the cap-like retainer so that said cotter ring is wedged between said bottom surface of said groove and said inner tapered surface when the male coupling member is pulled back.

5,022,688
FLANGE TYPE DUCT JOINT ASSEMBLY AND SEAL ARRANGEMENT THEREFOR

Peter J. Arnoldt, Puce, Canada, assignor to Ductmate Industries, Inc., Monongahela, Pa.
Continuation of Ser. No. 232,627, Aug. 11, 1988, abandoned, Ser. No. 46,460, May 4, 1987, abandoned, Ser. No. 682,091, Dec. 17, 1984, Pat. No. 4,662,661, and Ser. No. 327,934, Dec. 7, 1981, Pat. No. 4,508,376, which is a continuation of Ser. No. 933,179, Aug. 14, 1978, abandoned, which is a continuation-in-part of Ser. No. 872,644, Jan. 26, 1978, Pat. No. 4,218,079. This application Aug. 10, 1989, Ser. No. 392,076
Int. Cl.⁵ F16L *23/00*
U.S. Cl. 285—363 **6 Claims**



1. A corner piece for connecting a pair of duct connecting flange members comprising,

a corner section with a pair of legs extending angularly therefrom,

said corner section having a front surface portion and a corner portion,

said legs arranged to extend into said duct connecting flange members to form a generally rectangular duct frame for connection to a duct end portion, and

corner means associated with said corner section at said corner portion, said corner means having a front surface displaced rearwardly from said corner section front surface for permitting a corner edge portion of the duct end portion positioned between the end portions of adjacent duct connecting flange members to extend beyond said front surface of said corner means into abutting relation with a unitary continuous external gasket means having a uniform thickness that extends around the periphery of said duct connecting flange members and by said uniform thickness seals said duct connecting flange members and

VOL
1127

ISS
2

JE
11

1991

UMI

also the corner edge portions of the duct, said unitary continuous external gasket means forming the only seal for the corner edge portions of the duct extending beyond said front surface of said corner means.

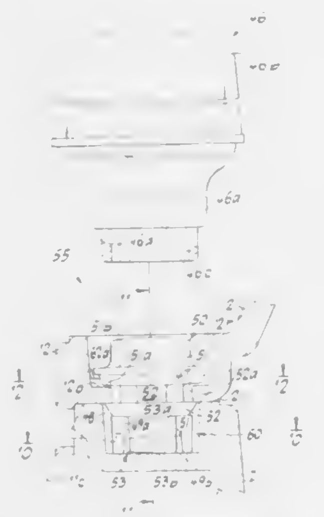
5,022,689
SUSPENDABLE HINGED LOCKABLE LID STORAGE BOX

Thomas F. Perdue, Jr., Crystal Lake; Jeffrey D. Bransky, Claredon Hills; William S. Carvell, Mount Prospect; David E. Dettloff, Skokie; Duane K. Ischay, and Kenneth H. Oberg, both of Barrington, all of Ill., assignors to Acco World Corporation, Wheeling, Ill.

Division of Ser. No. 331,408, Mar. 31, 1989, Pat. No. 4,976,373. This application Oct. 11, 1990, Ser. No. 595,510

Int. Cl.^{5} E05C *19/06*

U.S. Cl. 292—19 2 Claims



1. A key lockable arrangement for locking a first member abbutingly to a second member including a turnable lock cylinder and a key comprising

- cylinder button means mounted in the first member for turning movement therein said cylinder button means including an upper portion which is key-turnable and a lower portion which has flexible lock elements;
- a configured housing in the second member to receive said flexible lock elements in unflexed position when the first and second members are in abutting relationship and key means to flex the flexible lock elements when the cylinder button means is partially turned and to receive the flexible elements in a second unflexed position upon further turning of the button means;

whereby the button means tends to stay in either of the two unflexed positions until turned using the key to move the element through the flexed position.

5,022,690
QUICK RELEASE LATCH MECHANISM

George E. Coltrin, Rowland Heights, and Siamak Ilami, Santa Ana, both of Calif., assignors to Adams & Coltrin, Inc., City of Industry, Calif.

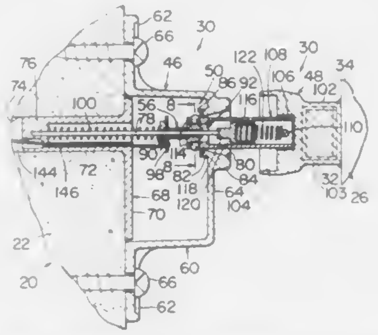
Filed Sep. 18, 1989, Ser. No. 408,687

Int. Cl.^{5} E05C *1/14*

U.S. Cl. 292—21 27 Claims

1. A latch comprising:

- first and second latch parts movable relative to one another between engaged and disengaged positions, and
- coacting latch means on said parts for releasibly locking said parts in said engaged positions including a latch member on one part having a locking position wherein said parts are locked against disengagement and movable in one direction from said locking position to a first unlocking position and in the opposite direction from said locking position to a second unlocking position, and locking means on the other part which are positionable by said latch member in a first position wherein said locking means are engagable with said one part to lock said parts against disengagement by movement of said latch member to said locking position when said parts occupy said engaged positions and are released for movement to a second position wherein said parts are released for disengagement upon movement of said latch member to either unlocking position.



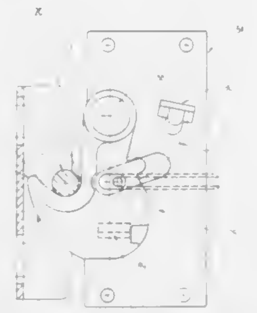
5,022,691
SIDE LOCK FOR A ROLL-UP DOOR

Roy T. Clay, Jr., Snyder, N.Y., assignor to Whiting Roll-Up Door Mfg. Corp., Akron, N.Y.

Filed Aug. 17, 1990, Ser. No. 570,150

Int. Cl.^{5} E05C *19/10*

U.S. Cl. 292—121 11 Claims



1. A side lock for a roll-up door mounted on a body to selectively close an opening, said body having a jamb on either side of said opening, said door having a pair of inverted L-shaped tracks mounted on said jambs in transversely-spaced facing relation to one another, said door having a plurality of panels mounted for guided articulated movement along said tracks between a vertically-disposed position closing said opening and an overhead substantially-horizontal out-of-the-way position permitting access to said body through said opening, said side lock comprising:

- a keeper mounted one of said jambs, said keeper having a catch arranged in spaced relation to said jamb; and
- a hook member pivotally mounted on one of said panels for selective engagement with said catch, said hook member having a leg portion extending away from said pivotal axis and having a hook portion extending away from said leg portion and terminating in a tip, said hook member being biased to rotate relative to said one panel about said pivotal axis in one angular direction such that said leg portion is continuously urged to move toward said catch, said hook portion having a lower cam surface adapted to engage said catch when said door is moved toward said closed position for causing said hook member to rotate about said axis in the opposite angular direction to permit said tip to pass beneath said catch, said hook portion having an upper cam surface arranged to engage said catch surface after said tip portion has passed beneath said catch, said hook member also having a concave surface arranged between said upper cam surface and said leg portion, said upper cam surface and said concave surface being so dimensioned and configured that said catch will be urged to move toward said concave surface during relative vibratory motion between said jamb and panel when said upper cam surface engages said catch.

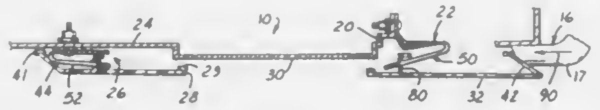
5,022,692
SPRING MOUNTED MOLDING FOR A VEHICLE

John Horansky, Troy, and Thomas J. Butkovich, Southfield, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed May 29, 1990, Ser. No. 451,701

Int. Cl.^{5} B60R *19/42*

U.S. Cl. 293—128 5 Claims



1. In a spring mounted molding for a vehicle having a body with a forward end and a rearward end, a bumper mounted on one of the forward and rearward ends thereof, energy absorbing structure mounting the bumper to the vehicle, said energy absorbing structure biasing the bumper to a normal position but permitting movement of the bumper towards the vehicle upon impact, said bumper having an end portion extending around a side of the vehicle body, said spring mounted molding comprising a relatively rigid element having an underside and an exterior side, spring means on the underside of the molding, said spring means being connected between the molding and the vehicle with the molding lying on an exterior of the vehicle body in alignment with, and adjacent to, said bumper end portion, said spring means biasing the molding closely adjacent to the vehicle body, the molding having a camming surface adjacent to the bumper end portion, the bumper end portion having a mating camming surface adapted to contact the molding camming surface and to move to the underside of the molding when the bumper is moved towards the vehicle upon impact, with said molding moving away from the vehicle body against the action of said spring means, said spring means being effective to bias the molding back to an original position thereof upon retraction of the bumper end portion, said spring means being fixedly anchored to one of the vehicle and the molding and slidably anchored to the other of the vehicle and the molding, said spring means comprising a pair of spring mechanisms, one of said spring mechanisms being positioned remotely from said bumper end portion and being fixedly anchored to both the vehicle and molding, the other of said spring mechanism being positioned between said one spring mechanism and the bumper end portion, said other of said spring mechanisms being fixedly anchored to the vehicle and slidably anchored to the molding, the improvement comprising said other spring mechanism including a wall member provided on the underside of the molding, the wall member having a slot therein, and a substantially U-shaped flat spring member having two free ends with one free end fixedly anchored to the vehicle and the other free end extending through said slot in slidable relationship therewith to provide said slidable anchor.

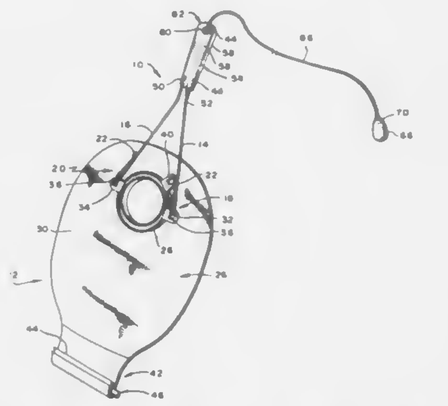
5,022,693
OSTOMY BAG HOLDER

Kenneth L. Loveless, Spring Hill, Fla., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Dec. 14, 1989, Ser. No. 450,823

Int. Cl.^{5} A61M *27/00;* **A47K** *17/00*

U.S. Cl. 294—1.1 8 Claims



1. An ostomy bag holder which is usable to hold and to manipulate an ostomy bag which has a mouth rim with spaced apertured tabs, said ostomy bag holder comprising:

- a handle having first and second spaced ends;
- first and second spaced arms each having first and second ends, said first ends of said first and second spaced arms being secured to said first end of said handle;
- means at said end of each of said first and second spaced arms to engage an apertured tab of a mouth rim of an ostomy bag; and
- an elongated tether line secured at a first end to said second end of said ostomy bag holder handle and extendable away from said second end of said handle.

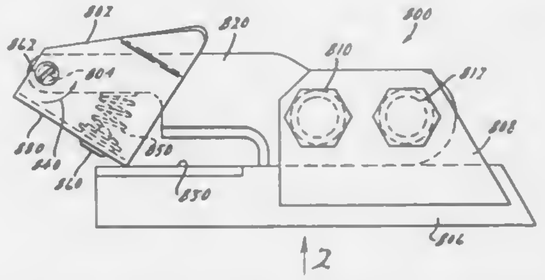
5,022,694
SAFETY LINE LATCH FOR USE WITH TOWING SYSTEMS

Ted D. Thomison, Flintstone, Ga., assignor to Century Wrecker Corporation, Ooltewah, Tenn.

Continuation of Ser. No. 312,528, Feb. 21, 1989, abandoned. This application Aug. 10, 1990, Ser. No. 565,907

Int. Cl.^{5} B66C *1/36*

U.S. Cl. 294—82.2 4 Claims



1. A latching mechanism for securely holding a safety chain in place, the latching mechanism comprising:

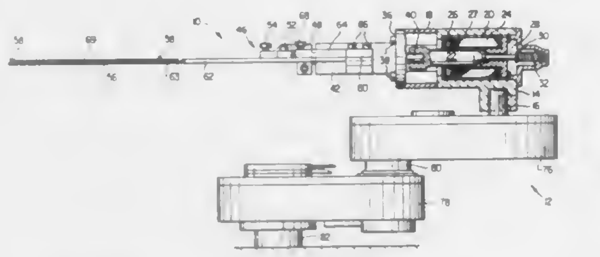
- a base member, said base member having a slot therein, said slot being open at one end,
- a retainer member attached to said base member and being movable between a first position covering said open one end of said slot and a second position allowing access to said slot,
- said base member comprising two portions, a first portion attached to said retainer member, and a second portion releasably fastened to the first portion,

VOL
1127
ISS
2
JE
11
1991
UMI

whereby when said retainer member is in said first position the chain is securely held in said slot, and when said retainer member is in said second position the chain is removable from said slot, and
whereby when the two portions are released from one another, the chain is removable from said slot without movement of said retainer member.

5,022,695
SEMICONDUCTOR SLICE HOLDER

Joe W. Ayers, Sherman, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Continuation of Ser. No. 304,009, Jan. 30, 1989, abandoned, which is a continuation of Ser. No. 89,205, Aug. 25, 1987, abandoned. This application Oct. 24, 1989, Ser. No. 426,515
Int. Cl.⁵ B25J *9/00, 15/02*
U.S. Cl. 294—88 **14 Claims**

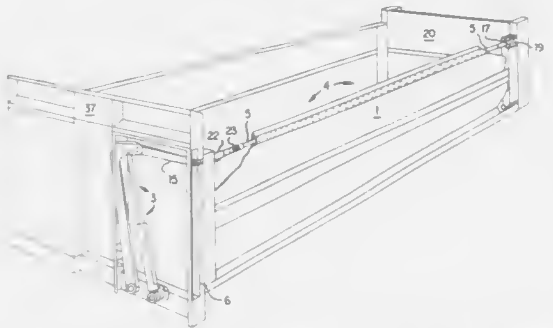


1. Apparatus for holding a semiconductor slice during processing, comprising:
(a) a plurality of tines including a movable center tine and fixed tines on opposite sides of said center tine, each said tine having an end portion and said center tine having an upper surface and a recessed portion on said upper surface extending immediately below the slice;
(b) plural holding pins, one said holding pins secured to an end portion of each of said tines, one of said holding pins being offset from a line passing through the other of said holding pins for holding said slice against movement relative to said holding pins;
(c) an electrically activatable magnetic coil, and
(d) a plunger within said magnetic coil coupled to said center tine, said magnetic coil being electrically activatable to move said plunger axially of said magnetic coil, and
(e) means responsive to the instantaneous axial position of said plunger to control said magnetic coil and cause said plunger to stop at a predetermined location.

5,022,696
SIDEBOARD CONTROL MECHANISM

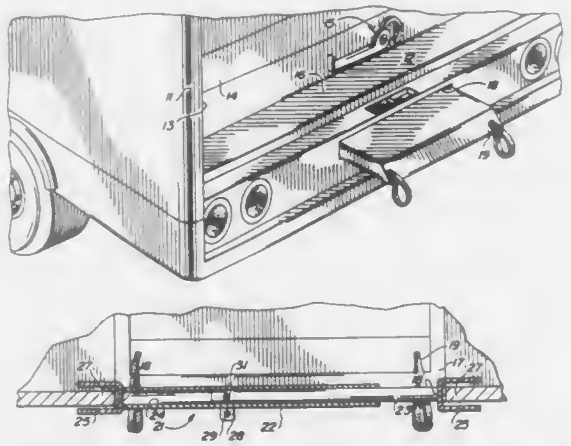
Jan Moller, Birkedalen 34, DK-2670 Greve Strand, Denmark
PCT No. PCT/DK87/00154, § 371 Date Oct. 16, 1989, § 102(e) Date Oct. 16, 1989, PCT Pub. No. WO89/05749, PCT Pub. Date Jun. 29, 1989
PCT Filed Dec. 14, 1987, Ser. No. 382,643
Int. Cl.⁵ B62D *27/00*
U.S. Cl. 296—36 **8 Claims**

1. A mechanism for locking and actuating a vehicle sideboard or the like relative to a vehicle floor, said sideboard having a pair of opposed ends and being pivotably supported about an axis generally in plane alignment with the vehicle floor, said mechanism comprising
(a) a sole actuating mechanism for pivoting said sideboard between a closed position and an open position, said actuating mechanism being fixed relative to said vehicle floor adjacent to one end only of the pivoted sideboard and having a first actuating member connected to said one end of the pivoted sideboard at a point distant from said axis, and
(b) a locking mechanism which retains the pivoted sideboard in the closed position by locking it at both ends relative to said vehicle floor, said locking mechanism comprising transmission means operatively connected to said sole actuating mechanism for producing locking and unlocking movements and for transmitting locking and unlocking movements thus produced from said one end of the pivoted sideboard to the opposite end of the pivoted sideboard.



5,022,697
TRUCK RAMP ANTI-THEFT SYSTEM

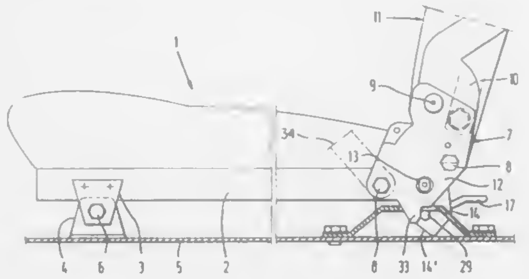
James C. Hettwer, Grand Forks, Minn., assignor to U-Haul International, Inc., Phoenix, Ariz.
Filed Jun. 20, 1990, Ser. No. 539,571
Int. Cl.⁵ B60P *1/43*
U.S. Cl. 296—37.6 **13 Claims**



2. In a truck having a frame, the frame having an opening through which a ramp can pass, the opening being defined by opposed frame members, the improvement consisting of a system for blocking passage of the ramp through the opening, the system including:
means for blocking the opening, the blocking means comprising:
a blocking member having a body, the body having opposed ends; and
connecting means, connected to the opposed ends of the body, for connecting the blocking member to the opposed frame members, the connecting means being movable with respect to each other from a first position whereby the connecting means are connected to the frame members so that the blocking member blocks passage of the ramp through the opening, to a second position whereby the connecting means are unconnected and removed from the frame members such that the ramp can pass through the opening; and
locking means, connectable to the blocking member, for locking the connecting means into the first position, the locking means being operable by one of a key and a combination.

5,022,698
VEHICLE SEAT

Timothy R. Butt, Kaiserslautern, Fed. Rep. of Germany, and Sergio Zolin, Sao Paulo, Spain, assignors to Keiper Recaro GmbH & Co., Fed. Rep. of Germany
Filed Apr. 13, 1990, Ser. No. 508,424
Claims priority, application Fed. Rep. of Germany, Apr. 15, 1989, 3912463
Int. Cl.⁵ B60N *2/36*
U.S. Cl. 296—65.1 **14 Claims**

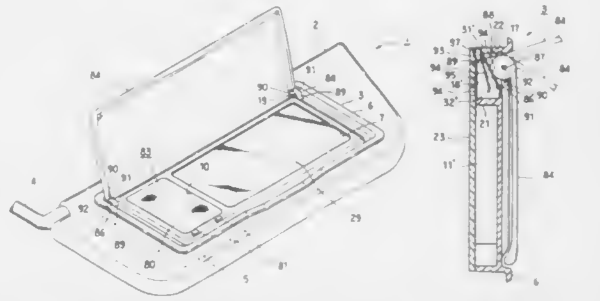


1. A vehicle seat including a seat backrest having a useful range and having at least one hinge fitting having a hinge axle, an upper fitting element of the hinge fitting being associated with the backrest and a lower fitting element of which is associated with the seat frame and having a hook adapted to engage and disengage a lock bolt, said hook being arranged to be suspended, pivoted, and engage, in its locking position, said lock bolt, said lock bolt running parallel to the hinge axle, comprising:
a seat frame adapted to be connected with the vehicle floor at a distance in front of a pivot axis (13) of the hook (14); wherein
said lock bolt (29) is rigidly connected with the vehicle floor;
the upper fitting element (10) has a detent (28) in a surface (27) extending in its pivot direction;
a counter-detent (22') is provided on one end of a double-armed pivot lever (20) which is pivotably mounted on the lower fitting element (7) and is spring-loaded in the sense of a movement of the counter-detent (22') toward the detent (28);
the detent (28) and the counter-detent (22') lie within an angular position of the upper fitting element (10) which lies outside the useful range of the backrest, engage with one another, and form a form-fitting pivot lock for the upper fitting element (10); and
the other end of the double-armed pivot lever (20) is provided with an angular surface by means or which the double-armed pivot lever (20) is forcibly pivoted from the lock bolt (29) into a released position, where the detent (28) and the counter-detent (22') are disengaged, and the rear end of the seat is lowered into the use position, where it is form-fittingly connected with the lock bolt (29) by means of the hook (14).

5,022,699
COVERED ILLUMINATED VANITY MIRROR

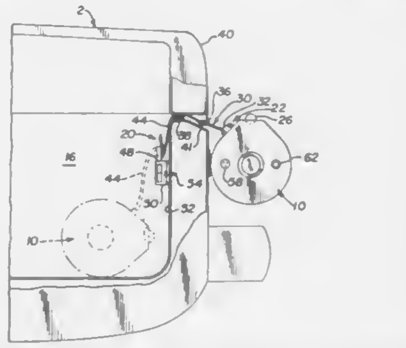
Yoshihide Yosbida, Shimizu, Japan, assignor to Koito Manufacturing Co., Ltd., Tokyo, Japan
Filed Oct. 5, 1989, Ser. No. 417,637
Claims priority, application Japan, Oct. 7, 1988, 63-253440
Int. Cl.⁵ B60J *3/00*
U.S. Cl. 296—97.5 **5 Claims**

1. A vanity mirror for a sun visor of a vehicle of a type including a mirror body, a mirror supported on the mirror body, and a cover being mounted pivotally on the mirror body for uncovering and covering a front surface of the mirror, wherein a mounting lug is formed on the cover, a space receiving therein pivotally the mounting lug of the cover is formed in one end portion of the mirror body, the mounting lug is formed to have an end surface which is faced toward a rear direction in the uncovered condition of the cover and another end surface which is faced toward the rear direction in the covered condition of the cover, and a leaf spring member of a generally inverted V shape in a side view thereof is received in the space in the mirror body for resiliently engaging in face-to-face relationship with either of the end surfaces of the mounting lug, said leaf spring member being mounted on the mirror body by inserting the leaf spring member through an opening formed in the mirror body.



5,022,700
MOUNTING SYSTEM FOR AN AUTOMOBILE COVER

Edward J. Fasiska, Pittsburgh, and Adam N. Aretz, Greensburg, both of Pa., assignors to Auto Wrap, Inc., Pittsburgh, Pa.
Filed Jul. 19, 1990, Ser. No. 555,581
Int. Cl.⁵ B60J *11/00*
U.S. Cl. 276—98 **10 Claims**

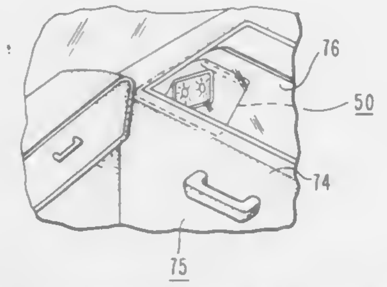


1. A mounting system for an automobile cover containment housing comprising:
channel means having slot means and extending along the containment housing;
mounting clip means slidably positioned in said channel means;

VOL 1127 ISS 2 JE 11 1991 UMI

strap means having first and second ends, attached to said mounting clip means at a first end and carrying detachable clip means at a second end;
permanent clip means adapted to be affixed to an interior portion of a trunk compartment of an automobile, whereby said detachable clip means is adapted to matingly engage said permanent clip means; and
means for adjusting a length of said strap means, whereby, when a selected strap means length is obtained, a trunk lid, when moved to a closed position, substantially covers said strap means and engages a portion of said mounting clip means to resist movement of the containment housing and to deter theft of said housing.

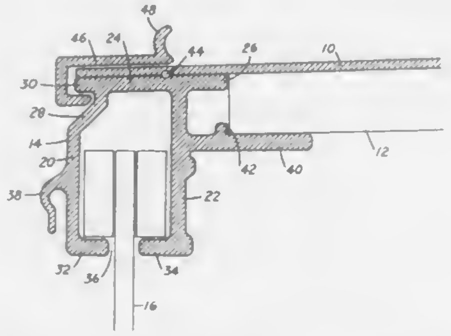
5,022,701
GLAREBLOCKER
Jesse P. Thompson, II, 63 Executive La., Willingboro, N.J. 08046
Filed Apr. 11, 1990, Ser. No. 507,529
Int. Cl.^{5} B60J *3/00*
U.S. Cl. 296—152 **2 Claims**



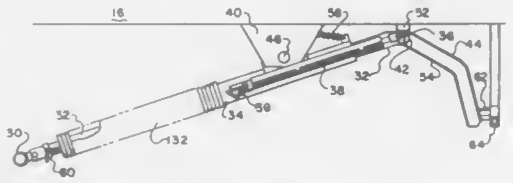
2. A blocking device adapted for use in a vehicle having a side door, an inner panel, a side window and a cavity for receiving same and a nearby side-mounted rearview mirror, comprising a blocking means for shielding a portion of light reflected from said rearview mirror and simultaneously blocking a portion of any wind flowing into said vehicle when said vehicle is in motion; a first means for simultaneously cushioning said blocking means from vibrations from said vehicle and bracing said sheet against said side window, said first means extending in a first direction away from said blocking means and towards said side window; a second means for inserting said sheet in said cavity in between the inner panel of said side door and the side window, said second means further adapted to press said blocking means against the side window wherein the blocking means has at least five edges configured to generally adapt to a foremost corner of a side window, first and second of said edges being horizontally parallel and of unequal lengths, said first edge being shorter than said second edge, a third edge being oriented obliquely to said first edge and a fourth edge, said fourth edge being perpendicular to said second edge and parallel to a fifth edge which interconnects said first and said second edges wherein said first means is an elongated resilient member attached to said sheet parallel to said first edge and above said second means wherein said second means comprises a cantilevered panel located at said second edge, said cantilevered panel extending away from said sheet in a second direction opposite to said first direction in which said first means extends.

5,022,702
REDUCED HEIGHT UPPER RAIL FOR CURTAINSIDE TRUCK TRAILERS
Martin L. Straub, 13131 Island Lake Rd., Dexter, Mich. 48130, and James D. Davis, Rte. 2, Box 535, Minden, La. 71055
Filed Aug. 3, 1990, Ser. No. 562,125
Int. Cl.^{5} B60J *5/06*
U.S. Cl. 296—181 **14 Claims**

1. A curtainside truck-trailer three inch upper rail comprising in cross-section a substantially horizontal top plate, a pair of spaced apart inner and outer substantially vertical webs depending from the top plate, the upper portion of the outer web having an intermediate part thereof biased inwardly and the top plate extending outwardly beyond the juncture with the outer web, a pair of substantially horizontal flanges each extending from one web and toward the other web to form a gap therebetween at the bottom of the rail whereby a trolley may be supported for longitudinal motion within the rail, the combination of the top plate, bottom flanges and pair of webs having a substantially rectangular cross-section for substantially the full height of the rail, and means extending inwardly from the inner web to support truck-trailer roof bows.

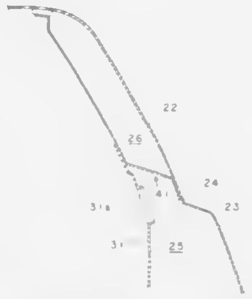


5,022,703
RETRACTABLE REAR BUMPER
James E. Westbrook, Lubbock, Tex., assignor to Module Truck Service, Inc., Lubbock, Tex.
Filed Mar. 13, 1990, Ser. No. 492,642
Int. Cl.^{5} B60R *19/02*
U.S. Cl. 296—183 **12 Claims**



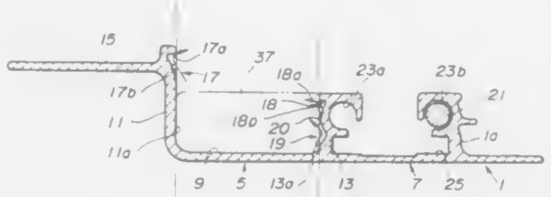
1. A motorized vehicle having:
a. a cab,
b. ground engaging wheels,
c. a bed on said vehicle having a rear end, and
d. means for tilting said bed so that the rear end is proximate the ground,
e. wherein the improvement comprises:
f. a horizontal rear bumper behind all of the ground engaging wheels,
g. at least two shafts of consistent cross-section attached to said bumper,
h. tubes having a correlative cross-sectional shape as said shafts,
j. said shafts telescoped within said tubes,
k. a tube bracket hinged to the bed behind the ground engaging wheels and forward of the bumper,
l. said tubes mounted upon said tube bracket,
m. a cross member attached to said shafts forward of said tubes, and
n. extension means attached to the cross member for sliding the shafts forward in the tubes, thereby moving the bumper forward and upward.

5,022,704
STRUCTURE OF AN AUTOMOBILE BODY IN THE VICINITY OF A ROOF PANEL, A REAR FENDER PANEL AND A QUARTER PANEL AND INCLUDING A REINFORCEMENT MEMBER
Eiichi Mizuno; Noritaka Sakiyama; Yukito Matsui; Yoshikazu Kono, and Kiyoshige Yamada, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan
Filed May 8, 1989, Ser. No. 348,643
Claims priority, application Japan, May 10, 1988, 63-61336[U]; May 25, 1988, 63-69063[U]
Int. Cl.^{5} B62D *25/08*
U.S. Cl. 296—195 **20 Claims**



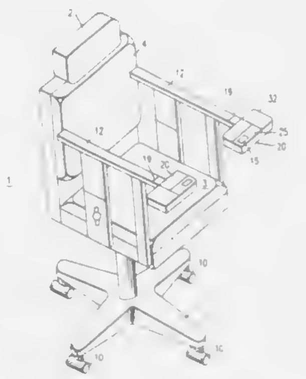
1. An automobile rear body structure comprising:
a roof panel, for forming an upper surface of a roof portion of a vehicle body, provided with an integrally formed downwardly extending portion to form an outer surface of a rear pillar at a rear side portion thereof;
a rear fender panel, joined to a lower end of said downwardly extending portion to form a joint therebetween, for forming an outer surface of a rear side wall;
a quarter panel spaced from said rear fender panel; and
a reinforcement member for connecting said rear fender panel and said quarter panel at a location near a lower end of said rear pillar.

5,022,705
LID GUIDE STRUCTURE FOR SUN ROOF DEVICE
Jun Takahashi, Yokohama, Japan, assignor to Ohi Seisakusho Co., Ltd., Yokohama, Japan
Filed Oct. 11, 1989, Ser. No. 420,096
Claims priority, application Japan, Oct. 11, 1988, 63-131821[U]; Dec. 12, 1988, 63-160356[U]
Int. Cl.^{5} B60J *7/00*
U.S. Cl. 296—213 **15 Claims**



1. A lid guide structure for a sun roof device, comprising:
a first elongate member;
second and third elongate members extending in parallel from longitudinal ends of said first elongate member, respectively;
wherein each of said second and third elongate members includes a longitudinally extending gutter portion which is defined between outboard and inboard walls,
wherein mutually facing surfaces of said outboard and inboard walls are each formed at a major flat part thereof with a longitudinally extending channel leaving a longitudinally extending ridge at an upper end of the corresponding wall;
wherein each of said longitudinally extending channels of the facing surfaces is defined by a first inclined surface positioned close to said longitudinally extending ridge and a second inclined surface positioned remote from said longitudinally extending ridge; and
wherein an angle defined between a major part of said first inclined surface and said major flat part of the corresponding wall is greater than that defined between a major part of said second inclined surface and said major flat part of said corresponding wall.

5,022,706
ADJUSTABLE KEYBOARD CHAIR
Jed A. Bryan, 188 Linde Cir., Marina, Calif. 93933
Filed May 14, 1990, Ser. No. 523,617
Int. Cl.^{5} A47B *39/00*
U.S. Cl. 297—162 **18 Claims**



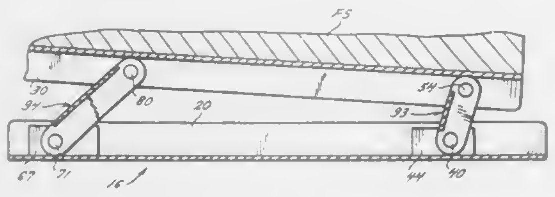
1. In combination with a chair of the type having a back, a seat and a pair of rigid side arms, a pair of support tables for supporting a computer keyboard over the seat in front of a user, each of said support tables pivotally secured to a different one of said rigid side arms, each of said support tables extending inwardly towards one another in spaced relationship with one another, each of said support tables rotatably about a first axis parallel to a rear edge thereof and transverse to said rigid side arm and about a second axis parallel to and adjacent an outside edge of said support table and normal to said first axis, each said support table rotatable about said first axis from a generally horizontal position level with and at the front of said rigid side arm to a vertical position disposed in front of said rigid side arm and rotatable about said second axis from said front vertical position to a position disposed adjacent the outside facing side of said rigid side arm, each said rigid side arm including a contoured keyboard stop formed in the upper surface and at the front end thereof, said pair of support tables and said contoured keyboard stops are adapted to receive and support a computer keyboard when said support tables are disposed in said generally horizontal position, whereby said contoured keyboard stops maintain a desired position of said computer keyboard.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,707

VEHICLE SAFETY DEVICE

Randall Beauvais, Fenton, and Albert J. Meade, Ballwin, both of Mo., assignors to Life Force Associates, L.P., Fenton, Mo.
Continuation-in-part of Ser. No. 240,200, Sep. 7, 1988, which is a continuation-in-part of Ser. No. 195,946, May 19, 1988, which is a continuation-in-part of Ser. No. 167,005, Mar. 11, 1988, which is a continuation-in-part of Ser. No. 142,674, Jan. 7, 1988, abandoned. This application Oct. 25, 1988, Ser. No. 261,300
Int. Cl.^{5} B60R *21/00*
U.S. Cl. 297—216 72 Claims



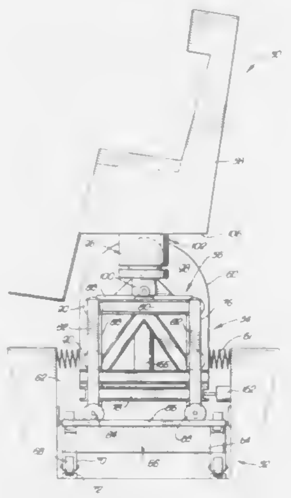
1. A seat tilting device comprising:
a seat support having front and rear portions for supporting front and rear ends of a seat;
a base for supporting the seat support, said base having means for attachment to a vehicle chassis;
a rear link having a first end pivotally connected to the rear portion of said seat support and a second end pivotally connected to said base;
a front link having a length longer than that of the rear link, a first end pivotally connected to the front portion of said seat support, and a second end pivotally connected to the base;
said second ends of the links being supported in said base for limited rear to front sliding movement with respect to the base; and
said base including means for elevating the links during such sliding movement;
wherein the links are pivotable from a first position in which the seat support is in contact with the base to a second position in which said seat support is disposed forwardly of the first position and the front portion of the seat support is spaced from the base at a distance greater than that by which the rear portion of the seat support is spaced from the base.

5,022,708

MECHANICAL SEAT APPARATUS FOR SIMULATING MOTION

Tim M. Nordella, Frazier Park, and William J. Sieber, Northridge, both of Calif., assignors to Creative Presentations, Inc., Valencia, Calif.
Filed Nov. 16, 1989, Ser. No. 437,345
Int. Cl.^{5} F16M *13/00*
U.S. Cl. 297—327 17 Claims

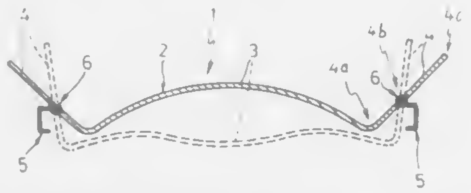
4. An apparatus for simulating motion, comprising:
a support structure;
a bearing including at least a portion of a sphere mounted upon the support structure and a housing at least partially enclosing the at least portion of a sphere;
a seat mounted upon the housing of the bearing;
biasing means for selectively biasing the housing in and out of contact with the at least portion of a sphere to respectively prevent and enable relative motion between the housing and the at least portion of a sphere; and
automatically actuated motion imparting means for automatically imparting motion to the housing relative to the at least portion of a sphere during activation of the biasing means.



5,022,709

SPRINGING AND WRAP-AROUND ELEMENT FOR A SEAT AND/OR BACKREST, AND SEAT EMBODYING THE SAME

Piero Marchino, MC 98000, 6 Avenue des Citronniers, Monaco, Italy
Filed Feb. 13, 1989, Ser. No. 310,219
Claims priority, application Italy, Feb. 12, 1988, 67105 A/88
Int. Cl.^{5} A47C *7/02*
U.S. Cl. 297—452 27 Claims

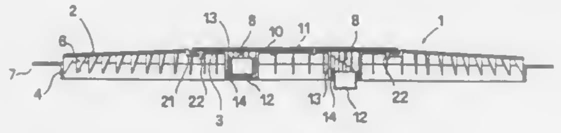


1. A springing and wrap-around device for a seat cushion and seat backrest, comprising:
(a) a pair of fixed supports;
(b) a flexible blade mounted on said supports, said flexible blade including
(i) a central portion which is curved in a convex manner towards a load receiving direction of said device, and
(ii) two side walls extending outwardly from said central portion towards the load receiving direction, each said side wall having
(A) a rear portion connected to the central portion of said blade,
(B) an intermediate portion, and
(C) a front portion, and
(iii) said central portion defining elastically deformable means for moving apart said rear portions of said side walls and for rotating inwardly said front portions of said side walls, and
(c) pivot mounting means for pivotally mounting each said intermediate portion with respect to one said fixed support so that the central portion moves apart the rear portions of the side walls and rotates inwardly the front portions of the side walls, in response to a load applied to the central portion.

5,022,710

WHEEL COVER FOR MOTOR VEHICLES

Domenico Groppo, Regione Fornace 79, Ceresole d'Alba (Cueno), Italy
Continuation-in-part of Ser. No. 308,310, Feb. 8, 1989, abandoned. This application Apr. 12, 1990, Ser. No. 509,472
Claims priority, application Italy, Apr. 8, 1988, 53049/88[U]
Int. Cl.^{5} B60B *7/06*
U.S. Cl. 301—37 S 8 Claims

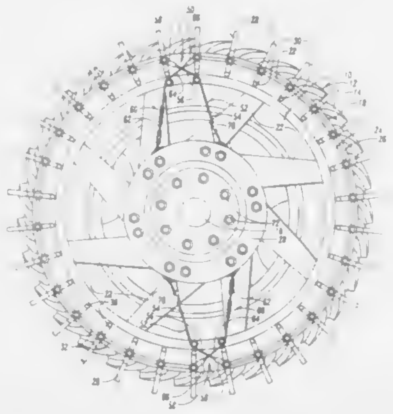


1. A vehicle wheel cover, comprising:
a central wheel cover portion;
a peripheral wheel cover portion, connected coaxially with respect to said central portion for rotation about said central portion, said peripheral portion having a passage for a tire inflation valve;
a plurality of fastening bolt seats, each fastening bolt seat defining a fastening bolt plane; and
adjustment means for adjustably positioning each fastening bolt seat for adjusting the position of each fastening bolt plane with respect to said central portion.

5,022,711

AUXILIARY TRACTOR WHEEL FOR INCREASED TRACTION

Norman E. Bangert, 1012 Virginia, Des Moines, Iowa 50315
Filed Aug. 20, 1990, Ser. No. 570,128
Int. Cl.^{5} B60B *15/10*
U.S. Cl. 301—47 17 Claims

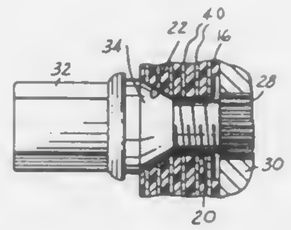


1. In combination with a tractor wheel rotatably mounted on a rear axle of a tractor, an auxiliary tractor wheel comprising:
wheel means mounted on the axle adjacent the tractor wheel, and having a perimeter edge;
a plurality of traction plates pivotally mounted on the wheel means for movement between a retracted position wherein the traction plates are drawn within the perimeter edge of the wheel means and an extended position wherein the traction plates extend radially outwardly beyond the perimeter edge of the wheel means; and
actuation means for moving the traction plates between the retracted and extended positions, the actuation means including tension means for urging the traction plates to the extended position, and the actuation means further including adjustment means for adjusting the tension in the tension means.

5,022,712

FIBER-REINFORCED RESIN VEHICLE WHEEL MOUNTING

James A. Woelfel, Lansing, and Thomas A. Hineline, Dewitt, both of Mich., assignors to Motor Wheel Corporation, Lansing, Mich.
Continuation-in-part of Ser. No. 292,372, Dec. 30, 1988, abandoned. This application Sep. 11, 1989, Ser. No. 405,753
Int. Cl.^{5} B60B *5/02*
U.S. Cl. 301—63 PW 27 Claims

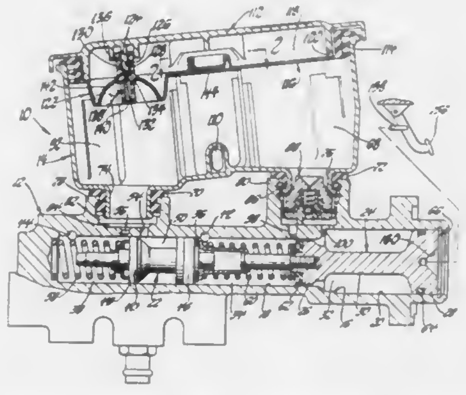


1. A fiber-reinforced composite vehicle wheel that comprises an annular rim for mounting of a vehicle tire and a wheel-mounting disc internally spanning said rim, said disc having a plurality of mounting openings disposed in a circular array around a wheel-mounting axis and being constructed to be received over threaded studs on wheel-mounting structure, means forming an axially oriented, surface surrounding each said opening on one face of said disc for seating engagement with threaded fasteners received on the studs, reinforcing fibers being oriented in said disc such that fiber ends terminate at said seating surfaces, and lubricant on each said seating surface to reduce frictional engagement between the fastener and said fiber ends at said surfaces.

5,022,713

VENTING MASTER CYLINDER RESERVOIR DIAPHRAGM

Cecil C. Pugh, Kettering, and John R. Coleman, Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.
Filed May 8, 1989, Ser. No. 348,929
Int. Cl.^{5} F17B *7/10*
U.S. Cl. 303—1 3 Claims



1. A reservoir diaphragm cover assembly for a vehicle brake master cylinder fluid reservoir being used in atmosphere comprising:
a reservoir diaphragm having a sealing edge for mating with and separating the cylinder fluid reservoir from a reservoir cap;
said reservoir cap and said diaphragm forming a chamber;
said reservoir cap having a venting means for connecting said chamber to said atmosphere, and a projection perpen-

VOL
1127
ISS
2
JE
11
1991
UMI

dicular from said prominent plane of said reservoir cap having a first sealing surface;

a receptacle means projecting from said reservoir diaphragm towards said reservoir cap, having an interior wall for aligning the projection, where the interior wall has a second sealing surface;

said diaphragm having a hole adjacent to said interior wall of said receptacle means, a fluid access means projecting away from said reservoir cap into said fluid reservoir; and

said fluid access means and said interior wall of said receptacle means defining a passage between said reservoir and said chamber, whereby said passage is normally sealed with said first and second sealing surface in contact closing of said passage between said fluid reservoir and said chamber, wherein a vacuum in said fluid reservoir will pull said reservoir diaphragm and said receptacle means away from said reservoir cap and create an opening around said projection, allowing air from said atmosphere to enter said fluid reservoir eliminating said vacuum.

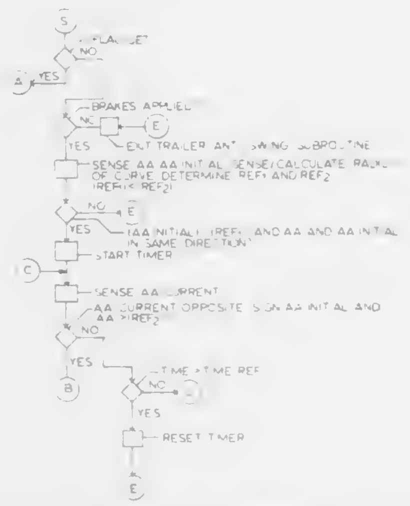
5,022,714
TRACTOR TRAILER ANTI-TRAILER SWING SYSTEM AND METHOD

Michael T. Breen, Garden City, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Dec. 20, 1989, Ser. No. 454,602

Int. Cl.^{5} B60T *7/20*

U.S. Cl. 303—7 28 Claims


S
FLAG SET
NO
YES
A
BRAKES APPLIED
NO
E
YES
EXIT TRAILER ANTI-SWING SUBROUTINE
SENSE AA AA INITIAL SENSE/CALCULATE RADIUS OF CURVE DETERMINE REF1 AND REF2 (REF1 < REF2)
NO
E
YES
(AA INITIAL) (REF1) AND AA AND AA INITIAL IN SAME DIRECTION
START TIMER
C
SENSE AA CURRENT
AA CURRENT OPPOSITE SIGN AA INITIAL AND AA > REF2
NO
YES
B
TIME > TIME REF
NO
YES
RESET TIMER
E

1. A trailer anti-swing brake control method for articulated vehicles (**10**) of the type comprising a tractor (**12**) and a trailer (**14**) connected at an articulating connection (**34/176**) defining a pivot axis (**176**) about which the trailer is pivotable relative to the tractor, an articulation angle (AA) of said vehicle defined by the included angle defined by a longitudinally extending axis of the trailer passing through said pivot axis (**202**) relative to a longitudinally extending axis of the tractor passing through said pivot axis (**200**), a tractor brake system, a trailer brake system, a driver operated brake effort demand device (**76/78**) for providing a demand input signal indicative of the magnitude of operators demand for vehicle braking, trailer brake control means (**174**) responsive in at least one operating mode for causing the trailer brake system to be applied with an operating force generally proportional to the magnitude of said demand input signal, said control method characterized by:

determining (**170/172**) a value indicative of at least articulation angle (AA), and a second order or higher time derivative of articulation angle (d^2AA/dt^2) and providing articulation input signals indicative thereof; and

receiving and processing said input signals (**70**) according to predetermined logic rules to detect the existence of conditions indicative of at least one of incipient and initial trailer brake induced trailer swing events and generating output signals in response to detection of the existence of said conditions and

responding (**174**) by said control means to said output signals by causing the trailer brake system brakes to be applied with a substantially reduced force (**210–212**) regardless of the magnitude of said demand input signal;

said processing said input signals to determine the existence of said conditions comprising (A) starting a timer if (i) sensing that the operator has demanded at least partial braking, (ii) sensing that initial articulation angle and the initial timer derivative of articulation angle are in the same direction of rotation about said pivot axis and (iii) sensing that the absolute value the initial time derivative of articulation angle (d^2AA/dt^2) exceeds the absolute value of a first reference value (REF_1) and (B) generating said output signals if, after starting said timer and prior to time exceeding a predetermined time reference, (i) the current value of the time derivative of articulation angle changes direction and remains in the changed direction and (ii) the absolute value of the current value of the time derivative of articulation angle exceeds the absolute value of a second reference value (REF_2).

5,022,715
PRESSURE CONTROL DEVICE FOR BRAKE SYSTEMS OF AUTOMOTIVE VEHICLES

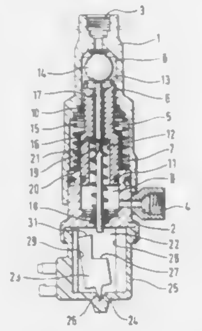
Juergen Schonlau, Walluf, Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 10, 1990, Ser. No. 463,055

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1989, 3902789

Int. Cl.^{5} B60T *8/26*

U.S. Cl. 303—9.68 17 Claims



1. A pressure control device for brake system of automotive vehicles with a stepped control piston which is guided axially displaceably within a housing and which, cooperating with a valve element, controls the pressure medium passage between an inlet chamber and an outlet chamber, with a smaller diameter portion of the control piston being coupled with the inlet chamber containing the valve element, wherein in the valve element (**14**) is applied by a displaceable stop (**17**) including a spring which prestresses said stop (**17**) in the direction of said valve element (**14**).

5,022,716
BRAKE SYSTEM

Heinz Siegel, Stuttgart, and Klaus Mueller, Tamm, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

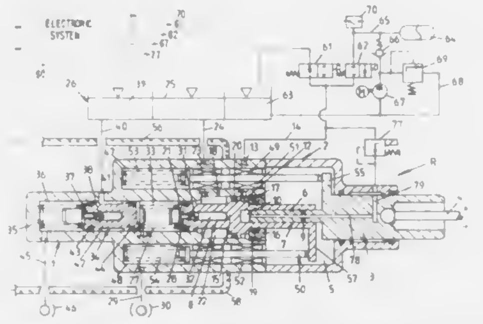
Filed Nov. 17, 1989, Ser. No. 437,863

Claims priority, application Fed. Rep. of Germany, Dec. 28, 1988, 3844068

Int. Cl.^{5} B60T *8/58, 8/44*

U.S. Cl. 303—104 33 Claims

1. A brake system having a master brake cylinder embodied as an electrohydraulic booster, a brake pedal, a piston rod which is actuated by said brake pedal, said master brake cylinder communicates via said piston rod with said brake pedal, said piston rod acts upon at least one master cylinder piston via which at least one brake chamber can be put at brake pressure, so that brake fluid flows via brake lines to corresponding wheel brake cylinders, a servo piston chamber associated with the master cylinder piston, said servo piston chamber communicates via an inlet line (**14**) and a control element with an apparatus for supplying power brake fluid to said servo piston chamber wherein said control element is controlled via a first travel transducer that detects the motion of the piston rod, and a second travel transducer associated with said master cylinder piston which likewise controls said control element via an electronic system, in which the pedal travel (sp) is convertible into a voltage (U_{sp}) in said first travel transducer (**49**), and after processing in a first control unit (**72**) said voltage (U_{sp}) is present as a set-point value ($U_{SK,soll}$) for the master cylinder piston (**8**) at a summation point (**76**), at which said set-point value is compared with an actual voltage value ($U_{SK,ist}$) by the travel transducer (**50**).



5,022,717
PRESSURE CONTROL UNIT, ESPECIALLY FOR MOTOR VEHICLE BRAKE SYSTEMS

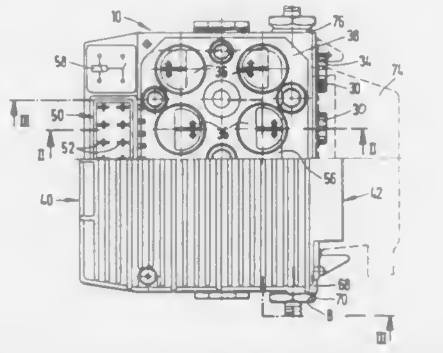
Helmut Heibel, Moschheim, and Leo Gilles, Koblenz, both of Fed. Rep. of Germany, assignors to Lucas Industries public limited company, Birmingham, England

Filed Dec. 11, 1989, Ser. No. 448,534

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1988, 8815426[U]; Dec. 12, 1988, 8815427[U]

Int. Cl.^{5} B60T *8/34, 13/68, 8/38;* **G05D** *16/20*

U.S. Cl. 303—119 13 Claims



1. A pressure control unit, especially for motor vehicle brake systems, comprising

a valve block (**10**) which includes fluid passages (**12**), valves (**14**), and connections (**30, 32, 34**) for fluid operated devices,

electromagnets (**36**) attached to the valve block (**10**) for actuating the valves (**14**),

a hood (**40**) placed on the valve block (**10**) and covering the electromagnets (**36**),

an external plug group (**42**) arranged at the hood (**40**) and including plugs (**44**) accessible from outside to connect to sensors and the like, and

electrical connections between the electromagnets (**36**) and corresponding plugs (**44**) of the external plug group (**42**), characterized in that

a second plug group (**46**) including plugs (**48**) is disposed within the hood (**40**), the plugs (**48**) of said second group being connected to the plugs (**44**) of the external plug group (**42**),

a third plug group (**50**) including plugs (**52**) is disposed at the valve block (**10**), the plugs (**52**) of said third group being adapted to be connected to the plugs (**48**) of the second plug group (**46**) by donning of the hood (**40**),

the electrical connections comprise a conductor arrangement (**56**) linking the electromagnets (**36**) with the plugs (**52**) of the third plug group (**50**), and

a space (**53**) is provided inside the hood (**40**) to receive electronic components.

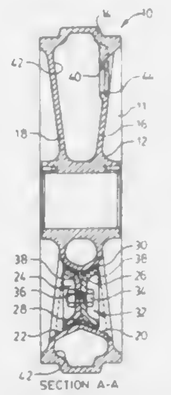
5,022,718
IDLER WHEEL ASSEMBLY

Mark S. Diekevers, East Peoria, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Aug. 31, 1990, Ser. No. 575,754

Int. Cl.^{5} B62D *55/14*

U.S. Cl. 305—24 9 Claims



SECTION A-A

1. An idler wheel assembly for guiding and carrying endless track chains of a track-type vehicle, comprising:

a central hub portion;

an annular rim portion;

first and second side-wall portions joining said hub portion to said rim portion, said side-wall portions having a plurality of aligned apertures therethrough, said apertures being substantially equally spaced circumferentially about said hub portion; and

a plurality of resilient plug assemblies, one plug assembly positioned in each set of aligned apertures, said plug assemblies each including first and second plates, a resilient pad positioned between said plates and said idler wheel side wall portions, and means for securing said first plate to said second plate and for securing said pad between said plates and said side wall portions.

5,022,719
LIGHTED DISPLAY CASE

Douglas D. Amstutz, Muskegon, and Ronald A. Vanderboegh, Twin Lakes, both of Mich., assignors to Amstore Corporation, Muskegon, Mich.

Filed Feb. 23, 1990, Ser. No. 483,667

Int. Cl.^{5} A47F *3/00*

U.S. Cl. 312—140 1 Claim

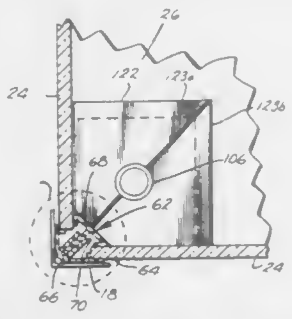
1. A showcase comprising:

a frame including frame segments;

a base supporting said frame;

VOL
1127
ISS
2
JE
11
1991
UMI

a window supported by said frame; and
retention means for retaining said window within said frame and including a plurality of mounting devices each fixedly secured to one of said frame segments, said retention means further including a plurality of retainers each releasably secured to one of said mounting devices, said window being entrapped between said mounting devices and said retainer, at least one of said mounting devices and said retainers including gripping means for frictionally gripping said window, said gripping means having a high coefficient of friction to prevent relative movement between said window and said gripping means, whereby said retention means additionally provides mechanical strength to the showcase by incorporating the window as a structural member, said mounting device and said retainer each comprising a coextruded member having at least two portions, a first one of said portions comprising a relatively lower durometer material, a second one of said portions comprising a relatively higher durometer material, and wherein said first one of said portions comprises said gripping means.



5,022,720

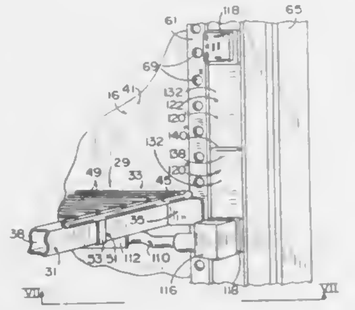
DISPLAY CASE

Robert J. Fevig; Randall S. Holleman, both of Grand Haven, Mich., and Duane L. Seaver, N. Muskegon, all of Mich., assignors to Structural Concepts Corporation, Spring Lake, Mich.

Filed Apr. 30, 1990, Ser. No. 516,443

Int. Cl.⁵ A47B *51/00*

U.S. Cl. 312—223 11 Claims



1. A display case comprising:
a housing defining an enclosure;
a plurality of shelves adapted to support items thereon for display;
a plurality of light fixtures, each of said light fixtures attached to one of said shelves;
first means for movably supporting said plurality of shelves within said enclosure at a plurality of different vertical locations;
a plurality of electrical outlets for supplying power to each of said plurality of light fixtures;
second means for movably mounting said outlets within said enclosure so that each of said outlets can be positioned in proximity to an associated one of said shelves, said second means comprising:
a raceway within said enclosure defining a plurality of generally vertically extending tracks;
a plurality of carriage members disposed ian vertical adjacency along said raceway, each of said carriage members carrying at least one of said electrical outlets, said tracks including means for vertical slidable support of said carriage members therealong, each of said carriage members having an end edge portion disposed overlapping the end edge portion of a vertically adjacent carriage member so that no unsightly and hazardous gaps are created in said raceway.

5,022,721

FURNITURE CONSTRUCTION SYSTEM

George Melgers, Postbud 50068, 1305 AB Almere, Netherlands

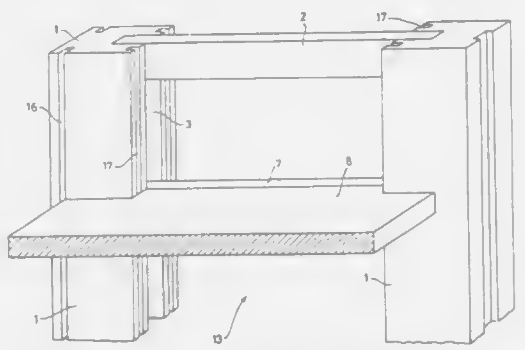
PCT No. PCT/NL88/00024, § 371 Date Jan. 18, 1989, § 102(e) Date Jan. 18, 1989, PCT Pub. No. WO88/09136, PCT Pub. Date Dec. 1, 1988

PCT Filed May 24, 1988, Ser. No. 328,222

Claims priority, application Netherlands, May 22, 1987, 8701223

Int. Cl.⁵ A47B *3/00*

U.S. Cl. 312—257.1 11 Claims



1. A wooden furniture construction system comprising a pair of spaced vertical stands (13) for supporting therebetween a plurality of vertically spaced parallel horizontal shelves (8), each of said stands comprises a pair of spaced mirror symmetrical profile columns (1) having opposed faces directed toward each other, there being a longitudinal groove (3) in each of said opposed faces and each said longitudinal groove having a bottom, there being a plurality of mutually spaced pin holes (4) in the bottom of each said groove, a block (6) disposed in each of said opposed longitudinal grooves of each of said stands at similar heights, each of said blocks having a pin (5) received within a said pin hole, a supporting beam (7) positioned on each of said pairs of blocks and having a sideward extension (15) in the longitudinal direction of a said beam extending between the stands each said sideward extension having an upper surface spaced below the upper surface of said beam, a said shelf (8) disposed upon the upper surfaces of said sideward extensions of a pair of beams, said shelf having a thickness equal to the distance between the upper surfaces of said beam and said sideward extension thereon.

5,022,722

PORTABLE CLOSET

Maynard A. Wallin, 2399 E. 14th Sp 147, San Leandro, Calif. 94577

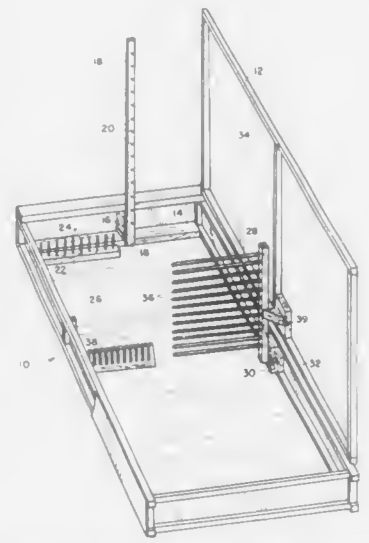
Filed Sep. 15, 1989, Ser. No. 390,072

Int. Cl.⁵ A47B *61/00*

U.S. Cl. 312—309 5 Claims

1. A temporary closet for storage of clothing in a non-permanent residence, said closet including:
an enclosed cabinet having a top, a bottom, first and second sides, and a rear panel, said cabinet having a maximum

height of 84 inches, a maximum width of thirty inches, and a maximum front-to-back thickness of ten inches, said cabinet having a hinged panel door enclosing the front of said cabinet and swinging open from the first side of said cabinet;
a bracket attached to the interior surface of said door at a location at the approximate center of said door; and



a trouser rack including an arm pivotally coupled to the first interior side of said cabinet at a location at the approximate center of said first side, said arm engaging the top of said bracket when said door is open for holding said trouser rack in a substantially horizontal position.

5,022,723

PANORAMIC PERISCOPE FOR TWO SPECTRUM RANGES

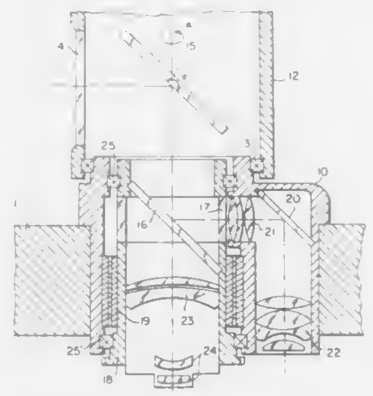
Horst Schmidt, Wetzlar-Nauborn, and Reinhold Schmidt, Solms, both of Fed. Rep. of Germany, assignors to Wild Leitz GmbH, Wetzlar, Fed. Rep. of Germany

Filed Jul. 13, 1989, Ser. No. 379,115

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1988, 3823647

Int. Cl.⁵ G02B *23/04, 23/08, 23/16, 27/10*

U.S. Cl. 350—1.2 16 Claims



1. A panoramic periscope comprising:
a. a panoramic head;
b. a viewing mirror movable in elevation and azimuth mounted in said panoramic head;
c. a front window or windows of said panoramic head which transmit at least two spectrum ranges;
d. a tube containing at least one measuring or observation device, said viewing mirror directing a beam path of each said device coaxially through said front window;
e. a component through which one of said at least two spectrum ranges can be transmitted laterally out to be viewed and which couples said panoramic head with said tube; and
f. a spectrum divider positioned in an upper portion of said tube and in the beam path of incoming radiation directed by said viewing mirror, to direct a first spectrum range in one direction and a second spectrum range in a second direction.

5,022,724

ZOOM SYSTEM

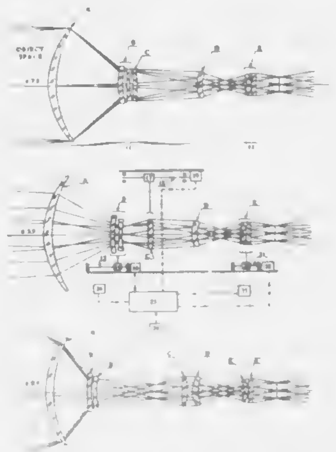
Mark Shechterman, Nes-Ziona, Israel, assignor to El-Op Electro-Optics Industries, Rehovot, Israel

Filed Feb. 5, 1990, Ser. No. 475,276

Claims priority, application Israel, Feb. 15, 1989, 89301

Int. Cl.⁵ G02B *15/00*

U.S. Cl. 350—1.3 4 Claims



1. An infra-red zoom system providing a high performance over a wide range of magnifications (from about 0.5 to about 8 times), with a correction for temperature changes in the −35° C. to 55° C. range, comprising five optical groups of a total of seven lenses groups (termed herein A to D), which are arranged in the sequence of A, a front singlet lens of positive power with a diameter larger than that of the other lenses and which has a corrected spherical aberration, B a negative optical element consisting of lenses B′ and B″;
B′ and B″ being at a fixed distance respective each other;
B′ being a negative lens having a dispersive factor larger than that of the other lenses, resulting in a chromatization of the system;
B″ is a negative lens
Both negative lenses B′ and B″ have undercorrected spherical aberrations,
C being a positive lens, modifying with lens B the magnification of the system;
D being a positive auxiliary lens, decreasing the overall length of the system, being at a fixed distance respective lens A;
E being a movable collimator of positive optical power, for maintaining the afocality of the system;
lenses B, C, and E being movable respective fixed lenses A and D, said lenses transmitting in the 3μ to 12μ range, wherein lenses A to D define an objective and E a collimator (eyepiece), the movements of lenses B, C, and E being according to a predetermined program which takes into consideration changes of temperature of the system.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,725
OPTICAL SENSOR

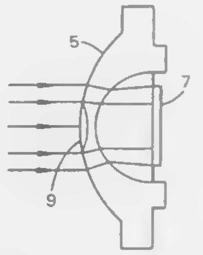
Takao Matsunami, Hirakata, and Hidenori Okuda, Shiga, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 18, 1989, Ser. No. 423,087

Claims priority, application Japan, Oct. 21, 1988, 63-266389

Int. Cl.^{5} G02B *17/00*

U.S. Cl. 350—1.4 4 Claims



1. An optical sensor comprising a light detector, a converging lens having an optical axis, said converging lens being located between said light detector and a light source, the light rays from which are detected by said light detector, and a light shielding means provided on a part of the converging lens in alignment with said optical axis thereof such that said shielding means shields only a center part of the light rays emitted from said light source.

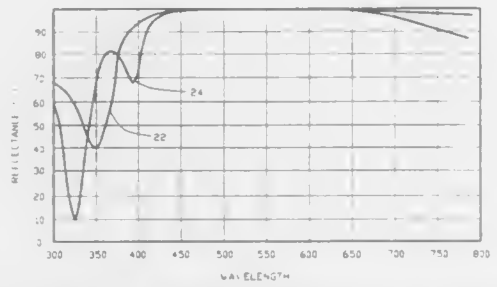
5,022,726
MAGNESIUM FILM REFLECTORS

Russell Austin, Novato, Calif., and Eric R. Dickey, Northfield, Minn., assignors to Viratec Thin Films, Inc., Faribault, Minn.

Filed Dec. 20, 1989, Ser. No. 454,749

Int. Cl.^{5} G02B *5/26*

U.S. Cl. 350—1.7 10 Claims



1. A reflector comprising: at least one layer of material including at least about 90 percent magnesium and having a reflectivity value substantially across the visible spectrum of at least about 92 percent, said layer defining a light reflecting surface.

5,022,727
METHOD AND APPARATUS FOR PRODUCING FULL COLOR STEREOGRAPHIC HOLOGRAMS

Steven L. Smith, Chicago, and Tung H. Jeong, Lake Forest, both of Ill., assignors to Advanced Holographic Imaging Technologies, Inc., Chicago, Ill.

Filed Nov. 1, 1989, Ser. No. 429,990

Int. Cl.^{5} G03H *1/26*

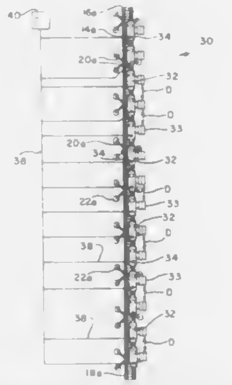
U.S. Cl. 350—3.76 5 Claims

1. An apparatus for photographically recording temporally coherent images of multiple views of a subject for use in producing a stereographically correct, temporally coherent hologram, comprising:

a multiple lens exposure system having a plurality of lenses, each said lens having a shutter associated therewith, means for triggering each of said shutters, said lenses being disposed relative to the subject so that said lenses all face a front side and are trained in the general direction of the subject;

each of said lenses being disposed in a specific spaced relationship relative to the adjacent lenses in a stereographic linear arrangement to approximate the stereoscopic view from the eyes of an individual observing the subject from the location of the respective lenses; and

means for triggering said shutters to obtain multiple, temporally coherent exposures of the subject, so that when such exposures ar placed side-by-side in a linear arrangement corresponding to the relative positioning of said lenses, and are sequentially projected within a holographic optical printer wherein a light sensitive holographic plate is positioned to be exposed to an interference pattern created by the interference of a reference beam and an object beam thereupon, the object beam being directed upon and through said multiple coherent exposures in sequence, the reference beam being coherent to said object beam, so that a temporally coherent, stereographically correct image of the subject is obtained, the spacing of said lenses being designed so that said multiple coherent exposures have a spacing corresponding to a desired spacing of images projected upon the holographic plate.



5,022,728
DEVICE COMPOSED OF A LIGHT GUIDE PLATE

Heinz-Jürgen Fandrich, Ritterfelddamm 112, D-1000 Berlin 22, Fed. Rep. of Germany

PCT No. PCT/DE88/00562, § 371 Date Mar. 6, 1990, § 102(e) Date Mar. 6, 1990, PCT Pub. No. WO89/02606, PCT Pub. Date Mar. 23, 1989

PCT Filed Sep. 7, 1988, Ser. No. 490,662

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1987, 3730169; Sep. 19, 1987, 3731577; Sep. 21, 1987, 3731676; Oct. 27, 1987, 3736804

Int. Cl.^{5} G02B *6/00;* **F21V** *7/04*

U.S. Cl. 350—96.10 20 Claims

1. Device composed of a light guide plate in which light emitted from a light source is guided by components in a direction parallel to the main surfaces of the plate and is emitted from said plate through projections (3) extending over a surface of the plate, characterized in that a smooth surface of the plate through which light can be emitted is coated with a continuous, transparent intermediate layer (2), said intermediate layer having on one side thereof closely spaced projections (3), each of said projections having a height and width lying in a range between 0.5 mm and 0.001 mm.

5,022,729
OPTICAL WAVEGUIDE AND SECOND HARMONIC GENERATOR

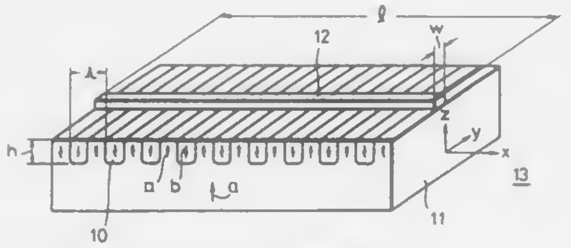
Hitoshi Tamada, and Masaki Saitoh, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 20, 1989, Ser. No. 424,768

Claims priority, application Japan, Oct. 21, 1988, 63-265785; Oct. 21, 1988, 63-265786; Oct. 21, 1988, 63-265787; Jun. 2, 1989, 1-141946

Int. Cl.^{5} G02B *6/12*

U.S. Cl. 350—96.12 7 Claims



1. An optical waveguide comprising:

a substrate; and

an optical waveguide formed on said substrate, wherein said optical waveguide is a Ta_2O_5-TiO_2-system amorphous thin film in which an amount of Ti relative to a sum of Ti and Ta is selected in a range from more than 0 to not more than 60 atomic percent.

5,022,730
WAVELENGTH TUNABLE OPTICAL FILTER

Leonard J. Cimini, Howell; Isam M. I. Habbab, Old Bridge, and Sheryl L. Woodward, Lincroft, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 12, 1989, Ser. No. 449,040

Int. Cl.^{5} G02B *6/10*

U.S. Cl. 350—96.13 9 Claims

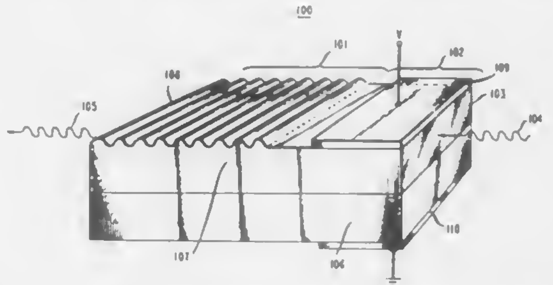
1. An optical filter comprising:

a passive waveguide region having an end facet, said passive waveguide region for supporting the propagation of an optical signal;

a Distributed Bragg Reflector having a peak reflectivity, said Distributed Bragg Reflector disposed on a surface of said passive waveguide region, said surface substantially parallel to the propagation direction of said optical signal;

means for varying the effective refractive index of said passive waveguide region to wavelength shift a transmission characteristic of said optical filter; and

a mirror on said end facet, said mirror having a reflectivity related to the peak reflectivity of said Distributed Bragg Reflector for a sufficiently strong resonance to exist between said mirror and said Distributed Bragg Reflector so that said optical filter exhibits substantially a single transmission peak.



5,022,731
DEVICE FOR OPTICAL FREQUENCY TRANSLATION AND A MODULATOR IN WHICH SAID DEVICE IS EMPLOYED

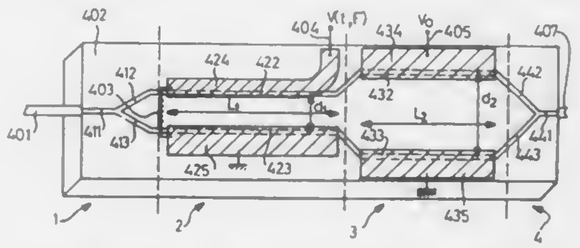
Charles Maerfeld, Antibes, and Bernard Desormiere, Vence, both of France, assignors to Thomson-CSF, Puteaux, France

Filed Dec. 12, 1989, Ser. No. 448,982

Claims priority, application France, Dec. 16, 1988, 88 16617

Int. Cl.^{5} G02B *6/10*

U.S. Cl. 350—96.14 9 Claims



1. A device for optical translation of optical frequency, comprising:

a substrate of electrooptical material;

two optical transmission waveguides integrated on said substrate, said two optical transmission waveguides being in substantially parallel relationship over a length L_1 and spaced from each other at a distance d_1;

at least two electrodes extending along said waveguides over the distance L_1, forming a microwave propagation line;

a characteristic impedance which closes said microwave propagation line;

a microwave signal having a frequency F supplied to said microwave propagation line;

said microwave propagation line converting the symmetric mode of a transmitted optical wave to the antisymmetric mode with a frequency translation in the antisymmetric mode of F; and

means for converting the antisymmetric mode to the symmetric mode to produce ann optical signal which is frequency-shifted by the frequency F.

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5,022,732

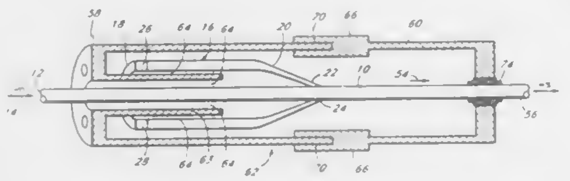
FIBER OPTIC INTERMODE COUPLING SINGLE SIDEBAND FREQUENCY SHIFTER

Helge E. Engan, Trondheim, Norway; Byoong Y. Kim, Menlo Park, Calif.; James N. Blake, Phoenix, Ariz., and Herbert J. Shaw, Stanford, Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Continuation-in-part of Ser. No. 48,142, May 11, 1987, Pat. No. 4,832,437, which is a continuation-in-part of Ser. No. 520,513, Jan. 17, 1986, abandoned, and a continuation-in-part of Ser. No. 909,503, Sep. 19, 1986, abandoned, which is a continuation-in-part of Ser. No. 820,513, Jan. 17, 1986, abandoned. This application Apr. 25, 1989, Ser. No. 342,947

Int. Cl.⁵ G02B *6/26, 6/02*

U.S. Cl. 350—96.15 34 Claims



1. An apparatus for coupling optical energy between optical propagation modes in an optical fiber, comprising:

an optical fiber having a longitudinal axis, said optical fiber supporting a first optical propagation mode and a second optical propagation mode for an optical signal propagating therein; and

a generator connected to said fiber such that said generator produces a flexural wave which propagates in said optical fiber, the energy of said flexural wave confined to said optical fiber, said flexural wave having a frequency, a propagation velocity and a wavelength, said wavelength of said flexural wave being a function of said frequency and said propagation velocity, and being selected to cause coupling of light from one of said modes to the other of said modes, said generator of said flexural wave having a longitudinal axis substantially coaxial with the longitudinal axis of said optical fiber.

5,022,733

LOW-REFLECTION BALL LENS CONNECTOR PART

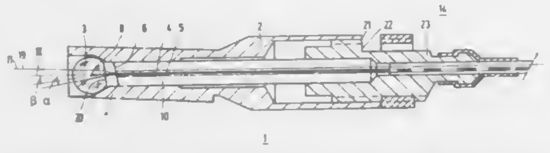
Johannes H. Angenent; Giok D. Khoe, both of Eindhoven, Netherlands; Gathal J. Mahon, Glostrup, Denmark; Abram Van De Grijp, Eindhoven, Netherlands; Cornelis J. T. Potters, Eindhoven, Netherlands, and Kieran G. Wright, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 22, 1989, Ser. No. 397,057

Claims priority, application Netherlands, Aug. 25, 1988, 8802094; Jul. 14, 1989, 8901821

Int. Cl.⁵ G02B *6/32*

U.S. Cl. 350—96.18 10 Claims



1. A ball lens connector part for use in an optical connector, which ball lens connector part comprises a tubular housing, a ball lens provided in one end of the housing and an end part of an optical fiber having a light conducting core secured in the housing, the center of the end face of the fiber core in the housing being situated substantially in the focal plane of the ball lens, the center line of the circumference of the tubular housing at the area of the end coinciding with the optical axis of the connector part, the said optical axis being defined as the center line of a parallel light beam emanating via the ball lens when the connector is used, the center of the ball lens being situated on the elongation of the center line of the fiber core, wherein the smallest angle which is formed by the normal of the end face of the fiber core and the center line of the fiber core at the area of the end part of the fiber is not equal to 0° and the end of the housing is machined so that the center line of the circumference of the end and the optical axis coincide.

5,022,734

METHOD OF MODIFYING AN OPTICAL WAVEGUIDE AND WAVEGUIDE SO MODIFIED

Raman Kashyap, Ipswich, England, assignor to British Telecommunications public limited company, England

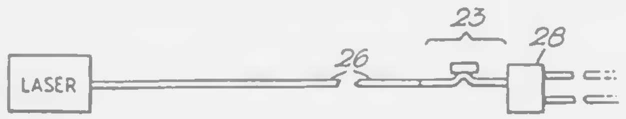
PCT No. PCT/GB88/00775, § 371 Date May 1, 1989, § 102(e) Date May 1, 1989, PCT Pub. No. WO89/02334, PCT Pub. Date Mar. 23, 1989

PCT Filed Sep. 21, 1988, Ser. No. 348,700

Claims priority, application United Kingdom, Sep. 21, 1987, 8722200

Int. Cl.⁵ G02B *6/26, 6/42*

U.S. Cl. 350—96.15 16 Claims



1. An optical waveguide network couplable to a source of optical power, said network including a first optical waveguide coupled in series to an optical device, said device having a damage threshold, said first optical waveguide being arranged such that the propagation of a structural modification along the waveguide towards said source of optical power will be initiated and sustained at an optical power below said damage threshold of the optical device.

5,022,735

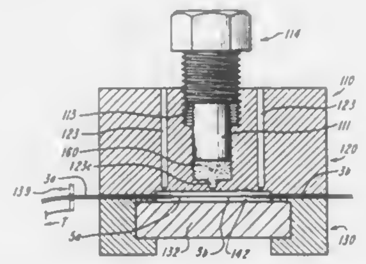
FIBER SPLICE COATING SYSTEM

Robert P. Dahlgren, Somerville, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Nov. 7, 1989, Ser. No. 432,980

Int. Cl.⁵ G02B *6/38;* **H01B** *13/00, 17/34;* **B05D** *3/06*

U.S. Cl. 350—96.21 15 Claims



1. Apparatus for forming a protective covering over a fused optical fiber junction, such apparatus comprising

a die block having an open-sided cavity formed in a surface thereof and having successive first, second and third regions, at least said first and third regions being of cross-sectional dimension for sealingly accommodating a jacketed optical fiber and said second region extending between said first and third regions to accommodate an unclad fiber portion extending therebetween, said die block further including a bleeder passage communicating with said cavity to provide fluid egress therefrom,

means for injecting a coating medium into said cavity, and

means for illuminating at least said second region of the cavity,

whereby when a fiber splice is positioned in said cavity with its fused optical fiber junction positioned in the second region and jacketed regions of the fiber are positioned in said first and third regions of the die block, a coating medium injected into the cavity is cured to form a protective covering of the fiber splice extending between the jacketed regions of the fiber.

5,022,736

SOLAR RAY DEVICE FOR ILLUMINATION

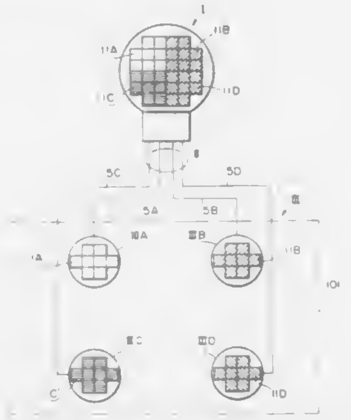
Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

Filed Nov. 20, 1989, Ser. No. 439,074

Claims priority, application Japan, Jan. 26, 1989, 1-16823

Int. Cl.⁵ G02B *6/04*

U.S. Cl. 350—96.24 8 Claims



1. A solar ray device for illuminating a desired area comprising a solar ray collecting means having a first plurality of collector lenses for receiving and focusing solar rays, illuminator means disposed at said desired area to be illuminated, said illuminator means comprising an illuminator frame means mounted a second plurality of light projection lenses, said first plurality of collector lenses being equal to said second plurality of projection lenses to thereby define paired collector and projection lenses, a plurality of cable means comprising a separate light-guiding cable connected between each paired collector lens and projection lens, each of said separate light-guiding cables having a light-receiving end disposed at the focal point of a respective collector lens, sensor means for detecting the direction of the sun's rays and operable to direct said collector lenses towards the sun such that the sun's rays are introduced into the light-receiving ends of said separate light-guiding cables, each of said separate light-guiding cables further having a light-emitting end, said frame means having mounting means for mounting each of said light-emitting ends at a position such that solar light rays introduced into said separate light-guiding cables are emitted from said light-emitting ends to pass to said projection lenses to be radiated through said projection lenses and thereby projected to said desired area for illuminating said desired area.

5,022,737

PLASTIC CLADDING COMPOSITION FOR PLASTIC CORE OPTICAL FIBER, AND PLASTIC CORE OPTICAL FIBER PREPARED THEREFROM

Takashi Yamamoto, Hiroshima; Tsuruyoshi Matsumoto, Otake; Katsuhiko Shimada, Otake; Yoshihiro Uozu, Otake, and Ryuji Murata, Iwakuni, all of Japan, assignors to Mitsubishi Rayon Company Ltd., Tokyo, Japan

Continuation of Ser. No. 81,758, Aug. 5, 1987, abandoned. This application Nov. 22, 1989, Ser. No. 443,794

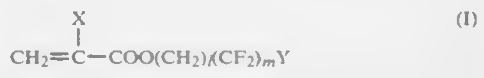
Claims priority, application Japan, Aug. 6, 1986, 61-183342; Feb. 26, 1987, 62-41379; Mar. 31, 1987, 62-76016; Apr. 3, 1987, 62-82704

Int. Cl.⁵ G02B *6/02*

U.S. Cl. 350—96.29 9 Claims

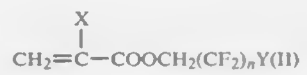
1. A plastic clad plastic core optical fiber comprising a plastic core with a reflective index n_1 and an ultraviolet ray-cured cladding composition with a refractive index n_2, wherein said ultraviolet ray-cured cladding composition is a cured product of a cladding composition comprising:

(a) an ultraviolet ray-curable monofunctional acrylic monomer mixture comprising a highly fluorinated monofunctional acrylate or α-fluoroacrylate represented by the following formula (I):



$$CH_2{=}\overset{\overset{X}{|}}{C}{-}COO(CH_2)_l(CF_2)_mY \qquad (I)$$

wherein X and Y represent H or F, l is an integer of from 1 to 12 and m is an integer of from 5 to 12, and a lowly fluorinated monofunctional acrylate or α-fluoroacrylate represented by the following formula (II):



$$CH_2{=}\overset{\overset{X}{|}}{C}{-}COOCH_2(CF_2)_nY(II)$$

wherein X and Y represent H or F and n is an integer of from 1 to 3,

(b) a polyfunctional acrylate or α-fluoroacrylate having at least two acryloyl or α-fluoroacryloyl radicals in the molecule, and

(c) a photoinitiator, and the difference (n_1-n_2) between the refractive index n_1 of the plastic core and the refractive index n_2 of the cured cladding composition is at least 0.01.

5,022,738

OPTICAL FIBER NONLINEAR WAVELENGTH MODULATOR DEVICE

Naota Uenishi; Takafumi Uemiya; Akira Mizoguchi; Yasuji Ogaki; Yasuhiro Hattori, all of Osaka; Teruo Tohma, Saitama; Kiyofumi Chikuma, Saitama, and Sota Okamoto, Saitama, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Pioneer Electronic Corporation, Tokyo, both of, Japan

Filed Sep. 26, 1990, Ser. No. 588,615

Claims priority, application Japan, Sep. 26, 1989, 1-250923

Int. Cl.⁵ G02B *6/00;* **H03F** *7/00;* **F21V** *9/00*

U.S. Cl. 350—96.34 4 Claims

1. A fiber wavelength modulator device which emits a secondary harmonic component by Cerenkov radiation, comprising:

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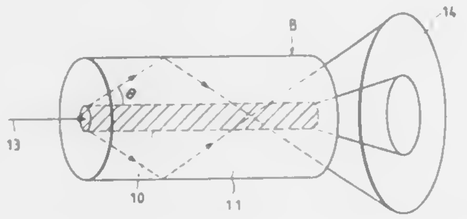
a core being a single crystal of a non-linear optical material; and
a cladding being composed of glass,



wherein the relative difference between said core and said cladding has a refraction index with respect to an incident beam, of at least 0.015.

5,022,739

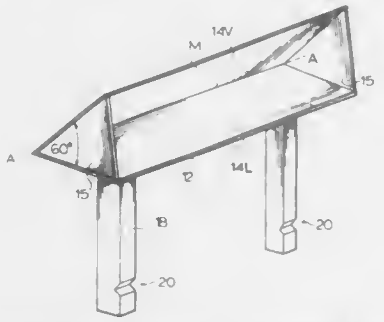
DIRECTION INDICATING REFLECTOR WITH PLANAR REFLECTOR PANELS INCLUDING CUBE CORNERS

Reginald B. Bennett, 3103 Seneca Dr., Oakville, Ontario, Canada L4L 1B1., and Reginald S. Bennett, 44 Charles Street West, Suite 4408, P.O. Box 247, Station 'F' , Toronto, Ontario, Canada M4Y 2L5

Filed Jun. 13, 1990, Ser. No. 538,012

Int. Cl.^{5} G02B *5/122*

U.S. Cl. 350—102 8 Claims



1. Direction indicating reflector comprising a pair of planar reflector panels arranged at an included angle of approximately 60° to each other
each planar reflector panel provides an optically exposed plurality of cube corners
arranged in triads of mutual perpendicular retro reflectant surfaces which are not individually distinguishable at minimum expected viewing distances
wherein said triads of mutually perpendicular surfaces are each approximately symmetrical about a normal to the panel.

5,022,740

INSTRUMENT GAUGE LIGHT PROJECTION DEVICE

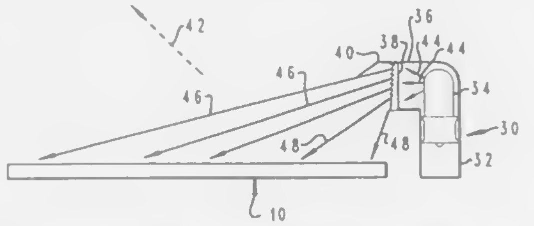
Jack Maziorka, Arlington, Tex., assignor to Steve Forthner, Grand Prairie, Tex.

Filed Jan. 4, 1990, Ser. No. 460,823

Int. Cl.^{5} G02B *27/02*

U.S. Cl. 350—114 20 Claims

1. A light projection device for illuminating a substantially planar surface, comprising:
a housing extending substantially perpendicular to the plane of the surface, and located adjacent said surface;
a housing extension connected to said housing, said extension extending toward the planar surface and having an opening for transmitting light;
a light source located within said housing near its junction with said housing extension; and
a Fresnel lens mounted in said housing extension adjacent the opening for directing light emitted by said source toward the planar surface, said Fresnel lens having a graded transmission function, wherein more light is transmitted at angles directed toward farther regions of the surface, and less light is transmitted at angles directed toward closer regions of the surface, whereby a relatively even level of illumination is achieved over the surface.



5,022,741

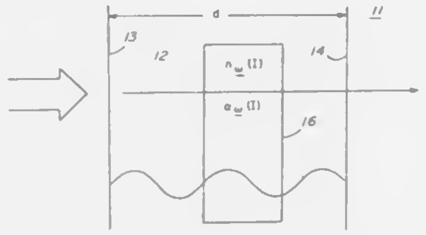
OPTICAL BISTABLE DEVICES BASED ON BOUND EXCITON NONLINEARITY

Mario Dagenais, Wellesley, and Wayne F. Sharfin, Lexington, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Nov. 12, 1985, Ser. No. 796,834

Int. Cl.^{5} G02F *1/01;* G02B *5/23*

U.S. Cl. 350—353 4 Claims



1. An optical bistable device for light at a given wavelength, comprising
a Fabry-Perot cavity having a pair of opposed mirrored surfaces;
direct bandgap semiconductor, having a bound exciton, located within said cavity;
said light being tuned near resonance of said cavity, and
said bound exciton having an absorption frequency near said cavity resonance; and
means for applying a light beam of varying intensity from without said cavity to one of said surfaces,
said semiconductor having an index of refraction that varies with the magnitude of light applied thereto, and
said semiconductor having a coefficient of absorption that varies with the magnitude of light applied thereto, whereby
light applied to said one of said surfaces passes through said device either substantially unimpeded or substantially impeded, dependent upon the magnitude of the applied light.

5,022,742

FAST SHUTTER FOR PROTECTION FROM ELECTROMAGNETIC RADIATION

Franklin D. Hains, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 3, 1983, Ser. No. 538,617

Int. Cl.^{5} G02F *1/01*

U.S. Cl. 350—355 25 Claims

1. A device for modulating electromagnetic radiation comprising:
a substrate of a material transparent to substantially all electromagnetic wave frequencies;
a first thin film of an amorphous semiconductor chalogenide alloy glass deposited on one surface of said substrate;
a second thin film of an amorphous semiconductor chalogenide alloy glass material deposited on the opposite surface of said substrate, and;
means for applying a first predetermined voltage across said first film and applying a second predetermined voltage across said second film in response to electromagnetic radiation having a frequency greater than a predetermined value and incident on either of said thin films such that current flow through said first film is in a direction opposite to the current flow through said second film.

5,022,743

SCANNING CONFOCAL OPTICAL MICROSCOPE

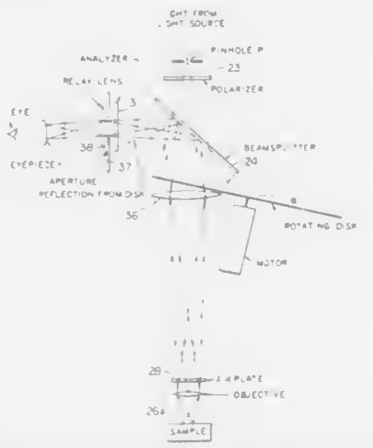
Gordon S. Kino, and Guoging Xiao, both of Stanford, Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Division of Ser. No. 226,044, Jul. 29, 1988, Pat. No. 4,927,254, which is a continuation of Ser. No. 31,516, Mar. 27, 1987, abandoned. This application May 29, 1990, Ser. No. 509,731

The portion of the term of this patent subsequent to May 22, 2007, has been disclaimed.

Int. Cl.^{5} G02B *21/06*

U.S. Cl. 350—507 1 Claim



1. A scanning microscope for viewing an object comprising
a scanning disc with a plurality of pinholes arranged in a predetermined pattern;
a light source on one side of said disc for illuminating an area of said disc;
a first polarizer for polarizing the light which illuminates the disc;
an objective lens on the opposite side of said disc for focusing light diffracted by said pinholes onto the object to illuminate a plurality of points on said object;
means for mounting said disc with its rotational axis at an angle with respect to the axis of light from said source to said objective lens;
means for rotating said disc to scan the points across the object;
said objective lens serving to receive light reflected from the object and focus the light on corresponding pinholes;
a quarterwave plate disposed to cooperate with said objective lens to intercept the light traveling to and reflected from said object;
a beam splitter on said one side of said disc between said first polarizer and said disc for receiving reflected light traveling through said quarterwave plate and said pinholes and directing it; and
a polarizer for receiving the directed light.

5,022,744

MICROSCOPE WITH A CAMERA AND AUTOMATIC COLOR TEMPERATURE BALANCE

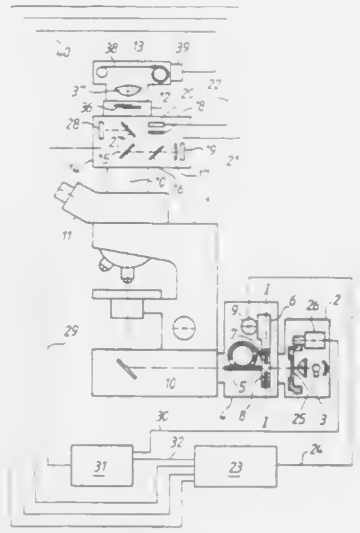
Herbert Leiter, Wetzlar, Fed. Rep. of Germany, assignor to Wild Leitz GmbH, Wetzlar, Fed. Rep. of Germany

Filed Apr. 26, 1989, Ser. No. 343,369

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1988, 3814006

Int. Cl.^{5} G02B *21/26, 21/00*

U.S. Cl. 350—530 5 Claims



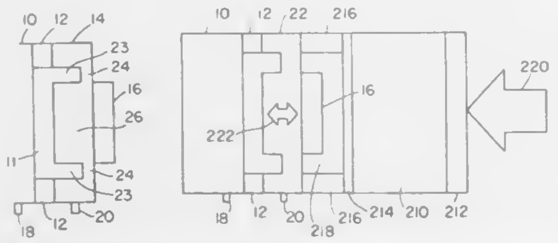
1. A microscope comprising:
illumination means for generating a first light;
a carrier having a first and second optical filter and a provided slit, said provided slit being situated between said first and second optical filters and said first light passing through said carrier resulting in a second light;
motor means for moving said carrier thereby varying a color temperature of said second light;
light guide means for receiving and redirecting said second light as redirected light, said provided slit corresponding to a diameter of said light guide means;
color temperature measuring means for measuring color temperature of said redirected light and outputting color temperature data;

VOL
1127
ISS
2
JE
11
1991
UMI

- color temperature control means for receiving said color temperature data and for correspondingly driving said motor means thereby controlling said color temperature of said second light;
- means for regulating intensity of said redirected light; and
- wherein said means for regulating intensity is connected to said color temperature control means, for compensating any change of said intensity of said redirected light resulting from varying said color temperature of said second light.

5,022,745
ELECTROSTATICALLY DEFORMABLE SINGLE CRYSTAL DIELECTRICALLY COATED MIRROR

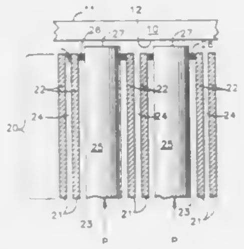
John J. Zayhowski, Pepperell, and Aram Mooradian, Winchester, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.
Filed Sep. 7, 1989, Ser. No. 404,176
Int. Cl.^{5} G02B *5/10;* H01L *29/04*
U.S. Cl. 350—608 **9 Claims**



1. A resonant cavity for a laser formed by two opposing mirrors one of which is an electrostatically deformable single crystal dielectrically coated mirror comprising:
- a thick substrate;
- an insulating layer on said thick substrate, from which a central region has been removed;
- a thin substrate on said insulating layer having at least one polished surface on a side opposite said insulating layer,;
- a mirror layer on said polished surface of said thin substrate which thin substrate is substantially thicker than 10 microns and is sufficiently thick to support said mirror layer but thin enough to deform upon application of a potential between said thin and thick substrates; and
- at least one electrical contact adapted to provide a potential between said thick substrate and said thin substrate to cause said thin substrate to deform and thereby change the resonance of the cavity to tune the laser frequency.

5,022,746
SOLID-TO-LIQUID PHASE CHANGE COOLED MIRROR ARRANGEMENT

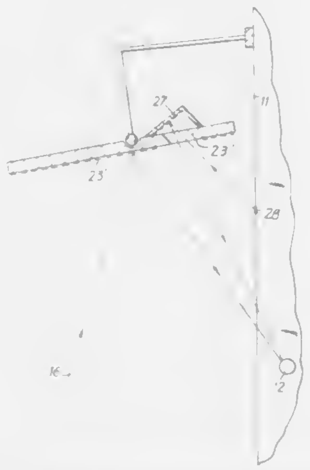
John Bluege, Lake Park, Fla., assignor to United Technologies Corporation, Hartford, Conn.
Filed Jan. 25, 1990, Ser. No. 469,977
Int. Cl.^{5} G02B *5/10*
U.S. Cl. 350—610 **10 Claims**



1. A phase change material cooled mirror arrangement comprising
- a mirror substrate having a reflective front major surface and a rear major surface;
- means for advancing at least one rod of a solid phase change material toward said rear major surface of said mirror substrate for gradual melting of said material at said rear major surface by heat absorbed from said substrate with attendant cooling of the latter, at an advancement speed sufficient for the solid phase change material to make up for the amount of such material that has been transformed into liquid by the melting thereof;
- means for removing said amount of the liquid phase change material from the vicinity of said substrate; and
- means for replenishing said solid phase change material of said rod, including means for adding a replenishment amount of said solid phase change material that is sufficient to make up for the removed amount of said liquid phase change material to an end portion of said rod that is remote from said substrate.

5,022,747
DEVICE FOR ADJUSTING AUTOMOBILE SIDE VIEW MIRROR

Michael L. Polanyi, and Thomas G. Polanyi, both of 105 Vaughn Hill Rd., Bolton, Mass. 01740
Filed Nov. 6, 1989, Ser. No. 431,917
Int. Cl.^{5} G02B *5/08*
U.S. Cl. 350—612 **8 Claims**

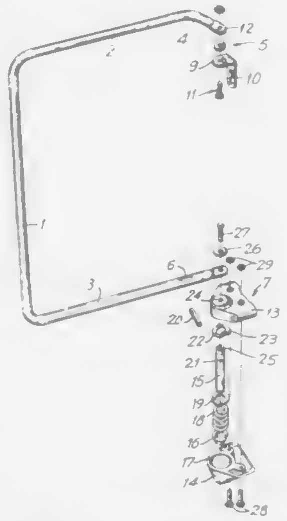


2. A device for adjusting a side view mirror of an automobile, comprising an auxiliary mirror arranged to be located on said side view mirror and being considerably smaller than the

side view mirror. said auxiliary mirror having a reflective surface which is inclined relative to a surface of said side view mirror so that when the driver of the automobile adjusts the side view mirror so as to see an image of a target provided on an automobile body in said reflective surface of said auxiliary mirror, the line of sight of a driver looking in said side view mirror is directed toward a required blind spot area near the automobile.

5,022,748
SUPPORT FOR AN EXTERNAL REARVIEW MIRROR FOR MOTOR VEHICLES

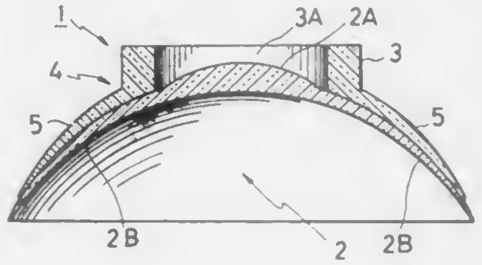
Antonio F. Espirito Santo, Sao Paulo, Brazil, assignor to Metagal Industria e. Comercia Ltda., Sao Paulo, Brazil
Filed Jul. 6, 1990, Ser. No. 550,109
Claims priority, application Brazil, Dec. 11, 1989, 6902578[U]
Int. Cl.^{5} G02B *7/18*
U.S. Cl. 350—639 **3 Claims**



1. A support for an external rearview mirror for motor vehicles, comprising a support rod having an intermediate vertical portion for supporting the mirror and upper and lower transverse portions extending substantially horizontally from opposite ends of said vertical portion and having free ends; and first and second base means connected with respective free ends of said upper and lower transverse portions for attaching said support to a vehicle body, one of said first and second base means including means for pivotally attaching a respective free end of one of said upper and lower transverse portions of said support rod to the vehicle body, and another one of said first and second base means including means for fixedly attaching a free end of another of said upper and lower transverse portions of said support rod to the vehicle body, said second base means including a support body consisting of upper and lower support elements, said fixedly attaching means including a pin having an upper end portion projecting through an opening in said upper support element and an opening in the free end portion of said another of said upper and lower transverse portions of said support rod, a support for receiving a lower end portion of said pin and received in a seat in said lower support element, an elastic pin extending through a through radial opening formed in said pin adjacent to said upper end portion of said pin, a washer located in said upper support element and having folds for receiving said elastic pin, a helical spring extending between an end surface of said seat in said lower support element and said elastic pin, said upper end portion of said pin having axial recesses formed thereon, said fixedly attaching means further including a washer overlying the free end of said another of said upper and lower transverse portions of said support rod and having an opening provided with teeth cooperating with said axial recesses on said upper end portion of said pin to secure said pin against rotation, and thread means for securing said overlying washer to said free end of said another of said upper and lower transverse portions of said support rod.

5,022,749
AUXILIARY INSTRUMENT FOR EXAMINING EYES

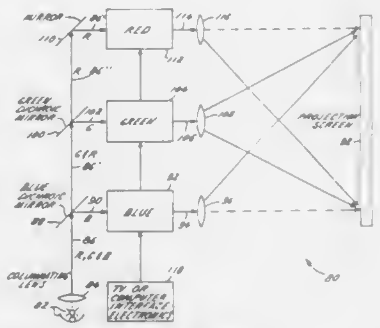
Nobunori Ogura, Tokyo, Japan, assignor to Rainbow Optical Laboratory Co., Ltd., Tokyo, Japan
Filed Jul. 5, 1989, Ser. No. 375,698
Claims priority, application Japan, May 28, 1988, 63-70630
Int. Cl.^{5} A61B *3/00*
U.S. Cl. 351—219 **5 Claims**



1. An auxiliary instrument for examining an eye comprising:
- a contact lens having a spherical surface portion for contacting the surface of the cornea of an eyeball;
- an examination member including a spherical surface portion for overlying and engaging a portion of said contact lens, said examination member including a central opening and wall means surrounding said central opening, said surface portion of said examination member having a concave side and a convex side with said wall means protruding from said convex side a selected distance.

5,022,750
ACTIVE MATRIX REFLECTIVE PROJECTION SYSTEM

Richard A. Flasck, San Ramon, Calif., assignor to RAF Electronics Corp., San Ramon, Calif.
Filed Aug. 11, 1989, Ser. No. 392,746
Int. Cl.^{5} G02F *1/13;* G03B *21/00*
U.S. Cl. 353—31 **55 Claims**



23. A projector system, comprising:
- a source of light;
- means for forming separate blue, green and red light components from said source of light;
- separate reflective imaging means for each said light component, each reflective imaging means including a wafer based active matrix for forming a reflected component light beam and for imparting information onto said reflected component light beam;
- said wafer being a non light transmissive single crystal wafer substrate with said active matrix formed on one surface of said wafer;

VOL
1127
ISS
2
JE
11
1991
UMI

means for directing each of said light components to its respective reflective imaging means; and

at least one means for projecting each of said reflected component light beams for viewing.

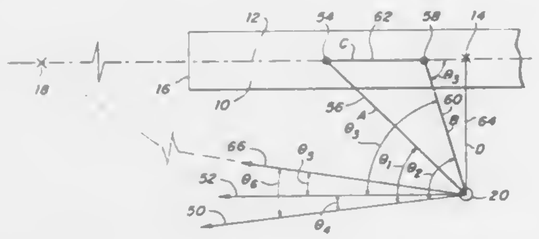
5,022,751
PORTABLE LOCALIZER SITING SYSTEM

Bruce S. Howard, Mercer Island, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Aug. 21, 1989, Ser. No. 396,495

Int. Cl.^{5} G01C *3/00, 3/08;* **G01B** *11/26*

U.S. Cl. 356—1 **14 Claims**



1. A self-siting ground station for an azimuth guidance system for guiding aircraft on approach to a runway, comprising:

a supporting structure;

a rotatably mounted antenna having a predetermined directional transmitting beam supported by supporting structure, said antenna being rotatable in azimuth;

a rotatably mounted range finder collocated with said antenna, said range finder having a predetermined sighting direction and being rotatable in azimuth;

means coupled to said antenna and to said range finder for providing a signal representative of the difference in azimuth between the direction of the transmitting beam of the antenna and the sighting direction of the range finder; and

computing means responsive to two measured distances between the range finder and each of two arbitrary points along the runway and responsive to the difference in azimuth between the two points for determining the azimuth of the direction of the transmitting beam of the antenna required to cause the transmitting beam to intersect a third predetermined point above an extended portion of a line connecting said two arbitrary points.

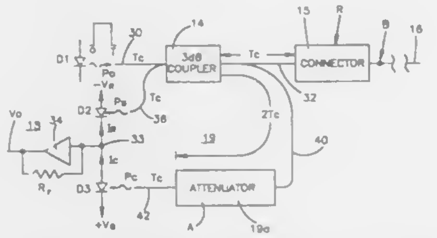
5,022,752
ECHO CANCELLING CIRCUIT FOR USE WITH LASER

George Bu-Abbud, Plano, Tex., assignor to Reliance Comm/Tec Corporation, Chicago, Ill.

Filed Sep. 25, 1989, Ser. No. 411,727

Int. Cl.^{5} G01N *21/88*

U.S. Cl. 356—73.1 **13 Claims**



1. An echo cancelling circuit for connection to an instrument, said instrument including source means for generating light, means for connecting said source means generated light to an optical fiber, said connecting means reflecting with a known intensity some of said source means generated light, and first means responsive to said known intensity connecting means reflected light for generating an electrical signal occurring at a predetermined time after said source means generates light and having an amplitude related to said known intensity, said echo cancelling circuit comprising:

a) attenuating and delay means responsive to said source means generated light when said echo cancelling circuit is connected to said instrument for providing at said predetermined time light having an intensity which is substantially equal to said known intensity; and

b) second means responsive to said attenuating and delay means provided light for generating an electrical signal having an amplitude related to said attenuating and delay means provided light intensity, said second means generated electrical signal provided in phase opposition to said first means generated electrical signal when said echo cancelling circuit is connected to said instrument to thereby substantially cancel said first means generated electrical signal.

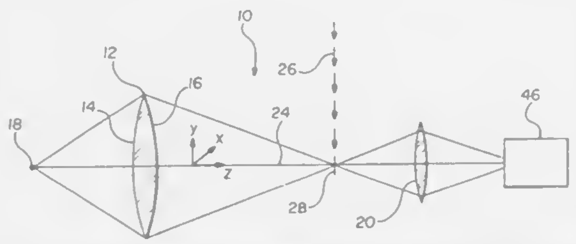
5,022,753
MODIFIED FOUCAULT METHOD FOR UNIQUELY PROFILING AN IMAGING DEVICE

Thomas W. Dey, Springwater, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 31, 1990, Ser. No. 531,202

Int. Cl.^{5} G01B *9/00*

U.S. Cl. 356—124 2 Claims



1. A method suitable for locating and specifying the regions of origination of unacceptable transverse ray aberrations in an imaging device, the imaging device being tested in a modified Foucault knife-edge test assembly, which assembly comprises:

a) an imaging device to be tested;

b) a source of radiation energy that can be directed along a reference axis to the imaging device;

c) a photodetector aligned on the source reference axis, for detecting and measuring the radiation energy imaged by the imaging device; and

d) a knife-edge capable of being positioned in a series of knife-edge position steps, for cutting the radiation imaged by the imaging device, thereby producing a variable radiation energy function, as measurable by the photodetector, the knife-edge comprising a substrate comprising an opaque region;

the method comprising the steps of:

1) normalizing energy radiation levels of the assembly;

2) positioning the knife-edge opaque region in three degrees of freedom, for reducing the radiation energy measured by the photodetector;

3) positioning the knife-edge opaque region in three degrees of freedom, until the photodetector measures a minimum radiation energy; and

4) generating a conjugate image of the imaging device under the last step (3) condition, which conjugate image comprises discrete dark and light regions, which discrete regions correspond to unique mapping of pass/fail portions of the imaging device under test.

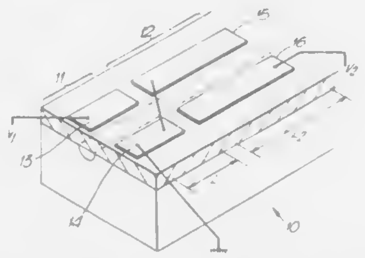
5,022,754
DETERMINING THE WAVELENGTH OF OPTICAL RADIATION

Malcolm P. Varnham, Stevenage, United Kingdom, assignor to British Aerospace Public Limited Company, London, England

Filed Aug. 7, 1989, Ser. No. 390,247

Int. Cl.^{5} G01J *3/00;* **G01B** *9/02*

U.S. Cl. 356—300 6 Claims



1. A method of determining a wavelength of interest of optical radiation, which method comprises:

subjecting the radiation to a plurality of wavelength dependent phase modulations, together having a net phase modulating effect which varies with wavelength and which is zero at a predetermined wavelength,

then determining a net phase modulation of the radiation; and

then determining a difference between said wavelength of interest and said predetermined wavelength from said net phase modulation to determine said wavelength of interest.

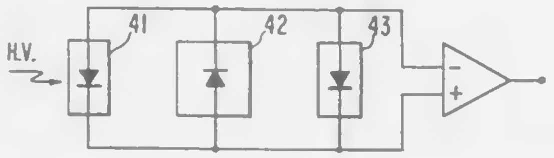
5,022,755
PHOTODIODE CONFIGURATIONS FOR SIMULTANEOUS BACKGROUND CORRECTION AND SPECIFIC WAVELENGTH DETECTION

Gregory J. Wells, Suisun, and Barbara A. Bolton, Albany, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed May 9, 1989, Ser. No. 349,200

Int. Cl.^{5} G01J *3/36*

U.S. Cl. 356—307 **4 Claims**



1. In a gas chromatography apparatus having an optical spectrometer with photodetectors at fixed wavelengths, a photodetector comprising:

a first means for detecting radiation at the fixed wavelength and for providing a first electrical signal as a function of radiation intensity;

a second means for detecting radiation at a wavelength slightly greater than the fixed wavelength and for providing a second electrical signal as a function of radiation intensity;

a third means for detecting radiation at a wavelength slightly less than the fixed wavelength and for providing a third electrical signal as a function of radiation intensity;

said second and third means being connected in the same polarity so that said second and third electrical signals add to provide a summed electrical signal and said first means being connected in reverse polarity to said second means so that said summed electrical signal is subtracted from said first electrical signal, the efficiency of said first, second and third means being such that said first means provides twice as much electrical signal as said second means or said third means for the same amount of radiation.

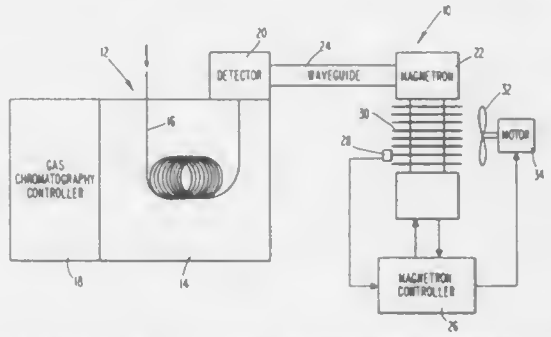
5,022,756
METHOD AND APPARATUS FOR SPECTROCHEMICAL ANALYSIS HAVING MAXIMUM REPEATABILITY

Robert P. Rhodes, Lincoln University, Pa., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 3, 1989, Ser. No. 431,504

Int. Cl.^{5} G01N *21/73*

U.S. Cl. 356—316 **24 Claims**



1. Apparatus for controlling measurement repeatability in spectrochemical analysis which analysis utilizes a plasma source, said apparatus comprising:

a plasma generator for providing energy to said plasma source to sustain plasma;

a sensor for sensing the operating temperature of said plasma generator; and

temperature control means for controlling the operating temperature of said plasma generator in response to said sensor so that the repeatability is controlled.

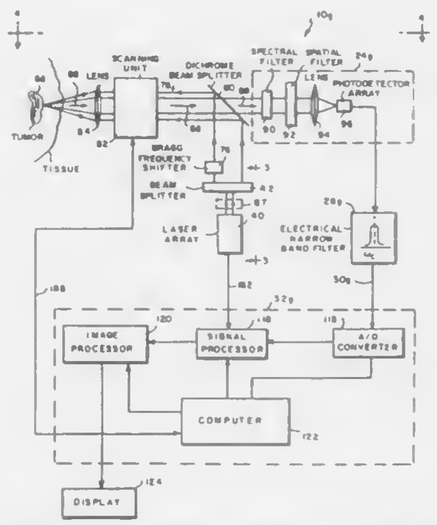
5,022,757
HETERODYNE SYSTEM AND METHOD FOR SENSING A TARGET SUBSTANCE

Mark D. Modell, 321 Tappan St., Brookline, Mass. 02164

Filed Jan. 23, 1989, Ser. No. 299,315

Int. Cl.^{5} G01N *21/64, 21/49*

U.S. Cl. 356—318 **27 Claims**



1. A system for sensing a target substance in a medium, comprising:

transmitter means for directing first and second beams of radiation to intersect within the medium and establish a sensing volume, the beams having different frequencies to generate a beat frequency at the sensing volume;

means for detecting a selected optical effect, based on an optical property of the target substance within the sensing

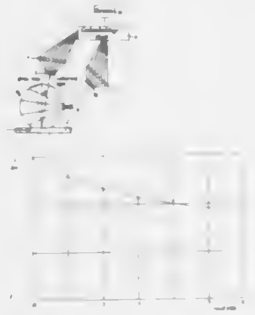
VOL
1127
ISS
2
JE
11
1991
UMI

volume, on the first and second beams at at least one selected spectral line and for generating a signal representative of the selected optical effect;
signal filter means for passing only the portion of the signal which is substantially at the beat frequency to produce a beat portion signal; and
means for combining the beat portion signal with a selected value to determine the amount of the target substance.

5,022,758

ARRANGEMENT FOR DETERMINING THE DEGREE OF DISPERSION OF MAGNETIC PIGMENTS IN A DISPERSION

Horst Schulz, Miesbach, Fed. Rep. of Germany, assignor to BASF Magnetics GmbH, Mannheim, Fed. Rep. of Germany
Filed Sep. 12, 1988, Ser. No. 242,521
Claims priority, application Fed. Rep. of Germany, Sep. 22, 1987, 3731804
Int. Cl.⁵ G01N *15/02, 21/85, 21/49;* **G01B** *5/842*
U.S. Cl. 356—319 14 Claims



1. A method for determining the degree of dispersion of magnetic pigments in a dispersion in an illuminating and measurement apparatus
comprising the sequential steps of
providing a pulverulent magnetic pigment, a solvent and at least one polymer soluble in the solvent in a dispersion, passing the dispersion through a conduit having at least a section transparent to radiation in the visible spectrum,
providing light in the visible spectrum from an illuminating means,
diffusely reflecting a portion of said light from said dispersion as it passes through said transparent section, directing said diffusely reflected light to a first holographic grid,
breaking down said diffusely reflected light spectrally at said first grid,
directing another portion of the light as a reference light from said illuminating means directly to a second holographic grid and
breaking down said reference light spectrally at said second grid,
measuring the spectrally broken down light from said first and second grids at photoelectric means for measuring visible radiation,
observing the color and brightness of the light spectrally broken down at the grids and measured at the photoelectric means
providing a calculating unit with data from observations at the photoelectric means,
performing in the calculating unit calculations from the data obtained from the
photoelectric means, the equation for determining the color distance in a color system of the diffusely reflected light which is

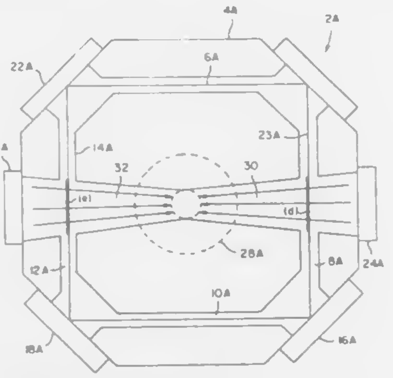
$$\Delta E^* = \sqrt{(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2}$$

in which
L* represents the range of brightness from white to dark,
Δa* represents the range of color values from red to green,
Δb* represents the range of color values from yellow to blue,
The color and brightness values being determined from the achromatic center point of the color system,
ΔE* represents the color and/or brightness distance between the reference light and diffusely reflected light
and performing in the calculating unit calculation from the obtained data to obtain the degree of dispersion of the magnetic pigment.

5,022,759

RING LASER GYROSCOPE ARRANGED FOR MAINTAINING IONIZED GAS DISCHARGE TRANSVERSE TO THE OPTICAL AXIS OF THE GYROSCOPE

Joseph P. Ficalora, Oak Ridge, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.
Filed Mar. 5, 1990, Ser. No. 488,186
Int. Cl.⁵ G01C *19/64*
U.S. Cl. 356—350 10 Claims



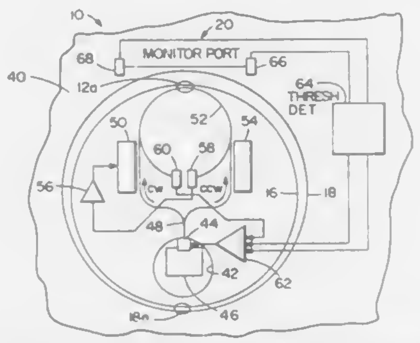
1. A ring laser gyro comprising:
a base;
passageways within the base which, together with mirrors, form a closed optical cavity for counterpropagating beams of coherent light traveling around an optical axis;
the base forming a sealed envelope containing a gas under a low pressure in the closed optical cavity;
electrodes disposed in communication with the closed optical cavity so that when said electrodes are energized an electrical potential sufficient to support ionized gas excitation and optical gain is maintained in the gas;
the closed optical cavity having optical gain sections which are the portions of the closed optical cavity in which the energized electrodes maintain an ionized gas discharge; and
the electrodes and the closed optical cavity arranged so that said discharge is generally transverse to the direction of the optical axis.

5,022,760

COMPOUND RESONATOR FOR IMPROVING OPTIC GYRO SCALE FACTOR

Anthony W. Lawrence, Walpole, and Joseph J. Danko, Franklin, both of Mass., assignors to Northrop Corporation, Hawthorne, Calif.
Filed Mar. 22, 1990, Ser. No. 497,955
Int. Cl.⁵ G01B *9/02*
U.S. Cl. 356—350 10 Claims

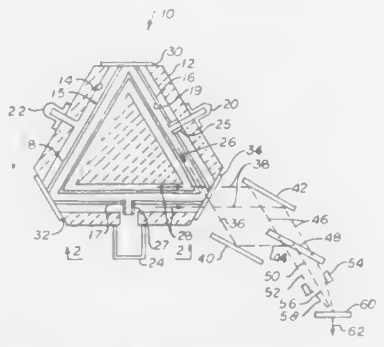
1. An optic gyroscope comprising:
laser source means coupled to means for varying a frequency of an optical output of the laser source means;
first resonator means coupled to the optical output of the laser source means for propagating a clockwise rotating radiation beam and a counter-clockwise rotating radiation beam both of which are derived from the laser source means optical output;
first detector means optically coupled to the first resonator means for detecting an amount of energy associated with at least one of the propagating radiation beams;
second resonator means, optically coupled to the first resonator means, for extracting a significant amount of energy from the first resonator means when a coresonance frequency condition exists with the first resonator means and for extracting an insignificant amount of energy from the first resonator means when a coresonance frequency condition does not exist with the first resonator means; and
second detector means optically coupled to the second resonator means for detecting an amount of energy within the second resonator means; wherein
the frequency varying means is coupled to an output of the second detector means and is responsive thereto for ramping the frequency of the laser source means to a first frequency substantially equal to a coresonance frequency, the frequency varying means further being coupled to an output of the first detector means and responsive thereto for further ramping the frequency of the laser source means to a second frequency that is not a coresonance frequency, the second frequency being a nominal operating frequency for the optical gyroscope, and for selecting the second frequency as a frequency for operation of the optical gyroscope.



5,022,761

RING LASER GYROSCOPE WITH A TUBE ASSEMBLY

Thomas W. Kennedy, 134 Wildwood Ave., Montclair, N.J. 07043
Filed Nov. 6, 1989, Ser. No. 431,993
Int. Cl.⁵ G01C *19/68;* **H01S** *3/083*
U.S. Cl. 356—350 7 Claims

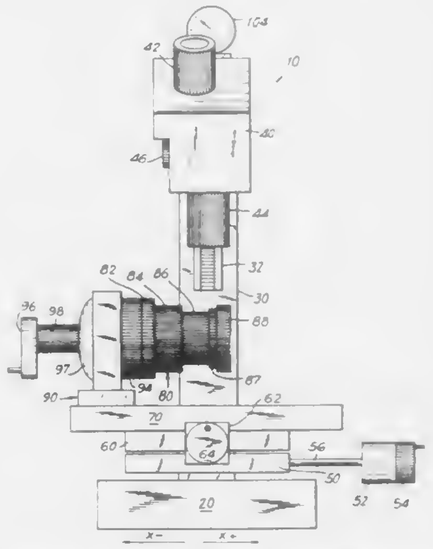


1. A ring laser gyroscope comprising:
a block having an outer cavity for an outer beam;
a tube assembly having a coaxial inner cavity for an inner beam;
a pair of anodes and a cathode for energizing the beams;
a plurality of mirrors respectively disposed at the corners of the block; and
a beam combiner and detector assembly for combining the beams and for providing a gyroscope output whereby lock-in is avoided.

5,022,762

APPARATUS FOR OPTICALLY INSPECTING PRINTER DIE MOTIFS

Roy C. Stroud, 4120 Round Tree Road, Richmond, Va. 23229, and Walter A. Baker, 4031 Dorset Road, Richmond, Va. 23234
Filed Jun. 29, 1989, Ser. No. 373,887
Int. Cl.⁵ G01B *11/00*
U.S. Cl. 356—372 14 Claims



1. A portable apparatus for inspecting dimensions and an orientation of printer die motifs, comprising:
optics for viewing a printer die motif, with the optics being supported by a support means;
means for positioning the printer die in a predetermined manner;
means for measuring at least three dimensions of a printer die motif;
means for moving a printer die motif in a first and an opposite second direction in a plane perpendicular to an axis of an optical path issuing from the optics;
means for moving a printer die motif in a third and an opposite fourth direction in a plane perpendicular to the axis of the optical path issuing from the optics, with the third and opposite fourth directions being disposed 90° from the first and opposite second direction; and
means for rotating the printer die motif through the optic path issuing from the optics.

5,022,763

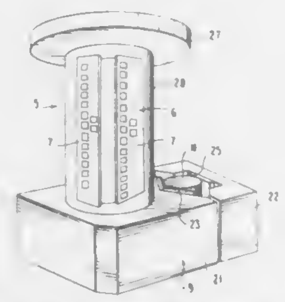
RECEIVER FOR ROTATING LASERS USED FOR GUIDING MACHINES, PARTICULARLY PUBLIC WORKS MACHINES

Louis Vuagnat, Sainte Foy Les Lyon, France, assignor to GV S.A., France
PCT No. PCT/FR89/00221, § 371 Date Jan. 9, 1990, § 102(e) Date Jan. 9, 1990, PCT Pub. No. WO89/11107, PCT Pub. Date Nov. 16, 1989
PCT Filed May 9, 1989, Ser. No. 465,096
Claims priority, application France, May 10, 1988, 88 06559
Int. Cl.⁵ G01S *1/70;* **G05D** *1/03*
U.S. Cl. 356—400 4 Claims

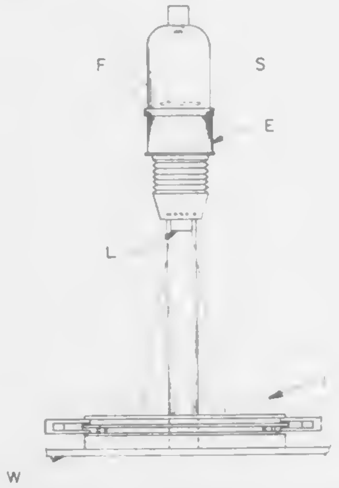
1. In a receiver for rotating beam lasers for guiding a ma-

VOL
1127
ISS
2
JE
11
1991
UMI

chine, said receiver comprising: a receiver assembly (6) disposed on a support (9) for fastening said receiver assembly on the machine, said receiver assembly consisting essentially of plates (7) carrying photodiodes (8) disposed around a fixed shaft to form a pillar such that the laser beam can be detected over 360°, and a peripheral shell (28) capped by a protective hood (27) about said receiver assembly, the improvement wherein the photodiode (8) plates (7) are three in number, disposed vertically around a vertical, central support shaft forming an angle of 60° to one another, means for detachably mounting said plates (7) to said shaft (10) and damping members disposed at each end of the plate support shaft (10) and around the shaft (10).

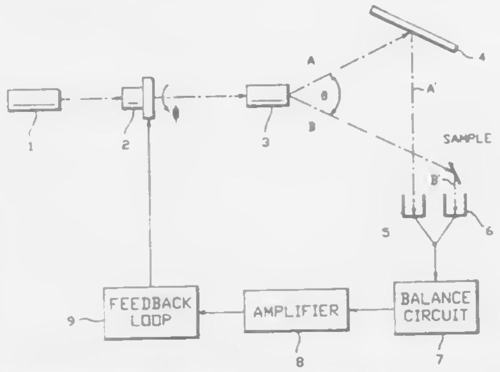


5,022,764
EASEL FOR OPTIMIZING PHOTOGRAPHIC COLOR PRINTS
James S. Kilgore, Jr., Dallas, Tex., assignor to Doyle J. Craig, Jr. and Tom D. Copeland, Jr., both of Garland, Tex., a part interest to each
Filed Jul. 10, 1989, Ser. No. 377,543
Int. Cl.^{5} G01J *3/40;* G03B *27/58*
U.S. Cl. 356—404 13 Claims



1. In an easel device for preparing color calibration test prints by selective exposure of print paper to a film image through light filters and a light source, having a print paper support pedestal and a plurality of light filters encased in a filter magazine, and a means for rotating said pedestal selectively under each light filter within said light filter magazine, the improvement comprising:
- a. a single pivot pin for translation direction control for said print paper support pedestal;
- b. a platen with a continuous slot providing a translational path to be followed by said pivot pin;
- c. a filter magazine encasing said light filters.

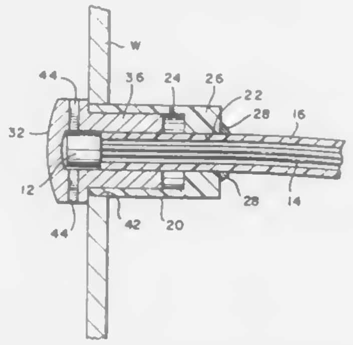
5,022,765
NULLING OPTICAL BRIDGE FOR CONTACTLESS MEASUREMENT OF CHANGES IN REFLECTIVITY AND/OR TRANSMISSIVITY
Daniel Guidotti, Yorktown Heights; Swie-in Tan, Stormville, and John G. Wilman, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Oct. 23, 1987, Ser. No. 112,803
Int. Cl.^{5} G01J *4/00*
U.S. Cl. 356—435 11 Claims



1. A nulling optical bridge for measuring the relative power of the two optical beams and the change in the reflection and/or transmissivity characteristics of a material under processing comprising:
- (a) illumination means for supplying a source of light,
- (b) adjustable polarizer means for linearly polarizing said source of light incident thereon,
- (c) prism means for splitting said light from said polarizer means into more than one beam,
- (d) first photodetector means,
- (e) reflection means for reflecting said beams from said prism means, with one of said beams being directed to be incident on the material under processing and another of said beams being reflected directed to said first photodetector means,
- (f) second photodetector means for receiving in synchronism said beam reflected from the material under processing, and
- (g) control means for comparing the power of said detected beam from the material under processing received by said second photodetector means to the power of said another beam received by said first photodetector means such that any differences in the relative power between these beams is fedback to adjust said polarizer means until the intensity of said beams is equalized.

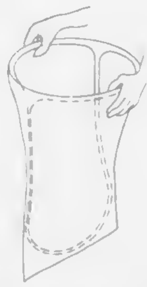
5,022,766
TEMPERATURE SENSING DEVICE
Jack M. Phipps, 1337 Rutherford Dr., Mesquite, Tex. 75149
Filed Jan. 19, 1990, Ser. No. 467,561
Int. Cl.^{5} G01K *1/14, 1/20*
U.S. Cl. 374—209 11 Claims

1. A temperature sensing device for mounting on a wall, comprising:
- a) an electrically operative temperature sensing element;
- b) housing means surrounding said sensing element;
- c) said housing means including an insulating sleeve surrounding said sensing element;
- d) said housing means further including a protective cap for mounting in the wall and covering the sensing element;
- e) said insulating sleeve is mounted to said cap; and,
- f) said protective cap including a passage therein, whereby ambient air may flow through said passage to said temperature sensing element;
- g) said cap includes a depending portion;



- h) said insulating sleeve has a hollow portion; and,
- i) said depending portion is located inside said hollow portion of said sleeve.

5,022,767
SELF SUPPORTING TRASH BAG
Richard Cardulla, 801 Independence Ave., S.E., Washington, D.C. 20003
Filed Feb. 6, 1990, Ser. No. 476,000
Int. Cl.^{5} B65D *33/02*
U.S. Cl. 383—33 3 Claims



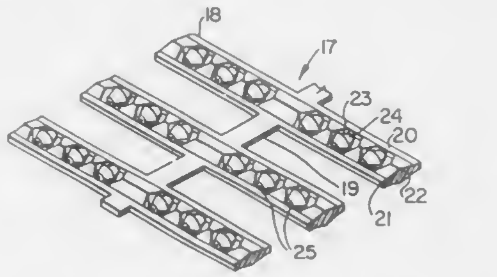
1. A bag of thermoplastic material comprising an open top, a closed bottom and vertical seams in combination with a foldable, metal frame, said frame further comprising a pair of overlying, deformable oblong hoops having elongated portions fastened together within the vertical seams of the bag and located at one end of the elongated portions are tops of the hoops that remain unattached to each other and located at the opposite end of the elongated portions are bottoms of the hoops that remain unattached to each other, whereby upon bending the tops away from each other and upon bending the bottom away from each other, the bag is maintained in an open and upright position.

5,022,768
MOULDED ROLLER BEARINGS AND RETAINER CAGE AND METHOD OF ASSEMBLING DRAWER SLIDES
Alan R. Baxter, Waterloo, Canada, assignor to Waterloo Metal Stampings Ltd., Waterloo, Canada
Filed May 10, 1990, Ser. No. 520,657
Claims priority, application Canada, Aug. 28, 1989, 609551
Int. Cl.^{5} F16C *29/04, 33/46;* A47B *88/00*
U.S. Cl. 384—19 9 Claims

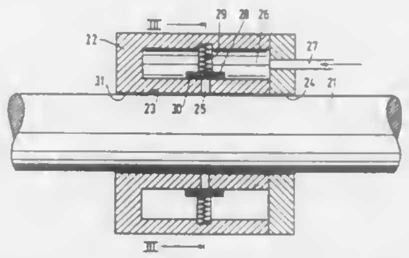
1. A moulded roller bearing cage assembly for use with slides for drawers and cabinets comprising a plurality of rollers and a cage having a plurality of apertures; wherein the maximum diameter of said rollers exceeds the maximum width of said cage; said rollers being positioned in said apertures and integral with said cage and being connected to said cage at their ends solely through narrow frangible links; said frangible links serving to maintain said rollers in position in their apertures until and during the time of installation and thereafter being breakable by engagement with raceway surfaces in the installation to enable rotation.

8. A drawer slide for use with drawers and cabinets comprising:

an inner channel and an outer channel having raceway surfaces, and at least one molded roller bearing cage assembly positioned between said channels, said molded roller bearing cage assembly having a plurality of rollers and a cage having a plurality of apertures, and wherein the maximum diameter of said rollers exceeds the minimum width of said cage, and the peripheral surfaces of said rollers engaging said raceway surfaces, and wherein prior to operation of said drawer slide, said rollers are positioned in said apertures and are integral with said cage being connected thereto at their ends solely through narrow frangible links, and wherein, upon operation of said drawer slide, said frangible links are broken by the engagement of said rollers with said raceway surfaces.



5,022,769
STATIC BEARING
Johannes A. H. M. Jacobs, and Peter L. Holster, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Continuation of Ser. No. 318,082, Mar. 2, 1989, abandoned. This application Jun. 6, 1990, Ser. No. 535,238
Claims priority, application Netherlands, Mar. 17, 1988, 8800656
Int. Cl.^{5} F16C *32/06*
U.S. Cl. 384—118 2 Claims



1. A radial static bearing comprising an annular bearing bush for rotatably supporting a journal, said bearing bush having a bearing surface spaced from said journal defining a bearing space, an annular chamber adjacent said bearing surface into which a bearing medium is supplied under pressure during bearing operation, a plurality of supply openings extending from said annular chamber through said bearing surface for supplying bearing medium from said annular chamber to said bearing space and for communicating pressure of said bearing medium in said bearing space to said annular chamber, and valve means associated with each opening for controlling the passage of fluid through said each opening in response to changes in pressure of the bearing medium in the bearing space adjacent said each opening, characterized in that:

said valve means comprises a continuous annular flexible ring in said chamber and

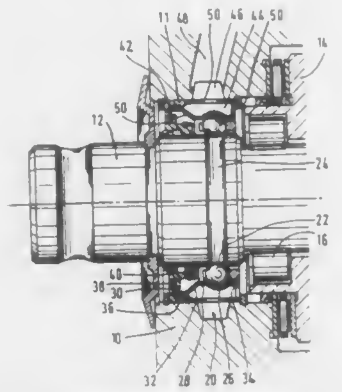
294-517 O.G.-91-9

VOL
1127
ISS
2
JE
11
1991
UMI

biasing means for biasing said flexible ring towards said openings, said annular ring being spaced from said supply openings with a predetermined gap in the unloaded condition of said biasing means.

5,022,770
ROTATING AND SEALED BEARING ASSEMBLY OF A FIRST MEMBER ROTATING IN A SECOND MEMBER

Esteve C. Guasch, Barcela, Spain, assignor to Bendix Espana S.A., Barcelona, Spain
Filed Jun. 26, 1990, Ser. No. 543,626
Claims priority, application Spain, Aug. 7, 1989, 8902799
Int. Cl.⁵ F16C *33/72, 33/58*
U.S. Cl. 384—477 **8 Claims**



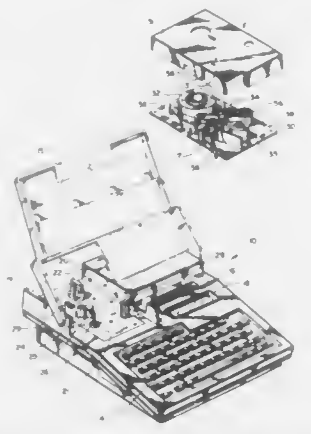
1. A rotating and sealed bearing assembly of a first member rotating in a second member, comprising a bearing outer track structure mounted in a bore of the second member traversed by the first member and bearing a lip seal, a bearing inner track being formed on the first member, the bearing outer track structure being made of a sheet steel backing plate shaped in order to present an intermediate zone of rounded profile forming the bearing outer track structure, the intermediate zone being extended on one side by a first end zone extending axially and on the other side by a second end zone extending axially. the second end zone being connected to the intermediate zone by a median zone extending radially, the second end zone extending axially in the same direction of the first end zone, the second end zone being joined with the first end zone, and the sheet steel backing plate defining an annular chamber between the bearing outer track structure and the bore of the second member.

5,022,771
THERMAL PRINTING APPARATUS AND TAPE SUPPLY CARTRIDGE THEREFOR

Michael W. Paque, Scottsdale, Ariz., assignor to Kroy Inc., Scottsdale, Ariz.
Filed Jul. 17, 1989, Ser. No. 381,057
Int. Cl.⁵ B41J *3/02, 35/28*
U.S. Cl. 400--120 **18 Claims**

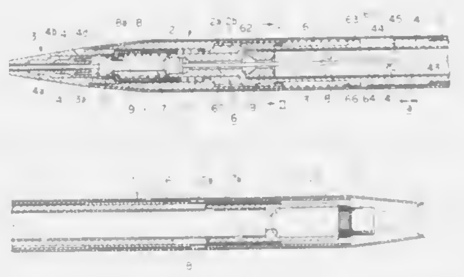
1. A tape supply cartridge for operative insertion into and use with a thermal printing device or the like having cartridge receiving and alignment means, a platen alignment post and a printhead, said cartridge comprising:

a cartridge housing having top and bottom walls and an end wall joining said top and bottom walls;
a printhead opening in one of said top and bottom walls;
a tape opening in a portion of said end wall;
a supply of tape;
a printing platen disposed between and mounted for limited alignment positioning relative to, said top and bottom walls and adapted for alignment relative to said platen alignment post, said platen cooperating with said printhead to define a print station for generating printed characters on said tape; and
guide means for guiding said tape past said print station.



5,022,772
ROTARY KNOCK TYPE MECHANICAL PENCIL

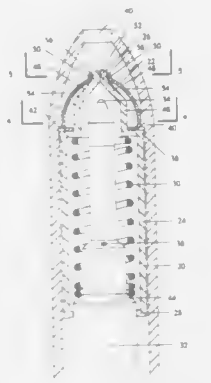
Hidehei Kageyama, Saitama, Japan, and Robert V. Lozeau, Cumberland, R.I., assignors to Kotobuki & Co., Ltd., Kawagoye, Japan and A.T. Cross Company, Lincoln, R.I.
Continuation of Ser. No. 123,266, Nov. 20, 1987, Pat. No. 4,895,467. This application Sep. 11, 1989, Ser. No. 405,883
Claims priority, application Japan, Nov. 25, 1986, 61-180740; Jun. 15, 1987, 62-91654
The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.
Int. Cl.⁵ B43K *21/20*
U.S. Cl. 401—65 **7 Claims**



1. A rotary knock type mechanical pencil comprising:
(a) a forward outer cylinder.
(b) a rearward outer cylidner rotatably and removably connected to a rear end of said forward outer cylinder,
(c) a lead chuck fitted in said forward outer cylinder and movable to feed a lead responsive to rotation of said rearward outer cylinder, said lead chuck having an extremity end for engagement by a chuck tightening ring to clamp lead in said chuck,
(d) a forward inner cylinder engaged in said forward outer cylinder,
(e) a chuck tightening ring engageable over the extremity end of said lead chuck,
(f) a sleeve axially movable in said forward inner cylinder into engagement with said chuck tightening ring, said sleeve having an extremity end with an inward projection near said ring.
(g) a lead guide connected to said chuck and having a forward and rear end,
(h) a first resilient member resiliently fitted between the inward projection of said sleeve and the forward end of the lead guide and biasing said tightening ring in the forward direction through said sleeve,
(i) cam engaging means connected at the rear end of said lead guide and movably inserted into said forward outer cylinder for axial movement together with said lead guide,
(j) a cam cylinder connected to said rearward outer cylinder, said cam cylinder being rotatably and removably inserted into a rearward part of said forward outer cylinder,
(k) cam surface means connected in a front end of said cam cylinder integrally rotated with said rearward outer cylinder to feed the lead,
(l) the cam surface means comprising a large cam surface and a small cam surface, the large and small cam surfaces being inclined in opposite directions,
(m) the cam surface means being operatively engaged with said cam engaging means, and
(n) an engaging part arranged in front of said small cam surface, whereby movement of the cam engaging means on the cam surface means as the cam surface means rotates with rotation of said rearward outer cylinder in either direction causes axial movement of the chuck for feeding lead, engagement of said cam engaging means with the engaging part comprising a release position for lead in the chuck.

5,022,773
RETRACTABLE PEN WITH SELF SEALING WRITING TIP OPENING

Richard Waldinger, 11 Ridge Rd., Searingtown, N.Y. 11507, and Allan L. Backus, 1550 Centinela Ave., #210, Los Angeles, Calif. 90025
Filed Mar. 30, 1990, Ser. No. 502,252
Int. Cl.⁵ B43K *34/00, 3/02, 5/16*
U.S. Cl. 401—107 **5 Claims**

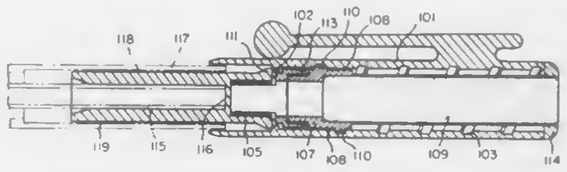


1. A retractable tip writing instrument with self sealing tip comprising:

a hollow elongated outer housing with a writing tip orifice at one end;
an elongated writing fluid reservoir with a writing tip at one end, said elongated writing fluid reservoir having an air vent and being disposed within said elongated outer housing;
means to protract and retract said writing tip through said writing tip orifice;
a pliable seal disposed entirely within said hollow elongated outer housing, said pliable seal being closed at one end and sealing both said writing tip and said air vent from contact with outside air when said writing tip is retracted, said pliable seal being wedged open by said writing tip when said writing tip is protracted; and
wherein said pliable seal has a secondary seal which is in contact with said writing fluid reservoir and both said pliable seal closure and said secondary seal block said writing tip and said vent from contact with outside air.

5,022,774
WRITING TOOL WITH ERASER DISPENSER

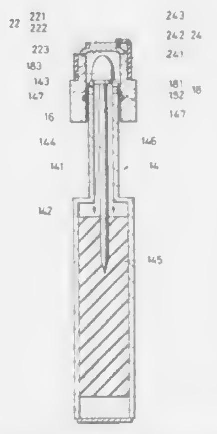
Shuhei Kageyama; Toshihiko Kageyama; Youichi Nakazato, and Yoshihide Mitsuya, all of Kawagoe, Japan, assignors to Kotobuki & Co., Ltd., Kyoto, Japan
Filed Oct. 7, 1988, Ser. No. 255,101
Claims priority, application Japan, Oct. 9, 1987, 62-155300[U]; Oct. 9, 1987, 62-155301[U]; Oct. 9, 1987, 62-155302[U]; Nov. 6, 1987, 62-170189[U]; Nov. 6, 1987, 62-1701090[U]; May 18, 1988, 62-66194[U]
Int. Cl.⁵ B43K *29/02*
U.S. Cl. 401—52 **3 Claims**



1. A writing tool comprising: a writing shaft (**2**) having a head member (**1**); an outer sleeve (**6**); said writing shaft (**2**) being inserted in said outer sleeve (**6**) with said head member (**1**) projecting from said sleeve (**6**); a lead container (**3**) on said writing shaft (**3**); said lead container being constructed for movement in an axial direction and including means for locking said lead container (**3**) from turning movement against an inner surface of said outer sleeve (**6**); a detachable tubular cap (**10**) having a tubular portion (**9**) rotatably engaging said lead container (**3**); said tubular cap (**10**) having a spiral groove (**11**) on an inner surface; an eraser holder (**13**) having an eraser (**12**); said eraser holder (**13**) being inside said tubular cap (**10**) and having a projecting part (**13**a) engaging said spiral groove (**11**); said eraser holder (**13**) having a tubular body (**16**) engaging a rear portion of said lead container (**3**) for axial movement therewith; said tubular body (**16**) having a retaining recess (**104**) receiving an annular projection (**102**) on an inner forward end of said tubular cap (**10**); whereby rotation of said cap causes said eraser holder (**13**) to move in an axial direction to extend or retract said eraser.

5,022,775
WRITING INPLEMENT WITH MAGNETIC CLOSURE

Shigeyasu Inoue; Tatsuya Ozu, and Yasunori Nakatani, all of Osaka, Japan, assignors to Kabushiki Kaisha Sakura Kurepasu, Osaka, Japan
Filed Aug. 2, 1990, Ser. No. 562,047
Claims priority, application Japan, Aug. 9, 1989, 1-94208[U]; Jul. 31, 1990, 2-204267
Int. Cl.⁵ B43K *9/00*
U.S. Cl. 401—107 **29 Claims**



1. A writing implement having a sleeve formed with a bore

VOL
1127
ISS
2
JE
11
1991
UMI

extending therethrough axially of the implement, a barrel inserted in the bore of the sleeve and retractably projectable forward from the forward end of the sleeve, and a closure so shaped as to close the forward end opening of the bore of the sleeve, the writing implement being characterized in that at least the forward end portion of the sleeve and the closure are made of a magnetic material, at least one of the sleeve forward end portion and the closure being formed by a magnet so as to attract the other, the closure being connected to the sleeve by a connecting member made of an elastic material so as to be movable between a position where the closure closes the forward end opening of the sleeve bore and position where the closure opens the forward end opening to permit the barrel to project forward, the closure being biased by the connecting member toward the sleeve to a position where the closure is attractable by the sleeve.

5,022,776

Patent Not Issued For This Number

5,022,777

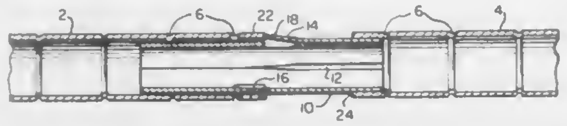
POST CONNECTOR

Albert Kolvites, Mountaintop, Pa., assignor to InterMetro Industries Corporation, Wilkes-Barre, Pa.

Filed May 23, 1990, Ser. No. 527,387

Int. Cl.^{5} B25G *3/00*

U.S. Cl. 403—14 **14 Claims**



1. A connector sleeve device for connecting together first and second hollow posts each having an end surface, said connector sleeve device comprising:

a sleeve having an outer surface dimensioned to be inserted into the interior of both the first and second posts;

a first flexible generally rectangularly shaped protrusion formed by a generally U-shaped opening in a first side of said sleeve at a mid-region thereof, said first protrusion being biased in a direction away from the outer surface of said sleeve and forming an incline with respect to said outer surface, said first protrusion further having a first interference surface adapted to abut the end surface of the first post when said sleeve is inserted into the first post, for preventing said sleeve from being moved further into the first post; and

a second flexible generally rectangularly shaped protrusion formed by a generally U-shaped opening in a second side of said sleeve at the mid-region thereof, said second protrusion being biased in a direction away from the outer surface of said sleeve and forming an incline with respect to said outer surface, said second protrusion further having a second interference surface adapted to abut the end surface of the second post when said sleeve is inserted into the second post, for preventing said sleeve from being moved further into the second post, said second interference surface being disposed substantially in the same cross-sectional plane of said sleeve as is said first interference surface surface, said inclines of said respective first and second protrusions inclining in opposite directions, and said first and second sides of said sleeve being generally opposed to each other, whereby the end surfaces of the first and second posts are permitted to come into contact.

5,022,778

PIVOT SHAFT

Sheng N. Lu, No. 174, Chun Ying St., Shu Lin Chen, Taipei Hsien, Taiwan

Filed Nov. 2, 1990, Ser. No. 608,264

Int. Cl.^{5} F16C *11/00*

U.S. Cl. 403—120 **1 Claim**

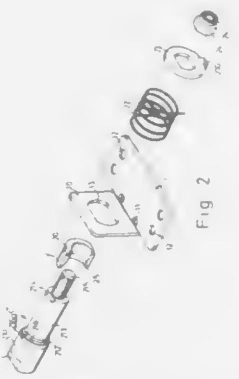


Fig 2

1. A pivot shaft comprising:

a holder having a base and a vertical mount, said base having two pairs of side holes and a pair of joint holes, said vertical mount having a shaft hole;

a sleeve having a first pair of diametrically opposed notches fitted into said shaft hole of said vertical mount, and providing an inner tapered portion for a shaft to pass therethrough and be rotatable therein;

said shaft constructed with a head, a cylinder, and a threaded portion which are integral, said head having a second pair of diametrically opposed notches, and a tapered portion provided between said head and said cylinder engaging with said inner tapered portion of said sleeve, said tapered portion on the shaft having a peripheral groove with a pair of channels disposed perpendicular thereto, said cylinder having a third pair of diametrically opposed notches near a boundary of said cylinder and said threaded portion engaging with a washer;

a spring provided about said shaft between said vertical mount and said washer, and a first end of said spring inserted into one of said joint holes and a second end of said spring abutting an outer edge on said washer;

said washer having said outer edge to block said second end of said spring and an opening for said threaded portion of said shaft to pass therethrough, said third pair of diametrically opposed notches of said cylinder engaging with said opening; and

a nut having an inner washer for said threaded portion to pass therethrough and fasten therein.

5,022,779

BALL JOINT

Franz D. Schnitzler, Hilden, Fed. Rep. of Germany, assignor to TRW Ehrenreich GmbH & Co., KG, Fed. Rep. of Germany

Continuation of Ser. No. 373,907, Jun. 29, 1989, abandoned. This application Oct. 2, 1990, Ser. No. 593,482

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1988, 8808443.4

Int. Cl.^{5} F16C *11/06*

U.S. Cl. 403—138 **5 Claims**

1. A ball joint comprising:

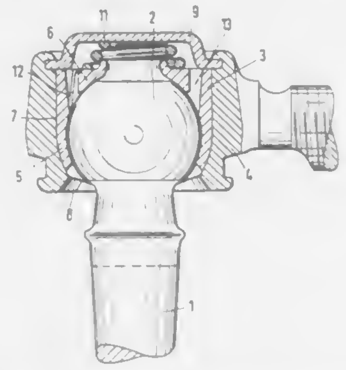
a joint housing including a housing cover defining a chamber and having an opening extending into said chamber;

a ball stud including a ball head disposed in said chamber and a joint stud extending through said opening, said ball stud being rotatable and pivotable in said joint housing;

a plastic one-piece bearing shell in said chamber including a lower shell portion facing toward said opening in said joint housing and an upper shell portion having an outer rim, said upper and lower shell portions having bearing surfaces engaging said ball head;

a spring element disposed between said housing cover and said upper shell portion urging said upper shell portion against said ball head; and

at least ne form-elastic connection stop integral with and spacing said lower shell portion and said outer rim of said upper shell portion and lower shell portion, said at least one connection stop, and said upper shell portion defining said piece bearing shell before and after location thereof in the chamber of said joint housing, said at least one form-elastic connection stop permitting relative axial movement of said upper and lower shell portions.



5,022,780

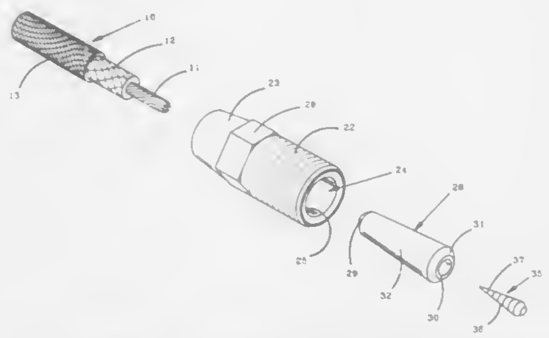
END CLAMP FOR TEXTILE ROPE WITH A METALLIC CORE

Charles R. Shaw, Twinsburg, Ohio, assignor to Esmet, Inc., Canton, Ohio

Filed May 3, 1990, Ser. No. 518,572

Int. Cl.^{5} F16G *11/05*

U.S. Cl. 403—275 **19 Claims**



1. A rope clamp for connecting the end of a composite rope having a heat-resistant multi-strand metallic cable core, a first inner fibrous plastic sheath wrapped tightly around said core, and a second outer fibrous plastic sheath wrapped tightly around said inner sheath, said rope clamp comprising a hollow sleeve member having an outer male threaded portion and a tapered central opening adapted to receive the said composite rope with its terminating end extending beyond the larger end of said sleeve tapered opening, the inner and outer sheaths being frayed outwardly adjacent the larger end of the tapered opening of said sleeve, a first hollow wedging plug member having a tapered central opening and smooth tapered exterior surfaces generally complemental in contour to said sleeve tapered opening, said first wedging plug member and said sleeve member being movable with respect to one another to clamp the frayed inner and outer sheaths between said first wedging plug member and the tapered central opening of said sleeve, the multi-strand metallic cable core being frayed over the outer extremity of said first wedging plug member, a second wedging plug member having a sharper taper than said first wedging plug member, said first and second wedging plug members being movable with respect to one another to clamp the frayed multi-strand metallic core between said first and second wedging plug members, the plural strands of said frayed inner and outer sheaths and said multi-strand central core extending exteriorly from the respective first and second wedging plug members being gathered together joinedly beyond said sleeve by melting for positive durable interconnection of said rope to said sleeve.

5,022,781

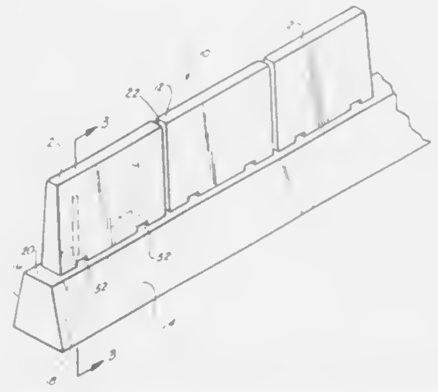
ANTI-GLARE MODULES ADAPTABLE TO HIGHWAY MEDIAN BARRIERS

Timothy S. Smith, 2121 N. Arnoult Dr., Metairie, La. 70001

Filed Dec. 18, 1989, Ser. No. 452,577

Int. Cl.^{5} E01F *15/00*

U.S. Cl. 404—6 **9 Claims**



1. An anti-glare, module mountable to the median barrier of a divided highway, comprising:

a) a principal body portion, constructed of lightweight material, and including a first and second bores in the base of the anti-glare module;

b) first and second mounting rods secured to the median barrier, each of the mounting rods positioned a distance apart for slideably engaging into the first and second bores of each anti-glare module;

c) means for securing the anti-glare module onto the mounting rods, so that the bottom face of the anti-glare module is positioned adjacent the upper face of the barrier, and the anti-glare module is secured onto each of the mounting rods.

5,022,782

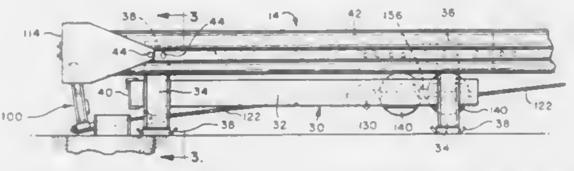
VEHICLE CRASH BARRIER

David C. Gertz, Citrus Hts., and William G. Krage, Fair Oaks, both of Calif., assignors to Energy Absorption Systems, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 439,654, Nov. 20, 1989. This application Dec. 18, 1989, Ser. No. 452,791

Int. Cl.^{5} E01F *13/00, 15/00*

U.S. Cl. 404—6 **43 Claims**



1. A vehicle crash barrier for decelerating a vehicle, said crash barrier comprising:

an elongated frame comprising a plurality of sections including a front section and at least one additional section

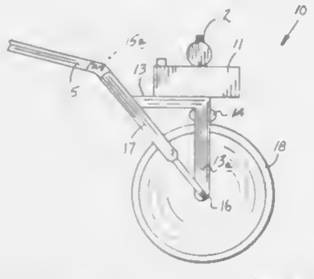
VOL
1127
ISS
2
JE
11
1991
UMI

arranged end to end along an axial direction, said frame configured to collapse axially when struck axially on the front section by a vehicle;

a tension member positioned generally parallel to the frame and having a forward end portion anchored independently of the frame and rearward end portion;

brake means for resiliently biasing a brake member against the tension member, said brake means mounted in the frame and frictionally engaged with the tension member such that, following an impart of the vehicle against the front section that causes the frame to collapse axially, the vehicle causes the brake means to move along the tension member and to generate a frictional retarding force to decelerate the vehicle.

5,022,783
CEMENTIOUS PATTERN IMPARTING TOOL
Kenneth L. Jones, 4871 A. Jackson St., Riverside, Calif. 92503
Filed Nov. 6, 1989, Ser. No. 432,371
Int. Cl.^{5} E01C *19/26*
U.S. Cl. 404—122 1 Claim



1. A pattern imparting tool for directing a pattern into an uncured concrete surface, comprising,

a framework including a horizontal frame member with a downwardly extending leg member mounted at each end of the framework, wherein each leg member includes an axle aperture adjacent a lower terminal end of each leg member orthogonally directed therethrough, with an axle mounted through each axle aperture, the axle including a rotatably mounted cylindrical drum mounted about the axle between each leg member, wherein the drum comprises a cylindrical drum and underlies the frame member and extends between each leg member, and

a handle member mounted to the framework extending rearwardly thereof, and

a plurality of blade means for selective securement about the surface of the drum, and

wherein the cylindrical drum includes a matrix pattern of apertures directed through the drum about the arcuate surface thereof defining a predetermined diameter, and each of the blade means including a plurality of securement rods, the securement rods integrally mounted to a bottom surface of each blade means defining a further diameter greater than the predetermined diameter to effect an interference fit between the securement rods and the apertures, and

wherein the securement rods define a roughened surface to enhance securement of each blade means to the cylindrical drum when the rods are directed through the apertures defined within the cylindrical drum, and

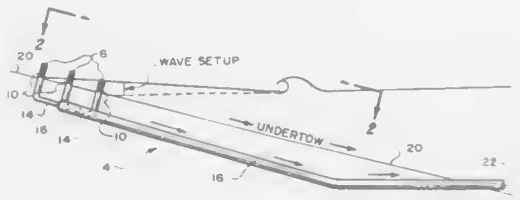
wherein the handle includes a forward threaded end threadedly mounted within the framework, and

wherein the framework further includes a plurality of rearwardly extending links extending from lowermost ends of each leg rearwardly thereof and merging at a common junction for threaded reception of the handle, and

further including an elongate container mounted underlying the horizontal frame member spaced above the cylindrical drum, the container coextensive with the drum extending thereover, and the container including a series of nozzles, the nozzles mounted overlying the drum surface, wherein the container includes a fluid release agent for directing the fluid onto the drum to minimize adherence of the uncured concrete to the blade means, and

wherein a vibratory means is mounted onto an upper surface of the horizontal frame member for imparting vibratory motion throughout the framework and to the drum to enhance imparting of a pattern by the blade means into the uncured concrete.

5,022,784
UNDERTOW REDUCTION SYSTEM FOR SHORELINE PROTECTION
Jack DeVries, Oxnard; James A. Bailard, Carpinteria, both of Calif., and Daniel M. Hanes, Gainesville, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Sep. 17, 1990, Ser. No. 583,742
Int. Cl.^{5} E02B *3/04*
U.S. Cl. 405—15 10 Claims



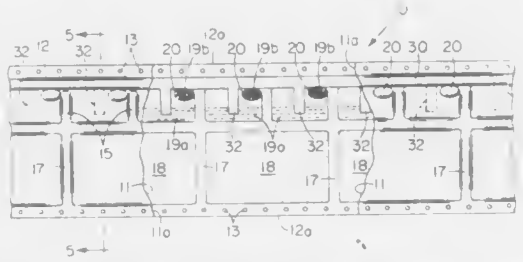
1. An apparatus for artificially reducing the strength of the nearbottom offshore directed current inside a surfzone thereby promoting sand accretion on a beach comprising:

(a) means located in the surfzone for sequestering a portion of surfzone fluid;

(b) discharge openings located beyond said surfzone for allowing the discharge of the sequestered surfzone fluid to open sea; and

(c) conveying means communicating with the sequestering means on one end and with the discharge openings on the other end, the conveying means operating to guide said sequestered surfzone fluid from said sequestering means to said discharge openings.

5,022,785
FLOATING BARRIER METHOD AND APPARATUS
Kip B. Goans, Harvey, La., assignor to Richard J. Lazes, Harvey, La.
Filed Oct. 19, 1989, Ser. No. 424,158
Int. Cl.^{5} E02B *15/06*
U.S. Cl. 405—69 10 Claims



1. An inflatable float boom for confining material floatable on a liquid surface, comprising, in combination:

an elongated collapsible member formed of fluid impervious materials;

said collapsible member defining a flat reelable configuration when collapsed;

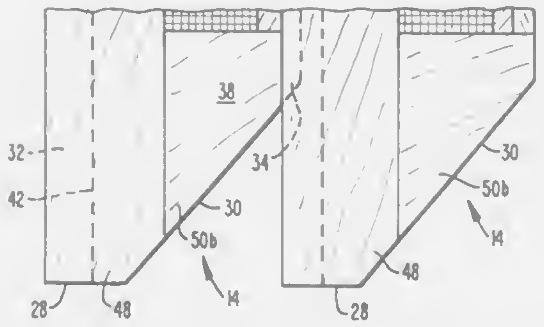
sealing means separating the interior of the collapsible member into a plurality of float boom inflation compartments sequentially disposed along the length of said collapsible member;

means for generating float boom inflating gas for inflation of said compartments comprising a first and second substance;

said compartments comprising a plurality of chambers when said float boom is in a pre-deployed position, each of said chambers containing one of said first or second substances; and

wherein upon deployment of said float boom, at least one of said chambers being openable by a compressive force applied to at least one side of said collapsible member thereby mixing the first and second substance and generating said inflation gas.

5,022,786
METHOD AND APPARATUS FOR THE RECOVERY AND TREATMENT OF GROUND WATER CONTAMINATED BY HAZARDOUS WASTE
Kenneth W. Philo, 7 Palm Ave., San Rafael, Calif. 94901
Filed May 23, 1990, Ser. No. 527,621
Int. Cl.^{5} E02B *11/00;* E02D *29/00*
U.S. Cl. 405—128 32 Claims



1. A method for removing hazardous waste generated at a dump site from ground water flowing beneath the site comprising the steps of:

driving a multiplicity of elongated, upright sheets directly into the ground and interconnecting the sheets so that they form a substantially water-impermeable barrier proximate to and spaced from a periphery of the site and positioned so that the barrier intercepts the ground water flow beneath the site;

forming generally horizontal, open channels in the sheets which face the ground water flow, generally upright conduits between adjoining sheets, and fluidly interconnecting the channels and the conduits;

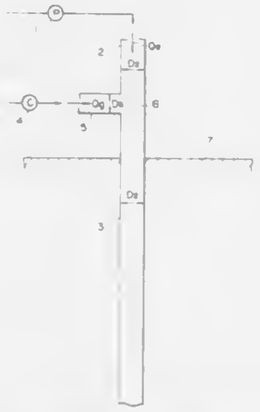
positioning a filter across the channels to permit ground water to collect in the channels and prevent ground from entering the channels;

flowing the collected ground water along the channels and into and through the conduits; and

pumping ground water collected in at least one of the conduits through an open end of the conduit at the top of the barrier;

whereby contaminated water is prevented from flowing past the wall and a contamination of ground water on a downstream side of the barrier is prevented.

5,022,787
METHOD OF RETURNING GEOTHERMAL GASES TO THE UNDERGROUND
Mutsuo Kuragasaki; Mamoru Tahara, and Shunsei Tazaki, all of Nagasaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 6, 1989, Ser. No. 418,115
Claims priority, application Japan, Jul. 10, 1988, 63-253056
Int. Cl.^{5} G21F *9/24*
U.S. Cl. 405—128 2 Claims

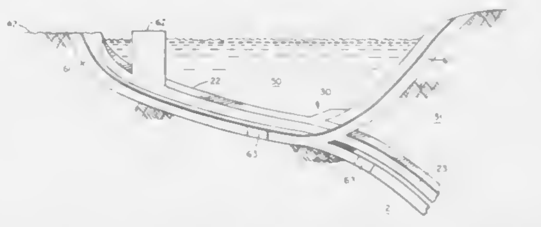


1. A method of returning geothermal noncondensable gas including H_2S gas together with geothermal waste water into an underground statum through a waste water return well under the two-phase gas-and-liquid flow conditions of froth or slug flow at the gas returning point around the wellhead, characterized in that the introduction of the geothermal gas at the gas returning point around the wellhead is regulated to satisfy the following equation;

$$V_{go} < 1.33V_{eo} - 0.41,$$

where V_{go} and V_{eo} are the apparent velocity of the geothermal gas and the waste water at said gas returning point, respectively, and V_{eo} at said gas returning point is not less than one meter per second, and where apparent velocity is defined as the volumetric flow rate of the fluid divided by the well cross-sectional area at said gas returning point.

5,022,788
SUBDUCTIVE WASTE DISPOSAL METHOD
James R. Baird, 1401 Rose Ann Drive, Nanaimo, British Columbia, Canada V9T 4L3
Filed Dec. 13, 1989, Ser. No. 449,750
Int. Cl.^{5} G21F *9/34;* B09B *1/00*
U.S. Cl. 405—128 13 Claims



1. A method for disposing waste material comprising the steps of:

a. constructing an access tunnel into a subtending tectonic plate moving towards a subduction zone, the tunnel having a sidewall and a floor for the movement of material transporting vehicles thereon;

b. forming at least one separate waste repository in the sidewall of the tunnel and emanating from said access tunnel; and

VOL
1127
ISS
2
JE
11
1991
UMI

c. depositing said waste material from inside the tunnel into said waste repository.

5,022,789

METHOD AND MACHINE FOR CONSTRUCTING SHAFTS

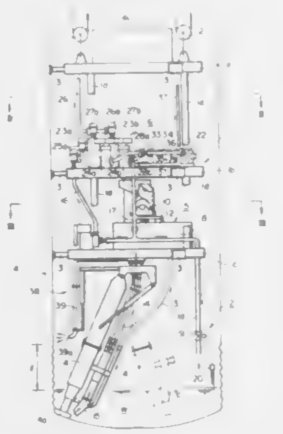
Akira Miyazaki; Yuichi Kikuchi; Yoshiyuki Ohara; Tomosburo Fujinaga; Takashi Kawata; Fumitoshi Mizutani, all of Tokyo; Tsugio Hida, Omuta, and Shiroyasu Shimazaki, Tokyo, all of Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1988, Ser. No. 273,368

Claims priority, application Japan, Nov. 18, 1987, 62-290967; Nov. 18, 1987, 62-290968; Nov. 18, 1987, 62-290970

Int. Cl.^{5} E21D *1/06*

U.S. Cl. 405—133 11 Claims



1. A method for constructing a shaft, comprising the steps of:

(a) disposing an excavating machine at a working face of a shaft which is being excavated in a soft rock;

(b) pouring water into the shaft;

(c) excavating the soft rock by means of the excavating machine to deepen the shaft, thereafter spraying concrete onto a peripheral wall exposed above the surface of the water in the shaft to form a concrete layer on the peripheral wall;

(d) mixing the water and muck excavated from the working face of the shaft to form a slurry;

(e) conveying the slurry to outside of the shaft, said conveying being performed by a slurry-conveying apparatus comprising a pair of tanks and a main pump, said conveying step comprising: pumping said slurry from the working face alternately into the pair of tanks; filtrating the slurry introduced into one of the tanks and thereby separating water from the slurry; and supplying the separated water into the other tank through the main pump and thereby sending both the supplied water and the slurry in the other tank to the outside of the shaft;

(f) and controlling the amount of water poured into the shaft so as to adjust the water level in the shaft to a certain level and thereby allowing only a lower end of the excavating machine to be under the water, including measuring the water level in the shaft, and wherein the amount of water poured into the shaft is controlled on the basis of the measured water level.

5,022,790

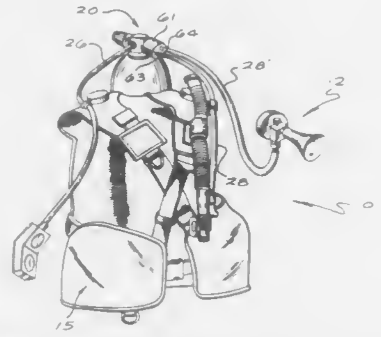
AUDIBLE SIGNALLING SYSTEM FOR DIVERS

Robert A. Stevenson, Canyon Country, Calif., assignor to Rolyn Productions Inc., Canyon Country, Calif.

Filed Dec. 4, 1989, Ser. No. 445,274

Int. Cl.^{5} B63C *11/26*

U.S. Cl. 405—186 8 Claims



1. An audible signalling system for divers, comprising:

a tank having a supply of air under pressure contained therein and adapted to be carried by a diver;

means for delivering air from said tank to the diver for breathing;

a sonic oscillator mounted generally on said tank, said sonic oscillator including a housing defining a flow path for passage of air under pressure from said tank, and a valve means, mounted along said flow path, for generating an audible sound by oscillatorily contacting a valve seat defined by said housing, whereby an audible sound is resonated through said tank upon passage of air under pressure through said flow path; and

control valve means for selectively connecting said sonic oscillator flow path to said tank for passage of air under pressure through said flow path.

5,022,791

PROCESS, ANCHORING MEMBER, AND CLAMPING DEVICE FOR CLAMPING A ROD

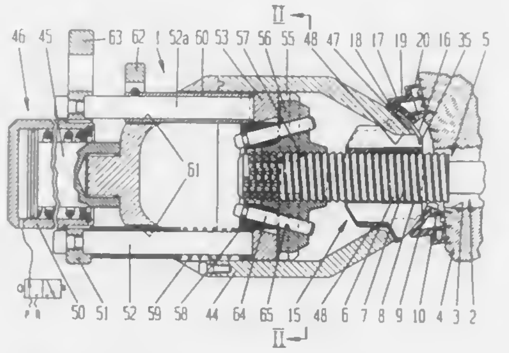
Erwin Isler, Rapperswil, Switzerland, assignor to H. Weidmann AG, Rapperswil, Switzerland

Filed Feb. 6, 1990, Ser. No. 475,495

Claims priority, application Switzerland, Feb. 6, 1989, 401/89

Int. Cl.^{5} E21D *21/00*

U.S. Cl. 405—260 10 Claims



1. A method for prestressing a tie rod while simultaneously forcing an anchor member, mounted on the tie rod, against an anchor plate, the tie rod being anchored in the rock for securing the rock and having a free end formed with a plurality of sawtooth configured grooves therein, said method comprising the steps of:

(a) placing an anchor plate over the free end of said tie rod and against the rock;

(b) sliding the anchor member over the free end of said tie rod and against said anchor plate;

(c) clamping the free end of the tie rod by means of a clamping device, said clamping device including an anchoring element for engaging the sawtooth configured grooves of the tie rod, said clamping device resting exclusively against the anchor member; and

(d) preloading the tie rod with a preloading force while simultaneously forcing the anchor member against the anchor plate with a force corresponding to the preloading force of the tie rod.

5,022,792

UNDERGROND CONTINUOUS IMPERVIOUS WALL AND METHOD FOR INSTALLING SAME

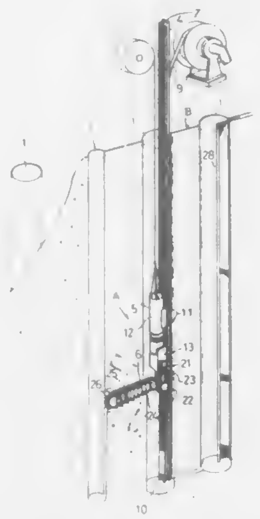
Shozo Konno, and Nobuyuki Matsui, both of Tokyo, Japan, assignors to Kajima Corporation, Tokyo, Japan

Division of Ser. No. 196,617, May 19, 1988, Pat. No. 4,909,674. This application Jan. 2, 1990, Ser. No. 460,044

Claims priority, application Japan, May 28, 1987, 63-132218; May 28, 1987, 63-132219; Jun. 3, 1987, 63-139497; Jun. 3, 1987, 63-139498; Jun. 10, 1987, 63-144951

Int. Cl.^{5} E02D *5/20*

U.S. Cl. 405—267 4 Claims



2. The method of constructing an underground water-impervious wall in a slit trench comprising the steps of:

(a) boring a plurality of holes at preselected intervals along the center line of the proposed wall;

(b) charging said holes with fluidized mud simultaneously with the boring thereof;

(c) placing a hollow tube in one of said bore holes positioned to receive a slurry of excavated earth and mud into the bottom of said tube and to discharge said slurry out of the top of said tube;

(d) mounting a cantilevered excavating head on said tube adapted to excavate the earth between a pair of bore holes and to transport said earth into said bore hole containing said hollow tube;

(e) urging said cantilevered excavating head downwardly along said tube until all earth has been excavated between said pair of bore holes;

(f) consecutively excavating the earth between said holes to form a continuous slit trench while simultaneously charging said slit trench portion so formed with fluidized mud;

(g) removing a slurry of fluidized mud and excavated earth from said slit trench;

(h) continuously replacing the slurry removed from said trench during excavation with fluidized mud;

(i) positioning and stretching in a vertical plane a water-impervious membrane throughout said fluidized mud-filled trench; and

(j) charging a substance on opposite sides of said membrane to harden said fluidized mud.

5,022,793

SCRAP COLLECTION SYSTEM

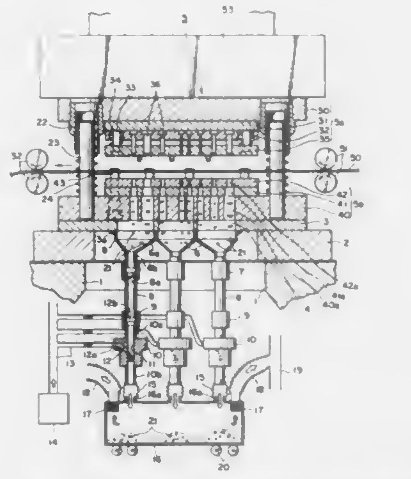
Kazubiko Hoshino, and Akio Ishii, both of Tokyo, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Feb. 27, 1989, Ser. No. 315,511

Claims priority, application Japan, Feb. 27, 1988, 63-24488[U]

Int. Cl.^{5} B65G *53/14*

U.S. Cl. 406—153 2 Claims



1. A scrap collection system for collecting scraps produced when materials such as metals and plastics are processed by a processing machine such as a pressing machine and a lathe, comprising;

a scrap receiver means for receiving scraps from the processing machine and which has at least one hopper having an open top for positioning beneath the part of the processing machine form which scraps will fall during the normal processing operation of the processing machine;

a scrap collector box vertically below said hopper and in which the scraps are to be collected and having at least one opening into which a conduit is directed for delivering scraps into said scrap collector box, and at least one opening having a filter for discharging air from said scrap collector box;

a single unconstricted and unobstructed scrap conveying conduit extending in a straight vertical path from said hopper to said scrap collector box; and

an air ejector means connected in said conduit at a position between said scrap receiver means and said scrap collector box and having an ejector body having an unobstructed scrap passage therethrough forming part of said conduit and an air passage extending from outside said ejector body through said ejector body and opening into the periphery of said scrap passage at an angle to the scrap passage and toward said scrap collector box for ejecting high pressure air through said conduit in a direction toward said scrap collector box for creating a suction effect for moving scraps from said scrap receiver means to said scrap collector box.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,794
FAST DISCHARGE AND INTRODUCTION DEVICES FOR A TIGHT INSULATOR

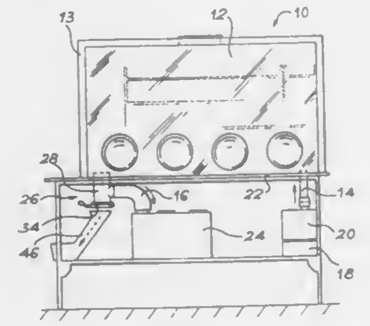
Bernard Saint Martin, Montrouge, France, assignor to Iso Concept S.A., Boulogne, France

Filed Dec. 7, 1989, Ser. No. 447,425

Claims priority, application France, Dec. 15, 1988, 8816566

Int. Cl.⁵ B65G *51/12*

U.S. Cl. 406—171 10 Claims



1. Device for the rapid discharge of objects for a tight insulator in which there is a pressure above the external pressure, said insulator being equipped with a ventilation circuit having an intake pipe and an exhaust pipe equipped with filtering means, said device being characterized in that it comprises a discharge tube, whereof one end issues into the insulator and whereof the opposite end is tightly sealed by a door, the exhaust pipe issuing into the discharge tube in the vicinity of the door and said door is provided with means normally maintaining said door in a closed and locked position.

5,022,795
CUTTING ROTOR

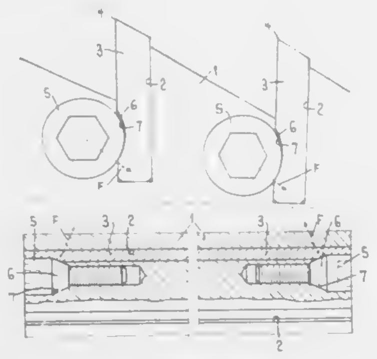
Peter Stampfli, Walliswil - bei Bipp, and Peter Frey, Schüpfen, both of Switzerland, assignors to Krupp Widia (Schweiz) AG, Biel, Switzerland

Filed Aug. 21, 1989, Ser. No. 396,335

Claims priority, application Switzerland, Feb. 9, 1988, 03297/88

Int. Cl.⁵ B23C *5/24*

U.S. Cl. 407—47 11 Claims



1. A cutting rotor having cutting blades clamped in grooves of a rotor body, wherein each cutting blade has a longitudinal axis and is provided with at least one concave clamping surface against which a conical screw of a clamping element is applied, the axis of said conical screw being generally parallel to the longitudinal axis of the cutting blade, the conical screw having a conical head which eccentrically abuts to said clamping surface, the clamping force having a radial and an axial component acting upon the cutting blade, wherein each cutting blade has opposed longitudinal ends and wherein a conical screw is provided at each longitudinal end to clamp the blade to the rotor body and said conical screws allowing radial clamping and fine axial adjustment of said cutting blade.

5,022,796
CUTTING INSERT

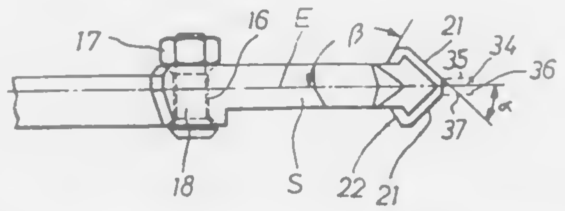
Joseph Pano, Shave Zion, Israel, and Hans Braun, Westfalen, Fed. Rep. of Germany, assignors to Iscar, Ltd., Midgal Tefe, Israel

Division of Ser. No. 336,216, Apr. 11, 1989, Pat. No. 4,938,640, which is a continuation-in-part of Ser. No. 94,692, Sep. 9, 1987, abandoned. This application Apr. 24, 1990, Ser. No. 513,916

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1986, 3630845; Oct. 15, 1986, 3635052

Int. Cl.⁵ B23B *05/16, 27/02, 27/06*

U.S. Cl. 407—113 3 Claims



1. A cutting insert for use in internal and external chamfering of pipe ends comprising an elongated body portion having a median longitudinal plane; upper and lower, substantially parallel, longitudinally directed surfaces of said body portion; a forward terminal cutting end portion; a first pair of cutting edges of said cutting end portion having adjacent leading ends, being symmetrically disposed with respect to said median plane and sloping rearwardly away from said median plane from said adjacent leading ends to respective spaced apart trailing ends thereof; a second pair of cutting edges of said cutting end portion symmetrically disposed with respect to said median plane and sloping rearwardly towards said median plane from adjacent said trailing ends of said first pair of cutting edges; an arched recess formed in and extending across said lower surface adjacent said cutting end and a pair of longitudinally extending keying grooves formed respectively in said surfaces and extending into said arched recess.

5,022,797
DIAMOND TOOL

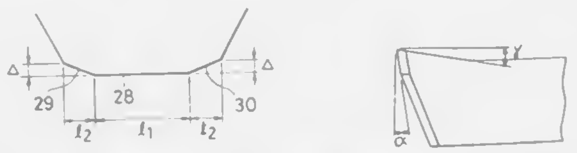
Masashi Sawa; Masami Masuda; Yukio Maeda, all of Yokohama, and Ryu Itoh, Ebina, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 48,600, May 11, 1987, abandoned. This application Apr. 24, 1989, Ser. No. 343,830

Claims priority, application Japan, May 14, 1986, 61-108414; Sep. 9, 1986, 61-197635

Int. Cl.⁵ B23B *27/02, 27/20*

U.S. Cl. 407—119 2 Claims



1. A diamond tool for mirror-finish cutting of nonferrous materials, provided with a single crystal diamond tip, said diamond tip comprises: a flat rake face; a forward end relief surface; a main cutting edge defined by the line of intersection of said rake face and said end relief surface; a side cutting edge formed at an end of said main cutting edge, said side cutting edge having a finite length so as to extend at an inclination to said main cutting edge rearwardly from said main cutting edge so that the end of said side cutting edge is displaced rearwardly of said main cutting edge by a depth of chamfer, the length of said main cutting edge being 0.8 mm, the length of said side cutting edge being 0.2 mm, and the depth of chamfer of said side cutting edge being 0.4 um so that said side cutting edge is sunk diagonally relative to said main cutting edge.

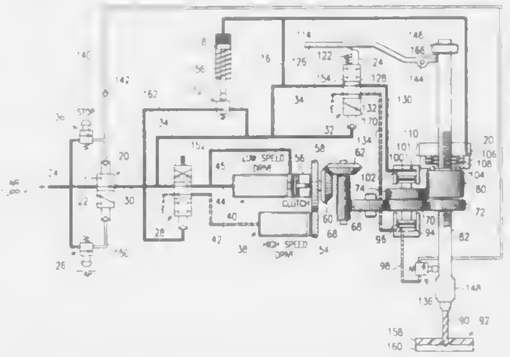
5,022,798
THRUST-RESPONSIVE TWO-SPEED DRILL AND METHOD OF OPERATION

Richard E. Eckman, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jun. 11, 1990, Ser. No. 535,841

Int. Cl.⁵ B23B *35/00*

U.S. Cl. 408—1 R 12 Claims



12. A method for drilling a hole in a composite material with a pneumatically powered positive feed drill, said composite material including a first portion of a first predetermined hardness overlaying a second portion of a second predetermined hardness greater than said first predetermined hardness, said positive feed drill including a drill spindle and drill bit, a first air motor connectable to the drill spindle, a second air motor connectable to the drill spindle and means to sense the thrust on the drill bit, the method comprising the steps of:

activating the first air motor to rotate the drill spindle and drill bit at a first predetermined speed and to feed the spindle and drill bit toward and into the first portion of the composite material at a first predetermined speed;

rotating and feeding the drill spindle and drill bit through the first portion of the composite material until the drill bit contacts the second portion of the composite material;

sensing the increase in thrust on the drill spindle and drill bit when the drill bit contacts the second portion of the composite material;

deactivating said first air motor;

activating the second air motor to rotate the drill spindle and drill bit at a second predetermined speed and to feed the drill spindle and drill bit into the second portion of the composite material at a second predetermined speed slower than said first predetermined speed;

sensing when the drill bit drills through the second portion of the composite material by sensing the decrease in thrust on the drill spindle and drill bit;

deactivating the second air motor;

activating the first air motor;

retracting the drill bit from the composite material to a retract position; and

deactivating the first air motor.

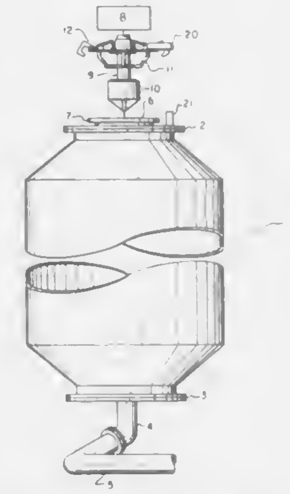
5,022,799
COKE DRUM DRILL STEM ALIGNMENT DEVICE

Daniel L. Torres, Bellingham; Timothy J. Murphy; Guy A. Maakad, both of Ferndale; Jeffrey R. Roberts, Bellingham, and Kent S. Murray, Everson, all of Wash., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 15, 1989, Ser. No. 451,917

Int. Cl.⁵ B23B *35/00, 41/00*

U.S. Cl. 408—1 R 17 Claims



1. Apparatus for aligning a drill stem with an aperture in an upper portion of a coke drum, said drill stem having a cutting tool at a first end and a fluid inlet at a second opposite end, said aperture having an opening including an end flange at an upper portion thereof and being adapted to operatively receive said cutting tool in a lower portion thereof, said apparatus comprising:

a flange fixedly mounted on said drill stem between said cutting tool and said fluid inlet;

a plate slidably mounted on said drill stem above said flange, said plate being no smaller than said opening in said aperture, said flange preventing said plate from sliding below a first position on said drill stem by engaging a first face thereof; and

a drill stem guide mounted on said plate and extending normally from said first face of said plate in substantial alignment with a vertical axis of said drill stem, said guide being designed to fit in said aperture and to align said drill stem for receipt of said cutting tool in said lower portion of said aperture.

15. A method for aligning a drill stem on a longitudinal axis of a coke drum, said method comprising:

providing a drill stem guide on said drill stem;

introducing said drill stem provided with said drill stem guide into an aperture in an upper end of said coke drum, said aperture having an axial bore with an axis substantially coincident with said longitudinal axis and an opening including an end flange at an upper portion thereof;

registering said drill stem guide with said axial bore so as to align said drill stem; and

fixing said drill stem guide in position relative to said aperture by attaching said drill stem guide to said end flange with at least one clamp external to said aperture.

5,022,800
RAPID ADVANCE FEED DRILL WITH IDLE MODE

Pierre G. Vindez, Redondo Beach, Calif., assignor to P.V. Tool, Inc., Gardena, Calif.

Filed Jul. 9, 1990, Ser. No. 549,954

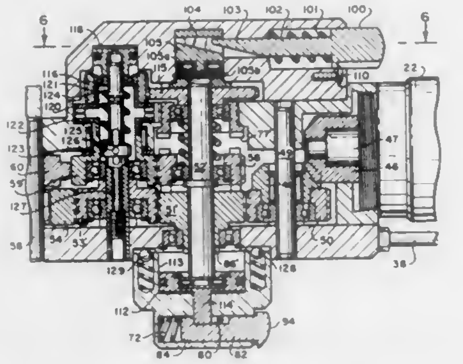
Int. Cl.⁵ B23B *45/04*

U.S. Cl. 408—14 8 Claims

1. A positive feed drill having a drive gear train comprised

VOL
1127
ISS
2
JE
11
1991
UMI

of a drive coupling gear keyed to a motor driven shaft for turning a spindle carrying a cutting tool at a predetermined rate and a feed gear train comprised of a feed coupling gear driven through a clutch by said drive coupling gear and an idle gear for advancing said spindle at a predetermined rate as said cutting tool drills through a work piece, and further having means for automatically retracting said spindle after it has been advanced a predetermined extent by disengaging said clutch and engaging means for locking said feed coupling gear, and means for automatically placing said feed gear train in an idle mode upon retracting said spindle by disengaging said locking means without engaging said clutch, a rapid advance gear train, actuatable control means for coupling said rapid advance gear train to said idle gear of said feed gear train, and control means for placing said feed gear train in an idle mode if not already in an idle mode by disengaging said clutch between said feed coupling gear and said drive coupling gear without engaging said means for locking said feed coupling gear and actuating said control means for coupling said rapid advance gear train to said idle gear of said feed gear train, said rapid advance gear train having a higher gear ratio than said feed gear train for advancing said spindle at a higher rate while said actuatable control means is being actuated.



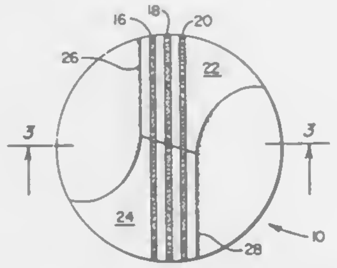
5,022,801
CVD DIAMOND COATED TWIST DRILLS

Thomas R. Anthony, Schenectady, and James F. Fleischer, Scotia, both of N.Y., assignors to The General Electric Company, Worthington, Ohio

Filed Jul. 18, 1990, Ser. No. 555,879

Int. Cl.^{5} B23B *51/02*

U.S. Cl. 408—144 9 Claims



7. A twist drill coated with a layer of CVD diamond and having slots in the head thereof filled with CVD diamond.

5,022,802
SYSTEM FOR GENERATING A TOOTH PROFILE USED IN A DIFFERENTIAL SPEED REDUCTION APPARATUS

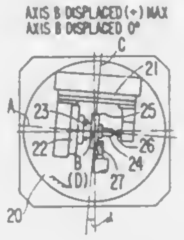
Takao Yokoi, Mieken, Japan, assignor to Kabushiki Kaisha Shinkoseisakusho, Osaka, Japan

Division of Ser. No. 318,250, Mar. 3, 1988, Pat. No. 4,966,573. This application Aug. 25, 1989, Ser. No. 398,390

Claims priority, application Japan, Mar. 10, 1988, 63-56984

Int. Cl.^{5} B23F *5/20*

U.S. Cl. 409—52 2 Claims



1. A system for generating a tooth profile adapted for use in a differential gear reduction apparatus comprising a double-toothed gear including face cams at opposite sides, an input shaft carrying the double-toothed gear, a slant shaft rotatably connected to the input shaft in such a manner that the slant shaft wobbles upon a rotation of the input shaft, a stationary face gear engageable with the face cams of the double-toothed gear, a movable face gear secured to an output shaft, wherein the stationary face gear and the movable face gear have one of a roller and a convex-face contour, the system comprising a B-axis NC rotary table reversibly rotatable about an axis B by an angle α, a C-axis NC rotary table provided on the B-axis rotary table, the C-axis NC rotary table being reversibly rotatable about an axis C by an angle θ, the axis C intersecting the axis B at a right angle, an A-axis NC rotary table provided on the C-axis NC rotary table, the A-axis NC rotary table being reversibly rotatable about an axis A intersecting the axis C at a right angle, the A-axis NC rotary table including a rotary shaft, a gear blank holder, an end mill for cutting the sides of a gear blank held by the gear blank holder, the end mill having a diameter equal to a diameter of the stationary face gear and the movable face gear, the A-axis rotary table being driven to enable the gear blank to rotate by ΔA° at which the slant shaft wobbles, and the B-axis NC rotary table and the C-axis NC rotary table are driven to enable the gear blank to respectively reversibly rotate by the angles α for generating a desired tooth profile.

5,022,803
PIN TYPE CARBON-CARBON FASTENER

Kurt W. Swanson, Kent, Wash., assignor to General Dynamics Corporation, Convair Division, San Diego, Calif.

Filed May 25, 1990, Ser. No. 528,409

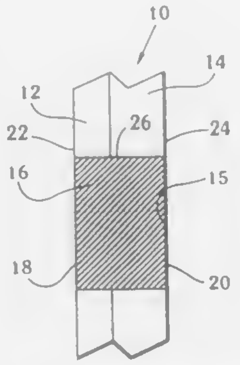
Int. Cl.^{5} F16B *13/04*

U.S. Cl. 411—19 16 Claims

1. A pin fastener system for joining carbon-carbon structural material with aligned apertures therethrough comprising:

a pin formed of carbon and

a powdered metal coating covers the pin surfaces in contact with the aperture walls whereby when said pin is heated in a gaseous atmosphere said powdered metal coating expands and fastens said pin to said carbon-carbon structural material.



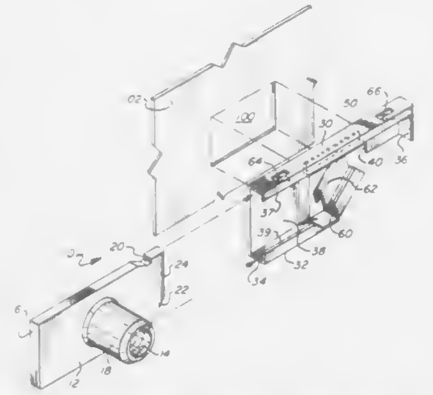
5,022,804
SELF-MOUNTING FASTENER

Francis C. Peterson, Woodbury, Conn., assignor to Buell Industries, Inc., Waterbury, Conn.

Filed Feb. 14, 1989, Ser. No. 310,392

Int. Cl.^{5} F16B *37/04*

U.S. Cl. 411—104 16 Claims



1. A self-mounting fastener adapted to mount to an aperture in a workpiece, said workpiece having a plane, said aperture being located in said workpiece plane and extending perpendicularly thereto, comprising:

- a fastener body; and
- a cage formed of a sleeve in which said fastener body is slidably fitted, having at least one hinged latch means operable and adapted to engage said aperture by the sliding of said body in said sleeve in a direction substantially parallel to the plane of said workpiece.

5,022,805
CANTILEVER MOUNTING SYSTEM FOR STRUCTURAL MEMBERS HAVING DISSIMILAR COEFFICIENTS OF THERMAL EXPANSION

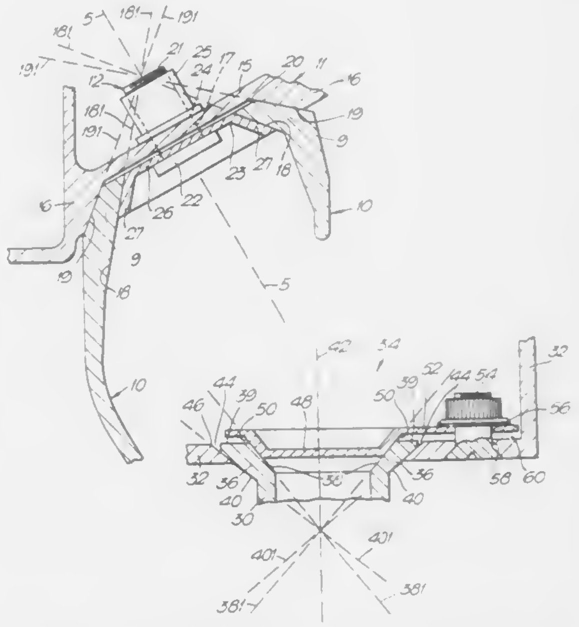
Martyn G. Roberts, Roswell, Ga., assignor to Rolls-Royce Incorporated, Greenwich, Conn.

Filed Feb. 16, 1989, Ser. No. 310,968

Int. Cl.^{5} F16B *43/02;* **F02K** *3/10*

U.S. Cl. 411—468 5 Claims

1. A cantilever mounting for a tubular member having an isotropic coefficient of thermal expansion different from that of the tubular member, (a) the tubular member comprising a conical end with a frusto-conical inner and outer faces having a common axis of symmetry and different cone angles relative to said axis of symmetry such that line extensions of said frusto-conical faces meet at a common point on said axis of symmetry, (b) the support member comprising an annular flange member having a female frusto-conical surface adapted to cooperate with the outer frusto-conical face of said end of the tubular member, (c) a fastener assembly comprising a male frusto-conical surface adapted to cooperate with the inner frusto-conical surface of said end of the tubular member and including means to urge the outer frusto-conical surface of said end of the tubular member into mating engagement with the female frusto-conical surface of the flange member, and (d) said cone angles providing a thermally stress-free interface between the support member and the tubular member when the members are in mating engagement.



5,022,806
APPARATUS FOR CHARGING A SHAFT FURNACE

Emile Lonardi, Bascharage; Giovanni Cimenti, Fentange, and Pierre Mailliet, Howald, all of Luxembourg, assignors to Paul Wurth S.A., Luxembourg

Filed Sep. 21, 1989, Ser. No. 410,713

Claims priority, application Luxembourg, Sep. 22, 1988, 87341

The portion of the term of this patent subsequent to Jul. 17, 2007, has been disclaimed.

Int. Cl.^{5} F23K *3/18*

U.S. Cl. 414—208 15 Claims

1. An apparatus for charging a shaft furnace with a flowable material comprising:

- a cylindrical casing secured to the furnace, said casing having an inner surface;
- a first ring rotatably secured to the inner surface of the casing for rotation about a vertical axis, said ring having an inner surface;
- a second ring rotatably secured to the inner surface of the casing for rotation about the vertical axis;
- a pair of crossmembers extending across the first ring and secured to the inner surface of the first ring;
- a distribution chute pivotably suspended between the crossmembers at an angle of inclination relative to the vertical axis;

means for rotating the first ring;

VOL
1127
ISS
2
JE
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1991
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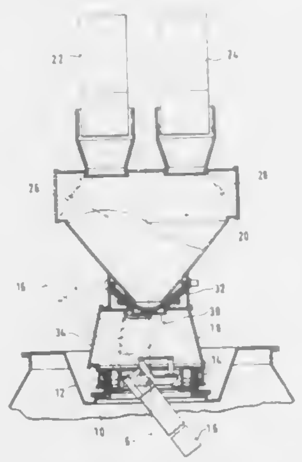
means for rotating the second ring;

means for linking the chute with the second ring so that differential relative rotational movement between the first and second means changes the angle and inclination of the chute relative to the vertical axis;



a charging lock secured atop the casing, said lock having a first opening for introducing the material into the lock and a second opening for discharging material from the lock to the distribution chute; and

valve means for metering flow of material from the second opening of the charging lock.

5,022,807

DEPOSITORY FOR ACCUMULATIONS OF PAPER SHEETS

Heinz Linder, Zofingen, Switzerland, assignor to Grapha-Holding Ag, Hergiswil, Switzerland

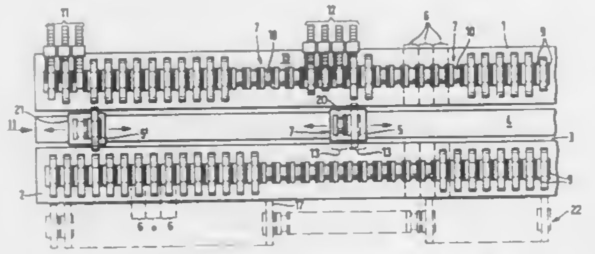
Continuation of Ser. No. 826,286, Feb. 5, 1986, Pat. No. 4,752,176. This application Apr. 8, 1988, Ser. No. 179,038

Claims priority, application Switzerland, Feb. 7, 1985, 550/85

The portion of the term of this patent subsequent to Jun. 21, 2005, has been disclaimed.

Int. Cl.⁵ B65G *1/133*

U.S. Cl. 414—278 **14 Claims**



14. A depository for articles, comprising at least one row of neighboring first facilities for temporary storage of respective articles; at least one vehicle arranged to move along said row and having at least two second facilities for temporary storage of respective articles; guide means for guiding said vehicle along said row; mobile carriers for the articles transferable between the respective first and second facilities, said carriers including a carrier in at least one of said second facilities so that at least one of said second facilities is occupied whenever said vehicle travels along said row; and conveyor means for effecting the transport of carriers between said first facilities and said second facilities.

5,022,808

STORING SYSTEM WITH A CONVEYING DEVICE

Albert Blum, Scheiderhöhe, 5204 Lohmar 1, and Horst Tadday, Lüdenscheider Str. 31, 5974 Herscheid, both of Fed. Rep. of Germany

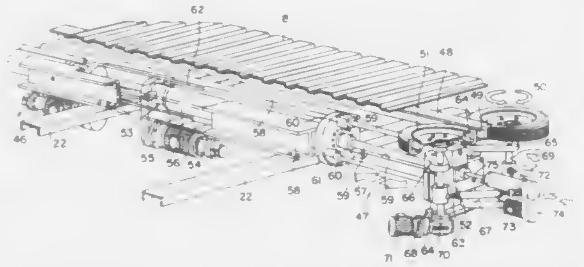
PCT No. PCT/DE88/00719, § 371 Date May 14, 1990, § 102(e) Date May 14, 1990, PCT Pub. No. WO89/04900, PCT Pub. Date Jun. 1, 1989

PCT Filed Nov. 18, 1988, Ser. No. 477,969

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1987, 3739158

Int. Cl.⁵ B65G *1/00;* **B25J** *3/00*

U.S. Cl. 414—280 35 Claims



1. Storing system with a conveying device for conveying heavy objects on movable transport pallets placed in an entry point to depositing spaces arranged in at least one tier above and adjacent to each other and from the respective depositing space to an exit point, with a lift system consisting of at least one tower-like frame which extends over the entire height of the storing system and movable along a horizontal guide, a receiving device arranged in the tower-like frame and movable up and down along a vertical guide located on said tower-like frame, two roller rails, running parallel to each other, arranged on opposite sides in the receiving device and lying perpendicular to the horizontal guide of the tower-like frame, stationary roller rails arranged in the individual depositing spaces and with which the roller rails of the receiving device can be aligned, characterized in that the movable transport pallets (8) for carrying the objects to be stored are guided on the roller rails (20, 7), at least one transfer means (**46**; **47**) including gripping wheels is arranged on the receiving device (**19**) between the roller rails (**20**) to move the respective transport pallet during transfer and to secure the transport pallet (**8**) during the conveying on the receiving device (**19**), on the underside of each transport pallet (**8**) approximately centrally and running in its longitudinal direction, a guide rail (**48**; **96**) is fastened, each guide rail including a guide part (**49**) of which points downwards, and said gripping wheels (**50**, **51**) belonging to the transfer means (**46**; **47**) are arranged on both sides of the guide part (**49**) are rotatable about respective vertical axes and their circumferences and can be applied against opposite sides of the guide part (**49**) and moved away from the latter again, and said gripping wheels can be selectively driven and immobilized together.

5,022,809

TRUCK FOR ALTERNATELY HANDLING BULK AND PALLETIZED CARGO

Teddy P. Hinson, Mechanicsville, Va., assignor to Solite Corporation, Richmond, Va.

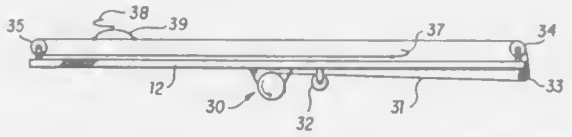
Filed Feb. 7, 1990, Ser. No. 476,168

Int. Cl.⁵ B65G *67/02*

U.S. Cl. 414—494 6 Claims

1. A dumping type vehicle having a body that is movable from a horizontal to an inclined position, for loading and transporting comminuted material while in a horizontal position and dumping it while int he inclined position, or, alternatively, for loading, transporting, and unloading pallets while in the horizontal position, said vehicle having an open top, a generally flat bed portion and walls for holding comminuted material on

the bed portion, said vehicle having a wall that may be opened to permit the dumping of comminuted material while in an inclined position, or, alternatively, to permit the loading and unloading of pallets while in a horizontal position, rail means



mounted on the bed portion for receiving, transporting and unloading said pallets, and means mounted on the vehicle and having pallet engaging means for moving pallets along said rail means while the vehicle body is in a horizontal position.

5,022,810

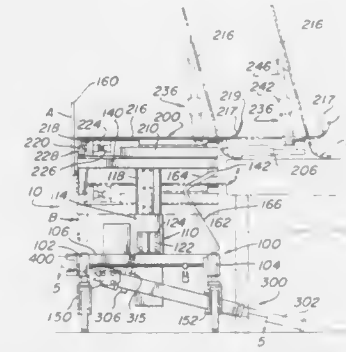
GURNEY

Lionel Sherrow, Huntington Valley; Harold Rosenthal, Philadelphia; Joseph M. Spitz, Bensalem, and Stephen W. Haines, Langhorne, all of Pa., assignors to Lavelle Aircraft Company, Inc., Philadelphia, Pa.

Filed Sep. 1, 1989, Ser. No. 402,381

Int. Cl.⁵ A61G *7/08*

U.S. Cl. 414—501 **24 Claims**



1. A transfer device for moving an object from a first location to a second location, said device comprising:

litter means for carrying said object to be transported thereon;

support means including fixed guide means for supporting said litter means, laterally movable means associated with said fixed guide means and means for moving said litter means laterally with respect to said support means and guide means members, back and forth from said first location to said second location;

said litter means having a leading edge adapted to be positioned adjacent said object to be moved means associated with said laterally movable means to cause said litter means to pivot from a generally horizontal position toward said object after said litter means have moved laterally to said second location and to pivot back to a generally horizontal position after said object has been positioned on said litter means; and stabilizing means connected to said support means for preventing said transfer device from tipping over when said litter means is moved laterally with respect to said support means.

5,022,811

ASSEMBLY FOR MOVING HEAVY OBJECTS

Lennart K. O. Wallman, Harstenagatan 2, S-582 73 Linkoping, Sweden

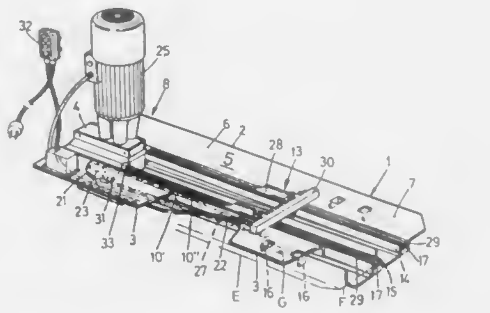
PCT No. PCT/SE88/00359, § 371 Date Feb. 12, 1990, § 102(e) Date Feb. 12, 1990, PCT Pub. No. WO89/00146, PCT Pub. Date Jan. 12, 1989

PCT Filed Jun. 29, 1988, Ser. No. 457,706

Claims priority, application Sweden, Jul. 6, 1987, 8702768

Int. Cl.⁵ B66F *9/12;* **B23Q** *7/00*

U.S. Cl. 414—607 **5 Claims**



1. An accessory adapted to be readily removably mounted on the forwardly projecting tines of a forklift truck, by means of which heavy articles can be slid off of and onto supporting surfaces and on which such articles can be transported from one to another of such surfaces, said accessory comprising:

- A. structure providing a platform having
  - (1) a front end,
  - (2) a rear end,
  - (3) laterally opposite sides, and
  - (4) top surface portions which lie in a substantially horizontal plane and upon which a heavy article can be slidably supported;
- B. a laterally extending shaft confined to rotation near the rear end of said platform and below and parallel to said plane;
- C. a pair of axially spaced sprockets on said shaft, constrained to rotation with it, each said sprocket being oriented to have a top and a bottom;
- D. two track pairs on said structure, one track pair for each of said sprockets,
  - (1) each said track pair comprising
    - (a) an elongated upper track having a rear end forwardly adjacent to the top of its sprocket and a front end near the front end of said platform, and
    - (b) an elongated lower track which is spaced downwardly from the upper track, has a rear end forwardly adjacent to the bottom of its sprocket, and has a front end between its sprocket and the front end of said platform, and
  - (2) each said track being of substantially U-shaped cross-section and defining an upwardly opening groove;
- E. a pair of drive chains, one for each of said sprockets, each said drive chain having
  - (1) a medial portion trained around the rear of its sprocket to be driven lengthwise by rotation of the sprocket,
  - (2) an upper stretch which has a front end and which is received with a close slidable fit in the upper track for its sprocket to be confined to linear motion by that track, and
  - (3) a lower stretch which has a front end and which is similarly received in the lower track for its sprocket;
- F. a pair of sliders, one for each drive chain, each said slider having
  - (1) a lower portion
    - (a) which is confined in the upper track for the drive chain, to be constrained by that track to motion lengthwise along it, and

VOL
1127
ISS
2
JE
11
1991
UMI

(b) which has a connection with the front end of the upper stretch of its drive chain, to be moved along said track by rotation of the sprocket for its chain, and

(2) an upper portion which is above said plane;

G. article engaging means secured to the upper portions of said sliders, at front ends thereof, and bridging across them, whereby an article can be slid off of said top surface of the platform; and

H. drive means on said structure for driving said shaft in each direction of its rotation.

5,022,812

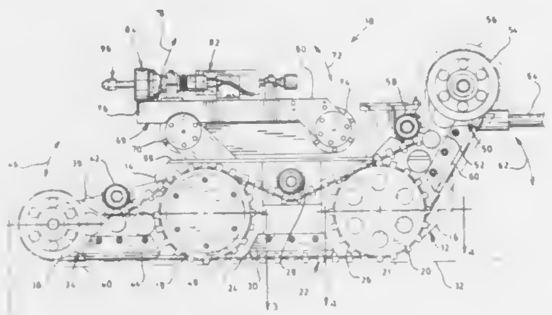
SMALL ALL TERRAIN MOBILE ROBOT

Joel B. Coughlan, Bonnerville County, Id.; Kenneth A. Farnstrom, Anderson County, Tenn.; Howard W. Harvey, Roane County, Tenn.; R. Glen Upton, Anderson County, Tenn.; John R. White, Roane County, Tenn., and Kenneth L. Walker, Anderson County, Tenn., assignors to Remotec, Inc., Oak Ridge, Tenn.

Continuation-in-part of Ser. No. 248,973, Sep. 26, 1988, Pat. No. 4,932,831. This application Jun. 11, 1990, Ser. No. 536,142

Int. Cl.^{5} B66C *9/00*

U.S. Cl. 414—729 **9 Claims**



1. An all terrain vehicle adapted for remote control operation in potentially hostile environments, including operation when submerged, which comprises:

a main chassis having a forward end and a rearward end, said main chassis equipped with a pair of rotatable sprocket wheels on each side thereon, at least one of said sprocket wheels on each side being driven, said pair of sprocket wheels on each side having a flexible, main track engaged therewith, said main tracks supporting and moving said vehicle on said terrain;

a first articulated auxiliary chassis pivotally mounted on said forward end of said main chassis, said first auxiliary chassis having a cantilevered arm on each side with a rotatable sprocket wheel at a distal end of each, and with a second sprocket wheel coupled with one of said sprocket wheels of said main chassis closest to said forward end, said distal end sprocket wheel and said sprocket wheel coupled with said drive sprocket wheel of said main chassis having a flexible first auxiliary track engaged therewith for further supporting and moving of said vehicle across said terrain, said cantilevered arms being joined by a cross-connecting torsion member attached to each of said arms at a point intermediate said sprocket wheels on each side whereby pivotal motion of one arm is transmitted to the second arm,

a second articulated auxiliary chassis pivotally mounted on said rearward end of said main chassis, said second auxiliary chassis having a cantilevered arm on each side with a rotatable sprocket wheel at a distal end of each, and with a second sprocket wheel coupled with one of said sprocket wheels of said main chassis closest to said rearward end, said distal end sprocket wheel and said sprocket wheel coupled with said drive sprocket wheel of said main chassis having a flexible second auxiliary track engaged therewith for further supporting and moving of said vehicle across said terrain, said cantilevered arms being joined by a cross-connecting torsion member attached to each of said arms at a point intermediate said sprocket wheels on each side whereby pivotal motion of one arm is transmitted to the second arm;

a first main chassis drive means mounted within said main chassis that has a drive motor means and gear means for rotating one of said sprocket wheels on one side of said main chassis and said coupled sprocket wheel of said first auxiliary chassis to cause rotation of one of said main tracks and rotation of said auxiliary tracks of said first and second auxiliary chassis on said one side, said first main chassis drive means including bearings and a seal to protect said bearings during operation;

a second main chassis drive means mounted within said main chassis diagonally from said first main chassis drive means, said second main chassis drive means having a drive motor means and gear means for rotating one of said sprocket wheels on a second side of said main chassis and said coupled sprocket wheel of said second auxiliary chassis to cause rotation of a second of said main tracks and rotation of said auxiliary tracks of said first and second auxiliary chassis on said second side, said second main chassis drive means including bearings and a seal to protect said bearings during operation;

a first auxiliary chassis drive means mounted within said main chassis having a motor means and gear means coupled to one of said arms of said first auxiliary chassis to produce pivotal movement of said first auxiliary chassis with respect to said main chassis, said first auxiliary chassis drive means including bearings and a seal to protect said bearings during operation of said vehicle;

a second auxiliary chassis drive means mounted within said main chassis diagonally opposite said first auxiliary chassis drive means, said second auxiliary chassis drive means having a motor means and gear means coupled to one arm of said second auxiliary chassis for pivotally moving said second auxiliary chassis with respect to said main chassis, said second auxiliary chassis drive means including bearings and a seal to protect said bearings during operation of said vehicle;

a manipulatable arm unit pivotally mounted on said main chassis, said arm unit having a shoulder joint providing for rotation about at least a horizontal axis relative to said main chassis, an elbow joint providing for rotation about a horizontal axis relative to said main chassis, an upper arm portion joining said shoulder joint with said elbow joint and a forearm portion attached at one end to said elbow joint, said forearm portion provided with adaptive means for releasable attachment of apparatus to carry out selected actions by said vehicle in said environment;

drive means mounted within said upper arm portion for producing individual selected movements of said shoulder and elbow joints; and

circuit means within said main chassis and connected to said drive means of said main chassis, to said first and second auxiliary chassis, to said arm unit for remote operation of components of said vehicle.

5,022,813

STACKER BUNDLER SHUTTLE SYSTEM

Clark L. Smith, Belle Mead, and Gregory Balcerek, Wayne, both of N.J., assignors to Stacker Machine Co., Mountainside, N.J.

Continuation of Ser. No. 153,993, Feb. 9, 1988, abandoned, which is a continuation-in-part of Ser. No. 764,242, Aug. 9, 1985, Pat. No. 4,723,883. This application Jan. 24, 1990, Ser. No. 472,449

Int. Cl.^{5} B65H *31/30*

U.S. Cl. 414—790 **6 Claims**

2. An apparatus for transporting paper sheet material in signature form comprising:

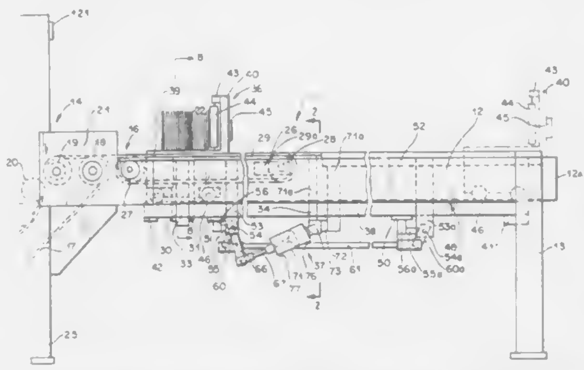
(a) a horizontal frame;

(b) a conveyor mounted in said frame comprising a plurality of horizontally disposed belts for receiving said material to form a stack of signatures on said belts, said belts being spaced apart to form gaps therebetween;

(c) a plurality of tracks mounted horizontally in said frame and extending under said conveyor;

(d) means for raising and lowering said tracks; and

(e) a carriage having a plurality of connected vertical support segments and wheels which ride on said tracks,



wherein said carriage further comprises an upright member extending above each segment having a vertically disposed roller mounted thereon, said segments being aligned with said gaps between said belts, said segments occupying a first position below said conveyor belts when said tracks are lowered by said means for raising and lowering and a second position above said conveyor belts when said tracks are raised by said means for raising and lowering, said segments in said second position lifting the stacked signatures from the conveyor.

5,022,814

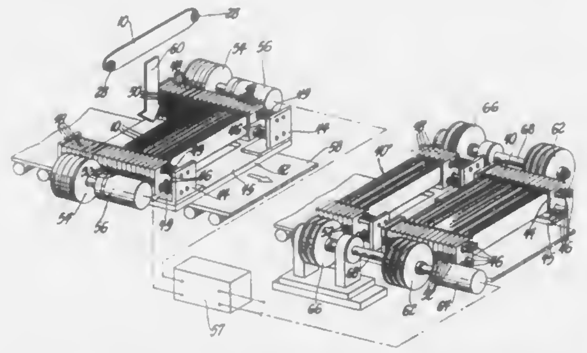
JUMP INDEXING PALLET AND METHOD FOR HEAT EXCHANGER ASSEMBLY

Michael A. Breda, East Amherst; George K. Snyder, and Peter A. Lyon, both of Lockport, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 27, 1989, Ser. No. 328,847

Int. Cl.^{5} B65G *1/18*

U.S. Cl. 414—799 **2 Claims**



1. A pallet system for the assembly of heat exchanger elements comprising:

a plurality of pallets movable in an advancing manner through a loading station,

lead screw means selectively engagable with the pallets for controlling pallet position,

motor means drivingly connected to the lead screw means for advancing each pallet with respect to the loading station,

the lead screw means having a first screw means for indexing one pallet in an advancing manner through the loading station and for discharging the one pallet in an advancing manner from the station and having a second screw means synchronized with said first screw means for advancing another pallet to the loading station for operative engagement with the first screw means simultaneously with but only during the discharge of the said one pallet whereby the rate of movement of the said another pallet relative to said one pallet is under positive control of the motor means for rapid indexing,

the first and second screw means being separate lead screws spaced in the direction of pallet advancing and connected for synchronous rotation by the motor means so that the said pallets move together when advanced by the lead screw means.

5,022,815

STRUCTURE FOR MOUNTING A FAN TO A FAN MOTOR

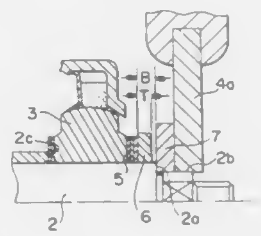
Masaei Sato, Yabuzuka-hommachi, Japan, assignor to Mitsuba Electric Manufacturing Co., Ltd., Gumma, Japan

Filed Sep. 7, 1989, Ser. No. 403,817

Claims priority, application Japan, Sep. 24, 1988, 63-124890[U]

Int. Cl.^{5} F01D *3/04*

U.S. Cl. 415—107 **1 Claim**



1. A structure for mounting a fan to a fan motor, comprising:

a fan motor shaft supported in a motor casing through a bearing;

a fan-mounting seat provided on the motor shaft adjacent an end thereof, said seat including a thrust washer fitting section and a stepped section beyond the thrust washer fitting section toward said end of the motor shaft, said stepped section having a smaller diameter than the thrust washer fitting section;

a plurality of thrust washers fit onto said thrust washer fitting section; and

a flat washer fitted onto the peripheral surface of said stepped section;

wherein, an outermost thrust washer of said plurality of thrust washers, located opposite to the flat washer, has a thickness greater than a traveling play distance of the motor shaft along a longitudinal axis of the motor shaft, and less than an interval from an immediately adjacent thrust washer to the peripheral surface of the stepped section.

5,022,816

GAS TURBINE BLADE SHROUD SUPPORT

Mark S. Maier, North Palm Beach, and Jack W. Wilson, Jr., West Palm Beach, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 24, 1989, Ser. No. 427,226

Int. Cl.^{5} F04D *29/40*

U.S. Cl. 415—115 **8 Claims**

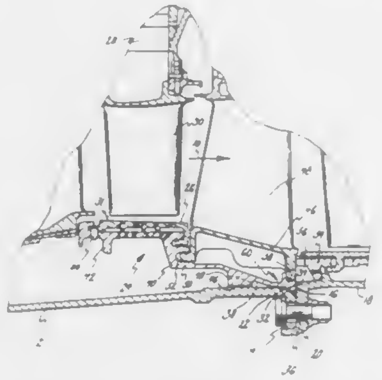
1. In a gas turbine having an axial flow of gas from upstream to downstream therethrough, a static structure comprising:

a substantially cylindrical upstream casing section of relatively high coefficient of expansion material;

a substantially cylindrical turbine downstream casing section;

VOL
1127
ISS
2
JE
11
1991
UMI

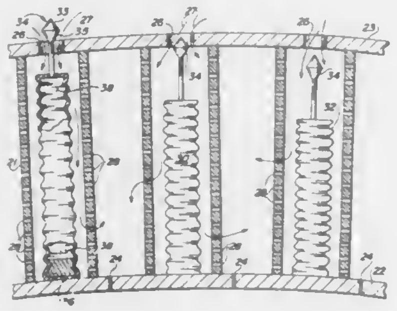
- a first outwardly extending flange on said upstream section;
- a second outwardly extending flange on said downstream section, abutable with said first flange and having a flange abutment surface extending inwardly of said first flange;
- a conical inside surface on said upstream section at the location of said first flange;
- a plurality of bolts for rigidly joining said first and second flanges;
- a first stage support ring of relatively low coefficient of expansion material of substantially cylindrical axially extending form, and having a conical outside surface adjacent the downstream end, with a ring abutment surface at the downstream end, a plurality of tip shrouds carried on said support ring at an upstream support location; and
- said conical inside surface and said conical outside surface having mating tapers and in touching contact when said support ring is displaced slightly downstream of said upstream casing section, but an interference fit compressive contact when said first and second flanges are in contact and said flange abutment surface is in contact with said ring abutment surface.



5,022,817

THERMOSTATIC CONTROL OF TURBINE COOLING AIR

Bernard O'Halloran, Scottsdale, Ariz., assignor to Allied-Signal Inc., Morris County, Morris Township, N.J.
Filed Sep. 12, 1989, Ser. No. 405,991
Int. Cl.^{5} F01D *5/00*
U.S. Cl. 415—115 **12 Claims**



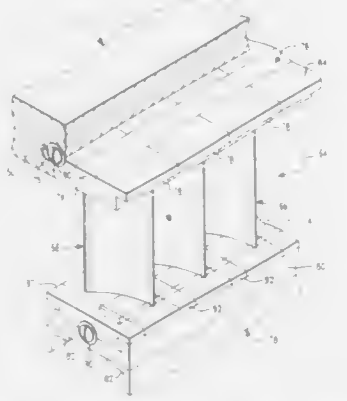
1. A gas turbine engine guide nozzle, of the type having a plurality of hollow, air cooled vanes extending generally radially between annular inner and outer shroud rings, comprising:

- a plurality of air inlet orifices in one of said shroud rings, with one orifice adjacent the end of each of said plurality of vanes for admitting cooling air flow into the hollow interior thereof; and
- a plurality of individually adjustable air control means for varying the flow of sad cooling air through each vane by variably blocking each of said orifices,
- said air control means contained within the hollow interior or of each vane near the leading edge thereof and including a sealed convoluted cylinder, an expandable material in said cylinder, and a metering pin attached to one end of the cylinder and aligned with said inlet orifice.

5,022,818

COMPRESSOR DIAPHRAGM ASSEMBLY

Augustine J. Scalzo, Longwood, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed Feb. 21, 1989, Ser. No. 312,287
Int. Cl.^{5} F04D *29/54*
U.S. Cl. 415—209.3 **28 Claims**



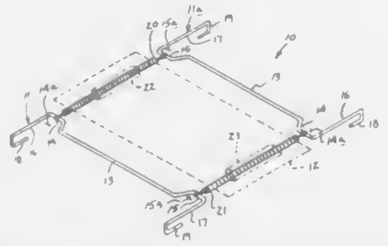
1. In a combustion turbine having a casing, one or more slots of a first predetermined cross-section formed circumferentially within the casing at a compressor portion of the turbine, and a compressor diaphragm assembly adapted to be suspended from each of the one or more slots to provide a labyrinth seal with a plurality of compressor discs, a method of forming each compressor diaphragm assembly comprising the steps of:

- providing a plurality of vane airfoils each of which have an integrally-formed inner shroud and an integrally-formed outer shroud, each said integrally-formed outer shroud having a complementary cross-section to the first predetermined cross-section so as to slidably engage the slots in the turbine casing;
- providing load transfer means for each said vane airfoil for restraining motion; and
- providing carrier means for engagement with each said inner shroud, said carrier means including at least one pair of disc-engaging seals.

5,022,819

AIR FRAGRANCE DEVICE FOR CEILING

Daniel Murcin, and Neva Murcin, both of 8800 66th St. N., Pinellas Park, Fla. 34666
Filed Nov. 29, 1989, Ser. No. 442,905
Int. Cl.^{5} F01D *25/00*
U.S. Cl. 416—62 **6 Claims**



1. An air fragrance device for securement to an elongate fan blade of a circulatory fan, wherein the blade includes an upper

surface and a lower surface defining spaced first and second lateral edges, the device comprising,

- a first "U" shaped clip member securable to said first lateral edge, and a second "U" shaped clip member securable to said second lateral edge, and
- a fragrance impregnated package, and
- a first elongate securement means and a second elongate securement means, wherein the first and second elongate securement means are each spaced parallel to one another, and wherein each elongate securement means is joined to the first and second "U" shaped clip member at opposed terminal ends of each elongate securement means for securement of the package relative to the fan blade.

5,022,820

VARIABLE PITCH PROPELLER

Robert M. Bergeron, Whithers Grove, N.H., assignor to Land & Sea, Inc., North Salem, N.H.
Filed Dec. 12, 1989, Ser. No. 449,574
The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.
Int. Cl.^{5} B63H *1/06*
U.S. Cl. 416—89 **19 Claims**

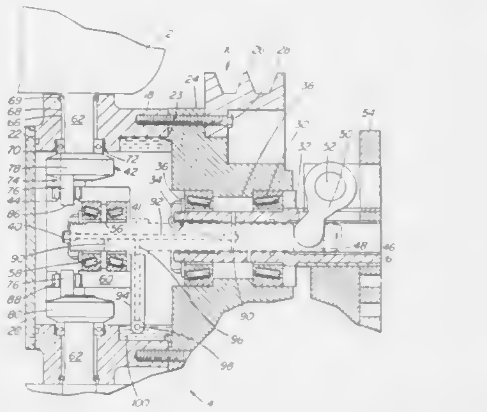
1. An automatic variable pitch marine propeller comprising:

- a central hub defining a rotation axis, said central hub having a radial bore receiving a propeller blade shaft, and a guide pin bore receiving a guide pin, said guide pin bore being parallel to said propeller rotation axis and intersecting perpendicularly said radial bore; and
- a propeller blade comprising said blade shaft and a blade portion, said blade shaft being attached to said blade portion at one end and extending away from said blade portion into said radial bore, said blade shaft being capable of rotation within said radial bore about an axis of pitch rotation, said blade shaft having an opening closely housing a cam defining insert in which is formed a cam groove to receive said guide pin, said blade portion being configured and attached to said blade shaft such that force due to water pressure on said blade portion defines a center of pressure which is located remote from the axis of pitch rotation;
- said guide pin passing through a said guide pin bore and being received by said cam groove wherein said cam groove, by way of cooperation between said insert and said shaft, defines pitch of the associated said propeller blade by controlling its rotation within said radial bore about its axis of pitch rotation; wherein
- during operation of said propeller, by virtue of the interaction of said guide pin with said cam groove and the cooperation of said insert with said shaft, centrifugal force tends to increase pitch and diameter in opposition to said force due to water pressure acting on said propeller blades tending to reduce pitch and diameter.

5,022,821

VARIABLE PITCH FAN

Clarence A. Isert, Dewberry, Canada, assignor to Flexxaire Manufacturing Inc., Edmonton, Canada
Filed Aug. 16, 1989, Ser. No. 393,681
Int. Cl.^{5} F04D *29/06*
U.S. Cl. 416—167 **8 Claims**



1. A fan assembly incorporating a plurality of variable pitch blades adjustable during operation of said assembly to alter volume and direction of airflow induced by said assembly, comprising:

- a main, non-rotatable shaft;
- a second shaft coaxially located within said main shaft for limited axial fore and aft movement within said main shaft;
- a pulley hub and pulley mounted for rotation on said main shaft;
- a blade hub secured to said pulley hub for rotation therewith;
- a plurality of fan blades each having a blade shaft mounted for rotation in said blade hub;
- each blade shaft having an interior end extending into the blade hub and having a crank arm secured to the interior end;
- means for axially moving the secondary shaft within the main shaft;
- a spider rotatably mounted on the secondary shaft, the spider including a plurality of spherical bearings, one spherical bearing corresponding to each blade shaft;
- the crank arm of each blade shaft being snugly mounted for rotation within the spherical bearing corresponding to that blade shaft;
- one or both of the pulley hub and hub defining an annular reservoir for receiving lubricant upon rotation of the fan assembly;
- the pulley hub being mounted on a first bearing assembly on the main shaft;
- the spider being mounted on a second bearing assembly on the secondary shaft;
- a stationary feed pipe fixed to the main shaft and having a pick-up end disposed within the reservoir;
- the secondary shaft including a lubricant gallery terminating at openings in fluid connection with the first and second bearing assemblies; and
- the lubricant gallery directly interconnecting the feed pipe and the openings.

5,022,822

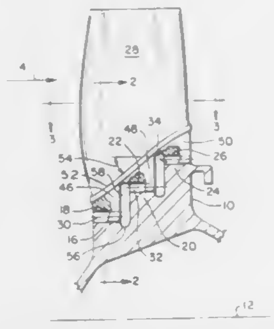
COMPRESSOR BLADE ATTACHMENT ASSEMBLY

Steven M. Sincere, Hobe Sound, Fla., assignor to United Technologies Corporation, Hartford, Conn.
Filed Oct. 24, 1989, Ser. No. 427,224
Int. Cl.^{5} F01D *5/30*
U.S. Cl. 416—219 R **7 Claims**

1. A blade attachment assembly for an axial compressor,

VOL
1127
ISS
2
JE
11
1991
UMI

which compressor has a rapidly decreasing flowpath in the axial direction, comprising:
- a disk having a plurality of axially spaced rim portions forming outside diameters from a minimum outside diameter at the upstream side to a maximum outside diameter at the downstream side;
- a plurality of compressor blades, each having a blade platform at a platform angle with respect to the intended axial flowpath past the blade;
- a plurality of groove arrangements; one groove arrangement for each blade to be installed;

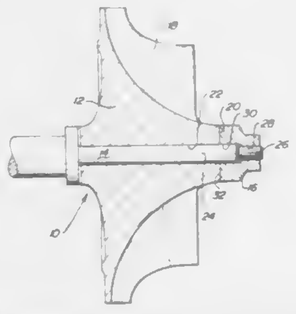


- each groove arrangement comprising a substantially axially extending blade retention groove through each of said rim portions, each groove located at a diameter commensurate with the outside diameter of the respective rim portion; and
- each blade having a plurality of tongues, each tongue engageable with one of each of said grooves of said groove arrangement in each of said rim portions;
- whereby increased live load is obtained with the rim portion beyond the minimum diameter rim portion.

5,022,823
ROTOR ATTACHMENT ASSEMBLY

Thomas C. Edelmayer, Mobile, Ala., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Mar. 6, 1989, Ser. No. 319,087
Int. Cl.⁵ F04D *29/20*
U.S. Cl. 416—244 A **21 Claims**

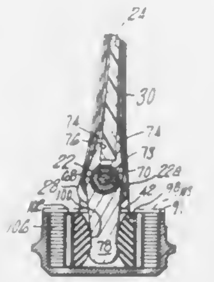


1. A rotor attachment assembly for accurately positioning a rotor on a rotor shaft, comprising:
- a rotor;
- said rotor having a rotor shaft receiving aperture axially defined therein;
- a rotor shaft having a substantially smooth elongated shaft body for attachment to said rotor;
- said rotor shaft further having a threaded end portion;
- a nut for holding said rotor to said shaft, said nut having an aperture axially defined therein, said aperture including a shaft locating hole having a smooth inner wall and a threaded portion for receiving said shaft; and
- said elongated shaft body being of sufficient length so that a portion of said shaft body extends beyond said rotor when said rotor is in place on said rotor shaft;
- said rotor having a multi-vaned body portion and a nut mating portion, said nut mating portion extending beyond said multi-vaned body portion;
- said nut mating portion having a substantially planar nut mating surface;
- said nut mating surface being perpendicular to said axially-defined aperture of said rotor;
- said nut having a substantially planar rotor mating surface for mating with said nut mating surface;
- said rotor mating surface being perpendicular to said axially-defined aperture of said nut;
- said smooth shaft body and said smooth inner wall of said nut having an interference fit.

5,022,824
PINNED AIRFOIL PROPELLER BLADE

John A. Violette, Granby, and Sean Auyeung, Windsor, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 7 1988, Ser. No. 255,100
Int. Cl.⁵ F01D *5/14*
U.S. Cl. 416—230 **15 Claims**

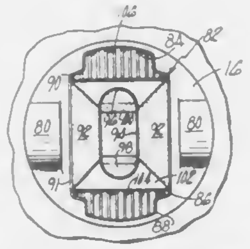


1. A high speed airfoil blade comprising:
- a spar forming a main structural member of the said blade, said spar comprising:
  - a root portion, said root portion having; means for allowing rotation of said blade about an axis passing through said blade in a chordwise direction, and
  - a composite insert attaching to said root portion, said insert extending along a length of said blade, said insert forming a main load bearing structure of said spar; and,
- a shell covering said root portion and said insert of said spar, said shell forming an airfoil surface.

5,022,825
PITCH RETENTION MEMBER

John A. Violette, Granby, and David P. Nagle, Windsor Locks, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 7, 1988, Ser. No. 225,100
Int. Cl.⁵ F04D *29/66*
U.S. Cl. 416—500 **20 Claims**

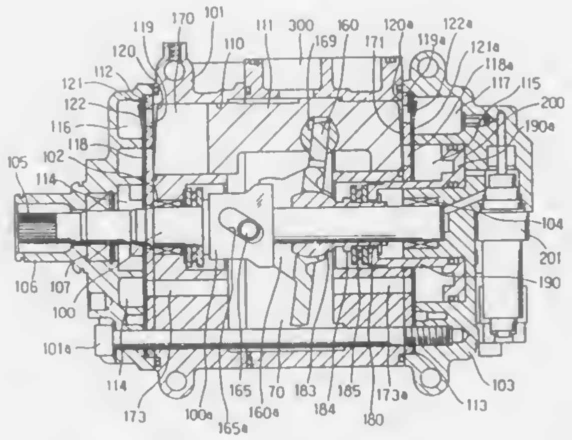


1. A pitch member for rotatably mounting a propeller or fan blade to a hub, said propeller or fan blade having means depending therefrom for limiting rotation of said propeller or fan blade about a root portion thereof, said member comprising;
- a opening for receiving said means for limiting rotation,
- first means disposed within said opening for resisting a force of rotational motion of said propeller or fan blade about said root portion thereof below a threshold bending moment limit upon said propeller or fan blade, and
- second means disposed within said opening for absorbing said force of rotational motion of said propeller or fan blade about said root portion thereof exceeding a threshold bending moment limit upon said propeller or fan blade.

5,022,826
VARIABLE CAPACITY TYPE SWASH PLATE COMPRESSOR

Mikio Matsuda; Mitsuo Inagaki; Ikuo Hayashi; Masahiro Goto, all of Okazaki; Akikazu Kojima, Gamagori; Toshiki Taya, Nagoya, and Nobuhiro Miura, Okazaki, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Nippon Soken, Inc., Nishio, both of, Japan

Filed May 24, 1989, Ser. No. 356,304
Claims priority, application Japan, May 25, 1988, 63-126015
Int. Cl.⁵ F04B *21/04, 1/26, 27/08*
U.S. Cl. 417—63 **13 Claims**



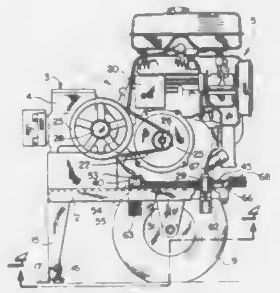
1. A variable capacity type swash plate compressor comprising:
- a cylinder block having a cylinder bore therein;
- a shaft rotatably provided within said cylinder block,
- a swash plate functionally connected with said shaft so that said swash plate rotates simultaneously with said shaft,
- a piston slidably provided within said cylinder bore and functionally connected with said swash plate so that said piston reciprocates within said cylinder bore, said piston defining a first working chamber and a second working chamber at respective ends thereof,
- a spool functionally so connected with said swash plate that a center portion of said swash plate slides along with an axis of said shaft and an inclining angle of said swash plate is varied in accordance with a moment of said spool, whereby a reciprocating movement of said piston is so controlled in such a manner that a top dead point of said piston at said first working chamber is varied while a top dead point of said piston at said second working chamber is substantially constant,
- a detected portion provided on an outer surface of said piston, and
- a detector provided on said cylinder block for detecting a change of a magnetic density relating to a movement of said detected portion and outputting a signal, said detector being provided at a position on a front side of a center portion of a reciprocating movement of said piston when a reciprocating movement of said piston is minimized.

wherein:
- said detector is positioned at a side of said first working chamber of a center point of the reciprocating stroke of said detected portion, and on a side of said second working chamber of said detected portion when said detected portion moves towards said first working chamber side during a condition that a reciprocating stroke of said piston is minimized.

5,022,827
PAINT SPRAYER APPARATUS INCLUDING RAPIDLY CHANGEABLE PRIME MOVERS

Eugene F. Gargas, Wellington, Ohio, assignor to The Wooster Brush Company, Wooster, Ohio

Filed Nov. 13, 1986, Ser. No. 930,258
Int. Cl.⁵ F04B *39/14*
U.S. Cl. 417—360 **17 Claims**



1. Sprayer apparatus comprising a frame, a sprayer pump mounted on said frame, and mounting means for interchangeably mounting any one of a plurality of prime movers on said frame, one at a time, for use in driving said sprayer pump, said one prime mover including a polygonally shaped base member having diagonally opposite corners, and said mounting means consisting of a single pair of shoulder bolts non-rotatably attached to said base member at said diagonally opposite corners, said shoulder bolts having non-threaded shank portions extending downwardly below said base member, and diagonally spaced slot means in said frame for close receipt of said non-threaded shank portions of said shoulder bolts, and threaded ends on the ends of said shank portions which extend below said frame when said shank portions are received in said slot means, and fastener knob means adapted to be threaded onto said threaded ends of said shoulder bolts and tightened against the underside of said frame by hand to secure said one prime mover in place on said frame and loosened and removed by hand to permit removal and replacement of said one prime mover.

5,022,828
COOLER FAN ORIFICE ASSEMBLY

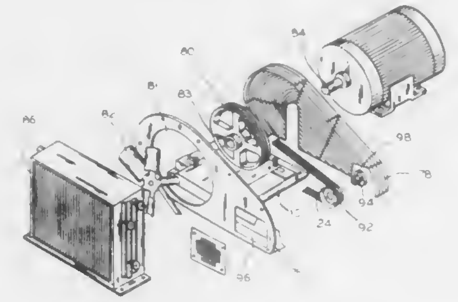
Wayne K. Myers, Loraine, Ill., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Oct. 11, 1989, Ser. No. 419,769
Int. Cl.⁵ F04B *35/00*
U.S. Cl. 417—362 **12 Claims**

1. A cooler fan orifice assembly for adjusting the tension of

VOL
1127
ISS
2
JE
11
1991
UMI

a compressor fan belt comprising a motor slide base and a fan orifice ring, said motor slide base having a generally rectangular frame and having adjusting means that are connected to said fan orifice ring and a compressor motor, said adjusting means causing said motor and said fan orifice ring to slideably move within an elongated slot on said motor slide base, said lateral movement of said motor within said slot causing a change in the tension of said fan belt.



5,022,829
VACUUM APPARATUS

Gerrit De Haan, Old Hall, Great Britain, assignor to The BOC Group plc, Windlesham, United Kingdom

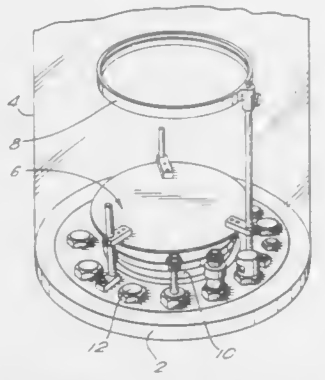
PCT No. PCT/GB88/01105, § 371 Date Oct. 12, 1989, § 102(e) Date Oct. 12, 1989, PCT Pub. No. WO89/05689, PCT Pub. Date Jun. 29, 1989

PCT Filed Dec. 14, 1988, Ser. No. 382,659

Claims priority, application United Kingdom, Dec. 15, 1987, 8729245

Int. Cl.⁵ F04B *37/14*

U.S. Cl. 417—423.2 8 Claims



1. In an apparatus having a having a high vacuum environment and a plurality of components located within the high vacuum environment so as to be exposed to high vacuum, the improvement comprising at least one of said components formed from a plastic material comprising liquid crystal polymer to prevent outgassing of the plastics material in the high vacuum environment.

5,022,830
SUBMERGED FUEL PUMP

Rainer J. Weber, Kirchhausen, and Johann Attenni, Wettstetten, both of Fed. Rep. of Germany, assignors to Audi AG, Ingolstadt, Fed. Rep. of Germany

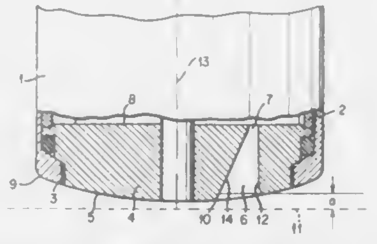
PCT No. PCT/DE88/00267, § 371 Date Nov. 13, 1989, § 102(e) Date Nov. 13, 1989, PCT Pub. No. WO88/08929, PCT Pub. Date Nov. 17, 1988

PCT Filed May 5, 1988, Ser. No. 442,327

Claims priority, application Fed. Rep. of Germany, May 12, 1987, 8706776[U]

Int. Cl.⁵ F04B *35/04*

U.S. Cl. 417—423.14 4 Claims



1. A fuel pump for submersion in a fuel tank, comprising a vertically disposed cylindrical housing with an open lower end, a circular base means inserted into said lower end and having an outer and an inner surface and containing a suction passage starting from said outer surface and terminating in a suction port in the inner surface, said suction passage having a kidney-shaped cross section and being disposed eccentrically with respect to a longitudinal center line of the housing and having radially outer and inner walls, wherein

a. said outer surface is smooth and has a convex shape;

b. the radially outer and inner walls of said suction passage converge toward said suction port whereby the radially outer wall includes with said longitudinal center line an angle which is smaller than the angle which the radially inner wall includes with said longitudinal center line; and

c. the edge of the suction passage is rounded off extensively towards the outer surface of the base means.

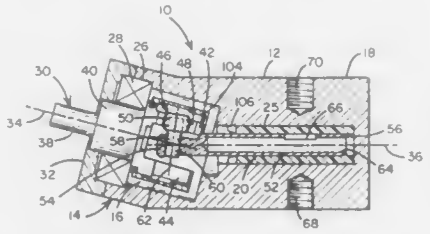
5,022,831
POSITIVE DISPLACEMENT PUMP WITH ROTATING RECIPROCATING PISTON

C. Richard Gerlach, and Edgar C. Schroeder, both of San Antonio, Tex., assignors to Hypro Corporation, New Brighton, Minn.

Filed Oct. 24, 1990, Ser. No. 602,786

Int. Cl.⁵ F04B *7/06;* F16D *3/08*

U.S. Cl. 417—500 5 Claims



1. A fluid pump comprising:

(a) a housing including a crankcase defining a hollow chamber and a contiguously disposed cylinder block, said cylinder block including a longitudinal cylinder bore of a predetermined diameter and a pair of oppositely oriented ports extending laterally through said block to said cylindrical bore;

(b) a shaft journaled for rotation in said crankcase, said shaft having a central axis at a first predetermined angle to the central axis of said cylindrical bore, said shaft supporting a spherical bearing within said hollow chamber and which is offset radially from said central axis of said shaft; and

(c) an elongated cylindrical piston having first and second ends with a pin extending laterally from a side surface thereof proximate said first end, said pin being canted from the perpendicular relative to the longitudinal axis of said piston and operatively journaled in said spherical bearing when said piston is disposed within said longitudinal cylindrical bore, said piston including a longitudinal bore extending inward from said second end and a timing window formed through the surface of said cylindrical piston at a location between said first and second ends to communicate with said longitudinal bore of said piston, the location of said timing window causing said timing window to sweep past said oppositely oriented ports when said shaft is rotated; the angle at which said pin is canted from the relative to the longitudinal axis of said shaft being such that pin loading induced side forces on said piston are eliminated over the entire range of rotation of said piston within said longitudinal cylindrical bore.

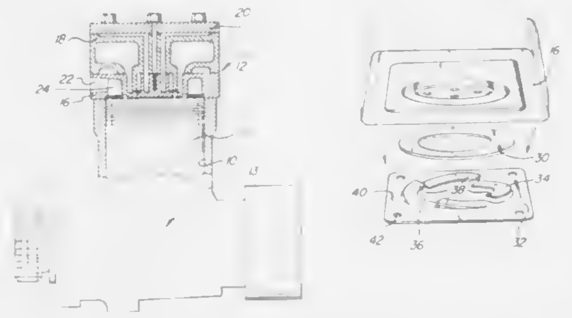
5,022,832
RING VALVE TYPE AIR COMPRESSOR

Jerre F. Lauterbach; Nathan Ritchie, both of Columbus, and Richard F. Miller, North Vernon, all of Ind., assignors to Holset Engineering Company, Columbus, Ind.

Filed Nov. 30, 1988, Ser. No. 278,225

Int. Cl.⁵ F04B *21/02*

U.S. Cl. 417—571 14 Claims



1. A valve assembly and reciprocating fluid pump having a piston cylinder and a cylinder head secured to said piston cylinder defining a fluid chamber, said valve assembly comprising:

a) a first ring valve with a seal surface on one side thereof disposed adjacent to said cylinder head to selectively engage a seat means on said cylinder head and close at least one fluid passage through said cylinder head; and

b) a bias means for urging said first ring valve against said seat means on said cylinder head by abutting said first ring valve on a side opposite from said seal surface;

wherein said bias means includes a peripheral region connected to said fluid pump, wherein said peripheral region of said bias means is connected to said fluid pump between opposing faces of said piston cylinder and said cylinder head and serves as a gasket for said fluid chamber, and said bias means retains said first ring valve between said cylinder head and said bias means.

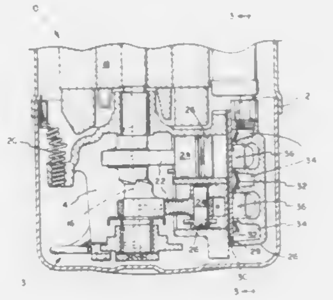
5,022,833
SINGLE PIECE GASKET VALVE PLATE ASSEMBLY

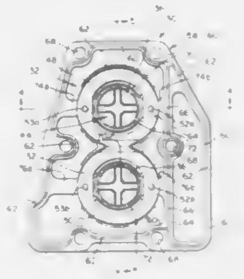
Tara C. Kandpal, Tecumseh; Andrew W. Paczuski, Adrian, both of Mich., and Herbert G. Siewert, Sylvania, Ohio, assignors to Tecumseh Products Company, Tecumseh, Mich.

Filed Dec. 6, 1989, Ser. No. 446,648

Int. Cl.⁵ F04B *39/10, 21/02*

U.S. Cl. 417—571 11 Claims





1. In a hermetic reciprocating compressor including a crankcase having a plurality of cylinder bores formed therein, a piston reciprocatingly disposed within each of said cylinder bores, a cylinder head defining a suction chamber and a discharge chamber, a value plate intermediate said crankcase and said cylinder head and having a respective suction port aligned with each cylinder bore and a plurality of groups of discharge ports in fluid communication with respective said cylinder bores, each said group of discharge ports comprising a plurality of discharge ports at least partially encircling a respective said suction port, discharge valves and respective discharge valve retainers mounted to said valve plate and associated with said discharge ports, a unitary valve plate gasket disposed between said cylinder head and said valve plate, said valve plate gasket comprising:

a compressible peripheral portion;

a plurality of annular central portions in spaced relationship with said peripheral portion, each said central portion encircling a respective one of said suction ports; and

connecting portions extending from said peripheral portion to respective annular central portions to connect said peripheral portion to said central portions of said gasket, each said connecting portion extending between adjacent discharge ports in a respective said group thereof.

VOL
1127
ISS
2
JE
11
1991
UMI

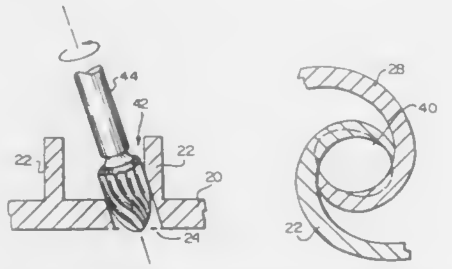
5,022,834
SCROLL COMPRESSOR WITH ENHANCED DISCHARGE PORT

Shahrokh Etemad, Stratford, Conn.; Donald Yannascoli, Manlius, N.Y.; Howard H. Fraser, Jr., Lafayette, N.Y., and William R. Lane, Dewitt, N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Jan. 16, 1990, Ser. No. 466,068

Int. Cl.^{5} F04C *18/04;* **B23B** *35/00;* **B23P** *13/02*

U.S. Cl. 418—55.1 5 Claims



1. A scroll compressor of the type which comprises a pair of mating scrolls disposed on parallel eccentric axes, each of which includes a scroll plate and a spiral, involute wrap on a face surface of the scroll plate, and drive means for causing one of the scrolls to orbit about the axis of the other scroll while maintaining a fixed azimuthal relation to it, so that a compressible fluid enters the pair of scrolls at a periphery thereof, is carried and compressed in one or more pockets defined by the mating wraps of the scrolls as the one scroll orbits the other, and is discharged out a discharge port that is provided at the center of the scroll plate of one of said scrolls;

wherein the improvement comprises said discharge port being bored into the scroll plate of said one scroll diagonally with respect to the scroll axis so as to have an elongated elliptical aperture at the center of the surface of the scroll plate.

5,022,835
HERMETIC COMPRESSOR WITH CRANKSHAFT HAVING ECCENTRIC PISTON PORTION WITH HYDRODYNAMIC WEDGE

Caio M.F.N. Da Costa, Joinville, Brazil, assignor to Empresa Brasileira De Compressores S/A - Embraco, Joinville, Brazil

Filed Nov. 21, 1989, Ser. No. 439,668

Claims priority, application Brazil, Nov. 24, 1988, PI 8806263

Int. Cl.^{5} F04C *18/356, 29/10*

U.S. Cl. 418—63 **16 Claims**

1. A hermetic compressor comprising:

a cylinder,

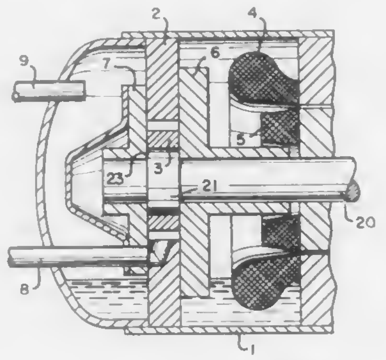
a rolling piston,

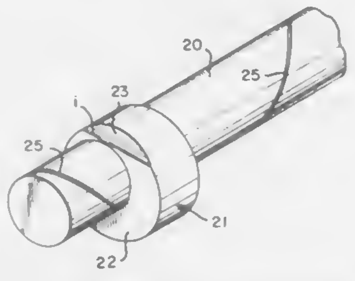
a crankshaft having an eccentric portion extending therefrom with a bearing surface,

said eccentric portion bearing surface having a first section,

means for rotating said crankshaft to rotate the eccentric portion and the rolling piston within the cylinder,

an axial thrust bearing adjacent said cylinder having a surface which said eccentric portion bearing surface faces during its rotation,





said eccentric portion first section including a part shaped to provide a hydrodynamic wedge with the axial thrust bearing surface.

5,022,836
SEALING DEVICE FOR OIL ROTARY VACUUM PUMP

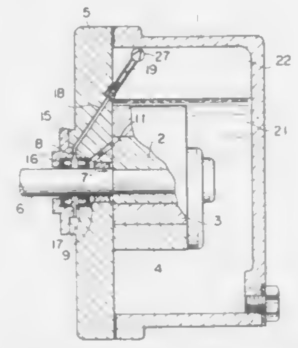
Kiyonori Tokumitsu; Akira Baba, and Sadanori Hirano, all of Fukuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 7, 1990, Ser. No. 476,226

Claims priority, application Japan, Aug. 10, 1989, 1-205802

Int. Cl.^{5} F04C *27/02, 29/02*

U.S. Cl. 418—76 4 Claims



1. A sealing device for an oil rotary vacuum pump of the type which includes a rotor, a cylinder for accommodating said rotor, said cylinder having a suction port and a discharge port, an end cover provided at one end of said cylinder, a rotary shaft of said rotor passing through said end cover, an oil casing attached to said end cover such that it encloses said cylinder, said oil casing containing oil, an interior of said oil casing above the upper surface of said oil forming a space portion, and a bearing provided in said end cover so as to rotatably support said rotary shaft of said rotor,

the sealing device further comprising:

a pair of sealing members mounted on said rotary shaft of said rotor and provided in said end cover, said sealing members being disposed separately from each other so as to form a gap portion therebetween, said pair of sealing members being located on the side of said bearing which is remote from said rotor;

an oil reservoir portion formed between said bearing and the sealing member closer to said rotor in said pair of sealing members;

a first passage for connecting said oil reservoir portion and the interior of said cylinder which is in the vicinity of said discharge port thereof;

a lubricant disposed in said gap portion between said pair of sealing members; and

a second passage for connecting said gap portion between said pair of sealing members and said space portion of said oil casing.

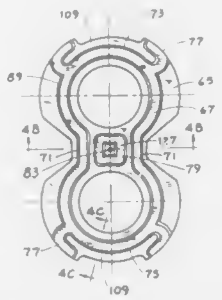
5,022,837
SEAL ARRANGEMENT FOR A GEAR MACHINE

David E. King, and Walter E. Marietta, both of Racine, Wis., assignors to Sta-Rite Industries, Inc., Milwaukee, Wis.

Filed Nov. 13, 1989, Ser. No. 434,445

Int. Cl.^{5} F04C *2/18, 15/00*

U.S. Cl. 418—132 15 Claims



1. A seal arrangement for a gear machine including:

a thrust plate for reducing the cross-face leakage of fluid from a high pressure side to a low pressure side of a gear machine, such thrust plate having an inward face adjacent the gears and an outer face;

a first groove and a second groove formed in the outer face of the thrust plate for receiving a first seal assembly and a second seal assembly, respectively;

the first groove generally defining a numeral "8" with lateral sides spaced from one another, the first groove further including a top segment and a bottom segment, each of the segments having an extension at each end thereof;

the second groove being isolated from the first groove and defining a geometric form located between the lateral sides of the first groove and having its center area spaced generally equidistant between the segments;

the first groove and the first seal assembly being arranged to from four chambers, three of which confine pressurized fluid during operation of the machine;

the second groove and the second seal assembly being arranged to from a fifth chamber to confine pressurized fluid therein during operation of the machine;

the chambers so formed thereby acting, when pressurized, to urge localized areas of the plate toward sealing engagement with the gears of the machine.

5,022,838
MULTI-AXIS ROTATIONAL DISTRIBUTING APPARATUS

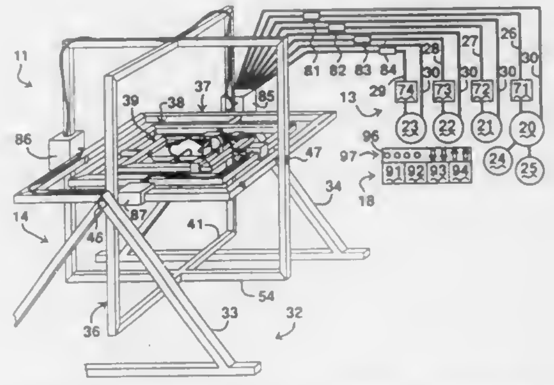
LeRoy Payne, 3300 Nicholas La., Molt, Mont. 59057

Continuation-in-part of Ser. No. 271,686, Nov. 16, 1988, Pat. No. 4,956,133, which is a continuation-in-part of Ser. No. 202,267, Jun. 6, 1988, Pat. No. 4,956,135, which is a continuation-in-part of Ser. No. 890,742, Jul. 30, 1986, Pat. No. 4,749,533, which is a division of Ser. No. 766,498, Aug. 19, 1985, Pat. No. 4,671,753. This application Oct. 5, 1989, Ser. No. 417,502

The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.

Int. Cl.^{5} B29C *41/06, 41/52, 67/20*

U.S. Cl. 425—145 25 Claims



1. Multi-axis rotational polymeric mixture distributing apparatus including a raw material supplying portion, a supporting portion, a raw material mixing portion, a polymeric mixture accepting portion and a control portion; said raw material supplying portion including a plurality of reservoirs, reservoirs being connected independently with said mixing portion through conduit means; said supporting portion including a base section with generally parallel spaced upstanding end sections, a plurality of frame members each with a large open central area being disposed between said upstanding end sections and rotatably supported thereon, each of said frame members being progressively smaller in size and disposed within said open central area of a next larger frame member, alternate frame members being rotatable about aligned axes with frame members therebetween being rotatable about axes generally perpendicular thereto, the smallest frame member including rotatable holding sections extending inwardly toward one another along an axis perpendicular to the axis of said smallest frame member; said raw material mixing portion including a mixing chamber mounted adjacent said smallest frame member, a plurality of spaced deflector sections selectively positionable within said mixing chamber along the length thereof, means for withdrawing said deflector sections from said mixing chamber and piston means selectively movable within said mixing chamber along the length thereof when said deflector sections are withdrawn therefrom; said polymeric mixture distributing portion including movable delivery means extending from said mixing chamber toward said axis of said holding sections; said polymeric mixture accepting portion including a profile member with a surface having a desired configuration positionable between said holding sections and securable therebetween; said control portion including pump means, valve means and flow monitoring means disposed along each conduit means, independent drive means disposed adjacent the axis of each frame member providing rotation thereof independently of other frame members, programmable memory means and actuating means responsive thereto controlling and activating said pump means, said valve means and said drive means

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,839
DEVICE FOR CLEANING A MOLDING TOOL IN PLASTICS PROCESSING MACHINES

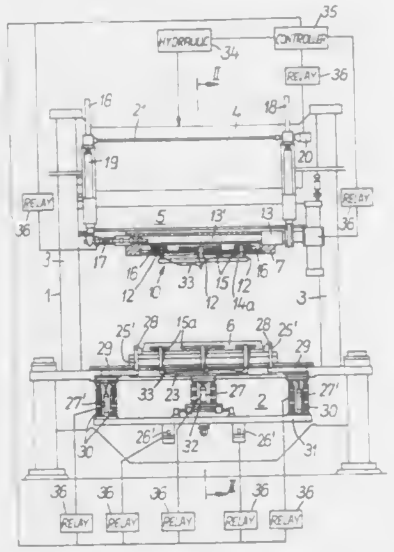
Richard Brüssel, Sulzfeld, Fed. Rep. of Germany, assignor to Fried. Krupp GmbH, Essen, Fed. Rep. of Germany

Filed Oct. 25, 1989, Ser. No. 426,279

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1988, 3837257

Int. Cl.^{5} B29C *45/04, 45/17*

U.S. Cl. 425—161 **10 Claims**



1. In a plastics processing machine in the form of a press having a molding tool which includes a male mold and a female mold on respective carriers which are movable in an operating stroke of the press, toward and away from each other to mold a plastic product, and a cleaning tool which is movable to the female mold for cleaning thereof, the improvement comprising a holder fastened to the carrier of the female mold, the cleaning tool comprising blow nozzles mounted to the holder, and means for moving the holder and the blow nozzles therewith toward the female mold in synchronism with movement of the male and female molds away from each other during the operating stroke of the press, the holder being pivotable about an axis extending transversely to the operating stroke of the press, the axis being located a distance from the female mold such that the blow nozzles of the cleaning tool are pivotable to an operating position in which they engage the female mold, the female mold having immersion edges, the cleaning tool including blow strips formed in combination by the blow nozzles, the blow strips extending in the same direction as the immersion edges.

5,022,840
AGGLOMERATION DEVICE

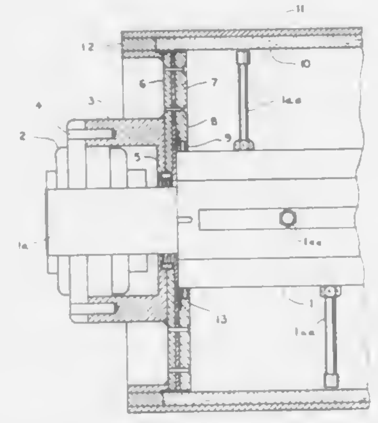
Carl A. Holley, 14315 Tall Oaks, Riverview, Mich. 48192

Filed Apr. 26, 1990, Ser. No. 515,076

Int. Cl.^{5} B01J *2/10*

U.S. Cl. 425—222 **6 Claims**

1. In an agglomeration device having a rigid cylindrical casing including end plates in which rotates a driven shaft with pin means extending radially outwardly thereof sweeping closely to the inner surface of the casing of said device: the improvement comprising ring means of nonmetallic material rigidly attached to the inner surface of said end plates with a notched out portion close to the surface of said shaft and a rotating metallic ring rigidly secured to the ends of said shaft and closely fitted in said notched out portion.



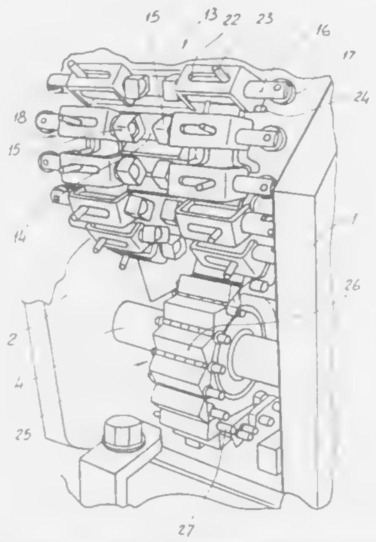
5,022,841
CHAIN DIE ASSEMBLY FOR MAKING HARD AND STUFFED SUGAR DROPS

Francesco Rizzi, Via Trieste, 62, 24057 Martinengo (Bergamo), Italy

Filed Nov. 30, 1989, Ser. No. 443,938

Int. Cl.^{5} A23G *3/12*

U.S. Cl. 425—235 10 Claims



1. A chain die assembly for making hard and stuffed sugar drops comprising a top chain and a bottom chain, entrained on horizontal parallel axis gear wheels and having contacting sliding corresponding portions, said top chain supporting, at a central portion thereof, essentially dihedral structures defining open seats therealong which are capable of sliding two dies of a sugar drop forming die assembly, said bottom chain defining in turn a plurality of like dihedral structures having corner portions adapted to cut a sugar drop forming sugar bead, means being moreover provided for clamping said two dies of said die assembly and cutting said sugar bead.

5,022,842
VANE PUMP WITH ROTATABLE ANNULAR RING MEANS TO CONTROL VANE EXTENSION

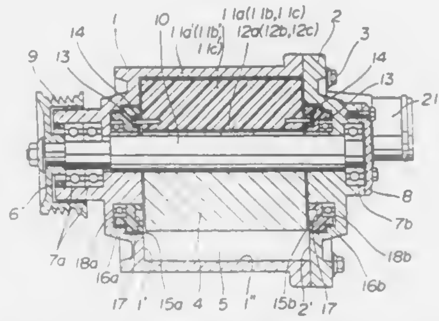
Hiroshi Sakamari; Yukio Horikoshi; Takeshi Jinnouchi, and Kenji Tanzawa, all of Sakado, Japan, assignors to Eagle Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 197,548, May 23, 1988, Pat. No. 4,958,995, which is a continuation-in-part of Ser. No. 75,006, Jul. 17, 1987, abandoned, Ser. No. 110,919, Oct. 21, 1987, abandoned, Ser. No. 113,568, Oct. 26, 1987, abandoned, and Ser. No. 115,677, Oct. 30, 1987, abandoned. This application Apr. 12, 1990, Ser. No. 508,743

Claims priority, application Japan, Jul. 22, 1986, 61-111490[U]; Jul. 22, 1986, 61-170903; Oct. 23, 1986, 61-161609[U]; Oct. 23, 1986, 61-161610[U]; Nov. 4, 1986, 61-168145[U]; Nov. 4, 1986, 61-168147[U]; Nov. 14, 1986, 61-269960[U]; Nov. 17, 1986, 61-271934; Nov. 21, 1986, 61-178287[U]; Nov. 21, 1986, 61-178288[U]; Nov. 21, 1986, 61-276689; Nov. 21, 1986, 61-276690; Dec. 3, 1986, 61-185571[U]; Nov. 14, 1988, 61-269961

Int. Cl.^{5} F04C *2/344*

U.S. Cl. 418—257 3 Claims



1. A vane pump comprising a housing having a rotor chamber, said rotor chamber having longitudinal end walls and an inner annular surface, a rotor means rotatably mounted in said rotor chamber, said inner annular surface having a chamber axis which is eccentric relative to the axis of rotation of said rotor means, said rotor member end walls being perpendicular to said axis of rotation, said rotor means having a plurality of generally radially disposed vane slots, a plurality of vane means slidably mounted in said vane slots and operable to define variable volume chambers for effecting a pumping action as said rotor means rotates and said vane means move generally radially in and out of said vane slots, said vane means each having an outer radial end and longitudinal axial ends, projections means projecting from said longitudinal ends, said housing having an annular channel coaxial with said chamber axis, said channel having spaced inner and outer peripheral walls formed by said housing an extending from said rotor chamber end wall, annular ring means disposed in said channel, bearing means rotatable within said channel rotatably supportin said ring means within said channel, said bearing means being spaced from said outer peripheral wall of said channel, said ring means having an uninterrupted annular groove coaxial with said chamber axis, said groove having a continuous uninterrupted inner cylindrical surface disposed to be engaged by said projection means such that during rotation of said rotor means, the resulting centrifugal force urges said vane means radially outwardly of the respective vane slot such that said projection means engages and presses against said inner cylindrical surface to effect rotation of said ring means, said inner cylindrical surface being disposed to limit the extent of outward radial movement of said vane means from its respective vane slot to provide a space between said outer radial ends of said vane means and said inner annular surface of said housing, thereby precluding sliding contact between said outer radial ends of said vane means and said inner annular surface as said rotor means rotates within said housing.

5,022,843
PYROHY MAKER

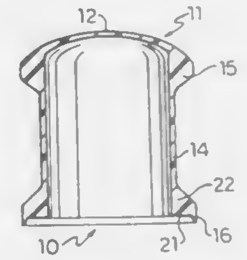
Loretta Secondiak, Alberta, Canada, assignor to 303576 Alberta Ltd., Calgary, Canada

Filed Nov. 15, 1989, Ser. No. 436,613

Claims priority, application Canada, Feb. 17, 1989, 591402

Int. Cl.^{5} A21C *11/10*

U.S. Cl. 425—289 **2 Claims**



1. A pyrohy maker comprising a single substantially cylindrical cup with an open end, an annular cutting ring surrounding the open end and having a free cutting edge, an inner frusto-conical face leading from the cutting edge, a substantially planar sealing surface extending inwardly from the frusto-conical face, and a substantially dome-shaped end opposite the cutting edge.

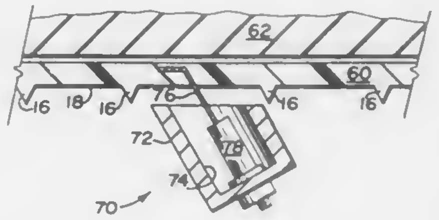
5,022,844
APPARATUS FOR FORMING FOLDABLE PLASTIC PRODUCTS

Gary T. Schwertner, St. Joseph, Tenn., and Edward S. Robbins, III, 459 N. Court, Florence, Ala. 35630, assignors to Edward S. Robbins, III, Florence, Ala.

Division of Ser. No. 221,367, Jul. 19, 1988, Pat. No. 4,921,563, which is a division of Ser. No. 82,142, Aug. 6, 1987, Pat. No. 4,784,888. This application Jan. 18, 1990, Ser. No. 467,185

Int. Cl.^{5} B29C *47/52, 59/04*

U.S. Cl. 425—302.1 **9 Claims**



1. Apparatus for forming a foldable plastic product comprising:

forming means for forming a shaped body of plastic material having one and another surfaces which define a thickness dimension therebetween; and

slitting means for slitting said body so as to create a hinge in said body along a slit which includes (i) a first segment that extends, when viewed in profile, in one direction from said one surface of said body towards said another surface thereof to a first location which is within said thickness dimension of said body, and (ii) a second segment that extends in a second direction from said first location to a second location also within said thickness dimension of said body, and wherein

said slitting means includes blade means configured so as to have first and second portions corresponding to said first and second segments of said slit, respectively, for simultaneously forming said first and second slit segments in said body.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,845

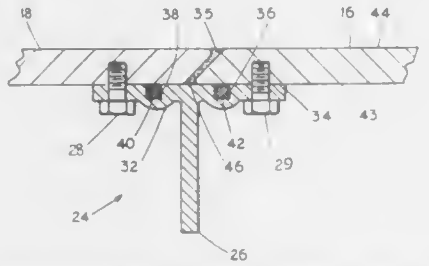
SEGMENTED MANDREL FOR FORMING COMPOSITE ARTICLES

Sandra M. Charlson; Steven J. Kotula, and Michael R. McCloy, all of Salt Lake City, Utah, assignors to Hercules Incorporated, Wilmington, Del.

Filed Apr. 25, 1989, Ser. No. 343,453

Int. Cl.^{5} B29C *33/48*

U.S. Cl. 425—403 **7 Claims**



1. A segmented mandrel for use in shaping a fiber containing body with a curvature that necessitates, or otherwise is conducive to, disassembly of said mandrel after shaping said body around an external surface of said mandrel, said mandrel rotatable about a mandrel first axis that extends through said mandrel lengthwise along the central longitudinal axis thereof, said mandrel comprising:

- a center shaft extending lengthwise along said mandrel first axis and adapted to receive rotary motion that turns said mandrel around said mandrel first axis;
- first and second mandrel segments mating together along a seam between their respective adjacent edges in forming a portion of said external surface extending around said shaft;
- a stiffener top section (a) engaging said first and second mandrel segments along said seam beneath said adjacent edges, (b) fastening said mandrel segments on either side of said seam through fasteners extending into said segments through said top section and (c) sealing inner and outer surfaces of said segments on either side of said seam by sealing means located respectively between (i) said fastener of said first segment and said seam and (ii) said fastener of said second segment and said seam;
- a stiffener support leg integral with said top section and extending inwardly toward said shaft;
- a bulkhead rigidly mounting around said shaft and to said segments for translating rotary motion from said shaft to said segments, said bulkhead is removably connected to said stiffener support leg,
- wherein said first and second mandrel segments have a sealant between their respective mating edges above said top section whereby said sealant and stiffener create a vacuum seal between the mandrel segments while at the same time retain the function of support and alignment of the mandrel segments.

5,022,846

PNEUMATIC ACTUATING MECHANISM FOR INJECTION MOLDING

Harald H. Schmidt, Georgetown, Canada, assignor to Mold-Masters Limited, Georgetown, Canada

Filed Aug. 29, 1989, Ser. No. 399,999

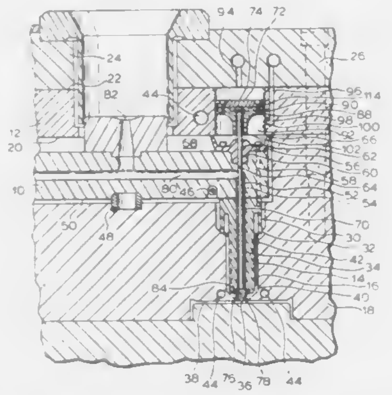
Claims priority, application Canada, Jul. 14, 1989, 605753

Int. Cl.^{5} B29C *45/22, 45/23*

U.S. Cl. 425—564 **6 Claims**

1. In a multi-cavity valve gated injection molding apparatus having an elongated manifold extending between a cylinder plate having a front surface and a rear surface and a plurality of spaced heated nozzles, each nozzle being seated in a well in a cooled cavity plate and having a central bore extending therethrough in alignment with a gate leading to a cavity, an elongated valve member having a rear end and a forward end mounted in the central bore through the nozzle to extend rearwardly through the manifold, a sealing bushing mounted around each valve member to extend across an air space between the manifold and the cylinder plate, each sealing bushing having a central bore which receives the valve member therethrough and an outer flanged portion which extends into bearing contact against the front surface of the cylinder plate, a pneumatic valve member actuating mechanism mounted in the cylinder plate to engage the rear end of the valve member to drive the valve member between an open position and a closed position wherein the forward end is seated in the gate, and a melt passage which branches from a common inlet and extends through the manifold and around the valve member in the central bore of each nozzle to convey pressurized melt to each gate, the improvement:

- wherein the valve member actuating mechanism includes a piston which engages the rear end of the valve member, the piston being mounted to reciprocate in a cylindrical opening extending through the cylinder plate from the rear surface to the front surface, and first and second air ducts extending to the cylindrical opening through the cylinder plate on opposite sides of the piston, the cylindrical opening through the cylinder plate having an open forward mouth, the outer flanged portion of the sealing bushing bearing against the front surface of the cylinder plate around the open forward mouth of the cylindrical opening whereby the flanged portion is outside the open mouth of the cylindrical opening to prevent air escaping from the opening in the cylinder plate into the air space surrounding the flanged portion of the sealing bushing, and a back plate is securely mounted against the back surface of the cylinder plate to enclose the cylindrical opening.



5,022,847

INJECTING UNIT FOR USE IN AN INJECTION MOLDING MACHINE

Karl Hehl, Arthur-Hehl-Strasse 32, D-7298 Lossburg 1, Fed. Rep. of Germany

Filed Jul. 3, 1989, Ser. No. 374,925

Claims priority, application Fed. Rep. of Germany, Jul. 7, 1988, 3822926

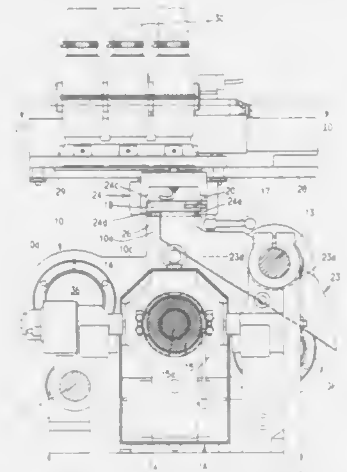
Int. Cl.^{5} B29C *45/16*

U.S. Cl. 425—578 **9 Claims**

1. In an injecting unit for an injection molding machine; said injecting unit having

- a vertical longitudinal plane of symmetry;
- a feeding block;
- a plasticizing cylinder passing through said feeding block;
- a feeding shaft formed in said feeding block and communicating with the plasticizing cylinder;
- a track rail mounted on the feeding block and having a feeding bore being in alignment with an inlet of the feeding shaft and an emptying bore spaced from the feeding bore;
- a feeding unit mounted on the track rail for displacement therealong; said feeding unit having an outlet opening; the feeding unit being movable on the track rail into a feeding position in which the outlet opening is in alignment with the feeding bore, whereby plastic material is dischargeable from the feeding unit through the feeding bore and feeding shaft into the plasticizing cylinder; the feeding unit being movable on the track rail into an emptying position in which the outlet opening is in alignment with the emptying bore, whereby plastic material may be emptied from the feeding unit through the emptying bore;

- the improvement wherein said track rail extends along and symmetrically with said vertical longitudinal plane of symmetry, wherein said emptying bore is situated at least approximately symmetrically with said vertical longitudinal plane of symmetry;



- the improvement further comprising an emptying duct having an inlet opening communicating with said emptying bore and an outlet situated at a distance from said vertical longitudinal plane of symmetry, whereby plastic material is dischargeable from said feeding unit through said emptying duct when said feeding unit is in said emptying position; and
- a carrier forming part of and supporting said feeding unit; said carrier being readily detachably mounted on said track rail.

5,022,848

APPARATUS AND METHOD FOR HEATING A WASTE DISPOSAL SYSTEM

Benjamin P. Fowler, 805 S. Country Club, LaPorte, Tex. 77057

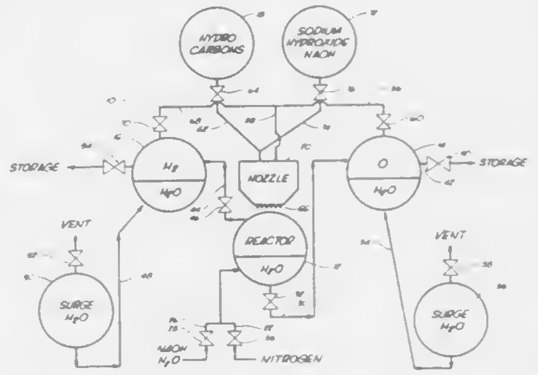
Continuation-in-part of Ser. No. 398,246, Aug. 24, 1989, Pat. No. 4,934,286. This application Jun. 18, 1990, Ser. No. 539,992

Int. Cl.^{5} F23H *5/00*

U.S. Cl. 431—2 **8 Claims**

1. A method of generating heat comprising:

- dissociating water in a high temperature oxygen-free environment so as to separate a hydrogen component and an oxygen component from said water;
- pressurizing said oxygen component to a pressure greater than 1000 p.s.i.;
- mixing the pressurized oxygen with hydrocarbons; and



- igniting the mixture of said pressurized oxygen and said hydrocarbons.

5,022,849

LOW NOX BURNING METHOD AND LOW NOX BURNER APPARATUS

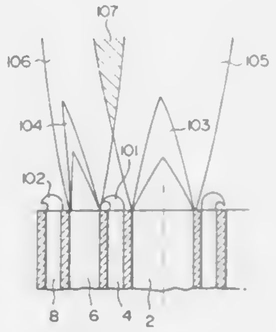
Yasuo Yoshii, Katsuta; Shigeru Azuhata; Norio Arashi, both of Hitachi; Kenichi Sohma, Ibaraki; Tooru Inada; Hideo Kikuchi, both of Hitachi; Masayuki Taniguchi, Katsuta; Kiyoshi Narato, Ibaraki; .Hironobu Kobayashi, Katsuta; Tadayoshi Murakami, Hitachi; Michio Kuroda, Hitachi; Yoji Ishibashi, Hitachi, all of Japan, and Stephen M. Masutani, Honolulu, Hi., assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 14, 1989, Ser. No. 379,926

Claims priority, application Japan, Jul. 18, 1988, 63-176914

Int. Cl.^{5} F23Q *9/00*

U.S. Cl. 431—2 **25 Claims**



1. In a low NOx burning method wherein a low air ratio flame burned with an amount of air less than an amount of air in a theoretical air ratio required for burning fuel perfectly is formed, and combustibles discharged from said low air ratio flame are burned at a training stream of said low air ratio flame while supplying air, the improvement wherein:

- said low air ratio flame is a premixing flame burned by premixing said fuel and air, and combustion of said premixing flame is maintained in a vicinity of said premixing flame by a flame burned around an outer periphery of said low air ratio flame, said last mentioned flame being a premixing flame burned by premixing the fuel and the air having substantially the theoretical air ratio required for substantially perfect combustion.

13. A low NOx burner apparatus comprising a first nozzle means for forming a low air ratio flame burned with an amount of air less than a theoretical air amount required for perfectly burning fuel, an air supplying nozzle means arranged coaxial with said first nozzle means for supplying air to burn combustibles discharged from said low air ratio flame at a trailing

VOL
1127
ISS
2
JE
11
1991
UMI

stream of said low air ratio flame, means for burning said low-air ratio flame by premixing the fuel and air, and means arranged in a vicinity of the low air ratio flame for maintaining the combustion of said low air ratio flame by burning a flame around an outer periphery of said low-air ratio flame, said last mentioned flame being a premixing flame burned by premixing the fuel and the air having substantially the theoretical air ratio required for substantially perfect combustion.

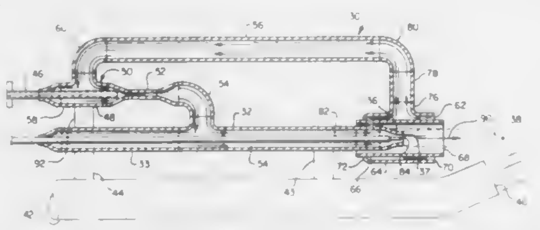
5,022,850
PILOT FLAME APPARATUS

W. Mark Bohon, Frisco, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Mar. 23, 1990, Ser. No. 498,195

Int. Cl.^{5} F23D *11/44*

U.S. Cl. 431—207 **19 Claims**



1. A pilot flame apparatus for generating and sustaining a flame comprising:

conduit means including a chamber for mixing combustion air with a fluid fuel;

flame nozzle means at one end of said conduit means and having an outlet opening for emitting a fuel-air mixture to be combusted to form a flame;

a fuel supply conduit having a discharge end;

eductor means in communication with said conduit means and disposed in proximity to said discharge end of said fuel supply conduit for educting combustion air into said conduit means to mix with fuel emitted from said fuel supply conduit, and means forming an ambient atmospheric combustion air inlet passage for conveying combustion air to said eductor means and whereby said combustion air inlet passage is arranged to receive ambient atmospheric combustion air flowing from a direction which is opposite to the direction of propagation of said flame so that the pressure of combustion air entering said conduit means is increased in proportion to an increase in resistance to emission of a fuel-air mixture from said outlet opening of said nozzle means caused by wind.

5,022,851
FUEL PRE-HEATER FOR LIQUID FUELED ENGINE

Peter Reiser, Esslingen; Fritz Mohring, Ostfildern, and Adolf Schodt, Esslingen, all of Fed. Rep. of Germany, assignors to J. Eberspächer, Esslinger, Fed. Rep. of Germany

Filed Jun. 23, 1988, Ser. No. 210,630

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1987, 3721834

Int. Cl.^{5} F23D *11/44*

U.S. Cl. 431—215 **7 Claims**

1. Engine-independent heater operated with diesel fuel for vehicles, comprising:

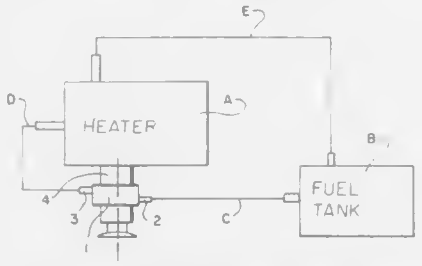
a fuel tank,

a fuel line connected between said fuel tank and a fuel pump associated with the heater,

a fuel return line connected between the heater and said fuel tank, and

an exhaust gas line removing exhaust gas from a combustion chamber of the heater,

said fuel line, connecting the fuel tank to the fuel pump, having a section surrounding the exhaust gas line for preheating the diesel fuel, said surrounding section being formed by a one-layer wrapping of the fuel line and is arranged on a sleeve, by which the heat-transferring contact with the exhaust gas line takes place.



5,022,852
ROTARY KILN

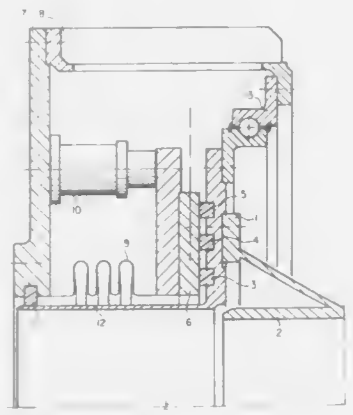
Michael Blasko, Gladbeck, and Hans-Peter Wenning, Raesfeld, both of Fed. Rep. of Germany, assignors to Veba Oel Entwicklungs-Gesellschaft mbH, Gelsenkirchen, Fed. Rep. of Germany

Filed Sep. 11, 1989, Ser. No. 405,231

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1988, 3830678

Int. Cl.^{5} F27B *7/24;* F16J *15/38*

U.S. Cl. 432—115 **9 Claims**



1. A rotary kiln comprising:

(a) a stationary frame structure having a first surface that is perpendicular to the axis of the rotary kiln and a second surface that is perpendicular to the axis of the rotary kiln;

(b) a ball bearing turning connection mounted on the second surface of said stationary frame structure, said ball bearing turning connection having a first surface that is perpendicular to the axis of the rotary kiln and that abuts the second surface of said stationary frame structure and a second surface that is perpendicular to the axis of the rotary kiln;

(c) a rotating cylinder head mounted on the second surface of said ball bearing turning connection, said rotating cylinder head having a first surface that is perpendicular to the axis of the rotary kiln and that abuts the second surface of said ball bearing turning connection and a second surface that is coaxial to the axis of the rotary kiln;

(d) a rotating sealing flange mounted on the first surface of said rotating cylinder head;

(e) a rotating cylinder connected to said rotating sealing flange;

(f) a stationary sealing flange mounted on the first surface of said stationary frame structure, said stationary sealing flange having a first surface that is perpendicular to the axis of the rotary kiln and that abuts the first surface of said stationary frame structure and a second surface that is coaxial to the axis of the rotary kiln;

(g) a rotationally stationary but radially movable sealing flange spaced from said stationary sealing flange;

(h) a first sealing element located between said rotationally stationary but radially movable sealing flange and said rotating cylinder head;

(i) a second sealing element located between the second surface of said stationary sealing flange and the second surface of said rotary cylinder head;

(j) means for biasing said rotationally stationary but radially movable flange against said first sealing element with an at least approximately constant force despite wear of said first sealing element; and

(k) a compensator unit disposed between said stationary sealing flange and said rotationally stationary but radially movable sealing flange.

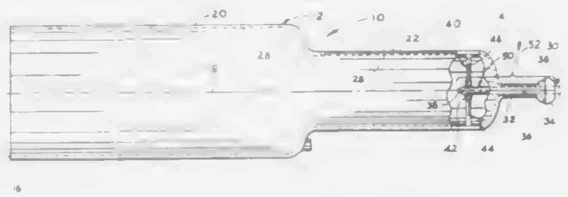
5,022,853
SEMICONDUCTOR PROCESSING FURNACE TUBE AND ALIGNMENT JIG

Eric Powell, and Navjot Chhabra, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Apr. 24, 1990, Ser. No. 513,555

Int. Cl.^{5} F27B *5/16, 9/04*

U.S. Cl. 432—200 **2 Claims**



1. A tube for a furnace for processing semiconductor wafers, the tube being of a type adapted for slidably and removably receiving a particular elongated gas injector assembly, the particular gas injector assembly comprising an elongated cylinder having an injector nozzle end which is configured to be received entirely within the tube, the elongated cylinder of the injector end having smooth coextensive outer cylindrical walls of a defined outer diameter, the outer cylindrical walls of the injector nozzle end being void of external radial projections, the tube comprising:

an elongated hollow body having opposed first and second ends, inner and outer longitudinal walls, and a longitudinal axis;

an injector opening being formed in the first end, the injector opening including sidewalls which are spaced to slidably receive the particular elongated gas injector assembly through the opening, the injector opening being sized to enable both slidable insertion and removal of the entire injector nozzle end therethrough; and

an alignment jig received within the hollow body inwardly adjacent the first end and injector opening, the alignment jig comprising a ring-like member having an internal open diameter and central axis, the ring-like member open diameter being slightly larger than the outer diameter of the gas injector cylindrical walls to slidably and removably receive the outer cylindrical walls of the gas injector elongated cylinder to contact and support the elongated cylinder, the ring-like member being immobily welded to the internal longitudinal tube walls to position the ring-like member central axis coincident with the longitudinal tube axis for emitting gas from the particular gas injector received by the ring-like member substantially along the longitudinal tube body axis.

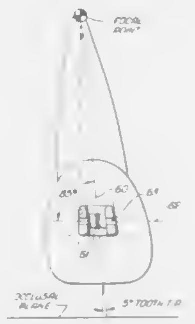
5,022,854
ORTHODONTIC BRACKET

Dan Q. Broughton, Vista, and Nicholas O. Norris, Oceanside, both of Calif., assignors to Ortho Organizers, San Marcos, Calif.

Continuation of Ser. No. 285,208, Dec. 16, 1988, abandoned. This application Jul. 5, 1990, Ser. No. 549,259

Int. Cl.^{5} A61C *3/00*

U.S. Cl. 433—8 **3 Claims**



1. An orthodontic bracket having a trapezoidal configuration for mounting on a tooth comprising:

a single tie wing having non-parallel mesial distal edges,

the mesial and distal edges of the tie wing forming sight lines which intersect at a focal point located at the tip of the tooth root,

the sight lines of the mesial and distal edges for aligning and positioning the bracket in relation to the mesial and distal edges of the tooth,

said edges of the mesial and distal tie wing being non-parallel to the tooth axis,

an archwire slot having a sight line midway between the sides of said slot and parallel to the occlusal plane,

the tie wing having an occlusal edge forming a sight line that is substantially parallel to the sight line of the archwire slot and the occlusal edge of the tooth,

the sight lines of the occlusal edge and archwire slot for aligning and positioning the bracket in relation to the occlusal edge of the tooth.

5,022,855
INTRAORAL ORTHODONTIC DIRECTIONAL FORCE APPLICATOR

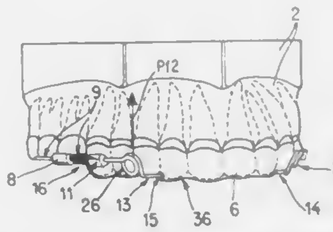
Norbert Jeckel, Mühlematten 21, D-7801 Umkirch, Fed. Rep. of Germany

Filed Dec. 7, 1989, Ser. No. 448,133

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1988, 3841202

Int. Cl.^{5} A61C *3/00*

U.S. Cl. 433—18 **32 Claims**



1. An intraoral orthodontic applicator of directional force to one or more first teeth of the upper or lower row of teeth, particularly to one or more posterior teeth, comprising at least one attachment connectable with a first tooth; at least one brace at least partially conforming to and arranged to overlie several second teeth of the respective row; and means for

VOL
1127
ISS
2
JE
11
1991
UMI

biasing said at least one attachment in a selected direction, including at least one first component reacting against said at least one brace, at least one second component bearing against said at least one attachment and means for separably connecting said at least one attachment to said at least one second component, said connecting means comprising a female element and an elongated male element receivable in said female element, one of said elements being provided on said at least one attachment and the other of said elements being provided on said at least one second component, said connecting means further comprising at least one resilient element interposed between said male and female elements and a stop provided on said male element, said resilient means being interposed between said female element and said stop and said stop being movable longitudinally of said male element, said connecting means further comprising means for separably affixing said stop to said male element.

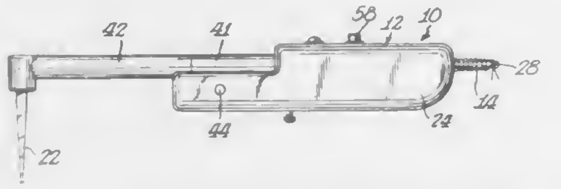
5,022,856
DENTAL PROBE ASSEMBLY

Alan Zimble, 2006 Limestone Rd., Ste. 2, Wilmington, Del. 19808

Continuation-in-part of Ser. No. 236,773, Aug. 26, 1988, Pat. No. 4,883,425. This application Oct. 24, 1989, Ser. No. 426,006

Int. Cl.^{5} A61C *19/04*

U.S. Cl. 433—72 **17 Claims**



1. A probe assembly for depth measurement comprising a hand held portable tool having a handle section at one end thereof, a neck section detachably mounted to said handle section, a probe tip mounted to said neck section remote from said handle section, said probe tip being made of a light conducting and emitting material, means for transmitting light to said probe tip, means for indicating the amount of light on said probe tip to thereby indicate the depth of a pocket into which said probe tip is inserted, said means for transmitting light to said probe tip comprising first fiber optic bundle in said handle section and said neck section associated with said probe tip, and said indicating means includes a second fiber optic bundle in said handle section and said tool section communicating with a lens assembly located at said probe tip.

5,022,857
DENTAL BURR AND DENTAL HANDPIECE

Kanji Matsutani, Takanezawa, and Masatoshi Fukuda, Utsunomiya, both of Japan, assignors to Matsutani Seisakusho Co., Ltd., Tochigi, Japan

Filed Dec. 21, 1988, Ser. No. 287,116

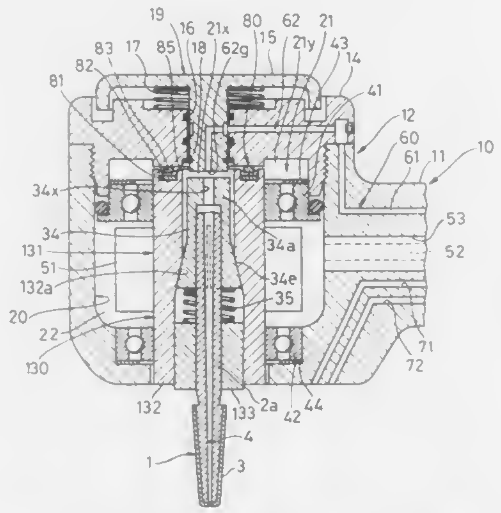
Int. Cl.^{5} A61C *1/12*

U.S. Cl. 433—85 **10 Claims**

1. A dental handpiece for rotatably holding a dental burr, said dental burr including an elongated burr body having a front and a rear end and having an axis of rotation therethrough in a direction of a length thereof, said body having a shank portion defined by a rear end portion thereof and a cutting portion defined by a front end portion thereof, said body having a first cooling water passage extending along the axis of said body, said passage opening at one end to the rear end of said body and opening at the other end to an outer surface of said cutting portion of said body; said handpiece comprising:

(a) a handpiece body including a handgrip portion and a head portion provided at one end of said handgrip portion and having an internal space therein, said head portion comprising a tubular portion formed at the one end of said handgrip portion and having opposite open ends through one of which said cutting portion of said dental burr is adapted to extend outwardly of said handpiece body, said head portion also comprising a cap for closing the other open end of said tubular portion and a push button mounted on said cap for movement relative to said cap, said push button having a stem portion slidably extending along an axis of said tubular portion through said cap into said internal space, said handpiece body having a second cooling water passage comprising a first sub-passage and a second sub-passage, said first sub-passage being formed in said handgrip portion and connectable to a source of cooling water, said second sub-passage having a proximal end connected to said first sub-passage, said second sub-passage being formed in said tubular portion of said head portion, said cap and said push button, said second sub-passage having a distal portion which is formed in said stem portion and extends along a longitudinal axis of said stem portion, said second sub-passage opening at its distal end to an end face of said stem portion of said push button;

(b) support means mounted within said internal space of said head portion for supporting said shank portion of said dental burr in such a manner that said cutting portion of said dental burr extends outwardly from said head portion, said support means comprising a tubular rotatable body extending along the axis of said tubular portion, said support means also comprising chuck means received in said rotatable body so as to releasably chuck said shank portion of said dental burr, said stem portion of said push button being operatively engageable with said chuck means so as to release the chucking of said shank portion by said chuck means when said push button is depressed, said distal portion of said second sub-passage of said second cooling water passage being on the axis of said first cooling water passage of said dental burr when said dental burr is supported by said support means, the distal end of said second sub-passage being communicated with said first cooling water passage;



(c) bearing means for rotatably supporting said tubular rotatable body of said support means in such a manner that said burr body is rotatable about the axis of rotation thereof, said support means being disposed in spaced relation to an inner surface of said head portion defining said internal space; and

(d) drive means for imparting a rotational movement to said support means.

5,022,858
PORTABLE DENTAL INSTRUMENT STERILIZING CONTAINER

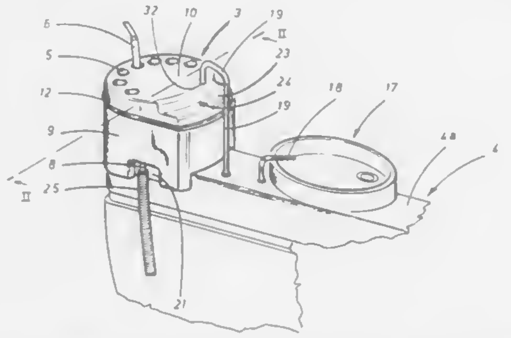
Franco Castellini, Bologna, Italy, assignor to Castellini, S.P.A., Bologna, Italy

Filed Oct. 31, 1988, Ser. No. 265,392

Claims priority, application Italy, Nov. 18, 1987, 5002/87[U]; Jul. 6, 1988, 4880/88[U]

Int. Cl.^{5} A61C *17/14*

U.S. Cl. 433—97 **7 Claims**



1. A portable dental instrument sterilizing container which is to be connected to a support which flanks a dental chair with said support having a well defined in its top surfaces comprising:

- a top section, a bottom section and an internal middle section,
- said bottom section having a projection formed in its bottom surface which is sized and adapted to be inserted in said well to hold and stabilize said sterilizing container on said support,
- said top section having a plurality of holes therein which form dental instrument holding sockets,
- a portion of said top section being shaped to rest a rinsing cup therein,
- said internal middle section being shaped as a container to form an internal container,
- said holding sockets communicating with said internal container,
- said internal container being sized such that dental instruments placed in the sockets project above said top section and approximately to a bottom internal surface of said internal container,
- said internal container having a suction port and a drainage port,
- said suction port having means to connect said means to drain said internal container, and
- said internal drainage port being positioned to open into said sterilizing container.

5,022,859
GINGIVAL RECTRACTOR INSTRUMENT

Richard A. Oliva, 3318 Club Dr., Los Angeles, Calif. 90064

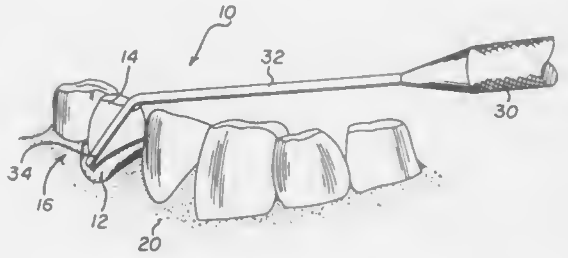
Filed Oct. 10, 1989, Ser. No. 419,142

Int. Cl.^{5} A61C *3/00*

U.S. Cl. 433—141 **11 Claims**

1. A gingival retractor instrument, comprising:

- an instrument handle; and
- a working tip formed at one end of said handle and defining a distal end face of circular shape and having a narrow profile less than about 1.0 millimeter in width, said end face further having a recess formed therein.



5,022,860
ULTRA-SLIM DENTAL IMPLANT FIXTURES

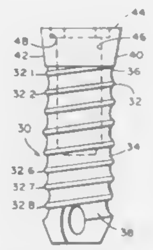
Richard J. Lazzara, Lake Worth, and Keith D. Beaty, West Palm Beach, both of Fla., assignors to Implant Innovations, Inc., West Palm Beach, Fla.

Filed Dec. 13, 1988, Ser. No. 283,977

The portion of the term of this patent subsequent to Mar. 19, 2008, has been disclaimed.

Int. Cl.^{5} A61C *13/00*

U.S. Cl. 433—174 **8 Claims**



1. A dental implant fixture having an implant shaft for implantation in a specially prepared bore in a patient's jawbone, said prepared bore extending from a gingival apsect of said jawbone to an interior region within said jawbone, said shaft extending between a gingival region and an apical end which reaches to said interior region when said shaft is installed in said prepared bore with said gingival region located at said gingival aspect, said shaft having on its exterior screw thread means the root-to-peak depth of which is greater at said apical end than at said gingival end, the peaks of said screw threads being on the locus of a cylinder extending from said apical end toward said gingival region, said shaft being tapered over at least part of its axial length to a reduced diameter at its apical end, so as to provide a tapered make shaft at the roots of said threads having said exterior threads with peaks on a cylindrical locus, the wider end of said shaft being toward said gingival end, said fixture having a receiving bore opening through said gingival region and extending along the tubular axis of said fixture from said gingival region toward said apical end to terminate in a location between said gingival region and said apical end, for receiving prosthodontic support means, wherein the diameter of said cylindrical locus is less than 3.00 mm., the diameter of said shaft at the roots of said screw threads is in the range from about 2.2 mm. at said apical end to not substantially greater than said cylindrical locus toward said gingival end, the root diameter of said shaft at said location is about 2.5 mm., and the internal major diameter of said receiving bore is about 1.8 mm.

VOL
1127
ISS
2
JE
11
1991
UMI

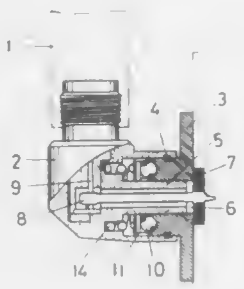
5,022,861
ROTARY ANTENNA CONNECTOR

Kozo Aoto, Kawasaki, Japan, assignor to Nisshin Parts Co., Ltd., Tokyo, Japan

Filed Jun. 6, 1990, Ser. No. 534,445

Int. Cl.^{5} H01R *39/00*

U.S. Cl. 439—13 **2 Claims**



1. A rotary antenna connector comprising:

a rotatable shell;

said rotatable shell including means for permitting a unitary connection to an antenna;

a stationary shell;

means for slidably fitting said rotatable shell upon said stationary shell, and for permitting rotational relative motion therebetween;

a first plurality of balls retained in a floating shell disposed between said rotary shell and said stationary shell;

a second plurality of grooves on an opposed surface of said stationary shell;

said balls facing said grooves; and

resilient means for urging said balls partially into said grooves;

said floating shell includes a first plurality of generally round holes therein for retaining said first plurality of balls in relatively fixed angular positions.

5,022,862
MODULAR CONNECTOR

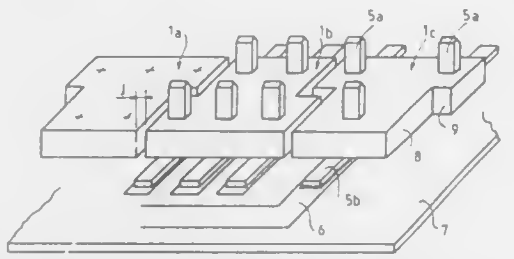
Jean-Paul Martin, St. Pierre du Perray, and Guy Kolozsvari, Verrieres-le-Buisson, both of France, assignors to Societe C E T R A, Ste Genevieve des Bois, France

Continuation-in-part of Ser. No. 118,581, Nov. 6, 1987, abandoned. This application Feb. 14, 1990, Ser. No. 481,666

Claims priority, application France, Nov. 12, 1986, 86 15970

Int. Cl.^{5} H01R *9/09*

U.S. Cl. 439—83 **5 Claims**



I. A connector for printed circuit having conductive tracks, said connector comprising a plurality of T-shaped modules interfitted so that a crossbar of one T-shaped module fits between shanks of two other T-shaped modules flanking said one T-shaped module and crossbars of said other T-shaped modules flank a shank of said one T-shaped module, each of said modules comprising:

an electrically insulating block having upper and lower faces of T-shaped outline defining the shank of the respective T-shaped module and the crossbar of the respective T-shaped module perpendicular to the respective shank, and shank and ends of the crossbar of said block having beveled flanks commencing at a location spaced from one of said faces and extending inwardly to terminate at the other of said faces, the beveled flanks of said block being juxtaposed with and complementary to the beveled flanks of the blocks of adjacent modules; and

a plurality of electrically conductive contact elements extending through the respective block, projecting in mutually parallel spaced relationship from an upwardly turned one of said faces of the respective block, and bent portions lying along a downwardly turned one of said faces of the respective block and soldered to said tracks as exclusive means for anchoring said modules to said printed circuit,

each block having, between the respective beveled flanks and the face of the block from which the beveled flanks are spaced, mutually parallel flanks on opposite sides of the body for gripping by a machine for automatically mounting said modules on said printed circuit.

5,022,863
APPARATUS FOR AN ELECTRICAL CONNECTION OF A PRINTED CIRCUIT BOARD TO A MODULE RAIL OF A COMPONENT RACK

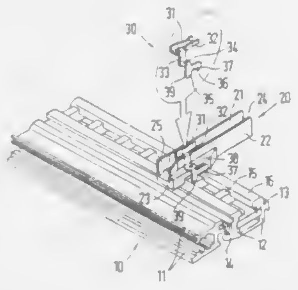
Gary Keens, Plymouth, and Roger Fursier, Cornwall, both of Great Britain, assignors to Rittal-Werk Loh GmbH & Co. KG, Fed. Rep. of Germany

Filed Jan. 16, 1990, Ser. No. 464,874

Claims priority, application Fed. Rep. of Germany, May 26, 1989, 8906491[U]

Int. Cl.^{5} H01R *4/66*

U.S. Cl. 439—108 **2 Claims**



1 In an apparatus for an electrical connection of a printed circuit board inserted into a first receiving channel of a guide rail to a module rail, the module rail carrying the guide rails of a component rack, the improvement comprising:

in a first peripheral region surrounded by the first receiving channel (**24**), a ground conductor path on at least one side of the printed circuit board;

in a second peripheral region of fastening to the module rail (**10**), the first receiving channel (**24**) of the guide rail (**20**) receiving a sliding bow contact (**30**), the sliding bow contact (**30**) being aligned parallel to inner walls of the first receiving channel (**24**) and the first receiving channel (**24**) receiving an edge of the printed circuit board;

outside the first receiving channel (**24**) the sliding bow contact (**30**) being secured to the guide rail (**20**), the sliding bow contact (**30**) being removable from the first receiving channel (**24**) and having at least one contact spring (**36**), at least one contact tip (**37**) and at least one contact lug (**39**) in electrical communication with at least one of the module rail (**10**) and a divider strip (**13**), and the divider strip being insertable into the module rail (**10**);

one of two lateral legs of a U-shaped bow part merging with an initial segment (**33**) of a Z-shaped connecting portion and overlapping one of guide rail lateral legs (**21, 22**), a middle segment (**34**) of said Z-shaped connecting portion being secured to a lateral extension (**23**) of said guide rail (**20**), and an end segment (**35**) of said Z-shaped connecting portion having at least one said contact spring (**36**), at least one said contact tip (**37**) and at least one said contact lug (**39**);

said initial segment (**33**) of said Z-shaped connecting portion being positioned adjacent an outside surface of said guide rail lateral leg (**22**) of said guide rail (**20**), and said end segment (**35**) of said Z-shaped connecting portion being positioned on a vertical outside surface of said lateral extension (**23**) of said guide rail (**20**);

said end segment (**35**) of said Z-shaped connecting portion terminating in said contact lug (**39**), said contact lug (**39**) being resiliently braced on said divider strip (**13**);

said contact spring (**36**) being positioned on said end segment (**35**) of said Z-shaped connecting portion, said contact spring (**36**) being aligned parallel to said vertical outside of said lateral extension (**23**) of said guide rail (**20**) and extending in an insertion direction of said printed circuit board; and

said contact tip (**37**) being laterally formed on said contact spring (**36**), said contact tip (**37**) being resiliently braced on said module rail (**10**) outside a second receiving channel (**12**), said second receiving channel (**12**) being capable of receiving said divider strip (**13**).

5,022,864
EQUIPMENT FOR DELIVERING A FLUID

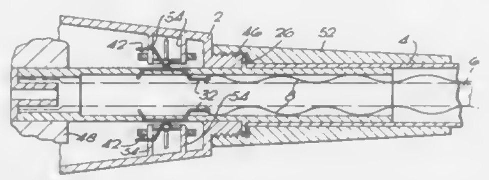
Eren Ali, Bristol, United Kingdom, assignor to Nomix Manufacturing Company Limited, Bristol, United Kingdom

Filed Sep. 20, 1989, Ser. No. 410,135

Claims priority, application United Kingdom, Sep. 20, 1988, 8822078; May 25, 1989, 8910404

Int. Cl.^{5} H01R *4/60*

U.S. Cl. 439—192 **10 Claims**



1. Equipment for delivering a fluid, comprising a carrier and a delivery head connected to the carrier by a support tube which accommodates a supply duct, for conveying fluid from the carrier to the delivery head, and an electrical lead extending between the carrier and the delivery head, the support tube being provided, at the end adjacent the carrier, with a connector which makes sealing contact within a bore in a fluid supply element provided in the carrier, the engagement between the spigot and the bore being such as to prevent rotation of the spigot relative to the supply element, the connector having a first contact element, which is connected to the electrical lead and is exposed to the exterior of the connector, and the carrier having a second contact element which resiliently engages the first contact element, the connector being releasably connected to the carrier.

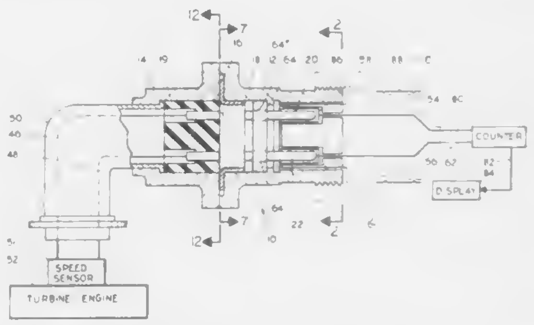
5,022,865
HERMETICALLY SEALING CONNECTOR AND METHOD OF USE THEREOF

James R. Wright, Guilford; James R. Hall, Bainbridge, and Keith D. Theobald, Sidney, all of N.Y., assignors to Simmonds Precision Products, Inc., Wilmington, Del.

Division of Ser. No. 244,199, Sep. 14, 1988, Pat. No. 4,871,328. This application Jun. 23, 1989, Ser. No. 370,943

Int. Cl.^{5} H01R *13/52*

U.S. Cl. 439—279 **19 Claims**



1. A cable connecting system, comprising:

a cable connector housing, a connector sleeve, a cable adaptor and a cable,

said cable connector housing having a cable connector housing groove, said cable adaptor having a cable adaptor groove, said connector sleeve having first and second end portions, said first end portion of said connector sleeve being bent into said cable connector housing groove,

said second end portion of said connector sleeve being bent into said cable adaptor groove, said cable adaptor being connected to said cable, said sleeve being adapted to be substantially deformed during removal of said first and second end portions of said sleeve from said grooves whereby said removal is readily detectable.

5,022,866
ELECTRICAL PLUG AND SOCKET CONNECTOR WITH U-SHAPED LOCKING HOOP

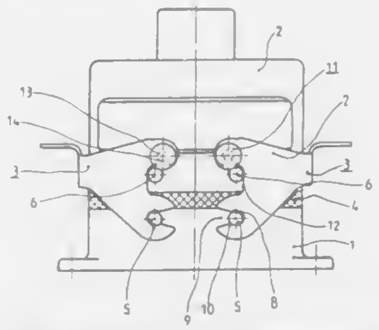
Dietmar Harting, Espelkamp, and Günter Piewitt, Lübbecke, both of Fed. Rep. of Germany, assignors to Harting Elektronik GmbH, Espelkamp, Fed. Rep. of Germany

Filed Oct. 9, 1990, Ser. No. 594,260

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1989, 3937022

Int. Cl.^{5} H01R *13/62, 13/64*

U.S. Cl. 439—372 **17 Claims**



1. An electrical connecting device comprising a plug connector and a socket connector, each of said connectors having a pin, a locking member pivotably mounted on a first pin of one of said connectors, said locking member having a mounting portion, a roller means rotatably mounted on said mounting portion of said locking member, said roller means comprising

VOL
1127
ISS
2
JE
11
1991
UMI

an axle and two axially spaced roller parts on said axle to define a space between said two roller parts, said space having an axial width slightly greater than the width of said mounting portion of said locking member, said mounting portion of said locking member having an outer edge, a support opening in said mounting portion of said locking member and a slot leading from said support opening to said outer edge, said support opening having a diameter substantially equal to the diameter of said axle, said slot being tapered with a narrowest slot width being juxtaposed to said support opening, said narrowest width of said slot being less than the diameter of said axle such that said roller means is assembled on said mounting part of said locking member by sliding said axle through said slot to said support opening while temporarily widening said narrowest width of said slot, said mounting portion of said locking member being disposed in said space between said two roller parts, said locking member being pivotal to a locking position in which said roller means lockingly engages a second pin on the other of said connectors.

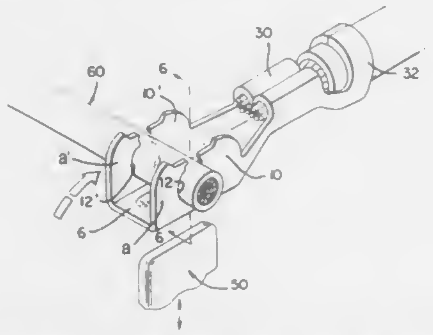
5,022,867
ELECTRICAL TERMINAL

Friedrich J. A. Kourimsky, Bensheim, and Paul E. Romak, Langen, both of Fed. Rep. of Germany, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 12, 1989, Ser. No. 365,280

Int. Cl.^{5} H01R *4/24*

U.S. Cl. 439—395 **6 Claims**



1. An insulation desplacement type electrical terminal having at least two edges which extend from a base portion to form a slot where an insulated conductor can be moved laterally into the slot for electrical termination, the two edges have arcuately shaped concave surfaces which face each other, the concave surfaces cooperate with the conductor to retain the conductor therebetween, the base portion is coined in a direction along the length to form an elongate recessed section to resist counterbending of the base portion.

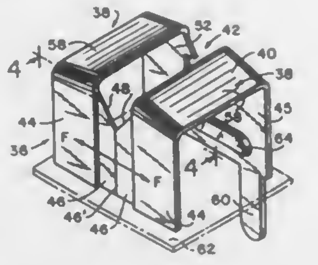
5,022,868
TORSION INSULATION DISPLACEMENT CONNECTOR

Janos Legrady, Putnam Valley, N.Y., assignor to Zierick Manufacturing Corporation, Mt. Kisco, N.Y.

Filed Dec. 28, 1989, Ser. No. 458,142

Int. Cl.^{5} H01R *4/24*

U.S. Cl. 439—399 **19 Claims**



1. An insulation displacement connector for attachment to an insulation covered wire comprising a pair of substantially co-extensive U-shaped beams formed of flat sheet material and laterally spaced from each other to form a longitudinal wire-receiving channel, each U-shaped beam having substantially parallel contact portions and mounting beam portions and a transverse beam portion extending between and joining said mounting and contact beam portions, said mounting beam portions of said U-shaped beams being rigidly fixed to each other in a mounting plane to prevent relative movements which separate said mounting beam portions in said mounting plane, said contact beam portions of said U-shaped beams being arranged a predetermined distance from each other in a contact plane which is substantially parallel to said mounting plane, said contact beam portions being movable within said contact plane to separate said contact beam portions when a wire is placed into said wire-receiving channel, at least portions of said transverse beams being torsionally deformable when a wire is placed within said wire-receiving channel and said contact beam portions are forced by the wire and its insulation to separate and thereby increase the spacing between said contact beam portions within said contact plane beyond said predetermined distance.

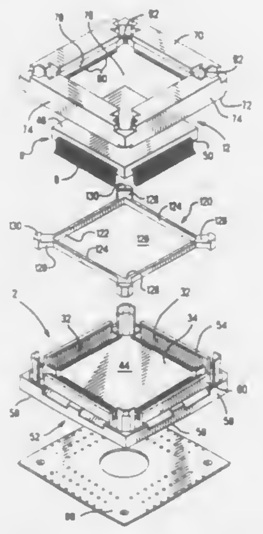
5,022,869
ADAPTER FOR USE WITH A BUMPERLESS CHIP CARRIER

Kevin E. Walker, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 6, 1989, Ser. No. 431,794

Int. Cl.^{5} H01R *23/72*

U.S. Cl. 439—526 **5 Claims**



1. An adapted for use with a chip carrier which has an essentially rectangular configuration, the chip carrier has leads which extend from side edges thereof, the adapter comprising:

a frame having an essentially rectangular configuration with a first surface and an oppositely facing second surface, the frame having a chip carrier opening which extends from the first surface to the second surface, the chip carrier opening being dimensioned to receive the chip carrier therein, the first surface of the frame cooperates with the leads of the chip carrier when the chip carrier is inserted into the chip carrier opening to act as a stop surface, insuring that the chip carrier will be properly positioned in the chip carrier opening;

projections provided in corners of the frame, the projections extend outwardly from the frame in a direction away from the chip carrier opening;

retention means which cooperate with the chip carrier to retain the chip carrier in the chip carrier opening;

whereby the adapter provides the chip carrier with the projections required to provide for the manipulation of the chip carrier.

5,022,870
RETAINER FOR CONNECTOR TERMINALS

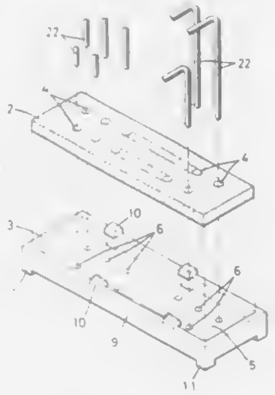
Yukio Sakamoto; Iwao Fukutani, and Toshio Hori, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan

Filed Feb. 26, 1990, Ser. No. 485,086

Claims priority, application Japan, Feb. 28, 1989, 1-49690; May 30, 1989, 1-139643

Int. Cl.^{5} H01R *13/648*

U.S. Cl. 439—608 **14 Claims**



9. The combination of an electrical connector having a plurality of spaced pin terminals arranged in at least one row, and a retainer for maintaining the spacing between said terminals and for filtering noise in electric signals transmitted through said connector by said pin terminals,

said retainer comprising a rectangular ferrite member having opposed surfaces and an aligned arrangement of a plurality of through-holes extending therethrough between said surfaces at positions spaced apart by intervals corresponding to said spacing, and a resin member having an aligned arrangement of a plurality of terminal-receiving through-holes extending therethrough and located over the through-holes of said ferrite member, respectively.

said resin member also having deformed or fractured thin portions extending along inner circumferential surfaces thereof that define respective ones of said terminal-receiving through-holes,

said pin terminals extending through the through-holes of said ferrite member and the terminal-receiving through-holes of said resin member, and

said thin portions sandwiched between respective ones of said pin terminals and said inner circumferential surfaces of said resin member, and respectively elastically engaging said respective ones of said pin terminals to secure said retainer to said electrical connector, and

said resin member having a portion thereof of a rectangular shape corresponding to the rectangular shape of said ferrite member, said portion of the resin member covering one of the surfaces of said resin member, and said resin member having a plurality of sidewalls extending from said portion thereof and confronting side edges of the rectangular ferrite member.

5,022,871
MULTIPOLAR CONNECTOR SOCKET

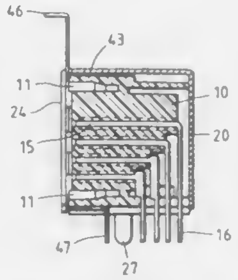
Shigemi Sekiguchi, Kiryu, Japan, assignor to Hosiden Corporation, Osaka, Japan

Filed Nov. 23, 1990, Ser. No. 617,216

Claims priority, application Japan, Nov. 29, 1989, 1-138923[U]; Mar. 16, 1990, 2-26819[U]

Int. Cl.^{5} H01R *13/648*

U.S. Cl. 439—609 **10 Claims**



1. A multipolar connector socket comprising:

A. an insulating body having a column portion surrounded by an annular recessed groove which is formed to extend rearward from a square front surface of said body female contacts received in a plurality of contact-receiving holes formed in said column portion, said insulating body having a rear surface and two sides,

B. a front shield plate formed of a conductive spring material including a square plate portion for covering the front surface of said insulating body, a pair of holding means respectively extending from the upper and lower edges of said plate portion and bent toward top and bottom surfaces of said insulating body, respectively, so as to be engaged with said insulating body, thereby holding said plate portion so as to cover the front surface of the insulating body, said front shield plate having at least one contact piece extending rearward from the upper edge of said plate portion along the top surface of said insulating body, and bent so that either a crest or a valley is formed at least one place in the middle of said upper edge, a circular hole formed in said plate portion and having a diameter substantially equal to the outer circumference of the annular recessed groove formed in said insulating body, and a plurality of tongue pieces formed so as to extend rearwardly in said annular recessed groove from the peripheral edge of said circular hole, and

C. a shield cover capped over said insulating body with said front shield plate being attached to the front surface of said insulating body, and including a top plate portion, a rear plate portion and two side plate portions covering at least the top surface, rear surface and both sides of said insulating body, respectively, said crest or valley of said contact piece being sandwiched between the top surface of said insulating body and said top plate portion of said shield cover and elastically contacted with said top plate portion, whereby said front shield plate and said shield cover are electrically connected.

5,022,872
JACK

Akihito Shichida, Osaka, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan

Filed Jun. 27, 1990, Ser. No. 544,376

Claims priority, application Japan, Jul. 12, 1-82678[U]

Int. Cl.^{5} H01R *13/00*

U.S. Cl. 439—668 **7 Claims**

1. A jack which has a tip contact piece mounted on a body of insulating material for engagement with a tip electrode of a plug when the plug is inserted into a plug insertion hole in said body, said tip electrode of the plug having a neck and a radial protrusion;

VOL
1127
ISS
2
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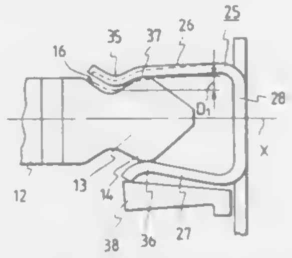
11
1991
UMI

said tip contact piece having a U-shape formed by bending a metal plate, said tip contact piece being disposed at a rear end of said body and having two legs that extend forward in said plug insertion hole, said two legs defining first and second contact pieces for gripping therebetween said tip electrode of said plug when said plug has been inserted into said plug insertion hole;

said first contact piece being longer than said second contact piece, a forward free end portion of said first contact piece being inwardly convexed to form an engaging protrusion that projects into said plug insertion hole for engagement with the neck of said tip electrode when said plug is inserted into said plug insertion hole, the depth of projection of said engaging protrusion into said plug insertion hole being within about 20% of the inner diameter of said plug insertion hole; and

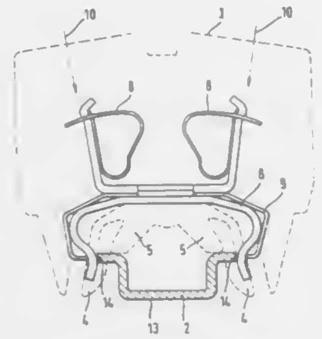
said second contact piece having a forward free end portion that includes a contact portion which is disposed rearward of said engaging protrusion and which is positioned to make resilient contact with the radial protrusion of said tip electrode after the radial protrusion of said tip electrode has passed said engaging protrusion of said first contact piece during insertion of said plug into said body.



5,022,873
GROUND CONDUCTOR SERIES TERMINAL

Hans J. Köllmann, Minden, Fed. Rep. of Germany, assignor to Wago Verwaltungsgesellschaft mbH, Minden, Fed. Rep. of Germany

Filed Mar. 7, 1990, Ser. No. 475,844
Int. Cl.^{5} H01R *9/26*
U.S. Cl. 439—716 4 Claims

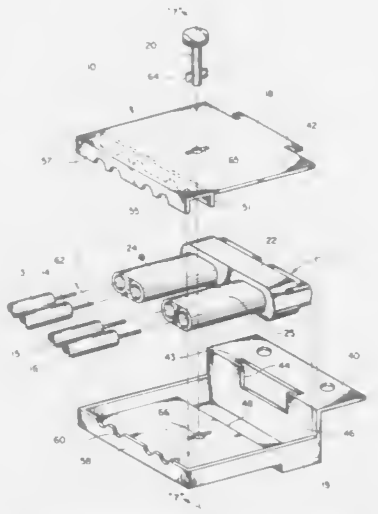


1. In a series terminal for use in connection with an elongated assembly rail of a type including a base portion, a pair of leg portions extending upwardly from opposite sides of said base portion, and a pair of side flange portions extending outwardly from the upper extremities of said leg portions terminating in elongated longitudinally extending side edges, said series terminal including a current bar which is electrically connectible to a ground connection, a contact base which is adapted to be latched to the assembly rail, and an insulator case including insulator latching bases for latching said insulator case to said assembly rail, the improvement comprising said contact base being integrally formed in a unitary construction with said current bar from a highly conductive metal and including a pair of spaced clamp ends which are receivable in clamping engagement with said opposite side edges so that said clamp ends are in substantially perpendicular relation to said base portion, said series terminal further comprising a resilient spring bow received on said contact base for resiliently urging the clamp ends thereof together in order to maintain said clamp ends in clamping engagement with said opposite side edges.

5,022,874
MINIATURE HIGH VOLTAGE CONNECTOR

Arthur J. Lostumo, Franklin Park, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Sep. 28, 1990, Ser. No. 589,726
Int. Cl.^{5} H01R *11/09, 13/52*
U.S. Cl. 439—724 11 Claims



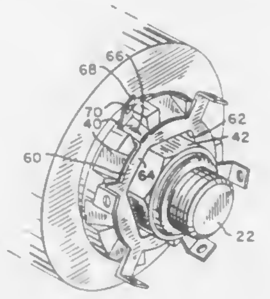
1. An easily connectable and disconnectable high voltage connector for at least one sheathed input lead and one sheathed output lead each having conductors with stripped bare wire ends, comprising: a resilient electrically insulative receptacle having bores for respectively receiving the input and output leads, which bores are sized to squeeze and seal on the sheaths of the leads, common conductor means mounted completely within the receptacle for receiving and electrically interconnecting the conductors, and strain relief means for engaging the conductor sheaths for preventing withdrawal of the conductors from the receptacle, the length of said bores and the resilient constriction of said bores on said lead sheaths along said length of said bores being such that high voltage carried by said conductors can not arc to the outside of said receptacle through said bores, whereby the need for a plug assembly is eliminated and the conductors can be inserted without additional parts directly into said conductor means encapsulated within the receptacle.

5,022,875
MARINE PROPELLER LOCKING TAB WASHER

Michael A. Karls, Hilbert, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Oct. 20, 1989, Ser. No. 424,531
Int. Cl.^{5} B63H *23/34*
U.S. Cl. 440—49 5 Claims

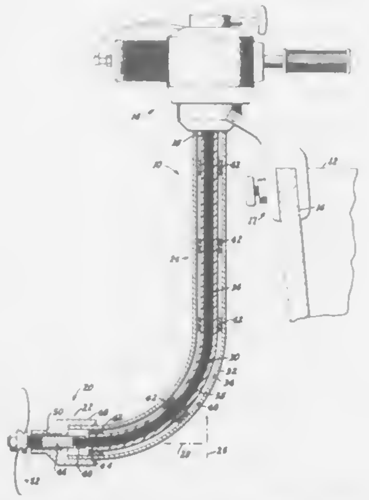
1. In a marine drive having a propeller with a hub, a propeller shaft with a rear threaded portion, a rear thrust hub mounting said propeller hub to said propeller shaft, said rear thrust hub having one or more slots therein spaced circumferentially around said propeller shaft, a nut threaded onto said rear threaded portion of said propeller shaft, a locking tab washer around said propeller shaft between said nut and said rear thrust hub, said locking tab washer having a given configured surface engaging said nut and preventing rotation thereof relative to said locking tab washer, said locking tab washer having one or more tabs spaced circumferentially around said propeller shaft and bendable into said slots to prevent rotation of said locking tab washer relative to said rear thrust hub, said tabs having ears extending therefrom and accessible when said tabs are in said slots such that said ears may be gripped and pulled to bend said tabs back out of said slots, to enable removal of said nut, wherein said ears extend externally of said slots when said tabs are in said slots.



5,022,876
TRANSMISSION MEANS

D. Christopher Etter, 503 E. S. Countyline Rd., Indianapolis, Ind. 46227

Filed Oct. 23, 1989, Ser. No. 425,489
Int. Cl.^{5} B63H *23/02*
U.S. Cl. 440—63 10 Claims



1. A propulsion means for a watercraft having a power means carried on the craft,

and having power output means for receiving power from the power means and for imparting the power to a driving means submerged in the water at a craft-propelling location spaced from the power output means,

and also having power transmission means for receiving power from the power output means by rotation about a first axis, and for transmitting the power from the power output means and delivering the power to the driving means, the driving means having rotation about a second axis,

the first axis and the second axis being significantly non-aligned,

in which the power transmission means includes a significant portion of the power transmission means to be of flexible nature sufficient to operatively interconnect the power output means and the submerged driving means, and accommodate the non-alignment of the first axis with respect to the second axis,

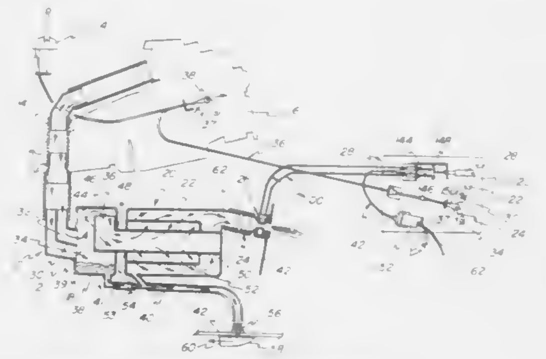
and in which the flexible portion of the power transmission means is disposed in a tubular member having a hollow bore, the power transmitting means comprising a flexible power-transmitting cable which is capable of transmitting power by rotation about its own axis even though the cable and the tubular member are significantly curved to accommodate said non-alignment,

the cable being provided as a spirally wound cable of a plurality of windings, successive windings being of opposite hand.

5,022,877
MARINE EXHAUST SYSTEM

Earl W. Harbert, Coral Springs, Fla., assignor to Vernay Laboratories, Inc., Yellow Springs, Ohio

Filed Feb. 16, 1990, Ser. No. 481,073
Int. Cl.^{5} B63H *21/32*
U.S. Cl. 440—89 28 Claims



1. A marine exhaust system comprising:

an exhaust assembly having a first and second chamber;

said first chamber forming a water separation compartment and having a top and bottom wall, an exhaust entrance located between said walls for permitting entry of a gas/-water mixture to be separated, a gas exit located adjacent said top wall, a water exit located in said bottom wall, and a water discharge pipe for conveying water directly from said first chamber at said water exit;

said second chamber forming an acoustical chamber for reducing exhaust noises and including an inlet and a gas exit, said inlet being connected to said gas exit of said first chamber, sound baffling means through which gases entering said second chamber at said inlet pass, a water exit for conveying condensed water from said second chamber, said second chamber water exit being connected to said discharge pipe, said gas exit being located above said second chamber water exit; and

a nozzle connected to said second chamber gas exit, said nozzle having a variable outlet area.

5,022,878
WET SUIT STYLE PERSONAL FLOTATION DEVICE

Thomas R. Casad, Celina, Ohio, assignor to Casad Manufacturing Corp., St. Marys, Ohio

Filed Sep. 2, 1988, Ser. No. 240,752
Int. Cl.^{5} B63C *9/093*
U.S. Cl. 441—103 12 Claims

1. A wet suit style personal flotation device comprising:

a wet suit adapted for fitting about at least a portion of a wearer and substantially conforming to at least the wearer's torso, the wet suit comprising a pair of pants attached to a vest having an outer layer and an inner layer and at least one insert interposed between the outer layer and inner layer of the vest, the insert extending in front of and behind the wearer's body; wherein a leading edge of the outer layer of the vest and a leading edge of the inner layer of the vest are in alignment and seamed together; and the

VOL
1127
ISS
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1991
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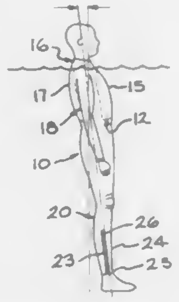
seamed together leading edges are in a spaced apart relationship to a leading edge of the pants and seamed together;

the wet suit comprising a flexible protective material and the insert comprises a foam buoyant material, the flexible protective material and the foam buoyant material having a minimum total buoyant of at least about 15½ pounds-force whereby the wet suit style personal flotation device supports the wearer in a slightly back from vertical position in water.



5,022,879

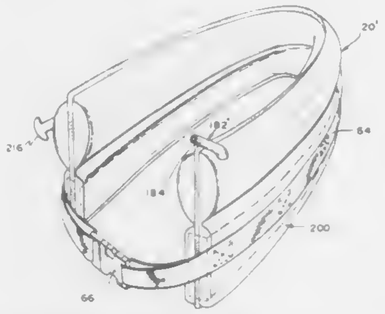
INFLATABLE LIFE BELT

Mario P. DiForte, P.O. Box 8537, Baltimore, Md. 21234

Filed Dec. 13, 1989, Ser. No. 449,797

Int. Cl.^{5} B63C *9/08*

U.S. Cl. 441—113 14 Claims



1. An inflatable life belt comprising:

a) a flexible belt member of generally flat, elongated shape for encircling the waist of the wearer;

b) a first means for detachably securing the ends of said flexible belt member together;

c) an inflatable member comprising first and second buoyancy portions;

d) each of said buoyancy portions having opposed, flexible sidewalls, the edges of which are sealed together to provide a closed chamber;

e) a sidewall of one of said buoyancy portions being engaged with the body of the wearer;

f) the other of said buoyancy portions being folded over, and engaged with the other sidewall of said one buoyancy portion and said flexible belt member, when the life belt is in the inoperative position; and,

g) a second means for inflating said second buoyancy portion and effecting relocation thereof into engagement with the body of the wearer.

5,022,880

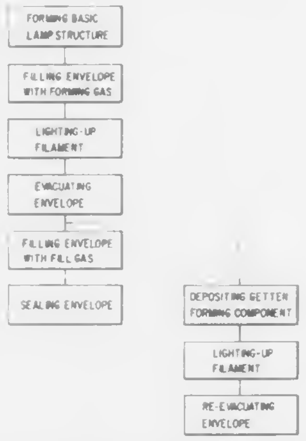
METHOD OF CONSTRUCTING AN ELECTRIC LAMP USING CARBON MONOXIDE AS A FORMING GAS

John W. Shaffer, Danvers, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed Jan. 29, 1990, Ser. No. 471,637

Int. Cl.^{5} H01J *9/44*

U.S. Cl. 445—6 20 Claims


FORMING BASIC LAMP STRUCTURE
FILLING ENVELOPE WITH FORMING GAS
LIGHTING-UP FILAMENT
EVACUATING ENVELOPE
FILLING ENVELOPE WITH FILL GAS
SEALING ENVELOPE
DEPOSITING GETTER FORMING COMPONENT
LIGHTING-UP FILAMENT
RE-EVACUATING ENVELOPE

1. A method of constructing an electric lamp, said electric lamp comprising a basic lamp structure including an envelope, a plurality of electrical conductors sealed into and passing through said envelope, and at least one filament electrically connected to said electrical conductors, said method comprising the steps of:

(a) forming said basic lamp structure;

(b) filling said envelope with a forming gas comprising carbon monoxide;

(c) lighting-up said filament in the presence of said forming gas;

(d) evacuating said envelope when said lighting-up ceases;

(e) filling said envelope with a desired fill gas; and

(f) sealing said envelope.

5,022,881

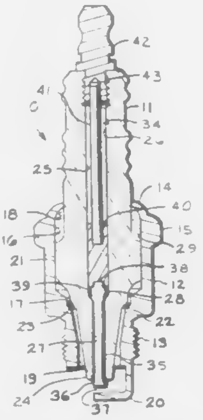
METHOD FOR MAKING A SPARK PLUG WITH A PREDETERMINED SPARK GAP

William L. Nagy, Northwood, Ohio, assignor to Cooper Industries, Inc., Houston, Tex.

Filed Jul. 19, 1985, Ser. No. 756,529

Int. Cl.^{5} H01T *21/02*

U.S. Cl. 445—7 4 Claims



1. In a method for making a spark plug with a predetermined spark gap, said spark plug including a tubular shell having an externally threaded end, a ground electrode attached to said shell adjacent said threaded end and an opening through said shell with a step facing away from said threaded end of the shell, an insulator having a shoulder and a central bore having a step, means mounting said insulator in said shell with a seal formed between said insulator shoulder and said shell step, and a center electrode assembly mounted in said insulator bore and including a center electrode seated on said bore step and having a tip projecting from said insulator to form said predetermined spark gap with said ground electrode, a terminal, means for establishing an electrical connection between said center electrode and said terminal and means for forming a seal in said insulator bore, a method for mounting a center electrode assembly in an insulator bore characterized by the steps of:

(a) positioning said insulator in a jig having a seat which receives said insulator shoulder and having a surface at a predetermined location relative to said seat;

(b) inserting a center electrode blank into said insulator bore with a tip projecting from said bore to said predetermined location relative to said insulator shoulder, said center electrode blank tip projecting from said insulator bore and contacting said jig surface when inserted into said insulator bore, said center electrode blank having a thin walled end located in said insulator bore extending above said bore step;

(c) upsetting a shoulder on said thin walled end of said center electrode blank to contact said insulator bore step while maintaining the location of said center electrode blank tip relative to said insulator shoulder by advancing a punch into said insulator bore to deform said thin walled end into said shoulder while maintaining said center electrode blank tip at said predetermined location relative to said insulator shoulder and passing an electric current through said center electrode blank to soften said thin walled end as said punch deforms said thin walled end; and

(d) completing said center electrode assembly.

5,022,882

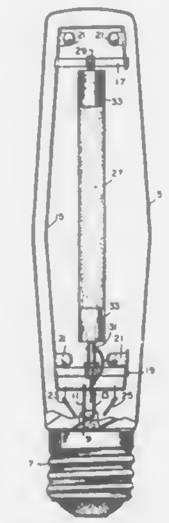
ARC TUBE DOSING PROCESS FOR UNSATURATED HIGH PRESSURE SODIUM LAMP

Philip J. White, Georgetown, and Dennis B. Shinn, Topsfield, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 277,467, Nov. 23, 1988, abandoned, which is a continuation of Ser. No. 473,892, Mar. 10, 1983, abandoned. This application Nov. 19, 1990, Ser. No. 617,439

Int. Cl.^{5} H01J *9/00*

U.S. Cl. 445—21 **6 Claims**



1. A process for dosing the arc tube of an unsaturated vapor high pressure sodium lamp comprising the steps of:

locating a fill consisting essentially of a sodium-and-oxygen-containing compound, an oxygen-absorbing getter, mercury and a rare gas within said arc tube; and

sealing said arc tube whereby thermal decomposition of said sodium-and-oxygen-containing compound is effected within said arc tube to provide sodium and oxygen with said getter removing said oxygen to prevent sodium-and-oxygen-containing compound reformation.

5,022,883

METHOD OF MAKING A LONG LIFE HIGH CURRENT DENSITY CATHODE FROM ALUMINUM OXIDE AND TUNGSTEN OXIDE POWDERS

Louis E. Branovich, Howell; Gerard L. Freeman, Freehold; Donald W. Eckart, Wall, and Bernard Smith, Ocean, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 6, 1990, Ser. No. 609,537

Int. Cl.^{5} H01J *19/06*

U.S. Cl. 445—50 **7 Claims**

1. Method of making a long life high current density cathode from a mixture of Al_2O_3 and WO_3 powders, said method including the steps of:

(A) adding the mixture of powders to a metal sleeve that is contained at one end in a cup,

(B) placing the sleeve containing the powder into a furnace and heating the powder to about 1100° C. for about 5 to 15 minutes,

(C) removing the sleeve and powder that has fused and formed into $Al_2(WO_4)_3$ from the furnace after the furnace has cooled,

(D) cleaning residual $Al_2(WO_4)_3$ from the outer parts of the sleeve,

(E) adding barium hydride to the sleeve containing the $Al_2(WO_4)_3$ in it in an inert atmosphere,

(F) inverting the sleeve containing the $Al_2(WO_4)_3$ and heating to about 700° C. for about 5 to 10 minutes to decompose the barium hydride and obtain barium metal,

(G) allowing the sleeve with $Al_2(WO_4)_3$ and barium metal to cool and cleaning any barium that may have spattered onto the side of the sleeve, and

(H) preparing the sleeve with $Al_2(WO_4)_3$ and barium metal for a cathode environment by heating the sleeve under vacuum.

5,022,884

TEMPERATURE ACTIVATED TOY VEHICLE

Keith A. Hippely, Manhattan Beach, and Eric C. Ostendorff, Torrance, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Apr. 9, 1990, Ser. No. 506,634

Int. Cl.^{5} A63H *17/26*

U.S. Cl. 446—14 **11 Claims**

1. A temperature activated toy vehicle comprising:

a vehicle body;

a vehicle component movably supported by said vehicle body and movable with respect thereto between first and second positions; and

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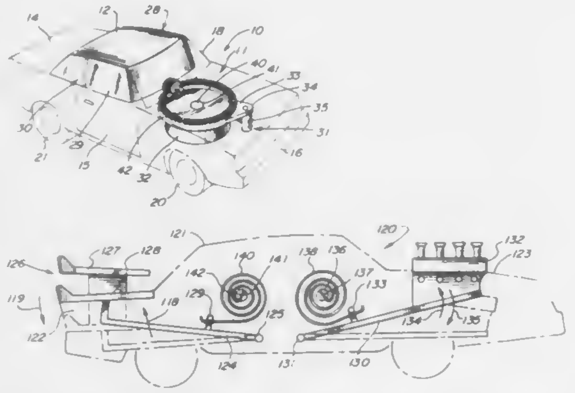
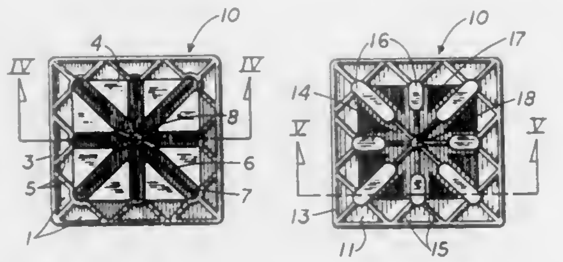
temperature responsive activating means, coupled to said vehicle body and said vehicle component, for moving said vehicle component between said first and second positions.



5,022,885
TOY CONSTRUCTION SET FEATURING RADIATING FACE AND COMPLEMENTARY EDGE CONNECTORS

Ronald L. Lyman, 11140 Squanan River Ct., Rancho Cordova, Calif. 95670

Filed Oct. 10, 1989, Ser. No. 419,095
Int. Cl.^{5} A63H *17/00, 33/04, 33/06, 33/08*
U.S. Cl. 446—95 23 Claims

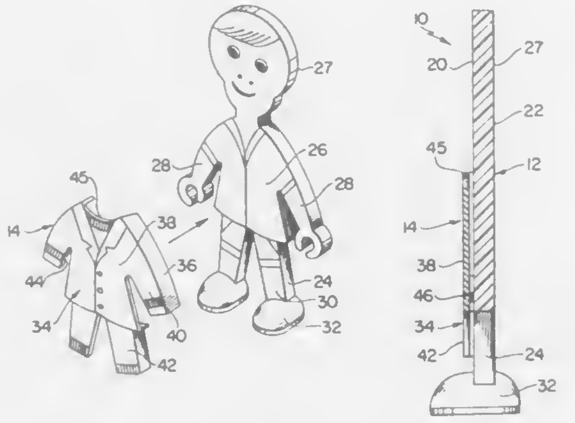


1. A sub-planar building block comprising, in combination a planar top wall, a planar bottom wall and a peripheral edge between said top and bottom wall, said top wall defining a first attachment surface, said bottom wall defining a second attachment surface, said first and second attachment surfaces defining complemental, interconnecting contours, of plural centrally disposed radially extending vanes of constant width centrally disposed on one said wall frictionally engageable within a series of complementally formed spaces on another said wall and said peripheral edge defines a third attachment means.

5,022,886
TOY DOLL AND ACCESSORIES THEREFOR

Barbara P. Jenkins, Providence, R.I., assignor to Hasbro, Inc., Pawtucket, R.I.

Filed Feb. 6, 1990, Ser. No. 475,845
Int. Cl.^{5} A63H *3/00, 3/08, 33/00*
U.S. Cl. 446—268 7 Claims



1. A doll construction comprising a substantially rigid body member including a front surface portion and a peripheral side surface portion, said front surface portion having a peripheral configuration resembling a silhouette of a character figure, said side surface portion extending substantially perpendicularly rearwardly from said front surface portion along substantially the entire periphery of said front surface portion, and a substantially rigid clothing member including a front plate portion and a peripheral flange portion extending rearwardly from said front plate portion, said front plate portion having a peripheral configuration which is substantially the same as the peripheral configuration of a portion of said front surface portion but being of slightly larger dimension than said portion of said front surface portion, said clothing member being receivable in an assembled relation with said body member wherein said front plate portion is received in substantially aligned closely adjacent relation on said portion of said front surface portion, said flange portion engaging said side surface portion to releasably retain said clothing member on said body member when said clothing member is received in assembled relation on said body member, said doll further comprising fulcrum means on one of either said body member or said clothing member, said fulcrum means being interposed between said front surface portion and a central portion of said front plate portion when said clothing member is received in assembled relation on said body member, said clothing member being removable from said body member by pressing a portion of said clothing member inwardly toward said body member to pivot said clothing member about said fulcrum means and to thereby move a portion of clothing member outwardly away from said body member.

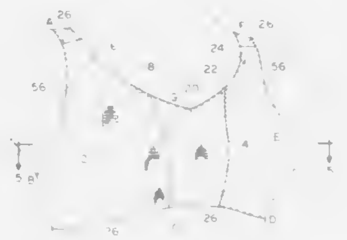
5,022,887
HARD CUP BRASSIERE

LaJean Lawson, Corvallis, Oreg., assignor to Playtex Apparel, Inc., Stamford, Conn.

Filed Oct. 3, 1989, Ser. No. 416,692
Int. Cl.^{5} A41C *3/00, 3/10, 3/14*
U.S. Cl. 450—54 26 Claims

1. A hard cup brassiere comprising:

a fabric portion having a front, shoulder straps, and sides generally conformed to the shape of a female upper torso, and a plurality of layers, wherein said layers form pocket means, and

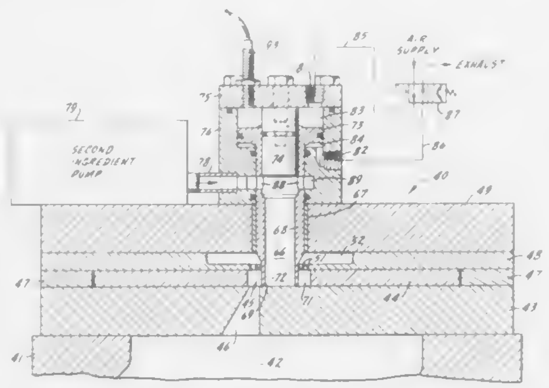


a plurality of overlapping hard cup plates which are placed in said pocket means.

5,022,888
CO-FORMING APPARATUS FOR FOOD PATTY MOLDING MACHINE

Scott A. Lindee, New Lenox, Ill., assignor to Formax, Inc., Mokena, Ill.

Filed May 3, 1990, Ser. No. 518,480
Int. Cl.^{5} A22C *7/00*
U.S. Cl. 452—174 17 Claims



1. Co-forming apparatus for the molding station of a food patty molding machine of the kind comprising:

a mold plate, including a mold cavity, movable along a given path between a fill position, in which the opposite sides of the mold cavity are covered by first and second mold covers, and a discharge position, in which the mold cavity is clear of the mold covers;

mold plate drive means for cyclically driving the mold plate between its fill and discharge positions;

a first fill passage, through one of the mold covers, aligned with the mold cavity fill position;

and first pump means for pumping a first food ingredient through the first fill passage into a first part of the mold cavity;

the co-forming apparatus comprising:

a second fill passage, through one of the mold covers, aligned with the mold cavity fill position;

second pump means for pumping a second food ingredient through the second fill passage into a second part of the mold cavity;

a tubular separator member movably mounted in the second fill passage;

and separator drive means for driving the separator member between a separator fill position in which the separator extends into the mold cavity fill position and separates the second part of the mold cavity from the first part, and a separator discharge position in which the separator member is clear of the mold plate.

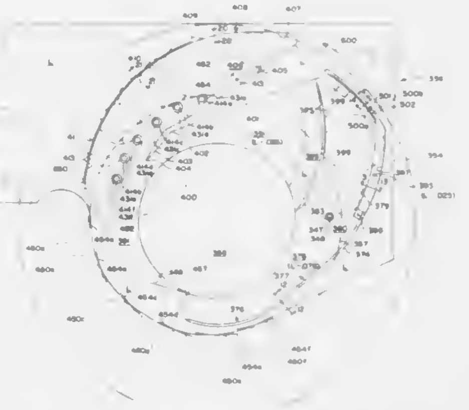
5,022,889
COIN SORTER

Victor G. Ristvedt, Rte. 8, Box 8904, and Mark E. Ristvedt, 1000 Woodland Ct., both of Manchester, Tenn. 37355

Continuation-in-part of Ser. No. 44,971, May 6, 1987, Pat. No. 4,863,414, which is a continuation-in-part of Ser. No. 877,205, Jun. 23, 1986, Pat. No. 4,681,128. This application Oct. 19, 1988, Ser. No. 260,183

The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.

Int. Cl.^{5} G07D *3/16*
U.S. Cl. 453—6 10 Claims



1. In a coin sorter for sorting coins of a multiplicity of diameters having a plate including a side closely facing a rotating, generally planar, resilient disc, said plate having an opening through which coins are loaded onto said disc and defining an interior edge thereof, said plate having an outer edge forming boundaries of said plate, and said side of said plate being configured with lands and recesses which vary in shape and vary in clearance from said disc, the improvement comprising:

one of said lands of said plate having an elongated edge in a region between said edges of said plate, said elongated edge extending through differing radaii and differing angular positions with respect to rotation of a radial line about the center of rotation of said disc, and at least a substantial length of said elongated edge being an inclined edge which is inclined generally toward, and in the direction of, rotation of said disc;

a plurality of coin deflection regions, discrete ones of said regions being differently spaced from said inclined edge as a function of the difference in diameters of coins to be sorted, whereby a coin of a discrete diameter is rotated by said disc and moved to a position where it is engaged between one of said deflection regions and said inclined edge and is thereby urged by said rotating disc across said inclined edge and thereby captured by said one of said lands and at a discrete radial position which differs for coins of different diameters; and

said outer edge of said plate having portions varying in distance from the center of rotation of said disc and selectively cooperating with the radius of the paths of rotation of said coins of a multiplicity of diameters;

whereby coins of different diameters are discharged from said sorter at different positions along said outer edge of said plate.

VOL
1127
ISS
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1991
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STACKING DEVICE FOR COINS OR SIMILAR DISK-SHAPED OBJECTS

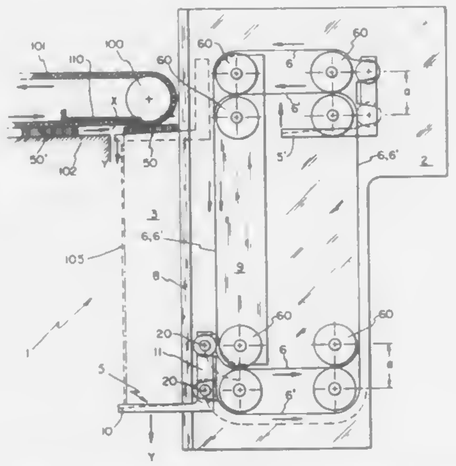
Joachim Rapp, Bahnhofstr. 32, D-7504 Weingarten, Fed. Rep. of Germany

Filed Aug. 24, 1989, Ser. No. 398,158

Int. Cl.^{5} G07D *9/06*

U.S. Cl. 453—56 **10 Claims**

1. Device for the vertical stacking of successively fed coins or similar disk-shaped articles with a coin carrier that is connected with a continuously revolving transport means, receives the stack of coins and which in a stacking space of a coin packing machine can be lowered in synchronism with the growing stack, and with another coin carrier which, based on the transport means, is arranged at an equal distance from the other coin carrier so that with each revolution of the transport means it is possible to build two stacks of coins, characterized in that the coin carriers are formed by an L-shaped finger whose first shank protrudes horizontally into the stacking space and whose second shank is connected with a pair of continuously revolving transport means in such a way that these, based on the longitudinal axis of the second shank, attach to two sideways articulated axles that are offset relative to each other, in that the continuously revolving transport means revolve along essentially rectangular trajectories that correspond to the spacing of the width of the second shank and are parallel to each other while in vertical stacking direction they are mutually offset according to the spacing of the sideways articulated axles, and in that the second shank runs in such a way along the stacking space that the first shank is being lowered down the stacking space in positionally stable fashion as the coins are being stacked.



5,022,891

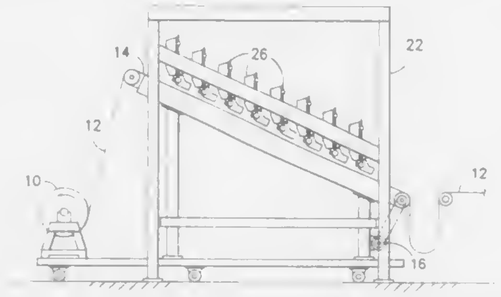
JET REDUCTION DISCHARGE OF DYE COLOR

Daniel T. McBride, Chesnee, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Apr. 30, 1990, Ser. No. 516,361

Int. Cl.^{5} D06P *5/15*

U.S. Cl. 8—457 **28 Claims**



1 A process for discharging the color from selected areas of a pile fiber, textile substrate dyed with a dischargeable dye, comprising the steps of:

jet forcing an aqueous reducing system onto an outer surface of said pile fiber, textile substrate with sufficient velocity to penetrate below said outer surface and downward along a length of said pile fibers wherein said velocity of said reducing system is between 2.0 and 20.0 meters per second; and

heating said pile fiber, textile substrate to sufficiently activate said reducing system to reduce said dischargeable dye.

5,022,892

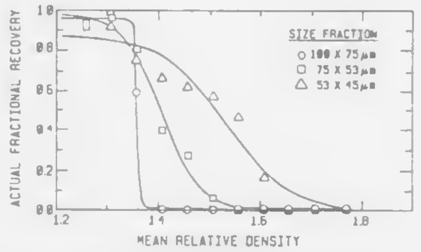
FINE COAL CLEANING VIA THE MICRO-MAG PROCESS

Mark S. Klima, Finleyville; Carl P. Maronde, McMurray, and Richard P. Killmeyer, Pittsburgh, all of Pa., assignors to United States Department of Energy, Washington, D.C.

Filed Jan. 3, 1990, Ser. No. 460,465

Int. Cl.^{5} C10L *10/00*

U.S. Cl. 44—621 **15 Claims**



1. A method of cleaning coal, comprising providing a particulate coal and a dense-medium slurry inlet feed to a cyclone separator wherein the coal particle size distribution is in the range of from about 37 microns to about 600 microns, the dense medium including water and ferromagnetic particles has a medium relative density in the range of from about 1.2 to about 1.8, the ferromagnetic particles of the dense medium having a relative density in the range of from about 4.0 to about 7.0 and 100% of the particle size are less than about 15 microns and at least 50% of the dense medium has particle sizes less than about 5 microns, separating the particulate coal and dense medium slurry into a low gravity product stream and a high gravity product stream wherein the differential in relative density between the micronized-magnetite medium associated with the low gravity stream and the micronized-magnetite medium associated with the high gravity stream is not greater than about 0.2, and treating the low gravity and high gravity streams to separately recover the ferromagnetic particles therefrom.

5,022,893

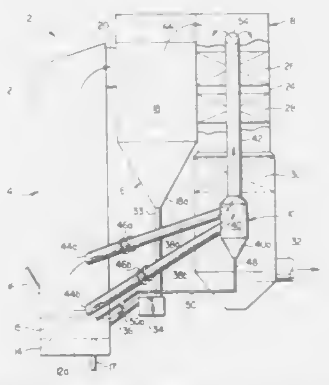
FLUIDIZED BED STEAM TEMPERATURE ENHANCEMENT SYSTEM

Iqbal F. Abdulally, Randolph, N.J., assignor to Foster Wheeler Energy Corporation, Clinton, N.J.

Filed Mar. 1, 1990, Ser. No. 489,314

Int. Cl.^{5} C10S *3/56*

U.S. Cl. 48—76 **8 Claims**



1. A fluidized bed reactor comprising a furnace section for containing solid particulate material including fuel and having an upper region located above the middle of said furnace section and a lower region located below the middle of said furnace section, a heat recovery section, means for introducing air into said lower region of said furnace section at a sufficient velocity to fluidize said particulate material and support combustion or gasification of said fuel to produce flue gases, a portion of which rises to said upper region of said furnace section, means for directing said flue gases from said upper region of said furnace section to said heat recovery section, and flue gas by-pass means extending from said lower region of said furnace section to said heat recovery section for directing the remaining portion of said flue gases from said lower region of said furnace section directly to said heat recovery section.

5,022,894

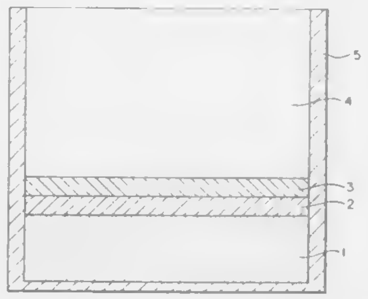
DIAMOND COMPACTS FOR ROCK DRILLING AND MACHINING

Suresh S. Vagarali, Columbus, and Bobby G. Hoyle, Worthington, both of Ohio, assignors to General Electric Company, Worthington, Ohio

Filed Oct. 12, 1989, Ser. No. 420,191

Int. Cl.^{5} B24D *3/00*

U.S. Cl. 51—293 **9 Claims**



1. A method for making diamond and cubic boron nitride compacts, comprising providing a mass of diamond or cubic boron nitride particles and a cemented carbide support or carbide molding powder; positioning a catalyst metal disc

VOL
1127
ISS
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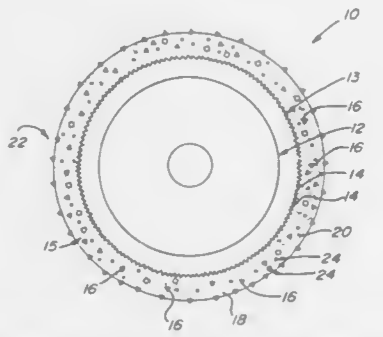
JE
11
1991
UMI

adjacent to the mass of diamond or cubic boron nitride particles and a metal barrier disc intermediate said catalyst metal disc and said cemented carbide support or carbide molding powder, wherein the surface area of said metal barrier disc is substantially identical to the surface area of said cemented carbide support or carbide molding powder at their interface; and subjecting such arrangement to temperature-pressure conditions within the diamond or cubic boron nitride stable region of the carbon or boron nitride phase diagram but below the melting point of said metal barrier disc.

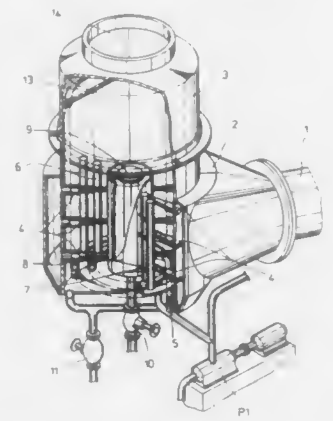
5,022,895
MULTILAYER ABRADING TOOL AND PROCESS
Ronald C. Wiand, 18500 Fairway Dr., Detroit, Mich. 48221
Continuation of Ser. No. 310,783, Feb. 14, 1988, Pat. No. 4,908,046. This application Oct. 18, 1989, Ser. No. 423,762
Int. Cl.^{5} B24B *1/00*
U.S. Cl. 51—295 **2 Claims**



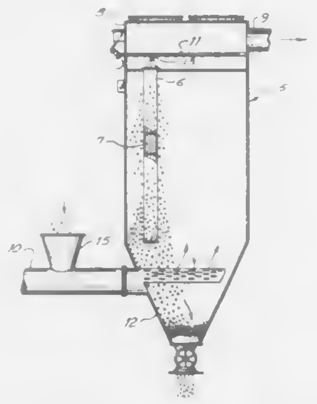
1. An abrading tool having a "multilayer abrasive grit matrix surface layer" produced without a mold, said abrading tool comprising:
- an abrading tool substrate, having a structured abrading surface, and a multilayer of abrasive particles attached thereto in substantially an even thickness coating, said multilayer of abrasive particles being diamond grit suspended in an infiltrant matrix.

5,022,896
METHOD OR PURIFYING POLLUTANT GASES AND APPARATUS THEREOF
Ha Y. Chang, Seoul, Rep. of Korea, assignor to Hyundae Environment Energy Management Corp. Ltd., Seoul, Rep. of Korea
Filed Nov. 3, 1989, Ser. No. 431,331
Claims priority, application Rep. of Korea, Nov. 9, 1988, 14678/1988
Int. Cl.^{5} B01D *47/00*
U.S. Cl. 55—85 **5 Claims**

1. A method of purifying a pollutant gas comprising:
- partially filling an enclosed area with a purifying solution;
- causing said purifying solution to swirl in a vortex motion;
- injecting said pollutant gas directly into the swirling purifying solution wherein said gas is injected into the solution from a number of spaced, radially oriented locations and thereby creating bubbles of pollutant gas within the purifying solution;
- maintaining the pollutant gas in contact with the purifying solution for a duration of time that allows the bubbles of gas to become elongated and to become absorbed by the liquid; and
- venting purified gas from the enclosed area.

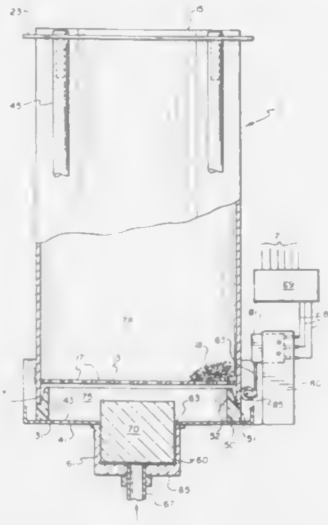


5,022,897
METHOD FOR HAZARDOUS WASTE REMOVAL AND NEUTRALIZATION
Gerald P. Balcar, Newfoundland, N.J.; Paul Krumrine, Hatfield, Pa.; Neal Schwartz, Fayetteville, N.Y.; Burton J. Sutker, Edison, and Gail J. Wood, West Milford, both of N.J., assignors to Potters Industries, Inc., Parsippany, N.J. and Roth Bros. Smelting Corp., Syracuse, N.Y.
Filed Nov. 22, 1989, Ser. No. 440,899
Int. Cl.^{5} B01D *46/00*
U.S. Cl. 55—96 **23 Claims**



1. A method of coating a filter medium in a flowing gaseous stream, the method comprising:
- directing a gas stream along a feed path;
- combining with said gas stream a multiplicity of glass dust particles;
- positioning a fibrous filter medium along said feed path downstream of the point at which the glass dust particles are combined with said stream, the glass dust particles forming a coating on said filter medium to assist in the capture thereon of hazardous waste material when said stream contains such material; and
- intermittently removing the particulate coating material and any such hazardous waste material from the filter medium and collecting the same.

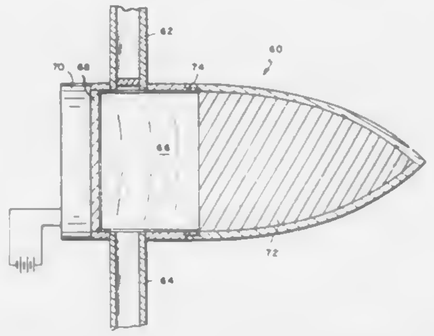
5,022,898
EXHAUST FILTER SYSTEM FOR STERILIZERS
John C. Schmoegner, Redoodo Beach, and Danny L. Baldoz, Carson, both of Calif., assignors to MDT Corporation, Torrance, Calif.
Filed Jan. 11, 1990, Ser. No. 463,442
Int. Cl.^{5} B01D *53/00*
U.S. Cl. 55—210 **14 Claims**



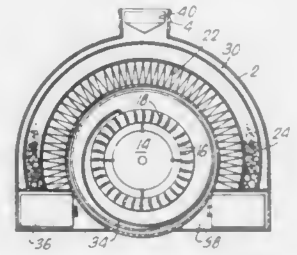
1. A filter apparatus for the vent stream of a sterilization apparatus comprising:
- a structural base with first and second mounting surfaces;
- an inlet chamber with a first end connected to said first mounting surface to form a well having a top openly communicating through said base and a bottom;
- an inlet conduit openly communicating through said bottom with said well, constituting means for delivering vent fluids to said well;
- a filter canister with a recessed inlet end and an outlet end, said canister containing filter medium and said inlet end being sealedly mounted to said second mounting surface to provide a travel path for vent fluids from said well, through said recessed inlet end, through said filter medium and out through said outlet end;
- a liquid trap filter mounted in said well in said travel path between said inlet conduit and said recessed inlet end; and
- a proximity switch mounted for actuation into a first mode when said canister is sealedly positioned on said structural base and for actuation into a second mode when said canister is removed from said structural base.

5,022,899
SONIC DEBUBBLER FOR LIQUIDS
Robert G. Hohlfeld, 654 High St., N. Attleboro, Mass. 02760, and Edward H. Thomas, Attleboro Falls, Mass., assignors to Robert G. Hohlfeld, Attleboro, Mass.
Continuation of Ser. No. 679,707, Dec. 10, 1984, abandoned. This application May 16, 1986, Ser. No. 864,567
Int. Cl.^{5} B01D *51/08*
U.S. Cl. 55—277 **8 Claims**

1. A fluid debubbler device for removing gas bubbles from a liquid having a specific gas solubility comprising:
- a fluid container, having an inner surface coated with an acoustically anti-reflective coating which reduces acoustic wave reflections, for containing a liquid from which bubbles are to be removed;
- a fluid inlet port positioned in a wall of said fluid container;
- a fluid outlet port positioned in a wall of said fluid container; and
- a pressure wave transducer that produces an acoustic wave in said liquid in response to an energy source, said pressure wave transducer being positioned so that the Rayleigh pressure of the acoustic wave drives said gas bubbles away from said fluid outlet port without substantially changing the gas solubility of said liquid.



5,022,900
FORCED VENTILATION FILTRATION DEVICE
Itzchak Bar-Yona, Neveh Monoson, and Gad Bar-Sela, Tel-Aviv, both of Israel, assignors to Eagle, Military Gear Overseas Ltd., Tel-Aviv, Israel
Filed Jul. 13, 1989, Ser. No. 379,382
Claims priority, application Israel, Jul. 20, 1988, 87156
Int. Cl.^{5} B01D *53/04*
U.S. Cl. 55—316 **12 Claims**



1. A compact, integral forced-ventilation personal respirator device comprising:
- means defining a closed personal breathing space to be protected;
- a housing including connector means for air-tight connection of said housing to said closed space to be protected;
- an electric blower removably attachable to said housing and comprised of an electric motor stationary relative to said housing in the attached state of said blower and a bladed centrifugal-type rotor fixedly mounted on the output shaft of said motor; and
- at least one at least partly annular compartment inside said housing for accommodating at least one filter medium of at least partly annular configuration located downstream of said blower, both said electric motor and the rotor of said blower being disposed within a space inside of said partly annular filter medium, at least a portion of the blading of said rotor being substantially coplanar with said filter medium, said compartment providing access of the output air from said blower to said filter medium and egress of filtered air from said filter medium to a space communicating with said connector means of said housing,
- whereby ambient air is drawn into said housing by said blower and forced thereby via said at least one filter medium and said connector means into said closed space to be protected.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,901
COMPRESSION SEAL CANISTER

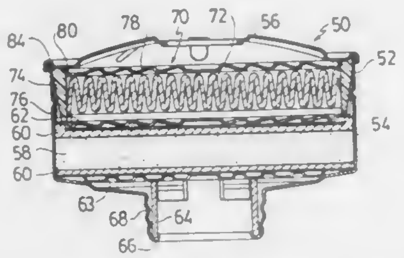
Pierre P. Meunier, Nepean, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Canada

Filed Apr. 27, 1989, Ser. No. 343,742

Claims priority, application Canada, Sep. 22, 1988, 578167

Int. Cl.⁵ B01D *50/00*

U.S. Cl. 55—316 18 Claims



1. A filter canister for use on a gas mask, comprising:

a canister housing having an annular peripheral wall with an inner cylindrical surface;

a filter for particulate materials in the housing, the filter including a filter element surrounded by an annular sealing ring of resiliently compressible elastomeric material; and

means for engaging an inner peripheral surface of the sealing ring and compressing the sealing ring radially against the inner cylindrical surface of the peripheral wall of the housing.

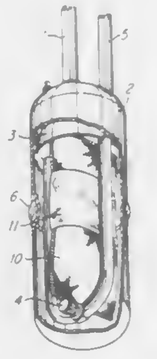
5,022,902
ADSORBENT PACKAGE THAT IS RESISTANT TO HIGH TEMPERATURE

Daniel L. Juhl, Centerville, and Raymond B. Wood, Brookville, both of Ohio, assignors to Stanhope Products Company, Brookville, Ohio

Continuation-in-part of Ser. No. 427,444, Oct. 26, 1989, abandoned. This application May 18, 1990, Ser. No. 525,475

Int. Cl.⁵ B01D *53/04*

U.S. Cl. 55—387 9 Claims



1. An adsorbent package that is resistant to high temperature, comprising:

a bag that contains adsorbent; and

a foil wrapping that is disposed about a portion of said beg, with said foil wrapping having a first side that is disposed adjacent said bag and is laminated with a heat sealing material via which said foil wrapping is connected to the material of said bag, with said heat sealing material being polyethylene, whereby said foil wrapped has two ends that overlap one another, and said foil wrapping has a second side that is remote from said bag and is laminated with nylon.

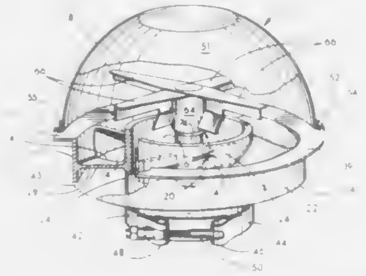
5,022,903
AIR-PRECLEANER

William Decker, Cambridge, Wis., assignor to American Farm Implement & Specialty, Inc., Janesville, Wis.

Filed Oct. 23, 1989, Ser. No. 425,760

Int. Cl.⁵ B01D *45/00*

U.S. Cl. 55—404 28 Claims



1. An air precleaner that separates particulates from air, comprising:

(a) a base assembly having an inlet port through which air enters the precleaner and an outlet port through which air exits the precleaner;

(b) a hood that defines an air space above the base assembly so that the air space and the inlet and outlet ports are in fluid communication, the hood positioned above the base assembly so as to form a gap that extends substantially along the interface of the base assembly and the hood; and

(c) a rotor assembly that is rotatably mounted within the air space that is defined by the hood and that rotates when air enters through the inlet port to fling particulates outward for expulsion through the gap, wherein the rotor assembly further includes:

an axle mounted to the base assembly,

a hub that is rotatably mounted upon the axle, and

an arm that is attached to the hub in the path of air entering through the inlet port, the air causing the hub to rotate upon the axle and the arm to fling particulates outward, wherein the arm includes a first blade that is mounted to the arm in a plane radial to the hub and a second blade that descends at right angles to the first blade in a plane axial to the hub, and wherein the second blade further includes a tab that extends downward from the second blade proximate the hub.

5,022,904
METHOD OF MAKING OPTICAL GLASS ARTICLE

Yoichi Ishiguro; Hiroo Kanamori; Akira Urano, and Michihisa Kyoto, all of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

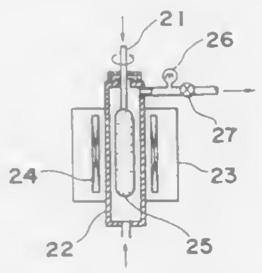
Continuation of Ser. No. 338,674, Apr. 17, 1989, abandoned, which is a continuation-in-part of Ser. No. 161,140, Feb. 26, 1988, abandoned, which is a continuation-in-part of Ser. No. 947,432, Dec. 29, 1986, abandoned. This application Jun. 13, 1990, Ser. No. 537,010

Claims priority, application Japan, Dec. 27, 1985, 60-293060; Nov. 10, 1986, 61-265665

Int. Cl.⁵ C03B *37/014*

U.S. Cl. 65—2 3 Claims

1. A method of making a glass article which comprises heating a cylindrical glass soot preform which has a larger bulk density in its axially extending center part than in its peripheral part surrounding said center part in an atmosphere comprising a fluorine-containing compound and an inert gas to add fluorine to the preform and then vitrifying the fluorine added preform to obtain a transparent glass article, wherein the heating is carried out in two heating is substeps under such conditions that a partial pressure of the fluorine-containing compound in the first heating substep is 1.3 to 2.5 times higher than that in the second heating substep whereby the glass article contains fluorine in substantially the same concentration at any part of the glass article, said partial pressure being controlled such that the decrease impartial pressure in the second heating substep compensates for the lower bulk density at the peripheral part of the preform whereby a substantially equal amount of fluorine is added to the preform at any part of the preform.



5,022,905
METHOD AND APPARATUS FOR COATING GLASS

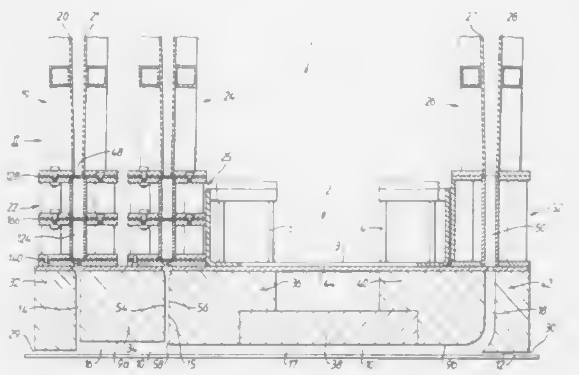
Barry T. Grundy, Wigan; Edward Hargreaves, and Peter J. Whitfield, both of Merseyside, all of England, assignors to Pilkington PLC, St. Helens, United Kingdom

Filed Oct. 12, 1989, Ser. No. 420,513

Claims priority, application United Kingdom, Oct. 14, 1988, 8824102

Int. Cl.⁵ C03C *17/34*

U.S. Cl. 65—60.51 12 Claims



11. A method of depositing a coating formed from the reaction of at least two gaseous reactants onto the surface of a moving ribbon of hot glass which comprises providing a flow of a first gaseous reactant in a direction substantially parallel to the direction of movement of the glass in a coating chamber over the glass and introducing a second gaseous reactant to the flow of the first gaseous reactant through an inlet means constituted by an inlet channel which extends across the ceiling of the chamber and causing said first and second gaseous reactants to flow through said coating chamber in contact with the glass surface in a direction substantially parallel to the direction of movement of the glass to form the desired coating on the glass, the ceiling of the coating chamber having a stepped configuration at the juncture of the said inlet channel and the coating chamber, so that the ceiling of the coating chamber on the upstream side (with reference to flow of the first reactant gas) of the inlet channel is at a higher level than the ceiling of the coating chamber on the downstream side (with reference to flow of the first reactant gas) of the said inlet channel, the line described by a longitudinal cross-section taken through the ceiling having a stepped configuration.

5,022,906
PROCESS FOR OBTAINING BENT-TEMPERED MOTOR VEHICLE GLAZINGS

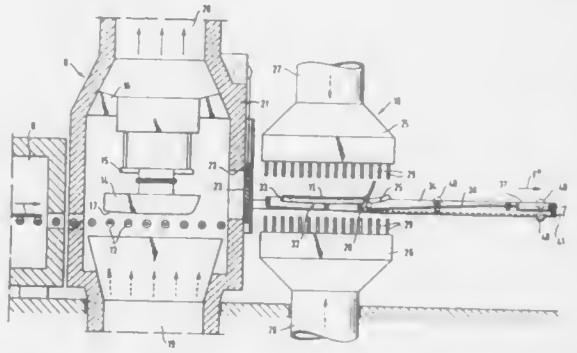
Luc Vanaschen, Eupen; Hans-Werner Kuster, Aachen; Hubert Havenith, Wurselen, and Benoit D'Iribarne, Aachen, all of Fed. Rep. of Germany, assignors to Saint-Gobain Vitrage International, Courbevoie, France

Filed Dec. 13, 1989, Ser. No. 450,088

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1988, 38411989

Int. Cl.⁵ C03B *23/03, 27/044*

U.S. Cl. 65—104 6 Claims



1. A process for obtaining bent-tempered motor vehicle glazings having at least one bent marginal zone, wherein glass sheets are bent to a desired shape in a horizontal position, comprising the steps of:

heating the glass sheets to a bending temperature in a horizontal tunnel furnace;

pressing the glass sheets between a solid upper form and a bending form to obtain said desired bent shape, said bending form having an opening in its center and comprising several parts which are movable relative to one another, said bending form serving as a lower bending form, said pressing step comprising the further step of rotating at least one of said parts to a bent position during the pressing to deform said marginal zone, said at least one of said parts being covered with an elastically deformable felt material of refractory fibers;

carrying said bent glass sheets by way of the bending frame into a tempering station;

tempering said glass sheets in said tempering station by blowing cold air on the glass sheets; and

rotating, during said tempering step, said at least one of said parts from said bent position to a position in which said at least one of said parts is removed from the glass sheets.

5,022,907
APPARATUS FOR BENDING GLASS PANES IN A HORIZONTAL POSITION

Luc Vanaschen, Eupen; Herbert Radermacher, Raeren, both of Belgium, and Hans-Werner Kuster, Aachen, Fed. Rep. of Germany, assignors to Saint-Gobain Vitrage International, Courbevoie, France

Filed Aug. 30, 1990, Ser. No. 574,820

Claims priority, application Fed. Rep. of Germany, Sep. 1, 1989, 3928968

Int. Cl.⁵ C03B *23/023*

U.S. Cl. 65—163 **11 Claims**

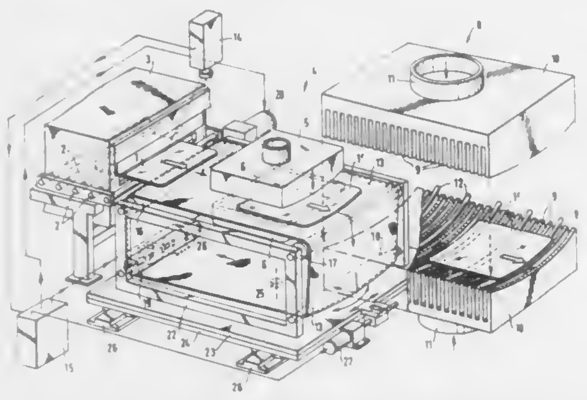
1. Apparatus for bending glass panes in a horizontal position, comprising:

a bending mold disposed above a conveying level for the glass panes and within a bending station; and

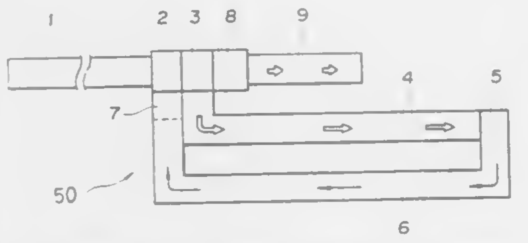
an endless conveyor belt for conveying the glass pane heated to a bending temperature from a furnace to the bending mold and from the bending mold to a cooling station, said endless conveyor belt being made from a heat-resistant, flexible material and being guided over deflector rolls,

VOL
1127
ISS
2
JE
11
1991
UMI

said deflector rolls comprising at least an upper deflector roll disposed at an exit end of said bending station and a lower deflector roll which follows the upper deflector roll, wherein the shape of the upper deflector roll corresponds to a transverse bend of the bent glass pane, and the lower deflector roll which follows the upper deflector roll has a shape which is complementary to the shape of the upper deflector roll for compensating for relative differences in length of the conveyor belt between its middle zone and its edge zones resulting from the upper deflector roll.



5,022,908
APPARATUS FOR BENDING GLASS SHEET
Seiichiro Honjo, and Yasunori Okajima, both of Osaka, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan
Filed Aug. 2, 1989, Ser. No. 388,443
Claims priority, application Japan, Aug. 3, 1988, 63-102904; Aug. 3, 1988, 63-194043
Int. Cl.^{5} C03B *23/03, 25/08, 27/00*
U.S. Cl. 65—268 **15 Claims**



1. An apparatus for bending a glass sheet, comprising:

a heating means defining a heating zone for heating the glass sheet;

a shaping means defining a shaping zone for shaping the glass sheet;

a cooling means defining a cooling zone for cooling the glass sheet; and

a transfer means defining a transfer zone disposed immediately before said shaping zone in a direction in which the glass sheet is fed;

first feed means extending from said heating zone to said transfer zone for feeding the glass sheet from said heating zone to said transfer zone;

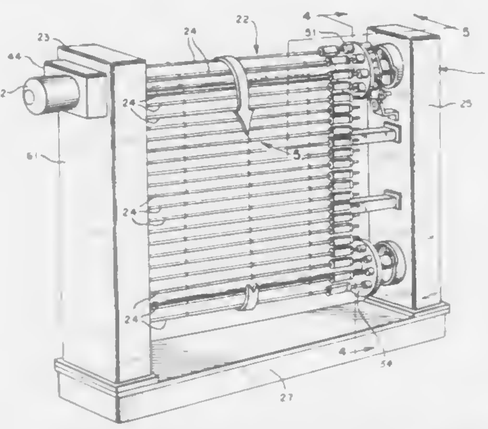
second feed means movable between said transfer zone, said shaping zone, and said cooling zone for moving the glass sheet between said transfer zone, said shaping zone and said cooling zone;

the glass sheet being transferred from said first feed means to said second feed means in said transfer zone; and

said second feed means comprising ring mold means for supporting the glass sheet from below,

wherein said cooling means has a lehr section and a quenching section which are selectively usable.

5,022,909
TUBE PROCESSING MACHINE
Douglas L. Swanson, McKean, Pa., assignor to Swanson Systems, Inc., Erie, Pa.
Filed Oct. 5, 1988, Ser. No. 254,272
Int. Cl.^{5} C03B *23/04*
U.S. Cl. 65—278 **19 Claims**



1. A machine for processing tubes, said machine comprising:

a plurality of holding means, each of said holding means for holding a tube and being pivotally connected to two adjacent holding means of said plurality of holding means to thereby form a first endless loop of holding means mounted so as to travel in a first endless path, said first endless path including a first portion, and a second portion;

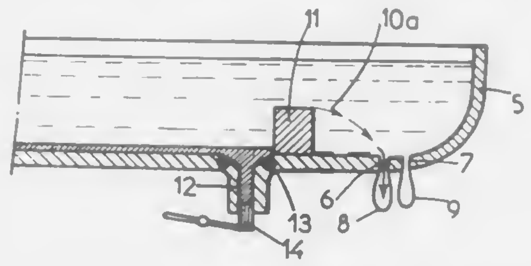
means for continuously moving said endless loop of holding means in said first endless path;

a plurality of tube processing means, each of said tube processing means for processing a tube, said plurality of tube processing means being mounted so as to travel in a second endless path, said second endless path being smaller than the first endless path, a portion of said second endless path coinciding with the first portion of the first endless path of the holding means, the plurality of tube processing means being of sufficient number and appropriate spacing so that each of said tube processing means lines up with one of said holding means in said first portion of the first endless path and completes the processing of a tube held in said one holding means while the one holding means travels in said first portion of the first endless path; and

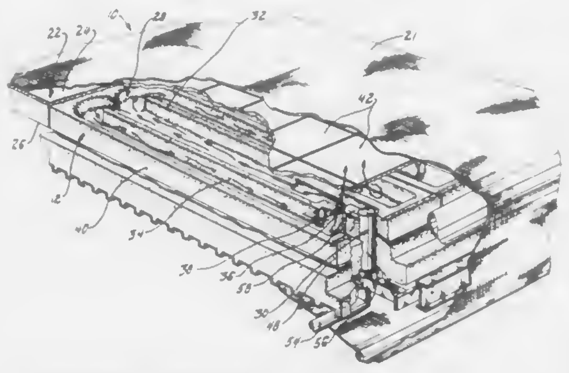
means continuously moving said plurality of tube processing means through the second endless path at a velocity selected so as to match the velocity of the plurality of holding means traveling through said first portion of the first endless path.

5,022,910
FEEDER TROUGH FOR TRANSFERRING MOLTEN GLASS FROM A FURNACE TO A FORMING STATION
Gérard Duvierre, Avignon, and Joseph Recasens, Sorgues, both of France, assignors to Societe Europeenne des Produits Refractaires, Coubevoie, France
Filed Apr. 4, 1990, Ser. No. 504,000
Claims priority, application France, Apr. 6, 1989, 89 04522
Int. Cl.^{5} C03B *5/26, 7/00*
U.S. Cl. 65—325 **4 Claims**

1. A feeder trough for molton glass which has a bottom and lateral side walls and which extends from a first end that connects with a glass furnace to a second end above an object-forming station, said second end being shaped as a bowl portion and said feeder trough providing a channel portion that extends from said first end to said bowl portion; at least one vertical orifice in said bottom within said bowl portion through which molten glass can flow to the object-forming station; a sill extending above said bottom in said channel portion and between said lateral side walls, said sill providing a vertical upstream wall facing said first end, a vertical downstream wall face facing said bowl portion, and having a thickness of about 4 to 10 cm; and a drainage opening in said bottom in said channel portion adjacent the upstream wall of said sill for removing viscous phase material flowing along said channel prior to reaching said sill, said channel portion being devoid of side drains.



5,022,911
GAS FIRED RADIANT HEATER FOR FURNACE FLOOR
Ben M. Balestra, Temperance, Mich., assignor to Glasstech, Inc., Perrysburg, Ohio
Filed Feb. 2, 1990, Ser. No. 474,547
Int. Cl.^{5} C03B *27/04*
U.S. Cl. 65—349 **20 Claims**



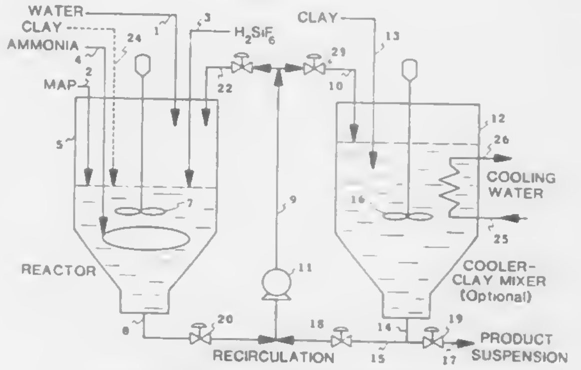
1. A glass sheet heating furnace comprising:

a housing defining a generally enclosed heating chamber and having a floor that defines the lower extremity of the heating chamber, said floor including an upper surface that faces upwardly toward the heating chamber and a lower surface that faces downwardly, and said floor including a heating passage extending horizontally at a location between the upper and lower floor surfaces; and a burner supplying a horizontal flame in said passage to heat the furnace.

5,022,912
METHODS FOR FERTILIZING WITH AMMONIACAL FERTILIZERS
Donald C. Young, Fullerton, and James A. Green, II, Chino, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.
Continuation-in-part of Ser. No. 685,454, Nov. 16, 1984, Pat. No. 4,476,113, and Ser. No. 931,517, Nov. 17, 1986, abandoned, said Ser. No. 685,454, is a continuation-in-part of Ser. No. 315,492, Oct. 27, 1981, Pat. No. 4,476,113, and Ser. No. 490,461, May 2, 1983, abandoned. This application Dec. 3, 1987, Ser. No. 128,146
The portion of the term of this patent subsequent to Feb. 23, 2005, has been disclaimed.
Int. Cl.^{5} C05C *9/00*
U.S. Cl. 71—30 **16 Claims**

1. A method for inhibiting the nitrification of an ammoniacal fertilizer in soil comprising introducing into soil containing said ammoniacal fertilizer (a) an amount of water sufficient to obtain a soil water content greater than 50 percent of soil saturation and to substantially retard the decomposition rate of the thiocarbonate compound hereinafter defined relative to the decomposition rate of said compound at 50 percent of soil saturation, and (b) a soil fumigation effective amount of an aqueous solution of a thiocarbonate compound of ammonium, lithium, sodium, potassium, cesium, magnesium, calcium, strontium, or barium ions, or mixtures of two or more of such compounds.

5,022,913
STABILIZED AMMONIUM ORTHOPHOSPHATE SUSPENSIONS
Ewell F. Dillard, Florence, and James R. Burnell, Sheffield, both of Ala., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.
Filed Aug. 28, 1989, Ser. No. 399,032
Int. Cl.^{5} C01B *25/28;* **C05B** *7/00, 11/10*
U.S. Cl. 71—34 **22 Claims**



Batch Production of Ammonium OrthoPhospate Base Suspension Fertilizers

12. A process for the production of ammonium orthophosphate suspension fertilizers from ammonia and certain solid intermediates which suspensions contain from about 10 to about 12 weight percent nitrogen and about 30 to about 36 weight percent P_2O_5, and have excellent physical properties including low viscosities and high pourabilities and exhibit desirable long term storage characteristics, which process comprises the steps of:

(a) introducing into reactor means predetermined quantities of water of formulation and predetermined quantities of solid intermediates derived from wet-process phosphoric acids along with predetermined quantities of fluorosilicic acid sufficient to provide from about 0.6 to about 5.0 weight percent fluorine in the product suspension removed in step (g), infra;

(b) maintaining said fluorosilicic acid introduced in step (a),

VOL
1127
ISS
2
JE
11
1991
UMI

supra, in continuous and intimate contact with the phosphate-containing materials introduced therein for a period of time ranging from about 1 minute to about 5 minutes;

(c) subsequently introducing into the resulting fluorosilicic acid treated phosphate-containing materials, predetermined quantities of ammoniating media sufficient to effect at least a partially ammoniated ammonium orthophosphate slurry material having a $N:P_2O_5$ weight ratio ranging from about 0.30:1 to about 0.35:1 and having a pH ranging from between about 6.0 and about 7.2;

(d) intimately mixing the materials combined in step (c), supra, and maintaining the resulting mixture at a temperature in the range from about 120° to about 200° F. for a time ranging from about 10 to about 40 minutes;

(e) introducing into the resulting at least partially ammoniated material effected in step (d), supra, predetermined quantities of gelling clay;

(f) maintaining said clay introduced in step (e), supra, in continuous and intimate contact with said at least partially ammoniated material for a period of time ranging from about 5 minutes to about 30 minutes to thereby effect the formulation of a resulting gelled suspension; and

(g) recovering as product the gelled suspension resulting in step (f), supra, for ultimate use in the production of NPK suspension mixtures, direct application, or storage;

said process characterized by the fact that mixing of said fluorosilicic acid with said solid intermediates prior to the ammoniation thereof effects a substantial reduction of the overall water-insoluble content and substantially increases the available citrate-soluble P_2O_5 thereof by the conversion of the congeneric cations therein to the respective fluorine salts prior to the ammoniation step, wherein is effected substantially improved disintegration of the solid intermediate particulates during such subsequent ammoniation, and wherein a separate cooling step subsequent to the ammoniation and prior to the clay addition, is herein substantially eliminated.

5,022,914

CYCLOHEXENONE OXIME ETHERS, THEIR PREPARATION AND THEIR USE AS HERBICIDES

Juergen Kast, Boehl-Iggelheim; Dieter Kolassa, Ludwigshafen; Norbert Meyer, Ladenburg; Ulrich Schirmer, Heidelberg; Albrecht Harreus, Ludwigshafen; Jochen Wild, Deidesheim; Karl-Otto Westphalen, Speyer, and Bruno Wuerzer, Otterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

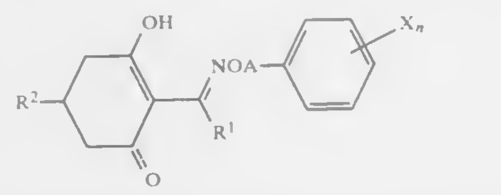
Filed Oct. 31, 1989, Ser. No. 429,451

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1988, 3838309

Int. Cl.⁵ C07D *311/00, 315/00;* **A01N** *43/16*

U.S. Cl. 71—88 **3 Claims**

1. A cyclohexenone oxime ether of the formula I



(1)

where R^1 is C_1-C_6-alkyl, A is a C_4-alkyl or C_4-alkenyl which chain is unsubstituted or is substituted by one to three C_1–C_3-alkyl groups, one to three halogen atoms or from 2 to 3 of a mixture of at least one end up to 2 C_1–C_3-alkyl and at least one and up to 2 halogen atoms, X is nitro, cyano, halogen, C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, C_1–C_4-haloalkyl, C_1–C_4-haloalkoxy, carboxyl, C_1–C_4-alkoxycarbonyl, benzyloxycarbonyl and/or phenyl, and the aromatic radicals may carry from one to three of the following substituents: nitro, cyano, halogen, C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, C_1–C_4-haloalkyl, C_1–C_4-haloalkyloxy, carboxyl, C_1–C_4-alkoxycarbonyl and/or benzyloxycarbonyl, n is from 0 to 3 or from 1 to 5 when X is halogen, R^2 is unsubstituted tetrahydropyran or tetrahydropyran in which the ring carries from one to three of the following substituents: hydrozy, halogen, C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, and/or C_1–C_4-haloalkyl, and their agriculturally useful salts and esters of C_1–C_{10}-carboxylic acids and inorganic acids.

5,022,915

SUBSTITUTED 2,4-DIARYLPYRIMIDINES AND THEIR USE AS HERBICIDES

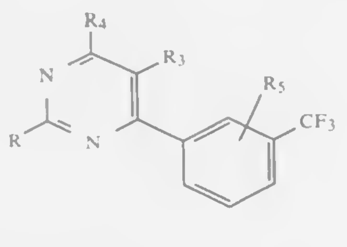
Michael P. Prisbylla, Richmond, Calif., assignor to ICI Americas Inc., Wilmington, Del.

Filed Mar. 1, 1990, Ser. No. 487,334

Int. Cl.⁵ C07D *239/26, 239/34, 239/52;* **A01N** *43/54*

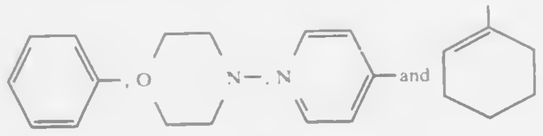
U.S. Cl. 71—92 **21 Claims**

15. A method of controlling undesirable vegetation comprising applying to said vegetation or to the locus thereof an herbicidally effective amount of a compound having the formula



wherein

R is selected from the group consisting of



R_1 and R_2 are independently selected from the group consisting of H, Br, Cl, F, C≡N, CF_3 and OCF_3;

R_3 is selected from the group consisting of H, C_1–C_4 alkyl, CO_2CH_3, $CO_2CH_2CH_3$, CH_2Cl, CH_2OCH_3, $CH{=}CH_2C_1$–C_3 thioalkyl, and C_1–C_3 alkoxy;

R_4 is selected from the group consisting of H, —OH, C_1–C_4 alkyl, C_1–C_3 thioalkyl, C_1–C_3 alkoxy; and

R_5 is selected from the group consisting of H and F.

5,022,916

SUBSTITUTED SULFONYLDIAMIDES, PROCESSES FOR THEIR PREPARATION, AND THEIR USE AS HERBICIDES AND PLANT GROWTH REGULATORS

Lothar Willms, Hillscheid; Klaus Bauer, Hanau; Hermann Bieringer, Taunus, and Helmut Bürstell, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

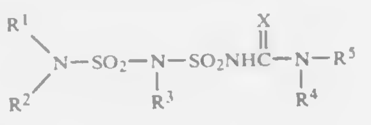
Filed Jun. 16, 1989, Ser. No. 367,360

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1988, 3820647; Jul. 6, 1988, 3822841

Int. Cl.⁵ A01N *43/54, 43/66, 43/713;* **C07D** *239/42*

U.S. Cl. 71—92 **22 Claims**

1. A compound of formula 1 or a salt thereof

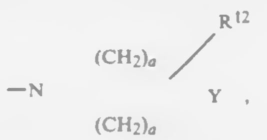


$$R^1R^2N-SO_2-N(R^3)-SO_2NHC(=X)-N(R^4)-R^5$$

(1)

where

R^1 and R^2 independently of one another are H, or $(C_1$–$C_8)$alkyl, $(C_2$–$C_8)$alkenyl or $(C_2$–$C_8)$alkynyl, it being possible for these radicals optionally to be mono-substituted or polysubstituted by halogen or mono-substituted or disubstituted by $(C_1$–$C_4)$alkoxy or $(C_1$–$C_4)$alkylthio, or are $(C_1$–$C_4)$alkoxycarbonyl$(C_1$–$C_3)$-alkyl, or phenyl which is unsubstituted or monosubstituted or polysubstituted by $(C_1$–$C_4)$alkyl, $(C_1$–$C_4)$alkoxy, $(C_1$–$C_4)$alkylthio, $(C_1$–$C_4)$alkylsulfinyl or $(C_1$–$C_4)$alkylsulfonyl, it being possible for the abovementioned radicals to be polysubstituted in the alkyl moiety by halogen or monosubstituted or disubstituted in the alkyl moiety by $(C_1$–$C_4)$alkoxy, or phenyl which is unsubstituted or monosubstituted or polysubstituted by $(C_1$–C_4alkoxy)carbonyl, halogen or NO_2, or R^1 and R^2 together with the N atom by which they are linked are a heterocyclic ring of formula

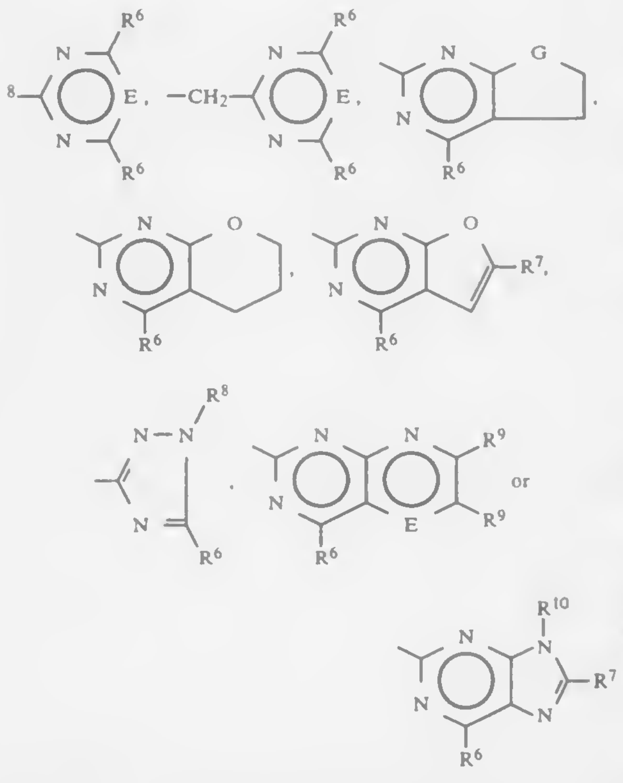


a indices independently of one another being an integer from 1 to 3,

R^3 is H, $(C_1$–$C_{12})$alkyl, $(C_2$–$C_8)$alkenyl or $(C_2$–$C_8)$alkynyl, it being possible for these radicals to be mono-substituted or polysubstituted by halogen or mono-substituted or disubstituted by $(C_1$–$C_4)$alkoxy or $(C_1$–$C_4)$alkylthio, or R^3 is $(C_1$–C_4alkoxy)carbonyl$(C_1$–$C_3)$alkyl, or —$(CH_2)_b$phenyl, b being an integer from 0 to 2 and the phenyl radical being unsubstituted or monosubstituted or polysubstituted by $(C_1$–$C_4)$alkyl, $(C_1$–$C_4)$alkoxy, $(C_1$–$C_4)$alkylthio or $(C_1$–$C_4)$alkylsulfonyl, it being possible for the abovementioned radicals to be monosubstituted or polysubstituted in the alkyl moiety by halogen, or phenyl being substituted by $(C_1$–$C_4)$alkoxycarbonyl, halogen or NO_2, or R^2 and R^3 together are a $(C_2$–$C_4)$alkylene chain,

R^4 is H, $(C_1$–$C_6)$alkyl, $(C_2$–$C_8)$alkenyl, $(C_2$–$C_8)$alkynyl or $(C_1$–$C_4)$alkoxy,

R^5 is a radical of formula



E is CH,

G is CH_2 or O,

R^6 radicals independently of one another are H, halogen, $(C_1$–$C_6)$alkyl, $(C_1$–$C_6)$alkoxy or $(C_1$–$C_6)$alkylthio, it being possible for the abovementioned radicals to be monosubstituted or polysubstituted in the alkyl moiety by halogen or monosubstituted or disubstituted in the alkyl moiety by $(C_1$–$C_4)$alkoxy or $(C_1$–$C_4)$alkylthio; or are a radical $N(R^{11})_2$, $(C_3$–$C_6)$cycloalkyl, $—OCHR^7COOR^{11}$, $(C_2$–$C_5)$alkenyl, $(C_2$–$C_4)$alkynyl, $(C_3$–$C_5)$alkenyloxy or $(C_3$–$C_5)$alkynyloxy,

R^7 is H or $(C_1$–$C_4)$alkyl,

R^8 is $(C_1$–$C_4)$alkyl, $—CHF_2$ or $—CH_2CF_3$,

R^9 radicals independently of one another are H, $(C_1$–$C_4)$alkyl, $(C_1$–$C_4)$alkoxy or halogen,

R^{10} is H, $(C_1$–$C_4)$alkyl, $—CHF_2$ or $—CH_2CF_3$,

R^{11} radicals independently of one another are.H, $(C_1$–$C_4))$alkyl, $(C_2$–$C_4)$alkenyl or $(C_1$–$C_4)$alkynyl,

R^{12} is H, $(C_1$–$C_4)$alkyl, $(C_1$–C_4alkoxy)carbonyl or $(C_1$–$C_4)$alkoxymethyl,

X is O or S and

Y is O, S, CH_2, NH or $N(C_1$–$C_4)$alkyl.

22. The compound which is N-[(4,6-dimethoxy-pyrimidin-2-yl)aminocarbonyl]-N'-(dimethylaminosulfonyl)-methylaminosulfonamide.

5,022,917

LIQUID HERBICIDALLY ACTIVE COMPOSITIONS

G. Graham Allan, Seattle, Wash., assignor to Melamine Chemicals, Inc., Donaldsonville, La.

Continuation of Ser. No. 671,731, Nov. 15, 1984, abandoned, which is a continuation-in-part of Ser. No. 518,281, Jul. 28, 1983, abandoned. This application Feb. 12, 1990, Ser. No. 478,729

Int. Cl.⁵ A01N *43/64*

U.S. Cl. 71—93 **7 Claims**

1. A process for herbicidally treating an agricultural substrate, comprising

applying to said substrate in an agriculturally acceptable liquid:

(a) a herbicidally active hexazinone material, and

(b) a melamine component selected from the group consisting of melamine, physiologically acceptable inorganic and organic salts thereof, and mixtures thereof;

said melamine component being partly dissolved in said liquid, and the undissolved melamine component comprises particles primarily less than 440 micrometers in size that are dispersed in said liquid,

said herbicidally active hexazinone material being applied at a concentration that is useful and effective for the exertion of its herbicidal activity,

said herbicidally active hexazinone material and said melamine component being applied to be present on said substrate in such contact that they can coact to improve the efficacy of said herbicidally active hexazinone material.

5,022,918

HEAT-RESISTANT ALUMINUM ALLOY SINTER AND PROCESS FOR PRODUCTION OF THE SAME

Seiichi Koike; Hiroyuki Horimura; Masao Ichikawa, and Noriaki Matsumoto, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 1, 1988, Ser. No. 278,581

Claims priority, application Japan, Dec. 1, 1987, 62-301539; Dec. 2, 1987, 62-303239; Dec. 4, 1987, 62-305904; Dec. 10, 1987, 62-310963; Feb. 9, 1988, 63-28206; Feb. 10, 1988, 63-27786; Oct. 20, 1988, 63-264467

Int. Cl.⁵ B22F *1/00*

U.S. Cl. 75—229 **11 Claims**

1. A heat-resistant aluminum alloy sinters comprising 5 to 12% by weight of Cr, less than 10% by weight of at least one element selected from the group consisting of Co, Ni, Mn, Zr, V, Ce, Fe, Ti, Mo, La, Nb, Y and Hf, and the balance of Al

VOL
1127
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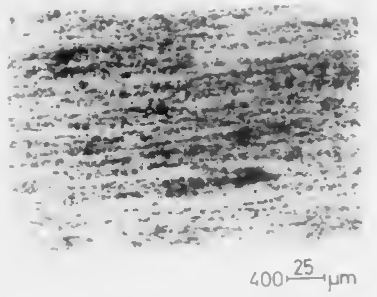
containing unavoidable impurities, wherein said sinter includes Fe and Zr, the Fe content being set in a range of 1 to 5% by weight, and the Zr content being set in a range of 0.5 to 3% by weight.



5,022,919

COMPLEX BORIDE CERMETS AND PROCESSES FOR THEIR PRODUCTION

Yasuo Shinozaki, Sagamihara; Noritoshi Horie, Tokyo; Kazuo Hamashima, Yokohama, and Makoto Imakawa, Yokohama, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed May 16, 1989, Ser. No. 352,414

Claims priority, application Japan, Jul. 8, 1988, 63-168930

Int. Cl.^{5} C22C *29/04*

U.S. Cl. 75—238 **28 Claims**

1. A complex boride cermet having high strength and high toughness, which comprises a hard phase consisting essentially of a complex boride $((MO_{1-x}W_x)_2NiB_2)$, the molar ratio x of tungsten substituted for molybdenum is within the range of from 0.04 to 0.40 , being a solid solution of a nickel-molybdenum complex boride (MO_2NiB_2), and a matrix of an alloy phase consisting essentially of nickel and containing molybdenum.

5,022,920

METHOD AND COMPOSITION FOR INVESTMENT CASTING OF LAMINAR CERAMIC SHELL MOLDS

Kermit A. Buntrock, Chicago, Ill.; Daniel R. English, Felton, Calif., and Wescomb R. Jones, Wilmington, Del., assignors to Buntrock Industries, Inc., Lively, Va.

Division of Ser. No. 148,940, Jan. 27, 1988, Pat. No. 4,927,673. This application Jan. 16, 1990, Ser. No. 465,422

Int. Cl.^{5} B28B *7/34*

U.S. Cl. 106—38.3 **13 Claims**

1. A solution for use in making a laminar ceramic shell mold for investment casting, comprising in combination:

(a) water, and

(b) an acid stabilized phosphate modified positively charged aluminum salt.

5,022,921

PHOSPHATE GLASSES FOR GLASS MOLDS

Bruce G. Aitken, Painted Post, N.Y., assignor to Corning Incorporated, Corning, N.Y.

Filed Oct. 19, 1990, Ser. No. 599,743

Int. Cl.^{5} C03C *3/17*

U.S. Cl. 106—38.9 **6 Claims**

1. A glass exhibiting a softening point between 500°-620° C., a linear coefficient of thermal expansion (25°-300° C.) between $50\text{-}80\times10^{-7}/°C.$, a temperature interval between the softening point and annealing point of 100°-160° C., and a weight loss after exposure to boiling water for six hours no greater than 0.5% consisting essentially, expressed in terms of mole percent on the oxide basis, of 34-56% ZnO, 4-14% Al_2O_3, 40-52% P_2O_5, the sum of $ZnO+Al_2O_3+P_2O_5$ constituting at least 85% of the total composition.

5,022,922

AGENT FOR IMPROVING COMPOSITE MATERIALS

Akinari Itagaki; Masaaki Yamaya, both of Gunma; Hiroshi Yoshioka, Tokyo; Akihiko Watanabe, and Keita Miyazato, both of Fukushima, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo and Nitto Boseki Co., Ltd., Fukushima, both of, Japan

Division of Ser. No. 232,038, Aug. 15, 1988. This application May 29, 1990, Ser. No. 529,402

Claims priority, application Japan, Aug. 18, 1987, 62-204925

Int. Cl.^{5} C09K *3/00*

U.S. Cl. 106—287.11 **6 Claims**

1. A treatment agent suitable for the treatment of an inorganic reinforcing material used for the formation of a composite material adapted for use in a laminated plate for a printed circuit board and which comprises:

(A) a solvent; and

(B) a trialkoxysilylalkyl-substituted polymethylene diamine silane coupling agent, in an amount effective to render the treatment agent useful as an agent for improving the heat resistance of the composite material represented by the general formula

$$(R^1O)_3SiR^2NH(CH_2)_nNHCH_2C_6H_5,$$

in which R^1 is a methyl group or an ethyl group, R^2 is a divalent hydrocarbon group having 1 to 6 carbon atoms and n is an integer in the range of 4 to 8, or a hydrochloride thereof, dissolved in the solvent.

5,022,923

PEARL LUSTER PIGMENTS STABLE TO GLAZE AND ENAMEL

Axel Rau, Pfullendorf; Klaus Ambrosius, Frankfurt, and Klaus D. Franz, Kelheim, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft Mit Beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Oct. 8, 1986, Ser. No. 916,757

Int. Cl.^{5} C04B *14/20*

U.S. Cl. 106—415 **5 Claims**

1. A pearlescent pigment stable during preparation of glaze and enamel compositions containing the same, comprising mica flakes coated with at least one metal oxide layer and, in addition, a top layer, wherein the top layer is a mixture tin dioxide and cerium dioxide, in an amount of 10-30% by weight effective to stabilize the pigment to degradation from a coating of an enamel or a glaze.

5,022,924

METHOD FOR REDUCING THE ABRASION OF CALCINED CLAY

Rasik H. Raythatha, Kingwood, Tex.; Paul R. Suitch, Milledgeville, and E. Wayne Andrews, Sandersville, both of Ga., assignors to ECC America Inc., Atlanta, Ga.

Filed Feb. 21, 1990, Ser. No. 482,541

Int. Cl.^{5} C04B *14/10*

U.S. Cl. 106—486 **11 Claims**

1. A method for reducing the abrasiveness of calcined kaolin clay, comprising admixing the clay prior to calcining with from about 0.2 to 3% by weight of a finely divided silica based on the dry weight of the kaolin clay; followed by a calcining step.

5,022,925

COMPOSITION FOR PREPARING ARTIFICIAL STONE MATERIALS

Viktor G. Surguchev, USSR, Simferopol, ulitsa Kievskaya, 153, kv. 187, Simferopol, U.S.S.R.; Oleg V. Kuraev, USSR, Simferopol, ulitsa Rostovskaya, 22, kv. 59, Simferopol, U.S.S.R.; Raisa N. Surgucheva, USSR, Simferopol, ulitsa Kieveskaya, 153, kv. 187, Simferopol, U.S.S.R.; Leonid P. Makhnovsky, USSR, Simferopol, ulitsa Zalesskaya, 81, kv. 201, Simferopol, U.S.S.R.; Anatoly P. Troschenovsky, USSR, Simferopol, ulitsa Dorozhnaya, 9, kv. 45, Simferopol, U.S.S.R.; Alexandr N. Tetior, USSR, Simferopol, ulitsa Gavena, 109, kv. 6, Simferopol, U.S.S.R.; Igor V. Golovchenko, USSR, Simferopol, prospekt Pobedy, 82, kv. 271, Simferopol, U.S.S.R., and Tatyana V. Scherbina, USSR, Simferopol, ulitsa Treneva, 17, kv. 4, Simferopol, U.S.S.R.

PCT No. PCT/SU88/00198, § 371 Date Jun. 13, 1989, § 102(e) Date Jun. 13, 1989, PCT Pub. No. WO89/03370, PCT Pub. Date Apr. 20, 1989

PCT Filed Oct. 5, 1988, Ser. No. 381,740

Int. Cl.^{5} C04B *12/04, 22/08, 14/28*

U.S. Cl. 106—631 **7 Claims**

1. A composition for preparing artificial stone materials, consisting of a silicate component, limestone, and an aqueous solution of an acid with pH 1-4, said silicate component consisting of soluble glass, said composition having the following ratio of the components (mass %):

soluble glass: 3-65
limestone: 1-75
aqueous solution of an acid with pH 1-4: 5-52.

5,022,926

CORROSION CONTROL

Robert P. Kreh; Joseph T. Lundquist, both of Jessup; Wayne L. Henry, Gaithersburg, all of Md.; John A. Kelly, Crystal Lake, Ill., and Vincent R. Kuhn, Twin Lakes, Wis., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation-in-part of Ser. No. 204,664, Jun. 12, 1988, abandoned. This application May 18, 1989, Ser. No. 353,231

Int. Cl.^{5} B08B *3/08*

U.S. Cl. 134—2 **30 Claims**

1. A method of removing iron contaminants from an aqueous system of comprising introducing an aqueous solution into the system and removing portions of the aqueous system containing said iron contaminants, said solution consisting essentially of water and at least one dihydroxylaromatic compound represented by the formula:

$$Q—(Ar)—(OH)_2$$

wherein Ar represents benzene aromatic moiety, Q represents at least one electron withdrawing group substituted on the Ar moiety, and the hydroxy (OH) groups are substituted on the Ar moiety in ortho position with respect to eacn other and said solution being introduced into said system in an amount to provide from 0.1 to 50,000 parts per million concentration of the compound within the system.

5,022,927

METHOD FOR HYDRAULIC CEILING-CONCRETE REMOVAL

Jurgen F. Seidel, Calumet City, Ill., assignor to Midwest Hydro-Blasting, Inc., Chicago, Ill.

Division of Ser. No. 163,273, Mar. 2, 1988, Pat. No. 4,911,188. This application Dec. 13, 1989, Ser. No. 449,989

Int. Cl.^{5} B08B *3/00*

U.S. Cl. 134—34 **9 Claims**

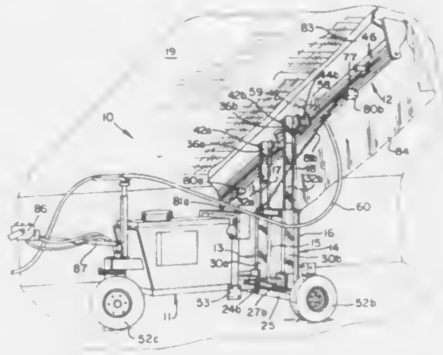
1. A method of removing concrete from the surface of a concrete ceiling comprising:

(A) holding a first end of an elongated boom at a first predetermined distance from said surface;

(B) holding a second end of said boom at a second predetermined distance from said surface;

(C) moving a lance along a path on said boom between said first and second ends; and

(D) directing a stream of water under pressure, while said lance moves along said path, toward said surface through a nozzle attached to said lance.



5,022,928

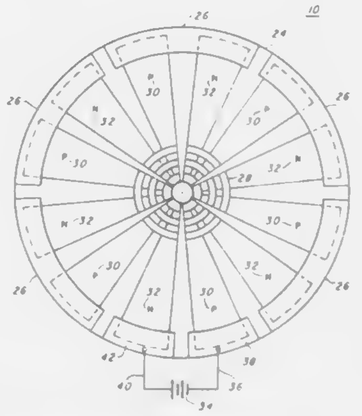
THERMOELECTRIC HEAT PUMP/POWER SOURCE DEVICE

Richard J. Buist, 1802 Clover Trail, Richardson, Tex. 75081

Division of Ser. No. 91,323, Aug. 31, 1987, Pat. No. 4,859,250, which is a continuation of Ser. No. 784,189, Oct. 4, 1985. This application May 9, 1988, Ser. No. 161,756

Int. Cl.^{5} H01L *35/28*

U.S. Cl. 136—212 **4 Claims**



1. A thermoelectric device comprising:

(a) a substrate of thermally anisotropic material;

(b) alternatively arranged p-type and n-type conductivity material elements having first and second ends, said p-type and n-type conductivity material elements progressively increasing in size from the first ends to the second ends; and

(c) a pluality of leads attached at spaced intervals between the first and second ends of the p-type and n-type conductivity material elements for connection to a plurality of preselected dc power sources having potentials sufficient to maintain current density throughout the increasing area portions of the elements between the spaced leads whereby the heat pumping capacity increases progressively from the first ends to the second ends thereof for producing a cascading effect of a multistage thermoelectric device.

VOL
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5,022,929
SOLAR COLLECTOR

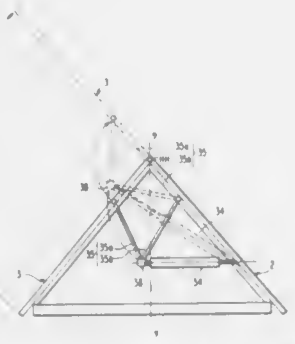
Roger Gallois-Montbrun, 11 bis, rue de Navarre, 75005 Paris, France

Filed Feb. 22, 1990, Ser. No. 483,190

Claims priority, application France, Feb. 23, 1989, 89 02329

Int. Cl.^{5} H01L *31/045*

U.S. Cl. 136—246 **5 Claims**



1. Solar collector device comprising: a roof-shaped structure (1) having elongated rectangular front and rear faces and a horizontal ridge line (HH'), said front and rear faces respectively providing support for a front panel (2) and a rear panel (3) having approximately the same dimensions as the structure (1) faces and arranged such that top longitudinal edges of said front panel and rear panel coincide with said horizontal ridge line (HH'); said front panel (2) having photovoltaic cells mounted thereon for providing a plane solar collector having a fixed inclination angle corresponding to a slope angle of the structure (1) front face;

a means for moving said roof-shaped structure (1) about a central vertical axis of rotation (VV'); a tracking mechanism for maintaining said front panel (2) facing the sun;

wherein said structure (1) further comprises a second solar collector constituted by said rear panel (3) having photovoltaic cells mounted thereon providing the same collecting surface as the solar collector mounted on the front panel (2), said rear panel (3) being independent from its supporting structure (1) rear face, and rotatable about a horizontal rotation axis coinciding with the structure (1) ridge line (HH') to which said top longitudinal edge is hinged; and orientation means operating in elevation for inclining and maintaining said rear panel (3) normal to the sun.

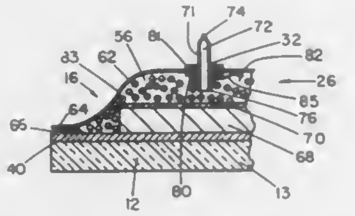
5,022,930
THIN FILM PHOTOVOLTAIC PANEL AND METHOD

Bruce Ackerman; Scot P. Albright, and John F. Jordan, all of El Paso, Tex., assignors to Photon Energy, Inc., El Paso, Tex.

Filed Jun. 20, 1989, Ser. No. 369,181

Int. Cl.^{5} H01L *31/048, 31/18*

U.S. Cl. 136—251 **42 Claims**



1. An improved stability photovoltaic panel, comprising a plurality of photovoltaic cells each having a plurality of polycrystalline thin film layers, each of the plurality of thin film layers respectively deposited on a common vitreous substrate for allowing light to pass therethrough to reach a photovoltaic hetrojunciton formed by at least two of the plurlaity of thin film layers, at least one of the film layrs forming the photovoltaic heterojunction for each of the plurlaity of photovoltaic cells, each of the photovoltaic cells lying within a plane substantially parallel to an interior planar surface of the vitreous substrate, each of the photovoltaic cells being connected electrically in series to pass electrical current from the photovoltaic panel, a pliable sheet material backcap opposite the vitreous substrate with respect to the plurality of photovoltaic cells and spaced from the plurality of photovoltaic cells so as to form a substantially planar spacing between the plurality of photovoltaic cells and an interior surface of the sheet material backcap, a perimeter portion of the sheet material backcap having a bend for positioning an edge strip of the sheet material backcap spaced from the interior surface of the backcap to form the planar spacing, the edge strip forming a planar surface parallel with an sealingly engaging the vitreous substrate for forming a fluid-tight seal with the vitreous substrate about the perimeter of the plurality of photovoltaic cells for protecting the plurality of photovoltaic cells from elements exterior of the photovoltaic panel, and a selected desiccant filling substantially the planar spacing for preventing water vapor within the planar spacing from adversely affecting the plurality of photovoltaic cells.

5,022,931
PROCESS FOR HOT WORKING ARTICLE DEFINING HOLE AT THE CENTER THEREOF

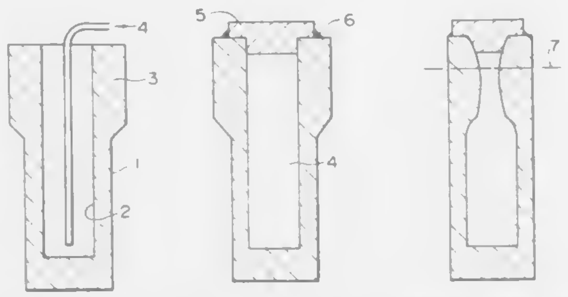
Hiroshi Iida, Kiyose, Japan, assignor to Sumitomo Heavy Industries, Tokyo and Sumitomo Precision Products, Co., Amagasaki, both of, Japan

Filed Apr. 3, 1990, Ser. No. 503,592

Claims priority, application Japan, Nov. 10, 1989, 1-291288

Int. Cl.^{5} C21D *7/13*

U.S. Cl. 148—12 R **3 Claims**



1. A process for hot working an article defining a hole at the center thereof from a tubular material which has a hole being open at one end of the material and closed at the other end of the material, the hot working process comprising the steps of:

injecting an inert gas through said open end into the hole; then

fastening a cap to said open end to seal the hole;

heating the tubular material the hole of which has been filled with the inert gas; then

hot working the tubular material; then separating said end to which the cap has been fastened from the reminder of the tubular material.

5,022,932
RAPID SOLIDIFICATION OF METAL-METAL COMPOSITES HAVING AG, AU OR CU ATRIX

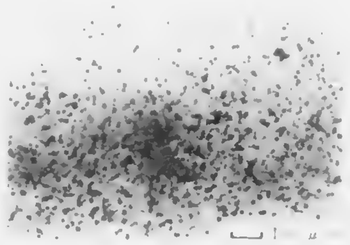
Shuji Yamada; Koji Tsuji; Yoshinobu Takegawa, all of Kadoma; Akira Tanimura, Amagasaki; Akira Menju, Amagasaki, and Nobuyoshi Yano, Amagasaki, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka and Unitika, Ltd., Hyogo, both of, Japan

Division of Ser. No. 171,700, Mar. 22, 1988, Pat. No. 4,911,769. This application Jan. 22, 1990, Ser. No. 468,210

Claims priority, application Japan, Mar. 25, 1987, 62-70683; Mar. 25, 1987, 62-70694

Int. Cl.^{5} C22C *9/00*

U.S. Cl. 148—13.1 **9 Claims**



1. A method for manufacturing a strengthened composite conductive material, comprising:

forming a melt of a matrix metal selected from the group consisting of gold, silver and copper and at least a second metal, the second metal being solid insoluble with the matrix metal at ambient temperature and being in admixture with the matrix metal in an amount of from 0.5 to 20 wt% of the melt weight;

dispersing the second metal in the melt; and

rapidly cooling and solidifying the melt by atomization and forming uniformly distributed particles of the second metal in the matrix metal, the particles being from 0.1 μm to less than 1 μm in size.

5,022,933
PROCESS FOR ANNEALING BORON-CONTAINING STEELS AND PRODUCT THEREOF

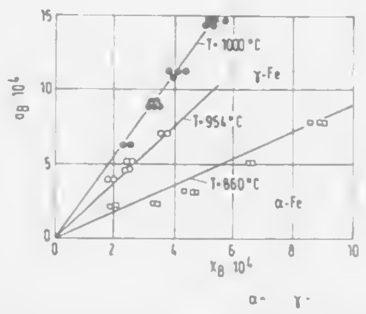
Helmut Brandis; Bernd Huchtemann; Peter Schuler, and Dietrich Werner, all of Krefeld, Fed. Rep. of Germany, assignors to Thyssen Edelstahlwerke AG, Krefeld, Fed. Rep. of Germany

Filed Oct. 16, 1989, Ser. No. 421,590

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1988, 3836102; May 26, 1989, 3917071

Int. Cl.^{5} C21D *1/26*

U.S. Cl. 148—16 **6 Claims**



1. In a process for the annealing of steel products having boron contents of up to 200 ppm in the temperature range between 850° and 1050° C., the improvement in which the products are subjected to annealing in a state of equilibrium in a non-oxidizing gaseous atmosphere which has a boron potential supplied by a pulverulent boron oxide (B_2O_3) source having a value such that the products retain or absorb their boron content.

5,022,934
HEAT TREATING A METALLIC WORKPIECE IN A FLUIDIZED BED

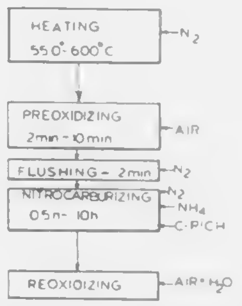
Ewald Schwing, Neukirchen-Vluyn; Peter Sommer, and Horst Uhrner, both of Issum, all of Fed. Rep. of Germany, assignors to Ewald Schwing, Neukirchen-Vlyn and Horst Uhrner, Issum, both of, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 405,412, Sep. 11, 1989, abandoned, continuation of Ser. No. 167,564, Mar. 14, 1988, abandoned. This application Jan. 16, 1990, Ser. No. 465,736

Claims priority, application Fed. Rep. of Germany, May 30, 1987, 3718240

Int. Cl.^{5} C21D *1/53*

U.S. Cl. 148—16.5 **3 Claims**



1. A process for heat treating a metallic workpiece comprising the steps of:

a) heating the metallic workpiece in a gas stream fluidized bed made from a plurality of refractory particles for 2 min to 10 min under an inert-gas atmosphere to a treatment temperature of from about 500° to 560° C.;

b) thereafter oxidizing the heated workpiece with an oxidizing gas stream in the fluidized bed;

c) thereafter flushing the fluidized bed with an inert gas and thereby terminating any oxidation therein;

d) thereafter nitrocarburizing the oxidized and heated workpiece by contacting it for between 0.5 h and 10 h in the fluidized bed with a gas mixture composed of nitrogen, ammonia, and a carbon-rich gas; and

e) varying the composition of the gas mixture during step d) from a starting composition of about 75% to 40% by volume of ammonia and from about 20% to 55% by volume nitrogen with the balance being propane or natural gas by reducting the ammonia partial volume in a series of steps at intervals from 10 min top 60 min and increasing the nitrogen partial volume component complementarily such that the partial volume component of the carbon-rich gas is kept constant during step d) to an ending composition of from about 10% to 30% by volume ammonia, whereby the workpiece surface is left substantially free of pores.

5,022,935
DEOXIDATION OF A REFRACTORY METAL

Richard L. Fisher, Warren, Ohio, assignor to RMI Titanium Company, Niles, Ohio

Continuation-in-part of Ser. No. 248,227, Sep. 23, 1988, Pat. No. 4,923,531. This application Feb. 22, 1990, Ser. No. 483,234

Int. Cl.^{5} C21D *1/00*

U.S. Cl. 148—126.1 **46 Claims**

1. A process for the deoxidation of an oxidized refractory metal comprising:

contacting a refractory metal containing oxygen in minor concentration with a metallic deoxidant in a dry inert atmosphere;

heating said contacted refractory metal and metallic mixture

VOL
1127
ISS
2
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11
1991
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to at least liquefy said metal mixture and at least partially deoxidize said refractory metal;
cooling said liquified metallic deoxidant and said deoxidized refractory metal; and
removing contaminants from the surface of said deoxidized refractory metal.

5,022,936

METHOD FOR IMPROVING PROPERTY OF WELD OF AUSTENITIC STAINLESS STEEL

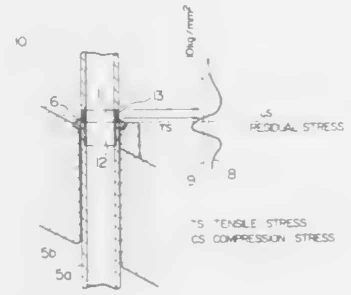
Hiroshi Tsujimura; Yasumasa Tamai; Hideyo Saito, and Masahiro Kobayashi, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 4, 1989, Ser. No. 445,535

Claims priority, application Japan, Dec. 7, 1988, 63-307853

Int. Cl.⁵ C21D *9/08, 8/10*

U.S. Cl. 148—135 **4 Claims**



1. A method for improving a property of a weld of a structure made of an austenitic stainless steel intended to be brought into contact with a corrosive fluid on both of opposed surfaces, at a region having been affected by welding heat, comprising the steps of:
cooling said thermally affected region on one of said opposed surfaces; and
simultaneously with said cooling step, applying a melting treatment to the other surface, thereby changing micro structure of the portion to be treated into a micro structure containing delta (δ) ferrite and having superior corrosion resistant property.

5,022,937

COLORED ZINC COATING

Masatoshi Tomita; Susumu Yamamoto, both of Kurobe; Chikara Tominaga, Tokyo, and Kazuya Nakayama, Kurobe, all of Japan, assignors to Nippon Mining Co., Ltd., Tokyo and Nikko Aen Kabusbiki Kaisba, Toyama, both of, Japan

Filed Nov. 3, 1987, Ser. No. 116,613

Claims priority, application Japan, Nov. 21, 1986, 61-278171; Nov. 21, 1986, 61-278172; Nov. 21, 1986, 61-278173; Nov. 21, 1986, 61-278174; Nov. 21, 1986, 61-278175; Nov. 21, 1986, 61-278176; Nov. 21, 1986, 61-278177; Apr. 1, 1987, 62-80500; Apr. 1, 1987, 62-80501; Apr. 3, 1987, 62-81059; Apr. 3, 1987, 62-81060; Apr 3, 1987, 62-81061; Apr. 3, 1987, 62-81062; Apr. 3, 1987, 62-81063

Int. Cl.⁵ C23C *8/00*

U.S. Cl. 148—277 **6 Claims**

1. A method of forming a colored zinc coating on an iron or steel surface characterized in that using a galvanizing zinc alloy containing 0.15–0.5 wt % Ti, said iron or steel surface is coated in a hot-dipping bath of said alloy at a bath temperature of 450–470° C., the coated surface is allowed to cool in the air for 5–20 seconds, and thereafter cooled with cold or warm water to form a golden colored coating.

5,022,938

METHOD FOR PREPARING CORROSION-RESISTANT ZINC-COBALT SURFACES

Walter J. Wieczerniak, Utica, Mich., assignor to OMI International Corporation, Warren, Mich.

Filed Jul. 31, 1989, Ser. No. 385,562

Int. Cl.⁵ C23C *23/26*

U.S. Cl. 148—267 **15 Claims**

1. A method for providing a corrosion-resistant coating on a zinc-cobalt alloy surface, comprising contacting said surface with an aqueous hexavalent-chromium-containing treatment solution comprising:
(a) about 2 to about 40 g/l of CrO_3;
(b) 0 to about 25 g/l of dichromate ion; wherein the total Cr^{+6} is in the range of about 1 to about 35 g/l;
(c) about 0.5 to about 20 g/l of NH_4^+;
(d) about 5 to about 30 g/l of formate ion;
(e) about 2 to about 25 g/l of Cl^-; wherein said treatment solution has a pH in the range of about 0.8 to about 2.5 and is substantially-free of sulfate, chlorate and nitrate.

5,022,939

PERMANENT MAGNETS

Koichi Yajima, Urawa; Osamu Kohmoto, Ichikawa, and Tetsuhito Yoneyama, Narashino, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed May 2, 1989, Ser. No. 346,457

Claims priority, application Japan, Jul. 30, 1987, 62-191380; Oct. 14, 1987, 62-259373; Jan. 30, 1989, 1-20093; Jan. 30, 1989, 1-20094

Int. Cl.⁵ H01F *1/053*

U.S. Cl. 148—302 **22 Claims**

1. A permanent magnet material which is prepared by rapid quenching from a molten alloy having a composition represented by the formula:

$$R_xT_{(100-x-y-z-w)}B_yM_zNi_w$$

wherein R is at least one member selected from the rare earth elements including Y,
T is Fe or a mixture of Fe and Co,
M is at least one member selected from the group consisting of T, V, Cr, Zr, Nb, Hf, Ta and W,
letters x,y,z, and w represent atom percents of the corresponding elements and have positive values with the proviso that w can be equal to zero,

$$5.5 \leq x < 11.76,$$

$$2 \leq y < 15,$$

$$0 < z \leq 15, \text{ and}$$

$$0 < z+w \leq 30,$$

and consisting essentially of a primary phase of substantially tetragonal grain structure and at least one auxiliary phase selected from amorphous and crystalline R-poor auxiliary phases, said auxiliary phase being present as a grain boundary layer, the atomic ratio of the R content of the auxiliary phase to that of the primary phase being up to 9/10.

5,022,940

PROCESS OF MAKING A DRIP IRRIGATION CONDUIT

Raphael Mehoudar, Tel Aviv, Israel, assignor to Hydro-Plan Engineering Ltd., Israel

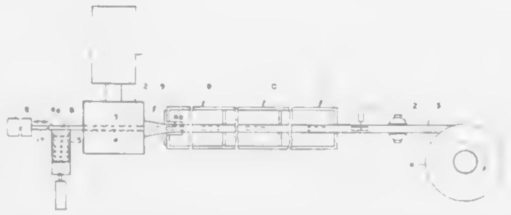
Continuation of Ser. No. 211,372, Jun. 24, 1988, abandoned. This application Sep. 26, 1989, Ser. No. 412,889

Claims priority, application Israel, May 30, 1988, 86549

Int. Cl.⁵ B29C *47/02, 47/92;* **B32B** *31/18*

U.S. Cl. 156—64 **3 Claims**

1. A process for producing a drip irrigation conduit having a transverse peripheral extent and having internally heat welded emitter units, each emitter unit having a welded area which has a transverse, peripheral extent which is not greater than half the transverse peripheral extent of the conduit, comprising the steps of:
continuously extruding an irrigation conduit from an extrusion cross head at a first outer diameter and a first linear velocity;
passing the extruded conduit through an intermediate zone following said extrusion cross head and into a succeeding calibrator unit so as to be drawn down to a second outer diameter which is less than the first outer diameter and so as to have a second linear velocity greater than the first linear velocity;
supporting said emitter units over a support region coaxial with the extruded conduit and extending from a first end of said support region within the extruder cross-head to an opposite end thereof within the calibrator unit;



successively accelerating said supported emitter units so as to attain an emitter unit linear velocity substantially equal to said second linear velocity;
displacing each supported emitter unit at said emitter unit linear velocity into contact with said extruded conduit where the conduit has substantially attained said second linear velocity;
displacing each supported emitter unit at said emitter unit linear velocity in contact with the extruded conduit until the emitter unit is internally heat welded to the conduit at substantially said opposite end;
cooling the extruded conduit and internally heat welded emitter units;
successively determining the location of the heat welded emitter units in the conduit; and
aperturing the conduit so as to form respective drip outlets for the emitter units.

5,022,941

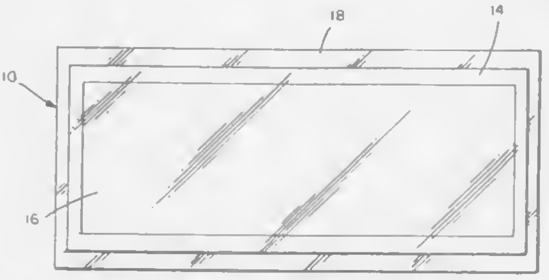
CLOSURE DEVICE FOR SHRINKWRAPS

Anthony J. Doheny, Jr., Natick, and James R. Noonan, Watertown, both of Mass., assignors to The Kendall Company, Lexington, Mass.

Division of Ser. No. 318,863, Mar. 6, 1989, Pat. No. 4,961,978. This application Dec. 26, 1989, Ser. No. 456,719

Int. Cl.⁵ B32B *31/26*

U.S. Cl. 156—85 **9 Claims**



1. A method for protecting a pipeline comprising the steps of:
(a) wrapping a heat-shrinkable film around the surface of a portion of pipeline;
(b) overlapping the longitudinal edges of the heat-shrinkable film;
(c) applying a closure device comprising:
  (i) a polyimide backing layer;
  (ii) a silicone based adhesive applied to one surface of said backing layer; and
  (iii) a polyolefinic heat-shrinkable film dimensionally smaller than said silicone adhesive layer, applied to said adhesive layer so as to maintain a peripheral area of exposed silicone adhesive;
over the overlapped edges of the heat shrinkable film;
(d) applying heat to said closure until said closure heat-shrinkable film and the underlying heat shrinkable film are fused together.

5,022,942

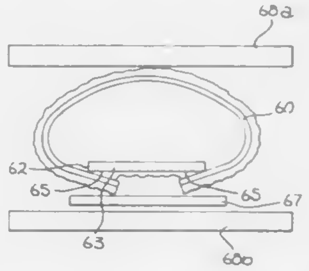
METHOD OF MAKING TEXTURED SURFACE PROSTHESIS IMPLANTS

John Y. J. Yan, and Bobby K. Purkait, both of Santa Barbara, Calif., assignors to Mentor Corporation, Goleta, Calif.

Division of Ser. No. 54,607, May 27, 1987, abandoned. This application Jun. 5, 1989, Ser. No. 361,140

Int. Cl.⁵ B29C *41/00*

U.S. Cl. 156—219 **20 Claims**



1. A process for making a textured surgical implant comprising:
providing a smooth surface prosthesis shell having an exterior surface;
disposing said shell on a substantially round disc-shaped mounting means, said mounting means having a first side and a second side, and wherein said shell is substantially disposed on said first side of said disk;
disposing a formable, biocompatible material over said shell at least a portion of said exterior surface;
providing a texturizing means;
disposing said texturizing means over said formable, biocompatible material thereby imprinting said material to form a textured surface thereon;
removing said texturing means from said textured material;
curing said textured material to form a textured shell;
patching said shell;
filling said shell with a filler material; and
patching said filled shell to retain said filler material in said shell.

5,022,943

METHOD OF MAKING THERMOFORMABLY SHAPED FIBREBOARD SANDWICH STRUCTURES

Harold H. Zaima, Birmingham, Mich., assignor to Eften, Inc., Farmington Hills, Mich.

Filed Aug. 25, 1989, Ser. No. 398,543

Int. Cl.⁵ B32B *31/20*

U.S. Cl. 156—222 **3 Claims**

1. A method of manufacturing a rigid shaped panel comprising:
providing an open-cell paper core layer having a plurality of cells defined by cell walls extending substantially perpendicularly to opposite sides of the core layer;
covering one side of the core layer with a first paper liner-

VOL
1127
ISS
2
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11
1991
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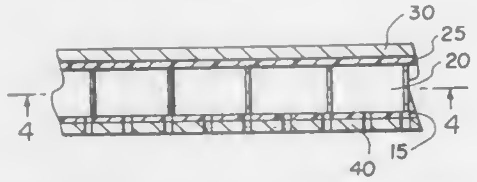
board which extends substantially perpendicularly to the cell walls of the core layer;

covering an opposite side of the core layer with a second paper linerboard which extends substantially perpendicularly to the cell walls of the core layer;

providing a layer of thermoplastic resin between each of the linerboards and the core layer;

pre-bonding the first linerboard to the core layer through the layer of thermoplastic resin between the first linerboard and the core layer, using heat, the second linerboard remaining unbonded to the core layer but covering the core layer with the layer of thermoplastic resin between the second linerboard and the core layer, the first linerboard, core layer and second linerboard remaining planar;



subsequently to the pre-bonding, reheating and shaping the first linerboard, the core layer, the layers of thermoplastic resin and the second linerboard into a shaped panel, in a mold, the reheating causing the layer of thermoplastic resin which pre-bonded the first linerboard to the core layer to melt for allowing the first linerboard to slip with respect to the core layer during shaping of the panel;

one of said first and second linerboards being perforated and the other of said first and second linerboards being imperforate; and

allowing the shaped panel to cool to bond the linerboards to the core layer and to form a rigid shaped panel.

5,022,944

IN-LINE EXTRUSION COATABLE POLYESTER FILM HAVING AN AMINOFUNCTIONAL SILANE PRIMER

Howard W. Swofford, Taylors; Sandra W. Rice, Greer; Grover L. Farrar, Greenville, all of S.C., and David Rudd, Naples, N.C., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Division of Ser. No. 366,051, Jun. 13, 1989, Pat. No. 4,954,396, which is a continuation-in-part of Ser. No. 240,701, Sep. 6, 1988, Pat. No. 4,939,035. This application Apr. 2, 1990, Ser. No. 502,964

Int. Cl.^{5} B29C *47/06*

U.S. Cl. 156—244.11 2 Claims

1. A method of preparing a polyester film having a primer coating composition comprising the steps of:

(a) extruding a substantially amorphous polyester melt into a film;

(b) orienting said film by stretching it sequentially in one or more directions;

(c) coating said film with a primer coating prior to said stretching, or subsequent to stretching in one direction but prior to stretching in a mutually perpendicular direction, or subsequent to stretching in two directions; and

(d) heat setting said film, wherein said primer coating composition comprises the dried residue of a hydrolyzed aminosilane compound having the formula in the unhydrolyzed state:

$$(R^1)_aSi(R^2)_b(R^1)_c$$

wherein R^1 is a functional group with at least one primary amino group, R^2 is a hydrolyzeable group selected from the group consisting of a lower alkoxy group having 1–8 carbon atoms, C_1 to C_8, an acetoxy group, or a halide group, and R^3 is a nonreactive, nonhydrolyzeable group selected from the group consisting of a lower alkyl having 1–8 carbon atoms, or a phenyl group; with (a) being greater than or equal to 1; (b) being greater than or equal to 1; (c) being greater than or equal to zero, and with $a+b+c=4$, said primer coating composition being applied in-line to said polyester film at a weight effective to improve the adhesion of one or more extrusion coated polymers to said polyester film.

5,022,945

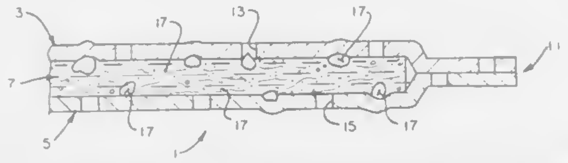
METHOD FOR CONSTRUCTING ABSORBENT PAD

John C. Rhodes, Washington, Mo.; Ronald R. Aljoe, Lewisville, Tex., and Berne F. Ellers, Orkelejunga, Sweden, assignors to Clean-Pak, Inc., St. Louis, Mo. and Dry Forming Processes AB, Orkelljunga, Sweden

Division of Ser. No. 246,155, Sep. 19, 1988, Pat. No. 4,940,621. This application Feb. 20, 1990, Ser. No. 481,637

Int. Cl.^{5} B32B *31/06, 31/18*

U.S. Cl. 156—253 5 Claims



1. The method of constructing an absorbent pad for meat and poultry products and the like, comprising the steps of:

forming upper and lower plastic film layers at least one of which is perforated,

positioning said film layers in spaced relationship to one another;

forming an absorbent material layer with a series of juxtaposed and overlapping absorbent material fibers which are secured to adjacent absorbent material fibers to provide a plurality of interacting structurally supported fibers with spaced interstices therethrough;

homogeneously dispersing superabsorbent granules throughout said absorbent layer;

supporting and physically retaining said superabsorbent granules in place against movement within said absorbent material layer by said interacting structurally supported fibers of said absorbent layer;

positioning the thus constructed absorbent layer between said upper and lower film layers;

moving said layers into assembled proximity to one another; and

attaching marginal edges of said upper and lower layers at least partially along circumferential portions thereof to retain said absorbent layer therebetween.

5,022,946

PADDED TOILET SEAT LID

John M. Stewart, Ontario, Canada, assignor to Sanitation Equipment Limited, Concord, Canada

Filed Feb. 7, 1990, Ser. No. 476,233

Claims priority, application Canada, Nov. 16, 1989, 2003103

Int. Cl.^{5} B32B *31/00, 31/20;* A47K *13/14*

U.S. Cl. 156—272.4 8 Claims

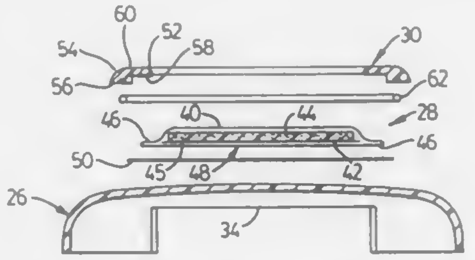
1. A method of making a padded toilet seat lid, comprising the steps of:

providing a lid having an upper surface portion made of a thermoplastic material;

providing a cushion having a peripheral margin for securing the cushion to said lid surface portion;

providing a frame which is made of a thermoplastic material and which is designed to extend around said margin of the cushion for securing the cushion to said lid portion, said frame having inner and outer parts for overlying respectively said peripheral margin of the cushion and a surrounding part of said lid surface portion, said outer part of the frame being adapted to be sealed to said lid surface portion and having a lower surface provided with a groove for receiving a sealing strip, and said inner frame part being adapted to hold the cushion against said lid surface portion when the outer frame part is sealed to the lid;

providing said sealing strip which is adapted to be received in said groove for sealing said outer frame part to said lid surface portion, the strip comprising a thermoplastic material which is capable of fusing with said lid surface portion and said frame and which has magnetically excitable particles dispersed therein;



assembling said lid, cushion, frame and sealing strip in their intended final relative positions; and,

following said assembly step, subjecting said sealing strip to the effect of a high frequency magnetic field having characteristics selected to excite said particles in the sealing strip to an extent sufficient to cause said strip to fuse with said lid surface portion and frame.

5,022,947

METHOD FOR THE PREPARATION OF A WATER-RESISTANT PRINTED MATERIAL

Masamitsu Hasegawa; Satoshi Tamura; Isao Sugiyama, and Takashi Wakashima, all of Saitama, Japan, assignors to Shin-Etsu Polymer Co., Ltd., Tokyo, Japan

Division of Ser. No. 266,944, Nov. 3, 1988, Pat. No. 4,966,804. This application Jun. 5, 1990, Ser. No. 533,493

Claims priority, application Japan, Nov. 30, 1987, 62-301776

Int. Cl.^{5} B32B *31/20;* B05D *1/02, 5/00*

U.S. Cl. 156—277 8 Claims

1. A method for the preparation of a water-resistant printed material which comprises the steps of:

(A) coating the surface of a base sheet material, of which at least the surface layer has no or little capacity of absorbing water, with a coating composition comprising a water-absorptive resinous polymer to form a printable sheet material having a water-absorptive coating layer;

(B) forming a dot-wise printed image in said coating layer using an aqueous ink containing a water-soluble coloring material by the method ink-jet printing;

(C) overcoating the surface of the printed sheet material after printing by the ink-jet printing method with a curable polyisocyanate compound; and

(D) curing the polyisocyanate compound.

5,022,948

METHOD OF BONDING LAYERS USING DISCRETE AREAS OF ADHESIVE

Gerald Hallworth, Ramsbottom, England, assignor to The Dow Chemical Company, Midland, Mich.

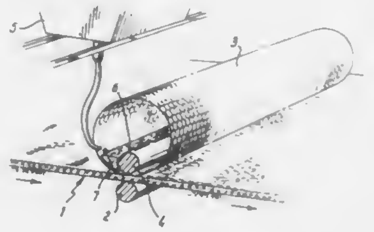
Continuation-in-part of Ser. No. 128,080, Dec. 3, 1987, which is a continuation of Ser. No. 828,528, Feb. 12, 1986, Pat. No. 4,752,510. This application Jun. 14, 1989, Ser. No. 365,814

Claims priority, application United Kingdom, Jun. 16, 1988, 8814282; Nov. 4, 1988, 8825868

The portion of the term of this patent subsequent to Dec. 18, 2007, has been disclaimed.

Int. Cl.^{5} B32B *31/12*

U.S. Cl. 156—291 7 Claims



1. A method of bonding a backing material layer to a substrate layerin the manufacture of carpeting wherein discrete areas of adhesive are applied to one side of one of said layers, and said side is pressed into contact with the other of said layers thereby to cause said layers to be bonded together, wherein said discrete areas of adhesive are applied to said one side of said one layer with apparatus comprising a roller having a perforated outer wall, the said one layer being moved in contact with or in close proximity to the roller, fluent adhesive material being provided in the interior of the perforated roller, and the roller being moved relative to an abutment which is in contact with or in close proximity to the inner surface of the roller so that said adhesive material is displace through the perforated wall of the roller and is deposited therefrom onto the said one layer.

5,022,949

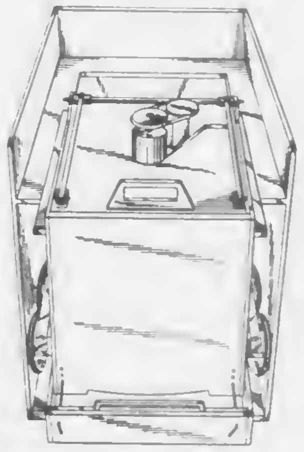
VARIABLE VOLUME ETCHING MACHINE

James Jengo, U.S. Postal Service, 30th St. & Palisade Ave., Union City, N.J. 07087-0081

Filed Oct. 4, 1990, Ser. No. 592,858

Int. Cl.^{5} C23F *1/02*

U.S. Cl. 156—345 18 Claims



1. An etching machine comprising:

an upper frame member having side members connected together to define an etching chamber therein, said upper frame member having open top and bottom sections;

VOL
1127
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1991
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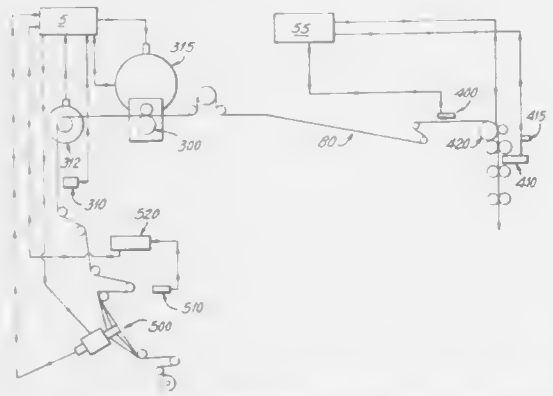
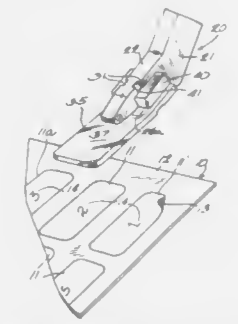
a cover plate, movable between a first closed position wherein said top section is closed and said cover plate rests on said upper frame member, to a second open position wherein said top section is open to expose said etching chamber;
a motive transmission means, connected to a rotatable drive shaft passing through an aperture in said cover plate so that in use activation of said motive transmission means causes rotation of said rotatable drive shaft;
an etching plate holder within said etching chamber, and connected to said rotatable drive shaft, so that rotation of said rotatable drive shaft causes rotation of said etching plate holder;
an adjustable clamping means connected to said etching plate holder to secure an etching plate to said etching plate holder;
splashing means within said etching chamber for engaging a supply of mordant within said etching machine and splashing said mordant onto said etching plate as said etching plate is being rotated;
a lower tank member for holding said supply of mordant and having an open top portion so in use said lower tank section is in fluid communication with said upper frame member and said splash means; and
adjusting means engaging said upper frame member and said lower tank member so that said upper frame member and said lower tank member can be moved along an upright axis with respect to each other so that the volume of mordant within the etching machine, relative to said splashing means, is adjustable according to the mordant requirements for a particular etching plate.

5,022,950
ON-LINE EMBOSSING APPARATUS FOR A LABELING MACHINE
John L. Ingalls, Richmond; Reiner G. Brinker, Mechanicsville, and Jesse L. Hawkins, Jr., Richmond, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.
Filed Jul. 17, 1989, Ser. No. 381,116
Int. Cl.^{5} B32B *31/00*
U.S. Cl. 156—361 **27 Claims**



1. An apparatus for embossing and cutting printed labels, comprising:
a feed means for feeding a sheet of printed labels through said apparatus;
an embossing means located upstream of said feed means for embossing each printed label of said sheet of printed labels;
a sensing means located between said embossing means and said feed means for sensing the location of a registration mark on each printed label of said sheet of printed labels;
a cutting means located downstream of said feed means for cutting each printed label from said sheet of printed labels; and
a control means for controlling the feed rate of said sheet of printed labels to said embossing means and to said cutting means, wherein said control means receives data from said sensing means based on the location of said registration mark and data from said cutting means based on the speed and phase of said cutting means to thereby control said feed means and ensure that each printed label is embossed within specified tolerances at a specific location and each printed label is cut from said sheet within specified tolerances at a specific location.

5,022,951
LABEL REMOVAL AND APPLICATOR HAND TOOL
Robert F. Behlmer, Wauwatosa; Robert L. Schanke, New Berlin, and Robert G. DeSmidt, Cedar Grove, all of Wis., assignors to W. H. Brady Co., Milwaukee, Wis.
Filed Sep. 19, 1989, Ser. No. 411,067
Int. Cl.^{5} B32B *31/00*
U.S. Cl. 156—379 **4 Claims**

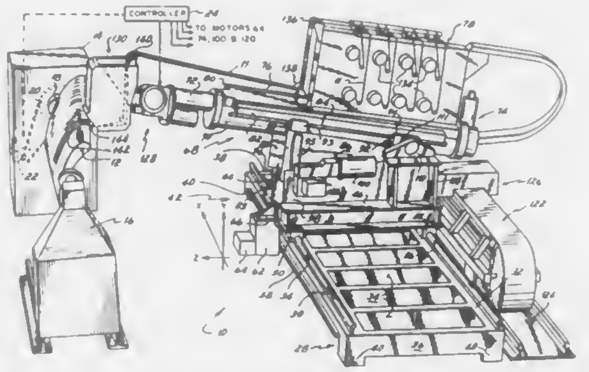


1. A removal and applicator tool for removing adhesive labels carried on a liner and applying the labels to an object comprising, in combination:
a handle, a foot member extending from the handle and including a lower element spaced from an upper element, the lower element having a leading edge portion, and a label retainer-wiper plate secured between the upper element and lower element of the foot member, the label retainer-wiper plate including a retainer panel between the upper and lower elements of the foot member and a wiper panel extending beyond the leading edge portion of the foot member, the plate being movable between a first position in which the retainer panel is in contact with the lower element to retain a label therebetween and a second position in which at least a portion of the retainer panel is out of contact with the lower element for removing a label from a liner and for application of a label to an object with the tool.

5,022,952
FIBER PLACEMENT MACHINE
Milo M. Vaniglia, Southgate, Ky., assignor to Cincinnati Milacron Inc., Cincinnati, Ohio
Continuation-in-part of Ser. No. 808,911, Dec. 13, 1985, Pat. No. 4,907,754. This application Dec. 4, 1989, Ser. No. 445,583
The portion of the term of this patent subsequent to Mar. 13, 2007, has been disclaimed.
Int. Cl.^{5} B43M *3/00*
U.S. Cl. 156—441 **10 Claims**

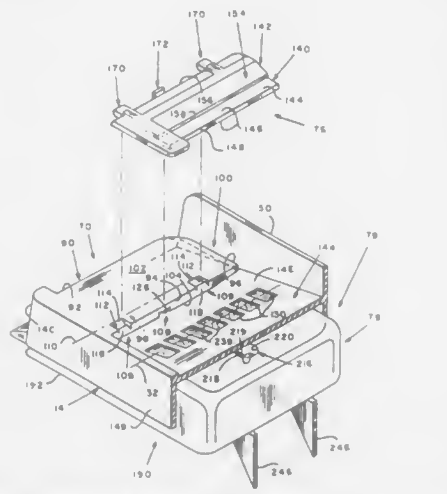
3. A fiber placement machine, comprising:
a base support having a substantially horizontally extending, longitudinal axis;
a carriage mounted to said base support;
means for moving said carriage along said longitudinal axis of said base support;
a cross slide mounted to said carriage and movable therewith along said longitudinal axis of said base support;
means for selectively and actively tilting said cross slide with respect to said carriage in a reversible, substantially vertical direction about a pivot axis which is substantially parallel to said longitudinal axis;

means for moving said cross slide with respect to said carriage in a transverse direction which is substantially perpendicular to said longitudinal axis of said base support and substantially perpendicular to said vertical direction;
a multi-axis manipulator mounted to said cross slide and movable therewith;
a fiber placement head carried by said multi-axis manipulator, said multi-axis manipulator including means for moving said fiber placement head along multiple axes relative to the surface of a mandrel;



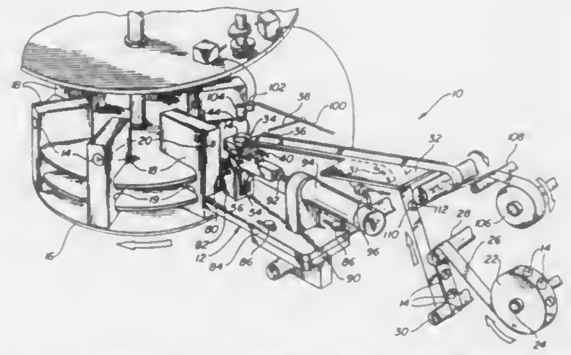
fiber tow supply means carried by said cross slide for supplying a number of individual fiber tows at independent rates to said fiber placement head, said fiber placement head being effective to lay down the fiber tows side-by-side upon the surface of the mandrel to form a fiber band and to compact the fiber band against the surface;
fiber tow guide means associated with said fiber tow supply means and said fiber placement head for maintaining substantially continuous alignment of said fiber tow supply means and said fiber placement head as said fiber placement head is moved by said multi-axis manipulator with respect to said fiber tow supply means.

5,022,953
MOISTURE APPLYING APPARATUS HAVING A REMOVABLE MOISTURE APPLICATOR
Arnold Fassman, Westport, and John R. Nobile, Fairfield, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.
Filed May 19, 1989, Ser. No. 354,064
Int. Cl.^{5} B43M *5/00, 11/00*
U.S. Cl. 156—441.5 **7 Claims**



1. Moisture applying apparatus comprising:
(a) a piece-part made of a resilient plastic material, the piece-part including a generally rectangularly-shaped upper wall portion having a longitudinally-extending side edge, said piece-apart including first and second longitudinally-extending lower wall portions depending from said upper wall portion, said lower wall portions converging towards one another and defining a longitudinally-extending channel which is generally U-shaped in transverse cross-section and has a longitudinally-extending opening thereinto, said upper wall portion including a substantially flat upper surface area;
(b) the piece-part including at least one elongate upper hinge segment transversely-extending from said side edge, said at least one upper hinge segment including a first lower longitudinally-extending surface which is convexly-shaped in transverse cross-section and transversely extends from said side edge, said at least one upper hinge segment including a second lower longitudinally-extending surface which is inclined upwardly in transverse cross-section and transversely extends from said first lower surface, said second lower surface inclined at an angle of twenty degrees relative to said flat upper surface area;
(c) said piece-apart including at least one elongate lower hinge segment transversely-extending from said side edge, said at least one lower hinge segment including an upper longitudinally-extending surface which is concavely-shaped in transverse cross-section and transversely extends from said side edge; and
(d) means removably connected to said piece part and depending therefrom, said removably connected means including a generally rectangularly-shaped moisture applicator pad made of a wicking material, the pad including a longitudinally-extending marginal portion, said removably connected means including an elongate base portion connected to said marginal portion, said base portion removably mounted within said channel, and said pad depending through said channel opening from said base portion.

5,022,954
APPARATUS FOR APPLYING LABELS TO CONTAINERS
Frederick A. Plaessmann, Edison, N.J., assignor to Seal Spout Corporation, Liberty Corner, N.J.
Filed Oct. 4, 1989, Ser. No. 416,857
Int. Cl.^{5} B65C *9/18, 9/14*
U.S. Cl. 156—542 **32 Claims**



19. An apparatus for sequentially applying a label to a surface of each of a plurality of containers comprising:
an indexing table having means for removably holding a plurality of containers whereby a surface thereof is substantially vertical and sequentially conveying each container to a label applying station;
means for feeding a continuous web to the label applying station, the label applying station comprising a label receiving station and an associated cam surface and pivoting pin the web having a plurality of labels removably dis-

VOL
1127
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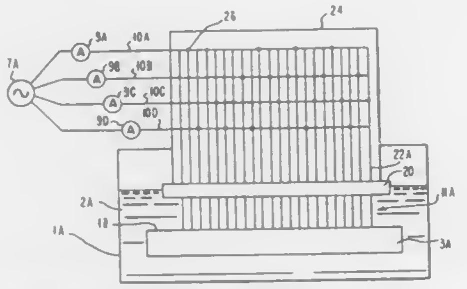
posed thereon, each label having a surface with an adhesive thereon;
means for removing a label from the web at the label applying station and depositing the label, adhesive side exposed, on a substantially horizontal label receiving station;
wherein the means for removing the label includes a peeling edge proximate to the label receiving station wherein the web is directed toward the label receiving station on one side of the edge, directed over the edge, and directed away from the label receiving station on the other side of the edge, whereby the label is removed from the web by the edge and deposited on the label receiving station;
piston means acting on the label applying station causing the cam surface to pivot about the pivoting pin to thereby position the substantially horizontal label receiving station to a substantially vertical position whereby the label is parallel to the substantially vertical surface of the container to which the label is to be applied;
piston mans extending the applying station to thereby position the label in contact with the surface of the container enabling the adhesive surface to adhere to the container surface;
means for repositioning and retracting the label receiving station to a substantially horizontal position to permit the depositing of another label from the web to the label receiving station;
wherein the label receiving station comprises means for conforming the label to the surface of the container;
means for applying continuous tension to the web; and
means for taking up the web after the label is removed therefrom.

5,022,955
APPARATUS AND METHOD FOR SELF-INDUCED REPAIR OF CIRCUIT SHORTS AND NEAR-SHORTS

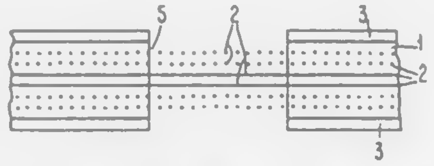
Chengjun J. Chen, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Continuation-in-part of Ser. No. 475,583, Feb. 6, 1990. This application Nov. 21, 1990, Ser. No. 617,114
Int. Cl.^{5} B44C *1/22;* **C03F** *1/02;* **C03C** *15/00;* **B23H** *3/00*
U.S. Cl. 156—627 21 Claims



13. A method for repairing electronic circuit shorts or near shorts resulting from, respectively, bridges or remnants thereof between lines comprising:
classifying the lines into four groups so that no adjacent lines belong to the same group;
providing an electrical connection means for each of said groups which electrically connects to each line in its respective group;
applying an appropriate voltage sequentially between selected parts of said electrical connection means until a voltage has been applied at least once to each said pairs, said voltage being sufficient to cause temperature of said bridges or remnants thereof to be greater than that of said lines and to cause removal of said bridges or remnants thereof.

5,022,956
PRODUCING VIAHOLES IN PLASTIC SHEETS AND APPLICATION OF THE METHOD

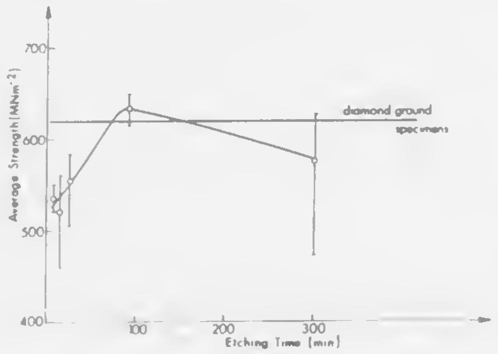
Werner Cziep, Altdorf, Fed. Rep. of Germany; Ulrich Kuenzel, San Jose, Calif., and Wolf-Dieter Rub, Sindelfingen, Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Jun. 10, 1985, Ser. No. 742,684
Claims priority, application European Pat. Off., Jul. 16, 1984, 84108324.9
Int. Cl.^{5} C03C *25/06;* **H05K** *3/00;* **H05H** *1/00*
U.S. Cl. 156—643 5 Claims



1. A method for making at least one viahole in a glass fiber reinforced epoxy resin plastic sheet, comprising:
plasma etching the plastic sheet from one or simultaneously both surfaces of the plastic sheet in an atmosphere containing CF4 and O2 at the location(s) where it is desired to make the viahole(s), to remove the plastic material and leave the glass fiver in the viahole(s).

5,022,957
ETCHING PROCESS FOR IMPROVING THE STRENGTH OF A LASER-MACHINED SILICON-BASED CERAMIC ARTICLE

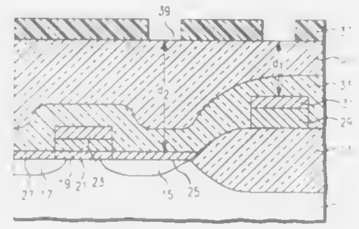
Stephen M. Copley, Palos Verdes; Hongyi Tao, Covina, and Judith A. Todd-Copley, Palos Verdes, all of Calif., assignors to University of Southern California, Los Angeles, Calif.
Filed Sep. 29, 1989, Ser. No. 414,906
Int. Cl.^{5} B44C *1/22;* **C03C** *15/00, 25/06*
U.S. Cl. 156—643 12 Claims

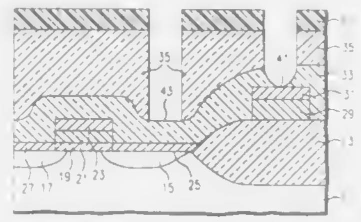


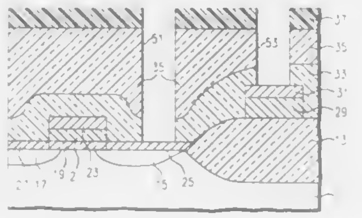
1. A process for improving the strength of a silicon-based ceramic article having a laser-machined surface, the process comprising a step of applying to the laser-machined surface an etching solution for a duration sufficient to remove substantially all of any silicon film residue on the surface but insufficient to weaken substantially the grain boundaries of the underlying silicon-based ceramic material, such that the strength of the ceramic article is substantially improved.

5,022,958
METHOD OF ETCHING FOR INTEGRATED CIRCUITS WITH PLANARIZED DIELECTRIC

David P. Favreau, Coopersburg; Jane A. Swiderski, Kunkletown, and Daniel J. Vitkavage, Zionsville, all of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.
Filed Jun. 27, 1990, Ser. No. 544,705
Int. Cl.^{5} B44C *1/22;* **C03C** *15/00, 25/06*
U.S. Cl. 156—643 8 Claims





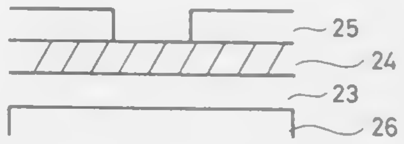


1. A method of fabricating an integrated circuit comprising the steps of:
forming a raised topographic feature upon a substrate
forming a first dielectric layer covering said raised topographic feature;
forming a second dielectric layer covering said first dielectric layer
characterized by the further steps of planarizing said second dielectric layer;
selectively etching said second dielectric layer to create at least first and second openings, said first opening being above said topographic feature and said second opening being above said substrate, said etching process stopping in said second opening in the vicinity of said first dielectric; and then
etching said first dielectric to extend said second opening to said substrate.

5,022,959
METHOD OF WET ETCHING BY USE OF PLASMA ETCHED CARBONACEOUS MASKS

Kenji Itoh, Zama, and Osamu Aoyagi, Atsugi, both of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan
Filed Aug. 11, 1989, Ser. No. 392,582
Claims priority, application Japan, Aug. 23, 1988, 63-209724
Int. Cl.^{5} H01L *21/306*
U.S. Cl. 156—643 5 Claims

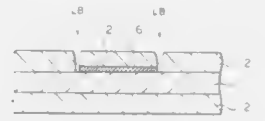
1. A method for etching a film carried on a substrate to produce a predetermined pattern in the film, comprising the steps of:
(a) placing the film-carrying substrate in a reaction chamber;
(b) introducing a reactive gas comprising a hydrocarbon and a carrier gas into the reaction chamber;
(c) inputting energy into the reaction chamber at a level sufficient to decompose the reactive gas and deposit a film of carbon atoms on the film to be patterned;
(d) removing the carbon film-containing substrate from the reaction chamber;
(e) forming an organic mask on top of the carbon film to selectively cover portions of the carbon film;
(f) returning the mask-carbon-film, film to be patterned and the carrying substrate to the reaction chamber;

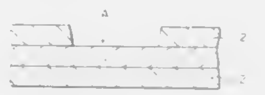


(g) introducing an etchant gas containing oxygen or an oxygen compound into the reaction chamber;
(h) activating the etchant gas to form a plasma which removes the portions of the carbon film not covered by the organic mask;
(i) removing the substrate carrying the film to be patterned, etched carbon film and the mask from the reaction chamber; and
(j) wet etching the film to be patterned in the areas not covered by the carbon film to produce said predetermined pattern in said film.

5,022,960
METHOD OF MANUFACTURING CIRCUIT BOARD FOR MOUNTING ELECTRONIC COMPONENTS

Takeshi Takeyama, and Mitsubiro Kondo, both of Oogaki, Japan, assignors to Ibiden Co., Ltd., Japan
Filed Jan. 2, 1990, Ser. No. 460,004
Claims priority, application Japan, May 1, 1989, 1-113425
Int. Cl.^{5} B44C *1/22;* **C23F** *1/02;* **C03C** *15/00, 25/06*
U.S. Cl. 156—643 3 Claims





1. A method of manufacturing a circuit board for mounting electronic components including a metal layer exposed through part of a substrate layer comprising:
disposing a mask on a part of a metal layer that will be exposed;
placing a substrate layer covering said mask on the metal layer;
uniting said substrate layer with said metal layer with said mask therebetween;
projecting a laser beam onto said substrate layer adjacent to said mask to cut away said substrate layer adjacent to said mask; and

VOL
1127
ISS
2
JE
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1991
UMI

stripping off that part of said substrate layer disposed on said mask and said mask.

5,022,961
METHOD FOR REMOVING A FILM ON A SILICON LAYER SURFACE

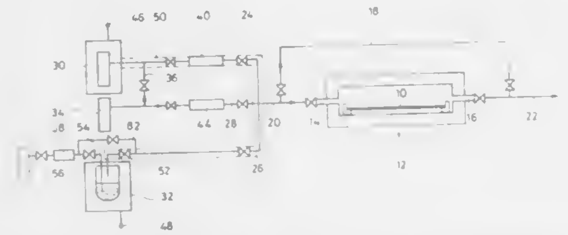
Akira Izumi; Keiji Toei; Nobuatsu Watanabe, and Yong-Bo Chong, all of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Jul. 24, 1990, Ser. No. 557,550

Claims priority, application Japan, Jul. 26, 1989, 1-195764; Oct. 14, 1989, 1-267777; Oct. 14, 1989, 1-267778

Int. Cl.^{5} B44C *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—646 20 Claims



1. A method for removing a film on a silicon layer formed on a surface of a substrate, comprising the steps of:
(a) placing said substrate in a reaction chamber to be isolated in an airtight manner from the outside air, and
(b) feeding anhydrous hydrogen fluoride and alcohol simultaneously into said reaction chamber

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5,022,962
METHOD FOR THE TREATMENT OF SPENT LIQUORS IN PULP PRODUCTION

Olli Korbonen; Juhani Orivuori, both of Helsinki, Finland, assignor to Enso-Gutzeit Oy, Helsinki, Finland

Filed Oct. 24, 1989, Ser. No. 425,902

Claims priority, application Finland, Oct. 25, 1988, 884920

Int. Cl.^{5} D21C *9/02, 11/00*

U.S. Cl. 162—29 7 Claims

1. A method for the treatment of spent liquors from wood pulp production using both a chemical process and a mechanical process selected from the group consisting of a chemical-mechanical process and a chemi-thermo-mechanical process, said method comprising introducing fresh wash water into a last pulp washing stage of a mechanical process line, advancing said wash water countercurrent to said pulp direction, transferring said wash water from a first washing stage of said mechanical process to a washing stage of said chemical process, withdrawing said wash water as spent liquor from a first washing stage of said chemical process line and treating said spent liquor by evaporation and burning.

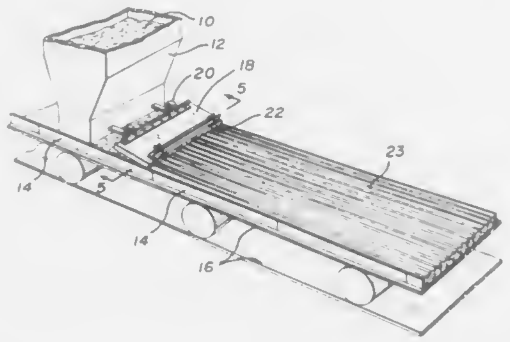
5,022,963
WET END CORRUGATING OF ACOUSTICAL TILE

William F. Porter, Lake Zurich; Michael G. Mastrogany, Mundelein, and Michael J. Porter, Hanover Park, all of Ill., assignors to USG Interiors, Inc., Chicago, Ill.

Filed Jun. 5, 1989, Ser. No. 361,891

Int. Cl.^{5} D21F *11/12*

U.S. Cl. 162—116 4 Claims



1. A method for imparting a corrugated texture to a highly fibrous mass designed to be converted into acoustical tiles comprising:
(1) forming a mineral fiber pulp in a head box, said pulp containing from about 6% to about 25% of mineral fiber by weight of the wet pulp;
(2) distributing the pulp from the head box across the breadth of a first pulp carrier means, said carrier means having a line speed of about 40 to 55 feet per minute;
(3) forcing the pulp into contact with a corrugated surface of a first, unitary texturing skid with no prior scoring of the pulp, said corrugated skid surface having grooves and being inclined at an acute angle of 30° or less at the point of contact with said pulp, and said skid having lateral ends to which pressure is applied causing the corrugated surface of the skid to become slightly concave and to register with a slightly convex surface of the pulp;
(4) maintaining said pulp in contact with said skid for about 1 to about 6 seconds;
(5) impressing a pattern in said pulp by means of said skid whereby pulp is forced into the grooves formed by the surface of the skid, with the corrugated surface of the skid being the negative of the pattern impressed in the pulp.
(6) drying the pulp having the impressed pattern retained therein; and
(7) recovering an acoustical tile material.

5,022,964
NONWOVEN FIBROUS WEB FOR TOBACCO FILTER

L. Paul Crane, Simsbury; H. Clark Lind, Enfield, both of Conn., and Martine E. Frederix, Charlotte, N.C., assignors to The Dexter Corporation, Windsor Locks, Conn. and Hoechst Celanese Corporation, Somerville, N.J.

Filed Jun. 6, 1989, Ser. No. 362,054

Int. Cl.^{5} D21F *11/12*

U.S. Cl. 162—146 12 Claims

1. A nonwoven fibrous web material for use as a filter media comprising cellulose ester fibers, cellulose ester fibrets and a minor amount of activated fusible fibers uniformly dispersed throughout the cellulose ester fibers and fibrets, said activated fusible fibers being present in an amount effective for retaining particulate material within the web material without substantially adversely affecting the filtration efficiency of the cellulose ester fibers and fibrets.

5,022,965
METHOD AND DEVICE IN A HEAD BOX OF A PAPER MACHINE FOR CONTROLLING DISTRIBUTION OF FIBER ORIENTATION IN A PAPER WEB

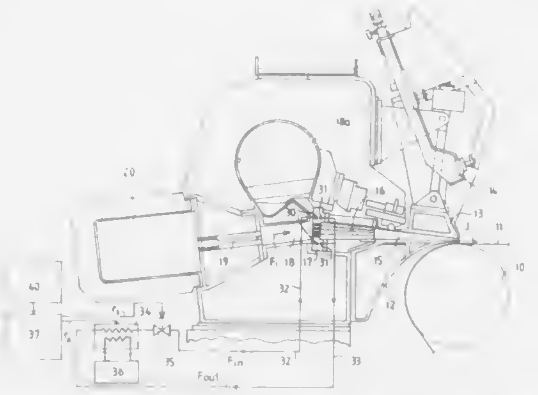
Pitkäjärvi, Jyväskylä, Finland, assignor to Valmet Paper Machinery Inc., Finland

Filed Sep. 26, 1989, Ser. No. 412,879

Claims priority, application Finland, Sep. 26, 1988, 884408

Int. Cl.^{5} D21F *1/02*

U.S. Cl. 162—192 15 Claims



1. Method in a head box of a paper machine for controlling distribution of fiber orientation in a paper web in a transverse direction of the machine, in which a transverse speed component of a discharge jet is regulated, comprising the step of
controlling said transverse speed component of said discharge jet by regulating alignment of turbulence pipes in a pipe battery of a turbulence generator in the head box, and comprising the additional steps of
heating or cooling a perforated plate by means of a heating arrangement fitted in connection with said perforated plate, said perforated plate being situated at the inlet side of said turbulence generator and extending across an entire width of said head box in said transverse direction, and to which said pipes of said pipe battery are attached at the inlet sides thereof, and
regulating angles of alignment of said pipes in said pipe battery by means of thermal expansion or contraction produced by means of said heating or cooling of said perforated plate.

5,022,966
PROCESS FOR CONTROLLING PROPERTIES OF TRAVELLING SHEETS

Hung-Tzaw Hu, Cupertino, Calif., assignor to Measurex Corporation, Cupertino, Calif.

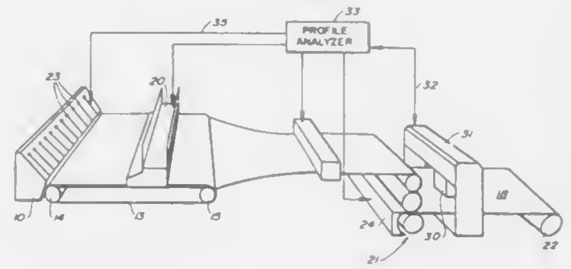
Division of Ser. No. 303,478, Jan. 27, 1989, Pat. No. 4,921,574. This application Dec. 13, 1989, Ser. No. 450,213

The portion of the term of this patent subsequent to May 1, 2007, has been disclaimed.

Int. Cl.^{5} D21F *1/06, 7/06*

U.S. Cl. 162—198 7 Claims

1. A method for controlling high-speed sheetmaking machine after abrupt process changes, comprising:
operating a scanning sensor to periodically traverse back and forth across the full width of a sheet in the cross direction to detect values of a selected sheet property along each scan;
the scanning sensor having a normal cross-directional speed and a normal rate at which measurements of the sheet property are made when the scanning sensor traverses the full width of the sheet; and



after an abrupt process change, controllably changing the cross-directional width of each scan to be substantially less than the entire width of the sheet subject to scanning.

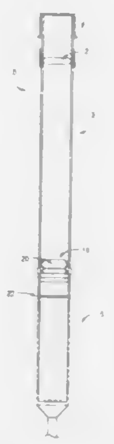
5,022,967
MICRODISTILLATION APPARATUS

Scott Stieg, Milwaukee, Wis., assignor to Lachat Instruments, Milwaukee, Wis.

Filed Sep. 18, 1989, Ser. No. 408,681

Int. Cl.^{5} B01D *3/00*

U.S. Cl. 202—197 24 Claims



1. A microdistillation apparatus for the distillation of a volumetric sample containing volatile analyte compounds, said apparatus comprising:
a sample tube including means for holding the volumetric sample, said sample tube having an open top end and a closed bottom end;
a collector tube having an open bottom end and top end, said open bottom end being fitted to said open end of said sample tube, said collector tube including means for holding a trapping solution;
at least two hydrophobic, porous membranes, one of said membranes disposed in said collector tube in close proximity to said bottom end of said collector tube in spaced relation from the volumetric sample, said membrane permitting the volumetric sample to pass through when volatized thereby conveying a purged analyte to the trapping solution, said membrane further preventing reverse transmission of the trapping solution and condensate, the other of said two hydrophobic, porous membranes being disposed in said collector tube proximate said top end.

VOL
1127
ISS
2
JE
11
1991
UMI

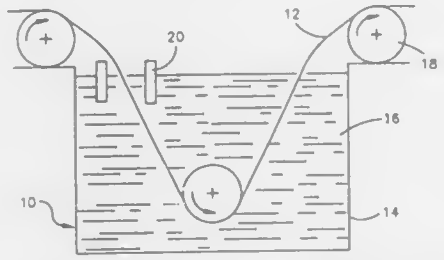
5,022,968
METHOD AND COMPOSITION FOR DEPOSITING A CHROMIUM-ZINC ANTI-TARNISH COATING ON COPPER FOIL

Lifun Lin, and Chung-Yao Chao, both of Waltham, Mass., assignors to Olin Corporation, New Haven, Conn.

Filed Sep. 20, 1990, Ser. No. 585,832

Int. Cl.^{5} C25D *7/06, 11/38*

U.S. Cl. 204—28 **24 Claims**



1. A basic solution having hydroxide ions for electrolytically depositing an anti-tarnish coating on a copper or copper based alloy foil, comprising:
- from about 0.07 grams per liter to about 10 grams per liter zinc ions supplied in the form of a water soluble zinc compound;and
- from about 0.1 grams per liter to about 100 grams per liter of chromium (VI) ions in the form of a water soluble hexavalent chromium salt wherein the concentration of either said zinc ions or said chromium (VI) ions or both is less than 1.0.

5,022,969
PROCESS FOR ENCASING AN ELECTRONIC COMPONENT

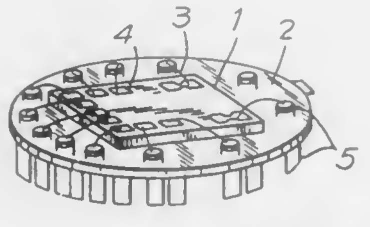
Mira Josowicz, Robert-Koch-Str. 20, and Karin Potje-Kamloth, Rathaus-Str. 2, both of 8012 Ottobrunn, Fed. Rep. of Germany

Filed May 15, 1989, Ser. No. 353,072

Claims priority, application Fed. Rep. of Germany, May 13, 1988, 3816457

Int. Cl.^{5} C25D *11/00*

U.S. Cl. 204—56.1 **20 Claims**



1. A process for encasing an electrically conductive region in an electronic component in an insulating layer comprises the steps of:
- a. depositing a polymer layer on said electrically conductive region by electrochemical polymerization of a single monomer selected from the group consisting of substituted phenol-, thiophenol- and aniline-containing monomers, from an electrolytic solution; and
- b. subsequently self cross-linking said polymer layer by one of heating and irradiating to form a chemically inert insulating layer.

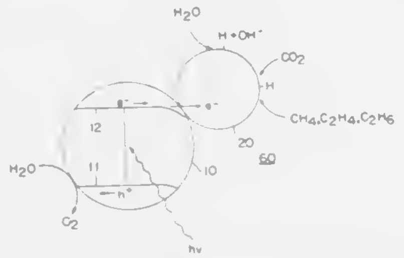
5,022,970
PHOTOELECTROCHEMICAL REDUCTION OF CARBON OXIDES

Ronald L. Cook, Aurora, and Anthony F. Sammells, Naperville, both of Ill., assignors to Gas Research Institute, Chicago, Ill.

Filed Sep. 28, 1989, Ser. No. 413,639

Int. Cl.^{5} C25B *3/04*

U.S. Cl. 204—72 **15 Claims**



1. A process for photoelectrochemical reduction of at least one of CO_2 and CO to hydrocarbon products, said process comprising: dispersing particulate semiconductors in a liquid aqueous containing electrolyte; illuminating said semiconductors at appropriate frequency and quantity causing excitation of electrons from the valence band to the conductance band of said semiconductors; contacting surface portions of said semiconductors with metallic copper, non-semiconductor contacting surface portions of said copper contacting said liquid aqueous containing electrolyte; contacting said surface portions of said copper contacting said liquid aqueous containing electrolyte with at least one of said CO_2 and CO causing its reduction to said hydrocarbon products by energy passage between said semiconductor and said copper.

5,022,971
PROCESS FOR THE ELECTROLYTIC PICKLING OF HIGH-GRADE STEEL STRIP

Gerald Maresch, Mödling, and Ulrich Krupicka, Vienna, both of Austria, assignors to Maschinefabrik Andritz Actiengesellschaft, Graz-Andritz, Austria

Filed Sep. 13, 1989, Ser. No. 406,342

Claims priority, application Austria, Sep. 14, 1988, 2258/88

Int. Cl.^{5} C25B *1/06*

U.S. Cl. 204—145 R **13 Claims**

1. A process for the electrolytic pickling of high-grade steel strip, comprising the steps of: first alternately anodically and cathodically pickling a strip of high-grade steel in an aqueous neutral solution of Na_2SO_4, the concentration of Na_2SO_4 in the aqueous solution amounting to between 50 and 300 g/l, at a temperature amounting to between 20° and 90° C., and the anodic and cathodic current density during the electrolytic pickling amounting to between 1 and 50 A/dm^2, and subsequently alternately anodically and cathodically pickling the strip of high-grade steel cathodically pickling the strip of high-grade steel in an aqueous neutral salt solution which contains the same anions as a conventional HNO_3/HF mixed acid.

5,022,972
PROCESS FOR MEASURING AND DETERMINING ZETA-POTENTIAL IN A LAMINARLY FLOWING MEDIUM FOR PRACTICAL PURPOSES

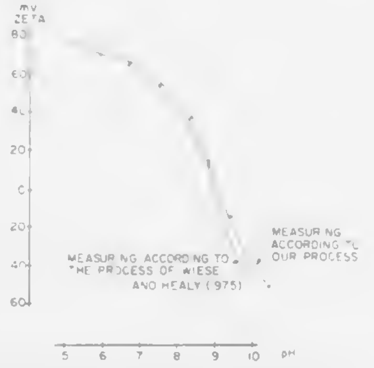
Ágoston Dávid; Márai K. Dávid István Rácz, all of Budapest, Hungary, assignors to MTA Kutatä i Eszközöket Kivitelezo Vállata, Budapest, Hungary

PCT No. PCT/HU87/00048, § 371 Date Jun. 20, 1988, § 102(e) Date Jun. 20, 1988, PCT Pub. No. WO88/03265, PCT Pub. Date May 5, 1988

PCT Filed Dec. 5, 1987, Ser. No. 269,664

Int. Cl.^{5} G01N *27/447, 27/26*

U.S. Cl. 204—183.3 **3 Claims**



1. A method for determining the zeta-potential of a material suspended in a liquid medium which comprises.
- (a) streaming the suspension in a laminar flow,
- (b) subjecting the laminarly flowing suspension to the effect of selectively applied and controlled D.C. voltage,
- (c) selecting a particle for optical examination and determining the electrophoretic velocity from induced changes of flow velocity in the selected particle as a function of the applied voltage, and
- (d) utilizing said determination to calculate the zeta-potential.

5,022,973
METHOD OF ELECTROSTATICALLY ENHANCED SOLVENT EXTRACTION AND APPARATUS THEREFOR

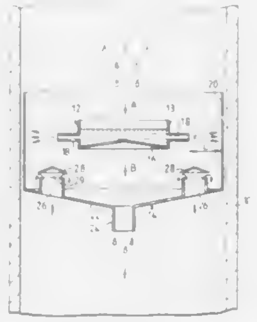
John D. Thornton, Evesham, United Kingdom, assignor to United Kingdom Atomic Energy Authority, London, United Kingdom

Filed Jul. 28, 1989, Ser. No. 386,117

Claims priority, application United Kingdom, Aug. 15, 1988, 8819378

Int. Cl.^{5} G21C *19/50*

U.S. Cl. 204—186 **17 Claims**



1. A method of electrostatically enhanced solvent extraction in which a dispersed phase interacts with a continuous liquid phase flowing through a column in counter-current relationship, wherein the improvement comprises, locating interacting means in the column so as to catch the dispersed phase flowing in the column and so as to define a space at a side of the interacting means between the side and the side of the column and through which space the continuous phase flows, and providing an electric field to cause the discharge of charged droplets of the dispersed phase sideways from the interacting means through the space toward the side of the column.

5,022,974
METHOD AND APPARATUS FOR ELECTROLYTIC TREATMENT OF LIQUIDS, ESPECIALLY WASTE WATER

Erkki Häivälä, Pellervontie 4, SF-05830 Hyvinkää, Finland

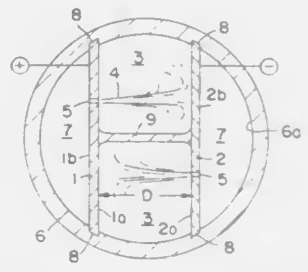
PCT No. PCT/FI87/00101, § 371 Date Feb. 3, 1989, § 102(e) Date Feb. 3, 1989, PCT Pub. No. WO88/00926, PCT Pub. Date Feb. 11, 1988

PCT Filed Aug. 4, 1987, Ser. No. 314,662

Claims priority, application Finland, Aug. 4, 1986, 863166

Int. Cl.^{5} C02F *1/46*

U.S. Cl. 204—275 **1 Claim**



1. Apparatus for electrolytically treating a liquid which contains reactants, said apparatus comprising:
- two plate-like electrodes having opposite charges and operative surfaces which are opposed to each other to form a reaction area therebetween for said liquid passing between said electrodes;
- means for passing said liquid into said reaction area; and,
- means for introducing a medium into said reaction area separately from said liquid and in a flow direction different from the flow of liquid across said operative surfaces of said electrodes, said means comprising through holes perforated in at least one of said plate-like electrodes for passing medium from behind at least one of said electrodes into said reaction area, said holes being sufficiently large to provide a jet-like flow of medium into said liquid for causing turbulence in said liquid, the ratio of total area of said holes to the area of the operative surfaces of said at least one electrode being less than about 2%.

5,022,975
SOLID STATE ELECTROCHEMICAL POLLUTION CONTROL DEVICE

Arnold Z. Gordon, Beachwood, Ohio, assignor to 16R Enterprises, Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 13,022, Feb. 10, 1987, abandoned, which is a continuation-in-part of Ser. No. 796,879, Nov. 12, 1985, Pat. No. 4,659,448. This application Jul. 12, 1989, Ser. No. 378,831

The portion of the term of this patent subsequent to Apr. 21, 2004, has been disclaimed.

Int. Cl.^{5} C25B *9/00;* **C25F** *7/00*

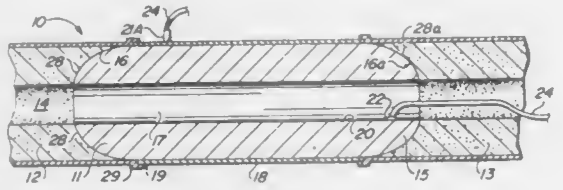
U.S. Cl. 204—277 **24 Claims**

1. A solid state electrochemical cell adapted to alter the composition of a gas stream passing therethrough comprising: a porous, high surface area body consisting essentially of a darkened porous, solid ceramic electrolyte which permits the passage of gas stream components therethrough, said body having a first surface and a second surface spaced apart therefrom, and a blocking portion of the body having a transference number of from about 0.50 to 0.9999;

an electronically conductive porous coating disposed over

VOL
1127
ISS
2
JE
11
1991
UMI

the first surface of the electrolyte body, of sufficient porosity to permit passage of gas stream components;
a conductive coating disposed over the second surface of the electrolyte body;
a first electrode lead contacting the porous conductive coating disposed over the first surface;



a second opposing electrode lead contacting the conductive coating disposed over the second surface;
a voltage source connected between said first and second opposing electrode leads.

5,022,976

PROCESS AND JIG FOR PLATING PIN GRID ARRAYS

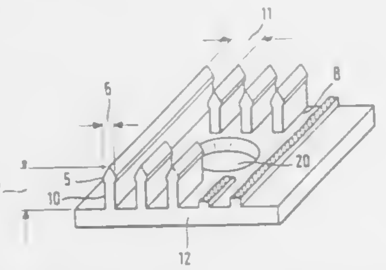
Rudolf Röll, Marktredwitz; Jürgen Brandenburger, Selb, and Horst Hempel, Marktredwitz, all of Fed. Rep. of Germany, assignors to Hoechst CeramTec Aktiengesellschaft, Selb, Fed. Rep. of Germany

Filed Mar. 29, 1989, Ser. No. 330,140

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3810992

Int. Cl.⁵ C25D *17/06*

U.S. Cl. 204—297 R **23 Claims**



1 A receiving jig for pin grid arrays (PGAs), wherein a rectangular metal baseplate made of corrosion-resistant material whose length and width are at least equal to the length and width of a PGA housing has a plurality of regularly arranged metallic projections to which all the pins of a PGA can be securely clamped and also at least one hole.

5,022,977

ION GENERATION APPARATUS AND THIN FILM FORMING APPARATUS AND ION SOURCE UTILIZING THE ION GENERATION APPARATUS

Morito Matsuoka, Hitachi, and Ken-ichi Ono, Mito, both of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

PCT No. PCT/JP87/00695, § 371 Date May 25, 1988, § 102(e) Date May 25, 1988, PCT Pub. No. WO88/02546, PCT Pub. Date Apr. 7, 1988

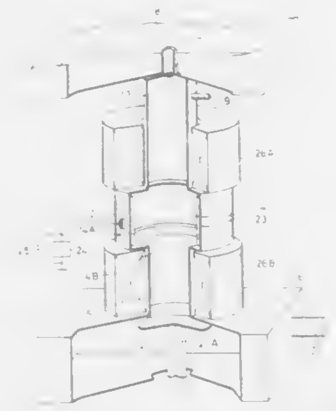
PCT Filed Sep. 24, 1987, Ser. No. 198,500

Claims priority, application Japan, Sep. 29, 1986, 61-230829; Sep. 29, 1986, 61-230830; Aug. 21, 1987, 62-208003; Aug. 21, 1987, 62-208004; Aug. 28, 1987, 62-214899; Aug. 28, 1987, 62-214900

Int. Cl.⁵ C23C *14/34;* H01G *27/00*

U.S. Cl. 204—298.16 **32 Claims**

1. An ion generation apparatus, comprising:
a vacuum chamber including a vacuum waveguide having a microwave introduction window at one end thereof, said microwave introduction window being connected to a microwave waveguide, a cylindrical plasma generation chamber having a diameter and a length sufficient to define a microwave cavity resonator for causing the resonance of a microwave to be introduced, and an end portion of said plasma generation chamber all connected with each other in the order named, and further having a gas introduction inlet;
a tubular target disposed along an inner wall of said plasma generation chamber and supplied with a negative voltage; and
at least one pair of magnetic field producing means which are disposed around said vacuum waveguide and said end portion of said plasma generation chamber so that a mirror field is produced in such a way that the strength of the magnetic field in said plasma generation chamber has a minimum in the neighborhood of the center of said plasma generation chamber.



5,022,978

APPARATUS FOR COATING THREE DIMENSIONAL SUBSTRATES BY MEANS OF CATHODE SPRUTTERING

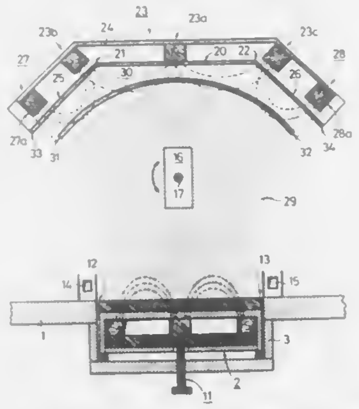
Bernd Hensel, Frankfurt; Uwe Kopacz, Hainburg; Dieter Hofmann, Bruchköbel; Hans Schüssler, Schiffweiler, and Gunter Eckhardt, Hanau, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Jul. 5, 1990, Ser. No. 548,299

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1990, 4009151

Int. Cl.⁵ C23C *19/34*

U.S. Cl. 204—298.19 **6 Claims**



1. Device for coating substrates by means of cathode sputtering comprising
a a rectangular magnetron cathode which is provided with a target with longitudinal edges and defines a coating region, said cathode including a magnet system having poles,
b. a substrate holder for substrates having rotated means and a rotating axis that is parallel to the longitudinal edges, whereby the substrates have surface elements which can be moved in the coating region on a circular path,
c. a planar wall which has longitudinal edges and is made of a non-magnetic material, the edges also running parallel to the rotating axis of the substrate holder, including a magnet arrangement having poles, disposed behind the wall, for the generation of a longitudinally extended magnetic tunnel having longitudinal sides, this tunnel extending across the surface of the wall which faces the substrate, the magnetron cathode and the wall being on opposite sides of the rotating axis and the longitudinal sides of the magnetic tunnel also running parallel to the longitudinal edges of the target, and
d. an anode between said planar wall and said substrate holder,
e. characterized in that at least one additional wall **25**, **26** having a respective at least one additional magnet system **27**, **28** therebehind extends from a respective at least one longitudinal edge **21**, **22** of said planar wall to an outer longitudinal edge **33**, **34** which also parallels said rotating axis **17** at an angle which places said outer longitudinal edge of said additional wall closer to said target, as measured along a circular arc center on said rotating axis and extending from said respective at least one longitudinal edge of said planar wall toward said respective at least one longitudinal edge closes the circumferential distance, as seen from said axis, between said outer edge and said target, and in that
f. the poles of the magnet system **10** and all the magnet arrangements **23**, **27**, **28** alternate on the circumference of the substrate holder such that the entire circumference of the substrate holder **16** is surrounded by an uninterrupted series of magnetic tunnels.

5,022,979

ELECTRODE FOR USE IN THE TREATMENT OF AN OBJECT IN A PLASMA

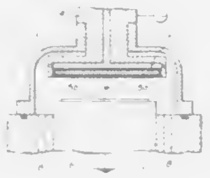
Isamu Hijikata; Akira Uehara, and Mitsuo Samezawa, all of Kanagawa, Japan, assignors to Tokyo Ohka Kogyo Co., Ltd., Kanagawa, Japan

Filed Oct. 25, 1988, Ser. No. 262,531

Claims priority, application Japan, Oct. 26, 1987, 62-164365[U]

Int. Cl.⁵ C23F *4/04*

U.S. Cl. 204—298.33 **7 Claims**



1. In a plasma reaction apparatus having a pair of vertically spaced apart electrodes, an upper electrode of said pair being adapted for use in the treatment of an object through plasma reaction and which is highly resistant to being modified and etched away by the plasma reaction, said upper electrode having at least an outermost surface layer formed of silicon carbide, and said upper electrode being disposed vertically above the object to be treated through plasma reaction in spaced relation therewith:
said upper electrode comprising a base formed of carbon, and said surface layer of silicon carbide being formed on a surface of said base by a CVD coating process.

4. An electrode for use in the treatment of an object through plasma reaction and which is highly resistant to being modified and etched away by the plasma reaction, said electrode having at least an outermost surface layer formed of silicon carbide, and said electrode being of a disk shape and having a plurality of through holes defined therein for ejecting reaction gas therethrough toward said object:
said electrode comprising a base formed of carbon, and said surface layer of silicon carbide being formed on a surface of said base by a CVD coating process.

5,022,980

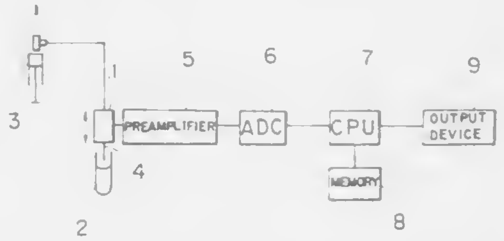
SYSTEM FOR DETERMINING CONCENTRATION OF AN ELECTROLYTE

Akikn Tanaka, and Toshio Takiguchi, both of Otawara, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 30, 1988, Ser. No. 292,333

Int. Cl.⁵ G01N *27/26, 27/414*

U.S. Cl. 204—400 **8 Claims**



4. A system for determining the concentration of an electrolyte in a solution utilizing a measuring system, the system comprising the steps of:
means for obtaining a test solution having an electrolyte concentration to be measured;
means for measuring positive and negative potential levels of a correction solution having substantially a same composition as the test solution in a normal state for use as standard positive and negative potential levels of the correction solution;
means for storing the standard positive and negative potential levels of the correction solution;
means for measuring positive and negative potential levels of the test solution and the correction solution at time intervals;
means for comparing each measured positive and negative potential level of the test and the correction solutions respectively with the standard positive and negative potential levels of the correction solution;
means for detecting if a variation exists between the standard and measured positive and negative levels of the correction solution;
means for determining whether the positive and negative potential levels of the correction solution measured at time intervals deviate towards one of an opposite polarity with respect to each other and a same polarity with respect to each other.
means for obtaining the concentration of the electrolyte of the test solution as a difference between potential levels of the test solution containing the electrolyte to be measured with the measured potential levels of the correction solution when no variation is detected: and
means for outputting a signal of abnormal results when a variation is detected.

VOL
1127
ISS
2
JE
11
1991
UMI

5,022,981

AROMATIC EXTRACTION PROCESS USING MIXED POLYALKYLENE GLYCOL/GLYCOL ETHER SOLVENTS

Paulino Forte, Yonkers, N.Y., assignor to UOP, Des Plaines, Ill.
Filed Sep. 18, 1989, Ser. No. 408,827
Int. Cl.⁵ C10G *21/16, 21/28*
U.S. Cl. 208—334 **23 Claims**

1. A process for the recovery of aromatic hydrocarbons from a feed comprising a mixture thereof with non-aromatic hydrocarbons, which comprises the steps of:

(a) contacting said feed in an extraction zone at a temperature of less than about 250° F. with an aromatic extraction solvent to provide a rich solvent phase containing aromatic hydrocarbons and a raffinate phase containing non-aromatic hydrocarbons, wherein the aromatic extraction solvent comprises a polyalkylene glycol of the formula

$$HO{-}[CHR_1{-}(CR_2R_3)_n{-}O{-}]_mH$$

wherein n is an integer from 1 to 5, m is an integer having a value of 1 or greater and R_1, R_2 and R_3 are selected form hydrogen, alkyl, aryl, aralykyl, alkylaryl and mixtures thereof and a glycol ether of the formula

$$R_4O{-}[CHR_5{-}(CHR_6)_xO]_y{-}R_7$$

wherein R_4, R_5, R_6 and R_7 are selected from hydrogen, alkyl, aryl, aralkyl, alkylaryl and mixtures thereof; R_4 and R_7 are not both hydrogen; x is an integer from 1 to 5; and y is an integer from 2 to 10, said glycol ether comprising from about 5 to 50 wt. % of the mixed extraction solvent;

(b) heating said rich solvent phase by indirect heat exchange with a lean solvent to provide a heated rich solvent phase and a cooled lean solvent phase;

(c) passing said heated rich solvent phase to a first distillation zone to provide a first distillate comprising a reflux hydrocarbon phase and a first aqueous phase, and a first bottoms comprising said aromatic hydrocarbons and said aromatic extraction solvent;

(d) passing said first bottoms to a second distillation zone to provide a second distillate comprising an aromatic hydrocarbon phase and a second aqueous phase, and a second bottoms comprising said lean solvent phase;

(e) recycling at least a portion of said cooled lean solvent phase to the extraction zone;

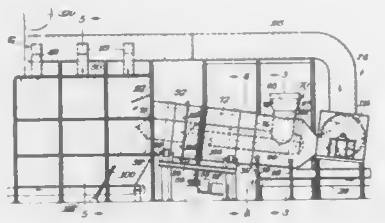
(f) recycling at least a portion of said reflux hydrocarbon phase to the extraction zone; and

(g) recovering an aromatic hydrocarbon product from said aromatic hydrocarbon phase and a non-aromatic hydrocarbon product from said raffinate phase.

5,022,982

ROTARY DRUM SOLID WASTE AIR CLASSIFIER

Robert H. Greeley, Kennett Sq., Pa., assignor to CPM Energy Systems Corporation, Greenville, Del.
Filed Jan. 13, 1989, Ser. No. 296,604
Int. Cl.⁵ B07B *9/02, 11/06*
U.S. Cl. 209—12 **16 Claims**



1. In a rotary drum solid waste air classifier in which lightweight waste material is separated as a light fraction from the remaining heavy fraction in a solid waste treatment system wherein the waste material is fed to the lower feed end of an inclined rotating classification drum with the waste material being conveyed by a conveyor into the drum and the heavy fraction is discharged by gravity from the lower end of the drum and the light fraction is entrained by air and discharged from the upper end of the drum into a plenum, the improvement being in that a non-rotatable separation enhacing tube is mounted longitudinally in said drum and extends completely through said drum, said waste conveyor being longitudinally mounted within said tube, the feed end of said waste conveyor being located outwardly of said lower end of said drum, the discharge end of said waste conveyor being located within said drum, and said tube having a delivery cut-out at and below said discharge end of said waste conveyor whereby the waste material falls from said discharge end of said waste conveyor and through said delivery cut-out and onto said drum for being discharged from said lower end of said drum and whereby the light fraction is conveyed by the air flow into said plenum.

5,022,983

PROCESS FOR CLEANING OF COAL AND SEPARATION OF MINERAL MATTER AND PYRITE THEREFROM, AND COMPOSITION USEFUL IN THE PROCESS

Cal Y. Myers, Carbondale, and Richard B. Read, Champaign, both of Ill., assignors to Southern Illinois University Foundation, Carbondale, Ill.
Continuation of Ser. No. 81,140, Aug. 3, 1987, abandoned. This application Aug. 17, 1989, Ser. No. 395,014
Int. Cl.⁵ B03D *1/02*
U.S. Cl. 209—167 **35 Claims**

1. A process for cleaning of particulate coal and separation therefrom of pyrite and ash, comprising the steps of:

slurrying a particulate coal feed material in an aqueous liquid flotation composition to produce a pulp, said feed material comprising particles of carbonaceous matter, particles comprising pyrite and particles comprising ash, and said aqueous liquid flotation composition containing an anionic surfactant comprising a substituted ethenesulfonic acid or salt thereof;

aerating said pulp to produce bubbles therein, whereby the particles of carbonaceous material contained in the pulp adhere preferentially to the surfaces of the bubbles and are carried by said bubbles to the upper surface of said liquid where a foam of said bubbles is formed, the solids contained within said foam being enriched in said carbonaceous matter, the solids in a zone of the liquid phase below said foam being relatively enriched in pyrite and ash;

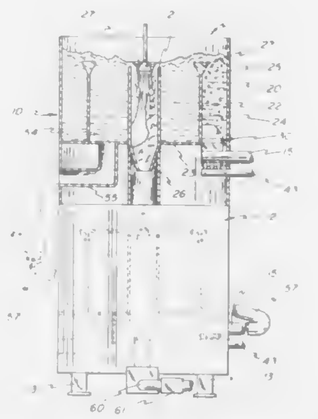
separating said foam from the liquid phase comprising said zone; and

recovering said carbonaceous matter from said foam

5,022,984

FROTH FLOTATION APPARATUS AND METHOD

John J. Pimley, Gwent, United Kingdom; Christopher M. Vitori, Middletown, Ohio; Irenee J. Phillippe, Monroe, Ohio, and Paul G. Marsh, Hamilton, Ohlo, assignors to The Black Clawson Company, Middletown, Ohio
Filed Feb. 28, 1990, Ser. No. 486,477
Int. Cl.⁵ B03D *1/24;* **B21B** *1/32*
U.S. Cl. 209—170 **7 Claims**



1. Froth flotation apparatus for separating contaminant particles from a liquid suspension stock, comprising:

(a) radially spaced outer, inner and intermediate vertical annular walls and an annular bottom wall connected to said vertical walls to form outer and inner substantially concentric annular chambers and a central discharge conduit,

(b) means for delivering a stream of aerated stock into said outer chamber adjacent said bottom wall thereof for circulation therein while the bubbles in said stock rise through the stock in said chamber to form froth adjacent the top of said outer chamber,

(c) said intermediate wall being of lesser height than said outer wall to provide an overflow outlet from said outer chamber to said inner chamber,

(d) means on the top of said intermediate wall forming an annular generally horizontal upper surface of substantial radial width for spreading stock overflowing said intermediate wall into a thin film to expedite the formation of a layer of froth on the top of said overflowing stock, said upper surface being at a lesser height than the height of said outer wall,

(e) said inner wall being slightly shorter in height than said intermediate wall to provide an overflow outlet from said inner chamber to said discharge conduit while maintaining the liquid level in said inner chamber close to that in said outer chamber,

(f) means forming an outlet for accepted stock from the bottom of said inner chamber, and

(g) means for controlling the flow of accepted stock from said outlet to maintain the level of said stock in said inner chamber sufficiently close to the top of said inner wall to cause froth on top of said stock to overflow said inner wall into said discharge conduit defined by said inner wall.

5,022,985

PROCESS FOR THE SEPARATION AND RECOVERY OF PLASTICS

Duane C. Nugent, Perrysburg, Ohio, assignor to Plastic Recovery Systems, Inc., Toledo, Ohio
Filed Sep. 15, 1989, Ser. No. 407,558
Int. Cl.⁵ B03B *5/44;* **B29B** *17/00;* **C08J** *11/06*
U.S. Cl. 209—172.5 **19 Claims**

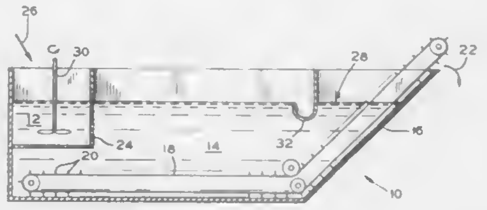
1. A process for separating and reclaiming plastic, from a mixture containing the plastic and a contaminant, the contaminant having a specific gravity greater than the plastic, comprising the steps of:

A) immersing the mixture in an aqueous dispersion, comprising water as the disperse medium, and a disperse phase having an average mean particle size from about 1 micron to about 75 microns, the aqueous dispersion having a specific gravity intermediate the specific gravities of the plastic and the contaminant, whereby the plastic floats to the surface of the aqueous dispersion and the contaminant sinks to the bottom of the aqueous dispersion;

B) removing the plastic from the surface of the aqueous dispersion; and

C) removing the contaminant from the bottom of the aqueous dispersion;

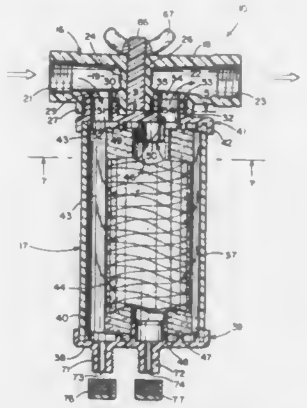
wherein a portion of the disperse phase is retained on the reclaimed plastic providing an inert filler for subsequent reprocessing of the plastic.



5,022,986

MANIFOLD AND DISPOSABLE FILTER ASSEMBLY

John Lang, 6800 Shingle Creek Pkwy., Brooklyn Center, Minn. 55430
Filed Jan. 11, 1990, Ser. No. 463,619
Int. Cl.⁵ B01D *35/30*
U.S. Cl. 210—94 **48 Claims**



1. A manifold and filter assembly for filtering a fluid comprising: a housing having a fluid inlet passage and a fluid outlet passage, wall means separating the inlet passage from the outlet passage, said wall means having a hole separated from said passages extended through the wall means, said hole open to top and bottom sides of the housing and having an axis, a first flange having a first cylindrical inside surface surrounding a first pocket having an axis generally parallel to the axis of said hole, an inlet port in said housing open to the inlet passage and the first pocket, a second flange having a second cylindrical inside surface surrounding a second pocket having an axis generally parallel to the axis of said hole, an outlet port in said housing open to the outlet passage and said second pocket, a filter cartridge mounted on said housing having a chamber for receiving fluid from said inlet passage, filtering said fluid, and directing said fluid toward the outlet passage, said cartridge having filter means located in said chamber for filtering said fluid, said filter cartridge including a first tubular member

VOL
1127
ISS
2
JE
11
1991
UMI

having a passage open to the filter means, first seal means mounted on the first tubular member located in sealing engagement with the first inside surface of the first flange when the first tubular member is located in the first pocket and the passage therein is aligned with the inlet port, said filter cartridge including a second tubular member having a passage open to the filter means, second seal means mounted on the second tubular member located in sealing engagement with the second inside surface of the second flange when the second tubular member is located in the second pocket and the passage therein is aligned with the outlet port, post means extended through said hole in the housing, and means connected to the cartridge cooperating with the post means and housing to retain the first and second tubular members in the first and second pockets and maintain the first and second seal means in sealing relation with the first and second inside surfaces.

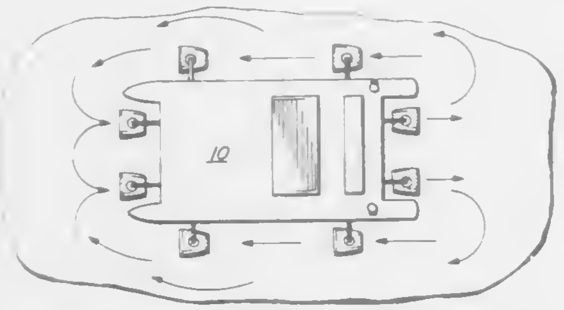
5,022,987
APPARATUS AND METHOD FOR SEPARATING AND REMOVAL OF FLOATING POLLUTANTS FROM A WATER SURFACE

Robert C. Wells, P.O. Box 984, Casa Grande, Ariz. 85222

Filed Jun. 4, 1990, Ser. No. 532,814

Int. Cl.⁵ E02B *15/04*

U.S. Cl. 210—173 13 Claims



1 A skimmer craft for removing a pollutant layer from the surface of a body of water comprising:

(a) flotation means having a bow and stern and having a generally horizontal floor portion normally located below the water surface establishing a flotation pool above the floor and a submarine flow from bow to stern below the floor;

(b) means defining a water exit channel below the water surface communicating with said flotation pool and discharging into the submarine flow;

(c) a sump having a spill board located in said flotation pool, said spill board being located below the normal water surface to separate and direct at least a portion of the pollutant layer into the sump; and

(d) propulsion means connected to said skimmer craft at the bow, port, starboard and stern, said propulsion means being outboard of said flotation means to establish a predetermined and controlled flow pattern, said bow propulsion means directing water into the flotation pool at the bow of the boat, said stern propulsion means directing water rearwardly from said exit channel and said port and starboard, propulsion means directing water forwardly along the side of the flotation means toward the bow of the skimmer craft.

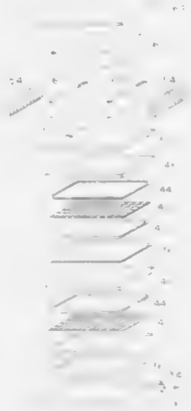
5,022,988
DEVICE FOR PLASMA MODIFICATION—COMPOSITION AND REMODELING

Thomas B. Okarma, Palo Alto; Chin-Hai Chang, Los Altos; Brian R. Clark, Redwood City, and L. Bernard Lerch, Menlo Park, all of Calif., assignors to Applied ImmuneSciences, Menlo Park, Calif.

Continuation-in-part of Ser. No. 191,039, May 19, 1988, Pat. No. 4,963,265. This application Oct. 20, 1988, Ser. No. 260,382

Int. Cl.⁵ B01D *63/08*

U.S. Cl. 210—321.84 8 Claims



1. A device for modifying plasma by removing or remodeling at least one plasma component, which plasma component is a member of a specific binding pair, said device having a predetermined volume rating, said device comprising:

a container of a biocompatible material having an entry and an exit port and an extended flow path between said ports;

a high surface area biocompatible cellulosic porous solid support comprising a member of said specific binding pair substantially uniformly and irreversibly bonded to said support in an amount sufficient to bind the reciprocal member of said specific binding pair at the volume rating of said device, wherein said flow path directs said plasma through said porous support;

said porous support comprising membrane sheets in stacks of at least two sheets, there being at least two stacks;

separating said stacks are alternating U-rings in alternate directions to alternately direct the flow path in opposite directions

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5,022,989
BELT FILTER PRESS AND BELT FOR SAME

Frederik W. Put, Winterswijk, Netherlands, assignor to Strategic American Markets, Inc., Syracuse, N.Y.

Continuation of Ser. No. 233,857, Aug. 18, 1988, Pat. No. 4,911,841, whicb is a continuation of Ser. No. 927,727, Nov. 7, 1986, abandoned. This application Nov. 28, 1989, Ser. No. 442,191

Claims priority, application European Pat. Off., Apr. 28, 1986, 86200736.6

The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.

Int. Cl.⁵ B01D *33/04*

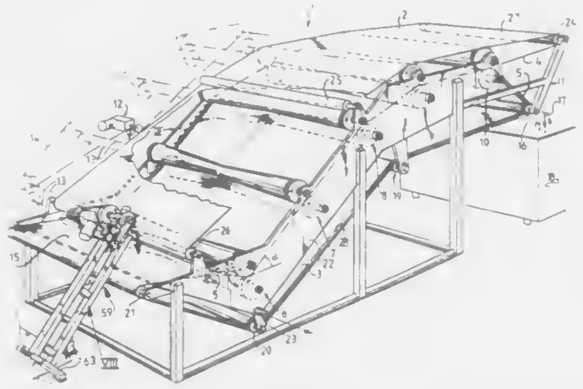
U.S. Cl. 210—386 9 Claims

1 A filter belt assembly for separating solid material and liquid, said assembly comprising

a liquid-permeable, endless lower drainage belt,

a liquid-impermeable, endless upper press belt,

a frame which supports a plurality of upper pressure rolls, a plurality of upper guide rolls, a plurality of lower pressure rolls, and a plurality of lower guide rolls, said upper belt being movably mounted on said upper pressure rolls and said upper guide rolls and said lower belt being movably mounted on said lower pressure rolls and said lower guide rolls, said upper and lower pressure rolls being respectively mounted on said frame to form nip-defining pairs through which said upper and lower belts pass, a first pair of pressure rolls through which said belts pass defining an upstream end of a filtering run, an ultimate pair of pressure rolls defining a downstream end of said filtering run, and a second pair of pressure rolls being mounted on said frame relative to said first pair of pressure rolls so that said belts will move upwardly from said first pair to said second pair, each pair of pressure rolls being shaped such that at least side edges of said upper and lower belts are pressed together and gaps are provided between center portions thereof, said gaps between the center portions of said belts decreasing between sequential pairs of pressure rolls in the donwstream direction, one of said plurality of upper guide rolls and one of said plurality of lower guide rolls being mounted on said frame so as to respectively cause said upper and lower belts to converge downwardly towards said first pair of pressure rolls, thereby providing a lead-in run of said belts; and a second of said lower guide rolls being mounted on said frame to provide a discharge end of said lower belt, and



drive means driving the upper and lower belts so as to circulate between said pressure rolls in the direction of said downstream end of said filtering run,

mixtures of solid material and liquid supplied to said lead-in run of said belts being retained between said belts and subjected to increasing pressure as said belts pass between sequential pairs of pressure rolls along said filtering run, liquid being drained through said lower belt and solid material being retained on the upper belt and returned to said lead-in run and through said filtering run until sufficiently dry be retained on said lower belt and discharged at said discharge end of said lower belt.

5,022,990
POLYVINYLIDENE FLUORIDE POROUS MEMBRANE AND A METHOD FOR PRODUCING THE SAME

Yoshinao Doi, Moriyama, and Haruo Matsumura, Iruma, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jan. 10, 1990, Ser. No. 463,058

Claims priority, application Japan, Jan. 12, 1989, 1-3675

Int. Cl.⁵ B01D *53/22, 71/34*

U.S. Cl. 210—500.42 12 Claims

1. A porous membrane comprising a polyvinylidene fluoride, resin and having pores running throughout an interior of said porous membrane and opening at both surfaces of said porous membrane,

said interior of said porous membrane containing substantially no macrovoids having a diameter of 10 μm or more,

the average diameter of said pores in each surface of said porous membrane being within the range of from 0.05 μm to less than 5 μm,

the ratio of the average pore diameter of said pores at each surface of said porous membrane to the average pore diameter of said pores in the interior of said porous membrane in terms of the average pore diameter of pores in a cross-section of said porous membrane taken along a line perpendicular to each surface of said porous membrane, being from 0.5 to 2.0,

the ratio of the maximum pore diameter of said pores as measured by the bubble point method to a true average pore diameter of said pores as measured by the half-dry method being from 1.2 to 2.5,

and said membrane having a uniform, three-dimensional, network pore structure, and a tensile strength at break of from 70 to 200 kg/cm^2, a tensile elongation at break of from 100 to 500% and a porosity of from 40 to 90%.

5,022,991
THERMITE COATED FILTER

John P. Day, Big Flats, and Timothy V. Johnson, Corning, both of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Sep. 8, 1988, Ser. No. 241,581

Int. Cl.⁵ B01D *39/20*

U.S. Cl. 210—506 18 Claims

1. A molten metal filter comprising a substrate having a thermite coating thereon, said coating comprises reactants which will undergo reaction that has a negative free energy of reaction and is initiated by catalysis or heat communication with said thermite coating.

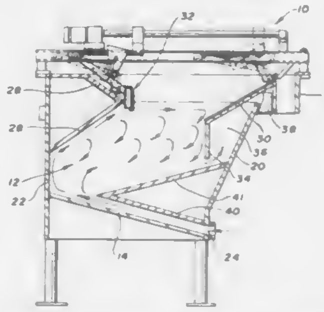
5,022,992
APPARATUS FOR SEPARATING SLUDGE

Jack D. Looker, 84 Grand Ct., Highland, Micb. 48031

Filed Feb. 12, 1990, Ser. No. 478,923

Int. Cl.⁵ B01D *17/28*

U.S. Cl. 210—521 14 Claims



1. Sludge removal apparatus for removing floatable sludge from a carrier fluid comprising:

a tank having a bottom, side and first and second end walls for receiving and holding an immiscible mixture of fluid an floatable sludge; said first end wall being upwardly inclined in one direction and said tank bottom being upwardly inclined in the opposite direction between said first and second end walls and configured in a trough shape; said tank having an inlet beneath said first end wall and communicating with said tank bottom for receiving the mixture into said tank in a flow along said inclined bottom toward said second end wall;

a diverter projecting from said second end wall and having one portion in the path of the mixture being received for directing the flow of the mixture upwardly in said one direction during which floatable sludge rises to the surface of the mixture being held in said tank to form a mat of sludge on said surface; said diverter including a guide portion above said surface;

an inclined ramp extending through the surface where the

VOL
1127
ISS
2
JE
11
1991
UMI

mat of sludge is formed for receiving the sludge to be skimmed;

a skimmer mounted on said tank and movable in a sequential path which includes the surface of said mixture, a portion of said ramp above said surface and the guide portion of said diverter for skimming the sludge from said surface, moving said skimmed sludge up said inclined ramp out of said mixture and returning to said surface along said guide portion;

a baffle mounted below said inclined ramp and extending generally vertically into said tank to a position spaced from said first end wall to form with said inclined ramp and said first end wall an outlet chamber for receiving fluid with the sludge removed; and

a collector communicating with said outlet chamber for receiving said fluid with the sludge removed for recirculation of said fluid to said inlet.

5,022,993

PROCESS FOR TREATING WASTEWATER

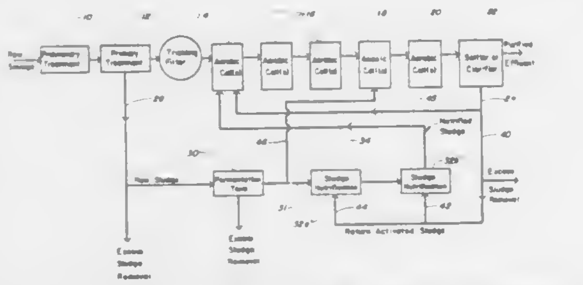
Ronald E. Williamson, Hillsborough, N.C., assignor to Orange Water and Sewer Authority, Carrboro, N.C.

Continuation-in-part of Ser. No. 238,059, Aug. 30, 1988, Pat. No. 4,874,519, which is a continuation-in-part of Ser. No. 201,185, Jun. 2, 1988, abandoned. This application Aug. 4, 1989, Ser. No. 389,885

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.^{5} B01D *3/30*

U.S. Cl. 210—605 3 Claims



1. A process for removing both phosphorus and nitrogen from wastewater comprising the steps of:

(a) directing raw sewage into a primary treatment area and treating the same and in the process separating the raw sewage into settled sewage and raw sludge;

(b) directing the settled sewage in and through a main stream secondary treatment area and particularly subjecting the settled sewage to a first aerobic treatment zone, followed by an anoxic treatment zone, after which the settled sewage is subjected to a second aerobic treatment zone;

(c) passing the effluent from the main stream secondary treatment area to a settling zone and separating the secondary treatment effluent into purified wastewater and settled sludge;

(d) returning the settled sludge to a sidestream sludge nutrification zone that lies outside of the main stream secondary treatment area;

(e) directing the separated raw sludge from the primary treatment area to a sidestream fermenter and fermenting the raw sludge to produce a fermented supernatant that includes volatile fatty acids;

(f) transferring fermenter supernatant from the fermenter and splitting the fermenter supernatant into at least two streams;

(g) transferring one stream of the fermenter supernatant to the sidestream nutrification zone and mixing the fermenter supernatant with the settled sludge to form conditioned activated sludge and holding the conditioned activated sludge within the nutrification zone a selected time period;

(h) conveying the conditioned activated sludge to the main treatment area and particularly to the first aerobic treatment zone that precedes the anoxic treatment zone and mixing the conditioned activated sludge with the settled sewage in the first aerobic treatment zone;

(i) wherein the fermenter supernatant and the volatile fatty acids associated therewith form a favorable food source for phosphorus removing microorganisms that is consumed in the nutrification zone; and

(j) transferring the other stream of the fermenter supernatant to the anoxic zone in the main stream and mixing the fermenter supernatant with the settled sewage to give rise to denitrification in the anoxic zone as the volatile fatty acids associated with the fermenter supernatant provides a favorable food source that is consumed by denitrifying microorganisms in the anoxic zone.

5,022,994

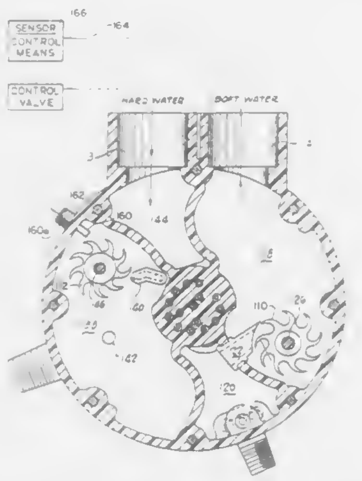
FLUID TREATMENT SYSTEM

Norman R. Avery, Chesterland; Dale J. Spangenberg, Jr.; Jimmy D. Buth, both of Chardon, and Kenneth C. Seuffer, Jr., Middlefield, all of Ohio, assignors to Kinetico Incorporated, Newbury, Ohio

Continuation-in-part of Ser. No. 156,300, Feb. 16, 1988, abandoned. This application Apr. 6, 1989, Ser. No. 334,453

Int. Cl.^{5} B01D *15/04*

U.S. Cl. 210—670 27 Claims



8. In a fluid treatment apparatus including a tank containing an ion exchange resin, a method for initiating and driving a regeneration sequence controller, comprising the steps of:

a) providing a regeneration sequence control means in a control valve housing;

b) providing a turbine in said housing operatively connected to said regeneration sequence means;

c) providing structure for impinging a metered flow of fluid against said turbine during a regeneration cycle in order to move said regeneration control sequencer through a predetermined range of movement;

d) providing a regeneration initiating nozzle in a fluid impinging relationship with said turbine, said nozzle located external to said structure for impinging; and

e) communicating pressurized fluid to said regeneration initiating nozzle upon sensing a predetermined quality level in fluid entering said fluid treatment system or fluid discharged by said fluid treatment apparatus.

5,022,995

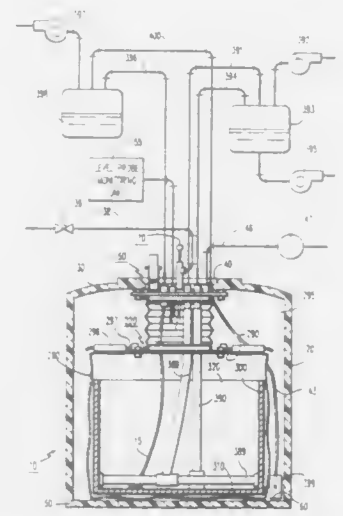
APPARATUS AND METHOD FOR REMOVING LIQUID FROM A COMPOSITION AND FOR STORING THE DELIQUIFIED COMPOSITION

Bryan A. Roy, Mullica Hill; Gregory F. Boris, Sewell, both of N.J.; John J. Campbell, Prospect Park, Pa.; John G. Funk, Raleigh, N.C.; David J. Wozniak, Blackwood, N.J.; James D. Gibson, Voorhees, both of N.J., and Robert M. McCauley, Tabernacle, N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 460,672, Nov. 16, 1989. This application May 16, 1990, Ser. No. 524,241

Int. Cl.^{5} B01D *63/00*

U.S. Cl. 210—651 4 Claims



1. A method for dewatering slurry solids, comprising the steps of:

(a) positioning a collapsible non-porous membrane leak-tight outer container;

(b) positioning a plurality of porous filters in the membrane;

(c) transferring the slurry solids into the membrane; and

(d) compressively removing the water from the slurry solids.

5,022,996

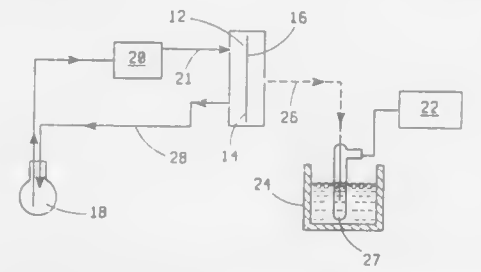
METHOD OF SEPARATING ORGANIC CONTAMINANTS FROM FLUID FEEDSTREAMS WITH POLYPHOSPHAZENE MEMBRANES

Robert R. McCaffrey, Milford, Mass., and Daniel G. Cummings, Idaho Falls, Id., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 30, 1990, Ser. No. 516,400

Int. Cl.^{5} B01D *6/14*

U.S. Cl. 210—654 18 Claims



1. A method for separating halogenated hydrocarbons from a fluid feedstream comprising:

flowing the fluid feedstream across a first surface of a polyphosphazene semipermeable membrane; whereby

at least one halogenated hydrocarbon from the fluid feedstream is permeated through said membrane to a second opposed surface of said polyphosphazene semipermeable membrane; and

removing said permeated halogenated hydrocarbon from said second opposed surface of said semipermeable membrane.

5,022,997

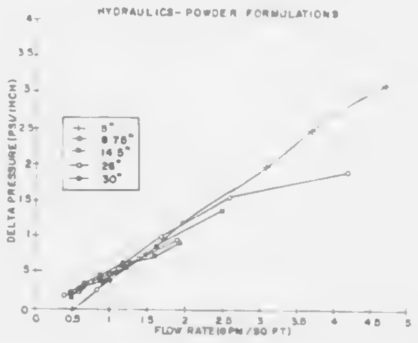
METHOD FOR TREATING AQUEOUS SOLUTIONS

Eli Salem, Deal; Bruce L. Libutti, Teaneck, both of N.J., and Robert Kunin, Yardley, Pa., assignors to The Graver Company, Union, N.J.

Filed Dec. 18, 1989, Ser. No. 452,194

Int. Cl.^{5} C02F *1/28, 1/42;* B01D *37/02*

U.S. Cl. 210—670 26 Claims



1. A method for removing substances from a liquid, comprising:

passing said liquid through a filter bed comprising a mixture of active particulate material in the size range of about 5.0 microns to about 100 microns, at a flow rate generally greater than about 0.02 gpm/ft^2, said mixture producing a clumping phenomenon, said filter bed having a depth in the range of about 3.0 inches to about 60 inches and having a pressure differential therethrough generally less than about 3.0 psi/in at a flow rate of 5.0 gpm/ft^2.

5,022,998

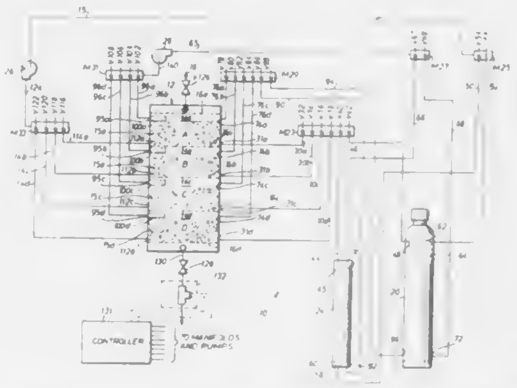
METHOD FOR TREATING FLUIDS

Johnny Arnaud, Houston, Tex., assignor to Hydrotreat, Inc., Pasadena, Tex.

Continuation of Ser. No. 939,697, Dec. 9, 1986, Pat. No. 4,906,361. This application Feb. 27, 1990, Ser. No. 485,614

Int. Cl.^{5} B01D *15/00*

U.S. Cl. 210—675 5 Claims



1. A method for the continuous treatment of fluids, comprising the steps of:

establishing a treatment vessel having a plurality of vertically arranged chambers, said chambers defined by apertured separation members adapted to retain a volume of

VOL
1127
ISS
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JE
11
1991
UMI

contact media within the chamber to form a contact media bed;

passing an influent downwardly through said plurality of chambers and said beds of contact media, said influent passing directly from on chamber to another through said apertured separation members, whereby the passage of said influent through said plurality of beds of contact media maintains said beds of contact media in a generally compacted state;

selectively removing at least one of said plurality of beds of contact media form contact with said influent;

treating said contact media while it is removed from contact with said influent; and

replacing said treated contact media into contact with said influent,

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5,022,999

METHOD OF TREATING STARCH-CONTAINING WATER

Naotaka Watanabe, Tokyo; Hiroshi Itoda, and Reiko Funato, both of Kanagawa, all of Japan, assignors to Mitsui-Cyanamid, Ltd., Tokyo, Japan

Filed Sep. 22, 1989, Ser. No. 411,091

Int. Cl.^{5} C02F *1/56*

U.S. Cl. 210—692 **3 Claims**

1. A method of treating starch-containing water to remove water soluble starch therefrom which comprises adding water-swellable, cationic, polymer particles to said starch-containing water, said water-swellable cationic polymer particles being a polymer of a cross-linkable monomer and either a cationic vinyl monomer or a cationic vinyl monomer and a nonionic vinyl monomer, and wherein said cationic vinyl monomer is a neutral salt or quaternary of a dialkylaminoalkyl(meth)acrylate, a neutral salt or quaternary of dialkylaminoalkyl(meth)acrylamide; diallyldialkylammonium chloride; acryloxyalkyltrialkylammonium chloride or a N,N-dialkylaminoalkyl(meth-)acrylate;

and removing said polymer particles having starch thereon from said water.

5,023,000

OLIGOMER-CONTAINING PHOSPHATE SCALE INHIBITORS

James F. Kneller, LaGrange Park; Barbara E. Fair, Downers Grove, both of Ill.; Gianfranco F. Mazzani, and I. Sergio Di Simone, both of Roma, Italy, assignors to Nalco Chemical Company, Naperville, Ill.

Filed May 10, 1990, Ser. No. 521,627

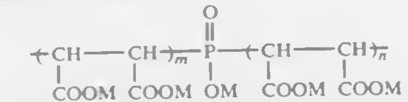
Int. Cl.^{5} C02F *5/14*

U.S. Cl. 210—697 **3 Claims**

1. A method for controlling the deposition of calcium carbonate scale on the structural parts of a system exposed to alkaline cooling water containing calcium carbonate under deposit-forming conditions, which method comprises adding to said cooling water an effective amount of phosphinate-containing composition comprising:

Ingredients		Mole Percent - Less Than
A.	Monosodium phosphinicobis-(succinic acid)	22
B.	Monosodium phosphinico-succinic acid	26
C.	Sodium phosphonosuccinic acid	12
D.	Sodium phosphate	5
E.	Sodium phosphite	6
F.	Sodium hypophosphite, and	6
G.	A phosphinicosuccinic acid oligomer having the structural formula:	

-continued

Ingredients	Mole Percent - Less Than
 $-\!\left[CH(COOM)-CH(COOM)\right]_m-P(=O)(OM)-\left[CH(COOM)-CH(COOM)\right]_n-$	

wherein G exceeds 32 mole percent, M is chosen, at each occurrence, from H, Na, K, NH_4; and m and n are either 0 or a whole number and the sum of m plus n is greater than 2, wherein said composition is formed by reacting greater than 2.2, but less than 3 moles of maleic acid or its equivalent salts, anhydride, or esters with one mole of sodium or other water-soluble hypophosphite.

5,023,001

CALCIUM PHOSPHONATE SCALE INHIBITION

Zahid Amjad, Avon Lake, and William F. Masler, III, Hinckley, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Continuation of Ser. No. 177,719, May 23, 1988, abandoned, which is a continuation of Ser. No. 929,971, Nov. 3, 1986, abandoned. This application Aug. 23, 1989, Ser. No. 397,628

Int. Cl.^{5} C02F *5/14*

U.S. Cl. 210—699 **1 Claim**

1. In a water treatment system using a phosphonate to inhibit calcium scale, a method for preventing said phosphonate from forming a calcium phosphonate scale, said method comprising:

adding to the water system a calcium phosphonate scale inhibiting copolymer wherein the weight amount of the phosphonate scale inhibiting copolymer relative to the weight amount of phosphonate in the water system is in the range of about 5:1 to about 1:5;

said calcium phosphonate scale inhibiting copolymer comprising a first, a second and a third comonomer, wherein:

the first comonomer is acrylic acid, methacrylic acid, salts of said acids, or a combination thereof;

the second comonomer is 2-acrylamido-2-methyl propane sulfonic acid, a salt of said acid or a combination thereof;

the third comonomer is a member of the group consisting of tertiary butyl acrylamide, 2-(2-ethoyxethoxy)ethyl acrylate, hydroxyethyl acrylate, methoxyethyl acrylate, hydroxypropyl acrylate, N-isopropyl acrylamide, methyl methacrylate, ethyl methacrylate and combinations thereof; wherein the ratio of the first, second and third comonomer in weight parts is 50–80:5–30:10–30,

wherein the weight average molecular weight of the calcium phosphonate scale inhibiting polymer is in the range of about 1,000–50,000.

5,023,002

METHOD AND APPARATUS FOR RECOVERING OIL FROM AN OIL SPILL ON THE SURFACE OF A BODY OF WATER

Richard W. Schweizer, Sugar Land; Kantilal P. Patel, and Philip Y. Lau, both of Houston, Tex., assignors to ACS Industries, Inc., Woonsocket, R.I.

Filed Apr. 9, 1990, Ser. No. 506,705

Int. Cl.^{5} E02B *15/04;* B01D *17/02*

U.S. Cl. 210—710 **19 Claims**

1. A method of recovering a hydrophobic hydrocarbon oil from the surface of a body of water, said body of water having a water temperature, said oil having a specific gravity which is less than the specific gravity of the water in said body of water and a viscosity which is greater than approximately 80 centipoise at said water temperature, said method comprising the steps of:

a. continuously withdrawing a feed oil-water mixture from the surface of said body of water;

b. continuously adjusting the viscosity of the oil in said feed oil-water mixture to a level below approximately 80 centipoise to form an adjusted oil-water mixture; and

c. continuously passing said adjusted oil-water mixture through an oil-water coalescer to separate the oil in said adjusted oil-water mixture from the water in said adjusted oil-water mixture.

5,023,003

SOFTENER COMPOSITION CONTAINING CIS- AND TRANS- ISOMERS OF ETHYLENICALLY UNSATURATED QUATERNARY AMMONIUM SALTS

Masaaki Yamamura, Tochigi, Japan; Kazuhiko Okabe, Barcelona, Spain; Kohshiro Sotoya, Wakayama, and Moriyasu Murata, Chibashi, both of Japan, assignors to Kao Corporation, Tokyo, Japan

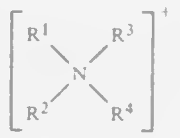
Filed Nov. 17, 1989, Ser. No. 437,882

Claims priority, application Japan, Nov. 21, 1988, 63-294316

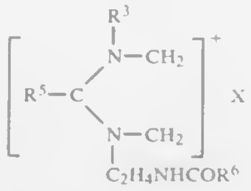
Int. Cl.^{5} D06M *11/58, 15/647;* C11D *1/62, 3/16*

U.S. Cl. 252—8.8 **9 Claims**

1. A softener composition comprising a fabric softening effective amount of at least one quaternary ammonium salt having one of the following formulae (I)–(III):

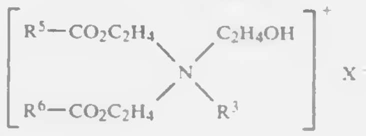


(I)



(II)

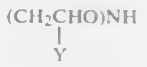
-continued



(III)

wherein R^1 and R^2 each represent a hydrocarbon radical having 12–22 carbon atoms, preferably 16–22 carbon atoms and one unsaturated bond;

R^3 and R^4 each represent a methyl, ethyl or


$$(CH_2\underset{\substack{|\\ Y}}{C}HO)NH$$

wherein n is an integer from 1 to 5, and Y is H or methyl;

R^5 and R^6 each represent a hydrocarbon radical having 11–21 carbon atoms and one unsaturated bond;

X represents a halogen, CH_3SO_4 or $C_2H_5SO_4$; wherein the stereoisomeric structure of the above said salt having one of the formulae (I)–(III) include both the cis-isomer and the trans-isomer with the cis-isomer and the trans-isomer ratio being in the range of from 25/75 to 90/10.

5,023,004

Patent Not Issued For This Number

5,023,005

SOLUTION OF OIL AND SULFONE ADDUCT

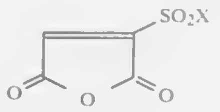
Warren A. Thaler, Flemington; Stanley J. Brois, Westfield, both of N.J., and Henry K. Hall, Tucson, Ariz., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Division of Ser. No. 174,380, Mar. 28, 1988, Pat. No. 4,920,179, which is a continuation-in-part of Ser. No. 911,761, Sep. 26, 1986, Pat. No. 4,737,303, which is a continuation-in-part of Ser. No. 809,030, Dec. 16, 1985, Pat. No. 4,652,600, which is a continuation-in-part of Ser. No. 778,269, Sep. 20, 1985, Pat. No. 4,587,304. This application Mar. 1, 1990, Ser. No. 486,688

Int. Cl.^{5} C10M *151/02*

U.S. Cl. 252—47.5 **2 Claims**

1. A polymeric solution comprising a hydrocarbon liquid and about 0.01 to about 90 weight percent of a sulfone adduct which comprises the reaction of:



and an unsaturated hydrocarbon polymer wherein X is an alkyl group selected from the group consisting of $C_nH_{2n}+1$, wherein n=1 to 18; X is an aryl group consisting of C_mH_{m-1} wherein m=6 and $C_mH_{m-2}Z$ wherein m=6 and Z is selected from the group consisting of OR', R", COOR"', NO_2, Cl, Br, F and I where R', R" and R"' having about 1 to about 18 carbon atoms; wherein said unsaturated hydrocarbon polymer is selected from the group consisting of ethylene propylene terpolymers, ethylene diene copolymers, propylene diene copolymers, polyisoprene, butyl rubber, polybutadiene and styrenebutadiene, and styrene-isoprene random and block copolymers, polypropylenes and polyisobutylenes.

VOL
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5,023,006
THERMAL INSULATION CHEMICAL COMPOSITION AND METHOD OF MANUFACTURE

Thomas F. Davidson, Manassas; Guy B. Spear, Orlean, and Timothy L. Ludlow, Sterling, all of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 30, 1990, Ser. No. 621,102

Int. Cl.^{5} E04B *1/74;* **C08K** *3/36*

U.S. Cl. 252—62 **9 Claims**

1. A thermal insulation composition comprising:

EPDM Elastomer
2 Chlorobutadiene 1,3 Elastomer
Silica Hydrate
Polymerized Trimethyl Dihydroquinoline
Alkylated Diphenylamines and Diphenyl-P-Phenylendiamene
40% a,a'Bis(Tert-Butylperoxy), Diisopropylbenzene
Naphthenic Process Oil
Synthetic Polyterpene Resin
Aramid Fiber
Zinc Oxide, Technical.

5,023,007
LIQUID REFRIGERANT COMPOSITIONS

Arturs Grava, Mayfield Hts., and Scott T. Jolley, Mentor, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Division of Ser. No. 269,894, Nov. 10, 1988. This application Mar. 23, 1990, Ser. No. 498,234

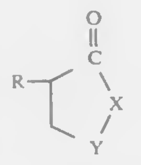
Int. Cl.^{5} C09K *5/00*

U.S. Cl. 252—67 **14 Claims**

1. A liquid composition comprising

(A) a major amount of a fluorine containing hydrocarbon containing one or two carbon atoms, and

(B) a minor amount of a soluble organic lubricant free of acetylenic and aromatic unsaturation and comprising a cyclic compound characterized by the following structure



(I)

wherein

R is H, a hydrocarbyl group having 5 to about 15 carbon atoms, or —R^2COOR^1,
X is O or NR^3,
Y is CHR^4, C═O, C═NR^5,
R^1 is H or a lower hydrocarbyl group,
R^2 is an alkylene group,
R^3 is H, a hydrocarbyl group, an alkylene group joined to R^5 when Y is C═N—^{5} to form a cyclic moiety, —R^6OR^7, or —$R^8NR^9R^{10}$,
R^4 is H or a hydrocarbyl group,
R^5 is H or an alkylene group joined with R^3 when X is NR^3 to form a cyclic moiety,
R^6 is an alkylene group,
R^7 is H or a hydrocarbyl group,
R^8 is an alkylene group, and
R^9 and R^{10} are each independently H or hydrocarbyl group, or R^9 and R^{10} are hydrocarbylene groups joined together to from a heterocyclic moiety, provided that when Y is CH^2 and X is NR^3, R^3 is not a hydrocarbyl group.

5,023,008
ANTI-MICROBIAL COMPOSITION CONTAINING ALIPHATIC POLYGYCIDOL ADDUCTS

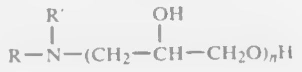
Michael Scardera, Hamden, and Frank R. Grosser, Bethany, both of Conn., assignors to Olin Corporation, Cheshire, Conn.

Filed Nov. 17, 1989, Ser. No. 438,753

Int. Cl.^{5} C11D *3/48, 3/26, 1/75*

U.S. Cl. 252—106 **15 Claims**

1. A cleaning composition which comprises an aqueous liquid containing a surface active agent and an antimicrobial effective concentration of an amine glycidol compound represented by the formula:



$$\mathrm{R-\overset{\overset{R'}{|}}{N}-(CH_2-\overset{\overset{OH}{|}}{C}H-CH_2O)_nH}$$

wherein R represents an alkyl group having from about 8 to about 18 carbon atoms and mixtures thereof;

R' represents an alkyl group, the sum total of carbon atoms in R + R' being from about 8 to about 18; n is from about 1 to about 6; and

wherein the molar ratio of amine glycidol compound to surfactant is from about 10:1 to about 1:10.

5,023,009
BINARY AZEOTROPIC COMPOSITIONS OF 1,1,1,2,3,3-HEXAFLUORO-3-METHOXYPROPANE AND 2,2,3,3,3-PENTAFLUOROPROPANOL-1

Abid N. Merchant, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 3, 1990, Ser. No. 592,562

Int. Cl.^{5} C11D *7/30, 7/50;* **C23G** *5/028;* **C09K** *5/04*

U.S. Cl. 252—171 **8 Claims**

1. An azeotropic composition consisting essentially of about 95-99 weight percent 1,1,1,2,3,3-hexafluoro-3-methoxypropane and about 1-5 weight percent 2,2,3,3,3-pentafluoropropanol-1, wherein the composition has a boiling point of about 54.4° C. when the pressure is adjusted to substantially atmospheric pressure.

5,023,010
BINARY AZEOTROPIC COMPOSITIONS OF 1,1,1,2,3,3-HEXAFLUORO-3-METHOXYPROPANE WITH METHANOL OR ISOPROPANOL OR N-PROPANOL

Abid N. Merchant, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 23, 1990, Ser. No. 555,758

Int. Cl.^{5} C11D *7/30, 7/50;* **C23G** *5/028;* **C09K** *3/30*

U.S. Cl. 252—171 **19 Claims**

1. An azeotropic composition consisting essentially of:

(a) about 89-99% by weight 1,1,1,2,3,3-hexafluoro-3-methoxypropane with about 1-11% by weight methanol, wherein the composition has a boiling point of about 47.1° C. when the pressure is adjusted to substantially atmospheric pressure;

(b) about 95-99% by weight, 1,1,1,2,3,3-hexafluoro-3-methoxypropane with about 1-5% by weight isopropanol, wherein the composition has a boiling point of about 51.4° C. when the pressure is adjusted to substantially atmospheric pressure; or

(c) about 95.9-99.9% by weight 1,1,1,2,3,3-hexafluoro-3-methoxypropane with about 0.1-4.1% by weight n-propanol, wherein the composition has a boiling point of about 51.2° C. when the pressure is adjusted to substantially atmospheric pressure.

5,023,011
COOLING WATER TREATMENT SYSTEM

Bruce D. Busch, Shakopee, and Jeffrey R. Nicholls, Prior Lake, both of Minn., assignors to Fremont Industries, Inc., Shakopee, Minn.

Continuation-in-part of Ser. No. 420,115, Oct. 10, 1989. This application Nov. 13, 1990, Ser. No. 611,778

Int. Cl.^{5} C00F *5/10*

U.S. Cl. 252—180 **1 Claim**

1. A chemical treatment to be utilized in recirculating evaporative cooling tower systems providing for the prevention of scale and deposition and further providing for the in-service removal of scale and deposits present in the systems consisting essentially of a composition having the following formulation:

Ingredient	Percent by Weight
Tetrasodium salt of ethylene diamine tetraacetic acid (EDTA) (as a 40% active, aqueous solution)	10%
2-phosphonobutane-1,2,4-tricarboxylic acid (PBTC phosphonate) (as a 50% active, aqueous solution)	10%
1-hydroxyethane-1,1-diphosphonic acid (HEDP) (as a 60% active, aqueous solution)	3%
Polymaleic acid, sodium salt (as a 50% active, aqueous solution) with a molecular weight of between 500-1000	5%
Polyacrylate copolymer (as a 50% active, aqueous solution) with a molecular weight of about 10,000	6%
Polyacrylate (as a 50% active, aqueous solution) with a molecular weight of between 2000-6000	2%
Sodium gluconate	1%
Sodium molybdate	2%
Sodium benzotriazole	0.5%
Water	balance.

5,023,012
PURIFICATION OF WATER

Pieter W. W. Buchan, 68 Second Street, Linden, Johannesburg, Tranvsvaal Province, and Leon Buchan, Kameeldrift District, both of South Africa, assignors to Pieter Walter William Buchan, Johannesburg, South Africa

Continuation-in-part of Ser. No. 107,921, Oct. 9, 1987, abandoned, which is a continuation of Ser. No. 830,493, Feb. 19, 1986, abandoned, which is a continuation of Ser. No. 658,056, Oct. 4, 1984, abandoned, which is a continuation of Ser. No. 379,703, May 19, 1982, abandoned. This application Jul. 25, 1989, Ser. No. 385,553

Claims priority, application South Africa, Oct. 4, 1988, 88/7442

Int. Cl.^{5} C02F *1/56;* **B03D** *3/06*

U.S. Cl. 25—181 **4 Claims**

1. A composition for the purification of water which is in unit dosage form for the single step batch purification of a relatively small predetermined volume of water, and which comprises:

40-60% (by mass) aluminum sulphate as a coagulant for rapidly coagulating solid impurities dispersed in the water to form primary flocs;

15-25% (by mass) sodium bicarbonate as a coagulant promotor;

20-25% (by mass) bentonite as a clay;

0.5-3% (by mass) sodium dichloroisocyanurate as a first micro-biocide capable of releasing a micro-biocidally effective amount of a micro-biocidal agent into the water at a rate no slower than the rate of formation of the primary flocs, thereby to kill off micro-organisms in the water during, or prior to, primary floc formation;

1-3% (by mass) carboxymethylcellulose as an organic hydrophilic colloid capable, when dispersed simultaneously with the coagulant and first micro-biocide in water, of hydrating to form a sol for aggregating the primary flocs into larger secondary flocs, the proportion of organic hydrophilic colloid in the composition being such that when the composition is used to purify the intended quantity of water, the organic hydrophilic colloid does not interfere with coagulant dispersal in the water or with primary floc formation so that the rate of hydration of the colloid is hence slower than the rate of formation of the primary flocs;

1-3% (by mass) synthetic silica compound as a silica-based substance;

0.02-0.15% (by mass) polyacrylamide as a secondary colloid; and

1-4% (by mass) halazone as a second micro-biocide capable of being aggregated by the hydrophilic colloid with the primary flocs, into the secondary flocs, and also being capable of killing off micro-organisms in the secondary flocs, the second micro-biocide hence differing from the first micro-biocide in that it is capable of releasing a micro-biocidally effective amount of a second micro-biocidal agent into the water at a rate slower than the rate of formation of the primary flocs.

5,023,013
LIQUID CRYSTAL ELECTRO-OPTICAL DEVICE AND MANUFACTURING METHOD THEREFOR

Shunpei Yamazaki, Tokyo, and Masahiko Sato, Atsugi, both of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

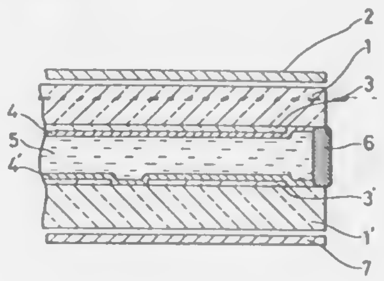
Continuation of Ser. No. 250,411, Nov. 28, 1988, Pat. No. 4,906,074. This application Jan. 26, 1990, Ser. No. 470,725

Claims priority, application Japan, Sep. 29, 1987, 62-244808; Oct. 7, 1987, 62-253178; Oct. 7, 1987, 62-253179; Oct. 7, 1987, 62-253180

The portion of the term of this patent subsequent to Jun. 12, 2007, has been disclaimed.

Int. Cl.^{5} C09K *19/20, 19/06;* **G02F** *1/13*

U.S. Cl. 252—299.67 **4 Claims**



1. A liquid crystal device comprising:

a pair of substrates;

a chiral smectic liquid crystal layer interposed between said substrates;

an electrode arrangement provided for defining a plurality of cell regions in said liquid crystal layer in array form and for applying an electric field to each region; and

an orientation control surface formed on at least one inside surface of said substrates;

wherein said liquid crystal layer comprises at least a material conforming to the formula;

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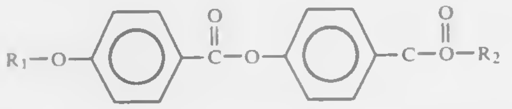


where R_1 is a hydrocarbon having at least 8 and not more than 10 carbon atoms, and R_2 is a hydrocarbon comprising at least two asymmetric carbon atoms wherein the difference in the number of carbon atoms between R_1 and R_2 is within 3 so that micro-domains are formed in said liquid crystal layer whereby each region consists of a plurality of micro-domains in each of which liquid crystal molecules are aligned in accordance with one direction which is different from the direction of liquid crystal molecules of adjacent micro-domains contiguous thereto.

5,023,014
PHOSPHOR

Hiroyuki Toda; Junji Miyahara, and Kenji Takahashi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minamiashigara, Japan

Continuation of Ser. No. 794,377, Nov. 4, 1985, abandoned, which is a continuation of Ser. No. 657,171, Oct. 3, 1984, abandoned, which is a division of Ser. No. 420,111, Sep. 20, 1982, abandoned, which is a division of Ser. No. 367,665, Apr. 12, 1982, abandoned, which is a continuation of Ser. No. 209,208, Nov. 21, 1980, abandoned. This application Sep. 5, 1989, Ser. No. 403,072

Claims priority, application Japan, Nov. 21, 1979, 54-150873

Int. Cl.^{5} C09K *11/62*

U.S. Cl. 252—301.4 H **2 Claims**

1 A rare earth element activated complex halide phosphor represented by the formula:

$$BaFX \cdot cGaX_3''': dA$$

each of X and X''' is at least one halogen selected from the group consisting of Cl, Br and I, A is at least one rare earth element selected from the group consisting of Eu, Tb, Ce, Tm, Dy, Pr, Ho, Nd, Yb, Er, Gd, Lu, Sm and Y, c is a number satisfying the condition of $10^{-4} \leqq c \leqq 0.1$, and d is a number satisfying the condition of $10^{-6} \leqq d \leqq 0.2$.

5,023,015
METHOD OF PHOSPHOR PREPARATION

Costas C. Lagos, Danvers, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed Dec. 19, 1989, Ser. No. 452,900

Int. Cl.^{5} C09K *11/63*

U.S. Cl. 252—301.4 R **9 Claims**

1. A method for preparing divalent europium doped strontium orthoborate phosphor having the empirical formula:

$$Sr_{1-x}B_4O_7.Eu_x^{+2}$$

wherein x is from about 0.005 to about 0.05, the method comprising:

- preparing a solution comprising europium (3+) and strontium in molar proportions equal to their respective molar proportions in the phosphor and boron in a molar proportion of about 4 to about 4.2:
- precipitating the europium (3+), strontium, and boron from the solution by adding a precipitating agent to the solution;
- spray drying the solution, including the precipitate, to form a spray dried powder; and
- firing the spray dried powder in a single firing step in a reducing atmosphere comprising:
  - (a) increasing the temperature of the spray dried powder at an even rate no faster than about 5.5° C./minute from room temperature to a firing temperature of from about 920 to about 942° C.; and (b) maintaining the temperature of the spray dried powder at the firing temperature for a period of at least 4 hours to produce the phosphor.

5,023,016
THERMALLY STABLE SULFONATE COMPOSITIONS

Lawrence V. Gallacher, Norwalk, Conn.; Alfen J. Gustavsen, Ballwin, Mo., and Robert L. Kugel, Norwalk, Conn., assignors to King Industries, Inc., Norwalk, Conn.

Continuation of Ser. No. 26,077, Mar. 16, 1987, Pat. No. 4,895,674. This application Nov. 22, 1989, Ser. No. 440,872

The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.

Int. Cl.^{5} C23F *11/10*

U.S. Cl. 252—389.52 **25 Claims**

1. A rust- and corrosion-inhibiting composition comprising
- (A) a homogeneous concentration of:
  - (a) an oil soluble metal sulfonate;
  - (b) an alkali or alkaline earth metal or zinc soap of a partially esterified alkyl or alkenyl succinic acid or a mixture of any of the foregoing;
  - (c) a carrier; and
- (B) a diluting amount sufficient to provide a composition wherein components (A)(a) and (A)(b) together comprise a minor proportion of said composition, of
  - a base medium which may be the same as or different than (A)(c) or a base medium which may be the same as or different than (A)(c), containing an oil soluble metal sulfonate which may be the same as or different than (A)(a);
- wherein components (A)(a) and (A)(b), together, are capable of imparting retention of greater than about 90 percent of the metal sulfonate content at a temperature of 200° C. for 22 hours and wherein said concentration (A) comprises a minor amount of said composition.

24. A method for the preparation of a rust- and corrosion-inhibiting composition comprising intimately mixing a homogeneous concentrate (A) of:
- (a) an oil soluble metal sulfonate;
- (b) an alkali or alkaline earth metal or zinc soap of a partially esterified alkyl or alkenyl succinic acid, or a mixture of any of the foregoing;
- (c) a carrier; and

(B) a diluting amount sufficient to provide a composition wherein components (A)(a) and (A)(b) together form a minor proportion of said composition, of a base medium which may be the same or different than (A)(c) or a base medium which may be the same as or different than (A)(c) containing an oil soluble metal sulfonate which may be the same as or different than (A)(a);
- wherein components (A)(a) and (A)(b), together, are capable of imparting retention of greater than about 90 percent of the metal sulfonate content at a temperature of 200° C. for 21 hours and wherein said concentrate (A) comprises a minor amount of said composition.

5,023,017
STABLE ALKALINE LABIATAE ANTIOXIDANT EXTRACTS

Paul H. Todd, Jr., Kalamazoo, Mich., assignor to Kalamazoo Holdings, Inc., Kalmazoo, Mich.

Filed Aug. 21, 1989, Ser. No. 396,530

Int. Cl.^{5} C09K *15/00*

U.S. Cl. 252—407 **14 Claims**

1 A stable aqueous alkaline Latiatae antioxidant solution, which does not lose its antioxidant strength (AOS) at ambient temperatures at least six months, consisting essentially of substantially all of the antioxidant substances present in the herb, a solvent selected from the group consisting of an edible lower-aliphatic alcohol and an edible polyol, or a mixture of such alcohol and polyol, and less than about 75% water, the solution having an antioxidant strength (AOS) of 0.2 or more when compared with a BHT standard having an AOS of one (1) and a pH above about 8.4 and below about 11.8.

11. An aqueous alkaline epoxy emulsion having antioxidant properties consisting essentially of the epoxy emulsion and an effective antioxidant amount of natural antioxidants derived from a Labiatae herb and substantially free of lipids present in the herb.

5,023,018
USE OF POLYHYDROXYALKYLAMINE-N,N-DICARBOXYLIC ACIDS AND THEIR SALTS AS BUILDERS IN DETERGENTS AND CLEANING AGENTS

Heike Kelkenberg, Gladbeck, and Wulf Ruback, Recklinghausen, both of Fed. Rep. of Germany, assignors to Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany

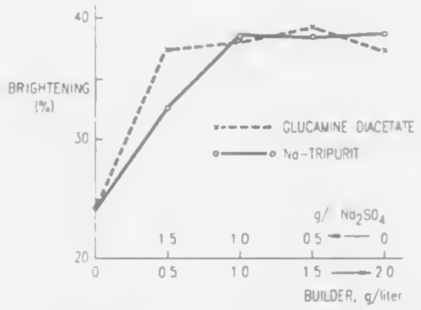
Continuation of Ser. No. 159,738, Feb. 24, 1988, Pat. No. 4,882,091. This application Jul. 21, 1989, Ser. No. 383,062

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1987, 3710062

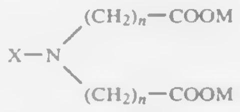
The portion of the term of this patent subsequent to Nov. 21, 2006, has been disclaimed.

Int. Cl.^{5} C11D *3/33, 1/83;* C07C *229/02*

U.S. Cl. 252—527 **5 Claims**



1. A detergent or cleansing composition, comprising:
- a combination of at least one surfactant with from 2–60 wt.%, based on the weight of the composition, of a builder consisting of a polyhyroxyalkylamine-N,N-dialkylcarboxylic acid or a salt thereof of the formula:



$$X-N\begin{cases}(CH_2)_n-COOM\\(CH_2)_n-COOM\end{cases}$$

wherein X is 1 -deoxyerythrityl, 1-deoxyarabityl, 1-deoxyxylityl, 1-deoxysorbityl, 2-deoxysorbit-2-yl, 1-deoxymannityl, 2-deoxymannit-2-yl, 1-deoxygalactityl, 1-deoxy-4-glucosidosorbityl, 1-deoxy-4-galactosidosorbityl, 2-deoxy-4-glucosidosorbit-2-yl, 2-deoxy-4-glucosidomannit-2-yl, 1-deoxy-4-maltoglucosido-sorbityl, 1-deoxy-4-oligoglucosido-sorbityl, or 1-deoxy-4-polyglucosidosorbityl, M is hydrogen, ammonium or an alkali metal ion and n is an integer of from 1 to 3.

5,023,019
U.V. DETECTABLE FLAME RETARDANT

Patrick D. Bumpus, P.O. Box 7305, Auburn, N.Y. 13022

Filed Aug. 15, 1990, Ser. No. 567,635

Int. Cl.^{5} C09K *21/00*

U.S. Cl. 252—607 **7 Claims**

1. A flame retardant or fire retardant preparation that comprises an aqueous solution of ammonium sulfate, a metasilicate salt serving as a binder, and an effective amount of a fluorescent agent which is invisible under normal visible light but is clearly visible under ultraviolet illumination, wherein said fluorescent agent is a substituted 2,2'-disulfonic acid salt.

5,023,020
METHOD FOR SUPPLYING AROMAS, APPARATUS THEREFORE AND FACILITIES PROVIDED WITH SAME

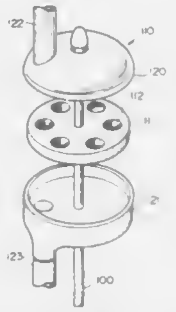
Hiroji Machida; Michiaki Asano; Yozo Watanabe; Tomoya Tokuhiro; Hiroshi Satoh; Motoyuki Iwahashi; Norihiro Yamaguchi; Koshin Kikuchi, and Hiroaki Watanabe, all of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 204,373, Jun. 9, 1988, abandoned. This application Mar. 14, 1990, Ser. No. 494,853

Claims priority, application Japan, Jun. 10, 1987, 62-144334; Nov. 10, 1987, 62-283629

Int. Cl.^{5} B01F *3/04*

U.S. Cl. 261—18.1 **11 Claims**



2. An apparatus for supplying aromas comprising:
- a cylindrical receptor having plural containers for receiving aromas, each of said containers being defined by a peripheral wall and plural walls extending radially from a center thereof to said peripheral wall and having an inlet aperture and an outlet aperture for passing air therethrough, a ventilator for supplying air to the container where a selected aroma is received to obtain an air containing aroma, drive means having a drive shaft for rotating said receptor about an axis thereof so as to move a stated container to a stated position for passage of air therethrough, air passage means for interconnecting said receptor and said ventilator, and a controller for controlling said receptor to adjust the amount of one stated aroma from the plural aromas in said receptor according to an influence on people by the stated aroma at a stated time in a day.

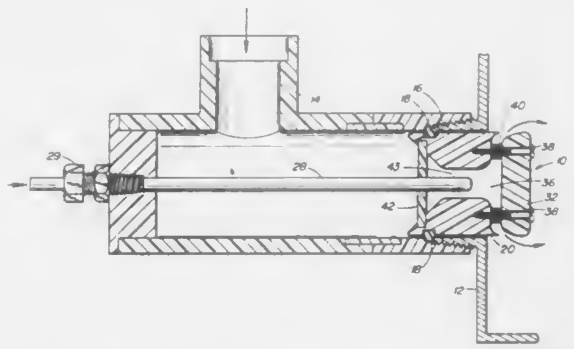
5,023,021
CARTRIDGE VENTURI

Richard H. Conrad, 950 Idylberry Rd., San Rafael, Calif. 94903

Filed Mar. 7, 1990, Ser. No. 489,674

Int. Cl.^{5} B01F *3/04*

U.S. Cl. 261—76 **18 Claims**



1. A cartridge venturi for aspirating a first fluid into a second fluid, said cartridge venturi conditioned for installation into a pipe carrying said second fluid, said cartridge venturi comprising:

VOL 1127
ISS 2
JE 11
1991
UMI

a cartridge body bearing an entrance cone portion, a venturi throat portion, and a rear surface, said venturi throat portion having a longitudinal axis;

an aspirator tube for delivery of said first fluid, said aspirator tube bearing an entry end and a terminal opening, said terminal opening positioned in said venturi throat, said aspirator tube having a longitudinal axis coaxial with said venturi throat portion longitudinal axis; and

an end piece bearing a front surface, said end piece front surface positioned proximate said cartridge body rear surface to generally define a disc volume, so that said fluids flow through said venturi throat portion and are directed into a radially flowing thin sheet.

5,023,022

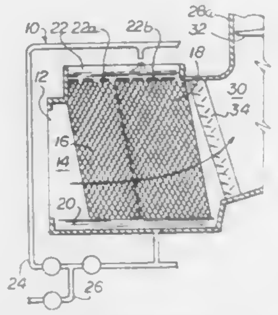
COOLING TOWER WITH MULTIPLE FILL SECTIONS OF DIFFERENT TYPES

Peter M. Phelps, 15 Buckeye Way, Kentifield, Calif. 94904

Continuation-in-part of Ser. No. 410,364, Sep. 20, 1989, Pat. No. 4,934,663. This application Dec. 15, 1989, Ser. No. 451,464

Int. Cl.^{5} B01F *3/04*

U.S. Cl. 261—111 **17 Claims**



1. A tower for contacting liquid and gas comprising at least one upright sidewall having a gas inlet opening, a gas outlet opening, means for supplying gravitating liquid through an upper portion of the tower and including adjacent outboard and inboard liquid supply sections, said outboard liquid supply section including means supplying gravitating liquid at a flow rate per distribution area substantially higher than said inboard liquid supply section, at least one outboard film fill section disposed directly below said outboard liquid supply section, and an inboard fill section including film fill or splash fill or both and disposed directly below said inboard liquid supply section, the effective fill density of said fill below said outboard liquid supply section being substantially higher than that of the fill below said inboard liquid supply section.

5,023,023

METHOD OF FORMING CURVED TRANSPARENT CELLULOSE DIACETATE VISOR HAVING SILK SCREENED ELECTRIC HEATING CONDUCTOR

Allen Elenewski, Rte. 2, 2270 15th La., Friendship, Wis. 53934

Filed Jun. 20, 1989, Ser. No. 369,407

Int. Cl.^{5} B29C *51/14*

U.S. Cl. 264—1.7 **18 Claims**

1. A method of forming an optically transparent, curved visor of a type to be used with a helmet, the visor being formed to have an electric heater thereon, comprising the steps of: applying metal silk screen ink through a silk screen form onto a flat optically transparent organic sheet; drying the ink on the flat sheet such that the optical properties of the transparent sheet are not substantially affected; placing the flat sheet with the dried silk screen ink thereon into an oven on a form curved to the approximate final shape of the visor; while the flat sheet is on the form in the oven, raising the temperature of the flat sheet so the flat sheet becomes plastic while exerting a force on the flat sheet so a surface of the sheet conforms approximately to the shape of the form, the temperature of the oven and the length of time the sheet is at the raised temperature being such that (a) mechanical and electrical characteristics of the silk screening ink on the sheet are not substantially affected and (b) the optical characteristics of the sheet are not substantially affected.

5,023,024

PROCESS FOR PRODUCING MICROCAPSULES

Nobuo Kyogoku, Osaka; Takeshi Saeki, Gunma, and Shigeaki Fujikawa, Osaka, all of Japan, assignors to Suntory Limited, Osaka, Japan

Filed Jan. 13, 1989, Ser. No. 296,777

Int. Cl.^{5} B01J *13/20, 13/10*

U.S. Cl. 264—4.3 **4 Claims**

1. In a process for producing microcapsules by complex coacervation of an aqueous solution of gelatin and an anionic polymeric substance having a core material present in an emulsified or dispersed state, the improvement wherein the gelatin in the wall membrane of coacervates formed around the microdroplets of the core material is hardened by a crosslinking reaction with an iridoid compound to produce heat stable and edible microcapsules.

5,023,025

HALOCARBONS FOR FLASH-SPINNING POLYMERIC PLEXIFILAMENTS

Hyunkook Shin, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 379,291, Jul. 18, 1989, abandoned, which is a continuation-in-part of Ser. No. 238,442, Aug. 30, 1988, abandoned. This application Feb. 27, 1990, Ser. No. 485,666

Int. Cl.^{5} D01D *5/11*

U.S. Cl. 264—13 **12 Claims**

1. An improved process for flash-spinning plexifilamentary film-fibril strands wherein polyethylene is dissolved in a halocarbon spin liquid to form a spin solution containing 10 to 20 percent of polyethylene by weight of the solution at a temperature in the range of 130 to 210° C. and a pressure that is greater than 2400 psi which solution is flash-spun into a region of substantially lower temperature and pressure, the improvement comprising the halocarbon being selected from the group consisting of

1,1-dichloro-2,2,2-trifluoroethane,
1,2-dichloro-1,2,2-trifluoroethane and
1,1-dichloro-1,2,2-trifluoroethane.

5,023,026

METHOD FOR HYDROPHILICATION TREATMENT OF SYNTHETIC RESIN OBJECT, AND CULTURE DEVICES AN INSPECTION APPARATUS TREATED BY SAME

Takao Yoshida, Tama; Keinosuke Isono, Kawaguchi, and Tatsuo Suzuki, Machida, all of Japan, assignors to Material Engineering Technology Laboratory, Incorporated, Tokyo, Japan

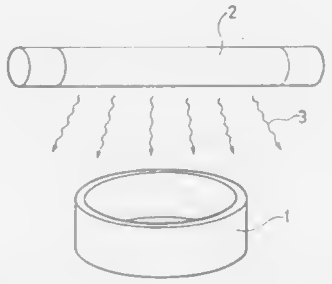
Continuation of Ser. No. 133,426, Dec. 15, 1987, abandoned. This application Oct. 23, 1989, Ser. No. 425,359

Claims priority, application Japan, Dec. 17, 1986, 61-301035

Int. Cl.^{5} B29C *71/04*

U.S. Cl. 264—22 **5 Claims**

1. A method for reducing the contact angle of a synthetic resin object to be contacted with an aqueous liquid, comprising: irradiating the surface of a synthetic resin object, having a first contact angle with water, with ultraviolet rays having wavelengths of 184.9 nm and 253.7 nm, without irradiating so as to cause the shape of the surface of said synthetic resin object to change, whereby the surface of said synthetic resin object is oxidized by said irradiation to obtain a synthetic resin object having an oxidized surface with a second contact angle with water, wherein said synthetic resin is selected from the group consisting of thermoplastic and thermosetting resins and said second contact angle with water is less than said first contact angle.



5,023,027

PROCESS FOR PRODUCING FIBROUS MATS AS A STARTING MATERIAL FOR COMPRESSION MOULDED ARTICLES

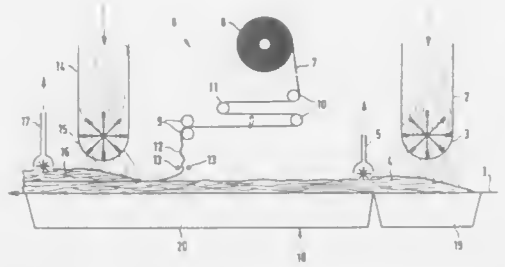
Herbert Nopper, Kuppenheim, Fed. Rep. of Germany, assignor to Casimir Kast GmbH & Co., KG, Gernsbach, Fed. Rep. of Germany

Filed Feb. 1, 1985, Ser. No. 697,452

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1984, 3403670

Int. Cl.^{5} D04H *1/58;* B27N *3/12*

U.S. Cl. 264—37 **6 Claims**



1. A process for producing fibrous mats for forming a starting material for compression moulded articles, the process comprising the steps of:

mixing fiberized waste materials with at least one of a thermoplastic and thermosetting binder;
spreading the mixed material onto an air permeable conveyor belt to form a first layer;
thermally conditioning one of a polyester fabric or lattice with multi-filament threads and a mesh size of between 4 mm and 7 mm at a temperature substantially corresponding to a mould temperature of the molded articles;
loosely placing one of the polyester fabric or lattice and a thermosetting heat activatable finish having an affinity to the binder of the fibers of the fiberized material on the first fleece layer;
constantly applying a vacuum to a bottom of the conveyor belt during placing of one of the polyester fibers or lattice on the first fleece layer;
spreading a second fleece layer onto the fabric or lattice; and
compressing the first and second layers to form the fibrous mat.

5,023,028

METHOD AND APPARATUS FOR CONTROLLING A BACK PRESSURE OF A MOTOR-DRIVEN INJECTION MOLDING MACHINE

Masao Kamiguchi, and Minoru Kobayashi, both of Yamanashi, Japan, assignors to Fanuc Ltd., Yamanashi, Japan

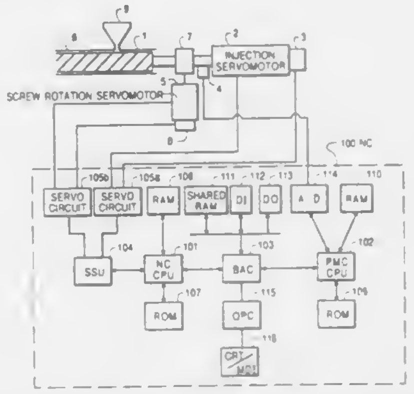
PCT No. PCT/JP89/01126, § 371 Date Jul. 10, 1990, § 102(e) Date Jul. 10, 1990, PCT Pub. No. WO90/05057, PCT Pub. Date May 17, 1990

PCT Filed Oct. 31, 1989, Ser. No. 536,551

Claims priority, application Japan, Oct. 31, 1988, 63-273205

Int. Cl.^{5} B29C *45/77*

U.S. Cl. 264—40.1 **4 Claims**



1. A method of controlling a back pressure of a motor-driven injection molding machine, comprising the steps of:

(a) rotating a servomotor which is operable to axially move a screw, in a screw receding direction at a target rotation speed equal to the product of an override value and a rotation speed specified by a numerical control program, in a metering process; and
(b) varying said override value used in said step (a) such that a detected actual resin pressure becomes equal to a previously set target back pressure.

5,023,029

METHOD AND APPARATUS FOR PRODUCING PIPE WITH ANNULAR RIBS

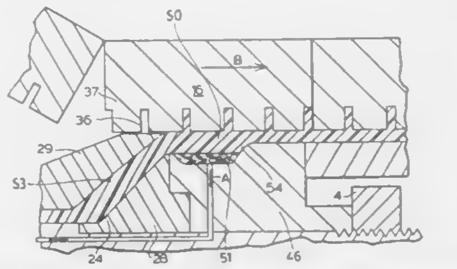
Manfred A. A. Lupke, 10 McLeary Ct., Concord, Canada L4K 2Z3

Filed Sep. 11, 1989, Ser. No. 405,777

Claims priority, application Canada, Sep. 16, 1988, 577653

Int. Cl.^{5} B29C *47/22*

U.S. Cl. 264—40.5 **16 Claims**



1. A method for extruding seamless plastic tubing having annular solid ribs spaced one from the other by grooves along the length of such tubing with apparatus including a mold tunnel axially advancing at a substantially constant rate having radially outwardly extending troughs for molding said ribs, the troughs being axially separated one from another by crests for molding the grooves, a mandrel, a nozzle, an extrusion orifice formed between the nozzle and mandrel, and a pressure compensating chamber associated with the orifice having an open face to the troughs and crests for the discharge of said plastic

VOL
1127
ISS
2
JE
11
1991
UMI

material therefrom, and a chamber volume varying component, the method comprising the steps of:

extruding a thermoplastic material at a predetermined rate into an axially advancing mold tunnel, varying the effective volume of the chamber to maintain substantially uniform pressure thereby satisfying requirements for supply of thermoplastic material to compensate for pressure fluxuations and requirements for the thermoplastic material for molding the pipe ribs in the troughs and for molding the pipe grooves at the crests of the molds.

8. Improvements in apparatus for producing thermoplastic tubing having annular solid ribs spaced from one another by grooves, the apparatus generally defining an axially disposed molding tunnel composed of a plurality of advanceable, articulated, interconnected mold blocks in an endless chain having a ribbed wall defined by alternating crests and troughs in the mold-defining faces for forming an outer tube surface, a forming plug for forming an inner tube surface, extrusion means including a nozzle, a mandrel, and an orifice formed therebetween disposed at the entrance to the mold tunnel for extruding a tube of thermoplastic material, and means for urging said tube outwardly against said ribbed wall, the improvement comprising:

a pressure compensating chamber extending from and fluidly connected with the orifice and open to the ribbed wall, the chamber being located to receive thermoplastic material from the extrusion means and to discharge said thermoplastic material into the mold tunnel, said pressure compensating chamber including means for varying the effective volume of the thermoplastic material to maintain a substantially uniform pressure of the thermoplastic material for molding the pipe ribs in the troughs and for molding the pipe grooves at the crests of the molds.

5,023,030

METHOD FOR CASTING ONE OR SEVERAL CONCRETE PRODUCTS PLACED SIDE BY SIDE

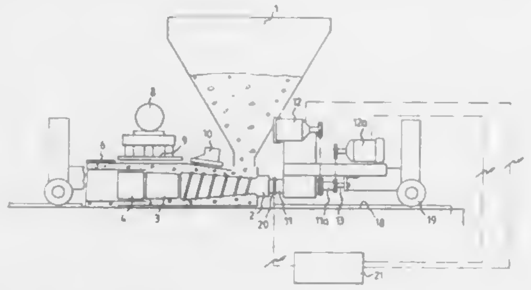
Heikki Rantanen, Toijala, Finland, assignor to Oy Partek Ab, Toijala, Finland

Filed Sep. 14, 1989, Ser. No. 407,154

Claims priority, application Finland, Sep. 14, 1988, 884233

Int. Cl.^{5} B28B *1/08;* B29C *43/22, 47/60, 47/92*

U.S. Cl. 264—40.5 **18 Claims**



1. A method for casting at least one concrete product from a high-consistency concrete mix by means of a slide-casting machine, comprising the steps of:

feeding the concrete mix by means of at least two parallel feed members placed side by side into at least one cross section of the concrete product to be cast;

compacting the concrete mix by reducing free spaces present between aggregate particles in the concrete mix with a compacting member to form the concrete product;

monitoring the compacting of the concrete mix by measuring the pressure of the concrete mix acting upon a part of the slide-casting machine in at least two points of the cross section of the concrete product; and

regulating operating values of the feed movements of each of the parallel feed members separately of each other and regulating operating values of the compacting movements of the compacting member in response to the measurement values obtained to thereby ensure substantially uniform compaction of the cross section of the concrete product.

5,023,031

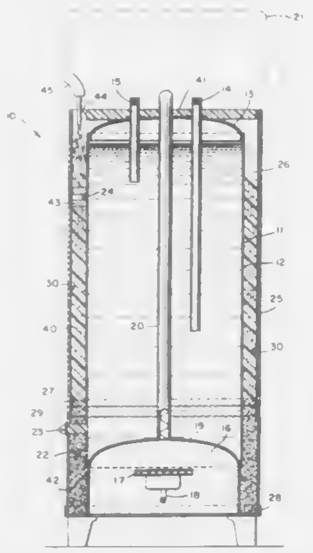
METHOD OF MAKING A FOAM INSULATED WATER HEATER

Eugene L. West, Grand Rapids, and Robert J. Marcinkewicz, Plainwell, both of Mich., assignors to Bradford-White Corporation, Philadelphia, Pa.

Continuation of Ser. No. 743,422, Jun. 11, 1985, Pat. No. 4,904,428. This application Oct. 3, 1989, Ser. No. 416,378

Int. Cl.^{5} B29C *67/22*

U.S. Cl. 264—46.5 **2 Claims**



1. In a method of insulating a water heater having a water tank with an expandable polyurethane foam insulating material, the steps comprising:

(a) securing a jacket around the tank, the jacket being dimensioned to provide a space between the tank and the jacket, the space being capable of containing an expandable foam insulating material in an initial liquid state;

(b) with the space between the tank and the jacket open at the top, introducing an expandable polyurethane foam forming liquid having an initial viscosity, as introduced, of less than about 300 cps when measured at a temperature of 25° C. and under atmospheric pressure and at a relative humidity of about 50%, a flow index $\geqq$ about 0.7, a gel index $\geqq$ about 0.8 and which generates a maximum pressure of $\leqq$ about 1.0 psig, between the tank and the jacket, and

(c) thereafter securing a cover on the top of the jacket to close off the top of the jacket, whereby the foam forming liquid expands within the jacket and against the tank to fill said space and the resulting polyurethane foam solidifies in place.

5,023,032

ELECTROSTRICTIVE CERAMIC MATERIAL INCLUDING A PROCESS FOR THE PREPARATION THEREOF AND APPLICATIONS THEREFOR

Alex E. Bailey, Cockeysville; Stephen R. Winzer, Ellicott City; Audrey E. Sutherland, Eldersburg, and Andrew P. Ritter, Baltimore, all of Md., assignors to Martin Marietta Corporation, Bethesda, Md.

Continuation of Ser. No. 256,030, Oct. 7, 1988, abandoned, which is a continuation-in-part of Ser. No. 106,468, Oct. 9, 1987, abandoned. This application Aug. 31, 1990, Ser. No. 579,205

Int. Cl.^{5} C04B *35/64*

U.S. Cl. 264—63 **14 Claims**

1. A method of making an electrostrictive material comprising:

mixing together powders of $Pb(Mg_{1/3}Nb_{2/3})O_3$, $PbTiO_3$, PbO, TiO_2 and at least one dopant material selected from the group consisting of $SrCO_3$ and $BaCO_3$ in desired stoichiometric proportions to form a mixture;

wet milling said mixture;

drying and calcining said mixture to form a calcined powder;

wet milling said calcined powder;

forming a binder-distilled water mixture;

adding said calcined powder to said binder-distilled water mixture to form a slurry;

evaporating substantially all water from the slurry to form a dried mass;

grinding the dried mass to -100 mesh powder;

dry pressing said -100 mesh powder to form compacts;

isostatically pressing said compacts to form pellets;

packing the pellets into a powder having substantially the same chemical composition as the pellets; and

firing the pellets.

5,023,033

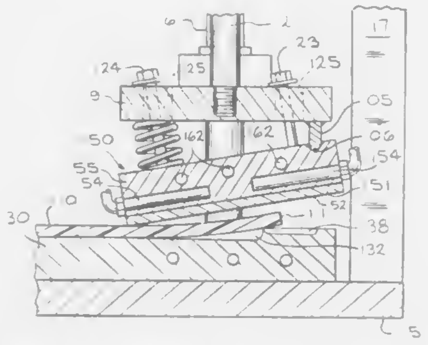
DECORATIVE PLASTIC TRIM STRIP AND METHOD AND APPARATUS FOR FORMING

Mehmet Y. Cakmakci, Rochester Hills, Mich., assignor to Aeroquip Corporation, Jackson, Mich.

Continuation-in-part of Ser. No. 397,965, Aug. 24, 1989. This application May 21, 1990, Ser. No. 526,476

Int. Cl.^{5} B29C *57/10;* B28B *1/02*

U.S. Cl. 264—161 **8 Claims**



1 A method for reshaping an end portion of an extruded plastic strip having a flat side and contoured side comprising the steps of:

(a) providing a first mold section having a surface and an upwardly facing cavity formed therein, said cavity having a contour conforming to the desired configuration of the contoured side after reshaping, said cavity including a closed end, at least a portion of said cavity having a contour which is dissimilar from the contour of said contoured side as extruded;

(b) positioning a second mold section having a planar molding face above said first mold section with said planar molding face disposed at an angle relative to said surface such that the portion overlying said closed end is higher than the portions of said planar molding face overlying the rest of said cavity;

(c) positioning a length of said plastic strip in said first mold section with said contoured side facing the cavity and with its end extending beyond the end of said cavity;

(d) imparting relative movement between said first and second mold sections toward one another to cause the second mold section planar molding face to engage said plastic strip positioned in said cavity at an area away from said end;

(e) heating said second mold section planar molding face and the plastic strip contacted thereby to a temperature at which said plastic strip can be reshaped while cooling said first mold section to maintain the surface of said cavity below the softening point of the plastic material forming said plastic strip;

(f) during step (e) continuing said relative movement while rotating said planar molding face into engagement with the remaining portions of said plastic strip lying under said planar molding face to compression mold and reshape said length of plastic strip into conformity with said cavity; and,

(g) cooling the reshaped plastic strip in said cavity.

5,023,034

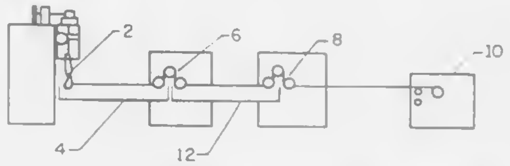
WET SPINNING OF SOLID POLYAMIC ACID FIBERS

William E. Dorogy, Jr., Newport News, and Anne K. St. Clair, Poquoson, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation-in-part of Ser. No. 410,572, Sep. 21, 1989, abandoned. This application Jun. 26, 1990, Ser. No. 543,926

Int. Cl.^{5} D01F *6/74*

U.S. Cl. 264—184 **8 Claims**



1. A process for preparing solid aromatic polyamic acid fibers comprising the steps of:

(a) reacting of an aromatic dianhydride with an aromatic diamine in an aprotic organic solvent so that the resulting resin solution has a solid content of at least about 15% (w/w) and a resin inherent viscosity of at least about 1.6 dl/g at approximately 35° C.;

(b) extruding the resin solution into a coagulation bath selected from the group consisting of:

an alcohol and an aqueous solution of an alcohol;

so that the diameters of the resulting fibers are approximately 50 microns or less when the resin inherent viscosity of the resin solution is approximately 1.6 dl/g.

5,023,035

CYCLIC TENSIONING OF NEVER-DRIED YARNS

Hung H. Yang, Richmond, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 21, 1989, Ser. No. 312,653

Int. Cl.^{5} D01F *6/60;* D01D *10/06*

U.S. Cl. 264—184 **6 Claims**

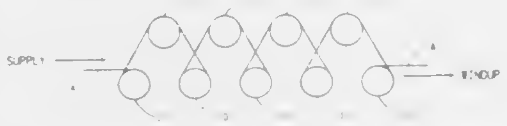
1. A process for preparing high tenacity, high modulus fibers of para-aramid having an inherent viscosity of at least 4.0 whose chain extending bonds are coaxial or parallel and oppositely directed, comprising the steps of:

(a) extruding an anisotropic solution of the para-aramid in 98.0 to 100.2% sulfuric acid having a para-aramid concentration of at least 30 g/100 ml sulfuric acid through a layer of non-coagulating fluid into a coagulating bath to yield fibers;

VOL
1127
ISS
2
JE
11
1991
UMI

(b) washing the fibers; and

(c) applying at least two cycles of tensioning forces to the washed fibers at a temperature of 5° to 50° C. having at least 20% moisture,



wherein the tensioning force in the first cycle is 10 to 80% of the never-dried breaking load followed by a relaxation to 0 to 25% of the first tensioning force and subsequent tensioning forces are 10 to 80% of the never-dried breaking load followed by subsequent relaxations to 0 to 25% of the tensioning forces.

5,023,036

METHOD OF MANUFACTURING ELECTROSTATIC DISSIPATING COMPOSITION

Biing-Lin Lee, Broadway Heights; Francis R. Sullivan, Cleveland Heights, and Elaine Audrey Mertzel, Rocky River, all of Ohio, assignors to The BF Goodrich Company, Akron, Ohio

Filed Jul. 13, 1989, Ser. No. 379,393

Int. Cl.^{5} B29C *47/36;* **B29B** *11/10*

U.S. Cl. 264—211.23 **6 Claims**

1. A method of manufacturing an electrostatic dissipating material, said method comprising:

heat mixing or blending a first, a second and a third component in two steps, whereby in the first step the second and third components are first heat mixed or blended together to provide an initial mixture and then in a second step the first component is heat mixed or blended with said initial mixture,

said first component being a polyolefinic, urethane, condensation, vinylic or styrenic polymers, said second component being an oxirane copolymer which is substantially the polymer product of the following comonomers;

i) ethylene oxide in the range from about 5% to about 95% by weight; and

ii) at least one heterocyclic comonomer in the range of from about 95% to about 5% by weight, wherein the cyclic comonomer comprises a ring comprising an oxygen atom and at least 2 carbon atoms;

and said third component being a polymer additive, whereby the amount of the second component is less than the amount necessary to obtain the same performance in a conventional one step process of the same material composition and the electrostatic dissipating material has a 90% decay time of not more than 0.5 seconds and a 99% decay time of not more than 2.0 seconds.

5,023,037

METHOD OF AND ARRANGEMENT FOR MANUFACTURING ENCLOSED BLOCKS

Heinz Züllig, Niederweningen, Switzerland, assignor to Bucher-Guyer AG Maschinenfabrik, Niederweningen, Switzerland

Continuation of Ser. No. 573,031, Jan. 23, 1984, abandoned, which is a division of Ser. No. 405,874, Aug. 6, 1982, Pat. No. 4,449,905. This application Apr. 17, 1989, Ser. No. 339,162

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1981, 3133663

Int. Cl.^{5} B30B *11/02;* **B29C** *43/34*

U.S. Cl. 264—261 **6 Claims**

1. A method for manufacturing refractory blocks in a pressing region located between opposing upper and lower pressing dies, comprising

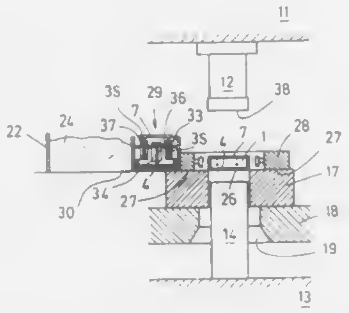
advancing said lower pressing die through a mold chamber with a pressing surface of said lower pressing die facing said upper pressing die so that said pressing surface of said lower pressing die becomes flush with an upper surface of a mold facing said upper pressing die,

automatically inserting upper and lower block casings on a feeding means which includes pushing means, said feeding means being movable along a horizontal plane which passes through said pressing region from a first side thereof to a second side thereof,

while inserting said upper and lower casings on said feeding means, bringing a previously formed refractory block in said pressing region into position for removal,

bringing said feeding means with said upper and lower block casings into said pressing region between said upper and lower pressing dies, while simultaneously removing said previously formed refractory block from said pressing region,

withdrawing said lower pressing die from said upper surface of said mold,



by means of said pushing means, ejecting said lower block casing into said mold chamber within said pressing region while simultaneously ejecting said upper block casing toward said upper pressing block for self-releasable holding thereon,

withdrawing said feeding means from said pressing region while simultaneously bringing filling means into said pressing region to fill said lower block casing with said refractory material,

removing excess refractory material from said pressing region by withdrawing said filling means therefrom,

pressing said upper and lower block casings together by means of said upper and lower pressing dies to form a refractory block, and

cyclically repeating each of said steps in synchronism with said pressing step of said upper and lower pressing dies.

5,023,038

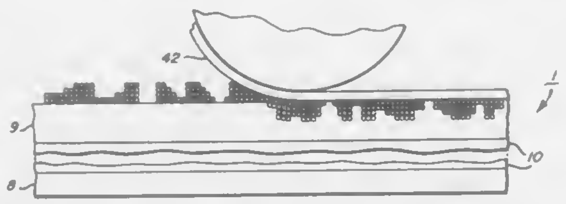
METHOD AND APPARATUS FOR TEXTURIZING TONER IMAGE BEARING RECEIVING SHEETS AND PRODUCT PRODUCED THEREBY

Muhammad Aslam, Rochester; Thomas J. Farnand, Webster, and Ernest J. Tamary, Brighton, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 11, 1989, Ser. No. 405,175

Int. Cl.^{5} B28B *11/08*

U.S. Cl. 264—293 **16 Claims**



1. A method of imparting a texture to a surface of a thermoplastic layer on a support, which layer carries a toner image, said method comprising:

heating said thermoplastic layer to its glass transition temperature,

then placing said support between first and second pressure members, said first member contacting the thermoplastic layer, and the second member contacting the opposite side of the sheet and having a texturizing surface, and

applying sufficient pressure between said pressure members to impart a texture to said thermoplastic layer corresponding to said texturizing surface.

5,023,039

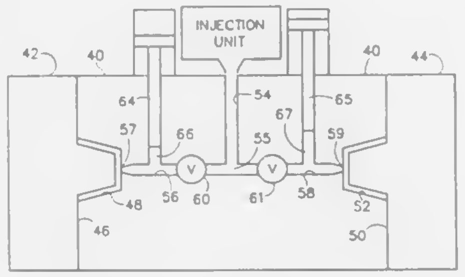
HOLD-PRESSURE CONTROL IN MULTI-PARTING INJECTION MOLDING SYSTEM

Jens O. Sorensen, Rancho Santa Fe, Calif., assignor to Primtec, Rancho Santa Fe, Calif.

Continuation of Ser. No. 70,850, Jul. 8, 1987, abandoned. This application Mar. 22, 1989, Ser. No. 327,373

Int. Cl.^{5} B29C *45/12, 45/57*

U.S. Cl. 264—297.2 **6 Claims**



1. A method of controlling hold pressure applied to cooling cavities of a stacked multi-parting injection molding system having desynchronized injection periods, including a center part and first and second end parts disposed for movement with respect to each other along a common axis and defining a first cooling cavity between the center part and the first end part and a second cooling cavity between the center part and the second end part, when cyclic injection molding a plastic material by utilizing a combination of the center part and an injection unit which together encompass a feed system that is separated during the molding cycle by the injection unit being separated from the center part, the feed system comprising a first branch with a first valve in the center part for feeding the first cooling cavity and a second branch with a second valve in the center part for feeding the second cooling cavity, the method comprising the cyclic steps of

(a) opening the first valve;

(b) filling the first cooling cavity with plastic material by pressurizing the injection unit;

(c) shutting the first valve to withhold said plastic material in the first cooling cavity;

(d) hold pressurizing the plastic material withheld by the first valve in the first cooling cavity;

(e) opening the second valve;

(f) filling the second cooling cavity with plastic material by pressurizing the injection unit;

(g) shutting the second valve to withhold said plastic material in the second cooling cavity;

(h) hold pressurizing the plastic material withheld by the second valve in the second cooling cavity; and

(i) separating the injection unit from the center part at a time when the injection unit is not being pressurized in accordance with step (b) or step (f);

wherein the first branch between the first valve and the first cooling cavity is connected to a first piston means, and wherein the second branch between the second valve and the second cooling cavity is connected to a second piston means;

wherein step (d) further comprises the step of

(j) further hold pressurizing the first cooling cavity by protracting the first piston means; and

wherein step (h) further comprises the step of

(k) further hold pressurizing the second cooling cavity by protracting the second piston means.

5,023,040

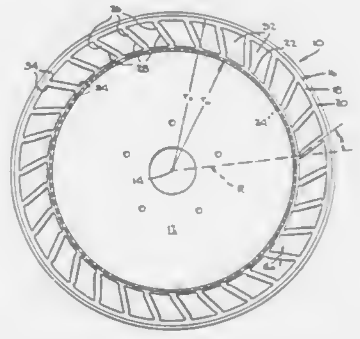
METHOD OF MAKING A POLYURETHANE NON-PNEUMATIC TIRE

Vincent J. Gajewski, Cheshire; Wallace I. Goddard, Southbury; Richard L. Palinkas, Northfield, and George H. Nybakken, Middlebury, all of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

Division of Ser. No. 172,039, Mar. 23, 1988, Pat. No. 4,934,425. This application May 25, 1990, Ser. No. 529,052

Int. Cl.^{5} B29C *45/00*

U.S. Cl. 264—328.3 **6 Claims**



1. A method of manufacturing a non-pneumatic tire having improved hysteresis and flex fatigue resistance comprising the steps of:

(a) intimately preblending about 95 to 50 mol percent of a first low molecular weight polytetramethylene ether glycol having a molecular weight of between 200 and 1,500 with about 5 to 50 mol percent of a second higher molecular weight polytetramethylene glycol having a molecular weight of between 1,500 and 4,000 to form a PTMEG blend:

(b) reacting said PTMEG blend with toluene diisocyanate to form a mixed molecular weight diisocyanate end capped polyether glycol prepolymer;

(c) reacting said mixed molecular weight isocyanate end capped prepolymer with an aromatic diamine curative in a mold having an internal cavity shaped to form an annular body having a generally cylindrical outer member at the outer periphery thereof, a generally cylindrical inner member spaced radially inward from and coaxial with said outer member, a plurality of axially extending, circumferentially spaced-apart rib members connected at their corresponding inner and outer ends to said inner and outer cylindrical members, said rib members being generally inclined at an angle of about 0° to 75° to radial planes which intersect them at their inner ends, and at least one web member having opposite side faces, said web member having its inner and outer peripheries connected respectively to said inner and outer cylindrical members, said web member being connected on at least one of its side faces to at least one of said rib members to thereby form with said rib member a load-carrying structure for said outer cylindrical member, said load carrying structure being constructed to permit locally loaded members to buckle; and

(d) demolding said annular body.

VOL
1127
ISS
2
JE
11
1991
UMI

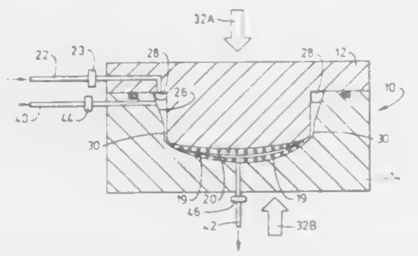
5,023,041
METHOD FOR MAKING A FIBER REINFORCED COMPOSITE ARTICLE

Jackie D. Jones; Guy C. Murphy, both of Fairfield; Thomas C. Mesing, Mainville, and Barrett J. Fuhrmann, Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Continuation of Ser. No. 333,877, Apr. 4, 1989, abandoned, which is a continuation of Ser. No. 131,473, Dec. 10, 1987, abandoned. This application Mar. 12, 1990, Ser. No. 504,072

Int. Cl.^{5} B29C *43/18, 45/02, 45/16*

U.S. Cl. 264—510 3 Claims



1. In the method for making a fiber reinforced composite article, including placing within a mold, a plurality of plies stacked in preselected order to make a preform, each ply having fibers embedded in a heat flowable matrix material; and closing the mold portions to define an article cavity about the preform; the subsequent steps of:

at the pressure existing in the article cavity about the preform upon closing the mold, heating the preform to a temperature selected to fluidize the matrix material in the preform and to flow the matrix material within and about the article cavity and the preform fibers, while maintaining the article cavity, to generally fill the article cavity, and to flow excess fluid preform matrix material from within the article cavity outside of the article cavity and in fluid flow relationship with the article cavity;

while maintaining the matrix material fluid through heating, applying a gas back pressure to the excess fluid matrix material to force the excess fluid matrix material back into the article cavity and thereby to pressurize the article cavity through the excess fluid matrix material; and then,

maintaining the gas pressure to pressurize the article cavity while solidifying the matrix material.

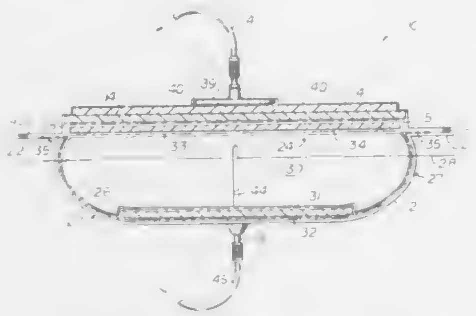
5,023,042
FLEXIBLE MOLD FOR MAKING SEAMLESS SAILBOARDS

Gary Efferding, P.O. Box 2562, Dunedin, Fla. 34697

Filed Jun. 29, 1989, Ser. No. 373,832

Int. Cl.^{5} B29C *33/50, 65/02, 31/30*

U.S. Cl. 264—511 2 Claims



1. A method of producing a seamless sailboard from a blank that is pervious to air, comprising the steps of:

providing a flexible and resilient mold part having an internal cavity means of predetermined breadth and configuration and having an open end of less breadth than the breadth of said internal cavity means;

providing a flat, laterally extending flange means about the peripheral border of said open end;

increasing the breadth of said open end by flexing said mold part;

introducing said blank into said internal cavity means;

releasing said mold part so that it substantially returns to its original position, said open end thereby substantially returning to its original breadth;

closing said open end with a rigid mold part;

drawing said flexible mold part and said rigid mold part together by creating a vacuum around said flange means and said rigid mold part;

withdrawing air from the blank, thereby creating a vacuum extending into the interstitial spaces of the blank;

after the passage of a predetermined amount of time, opening said open end by removing said rigid mold part therefrom;

again flexing said flexible mold part to increase the breadth of its open end; and

removing the seamless sailboard from said internal cavity means.

5,023,043
ACTIVELY COOLED DEVICE

Heinz E. Kotzlowski, Ismaning, Fed. Rep. of Germany, and Günter Kneringer, Breitenwang bei Reutte, Austria, assignors to Max-Planck-Gesellschaft zür Förderung der Wissenschaften e.V., Göttingen, Fed. Rep. of Germany and Schwarzkopf Development Corporation, New York, N.Y.

Continuation of Ser. No. 822,410, filed as PCT EP85/00208 on May 7, 1985, abandoned. This application Nov. 10, 1988, Ser. No. 271,390

Claims priority, application Fed. Rep. of Germany, May 7, 1984, 3416843

Int. Cl.^{5} G21B *1/00*

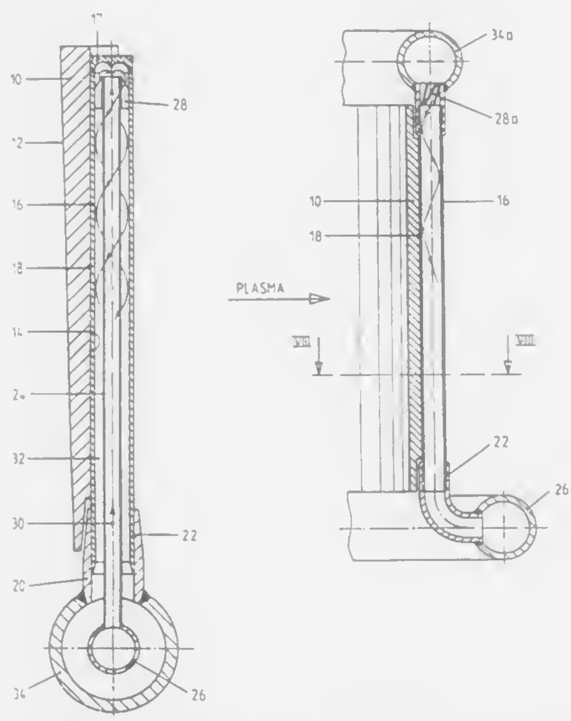
U.S. Cl. 376—150 18 Claims

1. An actively cooled heat shield for use at a high temperature range, as is present in a fusion reactor, comprising:

at least one body made of a refractory material, said body having a thermally stressed surface facing the fusion reactor and an opposing surface, the opposing surface having at least one recess, the at least one recess being at least partially arc-shaped in cross-section:

a respective metal cooling pipe disposed in the respective at least one recess and thermally coupled thereto, the cooling pipe having a cross-section complementary to the cross-section of the respective recess in which the cooling pipe is disposed, forming a heat transfer surface, the cooling pipe being brazed along the entire heat transfer surface to the refractory body; and

a cooling medium circulating in the cooling pipe.



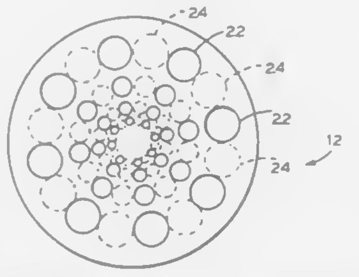
5,023,044
NUCLEAR REACTOR CONTROL ASSEMBLY

Scott B. Negron, Forest, Va., assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Jul. 11, 1990, Ser. No. 551,216

Int. Cl.^{5} G21C *7/30*

U.S. Cl. 376—213 9 Claims



1. An assembly for providing global power control in a nuclear reactor having the core split into two halves, said assembly comprising;

a. a disk assembly formed from at least two disks each machined with an identical surface hole pattern such that rotation of one disk relative to the other causes the hole pattern to open or close, said disk assembly being positioned substantially at the longitudinal center of and coaxial with said core halves; and

b. means for rotating at least one of said disks relative to the other.

5,023,045
PLANT MALFUNCTION DIAGNOSTIC METHOD

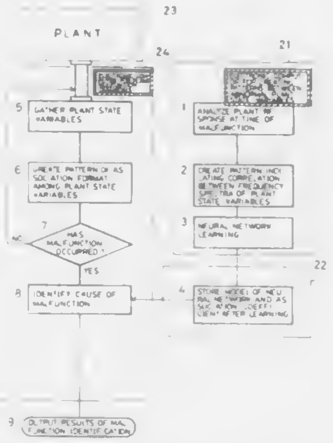
Kenshiu Watanabe, and Kiyoshi Tamayama, both of Oarai, Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, Japan

Filed Feb. 7, 1990, Ser. No. 476,922

Claims priority, application Japan, Feb. 7, 1989, 64-28093

Int. Cl.^{5} G21C *7/36*

U.S. Cl. 376—215 2 Claims


23
PLANT
24
21
5
GATHER PLANT STATE VARIABLES
6
CREATE PATTERN OF ASSOCIATION FORMAT AMONG PLANT STATE VARIABLES
7
HAS MALFUNCTION OCCURRED?
NO
YES
8
IDENTIFY CAUSE OF MALFUNCTION
1
ANALYZE PLANT RESPONSE AT TIME OF MALFUNCTION
2
CREATE PATTERN INDICATING CORRELATION BETWEEN FREQUENCY SPECTRA OF PLANT STATE VARIABLES
3
NEURAL NETWORK LEARNING
22
4
STORE MODEL OF NEURAL NETWORK AND ASSOCIATION COEFFICIENT AFTER LEARNING
9
OUTPUT RESULTS OF MALFUNCTION IDENTIFICATION

1. A plant malfunction diagnostic method comprising:

a step of determining by simulation a change in a plant state variable at the time of a malfunction and forming a pattern among plant state variables obtained by autoregressive analysis of the change in plant state variable;

a step of inserting the formed pattern among the plant state variables in a neural network comprising an input layer, a middle layer and an output layer, and performing learning within a preset precision to decide a model of the neural network as well as connection weight between processing elements (neurons) in the input layer and middle layer and between the middle layer and the output layer; and

a step of identifying the cause of the malfunction by inputting a pattern, which indicates the pattern among plant state variables formed from the plant state variable, after detection of an actual plant malfunction.

5,023,046
DRIVE UNIT FOR INSPECTING NUCLEAR FUEL RODS

Charles W. Speight, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Jan. 16, 1990, Ser. No. 467,468

Int. Cl.^{5} G21C *17/00*

U.S. Cl. 376—261 7 Claims

6. A drive unit for use in inspecting nuclear fuel rods, comprising:

a. a housing;

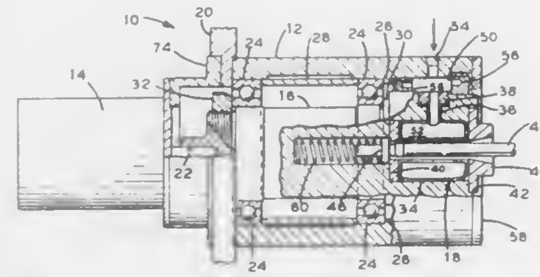
b. a drive motor mounted at the first end of said housing;

c. a spindle directly coupled to said drive motor rotatably mounted on bearings in said housing and having a recess at its end adjacent the second end of said housing;

d. a substantially donut shaped rubber bladder received in said recess and having its longitudinal axis coaxial with that of said spindle whereby said bladder rotates in conjunction with said spindle in response to driving rotation by said drive motor; and

VOL
1127
ISS
2
JE
11
1991
UMI

e. a flanged port extending radially from said bladder and in fluid communication with the interior thereof whereby



said bladder may be pressurized, causing radial internal expansion thereof for gripping a fuel rod.

5,023,047
NUCLEAR REACTOR HAVING AN ASCENDING COOLING PATH MUCH GREATER THAN THE DESCENDING COOLING PATH

Koji Nishida, Hitachi; Osamu Yokomizo, Ibaraki; Yasuhiro Masuhara, Katsuta; Toshitsugu Nakao; Shin-ichi Kashiwai, both of Hitachi; Akio Tomiyama, Kobe; Junichi Yamashita, and Tatsuo Hayashi, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 14, 1988, Ser. No. 284,345

Claims priority, application Japan, Dec. 18, 1987, 62-318907; Jan. 22, 1988, 63-10718; Jan. 29, 1988, 63-16991

Int. Cl.^{5} G21C *15/00*

U.S. Cl. 376—370 **9 Claims**

1 A nuclear reactor comprising:

a plurality of fuel assemblies loaded in the core;

control rods inserted in the core; and

a means to regulate a coolant flow supplied to the core;

the fuel assemblies each consisting of:

a lower tie plate;

a plurality of fuel elements with lower ends held by a fuel support of the lower tie plate;

a first coolant passage formed among the fuel elements;

a second coolant passage formed separate from and inside of the first coolant passage, the second coolant passage constituting a water rod and having a coolant ascending path and a coolant descending path, the coolant ascending path opening blow the fuel support and rising above the fuel support, the coolant descending path communicating with the coolant ascending path and opening above the fuel support, the coolant descending path being adapted to guide the coolant from the coolant ascending path downwardly, whereby the lateral cross section of the coolant ascending path is larger than 25 times that of the coolant descending path.

5,023,048
ROD FOR A FUEL ASSEMBLY OF A NUCLEAR REACTOR RESISTING CORROSION AND WEAR

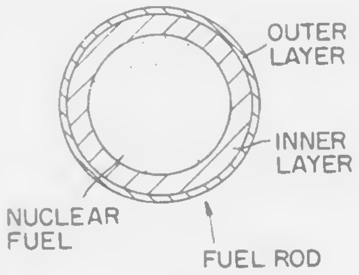
Jean-Paul Mardon, Caluire; Daniel Charquet, Albertville; Marc Perez, Levallois, and Jean Senevat, Saint Brevin les Pins, all of France, assignors to Framatome, Courbevoie; Cogema, Velizy Villacoublay; Compagnie Européenne du Zirconium dite Cezus and Société en Nom Collectif Zircotube, both of Courbevoie, all of, France

Filed Jan. 22, 1990, Ser. No. 468,330

Claims priority, application France, Jan. 23, 1989, 89 00761

Int. Cl.^{5} G21C *3/06*

U.S. Cl. 376—416 **8 Claims**



1. Rod for a fuel assembly of a nuclear reactor, said rod comprising a sheath having a wall and a nuclear fuel material within said sheath, said sheath comprising an inner tubular layer and an outer surface layer composed of zirconium alloys which layers differ from each other, said surface layer consisting of a zirconium-base alloy containing by weight 0.35 to 0.65% tin, 0.20 to 0.65% iron, 0.09 to 0.16% oxygen and an element selected from the group consisting of niobium in a proportion of 0.25 to 0.35%, the balance being constituted by zirconium apart from inevitable impurities.

5,023,049
PRECIPITATION HARDENING TOOL STEEL FOR MOULDING TOOLS AND MOULDING TOOL MADE FROM THE STEEL

Lars-Ake Norström; Anders Cederlund, and Henrik Jespersson, all of Hagfors, Sweden, assignors to Uddeholm Tooling Aktiebolag, Hagfors, Sweden

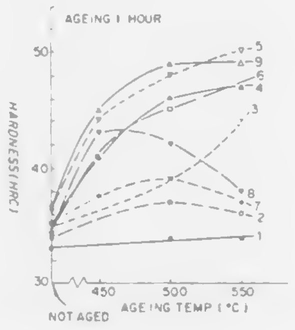
PCT No. PCT/SE88/00592, § 371 Date May 10, 1990, § 102(e) Date May 10, 1990, PCT Pub. No. WO89/05869, PCT Pub. Date Jun. 29, 1989

PCT Filed Nov. 3, 1988, Ser. No. 488,004

Claims priority, application Sweden, Dec. 23, 1987, 8705140; Mar. 22, 1988, 8802914; Apr. 11, 1988, 8801313

Int. Cl.^{5} C22C *38/44*

U.S. Cl. 420—91 **28 Claims**



1. Precipitation hardening tool steel for use in the production of mould tools, containing, expressed in weight-%,:

0.01–0.1 C

from traces to max 2 Si

0.3–3.0 Mn

1–5 Cr

0.01–1 Mo

wherein the total amount of Mn+Cr is at least 3% and said steel further containing Ni as a toughness and hardenability improving element, and either Ni and Al as a compound or Ni, Al and Cu for precipitation hardening purposes, wherein the contents of Ni and Al and Cu amount to:

1–7 Ni

1.0–3.0 Al and

4.0 max Cu,

wherein $1.5\times Al+Cu\geqq 2.0$, balance being essentially only iron, impurities and accessory elements in normal amounts.

5,023,050
SUPERALLOY FOR HIGH-TEMPERATURE HYDROGEN ENVIRONMENTAL APPLICATIONS

Eugene C. McKannan; William B. McPherson, both of Huntsville, Ala.; Shaffiq Ahmed, Youngstown, Ohio, and Shirley S. Chandler, Huntsville, Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 24, 1989, Ser. No. 425,904

Int. Cl.^{5} C22C *19/05;* **C22F** *1/10*

U.S. Cl. 420—448 **10 Claims**

Figure 1

1. A nickel-based superalloy suitable for use in high-temperature hydrogen environments, consisting essentially of: ten (10) to twenty (20) percent by weight of chromium (Cr); two (2) to six (6) percent by weight of aluminum (Al); two (2) to five (5) percent by weight of cobalt (Co); three (3) to eight (8) percent by weight of titanium (Ti); five (5) to twelve (12) percent by weight of tungsten (W); five (5) to ten (10) percent by weight of molybdenum (M0); and one (1) to three (3) percent by weight of niobium (Nb); balance fifty (50) to sixty (60) percent by weight of nickel (Ni);

wherein the tungsten/molybdenum ratio is approximately equal to one (1) and the titanium/aluminum ratio is from about one (1) to about two (2).

5,023,051
HYPOEUTECTIC ALUMINUM SILICON MAGNESIUM NICKEL AND PHOSPHORUS ALLOY

Richard S. Lindberg, Mt. Prospect, Ill., assignor to Leggett & Platt Incorporated, Carthage, Mo.

Filed Dec. 4, 1989, Ser. No. 445,199

Int. Cl.^{5} C22C *21/02*

U.S. Cl. 420—549 **8 Claims**

1. A hypoeutectic aluminum silicon magnesium alloy comprising

4–10% silicon, 0.15–1% magnesium, from about 0.005% to about 0.01% phosphorus and aluminum wherein said alloy has a spherical aluminum silicon magnesium phosphorus precipitate.

5,023,052
ELEMENT FOR ANALYZING BODY FLUIDS

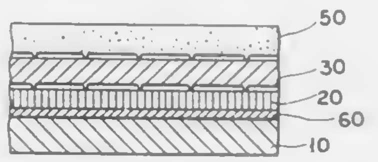
Shigeru Nagatomo, and Mitsutoshi Tanaka, both of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 23, 1989, Ser. No. 300,123

Claims priority, application Japan, Jan. 20, 1988, 63-10452

Int. Cl.^{5} G01N *31/22*

U.S. Cl. 422—56 **16 Claims**



1. A multi-layer analytical element comprising in this order, a light transmitting and water impermeable support, a first non-fibrous porous layer, a second non-fibrous porous layer, and a fibrous porous layer, the three porous layers being locally bonded together with an adhesive to allow for through-holes so as not to substantially interfere with uniform penetration of a liquid therethrough, at least one of the non-fibrous porous layers containing a reagent composition which undergoes a detectable optical change in the presence of a component to be analyzed, said optical change being detectable in the first non-fibrous porous layer, wherein said first non-fibrous porous layer comprises a polysulfone.

5,023,053
BIOLOGICAL SENSORS

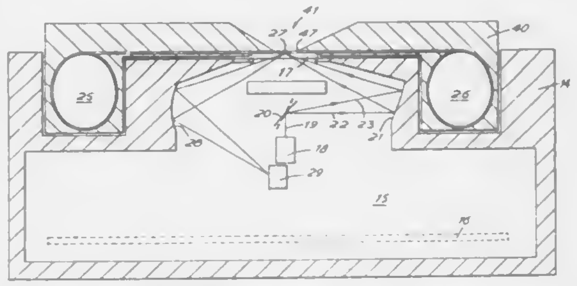
Martin F. Finlan, Aylesbury, England, assignor to Amersham International PLC, Little Chalfont, England

Filed May 22, 1989, Ser. No. 355,187

Claims priority, application United Kingdom, May 20, 1988, 8811919

Int. Cl.^{5} G01N *21/00, 21/55;* **G01J** *3/30*

U.S. Cl. 422—82.05 **13 Claims**



1. A sensor for use in biological, biochemical or chemical testing, said sensor comprising a source of electromagnetic radiation for producing a beam of electromagnetic radiation, membrane in the form of a laminate comprising a first film of transparent material, a second film of metal applied to at least part of one surface of said first film and a third film of sensitive material applied to the second film, said membrane further including a sample feeding means whereby the sample to be analyzed is transferred in a controlled manner to said sensitive layer, said sample feeding means comprising a further layer in the laminate comprising said membrane, which further layer is applied to said third film of sensitive material, said further layer being made of a porous material through which a sample may be passed from the side opposite the sensitive layer, in order to react with said sensitive layer, means for directing said beam of electromagnetic radiation into said first film of transparent material in such a way as to be internally reflected off said part of said one surface, and detector means positioned to receive

VOL
1127
ISS
2
JE
11
1991
UMI

the internally reflected beam, wherein the angle of incidence of said beam at said one surface is such as to cause surface plasmon resonance to occur, the characteristics of which resonance, as detected by the monitoring means, is dependent upon the reaction between the sample and the sensitive layer.

5,023,054

BLOOD FILTER AND APPARATUS FOR HEMORHEOLOGICAL MEASUREMENT

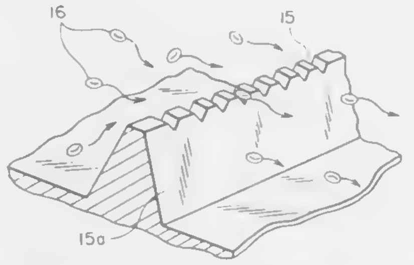
Kazuo Sato, Tokyo; Yuji Kikuchi, 108-402, Takezono-3-chome, Tsukuba-shi; Hiroshi Ohki, Tsuchiura, and Toshio Kaneko, Katsuta, all of Japan, assignors to Hitachi Ltd., Tokyo and Yuji Kikuchi, Tsukuba, both of, Japan

Filed Nov. 9, 1989, Ser. No. 433,897

Claims priority, application Japan, Nov. 11, 1988, 63-283687

Int. Cl.^{5} G01N *11/00, 15/00, 21/00, 27/00*

U.S. Cl. 422—82.09 **12 Claims**



12. A blood filter comprising a first substrate including a surface having a plurality of grooves formed thereon; a second substrate contacting the first substrate so as to form a plurality of blood flow passages within said grooves through which blood is permitted to flow; means for causing blood to flow through blood flow passages, and said second substrate including transparent means for observing the blood flowing in said flow passages from a surface of said second substrate.

5,023,055

FLOW TESTER

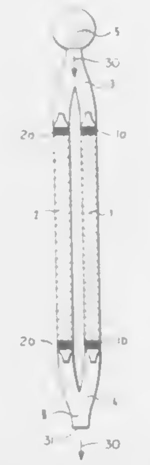
Johannes Heckmann, Lübeck, Fed. Rep. of Germany, assignor to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed Oct. 21, 1988, Ser. No. 261,164

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1987, 3735676

Int. Cl.^{5} G01N *31/00*

U.S. Cl. 422—83 **17 Claims**



1. An air flow tester for making an ambient air current visible, the air flow tester comprising:

first through-flow passage means defining a first through-flow path and having a first chamber disposed in said first through-flow path;

second through-flow passage means defining a second through-flow path and having a second chamber disposed in said second through-flow path; said first and second through-flow passage means each having an input and output end and being connected in parallel with each other;

first and second aerosol-forming substances disposed in respective ones of said chambers;

a mixing enclosure having input means connected to said output ends of said first and second through-flow passage means and having an outlet; and,

air supply means connected to said input ends of said passages for permitting air to flow through said first and second through-flow passage means for entraining said substances so that said substances flow out of said output ends and into said mixing enclosure wherein the first and second substances combine to produce the aerosols which pass from said mixing enclosure and into the ambient through said outlet of said enclosure to provide a visible indication of the air current.

5,023,056

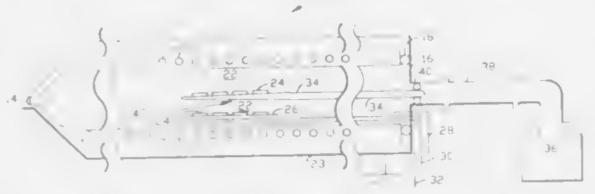
PLASMA GENERATOR UTILIZING DIELECTRIC MEMBER FOR CARRYING MICROWAVE ENERGY

Monti E. Aklufi, and David W. Brock, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 27, 1989, Ser. No. 457,431

Int. Cl.^{5} B01J *19/08*

U.S. Cl. 422—186 **68 Claims**



1. A system in which electromagnetic energy is used to generate a plasma from a gas comprising:

a reaction chamber which is evacuated to less than ambient pressure and into which said gas is introduced; and

a nonconductive member projecting within said reaction chamber, said nonconductive member for carrying said electromagnetic energy and for emitting said electromagnetic energy so that a plasma is formed from said gas.

5,023,057

APPARATUS FOR THE PREPARATION OF CARBON POLYMONOFLUORIDE

Jean Metzger, Pierre Benite, France, assignor to Societe Atochem, Puteaux, France

Division of Ser. No. 136,941, Dec. 23, 1987, Pat. No. 4,855,121. This application Mar. 9, 1989, Ser. No. 321,082

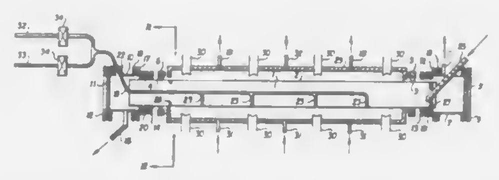
Claims priority, application France, Jan. 5, 1987, 87 00015

Int. Cl.^{5} B01J *8/00*

U.S. Cl. 422—202 **11 Claims**

1. An apparatus for reactions involving contact between particles of carbon and fluorine diluted with at least one inert gas, comprising a reactor in which the particles travel as a thin layer, on a carrying surface, from one end of the reactor to the other, means by which to turn the reactor, a means for feeding the reactor with diluted fluorine, a means for feeding the reactor with particles, a means for removing the particles, a means for removing the reaction gases and the unreacted gases, heat exchange means for the reactor, the apparatus being characterized in that the means for feeding diluted fluorine comprises

means for introducing the diluted fluorine into the reactor in the form of a plurality of gaseous mixtures, means for delivering the gaseous mixtures at a plurality of points distributed



inside the reactor and means for independently controlling flow rates of fluorine and of inert gas in each of the gaseous mixtures.

5,023,058

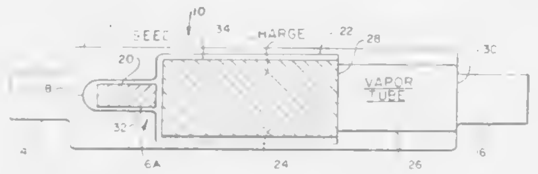
AMPOULE FOR CRYSTAL-GROWING FURNACE

John F. Klein, Port Washington, N.Y.; Joel Kearns, Reston, Va., and Jerry Gonen, Jericho, N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Jan. 30, 1990, Ser. No. 472,232

Int. Cl.^{5} B01D *9/00*

U.S. Cl. 422—248 **2 Claims**



1. An ampoule for growing semiconductor crystals comprising:

an outer generally cylindrical wall;

projections formed on outer ends of the wall for securing the ampoule within a furnace;

a generally cylindrical step down inner container closed at one end and having two contiguous hollow sections including

(a) a first section of smaller diameter located at the closed cylindrical end for enclosing a single crystal seed; and

(b) a second section of larger diameter for receiving a charge of raw material through an open end, the charge positioned adjacent the seed;

a tube located inside the wall, abutting an end of the charge, the tube being located at the open cylindrical end for maintaining the charge in place and creating a space for vapor emitted from the charge thereby accommodating overpressurization of the charge when it is being melted for ensuring uniformity and homogeneity of a grown crystal.

5,023,059

RECOVERY OF METAL VALUES AND HYDROFLUORIC ACID FROM TANTALUM AND COLUMBIUM WASTE SLUDGE

Edwin J. Bielecki, 310 E. Sixth St., Boyertown, Pa. 19512; Karl A. Romberger, 100 Martin Ave., Gilbertsville, Pa. 19512; Bart F. Bakke, 126 Russell Ave., Douglassville, Pa. 19518; Martin A. Hobin, 3821 High Point Dr., Allentown, Pa. 18103, and Charles R. Clark, 339 S. Hanover St., Pottstown, Pa. 19464

Filed Nov. 2, 1988, Ser. No. 266,394

Int. Cl.^{5} B01D *11/00*

U.S. Cl. 423—9 **44 Claims**

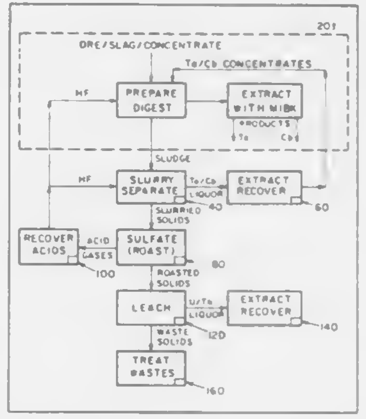
1. A process for recovering metal values from a source material containing at least tantalum and columbium which comprises:

(a) digesting the source material in concentrated hydrofluoric acid to form a slurry comprising a first aqueous phase containing tantalum and columbium values and a sludge containing entrained therein dissolved tantalum and columbium values along with insolubles;

(b) separating the first aqueous phase from the sludge;

(c) extracting the tantalum and columbium values from the separated first aqueous phase by ketone extraction;

(d) slurrying the sludge with dilute hydrofluoric acid to form a second slurry comprising a second aqueous phase



containing the dissolved tantalum and columbium values and a residual slurry;

(e) separating the second aqueous phase from the residual slurry; and

(f) extracting the dissolved tantalum and columbium values from the second aqueous phase using a liquid amine exchange agent.

5,023,060

RECOVERY OF GOLD BY A CARBON-IN-PULP PROCESS

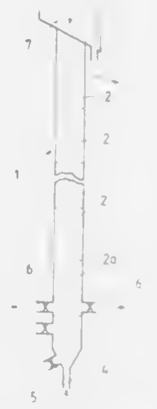
Ahmet Mehmet, Johannesburg, South Africa, assignor to Council for Mineral Technology, South Africa

Filed Aug. 7, 1989, Ser. No. 390,699

Claims priority, application South Africa, Aug. 24, 1988, 88/6268

Int. Cl.^{5} C22B *3/24*

U.S. Cl. 423—27 **10 Claims**



1. A process for the recovery of gold from leach pulp comprising the steps of:

(i) diluting the leach pulp to provide a specific gravity thereof which is less than that of activated carbon to be used for effecting gold extraction;

(ii) contacting the diluted pulp with activated carbon in countercurrent fashion in a multi-stage liquid/solid

VOL
1127
ISS
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contact column in which the stages are defined by transverse plates or trays, said contact being effected by:

(a) causing the diluted pulp to flow upwardly through the stages of the contact column at a superficial velocity chosen to fluidise activated carbon therein during a first part of a cycle;

(b) causing the pulp flow velocity to decrease to allow settling of the carbon onto the plates or trays in a second part of the cycle;

(c) reversing the flow of pulp to cause a downward flow of carbon through the stages within the column and some carbon to be removed from the lowermost stage thereof in a third part of the cycle;

(d) adding fresh or re-activated carbon at an upper stage; and,

(e) recommencing the first part of the cycle, and,

(iii) recovering adsorbed gold from carbon removed from the column during the third part of the cycle.

5,023,061

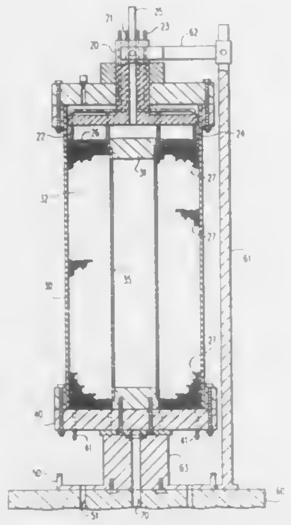
CHROMATOGRAPHIC SEPARATION OF ZIRCONIUM ISOTOPES WITH ANHYDROUS READILY RECYCLABLE ELUENTS

Thomas S. Snyder, Oakmont, Pa., and Ernest D. Lee, Ogden, Utah, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 2, 1990, Ser. No. 546,982

Int. Cl.^{5} B01D *15/08;* **C22B** *34/14;* **C10G** *25/00, 27/00*

U.S. Cl. 423—70 **22 Claims**



1. A process for reducing the thermal neutron cross-section of zirconium by increasing the concentration of the low cross-section isotopes and decreasing the concentration of the high cross-section isotopes which comprises subjecting an essentially anhydrous alcoholic solution of an ionic zirconium compound with a higher than desired distribution of high cross-section isotopes to continuous steady state chromatography utilizing a cation exchange resin with pentavalent phosphorus derived active groups as the stationary phase, collecting at least two product fractions, one enriched in zirconium 90 and the other enriched in zirconium 94, and combining them to yield a zirconium with a lower cross-section than the starting zirconium.

5,023,062

Patent Not Issued For This Number

5,023,063

ACID RAIN ABATEMENT

Alvin B. Stiles, Wilmington, Del., assignor to The University of Delaware, Newark, Del.

Filed Mar. 26, 1990, Ser. No. 498,539

Int. Cl.^{5} B01J *8/00;* **C01B** *21/00. 17/00*

U.S. Cl. 423—239 **18 Claims**

1. A method of obtaining acid rain abatement from a flue gas containing nitrogen oxides (NOX) and sulfur oxides (SOX) comprising the steps of treating the flue gas with a reducing agent to remove the remaining oxygen and produce an effluent, the reducing agent being selected from group consisting of natural gas, methane, a mixture of CO and hydrogen derived from steam, hydrocarbon, and hydrogen, passing the effluent over a catalyst to simultaneously reduce the NOX to water and elemental nitrogen and the SOX to H_2S or elemental sulfur, the catalyst being selected from the group consisting of heteropoly acids and their salts, the reduction of the NOX and SOX taking place in a temperature range of 200°-900° C., and removing the sulfur or sulfur compounds from the reduced flue gas to thereby remove essentially all of the NOX and SOX.

5,023,064

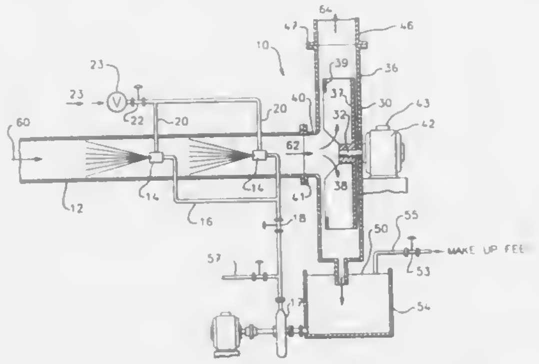
METHOD FOR REMOVING SULFUR OXIDE

J. Stuart Burgess, London; Donald R. Spink, Waterloo, and Jerry Y. Stein, Thornhill, all of Canada, assignors to Turbotak Inc., Waterloo, Canada

Division of Ser. No. 243,720, Sep. 13, 1988, Pat. No. 4,963,329, which is a continuation-in-part of Ser. No. 20,953, Mar. 2, 1987, Pat. No. 4,865,817. This application Nov. 20, 1989, Ser. No. 438,047

Int. Cl.^{5} C01B *17/00*

U.S. Cl. 423—242 **15 Claims**



1. A method for wet mass transferring at least one solute gas from a process gas stream into a reacting medium, comprising:

(a) passing a gas stream containing at least one solute gas comprising sulfur dioxide through an elongated conduit having an inlet thereto and an outlet therefrom and into a vortex of a slowly-turning fan operating at a relatively low speed sufficient to move the gas along the conduit into the fan;

(b) injecting a liquid reacting medium comprising an aqueous alkaline medium capable of reacting with said at least one solute gas directly into said gas stream under an atomizing gas pressure of about 20 to about 100 psi from a plurality of dual fluid spray nozzles coaxially disposed in series in said conduit and spaced apart by a distance sufficient to form a spray pattern from each of said nozzles filling homogeneously the cross-section of said conduit without substantially overlapping each other and containing liquid droplets ranging in size from about 5 to about 100 microns, thereby to form a plurality of contact spray zones whereby mass transfer of said at least one solute gas into said reacting medium is carried out in a very efficient way due to the large interfacial surface area for mass transfer, turbulent mixing and relatively long residence time generated therein;

(c) simultaneously mass transferring said at least one solute gas to the reacting medium and separating entrained liquid reaction medium containing the solute gas from clean gas stream in said fan, wherein agglomerated liquid reacting medium impinges on and adheres to and coats blades of the fan to form a coalesced layer of liquid that is separated from the blades by the effects of centrifugal forces moving outwards in so doing, so as to form an attendant annular spray zone of relatively larger droplets for continued mass transfer, the droplets upon impingement on the fan casing being coalesced and removed by gravity from the fan;

(d) removing any agglomerated droplets contained in the gas discharge from the fan with an entrainment separator; and

(e) discharging the clean gas stream separated from said liquid reacting medium to atmosphere.

5,023,065

SYNTHETIC MICA POWDER, MANUFACTURING METHOD THEREOF AND COSMETICS HAVING THE SYNTHETIC MICA POWDER BLENDED THEREIN

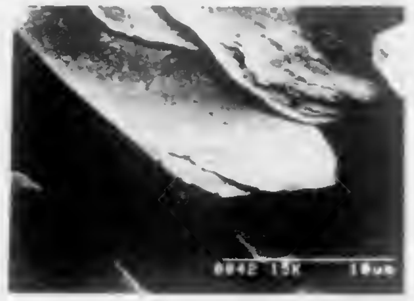
Kazuhisa Ohno, Kanagawa; Tetsushi Kosugi, Aichi; Kenichiro Sugimori, Aichi; Akitsugu Ando, Aichi; Masaru Yamamoto, Aichi; Fukuji Suzuki; Masahiro Nakamura, both of Kanagawa, and Nobuhisa Tsujita, Tokyo, all of Japan, assignors to Shiseido Co., Ltd. and Topy Kogyo K.K., both of Tokyo, Japan

Filed Sep. 26, 1988, Ser. No. 265,862

Claims priority, application Japan, Jan. 26, 1987, 62-15676; Jan. 26, 1987, 62-15677; Jan. 26, 1987, 62-45678

Int. Cl.^{5} C01B *33/20, 33/25, 33/34, 33/32*

U.S. Cl. 423—326 **7 Claims**



1. A process for producing a synthetic mica powder in which the mol number of fluorine in the synthetic mica powder is from 75 to 99% of the stoichiometrical composition comprising heating synthetic mica having the stoichiometrical composition heated at 600–1350° C. to yield said synthetic mica powder having a mol number of fluorine from 75 to 99% of the stoichiometrical composition.

5,023,066

PROCESS FOR INTRODUCTION OF SILICON ATOMS INSTEAD OF ALUMINUM ATOMS IN THE CRYSTAL LATTICE OF A ZEOLITE OF THE FAUJASITE TYPE

Moritz Gimpel, Obernburg, Fed. Rep. of Germany, and Jan W. Roelofsen, Oegstgeest, Netherlands, assignors to Akzo N.V., Arnhem, Netherlands

Filed Jun. 1, 1988, Ser. No. 200,906

Claims priority, application Fed. Rep. of Germany, Jun. 6, 1987, 3719049

Int. Cl.^{5} C01B *33/34*

U.S. Cl. 423—328 **10 Claims**

1. A process for introduction of silicon atoms instead of aluminum atoms in the crystal lattice of a zeolite of the faujasite type, comprising reacting an activated crystalline zeolite of the faujasite type with a halosilane at a reaction temperature of about 80° C. to 150° C. to form a reaction product, followed by washing said reaction product, wherein the reaction product is first washed with substantially non-aqueous liquid and then with water.

5,023,067

MANUFACTURING METHOD FOR CERAMICS AND PRODUCTS THEREOF

Nicholas D. Spencer, Washington, D.C.; Wie-Hin Pan, and John A. Rudesill, both of Columbia, Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation-in-part of Ser. No. 219,677, Jul. 15, 1988, abandoned, which is a continuation-in-part of Ser. No. 155,340, Feb. 12, 1988, which is a continuation-in-part of Ser. No. 95,083, Sep. 11, 1987, abandoned. This application Aug. 26, 1988, Ser. No. 237,268

The portion of the term of this patent subsequent to Mar. 19, 2008, has been disclaimed.

Int. Cl.^{5} C01C *1/26*

U.S. Cl. 423—420 **26 Claims**

19. Process comprising reacting in aqueous medium, carbonate ions from quaternary ammonium carbonate, with L.M.A metal ions and anions thereby to form a slurry comprising precipitates of the respective metal carbonates, and recovering and drying the precipitates; the precipitate is heated to a temperature sufficient to decompose or otherwise volatilize any remaining quaternary ammonium and anions and to achieve partial conversion of carbonates in the co-precipitate to oxides; L being at least one trivalent metal, M being at least one bivalent metal, and A being at least one metal of multiple valency; and L, M, and A being present in a predetermined atomic ratio for a superconductor.

5,023,068

DIAMOND GROWTH

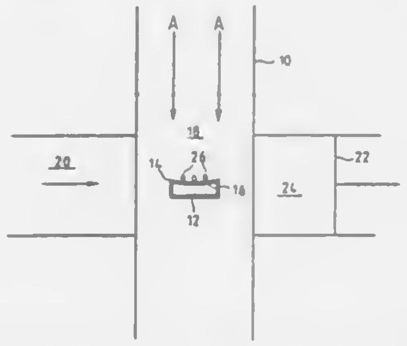
Barbara L. Jones, 80 Chisbury Place, Forest Park, Bracknell, RG12 3TX, England

Filed Apr. 26, 1989, Ser. No. 343,910

Claims priority, application United Kingdom, Apr. 28, 1988, 8810111

Int. Cl.^{5} C01B *31/06*

U.S. Cl. 423—446 **16 Claims**



1. A method of growing crystalline diamond on a substrate which includes the steps of providing a surface of a nitride wherein the nitride is silicon nitride, aluminum nitride, titanium nitride or tantalum nitride, said nitride completely covering a support which is a microwave energy sink, placing the substrate on the nitride surface, creating an atmosphere of a gaseous carbon compound around the substrate, bringing the temperature of the nitride surface and substrate to at least 600° C., and subjecting the gaseous carbon compound to microwave energy suitable to cause the compound to decompose and produce carbon which deposits on the substrate and forms crystalline diamond thereon.

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PROCESS FOR REMOVING SULFUR MOIETIES FROM CLAUS TAIL-GAS

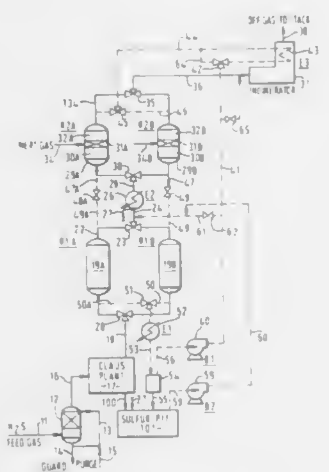
Willibald Serrand, Buxheim, Fed. Rep. of Germany, assignor to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Mar. 8, 1989, Ser. No. 320,727

Claims priority, application United Kingdom, Mar. 9, 1988, 8805552

Int. Cl.⁵ C01B *17/04*

U.S. Cl. 423—574 R **14 Claims**



1. A process for removing sulfur and sulfur compounds from a sulfurous gas containing H_2S and SO_2 comprising the steps of:

(a) passing the said gas containing H_2S and SO_2 in a mol ratio of H_2S:SO_2 of about 2:1 in contact with a first stage catalyst at conversion conditions to promote the reaction: $2H_2S+SO_2 \rightarrow 2H_2O+3S$;

(b) separately recovering, as products from step (a), elemental sulfur and a gas depleted in sulfur moieties;

(c) cooling and diluting the gas recovered from step (b), said gas being cooled to a temperature below the freezing temperature of sulfur and being diluted by being mixed with an inert gas such that the partial pressure of water vapour in the gas is less than the equilibrium partial pressure of liquid water and water vapour at the temperature of the resulting cooled and diluted gas mixture;

(d) passing the cooled, diluted gas mixture containing H_2S and SO_2 in contact with a catalyst-adsorbent mass in a subsequent stage to convert H_2S and SO_2 to elemental sulfur which deposits upon and/or is adsorbed on the said mass; and

(e) discharging a gas mixture depleted in sulfur moieties.

5,023,070

PROCESS FOR OBTAINING A CERIC OXIDE

Jean-Luc Le Loarer, La Rochelle, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France

Filed Jun. 29, 1988, Ser. No. 213,147

Claims priority, application France, Jun. 29, 1987, 87 09122

Int. Cl.⁵ C01B *13/14*

U.S. Cl. 423--592 **34 Claims**

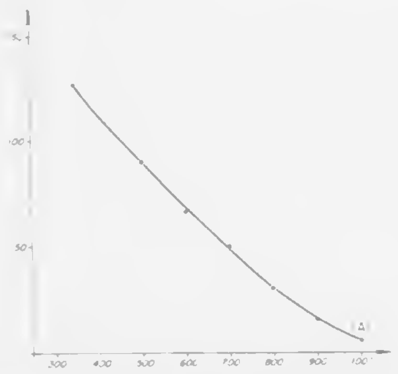
1. A process for preparing a ceric oxide obtained by calcination of a ceric hydroxide, wherein the ceric hydroxide is subjected to solvothermal treatment before calcination, said solvothermal treatment including the steps of:

forming a suspension of the ceric hyrdroxide in a liquid medium;

heating the suspension in a sealed chamber until a temperature and pressure are achieved which are less than the critical temperature and pressure, respectively, of said liquid medium;

cooling the liquid medium and reducing the pressure to atmospheric; and

separating the ceric hydroxide thus reacted from the liquid medium.



5,023,071

PROCESS FOR FORMING METAL OXIDE POWDERS FROM THE METAL ALKOXIDE

Fawzy G. Sherif, Stony Point, N.Y., assignor to Akzo America Inc., New York, N.Y.

Continuation of Ser. No. 253,300, Oct. 5, 1988, abandoned. This application Apr. 30, 1990, Ser. No. 517,459

Int. Cl.⁵ C01B *13/32*

U.S. Cl. 423—592 **7 Claims**

1. A process for forming metal oxide powders useful in forming plasma spray coatings which comprises dissolving a metal alkoxide in a, rather than polar, organic solvent, adding water and then emulsifying the blend of water and non-polar organic solvent containing the metal alkoxide dissolved in the emulsion thus formed to cause hydrolysis of the alkoxide with formation of the metal oxide as a precipitate, and recovering the metal oxide precipitate.

5,023,072

PARAMAGNETIC/SUPERPARAMAGNETIC/FERROMAGNETIC SUCROSE SULFATE COMPOSITIONS FOR MAGNETIC RESONANCE IMAGING OF THE GASTROINTESTINAL TRACT

Kenneth T. Cheng, Mount Pleasant, S.C., assignor to University of New Mexico, Albuquerque, N. Mex.

Filed Aug. 10, 1988, Ser. No. 230,756

Int. Cl.⁵ G01N *31/00, 24/00;* **A61B** *5/50, 6/00*

U.S. Cl. 424—9 **15 Claims**

1. A composition useful for administration to a patient as an image contrast agent for selective identification of diseased sites in the gastrointestinal tract by magnetic resonance imaging, comprising a sucrose sulfate labeled with at least one member selected from the group consisting of paramagnetic ions, superparamagnetic particles, and ferromagnetic particles.

5,023,073

METHOD OF COMBATING FLUPROPADINE POISONING USING PHENOTHIAZINES

Russell A. Nicholson, Maple Ridge, Canada, assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Oct. 12, 1989, Ser. No. 420,260

Claims priority, application United Kingdom, Oct. 13, 1988, 8824050

Int. Cl.⁵ G01N *33/15;* **A61K** *31/54, 31/445*

U.S. Cl. 424—10 **3 Claims**

1. A method of using phenothiazines to combat poisoning in mammals by flupropadine, the method comprising administering to said mammal an effective dose of a phenothiazine.

5,023,074

STABILIZED AMINE FLUORIDE DENTAL CREAM

Anthony J. Morton, Ashton-uner-Lyne; Ian W. Stewart, Widnes, and Kenneth Harvey, Wilmslow, all of England, assignors to Colgate-Palmolive Company, N.J.

Continuation of Ser. No. 268,624, Nov. 7, 1988, abandoned, which is a continuation of Ser. No. 862,842, May 13, 1986, abandoned. This application May 7, 1990, Ser. No. 520,169

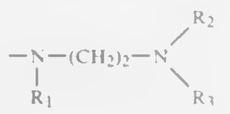
Int. Cl.⁵ A61K *7/16, 7/18, 7/22*

U.S. Cl. 424—52 **6 Claims**

1. In a process for stabilizing a flavored dental cream against phase separation, which dental cream comprises a fluoride providing compound which provides to said dental cream about 0.01–1% by weight of soluble fluoride, at least about 70% by weight of said fluoride-providing compound being an amine fluoride selected from the group consisting of a quaternary ammonium fluoride and an amine hydrofluoride having the formula:

RXHF

wherein R is alkyl or alkenyl containing about 10–24 carbon atoms, X is NH_2 or



$$-\underset{\displaystyle R_1}{\underset{|}{N}}-(CH_2)_2-N\begin{matrix} \diagup R_2 \\ \diagdown R_3 \end{matrix}$$

wherein y is an interger of 1–3 and R_1, and R_3 are hydrogen or lower alkyl, lower alkenyl or lower alkanol containing up to 5 carbon atoms, about 25–80% by weight of an aqueous liquid phase comprising humectant in amount of at least about 20% by weight of said dental cream, said humectant being selected from the group consisting of sorbitol, glycerine and mixture thereof, a solid phase comprising about 0.2–5% by weight of a non-ionic cellulosic gelling agent, about 0.01–5% by weight of flavor and sweetening agents and about 20–75% by weight of a polishing material containing insoluble alkali metal metaphosphate as at least the major component of said polishing material, the improvement wherein polyethylene glycol having an average molecular weight of about 200–1000 is incorporated into said aqueous liquid phase, wherein the weight ratio of said humectant to said polyethylene glycol is from about 10:1 to about 1:2 and the amount of polyethylene glycol is about 2%–10% by weight, which amount is less than 20% by weight, at which 20% amount, polyethylene glycol of average molecular weight of about 600 provides an undesirable flavor note, thereby stabiliaing said flavored dental cream against phase separation.

5,023,075

MICROFINE COSMETIC POWDER COMPRISING POLYMERS, SILICONE, AND LECITHIN

Ralph A. Macchio, Monsey, N.Y.; Julio G. Russ, Germantown, Tenn.; Brent Slobody, New City, and Mariene Tietjen, New York, both of N.Y., assignors to Revlon, Inc., New York, N.Y.

Filed Oct. 10, 1989, Ser. No. 418,678

Int. Cl.⁵ A61K *7/020, 7/021, 7/035*

U.S. Cl. 424—63 **13 Claims**

1. A cosmetic comprising 10–90% by weight of a powder component and 1–10% by weight of a silicone oil component wherein the powder component has a particle size less than 30 microns, at least 50% of said particles having, an average particle size of 10 microns, and at least 70% of said particles being coated with lecithin, the lecithin coating on any nylon or filler comprising 0.2–5%, said powder component comprising 1–10% by weight methylmethacrylate polymer having a particle size of below 10 microns, 5–25% by weight nylon polymer, 1–6% by weight polyethylene and 25–75% by weight fillers, said nylon and fillers having a particle size below 20 microns; at least 50% of the filler being coated with lecithin; and wherein the silicone oil component is a blend of low and high molecular weight dimethyl polysiloxane polymers at a ratio of 4:1 to 8:1, the blend having a viscosity of 10–500 centipoises.

5,023,076

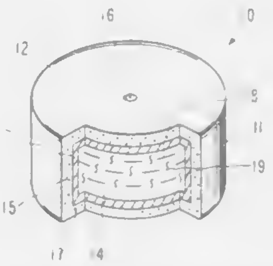
LAMINA COMPRISING CARBOXYVINYL POLYMER

Atul D. Ayer, Mt. View, and Lawrence G. Hamel, Sunnyvale, both of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 310,167, Feb. 15, 1989, Pat. No. 4,915,952, which is a division of Ser. No. 19,989, Feb. 27, 1987, Pat. No. 4,810,502. This application Mar. 26, 1990, Ser. No. 498,791

Int. Cl.⁵ A61K *31/74*

U.S. Cl. 424—78 **1 Claim**



1. A composition comprising 100 weight percent for manufacturing a lamina of a drug dosage form, wherein the composition comprises at least one drug, a hydroxypropylcellulose comprising a hydroxypropyl content of 7% to 16%, a hydroxypropylmethylcellulose comprising a molecular weight of 5,000 to 150,000, and a carboxyvinyl polymer comprising a molecular weight of 5,000 to 5,000,000.

5,023,077

IMMUNOGENIC COMPOSITIONS AND METHODS FOR THE TREATMENT AND PREVENTION OF GASTRIC AND DUODENAL ULCER DISEASE

Philip C. Gevas, Honolulu, Hi.; Stephen L. Karr, Jr., Davis; Stephen Grimes, both of Davis, Calif., and Richard L. Littenberg, Kai Lua, Hi., assignors to Aphton Corporation, Woodland, Calif.

Filed Jan. 24, 1989, Ser. No. 301,353

Int. Cl.⁵ C07K *7/06, 7/30;* **A61K** *39/00, 37/24*

U.S. Cl. 424—88 **8 Claims**

1. An immunogenic composition comprising a peptide selected from the group consisting of pGlu-Gly-Pro-Trp-Leu-Glu-Glu-GLu, pGlu-Gly-Pro-Trp-Leu-Glu-Glu, pGlu-Gly-Pro-Trp-Leu-Glu-, pGlu-Gly-Pro-Trp-Leu, pGlu-Gly-Pro-Trp" to "pGlu-Gly-Pro-Trp-Leu-Glu-Glu-Glu, pGlu-Gly-Pro-Trp-Leu-Glu-Glu, pGlu-Gly-Pro-Trp-Leu-Glu, pGlu-Gly-Pro-Trp-Leu, pGlu-Gly-Pro-Trp", coupled to an immunogenic carrier.

5,023,078

PLASMINOGEN ACTIVATOR-HEPARIN CONJUGATES

Albert P. Halluin, 31 Willowview Ct., Danville, Calif. 94526, assignor to Albert P. Halluin, Danville, Calif.

PCT No. PCT/US88/02771, § 371 Date May 24, 1989, § 102(e) Date May 24, 1989, PCT Pub. No. WO90/01332, PCT Pub. Date Feb. 22, 1990

PCT Filed Aug. 10, 1988, Ser. No. 363,908

Int. Cl.⁵ A61K *37/547, 31/725;* **C12N** *9/50*

U.S. Cl. 424—94.64 **9 Claims**

1. A pharmaceutical composition comprising a non-toxic, inert, pharmaceutically acceptable carrier medium in which is dissolved a biologically active selectively conjugated fibrin-specific tissue plasminogen activator, wherein the fibrin-specific tissue plasminogen activator is covalently conjugated via at least one of its lysine residues or amino-terminal amines to at least one heparin fragment having a terminal 2,5-anhydro-D-mannose residue through the aldehyde group of such resi-

VOL
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due, wherein the half-life of the tissue plasminogen activator is prolonged and the conjugate targets the heparin component to the site of thrombis or emboli.

5,023,079
HEPTAENE V-28-3 ANTIBIOTIC DERIVATIVE

Yasuo Komoda, Tokyo; Yasunori Yokogawa; Masahiko Okunishi, both of Kanagawa; Koichi Ishii; Hiroshiro Shibai, both of Kanagawa, and Ryosakn Noumi, Hiroshima, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Continuation-in-part of Ser. No. 164,973, Mar. 7, 1988, abandoned. This application Sep. 1, 1989, Ser. No. 403,033

Claims priority, application Japan, Mar. 6, 1987, 62-051570

Int. Cl.^{5} A61K *35/74*

U.S. Cl. 424—120 **4 Claims**

1. A compound having the following physicochemical properties:

1) appearance: yellow powder;
2) molecular weight (FABMS, $(M+H)^{30})=1127$;
3) molecular formula: $C_{59}H_{86}N_2O_{19}$;
4) melting point: turns brown at 135° C.;
5) UV spectrum: as shown in FIG. 1;
6) solubility in solvents: insoluble in water, diethyl ether, hexane and chloroform; slightly soluble in methanol, ethanol and n-butanol; soluble in dimethyl sulfoxide and N,N-dimethylformamide;
7) color reaction: phenol-sulfuric acid: positive, ferric chloride: negative, ninhydrin: positive, concentrated sulfuric acid: positive, iodine: positive;
8) ^{1}H—NMR spectrum: as shown in FIG. 2;
9) ^{13}D—NMR spectrum: as shown in FIG. 3;
10) specific rotation: $[\alpha]_D{}^{20}+296°$ (C=0.1% DMSO);
11) IR spectrum: as shown in FIG. 4.

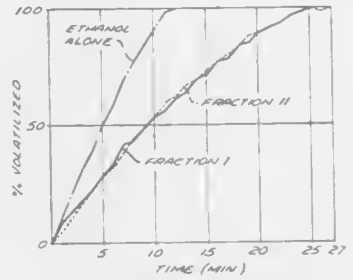
5,023,080
TIME RELEASE PROTEIN

Kashmiri L. Gupta, San Clemente, Calif., assignor to Basic Bio Systems, Inc., Missoula, Mont.

Filed Jun. 17, 1988, Ser. No. 208,731

Int. Cl.^{5} A61K *9/14*

U.S. Cl. 424—405 **13 Claims**



ELUTION OF ENCAPSULATED ETHANOL FRACTION I VS FRACTION II

1. A process for preparing a time release delivery vehicle for delivering an active ingredient over time, comprising the steps of:

(a) providing a biodegradable particulate seed protein material having a porous structure, wherein said particulate is in association with lipid materials naturally occurring in said seed;
(b) removing at least a portion of said lipid material from the particulate to form a substantially dry seed protein having a median particle size sufficiently small that said particulate is in the form of a free flowing powder; and

combining the dry protein with the active ingredient under conditions of agitation so that the active ingredient will permeate the porous structure of the individual particles of the protein, thereby forming a material that will provide sustained release of said active ingredient over a period of at least 20 minutes.

5,023,081
CONTROLLED RELEASE HYDROXYBUTYRATE POLYMER MICROSPHERES

Matt Trau, Northcote, and Rowan W. Truss, Oak Park, both of Australia, assignors to ICI Australia Operations Proprictary Limited, Melbourne, Australia

PCT No. PCT/AU88/00157, § 371 Date Jan. 27, 1989, § 102(e) Date Jan. 27, 1989, PCT Pub. No. WO88/09121, PCT Pub. Date Dec. 1, 1988

PCT Filed May 24, 1988, Ser. No. 328,156

Claims priority, application Australia, May 29, 1987, PI2220

Int. Cl.^{5} A61K *9/50*

U.S. Cl. 424—405 **10 Claims**

1. Controlled release hydroxybutyrate polymer microspheres comprising an amphipathic material and at least one active substance selected from pharmaceuticals, herbicides, pesticides, fungicides, and mixtures thereof, the hydroxybutyrate polymer comprising a co-polymer of 3-hydroxybutyric acid and 3-hydroxyvaleric acid, and the microspheres comprising a continuous skin covering the surface thereof wherein the skin comprises pores whose total surface area expressed as a percentage of the total surface area of the microspheres is up to 50% maximum.

5,023,082
SUSTAINED-RELEASE PHARMACEUTICAL COMPOSITIONS

Michael Friedman; Doron Steinberg, and Aubrey Soskolne, all of Jerusalem, Israel, assignors to Yissum Research Development Company of the Hebrew University of Jerusalem, Jerusalem, Israel

Continuation-in-part of Ser. No. 49,255, May 13, 1987, abandoned. This application Mar. 30, 1988, Ser. No. 175,623

Claims priority, application Israel, May 18, 1986, 78826

Int. Cl.^{5} A61K *9/00*

U.S. Cl. 424—426 **42 Claims**

1. A liquid precursor composition for the preparation of a biodegradable sustained-release composition for the administration of an active agent, wherein said sustained-release composition is formed by solidification of said liquid precursor composition, said liquid precursor composition comprising:

(1) a plasticizing agent, wherein said plasticizing agent is selected from the group consisting of a phthalate ester, a phosphate ester, a glycol derivative, a hydrocarbon, an oil, and a fatty acid;
(2) said active agent, wherein said active agent is present in an amount sufficient to impart a desired therapeutic, agricultural, or catalytic property to said sustained-release composition;
(3) a cross-linking agent, wherein said cross-linking agent is selected from the group consisting of aldehydes, alcohols, aluminum, chromium, titanium, zirconium, an acyl chloride, bis-diazobenzidine, phenol-2,4-disulfonyl chloride, 1,5-difluoro-2,4-dinitrobenzene, urea, 3,6-bis(mercurimethyl)-dioxane urea, dimethyl adipimidate and N,N'-ethylene-bis-iodacetamide; and
(4) a water-soluble protein which is capable of being cross-linked into a water-insoluble, biodegradable polymeric matrix, wherein said water-soluble protein is present at a concentration sufficient to provide said sustained-release composition with structural stability after being cross-linked, but not at so great a concentration as to render said sustained-release composition (i) incapable of biodegradation or (ii) incapable of permitting the release of said active agent.

5,023,083
AZARBINE COMPOSITION

William Drell, 4566 Sherlock Crt., San Diego, Calif. 92122

Continuation of Ser. No. 100,034, Sep. 23, 1987, abandoned. This application Jan. 12, 1990, Ser. No. 464,598

Int. Cl.^{5} A61K *9/36*

U.S. Cl. 424—439 **32 Claims**

1. A method for treating azaribine-responsive diseases in animals that exhibit severe serum pyridoxal phosphate depletion following oral administration of azaribine comprising:

encapsulating azaribine in a film-forming substance which is selectively soluble in the digestive juice of the intestine; and

orally administering the encapsulated azaribine to the animal.

5,023,084
TRANSDERMAL ESTROGEN/PROGESTIN DOSAGE UNIT, SYSTEM AND PROCESS

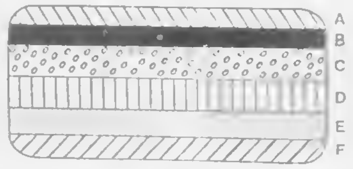
Yie W. Chien, North Brunswick, and Te-Yen Chien, Branchburg, both of N.J., assignors to Rutgers, The State University of New Jersey, New Brunswick, N.J.

Continuation-in-part of Ser. No. 131,462, Dec. 6, 1987, Pat. No. 4,906,169, which is a continuation-in-part of Ser. No. 947,130, Dec. 29, 1986, abandoned. This application Dec. 16, 1988, Ser. No. 285,878

Int. Cl.^{5} A61F *13/02*

U.S. Cl. 424—448 **15 Claims**

Multicompartment-type Transdermal Drug Delivery System (m-TDD System)



1. A process for controlling fertility by applying to the skin of a subject desiring said treatment one or more dosage units, to provide effective daily dosage amounts of estrogen and progestin for the appropriate term of about three weeks of the menstrual cycle in successive menstrual cycles, said dosage unit being a transdermal estrogen/progestin dosage unit comprising:

a) a backing layer which is substantially impervious to the estrogen and progestin hormones to be delivered transdermally;
b) a polymer layer which is adhered to said backing layer and which has dissolved and/or microdispersed therein an effective dosage amount of one or more effective estrogens absorbable transdermally and are pharmaceutically acceptable, said polymer being dioacceptable, providing a compatible environment for said one or more estrogens and permitting said one or more estrogens to be transmitted for transdermal absorption, and
c) an adhesive layer in intimate contact with said polymer layer, said adhesive layer having dissolved and/or microdispersed therein an effective dosage amount of one or more effective progestins selected from the group consisting of norgestrel, levonorgestrel, and biocompatible derivatives of norgestrel and levonorgestrel, which are absorbable transdermally and are pharmaceutically acceptable, said adhesive layer being bioacceptable, providing a compatible environment for said one or more progestins, and permitting said one or more progestins and said one or more estrogens to be transmitted for transdermal absorption, said adhesive layer having an effective amount of transdermal skin absorption enhancing agent;

said hormones being stable in said polymer and adhesive layers and being transdermally absorbed simultaneously to provide at least minimum effective daily doses of said hormones to effect fertility control.

5,023,085
TRANSDERMAL FLUX ENHANCERS IN COMBINATION WITH IONTOPHORESIS IN TOPICAL ADMINISTRATION OF PHARMACEUTICALS

Michael L. Francoeur, East Lyme, and Russell O. Potts, Old Saybrook, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Nov. 29, 1989, Ser. No. 443,699

Int. Cl.^{5} A61F *13/00*

U.S. Cl. 424—449 **15 Claims**

1. A method of treating a disease in a human or lower animal which comprises iontophoretic administration of a pharmaceutical composition comprising:

(a) a pharmaceutically effective amount of an active agent;
(b) an aqueous solvent; and
(c) a transdermal flux enhancing amount of a dermal penetration enhancer which is selected from the group consisting of 1-alkylazacycloheptan-2-one, said alkyl having from 8 to 16 carbon atoms, and a cis-olefin of the formula

$$CH_3(CH_2)_xCH{=}CH(CH_2)_yR^3$$

where R^3 is CH_2OH, CH_2NH_2 or COR^4, and R^4 is OH or $(C_1$-$C_4)$alkoxy, x and y are each an integer from 3 to 13 and the sum of x and y is from 10 to 16.

5,023,086
ENCAPSULATED IONOPHORE GROWTH FACTORS

Donald F. H. Wallach, Brookline, Mass., assignor to Micro-Pak, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 157,571, Mar. 3, 1988, Pat. No. 4,911,928, which is a continuation-in-part of Ser. No. 25,525, Mar. 13, 1987, abandoned, and a continuation-in-part of Ser. No. 78,658, Jul. 28, 1987, Pat. No. 4,855,090, and a continuation-in-part of Ser. No. 124,824, Nov. 24, 1987, Pat. No. 4,917,951. This application Dec. 20, 1988, Ser. No. 287,108

The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.

Int. Cl.^{5} A61K *9/127, 37/36;* **B01J** *13/02*

U.S. Cl. 424—450 **19 Claims**

1. An aqueous-based formulation active to promote animal growth comprising at least one active agent selected from a group consisting of substantially water insoluble ionophore growth factors, and mixtures thereof encapsulated in the amorphous central cavity of paucilamellar lipid vesicles dispersed in an aqueous-based carrier, said lipid vesicles having a nonphospholipid material as their primary lipid source.

5,023,087
EFFICIENT METHOD FOR PREPARATION OF PROLONGED RELEASE LIPOSOME-BASED DRUG DELIVERY SYSTEM

Annie Yau-Young, Los Altos, Calif., assignor to Liposome Technology, Inc., Menlo Park, Calif.

Continuation-in-part of Ser. No. 215,075, Jul. 5, 1988, abandoned, which is a continuation of Ser. No. 828,153, Feb. 10, 1986, abandoned. This application May 12, 1989, Ser. No. 326,198

Int. Cl.^{5} A61K *37/22*

U.S. Cl. 424—450 **13 Claims**

1. A liposome composition for use in administering a liposome-impermeable compound to the bloodstream from an intramuscular or subcutaneous site of injection, comprising

an aqueous suspension of liposomes containing the compound in entrapped form, and

mixed with said suspension, empty liposomes, which do not contain the entrapped drug, having an average size and in

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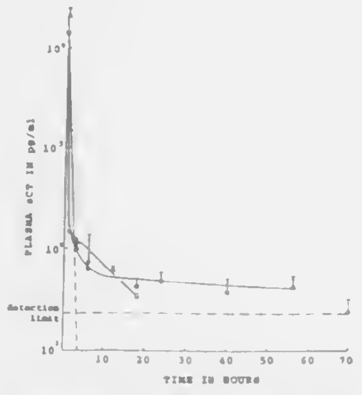
an amount effective to produce up to a severalfold increase in the half-life of clearance of the liposome en-



trapped compound from such injection site compared with the clearance half-life of the liposome-entrapped compound in the absence of the empty liposomes.

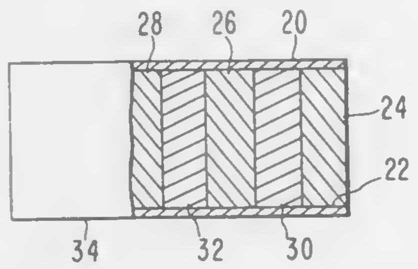
5,023,088
MULTI-UNIT DELIVERY SYSTEM

Patrick S. L. Woog, Palo Alto; Felix Theeuwes; James B. Eckenboff, both of Los Altos; Steven D. Larsen, Dublin, and Hoa T. Huynh, Fremont, all of Calif., assignors to Alza Corporation, Palo, Calif.

Continuation-in-part of Ser. No. 283,772, Dec. 13, 1988, abandoned, which is a continuation-in-part of Ser. No. 270,730, Nov. 14, 1988, abandoned, which is a continuation-in-part of Ser. No. 66,905, Jun. 25, 1987, abandoned. This application Mar. 19, 1990, Ser. No. 495,825

Int. Cl.^{5} A61K *9/24*

U.S. Cl. 424—473 35 Claims



1. An active agent dispenser for use in a fluid-containing environment comprising, in combination:

a. a rigid housing open at one end to provide outlet means therefor, at least a portion of said housing proximate the end of said housing opposite the outlet means permitting passage of the fluid in said environment to the interior of said housing;

b. a fluid-activated driving member within said housing in fluid transmitting relationship with the fluid passing portion of said housing proximate the end of said housing opposite said outlet means, said driving member, upon exposure of said dispenser to said fluid environment, being the source of motive power for moving the contents of said housing through said outlet; and

c. a plurality of solid, discrete active agent dosage units containing the active agent longitudinally disposed within said housing between said driving member and said outlet means, whereby said active agent units will be sequentially displaced from said housing into said fluid environment by said driving member upon exposure of said dispenser to said fluid environment, at least a portion of said active agent units being adapted to maintain their chemical and physical integrity while within the housing and to dispense a substantial portion of their active agent content into the fluid environment after their displacement from said housing into said environment.

5,023,089
SUSTAINED-RELEASE PREPARATIONS AND THE PROCESS THEREOF

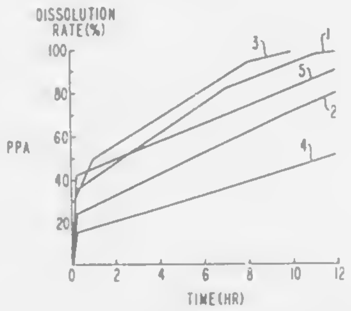
Teruo Sakamoto, Osaka; Toyohiko Takeda, Hyogo, and Yusuke Suzuki, Osaka, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Jul. 13, 1989, Ser. No. 379,631

Claims priority, application Japan, Jul. 18, 1988, 63-178757

Int. Cl.^{5} A61K *9/50*

U.S. Cl. 424—502 3 Claims



1. A process for manufacturing sustained-release two-layer preparations, wherein 1 part by weight of a water-soluble pharmaceutically active ingredient is suspended or melted in 1 to 10 parts by weight of a mixed melt consisting of two or more fats having different melting points, and while the temperature of the suspension or the melt is maintained at a level higher than the solidification point of the fat having a higher melting point, said suspension or melt is formulated into granules by means of spray-cooling, and then the granules obtained are annealed at a temperature which is lower than the melting point of the fat having a higher melting point but is higher than the melting point of the fat having a lower melting point.

5,023,090
TOPICAL COMPOSITIONS CONTAINING LYCD AND OTHER TOPICALLY ACTIVE MEDICINAL INGREDIENTS FOR THE TREATMENT OF ACNE

Robert H. Levin, 11127 Jardin Pl., Cincinnati, Ohio 45241

Continuation-in-part of Ser. No. 394,862, Aug. 16, 1989, Pat. No. 4,942,031, which is a continuation-in-part of Ser. No. 159,390, Feb. 23, 1988, abandoned. This application Apr. 2, 1990, Ser. No. 503,225

Int. Cl.^{5} A61K *35/72, 31/70, 33/40*

U.S. Cl. 424—520 13 Claims

1. A topical composition adapted for application to the skin comprising in admixture with a pharmaceutically acceptable topical carrier, an antiinfective agent effective in the treatment of acne, and from about 0.1% to about 3.0% by weight of said composition of Live Yeast Cell Derivative (LYCD) in amounts effective to ameliorate the effects of acne when applied to an affected area of the skin.

5,023,091
RUMINANT FEED METHOD OF MAKING AND METHOD OF USING

Thomas S. Winowiski, Mosinee, Wis., assignor to The Board of Regents of the University of Nebraska, Lincoln, Nebr.

Division of Ser. No. 28,969, Mar. 23, 1987, Pat. No. 4,957,748. This application Feb. 2, 1990, Ser. No. 474,533

The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.

Int. Cl.^{5} A23K *1/18*

U.S. Cl. 426—2 6 Claims

1. A feed for ruminants comprising a mixture of organic materials including at least one reaction product of a feed protein and a reducing carbohydrate, wherein the percentage of the reducing carbohydrate on the feed protein is about 0.5 percent to about 40 percent by weight such that degradability of the feed protein by rumen microorganisms is reduced and there is significant protein digestibility in the post rumen tract.

5,023,092
MANNITOL HAVING GAMMA SORBITOL POLYMORPH

James W. DuRoss, Smyrna, Del., assignor to ICI Americas Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 207,679, Jun. 16, 1988, abandoned. This application May 12, 1989, Ser. No. 352,632

Int. Cl.^{5} A23L *1/22, 1/236;* **A23G** *3/30, 1/00*

U.S. Cl. 426—3 10 Claims

1. A co-crystallized mannitol/sorbitol polymorph having an X-ray diffraction pattern of gamma sorbitol containing from 5–35 percent by weight mannitol and a single peak melting point ranging from 90°–100° -C as determined by Differential Scanning Calorimetry.

5,023,093
REDUCED CALORIE CHEWING GUM BASE AND COMPOSITIONS CONTAINING THE SAME

Subraman R. Cherukuri, Towaco, N.J., and Gul Mansukhani, Staten Island, N.Y., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 292,283, Dec. 30, 1988, and Ser. No. 377,800, Jul. 7, 1989, which is a continuation-in-part of Ser. No. 939,918, Dec. 10, 1986. This application Dec. 14, 1989, Ser. No. 451,277

The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl.^{5} A23G *3/30*

U.S. Cl. 426—3 68 Claims

1. A chewing gum base composition, which consisting essentially of:

a) about 0.5 to about 30% elastomer;

b) about 5% to about 40% of a polyvinyl acetate having a medium molecular weight of about 35,000 to about 55,000;

c) about 4.5% to about 15.0% acetylated monoglyceride;

d) about 6% to about 20% of a fat having a melting point below about 65° C.; and

e) remaining amounts of a filled material; all percents are by weight of the final gum base composition and are present to bring the weight of gum base to 100%.

5,023,094
RETARDING THE FIRMING OF BREAD CRUMB DURING STORAGE

Johannes H. Van Eijk, Biltboven, Netherlands, assignor to Gist-Brocades N.V., Delft, Netherlands

Filed Oct. 16, 1989, Ser. No. 421,997

Claims priority, application European Pat. Off., Aug. 10, 1989, 89202074.4

Int. Cl.^{5} A23L *1/105*

U.S. Cl. 426—20 14 Claims

1. A process for the production of a bread product having a retarded rate of crumb firming during storage comprising adding to a dough at least one thermostable α-1,6-endoglucanase or α-1,4-exoglucanese which is active during baking at temperatures between 65° and 95° C. in an amount which is able to modify selectively during baking the crystallization properties of the amylopectin component.

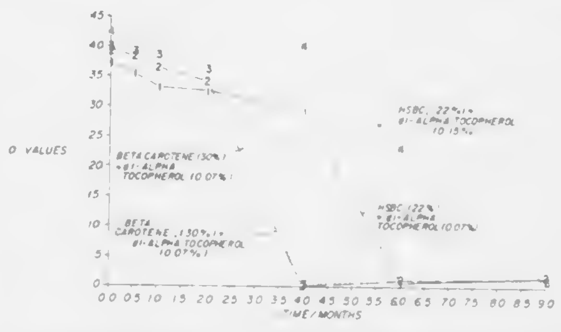
5,023,095
COLOR STABILIZATION SYSTEM FOR BETA-CAROTENE IN DRY FOOD MIXES

Paula S. Kirk, Dearborn Heights, Mich., assignor to BASF Corporation, Parsippany, N.J.

Filed Jun. 8, 1990, Ser. No. 535,074

Int. Cl.^{5} A23L *1/275*

U.S. Cl. 426—250 15 Claims



1. A color-stabilized food coloring composition for dry food compositions comprising:

about 0.5 wt. % to about 5.0 wt. % of beta-carotene;

about 0.5 wt. % to about 5.0 wt. % of at least one edible oil; and

about 0.05 wt. % to about 1.5 wt. % of dl-alpha-tocopherol, the composition, when used as a food coloring, has enhanced color stability.

5,023,096
FOOD PRODUCT AND METHOD FOR MAKING THE SAME

Frederic W. Plochman, Oak Lawn, Ill., assignor to NatureStar Foods, Inc., Oaklawn, Ill.

Filed Oct. 19, 1989, Ser. No. 423,943

Int. Cl.^{5} A23P *1/08*

U.S. Cl. 426—89 21 Claims

1. A method for producing a crunchy freeze-dried food product to be consumed in its non-reconstituted state comprising the steps of:

(a) providing a base layer of cheese;

(b) covering said base layer of cheese with a substantially uniform layer of popped popcorn;

(c) adding a second layer of a cheese on top of and within the interstices of said layer of popcorn;

(d) heating to melt said second layer of cheese to bond said second layer of cheese and said layer of popcorn to said base layer of cheese, thereby forming a structure having at least three layers bonded together;

(e) freezing said structure to form a frozen structure; and

(f) freeze-drying said frozen structure to provide a crunchy freeze-dried food product to be consumed in its non-reconstituted state.

5,023,097
DELIGNIFICATION OF NON-WOODY BIOMASS

George J. Tyson, Madison, Wis., assignor to Xylan, Inc., Madison, Wis.

Continuation of Ser. No. 177,786, Apr. 15, 1988, Pat. No. 4,842,877. This application May 16, 1989, Ser. No. 352,771

The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.

Int. Cl.^{5} A23K *1/00*

U.S. Cl. 426—271 13 Claims

1. A process for continuously treating a non-woody lignocellulosic substrate consisting of organic plant material having no more than about 20% lignin content, the process consisting essentially of:

a) reacting the substrate in a reaction medium including an

VOL
1127
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1991
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aqueous solution of a strong alkali at a pH in the range of about 10.5 and 12.5; and

b) continuously feeding the product of step a) to an aqueous solution in a pressurized extruder reactor and reacting the substrate in an oxygen atmosphere at a temperature between about 150° and 315° F. and at a pressure between about 250 and 450 psi, and in the presence of hydrogen peroxide for a period of time effective to delignify the substrate, wherein the hydrogen peroxide is added to the extruder at a rate of between about 20 and 40 pounds of hydrogen peroxide per ton of substrate.

5,023,098
METHOD OF PRODUCING PRESSURIZED GAS-ENTRAPPING CANDY

Naoki Sumi; Keizo Mochizuki; Yoshio Moriyama, all of Kawasaki, and Mitsuhiro Sakurai, Tokyo, all of Japan, assignors to Meiji Seika Kaisha, Tokyo, Japan

Filed Nov. 7, 1989, Ser. No. 432,821

Int. Cl.^{5} A23G *3/00*

U.S. Cl. 426—474 8 Claims

1. A method of producing a candy article containing pressurized gas entrapped therein which comprises heating a mixture of water and at least one raw material selected from the group consisting of sucrose, glucose, lactose, corn syrup, and a starch hydrolyzate containing oligosaccharides to a temperature of about 140° to 160° C. sufficient to dissolve said raw material in said water and to condense such; forming fine air bubbles in said condensate; cooling and shaping said condensate into shaped candy pieces; contacting such pieces with liquid nitrogen; removing such pieces from said liquid nitrogen contact and placing them in a pressure vessel means; pressuring said vessel means with an inert gas to a pressure of about 10 to 50 kg/cm^2; heating said candy pieces in said pressure vessel means to a temperature of about 100° to 140° C. sufficient to partially melt said pieces and to cause at least some of said pressurizing gas to become mixed therewith; while maintaining the pressure in said pressure vessel means, cooling said candy pieces sufficient to solidify such and to thereby entrap said gas therein; then releasing the pressure in said vessel means; and recovering the solidified, cooled candy pieces containing gas entrapped therein.

5,023,099
METHOD FOR PRODUCING SOFT COOKIES HAVING BLOOM RESISTANCE

Donald G. Boehm, Mt. Kisko, N.Y., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Continuation of Ser. No. 96,308, Sep. 9, 1987, abandoned, which is a continuation of Ser. No. 737,687, May 24, 1985, abandoned. This application May 3, 1989, Ser. No. 348,119

Int. Cl.^{5} A21D *8/00*

U.S. Cl. 426—549 19 Claims

1. A method for preventing bloom and oil seepage in cookies having a moist cake-like soft texture throughout the cookie which lasts for at least about two months in a closed container comprising:

a) forming a cookie dough with both a shortening or fat having a solid fat index of from about 18 to 31 at 50° F.(10° C.). 13.0 –18.0 at 70° F.(21.1° C.), less than 13 at 80° F.(26.7° C.) and being essentially completely liquid at a temperature of about 100° F. (37.8° C.) and a flavoring ingredient for reducing mobility of said shortening or fat in the cookie, said cookie dough comprising flour, sugar, flavor chips which are susceptible to bloom and a humectant in an amount of from about 10% by weight to about 50% by weight, based upon the weight of the flour, the amount of said shortening or fat being from about 20% by weight to about 80% by weight, based upon the weight of the flour, and the amount of said flavoring ingredient being from about 10% by weight to about 45% by weight, based upon the weight of the shortening or fat, and

b) baking said cookie to obtain said moist cake-like soft texture throughout the cookie, wherein interaction between said flavoring ingredient and said shortening or fat controls excessive oven spread and prevents undesirable oil seepage from the cookie to packaging materials.

5,023,100
FISH OIL

Stephen S. Chang; Yongde Bao, both of East Brunswick, N.J., and Timothy J. Pelura, Alameda, Calif., assignors to Kabi Vitrum AB, Sweden

Continuation of Ser. No. 189,198, May 2, 1988, Pat. No. 4,874,629. This application Oct. 2, 1989, Ser. No. 415,765

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.^{5} A23D *5/00;* **C11B** *3/12*

U.S. Cl. 426—601 16 Claims

1. An edible fish oil containing EPA and DHA produced by a process consisting essentially of:

subjecting said oil to vacuum steam distillation under mild conditions for a time sufficient to reduce low temperature boiling and less polar volatile flavor compounds;

contacting said oil with an adsorbent selected from the group consisting of silica gel and silicic acid to reduce high temperature boiling and more polar volatile flavor compounds and undesirable minor constituents selected from the group consisting of polymers, cholesterol, pigments, pesticides, PCB's, heavy metals and mixtures thereof, and

recovering the treated oil.

5,023,101
SHORTENING FOR HARD BUTTER PRODUCT AND PROCESS FOR PRODUCING HARD BUTTER PRODUCT

Hirosi Sugihara, Sennan; Hiroshi Hidaka, Sakai; Akira Doi, Sennan; Toshitaka Okawauchi, Sakai; Yasushi Kawabata, and Hideki Baba, both of Sennan, all of Japan, assignors to Fuji Oil Company, Limited, Osaka, Japan

Filed Dec. 14, 1988, Ser. No. 284,121

Claims priority, application Japan, Dec. 14, 1987, 62-316731; May 11, 1988, 63-115053

Int. Cl.^{5} A23C *15/12*

U.S. Cl. 426—603 3 Claims

1. Plasticized or fluidized shortening for a hard butter product which comprises crystallized fat and amorphous glycerides in an amount sufficient to provide said shortening with plasticized or fluidized properties at 30+ C., said crystallized fat being composed of as a main ingredient 1,3-saturated-2-unsaturated triglyceride, the total carbon atoms of the constituent fatty acid residues of which are not less than 50, and whereas the main crystals thereof are in a stable form such that they are at least in the V form of the glyceride.

5,023,102
METHOD AND COMPOSITION FOR INHIBITING FAT BLOOM IN FAT BASED COMPOSITIONS AND HARD BUTTER

Peter S. Given, Jr., Glenco, Ill., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Continuation-in-part of Ser. No. 292,532, Dec. 30, 1988, Pat. No. 4,923,708. This application Mar. 23, 1990, Ser. No. 497,685

Int. Cl.^{5} A23G *1/00*

U.S. Cl. 426—610 39 Claims

1. A stabilized fat composition having a resistance to fat bloom comprising a mixture of at least one fat which is solid or semi-solid at room temperature and an effective amount of a fat bloom inhibitor comprising at least one di-alcohol having the formula:

$$HOCH_2\text{-}R\text{-}CH_2OH$$

wherein R is an alkyl or alkenyl moiety having 4 to 22 carbon atoms; or, $(CH_2)_x$-R_1-$(CH_2)_y$ wherein R is a aryl moiety, -O-, -NH-, CO-NH-, -CO_2- or -CO- and x and y are 0 or an integer from 1 to 22 provided that the sum of $(x+y)$ is an integer from 4 to 22.

5,023,103
FIBER AND METHOD OF MAKING

Setlur R. Ramaswamy, Louisville, Ky., assignor to D. D. Williamson & Co., Inc., Louisville, Ky.

Continuation of Ser. No. 6,901, Jan. 27, 1987, abandoned. This application Dec. 14, 1988, Ser. No. 285,356

Int. Cl.^{5} A23L *1/10*

U.S. Cl. 426—626 8 Claims

1. A method of making dietary fiber having a non-gritty mouth feel and water absorbency comprising:

digesting oat hulls in an aqueous, alkaline solution to provide digested at a combined time, pressure, temperature and pH effective to reduce silica content of said fibers to less than about 2% by weight and reduce lignin content of said fibers to less than about 1% by weight and a water absorption of at least about 600% wherein said pressure is greater than about 15 psig and said pH is greater than about 11.

5,023,104
DEFATTED SOYBEANS AND SOYBEAN PROTEIN OBTAINED FROM THE SAME

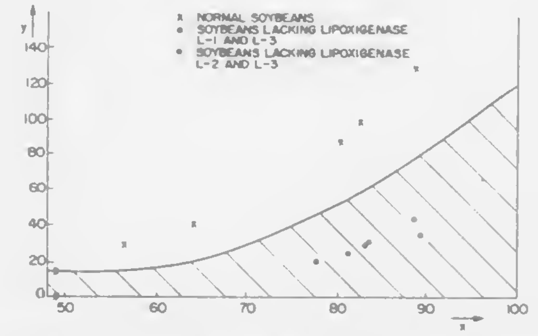
Shinichiro Nagatomo, Sennan; Masahiko Terashima, Osaka, and Hitoshi Taniguchi, Sennan, all of Japan, assignors to Fuji Oil Company, Limited, Osaka, Japan

Continuation-in-part of Ser. No. 157,723, Feb. 22, 1988, abandoned. This application Jul. 21, 1989, Ser. No. 383,531

Claims priority, application Japan, Feb. 24, 1987, 62-41624; Mar. 6, 1987, 62-52815

Int. Cl.^{5} A23L *1/212*

U.S. Cl. 426—634 1 Claim



1. Defatted soybeans having an NSI of between 70 and 92 and TBA value of not more than 40 obtained from cracked dehulled and flaked soybeans lacking at least two lipoxigenase isozymes.

5,023,105
FOOD PRODUCTS CONTAINING NON-PUNGENT DIJON MUSTARD FLAVORING AND A PROCESS FOR MAKING MUSTARD PASTE

Michael R. Warseck, Randolph, N.J., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Filed Jun. 15, 1989, Ser. No. 366,745

Int. Cl.^{5} A23L *1/221, 1/225*

U.S. Cl. 426—650 25 Claims

14. A process of producing a dijon mustard comprising:

mixing whole or crushed mustard seed or fractions thereof, water, vinegar, and spices to form a mustard seed blend;

grinding the mustard seed blend to form a mustard paste; and

adding a water soluble extract of brown mustard seed bran to either the mustard seed blend or to the mustard paste, wherein the extract imparts a non-pungent dijon flavor to the mustard paste.

5,023,106
PROCESS FOR TEMPERING FLAVORED CONFECTIONERY COMPOSITIONS CONTAINING REDUCED CALORIE FATS AND RESULTING TEMPERED PRODUCTS

Albert M. Ehrman; Paul Seiden; Rose M. Weltzel, and Robert L. White, all of Cincinnati, Ohio, assignors to The Procter & Gamble Co., Cincinnati, Ohio

Continuation-in-part of Ser. No. 329,619, Mar. 28, 1989, Pat. No. 4,888,196. This application Dec. 19, 1989, Ser. No. 452,880

The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.

Int. Cl.^{5} A23G *1/00*

U.S. Cl. 426—660 2 Claims

1. A process for tempering flavored confectionery compositions, which comprises the steps of:

(I) forming a temperable flavored confectionery composition which comprises:
  a. a flavor-enhancing amount of a flavor component;
  b. from about 25 to about 45% of a fat component comprising:
    (1) at least about 70% of a reduced calorie fat having:
      (a) at least about 85% combined MLM and MML triglycerides;
      (b) no more than about 10% combined LLM and LML triglycerides;
      (c) no more than about 2% LLL triglycerides;
      (d) no more than about 4% MMM triglycerides;
      (e) no more than about 10% other triglycerides;
wherein M is a C_6 to C_{10} saturated fatty acid residue and L is a C_{20} to C_{24} saturated fatty acid residue;
  (f) a fatty acid composition having:
    (i) from about 35 to about 60% combined C_8 and C_{10} saturated fatty acids,
    (ii) a ratio of C_8 to C_{10} saturated fatty acids of from about 1:4 to about 4:1,
    (iii) from about 35 to about 60% behenic fatty acid,
    (2) up to about 15% milkfat:
    (3) up to about 20% cocoa butter;
    (4) no more than about 4% diglycerides; and
  c. from about 55 to about 75% other nonfat confectionery ingredients;
(II) rapidly cooling the composition of step (I) to a temperature of about 57° F. (13.9° C.) or less so that the reduced calorie fat forms a sub α phase;
(III) holding the cooled composition of step (II) at a temperature of about 57° F. (13.9° C.) or less for a period of time sufficient to form an effective amount of β-3 crystals from a portion of the sub α phase of the reduced calorie fat; and
(IV) after step (III), warming the cooled composition to a temperature in the range of from above about 57° to about 72° F. (about 13.9° to about 22.2° C.) in a manner such that:
  (a) the remaining portion of the reduced calorie fat transforms into a stable β-3 phase; and (b) the β-3 phase formed does not melt.

5,023,107
HARD TISSUE SURFACE TREATMENT

Thomas A. Roberts, Cheshire, United Kingdom, assignor to Imperial Chemical Industries PLC, London, England

Filed May 3, 1989, Ser. No. 346,806

Claims priority, application United Kingdom, May 3, 1988, 8810412

Int. Cl.^{5} A61C *13/23*

U.S. Cl. 427—2 9 Claims

9. A method of improving adhesion of an adhesive to the surface of a hard tissue which comprises:

(i) pre-treating the surface of the hard tissue with an aqueous solution of a magnesium salt; and

(ii) priming the surface of the hard tissue with a primer selected from a long chain alkyl quaternary ammonium

VOL
1127
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salt, bisbiguanide, and an acid addition salt of polybiguanide, before applying the adhesive.

5,023,108

AQUEOUS DISPERSIONS OF WAXES AND LIPIDS FOR PHARMACEUTICAL COATING

Suresh C. Bagaria, Somerset, and Nicholas G. Lordi, Bloomfield, both of N.J., assignors to Research Corporation, New York, N.Y.

Continuation of Ser. No. 818,455, Jan. 13, 1986, abandoned. This application Sep. 8, 1987, Ser. No. 94,164

Int. Cl.⁵ A61K *9/42*

U.S. Cl. 427—3 12 Claims

1. A process for spray-coating medicaments or foods which comprises spraying onto the surface of the medicament an aqueous dispersion of a powder, said powder having been formed by spray drying an emulsion to consisting essentially of a member selected from the group wax, lipid and a mixture thereof, an emulsifying agent and water.

5,023,109

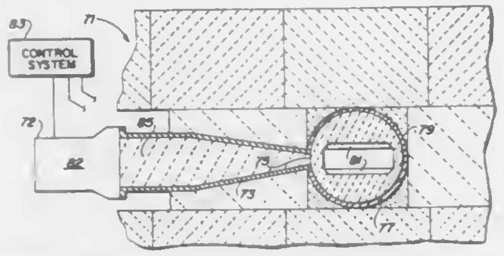
DEPOSITION OF SYNTHETIC DIAMONDS

Jack Chin, Carlsbad; Robert R. Goforth, Encinitas, and Tihiro Ohkawa, La Jolla, all of Calif., assignors to General Atomics, San Diego, Calif.

Filed Sep. 6, 1989, Ser. No. 403,284

Int. Cl.⁵ C23C *16/48*

U.S. Cl. 427—45.1 19 Claims



1. Apparatus for depositing a synthetic diamond film, which apparatus comprises

a pair of facing plate means each having front and rear surfaces, said front surfaces being spaced apart from each other to define a region therebetween,

means for maintaining a pressure of between about 1 torr and about 100 torr within said defined region,

means for supplying a gaseous mixture containing a major portion of hydrogen and a minor portion of a carbon source to said defined region, and

means for generating a plasma in said defined region in a manner so as to heat both said front plate surfaces to a relatively uniform temperature,

surrounding region exterior of said plate means being thermally insulated to maintain said uniform temperature whereby the deposition of films of synthetic diamond crystals upon said front surfaces of plate means is promoted.

15. A method for depositing a synthetic diamond film, which method comprises

providing a zone defined by a pair of facing plates having front surfaces which are spaced apart from each other,

maintaining a pressure of between about 1 torr and about 100 torr within said zone,

supplying a gaseous mixture containing a major portion of hydrogen and a minor portion of a carbon source to said zone,

thermally insulating the region surrounding said zone and said plates, and

generating a microwave plasma in said zone between said front plate surfaces in a manner to maintain both said front surfaces at relatively uniform temperatures, whereby the plasma causes deposition of films of synthetic diamond crystals upon said plate front surfaces.

5,023,110

PROCESS FOR PRODUCING ELECTRON EMISSION DEVICE

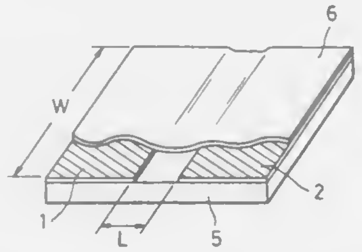
Ichiro Nomura, Yamato; Tetsuya Kaneko, Yokohama; Yoshikazu Banno, Atsugi, and Toshihiko Takeda, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 1, 1989, Ser. No. 345,173

Claims priority, application Japan, May 2, 1988, 63-107570; May 2, 1988, 63-107571; Aug. 26, 1988, 63-210445

Int. Cl.⁵ B05D *3/14*

U.S. Cl. 427—49 28 Claims



1. A process for producing an electron emission device having opposing electrodes arranged on a substrate and an electron emitting region formed between said opposing electrodes, the forming of said electron emitting region comprising the steps of:

forming a conductive thin film containing fine particles of particle sizes ranging between several tens of Angstroms (Å) and several micrometers (μm) between the opposing electrodes; and

effecting a heat treatment on said conductive thin film by supplying electric current to said conductive thin film.

5,023,111

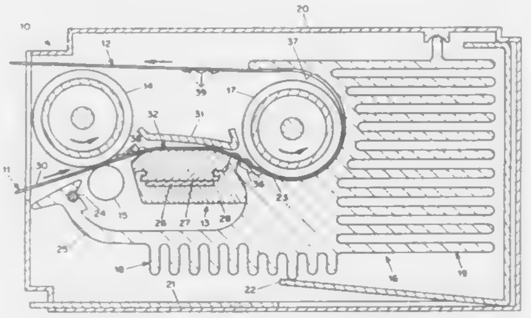
TREATMENT OF HOT MELT INK IMAGES

Steven J. Fulton, Hanover; Gerald T. Peters, Jr., Canaan, both of N.H.; Charles W. Spehrley, Jr., Hartford, Vt., and Lawrence R. Young, West Lebanon, N.H., assignors to Spectra, Inc., Hanover, N.H.

Continuation-in-part of Ser. No. 230,797, Aug. 10, 1988, Pat. No. 4,873,134. This application Oct. 2, 1989, Ser. No. 416,158

Int. Cl.⁵ B05D *3/00, 3/02, 5/06*

U.S. Cl. 427—164 19 Claims



1. A method for preparing a transparency comprising applying hot melt ink to the surface of a transparent substrate which is wetted by the ink to form an ink pattern containing three-dimensional ink spots having a curved surface, and maintaining the ink in the pattern at a temperature above the melting point of the ink during a time interval of at least 0.5 sec. to cause the ink spot to enlarge and decrease the angle of contact of the ink spots with the surface of the substrate.

5,023,112

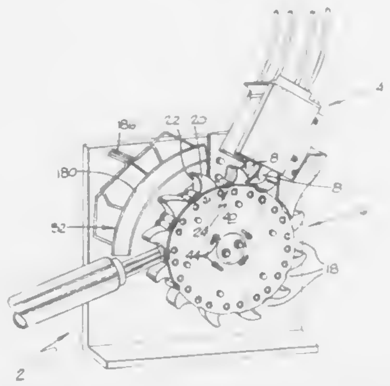
APPARATUS AND METHOD FOR APPLYING A COATING TO A CAN BODY

Robert H. Schultz, Golden, Colo., assignor to Adolph Coors Company, Golden, Colo.

Filed Apr. 11, 1989, Ser. No. 336,104

Int. Cl.⁵ B05D *5/08, 1/28;* **B05C** *1/02, 13/02*

U.S. Cl. 427—287 20 Claims



1. Apparatus for applying a coating of lubricant on at least a portion of the outer peripheral surface of a can body comprising:

a fixedly mounted support frame;

feeding means for continuously feeding can bodies to a feed station, each of said can bodies having a bottom end and an integral sidewall having a generally cylindrical outer peripheral surface;

drive means for rotating a main drive shaft which is mounted for rotation on said support frame;

a turret mounted on said main drive shaft for rotation therewith;

a plurality of pockets formed on said turret between radially outwardly projecting members for rotation therewith and wherein each of said pockets removes a can body from said feed station as said pocket moves through said feed station;

can body holding means in each of said pockets for holding each of said can bodies in each of said pockets so that at least a portion of said outer peripheral surface is freely exposed;

can body rotating means for rotating each of said can bodies in said pockets as said turret rotates; and

lubricant applying means mounted on said support frame at a fixed location and positioned so that said at least a portion of said outer peripheral surface of said rotating can body contacts said lubricant supplying means as said turret rotates for applying a coating of lubricant thereon.

16. A method for applying a coating of lubricant on at least a portion of the outer peripheral surface of a can body comprising:

mounting a turret for rotation about a relatively fixed axis;

forming a plurality of pockets on the outer peripheral surface of said turret;

feeding a can body having a generally cylindrical outer peripheral surface into each of said pockets as said turret is rotating;

holding each of said can bodies in one of said pockets by applying a force thereto using holding means within each of said pockets so that at least a portion of said outer peripheral surface is freely exposed;

rotating said can body about its own axis as it is being held in said pocket; and

moving said at least a portion of said outer peripheral surface of said can body into contact with a lubricant applying means so as to apply a coating of lubricant thereon.

5,023,113

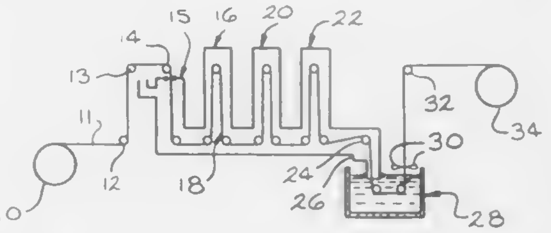
HOT DIP ALUMINUM COATED CHROMIUM ALLOY STEEL

Steven L. Boston, Middletown; Farrell M. Kilbane, Centerville; Danny E. Lee, Middletown; William R. Seay, Franklin; Richard A. Coleman, West Chester, all of Ohio, assignors to Armco Steel Company, L.P., Middletown, Ohio

Filed Aug. 29, 1988, Ser. No. 237,915

Int. Cl.⁵ C23C *2/12*

U.S. Cl. 427—320 8 Claims



1. A method of continuous hot dip coating a steel strip with aluminum, comprising the steps of:

heating a ferritic chromium alloy steel strip to a temperature no greater than about 650° C. by direct combustion of fuel and air wherein the gaseous products of said combustion have no free oxygen,

further heating said strip to a temperature of at least about 830° C., cooling said strip to a temperature near or slightly above the melting point of an aluminum coating metal,

passing said strip through a protective atmosphere having at least about 95% by volume hydrogen,

dipping said strip into a molten bath of said coating metal to deposit a coating layer on said strip,

said coating layer being substantially free of uncoated areas and tightly adherent to said strip.

5,023,114

METHOD OF HYDROPHILIC COATING OF PLASTICS

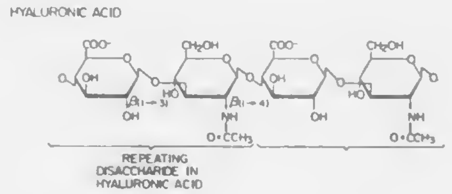
Gregory Halpern, Wilson Park Dr., Tarrytown, N.Y. 10591; Charles Campbell, Highwood Pl., Alpine, N.J. 07620; Ellington M. Beavers, 931 Coates Rd., Meadowbrook, Pa. 19046, and Huk Y. Cheh, 42-01 Auburndale La., Flushing, N.Y. 11358

Continuation of Ser. No. 198,358, May 25, 1988, abandoned, which is a division of Ser. No. 643,598, Aug. 23, 1984, Pat. No. 4,801,475. This application May 2, 1990, Ser. No. 517,482

The portion of the term of this patent subsequent to Jan. 31, 2006, has been disclaimed.

Int. Cl.⁵ B05D *3/04, 3/12;* **B32B** *7/12;* **A61K** *37/12*

U.S. Cl. 427—338 7 Claims



1. A method of interlaminar grafting of continuous coatings upon an object, the coatings being different and not mutually soluble, the method comprising the steps of:

(a) coating the object with a solution of a polymer having a plurality of functional groups capable of chemically reacting with a mucopolysaccharide, and manifesting a high degree of adhesion to the object,

(b) removing solvent from said solution, so as to form a first continuous film,

VOL
1127
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(c) applying as a second coat an aqueous solution of a mucopolysaccharide,
(d) removing water from said second coat so as to form a second continuous film, and
(e) chemically joining said first and second films so as to effect an interlaminar graft, wherein both films retain their individual integrity.

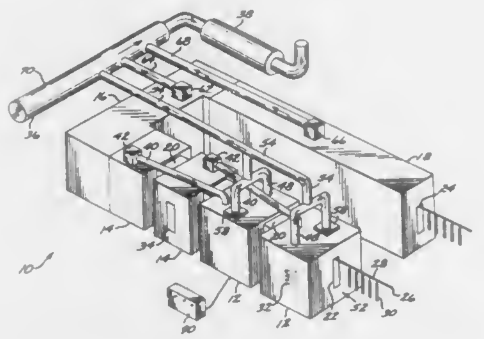
5,023,115
METHOD OF FORMING COATINGS IN COATED TUBULAR METAL MEMBERS

Toshihiko Mizuhashi, Mishima, Japan, assignor to Usui Kokusai Sangyo Kaisha, Ltd., Japan
Filed Sep. 15, 1989, Ser. No. 408,024
Claims priority, application Japan, Sep. 17, 1988, 63-233150
Int. Cl.^{5} B05D *3/02, 1/36;* **B29D** *22/00;* **B32B** *1/08*
U.S. Cl. 427—388.2 **10 Claims**

1. A method of forming coatings on coated tubular metal members which comprises the steps of:
coating a fluoro resin on a chromate layer on a tubular metal member previously applied with Zn-plating having such a chromate layer at the outer circumferential surface;
coating a primer on the surface of said fluoro resin;
depositing a heat shrinkable tubular, resin member onto said coated primer layer; and
then heat shrinking said tubular member by applying a heat treatment, thereby tightly adhering and laminating the various layers.

5,023,116
ENVIRONMENTALLY ACCEPTABLE PROCESS AND APPARATUS FOR VENTILATION OF CONTINUOUS PAINT LINES

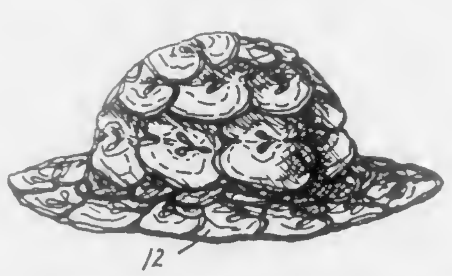
Larry Williams, 644 E. Fairway Dr., Redlands, Calif. 92373, and William Hunter, 13588 Pyramid Dr., P.O. Box SVL 542, Victorville, Calif. 92392
Filed Aug. 7, 1989, Ser. No. 391,104
Int. Cl.^{5} B05D *1/00*
U.S. Cl. 427—424 **9 Claims**



9. A process for painting objects that pass through a painting apparatus in a continuous manner, comprising the steps of:
furnishing
a first closed painting booth having an entry opening, the first painting booth having a painting applicator that forces organic-containing paint toward the objects in a first painting direction, and further having a semipermeable paint filter through which the paint not deposited upon the objects is directed,
a second painting booth connected to the first painting booth, the second painting booth having a painting applicator that sprays organic-containing paint toward the objects, and
a conveyer that moves the objects into the first painting booth through the entry opening and thereafter into the second painting booth;
recirculating air through the first painting booth, the air flowing in the first painting direction within the first painting booth, at a rate sufficiently high to force paint-laden air through the filter;
providing a flow of make up air to the first painting booth from the second painting booth, the make up air being drawn from the second painting booth at a rate sufficiently high to prevent applied organics from escaping from the second painting booth; and
withdrawing a portion of the recirculated air from the first painting booth at a rate such that the organics content of the air in the first painting booth is below the lower explosive level, such that the linear flow rate of air through the entry opening is sufficiently high to prevent sprayed organics from escaping from the second painting booth, and such that the volumetric flow rate of air withdrawn is substantially equal to the volumetric flow rate of make up air plus the volumetric flow rate of air entering the first painting booth through the entry opening.

5,023,117
NOVELTY ITEM AND METHOD OF MANUFACTURE

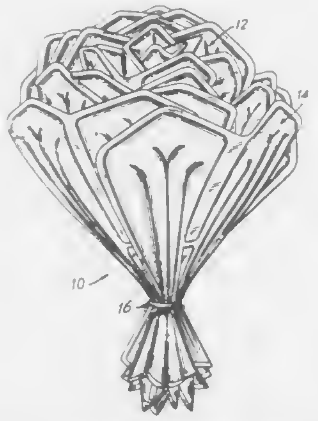
Kimetha L. Stephens, P.O. Box 1384, Danville, Ky. 40422
Filed Jan. 16, 1990, Ser. No. 465,504
Int. Cl.^{5} A01N *3/00*
U.S. Cl. 428—17 **8 Claims**



1. A novelty item comprising a form serving as a foundation, a plurality of dehydrated apple slices arranged in layers on said form, adhesive means securing said apple slices to each other and to said form, and wherein said assembled layers of apple slices have been sprayed with a presevative.

5,023,118
ARTIFICIAL FLOWER WITH INFLATABLE PETALS AND/OR INFLATABLE MULTIPLE PETAL ASSEMBLIES

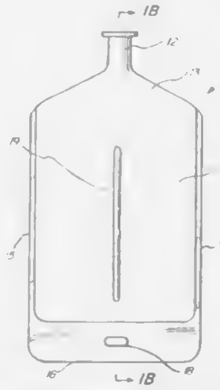
Peter S. C. Cheng, 5 Ross Street, Toronto, Ontario, Canada M5T 1Z8
Filed Jun. 12, 1990, Ser. No. 536,702
Int. Cl.^{5} A41G *1/00*
U.S. Cl. 428—24 **37 Claims**



1. An inflatable, artificial petal, comprising:
(a) an elongated envelope extending along a longitudinal direction and having a periphery, said envelope including a pair of overlying panels sealed together along the periphery of the envelope and bounding an interior into which gas is introduced to inflate the petal, each panel having a neck portion and a head portion integral therewith, each head portion having a larger transverse dimension, as considered along a transverse direction generally perpendicular to the longitudinal direction, than the transverse dimension of the neck portion of the respective panel; and
(b) means for sealing selected portions of the panels together within the periphery of the envelope along at least one elongated seam, said selected portions sealingly contacting each other along said at least one elongated seam, to impart a generally flattened shape to the inflated petal.

5,023,119
MEDICAL SOLUTION CONTAINER AND METHOD OF MAKING THE SAME

Kenichi Yamakoshi, Sapporo, Japan, assignor to Material Engineering Technology Laboratory, Inc., Tokyo, Japan
Continuation of Ser. No. 27,228, filed as PCT JP86/00298 on Jun. 13, 1986, published as WO86/07254 on Dec. 18, 1986, abandoned. This application Nov. 3, 1988, Ser. No. 267,717
Claims priority, application Japan, Jun. 14, 1985, 60-129563; Jul. 2, 1985, 60-145176; Jul. 3, 1985, 60-146125; Oct. 18, 1985, 60-232785; Oct. 18, 1985, 60-232786
Int. Cl.^{5} A61B *19/00;* **B65D** *33/00;* **B29C** *49/00*
U.S. Cl. 428—35.2 **12 Claims**

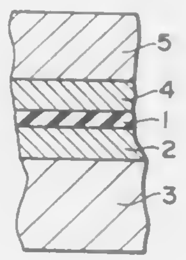


1. A flexible, walled, collapsible container for medical solutions formed from an organic polymer and including:
(a) a small port portion;
(b) a shoulder portion of continuously oval cross-section whose minor axis decreases in a lengthwise direction integral with said small port portion;
(c) a body portion integral with said port portion and said shoulder portion, said body portion having:
  (i) a central portion;
  (ii) a heat sealed side peripheral area;
  (iii) a heat sealed tail-end peripheral area; and
  (iv) a protruding portion proximate the central portion of said body portion.

5,023,120
PACKAGING MATERIAL FOR PHOTOSENSITIVE MATERIALS

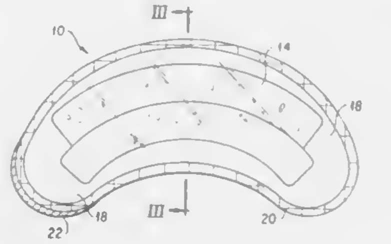
Mutsuo Akao, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan
Filed Dec. 4, 1989, Ser. No. 443,241
Claims priority, application Japan, Dec. 5, 1988, 63-305945
Int. Cl.^{5} B29D *22/00*
U.S. Cl. 428—35.9 **5 Claims**

1. A packaging material for photosensitive materials which comprises an aluminum foil and a polyolefin resin film having an elongation at rupture in either of longitudinal or lateral direction of more than 1.5 times of that of the aluminum foil laminated thereto through a modified polyolefin resin adhesive layer containing an adhesive polyolefin resin which is a graft modified polyolefin resin that is graft modified with at least one unsaturated carboxylic acid compound.



5,023,121
COEXTRUDED FILM WITH PEELABLE SEALANT

Gregory R. Pockat, Simpsonville; Carl C. Christenberry, Greenville, and Paul J. Satterwhite, Simpsonville, all of S.C., assignors to W. R. Grace & Co.-Conn., Duncan, S.C.
Filed Apr. 12, 1990, Ser. No. 509.688
Int. Cl.^{5} B32B *27/08*
U.S. Cl. 428—36.9 **4 Claims**



1. An easily opened package comprising:
(a) a first web including a sealant layer comprising a blend of polybutene and polypropylene and a third polymeric material selected from the group consisting of:
  (i) ethylene vinyl acetate copolymer;
  (ii) low density polyethylene;
  (iii) linear low density polyethylene; and
  (iv) ionomer; and
(b) a second web including a sealant layer consisting essentially of a polymeric material selected from the group consisting of ethylene vinyl acetate copolymer, low density polyethylene, linear low density polyethylene, ionomer, and mixtures thereof,
(c) the first and second webs heat-sealed to each other and enclosing an article, and
(d) and additional layer adjacent and bonded to the sealant layer of the first web, and comprising a polymeric adhesive.

5,023,122
EASY OPEN BAG STRUCTURE

Hugo Boeckmann, Arlington Heights, and Donald L. Van Erden, Wildwood, both of Ill., assignors to Minigrip, Inc., Orangeburg, N.Y.
Continuation-in-part of Ser. No. 150,229, Jan. 29, 1988, Pat. No. 4,846,585. This application Jun. 9, 1989, Ser. No. 363,771
Int. Cl.^{5} B65D *65/28*
U.S. Cl. 428—43 **19 Claims**

1. A plastic film sheet for use in forming a reclosable container, comprising in combination: a thin plastic film having mating interlocking
profiles on the surface thereof; a line of tear perforations extending along the
film parallel to the profiles and penetrating the film;

VOL
1127
ISS
2
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1991
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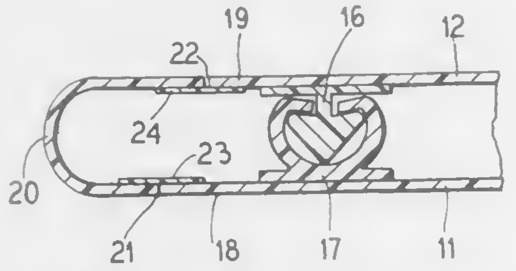
and a sealing frangible cap strip overlaid on the area of the perforations providing an impervious seal preventing the passage of air and moisture through the perforations, said strip being of a strength less than the film so that the film will tear along the perforations and the cap strip will separate along its length with the tearing of the film.

10. The method of making a plastic film sheet for use in forming a reclosable container comprising the steps:



providing a sheet of thin plastic container film;
forming a line of perforations longitudinally along the sheet and penetrating the sheet;
and adhering a cap layer of frangible sealing material to the surface of the sheet sealing the perforations with the cap layer having a tear strength less than the film sheet so that the film sheet will tear along the perforations while tearing the sealing material.

5,023,123
COMPATIBLE POLYMER MIXTURES

Werner Siol, Darmstadt-Eberstadt, and Ulrich Terbrack, Reinheim, both of Fed. Rep. of Germany, assignors to Rohm GmbH, Darmstadt, Fed. Rep. of Germany

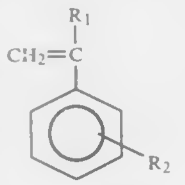
Division of Ser. No. 119,089, Nov. 10, 1987, Pat. No. 4,889,894. This application Aug. 29, 1989, Ser. No. 400,061

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1986, 3638443; Sep. 17, 1987, 3731248

Int. Cl.^{5} B32B *9/00, 27/34;* **D02G** *3/00;* **C08L** *33/06*

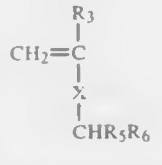
U.S. Cl. 428—392 **23 Claims**

1. A molded object comprising a first molded polymer P1 coated with a second polymer P2, wherein polymer P1 comprises at least 30 wt. % of monomers having formula I,



(I)

wherein R_1 is hydrogen or methyl, R_2 is a hydrocarbon group containing 1-18 carbon atoms, wherein said polymer P1 contains less than 20 wt. % styrene or α-methyl styrene, and wherein polymer P2 comprises at least 30 wt. % of polymer having formula II



$$\begin{array}{l} \quad\; R_3 \\ \quad\;\; | \\ CH_2{=}C \\ \quad\;\; | \\ \quad\;\; X \\ \quad\;\; | \\ \quad CHR_5R_6 \end{array} \qquad \text{(II)}$$

wherein R_3 is hydrogen, methyl or a group $—CH_2—X—CHR_5R_6$, X is $—C(O)—Z—$, $—Z—C(O)—$, $—Z—C(O)—Z'—$, wherein Z is oxygen or $—NR_4$, Z' is oxygen or NR_4, and R_4 is hydrogen or an alkyl group with 1-12 carbon atoms, and $—CHR_5R_6$ is an aliphatic or araliphatic hydrocarbon group with 5-24 carbon atoms.

5,023,124
ABSORBENT ARTICLE

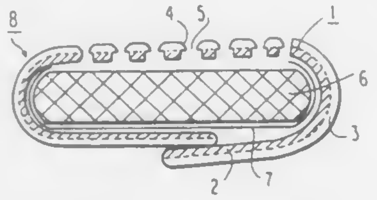
Takatoshi Kobayashi, Tochigi, Japan, assignor to Kao Corporation, Tokyo, Japan

Filed Aug. 21, 1990, Ser. No. 570,451

Claims priority, application Japan, Aug. 21, 1989, 1-97214[U]

Int. Cl.^{5} B32B *3/26*

U.S. Cl. 428—76 18 Claims



1. An absorbent article comprising:
a surface material;
a liquid-impermeable backing material; and
an absorbent being located between the surface material and the backing material, wherein the surface material comprises:
(A) a liquid-retentive structure body with a three-dimensional skeleton structure having an average interskeleton distance of from 150 to 700 μm;
(B) a hydrophobic film being integrally provided with said liquid-retentive body so as to form a skin-contact face; and
(C) openings penetrating through said liquid-retentive structure body and said hydrophobic film.

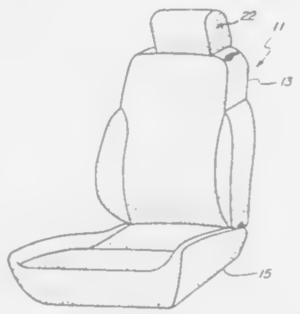
5,023,125
FASTENING MEANS FOR CUSTON-FIT SEAT COVERS

Jordan B. Gray, Newport Beach, Calif., assignor to Nouveaux Corporation, Irvine, Calif.

Continuation-in-part of Ser. No. 250,386, Sep. 28, 1988. This application Jul. 24, 1989, Ser. No. 384,501

Int. Cl.^{5} B32B *3/06*

U.S. Cl. 428—100 9 Claims



1. An improved seat-bottom cover for covering a seat-bottom, the improvement comprising:
a cover material, the cover material being shaped so as to snugly fit over the seat bottom;
a back-flap extending from a back side of the cover material,
at least one elongated front-strap fastened to and extending from a front side of the cover material so as to oppose the back-flap underneath the seat-bottom, the elongated front-strap having a pile fastening structure thereon for engaging the back-flap;
a side-flap extending from one side of the cover material; and
an elongated side-strap fastened to and extending from the other side of the cover material so as to oppose the side-flap underneath the seat-bottom, the elongated side-strap having a pile fastening structure thereon for engaging the side-flap.

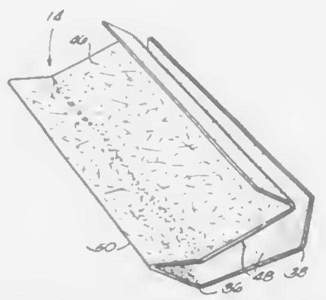
5,023,126
COMPOSITE TOWELS AND METHOD FOR MAKING COMPOSITE TOWELS

William P. Stevens, Oneida, and Mark E. Dowey, Green Bay, both of Wis., assignors to Fort Howard Corporation, Green Bay, Wis.

Continuation of Ser. No. 104,397, Oct. 2, 1987, abandoned. This application Oct. 30, 1989, Ser. No. 428,474

Int. Cl.^{5} D21H *1/02, 1/06*

U.S. Cl. 428—126 4 Claims



1. A towel adapted to be housed in a dispenser in a stack of similar towels, the towel comprising:
a composite layer of material having opposite surfaces, the composite layer of material including
a first layer of paper material defining one surface of the composite layer, the first layer of paper material comprising tissue having a smooth surface texture, and
a second layer of material integrally joined to the first layer, the second layer defining the opposite surface of the composite layer of material, and the second layer of material being comprised of absorbent dry formed material,
the material forming the towel being folded such that the first layer of paper material forms the outside surface of the towel, and the composite layer of material comprising a rectangle having opposite side edges and opposite ends, and wherein the rectangle is folded such that the opposite ends are positioned closely adjacent one another, and wherein the first layer of paper material forms the outside surface of the folded product.

5,023,127
MICROPOROUS COMPOSITES AND ELECTROLYTIC APPLICATIONS THEREOF

Jean Bachot, Bourg La Reine, and Jean-Claude Kiefer, Blaincourt Les Precy, both of France, assignors to Rhune-Poulenc Chimie De Base, Courbevoie, France

Division of Ser. No. 892,432, Aug. 4, 1986, Pat. No. 4,939,028. This application Feb. 28, 1990, Ser. No. 486,428

Claims priority, application France, Aug. 2, 1985, 85 11857

Int. Cl.^{5} B32B *3/10*

U.S. Cl. 428—137 **11 Claims**

1. A microporous composite comprising a deposit on a perforated rigid support substrate therefor, the deposit comprising a microporous material from a regular, homogeneous and consolidated deposit of monodispersed carbon fibers, said carbon fibers having a distribution by length such that the length of at least 80% of the individual fibers corresponds to the mean length of said fibers to within plus or minus 20%.

5,023,128
IMPACT-ABSORBING PAD

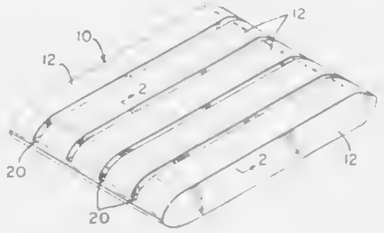
Wade T. Fatool, Sunbury, Pa., assignor to Competitive Atbletics Technology, Inc., Winfield, Pa.

Continuation-in-part of Ser. No. 212,871, Jun. 29, 1988, abandoned. This application Feb. 3, 1989, Ser. No. 305,742

Int. Cl.^{5} B32B *3/20;* **A47G** *9/06*

U.S. Cl. 428—172 **14 Claims**

1. An impact-absorbing pad formed of an integral body of compressible resilient material comprising a plurality of elongated, parallel, hollow pneumatic tubes extending side-by-side across the pad and defining a plurality of elongate, parallel central chambers extending side-by-side across the pad, said tubes being generally rectangular in outer cross section with top and bottom surfaces and side surfaces, said top and bottom surfaces defining the top and bottom of the pad and said side surfaces facing each other and being spaced apart from each other by a short distance, each tube being joined to an adjacent tube along one of its lengthwise side surfaces by an elongate web coextensive with elongate said side surfaces, each said elongate tube being sealed at spaced locations in order to trap air inside said tubes to provide a pad which resists compression.



11. Stock material for forming an impact-absorbing pad, said material including an integral extruded body of indefinite length formed from compressible resilient material, said body including a plurality of closely spaced elongated, parallel hollow open ended tubes, each tube being generally rectangular in cross section, and webs located between and joining each adjacent pair of tubes, the webs having a thickness less than the heighth of the tubes and the sides of the tubes are adjacent each other, said tubes being hollow and defining interior chambers extending along the length of the material, each chamber including an inwardly projecting ridge on the top or bottom wall thereof.

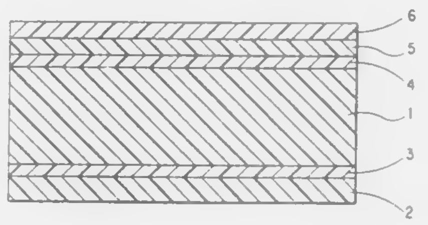
5,023,129
ELEMENT AS A RECEPTOR FOR NONIMPACT PRINTING

Steven J. Morganti, Brockport, and James H. Thirtle, Rochester, both of N.Y., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 376,110, Jul. 6, 1989, abandoned. This application Nov. 17, 1989, Ser. No. 438,830

Int. Cl.^{5} B32B *9/00*

U.S. Cl. 428—195 **18 Claims**



1. A film element suitable for nonimpact printing comprising a polymeric shaped article having two sides, an antistatic coating on one side thereof, and at least the other side of said article bearing a print receptive layer consisting essentially of a binder, a whitening agent, a matte agent present in an amount of at least 0.4 g/m^2 and a crosslinking agent for said binder, wherein said whitening agent is added in an amount sufficient to produce in the film element a transmission density to white light of at least 0.2.

VOL
1127
ISS
2
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11
1991
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5,023,130

HYDROENTANGLED POLYOLEFIN WEB

Penny C. Simpson, Richmond, Va., and Larry M. Smith, Old Hickory, Tenn., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Aug. 14, 1990, Ser. No. 567,207
Int. Cl.^{5} D03D *3/00*
U.S. Cl. 428—227 13 Claims

1. A process for hydroentangling an unbonded, nonwoven polyolefin web comprising the steps of:
- (a) supporting a lightweight web of continuous polyolefin filament fibers on a fine mesh screen; and
- (b) passing the supported web underneath high energy water jets operating at a pressure of at least 2000 psi and providing a total impact energy of at least 0.7 MJ-N/Kg to entangle the web in a random manner.

5,023,131

COTTON/POLYESTER FIBER BLENDS AND BATTS

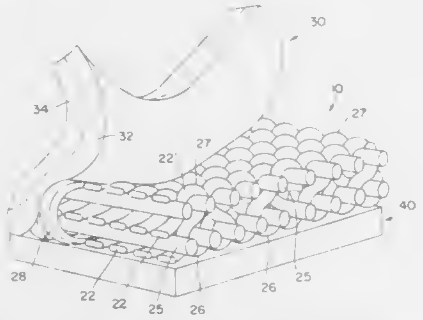
Wo K. Kwok, Hockessin, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Continuation-in-part of Ser. No. 361,418, Jun. 5, 1989, abandoned. This application May 22, 1990, Ser. No. 526,721
Int. Cl.^{5} D04H *1/58*
U.S. Cl. 428—288 10 Claims

1. A thermofusible blend of fibers including a uniform mixture of from 75 to 85 weight percent cotton and 15 to 25 weight percent copolyester binder fibers having a melting point of from 230° to 340° F.

5,023,132

PRESS FELT FOR USE IN PAPERMAKING MACHINE

William J. Stanley, Greenville, and William P. Irwin, Jr., Spartanburg, both of S.C., assignors to Mount Vernon Mills, Inc., Greenville, S.C.
Filed Apr. 3, 1990, Ser. No. 504,320
Int. Cl.^{5} B32B *5/02*
U.S. Cl. 428—234 18 Claims

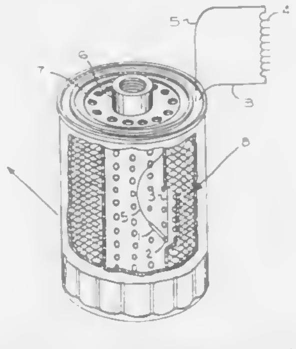


1. A papermaking felt for use in the press section of the papermaking machine comprising a base fabric, said fabric having a top surface and a bottom surface and including a plurality of warp ends and a plurality of shute ends interwoven with said warp ends according to a predetermined weave pattern, said warp ends being noncircular synthetic monofilaments with a generally planar surface presented at the top surface of the fabric in locations where said warp ends are exposed at said top surface, said monofilaments having a depth dimension of from about 0.010 inch to about 0.025 inch and a width dimension of from about 0.020 inch to about 0.035 inch; and at least one fiber batt secured to at least the top surface of said base fabric, said fibers in said at least one batt being synthetic fibers and having a denier in a range of from about 3 to about 60.

5,023,133

ACID SENSOR

Richard Yodice, Willoughby, and Richard E. Gapinski, Mentor, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio
Continuation of Ser. No. 231,126, Aug. 11, 1988, abandoned, which is a division of Ser. No. 941,018, Dec. 12, 1986, abandoned. This application Feb. 1, 1990, Ser. No. 474,236
Int. Cl.^{5} B32B *27/00*
U.S. Cl. 428—332 13 Claims



1. A polymer article comprising a partially protonated polyaniline polymer having a thickness in the range from about 0.1 to 2 mm, wherein the greatest axis of the article is up to about 25 mm.

5,023,134

POLYPROPYLENE-COATED MICROWAVEABLE WAXED PAPER

Thomas Bezigian, and George T. Nebel, both of Parchment, Mich., assignors to James River Corporation, Richmond, Va.
Filed Sep. 7, 1989, Ser. No. 403,866
Int. Cl.^{5} B32B *33/00, 29/00*
U.S. Cl. 428—336 36 Claims

1. A wrapping paper for use in heating and packaging articles of consumption comprising a paper-based substrate and a coating comprised of a polypropylene wax having a molecular weight between approximately 1500 to 3000 provided on said substrate.

5,023,135

MAGNETIC RECORDING MEDIUM WHICH CONTAINS A BINDER OF NITROGEN CONTAINING VINYL CHLORIDE POLYMER AND AN AMINO GROUP CONTAINING POLYURETHANE

Kazuo Hasumi; Kouichi Mochizuki, and Masaaki Fujiyama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Dec. 28, 1988, Ser. No. 290,940
Claims priority, application Japan, Dec. 28, 1987, 62-334271
Int. Cl.^{5} G11B *23/00*
U.S. Cl. 428—336 8 Claims

1. A magnetic recording medium comprising a nonmagnetic support having provided thereon a magnetic layer containing magnetic particles dispersed in a binder, said binder containing:
- (a) a vinyl chloride polymer resin having a vinyl chloride unit in an amount of 70 wt% or more, nitrogen in an amount of from 0.01 to 1 wt% and a degree of polymerization of from 250 to 700, and
- (h) a polyurethane having an amino group in an amount of from 10^{-6} to 10^{-3} eq/g,

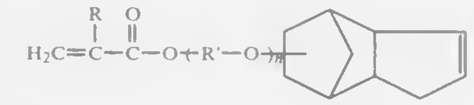
wherein said polyurethane has an average molecular weight of from about 10,000 to 200,000, wherein the compounding ratio of ferromagnetic particles and the binder in the magnetic layer of the magnetic recording medium is from 15 to 100 parts by weight of the binder per 100 parts by weight of the ferromagnetic particles, and wherein the ratio of said polyurethane to said vinyl chloride polymer resin is from 10 to 200 parts by weight of said polyurethane per 100 parts by weight of said vinyl chloride polymer resin.

5,023,136

TREATED INORGANIC BUILDING MATERIALS

Keishi Hamada, Omiya; Fumio Tashiro, Hitachi; Shigemasa Otani, Katsuta; Kanemasa Nomaguchi, Hitachi; Tomiguyu Murakami, Hitachi, and Sadayoshi Iijima, Hitachi, all of Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan
Filed Feb. 24, 1989, Ser. No. 314,888
Claims priority, application Japan, Feb. 26, 1988, 63-44841; Mar. 17, 1988, 63-64145
Int. Cl.^{5} B32B *17/10;* **B05D** *1/36*
U.S. Cl. 428—341 9 Claims

1 An inorganic building material obtained by coating a surface thereof with a composition comprising 100 to 25% by weight of a compound of the formula:



(I)

wherein R is hydrogen or a methyl group; R' is an alkylene group having 2 to 13 carbon atoms or oxaalkylene group having 2 to 6 carbon atoms as a total obtained by bonding two or more alkylene chain segments having 2 or more carbon atoms via an oxygen atom; n is zero or an integer of 1; and 0 to 75% by weight of one or more acrylic acid and/or methacrylic acid esters and an organic peroxide as a curing agent.

5,023,137

POLYESTER COMPOSITION WHICH IS PARTICULARLY SUITABLE FOR USE IN THERMOFORMING DUAL-OVENABLE TRAYS

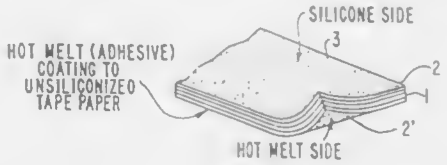
Richard R. Smith, Cuyahoga Falls, and Walter F. Johnston, Tallmadge, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Mar. 27, 1989, Ser. No. 329,033
Int. Cl.^{5} B32B *1/08*
U.S. Cl. 428—34.1 16 Claims

1. A thermoformed, non-oriented, heat set, thin walled article, comprising: (a) from about 92 to about 99 weight percent polyethylene terephthalate having an intrinsic viscosity of at least about 0.7 dl/g as measured in a 60:40 phenol/tetrachloroethane mixed solvent system at 30° C.; and (b) from about 1 to about 8 weight percent of a polyethylene ionomer having a melt flow index as measured using ASTM Method D-1238 of less than about 2 g/10 minutes; said article having a total crystallinity of from about 10% to about 40%.

5,023,138

METHOD OF IN-LINE PRODUCTION OF SUCCESSIVE BARRIER-AND SILICONE-COATED INEXPENSIVE POROUS AND ABSORBENT PAPER AND SIMILAR SUBSTRATES, AND PRODUCTS PRODUCED THEREBY

Frederic S. McIntyre, Wellesley, Mass., assignor to Acumeter Laboratories, Inc., Marlborough, Mass.
Division of Ser. No. 115,707, Nov. 2, 1987, Pat. No. 4,867,828. This application May 19, 1989, Ser. No. 354,134
Int. Cl.^{5} B32B *9/04, 23/08, 7/12, 15/04*
U.S. Cl. 428—352 6 Claims



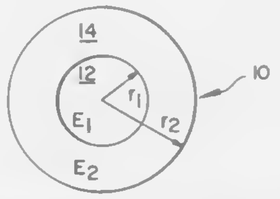
1. A silicone release paper comprising a porous and highly absorbent paper substrate integrated with a radiation-insensitive hardened hot melt barrier coating, upon which coating a radiation-cured silicone coating layer has been secured, said barrier coating being formed of a material having a viscosity sufficiently low that the material permeates the porous paper substrate.

2. A self-windable adhesive tape comprising a porous and highly absorbent paper substrate integrated, on one side thereof, with a radiation-insensitive hardened hot melt barrier coating, upon which coating a radiation-cured silicone coating layer has been secured; and carrying a pressure-sensitive adhesive on the other side, said barrier coating being formed of a material having a viscosity sufficiently low that the material permeates the porous paper substrate.

5,023,139

NONLINEAR OPTICAL MATERIALS

Meyer H. Birnboim, Troy, N.Y., and Arthur E. Neeves, Gillette, N.J., assignors to Research Corporation Technologies, Inc., Tucson, Ariz.
Filed Oct. 6, 1989, Ser. No. 418,057
Int. Cl.^{5} B32B *9/00*
U.S. Cl. 428—402 52 Claims



1. A particle comprising a core surrounded by a shell, one of said core and shell comprising a dielectric material exhibiting a third order nonlinear optical response when light is incident thereon and the other of said core and shell being a metal.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,140
FLOOR COVERING HAVING A MODIFIED GLASS WEAR LAYER

Craig A. Glotfelter, Lancaster, and Robert P. Ryan, Parkesburg, both of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Jun. 20, 1988, Ser. No. 209,097

Int. Cl.^{5} B32B *27/38, 9/00*

U.S. Cl. 428—413 **24 Claims**

1. A floor covering comprising a polymer/glass hybrid wear layer and a resilient flooring substrate, said polymer/glass hybrid comprising an inorganic metal oxide glass modified with a coupling agent having an inorganic metal alkoxide functionality and an organic functionality.

5,023,141
HIGH SOLIDS PRIMER COMPOSITION

Monroe M. Willey, Media, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 25, 1989, Ser. No. 384,811

Int. Cl.^{5} B32B *15/08, 27/08, 27/36;* **C08F** *20/00*

U.S. Cl. 428—458 **10 Claims**

1. A primer composition comprising solvents and about 50–85% by weight of a film forming binder and pigments in a pigment to binder weight ratio of about 1:100–150:100; and the binder consists essentially of about

(1) 30–65% by weight, based on the weight of the binder, of a hydroxyl containing polyester copolymer having a hydroxyl number of about 100–300 and a number average molecular weight of about 300–3,000 and being the esterification product of an alkylene glycol, a branched chain polyol, a cycloaliphatic dicarboxylic acid, an aliphatic dicarboxylic acid and an aromatic dicarboxylic acid or anhydride thereof;

(2) 5–20% by weight, based on the weight of the binder, of a reactive plasticizer selected from the group consisting of castor oil and polycaprolactone; and

(3) 30–50 % by weight, based on the weight of the binder, of a monomeric fully alkylated melamine formaldehyde crosslinking agent.

7. A substrate coated with a dried and cured layer of the composition of claim 1

8. The substrate of claim 7 in which the substrate is a metal.

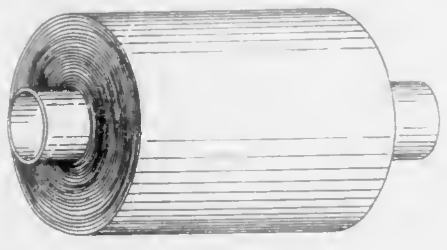
5,023,142
NON-TELESCOPING POLYETHYLENE FILM ROLL AND METHOD FOR PRODUCING SAME

Kevin G. Hetzler, Neenah; Wayne M. Wegner, and Billie C. Munger, both of Appleton, all of Wis., assignors to Reynolds Consumer Products, Inc., Appleton, Wis.

Continuation of Ser. No. 228,286, Aug. 4, 1988, abandoned. This application Sep. 14, 1989, Ser. No. 407,415

Int. Cl.^{5} C08L *23/06, 23/12;* **B32B** *27/32*

U.S. Cl. 428—500 **13 Claims**



1 A film composition comprising an anti-telescoping film layer which consists of:

linear low density polyethylene;

between about 0.25% and about 6.0% polypropylene; and 0.1–10% tackifier;

based on the weight of the anti-telescoping film layer.

5,023,143
LOW SHRINK FORCE SHRINK FILM

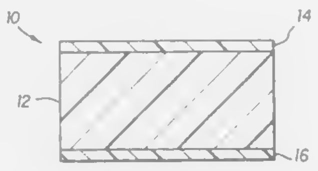
Martindale Nelson, Greer, S.C., assignor to W. R. Grace & Co. - Conn., Duncan, S.C.

Filed Mar. 14, 1989, Ser. No. 323,535

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.^{5} B32B *27/08*

U.S. Cl. 428—516 **18 Claims**



1. A multilayer shrink film comprising:

(a) a core layer comprising a polymeric material or blend of polymeric materials having an olefin component and a relatively low melting point; and

(b) two outer layers comprising a polymeric material or blend of polymeric materials comprising

(i) an olefin component or

(ii) a polyester, and

having a relatively high melting point;

wherein said film has a maximum average machine direction shrink tension of no more than about 300 pounds per square inch, and a maximum average transverse direction shrink tension of no more than about 300 pounds per square inch, said shrink tension values as measured by ASTM D 2838; and

wherein the material of the outer layer has a melting point at least about 10° C. higher than the melting point of the material of the core layer.

5,023,144
SILVER ALLOY FOIL FOR INTERCONNECTOR FOR SOLAR CELL

Shigeru Yamamoto; Satoru Mori, and Akira Hayashi, all of Sanda, Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan

Filed Mar. 23, 1990, Ser. No. 497,984

Claims priority, application Japan, Mar. 24, 1989, 1-73336; Mar. 24, 1989, 1-73337

Int. Cl.^{5} C22C *5/06*

U.S. Cl. 428—606 **2 Claims**

1. A foil for an interconnector of a solar cell made of a silver alloy consisting essentially of 10 ppm to 1,000 ppm to 750 ppm of at least one element selected from the group consisting of beryllium, lanthanum and indium; balance silver and unavoidable impurities.

5,023,145
MULTI CARBIDE ALLOY FOR BIMETALLIC CYLINDERS

Donald P. Lomax, Wales; Gregory N. Patzer, and Giri Rajendran, both of Waukesha, all of Wis., assignors to Bimex Corporation, Wales, Wis.

Filed Aug. 21, 1989, Ser. No. 397,033

Int. Cl.^{5} C22C *32/00*

U.S. Cl. 428—614 **5 Claims**

1. A hard wear and corrosion resistant alloy comprising a fused mixture of at least one matrix metal comprising a nickel-chromium alloy, at least one aggregate of tungsten carbide and at least one other first material, at least one aggregate of vanadium carbide and at least one second material, and at least one aggregate of titanium carbide and at least one third material, said at least one first material, said at least one second material and said at least one third material being such as to cause, said carbide aggregates to be substantially uniformly distributed throughout said alloy during the casting of said alloy.

5,023,146
BLACK SURFACE-TREATED STEEL SHEET

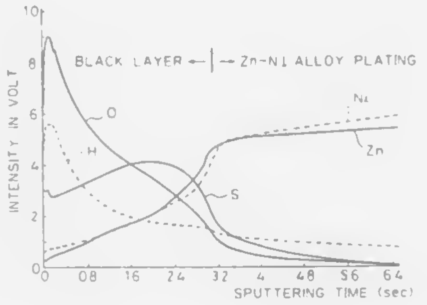
Katsushi Saito; Yujiro Miyauchi; Toshimichi Murata, and Yoshio Shindo, all of Kimitsu, Japan, assignnrs to Nippon Steel Corporation, Tokyo, Japan

Division of Ser. No. 301,240, Jan. 24, 1989, Pat. No. 4,968,391. This application Mar. 20, 1990, Ser. No. 496,334

Claims priority, application Japan, Jan. 29, 1988, 63-17467; Jun. 27, 1988, 63-158267; Sep. 2, 1988, 63-219735

Int. Cl.^{5} C22C *15/08*

U.S. Cl. 428—623 **7 Claims**



2. A black surface treated steel sheet or plated steel sheet, which comprises a composite electroplated coating formed in a deposition amount of 0.1 to 3 g/m^2 on the surface of the steel sheet or plate steel sheet;

said composite electroplated coating containing a first member selected from a group consisting of at least one of metal oxides and metal hydrous oxides, said metal being zinc and, in addition to zinc, at least one Ni, Co, Fe, and Cr; and in addition to said first member, said composite electroplated coating contains a sulfur compound;

a chromate coating formed in a deposition amount of 10 to 100 mg/m^2 as Cr disposed on said composite electroplated coating; and

a protective coating having a thickness of 0.1 to 3 um disposed on said chromate coating.

5,023,147
CERAMICS-METAL JOINTED BODY

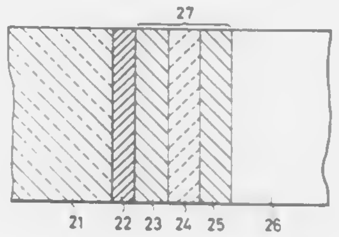
Hirobiko Nakata; Takao Nishioka; Nobuya Oooka, and Kenya Motoyoshi, all of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 151,642, Feb. 2, 1988, abandoned. This application Jul. 31, 1989, Ser. No. 387,430

Claims priority, application Japan, Feb. 2, 1987, 62-22054; Feb. 2, 1987, 62-22056; Feb. 2, 1987, 62-22057

Int. Cl.^{5} B32B *15/04*

U.S. Cl. 428—627 **10 Claims**



1. A ceramics-metal joined body having high temperature characteristics, comprising a ceramics part and a metal part, said body further comprising:

a metal deposition layer of one or more metals containing an active metal or metals between said ceramics part and said metal part; and an intermediate layer comprising at least a solder layer between said metal deposition layer and said metal part,

wherein said metal deposition layer has been formed by a process comprising one of laminate-deposition and multi-deposition of two or more metals containing an active metal or metals by means of a physical vapor deposition process and heating at a temperature above the melting point of the resultant alloy formed by said metal deposition layer, thereby to perform diffusion to said ceramics part.

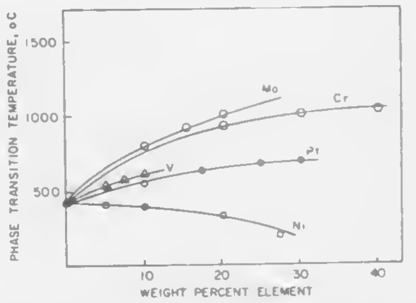
5,023,148
TINE FILM COBALT-CONTAINING RECORDING MEDIUM

Robert D. Fisher, San Jose, Calif., and James C. Allan, Bangkok, Thailand, assignors to Seagate Technology, Inc., Scotts Valley, Calif.

Filed Dec. 30, 1987, Ser. No. 139,673

Int. Cl.^{5} G11B *23/00*

U.S. Cl. 428—694 **5 Claims**



1. A magnetic recording medium comprising a substrate member having a chromium surface and a film of magnetic recording material over said chromium surface wherein said magnetic recording material comprises an alloy comprising 13.5 atomic percent tungsten, 5.0 atomic percent tantalum and 81.5 atomic percent cobalt.

VOL
1127
ISS
2
JE
11
1991
UMI

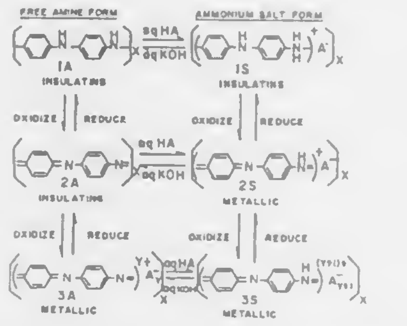
5,023,149
ELECTROCHEMISTRY EMPLOYING POLYANILINE

Alan G. MacDiarmid, Drexel Hill, and Nanayakkara L. D. Somasiri, Philadelphia, both of Pa., assignors to University Patents, Inc., Westport, Conn.

Division of Ser. No. 906,994, Sep. 12, 1986, Pat. No. 4,820,595, which is a continuation of Ser. No. 620,446, Jul. 14, 1984, abandoned. This application Jun. 3, 1988, Ser. No. 202,170

Int. Cl.⁵ H01M *4/00, 4/60*

U.S. Cl. 429—27 36 Claims



1. A secondary battery comprising an anode means, a cathode means and an electrolyte, the anode means being stable in the electrolyte, the cathode means comprising an aniline polymer, the electrolyte being maintained at a pH between 2 and 11.

5,023,150
METHOD AND APPARATUS FOR CONTROLLING A FUEL CELL

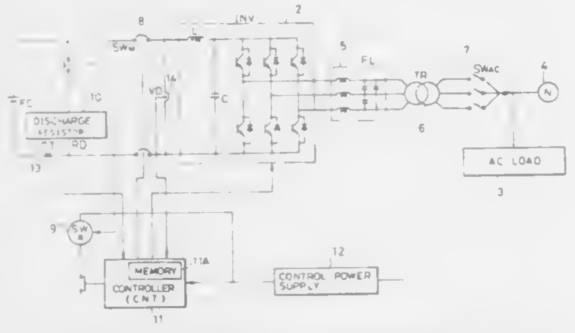
Yasuhiro Takabayashi, Kawasaki, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Aug. 11, 1989, Ser. No. 392,290

Claims priority, application Japan, Aug. 19, 1988, 63-204765; Jun. 22, 1989, 63-158300

Int. Cl.⁵ H01M *8/04*

U.S. Cl. 429—22 9 Claims



1. A method for controlling a fuel cell in the fuel cell power generator system which includes a fuel cell and a converter which converts the DC output power from the fuel cell into the corresponding AC output power, the method comprising the steps of:

at the start-up of said fuel cell, reducing the output voltage across said fuel cell to a certain value by resistor that is selectively connected in parallel with said fuel cell;

enabling said converter to be operated when the voltage across said fuel cell has been reduced to the certain value; and

keeping the resistor connected in parallel with said fuel cell while the output voltage of said fuel cell is rising, and disconnecting said resistor from said fuel cell when either of the output current from said fuel cell and the output voltage across said fuel cell has reached a certain value.

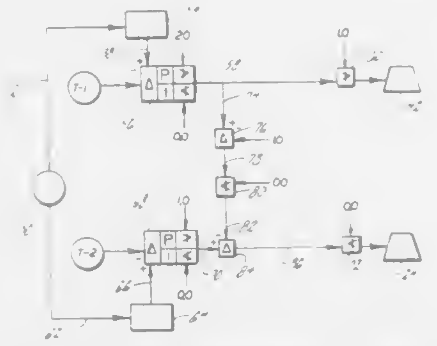
5,023,151
POWER PLANT COGENERATION CONTROL

Michael B. Landau, West Hartford; George Vartanian, Ellington, both of Conn., and Kazuyuki Matsuzawa, Urayasu, Japan, assignors to International Fuel Cells Corporation, S. Windsor, Conn.

Filed Oct. 1, 1990, Ser. No. 591,315

Int. Cl.⁵ H01M *8/04*

U.S. Cl. 429—24 7 Claims



1. A cooperative control arrangement for a fuel cell power plant and a waste heat recovery system comprising:

a fuel cell power plant including fuel cells;

a fluid loop for passing fluid coolant through said fuel cells;

a waste heat heat exchanger located in said fluid loop at a location to receive fluid coolant leaving said fuel cells;

a waste heat fluid flowpath through said waste heat heat exchanger for receiving heat from said coolant;

a heat rejection heat exchanger located in said fluid loop between said waste heat heat exchanger and the return to said fuel cells;

a heat rejection fluid flowpath through said heat rejection heat exchanger for receiving heat from said coolant;

a waste heat temperature sensing means for sensing the temperature of the waste heat fluid leaving said waste heat heat exchanger;

a first means for varying the heat exchange effectiveness of said waste heat heat exchanger in response to the temperature of the waste heat fluid leaving said waste heat heat exchanger;

a coolant return temperature sensing means for sensing the temperature of coolant returning to said fuel cell;

a coolant return set point temperature means for establishing a desired coolant return temperature;

second means for varying the heat exchange effectiveness of said heat rejection heat exchanger in response to said coolant return temperature; and

third means for further reducing the heat exchange effectiveness of said waste heat heat exchanger by overriding said first means in response to inability of said second means to maintain a sufficiently high coolant temperature to satisfy said coolant return set point temperature means.

5,023,152
FUEL CELL ASSEMBLY

Kousuke Akagi, Osaka, Japan, assignor to Osaka Gas Co., Ltd., Osaka, Japan

Filed Feb. 22, 1990, Ser. No. 483,942

Claims priority, application Japan, Jun. 16, 1989, 1-155517

Int. Cl.⁵ H01M *8/12*

U.S. Cl. 429—32 20 Claims

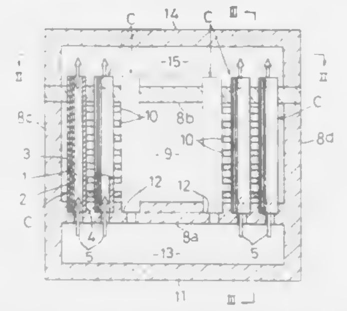
1. A fuel cell assembly comprising:

a cell consisting essentially of an electrolytic layer, an oxygen electrode attached to one side of the electrolytic layer and opposed to an oxygen-containing gas flow passage and of a fuel electrode attached to the other side of the electrolytic layer and opposed to a fuel flow passage;

a separator attached only to the oxygen electrode and for forming therewith and therebetween the oxygen-containing gas flow passage;

an oxygen-containing gas feed passage communicating with said oxygen-containing gas flow passage and disposed downwardly of said fuel flow passage; and

an exhaust passage communicating with said oxygen-containing gas flow passage and disposed upwardly of said fuel flow passage;



wherein said cell is disposed inside said fuel flow passage;

a lower end portion of said cell being inserted into a recess defined in a partition wall sectioning between said fuel flow passage and said oxygen-containing gas feed passage; and

an upper end portion of said cell being insertible into and withdrawable from a further partition wall sectioning between said fuel flow passage and said exhaust passage.

5,023,153
SOLID ELECTRODE IN AN ELECTROLYTIC CELL

Werner Weppner, Stuttgart, Fed. Rep. of Germany, assignor to Max-Planck-Gesellschaft zur Forderung der Wissenschafter e.V., Gottingen, Fed. Rep. of Germany

Continuation of Ser. No. 250,968, Sep. 23, 1988, abandoned, which is a continuation of Ser. No. 38,472, Apr. 13, 1987, abandoned, which is a continuation of Ser. No. 906,153, Sep. 8, 1986, abandoned, which is a continuation of Ser. No. 810,643, Dec. 18, 1985, abandoned, which is a continuation of Ser. No. 726,176, Apr. 23, 1985, abandoned, which is a continuation-in-part of Ser. No. 230,601, Jan. 28, 1981, abandoned. This application Apr. 5, 1989, Ser. No. 333,777

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1980, 3004571

Int. Cl.⁵ H01M *4/86, 4/48, 4/58;* **G02F** *1/17*

U.S. Cl. 429—40 20 Claims

1. An electrochemical device comprising at least a first electrode, a second electrode, and an electrolyte separating said first and second electrodes, wherein

(A) at least one electrode of said first and second electrodes is comprised of a solid semiconductive material that (i) is characterized by a coulometric titration curve that decreases sharply at a portion of said curve corresponding to a discharged condition B of said electrode and (ii) has a higher conductivity for electrons or holes than for movable ions; and

(B) said device is an electrochrome sign display or a fuel cell, wherein said electrode is characterized by a thermodynamic enhancement factor W which conforms to the relationship

$$W = -\frac{t_e^2 q}{kT}\ \frac{dE}{d\delta}$$

wherein $t_e = \frac{\sigma e}{\sigma^e + \sigma_i}$ and σe = conductivity of the electrons or holes

σ_i = conductivity of movable ions

δ = the stoichiometric number of the movable ions,

-continued

is greater than 10^2.

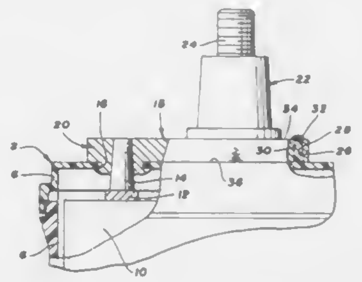
5,023,154
BATTERY TERMINAL PROTECTOR

James H. English, Anderson, Ind., assignor to General Motors Corpronation, Detroit, Mich.

Filed Aug. 31, 1990, Ser. No. 575,755

Int. Cl.⁵ H01M *2/30*

U.S. Cl. 429—182 3 Claims



1. In an electric storage battery having a container including an upper wall, a cell element in said container, a connector extending from said element through said wall, a terminal contiguous said wall outside said container said terminal having a base engaging said connector and a post extending from an upper surface of said base for connection to an external electrical load, said post being axially offset from said connector, the improvement comprising means for preventing rotation of said terminal about said connector and parting of said terminal from said wall incident to the application of battery carrying forces to said post, said means comprising an aperture through said base adjacent said post, a projection integral with said wall and extending through said aperture, and a cap secured to the distal end of said projection and engaging said upper surface surrounding said aperture.

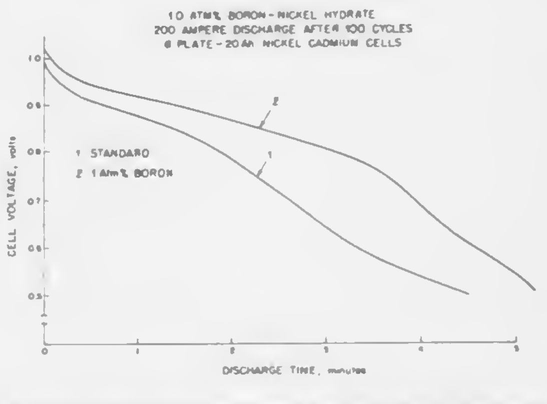
5,023,155
NICKEL ELECTRODE FOR ALKALINE BATTERIES

Allen Charkey, Brookfield, Conn., and Stanley Januszkiewicz, South Hadley, Mass., assignors to Energy Research Corporation, Danbury, Conn.

Filed Nov. 6, 1989, Ser. No. 431,998

Int. Cl.⁵ H01M *4/52*

U.S. Cl. 429—223 11 Claims



1. A nickel electrode comprising: an electrically conductive support; a layer on said support, said layer comprising a conductive diluent and active material including nickel hydroxide having 1–10% atom % boron contained within its crystalline lattice.

VOL
1127
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1991
UMI

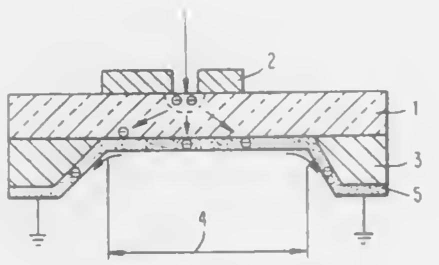
5,023,156

MASK FOR X-RAY LITYHOGRAPHY AND METHOD OF MANUFACTURING THE SAME

Susumu Takeuchi, and Nobuyuki Yoshioka, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 168,312, Mar. 18, 1988, abandoned.
This application Sep. 11, 1989, Ser. No. 405,583
Claims priority, application Japan, Aug. 4, 1987, 62-195706
Int. Cl.^{5} G03F *9/00*

U.S. Cl. 430—5 **11 Claims**



1. A mask for X-ray lithography, comprising:

a transparent thin film having a major front surface and a back surface, permeable to at least visible rays and X-rays;

X-ray absorbing layers formed on the front surface of said transparent thin film selectively in a spaced manner for absorbing at least X-rays;

a support member formed to have a front surface thereof attached to the back surface of said transparent thin film for supporting said transparent thin film and said X-ray absorbing layers formed on the front surface thereof, said support member having an opening for exposing at least a portion of the back surface of said transparent thin film; and

a conductive thin film, formed over the back surface of said exposed transparent thin film and a back surface of said support member, said conductive thin film being of a conductive substance and permeable to at least visible rays and X-rays and being disposed to provide a conductive path for electrons charged in said transparent thin film.

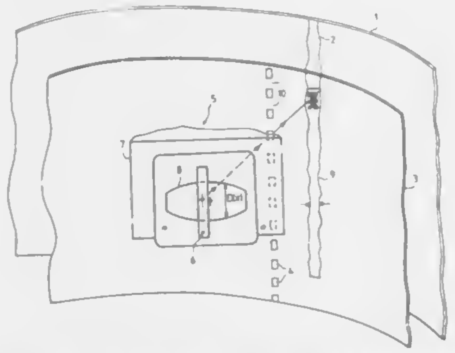
5,023,157

METHOD FOR THE ILLUMINATION OF A COLOR TELEVISION MASK TUBE SCREEN, AND DEVICE FOR IMPLEMENTATION THEREOF

Perluigi Testa, Rome, Italy, assignor to Videocolor, Paris La Defense, France

Filed Mar. 7, 1989, Ser. No. 319,755
Claims priority, application France, Mar. 11, 1988, 88 03188
Int. Cl.^{5} H01M *8/04*

U.S. Cl. 430—24 5 Claims



1. In a method for the illumination of a stripe screen of a mask type color television tube, during its manufacture, wherein said method includes the deposition of a solution of a luminescent substance and photosensitive substance in a layer which is followed by an operation to illuminate said layer through a slit- apertured mask of the tube, the illumination of said layer being by a linear source of radiation to which the photosensitive substance is sensitive, wherein the image of said linear source at the screen is limited by a diaphragm located adjacent to said source, said diaphragm having a single aperture therein, said deposition of a solution and said illumination being repeated for a plurality of different color-emitting luminescent substances, the improvement comprising

modifying the shape of said diaphragm aperture for each different color-emitting luminescent substance to obtain illumination having different angles of incidence with respect to said mask, the modification of the diaphragm associated with a particular screen stripe being made on the basis of a mean value which is calculated to provide equal illumination at two extreme points that are respectively associated with two consecutive mask slits that are associated with the particular screen stripe, the mean value being computed to ensure that each distance, equal to the distance between said two extreme points, along the same screen stripe receives the same illumination luminous flux.

5,023,158

TONER FOR USE IN DEVELOPING ELECTROSTATIC IMAGES

Makoto Tomono, Hino; Noriyoshi Tarumi, Tama, and Masayuki Sato, Ohtsuki, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Continuation of Ser. No. 477,193, Feb. 6, 1990, Pat. No. 4,988,598, which is a continuation of Ser. No. 147,025, Jan. 19, 1988, Pat. No. 4,917,982, which is a continuation of Ser. No. 65,092, Jun. 19, 1987, abandoned, which is a continuation of Ser. No. 768,496, Aug. 22, 1985, abandoned, which is a continuation of Ser. No. 550,992, Nov. 14, 1983, abandoned, which is a continuation of Ser. No. 279,673, Jul. 1, 1981, abandoned, which is a continuation of Ser. No. 50,475, Jun. 20, 1979, abandoned, which is a continuation of Ser. No. 741,408, Nov. 12, 1976, abandoned, which is a continuation-in-part of Ser. No. 408,008, Oct. 19, 1973, abandoned. This application Jul. 3, 1990, Ser. No. 578,026

The portion of the term of this patent subsequent to Apr. 17, 2007, has been disclaimed.

Int. Cl.^{5} G03G *13/20*

U.S. Cl. 430—99 14 Claims

1. In a method of electrophotography comprising developing an electrostatic latent image with a toner composition, then fixing the toner image by passing a paper bearing said toner image between rollers, at least one of which is heated to a temperature of about 155° to about 210° C., the improvement wherein the toner composition comprises

(a) a styrene homopolymer or copolymer of styrene with at least one acrylic comonomer, and

(b) about 1.0 to about 10.0 parts by weight of polypropylene per 100 parts by weight of said styrene homopolymer or copolymer, said polypropylene having a number average molecular weight of about 3,000 to about 4,000.

5,023,159

ENCAPSULATED ELECTROPHOTOGRAPHIC TONER COMPOSITIONS

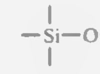
Beng S. Ong, Mississauga, and Grazyna Kmiecik-Lawrynowicz, Burlington, both of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 10, 1989, Ser. No. 419,425
Int. Cl.^{5} G03G *11/00*

U.S. Cl. 430—109 **44 Claims**

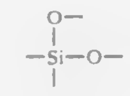
1. An encapsulated toner composition comprised of a core of a silane-modified polymer resin having incorporated therein an oxysilyl (I), a dioxysilyl (II), or a trioxysilyl (III) function,

pigment, dye particles or mixtures thereof; and a polymeric shell.



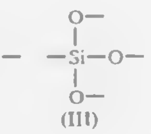
$-\overset{|}{\underset{|}{Si}}-O-$

(I)



$-\overset{O-}{\overset{|}{\underset{|}{Si}}}-O-$

(II)



$-\overset{O-}{\overset{|}{\underset{\underset{O-}{|}}{Si}}}-O-$

(III)

5,023,160

LIQUID DEVELOPER COMPOSITIONS

Stephan Drappel; James D. Mayo, both of Toronto, and Melvin D. Croucher, Oakville, all of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 8, 1989, Ser. No. 433,309
Int. Cl.^{5} G03G *9/00*

U.S. Cl. 430—114 21 Claims

1. A liquid developer composition comprised of aliphatic hydrocarbon insoluble polyolefin resin particles, a hydrocarbon carrier liquid, dye or dyes which are soluble in the resin, and insoluble in the liquid, and a charge director, which composition is prepared by mixing the polyolefin resin particles with the dye or dyes to achieve solubilization thereof followed by heating whereby the resin melts and thereafter cooling.

5,023,161

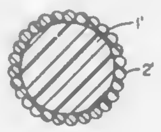
METHOD OF MAKING A TONER FOR USE IN ELECTROPHOTOGRAPHY

Yasuo Kitabatake; Tadashi Nakamura; Yoshiaki Takahashi, all of Nara, and Kazuya Maeda, Osaka, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 418,804, Oct. 4, 1989, abandoned, which is a continuation of Ser. No. 296,874, Jan. 12, 1989, abandoned, which is a division of Ser. No. 119,588, Nov. 12, 1987, abandoned. This application Oct. 25, 1990, Ser. No. 604,341

Claims priority, application Japan, Nov. 21, 1986, 61-279257
Int. Cl.^{5} G03G *9/093*

U.S. Cl. 430—137 5 Claims



1. A method of producing a toner for use in electrophotography comprising the steps of

heating to melt or soften and uniformly kneading a first mixture which includes a resin and a colorant mixed together and is substantially free of both charge controlling agents and conductive materials to thereby obtain a first kneaded substance which is substantially free of both charge controlling agents and conductive materials,

obtaining core particles which are substantially free of both charge controlling agents and conductive materials by crushing and sorting said first kneaded substance after said first kneaded substance is cooled to a normal temperature,

heating to melt or soften and uniformly kneading a second mixture which includes a resin, a charge controlling agent and a conductive material mixed together and is substantially free of colorants to thereby obtain a second kneaded substance which is substantially free of colorants,

obtaining outer particles which are substantially free of colorants and have smaller granular diameters than said core particles by crushing and sorting said second kneaded substance after said second kneaded substance is cooled to a normal temperature,

mixing approximately same weights of said outer particles and said core particles together to cause said outer particles to adhere to surfaces of said core particles, and

applying a pressure such that said outer and core particles are not crushed but that said outer particles form over said surfaces of said core particles an outer layer which is substantially free of colorants.

5,023,162

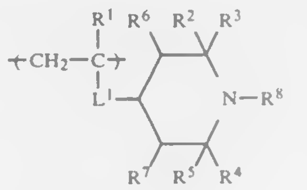
PHOTOGRAPHIC ELEMENT

Junichi Yamanouchi; Kentaro Shiratsuchi; Yukio Karino, and Takeshi Shibata, all of Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

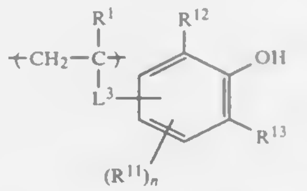
Filed Jul. 20, 1989, Ser. No. 382,365
Claims priority, application Japan, Jul. 21, 1988, 63-182672
Int. Cl.^{5} G03C *5/54*

U.S. Cl. 430—203 **9 Claims**

1. A photographic element comprising a polymer mordant containing a repeating unit derived from an ethylenically unsaturated monomer component containing a tertiary amino group or a quaternary ammonium salt and at least one repeating unit represented by the formula (I) or (II):



(I)



(II)

wherein R^1 represents a hydrogen atom or an alkyl group having from 1 to 6 carbon atoms; R^2, R^3, R^4 and R^5, which may be the same or different, each represent an alkyl group or substituted alkyl group; R^6, R^7, and R^8, which may be the same or different, each represent hydrogen, an alkyl group or a substituted alkyl group; R^1 represents an alkyl group, a substituted alkyl group, an alkoxy group, a substituted alkoxy group, an acylamino group or a halogen atom; R^{12} and R^{13}, which may be the same or different, each represent an alkyl group or a substituted alkyl group; L^1 and L^3, which may be the same or different, each represent a divalent connecting group having from 1 to 20 carbon atoms; and n represents an integer of 0 or 1, wherein the proportion of the repeating unit containing a tertiary amino group or a quaternary ammonium salt in the polymer is in the range of from 10 to 90 mol%, and the proportion of the at least one repeating unit represented by formula (I) or (II) in the polymer is in the range of 10 to 90mol%.

9. A photographic element as claimed in claim 1, wherein said photographic element is a heat-developable light-sensitive element comprising a light-sensitive silver halide and a binder provided on a support.

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5,023,163
MONOSHEET SELF-PROCESSING FILM UNIT AND METHOD OF MAKING THE SAME

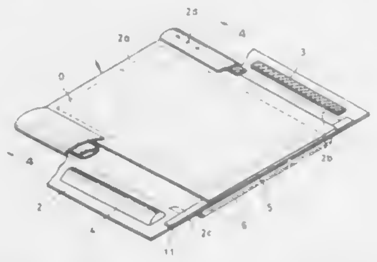
Tooru Simizu, and Hideaki Kataoka, both of Minami-Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 9, 1989, Ser. No. 349,241

Claims priority, application Japan, May 9, 1988, 62-111805; Jun. 24, 1988, 63-83769[U]

Int. Cl.^{5} G03C *5/54, 1/96*

U.S. Cl. 430—207 9 Claims



1. In a self-processing photographic film unit comprising a masking member formed with an opening; a photosensitive sheet attached to one surface of said masking member about said opening so that said opening defines an image-forming area on said photosensitive sheet; an elongated rupturable pod containing therein a developer reagent and attached to the other surface of said masking member along one end of said image-forming area; and a trapping member attached to said other surface of said masking member along the other end of said image-forming area opposite to said one end for trapping an excess of said developer reagent released from said pod and distributed over said image-forming area of said photosensitive sheet; the improvement in which said photosensitive sheet has an extended part that underlies only that part of said pod which is nearest said image-forming area.

5,023,164
HIGHLY SENSITIVE DRY DEVELOPABLE DEEP UV PHOTORESIST

William R. Brunsvold, Poughkeepsie, N.Y.; Philip Chiu, Edison, N.J.; Willard E. Conley, Jr., Cornwall, N.Y.; Dale M. Crockatt, Somers, N.Y.; Melvin W. Montgomery, New Windsor, N.Y., and Wayne M. Moreau, Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 23, 1989, Ser. No. 425,531

Int. Cl.^{5} G03C *1/735;* G03F *7/039*

U.S. Cl. 430—270 14 Claims

1. A dry developable photoresist composition which comprises a phenol-aldehyde type condensation product, wherein at least 90% of the hydroxyl groups of which are substituted with acid labile groups which inhibit the reaction of the protected reaction product with organometallic reagents and a photoactive compound which generates a strong acid upon exposure to deep UV radiation or vacuum UV radiation to remove the acid labile groups from the condensation product in its exposed regions to enable reaction of the de-protected hydroxy groups with the organometallic reagents.

5,023,165
PRINTING PLATE HAVING PHOTOSENSITIVE POLYMER COMPOSITION

Junichi Fujikawa, Kyoto, Japan, assignor to Toray Industries, Inc., Shiga, Japan

Continuation of Ser. No. 135,530, Dec. 17, 1987, Pat. No. 4,828,963, which is a continuation of Ser. No. 813,611, Dec. 26, 1985, abandoned, which is a continuation of Ser. No. 719,636, Apr. 4, 1985, Pat. No. 4,621,044, which is a continuation of Ser. No. 445,696, Dec. 1, 1982, abandoned. This application Feb. 27, 1989, Ser. No. 316,410

Claims priority, application Japan, Dec. 10, 1981, 56-198869; Jan. 26, 1982, 57-9539

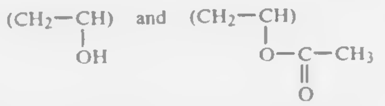
The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.^{5} G03F *7/033, 7/028*

U.S. Cl. 430—285 2 Claims

1. A printing plate comprising a photosensitive polymer composition layered on a support, said photosensitive composition comprising:

A. 100 parts by weight of partially saponified polyvinyl acetate having recurring units consisting essentially of



$$(CH_2-\underset{\underset{OH}{|}}{CH}) \text{ and } (CH_2-\underset{\underset{O-\underset{\underset{O}{\|}}{C}-CH_3}{|}}{CH})$$

a polymerization degree of 200 to 2,000 and a saponification degree of 70 to 90 mole %;

B. 50 to 150 parts by weight of polyfunctional acrylate or methacrylate having a molecular weight of not more than 2,000 and having at least two acryloyl or methacryloyl groups in the same molecule and a number of hydroxyl group or groups not more than the number of acryloyl and methacryloyl groups in the same molecule, said poly-functional acrylate or methacrylate being selected from the group consisting of:

  (a) a polyfunctional acrylate or polyfunctional methacrylate derived from the reaction of acrylic acid or methacrylic acid with the glycidyl ether of a polyhydric alcoholic having 20 to 30 carbon atoms and 2 to 5 hydroxyl groups;

  (b) a polyfunctional acrylate or polyfunctional methacrylate derived from the reaction of b-hydroxyethyl acrylate or b-hydroxyethyl methacrylate with the glycidyl ether of a polyfunctional alcohol having 2 to 30 carbon atoms and 2 to 5 hydroxyl groups;

C. 1 to 60 parts by weight of a saturated compound having two or more hydroxy groups and having the property of improving the compatibility of component A with component B, said saturated hydroxy compound being selected from the group consisting of ethylene glycol, diethylene glycol, triethylene glycol, glycerine, diglycerine, trimethylol-propane and trimethylol-amine; and

D. 0.01 to 10% by weight, based on the total weight of the composition, of a photosensitizer.

5,023,166
METHOD FOR FORMING PLATE CHARACTERS IN A HALF-TONE GRAVURE PLATEMAKING PROCESS

Kouichi Takakura, Chiba, Japan, assignor to Think Laboratory Co., Ltd., Chiba, Japan

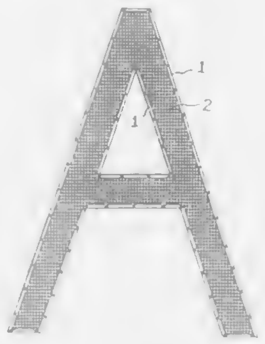
Filed Sep. 26, 1990, Ser. No. 589,167

Claims priority, application Japan, Sep. 27, 1989, 1-251228

Int. Cl.^{5} G03F *7/00*

U.S. Cl. 430—307 2 Claims

1. A method for forming plate characters in a half-tone gravure platemaking process, which is characterized in that (a) a laser beam of a laser exposure apparatus is moved so that a light sensitive material is subjected to flashing irradiation of said laser beam, thus causing a formation of plate characters on said light-sensitive material by exposure, (b) each of said plate characters consists of a character frame portion and a character fill portion which is surrounded by said character frame portion, (c) said character frame portion is formed by intermittent groove-form cells each having a prescribed length and a width that prevents flow of ink when ink is applied by wiping said plate surface with a doctor, and (d) said character fill portion is formed by dot-form cells which have a shadow-portion dot percentage.



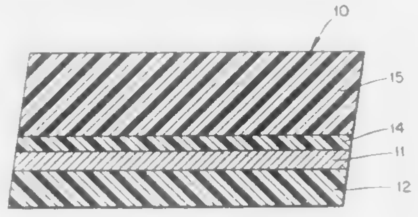
5,023,167
OPTICAL INFORMATION CARD

Palaiyur S. Kalyanaraman, Fanwood, and Frank J. Onoratn, Phillipsburg, both of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.

Filed Mar. 8, 1990, Ser. No. 490,217

Int. Cl.^{5} G03C *1/00*

U.S. Cl. 430—495 11 Claims



1. An optical information card comprised of

(i) a substrate;

(ii) a naphthalocyanine containing information layer;

(iii) a polyvinyl alcohol layer coated directly onto the naphthalocyanine layer wherein the said polyvinyl alcohol layer has a thickness in the range of from about 200–1000 Angstroms, and is of a thickness less than that of the information layer; and,

(iv) a protective topcoat layer.

5,023,168
SYNTHESIS OF POLYSILOXY CONTAINING NAPHTHALOCYANINE COMPOUNDS USING CYCLOSILOXANES

Robert E. Johnson, Hoboken, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

Filed Mar. 1, 1990, Ser. No. 487,697

Int. Cl.^{5} G03C *1/00, 1/72*

U.S. Cl. 430—495 16 Claims

14. A method for preparing an optical information storage medium which comprises a naphthalocyanine containing information layer and a substrate, which process comprises,

(a) reacting a cyclosiloxane with a nucleophile in a solvent to open the ring of the cyclosiloxane,

(b) reacting the ring-opened cyclosiloxane with a capping group compound and a naphthalocyanine precursor in a solvent, and

(c) coating the recovered product of (b) onto the surface of a suitable substrate.

5,023,169
LIGHT-SENSITIVE SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Shigeto Hirabayashi, Hachioji; Mayumi Tsuruta, Hino, and Noboru Mizukura, Kanagawa, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Continuation of Ser. No. 333,832, Apr. 5, 1989, abandoned, which is a continuation of Ser. No. 170,397, Mar. 18, 1988, abandoned. This application Dec. 15, 1989, Ser. No. 449,422

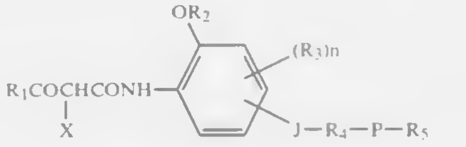
Claims priority, application Japan, Mar. 20, 1987, 62-66277

The portion of the term of this patent subsequent to Feb. 12, 2008, has been disclaimed.

Int. Cl.^{5} G03C *7/36, 7/38*

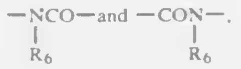
U.S. Cl. 430—505 8 Claims

1. A silver halide light-sensitive photographic material having a support, provided thereon, a blue-sensitive layer, a green-sensitive layer and a red-sensitive layer, wherein said blue-sensitive layer comprises a yellow coupler having Formula Y-1 and said green-sensitive layer comprises a magenta coupler having Formula M-1,



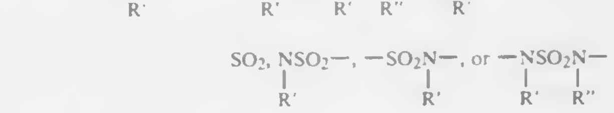
Y-1

wherein R_1 is selected from the group consisting of an alkyl group and a cycloalkyl group; R_2 is selected from the group consisting of an alkyl group, a cycloalkyl group, an acyl group and an aryl group; R_3 represents a group substitutable to a benzene ring; n represents an integer of 0 or 1; J is selected from the group consisting of



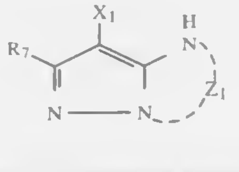
$$-\underset{\underset{R_6}{|}}{N}CO- \text{ and } -CO\underset{\underset{R_6}{|}}{N}-.$$

R_6 is selected from the group consisting of a hydrogen atom, an alkyl group, an aryl group and a heterocyclic group; R_4 represents an unsubstituted alkylene group that may be unbranched or branched; P represents



$$-COO-,\ -\underset{\underset{R'}{|}}{N}CO-,\ -CO\underset{\underset{R'}{|}}{N}-,\ -\underset{\underset{R'}{|}}{N}CO\underset{\underset{R''}{|}}{N}-,\ -\underset{\underset{R'}{|}}{N}COO-,$$
$$SO_2,\ \underset{\underset{R'}{|}}{N}SO_2-,\ -SO_2\underset{\underset{R'}{|}}{N}-, \text{ or } -\underset{\underset{R'}{|}}{N}SO_2\underset{\underset{R''}{|}}{N}-$$

and R′ and R″ independently are selected from the group consisting of a hydrogen atom, an alkyl group, an aryl group and a heterocyclic group; R_5 is selected from the group consisting of an alkyl group, a cycloalkyl group, an aryl group and a heterocyclic group; and X represents a group capable of splitting off by reaction with an oxidation product of a color developing product,



wherein Z_1 represents a group of non-metal atoms necessary to form a heterocyclic ring together with —NH—, the ring

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formed by Z_1 may have a substituent; X_1 represents a group capable of splitting off by reaction with an oxidation product of a color developing agent; and R_7 is selected from the group consisting of a hydrogen atom and a substituent.

5,023,170
LIGHT-SENSITIVE SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Masanobu Miyoshi; Makoto Kajiwara, and Kaoru Onodera, all of Odawara, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

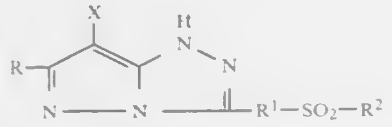
Continuation of Ser. No. 851,778, Apr. 14, 1986, abandoned. This application Aug. 21, 1990, Ser. No. 569,778

Claims priority, application Japan, Apr. 22, 1985, 60-86046

Int. Cl.^{5} G03C *7/38, 1/035*

U.S. Cl. 430—558 **10 Claims**

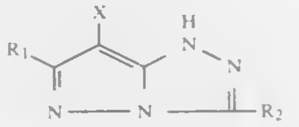
1. A light-sensitive silver halide color photographic material, having at least one light-sensitive silver halide emulsion layer on a support, wherein at least one of said emulsion layer contains light sensitive silver halide grains having outer surfaces principally comprised of (100) face which has a substantially cubic or tetradecahedral shape satisfying the relationship of $5<K$, where $K=$(Intensity of diffraction rays assigned to (200) face)/(Intensity of diffraction rays assigned to (222) face), and a coupler represented by Formula (XI) below:



Formula (XI)

wherein R^1 represents an alkylene group, R^2 represents an alkyl group, a cycloalkyl group or an aryl group, X represents a hydrogen atom or a substituent eliminable through the reaction with an oxidation product of a color developing agent and R represents a hydrogen atom, an alkyl group, a cycloalkyl group, alkenyl group, a cycloalkenyl group, an alkynyl group, an aryl group, a heterocyclic group, an acyl group, a sulfonyl group, a sulfinyl group, a phosphonyl group, a carbamoyl group, a sulfamoyl group, a cyano group, a spiro compound residual group, a bridged hydrocarbon residual group, an alkoxy group, an aryloxy group, a heterocyclic oxy group, a siloxy group, an acyloxy group, a carbamoyloxy group, an amino group, an acylamino group, a sulfonamide group, an imide group, an ureido group, a sulfamoylamino group, an alkoxycarbonylamino group, an aryloxycarbonylamino group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkylthio group, an arylthio group or a heterocyclic thio group.

2. A light-sensitive silver halide color photographic material, having at least one light-sensitive silver halide emulsion layer on a support, wherein at least one of said emulsion layer contains light-sensitive silver halide grains having outer surfaces principally comprised of (100) face which has a substantially cubic or tetradecahedral shape satisfying the relationship of $5<K$, where $K=$(Intensity of diffraction rays assigned to (200) face)/(Intensity of diffraction rays assigned to (222) face), and a magenta dye image forming coupler represented by Formula (II) shown below:



Formula (II)

wherein X represents a hydrogen atom or a substituent eliminable through the reaction with an oxidation product of a color developing agent; and R_1 and R_2 each represent a hydrogen atom or a substituent.

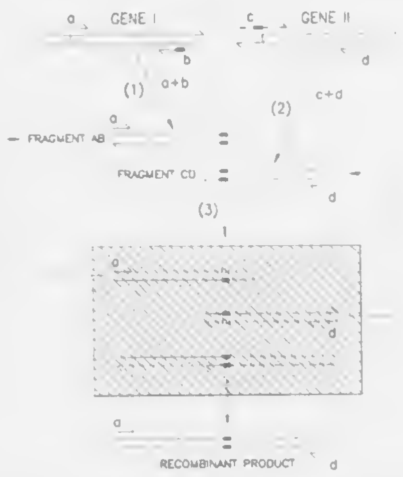
5,023,171
METHOD FOR GENE SPLICING BY OVERLAP EXTENSION USING THE POLYMERASE CHAIN REACTION

Steffan N. Ho, and Robert M. Horton, both of Rochester, Minn., assignors to Mayo Foundation for Medical Education and Research, Rochester, Minn.

Filed Aug. 10, 1989, Ser. No. 392,095

Int. Cl.^{5} C12Q *1/68;* **C07H** *15/12;* **C12N** *15/00*

U.S. Cl. 435—6 3 Claims



1 A method of forming a recombinant DNA molecule comprising:

(a) separating the strands of a first double-stranded DNA molecule (DNA-I) to yield two single-stranded DNA molecules (DNA-1 and DNA-2);
(b) annealing DNA-1 with a polyoligodeoxynucleotide primer (olgio-a) which is complementary to the 5′-end of DNA-1 and annealing DNA-2 with a second polyoligodeoxynucleotide primer (oligo-b) which is complementary to the 5′-end of DNA-2 and which further comprises a DNA sequence which extends beyond said 5′-end (DNA-b);
(c) using the polymerase chain reaction (PCR) to synthesize an amount of DNA-1, designated DNA-A, which further comprises DNA-b and a DNA sequence complementary thereto;
(d) separating the strands of a second double-stranded DNA molecule (DNA-II) to yield a second set of two single-stranded DNA molecules (DNA-3 and DNA-4);
(e) annealing DNA-4 with a polyoligodeoxynucleotide primer (oligo-d) which is complementary to the 5′-end of DNA-4 and annealing DNA-3 with a polyoligodeoxynucelotide primer (oligo-c) which is complementary to the 5′-end of DNA-3 and which further comprises a DNA sequence which extends beyond said 5′-end of DNA-3 (DNA-c) and which is complementary to DNA-b;
(f) using PCR to synthesize an amount of DNA-II, designated DNA-B, which further comprises DNA-c and a complementary DNA sequence corresponding to DNA-b;
(g) combining and denaturing said portions of DNA-A and DNA-B, so that the strand of DNA-A comprising the DNA sequence complementary to DNA-b anneals to the strand of DNA-B comprising the DNA sequence corresponding to DNA-b at their 3′-ends to yield an annealed product; and
(h) using DNA polymerase to synthesize a recombinant double-stranded DNA molecule from said annealed product, which comprises a sequence corresponding to the sequences of DNA-I and DNA-II linked by a sequence comprising DNA-b hybridized to DNA-c.

5,023,172
PREDICTIVE ASSAY FOR TUMOR CONTROL

Bozidar Djordjevic, Astoria, N.Y., assignor to The Research Foundation of State University of New York, Albany, N.Y.

Continuation-in-part of Ser. No. 884,954, Jul. 14, 1986, abandoned. This application Jul. 25, 1988, Ser. No. 223,558

Int. Cl.^{5} C12Q *1/02;* **C12N** *13/00, 5/00, 3/00*

U.S. Cl. 435—29 **31 Claims**

1. A method for forming clonable hybrid multicellular spheroids comprising the steps of:

(a) providing nonproliferating, metabolically active feeder cells capable of forming spheroids;
(b) providing test cells incapable of forming spheroids alone;
(c) combining the feeder cells and the test cells in a ratio of approximately 1:5 to 1:100 test cells to feeder cells;
(d) allowing the feeder cells and the test cells to contact each other such that clonable hybrid spheroids are formed containing feeder cell sand entrapped test cells; and
(e) harvesting the hybrid spheroids.

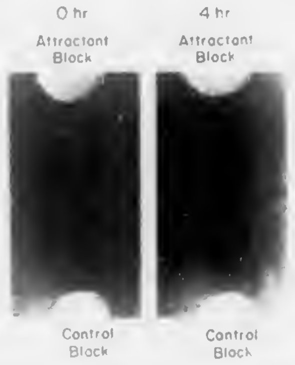
5,023,173
DEVICE FOR ASSESSING NEMATODE VITALITY AND METHOD FOR USING SAME

Arnold Horwitz, Los Angeles, and Changtung P. Chang, Chatsworth, both of Calif., assignors to Xoma Corporation, Berkeley, Calif.

Filed Oct. 14, 1986, Ser. No. 918,446

Int. Cl.^{5} C12Q *1/02;* **C12N** *1/00*

U.S. Cl. 435—29 **18 Claims**



1. A device for the detection of nematode vitality comprising:

(a) a solid surface having a coating, said coatign comprising a mixture of a gellable polymeric substrate and an assay stabilizing salt;
(b) said coating also containing, at particular areas, concentration gradients of a chemaatractant inorganic salt, wherein the anions of said assay stabilizing salt and of said chemattractant inorganic salt are identical.

11. The device of claim 1 wherein said stabilizing salt is selected from the group consisting of sulfate salts of sodium, potassium, lithium, rubidium, and cesium.

13. The device of claim 1 wherein said chematratant inorganic salt comprises an alkaline earth metal salt.

5,023,174
RECOMBINANT *BRUCELLA ABORTUS* GENE EXPRESSING IMMUNOGENIC PROTEIN

John E. Mayfield, and Louisa B. Tabatabai, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Ames, Iowa

Continuation-in-part of Ser. No. 905,297, Sep. 8, 1986, abandoned. This application Jun. 12, 1989, Ser. No. 365,226

Int. Cl.^{5} C12P *6/34;* **C12N** *15/00;* **C07H** *15/12*

U.S. Cl. 435—91 **2 Claims**

1. A synthetic recombinant DNA molecule containing a DNA sequence consisting essentially of a gene of *Brucella abortus* encoding an immunogenic protein having a molecular weight of approximately 31,000 daltons as determined by sodium dodecyl sulfate polyacrylamide gel electrophoresis under denaturing conditions, said protein having an isoelectric point around 4.9, and containing a twenty-five amino acid sequence from its amino terminal end consisting of Gln-Ala-Pro-Thr-Phe-Phe-Arg-Ile-Gly-Thr-Gly-Gly-Thr-Ala-Gly-Thr-Tyr-Tyr-Pro-Ile-Gly-Gly-Leu-Ile-Ala, wherein Gln, Ala, Pro, Thr, Phe, Arg, Ile, Gly, Tyr, and Leu, respectively, represent glutamine, alanine, proline, threonine, phenylalanine, arginine, isoleucine, glycine, tyrosine, and leucine.

5,023,175
NOVEL PRODUCTION PROCESS OF HYALURONIC ACID AND BACTERIUM STRAIN THEREFOR

Hideo Hosoya; Masayuki Kimura; Hiroshi Endo; Yoshio Hiraki; Shoji Yamamoto; Satoshi Yoshikawa; Hidetaka Omine, and Koji Miyazaki, all of Tokyo, Japan, assignors to Kabushiki Kaisha Yakult Honsha, Tokyo, Japan

Filed Apr. 16, 1987, Ser. No. 38,907

Claims priority, application Japan, May 1, 1986, 61-99446; May 1, 1986, 61-99477; Dec. 19, 1986, 61-302922; Mar. 19, 1987, 62-64994

Int. Cl.^{5} C12P *19/04;* C12N *15/00, 1/20*

U.S. Cl. 435—101 2 Claims

1. A process for the production of hyaluronic acid, which comprises the steps:

culturing in a culture medium *Streptococcus zooepidemicus* YIT 2030 (FERM BP-1305), and
collecting said hyaluronic acid.

5,023,176
PRODUCTION OF GLUCOSE SYRUPS AND PURIFIED STARCHES FROM WHEAT AND OTHER CEREAL STARCHES CONTAINING PENTOSANS

Paul Ducroo, Phalempin, France, assignor to Gist-Brocades N.V., Delft, Netherlands

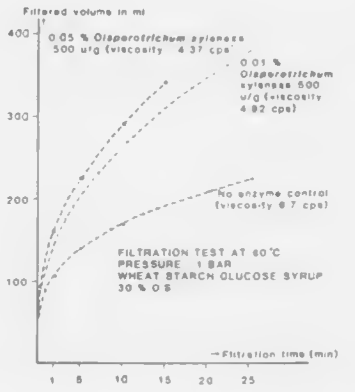
Filed Dec. 2, 1986, Ser. No. 936,802

Claims priority, application European Pat. Off., Dec. 3, 1985, 85202016.3

The portion of the term of this patent subsequent to May 24, 2005, has been disclaimed.

Int. Cl.^{5} C12P *19/02;* **C12C** *9/00;* **C12N** *9/24, 9/28*

U.S. Cl. 435—105 **5 Claims**



1. In a process of producing a glucose syrup of improved filterability and lower viscosity by enzymatic hydrolysis of impure cereal starch containing pentosans, the improvement comprising using as the enzyme xylanase produced by *Disporotrichum dimorphosphorum* to hydrolyse pentosans and subjecting the product to hydrolysis to convert starch into glucose.

VOL
1127
ISS
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1991
UMI

5,023,177

PROCESS FOR PRODUCTION OF HIGHLY UNSATURATED FATTY ACID HAVING ODD NUMBER OF CARBON ATOMS

Kengo Akimoto, Osaka; Yoshifumi Shinmen, Kyoto; Hideaki Yamada, Kyoto, and Sakayu Shimizu, Kyoto, all of Japan, assignors to Suntory Limited, Osaka, Japan

Filed Mar. 9, 1989, Ser. No. 321,095

Claims priority, application Japan, Mar. 9, 1988, 63-53641

The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.

Int. Cl.^{5} C12P *7/64;* **C12N** *1/38, 1/28, 1/14*

U.S. Cl. **435—134** 10 Claims

1. A process for the production of highly unsaturated fatty acid having an odd number of carbon atoms, comprising the steps of:

culturing a microorganism selected from the group consisting of *Mortierella hydrophila* IFO 5941 and *Mortierella alpina* CBS 219.35 to produce the highly unsaturated fatty acid having an odd number of carbon atoms or a lipid containing the highly unsaturated fatty acid having an odd number of carbon atoms; and

recovering the highly unsaturated fatty acid having an odd number of carbon atoms.

5,023,178

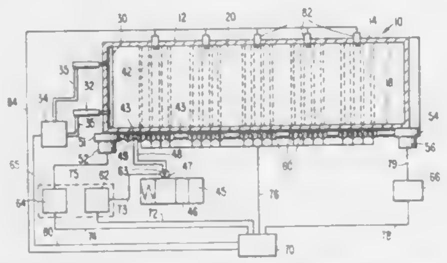
COMPOSTING METHOD AND APPARATUS UTILIZING AIR ASSIST TO AID IN MOVEMENT OF ORGANIC MATTER

Thomas M. Schiene, Humble, Tex.; William Christie, Irondale, Ala.; Harold W. Johnson, and Robert C. Black, both of Kingwood, Tex., assignors to Ashbrook-Simon-Hartley Corporation, Houston, Tex.

Filed Dec. 16, 1988, Ser. No. 285,624

Int. Cl.^{5} C12P *1/04;* **C12M** *1/04*

U.S. Cl. **435—170** 3 Claims



3. A method for composting organic matter comprising the steps of:

depositing organic matter into a chamber of a vessel;

exerting a compressive force on said organic matter in said chamber to advance the organic matter through the chamber;

during at least part of said exerting step, delivering into said chamber through a set of orifices a surge of pressurized air of such intensity as to effect movement of said organic matter through said chamber by an application of compressive force which is substantially less than the compressive force required to move the organic matter absent the surge of air, thereby providing a substantially less dense mass of organic matter moving through the chamber of the vessel than would be produced absent said surge delivering step; and

aerating the organic matter by introducing air into the chamber through said orifices at a lesser intensity than that provided by said surge delivering step.

5,023,179

PROMOTER ENHANCER ELEMENT FOR GENE EXPRESSION IN PLANT ROOTS

Eric Lam, Faculty House, 500 E. 63rd St., New York, N.Y. 10021; Philip N. Benfey, 325 E. 84th St., New York, N.Y. 10028; Philip M. Gilmartin, 500 E. 63rd St., New York, N.Y. 10021, and Nam-Hai Chua, 32 Walworth Ave., Scarsdale, N.Y. 10583

Filed Nov. 14, 1988, Ser. No. 272,169

Int. Cl.^{5} C12N *15/00, 1/00;* **C07H** *21/04;* **C12P** *21/00*

U.S. Cl. **435—172.3** 5 Claims

1. An isolated promoter element for enhancement of plant gene expression in roots consisting of the nucleotide sequence:

5'CTGACGTAAGGGATGACGCAC-3'.

5,023,180

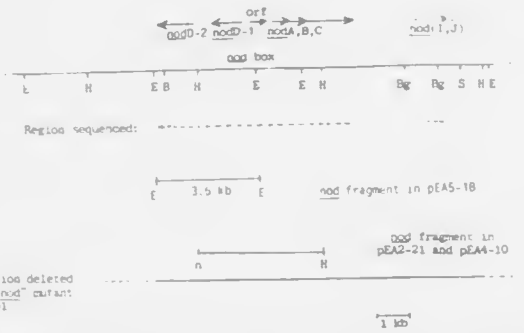
BRADYRHIZOBIUM JAPONICUM NODULATION REGULATORY PROTEIN AND GENE

Edward R. Appelbaum, Madison, Wis.; Hauke Hennecke, Zurich, Switzerland; Joseph W. Lamb, Zurich, Switzerland, and Michael Göttfert, Zurich, Switzerland, assignors to Lubrizol Genetics, Inc., Wickliffe, Ohio

Continuation-in-part of Ser. No. 875,297, Jun. 17, 1986, abandoned. This application Jun. 11, 1987, Ser. No. 61,848

Int. Cl.^{5} C12N *15/00, 1/00;* **C07H** *15/12*

U.S. Cl. **435—172.3** 5 Claims



1. A recombinant DNA molecule comprising a nucleotide sequence of a *nod*D−1 or *nod*D−2 gene of a *Bradyrhizobium japonicum* strain wherein said *Bradyrhizobium japonicum* strain is *Bradyrhizobium japonicum* USDA110 or USDA123.

5,023,181

PROCESS FOR PREPARING A CALCIUM-DEPENDENT OXYGENASE

Satoshi Inouye, Yokohamashi, Japan, assignor to Chisso Corporation, Osaka, Japan

Filed Jul. 13, 1988, Ser. No. 218,299

Claims priority, application Japan, Aug. 19, 1987, 62-206165

Int. Cl.^{5} C12N *9/02;* **C12Q** *1/26*

U.S. Cl. **435—189** 2 Claims

1. A process for preparing a Ca^{2+}-dependent oxygenase, which comprises treating apoaequorin with at least one reducing agent selected from the group consisting of 2-mercaptoethanol and dithiothreitol, followed by reacting Ca^{2+} ion with the resulting apoaequorin and then mixing coelenterazine as a substrate with the reduced apoaequorin.

5,023,182

NOVEL VIRUS COMPOSITION TO PROTECT AGRICULTURAL COMMODITIES FROM INSECTS

Patrick V. Vail, Fresno, Calif., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jun. 28, 1988, Ser. No. 212,641

Int. Cl.^{5} C12N *7/00, 7/02;* **A01N** *25/00, 25/08*

U.S. Cl. 435—235.1 **7 Claims**

1. A method for preparing a dry virus composition useful to control a postharvest insect which is susceptible to infection by a baculovirus selected from the group consisting of nuclear polyhedrosis virus (NPV) and granulosis virus (GV), which comprises:

(a) preparing a diet which consists essentially of (i) a substrate which serves as a nutritional component for larvae of a postharvest insect which is susceptible to infection by a baculovirus selected from the group consisting of NPV and GV, as a bulking agent, and as a carrier for other diet components; (ii) yeast in an amount sufficient to provide vitamins for larval growth, (iii) vitamins, and (iv) water in an amount sufficient to disperse diet components on said substrate, wherein said diet is devoid of glycerol and honey;

(b) infesting said diet with said postharvest insect eggs or larvae and incubating said infested diet to develop said eggs or larvae to the middle stages of larval development;

(c) inoculating said infested, incubated diet of step (b) with virus inoculum comprising said baculovirus and incubating for a sufficient time for said larvae to become infected with said baculovirus;

(d) homogenizing said inoculated, incubated mixture of step (c) in water; and

(e) drying said homogenate at temperatures which do not adversely affect the activity of said baculovirus in the composition to obtain a virus composition useful to control said postharvest insect.

5,023,183

MASS PRODUCTION IN LIQUID CULTURE OF INSECT-KILLING NEMATODES

Milton J. Friedman, San Francisco; Susan E. Langston, Saratoga, and Sonia Pollitt, San Bruno, all of Calif., assignors to Biosys Corporation, Palo Alto, Calif.

Filed Nov. 20, 1987, Ser. No. 123,130

Int. Cl.^{5} A01K *45/00, 67/033;* **C12N** *5/00*

U.S. Cl. 435—240.3 **16 Claims**

1. An emulsified liquid medium inoculated with bacteria for culturing entomogenous nematodes in liquid culture, said medium comprising an emulsifier, a yeast source, vegetable oil, and a source of protein,

wherein said medium has been sterilized prior to inoculation with bacteria symbiotic with said nematodes.

5,023,184

ANTIBIOTICS FROM MYXOCOCCUS

Hans Reichenbach, Wolfenbüttel; Klaus Gerth, Braunschweig; Herbert Irschik, Wolfenbüttel; Brigitte Kunze; Gerhard Höfle, both of Braunschweig; Hermann Augustiniak, Wolfenbüttel; Norbert Bedorf, Königslutter; Rolf Jansen; Wolfram Trowitzsch-Kienast, both of Braunschweig, and Heinrich Steinmetz, Hildesheim-Sorsum, all of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y. and Gesellschaft fur Biotechnologische Forschung mbH, Braunschweig, Fed. Rep. of Germany

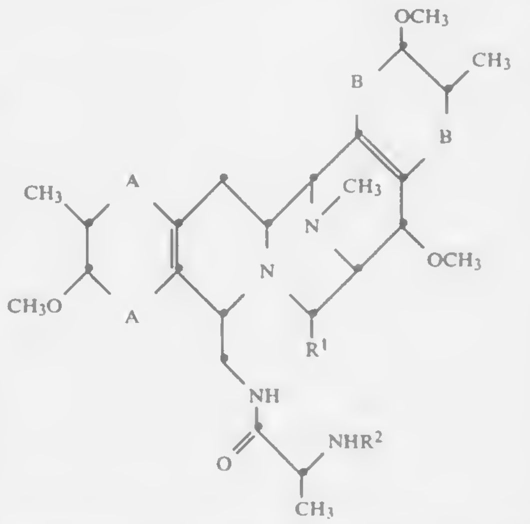
Filed Aug. 13, 1987, Ser. No. 85,438

Claims priority, application Switzerland, Aug. 15, 1986, 3294/86

Int. Cl.^{5} D12N *1/20;* **C12P** *17/18*

U.S. Cl. 435—252.1 **1 Claim**

1. A biologically pure culture of the strain Mx x48 of the microorganism *Myxococcus xanthus*, deposited at the National Collection of Industrial and Marine Bacteria, Aberdeen, Scotland, under the number NCIB 12 268, or a mutant derived from that strain, which produces a compound of the formula I in a recoverable amount:



(I)

in which R^1 represents hydrogen or hydroxy, R^2 represents hydrogen and A and B, independently of one another, each represents C=O or C—OH, and wherein the dashed line represents a C=C double bond at the position of the middle bond when A or B represents C=O, or at the position of the two outer bonds when A or B represents C—OH, and salts of such compounds.

5,023,185

METHOD FOR DETERMINING RESOLUTION POWER OR DISCRIMINATION CAPACITY OF AN NMR IMAGING APPARATUS

Masao Nambu, Yokohama, and Naoaki Yamada, Suita, both of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 133,015, Dec. 15, 1987, abandoned. This application Dec. 4, 1989, Ser. No. 445,908

Claims priority, application Japan, Dec. 17, 1986, 61-298656

Int. Cl.^{5} G01N *24/08*

U.S. Cl. 436—8 **16 Claims**

1. A method for determining resolution power or discrimination capacity of an NMR imaging apparatus comprising the steps of:

(a) charging an aqueous solution of polyvinyl alcohol having predetermined NMR properties into a phantom comprising a first container made of synthetic resin and at least one opening surrounded by a wall of said container;

(b) sealingly enclosing said aqueous solution of the polyvinyl alcohol within the container;

(c) cooling the aqueous solution of said polyvinyl alcohol enclosed in the container to a temperature of not higher than minus 10° C. to obtain a cooled frozen mass;

(d) thawing said cooled frozen mass to obtain a polyvinyl alcohol hydrogel contained within said container;

(e) inserting a sample material into said opening, said sample material having different NMR properties from those of said polyvinyl alcohol hydrogel contained within said container;

(f) placing said phantom and said sample material in a static magnetic field of said NMR imaging apparatus;

(g) photographing an image of said phantom and said sample material; and

(h) adjusting said NMR imaging apparatus so that said phantom and said sample material are distinctively recognized on said image.

VOL
1127
ISS
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1991
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5,023,186

BLOOD GAS/ELECTROLYTES CALIBRATOR AND METHODS OF MAKING AND USING THE SAME

Kathryn D. Herring, Miami, Fla., assignor to Baxter Diagnostics Inc., Deerfield, Ill.

Continuation of Ser. No. 359,250, May 31, 1989, abandoned, which is a division of Ser. No. 121,499, Nov. 17, 1987, abandoned. This application Jul. 18, 1990, Ser. No. 559,547

Int. Cl.^{5} G01N *33/00*

U.S. Cl. 436—11 **5 Claims**

1. Blood gas-electrolyte calibrating solutions comprised of an aqueous buffer, electrolytes and blood gas components comprising:
   (a) a first solution comprised of a sufficient amount of an aqueous buffer, electrolytes and blood gas components to obtain human reference value pH, pCO_2, pO_2, higher than human reference value electrolyte concentration for K^+ and Ca^{2+}, and human reference value electrolyte concentration for Na, said first calibrating solution having an ionic strength of about 160 mMol/l; and
   (b) a second solution comprised of a sufficient amount of an aqueous buffer, electrolytes and blood gas components to obtain human reference pH, higher than human reference value of pCO_2, and pO_2 of OmmHg, said OmmHg being maintained by adding a sufficient amount of sulfite, lower than human reference value electrolyte concentration for K^+ and Ca^{2+} and higher than human reference value electrolyte concentration for Na^{30}, said second calibrating solutions having an ionic strength of about 160 mMOL/l.

5. A method to include calcium in a calibration solution for an electrolyte instrument wherein either a bicarbonate buffer or CO_2 is also present in solution comprising adding, sufficient sulfate ions to prevent the formation of calcium carbonate to a calibrating solution including calcium.

5,023,187

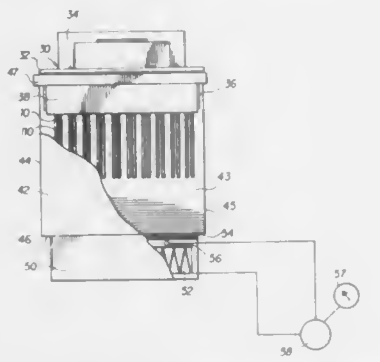
METHOD AND DEVICE FOR ACCELERATED TREATMENT OF THIN SAMPLE ON SURFACE

Douglas J. Koebler, Irwin; Carlo Cuomo, Verona, both of Pa., and David J. Brigati, Edmond, Okla., assignors to Fisher Scientific Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 775,864, Sep. 13, 1985, Pat. No. 4,731,335, and a continuation-in-part of Ser. No. 32,874, Mar. 31, 1987, Pat. No. 4,801,431. This application Mar. 15, 1988, Ser. No. 168,173

Int. Cl.^{5} G01N *1/10, 1/30;* **B01L** *7/00, 9/00*

U.S. Cl. 436—180 **24 Claims**



1. A method for treating a thin sample on a surface which comprises:
   (a) providing a thin sample on a first surface,
   (b) maintaining a second surface substantially parallel to and spaced by a first distance from the first surface, thereby providing a gap between the first and second surfaces,
   (c) introducing a treating liquid into the gap,
   (d) drawing the treating liquid by capillary action within the gap into contact with the thin sample, and
   (e) generating infrared radiation so as to expose the treating liquid in contact with the thin sample to the infrared radiation for a sufficient exposure level and time to accelerate the treatment of the thin sample by the treating liquid.

15. A device for accelerated treatment of thin samples by treating liquid which comprises:
   (a) a treatment chamber having a bottom wall and upstanding side walls, the treatment chamber forming an upper opening,
   (b) holding means for engaging the upper ends of a plurality of planar pieces and maintaining the planar pieces in parallel array extending downward from the holding means in a substantially vertical direction,
   (c) flange means associated with the holding means for cooperating with the holding means to substantially cover the upper opening formed by the treatment chamber, and
   (d) radiation means for generating infrared radiation within the treatment chamber with the flange means and holding means substantially covering the upper opening and for exposing the planar pieces to the infrared radiation.

5,023,188

METHOD OF DETERMINING THE DEPTH OF TRENCHES FORMED IN A SEMICONDUCTOR WAFER

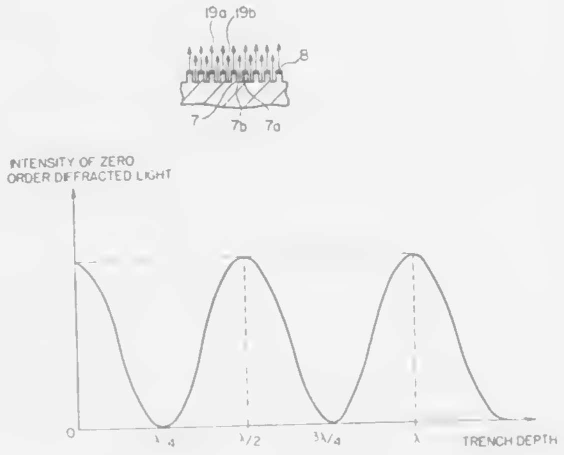
Hiroshi Tanaka, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Dec. 5, 1988, Ser. No. 279,722

Claims priority, application Japan, Jul. 13, 1988, 63-172644

Int. Cl.^{5} G01R *31/26;* **H01L** *21/66*

U.S. Cl. 437—8 **9 Claims**



1. A process for etching trenches of a desired depth in a semiconductor wafer comprising:
   etching a first pattern of a plurality of spaced apart first trenches in a first portion of a surface of a semiconductor wafer;
   etching a second pattern of a plurality of spaced apart second trenches in a second portion of said surface simultaneously with etching said first trenches, said second pattern including a first area, Ss, lying on the surface of said wafer and protected from etching by a mask and a second area, St, including the trenches, not lying on the surface of said wafer;
   choosing the ratio of the second area, St, to the first area, Ss, so that

$$St/SS=(1/At)[2\alpha As(Tr-l/k)\sin\Theta-Ar\sin(\Theta-(4\pi/\lambda)(Tr-l/k))]$$

   where
      As is the reflectance of the first area at a wavelength λ,
      At is the the reflectance of the second area at the wavelength λ,
      Ar is the reflectance of the mask disposed on the first area at the wavelength λ,
      α is the transmittance of the mask at the wavelength λ,
      Tr is the thickness of the mask,
      l is the desired trench depth,
      k is the ratio of the etch rate of the wafer to the etch rate of the mask, and
      Θ is the phase of the light passing through the mask and reflected from the first area
   whereby a selected order of light diffracted from the first area periodically extinguishes the selected order of diffracted light from the second area as the trench depth increases, wherein the trenches are of constant pitch when the selected order is higher than o;
   irradiating said second pattern with coherent light of a single wavelength λ;
   measuring the depth of said second trenches from the sum of the intensities of light of a single wavelength λ diffracted from the second area and from the first area; and
   terminating the etching when the second trenches reach a desired depth as indicated by the sum of the intensities of the coherent light diffracted from the first and second areas Ss and St.

5,023,189

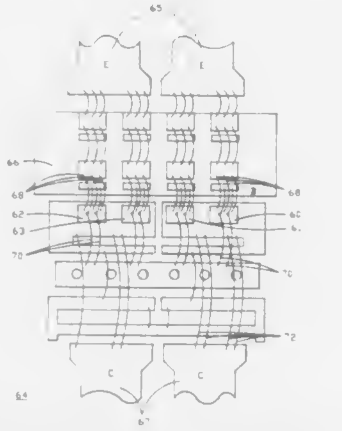
METHOD OF THERMAL BALANCING RF POWER TRANSISTOR ARRAY

Howard D. Bartlow, Sunnyvale, Calif., assignor to Microwave Modules & Devices, Inc., Mountain View, Calif.

Filed May 4, 1990, Ser. No. 519,136

Int. Cl.^{5} H01L *21/66*

U.S. Cl. 437—8 **7 Claims**



3. In thermally balancing an array of RF transistors connected in parallel, the method of
   interconnecting said transistors to array contacts by means of a plurality of discrete wire leads,
   determining the temperature distribution of said array during electrical test, and
   varying said plurality of discrete wire leads to improve thermal balance of said array.

5,023,190

IMPROVED CMOS PROCESSES

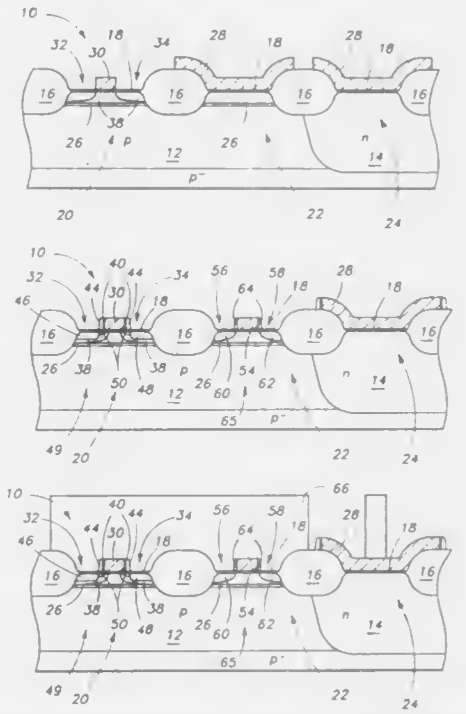
Ruojia Lee, and Fernando Gonzalez, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Aug. 3, 1990, Ser. No. 562,263

Int. Cl.^{5} H01L *21/265, 21/336*

U.S. Cl. 437—56 **18 Claims**

1. A process for fabricating CMOS integrated circuits in semiconductor wafers having p-type regions and n-type regions, the process comprising the following steps:
   providing upper field and gate insulating layers on a semiconductor wafer; defining a first portion in a p-type region for formation of an n-channel MOS transistor having LDD regions, a second portion in a p-type region for formation of an n-channel MOS transistor void of LDD regions, and a third portion in an n-type region for formation of a p-channel MOS transistor;
   applying a layer of conductive material atop the insulating layers;
   selectively patterning the conductive material layer to define a gate and exposed source and drain areas within the first portion, and to cover the second and third portions;
   doping exposed areas with n-type dopant material to a selected first concentratin to form LDD regions in the first portion, the conductive material masking the covered second and third portions from implantation of n-type dopant material during such first concentration doping;
   forming insulating spacers over edges of the conductive material defining the first portion gate to cover portions of the LDD regions within the first portion;



   doping exposed areas with n-type dopant material to a selected second concentration which is greater than the first concentration to form a source and a drain in the first portion having LDD regions, the conductive material masking the covered second and third portions from implantation of n-type dopant material during such second concentration doping;
   selectively patterning the conductive material layer to define a gate and exposed source and drain areas within the second portion, and to cover the third portion;
   doping exposed areas with n-type dopant material to a selected third concentration to form a source and a drain in the second portion which is void of LDD regions, the conductive material masking the covered third portion from implantation of n-type dopant material during such third concentration doping;
   selectively patterning the conductive material layer to define a gate and exposed source and drain areas within the third portion; and
   doping exposed areas with p-type dopant material to a se-

VOL
1127
ISS
2
JE
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1991
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lected fourth concentration to form a source and a drain in the third portion.

5,023,191
METHOD OF PRODUCING A SEMICONDUCTOR DEVICE USING A SINGLE MASK METHOD FOR PROVIDING MULTIPLE MASKING PATTERNS

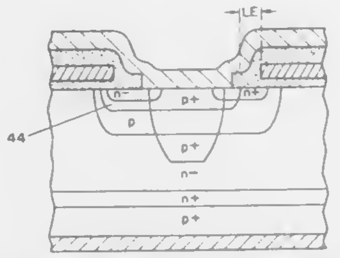
Kenya Sakurai, Matumoto, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Dec. 1, 1989, Ser. No. 444,567

Claims priority, application Japan, Dec. 1, 1988, 63-304494

Int. Cl.^{5} **H01L** *21/00, 21/02, 21/265, 21/306*

U.S. Cl. 437—27 **10 Claims**



1. A single mask method for providing multiple masking patterns usable for developing a semiconductor substrate for a semiconductor device, comprising the steps of:

(a) forming an etching mask having a first opening exposing an area of an insulative film covering a semiconductor layer;
(b) etching said insulative film, via said first opening, to an excessive degree so as to etch said film to a predetermined distance under said masking pattern to form in said film a second opening substantially coextensive with, but larger than, said first opening;
(c) etching said semiconductor layer, via said first opening, to form in said layer a third opening substantially coextensive with said first opening;
(d) removing said etching mask;
(e) etching said semiconductor layer, via said second opening, to an excess degree so as to etch said layer to a predetermined distance under said insulative film to form in said layer a fourth opening substantially coextensive with, but larger than, said second opening; and
(f) removing undesired portions of said insulative film to expose said fourth opening;

whereby, said first, third, second, and fourth openings are successively usable for etching and ion implantation processes for producing in an underlying semiconductor substrate a plurality of selected conductivity type regions of differing sizes without the need for application of successive masking patterns subject to registration constraints.

5,023,192
METHOD OF MANUFACTURING A BIPOLAR TRANSISTOR

Wilhelmus J. Josquin, and Jan Van Dijk, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

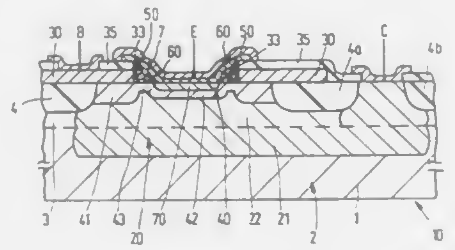
Filed Sep. 13, 1990, Ser. No. 582,298

Claims priority, application United Kingdom, Sep. 20, 1989, 8921262

Int. Cl.^{5} **H01L** *21/328*

U.S. Cl. 437—31 **9 Claims**

1. A method of manufacturing a semiconductor device, which method comprises providing a semiconductor body having adjacent one major surface a first device region of one conductivity type, providing on the one major surface a layer doped with impurities for forming an extrinsic subsidiary region of a second device region of the opposite conductivity type within the first device region, forming an opening through the doped layer, defining a first portion of an insulating material on the side wall of the doped layer bounding the opening and a second portion of a different material on the first portion, and introducing through the opening impurities for forming an intrinsic subsidiary region of the opposite conductivity type second device region within the first device region and a third device region of the one conductivity type within the intrinsic subsidiary region, characterised by introducing impurities for forming a coupling region of the opposite conductivity type through the opening prior to defining the insulating first portion on the side wall of the doped layer to form a first window, introducing the impurities for forming the intrinsic subsidiary region of the second device region through the first window, defining the second portion on the insulating first portion to form a smaller second window, and introducing the impurities for forming the third device region through the second window.



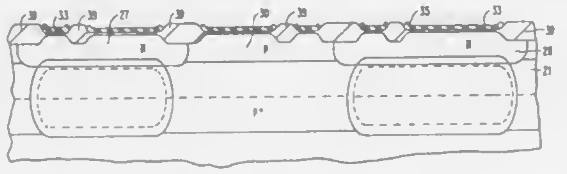
5,023,193
METHOD FOR SIMULTANEOUSLY FABRICATING BIPOLAR AND COMPLEMENTARY FIELD EFFECT TRANSISTORS USING A MINIMAL NUMBER OF MASKS

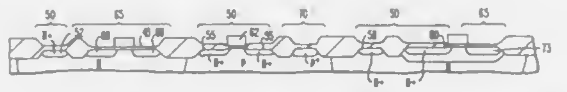
Juliana Manoliu, Palo Alto, and Prateep Tuntasood, San Jose, both of Calif., assignors to National Semiconductor Corp., Santa Clara, Calif.

Continuation of Ser. No. 887,006, Jul. 16, 1986, abandoned. This application Oct. 3, 1988, Ser. No. 253,946

Int. Cl.^{5} **H01L** *21/331*

U.S. Cl. 437—31 **5 Claims**





1. A method of fabricating a semiconductor structure used for the subsequent formation of both bipolar and complimentary field-effect transistors comprising the steps of:

blanket implanting a first conductivity-type impurity into a semiconductor substrate;
implanting a second conductivity-type impurity into a first region of the substrate where a buried layer is to be formed;
depositing an epitaxial layer of semiconductor material over the substrate after the first conductivity-type impurity and the second conductivity-type impurity are implanted;
implanting second conductivity-type impurity into a first region of the epitaxial layer overlying the first region of the substrate;

heating the structure to cause the second conductivity-type impurity in the substrate to contact the second conductivity-type impurity in the epitaxial layer for forming a second conductivity-type well and for forming a first conductivity-type well adjacent the second conductivity-type well;
depositing a nitride layer over the epitaxial layer;
etching the nitride layer for forming openings overlying portions of the epitaxial layer where a field oxide layer is to be formed;
implanting an impurity into the epitaxial layer using the nitride layer as a mask;
forming an oxide layer overlying the exposed portions of the epitaxial layer;
depositing an oxide-exclusion layer over the epitaxial layer, the layer being formed of a material which substantially prevents oxidation of the epitaxial layer;
etching the oxide-exclusion layer for forming openings overlying portions of the epitaxial layer where a field oxide layer is to be formed;
implanting an impurity into the epitaxial layer using the oxide-exclusion layer as a mask;
oxidizing the exposed portions of the epitaxial layer for forming the field oxide layer;
masking the epitaxial layer for forming an opening overlying a portion of the epitaxial layer in the second conductivity-type well, the opening defining a base region;
implanting first conductivity-type impurity into the base region;
removing the mask;
blanket implanting first conductivity-type impurity into the epitaxial layer;
implanting second conductivity-type impurity into exposed portions of the first conductivity-type well where a source and a drain are to be formed therein;
implanting second conductivity-type impurity into exposed portions of the second conductivity-type well where a collector and emitter are to be formed therein; and
oxidizing the exposed portions of the epitaxial layer for forming a differential oxide layer which is thinner over the exposed portions of the epitaxial layer which do not have second conductivity-type impurity implanted therein than over the exposed portions of the epitaxial layer which have second conductivity-type impurity implanted therein.

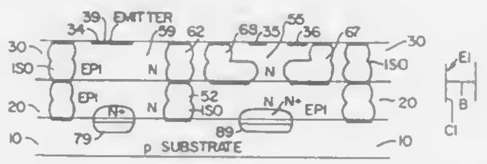
5,023,194
METHOD OF MAKING A MULTICOLLECTOR VERTICAL PNP TRANSISTOR

Piccolo G. Gianella, Saratoga, Calif., assignor to Exar Corporation, San Jose, Calif.

Filed Feb. 11, 1988, Ser. No. 154,832

Int. Cl.^{5} **H01L** *21/33, 21/36*

U.S. Cl. 437—31 **3 Claims**



1. A method of fabricating a vertical PNP transistor including the steps of:

providing a P-type substrate;
forming an N+ buried layer in said P-type substrate;
forming a first N-type epitaxial layer over said substrate;
forming a pair of P-type collector regions in said first epitaxial layer above said N+ layer;
forming a second N-type epitaxial layer over said first N-type epitaxial layer;
forming a pair of P-type collector contact regions, with smaller, lateral dimensions than said pair of P-type collector regions, in said second epitaxial layer above outside edges of said pair of P-type collector regions for connecting with said pair of P-type collector regions;
forming a pair of P-type emitter regions between said P-type collector contact regions and above said P-type collector regions; and
wherein said second N-type epitaxial layer forms a transistor base between said P-type emitter regions and collector regions.

5,023,195
METHOD FOR MANUFACTURING A SEMICONDUCTOR INTEGRATED CIRCUIT INCLUDING A BIPOLAR TRANSISTOR

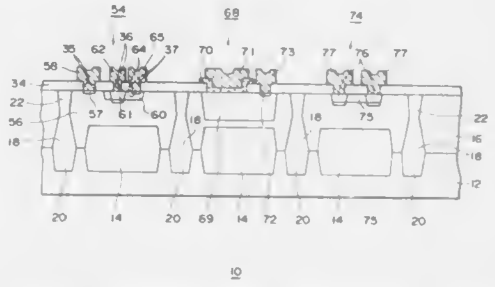
Nobuyuki Sekikawa, and Tadayoshi Takada, both of Gunma, Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed May 16, 1990, Ser. No. 525,166

Claims priority, application Japan, May 19, 1989, 1-127319

Int. Cl.^{5} **H01L** *21/331*

U.S. Cl. 437—31 **8 Claims**



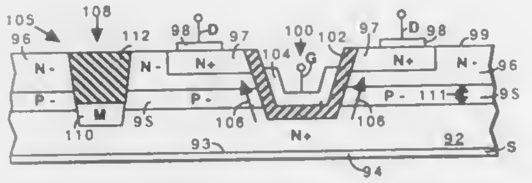
1. A method of manufacturing a semiconductor integrated circuit comprising steps of:

forming a first insulating film on the surface of a semiconductor layer;
opening the respective portions of the first insulating film corresponding to an upper isolating region and a first-conductive-type integrated circuit element region of the same conductive type as the upper isolating region to form doping windows for these respective regions;
forming a first mask which shields the doping window of the integrated circuit element region of the first insulating film, and introducing a first-conductive-type dopant into the semiconductor layer to form the upper isolating region;
introducing a dopant into the semiconductor layer through the doping windows for at least the integrated circuit element region in the first insulating film after the first mask is removed;
removing at least one part of the first insulating film to make the film thickness essentially uniform followed by forming a second insulating film;
opening the respective portions of the second insulating film corresponding to each contact region of the integrated circuit element region and the integrated circuit element region of a second-conductive-type to form the respective contact windows and/or doping windows;
forming a second mask with an opening for the second-conductive-type integrated circuit element region on the second insulating film, and introducing a dopant of the second-conductive-type into the semiconductor layer to form an integrated circuit element region of a second conductive type; and
removing the second mask, and forming an electrode which is in ohmic contact with the various contact regions of the integrated circuit element region.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,196
METHOD FOR FORMING A MOSFET WITH SUBSTRATE SOURCE CONTACT

Robert J. Johnsen, and Paul W. Sanders, both of Scottsdale, Ariz., assignors to Motorola Inc., Schaumburg, Ill.
Filed Jan. 29, 1990, Ser. No. 471,899
Int. Cl.^{5} H01L *21/44*
U.S. Cl. 437—40 **10 Claims**



1. A method for forming a semiconductor device comprising:

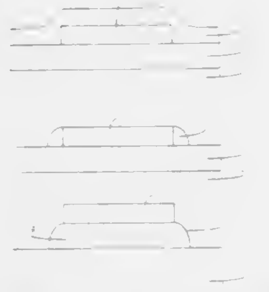
providing a semiconductor substrate having a first region of a first type and conductivity extending to a first surface, a second region of the first type and a lower second conductivity underlying the first region, a third region of a second type opposite the first type and a third conductivity underlying the second region, and a fourth region of the first type and a fourth conductivity underlying the third region and extending to a second, opposite surface;

forming a cavity extending into the substrate from the first surface, wherein first and second portions of the third region are exposed, respectively, on sides of the cavity and a first portion of the fourth region is also exposed in the cavity; and

then in either order, (i) forming a gate oxide on the first portion of the third region, and (ii) forming a nonrectifying connection between the first portion of the fourth region and the second portion of the third region in the cavity.

5,023,197
MANUFACTURING PROCESS OF MESA SOI MOS TRANSISTOR

Michel Haond, Meylan, and Jean Galvier, Gieres, both of France, assignors to French State represented by the Minister of Post, Telecommunications and Space, France
Filed Aug. 15, 1990, Ser. No. 567,861
Claims priority, application France, Aug. 16, 1989, 89 11228
Int. Cl.^{5} H01L *21/265*
U.S. Cl. 437—40 **8 Claims**



1. A method for manufacturing a MOS transistor in a silicon on insulator block wherein said block exhibits convex rounded up edges, initially consisting in etching the block in a thin layer of single crystal silicon on insulator, wherein etching of the block comprises the following steps:

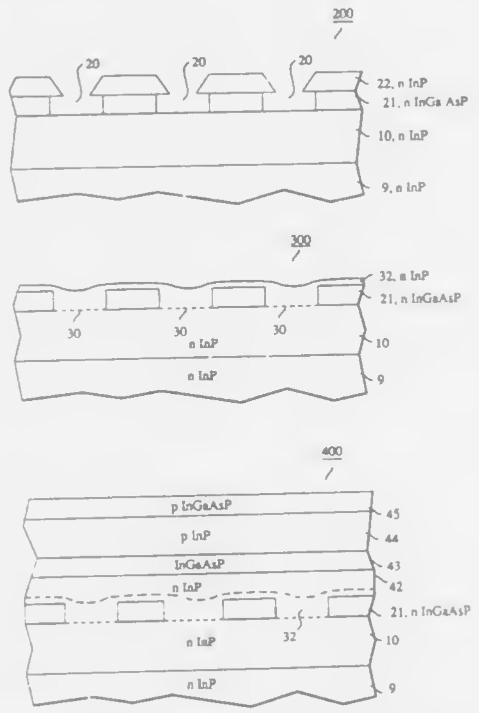
forming at the position where it is desired to obtain the block a mask layer portion (3) having a thickness slightly larger than that of the thin silicon on insulator layer;

depositing a second silicon layer (11) having a predetermined thickness; and

anisotropically etching silicon until said insulator is apparent outside said mask portion.

5,023,198
METHOD FOR FABRICATING SELF-STABILIZED SEMICONDUCTOR GRATINGS

Keith E. Strege, Branchburg Township, Somerset County, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.
Filed Feb. 28, 1990, Ser. No. 486,577
Int. Cl.^{5} H01L *21/20*
U.S. Cl. 437—129 **20 Claims**



1. A method of fabricating a semiconductor grating comprising the steps of:

(a) growing upon a top major surface of a first layer of first semiconductor material a second layer of second semiconductor material;

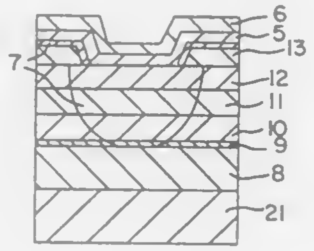
(b) growing upon the second layer of second semiconductor material a third layer of third semiconductor material;

(c) forming a plurality of grooves each of which penetrates through the third layer and through at least a portion of the depth of the second layer; the thickness of the third layer being sufficient so that, after the grooves have been formed, the volume of third material in the third layer is greater than the volume of the grooves in the second layer plus the volume of any grooves in the first layer; and

(d) heating the first, second, and third layers to a temperature sufficient to cause a mass transport of the third material of the third layer, whereby the entire surface of the grooves in the second layer and any surface of any grooves in the first layer is substantially buried by the third material.

5,023,199
METHOD OF DIFFUSING ZN INTO COMPOUND SEMICONDUCTOR

Takashi Murakami, and Takashi Motoda, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan
Filed Jan. 4, 1990, Ser. No. 461,069
Claims priority, application Japan, Mar. 31, 1989, 1-83279
Int. Cl.^{5} H01L *21/223*
U.S. Cl. 437—167 **6 Claims**



1. A method of producing a laser diode comprising:

successively growing a lower cladding layer, an active layer, an upper cladding layer, a current blocking layer, a cap layer, and an $Al_xGa_{1-x}As$ $(0 \leqq x \leqq 1)$ diffusion mask layer on a substrate;

removing a portion of said diffusion mask to expose a portion of said cap layer;

successively depositing a mixed film including Zn and a protection layer on said diffusion mask layer and said exposed portion of said cap layer; and

diffusing Zn from said mixed layer through said exposed portion of said cap layer, through said current blocking and upper cladding layers underlying said exposed portion of said cap layer and into said active layer.

5,023,200
FORMATION OF MULTIPLE LEVELS OF POROUS SILICON FOR BURIED INSULATORS AND CONDUCTORS IN SILICON DEVICE TECHNOLOGIES

Robert S. Blewer; Terry R. Gullinger; Michael J. Kelly, and Sylvia S. Tsao, all of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.
Filed Nov. 22, 1988, Ser. No. 274,892
Int. Cl.^{5} H01L *21/44*
U.S. Cl. 437—187 **14 Claims**

1. A method of fabricating a silicon-on-insulated conductor structure for semiconductor integrated circuits, comprising the steps of:

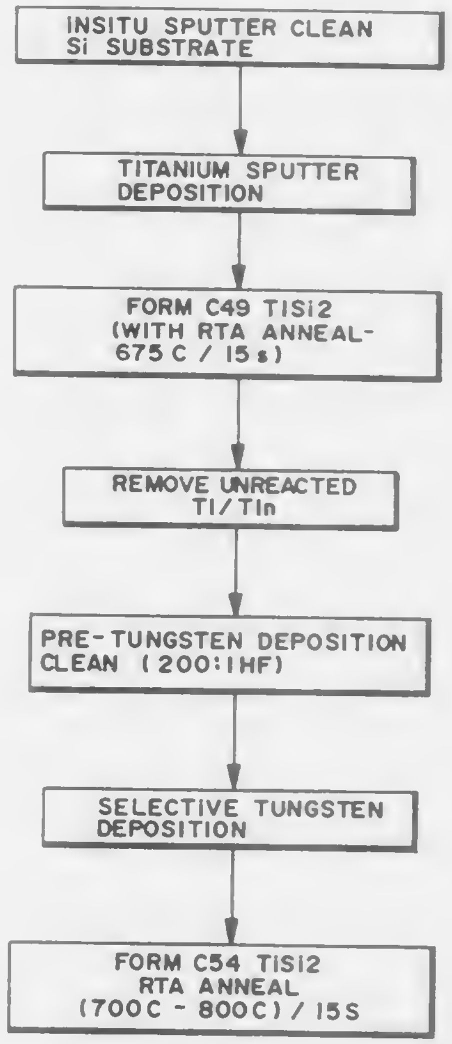
(a) forming multiple levels of porous silicon on a silicon substrate;

(b) selectively oxidizing at least one porous silicon layer to form an insulating layer;

(c) forming at least one conductor layer beneath said insulating layer by metallizing at least one layer of said porous silicon other than said insulating layer.

5,023,201
SELECTIVE DEPOSITION OF TUNGSTEN ON $TISI_2$

David Stanasolovich, Poughkeepsie, N.Y.; Leslie H. Allen, Champaigne, Ill., and James W. Mayer, Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.
Filed Aug. 30, 1990, Ser. No. 575,460
Int. Cl.^{5} H01L *21/44*
U.S. Cl. 437—192 **16 Claims**



1. A process for the selective deposition of tungsten on a titanium disilicide surface which comprises:

1) first forming a metastable titanium disilicide layer on a substrate wherein said disilicide is characterized as a metastable C49 titanium disilicide ($TiSi_2$);

2) selectively depositing tungsten (W) on said C49 $TiSi_2$ to give a product having a W/C49 $TiSi_2$ interface which is substantially free of oxygen and/or fluorine contamination; and

3) annealing the product of step 2 at a temperature and time sufficient to convert the C49 $TiSi_2$ to C54 $TiSi_2$; wherein the C49 $TiSi_2$ layer of step 2 is characterized by a resistivity of from about 80 to about 120 μohm-cm and is converted by annealing to a C54 $TiSi_2$ characterized by a resistivity in the range of from about 5 μohm-cm to about 50 μohm-centimeter.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,202

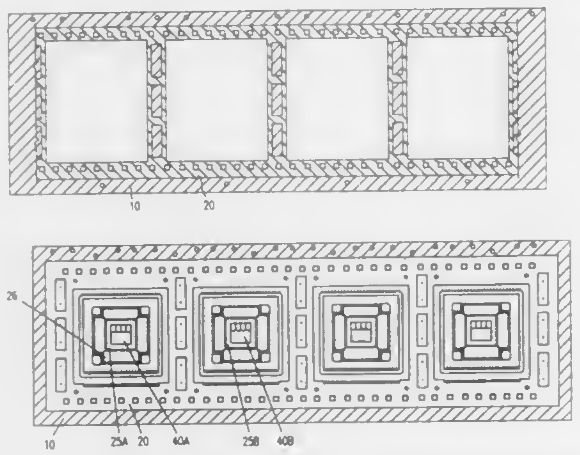
RIGID STRIP CARRIER FOR INTEGRATED CIRCUITS

Jon M. Long, Livermore, and Michael J. Steidl, San Jose, both of Calif., assignors to LSI Logic Corporation, Milpitas, Calif.

Filed Jul. 14, 1989, Ser. No. 380,174

Int. Cl.⁵ H01L *21/56, 21/60, 21/78*

U.S. Cl. 437—206 **28 Claims**



1. A process for bonding a semiconductor die to a tape having leads comprising the steps of:

providing a strip carrier which is a rigid flat metal plate;
attaching the tape to the strip carrier; and
bonding the die to the tape leads.

5,023,203

METHOD OF PATTERNING FINE LINE WIDTH SEMICONDUCTOR TOPOLOGY USING A SPACER

Sangsoo Choi, Chungnam, Rep. of Korea, assignor to Korea Electronics & Telecommunications Research Institute et al., Seoul, Rep. of Korea

Filed Jun. 23, 1989, Ser. No. 370,872

Claims priority, application Rep. of Korea, Jul. 28, 1988, 88-9546

Int. Cl.⁵ H01L *21/00, 21/02, 21/302, 21/314*

U.S. Cl. 437—228 **3 Claims**

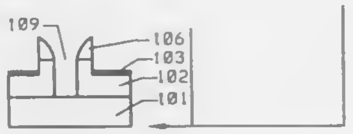


FIG. 5(G)

1. A method of manufacturing a semiconductor device comprising the steps of:

(a) forming a multilayer mask structure on a semiconductor substrate;
(b) forming an aperture through a portion of said multilayer mask structure, so as to expose a prescribed region of underlying mask material;
(c) forming a dielectric spacer along a sidewall portion of the aperture formed in step (b), so as to define a reduced spacing masking window over said underlying mask material; and
(d) etching that portion of said underlying mask material within said reduced spacing masking window, and wherein
step (a) comprises forming a bilevel mask structure by forming a first resist layer on said substrate and a second resist layer on said first resist layer, and wherein step (b) comprises forming said aperture through said second resist layer to expose a prescribed region of said first resist layer, and wherein
step (a) further includes the step of hardening said first resist layer at dry etch systemic conditions of C_2CLF_5: 50 sccm, 550 mTorr for one minute.

5,023,204

METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE USING SILICONE PROTECTIVE LAYER

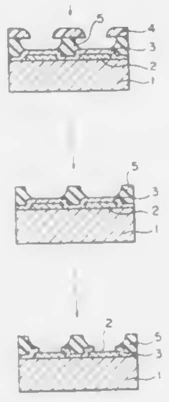
Etsushi Adachi; Hiroshi Adachi; Osamu Hayashi, and Kazuo Okahashi, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jan. 19, 1989, Ser. No. 298,950

Claims priority, application Japan, Jan. 21, 1988, 63-11217

Int. Cl.⁵ H01L *21/02*

U.S. Cl. 437—228 5 Claims



1. A method of manufacturing semiconductor devices in which a silicone protective layer is used comprising:

forming a stress relaxation protective layer of a silicone material on a glass coating layer directly contacting and covering a circuit disposed on a substrate of the semiconductor device;
modifying the surface of the thus-formed stress relaxation protective layer with an inert gas;
forming a resist on the thus-modified surface of said stress relaxation protective layer;
removing the resist in a predetermined region by patterning;
removing the stress relaxation protective layer in the region from which the resist has been removed by etching;
removing the remaining resist; and
etching the glass coating layer in the region from which said stress relaxation protective layer has been removed by using the remaining stress relaxation protective layer as a mask, thereby exposing the circuit.

5,023,205

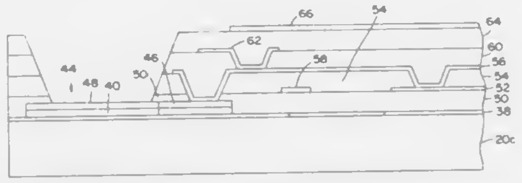
METHOD OF FABRICATING HYBRID CIRCUIT STRUCTURES

John J. Reche, Ventura, Calif., assignor to Polycon, Tempe, Ariz.

Filed Apr. 27, 1989, Ser. No. 344,252

Int. Cl.⁵ H01L *21/312*

U.S. Cl. 437—228 **10 Claims**



1. In a method of forming a ground plane on a substrate in a high density multilayer interconnect fabrication process, comprising the steps of:

(a) depositing a layer of metal on the substrate;
(b) putting a layer of polymer over the layer of metal deposited in step (a);
(c) depositing a layer of metal over the layer of polymer in step (b);
(d) patterning the layer of metal of step (c), and the layer of polymer of step (b) where the same is not masked by the remaining parts of the metal layer of step (c);
(e) putting a layer of polymer over the layer of metal deposited in step (a);
(f) depositing a layer of metal over the layer of polymer of step (e);
(g) patterning the layer of metal of step (f);
(h) putting a layer of polymer over the patterned layer of metal;
(i) patterning the layer of polymer of step (h), and the layer of polymer of step (e) where the same is not masked by the metal layer of steps (f) and (g); and whereby the first patterning of the polymer layer of step (e) occurs after the polymer layer of step (h) is applied; and wherein steps (b) through (d) in part form the bonding pads for the high density multilayer interconnect.

5,023,206

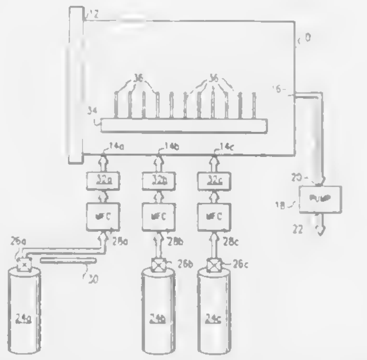
SEMICONDUCTOR DEVICE WITH ADJACENT NON-OXIDE LAYERS AND THE FABRICATION THEREOF

Dean W. Freeman, San Diego, Calif., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 16, 1987, Ser. No. 133,757

Int. Cl.⁵ H01L *21/00, 21/02;* **C23C** *15/00*

U.S. Cl. 437—228 12 Claims



1. A method of depositing a layer upon a surface of a non-oxide body, said depositing occurring substantially without formation of an intervening oxide layer, said method comprising the steps of:

enclosing the body in a sealed chamber;
introducing a gaseous etchant into the chamber so that if oxides are present at the body surface, the etchant substantially removes the oxides, while maintaining the temperature of said chamber at grater than 100 degrees Celsius so that water generated by the etching of oxides will vaporize and be driven away from the body surface;
purging the etchant from the chamber;
raising the temperature of the chamber after the step of introducing the gaseous etchant;
after raising the temperature of the chamber, introducing a substance into the chamber which forms the layer upon contact with the body; and
thereafter removing the body from the chamber.

5,023,207

SLAWSONITE-CONTAINING GLASS-CERAMICS

John F. MacDowell, Penn Yan, N.Y., assignor to Corning Incorporated, Corning, N.Y.

Filed Mar. 12, 1990, Ser. No. 492,107

Int. Cl.⁵ C03C *10/06, 3/085, 3/062*

U.S. Cl. 501—8 **1 Claim**

1. A glass-ceramic article exhibiting an apparent annealing point of at least 1200° C. and containing slawsonite crystals with, optionally, strontium silicate crystals as essentially the sole crystal phase(s) consisting, expressed in terms of weight percent on the oxide basis, of 15–40% SrO, 25–37% Al_2O_3, and 37–45% SiO_2.

5,023,208

SOL-GEL PROCESS FOR GLASS AND CERAMIC ARTICLES

Edward J. A. Pope, Lake Sherwood; Yoji Sano, Thousand Oaks; Shi-ho Wang, Newbury Park, and Arnab Sarkar, West Hills, all of Calif., assignors to Orion Laboratories, Inc., Camarillo, Calif.

Filed Dec. 19, 1989, Ser. No. 452,962

Int. Cl.⁵ C03C *3/00*

U.S. Cl. 501—12 9 Claims

1. A process for fabricating a gel monolith, comprising steps of:

mixing together prescribed reagents, to produce a liquid solution for placement in a mold;
allowing the solution to react while in the mold, to produce a porous gel matrix having a high concentration of microscopic pores;
immersing the porous gel matrix in an inert liquid having the same composition as a product of the reaction of the reagents in the liquid solution;
hydrothermally aging the porous gel matrix by immersing the matrix in deionized water at a prescribed temperature and for a prescribed time duration, wherein the prescribed temperature and resultant pressure are substantially below the critical temperature and pressure of deionized water; and
drying the hydrothermally-aged gel matrix, to produce a strong gel monolith substantially free of cracks;
wherein the step of hydrothermally aging increases the average size of the pores in the gel matrix by causing particles in the gel to migrate and fill small pores, such that capillary forces encountered in the subsequent step of drying are insufficient to induce cracking of the gel matrix.

5,023,209

FAST FADING, HIGH REFRACTIVE INDEX PHOTOCHROMIC GLASS

Luc Grateau, Paris, and Michel Prassas, Bourgogne, both of France, assignors to Corning France S.A., Avon Cedex, France

Filed Sep. 13, 1990, Ser. No. 581,789

Claims priority, application France, Oct. 12, 1989, 8913346

Int. Cl.⁵ C03C *4/06, 3/11*

U.S. Cl. 501—13 **3 Claims**

1. A photochromic glass having a refractive index between 1.585–1.610, an Abbe number higher than 41, a density less than 2.80 g/cm^3, being capable of receiving an antireflection coating, and which, in a thickness of 2 mm, exhibits

(a) a light transmittance in the clear state (T_o) of greater than or equal to 85%,
(b) a light transmittance in the darkened state after exposure for 15 minutes to actinic radiation (TD_{15}) over the temperature range from 0°–25° C. of less than 48%,
(c) a light transmittance in the darkened state after exposure for 15 minutes to actinic radiation (TD_{15}) at 25° C. of more than 20%,
(d) a fading rate at ambient temperature (20°–25° C.) such

VOL
1127
ISS
2
JE
11
1991
UMI

that the glass demonstrates a light transmittance (TF_5) of at least 60% within five minutes after withdrawing from actinic radiation,

(e) a difference in light transmittance in the darkened state over the temperature range from 25°–40° C. of less than 23 points of the degree of transmittance, and

(f) a difference in absolute value of light transmittance in the darkened state before and after exposure at 280° C. for one hour, that exposure simulating the application of an anti-reflection coating, of less than five points of transmittance; said glass consisting essentially, in weight percent on the oxide basis, of:

SiO_2	43-52	MgO	0–5
B_2O_3	12.5–18	CaO	0–5
Al_2O_3	0–3	SrO	0.8-9
ZrO_2	3–8	BaO	1–9
Li_2O	1.5–3.5	K_2O	2–9
Na_2O	0.3–3	TiO_2	2–8
Nb_2O_5	4–9		

with the provisos that:

$7 < X_2O < 12$ where $X_2O = Li_2O + K_2O$

$2 < XO < 12$ where $XO = MgO + CaO + SrO + BaO$

$12 < X_2O + XO < 20$

$15 < ZrO_2 + TiO_2 + Nb_2O_5 < 22$

$ZrO_2 + Al_2O_3 \leqq 10$

$Nb_2O_5 + Al_2O_3 \leqq 9$

$0.15 < Li_2O/X_2O < 0.40$

and of photochromic elements in the following proportions expressed in percent by weight:

Ag	0.100–0.175	Br	0.093–0.180
Cl	0.140–0.350	CuO	0.0080–0.0300

where the Ag, Cl and Br contents are as analyzed in the glass and the CuO content is as calculated from the glass batch, with the provisos that:

Ag + Br > 0.21

Br + Cl > 0.24.

5,023,210

NEUTRAL GRAY, LOW TRANSMITTANCE, NICKEL-FREE GLASS

John F. Krumwiede, Cumberland, Md.; Paul W. Kopp, Crystal City, Mo., and Robert B. Heithoff, LaVale, Md., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 3, 1989, Ser. No. 431,052

Int. Cl.^{5} C03C *3/087*

U.S. Cl. 501—71 **11 Claims**

1. A neutral gray colored glass composition having a base glass composition comprising:

SiO_2 68–75 percent by weight

Na_2O 10–18

CaO 5–15

MgO 0–5

Al_2O_3 0–5

K_2O 0–5

and traces of melting and refining aids, if any, and colorants consisting essentially of:

Fe_2O_3 (total iron) 0.4–0.7 percent by weight

FeO 0.08–0.15

Se 0.003–0.008

CoO 0.003–0.025

Cr_2O_3 0.022–0.050

the glass having a luminous transmittance less than 20 percent and total solar ultraviolet transmittance less than 20 percent at a thickness of 0.219 inch (5.56 millimeters).

5,023,211

SUPER-HARD CERAMICS

Akibico Kumaki, and Yoshito Izumi, both of Tokyo, Japan, assignors to Onoda Cement Co., Ltd., Onoda, Japan

Filed Aug. 21, 1990, Ser. No. 570,346

Claims priority, application Japan, Oct. 11, 1989, 1-264687

Int. Cl.^{5} C04B *35/56, 35/10, 35/50*

U.S. Cl. 501—87 **2 Claims**

1. A super-hard ceramic consisting essentially of 15-45% by weight of a mixture of titanium carbide and zirconium carbide at a ratio by weight of 1/0.05–1/0.40; 0.1–1.0% by weight of magnesium oxide; 0.05–0.5% by weight of lithium oxide; 0.2–1.0% by weight of neodymium oxide; and 52.5–84.65% by weight of alumina.

5,023,212

ELECTRICALLY MELTED MULTIPHASE MATERIAL BASED ON ALUMINA AND ALUMINIUM OXYCARBIDE AND OXYNITRIDE

Dominique Dubots, Le Fayet, and Pierre Toulouse, Chamonix, both of France, assignors to Pechiney Electrometallurgie, Courbevoie, France

PCT No. PCT/FR89/00097, § 371 Date Oct. 31, 1989, § 102(e) Date Oct. 31, 1989, PCT Pub. No. WO89/08624, PCT Pub. Date Sep. 21, 1989

PCT Filed Mar. 8, 1989, Ser. No. 432,769

Claims priority, application France, Mar. 11, 1988, 88 03415

Int. Cl.^{5} C04B *35/10*

U.S. Cl. 501—87 **5 Claims**

1. A multiphase alumina-based material consisting essentially of a matrix of corundum having homogeneously dispersed therein microcrystalline phases of aluminum oxide, aluminum oxycarbide, aluminum oxynitride and aluminum oxycarbonitride in the form of single crystals of size less than 100 microns, said material having a content of carbon in combined form between 0.5 and 5% by weight, and a content of nitrogen in combined form between 0.05 and 5% by weight.

5,023,213

PRECURSORS IN THE PREPARATION OF TRANSITION METAL NITRIDES AND TRANSITION METAL CARBONITRIDES AND THEIR REACTION INTERMEDIATES

Leon Maya, Oak Ridge, Tenn., assignor to United States Department of Energy, Washington, D.C.

Filed Dec. 9, 1986, Ser. No. 939,920

The portion of the term of this patent subsequent to May 24, 2005, has been disclaimed.

Int. Cl.^{5} C04B *35/58;* **C07F** *7/00, 9/00, 11/00*

U.S. Cl. 501—96 **9 Claims**

1. A composition comprising:

a transition metal bound to;

a first ligand selected from the group inorganic amide and imide ligands; and

a second ligand being acetylide ligands.

6. A process for making ceramics comprising:

pyrolyzing the precursor of claim 1 in an inert atmosphere.

5,023,214

SILICON NITRIDE CERAMICS CONTAINING A METAL SILICIDE PHASE

Roger L. K. Matsumoto, Newark, and Allan B. Rosenthal, Wilmington, both of Del., assignors to Hercules Incorporated, Wilmington, Del.

Filed Apr. 11, 1989, Ser. No. 336,397

Int. Cl.^{5} C04B *35/58*

U.S. Cl. 501—97 **13 Claims**

1. A sintered ceramic product consisting essentially of

(a) from about 20 to about 98 percent silicon nitride,

(b) from about 1 to about 80 percent of a silicide of at least one metal selected from the group consisting of iron, nickel and cobalt, and

(c) from 0.02 to about 20 percent of at least one oxide, nitride or silicate of an element selected from IUPAC groups 2, 3, 4, 13 or the lanthanide series, all percentages being by weight based on the total weight of the product.

5,023,215

CORDIERITE-SILICON NITRIDE BODY

Joseph J. Cleveland, Towanda, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Continuation of Ser. No. 426,644, Oct. 26, 1989, abandoned. This application Dec. 7, 1990, Ser. No. 624,500

Int. Cl.^{5} C04B *35/58*

U.S. Cl. 501—98 **1 Claim**

1. A process for fabricating a densified coated ceramic article comprising

blending silicon nitride, magnesium oxide, silicon dioxide, aluminum sesquioxide, and a nucleating agent to form a powder mixture, said mixture including said silicon nitride, magnesium oxide, silicon dioxide, aluminum sesquioxide, and a nucleating agent in an appropriate amount to form a silicon nitride and cordierite ceramic article having an approximate formula $(Si_3N_4)_{(1-x)}(2MgO.2Al_2O3.5SiO_2)_x$ wherein x is from about 0.2 to about 0.5,

pressing and sintering said powder mixture to form a ceramic article, said sintering being performed at an effective temperature in an inert atmosphere to form a densified ceramic article consisting essentially of a first phase of silicon nitride and a second continuous phase of cordierite and a nucleating agent having a density greater than 95 percent of theoretical density, and

reheating said densified ceramic article at an effective temperature for an effective time to crystallize said second continuous phase of cordierite,

machining said ceramic article into a final finished shape,

reacting said ceramic article having a final finished shape with oxygen in an oxidizing atmosphere at a temperature of from about 1000 degrees C. to about 1700 degrees C. for sufficient period of time to form a substantial continuous surface coating of a reaction bonded silicon oxide on said article, said ceramic article having a substantially continuous surface of oxide material being present on said surface, said oxide material consisting essentially of cordierite and coating of a reaction bonded silicon oxide.

5,023,216

CERAMIC MATERIAL

Michael R. Anseau, Coimbra, Portugal; James M. Lawson, Greenford, and Shaun Slasor, Tyne-Wear, both of United Kingdom, assignors to Cookson Group PLC, London, United Kingdom

PCT No. PCT/GB88/00398, § 371 Date Mar. 22, 1989, § 102(e) Date Mar. 22, 1989, PCT Pub. No. WO88/09314, PCT Pub. Date Dec. 1, 1988

PCT Filed May 20, 1988, Ser. No. 303,652

Claims priority, application United Kingdom, May 29, 1987, 8712683

The portion of the term of this patent subsequent to Feb. 14, 2006, has been disclaimed.

Int. Cl.^{5} C04B *35/58*

U.S. Cl. 501—98 **6 Claims**

1. A ceramic material which comprises a composite of zirconia and O′-/β′-sialon, the volume ratio of O′-sialon to β′-sialon being in the range of 1:7 to 7:1.

5,023,217

CERAMIC BODIES FORMED FROM PARTIALLY STABILIZED ZIRCONIA

Richard Everhart; Paul Bosomworth; Kenneth Butcher, and Matthias Hoffmann, all of Hendersonville, N.C., assignors to Swiss Aluminum Ltd., Chippis, Switzerland

Division of Ser. No. 408,739, Sep. 18, 1989, Pat. No. 4,923,830. This application Jan. 22, 1990, Ser. No. 468,184

Int. Cl.^{5} C04B *35/48, 38/00*

U.S. Cl. 501—103 **5 Claims**

1. A ceramic foam body for use in high temperature applications which comprises a porous ceramic body formed from zirconia and characterized by the presence of from about 12% to about 80% by weight zirconia in a monoclinic phase and the balance essentially in a cubic phase at room temperature.

5,023,218

FUSED AND CAST REFRACTORY PRODUCTS HAVING A HIGH ZIRCONIUM DIOXIDE CONTENT

Alain P. B. Zanoli, Morieres, and Emmanuel J. Sertain, Avignon, both of France, assignors to Societe Europeenne des Produits, Courbevoie, France

Filed Jun. 14, 1990, Ser. No. 537,815

Claims priority, application France, Jun. 15, 1989, 89 07943

Int. Cl.^{5} C04B *35/48*

U.S. Cl. 501—105 **2 Claims**

1. A refractory product without cracks obtained by fusion under oxidizing conditions and cast from a mixture of starting materials whereby said product consists essentially of, as expressed on an oxide basis in percent by weight:

ZrO_2	>92
SiO_2	2–6.5
Na_2O	0.12–1.0
Al_2O_3	0.4–1.15
$Fe_2O_3 + TiO_2$	<0.55
P_2O_5	<0.05.

5,023,219

DIELECTRIC CERAMIC COMPOSITION FOR ELECTRONIC DEVICES

Keisuke Kageyama, Osaka, Japan, assignor to Sumitomo Special Metal Co. Ltd., Osaka, Japan

Filed Apr. 25, 1990, Ser. No. 514,235

Claims priority, application Japan, Apr. 26, 1989, 1-106836; Feb. 9, 1990, 2-30415

Int. Cl.^{5} C04B *35/40*

U.S. Cl. 501—136 **5 Claims**

1. A dielectric ceramic composition for use in making electronic devices which is represented by the formula:

$$XBa(Zn_{\frac{1}{3}}Ta_{\frac{2}{3}})O_3 - Y(Ba_Z.Sr_{1-Z})(Ga_{\frac{1}{2}}.Ta_{\frac{1}{2}})O_3$$

where

ti $X + Y = 1$;

$0.3 \leqq X < 1$,

$0.7 \geqq Y > 0$; and

$0 \leqq Z \leqq 1$

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5,023,220

ULTRA HIGH ZEOLITE CONTENT FCC CATALYSTS AND METHOD FOR MAKING SAME FROM MICROSPHERES COMPOSED OF A MIXTURE OF CALCINED KAOLIN CLAYS

Lawrence B. Dight, Annandale; David C. Bogert, Tinton Falls, and Mark A. Leskowicz, Colonia, all of N.J., assignors to Engelhard Corporation, Iselin, N.J.

Continuation of Ser. No. 272,189, Nov. 16, 1988, abandoned. This application Jun. 13, 1990, Ser. No. 538,606

Int. Cl.^{5} B01J *29/08, 21/16*

U.S. Cl. 502—65 **23 Claims**

1. The method for making a high zeolite content fluid catalytic cracking catalyst comprising the steps of:

(a) forming an aqueous slurry containing 5–35 parts by weight hydrated kaolin clay, 30–40 parts by weight kaolin clay that has been calcined through its characteristic exotherm and 17–53 parts by weight of metakaolin, the proportions of kaolin clay that has been calcined through its exotherm being from 1 part by weight to from about 1.2 to 2 parts by weight metakaolin after step (c) below

(b) spray drying the aqueous slurry to obtain microspheres;

(c) calcining the microspheres obtained in step (b) at a temperature and for a time sufficient to convert the hydrated kaolin clay in the microspheres substantially to metakaolin, but insufficient to cause metakaolin or hydrated kaolin to undergo the characteristic kaolin exotherm and to provide microspheres of calcined clay having an acid-solubility in the range of 22–42% and a Hg pore volume between 0.50–0.70 cc/g;

(d) mixing the microspheres obtained in step (c) with sodium silicate and water to obtain an alkaline slurry of microspheres of calcined clay in an aqueous solution containing sodium silicate;

(e) heating the slurry of microspheres of calcined clay to a temperature and for a time sufficient to crystallize at least about 70% by weight Y-faujasite in the microspheres, said Y-faujasite being in the sodium form.

17. A fluid catalytic cracking catalyst for producing high octane gasoline comprising microspheres analyzing more than 95% by weight of SiO_2 and Al_2O_3, a unit cell size of about 24.60 Angstrom units or below, a total surface area above 500 m^2/g, a zeolite/matrix surface area ratio of about 4/1, and an EAI value below 1%/sec.

22. The cracking catalyst of claim 17 which is blended with about an equal weight of microspheres of substantially catalytically inert microspheres of calcined kaolin clay or microspheres obtained by calcining a mixture of kaolin clay and a source of magnesium oxide.

23. The method of claim 1 wherein after step (e) sodium cations in the microspheres are ion-exchanged with ammonium or a combination of ammonium and rare earth cations to provide a fluid cracking catalyst analyzing more than 95% by weight of SiO_2 and Al_2O_3, a SiO_2/Al_2O_3 ratio of about 2/1, a unit cell size of about 24.60 Angstrom units or below, a total surface area above 500 m^2/g, a zeolite/matrix surface area ratio of about 4/1, and an EAI value below 1%/second and further characterized by a Hg pore size distribution of about 0.08 cc/g of pores in the range of 40–100 Angstrom units and about 0.12 cc/g of pores in the range of 40–600 Angstrom units.

5,023,221

MIDDLE DISTILLATE HYDROCRACKING CATALYST AND PROCESS

Mario L. Occelli, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed May 31, 1990, Ser. No. 531,460

Int. Cl.^{5} B01J *21/16, 29/02, 29/04*

U.S. Cl. 502—66 **40 Claims**

32. A catalyst composition consisting essentially of:

(a) at least one hydrogenation metal component;

(b) a layered magnesium silicate;

(c) an intercalated clay; and

(d) a zeolitic molecular sieve.

33. A catalyst composition as defined by claim 32 wherein said catalyst composition contains a hydrogenation component comprising tungsten and a hydrogenation component comprising nickel.

5,023,222

CATALYST FOR PRODUCING SYNDIOTACTIC CONFIGURATION STYRENE-BASED POLYMERS

Hiroshi Maezawa; Norio Tomotsu, and Masahiko Kuramoto, all of Ichihara, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Division of Ser. No. 274,022, Nov. 21, 1988, Pat. No. 4,978,730. This application Oct. 1, 1990, Ser. No. 591,417

Claims priority, application Japan, Dec. 24, 1987, 62-325391; Jan. 19, 1988, 63-007465; Jan. 19, 1988, 63-007466; Feb. 13, 1988, 63-030048; Mar. 19, 1988, 63-066908; Mar. 19, 1988, 63-066910

Int. Cl.^{5} C08F *4/642*

U.S. Cl. 502—103 **8 Claims**

1. A catalyst for producing styrene-based polymers, comprising (A) a titanium compound and (B) a contact product of a methyl group-containing organoaluminum compound and water, wherein the contact product (B) has a high magnetic field component of not more than 50% in the methyl proton signal region due to an aluminum-methyl group ($Al-CH_3$) bond as determined by the proton nuclear magnetic resonance absorption method.

5,023,223

PROCESS FOR PRODUCING HIGHLY STEREOSPECIFIC ALPHA-OLEFIN POLYMERS

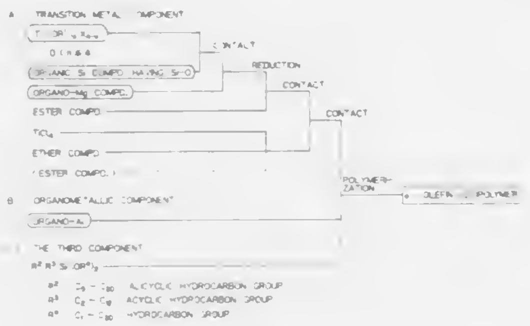
Takeshi Ebara; Toshio Sasaki, both of Ichihara, and Kiyoshi Kawai, Chiba, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 11, 1989, Ser. No. 448,285

Claims priority, application Japan, Dec. 16, 1988, 63-319145

Int. Cl.^{5} C08F *4/60*

U.S. Cl. 502—116 **21 Claims**



1. A catalyst system for hommopolymerization or copolymerization of an α-olefin, or copolymerization of an α-olefin with ethylene comprising:

(A) a solid catalyst component containing a trivalent titanium compound obtained by reducing a titanium compound represented by the following general formula:

$$Ti(OR^1)_nX_{4-n}$$

(R^1 represents a hydrocarbon group having 1 to 20 carbon atoms, X represents a halogen atom and n represents a number satisfying $0<n\leqq4$) with an organomagnesium compound in the presence of an organic silicon compound having Si—O bond to obtain a solid product. followed by treating the solid product with an ester compound and thereafter treating the ester-treated solid product with a mixture of an ether compound and titanium tetrachloride or a mixture of an ether compound, titanium tetrachloride and an ester compound,

(B) an organoaluminum compound, and

(C) a silicon compound represented by the following general formula:

$$R^2R^3Si(OR^4)_2$$

(R^2 represents an alicyclic hydrocarbon group having 5 to 20 carbon atoms, R^3 represents an acyclic hydrocarbon group having 2 to 12 carbon atoms, and R^4 represents a hydrocarbon group having 1 to 20 carbon atoms), wherein the organic silicon compound having Si—O bond is one represented by the general formulas:

$$Si(OR^5)_mR^6{}_{4-m}$$

$$R^7(R^8{}_2SiO)_pSIR^9{}_3 \text{ or}$$

$$(R^{10}{}_2SiO)_q$$

wherein R^5 represents a hydrocarbon group having 1 to 20 carbon atoms, R^6, R^7, R^8, R^9 and R^{10} each represents a hydrocarbon group having 1 to 20 carbon atoms or hydrogen atom, m represents a number satisfying $0<m\leqq4$, p represents an integer of 1 to 1,000, and q represents an integer of 2 to 1,000, the ester compound is selected from the group consisting of aliphatic carboxylic esters, olefinic carboxylic esters, alicyclic carboxylic esters and aromatic carboxylic esters; and the ether compound is a dialkyl ether.

5,023,224

ALKOXYLATION PROCESS CATALYZED BY LANTHANUM SILICATES AND METASILICATES

Richard A. Kemp, Stafford, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 401,269, Aug. 31, 1989, Pat. No. 4,960,952. This application Apr. 16, 1990, Ser. No. 509,279

Int. Cl.^{5} B01J *27/82, 21/08, 23/10*

U.S. Cl. 502—214 **10 Claims**

1. A catalyst composition comprising lanthanum silicate.

2. The catalyst composition of claim 1 wherein said lanthanum silicate additionally comprises a compound selected from the group consisting of hydroxide, phosphate and mixtures thereof.

5,023,225

DEHYDROGENATION CATALYST AND PROCESS FOR ITS PREPARATION

David L. Williams; Karl J. Russ; Edward K. Dienes, and George A. Laufer, all of Louisville, Ky., assignors to United Catalysts Inc., Louisville, Ky.

Filed Jul. 21, 1989, Ser. No. 383,177

Int. Cl.^{5} B01J *23/10, 23/78, 23/86*

U.S. Cl. 502—304 **15 Claims**

1. A process for preparing a dehydrogenation catalyst containing a major amount of red iron oxide and a mintor amount of chromium oxide and additionally an alkali metal oxide, an alkaline earth metal oxide, an oxide of a lanthanide having atomic numbers of 57 to 62, and oxide or molybdenum or tungsten, the improvement which comprises, prior to forming the catalyst, mixing chromium oxide or a chromium salt with yellow iron hydrate and heating the mixture to convert the yellow iron hydrate to red iron oxide.

5,023,226

RUTHENIUM SUPPORTED CATALYST, ITS PREPARATION AND ITS USE IN THE PREPARATION OF SUBSTITUTED OR UNSUBSTITUTED CYCLOHEXYLAMINE AND SUBSTITUTED OR UNSUBSTITUTED DICYCLOHEXYLAMINE

Otto Immel; Hans-Helmut Schwarz, and Reinhard Thiel, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, leverkusen, Fed. Rep. of Germany

Filed Jan. 9, 1989, Ser. No. 294,836

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1988, 3801755

Int. Cl.^{5} B01J *23/00, 25/58;* C07C *85/24, 87/36*

U.S. Cl. 502—313 **18 Claims**

1. A Ruthenium catalyst also containing palladium, platinum or palladium and platinum in addition to ruthenium on a support treated with chromium and manganese from the group of Al_2O_3 and aluminum spinel containing the noble metals in a total amount of 0.05–5% by weight and a weight ratio of Ru:Pd, Ru:Pt, or Ru:Pd/Pt of 1:9–9:1, the percentages being based on the total weight of the catalyst.

5,023,227

HEAT-SENSITIVE RECORDING MATERIAL

Gensuke Matoba; Katsuhiko Ishida; Hisashi Tani, and Hiroo Hayashi, all of Hyogo, Japan, assignors to Kanzaki Paper Mfg. Co., Ltd., Tokyo, Japan

Filed Dec. 22, 1989, Ser. No. 453,294

Claims priority, application Japan, Dec. 23, 1988, 63-327443; Feb. 15, 1989, 1-36629

Int. Cl.^{5} B41M *5/18*

U.S. Cl. 503—214 **5 Claims**

1. A heat-sensitive recording material comprising a support and a recording layer provided on the support, said recording layer containing a colorless or pale-colored basic dye and a color developer capable of forming a color upon application of heat, wherein a smectite clay is incorporated in at least one of layers constituting the recording material.

5,023,228

SUBBING LAYER FOR DYE-DONOR ELEMENT USED IN THERMAL DYE TRANSFER

Richard P. Henzel, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 13, 1990, Ser. No. 537,176

Int. Cl.^{5} B41M *5/035, 5/26*

U.S. Cl. 503—227 **20 Claims**

9. In a process of forming a dye transfer image comprising:

a) imagewise-heating a dye-donor element comprising a poly(ethylene terephthalate) support having thereon, in order, a subbing layer and a dye layer comprising a dye dispersed in a cellulosic binder, and

b) transferring a dye image to a dye-receiving element to form said dye transfer image,

the improvement wherein said subbing layer comprises a copolymer of vinyl alcohol and an alkyl ester of vinyl alcohol.

5,023,229

MIXTURE OF DYES FOR MAGENTA DYE DONOR FOR THERMAL COLOR PROOFING

Steven Evans, and Derek D. Chapman, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1990, Ser. No. 606,398

Int. Cl.^{5} B41M *5/035, 5/26*

U.S. Cl. 503—227 **12 Claims**

5. In a process of forming a dye transfer image comprising imagewise-heating a magenta dye-donor element comprising a support having thereon a dye layer comprising a mixture of a yellow dye and a magenta dye dispersed in a polymeric binder and transferring a magenta dye image to a dye-receiving element to form said magenta dye transfer image, the improvement wherein said magenta dye has the formula:

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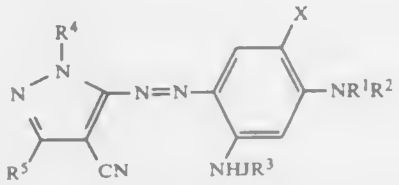


- R^1 is a substituted or unsubstituted alkyl or allyl group of from 1 to about 6 carbon atoms;
- X is an alkoxy group of from 1 to about 4 carbon atoms or represents the atoms which when taken together with R^2 forms a 5- or 6-membered ring;
- R^2 is any of the groups for R^1 or represents the atoms which when taken together with X forms a 5- or 6-membered ring;
- R^3 is a substituted or unsubstituted alkyl group of from 1 to about 6 carbon atoms, or a substituted or unsubstituted aryl group of from about 6 to about 10 carbon atoms;
- J is CO, CO_2, $-SO_2-$ or $CONR^5-$;
- R^4 is a substituted or unsubstituted alkyl or allyl group of from 1 to or about 6 carbon atoms, or a substituted or unsubstituted aryl group of from about 6 to about 10 carbon atoms; and
- R^5 is hydrogen, a substituted or unsubstituted alkyl group of from 1 to about 6 carbon atoms, or a substituted or unsubstituted aryl group of from about 6 to about 10 carbon atoms; said dye mixture approximating a hue match of the magenta SWOP Color Reference.

5,023,230
OXIDE SUPERCONDUCTORS ENCASED IN PAN-DERIVED CARBON MATRIX

Huai N. Cheng, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 94,190, Sep. 8, 1987. This application Jul. 7, 1989, Ser. No. 376,469

Int. Cl.^{5} H01L *39/12*

U.S. Cl. 505—1 7 Claims

1. A method of preparing a superconductor which comprises intimately dispersing a finely divided cupric oxide, yttrium oxide and barium carbonate precursor mixture in a stoichiometric ratio such that a superconductor will result, in a polyacrylonitrile polymer, wherein said precursor mixture is from about 23% to about 94% by weight in said polymer, forming the resulting dispersion into a film, tape, rod, or fiber and subjecting the formed dispersion to an elevated temperature of between about 800° C. to about 950° C. for about 12 hours whereby at said elevated temperature the polyacrylonitrile polymer is carbonized and the finely divided mixture is at the same time sintered in the presence of oxygen and rendered superconductive at a transition temperature for superconductivity of about 95° K. wherein at said temperature a gross change in magnetic susceptibility occurs, and wherein following said 12 hour heating of the formed dispersion at least a sufficient amount of carbon remains to act as a carbon matrix for, and to maintain the shape of, said film, tape, rod or fiber.

5,023,231
METHOD FOR PREPARING A SUPERCONDUCTIVE FIBER OF FILM

Che-Hsiung Hsu, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 188,341, May 4, 1988. This application Feb. 15, 1989, Ser. No. 310,384

Int. Cl.^{5} H01L *39/12*

U.S. Cl. 505—1 2 Claims

1. A method for preparing superconductive fiber or film of improved critical current density comprising forming a dispersion of a superconductive oxide precursor in an aqueous medium containing a water soluble polymer, extruding the dispersion into fiber or film through an orifice, and drying and firing the fiber or film to convert them into shaped superconductive fiber or film, said superconductive oxide precursor comprising a homogeneous mixture of $BaCO_3$, CuO, and an amorphous yttrium compound, in which the elements Y, Ba and Cu are intimately mixed on a micron to sub-micron scale and are present in the mixture in the ratio of 1:2:3 and which is prepared by a process comprising the steps of:

(a) blending an aqueous mixture of yttrium acetate, copper acetate, and a source of barium selected from barium hydroxide and barium acetate;

(b) removing excess solvent from the mixture; and

(c) calcining the product in air by heating while increasing the temperature according to a predetermined timed sequence from ambient to a temperature in the range of 450° C. to 750° C. and maintaining that temperature for at least one hour.

5,023,232
MIXTURES OF BICYCLIC ETHERS AND FRAGRANCE COMPOSITIONS CONTAINING SAME

Georg Fráter, Uster, and Harald Schmidt, Aathal-Seegräben, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

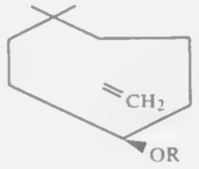
Filed Mar. 2, 1989, Ser. No. 317,881

Claims priority, application Switzerland, Mar. 4, 1988, 819/88

Int. Cl.^{5} A61K *7/46*

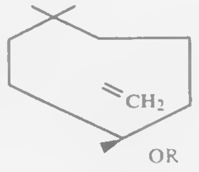
U.S. Cl. 512—19 4 Claims

1. A mixture of compounds of the formulas



Ia

and



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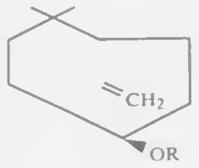
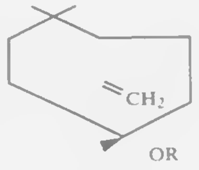
wherein R represents ethyl, said mixture having at least a 1.1:1 ratio of Ia to Ib.

3. A fragrance composition comprising an olfactorily effective amount of a mixture of compounds of the formulas



Ia

and



Ib

wherein R represents ethyl, said mixture having at least a 1.1:1 ratio of Ia to Ib, and at least one other olfactive agent.

5,023,233
FIBRINOGEN RECEPTOR ANTAGONISTS

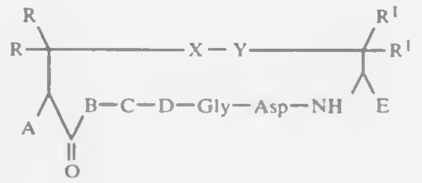
Ruth F. Nutt, Green Lane; Stephen F. Brady, Philadelphia, and Daniel F. Veber, Ambler, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jul. 28, 1989, Ser. No. 386,395

Int. Cl.^{5} C07K *5/12;* **A61K** *37/02*

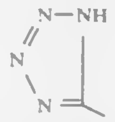
U.S. Cl. 514—11 8 Claims

1. A fibrinogen receptor antagonist of the formula:



wherein:

- A is H, acylamido, aminoacylamido, or N-methylaminoacylamido;
- R and R^1, same or different, are H, methyl, ethyl, or lower alkyl having from 1 to 4 carbons;
- X-Y is S—S, CH_2—S, S—CH_2, CH_2CH_2, $CH_2CH_2CH_2$, CH_2—S—S, CH_2—S—S—CH_2, S—S—CH_2;
- B is an L- common amino acid;
- C is a D- or L-secondary amino acid selected from proline or β-methylproline, β,β-dimethylproline, γ-hydroxyproline, anhydroproline, thioproline, β-methylthioproline, β,β-dimethylthioproline, pipecolic acid, azetidine carboxylic acid or an N-methyl amino acid or D or L-primary amino acids selected from Arg, His or Asn;
- D is an L isomer of arginine, homoarginine, guanido aminobutyric acid or guanido aminopropionic acid; and
- E is H,COOH, $CONH_2$, $CONHR^2$, $CONR^3R^4$



wherein R^2 is an alkyl group having 1 to 4 carbons, and R_3R_4 is an alkyl group having from 2 to 6 carbons, and NR^3R^4 is a secondary amino acid.

5,023,234
COMBINATION MALE BREAST CANCER THERAPY

Fernand Labrie, 2735 boul Liegeois, St-Foy, Quebec, Canada G1W 1Z9

Filed Feb. 8, 1985, Ser. No. 699,710

Int. Cl.^{5} A61K *37/02;* **C07K** *7/06*

U.S. Cl. 514—15 35 Claims

1. A method of treating breast cancer in a warm-blooded male animal in need of such treatment which comprises blocking testicular hormonal secretions of said animal by surgical or chemical means and administering to said animal a therapeutically effective amount of an antiandrogen, or pharmaceutical compositions thereof.

5,023,235
ANTIOXIDANT SYSTEM BASED ON AN ASCORBYL ESTER IN COMBINATION WITH A COMPLEXING AGENT AND A THIOL AND TO COMPOSITIONS CONTAINING THE SAME

Quang L. N'Guyen, Antony; Jacqueline Griat, Ablon, and Francois Millecamps, Paris, all of France, assignors to L'Oreal, Paris, France

Filed Feb. 8, 1988, Ser. No. 153,450

Claims priority, application France, Feb. 9, 1987, 87 01539

Int. Cl.^{5} A61K *7/02, 7/021, 7/025, 7/32*

U.S. Cl. 514—18 16 Claims

1. An antioxidant system comprising from 5 to 87.5 weight percent of an ascorbyl ester of an aliphatic acid having 6 to 24 carbon atoms stabilized with (i) a complexing agent in an amount ranging from 2 to 25 weight percent selected from the group consisting of ethylenediamine tetracetic acid, pentasodium salt of diethylenetriamine pentacetic acid, hexadecylamine salicylate, citric acid, tartaric acid, sodium-tartarate, phytic acid, dibenzyldithiocarbamate and mixtures thereof, and (ii) a thiol in an amount ranging from 1 to 37.5 weight percent selected from the group consisting of N-acetyl cysteine, glutathione and mixtures thereof, said percentages being based on the total weight of said system.

5,023,236
FACTOR VII/VIIA ACTIVE SITE INHIBITORS

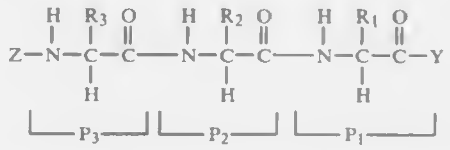
T. Scott Edgington, La Jolla, and Michael G. Pepe, San Diego, both of Calif., assignors to Corvas, Inc., San Diego, Calif.

Continuation-in-part of Ser. No. 178,495, Apr. 7, 1988, abandoned. This application Mar. 13, 1989, Ser. No. 320,559

Int. Cl.^{5} A61K *37/02;* **C07K** *5/08*

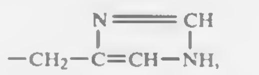
U.S. Cl. 514—18 58 Claims

1. A compound having the formula



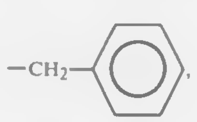
$$Z-\underbrace{\overset{H}{\overset{|}{N}}-\overset{R_3}{\overset{|}{\underset{\underset{H}{|}}{C}}}-\overset{O}{\overset{\|}{C}}}_{P_3}-\underbrace{\overset{H}{\overset{|}{N}}-\overset{R_2}{\overset{|}{\underset{\underset{H}{|}}{C}}}-\overset{O}{\overset{\|}{C}}}_{P_2}-\underbrace{\overset{H}{\overset{|}{N}}-\overset{R_1}{\overset{|}{\underset{\underset{H}{|}}{C}}}-\overset{O}{\overset{\|}{C}}-Y}_{P_1}$$

wherein R_1 is an arginine side chain $-(CH_2)_3-NH-CNHNH_2$, R_2 is a threonine side chain $-CHOH-CH_3$, or serine side chain $-CH_2OH$ or proline side chain $-(CH_2)_3-$ such that P_2 is proline except when P_3 is D-phenylalanine, R_3 is a side chain of asparagine $-CH_2-CONH_2$, aspartic acid $-CH_2-COO^-$, histidine



$$-CH_2-\overset{N\equiv\!\equiv CH}{\overset{|\qquad\quad|}{C=CH-NH,}}$$

leucine $-CH_2-CH-[CH_3]_2$, glutamine $-(CH_2)_2-CONH_2$, threonine $-CHOH-CH_3$ or phenylalanine



and oriented so that P_3 is either in the L or D form; Y is hydroxy or a straight or branched alkoxy group with one to four carbon atoms, benzyloxy, NA_1A_2 where each of A_1 and A_2 is H or alkyl of one to four carbon atoms, a chloromethyl or a fluoromethyl; Z is H, straight or branched alkyl, CH or CHO ring group, or CHO having one to six carbon atoms either unsubstituted or substituted by formyl or tert-butyloxycarbonyl, or by dansyl or tosyl.

5,023,237
METHODS AND COMPOSITIONS FOR HEALING ULCERS

Loren R. Pickart, Bellevue, Wash., assignor to ProCyte Corporation, Redmond, Wash.

Filed Aug. 30, 1989, Ser. No. 401,312

Int. Cl.^{5} A61K *37/02, 37/14*

U.S. Cl. 514—18 25 Claims

1. A method for reducing the secretion of stomach acid in warm-blooded animals, comprising:

administering to the animal a therapeutically effective amount of a composition comprising L-lysyl-L-histidylglycine.

VOL
1127
ISS
2
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1991
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5,023,238
NERVE GROWTH INDUCTION, STIMULATION AND MAINTENANCE AND ENZYME POTENTIATION

John P. DaVanzo, Greenville, and Joseph W. Paul, Jr., Ayden, both of N.C., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Oct. 4, 1988, Ser. No. 253,167

Int. Cl.^{5} A61K *37/02*

U.S. Cl. 514—21 **4 Claims**

1. A composition consisting essentially of nerve growth factor and 2-amino-1,1,3-tricyano-1-propene.

5,023,239
SIALOSYL CHOLESTEROL, PROCESS FOR PRODUCING THE SAME, AND NEUROPATHY REMEDY COMPRISING THE SAME

Haruo Ogura, Matsudo; Kimio Furuhata, Tokyo; Shingo Sato, Iruma; Masayoshi Ito, Kunitachi; Yoshiyasu Shitori, and Yoshitaka Nagai, both of Tokyo, all of Japan, assignors to MECT Corporation, Tokyo, Japan

PCT No. PCT/JP87/00288, § 371 Date Jan. 7, 1988, § 102(e) Date Jan. 7, 1988, PCT Pub. No. WO87/06936, PCT Pub. Date Nov. 19, 1987

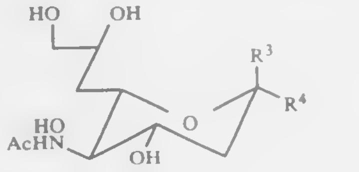
PCT Filed May 11, 1987, Ser. No. 150,647

Claims priority, application Japan, May 12, 1986, 61-108228; Sep. 4, 1986, 61-208380

Int. Cl.^{5} A61K *31/705;* **C07H** *15/24*

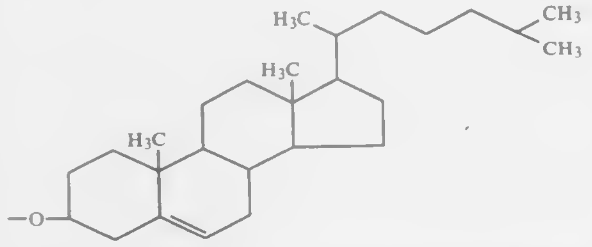
U.S. Cl. 514—26 **9 Claims**

1. A process for producing sialosyl cholesterol having the following formula (B):

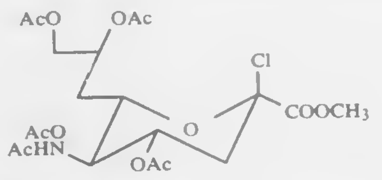


(B)

wherein one of R^3 and R^4 is —COONa and the other is the following formula:

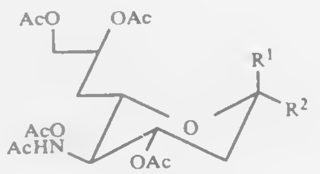


which comprises reacting a compound (1) having the following formula (1).



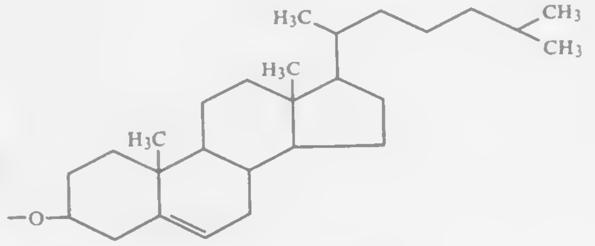
(1)

with cholesterol in the presence of a Koenigs-Knorr catalyst, to produce a compound (A) having the following formula (A):



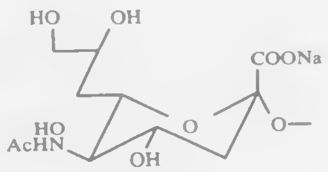
(A)

wherein one of R^1 and R^2 is $—COOCH_3$ and the other is a group having the following formula:

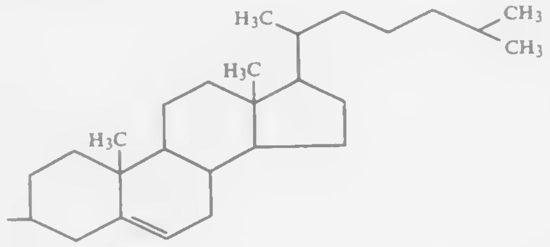


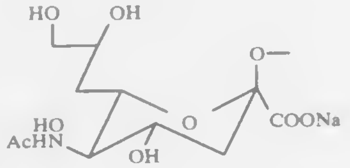
and then hydrolyzing the compound (A).

8. A pharmaceutical composition, comprising an antineuropathy effective amount of a sialosyl cholesterol having the formula (4) or (5):

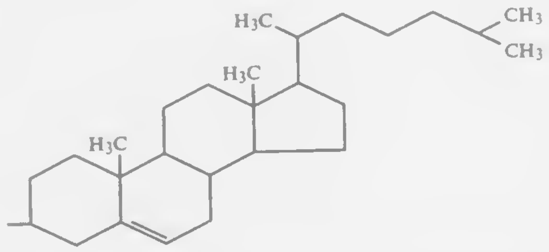


(4)





(5)



wherein Ac is an acetyl group together with a pharmaceutically acceptable carrier.

5,023,240
DERIVATIVES OF TYLOSIN AND 10,11,12,13-TETRAHYDRO TYLOSIN AND THEIR USE IN PHARMACEUTICALS

Amalija Narandja; Bozidar Suskovic; Slobodan Djokic, and Nevenka Lopotar, all of Zagreb, Yugoslavia, assignors to Sour Pliva, Yugoslavia

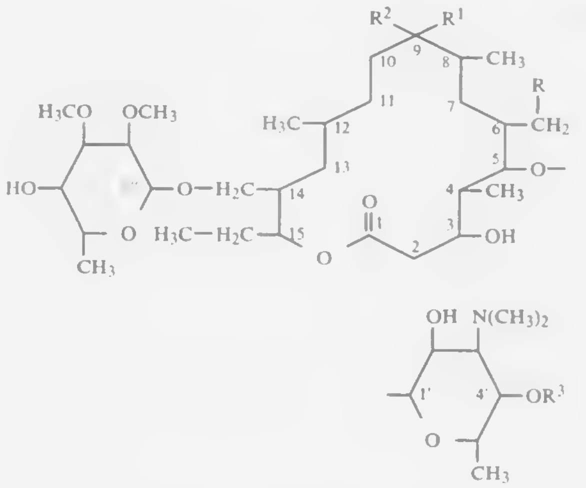
Filed Apr. 13, 1988, Ser. No. 180,940

Claims priority, application Yugoslavia, Apr. 14, 1987, 674/87

Int. Cl.^{5} A61K *31/70;* **C07H** *17/08*

U.S. Cl. 514—30 **24 Claims**

1. A compound of formula I



(I)

wherein

R stands for CHO, CH_2OH or $CH(OCH_3)_2$;
R^1 represents H;
R^2 represents OH; or
R^1 and R^2 are together O;
R^3 represents mycarosyl or H;

under the provision that R is not CHO when R^1 and R^2 stand together for O.

23. A method of treating microbial infections in humans or animals, which comprises administering an antimicrobial composition containing a pharmaceutically effective amount of a compound of claim 1.

5,023,241
AVERMECTIN DERIVATIVES

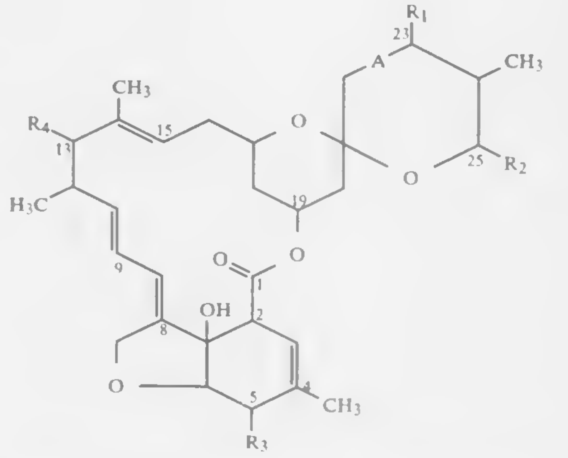
Bruce O. Linn, Bridgewater, and Helmut Mrozik, Matawan, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jul. 31, 1989, Ser. No. 387,207

Int. Cl.^{5} A61K *31/70;* **C07H** *17/04*

U.S. Cl. 514—30 **14 Claims**

1. A compound having the formula:

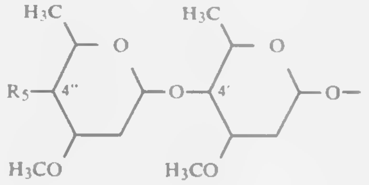


wherein A at the 22,23 position represents a single bond and wherein R_1 is hydrogen or hydroxy or oxo, or A represents a double bond and R_1 is absent;

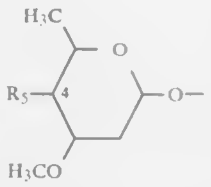
R_2 is methyl, ethyl, an alpha-branched C_3–C_8 alkyl, alkenyl, alkynyl, alkoxyalkyl or alkylthioalkyl group; a C_3–C_8 cycloalkyl or C_5–C_8 cycloalkenyl group, either of which may optionally be substituted by methylene or one or more C_1–C_4 alkyl groups or halo atoms; or a 3 to 6 membered oxygen or sulfur containing heterocyclic ring which may be saturated, or fully or partly unsaturated and which may optionally be substituted by one or more C_1–C_4 alkyl groups or halo atoms;

R_3 is hydroxy, loweralkoxy, loweralkanoyloxy, oxo or oxime;

R_4 is



or



where R_5 is NR_6R_7,

R_6 is substituted loweralkanoyl, wherein the substituent is halogen, hydroxy, loweralkoxy, phenoxy, loweralkylthio, loweralkylsulfinyl, loweralkylsulfonyl, amino, loweralkanoylamino, loweralkylamino, haloloweralkoxycarbonylamino, oxo, carboxy or lower alkoxycarbonyl; or R_6 is cycloloweralkanoyl, or benzoyl, or substituted benzoyl, wherein the substituent is halogen, loweralkoxy, sulfonamido, amino, loweralkylamino, diloweralkylamino or loweralkanoylamino; or R_6 is nicotinoyl;

R_7 is hydrogen, loweralkyl, substituted loweralkyl where the substituent is phenyl, hydroxy, loweralkoxy, amino, loweralkylamino, loweralkanoylamino, methylthio, methylsulfonyl or methylsulfinyl;

or R_5=

VOL
1127
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1991
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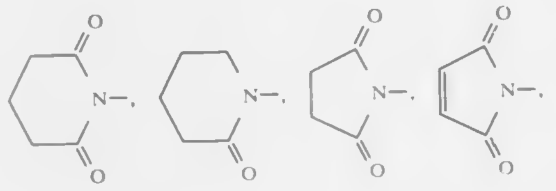
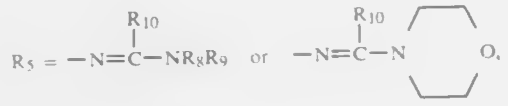




R_5=—NH—CO—NR_8R_9,

R_8, R_9 and R_{10} are independently hydrogen or loweralkyl, or R_5=—NH—CN.

12. A method for the treatment of parasitic infections of animals, which comprises treating the infected animal with an effective amount of a compound of claim 1.

5,023,242

PRIMYCIN SALTS

Gyula Dékány, and Judit Frank, both of Budapest, Hungary, assignors to Chinoin Gyogyszer Es Vegyeszeti Termekek Gyara Rt, Budapest, Hungary

Division of Ser. No. 751,624, Jul. 2, 1985, Pat. No. 4,782,141. This application Oct. 31, 1988, Ser. No. 265,481

Claims priority, application Hungary, Jul. 3, 1984, 2571/84

Int. Cl.^{5} A61K *31/70;* **C07H** *15/04*

U.S. Cl. 514—31 **8 Claims**

1. A salt of primycin formed with an organic acid selected from the group consisting of a C_1 to C_{16} aliphatic carboxylic acid, a halogenated carboxylic acid, an aliphatic dicarboxylic acid, an aromatic carboxylic acid, and an organic sulfonic acid and having an identical fine structure as that of primycin antibiotic.

8. An antimicrobial method of treatment which comprises administering to an infected subject a pharmaceutically effective amount of a salt of primycin as defined in claim 1.

5,023,243

OLIGONUCLEOTIDE THERAPEUTIC AGENT AND METHOD OF MAKING SAME

Richard H. Tullis, La Jolla, Calif., assignor to Molecular Biosystems, Inc., San Diego, Calif.

Continuation of Ser. No. 140,916, Dec. 29, 1987, abandoned, which is a continuation of Ser. No. 2,014, Jan. 9, 1987, abandoned, which is a continuation of Ser. No. 314,124, Oct. 23, 1981, abandoned. This application May 15, 1989, Ser. No. 355,140

Int. Cl.^{5} C07H *21/04;* **A61K** *31/725, 48/00*

U.S. Cl. 514—44 **14 Claims**

1. A method of selectively inhibiting in vivo synthesis of one or more specific targeted proteins without substantially inhibiting the synthesis of non-targeted proteins, comprising the steps of:

synthesizing an aligodeoxyribonucleotide having a nucleotide sequence substantially complementary to at least a portion of the base sequence of messenger ribonucleic acid coding for said targeted protein,

at least a portion of said oligodeoxyribonucleotide being in the form of a phospnotriester to limit degradation in vivo;

introducing said stable oligodeoxyribonucleotide into a cell; and

hybridizing said stable oligodeoxyribonucleotide with said base sequence of said messenger ribonnucleic acid coding for said targeted protein, whereby translation of said base sequence is substantially blocked and synthesis of said targeted protein is inhibited.

5,023,244

ANTI-DEMENTIA AGENTS

Masayoshi Goto, Tokyo; Nobutaka Demura, and Tsutomu Osaki, both of Saitama, all of Japan, assignors to Hoechst Japan Limited, Tokyo, Japan

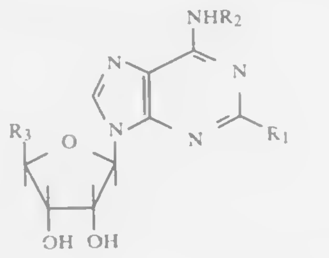
Continuation of Ser. No. 42,866, Apr. 14, 1987, abandoned. This application Sep. 15, 1989, Ser. No. 407,696

Claims priority, application Japan, Apr. 25, 1986, 61-94738

Int. Cl.^{5} A61K *31/70*

U.S. Cl. 514—46 **6 Claims**

1. A method for the treatment of memory deficits, which comprises administering to an animal host an effective amount of a compound having the formula (I)



(I)

wherein R_1 represents a hydrogen atom or a halogen atom, R_2 represents a hydrogen atom, a C_1–C_4-alkyl group, a C_3–C_7-cycloalkyl group or a phenyl-C_1–C_4-alkyl group and R_3 represents a hydroxymethyl group or the group -$CONHR_4$ in which R_4 represents a hydrogen atom, a C_1–C_4-alkyl group, a C_3–C_7-cycloalkyl group or a phenyl-C_1-C_4-alkyl group, with the exception that R_1 and R_2 are both hydrogen atoms and R_3 is a hydroxymethyl group.

5,023,245

IMPROVED NIACIN FORMULATION

Eric H. Kuhrts, Santa Barbara, Calif., assignor to Hauser-Kuhrts, Inc., Santa Barbara, Calif.

Continuation-in-part of Ser. No. 119,188, Nov. 10, 1987, abandoned, and a continuation-in-part of Ser. No. 178,472, Apr. 7, 1988, and a continuation-in-part of Ser. No. 212,715, Jun. 28, 1988, Pat. No. 4,965,252, and a continuation-in-part of Ser. No. 212,607, Jun. 28, 1988, Pat. No. 4,911,917. This application Nov. 22, 1989, Ser. No. 440,728

The portion of the term of this patent subsequent to Oct. 23, 2007, has been disclaimed.

Int. Cl.^{5} A61K *31/715, 31/33, 9/14*

U.S. Cl. 514—54 **40 Claims**

1. An oral antihyperlipidemic composition of nicotinic acid, having a reduced flushing effect, comprising an effective antihyperlipidemic amount of nicotinic acid and an effective cutaneous-flushing-reducing amount of a gel-forming dietary fiber.

5,023,246

BETAINE GROUP-CONTAINING DERIVATIVES OF CARBOXYMETHYLCELLULOSE, THEIR SYNTHESIS AND THEIR USE IN COSMETIC PREPARATIONS

Burghard Grüning; Klaus Hoffmann; Götz Koerner, and Hans-Joachim Kollmeier, all of Essen, Fed. Rep. of Germany, assignors to Th. Goldschmidt AG, Essen, Fed. Rep. of Germany

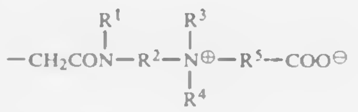
Filed May 17, 1989, Ser. No. 353,399

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1988, 3820029

Int. Cl.^{5} A61K *7/00;* **C08B** *1/00, 3/00, 11/00*

U.S. Cl. 514—57 **10 Claims**

1. A betaine group-containing derivative of carboxymethylcellulose, wherein at least a portion of the sites normally occupied by carboxymethyl groups are occupied by betaine groups of the formula



$$-\mathrm{CH_2CO}\overset{\overset{R^1}{|}}{\mathrm{N}}-R^2-\underset{\underset{R^4}{|}}{\overset{\overset{R^3}{|}}{\mathrm{N}}}{}^{\oplus}-R^5-\mathrm{COO}^{\ominus}$$

wherein

R^1 is hydrogen or methyl,

R^2 is a divalent aliphatic hydrocarbon group with 2 to 5 carbon atoms,

R^3 and R^4 are alkyl groups with 1 to 4 carbon atoms and

R^5 is a divalent aliphatic hydrocarbon group with 1 to 10 carbon atoms, with the proviso that, on the average, at least 0.1 betaine groups are present for each anhydroglucose unit of the polymeric molecule.

5. A composition comprising an aqueous vehicle and an effective amount of the carboxymethylcellulose derivative of claim I.

5,023,247

INSECTICIDAL COATING COMPOSITION AND PROCESSES FOR MAKING AND USING IT

Jean-Paul Boulanger; Jacques Lupuyo, and Francois Klug, all of Montreal, Canada, assignors to Insecta Paint, Inc., Burlington, Vt.

Continuation of Ser. No. 537,005, Sep. 29, 1983, abandoned, which is a continuation of Ser. No. 409,823, Aug. 20, 1982, abandoned. This application May 30, 1989, Ser. No. 358,488

Int. Cl.^{5} A01N *57/00, 31/14, 29/12, 25/26*

U.S. Cl. 514—89 **30 Claims**

1. A coating composition comprising:

A. a first liquid phase containing a cross-linkable resin; and

B. a second liquid phase containing water; and

C. a third liquid phase containing an insecticide dissolved in an insecticide-solvent;

with the proviso that:

(1) the insecticide-solvent is immiscible with the first phase; and

(2) the insecticide-solvent is immiscible with water; and

(3) wherein the third phase is free of surfactants.

5,023,248

METHOD OF TREATING DIABETES WITH INOSITOL TRIPHOSPHATE

Matti Siren, Montagnola/Lugano, Switzerland, assignor to Perstorp AB, Perstorp, Sweden

Continuation-in-part of Ser. No. 173,985, Mar. 28, 1988, which is a continuation-in-part of Ser. No. 38,230, Apr. 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 15,679, Feb. 17, 1987, Pat. No. 4,797,390, which is a continuation-in-part of Ser. No. 788,801, Oct. 8, 1985, Pat. No. 4,735,936. This application Sep. 30, 1988, Ser. No. 251,566

Claims priority, application Sweden, Oct. 23, 1984, 8405295; Apr. 16, 1986, 8601709

Int. Cl.^{5} A01N *57/00, 31/08, 37/08;* **C12P** *7/02*

U.S. Cl. 514—103 **3 Claims**

1. A method of treating diabetes or complications of diabetes in a human or an animal comprising administering to a human or an animal in need thereof a pharmaceutically effective amount of at least oneisomer of an inositol triphosphate.

5,023,249

FERTILITY DRUG AND METHOD OF PRODUCING THE SAME

Yoshikazu Kondo, Sendai; Shuetu Suzuki, and Morio Kuboyama, both of Tokyo, all of Japan, assignors to Morinaga Milk Industry Co., Ltd., Tokyo, Japan

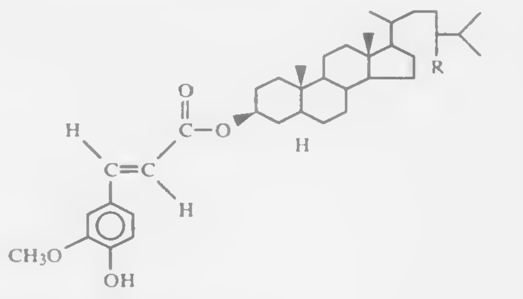
Continuation of Ser. No. 831,853, Feb. 24, 1986, Pat. No. 4,897,224. This application Nov. 8, 1989, Ser. No. 433,289

Claims priority, application Japan, Mar. 5, 1985, 60-41932; Mar. 7, 1985, 60-43725; Mar. 7, 1985, 60-43726; Mar. 9, 1985, 60-45732

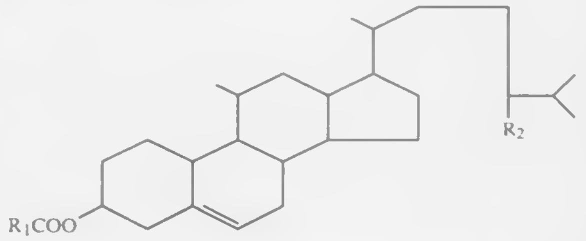
Int. Cl.^{5} A01N *45/00, 25/00;* **A61K** *31/56*

U.S. Cl. 514—170 **14 Claims**

1. A fertility drug composition, consisting essentially of, as an active component, about 40 to 80 mg of a ferulyl stanol derivative having the formula (I) or of a phytosterol fatty acid ester having the formula (II) or a mixture thereof:



wherein R is a lower alkyl group,



wherein R_1 is a radical of palmitic or stearic acid, and R_2 is a lower alkyl group; and a pharmaceutically-acceptable excipient.

5,023,250

STEROIDAL 14ALPHA-CARBOXY-ALKYL DERIVATIVES AS REGULATORS OF HMG-COA REDUCTASE

Jerry L. Adams, Wayne; Timothy F. Gallagher, Harleysville; Ruth J. Mayer, Wayne, and Brian W. Metcalf, Radnor, all of Pa., assignors to SmithKline Beecham Corporation, Philadelphia, Pa.

Filed Aug. 24, 1989, Ser. No. 398,206

Int. Cl.^{5} A61K *31/575;* **E07J** *9/00*

U.S. Cl. 514—179 **12 Claims**

1. A compound of the Formula I:

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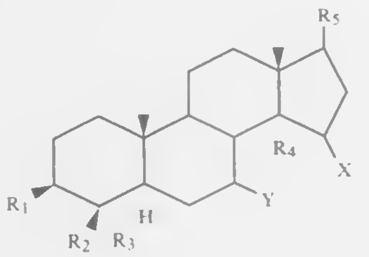


in which:

the B, C, and D rings have optional double bonds where indicated by the dotted lines, provided that the B and C rings do not have adjacent double bonds;

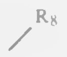
X and Y are H, F, OH, OR_6, $OCOR_7$ or keto; said X or Y being H or F when adjacent to a double bond;

R_1 is OH, OR_6, $OCOR_7$;

R_2 and R_3 are H, C_1–C_4alkyl or F;

R_4 is $(CH_2)_nCOOR_7$, $CHFCOOR_7$ or $CHOHCOOR_7$;

R_5 is



R_6 is C_1–C_4alkyl or benzyl;

R_7 is H, C_1–C_6alkyl or phenyl;

R_8 is C_1–C_{11}alkyl optionally substituted by hydroxy or oxo or C_2–C_{11}alkenyl; and

n is 1 to 3

and a pharmaceutically acceptable salt thereof.

5,023,251

O/W CREAM CONTAINING HYDROCORTISONE DIESTER

Henning Sattler, Hamburg, and Bodo Asmussen, Ammersbek, both of Fed. Rep. of Germany, assignors to Beiersdorf AG, Hamburg, Fed. Rep. of Germany

Continuation of Ser. No. 904,539, Sep. 5, 1986, abandoned. This application Oct. 31, 1989, Ser. No. 429,735

Claims priority, application Fed. Rep. of Germany, Sep. 28, 1985, 3534743

Int. Cl.^{5} A61K *31/575*

U.S. Cl. 514—179 **2 Claims**

1. A cream consisting essentially of

0.13% of hydrocortisone 17-propionate 21-acetate,
12.5% of O/W emulsifier based on Crodawax,
3.5% of stearyl alcohol,
15% of white vaseline,
2.2% of benzyl alcohol, and
66.67% of water.

5,023,252

TRANSDERMAL AND TRANS-MEMBRANE DELIVERY OF DRUGS

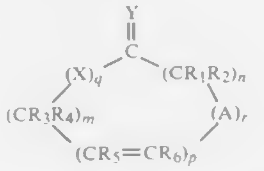
Dean Hseih, Brandamore, Pa., assignor to Conrex Pharmaceutical Corporation, Malvern, Pa.

Continuation of Ser. No. 138,830, Dec. 28, 1987, abandoned, Continuation-in-part of Ser. No. 899,049, Aug. 21, 1986, abandoned, Continuation-in-part of Ser. No. 804,661, Dec. 4, 1985, abandoned. This application Dec. 8, 1989, Ser. No. 449,117

Int. Cl.^{5} A61K *31/55*

U.S. Cl. 514—183 **53 Claims**

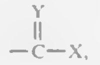
1. A method for increasing the rate of passage of a drug across animal or human skin, mucous membranes, or the blood brain barrier which comprises applying to the skin, mucous membrane or blood brain barrier a composition comprising an effective amount of the drug, a pharmaceutical carrier, and from about 0.1 to about 50% by weight of a compound (with or without dissolving in a solvent) effecting such increase in rate, said compound having the structure:



wherein X and Y are oxygen, sulfur or an imino group of the structure

$$-\underset{\displaystyle R}{\underset{|}{N}}-$$

or —N—R, with the proviso that when Y is an imino group, X is an imino group, and when Y is sulfur, X is sulfur or an imino group, A is a group having the structure



$$-\overset{\displaystyle Y}{\overset{\|}{C}}-X,$$

wherein X and Y are as defined above, m and n are integers having a value from 1 to 20 and the sum of m+n is not greater than 25, p is an integer having a value of 0 or 1, q is an integer having a value of 0 or 1, r is an integer having a value of 0 or 1, and each of R, R_1, R_2, R_3, R_4, R_5, and R_6 is independently hydrogen or an alkyl group having from 1 to 6 carbon atoms which may be straight chained or branched, provided that only one of R_1 to R_6 can be alkyl group, with the proviso that when p, q and r are 0 and Y is oxygen, then m+n is at least 11, and with the further proviso that when X is an imino group, q is equal to 1, Y is oxygen, and p and r are 0, then m+n is at least 11.

5,023,253

6-SUBSTITUTED MITOMYCIN ANALOGS

Remers, William A., and Sami, Salah M., both of Tucson, Ariz., assignors to University Patents, Inc., Westport, Conn.

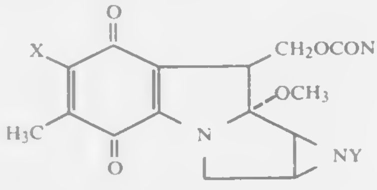
Filed Dec. 21, 1987, Ser. No. 135,317

Int. Cl.^{5} C07D *487/14;* **A61K** *31/40*

U.S. Cl. 514—228.2 **10 Claims**

1. Compounds of the formula,

V



wherein: Y is hydrogen or lower alkyl; and X is a radical of the formula —O—R, wherein R is:

N,N-di(hydroxy lower alkyl) amino lower alkyl, or tri-lower alkoxy silyl lower alkyl, or hydroxy lower alkenyl, or hydroxy lower alkyl thio lower alkyl thio lower alkyl, or lower alkyl thio lower alkyl, or phenyl thio lower alkyl, or lower alkyl thio hydroxy lower alkyl.

5,023,254

AMINOALKYLINDOLES, THEIR PRODUCTION, AND PHARMACEUTICAL PREPARATIONS BASED THEREON

Erwin von Angerer, Grasslfing, Fed. Rep. of Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Division of Ser. No. 370,509, Jun. 23, 1989, Pat. No. 4,943,572. This application May 11, 1990, Ser. No. 522,014

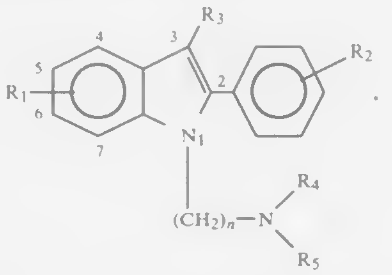
Claims priority, application Fed. Rep. of Germany, Jun. 23, 1988, 3821148

Int. Cl.^{5} A61K *31/405, 31/33;* **C07D** *413/06, 401/04*

U.S. Cl. 514—235.5 **6 Claims**

1. An aminoalkylindole of Formula I

(I)



wherein

R_1 is hydrogen, hydroxyl, or alkanoyloxy having 1–10 carbon atoms,

R_2 is hydroxyl or alkanoyloxy having 1–10 carbon atoms,

R_3 is hydrogen or methyl,

R_4 and R_5 are each hydrogen, alkyl of 1–10 carbon atoms, aralkyl of 7–10 carbon atoms, or cycloalkyl of 3–7 carbon atoms, or

R_4 and R_5, together with one or two nitrogen atoms, or a nitrogen and an oxygen atom, represent a 5- or 6-membered heterocyclic ring, and

n=4–15,

or an acid salt thereof.

5. A method of treating an estrogen-dependent disease comprising administering an anti-estrogenically effective dosage of a compound according to claim 1.

5,023,255

CHEMICAL COMPOUNDS

Frank Ellis, Luton; Alan Naylor, Royston; Christopher J. Wallis, Royston, and Ian Waterhouse, Royston, all of England, assignors to Glaxo Group Limited, England

Filed Mar. 14, 1990, Ser. No. 493,250

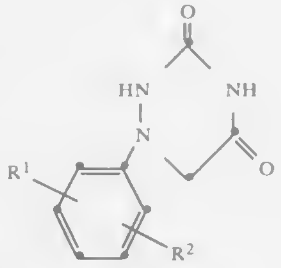
Claims priority, application United Kingdom, Mar. 15, 1989, 8905914; Oct. 26, 1989, 8924135; Oct. 26, 1989, 8924138

Int. Cl.^{5} C07D *253/06;* **A61K** *31/53*

U.S. Cl. 514—242 **22 Claims**

1. A triazine derivative of formula (I)

(I)



or a salt thereof, wherein

R^1 represents a halogen atom or a group selected from hydroxy; C_{1-8} alkyl; C_{1-6} alkoxy; C_{1-3} alkoxy C_{1-3} alkoxy; phenoxy or phenyl C_{1-3} alkoxy, wherein the phenyl group is optionally substituted by a halogen atom or a group selected from C_{1-3} alkyl, C_{1-3} alkoxy, and hydroxy; fluoro C_{1-3} alkyl; cyano; $—CO_2R^3$, wherein R^3 represents a hydrogen atom or a C_{1-4} alkyl group; and $—CONR^4R^5$, wherein R^4 and R^5 each independently represents a hydrogen atom or a C_{1-4} alkyl group; and

R^2 represents a hydrogen or halogen atom, or a group selected from hydroxy, C_{1-6} alkyl and C_{1-6} alkoxy.

22. A pharmaceutical composition comprising a triazine derivative according to claim 1 or a physiologically acceptable salt thereof in association with a physiologically acceptable carrier or excipient.

5,023,256

PHARMACOLOGICALLY ACTIVE AMINOIMIDAZOPYRIDINES

Giani Roberto, Locate Triulzi; Parini Ettore, Cologno Monzese; Borsa Massimiliano, Vimodrone, and Lavezzo Antonio, Lodi, all of Italy, assignors to Dompé Farmaceutici S.p.A., Milan, Italy

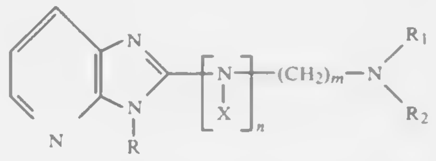
Filed May 7, 1990, Ser. No. 519,982

Claims priority, application Italy, May 8, 1989, 20405 A/89

Int. Cl.^{5} C07D *471/04;* **A61K** *31/495, 31/33*

U.S. Cl. 514—253 **7 Claims**

1. An aminoimidazopyridine compound of the formula



wherein

R represents an alkoxyalkyl radical containing 4–6 carbon atoms or a benzyl radical optionally substituted by a halogen atom, an alkyl or alkoxy radical having up to 3 carbon atoms;

X represents hydrogen or an alkyl radical having up to 3 carbon atoms;

n is 1;

m is an integer of from 2 to 5 inclusive; and

R_1 and R_2 are the same or different and represent a saturated or unsaturated alkyl radical containing up to 4 carbon atoms or they may form, together with the adjacent nitrogen atom, a pyrrolidine, piperazine or homopiperazine ring, optionally substituted with an alkyl radical containing up to 3 carbon atoms;

or a non-toxic, pharmaceutically acceptable acid addition salt thereof.

5,023,257

INTRAMUSCULAR INJECTION FORMS OF GYRASE INHIBITORS

Norbert Pöllinger, Odenthal; Peter Serno, Bergisch Gladbach; Wolfram Hofmann, Bonn, and Dieter Beermann, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 334,252, Apr. 6, 1989, abandoned. This application Jul. 6, 1990, Ser. No. 549,664

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1988, 3812508; Jan. 25, 1989, 3902079

Int. Cl.^{5} A61K *9/08, 9/10, 31/47*

U.S. Cl. 514—254 **15 Claims**

1. An intramuscular injection formulation of a gyrase inhibitor comprising about 0.05 to 70% by weight of a gyrase inhibitor of the formula

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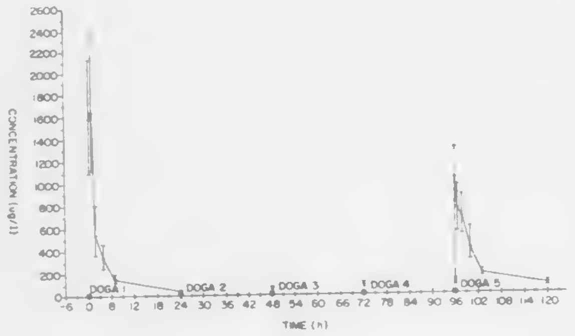
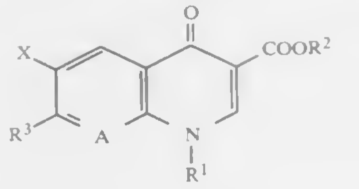


(I)

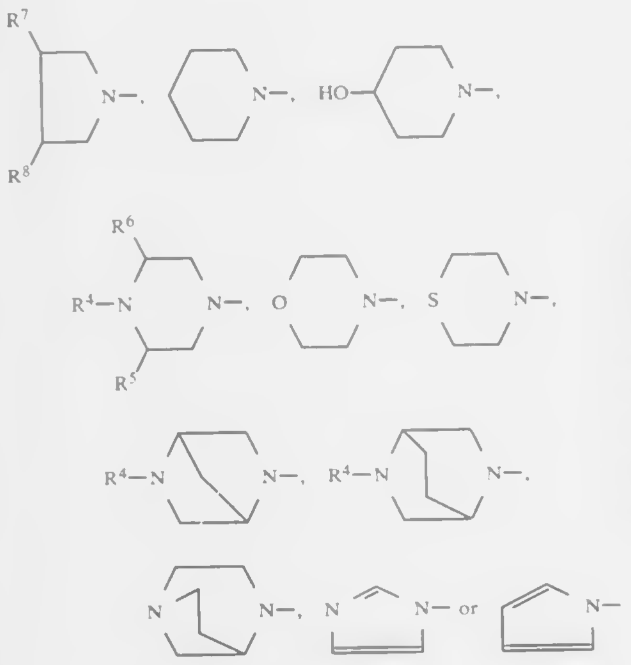


in which

R¹ stands for methyl, ethyl, propyl, isopropyl, cyclopropyl, vinyl, 2-hydroxyethyl, 2-fluoroethyl, methoxy, amino, methylamino, dimethylamino, ethylamino, phenyl, 4-fluorophenyl or 2,4-difluorophenyl,

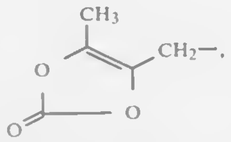
R² stands for hydrogen, alkyl having 1 to 4 carbon atoms or (5-methyl-2-oxo-1,3-dioxol-4-yl)-methyl,

R³ stands for methyl or a cyclic amino group of the formula



wherein

R⁴ stands for hydrogen, alkyl having 1 to 4 carbon atoms, 2-hydroxyethyl, allyl, propargyl, 2-oxopropyl, 3-oxobutyl, phenacyl, formyl, $CFCl_2$-S-, $CFCl_2$-SO_2-, CH_3O-CO-S-, benzyl, 4-aminobenzyl or



R⁵ stands for hydrogen or methyl,

R⁶ stands for hydrogen, alkyl having 1 to 4 carbon atoms, phenyl or benzyloxymethyl,

R⁷ stands for hydrogen, amino, methylamino, ethylamino, aminomethyl, methylaminomethyl, ethylaminomethyl, dimethylaminomethyl, hydroxyl or hydroxymethyl and

R⁸ stands for hydrogen, methyl, ethyl or chlorine,

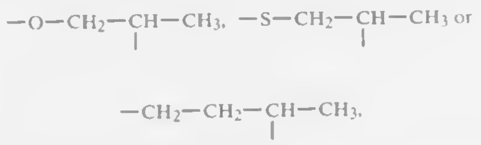
X stands for fluorine, chlorine or nitro and

A stands for N or C-R⁶,

wherein

R⁶ stands for hydrogen, halogen, methyl or nitro or, together with

R¹, forms a bridge having the structure



$$—O—CH_2—\underset{|}{C}H—CH_3,\quad —S—CH_2—\underset{|}{C}H—CH_3 \text{ or}$$

$$—CH_2—CH_2—\underset{|}{C}H—CH_3,$$

or a salt thereof with an acid or base in oily suspension.

5,023,258
TRIAZOLE ANTIFUNGAL AGENTS

Geoffrey E. Gymer, Sandwich; Subramaniyan Narayanaswami, Deal, and Kenneth Richardson, Birchington, all of England, assignors to Pfizer Inc., New York, N.Y.

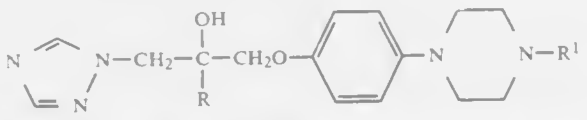
Filed Jun. 20, 1989, Ser. No. 368,692

Int. Cl.⁵ A61K *31/495;* **C07D** *417/12, 403/12, 403/14*

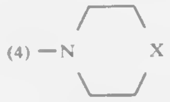
U.S. Cl. 514—255 10 Claims

1. A compound of the formula

(I)

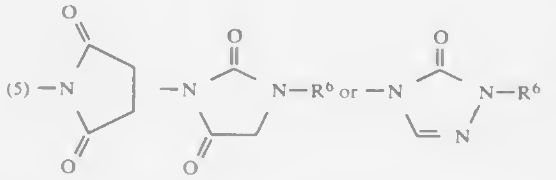


or a pharmaceutically acceptable acid addition salt thereof wherein R is 5-chloropyridin-2-yl, phenyl, difluorophenyl or dichlorophenyl and R¹ is para-substituted phenyl wherein said substituent is (1) —NHCOR² where R² is alkyl having one to four carbon atoms, cycloalkyl having three to seven carbon atoms, 2-chloropyridin-3-yl, alkoxy having one to four carbon atoms, allyloxy or alkylamino having one to four carbon atoms, (2) $—N(R^4)SO_2R^3$ where R³ is alkyl having one to four carbon atoms, haloalkyl having one to four carbon atoms or dialkylamino each alkyl having one to four carbon atoms, R⁴ is hydrogen or methyl; or R³ and R⁴ together form an alkylene group having three or four carbon atoms, (3) $—N=CH—N(R^6)_2$ where R⁶ is alkyl having one to four carbon atoms,

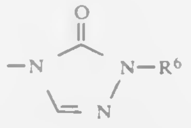


where

X is O, SO_2 or N-R⁵ where R⁵ is hydrogen, alkyl having one to four carbon atoms or alkanoyl having one to four carbon atoms or



where R⁶ is alkyl having one to four carbon atoms; or pyridinyl group optionally substituted with a group of the formula



where R⁶ is alkyl having one to four carbon atoms.

5,023,259
NITROENAMINES

Laurenz Gsell, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 14, 1989, Ser. No. 450,652

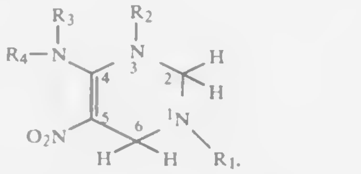
Claims priority, application Switzerland, Dec. 21, 1988, 4723/88; Apr. 26, 1989, 1594/89; Jun. 30, 1989, 2434/89

Int. Cl.⁵ C07D *239/42, 401/06, 401/12;* **A01N** *43/54*

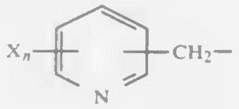
U.S. Cl. 514—256 21 Claims

1. A compound of formula I

(I)



wherein R_1 is di-C_1–C_5alkylamino, C_1–C_5alkoxy, C_3–C_5alkenyloxy, methoxy-C_1–C_4alkyl, methylthio-C_1–C_4alkyl, ethoxycarbonylamino, C_7–C_9aralkoxy, 2-thiazolyl or one of the halo-substituted or unsubstituted radicals C_1–C_5alkyl, C_3-C_5alkenyl, C_3–C_5-alkynyl, C_3–C_7cycloalkyl and C_7–C_9aralkyl, or is C_1–C_4alkyl that is unsubstituted or substituted in the α or β-position by cyano, carboxy, aminocarbonyl or by C_1–C_4alkoxycarbonyl, R_2 is C_1–C_5alkyl, C_3–C_7cycloalkyl or, when R_3 is alkyl or cycloalkyl, is the radical Z



wherein each X is independently of the others is chlorine, fluorine, nitro, cyano or hydroxy, or is C_1–C_5alkoxy, C_1–C_5alkylthio, C_1–C_5alkylsulfinyl or C_1–C_5alkylsulfonyl each of which is unsubstituted or halo-substituted, or is C_3–C_5-haloalkenyl, C_3–C_5haloalkynyl, hydroxy, C_1–C_5alkoxycarbonyl, di-C_1–C_4alkylamino, C_1–C_5alkylcarbonyl, C_1–C_5alkylcarbonyl, C_1–C_5alkylcarbonylamino or C_1–C_5alkylcarbonyloxy, and n is a number from 0 to 4, R_3 is C_1–C_4alkyl, C_3–C_7cycloalkyl or the radical Z as defined under R_2, and R_4 is C_1–C_5alkyl or C_3–C_7cycloalkyl or an acid salt of a compound of formula I.

21. A method of controlling pests of animals and plants selected from insects and arachnids, which comprises bringing said pests, in their various stages of development, into contact with at least an effective amount of a compound of formula I according to claim 1.

5,023,260
SUBSTITUTED URACILS, PROCESSES FOR THEIR PREPARATION AND THEIR USE AGAINST PARASITIC PROTOZOA

Werner Lindner, Cologne, and Axel Haberkorn, Wuppertal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 22, 1990, Ser. No. 497,469

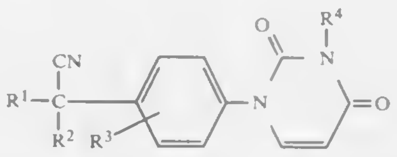
Claims priority, application Fed. Rep. of Germany, Apr. 13, 1989, 3912100

Int. Cl.⁵ A61K *31/505;* **C07D** *239/52*

U.S. Cl. 514—269 4 Claims

1. A substituted uracil of the formula

(I)



R¹ represents phenyl, pyridyl or benzothiazolyl, each of which is unsubstituted or substituted by one or more identical or different halogen, C_{1-4}-alkyl, C_{1-4}-halogenoalkyl, C_{1-4}-alkoxy, C_{1-4}-alkylthio, C_{1-4}-halogenoalkoxy, C_{1-4}-halogenoalkylthio, cyano, C_{1-4}-alkoxycarbonyl, C_{1-4}-alkylsulphinyl, C_{1-4}-alkylsulphonyl, C_{1-4}-halogenoalkylsulphinyl for C_{1-4}-halogenoalkylsulphonyl radical's

R² represents H or C_{1-4}-alkyl,

R³ represents one or more identical or different hydrogen, halogen, C_{1-4}-alkyl or C_{1-4}-halogenoalkyl radicals and

R⁴ represents hydrogen.

5,023,261
ACYLATED BENZOFURO[3,2-C]QUINOLINE COMPOUNDS WITH UTILITY AS TREATMENTS FOR OSTEOPOROSIS

Tetsuhide Kamijo; Arao Ujiie; Hiromu Harada; Naoyuki Tsutsumi; Atsushi Tsubaki; Toshiaki Yamaguchi, and Hideo Nagata, all of Nagano, Japan, assignors to Kissei Pharmaceutical Co., Ltd., Nagano, Japan

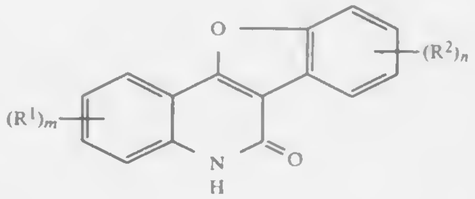
Filed Mar. 9, 1989, Ser. No. 321,248

Claims priority, application Japan, Aug. 30, 1988, 63-215755

Int. Cl.⁵ C07D *471/00;* **A61K** *31/44*

U.S. Cl. 514—285 10 Claims

1. A compound represented by the formula:



wherein

(1) each of R¹ and R² is the same, and represents a group of the formula of —OR³ in which R³ represents a carbamoyl group, an N-mono-alkylcarbamoyl group, an N,N-dialkylcarbamoyl group, m an alkylsulfonyl group, a formyl group or an aliphatic acyl group which may have an alkoxycarbonyl group as a substituent; m represents zero, 1 or 2; n represents zero or 1; with the proviso that n is not zero when m is zero,

(2) each of R¹ and R² is different, and represents a hydroxy

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group or an N,N-dialkylcarbamoyloxy group; m represents 1 or 2; n represents 1.

5,023,262
HYDROGENATED RAPAMYCIN DERIVATIVES

Craig E. Caufield, Plaiosboro, N.J.; John H. Musser, Yardley, and James M. Rinker, Reading, Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Aug. 14, 1990, Ser. No. 567,858

Int. Cl.^{5} A61K *31/395;* C07D *491/16*

U.S. Cl. 514—291 **6 Claims**

1. A derivative of rapamycin where one, two, or three of the double bonds at the 1-, 3-, or 5-positions of rapamycin have been reduced to the corresponding alkane or a pharmaceutically acceptable salt thereof.

4. A method of treating fungal infections by administering an effective amount of a compound which is a derivative of rapamycin in which one, two, or three of the double bonds at the 1-, 3-, or 5-positions have been reduced to the corresponding alkane or a pharmaceutically acceptable salt thereof.

5,023,263
42-OXORAPAMYCIN

Gregory F. Von Burg, Princeton, N.J., assignor to American Home Products Corporation, New York, N.Y.

Filed Aug. 9, 1990, Ser. No. 564,910

Int. Cl.^{5} A61K *31/395;* C07D *491/16*

U.S. Cl. 514—291 **9 Claims**

1. 42-Oxorapamycin or a pharmaceutically acceptable salt thereof.

2. A method of treating transplantation rejection, host vs. graft disease, autoimmune diseases, and diseases of inflammation in a mammal by administering an effective amount of 42-oxorapamycin or a pharmaceutically acceptable salt thereof.

5,023,264
RAPAMYCIN OXIMES

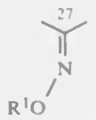
Craig E. Caufield, Plainsboro, and Amedeo A. Failli, Princeton Juncton, both of N.J., assignors to American Home Products Corporation, New York, N.Y.

Filed Jul. 16, 1990, Ser. No. 553,720

Int. Cl.^{5} A61K *31/395;* C07D *491/16*

U.S. Cl. 514—291 **9 Claims**

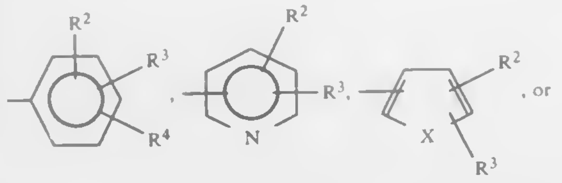
1. A derivative of rapamycin in which the 27-position has the structure



wherein

R^1 is hydrogen alkyl of 1–6 carbon atoms, or —CH$_2$Ar;

Ar is



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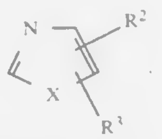
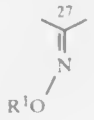


wherein R^2, R^3, and R^4 are each, independently, hydrogen, alkyl of 1–6 carbon atoms, aralkyl of 7–10 carbon atoms, alkoxy of 1–6 carbon atoms, hydroxy, cyano, halo, nitro, carbalkoxy of 2–7 carbon atoms, trifluoromethyl, amino, or a carboxylic acid;

X is N, O, or S;

or a pharmaceutically acceptable salt thereof.

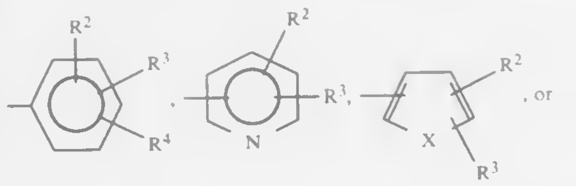
7. A method of treating transplantation rejection, host vs. graft disease, autoimmune diseases, and diseases of inflammation in a mammal by administering an effective amount of a compound which is a derivative of rapamycin in which the 27-position has the structure;

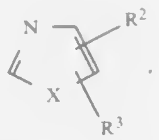


wherein

R^1 is hydrogen, alkyl of 1–6 carbon atoms, or —CH$_2$Ar;

Ar is





wherein R^2, R^3, and R^4 are each, independently, hydrogen, alkyl of 1–6 carbon atoms, aralkyl of 7–10 carbon atoms, alkoxy of 1–6 carbon atoms, hydroxy, cyano, halo, nitro, carbalkoxy of 2–7 carbon atoms, trifluoromethyl, amino, or a carboxylic acid;

X is N, O, or S;

or a pharmaceutically acceptable salt thereof.

5,023,265
SUBSTITUTED 1-H-PYRROLOPYRIDINE-3-CARBOXAMIDES

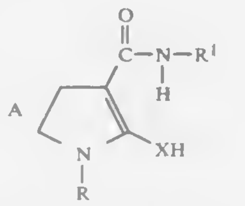
Margaret H. Scherlock, Bloomfield, and Wing C. Tom, Cedar Grove, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Jun. 1, 1990, Ser. No. 532,304

Int. Cl.^{5} A61K *31/435;* C07D *471/04*

U.S. Cl. 514—300 **11 Claims**

1. A compound of the structural formula:



I

or a pharmaceutically acceptable salt or solvate thereof, wherein:

- ring A represents a fused pyridine ring;
- X is oxygen or sulfur;
- R represents hydrogen, alkyl, aryl, aralkyl, or a heterocyclic aromatic group;
- R^1 represents alkyl, aryl, aralkyl, or a heterocyclic aromatic group.

5,023,266
METHOD OF TREATMENT OF PSYCHOTIC DISORDERS

Salomon Z. Langer, Paris; Jonathan R. Frost, Wissous; Johannes Schoemaker, Glf sur Yvette; Bernard Gaudilliere, Nanterre; Jean Bertin, Clamart; Jean Rousseau, Bourg-la-Reine; Régis Dupont, Tours, and Alexander E. Wick, St Nom la Bretéche, all of France, assignors to Synthelabo, Paris, France

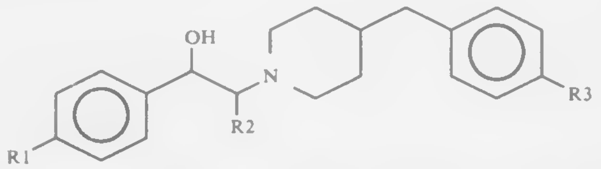
Filed Jan. 24, 1990, Ser. No. 469,783

Claims priority, application France, Nov. 14, 1989, 89 14868

Int. Cl.^{5} A61K *31/445*

U.S. Cl. 514—317 **8 Claims**

1. A method of treatment of schizophrenia-like psychoses in humans, which comprises administering to a patient in need thereof an antipsychotically effective amount of a compound of general formula (I)



wherein R1 denotes a halogen atom or a hydroxy group, R2 denotes a hydrogen atom or a methyl group, and R3 denotes a hydrogen or halogen atom,

said compound being a pure optical isomer or a mixture of optical isomers, in the form of either a free base or a pharmaceutically acceptable addition salt.

5,023,267
MICROBIOLOGICAL CONTROL AGENT

Douglas Clarkson, Aughton; Richard P. Clifford, South Wirral, and Alan Marshall, Warrington, all of England, assignors to W. R. Grace & Co.-Conn., New York, N.Y.

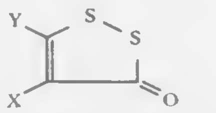
Division of Ser. No. 153,286, Feb. 8, 1988, Pat. No. 4,863,616. This application May 17, 1989, Ser. No. 353,133

Claims priority, application United Kingdom, Feb. 25, 1987, 8704416

Int. Cl.^{5} A01N *43/80;* C09D *5/16*

U.S. Cl. 514—372 **16 Claims**

1. A composition suitable for addition to an aqueous or non-aqueous system which comprises a bactericidally effective amount of a thiolan of the formula



wherein each of X and Y, which may be the same or different, represents fluorine, chlorine, or bromine, an alkylenebis-thiocyanate and a 2-N-alkyl-4-isothiazolin-3-one wherein the weight ratio of thiolin to thiocyanate is from 1:10 to 10:1 and the weight ratio of thiolan or thiocyanate to isothiazolinone is from 1:1 to 20:1.

5,023,268
3-PHENOXY (OR PHENYLTHIO)-CYCLOPENTANECARBONYLAMINO ACID ANALOGUES

Katsuhiro Imaki, Tsuzuki; Tadao Okegawa, Yawata, and Yoshinobu Arai, Mishima, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

Division of Ser. No. 268,623, Nov. 7, 1988, Pat. No. 4,888,351, which is a division of Ser. No. 158,457, Feb. 22, 1988, Pat. No. 4,829,078, which is a division of Ser. No. 942,109, Dec. 16, 1986, Pat. No. 4,783,476. This application Sep. 8, 1989, Ser. No. 404,713

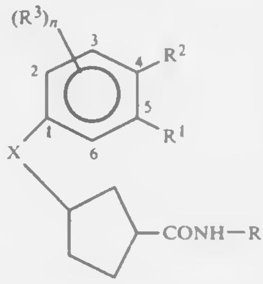
Claims priority, application Japan, Dec. 16, 1985, 60-281203

Int. Cl.^{5} A61K *31/415, 31/405, 31/195;* C07D *233/64, 229/18, 207/12*

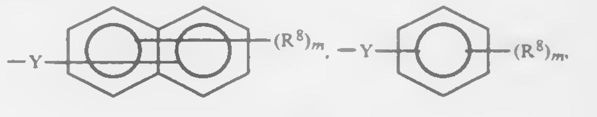
U.S. Cl. 514—400 **6 Claims**

1. A derivative of 3-phenoxy or phenylthio cyclopentanecarbonylamino acid of the formula:

(I)



R^1 represents a hydrogen atom and R^2 represents the group of the formula: —COR^7 wherein R^7 represents the group of the formula:



or $-N(R^9)_2$

wherein Y represents a single-bond, an alkylene group or an alkenylene group of 1 to 4 carbon atoms, m represents an integer of 1 to 3, R^8 represents a hydrogen atom, a halogen atom, a nitro group, a hydroxy group or an alkyl group or an alkoxy group of 1 to 4 carbon atoms, with the proviso that when m represents an integer of two or more, plural R^{8}s may be different each, and R^9 represents a hydrogen atom, an alkyl group of 1 to 4 carbon atoms or a phenyl group, with the proviso that two of R^9 may be different each, R^3 represents a hydrogen atom, a halogen atom, an alkyl group of 1 to 4 carbon atoms or two of R^3 and a phenyl group to which two of R^3 are linked, together represent a naphthyl group of the formula:

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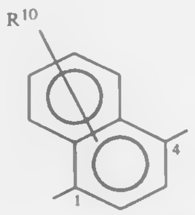


wherein R^{10} represents a hydrogen atom, a halogen atom or an alkyl group of 1 to 4 carbon atoms, with the proviso that when R^1 represents a hydrogen atom, the hydrogen atom may be replaced by R^3, and n represents an integer of 1 to 3, with the proviso that when n represents an integer of two or more, plural R^3s may be different, X represents an oxygen atom or a sulfur atom and R^4 represents an amino acid radical selected from the group consisting of alanine, β-alanine, asparagine, 4-aminobutyric acid, glycine, glutamine, serine, phenylalanine, cysteine, 4-amino-3-hydroxybutyric acid, tryptophane, leucine, isoleucine, threonine, methionine, proline, valine, glutamic acid, asparaginic acid, lysine, arginine and histidine, or a non-toxic salt thereof.

5. A pharmaceutical composition for the treatment of cerebral edema characterized by comprising as an active ingredient, an effective amount of a compound of the formula (I) described in claim **1**, wherein various symbols are as defined in claim **1**, or a non-toxic salt thereof together with a pharmaceutically acceptable carrier.

5,023,269
3-ARYLOXY-3-SUBSTITUTED PROPANAMINES

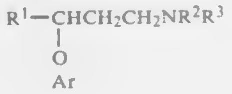
David W. Robertson, Greenwood; David T. Wong, and Joseph H. Krushinski, Jr., both of Indianapolis, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 462,925, Jan. 12, 1990, Pat. No. 4,956,388, which is a continuation of Ser. No. 945,122, Dec. 22, 1986, abandoned. This application Mar. 27, 1990, Ser. No. 499,940

Int. Cl.^{5} A61K *31/38, 31/44;* **C07D** *333/16*

U.S. Cl. 514—438 **51 Claims**

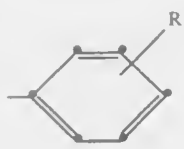
1. A compound of the formula



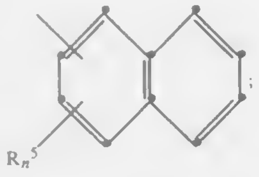
$$R^1-\underset{\substack{|\\ \text{O}\\ \text{Ar}}}{\text{C}}\text{HCH}_2\text{CH}_2\text{NR}^2\text{R}^3$$

wherein:

R^1 is thienyl, halothienyl, (C_1–C_4 alkyl)thienyl, furanyl, pyridyl or thiazolyl;



or



each of R^2 and R^3 independently is hydrogen or methyl;

each R^4 independently is halo, C_1–C_4 alkyl, C_1–C_3 alkoxy or trifluoromethyl;

each R^5 independently is halo, C_1C_4 alkyl or trifluoromethyl;

m is 0, 1 or 2;

n is 0 or 1; and

the pharmaceutically acceptable acid addition salts thereof.

20. A method for inhibiting serotonin uptake in mammals which comprises administering to a mammal requiring increased neurotransmission of serotonin a pharmaceutically effective amount of a compound of claim **1**.

5,023,270
ANTIDEPRESSANT METHOD OF USE

Jean-Jacques Goupil, 30 Avenue du Président Wilson, 94230 Cachan, France

Filed Apr. 13, 1989, Ser. No. 337,814

Claims priority, application France, Apr. 14, 1988, 88-04954

Int. Cl.^{5} A61K *31/35*

U.S. Cl. 514—455 **11 Claims**

1. A method of treating depression in a human in need of such treatment comprising administering at bedtime to a human in need of such treatment, a composition comprising an effective amount of 5-methoxypsoralen.

5,023,271
PHARMACEUTICAL MICROEMULSIONS

Jean-Louis Vigne, San Francisco, and John P. Kane, Hillsborough, both of Calif., assignors to California Biotechnology Inc., Mountain View, Calif.

Filed Aug. 13, 1985, Ser. No. 765,359

Int. Cl.^{5} A61K *31/355, 31/595, 31/07, 31/225*

U.S. Cl. 514—458 **11 Claims**

1. An aqueous suspension for the intravenous administration of fat-soluble active ingredient which is a microemulsion of pseudomicelles containing said active ingredient,

said pseudomicelles having diameters in the range of 300–1000 and which pseudomicelles are approximately spherical in shape and are comprised of 30–60% of a naturally occurring amphipatic substance as an outer layer surrounding 40–70% of a hydrophobic lipid as a hydrophobic core.

5,023,272
USE OF 5-PHENYL-2-FURAN ESTERS AND AMIDES AS ANTIEPILEPTIC AGENTS

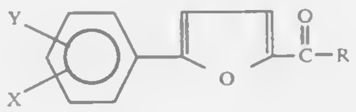
Homer A. Burch, Norwich; Alan W. Castellion, Oxford, and Stanford S. Pelosi, Jr., Norwich, all of N.Y., assignors to Norwich Eaton Pharmaceuticals, Inc., Norwich, N.Y.

Filed Jun. 23, 1989, Ser. No. 371,355

Int. Cl.^{5} C07D *307/52, 307/54;* **A61K** *31/34*

U.S. Cl. 514—471 **11 Claims**

1. A method of preventing epileptic seizures in a human or mammal subject susceptible to said seizures, comprising systemically administering to said subject a safe and effective amount of a compound of the formula:



wherein

(a) X is halo or hydrogen, and Y is a substituent selected from the group consisting of unsubstituted or halogen-substituted methyl, halo, nitro, amino, and methoxy; and

(b) R is $N(R^3)_2$, $OR^1N(R^3)_2$, $N(R^2)R^1N(R^3)_2$, or $N(R^2)N(R^3)_2$; where

R^1 is C_1–C_3 alkylene which is unsubstituted or substituted with C_1–C_2 alkyl;

R^2 is hydrogen or lower alkyl; and

each R^3 is, independently, hydrogen or lower alkyl;

or a pharmaceutically-acceptable salt thereof.

5,023,273
6-OXOPROSTAGLANDIN E DERIVATIVES, PROCESS FOR THEIR PRODUCTION AND THEIR PHARMACEUTICAL USE

Ulrich Klar; Werner Skuballa; Helmut Vorbrüggen; Claus-Steffen Stürzebecher; Karl-Heinz Thierauch, and Ekkehard Schillinger, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

PCT No. PCT/DE88/00151, § 371 Date Nov. 23, 1988, § 102(e) Date Nov. 23, 1988, PCT Pub. No. WO88/07037, PCT Pub. Date Sep. 22, 1988

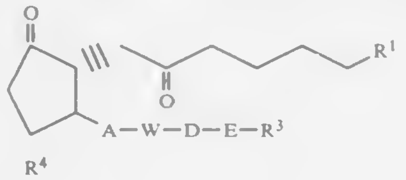
PCT Filed Mar. 11, 1988, Ser. No. 276,502

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 3708537

Int. Cl.^{5} C07C *177/00;* **A61K** *31/557*

U.S. Cl. 514—530 **8 Claims**

1. A 6-oxo-prostaglandin E_1 derivative of formula I,



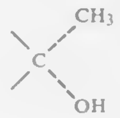
(I)

wherein

R^1 is the radical $COOR^2$ wherein R^2 is a hydrogen atom, a C_1–C_{10} alkyl, a C_5–C_6 cycloalkyl or a C_6–C_{10} aryl group or a 5- or 6-membered heterocyclic radical, having at least one O, N or S heteroatom,

A is an E-configured CH═CH or a —C≡C group,

W is a free or functionally modified hydroxymethylene group or a free or functionally modified



group, and the OH group in each case can be in the alpha or beta position,

D is a branched-chain alkylene group with 2–5 C atoms,

E is a —C≡C group,

R^3 is C_1–C_{10} alkyl, C_3–C_{10} cycloalkyl or an optionally substituted C_6–C_{10} aryl group or a 5- or 6-membered heterocyclic group, having at least one O, N or S heteroatom,

R^4 is a free or functionally modified hydroxy group, or if R^2 is a hydrogen atom, a salt thereof with a physiologically compatible base, or an alpha, beta or gamma cyclodextrin clathrate thereof,

with the proviso that the 16-position (prostanoic acid nomenclature) is substituted by alkyl.

5,023,274
FIBRE-REACTIVE FORMAZAN DYES CONTAINING β-HALOGENETHYL OR VINYLSULFONYL-ALKANOYLAMINO FIBER-REACTIVE GROUPS

Alois Püntener, Rheinfelden; Urs Lehmann, Basel; Peter Scheibli, Bottmingen, and Josef Koller, Reinach, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

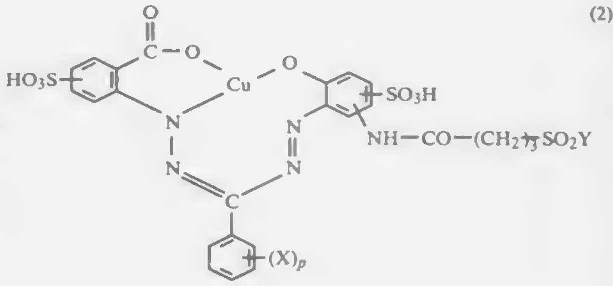
Filed Apr. 25, 1989, Ser. No. 342,925

Claims priority, application Switzerland, May 5, 1988, 1688/88

Int. Cl.^{5} C09B *62/503, 50/00;* **D06P** *1/384, 3/10*

U.S. Cl. 534—618 **6 Claims**

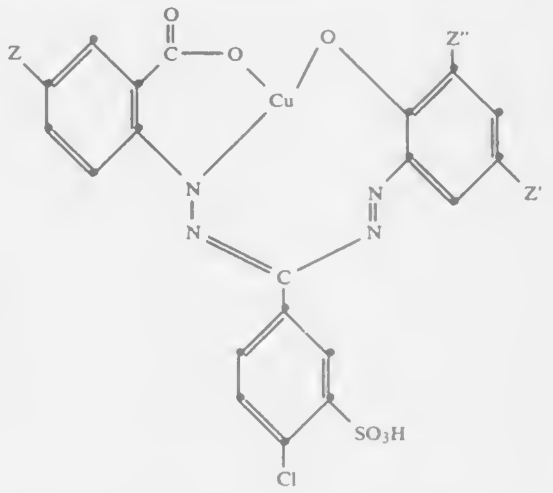
1. A fibre-reactive formazan dye of the formula



(2)

where X is chlorine, Y is β-halo-ethyl or vinyl and p is 0, 1 or 2.

6. A fibre-reactive formazan dye of the formula



(7)

where Z is hydrogen, Z' is sulfo and Z" is $—NH—CO—(CH_2)_3—SO_2—(CH_2)_2Cl$, or where Z is sulfo, Z' is $—NH—CO—(CH_2)_3—SO_2—(CH_2)_2Cl$ and Z" is hydrogen.

5,023,275
S-SUBSTITUTED BETA-THIOACRYLAMIDE BIOCIDES AND FUNGICIDES

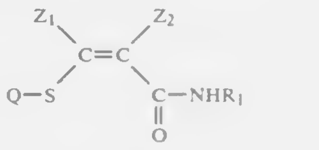
David R. Amick, Doylestown, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 387,452, Jul. 28, 1989. This application Jun. 5, 1990, Ser. No. 533,568

Int. Cl.^{5} A61K *31/165;* **C07C** *235/76*

U.S. Cl. 514—627 **7 Claims**

1. A compound of the formula



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wherein

R_1 is selected from phenyl, phenethyl and benzyl, each optionally substituted with chloro or C_1–C_4-alkyl,

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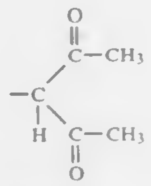


and Z_1 and Z_2 are independently selected from hydrogen, halogen and (C_1–C_4) alkyl.

7. A composition comprising a compound of claim 1 in a fungicidally-effective amount and in an agronomically acceptable carrier.

5,023,276

PREPARATION OF NORMALLY LIQUID HYDROCARBONS AND A SYNTHESIS GAS TO MAKE THE SAME, FROM A NORMALLY GASEOUS HYDROCARBON FEED

Robert M. Yarrington, and William Buchanan, both of Westfield, N.J., assignors to Engelhard Corporation, Iselin, N.J.

Continuation of Ser. No. 430,147, Sep. 30, 1982, abandoned. This application Jan. 19, 1989, Ser. No. 300,197

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.^{5} C07C *27/00*

U.S. Cl. 514—703 **21 Claims**

1. A process for preparing from a normally gaseous hydrocarbon feed a synthesis gas comprising hydrogen and carbon oxides and suitable for the synthesis of normally liquid hydrocarbons therefrom, the process comprising the steps of:

(a) preheating to a preheat temperature an inlet stream comprising a normally gaseous hydrocarbon feed, H_2O, oxygen and recycled carbon dioxide obtained as defined below, the preheat temperature being sufficiently high to initiate catalytic oxidation of said feed as defined below:

(o) introducing the preheated inlet stream into a first catalyst zone comprising a monolithic body having a plurality of gas flow passages extending therethrough and having a catalytically effective amount of palladium and platinum catalytic components dispersed therein, the amounts of feed, H_2O and oxygen introduced into said first catalyst zone being controlled to maintain in said inlet stream an H_2O to C ratio of from about 0.5 to 5 and an O_2 to C ratio of from about 0.4 to 0.65;

(c) contacting the preheated inlet stream within said first catalyst zone with said palladium and platinum catalytic components to initiate and sustain therein catalytic oxidation of said feed to produce hydrogen and carbon oxides therefrom, the temperature of at least a portion of said monolithic body being at least about 250° F. (139° C.) greater than the ignition temperature of said inlet stream, and oxidizing in said first catalyst zone a quantity, less than all, of said feed, which quantity is sufficient to heat such first zone effluent to an elevated temperature high enough to catalytically steam reform, within a second catalyst zone defined below, the hydrocarbons in such first zone effluent without supplying external heat thereto;

(d) passing the first zone effluent, while still at the elevated temperature, from said first catalyst zone to a second catalyst zone containing a platinum group metal steam reforming catalyst therein, and contacting the first zone effluent in said second catalyst zone with said reforming catalyst to react hydrocarbons therein with H_2O to produce hydrogen and carbon oxides therefrom and thereby provide a gas mixture including hydrogen, carbon monoxide and carbon dioxide;

(e) passing the effluent of said second catalyst zone to a carbon dioxide removal zone and separating carbon dioxide form the second zone effluent;

(f) recycling the carbon dioxide separated in step (e) to said inlet stream in an amount sufficient so that said inlet stream comprises from about 5 to 20 mole percent carbon dioxide; and

(g) withdrawing the carbon dioxide-depleted second-zone effluent obtained in step (e) as said synthesis gas.

5,023,277

SYNGAS CONVERSION CATALYST ITS PRODUCTION AND USE THEREOF

Colin H. McAteer, Aldershot, England, assignor to The British Petroleum Company p.l.c., London, England

Cootinuation of Ser. No. 282,213, Dec. 9, 1988, abandoned, which is a continuation-in-part of Ser. No. 97,807, Sep. 16, 1987, Pat. No. 4,826,800. This application Jul. 6, 1990, Ser. No. 549,631

Claims priority, application United Kingdom, Sep. 26, 1986, 8623233

Int. Cl.^{5} C07C *1/04*

U.S. Cl. 518—715 **5 Claims**

1. A process for the conversion of a synthesis gas of carbon monoxide and hydrogen to waxy hydrocarbon which process comprises contacting synthesis gas under conditions of elevated temperature and pressure with a reductively activated catalyst composition to selectively obtain waxy hydrocarbon products, wherein said catalyst composition consists of (i) cobalt either as elemental metal, the oxide or a compound thermally decomposable to the elemental metal and/or oxide and (ii) zinc in the form of the oxide or a compound thermally decomposable to the oxide, said composition being obtained by a process comprising: (I) precipitating at a temperature in the range from 0° to 100° C. the the metals cobalt and zinc in the form of insoluble thermally decomposable compounds thereof from a solution of soluble compounds thereof using a precipitant comprising ammonium hydroxide, ammonium carbonate, ammonium bicarbonate, a tetraalkyl ammonium compound or an organic amine, and (II) recovering the precipitate obtained in step (I), the molar ratio of said soluble compounds of cobalt to zinc being in the range from 1:5 to 2:1.

5,023,278

PHOSPHONITRILIC POLYMERS WITH CURABILITY BY SULFUR ACCELERATED CURES OR RADIATION CURES

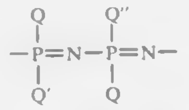
Hugh A. Fisher; Susan D. Landry, both of Baton Rouge, both of La., and Troy L. Smith, Jr., Kennesaw, Ga., assignors to Etnyl Corporation, Richmond, Va.

Filed Nov. 20, 1989, Ser. No. 438,789

Int. Cl.^{5} C08J *9/00*

U.S. Cl. 521—85 **12 Claims**

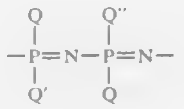
1. A process for producing a cured and foamed polyphosphazene composition comprised of a linear phosphazene polymer of the formula



$$-\overset{Q}{\underset{Q'}{P}}{=}N-\overset{Q''}{\underset{Q}{P}}{=}N-$$

wherein Q and Q′ are the same or different and are C_1 to C_{12} linear or branched alkoxy of C_6 to C_{10} aryloxy unsubstituted or substituted with C_1 to C_6 linear or branched alkyl and Q″ is a group of the formula —O—R—R′ where R is alkylene or arylene and R′ is a group having olefinic unsaturation, the amount of Q″ being from about 0.1 to about 5% of the total of Q, Q′ and Q″, said process comprising

forming more than one storable, stable accelerator base composition comprising by weight 25–80% of an sulfur-containing curing agent, 5–45% of a cyclic, linear or mixture of cyclic or linear phosphazene oil of the formula



$$-\overset{Q}{\underset{Q'}{P}}{=}N-\overset{Q''}{\underset{Q}{P}}{=}N-$$

where Q, Q′ and Q″ are as previously defined having a molecular weight between about 700 and about 500,000 and 10–15% of said linear phosphazene polymer, each one of said more than one storable, stable accelerator base composition comprising a different sulfur-containing curing agent;

preparing a master batch comprising for each 100 parts by weight of said linear phosphazene polymer, between about 150 and about 220 parts by weight of a hydrated filler selected from the group consisting of magnesium hydroxide, hydrated alumina and mixtures thereof, from about 1 to about 125 parts by weight of a processing aid selected from the group consisting of a metallic soap, polysiloxane, polyethylene ether glycol and mixtures thereof, from about 1 to about 50 parts by weight of said cyclic, linear or mixture of cyclic and linear phosphazene oil and an effective amount of a blowing agent;

blending said masterbatch with at least two of said more than one accelerator base composition;

foaming and curing said composition.

5,023,279

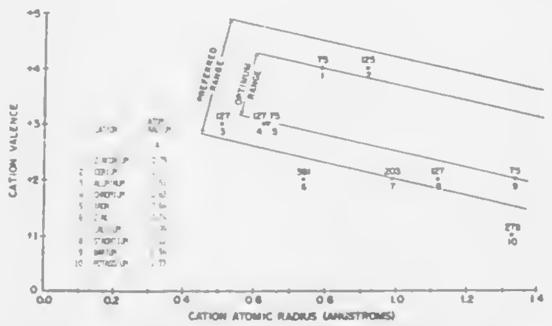
NUCLEATING AGENTS FOR THERMOPLASTIC RESINS

Marlin D. Buckmaster, Vienna, W. Va., and Stuart K. Randa, Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 312,989, Feb. 17, 1989, Pat. No. 4,877,815. This application Oct. 30, 1989, Ser. No. 429,129

Int. Cl.^{5} C08J *9/00*

U.S. Cl. 521—85 **42 Claims**



1. Foamable, thermoplastic resin extrusion composition containing as a nucleating agent a nucleating-effective amount of at least one thermally stable compound which is selected from the group consisting of sulfonic and phosphonic acids and salts thereof.

5,023,280

PROCESS FOR THE PRODUCTION OF POLYURETHANE FOAMS

Peter Haas, Haan, and Hans Hettel, Roesrath, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Apr. 7, 1989, Ser. No. 335,071

Claims priority, application Fed. Rep. of Germany, Apr. 14, 1988, 3812348

Int. Cl.^{5} C08J *9/14;* **C08K** *9/02*

U.S. Cl. 521—106 **15 Claims**

1. A process for the production of polyurethane foams comprising reacting

(1) a polyisocyanate with

(2) a polyester, polycarbonate, polylactone, or polyamide having a molecular weight of from about 400 to about 10,000 and containing at least two isocyanate reactive hydrogen atoms, or a mixture thereof,

in the presence of

(3) water, an organic blowing agent, or a mixture thereof,

(4) a catalyst, and

(5) a flame retardant comprising from about 1 to about 30 parts by weight, based on component (2), of a graphite modified with an inorganic expandable material.

5,023,281

MICROBIOCIDAL COMPOSITIONS COMPRISING AN ARYL ALKANOL AND A MICROBIOCIDAL COMPOUND DISSOLVED THEREIN

Nuno M. Rei, Boxford, and Ronald C. Wilson, Wenham, both of Mass., assignors to Morton International, Inc., Chicago, Ill.

Division of Ser. No. 301,691, Jan. 25, 1989, which is a division of Ser. No. 15,242, Feb. 17, 1987, which is a division of Ser. No. 619,092, Jun. 11, 1984, Pat. No. 4,663,077. This application Jul. 20, 1989, Ser. No. 383,125

Int. Cl.^{5} A01N *31/00, 43/80;* **A61K** *31/425*

U.S. Cl. 523—122 **7 Claims**

1. A composition for incorporation into a polymer comprising a plasticizer for the polymer and, in an amount at least sufficient to impart microbiocidal properties to the composition, a microbiocidal compound which is present in the composition as the solute in an aryl alkanol solvent, said microbiocidal compound being selected from the group consisting of N-(2-methylnaphthyl) maleimide, isoinodole dicarboximide having a sulfur atom bonded to the nitrogen atom of the dicarboximide group and isothiazolinone compounds.

5,023,282

ASPHALT CONTAINING GILSONITE, REACTIVE OIL AND ELASTOMER

Terry C. Neubert, Kent, Ohio, assignor to GenCorp Inc., Fairlawn, Ohio

Filed Nov. 17, 1989, Ser. No. 439,126

Int. Cl.^{5} C08L *7/00, 9/00, 95/00;* **C08K** *5/09*

U.S. Cl. 524—59 **19 Claims**

1. An asphalt composition consisting essentially of:

100 parts by weight of a petroleum asphalt;

from about 1 to about 10 parts by weight of a natural asphalt;

from about 1 to about 10 parts by weight of a thinning reactive oil comprising at least about a 60 percent unsaturated fatty acid content having from about 14 to 24 carbon atoms, and

from about 1 to about 10 parts by weight of an elastomer.

5,023,283

N,N-BIS(ACYLOXYETHYL)HYDROXYLAMINE DERIVATIVES

Ramanathan Ravichandran, Yonkers, and Raymond Seltzer, New City, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

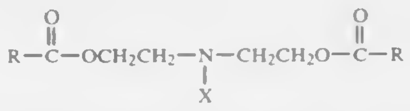
Continuation of Ser. No. 946,222, Dec. 24, 1986, abandoned. This application Apr. 25, 1989, Ser. No. 344,559

The portion of the term of this patent subsequent to Jan. 19, 2005, has been disclaimed.

Int. Cl.^{5} C07C *239/14*

U.S. Cl. 524—101 **13 Claims**

1. A compound of the formula



$$R-\overset{O}{\overset{\|}{C}}-OCH_2CH_2-\underset{X}{N}-CH_2CH_2O-\overset{O}{\overset{\|}{C}}-R$$

wherein each R is alkyl of 1 to 18 carbon atoms and X is hydroxyl.

4. A composition of matter consisting essentially of a plastic,

VOL
1127
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polymer, resin or oil subject to oxidative, thermal and actinic degradation stabilized with an effective stabilizing amount of a compound of claim 1.

5,023,284
PHOSPHATE/EPOXY STABILIZER FOR EXTRUDABLE POLYESTER BLENDS

Mo-Fung Cheung, Farmington Hills; Amos Golovoy, Canton, and Henk van Oene, Southfield, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 138,255, Dec. 28, 1987, Pat. No. 4,983,654. This application Aug. 9, 1989, Ser. No. 390,955

Int. Cl.^{5} C08K *5/15;* **C08G** *65/32*

U.S. Cl. 524—109 **13 Claims**

1. A composition comprising: polyester; and stabilizer comprising:
  I. A phosphate-epoxy adduct which is the reaction product of:
    (A) phosphate being selected from mono- and di-esters of orthophosphoric acid, said mono- and di-ester respectively having two and one ionizable hydrogen atoms; and
    (b) epoxy; wherein said phosphate and said epoxy are ionizable hydrogen atoms of said phosphate with an epoxide group of said epoxy; and
  II. a mixture of:
    (i) reactive functionality component selected from compounds having (1) imide or (2) oxazoline functionality; and
    (ii) hindered phenol component;
    wherein said phosphate-epoxy adduct comprises at least about 51 weight percent of said stabilizer.

5,023,285
BIS (TRI-TERTIARY-ALKYLPHENOXY) DIPHOSPHASPIROUNDECANES

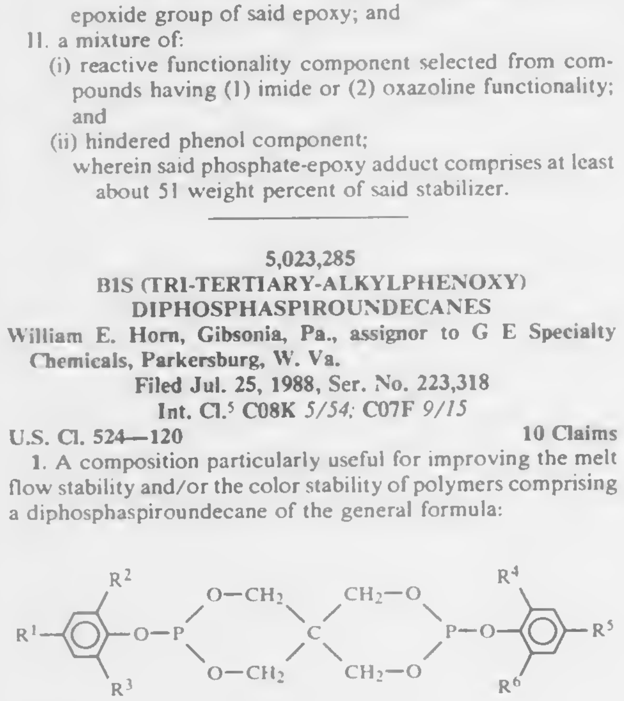
William E. Horn, Gibsonia, Pa., assignor to G E Specialty Chemicals, Parkersburg, W. Va.

Filed Jul. 25, 1988, Ser. No. 223,318

Int. Cl.^{5} C08K *5/54;* **C07F** *9/15*

U.S. Cl. 524—120 **10 Claims**

1. A composition particularly useful for improving the melt flow stability and/or the color stability of polymers comprising a diphosphaspiroundecane of the general formula:



wherein each of R^1, R^2, R^3, R^4, R^5 and R^6, is a tertiary-alkyl moiety.

5,023,286
POLYPROPYLENE RESIN COMPOSITIONS

Masaru Abe, Osaka; Yoichi Kawai; Masami Maki, both of Kanagawa, and Katuo Wada, Kanagawa, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 414,251

Claims priority, application Japan, Oct. 5, 1988, 63-249850

Int. Cl.^{5} C08K *5/51, 5/13*

U.S. Cl. 524—128 **12 Claims**

1. A polypropylene resin composition comprising
  1) about 100 parts by weight of a polypropylene resin containing an inorganic filler;
  2) from about 0.01 to about 0.5 part by weight of at least one phenolic antioxidant;
  3) from about 0.01 to about 0.5 part by weight of at least one phosphorus antioxidant; and
  4) from about 0.01 to about 3.0 parts by weight of fine powders comprising aggregates of intimately bonded particles comprising zinc oxide, titanium dioxide and water.

5,023,287
RUBBER CONTAINING MATRIX-ANTIDEGRADANTS

Larry R. Evans, Seville; Walter H. Waddell, Fairlawn; Frank W. Harris, Akron, and David A. Benko, Munroe Falls, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 5, 1987, Ser. No. 116,850

Int. Cl.^{5} C08K *5/18*

U.S. Cl. 524—255 **19 Claims**

1. A composition comprising a polymer derived from a diene monomer and a polymer/antidegradant matrix; wherein the matrix has a particle diameter of 100 microns or less and a partitioning coefficient of greater than 2.

5,023,288
SILICONE RUBBER ADHESIVE

Kazuo Hirai, and Akira Kasuya, both of Chiba, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

Filed Jun. 29, 1989, Ser. No. 373,850

Claims priority, application Japan, Jul. 15, 1988, 63-177887

Int. Cl.^{5} C08K *5/54*

U.S. Cl. 524—268 **3 Claims**

1 A silicone rubber adhesive composition comprising:
  (A) 100 weight parts of an organopolysiloxane having at least two silicon-bonded alkenyl groups in each molecule,
  (B) an organohydrogenpolysiloxane having at least two silicon-bonded hydrogen atoms in each molecule, in a quantity affording a value within the range of 0.5:1 to 5:1 for the molar ratio between the silicon-bonded hydrogen atoms in the instant component and the alkenyl groups in component (A),
  (C) 30 to 150 weight parts of reinforcing silica which has been hydrophobicized by a wet-method, said silica having a specific surface area of at least 200 m^2/g and constituted of the SiO_2 unit and organosiloxane units selected from the group consisting essentially of the $R_3SiO_{\frac{1}{2}}$ unit, R_2SiO unit, $RSiO_{3/2}$ unit, and their mixtures wherein R in each formula is a substituted or unsubstituted monovalent hydrocarbon group, with the proviso that the organosiloxane unit/SiO_2 unit molar ratio is 0.08 to 2.0,
  (D) 0.05 to 10 weight parts of a silane coupling agent selected from the group consisting of acryl-functional silane coupling agents and methacryl-functional silane coupling agents,
  (E) 0.05 to 10 weight parts of an epoxy-functional silane coupling agent,
  (F) 0 to 5 weight parts of the partial allyl ether of a multivalent alcohol, and
  (G) a platinum compound catalyst in a quantity sufficient to cause the curing of the composition of the present invention, wherein the tensile strength of said silicone rubber composition when uncured falls within the range of 1.5 kg/cm^2 to 5.0 kg/cm^2 at 25 degrees Centigrade.

5,023,289
RUBBER COMPOSITIONS HAVING IMPROVED PROCESSABILITY

Eric R. Lynch, Brussels, Belgium, assignor to Monsanto Europe, S.A., Brussels, Belgium

Filed May 25, 1990, Ser. No. 528,410

Claims priority, application United Kingdom, Jun. 2, 1989, 89 12718

Int. Cl.^{5} C08K *5/36*

U.S. Cl. 524—302 **12 Claims**

1. A rubber composition comprising an unvulcanised rubber polymer and, as a viscosity modifying additive, an alkylthioalkanoic acid, salt or ester having the formula

$$R^1S(CR^3R^4)_xCO_2R^2$$

where R^1 represents an alkyl group or a hydroxy- or alkoxy-substituted alkyl group, said group containing (apart from the alkoxy carbon atoms in an alkoxy-substituted alkyl group) from 4 to 22 carbon atoms, R^2 represents hydrogen, a metallic or other cationic group, or an esterifying group, each of R^3 and R^4 represents independently hydrogen or an alkyl group, and x has a value of from 1 to 10.

5,023,290
COMPOSITIONS AND METHODS FOR WATERPROOFING WET STRUCTURES FORMED FROM WATER-PENETRABLE CONSTRUCTION MATERIALS

James M. Gaidis, Ellicott City, Md., assignor to W. R. Grace & Co.-Conn., New York, N.Y.

Filed Sep. 12, 1988, Ser. No. 243,377

Int. Cl.^{5} C08K *5/09*

U.S. Cl. 524—320 **8 Claims**

1 A waterproofing agent primer composition which can be used on wet and dry structures that consisting essentially of
  a C_8 to C_{18} fatty acid;
  a natural or synthetic rubber;
  a diluent or filler resin; and
  an organic solvent in which the fatty acid is soluble.

5,023,291
POLYESTER COMPOSITION

Seiji Sakamoto, Machida, and Nobuyasu Shudo, Yokohama, both of Japan, assignors to Diafoil Company, Limited, Tokyo, Japan

Filed Jul. 13, 1989, Ser. No. 379,346

Claims priority, application Japan, Jul. 21, 1988, 63-182358

Int. Cl.^{5} C08K *3/20, 7/18;* **C08G** *63/183, 63/187*

U.S. Cl. 524—430 **6 Claims**

1. A polyester composition, which comprises:
  a polyester containing not less than 80 mol % of repeating units constituted of ethylene terephthalate units or ethylene-2,6-naphthalenedicarboxylate units, said polyester having a terminal carboxyl group content of 40 to 80 equivalents/10^6 g and 0.01 to 5 wt. %, based on the total amount of the polyester composition, of aluminum oxide particles of 0.005 to 5 μm in average particle diameter, said polyester composition having a melt resistivity of 6×10^6 to 5×10^8 Ω-cm.

5,023,292
TIRE COMPOUNDS

Sung W. Hong, Cheshire, and Edward L. Wheeler, Watertown, both of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

Filed Sep. 29, 1989, Ser. No. 414,807

Int. Cl.^{5} C08K *3/22, 5/22;* **C08L** *9/06, 61/06*

U.S. Cl. 524—432 **14 Claims**

1. A tire composition comprising a rubber having an iodine number of at least about 15, and a two-stage phenolic resin which has been cured with 1-aza-5-methylol-3,7-dioxabicyclo-(3,3,0) octane.

5,023,293
POLYARYLENE SULFIDE RESIN PAINT COMPOSITION

Akira Nakata; Naoki Yamamoto; Hiroshi Mori, all of Otake, and Takuya Ueno, Kobe, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Feb. 8, 1990, Ser. No. 476,627

Claims priority, application Japan, Feb. 9, 1989, 1-030525

Int. Cl.^{5} C08L *81/02*

U.S. Cl. 524—539 **8 Claims**

1. A polyarylene sulfide resin composition consisting essentially of a composition obtained by the reaction of a polymer composition consisting of 100 parts by weight of a composition of 10 to 90 wt. % of a polyarylene sulfide resin and 90 to 10 wt. % of a thermoplastic polyester with 0.01 to 10 parts by weight of a compound having two or more oxazoline groups in the molecule and 0 to 300 parts by weight, based on 100 parts by weight of the composition consisting of the polyarylene sulfide resin and the thermoplastic polyester, of a filler.

5,023,294
AQUEOUS DISPERSIONS OF URETHANE-ACRYLIC POLYMERS AND THE USE THEREOF AS PAINTS

Ennio Cozzi, Milan, and Natale Conti, Varese, both of Italy, assignors to Presidenza Del Consiglio Del Ministri, Rome, Italy

Filed Jul. 3, 1989, Ser. No. 374,776

Claims priority, application Italy, Jul. 7, 1988, 21267 A/88

Int. Cl.^{5} C08L *75/04*

U.S. Cl. 524—547 **24 Claims**

1. Aqueous dispersions of urethane-acrylic polymer containing in the macromolecule hydrophilic ionic groups, obtained according to the following operations:
  a) preparation of an unsaturated oligourethane by reaction between at least one organic polyisocyanate and a mixture comprising at least one macroglycol and at least one polyol containing in the same molecule of said at least one polyol at least one ionizable group and at least one ethylenic unsaturation;
  b) salification of the thus-obtained oligourethane;
  c) dispersion of the salified oligourethane in water, optionally in the presence of organic polyamines:
  d) polymerization of the oligourethane with alpha-beta-ethylenically unsaturated monomers.

5,023,295
COMPOSITIONS SUITABLE FOR COATING THE SURFACE OF ELECTRICAL HIGH-VOLTAGE INSULATORS

Erhard Bosch, Burgkirchen, Fed. Rep. of Germany; Dietrich Wolfer, Oberndorf, and Reinhard Maier, Braunau, both of Austria, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Sep. 8, 1989, Ser. No. 404,476

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1988, 3831479

Int. Cl.^{5} C08K *3/10*

U.S. Cl. 524—783 **24 Claims**

1. A composition for coating the surface of electrical high-voltage insulators, which is stable on storage in the absence of water and can be crosslinked to form an elastomer at room temperature when exposed to water comprising
  (I) a diorganopolysiloxane having terminal condensable groups capable of condensation with
  (II) a silicon compound having at least three hydrolyzable groups directly bonded to silicon per molecule; and
  (IV) an additive which is obtained by mixing
    (A) 60 to 80 percent by weight of a diorganopolysiloxane containing 75 to 85 mol percent of dimethylsiloxane units and 15 to 25 mol percent of vinylmethylsiloxane units with
    (B) 20 to 35 percent by weight of a compound selected from the group consisting of titanium dioxide and zirconium dioxide;
    (C) 0.05 to 0.25 percent by weight of platinum, calculated as the element, in the form of a platinum compound or a platinum complex; and
    (D) 1 to 5 percent by weight of an organosilicon compound having a basic nitrogen bonded to silicon via carbon,
in which the sum of the percentages of (A) to (D) is equal to percent by weight and the percentages by weight of (A) to (D) are based on the total weight of the additive (IV).

VOL
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5,023,296
RESIN COMPOSITION

Takamasa Moriyama, Suita, and Kuniyoshi Asano, Hirakata, both of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Dec. 19, 1989, Ser. No. 452,548

Claims priority, application Japan, Dec. 20, 1988, 63-322704

Int. Cl.^{5} C08G *63/48*

U.S. Cl. 525—58 **4 Claims**

1. A resin composition, comprising:
(A) 100 parts by weight of a hydrolyzed ethylene-vinyl acetate copolymer,
(B) 1 to 100 parts by weight of a polyester resin and
(C) 0.1 to 50 parts by weight of a polyester-amide resin, the polyester-amid resin functions to improve the compatibility between the hydrolyzed ethylene-vinyl acetate copolymer and the polyester resin.

5,023,297
IMPACT AND SOLVENT RESISTANT POLYCARBONATE COMPOSITION

Omar M. Boutni, Mt. Vernon, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 22, 1989, Ser. No. 455,066

Int. Cl.^{5} C08L *69/00*

U.S. Cl. 525—67 **12 Claims**

1. A composition comprising an admixture of
a. a major quantity of an aromatic polycarbonate and
b. a minor quantity of
  i. a polycarbonate polysiloxane block copolymer; and
  ii. a hydrogenated alkylidene vinyl aromatic block copolymer graft modified with an unsaturated dicarboxylic acid or unsaturated dicarboxylic acid anhydride,

wherein the quantities of b are such that the ⅛ inch impact resistance of a molded part and the organic solvent resistance is improved over polycarbonate alone while maintaining the compatibility of the composition of a and b.

5,023,298
CURABLE COMPOSITION

Hiroshi Miwa, Itami; Yoshitaka Okude, Hirakata; Masakazu Watanabe, Toyonaka, and Sakuichi Konishi, Ikoma, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Dec. 27, 1989, Ser. No. 457,939

Claims priority, application Japan, Dec. 28, 1988, 63-331572; Aug. 28, 1989, 1-220605

Int. Cl.^{5} C08L *83/00*

U.S. Cl. 525—103 **11 Claims**

1. A curable composition comprising
(A) a carboxylic anhydride group containing compound;
(B) an oxazolidine compound; and
(C) an alkoxysilyl group containing polymer.

5,023,299
POLYOLEFINECARBOXYLIC ACIDS, THEIR PREPARATION AND THEIR USE FOR PREPARING POLYOLEFINE-POLYCARBONATE BLOCK COPOLYMERS

Kurt P. Meuer; Helmut Waniczek, both of Cologne; Gerd Sylvester, Leverkusen, and Josef Witte, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Division of Ser. No. 250,014, Sep. 27, 1988, Pat. No. 4,929,689, which is a division of Ser. No. 50,165, May 14, 1987, Pat. No. 4,798,873. This application Feb. 1, 1990, Ser. No. 473,495

Claims priority, application Fed. Rep. of Germany, May 31, 1986, 3618378

Int. Cl.^{5} C08G *81/02, 64/18*

U.S. Cl. 525—146 **5 Claims**

1. A process for the production of a polyolefine-polycarbonate block copolymer, in which an aromatic polycarbonate of $\overline{M}w$ 2,000 to 60,000 having terminal phenolic OH groups is reacted with a poly-(C_2–C_{10}-α-olefine)-carbonyl halide having a weight average molecular weight of 2,000 to 235,000 in a mixing ratio of 1 to 99% by weight of polycarbonate: 99% by weight to 1% by weight of carbonyl halide at a temperature of 30° C. to 120° C. in an organic solvent which is inert under the reaction conditions, the solvent is removed after a reaction time of 2 hours to 10 hours, and the block copolymer obtained is purified and isolated.

5,023,300
THERMOPLASTIC OLEFIN ALLOYS AND METHOD FOR PRODUCING THE SAME

Terrence Huff, Baytown, and James J. McAlpin, Houston, both of Tex., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Continuation-in-part of Ser. No. 140,462, Jan. 4, 1988, abandoned. This application May 23, 1989, Ser. No. 354,358

Int. Cl.^{5} C08L *23/26, 23/04, 23/16*

U.S. Cl. 525—194 **10 Claims**

1. A process for producing a thermoplastic olefin alloy, comprising the steps of:
feeding propylene, ethylene and a catalyst to a first reactor to at least partially copolymerize said propylene and ethylene to produce a first random propylene/ethylene copolymer, thereby generating an outlet stream comprising said first random copolymer, unreacted propylene, unreacted ethylene and said catalyst;
feeding said outlet stream, additional propylene and additional ethylene into a second reactor to produce a reactor blend of said first random copolymer with a second random propylene/ethylene copolymer, said reactor blend having an ethylene content of from 3% to 8% by weight and an MFR of less than 1;
blending from 50% to 88% by weight, based upon the weight of said alloy, of said reactor blend, from 12% to 23% by weight, based upon the weight of said alloy, of an olefin copolymer elastomer, and from 0% to 33% by weight based upon the weight of the alloy, of polypropylene; and increasing the MFR of said alloy by blending said alloy in the presence of an organic peroxide.

5,023,301
POLYPROPYLENE REINFORCED RUBBER

Donald J. Burlett, Wadsworth; Richard G. Bauer, Kent, and Mellis M. Kelley, Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 5, 1990, Ser. No. 489,148

Int. Cl.^{5} C08L *9/00, 23/12*

U.S. Cl. 525—232 **16 Claims**

1. A process of forming polypropylene fibrils in a vulcanized diene containing rubber matrix comprising:
(1) forming a polymer alloy containing polypropylene by mixing at a temperature ranging from about 160° to 195° C. an unvulcanized diene rubber and polypropylene;
(2) forming a blend of (a) said polymer alloy containing polypropylene, (b) an unvulcanized rubber stock wherein said polypropylene is present in said blend in an amount ranging from about 5 phr to about 25 phr; and
(3) vulcanizing the rubber stock in said blend after orienting said polypropylene by the application of heat and flowing said rubber stock within a mold cavity wherein the vulcanization is conducted at a temperature ranging from about 140° C. to 200° C.

9. A vulcanized rubber matrix comprising a vulcanized diene containing rubber having randomly dispersed therein polypropylene fibrils which are formed in-situ by:
(1) forming a polymer alloy containing polypropylene by mixing at a temperature ranging from about 160° to 195° C. an unvulcanized diene rubber and polypropylene;
(2) forming a blend of (a) said polymer alloy containing polypropylene, and (b) an unvulcanized diene rubber stock wherein said polypropylene is present in said blend in an amount ranging from about 5 phr to about 25 phr: and
(3) vulcanizing the rubber stock in said blend after orienting said polypropylene by the application of heat and flowing said rubber stock within a mold cavity wherein said vulcanization is conducted at a temperature ranging from about 140° to 200° C.

5,023,302
PROCESS FOR PREPARATION OF METHACRYLIMIDE GROUP CONTAINING POLYMER AND LIGHT-TRANSMITTING FIBER COMPRISING POLYMER MADE BY THE PROCESS

Hisao Anzai, Otake; Isao Sasaki, Saeki; Kozi Nishida, Toyama; Hideaki Makino, Otake; Masami Ohtani, Kuga, and Katsuhiko Shimada, Otake, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Filed Aug. 28, 1989, Ser. No. 398,976

Claims priority, application Japan, Aug. 30, 1988, 63-215774

Int. Cl.^{5} C08F *8/32*

U.S. Cl. 525—378 **8 Claims**

1. A process for the preparation of a methacrylimide group-containing polymer, which comprises polymerizing methacrylic acid, a methacrylic acid ester, or a monomer mixture predominantly comprised of methacrylic acid or an ester thereof in the absence of a chain transfer agent, and then reacting the thus-prepared polymer with a compound represented by the following general formula:

$$R—NH_2$$

wherein R stands for H, an alkyl group having 1 to 12 carbon atoms, a cycloalkyl group having 7 to 11 carbon atoms or an aryl group having 6 to 10 carbon atoms,
to prepare an imidized polymer.

5,023,303
ALPHA, BETA-DIACID/N,N-SUBSTITUTED DIAMINE ADDUCT CATALYST FOR EPOXY RESIN AND ACID POLYESTER

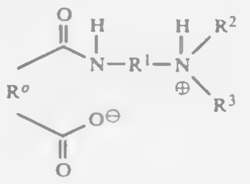
S. Peter Pappas, 2417 E. Country Club Dr., Fargo, N. Dak. 58103

Filed Jan. 29, 1988, Ser. No. 150,167

Int. Cl.^{5} C08L *63/02, 63/06, 67/02*

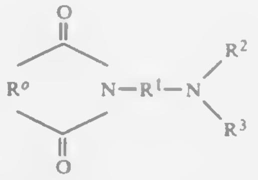
U.S. Cl. 525—438 **11 Claims**

1. A thermally curable epoxy composition comprising:
an epoxy resin;
an acid group containing polyester; and
a cure catalyzingly effective amount of a compound having the formula:



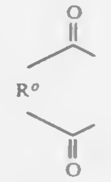
(1)

or the formula:



(2)

where the structure



(1a)

represents the residue of an α,β-aliphatic, cycloaliphatic or aromatic dicarboxylic acid and R^0 is an aliphatic, cycloaliphatic or aromatic group; R^1 is a C_1–C_{10} alkylene group, an arylene groups or a C_1–C_{10} alkylene group interrupted by an ether oxygen atom or a sulfur atom; and R^2 and R^3 are the same or different C_1–C_6 alkyl group, a C_1–C_6 alkyl group interrupted by an ether oxygen atom or a sulfur atom, a phenyl group, a benzyl group, or R^2 and R^3 are the same or different C_1–C_6 alkyl groups or C_1–C_6 alkyl groups interrupted by an ether oxygen atom or a sulfur atom which together with the nitrogen atom to which they are attached form a 4–8 member ring.

5,023,304
PROCESS FOR PRODUCING STYRENE-BASED POLYMER

Mizutomo Takeuchi, and Masahiko Kuramoto, both of Ichihara, Japan, assignors to Idemitsu Kosan Co., Ltd., Tokyo, Japan

Filed Mar. 7, 1990, Ser. No. 489,710

Claims priority, application Japan, Mar. 28, 1989, 1-73816

Int. Cl.^{5} C08F *12/08*

U.S. Cl. 526—160 **19 Claims**

1. A process for producing a styrene polymer which comprises contacting a styrene monomer with alkylaluminoxane, adding a transition metal compound to the resulting mixture and then polymerizing the styrene monomer, wherein the styrene monomer is contacted with the alkylaluminoxane at 0° C. to 100° C. for from 5 minutes to 1 hour.

5,023,305
OXYGEN-PERMEABLE HARD CONTACT LENS MATERIAL WITH EXCELLENT IMPACT RESISTANCE

Shigeharu Onozuka; Yuuichi Yokoyama, and Makoto Tsuchiya, all of Tokyo, Japan, assignors to Hoya Corporation, Tokyo, Japan

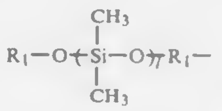
Continuation of Ser. No. 206,858, May 27, 1988, abandoned. This application Mar. 7, 1990, Ser. No. 492,388

Claims priority, application Japan, Sep. 30, 1986, 61-232789

Int. Cl.^{5} C08F *230/08, 30/08*

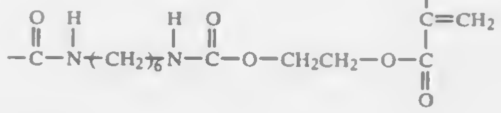
U.S. Cl. 526—194 **7 Claims**

1. An oxygen-permeable hard contact lens material with excellent impact resistance comprising a copolymer composed mainly of:
(1) a fluorine-containing methacrylate;
(2) a silicone-containing methacrylate; and
(3) a siloxane oligomer having a polymerizable functional group at the molecule terminals selected from the compounds represented by the following Formulas (I) to (III):



$$R_1-O\left(\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{Si}}-O\right)_{l}R_1- \qquad \text{I.}$$

where l is an integer of 10–200, and R_1 is



$$-\overset{\overset{O}{\|}}{C}-\overset{\overset{H}{|}}{N}\left(CH_2\right)_6\overset{\overset{H}{|}}{N}-\overset{\overset{O}{\|}}{C}-O-CH_2CH_2-O-\underset{\underset{O}{\|}}{C}-\overset{\overset{R_2}{|}}{C}{=}CH_2 \qquad \text{(a)}$$

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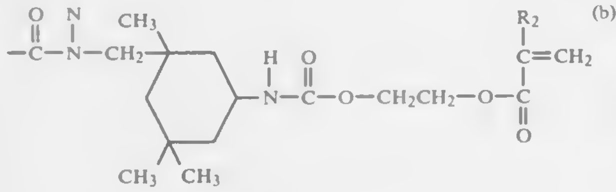
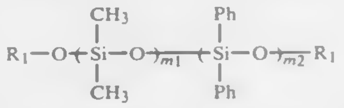
or



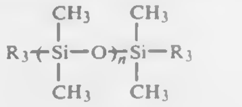
(b)

where R_2 is H or a methyl group



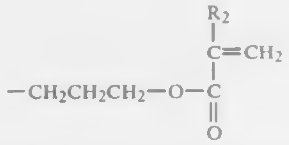
$$R_1-O+\underset{CH_3}{\overset{CH_3}{Si}}-O+_{m1}+\underset{Ph}{\overset{Ph}{Si}}-O+_{m2}R_1 \quad (II)$$

where $(m_1 + m_2)$ is an integer of 12-140, and $m_1 \geqq 0$ and $m_2 \geqq 1$; Ph is a phenyl group; and R_1 is the same as R_1 of Formula (I)



$$R_3+\underset{CH_3}{\overset{CH_3}{Si}}-O+_n\underset{CH_3}{\overset{CH_3}{Si}}-R_3 \quad (III)$$

where n is an integer of 10–500, and R_3 is



$$-CH_2CH_2CH_2-O-\underset{\underset{O}{\|}}{C}(-\overset{\overset{R_2}{|}}{C}=CH_2)$$

where (R_2 is H or a methyl group)

and mixtures thereof.

5,023,306

Patent Not Issued For This Number

5,023,307
METHYLPOLYSILANES HAVING CONTROLLABLE RHEOLOGY AND METHOD FOR THEIR PREPARATION

Gary T. Burns, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.
Filed Jul. 22, 1988, Ser. No. 223,012
Int. Cl.^{5} C08G *77/04*
U.S. Cl. 528—29 **9 Claims**

1. A process for the preparation of a methylpolysilane having a controllable glass transition temperature comprising the steps of:

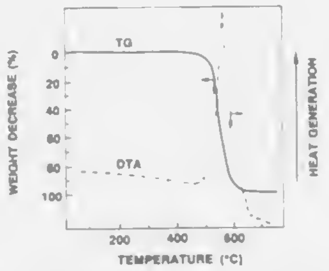
a) heating together to form a reaction mixture at least one alkoxy-functional disilane selected from the group consisting of disilanes having three and four alkoxy groups bonded to the silicon atoms, and mixtures thereof, with an amount of a dialkoxy-functional disilane effective to control the glass transition temperature of the resulting polymer within the range of from about 0 to about 200° C. in the presence of a catalyst which is a source of alkoxide ions;

b) reacting said mixture for a time sufficient for an alkoxy-functional methylpolysilane having a controlled glass transition temperature to form while separating by-produced volatile alkoxysilane materials from said reaction mixture; and

c) separating said catalyst from said alkoxy-functional methylpolysilane which has formed.

5,023,308
AMINOTRIAZINE POLYMERS AND METHOD OF PREPARING SAME

Masayuki Kawaguchi; Yasushi Kita, both of Ube; Kayoko Yamamoto, and Koji Nozaki, both of Yamguchi, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan
Filed Jul. 12, 1989, Ser. No. 378,914
Claims priority, application Japan, Jul. 12, 1988, 63-173186; Feb. 6, 1989, 1-27240
Int. Cl.^{5} C08G *73/00*
U.S. Cl. 528—423 5 Claims



1. A polymeric compound having a layer structure with a structural unit represented by the formula (1):

$$(C_3N_3)_2N_xH_y \quad (1)$$

wherein (C_3N_3) represents s-triazine ring, $2<x<4$, and $0<y<8$, in which the s-triazine rings are linked to each other by connection of the three carbon atoms of each s-triazine ring to a carbon atom of another s-triazine ring by —NH— group except that in a portion of s-triazine rings in the compound one or two carbon atoms are bonding to a hydrogen atom or $—NH_2$ group.

5,023,309
WATER DISPERSIBLE, MODIFIED POLYURETHANE THICKENER WITH IMPROVED HIGH SHEAR VISCOSITY IN AQUEOUS SYSTEMS

Uno Kruse, Titusville; Burlon C. Crowley, Toms River, both of N.J., and Wilbur S. Mardis, East Amherst, N.Y., assignors to Rheox, Inc., Hightstown, N.J.
Filed Sep. 18, 1987, Ser. No. 98,146
Int. Cl.^{5} C08G *18/32, 18/08*
U.S. Cl. 528—49 37 Claims

1. A water dispersible modified polyurethane thickener for aqueous compositions which is the reaction product of:

a) polyisocyanate;

b) polyether polyol in an amount ranging from about 0.10 to about 10.00 moles per mole of polyisocyanate;

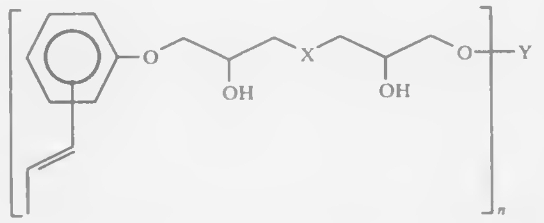
c) modifying agent in an amount ranging from about 0.015 to about 3.400 moles per mole of polyisocyanate, said modifying agent having at least two active hydrogen moieties and at least one pendant hydrophobic group, said pendant hydrophobic group having at least 12 carbon atoms and having no moieties reactive with the polyisocyanate or the polyether polyol; and

d) capping agent which is reactive with the reaction product of the polyisocyanate, the polyether polyol and the modifying agent and which is present in an amount sufficient to cap the reaction product of the polyisocyanate, the polyether polyol and the modifying agent, said water dispersible modified polyurethane thickener having improved high shear rate viscosity efficiency compared to a polyurethane which does not contain the modifying agent with said pendant hydrophobic group.

5,023,310
PROPENYLPHENOXY-TERMINATED OLIGOMERIC TOUGHENERS AND THEIR USE IN BISMALEIMIDE RESIN COMPOSITIONS

Jack D. Boyd, San Clemente, Calif., assignor to BASF Aktiengesellschaft, Ludwigshafen
Division of Ser. No. 202,412, Jun. 6, 1988, Pat. No. 4,902,778, which is a continuation-in-part of Ser. No. 156,983, Feb. 18, 1988, Pat. No. 4,923,928. This application Sep. 14, 1989, Ser. No. 406,989
Int. Cl.^{5} C08G *59/14*
U.S. Cl. 528—89 **8 Claims**

1. A chain-extended toughener, comprising: the reaction product of a propenylphenol, a diphenol or polyphenol, and an epoxy resin, wherein the mole ratio of phenolic hydroxyls in said 2-propenylphenol to hydroxyl groups in said diphenol or polyphenol to epoxy groups in said epoxy resin is from about 0.7–1.3:0.7–1.3:2 said toughener having the formula:

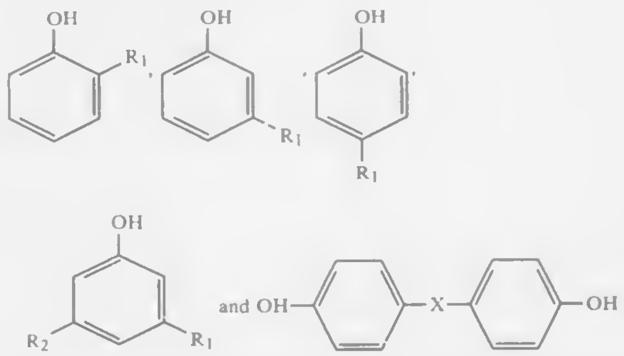


wherein X is the residue of the epoxy resin, Y is the residue of a diphenol or polyphenol, and n is an integer of 2 or more.

5,023,311
HIGH-MOLECULAR-WEIGHT SOLUBLE NOVOLAK RESIN AND PROCESS FOR PREPARATION THEREOF

Takashi Kubota, Kamakura, Japan, assignor to Toray Industries, Inc., Tokyo, Japan
Continuation of Ser. No. 937,905, Dec. 4, 1986, abandoned. This application Nov. 30, 1988, Ser. No. 277,509
Claims priority, application Japan, Dec. 6, 1985, 60-273375
Int. Cl.^{5} C08G *8/04, 8/08, 8/10;* **G03C** *1/60*
U.S. Cl. 528—153 22 Claims

1. An organic solvent-soluble, high-molecular-weight novolak resin having an inherent viscosity of at least 0.1, which is obtained by reacting a polyfunctional phenol with an aldehyde, said polyfunctional phenol being at least one member selected from the group consisting of phenol and compounds represented by the formulae:

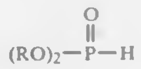


in which R_1 and R_2 independently represent an alkyl group having 1 to 10 carbon atoms, a phenyl group, a halogen atom or a hydroxyl group, and X represents $—CH_2—$, $—C(CH_3)_2—$ or —O—, and at least 30% by mole of the polyfunctional phenol having a functionality of at least 3; and said novolak resin having a solubility in acetone of at least 95% at 25° C.

5,023,312
MEADOWFOAM OIL AND MEADOWFOAM OIL DERIVATIVES AS LUBRICANT ADDITIVES

Frank L. Erickson, 1461 SW. 152nd St., Seattle, Wash. 98166; Robert E. Anderson, 355 S. Madison, Apt. 322, Pasadena, Calif. 91101, and Phillip S. Landis, 5753 Independence Cir., Alexandria, Va. 22312
Division of Ser. No. 221,061, Jul. 19, 1988, Pat. No. 4,925,581. This application Apr. 19, 1990, Ser. No. 510,942
Int. Cl.^{5} C07F *9/02*
U.S. Cl. 558—160 **4 Claims**

1. A lubricant additive comprising a phosphite adduct of triglyceride meadowfoam oil, wherein the phosphite adduct is a mono-, di-, tri-, tetra-, penta-, or hexa-adduct of the reaction product of



$$(RO)_2-\overset{\overset{O}{\|}}{P}-H$$

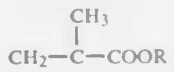
and triglyceride meadowfoam oil, wherein R is selected from the group consisting of H, $C_{1\text{-}12}$ alkyl, $C_{1\text{-}12}$ aryl, $C_{1\text{-}12}$ alkaryl, $C_{1\text{-}12}$ aralkyl, and cyclo $C_{4\text{-}12}$ alkyl.

5,023,313
ACRYLIC RESIN COMPOSITION

Bill R. Edwards, 10311 Merton St., Wichita, Kans. 67209
Division of Ser. No. 386,501, Jul. 27, 1989, Pat. No. 4,945,122. This application May 23, 1990, Ser. No. 528,728
Int. Cl.^{5} C08K *5/42;* **C08F** *2/38*
U.S. Cl. 524—166 **24 Claims**

1. A method for producing a polymerization syrup having an improved shelf life comprising:

admixing an acrylic monomer represented by the formula



$$CH_2-\overset{\overset{CH_3}{|}}{C}-COOR$$

wherein R is an alkyl moiety containing 1 to about 18 carbon atoms with effective minor amounts of 2, 2-bis(allyloxymethyl)-butan-1-ol, a mercaptan and a crosslinking agent compatible with the acrylic monomer to form an intimate blend containing from about 0.1 to about 1 parts by volume of 2, 2-bis(allyloxymethyl)-butan-1-ol, from about 0.5 to about 5 parts by volume of the mercaptan and from about 0.3 to about 40 parts by volume of the crosslinking agent; and

heating the blend at a temperature of from about 80 degrees Centigrade to about 110 degrees Centigrade for a period of time effective to provide the blend with a desired viscosity as determined by the end use for the polymerization syrup.

5,023,314
NOVEL POLYARYLATE COMPOSITIONS HAVING IMPROVED PROPERTIES

Balaram Gupta, and Gordon W. Calundann, both of Somerset, N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.
Filed Nov. 7, 1989, Ser. No. 433,231
Int. Cl.^{5} C08G *63/00, 63/02*
U.S. Cl. 528—190 **11 Claims**

1. An isotropic melt phase polyarylate consisting essentially of the recurring moieties from (a) isopthalic acid, terephthalic acid or a mixture thereof; (b) a bisphenolic compound; and (c) 5 to 10 mole % of 2-hydroxy-6-naphthoic acid.

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5,023,315
PROCESS FOR PREPARING ARYLENE SULFIDE POLYMERS

Joseph G. Ceurvorst, Arvada, Colo., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed Apr. 18, 1990, Ser. No. 510,903
Int. Cl.^{5} C08G *69/14*
U.S. Cl. 528—323 **27 Claims**

1. A process for preparing arylene sulfide polymers comprising the steps of:

(a) contacting at least one alkali metal hydroxide, water and at least one lactam to form a first mixture comprising an alkali metal aminoalkanoate, water and lactam, and subsequently contacting said first mixture with at least one sulfur source selected from the group consisting of alkali metal bisulfides, thiolactams and hydrogen sulfide under reaction conditions of time and temperature sufficient to produce a second mixture comprising a polymerizable complex of said alkali metal aminoalkanoate and said sulfur source, said lactam, water and metal impurities,
(b) separating at least a portion of said metal impurities from said second mixture to form a third mixture,
(c) contacting at least one dihaloaromatic compound with said third mixture to produce a polymerization mixture,
(d) subjecting said polymerization mixture to polymerization conditions of time and temperature sufficient to produce said arylene sulfide polymer, and
(e) recovering said arylene sulfide polymer.

5,023,316
CATALYTIC POLYERMIZATION OF BETA-SUBSTITUTED-BETA-PROPIOLACTONES BY OLIGOMERIC ISOBUTYLALUMINOXANE

Manuela Benvenuti, Siena, Italy, and Robert W. Lenz, Amherst, Mass., assignors to Exxon Chemical Patents, Inc., Linden, N.J.
Filed Jun. 14, 1990, Ser. No. 538,296
Int. Cl.^{5} C08G *63/08, 63/84*
U.S. Cl. 528—357 **13 Claims**

1. A method of preparing a polyester comprising polymerizing at least one β-substituted-β-propiolactone in the presence of a catalytic amount of isobutylaluminoxane in a solvent for said isobutylaluminoxane and for said β-substituted-β-propiolactone for a reaction time and at a temperature sufficient to produce said polyester.

5,023,317
PROCESS FOR DESTRUCTION OF TOXIC ORGANIC CHEMICALS AND THE RESULTANT INERT POLYMER BY-PRODUCT

Harold W. Adams, Monroe, Conn., assignor to Sultech, Inc., Wilmington, Del.
Continuation of Ser. No. 846,916, Apr. 1, 1986, Pat. No. 4,921,936, which is a continuation-in-part of Ser. No. 644,545, Aug. 27, 1984, Pat. No. 4,581,442. This application Mar. 21, 1990, Ser. No. 496,654
The portion of the term of this patent subsequent to Apr. 8, 2003, has been disclaimed.
Int. Cl.^{5} C08J *11/00, 11/02, 11/04*
U.S. Cl. 528—389 **36 Claims**

1. A chemically inert, solid composition of matter composed substantially of sulfur and carbon produced by the process comprising the following steps:

a) reacting sulfur vapor and a carbonaceous chemical together in a reactor under a substantially oxygen-free atmosphere at a temperature above the vaporization temperature of sulfur in the range of 500 degrees C. to 1500 degrees C. and at a pressure of about one to two atmospheres, so as to form a chemically inert, solid composition of matter composed substantially of sulfur and carbon, which resulting solid composition has little or no remaining residues of said carbonaceous chemical, and
b) separating the resulting formed solid composition from any vapor phases in the reactor.

5,023,318
PROCESS FOR PREPARING POLYKETONES FROM CARBON MONOXIDE/OLEFIN WITH AMIDE OR ACETONITRILE

Stephen L. Brown, Middlesex, England, assignor to The British Petroleum Company, p.l.c., London, England
Continuation of Ser. No. 249,715, Sep. 27, 1988, abandoned. This application May 23, 1990, Ser. No. 529,737
Claims priority, application United Kingdom, Oct. 8, 1987, 8723602
Int. Cl.^{5} C08G *67/02*
U.S. Cl. 528—392 **7 Claims**

1. A process for preparing polyketones by reacting a mixture of carbon monoxide and one or more olefins in the presence of a palladium catalyst prepared by reacting together (1) a source of palladium, (2) an amine, phosphine, arsine or stibine and (3) a non-coordinating or weakly coordinating anion, wherein the reacting is in the presence of an effective amount of an amide or of a nitrile comprising acetonitrile.

5,023,319
STABILIZATION OF MODIFIED ROSIN

Samuel D. Hollis, and Robert W. Johnson, Jr., both of Savannah, Ga., assignors to Union Camp Corporation, Wayne, N.J.
Filed Dec. 15, 1987, Ser. No. 132,301
Int. Cl.^{5} C08L *93/04*
U.S. Cl. 530—212 **7 Claims**

1. A method for treating polymerized rosin to decrease its tendency to oxidize comprising heating said rosin to an elevated temperature in the presence of a catalytic amount of one or more disproportionating catalysts selected from the group consisting of iodine, noble metals, hydroxylated arylsulfides, aryl thiols, or dithiin derivatives.

5,023,320
PROCESS FOR THE PURIFICATION OF PHYSIOLOGICALLY ACTIVE SUBSTANCE HAVING ANTITUMOR ACTIVITY

Katsuyuki Haranaka, Kokubunji, Japan; Lloyd J. Old, New York, N.Y.; Elizabeth C. Richards, Westport, and Barbara Williamson, Old Greenwich, both of Conn., assignors to Sloan-Kettering Institute For Cancer Research, New York, N.Y.
Continuation of Ser. No. 360,972, Mar. 23, 1982, abandoned. This application Jul. 14, 1988, Ser. No. 219,093
Int. Cl.^{5} C07K *15/04, 3/28*
U.S. Cl. 530—350 **12 Claims**

1. A process for purifying a proteinaceous physiologically active substance having antitumor activity, which is induced by administering to a rabbit at least one substance having a capacity for stimulating the reticuloendothelial system selected from the group consisting of Gram-positive bacteria, protozoas, yeasts, or synthetic high molecular weight compounds, and then injecting endotoxin from a Gram-negative bacterium into the rabbit, which comprises (1) contacting a crude solution of said proteinaceous physiologically active substance with a basic anion exchanger, using a buffer solution of pH 6.0 to 9.0 and salt concentration of not more than 0.2M, under conditions such that said physiologically active substance is adsorbed on the anion exchanger, (2) eluting the adsorbed physiologically active substance from the anion exchanger with a buffer solution of a salt concentration higher than 0.2M so that an eluate is produced, and (3) subjecting the eluate containing said physiologically active substance to gel filtration with a gel suitable for separation of a substance with a molecular weight in the range of 30,000 to 70,000 and an eluent comprising a buffer solution of pH 6.0 to 9.0, so that the substance is purified about 5,000- to 10,000-fold compared to the unpurified proteinaceous physiologically active substance.

5,023,321
MOLECULAR CLONING AND CHARACTERIZATION OF A FURTHER GENE SEQUENCE CODING FOR HUMAN RELAXIN

Peter J. Hudson, Bulleen; High D. Niall, Elwood, and Geoffrey W. Tregear, Hawthorn, all of Australia, assignors to Howard Florey Institute of Experimental Physiology & Medicine, Victoria, Australia
Division of Ser. No. 560,790, Dec. 13, 1983, Pat. No. 4,758,516. This application Mar. 4, 1987, Ser. No. 21,885
Claims priority, application Australia, Dec. 13, 1982, PF7247
Int. Cl.^{5} C07K *07/10*
U.S. Cl. 530—324 **4 Claims**

2. An essentially pure polypeptide having relaxin activity, wherein said polypeptide comprises:

(i) a human H2-relaxin A chain selected from the group consisting of A(1-24) to A(5-24), wherein amino acids 1-24 have the following sequence:

1 5 10 15
Gln Leu Tyr Ser Ala Leu Ala Asn Lys Cys Cys His Val Gly Cys
20 24
Thr Lys Arg Ser Leu Ala Arg Phe Cys

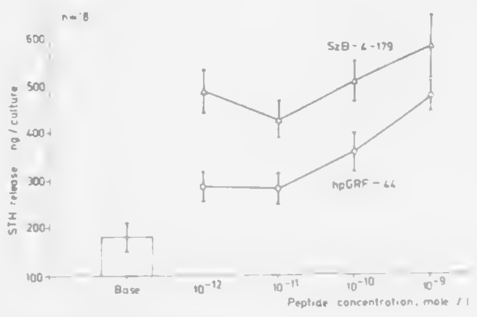
and

(ii) a human H2-relaxin B chain selected from the group consisting of B(−1-32) to B(4-23), wherein amino acids −1-32 have the following sequence:

−1 1 5 10
Asp Ser Trp Met Glu Glu Val Ile Lys Leu Cys Gly Arg Gly Leu
15 20 25
Val Arg Ala Gln Ile Ala Ile Cys Gly Met Ser Thr Trp Ser Lys
30 32
Arg Ser Leu.

5,023,322
ANALOGS OF GROWTH HORMONE RELEASING FACTOR (GRF) AND A METHOD FOR THE PREPARATION THEREOF

Magdolna Kovacs; Judit Horváth; Sándor Vigh, all of Pécs; Imre Mezo, Budapest; István Teplán, Budapest; Balázs Sícke, Budapest; János Seprődi, Budapest; Zsolt Vadász, Budapest; Edit Hegedüs, Budapest; Gábor Makara, Budapest, and György Rappay, Budapest, all of Hungary, assignors to MTA Kutatas-es Szervezetelemzo Intezete, Budapest, Hungary
Filed Aug. 30, 1989, Ser. No. 400,587
Claims priority, application Hungary, Aug. 31, 1988, 4498/88; Jul. 19, 1989, 3660/89
Int. Cl.^{5} C07K *7/10*
U.S. Cl. 530—324 **8 Claims**



1. A compound of formula (1),

H—Tyr—R^2—Asp—Ala—Ile—Phe—Thr—Asn—Ser— (1)
—Tyr—R^{11}—Lys—R^{13}—Leu—R^{15}—Gln—Leu—Ser—

—Ala—Arg—Lys—Leu—Leu—Gln—Asp—Ile—

-continued

—R^{27}—R^{28}—Arg—Gaba—Y

wherein
R^2 is Ala or D-Ala,
R^{11} is Arg or D-Arg,
R^{13} is Val or Ile,
R^{15} is Gly, Leu, Phe or a valence bond,
R^{27} is Met or Nle,
R^{28} is Ser, D-Ser or Asn, and
Y is OH or NH_2,
or a salt thereof.

5,023,323
METHOD OF SOMATOTROPIN NATURATION

Sa V. Ho, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.
Filed Sep. 12, 1990, Ser. No. 581,233
Int. Cl.^{5} C07K *3/08, 15/04*
U.S. Cl. 530—399 **15 Claims**

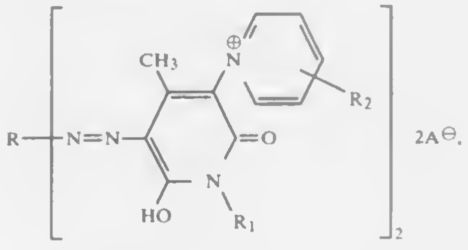
1. In a method for the solubilization and naturation of somatotropin protein from refractile bodies of a host cell containing said protein which comprises contacting said bodies with an aqueous solution of a chaotropic agent at a concentration and pH effective to achieve solubilization and thereafter contacting said solubilized protein with a mild oxidizing agent for a time sufficient to accomplish folding and oxidation of said protein,

the improvement comprising including in said aqueous solution of said chaotropic agent a soluble surfactant in an amount effective to increase the relative concentration of the folded and oxidized monomeric form of said somatotropin and decrease the relative concentration of dimer and aggregate forms thereof.

5,023,324
BISCATIONIC DISAZO AND TRISAZO COMPOUNDS HAVING OPTIONALLY FURTHER SUBSTITUTED 6-HYDROXY-4-METHY-3-N-PYRIDINIUMPYRIDONE-2 COUPLING COMPONENT RADICALS, DYES COMPOSITIONS COMPRISING THEM AND THEIR USE

Helmut Moser, Oberwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland
Continuation of Ser. No. 164,098, Jun. 30, 1980, abandoned, which is a division of Ser. No. 809,284, Jun. 23, 1977, abandoned, which is a continuation-in-part of Ser. No. 700,933, Jun. 29, 1976, abandoned. This application Jul. 29, 1986, Ser. No. 891,723
Claims priority, application Switzerland, Jun. 30, 1975, 8466/75; Nov. 5, 1975, 14261/75; Aug. 4, 1976, 9942/76
Int. Cl.^{5} C09B *44/02, 44/08;* **D06P** *1/41, 1/08*
U.S. Cl. 534—606 **56 Claims**

1. A compound of the formula



wherein
R is 2,7-fluoroenylene,

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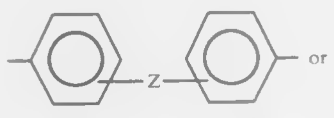
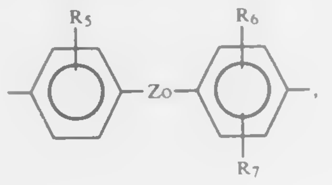
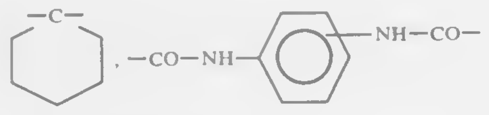
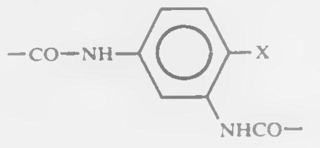


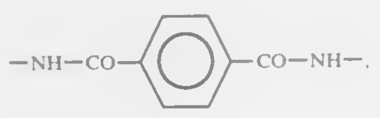


wherein

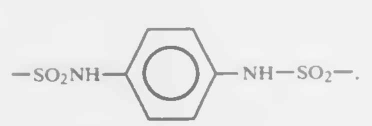
Z is a direct bond, straight or branched C_{1-6}alkylene, —CO—, —NHCSNH—, —S—, —O—, —CH═CH—, —S—S—, —SO_2—, —NH—, —NH—CO—, —NCH$_3$—CO—,



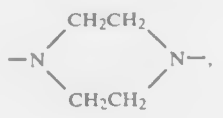


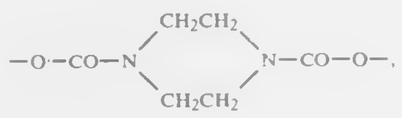


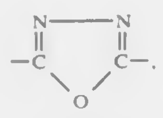
—XO_2NH—,



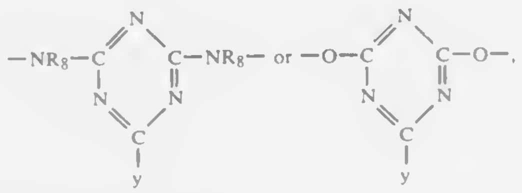
—NR_8—CO—$(CH_2)_n$—CO—NR_8—, —NR_8—CO—CH═CH—CO—NR_8—, —NR_8—CO—NR_8—, —CO—NH—NH—CO—, —CH_2—CO—NH—NH—CO—CH_2—, —CH═CH—CO—NH—NH—CO—CH═CH—,







—O—CO—O—, —CO—O—, —CO—CO—, —O—$(CH_2)_n$—O—,



wherein

each R_8 is independently hydrogen or C_{1-4}alkyl,

x is halo, C_{1-4}alkyl or C_{1-4}alkoxy,

y is halo, —$NHCH_2CH_2OH$ or —$N(CH_2CH_2OH)_2$, and

n is 1, 2, 3 or 4, with the proviso that Z is meta or para to each —N═N— linkage,

Zo is a direct bond, —N═N—, —CH_2— or —CH_2CH_2—,

R_5 is hydrogen, halo, C_{1-4}alkyl or C_{1-4}alkoxy,

R_6 is halo, C_{1-4}alkyl or C_{1-4}alkoxy, and

R_7 is hydrogen, C_{1-4}alkyl or C_{1-4}alkoxy,

each R_1 is independently hydrogen, C_{1-4}alkyl, C_{2-4}hydroxyalkyl the hydroxy group of which is in other than the 1-position or —NR_3R_4, wherein each of R_3 and R_4 is independently n-C_{1-4}alkyl,

each R_2 is independently hydrogen, n-C_{1-4}alkyl, n-C_{1-4}-hydroxyalkyl or C_{1-4}alkoxy, and

each $A^\ominus$ is an anion,

wherein each halo is independently fluoro, chloro or bromo.

5,023,325

FIBRE-REACTIVE DYES CONTAINING A SUBSTITUTED AMINOCARBONYL-PHENYLAMINO OR NAPHTHYLAMINO REACTIVE MOIETY

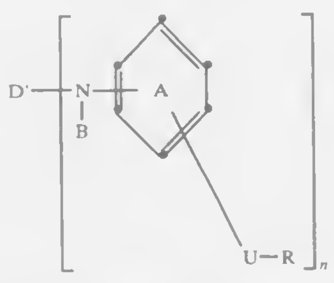
Athanassios Tzikas, Pratteln, and Peter Aeschlimann, Allschwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 884,770, Jul. 11, 1986, abandoned. This application May 11, 1988, Ser. No. 191,845

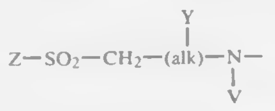
Int. Cl.⁵ C09B *62/04, 62/503;* **D06P** *3/10, 3/66*

U.S. Cl. 534—618 **8 Claims**

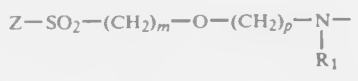
1. A fibre reactive dye of the formula



in which D′ is the radical of an anthraquinone, phthalocyanine, formazane, azomethine, dioxazine, phenazine, stilbene, triphenylmethane, xanthene, thioxanthone, nitroaryl, naphthoquinone, pyrenequinone or perylenetetracarbimide dye; U is —CO—; R is a radical of the formula

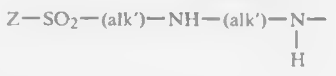


$$\text{Z}-\text{SO}_2-\text{CH}_2-\overset{\text{Y}}{\overset{|}{(\text{alk})}}-\underset{\underset{\text{V}}{|}}{\text{N}}-$$



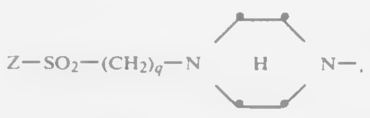
$$\text{Z}-\text{SO}_2-(\text{CH}_2)_m-\text{O}-(\text{CH}_2)_p-\underset{\underset{\text{R}_1}{|}}{\text{N}}-$$

-continued

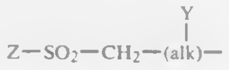


$$\text{Z}-\text{SO}_2-(\text{alk}')-\text{NH}-(\text{alk}')-\underset{\underset{\text{H}}{|}}{\text{N}}-$$

or



Z is sulfatoethyl, β-thiosulfatoethyl, β-phosphatoethyl, β-acetoxyethyl, β-halogenoethyl or vinyl; alk is a polymethylene radical having 1 to 6 C atoms or its branched isomers; Y is hydrogen, chlorine, bromine, fluorine, hydroxyl, sulfator, C_1-C_4alkanoyloxy, cyano, carboxyl, alkoxycarbonyl having 1 to 5 C atoms, carbamoyl or a radical —SO_2—Z in which Z is as defined above; V is hydrogen or C_1-C_4-alkyl which is unsubstituted or substituted by carboxyl, sulfo, C_1-C_2-alkoxy, halogen or hydroxyl; or a radical



$$\text{Z}-\text{SO}_2-\text{CH}_2-\overset{\text{Y}}{\overset{|}{(\text{alk})}}-$$

in which Z, alk and Y are as defined above; R_1 is hydrogen or C_1-C_6-alkyl; alk', independently of each other, are polymethylene radicals having 2 to 6 C atoms or their branched isomers; n is 1 to 4, m is 1 to 6, p is 1 to 6 and q is 1 to 6; B is hydrogen or alkyl having 1 to 4 carbon atoms which is unsubstituted or substituted by carboxyl, sulfo, cyano or hydroxyl; and the benzene or naphthalene radical A is further unsubstituted or is substituted by C_1-C_4-alkyl, C_1-C_4-alkoxy halogen hydroxyl carboxyl.

5,023,326

REACTIVE DYES CONTAINING THE 2-(CYANO, CARBONAMIDO, SULFO-, HYDROXY- OR SULFATO-C_2-C_5-ALKYLENEAMINO)-6-SULFO- OR 3,6-DISULFO-8-HYDROXYNAPHTHYL-(1) COUPLING COMPONENT

Athanassios Tzikas, Pratteln, and Herbert Seiler, Rieben, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

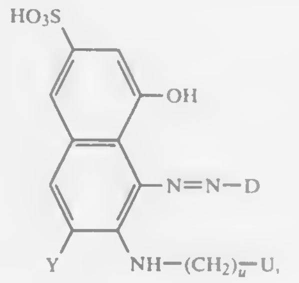
Filed Nov. 9, 1989, Ser. No. 435,222

Claims priority, application Switzerland, Nov. 16, 1988, 4261/88

Int. Cl.⁵ C09B *62/028, 62/45;* **D06P** *1/382, 1/384*

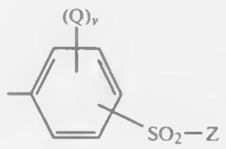
U.S. Cl. 534—638 **23 Claims**

1. A reactive dye of the formula

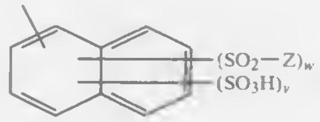


(1)

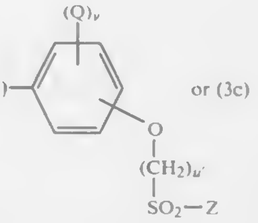
in which Y is hydrogen or sulfo, U is —CN, —$CONH_2$, —SO_3H, —OH or —OSO_3H, u is the number 2, 3, 4 or 5 and D is a radical of the formula



(3a),

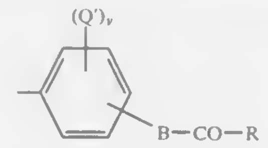


(3b)



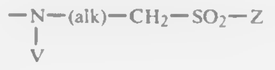
or (3c)

in which Q is C_1–C_4alkyl, C_1–C_4alkoxy, halogen, carboxyl or sulfo, v is the number 0, 1 or 2 and w is the number 1 or 2 and u′ is the number 2, 3, 4 or 5, and Z is β-sulfatoethyl, β-thiosulfatoethyl, β-phosphatoethyl, β-acyloxyethyl, β-halogenoethyl or vinyl; or D is a radical of the formula

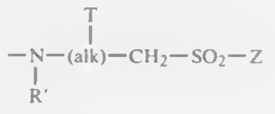


(6)

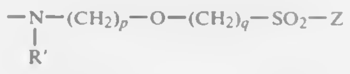
Q′ is C_1–C_4alkyl, C_1–C_4alkoxy, halogen, carboxyl, sulfo or —SO_2—Z in which Z is as defined above, v is the number 0, 1 or 2, B is a direct bond or a radical —(CH_2)—$_n$ or —O—(CH_2)—$_n$; n is 1, 2, 3, 4, 5 or 6; R is a radical of the formula



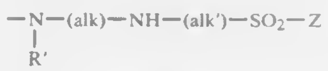
$$-\underset{\underset{\text{V}}{|}}{\text{N}}-(\text{alk})-\text{CH}_2-\text{SO}_2-\text{Z} \quad (7a)$$



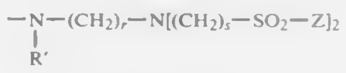
$$-\underset{\underset{\text{R}'}{|}}{\text{N}}-\overset{\text{T}}{\overset{|}{(\text{alk})}}-\text{CH}_2-\text{SO}_2-\text{Z} \quad (7b)$$



$$-\underset{\underset{\text{R}'}{|}}{\text{N}}-(\text{CH}_2)_p-\text{O}-(\text{CH}_2)_q-\text{SO}_2-\text{Z} \quad (7c)$$

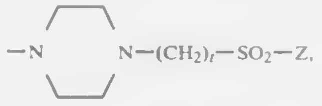


$$-\underset{\underset{\text{R}'}{|}}{\text{N}}-(\text{alk})-\text{NH}-(\text{alk}')-\text{SO}_2-\text{Z} \quad (7d)$$



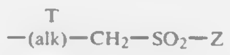
$$-\underset{\underset{\text{R}'}{|}}{\text{N}}-(\text{CH}_2)_r-\text{N}[(\text{CH}_2)_s-\text{SO}_2-\text{Z}]_2 \quad (7e)$$

or



(7f)

in which R′ is hydrogen or C_1–C_6alkyl, alk is an alkylene radical having 1 to 7 carbon atoms or branched isomers thereof, T is hydrogen, halogen, hydroxyl, sulfato, carboxyl, cyano, C_1–C_4alkanoyloxy, C_1–C_4alkoxycarbonyl, carbamoyl or a radical —SO_2—Z, V is hydrogen or C_1–C_4alkyl or a radical of the formula



$$-\overset{\text{T}}{(\text{alk})}-\text{CH}_2-\text{SO}_2-\text{Z}$$

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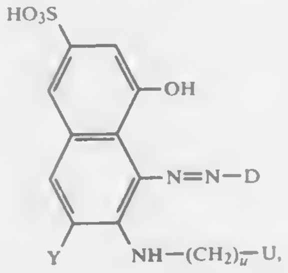
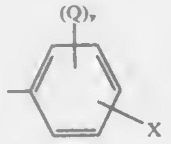
in which (alk) is as defined above, alk', independently of one another, are polymethylene radicals having 2 to 6 C atoms or branched isomers thereof, Z is as defined above, p, q, r and t, independently of one another, are each the number 1, 2, 3, 4, 5 or 6 and s is 2, 3, 4, 5 or 6.

2. A reactive dye of the formula

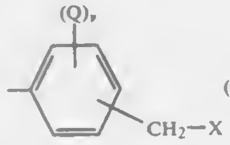


(1)

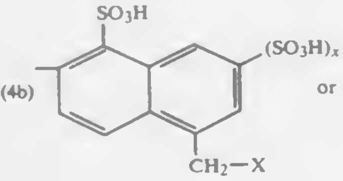
in which Y is hydrogen or sulfo, U is —CN, —CONH$_2$, —SO$_3$H, —OH or —OSO$_3$H, u is the number 2, 3, 4 or 5, and D is a radical of the formula



(4a)



(4b)



or (4c)

and X is a radical of the formula

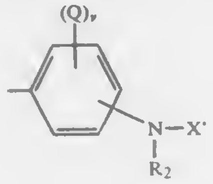
—NHCOCBr═CH$_2$ (5a),

—NHCOCHBrCH$_2$Br (5b),

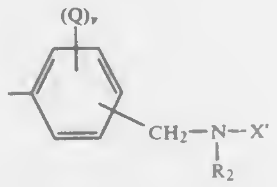
—NHCO—(CH$_2$)$_3$SO$_2$—Z (5c) or

—N(R$_{11}$)—SO$_2$—Z (5d),

Q is C$_1$–C$_4$alkyl, C$_1$–C$_4$alkoxy, halogen, carboxyl or sulfo, v is the number 0, 1 or 2, R$_{11}$ is hydrogen, methyl or ethyl, x is the number 0 or 1, and Z is β-sulfatoethyl, β-thiosulfatoethyl, β-phosphatoethyl, β-acyloxyethyl, β-halogenoethyl or vinyl; or D is a radical of the formula



(9a)



(9b)

or

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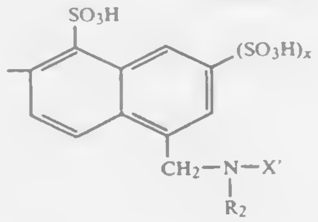
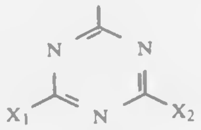


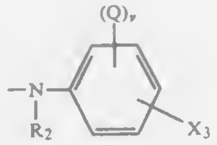
(9c)

in which Q, v and x are defined as given for formulae (4a), (4b) and (4c), R$_2$ is hydrogen, methyl, or ethyl, and X' is 2,4,5-trichloro-6-pyrimidinyl or 2,4-difluoro-5-chloro-6-pyrimidinyl, or X' is a radical of the formula



(10)

X$_1$ is fluorine or chlorine and X$_2$ is a radical of the formula



(11)

in which R$_2$, v and Q are defined as given for formulae (9a), (9b) and (9c) and X$_3$ is a radical of the formula

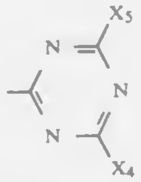
—NHCOCBr═CH$_2$ (5a),

—NHCOCHBr—CH$_2$Br (5b),

—NHCO—(CH$_2$)$_3$SO$_2$—Z (5c) or

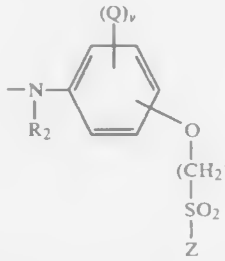
—N(R$_{11}$)—SO$_2$—Z (5d),

R$_{11}$ is hydrogen, methyl or ethyl, and Z β-sulfatoethyl, β-thiosulfatoethyl, β-phosphatoethyl, β-acyloxyethyl, β-halogenoethyl or vinyl, or X' is a radical of the formula



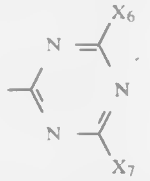
(12)

in which X$_4$ is fluorine, chlorine, bromine, sulfo, C$_1$–C$_4$alkylsulfonyl, phenylsulfonyl, carboxypyridinium, —NH$_2$ or C$_1$–C$_4$alkylamino, N,N-di-C$_1$–C$_4$alkylamino, phenylamino, N-C$_1$–C$_4$alkyl-N-phenylamino or naphthylamino, in which the alkyl radicals are unsubstituted or substituted by C$_1$–C$_4$alkoxy, cyano, halogen, hydroxyl, sulfo or sulfato, and the phenyl or naphthyl radical can be substituted by C$_1$–C$_4$alkyl, C$_1$–C$_4$alkoxy, halogen, carboxyl or sulfo; or is morpholino, or has the same meaning as X$_5$, independently thereof, and X$_5$ is a radical of the formula



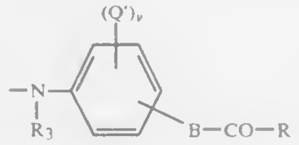
(13c)

in which Q, v, R$_2$, u and Z are defined as given above, or X' is a radical of the formula



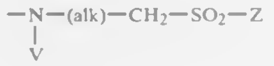
(14)

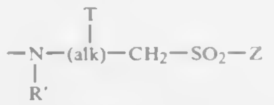
in which X$_6$ is fluorine, chlorine, bromine, sulfo, C$_1$–C$_4$alkylsulfonyl, phenylsulfonyl, carboxypyridinium, —NH$_2$ or C$_1$–C$_4$alkylamino, N,N-di-C$_1$–C$_4$alkylamino, phenylamino, N-C$_1$–C$_4$alkyl-N-phenylamino or naphthylamino, in which the alkyl radicals are unsubstituted or substituted by C$_1$–C$_4$alkoxy, cyano, halogen, hydroxyl, sulfo or sulfato, and the phenyl or naphthyl radical can be substituted by C$_1$–C$_4$alkyl, C$_1$–C$_4$alkoxy, halogen, carboxyl or sulfo; or is morpholino, or has the same meaning as X$_7$ independently thereof, and X$_7$ is a radical of the formula

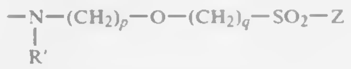


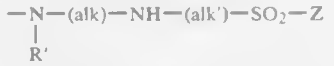
(15)

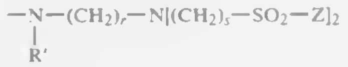
in which Q' is C$_1$–C$_4$alkyl, C$_1$–C$_4$alkoxy, halogen, carboxyl, sulfo, —SO$_2$—Z or sulfato, v is the number 0, 1 or 2, R$_3$ is hydrogen or C$_1$–C$_4$alkyl which is unsubstituted or substituted by halogen, hydroxyl, cyano, C$_1$–C$_4$alkoxy, C$_1$–C$_4$alkoxycarbonyl, carboxyl, sulfamoyl, sulfo or sulfato, B is a direct bond or a radical —(CH$_2$)—$_n$ or —O—(CH$_2$)—$_n$; n is 1, 2, 3, 4, 5 or 6; R is a radical of the formula


$$-\underset{V}{\underset{|}{N}}-(\mathrm{alk})-CH_2-SO_2-Z \quad (7a)$$


$$-\underset{R'}{\underset{|}{N}}-\overset{T}{\overset{|}{(\mathrm{alk})}}-CH_2-SO_2-Z \quad (7b)$$

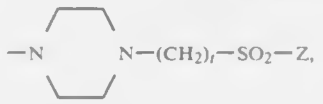

$$-\underset{R'}{\underset{|}{N}}-(CH_2)_p-O-(CH_2)_q-SO_2-Z \quad (7c)$$


$$-\underset{R'}{\underset{|}{N}}-(\mathrm{alk})-NH-(\mathrm{alk'})-SO_2-Z \quad (7d)$$


$$-\underset{R'}{\underset{|}{N}}-(CH_2)_r-N[(CH_2)_s-SO_2-Z]_2 \quad (7e)$$

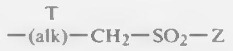
or

-continued



(7f)

in which R' is hydrogen or C$_1$–C$_6$alkyl, alk is an alkylene radical having 1 to 7 carbon atoms or branched isomers thereof, T is hydrogen, halogen, hydroxyl, sulfato, carboxyl or cyano, C$_1$–C$_4$alkanoyloxy, C$_1$–C$_4$alkoxycarbonyl, carbamoyl or a radical —SO$_2$—Z, V is hydrogen or C$_1$–C$_4$alkyl or a radical of the formula


$$-\overset{T}{(\mathrm{alk})}-CH_2-SO_2-Z$$

in which (alk) is as defined above, alk', independently of one another, are polymethylene radicals having 2 to 6 C atoms or branched isomers thereof, Z is as defined above, p, q, r and t, independently of one another, are each the number 1, 2, 3, 4, 5 or 6 and s is 2, 3, 4, 5 or 6, or X$_7$ is a radical of the formula (7a), (7b), (7c), (7d), (7e) or (7f) which is bound directly to the triazine ring and in which Z, alk, T, V, R', alk', p, q, r, s and t are as defined above.

5,023,327
FLUORINE-CONTAINING GLYCOSIDE AND ITS USE

Ryohei Yamaoka; Keizo Hayashiya; Tohru Yoshimura, all of Kyoto; Eiji Seki, Settsu; Tetsuya Masutani, Osaka, and Katsuhiko Kitahara, Kyoto, all of Japan, assignors to Daikin Industries Ltd., Osaka, Japan

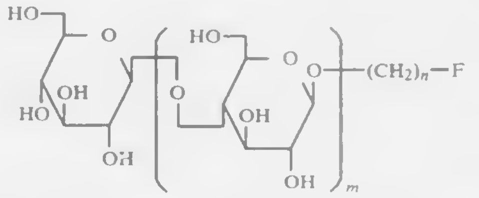
Filed Feb. 27, 1989, Ser. No. 315,535

Claims priority, application Japan, Feb. 27, 1988, 63-46917

Int. Cl.^{5} C07H *15/04;* **A01N** *43/18*

U.S. Cl. 536—18.4 **9 Claims**

1. A fluorine-containing glycoside of the formula:



(I)

wherein n is an even number of 2 to 20, and m is an integer of 0 to 5.

5,023,328
LEPIDOPTERAN AKH SIGNAL SEQUENCE

Max D. Summers, Bryan; James Y. Bradfield, and Larry L. Keeley, both of College Station, all of Tex., assignors to The Texas A&M University System, College Station, Tex.

Filed Aug. 4, 1989, Ser. No. 389,377

Int. Cl.^{5} C12N *15/16, 15/12*

U.S. Cl. 536—27 **3 Claims**

1. A purified, isolated DNA sequence comprising a DNA sequence coding for a signal peptide for a Lepidopteran *Manduca sexta* adipokinetic hormone precursor.

5,023,329
SUCROSE-6-ESTER PRODUCTION PROCESS

David S. Neiditch; Nicholas M. Vernon, and Robert E. Wingard, Jr., all of Athens, Ga., assignors to Noramco, Inc., Athens, Ga.

Filed Apr. 23, 1990, Ser. No. 512,692

Int. Cl.^{5} C07H *13/00, 23/00, 1/00;* **C08B** *37/00*

U.S. Cl. 536—119 **15 Claims**

1. Process which consists essentially of reacting sucrose with

VOL
1127
ISS
2
JE
11
1991
UMI

a di(hydrocarbyl)tin oxide in an inert organic reaction vehicle with removal of water for a period of time and at a temperature sufficient to produce a 1,3-di-(6-O-sucrose)-1,1,3,3-tetra(hydrocarbyl)distannoxane.

5,023,330
PROCESS FOR PREPARING 1,6-β-D-ANHYDROGLUCOPYRANOSE (LEVOGLUCOSAN) IN HIGH PURITY

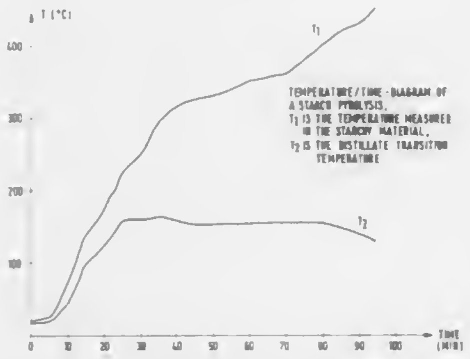
Michael Gander, Worms; Knut M. Rapp, Offstein, and Hubert Schiweck, Worms, all of Fed. Rep. of Germany, assignors to Suedzucker-Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

Filed Jan. 30, 1989, Ser. No. 302,885

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1988, 3803339

Int. Cl.^{5} C07H *3/10, 19/00;* **C08B** *37/00;* **C13K** *13/00*

U.S. Cl. 536—124 **20 Claims**



1. A process of preparing 1,6-β-D-anhydroglucopyranose (levoglucosan) in high purity comprising:
  vacuum pyrolyzing, at a pressure of less than 13.34 kPa, at least one material, having a water content of up to about 20%, selected from the group consisting of starch containing materials, and cellulose containing materials at a temperature of greater than about 150° C. to produce a levoglucosan containing volatile pyrolysis product;
  condensing the volatile products of said pyrolysis;
  neutralizing said condensate, with a base, to a pH of about 6 to 8;
  chromatographically separating said neutralized condensate with water at about 20–100° C. in contact with a substantially neutral ion-exchanger selected from the group consisting of sulfonated polystyrene and polyacrylate, whereby eluting salts and high molecular weight materials prior to eluting the levoglucosan containing fraction;
  concentrating the levoglucosan containing fraction; and
  crystallization levoglucosan from said concentrated fractions.

5,023,331
CEFADROXIL SOLVATES

Leonardo Marsili, Segrate, Italy, assignor to Rifar S.R.L., Milan, Italy

Continuation of Ser. No. 323,129, Mar. 13, 1989, Pat. No. 4,962,195, which is a continuation of Ser. No. 43,494, Apr. 28, 1987, abandoned. This application Jan. 3, 1990, Ser. No. 460,663

Int. Cl.^{5} C07D *501/22*

U.S. Cl. 540—230 **4 Claims**

1. Cefadroxyl solvate of monomethylformamide.

5,023,332
1-METHYL-3,5,7-TRIAZA-1-AZONIATRICYCLODECANE TRIIODIDE

S. Rao Rayudu, Germantown, Tenn., assignor to Buckman Laboratories International, Inc., Memphis, Tenn.

Division of Ser. No. 268,205, Nov. 4, 1988, Pat. No. 4,892,583. This application Oct. 27, 1989, Ser. No. 427,364

Int. Cl.^{5} C07D *487/18*

U.S. Cl. 544—185 **1 Claim**

1. The compound 1-methyl-3,5,7-triaza-1-azoniatricyclodecane triiodide.

5,023,333
DERIVATIVES OF 8-HYDROXYQUINOLINE

Adolf Hubele, Magden, Switzerland, assignor to CIBA-GEIGY Corporation, Ardsley, N.Y.

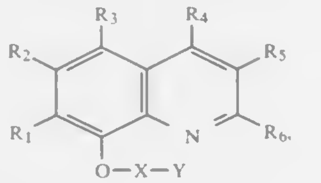
Division of Ser. No. 6,868,372, May 27, 1986, Pat. No. 4,902,340, which is a continuation of Ser. No. 6,663,739, Oct. 22, 1984, abandoned, which is a continuation-in-part of Ser. No. 6,539,604, Oct. 6, 1983, abandoned, which is a continuation-in-part of Ser. No. 6,490,912, May 2, 1983, abandoned. This application Apr. 14, 1989, Ser. No. 338,830

Claims priority, application Switzerland, May 7, 1982, 2841/82-9

Int. Cl.^{5} C07D *401/06, 401/12, 413/06, 215/24*

U.S. Cl. 546—175 **5 Claims**

1. A compound of the formula I



(I)

in which
  R_1, R_2 and R_3 independently of one another are hydrogen, halogen, nitro, cyano or C_1–C_3alkyl,
  R_4, R_5 and R_6 independently of one another are hydrogen, halogen or C_1–C_3alkyl,
  X is an alkylene radical having 1 to 3 atoms,
  Y is —$CONR_9R_{10}$,
  R_9 is hydrogen: C_1–C_{18}alkyl; C_2–C_8alkyl which is substituted by an amino group; C_2–C_6alkyl, which is substituted by halogen, hydroxyl, C_1–C_6alkylamino, C_2–C_8dialkylamino, C_2–C_6hydroxyalkylamino, C_2–C_6di-(hydroxyalkyl)-amino, C_2–C_6aminoalkylamino or C_1–C_4alkoxycarbonyl; C_1–C_4alkyl substituted by cyano, a phenyl radical, which is unsubstituted or substituted by halogen, nitro, C_1–C_3alkyl or C_1–C_3alkoxy, C_3–C_6cycloalkyl, or a furanyl, tetrahydrofuranyl, piperidino or morpholino radical; C_1–C_3alkoxy; C_3–C_6alkenyl; cyclohexyl, which is unsubstituted or substituted by a methyl group; or phenyl, which is unsubstituted or substituted by one or two substituents selected from the group consisting of chlorine, nitro, cyano, methyl, ethyl, methoxy and trifluoromethyl;
  R_{10} is hydrogen; amino; C_2–C_4dialkylamino; C_1–C_6alkyl; C_1–C_4alkyl, which is substituted by hydroxy or cyano; C_2–C_4alkoxyalkyl; C_3–C_6alkenyl; cyclohexyl; or phenyl; or
  R_9 and R_{10}, together with the nitrogen atom to which they are bonded, are a piperidino, tetrahydro-pyrimidino, morpholino or imidazoyl radical which is unsubstituted or substituted by 1 or 2 methyl groups,
with the proviso that
  a) if X is —$CH(CH_3)$—, R_1 and R_3 are hydrogen or chlorine, R_6 is hydrogen or methyl, R_2, R_4 and R_5 are hydrogen, and
    i) if R_{10} is hydrogen, ethyl, sec.-butyl or allyl, R_9 is not hydrogen, ethyl, sec.-butyl or allyl, or
  b) if X is —CH_2—, R_1 is hydrogen, chlorine, iodine or bromine, R_3 is hydrogen, chlorine, bromine, intro, methyl or ethyl, R_6 is hydrogen or methyl, R_2, R_4 and R_5 are hydrogen, and
    i) R_{10} is hydrogen, C_1–C_4alkyl, allyl or phenyl, R_9 is not hydrogen, C_1–C_4alkyl, allyl or phenyl which is unsubstituted or substituted in its para position by chlorine or
    ii) R_9 and R_{10}, together with the nitrogen atom to which they are bonded, are not morpholine, or
  c) if X is —CH_2—CH_2—CH_2— and R_1, R_2, R_3, R_4, R_5 and R_6 are hydrogen,
    i) R_9 and R_{10} are not ethyl including plant physiologically acceptable acid addition salts thereof.

2. A compound of claim 1, selected from the group consisting of
  2-(8-quinolinoxy)-propionic acid -N-(3-ethoxypropyl)-amide,
  2-(8-quinolinoxy)-propionic acid -N-(2-hydroxyethyl)-N-methylamide,
  2-(8-quinolinoxy)-acetic acid N-(2-hydroxyethyl)-N-methylamide
  2-(8-quinolinoxy)-acetic acid N,N-dihydroxyethylamide
  2-(8-quinolinoxy)-acetic acid-benzylamide
  2-(8-quinolinoxy)-acetic acid N-(1-hydroxymethylpropyl)amide
  2-(8-quinolinoxy)-acetic acid N-[3,3-di(2-hydroxyethyl)-propyl]amide
  2-(8-quinolinoxy)-acetic acid N-(3-methoxypropyl)amide
  2-(8-quinolinoxy)-acetic acid N-2-(2-hydroxyethylamino)-ethylamide
  2-(5-chloro-8-quinolinoxy)-acetic acid N-(3-ethoxypropyl)amide
  2-(5-chloro-8-quinolinoxy)-acetic acid N-(2-hydroxyethyl)-N-methylamide
  2-(5-chloro-8-quinolinoxy)-acetic acid N-(3-hydroxypropyl-)amide and
  2-(5-chloro-8-quinolinoxy)-acetic acid benzylamide.

5,023,334
ANTHELMINTIC PYRIDINYL ACYLHYDRAZONES

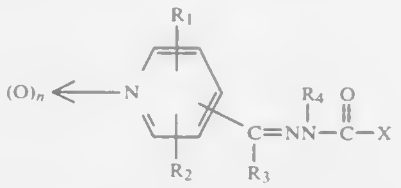
Douglas L. Rector, Oshtemo Township; George A. Conder, Richland Township, and Sylvester D. Folz, Comstock Township, all of Kalamazoo County, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 934,575, Oct. 3, 1986, which is a continuation-in-part of Ser. No. 715,425, Mar. 25, 1985, abandoned, which is a continuation-in-part of Ser. No. 700,375, Feb. 11, 1985, abandoned. This application Sep. 1, 1989, Ser. No. 402,385

Int. Cl.^{5} C07D *405/6, 213/40, 213/55, 213/77*

U.S. Cl. 546—268 **2 Claims**

1. A compound, hydrate thereof or pharmaceutically acceptable salt thereof of the formula



wherein X is selected from (o)C_1–C_6 alkoxy; (p)diphenylmethoxy; (q)cyclo(C_3–C_6)alkyloxy optionally substituted with one or two C_1–C_3 alkyl; (r)phenoxy optionally substituted with one, 2 or 3 C_1–C_4 alkyl, C_1–C_4 alkoxy, halo, or trifluoromethyl; and (s)benzyloxy optionally substituted with one, 2 or 3 C_1–C_4 alkyl, C_1–C_4 alkoxy, halo, or trifluoromethyl; with the proviso that when a 2-pyridinyl acylhydrazone and R_1, R_2, R_4 are hydrogen, R_3 is not benzyl;
  wherein R_1 and R_2, being the same or different, are hydrogen; hydroxy; C_1–C_4 alkyl; C_1–C_3 alkoxy; C_1–C_3 alkylthio; halo or trifluoromethyl;
  wherein R_3 is hydrogen; C_1–C_4 alkyl; cyclo(C_3–C_6)alkyl optionally substituted with one, 2 or 3 C_1–C_3 alkyl; phenyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, halo, trifluoromethyl, or C_1–C_3 alkoxy; phenyl (C_1–C_3)alkyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, halo, trifluoromethyl, or C_1–C_3 alkoxy; or 1,3-dioxacyclohexan-5-yl;
  wherein R_4 is hydrogen; C_1–C_2 alkyl; cyclo(C_3–C_6)alkyl optionally substituted with one, 2 or 3 C_1–C_3 alkyl; phenyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, halo, trifluoromethyl, or C_1–C_3 alkoxy; phenyl(C_1–C_3)alkyl optionally substituted with one, 2, or 3 C_1–C_4 alkyl, halo, trifluoromethyl, or C_1–C_3 alkoxy; and
  wherein n is zero or one;
other than:
  methyl(2-pyridinylmethylene)carbazate;
  ethyl(2-pyridinylmethylene)carbazate.
  ethyl(4-pyridinylmethylene)carbazate; and
  ethyl[1-(2-pyridinyl)ethylidene]carbazate.

2. A compound, hydrate or pharmaceutically acceptable salt thereof, according to claim 1 selected from the group consisting of
  ethyl [1-(4-pyridinyl)ethylidene)carbazate (Cpd #72);
  ethyl (3-pyridinylmethylene)carbazate (Cpd #74);
  1,1-dimethylethyl [1-(4-pyridinyl)ethylidene]carbazate (Cpd #76);
  benzyl [1-(4-pyridinyl)ethylidene]carbazate (Cpd #79);
  diphenylmethyl [1-(4-pyridinyl)ethylidene]carbazate (Cpd #80);
  diphenylmethyl [1-(2-pyridinyl)ethylidene]carbazate (Cpd #80A);
  methyl(4-pyridinylmethylene)carbazate hydrate (Cpd #83);
  benzyl (4-pyridinylmethylene)carbazate (Cpd #84);
  methyl [1-(4-pyridinyl)ethylidene]carbazate (Cpd #85);
  diphenylmethyl (4-pyridinylmethylene)carbazate (Cpd #86);
  methyl [1-(3-pyridinyl)ethylidene]carbazate (Cpd #89);
  1,1-dimethylethyl [1-(4-pyridinyl)propylidene]carbazate (Cpd #91);
  benzyl [1-(4-pyridinyl)propylidene]carbazate (Cpd #92);
  methyl [1-(4-pyridinyl)propylidene]carbazate (Cpd #93);
  phenyl [1-(4-pyridinyl)ethylidene]carbazate (Cpd #94);
  phenyl [1-(4-pyridinyl)ethylidene]carbazate monohydrochloride (Cpd #95);
  5-methyl-2-(1-methylethyl)cyclohexyl[1-(4-pyridinyl)ethylidene]carbazate (Cpd #97);
  ethyl [1-(4-pyridinyl)pentylidene]carbazate (Cpd #99);
  phenyl [1-(4-pyridinyl)butylidene]carbazate monohydrochloride (Cpd #100);
  phenyl (4-pyridinylmethylene)carbazate monohydrochloride (Cpd #101);
  1,1-dimethylethyl [1-(3-pyridinyl)propylidene]carbazate (Cpd #103);
  ethyl [1-(b-2-pyridinyl)propylidene]carbazate (Cpd #105);
  1,1-dimethylethyl [1-(2-pyridinyl)propylidene]carbazate (Cpd #106);
  ethyl [1-(3-pyridinyl)propylidene]carbazate (Cpd #107);
  1,1-dimethylethyl [1-(4-pyridinyl)butylidene]carbazate (Cpd #108);
  ethyl [1-(4-pyridinyl)ethylidene]carbazate 1-oxide (Cpd #109);
  ethyl [1-(4-pyridinyl)butylidene]carbazate (Cpd #110);
  methyl [1-(4-pyridinyl)ethylidene]carbazate 1-oxide (Cpd #111);
  phenyl [1-(4-pyridinyl)butylidene]carbazate 1-oxide (Cpd #112);
  1,1-dimethylethyl [1-(4-pyridinyl)butylidene]carbazate 1-oxide (Cpd #113);
  ethyl [1-(4-pyridinyl)butylidene]carbazate 1-oxide (Cpd #114);
  1,1-dimethylethyl [3-methyl-1-(4-pyridinyl)butylidene]carbazate (Cpd #116);
  phenyl [1-(4-pyridinyl)ethylidene]carbazate 1-oxide monohydrochloride (Cpd #118);

VOL
1127
ISS
2
JE
11
1991
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benzyl [1-(4-pyridinyl)ethylidene]carbazate 1-oxide hydrate (Cpd #119);
1,1-dimethylethyl [1-(4-pyridinyl)ethylidene]carbazate 1-oxide (Cpd #120);
4-methoxybenzyl (3-pyridinylmethylene)carbazate (Cpd #128);
4-methoxybenzyl (4-pyridinylmethylene)carbazate (Cpd #129);
4-methoxybenzyl [1-(3-pyridinyl)ethylidene]carbazate monohydrate (Cpd #130);
4-methoxybenzyl [1-(4-pyridinyl)ethylidene]carbazate (Cpd #131);
ethyl [(6-methyl-2-pyridinyl)methylene]carbazate hydrate (Cpd #132);
4-methoxybenzyl (2-pyridinylmethylene)carbazate (Cpd #133);
ethyl [1-(6-methyl-3-pyridinyl)ethylidene]carbazate (Cpd #332);
1,1-dimethylethyl[1-(6-methyl-3-pyridinyl)ethylidene]carbazate (Cpd #333);
phenyl[1-(6-methyl-3-pyridinyl)ethylidene]carbazate monohydrochloride (Cpd #334);
methyl [1-(3-chloro-4-pyridinyl)ethylidene]carbazate (Cpd #396);
ethyl [(1,3-dioxan-5-yl)-3-pyridinylmethylene]carbazate (Cpd #422);
ethyl [(1,3-dioxan-5-yl)-4-pyridinylmethylene]carbazate (Cpd #431);
methyl [(1,3-dioxan-5-yl)-3-pyridinylmethylene]carbazate (Cpd #432); and
methyl [(1,3-dioxan-5-yl)-4-pyridinylmethylene]carbazate (Cpd #436).

5,023,335
1,2-BIS (AMINOMETHYL) CYCLOBUTANE-PLATINUM COMPLEXES

Wolfgang Schumacher, Mannheim; Johannes Respondek, Hanau; Jürgen Engel, Alzenau; Jörg Pohl, Halle; Rainer Voegeli, and Peter Hilgard, both of Bielefeld, all of Fed. Rep. of Germany, assignors to ASTA Pharma Aktiengesellschaft

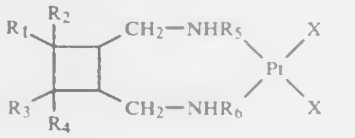
Continuation of Ser. No. 295,072, Jan. 9, 1989, abandoned. This application Sep. 25, 1990, Ser. No. 590,610

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1988, 3800415

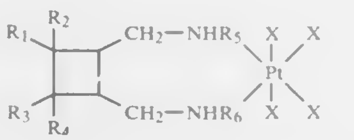
Int. Cl.⁵ C07D *25/00;* **C07F** *15/00*

U.S. Cl. 548—104 **13 Claims**

1. 1,2-Bis(aminomethyl)cyclobutane-platinum compounds having general formula:



I



I'

wherein the radicals, R_1, R_2, R_3, R_4, R_5 and R_6 are the same or different and are selected from the group consisting of hydrogen; C_1–C_6-alkyl; phenyl; phenyl-C_1–C_6-alkyl; C_1–C_6-alkyl which is substituted with halogen, hydroxy, C_2–C_6-alkanoyloxy or C_1–C_6-alkoxy; phenyl which is substituted with halogen, hydroxy, C_2–C_6-alkanoyloxy or C_1–C_6 alkoxy; and phenyl-C_1–C_6-alkyl in which the phenyl group is substituted with halogen, hydroxy, C_2–C_6-alkanoyloxy or C_1–C_6-alkoxy and

wherein x comprises a physiologically acceptable and pharmaceutically useful anion of single or multivalent acids, or a hydroxy anion.

5,023,336
IMIDAZOLE COMPOUND AND PROCESS FOR PREPARING THE SAME

Itaru Shigehara; Toshio Nakajima; Shigeyuki Nishimura, and Takeshi Ohshima, all of Shiga, Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan

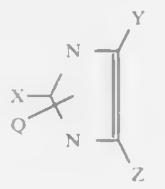
Filed Oct. 20, 1989, Ser. No. 424,630

Claims priority, application Japan, Oct. 20, 1988, 63-264868; Dec. 6, 1988, 63-308678

Int. Cl.⁵ C07D *233/68, 233/90*

U.S. Cl. 548—110 **2 Claims**

1. An imidazole compound represented by formula (I):



(I)

wherein:

X represents a —COOT group, in which T represents a hydrogen atom, an alkyl group, a benzyl group, or a phenyl group; or a $—CONH_2$ group,

Y represents a chlorine atom, or a bromine atom,

Z represents an alkyl group containing from 2 to 6 carbon atoms, which may be substituted with one or more halogen atoms; or a phenyl group which may be substituted with one or more halogen atoms and alkyl groups, and

Q represents a hydrogen atom; an $—SO_2R^1$ group, in which R^1 represents an alkyl group, a dialkylamino group, or a phenyl group which may be substituted with one or more alkyl groups; or a $—CH(R^2)(R^3)$ group, in which R^2 represents a hydrogen atom, a methyl group, or an alkoxy group, and R^3 represents an alkoxy group, an $—OCH_2CH_2Si(CH_3)_3$ group, or a phenyl group which may be substituted with one or more alkyl groups or alkoxy groups.

5,023,337
CHEMICAL PROCESS FOR THE PREPARATION OF PHARMACEUTICALLY ACTIVE COMPOUNDS

Ferenc Sperber; Csaba Huszar, both of Budapest; Attila Németh, Göd; Éva Somfai, and Irén Páli nee Ivanics, both of Budapest, all of Hungary, assigners to Chinoin Gyogyszer- Es Vegyeszeti Termekek Gyara Rt., Budapest, Hungary

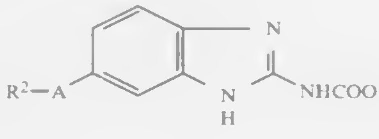
Continuation of Ser. No. 226,411, Jul. 29, 1988, abandoned. This application Jan. 19, 1990, Ser. No. 469,749

Claims priority, application Hungary, Jul. 30, 1987, 3510/87

Int. Cl.⁵ C07D *235/30*

U.S. Cl. 548—306 **2 Claims**

1. A process for the preparation of a compound of the Formula (I)



(I)

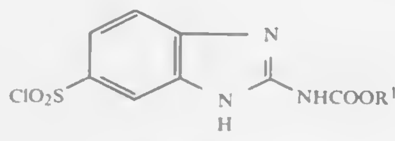
wherein

A is S, SO or SO_2;

R^1 is C_1 to C_4 alkyl; and

R^2 is C_1 to C_4 alkyl,

which comprises reacting a compound of the Formula (II)



(II)

at 20° to 100° C. in an organic solvent with a compound of the Formula (III)

$$R^2_nAlCl_{(3-n)}$$

wherein

n is 1, 2 or 3, whereby

(a) for producing the compound of the Formula (I) where A is S, the molar ratio of the compound of the Formula (II) to the compound of the Formula (III) is 1:3 to 3.5;

(b) for producing the compound of the Formula (I) where A is SO, the molar ratio of the compound of the Formula (II) to the compound of the Formula (III) is 1:2; and

(c) for producing the compound of the Formula (I) where A is SO_2, the molar ratio of the compound of the Formula (II) to the compound of the Formula (III) is 1:1.

5,023,338
RENIN INHIBITORS

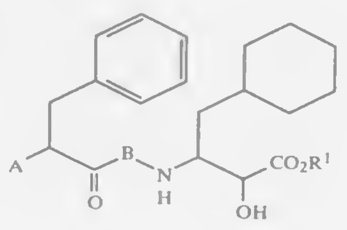
Timothy D. Ocain, Princeton, N.J., and David D. Deininger, Arlington, Mass., assignors to American Home Products Corporation, New York, N.Y.

Filed Mar. 8, 1990, Ser. No. 490,810

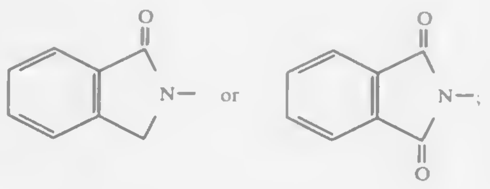
Int. Cl.⁵ C07D *403/12, 221/14, 487/04, 209/46*

U.S. Cl. 548—336 **9 Claims**

1. A compound of the formula:



wherein A is



in which

B is His, Leu, Ile, Nva, Nle, Ala or Val; and

R^1 is hydrogen, alkyl of 1 to 6 carbon atoms, phenyl or phenylalkyl in which the alkyl group has 1 to 6 carbon atoms;

or a pharmaceutically acceptable salt thereof.

5,023,339
STABILIZED MALEIMIDE COMPOSITION AND PROCESS FOR PREPARING SAME

Kenji Kato; Nariyoshi Koga, and Yukinori Haruta, all of Oita, Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

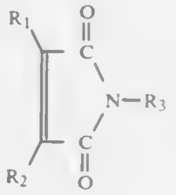
Filed Dec. 5, 1989, Ser. No. 446,266

Int. Cl.⁵ C07D *207/448, 207/452;* **C08F** *22/40*

U.S. Cl. 548—401 **9 Claims**

1. A maleimide composition of high stability comprising

(a) 5 to 70 wt.% of a maleimide compound represented by the formula (I)



(I)

wherein R_1 and R_2 each stand for a hydrogen atom, a halogen atom or a methyl group, R_3 stands for a straight-chained or branched alkyl group having 1 to 18 carbon atoms, a halogen-substituted straight-chained alkyl group having 1 to 18 carbon atoms, a cycloalkyl group having 3 to 12 carbon atoms or an aryl or aralkyl group having 6 to 18 carbon atoms;

(b) 0.1 to 20 wt.% of a surfactant;

(c) 0.1 to 10 wt.% of a protective colloid; and

(d) a balance of water.

5,023,340
PYRROLIZIOINES AND SYNTHESIS THEREOF

George W. J. Fleet, Oxford, United Kingdom, assignor to Monsanto Company, St. Louis, Mo.

Filed Oct. 20, 1989, Ser. No. 424,628

Int. Cl.⁵ C07D *487/04*

U.S. Cl. 548—453 **4 Claims**

1. (1S,2R,7R,7aR)-1,2,7-Trihydroxypyrrolizidine.

2. A method for the synthesis of (1S,2R,7R,7aR)-1,2,7-trihydroxypyrrolizidine comprising:

(a) reacting 4,5-anhydro-1-azido-1-deoxy-2,3-O-isopropylidene-6-O-trifluoromethanesulphonyl-D-talitol with lithium cyanide to form an azidocyanoepoxide,

(b) catalytically hydrogenating the azido-cyanoepoxide to give an amine,

(c) protecting the nitrogen on the amine by reaction of said amine with benzyloxychloroformate to give a benzyloxycarbonyl derivative,

(d) partially hydrolyzing the benzyloxycarbonyl derivative by hydrogen peroxide to give an amide,

(e) silylating the amide to give a protected amide,

(f) removing the benzyloxycarbonyl protecting group by acid hydrolysis to give an aminoamide,

(g) treating the aminoamide with sodium hydrogen carbonate to give a lactam,

(h) treating the lactam with borane:dimethyl sulfide complex to afford an amine borane adduct and

(i) removing the isopropylidine and silyl protecting groups and the borane group in the amine borane adduct by acid hydrolysis to give (1S,2R,7R,7aR)-1,2,7-trihydroxypyrrolizidine.

3. (1S,2R,7S,7aR)-1,2,7-trihydroxypyrrolizidine.

4. A method for the syntheses of (1S,2R,7S,7aR)-1,2,7-trihydroxypyrrolizidine comprising:

(a) reacting (1S,2R,7R,7aR)-7-O-tert-butyldimethylsilyl-1,2-O-isopropylidene-1,2,7-trihydroxypyrrolizidin-5-one with fluoride ion to remove the silyl protecting group and give an alcohol,

(b) oxidizing the alcohol to give the corresponding ketone,

VOL
1127
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(c) reducing the ketone with sodium borohydride to give the inverted lactam,

(d) reducing the lactam with borane:dimethyl sulfide complex to afford a borane adduct and

(e) removing the isopropylidine protecting group and the borane group in the borane adduct by acid hydrolysis to give (1S,2R,7S,7aR)-1,2,7-trihydroxypyrrolizidine.

5,023,341

COMPOUNDS HAVING A DISUBSTITUTED ACETYLENE MOIETY AND RETINOIC ACID-LIKE BIOLOGICAL ACTIVITY

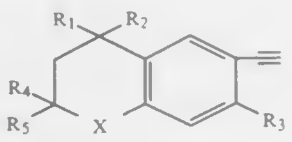
Roshantha A. S. Chandraratna, El Toro, Calif., assignor to Allergan, Inc., Irvine, Calif.

Filed Sep. 19, 1989, Ser. No. 409,477

Int. Cl.⁵ C07D *335/06*

U.S. Cl. 549—23 **9 Claims**

1. A compound of the formula,



wherein

X is S, and each of independently

R_1, R_2, R_3, R_4 and R_5 is hydrogen or lower alkyl having 1 to 6 car bons, or a salt thereof.

5,023,342

CYCLIC SULFATE COMPOUNDS

K. Barry Sharpless, Brookline, Mass., and Yun Gao, Menlo Park, Calif., assignors to Massachusetts Institute of Technology, Mass.

Filed May 26, 1988, Ser. No. 199,157

Int. Cl.⁵ C07D *327/10*

U.S. Cl. 549—34 **6 Claims**

1. A cyclic sulfate compound selected from the group consisting of: 1,2-decanediolcyclic sulfate, (2S*,3S*)-3-(2-methylphenoxy)-3-phenyl-1,2-propanediol cyclic sulfate, (2S*,3S*)-3-isopropyl-oxy-1,2undecanediol cyclic sulfate, (+)-(2S,3S)-3-(2-ethoxyphenoxy)-3-phenyl-1,2-propanediol cyclic sulfate, 3-undecanyl nitrato-1,2-cyclic sulfate, 5,6-decanediol cyclic sulfate, cyclohexyl glycidate-2,3-cyclic sulfate, methyl octadecanoate-2,3-cyclic sulfate, ethyl 3-cyclohexyl propionate-2,3-cyclic sulfate and N-benzyl glycidamide-2,3-cyclic sulfate.

5,023,343

P-AMINO SUBSTITUTED TETRAPHENYLTHIOPHENES AND ELECTROPHOTOGRAPHIC PHOTORECEPTORS CONTAINING THEM

Eishi Tanaka, Kyoto; Tsutomu Nishizawa, Yokohama; Yasuyuki Yamada, Yokohama; Hisato Itoh, Yokohama; Akihiro Yamaguchi. Kamakura, and Masakatsu Nakatsuka, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

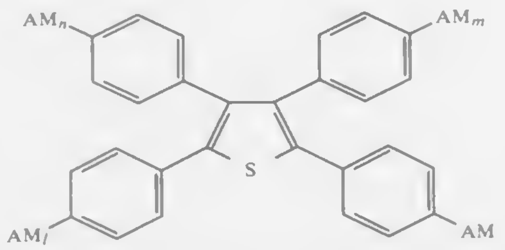
Division of Ser. No. 272,371, Nov. 17, 1988, Pat. No. 4,963,449. This application Jul. 16, 1990, Ser. No. 553,014

Claims priority, application Japan, Nov. 17, 1987, 62-288311; Dec. 16, 1987, 62-316019; Jan. 11, 1988, 63-2459; Jan. 13, 1988, 63-3685

Int. Cl.⁵ C07D *333/12, 333/22*

U.S. Cl. 549—74 **7 Claims**

1. A p-amino substituted tetraphenylthiophene of the formula



wherein AM is a tertiary amino group and each of l, m and n is the integer 0 or 1 and l≧m≧n.

5,023,344

12-HALOGENATED FORSKOLIN DERIVATIVES

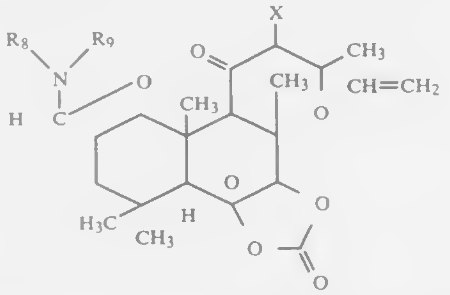
Gregory M. Shutske, Somerset, N.J., assignor to Hoechst-Roussel Pharmaceuticals Incorporated, Somerville, N.J.

Division of Ser. No. 390,126, Aug. 7, 1989, Pat. No. 4,978,678, which is a division of Ser. No. 932,553, Nov. 20, 1986, Pat. No. 4,871,764. This application May 14, 1990, Ser. No. 522,754

Int. Cl.⁵ C07D *317/26*

U.S. Cl. 549—229 **1 Claim**

1. A compound of the formula



where R_8 and R_9 are the same or different and are hydrogen or lower alkyl, and X is F, Cl, Br or I.

5,023,345

PREPARATION OF ALKYLENE CARBONATES

Robert J. Harvey, Teaneck, N.J., assignor to Scientific Design Company, Inc., Little Ferry, N.J.

Division of Ser. No. 502,024, Jun. 7, 1983, Pat. No. 4,841,072, which is a continuation of Ser. No. 326,447, Dec. 2, 1981, abandoned. This application Mar. 22, 1989, Ser. No. 327,126

Int. Cl.⁵ C07D *317/12*

U.S. Cl. 549—230 **9 Claims**

1. A process for preparing alkylene carbonates by the reaction of an alkylene oxide with carbon dioxide in the presence of at least one catalyst selected from the group consisting of organic quaternary ammonium halides, and organic sulfonium halides, at a temperature in the range of 20°-90° C.

5,023,346

PROCESS FOR THE PRODUCTION OF CYCLIC CARBONIC ACID ESTERS

Norbert Schön, and Hans-Josef Buysch, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

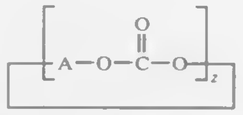
Filed Nov. 13, 1989, Ser. No. 434,443

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1988, 3838752

Int. Cl.⁵ C07D *317/04, 319/02, 323/00*

U.S. Cl. 549—231 **9 Claims**

1. A process for the production of cyclic carbonic acid esters corresponding to formula I



$$\left[A-O-\overset{\overset{O}{\|}}{C}-O \right]_z$$

(I)

by reaction of compounds corresponding to formula II

HO—A—OH

in which

z is an integer of from 1 to 5 and

A is a binding link selected from the residue of an aliphatic diol containing 3 to 18 carbon atoms, the residue of a non-aromatic, carbocyclic or heterocyclic diol containing 3 to 8 ring members, the residue of an ether-group-containing aliphatic diol containing up to 5 ether groups and up to 18 carbon atoms, and the residue of an aromatic or araliphatic dihydroxy compound containing one or two aromatic nuclei

with phosgene, wherein the reaction is carried out in the presence of 0.01 to 5% by weight, based on the weight of the compound of formula II, of a catalytic compound which contains at least one nitrogen atom as a member of an aromatic ring system.

9. In a process for preparing a cyclic carbonic acid ester by reacting a diol with phosgene, the improvement comprising carrying out the reaction in the presence of 0.01 to 5% by weight, based on the weight of diol, of a catalytic compound selected from a pyridine, quinoline, picoline, imidazole, benzimidazole, pyrazole, triazole, or a benzotriazole.

5,023,347

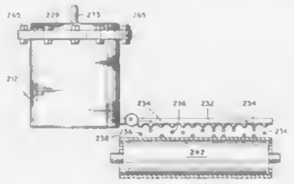
PROCESS FOR PREPARING COMPOSITIONS CONTAINING UNSATURATED LACTONES, PRODUCTS PRODUCED THEREBY AND ORGANOLEPTIC USES OF SAID PRODUCTS

Mohamad I. Farbood, Holmdel; James A. Morris, Wall; Mark A. Sprecker, Sea Bright; Lynda J. Bienkowski, Perth Amboy; Kevin P. Miller, Middletown; Manfred H. Vock, Locust, and Myrna L. Hagedorn, Edison, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

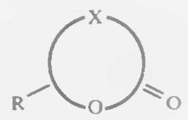
Division of Ser. No. 279,065, Dec. 2, 1988, Pat. No. 4,960,597, which is a continuation-in-part of Ser. No. 228,512, Aug. 5, 1988, Pat. No. 4,946,782. This application Jun. 29, 1990, Ser. No. 545,610

Int. Cl.⁵ C07D *307/04, 307/32, 313/02*

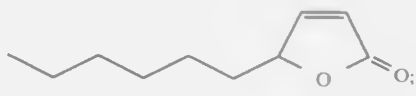
U.S. Cl. 549—263 **1 Claim**

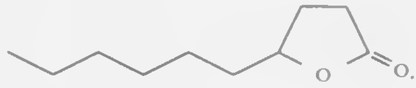


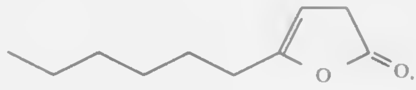
1. A mixture of unsaturated lactones and the saturated lactone, gamma-decalactone, each of which is defined according to the structure:

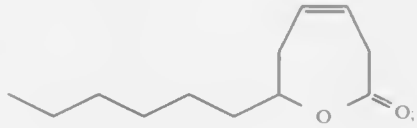


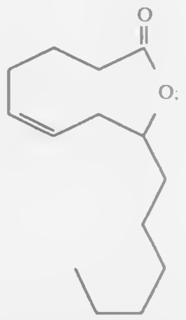
wherein R represents C_6 alkyl or alkenyl; and X represents C_2, C_4 or C_6 alkylene or alkenylene with the provisos that R is C_6 alkyl when X is C_2, C_4 or C_6 alkenylene or C_2 alkylene and R is C_6 alkenyl when X is C_2, C_4 or C_6 alkylene, said lactones having the structures:











VOL 1127 ISS 2 JE 11 1991 UMI

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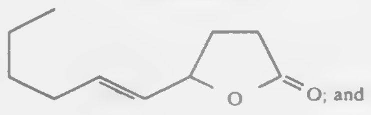
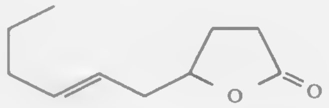


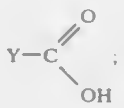


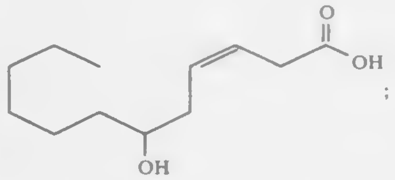
prepared according to the process consisting of the sequential steps of:

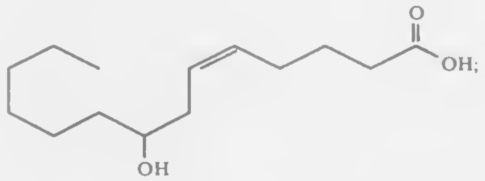
(i) fermenting at a pH in the range of from about 5.5 up to about 7 and at a temperature in the range of from about 20° C. up to about 35° C. castor oil, a castor oil hydrolysate or ricinoleic acid with a microorganism selected from the group consisting of:

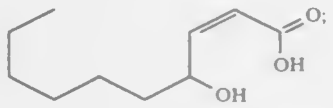
Candida petrophilum, ATCC 20226;
Candida oleophila, ATCC 20177;
Candida sp., ATCC 20504; and
Candida sake, ATCC 28137

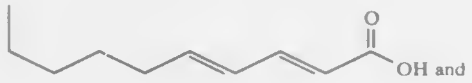
whereby gamma hydroxydecanoic acid and a mixture of other acids defined according to the generic structure:

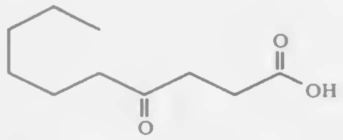




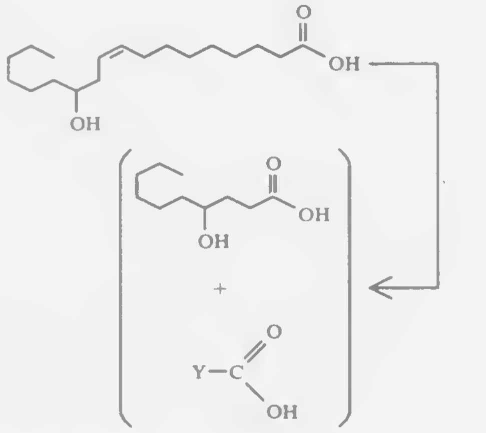




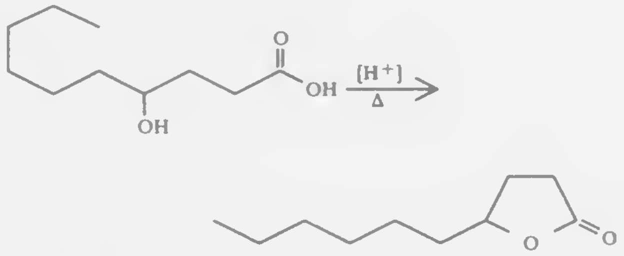




wherein Y represents an oxo-saturated, oxo-unsaturated or di-unsaturated C_9, C_{11} or C_{13} moiety according to the reaction:

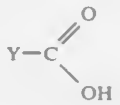


(ii) effecting the lactonization of the resulting gamma hydroxydecanoic acid at a pH in the range of 0–5 and at a temperature in the range of from about 90° C. up to about 120° C. by means of simultaneous acidification and heating according to the reaction:

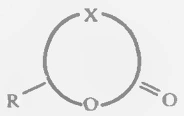


and then

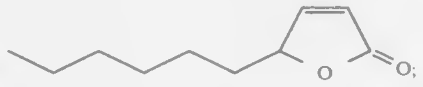
(iii) effecting lactonization by means of distillation at a temperature in the range of 120°-220° C. and at a pH of between about 1 and about 7 of the resulting acids defined according to the structure:

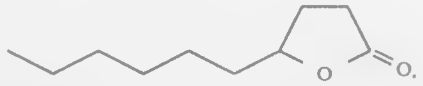


to form the mixture of lactones defined according to the structure:



and having the structures:





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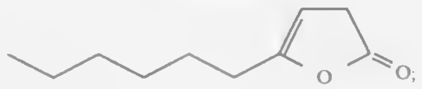
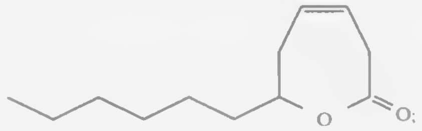
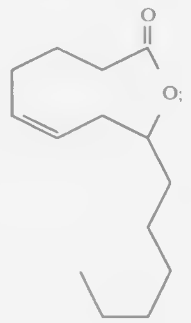
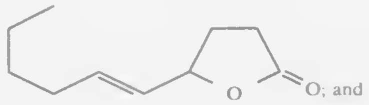
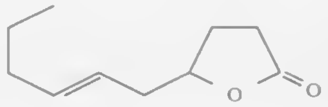


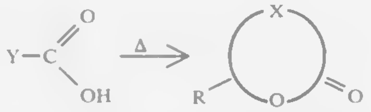








according to the reaction:



whereby the sum of the number of carbon atoms in the X moiety and in the R moiety is equal to the number of carbon atoms in the Y moiety minus 1.

5,023,348

PROCESS FOR THE PREPARATION OF MACROLIDE COMPOUNDS

Oswy Z. Pereira, Hounslow; Michael V. J. Ramsay, South Harrow, and Stephen Freeman, High Wycombe, all of United Kingdom, assignors to American Cyanamid Company, Me.

Continuation of Ser. No. 242,158, Sep. 9, 1988, abandoned. This application Apr. 2, 1990, Ser. No. 504,030

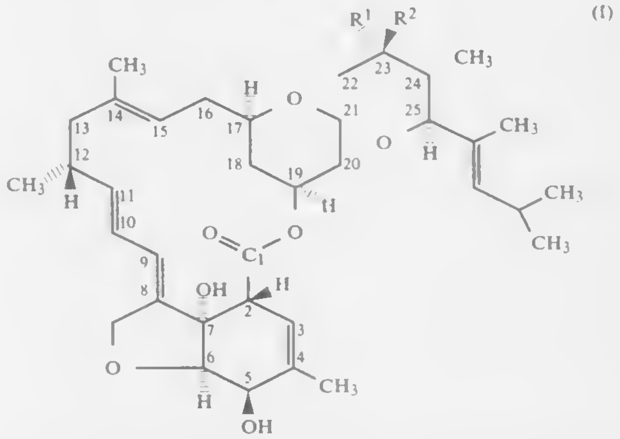
Claims priority, application United Kingdom, Sep. 11, 1987, 8721368; Sep. 11, 1987, 8721369; Sep. 11, 1987, 8721370

Int. Cl.⁵ C07D *313/00*

U.S. Cl. 549—264 **1 Claim**

1. A process for preparing a compound of formula (I)

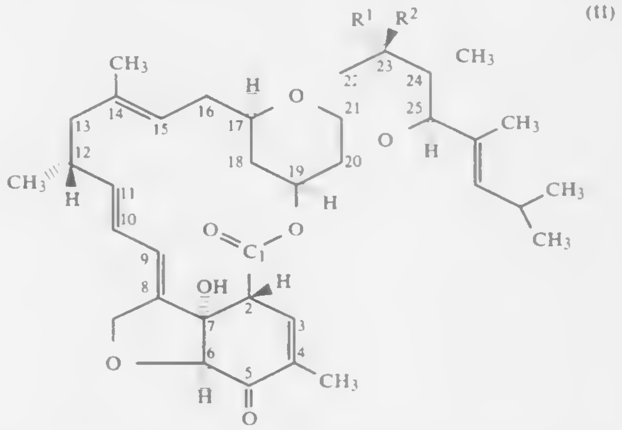
(I)



where (i) R^1 is an ethoxy group and R^2 is a hydrogen atom, (ii) R^1 is a hydrogen atom and R^2 is a bromine atom, or (iii) R^1 and R^2 together with the carbon atom to which they are attached represent >C═O,

which comprises stereoselectively reducing the corresponding compound of formula (II)

(II)



wherein the reduction is effected with sodium borohydride or lithium tributoxyaluminum hydride.

5,023,349

CONTINUOUS PROCESS FOR RAPID CONVERSION OF OLIGOMERS TO CYCLIC ESTERS

Kamlesh K. Bhatia, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

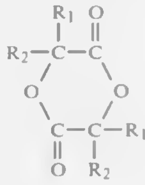
Filed May 8, 1990, Ser. No. 520,348

The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.

Int. Cl.⁵ C07D *319/00*

U.S. Cl. 549—274 **12 Claims**

1. A continuous process for preparing a cyclic ester having the formula



where R_1 and R_2 are independently a hydrogen or a C_1-C_6 aliphatic hydrocarbyl radical, which process comprises

VOL
1127
ISS
2
JE
11
1991
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(i) continuously feeding an oligomer of an alpha-hydroxy carboxylic acid, HOCR1R2COOH, or an ester or a salt thereof, into a reaction zone maintained at a temperature effective to liquefy the oligomer and form cyclic ester;
(ii) continuously feeding into the reaction zone a substance that is gaseous and non-reactive at said temperature, said substance forming a gaseous stream contacting the oligomer so as to form a large interfacial area with the oligomer; the amount and flow rate of the gaseous stream within the reaction zone being sufficient for the gas stream to strip cyclic ester from the oligomer substantially as fast as it is formed;
(iii) removing the gas stream containing cyclic ester from the reaction zone; and
(iv) recovering the cyclic ester from the gas stream.

5,023,350

PROCESS FOR THE PURIFICATION OF CYCLIC ESTERS

Kamlesh K. Bhatia, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 24, 1990, Ser. No. 528,632

The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.

Int. Cl.^{5} C07D *319/00*

U.S. Cl. 549—274 **12 Claims**

1. A process for purifying an impure cyclic ester selected from the group consisting of glycolide, lactides and mixtures thereof, which process comprises
(i) feeding the impure cyclic ester to a stripping device,
(ii) maintaining the cyclic ester molten in the stripping device at a temperature and pressure below its boiling point,
(iii) intimately contacting the molten cyclic ester with a flow of a substance that is gaseous at said temperature and pressure and inert to the cyclic ester,
(iv) removing the gas stream from the stripping device, and
(v) recovering the cyclic ester from the gas stream having a higher purity than the impure cyclic ester.

5,023,351

α-(ω-CYANOALKANOYL-γ-BUTYROLACTONE AND METHOD FOR PRODUCING THE SAME

Hiroshi Yoshida; Noboru Kakeya, and Masanori Kashiwagi, all of Ube, Japan, assignors to Ube Industries, Ltd., Ube, Japan

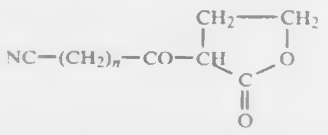
Filed May 29, 1990, Ser. No. 529,897

Claims priority, application Japan, Jun. 6, 1989, 1-142102

Int. Cl.^{5} C07D *307/33*

U.S. Cl. 549—321 **6 Claims**

1. A α-(ω-cyanoalkanoyl)-γ-butyrolactone represented by the formula:



(1)

wherein n represents an integer of 7 to 11.

5,023,352

ALKYL-SUBSTITUTED TETRA- OR HEXAHYDROBENZOPYRAN DERIVATIVES, ORGANOLEPTIC USES THEREOF AND PROCESS FOR PREPARING SAME

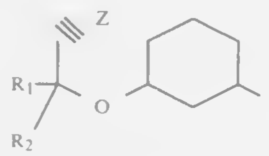
Mark A. Sprecker, Sea Bright; Robert P. Belko, Woodbridge; Marie R. Hanna, Keyport; Charles E. J. Beck, Summit, and Salvatore M. Brucato, Carteret, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 497,693, Mar. 22, 1990, Pat. No. 4,999,439. This application Jun. 29, 1990, Ser. No. 546,356

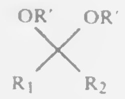
Int. Cl.^{5} C07D *311/74*

U.S. Cl. 549—345 **1 Claim**

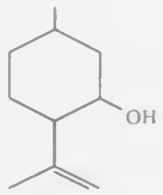
1. A process for preparing an alkyl-substituted tetra- or hexahydrobenzopyran derivative defined according to the structure:



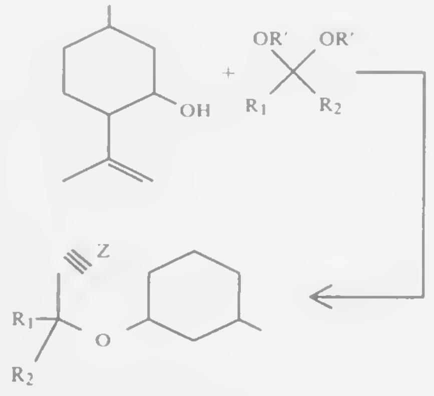
comprising the step of reacting a ketal or acetal having the structure:



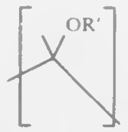
with isopulegol having the structure:



in the presence of a protonic acid catalyst according to the reaction:



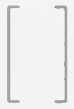
wherein Z is a moiety selected from the group consisting of:



-continued

and

wherein in the moiety having the structure:



one of the dashed lines is a carbon-carbon double bond and each of the other of the dashed lines is a carbon-carbon single bond; wherein R' is methyl or ethyl; and wherein R_1 and R_2 separately are the same or different hydrogen or C_1–C_3 alkyl or R_1 and R2 taken together complete a C_5 or C_6 cycloalkyl moiety.

5,023,353

DEOXOARTEMISININ: NEW COMPOUND AND COMPOSITION FOR THE TREATMENT OF MALARIA

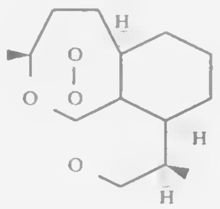
James D. McChesney, Rte. 1, Box 340, Etta, Miss. 38627, and Mankil Jung, 81 Jeff St., Oxford, Miss. 38655

Division of Ser. No. 329,669, Mar. 28, 1989, Pat. No. 4,920,147. This application Feb. 22, 1990, Ser. No. 482,845

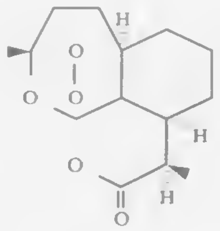
Int. Cl.^{5} C07D *321/10*

U.S. Cl. 549—348 **2 Claims**

1. The method of preparing deoxoartemisinin having the formula:



comprising the step of treating a compound having the formula:



with a reducing agent and refluxing the mixture to yield the deoxoartemisinin.

5,023,354

HIGH PURITY ALDITOL DIACETALS, FREE FROM ORGANIC SOLVENT TRACES AND PROCESSES FOR PREPARING SAME

Jean-Paul Salome, Vieux Berquin, and Guy Flecbe, Merville, both of France, assignors to Roquette Freres, Lestrem, France

Continuation of Ser. No. 177,960, Apr. 5, 1988, abandoned. This application Jul. 9, 1990, Ser. No. 549,548

Claims priority, application France, Apr. 7, 1987, 87 04884

Int. Cl.^{5} C07D *319/04*

U.S. Cl. 549—364 **17 Claims**

1. In a process for preparing a diacetal comprising the successive steps of
acetalizing in an aqueous medium comprising water as single solvent and in the presence of an acid catalyst by introducing in said medium under stirring a benzoic aldehyde and an alditol having 5 or 6 carbon atoms, the initial molar ratio of the benzoic aldehyde to the alditol being lower than 2/1,
neutralizing by means of a base the resulting mixture which is in the form of an aqueous suspension consisting of a solid and of a liquid phase,
separating the solid phase and
washing the separated solid phase with warm water, the improvement according to which
  the acid catalyst is selected from the group consisting of arylsulfonic acids,
  the arylsulfonic acid and the benzoic aldehyde are in a molar ratio which is initially higher than 0.6, and
  the acetalization is carried out at a temperature lower than about 45° C.

5,023,355

STABILIZED B-CAROTENE

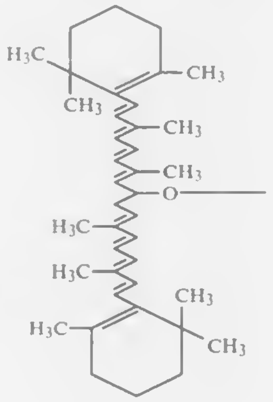
Alfred R. Globus, 26-53 210th St., Bayside, N.Y. 11360, and Joseph Vernice, 80 Parkview Dr. W., Shirley, N.Y. 11967

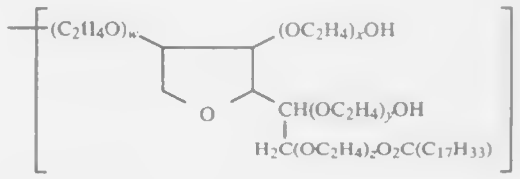
Filed Jun. 20, 1990, Ser. No. 541,039

Int. Cl.^{5} C07D *307/02*

U.S. Cl. 549—478 **6 Claims**

1. Stabilized B-carotene having the following formula:





where; w + x + y + z = 20

VOL
1127
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NOVEL TETRACYANOANTHRAQUINODIMETHANE DERIVATIVES AND PROCESS FOR PRODUCING SAME

Toshio Mukai; Yoshiro Yamashita; Takanori Suzuki, all of Miyagi; Yutaka Akasaki, Kanagawa; Katsuhiro Sato, Kanagawa; Naoya Yabuuchi, Kanagawa; Hiroyuki Tanaka, Kanagawa, and Katsumi Nukada, Kanagawa, all of Japan, assignors to Fuji Xerox Co., Ltd., Tokyo and Toshio Mukai, Miyagi, both of, Japan

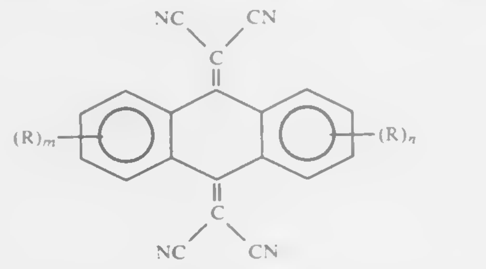
Filed Apr. 14, 1989, Ser. No. 337,997

Claims priority, application Japan, Sep. 12, 1986, 61-214062; Sep. 12, 1986, 61-214063; Sep. 24, 1986, 61-223766; Sep. 24, 1986, 61-223767; Oct. 22, 1986, 61-249541

Int. Cl.⁵ C07C *97/18;* **C09K** *19/58*

U.S. Cl. 552—210 **9 Claims**

1. A process for producing a charge transfer complex of an electron donating compound and a tetracyanoanthraquinodimethane derivative represented by formula (I)



(I)

wherein R represents a halogen atom, a cyano group, a nitro group, lower alkyl group, or a lower alkoxycarbonyl group, and m and n each represents 0, 1, or 2 and m+n is 2; which comprises

(i) dissolving both the tetracyanoanthraquinodimethane derivative and an excess of the electron donating compound in a mixed solvent consisting essentially of a solvent capable of dissolving both of them and a solvent capable of dissolving the electron donating compound but poor for the formed charge transfer complex, and

(ii) evaporating said solvent capable of dissolving both the tetracyanoanthraquinodimethane derivative and electron donating compound to precipitate the charge transfer complex.

5,023,357

ARYLMETHYLAZOLE PREPARATION PROCESSES

Herbert Siegel, Hofheim am Taunus; Klaus-Dieter Kampe, Soden am Taunus; Hans-Georg Alpermann, Königstein/-Taunus; Hermann J. Gerhards, Hofheim am Taunus; Patricia Usinger, Eppstein/Taunus; Ulrich Schacht, Hofheim am Taunus; Margret Leven, Kelkheim; Wolfgang Raether, Dreieich; Walter Dittmar, Hofheim am Taunus, and Burkhard Sachse, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

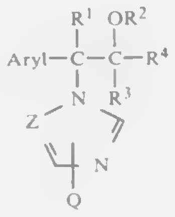
Division of Ser. No. 909,598, Sep. 22, 1986, abandoned. This application Sep. 21, 1989, Ser. No. 411,045

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1985, 3533824; Nov. 23, 1985, 3541429; Aug. 14, 1986, 3627656; Aug. 22, 1986, 3628545

Int. Cl.⁵ C07D *413/00, 403/00, 233/54, 417/00*

U.S. Cl. 544—132 **2 Claims**

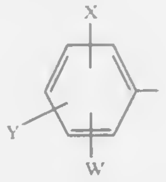
1. A process for the preparation of a compound of the formula I



I

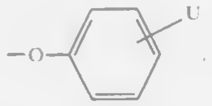
in which

aryl is a radical



or a 1- or 2-naphthyl radical which is unsubstituted or substituted by U and/or a substituent V, where

X is H, (C_1-C_4)-alkyl, phenyl, fluorine, chlorine, bromine, hydroxyl, (C_1-C_4)-alkoxy,



(C_1-C_4)-alkylthio, $—NR_2^5$, in which the radicals R^5, which are identical or different, are (C_1-C_4)-alkyl or together with the nitrogen atom are a pyrrolidine, piperidine or morpholine radical, or X is CF_3 or a benzyloxy group which is unsubstituted or carries one or two substituents in the phenyl radical, the substituents being identical or different and being fluorine, chlorine, OCH_3, OC_2H_5 or (C_1-C_3)-alkyl,

Y is H, (C_1-C_4)-alkyl, fluorine, chlorine, bromine, (C_1-C_4)-alkoxy or (C_1-C_4)-alkylthio, or

X and Y together in the 2,3- or 3,4-position are a $—(CH_2)_L—$-chain, in which L=3 or 4, $—OCH_2CH_2—$ or $—O—CH_2—O—$,

W is H, CH_3 or OCH_3,

V is (C_1-C_4)-alkyl, phenyl, fluorine, chlorine, bromine, hydroxyl, (C_1-C_4)-alkoxy, (C_1-C_4)-alkylthio, $—NR_2^5$, in which R^5 is (C_1-C_4)-alkyl or together with the nitrogen atom is a pyrrolidine, piperidine or morpholine radical, benzyloxy or CF_3, and

U is CH^3, F, Cl or OCH_3,

Z is CH or N,

R^1 and Q are H or (C_1-C_4)-alkyl,

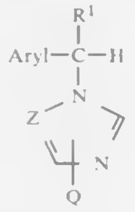
R^2 is H, (C_1-C_4)-alkyl, (C_3-C_5)-alkynyl,

R^3 and R^4, which are identical or different, are H, (C_1-C_{12})-alkyl or other hydrocarbon radicals which are unsubstituted or carry up to 3 substitutents, the substituents being identical or different and being F, Cl, Br, (C_1-C_4)-alkoxy, OC_6H_5 or (C_1-C_4)-alkylthio, or

R^3 and R^4 together are a $(CH_2)_n$-chain which is unsubstituted or substituted by (C_1-C_4)-alkyl, OCH_3 or phenyl, in which n is from 2 to 11, and which contains no benzene rings or 1 or 2 benzene rings which are unsubstituted or carry up to 2 substituents, which may be in a fused form, the substituents being identical or different and being F, Cl, (C_1-C_4)-alkoxy or (C_1-C_4)-alkyl, or a corresponding hydrocarbon chain containing a double bond, the hydrocarbon chain in turn containing no benzene rings or one or two benzene rings which are unsubstituted or carry up to 2 substituents, which may be in a fused form, the substituents being identical or different and being F, Cl, (C_1-C_4)-alkoxy or (C_1-C_4)-alkyl, or a $—(CH_2)_n$-chain which is unsubstituted or substituted by (C_1-C_4)-alkyl, OCH_3, CH_2OCH_3 or phenyl and is bridged singly or multiply, in which n is 4 or 5 and which contains 1 to 5 bridge carbon atoms, and the bridge carbon atoms in turn may be bridged and a bridge contains no C—C double bonds or one C—C double bond, the singly or multiply bridged $—(CH_2)_n$ chain containing no benzene rings or one or two benzene rings which are unsubstituted or carry up to 2 substituents, which may be in a fused form, where the substituents are identical or different and are F, Cl, (C_1-C_4)-alkoxy or (C_1-C_4)-alkyl,

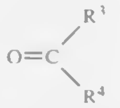
wherein

(a) one or two equivalents of a strong base are added to an arylmethylazole of the formula II



II

wherein aryl, Z, Q and R^1 have the meanings given above, and the product is then reacted first with a carbonyl compound of the formula III



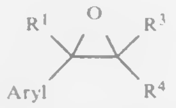
III

in which R^3 and R^4 have the above-mentioned meanings, and then with a protic acid or with an alkyl halide of the formula IV

R^2Hal IV

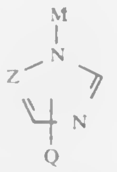
in which R^2 has the meaning given above and Hal represents chlorine, bromine or iodine, to give a compound of the formula I; or

(b) oxiranes of the formula V



V

wherein aryl, R^1, R^3 and R^4 have the above-mentioned meaning, are reacted with a compound of the formula VI



VI

in which M is hydrogen or an alkali metal or alkaline earth metal and Q and Z have the meaning given above, and the product is then reacted with a protic acid or with an alkyl halide of the formula IV R^2Hal; or

(c) in the case of compounds of the formula I which have been prepared by process (a) or (b), a substituent X or V in an aryl radical of the formula I is converted to a different substituent X or V and, if appropriate, the compounds I obtained by (a), (b) or (c) are converted to their acid addition salts with inorganic or organic acids and, if appropriate, a compound obtained by (a), (b) or (c) is resolved into its stereoisomers and/or its optically active enantiomers.

5,023,358

VANADYL ORGANO-MINERAL COMPOUND, METHOD FOR OBTAINING SUCH A COMPOUND, PHARMACEUTICAL COMPOSITION CONTAINING THIS ORGANO-MINERAL COMPOUND

René Lazaro, Clapiers; Gérard Cros, Montpellier, both of France; John H. McNeill, Delta, Canada, and Jean-Jacques Serrano, Montpellier, France, assignors to Panmedica S.A., Carros Cedex, France

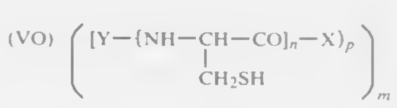
Filed Aug. 10, 1988, Ser. No. 230,520

Claims priority, application France, Aug. 11, 1987, 87 11425

Int. Cl.⁵ C07F *9/00*

U.S. Cl. 556—42 **9 Claims**

1. A vanadyl organo-mineral compound in the form of a complex of vanadyl and of cysteine with the following general formula:



$$(VO)\left(\begin{array}{c}[Y—\{NH—\underset{\displaystyle CH_2SH}{\underset{|}{CH}}—CO]_n—X)_p\end{array}\right)_m \qquad (I)$$

wherein n, p and m are integers equal to 1 or 2 respectively and wherein when p=1 then:

Y is selected from the group consisting of a hydrogen atom and a R'—CO group; and

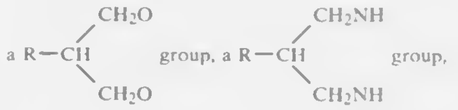
(a) when n=1 and m=2, X is selected from the group consisting of an OH group, an OR group and a NHR group wherein R is selected from the group consisting of an alkyl group different from a methyl group comprising from 2 to 9 carbon atoms;

wherein:

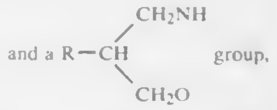
when X=an OH group: Y=a R'—CO group wherein R' is selected from the group consisting of an alkyl group comprising from 2 to 9 carbon atoms, and,

when X is selected from the group consisting of an OR group and an NHR group: Y is H; and

(b) when n=2 and m=1, X is selected from the group consisting of:



$$a\ R—CH\begin{array}{l}\diagup CH_2O\\ \diagdown CH_2O\end{array}\ group,\ a\ R—CH\begin{array}{l}\diagup CH_2NH\\ \diagdown CH_2NH\end{array}\ group,$$

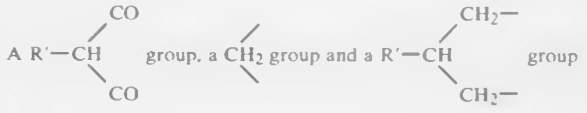


$$and\ a\ R—CH\begin{array}{l}\diagup CH_2NH\\ \diagdown CH_2O\end{array}\ group,$$

wherein R is selected from the group consisting of an alkyl group other than butyl comprising from 2 to 9 carbon atoms; and

wherein p=2 then:

n=1, m=1, X=an OH group, Y is selected from the group consisting of



$$A\ R'—CH\begin{array}{l}\diagup CO\\ \diagdown CO\end{array}\ group,\ a\ \begin{array}{l}\diagup\\ CH_2\\ \diagdown\end{array}\ group\ and\ a\ R'—CH\begin{array}{l}\diagup CH_2—\\ \diagdown CH_2—\end{array}\ group$$

wherein R' is selected from the group consisting of an alkyl group comprising from 2 to 9 carbon atoms.

VOL
1127
ISS
2
JE
11
1991
UMI

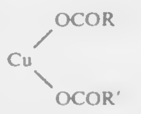
5,023,359

USE OF ORGANIC SALTS OF COPPER FOR THE TREATMENT OF HONEYBEE'S PARASITIC DISEASES

Michel Bounias, Cheval-Blanc, and Jean F. Dufour, Versailles, both of France, assignors to Benechim, S.A., Lessines, Belgium

Filed Jun. 13, 1990, Ser. No. 538,030
Int. Cl.^{5} A01K *47/00;* **A01N** *59/20*
U.S. Cl. 556—114 **8 Claims**

1. A method of treating honeybees contaminated with acarian parasites which comprises feeding to said bees, an ingestible aqueous solution of at least one organic copper salt at a concentration up to 1 g. copper/l., having the formula:


$$\mathrm{Cu}\begin{cases}\mathrm{OCOR}\\ \mathrm{OCOR'}\end{cases} \qquad (1)$$

in which R and R', may be the same or different, and are selected from the group consisting of:

- polyhydroxylated hydrocarbon chains having from 2 to 12 carbon atoms, straight or cyclic hydrocarbon chains bearing an amino radical, having from 2 to 4 carbon atoms,
- linear or cyclic hydrocarbon chains having from 2 to 10 carbon atoms, substituted by from 2 to 4 amino groups in the presence of a carboxylic group,
- hydrocarbon chains having both an amino group and an amido group,
- hydrocarbon chains having from 2 to 10 carbon atoms bearing one or several hydroxyl groups in the presence of one or more carboxylic groups.

5,023,360

SIMPLIFIED SYNTHESIS OF DIALKYLGOLD(III) BETA-DIKETONATES

Thomas H. Baum, San Jose; Phillip J. Brock, Sunnyvale, and Daniel J. Dawson, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 1, 1990, Ser. No. 517,272
Int. Cl.^{5} C07F *1/12*
U.S. Cl. 556—117 **5 Claims**

1. A process for the synthesis of a dialkylgold(III) β-diketonate comprising the steps of

(a) reacting a gold trihalide with an alkyl lithium compound in anhydrous ether,
(b) adding a β-diketone to the reaction mixture, and
(c) recovering the dialkylgold(III) β-diketonate.

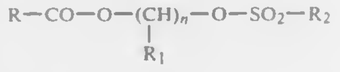
5,023,361

PROCESS FOR PREPARING HYDROXYALKYLATING AGENTS, THE AGENTS SO OBTAINED, AND THEIR USE

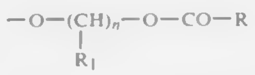
Viviane Massonneau; Michel Mulhauser, both of Ecully, and Albert Buforn, Lyons, all of France, assignors to Rhone-Poulenc Sante, Antony, France

Division of Ser. No. 296,688, Jan. 13, 1989, Pat. No. 4,925,950. This application Feb. 27, 1990, Ser. No. 485,514
Claims priority, application France, Jan. 15, 1988, 88 00416
Int. Cl.^{5} C07C *143/68, 141/00*
U.S. Cl. 558—32 **6 Claims**

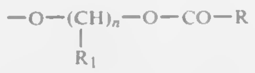
1. A process for preparing a hydroxyalkylating agent of formula:


$$\mathrm{R{-}CO{-}O{-}}\underset{\displaystyle \mathrm{R_1}}{\underset{|}{\mathrm{(CH)}_n}}\mathrm{{-}O{-}SO_2{-}R_2}$$

in which R denotes alkyl of 1 to 4 carbon atoms, n is 2 or 3, the symbols R , which may be identical or different, denote hydrogen or alkyl of 1 to 4 carbon atoms, and R_2 denotes alkyl of 1 to 4 carbon atoms, unsubstituted or substituted phenyl, or


$$\mathrm{{-}O{-}}\underset{\displaystyle \mathrm{R_1}}{\underset{|}{\mathrm{(CH)}_n}}\mathrm{{-}O{-}CO{-}R}$$

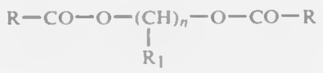
which R, n and R_1 are defined as above, so that in the two radicals


$$\mathrm{{-}O{-}}\underset{\displaystyle \mathrm{R_1}}{\underset{|}{\mathrm{(CH)}_n}}\mathrm{{-}O{-}CO{-}R}$$

the symbols R, n and R_1 have the same meanings, which comprises reacting an acid of formula:

$HO{-}SO_2{-}R_3$

in which R_3 denotes hydroxy, alkyl of 1 to 4 carbon atoms, or an unsubstituted or substituted phenyl, with a diester of formula:


$$\mathrm{R{-}CO{-}O{-}}\underset{\displaystyle \mathrm{R_1}}{\underset{|}{\mathrm{(CH)}_n}}\mathrm{{-}O{-}CO{-}R}$$

which may be in excess and in which R, n and R_1 are defined as above at a temperature of from 80° to 160° C., and removing the acid formed (RCOOH) by distillation under reduced pressure as and when it forms and, any excess diester.

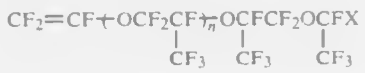
5,023,362

ALKYL PERFLUORO(2-METHYL-5-OXO-3-OXAHEXANOATE)

Carl G. Krespan, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 355,710, Mar. 8, 1982, abandoned, which is a division of Ser. No. 136,991, Apr. 3, 1980, Pat. No. 4,335,255. This application Jun. 19, 1987, Ser. No. 67,406
Int. Cl.^{5} C07C *255/10, 53/21, 69/65, 69/63*
U.S. Cl. 560—183 **3 Claims**

1. Compound of the formula


$$\mathrm{CF_2{=}CF}\!\left(\mathrm{OCF_2}\underset{\displaystyle \mathrm{CF_3}}{\underset{|}{\mathrm{CF}}}\right)_{\!n}\!\mathrm{O}\underset{\displaystyle \mathrm{CF_3}}{\underset{|}{\mathrm{CF}}}\mathrm{CF_2O}\underset{\displaystyle \mathrm{CF_3}}{\underset{|}{\mathrm{CF}}}\mathrm{X}$$

wherein X is CO_2M, CO_2R, CO_2H, or CN, R is alkyl of 1 to 8 carbon atoms, M is alkali metal, ammonium or quaternary ammonium and n is 1 to 6.

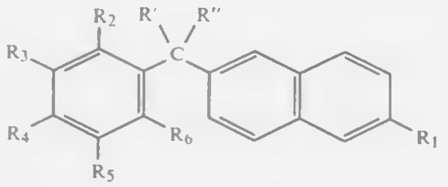
5,023,363

AROMATIC COMPOUNDS, A PROCESS FOR THEIR PREPARATION AND THEIR USE IN HUMAN AND VETERINARY MEDICINE AND FOR COSMETIC COMPOSITIONS

Jean Maignan, Tremblay-les-Gonesse; Gérard Lang, Saint-Gratien; Gérard Malle, Villiers-sur-Morin; Serge Restle, Aulnay-sous-Bois, and Braham Shroot, Antibes, all of France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 33,690, Apr. 3, 1987. This application Apr. 1, 1988, Ser. No. 176,746
Claims priority, application Luxembourg, Apr. 4, 1986, 86387
Int. Cl.^{5} C07C *69/76*
U.S. Cl. 560—52 **22 Claims**

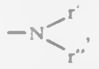
1. An aromatic compound having the formula



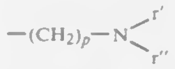
(1)

wherein

- R' represents hydrogen or alkoxy having 1–4 carbon atoms,
- R'' represents hydrogen, OH, acyloxy having 1–4 carbon atoms, alkoxy having 1–4 carbon atoms, or NH_2,
- or R' and R'' taken together form an oxo, methano or hydroxyimino radicla,
- R_1 represents $—CH_2OH$ or $—COR_{10}$,
- R_{10} represents hydrogen, $—OR_{11}$ or


$$-\mathrm{N}\begin{matrix}\diagup \mathrm{r'}\\ \diagdown \mathrm{r''}\end{matrix},$$

R_{11} represents hydrogen, linear or branched alkyl having 1–20 carbon atoms, monohydroxyalkyl, polyhydroxyalkyl, aryl or aralkyl optionally substituted, the residue of a sugar or


$$-(\mathrm{CH_2})_p-\mathrm{N}\begin{matrix}\diagup \mathrm{r'}\\ \diagdown \mathrm{r''}\end{matrix}$$

wherein p is 1,2 or 3 and r' and r'' represent hydrogen, lower alkyl, monohydroxyalkyl optionally interrupted by a heteroatom, polyhydroxyalkyl, aryl or benzyl optionally substituted, the residue of an amino acid, the residue of an aminated sugar, or r' and r'' taken together form a heterocycle,

- R_2, R_3, R_4, R_5 and R_6 represent hydrogen, —OH, linear or branched alkyl having 1–12 carbon atoms, cycloalkyl, cycloalkenyl, phenyl optionally substituted or a radical selected from (i) $—X\text{-}C_6H_5$, (ii) $—X—R_{12}$ or (iii) $—NH\text{-}COR_{13}$, wherein X represents —O—, —S—, —SO—, $—SO_2—$ or —OCO—, R_{12} represents alkyl or lower fluoroalkyl and R_{13} represents alkyl or phenyl, at least one of R_2 to R_6 being other than hydrogen,
- and the salts of said aromatic compound or its optical and geometric isomers.

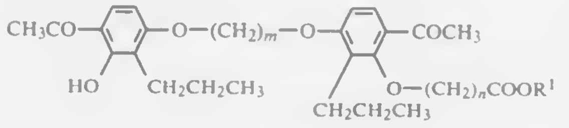
5,023,364

PHENOXYALKYLCARBOXYLIC ACID DERIVATIVES AND PROCESS FOR THEIR PREPARATION

Mitsuo Ohashi, Ohmiya; Katsuya Awano, Oyama; Toshio Tanaka, and Tetsuya Kimura, both of Tochigi, all of Japan, assignors to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 241,262, Sep. 7, 1988, abandoned. This application Mar. 17, 1989, Ser. No. 325,007
Claims priority, application Japan, Sep. 10, 1987, 62-226940
Int. Cl.^{5} C07C *69/76*
U.S. Cl. 560—53 **6 Claims**

1. Phenoxyalkylcarboxylic acid derivatives represented by the following general formula (I),



(1)

wherein R^1 indicates a hydrogen atom, a methyl group or an ethyl group, m is equal to 2, 3 or 4, and n is equal to 3 or 4; their alkali salts and hydrates thereof.

5,023,365

PROCESS FOR PREPARING AN INTERMEDIATE

Claudio Giordano, Monza; Graziano Castaldi, Briona, and Maurizio Paiocchi, Milan, all of Italy, assignors to Zambon Group S.p.A., Vicenza, Italy

Filed Dec. 20, 1989, Ser. No. 453,791
Claims priority, application Italy, Dec. 22, 1988, 23054 A/88
Int. Cl.^{5} C07C *69/76*
U.S. Cl. 560—56 **4 Claims**

1. A process for preparing the methyl ester of S(+)-2-(5-bromo-6-methoxy-2-naphthyl)-propionic acid or of the 5-chloro analogue (I-S compounds), consisting of subjecting to preferential crystallization a mixture of I-S and its I-R enantiomer in a ratio greater than or equal to 90:10 by dissolving it in methanol and cooling to a temperature of between 10° and 20° C.

5,023,366

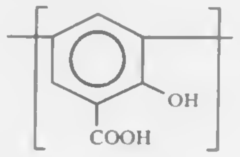
SALICYLIC ACID COPOLYMERS AND THEIR METAL SALTS, PRODUCTION PROCESS THEREOF, COLOR-DEVELOPING AGENTS COMPRISING METAL SALTS OF THE COPOLYMERS, AND COLOR-DEVELOPING SHEETS EMPLOYING THE AGENTS

Keizaburo Yamaguchi, Kawasaki; Yoshimitsu Tanabe; Makoto Asano, both of Yokohama, and Akihiro Yamaguchi, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

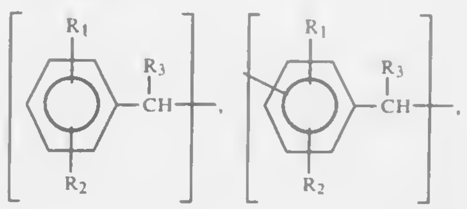
Filed Oct. 23, 1987, Ser. No. 111,763
Claims priority, application Japan, Nov. 5, 1986, 61-262019; Jan. 16, 1987, 62-6218; Jan. 30, 1987, 62-18472; Jan. 31, 1987, 62-19672; Jan. 31, 1987, 62-19673; May 11, 1987, 62-112296; May 11, 1987, 62-112297; May 22, 1987, 62-123864; Jun. 4, 1987, 62-139026
Int. Cl.^{5} C07C *69/88*
U.S. Cl. 560—71 **28 Claims**

1. A copolymer comprising 5 to 40 mole percent of structural units (I), 10 to 95 mole percent of structural units (III) and having a weight average molecular weight of 500 to 10,000, each of said structural units (I) being coupled via the α-carbon of one of said structural units (II) with the benzene ring of said one of said structural units (II), one or more of said structural (II) being optionally coupled via the α-carbon or α-carbons thereof to the benzene ring or rings of another or other structural units (II), one or more of said structural units (III) being coupled via the α-carbon or α-carbons thereof with the benzene ring or rings of one or more structural units (II) and/or ring or rings of another or other structural units (III), and said structural units (I), (II) and (III) being represented respectively by the following formulae (I), (II) and (III):

Formula (I):



Formula (II).



VOL
1127
ISS
2
JE
11
1991
UMI

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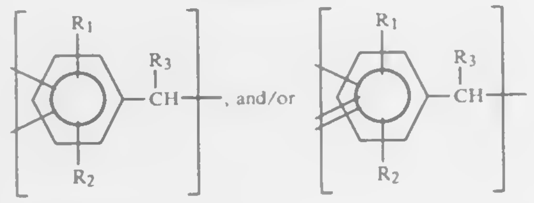
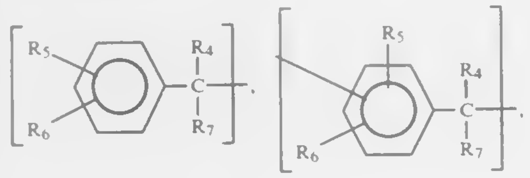
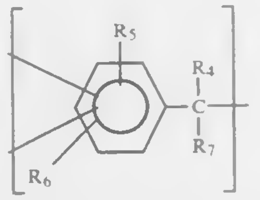


Formula (III):



and/or



wherein R_1, R_2, R_5 and R_6 mean independently a hydrogen atom or a $C_{1\text{-}12}$ alkyl, aralkyl, aryl or cycloalkyl group, R_3 and R_4 denote independently a hydrogen atom or $CH_{1\text{-}4}$ Alkyl group, and R_7 stands for hydrogen atom or $—CH_2—R_8$ wherein R_8 is hydrogen atom or methyl group; or a multivalent metal salt of said copolymer, in which at least one multi-valent metal atom forms said multi-valent metal salt between carboxyl groups within the same molecule of said copolymer or between carboxyl groups in different molecules of said copolymer.

5,023,367
LINEAR, LOW-MOLECULAR-WEIGHT POLYESTER-BASED POLYOL

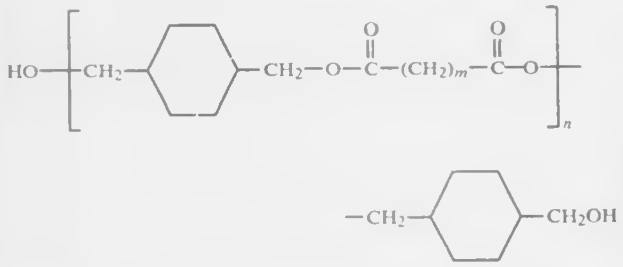
Leonard J. Calbo, Jr., Bethel, and Lawrence V. Gallacher, East Norwalk, both of Conn., assignors to King Industries, Inc., Norwalk, Conn.

Continuation of Ser. No. 453,222, Dec. 27, 1982, Pat. No. 4,902,821. This application May 22, 1989, Ser. No. 355,158

Int. Cl.^{5} C07C *69/34*

U.S. Cl. 560—193 **8 Claims**

1. A linear, low molecular weight; polyester-based polyol having terminal primary hydroxyl groups, low viscosity, high solids content and having the structural formula:



where n is 1 or 2 and at least 70% by weight is n=1; and m=2-10 said polyol having less than 4% by weight based on total weight of the final polyol reaction product of cyclohexane dimethanol.

5,023,368
AMINOPHOSPHONATE-CONTAINING POLYMERS

John C. Leighton, Flanders, and Carmine P. Iovine, Bridgewater, both of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Jun. 8, 1989, Ser. No. 363,244

Int. Cl.^{5} C07C *69/54, 69/60*

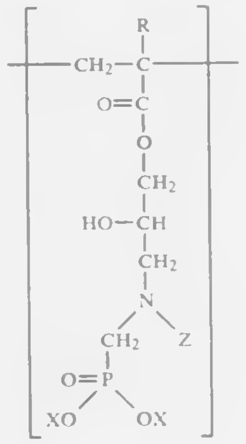
U.S. Cl. 560—195 **7 Claims**

1. An aminophosphonate-containing polymer having the formula:

$$B_mA_n$$

wherein

A represents repeating units from an ethylenically unsaturated comonomer(s),



wherein

R is hydrogen or methyl,

X is hydrogen or an alkali metal,

Z is $CH_2—P(O)(OX)_2$ or C_1–C_6 alkyl, aryl, cyclohexyl or alkaryl,

m and n are positive integers,

$m/n=0.01$ to 0.5.

5,023,369
PROCESS FOR PRODUCING N-PHOSPHONOMETHYLGLYCINE

Donald L. Fields, Jr., Manchester, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Jun. 25, 1990, Ser. No. 543,016

Int. Cl.^{5} C07F *9/38*

U.S. Cl. 562—17 **13 Claims**

1. In a process for producing N-phosphonomethylglycine by the oxidation of N-phosphonomethyliminodiacetic acid to form an intermediate N-phosphonomethyliminodiacetic acid-N-oxide and converting the intermediate to N-phosphonomethylglycine, the improvement which comprises contacting N-phosphonomethyliminodiacetic acid with a peroxide in the presence of an effective amount of a catalyst selected from the group consisting of a water-soluble tungsten compound, and a mixture of a water-soluble tungsten compound and a water-soluble molybdenum compound, to form N-phosphonomethyliminodiacetic acid-N-oxide, and thereafter converting the N-phosphonomethyliminodiacetic acid-N-oxide to N-phosphonomethylglycine.

5,023,370
FUNCTIONALIZATION OF IODOPOLYFLUOROALKANES BY ELECTROCHEMICAL REDUCTION AND NEW FLUORINATED COMPOUNDS THEREBY OBTAINED

Sylvie Benefice-Malouet, Montpellier, and Hubert Blancou, Magalas, both of France, assignors to Atochem, Courbevoie, France

Division of Ser. No. 38,188, Apr. 14, 1987, Pat. No. 4,830,715. This application Mar. 10, 1989, Ser. No. 322,271

Claims priority, application France, Apr. 17, 1986, 86 05519

Int. Cl.^{5} C07C *303/00*

U.S. Cl. 562—125 **2 Claims**

1. Mixed diacids of the formula

$$HO_2S—(CF_2)_{p-1}—COOH$$

wherein p is an even-numbered integer ranging from 4–12.

5,023,371
SYNTHESIS OF THIOGLYCOLIC ACID

Mosum E. Tsui, Silver Spring, and Martin B. Sherwin, Potomac, both of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation of Ser. No. 655,586, Nov. 28, 1984, abandoned. This application May 26, 1987, Ser. No. 53,976

Int. Cl.^{5} C07C *319/02, 319/06, 323/52*

U.S. Cl. 562—512 **15 Claims**

1. A process for forming thioglycolic acid comprising contacting in a reaction zone at a temperature of from ambient to about 150° C. and under an elevated pressure of at least 250 psig formed by hydrogen sulfide gas, a mixture of monochloroacetic acid and dichloroacetic acid or their alkali metal salts in a weight ratio of from 99:1 to 75:25 with an alkali or alkaline earth metal hydrosulfide such that the molar ratio of said metal hydrosulfide to monochloroacetic acid as free acid is at least 2.1 and to dichloroacetic acid is at least 3.1; separating the liquid products and recovering the thioglycolic acid therefrom.

5,023,372
METHODS AND COMPOSITIONS FOR INHIBITING (METH)ACRYLIC ACID POLYMERIZATION

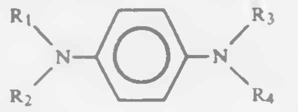
Paul V. Roling, Spring, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed May 16, 1989, Ser. No. 352,579

Int. Cl.^{5} C07C *57/075*

U.S. Cl. 562—598 **13 Claims**

1. A method of inhibiting acrylic acid monomer polymerization comprising adding to the monomer an effective inhibiting amount of (a) a manganese source compound comprising a member or members selected from the group consisting of manganese salts of C_1–C_{30} carboxylic acids, and (b) a phenylenediamine compound having the structure



wherein R_1, R_2, R_3, and R_4 are the same or different and are hydrogen, C_1–C_{20} alkyl, C_1–C_{20} aryl, C_1–C_{20} alkaryl, or C_1–C_{20} aralkyl, with the proviso that at least one of R_1, R_2, R_3, or R_4 is hydrogen, the weight ratio of (a):(b), wherein (a) is measured as Mn, being from about 0.05:1 to about 2.5:1.

5,023,373

Patent Not Issued For This Number

5,023,374
DICARBOXYLIC ACID DIAMIDES, PROCESS FOR THEIR PREPARATION, ION SELECTIVE MEMBERS AND TEST MEANS CONTAINING THEM AS WELL AS LITHIUM COMPLEXES OF THE DICARBOXYLIC ACID AMIDES

Wilhelm Simon, Zürich, Switzerland, assignor to Firma Willi Möller, Zurich, Switzerland

Continuation of Ser. No. 99,579, Sep. 22, 1987, abandoned. This application Sep. 19, 1990, Ser. No. 586,323

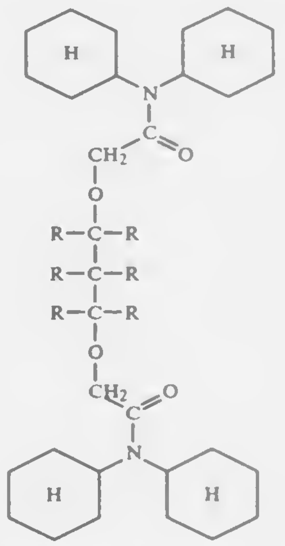
Claims priority, application Switzerland, Sep. 23, 1986, 3795/86

Int. Cl.^{5} C07C *235/14*

U.S. Cl. 564—152 **14 Claims**

1. A dicarboxylic acid diamide of formula I

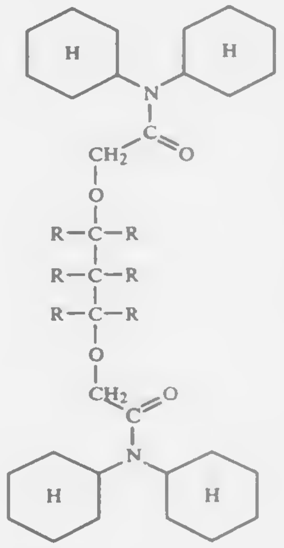
I



wherein each radical R is, independently of each other radical R, hydrogen, a straight chain or branched chain alkyl radical having 1-20 carbon atoms, a straight chain or branched chain alkenyl radical having 2-20 carbon atoms, or a straight chain or branched chain alkynyl radical having 2-20 carbon atoms.

7. A complex comprising lithium and a dicarboxylic acid diamide of formula I:

I



wherein each radical R is, independently of each other radical R, hydrogen, a straight chain or branched chain alkyl radical

VOL
1127
ISS
2
JE
11
1991
UMI

having 1-20 carbon atoms, a straight chain or branched chain alkenyl radical having 2-20 carbon atoms, or a straight chain or branched chain alkynyl radical having 2-20 carbon atoms.

5,023,375
PROCESS FOR THE SYNTHESIS OF AMIDES FROM VINYL ACETATE

Mark L. Listemann, Whitehall, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jan. 17, 1990, Ser. No. 466,527

The portion of the term of this patent subsequent to Nov. 6, 2007, has been disclaimed.

Int. Cl.⁵ C07C *233/00, 235/00, 237/00, 239/00*

U.S. Cl. 564—159 **18 Claims**

1. A process for the production of ethylidene bisamide comprising reacting vinyl acetate with a primary carboxylic acid amide over a catalyst comprising a salt of palladium(II), platinum(II) or mercury(II) in the presence of greater than 0.01 equivalents of an aliphatic or arylaliphatic alcohol based upon the limiting reagent.

5,023,376
REDUCTION OF NITROSAMINE FORMATION

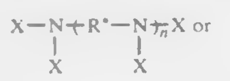
Noel S. Shehad, Taylor Lake Village; Laurie L. Dussack, Friendswood, both of Tex., and Dirk van Hemelrijk, Antwerp, Belgium, assignors to Interox America, Houston, Tex.

Filed Jul. 17, 1989, Ser. No. 380,432

Int. Cl.⁵ C07C *209/00, 291/00, 239/10, 313/18*

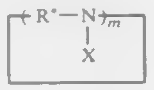
U.S. Cl. 564—298 **11 Claims**

1. In a process for the reaction of a secondary or tertiary amine-containing substrate with an aqueous solution of hydrogen peroxide, the improvement comprising carrying out the reaction in the presence of an effective amount of an alkyleneaminopoly(methylenephosphonic acid) or water soluble salt thereof obeying either of the general formulae:



$$X{-}N{+}R^{*}{-}N{+}_{n}X \text{ or}$$

1.



$$\boxed{{+}R^{*}{-}\underset{X}{N}{+}_{m}}$$

2.

in which

X represents a group of formula $—CH_2—PO_3My$ in which

M represents H or a non-transition metal cation conferring water-solubility, Y represents 1 or 2,

R^* represents an aliphatic or alicyclic diradical of 2 or 3 carbon atoms length and containing from 2 to 6 carbon atoms,

n represents an integer selected from 1 to 4 and

m represents an integer selected from 4 to 6.

5,023,377
PROCESS FOR PREPARING FLUORINATED COMPOUNDS

Darryl D. Desmarteau; Stefan P. Kotun, both of Clemson, S.C., and Alessandro Malacrida, Sovico, Italy, assignors to Ausimont, S.R.L., Milan, Italy

Filed Aug. 1, 1989, Ser. No. 387,819

Claims priority, application Italy, Aug. 2, 1988, 21615 A/88

Int. Cl.⁵ C07C *239/20*

U.S. Cl. 564—301 **8 Claims**

1. A process for the preparation of fluorinated compounds belonging to the classes:

$$XH—Y—CZ_1Z_2—(CF_2)_bF \quad (I)$$

and

$$YH—X—(CF_2)_n—CZ_1Z_2F \quad (II)$$

wherein:

X is NR_x, O, S, CFR_x, $C(R_x)_2$, or CF_2;

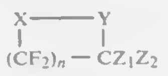
Y is NR_x, O, S, CFR_x, $C(R_x)_2$, or CF_2;

X is different from Y;

R_x is a perhalogenated alkyl group, containing from 1 to 4 carbon atoms;

n is either 0 or 1 with the proviso that when n=0, $X=NR_x$ and Y=0 and when n=1, one of X and Y is NR_2;

Z_1 and Z_2 which may be equal to, or different from, each other, represent F, Cl, Br, H or R_x, comprising a fluorinated cyclic compound of the formula:



$$\begin{array}{ccc} X & — & Y \\ | & & | \\ (CF_2)_n & — & CZ_1Z_2 \end{array}$$

(III)

wherein X, Y, R_x, n, Z_1 and Z_2 have the above stated meanings, is reacted, at a temperature within the range of from −80° to +300° C., with HF in the presence of a Lewis acid.

5,023,378
AMINE DERIVATIVES

Michael D. Dowle; David Middlemiss; Harry Finch; Alan Naylor, and Lawrence H. C. Lunts, all of Hertfordshire, England, assignors to Glaxo Group Limited, England

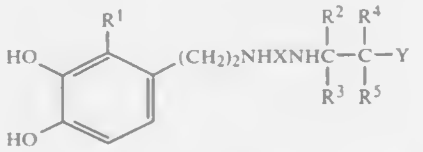
Continuation of Ser. No. 226,199, Jul. 29, 1988, abandoned, which is a continuation of Ser. No. 932,301, Nov. 19, 1986, abandoned, which is a continuation of Ser. No. 818,694, Jan. 14, 1986, abandoned. This application Oct. 6, 1989, Ser. No. 418,208

Claims priority, application United Kingdom, Jan. 15, 1985, 8500926; Jan. 15, 1985, 8500927

Int. Cl.⁵ C07C *321/00, 323/00, 381/00, 215/00*

U.S. Cl. 564—340 **12 Claims**

1. A compound of formula (I)



(I)

or a physiologically acceptable acid addition salt, metabolically labile ester or solvate thereof in which

R^1 represents a halogen atom or a methyl, ethyl, n-propyl or n-butyl group;

R^2, R^3, R^4 and R^5 each represent hydrogen atoms or one or two of R^2, R^3, R^4 and R^5 represent a methyl or ethyl group

X represents a C_{4-7} alkylene chain optionally substituted by one or more C_{1-4} alkyl or hydroxyl groups; or optionally containing one or two double or triple bonds; or optionally interrupted by an oxygen or sulphur atom, or by a sulphone ($—SO_2—$) or urea (—NHCONH—) group; and

Y represents a phenyl ring optionally carrying one to three substituents selected from hydroxyl, C_{1-4}-alkyl, C_{1-4} alkoxy, amino, carboxamido, C_{1-4} alkylsulphonylamino and nitro groups and halogen atoms with the proviso that when X is a C_{4-7} alkylene chain optionally containing one double bond then Y cannot represent phenyl or phenyl carrying one substituent which is halogen.

5,023,379
PROCESS FOR THE PREPARATION OF HYDROXYAMINES

Ernst Felder, Riva San Vitale, Switzerland; Michael Römer, Rodgau, Fed. Rep. of Germany; Hans Bardonner, Bad König, Fed. Rep. of Germany; Hartmut Härtner, Mühltal, Fed. Rep. of Germany, and Wolfgang Fruhstorfer, Mühltal-Traisa, Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschraenkter Haftung, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 30,775, Mar. 25, 1987, abandoned. This application Mar. 12, 1990, Ser. No. 492,018

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1986, 3609978

Int. Cl.⁵ C07C *209/26, 213/00*

U.S. Cl. 564—472 **24 Claims**

1. A process for the preparation of a hydroxyamine of formula I

$$R^1—CH(OH)—CH(NHR^3)—R^2 \quad (I)$$

wherein

R^1 and R^2 are each CH_2OH and one of R^1 and R^2 can also be H, and

R^3 is H, C_1–C_4-alkyl or C_1–C_4-hydroxyalkyl, comprising reacting an oxo compound of formula II

$$R^1—CH(OH)—CO—R^2 \quad (II)$$

with an amine of the formula R^3-NH_2 to obtain an intermediate and then reducing said intermediate with a reducing agent.

5,023,380
PERFLUOROVINYL COMPOUNDS

David A. Babb; Bobby R. Ezzell, and Katherine S. Clement, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 9, 1989, Ser. No. 364,665

Int. Cl.⁵ C07C *315/00, 317/00*

U.S. Cl. 568—34 **9 Claims**

1. A compound having a structure represented by Formula 1:

$$CF_2{=}CF—X—R—(X—CF—{=}CF_2)_m$$

wherein R represents an unsubstituted or inertly substituted hydrocarbyl group; each X is independently selected from the group consisting of groups having at least one non-carbon atom between R and $—CF{=}CF_2$; and m is an integer of from 1 to about 3; wherein either R is an unsubstituted or inertly substituted aromatic group or X is selected from the group consisting of oxygen atoms, sulfur atoms, sulfoxide, sulfone, carbonyl, and thiocarbonyl groups.

5,023,381
PROCESS FOR PREPARING AN ORGANIC SYNTHESIS INTERMEDIATE

Giulio Perdoncin, Vicenza; Claudio Giordano, Monza; Maurizio Paiocchi, Milan, and Roberto Casagrande, Bresso, all of Italy, assignors to Zambon Group S.p.A., Vicenza, Italy

Filed Dec. 20, 1989, Ser. No. 454,001

Claims priority, application Italy, Dec. 22, 1988, 23053 A/88

Int. Cl.⁵ C07C *45/45*

U.S. Cl. 568—322 **3 Claims**

1. A process for preparing 2-methoxy-6-propionyl-naphthalene by Friedel-Crafts acylation of 2-methoxy-naphthalene with propionyl chloride and $AlCl_3$, consisting of using a chlorinated hydrocarbon as solvent and operating in the presence of an excess of $AlCl_3$, in a quantity of between 1.1 and 2 moles per mole of propionyl chloride, and a quantitiy of nitrobenzene substantially equivalent in moles to the $AlCl_3$ excess.

5,023,382
SYNTHESIS OF 2,3-DISUBSTITUTED-2-CYCLOPENTENONES VIA LITHIOMETHYLMERCAPTO COMPOUNDS

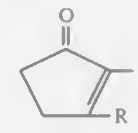
Jacob Mathew, Fenton, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Jan. 24, 1990, Ser. No. 469,901

Int. Cl.⁵ C07C *45/65*

U.S. Cl. 568—352 **15 Claims**

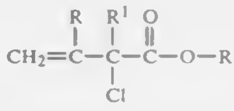
1. A method of preparing a cyclopentenone compound of the formula:



comprising

a. reacting together

i. an unsaturated ester of the formula:



$$CH_2{=}\overset{R}{\overset{|}{C}}—\underset{Cl}{\underset{|}{\overset{R^1}{\overset{|}{C}}}}—\overset{O}{\overset{\|}{C}}—O—R^2$$

wherein R and R^1 are organic moieties and R^2 is an alkyl moiety; with

ii. a mercaptan compound having a lithium-carbon-sulfur-moiety; and

b. subjecting the product of step a. to reductive dehydrosulfurization.

5,023,383
METHOD FOR PRODUCING AROMATIC ALCOHOL

Masashi Inaba; Ryozo Hamana; Hideyuki Hase, all of Yokkaichi, and Tatsuro Ashizawa, Kashima, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Jan. 3, 1990, Ser. No. 460,632

Claims priority, application Japan, Jan. 13, 1989, 1-4862

Int. Cl.⁵ C07C *27/04, 27/06*

U.S. Cl. 568—815 **15 Claims**

1. A method for producing an alcohol, comprising:

reducing an aromatic hydroperoxide selected from the group consisting of α-phenylethyl hydroperoxide, cumene hydroperoxide, cymene hydroperoxide, o,m- or o,p-diisopropylbenzene monohydroperoxide, o,m- or o,p-diisopropylbenzene dihydroperoxide, and isopropylnaphathalene hydroperoxide with hydrogen in a liquid phase at a temperature ranging from 20°–120° C. under a total pressure ranging from atmospheric pressure to 50 kg/cm^2G in the presence of a catalyst of Pt or Pt combined with at least one element selected from the group consisting of Pb, Sn, Cu, As, Sb, In, Se and Bi in a fixed bed reactor.

5,023,384
PROCESS FOR THE PREPARATION OF TRIFLUOROETHANOL

Georges Cordier, Francheville, France, assignor to Rhone-Poulenc Chimie, Courbevoie Cedex, France

Filed Oct. 20, 1989, Ser. No. 424,713

Claims priority, application France, Oct. 21, 1988, 88 13797

Int. Cl.⁵ C07C *29/136, 31/38*

U.S. Cl. 568—842 **14 Claims**

1. A continuous process for the preparation of trifluoroethanol comprising hydrogenating trifluoroacetic acid in solution in a water/trifluoroethanol mixture by passing said mixture more than once over a rhodium- or ruthenium-based catalyst in the presence of hydrogen.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,385

NOVEL HALIDE-ARYLALKOXY-CONTAINING MAGNESIUM COMPOUNDS

Bor-Ping E. Wang, Ossining; Elliot I. Band, North Tarrytown, and Richard J. Amata, Peekskill, all of N.Y., assignors to Akzo nv, Arnhem, Netherlands

Filed Mar. 22, 1990, Ser. No. 497,295

Int. Cl.^{5} C07C *31/30*

U.S. Cl. 568—851 **12 Claims**

1. A hydrocarbon soluble compound of the formula ROMgX, where X is halide and R is aralkylene.

5,023,386

PRODUCTION OF HEXANITROSTILBENE (HNS)

Peter Golding, Kings Langley; Asoka M. Jayaweera-Bandara, Long Ditton, and Henry Duffin, Surbiton, all of England, assignors to Secretary of State for Defence in her Britannic Majesty's Government, London, United Kingdom

PCT No. PCT/GB88/00420, § 371 Date Jan. 4, 1990, § 102(e) Date Jan. 4, 1990, PCT Pub. No. WO88/09784, PCT Pub. Date Dec. 15, 1988

PCT Filed May 26, 1988, Ser. No. 457,681

Claims priority, application United Kingdom, Jun. 1, 1987, 8712834

Int. Cl.^{5} C07C *205/06*

U.S. Cl. 568—931 **16 Claims**

1. A process for preparing 2,2′,4,4′,6,6′-hexanitrostilbene which comprises oxidizing 2,4,6-trinitrotoluene directly to 2,2′,4,4′,6,6′-hexanitrostilbene in the same reaction mixture throughout, the reaction mixture comprising a solvent having a base dissolved therein and containing an oxidizing transition metal compound in an amount of from 0.75 to 10 moles of said oxidizing compound per mole of 2,4,6-trinitrotoluene.

5,023,387

LIQUID FEED INJECTION IN A CHLOROMETHANES PROCESS

David H. West; Lawrence A. Hebert, both of Baton Rouge; Roger L. Bowlin, Denham Springs, and Michael T. Holbrook, Baton Rouge, all of La., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 342,252, Apr. 24, 1989, abandoned. This application Apr. 30, 1990, Ser. No. 517,000

Int. Cl.^{5} C07C *17/10*

U.S. Cl. 570—252 **13 Claims**

1. In an improved process for the thermally initiated adiabatic vapor phase chlorination of methyl chloride, methylene chloride and mixtures thereof wherein the improvement comprises injecting a portion of the methyl chloride, methylene chloride or mixtures thereof into a chlorination reactor in the liquid phase using an injecting means which produces a droplet spray having a Sauter mean diameter in the range of at least about 30 microns and no greater than about 200 microns under reaction conditions such that the temperature at essentially all points throughout the reaction zone is maintained at equal to or less than about 500° C. and greater than about 200° C.

5,023,388

POLYETHYLENE WAX, AND A PROCESS FOR THE PREPARATION THEREOF

Hartmut Lüker, Hofheim am Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

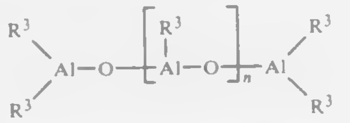
Filed Dec. 19, 1988, Ser. No. 286,326

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1987, 3743322

Int. Cl.^{5} C10M *101/02;* **C07C** *2/24, 2/02*

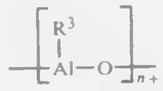
U.S. Cl. 585—9 **3 Claims**

1. A process for the preparation of a polyethylene wax comprising units derived from ethylene, having a molecular weight of from about 2,000 to about 10,000, a molecular weight distributon M_w/M_n of from about 2 to 10, a viscosity number of from 20 to 60 cm^3/g, a melting range from about 129° to 131° C. for a homopolymer and about 120° to 126° C. for a copolymer, and a density of from 0.93 to 0.97 g/cm^3 and a bulk density of from 200 to 400 g/dm^3 by polymerization of ethylene or copolymerization of ethylene with a 1-olefin of the formula $R\text{-}CH=CH_2$ in which R denotes a straight-chain or branched alkyl radical having 1 to 12 carbon atoms, at a temperature of from 20° to 100° C., a pressure of from 0.5 to 64 bar, in solution, in suspension or in the gas phase, in the presence of a catalyst comprising a metallocene as the transition metal component and an aluminoxane as the activator, which comprises carrying out the polymerization in the presence of a catalyst whose transition-metal component is bis(cyclopentadienyl)-dimethylzirconium or bis(cyclopentadienyl)zirconium dichloride, wherein the aluminoxane is one of the formula I



(I)

for the linear type and/or of the formula II



$$\left[\begin{array}{c}R^3\\ |\\ Al-O\end{array}\right]_{n+2}$$

(II)

for the cyclic type, where, in the formulae I and II, R^3 denotes a C_1–C_6-alkyl group and n is an integer from 2 to 40, and wherein hydrogen is present in an amount of from 1 to 20% by volume, based on ethylene.

5,023,389

PROCESS FOR PREPARING NORMALLY LIQUID OXYGENATE AND HYDROCARBONACEOUS PRODUCTS FROM A HYDROCARBON FEED CONTAINING LINEAR- AND BRANCHED OLEFINS

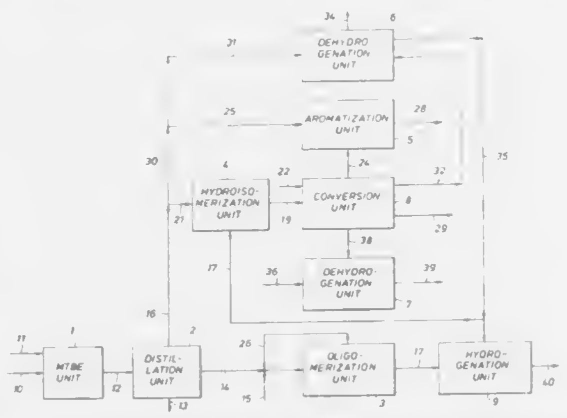
Pierre Grandvallet; Andras Guus Theodorus George Kortbeek; Johannes Petrus Van Den Berg, and Karl-Heinz Röbschläger, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 10, 1989, Ser. No. 308,489

Claims priority, application United Kingdom, Feb. 22, 1988, 8804033

Int. Cl.^{5} C07C *2/00*

U.S. Cl. 585—304 **8 Claims**



1. A process for preparing normally liquid oxygenate and hydrocarbonaceous products from a hydrocarbon feed containing 10–70% by weight paraffins, linear and branched olefins having 3 and 4 carbon atoms including 2-methyl-propene, and having at most 6 carbon atoms per molecule which process comprises the following steps:

- i) selectively converting branched olefins in the feed with methanol in the presence of a catalyst into a normally liquid oxygenated product;
- ii) separating product obtained in step (i) by distillation or contact with molecular sieves to obtain a linear olefins-containing stream and a stream of paraffins,
- iii) oligomerizing linear olefins in said linear olefins-containing stream from step (ii) in the presence of a solid catalyst into liquid hydrocarbons,
- iv) feeding said stream of paraffin from step (ii) to a hydroisomerization unit together with hydrogen, and catalytically hydroisomerizing linear paraffins in said second stream to obtain a product stream having a higher branched paraffin content than said feed, and,

having an additional step (a) comprising feeding at least one of said stream of paraffins from step (ii), and said product stream from step (iv) to a conversion unit together with olefins having at least 3 carbon atoms per molecule and converting said feed in the presence of an acidic catalyst into an alkylated hydrocarbon product stream.

5,023,390

PROCESS FOR PRODUCTION OF 2,6-DIMETHYLNAPHTHALENE

Takafumi Abe; Shuji Ebata; Hiroshi Machida, and Koichi Kida, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 405,966

Claims priority, application Japan, Oct. 3, 1988, 63-247372

Int. Cl.^{5} C07C *5/00, 11/253, 12/64, 12/00*

U.S. Cl. 585—320 **21 Claims**

1. A process for producing 2,6-dimethylnaphthalene which comprises (1) an acylation step comprising reacting m-xylene, propylene and carbon monoxide to form 2,4-dimethylisobutyrophenone; (2) a hydrogenation step comprising hydrogenating the carbonyl group of said 2,4-dimethylisobutyrophenone; and (3) a dehydrogenation and cyclization step comprising dehydrogenating and cyclizing said hydrogenated product of step 2 to form 2,6-dimethylnaphthalene.

5,023,391

PROCESS FOR UPGRADING METHANE TO HIGHER HYDROCARBONS

Scott Han, Lawrenceville, N.J.; Robert E. Palermo, New Hope, Pa.; Judith A. Pearson, Point Pleasant, N.J., and Dennis E. Walsh, Richboro, Pa., assignors to Mobil Oil Corp., Fairfax, Va.

Filed Dec. 21, 1989, Ser. No. 454,535

Int. Cl.^{5} C07C *2/00*

U.S. Cl. 585—500 **2 Claims**

1. A process for synthesizing a mixture of organic compounds comprising higher hydrocarbons including C_5+ liquid hydrocarbons by the direct partial oxidation of methane, said process comprising the steps of:

- (i) contacting a mixture of methane and oxygen with a GaZSM-5 catalyst under sufficient conversion conditions including a temperature of from about 350° C. to about 475° C. and a pressure of from about 150 psig to about 3000 psig; and
- (ii) recovering said mixture of organic compounds comprising higher hydrocarbons.

5,023,392

PROCESS FOR UPGRADING METHANE TO HIGHER HYDROCARBONS

Scott Han, Lawrenceville, N.J.; Robert E. Palermo, New Hope, Pa.; Judy A. Pearson, Point Pleasant, N.J., and Dennis E. Walsh, Richboro, Pa., assignors to Mobil Oil Corp., Fairfax, Va.

Filed Dec. 21, 1989, Ser. No. 454,536

Int. Cl.^{5} C07C *2/00*

U.S. Cl. 585—500 **2 Claims**

1. A process for synthesizing a mixture of organic compounds comprising higher hydrocarbons including C_5+ liquid hydrocarbons by the direct partial oxidation of methane, said process comprising the steps of:

- (i) contacting a mixture of methane and oxygen with a CuZSM-5 catalyst under sufficient conversion conditions including a temperature of from about 350° C. to about 475° C. and a pressure of from about 150 psig to about 3000 psig; and
- (ii) recovering said mixture of organic compounds comprising higher hydrocarbons.

5,023,393

PROCESS FOR UPGRADING METHANE TO HIGHER HYDROCARBONS

Scott Han, Lawrenceville, N.J.; Robert E. Palermo, New Hope, Pa.; Judith A. Pearson, Point Pleasant, N.J., and Dennis E. Walsh, Richboro, Pa., assignors to Mobil Oil Corp., Fairfax, Va.

Filed Dec. 21, 1989, Ser. No. 454,534

Int. Cl.^{5} C07C *2/00*

U.S. Cl. 585—500 **2 Claims**

1. A process for synthesizing a mixture of organic compounds comprising higher hydrocarbons including C_5+ liquid hydrocarbons by the direct partial oxidation of methane, said process comprising the steps of:

- (i) contacting a mixture of methane and oxygen with a NiZSM-5 catalyst under sufficient conversion conditions including a temperature of from about 350° C. to about 475° C. and a pressure of from about 150 psig to about 3000 psig; and
- (ii) recovering said mixture of organic compounds comprising higher hydrocarbons.

VOL
1127

ISS
2

JE
11

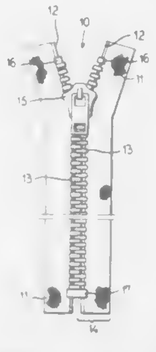
1991

UMI

5,023,394

SLIDE FASTENER CHAIN FOR SHIELDING THE ELECTROMAGNETIC WAVE

Kozo Watanabe, and Yasuhiko Sugimoto, both of Toyama, Japan, assignors to Yoshida Kogyo K.K., Tokyo, Japan
Filed Dec. 22, 1989, Ser. No. 455,174
Claims priority, application Japan, Dec. 27, 1988, 63-328008
Int. Cl.^{5} H05K *9/00*
U.S. Cl. 174—35 R **2 Claims**

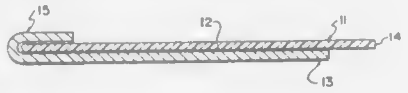


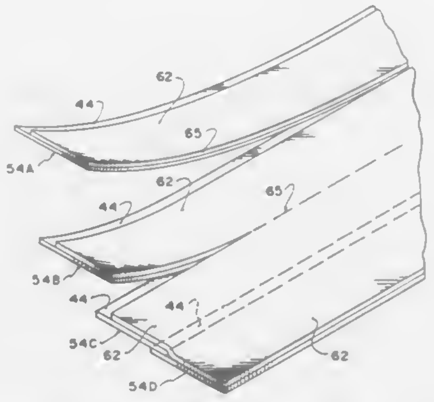
1. A slide fastener chain, possessing an ability to intercept electromagnetic waves and comprising a fastener tape made of synthetic fibers or natural fibers and being coated with a three-ply electroconductive layer of Ni, Cu and Ni being produced by sequentially coating nickel, copper and nickel on said fastener tape by electroless plating, and electroconductive fastener elements being planted along one lateral edge of said fastener tape.

5,023,395

CABLE SHIELDING TAPE

Lawrence J. O'Connor, Manitoba, Canada, assignor to KT Technologies Inc., Bridgetown, Barbados
Division of Ser. No. 172,425, Mar. 23, 1988, Pat. No. 4,898,640. This application Dec. 19, 1989, Ser. No. 452,304
Claims priority, application United Kingdom, Mar. 26, 1987, 8707219
Int. Cl.^{5} H01B *7/34;* **B32B** *3/04*
U.S. Cl. 174—36 **19 Claims**





1. A tape consisting of a single conducting layer, a single insulating layer and an intervening adhesive layer, said conducting layer being laminated by said intervening adhesive layer to one side of said insulating layer with one longitudinal edge of the conducting layer being spaced inwardly from the respective longitudinal edge of the insulating layer to form an edge portion of the insulating layer which is free from said conducting layer, said insulating layer and said conducting layer being coterminous at an opposed longitudinal edge, both said conducting layer and said insulating being commonly folded at said opposed longitudinal edge with said conducting layer outermost.

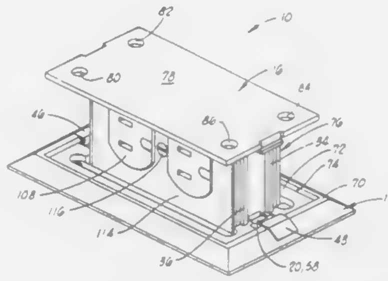
7. A tape comprising a supporting layer and a layer of metallic foil material carried thereon, said foil layer being laminated by an intervening adhesive layer to one side of said supporting layer with one longitudinal edge of the foil layer being spaced inwardly from a respective one of the longitudinal edges of the supporting layer which is free from said said foil layer, said supporting layer and said foil layer being coterminous at a longitudinal edge opposite to said one longitudinal edge, said foil layer being separated from a sheet of a foil material wider than said tape by tearing of he foil material of the sheet along said one longitudinal edge of the foil layer.

14. A tape comprising a layer of a supporting material and a layer of a metallic foil material carried thereon when manufactured by a method comprising forwarding a plurality of separate tapes each comprising a layer of said supporting material, laying the tapes as they are forwarded in a pattern each relative to the next so that an edge portion of each tape less than the width of the tape lies over an edge portion of a next adjacent tape, while the tapes remain in the pattern, laminating onto the tapes a sheet of said foil material of a width sufficient to cover more than one of the tapes, and separating each of the supporting material tapes from the other supporting material tapes each with a portion of the foil material laminated thereto covering a surface thereof except for said edge portion which is free from said layer of conducting material.

5,023,396

POP-UP SERVICE FITTING

Edward C. Bartee, Fairfield, Ohio, and Donald L. Chapman, Liberty, Ind., assignors to Square D Company, Palatine, Ill.
Filed Mar. 10, 1989, Ser. No. 321,927
Int. Cl.^{5} H02G *3/08*
U.S. Cl. 174—48 **16 Claims**



1. An electrical service fitting apparatus, comprising:

a base frame having a generally rectangular frame opening defined therethrough;

an extensible service fitting disposed through said frame opening and movable relative to said frame between a retracted position and an extended position;

said base frame having a plurality of grooves defined therein, said grooves opening into and communicating with said frame opening;

said service fitting having a plurality of elongated ribs defined thereon, said ribs being received in said grooves so that said ribs may slide in said grooves to guide said service fitting as it moves between said retracted and extended positions, at least one groove and associated rib being located on each end of two opposite sides of said frame opening; and

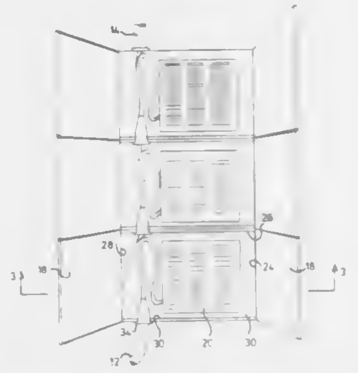
spring biasing means for biasing said service fitting toward said extended position.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,397

ENTRY BOX

Alex Tomes, and Gordon McPhedran, both of Calgary, Canada, assignors to Circa Telecommunications Inc., Calgary, Canada
Filed Jul. 14, 1989, Ser. No. 380,010
Claims priority, application Canada, Jul. 12, 1989, 605429
Int. Cl.^{5} H02G *3/08*
U.S. Cl. 174—50 **21 Claims**

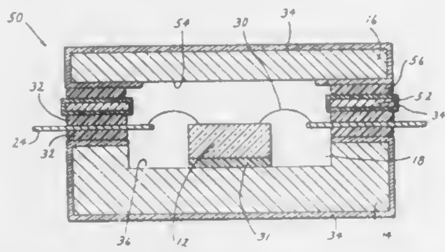


1. A junction box to facilitate connection of a conductor to a component located within said box, said box comprising a rear panel, side panels extending around the periphery of the rear panel, a front closure panel spaced from the rear panel, a pair of apertures in opposite ones of said side panels to allow passage of said conductor through said box, said opposite ones of said side panels being formed in two sections with one section being attached to said rear panel and the other section being attached to a further side panel extending between said opposite ones of said side panels, each of said two sections having a portion of said aperture formed therein, said further side panel being releasably connected to said rear panel by releasable fastening means positioned to be accessible upon removal of said closure panel, said closure panel being pivotally connected to said further side panel to be removable therewith.

5,023,398

ALUMINUM ALLOY SEMICONDUCTOR PACKAGES

Deepak Mahulikar, Meriden, and James M. Popplewell, Guilford, both of Conn., assignors to Olin Corporation, New Haven, Conn.
Continuation-in-part of Ser. No. 253,639, Oct. 5, 1988, Pat. No. 4,939,316. This application Apr. 4, 1990, Ser. No. 504,741
Int. Cl.^{5} H01L *23/02*
U.S. Cl. 174—52.4 **13 Claims**

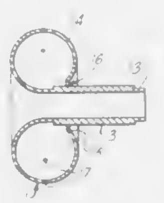


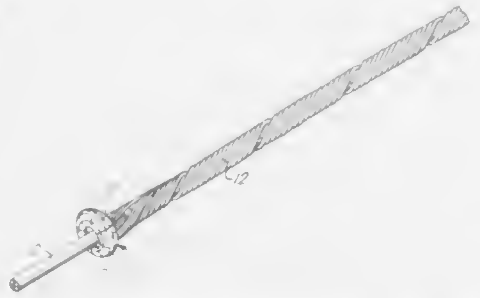
1. A package for encasing an electronic device, comprising:
a base component formed from aluminum or an aluminum alloy;
a window frame component formed from aluminum or an aluminum alloy and having first and second surfaces;
said base component and said window frame component defining a cavity;
a leadframe disposed between and adapted to be bonded to said base component and to the first surface of said window frame component, said leadframe bonded to said base component and to said first surface of said window frame component by a sealing glass having a coefficient of thermal expansion within about 20% of the coefficient of thermal expansion of said base component;
a cover component adapted to be bonded to the second surface of said window frame component; and
an anodization layer having a thickness in the range of from about 10 to about 2000 micro inches and covering at least those portions of said base and window frame components exposed to the atmosphere, as well as those portions bonded to said sealing glass.

5,023,399

SUPPORT ASSEMBLY INCLUDING A STRESS LIMITER FOR NON-METALLIC CABLE, AND METHOD OF FITTING THE STRESS LIMITER

Brian P. Mills, Hornchurch, and Edward K. George, Rainham, both of England, assignors to Telephone Cables Limited, England
Filed Jul. 16, 1990, Ser. No. 553,876
Claims priority, application United Kingdom, Jul. 31, 1989, 8917472
Int. Cl.^{5} H02G *15/064*
U.S. Cl. 174—73.1 **14 Claims**





1. A support assembly for an aerial non-metallic cable, comprising:
(a) a generally mushroom-shaped, metallic stress limiter having a hollow head portion of generally circular cross-section and a hollow, tubular stem portion integral with the head portion and extending therefrom along a longitudinal axis from an inner end region within the head portion to an outer end region axially spaced away from the head portion, said head portion having a smoothly curved exterior surface; and
(b) a metallic support fitting including a plurality of metallic wires wound helically about the longitudinal axis, and having wire ends that surround and securely grip the stem portion.

12. A method of fitting a stress limiter on an aerial non-metallic cable having a cable end surrounded by a plurality of metallic wires wound helically about a longitudinal axis and terminating in wire ends, comprising the steps of:
(a) temporarily and partially unwinding the wire ends to form an annular space between the wire ends and the cable;

(b) providing the stress limiter with a generally mushroom-shaped configuration having a hollow, metallic head portion of generally circular cross-section and a hollow, metallic, tubular stem portion integral with the head portion and extending therefrom along the longitudinal axis from an inner end region within the head portion to an outer end region axially spaced away from the head portion, said head portion having a smoothly curved exterior surface;
(c) inserting the stem portion into the annular space; and
(d) re-winding and tightening the wire ends about the stem portion.

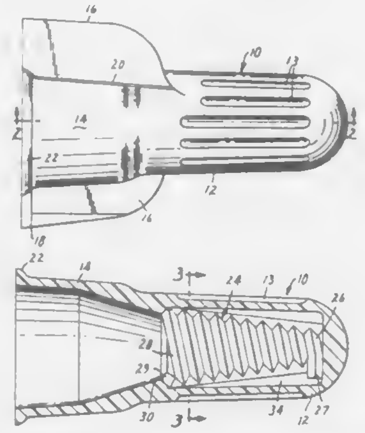
5,023,400

Patent Not Issued For This Number

5,023,401

TWIST-ON SPRING CONNECTOR WITH BREAKAWAY WINGS

Richard B. Clifton, Leander, Tex., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Aug. 2, 1990, Ser. No. 561,699
Int. Cl.^{5} H01R *4/22*
U.S. Cl. 174—87 **18 Claims**

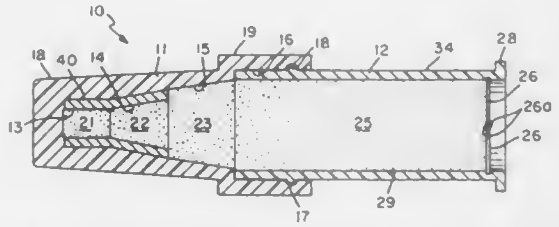


1. A twist-on type spring connector comprising:
a hollow insulative shell closed at one end and open at the other end, and a coiled spring retained in said shell;
said coiled spring having a small first coil and a large last coil, said small first coil disposed toward the closed end of said insulative shell and said large last coil disposed toward the open end of said insulative shell;
said coiled spring tapering substantially conically from said large last coil to said small first coil;
said connector having means for transferring the twisting force to said coiled spring from said insulative shell when said connector is turned down on a plurality of electrical wires, to prevent said coiled spring from twisting relative to said insulative shell;
said insulative shell having a plurality of wing to be connected means arranged to enable said connector to be turned down on the electrical wires with greater twisting force; and
frangible means for securing said wing means to said insulative shell, for providing support for said wing means when transferring force from said wing means to said insulative shell, and for removing said wing means from said insulative shell.

5,023,402

WATERPROOF WIRE CONNECTOR

Lloyd H. King, Jr., Town & Country, and Thomas A. King, Chesterfield, both of Mo., assignors to King Technology of Missouri, Inc., St. Louis, Mo.
Continuation-in-part of Ser. No. 450,156, Dec. 13, 1989, abandoned. This application Feb. 12, 1990, Ser. No. 478,687
Int. Cl.^{5} H02G *15/08*
U.S. Cl. 174—87 **10 Claims**



1. A waterproof connector to permit a user to simultaneously form a waterproof low resistance electrical connection between electrical leads comprising:
a cylindrical housing, said cylindrical housing having a first end and a second end;
an electrical conducting collar located in said cylindrical housing to permit a user to rotate said electrical conducting collar about the twisted ends of electrical leads to provide a low resistance electrical connection between the electrical leads;
a cylindrical tube, said cylindrical tube having a cavity therein, said cylindrical tube having a first end and a second end with said first end of said cylindrical tube rotatively mounted on either said first or said second end of said cylindrical housing;
a sealant located in said cylindrical tube and said cylindrical housing; and
a flexure cover located on said second end of said cylindrical tube, said flexure cover having segments that flex inward in response to insertion of the twisted junction ends of electrical leads into said cylindrical tube so that a user can simultaneously form a waterproof, low resistance electrical connection between electrical leads by grasping and holding said cylindrical tube in one hand while rotating said cylindrical housing with another hand.

8. The method of simultaneously forming a waterproof low resistance electrical connection between electrical leads comprising the steps of:
twisting the ends of electrical leads together to form a twisted junction;
inserting the twisted junction through a tube connected to a wire connector having a cavity containing a sealant until the twisted junction engages the interior of the wire connector and is surrounded by the sealant;
and then twisting the wire connector while holding the tube and the electrical leads so that the twisted junction is forced into a waterproof, low resistance electrical connection with the twisted junction surrounded by the sealant.

5,023,403

DEVICE FOR CONNECTING AN ELECTRICAL CABLE TO A WINDOW PANE HAVING ELECTRICAL CONDUCTORS

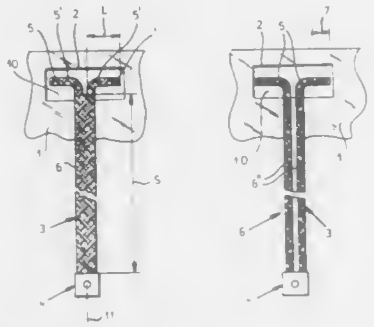
Rudolf Eckardt, Wesel, and Bernd Diedrichs, Hamminkeln, both of Fed. Rep. of Germany, assignors to Flachglas Aktiengesellschaft, Furth, Fed. Rep. of Germany
Filed Dec. 15, 1989, Ser. No. 451,346
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1988, 8815848[U]
Int. Cl.^{5} H01R *11/01*
U.S. Cl. 174—94 R **8 Claims**

1. A connecting assembly for connecting at least one con-

VOL
1127
ISS
2
JE
11
1991
UMI

ductive element on a window pane to an electrical cable, comprising:

an elongated braided body extending between a conductive element and a cable, said body being formed at one end with a pair of braided feet bent at a right angle to said body and forming arms of a T therewith;



means forming a solder junction between ends of said feet and said element; and

a lug connected to said body at an extremity thereof opposite said feet, for electrical connection to said cable.

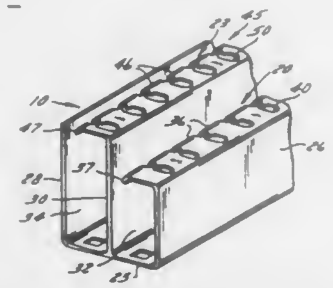
5,023,404
WIRING DUCT

Hugh F. Hudson, Wauwatosa, Wis.; Joseph F. Munsch, Boulder Creek; Joseph A. McArdle, Mountain View, both of Calif.; Jackie L. Kammer, Baraboo, and Robert W. Jermyn, Mukwonago, both of Wis., assignors to Johnson Service Company, Milwaukee, Wis.

Filed Sep. 13, 1989, Ser. No. 406,772

Int. Cl.⁵ H02G *3/04*

U.S. Cl. 174—97 **17 Claims**



1. A top entry top exit routing duct for routing a plurality of separate conductors to terminal devices, said duct comprising a bottom wall, side walls and an intermediate wall separating said duct into first and second channels for separating the conductors; a first partial top wall formed on one of said side walls, said first partial top wall including a first set of fingers having distal ends extending toward said intermediate wall to form a first top entry opening into said first channel and being spaced from each other to form a first set of open ended top exit slots, and a second partial top wall on said intermediate wall, said second partial top wall including a second set of fingers having distal ends extending toward the other of said side walls to form a second top entry opening into said second channel and being spaced from each other to form a second set of open ended top exit slots, whereby conductors can be routed into said first and second channels, respectively, through said first and second top entry openings and conductors in said first channel can be exited through said first set of top exit slots, and conductors in said second channel can be exited through said second set of top exit slots for connection to terminal devices.

5,023,405
ELECTRIC CABLE COMPRISING A BRAID SURROUNDING THE CABLE CORE

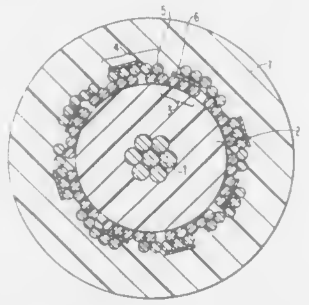
Ekkehard Kwast, Solingen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 1, 1990, Ser. No. 487,676

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1989, 3906575

Int. Cl.⁵ H01B *7/34*

U.S. Cl. 174—109 **18 Claims**



1. An electric cable having a cable core, and a braid surrounding the cable core, said braid comprising crossed metallic braiding elements and high tensile strength non-metallic braiding elements, the improvement, comprising:

said non-metallic braiding elements being arranged radially with respect to and in parallel with corresponding metallic braiding elements.

5,023,406
HIGH VOLTAGE INSULATOR

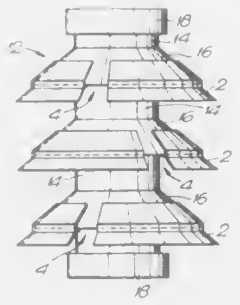
David W. M. Thornley, Maimesbury, England, assignor to Raychem Limited, Swindon, England

Continuation of Ser. No. 307,871, Feb. 7, 1989, abandoned. This application Nov. 17, 1989, Ser. No. 437,325

Claims priority, application United Kingdom, Feb. 8, 1988, 8802841

Int. Cl.⁵ H01B *17/32, 17/50, 17/60*

U.S. Cl. 174—209 **11 Claims**



1. An elongate high voltage electrical insulator comprising an elongate core having at least one shed extending laterally completely therearound, and one or more components of insulating material bonded to the shed and extending laterally therefrom around part only of the perimeter of the shed, thereby to increase the longitudinal creepage path length of the shedded core around part only of the core perimeter.

10. A method of increasing the longitudinal creepage current resistance of an elongate high voltage electrical insulator, the insulator comprising an elongate core having at least one shed extending laterally completely therearound, comprising the step of bonding one or more components of insulating material to the shed so as to extend laterally therefrom around part only of the perimeter of the shed, thereby to increase the longitudinal creepage path length of the shedded core around part only of the core perimeter.

11. A method according to claim 10, including forming the or each insulating component of recoverable material and recovering the or each insulating component onto the shed.

5,023,407
PRINTED CIRCUIT BOARD WITH A UNIFORM CONDUCTIVE LAYER FORMED BY EQUALIZATION OF METALS THEREIN

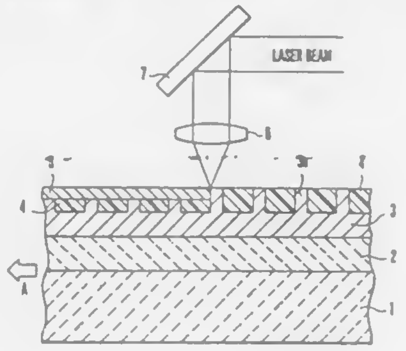
Mitugu Shirai; Kaoru Katayama; Hideaki Sasaki; Shinichi Kazui, all of Hadano; Ryohei Satoh; Tateoki Miyauchi, both of Yokohama, and Mamoru Kobayashi, Hadano, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 7, 1989, Ser. No. 390,616

Claims priority, application Japan, Aug. 30, 1988, 63-215680

Int. Cl.⁵ H05K *1/09*

U.S. Cl. 174—257 **16 Claims**



1. A circuit board, comprising:

a substrate; and

a junction pad or zone provided on the substrate and having a uniformly alloyed layer of gold and a metal other than gold at least on a surface or the junction pad or zone, said uniformly alloyed layer formed by melting and resolidifying a non-uniform layer of gold and a metal other than gold, the junction pad or zone being an area suited for bonding with an external wire element.

5,023,408
ELECTRONIC BLACKBOARD AND ACCESSORIES SUCH AS WRITING TOOLS

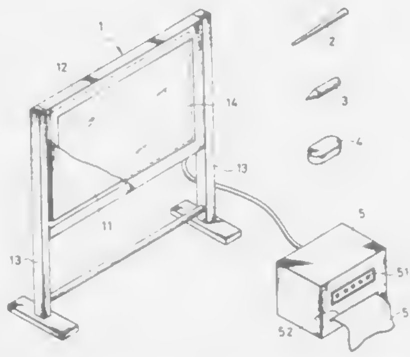
Azuma Murakami; Kazuo Aoki; Tsuguya Yamanami; Yoshiaki Tomofuji; Takeshi Tanaka; Satoshi Inashima; Takahiko Funahashi; Toshihide Chikami, and Toshiaki Senda, all of Saitama, Japan, assignors to Wacom Co., Ltd., Saitama, Japan

Filed Jun. 13, 1989, Ser. No. 365,388

Claims priority, application Japan, Jun. 22, 1988, 63-154518

Int. Cl.⁵ G08C *21/00*

U.S. Cl. 178—19 **85 Claims**



1. An electronic blackboard apparatus comprising:

a writing surface,

a tool for modifying an image on the surface including a tuned circuit having a predetermined resonant frequency;

means for sensing the presence of the tool relative to said surface, said means including electric wave generating means for generating an electric wave with plural frequencies, one of which is resonant to said frequency, and an electric wave detection means for detecting an electric wave reflected by said tuned circuit;

said sensing means including coordinate detection means responsive to the electric wave reflected from said tool and generated by said generating means for detecting a coordinate corresponding to the position of said tool; and

image information processing means for processing, on the basis of the thus-detected coordinate, image information corresponding to an image formed by the tool on the surface.

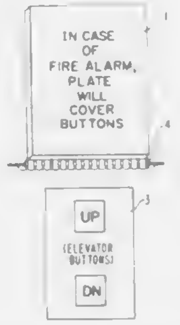
5,023,409
ELEVATOR CONTROL SAFETY DEVICE

Jim Wilson, 138 Bayou Cir., Gulfport, Miss. 39507

Filed Aug. 2, 1989, Ser. No. 388,392

Int. Cl.⁵ B66B *5/02*

U.S. Cl. 187—130 **12 Claims**



1. A safety device for indicating the service status of a building elevator having elevator call buttons, said device comprising:

a shield mounted adjacent said call buttons and adapted for movement from a first position to a second position, said shield rendering said call buttons inaccessible to elevator users when said shield is in said second position;

releasing means for holding said shield in said first position and releasing said shield for movement from said first position to said second position upon being activated; and

control means for activating said releasing means in response to a building emergency.

5,023,410
CORD REEL CONTACTS FOR A VACUUM CLEANER

Orland H. Danielson, Boyle County, and Joseph R. Gross, City of Danville, both of Ky., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Jan. 2, 1990, Ser. No. 459,650

Int. Cl.⁵ H02G *11/02*

U.S. Cl. 191—12.20 R **21 Claims**

1. A vacuum cleaner cord reel assembly comprising:

a support bracket fixedly mounted in a vacuum cleaner housing;

a cord reel rotatably supported on said support bracket about a rotational axis and carrying a two conductor electrical cord wound thereon for supplying power to the vacuum cleaner;

first and second planar conductive elements including output terminals for connection to electrical apparatus in said housing;

means for mounting said conductive elements to said support bracket in axially spaced relationship with one another,

VOL
1127
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2
JE
11
1991
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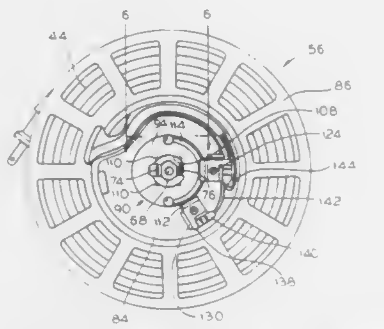
wherein said conductive elements are non-perpendicular to said rotational axis;

first and second contact terminals electrically connected to said two conductors; and



means for fixedly securing said contact terminals to said cord reel so that said first and second contact terminals are in electrical contact with said first and second conductive elements, respectively, incident to said cord reel being supported on said support bracket.

5,023,411

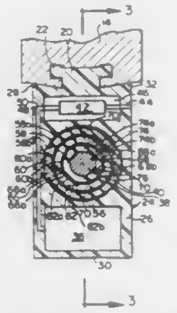
SENSING EDGESWITCH FOR A DOOR

Norman K. Miller, and Bearge D. Miller, both of Concordville, Pa., assignors to Miller Edge, Inc., Concordville, Pa.

Continuation-in-part of Ser. No. 491,781, Mar. 12, 1990, Pat. No. 4,972,054, which is a continuation-in-part of Ser. No. 396,493, Aug. 21, 1989, Pat. No. 4,908,483, and a continuation-in-part of Ser. No. 384,348, Jul. 21, 1989, Pat. No. 4,954,673. This application Oct. 3, 1990, Ser. No. 592,410

Int. Cl.^{5} H01H *3/16*

U.S. Cl. 200—61.43 10 Claims



1. A redundant sensing edge for causing a closing door to open by actuating a device upon force being applied to the sensing edge, the sensing edge comprising:

an elongate outer sheath compressible upon application of external pressure and fabricated of flexible air impervious material, the sheath having a front surface, a back surface, a lower surface and an upper surface, the upper surface for being attached to a door edge;

a substantially sealed air-impervious first chamber within the sheath proximate the lower surface of the elongate sheath;

a first pressure-sensitive switch having a switch element in fluid communication with the first chamber for sensing pressure change within the first chamber such that upon application of external pressure to the sheath, pressure within the first chamber is increased and thereby communicated to the pressure switch for actuation thereof to thereby actuate the device;

a second generally cylindrical chamber within the sheath for receiving a second switch, the second switch comprising:

a first generally cylindrical layer of resiliently compressible material having a first radially outer surface in engagement with the second chamber and a second radially inner surface;

a first generally cylindrical layer of electrically conductive material having a first radially outer surface in engagement with the second surface of the first layer of resiliently compressible material and having a second radially inner surface;

a generally cylindrical layer of non-conductive material having a first radially outer surface in engagement with the second surface of the first layer of electrically conductive material and a second radially inner surface, the layer of non-conductive material including at least one opening extending therethrough between the first and second surfaces;

a second generally cylindrical layer of electrically conductive material having a first radially outer surface in engagement with the second surface of the layer of non-conductive material and a second radially inner surface;

a second generally cylindrical layer of resiliently compressible material having a first radially outer surface in engagement with the second surface of the second layer of electrically conductive material and a second radially inner surface; and

a generally cylindrical support member having a radially outer surface in engagement with the second surface of the second layer of resiliently compressible material, the first and second layers of electrically conductive material being radially spaced apart by the layer of non-conductive material and presenting opposed portions to each other through the opening whereby upon the application of force to the sheath, a portion of at least one of the first and second layers of electrically conductive material deflects into the opening in the layer of non-conductive material and makes electrical contact between the first and second layers of electrically conductive material to thereby actuate the device.

5,023,412

HORN SWITCH ON STEERING WHEEL

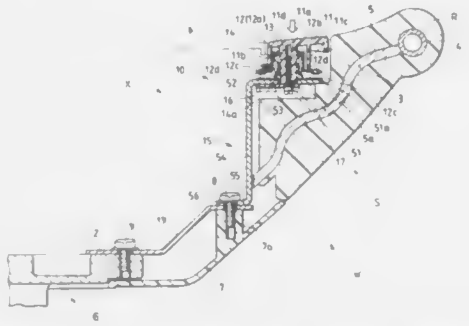
Syuichi Ishida, Aichi, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Mar. 16, 1990, Ser. No. 494,304

Claims priority, application Japan, Apr. 24, 1989, 1-48151[U]

Int. Cl.^{5} H01H *9/00, 13/08;* B62D *1/04*

U.S. Cl. 200—61.54 8 Claims



1. A steering wheel mountable horn switch comprising:

a stationary contact plate having an upper-side and a lower-side, said stationary contact plate including means defining a through-hole;

a movable contact plate having an upper-side and a lower-side positioned above said stationary contact plate upper-side, said movable contact plate including means defining a through-hole;

means for urging said movable contact plate away from said stationary contact plate;

means for electrically insulating said movable contact plate from accidental electrical contact with said upper-side of said stationary contact plate;

a horn button having an under-side and a upper-side, and including an abutting member mounted on said under-side, said abutting member being positioned as so to be in contact with said movable contact plate, said horn button further including a stem mounted to said under-side of said horn button, said stem being positioned so as to extend through said through-holes defined in each of said contact plates; and

a plate-shaped member fixedly mounted at one end thereof to said horn button stem, said plate-shaped member being positioned so as to abut said stationary contact plate under-side in close proximity to said through-hole of said stationary contact plate.

5,023,413

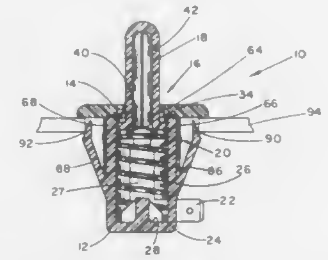
PLUNGER SWITCH

Paul R. Staples, Cub Run, Ky., assignor to E. M. B. Corporation, Elizabethtown, Ky.

Filed May 14, 1990, Ser. No. 522,687

Int. Cl.^{5} H01H *3/16*

U.S. Cl. 200—61.76 4 Claims



1. A plunger switch comprising:

a housing having an open end and a cap assembly closing said open end,

an axially spring biased plunger carried within said housing and extending through said cap assembly,

electrical terminals carried within said housing and extending outside thereof, and

a bridging electrical contact extending between said plunger to selectively engage and disengage from said electrical terminals,

said cap assembly including a cap having a first central aperture therein, a seal carried in said cap and having a second central aperture therein, said plunger forming a tight fit with said seal in said second central aperture, oppositely disposed pairs of lugs extending from a wall of said housing, each lug of said pair of lugs spaced apart to provide a slot there between, oppositely disposed spring loaded ears each extending from a base of said cap, notches in said ears, each of said ears extending through said slot with said notches engaging said lugs,

spring clips extending from said wall of said housing engaging a base holding said plunger switch while trapping said spring loaded ears in their engaged position.

5,023,414

ELECTRICAL SWITCH FOR DETECTING POSITIONS OF AN AUTOMATIC TRANSMISSION OF AN AUTOMOBILE

Harubiko Mihara; Norihiro Ida, and Tetsuya Hamaoka, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Mar. 13, 1990, Ser. No. 492,465

Claims priority, application Japan, Mar. 28, 1989, 1-75814[U]; Aug. 18, 1989, 1-213712[U]; Aug. 18, 1989, 1-213713[U]

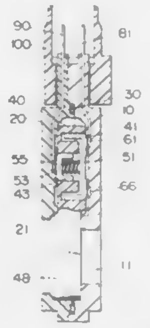
Int. Cl.^{5} H01H *3/16, 19/58*

U.S. Cl. 200—61.91 13 Claims

1. An electrical switch for detecting positions of an automatic transmission of an automobile and controlling correspondingly an electrical circuit in associate ion with the detected position of said transmission, said electrical control switch comprising:

a generally sector shaped switch casing having two radially extending sides defining an apex area and an axially extending opening adjacent said apex area, said casing comprising a pair of base plate and a cover plate each formed from an electrically insulative material, each of said base and cover plates provided in its interior surface with a plurality of circumferentially arranged fixed contacts, said interior surfaces facing each other in the switch casing;

an actuator rotatably supported between said base and cover plates for angular movement about a rotation axis centered about said opening, said actuator being elongated in the radial direction extending from said opening and having a sleeve ring in registration with said opening with means to receive and engage a control output shaft of an automatic transmission, the arrangement being such that the actuator can pivot about the axis of the opening in synchronism with said control output shaft of said automatic transmission which in turn rotates in synchronism with changing positions of said transmission;



said actuator having first and second opposed faces confronting the interior surfaces of said base plate and said cover plate, first and second radially extending movable contacts carried respectively by said first and second faces for electrical conduction between selective ones of said fixed contacts on the respective plates depending upon a particular angular position of said actuator;

a terminal projecting on said switch casing, said terminal comprising a plurality of terminal pins carried by both said base plate and said cover plate and electrically connected respectively to said fixed contacts.

5,023,415

SWITCH APPARATUS

Syunji Itoh, Hitachi; Hiroshi Kozawa, Katsuta, and Takahide Seki, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 27, 1989, Ser. No. 441,467

Claims priority, application Japan, Nov. 28, 1988, 63-298203

Int. Cl.^{5} H01H *33/82*

U.S. Cl. 200—148 R 10 Claims

1. A switch apparatus used in a distribution system, comprising:

a case;

at least one pair of bushing means arranged on said case so as to oppose each other;

breaking means arranged in said case so as to extend in a direction substantially perpendicular to an imaginary line interconnecting said pair of bushing means, said breaking means having at least one pair of contactor means;

actuator means provided in said case so as to actuate said breaking means;

first conductor means connected between first terminal means leading from one of said pair of contactor means and one of said bushing means; and

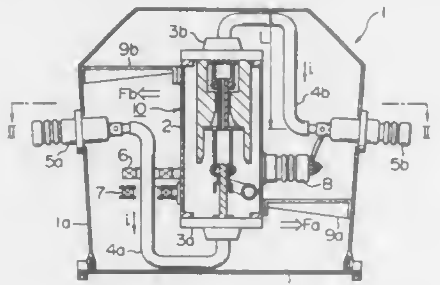
second conductor means connected between second termi-

VOL
1127
ISS
2
JE
11
1991
UMI

nal means leading from the other of said pair of contactor means and the other of said bushing means;

wherein said breaking means is arranged vertically in said case such that the axis representing the direction of breaking and closing actions substantially perpendicularly crosses said imaginary line interconnecting said pair of bushings,

said breaking means is encased in a hermetic container charged with an insulating gas, and said first and second conductor means being insulated cables.



5,023,416
CIRCUIT BREAKER

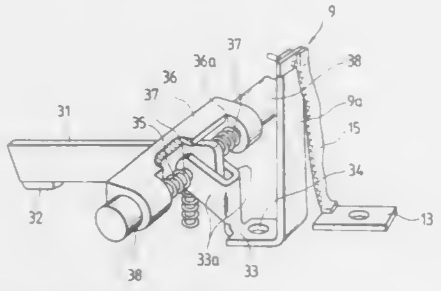
Jun Oyama; Naoshi Uchida; Makoto Unuma; Tatsunori Takahashi; Hisaji Shinohara, and Kiyoshi Kandatsu, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Dec. 29, 1989, Ser. No. 456,791

Claims priority, application Japan, Oct. 3, 1989, 1-258584; Oct. 14, 1989, 1-266588; Dec. 14, 1989, 1-324289

Int. Cl.⁵ H01H *1/22*

U.S. Cl. 200—244 17 Claims



1. A circuit breaker comprising:

a frame;

a connecting conductor mounted on said frame;

a movable contactor slidably engaging said connecting conductor to create an electrical connection therebetween;

a shaft member projecting through through-holes in the connecting conductor and the movable contactor to rotatably connect said connecting conductor to said movable contactor;

a switching shaft rotatably supported by said frame;

a holder, formed of electrically insulating material, engaging each end of said shaft member and being rotatably supported by said switching shaft;

means for rotating said movable contactor relative to said connecting conductor in response to a predetermined current.

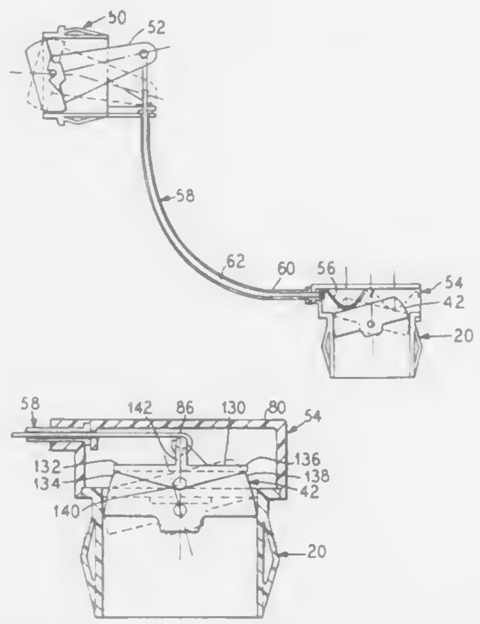
5,023,417
SWITCH ASSEMBLY HAVING A ROCKER SWITCH CONNECTED TO A REMOTE ACTUATOR

Joseph Magiera, 176 Acorn Ln., Libertyville, Ill. 60048

Filed Oct. 13, 1989, Ser. No. 421,147

Int. Cl.⁵ H01H *9/22, 3/02, 17/08*

U.S. Cl. 200—331 13 Claims



1. A switch assembly comprising:

means for actuating having at least one movable section;

rocker switch means for electrical switching having at least one movable cap which is movable from at least a first switch position to a second switch position;

means for moving said at least one movable cap of said rocker switch means,

said means for moving having a housing attached to said rocker switch means, said at least one movable cap having first and second ends and said housing containing a substantially triangular shaped element having a first end contacting said first end of said at least one movable cap, a second end contacting said second end of said at least one movable cap, and a third end pivotally attached to said housing, said triangular shaped element also having an arm opposed from said third end; and

means for connecting said at least one movable section of said means for actuating to said arm of said triangular shaped element;

wherein, when said at least one movable section of said means for actuating is moved, said at least one movable cap of said rocker switch means changes from said first switch position to said second switch position and vice-versa via said means for connecting and said means for moving.

5,023,418
SAFETY EDGE SWITCH

Karlheinz Beckhausen, Konradstrasse 15, D-5000 Cologne 41, Fed. Rep. of Germany

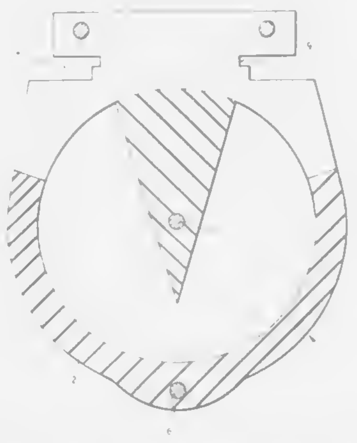
Filed Dec. 4, 1989, Ser. No. 445,762

Int. Cl.⁵ H01H *1/06*

U.S. Cl. 200—511 17 Claims

1. A safety edge switch for power-actuated devices such as roller gates, comprising:

a hollow rubber profile (1) including a tubular basic body part (2) with a hollow interior, a knife-edge rib part (5) within said interior, said rib part and said tubular basic body part presenting confronting contact surfaces which are electrically conductive and, when brought into contact, are operable to cause a switching pulse, said rib part (5) and said tubular basic body part (2) being rendered wholly electrically conductive by their being comprised of an admixture of conductive substances and an electrically conductive wire (6) disposed within one of said parts.



5,023,419
DEVICE FOR THE INDUCTION HEATING OF A WORKPIECE

Göran Langstedt, Nybamnsgatan 1, S-263 32 Höganäs, Sweden

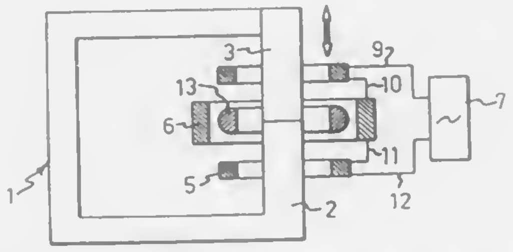
PCT No. PCT/SE88/00237, § 371 Date Dec. 26, 1989, § 102(e) Date Dec. 26, 1989, PCT Pub. No. WO88/09106, PCT Pub. Date Nov. 17, 1988

PCT Filed May 5, 1988, Ser. No. 435,383

Claims priority, application Sweden, May 7, 1987, 8701888

Int. Cl.⁵ H05B *6/10*

U.S. Cl. 219—10.57 8 Claims



1. A device for heating a workpiece consisting at least partly of metal, said device comprising a coil arrangement positioned around a core of electric steel sheeting, and a voltage source connected to said coil arrangement for producing a magnetic field around said coil arrangement in said core and outside said core, said core having a first pole and a second pole forming between them an air gap for accommodating a central portion of a workpiece which is heated by said magnetic field which is concentrated in said core, said coil arrangement including a first coil positioned around said first pole, and a second coil connected to said first coil positioned around said second pole, said first and second coils being disposed opposite one another to form therebetween a space for accommodating peripheral portions of the workpiece, such that said first and second coils, by means of said magnetic field outside said core, contribute to heating the peripheral portions of the workpiece whereby rapid and uniform heating in the workpiece is achieved.

5,023,420
WIRE TENSION CONTROLLING METHOD IN A WIRE CUT ELECTRIC DISCHARGE MACHINE

Toshiyuki Aso; Yasuo Arakawa, both of Oshino, and Junichi Kato, Komae, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

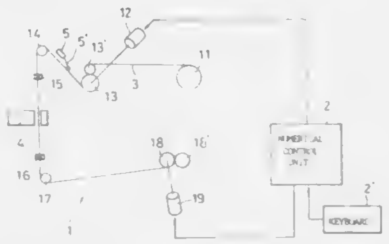
PCT No. PCT/JP89/00681, § 371 Date Mar. 23, 1990, § 102(e) Date Mar. 23, 1990, PCT Pub. No. WO90/00950, PCT Pub. Date Feb. 8, 1990

PCT Filed Jul. 5, 1989, Ser. No. 474,754

Claims priority, application Japan, Jul. 28, 1988, 63-186890

Int. Cl.⁵ B23H *7/10, 7/20*

U.S. Cl. 219—69.12 8 Claims



1. A wire tension controlling method in a wire cut electric discharge machine adapted to control a wire tension applied to a wire electrode by means of an electric brake, said method comprising steps of:

(a) determining, when a wire tension setting/updating instruction is delivered, whether an actual wire tension would exceed a predetermined range, if said electric brake is operated in accordance with said instruction;

(b) changing a target wire tension by a predetermined amount, when it is determined in step (a) that the actual tension will exceed the predetermined range; and

(c) periodically effecting said step (b) until said target wire tension reaches an instructed wire tension specified by said instruction.

5,023,421
DEVICE FOR LIMITING THE WITHDRAWAL OF THE ELECTRODE OF A DIE SINKING MACHINE

Marcel Bouchoud, Geneva, Switzerland, assignor to Charmilles Technologies SA, Meyrin, Switzerland

Filed Nov. 7, 1989, Ser. No. 432,791

Claims priority, application Switzerland, Nov. 8, 1988, 04142/88

Int. Cl.⁵ B23H *7/14, 7/32*

U.S. Cl. 219—69.13 9 Claims

6. A device for interrupting the operation of a die-sinking machine as soon as the machining zone is no longer immersed in the machining liquid as a consequence of the tool-electrode moving back up, comprising:

a first element mounted on a column of a machine frame,

a second element mounted on a machining head carrying a tool,

an electrode mounted as to move as one with said machining head when said head moves vertically,

said first element being arranged to engage said second element so as to cause the machining current to be cut off when said second element arrives opposite said first element and said machining head moves up,

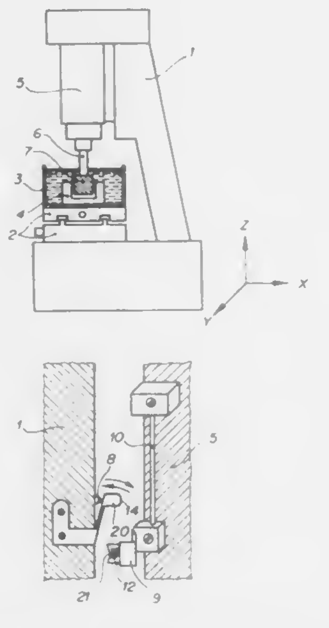
means for moving and fixing in position a vertically movable element and

an electrical circuit, said circuit including an element able to cause machining to be interrupted, the vertical position of said frame being adjustable to a predetermined height, said second element being mounted at a fixed height, and said first element being connected to an electrical circuit and being able to cause the machining current to be cut off when it is actuated by said second element; and

said second element is said vertically movable element, said

VOL
1127
ISS
2
JE
11
1991
UMI

vertically movable element is a mechanical part whose vertical position on the machining head is adjustable to a predetermined height, said mechanical part is provided



with a lug that is shaped so as to push back a spring blade fixed to the machine frame so that it presses on a microswitch that causes interruption on the machining current.

5,023,422

METHOD OF AND APPARATUS FOR FORMING A SLOT IN A WORKPIECE

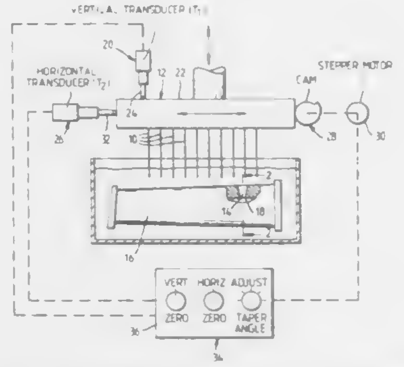
Laurence J. Laughton, Keighley, and Edward Ratcliffe, Colne, both of England, assignors to Rolls-Royce plc, London, England

Filed Feb. 24, 1990, Ser. No. 484,832

Claims priority, application United Kingdom, Mar. 31, 1989, 8907328

Int. Cl.⁵ B23H *9/14*

U.S. Cl. 219—69.2 **10 Claims**



1. A method of forming a tapered slot in a workpiece comprising the steps of moving a tool into the workpiece to achieve a desired depth and at the same time causing relative reciprocatory movement between the tool and the workpiece in directions laterally of the direction of movement of the tool into the workpiece and deriving electrical signals from said movements and wherein the signals derived from movement of the tool into the workpiece constantly reduce in magnitude, comparing said signals with each other and when the signals derived from said lateral movement have a value equal to the value of the signals derived from the movement of the tool into the workpiece or equal to a corresponding negative value thereof, deriving a further signal therefrom and utilizing said further signal to effect a reversal in the direction of said lateral movement between the workpiece and the tool.

5,023,423

TRANSFORMER APPARATUS WITH RECTIFIERS

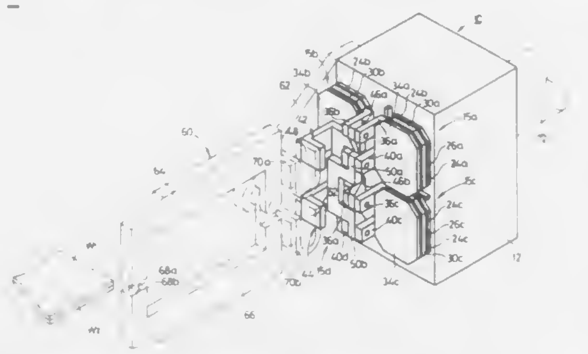
Geo Tsujii, and Toshihiro Murakawa, both of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 27, 1989, Ser. No. 457,500

Claims priority, application Japan, Dec. 27, 1988, 63-335314; Apr. 19, 1989, 1-99766

Int. Cl.⁵ B23K *11/24*

U.S. Cl. 219—108 **6 Claims**



1. A transformer apparatus comprising:

at least first and second transformer/rectifier assemblies each comprising respective first and second transformers including a secondary winding and a rectifier;

a first terminal plate connected to the secondary winding of said second transformer/rectifier assembly through said rectifier thereof;

a second terminal plate connected to the secondary winding of said second transformer/rectifier assembly through said rectifier thereof;

a first center tap terminal plate connected to an intermediate portion of the secondary winding of said first transformer/rectifier assembly, said first terminal plate and said first center tap terminal plate being disposed on one side of said first transformer;

a second center tap terminal plate connected to an intermediate portion of the secondary winding of said second transformer/rectifier assembly, said second terminal plate and said second center tap terminal plate being disposed on one side of said second transformer;

said first and second transformers being disposed side by side, and said first and second terminal plates being disposed closely to each other in confronting relation;

a first conductive body interconnecting said first and second terminal plates, and a second conductive body interconnecting said first and second center tap terminal plates;

third and fourth transformer/rectifier assemblies each comprising respective third and fourth transformers including a secondary winding and a rectifier;

a third terminal plate connected to the secondary winding to said third transformer/rectifier assembly through said rectifier thereof;

a fourth terminal plate connected to the secondary winding of said fourth transformer/rectifier assembly through said rectifier thereof;

a third center tap terminal plate connected to an intermediate portion of the secondary winding of said first transformer/rectifier assembly, said third terminal plate and said third center tap terminal plate being disposed on one side of said third transformer; and

a fourth center tap terminal plate connected to an intermediate portion of the secondary winding of said fourth transformer/rectifier assembly, said fourth terminal plate and said fourth transformer, one end of said first conductive body interconnecting said first and second terminal plates, and another end of said first conductive body interconnecting said third and fourth terminal plates, one end of said second conductive body interconnecting said first and second center tap terminal plates, and another end of said second conductive body interconnecting said third and fourth center tap terminal plates, and wherein said first and second transformer/rectifier assemblies are symmetrically disposed.

5,023,424

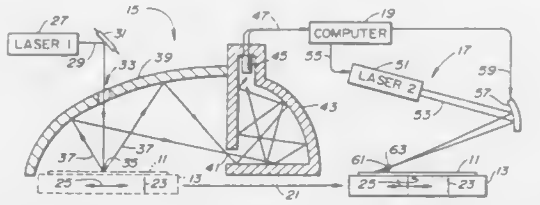
SHOCK WAVE PARTICLE REMOVAL METHOD AND APPARATUS

John L. Vaught, Palo Alto, Calif., assignor to Tencor Instruments, Mountain View, Calif.

Filed Jan. 22, 1990, Ser. No. 467,974

Int. Cl.⁵ B23K *26/00*

U.S. Cl. 219—121.6 **12 Claims**



1. A method of removing microscopic particles from solid surfaces comprising,

disposing a solid surface in a predetermined plane,

locating a position of each particle on said surface,

producing a gas-borne shock wave at a point proximate to said predetermined plane, said point at which said shock wave is produced being proximate to one said located position, particles on said surface near said point being removed from said surface by said shock wave, the production of said shock wave leaving said solid surface substantially undamaged, and

repeating the shock wave producing steps at other said located positions for each additional particle which is detectable on said surface.

5,023,425

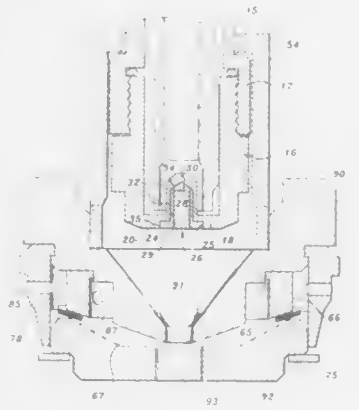
ELECTRODE FOR PLASMA ARC TORCH AND METHOD OF FABRICATING SAME

Wayne S. Severance, Jr., Florence, S.C., assignor to ESAB Welding Products, Inc., Florence, S.C.

Filed Jan. 17, 1990, Ser. No. 466,205

Int. Cl.⁵ B23K *9/26*

U.S. Cl. 219—121.59 **18 Claims**



1. An electrode adapted for supporting an arc in a plasma arc torch and comprising

a metallic holder having a front end, and a cavity in said front end, and

an insert assembly mounted in said cavity and comprising an emissive insert composed of a metallic material having a relatively low work function, and a sleeve surrounding said emissive insert so as to separate said emissive insert from contact with said holder, said sleeve having a radial thickness of at least 0.1 inches at said front end and being composed of a metallic material having a work function which is greater than that of the material of said emissive insert, and said sleeve being composed of a metal which is selected from the group consisting of silver, gold, platinum, rhodium, iridium, palladium, nickel, and alloys wherein at least 50% of the composition of the alloy consists of one or more of said metals and

whereby said sleeve acts to resist movement of the arc attachment point from said insert to said holder.

5,023,426

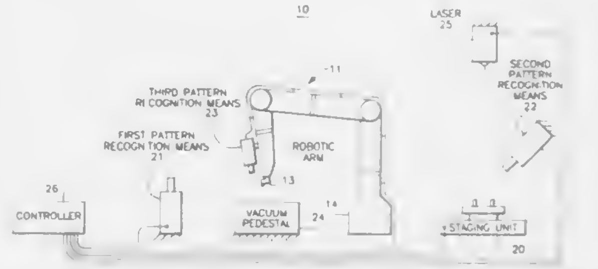
ROBOTIC LASER SOLDERING APPARATUS FOR AUTOMATED SURFACE ASSEMBLY OF MICROSCOPIC COMPONENTS

Steve A. Prokosch, North Saint Paul, and Kevin R. Aufderhar, Coon Rapids, both of Minn., assignors to Honeywell Inc., Honeywell Plaza

Filed Jun. 21, 1989, Ser. No. 369,394

Int. Cl.⁵ B23K *26/00*

U.S. Cl. 219—121.63 **3 Claims**


10
LASER 25
SECOND PATTERN RECOGNITION MEANS 22
THIRD PATTERN RECOGNITION MEANS 23
FIRST PATTERN RECOGNITION MEANS 21
ROBOTIC ARM
11
13
14
24
26
CONTROLLER
VACUUM PEDESTAL
STAGING UNIT
20

1. An apparatus for selecting a very small electrical component from an initial storage location and for moving said selected component with respect to a circuit board so that said selected component is positioned at a pre-selected location on said circuit board, and for soldering said selected component to said circuit board, the apparatus comprising:

a vacuum pickup means for picking up and holding said selected component;

a first pattern recognition means having an output for determining the position of said selected component while being held by said vacuum pickup means;

a staging unit for supporting said circuit board; means for moving said stage;

a second pattern recognition means having an output for determining the position of said circuit board on said stage;

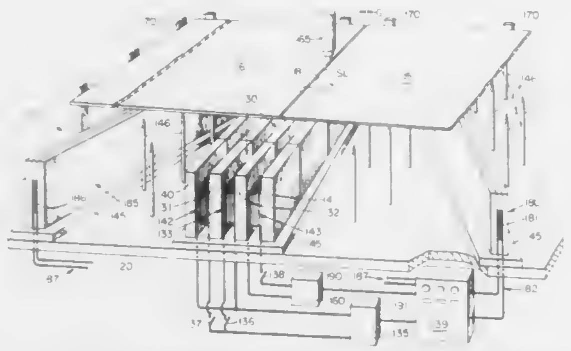
means responsive to the outputs of said first and second pattern recognition means for moving said vacuum pickup means with said selected component held thereby toward said circuit board and for positioning said selected component in a pre-selected orientation on a pre-selected location on said circuit board; and a laser for melting solder on said pre-selected location on said circuit board to create a soldered joint between said circuit board and said selected component while said vacuum pickup means is holding said selected component, said pickup means being disengaged from said selected component following the creation of said soldered joint.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,427
METHOD AND APPARATUS FOR AUTOMATICALLY ALIGNING PROXIMAL EDGES OF SHEETS TO BE BUTT WELDED

Gary L. Neiheisel, Cincinnati, and David C. McGraw, Franklin, both of Ohio, assignors to Armco Steel Company, L.P., Middletown, Ohio

Filed Apr. 12, 1990, Ser. No. 508,901
Int. Cl.^{5} B23K *26/02*
U.S. Cl. 219—121.82 **24 Claims**



1. A device for automatically aligning proximal edges of at least two appreciably magnetic individual sheets to be connected along said proximal edges, said device comprising:

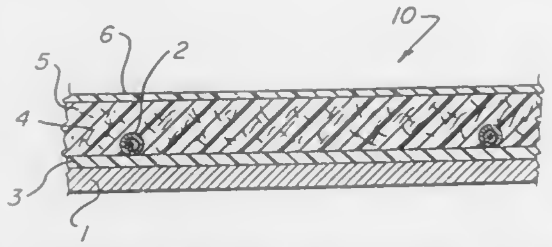
means for supporting said individual sheets in a substantially side-by-side relationship relative one another with their proximal edges oriented in approximately abutting relationship and generally aligned along a predetermined contiguous abutting seam line, at least one of said sheets being movably supported relative the other sheet; and

means for simultaneously creating an effective magnetic pole along the proximal edge of one of said sheets and an effective magnetic pole of opposite polarity along the confronting proximal edge of the other of said sheets so as to cause a magnetic attraction between said proximal edges for moving at least said movably supported sheet toward the other sheet to automatically align said proximal edges in intimate contact along their length.

5,023,428
SURFACE COATING

Björn Hegstad, Alf Godagers vei 16, 7081 Sjetnhaugan, Norway

Filed May 3, 1989, Ser. No. 346,999
Int. Cl.^{5} H05B *3/00*
U.S Cl. 219—213 **8 Claims**



1. A surface coating with heater cable, for the even heating of surface structures such as ships' decks, particularly for the purpose of hindering icing, the coating comprises:

a heating means being evenly distributed across the area to be covered by the surface coating,

a foundation layer of a plastic material which forms a base means for the heating means,

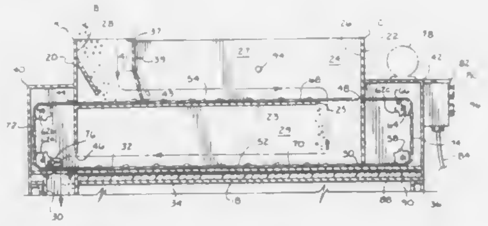
a layer of a plastic material which covers the heating means and includes thermically-conducting particles embedded therein,

a covering layer of a material having a lower thermic conductivity than said conducting layer containing the particles.

5,023,429
VESSEL AND METHOD FOR THERMALLY PROCESSING BULK MATERIAL

Richard G. Bailey, Overland Park, Kans., and Merton R. Leggott, Lincoln, Nebr., assignors to Flakee Mills, Inc., Lincoln, Nebr.

Filed Oct. 11, 1989, Ser. No. 420,030
Int. Cl.^{5} F27B *9/06;* F27D *11/02*
U.S. Cl. 219—388 **7 Claims**



7. A vessel for bulk material processing, which includes:
(a) a housing having:
  (1) top, bottom, front, back and opposite side panels;
  (2) an interior enclosed by said panels;
  (3) an upper material slide panel extending rearwardly from said front panel in parallel, spaced relation between said top and bottom panels, said upper material slide panel terminating at a rear edge in spaced relation in front of said back panel;
  (4) a material drop opening formed between said upper material slide panel rear edge and said back panel;
  (5) an inlet opening in said top panel adjacent to said front panel;
  (6) an outlet opening in said bottom panel adjacent to said front panel;
  (7) upper and lower compartments formed within said cabinet interior and demarcated by said upper material slide panel;
  (8) a front conveyor return compartment mounted on said front panel;
  (9) a front conveyor return compartment mounted on said back panel; and
  (10) each said front and back panel having upper and lower belt passages therethrough communicating said cabinet interior with said front and back conveyor return compartments respectively;
(b) a conveying system including:
  (1) a drive axle-and-sprocket subassembly mounted and extending transversely across said back conveyor return compartment;
  (2) an idler axle-and-sprocket subassembly mounted in said back conveyor return compartment and extending transversely thereacross;
  (3) a pair of idler axle-and-sprocket subassemblies mounted in and extending transversely across said front conveyor return compartment;
  (4) each said axle-and-sprocket subassembly including a transverse axle mounting a pair of sprockets;
  (5) a drag chain belt assembly including a pair of chains each reeved over a set of sprockets adjacent a respective side of said vessel and a plurality of transverse drag panels extending between said chains in spaced relation;
  (6) said drag chain belt assembly having an upper run extending along and on top of said upper material slide panel and a lower run extending along and on top of said bottom panel; and
  (7) a variable speed motor drivingly connected to said drive axle-and-sprocket subassembly; and
(c) a heating system including:
  (1) a bottom heating element and a pair of side heating elements mounted in said bottom and side panels between said inner and outer skins respectively;
  (2) each said heating element comprising a cloth-like material adapted for producing infrared radiation in response to a flow of electrical current therethrough;
  (3) thermal insulation layers positioned between said heating elements and respective panel outer skins;
  (4) electrical insulation layers positioned on both sides of said heating elements;
  (5) a temperature probe positioned in said cabinet interior; and
  (6) temperature control means connected to said temperature probe and adapted for controlling electrical power applied to said heating elements whereby a predetermined temperature range can be approximately maintained within said interior; and
(d) a flow level control assembly including a vertical panel slidably extending through said top panel and terminating at a lower edge positioned within said upper compartment and a flap hingedly mounted on said panel lower edge and depending generally downwardly therefrom.

5,023,430
HYBRID ELECTRONIC CONTROL SYSTEM AND METHOD FOR COLD WEATHER GARMENT

Kevin L. Brekkestran, Fargo, and Barry D. Batcheller, West Fargo, both of N. Dak., assignors to Environwear, Inc., Fargo, N. Dak.

Filed Sep. 8, 1989, Ser. No. 405,142
Int. Cl.^{5} H05B *1/02*
U.S. Cl. 219—486 **22 Claims**

1. A portable, wearable electronic temperature control system for an electrically heated garment having a plurality of independent heating zones, the system comprising:

a plurality of electrically heatable flexible heating elements, each said heating element being associated with a particular heating zone, and being independent of the other heating zones, and being operable to generate heat in response to current flowing therethrough;

a plurality of independent electric current switching means, each switching means being associated with at least one particular heating element and operable to selectively enable and interrupt current flowing therethrough;

a plurality of independent first power selection means, each being associated with a particular switching means of a particular heating zone and each being for independently selecting a desired level of heating for the particular heating zone;

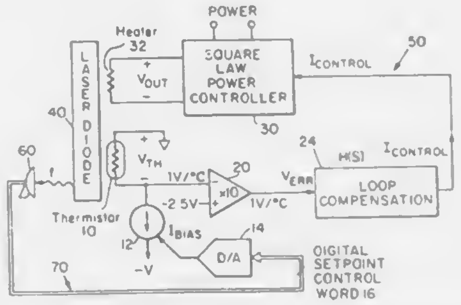
second power selection means, working cooperatively with each first power selection means, for simultaneously and uniformly adjusting the desired level of heating for each of the heating zones in proportion to one another; and

current limiting means for detecting an aggregate current flowing through the heating elements and for controlling simultaneously the switching means to limit such aggregate current.

5,023,431
LINEARIZED THERMAL FEEDBACK CIRCUIT AND TEMPERATURE CONTROLLER CIRCUIT UTILIZING THE SAME

James K. Roberge, Lexington, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Aug. 11, 1989, Ser. No. 392,404
Int. Cl.^{5} H05B *1/02*
U.S. Cl. 219—494 **21 Claims**



1. A temperature controller for a thermal system having a variable setpoint temperature setting, the controller comprising:

a heat transfer element configured to be thermally coupled to said thermal system;

a temperature sensor having an exponentially nonlinear temperature response configured to sense the temperature of said thermal system; and

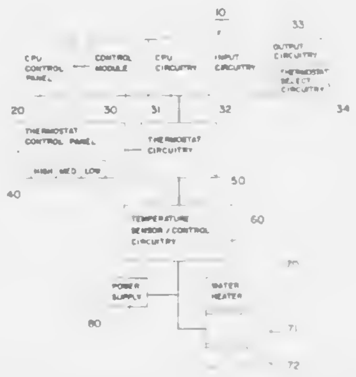
a linearizing element for linearizing the temperature response of said sensor such that the sensor sensitivity near the setpoint temperature is independent of setpoint setting;

said heat transfer element being responsive to the linearized response of said sensor to control the temperature of said thermal system to achieve the desired setpoint temperature.

5,023,432
PROGRAMMABLE HOT WATER HEATER CONTROL DEVICE

T. Brooks Boykin, 4630 Oakwood Cir., Winston Salem, N.C. 27106, and Timothy B. Boykin, 402 Hickory Ridge Dr., Seabrook, Tex. 77586

Filed Feb. 1, 1990, Ser. No. 473,418
Int. Cl.^{5} H05B *1/02*
U.S. Cl. 219—497 **17 Claims**



1. A device for selectively controlling the temperature of stored water in a tank over extended time periods, said tank having a heating element, a temperature sensing means and a

VOL
1127
ISS
2
JE
11
1991
UMI

water inlet and outlet, the improvement comprising a programmable control module, said control module comprising:

(a) CPU circuitry
(b) input circuitry, and
(c) output circuitry,

said output circuitry comprising thermostat select circuitry, said input circuitry and said output circuitry connected to said CPU circuitry, and said thermostat circuitry connected to said CPU circuitry, said thermostat circuitry comprising a plurality of independent thermostat circuits, temperature sensor/control circuitry, said temperature sensor/control circuitry, said thermostat circuitry connected to said CPU circuitry, a thermostat control panel, said thermostat control panel connected to adjustable temperature controls, said manually adjustable temperature controls positioned on said thermostat control panel, said manually adjustable temperature controls comprising:

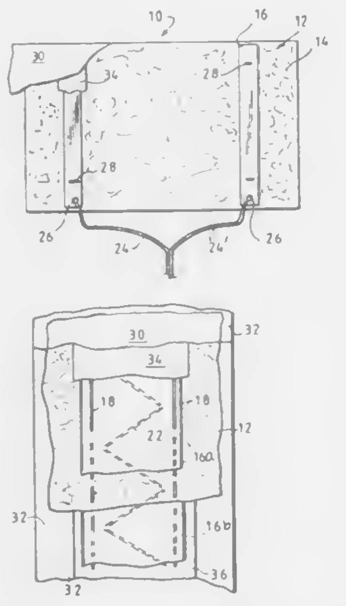
(1) a high temperature control,
(2) a medium temperature control, and
(3) a low temperature control,

said temperature controls each connected to one of said thermostat circuits whereby said stored water will be heated to the temperature indicated by said manually adjustable control of the selected thermostat circuit as determined by said thermostat select circuitry.

5,023,433

ELECTRICAL HEATING UNIT

Richard A. Gordon, 95 W. 3rd St., Freeport, N.Y. 11520
Filed May 25, 1989, Ser. No. 357,332
Int. Cl.⁵ H05B *3/34*
U.S. Cl. 219—548 13 Claims

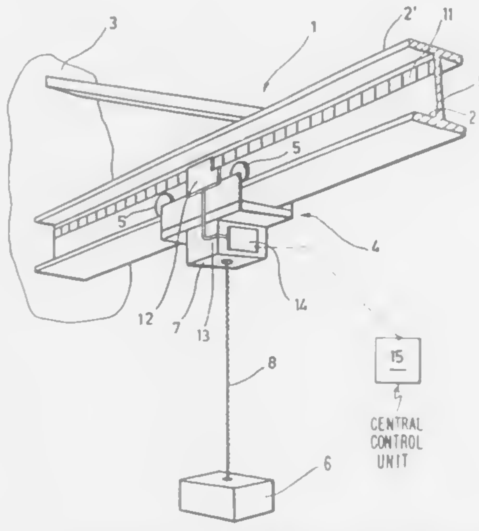


1 An electrical heating unit comprising a base sheet of fibrous material having metallic particles embedded therein in an arrangement throughout substantially the entire area of said sheet and in a concentration sufficient to permit a low level of electric current to pass through said sheet, and an electrode disposed near each of a pair of opposed edges of said sheet, connectable to a source of electric current, each of said electrodes comprising a narrow foil of highly conductive metal attached to the surface of said sheet and secured to each other and to said base sheet by a stitched thread passing therethrough, said base sheet and foils being sandwiched between a pair of resilient flexible insulating covers extending beyond the peripheral edges of said base sheet and being adhesively secured together to seal said heating unit therein.

5,023,434

POSITION INDICATING APPARATUS FOR TRANSPORTERS ON TRACKS

Hermann Lanfer, Künzelsau, and Dieter Kugler, Ohringen-Cappel, both of Fed. Rep. of Germany, assignors to R. Stahl Fördertechnik GmbH, Künzelsau, Fed. Rep. of Germany
Filed Jul. 20, 1989, Ser. No. 383,325
Claims priority, application Fed. Rep. of Germany, Jul. 23, 1988, 3825097
Int. Cl.⁵ G06F *15/20*
U.S. Cl. 235—375 19 Claims



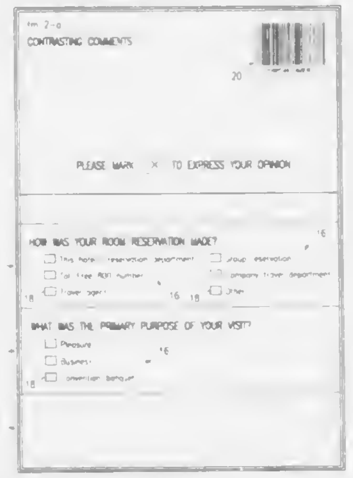
1. A position indicating apparatus for transport systems having

a transport carrier (4);
a rail or track (2) along which the transport carrier operates;
a code carrier (11) located longitudinally along the rail or track;
code marks (17) sequentially located on said code carrier, in a single row, one laterally adjacent the other, and placed in accordance with a predetermined code mark sequence, wherein m sequential code marks (17) form a code word; and
code reading means (12, 18, 19) including reading stations (19) on said transport carrier (4) positioned for reading said code marks forming the code words,
wherein said code reading means (19) comprises
three sets of reading heads (58*a*, 58*b*, 58*c*), wherein
the number of reading heads (58*al*. . . 58*an*; 58*bl*. . . 58*bn*; 58*cl*. . . 58*cn*) of any one set (58*a*. . .58*c*) is at least as great as the number of digits of a code word;
the reading heads (58*al*, 58*bl*, 58*cl*. . . 58*cn*) are spaced equidistantly, uniformly, longitudinally with respect to the code carrier (11);
the reading heads (58*al*, 58*bl*. . .58*cn*) of any one set (58*a*, 58*b*, 58*c*) are spaced from each other by a distance which is equal to the length of a code mark (17);
the reading heads (58*al*. . . 58*cn*) of the three sets of reading heads are so placed on the code reading stations(19) that there is at least one position of the code reading stations (19) relative to the code carrier (11) in which three reading heads (e.g. 58*al*, 58*bl*, 58*cl*) which are located immediately adjacent each other and belong to all three sets scan a single discrete code mark (17); and
a selection circuit (61) is provided, coupled to the reading heads (58*al*. . .58*cn*) of the sets (58*a*, 58*b*, 58*c*) for decoding the true code word in dependence on the signals delivered from said reading heads and providing an output code word representative of said decoded true code word.

5,023,435

RESPONSE FORM PROCESSING SYSTEM

David B. Deniger, 4050 Cochran Chapel, Dallas, Dallas County, Tex. 75209
Filed Mar. 6, 1990, Ser. No. 489,009
Int. Cl.⁵ G09F *1/08*
U.S. Cl. 235—375 18 Claims


CONTRASTING COMMENTS
20
PLEASE MARK TO EXPRESS YOUR OPINION
HOW WAS YOUR ROOM RESERVATION MADE?
WHAT WAS THE PRIMARY PURPOSE OF YOUR VISIT?
18
16

1. A system for processing response forms, comprising:

storage circuitry means for storing a group of questions associated with a client, a group code disposed on a particular response form comprising information identifying said particular response form with said client;
circuitry means for selecting a particular plurality of questions from said group of questions for inclusion on said particular response form, said group code further comprising information indicating which questions of said group comprise said particular plurality;
a group code reader for reading said group code from said particular response form;
a response scanner for reading responses associated with said particular plurality of questions from said particular response form; and
a processor means coupled to said group code reader, said response scanner and said storage circuitry means and operable to tabulate the responses responsive to the values of said group code and said responses.

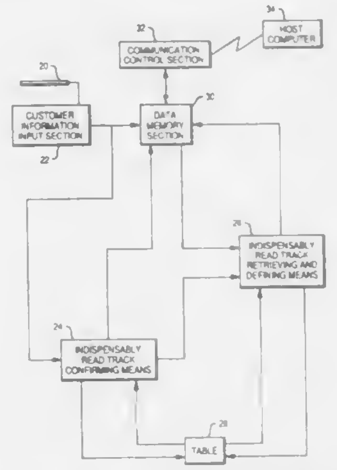
5,023,436

CREDIT CARD HANDLING APPARATUS AND METHOD

Kazuo Takada, and Osamu Shimoyama, both of Oiso, Japan, assignors to NCR Corporation, Dayton, Ohio
Filed Jun. 18, 1990, Ser. No. 539,949
Claims priority, application Japan, Jul. 6, 1989, 1-173159
Int. Cl.⁵ G06K *9/08*; G11B *25/04*
U.S. Cl. 235—380 8 Claims

1. A card handling apparatus for reading data on a card having a magnetic stripe including a plurality of magnetic recording tracks, for identifying a track to be indispensably read, and for performing a business transaction based on data recorded in said indispensably read track,

read means adapted to read out data recorded in said plurality of tracks,
memory means adapted to store all the data read out in each track,
table means containing the number of the track to be indispensably read and which number is previously stored in accordance with recorded data provided by the issuer of the card,
confirming means adapted to determine the card issuer in accordance with data read out from said plurality of tracks and to read out the number of the track read from said table means upon determining the card issuer and to send out a signal indicative of the track number,
retrieving and defining means adapted to determine the indispensable read out track in accordance with predetermined retrieving procedure which is contained in said table means, and to output a signal indicative of the number of the indispensable track when no track can be confirmed by said confirming means, and

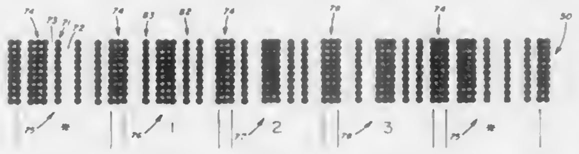

34
HOST COMPUTER
32
COMMUNICATION CONTROL SECTION
20
CUSTOMER INFORMATION INPUT SECTION
22
DATA MEMORY SECTION
26
INDISPENSABLY READ TRACK RETRIEVING AND DEFINING MEANS
24
INDISPENSABLY READ TRACK CONFIRMING MEANS
28
TABLE

executing means adapted to read out from said memory means the recorded data read from said indispensable track and stored in said memory means in accordance with the table means track number signal sent from said confirming means or from said indispensable track number signal sent from said retrieving means to execute a business transaction.

5,023,437

BAR CODE MARKING THE SURFACE OF AN OBJECT

Edwin W. Speicher, Pittsburgh, Pa., assignor to M. E. Cunningham Company, Ingomar, Pa.
Continuation of Ser. No. 11,061, Feb. 4, 1987, Pat. No. 4,810,867. This application Feb. 15, 1989, Ser. No. 312,585
The portion of the term of this patent subsequent to Mar. 7, 2006, has been disclaimed.
Int. Cl.⁵ G06F *3/12*
U.S. Cl. 235—432 8 Claims



1. A method for imprinting a machine readable bar code message in the surface of an object comprising the steps of;

providing an object,
imprinting a plurality of marks by indenting the surface of said object and forming recesses therein, said plurality of marks arranged in a plurality of substantially linear, rectangular arrays in the surface of said object,
spacing each imprinted substantially linear, rectangular array a preselected distance from each adjacent imprinted, substantially linear, rectangular array to provide a machine readable bar code message imprinted in the surface of each object, and
positioning each of said marks so that the adjacent edges of each of said marks are in juxtaposition with each other to thereby maximize the density of said plurality of marks imprinted within each said substantially linear, rectangu-

VOL
1127
ISS
2
JE
11
1991
UMI

lar array to minimize errors in reading said machine readable bar code message.

5,023,438

PORTABLE DATA INPUT APPARATUS WITH DIFFERENT DISPLAY MODES

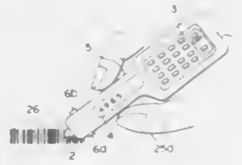
Yoshio Wakatsuki; Toshiharu Okuyama; Hajime Takeuchi; Giichiro Shimizu, and Misao Shimizu, all of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan

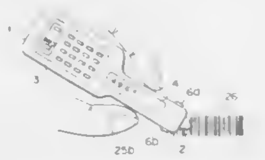
Filed Nov. 24, 1989, Ser. No. 440,764

Claims priority, application Japan, Nov. 26, 1988, 63-299317; Nov. 26, 1988, 63-299318

Int. Cl.^{5} G06K *7/10;* **G09G** *1/06*

U.S. Cl. 235—472 **14 Claims**





1. A portable data input apparatus comprising:

a pen-scanner type bar code reader for reading a bar code provided according to the king of a commodity and for generating a corresponding code data;

a keyboard for inputting at least numerical data representative of the amount of the commodity;

a display device for displaying the code data generated by said bar code reader and the numerical data input through said keyboard;

means for detecting whether the code data and numerical data are inversely or erectly displayed, and for generating a corresponding detection signal; and

display mode inverting means for vertically and horizontally inverting display states of the code data and numerical data displayed by said display device, in response to the detection signal generated by said detecting means.

5,023,439

ARRANGEMENT FOR DETECTING A SIGNAL FOR EFFECTING A FOCUS CONTROL OF AN OPTICAL HEAD

Kazuo Noda, Yokohama; Koichi Yamazaki, Sakado; Eiichi Nakamura, Sagamihara, and Tetsuya Honda, Shiki, all of Japan, assignors to Nippon Conlux Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 169,399, Mar. 17, 1988, abandoned. This application Dec. 26, 1989, Ser. No. 456,947

Claims priority, application Japan, Apr. 15, 1987, 62-92495

Int. Cl.^{5} G01J *1/20*

U.S. Cl. 250—201.5 **3 Claims**

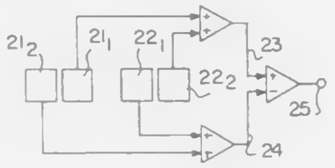
1. An arrangement for detecting a signal for effecting a focus control of an optical head comprising:

an optical system for taking out a reflected light beam from an optical information medium;

a photodetector including two pairs of elements arranged linearly, and a divisional line lying between the respective elements in the respective pairs so as to position the respective elements adjacently each other,

each of said elements having a considerably small light receiving area in comparison with the cross section of the light beam and being provided such that one element of each of said two pairs of elements is provided within an outer periphery of said light beam and one element of each of said two pairs of elements is provided out of said outer periphery of said light beam, and

a circuit including two adders for obtaining two sums of the outputs of the two pairs of elements with each adder summing an output of one of said elements within the outer periphery of the light beam and an output of one of said elements out of said outer periphery of said light beam, and a subtracter for obtaining a difference between the two sums so as to output the differences as a focus control signal.



5,023,440

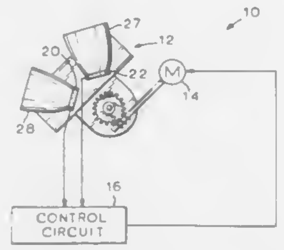
TRACKER USING ANGLE-CONVERTING CONES

John D. Kuppenheimer, Jr., Tewksbury, Mass., assignor to Lockheed Sanders, Inc., Nashua, N.H.

Continuation-in-part of Ser. No. 725,620, Apr. 22, 1985, abandoned. This application Feb. 23, 1990, Ser. No. 484,375

Int. Cl.^{5} H01J *3/14;* **G01J** *1/20*

U.S. Cl. 250—203.6 **12 Claims**



1. For tracking the position of an object from which it receives radiation, an optical tracker comprising:

(A) a receiver assembly that includes:

(i) a plurality of radiation detectors, adapted for reception of radiation thereon, for generating detector outputs representative of the radiation power that they receive;

(ii) a non-imaging, substantially étendue-preserving radiation concentrator associated with each detector, each concentrator having an inlet aperture and being disposed to receive radiation at the inlet aperture and, in a non-imaging manner, to direct to the transducer associated therewith a fraction of the received radiation that is a function of the angle at which the radiation reaches the aperture, the concentrators being so disposed in the receiver that the angular range for each concentrator function is displaced from the angular range of each other concentrator function;

(B) an aiming mechanism, adapted for application of control signals thereto, for aiming the receiver assembly in response to control signals applied thereto; and

(C) control circuitry, responsive to the detector outputs, for generating and applying to the aiming mechanism control signals that cause the aiming mechanism to aim the receiver assembly in a direction in which the relationship between the detector outputs assumes a predetermined value.

5,023,441

METHOD TO MEASURE THE ANGLE OF INCIDENCE FOR RADIATION AND A DETECTOR TO CARRY OUT THE METHOD

Kurt Nissborg, Skänninge, Sweden, assignor to Forsvarets Forskningsanstalt, Stockholm, Sweden

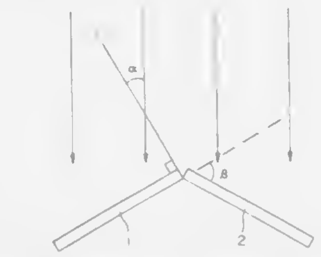
PCT No. PCT/SE88/00647, § 371 Date Jul. 20, 1989, § 102(e) Date Jul. 20, 1989, PCT Pub. No. WO89/04973, PCT Pub. Date Jun. 1, 1989

PCT Filed Nov. 25, 1988, Ser. No. 392,531

Claims priority, application Sweden, Nov. 27, 1987, 8704740

Int. Cl.^{5} H01J *40/14*

U.S. Cl. 250—206.2 **6 Claims**



1. A method for measuring an angle of incidence for short pulses of speckled radiation, caused by a turbulent atmosphere, in relation to a reference direction, comprising the steps of:

mounting two detector elements so each detector element receives essentially the same irradiance and in such a direction that the normals of each respective detector element form a known angle with each other; and

calculating the angle of incidence using signals from the detector elements, depending on the shape of the sensitivity beams, and said known angle between the detector elements.

5,023,442

APPARATUS FOR OPTICALLY WRITING INFORMATION

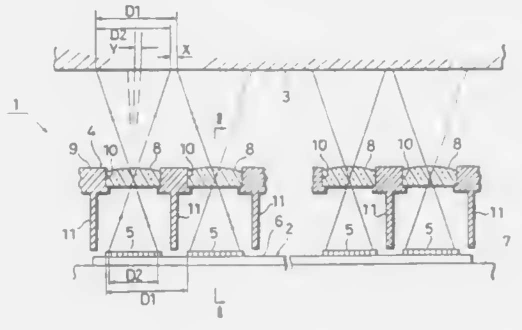
Hideo Taniguchi, Kyoto; Hiromi Ogata, Mudou; Kensuke Sawase, Takarazuka; Manabu Yokoyama, Kyoto, and Munekazu Tujikawa, Shiga, all of Japan, assignors to Rohm Co., Ltd., Kyoto, Japan

Filed Jun. 19, 1989, Ser. No. 367,750

Claims priority, application Japan, Jun. 21, 1988, 63-152582; Jul. 8, 1988, 63-171482; Jul. 8, 1988, 63-171483; Jul. 8, 1988, 63-171484; Jul. 21, 1988, 63-096705[U]

Int. Cl.^{5} H01J *40/14*

U.S. Cl. 250—208.1 **14 Claims**



1. An apparatus for optically writing information comprising:

at least one row of LED array chips arranged as spaced from each other along said at least one row, each array chip including a plurality of light emitting diodes constantly spaced along said row to provide luminescent dots;

a photosensitive surface arranged in facing relation to said at least one row of LED array chips in parallel thereto; and

a lens system disposed between said photosensitive surface and said at least one row of LED array chips, said lens system including a row of convex lens elements arranged in corresponding relation to said at least one row of LED array chips, the distance between said row of convex lens elements and said at least one row of LED array chips being larger than the focal length (f) of each lens element but less than double the focal length so that magnified images of the luminescent dots of each LED array chip are formed on said photosensitive surface in an inverted arrangement, the magnification of the respective convex lens elements being such that all of the dot images on said photosensitive surface are constantly spaced without image overlapping.

5,023,443

IMAGE SENSOR AND ITS DRIVING METHOD

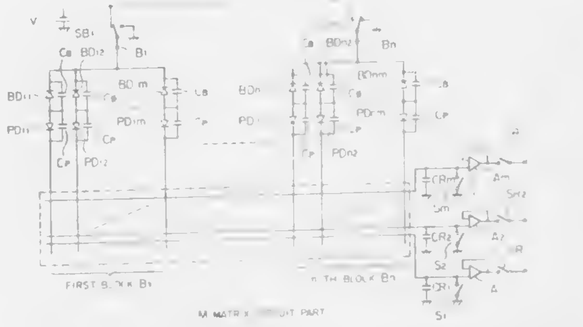
Katsuaki Komatsu, Hino; Hideo Watanabe, Hachioji, and Atsushi Takahashi, Hino, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jan. 17, 1990, Ser. No. 466,593

Claims priority, application Japan, Jan. 18, 1989, 64-9143; Jan. 20, 1989, 64-11546; Jan. 20, 1989, 64-11547; Mar. 6, 1989, 64-53211

Int. Cl.^{5} H01J *40/14*

U.S. Cl. 250—208.1 **3 Claims**



1. A method of driving an image sensor, the image sensor being provided with plural groups of photoelectric conversion elements, each element having a voltage input terminal and an output terminal, and each group of elements having a predetermined number of elements and a common voltage switch connected to all the voltage input terminals of the predetermined group of elements, and a matrix wired circuit having read-out lines corresponding in number to the predetermined number of elements within a group, each read-out line having a branch line connected to an output terminal of each element, and a reset switch, having a reset position and a work position, associated with each read-out line, the method comprising the steps of:

simultaneously applying an OFF voltage level to the common voltage switch of each group of elements and thus applying the OFF voltage level to the voltage input terminal of each element, and applying a reset signal to the reset switch of each read-out line to initialize the read-out lines;

simultaneously applying an ON voltage level to the common voltage switch of a group to be read and thus applying the ON voltage level to the voltage input terminals of each of the predetermined number of elements within the group to be read, and applying a work signal to each reset switch;

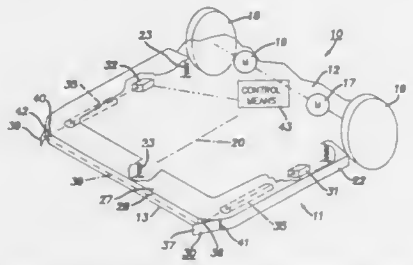
photoelectrically converting an image light signal into an electric signal by each of the predetermined number of elements within the group to be read;

transmitting the electric signal from each of the predetermined number of elements within the group to be read through the read-out lines to a reading unit.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,444
MACHINE PROXIMITY SENSOR

Carl Ohman, Danbury, Conn., assignor to Aktiebolaget Electrolux, Stockhom, Sweden
Filed Dec. 28, 1989, Ser. No. 458,318
Int. Cl.^{5} G01V *9/04*
U.S. Cl. 250—221 13 Claims



1. A proximity sensor for a machine having at least a moving part and having a frame with a periphery;

a perimeter guard including a radiation transmitter to project a radiation beam at least part of which extends outside said periphery, said transmitter being protectively mounted within and away from said periphery;

a radiation receiver mounted to receive said radiation beam for producing an output indication when it is not receiving the radiation beam, said receiver being protectively mounted within and away from said periphery;

drive means to drive the moving part;

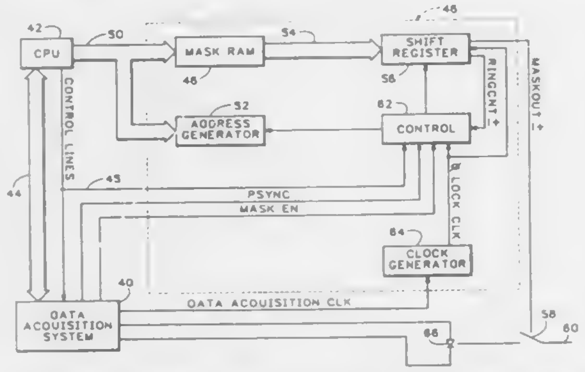
control means for said drive means responsive to said output indication;

said perimeter guard further including an optical system acting on said radiation beam capable of being moved to inhibit said radiation receiver from receiving said radiation beam; and

said radiation transmitter normally projecting a radiation beam at least part of which extends outside said periphery, whereby movement of said optical system relative to the machine inhibits said radiation beam from being received at said receiver and thus generates said output indication to arrest said machine movable part.

5,023,445
SIGNAL ACQUISITION METHOD AND AUTOMATIC MASKING SYSTEM FOR AN OTDR

Jeffrey H. Goll, Lake Oswego; William A. Trent, Bend; Richard I. Lane, Bend; Florian G. Bell, Bend, and Mark D. Marineau, Redmond, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.
Filed Apr. 27, 1990, Ser. No. 515,792
Int. Cl.^{5} H01J *5/16*
U.S. Cl. 250—227.15 15 Claims



1. In a high dynamic range optical receiver for converting an optical signal input to an electrical signal output having a signal level representative of the optical signal input level, a method of compensating for relaxation transients in the optical receiver that produce a receiver transient tail on a trailing edge of an electrical pulse representative of a high amplitude optical pulse in the optical signal, the steps comprising:

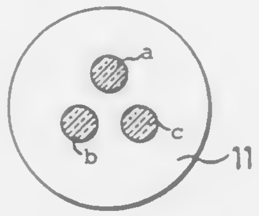
masking the optical receiver from the high amplitude optical pulse in optical signal to produce a first electrical signal output from the optical receiver having the electrical pulse and the receiver transient tail attenuated;

masking the optical receiver from the optical signal to produce a second electrical output from the optical receiver having the signal level representative of the optical signal input level, the electrical pulse, and the receiver transient tail attenuated; and

combining the second electrical output with the first electrical output to produce a resultant electrical output that is representative of the signal level of the optical signal.

5,023,446
APPARATUS FOR MEASURING DISTANCES WITH A MEASURING ELEMENT OPERATING ON AN OPTICAL BASIS

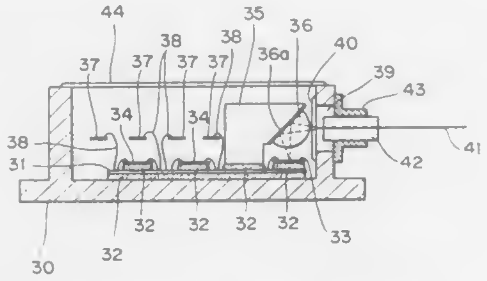
Wolfgang Gleine, Stade/Hagen, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany
Filed Feb. 12, 1990, Ser. No. 479,381
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1989, 3903881
Int. Cl.^{5} H01J *5/16;* **G01L** *1/24*
U.S. Cl. 250—227.16 5 Claims



1. An apparatus for measuring distance, comprising at least two parallel light conductors, support means for holding said at least two light conductors in a fixed parallel position relative to each other, said support means permitting a bending or deflection of said two light conductors in unison for coupling of light from one light conductor into the other light conductor as a function of said bending or deflection, a reflecting mirror at an effective first end of each light conductor so that each light conductor has a different optically effective length, whereby one conductor is shorter than the other, source means for introducing light into said shorter light conductor at a second end opposite said first reflecting end, light sensor means positioned to receive reflected light from each light conductor at said second end for providing respective light signals representing a measure of said bending or deflection of said light conductors, said measure in turn corresponding to the distance to be measured, and wherein a reflection only from said shorter light conductor indicates that no deflection or bending is taking place.

5,023,447
PHOTO-SEMICONDUCTOR MODULE EMPLOYING SEMI-SPHERICAL LENS TO ENHANCE DETECTION

Takayuki Masuko, Koganei; Akira Okamoto, Higashikurume; Kaoru Moriya, Kawasaki; Koji Okamura, and Tadao Arima, both of Tochigi, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan
Filed Jun. 18, 1990, Ser. No. 539,348
Claims priority, application Japan, Jun. 19, 1989, 1-154660; Mar. 14, 1990, 2-63271
Int. Cl.^{5} H01J *5/16*
U.S. Cl. 250—227.24 10 Claims



1. A photo-semiconductor module, comprising:

a casing having a bottom wall and a side wall which has an opening formed therein;

a substrate carried on said bottom wall of said casing;

a photo-semiconductor chip mounted on said substrate;

a support member carried on said substrate and having an inclined face which is inclined by an angle of 45 degrees with respect to a surface of said substrate;

a semi-spherical lens having a polished face passing the center of the sphere thereof and securely mounted at said polished face thereof on said inclined face of said support member above said photo-semiconductor chip;

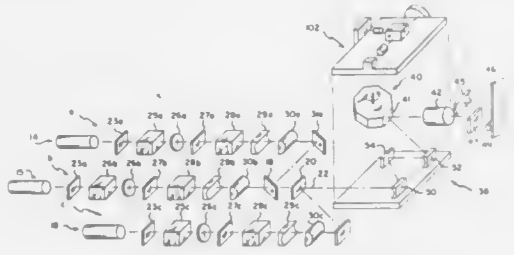
a glass member securely mounted on said side wall of said casing in such a manner as to close up said opening;

a lid mounted on said casing for sealing the inside of said casing in an airtight condition; and

an optical fiber mounted on said casing such that an end face thereof may be located in or in the neighborhood of said opening.

5,023,448
BEAM POSITION SENSOR FOR A LIGHT BEAM SCANNER

David Kessler, Rochester, and Roger E. Baldwin, Hilton, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Oct. 16, 1989, Ser. No. 422,381
Int. Cl.^{5} H01J *3/14*
U.S. Cl. 250—235 8 Claims



1. A beam position sensor for a light beam scanner, said scanner having a plurality of scanning surfaces, said sensor comprising:

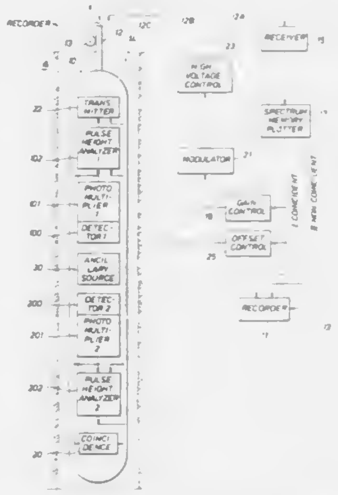
means for directing a first input beam of light at one of said scanning surfaces to produce a first reflected beam of light which is scanned through a first angle to define a scan plane, said means for directing said first input beam of light including a first light source;

means for directing a second input beam of light at said one surface to produce a second reflected beam of light which is scanned through a second angle to define a second plane which forms an angle with said scan plane, said means for directing said second input beam of light including a second light source which is located at one side of said scan plane and a means for receiving the second reflected beam of light from said surface which is located at a side of said scan plane opposite said one side; and

means for detecting said second reflected beam at a position thereof which corresponds to a predetermined position of said first reflected beam and for generating a synchronizing signal upon the detection of said second reflected beam.

5,023,449
NUCLEAR SPECTROSCOPY SIGNAL STABILIZATION AND CALIBRATION METHOD AND APPARATUS

Jacques M. Holenka, Houston, and W. R. Sloan, Missouri City, both of Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.
Filed Aug. 30, 1989, Ser. No. 400,847
Int. Cl.^{5} G01V *5/04, 5/06*
U.S. Cl. 250—252.1 29 Claims



1. Nuclear spectroscopy method for the stabilization of an energy spectrum, made from a signal, emitted by a radiation detector, and containing nuclear events, represented by pulses, whose amplitude is a measure of the energy of the particles, such as gamma rays, collected by said radiation detector, said energy spectrum including at least a first reference energy peak coming from an ancillary nuclear source, comprising the steps of:

(1) using at least two detectors for detecting the radiation under analysis;

(2) establishing at least one coincident spectrum corresponding to pairs of events simultaneously detected in both detectors and coming from said ancillary source; and

(3) stabilizing said coincident spectrum by using one energy peak of said spectrum as said first reference energy peak.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,450

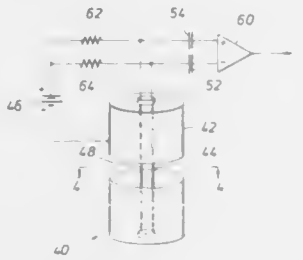
METHOD FOR DISCRIMINATING MICROPHONIC NOISE IN PROPORTIONAL COUNTERS

Randy Gold, Houston, Tex., assignor to Halliburton Logging Services, Inc., Houston, Tex.

Filed Apr. 12, 1990, Ser. No. 508,157

Int. Cl.^{5} G01V *5/04*

U.S. Cl. 250—261 12 Claims



1. A detector system responsive to nuclear events for installation in a downhole logging tool including measuring well drilling equipment which subjects the detection system to microphonic shock, the detector system which comprising:

(a) a closed chamber subject to impinging nuclear events and having two separate anode wires therein spaced apart from each other and spanning said chamber, providing a pair of separated spaced output terminals to thereby form an output signal;

(b) circuit means connecting from at least one of said chamber output terminals to a different amplifier means having two input terminals;

(c) said circuit means connected from said output terminal of said chamber to one of the input terminals of said differential amplifier means to cause formation of an output signal from said differential amplifier means; and

(d) vibration shock responsive means mounted in said detector system and having an output terminal which forms an output signal for connection to a second input at said differential circuit means so that microphonic signals from said chamber and said shock responsive means are provided thereto and tend to cancel when applied to the input terminals thereof, and wherein said shock responsive means does not cancel at said differential circuit means signals relating to nuclear events from said detector system.

5,023,451

INDICIA CONTRAST ENHANCEMENT FOR VEHICLE BORNE INFRARED VISION SYSTEM

Harvey A. Burley, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 20, 1990, Ser. No. 481,404

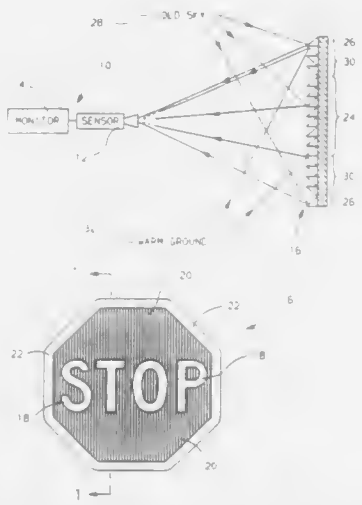
Int. Cl.^{5} G06K *9/00, 19/06;* **G01J** *5/02, 5/06*

U.S. Cl. 250—330 1 Claim

1. For use in conjunction with a vehicle borne infrared vision system including a detector for detecting infrared radiation received from a scene and a monitor for displaying an image of the detected scene in which the amount of contrast between different portions of the displayed image is based upon the amount of detectible difference in the intensity of the infrared radiation received from the corresponding portions of the scene;

an improvement for increasing within the displayed image of the scene the contrast between a particular indicia and an adjacent portion of the scene, the improvement comprising:

means for defining the indicia to be contrasted within the displayed image of the scene, the means including one or more infrared reflective surfaces oriented so as to reflect infrared radiation to the detector from a contrast enhancing source of infrared radiation having an intensity which is detectibly different form the intensity of infrared radiation received from the adjacent portion of the scene by an amount which is greater than would be the case without the infrared reflective surfaces, the contrast enhancing source of infrared radiation being at least one of the sky and the ground.



5,023,452

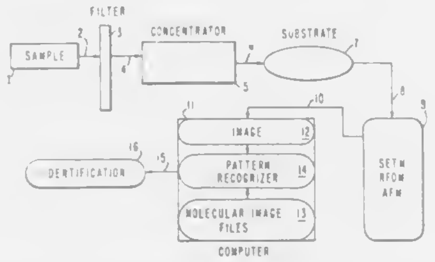
METHOD AND APPARATUS FOR DETECTING TRACE CONTAMINENTS

Lauren M. Purcell, Signal Hill, and Albert F. Lawrence, San Diego, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 20, 1990, Ser. No. 511,672

Int. Cl.^{5} G01N *23/00, 31/00*

U.S. Cl. 250—306 3 Claims



2. A method for identifying the nature of an unidentified substance in a known gaseous or liquid medium comprises collecting a sample of said substance in said media; filtering said sample to form a filtered sample; concentrating said filtered sample to form a filtered, concentrated sample; depositing at least a portion of said filtered concentrated sample on a known substrate; analyzing the filtered, concentrated sample on said substrate utilizing at least one of the SETM, NOFM and AFM techniques to form at least one image characteristic of the substance; and identifying the substance from said at least one image.

5,023,453

APPARATUS FOR PREPARATION AND OBSERVATION OF A TOPOGRAPHIC SECTION

Tatsuya Adachi, and Takashi Kaito, both of Tokyo, Japan, assignors to Seiko Instruments, Inc., Tokyo, Japan

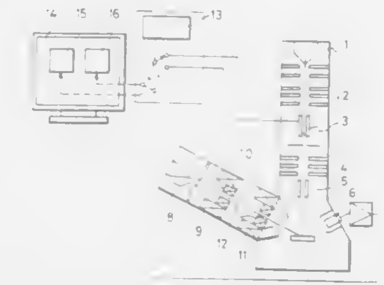
Filed Oct. 27, 1989, Ser. No. 427,537

Claims priority, application Japan, Nov. 1, 1988, 63-278036

Int. Cl.^{5} H01J *37/00*

U.S. Cl. 250—309 4 Claims

1. An apparatus for effecting preparation and observation of a topographic section in a particular region of a sample, comprising: a sample chamber for containing therein a sample, an ion beam irradiation unit mounted in said sample chamber for irradiating the sample with a scanned ion beam to form a groove in the sample at the particular region, to thereby prepare the topographic section; a particle beam irradiation unit mounted in said sample chamber for irradiating the topographic section of the sample with a scanned particle beam said particle beam irradiation unit being arranged relative to said ion beam irradiation unit such that the particle beam axis intersects the ion beam axis at the particular region at an angle not exceeding 90°; a detector disposed for detecting secondary electrons released from the sample upon irradiation by the ion beam and by the particle beam; beam switching means connected to said units and operable during the course of the preparation of the topographic section for temporarily switching from the ion beam to the particle beam; and display means connected to said detector and having first and second display areas, said display means being operative in response to the switching for displaying in the first display area, an image of the topographic section based on the detection of the secondary electrons released by irradiation of the sample with the particle beam, and for displaying, in the second display area, an image of the surface of the sample based on the detection of the secondary electrons released by irradiation of the sample with the ion beam, to thereby temporarily provide an image of the topographic section and the sample surface during the course of preparation thereof.



5,023,455

RADIATION-SENSITIVE DETECTOR ARRAY AND PRE-AMPLIFICATION READOUT INTEGRATED CIRCUIT

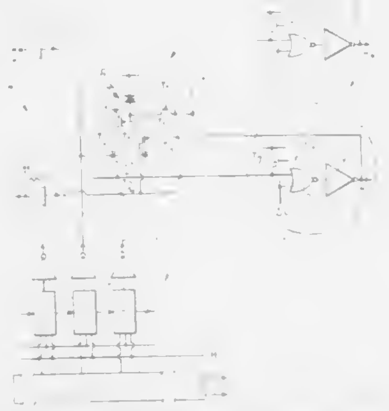
Guy F. R. J. Vanstraelen, Leuven, Belgium, assignor to Interuniversitair Micro-Elektronica Centrum vzw, Belgium

Filed May 26, 1989, Ser. No. 357,544

Claims priority, application Netherlands, May 31, 1988, 8801396; Sep. 13, 1988, 8802252

Int. Cl.^{5} G01J *5/00*

U.S. Cl. 250—370.01 5 Claims



1. A device for detecting radiation, comprising:

an array formed of rows and columns of elements sensitive to radiation and having respective outputs;

enabling means to consecutively enable the columns of radiation sensitive elements;

trigger means to generate a trigger signal responsive to the occurrence that an element, in a column which has been enables, has received an amount of radiation above a threshold value, such that the identity of such element can be ascertained; and

reading means responsive to said trigger signal for reading the respective outputs of only such identified elements.

5,023,456

RADIATION DETECTOR SYSTEM

Lennart Claussen, Karlskoga, Sweden, assignor to Aktiebolaget Sefors, Karlskoga, Sweden

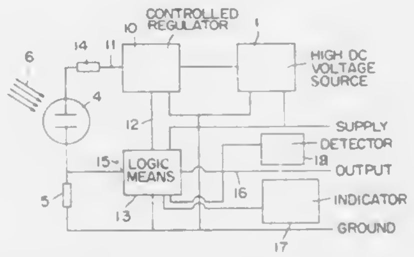
PCT No. PCT/SE89/00328, § 371 Date Feb. 13, 1990, § 102(e) Date Feb. 13, 1990, PCT Pub. No. WO89/12807, PCT Pub. Date Dec. 28, 1989

PCT Filed Jun. 9, 1989, Ser. No. 460,889

Claims priority, application Sweden, Jun. 13, 1988, 8802197

Int. Cl.^{5} G01J *1/44;* **G01T** *1/18*

U.S. Cl. 250—374 16 Claims



1 A radiation detecting system comprising:

a. a radiation sensitive gas tube for receiving radiation;

b. means for supplying at least three different direct current voltages to said tube, first a high voltage to provide ionization to the gas when the tube receives radiation and second a low or zero voltage to stop the self-regenerating discharge started by the radiation and third a medium voltage or voltages to accelerate the remaining ions and electrons to the electrodes of the tube for neutralization;

c. logic means for selecting any one of said direct current voltages;

d. means for sensing the current flow through said tube for supplying input data to said logic means.

5,023,457

ELECTRON BEAM DEVICE

Akira Yonezawa, Tokyo, Japan, assignor to Seiko Instruments, Inc., Tokyo, Japan

Filed May 30, 1990, Ser. No. 530,791

Claims priority, application Japan, May 30, 1989, 1-136557

Int. Cl.^{5} H01J *37/14*

U.S. Cl. 250—396 ML 4 Claims

1. An observation device for observing microscopic structures, comprising an electron beam source, including means for producing an acceleration voltage, for generating an electron beam with an energy dependent on the value of the acceleration voltage; means defining a sample location; and a unipolar magnetic field type objective lens disposed for focusing the electron beam at the sample location, said lens comprising an inner tube having an axis aligned with the electron beam and provided with an electron passage, a cylindrical base portion, and a magnetic pole end surface facing said sample location and disposed between said base portion and said sample location, said end surface being traversed by said passage, said lens further comprising a secondary electron beam detector located between said end surface and said electron beam source, and a focusing coil having a plurality of turns and connected to be

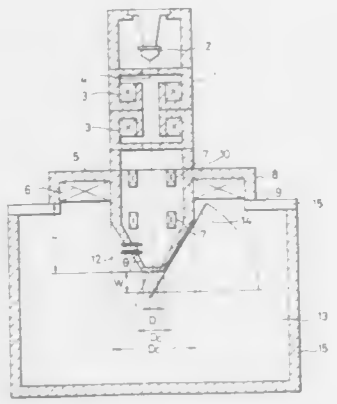
VOL
1127
ISS
2
JE
11
1991
UMI

supplied with a current for producing an electron beam focusing field, wherein:

said inner tube further comprises a conical portion extending between said base and said end surface, tapering toward said end surface and forming with said end surface an angle of between 50° and 70°;

said conical portion has an outer surface which intersects a plane containing said end surface at a circle of diameter D_o, the diameter of said electron passage, at said end surface, is D_i, and said conical portion intersects said base portion at a circle having a diameter D_c;

said tube is configured such that $4\ \mathrm{mm} \leqq D_i < D_o \leqq 18\ \mathrm{mm} < D_c$;



said lens further comprises an outer tube surrounding said inner tube and having a magnetic pole surface which faces in the same direction as said end surface and which is located in a plane that is closer than said end surface to said beam source; and

said coil is connected to receive a current having a value, and said inner tube is configured, such that:

$$J/\sqrt{U} > (7.1\,(D_o/W)+2.2)\cdot(0.19\,(D_c/D_o-1)+1),$$

where J is the product of the current, in amperes, through said focusing coil and the number of turns of said focusing coil, U is the electron beam acceleration voltage, in volts, D_o and D_c are in millimeters, and W is the distance between said end surface and said sample location.

5,023,458
ION BEAM CONTROL SYSTEM

Victor M. Benveniste, Magnolia, and Edward K. McIntyre, Jr., West Roxbury, both of Mass., assignors to Eaton Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 293,334, Jan. 4, 1989, Pat. No. 4,914,305. This application Mar. 1, 1990, Ser. No. 487,158

Int. Cl.^{5} H01J *37/30*

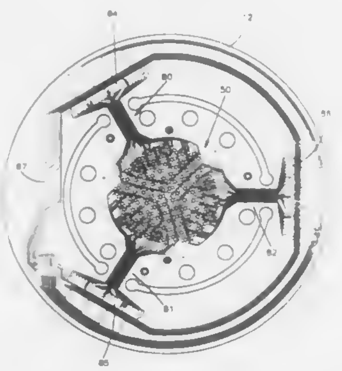
U.S. Cl. 250—396 R **12 Claims**

4. Apparatus comprising:

(a) source means for creating ions within a confined region and including a wall bounding the confined region having multiple exit apertures that allow ions to exit the confined region and form ion beam portions; said ion beam portions combining to form an ion beam having a beam cross section greater than that of the individual beam portions;

(b) extraction means comprising a conductive extraction plate maintained at an electric potential for attracting ions from the source means, said conductive extraction plate including multiple extraction apertures generally aligned with the multiple exit apertures in the wall of said source means; and

(c) intensity control means for extraction electrons from beam portions in the region of the conductive extraction plate to control beam density across the cross section of the ion beam.



5,023,459
MINIATURE MULTI-TEMPERATURE RADIOMETRIC REFERENCE

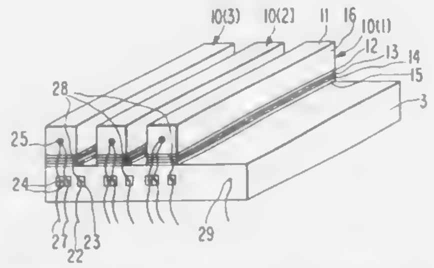
D. Bruce Osborn, Mission Viejo, and Harold R. Bagley, Jr., Irvine, both of Calif., assignors to Ford Aerospace & Communications Corporation, Newport Beach, Calif.

Filed Apr. 17, 1987, Ser. No. 39,416

The portion of the term of this patent subsequent to Mar. 11, 2007, has been disclaimed.

Int. Cl.^{5} H01L *25/00*

U.S. Cl. 250—332 8 Claims



1. A miniature multi-temperature radiometric reference comprising:

a single thermoelectric cooler having a platform; and

mounted on the platform, at least two radiometric reference elements each acting as a source of reference radiation and each comprising an exposed extended emissive surface on a thermally conductive substrate, and a heater located between the substrate and the platform; wherein

each surface has a substantially uniform temperature throughout said surface;

all points along each surface are controllably maintained within a preselected temperature range;

all of the surfaces are maintained at different actual temperatures;

the exposed surfaces of all the radiometric reference elements physically lie in an intermediate image plane of a re-imaging multi-detector optical system for imaging an object; and

the radiometric reference does not intrude upon the field of view of the object in said intermediate image plane, and therefore does not interfere with the normal imaging operation of said detectors.

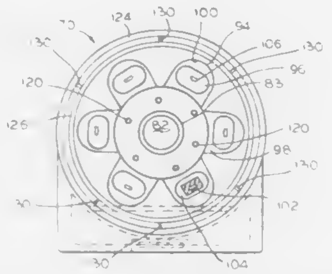
5,023,460
TOOTHBRUSH SANITIZER

Robert W. Foster, Jr., Hinsdale, and Jefferson L. Gentry, Deerfield, both of Ill., assignors to Associated Mills Inc., Chicago, Ill.

Filed Mar. 30, 1990, Ser. No. 502,449

Int. Cl.^{5} A61L *3/00*

U.S. Cl. 250—455.1 17 Claims



1. A toothbrush sanitizer comprising an irradiating source of ultraviolet light; a housing having a plurality of areas for supporting toothbrushes in positions which expose substantially all of the parts of said toothbrushes which enter the mouth, including their bristles and handles, to an irradiation of light from said source; said housing having internal contours which direct the light to completely surround said brush so that all sides of both said bristles and handles of said brush are irradiated by said light, said housing being closed by a cover to contain all ultraviolet light from said source, cover switch means for preventing said light from lighting except when said cover is in place to contain said light, said cover having a lip with a predetermined wall thickness, and a labyrinth seal at the lip of said cover, said seal comprising two upstanding concentric walls on said housing separated by a space which is wider than said predetermined wall thickness of said cover lip, means for holding said cover in an elevated position between said concentric walls, and openings in the bottom of said housing to provide an entrance for air in order to provide an updraft of cool air between said openings and said labyrinth seal.

5,023,461
RADIATION IMAGE STORAGE PANEL HAVING LOW REFRACTIVE INDEX LAYER AND PROTECTIVE LAYER

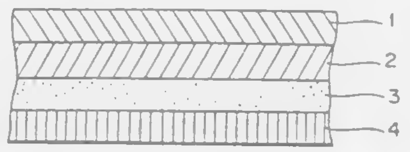
Masayuki Nakazawa; Masaaki Nitta; Hisanori Tsuchino, and Akiko Kano, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 232,495, Aug. 15, 1988, abandoned. This application Jun. 15, 1989, Ser. No. 366,785

Claims priority, application Japan, Aug. 18, 1987, 62-206017; Aug. 24, 1987, 62-211066; Jun. 10, 1988, 63-141522; Jun. 21, 1988, 63-151123

Int. Cl.^{5} G01N *23/04;* **G03C** *5/17*

U.S. Cl. 250—484.1 **71 Claims**



1. In a radiation image storage panel having a stimulable layer and a protective layer on a support, the improvement comprising a layer having a lower refractive index than the protective layer is provided between said stimulable phosphor layer and said protective layer, and wherein said lower refractive index layer is a gaseous layer.

5,023,462
PHOTO-CATHODE IMAGE PROJECTION APPARATUS FOR PATTERNING A SEMICONDUCTOR DEVICE

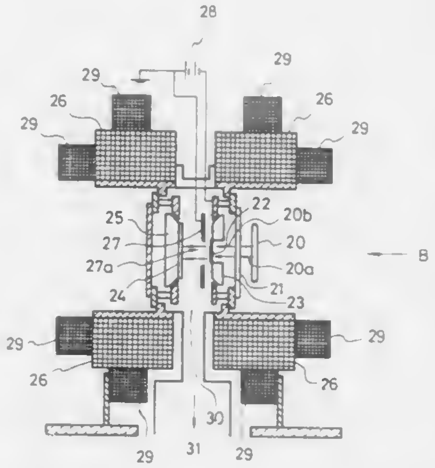
Akio Yamada, Kasasaki; Kiichi Sakamoto, Tokyo; Jinko Kudou, Kawasaki, and Hiroshi Yasuda, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 23, 1989, Ser. No. 327,728

Claims priority, application Japan, Mar. 23, 1988, 63-68762; Mar. 31, 1988, 63-76408; Jun. 15, 1988, 63-148945

Int. Cl.^{5} H01J *37/317*

U.S. Cl. 250—492.2 **25 Claims**



1. A photo-cathode image projection apparatus for projecting an image of a desired pattern on an object by a focused photoelectron base, comprising:

light source means for producing an optical beam;

photoelectron mask means disposed so as to be irradiated by the optical beam from the light source means, said photoelectron mask means including a photoelectron mask patterned according to said desired pattern with a material emitting photoelectrons in response to irradiation by said optical beam;

focusing means for focusing the photoelectrons emitted from the photoelectron mask to form a focused photoelectron beam that is focused on an object;

acceleration electrode means disposed in the path of the photoelectron beam for accelerating the photoelectrons in the photoelectron beam;

a single elongated passage defined in said acceleration electrode means for allowing a part of the photoelectron beam to pass therethrough, said elongated passage providing an elongated cross-section in the photoelectron beam passing therethrough;

stage means disposed for supporting the said object so that the part of the photoelectron beam passed through the elongated passage means is focused on the object;

additional electrode means provided between the stage means and the acceleration electrode including an electrode element disposed at each side of the photoelectron beam which has passed through the elongated passage so as to extend along the elongated cross-section of the photoelectron beam for correcting the path of the photoelectron beam as it travels toward the object; and

voltage source means for applying an acceleration voltage between the photoelectron mask and the acceleration electrode means and holding said acceleration electrode means at an electrical potential level identical to the electrical potential level of the stage means, so that the object supported on the stage means is electrically shielded from said photoelectron mask by the acceleration electrode means.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,463

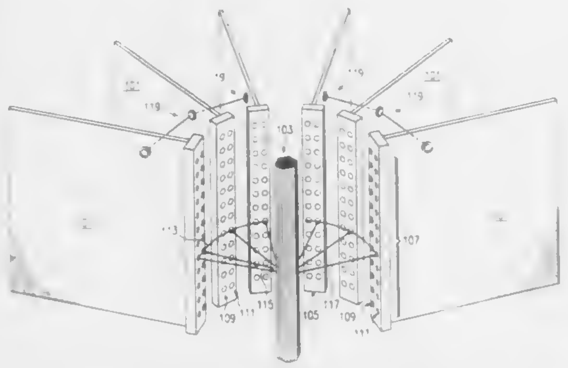
PHOTONIC ARRAY BUS FOR DATA PROCESSING AND COMMUNICATION SYSTEMS

John D. Boardman; Jimmie L. Sadler, both of Garland, and Richard A. Trimble, Rowlett, all of Tex., assignors to E-Systems, Inc., Dallas, Tex.

Filed Mar. 15, 1990, Ser. No. 493,952

Int. Cl.⁵ G02B *27/00*

U.S. Cl. 250—551 **19 Claims**



1. A photonic array bus for data transfers between components of a data processing or communications system, comprising:

a first coplanar array of pairs of laser transmitters and laser receivers coupled to the data processing or communications system; and

means for dispersing a laser beam emitted by a laser transmitter in the first coplanar array into an axially extending plane of laser light incident on the laser receivers in the first coplanar array.

5,023,464

FIXING APPARATUS AND RECORDING APPARATUS

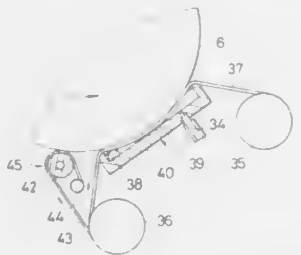
Teruaki Mitsuya, Katsuta; Shigetaka Fujiwara, Hitachi; Michio Endou, Niihari, and Akira Terakado, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Koki Co., Ltd., both of Tokyo, Japan

Filed Sep. 19, 1990, Ser. No. 584,616

Claims priority, application Japan, Sep. 20, 1989, 1-244855; Oct. 19, 1989, 1-270290

Int. Cl.⁵ G03G *15/22, 15/20*

U.S. Cl. 355—283 **25 Claims**



1. A fixing apparatus, comprising:

a heat roll provided with a hollow cylindrical mandrel, a heat source disposed within the mandrel, a surface layer provided to cover a surface of the mandrel, a thickness of the surface layer being formed not to exceed the thickness to be determined by a square root of the product of a heat diffusion rate of the surface layer material and a nip time for a form to pass a nip zone, a thickness of said mandrel being formed not less than the thickness to be determined by a square root of the product of a heat diffusion rate of the mandrel material and a one rotational period of the mandrel;

a back-up roll paired with the heat roll;

said nip zone formed at a portion where both the two rolls are opposite each other for fixing a toner to a recording paper passing through the opposing portions;

a separator for separating the recording paper coming out of said nip zone and sticking to said heat roll surface from the heat roll surface;

a cleaning device for removing a toner transferred to the heat roll from the recording paper.

5,023,465

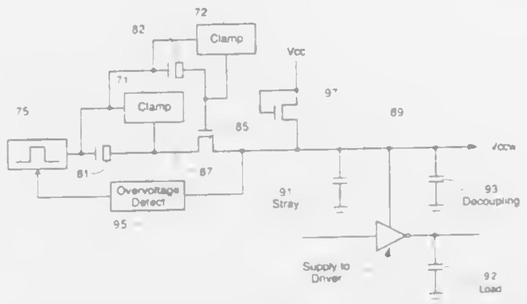
HIGH EFFICIENCY CHARGE PUMP CIRCUIT

Kurt P. Douglas, and Wen-Foo Chern, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Mar. 26, 1990, Ser. No. 498,772

Int. Cl.⁵ G11C *7/00*

U.S. Cl. 365—203 **10 Claims**



1. In a random access memory array, which includes an array of capacitor cells corresponding to memory address locations, at least one signal line which is precharged to signal sensing levels, a circuit for providing signals corresponding to signal levels in the capacitor cells to the signal lines, a signal level voltage source, and a precharge circuit which precharges the signal line, the random access memory array comprising:

(a) the precharge circuit including an oscillator providing an oscillating output, a capacitor connected at the oscillating output and a switching circuit connected across the capacitor and responsive to the oscillating output, the precharge circuit providing an elevated potential output at an output node; and

(b) a potential limiting circuit responsive to potential at the output node, the potential limiting circuit attenuating the output of the precharge circuit when the output node reaches a predetermined potential, thereby limiting the potential at the output node.

5,023,466

COAXIAL STARTER

Shuzoo Isozumi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisba, Tokyo, Japan

Filed Feb. 10, 1989, Ser. No. 308,502

Claims priority, application Japan, Feb. 12, 1988, 63-31210; Feb. 12, 1988, 63-31211; Feb. 29, 1988, 63-27072[U]

Int. Cl.⁵ F02N *11/04*

U.S. Cl. 290—48 **6 Claims**

1. A coaxial starter for an engine having a ring gear comprising:

an electric motor, having an armature shaft defining an axis of rotation, which produces torque;

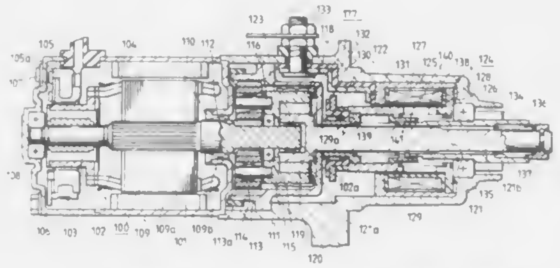
a speed reduction planet gear mechanism which connects the rotation of said armature shaft of said motor about said axis at a first speed into a rotation of an output portion of said mechanism about said axis at a second speed lower than said first speed;

an overrunning clutch which transmits the output torque of said mechanism when said clutch is engaged;

an output rotary shaft rotatable about said axis of rotation, and comprising a front and a rear portion, said rear portion comprising an inner member of said clutch;

a pinion provided on the outside circumferential surface of said front portion of said output rotary shaft so that said pinion is engaged with said ring gear of an engine as the torque of said output rotary shaft is received by said pinion;

an electromagnetic switch provided around said pinion to move said pinion forward and engage said ring gear of said motor;



an actuator, movable to connect a source of power to said motor when said switch is energized; and

a spring provided between said actuator and said pinion and biased to push said pinion forward.

5,023,467

METHOD AND AN INTERVAL SWITCH COMPRISING A CIRCUIT ARRANGEMENT FOR CONTROLLING THE INTERVAL OF TIME BETWEEN WIPING MOVEMENTS OF WIPERS IN VEHICLES

Günter Uhl, Unterreichenbach, Fed. Rep. of Germany, assignor to Doduco GmbH & Co. Dr. Eugen Durrwachter, Pforzheim, Fed. Rep. of Germany

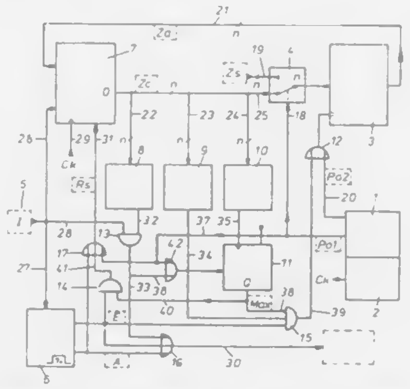
PCT No. PCT/EP88/00215, § 371 Date Nov. 16, 1988, § 102(e) Date Nov. 16, 1988, PCT Pub. No. WO88/06989, PCT Pub. Date Sep. 22, 1988

PCT Filed Mar. 17, 1988, Ser. No. 274,803

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1987, 3708547

Int. Cl.⁵ H02P *1/04*

U.S. Cl. 307—10.1 **23 Claims**



1. A method of controlling the interval of time between wiping movements of wipers in vehicles, wherein the interval of time between two consecutive wiping movements is determined and is set by means of a selector switch, which has at least the switch positions "wiping operation OFF" and "interval operation ON", and by means of an electric control circuit, by which the interval of time between two consecutive wiping movements (hereinafter called interval time) is measured, at least the second of said wiping movements has arbitrarily been started by an actuation of the selector switch, the measured value is stored and is subsequently used as interval time until a renewed arbitrary starting of wiping movements by a renewed actuation of the selector switch has been effected and another interval time is stored or the interval wiping operation of the wiper is interrupted or the control circuit is deenergized, characterized in that the selector switch is moved to the switch position "wiping operation OFF" for a prolongation and for a shortening of the interval time, a single wiping movement is thus started at the same time, the selector switch is moved to the switch position "interval wiping operation ON" after an arbitrarily selected interval time, and that interval time is measured and stored.

5,023,468

SAFETY DEVICE FOR CAR PASSENGERS

Wolfgang Drobny, Besigheim; Werner Nitschke, Ditzingen; Peter Taufer, Renningen, and Hugo Weller, Oberriexingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

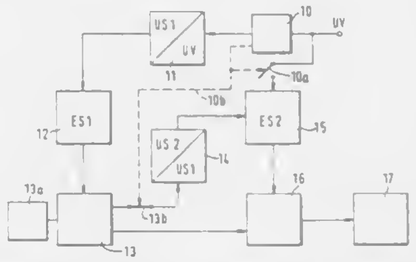
PCT No. PCT/DE87/00320, § 371 Date Jan. 25, 1989, § 102(e) Date Jan. 25, 1989, PCT Pub. No. WO88/00896, PCT Pub. Date Feb. 11, 1988

PCT Filed Jul. 15, 1987, Ser. No. 314,579

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1986, 3626601

Int. Cl.⁵ G60Q *9/00;* **H02J** *7/00*

U.S. Cl. 307—10.1 **4 Claims**



1. A safety device for an occupant of a vehicle having an in-vehicle voltage source, said safety device comprising retaining means; a sensor for sensing a vehicle condition; a sensor circuit for evaluating a sensor condition; a control circuit for actuating said retaining means in response to a predetermined sensor condition; first separate reserve energy storage means for supplying an electrical energy to said sensor and said sensor condition evalutating circuit; second separate reserve energy storage means for supplying an electrical energy to said control circuit; a first voltage transformer for connecting said first reserve energy storage means to the in-vehicle voltage source for charging said first reserve energy storage means to a voltage which is lower than that of the in-vehicle voltage source; second voltage transformer fed from said first reserve energy source means; and means for connecting said second reserve energy storage means to the in-vehicle voltage source as long as the in-vehicle voltage source is able to supply a predetermined voltage level, and for connecting said second reserve energy storage means to said second voltage transformer for receiving the predetermined voltage level therefrom, when the voltage level of the in-vehicle voltage source falls below the predetermined voltage level.

5,023,469

INTERLOCK SYSTEM FOR BYPASS/ISOLATION AUTOMATIC TRANSFER SWITCH

Ronald M. Bassett, Chicago, and Carl Kyrk, Stickney, both of Ill., assignors to Zenith Controls, Inc., Chicago, Ill.

Filed Feb. 5, 1990, Ser. No. 475,031

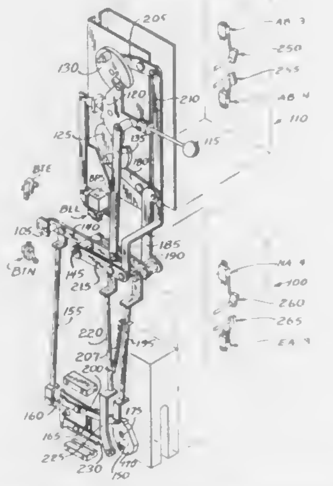
Int. Cl.⁵ H02J *9/00*

U.S. Cl. 307—64 **15 Claims**

9. A safety interlock system for a bypass/isolation automatic transfer switch, including an automatic transfer switch for automatic switching between normal and emergency power sources according to preset criteria and a manually operated bypass/isolation switch for bypassing the automatic transfer switch to permit servicing of the automatic transfer switch, the bypass/isolation automatic transfer switch being received in a

VOL
1127
ISS
2
JE
11
1991
UMI

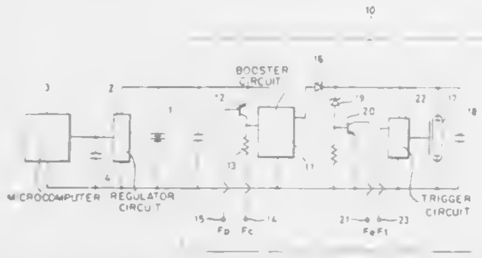
frame, the automatic transfer switch being removable therefrom for servicing, the interlock system comprising:
- mechanical interlock means for preventing the automatic transfer switch and the bypass/isolation switch from being mechanically closed into different power sources at the same time;
- electromechanical interlock means, operating in conjunction with the mechanical interlock means, for preventing the bypass/isolation switch, when closed into a live source, from being switched into a dead source,
- detecting means for automatically determining whether the normal or emergency power sources, or both of them, are live, whereby the electromechanical interlock system prevents switching into a dead source,
- the electromechanical interlock means further comprising means for preventing switching by the automatic transfer switch during movement of the automatic transfer switch outwardly from the frame for servicing;
- means for testing that the automatic transfer and bypass-isolation switches are closed into the same source before the automatic transfer switch may be moved outwardly of the frame; and,
- retractable table means operably connected to the frame for supporting the automatic transfer switch while permitting movement of switch outward from the frame.



5,023,470
ELECTRONIC FLASH CHARGING CIRCUIT

Haruo Onozuka; Takao Umezu; Muneyoshi Sato, all of Saitama, and Seiji Takada, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 18, 1989, Ser. No. 339,987
Claims priority, application Japan, Apr. 18, 1988, 63-95133
Int. Cl.⁵ A03B *15/05*
U.S. Cl. 307—108 11 Claims

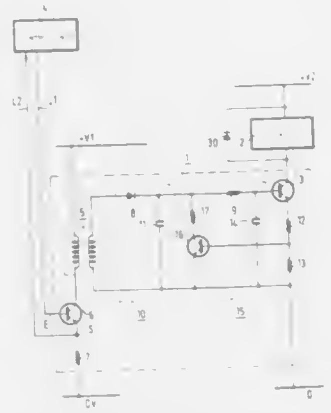


1. An electronic flash charging circuit for a camera having a power source common to a microcomputer that controls a plurality of camera functions and to an electronic flash, the charging circuit comprising:
- booster circuit means for boosting a voltage applied to the charging circuit and charging a main capacitor of the electronic flash, said booster circuit means comprising a blocking oscillator; and
- control means for causing said booster circuit means to operate intermittently, thereby intermittently charging the main capacitor;
- wherein said control means includes a transistor of which the emitter is connected to an input terminal of said blocking oscillator and the base is fed with a signal changing alternately between a high level and a low level.

5,023,471
TESTABLE INPUT/OUTPUT CIRCUIT FOR A LOAD DECOUPLED BY A TRANSFORMER

Jean Pauly, Lisses, France, assignor to Cegelec, Levallois-Perret, France

Filed Dec. 27, 1989, Ser. No. 457,677
Int. Cl.⁵ H02J *13/00*
U.S. Cl. 307—149 6 Claims

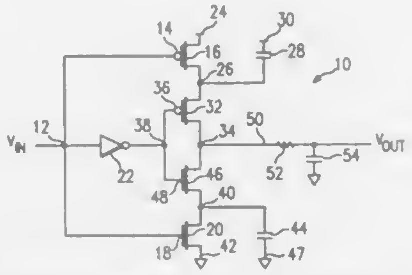


1. An input/output circuit for prior testing and control of an electrical load (2) decoupled by a transformer (5), the circuit being characterized in that it comprises:
- an input (E) acting on a first switching member (6) connected in series with a primary winding of the transformer in a power supply circuit for said primary winding, referred to as the "first" circuit, and controlled by the first switching member;
- an output (S) providing a signal from the voltage present across the terminals of an output resistor (7) connected in series with the primary winding of the transformer in the power supply circuit for said winding;
- a secondary circuit including a second switching member (3) which is inserted in series with the load in a power supply circuit for said load, referred to as the "second" circuit and under the control of the second switching member, the second switching member is controlled from the input of the circuit via the transformer and a rectifier circuit (10) connected to the terminals of a secondary winding of said transformer, said secondary circuit further including an impedance-switching circuit (13, 16) which is connected to the second switching member and is responsive to power supply current flowing through the second switching member, the second switching member responding thereto by switching an auxiliary impedance (17) to the terminals of the second winding in order to act on the output of the input/output circuit by changing the voltage across the terminals of the output resistor.

5,023,472
CAPACITOR-DRIVEN SIGNAL TRANSMISSION CIRCUIT

Masashi Hashimoto, and Oh-Kyong Kwon, both of Garland, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 9, 1988, Ser. No. 242,762
Int. Cl.⁵ H03K *3/01, 17/687, 19/094, 17/16*
U.S. Cl. 307—270 7 Claims



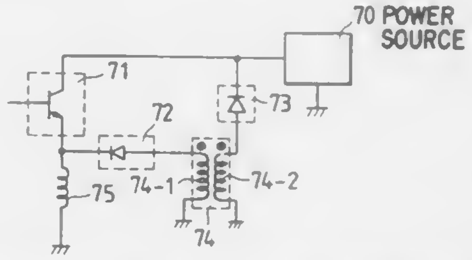
1. A transmission line driver circuit, comprising:
- a signal input;
- a first capacitor for storing a first voltage level corresponding to a first of two possible bit values of an input signal;
- a second capacitor for storing a second voltage level corresponding to a second of said possible bit values of said input signal;
- a first voltage supply source selectively coupled to said first capacitor for recharging said first capacitor to said first voltage level;
- a second voltage supply source selectively coupled to said second capacitor for recharging said second capacitor to said second voltage level;
- a transmission line; and
- a switching circuit, an input of said switching circuit coupled to said signal input, an output of said switching circuit coupled to said switching circuit, said switching circuit comprising an inverter coupled to said signal input and having an output, said inverter being operable to invert said input signal to produce an inverted signal on said inverter output having a bit value inverted from the bit value of said input signal, first and second capacitor coupling switches, each having control nodes coupled to said output of said inverter, said first capacitor coupling switch being operable to couple said capacitor to said transmission line in response to a second bit value of said inverter signal in its switch control node, said second capacitor coupling switch being operable to couple said second capacitor to said transmission line in response to receiving a first bit value of said inverted signal on its switch control node, said switching circuit being operable to couple said first capacitor to said output in response to an input signal of a first bit value and being operable to couple said second capacitor to said output in response to an input signal of said second bit value, such that the bit value received on said signal input is transmitted to said transmission line.

5,023,473
DRIVE CIRCUIT FOR BLOCH LINE MEMORY

Takashi Toyooka, Sayama; Yoji Maruyama, Iruma, and Ryo Suzuki, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 274,894, Nov. 22, 1988, abandoned.
This application Oct. 1, 1990, Ser. No. 593,375
Claims priority, application Japan, Nov. 22, 1987, 62-297750
Int. Cl.⁵ H03K *3/01*
U.S. Cl. 307—270 31 Claims

1. A drive circuit for a Bloch line memory, comprising:
- a bias magnetic field coil for generating a pulsed bias magnetic field;
- a source for supplying a pulsed current to said bias magnetic field coil;
- means for returning the pulsed current from the bias magnetic field coil to said source;
- a first current path electrically connecting the source, the bias magnetic field coil and a first switching means for supplying the pulsed current from said source to said bias magnetic field coil;

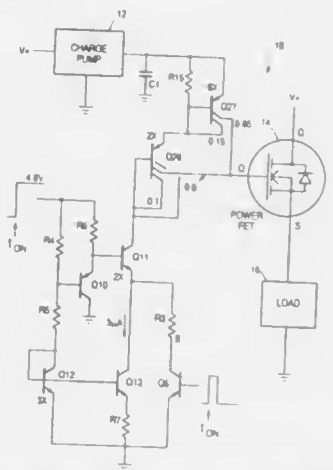


- a second current path electrically connecting the bias magnetic field coil, the returning means and a second switching means for returning the pulsed current from said bias magnetic field coil to said returning means; and
- a third current path electrically connecting the returning means, the source and a third switching means for returning the pulsed current from said returning means to said source.

5,023,474
ADAPTIVE GATE CHARGE CIRCUIT FOR POWER FETS

Milton E. Wilcox, Saratoga, Calif., assignor to National Semiconductor Corp., Santa Clara, Calif.

Filed Nov. 8, 1989, Ser. No. 433,557
Int. Cl.⁵ H03K *3/01, 17/60*
U.S. Cl. 307—270 5 Claims



1. An adaptive gate charge circuit comprising
- (a) driving means responsive to a control signal for providing a charging current from a charge supply for an initial time period sufficient to charge an element to a desired potential;
- (b) adaptive sustaining means connected to the charge supply for providing sufficient holding current from the charge supply to the element after the initial time period to compensate for charge leakage from the element; and
- (c) current limiting means connected to the adaptive sustaining means for limiting current drain from the charge supply after the initial time period to the holding current plus a minimum additional current value.

VOL
1127
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1991
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5,023,475
IC D-TYPE MASTER/SLAVE FLIP-FLOP

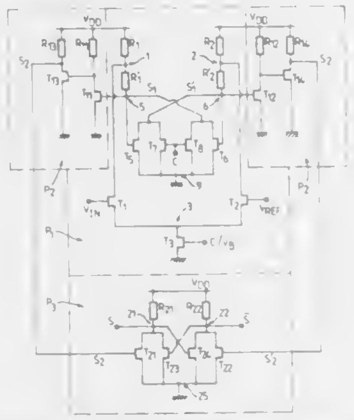
Thierry Ducourant, Crosoe, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 16, 1989, Ser. No. 367,522

Claims priority, application France, Jun. 17, 1988, 88 08148

Int. Cl.^{5} H03K *3/284. 3/26*

U.S. Cl. 307—272.2 12 Claims



1. An integrated circuit D-type master/slave flipflop comprising:

a bistable master element connected between two supply voltage terminals, said master element having a first data input for receiving input data;

control means having a control input for erasing or enabling writing into the master element under the control of a control signal;

a bistable slave element connected between two supply voltage terminals and having a second data input connected to a data output of said master element, and

means for controlling the slave element only via a data input signal at said second data input and for simultaneously writing into the slave element when said data input signal at said second data input reaches a predetermined voltage level.

5,023,476
SEMICONDUCTOR DEVICE WITH POWER SUPPLY MODE-CHANGE CONTROLLER FOR RELIABILITY TESTING

Yohji Watanabe, Kawasaki, and Tohru Furuyama, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 31,263, Mar. 30, 1987, Pat. No. 4,833,341. This application Jan. 23, 1989, Ser. No. 299,424

Claims priority, application Japan, Apr. 1, 1986, 61-74980

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.^{5} G05F *3/16*

U.S. Cl. 307—296.1 9 Claims

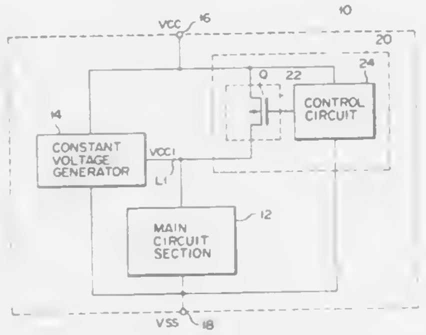
1. A semiconductor integrated circuit device comprising:

a semiconductor substrate;

a main circuit section formed on said substrate;

constant voltage generator means formed on said substrate, for receiving an externally supplied d.c. power supply and for producing a regulated d.c. voltage having a potential level lower than that of the external power supply voltage; and

operation reliability test means for executing an accelerated test for said integrated circuit device independently of an operating condition of said main circuit section, said test means comprising switching means formed on said substrate and connected to said main circuit section and said constant voltage generator means, for providing said regulated d.c. voltage from said constant voltage generator means to said main circuit section in a normal operation mode of said device, and for, in a test mode of device, allowing said external power supply voltage to be directly applied to said main circuit section as an increased power supply voltage for said accelerated test.



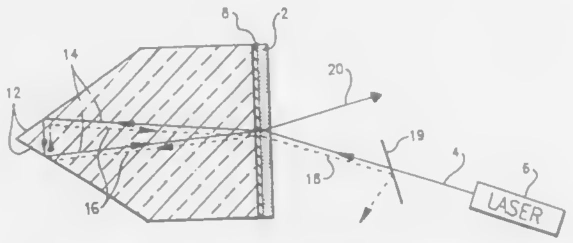
5,023,477
TRANSIENT ENERGY SELF-PUMPED CONJUGATOR AND METHOD

George C. Valley, Los Angeles, and Thomas F. Boggess, Jr., Newbury Park, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Feb. 1, 1990, Ser. No. 473,532

Int. Cl.^{5} G02B *6/32;* **H03F** *7/00;* **H02J** *3/02;* **H04J** *3/00*

U.S. Cl. 307—425 26 Claims



1. A self-pumped phase conjugate mirror (PCM) for a pulsed optical probe beam having a predetermined pulse duration, comprising:

a non-linear gain medium for receiving and transmitting said beam, said nonlinear gain medium forming an optical grating in response to the probe beam and a noise beam generated in said medium, said grating having a grating response time greater than the pulse duration of said probe beam, and

means for directing said noise beam and said probe beam after transmission through said non-linear gain medium along approximately equal time duration return paths as returned probe and noise beams back into said medium for mixing with each other in said medium, thereby inducing a transient transfer of energy from said returned probe beam to said returned noise beam,

the thickness and optical coupling coefficient of said non-linear gain medium and the angle between said returned probe and noise beams being selected to produce a noise beam gain to generate a phase conjugate of said probe beam.

5,023,478
COMPLEMENTARY EMITTER FOLLOWER DRIVERS

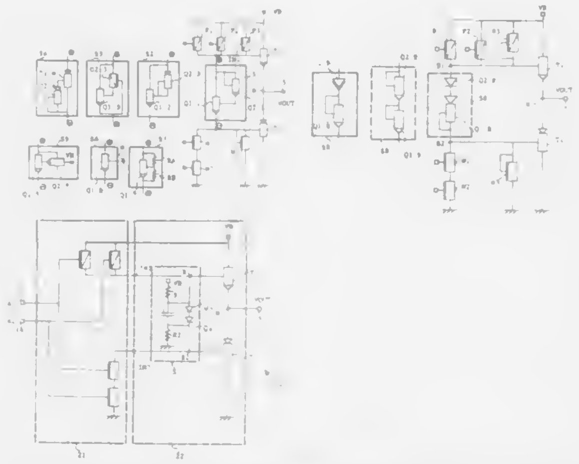
Gerard Boudon, Mennecy; Pierre Mollier, Boissise Le Roi, both of France; Seiki Ogura, Hopewell Junction, N.Y.; Dominique Omet, Evry, France; Pascal Tannhof, Perthes, France, and Franck Wallart, Cesson, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 13, 1990, Ser. No. 493,079

Claims priority, application European Pat. Off., Mar. 14, 1989, 89480046.5

Int. Cl.^{5} H03K *19/092, 19/013, 19/017, 19/086*

U.S. Cl. 307—446 18 Claims



1. A CEF driver (22) of the kind comprising a top NPN (T1) and a bottom PNP (T2) output bipolar transistors connected respectively to a first supply voltage (VH) and a second supply voltage (GND) with a common output node (N) connected therebetween; a terminal (15) being connected to the said output node (N) where the output signal (VOUT) is available; a translator voltage circuit (S) placed between the base nodes (B1, B2) of the said respective bipolar output transistors; the said base nodes being driven by respective logic signals (IN1, IN2) supplied by a preceding driving circuit (21), characterized in that said translator voltage circuit (S) includes diode means (Q1, Q2) to ensure that the voltage shift VS that exists between the base nodes (B1, B2) of the said bipolar output transistors (T1, T2) places the said output transistors at an operating point (18, FIG. 3) that provides optimized operation of the said output transistors, at a minimum relative power and relative delay.

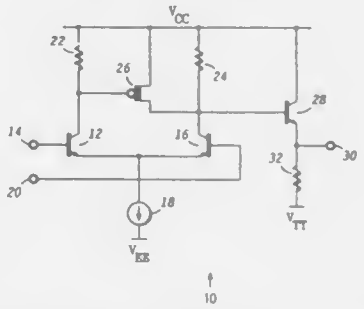
5,023,479
LOW POWER OUTPUT GATE

Philip A. Jeffery, and Bor-Yuan Hwang, both of Tempe, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 31, 1990, Ser. No. 560,920

Int. Cl.^{5} H03K *19/02*

U.S. Cl. 307—446 12 Claims



1. A BiMOS output gate,comprising:

an input stage responsive to logic input signals supplied to first and second inputs for providing output logic signals at first and second outputs;

a field effect transistor having first and second electrodes and a control electrode, said control electrode being coupled to said first output of said input stage, said first electrode being coupled to said second output of said input stage, and said second electrode being coupled to a first supply voltage terminal;

a first resistor coupled across said second and control electrodes of said field-effect transistor;

a second resistor coupled across said first and second electrodes of said field-effect transistor such that when said logic input signal applied to said first input of said input stage is in a first logic state, the voltage drop occurring across said first resistor renders said field-effect transistor operative wherein the effective resistance of said second resistor is decreased; and

an output stage coupled to said second output of said input stage for providing an output logic signal at an output terminal of the BiMOS output gate responsive to said logic input signals.

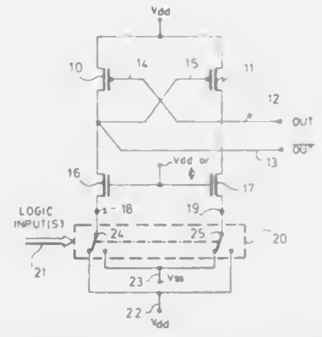
5,023,480
PUSH-PULL CASCODE LOGIC

Bruce A. Gieseke, Natick; Robert A. Conrad, Millbury; James J. Montanaro, Princeton, and Daniel W. Dobberpuhl, Shrewsbury, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jan. 4, 1990, Ser. No. 460,818

Int. Cl.^{5} H03K *5/153;* **H03F** *3/45*

U.S. Cl. 307—448 18 Claims



1. A logic circuit using a voltage supply having first and second terminals, comprising:

(a) first transistor having a source-to-drain path and a gate,

VOL
1127
ISS
2
JE
11
1991
UMI

one end of said source-to-drain path of said first transistor being coupled to said first terminal of said voltage supply, the other end of said source-to-drain path of said first transistor being coupled to a first output node; a second transistor having a source-to-drain path and a gate, one end of said source-to-drain path of said second transistor being coupled to said first terminal of said voltage supply, the other end of said source-to-drain path of said second transistor being coupled to a second output node; said gates of said first and second transistors being cross-coupled to said first and second output nodes;

(b) a combinatorial logic network having switching means coupling one of said first and second output nodes to said first terminal of said voltage supply and other of said first and second output nodes to said second terminal of said voltage supply, or vice versa, depending upon the value of a logic input of said network, to thereby drive said first and second output nodes toward voltage levels of said first and second terminals.

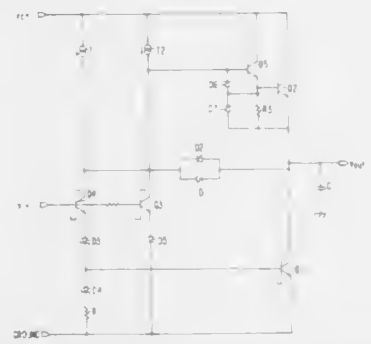
5,023,481
TOTEM POLE CIRCUIT WITH ADDITIONAL DIODE COUPLING

John Tero, Saratoga; Shaoan Chin, Cupertino, and Bing F. Ma, Sunnyvale, all of Calif., assignors to North American Philips Corporation, New York, N.Y.

Filed Dec. 27, 1989, Ser. No. 457,457

Int. Cl.^{5} H03K *19/088, 19/084, 19/013, 17/04*

U.S. Cl. 307—456 **10 Claims**



1. A switchable output circuit, having an output taken from a node between output transistors connected in series for conducting current alternatively, comprising:

first and second connections for supplying power to said circuit at respective first and second reference voltage levels,

first output transistor means including a first output transistor, connected to provide a first current path between said first connection and said node, and having a first output control electrode; and second output transistor means including a second output transistor, connected to provide a second current path between said second connection and said node, and having a second output control electrode,

a pull-up driver circuit connected to provide a third current path to said first connection, having a driver electrode connected to said second output control electrode, and a pull-up driver signal input connection,

a pull-down current source, and a pull-down driver circuit connected to provide a fourth current path between said pull-down current source and said first connection, having a driver electrode connected to said first output control electrode, and a pull-down driver signal input connection, and

a first diode connected between the output node and the fourth current path, said first diode being connected to the fourth current path between said pull-down current source and said pull-down driver circuit with a polarity chosen for conducting current toward said output node the same as current through said second current path,

whereby said circuit can drive a highly capacitive load, connected to said output node, without cross conduction current through the output transistors during switching transients.

5,023,482
ISL TO TTL TRANSLATOR

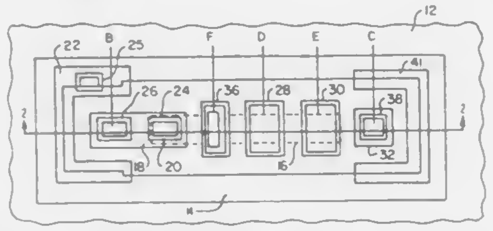
Joseph T. Bellavance, San Jose, Calif., assignor to North American Philips Corp., Sunnyvale, Calif.

Continuation of Ser. No. 362,923, Mar. 29, 1982, abandoned.

This application May 13, 1985, Ser. No. 733,416

Int. Cl.^{5} H03K *19/091;* **H01L** *27/082*

U.S. Cl. 307—456 4 Claims



1. An integrated circuit in which:

n-type semiconductive islands adjoin a common underlying p-type semiconductive substrate region;

isolation means laterally surrounds each island to horizontally electrically isolate it from the other islands at least during operation of the circuit;

a first transistor has a P base located within one of the islands along its upper surface for receiving a signal input, an N emitter located within the P base along the upper surface spaced apart from material of the island outside the P base, and an N collector adjoining the P base below it; and

an n-type zone located within the island along the upper surface and coupled through an n-type path to the N collector adjoins an overlying electrical conductor to form a Schottky diode; characterized by:

a second transistor having a P emitter located within the island along the upper surface spaced apart from the P base, an N base adjoining the P emitter below it and coupled through an n-type path to the N collector, and a P collector comprising the substrate region;

a third transistor having an N emitter, a P base connected to the emitter of the second transistor, and an N collector;

a fourth transistor having an N emitter, a P base connected to the emitter of the third transistor and to the conductor, and an N collector;

a fifth transistor having an N emitter, a P base coupled to the collector of the third transistor, and an N collector; and

a sixth transistor having an N emitter coupled to the collector of the fourth transistor for providing a signal output, a P base coupled to the emitter of the fifth transistor, and an N collector.

5,023,483
APPARATUS AND METHOD FOR DECODING FOUR STATES WITH ONE PIN

Bradley A. May, San Jose, Calif., assignor to Chips and Technologies, Incorporated, San Jose, Calif.

Filed Jun. 27, 1989, Ser. No. 372,070

Int. Cl.^{5} H03K *19/02, 17/16*

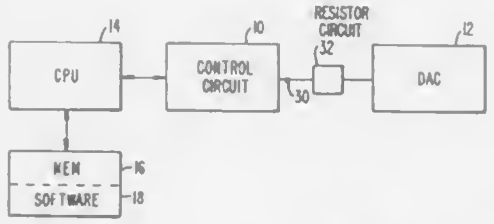
U.S. Cl. 307—463 **10 Claims**

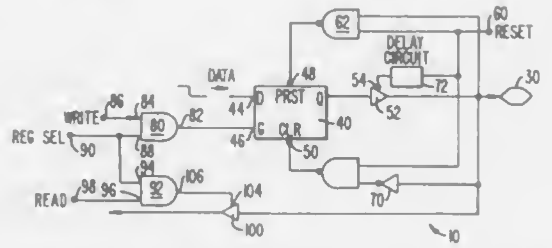
1. Apparatus for decoding one of a plurality of conditions present at a circuit node having a default logic state, comprising:

a memory, having an output coupled to the circuit node, for storing the default logic state and a commanded logic state;

an isolator circuit, coupled to said memory, for isolating said memory output from said circuit node, in response to a reset signal;

a default circuit, coupled to said circuit node and said memory and responsive to said reset signal, for storing said default logic state in said memory while said memory output is isolated from said circuit node;





a read circuit, coupled to said circuit node, for reading a particular logic state present at said circuit node; and

a write circuit, coupled to said memory, to cause said commanded logic state to be output from said memory output to said circuit node.

5,023,484
ARCHITECTURE OF HIGH SPEED SYNCHRONOUS STATE MACHINE

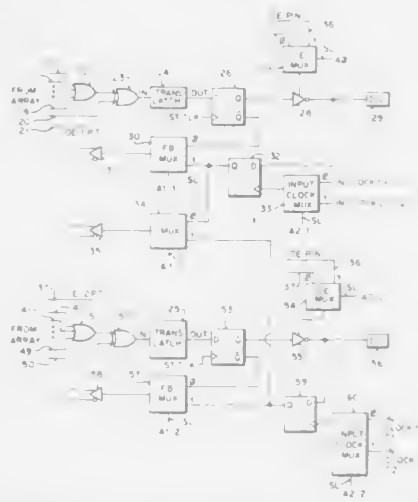
Jagdish Pathak, Los Altos Hills; Stephen M. Douglass, Santa Clara; Dov-Ami Vider, Sunnyvale, all of Calif., and Hal Kurkowski, Dallas, Tex., assignors to Cypress Semiconductor Corporation, San Jose, Calif.

Continuation of Ser. No. 241,015, Sep. 2, 1988, Pat. No. 4,879,481. This application Oct. 31, 1989, Ser. No. 429,850

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.^{5} H03K *19/177*

U.S. Cl. 307—465 4 Claims



1. An input/output macrocell for a programmable logic device, said macrocell being coupled to a state clock to receive a state clock signal to operate a programmable array as a synchronous state machine and being coupled to an input and an output of said array, said input/output macrocell comprising:

- an input/output connector means;
- an input register, said input register having an input, an output, and a clock input, such that:
  - (i) said clock input being coupled to receive an input clock signal,
  - (ii) said input of said input register being coupled to said input/output connector means, and
  - (iii) said output of said input register being coupled to said input to said programmable array;
- an input clock multiplexer, said input clock multiplexer having:
  - (i) a first and a second input for receiving a first and a second clock signal;
  - (ii) an output being coupled to said clock input of said input register to provide said input clock signal, and
  - (iii) a first select line means for selecting between said first and said second clock signals;
- a state register, said state register having an input, an output and a complementary output and having a clock input, such that:
  - (i) said clock input being coupled to receive a state clock signal, and
  - (ii) said input of said state register being coupled to said output of said array through a transparent latch;
- a state clock multiplexer, said state clock multiplexer having:
  - (i) a first and a second input for receiving a third and a fourth clock signal,
  - (ii) an output being coupled to said clock input of said state register to provide said state clock signal, and
  - (iii) a second select line means for selecting between said third and said fourth clock signals;
- a tri-state latched output driver, said tri-state latched output driver having an input, an output and a control input for receiving a first output enable signal, such that:
  - (i) said output of said tri-state latched output driver being coupled to said input/output connector means,
  - (ii) said input of said tri-state latched output driver being coupled to said output of said state register to provide the signal present on said output of said state register to said input/output connector means when said first output enable signal is active;
- said connection between said output of said input register and said input to said programmable array being through a feedback multiplexer such that:
  - (i) one input to said feedback multiplexer being coupled to said output of said input register,
  - (ii) another input to said feedback multiplexer being coupled to said complementary output of said state register,
  - (iii) wherein said inputs to said feedback multiplexer are selected between by a third select line means.

5,023,485
METHOD AND CIRCUITRY FOR TESTING A PROGRAMMABLE LOGIC DEVICE

Frank J. Sweeney, Rowlett, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 4, 1989, Ser. No. 445,069

Int. Cl.^{5} H03K *19/177*

U.S. Cl. 307—465 **39 Claims**

1. Circuitry for synchronously or asynchronously testing the functions of a programmable logic device, said device including a plurality of elements responsive to logic signals and a plurality of input lines, said input lines forming a portion of a data flow path of said device when not in test mode, comprising:

a test memory operable to receive, store and output a plurality of test configuration bits; and

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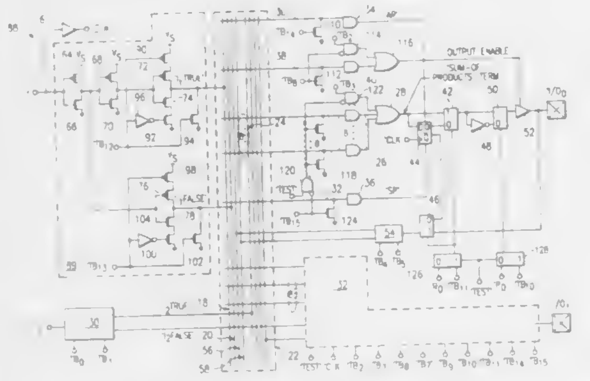
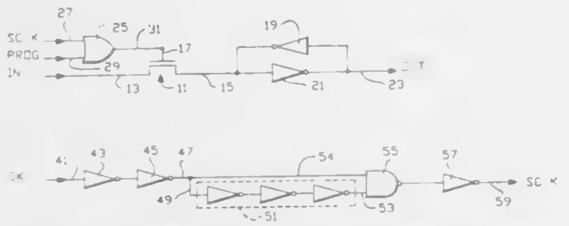
circuitry responsive to said test configuration bits for forcing said elements of the logic device into predetermined con-



figurations while test signals are applied to at least one of said plurality of input lines.

5,023,486
LOGIC OUTPUT CONTROL CIRCUIT FOR A LATCH

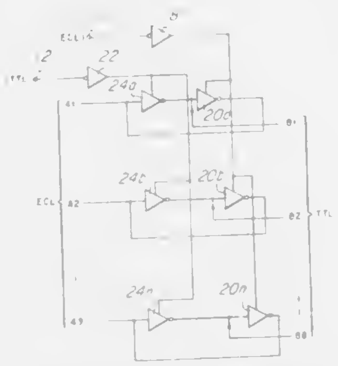
Geoffrey S. Gongwer, San Jose, Calif., assignor to Atmel Corporation, San Jose, Calif.
Filed Mar. 30, 1990, Ser. No. 502,221
Int. Cl.^{5} H03K *3/356*
U.S. Cl. 307—465 12 Claims



1. An output control circuit for a logic signal comprising,
latching means having an input and an output for storing a logic signal received at said input, said logic signal being able to freely pass from said input to said output of said latching means whenever said logic signal is being received at said input, a stored logic signal being available from said latching means at said output whenever a logic signal is blocked from said input, said output of said latching means being coupled to a circuit output,
switching means having an input and an output and responsive to a control signal for selectively passing a logic signal received at said input to said output whenever said control signal is in a first logic state and blocking said logic signal at said input whenever said control signal is in a second logic state, said input of said switching means being coupled to a circuit data input, said output of said switching means being connected to said input of said latching means, and
programmable means having a program input and a clock input for providing said control signal to said switching means, said control signal being fixed in said first logic state whenever said program input has a first program value, said control signal alternately switching between said first and second logic state in response to a clock signal on said clock input whenever said program input has a second program value.

5,023,487
ECL/TTL-CMOS TRANSLATOR BUS INTERFACE ARCHITECTURE

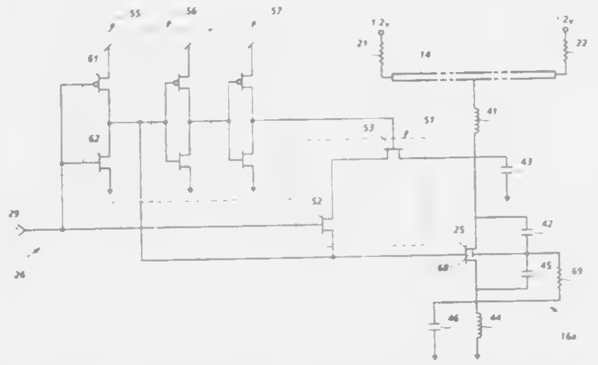
Christopher M. Wellheuser, Sherman, and Richard T. Moore, Denison, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed Sep. 29, 1989, Ser. No. 416,193
Int. Cl.^{5} H03K *19/094, 17/30*
U.S. Cl. 307—475 14 Claims



1. A translation architecture for a signal processor for translation from one signal environment to another, said architecture comprising:
a first input line for receiving a first control signal from a first signal environment;
a second input line for receiving a second control signal from a second signal environment;
logic circuitry coupled between said first and second input lines and a plurality of translator circuits, said logic circuitry transmitting a third control signal in response to receiving said first or said second control signal; and
each said translator circuit receiving a respective data signal from said first signal environment and said third control signal and transmitting an output signal in said second signal environment.

5,023,488
DRIVERS AND RECEIVERS FOR INTERFACING VLSI CMOS CIRCUITS TO TRANSMISSION LINES

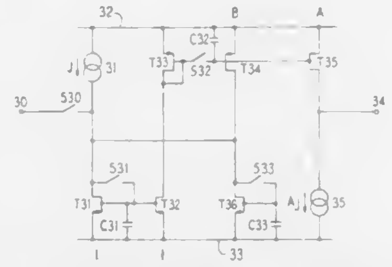
William F. Gunning, Los Altos Hills, Calif., assignor to Xerox Corporation, Stamford, Conn.
Filed Mar. 30, 1990, Ser. No. 502,372
Int. Cl.^{5} H03K *5/09*
U.S. Cl. 307—475 5 Claims



1. An interface for interfacing VLSI CMOS binary circuits to a terminated transmission line for binary communications between said circuits at signal levels providing a signal swing of about 0.8 v–1.4 v between a line terminating voltage level of about 1.2 v–2.0 v and a low voltage level of about 0.4 v–0.6 v; said interface comprising
driver means for feeding binary signals from said CMOS circuits to said transmission line; each of said driver means including an N-channel transistor means having a drain coupled to said transmission line, a source returned to ground, and a gate coupled to receive binary signals from one of said CMOS circuits; the gate of said transistor means being of predetermined effective width and length, with its width being plural orders of magnitude greater than its length.

5,023,489
INTEGRATOR CIRCUIT

Ian C. Macbeth, Crawley, England, assignor to U.S. Philips Corporation, New York, N.Y.
Filed May 8, 1990, Ser. No. 520,696
Claims priority, application United Kingdom, May 10, 1989, 8910756.9
Int. Cl.^{5} G05F *3/24*
U.S. Cl. 307—490 24 Claims

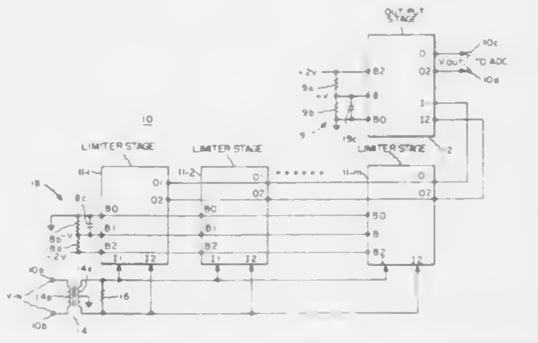


1. An integrator circuit for integrating an input signal in the form of a sampled analog current comprising:
input means for receiving the input signal,
output means for supplying an output signal corresponding to an integrated input signal,
a current memory for producing at its output during a first portion of a sampling period a current related to a current applied to its input during a second portion of that or a preceding sample period,
means for coupling the output means to an output of the current memory,
means for supplying a feedback current from an output of the current memory to the input of the current memory,
means for determining the feedback current, said determining means including means for determining, during the first portion of the sampling period, a difference current between the feedback current and the current applied to the input of the current memory during the second portion of that or a preceding sample period, and means for modifying the feedback current in accordance with the difference current, and
means for applying the modified feedback current to the input of the current memory during the second portion of the sample period.

5,023,490
ANALOG SIGNAL COMPRESSION CIRCUIT

Norman C. Gittinger, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.
Filed Jun. 21, 1989, Ser. No. 369,404
Int. Cl.^{5} G06F *7/556;* H03F *1/30*
U.S. Cl. 307—492 8 Claims

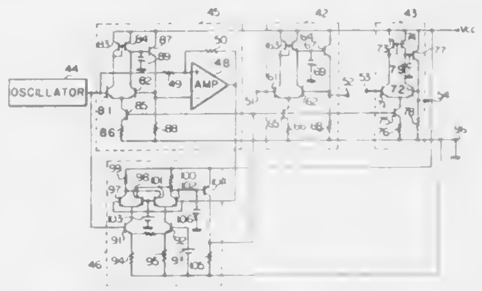
1. An analog compression circuit for performing a desired non-linear, monotonic compression function substantially symmetrically upon both polarities of an alternating-current (AC) input signal, including: input means for receiving said input signal; a plurality N of limiting stages, each having input circuitry with like terminals connected in parallel to one another to receive an input voltage from said input means, and having output circuitry providing an output current proportional to said input voltage, with a gain constant decreasing for an increasing stage number, said output circuitry having like terminals connected in parallel so as to provide a total of the output currents from said limiting stages; and a single output



stage for receiving said total of the output currents from said limiting stages and converting said total to an output voltage.

5,023,491
FILTER CIRCUIT ARRANGEMENTS WITH AUTOMATIC ADJUSTMENT OF CUT-OFF FREQUENCIES

Jun Koyama, Tokyo, Japan, assignor to NEC Corporation, Japan
Filed Jan. 17, 1989, Ser. No. 297,426
Claims priority, application Japan, Jan. 18, 1988, 63-8940; Jan. 18, 1988, 63-8941
Int. Cl.^{5} H03K *5/00, 3/20*
U.S. Cl. 307—521 8 Claims



1. A filter circuit comprising
(a) a plurality of filter units responsive to a control signal for changing cut-off frequencies, respectively; and
(b) a controller having an oscillator for producing a first output signal, a sample filter unit supplied with the first output signal and producing a second output signal, status signal producing means responsive to the second output signal and producing a status signal which is representative of a deviation in phase of the second output signal from a standard signal corresponding to said first output signal, and a comparator operative to compare the status signal with said standard signal for producing said control signal, in which said status signal producing means is formed by an amplifier coupled at an inverted node thereof to said sample filter unit, a first resistor coupled between said oscillator and a non-inverted node of the amplifier, and a second resistor coupled between the non-inverted node and an output node of the amplifier, said sample filter circuit, said first and second resistors and said amplifier circuit forming in combination a phase shifter.

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Patent Not Issued For This Number

5,023,493

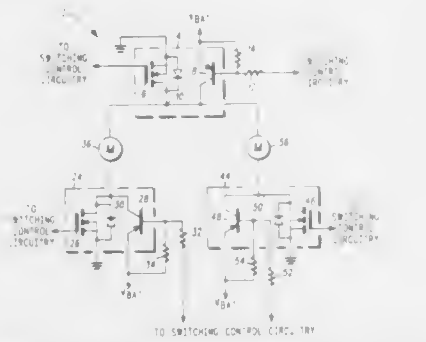
FET AND BIPOLAR TRANSISTOR BRIDGE CIRCUIT FOR DRIVING A LOAD

Stanley Wrzesinski, Arlington Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 4, 1989, Ser. No. 417,094

Int. Cl.⁵ H03K *17/60, 17/74, 3/01;* **B60L** *1/00*

U.S. Cl. 307—570 7 Claims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TO SWITCHING CONTROL CIRCUITRY

1. A bridge circuit for driving a load, the circuit comprising:

a first arm for connection between a first supply potential and a second supply potential, the first arm comprising first and second switch means connected in series via a first node for connection to a first terminal of a load; and

a second arm for connection between the first supply potential and the second supply potential, the second arm comprising third and fourth switch means connected in series via a second node for connection to a second terminal of the load,

the first switch means and the third switch means each being field effect transistors having intrinsic diodes conducting forward-biased current in predetermined directions, and

the second switch means and the fourth switch means each being bipolar transistors having diode junctions conducting forward-biased current in directions opposite respectively to the intrinsic diodes of the first switch means and the third switch means, so as to prevent conduction through the first or second arm if the intrinsic diode of the first switch means or the third switch means is forward-biased.

5,023,494

HIGH ISOLATION PASSIVE SWITCH

Toshikazu Tsukii, Santa Barbara; S. Gene Houng; Michael D. Miller, both of Goleta, and Sherwood A. McOwen, Jr., Santa Barbara, all of Calif., assignors to Raytheon Company, Lexington, Mass.

Filed Oct. 20, 1989, Ser. No. 424,773

Int. Cl.⁵ H03K *3/013, 17/08, 17/687;* **H01P** *1/15*

U.S. Cl. 307—571 9 Claims

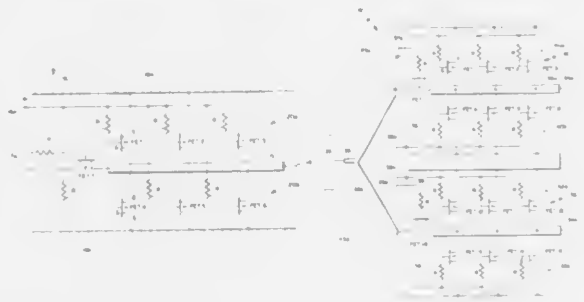
1. A radio frequency switch having a pair of terminals comprises:

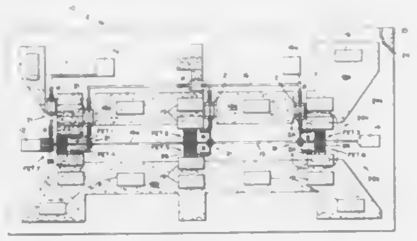
a substrate, having disposed over a first surface thereof a reference conductor;

a pair of conductors disposed over a second opposite surface of said substrate and coupled to the reference conductor;

at least one pair of transistors, disposed on said second surface of said substrate between said pair of conductors, each one of said transistors having a control electrode, and first and second electrodes; and

a propagation network disposed on said second surface of said substrate between said pair of conductors having a first end coupled to a first terminal of the switch, with first ones of said first and second electrodes of each one of the pair of transistors being connected to said network and with second ones of said first and second electrodes of the transistor being connected to a respective one of said pair of conductors.





5,023,495

MOVING-MAGNET TYPE LINEAR D.C. BRUSHLESS MOTOR HAVING PLURAL MOVING ELEMENTS

Masayuki Ohsaka, Sagamihara, and Osami Miyao, Yamato, both of Japan, assignors to Hitachi Metals & Shicoh Engine, Japan

Filed Apr. 17, 1990, Ser. No. 509,760

Int. Cl.⁵ H02K *41/02*

U.S. Cl. 310—12 9 Claims

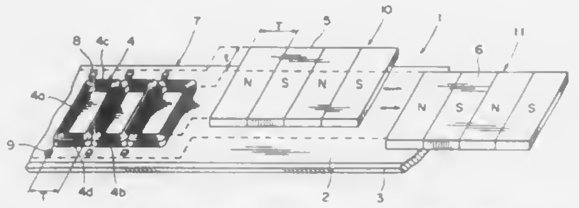
1. A moving-magnet type linear d.c. brushless motor having plural moving elements, which comprises:

a stator armature provided along a traveling track of moving elements;

n moving elements, each including a thrust-generating field magnet having an arrangement of P contiguous magnetic poles of alternating N and S polarity, where n is an integer of at least 2 and P is an integer of at least 1, the moving elements being face to face with the stator armature and traveling separately and independently;

n position-detecting magnets, which are provided respectively on said n moving elements each of the position-detecting magnets having P magnetic poles of N and S polarity at in-phase position relative to the thrust-generating field magnets and substantially the same pitch as that between N and S magnetic poles in each of the thrust-generating field magnets; and

n groups of position sensors, each group facing a corresponding one of the position-detecting magnets, and detecting signals from the magnetic poles of the corresponding position-detecting magnet, so that in accordance with respective detected signals of positions of the poles of the position-detecting magnets from said respective group of the position sensors, an electric current is caused to flow into the stator armature facing the thrust-generating field magnet of said moving element having said position-detecting magnet so as to generate thrust, which causes said detected moving element to move in a predetermined direction, whereby said moving elements are energized and controlled to travel separately and independently.



5,023,496

LINEAR MOTOR

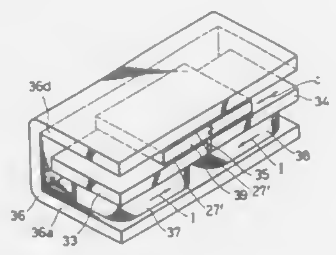
Hideo Niikura, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Division of Ser. No. 149,698, Jan. 29, 1988, Pat. No. 4,883,994, which is a division of Ser. No. 918,151, Oct. 14, 1986, Pat. No. 4,803,388. This application Aug. 21, 1989, Ser. No. 395,978

Claims priority, application Japan, Oct. 28, 1985, 60-241144

Int. Cl.⁵ H02K *41/00*

U.S. Cl. 310—12 8 Claims



1. A linear motor, comprising:

a first yoke having a first connecting portion extending therefrom;

a second yoke spaced apart the predetermined width of a first gap from said first yoke, said second yoke including a second connecting portion extending therefrom;

a first coil wound around said first connecting portion of said first yoke;

a second coil wound around said second connecting portion of said second yoke;

a third yoke substantially of a U-shape having upper and lower flanges, said lower flange of said third yoke being connected to said first and second connecting portions, said upper flange of said third yoke being spaced from said first and second yokes and being on an opposite side of said first and second yokes from said lower flange so that said first and second yokes are between said upper and lower flanges; and

a magnet provided in opposed relation with and spaced apart the predetermined width of a second gap from said first and second yokes, said magnet being between said upper flange and said first and second yokes.

5,023,497

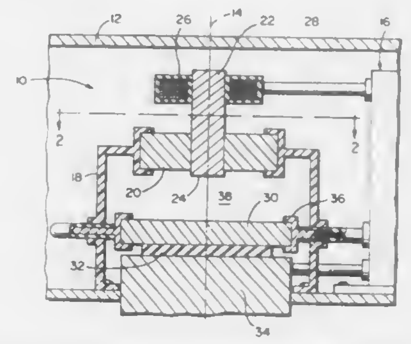
MAGNETIC FORCE GENERATING SYSTEM

Franklin C. Pereny, 320 Lake Ave., Lancaster, N.Y. 14086

Filed Dec. 7, 1987, Ser. No. 129,522

Int. Cl.⁵ H02K *33/10*

U.S. Cl. 310—36 3 Claims



1. A device for transmitting intermittent thrust, said device comprising:

a force transmitting frame for applying intermittent thrust,

a holding member secured to said frame,

an annular member fixedly mounted to said frame by said holding member, said annular member being made of a lightweight material having low magnetic reluctance property,

a magnet extending through said annular member and terminating at one axial end in a magnetic pole face,

an electromagnetic coil assembly mounted on said magnet adjacent an axial end opposite to said one axial end,

power control means connected to said electromagnetic coil assembly for varying a generated magnetic field,

a circular plate in axially spaced alignment with said coil assembly and said annular member, said circular plate being of a superconductive material, said power control means being connected to said plate for cyclically energizing said plate,

a reference base,

an insulative spacer for spacing said circular plate from said base so that upon energization of said coil assembly, a magnetic field is generated with magnetic flux emitted from said one axial end into a flux gap located between said annular member and said plate and upon simultaneous energization of said plate under superconductivity conditions, a magnetic field repelling effect will generate a repelling force applied to said frame through said holding member during limited duration time periods occurring cyclically under control of said power control means, resulting in axial displacement of said force transmitting frame.

5,023,498

FLEXIBLE CIRCUIT BOARD FOR MOTOR POSITION ADJUSTMENT

Youji Abe, Kiyose, Japan, assignor to Teac Corporation, Tokyo, Japan

Filed Jul. 16, 1990, Ser. No. 552,793

Claims priority, application Japan, Jul. 17, 1989, 1-83722

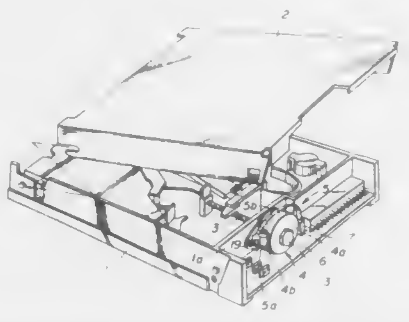
Int. Cl.⁵ H02K *5/26;* **G11B** *5/54*

U.S. Cl. 310—71 3 Claims

1. A flexible circuit board electrically connecting an external circuit and a motor and loosely wound around an outer surface of the motor, wherein a body of said motor must be rotated at a time of adjusting a setting position thereof, said flexible circuit board comprising:

- a first connection portion provided on an end of said flexible circuit;
- a second connection portion provided on another end of said flexible circuit, said second connection portion being connected to said external circuit; and
- a coupling portion provided between said first and second connection portions, said coupling portion being loosely wound around the outer surface of said motor,

said first connection portion comprising:



- a first portion fixed to a terminal block which is provided on the outer surface of said motor, and
- a second portion integrated with said coupling portion and connecting said first portion and said coupling portion, said second portion being bent in accordance with bending of said coupling portion when said first portion is fixed to said terminal block of said motor,

wherein said first connection portion has a slit which divides said first connection portion into said first and second portions.

5,023,499
EDDY CURRENT TYPE BRAKE SYSTEM

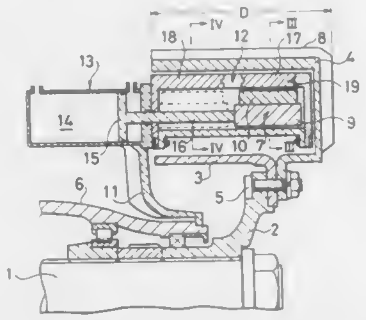
Touru Kuwahara, Kawasaki, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Aug. 28, 1990, Ser. No. 573,949

Claims priority, application Japan, Aug. 28, 1989, 1-218498

Int. Cl.^{5} H02K *49/04*

U.S. Cl. 310—105 **10 Claims**



1. An eddy current type brake system adapted to a vehicle, the vehicle having a shaft rotating with an engine of the vehicle, comprising:
- a rotor connected to the shaft, the rotor having an axial direction;
- a stator provided inside the rotor in a manner such that the stator can move in the axial direction of the rotor, the stator having a circumferential direction;
- magnets mounted on the stator in the circumferential direction of the stator at intervals in a manner such that polarities of the magnets are reversed alternately;
- braking means formed between the stator and the rotor for magnetically connecting the magnets on the stator with the rotor to apply a brake force to the rotor; and
- brake releasing means formed between the stator and the rotor for magnetically disconnecting the magnet from the rotor to release the rotor from the brake force.

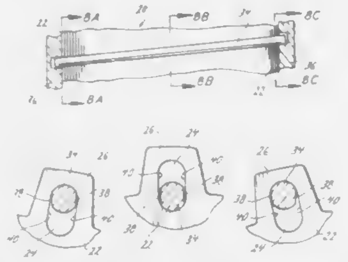
5,023,500
STATOR LAMINATION WITH ALIGNMENT STRUCTURE FOR CONTROLLED SKEWING

Hollis D. Sisk, Chesterfield, Mo., assignor to Century Electric, Inc., St. Louis, Mo.

Filed Apr. 21, 1989, Ser. No. 341,167

Int. Cl.^{5} H02K *15/02*

U.S. Cl. 310—218 **20 Claims**



1. In a skewed stator core of a dynamoelectric machine comprising a plurality of plate-type laminations, each of said laminations having a plurality of winding slots so that as said laminations are stacked in a first substantially axially aligned orientation said slots align with each other to facilitate the automatic placement therein of an electrically conductive winding, the improvement comprising means for positively mechanically constraining the stator laminations to thereby maintain their relative orientation in a first substantially axially aligned orientation to facilitate their winding, said constraining means having means for retaining the relative alignment of the laminations while permitting relative radial movement between it and said laminations as the laminations are moved from said first substantially axially aligned orientation to a second substantially skewed orientation.

5,023,501
HORIZONTAL AXIS ELECTRICAL MACHINE WITH RADIAL SUPPORT BOLTS

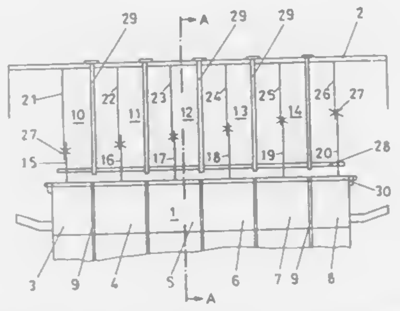
Hans Zimmermann, Mönchaltorf, Switzerland, assignor to Asea Brown Boveri Ltd., Baden, Switzerland

Filed May 18, 1990, Ser. No. 524,907

Claims priority, application Switzerland, Jul. 4, 1989, 2483/89

Int. Cl.^{5} H02K *1/18, 15/14*

U.S. Cl. 310—258 **4 Claims**



1. A horizontal axis electrical machine comprising:
- a housing comprising an inner cylindrical surface with a given radius, said surface defining a first cylindrical axis, said housing oriented so that said first axis is horizontal;
- plates connected at said inner surface, said plates having major surfaces which are parallel to at least one radially outward pointing line which passes through said plate;
- bolts pointing radially inward secured to said housing by fastening means comprising said plates;

- a constructional unit comprising a laminated stator core, mounting wedges, support bars, and spaced apart rings;
- said laminated stator core having a generally cylindrical outer surface which defines a second cylindrical axis and an outer stator core diameter, said unit oriented so that said second axis is horizontal;
- said wedges connected at said outer surface;
- said spaced apart rings having a ring outer diameter and a ring inner diameter, said ring inner diameter is larger than said stator core diameter, said rings are positioned to have said stator core inside said inner diameter, and said rings are connected at said wedges to said stator core;
- said support bars spaced apart from said stator core and extending parallel to said second axis are connected at said rings, said bars symmetrically spaced around a vertical plane defined by said second axis and the vertical direction;
- said first axis substantially coaxial with said second axis, and said unit substantially inside said inner cylindrical surfaces; and
- bolts pointing radially inward and secured to said housing by fastening means comprising said plates, and secured to said unit by fastening means comprising said bars, thereby accommodating large tolerances in alignment of said unit and said housing while rigidly holding said stator core in circumferential directions, and elastically holding said stator core in said axial direction.

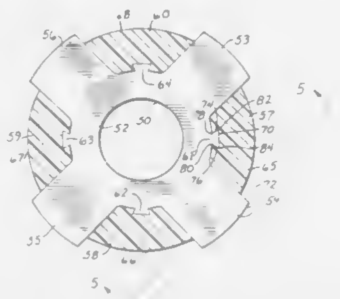
5,023,502
SWITCHED RELUCTANCE MOTOR ROTOR

J. Herbert Johnson, Tipp City, Ohio, assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Oct. 31, 1989, Ser. No. 429,823

Int. Cl.^{5} H02K *1/22*

U.S. Cl. 310—261 **9 Claims**



1. A switched reluctance motor rotor comprising a central annular hub having a plurality of rotor poles extending radially outwardly from said hub, said rotor poles being circumferentially spaced and having gaps therebetween, retention structure on said hub in said gaps, and electrically insulating material in said gaps and retained therein by said retention structure, wherein said rotor comprises a plurality of rotor laminations stacked axially to form a laminated stack, and wherein said retention structure comprises a tang integrally formed with each of said rotor laminations and extending from said hub into a respective one of said gaps.

5,023,503
SUPER HIGH FREQUENCY OSCILLATOR/RESONATOR

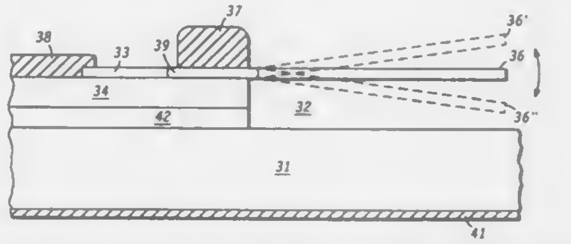
Ronald Legge, Scottsdale, and Curtis D. Moyer, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 3, 1990, Ser. No. 460,454

Int. Cl.^{5} H01L *41/08*

U.S. Cl. 310—311 **19 Claims**

7. A series resonator comprising: a conductive layer; a piezoelectric layer formed on top of the conductive layer which extends beyond the conductive layer to form a beam, wherein the beam is free to vibrate at a resonant frequency; a first electrode formed on the piezoelectric layer for stimulating a vibration in the piezoelectric layer; a semi-insulating region under the first electrode; a second electrode coupled to the conductive layer, whereby piezoelectric charge couples electric signals of the resonant frequency across the semi-insulating region.



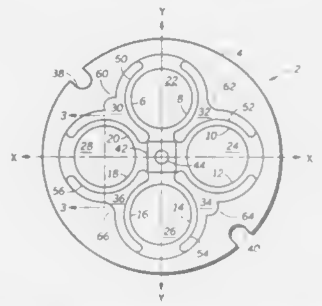
5,023,504
PIEZO-ELECTRIC RESONANT VIBRATOR FOR SELECTIVE CALL RECEIVER

Charles W. Mooney, Lake Worth, and Irving H. Holden, Boca Raton, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 26, 1990, Ser. No. 514,981

Int. Cl.^{5} H01L *41/04*

U.S. Cl. 310—322 **21 Claims**



1. A piezoelectric resonant vibrator, comprising:

an armature having
- a planar circular perimeter region,
- a planar central region, and
- a plurality of planar circular spring members, arranged regularly around said central region within said perimeter region, and coupled to said perimeter region and to said central region;
- a weight, coupled to said central region, said weight including a magnetic member for maintaining tension on said armature;
- actuator means, coupled to said perimeter region, for inducing movement of said armature at a predetermined resonant frequency; and
- a housing, comprising an upper member and a lower member, coupled to said perimeter region, for enclosing and supporting said armature.

5,023,505
ELECTRIC LAMP WITH IMPROVED FRAME SUPPORT AND METHOD OF PRODUCING SAME

Paul A. Ratliff, Hazelwood, Mo., and Robert J. Karlotski, Richmond Hts, Ohio, assignors to GTE Products Corporation, Danvers, Mass.

Filed Dec. 20, 1989, Ser. No. 453,537

Int. Cl.^{5} H01J *61/34, 9/34*

U.S. Cl. 313—25 **32 Claims**

1. An electric lamp, comprising:
- a sealed outer glass envelope;

VOL
1127
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2
JE
11
1991
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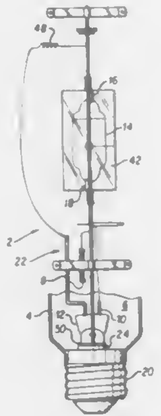
a pair of electrical conductors sealed into and passing through said outer glass envelope;
disposed within said outer glass envelope and electrically connected to a respective electrical conductor of said pair of electrical conductors for converting electrical energy into light, said pair of electrical conductors and said converting means comprising an electrical circuit within said outer glass envelope;
a lamp base mechanically connected to said outer glass envelope and electrically connected to said pair of electrical conductors;



a support means disposed within said outer glass envelope for supporting said converting means therein from a stem of said outer glass envelope, said support means being electrically isolated from said electrical circuit and comprising a support member supported relative to said stem at one end of said support member by a stem clip; and
inert means interposed between said stem clip and said stem for providing resiliency and a friction fit between said stem clip and said stem.

5,023,506

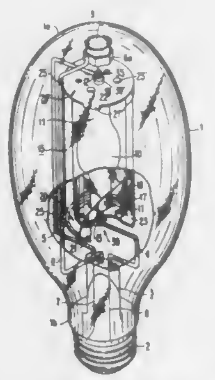
EXPLOSION PROOF HIGH PRESSURE DISCHARGE LAMP

Joseph E. Canale, Painted Post; John P. Dunn, and William R. Narby, both of Hammondsport, all of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Filed Dec. 28, 1989, Ser. No. 458,111

Int. Cl.^{5} H01J *61/34, 17/28, 17/34*

U.S. Cl. 313—25 19 Claims



10. A high pressure metal halide discharge lamp having an outer envelope,
a quartz glass discharge vessel arranged within said outer envelope, said discharge vessel having sealed ends sealing said discharge vessel in a gas-tight manner, a pair of discharge electrodes arranged with said discharge vessel, a pair of lead-throughs each connected to a respective electrode and extending through a respective sealed end to the exterior, and an ionizable fill material within said discharge vessel comprising mercury, sodium, and a metal halide, said ionizable fill material developing a pressure of greater than one atmosphere during lamp operation,
wherein the improvement comprises:
a containment sleeve circumferentially surrounding and extending the length of said discharge vessel for containing fragments of said discharge vessel in the event of an explosive failure of said discharge vessel, said containment sleeve having opposing open ends each adjacent a respective sealed end of said discharge vessel;
a pair of metallic end caps for holding a respective open end of said containment sleeve, said end caps having sufficient mechanical strength for containing fragments of said discharge vessel which would otherwise escape out said open ends of said containment sleeve and impinge on said outer envelope, each end cap having a central aperture;
a pair of insulative members disposed in said end cap apertures, each insulative member having a bore through which a respective discharge vessel lead-through extends, said insulating members electrically insulating said lead-throughs from said ends caps; and
a metallic support extending longitudinally within the lamp envelope,
each of said end caps being fixed to said metallic support with said containment sleeve extending between and held by said end caps, said discharge vessel being enclosed by said containment sleeve and said end caps, and
energizing means for energizing said discharge vessel to ionize said fill material to emit light.

5,023,507

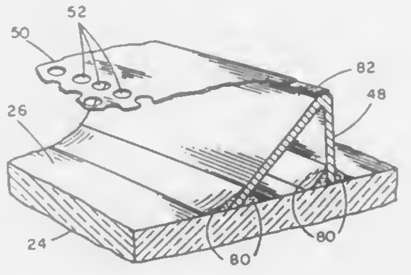
TENSION MASK COLOR CATHODE RAY TUBE WITH IMPROVED COLOR SELECTION ELECTRODE SUPPORT STRUCTURE

Lawrence W. Dougherty, Sleepy Hollow, and William N. Roberts, Niles, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Division of Ser. No. 26,926, Mar. 17, 1987. This application Dec. 29, 1989, Ser. No. 459,034

Int. Cl.^{5} H01S *29/07*

U.S. Cl. 313—407 6 Claims



1. A color cathode ray tube having a faceplate assembly including a flat glass faceplate having on its inner face a centrally disposed phosphor screen, and a metal color selection electrode support structure located on opposed sides of said screen and secured to said inner face, said support structure having secured thereon by meltable filler metal means a planar metal foil color selection electrode in tension.

5,023,508

IN-LINE TYPE ELECTRON GUN FOR COLOR CATHODE RAY TUBE

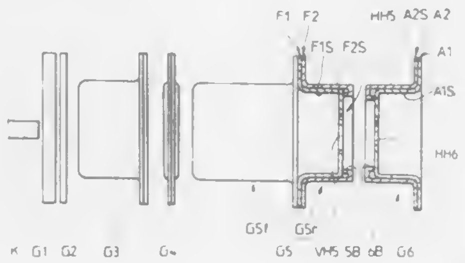
In-gyu Park, Suwon, Rep. of Korea, assignor to Samsung Electron Devices Co., Ltd., Rep. of Korea

Filed Dec. 6, 1989, Ser. No. 446,819

Claims priority, application Rep. of Korea, Dec. 15, 1988, 88-20777

Int. Cl.^{5} H01J *29/51*

U.S. Cl. 313—414 2 Claims



1. An in-line type electron gun for a cathode ray tube comprising:
a triode including a cathode, a control grid, and a screen grid; and
a main lens including a final focus electrode and an anode forming a major lens of said main lens, at least one of said final focus electrode and anode including:
a cup-shaped first member having a first tubular skirt and a first bottom plate depending from said first tubular skirt including three independent beam passing holes disposed at a beam passing plane of said first member; and
a second member having a second tubular skirt and a second bottom plate depending from said second tubular skirt and including a common beam passing hole disposed at a beam passing plane of said second member and a peripheral rim projecting into said second tubular skirt at the periphery of the common beam passing hole, said first tubular skirt being disposed tightly fitting within and contacting said second tubular skirt with said first bottom plate abutting and contacting said rim.

5,023,509

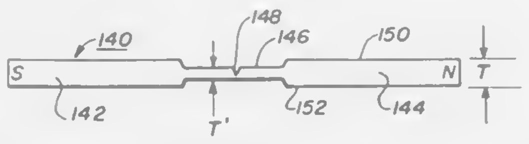
COLOR CRT-YOKE COMBINATION HAVING CONFORMING CORRECTIVE MAGNETIC FIELD MEANS ATTACHED TO THE CRT

Samuel B. Deal, Lancaster, Pa., and James A. Calamari, Jr., Marion, Ind., assignors to RCA Licensing Corp., Princeton, N.J.

Filed Oct. 27, 1989, Ser. No. 427,403

Int. Cl.^{5} H01J *29/70*

U.S. Cl. 313—430 13 Claims



1. In combination, a color cathode-ray tube having a glass envelope, means for producing magnetic fields positioned on said envelope and at least one semi-flexible corrective magnetic field means attached to a curved portion of said envelope, said corrective magnetic field means having a given thickness, the improvement wherein said corrective magnetic field means comprises
at least one portion of reduced thickness formed therein to provide an increase in flexibility of said corrective magnetic field means to provide conformity to said curved portion of said envelope.

5,023,510

PICTURE TUBE HAVING AN ELECTRO-MAGNETIC DEFLECTION UNIT

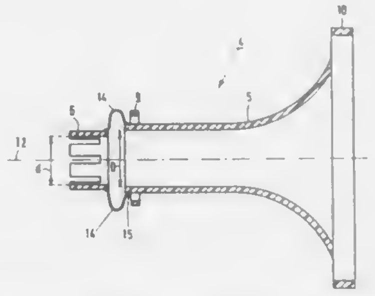
Adriaan J. Groothoff, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 19, 1989, Ser. No. 354,006

Claims priority, application Netherlands, Jun. 20, 1988, 8801566

Int. Cl.^{5} H01J *29/70*

U.S. Cl. 313—440 6 Claims



1. A picture tube assembly comprising a picture tube and an electro-magnetic deflection unit including deflection coils which are supported by a coil holder disposed on the picture tube, which picture tube has a neck and a funnel-shaped envelope portion and which coil holder has a narrow end and a flared end, the narrow end of the coil holder being clamped by means of a cylindrical connection member onto the neck of the picture tube and the flared end of the coil holder being positioned on the funnel-shaped envelope portion of the picture tube and the coil holder being tiltable around first and second mutually perpendicular axes, each of which is perpendicular to a longitudinal axis of the coil holder, characterized in that the cylindrical connection member is flexibly connected to the narrow end of the coil holder with the aid of connection members which are positioned as diametrically opposite pairs on each of said first and second axes.

5,023,511

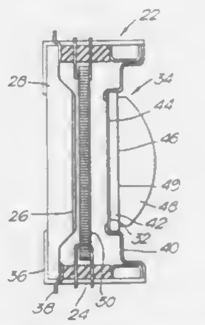
OPTICAL ELEMENT OUTPUT FOR AN IMAGE INTENSIFIER DEVICE

Earle N. Phillips, Roanoke, Va., assignor to ITT Corporation, New York, N.Y.

Continuation of Ser. No. 265,368, Oct. 27, 1988, abandoned. This application Jun. 25, 1990, Ser. No. 541,203

Int. Cl.^{5} H01J *40/16, 31/50*

U.S. Cl. 313—524 7 Claims



1. An image intensifier device comprising:
an input window formed of optical material and having a planar light receiving surface and an opposed planar light transmitting surface;
photoemissive means on said light transmitting surface for emitting electrons in response to light received at said photoemissive means;
amplifying means positioned adjacent said photoemissive

VOL
1127
ISS
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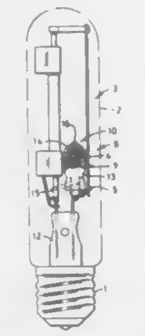
1991
UMI

means for amplifying the number of electrons emitted from said photoemissive means;

converting means positioned adjacent said amplifying means for converting the energy from said amplified electrons to light to form an image at an output screen thereof; and

an output element for outputting the image from said converting means having means for preventing refections of the image between said output element and said planar light transmitting surface of said input window in the form of a flat plano glass element having an input surface positioned adjacent the output screen of said converting means and an output surface in parallel therewith, and a plano-curved lens element having a planar first surface in parallel with said planar light transmitting surface of said input window and being joined to the output surface of said flat plano glass element for receiving the image from said converting means and a curved second surface for transmitting the image therefrom without such reflections.

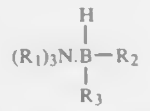
5,023,512
GETTER MEANS AND LAMP INCLUDING SAME
Walter A. L. Schaaf, Diest, Belgium, assignor to GTE Sylvania N.V., Tienen, Belgium
Filed Sep. 29, 1989, Ser. No. 414,891
Claims priority, application European Pat. Off., Sep. 30, 1988, 88202147.0
Int. Cl.^{5} **H01J** *17/24, 19/70, 61/26*
U.S. Cl. 313—560 24 Claims



1. A lamp comprising an evacuated outer envelope, a light source capsule mounted within the evacuated outer envelope, and getter means disposed within the evacuated outer envelope, the getter means including a getter and protection means for protecting lamp parts during flashing of the getter, the protection means comprising an envelope having an opening, the getter being disposed within the envelope.

5,023,513
AMINE-ALKYLBORANE DERIVATIVES AND METHODS
Bernard F. Spielvogel, Raleigh, and Anup Sood, Durham, both of N.C., assignors to Boron Biologicals, Inc., Raleigh, N.C.
Filed Jun. 9, 1989, Ser. No. 364,650
Int. Cl.^{5} **A61K** *31/69;* **C07F** *5/02*
U.S. Cl. 514—64 12 Claims

1. An amine-alkylborane derivative corresponding to the general formula:

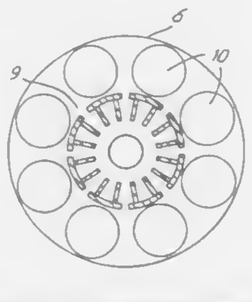


$$(R_1)_3N.\underset{R_3}{\overset{H}{B}}-R_2$$

wherein R_1 is simultaneously or independently H, CH_3, or CH_2CH_3, with the proviso that when $(R_1)_3N$ is a primary amine, the alkyl R_1 can be C_1–C_{10} linear alkyl; R_2 is C_1–C_{10} alkyl or corresponds to the R group of the common amino acids; and R_3 is I, CN, $CNCH_2CH_3+BF_4$—or $C(O)N(H)CH_2CH_3$.

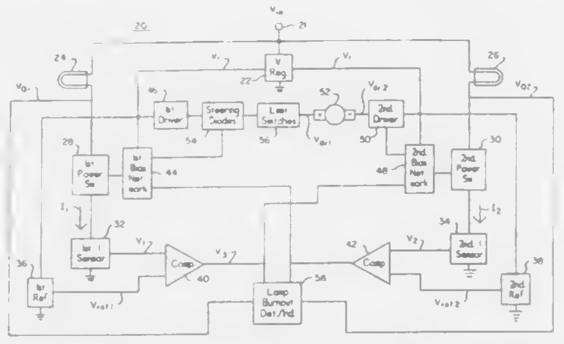
8. A method for inducing antineoplastic activity in an animal comprising administering a therapeutic amount of an amine-alkylborane derivative.

5,023,514
COAXIAL MAGNETRONS WITH DIELECTRICALLY LOADED OUTPUT CAVITY
Melvin G. England, Asbford Common, England, assignor to Thorn Microwave Devices Limited, Hayes, England
Filed Apr. 18, 1989, Ser. No. 339,731
Claims priority, application United Kingdom, Apr. 19, 1988, 8809218
Int. Cl.^{5} **H01J** *25/55*
U.S. Cl. 315—39.51 5 Claims



1. A coaxial magnetron comprising a cathode arranged on a longitudinal axis of the magnetron; a coaxial anode wall surrounding the cathode and having a plurality of anode vanes arranged at regular intervals around, and extending radially inwards towards said cathode, the region between each pair of adjacent anode vanes defining a respective resonant cavity; a coaxial cavity surrounding all the resonant cavities and coupled to each said resonant cavity by a respective slot in the anode wall; and a quantity of a dielectric material disposed within said coaxial cavity, the quantity having a substantially fixed position and orientation with in the cavity, and wherein said quantity of dielectric material is so distributed within said coaxial cavity as to be substantially shielded, in operation of the magnetron, from cathode emission products.

5,023,515
REDUNDANT LAMP CONTROL CIRCUIT
Thomas E. Olon, Fairview, and Carl C. Krihwan, Erie, both of Pa., assignors to American Sterilizer Company, Erie, Pa.
Filed Mar. 16, 1990, Ser. No. 495,236
Int. Cl.^{5} **F21V** *19/04*
U.S. Cl. 315—88 5 Claims



1. A circuit for energizing one of a first and second lamps and for energizing a motor to position the energized lamp, said circuit comprising:

first and second switch means for supplying current to the first and second lamps, respectively;

first and second current sensing means for producing first and second signals, respectively, when the first and second lamps are energized;

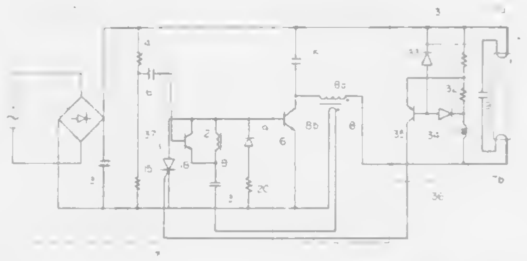
a first driver responsive to said second signal for providing a driving current to the motor when the second lamp is energized;

a second driver responsive to said first signal for providing a driving current to the motor when the first lamp is energized;

a first biasing network responsive to said second signal for inhibiting the operation of said first switch means; and

a second biasing network responsive to said first signal for inhibiting the operation of said second switch means.

5,023,516
DISCHARGE LAMP OPERATION APPARATUS
Kazuhiko Ito, Hirakata; Kouji Miyazaki, Yawata; Masakatsu Kichibayashi, Sakaide; Shigeru Horii, Takatsuki, and Masataka Ozawa, Takarazuka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed May 3, 1989, Ser. No. 346,940
Claims priority, application Japan, May 10, 1988, 63-114455; Jun. 6, 1988, 63-138813; Aug. 1, 1988, 63-192528
Int. Cl.^{5} **H05B** *39/00*
U.S. Cl. 315—101 20 Claims



1. A discharge lamp operation apparatus comprising:

a power source having a predetermined polarity of output voltage;

a switching circuit connected to an output of said power source, possessing at least one switch with control terminal, inductor, and capacitor, said switching circuit designed to start and operate a discharge lamp connected to said output by turning said power source on and off and to control an electric current of the discharge lamp in the forward direction by means of said at least one switch;

a driving circuit connected to said at least one switch;

a voltage detecting circuit having at least one inductor connected in parallel to the discharge lamp, and designed to detect the lamp voltage of the discharge lamp by detecting the current flowing in the inductor, and

a control circuit for receiving an output signal from said voltage detecting circuit and for delivering a signal to said driving circuit so as to turn off said switch.

5,023,517
LIGHT CONTROLLER APPARATUS
Ladislav Husak, 8100 Park Plz., #248, Stanton, Calif. 90680
Filed May 15, 1989, Ser. No. 351,713
Int. Cl.^{5} **H05B** *37/00*
U.S. Cl. 315—200 A 17 Claims

1. A control apparatus comprising,

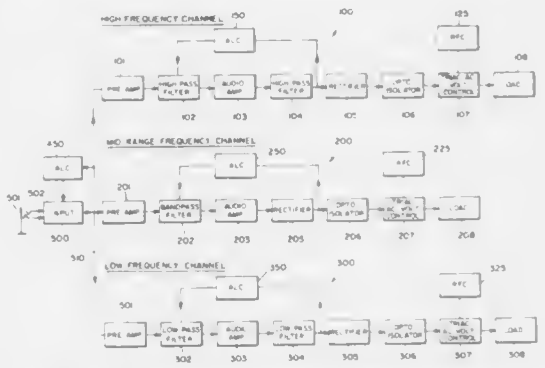
input signal receiving means,

a plurality of signal processing channels connected to said input signal receiving means,

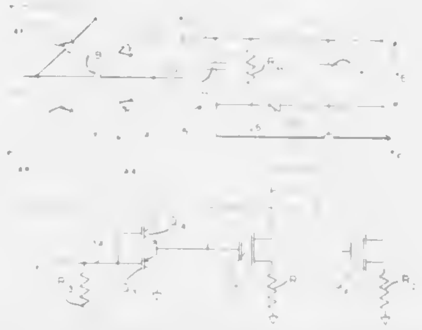
each of said signal processing channels operative to process signals of different frequency bands,

separate automatic channel level controller means included in each of said signal processing channels, and

automatic input level controller means connected to said input signal receiving means and operative to automatically control the level of signals at said input signal receiving means.



5,023,518
BALLAST CIRCUIT FOR GASEOUS DISCHARGE LAMP
Wayne K. Mans, Bridgewater, and Vincent J. Rizzo, Basking Ridge, both of N.J., assignors to Joseph A. Urda, Basking Ridge, N.J.
Filed Dec. 12, 1988, Ser. No. 283,255
Int. Cl.^{5} **H05B** *37/02, 41/16, 39/04;* **G05F** *1/00*
U.S. Cl. 315—219 22 Claims



1. An electronic ballast circuit for energizing a gaseous discharge lamp, comprising in combination:

power source means for producing a d-c voltage;

power supply means including a transformer operatively connected to said power source means and operatively connectable to the gaseous discharge lamp for transferring electrical power thereto from said power source means;

switching means connected to said power supply means for controlling a flow of current from said power source means through said power supply means, said switching means including at least one MOSFET having a drain terminal connected to said power supply means and a grounded source terminal;

control means connected to a gate terminal of said MOSFET for controlling the on and off times of said switching means, said control means including pulse generation means for generating a train of pulse-width-modulated rectangular pulses of substantially a single frequency fed to said gate terminal; and

discharge means operatively connected to said supply means for discharging said transformer during an off period of said MOSFET, said discharge means including a resistor and a capacitor connected in parallel across a primary winding of said transformer.

VOL
1127
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1991
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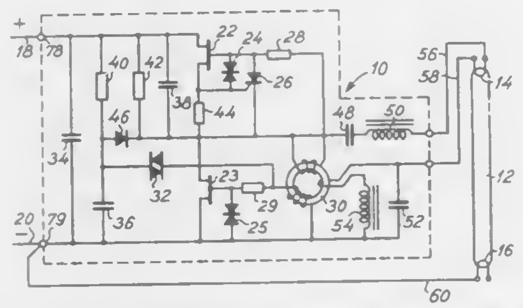
5,023,519
CIRCUIT FOR STARTING AND OPERATING A GAS DISCHARGE LAMP

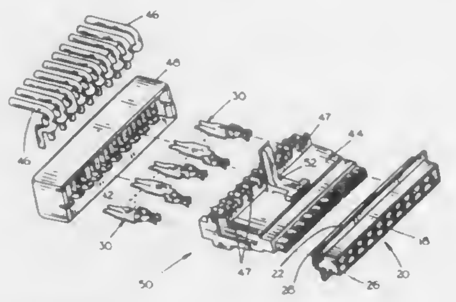
Kaj Jensen, Kaerparken, 4, DK-2800 Lyngby, Denmark
PCT No. PCT/DK87/00092, § 371 Date May 16, 1988, § 102(e) Date May 16, 1988, PCT Pub. No. WO88/00788, PCT Pub. Date Jan. 28, 1988
PCT Filed Jul. 16, 1987, Ser. No. 165,104
Claims priority, application Denmark, Jul. 16, 1986, 3395/86
Int. Cl.⁵ H05B *41/24, 41/36*
U.S. Cl. 315—242 **22 Claims**



1. A circuit for starting and operating a gas discharge lamp, comprising:
- a series-resonance circuit comprising a first capacitator and a first inductor;
- a parallel-resonance circuit, comprising a second capacitor and a second inductor, said series-resonance circuit having a resonance frequency lower than that of said parallel-resonance circuit; and
- oscillator means, connected to said series-resonance circuit, for generating and supplying an oscillator signal of a specific oscillator frequency, substantially identical to said resonance frequency of said parallel-resonance circuit, to said gas discharge lamp through said series-resonance circuit,
- said series-resonance circuit and said parallel-resonance circuit being connected in a series configuration.

5,023,520
BALLAST CONNECTOR

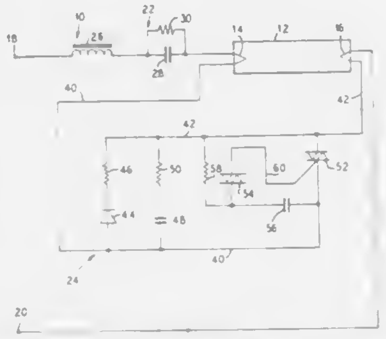
Larry J. Costa, Danville, Ill., assignor to Valmont Industries, Inc., Valley, Nebr.
Filed Jul. 6, 1990, Ser. No. 549,265
Int. Cl.⁵ H05K *5/04*
U.S. Cl. 315—276 **16 Claims**



1. In combination,
- a ballast for a fluorescent light including a case portion having the ballast components positioned therein and a base secured to said case portion, at least some of said ballast components having an elongated conductor extending therefrom, said case portion including opposite ends, one end of said case portion having an opening formed therein,
- an internal connector housing means positioned in said opening and having an inner end positioned in said case portion and an outer end positioned outwardly of said case portion, said internal connector means having a plurality of elongated openings formed therein which receive the elongated conductors extending therethrough,
- an external connector housing means having inner and outer ends and having its inner end positioned adjacent the outer end of said internal connector housing means,
- a plurality of connector terminals in said external connector housing means having inner and outer means,
- the inner ends of said connector terminals being selectively removably secured to predetermined conductors,
- the outer ends of said connector terminals adapted to have service leads selectively removably secured thereto,
- and a lead wire retainer means at the outer end of said external connector housing means for retaining the service leads in said connector terminals.

5,023,521
LAMP BALLAST SYSTEM

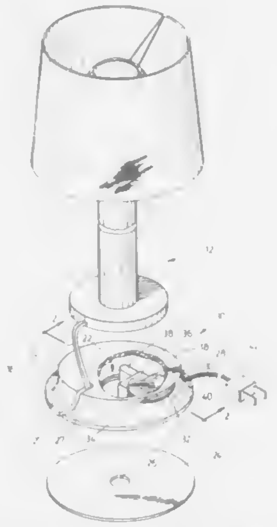
Sri P. Sridharan, Hickory Hills, Ill., assignor to Radionic Industries, Inc., Chicago, Ill.
Filed Dec. 18, 1989, Ser. No. 451,612
Int. Cl.⁵ H05B *41/16*
U.S. Cl. 315—290 **15 Claims**



1. A ballast circuit for a fluorescent lamp, comprising:
- means coupled between the lamp and an alternating current power supply for limiting changes in current flow to the lamp;
- means coupled between the lamp and the power supply for correcting the power factor between the lamp and the power supply and for controlling current flow in the circuit;
- electronic starter means coupled across electrodes of the lamp for providing current through said electrodes for preheating said electrodes, said starter means comprising a triac coupled across said electrodes, said triac having a trigger input coupled to a diac that in turn is coupled to a capacitor coupled to said power supply so that said triac is triggered whenever a sufficient voltage builds up across said capacitor to trigger said diac, said triac and means for limiting current changes being disposed such that termination of triggering of said triac causes a sufficient voltage pulse to be produced across said electrodes to produce an arc thereacross;
- a snubber circuit coupled across said triac and comprising a resistor and capacitor connected in series so that said starter means is prevented from latching at the triggering point of said triac; and
- a diode and resistor coupled in series to form a preheating current path which in turn is coupled across said electrodes thereby to provide additional preheat current through said electrodes during every other half cycle of said current prior to production of said arc.

5,023,522
DIMMER FOR TABLE LAMPS

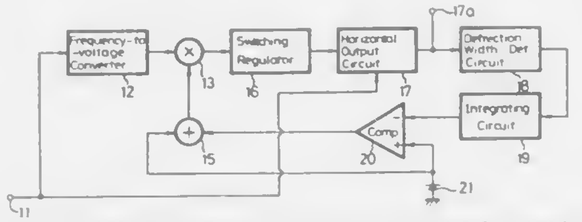
George A. Mansour, 15 Blacktoff Dr., Scarborough, Ontario, Canada
Filed Apr. 11, 1989, Ser. No. 336,137
Claims priority, application Canada, Apr. 13, 1988, 564079
Int. Cl.⁵ F21S *1/12*
U.S. Cl. 315—291 **3 Claims**



1. A dimmer for lighting devices, for use as a stand for a lighting device having an electrical cord and plug and comprising;
- a housing body defining a planer lighting device supporting surface and edge portions;
- a chamber defined within said housing body;
- a dimmer switch in said housing body,
- a manual control means comprising a rotatable shaft extending from said dimmer switch within said chamber, and a manual control on shaft, a portion of said control being accesible from the exterior of said body,
- electrical receptacle means within said body connected to said dimmer switch
- opening means in said body whereby said electrical cord from said lighting device may be inserted within said body and said plug inserted into said receptacle means;
- a storage enclosure in said chamber for receiving said cord for storing of same in said chamber, and,
- means for connecting said dimmer to a source of electrical power.

5,023,523
HORIZONTAL DEFLECTION CIRCUIT

Hideo Tomita, Chiba, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed May 16, 1990, Ser. No. 524,076
Claims priority, application Japan, May 16, 1989, 1-122447; May 16, 1989, 1-122448
Int. Cl.⁵ G09G *1/04;* **H01J** *29/70*
U.S. Cl. 315—364 **5 Claims**


Frequency-to-voltage Converter
12
×
13
Switching Regulator
16
Horizontal Output Circuit
17
17a
Deflection Width Det Circuit
18
Integrating Circuit
19
+
15
Comp
20
21
11

1. A horizontal deflection circuit for a multiple-scanning type television receiver that displays input video signals having different respective horizontal frequencies, comprising:
- detecting means for detecting a deflection width of an input video signal and producing a detected output signal;
- comparing means for comparing said detected output signal with a picture size signal proportional to a picture size of the input video signal in the horizontal direction and producing a compared output signal;
- adding means for adding said compared output and said picture size signal;
- voltage signal generating means for generating an output voltage signal proportional to the horizontal frequency of the input video signal; and
- multiplying means for multiplying an output signal of said adding means and said voltage signal and producing an output signal for controlling a horizontal output circuit of the television receiver.

5,023,524
GRID-DRIVE TYPE DISPLAY APPARATUS

Masanori Ogino; Tsuneo Fujikura; Yuji Shinagawa, and Takeo Yamada, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Aug. 16, 1989, Ser. No. 394,669
Claims priority, application Japan, Aug. 29, 1988, 63-212456
Int. Cl.⁵ G09G *1/04;* **H01J** *29/52*
U.S. Cl. 315—383 **20 Claims**

1. A grid drive-type display apparatus for applying a video signal to at least a first grid electrode of a CRT, said apparatus comprising:
- a resistor connected in series between a second grid electrode of said CRT and a second grid voltage supply source, wherein said resistor has a resistance value such that a product of a capacitance value between said second grid electrode and said first grid electrode and said resistance value is greater than a reciprocal of an angular frequency bandwidth of said video signal.

5,023,525
MAGNETIC DEFLECTION CIRCUIT WITH STABILIZED RETRACE

J. Stanley Kriz, Fairfax, Va., assignor to MegaScan Technology, Inc., Littleton, Mass.
Filed Apr. 3, 1990, Ser. No. 504,347
Int. Cl.⁵ G01S *1/16*
U.S. Cl. 315—408 **11 Claims**

1. A deflection circuit, comprising:
- a magnetic deflection inductor;
- switch means for selectively energizing said magnetic deflection inductor;
- a first capacitor connected to said magnetic deflection inductor forming a resonant circuit having a resonant period;
- diode means for providing a continued first flow of current in said magnetic deflection inductor at the end of said retrace period; and

VOL
1127
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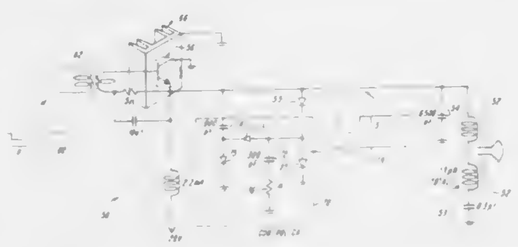
conduction control means connected to said diode means, for initiating a second flow of current through said diode means before the end of said retrace period and terminating the second flow of current through said diode means at the end of said retrace period and substantially before



said switch means begins to energize said magnetic deflection inductor, wherein the second flow of current through said diode means is absent for at least the majority of the period between the end of said retrace period and the beginning of energization of said magnetic deflection inductor by said switch means.

5,023,526

VIBRATORY MOTOR

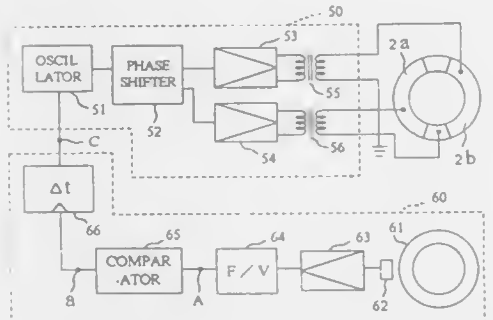
Yasuo Kuwabara; Naofumi Fujie, both of Nagoya, Japan, and Takao Saeki, Farmington Hills, Mich., assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Oct. 17, 1989, Ser. No. 422,907

Claims priority, application Japan, Oct. 31, 1988, 63-276587; Jan. 25, 1989, 1-15499

Int. Cl.^{5} H01L *41/08*

U.S. Cl. 318—116 5 Claims



1. A vibratory motor for generating a traveling wave comprising:

a stator member;

a vibrating member fixed to the stator member and generating the traveling wave;

a rotor member in contact with the stator member and driven by the traveling wave on the stator member;

oscillating means for generating the traveling wave on the stator member;

detecting means for detecting a rotational speed of the rotor member;

control means including a comparator for stopping oscillation of the oscillating means when the rotational speed of the rotor is less than a predetermined speed;

delaying means for oscillating the oscillating means for a predetermined time when the rotational speed is less than the predetermined speed; and

restart means for restarting the oscillating means after a predetermined period of time.

5,023,527

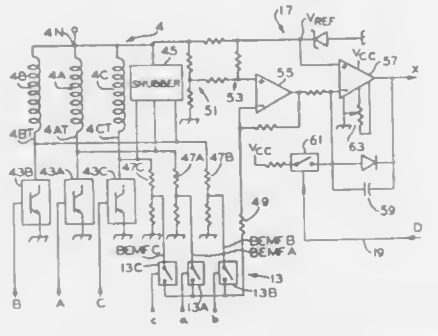
CONTROL CIRCUITS, ELECTRONICALLY COMMUTATED MOTOR SYSTEMS AND METHODS

David M. Erdman; James A. Beatty, and Amritlal H. Patel, all of Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.

Continuation of Ser. No. 200,766, May 31, 1988, abandoned, which is a continuation-in-part of Ser. No. 15,409, Feb. 17, 1987, Pat. No. 4,763,347, which is a continuation-in-part of Ser. No. 463,147, Feb. 2, 1983, Pat. No. 4,654,566, which is a continuation-in-part of Ser. No. 412,421, Aug. 27, 1982, Pat. No. 4,449,079, which is a continuation of Ser. No. 141,267, Apr. 17, 1980, abandoned, which is a continuation-in-part of Ser. No. 77,656, Sep. 21, 1979, abandoned, which is a continuation-in-part of Ser. No. 802,484, Jun. 1, 1977, Pat. No. 4,169,990, which is a continuation-in-part of Ser. No. 729,761, Oct. 5, 1976, abandoned, which is a continuation-in-part of Ser. No. 482,409, Jun. 24, 1974, Pat. No. 4,005,347, which is a continuation-in-part of Ser. No. 482,407, Jun. 24, 1974, Pat. No. 4,015,182. This application Apr. 18, 1990, Ser. No. 515,317

Int. Cl.^{5} H02P *6/02*

U.S. Cl. 318—254 143 Claims



1 A control circuit for an electronically commutated motor having a rotatable assembly and further having a stationary assembly with a plurality of winding stages having terminals for energization, and switching means for applying a voltage to one or more of the terminals of the winding stages at a time and commutating the winding stages in a preselected sequence to rotate the rotatable assembly, leaving a preselected sequence of winding stages correspondingly unpowered so that a plurality of the winding stages are unpowered at some time, wherein the winding stages generate back emf signals and also couple electrical signals from each energized winding stage to the unpowered winding stages which signals can interfere with detection of back emf for position sensing purposes, the control circuit comprising:

means for selecting at least two of the unpowered winding stages which have electrical signals coupled to them that have a predetermined relationship in polarity and magnitude; and

means for producing an electrical output from the voltages on the winding stage terminals of the winding stages selected, so that the electrical signals coupled from each energized winding stage are substantially canceled when they have the predetermined relationship while the back emf is preserved for position sensing substantially free from interference from the electrical signals that are coupled from each energized winding stage to the unpowered winding stages.

14. A control circuit for an electronically commutated motor to be energized from a power source and including a stationary assembly having a plurality of winding stages connected to a neutral adapted to be electronically commutated in a preselected sequence, and a rotatable assembly associated in selective magnetic coupling relation with the winding stages, each winding stage having a terminal and a terminal voltage associated therewith, the control circuit comprising:

commutating means for applying a voltage from the power

source to energize the motor so that a winding stage is temporarily powered and another winding stage is temporarily unpowered, terminating the application of voltage to a temporarily powered winding stage in response to a first control signal and advancing in the sequence in response to a second control signal to effect rotation of the rotatable assembly;

means responsive to the terminal voltage of a temporarily unpowered winding stage for producing a sensing output which is a function of angular position of the rotatable assembly;

voltage divider means for the neutral for providing a voltage generally proportional to the voltage on the neutral to said means for producing the sensing output;

means for establishing a first electrical level representative of a first position of the rotatable assembly at which a temporarily powered winding stage is to be deenergized, and a second electrical level representative of a second position of the rotatable assembly at which said commutating means is to advance in the sequence; and

means for comparing the sensing output with the first and second electrical levels to produce the first and second control signals for said commutating means when the first and second positions are respectively reached by the rotatable assembly.

53. Control circuit for an electronically commutated motor having a rotatable assembly and further having a stationary assembly with a plurality of winding stages, and switching means for commutating the winding stages in a preselected sequence to rotate the rotatable assembly, the control circuit comprising:

shift register means having a serial input, a set of parallel inputs, a control input to select the serial input or parallel inputs for entry, and outputs for supplying a parallel digital signal representing a commutation in the sequence, said shift register means to be protected from electrical interference which could cause the outputs to supply a parallel digital signal unrepresentative of any commutation in the sequence;

means for supplying a parallel digital signal representing a particular commutation in the sequence to the set of parallel inputs of said shift register means; and

means for clocking said shift register means, said control input of said shift register means connected to respond to at least one of the outputs and said serial input connected to respond to at least one of the outputs so that if any unrepresentative parallel digital signal appears which does not represent any commutation in the sequence at the outputs of said shift register means, the unrepresentative parallel digital signal is replaced by another parallel digital signal representing a commutation in the sequence when said means for clocking next clocks said shift register means.

68. Control circuit for an electronically commutated motor having a rotatable assembly and further having a stationary assembly with a plurality of winding stages, position sensing means for repeatedly generating a sensing signal generally representative of rotation of the rotatable assembly, and commutating means responsive to the sensing signal for commutating the winding stages in a preselected sequence to energize the winding stages and thereby rotate the rotatable assembly, the control circuit comprising:

oscillator means for producing oscillator pulses;

means for frequency dividing the oscillator pulses to supply lower frequency pulses, said means for frequency dividing having a reset input for repeated resetting by said sensing signal, so that when the rotatable assembly is turning at least as fast as a predetermined spin rate the sensing signal is generated at a repetition rate for resetting that prevents the lower frequency pulses from being supplied and otherwise allows the lower frequency pulses to be supplied when the sensing signal is generated at a lower repetition rate; means responsive to the lower frequency pulses when they occur for producing an electrical signal generally representing an accumulated number of the lower frequency pulses; and

means for comparing with a predetermined value the electrical signal representing the accumulated number of the lower frequency pulses, and for supplying a disabling signal for a predetermined period of time for the commutating means after the predetermined value is reached by the electrical signal, to prevent energization of the motor during that predetermined period of time.

98. A control circuit for an electronically commutated motor having a rotatable assembly and further having a stationary assembly with a plurality of winding stages for energization, and switching means for applying a voltage from a voltage source to one or more of the winding stages at a time and commutating the winding stages in a preselected sequence to rotate the rotatable assembly at a speed dependent on the energization applied to the winding stages, the control circuit to be compatible with alternative external control devices indicating desired speed, and the control circuit comprising:

means for generating pulse width modulated pulses to control the switching means, the pulses modulated in width as a function of an analog speed control signal; and

means for supplying the analog speed control signal with respect to a common to said means for generating the pulse width modulated pulses, said means for supplying including a capacitor and active device circuit means having an input resistively connected to a terminal for the voltage source, said input also for connection to any of the external control devices, and an output resistively connected to said capacitor so that said capacitor develops the analog speed control signal when the input of said active device circuit means is connected to any of the following external control devices: A) pulse generator with a duty cycle representative of desired speed, B) variable voltage source representative of desired speed, or C) variable resistance representative of desired speed.

5,023,528

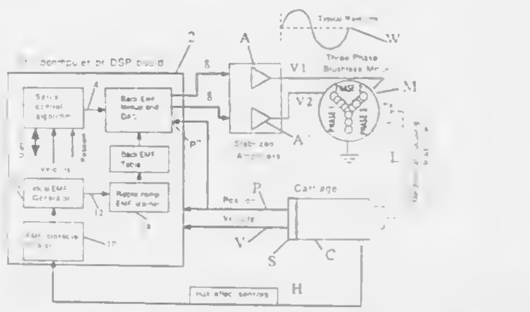
METHOD OF THREE-PHASE WINDING MOTOR CONTROL OF ROTARY MOTOR-DRIVEN LINEAR ACTUATORS, LINEAR MOTOR-ACTUATED CARRIAGES, AND SIMILAR SYSTEMS, AND APPARATUS FOR PRACTICING THE SAME

Zain Saidin, Kailua, Hi., and Alexander H. Slocum, McLean, Va., assignors to Advanced Engineering Systems, Operation & Products, Inc., Concord, N.H.

Filed Oct. 27, 1988, Ser. No. 263,502

Int. Cl.^{5} H02K *29/02*

U.S. Cl. 318—254 10 Claims



1. A method of control of a rotary electric motor having three phase windings and driving a linear actuated carriage, that comprises, generating sinusoidal waveforms that approximate the ideal back-emf of the said windings of the motor; generating a velocity or torque command signal in response to user desired location and the position and velocity of said carriage; and applying the back-emf shaped sinusoidal waveforms corresponding to two of the three phase windings of the motor and in response to such command signal to the respective said two of the windings in order to effect application on

VOL
1127
ISS
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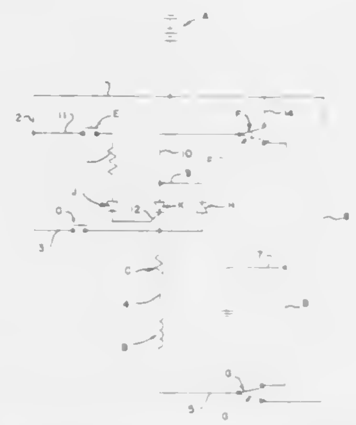
1991
UMI

all three phase windings of smooth, continuous periodic waveforms that match the shape of the back-emf of the motor at the desired motor speed, thereby smoothly moving the said carriage with compensation for nonlinearities in motor parameters and stiffness and damping.

5,023,529
CONTROL CIRCUIT
James A. Tennant, Perrysville, Ohio, assignor to Therm-O-Disc, Incorporated, Mansfield, Ohio
Continuation-in-part of Ser. No. 228,439, Aug. 5, 1988, Pat. No. 4,983,897. This application Feb. 5, 1990, Ser. No. 475,293
Int. Cl.^{5} H02P *1/22*
U.S. Cl. 318—266 **8 Claims**



1. A control circuit for connecting a load driving motor to a voltage source comprising:

first and second manually operated switches coupled to the voltage source and the motor for causing the motor to selectively drive the load in first and second directions:

an electronic switch in series with the motor and the voltage source and having a conducting and a non-conducting state;

a time constant latching circuit coupled to the electronic switch for placing the electronic switch in a conducting state to enable the motor to continuously drive the load in the first direction when the time constant latching circuit is energized; and

a third manually operated switch that is operable momentarily for energizing the time constant latching circuit.

5,023,530
WINDSHIELD WIPER MOTOR
Yasuo Ohashi, and Masao Irie, both of Yokohama, Japan, assignors to Jidosha Denki Kogyo K.K., Kanagawa, Japan
Filed May 15, 1990, Ser. No. 523,960
Claims priority, application Japan, May 16, 1989, 1-56302[U]
Int. Cl.^{5} B60S *1/08;* H01H *19/20*
U.S. Cl. 318—446 **2 Claims**

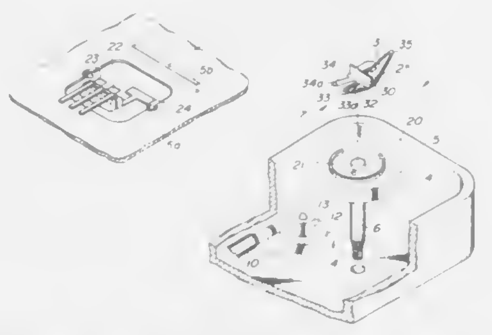
1. A windshield wiper motor comprising:

an electric motor part;

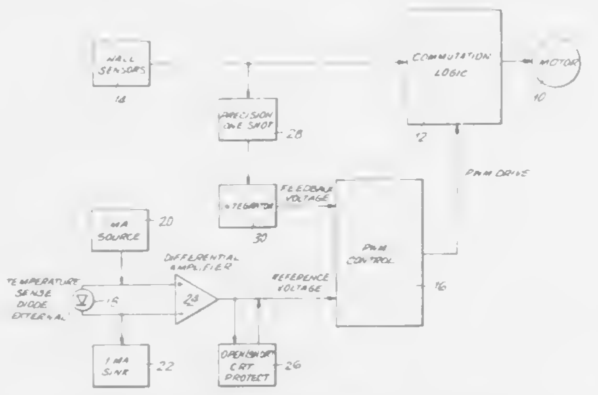
a gear case connected with said motor part and housing reduction gear for reducing rotational speed of an armature of said motor part; and

an auto-stopping switch provided to said gear case and for driving an output shaft of said reduction gear to a fixed stopping position and stopping the armature of said motor part at said stopping position by dynamic braking according to OFF-operation of a wiper switch;

said auto-stopping switch being provided with a first contact plate connected to a grounding conductor, a second contact plate connected to a power source and a third contact plate connected to a line terminal of the motor part on the inner surface of a gear cover, and provided with a contact shoe for contacting with said third contact plate at all times and for contacting with said first or second contact plate selectively by sliding on a straight line reciprocatively in accordance with rotation of the final gear of said reduction gear.



5,023,531
DUAL HYBRID DEMAND REFRIGERATION CONTROL APPARATUS
George A. Altemose, Stony Brook; Michael Consi, Deer Park; Edwin R. Joscelyn, Commack; William Wiemann, Wantagh, all of N.Y.; David B. Giguere, Palos Verdes Estates, Calif.; Wilfred J. Gully, Torrance, Calif., and Stanley E. Spencer, Palos Verdes Estates, Calif., assignors to Arx, Inc., Plainview, N.Y.
Filed May 19, 1988, Ser. No. 195,914
Int. Cl.^{5} H02P *6/02;* G05D *23/00*
U.S. Cl. 318—471 **19 Claims**



1. A temperature regulating apparatus comprising:

a brushless variable speed drive motor coupled to a cooling compressor adapted to cool a location remote from said drive motor, said drive motor including a permanent magnet rotor, a multipole stator and a stator armature with separably energizable windings for successive stator poles;

a temperature sensor at said remote location, said temperature sensor including an element whose resistance varies with the temperature thereof;

means for sensing predetermined angular positions of said rotor;

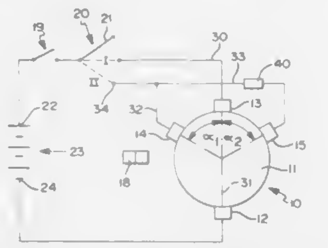
a motor control network including means for producing a first signal derived from the voltage across said temperature sensor, means for producing a second signal in response to the angular speed of said rotor, and means for feeding a constant current through said resistance varying element·

a compensation network for adjusting the response of said motor control network to the output of said temperature sensor:

means for producing a relatively high frequency pulse signal with a pulse width duty cycle being modulated in response to a predetermined relationship of said first and second signals; and

a commutation network responsive to said rotor position sensing means for energizing said pole windings in a predetermined phase relationship to the position of said rotor and at a level responsive to said high frequency pulse signal, whereby the energization of said armature is responsive to said predetermined relationship of said first and second signals.

5,023,532
DRIVE MECHANISM FOR WINDSHIELD WIPER SYSTEMS ON MOTOR VEHICLES
Werner Gakenholz, Bietigheim-Bissingen, Fed. Rep. of Germany, assignor to SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany
PCT No. PCT/EP89/00948, § 371 Date May 2, 1990, § 102(e) Date May 2, 1990, PCT Pub. No. WO90/02063, PCT Pub. Date Mar. 8, 1990
PCT Filed Aug. 11, 1989, Ser. No. 469,602
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1988, 3828176
Int. Cl.^{5} H02K *23/20;* H02P *7/00*
U.S. Cl. 318—541 **9 Claims**



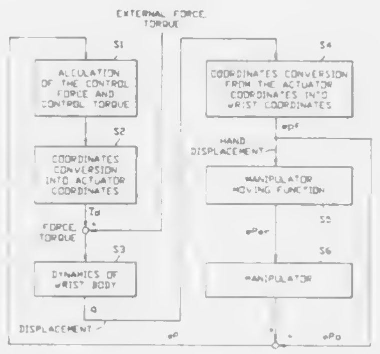
1. A drive mechanism for windshield wipers on motor vehicles comprising a d.c. motor **(10)** having at least two different speeds of operation, which d.c. motor comprises a collector **(11)**, a first and a second carbon brush **(12, 13)** resting against the collector **(11)** substantially diametrical to each other, and a third carbon brush **(14)** which, set off relative to the second carbon brush **(13)** at a defined angle, rests against the collector **(11)** on one side between the first and second carbon brush, wherein, when the d.c. motor **(10)** is operated with the first speed of operation **(I)** the first and the second carbon brush **(12, 13)** are connected to a voltage source **(23)** and, when the d.c. motor **(10)** is operated in the second speed of operation **(II)** the first and the third carbon brush **(12, 14)** are connected to said voltage source, and a fourth carbon brush **(15)** which, relative to the third carbon brush **(14)** rests against the collector **(11)** at the other side of the connecting line **(31)** between the first and second carbon brush **(12, 13)** and is connected to the voltage source **(23)** in parallel to and jointly with the third carbon brush **(14)** and including means cooperating with said fourth carbon brush for adjusting a starting torque in the second speed of operation.

5,023,533
METHOD AND SYSTEM FOR COMPLIANCE CONTROL
Hiroshi Ishikawa, Ichikawa, and Kei Kawase, Komae, both of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Feb. 9, 1990, Ser. No. 477,774
Claims priority, application Japan, Feb. 10, 1989, 1-29713
Int. Cl.^{5} G05D *11/08*
U.S. Cl. 318—568.21 **7 Claims**

1. A method for compliance control of a robot having a manipulator and a wrist body having a hand which is located at the end of the manipulator, is movable relative to the manipulator, and generates an adjustable force at the hand, comprising the steps of:

(a) determining at least the values of the position and the velocity of the hand;

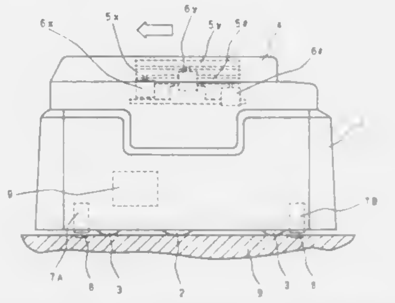
(b) determining the force to be generated at the hand responsive to the detected values of the position and velocity of the hand;


EXTERNAL FORCE TORQUE
S1
ALCULATION OF THE CONTROL FORCE AND CONTROL TORQUE
S2
COORDINATES CONVERSION INTO ACTUATOR COORDINATES
Td
FORCE TORQUE
S3
DYNAMICS OF WRIST BODY
Q
DISPLACEMENT
S4
COORDINATES CONVERSION FROM THE ACTUATOR COORDINATES INTO WRIST COORDINATES
HAND DISPLACEMENT
MANIPULATOR MOVING FUNCTION
S5
S6
MANIPULATOR

(c) causing the wrist body to generate the force determined in step (b), and

(d) if the position of the hand is varied by step (c), then controlling the position of the manipulator so that the range of motion of the wrist body is compensated for responsive to the varied position by step (c).

5,023,534
AUTOMATIC GUIDED VEHICLE, METHOD FOR POSITIONING SAID VEHICLE, AND LOADING TABLE HAVING POSITIONING DEVICE
Satoshi Ueda, Itami; Masahiro Sudare, Higashi-Osaka; Yasuyuki Suyama, Uji; Kazuhiko Kishimoto, Nara; Kenshi Suzuki, Takatsuki; Shiroh Inoue, Daito, and Shunji Sakura, Kyoto, all of Japan, assignors to Tsubakimoto Chain Co., Osaka, Japan
Filed Dec. 22, 1988, Ser. No. 283,400
Claims priority, application Japan, Jan. 19, 1988, 63-10406; Jan. 22, 1988, 63-12841; Jan. 22, 1988, 63-12842
Int. Cl.^{5} B64C *13/18*
U.S. Cl. 318—587 **9 Claims**



1. An automatic guided vehicle which runs along a predetermined running course comprising:

a loading table coupled to the guided vehicle, said guided vehicle provided with positioning means for adjusting a position of said loading table relative to said guided vehicle;

mark-detecting means, coupled to said guided vehicle, for detecting positioning marks disposed relative to said running course, said positioning marks representative of a desired orientation for said loading table;

means, coupled to said guided vehicle, for computing a first deviation between a position represented by said detected positioning marks and a position of said automatic guided vehicle, said first deviation representative of a second

VOL
1127
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deviation between said desired orientation for said loading table and an actual orientation of said loading table; and

means, coupled to said loading table and said computing means, for controlling said positioning means to reduce said second deviation.

5,023,535

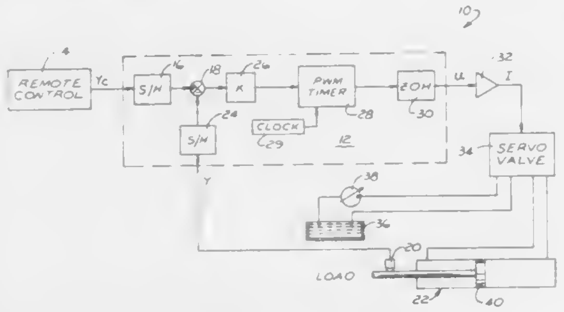
HIGH RESOLUTION PULSE WIDTH MODULATION

John A. Miller; Richard S. Leemhuis, and Rajamouli Gunda, all of Rochester Hills, Mich., assignors to Vickers, Incorporated, Troy, Mich.

Filed Apr. 21, 1989, Ser. No. 341,212

Int. Cl.^{5} G05B *11/28*

U.S. Cl. 318—599 **5 Claims**



1. An electrohydraulic system comprising

means responsive to an electrical control signal for variably controlling flow of hydraulic fluid, and

microprocessor-based control means including means for receiving an input command, means for generating a flow command as a function of said input command, means for sampling said input command and updating said flow command at predetermined fixed sampling intervals, and means for directing a pulse width modulated control signal to said flow-controlling means as a function of said flow command,

said pulse width modulated control signal consisting of a continuous series of alternating on and off half-cycles at a fixed period less than said sampling interval, all on half-cycles having an identical base time duration and all off half-cycles having an identical base time duration, said base time durations being updated at each said sampling interval and remaining constant during each sampling interval,

said control means further including means for selectively increasing or decreasing time durations of said on and off half-cycles from said base time durations within each said sampling interval while maintaining constant said fixed period of said pulse width modulated control signal.

5,023,536

SERVO-CONTROLLER

Miyuki Tachibana, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 7, 1989, Ser. No. 377,112

Claims priority, application Japan, Jul. 7, 1988, 63-169620

Int. Cl.^{5} G05B *1/02*

U.S. Cl. 318—638 **8 Claims**

1. A servo-controller comprising:

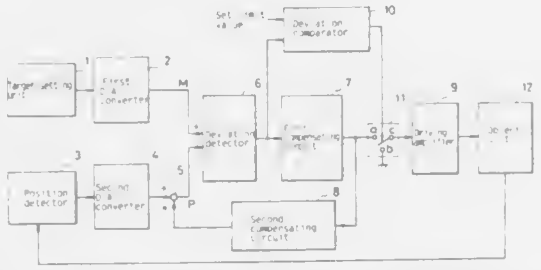
a target-setting means for setting a target value for an object unit to be controlled;

a position detecting means which produces a position feed-back signal by detecting the present value of said object unit;

a deviation detecting means which produces a deviation signal by comparing said position feed-back signal with said target value;

a driving means for driving said object unit by utilizing said deviation signal as its control signal;

a comparator for comparing said deviation signal with a predetermined set limit value, and for stopping operation of said driving means when said deviation signal is more than said predetermined set limit value; and



a switch means responsive to said comparator for switching said driving means into ground level when said deviation signal is more than said predetermined set limit value.

5,023,537

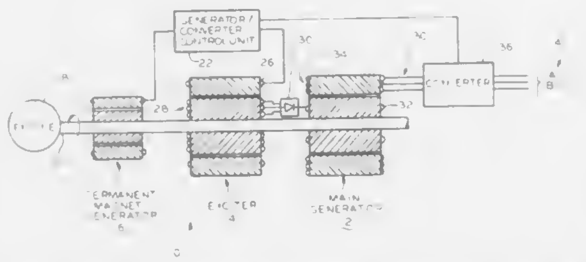
LOW FREQUENCY FEEDER FAULT PROTECTION

Paul Baits, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Aug. 23, 1989, Ser. No. 397,282

Int. Cl.^{5} H02P *9/30*

U.S. Cl. 318—732 **9 Claims**


GENERATOR / CONVERTER CONTROL UNIT
22
26
30
34
36
28
32
CONVERTER
B
PERMANENT MAGNET GENERATOR 6
EXCITER 4
MAIN GENERATOR 2

1. In a start control for a polyphase brushless machine having a rotor and a stator having a polyphase stator coil which is controllably energized from a converter which develops regulated power from a source of unregulated AC power to impart rotation to the rotor, wherein the regulated power comprises relatively low-frequency power at start-up, a fault protection control comprising:

an input feeder circuit comprising a conductor for each phase connecting the power source to said converter each conductor conducting low frequency current at start-up;

an output feeder circuit comprising a conductor for each phase connecting said converter to the polyphase stator coil each conductor conducting low frequency current at start-up;

a single current sensor operatively associated with all of the conductors of at least one of said feeder circuits to sense a sum of the low frequency currents through the conductors associated with the one of said feeder circuits; and

means coupled to said sensing means for indicating a fault condition at start-up if the current sum sensed by said current sensor is greater than a select minimum level.

5,023,538

PWM INVERTER APPARATUS FOR CONTROLLING ROTATING MAGNETIC FLUX IN A.C. MOTORS

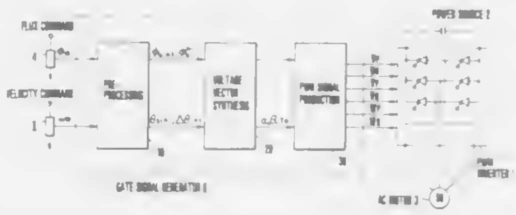
Nobuyoshi Mutoh, Katsuta; Keijiro Sakai, Hitachiota; Akiteru Ueda, Ibaraki, and Hiroshi Fujii, Chiba, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 14, 1989, Ser. No. 380,039

Claims priority, application Japan, Jul. 19, 1988, 63-179763

Int. Cl.^{5} H02A *7/42*

U.S. Cl. 318—811 **15 Claims**



1. A PWM inverter apparatus used for driving an a.c. motor, comprising:

inverter means including an output part connected to said a.c. motor and switching elements on-off controller by a PWM signal;

means for receiving, at an interval of a given sampling period, status command information specifying a vector of a rotating magnetic flux in said a.c. motor;

means for predicting, on the basis of at least said status command information received at each sampled time, a next vector of the rotating magnetic flux which will be produced in said a.c. motor at a next sampling time;

means for calculating a difference vector between the present vector of the rotating magnetic flux specified by said status command information sampled at the present sampling time and the predicted next vector of the rotating magnetic flux;

means for synthesizing said difference vector using selected ones of reference voltage vectors from among a plurality of predetermined reference voltage vectors; and

means for generating a PWM signal for controlling said switching elements of said inverter means so as to produce said selected reference voltage vectors.

5,023,539

ALTERNATOR VOLTAGE TRANSIENT MINIMIZATION METHOD AND APPARATUS

John M. Miller, Saline; James E. Fenton, Ann Arbor, and Harold G. Spring, Garden City, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jun. 12, 1989, Ser. No. 364,910

Int. Cl.^{5} H02J *7/16*

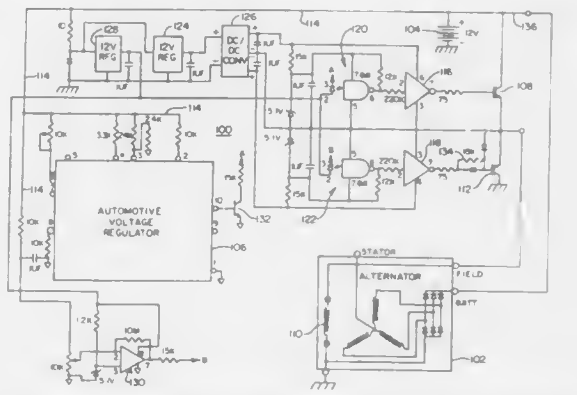
U.S. Cl. 322—28 **12 Claims**

1. Circuitry for controlling the flow of current from a power supply through a field winding of an alternator comprising:

a first insulated gate transistor connected in series with and between said power supply and said field winding for selectively providing current from said power supply to said field winding;

a second insulated gate transistor connected across said field winding; and

regulator means connected to an output of said alternator for controlling the operation of said first and second transistors to auto-commutate the current through said field winding to maintain a desired regulated output voltage at said alternator output, said regulator means further providing for switching off said first and second transistors in a controlled manner in the event of a disconnection of said alternator output from a load driven by said alternator such that energy stored in said field winding is dissipated in said second transistor to substantially suppress a voltage transient generated at said alternator output by said disconnection.



5,023,540

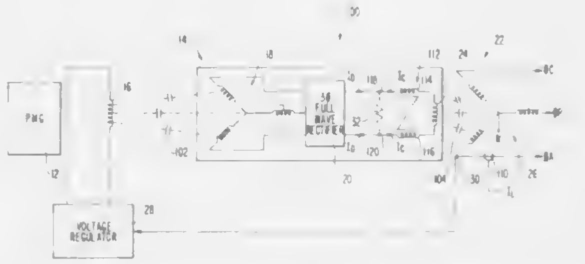
BRUSHLESS POWER GENERATING SYSTEM HAVING REDUCED CONDUCTED EMISSIONS IN OUTPUT POWER

Derrick N. Walton, Roscoe; Clarence F. Dolan, and Mahesh J. Shah, both of Rockford, all of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 22, 1989, Ser. No. 454,968

Int. Cl.^{5} H02K *11/00*

U.S. Cl. 322—58 **17 Claims**



1. A brushless electrical power generating system comprising:

an exciter for producing alternating current from an exciter rotor;

a rectifier mounted for rotation with the rotor for producing a rectified control current from the alternating current;

a common mode inductor, coupled to the rectifier, for cancelling common mode noise components within the rectified control current; and

a main generator, having a rotating field winding mounted on a main generator rotor excited by the control current and producing an alternating current power output from a stator.

5,023,541

POWER SUPPLY CONTROL CIRCUIT HAVING CONSTANT VOLTAGE AND CONSTANT CURRENT MODES

Neil J. Yosinski, Johnsonburg, N.J., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 23, 1990, Ser. No. 498,322

Int. Cl.^{5} G05F *1/563*

U.S. Cl. 323—275 **14 Claims**

1. A power supply control circuit for a power supply operative in constant current and constant voltage modes, comprising:

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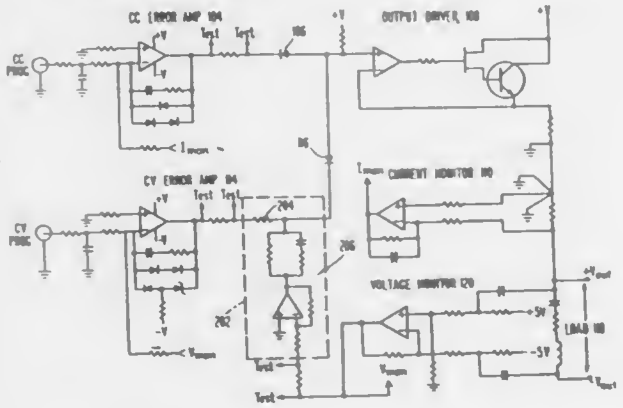
- a first control loop for controlling said power supply during operation in one of said modes;
- a second control loop for controlling said power supply during operation in the other of said modes;
- an output stage having one of said modes as a preferred operating mode; and



means for decoupling transfer functions of said control loops such that said power supply can perform in each of said modes independent of performance achieved in the other of said modes.

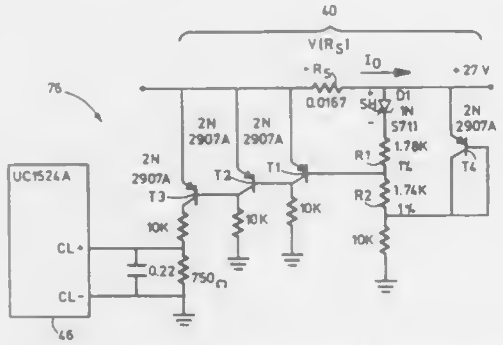
5,023,542
CURRENT LIMITING ARRANGEMENT IN A POWER CONVERTER

George A. Banura, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 389,245, Aug. 3, 1989, Pat. No. 4,961,048. This application May 3, 1990, Ser. No. 518,621

Int. Cl.^{5} H02M *3/158*

U.S. Cl. 323—284 **5 Claims**



1. A current limiting arrangement in a switching DC/DC converter, comprising:

- (a) means connected between an input and an output of the converter for receiving a flow of current and sensing the voltage between the converter input and output; and
- (b) means connected between said voltage sensing means and the current output for establishing a reference threshold voltage; and
- (c) a comparator coupled to said establishing means and said sensing means, said comparator being operable for comparing the sensed voltage and reference threshold voltage and shutting down the converter when said sensed voltage exceeds said referenced threshold voltage, said comparator including a plurality of transistors being connected together in a cascaded manner.

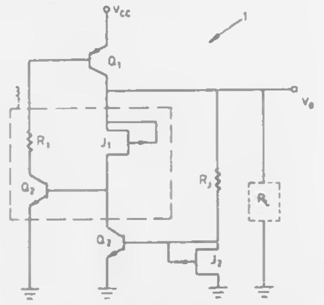
5,023,543
TEMPERATURE COMPENSATED VOLTAGE REGULATOR AND REFERENCE CIRCUIT

Lawrence T. Tse, Nepean, Canada, assignor to Gennum Corporation, Burlington, Canada

Filed Sep. 15, 1989, Ser. No. 407,993

Int. Cl.^{5} G05F *3/20*

U.S. Cl. 323—314 **15 Claims**



1. A voltage reference circuit, having a voltage output, the circuit comprising: a Bipolar Junction Transistor (BJT) having a common emitter; a Junction Field Effect Transistor (JFET) current source having a given pinch-off voltage; and a JFET resistor; wherein, the current source is connected to the base of the BJT, the JFET resistor is connected between the voltage output and the base of the BJT, and the JFET resistor is selected to produce a voltage approximately equal to the pinch-off voltage of the current source when the circuit is biased in an operating condition.

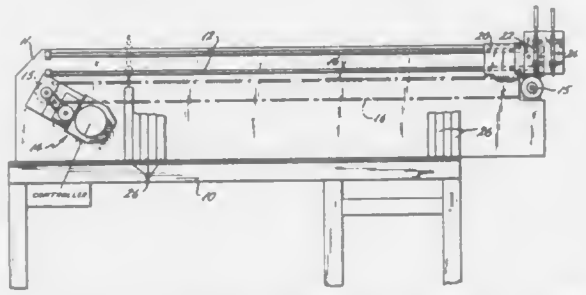
5,023,544
EXTENDED INPUT AND TESTING OF ELECTRICAL COMPONENTS FOR ONSERTION MACHINES

Giacinto Vallone, Endicott; Stanley W. Janisiewicz, Endwell; Michael D. Snyder, Binghamton; Gerald B. Hemmelgarn, Owego, and Wayne A. Glidden, Johnson City, all of N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.

Continuation of Ser. No. 33,843, Apr. 3, 1987, abandoned, which is a continuation of Ser. No. 705,114, Feb. 25, 1985, abandoned. This application Nov. 20, 1990, Ser. No. 616,765

Int. Cl.^{5} G01R *31/02;* B65C *47/24;* B07C *5/344*

U.S. Cl. 324—158 F **11 Claims**



1. A method of handling electrical components of a surface mounting type for subsequent placement at selected locations on a circuit board, and comprising the steps of:

- providing an automated supply for a component placement machine, said automated supply comprising plural supply stations;
- feeding components sequentially to each of said supply stations as needed for subsequent acquisition therefrom;
- selecting at least one of said supply stations and acquiring a particular component therefrom;
- delivering said particular component from said supply station to a transfer assembly which is situated at a shuttle unload station and returning to a selected supply station for another component;
- testing electrical functioning of said particular component;
- moving said transfer assembly between said shuttle unload station and a subsequent processing station in order to effect transferring of said particular component therebetween; and
- presenting said particular component to a placement head situated at said subsequent processing station.

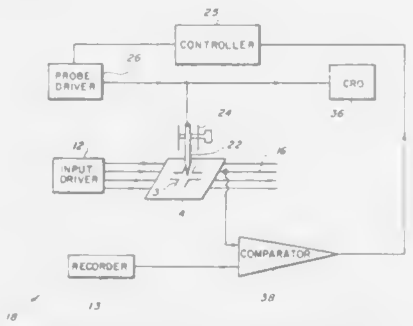
5,023,545
CIRCUIT PROBING SYSTEM

Anthony M. Marqués, Lexington, Mass., assignor to The United States of America, Washington, D.C.

Filed Jun. 4, 1990, Ser. No. 532,416

Int. Cl.^{5} G01R *15/12, 31/02*

U.S. Cl. 324—158 P **3 Claims**



1. A probing system for a circuit, comprising:

- (a) input means for operating a circuit normally, the circuit having an output line and an associated node;
- (b) probe means in contact with the node for applying an initial test probe voltage signal to the node of the operating circuit in a first probe test, the circuit producing a corresponding test output signal on the output line;
- (c) means for providing a recorded normal line output signal for the input means;
- (d) comparator means for comparing the test line output signal on the output line with the recorded normal line output signal and for providing a comparator output signal based on the comparison; and
- (e) controller means for changing the test probe voltage signal based on the comparator output signal, said probe means for providing probe tests continuing until the comparator output signal reaches a null value.

5,023,546
VARIABLE RELUCTANCE ROTATION SENSOR WITH CHANGING COIL LINKAGES AND A PAIR OF FLUX PRODUCING MAGNETS

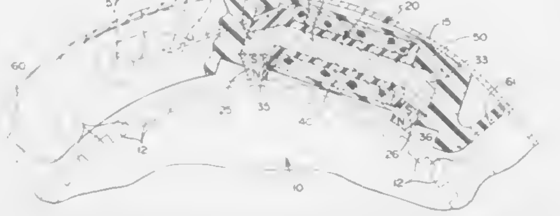
Andrzej M. Pawlak, Troy, Mich., and Takeshi Shirai, Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 8, 1989, Ser. No. 433,306

The portion of the term of this patent subsequent to Jun. 11, 2008, has been disclaimed.

Int. Cl.^{5} G01P *3/488;* H02K *21/38*

U.S. Cl. 324—174 **2 Claims**



1. A variable reluctance rotation sensor comprising a magnetic toothed wheel having teeth evenly spaced by slots around the periphery thereof and being rotatably supported with respect to a fixed magnetic pickup assembly comprising, in combination;

- a pair of permanent magnets each having a pair of poles with a similar one of its pair of poles adjacent the toothed wheel, the permanent magnets being separated from each other circumferentially around the periphery of the toothed wheel by an arc equal to the arc between one of the teeth and a non-adjacent slot, whereby the first and second permanent magnets are alternately and opposingly aligned with teeth and slots as the toothed wheel rotates; and
- a magnetic flux member with a multi-turn electrical coil wound thereon, the flux member joining the other of the poles of the first and second permanent magnets in series opposed relationship and extending between the permanent magnets in close proximity to the toothed wheel to hold the coil tangentially in close proximity thereto without additional flux concentrating poles so as to establish separate, oppositely directed flux loops for each of the permanent magnets with return paths established through the coil between ones of the teeth between the permanent magnets and portions of the magnetic flux member adjacent the ones of the teeth so as to be distributed circumferentially across the coil, the flux loops being variably spatially determined by the position of teeth and slots in proximity to the magnetic flux member between the permanent magnets and thus fluctuating circumferentially across the coil with passing alternating teeth and slots as the wheel rotates to generate an electrical signal in the electrical coil by variation of the flux linkages to individual coil turns with wheel rotation.

5,023,547
VARIABLE RELUCTANCE ROTATION SENSOR WITH CHANGING FLUX LINKAGES AND INCLUDING A PAIR OF OPPOSITELY POLED MAGNETS

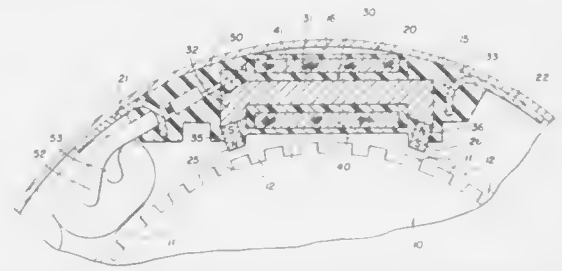
Andrzej M. Pawlak, Troy, Mich., and Takeshi Shirai, Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 8, 1989, Ser. No. 433,000

The portion of the term of this patent subsequent to Jun. 11, 2008, has been disclaimed.

Int. Cl.^{5} G01P *3/488;* H02K *21/38*

U.S. Cl. 324—174 **2 Claims**



1. A variable reluctance rotation sensor comprising a magnetic toothed wheel having teeth evenly spaced by slots around the periphery thereof and being rotatably supported with respect to a fixed magnetic pickup assembly comprising, in combination:

- a pair of permanent magnets each having a pair of poles with an opposite one of said poles adjacent the toothed wheel, the permanent magnets being separated from each other circumferentially around the periphery of the toothed wheel by an arc equal to the arc between two of the teeth, whereby when a pole of one of the magnets is aligned with one of the teeth the opposite pole of the other magnet is aligned with another of the teeth; and
- a magnetic flux member with a multi-turn electrical coil

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wound thereon, the flux member joining the other of the poles of the first and second permanent magnets to establish a common main flux loop through the first and second permanent magnets in series aiding relationship, the magnetic flux member and the toothed wheel for generation of an electrical signal in the coil with amplitude variation in the main flux loop due to varying air gap at the permanent magnets, the magnetic flux member extending between the magnets in close proximity to the toothed wheel to hold the coil tangentially in close proximity thereto without additional flux concentrating poles so as to further establish additional flux loops separately through each of the permanent magnets, the magnetic flux member and the toothed wheel between the permanent magnets with return paths established through the coil between ones of the teeth between the permanent magnets and portions of the magnetic flux member adjacent the ones of the teeth so as to be distributed circumferentially across the coil, the additional flux loops thus fluctuating circumferentially across the coil with passing alternating teeth and slots as the wheel rotates to increase the electrical signal in the coil by variation of the flux linkages to individual coil turns with wheel rotation.

5,023,548

METHOD AND APPARATUS FOR VERIFYING A HELICAL SCAN RECORDING TAPE USING A PLURALITY OF LINEAR RECORDING HEADS

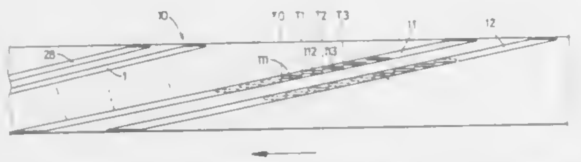
William McMorran, Nottinghamshire, England, assignor to TDM Tape Services, Ltd., Nottingham, England

Filed Jul. 21, 1989, Ser. No. 382,894

Claims priority, application United Kingdom, Jul. 23, 1988, 8817600

Int. Cl.⁵ G01R *33/12;* G11B *27/36*

U.S. Cl. 324—212 **5 Claims**



3. Apparatus for verifying a helically recorded magnetic tape including an array of linear scan heads each head being spaced apart by a defined distance across the width of the tape corresponding to the distance between each helically recorded track and including means for interrogating the output of each head for a defined period of time and multiplexer means for switching between selected outputs of adjacent heads of the array of linear scan heads at time intervals synchronized to the speed of movement of the tape and including memory means for storing the signals received from said selected outputs, to simulate a desired one of a plurality of possible helical tracks on the tape.

5,023,549

EDDY CURRENT PROBE WITH SENSOR SUPPORTING EXPANDABLE ELASTIC MEMBRANE FOR INSPECTING HOLLOW CYLINDRICAL STRUCTURES

Gary J. Dau, Palo Alto, Calif.; David C. Schiltz, Columbus, and William R Schneider, Athens, both of Ohio, assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Mar. 7, 1989, Ser. No. 319,962

Int. Cl.⁵ G01N *27/82, 27/90;* G01R *33/12*

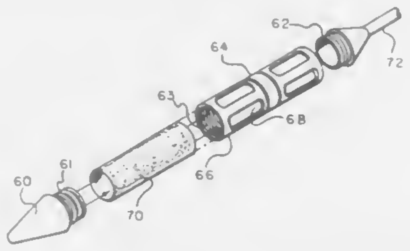
U.S. Cl. 324—220 **7 Claims**

5. Eddy current probe apparatus adapted to be positioned within a hollow structure having an unknown interior contour to perform test and produce data having a predetermined relationship to the characteristics of said structure, comprising in combination,

a) at least a first rigid portion having a diameter less than the expected minimum internal diameter of said hollow structure;

b) at least a second rigid portion having a diameter less than the expected minimum internal diameter of said hollow structure;

c) a central portion comprising a hollow cylindrical outer portion having an outer diameter less than the inner diameter of the structure to be inspected, coaxially positioned with a flexible membrane portion of smaller diameter than said hollow cylindrically portion, said hollow cylindrically outer portion also including elongated openings therein, first and second ends of said central portion being respectively attached to an end of said first and second portions, said membrane portion being adapted to support sensors such that a differential pressure across said membrane causes the diameter of said membrane to selectively change to expand said membrane outwardly through said elongated openings to position said eddy current sensors in a fixed position with respect to the interior surface of a structure to be inspected.



5,023,550

ROTATING HEAD MECHANISM OF ROTARY TYPE AC MAGNETIC FLUX LEAKAGE FLAW DETECTOR

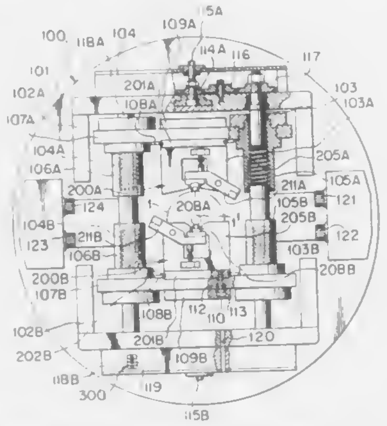
Makoto Yamazaki; Kazumi Ueda; Shinichi Isobe, and Katsunari Sato, all of Tokyo, Japan, assignors to Eddio Corporation, Tokyo, Japan

Filed Feb. 1, 1990, Ser. No. 473,606

Claims priority, application Japan, Feb. 22, 1989, 1-42465

Int. Cl.⁵ G01N *27/87;* G01R *33/12*

U.S. Cl. 324—262 **4 Claims**



1. A rotating head mechanism of a rotary type AC magnetic flux leakage flaw detector, comprising a rotating disc which has an opening for passing a test piece for flaw detection, mounting frames which are secured to said rotating disc so as to oppose each other with said opening located therebetween, shafts which are provided to extend between said mounting frames and the ends of which are pivotally supported by said mounting frames each of which has external threads of senses opposite to each other at a position on one side of said opening and a position on the other side thereof, a first nut which engages the external thread of one sense in said external threads of each shaft, a second nut which engages the external thread of the other sense in said external threads of each shaft, a first cradle which is coupled to the first nuts, a second cradle which is coupled to the second nuts, a first exciting magnetic poles/detecting probes-assembly which is mounted on said first cradle, a second exciting magnetic poles/detecting probes-assembly which is mounted on said second cradle, and rotation drive means for rotating said shafts, wherein when said shafts are rotated by said rotation drive means, said first and second nuts are moved in a direction in which they come near to each other or away from each other along said shafts, thereby making it possible to change an opposing spacing in a diametrical direction of said opening, between said first and second exciting magnetic poles/detecting probes-assemblies respectively mounted on said first and second cradles.

5,023,551

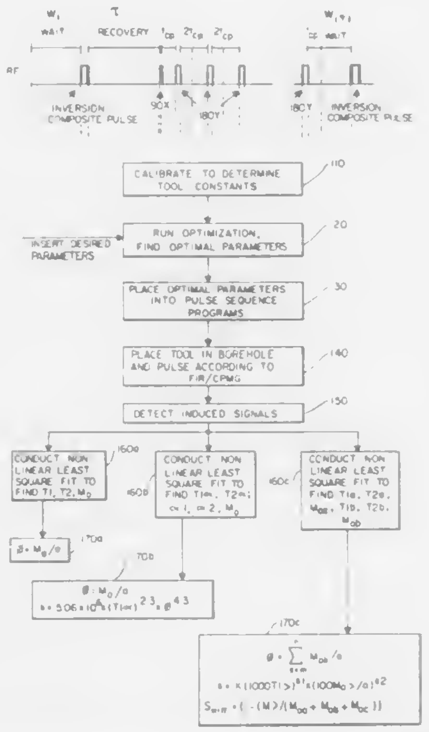
NUCLEAR MAGNETIC RESONANCE PULSE SEQUENCES FOR USE WITH BOREHOLE LOGGING TOOLS

Robert L. Kleinberg, Ridgefield; Abdurrahman Sezginer, Brookfield, both of Conn., and Masafumi Fukuhara, Sagamihara, Japan, assignors to Schlumberger-Doll Research, New York, N.Y.

Continuation-in-part of Ser. No. 368,916, Jun. 19, 1989, Pat. No. 4,933,638, which is a continuation of Ser. No. 901,084, Aug. 27, 1986, abandoned. This application Dec. 19, 1989, Ser. No. 452,903

Int. Cl.⁵ G01R *33/20*

U.S. Cl. 324—303 **62 Claims**


W
WAIT
τ
RECOVERY
RF
INVERSION COMPOSITE PULSE
90X
180Y
INVERSION COMPOSITE PULSE
CALIBRATE TO DETERMINE TOOL CONSTANTS
110
RUN OPTIMIZATION, FIND OPTIMAL PARAMETERS
20
INSERT DESIRED PARAMETERS
PLACE OPTIMAL PARAMETERS INTO PULSE SEQUENCE PROGRAMS
30
PLACE TOOL IN BOREHOLE AND PULSE ACCORDING TO FIR/CPMG
140
DETECT INDUCED SIGNALS
150
CONDUCT NON LINEAR LEAST SQUARE FIT TO FIND T1, T2, M0
160a
160b
160c
170a
170b
170c

1. A method for measuring an indication of an attribute of a volume of earth formation with a borehole tool having means for producing static magnetic fields in a volume of a formation, means for producing oscillating magnetic fields in a volume of a formation, and means for measuring an induced magnetic signal, said method comprising:

a) producing a static magnetic field in said volume of formation;

b) producing oscillating magnetic fields according to a pulse sequence

$$[W_i-180-\tau_i-90-(t_{cp}-180-t_{cp}-\mathrm{echo})_j]_i$$

where j=1, 2, . . . J, and J is the number of echoes collected in a single Carr-Purcell-Meiboom-Gill (CPMG) sequence, where i=1, . . . I, and I is the number of waiting times used in the pulse sequence,

where W_i are recovery times before a CPMG sequence, and

where τ_i are recovery times before a CPMG sequence, and

where t_{cp} is the Carr-Purcell spacing, in order to induce signals in said volume which are measurable by said tool in said borehole; and

c) measuring with said tool said induced signals.

5,023,552

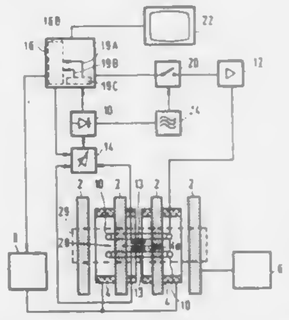
MAGNETIC RESONANCE DEVICE WITH A SELECTABLE GAIN SIGNAL AMPLIFIER

Antoon F. Mehlkopf; Johannes H. Den Boef, both of Eindhoven, and Rolf J. M. Lioen, Landsmeer, all of Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Continuation of Ser. No. 369,567, Jun. 21, 1989, abandoned. This application Oct. 24, 1990, Ser. No. 607,779

Int. Cl.⁵ G01R *33/20*

U.S. Cl. 324—309 **15 Claims**



1. A magnetic resonance device for determining a nuclear magnetization distribution in a region in an object, which device comprises:

(a) means for generating a steady, uniform, magnetic field,

(b) means for generating RF electromagnetic radiation in order to generate magnetic resonance signals,

(c) means for generating at least one gradient magnetic field with an adjustable gradient direction for influencing the magnetic resonance signals,

(d) a detection chain comprising a signal amplifier for detecting, amplifying and sampling the resonance signals during a measuring period, including an analog-to-digital converter which is connected thereto,

(e) processing means for processing the sampled resonance signals, and

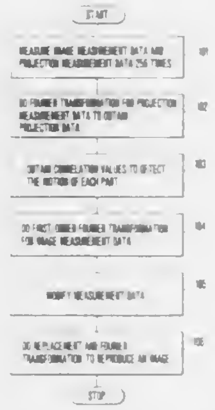
(f) control means for controlling at least the means specified in subdivisions (b) to (e) in a manner that resonance signals are conditioned during a preparation period preceding the measuring period, the control means supplying the gradient field generating means with control signals for adjusting the strength and/or the duration of at least one gradient field so that the integral of the strength of the gradient magnetic field over the preparation period is different from each conditioned corresponding resonance signal to be sampled, characterized in that there are provided adjusting means for adjusting a gain of the amplifier so that the gain is increased when the signal level of a resonance signal conditioned by a last preparation period decreases with respect to a corresponding resonance signal conditioned by a preparation period prior to the last preparation period, until the noise factor of the detection chain and the analog to digital converter connected thereto has become substantially independent of the gain.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,553
METHOD AND APPARATUS FOR BODY MOTION CORRECTIVE IMAGING

Koichi Sano, Sagamihara; Tetsuo Yokoyama, Tokyo, and Hideaki Koizumi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 30, 1989, Ser. No. 330,835
Claims priority, application Japan, Apr. 1, 1988, 63-78007
Int. Cl.^{5} G01N *33/20*
U.S. Cl. 324—309 6 Claims


START
MEASURE IMAGE MEASUREMENT DATA AND PROJECTION MEASUREMENT DATA 256 TIMES
101
DO FOURIER TRANSFORMATION FOR PROJECTION MEASUREMENT DATA TO OBTAIN PROJECTION DATA
102
OBTAIN CORRELATION VALUES TO DETECT THE MOTION OF EACH PART
103
DO FIRST ORDER FOURIER TRANSFORMATION FOR IMAGE MEASUREMENT DATA
104
MODIFY MEASUREMENT DATA
105
DO REPLACEMENT AND FOURIER TRANSFORMATION TO REPRODUCE AN IMAGE
106
STOP

1. A body motion corrective imaging method comprising the steps of:

generating a static magnetic field, a gradient magnetic field and a high-frequency magnetic field;

measuring image signal measurement data and projection measurement data from an object under examination to which said magnetic fields are applied;

computing a projection data by Fourier transformation from said projection measurement data;

selecting a reference datum from said projection data;

correlating said reference datum with an intermediate data, said intermediate data being a sum of a remaining data from said projection data and a variable offset value;

varying said variable offset value and repeating said correlating step until a final value of said variable offset value is found which maximizes an output from said correlating step;

computing a movement of at least one datum point of said projection data based on said final value;

storing said movement in a table;

repeating said selecting, correlating, varying, computing, and storing steps until said table contains a plurality of said movement values, each of said plurality corresponding to a movement of a datum point of said projection data;

Fourier transforming said image signal measurement data;

modifying said Fourier transformed image signal measurement data on the basis of said stored table values; and

reconstructing an image of said object from said modified data.

5,023,554
FRINGE FIELD MRI

Zang-Hee Cho, Corona Del Mar, and Edward K. Wong, Jr., Newport Beach, both of Calif., assignors to The Reagents of the University of California, Oakland, Calif.

Filed May 22, 1989, Ser. No. 354,990
Int. Cl.^{5} G01R *33/20*
U.S. Cl. 324—309 **49 Claims**

1. A magnetic resonance imaging method comprising:

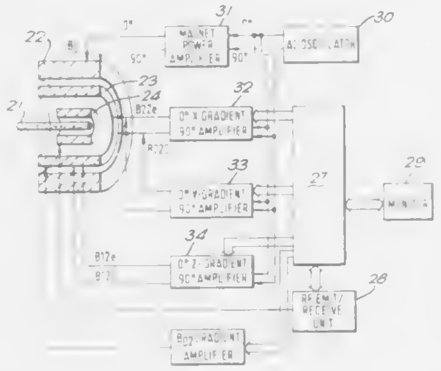
generating a static, non-homogenous, magnetic fringe field having an intensity greater than 2 Tesla with a static magnetic gradient in excess of 2 Gauss/cm along a predetermined z-axis through an MRI image volume; and

using said static magnetic gradient in conjunction with an NMR RF pulse during an MRI data acquisition pulse sequence to achieve volume-selective NMR nutation of nuclei within said MRI image volume.

5,023,555
MAGNETIC RESONANCE IMAGING

Gosta J. Ehnholm, Helsinki, Finland, assignor to Instrumentarium Corporation, Helsinki, Finland

Filed Jan. 2, 1990, Ser. No. 459,453
Claims priority, application United Kingdom, Jan. 3, 1989, 8900030
Int. Cl.^{5} G01R *33/20*
U.S. Cl. 324—318 16 Claims



1. A magnetic resonance imaging apparatus having a primary field generating means for generating a substantially uniform magnetic field, wherein said primary field generating means is arranged in use to generate a magnetic field the field direction of which varies with time.

5,023,556
SENSOR CIRCUIT RESPONSE TO DIFFERENT FLUID CONDUCTIVITIES AND HAVING TIME DELAY FEATURE

Francis M. Miller, Clearwater, Fla., assignor to Conax Florida Corporation, St. Petersburg, Fla.

Filed Feb. 2, 1990, Ser. No. 473,883
Int. Cl.^{5} G01R *27/02;* F42C *11/06*
U.S. Cl. 324—439 **21 Claims**

1. A circuit for operating a load in response to predetermined external conductivity conditions comprising:

(a) a pair of sensing electrodes;

(b) a source of electrical energy having a pair of terminals, one of which is connected to one of said electrodes;

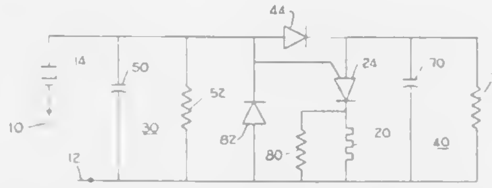
(c) a load having a pair of terminals, one of which is connected to the other of said sensing electrodes;

(d) a controlled switch connected to the other terminal of said load so as to be in series therewith;

(e) energy storage means operatively connected to said source and to said other electrode;

(f) control means operatively connected to said energy storage means and connected in controlling relation to said controlled switch; and

(g) time delay means operatively connected to said control means;

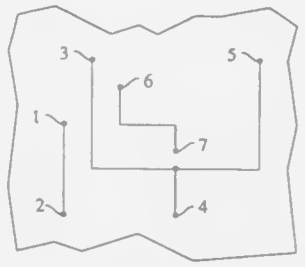


(h) so that when said electrodes are exposed to a first medium having a predetermined electrical conductivity energy builds up on said storage means and said controlled switch is open and then a predetermined time after said electrodes are exposed to a second medium having a different electrical conductivity said controlled switch is closed and said load is operated by energy stored in said energy storage means, said predetermined time being established by said time delay means.

5,023,557
TESTING PROCESS FOR ELECTRONIC DEVICES

Joseph M. Moran, Berkeley Heights, and Thomas C. Russell, Hoboken, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 378,431, Jul. 10, 1989, abandoned, which is a continuation of Ser. No. 99,196, Sep. 21, 1987, abandoned. This application Sep. 5, 1990, Ser. No. 581,164
Int. Cl.^{5} G01R *15/12*
U.S. Cl. 324—537 14 Claims

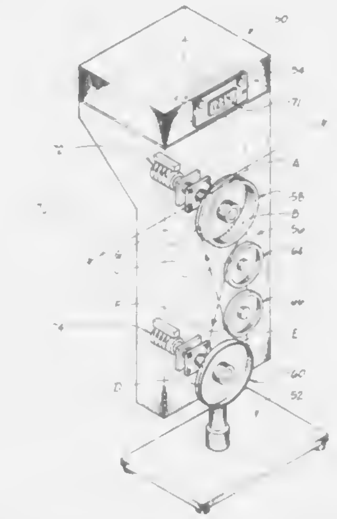


1. A process for fabricating a body having electrically conductive nets that electrically interconnect in a desired pattern a plurality of nodes, said process comprising the steps of examining a plurality of said nets by a series of net tests, said net tests including at least two measurements made on said net to ensure the presence of said desired interconnection pattern and employing said body based on said measurements wherein said measurements are made using a first and second probe to contact said nodes for said measurements characterized in that said measurements are made such that for at least one net all said measurements to be made on said net are not performed before making at least one of said measurements on a second of said nets such that the total movement distance of the said probes for all said measurements is less than the total movement distance for said probes in a sequence wherein each of said net tests is completed before another net test is performed.

5,023,558
IGNITION WIRE CORE CONDUCTIVE IRREGULARITY DETECTOR

Lewis M. Brown, Columbia City, Ind., assignor to Essex Group, Inc., Fort Wayne, Ind.

Filed May 15, 1989, Ser. No. 351,980
Int. Cl.^{5} G01R *31/08*
U.S. Cl. 324—515 9 Claims



1. An overwrapped ignition wire core conductive irregularities detector comprising:

at least two electrical conductive sheaves, spaced a predetermined distance apart, for traversing an overwrapped ignition wire therebetween;

at least two non-electrical conductive sheaves, operatively positioned between the two conductive sheaves, for bending the overwrapped ignition wire so that small conductive breaks in the wire can be better detected between the conductive sheaves;

electric current means in direct contact with the two conductive sheaves for directly applying a small electrical current in the overwrapped ignition wire between the two sheaves as the wire traverses therebetween;

monitoring means for monitoring the voltage in the wire between the two conductive sheaves as it traverses between the two conductive sheaves at speeds in excess of 300 feet per minute; and

means, operatively connected to the monitoring means, for stopping the overwrapped wire core from continuing to traverse between the two conductive sheaves when a conductive irregularity is detected.

5,023,559
CAPACITANCE-TYPE MEASURING DEVICE FOR ABSOLUTE MEASUREMENT OF POSITIONS

Nils I. Andermo, Kirkland, Wash., assignor to Mitutoyo Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 200,368, May 31, 1988, which is a continuation-in-part of Ser. No. 30,346, Mar. 26, 1987, abandoned, Ser. No. 31,049, Mar. 26, 1987, abandoned, and Ser. No. 35,859, Apr. 8, 1987, abandoned. This application Jun. 29, 1989, Ser. No. 372,773

Claims priority, application Japan, Apr. 4, 1986, 61-078947; Apr. 4, 1986, 61-078948; Apr. 9, 1986, 61-083205; Apr. 11, 1986, 61-083470; Apr. 15, 1986, 61-087839

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

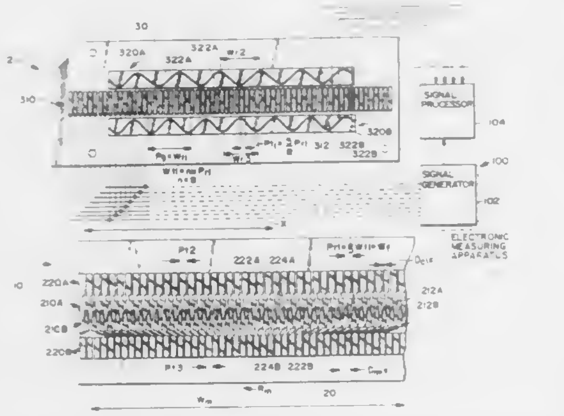
Int. Cl.^{5} G01R *27/26;* G08C *19/10*
U.S. Cl. 324—662 30 Claims

1. Capacitive-type measuring apparatus comprising:

first and second support members, said support members

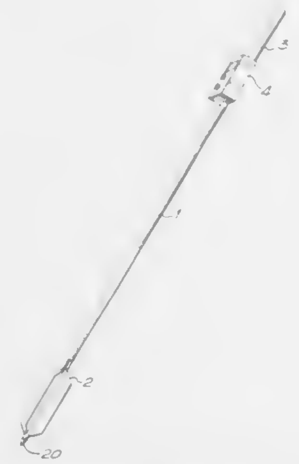
VOL
1127
ISS
2
JE
11
1991
UMI

being relatively displaceable with respect to each other, and at least one of said support members being displaceable relative to a measurement axis;
an array of first electrodes disposed on said first support member in alignment with said measurement axis;
an array of second electrodes disposed on said second support member in alignment with said measurement axis and such that differing portions of said second electrode array are capacitively coupled with said first electrode array in dependence on the relative positions of said supporting members; and
an array of third electrodes disposed on said second support member in relative alignment with said second electrode array, each of said third electrodes being electrically connected to a corresponding one of said second electrodes so as to be offset from the corresponding second electrode by an amount which is a predetermined function of the position of the third electrode relative to a reference position on said measurement axis.



5,023,560
DEVICE FOR MOISTURE MEASUREMENT OF PARTICULATE MATERIAL

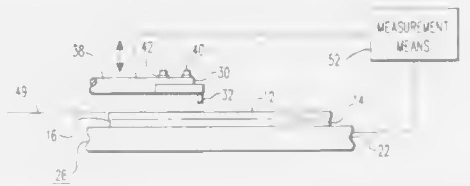
John G. Gallagher, 77 Town Street, Old Malton, Malton, North Yorkshire, England
Filed Jan. 26, 1990, Ser. No. 470,846
Int. Cl.^{5} G01R *27/26*
U.S. Cl. 324—664 10 Claims



1. A device for measurement of moisture in a body of particulate material, comprising a support shaft having an end region, at least two electrically conductive plates carried at the end region of said shaft and each configured as a fin for contact with said particulate material, each said fin extending lengthwise of said shaft, and means for measurement of an electrical property of the material between said plates in order to measure the moisture content of the particulate material when said plates are immersed in said body of the particulate material.

5,023,561
APPARATUS AND METHOD FOR NON-INVASIVE MEASUREMENT OF ELECTRICAL PROPERTIES OF A DIELECTRIC LAYER IN A SEMICONDUCTOR WAFER

Robert J. Hillard, Avalon, Pa., assignor to Solid State Measurements, Inc., Pittsburgh, Pa.
Filed May 4, 1990, Ser. No. 518,712
Int. Cl.^{5} G01R *27/14*
U.S. Cl. 324—719 9 Claims



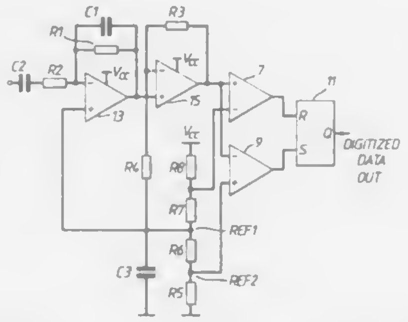
1. An apparatus for measurement of electrical properties of a dielectric layer in a semiconductor wafer body, said semiconductor wafer body including substrate means, said apparatus comprising:
means for supporting said semiconductor wafer body in predetermined position;
first electrical contact means for contacting said substrate means of said semiconductor wafer body;
second electrical contact means for contacting said dielectric layer, said second electrical contact means comprising probe means, said probe means including conductive probe tip means, said conductive probe tip means having a uniformly flat contact portion thereon of predetermined dimensions;
kinematically stable probe arm positioning means comprising a probe arm having said probe means affixed thereto, said kinematically stable probe arm positioning means for controlling the pressure and rate of travel of said probe tip means;
means for establishing a planar contact between said uniformly flat contact portion of said probe tip means and the outer surface of, said dielectric layer of said semiconductor wafer body;
measurement means for causing an electrical current to flow through said dielectric layer and measuring the resultant electrical properties of said dielectric layer, said measurement means connected in circuit with said first electrical contact means and said second electrical contact means.

5,023,562
DIGITIZING CIRCUIT FOR DEMODULATED DIGITAL DATA SIGNALS

Murat Gumussoy, Reading, England, assignor to Orbitel Mobile Communications Limited, Bracknell, England
Filed Jun. 21, 1990, Ser. No. 541,640
Claims priority, application United Kingdom, Jun. 23, 1989, 8914466
Int. Cl.^{5} H04L *27/14*
U.S. Cl. 329—303 7 Claims

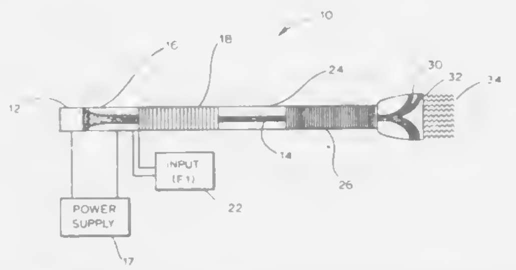
1. Signal processing apparatus for digitizing a demodulated digital data signal, the apparatus comprising differentiating means arranged to receive the demodulated data signal and produce differentiated pulses, first and second comparators each arranged to compare the differentiated pulses with a respective predetermined reference voltage so as to generate output pulses when differentiated pulses above and below the respective reference voltages are detected, and a flip-flop having set and reset inputs, and an output, the outputs of the

first and second comparators being connected to the set and reset inputs respectively of the flip-flop, so as to cause a digitized form of the demodulated data signal to be generated at the output of the flip-flop.



5,023,563
UPSHIFTED FREE ELECTRON LASER AMPLIFIER

Robin J. Harvey, Thousand Oaks, Calif., and A. Jay Palmer, Longmont, Colo., assignors to Hughes Aircraft Company, Los Angeles, Calif.
Continuation-in-part of Ser. No. 363,665, Jun. 8, 1989, abandoned. This application Sep. 24, 1990, Ser. No. 589,702
Int. Cl.^{5} H01S *3/09, 3/14*
U.S. Cl. 330—4.3 10 Claims



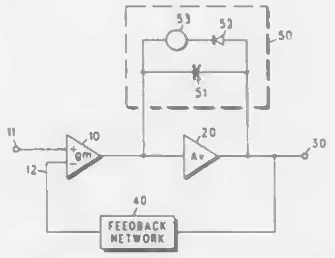
1. A method of employing free electron lasing action at a first frequency to achieve gain in output power at a second frequency comprising the steps of:
driving an electron beam with an electromagnetic wave at said first frequency in a first stage, said first stage having a first spatial period λ_{w1}, to cause bunching of the electron beam and
oscillating the electrons in said bunched electron beam with a second stage having a second spatial period λ_{w2} to generate electromagnetic wave power from said beam at said second frequency, wherein the spatial period of the second stage λ_{w2} is related to the spatial period of the first stage λ_{w1} by:

$$\lambda_{w1}/\lambda_{w2} = n[1/\beta - (1 - (k_{c2}/nk_{s1})^2)] \div [1/\beta - (\pm)(1 - (k_{c1}/k_{s1})^2)^{\frac{1}{2}}]$$

where:
n=an integer,
β=the velocity v of the wave divided by the speed of light constant c;
k_{s1}=the free-space signal wavenumber (proportional to the frequency of the radiation field) of the electromagnetic radiation of the first frequency within said first stage;
k_{c1}=the cutoff wavenumber for radiation in the first stage;
k_{c2}=the cutoff wavenumber for radiation in the second stage.

5,023,564
AMPLFIER CIRCUIT

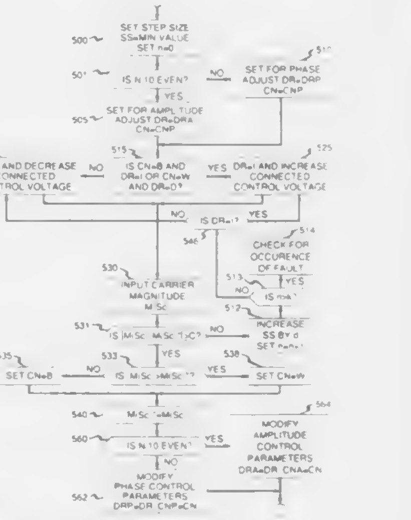
David T. Jobling, Geneva, Switzerland, assignor to Motorola, Inc., Schaumburg, Ill.
Filed Nov. 13, 1989, Ser. No. 434,212
Claims priority, application United Kingdom, Nov. 18, 1988, 8827071.5
Int. Cl.^{5} H03F *1/34*
U.S. Cl. 330—107 3 Claims



1. An amplifier comprising a transconductance stage in series with a voltage gain stage the transconductance stage having an input for receiving an input signal, a compensation capacitance connected across the voltage gain stage for rendering the amplifier stable under predetermined negative feedback and wherein the compensation capacitance has a value which is continuously dependent upon the output voltage at the output of the voltage gain stage, the compensation capacitance comprising a voltage controllable capacitance and a source of bias voltage wherein the voltage controllable capacitance comprises a diode series coupled with the source of bias voltage.

5,023,565
LINEAR AMPLIFIER WITH AUTOMATIC ADJUSTMENT OF FEED FORWARD LOOP GAIN AND PHASE

Winston H. Lieu, Parsippany, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.
Filed Jan. 26, 1990, Ser. No. 470,672
Int. Cl.^{5} H03F *1/32*
U.S. Cl. 330—151 3 Claims


SET STEP SIZE SS=MIN VALUE SET n=0
500
IS N 10 EVEN?
NO
YES
SET FOR PHASE ADJUST DR=DRP CN=CNP
SET FOR AMPLITUDE ADJUST DR=DRA CN=CNA
DR=DR AND DECREASE CONNECTED CONTROL VOLTAGE
DR=DR AND INCREASE CONNECTED CONTROL VOLTAGE
CHECK FOR OCCURENCE OF FAULT
INPUT CARRIER MAGNITUDE
INCREASE SS BY 2
SET CN=B
SET CN=W
540
560
IS N 10 EVEN?
YES
NO
MODIFY AMPLITUDE CONTROL PARAMETERS DRA=DR CNA=CN
564
MODIFY PHASE CONTROL PARAMETERS DRP=DR CNP=CN
562

1. An amplifier circuit, comprising.
an input and an output,
an amplification path interconnecting the input and the output,
a feed forward path coupled to the input and the output and operative for compensating distortion introduced into the amplification path, including;

VOL
1127
ISS
2
JE
11
1991
UMI

- means for generating a correction signal in the feed forward path representative of distortion in the amplification path, and having;
- means for adjusting a phase and amplitude of the correcting signal in quantized steps,
- means for adjusting the magnitude of the quantized steps;
- wherein the improvement comprises;
- means for setting an initial quantized signal step magnitude,
- means for comparing a difference between a signal of a previous correction to a present signal with a preset value,
- means for adjusting the signal step magnitude from the initial quantized step signal magnitude by a fixed value if the difference is less than the preset value,
- means for establishing a count,
- means for decrementing the count in response to each adjustment of the step signal magnitude,
- means to terminate the adjustment when the established count is attained, and
- means for checking for the occurence of a fault when the established count is attained.

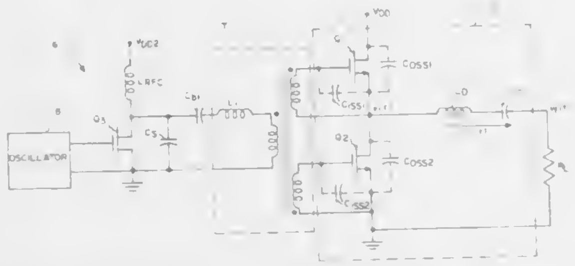
5,023,566
DRIVER FOR A HIGH EFFICIENCY, HIGH FREQUENCY CLASS-D POWER AMPLIFIER

Sayed-Amr A. El-Hamamsy, Schenectady, and George Jernakoff, Loudonville, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 21, 1989, Ser. No. 454,614

Int. Cl.^{5} H03F *3/217*

U.S. Cl. 330—251 10 Claims



1. A driver for a high efficiency Class-D voltage-switching power amplifier of the type having first and second switching devices connected in series in a half-bridge configuration and including an output resonant circuit at the junction between said firs and second switching devices, said output resonant circuit comprising a capacitance connected in series with an inductance, said first and second switching devices each having an input capacitance and an output capacitance, said driver comprising:

- sinewave signal generating means for providing an input sinewave power signal to said firs and second switching devices so as to produce sinusoidal voltage signals of predetermined amplitude at the inputs of said first and second switching devices in order to control the transition time between turn-off of one of said first and second switching devices and turn-on of the other one of said switching devices in order to ensure that the output capacitance of said other one of said switching devices is substantially discharged and further that turn-on of said one of said switching devices occurs when there is substantially zero voltage thereacross and substantially zero current therethrough, thereby resulting in substantially lossless switching; and
- oscillator means for driving said sinewave signal generating means.

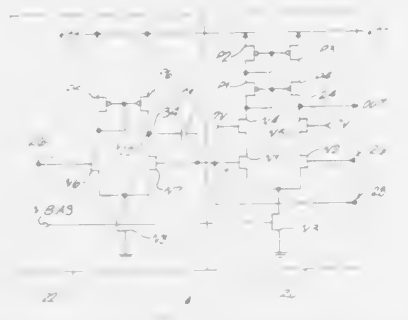
5,023,567
STABILITY-COMPENSATED OPERATIONAL AMPLIFIER

Timothy G. O'Shaughnessy, Norco, and Mike Spaur, Laguna Niguel, both of Calif., assignors to Western Digital Corporation, Irvine, Calif.

Filed Jun. 6, 1990, Ser. No. 533,890

Int. Cl.^{5} H03F *3/45, 3/16*

U.S. Cl. 330—253 8 Claims



1. A stability-compensated, integrated-circuit operational amplifier comprising:

- an inverting node and a non-inverting node;
- a first differential amplifier comprising CMOS transistor means that are connected to the inverting node and to the non-inverting node, the CMOS transistor means of the first differential amplifier having an output node, and having means for producing on the output node an output potential that, with reference to a predetermined potential, defines an output signal having a magnitude that is a function of the magnitude of the difference between a first potential at the inverting node and a second potential at the non-inverting node;
- a second differential amplifier comprising CMOS transistor means that are connected to the inverting node and to the non-inverting node, the CMOS transistor means for having means for producing a compensation signal; and
- capacitance means for coupling the compensation signal to the non-inverting node.

5,023,568
COMBINED CURRENT DIFFERENCING AND OPERATIONAL AMPLIFIER CIRCUIT

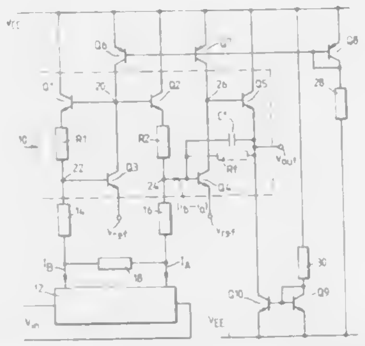
Paul A. Moore, Hove; Colin L. Perry, Crawley, both of England, and Johannes O. Voorman, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 18, 1990, Ser. No. 540,017

Claims priority, application United Kingdom, Jul. 28, 1989, 8917340.5

Int. Cl.^{5} H03F *3/45*

U.S. Cl. 330—257 15 Claims



1. A combined current differencing and operational amplifier circuit comprising first, second, third, fourth and fifth NPN transistors each having base, emitter and collector electrodes, a feedback element, first and second resistive elements having first and second ends, wherein the base electrodes of the first and second transistors are connected together to form a junction, the first ends of the first and second resistive elements are connected to the emitter electrodes of the first and second transistors, respectively, the base and collector electrodes of the third transistor are coupled respectively to the second end of the first resistive element and to said junction, the base and collector electrodes of the fourth transistor are coupled respectively to the second end of the second resistive element and to the base electrode of the fifth transistor, and wherein the feedback element is connected between the base electrode of the fourth transistor and the emitter electrode of the fifth transistor, first and second signal inputs coupled to the second ends of the first and second resistive elements, respectively and a signal output being derived from the emitter circuit of the fifth transistor.

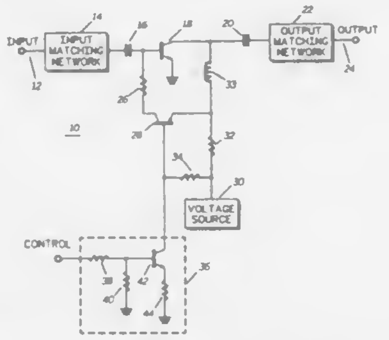
5,023,569
VARIABLE GAIN AMPLIFIER

Gregory S. Raven, Ft. Worth, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 29, 1989, Ser. No. 373,113

Int. Cl.^{5} H03G *3/10*

U.S. Cl. 330—285 7 Claims



1. An amplifier, comprising:

- means for variably amplifying an input signal in response to a variable bias current;
- bias means for providing the variable bias current to a bipolar transistor in response to a control signal; and
- feedback means for maintaining the variable bias current at a substantially constant level after the level has been determined by the control signal.

5,023,570
EMITTER-FOLLOWER CIRCUIT

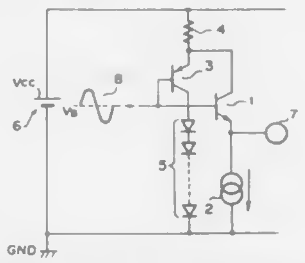
Kouichl Matsumoto, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Feb. 12, 1990, Ser. No. 478,843

Claims priority, application Japan, Feb. 21, 1989, 1-41109

Int. Cl.^{5} H01H *7/20;* H03K *5/08*

U.S. Cl. 330—299 7 Claims



1. An emitter-follower circuit comprising:

- a first and a second power supply source and an input and an output terminal;
- a resistor connected at its one end to said first power supply source;
- a first conductivity type transistor connected between the other end of said resistor and said output terminal, the base of said transistor being connnected to said input terminal;
- a constant current means connected between said output terminal and said second power supply source;
- a second conductivity type transistor having its emitter connected to the other end of said resistor and its base being connected to said input terminal; and
- at least one diode connected in a forward direction with respect to the collector current of said second transistor between the collector of said second transistor and said second power supply source.

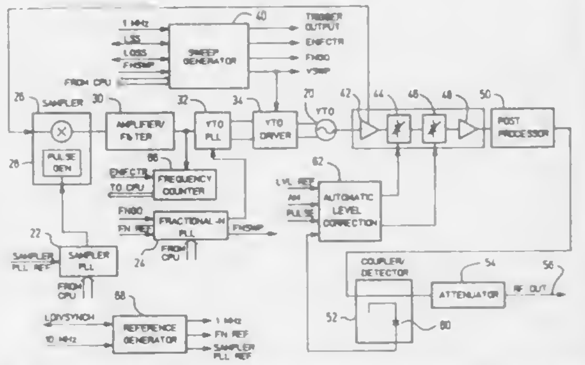
5,023,571
DIGITALLY-SYNCHRONIZED SWEEP SIGNAL SOURCE

Douglas E. Fullmer, Santa Rosa; Michael J. Seibel, Windsor, and Roger D. Sheppard, Santa Rosa, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 29, 1989, Ser. No. 414,555

Int. Cl.^{5} H03L *7/00*

U.S. Cl. 331—4 35 Claims



1. A method for synchronizing predetermined frequencies generated by a sweep oscillator to sweep-related events, said method comprising the steps of:

- generating a periodic digital synchronization signal;
- generating a ramp signal, said ramp signal being initiated by said digital synchronization signal, said ramp signal being generated with sufficient precision to insure synchronization with said digital synchronization signal;
- controlling the frequency of the sweep oscillator with said ramp signal to generate said predetermined frequencies; and
- synchronizing said sweep-related events to said digital synchronization signal, said sweep-related events thereby being substantially synchronized with the generation of said predetermined frequencies.

5,023,572
VOLTAGE-CONTROLLED OSCILLATOR WITH RAPID TUNING LOOP AND METHOD FOR TUNING SAME

Stephen P. Caldwell, Columbia, Md.; David S. Korn, Washington, D.C., and Francis W. Hopwood, Severna Park, Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 20, 1989, Ser. No. 453,742

Int. Cl.^{5} H03L *7/085*

U.S. Cl. 331—10 19 Claims

1. An oscillator circuit coupled to receive first and second reference signals, comprising:

- a voltage-controlled oscillator for generating an oscillating signal;
- first means for producing a digital count signal corresponding to a difference in frequency between the oscillating signal and the first reference signal; and
- second means for comparing the digital count signal and the

VOL
1127
ISS
2
JE
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1991
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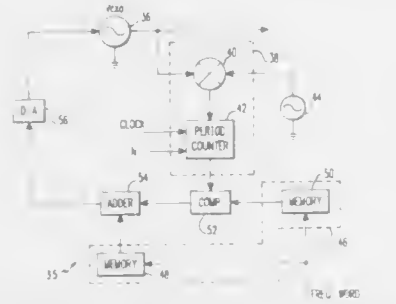
second reference signal which is a digital signal corresponding to a predetermined frequency for the oscillating signal, and generating a digital error signal, and for converting the digital error signal to a control signal which is input to said voltage-controlled oscillator to control the frequency of the oscillating signal.



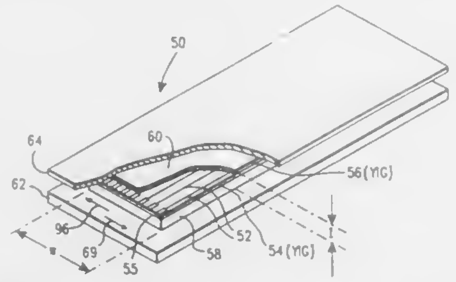
5,023,573
COMPACT FREQUENCY SELECTIVE LIMITER CONFIGURATION

John D. Adam, Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 21, 1989, Ser. No. 410,575

Int. Cl.^{5} H01P *1/218*

U.S. Cl. 333—17.2 **15 Claims**



1. A device for attenuating microwave signals above a preselected power level passed therethrough comprising:

a pair of planar ferrite members;

a plurality of signal-carrying conductors positioned between said ferrite members for carrying the microwave signals on an axis substantially parallel thereto; and

a planar ground plane surrounding the ferrite members in spaced relation with respect to the conductors by a selected distance, said signal carrying conductors being separated by at least ten times the distance from the ground plane to the conductors such that microwave field coupling between adjacent conductors is negligible.

5,023,574
NONLINEAR TRANSMISSION LINES HAVING NONCOMMENSURATE VARACTOR CELLS

William J. Anklam, Santa Rosa, and William E. Kunz, Foster City, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 17, 1990, Ser. No. 512,297

Int. Cl.^{5} H01P *5/00*

U.S. Cl. 333—20 **20 Claims**

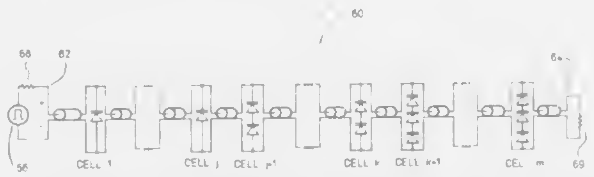
1. A nonlinear transmission line comprising:

an unloaded transmission line having an input and an output;

means for injecting at the transmission line input one of a pulse and a step signal having a profile that sufficiently matches the profile of a stable soliton at the input of the transmission line so that substantially only a single soliton is generated by the input signal at the output of the transmission line; and

a plurality of varactor cells that load the transmission line at a plurality of locations along the transmission line, each varactor cell being contiguous with adjacent varactor cells;

at least one of the plurality of varactor cells having a voltage-variable capacitance different from a voltage-variable capacitance of at least one other varactor cell, such that the varactor cells of the nonlinear transmission line are noncommensurate, with a first varactor diode means comprising at least one varactor diode in the at least one varactor cell being configured so that the amplitude of the propagating soliton is sufficient to fully deplete the first varactor diode means but is not sufficient to deplete a second varactor diode means comprising at least two stacked varactor diodes in the at least one other varactor cell.



5,023,575
COAXIAL ANTENNA SELECTOR MATRIX

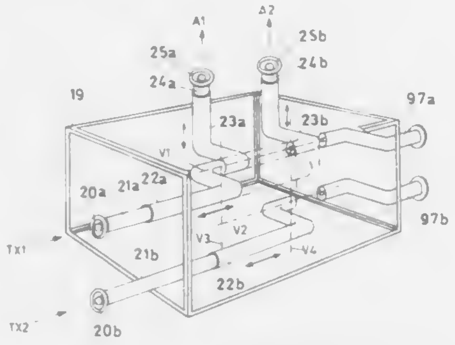
Stojan Davcev, Skopie, Yugoslavia, assignor to Asea Brown Boveri Ltd., Baden, Switzerland

Filed May 19, 1989, Ser. No. 354,369

Claims priority, application Switzerland, Jun. 8, 1988, 2179/88

Int. Cl.^{5} H01P *1/12*

U.S. Cl. 333—105 **9 Claims**



1. A coaxial antenna selector comprising:

a plurality of coaxial input lines for feeding-in RF power from corresponding RF transmitters;

a plurality of coaxial output lines for delivering the RF power to corresponding antennas; and

means for connecting any one of said input lines to any one of said output lines;

wherein each input line is associated with a single moving input line link element in the form of a coaxial line with a first line end and a second line end;

wherein each output line is associated with a single moving output line link element in the form of a coaxial line with a first line end and a second line end;

wherein each input line link element is electrically and movably connected at said first line end to the associated input line;

wherein each output line link element is electrically and movably connected at said first line end to the associated output line;

wherein each of said input line link elements is movable with said second line end along an associated first geometrical displacement line;

wherein each of said output line link elements is movable with said second line end along an associated second geometrical displacement line; and

wherein each of said first displacement lines intersects each of said second displacement lines thereby making up a plurality of line crosses; such that if any input line link element and any output line link element are moved with said second line end along their respective first and second displacement lines and meet at a line cross, they electrically contact each other with said respective second line ends.

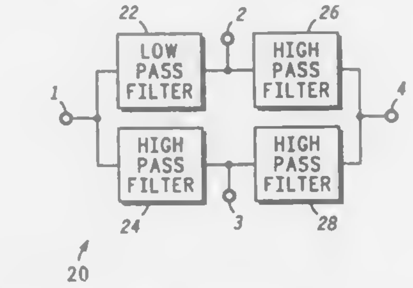
5,023,576
BROADBAND 180 DEGREE HYBRID

Joseph Staudinger, and Warren L. Seely, both of Chandler, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 4, 1989, Ser. No. 445,307

Int. Cl.^{5} H03H *7/21, 7/48*

U.S. Cl. 333—118 **9 Claims**



1. A 180 degree hybrid comprising:

first means for splitting a first input signal;

a first plurality of phase shifting means for generating a 180 degree phase differential between said split first input signal;

said first means coupled to a first input to receive said first input signal and coupled to said first plurality of phase shifting means to relay said split first input signals to said first plurality of phase shifting means;

said first plurality of phase shifting means coupled to a plurality of outputs;

said first plurality of phase shifting means comprising a high pass filter;

second means for splitting a second input signal;

a second plurality of phase shifting means for generating a substantially 0 degree phase differential between said split second signals;

said second means coupled to a second input to receive said second input signal and coupled to said second plurality of phase shifting means to relay said split second input signals to said second plurality of phase shifting means; and

said second plurality of phase shifting means coupled to said plurality of outputs.

5,023,577
FEEDTHROUGH RADIO FREQUENCY FILTER

Richard G. Drake, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 17, 1990, Ser. No. 524,395

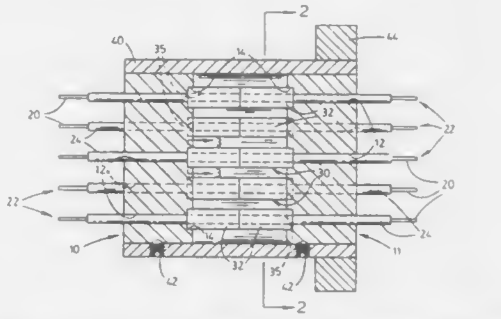
Int. Cl.^{5} H03H *7/01;* **H01R** *13/66*

U.S. Cl. 333—182 **20 Claims**

1. A feedthrough radio frequency filter for a plurality of physically parallel conductors, the filter comprising:

a plate defining therein a plurality of parallel openings corresponding individually to said conductors, each conductor extending through the one of said openings corresponding to the conductor;

a plurality of coverings constructed of dielectric material and corresponding individually to said conductors, each of said coverings circumscribing the one of said conductors corresponding to the covering and being disposed within the opening corresponding to said one conductor between said one conductor and said plate; and



a plurality of inductive elements corresponding individually to said conductors, each of said inductive elements being juxtapositioned to the plate and to the one of said conductors corresponding to the inductive element.

5,023,578
FILTER ARRAY HAVING A PLURALITY OF CAPACITANCE ELEMENTS

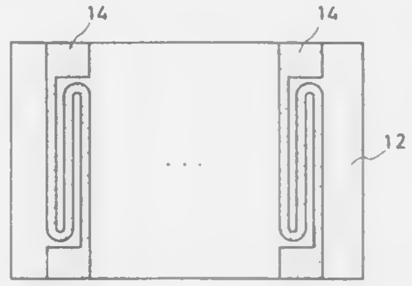
Toshimi Kaneko; Hidetoshi Yamamoto, and Takayuki Hirotsuji, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Continuation of Ser. No. 231,081, Aug. 11, 1988, abandoned. This application Feb. 14, 1990, Ser. No. 481,738

Claims priority, application Japan, Aug. 11, 1987, 62-123235; Dec. 21, 1987, 62-194177; Dec. 21, 1987, 62-194178

Int. Cl.^{5} H03H *7/01*

U.S. Cl. 333—185 **21 Claims**



19. A filter array which includes a plurality of capacitance elements, comprising:

a dielectric unit having a rectangular shape which defines a length direction and a width direction;

a plurality of individual electrodes formed on one main surface of said dielectric unit at predetermined intervals and extending fully across aid dielectric unit in said direction of width of said dielectric unit and terminating in respective ends, at least one of said plurality of individual electrodes forming a meandering pattern having at least two successive portions of said at least one electrode, both portions extending generally in said width direction, but being spaced from one another in said length direction, thereby providing generally opposite current path directions for a current in said electrode, wherein each of said individual electrodes is longer than a distance fully across aid dielectric unit in said direction of width;

a common electrode formed on another main surface of said dielectric unit so as to be opposite to said plurality of individual electrodes, said plurality of capacitance elements being formed by said dielectric unit, said common electrode, and respective ones of said plurality of individual electrodes;

a plurality of pairs of input and output terminals, each pair being connected to said respective ends of a respective one of said individual electrodes; and

VOL
1127
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1991
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a common terminal connected to said common electrode.

5,023,579

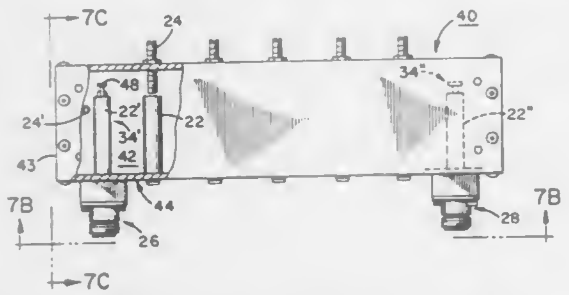
INTEGRATED BANDPASS/LOWPASS FILTER

Salvatore Bentivenga, and Michael J. Bentivenga, both of Parlin, N.J., assignors to Radio Frequency Systems, Inc., Marlboro, N.J.

Filed Jul. 10, 1990, Ser. No. 550,720

Int. Cl.^{5} H01P *1/205*

U.S. Cl. 333—203 30 Claims



1. An integrated bandpass/lowpass filter comprising:
(A) a bandpass filter having,
(1) a cavity,
(2) at least one resonator positioned within the cavity, and
(3) means for coupling electromagnetic energy into and out of the filter; and
(B) at least one integrated lowpass filter, each lowpass filter formed within one resonator of the bandpass filter, each lowpass filter having,
(1) at least one low impedance element positioned within the resonator,
(2) at least one high impedance element connected to the low impedance element and positioned within the resonator,
(3) means for coupling the output of the lowpass filter to the bandpass filter, and
(4) means for coupling the lowpass filter to the means for coupling electromagnetic energy into and out of the bandpass filter.

5,023,580

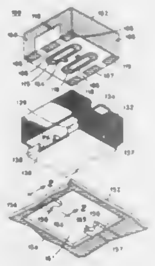
SURFACE-MOUNT FILTER

Jin D. Kim, Chicago, and William T. Waldie, Palatine, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 22, 1989, Ser. No. 455,062

Int. Cl.^{5} H01P *1/202;* **H04B** *1/50*

U.S. Cl. 333—206 24 Claims



1. A filter assembly, comprising:
surface-mount filtering means, comprising:
a dielectric block having top, bottom and side surfaces and having at least a first hole extending from the top surface toward the bottom surface, said bottom and side surfaces and said hole being substantially covered with a conductive material;
first electrode means disposed on the top surface of said dielectric block for capacitively coupling to said first hole;
bracket means for substantially enclosing the top surface of said dielectric block, said bracket means further having a first opening opposite to and exposing said first electrode means; and
circuit board means including;
an opening having a first tab for receiving said surface-mount filtering means; and
first coupling means disposed on said first tab for coupling to said first electrode means of said surfacemount filtering means.

5,023,581

ELECTROMAGNETIC SWITCH

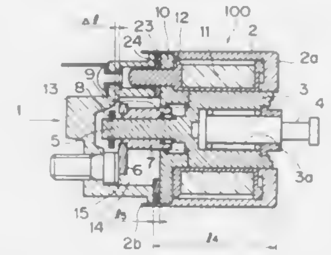
Takeshi Sugiyama, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 7, 1990, Ser. No. 476,228

Claims priority, application Japan, Feb. 20, 1989, 1-19294[U]

Int. Cl.^{5} H01H *67/02*

U.S. Cl. 335—126 6 Claims



1. An electromagnetic switch comprising:
a bottomed case;
a coil bobbin mounted with a solenoid and fitted in the case;
a plunger with an integral contact rod axially slidably received in the bore of the coil bobbin;
a stationary core fixedly held on the open end of the case so as to limit the range of movement of the plunger;
a contact holding member axially slidably mounted on the contact rod of the plunger and supported by the stationary core;
a moving contact held on the contact holding member;
a stopping member provided at the extremity of the contact rod of the plunger to limit the axial movement of the contact holding member toward the extremity of the contact rod;
a cap joined to the open end of case; and
a stationary contact attached to the cap opposite to the moving contact;
characterized in that elastic means is inserted between the cap and the stationary core to seal the gap between the cap and the stationary core and to exert a pressure to the cap, and the brim of the open end of the case is crimped by rolling in attaching the cap to the case so that the cap is held firmly in place on the case and the elastic means is compressed in a thickness to form an appropriate gap between the movable contact and the stopping means when the plunger is attracted to the stationary core and the movable contact is in contact with the stationary contact.

5,023,582

MOLDED CASE CIRCUIT BREAKER COMPACT LATCH ASSSEMBLY

Laura A. Williams, Plainville; Gary D. Magnon, Bristol; Michael C. von Kannewurff, Middlebury, and Raymond K. Seymour, Plainville, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed May 21, 1990, Ser. No. 526,481

Int. Cl.^{5} H01H *9/20*

U.S. Cl. 335—167 24 Claims

1. A multi-latch system for molded case circuit interrupters comprising:
a support frame including means for attaching to a circuit interrupter case and recess means for supporting a latch assembly;
a primary latch lever pivotally attached to said support frame within said recess means by a first pivot pin;
a secondary latch lever pivotally attached to said support frame proximate a top part of said primary latch by a second pivot pin;

a secondary latch spring arranged about said second pivot pin biasing said secondary latch lever to a rest position;
a tertiary latch lever pivotally attached to said support frame outboard said primary latch lever by a third pivot pin; and
a double-action spring arranged around said first pivot pin to allow said primary latch lever and said tertiary latch lever to automatically become reset.

5,023,583

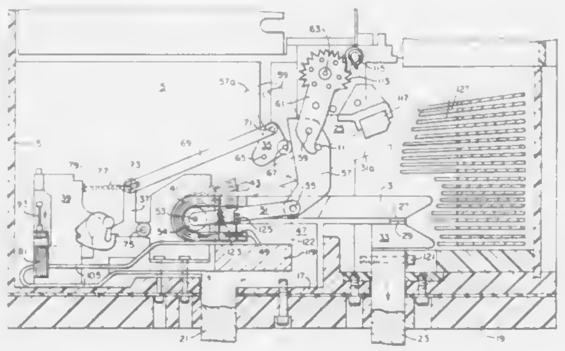
CIRCUIT BREAKER CONTACT OPERATING STRUCTURE

Walter V. Bratkowski, McKeesport; Daun Bhasavanich, Monroeville, and Norman Davies, Penn Township, Westmoreland County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 21, 1988, Ser. No. 260,767

Int. Cl.^{5} H01H *3/00, 77/00*

U.S. Cl. 335—195 5 Claims



5. A circuit breaker, comprising:
a pair of separable contacts including a movable contact and a fixed contact;
a movable contact arm carrying the movable contact and movable between open and closed positions of the contacts;
an operating mechanism for actuating the movable contact;
a first conductor in the electrical circuit of the circuit breaker, the movable contact arm being connected to said first conductor, said first conductor extending substantially parallel to said movable contact arm so as to cause an induced electromagnetic repulsion force between said first conductor and said movable contact arm when electrical current of a predetermined magnitude is flowing in each; and
a second conductor supporting said fixed contact and extending substantially parallel to said movable contact arm when said contacts are closed so as to cause an induced repulsion force between said second conductor and the portion of said arm adjacent to said movable contact when electrical current of predetermined magnitude is flowing therein.

5,023,584

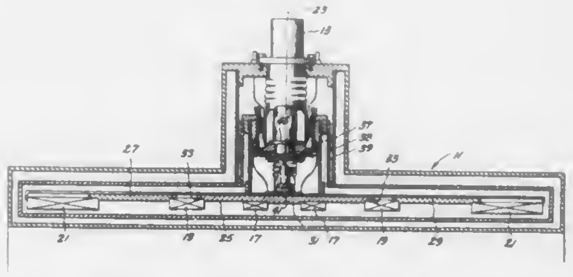
MAGNET CARTRIDGE FOR MAGNETIC RESONANCE MAGNET

Evangelos T. Laskaris, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 17, 1989, Ser. No. 395,636

Int. Cl.^{5} H01F *7/22*

U.S. Cl. 335—216 13 Claims



1. A magnet cartridge for use in MR magnets comprising:
a cylindrical sleeve of thermally conductive material defining a circumferentially extending rabbet on either end of the sleeve on the inner diameter;
two epoxy impregnated superconductive coils having the edge of outer diameter of each coil secured in one of the rabbets in said sleeve.

5,023,585

COMMON-MODE CHOKING COIL

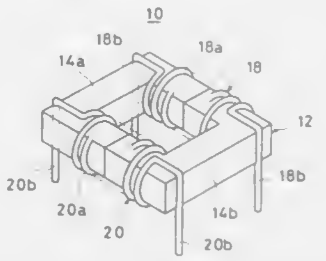
Shinichi Kurano; Masahiro Bando; Yasuhiro Mitsuya, and Takeshi Tanabe, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Nov. 17, 1989, Ser. No. 438,587

Claims priority, application Japan, Nov. 17, 1988, 63-150513; Jan. 13, 1989, 1-3200; Jan. 30, 1989, 1-21916

Int. Cl.^{5} H01F *15/14, 27/26*

U.S. Cl. 336—69 4 Claims



1. A common-mode choking coil comprising:
a closed magnetic path core formed by combining two partial cores, and
two single-layer-wound coils wound around two respective legs of said closed magnetic path core,
wherein said two coils are formed by winding respective conductor wires in opposite directions with respect to said closed magnetic path core; and
wherein said single-layer-wound coil is constituted by a

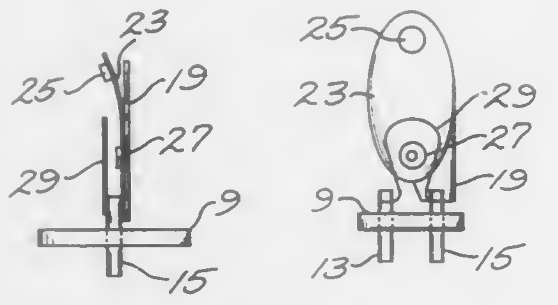
VOL
1127
ISS
2
JE
11
1991
UMI

wire-wound part formed by winding a conductor wire having a spring property, and lead parts extending from both ends of said wire-wound part, and said coil being mounted on the respective leg of said closed magnetic path core with said wire-wound part being pulled lengthwise and thereby stretched, and said coil being fixed to said closed magnetic path core by said lead parts which engage said two partial cores and draw them together by said spring property of said conductor wire; whereby said two partial cores are combined to form said closed magnetic path core.

5,023,586
HERMETIC MOTOR PROTECTOR

John R. D'Entremont, Foxboro, Mass.; Matthew L. Behler, Merrimack, N.H., and Gordon S. Swanson, Bellingham, Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 18, 1989, Ser. No. 452,182
Int. Cl.^{5} H01H *37/12, 37/52*
U.S. Cl. 337—104 4 Claims



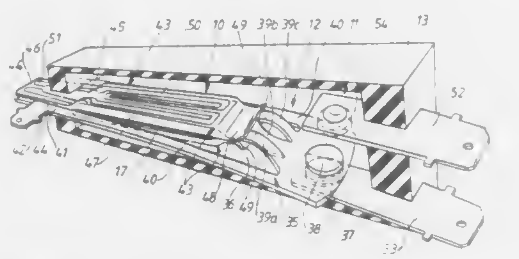
1. A motor protector comprising:
(a) an electrically conductive header having a pair of spaced apart pins extending therethrough and insulated therefrom and from each other, the pins having axes extending in a common plane:
(b) a contact member movable in response to heat having a major surface portion disposed in a second plane substantially parallel to said common plane including the axes of said pin, the contact member being connected to one of said pins by a weld disposed between said planes;
(c) a heater spaced from said contact member, coupled to each of said pins and disposed in an additional plane substantially parallel to said common plane including the axes of said pins; and
(d) electrically conductive can means normally contacting said contact member sealed to said header.

5,023,587
ARM FOR ELECTRIC SWITCHES AND THE LIKE CONTROLLED BY ELECTRICITY

Per-Marcus Bergquist, Lidingö, and Henrik E. Troberg, Tumba, both of Sweden, assignors to Electrolux Research & Innovation Aktiebolag, Stockholm, Sweden

Filed Jun. 6, 1990, Ser. No. 534,137
Claims priority, application Sweden, Jun. 12, 1989, 8902103
Int. Cl.^{5} H01H *61/00, 71/18*
U.S. Cl. 337—123 6 Claims

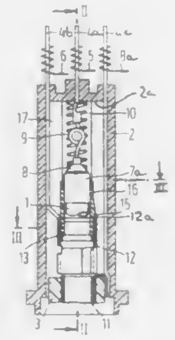
1. A switch which is controlled by electricity having a first fixed end and a second end movable perpendicular to the length direction of the arm, comprising two substantially parallel portions **(15, 16, 47, 57)** which are thermally separated from each other and are connected to each other at their ends, electrical heating means associated with at least one of said portions causing longitudinal differential expansion of said one portion with respect to the other of said portions to achieve said movement, said portions being shaped adjacent the end which is fixed (at **18, 45, 39**) to provide a reduced bending resistance compared with the remainder of said portions about an axis which is perpendicular to the length direction of said arm and to said direction of movement, said portions **(43, 58)** having a profile along the major part of the distance between said ends shaped to increase the bending resistance thereof, and said portions being flat and abutting each other in the area of reduced bending resistance.



5,023,588
HOLDER FOR A TUBULAR SAFETY FUSE

Claus-Peter Heitzig, Pfaffenhofen/Glonn, and Dietmar Schuetz, Germering, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 12, 1990, Ser. No. 581,374
Claims priority, application Fed. Rep. of Germany, Aug. 14, 1990, 9011813 [U]
Int. Cl.^{5} H01H *85/02, 85/46;* **H01R** *13/68*
U.S. Cl. 337—195 10 Claims

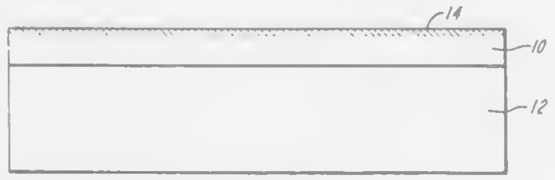


1. A holder arrangement for a tubular safety fuse, the tubular safety fuse having a first contact cap at one end and a second contact cap at an opposite end, comprising:
a front closure cap,
a receiving member, providing a cavity for receiving the fuse therein, said receiving member engageable with said front closure cap to hold said fuse into said cavity,
a first contact piece mounted resiliently to said receiving member, axially displaceable along an axis of installation of said tubular safety fuse into said cavity, said first contact piece abutting said first contact cap when said fuse is installed into said cavity,
a second contact piece mounted to said front closure cap, said second contact piece abutting said second contact cap when said fuse is installed into said cavity and said front closure cap is engaged to said receiving member,
a tubular middle contact mounted inside said cavity and surrounding said safety fuse when installed, and electrically contactable with said second contact piece upon closure of said front closure cap, said middle contact having a backside region projecting toward said first contact cap,
an insulating ring mounted inside said cavity and surrounding said safety fuse, and separating said safety fuse from said middle contact, said insulating ring having a longitudinal slot and a catch nose, said longitudinal slot providing flexibility to compress a diameter of said insulating ring to pass said insulating ring with said catch nose through said tubular middle contact, said catchy nose springing behind a back end edge of said middle contact to prevent retraction of said insulating ring once installed,
a first electrical line connected to said first contact piece providing an electrical connection to said safety fuse, and
a second electrical line connected to said middle contact and providing a second electrical connection to said safety fuse.

5,023,589
GOLD DIFFUSION THIN FILM RESISTORS AND PROCESS

Allen T. Hall, Forestdale, R.I., assignor to Electro-Films, Inc., Warwick, R.I.

Filed Sep. 8, 1989, Ser. No. 404,590
Int. Cl.^{5} H01C *1/012*
U.S. Cl. 338—308 5 Claims

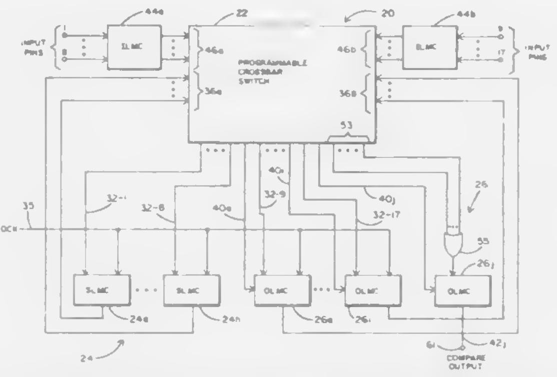


1. A thin film resistor, comprising:
a film of nickel-chromium alloy; and
gold diffused in at least one surface of said alloy film in an amount sufficient to cause the resistivity of the resulting composite to be between the resistivity of gold and the resistivity of said nickel-chromium alloy the diffused gold having a concentration gradient which is of highest concentration at or near said at least one surface.

5,023,590
17-BIT CASCADABLE COMPARATOR USING GENERIC ARRAY LOGIC

John R. Johnson, Laguna Hills, and Melvin W. Thexton, La Palma, both of Calif., assignors to Loral Aerospace Corp., New York, N.Y.

Filed Dec. 6, 1989, Ser. No. 446,965
Int. Cl.^{5} E06F *7/02*
U.S. Cl. 340—146.2 6 Claims

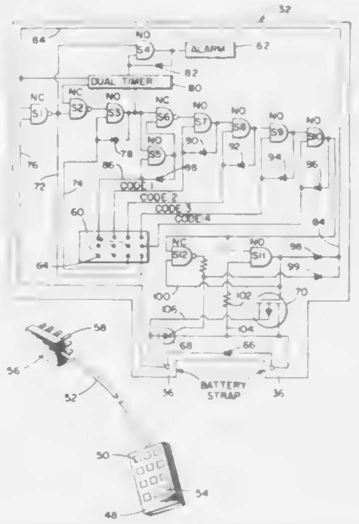


1. A cascadable self-testing comparator chip, comprising:
(a) a generic logic array chip including a pulsable clock, a plurality of input pins, a plurality of logic macro cells, and a programmable crossbar switch for selectably interconnecting the same;
(b) first interconnections programmed into said crossbar switch to connect said input pins to said macro cells, said macro cells being configured as registers storing data applied to said pins when said clock is pulsed;
(c) an output pin;
(d) an additional macro cell having its input connected to said crossbar switch and having its output connected to said output pin; and
(e) second interconnections programmed into said crossbar switch to produce a predetermined logic level at said input of said additional macro cell when the data applied to said input pins matches the data stored in said plurality of logic macro cells, said additional macro cell being configured to produce a predetermined output at said output pin in response to said predetermined logic level being produced at the input of said additional macro cell.

5,023,591
ANTI-THEFT CONTROL APPARATUS

Allen V. Edwards, 1528 Geraldine St., Bethlehem, Pa. 18017, assignor to Allen V. Edwards, Bethlehem, Pa.

Filed Nov. 15, 1989, Ser. No. 437,279
Int. Cl.^{5} B60R *25/00*
U.S. Cl. 340—426 13 Claims

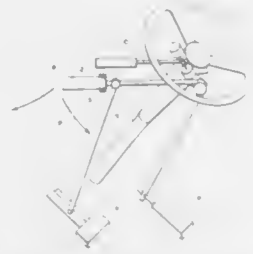


1. A system for deterring theft of a motor vehicle comprising:
a battery having a plurality of cells providing electrical energy for the motor vehicle; and
interface means within said battery for electrically connecting adjacent ones of said cells of said battery to provide electrical continuity between said cells by reason of which an EMF is generated, said interface means being selectively operable for disconnecting said adjacent cells to interrupt generation of an EMF thereby rendering said battery inoperative, said interface means including electronic circuitry coupled to a plurality of code entry switches and responsive to a predetermined sequential activation thereof for providing electrical continuity between the cells in one instance and for preventing electrical continuity in another instance.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,592
TURN SIGNAL ACTUATOR FOR MOTOR VEHICLE HAND CONTROLS

Larry L. Schumacher, 18876 Tenderfort Trail, Newhall, Calif. 91321
Filed Jul. 13, 1990, Ser. No. 552,312
Int. Cl.⁵ B60Q *1/34;* **H01H** *9/00*
U.S. Cl. 340—475 3 Claims



1. An apparatus for electrically controlling a motor vehicle turn signal arm from a hand control accelerator-brake grip comprising:

an electrical signal arm actuator attached to a motor vehicle steering column being used to rotate the motor vehicle turn signal arm;

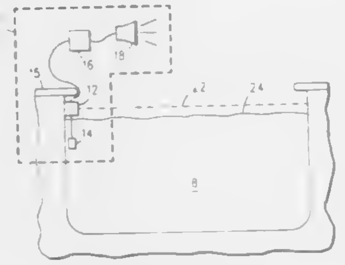
an electrical left turn signal switch attached to the hand control accelerator-brake grip and linked by an electrical circuit to the electrical signal arm actuator, the electrical left turn signal switch being used to actuate the electrical signal arm actuator signaling a motor vehicle left turn;

an electrical right turn signal switch attached to the hand control accelerator-brake grip and linked by an electrical circuit to the electrical signal arm actuator, the electrical right turn signal switch being used to actuate the electrical signal arm actuator signaling a motor vehicle right turn;

a linkage structure attaching the electrical signal arm actuator to the motor vehicle turn signal arm, the linkage structure rotating the turn signal arm in response to the electrical signal actuator while permitting a motor vehicle operator to rotate the motor vehicle turn signal arm without interference from the electric signal arm actuator.

5,023,593
PASSIVE INFRARED/ACOUSTIC POOL SECURITY SYSTEM

Steven E. Brox, 5246 E. Glencove Cir., Mesa, Ariz. 85205
Continuation of Ser. No. 569,211, Aug. 20, 1990, abandoned, which is a continuation of Ser. No. 336,140, Apr. 11, 1989, abandoned. This application Dec. 26, 1990, Ser. No. 632,625
Int. Cl.⁵ G08B *21/00, 13/18*
U.S. Cl. 340—522 7 Claims



1. A security system for detecting the entry of a heat-emitting body into a defined liquid pool and producing an alarm, said system comprising in combination:

(a) an alarm;

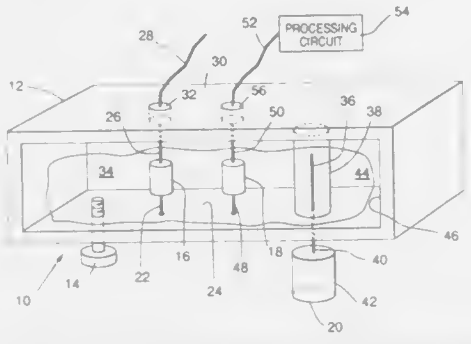
(b) at least one infrared sensor to detect said body in proximity to the surface of said pool and to generate a first signal in response thereto;

(c) at last one transducer to detect waves produced by said body at or below sonic frequencies and to generate a second signal in response thereto;

(d) a controller to receive said first and second signals and activate said alarm in response thereto.

5,023,594
CEILING MOUNT MICROWAVE TRANSCEIVER WITH 360 DEGREE RADIATION PATTERN

John D. Wallace, San Jose, Calif., assignor to C & K Systems, Inc., San Jose, Calif.
Filed Mar. 1, 1990, Ser. No. 487,413
Int. Cl.⁵ G08B *13/18*
U.S. Cl. 340—552 14 Claims



1. An improvement in an apparatus for the transmission and reception of electromagnetic radiation, said apparatus having generator means for generating transmitted electromagnetic radiation for transmission at a transmission frequency, cavity means for propagating said transmitted radiation in a waveguide mode, and reception means for receiving and converting received electromagnetic radiation into a received electrical signal, wherein said improvement comprises:

antenna means for radiating said transmitted radiation and collecting said received radiation within a spatial region elevated from and extending substantially radially outward and 360° in azimuth with respect to said antenna means, said spatial region having a substantially spatulate radial cross-section;

pickup means electrically connected to said antenna means and positioned within said cavity means for receiving and converting said propagated transmitted radiation from said waveguide mode to a coaxial mode and for converting said collected received radiation from a coaxial propagation mode to a waveguide propagation mode; and

filter means for substantially shunting to ground reference said propagated transmitted radiation comprising substantially the second harmonic of said transmission frequency.

5,023,595
MAIL ARRIVAL SIGNAL SYSTEM

Charles S. Bennett, P.O. Box 1531, Mercer Island, Wash. 98040
Filed Feb. 27, 1989, Ser. No. 316,897
Int. Cl.⁵ G08B *13/14;* **H01H** *3/16;* **B65D** *91/00*
U.S. Cl. 340—569 19 Claims

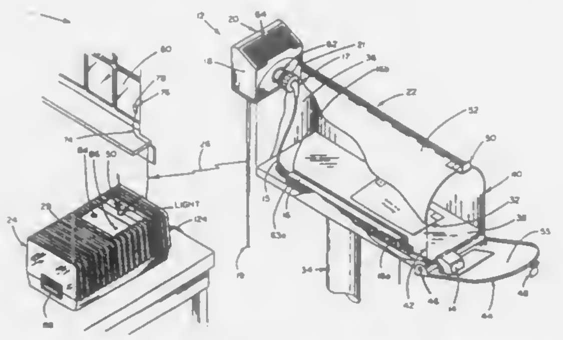
1. An automatic system for signalling arrival of mail, said signal system for use with a mailbox of a type comprised of an elongated container having a bottom, sidewalls, a rear end, and an open end, said open end having attached thereto a door, said door being outwardly pivotable, manually movable, and normally closed, said signal system comprising in combination:

(a) a transmitter assembly for placement at said mailbox, comprising:

(i) radio-frequency transmitter means, said transmitter means including high efficiency thin film solar cells, said solar cells adapted to collect sunlight falling thereon and to generate a direct-current output therefrom, said transmitter means also including direct-current storage means adapted to receive said direct current output from said solar cells and to store electrical energy in response thereto; and

(ii) a transmitter housing adapted to enclose said transmitter means; and

(iii) switch means internally mounted on said floor, said switch means electrically connected to said transmitter means, said switch means responsive to angular displacement of said door by an angle Alpha (α), said response of said switch means operating to trigger emission of a radio frequency signal by said transmitter means; and



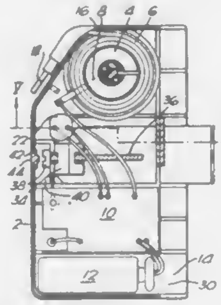
(b) a receiving and signalling assembly for placement at a remote location, said assembly comprising:

(i) a receiving antenna, said receiving antenna adapted to detect said radio frequency signal radiated by said transmitter means, and

(ii) a radio-frequency receiver, said receiver tuned to receive said signal radiated by said transmitter means and detected by said receiving antenna means, said receiver further including an alarm means, said alarm means responsive to signals received by said receiver to provide a signal indicating the arrival of mail.

5,023,596
BICYCLE ALARM

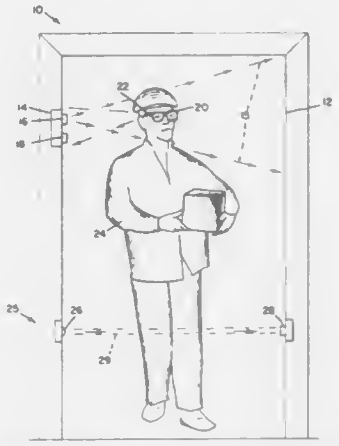
James B. Sirman, Surbiton, and Ivan F. S. Foti, Hounslow, both of England, assignors to Datatool Alarms Limited, London, England
Filed Jan. 24, 1990, Ser. No. 469,388
Claims priority, application United Kingdom, Oct. 13, 1989, 8923105
Int. Cl.⁵ G08B *13/14*
U.S. Cl. 340—571 9 Claims



1. An alarm lock comprising:
a casing;
said casing containing: an alarm circuit a siren connected to said alarm circuit and a battery compartment;
means for arming said alarm circuit;
a security cable connected to said alarm circuit one end of said cable being secured to said casing;
releasable connector means on the other end of said cable; and
co-operating connector means on said casing, whereby said siren is triggered by unauthorised removal of said connector or unauthorised disconnection or breaking of said cable;
a releasable strap for attachment of said casing to a part of an article to be secured;
and an access opening in said casing for said battery compartment, said access opening being so arranged as to be obstructed by said article, when said casing is attached there; one end of said strap comprising threaded adjustment means, the casing carrying cooperating means whereby the position of the strap, relative to the casing, may be adjusted, and the other end of said strap carrying hook means, the casing incorporating an aperture on its external surface adapted to receive said hook whereby the alarm lock can be attached to said article by passing said strap around said article, engaging said hook in said aperture, and tightening said adjustment means.

5,023,597
DETECTION APPARATUS FOR SAFETY EYEWEAR

Richard Salisbury, 24331 Rhona Dr., Laguna Niguel, Calif. 92656
Filed Feb. 28, 1990, Ser. No. 486,537
Int. Cl.⁵ G08B *13/14*
U.S. Cl. 340—572 **14 Claims**



1. A detection apparatus for monitoring specified safety eyewear being worn by persons who are passing through an entryway into a designated area which requires that persons in said area be wearing said specified safety eyewear, said detection apparatus comprising:

(a) an infrared reflector which reflects infrared radiation and which is fixed to said specified eyewear,

(b) an infrared transmitter which is located at one side of said entryway for transmitting a beam of infrared radiation toward the opposite side of said entryway so that at least a portion of said beam is reflected back to said one side by the reflector of said specified eyewear which is worn by a person who is passing through said entryway,

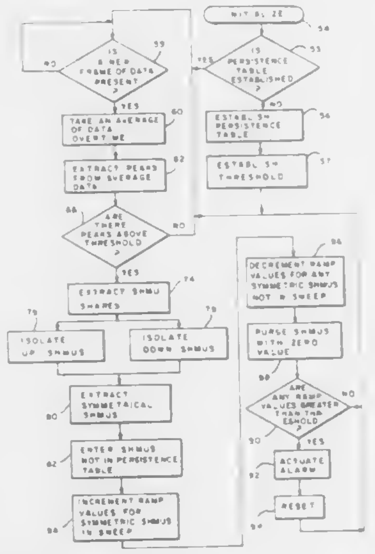
(c) a receiver which is located at said one side of said entryway for receiving said reflected infrared radiation, and

(d) an alarm which is normally inactive and which is operatively connected to said transmitter and said receiver, said alarm remaining inactive when a beam of infrared radiation is transmitted by said transmitter and reflected to said receiver, said alarm being activated when a beam of infrared radiation is transmitted by said transmitter and no reflected infrared radiation is received by said receiver.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,598
DIGITAL SIGNAL PROCESSOR FOR ELECTRONIC ARTICLE GATES

Kenneth C. Zemlok, Shelton, and Andrei Obrea, Bethel, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.
Filed Jan. 2, 1990, Ser. No. 459,610
Int. Cl.^{5} G08B *13/18*
U.S. Cl. 340—572 **6 Claims**


INITIALIZE
IS A NEW FRAME OF DATA PRESENT ?
NO
YES
TAKE AN AVERAGE OF DATA OVER TIME
EXTRACT PEAKS FROM AVERAGE DATA
ARE THERE PEAKS ABOVE THRESHOLD ?
EXTRACT SHMU SHAPES
ISOLATE UP SHMUS
ISOLATE DOWN SHMUS
EXTRACT SYMMETRICAL SHMUS
ENTER SHMUS NOT IN PERSISTENCE TABLE
INCREMENT RAMP VALUES FOR SYMMETRIC SHMUS IN SWEEP
IS PERSISTENCE TABLE ESTABLISHED ?
ESTABLISH PERSISTENCE TABLE
ESTABLISH THRESHOLD
DECREMENT RAMP VALUES FOR ANY SYMMETRIC SHMUS NOT IN SWEEP
PURGE SHMUS WITH ZERO VALUE
ARE ANY RAMP VALUES GREATER THAN THRESHOLD ?
ACTUATE ALARM
RESET

1. An article surveillance system for processing signals that includes a generator for generating a frequency sweeping electromagnetic field within an interrogation zone, a receiver for receiving signals that are induced in a marker within such zone for the purpose of detecting the presence of a marker and an alarm in communication with the receiver for indicating the presence of a marker in the interrogation zone, the signal receiver comprising:
- means for averaging the signals received over time,
- means for extracting peaks from said signals received,
- means for creating a peak threshold,
- means for identifying peaks above said threshold,
- means for extracting SHMU's, shape-recognized sequences of peaks corresponding to the presence of a marker, from said identified peaks,
- means for separating up-sweeping SHMU's from down-sweeping SHMU's,
- means for determining symmetrical SHMU's i.e., those present during both "up" and "down" sweeps,
- means for establishing a persistence table containing signals corresponding to SHMU's present over a determined number of up-sweep and down-sweep cycles,
- means for entering signals corresponding to new symmetrical SHMU's into said persistence table, and
- means for determining if the number of cycles of the signals corresponding to symmetrical SHMU's in said persistence table is, above a threshold, whereby upon a finding that the number of cycles of signals corresponding to symmetrical SHMU's in the persistence table is above said threshold, the signal receiver will enable the alarm.

5,023,599
THROTTLE POSITION SENSOR ADVANCED BRAKE LIGHT DEVICE

Steven R. Mitchell, Niles, Mich., and Vernon M. Daly, Jr., Mishawaka, Ind., assignors to CTS Corporation, Elkhart, Ind.
Filed Jun. 22, 1989, Ser. No. 370,591
Int. Cl.^{5} B60Q *1/50*
U.S. Cl. 340—467 **3 Claims**

1. A method for signalling a rapid deceleration of an engine powered means for motion comprising the steps of:
- monitoring a first amount of demand for said engine power;
- converting said first amount of demand into a first voltage substantially proportional to a rate of change of said first amount;
- providing a reference voltage;
- adjusting said reference voltage with a second CTS-641 Throttle Position Sensor Advanced Brake Light Device

voltage substantially proportional to said first amount of demand to thereby produce an adjusted reference voltage;
- delaying changes in said adjusted reference voltage relative to changes in said first voltage to produce a delayed adjusted reference voltage;
- comparing said delayed adjusted reference voltage with said first voltage to provide a result;
- initiating the lighting of a signal responsive to said result

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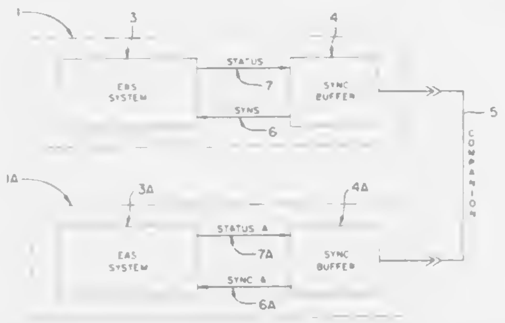
5,023,600
ELECTRONIC ARTICLE SURVEILLANCE SYSTEM WITH ADAPTIVENESS FOR SYNCHRONIZATION WITH COMPANION SYSTEMS

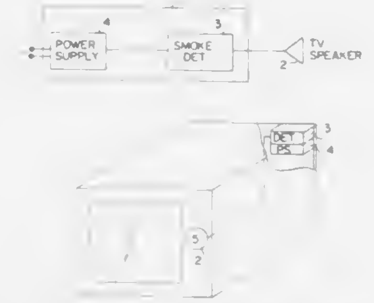
Craig R. Szklany, Boynton Beach, and Frank Drucker, Tamarac, both of Fla., assignors to Sensormatic Electronics Corporation, Deerfield Beach, Fla.
Filed Apr. 10, 1990, Ser. No. 507,619
Int. Cl.^{5} G08B *13/14*
U.S. Cl. 340—572 **8 Claims**



1. In combination, an electronic article surveillance system for disposition in an area to be subjected to such surveillance and control circuit means connected with said system, said system generating a readiness signal when prepared to effect electronic article surveillance and being thereafter responsive to an input signal to commence electronic article surveillance, said control circuit means being responsive to said readiness signal selectively to generate said input signal and being adapted to suppress generation of said input signal responsively to further input to said control circuit means indicative of the existence of a predetermined condition.

5,023,601
SMOKE DETECTOR FOR TV

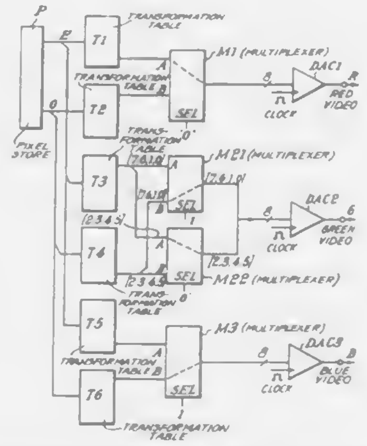
Patrick J. McGannon, 2797 Stevens St., Oceanside, N.Y. 11572
Filed Feb. 27, 1989, Ser. No. 316,079
Int. Cl.^{5} G08B *17/10*
U.S. Cl. 340—628 **2 Claims**



1. In a conventional T.V. having a speaker and a source of power,
- a smoke detector, a first frequency oscillator, the output of the smoke detector being connected to said oscillator,
- a power supply connected to the T.V. source of power, the output of said power supply being connected to said smoke detector,
- the smoke detector and power supply being packaged together and installed inside the case of the T.V.,
- a second oscillator, having a second frequency and means connected to the oscillators to heterodyne the first and second frequencies to emit a plurality of frequencies, wherein the output of said means to heterodyne the first and second frequencies is connected to said speaker.

5,023,602
RASTER GRAPHICAL DISPLAY APPARATUS

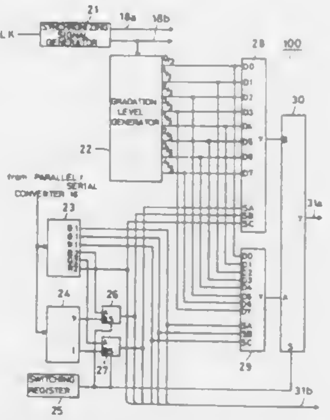
Mark C. Elgood, Guildford, and Richard J. Jales, West Sussex, both of England, assignors to Sigmex Limited, England
Continuation of Ser. No. 1,635, Nov. 20, 1986, Pat. No. 4,829,291. This application Oct. 6, 1988, Ser. No. 254,491
Claims priority, application United Kingdom, Mar. 27, 1985, 8507988
The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.
Int. Cl.^{5} G09G *1/16*
U.S. Cl. 340—701 **2 Claims**



1. Raster graphical display apparatus comprising means for providing, in a first operating mode, a video raster signal based on a resolution of x pixels per line and y lines where x and y are non-zero integers, a pixel store arranged to provide n planes per pixel where n is a non-zero integer and thus 2^n color possibilities per pixel, means for selecting a second operating mode providing a video raster subdivided into micro-pixels and based on a resolution of x/ml macro pixels per line an y/m^2 lines, each macro-pixel comprising a rectangular array of pixels to make available mn planes per macro-pixel in the pixel store, where m is an integer greater than 1 and m=m1.m2 where m1 is a non-zero integer denoting the dimension of each macro-pixel along the scan lines and expressed in pixels, and m2 a non-zero integer denoting the dimension of each macro-pixel transverse to the scan lines and expressed in lines of the first operating mode raster, whereby each macro-pixel can contain up to m times as much color information as each pixel for a corresponding trade-off in resolution.

5,023,603
DISPLAY CONTROL DEVICE

Kingo Wakimoto, Itami, and Kousaku Takeda, Kamakura, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed May 31, 1989, Ser. No. 359,324
Claims priority, application Japan, Feb. 21, 1989, 1-42475
Int. Cl.^{5} G09G *3/00*
U.S. Cl. 340—793 **8 Claims**


CLK
21
18a
18b
28
100
GRADATION LEVEL GENERATOR
30
22
from PARALLEL / SERIAL CONVERTER 16
23
31a
24
26
27
29
SWITCHING REGISTER
25
31b

1. A display control device for displaying a picture in gradation on a monochrome display device, comprising:
- a gradation level generator for generating a plurality of gradation levels;
- a color data generator for generating color data on said picture;
- a monochrome data generator for generating monochrome data on said picture;
- a switching signal generator for generating first and second switching signals; and
- a gradation level selecting circuit connected to said gradation level generator, color data generator, monochrome data generator and switching signal generator, for selecting one of said plurality of gradation levels in accordance with at least said monochrome data to output it to said monochrome display device when said first switching signal is received from said switching signal generator and selecting one of said plurality of gradation levels in accordance with said color data to output it to said monochrome display device when said second switching signal is received from said switching signal generator.

5,023,604
COMMUNICATION SYSTEM

Akihiko Takase, Tokyo, and Yoshitaka Takasaki, Tokorozawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Aug. 17, 1988, Ser. No. 233,096
Claims priority, application Japan, Aug. 24, 1987, 62-208114
Int. Cl.^{5} H04J *3/02*
U.S. Cl. 340—825.03 **4 Claims**

1. A data exchange network system comprising:

VOL
1127
ISS
2
JE
11
1991
UMI

a first group of network terminations, each having a first terminal device;

a first concentrator connected with each of the network terminations;

a first switch connected with the first concentrator;

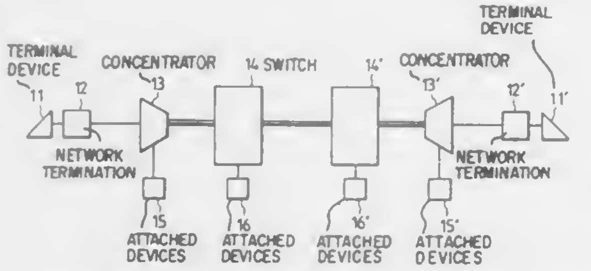
a second switch connected with the first switch;

a second concentrator connected with the second switch;

a second group of network terminations, each having a second terminal device, connected with the second concentrator; and

attached devices for data transmission connected with the first concentrator, the first and second switches, and the second concentrator, the attached devices preparing a waiting queue of a right of transmission;

wherein the first concentrator sending a synchronization pattern to a first network termination in the first group after receiving a call request from a first terminal device of the first terminal devices to establish a frame synchronization, said first network termination sending a destination number and a communication mode identification signal to the second concentrator through the first concentrator and the first and second switches to select a path of transmission, the path being registered and maintained as a transfer mode in the attached devices, the second concentrator activating a second network termination in the second group to establish a frame synchronization therewith, said second network termination returning a response signal to said first network termination, the first network termination sending a data request signal to a second terminal device of said second termination, said second terminal device sending data through said path, after receiving said data, said first terminal device sending a hold signal to the first and second concentrator and to the first and second switches to place a right of use of transmission through said path in a waiting queue, said first network termination sending another destination number upon a request of another data transmission by said first terminal device, and thereafter repeating the same steps until the call is reset or disconnected.



5,023,605

PATTERNED TRANSDUCER APPARATUS FOR CORRECTING SPURIOUS SIGNALS IN SAID DEVICES

James R. McColl, Concord, Mass., assignor to GTE Laboratories, Inc., Danvers, Mass.

Continuation of Ser. No. 276,072, Nov. 25, 1988, Pat. No. 4,945,354. This application Jan. 19, 1990, Ser. No. 467,112

The portion of the term of this patent subsequent to Jul. 31, 2007, has been disclaimed.

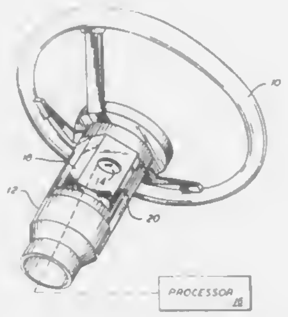
Int. Cl.⁵ G06F *7/00*

U.S. Cl. 340—825.31 **17 Claims**

1. A security device for a motor vehicle that provides a coded surface acoustical wave which is converted to an electrical signal for comparison with a preset code, said security device comprising:

a substrate having means defining an acoustical wave path; and

a pattern of transducers disposed upon said substrate for providing said coded surface acoustical wave, including a plurality of spaced-apart tap transducers disposed along said acoustical wave path and operatively connected to a main transducer, at least one of said tap transducers is disposed upon said substrate to produce a signal pulse of opposite phase but approximately equal amplitude with respect to a crosstalk signal pulse in order to cancel same, and said pattern of transducers being further characterized by being operative to propagate acoustical waves in a relative direction towards and away from said main transducer to provide a bidirectional wave propagation with respect to said substrate.



5,023,606

PROGRAMMABLE LOGIC DEVICE WITH GANGED OUTPUT PINS

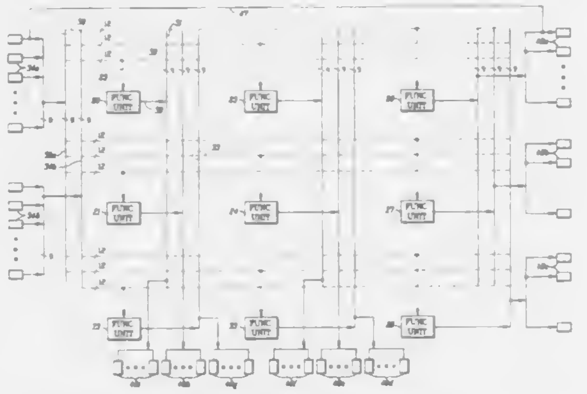
Cecil H. Kaplinsky, Palo Alto, Calif., assignor to Plus Logic, Inc., San Jose, Calif.

Continuation-in-part of Ser. No. 143,619, Jan. 3, 1988, Pat. No. 4,847,612. This application May 9, 1989, Ser. No. 349,581

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.⁵ H04Q *1/00*

U.S. Cl. 340—825.8 **10 Claims**



1. A programmable logic device comprising,

a plurality of functional units, each functional unit having a set of inputs and a set of outputs, each functional unit being individually programmable for carrying out one or more specified logic functions, each functional unit being a programmable logic device with an AND array and an OR array connected to the AND array,

a first set of conductive lines, each line of said first set being permanently connected to an output from an OR array of one of said functional units,

a second set of conductive lines, each line of said second set being permanently connected to an input to an AND array of one of said functional units,

wherein said second set of conductive lines cross said first set of conductive lines, areas where said first and second sets of conductive lines cross forming at least one programmable interconnection matrix, said at least one matrix including programmable links at the intersections of each conductive line of the first set with a conductive line of the second set, each of said links being selectively openable and closable so as to connect any output of any functional unit to any input of any functional unit,

a plurality of input pins, each input pin being selectively connectable to at least one conductive line of said second set, and

a plurality of output pins, each output pin being permanently connected directly to one conductive line of said first set.

5,023,607

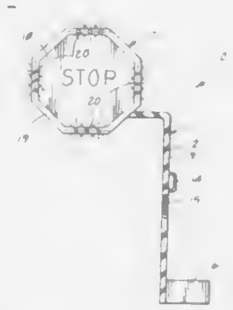
PEDESTRIAN CROSSING SAFETY APPARATUS

Roy G. Staten, 2275 Palm Ave. #79, San Diego, Calif. 92032

Filed Jun. 21, 1990, Ser. No. 541,326

Int. Cl.⁵ G08G *1/00*

U.S. Cl. 340—908.1 **8 Claims**



1. A pedestrian crossing safety apparatus comprising,

an L-shaped support shaft, the L-shaped support shaft including an alternating first reflective spiral coloration stripe coextensively directed about the L-shaped support shaft defining a second reflective coloration stripe of a contrasting coloration relative to the first coloration, and

the L-shaped support shaft including a horizontal shaft and a vertical shaft, and

a battery storage container mounted to the vertical shaft and a sign member mounted to the horizontal shaft with a light switch member mounted within the vertical shaft,

light means mounted about the sign member to effect selective flashing of the light means upon actuation of the switch member, and

wherein the sign member includes a reflective first sign coloration defining a central panel of the sign member with the sign member including a forward and rear central panel of identical configuration with each said central panel including a stop indicia designation within the central panel, and each said central panel including a continuous border including a forward border surface positioned about the forward central panel and a rear border surface positioned about the rear central panel with said border including a second sign coloration contrasting the first sign coloration with the light means positioned within the second sign coloration of the border to include a series of four flashing light sets mounted on the rear border surface about the sign member and the light means further including a further series of four flashing light sets mounted on the forward border surface of the sign member.

5,023,608

FUEL FILLER ALARM FOR BOATS

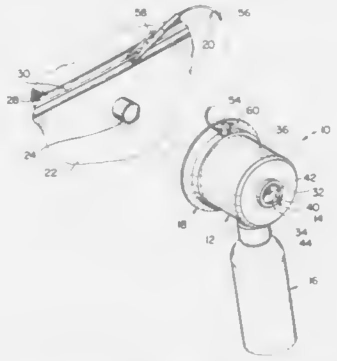
Robert L. Delisle, Jr., 8 Landover Dr., East Greenwich, R.I. 02818, and Douglas J. Goss, North Kingstown, R.I., assignors to Robert L. Delisle, Jr.

Filed Feb. 24, 1989, Ser. No. 315,132

Int. Cl.⁵ G08B *3/00*

U.S. Cl. 340—984 **7 Claims**

1. A fuel filler alarm for a boat comprising whistle means operable in response to an air stream passing through a fuel tank vent on an exterior hull surface of the boat during a fueling operation for producing an audible sound, a housing having an aperture therein, said whistle means being received in said aperture, securing means for detachably securing said housing to the hull of said boat so that said housing encircles said vent causing air passing through said vent to pass through said housing and outwardly through said whistle means to produce an audible sound and receiver means on said housing for receiving and containing fuel spilled from said vent, said receiver means being detachable from said boat hull with said housing.



5,023,609

DIGITAL DEEMPHASIS CIRCUIT

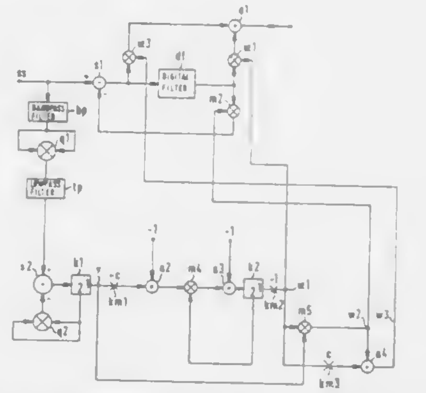
Werner Reich, Emmendingen, Fed. Rep. of Germany, assignor to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

Filed May 15, 1989, Ser. No. 352,228

Claims priority, application European Pat. Off., Jun. 7, 1988, 88109041

Int. Cl.⁵ H04N *5/60*

U.S. Cl. 341—50 **8 Claims**



1. A digital deemphasis circuit for a volume-compressed, amplitude-normalized audio signal digitized in the two's complement binary system, said digital deemphasis circuit having an input terminal to receive a digitized audio input signal and an output terminal that provides a deemphasized audio output signal, said digital deemphasis circuit comprising:

a first subtracter having a minuend input, a subtrahend input and an output, said minuend input receiving said digitized audio signal;

a digital filter having an input and an output, said digital filter having a transfer function

$$F(z)=(b-ac)/(z+a),$$

where z is the complex frequency variable, and a, b, c are constants that determine the frequency response of said digital filter, said input of said digital filter connected to the output of said first subtracter;

a first multiplier having a first input, a second input and an

VOL
1127
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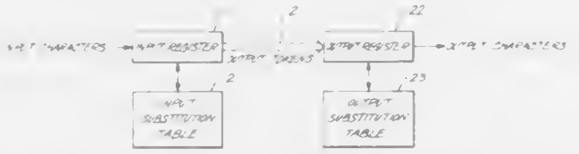
output, said first input connected to said output of said digital filter;
a second multiplier having a first input, a second input and an output, said first input connected to said output of said digital filter;
a third multiplier having a first input, a second input and an output, said first input connected to said output of said first subtracter;
a first adder having a first input, a second input and an output, said first input connected to said output of said first multiplier and said second input connected to said output of said third multiplier, said output of said first adder connected to said output terminal to provide said deemphasized audio output signal;
a band-pass filter having an input and an output, said input of said band-pass filter connected to said input terminal to receive said digitized audio signal,
a first squarer having an input and an output, said input of said first squarer connected to said output of said band-pass filter;
a low-pass filter having an input and an output, said input of said low-pass filter connected to said output of said first squarer, said low-pass filter having a cutoff frequency on the order of 10 Hz;
a second subtracter having a minuend input, a subtrahend input and an output, said minuend input connected to said output of said low-pass filter;
a first accumulator having an input and first and second outputs, said input of said first accumulator connected to said output of said second subtracter, said first output of said first accumulator providing a first accumulator output signal;
a second squarer having an input and an output, said input of said second squarer connected to said second output of said first accumulator, said output of said second squarer coupled to said subtrahend input of said second subtracter;
a first constant multiplier having an input and an output, said input of said first constant multiplier connected to said first output of said first accumulator to receive said first accumulator output signal, said first constant multiplier multiplying said first accumulator output signal by a constant $-c$;
a second adder having a first input, a second input and an output, said first input of said second adder connected to said output of said first constant multiplier, said second input of said second adder connected to receive a constant digital signal having a value of -1;
a fourth multiplier having a first input, a second input and an output, said first input of said fourth multiplier connected to said output of said second adder;
a third adder having a first input, a second input and an output, said first input of said third adder connected to said output of said fourth multiplier, said second input of said third adder connected to receive a constant digital signal having a value of -1;
a second accumulator having an input, a first output and a second output, said input of said second accumulator connected to said output of said third adder, said second output of said second accumulator connected to said second input of said fourth multiplier, said second accumulator providing a second accumulator output signal on said first output;
a second constant multiplier having an input and an output, said input connected to said first output of said second accumulator to receive said output signal from said second accumulator, said second constant multiplier multiplying said output signal from said second accumulator by a constant -1, said output of said second constant multiplier connected to said second input of said first multiplier;
a fifth multiplier having a first input, a second input and an output, said first input connected to said first output of said first accumulator, said second input connected to said output of said second constant multiplier, said output of said fifth multiplier connected to said second input of said second multiplier;
a third constant multiplier having an input and an output, said input connected to said output of said second constant multiplier, said third constant multiplier multiplying said output signal from said second constant multiplier by a constant c; and
a fourth adder having a first input, a second input and an output, said first input connected to said output of said fifth multiplier, said second input connected to said output of said third constant multiplier, said output of said fourth adder connected to said second input of said third multiplier.

5,023,610

DATA COMPRESSION METHOD USING TEXTUAL SUBSTITUTION

Keith A. Rubow, Glendora, and Robert D. Wachel, South Pasadena, both of Calif., assignors to Cordell Manufacturing, Inc., Covina, Calif.

Filed Jun. 13, 1990, Ser. No. 537,502
Int. Cl.^{5} H03M *7/30*
U.S. Cl. 341—51 **9 Claims**



1. A data compression and decompression method for compressing digital data and recovering the original data from the compressed data comprising the steps of:
(a) parsing a stream of input character symbols, wherein said parsing step comprises the steps of:
  (i) defining two identical search trees, an input search tree and an output search tree, each tree having a plurality of nodes and branches associated with each node, each node having a plurality of incoming branches and a plurality of outgoing branches, each node being representative of any combination of character symbols or node symbols, wherein a node symbol is a parsed character stream having a plurality of individual character symbols;
  (ii) tracing said stream of input data symbols through input search tree by substituting consecutive characters symbols with a single node symbol from the input search tree representative of the substituted characters symbols;
  (iii) tracing said stream of input character symbols through the input search tree by substituting combinations of a character and a node symbol with a single node symbol from the input search tree;
  (iv) tracing said stream of input character symbols through the input search tree by substituting combinations of two node symbols with a single node symbol from the input search tree;
(b) transmitting unparsed characters;
(c) transmitting parsed input data symbols in the form of node symbols;
(d) replacing node symbols in the input search tree with new node symbols representative of substitutions made in the tracing steps;
(e) receiving the transmitted character and node symbols;
(f) expanding the received node symbols wherein the expanding step comprises the steps of:
  (i) tracing the received node symbols through the output search tree;
  (ii) substituting for each received node symbol the node or character symbols the received node symbol is representative of according to the output search tree; and

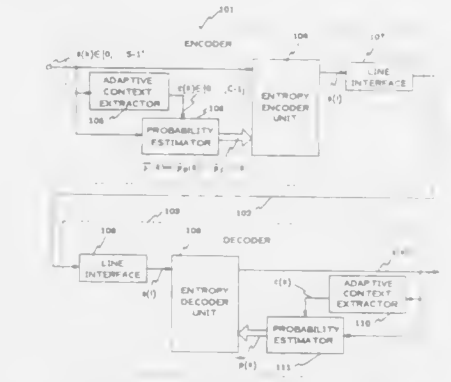
(g) repeating the expanding step until the original received node symbol is expanded to only character symbols;
(h) replacing node symbols in the output search tree with new node symbols representative of substitutions made in the expanding step; and
(i) returning to the parsing step to input new character symbols.

5,023,611

ENTROPY ENCODER/DECODER INCLUDING A CONTEXT EXTRACTOR

Christodoulos Chamzas, West Long Branch, and Donald L. Duttweiler, Rumson, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 28, 1989, Ser. No. 386,537
Int. Cl.^{5} H03M *7/34*
U.S. Cl. 341—51 **20 Claims**



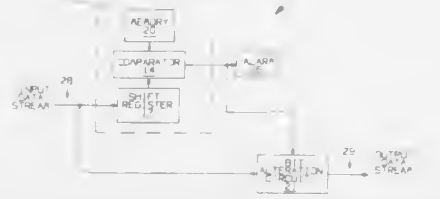
1 An encoder for encoding a supplied signal having a plurality of symbol values including,
means for extracting a context dependent on a configuration of prior symbols of said supplied signal,
probability estimator means being responsive to said supplied signal and said context for generating probability estimates of said supplied signal,
entropy encoder means being responsive to said supplied signal and said probability estimates for generating an encoded version of said supplied signal,
said means for extracting a context being
characterized by
said prior symbols being at prescribed lag intervals relative to a current symbol being encoded, and
means responsive to said supplied signal for adaptively adjusting said configuration.

5,023,612

ILLEGAL SEQUENCE DETECTION AND PROTECTION CIRCUIT

Kuo-Hui Liu, San Ramon, Calif., assignor to Pacific Bell, San Francisco, Calif.

Filed Jul. 13, 1989, Ser. No. 379,487
Int. Cl.^{5} H03M *13/00*
U.S. Cl. 341—94 **6 Claims**



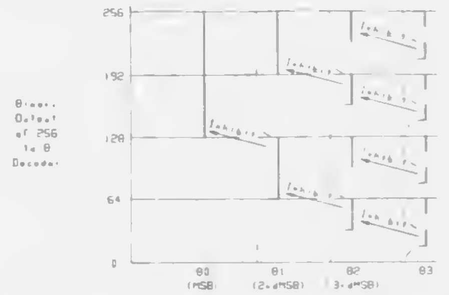
1. A interface circuit for converting an input data sequence to an output data sequence, said input and output data sequences comprising the same number of bits, said output data sequence differing from said input data sequence if said input data sequence matches an illegal sequence comprising a predetermined sequence of N data bits, said interface circuit comprising:
means for receiving said data sequence:
means for storing at least one of the last N data bits received by said receiving means;
means for determining if the previously received N data bits match said illegal sequence;
means responsive to said determining means for altering one of the said data bits stored in said storing means if said data determining means determines that said previously received N data bits match said illegal sequence; and
means for outputting the data bits stored in said storing means to form said output data sequence.

5,023,613

DECODER ERROR PREVENTION APPARATUS FOR USE IN FLASH ANALOG-TO-DIGITAL CONVERTERS

Andrew G. F. Dingwall, Princeton Township, Mercer County, N.J., assignor to Harris Semiconductor Patents, Inc., Melbourne, Fla.

Filed Mar. 31, 1988, Ser. No. 176,323
Int. Cl.^{5} H03M *1/06*
U.S. Cl. 341—118 **18 Claims**



1. In a flash analog-to-digital converter of the type employing 2^n-1 comparators where n is a positive integer greater than 1 and selected according to the number of bits converted, each of said comparators having one input coupled to an associated tap on a reference biased resistance ladder and having another input coupled to an analog signal source with said comparators arranged from a lowest decision ordered comparator to a highest decision ordered comparator, where said comparator trip points are spaced one least significant bit apart so that a first plurality of comparators for a given input signal voltage exhibit a high output, while a second plurality exhibits a low output for the same given input voltage, whereby one of said comparators in said plurality has a high output with a lower least significant bit adjacent comparator having a low output and a higher least significant bit adjacent comparator having a high output so that said one comparator output is the desired selected output of said converter, whereby if said analog signal source is slewing rapidly more than one comparator in said plurality will undesirably provide an output due to adjacent comparators exhibiting high and low outputs, the combination therewith of apparatus for preventing such multiple outputs in a flash-type converter, comprising:
means coupled to selected comparator outputs for detecting all the comparator output states for a given input signal voltage to determine the comparators providing said high output and the comparators providing said low output; and
means coupled to said comparators for inhibiting any output from a comparator of a higher decision order when a lower decision order comparator is also providing said output, whereby only one lower order comparator will provide an output for said given input signal voltage.

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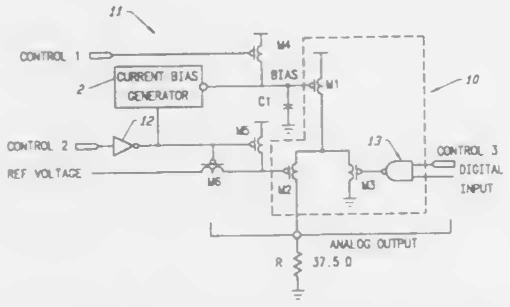
5,023,614
SWITCHABLE DAC WITH CURRENT SURGE PROTECTION

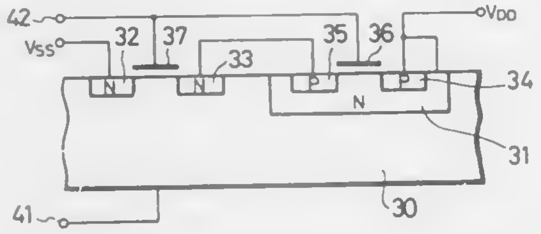
Jimmy Fung, Cupertino; Jiu An, San Jose; David L. Campbell, Sunnyvale, and Steven Shyu, Cupertino, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.
Filed Sep. 13, 1989, Ser. No. 407,447
Int. Cl.^{5} H03M *1/66, 1/06*
U.S. Cl. 341—144 **18 Claims**



1. In a DAC having a plurality of stages, each of said stages having a bias transistor coupled in series with a parallel connected reference voltage transistor and digital input transistor, an apparatus for selectively switching said DAC between a sleep mode and a normal operating mode with little, if any, surge current resulting therefrom, comprising:
- means for applying a reverse biasing potential to said reference voltage transistor and said digital input transistor at a rate such that the rate of change of current in said reference voltage transistor is less than a predeter,.mined magnitude when said DAC is switched to said sleep mode; and
- means for first applying a predetermined forward biasing potential to said bias transistor and, thereafter, changing said reverse bias potential applied to said reference voltage transistor to a predetermined reference voltage and removing said reverse bias potential from said digital input transistor when said DAC is switched to said normal operating mode.

5,023,615
LARGE SCALE INTEGRATED CIRCUIT FOR CONVERTING PULSE CODE MODULATED DATA TO AN ANALOG SIGNAL

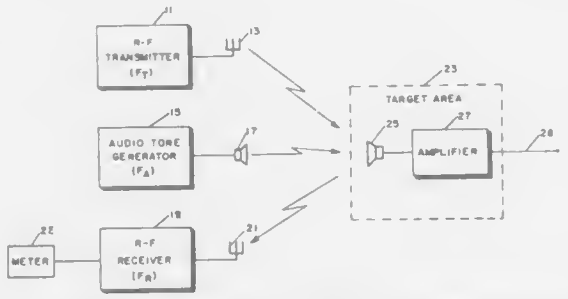
Takaaki Yamada, and Kazutoshi Shimizume, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Feb. 20, 1990, Ser. No. 482,085
Claims priority, application Japan, Feb. 21, 1989, 1-19129 [U], Feb. 22, 1989, 1-42578 [U]
Int. Cl.^{5} H03M *1/82*
U.S. Cl. 341—152 **4 Claims**



1. In a digital-to analog converter for converting a received digital signal having N bits and a sampling frequency fs to an analog signal with an improved signal-to-noise ratio which comprises,
- digital interpolation filter means for receiving said digital signal and generating a modified digital signal having a number of bits less than N and a sampling frequency greater than fs, pulse width modulator means for receiving said modified digital signal and generating a pulse signal having pulse widths which correspond to said modified signal, output buffer means for receiving said pulse signal and having a complementary metal oxide semiconductor (CMOS) inverter circuit including P channel and N channel transistors having respective resistance values, and low-pass filter means for receiving an output signal from said output buffer means;
- said digital interpolation filter means, said pulse width modulator means and said output buffer means are formed in an integrated circuit which includes a substrate and means for receiving a variable supplied voltage through said substrate, and said supplied voltage is adjusted so that, when the transistors are conductive, the resistance values of said P channel and N channel transistors are made equal to each other so as to improve the signal-to-noise ratio of the produced analog signal.

5,023,616
MICROPHONE AMPLIFIER DETECTOR

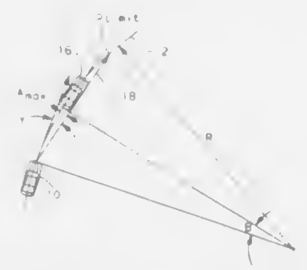
John S. Gerig, 5954 Whitehall Pl., McLean, Va. 22101
Filed Aug. 25, 1967, Ser. No. 665,196
Int. Cl.^{5} G01S *13/74*
U.S. Cl. 342—52 **8 Claims**



1. A device for detecting a convert microphone-amplifier including a time varying impedance comprising
- radio frequency transmitting means for illuminating an area to be inspected,
- audio tone generating means for simultaneously illuminating said area, and
- radio frequency receiving means for receiving radiated energy from said time varying impedance within said illuminated area.

5,023,617
VEHICLE FORWARD SENSOR ANTENNA STEERING SYSTEM

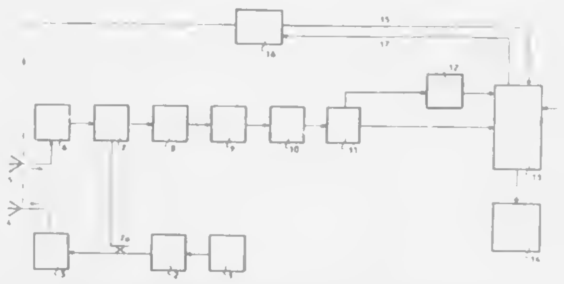
Richard K. Deering, Mt. Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Feb. 20, 1990, Ser. No. 483,037
Int. Cl.^{5} G01S *9/46*
U.S. Cl. 342—70 **11 Claims**



1. The method of steering a beam transmitted and received by a forward looking sensor of a source vehicle traveling through a curvilinear path in response to an operator steering input, the method comprising the steps of:
- measuring the operator steering input;
- determining a beam steering angle in accord with a predetermined function including the measured operator steering input that results in a lateral shift of the beam relative to the path as the beam is steered to the determined angle that establishes a predetermined minimum overlapping relationship between the beam and a target vehicle in the path ahead of the source vehicle; and
- steering the beam to the determined beam steering angle, whereby the beam of the sensor is steered to an angle that provides for the minimum overlapping relationship between the beam and the target vehicle while traveling through the curvilinear path.

5,023,618
FM-CW RADAR APPARATUS

Bernard J. Reits, Hengelo, Netherlands, assignor to Hollandse Signaalapparaten B.V., Hengelo, Netherlands
Filed Oct. 11, 1990, Ser. No. 597,613
Claims priority, application Netherlands, Oct. 24, 1989, 8902628
Int. Cl.^{5} G01S *13/26*
U.S. Cl. 342—128 **4 Claims**

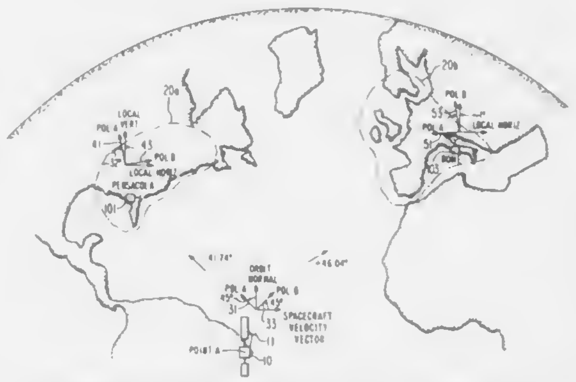


1. FM-CW radar apparatus provided with:
- a transmitter unit for the emission of frequency-modulated continuous carrier waves of bandwidth B;
- a receiver unit for the reception of echo signals reflected by a target, which originate from the carrier waves emitted by the transmitter unit, and for the generation of target-representing beat signals;
- a signal processing unit, to which the beat signals are applied, and which is equipped with:
  - an A/D conversion unit for the sampling and digitisation of the beat signals;
  - a first DFT processing unit, to which the sampled and digitised beat signals are applied with the object of obtaining at least range information about the target;
- a control unit, which makes the output signals, generated by the first DFT processing unit, suitable for presentation on a display,

characterised in that
- a modulation sweep of the frequency-modulated carrier waves occupies a time of k.T seconds ($k > 1$, $k \in R$);
- a DFT sample period of the first processing unit occupies a length of time of T seconds, so that a modulation sweep covers more than one DFT sample period;
- the FM-CW radar apparatus is provided with a second DFT processing unit, to which is applied at least part of the first DFT processing unit's output signals, associated with one modulation sweep, and an output signal of which, containing target range information of a higher resolution than that generated by the first DFT processing unit, is applied to the control unit.

5,023,619
SATELLITE COMMUNICATIONS SYSTEM

Joseph F. Balcewicz, Hightstown, N.J., assignor to General Electric Company, East Windsor, N.J.
Filed Dec. 1, 1986, Ser. No. 936,499
Int. Cl.^{5} H01Q *1/28*
U.S. Cl. 342—361 **8 Claims**



1. A satellite communication system for operating over two widely separated land areas such as those land areas separated by an ocean, said land areas having a relatively heavy precipitation region comprising:
- a first ground station located in the heavy precipitation region of a first of said land areas;
- a second ground station located in the heavy precipitation region of a second of said land areas;
- each of said ground stations including antenna means for receiving orthogonal linearly polarized signals in their local vertical or horizontal orientations;
- a satellite located in orbit above an earth longitude somewhere between the longitude of the first and second land areas and including a satellite antenna for transmitting and receiving orthogonal linearly polarized signals which antenna includes means for radiating orthogonal linearly polarized RF signals;
- said satellite antenna being oriented and arranged such that the first linearly polarized signals transmitted from the satellite antenna at the satellite location are oriented an acute angle off orbit normal and the second linearly polarized signals transmitted from the satellite are oriented orthogonal to the first linearly polarized signals;
- means at the first ground station for receiving said first polarized signals as local vertical signals and second polarized signals as local horizontal signals and means at said second ground station for receiving said first polarized signals as local horizontal signals and said second polarized signals as vertical signals.

5,023,620
CROSS-POLARIZATION INTERFERENCE CANCELLATION SYSTEM CAPABLE OF STABLY CARRYING OUT OPERATION

Toru Matsuura, Tokyo, Japan, assignor to NEC Corporation, Japan
Filed Jul. 27, 1990, Ser. No. 558,754
Claims priority, application Japan, Jul. 27, 1989, 1-195515; Sep. 13, 1989, 1-237450
Int. Cl.^{5} H01Q *21/06, 21/24*
U.S. Cl. 342—362 **14 Claims**

1. A cross-polarization interference cancellation system for use in cancelling a cross-polarization interference which occurs during transmission of first and second polarized waves having planes of polarization orthogonal to each other, said cross-polarization interference cancellation system being supplied with first and second input signals which result from said first and said second polarized waves, respectively, and com-

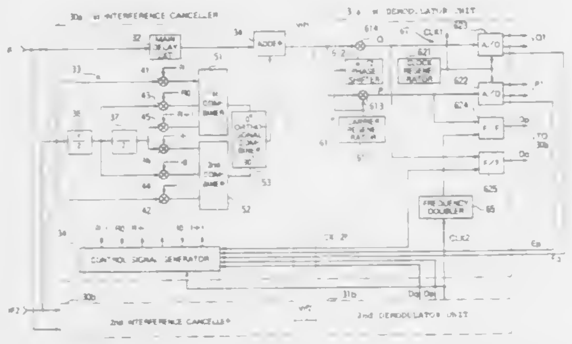
VOL
1127
ISS
2
JE
11
1991
UMI

prising an interference cancellation circuit supplied with said first and said second input signals for cancelling the cross-polarization interference included in said first and said second input signals to produce first and second interference free signals, respectively, and a demodulating circuit coupled to said interference cancelling circuit for demodulating said first and said second interference free signals into first and second demodulated signals together with first and second sets of error signals and first and second sets of quadrant detection signals, respectively, said first and said second sets of the quadrant detection signals being representative of quadrants of said first and said second demodulated signals, respectively, when said first and said second demodulated signals are represented on a phase plane, said demodulating circuit comprising:

first and second coherent detecting means supplied with said first and said second interference free signals for carrying out coherent detection of said first and said second interference free signals to produce first and second sets of detected signals, respectively;

first and second clock production means for producing first and second clock signals each of which has a clock frequency;

first and second analog/digital converter means supplied with said first and said second sets of the detected signals and with said first and said second clock signals for converting said first and said second sets of the detected signals into first and second detected digital signals, respectively;



first frequency doubler means supplied with a selected one of said first and said second clock signals for doubling the clock frequency of said selected one of the first and the second clock signals to produce a first specific clock signal having twice the clock frequency of said selected one of the first and the second clock signals;

second frequency doubler means supplied with a remaining one of the first and the second clock signals for doubling the clock frequency of the remaining one of the first and the second clock signals to produce a second specific clock signal having twice the clock frequency of the remaining one of the first and the second clock signals;

first quadrant detection means for detecting the quadrant of a selected one of said first and said second sets of detected signals in response to a selected one of the first and the second specific clock signals and said selected one of the first and the second sets of said detected signals; and

second quadrant detection means for detecting the quadrant of a remaining one of said first and said second sets of detected signals in response to a remaining one of the first and the second specific clock signals and said remaining one of the first and the second sets of said detected signals.

5,023,621
SMALL ANTENNA

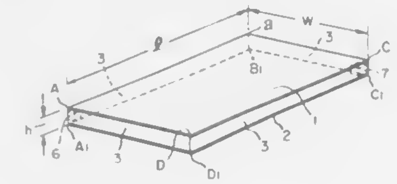
Katsumi Ushiyama; Sadafumi Sakamoto, both of Tokyo, Japan, and Kiyohiko Itoh, 1-10, Minami 5-jo, Nisbi 16-chome, Chuo-ku, Sapporo-shi, Hokkaido, Japan, assignors to Kokusai Electric Co., Ltd., Tokyo and Kiyohiko Itoh, Hokkaido, both of, Japan

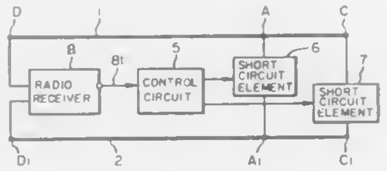
Filed Mar. 9, 1989, Ser. No. 321,626

Claims priority, application Japan, Mar. 28, 1988, 63-75352

Int. Cl.^{5} H01Q *1/24*

U.S. Cl. 343—702 5 Claims





1. A small antenna construction for portable radio or the like comprising;

a pair of planar conductive boards disposed parallel to each other;

a dielectric insert spacing means positioned between and spacing said planar conductive boards at a distance from each other that is less than the wavelength of the signals selected to be received;

said planar conductive boards providing a plurality of arbitrarily selected connecting points on their respective edges for connecting feed conducting means and short circuits conducting means;

means to selectively change said arbitrarily selected connecting points in response to the directivity characteristic of the received radio wave;

said means to selectively change said arbitrarily selected connecting points comprising; a plurality of conductors connected to a plurality of arbitrarily selected connecting points, electronic means connected to each of said conductors said electronic means constructed to automatically switch between selected connecting points to change the polarization characteristic of said small antenna for the best reception;

said electronic means comprising; circuit elements selected from the group of a PIN diode and a variable capacitance diode connected to each of said plurality of conductors, a radio receiver having a field strength detecting circuit, a control circuit connected between said radio receiver and said circuit elements for automatically selecting the particular short circuiting position that provides optimum reception and output from said radio receiver, said electronic means including means comparing the output signals from said radio receiver and switching to the short circuiting position that has the best reception;

said short circuit conducting means comprising at least one conductor connecting said planar conductive boards at said arbitrarily selected connecting points on their respective edges;

whereby the polarized directivity characteristics of said antenna for said radio or the like may be changed by changing the position of said at least one conductor.

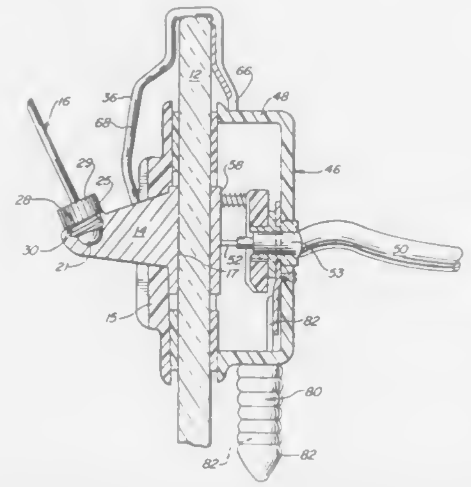
5,023,622
ON-GLASS ANTENNA WITH CENTER-FED DIPOLE OPERATION

Herbert R. Blaese, 3314 Olcott Ave., Chicago, Ill. 60634

Continuation of Ser. No. 379,179, Jul. 13, 1989, abandoned. This application Jun. 7, 1990, Ser. No. 535,281

Int. Cl.^{5} H01Q *1/320, 9/160*

U.S. Cl. 343—715 3 Claims



1. An antenna for mounting on a window, which comprises:

an outer RF transfer member comprising a weather-resistant carrier having a first electrically conductive member on its underside for engagement with the outside of said window;

a current-fed radiator adapted to be located on the outside of said window, said current-fed radiator having a proximal end and a distal end;

means connecting said proximal end of said current-fed radiator to said first electrically conductive member whereby said distal end of said current-fed radiator extends upwardly and outwardly when the antenna is mounted on a window;

an inner RF transfer member including a housing and having a second electrically conductive member on its underside for engagement with the inside of the window;

a coaxial electrical cable having a main electrical conductor and a ground conductor, said main electrical conductor being in electrical engagement with said second electrically conductive member;

said first electrically conductive member and said second electrically conductive member capacitively coupling said current-fed radiator to said main electrical conductor;

a conductive radiating element carried by said inner RF transfer member, said conductive radiating element having a proximal end and a distal end;

means connecting said proximal end of said conductive radiating element to said ground conductor, with said coaxial electrical cable extending generally between said proximal end of said current-fed radiator and said proximal end of said conductive radiating element with only said main electrical conductor being capacitively coupled to said current-fed radiator;

said ground conductor being located only on the inside of said window and not being capacitively coupled to said current-fed radiator;

said distal end of said conducive radiating element extending generally in the opposite direction from said distal end of said current-fed radiator, whereby said antenna resembles a center-fed dipole antenna with said conductive radiating element representing one of the radiating arms of the antenna and also substituting as a ground plane.

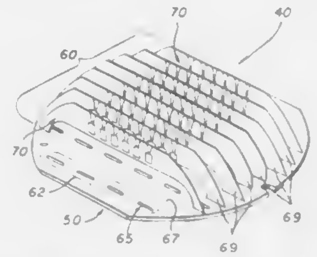
5,023,623
DUAL MODE ANTENNA APPARATUS HAVING SLOTTED WAVEGUIDE AND BROADBAND ARRAYS

Donald E. Kreinheder, Granada Hills, and David S. Bell, Canoga Park, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 21, 1989, Ser. No. 454,680

Int. Cl.^{5} H07Q *21/00*

U.S. Cl. 343—725 6 Claims



1. A dual mode antenna apparatus, said apparatus describing an antenna aperture, comprising:

waveguide antenna array means for generating a first radiation pattern of a first polarization through said aperture, said waveguide antenna array means including a slotted waveguide antenna having a plurality of rows of waveguide slots opening on a ground plane, each of said slots being rectangularly shaped and arranged lengthwise in said rows; and

broadband antenna array means coupled to said waveguide antenna array means for generating a second radiation pattern of a second polarization through said aperture, said broadband antenna array means including a plurality of linear notch element arrays, each of said notch element arrays being positioned substantially parallel with said rows of waveguide slots.

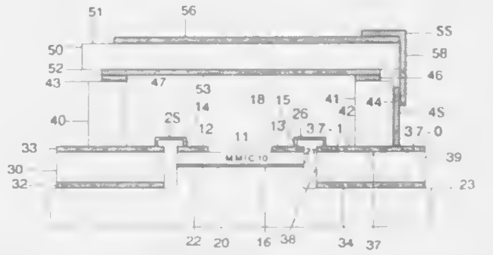
5,023,624
MICROWAVE CHIP CARRIER PACKAGE HAVING COVER-MOUNTED ANTENNA ELEMENT

Douglas E. Heckaman, Indialantic; Jeffrey A. Frisco, Palm Bay; Gregory C. Rieder, Satellite Beach, and Edward J. Bajgrowicz, Palm Bay, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Oct. 26, 1988, Ser. No. 262,793

Int. Cl.^{5} H01Q *1/22, 1/38*

U.S. Cl. 343—860 27 Claims



1. A support package for a microwave integrated circuit component and an antenna therefor comprising:

a base member upon which said microwave integrated circuit component is mountable;

a first insulation layer mounted on said base member and supporting at least one signal conductor on a location adjacent to a signal lead on said circuit component;

a second insulation layer supported on said first insulation layer and surrounding the location whereat said circuit component is mountable;

a third insulation layer supported on said second insulation layer and forming a cover for said package, so as to define, with said base member and said first and second insulation

VOL
1127
ISS
2
JE
11
1991
UMI

layers, a cavity within which said circuit component is housed;

an antenna element supported on an outer surface of said third layer; and

means for connecting a signal conductor supported by said first insulation layer to said antenna element, and wherein said second insulation layer is hermetically sealed at an interface formed with said first insulation layer upon which said second insulation layer is supported, and said third insulation layer is hermetically sealed at an interface formed with said second insulation layer upon which said third insulation layer is supported, and wherein

said first insulation layer has a first surface on which said at least one signal conductor is formed and on which said second insulation layer is supported, and said second insulation layer has a dimension in a radial direction outwardly from the location of said circuit component such that said at least one signal conductor extends over the surface of said first insulation layer beyond the outer perimeter of said second insulation layer thereon.

5,023,625

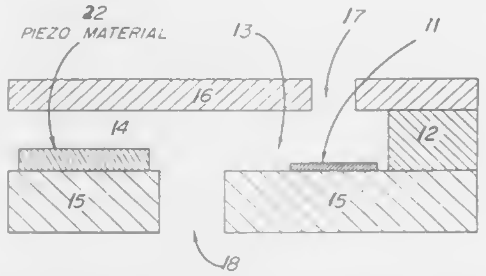
INK FLOW CONTROL SYSTEM AND METHOD FOR AN INK JET PRINTER

Steven J. Bares, and Marzio A. Leban, both of Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 230,644, Aug. 10, 1988, abandoned. This application Jan. 12, 1990, Ser. No. 464,706

Int. Cl.⁵ B41J *2/05, 2/175*

U.S. Cl. 346—1.1 8 Claims



1. A method for pumping ink to an opening in an inkjet printhead orifice plate to overcome the inability of the natural ink feed capillary action to adequately supply ink to the inkjet printhead and to extend the maximum operational frequency thereof while simultaneously controlling and varying the ink drop volume ejected from said orifice plate, which comprises the steps of:

a providing an ink flow path to an opening in said orifice plate,

b pulsing a first transducer in or adjacent to said ink flow path and disposed on said printhead to provide a pumping action in a direction parallel to said ink flow path to enable said printhead to operate with inks having a lower surface tension and a higher viscosity or both and to control the oscillations of an ink meniscus at said opening in said orifice plate, and

c pulsing a second transducer in said ink flow path so that the pulsing of said second transducer ejects ink drops of varying volume from said orifice opening by timing said drop ejection with the height of said meniscus at said orifice plate opening, whereby small drops are ejected when the firing of said second transducer occurs at low meniscus levels, and large drops are ejected when the firing of said second transducer occurs at high meniscus levels.

5,023,626

PRINTER CAPABLE OF TEMPERATURE COMPENSATION OF THE OPTICAL DENSITY OF A PRINTED IMAGE AFTER A COMPLETE IMAGE IS PRINTED

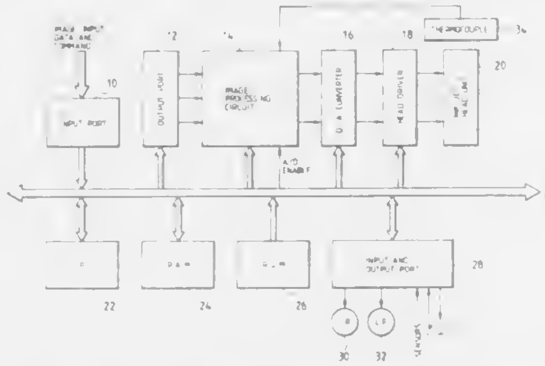
Hideaki Kawamura, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 29, 1988, Ser. No. 226,081

Claims priority, application Japan, Aug. 7, 1987, 62-197960

Int. Cl.⁵ G01D *9/00, 15/10;* **B41J** *2/315, 2/01*

U.S. Cl. 346—33 TP 42 Claims



1. A printer for recording plural images on a recording medium, comprising:

recording means for recording at least one of said plural images on said recording medium;

temperature detecting means for detecting a temperature;

control means for controlling energy to be applied to said recording means in accordance with a detection result of said temperature detecting means;

memory means for storing a plurality of predetermined commands for the printer, each command indicating that a boundary of said at least one image has been reached;

recognizing means for recognizing the boundary of said image in response to each and every one of the plurality of predetermined commands; and

operating means for operating said control means in accordance with the boundary of said image recognized by said recognizing means.

5,023,627

PRINTING HEAD

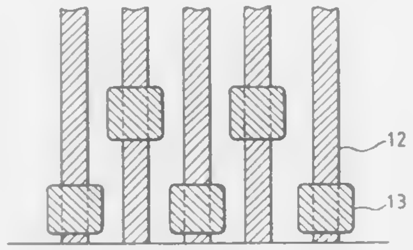
Hiroo Soga, and Eiichi Akutsu, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Nov. 2, 1989, Ser. No. 430,267

Claims priority, application Japan, Nov. 29, 1988, 63-299492

Int. Cl.⁵ G01D *15/10*

U.S. Cl. 346—76 PH 7 Claims



1. A printing head, comprising:

an electrically insulating board;

a plurality of printing electrodes positioned parallel to each other on said electrically insulating board, said plurality of printing electrodes terminating adjacent a front edge of said electrically insulating board;

an electrically insulating layer overlaying said electrically insulating board and said plurality of printing electrodes; and

electrically conductive projections, each having a selected width greater than the width of one of said plurality of printing electrodes, and each in ohmic contact with one of said plurality of printing electrodes through said electrically insulating layer, said electrically conductive projections being disposed in a zigzag format relative to said front edge.

5,023,628

THERMAL HEAD MOUNTING/POSITIONING ASSEMBLY

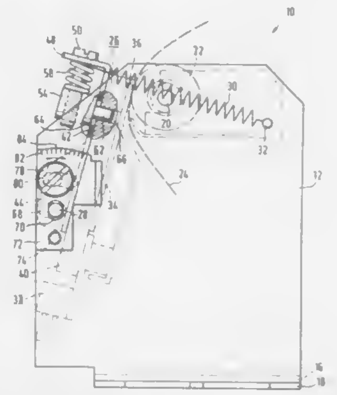
Ulf Koch, Eberbach, Fed. Rep. of Germany, assignor to Esselte Meto International Produktions GmbH, Hirschhorn, Fed. Rep. of Germany

Filed Mar. 20, 1990, Ser. No. 495,974

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1989, 3909254

Int. Cl.⁵ G01D *15/10*

U.S. Cl. 346—76 PH 3 Claims



1. A thermal printing head having a housing wherein a support carrying a thermal printing plate is mounted to be pivotable about an axis mounted on both of its ends, the thermal printing plate comprising several seletively triggerable heating elements being arranged in a line, one adjacent to the other, a counter-pressure roll being mounted in said housing to be rotatable about an axis, the line of heating elements of the thermal printing plate being held in frictional contact therewith along a paraxial generating line, the mounting axis of the support extending to be parallel with respect to the axis of said counter-pressure roll and to be spaced apart from said axis, characterized in that one end of the axis (28) to be adjustable in perpendicular direction with respect to the plane formed by said axis (28) and the line (36) of the heating elements where the adjustably mounted end of the axis (28) is mounted in one aperture (70) of a setting member (72) being pivotably connected with a side plate (12) of the housing (12, 14, 16).

5,023,629

INK JET RECORDING APPARATUS WITH A MEMBER FOR ABSORBING WASTE INK CREATED BY INSERTION AND REMOVAL OF AN INK CONTAINER

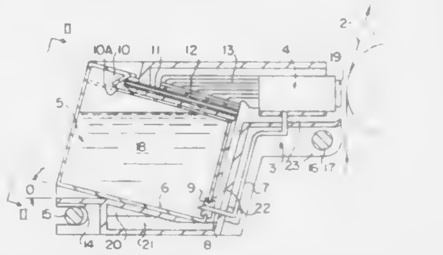
Takehiko Kiyohara, Zama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 237,641, Aug. 26, 1988, Pat. No. 4,878,069, which is a continuation of Ser. No. 82,946, Aug. 10, 1987, abandoned, which is a continuation of Ser. No. 752,538, Jul. 8, 1985, abandoned. This application Sep. 11, 1989, Ser. No. 405,212

Claims priority, application Japan, Jul. 9, 1984, 59-140744

Int. Cl.⁵ B41J *2/175*

U.S. Cl. 346—140 R 3 Claims



1. An ink jet recording apparatus comprising:

an ink jet recording head;

a supporting section for removably supporting an ink container on the apparatus, the ink container being adapted to hold ink for supply to said recording head, wherein said supporting section includes a hollow needle and an opening for allowing insertion of said hollow needle into the ink container when the ink container is supported on said supporting section;

an ink supply path between said hollow needle and said recording head for supplying ink in the ink container to said recording head; and

an absorbing material proximate to said opening and disposed in a reservoir formed in said supporting section for absorbing waste ink collecting near said opening during mounting or removal of the ink container.

5,023,630

INK JET RECORDING HEAD HAVING A SURFACE INCLINED TOWARD THE NOZZLE FOR ACTING ON THE INK

Jiro Moriyama, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

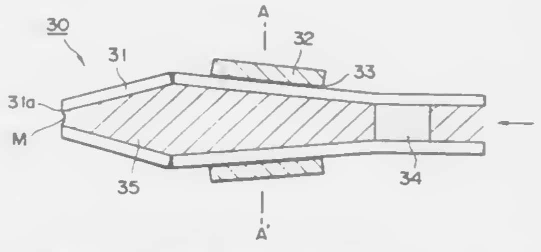
Continuation of Ser. No. 9,873, Feb. 2, 1987, abandoned. This application Oct. 27, 1989, Ser. No. 427,644

Claims priority, application Japan, Feb. 5, 1986, 22054/1986

The portion of the term of this patent subsequent to Jan. 16, 2007, has been disclaimed.

Int. Cl.⁵ G01D *15/16*

U.S. Cl. 346—140 R 16 Claims



1. An ink jet recording head comprising:

a member forming an ink flow path communicating with an opening for discharging ink therefrom; and

VOL
1127
ISS
2
JE
11
1991
UMI

an electro-mechanical converting element provided along said ink flow path at an ink acting surface inclined with respect to an ink flow direction so as to increase the sectional area of said ink flow path toward said ink discharging opening.

5,023,631

STOPPING PROCESS CONTROL DEVICE

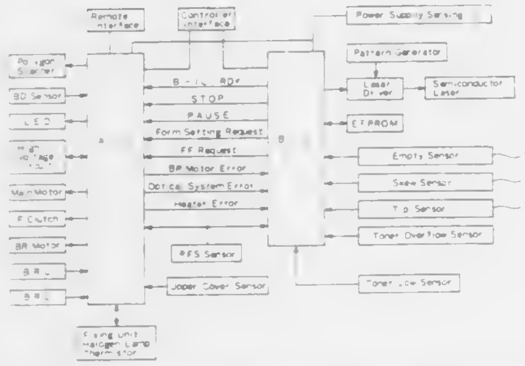
Kiyoshi Negishi; Ikuo Negoro, and Masahiro Kita, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1989, Ser. No. 435,990

Claims priority, application Japan, Nov. 14, 1988, 63-286993

Int. Cl.^{5} G01D *15/06;* **G03G** *21/00*

U.S. Cl. 346—154 **17 Claims**



12. A laser printer having means for printing an image on a form, means for fixing said image to said form, and means for detecting various errors that may occur in said laser printer, comprising:

means for determining a priority of an error detected by said detecting means; and

means for controlling said printing means and said fixing means so as to complete printing an image on a page of said form that is currently being printed and then fix said printed image to said page before stopping the operation of said printing means and said fixing means when a low priority error is detected by said detecting means, and immediately stopping the operation of said printing means and said fixing means when a high priority error is detected by said detecting means.

5,023,632

ELECTROPHOTOGRAPHIC IMAGE FORMING METHOD

Hajime Yamamoto, Ibaraki; Yukimasa Kuramoto, Takarazuka; Yuji Takashima, Nishinomiya; Masahiko Nakamura, Osaka, and Kenichi Nakano, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

PCT No. PCT/JP88/01315, § 371 Date Oct. 16, 1989, § 102(e) Date Oct. 16, 1989, PCT Pub. No. WO89/05999, PCT Pub. Date Jun. 29, 1989

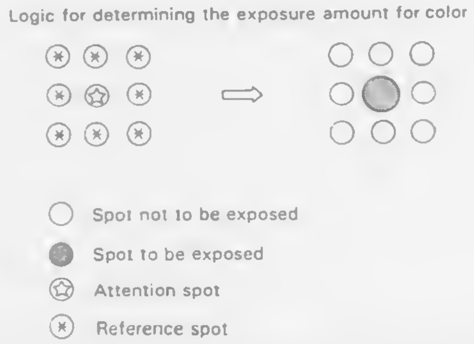
PCT Filed Dec. 23, 1988, Ser. No. 415,204

Claims priority, application Japan, Dec. 23, 1987, 62-325812

Int. Cl.^{5} G03G *15/01;* **G01D** *15/06*

U.S. Cl. 346—157 **18 Claims**

1. An electrophotographic image forming method for reproducing a color image by repeating the cycle of charging, exposure and developing a plurality of times to superimpose black and color toner images on a photoconductor, wherein exposure is provided by a beam of light decomposed in pixels, the exposure being varied for a beam spot between black and color images.



5,023,633

ELECTROSTATIC PRINTER USING CONTINUOUS PAPER

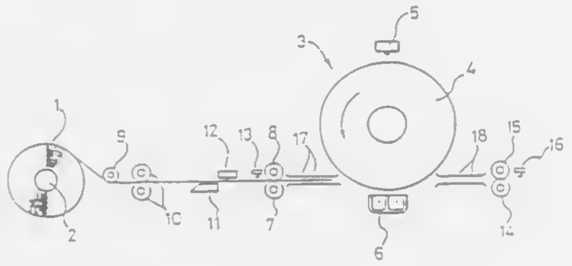
Toyozo Ito, Iwate, Japan, assignor to Kabushiki Kaisha Sato, Japan

Filed Dec. 13, 1989, Ser. No. 450,217

Claims priority, application Japan, Dec. 23, 1988, 63-323429

Int. Cl.^{5} G01D *15/14, 15/34*

U.S. Cl. 346—160 **9 Claims**



1. A printer, comprising:

a paper holder;

a printing section including an electrostatic printing head for imprinting information on continuous paper;

a paper transport means disposed between the paper holder and the printing section for transporting the continuous paper from the paper holder to the printing section;

paper ejection means, disposed at a downstream side of the printing section, relative to the direction of paper travel, for ejecting paper; and,

paper cutting means for cutting the paper, the paper cutting means disposed between the paper holder and the paper transport means.

5,023,634

ANTENNA SYSTEM

Yasubiko Nishioka; Hazime Kawano, and Kazuyoshi Inami, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 5, 1990, Ser. No. 461,641

Claims priority, application Japan, Jan. 9, 1989, 1-2504; Apr. 11, 1989, 1-91436; Apr. 11, 1989, 1-91437; Apr. 11, 1989, 1-91438

Int. Cl.^{5} H01Q *3/22, 3/24*

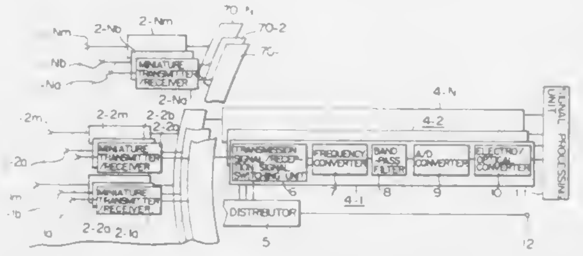
U.S. Cl. 342—368 **10 Claims**

1. An antenna system, comprising:

a plurality of element antennas for both transmission and reception of signals, which are constituted on an effective surface and are divided into a plurality of blocks, each including at least more than two element antennas;

a plurality of miniature transmitters/receivers connected respectively to said plurality of element antennas, which are adapted to switch between a transmission mode and a reception mode, to control the phase shift of transmission signals and amplify the controlled transmission signals in said transmission mode or to control the phase shift of reception signals and amplify the controlled reception signals;

a plurality of power supply circuit means connected respectively to said plurality of blocks, each of which is adapted to distribute the transmission signals to the corresponding block, or to combine the reception signals from the corresponding block;


MINIATURE TRANSMITTER/RECEIVER
TRANSMISSION SIGNAL/RECEPTION SIGNAL SWITCHING UNIT
FREQUENCY CONVERTER
BAND PASS FILTER
A/D CONVERTER
ELECTRO/OPTICAL CONVERTER
DISTRIBUTOR
SIGNAL PROCESSING UNIT
4-2
4-1
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12

a plurality of reception signal converting means connected respectively to said plurality of power supply circuit means, each of which comprises transmission signal/-reception signal switching means, frequency converter means, band-pass filter means, analog/digital converter means and electro/optical converter means, which are connected in series, so as to output optical digital signals of the reception signals; and

signal processing means responsive to said optical digital signals for digital beam forming processing of the optical digital signals.

5,023,635

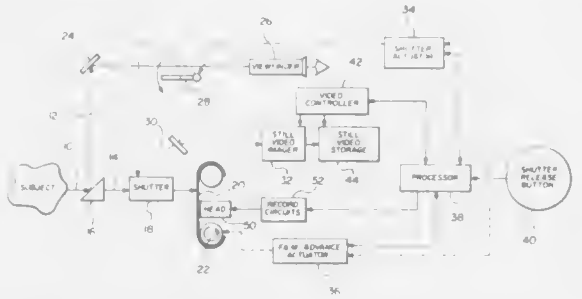
DUAL FILM AND STILL VIDEO STUDIO PORTRAIT SYSTEM USING PARALLEL DEDICATED MAGNETIC TRACKS ON FILM

James V. Nealon, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 23, 1989, Ser. No. 370,661

Int. Cl.^{5} G03B *29/00, 17/24*

U.S. Cl. 354—76 **3 Claims**



1. A camera system comprising:

means for splitting an incoming beam into two beams;

a strip of film having a virtually transparent magnetic layer therein;

a still video imager;

means for simultaneously exposing an image from one of said two beams onto said film to form a latent image frame thereon and for capturing an image from the other of said two beams on said still video imager, said exposing and capturing means including a processor responsive to a shutter release button for controlling the capturing of said image by said still video imager simultaneously with the exposing of said film, said processor including means for determining a still video frame number corresponding to the image captured by said still video imager;

means responsive to said processor for recording data pertaining to said film frame, including said still video frame number, in a magnetic track on said magnetic layer adjacent said film frame, said recording means being comprised of record circuits connected to said processor and a magnetic head connected to said record circuits, said magnetic head being closely adjacent said film frame; and

order entry station means for storing order information magnetically played back from said film, for storing subsequent modifications to said order information and for transmitting a modified version of said order information for magnetic recording on said film.

5,023,636

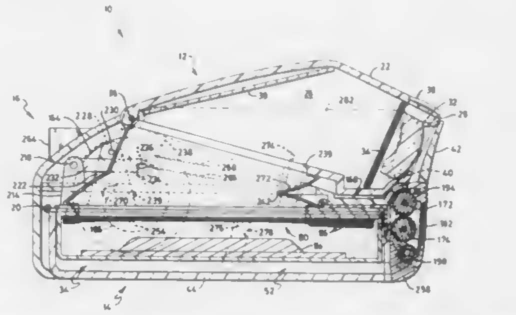
PIVOTALLY MOUNTED SPREAD ROLLER ASSEMBLY

Lawrence M. Douglas, South Easton, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed May 2, 1990, Ser. No. 517,707

Int. Cl.^{5} G03B *17/50*

U.S. Cl. 354—86 **4 Claims**



1. Apparatus for spreading a processing liquid across a layer of an exposed film unit to initiate the formation of a visible image therein comprising:

a pair of rollers;

means for supporting said pair of rollers in juxtaposition to define a gap through which an exposed film unit is adapted to be advanced while said rollers spread a processing liquid across a layer of the exposed film unit to initiate the formation of a visible image in the film unit;

means for pivotally coupling said supporting means to a camera housing for movement between an operative position, wherein said gap is located to receive the exposed film unit as it approaches said gap, and an inoperative position wherein said pair of rollers are available for maintenance purposes;

manually operable means mounted for movement between a first position, in which it prevents ambient light from striking the exposed film unit as the film unit initially emerges from between said pair of rollers, and a second position in which said pair of rollers are exposed to the ambient light;

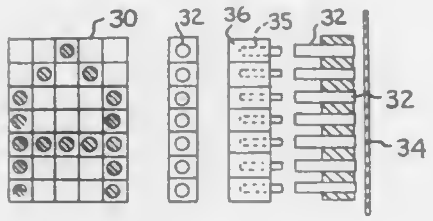
a gear mounted on one end of at least one of said pair of rollers, said gear being in driven engagement with a camera power train when said manually operable means is in said first position and out of engagement therewith when said manually operable means is in said second position and said pair of rollers may be manually and freely rotated for inspection of their surfaces; and

means extending from said manually operable means into engagement with said supporting means for moving said supporting means from said operative position to said inoperative position as said manually operable means is moved from said first position to said second position.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,637
FILM MARKING APPARATUS

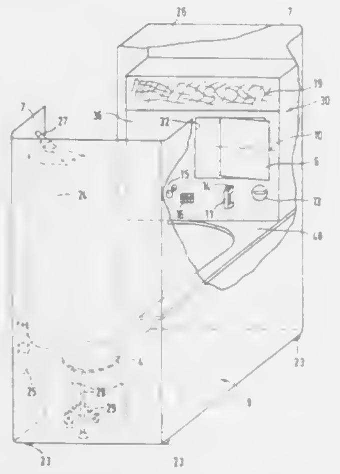
Tina L. E. Lorton, 735 Sunrise Blvd., and Timothy R. Eno, 12 Eno's La., both of Forked River, N.J. 08731
Filed Aug. 6, 1990, Ser. No. 562,824
Int. Cl.^{5} G03B *17/24*
U.S. Cl. 354—106 **4 Claims**



1. A still camera comprising:
a film advance motor operable during the period between successive picture-taking events;
a dot matrix printer means operable to print a single column of dots on the film in a direction normal to the direction of film advance, whereby repeated operation of the printer means forms a message of individual characters extending parallel to the direction of film advance;
a manual keyboard means;
a memory receiving signals generated by the keyboard means;
oscillator means operable to generate electrical pulses in synchronism with the film advance speed; and
a clocked decoder means connected to the memory and controlled by the oscillator means so that the characters printed on the film during the film-advance period correspond to the characters originally put into the memory by operation of the keyboard.

5,023,638
PHOTOGRAPHIC PORTRAIT SHOOTING APPARATUS

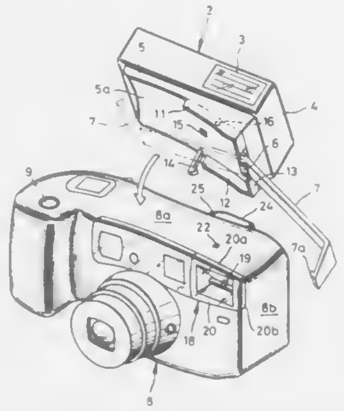
Franz Siegesleuthner, and Walter Hebeisen, both of Osterreich, Austria, assignors to Fotoking Passbildsysteme, Austria
PCT No. PCT/EP89/00139, § 371 Date Nov. 15, 1989, § 102(e) Date Nov. 15, 1989, PCT Pub. No. WO89/08865, PCT Pub. Date Sep. 21, 1989
PCT Filed Feb. 15, 1989, Ser. No. 445,831
Claims priority, application Fed. Rep. of Germany, Mar. 18, 1988, 3809168
Int. Cl.^{5} G03B *15/02, 15/06, 13/08*
U.S. Cl. 354—126 **20 Claims**



1. Photographic portrait shooting apparatus, comprising a camera (1) having a camera lens for receiving the image of an object to be photographed and a partially transmitting mirror (2) disposed in the optical path (9) between the camera lens (3) and the object, comprising an even number of reflecting mirrors (5, 6), only one of said reflecting mirrors including a rotatable support for swinging of said mirror, said partially transmitting mirror (2) having field marking defining a limited field of view, and a remote release means (11, 14) for actuating the camera by the operator.

5,023,639
SLAVE ELECTRONIC FLASH UNIT FOR A CAMERA

Seimel Ushiro, and Hiroshi Ohmura, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Feb. 9, 1990, Ser. No. 477,521
Claims priority, application Japan, Feb. 10, 1989, 1-32314; Mar. 13, 1989, 1-60492
Int. Cl.^{5} G03B *15/03*
U.S. Cl. 354—132 **16 Claims**

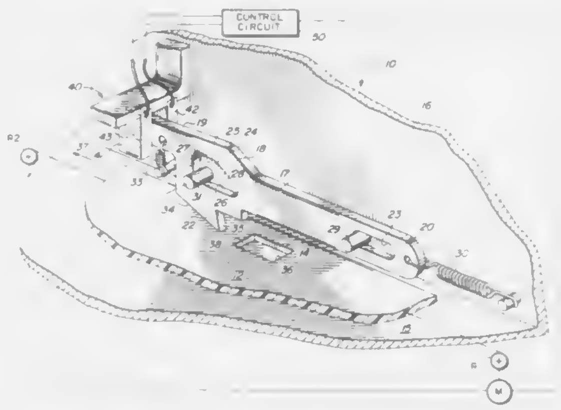


1. For use with a camera provided with an electronic flash device built therein, a slave electronic flash unit adapted to be mounted on a said camera and having a flash emission window for permitting a flash to be transmitted therethrough, said slave unit comprising:
flash emission means for emitting an auxiliary flash;
a housing containing therein said flash emission means and having a hole through a bottom surface thereof;
a photosensor adapted to output a detecting signal when said sensor directly detects a flash from said built-in electronic flash device through said hole; and
means for flashing said flash emission means when said detecting signal is generated.

5,023,640
FILM METERING APPARATUS AND METHOD

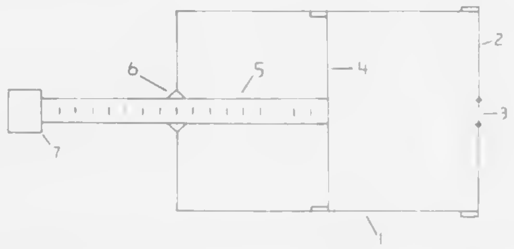
Conrad Diehl, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Feb. 28, 1990, Ser. No. 486,489
Int. Cl.^{5} G03B *1/18*
U.S. Cl. 354—173.1 **11 Claims**

1. In a camera having a housing, means defining an exposure plane within said housing, and means for advancing a strip of film in a frame-to-frame advancement direction along said exposure plane, said film having a plurality of perforations located at predetermined frame metering intervals along said film, frame metering apparatus comprising:
first and second pins fixedly located on said housing;
an elongated pawl including a film perforation sensing tooth; said pawl being formed with an elongated slot and an integral ramp surface; and said pawl being mounted for rotation and longitudinal movement relative to said housing, with said first pin engaging said slot and said second pin proximate said ramp surface;
means biasing said pawl in a longitudinal direction, said said ramp surface being urged in noncontacting relationship relative to said second pin; and
means biasing said pawl in a rotational direction about said fist pin, with said tooth being urged toward said exposure plane; and
electronic sensing means for monitoring the position of said pawl, and for developing an electrical signal indicative of when said pawl tooth is engaged in said perforation;
said pawl and biasing means being relatively dimensioned, configured and adapted so that said tooth is urged in engage with a perforation when said film is moved in said advancement direction to a position of registration of a next available exposure frame, and said ramp surface is brought into engagement with said second pin against the bias of said longitudinal direction biasing means to disengage said tooth from said perforation in response to movement of said tooth with said film, when said film is moved beyond said registration position further in said advancement direction.



5,023,641
PINHOLE CAMERA WITH ADJUSTABLE FOCAL LENGTH

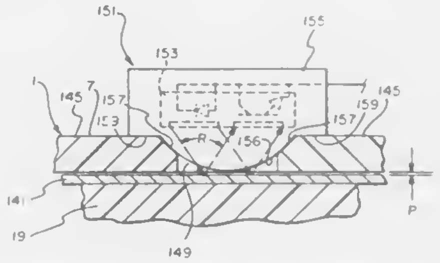
Frank J. Merrick, 789 Willow Rd., Harvey, Mich. 49855
Filed Sep. 14, 1990, Ser. No. 582,372
Int. Cl.^{5} G03B *13/32, 17/02*
U.S. Cl. 354—195.1 **4 Claims**



1. A pinhole camera with an adjustable focal length comprising:
an opaque camera housing;
an opaque, removable camera end-cap slidably mounted on said camera body;
a pinhole lens constructed of suitable material and attached to said camera end-cap;
a photographic paper holder slidably mounted within said camera body so as to be slidable toward and away from said pinhole lens;
a focal length adjustment rod attached to said photographic paperholder; said focal length adjustment rod projects from said camera body and includes markings which indicate to the user the position of said photographic paper holder within said camera body;
a slide integrated into said camera body which allows said focal length adjustment rod to slide in and out of said camera body while preventing light from entering said camera;
a handle attached to said focal length adjustment rod for use as a hand hold.

5,023,642
SENSOR APPARATUS TO READ FILM INFORMATION

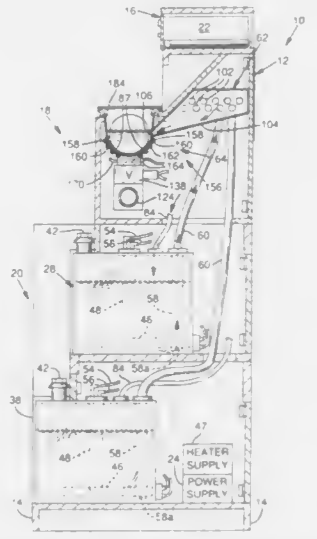
Daniel M. Pagano, Henrietta, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Jul. 31, 1990, Ser. No. 560,905
Int. Cl.^{5} G03B *17/26*
U.S. Cl. 354—275 **4 Claims**



1. Sensor apparatus to be used with a film cassette which includes optically readable film information indicia and a viewing aperture for viewing the film information indicia, said sensor apparatus comprising:
an optoelectronic sensor for reading the film information indicia of the film cassette; and
a mount for said optoelectronic sensor complementarily shaped with respect to the viewing aperture of the film cassette to fit only part way into the viewing aperture to critically position the optoelectronic sensor relative to the film information indicia of the film cassette.

5,023,643
AUTOMATIC PHOTO PROCESSOR

Marine D. Lynch, Beaverton; James W. Bernklau, Tigard; Richard D. Paulson, Beaverton, and Steven L. Reeck, Portland, all of Oreg., assignors to Wing-Lynch, Inc.
Filed Feb. 15, 1990, Ser. No. 482,009
Int. Cl.^{5} G03D *3/04, 3/06*
U.S. Cl. 354—299 **42 Claims**



1. A photo processor for processing sensitized photographic materials in various liquid chemical solutions in a processing procedure, for use with a water source and a disposal system, comprising:

VOL
1127
ISS
2
JE
11
1991
UMI

- plural solution storage tanks;
- an elongate processing trough;
- a liquid-entry manifold located intermediate the ends of said trough, adjacent the center thereof, for introducing processing solutions and water (liquids) into said trough;
- means for maintaining the photographic material substantially in the central portion of said trough adjacent said liquid-entry manifold;
- plural, substantially simultaneously acting exhaust drains for exhausting a liquid from said trough; and
- a liquid delivery system for delivering the solutions from said storage tanks to said trough and for delivering wash water into said trough.

5,023,644

SMALL-SIZED AUTOMATIC DEVELOPER OF PHOTOGRAPHIC MATERIAL

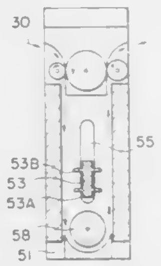
Masayuki Kurematsu; Shigeharu Koboshi, and Nobutaka Goto, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Nov. 13, 1989, Ser. No. 435,071

Claims priority, application Japan, Nov. 16, 1988, 63-290980

Int. Cl.^{5} G03D *3/04, 3/08*

U.S. Cl. 354—320 **22 Claims**



1. An apparatus for developing a photographic material having an emulsion surface thereon, comprising

- a processing tank for storing processing solution therein;
- a conveying means,' disposed in said processing tank, for conveying a photographic material downwardly so that a photographic material is introduced in the processing solution and for conveying a photographic material upwardly so that a photographic material is delivered from the processing solution, wherein an emulsion surface of a photographic material being conveyed downwardly is arranged to face an emulsion surface of a photographic material being conveyed upwardly; and
- an agitation means, disposed between the downwardly conveyed photographic material and the upwardly conveyed photographic material, for agitating the processing solution, said agitation means having an agitation member and moving said agitation member reciprocatively along the conveying direction of the photographic material.

5,023,645

LENS POSITION DETECTING DEVICE FOR CAMERA

Yutaka Yoshida, Tokyo; Takao Umetsu, and Junichi Iwamoto, both of Saitama, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 6, 1990, Ser. No. 488,839

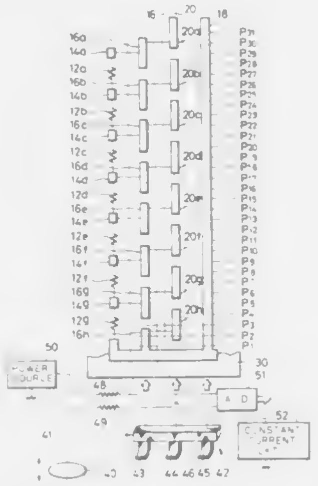
Claims priority, application Japan, Mar. 7, 1989, 1-54183

Int. Cl.^{5} G03B *3/02, 3/10*

U.S. Cl. 354—400 **13 Claims**

1. A lens position detecting device for a camera which detects the position of a lens moving in the direction of its optical axis, comprising:

- two adjacent parallel columns each comprised by a plurality of contacts disposed on an insulating plate, one of the two columns being longitudinally offset form the other of the two columns such that both ends of each contact of one of said two columns are shifted by a predetermined amount from the ends of the contacts of the other column;
- a brush having a pair of brush segments, each brush segment contacting seriatim the contacts of a corresponding one of said two columns as said brush slides along said columns upon lens movement; and



- means for supplying a group of different voltages to each column such that a voltage detectable at one contact of a column is different from that detectable at another contact of the same column, wherein said voltage supply means comprises a plurality of resistors connected in series, and connected to each of said two columns such that each contact of said two columns is connected to said series of resistors at a node between adjacent resistors.

5,023,646

AUTOMATIC FOCUS DETECTION SYSTEM

Tokuji Ishida; Masataka Hamada; Kenji Ishibashi; Nobuyuki Taniguchi; Hiroshi Ootsuka; Toshio Norita, and Toshihiko Karasaki, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

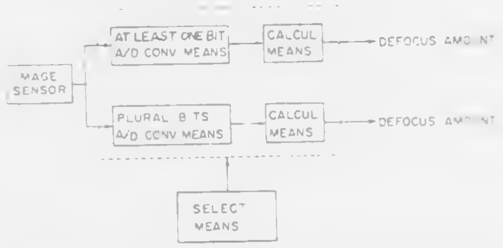
Continuation-in-part of Ser. No. 51,138, May 15, 1987, Pat. No. 4,831,403, which is a continuation-in-part of Ser. No. 946,578, Dec. 22, 1986, abandoned. This application May 12, 1989, Ser. No. 351,176

Claims priority, application Japan, Dec. 27, 1985, 60-298035; Dec. 27, 1985, 60-298036; May 16, 1986, 61-113315

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.^{5} G03B *13/36;* **G02B** *7/28*

U.S. Cl. 354—402 **18 Claims**



1. An automatic focus detection system for detecting a focusing condition of an objective lens, comprising:

- an optical means;
- an image sensor means for receiving light from an object to be photographed by the objective lens through the optical means to output analog signals;
- an A/D converting means for converting the analog signals to digital signals;

- a first calculating means for performing a first calculation with the digital signals of a first number of at least one bit to obtain a first defocus amount of the objective lens;
- a second calculating means for performing a second calculation with the digital signals of a second number of bits to obtain a second defocus amount of the objective lens, the second number being larger than the first number, and
- a selecting means for selecting either of the first defocus amount and the second defocus amount on the basis of a predetermined condition.

5,023,647

AUTOMATIC STATUS DISCRIMINATOR

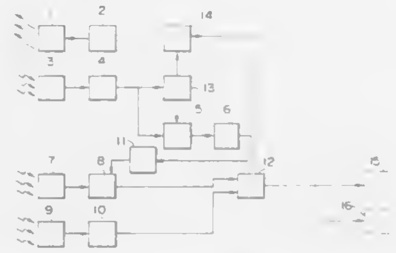
Yasuhiko Shiomi, Tokyo, and Takayuki Tsuboi, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 361,697, Jun. 1, 1989, abandoned, which is a continuation of Ser. No. 273,104, Nov. 18, 1988, abandoned, which is a continuation of Ser. No. 191,752, May 5, 1988, abandoned, which is a continuation of Ser. No. 5,765, Jan. 21, 1987, abandoned. This application Dec. 20, 1989, Ser. No. 455,906

Claims priority, application Japan, Jan. 21, 1986, 61-10656

Int. Cl.^{5} G03B *7/08, 15/05*

U.S. Cl. 354—414 **31 Claims**



1. An automatic status discriminator comprising:

- distance measuring means for calculating the distance to a target object to provide a signal corresponding to the distance;
- reflection coefficient calculation means for calculating the reflection coefficient of the target object on the basis of the signal provided from said distance measuring means;
- light intensity measuring means for providing signals respectively corresponding to the brightness of the target object and the brightness of a region near the target object;
- adjusting means for adjusting the signal corresponding to the brightness of said target object on the basis of the reflection coefficient obtained from said reflection coefficient calculation means to provide the adjusted signal; and
- status discriminating means for comparing the signal corresponding to the brightness of the region near said target object with the output from said adjusting means to thereby discriminate the status of said target object.

5,023,648

FLASH TAKING LENS SHUTTER CAMERA

Hiroshi Meguro, Kawasaki; Tsugio Takahashi; Hitoshi Aoki, both of Tokyo, and Toru Kosaka, Zama, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 331,304

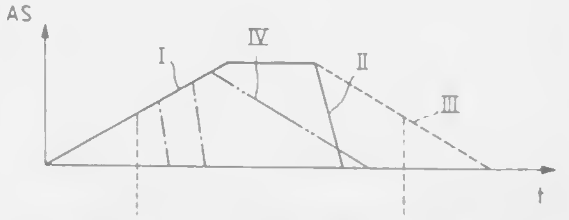
Claims priority, application Japan, Apr. 5, 1988, 63-84359

Int. Cl.^{5} G03B *7/00, 15/03*

U.S. Cl. 354—420 **4 Claims**

1. A camera having a lens shutter and flash means for emitting flash toward an object, comprising:

- a) signal output means for selectively outputting a first mode signal and a second mode signal;
- b) drive means having first and second modes for effecting opening and closing movement of said lens shutter, said drive means selecting said first mode in response to said first mode signal and selecting said second mode in response to said second mode signal, said drive means effecting the opening movement of said lens shutter at a first opening speed and the closing movement of said lens shutter at first closing speed faster than said first opening speed in said first mode, and effecting the opening movement of said lens shutter at a second opening speed substantially equal to said first opening speed and the closing movement of said lens shutter at a second closing speed slower than said first closing speed in said second mode; and



- c) control means for controlling the timing of flash emission from said flash means, said control means effecting the flash emission of said flash means during the opening movement of said lens shutter in said first mode, and effecting the flash emission of said flash means during the closing movement of said lens shutter in said second mode.

5,023,649

EXPOSURE CONTROLLING APPARATUS OF A CAMERA HAVING A PLURALITY OF AREAS FOR MEASURING BRIGHTNESS

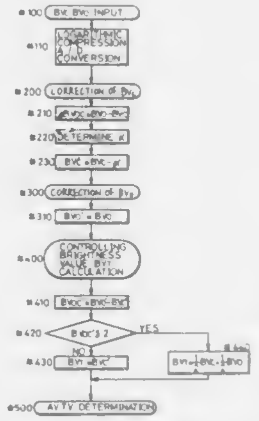
Kohtaro Hayashi; Toshihiko Karasaki; Yasuteru Yamano; Hiromu Mukai; Koji Hata, and Masayuki Ikemura, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 19, 1989, Ser. No. 340,459

Claims priority, application Japan, Apr. 20, 1988, 63-97776; Apr. 20, 1988, 63-97777

Int. Cl.^{5} G03B *7/08, 7/099*

U.S. Cl. 354—434 **34 Claims**



1. An exposure controlling apparatus of a camera, comprising:

- first brightness measuring means for measuring brightness of a first area to output a first value corresponding to the measured brightness;
- second brightness measuring means for measuring brightness of a second area around said first area to output a second value corresponding to the measured brightness;
- photographing magnification detecting means for detecting photographing magnification, which changes in accor-

VOL
1127
ISS
2
JE
11
1991
UMI

dance with a focal length and a distance to an object from the camera;
correcting value setting means for setting a correcting value based on the photographing magnification;
first comparing means for comparing said first and second values; and
correcting means for correcting, when it is determined by said comparing means that said second value is larger than said first value, said first value by the correcting value.

5,023,650
SILVER HALIDE FILM TYPE CAMERA

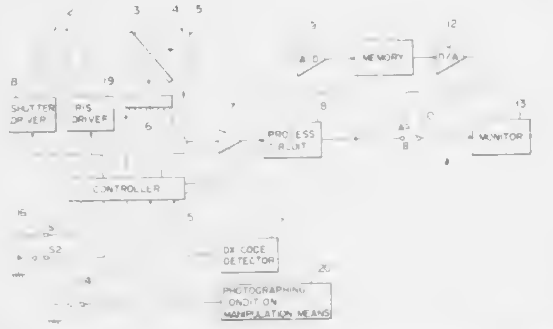
Yasushi Hoshino; Kazuhiro Sugiyama; Yoshitaka Obta, and Masaki Shimada, all of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Oct. 3, 1989, Ser. No. 416,661

Claims priority, application Japan, Oct. 11, 1988, 63-253721

Int. Cl.⁵ G03B *7/08*

U.S. Cl. 354—441 5 Claims



1. A camera for taking a picture of an object on silver halide film, comprising:
means for converting an optical image of the object into an image information signal corresponding to the optical image, the converting means including a photographing section for receiving the optical image;
memory means for storing the image information signal to reproduce a visible still image of the optical image;
means for displaying the visible still image;
means for setting photographic conditions depending upon the visible still image displayed on the display means;
means for switching the operation of the camera between a first mode and a second mode, wherein when the camera is operated in the first mode the photographic conditions can be adjusted to obtain a desirable photographing condition and in the second mode the picture is taken based upon the photographic conditions set in the first mode;
means for detecting a sensitivity of the silver halide film; and
means for adjusting the photographing section of the converting means in response to the sensitivity of the film detected by the detecting means, so that the visible image displayed by the display means is substantially equivalent to the object being photographed.

5,023,651
METHOD OF AND APPARATUS FOR RE-CREATING IMAGES

Richard J. Burch, Billericay, and Brian W. Oxley, Beckenham, both of Great Britain, assignors to Gilcbrist Studios Group Limited, London, England

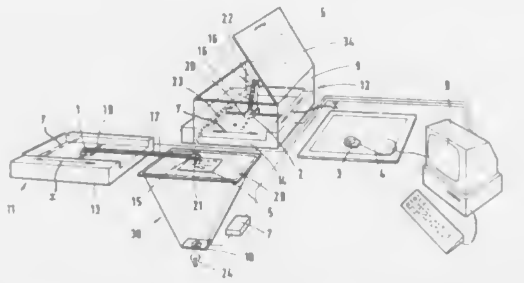
PCT No. PCT/GB87/00121, § 371 Date Oct. 13, 1987, § 102(e) Date Oct. 13, 1987, PCT Pub. No. WO87/05126, PCT Pub. Date Aug. 27, 1987

PCT Filed Feb. 18, 1987, Ser. No. 463,862

Claims priority, application United Kingdom, Feb. 19, 1986, 8700121

Int. Cl.⁵ G03B *27/00*

U.S. Cl. 355—1 18 Claims



1. A method of re-creating an image carried on original photographic film but with selective controlled alterations; said method comprising forming an image by projecting light modified by original photographic film; subjecting the image to a scanning process with a punctiform light collector, the scanning process involving relative movement between the image and the collector to define a reference frame formed by a series of indexed lines of movement in two different directions and subjecting the image to the action of occluder means to inhibit the collection of light at certain times during the scanning process, transferring light collected by the collector or information representing such light to a punctiform light emitter, subjecting unexposed photographic film to another scanning process to create another image, the other scanning process involving relative movement between the film and the light emitter to expose the film over a frame formed by a series of indexed lines of movement in two different directions and generally corresponding to the reference frame and utilizing programmable control means to control the scanning processes independently of one another and to control the action of the occluder means in a manner that may be varied in accordance with unique characteristics of the image carried on the original photographic film and means for selecting regions of image to cause correlation of the processes over at least one region of the respective frames where the corresponding part of the other image is to be the same as the corresponding part of the original image and to cause non-correlation of the processes over at least one further region of the respective frame where a corresponding part of the other image is to be different to the corresponding other part of the original image.

5,023,652
METHOD AND APPARATUS FOR PHOTOGRAPHIC PRINTING

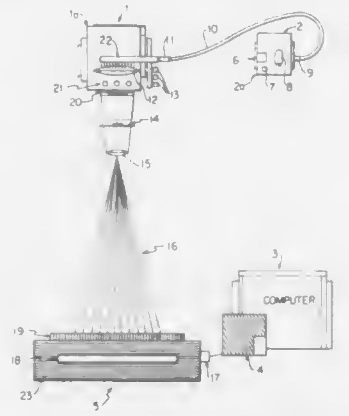
Norina M. Purro, 156 George Pl., Oceanside, N.Y. 11572

Filed Jul. 11, 1989, Ser. No. 378,398

Int. Cl.⁵ G03B *27/00*

U.S. Cl. 355—1 17 Claims

1. An apparatus for exposing light sensitive materials, comprising:
means for emitting light from a single light source along a path through a light transmissible element to the light sensitive materials;
a plurality of light guides in said path;
shutter means in said path for selectively and individually blocking the light from exposing said light sensitive materials from each of said light guides, said shutter means including a plurality of shutter elements in registry with said plurality of light guides, respectively; and



a movable arm supporting said light guides and said sensing means, said arm being movable for sweeping between the light sensitive materials and the light transmissible element.

5,023,653
IMAGE RECORDING APPARATUS HAVING SHEET SLACK ABSORBING MEANS

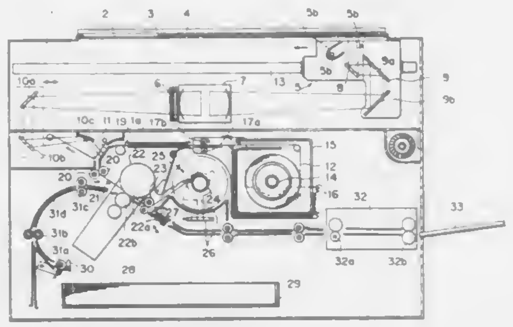
Hideo Yoshihara, Kasugai, Japan, assignor to Brother Kogyo Kabusbiki Kaisha, Nagoya, Japan

Filed Sep. 14, 1990, Ser. No. 582,161

Claims priority, application Japan, Oct. 30, 1989, 1-282233; Oct. 30, 1989, 1-282234; Oct. 30, 1989, 1-282235

Int. Cl.⁵ G03B *27/32, 27/52*

U.S. Cl. 355—27 4 Claims



1. An image recording apparatus which uses an elongated photosensitive recording medium having a photosensitive pressure sensitive layer comprises;
sheet feed means for feeding the elongated photosensitive recording medium;
an exposure unit for exposing the photosensitive recording medium to light for forming a latent image thereon;
a pressure developing unit positioned downstream of the exposure unit with respect to the sheet feeding direction for pressure developing the latent image on the photosensitive recording medium into a visible image;
a sheet slack absorbing means positioned between the exposure unit and the pressure developing unit, the sheet slack absorbing means being pivotably movable between a first position to absorb a sheet slack with contacting the photosensitive pressure sensitive layer and a second position out of contact with the photosensitive recording medium; and
drive means for selectively driving the sheet slack absorbing means to one of the first and the second positions.

5,023,654
THERMAL FIXING DEVICE FOR IMAGE RECORDING APPARATUS

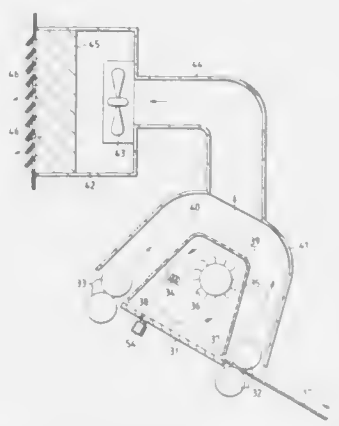
Yumio Matsumoto, Kasugai; Yasuo Kimura, Ichinomiya; Osamu Takagi, Nagoya; Yuji Asano, Nagoya; Takemi Yamamoto, Nagoya, and Takashi Nakata, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Oct. 31, 1989, Ser. No. 429,491

Claims priority, application Japan, Oct. 31, 1988, 63-142154 [U]; Oct. 31, 1988, 63-275319; Dec. 16, 1988, 63-318874; Dec. 19, 1988, 63-321337; Jan. 30, 1989, 1-20510; Jan. 31, 1989, 1-23047

Int. Cl.⁵ G03B *27/52*

U.S. Cl. 355—27 23 Claims



1. A thermal fixing device for thermally fixing and accelerating coloring of an image formed on a sheet (**17**), comprising:
delivery means (**32, 33**) for delivering the sheet (**17**) along a delivery path;
heating means (**34**) disposed on said delivery path of the sheet (**17**) for heating said sheet;
a device body (**39**) incorporating said heating means (**34**) therein and provided with an inlet (**37**) and an outlet (**38**) through which the sheet (**17**) is delivered;
suction means (**43, 45**) connected to said inlet and outlet (**37, 38**) for sucking a gas, generated from the sheet (**17**) when heated, through said inlet and outlet and vicinities of said inlet and outlet, thereby discharging the gas to an outside of the device body (**39**);
temperature setting means (**51**) for selectively setting one of a plurality of heating temperatures; and
control means (**51**) for controlling said heating means (**34**) and said suction means (**43, 45**) in response to the temperature set by said setting means (**51**).

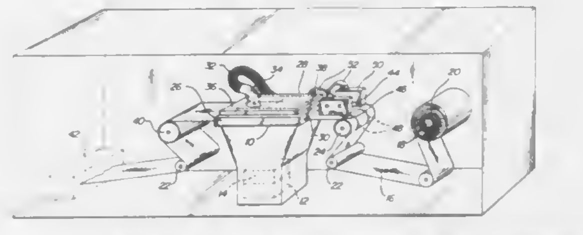
5,023,655
APPARATUS FOR PRINTING INFORMATION ON A SUBSTANTIALLY CONTINUOUS ROLL OF PHOTOGRAPHIC PAPER

Ray Hicks, 2605 Corunna Rd., Flint, Mich. 48503-3362

Filed Dec. 20, 1989, Ser. No. 453,582

Int. Cl.⁵ G03B *27/32, 27/52*

U.S. Cl. 355—39 17 Claims



1. In a photographic printing device for printing information

VOL
1127
ISS
2
JE
11
1991
UMI

on a substantially continuous roll of photographic paper having a photographic paper guide system, including a plurality of rollers necessary to transport the photographic paper in said device, and an exposure platen configured to retain the photographic paper in a single plane proximate the exposure area wherein at least one photographic print may be exposed on the front side of said photographic paper, an improved apparatus for printing information on the reverse side of said paper, wherein the improvement comprises:

a marking device; and

attachment means configured to fasten said marking device to the upper surface of the exposure platen, whereby said marking device utilizes a portion of one of said plurality of rollers necessary to transport the photographic paper as a platen for printing information on said reverse side of said paper.

5,023,656
PHOTOGRAPHIC PRINTING METHOD

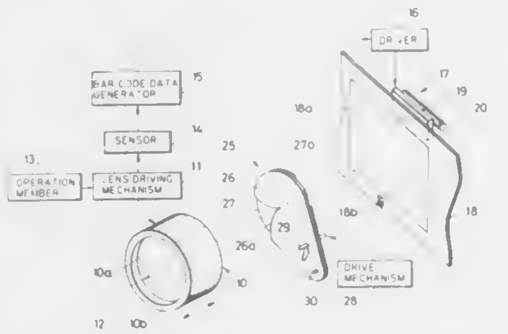
Takaaki Terashita, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 20, 1990, Ser. No. 512,281

Claims priority, application Japan, Apr. 20, 1989, 1-100961; Apr. 20, 1989, 1-100962; Jul. 7, 1989, 1-176415; Jul. 7, 1989, 1-176416; Sep. 14, 1989, 1-238784

Int. Cl.⁵ G03B *27/52, 27/74, 27/80, 27/32*

U.S. Cl. 355—41 26 Claims



1. A photographic printing method for printing an image of an object on a photosensitive material, said image having been taken by an image taking device, said method comprising the steps of:

reading distance information of said object from a recording medium said distance information corresponding to a distance of said object from said image taking device; and

controlling a print exposure amount of said image to be printed on said photosensitive material, in accordance with said distance information.

5,023,657
MICRO-IMAGE HANDLING APPARATUS WITH AUTOMATIC FOCUSING FUNCTION

Masaaki Kuriyama, Azuchi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 223,446, Jul. 22, 1988, abandoned. This application Jun. 1, 1990, Ser. No. 532,168

Claims priority, application Japan, Jul. 22, 1987, 62-184523; Jul. 22, 1987, 62-184524; Jul. 22, 1987, 62-184525; Jul. 22, 1987, 62-184526

Int. Cl.⁵ G03B *27/28*

U.S. Cl. 355—45 25 Claims

1. A micro-image handling apparatus comprising:

a projecting lens for projecting an image of a microfilm in magnification;

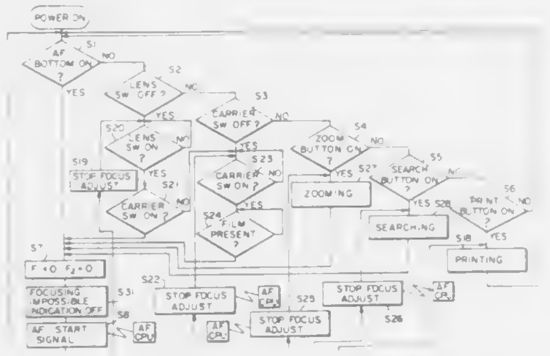
detecting means disposed on a projecting optical path for detecting focus states of the image as projected;

autofocus means for moving said projecting lens along an optical axis in response to said detecting means;

searching means for placing a selected frame of said microfilm on the projecting optical path in response to a search command;

first control means for controlling an operation of said autofocus means and said searching means, upon receipt of the search command during the operation of said autofocus means, to stop the operation of said autofocus means and initiate said searching means to operate; and

second control means for controlling said autofocus means to operate automatically when a selected frame is placed on the projecting optical path by said searching means.



5,023,658
IMAGE FORMING APPARATUS

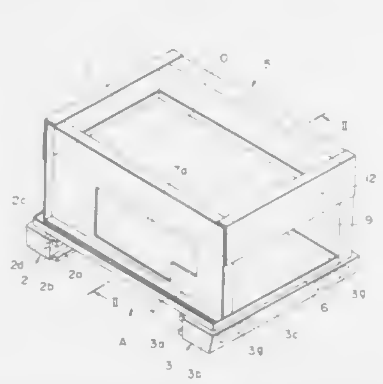
Yoshikuni Toyama, Yokohama; Kazuo Kagiura, Tokyo; Hiroyoshi Maruyama, Yokohama; Tatsuya Shiratori, Kawasaki; Masashi Ohashi, Tokyo; Masanari Shirai, Chigasaki, and Eiichi Ando, Toride, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 311,279, Feb. 16, 1989, abandoned. This application Jul. 20, 1990, Ser. No. 555,369

Claims priority, application Japan, Feb. 20, 1988, 63-037866; Feb. 20, 1988, 63-037867

Int. Cl.⁵ G03B *27/58*

U.S. Cl. 355—72 15 Claims



1. An image forming apparatus in which a sheet containing means for containing sheet is removably mounted to a body of the apparatus, comprising a frame structure having:

a pair of left and right bases spaced apart from each other:

a bottom plate arranged on said bases;

a first side plate arranged at one end of said bases and uprightly mounted on said bottom plate;

a second side plate arranged in confronting relation to said first side plate at the other end of said bases and having a lower end portion extending below said bases and covering said other end of said bases; and

a stay means for interconnecting said first and second side plates at their upper portions;

wherein a mounting portion for mounting said sheet containing means is formed by a space enclosed by said bases, said bottom plate and said second side plate.

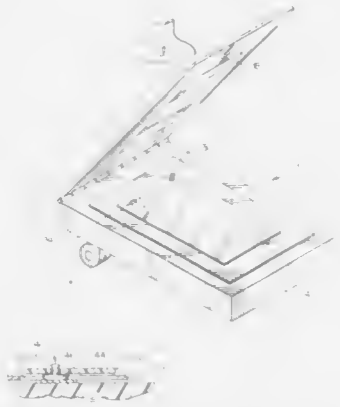
5,023,659
COMBINATION REGISTRATION PIN

Thomas T. Beasely, 2372 Tyrolean Way, Sacramento, Calif. 95609

Filed Jun. 11, 1990, Ser. No. 535,654

Int. Cl.⁵ G03B *27/04*

U.S. Cl. 355—85 13 Claims



1. A register pin for use in a registration system for aligning a layout mask sheet and a lithographic plate comprising in combination:

a thin planer base member;

a first register pin portion mounted on said base member in perpendicular relation thereto and having a pair of opposed, spaced apart, parallel side surfaces;

a second register pin portion having a circular cross section mounted on said first pin portion;

said second register pin portion having the axis thereof positioned perpendicular to said base member and in a plane passing through the midpoint between said side surfaces and parallel thereto.

5,023,660
IMAGE BEARING MEMBER AND DRIVING MECHANISM THEREFOR

Tokihide Ebata, Tana, and Shigeyoshi Onoda, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 906,040, Sep. 10, 1986, abandoned. This application Jun. 27, 1988, Ser. No. 212,087

Claims priority, application Japan, Sep. 17, 1985, 64-204951; Sep. 17, 1985, 64-205102

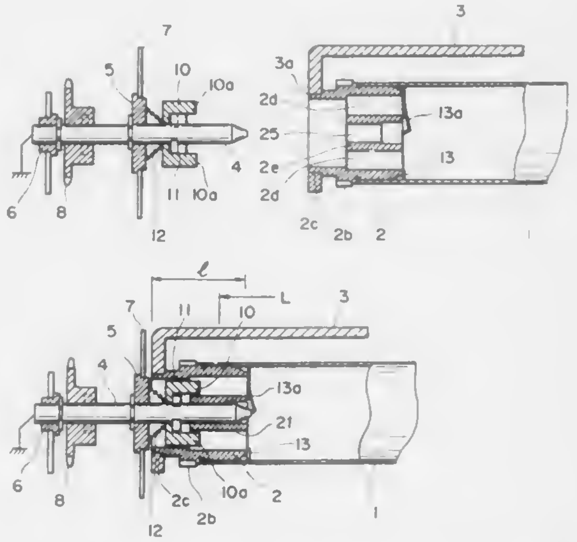
Int. Cl.⁵ G03G *15/00*

U.S. Cl. 355—200 41 Claims

1. An image bearing member having an image bearing surface detachably mountable into an image forming apparatus, comprising:

a positioning portion, disposed adjacent an end of said image bearing member, for engagement with a straight portion of a rotational center positioning member of the image forming apparatus when said image bearing member is mounted into the image forming apparatus wherein said image bearing member is in the form of a cylinder, and said positioning portion is within the cylinder; and

a driving force receiving portion, for receiving a driving force for rotating said image bearing member, said driving force receiving portion being radially overlapped, at least in part, with said positioning portion.



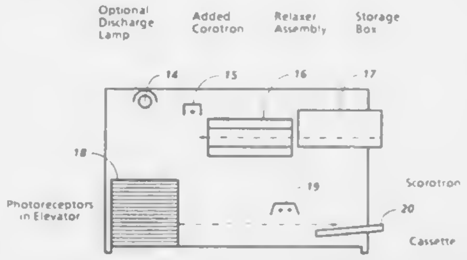
5,023,661
PRECHARGING OF THE X-RAY PHOTORECEPTOR TO ELIMINATE THE FATIGUF ARTIFACT

William D. Fender, Pasadena, and Lothar S. Jeromin, Sierra Madre, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 10, 1989, Ser. No. 335,305

Int. Cl.⁵ G03G *21/00*

U.S. Cl. 355—210 2 Claims



1. In a xerographic process comprising the steps of charging a xerographic selenium plate to a first voltage, exposing the plate to radiation, developing the plate with toner, transferring the toner image to the paper to create a copy, and cleaning the plate of toner before the next charging step, the additional steps between said cleaning step and said next charging step of:

precharging said plate to a second voltage of the same polarity as said first voltage, and

waiting at least thirty seconds to release any trapped charges in said plate.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,662

IMAGE FORMATION WITH MANUAL AND AUTOMATIC EXPOSURE ADJUSTMENT

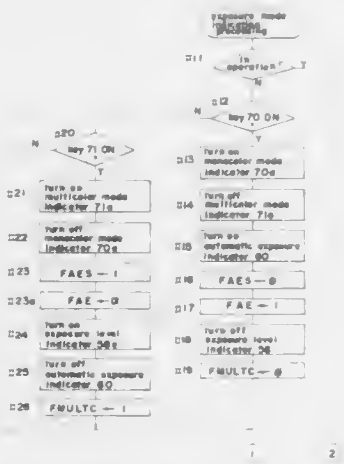
Keiji Kusumoto, and Kenzo Nagata, both of Osaka, Japan, assignors to Minolta Camera Co., Ltd., Osaka, Japan

Filed Sep. 8, 1989, Ser. No. 404,772

Claims priority, application Japan, Sep. 9, 1988, 63-227197; Sep. 9, 1988, 63-227198

Int. Cl.⁵ G03G *15/04, 15/01*

U.S. Cl. 355—228 21 Claims



1. An image forming apparatus which comprises:

image forming means for forming images in one of first and second modes;

manual adjusting means for manually adjusting the density of the images formed by said image forming means;

automatic adjusting means for automatically adjusting the density of the images formed by said image forming means;

mode selecting means for selecting one mode of said first and second modes; and

control means for activating said manual adjusting means in response to the first mode selection and activating said automatic adjusting means in response to the second mode selection.

5,023,663

COPYING MAGNIFICATION SETTING DEVICE FOR AN ELECTROPHOTOGRAPHIC COPYING APPARATUS

Kenji Shibazaki, Aichi; Yutaka Irie, Toyokawa; Masazumi Ito, Toyokawa, and Tomoji Murata, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 762,122, Aug. 2, 1985, Pat. No. 4,644,499, which is a division of Ser. No. 498,885, May 27, 1983, Pat. No. 4,543,643. This application Nov. 24, 1986, Ser. No. 934,350

Claims priority, application Japan, May 28, 1982, 57-91877; Nov. 25, 1982, 57-206444; Nov. 29, 1982, 57-209845; Feb. 10, 1983, 58-20833; Mar. 8, 1983, 58-38743

Int. Cl.⁵ G03G *15/04*

U.S. Cl. 355—243 7 Claims

1. An image forming apparatus for obtaining any copy ratio within a predetermined continuously varying range of copy ratios comprising:

a main body;

an original table, connected to said main body, for receiving an original placed thereon;

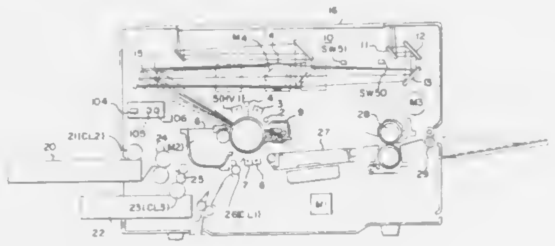
an image carrier for forming an image of said original thereon;

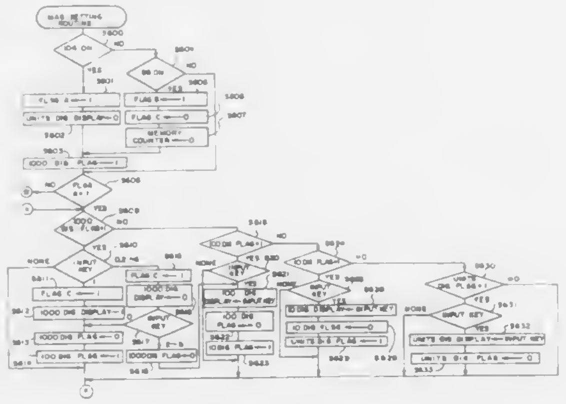
illuminating means for illuminating said original on said original table;

optical means, disposed in said main body, for directing light reflected from said original along an optical axis to said image carrier, said optical means including a single focus lens movable along said optical axis and having a fixed focal length (f) for focusing said reflected light on said image carrier;

a first drive means including a first motor disposed in said main body, for optically scanning said original through relative movement of said original and said illuminating means;

a second drive means including a second motor disposed in said main body, for varying a distance (a) from said original to said lens, and a distance (b) from said lens to said image carrier;





first means, connected to said main body, for inputting data specifying a copy ratio which is within said range of copy ratios;

second means for causing said second drive means to change the distances (a) and (b) to make a ratio (b/a) coincident with said specified copy ratio data input from said first means satisfying an equation $1/a+1/b=1/f$, and for causing said first drive means to provide said relative movement at a speed in accordance with said specified copy ratio data; and

a third motor driving said image carrier.

5,023,664

NON-MECHANICAL PRINTER OR COPIER MEANS COMPRISING AN EXPOSURE MEANS ARRANGED IN THE DEVELOPMENT REGION

Rainer Koefferlein, Munich; Bernhard Schlageter, Unterhaching, and Erich Baier, Schweitenkirchen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

PCT No. PCT/DE87/00428, § 371 Date Mar. 22, 1989, § 102(e) Date Mar. 22, 1989, PCT Pub. No. WO88/02502, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 21, 1987, Ser. No. 331,665

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1986, 3632474

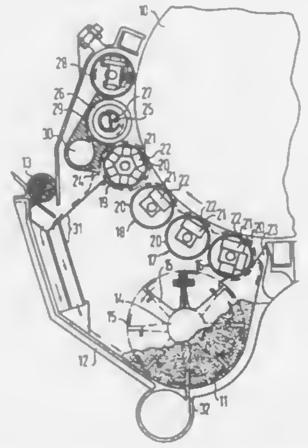
Int. Cl.⁵ G03G *21/00*

U.S. Cl. 355—245 5 Claims

1. A non-mechanical printer or copier device, comprising:

a charge image carrier in the printer or copier device;

an exposure means in the printer or copier device for exposing said charge image carrier with a character image to produce a charge image on said charge image carrier;



a development region in the printer or copier device for developing by reversal development the charge image generated on said charge image carrier to thereby form charged and discharged regions on said charge image carrier, said development region utilizing a developer mix composed of toner particles and of carrier particles, said development region including

development rollers positioned relative to said charge image carrier to apply the developer mix to regions of the charge image that are discharged by the character image exposure, and

a means for removing carrier particles from the charge image carrier, said means following the development rollers in a moving direction of the charge image carrier;

an illumination means following said development region for illuminating the charge image carrier, said illumination means discharging by exposure highly charged and nontonered regions of the charge image carrier, light generated in the illumination means roughly corresponding in terms of its spectral composition to light of the exposure means; and the illumination means being arranged inside the development region between the means for removing the carrier particles of the developer mix and the development region so that the carrier particle are removable by said means for removing while leaving the toner particles adhered to the charge image carrier for image transfer.

5,023,665

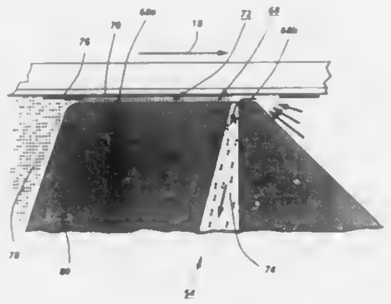
EXCESS LIQUID CARRIER REMOVAL APPARATUS

Robert W. Gundlach, Victor, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 27, 1990, Ser. No. 544,565

Int. Cl.⁵ G03G *15/10*

U.S. Cl. 355—256 15 Claims



8. An electrophotographic printing machine, including:

a moving photoconductive member;

means for recording an electrostatic latent image on said photoconductive member;

means for developing the electrostatic latent image recorded on said photoconductive member with a liquid developer material comprising at least a liquid carrier and toner particles so as to form a toner particle image on said photoconductive member;

means for transferring the toner particle image and liquid carrier from said photoconductive member to a sheet of support material;

vacuum means, interposed between said transferring means and said developing means and positioned closely adjacent said moving photoconductive member to define a gap therebetween, for withdrawing air and liquid carrier from the gap; and

means for electrically biasing said vacuum means to generate an electrical field sufficient to maintain the toner particle image substantially undisturbed as said vacuum means withdraws air and liquid carrier.

5,023,666

IMAGE FORMING APPARATUS USING AN IMAGE CARRIER WITH MULTIPLE LAYERS

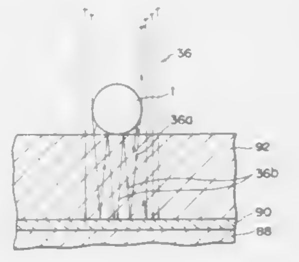
Takasbi Shimazaki, and Kenichi Tsuneeda, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

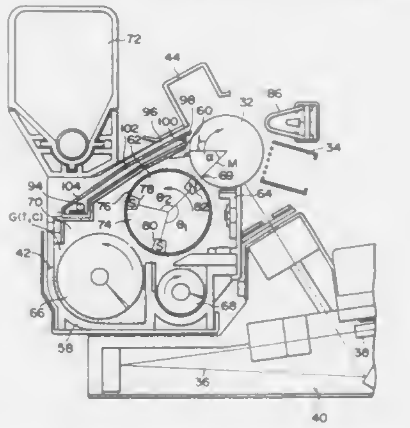
Continuation of Ser. No. 124,949, Nov. 24, 1987, abandoned. This application May 29, 1990, Ser. No. 529,754

Claims priority, application Japan, Nov. 26, 1986, 61-281254

Int. Cl.⁵ G03G *21/00*

U.S. Cl. 355—269 14 Claims





1. An image forming apparatus adapted to use a developing agent to form an image comprising:

an image carrier including a charge generating layer for holding a charge and a charge transport layer, covering said charge generating layer, of a type which passes charge therethrough;

charging means for electrically charging the image carrier so that electric charge is produced and held in the charge generating layer;

exposure means for applying a light beam bearing image information to the charge generating layer of the image carrier through the charge transport layer thereby forming an electrostatic latent image corresponding to the image information on a surface of the image carrier;

VOL
1127
ISS
2
JE
11
1991
UMI

developing means for developing the electrostatic latent image by means of a developing agent, thereby forming a developed image on the surface of the image carrier; and

transfer means for transferring the developed image to the surface of the image carrier, and

said charge transport layer having a thickness which is equal to or more than a mean particle diameter of the developing agent, so that said light beam, applied by the exposure means, passes through the charge transport layer so as to impinge upon those regions of the charge generating layer which would be otherwise shaded by the residual developing agent.

5,023,667

APPARATUS FOR PREVENTING DAMAGE TO BOTH AN ELECTROPHOTOGRAPHIC PRINTER AND A RECORDING FORM USED WITH THE PRINTER

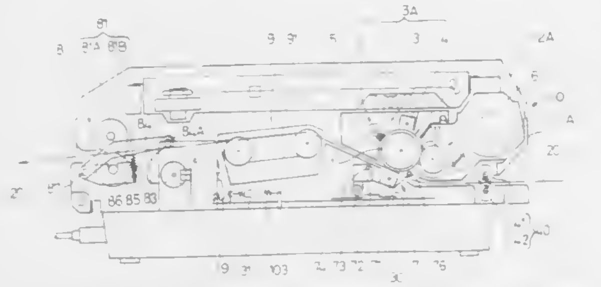
Ikuo Negoro, Sakado; Masatoshi Takano, Akikawa; Atsushi Chikama, Tokyo, and Kiyoshi Negishi, Saitama, all of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 28, 1989, Ser. No. 372,537

Claims priority, application Japan, Jun. 28, 1988, 63-160328; Jul. 1, 1988, 63-177466; Jan. 10, 1989, 1-1522; Apr. 13, 1989, 1-94071; Jun. 16, 1989, 1-153746

Int. Cl.^{5} G03G *15/16, 15/20*

U.S. Cl. 355—274 **20 Claims**



1. A printer for electrophotographically forming an image on a continuous-form recording paper, comprising:

a pair of fixing rollers, at least one of said fixing rollers being withdrawable so that it can be moved from a fixing roller operative position to a fixing roller withdrawn position;

a transfer charger that is movable between a transfer charger operative position to a transfer charger withdrawn position; and

drive means for executing a withdrawing and restoring operation to simultaneously withdraw said withdrawable fixing roller and said transfer charger to respective withdrawn positions, or simultaneously restore said withdrawable fixing roller and transfer charger to respective operative positions.

5,023,668

METHOD AND APPARATUS FOR ADHESIVE TRANSFER

Dennis J. Kluy, Stillwater; Gregory L. Zwadlo, Ellsworth; John L. Marty, White Bear Lake, and William V. Dower, St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing, St. Paul, Minn.

Filed Apr. 16, 1990, Ser. No. 504,526

Int. Cl.^{5} G03G *15/16, 13/16*

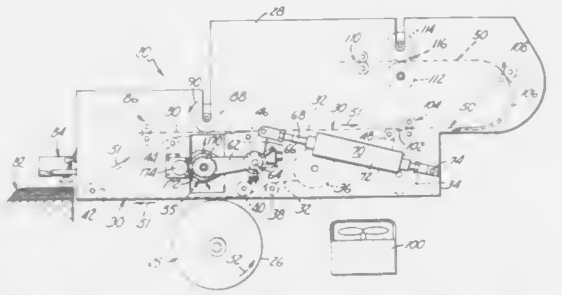
U.S. Cl. 355—281 **40 Claims**

30. An electrographic copying apparatus for transferring a toned image from an electrostatic carrier to a substrate, the apparatus comprising:

an image transfer web;

means for moving the web along a path past the electrostatic carrier;

a first lamination roller movable between first and second lamination positions wherein the roller is positioned adjacent the electrostatic carrier in the first lamination position whereby pressure is applied by the roller against the electrostatic carrier to laminate the image to the web as the web is moved along the path past the carrier, wherein the roller is spaced from the carrier in the second lamination position;



a second lamination roller spaced from the electrostatic carrier and along the path so that when the first lamination roller is moved to its second lamination position the first and second lamination rollers form a nip across the path for laminating the substrate to the image-bearing web as the web is advanced along the path; and

means for separating the substrate and image from the web.

5,023,669

IMAGE FORMING APPARATUS HAVING AN INTERMEDIATE SHEET ALIGNMENT AND RECEIVING UNIT

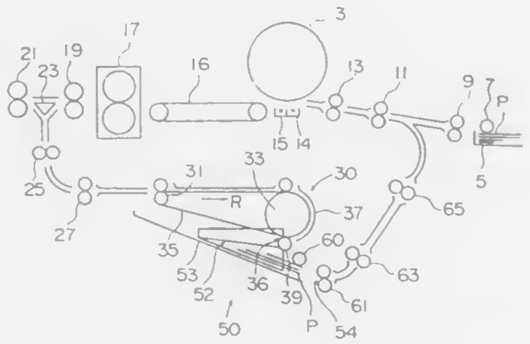
Masaru Hatano, Amagasaki, and Yoshiaki Tabata, Sakai, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

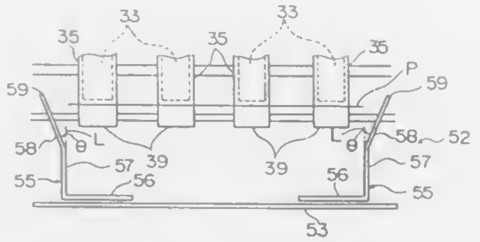
Filed Nov. 2, 1989, Ser. No. 430,342

Claims priority, application Japan, Nov. 11, 1988, 63-147919

Int. Cl.^{5} G03G *21/00*

U.S. Cl. 355—319 **10 Claims**





1. An image forming apparatus, comprising:

means for forming an image on a sheet;

means for feeding the sheet on which a first image is formed by said image forming means;

a receiving means for receiving the sheet fed by said feeding means, said receiving means comprising an inlet for receiving the sheet, a tray member for supporting the received sheet, an outlet through which the received sheet is re-fed, and means for aligning the sheet, wherein said aligning means comprises a pair of standing members positioned on the tray member in spaced relationship with each other at a predetermined distance, said standing members extending out away from the inlet in a sheet discharging direction, said standing members extending upward to a level which is higher than said inlet, and each of said pair of standing members having a widened portion with a first and second end for guiding the sheet from the inlet, said first end being positioned closer to said inlet than said second end, and said inlet including a pair of rollers and said pair of rollers each extending between said widened portions and a portion of each one of said pair of rollers being positioned between said first and second ends of said standing members; and

means for re-feeding the sheet out of said receiving means to form a second image thereon.

5,023,670

DEVELOPING APPARATUS HAVING DEVELOPING UNITS WITH A SLIDING MEMBER CONTACTING A GUIDE MEMBER

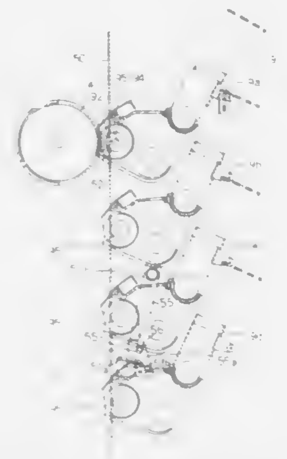
Hideki Kita, Suita; Akira Nakakuma, Takaishi; Hidehiro Fukui, Hirakata, and Hiroyuki Deguchi, Osaka, all of Japan, assignors to Mita Industrial Co., Ltd., Japan

Filed Jun. 27, 1990, Ser. No. 544,429

Claims priority, application Japan, Jun. 30, 1989, 1-170858

Int. Cl.^{5} G03G *15/01*

U.S. Cl. 355—326 **15 Claims**



1. A developing apparatus including a photoreceptor, said apparatus comprising:

a plurality of developing units which are aligned in one row, each developing unit having a developing roller for conveying toner to a latent image on said photoreceptor,

forcing means for always forcing each developing unit towards the photoreceptor,

a sliding member disposed in each of said developing units,

a guide member for guiding said developing units, said guide member having at least one open portion wherein said photoreceptor and one of said developing units face each other during developing, said sliding members being forced into contact with said guide member under the force exerted by said forcing means for forcing said developing units towards said photoreceptor,

driving means for moving said developing units along said guide member, one of said sliding members being moved into said open portion by said forcing means as said one sliding member reaches said open portion when said developing units are driven by said driving means, whereby one of said developing units is positioned near said photoreceptor, said guide member being formed so that said one sliding member moves out of said open portion against the force exerted by said forcing means as said one sliding member is driven away from said open portion when said developing units are driven by said driving means.

5,023,671

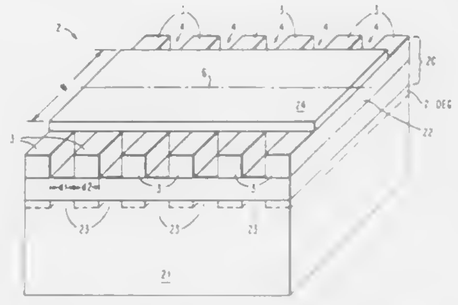
MICROSTRUCTURES WHICH PROVIDE SUPERLATTICE EFFECTS AND ONE-DIMENSIONAL CARRIER GAS CHANNELS

David P. DiVincenzo, Chappaqua; Kim Y. Lee, North Tarrytown, and Theoren P. Smith, III, Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 27, 1989, Ser. No. 328,830

Int. Cl.^{5} H01L *27/12*

U.S. Cl. 357—4 **45 Claims**



1. A quantum mechanical effect device comprising

a layer of a wide band gap compound semiconductor material having a given longitudinal axis in the direction of current flow and edges parallel to said axis and a doped upper portion,

a substrate of a narrower band gap compound semiconductor material forming an interface with said layer and a two-dimensional carrier gas adjacent said interface, and

means laterally displaced from said given longitudinal axis disposed over said substrate for periodically interrupting said two-dimensional carrier gas to form a continuous, quasi-one-dimensional channel parallel to said given axis and for subjecting said channel to periodic potential variations along the length thereof

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5,023,672

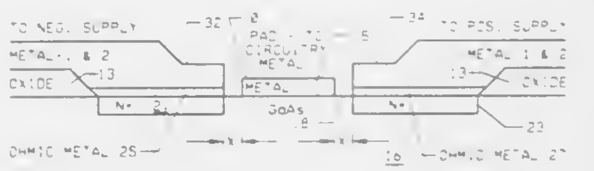
ELECTROSTATIC DISCHARGE PROTECTION DEVICE FOR GALLIUM ARSENIDE RESIDENT INTEGRATED CIRCUITS

Thomas E. Paquette, Colorado Springs, Colo., assignor to Ford Microelectronics, Colorado Springs, Colo.

Filed Nov. 15, 1989, Ser. No. 437,474

Int. Cl.^{5} H01L *29/48*

U.S. Cl. 357—15 **16 Claims**



1. A semiconductor device for effectively directing electrostatic charge away from a semiconductor circuit, formed within a semiconductor substrate of semi-insulating material and having a conductive link through which electrical signal inputs to said semiconductor circuit are applied and by way of which said electrostatic charge may be coupled to said semiconductor circuit, comprising:

a first metallic layer contacting a first surface portion of the semi-insulating material of said semiconductor substrate adjacent to said conductive link and forming a first

VOL
1127
ISS
2
JE
11
1991
UMI

Schottky barrier with said first surface portion of the semi-insulating material of said substrate;
a first ohmic contact region formed in second surface portion of said substrate adjacent to but spaced apart from said first surface portion of the semi-insulating material of said substrate;
first means for coupling one of said first metallic layer and first ohmic contact region to said conductive link; and
second means for coupling the other of said first metallic layer and said first ohmic contact region to a first source of reference potential;
said conductive link through which electrical signal inputs are applied to said semiconductor circuit being exclusive of any reference potential applied to said substrate;
a first series circuit of said first Schottky barrier and a first resistance, corresponding to semiconductor material of said first ohmic contact region and semi-insulating material of said substrate between said first ohmic contact region and said first Schottky barrier, existing between said conductive link and said first source of reference potential and providing a first path for effectively removing electrostatic charge from said conductive link.

5,023,673

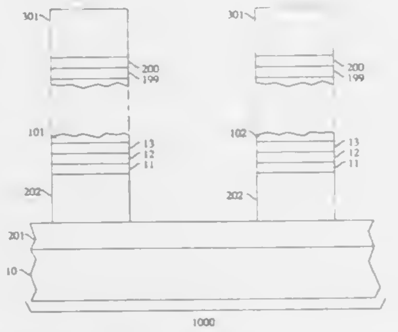
SEMICONDUCTOR MESA STRUCTURED OPTICAL PROCESSING DEVICES, WITH ADDED SIDE-SURFACE RECOMBINATION CENTERS TO IMPROVE THE SPEED OF OPERATION

Samuel L. McCall, Jr., Chatham, and Kuochou Tai, North Plainfield, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 21, 1989, Ser. No. 384,341

Int. Cl.⁵ H01L *29/161, 29/205, 29/225, 29/34*

U.S. Cl. 357—16 1 Claim



1. An optical processing arrangement comprising:
(a) a semiconductor optical processing device including a multiple quantum well mesa semiconductor structure with a side surface into which have been introduced impurities that increase the surface recombination velocity of charge carriers in said semiconductor structure, whereby the optical switching speed of the device is increased;
(b) an optical interferometer in which the multiple quantum well mesa structure is located;
(c) first and second optical source means for respectively supplying first and second optical beams incident upon the device; and
(d) optical detection and utilization means for detecting and utilizing optical radiation emitted by the device in response to the first and second beams.

5,023,674

FIELD EFFECT TRANSISTOR

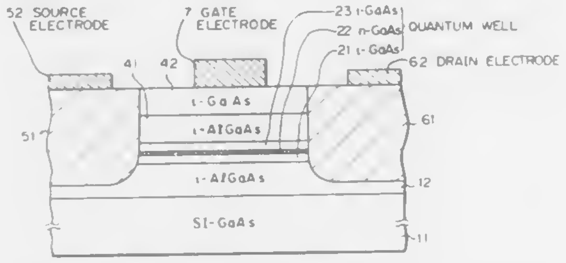
Kohki Hikosaka, Atsugi, and Yasutake Hirachi, Musashino, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 219,795, Jul. 14, 1988, abandoned, which is a continuation of Ser. No. 897,919, Aug. 19, 1986, abandoned. This application Oct. 4, 1990, Ser. No. 593,502

Claims priority, application Japan, Aug. 20, 1985, 60-182198; Sep. 28, 1985, 60-215603

Int. Cl.⁵ H01L *29/267, 29/080*

U.S. Cl. 357—16 5 Claims



1. A field effect transistor, comprising:
a semiconductor substrate;
a first semiconductor layer formed on said semiconductor substrate;
a second semiconductor layer formed above said first semiconductor layer, said first and second semiconductor layers each having an electron affinity and each having an overall layer thickness such that carriers cannot tunnel therethrough;
a third semiconductor layer, formed between said first and second semiconductor layers and heterojunctions formed between said first and third semiconductor layers and said second and third semiconductor layers, said third semiconductor layer having an electron affinity larger than the electron affinity in the first and second semiconductor layers, forming a quantum well, and including a doped layer being planar doped or highly doped, electrons supplied from the doped layer being confined by said quantum well and forming a quasi-two-dimensional electron gas, and said third semiconductor layer having an entire layer thickness such that only one two-dimensional electron gas layer is formed as a channel layer;
a gate electrode, for controlling carriers in said third semiconductor layer, formed above said second semiconductor layer;
a source/drain region provided on two sides of said gate electrode and contacting said first, second and third semiconductor layers;
a source electrode and a drain electrode formed on said source/drain region; and
a channel formed in said third semiconductor layer along said quantum well.

5,023,675

SEMICONDUCTOR DEVICE

Tomonori Ishikawa, Fujisawa, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

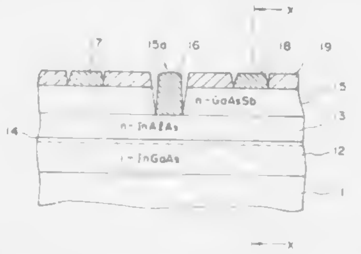
Filed Oct. 4, 1989, Ser. No. 416,944

Claims priority, application Japan, Oct. 8, 1988, 63-25917

Int. Cl.⁵ H01L *29/161, 29/80*

U.S. Cl. 357—22 9 Claims

1. A semiconductor device having a heterojunction and utilizing a two-dimensional electron gas formed at said heterojunction, comprising:
a substrate;
a first semiconductor layer of undoped indium gallium arsenide formed on said substrate;
a second semiconductor layer of n-type indium aluminum arsenide having top and bottom surfaces and formed with said bottom surface on said first semiconductor layer so as to define said heterojunction between said first semiconductor layer and said second semiconductor layer adjacent said bottom surface thereof;
a third semiconductor layer of n-type gallium arsenide antimonide formed as a cap layer on the top surface of the second semiconductor layer and having a window defined therein so as to expose said top surface in a predetermined region thereof;
a gate electrode provided in self-alignment with said window and in contact with said exposed top surface region of the second semiconductor layer; and
ohmic electrodes formed on the cap layer in ohmic contact therewith.



5,023,676

COMPOUND SEMICONDUCTOR MESFET DEVICE WITH PASSIVATION FILM

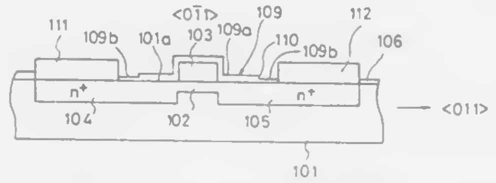
Shigeru Tatsuta, Atsugi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 1, 1989, Ser. No. 387,801

Claims priority, application Japan, Aug. 1, 1988, 63-192286

Int. Cl.⁵ H01L *27/14*

U.S. Cl. 357—22 12 Claims



1 A metal-semiconductor field effect transistor, comprising:
a substrate of a group III-V compound semiconductor material having a zinc blend structure;
a gate electrode provided on the substrate so as to extend in a $<0\bar{1}1>$ direction of the substrate;
a channel region defined in the substrate in alignment with the gate electrode and extending in a $<011>$ direction of the substrate;
a source region defined in the substrate at one side of the channel region;
a drain region defined in the substrate at the other side of the channel region;
a source electrode provided on the substrate so as to cover a first part of the source region spaced from the gate electrode while leaving a second part of the source region adjacent the gate electrode uncovered;
a drain electrode provided on the substrate so as to cover a first part of the drain region spaced from the gate electrode while leaving a second part of the drain region adjacent the gate electrode uncovered; and
a passivation film of a material experiencing a compressive stress during operation, said passivation film being provided so as to cover the gate electrode, said second part of the source region and said second part of the drain region, said passivation film comprising an inner area part covering a part of said second part of the source region adjacent the gate electrode and a part of said second part of the drain region adjacent the gate electrode, said film also comprising a marginal area part covering a part of said second part of the source region spaced from the gate electrode and a part of said second part of the drain region spaced from the gate electrode, said marginal area part having a thickness that is substantially less than that of said inner area part.

5,023,677

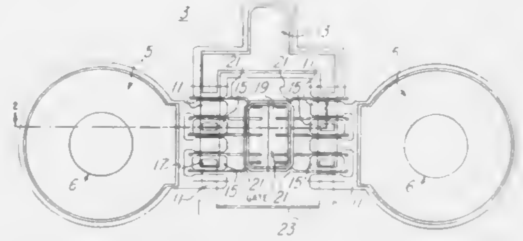
LOW PARASITIC FET TOPOLOGY FOR POWER AND LOW NOISE GAAS FETS

George A. Truitt, Allen, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 2, 1990, Ser. No. 518,349

Int. Cl.⁵ H01L *29/80, 23/48, 29/06*

U.S. Cl. 357—22 20 Claims



1. A FET comprising:
(a) a substrate having an active region at a surface thereof;
(b) a gate pad disposed on said active region;
(c) a plurality of gate fingers coupled to said gate pad, some of said gate fingers extending from said gate pad in opposite directions;
(d) a plurality of interleaved source contacts and drain contacts disposed on said active region and making an ohmic contact with said active region, at least some of said gate fingers disposed between an adjacent pair of contacts, one of said contacts being a source contact and the other of said contacts being a drain contact and
(e) an air bridge coupling together predetermined ones of one of said source contacts and said drain contacts, said air bridge extending over the other of said source contacts and said drain contacts adjacent to said predetermined ones of one of said source and drain contacts.

5,023,678

HIGH POWER MOSFET AND INTEGRATED CONTROL CIRCUIT THEREFOR FOR HIGH-SIDE SWITCH APPLICATION

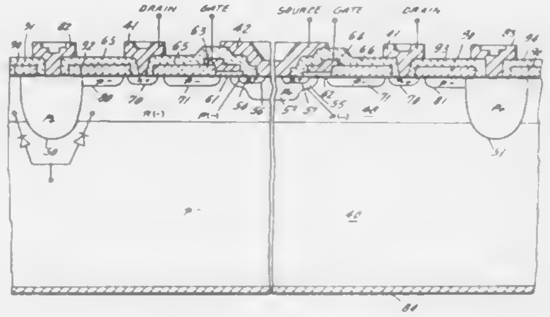
Daniel M. Kinzer, Riverside, Calif., assignor to International Rectifier Corporation, El Segundo, Calif.

Division of Ser. No. 54,627, May 27, 1987, Pat. No. 4,866,495. This application Aug. 9, 1989, Ser. No. 391,487

The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.

Int. Cl.⁵ H01L *29/78*

U.S. Cl. 357—23.4 19 Claims



1. A power integrated circuit integrally including a power

VOL 1127 ISS 2 JE 11 1991 UMI

MOSFET and an electrically-isolated control circuit for controlling the switching state of said power MOSFET;

said power MOSFET being for placement on the high potential side of a load;

said control circuit being formed in the power integrated circuit atop a substrate of monocrystalline semiconductor material;

said power MOSFET also being formed atop said substrate, being electrically isolated from said control circuit, and including a first layer of a first conductivity type formed atop said substrate, defining a reduced surface field first region, and having top and bottom surfaces; a surface-adjoining body region of a second conductivity type formed in said first layer and comprising first and second laterally-spaced segments; a surface-adjoining source region of said first conductivity type formed in said first layer and having first and second segments respectively within said first and second body region segments; said first and second source region segments spaced from confronting edges of said first and second body region segments respectively and defining respective first and second surface channel segments at said top surface of said first layer; the laterally-outwardly spaced portions of said first and second body region segments respectively adjoining said first and second source region segments and having a substantially greater conductivity than the adjacent laterally-inwardly spaced portions of said first and second body region segments for suppressing parasitic bipolar transistor turn-on; a gate oxide and gate electrode formed atop said surface channel; a drain region of said first conductivity type formed in said first layer and comprising first and second laterally-spaced segments spaced laterally outwardly of said first and second body region segments; a second region of said second conductivity type formed in said first layer and comprising a first segment interposed between said first body region segment and said first drain region segment and defining a reduced surface field region segment and a second segment interposed between said second body region segment and said second drain region segment and defining a reduced surface field region segment, whereby current flow from said surface channel has a vertical component from said surface to a depth greater than the depth of said second region, and first and second lateral components respectively beneath said first and second segments of said second region; said first region having a total charge approximately equal to the charge which will be depleted from both the top and bottom of said first region when said device is off; said second region having a total charge of approximately 1×10^{12} ions/cm^2.

5,023,679
SEMICONDUCTOR DEVICE

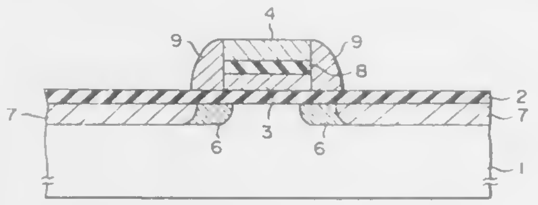
Hideki Shibata, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 28, 1989, Ser. No. 372,462

Claims priority, application Japan, Jun. 30, 1988, 63-160779

Int. Cl.⁵ H01L *29/78, 29/100, 29/040*

U.S. Cl. 357—23.4 4 Claims



1. A semiconductor device, comprising:

a semiconductor substrate of a first conductivity type;

a source/drain diffusion layer of a second conductivity type in the surface region of the semiconductor substrate, said source/drain diffusion layer including a first diffusion layer of a high impurity concentration and a second diffusion layer of a low impurity concentration;

a first insulation film formed on the semiconductor substrate;

a gate electrode formed on the first insulating film, said gate electrode including;

a first conductor layer having a thickness of about 500A or less formed on the first insulation film,

a second insulation film formed on the first conductor layer, and

a second conductor layer formed on the second insulation film,

the first and second conductor layers and the insulation film defining a sidewall surface,

a sidewall spacer including a third conductor layer formed on the sidewall surface for maintaining an electrical connection between the first conductor layer and the second conductor layer.

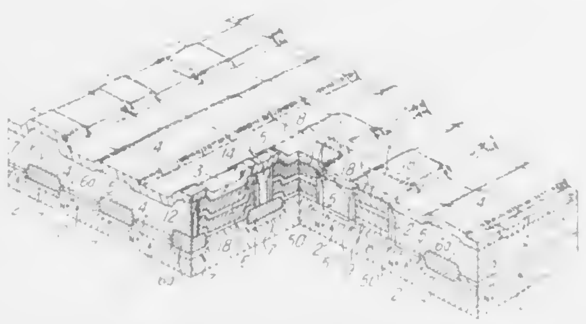
5,023,680
FLOATING-GATE MEMORY ARRAY WITH SILICIDED BURIED BITLINES AND WITH SINGLE-STEP-DEFINED FLOATING GATES

Manzur Gill, Rosharon, and Howard L. Tigelaar, Allan, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 10, 1988, Ser. No. 269,836

Int. Cl.⁵ H01L *29/68, 27/04, 27/10*

U.S. Cl. 357—23.5 23 Claims



1. A non-volatile memory cell array, comprising:

a plurality of parallel conductors including source-drain regions formed in a face of a semiconductor substrate, each of said conductors being a heavily-doped region of second conductivity-type opposite that of a first conductivity-type of the underlying material of said semiconductor substrate, each of said source-drain regions being spaced from at least one other said source-drain region on said face by a channel area, wherein said parallel conductors are formed in groups of three conductors;

thick field oxide regions located at the face of said semiconductor substrate between adjacent ones of said conductors and between adjacent ones of said channel areas;

thick field oxide strips located in the face of said semiconductor substrate between each said group of three parallel conductors;

a floating gate over each said channel are, the floating gate being separated from said channel area of said face by a gate insulator layer, wherein said floating gate extends over a part of each adjacent thick field oxide region, the extensions being in directions substantially at right angles to the direction of said parallel conductors;

a control gate extending along said face over said floating gate, the control gate being separated from said floating gate by an inter-level dielectric layer; and

a plurality of separately formed wordlines contacting said control gates and extending over said control gates in a direction substantially at right angle to the direction of said parallel conductors;

wherein each of said conductors including said source-drain regions also includes a silicided region.

5,023,681
METHOD FOR ARRANGING EEPROM CELLS AND A SEMICONDUCTOR DEVICE MANUFACTURED BY THE METHOD

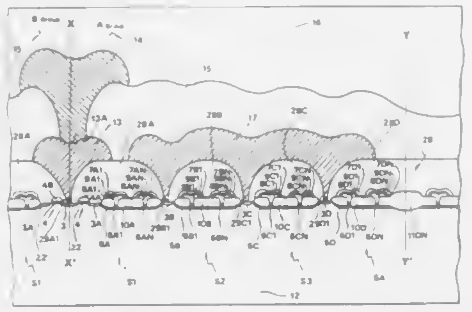
Chang W. Ha, Pusan, Rep. of Korea, assignor to Hyundai Electronics Industries Co., Ltd., Rep. of Korea

Filed Oct. 5, 1989, Ser. No. 417,286

Claims priority, application Rep. of Korea, Oct. 8, 1988, 88-131157

Int. Cl.⁵ H01L *29/68, 27/10, 29/34, 23/48*

U.S. Cl. 357—23.5 3 Claims



1. A semiconductor device having a plurality of EEPROM cells, wherein said EEPROM cells are arranged in a bit line direction and in a word line direction, comprising:

a plurality of segmentized buried diffusion regions formed on a semiconductor substrate, with each of said segmentized buried diffusion regions being sequentially spaced in a bit line direction and also sequentially spaced in a word line direction, and said plurality of segmentized buried diffusion regions spaced in said bit line direction including a first segmentized buried diffusion region and a last segmentized buried diffusion region;

a plurality of buried oxide film layers formed on each of said segmentized buried diffusion regions;

a plurality of tunnel oxide film layers formed on each of said buried oxide film layers;

a plurality of first gate oxide film layers with each of said first gate oxide film layers being formed on said substrate and extending between each of said respective segmentized buried diffusion regions in said word line direction;

a plurality of first poly layers for a floating gate with each of said first poly layers for said floating gate being formed on a portion of each of said first gate oxide film layers and on each of said tunnel oxide film layers in said word line direction;

a plurality of second gate oxide film layers with each of said second gate oxide film layers being formed on each of said first poly layers for said floating gate;

a plurality of second poly layers for a gate electrode with each of said second poly layers for said gate electrode extending in said word line direction and being formed on each of said second gate oxide film layers and on a portion of each of said first gate oxide film layers, thereby forming a plurality of EEPROM cells arranged in said word line direction and said plurality of EEPROM cells including an erased cell at a predetermined number of said EEPROM cells arranged in said word line direction;

a plurality of contact-diffusion regions with each of said contact-diffusion regions being formed on the substrate between each of said segmentized buried diffusion regions, respectively, for connecting said plurality of segmentized buried diffusion regions in said bit line direction and with each of said contact-diffusion regions further including a contact for connection therewith;

a plurality of selecting transistors with each of said selecting transistors being spaced in said word line direction, and being connected to said first segmentized buried diffusion region, and each of said selecting transistors comprising a diffusion region for a source electrode, a second poly layer formed on a gate oxide film layer which is formed on said substrate, and a diffusion region for a drain electrode for sharing which is shared by another selecting transistor of said plurality of selecting transistors, said diffusion region for said drain electrode for sharing further including a contact, thereby connecting said selecting transistor of said plurality of selecting transistors by said diffusion region for said source electrode to said first segmentized buried diffusion region of each of said segmentized buried diffusion regions;

a plurality of field oxide film layers for insulation formed on said substrate between each of said second poly layers for said gate electrode in said bit line direction and between each of said segmentized buried diffusion regions in said word line direction;

a field oxide film layer for segment separation extending in said word line direction and being formed at each of said last segmentized buried diffusion regions of said plurality of segmentized buried diffusion regions formed in said bit line direction;

a first insulating layer covering a surface comprising said plurality of buried oxide film layers, said plurality of second poly layers for said gate electrode, said plurality of selecting transistors, and said plurality of field oxide film layers for insulation and said field oxide film layer for segment separation, save for each of said contact-diffusion regions and each of said contacts of said diffusion regions for said drain electrode for sharing;

a plurality of first conducting layers for via contact connected with each of said contacts of each of said diffusion regions for drain for sharing, and each of said first conducting layers for via contact further including a bit line contact;

a plurality of first conducting layers for resistance reduction formed on said first insulating layer for connecting each of said contacts of said plurality of said contact-diffusion regions;

a second insulating layer covering a surface comprising said first insulating layer and said plurality of first conducting layers for resistance reduction save for each of said bit line contacts of said first conducting layer for via contact of said plurality of first conducting layers for via contact;

a plurality of second conducting layers for bit line for connecting each of said bit line contacts of said first conducting layer for via conduct of said plurality of first conducting layers for via contact to enable, in use, each of said selecting transistors to connect each of said segmentized buried diffusion regions to a bit line through each of said first conducting layers for via contact and each of said second conducting layers for bit line;

a protective layer formed on said second conducting layer for bit line and said second insulating layer thereby forming a group A structure;

a group B structure consisting of said group A structure wherein said diffusion region for said drain electrode for sharing is shared by said group A structure and said group B structure, thereby providing a semiconductor device having said plurality of EEPROM cells arranged to selectively connect, in use, said segmentized buried diffusion regions to said bit line selected by said selecting transistors, so that a parasitic capacitance produced between said substrate and said segmentized buried diffusion regions is reduced.

VOL 1127
ISS 2
JE 11
1991
UMI

5,023,682

SEMICONDUCTOR MEMORY DEVICE

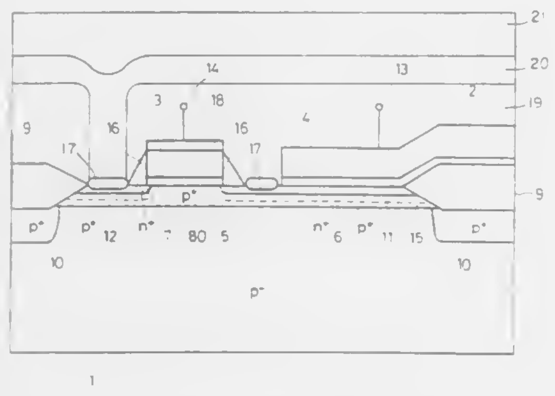
Masahiro Shimizu; Hiroki Shimano; Masahide Inuishi, and Katsuhiro Tsukamoto, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 295,101, Jan. 9, 1989, which is a division of Ser. No. 943,052, Dec. 18, 1986, abandoned. This application Jun. 23, 1989, Ser. No. 370,662

Claims priority, application Japan, Dec. 20, 1985, 60-288206

Int. Cl.^{5} H01L *29/68, 27/14, 27/02*

U.S. Cl. 357—23.6 17 Claims



1. A thin semiconductor memory device comprising:

a semiconductor substrate of a first conductivity type;

a first semiconductor region of a second conductivity type, a part of said first semiconductor region serving as one source/drain region and the other part thereof serving as a charge storage region for storing data;

a second semiconductor region of the second conductivity type formed apart from said first semiconductor region, said second semiconductor region serving as the other source/drain region and connected to a bit line:

a first gate insulator film formed on said charge storage region in said first semiconductor region;

a first gate electrode formed on said first gate insulator film, said first gate electrode being connected to a power supply for supplying constant voltage;

a second gate insulator film formed at least between said first and second semiconductor regions:

a second gate electrode formed on said second gate insulator film to provide a transfer gate, said second gate electrode being connected to a word line;

a shallow semiconductor layer of the first conductivity type formed on said semiconductor substrate and having higher impurity concentration than that in said semiconductor substrate for controlling a threshold voltage of said transfer gate and for providing a barrier layer to prevent soft errors caused by radioactive rays;

said first and second semiconductor regions of the second conductivity type and said second gate insulation film being on said semiconductor layer,

a first refractory metal silicide film formed on said one source/drain region in said first semiconductor region;

a second refractory metal silicide film formed on said second semiconductor region; and

a third refractory metal silicide film formed on said second gate electrode; said first and second refractory metal silicide films being formed to reduce the resistance of the source/drain region.

5,023,683

SEMICONDUCTOR MEMORY DEVICE WITH PILLAR-SHAPED INSULATING FILM

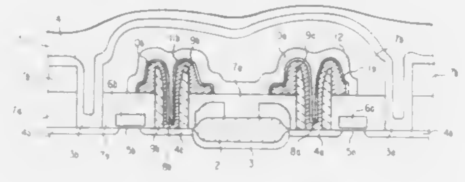
Takashi Yamada, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 8, 1989, Ser. No. 404,878

Claims priurity, application Japan, Sep. 30, 1988, 63-246413

Int. Cl.^{5} H01L *29/68, 29/06, 27/02*

U.S. Cl. 357—23.6 6 Claims



1. A semiconductor memory device, comprising: a semiconductor substrate;

an insulating film on the semiconductor substrate; an opening provided in the insulating film, exposing the substrate surface;

a hollow pillar-shaped sidewall insulating film provided on the inner sidewall of the opening, having a thickness, perpendicular with respect to the substrate, greater than that of said insulating film;

a first conductive film on the sidewall insulating film;

a capacitor insulating film on the first conductive film; and

a second conductive film on the capacitor insulating film; and

a second sidewall insulating film on the outer circumference of the sidewall insulating film.

5,023,684

COMPOSITE SEMICONDUCTOR DEVICE HAVING FUNCTION FOR OVERCURRENT DETECTION

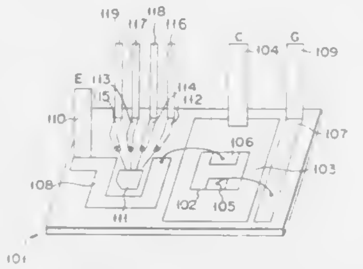
Tetsujiro Tsunoda, Fujisawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 31, 1990, Ser. No. 575,614

Claims priority, application Japan, Sep. 1, 1989, 1-227245

Int. Cl.^{5} H01L *27/22;* **H02H** *3/00, 3/18;* **H03K** *17/90*

U.S. Cl. 357—27 16 Claims



1. A composite semiconductor device having a function for overcurrent detection comprising:

an insulating substrate including at least one first conductive layer for producing a magnetic field and at least one second conductive layer thereon;

at least one semiconductor element having main electrodes, said semiconductor element being mounted on said second conductive layer through one of said main electrodes;

external terminals electrically connected to one end of said first and second conductive layers; and

a current detector for detecting said magnetic field produced by a main current flowing through said first conductive layer.

5.023,685

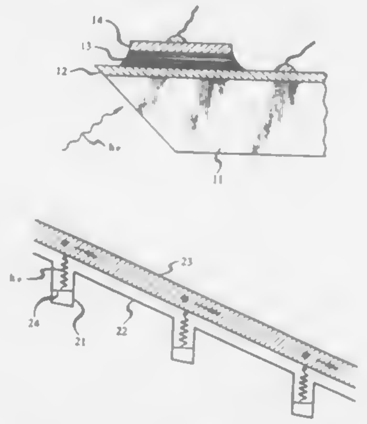
QUANTUM-WELL RADIATION-INTERACTIVE DEVICE, AND METHODS OF RADIATION DETECTION AND MODULATION

Clyde G. Bethea, 943 Hillside Ave., Plainfield, N.J. 07062; Ghulam Hasnain, 14 Daphne Ct., Edison, N.J. 08820; Barry F. Levine, 22 Bear Brook La., Livingston, N.J. 07039, and Roger J. Malik, 23 Ridgedale Ave., Summit, N.J. 07901

Continuation-in-part of Ser. No. 202,860, Jun. 6, 1988, abandoned. This application Jun. 6, 1989, Ser. No. 361,879

Int. Cl.^{5} H01L *27/14*

U.S. Cl. 357—30 26 Claims



1. A device responsive to electromagnetic radiation at a wavelength of interest comprising a substrate-supported semiconductor superlattice between contact layers, said superlattice comprising interleaved quantum-well and barrier layers, quantum wells formed by said layers respectively having a thickness of less than about 65 Angstroms so as to have one and only one conduction-band bound energy state;

said quantum wells being adapted for carrier excitation by said electromagnetic radiation from said conduction-band bound energy state into a conduction-band continuum energy state, and

the thickness of said barrier layers being significantly greater than the thickness of said quantum-well layers.

5,023,686

PIN-FET COMBINATION WITH BURIED P-LAYER

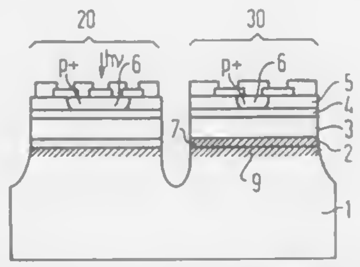
Albrecht Helmut, Munich, and Christl Lauterbach, Siegertsbrunn, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 15, 1990, Ser. No. 538,786

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1989, 3921027

Int. Cl.^{5} H01L *27/14*

U.S. Cl. 357—30 20 Claims



1. A Photodiode-FET combination having the following grown on one another on a substrate (1) of III-V semiconductor material;

an absorption layer (20-3) having low doping for a first conductivity type,

a contact layer (**20-4**) having high doping for this first conductivity type, and

a first cover layer (**20-5**) having a region (**20-6**) formed therein that extends from the surface of the first cover layer (**20-5**) down to the contact layer (**20-4**) and that is doped for an opposite, second conductivity type,

whereby the absorption layer, the contact layer and the first cover layer (**20-3**, **20-4**, **20-5**) form a photodiode (**20**),

a buffer layer (**30-3**) having low doping for the first conductivity type,

a channel layer (**30-4**) having high doping for the first conductivity type, and

a second cover layer (**30-5**) having a gate region (**30-6**) therein;

whereby the buffer layer, the channel layer and the second cover layer (**30-3**, **30-4**, **30-5**) form an FET (**30**), and

having contact for the electrical connection of the photodiode (**20**) and of the FET (**30**),

a basic layer (**2**) of semiconductor on the substrate (**1**);

a first semiconductor layer (**3**) on the basic layer (**2**), said first semiconductor layer forming the absorption layer (**20-3**) in the region of the photodiode (**20**) and forming the buffer layer (**30-3**) in the region of the FET (**30**);

a second semiconductor layer (**4**) on the first semiconductor layer (**3**), said second semiconductor layer forming the contact layer (**20-4**) in the region of the photodiode (**20**) and forming the channel layer (**30-4**) in the region of the FET (**30**);

a third semiconductor layer (**5**) on the second semiconductor layer (**4**), said third semiconductor layer forming the respective cover layers (**20-5**, **30-5**);

a first layer portion (**7, 8**) doped for the second conductivity type located between the substrate (**1**) and the channel layer (**30-4**) in the region of the FET (**30**); and the photodiode (**20**) and the FET (**30**) separated from one another by an isolating trench that extends down into the substrate (**1**).

5,023,687

SEMICONDUCTOR DEVICE

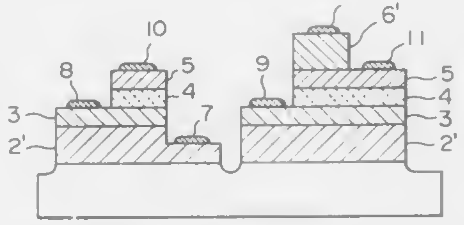
Tomonori Tanoue, Ebina; Chushirou Kusano, Tokorozawa, and Susumu Takahashi, Nishitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 31, 1989, Ser. No. 304,210

Claims priority, application Japan, Feb. 3, 1988, 63-21955

Int. Cl.^{5} H01L *29/72*

U.S. Cl. 357—34 21 Claims



1. A semiconductor device comprising:

a first region on a substrate having a first bipolar transistor formed thereon, the first bipolar transistor including a stacked arrangement of:

a first semiconductor layer, for providing one of collector and emitter regions, having a first conductivity type,

a second semiconductor layer, for providing a base region, being formed on the first semiconductor layer and having a second conductivity type, opposite to the first conductivity type,

a third semiconductor layer formed on the second semiconductor layer and having an impurity density equal to or smaller than $1 \times 10^{16}/cm^3$, the third semiconductor layer being substantially intrinsic,

VOL
1127
ISS
2
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1991
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- a fourth semiconductor layer, for providing the other one of the collector and emitter regions, being formed on the third semiconductor layer and having the first conductivity type,
- a first electrode electrically connected to the first semiconductor layer,
- a second electrode electrically connected to the second semiconductor layer, and
- a third electrode electrically connected to the fourth semiconductor layer; and
- a second region on the substrate, at a different portion thereof, having a second bipolar transistor formed thereon, the second bipolar transistor including a second stacked arrangement of:
- a first semiconductor layer having the first conductivity type,
- a second semiconductor layer, for providing one of collector and emitter regions, being formed on the first semiconductor layer and having the second conductivity type,
- a third semiconductor layer formed on the second semiconductor layer and having an impurity density equal to or smaller than $1 \times 10^{16}/\text{cm}^3$, the third semiconductor layer being substantially intrinsic,
- a fourth semiconductor layer, for providing the base region, being formed on the third semiconductor layer and having the first conductivity type,
- a fifth semiconductor layer, for providing the other one of the collector and emitter regions, being formed on the fourth semiconductor layer and having the second conductivity type, the fifth semiconductor layer functioning similarly as is the first semiconductor layer of the first bipolar transistor,
- a first electrode thereof being electrically connected to the second semiconductor layer,
- a second electrode thereof being electrically connected to the fourth semiconductor layer, and
- a third electrode thereof being electrically connected to the fifth electrode,

wherein the stacked first, second, third and fourth semiconductor layers of the first region are disposed along planes which are in common and which would intersect, if extended, with planes corresponding to the first, second, third and fourth semiconductor layers of said second region, respectively.

5,023,688

TRANSFER GATE WITH THE IMPROVED CUT-OFF CHARACTERISTIC

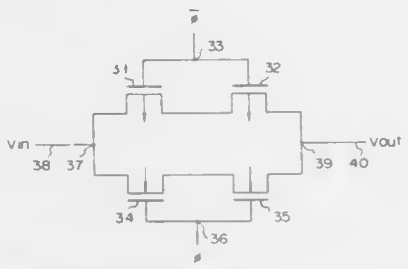
Kazumasa Ando, Kawasaki; Hideo Sakai, Yokohama, and Miki Sakai, Kitakami, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 7, 1989, Ser. No. 447,063

Claims priority, application Japan, Dec. 15, 1988, 63-317105

Int. Cl.^{5} H01L *27/02;* H03K *3/26, 17/16, 17/687*

U.S. Cl. 357—42 **4 Claims**



1. A transfer gate comprising:
- a semiconductor substrate of a first conductivity type;
- a plurality of well regions of a second conductivity type formed in a major surface region of said semiconductor substrate at different locations separated from each other by predetermined distances;
- an input node to which a signal is supplied;
- an output node for outputting the signal supplied through the input node to an analog circuit;
- a plurality of MOS FETs of the first conductivity type formed in the major surface region of the semiconductor substrate and connected in series to form a current path, one end of said current path being connected to the input node, another end of said current path being connected to the output node, and a first common control signal being supplied to gates of said MOS FETs for on/off control; and
- a plurality of MOS FETs of the second conductivity type formed in the well regions and connected in series to form a current path, one end of said current path being connected to the input node, the other end of said current path being connected to the output node, and a second common control signal opposite in phase to the first common control signal being supplied to the gates of said MOS FETs for the on/off control.

5,023,689

COMPLEMENTARY INTEGRATED CIRCUIT DEVICE EQUIPPED WITH LATCH-UP PREVENTING MEANS

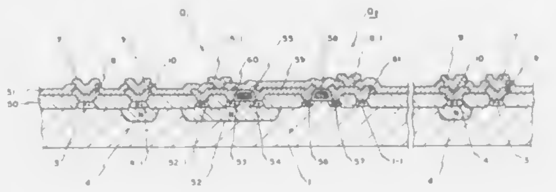
Yukari Sugawara, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Mar. 18, 1988, Ser. No. 170,285

Claims priority, application Japan, Mar. 18, 1987, 62-64667

Int. Cl.^{5} H01L *27/092*

U.S. Cl. 357—42 **8 Claims**



1. A complementary semiconductor device comprising a semicondutor substrate having a first area in which a plurality of first transisitors are formed and a second area in which a plurality of second transistors are formed, said first transistors being larger in size than second transistors, to produce carriers moving in said semiconductor substrate when said first transistors are in operation, a guard ring region formed along a periphery of said first area in said semiconductor substrate and surrounding said first area, a first interconnection line formed on said substrate and supplying a power voltage to transistors in said first area, a conductor layer formed on a surface of said guard ring region and along said guard ring region to be in contact with substantially the entire surface of said guard ring region, and a second interconnection line formed on said semiconductor substrate separately from said first interconnection line for supplying said power voltage via said conductor layer to said guard ring region independently of said first interconnection line, whereby the voltage of said guard ring region is substantially equalized over its entire length irrespective of an internal resistance of said guard ring region and stabilized irrespective of a change in voltage of said first interconnection line caused by the operation of said first transistors so that said guard ring region absorbs said carriers to prevent said carriers from being substantially transferred from said first area to said second area.

5,023,690

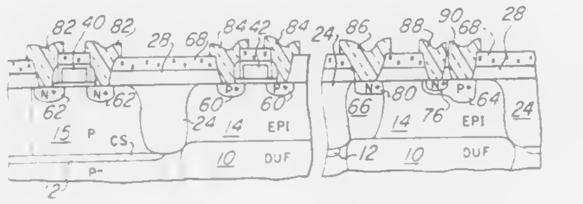
MERGED BIPOLAR AND COMPLEMENTARY METAL OXIDE SEMICONDUCTOR TRANSISTOR DEVICE

Douglas P. Verret, Sugarland, Tex.; Michael C. Smayling, Freising, Fed. Rep. of Germany; Abnash C. Sachdeva, Houston, and Stephen A. Keller, Sugarland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 206,062, Jun. 13, 1988, abandoned, which is a division of Ser. No. 922,691, Oct. 24, 1986, Pat. No. 4,719,558. This application Feb. 27, 1990, Ser. No. 489,762

Int. Cl.^{5} H01L *27/02*

U.S. Cl. 357—43 **6 Claims**



1. An integrated circuit comprising:
- (a) a layer of semiconductor material with a surface;
- (b) a first field effect transistor with channel region in a first N type region in said layer at said surface, said first N type region isolated by a first buried N+ region in said layer away from said surface plus insulator regions extending from the depth of and in contact with said first buried N+ layer to said surface;
- (c) a second field effect transistor with channel region in a first P type region in said layer at said surface, said first P type region isolated by a first buried P+ type region in said layer away from said surface plus insulator regions extending from the depth of and in contact with said first buried P+ layer to said surface;
- (d) a bipolar transistor with collector in a second N type region at said surface, said second N type region isolated by a second buried N+ region in said layer away from said surface plus insulator regions extending from the depth of and in contact with said second buried N+ layer to said surface; and
- (e) conductive interconnections among said transistors.

5,023,691

INSULATED GATE BIPOLAR TRANSISTOR

Hiroyasu Hagino, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

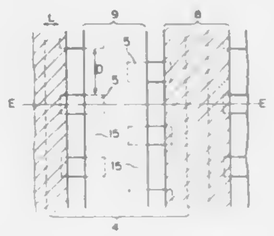
Filed Sep. 1, 1989, Ser. No. 401,827

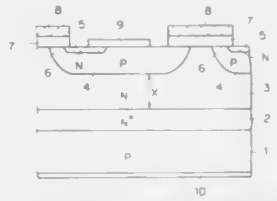
Claims priority, application Japan, May 26, 1989, 1-133202

Int. Cl.^{5} H01L *27/02*

U.S. Cl. 357—43 **14 Claims**

1. An insulated gate bipolar transistor having a breakdown voltage of about 500 to 750 volts, comprising:
- a first conductivity type first semiconductor layer having first and second major surfaces;
- a second conductivity type second semiconductor layer formed on said first major surface of said first semiconductor layer;
- a first conductivity type first semiconductor region selectively formed in a surface of said second semiconductor layer;
- a second conductivity type second semiconductor region selectively formed in a surface of said first semiconductor region,
- portions of said first semiconductor region, in a peripheral portion of said first semiconductor region, near a portion of the surface of said first semiconductor region between ends of surfaces of said first and second semiconductor regions being defined as a channel regions,
- a value W_U per unit area of a width of said channel region, which is defined as a length along opposite ends of the surfaces of said first and second semiconductor regions, satisfying $140\ \text{cm}^{-1} \leqq W_U \leqq 280\ \text{cm}^{-1}$;
- an insulation film formed on said channel region;
- a control electrode formed on said insulation film;





- a first main electrode formed on said first and second semiconductor regions; and
- a second main electrode formed on said second major surface of said first semiconductor layer.

5,023,692

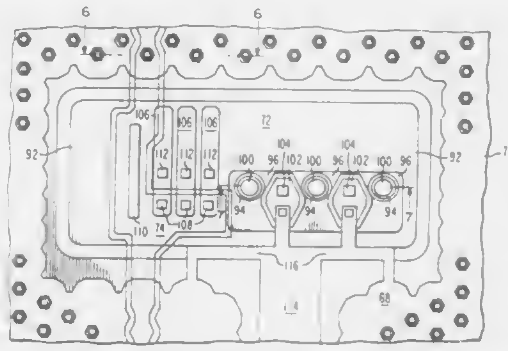
POWER MOSFET TRANSISTOR CIRCUIT

Paul J. Wodarczyk, Mountaintop; Carl F. Wheatley, Jr., Drums; John M. S. Neilson, Norristown, and Frederich P. Jones, Mountaintop, all of Pa., assignors to Harris Semiconductor Patents, Inc., Melbourne, Fla.

Filed Dec. 7, 1989, Ser. No. 447,330

Int. Cl.^{5} H01L *27/02, 29/04, 29/10*

U.S. Cl. 357—43 **8 Claims**



1. A power MOS transistor comprising
- a substrate of a semiconductor material of one conductivity type having first and second opposed surfaces;
- a drain region extending through said substrate between said surfaces;
- a plurality of spaced body regions of the opposite conductivity type in said substrate at said first surface, each of said body regions forming a body/drain junction with the drain region;
- a separate source region of the one conductivity type in said substrate at the first surface and within each body region, each of said source regions forming a source/body junction with its respective body region which is spaced from the body/drain junction of its respective body region to form a channel region therebetween along the first surface, each of the source regions and its respective body region forming a source/body cell;
- a conductive gate over and insulated from said first surface and extending across the channel regions;

VOL
1127
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2
JE
11
1991
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- a first conductive electrode over and insulated from said gate and contacting a first portion of the source/body cells;
- a second conductive electrode over and insulated from said gate and contacting a second portion of the source/body cells, the number of source/body cells in the second portion being smaller than the number in the first portion;
- a bipolar transistor in said substrate at said first surface having a collector region, an emitter region and a base region;
- a diode in the substrate at said first surface, said diode having first and second regions of opposite conductivity type; and
- first and second resistors over and insulated from said first surface;
- one end of the first resistor being connected to one side of the diode and the other end of the first resistor being connected to the collector of the bipolar transistor and the gate;
- one end of the second resistor being connected to the base of the bipolar transistor and the second electrode; and
- the emitter of the bipolar transistor being connected to the other side of the diode and to the first electrode.

5,023,693
TRANSISTOR WITH CURRENT SENSING FUNCTION

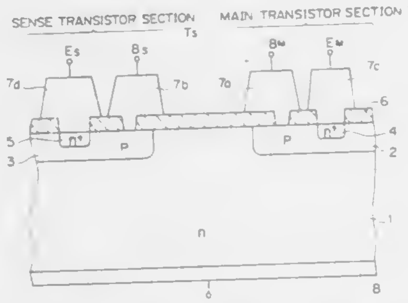
Shogo Mori, and Tetsuo Tateishi, both of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Jun. 4, 1990, Ser. No. 532,573

Claims priority, application Japan, Jun. 6, 1989, 1-143263; May 21, 1990, 2-130879

Int. Cl.^{5} H01L *27/02, 27/22, 29/72, 29/82*

U.S. Cl. 357—46 **9 Claims**



1. A monolithic transistor having a main transistor section for conducting a main current and a sensing transistor section for sensing the current flowing through said main section, said transistor comprising:
- a collector substrate common to said main transistor section and said sensing transistor section;
- said main transistor section comprising a base diffusion region in said substrate, an emitter diffusion region in said base region, a first electrode electrically connected to said emitter diffused region and electrically separated from said base diffusion region and a second electrode electrically connected to said base diffusion region and electrically separated from said emitter diffusion region; and
- said sensing transistor section comprising a further base diffusion region in said substrate electrically separated from said base diffusion region of said main transistor section, a further emitter diffusion region in said base region, a third electrode electrically connected to said further emitter diffused region and electrically separated from said base diffusion region of said main transistor section and a fourth electrode electrically connected to said further base diffusion region and electrically separated from said further emitter diffusion region.

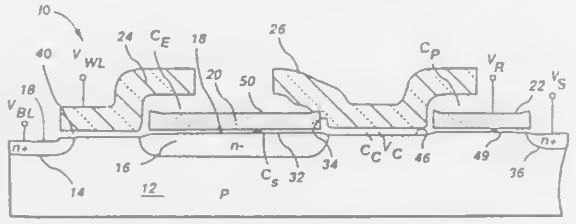
5,023,694
SIDE WALL CONTACT IN A NONVOLATILE ELECTRICALLY ALTERABLE MEMORY CELL

Bing Yeh, Los Altos, Calif., assignor to Xicor, Inc., Milpitas, Calif.

Filed Aug. 3, 1988, Ser. No. 227,811

Int. Cl.^{5} H01L *29/68, 27/02, 29/04, 23/48*

U.S. Cl. 357—54 **21 Claims**



1. An integrated circuit device comprising:
- a substrate of a first conductivity type having a first surface;
- a first polysilicon layer spaced from said first surface, and including a first portion and a second portion electrically insulated from said first portion, said first portion having a planar bottom surface spaced from said substrate and having at least one side wall substantially perpendicular to said bottom surface; and
- a second polysilicon layer having a first portion spaced from said first surface and a second portion electrically insulated from said first portion of said second polysilicon layer, said second portion of said second polysilicon layer having at least one surface in electrical contact with said side wall.

5,023,695
FLAT COOLING STRUCTURE OF INTEGRATED CIRCUIT

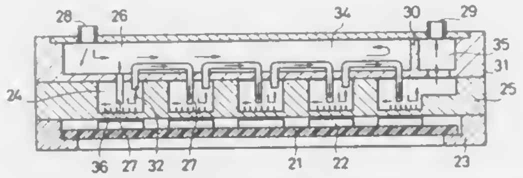
Kazuhiko Umezawa; Toshiaki Komatsu, both of Tokyo, and Jun Kubokawa, Yamanashi, all of Japan, assignors to NEC Corporation, Tokyo, Japan

Filed May 8, 1989, Ser. No. 349,411

Claims priority, application Japan, May 9, 1988, 63-113222; Jun. 22, 1988, 63-155523; Oct. 6, 1988, 63-253539; Oct. 6, 1988, 63-253540; Mar. 10, 1989, 1-58720

Int. Cl.^{5} H01L *25/04*

U.S. Cl. 357—82 **6 Claims**



1. An integrated circuit cooling structure, comprising: a substrate; a plurality of integrated circuits arranged on said substrate; a cooling plate opposed in gap relation to the upper surfaces of said plurality of integrated circuits and formed with a plurality of cut cavities arranged in correspondence to said plurality of integrated circuits; a cooling container having a suction compartment formed with an inlet for cooling fluid and a discharge compartment formed with an outlet for cooling fluid, and being disposed on said cooling plate so as to seal said plurality of cut cavities; a plurality of nozzle pipes, each disposed through a bottom portion of said suction compartment and respectively extending vertically into each of said plurality of cut cavities; and a plurality of collecting pipes, each being disposed through said bottom portion of the suction compartment to respectively extend into each of the cut cavities except the cut cavity communicating with the discharge compartment and being directly connected in said suction compartment to another nozzle pipe communicating with an adjacent cut cavity.

5,023,696
SEMICONDUCTOR DEVICE HAVING COMPOSITE SUBSTRATE FORMED BY FIXING TWO SEMICONDUCTOR SUBSTRATES IN CLOSE CONTACT WITH EACH OTHER

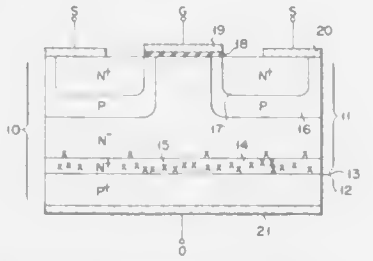
Masanobu Ogino, Yokosuka, Japan, assignor to Kabusbiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 3, 1989, Ser. No. 305,652

Claims priority, application Japan, Feb. 4, 1988, 63-22803

Int. Cl.^{5} H01L *29/04, 29/10, 29/74*

U.S. Cl. 357—60 **12 Claims**



1. A semiconductor device comprising:
- a first semiconductor substrate having first and second surfaces;
- a second semiconductor substrate having a third surface in which crystal defects are formed in a surface region thereof, and a fourth surface, said third surface being directly bonded to the first surface of said first semiconductor substrate; and
- at least one semiconductor element formed in a composite substrate formed by directly bonding said first and second semiconductor substrates;
- wherein said crystal defects are formed by ion-implanting atoms into the surface region of said second semiconductor substrate, said atoms are selected from those which function as neither an acceptor or a donor in said second semiconductor substrate, and said atoms do not introduce oxygen into said second semiconductor substrate.

5,023,697
SEMICONDUCTOR DEVICE WITH COPPER WIRE BALL BONDING

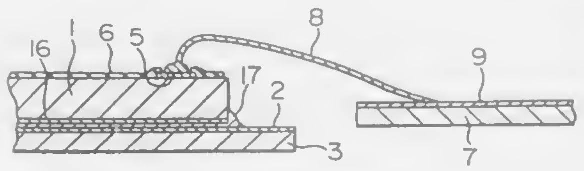
Kiyoaki Tsumura, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Apr. 6, 1990, Ser. No. 505,482

Claims priority, application Japan, Jan. 10, 1990, 2-1467

Int. Cl.^{5} H01L *23/48, 29/44, 39/02, 23/01*

U.S. Cl. 357—65 **9 Claims**



1. A semiconductor device comprising:
- a die pad;
- a silicon semiconductor chip having opposed first and second surfaces bonded at the second surface to said die pad;
- an aluminum electrode pad, an aluminum wire, and a glass coating disposed on the first surface of said chip;
- a solder bonding said semiconductor chip at the second surface to said die pad having a liquidus temperature at which no cracking occurs between said glass coating and said semiconductor chip; and
- a fine copper wire ball bonded to said aluminum electrode pad.

5,023,698
SEMICONDUCTOR DEVICE

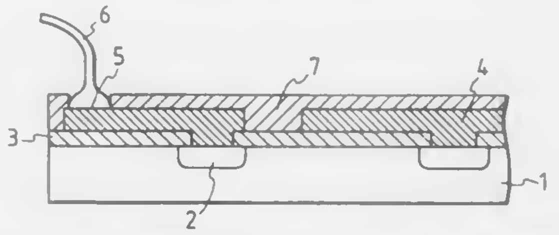
Shiro Kobayashi, Hitachi; Emiko Murofushi, Mito, and Masahiko Itoh, Ohta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 23, 1989, Ser. No. 327,609

Claims priority, application Japan, Mar. 30, 1988, 63-74658

Int. Cl.^{5} H01L *23/54, 23/48*

U.S. Cl. 357—67 **2 Claims**



1. A semiconductor device comprising a semiconductor chip, a diffusion layer formed on said semiconductor chip, an insulator film layer formed on said semiconductor chip, a metallization film layer formed on said semiconductor chip, an electrode portion formed on said metallization form layer, a protection film layer formed on said metallization film layer, a wire connected to said electrode portion, a lead frame connected to said wire. and package covering said semiconductor chip, said protection film layer and said wire, characterized in that
- said metallization film layer is made of Cu alloy which contains a metal element less noble than Cu and the balance of which consists of Cu and unavoidable impurities; said metal element less noble than Cu is at least one element selected from the group consisting of Al, Be, Cr, Fe, Mg, Ni, Si, Sn and Zn and the content of said metal element less noble than Cu in a weight ratio is 0.01 to 0.5% of Al, 0.01 to 0.3% of Be, 0.01 to 0.3% of Cr, 0.01 to 0.2% of Fe, 0.01 to 0.3% of Mg, 0.01 to 0.5% of Ni, 0.01 to 0.2% of Si, 0.01 to 0.5% of Sn and 0.01 to 2% of Zn; said film layer exhibiting high electrical conductivity, high heat resistance, high electro-migration resistance and high corrosion resistance.

5,023,699
RESIN MOLDED TYPE SEMICONDUCTOR DEVICE HAVING A CONDUCTOR FILM

Yuji Hara, Koganei; Satoru Ito, and Tatsuro Toya, both of Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 191,080, May 6, 1988, abandoned, which is a continuation of Ser. No. 902,539, Sep. 2, 1986, abandoned, which is a continuation of Ser. No. 744,151, Jun. 13, 1985, Pat. No. 4,625,227, which is a continuation of Ser. No. 292,585, Aug. 13, 1981, abandoned. This application Oct. 10, 1989, Ser. No. 419,007

Claims priority, application Japan, Sep. 1, 1980, 55-119817

The portion of the term of this patent subsequent to Nov. 25, 2003, has been disclaimed.

Int. Cl.^{5} H02L *29/34, 29/40, 23/48, 23/28*

U.S. Cl. 357—68 **29 Claims**

1. A semiconductor integrated circuit device having:
- (a) a plurality of active circuit elements which are formed in one major surface of a substantially tetragonal semiconductor substrate,
- (b) metal wiring means for electrically connecting said plurality of active circuit elements formed on the major surface of the semiconductor substrate; said metal wiring means having a broad metal conductor film extended along peripheral edges of the one major surface of the

VOL
1127
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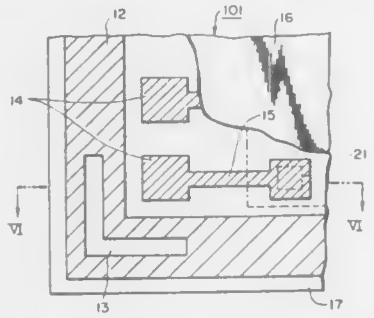
substantially tetragonal semiconductor substrate and extended on at least one corner of said semiconductor substrate,

(c) an inorganic passivation film which is formed over said broad metal conductor film; and

(d) a thermosetting sealing resin which overlies said passivation film and which encapsulates the semiconductor substrate, said broad metal conductor film having at least one L-shaped slit at a corner portion of the one major surface of the substantially tetragonal semiconductor substrate and the width of said broad conductor film being sufficient to act as a power source or a ground potential for the plurality of active circuit elements.



5,023,700

MINUTELY PATTERNED STRUCTURE

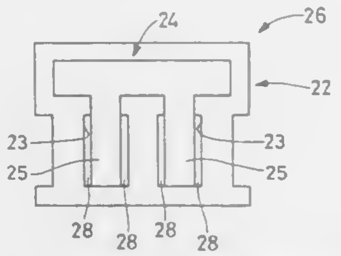
Yukihisa Takeuchi; Tetsuo Watanabe; Azuma Yamamoto, all of Nagoya; Kazuo Shirakawa, and Takao Segawa, both of Tokyo, all of Japan, assignors to NGK Insulators, Ltd. and Toppan Printing Co., Ltd., Japan

Filed Jun. 16, 1989, Ser. No. 367,257

Claims priority, application Japan, Jun. 17, 1988, 63-150885; Jul. 8, 1988, 63-171099; Jul. 8, 1988, 63-171100; Apr. 27, 1989, 1-108091

Int. Cl.^{5} H01L *23/48, 29/44, 29/52, 29/60*

U.S. Cl. 357—70 10 Claims



1. A patterned structure comprising a plurality of patterned sheet members each of which has a plurality of strip portions spaced apart from each other in a direction of a width thereof, said patterned sheet members being partially superposed on each other such that said strip portions of said patterned sheet members cooperate with each other to define a plurality of volts, and such that said strip portions of said patterned sheet members are separated from each other by said voids, said patterned sheet members having respective areas at which the sheet members are superposed on each other, at least a part of the area of at least one of said patterned sheet members including a thin-walled portion whose thickness is smaller than a thickness of the other portion of said at least one patterned sheet member.

5,023,701

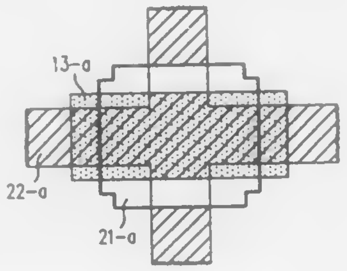
GATE ARRAY STRUCTURE AND PROCESS TO ALLOW OPTIONING AT SECOND METAL MASK ONLY

Bradley A. Sharpe-Geisler, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 175,834, Mar. 31, 1988, abandoned. This application Sep. 15, 1989, Ser. No. 408,461

Int. Cl.^{5} H01L *23/525*

U.S. Cl. 357—71 10 Claims



1. A semiconductor structure comprising:

a plurality of circuit elements;

a plurality of conductive lines which interconnect said circuit elements;

an insulation layer disposed on said conductive lines and having vias disposed therein, wherein said vias are arranged at locations above at least those of said conductive lines which must be broken to achieve a selected function; and

a conductive layer disposed on said insulation layer and contacting some of said conductive lines through said vias, said conductive layer being open adjacent at least one of said vias, and corresponding conductive lines beneath said at least one of said vias being discontinuous beneath said at least one of said vias.

5,023,702

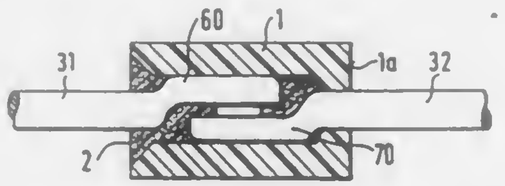
SEMICONDUCTOR DEVICE, METHOD OF MANUFACTURING THE SAME, AND APPARATUS FOR CARRYING OUT THE METHOD

Lyubomir Micic, Freiburg; Günter Gärtlein, Freiamt; Eberhard Schmitt; Axel Müller, both of Freiburg; Egoo Seng, Kenzingen-Hecklingen, and Siegfried Spindler, Waldkirch, all of Fed. Rep. of Germany, assignors to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 399,667

Int. Cl.^{5} H01L *23/04, 23/48*

U.S. Cl. 357—74 21 Claims



1. A semiconductor device comprising:

two leads aligned along a common axis and having inner end portions facing each other;

a prefabricated, can-shaped, cylindrical, plastic housing having a bottom with an aperture therein at one end and an open top at the other end, one of said leads passing through said aperture, and the other of said leads extending out of said open top;

a prefabricated semiconductor die attached between said inner end portions of said leads; and

a plastic cast resin compound filling the interior of said housing and encapsulating said inner end portions of said leads and said semiconductor die.

5,023,703

SEMICONDUCTOR DEVICE

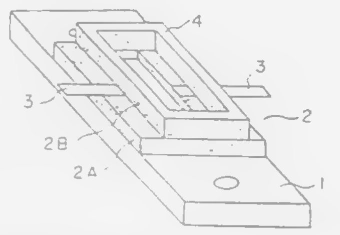
Norio Hidaka; Shigeyuki Yamamura, both of Sagamihara, and Masumi Fukuta, Machida, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 571,542, Dec. 20, 1983, Pat. No. 4,908,694. This application Dec. 12, 1989, Ser. No. 448,858

Claims priority, application Japan, Apr. 30, 1982, 57-7308

Int. Cl.^{5} H01L *23/02, 23/12*

U.S. Cl. 357—74 16 Claims



1. A package for a semiconductor device, comprising:

a solid metal case having a through passage connecting an inside and outside of said case; and

an electric terminal in the through passage, said electric terminal comprising:

an insulator base having a planar surface;

a strip line conductor formed on said insulator base; and

an insulator piece abutting part of the planar surface, an upper surface of said conductor being exposed on both sides of said piece and being provided on the inside and outside of said metal case.

5,023,704

COLOR TEMPERATURE DETECTING DEVICE WHEREIN COMPARISON IS MADE BETWEEN COLOR COMPONENT LEVELS AND REFERENCE LEVELS WHICH VARY WITH THE ILLUMINANCE OF INCIDENT LIGHT

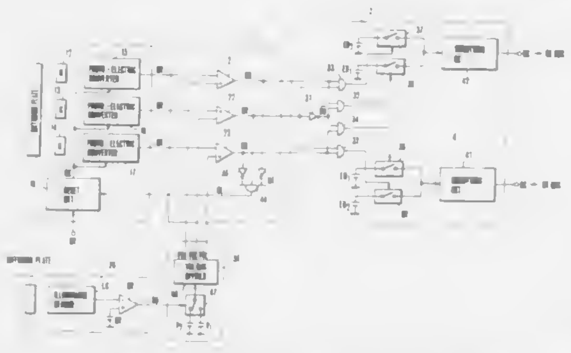
Teruo Hieda; Hiroyuki Shimizu, and Kazunori Masuda, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 192,958, May 12, 1988, Pat. No. 4,942,459. This application Oct. 11, 1989, Ser. No. 420,777

Claims priority, application Japan, May 15, 1987, 62-117017; May 15, 1987, 62-117018; May 15, 1987, 62-117019

Int. Cl.^{5} H04N *9/64, 9/04*

U.S. Cl. 358—29 C 9 Claims



1. A color temperature detecting device, comprising:

(a) a plurality of color detecting means for detecting levels of a plurality of color components included in an incident light;

(b) comparison means for comparing levels of the plurality of color components with respective reference levels;

(c) illuminance detecting means for detecting the illuminance level of said incident light; and

(d) control means for changing said reference levels according to the illuminance level detected by said illuminance detecting means.

5,023,705

APPARATUS FOR FORMING A THREE COLOR IMAGE INCLUDING A FIRST, A SECOND, AND A BLACK COLOR FROM TWO COMPLIMENTARY COLORS

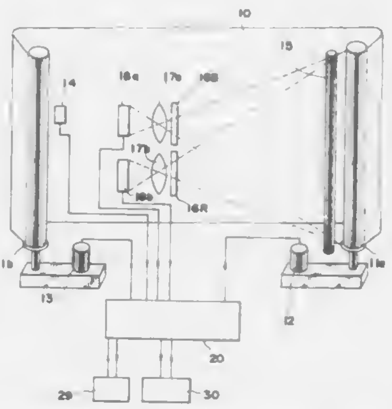
Shoji Kondo, and Yasuhiro Kyoden, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 12, 1989, Ser. No. 296,194

Claims priority, application Japan, Jan. 18, 1988, 63-9312; Jan. 18, 1988, 63-9313

Int. Cl.^{5} H04N *1/46*

U.S. Cl. 358—80 19 Claims



1. A printing device for forming an image from an original image which includes first color, second color and black color portions, the device comprising:

reading means for reading said first color, second color and black color portions of the original image;

first printing means for printing in the first color an image corresponding to said first color and black color portions read by said reading means and

second printing means for printing in the second color an image corresponding to said second color and black color portions read by said reading means so that

the black color is reproduced by overlapping the first and second colors.

5,023,706

TELEVISION, RADIO AND BINOCULAR SYSTEM

Thomas M. Sandberg, Minneapolis, Minn., assignor to The Kenyon Consortium, Minneapolis, Minn.

Filed Feb. 27, 1990, Ser. No. 486,552

Int. Cl.^{5} H04N *5/64*

U.S. Cl. 358—254 11 Claims

1. A portable recreation unit suitable for hands free support by a user, said unit comprising in combination:

(a) a protective housing constructed from high impact plastic containing a battery powered television, a battery powered radio and binoculars;

(b) at least one support strap attached to said housing for allowing said unit to be supported, hands-free, by a user when the support strap is placed on the user; and

(c) said protective housing having at least one open position

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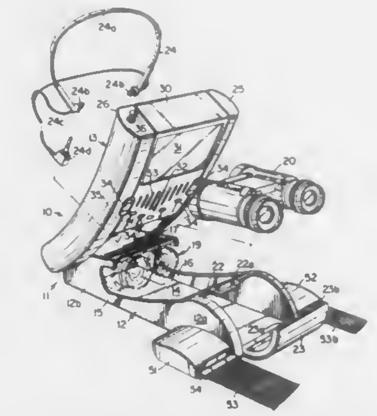
and at least one closed position, whereby the television, radio or binoculars can be used in said open position and



where said television, radio or binoculars can be restrained or concealed in said closed position.

5,023,707

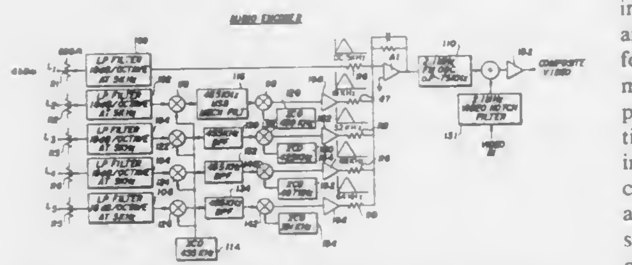
SYSTEM FOR COMBINING MULTIPLE AUDIO CHANNELS INTO THE BASEBAND VIDEO SIGNAL AND THE RECOVERY OF THE AUDIO CHANNELS THEREFROM

James B. Briggs, La Canada, Calif., assignor to Media Transference International, Ltd., Los Angeles, Calif.

Continuation of Ser. No. 803,595, Dec. 2, 1985, abandoned. This application Sep. 21, 1989, Ser. No. 411,214

Int. Cl.^{5} H04N *5/76*

U.S. Cl. 358—343 **28 Claims**



1. A method for encoding a plurality of audio signals, representative of audio in different languages, which correspond to a single video signal, said plurality of audio signals being encoded within the bandwidth of standard format composite video signal prior to the translation of a baseband video signal into a modulated format used for conduction, transmission and recording of a video signal said method comprising the steps of:

allocating the audio signal representative of each language to a separate audio channel;

filtering a predetermined frequency from the baseband video signal to remove energy from the baseband video signal at the predetermined frequency;

modulating a carrier signal by the audio signals from the audio channels, said carrier signal having a frequency equal to the predetermined frequency; and

inserting the modulated carrier signal at the predetermined frequency into the baseband video signal;

whereby the audio signals representative of audio in different languages are encoded into the baseband video signal, thereby avoiding the addition of signals outside the baseband video signal and an increase in bandwidth of the signal, and the baseband video signal encoded with the audio signals can be subsequently conducted, transmitted or recorded using unmodified video transmission or recording equipment.

5,023,708

COLOR IMAGE FORMING APPARATUS FOR SUPERPOSING A PLURALITY OF IMAGES

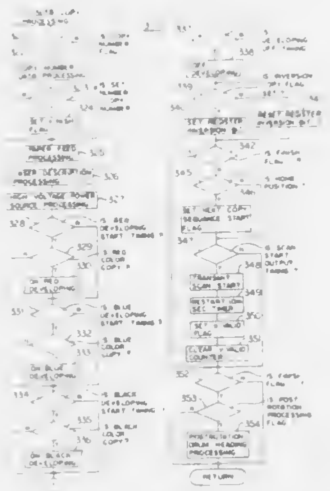
Hiroyuki Maruyama; Tadao Kishimoto; Toshifumi Isobe, and Jun Yokobori, all of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan

Continuation of Ser. No. 121,528, Nov. 17, 1987, abandoned. This application Feb. 2, 1990, Ser. No. 474,224

Claims priority, application Japan, Nov. 20, 1986, 61-277739; Nov. 28, 1986, 61-285340

Int. Cl.^{5} H04N *1/46*

U.S. Cl. 358—75 **5 Claims**



1. A color image forming apparatus for forming a color image by rotating plural times an image retainer and repeating an image forming cycle comprising at least a latent image formation and a development, said apparatus comprising means for generating reference signals corresponding to a plurality of predetermined positions on said image retainer, timing control means for controlling the start timing of an image forming cycle by using one of said reference signals corresponding to one of said positions, and the start timing of another image forming cycle by using another of said reference signals; reading means for reading an image; and signal processing means for receiving a signal from said reading means and generating a signal for forming a latent image; said timing control means being further operable to control the start of reading based on the said one reference signal.

5,023,709

AUTOMATIC FOLLOW-UP LIGHTING SYSTEM

Kunio Kita; Shigesumi Kuwashima; Takahito Suzuki, and Chikashi Seki, all of Tokyo, Japan, assignors to AO1 Studio Kabushiki Kaisha and Kabushiki Kaisha Ouyo Keisoku Kenkyusho, both of Tokyo, Japan

Filed Nov. 6, 1989, Ser. No. 431,847

Int. Cl.^{5} H04N *7/18*

U.S. Cl. 358—125 **12 Claims**

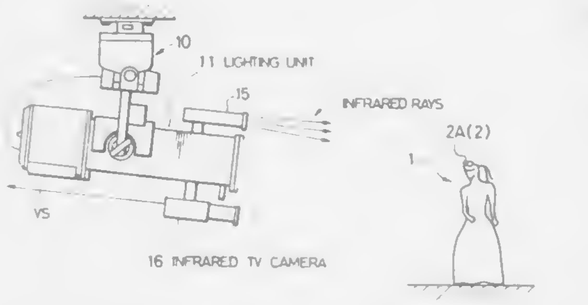
1. An automatic follow-up lighting system for automatically following an object having a mark thereon, said system comprising:

a turntable pivotable arbitrarily in a vertical and a horizontal direction;

a lighting unit fixed to said turntable and having directivity;

an imaging means having a field of view covering at least a part of a lighting range provided by said lighting unit, said imaging means producing output signals corresponding to said field of view thereof;

a calculating controller means for processing said output signals obtained from said imaging means to determine a



position of the mark on the object and to drive said turntable so as to track the mark on the object.

5,023,710

HIGHLY EFFICIENT CODING APPARATUS

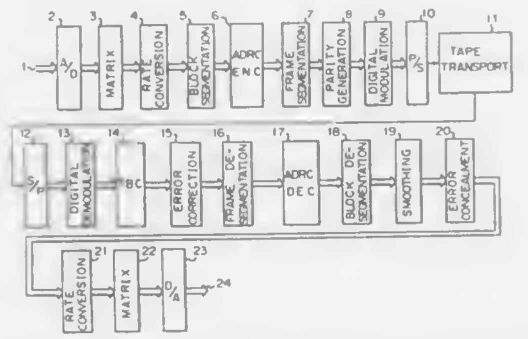
Tetsujiro Kondo, Kanagawa; Michio Nagai, Saitama, and Norihisa Shirota, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 24, 1990, Ser. No. 602,477

Claims priority, application Japan, Dec. 16, 1988, 63-317736

Int. Cl.^{5} H04N *7/13, 11/00*

U.S. Cl. 358—133 **7 Claims**



1. A highly efficient coding apparatus for coding digital video data in the form of blocks of digital video data representing plural picture elements so as to provide compressed video data for transmission by data transmission means having a predetermined transmission capacity, comprising:

block segmentation means supplied with input video data for generating a series of blocks of digital video data representing plural picture elements,

encoding means for encoding the digital video data in each block with a variable digitized bit number determined by characteristics of each block so as to provide coded data of variable bit length, and

frame segmentation means for generating a series of sync block data, each of which includes a plurality of blocks of coded data, and at least the most important data portions of the coded data being located in predetermined portions of each sync block.

5,023,711

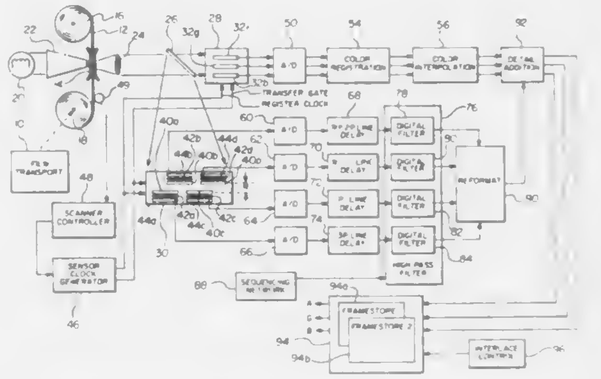
LINE SCANNING APPARATUS USING STAGGERED LINEAR SEGMENTS WITH ADJOINING OVERLAP REGIONS

Herbert J. Erhardt, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 16, 1989, Ser. No. 422,254

Int. Cl.^{5} H04N *3/10*

U.S. Cl. 358—76 **14 Claims**



1. Apparatus for generating an electronic signal from a line scan of an original, said apparatus comprising:

means for forming an optical image of at least two lines from the original;

first linear sensing means for generating a first signal from a first of said lines;

second linear sensing means for generating a second signal from a second of said lines;

means for supporting both said sensing means in staggered relationship in the path of said first and second optical line images such that said adjoining end portions overlap, thereby establishing a crossover point between said sensing means;

means for sampling the line signals;

means for filtering the line samples according to a processing algorithm that includes a plurality of said line samples in the generation of a filtered signal; and

means for sequencing said filtering means between said first and second line signals so that horizontally-contiguous filtered line signals on either side of the crossover point are derived according to the algorithm from a plurality of samples that are wholly within a corresponding one of said sensing means.

5,023,712

TRACKING DISTANCE-MEASURING EQUIPMENT SYSTEM WITH MEANS FOR SETTING A WINDOW AND MEANS FOR SAMPLING IMAGE SIGNALS AT PREDETERMINED TIME INTERVALS

Yasuya Kajiwara, Hyogo, Japan, assignor to Mitsubishi Denki K.K., Tokyo, Japan

Filed Mar. 6, 1990, Ser. No. 489,139

Claims priority, application Japan, Mar. 7, 1989, 1-54320; Mar. 7, 1989, 1-54321

Int. Cl.^{5} H04N *7/18*

U.S. Cl. 358—105 **3 Claims**

1. A tracking distance-measuring system for measuring a distance from a moving target on the principle of triangulation by electrically detecting a respective dislocation of first and second images individually focused on first and second image sensors (3,4) by first and second juxtaposed optical systems (1,2) and comparing corresponding first and second image signals provided by the image sensors, said tracking distance-measuring system comprising:

means for setting a window in a specific portion of either the first or second image signal;

VOL
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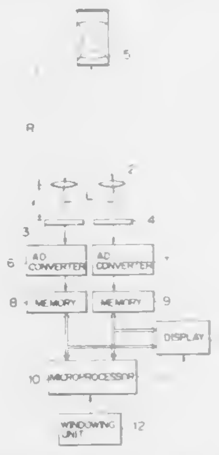
- means for determining the distance from the moving target by comparing the first and second image signals on the basis of an image signal in the window; and
- means for sampling the image signals periodically at predetermined time intervals for comparing the image signal within the window set at a sampling point and an image signal at the next sampling point to set a new window in a portion of the image signals best coinciding with each other for determining the direction and distance of movement of the target from a variation.



5,023,713

MOTION DETECTION CIRCUIT FOR USE IN A TELEVISION

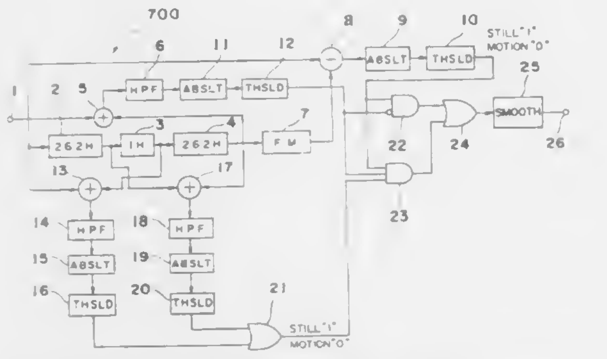
Yoshihisa Nishigori, Itami, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 20, 1990, Ser. No. 511,773

Claims priority, application Japan, Apr. 24, 1989, 1-103832

Int. Cl.⁵ H04N *9/78*

U.S. Cl. 358—105 2 Claims



1. A motion detection circuit which comprises:

- means for obtaining, with respect to a perceived pixel based on a NTSC input signal, a pixel 262 lines preceding the perceived pixel, a pixel 263 lines preceding the perceived pixel, and a pixel one frame preceding the perceived pixel;
- first threshold circuit means for comparing the amplitude of a first sum, which is a sum of the perceived pixel and the pixel one frame preceding the perceived pixel, with a first threshold;
- second threshold circuit means for comparing the amplitude of a second sum, which is a sum of the perceived pixel and the pixel 263 lines preceding the perceived pixel, with a second threshold;
- third threshold circuit means for comparing the amplitude of a third sum, which is a sum of the pixel 262 lines preceding the perceived pixel and the pixel one frame preceding the perceived pixel, with a third threshold; and
- logic circuit means for detecting a motion when the first sum is less than the first threshold and, at the same time, when at least one of two conditions is satisfied, a first of the two conditions being that the second sum is greater than the second threshold and a second of the two conditions being that the third sum is greater than the third threshold.

5,023,714

METHODS AND SYSTEMS FOR SCANNING AND INSPECTING IMAGES

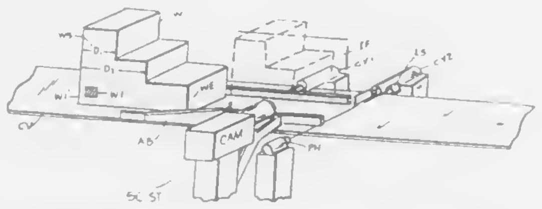
Jerome H. Lemelson, Call Box 14-286, 868 Tyner Way, Incline Village, Nev. 89450

Continuation of Ser. No. 500,287, Mar. 27, 1990, which is a continuation of Ser. No. 906,969, Sep. 15, 1986, which is a continuation of Ser. No. 723,183, Apr. 15, 1985, Pat. No. 4,660,086, which is a continuation of Ser. No. 394,946, Jul. 2, 1982, Pat. No. 4,511,918, which is a division of Ser. No. 13,608, Feb. 16, 1979, Pat. No. 4,338,626, which is a division of Ser. No. 778,331, Mar. 16, 1977, Pat. No. 4,148,061, which is a continuation of Ser. No. 267,377, Mar. 11, 1963, abandoned, which is a continuation-in-part of Ser. No. 626,211, Dec. 4, 1956, Pat. No. 3,081,379, and a continuation-in-part of Ser. No. 477,467, Dec. 24, 1954, abandoned. This application Aug. 22, 1990, Ser. No. 571,764

The portion of the term of this patent subsequent to Apr. 16, 2002, has been disclaimed.

Int. Cl.⁵ H04N *7/18, 7/00*

U.S. Cl. 358—107 4 Claims



1. An automatic inspection apparatus comprising:

- (a) means for positioning an object to be inspected at an inspection work station;
- (b) electronic scanning means disposed at the work station for examining the object under inspection;
- (c) said scanning means including means for generating analog information signals that are representative of variations in the physical characteristics of the object under inspection;
- (d) means for effecting relative movement between the object under inspection and the electronic scanning means so as to present different portions of the object in the field scanned by the scanning means;
- (e) electronic circuit means for analyzing the information content of the analog information signals generated by the electronic scanning means; and
- (f) said electronic scanning means being mounted on a controllable arm member for movement of the scanning means relative to the object under inspection.

5,023,715

METHOD OF AND APPARATUS FOR TRANSMITTING IMAGE INFORMATION

Mitsuru Owada, Yokohama, and Yoshiki Ishii, Hadano, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 272,418, Nov. 17, 1988, abandoned. This application May 8, 1990, Ser. No. 520,857

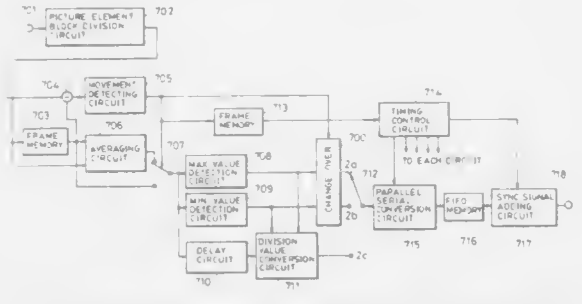
Claims priority, application Japan, Dec. 1, 1987, 62-301554

Int. Cl.⁵ H04N *7/18, 7/12*

U.S. Cl. 358—133 24 Claims

1. An image information transmission method for transmitting image information composed of a plurality of picture element data carried by a plurality of picture elements of a frame, comprising:

- (A) a first step of dividing the image information of said frame into a plurality of picture element blocks each including a predetermined number of picture element data carried by a predetermined number of picture elements;
- (B) a second step of forming, for each of said picture element blocks and by making use of the predetermined number of picture element data constituting each said picture element block, a plurality of distribution data which are distinguishable from each other and each of which represents a distribution of levels of said predetermined number of picture element data, and forming also a plurality of position data which represent the levels of said picture element data with respect to said plurality of distribution data, said plurality of distribution data and said plurality of position data forming a unit data block for each of said picture element blocks;


701
PICTURE ELEMENT BLOCK DIVISION CIRCUIT
702
704
MOVEMENT DETECTING CIRCUIT
705
703
FRAME MEMORY
706
AVERAGING CIRCUIT
707
FRAME MEMORY
713
MAX VALUE DETECTION CIRCUIT
708
MIN VALUE DETECTION CIRCUIT
709
DELAY CIRCUIT
710
DIVISION VALUE CONVERSION CIRCUIT
711
CHANGE OVER
700
2a
2b
2c
712
714
TIMING CONTROL CIRCUIT
TO EACH CIRCUIT
PARALLEL SERIAL CONVERSION CIRCUIT
715
FIFO MEMORY
716
SYNC SIGNAL ADDING CIRCUIT
717
718

- (C) a third step of serially transmitting said unit data blocks of successive picture element blocks in a predetermined sequence of picture element blocks, while deciding the sequence of transmission of said plurality of distribution data in each unit data block in accordance with a predetermined information;
- (D) a fourth step of receiving the serial data transmitted in said third step and restoring said predetermined information in accordance with the sequence of transmission of said plurality of distribution data; and
- (E) a fifth step of receiving said unit data blocks transmitted in said third step and restoring the picture element data carried by picture elements of each of successive picture element blocks in accordance with the plurality of distribution data and the plurality of position data.

5,023,716

IMAGE INFORMATION SIGNAL TRANSMITTING SYSTEM

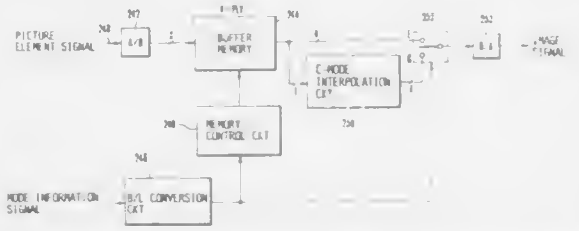
Tadayoshi Nakayama; Hisashi Ishikawa, both of Kanagawa; Susumu Kozuki, Tokyo; Koji Takahashi; Katsuji Yoshimura, both of Kanagawa; Kenichi Nagasawa, and Tomohiko Sasatani, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 460,284, Jan. 2, 1990, abandoned, which is a continuation of Ser. No. 325,543, Mar. 20, 1989, abandoned. This application Oct. 31, 1990, Ser. No. 608,634

Claims priority, application Japan, Mar. 28, 1988, 63-071962; Mar. 28, 1988, 63-071963

Int. Cl.⁵ H04N *1/415, 7/13*

U.S. Cl. 358—138 12 Claims



1. An image information signal transmitting system which is arranged to divide an image information signal for one picture constituted by a set of picture element data into blocks each constituted by a predetermined quantity of picture element data, transmit the picture element data on each of said blocks on the basis of a mode selected from among a plurality of transmission modes each of which allows a different quantity of picture element data to be transmitted and transmit a mode information signal indicative of the transmission mode of each of said blocks, and restore said transmitted picture element data on each of said blocks to the original image information signal, comprising:

- (a) storage means for storing said transmitted picture element data;
- (b) data readout means for reading out said picture element data stored in said storage means at a data readout rate of one kind which is selected from among a plurality of different data readout rates and which corresponds to the kind of transmission mode indicated by said transmitted mode information signal; and
- (c) data restoring means for implementing a data restoring processing on said picture element data read from said storage means on the basis of a data restoring processing of one kind which is selected from among a plurality of different data restoring processings and which corresponds to the kind of transmission mode indicated by said transmitted mode information signal.

5,023,717

TELEVISION STANDARD CONVERSION ARRANGEMENT WHICH CONVERTS DIRECTLY TO A SECOND STANDARD FROM A FIRST STANDARD WITHOUT AN INTERMEDIARY CONVERSION

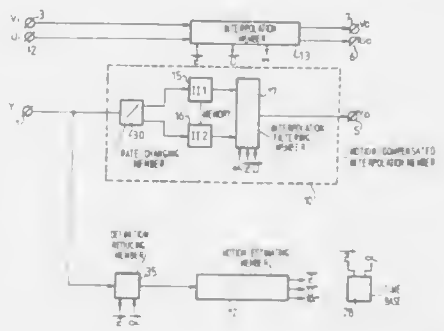
Moustanir Lamnabbi, Limeil Brevannes, and Jean-Jacques Lhuillier, Saint Maur, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 7, 1989, Ser. No. 404,935

Claims priority, application France, Sep. 9, 1988, 88 11797

Int. Cl.⁵ H04N *7/01*

U.S. Cl. 358—140 2 Claims



1. A television standard conversion arrangement, comprising:

- motion-compensated interpolation means coupled to receive pictures of a first standard for obtaining picture elements of pictures of a second standard directly on the basis of said pictures of said first standard;
- motion-estimation means for applying motion indications for each of said picture elements of said second standard to said motion-compensated interpolation means; and
- definition-reducing means coupled to receive said pictures of said first standard for applying a reduced number of picture elements of said pictures of said first standard to said motion-estimation means, whereby said motion-estimation means only uses said reduced number of pictures elements to obtain said motion indications.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,718
STORING DIGITAL VIDEO SIGNALS

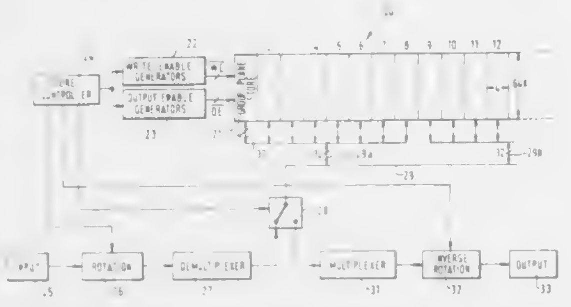
Jonathan M. Soloff, Basingstoke, United Kingdom, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 203,259, May 27, 1988, abandoned. This application Apr. 25, 1990, Ser. No. 515,643

Claims priority, application United Kingdom, Jul. 14, 1987, 8716564

Int. Cl.⁵ H04N *5/14*

U.S. Cl. 358—160 **12 Claims**



1. A method of storing a plurality of fields of digital video signal where each field consists of a plurality of data words and where the number of bits in a data word varies for different fields but is less than or equal to a predetermined maximum number of bits, the method comprising the steps of:

- arranging the data words of each field into a number of bit-planes equal in number to the number of bits in each data word, each said bit-plane containing a same respective bit from each successive data word of each field;
- providing a video signal store comprising a plurality of memories each memory capable of storing one of said bit-planes;
- supplying said bit-planes over a common data bus to said memories; and
- controlling writing of said bit-planes to said memories such that bit-planes of a first field are written to a first number of said memories equal in number to the number of bits in each data word of said first field, bit-planes of a next field are written to a second number of said memories equal in number to the number of bits in each data word of said next field, and so on until all said memories have been written in, and where the number of bits in the data word varies for each successive field but is less than or equal to a predetermined maximum number of bits.

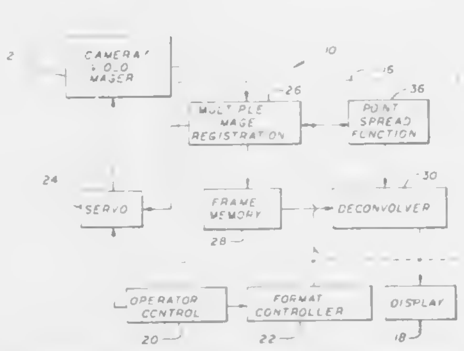
5,023,719
IMAGING SYSTEM FOR PROVIDING MULTIPLE SIMULTANEOUS REAL TIME IMAGES

Robert Zwirn, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 16, 1989, Ser. No. 422,356

Int. Cl.⁵ H04N *3/223, 7/18, 5/33, 3/32*

U.S. Cl. 358—180 **25 Claims**



1. An imaging system for providing first and second simultaneous real time images from a sensor for viewing on a display said image sensor providing a first set of electrical signals in response to inputs received thereby from a scene, said imaging system comprising:

- processing means for processing said first set of electrical signals to provide a second set of electrical signals representative of said first and second simultaneous real time images, said first simultaneous real time image being a view of a portion of said scene represented by said first set of electrical signals and said second simultaneous real time image being a resolution enhanced view of a portion of said scene and
- display means for displaying said second simultaneous real time image within the display of said first simultaneous real time image in response to said second set of electrical signals.

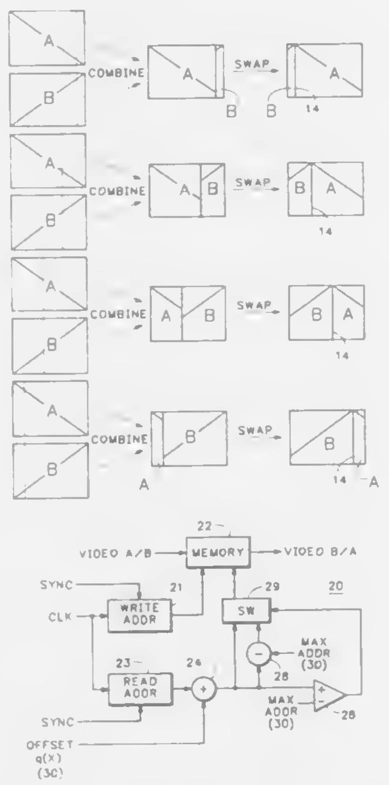
5,023,720
SINGLE CHANNEL VIDEO PUSH EFFECT

Philip D. Jardins, Nevada City, Calif., assignor to The Grass Valley Group, Inc., Nevada City, Calif.

Filed Oct. 30, 1989, Ser. No. 428,578

Int. Cl.⁵ H04N *5/262, 5/272*

U.S. Cl. 358—183 **11 Claims**



1. A method of forming a push snapshot for a video push effect comprising the steps of:

- (a) combining a portion of a first frame of a first video signal with a complementary portion of a first frame of a second video signal; and
- (b) swapping the portion of the first frame of the first video signal with the complementary portion of the

5,023,721
TV OF INTERNAL PIP TYPE FOR RECEIVING THE CHARACTER MULTIBROADCASTING

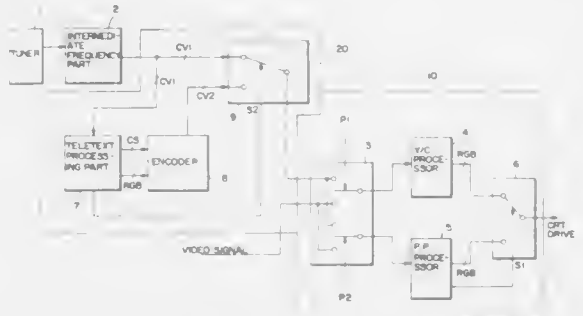
Seo Moon-Hwan, Seoul, Rep. of Korea, assignor to SamSung Electronics Co. Ltd., Suwon, Rep. of Korea

Filed Jul. 12, 1989, Ser. No. 378,915

Claims priority, application Rep. of Korea, Dec. 12, 1988, 88-16612

Int. Cl.⁵ H04N *7/87, 5/268, 5/262, 5/272*

U.S. Cl. 358—147 **6 Claims**



1. A device for a television receiver of internal picture-in-picture type receiving character multibroadcasting for a character multiblock having a PiP block constructed so that a complex input signal and a complex image signal of an intermediate frequency part are selected at a switching board wherein one signal is selectably applied to a luminance/chrominance processor and the other signal is selectively applied to a picture-in-picture processor, the device comprising:

- teletext-processing means for providing a complex synchronization signal and color signals after extraction and decoding of the character multiinformation included in a first complex image signal provided from said intermediate frequency part,
- encoder means for providing a second complex imager signal by encoding said complex synchronization signal and color signals, and
- switching means for providing the first or second complex image signals provided from said intermediate frequency part and the encoder means respectively, to the switching board by switching of a control signal provided from the teletext-processing means.

5,023,722
CIRCUIT FOR GENERATING A CENTER POINT OF A VIEW FINDER

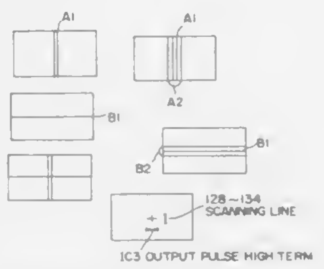
Seong-Bae Ryu, Kyungki, Rep. of Korea, assignor to SamSung Electronics Co. Ltd., Kyungki, Rep. of Korea

Filed Jun. 9, 1989, Ser. No. 363,712

Claims priority, application Rep. of Korea, Jun. 11, 1988, 88-9015[U]

Int. Cl.⁵ H04N *5/30*

U.S. Cl. 358—224 **25 Claims**



1. A circuit for generating a center point of a view finder, comprising:

- first means including a plurality of pulse delay stages for generating first and second horizontal display-signals, upon receipt of a horizontal drive-pulse, by adjusting the time constants of said pulse-delay stages;
- second means for generating first and second vertical display-signals using counter means to reset the horizontal drive-pulse upon application of a vertical drive-pulse;
- third means for generating a center point display-signal by combining the output of said first and second means; and
- means for combining said center point display-signal with a video signal to provide a resulting output signal.

5,023,723
IMAGE SENSING APPARATUS HAVING PLURAL IMAGE SENSORS AND PLURAL SHUTTERS

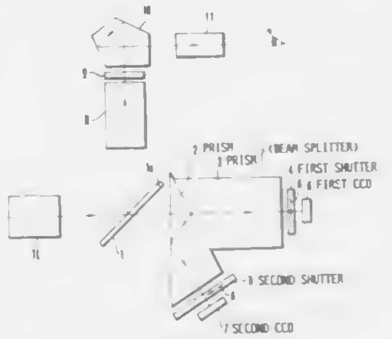
Nobuaki Date, Kawasaki, and Syuichiro Saito, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 12, 1989, Ser. No. 336,707

Claims priority, application Japan, Apr. 18, 1988, 63-093580; Apr. 18, 1988, 63-093581; Apr. 18, 1988, 63-093582

Int. Cl.⁵ H04N *9/00*

U.S. Cl. 358—225 **36 Claims**



1. An image sensing apparatus comprising:

- a) a plurality of image sensing devices;
- b) a beam splitter for supplying the same image of an object to said plurality of image sensing devices; and
- c) a plurality of shutter means each of which is disposed between an exit face of said beam splitter and one of said plurality of image sensing devices.

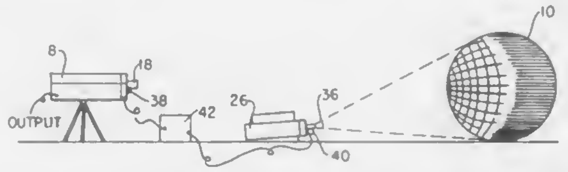
5,023,724
FOCUS ENHANCING METHOD

Bran Ferren, 615 Fireplace Rd., East Hampton, N.Y. 11937

Filed May 24, 1989, Ser. No. 356,427

Int. Cl.⁵ H04N *5/225*

U.S. Cl. 358—227 **3 Claims**



1. For use with a video camera having a lens, detecting means for determining when the focal plane of the camera is positioned at an object by detecting frequency components indicative of an in-focus sharp line on the object image, and focusing means for moving the focal plane of the camera over a range including the object, the improvement comprising:

- means for projecting a preselected optical pattern onto said object to produce a defined image on the surface of said object that can be detected by said detecting means, said defined image being more readily detectable by said detecting means than the surface of said object.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,725

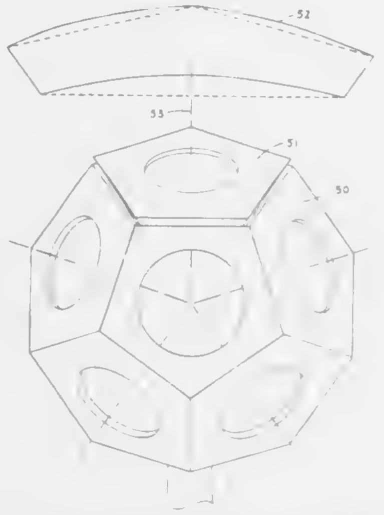
METHOD AND APPARATUS FOR DODECAHEDRAL IMAGING SYSTEM

David McCutchen, 931 N. Gardner St., W. Hollywood, Calif. 90046

Filed Oct. 23, 1989, Ser. No. 425,406

Int. Cl.^{5} H04N *5/74, 7/00, 9/31, 7/18*

U.S. Cl. 358—231 **34 Claims**



1. A method for photographing and projecting a field of view up to a complete sphere, including the steps of:

centering a dodecahedron inside a concentric sphere representing a spherical field of view, and evert extension of the faces of said dodecadedron onto said sphere, thereby forming twelve spherical sections divided by pentagonal borders,

photographing a composite image of a wide field of view up to a complete sphere, comprising a plurality of camera images and covering a total area of more than one section, by means of at least one camera, with each camera image being formed through a camera lens having an optical axis aligned to said dodecahedron, said camera lens also having a field of view sufficient to produce a camera image including at least one section's pentagonal border,

cropping said camera image to said pentagonal border,

aligning an array of projectors associated respectively with said camera images, each projector having a projector lens having an optical axis aligned to said dodecahedron,

projecting said composite image by said array of projectors onto a concentric screen, thereby producing through a simultaneous display of adjacent camera images an apparently continuous composite picture of said wide field of view up to a complete sphere.

5,023,726

UNITARY CHASSIS FOR TELEVISION RECEIVERS WITH TWO CIRCUIT BOARDS AND METHOD OF MANUFACTURE

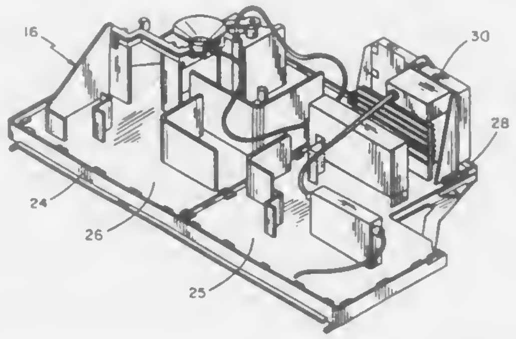
Carl Campisi, Chicago, Ill., assignor to Zenith Electronics Corporation, Gleuview, Ill.

Filed Nov. 28, 1989, Ser. No. 442,283

Int. Cl.^{5} H04N *5/645*

U.S. Cl. 358—254 **15 Claims**

1. Standard chassis assemblies for a plurality of television receivers in a line of receivers having different sized CRTs, comprising: a plurality of identically sized plastic frames, each of the frames including a first identically sized circuit board receiving slot and a second identically sized circuit board receiving slot, a plurality of first circuit boards containing power supply components that provide power for components of the receiver, some of said first circuit boards having a first power level capacity and some of said first circuit boards having a second power level capacity to accommodate smaller and larger CRTs, and a plurality of second circuit boards containing video input and video driving circuitry substantially common to receivers having different sized CRTs, said first circuit boards being selectively mountable in the first slots of the frames with the second circuit boards in the second slots in the frame, to provide a plurality of chassis assemblies for different sized television receivers.



5,023,727

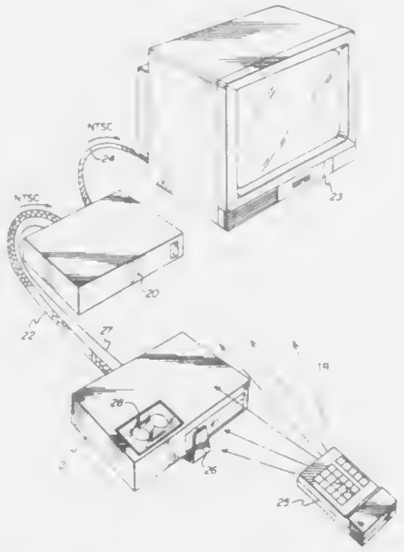
METHOD AND DEVICE FOR PRODUCING A SUBSTANTIALLY CONTINUOUS COMPOSITE VIDEO SIGNAL

Ian A. R. Boyd, 149 4th Ave., Milford, Conn. 06460; William J. Rose, West Hartford, Conn., and George A. Schaeffer, Clinton, Mass., assignors to Ian A. R. Boyd, Milford, Conn.

Filed Oct. 12, 1989, Ser. No. 420,827

Int. Cl.^{5} H04N *5/782*

U.S. Cl. 358—310 **76 Claims**



1. A method of combining RGB fields with a video signal to form a composite video signal comprising:

providing a video signal preprogrammed in the video portion thereof with data, the data comprising

a listing of what portion of the video signal includes the data,

a field count in every field of the video signal,

information for assembling the RGB fields, and

an index of which RGB field to combine with which fields in the video signal;

reading the listing of what portion of the video signal includes the data;

decoding the data into the information for assembling the RGB fields and the index of which RGB field to combine with which fields in the video signal;

storing the decoded data;

reading a field count of a current field of the video signal;

comparing the field count of the current field with the index of fields in the video signal to be combined with the RGB fields;

whenever the current field count matches a field in the index, assembling the corresponding RGB field in the index from the information for assembling RGB fields; and

combining the RGB field with the current field of the video signal by switching between the fields according to the information for assembling the RGB fields to form a composite video signal.

5,023,728

IMAGE FORMING APPARATUS

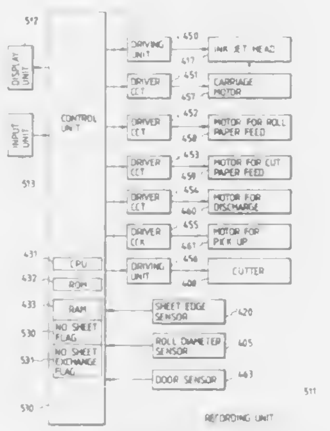
Mitsuo Nimura, and Hideyuki Tanaami, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 19, 1989, Ser. No. 382,183

Claims priority, application Japan, Jul. 20, 1988, 63-182552; Oct. 11, 1988, 63-256330; Oct. 19, 1988, 63-261616

Int. Cl.^{5} H04N *1/00*

U.S. Cl. 358—437 **12 Claims**



1. An image forming apparatus comprising:

output means for outputting a frame of image data in a divided manner;

recording means for recording in order a plurality of images corresponding to the divided image data output from said output means, respectively on plural recording materials;

manual instruction means for instructing interruption of the image recording operation by said recording means and for re-starting the interrupted image recording operation; and

control means for controlling the image recording operation of said recording means, wherein said control means interrupts the image recording operations in accordance with the interruption instruction from said manual instruction means, and wherein said control means re-starts the interrupted image recording operation in accordance with the re-start instruction from said manual instruction means.

5,023,729

METHOD AND SYSTEM FOR GENERATING A DENSITY CONCURRENT MATRIX

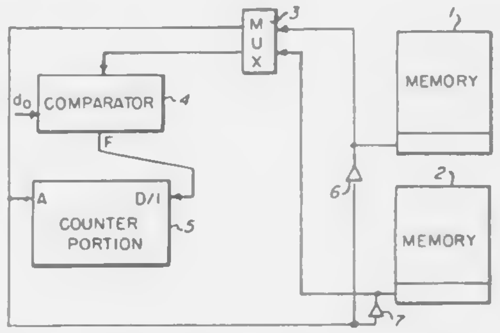
Ryohei Kumagai, Tokyo, Japan, assignor to Ezel, Inc., Tokyo, Japan

Filed Apr. 6, 1989, Ser. No. 333,910

Claims priority, application Japan, Apr. 21, 1988, 63-99080

Int. Cl.^{5} H04N *1/387*

U.S. Cl. 358—457 **8 Claims**



1. An image processing method comprising steps of:

storing pixel density values of an original image;

generating a shifted image by shifting the pixel density values of the original image by a predetermined distance;

generating a set of counts, each count corresponding to a selected density value, each count being a number of times that a pixel in the shifted image equals selected density value simultaneously with a corresponding pixel in the original image equaling a predetermined value.

5,023,730

INFORMATION RECORDING SYSTEM AND APPARATUS

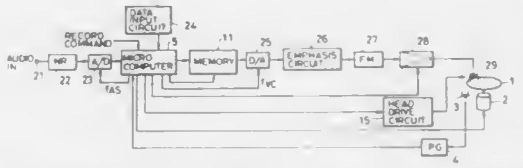
Tsuguhide Sakata, Machida; Norio Kimura, Tokyo, and Masahiro Takei, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 369,931, Jun. 22, 1989, abandoned, which is a division of Ser. No. 289,455, Dec. 22, 1988, Pat. No. 4,914,526, which is a continuation of Ser. No. 864,149, May 16, 1986, abandoned. This application Jun. 18, 1990, Ser. No. 539,306

Claims priority, application Japan, May 22, 1985, 60-109640; May 24, 1985, 60-111467

Int. Cl.^{5} G11B *5/09*

U.S. Cl. 360—48 **12 Claims**



1. An apparatus for recording a time base compressed information signal on a recording medium, comprising:

(a) means for producing a pair of signals including a start signal indicative of the beginning of the time base compressed information signal and an end signal indicative of the end of the time base compressed information signal to sandwich the time base compressed information signal therebetween;

(b) means for providing a control data signal which is used to control an expanding process of the time base compressed information signal according to the time base compressed information signal;

(c) memory means for receiving, in the following order, the start signal, the control data signal, the time base compressed information signal, and the end signal; and

VOL
1127
ISS
2
JE
11
1991
UMI

(d) recording means for sequentially reading out the signals stored in said memory means in said order and for according said signals read out from said memory means on said recording medium.

5,023,731
MAGNETIC RECORDING AND PLAYBACK APPARATUS

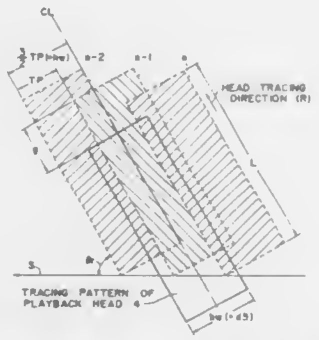
Kazuhiko Morisaki, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Feb. 16, 1989, Ser. No. 311,067

Claims priority, application Japan, Feb. 18, 1988, 63-36381

Int. Cl.⁵ G11B *15/14, 27/36*

U.S. Cl. 360—64 4 Claims


CL
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n-1
n
TP
HEAD TRACING DIRECTION (R)
L
S
TRACING PATTERN OF PLAYBACK HEAD 4

1. In a magnetic recording and playback apparatus including recording head means for recording, while forming tracks in succession on a magnetic recording medium partially wrapped around drum means in an angular range of substantially 90 degrees, a recording signal at least including a pulse code modulated (PCM) signal obtained by applying pulse code modulation to an information signal to be recorded together with pilot signals located before and after said PCM signal on a formed track, respectively, and playback head means corresponding with said recording head means and for tracing said tracks formed on said medium to reproduce said recording signal, said drum means being a rotary drum having a rotary axis inclined at a fixed angle with respect to the running direction of a magnetic recording tape as said medium and having said recording head means and said playback head means mounted on an outer peripheral surface thereof, the improvement wherein:

said recording head means comprises two recording heads of first and second channels at positions angularly spaced to each other by 180 degrees, respectively, and having azimuth angles different from each other, and a gap width wider than a track pitch;

said playback head means comprises two playback heads of the first and second channels at positions angularly spaced to each other by 180 degrees, respectively, and having azimuth angles different from each other but common in corresponding channels to said two recording heads, and a gap width wider than a track pitch;

said first channel recording head, said second channel playback head, said second channel recording head and said first channel playback head are arranged in a recited order along the outer peripheral surface in a direction opposite to a rotating direction of said rotary drum, and have an angular interval of substantially 90 degrees between two adjacent heads of the first channel recording and playback heads and second channel recording and playback heads;

an axial distance of (7/4)×Tp to the rotary axis of said rotary drum is provided between said recording head means and corresponding playback head means of said channels, where Tp is a normal track pitch of said tracks; and

selecting means is provided for selectively supplying the recording signal to said first and second channel recording heads and selectively outputting a signal from said first and second channel playback heads, said selecting means comprising

first terminal means to which said recording signal is supplied,

second terminal means for outputting a reproduced signal,

a changeover timing generator circuit coupled to said first terminal means responsive to a recording and playback discrimination signal, a channel discrimination signal, and a recording signal to switch and control the operation timings by which respective heads record and reproduce said recording signal onto and from said medium,

a recording head changeover switch for selecting said first channel recording head and said second channel recording head on the basis of a first output from said generator circuit,

first amplifier means for amplifying said recording signal to be supplied to said first and second channel recording heads,

second amplifier means for amplifying reproduced signals from said first and second channel playback heads, and

a playback head changeover switch for selecting said first channel playback head and said second channel playback head on the basis of a second output from said generator circuit so that said reproduced signals from said first and second channel playback heads are selectively outputted to said second terminal means; and

said changeover timing generator circuit comprising:

a first NOT circuit for sending NOT output of a recording and playback discrimination signal input thereto,

a second NOT circuit for sending a NOT output of a channel discrimination signal for discriminating between first and second channels input thereto,

a first logic circuit for receiving the recording signal from said first terminal means and an output from said first NOT circuit to perform an operation of logical product thereof for passing said recording signal to said recording head changeover switch in a recording mode.

a second logic circuit for receiving outputs from said first and second NOT circuits to perform an operation of logical product thereof to send an output of high or low level for operating said recording changeover switch, so that said recording signal is selectively supplied to said first and second channel recording heads in a recording mode, and

a third logic circuit for receiving said recording and playback discrimination signal and said output from said second NOT circuit to perform an operation of logical product thereof to send an output of high or low level for operating said playback head changeover switch so that playback signals from said first and second channel playback heads are selectively supplied to said second terminal means in a playback mode.

5,023,732
MAGNETIC DISK APPARATUS HAVING A CIRCUIT FOR DETECTING THE POSITION OF SERVO INFORMATION RECORDED ON A MAGNETIC DISK

Yoichi Murakami, Tokyo; Yoshihisa Okawa, and Takao Ishikawa, both of Gunma, all of Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Sep. 27, 1989, Ser. No. 413,492

Claims priority, application Japan, Sep. 28, 1988, 63-245031

Int. Cl.⁵ G11B *5/596*

U.S. Cl. 360—77.08 11 Claims

1. A magnetic disk apparatus for carrying out a recording or reading operation for a magnetic disk including a plurality of concentric tracks each having data areas for storing a user's data and servo areas followed by said data areas, each of said servo areas including servo information for aligning a magnetic head with a center of a target track and an identification signal recorded at a predetermined discrimination frequency to indicate a starting position of each of said servo areas, the disk apparatus comprising:

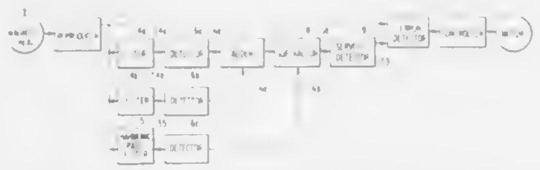
reproducing means for reading a signal recorded on said target track through said magnetic head and supplying a reproduced signal;

first identifying means for extracting a signal component equal or close to said discrimination frequency from said reproduced signal and generating a first detection signal;

second identifying means for extracting a signal component having a harmonic of said discrimination frequency from said reproduced signal and generating a second detection signal;

subtracting means for determining an amplitude difference between said first detection signal and said second detection signal and supplying a subtraction signal; and

detecting means for detecting said discrimination signal when said subtraction signal reaches a predetermined threshold level, thereafter outputting a third detection signal.



5,023,733
HEAD POSITIONING CONTROL FOR A SPINDLE MOTOR DISK DRIVE

Yoshiro Koga; Akihiro Gomi; Takashi Miyasaka; Yasunaga Miyazawa; Kenichi Endo; Junichiro Shinozaki; Kaneo Yoda; Takashi Ichikawa; Hitoshi Miyasaka, and Chiharu Kaburagi, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Continuation of Ser. No. 107,722, Oct. 7, 1987, abandoned, which is a continuation of Ser. No. 93,201, Aug. 14, 1987, abandoned. This application Feb. 15, 1990, Ser. No. 481,755

Claims priority, application Japan, Dec. 16, 1985, 60-282189; Dec. 19, 1985, 60-286431; Feb. 21, 1986, 61-36778; Feb. 25, 1986, 61-39732; Apr. 2, 1986, 61-75903; Apr. 28, 1986, 61-99816; May 7, 1986, 61-104161; Jun. 30, 1986, 61-153006; Oct. 7, 1986, 61-238269; Oct. 7, 1986, 61-238270; Oct. 8, 1986, 61-239602; Oct. 8, 1986, 61-239603; Oct. 8, 1986, 61-239604; Oct. 21, 1986, 61-250066; Nov. 25, 1986, 61-280319; Nov. 25, 1986, 61-280320

Int. Cl.⁵ G11B *5/55*

U.S. Cl. 360—77.04 57 Claims

1. A magnetic recording device for recording data on at least one and no more than four disks wherein each disk has an outer diameter no greater than 3.5 inches and an inner diameter no greater than 40 mm, the device comprising:

a base,

a spindle supported on a portion of the base, at least one of the disks being mounted in a spaced relationship along the spindle from the other disks;

bearing means for rotatably supporting said spindle, said spindle having a bottom end and top end, the bearing means having a bearing located at the bottom end of said spindle and a second bearing located intermediate said bottom end and said top end;

a spindle motor comprising:

stator means mounted to extend circumferentially about the axis of the spindle for sequentially providing a magnetic field about the axis of the spindle; and

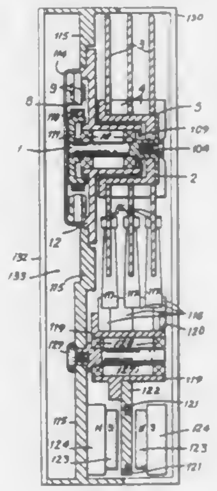
rotor magnet means coupled to the spindle and mounted within the stator means for rotating the spindle in cooperation with the stator means when the stator means provides an magnetic field, whereby the disks mounted on the spindle are caused to rotate at a predetermined speed;

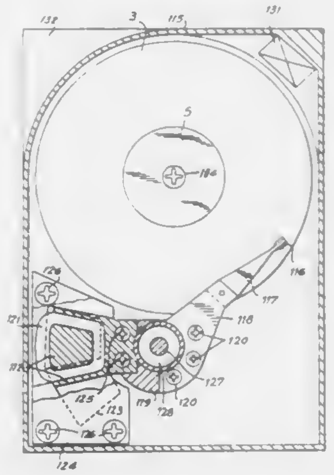
head means for recording and reproducing data on the disks;

head actuator means mounted on the base for moving the head means to a predetermined data track on said disks, said actuator means including arm means for supporting said head means at one end thereof and being pivotably mounted in a central region thereof;

a pivot shaft mounted on the bas in a cantilevered manner for supporting the arm means at the central region thereof, and actuator motor means positioned radially relative to the disks for pivotably displacing said arm means to move said head means, said actuator motor means comprising actuator coil means on the arm means including an air coil mounted on the arm means on the opposed sides of the head relative to the pivot shaft and securing magnet means disposed in facing relationship with the actuator coil means so that said air core is disposed therebetween and being shaped so that the area of the securing magnet means in facing relationship with the air core coil is enlarged as the air core coil moves towards an edge of said securing magnet means; and

a cover member for covering the disk and the actuator means, said cover member being supported on the base.





5,023,734
CYLINDRICAL ROTARY TRANSDUCER

Yoshihiro Tamaki, Kawasaki, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Oct. 30, 1989, Ser. No. 428,995

Claims priority, application Japan, Oct. 31, 1988, 63-142513

Int. Cl.⁵ G11B *5/027*

U.S. Cl. 360—84 6 Claims

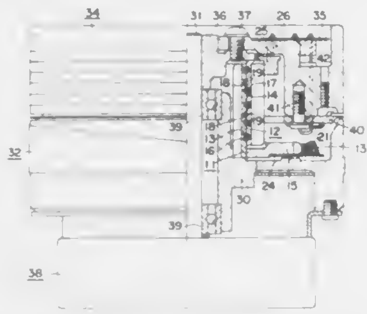
1. A cylindrical rotary transducer comprising a stator core cylindrically formed from a high permeability material, a rotary core disposed concentrically with said stator core and

VOL
1127
ISS
2
JE
11
1991
UMI

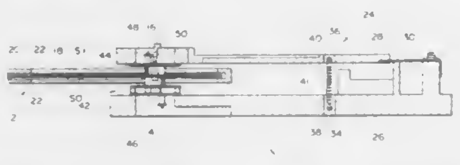
cylindrically formed from a high permeability material, and at least a stator coil and a rotary coil having free coil ends and disposed respectively on the stator core and the rotary core so as to confront each other, said cylindrical rotary transducer further comprising:

a disk-shaped terminal member mounted on one of the stator and rotary cores, having a plurality of projections radially formed on an outer peripheral edge thereof, and having a plurality of radially extending slits and grooves adjacent to said projections so as to guide said free coil ends to one of said stator and rotary coils through said slits and grooves to said projections each of said free coiled ends of one of said stator and rotary coils being wrapped around and fastened respectively to each of said plurality of projections; and

means for rotatably supporting one of said stator and rotary cores with respect to the other of said stator and rotary cores.



5,023,735
MAGNETIC HEAD SUPPORT DEVICE WITH DOUBLE GIMBAL STRUCTURE
Takashi Kuzuhara, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Continuation of Ser. No. 188,378, Apr. 29, 1988, abandoned. This application Dec. 5, 1989, Ser. No. 445,151
Claims priority, application Japan, Apr. 30, 1987, 62-106814
Int. Cl.^{5} G11B *5/48*
U.S. Cl. 360—104 6 Claims



1. A magnetic head support device for maintaining a first and a second magnetic head in operative relation with opposite sides of a non-rigid planar magnetic recording medium, the first and second magnetic heads being capable of reading data from or writing data on a respective side. of the recording medium, the recording medium defining a reference plane during ideal conditions, the support device comprising:

carriage means for carrying said first and second magnetic heads to predetermined positions with respect to said magnetic recording medium;

gimbal plate means for supporting said first magnetic head on said carriage means and allowing said first magnetic head to roll and to move perpendicular to the reference plane; and

support means for supporting said second magnetic head on said carriage means and for resisting rolling of said second magnetic head and allowing said second magnetic head to move while it is kept substantially parallel to said reference plane,

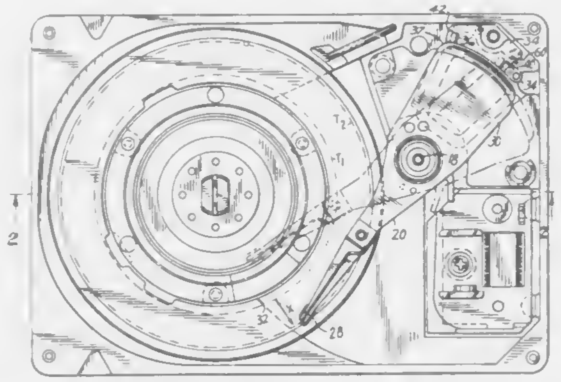
said support means including:

a first gimbal plate having a central portion on which said second magnetic head is mounted, the central portion being coplanar with and pivotable about first and second orthogonal pivot axes, a frame-like peripheral portion located around said central portion with a predetermined interval therebetween, and a frame-like gimbal portion arranged between and connecting said central portion and said peripheral portion, wherein said central portion is pivotable about said first and second orthogonal pivot axes;

a second gimbal plate, mounted on said carriage means and including a central portion, the central portion being coplanar with and pivotable about third and fourth orthogonal pivot axes, a frame-like peripheral portion located around said central portion with a predetermined interval therebetween, and a frame-like gimbal portion arranged between and connecting said central portion and said peripheral portion, wherein said second gimbal plate is disposed substantially parallel to said first gimbal plate, and wherein a peripheral portion of said second gimbal plate is mounted on said carriage means; and

spacer means arranged between and connecting said first and second gimbal plates, said spacer means for maintaining said gimbal plates substantially parallel to and a predetermined distance apart from each other, said spacer means including a first portion fixed between said central portions of said first and second gimbal plates said first portion of said spacer means having a pair of opposite surfaces which are in surface contact with said central portions of said first and second gimbal plates, respectively, and including a frame-like second portion fixed between said peripheral portions of said first and second gimbal plates and located around said first portion of said spacer means.

5,023,736
MAGNETIC LATCH FOR DISK DRIVE ACTUATOR
Gary Kelsic, and Jim Martinez, both of Longmont, Colo., assignors to MiniScribe Corporation, Longmont, Colo.
Filed May 22, 1989, Ser. No. 355,162
Int. Cl.^{5} G11B *5/54*
U.S. Cl. 360—105 15 Claims



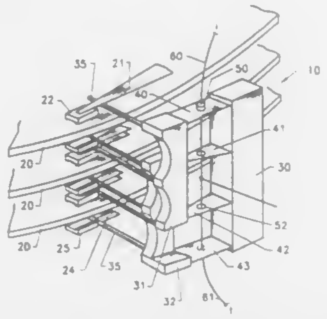
1. A limit stop/latching assembly in a disk storage system having a movable actuator carriage, said assembly comprising:

crash stop means for limiting travel of said actuator carriage at a fixed stop position and including a crash stop pin and latch means being directly incorporated into said crash stop pin, said latch means having a magnet and a pair of magnetic pole pieces abutting said magnet, said pole pieces being immovable with respect to said crash stop pin;

a latch actuator plate extending from said actuator carriage and movable with said actuator carriage in a path of travel of said actuator carriage to abut said stop position, said latch actuator plate having a magnetically attractive element; and

means for moving said actuator carriage between a free position, wherein said latch actuator plate is moved remote from said crash stop means, and a latched position defining said fixed stop position, wherein magnetic flux emanating from said magnet flows through said magnetically attractive element such that said pole pieces are in magnetic contact with said element.

5,023,737
DISC DRIVE SLIDER LIFTER USING SHAPE MEMORY MATERIALS
John R. Yaeger, Sunnyvale, Calif., assignor to Seagate Technology, Inc., Scotts Valley, Calif.
Filed Apr. 5, 1990, Ser. No. 505,011
Int. Cl.^{5} G11B *5/54, 21/22*
U.S. Cl. 360—105 15 Claims



1. A slider lifter arrangement for a disc drive assembly including a frame, a plurality of vertically aligned, spaced apart rotatable information storage discs, each information storage disc having top and bottom storage surfaces, a multiplicity of vertically aligned flexure arms each carrying a slider transducer for transferring information between a particular disc surface and an external system, the flexure arms being designed such that when the discs are rotating at an operational speed, each slider flies above the surface of its associated disc surface and wherein when the disc is stopped, the sliders rest on the surface of their associated discs, and a head positioning means for positioning the sliders relative to the information storage discs, the slider lifter comprising:

a support post coupled to the frame;

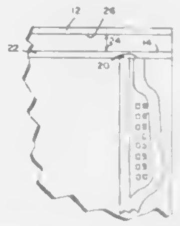
a pair of opposing comb members carried by the post, each said comb member having a plurality of stacked fingers each extending outwardly to engage one of said flexures, the comb members being adapted for movement in opposite directions between first and second positions relative to one another, wherein in one of said relative positions, the fingers engage their associated flexures to physically lift the associated sliders from their associated disc surfaces;

biasing means for urging the comb members towards the first relative position;

a shape memory alloy element having martensitic and austenitic phase conditions, the shape memory alloy element cooperating with the biasing means such that when the shape memory element is in a first phase condition, the biasing means forces the comb members to their first relative position and wherein when the shape memory alloy element is in a second phase condition, the comb members are held in their second relative position; and

transform means for heating the shape memory alloy element to change the state of the shape memory alloy element from one of said phase conditions to the other phase condition.

5,023,738
CORROSION RESISTANT MAGNETIC RECORDING READ
Michael B. Prenosil, Roseville, Minn., assignor to Seagate Technology, Inc., Scotts Valley, Calif.
Filed Dec. 18, 1989, Ser. No. 452,689
Int. Cl.^{5} G11B *5/187*
U.S. Cl. 360—122 24 Claims



1. A magnetic head comprising:

a pair of magnetic poles having pole tips with a spacer therebetween, the pole tips having end surfaces which face a magnetic medium when the magnetic head is in use; and

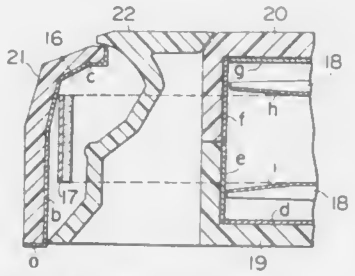
a protective coating over the pole tip end surfaces for inhibiting corrosion of the end surfaces, the protective coating including a compound selected from the group consisting of silanes, titanates, and zirconates.

17. A method of protecting a magnetic head from corrosion comprising the following steps:

providing a solution which includes a hydrolyzable silane, zirconate or titanate compound; and

applying the solution to a surface of the magnetic head to form a protective layer.

5,023,739
TAPE CASSETTE WITH A TRAPPING LAYER HAVING A CORROSIVENESS WHICH IS EQUAL TO OR HIGHER THAN THAT OF THE MAGNETIC RECORDING LAYER ON THE TAPE
Koichi Shinohara, Kobe; Takashi Suzuki, Takatsuki; Masao Kawagishi, Nara; Nobuo Satoh, Hirakata; Takeshi Murakami, Settsu, and Takashi Fujita, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Feb. 10, 1989, Ser. No. 308,765
Claims priority, application Japan, Feb. 15, 1988, 63-32255; Mar. 11, 1988, 63-58760
Int. Cl.^{5} G11B *23/02*
U.S. Cl. 360—132 17 Claims



1. A magnetic tape cassette comprising:

a case in which a tape path is defined, said case including a case portion arranged adjacent to said tape path;

a pair of reels rotatably disposed in said case;

a magnetic tape having a magnetic recording layer made of a metallic magnetic material which is a Co-group alloy containing an additive element selected from a group consisting of Ni, Cr and O, said magnetic tape being wound on said pair of reels and stretched therebetween along said tape path;

VOL
1127
ISS
2
JE
11
1991
UMI

a trapping layer formed on said case portion, said trapping layer being oriented to face said magnetic recording layer of said magnetic tape and having a corrosiveness which is equal to or higher than that of said magnetic layer under a condition wherein said cassette is exposed to an atmosphere containing HCl having a concentration of about 3 ppm under a temperature of about 35° C. with a relative humidity of about 80 %, for 3 min.

5,023,740
TAPE CASSETTE HAVING TAPE PROTECTING COVERS

Shin Sasaki, Miyagi, Japan, assignor to Tsuchiya Patent Office, Tokyo, Japan

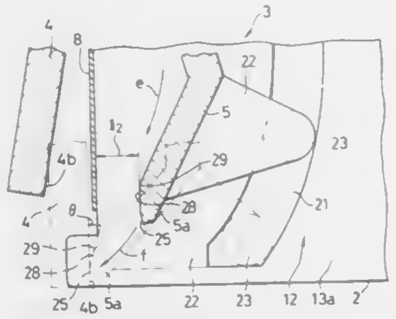
PCT No. PCT/JP84/00400, § 371 Date Apr. 4, 1985, § 102(e) Date Apr. 4, 1985, PCT Pub. No. WO85/00919, PCT Pub. Date Feb. 28, 1985

PCT Filed Aug. 10, 1984, Ser. No. 719,250

Claims priority, application Japan, Aug. 12, 1983, 58-125989

Int. Cl.^{5} G11B *23/087*

U.S. Cl. 360—132 2 Claims



1. A tape cassette comprising:

a cassette housing which passes a tape housed therein along an opening in a front surface of said housing;

a front cover having a rectangular cross section and having a flat bottom surface and flat front and rear surfaces and being pivotally attached to the cassette housing for covering the front side of the passes tape;

a rear cover pivotally attached to the front cover for covering the rear side of the passed tape;

a guide pin provided on the rear cover; and

a guide groove provided on the cassette housing for guiding the guide pin so as to have a lower edge portion of the rear cover separated from the front cover rearwardly relative to said front surface when the front cover is pivotally rotated in its opening direction, so that the rear cover is pivotally rotated therewith with respect to the front cover in its opening direction,

characterized in that a front surface of said lower edge portion of the rear cover is formed of a first flat surface and a second flat surface angularly arranged relative thereto, said second flat surface being slanted and extending rearwardly at an angle θbetween 10° to 30° from a transition line between said first and second flat surfaces toward an upper end of said front surface and an entire area of said first flat surface contacts said flat rear surface of said front conver and said second flat surface is completely out of contact with said flat rear surface of said front cover and extends rearwardly at said angle θ under the tape during the closed state of said front and rear covers.

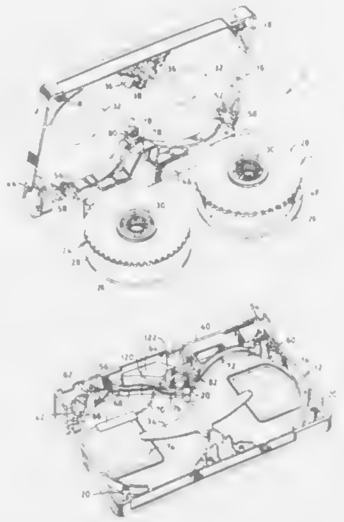
5,023,741
PROGRAMMABLE LIMITED PLAY VIDEO TAPE CASSETTE

Albert B. Conti, Stoneham, and Richard G. Egan, Dover, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 28, 1988, Ser. No. 263,893

Int. Cl.^{5} G11B *23/02, 5/03*

U.S. Cl. 360—132 3 Claims



1. A limited play video tape cassette of the type including a cassette housing, supply and take up reels, and a video tape having prerecorded program information thereon including video signals for providing viewable and recognizable images when the tape is played and also having encrypted thereon a disruptive code which renders the images non-recognizable unless the disruptive code is removed prior to tape play, said limited play video tape cassette comprising:

programmable control means for providing a play limit signal at the termination of a preselected and programmed play period;

a decryption head, disposed in the cassette housing along the tape's path of travel from the supply reel to an opening in the cassette providing access for tape play, which is normally enabled for removing the disruptive code prior to tape play;

an encryption head, disposed in the cassette housing along the tape's path of travel from the access opening to the take-up reel, for once again encrypting the tape with the disruptive code after tape play; and

means, responsive to said play limit signal from said programmable control means, for inhibiting viewing of the video images in recognizable form, said inhibiting means including means for disabling said decryption head so that it does not remove the disruptive code thereby rendering the images non-recognizable when the tape is played.

5,023,742
MAGNETIC-TAPE-CASSETTE APPARATUS INCLUDING PINCH ROLLER-OPERATED SWITCHING ELEMENTS FOR PRODUCING MUTING AND/OR TRACK DIRECTION DETECTION

Norbert Kunze, Ehringsbausen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 11, 1989, Ser. No. 378,553

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1988, 3826007

Int. Cl.^{5} G11B *5/008*

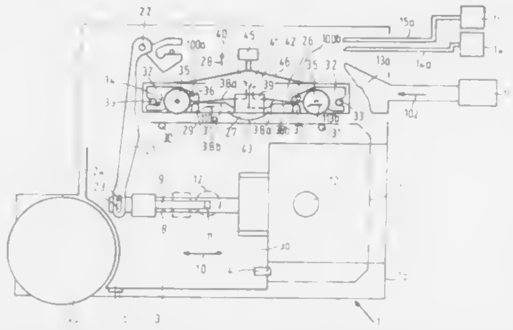
U.S. Cl. 360—137 6 Claims

1. A magnetic tape cassette apparatus, comprising:

a magnetic head mounted on a head mounting plate, said plate being movable toward and away from a magnetic tape contained in a magnetic tape cassette inserted into said apparatus;

at least a first capstan capable of frictionally engaging said magnetic tape;

at least a first pressure roller mounted on a first support pivotably mounted on said head mounting plate, said first support serving to pivot said first pressure roller toward and away from said first capstan, characterized in that



said apparatus further comprises means for producing muting signals to be communicated to said magnetic head or a preamplifier of said apparatus, said means including a switch mounted on said head mounting plate, said switch including first switching elements engageable by said first support.

5,023,743
DEVICE FOR PROTECTING A DELAY-LINE MODULATOR

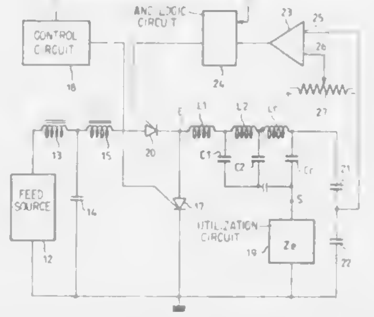
Jacques Milcamps, Clamart; Jean-Louis Pourre, Les Molieres, and Jean-Pierre Thiebaut, Orsay, all of France, assignors to CGR MEV, Buc, France

Filed Aug. 22, 1989, Ser. No. 396,637

Claims priority, application France, Aug. 26, 1988, 88 11292

Int. Cl.^{5} H02H *3/00*

U.S. Cl. 361—1 3 Claims



1. A device for protecting a delay-line modulator, of the type including a first switch for charging the delay-line and a second switch for discharging the delay line into a utilization circuit, closing of the first and second switches being controlled by trigger pulses, said device comprising:

first means for providing an output signal when the output voltage of said delay-line is smaller than the conduction threshold of said second switch; and

second means for permitting closing of said second switch when said first means provided said output signal.

5,023,744
TEMPERATURE SWITCHING DEVICE

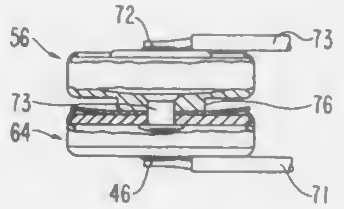
Peter Hofsäss, Strietweg 45, D-7530 Pforzheim, Fed. Rep. of Germany

Filed May 12, 1989, Ser. No. 350,767

Claims priority, application Fed. Rep. of Germany, May 20, 1988, 8806648[U]

Int. Cl.^{5} H02H *5/04*

U.S. Cl. 361—26 25 Claims



1. Temperature switching device for an electrotechnical part to be protected against an excess temperature due to a malfunctioning of the electrotechnical part, the temperature sensitive device including a first thermal switch means, an ohmic resistor means connected in parallel to said first thermal switch means, said first thermal switch means being adapted to be opened as a result of an excess temperature so that a flow of current takes place across the ohmic resistor means, and at least one automatically resettable second thermal switch means having an opening temperature above an opening temperature of the first thermal switch means but well below temperatures causing irreversible damage to bimetallic elements of the first and second thermal switch means such that heat produced as a result of the flow of current across the ohmic resistor means does not maintain the first thermal switch means in an open position upon a cooling of the excess temperature initially triggering the switching process of the first thermal switch means, and wherein the two thermal switch means are in close thermal contact.

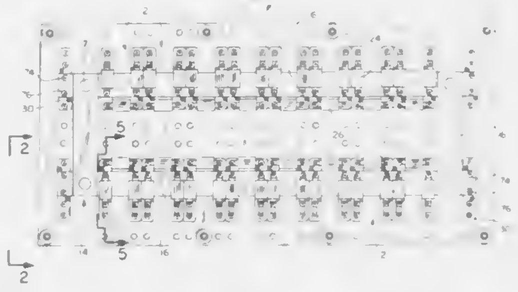
5,023,745
SURGE ARRESTOR APPARATUS AND METHOD

John C. Glass, Streetsboro, Ohio, assignor to Erico International Corporation, Solon, Ohio

Filed Sep. 6, 1989, Ser. No. 403,366

Int. Cl.^{5} H02H *9/04*

U.S. Cl. 361—56 25 Claims



1. A device for grounding an electrical surge in a circuit used in a railroad application, comprising:

a grounding member having a high surface to cross-sectional area ratio for facilitating the low impedance conductance of high frequency electrical energy;

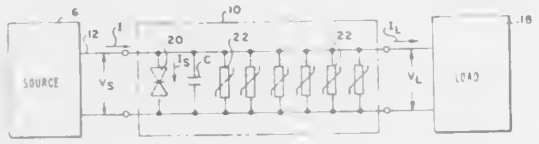
a plurality of conductors for the conductance of electrical signals from a power source to a load; and,

a plurality of surge arrestors electrically connected to said conductors and said grounding member for grounding any of such electrical signals to said grounding member when any of such signals exceeds a predetermined voltage.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,746
SUPPRESSION OF TRANSIENTS BY CURRENT SHARING

Barry M. Epstein, 7523 Cliffbrook, Dallas, Tex. 75240
Continuation of Ser. No. 279,943, Dec. 5, 1988, abandoned. This application Nov. 3, 1989, Ser. No. 431,681
Int. Cl.^{5} H02H *3/20*
U.S. Cl. 361—56 3 Claims



1. In a system wherein AC power is supplied from an AC power source through power supply conductors to an electrical load, the improvement comprising:

(a) means for connecting said AC power source across said load; and

(b) a protector network disposed in parallel connected relation between said AC power source and said load, said protector network comprising:

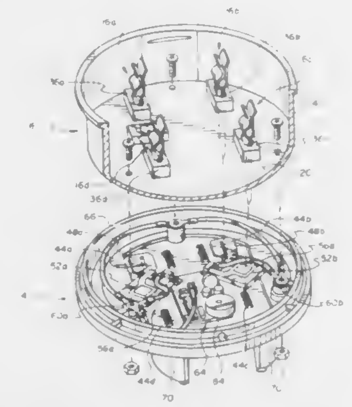
(i) a first voltage suppressor connected across the said power supply conductors,

(ii) a second voltage suppressor connected across the said power supply conductors, and in direct parallel connection with said first voltage suppressor, the break-down voltage of said second voltage suppressor being greater than the break-down voltage of said first voltage suppressor, said second voltage suppressor further comprising a plurality of metal oxide varistors connected in direct parallel relationship with one another, and

(iii) capacitive filter means connected in direct parallel connection with, and intermediate, said first and second voltage suppressors for attenuating high frequency components of said AC power.

5,023,747
METER BASE SURGE SUPPRESION SYSTEM

Roger K. Lindsay, Salt Lake City, Utah, assignor to EFI Electronics Corporation, Salt Lake City, Utah
Filed Apr. 12, 1990, Ser. No. 508,927
Int. Cl.^{5} H02H *3/20*
U.S. Cl. 361—117 13 Claims



1. A meter base surge suppression system mountable on a meter mounting panel having a plurality of prong receptacles for receiving and holding the prongs of an electric meter, said mounting panel being coupled to an electrical load, said system comprising

a base plate having a plurality of openings through which contact prongs may be inserted, and an electrical contact element disposed by one of the openings for making electrical contact with a prong inserted through said one opening,

surge suppression means disposed on an upper side of the base plate and coupled between the contact element and ground potential, and

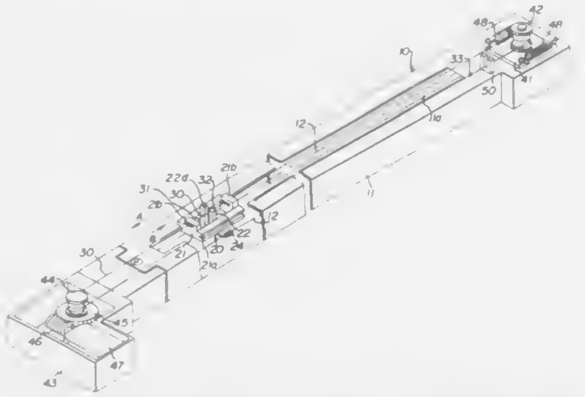
a receiving plate mountable on the base plate and on which an electric meter may be mounted, said receiving plate including a plurality of buss means each having

a shank prong which extends downwardly from an underside of the receiving plate and through a corresponding opening in the base plate when the receiving plate is mounted on the base plate, for insertion into a corresponding one of the prong receptacles of the meter mounting panel, and

a clip which extends upwardly from an upper side of the receiving plate for receiving a corresponding prong of an electric meter.

5,023,748
CORONA WIRE CLEANING DEVICE FOR A CORONA UNIT

Sueaki Okamoto, Kyoto; Seitaro Yoshida, Osaka; Hiroshi Kageyama, Neyagawa, and Sbinji Ogaki, Kishiwada, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan
Filed Oct. 20, 1989, Ser. No. 424,474
Claims priority, application Japan, Oct. 21, 1988, 63-266881
Int. Cl.^{5} H01J *37/26;* G03G *15/02*
U.S. Cl. 361—229 8 Claims



1. A corona wire cleaning device for a corona unit for cleaning corona wires stretched in a shield case, comprising:

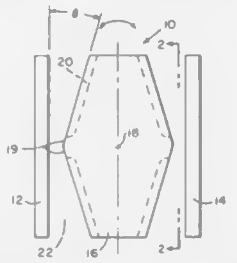
a driving wire around on a driving pulley and an idle pulley for reciprocating motion along the length of the corona wire; and

a cleaning member slidably mounted in the shield case for traveling motion in association with the reciprocating motion of the driving wire and having a cleaning tool which rubs and cleans the corona wire by the traveling motion thereof in one direction and which comes away from the corona wire by the traveling motion thereof in the other direction, said cleaning member having a support lever swingably mounted thereon.

5,023,749
CAPACITIVE ANGLE SENSOR IMPROVEMENT

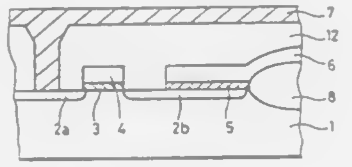
Alexis Hubert, Littleton, and John A. Shepic, Lakewood, both of Colo., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Aug. 16, 1990, Ser. No. 567,999
Int. Cl.^{5} H01G *7/00;* G01P *15/08*
U.S. Cl. 361—292 3 Claims

1. A capacitive angle sensor comprising, two parallel stationary capacitor plates with flat side surfaces, a rotary capacitor plate mounted between said parallel stationery capacitor plates, said rotary capacitor plate being mounted for rotation about an axis, said rotary capacitor plate having tapered flat side surfaces to define air spaces between said rotary capacitor plate and said flat side surfaces of said parallel stationary capacitor plates, there being groove means in said flat side surfaces of said plates for allowing free flow of air between the rotary capacitor plate and said stationary plates as said rotary capacitor plate is rotated relative to said stationary capacitor plates.



5,023,750
ELECTRONIC COMPONENT HAVING IMPROVED LOW RESISTANCE CONTACT AND MANUFACTURING METHOD THEREFOR

Makoto Hirayama, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 21, 1990, Ser. No. 482,583
Claims priority, application Japan, Feb. 23, 1989, 1-44301
Int. Cl.^{5} H01G *4/06. 7/00;* H01L *27/02*
U.S. Cl. 361—313 13 Claims



5. An improved capacitor structure comprising:

a lower electrode formed of electrically conductive material,

an incidental oxide film having a thickness of less than five angstroms formed on the surface of said lower electrode, and

a layer of dielectric material formed on said incidental oxide film, and

an upper electrode of electrically conductive material formed on said dielectric layer.

5,023,751
METHOD OF PRODUCING A TAPE FOR PROVIDING ELECTRONIC MODULES. AND TAPE OBTAINED BY THIS METHOD

Jean-Marcel Stampfli, Le Landeron, Switzerland, assignor to ETA SA Fabriques d'Ebauches, Switzerland
PCT No. PCT/CH88/00102, § 371 Date Feb. 3, 1989, § 102(a) Date Feb. 3, 1989, PCT Pub. No. WO88/10509, PCT Pub. Date Dec. 29, 1988
PCT Filed Jun. 6, 1988, Ser. No. 328,252
Claims priority, application France, Jun. 22, 1987, 87 08790
Int. Cl.^{5} B32B *31/18*
U.S. Cl. 361—398 18 Claims

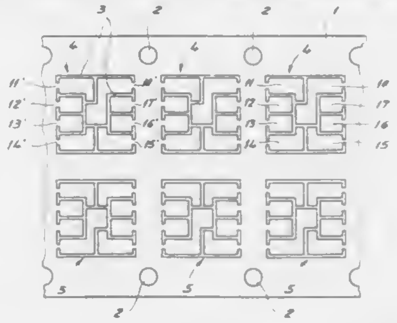
1. A method of mass producing a tape for providing a plurality of electronic modules, each module including an insulating substrate, a pattern of conductors for forming a circuit, and at least one electronic component having a plurality of terminals, said method comprising:

providing a thin continuous metal strip having a series of openings going right through the strip, these openings defining patterns of conductors for a plurality of said circuits, each conductor being connected to the strip by a bridge;

providing a plurality of insulating sheets each for providing one of said substrates;

sticking each sheet onto one face of the metal strip by means of an adhesive to form the substrate for a corresponding one of said patterns;

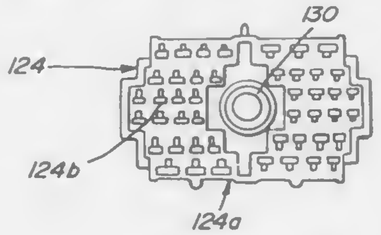
providing a plurality of electronic components and placing at least one of said electronic components on at least one of the conductors of each of said patterns; and,



connecting the terminals of each of said electronic components with at least some of the conductors of its corresponding pattern so as to form a tape supporting a plurality of electronic modules, each conductor of which remains galvanically connected to the metal strip by means of its corresponding bridge so that said terminals are short-circuited to protect said electronic components against static electrical discharges during storage or handling of the tape.

5,023,752
ELECTRICAL POWER DISTRIBUTION CENTER

Gary C. Detter, Berlin Center, Ohio; Andrew F. Rodondi, Sharpsville, Pa.; Christopher D. Burns, Niles; Samuel A. Norling, New Middletown, both of Ohio; Jay H. Garretson, and Richard V. Landries, both of Warren, Ohio, assignors to General Motors Corporation, Detroit, Mich.
Filed Oct. 31, 1989, Ser. No. 429,943
Int. Cl.^{5} H02B *1/04*
U.S. Cl. 361—399 25 Claims



7. An electrical power distribution center for providing electrical interconnections between electrical and electronic devices and electrical wiring connections comprising:

a plurality of electrical insulation boards each having opposite surfaces located in juxtaposed relationship with one another;

housing means including a lower housing and an upper housing for containing said electrical insulation boards;

a plurality of pre-stamped metal circuit components each having a first plurality of terminals on one end thereof extending transversely of said electrical insulation boards in a first direction and through said lower housing for connection to a wiring connection; said plurality of pre-stamped metal circuit components each having a second plurality of terminals on the opposite end thereof extending transversely of said electrical insulation boards in a direction opposite to said first direction and into said

VOL
1127
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upper housing for connection to an electrical or electronic device on said upper housing;

one surface of said electrical insulation boards having a plurality of cavities therein formed to receive said stamped metal circuit components and the other surfaces of each of said electrical insulation boards having means thereon to close said cavities to hold said pre-stamped metal circuit components in place in said plurality of cavities and to electrically insulate each of said pre-stamped metal circuit components one from the other to form different current carrying capacities in each of said electrical insulation boards;

characterized by electrical devices carried by the upper housing; cover means connected to said upper housing and including a plurality of ribs thereon extending toward said upper housing and having a length to be located closely adjacent the upper surface of each of the electrical devices carried by said upper housing for maintaining each of the electrical devices in their proper position on said upper housing when said cover means is secured thereto.

5,023,753
PRINTED CIRCUIT

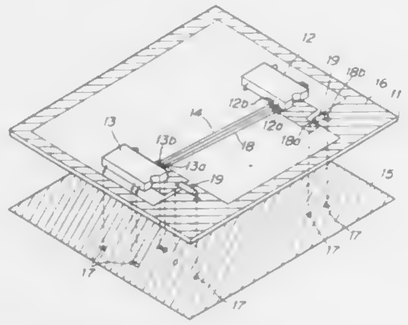
Hirotoshi Abe, Saitama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawashi, Japan

Filed Jan. 5, 1990, Ser. No. 461,422

Claims priority, application Japan, Jan. 13, 1989, 1-6644

Int. Cl.^{5} H05K *7/02*

U.S. Cl. 361—400 2 Claims



1. A printed circuit board, comprising:

an insulating board;

a first conductor layer formed on a first surface side of said insulating board,

said first conductor layer being a ground plane located on the side of the first surface of said insulating board;

first and second circuit devices each having at least a signal input and output terminal and ground terminal and located on said insulating board;

a second conductor layer, formed on a second surface side of said insulating board, having a signal pattern on the side of the second surface of said insulating board, and said signal pattern connecting said signal input and output terminals of said first and second circuit devices with each other;

said second conductor layer also having a ground pattern located on the side of said second surface of said insulating board, which connects said ground terminals of said first and second circuit devices with each other and said ground pattern being adjacent and parallel to said signal pattern; and

an inductance device electrically connecting said ground pattern and ground plane with each other,

stray capacitances existing respectively between said signal pattern and ground pattern, between said signal pattern and ground plane and between said ground pattern and ground plane.

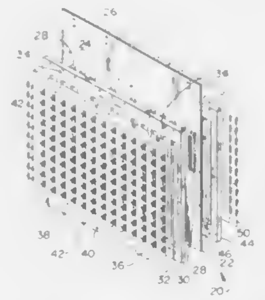
5,023,754
DOUBLE-SIDED BACKPLANE ASSEMBLY

Conrad J. Aug, Preston; Wayne J. Casanova, Rochester; William D. Corfits, Rochester; Roger F. Dimmick, Rochester, and Stephen E. Wheeler, Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 19, 1990, Ser. No. 467,450

Int. Cl.^{5} H05K *7/14*

U.S. Cl. 361—415 3 Claims



1. A backplane card for use in a backplane assembly for electronic enclosures used to contain logic elements, said backplane card comprising a printed circuit card having two opposed planar faces, a front face and a rear face, each of said faces having connectors for connecting said backplane card to said logic elements, said connectors on the front face being aligned in discrete spaced apart first rows and having connector conductors extending through said card to said rear face; said connectors on the rear face being aligned in discrete spaced apart second rows and having connector conductors extending through said card to said front face; said first rows being aligned parallel to said second rows and said connectors on the front face being laterally offset a predetermined lateral distance from those connectors on the rear face; said respective front face connectors and said rear face connectors not sharing the same connector conductor.

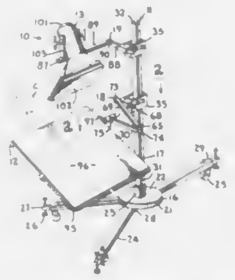
5,023,755
SUPPORT SYSTEM

Rex W. Rosenberg, 1910½ Broadway, P.O. Box 2001, Great Bend, Kans. 67530

Filed Apr. 9, 1990, Ser. No. 506,280

Int. Cl.^{5} G03B *15/02*

U.S. Cl. 362—12 8 Claims



1. A photographic lighting system, which comprises:

(a) a base assembly including:

(1) a central base member;

(2) a plurality of base legs each having a proximate end attached to said central member and a distal end; and

(3) a plurality of castors each mounted on a respective leg distal end;

(b) a generally vertical column includign a lower end attached to said base central member and an upper end;

(c) upper and lower arm assemblies, each including:

(1) a column mounting subassembly including a barcket with a receiver adapted to slidably receive said column and a clamp having a clamp position in frictional engagement with said column whereby said column mounting subassembly is clamped to said column and in a release position disengaged from said column whereby said column mounting subassembly is freely slidable on said column;

(2) an arm having a proximate section connected to said column mounting subassembly and a distal section; and

(3) an elbow including a first portion mounted on said arm proximate section, a second portion mounted on said arm distal section and a hinge pin pivotally clamping said body first and second portions together;

(d) a lower lighting component mounted on said lower arm assembly distal section;

(e) an upper lighting component mounted on said upper arm assembly distal section; and

(f) said lower lighting component comprising a translucent panel.

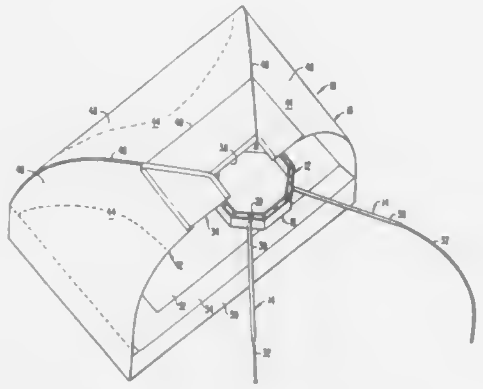
5,023,756
LIGHT DIFFUSION BOX

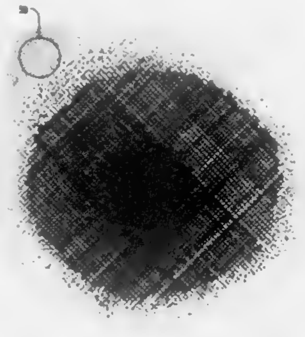
Gary L. Regester, P.O. Box 451, Silver Plume, Colo. 80476

Filed Jun. 13, 1989, Ser. No. 366,095

Int. Cl.^{5} G03B *15/02*

U.S. Cl. 362—16 19 Claims





1. A light diffusion box for illumination of objects to be photographed comprising:

a housing of fabric material, said housing having a pair of opposed ends; a mounting means coupled to the housing at one end thereof, said mounting means adapted to mount a single point light source in the housing with the light radiating from the light source into and through the housing; a light diffusion screen coupled to the housing at the opposite end thereof, and a deflection/transmission panel between the mounting means and the screen and having a deflection/transmission pattern equal and opposite to the naturally-occurring light fall-off pattern from the light source so as to result in substantially even light values of the light rays falling on the front screen, the panel having a substrate of flexible material, and at least one layer of coating material on one face of the substrate.

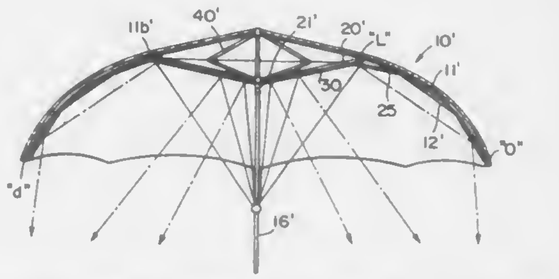
5,023,757
UMBRELLA TYPE REFLECTOR FOR PHOTOGRAPHIC REFLECTION

John Shirilla, 525 McClurg Road, P.O. Box 3365, Youngstown, Ohio 44512

Filed May 26, 1989, Ser. No. 357,470

Int. Cl.^{5} G03B *15/02;* F21V *7/02*

U.S. Cl. 362—16 3 Claims



1. A light reflector apparatus of the umbrella type for utilization of a light source to produce indirect lighting of images as employed in photography, the apparatus comprising a skeleton frame having an array of relatively long outer ribs and inner relatively shorter ribs and stays, an inner covering of light reflecting material covering the surface of said inner ribs and stays, means for securing said covering to both inner ribs and stays and said outer ribs whereby light from an external source is reflected by the inner covering of the photograph umbrella skeletonal frame.

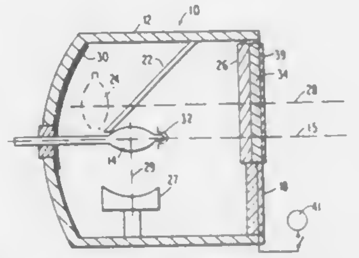
5,023,758
SINGLE ARC DISCHARGE HEADLAMP WITH LIGHT SWITCH FOR HIGH/LOW BEAM OPERATION

Gary R. Allen, Chesterland; John M. Davenport, Lyndhurst, and Richard L. Hansler, Pepper Pike, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 13, 1989, Ser. No. 435,902

Int. Cl.^{5} B60Q *1/00*

U.S. Cl. 362—61 17 Claims



1. An arc discharge headlamp for producing a high beam pattern and a low beam pattern, comprising in combination:

a reflector having a parabolic reflecting surface and an opening;

an arc light source positioned within said reflector near the focal point of said reflecting surface;

a first lens at said opening, light from said arc light source being reflected by said reflecting surface toward said first lens and passing therethrough to form said low beam pattern;

a mirror within said reflector configured and positioned to form a virtual image of said arc light source;

a second lens at said opening horizontally centered with respect to said first lens for receiving light from said virtual image of said arc light source; and means for controlling light from said virtual image passing through said second lens, said light from said virtual image when allowed to pass through said second lens forming at least a portion of said high beam pattern.

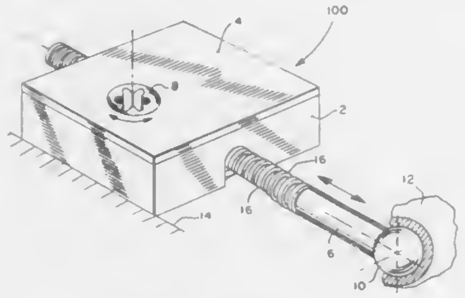
5,023,759

VEHICLE HEADLIGHT POSITION ADJUSTMENT ASSEMBLY

Robert T. Eckenrode, North Canton, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 24, 1990, Ser. No. 586,657
Int. Cl.^{5} F21V *21/00*

U.S. Cl. 362—66 — 8 Claims



1. An improved vehicle headlight position adjustment assembly of the type having an elongate threaded output adjustment member that extends through substantially axially aligned openings through opposite sides of a first part of a detachable two part gear box housing, said gear box housing including a rotary input member operative to cause the output adjustment member to move in opposite axial directions in response to rotation of the input member in opposite directions, and said improvement characterized by said gear box housing second part having at least one pedestal extending therefrom having an aperture therethrough that is in substantial axial alignment with the gear box housing first part openings and is adapted to receive the output adjustment member therethrough when the first and second gear box housing parts are attached together enabling said pedestal to hold the gear box first and second housing parts together in the event that they become detached from each other.

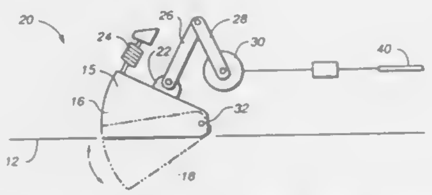
5,023,760

RETRACTABLE TURN SIGNAL ASSEMBLY FOR TRUCKS

Herb Izuno, Fremont, Calif., assignor to Paccar Inc., Bellevue, Wash.

Filed Aug. 25, 1989, Ser. No. 398,635
Int. Cl.^{5} B60Q *1/076*

U.S. Cl. 362—66 — 10 Claims



1. A turn signal assembly specifically configured for use in a side of a highway truck, said assembly, comprising:

light means having a front end with a front-facing surface for projecting illumination in a forward direction with respect to said truck, when in an extended position, said light means producing blinking illumination in said extended position;

means supporting said light means for movement between a normally retracted position at least flush with said side of said truck and said extended position with said front end and said front-facing surface protruding outwardly by a distance sufficient for illumination from said front-facing surface in a forward direction, and said front-facing surface sloping rearwardly from said side of said truck in said extended position,

means for moving said light means between said retracted and extended positions; and

activation means for causing said moving means to move said light means to said extended position upon designation of said activation means by an operator, said light means being in said retracted position when said activation means is not designated.

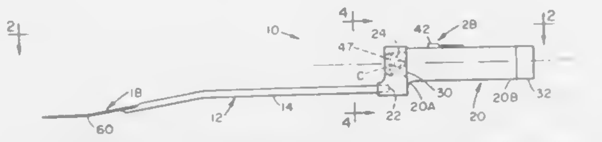
5,023,761

LIGHTED COOKING UTENSIL HOLDER ACCESSORY

Raymond D. de Lange, 2218 Place Rebecca La. #12, Houston, Tex. 77090

Filed Nov. 7, 1990, Ser. No. 610,391
Int. Cl.^{5} B25B *23/18*

U.S. Cl. 362—120 — 20 Claims



1. A lighted cooking utensil holder accessory, comprising:

(a) an elongated hand grip having a forward end and a hollow interior cavity for receiving and supporting at least one electric battery;

(b) means forming a light socket on said forward end of said hand grip aligned and in communication with said interior cavity of said, hand grip;

(c) means forming a utensil socket on said forward end of said hand grip being spaced in offset relation from and forwardly of said light socket and said hollow cavity, said utensil socket being capable of receiving and mounting a coupling end of a shaft of a cooking utensil that also has an opposite working end;

(d) said light socket being capable of receiving and positioning a light bulb to make contact with the battery when mounted in said interior cavity of said hand grip and to direct a beam of light along the utensil shaft and toward the working end of the utensil so as to illuminate food located adjacent the working end of the utensil; and

(e) means mounted on said hand grip being electrically coupled to said interior cavity and said light socket for switching "on" and "off" a supply of electrical energy from the battery when mounted in said interior cavity to the light bulb when mounted in said light socket.

5,023,762

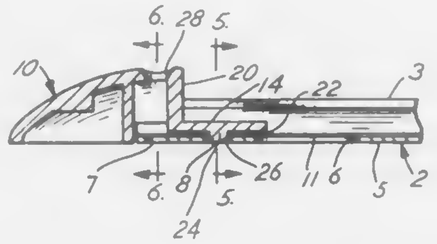
CHANNEL WITH LOCKING TIP FOR DECORATIVE STRIP LIGHTING

Dwayne Tieszen, Ponder, Tex., assignor to Vista Manufacturing, Inc., Elkhart, Ind.

Filed Aug. 24, 1990, Ser. No. 572,222
Int. Cl.^{5} F21S *3/00*

U.S. Cl. 362—223 — 3 Claims

1. In combination, an elongated channel a locking end tip and a strip light tube, said channel having an end and including a pair of side walls connected by an integral bottom wall, said bottom wall including an opening therethrough adjacent said channel end, said tip including a body and an integral flange extending from said body, said tip being inserted into said channel with said flange extending between said channel side walls adjacent said channel end, a nib extending from said tip flange in the direction of said channel bottom wall, said nib being positioned within said channel opening to prevent longitudinal shifting of said tip relative to said channel, said strip light tube being retained within said channel by said side walls, said strip light tube having an end, said strip light tube overlying said tip flange with said strip light tube end adjacent the body of the tip.



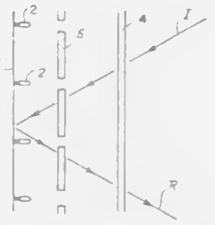
5,023,763

ILLUMINATED DISPLAY FANEL

Monsieur J. Le Gars, Maurepas, France, assignor to Societe d'Etudes pour le Developpement des Productions Electroniques, Maurepas, France

Filed Oct. 20, 1989, Ser. No. 424,549
Claims priority, application France, Oct. 21, 1988, 88 13869
Int. Cl.^{5} F21V *9/00*

U.S. Cl. 362—240 — 7 Claims



1. Display device comprising: spaced luminous elements of light-emitting diodes each having an outlet window by which light of a particular color is emitted, said outlet windows defining a plane portion on which the windows are distributed with spaced portions between the windows; a first filter having the same color as the light emitted by said luminous elements and covering the whole of said plane portion; and a second filter having a complementary color to said first filter covering only the spaced portions between the windows, whereby the second filter masks the spaced portions but permits light rays from the luminous elements to pass freely.

5,023,764

STROBOSCOPIC LAMP OPTICAL SYSTEM

Donald C. McKinnon, and Thomas F. Gauthier, both of Cheboygan, Mich., assignors to Ferret Instruments, Inc., Cheboygan, Mich.

Filed Nov. 3, 1989, Ser. No. 431,535
Int. Cl.^{5} F21V *7/12*

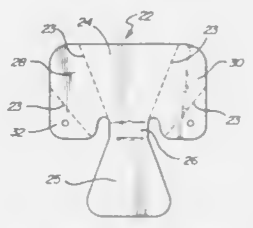
U.S. Cl. 362—299 — 26 Claims

1. An improved stroboscopic timing light assembly, comprising:

a flash lamp;

a pair of planar side reflectors each terminating in a free edge, said pair of forward facing side reflectors being substantially disposed along respective planes which converge at a point to form an acute angle with respect to each other, said flash lamp being disposed between said reflectors proximate said point and spaced therefrom; and

a convex projecting lens disposed proximate said free edges, the reflectors, the lamp and the lens being disposed such that a beam of light emitted from said lamp is reflected by said reflectors to create a plurality of images, which are condensed and projected by said lens to create an enhanced image projected from the assembly.



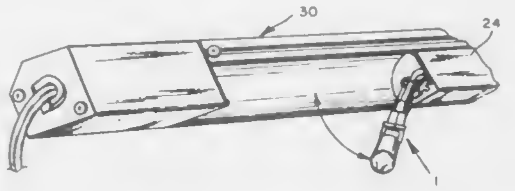
5,023,765

PIVOTABLE LAMP BRACKET FOR LINEAR LIGHTING FIXTURE

Daniel W. Barton, 17170 Courtney La., Hungtington Beach, Calif. 92649

Filed Dec. 3, 1990, Ser. No. 621,576
Int. Cl.^{5} F21V *21/10*

U.S. Cl. 362—429 — 4 Claims



1. In a linear lighting fixture containing light modules, lamp sockets and supporting brackets adapted for use with low voltage halogen lamps, an improved lamp bracket; said lamp bracket comprising:

a lamp socket;

a socket support member, made of a rigid material and formed into two plane surfaces: a forward plane and a rear plane which are perpendicular to each other; said rear plane being shaped and sized to fit a surface of said lamp socket; said socket support member being connected to said lamp socket by a rivet through said rear plane surface;

a bracket support member, made of a rigid material and formed into two plane surfaces: a forward plane and a rear plane which are perpendicular to each other; and

a pivot means which is used to join the forward plane of said bracket support member to the rear plane of said socket support member, allowing said socket support member to be rotated with respect to said bracket support member.

5,023,766

POWER SUPPLY UTILIZING TRANSFORMERLESS OPTICAL DRIVING CONTROL CIRCUIT

Graham A. Laidler, Ipswich, England, assignor to British Telecommunications Public Limited Company, United Kingdom
Continuation of Ser. No. 150,947, Feb. 1, 1988, abandoned. This application Mar. 2, 1990, Ser. No. 490,521
Claims priority, application United Kingdom, Feb. 2, 1987, 8702299

Int. Cl.^{5} H02M *3/335*

U.S. Cl. 363—16 — 17 Claims

1. A power supply system including:

first and second series-connected power FET switching means connected to receive a d.c. voltage;

transformerless driving means comprising first and second optical driving means for driving the first and second switching means respectively;

variable frequency generator means connected to switch said first and second switch means via the optical driving

VOL
1127
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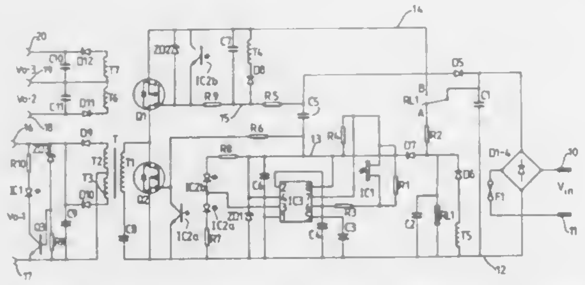
means at a switching rate determined by a frequency output of the generator means;

transformer means having a plurality of windings including a first winding connected to at least one of the switching means, a second winding configured to provide a power supply output at a desired voltage, a third winding for providing a power supply to the variable frequency generator means, and a fourth winding for providing a power supply to the optical driving means;

first rectification means connected to said second winding for converting the a.c. voltage at said second winding into a substantially d.c. voltage;



second rectification means connected to said third winding to provide a d.c. power supply to said variable frequency generator means; and third rectification means connected to said fourth winding to provide a d.c. power supply to the optical driving means;

sensing means for detecting output voltage errors; and optical feedback means including an opto-generator and a FET receiver for providing a control path from said sensing means to said variable frequency generator means to modify the switching frequency of the switching means by modifying the frequency output of the generator means to compensate for detected output errors.

5,023,767

HIGHLY EFFICIENT CONVERSION CIRCUIT FOR POWER SUPPLIES

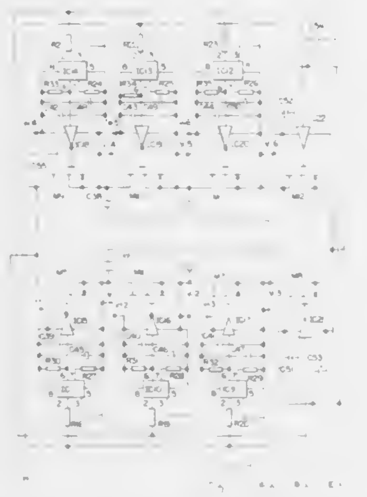
Javier E. M. Lopez, Mataro, and Mark G. Palaske, Alella, both of Spain, assignors to Quest Electronics, SA, Barcelona, Spain

Continuation of Ser. No. 244,903, Sep. 15, 1988, abandoned. This application Apr. 9, 1990, Ser. No. 506,575

Claims priority, application Spain, Sep. 21, 1987, 8702699

Int. Cl.^{5} H02M *3/335*

U.S. Cl. 363—17 13 Claims



1. A highly efficient power supply apparatus, comprising:

means for receiving a power supply input signal;

a timing circuit means for developing circuit control signals;

a signal control circuit including at least one power amplifier, each power amplifier having a duty cycle and being responsive to the power supply input signal and having associated therewith a signal amplifier responsive to said circuit control signals for activating said power amplifier at specified times, to produce a control circuit voltage signal, wherein the power amplifier comprises a plurality of power transistors and wherein the signal control circuit includes storage capacitors associated with the power transistors, the power amplifier further including means for sequentially activating and deactivating selected ones of the power transistors, thereby charging and discharging the storage capacitors in alternating fashion, the storage capacitors being connected in such a manner that a capacitor which is discharging to a load is not connected to the input signal receiving means, thereby achieving electrical isolation between the input signal and the load without a transformer;

a voltage multiplier means for increasing the control circuit voltage signal to produce a power supply output voltage; and

means feeding back a signal representative of the power supply output voltage to the timing circuit means for control of the circuit control signals, and hence control of the duty cycle of the power amplifier.

5,023,768

HIGH VOLTAGE HIGH POWER DC POWER SUPPLY

John C. Collier, Guelph, Canada, assignor to Varian Associates, Inc., Palo Alto, Calif.

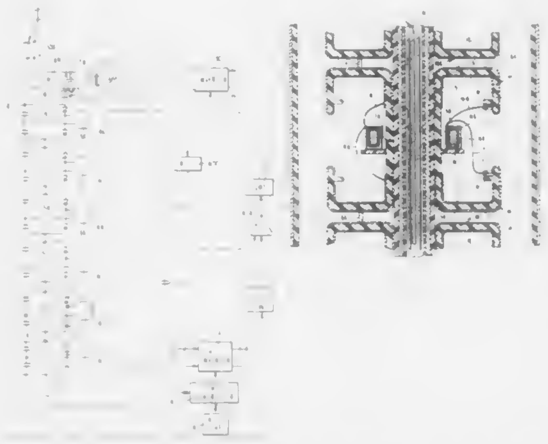
Continuation-in-part of Ser. No. 441,099, Nov. 24, 1989, abandoned. This application Dec. 13, 1989, Ser. No. 450,183

Int. Cl.^{5} H02M *3/18, 7/02*

U.S. Cl. 363—68 67 Claims

1. A high voltage, high power DC power supply comprising an AC source having a frequency in excess of about 100kHz, a transformer having: a single turn primary winding responsive to said source and arranged to respond to the source to derive a magnetic field having flux lines concentric with a longitudinal axis in planes at right angles to the axis, the primary winding including a first metal cylindrical wall coaxial with said longitudinal axis and a second metal wall surrounding the first metal wall, the second wall having only continuously curved surfaces in proximity to the first wall, the first and second walls having ends electrically connected to each other so that the ends are at the same electric potential, plural secondary winding and rectifier assemblies magnetically coupled to the primary winding for developing a portion of the high voltage DC derived by the power supply, each of said assemblies having a different axial position relative to the length of the first wall and being in a volume between the first and second walls; each of said assemblies including: a magnetic core having a circular inner diameter coaxial with said first wall and an outer diameter having only curved surfaces, a winding wound about each of said cores, rectifier means connected to the winding of each of the assemblies for developing a DC voltage, the spacing from the inner wall to the inner diameter and from the outer diameter to the outer wall being such that the windings of secondary assemblies are loosely magnetically coupled to the primary winding so that each of the secondary winding assemblies has an appreciable parasitic inductance and a relatively

small capacitance; means within the volume for adding the developed voltages together; and a capacitor connected in series with the primary winding, the capacitor having a value for approximately resonating the transformer to the source.



5,023,769

X-RAY TUBE HIGH-VOLTAGE POWER SUPPLY WITH CONTROL LOOP AND SHIELDED VOLTAGE DIVIDER

Robert Beland, Bellefeuille, Canada, assignor to Electromed International Ltd., Quebec, Canada

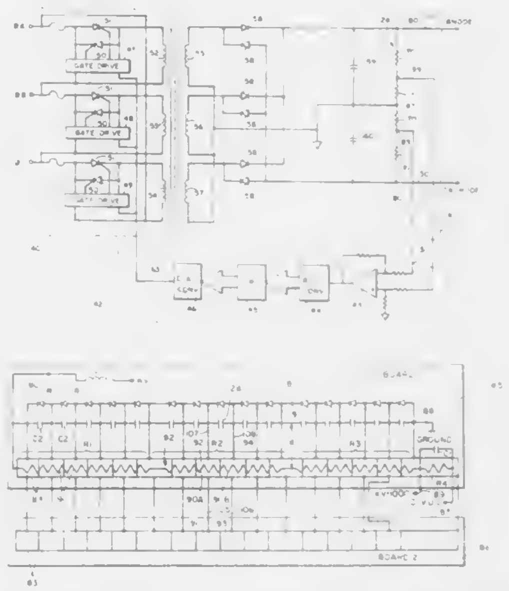
Filed Dec. 7, 1989, Ser. No. 447,559

Int. Cl.^{5} H02M *7/155*

U.S. Cl. 363—86 5 Claims

1. A shielded resistor circuit comprising:
- a resistor means having opposing end terminals; and
- a shield for preventing electrical noise from interfering with the operation of the resistor means, the shield including:
  - a plurality of paired conductive members disposed along the length of the resistor means and having opposing end terminals, the pairs of conductive members separating the resistor means into separate portions by providing alternating first and second pairs of conductive members along the length of the resistor means;
  - a capacitor series comprising a plurality of serially connected capacitor means disposed a predetermined distance from the resistor means and having opposing end terminals, each capacitor means being connected between adjacent first and second pairs of conductive members, the end terminals of the conductive members being connected to the end terminals of the capacitor series, and the dynamic impedance of the capacitor series being less than the dynamic impedance of the resistor means;

wherein when the end terminals of the resistor means are connected between a higher-voltage potential and a lower voltage potential, and the end terminals of the capacitor series are connected between the higher-voltage potential and ground, electrical noise is coupled to the capacitor series and does not interfere with the resistor means.



5,023,770

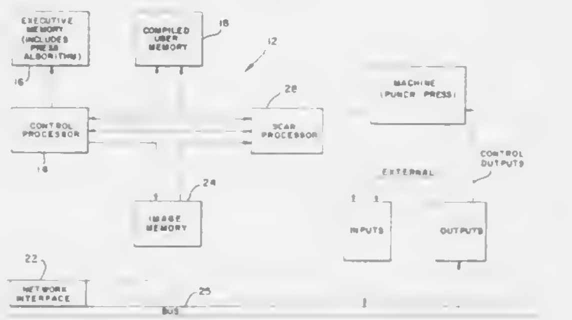
HIGH-SPEED PRESS CONTROL SYSTEM

Erich H. Siverling, Wauwatosa, Wis., assignor to Square D Company, Palatine, Ill.

Filed Apr. 11, 1988, Ser. No. 179,743

Int. Cl.^{5} G06F *9/00*

U.S. Cl. 364—140 8 Claims



1. A programmable logic controller (PLC) for controlling a high-speed machine operating in cycle-type modes, the machine having a plurality of components having at least two status states, the PLC comprising:
- an executive memory,
- an image memory including an input image table and an output image table,
- a machine control algorithm,
- an internal clock for generating repetitive timed interrupts,
- a control processor for coordinating operation of the system in accordance with instructions contained in said executive memory, including updating of said image memory;
- a communication bus adapted for communicating with the machine; and

VOL
1127
ISS
2
JE
11
1991
UMI

a scan processor having its own executive memory, said scan processor for reading said input image table, executing said machine control algorithm and updating said output image table in response to said repetitive timed interrupts.

5,023,771

CONTROLLER FOR TWO TIMERS OF A VIRTUAL MACHINE SYSTEM, ONE UPDATED ONLY IN THE VMOS MODE

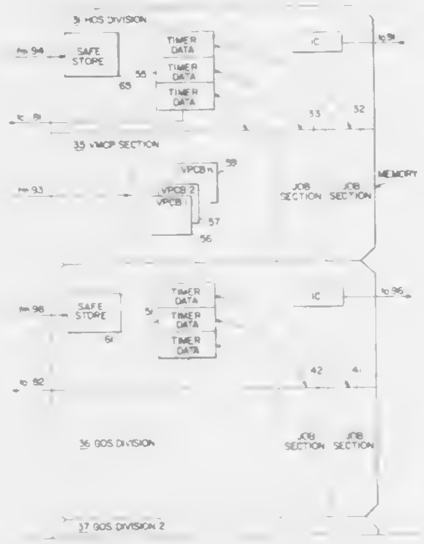
Takao Kishi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 147,546, Jan. 25, 1988, abandoned. This application Sep. 7, 1990, Ser. No. 580,367

Claims priority, application Japan, Jan. 26, 1987, 62-14278

Int. Cl.^{5} G06F *9/00, 9/46*

U.S. Cl. 364—200 3 Claims



1. A timer controller for use in a virtual machine system comprising a host operating system, said virtual machine system also comprising a memory and a real central processing unit,

said memory comprising a host division including a plurality of first job sections storing first ordinary jobs, a virtual machine control program section storing a virtual machine control program and a plurality of guest operating system divisions each including additional job sections storing additional ordinary jobs and respective timer data sections;

said host operating system being operable in a plurality of modes including a non-virtual machine mode, a virtual machine monitoring mode and a virtual machine operating system mode, wherein,

in said non-virtual machine mode said first ordinary jobs are performed in said central processing unit,

in said virtual machine monitoring mode said virtual machine control program is operated to establish data for a plurality of guest operating systems, and

in said machine operating system mode data is established for said additional ordinary jobs and said additional ordinary jobs are performed;

said timer controller including a mode register indicating one of said plurality of modes in which said virtual machine system is operating,

wherein the improvement comprises:

first timer means decremented when said mode register indicates each of said non-virtual machine mode, said virtual machine monitoring mode and said virtual machine operating system mode,

said first timer means supplying a time for dispatching said first ordinary jobs in said non-virtual machine mode and said additional ordinary jobs in said virtual machine operating system mode and supplying a time for dispatching said guest operating systems in said virtual machine monitoring mode;

second timer means, coupled to said mode register, decremented only when said mode register indicates said virtual machine operating system mode but not when said mode register indicates said non-virtual machine mode or said virtual machine monitoring mode,

said second timer means setting a value obtained from said timer data sections for supplying a time for dispatching said additional ordinary jobs;

an interruption signal receiving circuit, coupled to said first and second timer means,

said receiving circuit receiving a first interruption signal only when said first timer means is decremented to a first predetermined value and receiving a second interruption signal only when said second timer means is decremented to a second predetermined value; and

informing means, coupled said receiving circuit for informing said host operating system that said first interruption signal is received and for informing said guest operating systems that said second interruption signal is received.

5,023,772

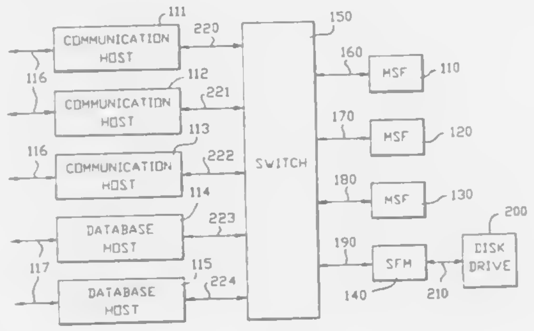
METHOD AND SYSTEM FOR STORING MESSAGES BASED UPON A NON-QUERIED NAME ASSIGNMENT

Richard P. King, Thornwood, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,420

Int. Cl.^{5} G06F *12/02*

U.S. Cl. 364—200 10 Claims



1. In a message storage system implemented on a computer, having a plurality of message storage facilities with storage locations and associated storage location designations, a method of storing messages from a plurality of host devices comprising the steps of:

(a) assigning an individual generation number to each message storage facility;

(b) locating a free storage location in one of the message storage facilities upon receipt of a message from a host device by said one message storage facility;

(c) storing the message in the free storage location;

(d) identifying the stored message by an individual name, said name comprised of the generation number of the message storage facility where it is stored and the associated storage location designation;

(e) returning the individual name to the host device which sent the message;

(f) repeating steps (b)–(e) until said message storage facility approaches its storage capacity of messages;

(g) changing the generation number of said one message storage facility after said one message storage facility approaches its storage capacity of messages; and

(h) moving the messages stored in said one message storage facility after said one message storage facility approaches its storage capacity of messages it reaches its storage capacity.

5,023,773

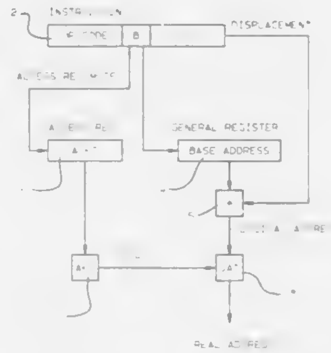
AUTHORIZATION FOR SELECTIVE PROGRAM ACCESS TO DATA IN MULTIPLE ADDRESS SPACES

Richard I. Baum; Terry L. Borden, both of Poughkeepsie; Justin R. Butwell, Milton; Carl E. Clark, Poughkeepsie; Alan G. Ganek, Chappaqua, all of N.Y.; James Lum, Redwood City, Calif.; Michael G. Mall, Lagrangeville, N.Y.; David R. Page, Romsey, United Kingdom; Kenneth E. Plambeck; Casper A. Scalzi, both of Poughkeepsie, N.Y., and Richard J. Schmalz, Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 10, 1988, Ser. No. 154,740

Int. Cl.^{5} G06F *12/14*

U.S. Cl. 364—200 49 Claims



1. In a computer system having a central processor, a main memory, and an operating system operating said central processor for executing programs having instructions for processing data, each instruction having an operand field, and said main memory being allocated into a plurality of address spaces containing data to be processed by said programs, a program authorization mechanism authorizing a program to access data in one of said address spaces comprising:

a plurality of access registers, each access register for containing a number having the value of an access-list-entry token (ALET) designating one of said address spaces for associating each access register and its ALET with one of said address spaces, said access registers being addressable by the contents of the operand field of a program instruction;

access-register translation (ART) means in said central processor having an input for receiving the ALET of the access register designated by the contents of the operand field of the instruction and, responsive thereto, providing an address into the address space associated with said ALET;

address translating means in said central processor having an input for receiving the contents of the operand field of the program instruction being executed by said central processor, and an input for receiving the address from said ART means, said address translating means for translating the contents of the operand field to a logical address and combining said logical address with the address from the ART means to form a real address in the address space designated by the ALET;

said ART means further including authorizing means for authorizing data access to the address space designated by the ALET by the program being executed by said central processor;

an access list having a plurality of access-list entries in said main memory, each access-list entry being associated with one of said address spaces, said access list being associated with selected programs;

an access-list entry number (ALEN) in each ALET, said ALEN designating one of said access-list entries;

a P bit in each of said access-list entries, said P bit being assigned a first value when the address space associated with the access-list entry is open to all of said selected programs, and being assigned a second value when the address space associated with the access-list entry is open to only authorized programs;

first access allowing means in said ART for determining the value assigned to said P bit, said first access allowing means allowing continued execution of the instruction for allowing access to said designated address space by said program being executed by said central processor when said P bit has its first value;

a control register for storing an extended authorization index (EAX) value for said program being run by said operating system;

an access list extended authorization index (ALEAX) field in each of said access-list entries for storing an ALEAX value; and

second access allowing means in said ART means for comparing the EAX value with an ALEAX when said P bit has its second value, said second access allowing means allowing access to said designated address space by said program being executed by said central processor when said EAX value is equal to the ALEAX value of the access-list entry designated by the ALEN of the ALET in the access register addressed by the contents of said operand field.

5,023,774

DATA I/O TRANSACTION METHOD AND SYSTEM

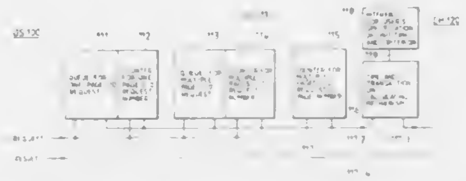
Naohumi Sakai, Yokohama; Masashi Tsuchida, Tokyo; Kazuhiko Ohmachi, Kawasaki; Yasuhiro Imai, Hadano, and Toshio Honma, Yokohama, all of Japan, assignors to Hitachi Software Engineering Co., Ltd. and Hitachi Ltd., both of Tokyo, Japan

Filed Nov. 8, 1988, Ser. No. 268,810

Claims priority, application Japan, Nov. 13, 1987, 62-285604

Int. Cl.^{5} G06F *1/00*

U.S. Cl. 364—200 9 Claims



1. A data I/O transaction system comprising:

means for counting an accumulated quantity of I/O requests generated in a predetermined certain unit time period based on a number of one page I/O requests generated in said predetermined certain unit time period, an accumulated number of multiple pages I/O requests generated in said predetermined certain unit time period, and a number of pages for each of the multiple pages I/O requests;

means for dynamically changing and fixing said number of pages for a multiple pages I/O request in correspondence with a multiple pages I/O request from a user in accordance with said accumulated quantity, said accumulated number and said number of pages counted by said counting means in such a manner that said number of pages is decreased when the accumulated quantity is increased, while it is increased when the accumulated quantity is decreased; and

means capable of actually performing I/O transactions of said one page I/O requests and said multiple pages I/O requests by said changing and fixing means.

VOL
1127
ISS
2
JE
11
1991
UMI

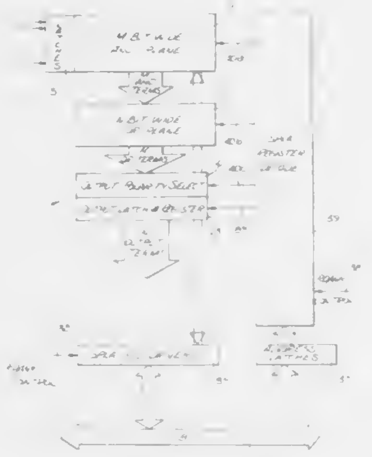
5,023,775
SOFTWARE PROGRAMMABLE LOGIC ARRAY UTILIZING "AND" AND "OR" GATES

Mark Poret, Phoenix, Ariz., assignor to Intel Corporation, Santa Clara, Calif.

Continuation of Ser. No. 388,304, Jul. 27, 1989, abandoned, which is a continuation of Ser. No. 88,992, Aug. 21, 1987, abandoned, which is a contiouation of Ser. No. 702,046, Feb. 14, 1985, abandoned. This application Oct. 15, 1990, Ser. No. 598,794

Int. Cl.^{5} H03K *19/00*

U.S. Cl. 364—200 7 Claims



1. A software programmable logic array comprising a first plurality of programmable bit means, each having a single data input and two and only two programming inputs for selectively generating an output which is dynamically programmable by the application of logic level signals to said two and only two programming inputs wherein the outputs of each said programmable bit means are ANDed together to produce a single AND term, said selectable output of each of said programmable bit means being determined by the values of said two and only two programming input to said programmable bit means, wherein said two and only two programming inputs for each of said plurality of programmable bit means are programmed in parallel, and wherein said data inputs for each of said plurality of programmable bit means receive input in parallel, and wherein each of said first plurality of programmable bit means includes:

first and second flip-flops, each having a Q output, whose inputs are coupled to said two and only two programming inputs;

first and second AND gates, each having as one input, a respective one of said Q outputs, a second input of said first AND gate being said single data input and a second input of said second AND gate being said single data input inverted; and

an OR gate whose first and second inputs are the outputs of said first and second AND gates.

5,023,776
STORE QUEUE FOR A TIGHTLY COUPLED MULTIPLE PROCESSOR CONFIGURATION WITH TWO-LEVEL CACHE BUFFER STORAGE

Steven L. Gregor, Endicott, N.Y., assignor to International Business Machines, Corp., Armonk, N.Y.

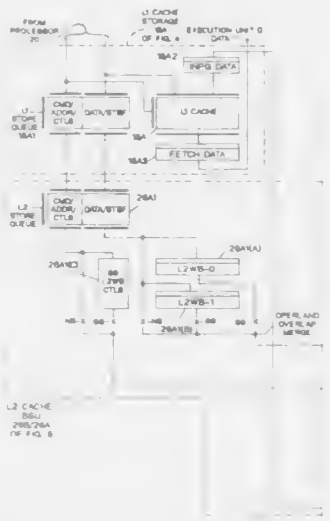
Filed Feb. 22, 1988, Ser. No. 159,016

Int. Cl.^{5} G06F *13/00*

U.S. Cl. 364—200 15 Claims

1. In a multiprocessor system having a plurality of processors including a first processor and at least one second processor, a first level cache connected to each processor, a single second level cache connected to each first level cache and shared by the processors, and a third level main memory connected to the second level cache, a system for queuing and buffering data and/or instructions, comprising:

a first level store queue means associated with each processor and having an input connected to its corresponding processor and connected to an input of its corresponding first level cache for receiving said data and/or instructions from said its corresponding processor intended for potential storage in said its corresponding first level cache and for queuing said data and/or instructions therein simultaneously with in its corresponding first level cache, each of the first level store queue means having outputs; and



a plurality of second level store queue means each of which is associated with a first level store queue means and interconnected between the output of such associated first level store queue means and an input of the single second level cache for receiving said data and/or instructions from said first level store queue means and for queuing said data and/or instructions therein prior to storage of said data and/or instruction in said second level cache, said first and second level store queues temporarily holding data and/or instructions to prevent the first processor from delaying its execution of additional instructions due to the second level cache being being busy with a store operation associated with a second processor.

5,023,777
INFORMATION PROCESSING SYSTEM USING DOMAIN TABLE ADDRESS EXTENSION FOR ADDRESS TRANSLATION WITHOUT SOFTWARE MODIFICATION

Hideo Sawamoto, Hadano, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 3, 1988, Ser. No. 252,815

Claims priority, application Japan, Oct. 5, 1987, 62-250913

Int. Cl.^{5} G06F *9/318, 12/06, 12/10, 7/02*

U.S. Cl. 364—200 4 Claims

1. An information processing device for executing programs having selectively variable address spaces including a virtual address space and an extended virtual address space, the information processing device comprising:

address generating means for generating a virtual address, the virtual address having a translatable part and an untranslatable part, the translatable part comprising a segment index and a page index;

a main storage, communicating with the address generating means, for storing a segment table and a page table, the segment table having an entry holding a page table origin comprising a page table start address and the page table having an entry holding a page frame real address;

a translation means, communicating with the main storage, for translating the translatable part into a real address by accessing the segment table using a segment table origin stored in a first register and the segment index of the virtual address to obtain the page table origin and accessing the page table using the page table origin and the page index of the virtual address;

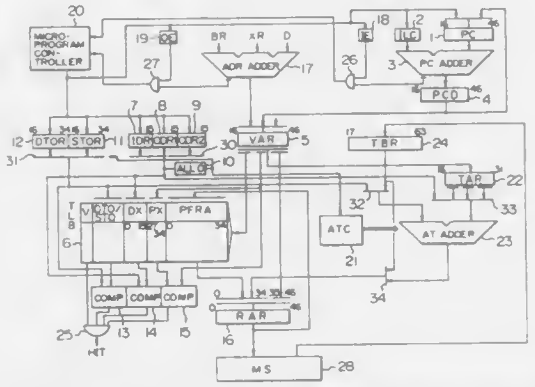
means for accessing the main storage using the real address obtained from the translation means;

an extended address storage means, communicating with the translation means, for storing an extended address portion, the extended address portion is appended to the virtual address to thereby construct an extended virtual address;

a domain table in the main storage for storing a plurality of segment table origins;

a second register means for holding a domain table origin comprising a start address of the domain table in the main storage;

a plurality of third register means for storing an additional domain table index, one of the third register means being



selected by the program, each additional domain table index comprising an extended address portion added to the virtual address to thereby construct the extended virtual address;

zero detecting means for selectively enabling the virtual address space when a content of the selected third register means is zero, and enabling the extended virtual address space when one of the plurality of third means is not zero;

means, responsive to the zero detecting means, for selectively obtaining the segment table origin from the first register, for activating the translation means to obtain the real address; and,

means, responsive to the zero detecting means, for selectively obtaining the domain table origin from the second register means and extended address portion from the selected third register means, respectively, for accessing the domain table by using the domain table origin and the extended address portion to obtain the segment table origin, and for activating the translation means to obtain the real address.

5,023,778
INTERPROCESSOR COMMUNICATION METHOD

Robert C. Simon, Jr., Novi, Mich.; Dale W. Deutscher, Phoenix, Ariz.; Charles M. Grimm, Luxembourg, Luxembourg; Dennis D. Thompson, Atlanta, and Kirk A. Bailey, Carmel, both of Ind., assignors to General Motors Corporation, Detroit, Mich. and Delco Electronics Corp., Kokomo, Ind.

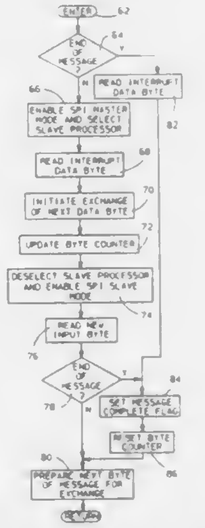
Filed Mar. 23, 1990, Ser. No. 498,080

Int. Cl.^{5} G06F *15/16, 13/00*

U.S. Cl. 364—200 3 Claims

1. A method of exchanging multiple by messages between first and second processors each being selectively configurable in a master operating mode for controlling data by exchanges or in a slave operating mode in which an interrupt is generated upon the exchange of a data byte with a processor configured in a master operating mode, the method comprising the steps of:

initating a message exchange by the first processor that is initially configured in a master operating mode by (A) selecting the second processor that is initially configured in a slave operating mode, (B)(commanding the exchange of a first data byte of a first multiple byte message of the first processor and a first data byte of a second multiple byte message of the second processor, (C) preparing a second data byte of the first multiple byte message for exchange and (D) reconfiguring itself in a slave operating mode and


ENTER
62
END OF MESSAGE ?
64
Y
N
READ INTERRUPT DATA BYTE
82
66
ENABLE SPI MASTER MODE AND SELECT SLAVE PROCESSOR
READ INTERRUPT DATA BYTE
68
INITIATE EXCHANGE OF NEXT DATA BYTE
70
UPDATE BYTE COUNTER
72
DESELECT SLAVE PROCESSOR AND ENABLE SPI SLAVE MODE
74
READ NEW INPUT BYTE
76
END OF MESSAGE ?
78
Y
N
SET MESSAGE COMPLETE FLAG
84
RESET BYTE COUNTER
86
80
PREPARE NEXT BYTE OF MESSAGE FOR EXCHANGE
RETURN

initiating exchanges of subsequent data bytes of the first and second multiple byte messages by each of the first and second processors responding to an interrupt generated upon the exchange of a data byte while being configured in a slave operating mode by (A) reconfiguring itself in a master operating mode, (B) selecting the other one of the first and second processors, (C) commanding the exchange of the next data byte of the first and second multiple byte messages, (D) preparing the next data byte of its multiple byte message for exchange and (E) reconfiguring itself in a slave operating mode, whereby the first and second processors are alternately configured in a master operating mode to command exchanges of the data bytes of the multiple byte messages.

5,023,779
DISTRIBUTED PROCESSING ENVIRONMENT FAULT ISOLATION

Anthony M. Federico, West Webster, and Ronald A. Ippolito, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sep. 21, 1982, Ser. No. 420,991

Int. Cl.^{5} G06F *11/00*

U.S. Cl. 364—200 3 Claims

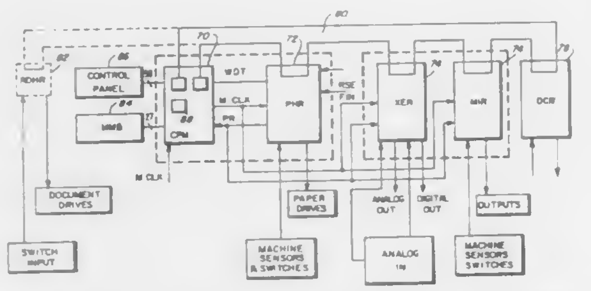
1. In a control for controlling the operation of a printing machine, the printing machine including a plurality of operating components for producing images on a copy sheet, the control including a master processor with memory and message receive circuitry, a shared communication channel, and a plurality of remote processors connected to a master processor through the shared communication channel, the master processor adapted for transmitting a verification message to itself over the message receive circuitry, the method of the master processor identifying a fault occurring in one of the remote processors manifested by a fault message comprising the steps of:

one of the remote processors recognizing said fault and generating said fault message,

VOL
1127
ISS
2
JE
11
1991
UMI

said one of the remote processors conveying the fault message to the master processor,

the master processor recording the fault message in said memory,



the master processor transmitting said verification message to itself over said message receive circuitry for verifying the integrity of the message receive circuitry, and

the master processor identifing the source of the fault to be said one of the remote processors.

5,023,780

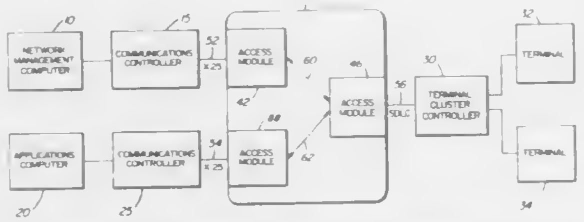
METHOD OF OPERATING A PACKET SWITCHING NETWORK

John R. Brearley, Nepean, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Jan. 3, 1991, Ser. No. 635,382

Int. Cl.^{5} G06F *15/16;* **H04Q** *1/00;* **H04L** *5/00*

U.S. Cl. 364—200 5 Claims



1. A method of operating a packet switching network comprising at least a first network access module having a plurality of terminals coupled thereto via a terminal cluster controller and at least two second network access modules each having a respective computer coupled thereto, the method comprising the steps of:

storing in the first network access module information relating to a configuration of the terminal cluster controller and said plurality of terminals;

establishing a first switched virtual circuit connection between the first network access module and one of the second network access modules having a first computer coupled thereto, wherein the first network access module provides a representation of said configuration of the terminal cluster controller and said configuration of the terminal cluster controller and said plurality of terminals from the stored information to the first computer via this first switched virtual circuit connection for control of the terminal cluster controller and said plurality of terminals by said first computer;

establishing a second switched virtual circuit connection between the first network access module and one of the second network access modules having a second computer coupled thereto, wherein the first network access module provides a representation of a single one of said plurality of terminals coupled thereto via the terminal cluster controller to the second computer via this second switched virtual circuit connection; and

establishing addresses in the first network access module for communications via the second switched virtual circuit connection between the second computer and said single one of said plurality of terminals.

5,023,781

ELECTRIC CASH REGISTER

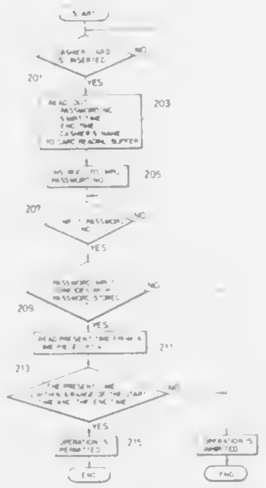
Masaki Yamato, Kyoto, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Feb. 20, 1987, Ser. No. 16,733

Claims priority, application Japan, Feb. 21, 1986, 61-38003

Int. Cl.^{5} G06F *15/20*

U.S. Cl. 364—405 7 Claims



1. An electronic cash register which an operator can operate by using a card on which at least a first password number and an operable period of time for which said register is operable have been recorded, comprising:

reading means for reading data from said card;

time indicating means for indicating the present time;

time determining means for determining whether or not the time indicated by said time indicating means is within said operable period of time read by said reading means;

means for entering a second password number;

means for determining whether or not said first password number read by said reading means has a predetermined correspondence with said second password number entered by said entering means; and

operation control means permitting said operator to operate said electronic cash register only when said determining means has determined that said first password number read by said reading means has said predetermined correspondence with said second password number read from said card by said reading means and said time determining means has determined the time indicated by said time indicating means is within said operable period of time read from said card by said reading means.

5,023,782

TRAVELERS CHEQUE TRANSACTION TERMINAL

William A. Lutz, Halesite; John B. Wright, Crestwood, both of N.Y.; Noel Moss, St. Louis, Mo., and Richard Delia, Brooklyn, N.Y., assignors to MasterCard International Inc., New York, N.Y.

Filed Mar. 26, 1990, Ser. No. 499,617

Int. Cl.^{5} G06F *15/21, 15/30*

U.S. Cl. 364—405 5 Claims

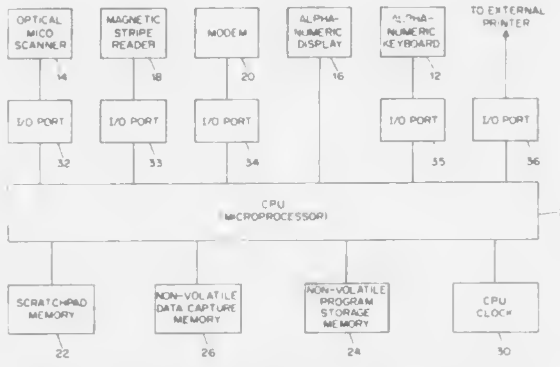
1. An electronic travelers cheque transaction terminal for use in a financial institution such as a bank for purposes of assisting in the sale, refund or encashment of travelers cheques, and used in combination with a host computer with which said terminal is connected by telephone communication lines and which provides authorization of travelers cheque transactions, comprising:

optical character recognition means for reading data from said travelers cheques being sold, encashed or refunded;

control means including a control processing unit and a control program stored in a first memory means for controlling verification of the status of said data, the receipt of authorization of the transaction upon verification of the data, and the storage of said data into second memory means upon authorization of the transaction, said control means further including means for generating a first signal when the storage of said second memory means is at capacity; and

wherein said second memory means includes two parts, the first of which stores data read from individual travelers' cheques and the second of which stores data from packaged travelers' cheques, and wherein said means for generating said first signal generates said signal when the storage of either of said parts is at capacity;

wherein said control program further controls the transmission of the contents of each of said parts of second memory means to said host computer; and



wherein said travelers cheque data is of predetermined length and includes a key check digit and said travelers cheques are sold in packages of a predetermined quantity, and wherein said second memory means has stored information representative of the predetermined length of the data to be read from said travelers cheque, the key digit and said predetermined quantity, and wherein said control program for controlling the verification of the status of said data includes means for performing a first verification test of the length of said data read by the optical character recognition means, means for performing a second verification test of the key check digit, and means for performing a third verification test of the predetermined quantity of travelers cheques sold, said tests comprising a comparison of the data read and stored information, whereby said control means generates a verification signal in the event the data read and the stored information match, and a rejection signal in the event the read and the stored information do not match.

5,023,783

EVOKED RESPONSE AUDIOMETER FOR TESTING SLEEPING SUBJECTS

Lawrence T. Cohen, and Field W. Rickards, both of Melbourne, Australia, assignors to The University of Melbourne, Victoria, Australia

Continuation of Ser. No. 270,042, Nov. 14, 1988, abandoned.

This application Jun. 8, 1990, Ser. No. 534,356

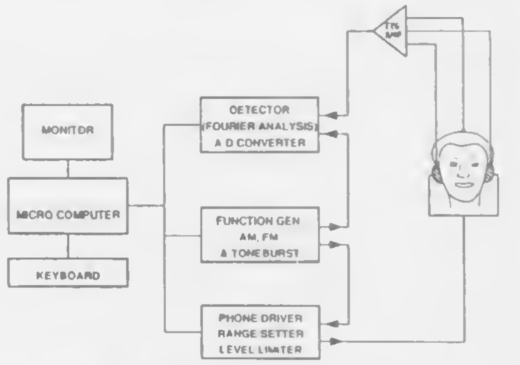
Claims priority, application Australia, Nov. 13, 1987, PI5454

Int. Cl.^{5} A61B *5/0484, 5/12*

U.S. Cl. 364—413.02 18 Claims

1. An evoked response audiometer comprising means of supplying to a sleeping patient an auditory signal consisting of a carrier frequency which is periodically modulated such that the stimulus is at least substantially frequency specific, said auditory signal being presented for a sufficiently extended period of time to enable phase-locked steady-state potentials to be evoked in the brain, means for sampling the brain potential signals evoked by said signal, and means for analysing said brain potentials to determine whether phase-locking of said brain potentials to the modulated auditory signal has occurred, said auditory signal means being controlled so that said auditory signals are periodically modulated at frequencies of at least 70 Hz, the frequency of modulation being varied in a generally increasing manner for auditory signals of higher frequencies.

12. An evoked response audiometer comprising means of supplying to a sleeping patient an auditory signal consisting of a carrier frequency which is periodically modulated such that the stimulus is at least substantially frequency specific, said auditory signal being presented for a sufficiently extended period of time to enable phase-locked steady-state potentials to be evoked in the brain, means for sampling the brain potential signals evoked by said signal, and means for analyzing said brain potentials to determine whether phase-locking of said brain potentials to the modulated auditory signal has occurred, said auditory signal means being controlled so that said auditory signals are periodically modulated at frequencies of at least 70 Hz, the frequency of modulation being varied in a generally increasing manner for auditory signals of higher frequencies;


MONITOR
MICRO COMPUTER
KEYBOARD
DETECTOR (FOURIER ANALYSIS) A D CONVERTER
FUNCTION GEN AM, FM & TONE BURST
PHONE DRIVER RANGE SETTER LEVEL LIMITER

said sampling means comprising means for multiplying said brain potential signals by said modulation frequency waveform and its quadrature component and by the waveform of the second harmonic of the modulation frequency and its quadrature component to produce product waveforms;

means for low-pass filtering said product waveforms to provide a time window which samples the brain potential for a predetermined interval to provide a set of Fourier analysis samples containing amplitude and phase data in narrow bands centered on the modulation frequency and its second harmonic.

5,023,784

METHOD FOR DIAGNOSING SERUM DEFICIENCIES

Paul Cabell, Overland Park, Kans., assignor to Doral Technical Services, Inc., Overland Park, Kans.

Filed Apr. 6, 1989, Ser. No. 334,315

Int. Cl.^{5} G06F *15/42*

U.S. Cl. 364—413.07 5 Claims

1. A method of reducing aluminum in the blood serum of a patient, said method comprising the steps of:

taking a blood serum sample from a patient;

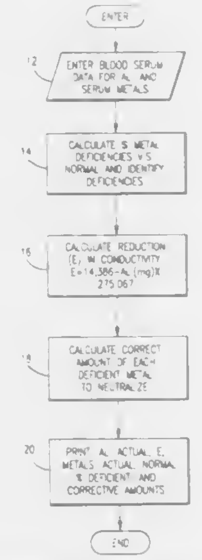
analyzing said blood serum sample for the presence of aluminum and the aluminum content thereof;

if aluminum is present in said sample, then determining the reduction in conductivity of physiological saline having the same aluminum content as said sample when aluminum presence is indicated therein;

determining the respective amounts of physiological metals required to neutralize said conductivity reduction in said

VOL
1127
ISS
2
JE
11
1991
UMI

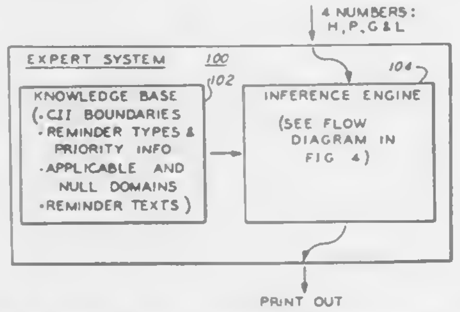
physiological saline, said amounts being representative of the respective corrective amounts of said metals needed to reduce said aluminum content in the blood serum of a patient; and


ENTER
12
ENTER BLOOD SERUM DATA FOR AL AND SERUM METALS
14
CALCULATE 5 METAL DEFICIENCIES VS NORMAL AND IDENTIFY DEFICIENCIES
16
CALCULATE REDUCTION (E) IN CONDUCTIVITY E=14,386-AL(mg)X 275.067
18
CALCULATE CORRECT AMOUNT OF EACH DEFICIENT METAL TO NEUTRALIZE
20
PRINT AL ACTUAL E, METALS ACTUAL NORMAL % DEFICIENT AND CORRECTIVE AMOUNTS
END

repeatedly administering to the patient over time a dietary supplement of at least one of said physiological metals in correspondence with said amounts required to neutralize said conductivity reduction in said saline in order to reduce the aluminum in the blood serum of the patient.

5,023,785
HEMATOLOGY - DIAGNOSIS APPARATUS EMPLOYING EXPERT SYSTEM TECHNOLOGY

Robert F. Adrion, Cary; Joan W. Curry, Durham, both of N.C., and Robert A. Levine, Guilford, Conn., assignors to Becton & Dickinson Co., Franklin Lakes, N.J.
Filed Nov. 16, 1987, Ser. No. 103,935
Int. Cl.^{5} G06F *15/42*
U.S. Cl. 364—413.08 **12 Claims**



1. An apparatus for the non-interactive, automatic interpretation of hematology results comprising:

data processing means which includes;

means for evaluating blood-derived parametric values, and

means for ascertaining a clinically important interval (CII) combination applicable to blood-derived parametric values from a listing a plural CII's and producing output messages therefrom;

memory means for storing data and data-processing instructions to be executed by the data processing means;

means for entering data which represent the values of hematology parameters derived from a patient's blood; and

means for outputting the messages of hematologic/diagnostic significance applicable to the patient;

wherein the memory means stores a data base and execution-instructions of an automatically interpreting hematology-diagnostic system which is suitable for operation upon the hematology parameters and their blood-derived values;

the data base including:

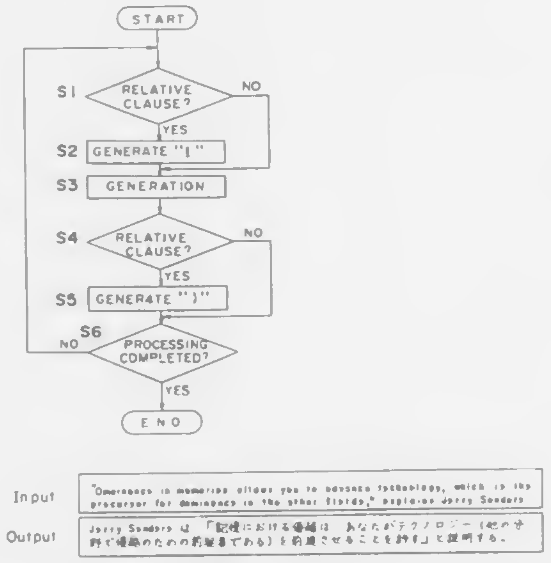
a relatively large number of messages of hematology diagnostic significance, each message being associated with a range of values for each of the hematology parameters, each range of values constituting one CII, and

a listing of the CII's within which the blood-derived parametric values may lie, the listing including a series of consecutive CII numbers and a range of values and a descriptive phrase associated with each CII;

the stored execution-instructions causing the data processing means to evaluate the blood-derived parametric values and to retrieve from the memory means the one or more messages whose CII combinations apply to the blood-derived parametric values, wherein the one or more messages are provided in a form to permit the interpretation of the hematologic condition of the patient.

5,023,786
LANGUAGE TRANSLATOR WHICH RECOGNIZES AND INDICATES PREPOSITIONAL OR INDEFINITE PHRASES AND RELATIVE CLAUSES

Shuzo Kugimiya; Hitoshi Suzuki; Yoji Fukumoshi; Ichiko Sata, all of Nara; Tokuyuki Hirai, Yamatokoriyama, and Yumi Nishida, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Sep. 7, 1988, Ser. No. 241,252
Claims priority, application Japan, Sep. 8, 1987, 62-224842
Int. Cl.^{5} G06F *15/38*
U.S. Cl. 364—419 **10 Claims**



1. A method of translating an input sentence of a source language into a target language comprising the steps of:

dividing an inputted sentence of the source language into a string of morphemes;

analyzing the string of morphemes and converting the string of morphemes into the target language;

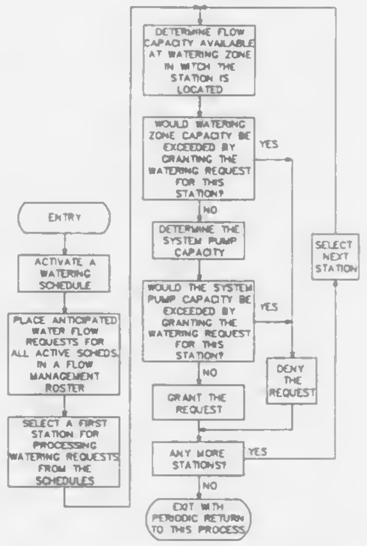
generating a translated sentence of the target language in accordance with the converted morphemes;

determining in syntactic decision means if a relative clause of nonrestrictive use or a prepositional or indefinite phrase for modifying a verb, accompanied by a comma located immediately before the prepositional or indefinite phrase, exists in the string of morphemes; and

displaying on display means said translated sentence with first and second symbols which respectively indicate the start and end of an existing relative clause or an existing prepositional or indefinite phrase as determined by said determining step.

5,023,787
IRRIGATION CONTROL AND FLOW MANAGEMENT SYSTEM

Rene H. Evelyn-Veere, Alta Loma, Calif., assignor to Rainbird Sprinkler Mfg. Corp., Glendora, Calif.
Continuation-in-part of Ser. No. 151,318, Feb. 1, 1988, abandoned. This application Feb. 6, 1989, Ser. No. 307,867
Int. Cl.^{5} A01G *25/16*
U.S. Cl. 364—420 **18 Claims**


ENTRY
ACTIVATE A WATERING SCHEDULE
PLACE ANTICIPATED WATER FLOW REQUESTS FOR ALL ACTIVE SCHEDS. IN A FLOW MANAGEMENT ROSTER
SELECT A FIRST STATION FOR PROCESSING WATERING REQUESTS FROM THE SCHEDULES
DETERMINE FLOW CAPACITY AVAILABLE AT WATERING ZONE IN WITCH THE STATION IS LOCATED
WOULD WATERING ZONE CAPACITY BE EXCEEDED BY GRANTING THE WATERING REQUEST FOR THIS STATION?
YES
NO
DETERMINE THE SYSTEM PUMP CAPACITY
WOULD THE SYSTEM PUMP CAPACITY BE EXCEEDED BY GRANTING THE WATERING REQUEST FOR THIS STATION?
YES
NO
GRANT THE REQUEST
DENY THE REQUEST
SELECT NEXT STATION
ANY MORE STATIONS?
YES
NO
EXIT WITH PERIODIC RETURN TO THIS PROCESS

12. A method of controlling an irrigation control system in accordance with an evapotranspiration (ET) level, available pump capacity and local flow constraints, the method comprising the steps of:

supplying a watering schedule having a plurality of programmed watering times for a plurality of stations;

supplying a reference ET level (ETR) that is a representative measure of the depth of water to be spread per day in an irrigation schedule;

supplying a weather ET value representative of the weather conditions currently prevailing;

adjusting the programmed watering times in the schedule by a factor proportional to the ratio (ET/ETR), whereby the watering times will be varied qualitatively in proportion to the weather ET value;

placing the watering times as flow requests in a flow management roster; and

processing the flow requests, including

granting requests based on availability of pump capacity and maintaining flow in local zones below designated maxima, and

updating the flow management roster as watering continues, to reflect the passage of time and the current total flow conditions.

5,023,788
CONTROL APPARATUS OF WORKING ROBOT TO FLATTEN AND FINISH THE CONCRETED FLOOR

Masahiro Kitazume, and Kazuya Honma, both of Yokohama, Japan, assignors to Tokyo Keiki Company Ltd., Tokyo, Japan
Filed Mar. 30, 1990, Ser. No. 502,285
Claims priority, application Japan, Apr. 25, 1989, 64-105469
Int. Cl.^{5} G05D *1/02*
U.S. Cl. 364—424.01 **7 Claims**

1. A control apparatus of a working robot to flatten and finish a concreted floor by a rotary trowel while running on the concreted floor, comprising:

running distance detecting means for detecting a running distance of the working robot;

azimuth detecting means for detecting a progressing azimuth of the working robot;

working range setting means for setting a working range of the working robot;

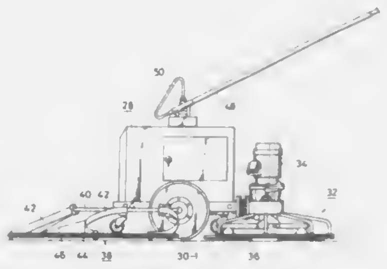
running pattern setting means for setting a zigzag running pattern in the working range by setting the progressing direction, a first turning direction, and a lap width as initial values in a state in which the working robot was positioned to a running start point in the working range;

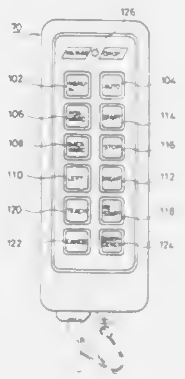
mode selecting means for selecting either one of an automatic operating mode, a manual operating mode, and a teaching mode;

automatic operation control means for running the working robot so as to trace the zigzag running pattern which was set by said running pattern setting means when the automatic operating mode was selected by the mode selecting means;

manual operation control means for running the working robot in accordance with a forward, backward, or turning operation by an operator when the manual operating mode was selected by the mode selecting means; and

teaching operation control means which is constructed in a manner such that when the teaching mode was selected by the mode selecting means, the manual operating mode is first automatically selected, and when a first straight running according to the zigzag running pattern to be set and the turning operation subsequent to the straight running were executed by the manual operation control, the straight running distance detected by the running distance detecting means and the turning direction obtained from a change in progressing azimuth detected by the azimuth detecting means are input as initial values to the running pattern setting means, thereby setting the zigzag running pattern, and after the zigzag running pattern was set, the





VOL
1127
ISS
2
JE
11
1991
UMI

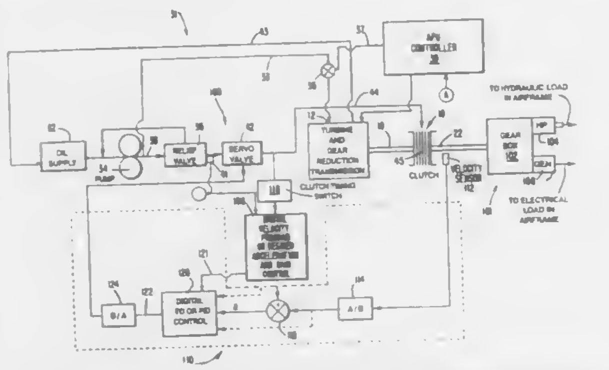
automatic operating mode is automatically selected, and the automatic operation by the automatic operation control means is started.

5,023,789

TEMPERATURE COMPENSATED CLOSED LOOP CONTROL OF A HYDRAULICALLY CONTROLLED CLUTCH AND APU STARTING SYSTEM

Steven W. Lampe, San Diego, and Kourosh Mehr-Ayin, Vista, both of Calif., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Jun. 4, 1990, Ser. No. 532,675
Int. Cl.^{5} B60K *41/04;* F16D *66/00*
U.S. Cl. 364—424.1 22 Claims


APU CONTROLLER
TO HYDRAULIC LOAD IN AIRFRAME
OIL SUPPLY
PUMP
RELIEF VALVE
SERVO VALVE
TURBINE AND GEAR REDUCTION TRANSMISSION
CLUTCH
GEAR BOX
CLUTCH TIMING SWITCH
VELOCITY SENSOR
TO ELECTRICAL LOAD IN AIRFRAME
D/A
DIGITAL PD OR PID CONTROL
A/D
110

1. A control system for a hydraulically controlled clutch for coupling a source of rotary power to a load for accelerating the load from a first velocity to a second velocity within a time interval measured from a beginning of the acceleration and ending between first and second times measured from the beginning of acceleration with the load being variable during the acceleration of the load from the first velocity to the second velocity comprising:

a source of pressurized hydraulic fluid;

a temperature sensor coupled to the hydraulic fluid which provides a temperature signal of a temperature of the hydraulic fluid;

a servo valve, having an inlet coupled to the source of pressurized fluid and an outlet coupled to the hydraulically controlled clutch, the servo valve being responsive to a control signal to vary the pressure of hydraulic fluid applied to the hydraulically controlled clutch to vary the coupling between the source of rotary power and an output shaft which is coupled to the load;

a sensor for producing a velocity signal proportional to the velocity of the output shaft;

a stored program controlling a programmed acceleration of the load from the first velocity to the second velocity within a time interval measured from the beginning of the acceleration and ending between the first and second times; and

a controller, responsive to the stored program, the velocity signal and the temperature signal, for producing the control signal which is a function of a difference between the velocity signal and a desired velocity of the output shaft during acceleration from the first velocity to the second velocity by the stored program and a gain control signal which is a function of the temperature signal.

5,023,790

AUTOMATIC GUIDED VEHICLE SYSTEM

Walter Luke, Jr., Binghamton, N.Y., assignor to WHS Robotics, Binghamton, N.Y.

Filed Feb. 17, 1989, Ser. No. 313,654
Int. Cl.^{5} G06F *15/50*
U.S. Cl. 364—424.02 27 Claims

15. An automatic guided vehicle (AGV) system being expandable by virtue of a hierarchy of command architecture, and having vehicles guided along a pathway between pick-up and delivery stations within a facility, comprising:

means defining a guide path for automatically guided vehicles, including a number of intersections;

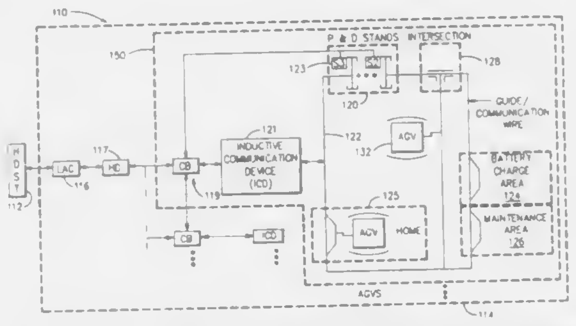
a plurality of pick-up and delivery stands disposed along said guide path;

a plurality of automatically guided vehicles for movement along said guide path, each automatically guided vehicle having an on-board computer;

a host computer for controlling and guiding the automatically guided vehicles along said guide path;

control means disposed along said guide path and operatively connected to said host computer for controlling pick-up and delivery within said plurality of pick-up and delivery stands, said control means further including a local area controller that interfaces with said host computer, and a plurality of pick-up and delivery control boxes, each pick-up and delivery control box of said plurality of pick-up and delivery control boxes disposed between said local area controller and said pick-up and delivery stands for communicating information to said host computer with respect to availability of said pick-up and delivery stands; and

traffic control mean disposed along said guide path and operatively connected to said host computer for maintaining traffic flow within each intersection.

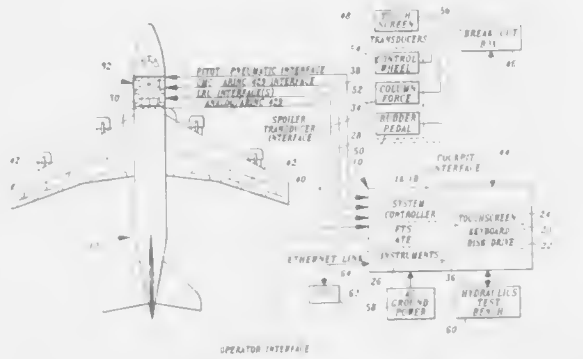


5,023,791

AUTOMATED TEST APPARATUS FOR AIRCRAFT FLIGHT CONTROLS

Garry G. Herzberg, Renton, and Robert C. Reynolds, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Feb. 12, 1990, Ser. No. 478,358
Int. Cl.^{5} G06F *15/20;* G01M *19/00*
U.S. Cl. 364—424.04 25 Claims



13. An automated test apparatus for testing a flight controls system of an aircraft, the aircraft including an onboard maintenance computer that is connected to the flight controls system and a non-volatile memory that is programmed to run onboard tests of the flight controls system, said apparatus comprising:

a system controller having memory means for storing programmed instructions that control operation of the automated test apparatus to automatically test the flight controls system and for storing flight controls system test data;

information entry means for entering information into said system controller;

output means for outputting said test data from said system controller;

instrumentation means for generating a first set of signals that are input to the flight controls system, and for monitoring a second set of signals that are produced by the flight controls system, said instrumentation means being controlled by said system controller and connected to provide digital signals to said system controller corresponding to at least some of the second set of signals; and

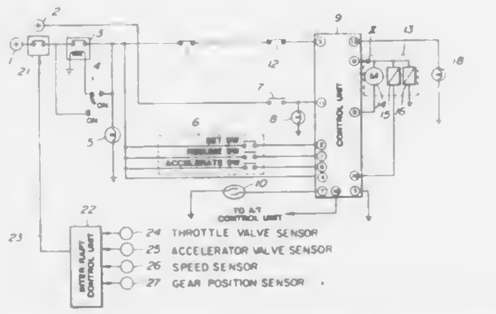
interface means connecting said system controller to at least said onboard maintenance computer, said system controller controlling the onboard maintenance computer in accordance with the programmed instructions to run the onboard tests of the flight controls system while the aircraft is on the ground, in coordination with the first set of signals generated by said instrumentation means, results of the onboard tests being conveyed through said interface means to said system controller.

5,023,792

SYSTEM AND METHOD FOR CONTROLLING VEHICLE SPEED TO CRUISE AT DESIRED SPEED FOR VEHICLE

Giichi Shioyama, Isezaki, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Mar. 29, 1989, Ser. No. 330,257
Claims priority, application Japan, Mar. 31, 1988, 63-76172
Int. Cl.^{5} B60K *31/00*
U.S. Cl. 364—426.04 14 Claims



1. A system for automatically controlling a vehicle speed to a desired cruise speed, comprising:

a) a control apparatus for controlling the vehicle to run at a target cruise speed in a feedback control mode such that an operating variable of an engine speed adjusting mechanism installed in a vehicular engine is controlled so that an actual vehicle speed coincides with the target vehicle speed,

b) first means for detecting the operating variable of the engine speed adjusting mechanism;

c) second means for detecting whether a mechanism linked to the engine speed adjusting mechanism is manipulated;

d) third means for detecting the actual vehicle speed;

e) fourth means for detecting a gear position of a vehicular transmission;

f) fifth means for detecting whether a vehicular brake mechanism is manipulated; and

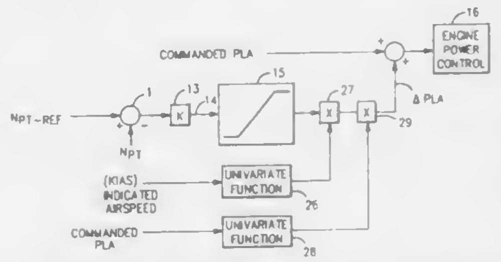
g) sixth means for determining whether any one of the following conditions is established and halting the operation of the control apparatus when determining that any one of the following conditions is established, the conditions being that (1) the vehicle speed is below a predetermined speed value, (2) the gear position of the transmission is placed in a low-speed gear range or in a reverse range, (3) the operating variable of the engine speed adjusting mechanism is small and is below a predetermined value, (4) a time for which the vehicle speed is above the predetermined speed value is continued within a predetermined time, (5) it is within a predetermined time from a time at which the gear position is placed in a neutral position to a time at which the gear position is placed in a drive range, (6) it is within a predetermined time upon the drive to produce the operating variable of the engine speed adjusting mechanism, and (7) with no operation of the mechanism linked to the engine speed adjusting mechanism and with the operation of the brake mechanism, the operating variable of the engine speed adjusting mechanism is above the predetermined value.

5,023,793

APPARATUS AND METHOD FOR DYNAMIC COMPENSATION OF A PROPELLER PITCH SPEED CONTROL GOVERNOR

Roy W. Schneider, Ellington, and David E. Leenhouts, Windsor Locks, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 10, 1989, Ser. No. 335,901
Int. Cl.^{5} B64C *27/57, 11/00*
U.S. Cl. 364—431.02 13 Claims



1. Apparatus, for improving a performance stability of a speed governor of a variable pitch control for a propeller driven aircraft having a gas turbine engine with an electronic fuel control for regulating fuel flow to the gas turbine in dependance on a set point value of a power lever angle controlled by an operator, comprising:

sensor means, for providing sensed signals indicative of turbine engine speed, aircraft air speed, and power lever angle setting;

signal summing means, for providing a turbine engine speed error signal as a difference magnitude between said turbine engine speed signal and a reference turbine engine speed signal presented thereto;

signal processing means, responsive to said turbine engine speed error signal, and having memory means for storing signals including program signals defining an executable algorithm for multiplying said turbine engine speed error signal by a proportional gain signal to provide a dynamic compensation signal; and

signal multiplying means, for presenting a fuel control signal, as a product magnitude of said air speed signal, said dynamic compensation signal, and said power lever angle signal, to the electronic fuel control to control the gas turbine engine torque and, thereby controlling propeller torque.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,794
METHOD AND APPARATUS FOR AN INTERNAL COMBUSTION ENGINE WITH LEARNING CLOSED-LOOP CONTROL

Klenk Martin, Backnang, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

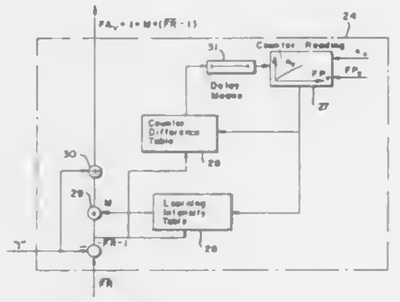
PCT No. PCT/DE88/00138, § 371 Date Nov. 28, 1989, § 102(e) Date Nov. 28, 1989, PCT Pub. No. WO89/09331, PCT Pub. Date Oct. 5, 1989

PCT Filed Mar. 4, 1989, Ser. No. 445,704

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1988, 3811263

Int. Cl.^{5} G06F *15/48;* G06G *7/70;* F02M *51/00;* F02P *5/00*

U.S. Cl. **364—431.04** 6 Claims



1. A method for learning control with precontrol for an operating variable of an internal combustion engine, the method comprising the steps of:

determining a precontrol value and correcting said precontrol value by means of an adaptation value and an output value with the adaptation values being formed from the desired values by means of logic operations utilizing corrective values;

storing counter values in a counter reading memory for a predetermined number of operating points, the counter values being a measure for the learning advancement at a particular operating point with the counter value being limited to a maximum value;

applying the counter reading from the counter reading memory and a value dependent on an actuating variable to a counter difference table and for these values, reading out a corresponding counter difference with which the counter reading is changed in the counter reading memory for the particular operating point;

applying a counter read value and a value dependent on an actuating variable to a learning intensity table and reading a corresponding learning intensity value out of the table in dependence upon the values applied;

logically combining the value dependent upon an actuating variable with the learning intensity value for forming the correction value; and,

applying the correction value to control the internal combustion engine.

5,023,795
FUEL INJECTION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE WITH COMPENSATION OF FUEL AMOUNT CONSUMED FOR WETTING INDUCTION PATH

Toshio Matsumura, and Yasutoshi Nanyoshi, both of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Feb. 16, 1989, Ser. No. 310,870

Claims priority, application Japan, Feb. 17, 1988, 63-34391

Int. Cl.^{5} F02B *3/02;* F02D *4/18;* F02M *51/00*

U.S. Cl. **364—431.06** **11 Claims**

1. A fuel injection control system for an internal combustion engine, comprising:

sensor means for monitoring an engine driving condition including an intake air flow rate in an induction system of the internal combustion engine and an air/fuel ratio of actually combustioned air/fuel mixture in a combustion chamber of said engine for providing a fuel injection control parameter signal;

control means including

a first arithmetic stage responsive to said fuel injection control parameter signal for setting a target air/fuel ratio of an air/fuel mixture to be actually introduced into said combustion chamber of said internal combustion engine on the basis of an air/fuel ratio control parameter represented by said fuel injection control parameter signal and deriving a target fuel amount necessary for establishing said target air/fuel ratio;

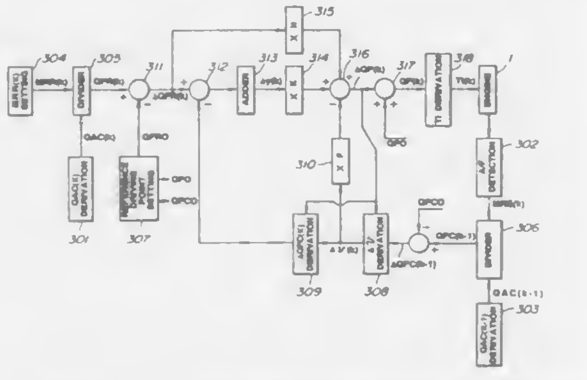
a second arithmetic stage for deriving an amount of intake air introduced into said combustion chamber on the basis of an intake air flow rate indicative parameter data;

a third arithmetic stage for arithmetically deriving a fuel amount wetting the periphery of said induction system on the basis of said introduced intake air amount and an air/fuel ratio indicative parameter data representative of air/fuel ratio of said actually combustioned air/fuel mixture;

a fourth arithmetic stage for deriving a basic fuel injection amount on the basis of basic fuel injection control parameters represented by said fuel injection control parameter signal;

a fifth arithmetic stage for arithmetically deriving a fuel amount to be introduced into said combustion chamer on the basis of said basis fuel injection amount and said fuel amount wetting the periphery of said induction system; and

a sixth arithmetic stage for comparing said fuel amount to be introduced into said combustion chamber with said target fuel amount for modifying said basic fuel injection amount so that a difference between said fuel amount to be introduced into said combustion chamber and said target fuel amount is reduced to zero and outputting a fuel injection control signal representative of the modified fuel injection amount.



5,023,796
FLIGHT CONTROL APPARATUS WITH PREDICTIVE HEADING/TRACK HOLD COMMAND

Jeffrey A. Kahler, Phoenix, Ariz., assignor to Honeywell, Inc., Minneapolis, Minn.

Filed Oct. 3, 1989, Ser. No. 416,696

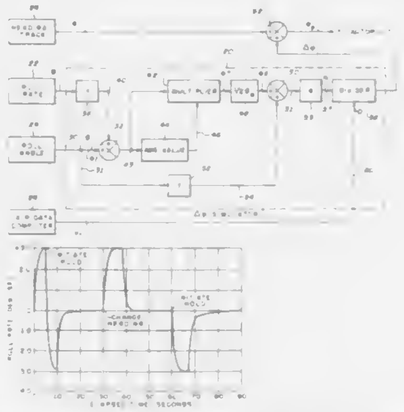
Int. Cl.^{5} G06F *15/48, 15/50;* G01C *21/00;* G05D *1/10*

U.S. Cl. **364—434** **11 Claims**

1. Flight path control apparatus for controlling an aircraft to execute a capture maneuver of a predetermined course along an exponential roll angle transition curve comprising:

means for providing a predetermined heading or track signal,

means for generating a variable heading or track signal based on signals representative of aircraft roll attitude, roll rate, and true airspeed, for maintaining said aircraft on said exponential transition curve, and means for combining said predetemined heading or track signal and said variable heading or track signal to provide a predictive heading or track command signal for controlling said aircraft to capture said predetermined course upon completion of said exponential transition in a wings level attitude.



5,023,797
RANGE MAXIMIZING, STABLE, HELICOPTER CRUISE FUEL CONSERVATION

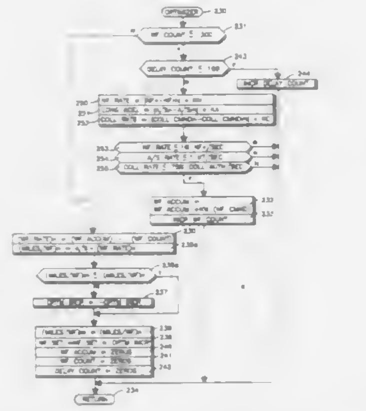
Nicholas D. Lappos, Orange, Conn.; David M. Walsh, Jupiter, Fla.; David H. Sweet, Tequesta, Fla., and Charles E. Greenberg, Jupiter, Fla., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 354,531, May 19, 1989, abandoned. This applicatioo Sep. 20, 1990, Ser. No. 587,495

The portion of the term of this patent subsequent to Oct. 11, 2001, has been disclaimed.

Int. Cl.^{5} F02L *9/08*

U.S. Cl. 364—442 2 Claims



1. A control for a helicopter engine having a free turbine for normally driving the helicopter rotors at a rated speed, comprising:

means for providing an actual speed signal indicative of the rotary speed of the free turbine;

fuel valve means for metering fuel to said engine at a rate determined by a fuel command signal applied thereto; and

fuel controlling signal processing means connected for response to said actual speed signal, for providing a reference speed signal indicative of desired rotary speed of the free turbine, for providing, in response to said actual speed signal and said reference speed signal, a speed error signal indicative of the difference in turbine speed indicated by said actual speed signal and said reference speed signal, and for providing said fuel command signal to said fuel valve means indicative of a desired fuel flow rate as a function of said speed error signal, said signal processing means responsive to said fuel command signal for, iteratively, in a sequence of successive iteration periods of time, summing a large number of samples of the fuel flow rate commanded to said valve means over a commensurate sampling period of time, the sampling period in each iteration period being separated from the sampling period of the next subsequent iteration period by a settling period, said number of samples being of an order of magnitude to substantially eliminate the effects of noise in said samples on said summation, for providing a current fuel consumption signal reflecting said summation, for providing, near the end of each of said iteration periods, a previous fuel consumption signal equal to said current fuel consumption signal after comparing the current fuel consumption signal provided in the current sampling period with the previous fuel consumption signal provided in the next previous sampling period, for providing a reference speed increment signal indicative of a small fraction of the turbine reference speed, said increment signal having a sign indicative of either an increase or a decrease in turbine speed and a magnitude small enough so that perturbations in engine speed will not unduly perturb the engine or the helicopter and large enough so that the change in reference will cause a change in fuel flow provided to the engine under helicopter flight conditions in which the engine fuel requirements indicated by said summation signal can vary as a function of turbine speed, and for providing in each iteration period, said reference speed signal as the summation of said reference speed signal with said increment signal, for changing the sign of the increment signal in any of said iteration periods in which the current fuel consumption signal indicates a greater rate of fuel consumption than said previous fuel consumption signal provided in the next previous sampling period, so that the reference speed signal is incremented, in successive iteration periods, in the same sense so long as said fuel consumption signal indicates decreased fuel consumption, but is incremented in a reverse sense in the event that said fuel consumption signal indicates increased fuel consumption;

characterized by:

said signal processing means comprising means for summing said large number of samples in sampling periods separated from the sampling period of the next prior iteration by a time period of duration sufficient to allow the engine to react to the change in said fuel command signal as a result of the change in said reference speed signal established in the next prior iteration, to allow the rotor speed and load to react to the change in the engine speed resulting from such change in fuel, to allow the helicopter attitude and speed to react to the changes in rotor speed and load, and to allow the engine to react to changes in rotor load, whereby no fuel samples are taken until the aircraft is fully settled at the engine set speed established in the prior iteration.

5,023,798
METHOD OF AND APPARATUS FOR DETERMINING A POSITION OF A LAND VEHICLE

Ernst-Peter Neukirchner, Hildesheim, and Dietmar Schlögl, Sibbesse, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE88/00332, § 371 Date Dec. 26, 1989, § 102(e) Date Dec. 26, 1989, PCT Pub. No. WO88/09916, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 4, 1988, Ser. No. 457,760

Claims priority, application Fed. Rep. of Germany, Jun. 6, 1987, 3718996

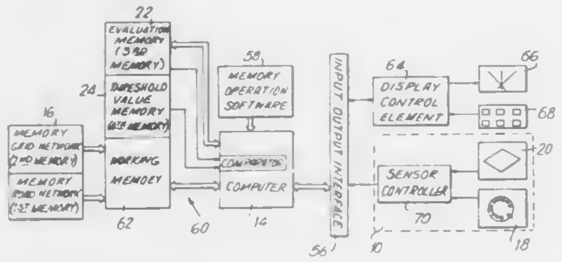
Int. Cl.^{5} G06F *15/50*

U.S. Cl. **364—449** **15 Claims**

1. A method of determining a position of a land vehicle, comprising the steps of dividing a digital road network in a plurality of meshes in a grid-like manner with each mesh containing a predetermined number of street sections that should

VOL
1127
ISS
2
JE
11
1991
UMI

not be exceeded; determining and evaluating driving data and calculating a position of the vehicle in accordance with the driving data; and correcting the calculated position of the vehicle by comparing the calculated position with possible positions of the digital road network wherein only street sections contained at least in a mesh in which the calculated position is located, are considered.


22
EVALUATION MEMORY (3RD MEMORY)
24
THRESHOLD VALUE MEMORY (4TH MEMORY)
16
MEMORY GRID NETWORK (2ND MEMORY)
MEMORY ROAD NETWORK (1ST MEMORY)
WORKING MEMORY
58
MEMORY OPERATION SOFTWARE
COMPARATOR
COMPUTER
INPUT OUTPUT INTERFACE
64
DISPLAY CONTROL ELEMENT
66
68
20
SENSOR CONTROLLER
70
62
60
14
56
10
18

5,023,799
VEHICULAR TRAVELING DIRECTION MEASURING SYSTEM

Okihiko Nakayama; Hiroshi Tsuda; Toshiyuki Itoh, and Hiroshi Ueno, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Feb. 6, 1990, Ser. No. 474,922

Claims priority, application Japan, Feb. 6, 1989, 1-27059

Int. Cl.^{5} G01C *17/38*

U.S. Cl. 364—449 **22 Claims**

16. A system comprising:

a geomagnetic sensor for sequentially deriving two directional component data of the geomagnetism around a vehicle, the two directions corresponding to said two directional component data, being orthogonal to each other on a horizontal plane;

first means for deriving a first traveling direction of the vehicle based on a direction toward a coordinate position defined by said two directional component data from a first coordinate position of a center of a corresponding output circle;

second means for deriving a variation in a traveling direction of the vehicle base on data output from a non-geomagnetic second sensor, said second sensor outputting said data without being affected by the geomagnetism around the vehicle;

third means for deriving a second traveling direction of the vehicle based on said variation derived by said second means;

fourth means for deciding whether a magnetization level on a vehicle body is shift from a first level to a second level based on said two direction component data;

fifth means for storing a first group of said two directional component data;

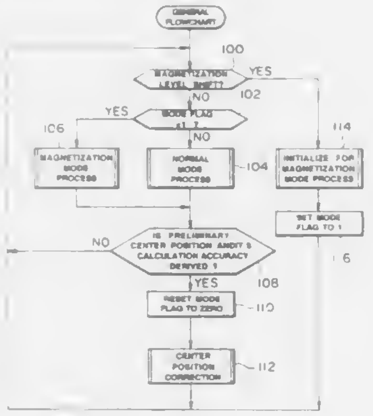
sixth means for storing a second group of said two directional component data;

seventh means for storing a third group of said two directional component data and corresponding data of said second traveling direction of the vehicle;

eighth means for deriving a second coordinate position as a preliminarily corrected value of said first coordinate position based on said first group of the data, said second coordinate position derived for said first magnetization level in response to a negative decision of said fourth means;

ninth means for deriving a third coordinate position as a preliminarily corrected value of said first coordinate position based on the data stored in said seventh means, said third coordinate position derived for said second magnetization level in response to a positive decision of said fourth means;

tenth means for deriving a first value indicative of accuracy of said second coordinate position;


GENERAL FLOWCHART
100
MAGNETIZATION LEVEL SHIFT?
YES
NO
102
MODE FLAG =1 ?
YES
NO
106
MAGNETIZATION MODE PROCESS
NORMAL MODE PROCESS
104
114
INITIALIZE FOR MAGNETIZATION MODE PROCESS
SET MODE FLAG TO 1
116
NO
IS PRELIMINARY CENTER POSITION AND IT'S CALCULATION ACCURACY DERIVED ?
YES
108
RESET MODE FLAG TO ZERO
110
CENTER POSITION CORRECTION
112

eleventh means for deriving a second value indicative of accuracy of said third coordinate position;

twelfth means for deriving a fourth coordinate position as a preliminarily corrected value of said first coordinate position based on said second group of the data, said fourth coordinate position derived for said second magnetization level when said second value is less than a first predetermined level;

thirteenth means for deriving a third value indicative of accuracy of said fourth coordinate position;

fourteenth means for deriving a fourth value which is variable depending on a variation in the magnetization level on the vehicle body;

fifteenth means for calculating a fifth coordinate position as a finally corrected value of said first coordinate position based on said second or third or fourth coordinate position and a latest value of said fifth coordinate position, said latent value derived in a prior calculation executed by said fifteenth means, by using a rate derived from said first or second or third value and said fourth value, said rate determining an amount of displacement of said fifth coordinate position between said latest value and said second or third or fourth coordinate position so as to determine a point of said fifth coordinate position between said latest value and said second or third or fourth coordinate position.

5,023,800
ASSEMBLY DATA MODEL SYSTEM

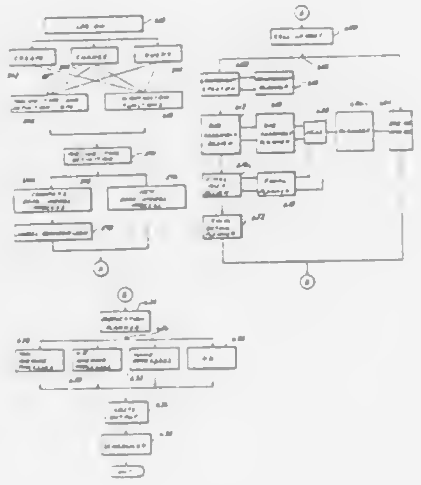
Larry L. Carver, Manhattan Beach; Charles E. Zamzow, Rancho Palos Verdes; Donald D. Mladenoff, Alta Loma, and Glenn A. Lovrien, Bellflower, all of Calif., assignors to Northrop Corporation, Hawthorne, Calif.

Continuation of Ser. No. 319,501, Mar. 6, 1989, abandoned, which is a continuation-in-part of Ser. No. 50,794, Apr. 14, 1987, abandoned. This application Oct. 17, 1990, Ser. No. 600,294

Claims priority, application Japan, Apr. 14, 1988, 63-92623

Int. Cl.^{5} G06F *15/00*

U.S. Cl. 364—474.24 **9 Claims**



1. A method of producing tools for forming and assembling an article from parts using a 3-dimensional graphics computer which comprises

generating, in said 3-dimensional graphics computer, a definition of an article to be formed at least in part by a tool, said definition generated as a graphics data set in a data base in said 3-dimensional graphics computer system,

selecting at least a portion of the definition of said article in said 3-dimensional graphics computer,

generating further data in said data base defining virtual images of component parts of tools which interact with said selected portions of said definition of said article,

downloading said further data to a means for forming parts,

operating said means for forming parts with said further data to form said component parts of tools,

assembling said component parts of said tools into tools,

operating said tools to form parts of said article generating, in said computer, from said description of said product, an assembly data model of means for forming a spatial reference system for assembling said parts of said article, and

downloading said description of said spatial reference system plurality from said computer to means forming a physical spatial reference system for assembling said article, and positioning said parts of said article in said spatial reference system for assembly.

5,023,801
PROGRAMMABLE - VOLTAGE - GENERATOR INTERFACE FOR DECREASING THE MINIMUM VOLTAGE STEP

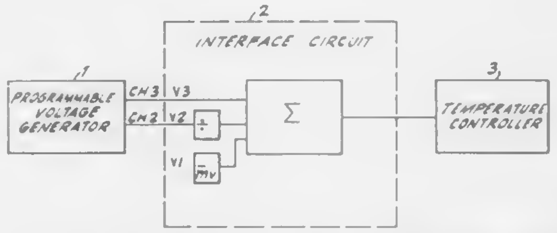
Adriano Mattera, Novara; Roberto Fornari, Parma; Renato Magnanini, Reggio Emilia; Carolo Paorici, Parma; Lucio Zanotti, Via S. Pellico, and Giovanni Zuccalli, Parma, all of Italy, assignors to Montedison S.p.A., Milan and Consiglo Nazionale Delle Ricerche, Rome, both of, Italy

Continuation of Ser. No. 867,024, May 27, 1986, abandoned. This application Mar. 15, 1989, Ser. No. 323,172

Claims priority, application Italy, May 28, 1985, 20915 A/85

Int. Cl.^{5} G06F *15/20*

U.S. Cl. 364—480 **6 Claims**



4. An interface circuit between a programmable voltage generator providing two channels variable between a minimum voltage and a maximum voltage by increments of greater than one millivolt and a voltage-responsive temperature-controlled oven for growing monocrystals, comprising:

means for obtaining a compressed voltage by dividing a first voltage from the programmable voltage generator by an attenuation factor equal to or greater than the minimum voltage increment for said first voltage;

means for obtaining a summed voltage by adding a second voltage from the programmable voltage generator to said compressed voltage; and

means for adding an inserted voltage equal in magnitude and opposite in polarity to the maximum voltage for said first voltage to said summed voltage to obtain a temperature-control voltage;

wherein the interface circuit provides incremental voltage changes in the temperature-control voltage to the voltage-responsive temperature-controlled oven of less than one millivolt responsive to incremental voltage changes from the programmable voltage generator of greater than one millivolt.

5,023,802
METHOD FOR PROCESSING INFORMATION ON CHEMICAL REACTIONS

Shinsaku Fujita, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 905,658, Sep. 11, 1986, abandoned. This application Feb. 15, 1989, Ser. No. 311,386

Claims priority, application Japan, Sep. 13, 1985, 60-203690

Int. Cl.^{5} G06F *15/20*

U.S. Cl. 364;496 **4 Claims**

1. A method for processing information on a two or more-step chemical reaction wherein individual reactions of producing at least one product from at least one starting material take place consecutively, to record and store said information in a computer system, which comprises:

topologically superposing structure of the starting material in the j-th step reaction upon that of the product in the k-th step reaction on the basis of information on the structures of the starting material and the product, wherein j and k are each a positive integer satisfying the condition of $1 \leqq j < k \leqq n$ and n is a positive integer of 2 or greater, being the total number of steps of the overall reaction;

distinguishing and classifying bonds into three categories of (1) bonds linking two nodes appearing both in the starting and product stages, (2) bonds linking two nodes appearing

VOL
1127
ISS
2
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1991
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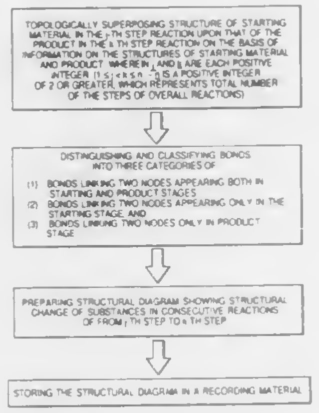
only in the starting stage and (3) bonds linking two nodes only in the product stage;

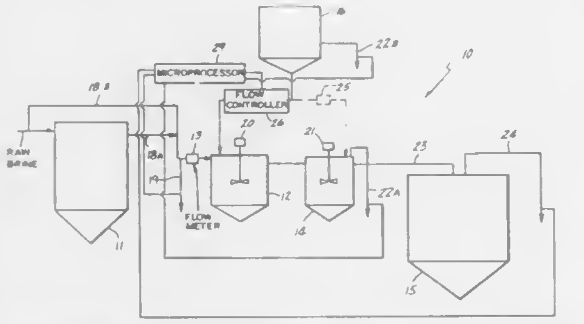

TOPOLOGICALLY SUPERPOSING STRUCTURE OF STARTING MATERIAL IN THE j-TH STEP REACTION UPON THAT OF THE PRODUCT IN THE k TH STEP REACTION ON THE BASIS OF INFORMATION ON THE STRUCTURES OF STARTING MATERIAL AND PRODUCT WHEREIN j AND k ARE EACH POSITIVE INTEGER (1 ≤ j < k ≤ n - n IS A POSITIVE INTEGER OF 2 OR GREATER, WHICH REPRESENTS TOTAL NUMBER OF THE STEPS OF OVERALL REACTIONS)
DISTINGUISHING AND CLASSIFYING BONDS INTO THREE CATEGORIES OF
(1) BONDS LINKING TWO NODES APPEARING BOTH IN STARTING AND PRODUCT STAGES
(2) BONDS LINKING TWO NODES APPEARING ONLY IN THE STARTING STAGE, AND
(3) BONDS LINKING TWO NODES ONLY IN PRODUCT STAGE
PREPARING STRUCTURAL DIAGRAM SHOWING STRUCTURAL CHANGE OF SUBSTANCES IN CONSECUTIVE REACTIONS OF FROM j TH STEP TO k TH STEP
STORING THE STRUCTURAL DIAGRAM IN A RECORDING MATERIAL

preparing a structural diagram showing structural change of substances in the consecutive reactions of from the j-th step to the k-th step; and

storing the prepared connection table in recording material.

5,023,803
PROCESS TO CONTROL THE ADDITION OF CARBONATE TO ELECTROLYTIC CELL BRINE SYSTEMS

Donald B. Loftis, and David D. Justice, both of Cleveland, Tenn., assignors to Olin Corporation, Cheshire, Conn.
Filed Apr. 10, 1989, Ser. No. 335,315
Int. Cl.^{5} G06F *15/46*
U.S. Cl. 364—497 6 Claims



1. A process to automatically control concentration of excess carbonate by addition of sodium carbonate from a sodium carbonate feed tank to an electrolytic cell brine system, the system employing at least one carbonate reactor, comprising the steps of:

(a) measuring flow rate of brine through the at least one carbonate reacto:;

(b) measuring calcium concentration in brine flowing to the at least one carbonate reactor;

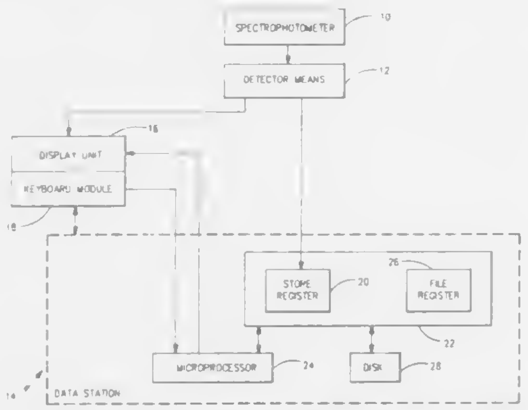
(c) measuring the sodium carbonate concentration in the sodium carbonate feed tank;

(d) adjusting sodium carbonate flow rate necessary to remove substantially all calcium impurities from the system as calcium carbonate; and

(e) automatically adjusting sodium carbonate flow rate to the at least one carbonate reactor to equal the quantity of sodium carbonate necessary to remove substantially all of the calcium impurities from the system and achieve a desired concentration of excess carbonate by repeatedly comparing the results of steps (c) and (d) above.

5,023,804
METHOD AND APPARATUS FOR COMPARING SPECTRA

Robert A. Hoult, Bethel, Coan., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.
Filed May 23, 1989, Ser. No. 355,587
Int. Cl.^{5} G01J *3/42*
U.S. Cl. 364—498 10 Claims



1. A method of analyzing spectral data from an analytical instrument including a spectrophotometer, a spectral detector receptive of spectra from the spectrophotometer, and a data station receptive of transmittance spectrum data points from the detector; the method comprising the steps of:

operating the instrument so as to generate and store first and second sets of transmittance spectrum data points for selected frequencies over a selected spectral frequency range;

establishing a set of weighting factors, each such factor being proportional to a sum of a first transmittance data point and a second transmittance data point for a selected frequency in the selected frequency range;

transforming of the first and second transmittance points respectively to sets of first and second absorbance spectrum data points;

converting at least one of the first and second sets of absorbance data points to a weighted data set by multiplying each data point in the at least one set by a corresponding weighting factor;

generating a spectral comparison factor as a normalized sum of products for each selected frequency range, each product being formed of a weighting factor squared and corresponding first and second unweighted absorbance data points; and

displaying the spectral comparison factor.

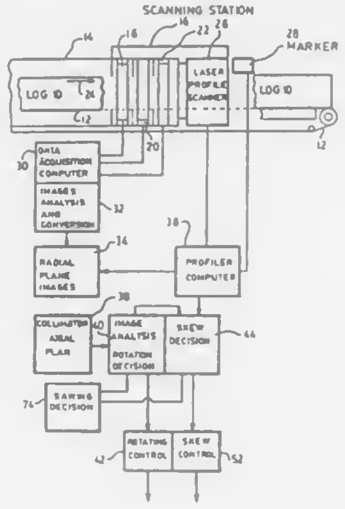
5,023,805
LOG SCANNER

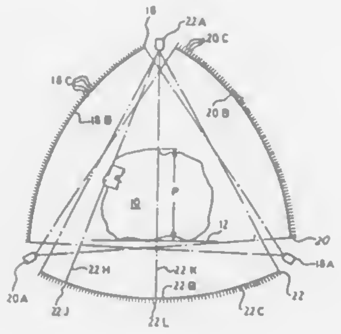
Jan E. Aune, and Peter K. L. So, both of Vancouver, Canada, assignors to MacMillan Bioedel Limited
Filed Sep. 28, 1988, Ser. No. 235,282
Int. Cl.^{5} G01N *23/06, 23/18*
U.S. Cl. 364—507 36 Claims

1. A system for analyzing a body to determine the position of elements of different density than the body within said body comprising means to relatively move said body and a density scanner means in a direction along a path of travel, said density scanner means including a plurality of sources of electromagnetic energy located adjacent to and circumferentially spaced around said path and each positioned to pass electromagnetic energy through said body in a direction transversing said path as said body and said scanner means are relatively moved on said path, a sensor means for each said source for sensing the amount of said electromagnetic energy passing through said body from its respective of said sources, each said sensor

means comprising plurality of discrete detectors arranged in circumferential side by side relationship on the opposite side of said path from its respective said source and each said detector adapted to detect the amount of radiation it receives from its respective said source thereby to provide signals of discrete values indicating the degree of attenuation of electromagnetic energy between each said discrete detector and its respective said source, means to generate an axial density signal based on radiation each said sensor detects over a length of said body as said body and said density scanner means are relatively moved, means for generating a longitudinal density plan from said axial density signals for each said sensor means, means for identifying areas representing said elements of different density in said body in each said density plan including means for separating components of said signal depicting said areas from signal components relating to geometry of said body.

27. A method of reconstruction a cross section through a body illustrating the location of elements of a different density from the body in the body comprising projecting electromagnetic energy from at least two sources through said body as it moves on a path relative to said sources, said sources being circumferentially spaced around said path, detecting the amount of such electromagnetic energy transversing said body issuing from each said source using a sensor composed of a plurality of detectors arranged in side by side circumferential relationship on the opposite side of said path from its respective of said sources to determine local densities of said body based on the amount of electromagnetic energy received by each detector and generating a projected longitudinal plan view of said local densities of said body for each said sensor, each said plan views having ares of different grey scale intensities dependent on the amount of electromagnetic energy received by said detector and representative of elements of different densities in said body, analyzing said plan views to find areas representing substantially the same size element and having end points in the same pair of spaced parallel planes substantially perpendicular to the longitudinal axis of said plan views and spaced longitudinally along said longitudinal axis thereby to define areas representing the same element in each of said plan views.

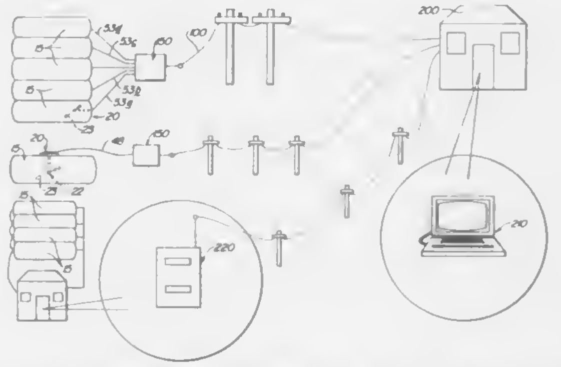




34. A method of analyzing a log to provide a rotational decision for sawing comprising determining a plurality of spaced cross sections of said log having knots positioned therein, defining a longitudinal axis of said log, applying a grey scale intensity to each knot located in each of said cross sections, projecting said grey scale intensity for said knots parallel to said longitudinal axis of said log to form a grey scale cross sectional image varying in grey scale intensity in various areas depending on the number of knot representations projected into said various areas of said image.

5,023,806
TELECOMMUNICATION SYSTEM FOR REMOTE LP GAS INVENTORY CONTROL

Naresh P. Patel, Rte. 5, Box 151P, Denton, Tex. 76201
Filed Apr. 3, 1989, Ser. No. 332,682
Int. Cl.^{5} G01F *23/38*
U.S. Cl. 364—509 14 Claims



1. Telecommunication apparatus to indicate the level of liquefied gas in a remote tank comprising: a float in the tank; magnetic field generating means; means operably connecting said float for moving said magnetic field generating means as the level of liquefied gas in the tank changes; a pair of Hall effect sensors; means securing each of said sensors outside the tank in a predetermined relationship to said magnetic field, said sensors being adapted for delivering electrical signals in response to a change in the level of liquefied gas in said tank; receiver means mounted remotely from said tank; and telecommunication means associated with said sensors and said receiver means for transmitting electrical signals from said sensors to said receiver means, said receiver means being adapted for indicating the level of liquefied gas in said tank.

5,023,807
SYSTEM AND METHOD FOR PRODUCING DISCRIMINATION NETS FOR EXPERT SYSTEMS

Kamesh Ramakrishna, Milford; Meyer Billmers, Lexington, and Daniel Theriault, deceased, late of Leominster, all of Mass. by Michael J. Theriault, administrator , assignors to Digital Equipment Corporation, Maynard, Mass.
Continuation of Ser. No. 264,696, Oct. 31, 1984, abandoned. This application Oct. 3, 1990, Ser. No. 593,400
Int. Cl.^{5} G06F *15/18*
U.S. Cl. 364—513 29 Claims

18. A method for evaluating an expression comprising conditions, the network being of a kind in which said conditions are represented by nodes and the relationships among conditions in said expression are represented by links among said nodes, said method comprising

storing information that identifies data elements having

VOL
1127
ISS
2
JE
11
1991
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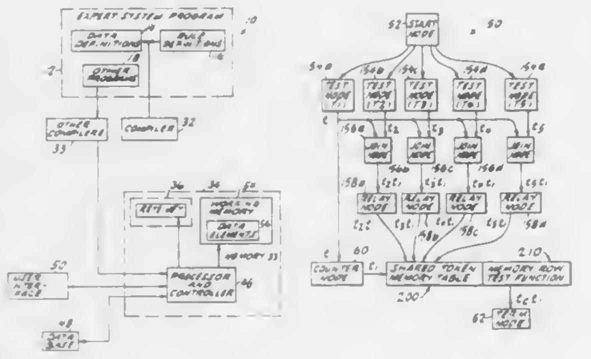
values which satisfy one or more of said conditions represented by at least some of said nodes; and

testing said stored information by applying said expression to



said stored information to determine whether a combination of data elements presented to the network have values that satisfy one or more of a plurality of combinations of said conditions.

5,023,808
DUAL-ARM MANIPULATORS WITH ADAPTIVE CONTROL

Homayoun Seraji, La Cresenta, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Continuation-in-part of Ser. No. 35,061, Apr. 6, 1987, Pat. No. 4,860,215. This application Sep. 30, 1988, Ser. No. 253,510

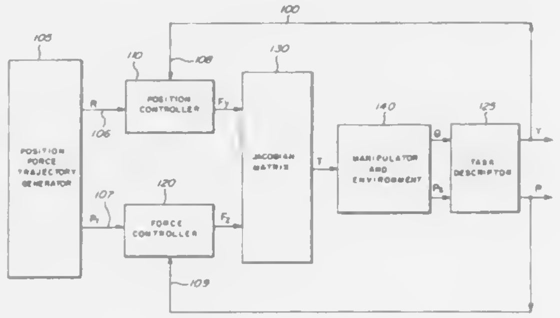
Int. Cl.^{5} G06F *15/46*

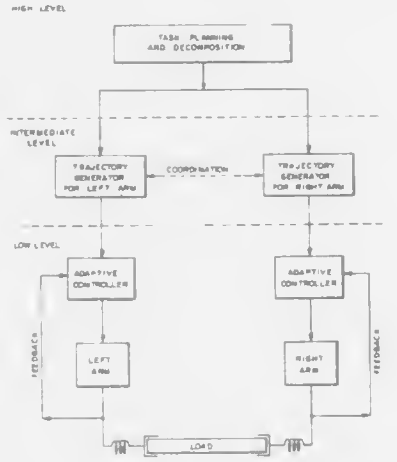
U.S. Cl. 364—513 **28 Claims**

1. In a hybrid controller adapted to issue control signals, each of which control a respective manipulator in a multi-manipulator system wherein each manipulator's position and/or force is applied in controlling a common load being acted upon in coordination by all of the manipulators of the system, the improvement comprising:

means individually associated with each of said manipulators for independently coordinating its part in controlling said load, and in so doing, introducing into the other manipulators, through the load, a cross-coupled position and/or force term; and

adaptive control means for generating a variable control signal applied to each of said manipulators, which variable control signal compensates in real-time for the intermanipulator cross-coupling terms introduced into the





other manipulators through said load as it is being acted upon by said multi-manipulator system.

5,023,809
TARGET TRACKING DEVICE

Kerry P. Spackman, and Henry A. Whale, both of Auckland, New Zealand, assignors to Precision Technology Inc., Newark, N.J.

Continuation of Ser. No. 265,692, Nov. 1, 1988, abandoned. This application Jun. 19, 1990, Ser. No. 541,089

Claims priority, application New Zealand, Feb. 2, 1987, 222404

Int. Cl.^{5} G06F *15/50;* **H04N** *7/18*

U.S. Cl. 364—516 **7 Claims**

1. A target tracking system comprising:

an oscillator on a target;

a radio transmitter operatively connected to said oscillator whereby a radio signal representative of a signal generated by said oscillator is transmitted by said transmitter at a selected frequency;

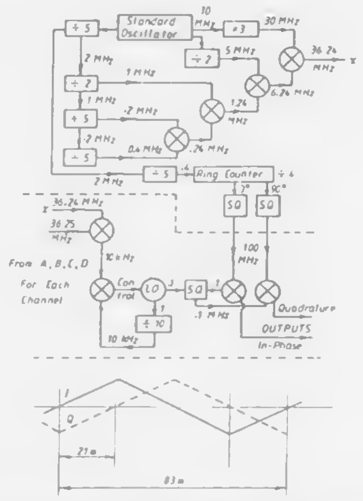
means for translating whereby the transmitted radio signal is received and retransmitted to a base receiving station;

said base receiving station also receiving said transmitted radio signal directly from said transmitter;

said base receiving station including a reference oscillator;

processing means at said base receiving station to enable synchronicity to be maintained between said reference oscillator and the oscillator on said target;

and comparing means connected to said processing means to compare phase changes in the signal received directly from said transmitter and signals retransmitted by said means for translating with a signal generated by said reference oscillator, thereby tracking position parameters



of the target relative to the means for translating and the base receiving station.

5,023,810
IMAGE LABEL UPDATING DEVICE USING SERIALLY CONNECTED MODULES

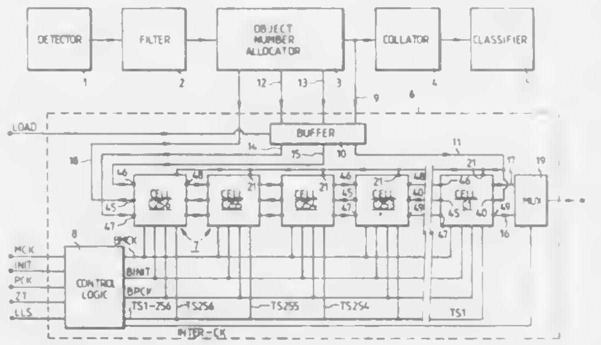
Geoffrey M. Briant; Alistair McDonald; Peter Cockings, and Vijay Dhokia, all of Hertfordshire, England, assignors to British Aerospace Public Limited Company, London, England

Continuation of Ser. No. 292,062, Dec. 30, 1988, abandoned. This application Mar. 20, 1990, Ser. No. 497,764

Claims priority, application United Kingdom, Dec. 31, 1987, 8730363

Int. Cl.^{5} G09G *1/00;* **G06F** *15/00*

U.S. Cl. 364—518 **8 Claims**



1. A digital signal processing device comprising:

a plurality of first storage elements connected in series for storing respective ones of a plurality of first digital signals representing old information from a signal source which is to be replaced;

a plurality of second storage elements connected in series for storing respective ones of a plurality of second digital signals representing new information from said signal source which is to replace said old information;

a plurality of third storage elements connected in series to form a series of third elements for receiving a stream of third digital signals representing current information, for storing respective ones of the third signals and for passing each stored third signal on to a next adjacent storage element in the series of third elements so the stream of signals is shifted through the series of third elements;

comparison means connected to said first and third storage elements for sensing correspondence of values of signals stored by the first and third elements to determine that said current information represents old information; and

switch means, controlled by the comparison means and connected to said second and third storage elements, for changing values of said third digital signals stored in the third elements to have the values of said new information in the second elements when a correspondence is detected.

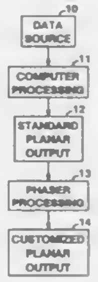
5,023,811
METHOD AND APPARATUS FOR SELECTIVELY PROCESSING PAGINATED OUTPUT

Kim F. Donnelly, and Kurt A. Gluck, both of Piscataway, N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Continuation of Ser. No. 257,218, Oct. 13, 1988, abandoned. This application Jun. 11, 1990, Ser. No. 535,991

Int. Cl.^{5} G06F *15/40*

U.S. Cl. 364—518 **6 Claims**



1. In a data processing system producing a plurality of reports each comprising a plurality of pages, each said page comprising a plurality of lines of output text data, a post-processor for such text data comprising

means for selectively identifying two dimensional patterns of pluralities of portions of said lines of text data,

means for storing said patterns, and

means utilizing said stored patterns for processing said pages to produce modified additional reports,

said means for selectively identifying comprising

means for generating patterns to be matched to identify first portions of said pages,

means for generating starting and ending line and column specifications to identify second portions of said pages, and

means for representing said first portions and said second portions of said pages in a common format.

5,023,812
PRINTING WITH A LIMITATION OF LAYER THICKNESS AND OF TONAL-VALUE INCREASE

Nikolaus Pfeiffer, Heidelberg, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Apr. 24, 1990, Ser. No. 513,929

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1989, 3913382

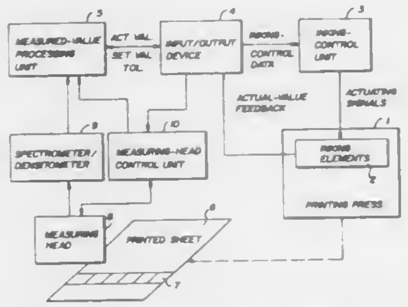
Int. Cl.^{5} G06K *15/00*

U.S. Cl. 364—519 **13 Claims**

1. Control system for inking a printing press wherein a sheet printed by the printing press is measured photoelectrically in a plurality of test areas and thus-obtained measured values are processed in conjunction with setpoint values to form control data, based upon which the inking of the printing press is controlled, which comprises computing a tonal-value increase (Z) at an actual locus (ACT) and at a setpoint locus (SET) from at least one measured value of a half-tone field and of a full-tone field of a printed sheet; if the tonal-value increase (Z) at the setpoint locus (SET) is not a tolerable tonal-value in-

VOL
1127
ISS
2
JE
11
1991
UMI

crease (ZSET±ZTOL), determining corresponding tolerance limits of ink layer thickness (Smax, Smin) for a maximum and a minimum tolerable tonal-value increase (ZSET+ZTOL and ZSET−ZTOL); with the ink layer thickness (Smax, Smin), computing a possible locus (POSS1) at the limit of the tolerable tonal-value increase (ZSET+ZTOL and ZSET−ZTOL, respectively) as a new setpoint locus (SET1), and triggering the setpoint locus (SET1), if it is additionally within a color tolerance (ETOL) and density tolerance (DVTOL), respectively.



5,023,813

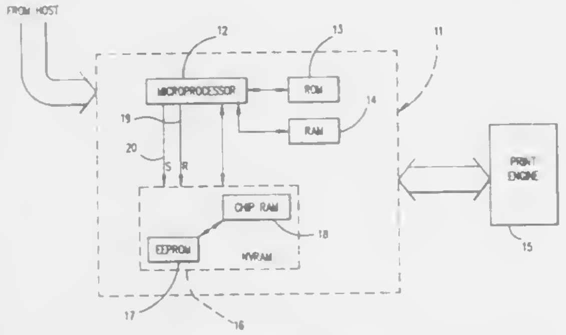
NON-VOLATILE MEMORY USAGE

John K. Brown, III, Lexington, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 3, 1989, Ser. No. 389,028

Int. Cl.^{5} G06K *15/00*

U.S. Cl. 364—519 6 Claims



1. A page printer controller comprising:
- a non-volatile memory including a control block portion and a data portion;
- means for storing data in the data portion of the non-volatile memory at a location indicated by the value of a pointer in the control block portion of the non-volatile memory;
- means for determining if data has not been stored accurately in the non-volatile memory; and
- means for changing the value of the pointer in the control block portion of the non-volatile memory if data has not been stored accurately in the non-volatile memory to thereby change the location in the data portion of the non-volatile memory indicated by the pointer in the control block portion, the means for storing data being operable to store data that was not stored accurately at the location indicated by the changed value of the pointer in the control block portion of the non-volatile memory.

5,023,814

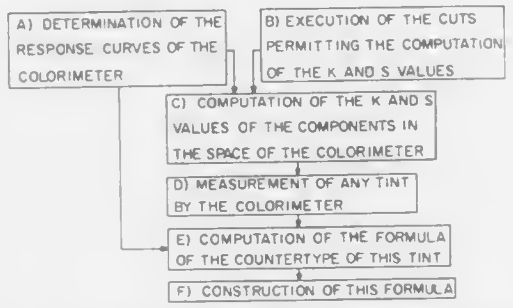
METHOD AND APPARATUS FOR COUNTERTYPING A TINT FROM A COLLECTION OF BASE TINTS

Jean-Pierre H. B. Guillemin, 2a, rue Henri Barbusse, 51100 Reims, France

Continuation-in-part of Ser. No. 919,262, Sep. 30, 1986, abandoned. This application Aug. 11, 1989, Ser. No. 392,651

Int. Cl.^{5} G01N *21/25*

U.S. Cl. 364—526 12 Claims


A) DETERMINATION OF THE RESPONSE CURVES OF THE COLORIMETER
B) EXECUTION OF THE CUTS PERMITTING THE COMPUTATION OF THE K AND S VALUES
C) COMPUTATION OF THE K AND S VALUES OF THE COMPONENTS IN THE SPACE OF THE COLORIMETER
D) MEASUREMENT OF ANY TINT BY THE COLORIMETER
E) COMPUTATION OF THE FORMULA OF THE COUNTERTYPE OF THIS TINT
F) CONSTRUCTION OF THIS FORMULA

1. A method for counterplying an original tint by formulation of a composition made from a collection of basic tints, without measuring a reflectance curve of the original tint to be countertyped, comprising:
- forming a first file including values of spectral trichromatic components x(λ), y(λ), and z(λ) supplied by the C.I.E. and including a characteristic response curve of a colorimeter which will be used for measuring the sample to be countertyped,
- forming a second file of K and S values of the basic tints,
- calculating, from these two files and thereby subject to said characteristic response curve, values of three characteristics, functions of the trichromatic components X, Y and Z, for each basic tint,
- measuring, by colorimetry, the trichromatic components X, Y and Z of the sample to be countertyped, from which the trichromatic coordinates x, y and z of the tint of this sample are obtained,
- determining, from the first file and from the values obtained by the colorimetric measurement, the same three characteristic values for the tint to be countertyped, and
- by successive approximations, determining a mixture of at least four basic tints, including white and black, which have the same three characteristic values equal to those of the tine to be countertyped, within admitted tolerances, and
- mixing said at least four basic tints in proportions determined,
- whereby a mixture is created will match the original tint sample.

5,023,815

METHOD AND APPARATUS FOR REGISTERING COLOR FILM SEPARATIONS

Monti R. Wilson, 7906 W. 99th St., Overland Park, Kans. 66212, and Gerard G. R. Medioni, 1833 Hillsboro Ave., Los Angeles, Calif. 90035

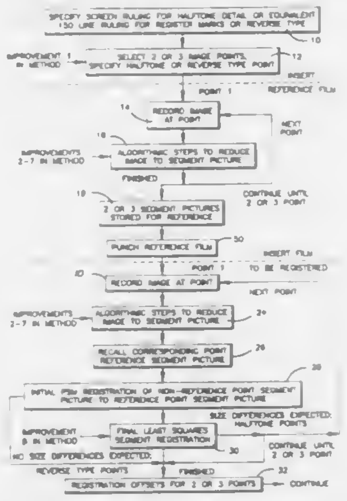
Filed Aug. 4, 1989, Ser. No. 389,855

Int. Cl.^{5} H04N *5/253*

U.S. Cl. 364—526 16 Claims

1. In a method of registering a pair of color separation films containing macroscopic edges which align when the films are registered, the steps of:
- selecting one of the films as a reference film;
- recording first, second and third pictures of the reference film containing macroscopic edges and centered at spaced apart first, second and third locations, respectively;
- recording fourth, fifth and sixth pictures of the other film containing macroscopic edges and centered at locations on the other film which approximately correspond to but

may be offset from the respective first, second and third locations;
- extracting from said first and fourth pictures the locations of corresponding macroscopic edges on the reference film and on the other film;
- extracting from said second and fifth pictures the locations of corresponding macroscopic edges on the reference film and on the other film;
- extracting from said third and sixth pictures the locations of corresponding macroscopic edges on the reference film and on the other film; and
- determining the offset between the edge locations on the reference film and the corresponding edge locations on the other film to thereby determine the positional adjustment of the other film necessary for registration with the reference film.


SPECIFY SCREEN RULING FOR HALFTONE DETAIL OR EQUIVALENT 150 LINE RULING FOR REGISTER MARKS OR REVERSE TYPE
10
IMPROVEMENT 1 IN METHOD
SELECT 2 OR 3 IMAGE POINTS. SPECIFY HALFTONE OR REVERSE TYPE POINT
12
INSERT
POINT 1
REFERENCE FILM
14
RECORD IMAGE AT POINT
NEXT POINT
IMPROVEMENTS 2-7 IN METHOD
ALGORITHMIC STEPS TO REDUCE IMAGE TO SEGMENT PICTURE
FINISHED
2 OR 3 SEGMENT PICTURES STORED FOR REFERENCE
CONTINUE UNTIL 2 OR 3 POINT
PUNCH REFERENCE FILM
INSERT FILM TO BE REGISTERED
RECORD IMAGE AT POINT
NEXT POINT
RECALL CORRESPONDING POINT REFERENCE SEGMENT PICTURE
INITIAL FSM REGISTRATION OF NON-REFERENCE POINT SEGMENT PICTURE TO REFERENCE POINT SEGMENT PICTURE
SIZE DIFFERENCES EXPECTED: HALFTONE POINTS
IMPROVEMENT 8 IN METHOD
FINAL LEAST SQUARES SEGMENT REGISTRATION
30
CONTINUE UNTIL 2 OR 3 POINT
NO SIZE DIFFERENCES EXPECTED: REVERSE TYPE POINTS
FINISHED
32
REGISTRATION OFFSETS FOR 2 OR 3 POINTS
CONTINUE

5,023,816

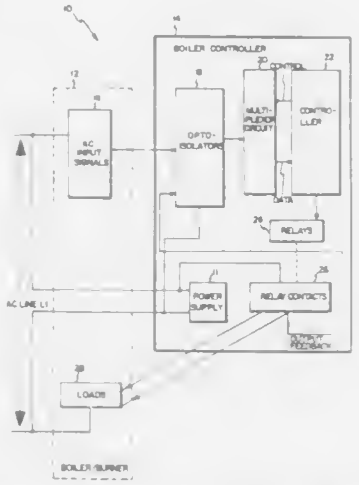
METHOD AND APPARATUS FOR CONDITIONING AC INPUT SIGNALS

Paul B. Patton, Rockford, and Kenneth B. Kidder, Coon Rapids, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 27, 1989, Ser. No. 303,340

Int. Cl.^{5} G06F *15/46;* F23N *5/00*

U.S. Cl. 364—550 33 Claims



1. A method for conditioning an AC input signal to control a system having a plurality of AC input signals representing senses parameters in the system, and a plurality of loads for the system, said loads comprising control means, where an AC system is substantially phase-synchronous with the AC input signal, the method for conditioning each AC input signal comprising the steps of:
- receiving the AC input signal from a sensor system;
- sampling the AC input signal to determine whether it is present or absent a plurality of times during a periodic half cycle of the AC system signal;
- determining and recording a result value for the AC input signal representing the presence of the AC input signal where the AC input signal is present a majority of times that it is sampled and representing the absence of the AC input signal where the AC input signal is absent the majority of times it is sampled during the periodic half cycle of the AC system signal;
- outputting a signal encoding an output value consistent with said result value to said control means; and
- controlling the system with said control means consistent with said result value.

5,023,817

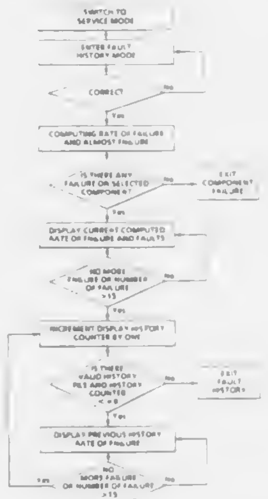
JAM HISTORY AND DIAGNOSTICS

Lai C. Au, Webster; John W. Schaben, Farmington; Robert G. Hamer, Canandaigua, and Larry H. Banks, Henrietta, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 6, 1989, Ser. No. 319,392

Int. Cl.^{5} G06F *11/30*

U.S. Cl. 364—550 5 Claims


SWITCH TO SERVICE MODE
ENTER FAULT HISTORY MODE
CORRECT
COMPUTING RATE OF FAILURE AND ALMOST FAILURE
DISPLAY CURRENT COMPUTED RATE OF FAILURE AND FAULTS
INCREMENT DISPLAY HISTORY COUNTER BY ONE
DISPLAY PREVIOUS HISTORY RATE OF FAILURE
NO MORE FAILURE OR NUMBER OF FAILURE >15

1. A method of storing and displaying information for predicting jams in a reproduction machine having a plurality of components including an operator console and touch sensitive display screen comprising the steps of:
- activating a switch to display a diagnostic and service mode on the display screen,
- entering a fault history mode at the operator console to display a table of machine fault histories, the fault histories including the number of actual faults and the number of amost faults of selected components,
- computing the rate of failure based on the number of failures and the number of almost failures relative to the number of opportunities to fail of said components,
- displaying the computed rate of failure for selected components on the display screen since the last service period, and
- displaying the history of previous computed rates of failure for previous service periods for selected components.

VOL
1127
ISS
2
JE
11
1991
UMI

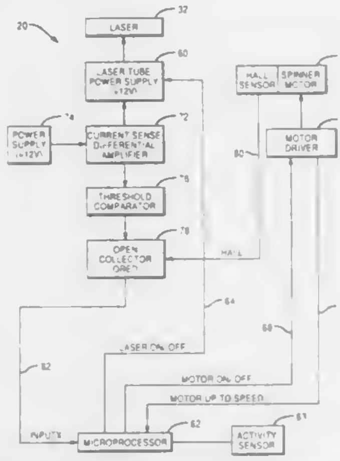
5,023,818
LASER SCANNER SAFETY APPARATUS AND METHOD

Christopher J. Wittensoldner; John K. Burkey, and Denis M. Blanford, all of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Sep. 21, 1989, Ser. No. 410,685

Int. Cl.^{5} G06K *7/10;* **G08B** *23/00*

U.S. Cl. 364—551.01 **8 Claims**



1. Record media scanning apparatus, comprising:
a laser for providing a scanning beam;
laser power supply means for providing power to drive said laser;
a motor for driving a movable element forming part of said scanning apparatus, said motor having sensing means associated therewith for sensing the speed of operation of said motor and for providing an output signal which varies in accordance with the speed of said motor;
motor driver means for driving said motor;
detection means coupled to said laser power supply means for detecting when said laser is operating and providing an output signal which varies in accordance with whether or not said laser is operating;
logic means coupled to said detection means and to said sensing means of said motor and capable of producing a logical output signal which is dependent upon the output signals from said detection means and said sensing means of said motor;
microprocessor means for controlling said laser power supply means and said motor driver means coupled to said logic means;
laser operating signal coupling means coupled to said microprocessor means and to said laser power supply means; and
motor operating signal coupling means coupled to said microprocessor means and to said motor driver means;
whereby said microprocessor means is capable of controlling the operation of said motor and said laser power supply means in accordance with the logical output signal received from said logic means.

5,023,819
LINEAR SHAPED FILTER

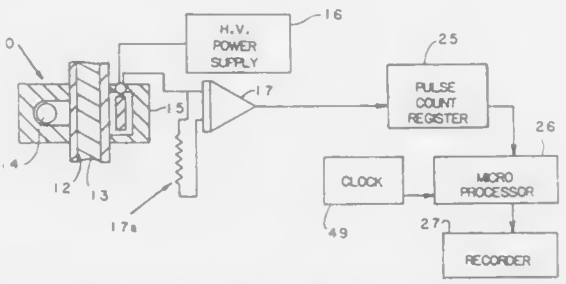
Alan J. Pitts, Comanche, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Jun. 2, 1989, Ser. No. 360,510

Int. Cl.^{5} G01N *7/00;* **G06G** *7/12*

U.S. Cl. 364—558 **13 Claims**

1. An apparatus utilized by a radiation detection system, comprising:
tubular means for conveying a fluid therethrough;
a radioactive source means, disposed adjacent said tubular means, for emitting radiation having random intensity over a relatively short period of time and a constant intensity over a relatively long period of time;
detection means, disposed diametrically opposite said radiation source means and adjacent said tubular means, for detecting said radiation, and for converting said radiation into electrical signals, said radiation being absorbed by said fluid based upon a density thereof and the radiation detected being a function of the fluid density;
timing means for sampling said electrical signals for a specific time period; and



computer means for processing said sampled electrical signals by filtering said electrical signals and by adjusting the present detected density value relative to the previous density value, said computer means utilizing a weighting factor based upon the absolute value of a difference between an average frequency of an initial group of sampled electrical signals, said difference being divided by the product of a standard deviation of said initial average frequency and a dampening factor capable of varying the speed by which said computer means processes said sampled electrical signals.

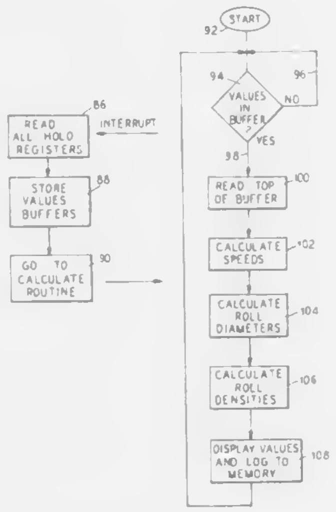
5,023,820
SYSTEM FOR MONITORING ROLL DENSITY

Scott A. Baum, Rockton, Ill., assignor to Beloit Corporation, Beloit, Wis.

Filed May 10, 1989, Ser. No. 349,629

Int. Cl.^{5} G06F *15/20*

U.S. Cl. 364—562 7 Claims



1. In combination with a computer which is programmed to compute paper web density, in response to an interrupt signal, of a paper roll from angular rotation of the roll as a web of paper is unwound from an unwind roll engaged and guided by a center drum and wound on a windup roll, apparatus comprising:
a first encoder coupled to the center drum and operating to produce first pulses upon each revolution of the center drum;
first counting means connected to said computer and to said first encoder for counting said pulses and producing an interrupt signal for the computer each time said first counting means reaches a predetermined count;
a second encoder coupled to the windup roll and operating to produce second pulses upon each revolution of the windup roll;
second counting means connected to said first counting means and to said second encoder, said second counting means counting said second pulses and being reset upon occurrence of the interrupt pulses; and
a register connected to said second counting means for storing the current count thereof upon occurrence of an interrupt signal and connected to the computer to be read after the occurrence of an interrupt signal.

5,023,821
DIGITAL FILTER OPERATING AT INTERMEDIATE FREQUENCY

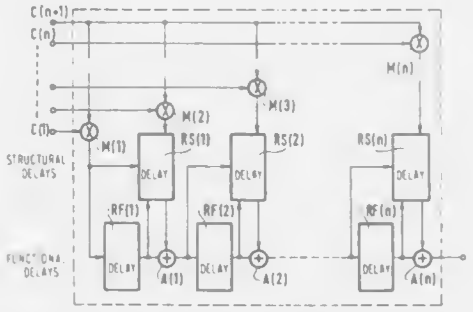
Lazare Argintaru, Le Pre Saint Gervais; Daniel Arnassand, Cachan, and Philippe Leclair, Antony, all of France, assignors to Alcatel Thomson Faisceaux Hertziens, Cedex, France

Filed Mar. 28, 1988, Ser. No. 173,963

Claims priority, application France, Mar. 26, 1987, 87 04218

Int. Cl.^{5} H04B *1/16, 3/06;* **H03H** *17/00*

U.S. Cl. 364—602 **8 Claims**



1. A digital filter operating at intermediate frequency, said digital filter comprising a transverse filter having coefficients, a recursive filter having coefficients, a storage device for storing the different coefficients of the two filters, a D-A conversion device situated at the output of said storage device, an addressing device for addressing said storage device and control means for controlling said addressing device, wherein each of said transverse and recursive filters includes a plurality of inputs including at last input and comprises:
a plurality of functional delay elements;
a plurality of adders connected in series with said functional delay elements, an adder being disposed at the output of each functional delay element;
a plurality of structural delay elements;
a plurality of multipliers each having first and second inputs with the first input receiving one of said plurality of filter inputs and the second input receiving the last input of the respective filter, each structural delay element having a first input connected to the output of the multiplier of immediately higher rank M(i+1), a second input connected to the input of the functional delay element of the same rank and a third input connected to the output of said functional delay element of the same rank, and having an output connected to the second input of the adder of the same rank, and a first of said plurality of multipliers having its output connected to the input of a first of said functional delay elements.

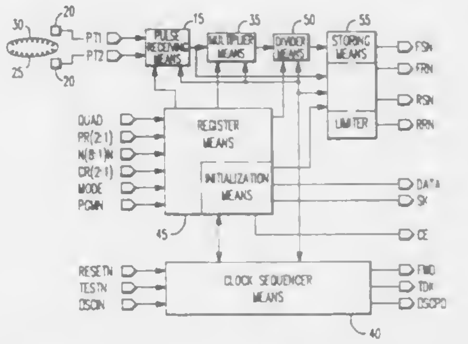
5,023,822
PULSE RATIO SYSTEM

John C. Schlotterer, 3479 Ivy La., Murrysville, Pa. 15668; Paul M. Johnston, 8900 Brookstone Ct., Raleigh, N.C. 27611; Mark F. Rusnak, P.O. Box 625, Irwin, Pa. 15642; Lawrence T. Pillage, 405 Smokey Wood Dr., Pittsburgh, Pa. 15218, and Thomas M. Byrd, Jr., 903 Washington St., Cary, N.C. 27511

Filed Oct. 31, 1988, Ser. No. 264,582

Int. Cl.^{5} G06F *15/20, 15/22, 7/68*

U.S. Cl. 364—703 **6 Claims**



1. A programmable system connectable to receive pulses representing a pattern on a rotatable disk comprising:
pulse receiving means for receiving the pulses, for detecting a direction of rotation of the disk and for providing motion signals in dependence upon said detecting;
register means for receiving control parameters, for storing said parameters and for providing a plurality of parameter outputs responsive to said control parameters;
ratio means for receiving said motion signals and for providing ratio signals responsive to said motion signals and to a ratio of a first group of said parameter outputs to a second group of said parameter outputs; and
output means for providing output drive signals responsive to said ratio signals and in accordance with a third group of said parameter outputs and said direction of rotation detected by said pulse receiving means.

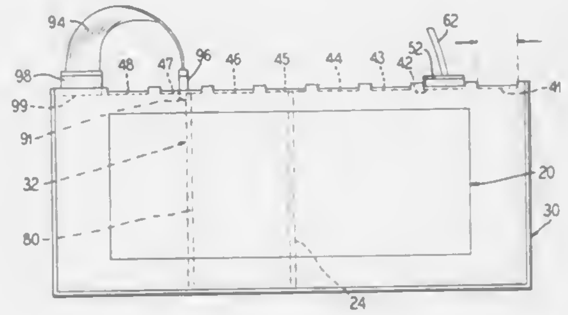
5,023,823
MULTIPLE CHANNEL COMMUNICATIONS SYSTEM AND PACKAGING CONFIGURATION THEREFOR

Keith K. Cargin, Jr., and George E. Hanson, both of Cedar Rapids, Iowa, assignors to Norand Corporation, Cedar Rapids, Iowa

Continuation of Ser. No. 928,916, Nov. 7, 1986, abandoned. This application Jun. 28, 1988, Ser. No. 212,435

Int. Cl.^{5} G06F *1/00, 13/00;* **H05K** *7/02*

U.S. Cl. 364—708 14 Claims



1. In a multichannel communications system, (a) a host processor console having a communications board on edge therein with at least four communications circuits, (b) a distribution enclosure means constructed to rest on top of said host processor console, and having a width to fit essentially within the lateral confines of said host processor console, (c) said

VOL
1127
ISS
2
JE
11
1991
UMI

distribution enclosure means having a series of communications ports along an edge thereof, for coupling with respective communications lines, and having connector means for coupling with signals to be transmitted to and from the respective communications ports, (d) said distribution enclosure means having distribution paths therein extending between said connector means and respective ones of said series of communications ports such that the communications circuits on said communications board of said console can be connected with the respective communications ports of said distribution enclosure means via said connector means, and (e) an electric cable extending between said communications board and said connector means of said distribution enclosure means for coupling the respective communications circuits with the respective distribution paths of said distribution enclosure means, (f) said distribution enclosure means comprising a flat rectangular housing in stacked relation on said console and fitting essentially within a space defined by a vertical extension of the lateral margins of the console, said flat rectangular housing having a thickness in a vertical direction which is small in comparison to the height of said host processor console, so that a further device stacked on top of the flat rectangular housing is conveniently assessable to the user of the console.

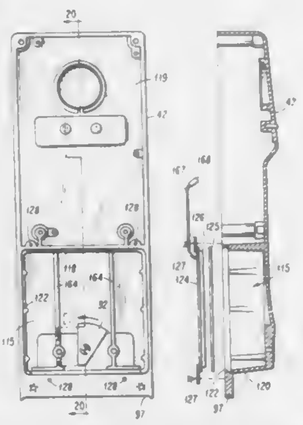
5,023,824
HAND-HELD COMPUTERIZED DATA COLLECTION TERMINAL WITH INDENTED HAND GRIP AND CONFORMING BATTERY DRAWER

George E. Chadima, Jr., Sarasota, Fla.; Darald R. Schultz, Cedar Rapids, Iowa; Jeffrey S. Krunnfusz, Cedar Rapids, Iowa, and William T. Gibbs, Cedar Rapids, Iowa, assignors to Norand Corporation, Cedar Rapids, Iowa

Continuation-in-part of Ser. No. 406,822, Sep. 7, 1989, Pat. No. 4,953,113, which is a continuation of Ser. No. 104,653, Oct. 2, 1987, abandoned. This application Feb. 9, 1990, Ser. No. 478,591

Int. Cl.⁵ G06F *1/00*

U.S. Cl. 364—708 15 Claims



1. A hand-held, portable data terminal housing assemblage comprising:

a housing having an elongate, substantially rectangular shape of a predetermined width and height, an upper portion of the housing supporting a visual display and a keyboard, and a contoured lower portion of the housing having a central surface portion displaced inwardly with respect to the substantially rectangular shape of the housing, and side surfaces having central surface portions sloping toward such displaced surface portion, the inwardly displaced and sloping surface portions forming a central grip conforming portion adjacent and between outer end portions of the housing;

a battery compartment formed within one of the end portions of the lower, contoured portion of the housing adjacent said grip conforming portion, the battery compartment including within the housing an interior cross wall and a shelf, the one end portion of the lower portion of the housing having an opening into the battery compartment, the battery compartment extending from the opening longitudinally of the housing into the housing to the interior cross wall, the shelf disposed within the one end portion of the housing, the shelf defining an inner wall of the battery compartment, extending between the cross wall and the opening in the one end portion of the housing and comprising means for sealing off the battery compartment from the remainder of the space enclosed by the housing; and

a plurality of contact terminals disposed within the battery compartment adjacent the interior cross wall of the battery compartment.

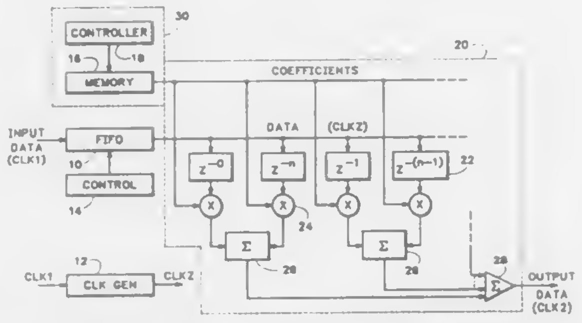
5,023,825
COEFFICIENT REDUCTION IN A LOW RATIO SAMPLING RATE CONVERTER

Ajay K. Luthra, Beaverton, and Ganesh Rajan, Portland, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Continuation of Ser. No. 379,850, Jul. 14, 1989, abandoned. This application Aug. 20, 1990, Ser. No. 569,598

Int. Cl.⁵ G06F *15/31*

U.S. Cl. 364—724.10 2 Claims



2. An apparatus for converting an input signal sampled at a first rate to an output signal sampled at a second rate, the ratio between the rates being close to one, comprising:

means for calculating a plurality of sets of filter coefficients, each set of filter coefficients corresponding to one of a plurality of bins into which each sampling interval for the input signal is divided;

means for storing samples of the input signal, the samples being input to the storing means at the first rate and being read out from the storing means at the second rate; and

means for applying the sets of filter coefficients to the samples read out from the storing means, the set of filter coefficients applied to each sample being determined by the bin into which the sample falls, the number of sets of filter coefficients being substantially less than the number of samples output per sampling interval of the input signal, to produce the output signal.

5,023,826
APPARATUS FOR SKIPPING ARITHMETIC CALCULATIONS INVOLVING LEADING ZEROS

Shirish Patel, Waltham, Mass., assignor to Bull HN Information Systems Inc., Billerica, Mass.

Filed Jan. 11, 1990, Ser. No. 464,504

Int. Cl.⁵ G06F *7/00*

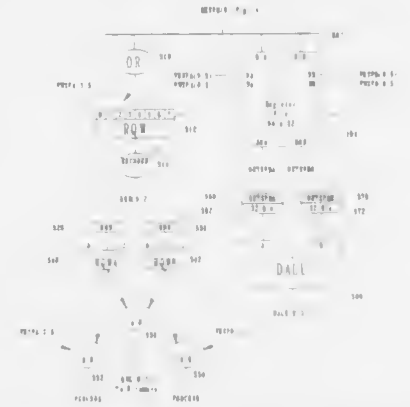
U.S. Cl. 364—736 6 Claims

1.In a digital computer having an ALU for performing arithmetic computation upon pairs of operands, a memory means connected to the ALU and organized as addressable words for storing operands, where an operand occupies a number of contiguous words, and fetching means for presenting the operands for storage in the memory means a word at a time, least significant word first,

apparatus for bypassing computation of those word positions of operands which contain no significant digits in either operand of the pair, comprising:

OR gate means connected to the fetching means for determining whether an operand word contains non-zero digits;

first register means operatively connected to the OR gate means for storing the number of words containing significant digits in a first operand of the pair;



second register means operatively connected to the OR gate means for storing the number of words containing significant digits in the second operand of the pair;

comparator means for determining an index number equal to the greater of the first register means contents and the second register means contents; and

means for terminating computation after one more than said index number of word positions have been computed.

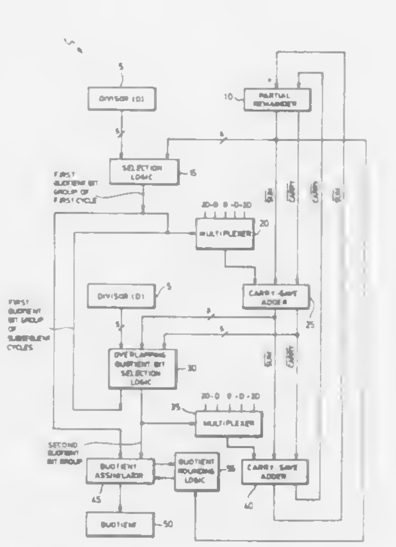
5,023,827
RADIX-16 DIVIDER USING OVERLAPPED QUOTIENT BIT SELECTION AND CONCURRENT QUOTIENT ROUNDING AND CORRECTION

Theodore H. Kehl, Seattle, and David N. Cutler, Bellevue, both of Wash., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Aug. 18, 1988, Ser. No. 233,378

Int. Cl.⁵ G06F *7/38*

U.S. Cl. 364—744 5 Claims



1. Apparatus for selecting a pair of quotient bits in division of a dividend by a divisor D, comprising:

(a) a multi-bit divisor register in which is loaded the divisor D;

(b) a multi-bit partial remainder register in which is initially loaded the dividend, said partial remainder register (1) having an input in a sum-and-carry-form from a carry-save adder and (2) having a sum output and a carry output;

(c) an assimilation adder having as inputs the sum output and the carry output of the partial remainder register, and having as an output an assimilated partial remainder;

(d) selection logic (1) having as inputs (i) the five most significant bits of the divisor register and (ii) the six most significant bits of the assimilated partial remainder, and (2) having an output of two quotient bits defining one of the numbers −2, −1, 0, +1, and +2;

(e) a multiplexer (1) having as data inputs the divisor D multiplied respectively by −2, −1, 0, +1, and +2, (2) having as a control input on the output of said selection logic, and (3) having as an output the said data input whose value is equal to the number defined by the control input multiplied by the divisor D; and

(f) a carry-save adder having (1) as inputs (i) the sum output and the carry output of the partial remainder register and (ii) the output of the first multiplexer, and (2) having as an output a partial remainder in said sum-and-carry form.

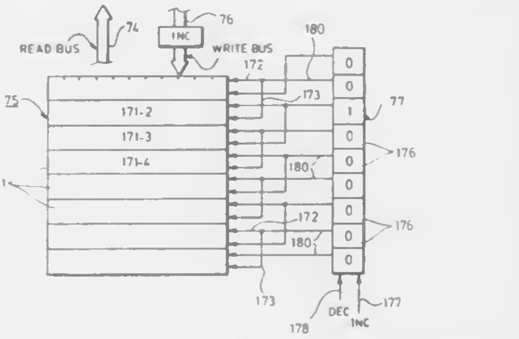
5,023,828
MICROINSTRUCTION ADDRESSING IN HIGH-SPEED CPU

William J. Grundmann, Westborough; William C. Madden, Lexington, and George M. Uhler, Marlborough, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jul. 20, 1988, Ser. No. 221,946

Int. Cl.⁵ G06F *9/24, 9/22*

U.S. Cl. 364—900 19 Claims



9. A memory stack of the type having a plurality of registers and having a stack pointer which may be incremented or decremented, said memory stack being part of digital apparatus having repetitive operating cycles, comprising:

means for unconditionally, in each operating cycle, writing from a write bus to the register of said stack pointed to by said stack pointer plus one,

means for unconditionally, in each operating cycle, copying to a read bus the contents of the register of said stack pointed to by said stack pointer,

and means for, in each operating cycle, conditionally dependent upon a control input generated in said digital apparatus, either incrementing said stack pointer, or decrementing said stack pointer, or neither incrementing nor decrementing said stack pointer.

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VOL
1127
ISS
2
JE
11
1991
UMI

5,023,829

DATA TRANSFER SYSTEM HAVING A CHANNEL ADAPTER WITH VARYING DATA TRANSFER LENGTHS

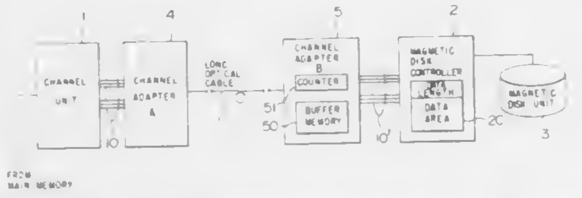
Yoshikazu Shibata, Minamiashigara, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 29, 1988, Ser. No. 226,277

Claims priority, application Japan, Sep. 11, 1987, 62-226613

Int. Cl.^{5} G06F *13/12*

U.S. Cl. 364—900 **4 Claims**



1. In a data transfer system for transferring data between a data producing unit and a data storing medium, wherein an adapter unit is connected between said data producing unit and a storing medium control unit and said storing medium control unit is connected to said data storing medium, a data transfer method comprising the steps of:

- transmitting a command signal from said data producing unit, said command signal including an instruction portion designating an operation of storing data and an information portion specifying a length of said data;
- receiving said command signal transmitted by said data producing unit at said storing medium control unit, said storing medium control unit then supplying the length of said data from said information portion of the command signal to said adapter unit;
- storing the length of said data in said adapter unit;
- requesting a transfer of data of said data producing unit by said adapter unit, said requested data having a length the same as the length stored in said adapter unit;
- transferring said requested data from said data producing unit to said adapter unit in response to the requesting of a transfer of data;
- storing said transferred data in said adapter unit;
- reading out the data stored in said adapter unit under command of said storing medium control unit;
- storing the data read out of said adapter unit in said storing medium control unit; and
- transferring the data stored in the storing medium control unit to the data storing medium.

5,023,830

Patent Not Issued For This Number

5,023,831

INTELLIGENT DISK DRIVE HAVING CONFIGURABLE CONTROLLER SUBSYSTEM PROVIDING DRIVE-STATUS INFORMATION VIA HOST-COMPUTER EXPANSION BUS

Carl Bonke, Rancho Santa Margarita, and Han Jen, Diamond Bar, both of Calif., assignors to Western Digital Corporation, Irvine, Calif.

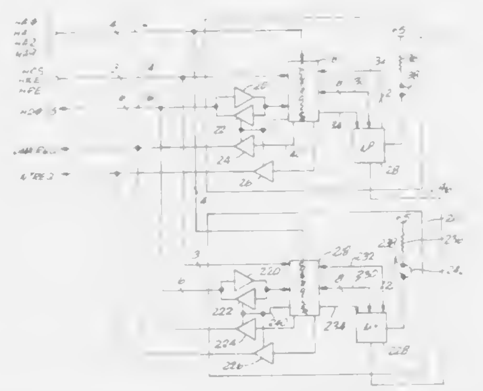
Continuation of Ser. No. 220,536, Jul. 18, 1988, abandoned. This application Apr. 17, 1990, Ser. No. 511,957

Int. Cl.^{5} G06F *13/12*

U.S. Cl. 364—900 **10 Claims**

1. A controller subsystem for incorporation with a disk drive in an intelligent disk drive unit that connects to a host computer via a host computer expansion bus to which a second intelligent disk drive unit may optionally be connected, the expansion bus including address and data lines, and an interconnect line, the host computer applying a common address to the address lines in the course of each of a plurality of sequences in which the host computer sends drive-selection information to identify a single disk drive, the controller subsystem comprising:

- a microprocessor;
- peripheral-controller means including register means for storing drive-status information to be sent to the host computer;
- bus means connecting the microprocessor to the peripheral controller means, the microprocessor providing binary-valued operation control signals to the peripheral controller means via the bus means;
- controllable bus-driver circuit means for selectively sending the stored status information from the register means to the host computer via the expansion bus;
- the peripheral controller means further including latching means for latching the binary-valued operation-control signals, and gating means responsive to the latched operation-control signals for controlling the controllable bus-driver circuit means;
- means connected to the interconnect line for carrying a first configuration-defining signal to the microprocessor;



- configurable means for providing a second configuration-defining signal to the microprocessor to designate a selected disk-drive identification number for the disk drive that is incorporated with the controller subsystem in the intelligent disk drive unit;
- the microprocessor causing a first operation-control signal to have a first value only upon receipt of the first configuration-defining signal, and causing a second operation-control signal to have a value depending upon the second configuration-defining signal;
- the gating means being responsive to the first operation-control signal having a second value for selectively disabling the controllable bus-driver circuit means depending on the value of the second operation-control signal, and being responsive to the first operation-control signal having the first value for enabling the controllable bus-driver circuit means to provide said drive-status information irrespective of the value of the second operation-control signal.

5,023,832

METHOD OF MAINTAINING ASYNCHRONOUS REAL-TIME DATA

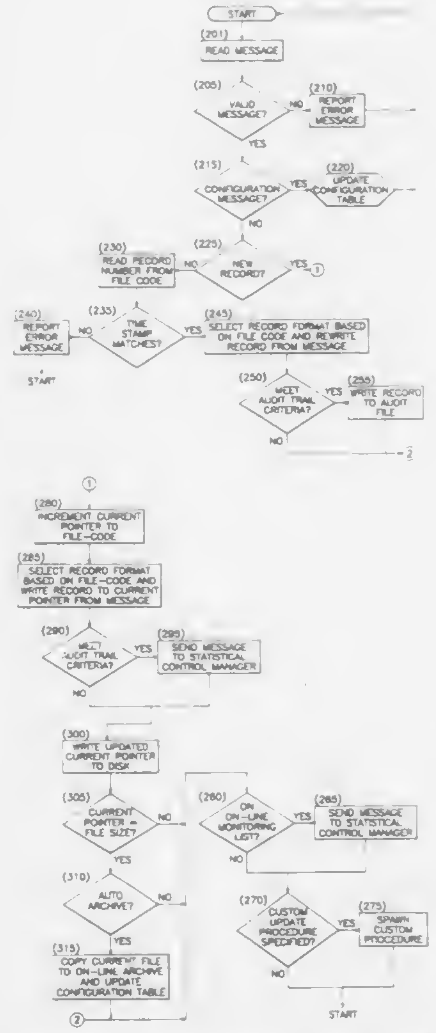
Leonard S. Fulcher, Jr., Peoria, and Richard R. Galbraith, Tempe, both of Ariz., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 12, 1989, Ser. No. 295,962

Int. Cl.^{5} G06F *15/46, 15/74*

U.S. Cl. 364—900 **9 Claims**

1. In a process control system for controlling a plant process, said process control system having a network which includes a plurality of modules, each module performing a predetermined function independent of each other, the modules including at least one history module, and at least one application module, said modules being linked via a medium such that each module can communicate with every other module of the network, said network interfacing with a control subsystem which interfaces with control elements of the plant process, the control elements having associated therewith process data, wherein the process data includes data values and event data, and wherein total data includes process data, data calculated from the process data, off-line data, and external data, and further wherein each module operates independently of each other on at least one predetermined data set associated therewith, wherein each data set includes predetermined data from the total data which is shared in other predetermined data sets and which is unique within the data set, said data sets of each module being stored in a storage device of said history module in response to a request from any of the modules, there being included a software control module which coordinates the requests from the modules and controls the writing of the data sets in the storage device such that any of said modules desiring to write any data makes requests to said software control module via messages, said messages being queued by said software control module, wherein said requests by each of said modules are inputted asynchronously to said software control module, and wherein said message includes data and information identifying the data set including data set identifier, new/-update command, time, record number, and validation code, each predetermined data set having a corresponding logical data file allocated in said storage device, a method for managing the data files comprising the steps of:


START
(201)
READ MESSAGE
(205)
VALID MESSAGE?
NO
YES
(210)
REPORT ERROR MESSAGE
(215)
CONFIGURATION MESSAGE?
YES
NO
(220)
UPDATE CONFIGURATION TABLE
(225)
NEW RECORD?
YES
NO
①
(230)
READ RECORD NUMBER FROM FILE CODE
(235)
TIME STAMP MATCHES?
(240)
REPORT ERROR MESSAGE
START
(245)
SELECT RECORD FORMAT BASED ON FILE CODE AND REWRITE RECORD FROM MESSAGE
(250)
MEET AUDIT TRAIL CRITERIA?
(255)
WRITE RECORD TO AUDIT FILE
2
①
(280)
INCREMENT CURRENT POINTER TO FILE-CODE
(285)
SELECT RECORD FORMAT BASED ON FILE-CODE AND WRITE RECORD TO CURRENT POINTER FROM MESSAGE
(290)
MEET AUDIT TRAIL CRITERIA?
(295)
SEND MESSAGE TO STATISTICAL CONTROL MANAGER
(300)
WRITE UPDATED CURRENT POINTER TO DISK
(305)
CURRENT POINTER = FILE SIZE?
(260)
ON ON-LINE MONITORING LIST?
(265)
SEND MESSAGE TO STATISTICAL CONTROL MANAGER
(310)
AUTO ARCHIVE?
(270)
CUSTOM UPDATE PROCEDURE SPECIFIED?
(275)
SPAWN CUSTOM PROCEDURE
(315)
COPY CURRENT FILE TO ON-LINE ARCHIVE AND UPDATE CONFIGURATION TABLE
②
START

- a) queuing the messages received from said modules;
- b) processing the messages to determine if a new record is to be written in said storage device, said processing being performed by the software control module, and if a new record is to be written, proceeding to step (c), otherwise proceeding to step (d);
- c) writing the new record in a next available adjacent logical record of the data file specified in the message, said record including the predetermined data of the data set, and further wherein said new record having added thereto time data indicating the real time of said process data of said new record, then proceeding to step (e);
- d) updating the record requested via the message with the selected portions of said data set as specified by the message; and
- e) repeating the processing, beginning at step (a).

5,023,833

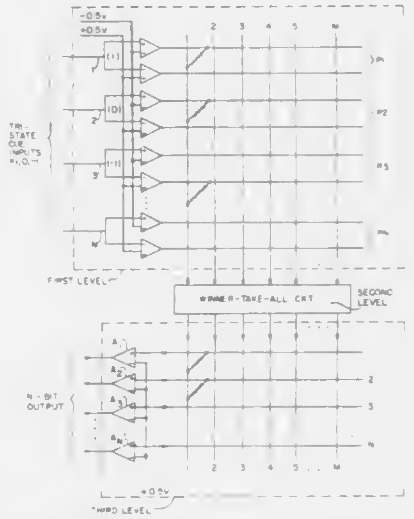
FEED FORWARD NEURAL NETWORK FOR UNARY ASSOCIATIVE MEMORX

Eric B. Baum, Pasadena, Calif.; John E. Moody, New Haven, Conn., and Frank A. Wilczek, Cambridge, Mass., assignors to California Institute of Technology, Pasadena, Calif., by said Eric B. Baum

Filed Dec. 8, 1987, Ser. No. 130,207

Int. Cl.^{5} G11C *15/00*

U.S. Cl. 365—49 **11 Claims**

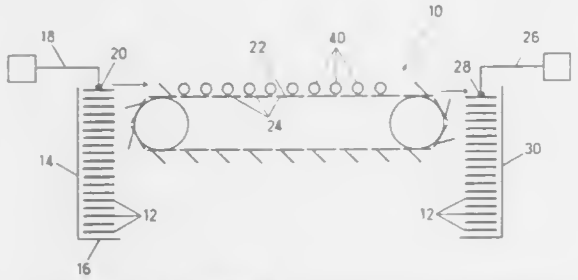


1. An associative content addressable memory comprising

- a matrix of input and output conductors, and means for making connections from input conductors to output conductors, thereby storing vectors of information on each output conductor, each vector stored being defined by a pattern of connection elements from said input conductors to one of said output conductors,
- means for applying cue signals to input conductors corresponding to as many signals as are known of a pattern of a vector sought to be recovered from said matrix, thereby producing on each output conductor an analog summation signal having an amplitude corresponding to the number of cues matched,
- unary output means responsive to said output signals of all output conductors for producing a single output signal on one terminal of an array of output terminals, whereby said one output terminal corresponds to the output conductor having the largest number of cues matched, and
- means responsive to each of said single output signals for converting each of said single output signals as they occur to a desired code of the vector recalled from storage in said matrix of conductors corresponding to each of said single output signals.

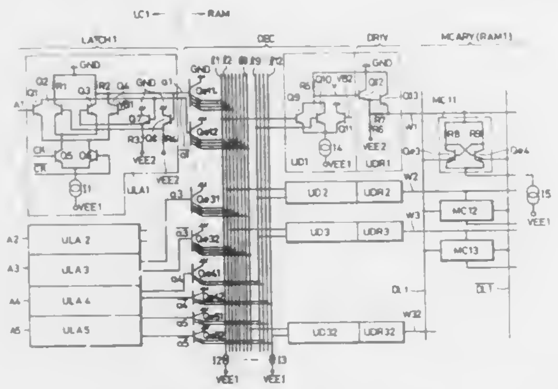
VOL
1127
ISS
2
JE
11
1991
UMI

5,023,834
AUTOMATED EPROM AND EEPROM READING, ERASING, AND WRITING SYSTEM
John D. Wiedemer, 930 West Forest Drive, Houston, Tex. 77079
Filed Sep. 23, 1988, Ser. No. 249,347
Int. Cl.⁵ G11C *13/00*
U.S. Cl. 365—52 **13 Claims**



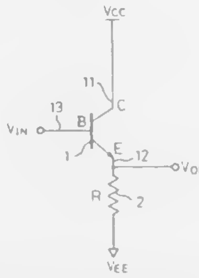
1. A system for processing EPROM modules comprising:
(a) a conveyor having a circuitous series of links, a plurality of the links having formed in them receptacles into which the modules are inserted, the conveyor moving the links from a first point to a second point so that the modules are moved from the first point to the second point;
(b) an electrode attached to each of the receptacles, each of the electrodes forming an electrical connection with one of the modules when the modules are inserted into receptacles;
(c) a head positioned proximate to the conveyor between the first point and the second point and positioned so that the head momentarily contacts with the electrode of each of the receptacles, the head processing each of the modules in succession through the electrical connection in the links as the conveyor moves the links past the head.

5,023,835
SEMICONDUCTOR MEMORY SYSTEM FOR USE IN LOGIC LSI'S
Kazuhiro Akimoto, Tokorozawa; Katsumi Ogiue, Hinode, and Takeo Uchiyama, Oume, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Continuation of Ser. No. 13,550, Feb. 11, 1987, abandoned. This application May 10, 1989, Ser. No. 351,044
Claims priority, application Japan, Feb. 19, 1986, 61-32955
Int. Cl.⁵ G11C *7/00, 11/411, 11/415*
U.S. Cl. 365—155 **18 Claims**



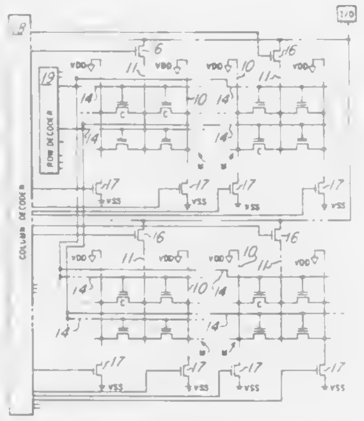
1. A memory system formed on a single semiconductor substrate comprising:
a memory section having decode means for decoding a pair of complementary address signals;
a latch circuit means having a bipolar transistor for delivering said pair of complementary address signals to said decode means; and
first and second lines coupled between said decode means of said memory section and said latch circuit for transmitting said pair of complementary address signals from said latch circuit to said decode means of said memory section,
wherein said latch circuit receives a plurality of address signals Al-AN, and wherein said latch circuit includes a plurality of unit latch circuits, each of which unit latch circuits respectively receives an individual one address signal Al-AN, and each of which unit latch circuits includes means for converting the received one of said address signals into a pair of said complementary address signals, and
wherein each of said unit latch circuits is comprised of a first differential transistor pair having a first bipolar transistor and a second bipolar transistor, wherein a base of the first bipolar transistor is coupled to receive one of said address signals Al-AN, and wherein a base of the second bipolar transistor receives a predetermined reference voltage, wherein each of said unit latch circuits further comprises a second differential transistor pair having a third bipolar transistor and a fourth bipolar transistor, each having bases coupled to receive feedback signals from outputs of said unit latch circuits, and wherein each of said unit latch circuits further comprises means for selectively operating either said first differential pair or said second differential pair.

5,023,836
SEMICONDUCTOR MEMORY DEVICE
Toshihiko Mori, Ishara, Japan, assignor to Fujitsu Limited, Kawasaki, Japan
Filed Jul. 18, 1989, Ser. No. 381,768
Claims priority, application Japan, Jul. 20, 1988, 63-179156
Int. Cl.⁵ G11C *11/40*
U.S. Cl. 365—174 **15 Claims**



1. A semiconductor memory device comprising:
a first power supply line;
a second power supply line;
an input terminal;
a transistor having first, second and third semiconductor layers, first, second and third electrodes respectively coupled to said first, second and third layers, and a superlattice structure between said second and third layers, said superlattice structure including first and second barrier layers and at least one quantum well layer having a subband therein and provided between said first and second barrier layers, said first electrode being operatively connected to said first power supply line, said second electrode being operatively connected to said second power supply line, and said third electrode being operatively connected to said input terminal, said transistor exhibiting a negative differential resistance characteristic with respect to the flow of current between said first layer and said second layer relatively to the voltage between said third layer and said second layer, whereby when minority carriers are injected from said second layer to said third layer through said sub-band, the energy level of the bottom of the conduction band formed between said third layer and said first layer is lower than the energy level specified by said injected minority carriers, said transistor correspondingly having two different, stable operating states and being selectively operable to maintain a selected one of said two different, stable operating states;
a resistor connected between said second power supply line and said second electrode at corresponding connection portions; and
an output terminal connected to the connection portion between said second power supply line and said second electrode, said device producing an output at said output terminal corresponding to the selected, maintained stable operating state of said transistor.

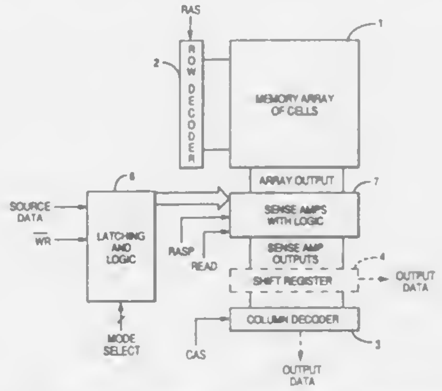
5,023,837
BITLINE SEGMENTATION IN LOGIC ARRAYS
John F. Schreck, Houston, and Debra J. Dolby, Missouri City, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed Sep. 5, 1989, Ser. No. 402,402
Int. Cl.⁵ G11C *11/40*
U.S. Cl. 365—185 **23 Claims**



12. A memory array comprising:
a plurality of rows and columns of modules, each of said modules including a plurality of rows and columns of memory cells and a plurality of wordlines, each of said memory cells having a control electrode, a first electrode, and a second electrode, each of said wordlines coupled to the control electrodes of the memory cells in a respective one of said rows of memory cells; and
a row decoder for simultaneously selecting one of said plurality of wordlines in each of said modules.

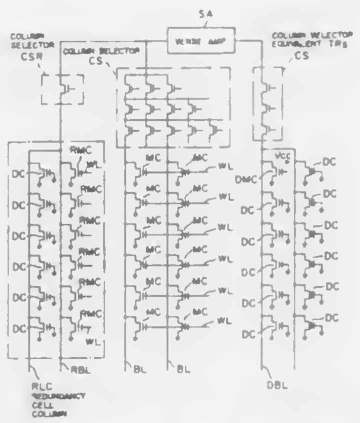
5,023,838
RANDOM ACCESS MEMORY DEVICE WITH INTEGRAL LOGIC CAPABILITY
Brian K. Herbert, Colorado Springs, Colo., assignor to NCR Corporation, Dayton, Ohio
Filed Dec. 2, 1988, Ser. No. 279,606
Int. Cl.⁵ G11C *7/00, 11/413, 7/06*
U.S. Cl. 365—189.08 **3 Claims**

1. A circuit for rapidly entering logic combinations of new and previously stored data into a random access memory, comprising:
a random access memory having a row decoder for selecting an addressed row line from the array;
sense amplifier responsive to data signals from the memory array bit lines;
mode logic means for generating control signals as defined by selected logical combinations and new data signals; and
means for altering the data in the sense amplifier during the addressing of a row line from the array in response to mode logic control signals
wherein the sense amplifier and means for directly altering the data in the sense amplifier are situated between the random access memory array bit lines and a column decoder; and
wherein the means for altering the data in the sense amplifier includes:
means for producing a direct complement of the previously stored data selected during the addressing of a row line;



means for sensing the binary state of the memory array bit lines; and
means for selectively driving the binary state of the sensed memory array bit line states to a binary "0" or binary "1" as defined by the mode logic control signals.

5,023,839
REDUNDANT SEMICONDUCTOR MEMORY DEVICE
Noriaki Suzuki; Junichi Miyamoto, and Nobuaki Ohtsuka, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jul. 12, 1990, Ser. No. 551,330
Claims priority, application Japan, Jul. 13, 1989, 1-181409
Int. Cl.⁵ G11C *29/00*
U.S. Cl. 365—200 **2 Claims**



1. A semiconductor memory cell, comprising:
(a) a memory cell array in which a plurality of memory cells are arranged in a matrix form;
(b) a redundancy cell column including a plurality of redundancy cells arranged independently from said memory cells, said redundancy cell column being selected instead of a cell memory including a defective cell when a memory cell column including a defective cell is selected from said memory cell array;
(c) a reference cell;
(d) a plurality of dummy capacity cells connected in parallel to said reference cell;
(e) at least one bit line to which an end of each of said memory cells belonging to the same column is connected;
(f) a redundancy bit line to which an end of each of said

VOL
1127
ISS
2
JE
11
1991
UMI

redundancy cells belonging to the same redundancy cell column is connected;

(g) a reference bit line to which one end of said reference cell and one end of each of said plural dummy capacity cells are connected;

(h) a differential sense amplifier having a comparison side to which said bit line and said redundancy bit line are connected and a reference side to which said reference bit line is connected, respectively, for comparing a potential of a selected memory cell on said bit line with a potential of said reference cell on said reference bit line when the selected memory cell column includes no defective cell, but for comparing a potential of the selected redundancy cell on said redundancy bit line with a potential of the reference cell on said reference bit line when the selected memory cell column includes a defective cell, to determine whether the potential level of a data read out of any one of the memory cells and the redundancy cells is at "1" or "0"; and

(i) at least one dummy capacity cell connected to said redundancy bit line, for equalizing a capacity on said reference bit line with a capacity on said redundancy bit line.

5,023,840

SEMICONDUCTOR MEMORY DEVICE HAVING TESTING FUNCTION AND TESTING METHOD THEREOF

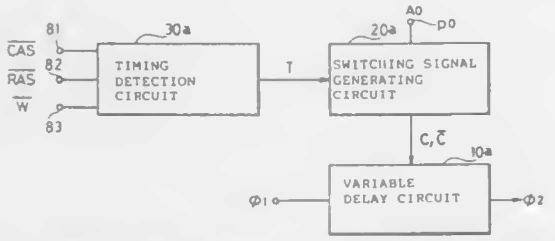
Youichi Tobita, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 24, 1990, Ser. No. 469,111

Claims priority, application Japan, Feb. 3, 1989, 1-26149

Int. Cl.^{5} G11C *29/00*

U.S. Cl. 365—201 26 Claims



1. A semiconductor memory device having an external terminal and operating in response to a signal applied to the external terminal, and including a circuit for facilitating detection of a defect in said memory device, said circuit comprising:

test signal generating means responsive to application of a signal of a predetermined state different from a state of an ordinary operation for generating a test signal,

first function means for performing an operation in response to a predetermined first signal,

delay means receiving said first signal for delaying said first signal by a predetermined delay time period to output the delayed signal as a second signal during a normal operation mode, means responsive to said test signal for changing said delay time period in a test operating mode,

second function means for performing an operation in response to said second signal outputted from said delay means and

evaluation means for evaluating said operation performed by said second means.

5,023,841

DOUBLE STAGE SENSE AMPLIFIER FOR RANDOM ACCESS MEMORIES

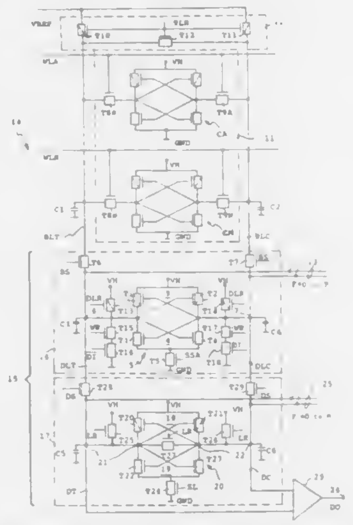
Chekib Akrout, Ris Orangis; Pierre Coppens, Savigny-Le-Temple; Bernard Denis, Mennecy, and Pierre-Yves Urena, Vence, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 21, 1989, Ser. No. 313,216

Claims priority, application European Pat. Off., Feb. 26, 1988, 88480005.3

Int. Cl.^{5} G11C *7/00, 11/40, 11/407*

U.S. Cl. 365—205 17 Claims



1. A sense amplifier for amplifying the difference between first and second signals on respective first and second signal lines, each said first and second signal line having inherent signal line capacitance, said sense amplifier comprising:

first amplifying means responsive to said first and second signals for providing a first differential output signal, including

a first clocked latch, and

first switching means for selectively connecting said first clocked latch to said first and second signal lines;

a second amplifying means responsive to said first differential output signal, including

a second clocked latch, and

second switching means for selecting said first clocked latch from a plurality of first clocked latches and connecting said second clocked latch to said selected first clocked latch; and

means for controlling said first and second amplifying means to sequentially amplify the difference between said first and second signals.

5,023,842

SEMICONDUCTOR MEMORY DEVICE HAVING IMPROVED SENSE AMPLIFIERS

Yoshio Okada, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 6, 1989, Ser. No. 375,902

Claims priority, application Japan, Jul. 11, 1988, 63-172315

Int. Cl.^{5} G11C *11/34*

U.S. Cl. 365—205 20 Claims

1. A semiconductor memory device comprising:

a first sense amplifier;

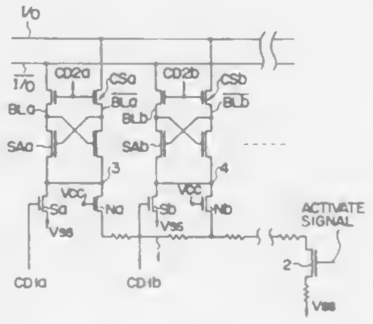
a reference potential terminal;

a first switching element connected between said first sense amplifier and said reference potential terminal;

a second sense amplifier connected to said first sense amplifier via an I/O line;

a second switching element connected between said second sense amplifier and said reference potential terminal; and

control means for generating and supplying a first column-selecting signal to said first switching element, to turn said first switching element on and off, and for generating and supplying a second column-selecting signal to said second switching element to turn said second switching element on and off.



5,023,843

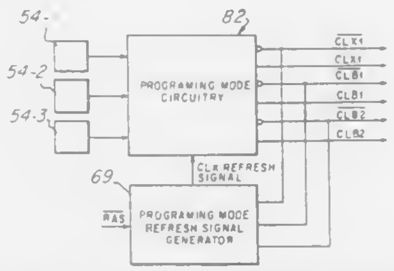
BONDING PAD PROGRAMMABLE INTEGRATED CIRCUIT

Andrew M. Love, Stafford, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 27, 1988, Ser. No. 263,590

Int. Cl.^{5} G11C *7/02*

U.S. Cl. 365—222 31 Claims



1. An electronic device having selectable programmable features comprising:

A. an integrated circuit carrying plural programming bond pads, said programming bond pads selectably being connected to a reference voltage and remaining programming bond pads unconnected from said reference voltage to indicate said programmable features, said programming bond pads being susceptible to electrical noise that makes an unconnected programming bonding pad appear to be connected to said reference voltage;

B. programming mode circuitry connected to said plural programming bond pads and sensing the voltage on each said programming bond pad, said mode circuitry producing at least one output signal of one state in response to a respective programming bond pad being sensed to have said reference voltage and of another state in response to said respective programming bond pad being sensed to be unconnected from said reference voltage, said programming mode circuitry refreshing its sensing of the voltage on each said programming bond pad in response to a refresh signal; and

C. a programming mode refresh signal generator generating a refresh signal to said programming mode circuitry.

5,023,844

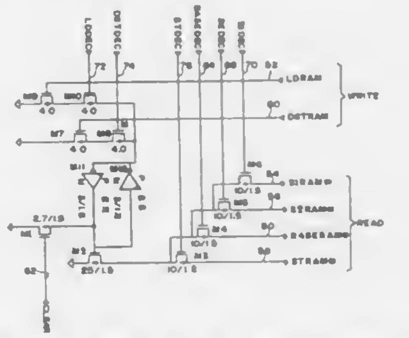
SIX-WAY ACCESS PORTED RAM ARRAY CELL

James M. Arnold, Hillsboro; Glenn J. Hinton, Portland, both of Oreg., and Frank S. Smith, Chandler, Ariz., assignors to Intel Corporation, Santa Clara, Calif.

Filed Feb. 28, 1990, Ser. No. 486,408

Int. Cl.^{5} G11C *13/00*

U.S. Cl. 365—230.05 4 Claims



1. For use in a random access memory including a read column address line (76) upon which address information to cause a cell to be read out onto output lines (58) is placed, write address line (72) upon which address information to cause a cell to be written into from an input line (52) is placed, said memory being driven by a clock having a first phase (PHI) and a second phase (PH2) during each successive cycle of said clock comprising:

an inverter (M 11);

an inverter (M 12);

said inverter (M 11) and said inverter (M 12) being connected to each other to thereby form a storage device capable of latching a binary one upon the condition that one of said inverters is conducting and a binary zero upon the condition that the other of said inverters is conducting;

a clear line (62);

a first transistor (M 1);

said first transistor being connected between the output (61) of one of said inverters and a sink (63), the gate of said first transistor being connected to said clear line (62); and,

a second transistor (M 2), the gate of said second transistor being connected in series with said invertor pair such that current flowing through said inverter pair (M 11, M 12) and said second transistor (M 2) can switch said first transistor (M 1).

5,023,845

EMBEDDED FIBER OPTIC BEAM DISPLACEMENT SENSOR

Roger M. Crane, Arnold, and Eugene C. Fischer, Stevensville, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 31, 1988, Ser. No. 264,734

Int. Cl.^{5} G06F *15/20*

U.S. Cl. 364—508 14 Claims

1. An apparatus for measuring motion of a beam having an optical fiber embedded therein, comprising:

means for generating and injecting light energy into a first end of said embedded optical fiber;

a photodetector grid array having a plurality of segments, each segment of said array positioned to receive a different portion of a light beam emanating from a second end of said optical fiber, said array adapted to produce electrical signals identifiable to the amount of light reaching each said segment;

amplifier means for increasing the magnitude of said electrical signals;

a light beam splitter operative to sample said emanating light beam;

means for monitoring said light beam sample, said means for

VOL
1127
ISS
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11
1991
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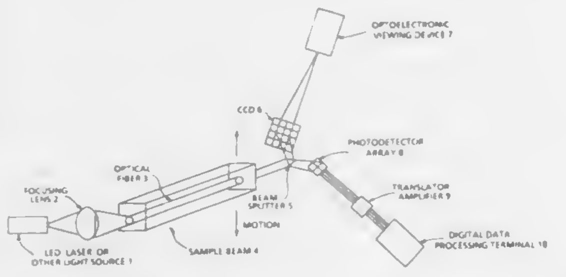
monitoring adapted to provide a visual representation of the impingement pattern of said light beam upon said grid array; and



a data processing terminal for receiving amplified electrical signals and resolving said amplified electrical signals into a system of vectors such that motion magnitude and direction of said beam are determined.

5,023,846

ULTRASONIC DETECTOR FOR DETECTING A THIN FILM

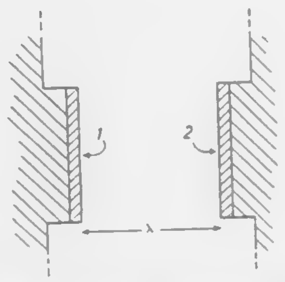
Thomas Busch-Sorensen, Copenhagen, Denmark, assignor to Eskofot A/S, Glostrup, Denmark

Continuation of Ser. No. 222,929, Jul. 22, 1988, abandoned. This application Feb. 28, 1990, Ser. No. 490,492

Claims priority, application Denmark, Aug. 5, 1987, 4083/87

Int. Cl.^{5} G01S *1/38*

U.S. Cl. 367—127 **9 Claims**



1. An ultrasonic detector for a thin film, comprising:

at least one ultrasonic transmitter confrontingly spaced apart a given distance from a respective ultrasonic receiver arranged for receiving ultrasound transmitted by said transmitter, as said transmitter transmits ultrasound which continuously varies with time, between upper and lower ultrasonic frequencies which are respectively greater than and less than a given ultrasonic frequency;

said given distance substantially corresponding to an integral multiple of one-half a wavelength of said ultrasound at said given ultrasonic frequency, whereby changes in reception which occur due to air temperature and humidity as film which is thin in relation to said distance is advanced through a gap defined between said transmitter and receiver are accommodated.

5,023,847

BOOM EVENT ANALYZER RECORDER

Robert A. Lee, Fairborn, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 30, 1989, Ser. No. 374,385

Int. Cl.^{5} G01S *3/00*

U.S. Cl. 367—136 **4 Claims**

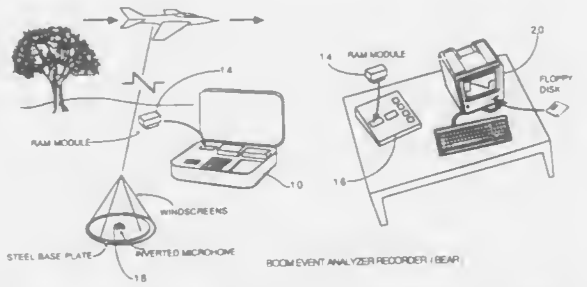
2. A method of analyzing and recording boom events, discerning the boom event from other noisy events with a boom screening methodology, in which sound levels are digitized with positive values for compression parts and negative values for rarefaction parts of sound waves, said method having an initialization phase, a data acquisition phase, and a evaluation phase;

wherein the initialization phase includes providing parameters which include a low trigger set to an absolute value of the sound pressure, so that there is a positive value and an equal negative value for the low trigger, a higher trigger having a value for a level which an event must exceed to be considered a good event, an event timer time duration which is preset to a predetermined value for a typical boom duration, a cycle timer time duration of shorter duration than that for the event timer, a positive pulse time, a negative pulse time, and a value for pressure rise and a value for a period of time which together define a rise time standard;

down crossings being defined as the absolute value of the pressure data going from greater than the absolute value of the low trigger value to less, up crossings being defined as the absolute value of the pressure data going from less than the absolute value of the low trigger value to more;

wherein the data acquisition phase starts following completion of the initialization phase and comprises the steps of continuously monitoring a noise environment and digitizing a noise signature to provide digitized values for sound levels at fixed intervals, examining the sound levels with a data acquisition routine which starts at the beginning of each of said fixed intervals and ends by returning, and then waiting for the beginning of the next interval;

wherein the data acquisition routine comprises getting the digitized value for the sound level and using it as a current data value, determining if the absolute value of the current data value is greater than the absolute value of the low trigger, and if so, flagging the start of an event, starting the event timer, storing the current data value in memory as a data point, also storing the current data value as a peak value, and returning; for subsequent intervals, event collection being in progress, storing the current data value in memory as a data point, determining if the current data value is greater than the previous peak value and if so updating the peak value, determining if the current data indicates a down crossing and if so starting the cycle timer, determining if the current data indicates an up crossing and if so stopping the cycle timer, if the current data value is negative determining if it is a negative peak value and if so storing the value as a negative peak value;



determining if either the event timer or the cycle timer has timed out by reaching its preset value, and if so starting the evaluation phase;

wherein the evaluation phase comprises the steps of (1) determining if the peak value is greater than said higher trigger value, (2) determining if all of the data points from the peak forward for said positive pulse time are greater than the positive value of the low trigger, and determining if all of the data points checked backward from the negative peak indicated by the fifth flag for said negative pulse time have an absolute value greater than the absolute value of the low trigger, and (3) determining if any rise time before said peak meets a predetermined criteria using said rise time standard;

and declaring a valid boom event if all of the above tests of the evaluation phase are passed, and otherwise declaring it not a valid boom event.

5,023,848

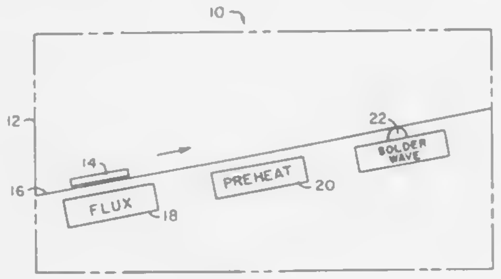
SOLDER WAVE DWELL TIMER

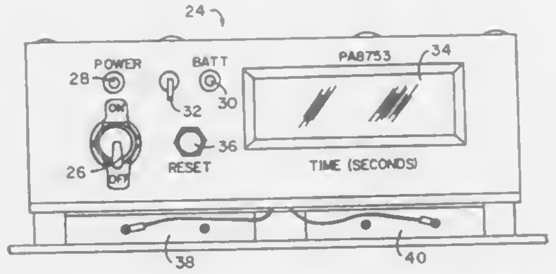
Eric M. Frey, and Joseph A. Lamb, both of Tucson, Ariz., assignors to Highes Aircraft Company, Los Angeles, Calif.

Filed May 15, 1989, Ser. No. 351,753

Int. Cl.^{5} G04F *08/00*

U.S. Cl. 368—1 **6 Claims**





1. Apparatus for measuring dwell time within a solder wave of a device to be soldered which is carried by a conveyor past the solder wave comprising:

a housing resting on a conveyor for joint movement therewith;

a pair of spaced apart probes secured to the housing and extending beneath the conveyor in to contact with a solder wave; and

timer circuit means mounted in the housing and connected to the probes for measuring the length of time both probes are in contact with the solder wave;

said timer circuit means including an up-down counter having an output terminal and an enabling terminal connected to one probe, a further probe connected to an electric power source; decoder and driver means having an input and an output its input being connected to the counter output, with display means mounted in the housing and connected to the output of the decoder and driver means.

5,023,849

ASTRONOMIC TIMEPIECE AND DISC INTENDED FOR USE THEREIN

Frank Vaucher, Cormoret, Switzerland, assignor to Compagnie des Montres, Longines, Francillon, S.A., Switzerland

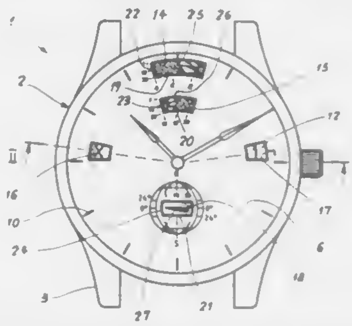
Filed Nov. 14, 1989, Ser. No. 435,886

Claims priority, application Switzerland, Nov. 15, 1988, 04241/88

Int. Cl.^{5} G04B *19/26*

U.S. Cl. 368—15 **11 Claims**

1. An astronomic timepiece for indicating at least one astronomic magnitude having an annual cycle varying daily, said timepiece comprising a movement, a first disc bearing a set of curve segments and arranged to be rotated stepwise by said movement so as to effect one revolution per year, a dial provided with at least one opening associated with each astronomic magnitude through each of which a portion of said first disc is visible, first graduations for each opening associated with a date, and a second graduations for each opening associated with the astronomic magnitude said curve segments cooperating with said graduations so as to indicate the daily value of said astronomic magnitude and being arranged in a manner to appear successively in each opening in the course of said rotation of the first disc.



5,023,850

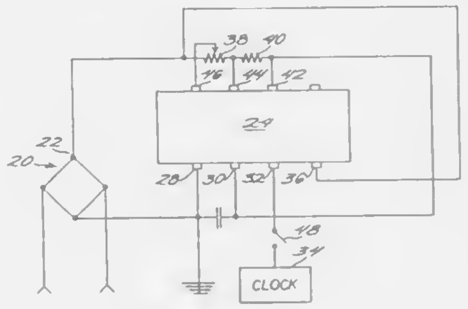
CLOCK FOR KEEPING TIME AT A RATE OTHER THAN HUMAN TIME

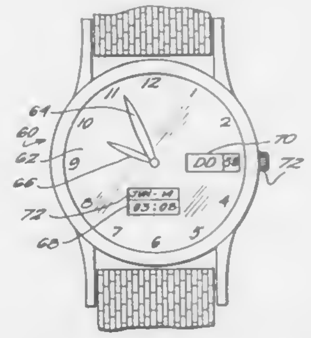
Rodney H. Metts, 520 Amherst Ave., Columbia, S.C. 29205, and Barry D. Thomas, 560 Powder Springs Rd. Apt. 15A2, Marietta, Ga. 30064

Continuation-in-part of Ser. No. 411,740, Sep. 25, 1989, abandoned. This application Jul. 9, 1990, Ser. No. 550,167

Int. Cl.^{5} G04B *19/24, 25/00*

U.S. Cl. 368—28 **8 Claims**





1. A clock for keeping animal time, wherein animal time is defined as human time multiplied by a ratio given by the average lifespan of a human divided by the average lifespan of a type of animal whereby an animal second is equal to one human second divided by said ratio, one animal minute is equal to one human minute divided by said ratio, one animal hour is equal to one human hour divided by said ratio, and one animal day is equal to one human day divided by said ratio, said clock comprising:

a housing;

means for generating a reference frequency;

first means responsive to said generating means for produc-

VOL
1127
ISS
2
JE
11
1991
UMI

ing pulses at a rate of sixty pulses per second times said ratio;

first clocking means for accumulating said pulses from said first producing means and producing an animal time output signal in animal hours, animal minutes and animal seconds;

second means responsive to said generating means for producing pulses at a rate of sixty pulses per second; and

second clocking means for accumulating said pulses from said second producing means and producing a human time output signal in human hours, human minutes and human seconds.

5,023,851

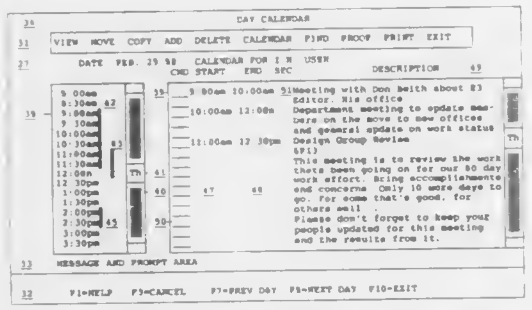
METHOD FOR PRESENTING ELECTRONIC CALENDAR INFORMATION IN AN INTERACTIVE INFORMATION HANDLING SYSTEM

Donna F. Murray, Euless; Joseph M. Pringle, Irving; Gerald C. Strope, Grapevine, all of Tex., and Stephen P. Berkson, Toronto, Canada, assignors to IBM Corp., Armonk, N.Y.

Filed Apr. 6, 1988, Ser. No. 178,725

Int. Cl.^{5} G04B *45/00*

U.S. Cl. 368—41 11 Claims



1. A method for an interactive computer display terminal which employs a calendar program for maintaining day calendar data for the operator of said terminal and for displaying selected day calendar screens in which each event is calendared for one or more sequential time slots pre-established interactively by said operator and said program, with multiline descriptions of said calendared events displayed contiguously in a time ordered fashion, said method assisting said operator to more readily determine the busy or free status of a specified time period covering one or more of said time slots and the detail nature of an event that is calendared for a busy time slot spanned by said time period, said method comprising the steps of,

(A) displaying at said terminal said selected day screen to illustrate for each calendared event, a start time, and end time and a description which can extend for a plurality of display lines,

(B) concurrently displaying at said terminal a vertical time scale in which successive pairs of adjacent display lines represent said time slots for one calendar day, and having displayed times on selected said display lines to assist said operator in interpreting said scale, and

(C) displaying a predetermined busy indicator adjacent each said time slot representation on said scale which has been calendared with an event to permit said operator to readily determine, (1) the status of a specific time slot merely by viewing said time scale, and (2) the details of an event when said specific time slot has said busy indicator displayed, by viewing the event description that is being concurrently displayed, said step of displaying a busy indicator further including the step of,

(i) automatically creating said busy indicator with said calendar program based on said start time and said end time of said event calendared for said specific time slot

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5,023,852

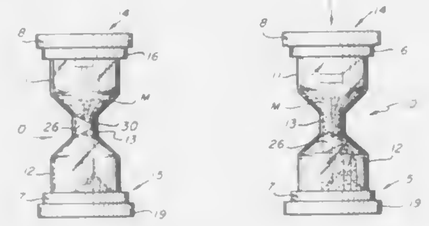
RESETTABLE GRAVITY TIMER

Peter Mikels, 5896 Mikels Rd., Sturgeon Bay, Wis. 54235

Filed Oct. 11, 1990, Ser. No. 595,572

Int. Cl.^{5} G04F *1/04*

U.S. Cl. 368—93 10 Claims



1. In a gravity timing apparatus in which a flowable material may pass from a first chamber to a second chamber which are generally axially aligned, the improvement comprising, a valve means disposed between said first and second chambers, said valve means defining an opening of a size to normally permit a controlled rate of flow of the material from one chamber to another, and means for selectively shifting said valve means generally axially with respect to said first and second chambers for selectively opening said valve means so as to permit an unobstructed flow of the material from one chamber to another.

5,023,853

ELECTRIC APPARATUS WITH SILENT ALARM

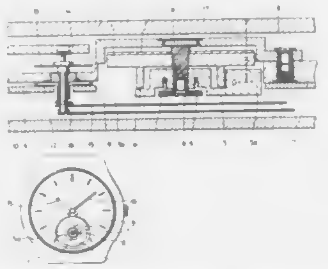
Masayuki Kawata, and Nobuo Tsukada, both of 31-1, Kameido 6-chome, Koto-Ku Tokyo, Japan

Filed Jun. 22, 1989, Ser. No. 369,732

Claims priority, application Japan, Jun. 27, 1988, 63-85405[U]; Feb. 13, 1989, 1-15692[U]

Int. Cl.^{5} G04B *19/06;* G04C *21/00*

U.S. Cl. 368—230 11 Claims



1. An electronic apparatus having a timekeeping function comprising:

a case capable of being held on the palm of a user's hand;

timecounting means in said cases for counting a present time;

alarm time setting means for setting an alarm time in response to a user operation;

an ultrasonic motor in said case and having an eccentric weight for generating a vibration;

alarm time detection means for detecting a coincidence of the present time with the alarm time set by said alarm time setting means; and

driving means for driving said ultrasonic motor in accordance with said detection of the coincidence.

5,023,854

DISC HAVING A DATA READ-ONLY AREA AND A DATA RECORDING ARM AND A RECORDING REPRODUCING SYSTEM THEREFOR

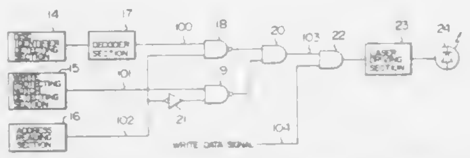
Isao Satoh, Neyagawa; Yoshihisa Fukushima, Osaka; Makoto Ichinose, Sakai; Yuzuru Kuroki, Toyonaka, and Yuji Takagi, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 7,641, Jan. 28, 1987, abandoned. This application May 17, 1989, Ser. No. 353,171

Claims priority, application Japan, Feb. 7, 1986, 61-26374; Feb. 7, 1986, 61-26376; Feb. 13, 1986, 61-29256; Feb. 24, 1986, 61-38839; Mar. 4, 1986, 61-46533; May 19, 1986, 61-113934; Jun. 3, 1986, 61-128669

Int. Cl.^{5} G11B *7/085*

U.S. Cl. 369—32 3 Claims



3. A system for information recording/reproducing on an optical disc having a plurality of tracks divided into a plurality of sectors, wherein said optical disc includes a light sensitive recording material formed on all tracks and each sector has a sector identifier portion in which address information is recorded and a data field portion for recording/reproducing data, said tracks including first tracks defining a data read-only area in which area has been recorded in a form of concave and convex pits in data field portions, and second tracks defining a data recording/reproducing area in which data can be recorded, and includes guard areas each having a width corresponding to a plurality of tracks and to which and from which no recording and no reproduction of data are caused respectively, said guard areas being formed before and after a boundary between said data read-only area and said data recording-/reproducing area;

said system comprising:

track search means for searching a target track by a rough searching and a fine searching;

detecting means for detecting said data field identification flag of an addressed sector, and

control means for controlling writing and reading of data, the number of tracks of said guard area being set equal to or greater than a maximum number of tracks constituting a possible search error which corresponds to a difference between a target track in the rough searching and a track at the time of completion of the rough searching performed by said track search means, in order to prevent said control means from recording and reproducing data in said guard area.

5,023,855

OPTICAL DISC ACCESS CONTROL SYSTEM THAT COUNTS TRACKS USING TRACKING CONTROL SIGNAL

Seiji Kobayashi, Tokyo, and Kiyoshi Ohsato, Chiba, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 18, 1988, Ser. No. 170,352

Claims priority, application Japan, Mar. 25, 1987, 62-72831

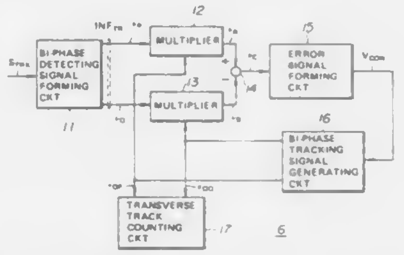
Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—44.28 9 Claims

1. An apparatus for counting a number of record tracks which an optical head traverses, the apparatus comprising:

means for detecting pits formed on record tracks and generating track transverse information signals, formed as first and second signals with a mutual phase shift of $\pi/2$, by periodically sampling a continuous signal based on the detection of the pits as successive tracks are traversed by the optical head;

tracking signal generating means for generating tracking signals whose frequency and phase are varied so as to follow those of the track transverse information signals, including a signal forming circuit receiving a control signal for producing therefrom a first tracking signal and a second tracking signal whose phase is shifted by $\pi/2$ with respect to the first tracking signal, multiplying means for multiplying respective ones of said first and second signals and said first and second tracking signals, and a subtractor for subtracting respective outputs of said multiplying means, the output of said subtractor representing said control signal; and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INF
MULTIPLIER
15
S
BI-PHASE DETECTING SIGNAL FORMING CKT
ERROR SIGNAL FORMING CKT
V
13
14
MULTIPLIER
11
16
BI-PHASE TRACKING SIGNAL GENERATING CKT
TRANSVERSE TRACK COUNTING CKT
17
6

means for counting the number of record tracks which the optical head traverses on the basis of the first tracking signal and the second tracking signal generated by the tracking signal generating circuit.

5,023,856

OPTICALLY READABLE RECORD CARRIER FOR RECORDING INFORMATION, APPARATUS FOR MANUFACTURING SUCH A RECORD CARRIER, APPARATUS FOR RECORDING INFORMATION ON SUCH A RECORD CARRIER, AND APPARATUS FOR READING INFORMATION RECORDED ON SUCH A RECORD CARRIER

Wilhelmus P. M. Raaymakers, and Franciscus L. J. M. Kuijpers, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 302,129, Jan. 24, 1989, abandoned, which is a continuation of Ser. No. 15,454, Feb. 17, 1987, abandoned. This application Mar. 28, 1990, Ser. No. 501,342

Claims priority, application Netherlands, Oct. 6, 1986, 8602504

Int. Cl.^{5} G11B *7/085, 7/950, 7/24, 7/26*

U.S. Cl. 369—32 10 Claims

1. An optical disc record carrier having a radiation-sensitive surface for recording information in a pattern of spiral or concentric tracks thereon, which information may be recorded or read by scanning such tracks with a radiation beam which produces radiation therefrom; characterized in that each of said tracks has a periodic modulation of its position in a direction transverse thereto and which, without occupying any portion of the track, generates a periodic clock signal in the radiation therefrom having a substantially constant frequency corresponding to the velocity of scanning of said tracks, the frequency of said clock signal only varying in accordance with variations in said scanning velocity; and in that the frequency of said clock signal is modulated in accordance with a digital

VOL
1127
ISS
2
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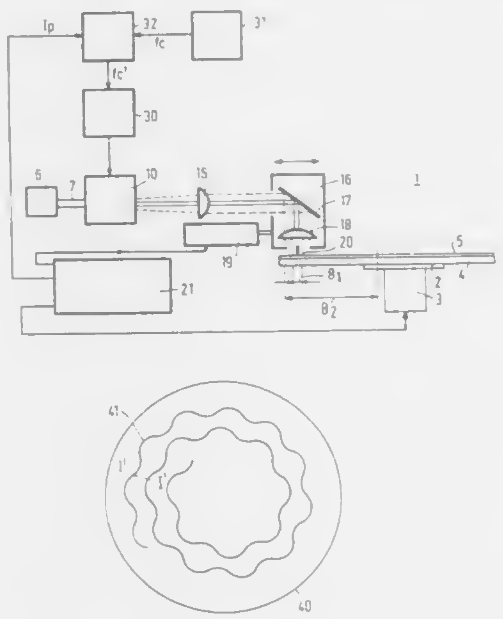
11
1991
UMI

position signal which identifies the relative positions of said tracks on said record carrier; whereby said scanning velocity



and the relative positions of said tracks are both recorded without occupying any portion of said tracks.

5,023,857

OPTICAL INFORMATION STORAGE APPARATUS INCLUDING ECCENTRICITY COMPENSATOR

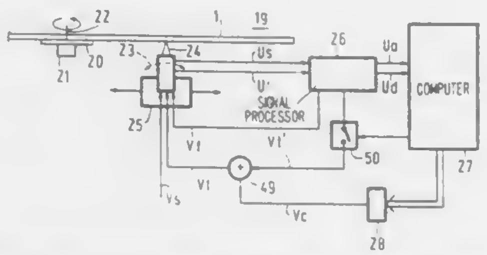
Johannes J. Verboom, Colorado Springs, Colo., assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 12, 1988, Ser. No. 243,400

Claims priority, application Netherlands, Sep. 23, 1987, 8702261

Int. Cl.^{5} G11B *7/095*

U.S. Cl. 369—44.25 **4 Claims**



1. Information recording and reading system comprising a record carrier provided with information tracks which are arranged substantially concentrically relatively to a common center, the record carrier being divided into sectors and the tracks of each sector containing address information in the form of optically detectable radially juxtaposed address information patterns, the address information being indicative of the radial position of the track relative to the center, and apparatus for recording and reading information on the information tracks, which apparatus comprises a drive means for rotating the record carrier about a center of rotation, means for scanning the information tracks by using a radiation beam for the purpose of recording and reading information on the information tracks, a closed-loop tracking system for keeping the radiation beam aimed at the information track to be scanned, and an angular-position detection system for determining the angular position of the record carrier, and the recording and reading apparatus comprising means for deriving a correction signal from the address information read while the tracking system is inoperative, which correction signal is related to the radial displacement of the point of incidence of the radiation beam on the record carrier relative to the center while the tracking system is inoperative, means for storing the correction signal thus derived in a memory as a function of the angular position, the tracking system comprising means for fetching the correction value associated with the instantaneously determined angular position from the memory and an open-loop control system for controlling the radial position of the point of incidence relative to the center of rotation depending on the fetched correction signal to compensate for the radial displacement of the point of incidence caused by an eccentric position of the center of rotation and out-of-roundness of the information tracks, and the correction signal being substantially proportional to the radial displacement of the point of incidence relative to the center while the tracking system is inoperative, the scanning device comprising means for optimizing the correction signal in an optimization time interval in which the radial position of the point of incidence is controlled exclusively by the open-loop control system, for which purpose the optimizing means includes means responsive to the address information read in the optimization time interval to adjust the amplitude of the correction signal to a value for which the amplitude of the radial displacement of the point of incidence as indicated by the addresses read is minimal.

5,023,858

SEPARATION TYPE OPTICAL PICKUP DEVICE

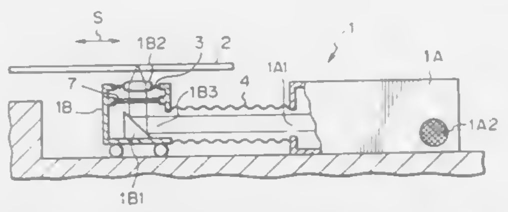
Masahiko Nakayama, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Feb. 26, 1990, Ser. No. 485,245

Claims priority, application Japan, Feb. 28, 1989, 1-48268; Jun. 26, 1989, 1-163275; Dec. 15, 1989, 1-325189

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—112 **12 Claims**



1. A separation type optical pickup device for an optical information reading and writing apparatus using an optical recording medium, comprising:

a fixed optical system, unmovable with respect to said recording medium, and including a means for emitting a laser beam and a fixed opening through which the laser beam is outputted;

a movable optical system, movable with respect to said recording medium, and having a movable opening for receiving therethrough the laser beam transmitted along a straight path from said fixed optical system, said movable opening facing said fixed opening of said fixed optical system, and a light guide means for guiding the laser beam received through said movable opening to said recording medium in the form of a convergent beam focussed on a surface of said recording medium; and

an expansible hollow member for interconnecting said fixed optical system and said movable optical system so as to enclose said fixed opening of said fixed optical system, said movable opening of said movable optical system and an optical path of said laser beam formed between said fixed opening of said fixed optical system and said movable opening of said movable optical system.

5,023,859

OPTICAL DATA STORAGE APPARATUS AND METHOD UTILIZING AN AMORPHOUS POLYMER WHICH EXHIBITS PHOTOCHROMIC PROPERTIES

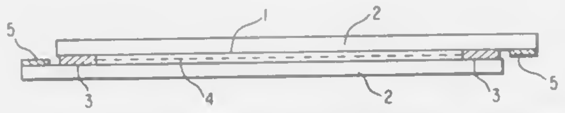
Manfred Eich, Frankfurt am Main; Norbert Rau, Sulzbach, and Joachim Wendorff, Nauheim, all of Fed. Rep. of Germany, assignors to Rohm GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany

Filed Mar. 30, 1989, Ser. No. 330,463

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1988, 3810722

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 365—113 **30 Claims**



1. A device for reversible optical data storage, comprising:

a polymer film comprising an amorphous polymer capable of local variation in the molecule order of said polymer by light induced photochromic isomerism, using polarized light, whereby data is stored in said polymer film.

5,023,860

MULTI-BEAMED OPTICAL PICK-UP

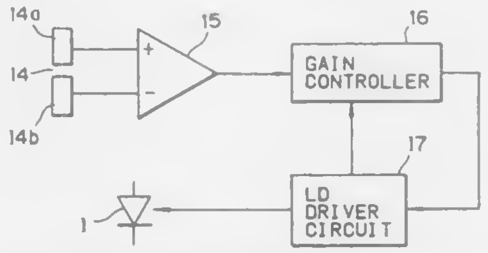
Aki Ueda, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Nov. 28, 1988, Ser. No. 276,681

Claims priority, application Japan, Nov. 26, 1987, 62-298652

Int. Cl.^{5} G11B *7/00, 27/36*

U.S. Cl. 369—116 **6 Claims**



1. An optical pick-up comprising:

a light source for emitting at least two light beams including first and second light beams; and '

an optical system for leading said first light beam from said light source to a recording surface of an optical disc at a first location and then leading said first light beam reflected from said optical disc to a first detection system, said optical system also leading said second light from said light source to said recording surface of said optical disc at a second location, which is separated away from said first location in a predetermined direction but is adjacent thereto, and then leading said second light reflected from said optical disc to a second detection system;

wherein:

said second detection system includes a tracking error detecting means for detecting a tracking error of said second light beam and adjusting means for adjusting a light intensity of said second light beam to be emitted from said light source in accordance with a tracking error of said second light beam on said optical disc;

said tracking error detecting means includes a pair of light receiving elements and a differential amplifier having a pair of input terminals connected to said pair of light receiving elements, respectively, and an output terminal for outputting a tracking error signal of said second light beam on said optical disc; and

said adjusting means includes a gain controller connected to receive said tracking error signal from said differential amplifier and a laser driver circuit which receives a gain-controlled tracking error signal from said gain controller and supplies a drive signal to said light source in response to said gain-controlled tracking error signal.

5,023,861

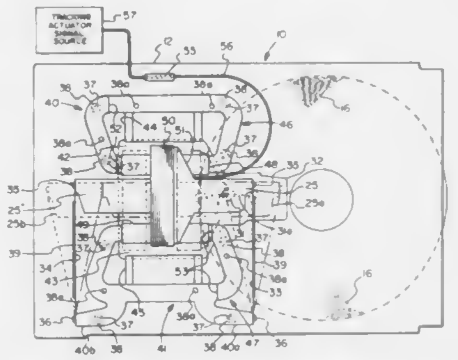
SINGLE STAGE TRACKING ACTUATOR APPARATUS FOR OPTICAL BEAM INFORMATION STORAGE DRIVE SYSTEM

Patrick J. Champagne, and Ingolf Sander, both of Cupertino, Calif., assignors to Literal Corporation, Colorado Springs, Colo.

Filed Dec. 20, 1988, Ser. No. 287,801

Int. Cl.^{5} G11B *21/02, 7/09*

U.S. Cl. 369—215 **9 Claims**



3. Tracking actuator apparatus according to claim 1 further comprising a mount housing having a base plate, two sides of which extend in parallel with said first axial center line of the head means; in which the first axial center line extends longitudinally of the head means through the end portions thereof and in which the ends of said leaf spring remote from the head means are fixedly secured adjacent one of the sides of the base plate at points lying in a line parallel with said first axial center line of the head means, the free ends of said springs being secured to extreme end surfaces of the head means at points lying in a line parallel with said first axial center line thereby forming an open span between said leaf springs; and in which one of said magnetic circuit means is positioned entirely within the span formed by said leaf springs.

5,023,862

APPARATUS FOR LOCKING A PICKUP UNIT OF A DISC PLAYER FOR A VEHICLE

Ko-Hyun Kim, Suweon, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Suweon, Rep. of Korea

Filed Jun. 14, 1990, Ser. No. 538,004

Claims priority, application Rep. of Korea, Dec. 4, 1989, 89-17848

Int. Cl.^{5} G11B *21/02, 17/00*

U.S. Cl. 369—215 **11 Claims**

1. An apparatus for locking a pickup unit of a disc player having a pickup unit supporting base plate resiliently mounted to a main chassis, the locking apparatus comprising:

guide means for supporting and guiding said pickup means in an operative position for tracking said disc, said guide means having a first threaded portion for engaging a correspondingly threaded portion on said pickup means for driving said pickup means in a tracking manner and for moving said pickup means to a locked position;

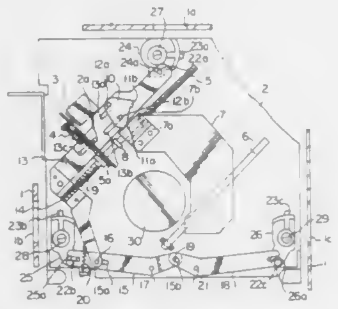
drive means for driving said guide means in a first rotational direction;

a first locking lever slidably mounted to said base plate;

a first locking means rotatably mounted to said base plate and operatively connected to said first locking lever;

VOL
1127
ISS
2
JE
11
1991
UMI

a second threaded portion on said guide means for engaging a correspondingly threaded portion on said first locking



lever for driving said first locking lever in a first linear direction so as to urge said first locker into engagement with a first locking slot in said chassis.

5,023,863
OPTICAL SWITCHING SYSTEM

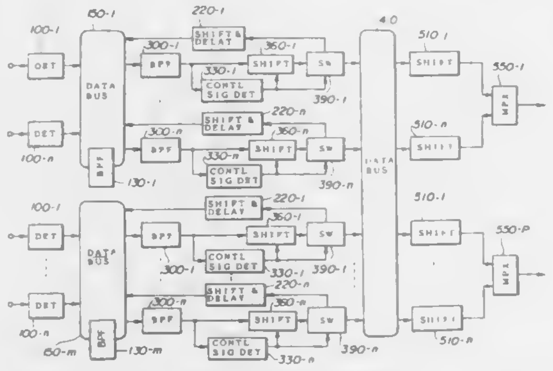
Shigefumi Masuda, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jul. 18, 1989, Ser. No. 381,595

Claims priority, application Japan, Jul. 18, 1988, 63-178512

Int. Cl.^{5} H04J *14/00, 14/02*

U.S. Cl. 370—1 **29 Claims**



14. An optical switching system comprising:

a plurality of detecting means for receiving an input optical signal which is a wavelength-division multiplexed signal and for detecting a control information included in the input optical signal;

a plurality of first optical buses, coupled to said detecting means, for transferring optical signals output from said detecting means in a predetermined direction within respective ones of said first optical data buses;

a plurality of optical bandpass filters, coupled to each of said first optical data buses, for extracting optical signals in predetermined wavelength regions based on said control information;

control information detecting means, coupled to said optical bandpass filters, for detecting a control information included in the optical signals output from said optical bandpass filters;

first shift means, coupled to said optical bandpass filters, for delaying phases of the optical signals output from said optical bandpass filters by a predetermined quantity and for shifting wavelengths of the optical signals a predetermined quantity determined by the control information output from said control information detecting means;

switching means, coupled to said first shift means, for outputting the optical signals output from said first shift means to one of a first path and a second path responsive to the control information output from said control information detecting means;

a second optical data bus, coupled to the first path of said switching means, for transferring the optical signals output from said switching means in a predetermined direction within said second optical data;

shift and delay means, coupled to the second path of said switching means, for receiving predetermined wavelength components of the optical signals output from said switching means determined by the control information output from said control information detecting means and for shifting wavelengths and delaying the predetermined wavelength components, said shift and delay means outputting optical signals corresponding to the shifted and delayed predetermined wavelength components to the respective first optical data buses;

second shift means, coupled to said second optical data bus, for extracting optical signals having wavelengths belonging to predetermined wavelength regions from said second optical data bus and for shifting wavelengths of the extracted optical signals a predetermined quantity determined by the control information output from said control information detecting means; and

multiplexing means coupled to said second shift means for multiplexing the wavelengths of the optical signals output from said fourth means so as to output an output optical signal which is wavelength-division multiplexed.

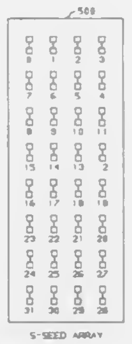
5,023,864
CROSSOVER NETWORK UTILIZING TWO-DIMENSIONAL ARRAYS OF NODES

Thomas J. Cloonan, Downers Grove, Ill.; Jürgen Jahns, Shrewsbury, N.J.; Frederick B. McCormick, Jr., Lisle, Ill., and Miles J. Murdocca, Jackson, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 8, 1989, Ser. No. 349,008

Int. Cl.^{5} H04J *14/00*

U.S. Cl. 370—1 **13 Claims**



1. A network comprising

a plurality of two-dimensional arrays of nodes, each of said arrays comprising C columns and R rows, C and R each being a power of two, said plurality of arrays being arranged in an ordered sequence and

a plurality of stages each comprising a plurality of links, said plurality of link stages being arranged in an ordered sequence, each link stage being interposed between successive ones of said ordered sequence of arrays and comprising

free space optical crossover means for interconnecting the nodes of successive ones of said arrays in a crossover pattern such that when the binary addresses corresponding to the integers from zero through RC-1 are respectively associated with successive nodes of rows and in opposite directions across successive rows in serpentine fashion, each node in one array is connected to the node in the successive array having a binary address differing in each of the p low order bit positions, p being a positive integer at most equal to $\log_2(RC)$, where RC is the product of R and C, RC-1 is the difference obtained by subtracting one from RC, and $\log_2(RC)$ is the base two logarithm of RC.

5,023,865
BEAM POINTING MECHANISM

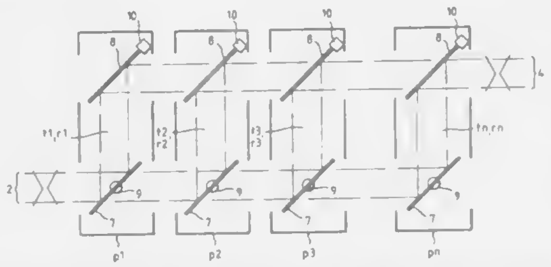
Michael Grant, and David Robson, both of Stevenage, England, assignors to British Aerospace Public Lmited Company, London, England

Filed Sep. 2, 1988, Ser. No. 239,923

Claims priority, application United Kingdom, Sep. 8, 1987, 8721075

Int. Cl.^{5} H04J *14/06*

U.S. Cl. 370—3 **2 Claims**



1. A pointing mechanism for receiving optical radiation comprising a plurality of different wavelength components and for independently controlling the pointing directions of the components, the mechanism comprising:

a first dichroic mirror for receiving said radiation; and

at least one further dichroic mirror arranged in series with the first dichroic mirror for receiving radiation transmitted by a previous mirror each in the series, the mirrors having respective different reflectance wavelength bands for reflecting respective ones of said components and each mirror being mounted for turning movement to control the pointing direction of the component reflected thereby.

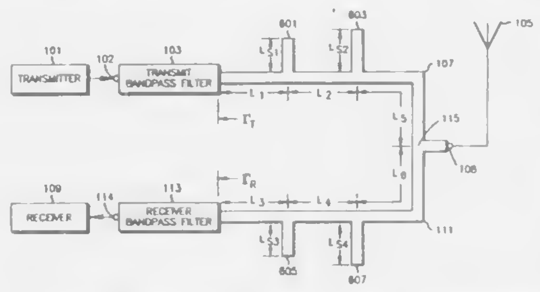
5,023,866
DUPLEXER FILTER HAVING HARMONIC REJECTION TO CONTROL FLYBACK

David M. De Muro, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 20,265, Feb. 27, 1987, abandoned. This application May 22, 1989, Ser. No. 355,844

Int. Cl.^{5} H01P *1/202, 1/205*

U.S. Cl. 370—24 **22 Claims**



17. A duplexer filter for a duplex radio communications transceiver comprising:

first periodically resonant means tuned to pass a band of frequencies utilized by the radio transmitter;

second periodically resonant means tuned to pass a band of frequencies utilized by the radio receiver;

a first transmission line coupling said first periodically resonant means to an antenna port, having a length determined by a phase shift necessary to produce an essentially open circuit at said antenna port at said band of frequencies utilized by the radio receiver, and having at least one open-circuited stub with a length substantially equal to one-fourth the electrical wavelength of the third harmonic of a frequency within said band of frequencies utilized by the radio transmitter; and

a second transmission line coupling said second periodically resonant means to said antenna port and having a length determined by a phase shift necessary to produce an essentially open circuit at said antenna port at said band of frequencies utilized by the radio transmitter.

5,023,867
PROTOCOL AND APPARATUS FOR SELECTIVELY SCANNING A PLURALITY OF LINES CONNECTED TO A COMMUNICATION DEVICE

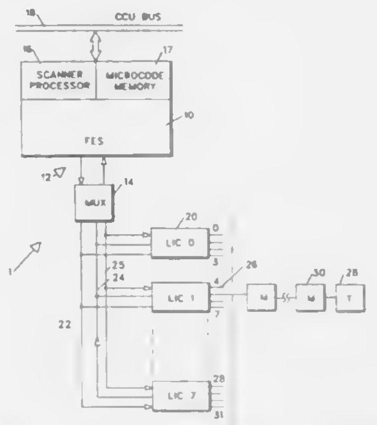
Mohamed Badaoui, Nice; Richard Dambricourt, Cagnes Sur Mer; Jean-Paul Franquenouille, Saint Jeannet; Christian Garcia, La Gaude; Yves Granger, Antibes, and Sylvie Spalmacin-Roma, Le Pecq, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 19, 1989, Ser. No. 299,865

Claims priority, application European Pat. Off., Jan. 22, 1988, 88480004.6

Int. Cl.^{5} H04Q *11/00*

U.S. Cl. 370—56 **8 Claims**



1. A scanning protocol for scanning a plurality of serial transmission lines (**26**) connecting users' devices to scanning means (**10, 16, 17**) of a communication device, said lines being coupled to the scanning means through line interface couplers (LICs) (**20**) which are plugged to the scanning means at physical addresses whereby each line interface coupler LIC has a wired address corresponding to its physical address which is known to the scanning means, said protocol being characterized by the fact that, for each configuration of active line interface couplers effectively connected to active serial transmission lines each active line interface coupler LIC is readdressable with a logical address corresponding to the wired address of any line interface coupler LIC in order to determine, for said configuration of active line interface couplers LICs, the shortest possible scanning scheme including only the active line interface couplers connected to active serial transmission lines, said scanning scheme being based upon the logical addresses.

5,023,868
AUTOMATED CALL HANDLING APPARATUS

Wayne A. Davidson, Winfield, and Diana S. Winter, Chicago, both of Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 291,922, Dec. 29, 1988, abandoned. This application Apr. 3, 1990, Ser. No. 504,711

Int. Cl.^{5} H04Q *11/04;* **H04J** *3/12;* **H04M** *11/00*

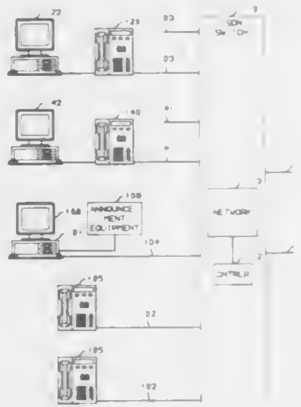
U.S. Cl. 370—62 **34 Claims**

1. Automated call handling apparatus for use with a telecommunication switching system transmitting associated messages

VOL
1127
ISS
2
JE
11
1991
UMI

corresponding to call handling information exchanged between said switching system and a telephone station connected thereto, comprising:

means for connecting said apparatus to said system; and



means responsive to certain of said associated messages indicating an incoming call to said telephone station for selecting an alternate destination for said call and for transmitting to said switching system digital messages for causing said switching system to transfer said call to said selected alternate destination.

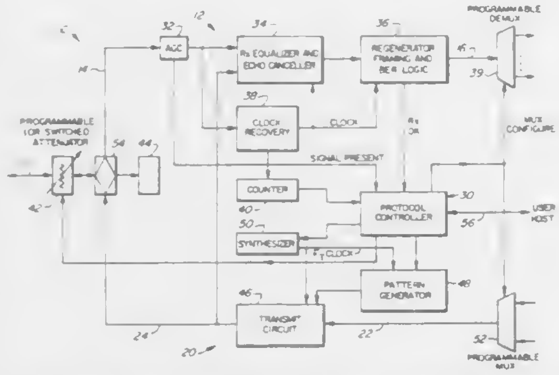
5,023,869

METHOD AND APPARATUS FOR MAXIMIZING THE TRANSMISSION CAPACITY OF A MULTI-CHANNEL BIDIRECTIONAL COMMUNICATIONS LINK

Wayne D. Grover; Tommy Fong, both of Edmonton; Joe P. Dubuc, Sherwood Park; Witold A. Krzymien, Edmonton, and George D. Fraser, Sherwood Park, all of Canada, assignors to Alberta Telecommunications Research Centre, Edmonton, Canada

Filed Mar. 27, 1989, Ser. No. 329,271
Int. Cl.^{5} H04J *3/22, 3/12*

U.S. Cl. 370—84 18 Claims



1. An interface circuit for use in a multi-channel, continuous, baseband transmission system in which communication signals may be transmitted bidirectionally over a communications link between two stations of said system, said interface circuit comprising:

receiver means, having a receiver input and a receiver output, for delivering a signal applied to said receiver input to said receiver output, said receiver means including means responsive to a signal applied to said receiver input for generating a "signal present" output signal and means for acquiring a signal applied to said receiver input and generating a "signal acquired" signal; said means for acquiring including an adaptive equalizer circuit means for receiving and converging on a signal applied to said receiver input, signal evaluation circuit means for subjecting a signal delivered thereto by said equalizer circuit means to predetermined criteria and producing said "signal acquired" signal when said criteria are satisfied, and clock recovery circuit means for determining the clock of a signal applied to said receiver input and delivering said clock to said equalizer circuit means and said evaluation circuit means;

transmitter means, having a transmitter input and a transmitter output, for delivering a signal received at said transmitter input to said transmitter output for transmission along said link to said other station; and

control means for controlling the mode of operation of said interface circuit wherein said interface circuit is operable in a NORMAL mode in which signals applied to said transmitter input are delivered by said transmitter means to said transmitter output for transmission along said link to said other station and signals received from said link at said receiver input and acquired by said receiver means are delivered to said receiver output, said receiver output delivering the "signal present" output signal and the "signal acquired" signal to said control means; and wherein said interface circuit is operable in a transmission rate ADAPTATION mode in which, in response to a first predetermined condition, said control means is operable to initiate a transmission rate testing process and subsequent thereto to restore said interface circuit for operation in said NORMAL mode of operation at the highest operable, bi-directional transmission rate determined pursuant to said testing process, or, in response to a second predetermined condition, said control means is responsive to a transmission rate testing process initiated at said other station and subsequent thereto to restore said interface circuit for operation in said NORMAL mode of operation at the highest operable, bi-directional transmission rate determined pursuant to said testing process.

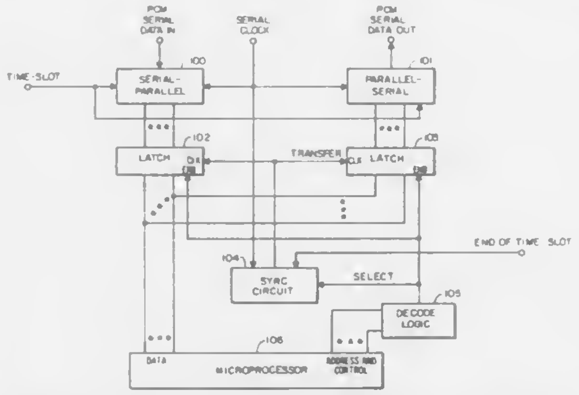
5,023,870

INTERFACE CIRCUIT FOR DATA TRANSMISSION BETWEEN A MICROPROCESSOR SYSTEM AND A TIME-DIVISION-MULTIPLEXED SYSTEM

Han Kem, Glendale, Ariz., assignor to AG Communication Systems Corporation, Phoenix, Ariz.

Filed Jun. 22, 1989, Ser. No. 369,885
Int. Cl.^{5} H04J *3/06*

U.S. Cl. 370—85.2 10 Claims



1. A synchronizing circuit for generating a transfer signal arranged to indicate when data is to be transferred through an interface circuit, said interface circuit connected between a microprocessor system and a time-division-multiplexed system, said time-division-multiplexed system includes a bit clock signal which defines individual bits within the time-division-multiplexed system, said synchronizing circuit comprising:

collision detection means connected to said time-division-multiplexed system and said microprocessor system, said collision detection means arranged to generate said transfer signal when a request for use of said interface circuit is received from either said time-division-multiplexed system or said microprocessor system, and alternatively, said collision detection means further arranged to generate a collision signal when said time-division-multiplexed system and said microprocessor system request use of said interface circuit simultaneously;

delay means for delaying said collision signal from said collision detection means, including an input arranged to receive said collision signal and an output arranged to transmit a delayed collision signal to said collision detection means, and;

responsive to said collision detection means receiving said delayed collision signal said collision detection means continues to generate said collision signal until said microprocessor system retracts the request for use of said interface circuit.

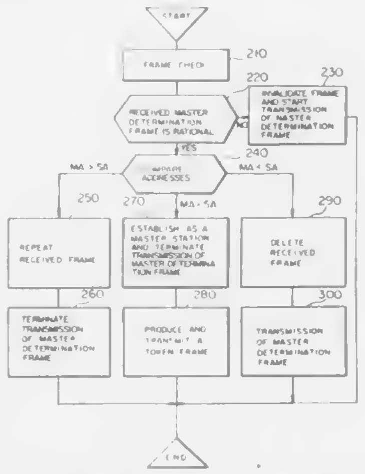
5,023,871

METHOD OF CONTROLLING THE OPERATION OF STATIONS IN A RING NETWORK

Susumu Nakayashiki, Sagamihara; Takeshi Harakawa, Hadano, and Jiro Kashio, Kawasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 27, 1989, Ser. No. 343,901
Claims priority, application Japan, Apr. 28, 1988, 63-103909
Int. Cl.^{5} H04J *3/00*

U.S. Cl. 370—85.500 6 Claims


START
FRAME CHECK
210
220
230
RECEIVED MASTER DETERMINATION FRAME IS RATIONAL
NO
INVALIDATE FRAME AND START TRANSMISSION OF MASTER DETERMINATION FRAME
YES
240
MA > SA
COMPARE ADDRESSES
MA < SA
250
270
MA = SA
290
REPEAT RECEIVED FRAME
ESTABLISH AS A MASTER STATION AND TERMINATE TRANSMISSION OF MASTER DETERMINATION FRAME
DELETE RECEIVED FRAME
260
280
300
TERMINATE TRANSMISSION OF MASTER DETERMINATION FRAME
PRODUCE AND TRANSMIT A TOKEN FRAME
TRANSMISSION OF MASTER DETERMINATION FRAME
END

1. A method of controlling the operation of stations in a network in which said stations are connected through at least one ring transmission path and one of said stations assigned to a station address having the highest priority works as a master station, said method comprising:

a step of transmitting from any one of said stations to said transmission path a series of frames for determining a master station, each of said frames including a source address indicative of a frame transmission source and an identifier specific to said frame;

a step of judging by each of said stations, upon receiving a frame for determining a master station transmitted from another station, whether or not the received frame has been received in duplication, on the basis of the source address and the frame-specific identifier included in said received frame;

a step of determining by each of said stations an operation mode of the station by comparing the source address of said received frame with an address assigned to the station as a part of a predetermined process for determining a master station among said stations if said judgment reveals that said received frame is not a duplicate; and

a step of transmitting from any one of said stations to said transmission path a series of new frames for determining a master station to try again said predetermined process if the station has judged that said received frame is a duplicate.

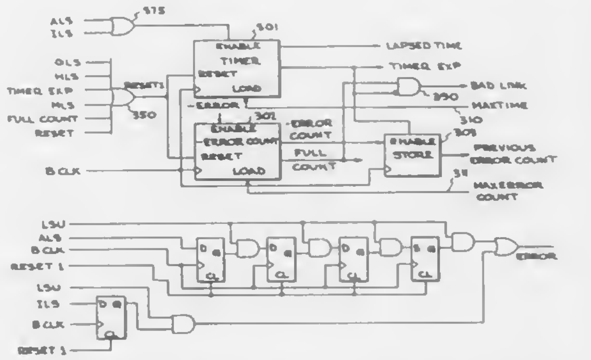
5,023,872

FDDI BIT ERROR RATE TESTER

Kadiresan Annamalai, Milpitas, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Mar. 25, 1988, Ser. No. 173,325
Int. Cl.^{5} G06F *11/00*

U.S. Cl. 371—5.1 13 Claims



1. Apparatus for performing continuous bit error rate monitoring at the physical (PHY) layer in each node of a Fiber Distributed Data Interface (FDDI) dual token ring network wherein each node in said network also includes a Station Management (SMT) layer, a Media Access Control (MAC) layer, a line state signal generator for generating a predetermined set of line state signals under predetermined conditions, and a byte clock signal generator for generating clocking signals, comprising:

(a) tester logic means, coupled to said line state signal generator, for outputting error event signals as a function of a first subset of said set of line state signals which include an Active Line State (ALS) signal, an Idle Line State (ILS) signal and a Line State Unknown (LSU) signal;

(b) resettable error count means, coupled to said tester logic means, enabled whenever an error event signal is output by said tester logic means, for accumulating an error event count and providing an output signal indicative of said error event count; and

(c) resettable timer means, coupled to said line state signal generator and said byte clock signal generator, enabled as a function of a second subset of said set of line state signals, for accumulating a measure of the time elapsed from timer means enablement until timer means reset, and for providing an output signal indicative of said measure of elapsed time.

5,023,873

METHOD AND APPARATUS FOR COMMUNICATION LINK MANAGEMENT

John G. Stevenson, and Raymond C. Williams, both of Raleigh, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 15, 1989, Ser. No. 366,947
Int. Cl.^{5} G06F *11/20*

U.S. Cl. 371—8.2 15 Claims

11. A system for problem determination and automatic non-disruptive recovery of communication link problems between a using node and a remote node in a data communication network comprising:

communication link manager means connected to said data communication network for coordinating a test of a plurality of link connection components on a communication link, and responsive to the test of said link connection

VOL
1127
ISS
2
JE
11
1991
UMI

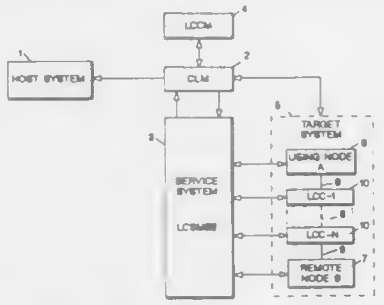
components, analyzing the results and invoking a recovery procedure;

first means at said using node for detecting a communication link problem;

second means at said using node for accumulating link event data and passing said link event data to said communication link manager means;

link configuration manager means cooperating with said communication link manager means for maintaining a configuration data base and providing link configuration data, said link configuration data including an identity of the plurality of link connection components on said communication link and a plurality of physical connections between said link connection components, and an identity of a backup component and a physical connection to use for recovery from a communication link problem; and

a plurality of link connection subsystem manager means connected to said communication network and cooperating with said communication link manager means for conducting the test of link connection components of said communication link, identifying a failed link connection component to said communication link manager means, and issuing recovery commands for said failed link connection component.



5,023,874

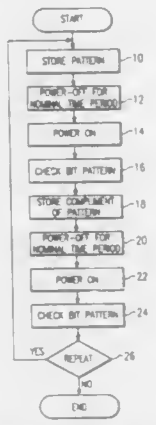
SCREENING LOGIC CIRCUITS FOR PREFERRED STATES

Theodore M. Houston, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 23, 1989, Ser. No. 314,619

Int. Cl.^{5} G06F *11/00*

U.S. Cl. 371—21.2 **12 Claims**



11. A method of testing a storage device with one or more storage cells comprising the steps of:

storing a logical state according to a selected pattern in each memory cell of said circuit under test;

turning off the power to each of the cells;

turning on the power to each of the cells after a selected time period;

comparing the logical state present in each cell with said selected pattern after power has been turned back on to determine if any of the cells have switched to another state;

storing the complement of the logical state in each memory cell from that previously stored;

turning off the power to each of the cells;

turning on the power to each of the cells after a selected time period; and

comparing the logical state present in each cell with said stored complement logical state after power has been turned back on to determine if any of the cells have switched to another state.

5,023,875

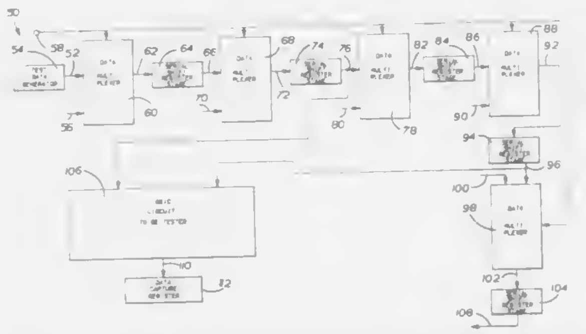
INTERLACED SCAN FAULT DETECTION SYSTEM

Gene W. Lee, Huntington Beach, and George D. Underwood, Inglewood, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 26, 1989, Ser. No. 357,234

Int. Cl.^{5} G06F *11/00*

U.S. Cl. 371—25.1 **10 Claims**



1. A circuit for facilitating fault detection in testing a logic circuit, comprising:

(a) first serial data shift register means for storing and transferring test data, said first serial data shift register means having an input and an output;

(b) first means for transferring said tests data from said first serial data shift register means to said logic circuit;

(c) second serial data shift register means for storing and transferring said test data, said second serial data shift register means having an input and an output;

(d) second means for transferring said test data from said second serial data shift register means to said logic circuit; and

(e) third serial data shift register means for storing and transferring said test data, having an input and an output wherein said input is coupled to said output of said first serial data shift register means and said output is coupled to the input of said second serial data shift register means, whereby said logic circuit is enabled to be tested at its normal operating speed such that substantially all of the propagation defaults associated with said logic may be detected.

5,023,876

METHOD AND APPARATUS FOR DETECTING FINALLY RECORDED SECTOR

Ryuichi Naito, and Tsuneo Ishii, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Oct. 31, 1988, Ser. No. 265,165

Int. Cl.^{5} G11B *20/18*

U.S. Cl. 371—40.1 **13 Claims**

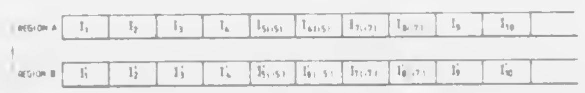
1. An apparatus for detecting a finally recorded index sector of a recording medium, comprising:

recording means by which a data signal and an index signal are recorded on said recording medium in a data sector in a data region and an index sector in an index region, respectively, an error code being added to each index signal, wherein a finally recorded index sector satisfies a first predetermined reference condition;

first means for successively reproducing said index signals;

second means for detecting errors in each of said reproduced index signals by utilizing said error code included therein; and

third means for recognizing as said finally recorded index sector an index sector existing just before a first non-recorded index sector in response to detecting said first non-recorded index section being a first sector not satisfying a second predetermined reference condition.



5,023,877

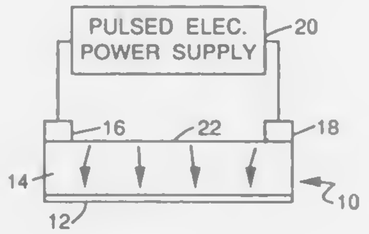
MINIATURE, OPTICALLY PUMPED NARROW LINE SOLID STATE LASER

James G. Eden, Mahomet, and Mark J. Kushner, Urbana, both of Ill., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 29, 1990, Ser. No. 546,462

Int. Cl.^{5} H01S *3/30*

U.S. Cl. 372—7 **27 Claims**



1. A miniature, optically pumped, narrow line width solid state laser comprising:

an optically transparent substrate;

an active laser medium comprising a film of lasing material on said substrate, said laser material comprising a thin film of a metal monohalide;

a pair of spaced electrodes on said substrate;

a source of short duration high voltage pulses connected across said electrodes, said pulses arcing between said electrodes and producing short wavelength light energy, said light energy passing through said transparent substrate to photodissociate molecules in said film, thereby causing laser emission to occur on a transition of the metal atom, thereby producing a narrow line width laser.

5,023,878

APPARATUS COMPRISING A QUANTUM WELL DEVICE AND METHOD OF OPERATING THE APPARATUS

Kurt Berthold, Munich, Fed. Rep. of Germany, and Anthony F. J. Levi, Summit, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

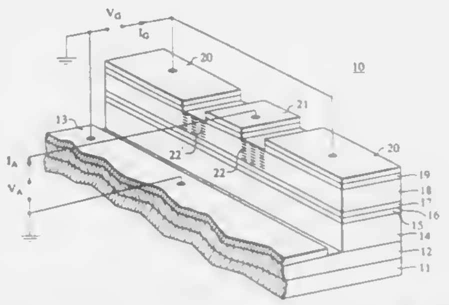
Filed Sep. 15, 1989, Ser. No. 407,608

Int. Cl.^{5} H01S *3/10*

U.S. Cl. 372—20 **13 Claims**

1. Method of using apparatus comprising a laser that comprises a semiconductor body, the body comprising a gain section and, optically coupled to the gain section but electrically substantially isolated therefrom, a loss section, the apparatus further comprising means for causing the flow of an electrical current through the gain section, and still further comprising means for electrically biasing the loss section, the body comprising at least one quantum well, associated with the body being a length L_C and a gain for radiation of a given wavelength, and associated with the quantum well being first and second energy sub-bands; and the apparatus further comprising means for utilizing radiation emitted by the laser; wherein the method comprises

(a) causing the flow of an electrical current through the gain section;



(b) electrically biasing the loss section, the electrical bias selected such that the laser emits first radiation of wavelength λ_1;

characterized in that the apparatus also comprises means for changing the bias conditions on the loss section, and the method further comprises

(c) changing the bias conditions on the loss section without changing L_C, such that the laser emits second radiation of wavelength λ_2 different from λ_1, with $|\lambda_1-\lambda_2|$ being at least 10 nm.

5,023,879

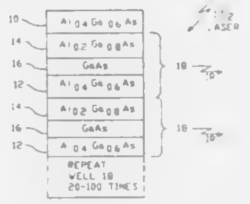
OPTICALLY PUMPED STEP QUANTUM WELL IR SOURCE

Kang L. Wang, Santa Monica, Calif., and Perng-Fei Yuh, Ossining, N.Y., assignors to The Regents of the University of California, Oakland, Calif.

Filed Apr. 26, 1990, Ser. No. 514,853

Int. Cl.^{5} H01S *3/19*

U.S. Cl. 372—43 **20 Claims**



1. A solid state IR source comprising

a multi layer semiconductor body including at least a first layer of a first semiconductor material functioning as a well layer, a second layer of a second material on said first layer and functioning as a step, a first barrier layer abutting said first layer, and a second barrier layer abutting said second layer; said first layer, said second layer, and said barrier layers defining three heterojunctions and three energy levels whereby electrons at the lowest level can be optically pumped to the highest energy level and photons are emitted as said electrons transition down to the next highest energy level, said first and second layers creating an electron population inversion between the lowest energy level and said next highest energy level.

VOL
1127
ISS
2
JE
11
1991
UMI

5,023,880

SEMICONDUCTOR LASER DEVICE

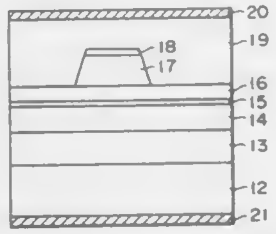
Mariko Suzuki, Yokohama; Kazuhiko Itaya, Tokyo; Masayuki Ishikawa, Nishimine; Yukio Watanabe, and Genichi Hatakoshi, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 12, 1990, Ser. No. 478,961

Claims priority, application Japan, Feb. 22, 1989, 1-40201

Int. Cl.^{5} H01S *3/19*

U.S. Cl. 372—45 **19 Claims**



1. In a semiconductor laser device comprising:

a semiconductor substrate of a first conductivity type, double hetero structure, including a lower cladding layer of the first conductivity type,

an active layer,

a first upper cladding layer of $In_{1-w}(Ga_{1-y}Al_y)_wP$ of a second conductivity type, formed on said semiconductor substrate, a second upper cladding layer of $In_{1-w}(Ga_{1-z}Al_z)_wP$ of the second conductivity type partially formed on said first upper clad layer, a first contact layer of $In_{1-w}(Ga_{1-s}Al_z)_wP$ ($0 \leqq s < z \leqq 1$) of the second conductivity type formed on said second upper cladding layer, and a second contact layer of GaAs of the second conductivity type formed on a first upper cladding layer and said first contact layer, wherein the value of y in $In_{1-w}(Ga_{1-y}Al_y)_wP$ which constitutes said first upper cladding layer, and the value of z in $In_{1-w}(Ga_{1-z}Al_z)_wP$ which constitutes said second upper cladding layer satisfy a relation $0.6 \leqq y < z \leqq 1$;

wherein the value of w in $In_{1-w}(Ga_{1-y}Al_y)_wP$ which constitutes said first upper cladding layer and $In_{1-w}(Ga_{1-z}Al_z)_wP$ which constitutes said second upper cladding layer satisfies relations $0.50 \leqq w \leqq 0.54$, and the value of w in $ln_{1-w}(Ga_{1-s}Al_s)_wP$ in said first contact layer satisfies the relation $0 \leqq w \leqq 1$.

5,023,881

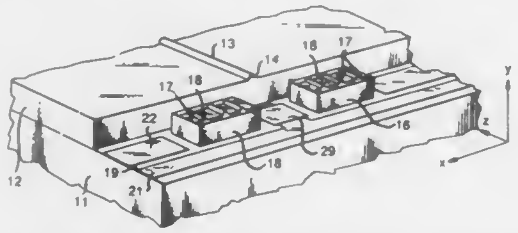
PHOTONICS MODULE AND ALIGNMENT METHOD

David A. Ackerman, Hopewell; Greg E. Blonder, Summit, and William M. Mac Donald, Stockton, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 19, 1990, Ser. No. 540,044

Int. Cl.^{5} H01S *3/19*

U.S. Cl. 372—46 **26 Claims**



1. A method for making an optical module containing a first optical device in predetermined alignment with a second optical device comprising the steps of:

supporting the first optical device on a first member;

supporting the second optical device on a second member;

depositing solder on a second surface of the second member;

aligning the first and second optical devices;

the aligning step comprising the step of abutting first surfaces of the first and second members;

the abutting step comprising the step of causing a third surface of the first member to overhang at least part of the solder and to be separated from the solder by a gap;

melting the solder to cause it to gather to an extent sufficient to contact the overhanging portion of the first member and to fill at least part of the gap;

and cooling to solidify the solder while maintaining said abutment, whereby the first and second members are permanently bonded together with the first and second devices in predetermined alignment.

5,023,882

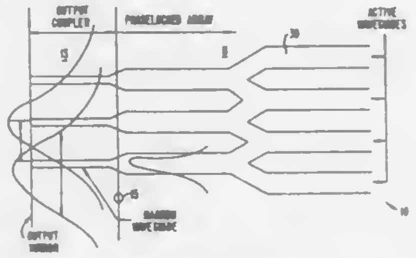
PHASED LOCKED ARRAYS WITH SINGLE LOBE OUTPUT BEAM

Thomas L. Paoli, Los Altos, Calif., assignor to Xerox Corporation, Rochester, N.Y.

Filed May 7, 1990, Ser. No. 519,718

Int. Cl.^{5} H01S *3/19*

U.S. Cl. 372—50 **42 Claims**



1. A semiconductor laser array comprising:

a monolithic semiconductor structure, divided into first and second parts separated by a boundary, having a plurality of semiconductor heterostructure layers disposed over a substrate, at least one of said layers being an active layer for light amplification and propagation under lasing conditions;

means, electrically coupled only to said first part, for applying an electrical forward bias to said layers in said first part to generate light waves in said active layer;

a plurality of index-guided amplification waveguides disposed in said first part for propagating only an in-phase array mode and terminating at said boundary;

a plurality of substantially parallel, spaced apart, low-loss, two-dimensional index-guided output waveguides disposed in said second part, each output waveguide oriented co-axially to a corresponding amplification waveguide and co-extensively coupled thereto at said boundary, with each output waveguide of width S and separated from an adjacent output waveguide by a distance D, said output waveguide for guiding said amplified light waves generated in said corresponding coupled amplification waveguide, each output waveguide providing low confinement of a guided light wave, so that the width, W, of the optical field of said generated light guided by said waveguide is substantially greater than S and greater than about 75% of D.

5,023,883

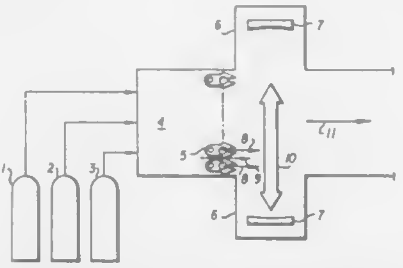
CONTINUOUS WAVE CHEMICALLY PUMPED VISIBLE ULTRAVIOLET LASER BASED ON CONTROLLED CONDENSATION

Theodore A. Jacobs, 4915 Loosestrife Ct., Annandale, Va. 22003, and George Emanuel, 504 Willow Branch Rd., Norman, Okla. 73072

Filed Sep. 26, 1989, Ser. No. 412,421

Int. Cl.^{5} H01S *3/22, 3/223*

U.S. Cl. 372—56 **57 Claims**



1. An apparatus for generating a continuous wave chemically pumped laser, comprising:

a means to produce a metal vapor contained in a nonreacting gas;

a means to produce halogen atoms contained in an inert gas;

a means operatively connected with said metal vapor production means for inputting said metal vapor into a laser cavity and for condensing the metal vapor so as to avoid condensation shocks; and

a means for inputting said halogen atoms into said laser cavity, whereupon when said halogen atoms react with said metal vapor, a laser beam is produced in said laser cavity.

5,023,884

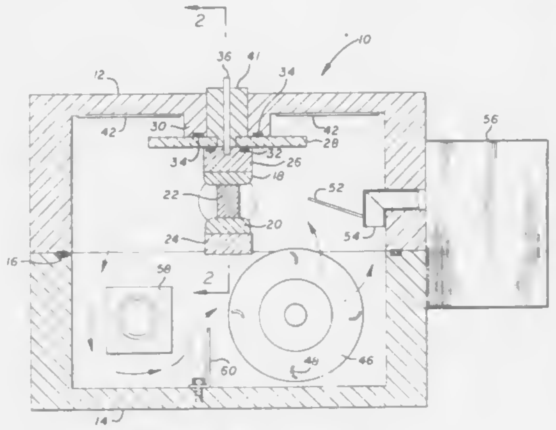
COMPACT EXCIMER LASER

Robert P. Akins; Donald G. Larson, both of San Diego; Uday K. Sengupta, Del Mar, and Richard L. Sandstrom, Encinitas, all of Calif., assignors to Cymer Laser Technologies, San Diego, Calif.

Division of Ser. No. 144,799, Jan. 15, 1988, Pat. No. 4,959,840. This application Jul. 10, 1990, Ser. No. 550,657

Int. Cl.^{5} H01S *3/22*

U.S. Cl. 372—57 **15 Claims**



1. A compact excimer laser, including

a housing structure having a plurality of walls forming an internal laser cavity,

a gas located within the laser cavity and with the gas capable of lasing action,

a pair of spaced electrodes located within the laser cavity and forming an electrical discharge area between the electrodes for stimulating gas within the discharge area to lasing action in accorance with an electrical discharge between the electrodes,

one of the pair of electrodes located along a central position within the cavity and grounded to the housing structure,

the other of the pair of electrodes located adjacent to one of the walls of the housing structure,

a rotating fan located within the laser cavity for circulating the gas through the discharge area,

a brushless DC motor coupled to the fan for providing rotation of the fan, and

the fan including a shaft and wherein the brushless DC motor is formed by a rotor and a stator and with the rotor coupled to the fan shaft and additionally including a sealing member interposed between the rotor and stator to enclose the rotor and with the sealing member sealed to the housing structure to have the rotor effectively sealed within the gas environment and the stator without the gas environment so as to eliminate rotating seals for the motor drive through the housing structure.

5,023,885

EXTERNAL OPTICAL RESONATOR FOR A SEMICONDUCTOR LASER

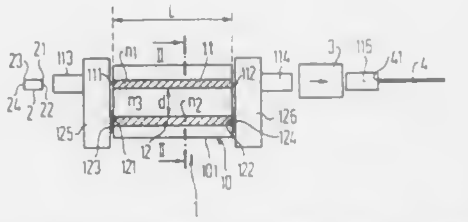
Franz Auracher, Baierbrunn; Eckhard Meissner; Bernd Noll, both of Munich, and Julius Wittmann, Oberhaching, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 24, 1989, Ser. No. 383,755

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1988, 3831943

Int. Cl.^{5} H01S *3/08*

U.S. Cl. 372—92 **15 Claims**



1. An external resonator for a semiconductor laser, said resonator comprising an optical directional coupler having a first optical waveguide having end faces, a second optical waveguide having end faces, said resonator being positioned relative to the semiconductor laser for the optical power beamed out of the laser to be coupled into an end face of the first optical waveguide, said directional coupler having optical feedback means arranged at each of the end faces of the second optical waveguide, said optical feedback means at least partially coupling optical power supplied in the second waveguide back into the second waveguide so that the optical power coupled into the optical directional coupler is coupled out of the other end face of the first waveguide.

5,023,886

HIGH POWER LASER WITH FOCUSING MIRROR SETS

James L. Hobart, Los Altos Hills; Michael W. Sasnett, Los Altos; Wayne S. Mefferd, Los Altos Hills, all of Calif., and Peter N. Allen, Sturbridge, Mass., assignors to Coherent, Inc., Palo Alto, Calif.

Filed Dec. 1, 1988, Ser. No. 278,665

Int. Cl.^{5} H01S *3/08*

U.S. Cl. 372—99 **5 Claims**

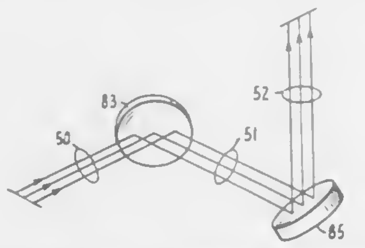
1. A laser system producing a high power laser beam which propagates along a path, and including:

an optical resonator cavity enclosing a lasing medium through which the laser beam propagates along a first portion of the path within the optical resonator cavity,

VOL
1127
ISS
2
JE
11
1991
UMI

wherein the laser beam emerges from the cavity and propagates along a second portion of the path outside the cavity; and

a first mirror set positioned along the first portion of the path within the cavity, said first set having effective focal length providing sufficient focal power to compensate for distributed thermally-induced lensing in the lasing medium and to maintain substantially constant laser beam diameter along a region of the path adjacent said first set, wherein each mirror in the first set is shaped and oriented so that the first set is substantially astigmatism-free, wherein the first set includes a spherical mirror and a cylindrical mirror, and wherein the spherical mirror has a radius of curvature equal to R and the cylindrical mirror has a radius of curvature substantially equal to R, and the first set has an effective focal length substantially equal to $f=\sqrt{2}R/4$.



5,023,887

DATA TRANSMISSION SYSTEM USING SPREAD SPECTRUM COMMUNICATION

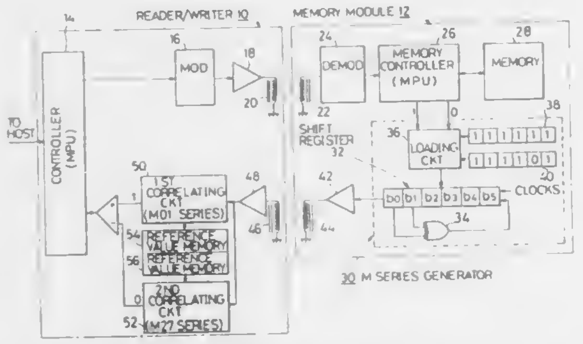
Kunibiko Takeuchi, Kawasaki; Masao Oba, and Shinichi Horinouchi, both of Yokohama, all of Japan, assignors to Tokyo Keiki Company Ltd., Tokyo, Japan

Filed Feb. 12, 1990, Ser. No. 478,502

Claims priority, application Japan, Mar. 2, 1989, 1-50814

Int. Cl.^{5} H04K *1/00*

U.S. Cl. 375—1 **8 Claims**



1. A data transmission system using a spread spectrum communication technique, comprising:

a first unit for requesting a bit transfer; and

a second unit for transmitting serial data bit by bit each time said second unit receives a bit transfer request from said first unit;

wherein said second unit has an M-series generating means for generating a first M-series signal having a predetermined word length in correspondence with one of two binary logic values of one bit of said serial data and for generating a second M-series signal in which a series start position differs although it is the same M-series signal as the first M-series signal in correspondence with the other of said two binary logic values of said one bit of said serial data;

and wherein said first unit has:

a first correlation calculating means for calculating a correlation between a reference signal which has previously been stored and is the same as said first M-series signal and a reception signal output from said second unit;

a second correlation calculating means for calculating a correlation between a reference signal which has previously been stored and is the same as said second M-series signal and said reception signal output from said second unit, and

a discriminating means for comparing magnitudes of a first correlation value which was calculated by said first correlation calculating means and a second correlation value which was calculated by said second correlation calculating means, for thereby discriminating the logic value of the data bit of said reception signal, and for outputting said logic values.

5,023,888

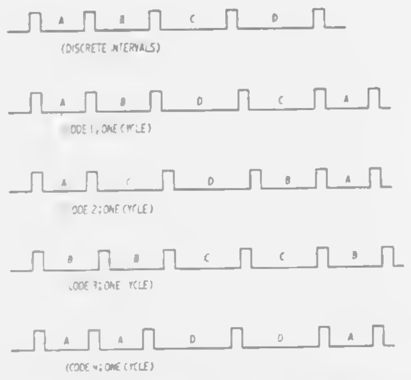
PULSE CODE RECOGNITION METHOD AND SYSTEM

Thomas E. Bayston, Maitland, Fla., assignor to Martin Marietta Corporation, Bethesda, Md.

Continuation-in-part of Ser. No. 277,180, Jul. 24, 1972. This application Feb. 26, 1973, Ser. No. 335,015

Int. Cl.^{5} H03K *7/04;* **G01S** *13/00;* **G06F** *15/336*

U.S. Cl. 375—23 **29 Claims**



1. A wave energy decoding system comprising:

means for receiving pulses of wave energy including pulses spaced in accordance with a pseudo-random, cyclically repetitive code, the spacing of the pulses of said code defining a plurality of sequential pairs of time intervals, each pair of time intervals being unique within one cycle of said code;

a first plural stage shift register;

means responsive to said pulse receiving means for clocking received pulses into said first shift register at a first predetermined rate;

means for generating a series of pulses defining said pseudo-random, cyclically repetitive code;

a second plural stage shift register;

means responsive to said pulse generating means for clocking generated pulses into said second shift register at a second predetermined rate higher than said first predetermined rate;

means for comparing the signal levels of corresponding stages of said first and second shift registers; and,

means responsive to said comparison means for generating a specific signal.

5,023,889

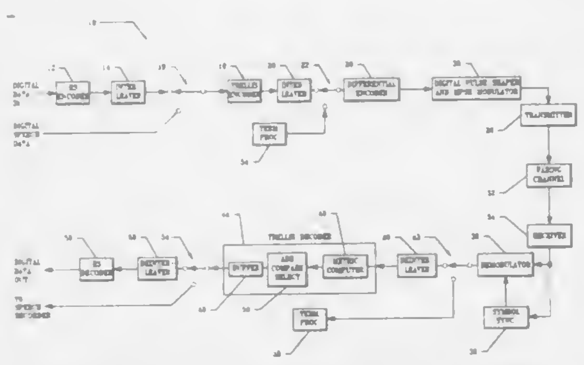
TRELLIS CODED MULTILEVEL DPSK SYSTEM WITH DOPPLER CORRECTION FOR MOBILE SATELLITE CHANNELS

Dariush Divsalar, Pacific Palisades, and Marvin K. Simon, La Canada, both of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed May 31, 1988, Ser. No. 200,742

Int. Cl.^{5} H04L *27/18, 1/00*

U.S. Cl. 375—27 **24 Claims**



1. A transmitter for a trellis coded multilevel differential phase shift keyed mobile communication system comprising:

multiple trellis encoder means for translating input signals into multiple trellis codes;

differential encoder means for differentially encoding said multiple trellis coded signals; and

means for transmitting said differentially encoded multiple trellis coded signals.

5,023,890

DIGITAL PEAK NOISE REDUCTION CIRCUIT

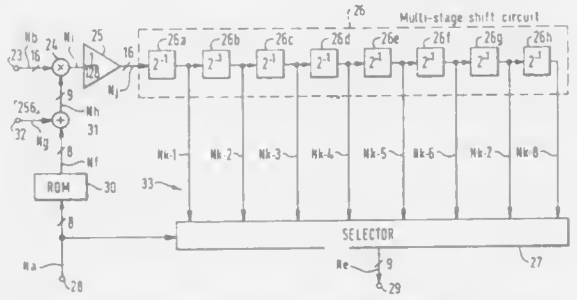
Kazuo Konishi, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Mar. 29, 1989, Ser. No. 330,037

Claims priority, application Japan, Mar. 31, 1988, 63-78772

Int. Cl.^{5} H03K *21/00;* **G06F** *7/50, 7/52*

U.S. Cl. 375—34 **10 Claims**



6. A division circuit for dividing a dividend by one of a plurality of divisors, comprising:

memory means responsive to said one of said plurality of divisors for selectively supplying one of a plurality of reciprocal related data stored therein, the reciprocal related data corresponding to reciprocals of said one of said divisors according to different expansion rates, each expansion rate corresponding to a different specific range of said plurality of divisors so that the reciprocal related data corresponding to each different specific range of said plurality of divisors has the same expanded range;

multiplication means for multiplying the dividend by the reciprocal related data output from the memory means; and

multi-stage shift means responsive to said one of said plurality of divisors for selectively compressing the output data from the multiplication means by different compression rates, the compression rates corresponding to the expansion rates of the memory means so that the multi-stage shift means produces digital quotient data having a level compensated by an amount equal to the expansion rate selected in the memory means by the compression rate selected in the multi-stage shift means.

5,023,891

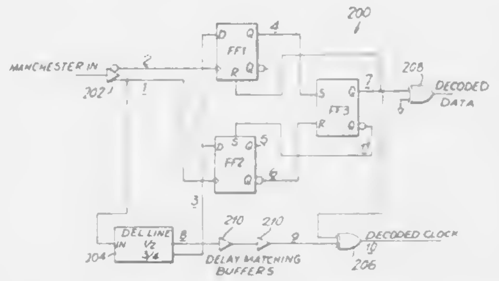
METHOD AND CIRCUIT FOR DECODING A MANCHESTER CODE SIGNAL

Hoke S. Johnson, III, Monte Sereno, Calif., assignor to SF2 Corporation, Sunnyvale, Calif.

Filed Jul. 25, 1989, Ser. No. 385,534

Int. Cl.^{5} H03D *3/22;* **H04L** *27/22*

U.S. Cl. 375—87 **13 Claims**



5. An apparatus for decoding a Manchester code signal having data cells each defined by a pair of high state and low state code bit cells and a rising or falling state transition between the code bit cells, the apparatus comprising:

first and second latch means each having a data input, a clocking input, and a data output, for latching a data signal from the data input to the data output when a clocking edge is present at the clocking input;

means for delaying the Manchester code signal between one and two code bit cells and for supplying the delayed code signal to each of the data inputs of the first and second latch means;

means for clocking the first latch means by providing a clocking edge to the clocking input of the first latch means in accordance with each falling transition of the Manchester code signal;

means for clocking the second latch means by providing a clocking edge to the clocking input of the second latch means in accordance with each rising transition of the Manchester code signal:

means for generating a data output signal at a data output, the data output signal generating means having first and second output respectively to low and high state states corresponding and first and second control inputs;

first circuit means coupled to the first latch means and the data output signal generating means for supplying a first control signal to the first control input of the data output signal generating means when the delayed Manchester code signal supplied to the data input of the first latch means is in a high state when latched by the first latch means, the first control signal causing the data output signal generating means to operate in a first output state; and

second circuit means coupled to the second latch means and the data output signal generating means for supplying a second control signal to the second control input of the data output signal generating means when the delayed Manchester code signal supplied to the data input of the second latch means is in a low state when latched by the second latch means, the second control signal causing the data output signal generating means to operate in a second output state,

whereby the data output signal generating means generates a

VOL
1127
ISS
2
JE
11
1991
UMI

data output signal representative of data encoded in the Manchester code signal.

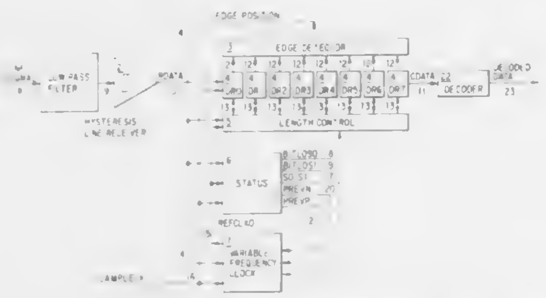
5,023,892
SYSTEM FOR DETECTING AND CORRECTING SIGNAL DISTORTION

Adrian Stoica, Silver Spring, Md., assignor to Printer Systems Corporation, Gaithersburg, Md.

Filed Apr. 6, 1990, Ser. No. 505,597

Int. Cl.⁵ H04L *25/08*

U.S. Cl. 375—118 **3 Claims**



1. A device for detecting and correcting signal distortion in a received digital signal comprising a series of signal pulses whose parameters are defined by transitions in the amplitude of said signal pulses, which device comprises

- A. Means for sampling said signal pulses a predetermined number of times;
- B. Variable length shift register means for selectively storing and retrieving said predetermined number of signal pulse values comprising
  - 1. A variable number of memory cells for selectively receiving and storing said pulse values;
  - 2. Means to selectively pass said signal pulse values sequentially through said memory cells;
  - 3. Means for selectively varying the number of said memory cells receiving said signal pulse values to thereby correct distortion in said received signal caused by aberrations in the position of signal pulse transitions.
- C. Means for generating a variable frequency reference clock;
- D. Means for synchronizing said reference cock with said sampled signal pulse values such that the position of transitions defining said signal pulses is predicted to occur at the middle of said shift register means.

5,023,893
TWO PHASE NON-OVERLAPPING CLOCK COUNTER CIRCUIT TO BE USED IN AN INTEGRATED CIRCUIT

Ho-Ming Leung, San Francisco, and Edward T. Pak, Fremont, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Oct. 17, 1988, Ser. No. 258,745

Int. Cl.⁵ H03K *23/44, 21/02, 21/10*

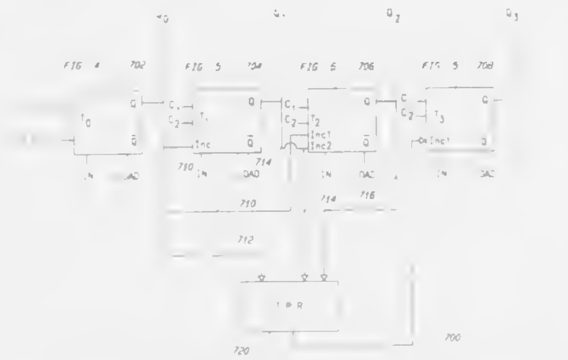
U.S. Cl. 377—117 **17 Claims**

1. A counter cell to be utilized in a two phase clock counter circuit, the cell having first and second clock signal inputs for receiving first and second clock signals, and having an output, said counter cell consisting of:

a present value stage for providing an output signal representing the count of said cell, said present value stage including an input, a first passgate coupled to said input and including means for receiving the second clock signal, and a first inverter, having an input and an output, said first inverter being coupled to said first passgate for transferring the logical inverse of data information present at its input to its output and to the output of said cell responsive to said second clock signal;

a second inverter, having an input and an output, said input of said second inverter being coupled to said output of said first inverter;

a next value stage for providing data information to the input of said present value stage, said next value stage including a second passgate, responsive to said first clock signal, and a third inverter coupled to said second passgate for transferring data information to said present value stage input responsive to said first clock signal;



means, coupled to the output of said counter cell, for providing a control signal;

an increment control passgate coupled to said second inverter and responsive to said control signal for selectively coupling the output signal to said second inverter; and

means for inputting both a logical one or logical zero to said counter cell coupled to said present value stage input

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5,023,894
DATA CORRECTING DEVICE FOR USE WITH COMPUTED TOMOGRAPHY APPARATUS

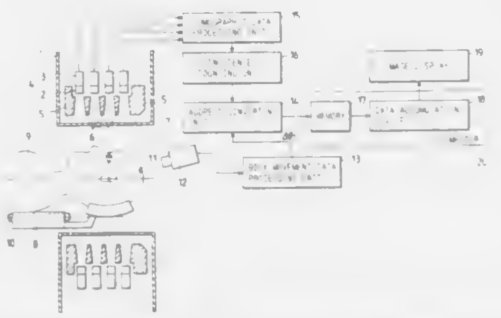
Takaji Yamashita; Mitsuo Watanabe; Hiroyuki Okada, and Keiji Shimizu, all of Shizuoka, Japan, assignors to Hamamatsu Photonics K.K., Shizuoka, Japan

Filed Feb. 2, 1990, Ser. No. 473,746

Claims priority, application Japan, Feb. 7, 1989, 1-28230

Int. Cl.⁵ A61B *6/00*

U.S. Cl. 378—4 **5 Claims**



1. A data correcting device for use with a computed tomography apparatus for obtaining a tomographic image with a subject holding means being positioned in a gantry, comprising:

body movement sensing means for detecting a body movement of a subject under examination;

body movement data processing means for converting body movement data from the body movement sensing means into address correcting data;

tomographic data processing means for processing tomographic data obtained in the gantry;

address converting means for correcting an address of the tomographic data with the address correcting data; and

memory means for storing at least corrected tomographic data.

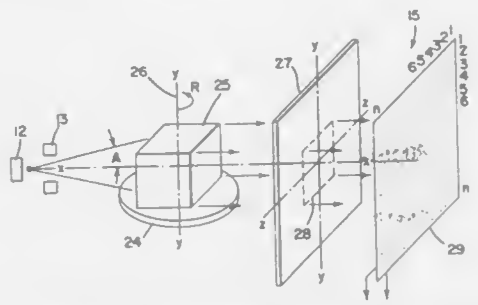
5,023,895
THREE DIMENSIONAL TOMOGRAPHIC SYSTEM

William K. McCroskey, Solon, and David S. Vickers, Macedonia, both of Ohio, assignors to Innovative Imaging Systems, Inc., Cleveland, Ohio

Filed Mar. 2, 1989, Ser. No. 317,767

Int. Cl.⁵ A61B *6/00;* **H05G** *1/02;* **G03B** *42/02*

U.S. Cl. 378—4 **23 Claims**



1. A computerized tomographic industrial radiation system for constructing a three dimensional transparent image of at least a portion of an object comprising:

a point source generator for generating a non-pulsed, three dimensional cone beam of emitted rays of hard radiation;

collimator means associated with said point source generator for controlling the three dimensional cone beam angle and the peripheral configuration of said three dimensional cone beam;

positioning means for locating said object in the path of said three dimensional cone beam such that a predetermined volumetric portion of said object is exposed to said three dimensional cone beam of hard radiation for attenuation of the radiation passing through said object;

two dimensional detector means fixed with respect to said point source generator and located on the opposite side of said object from said point source generator for recording the attenuated radiation, said two dimensional detector means including a scintillation screen for receiving said attenuated radiation and converting said attenuated radiation through said scintillation screen into a two dimensional shadow image;

digitizing means for converting said two dimensional shadow image into an ordered array of digitized numbers from analog signals initially generated by said two dimensional detector means, each digitized number in said ordered array corresponding to the energy level of an attenuated beam of radiation at a given location in said ordered array;

said positioning means including means for positioning said object in a three dimensional relationship relative to said point source generator and means for intermittently rotating said object relative to said point source generator and said two dimensional detector means about only one axis of said object through predetermined angular increments, said axis centered at said predetermined volumetric portion;

means for recording said digitized numbers during the time said means for intermittently rotating is unactuated;

imaging means for constructing a three dimensional transparent image of said predetermined volumetric portion from said digitized numbers after a predetermined number of angular rotations whereby said three dimensional image can be constructed;

said point source generator is centered along an x axis and situated at a predetermined distance from said object and operable to produce a plurality of emitted beams of radiation emanating from said point source generator in generally straight lines which define a three dimensional fan shaped array of emitted radiation beams;

said scintillation screen centered with respect to said x axis and extending along a y axis and a z axis perpendicular to one another and to said x axis for generating visible light in response to the energy level of attenuated radiation beams impacting thereon;

a plurality of detectors arranged in a generally ordered array correlated in a position to said y axis and z axis, each detector operable to generate an analog signal indicative of the light energy transmitted thereto from said scintillation screen;

said imaging means further effective to store a priori information related to said analog signal during an initial rotation of said object; and

dynamic flux integration means for narrowing the variation between the analog signals generated by said detectors within said ordered array between various rotational positions of said object to enhance the resolution of the image produced by said imaging means, said dynamic flux integration means including means for integrating over a time period said analog signals generated by said detectors and means for varying said time period actuated by said imaging means in accordance with said a priori data and correlated to the mass density of said object at any given angular rotation such that a longer integrating time is provided when the mass density of said object penetrated by said hard radiation over a predetermined volumetric portion of said object is higher than the mass density of said object at another predetermined volumetric portion, and said imaging means further correlated to said positioning means to adjust the digitized numbers of said detectors in response to the variation in the time of integration.

5,023,896
X-RAY TELEVISION APPARATUS

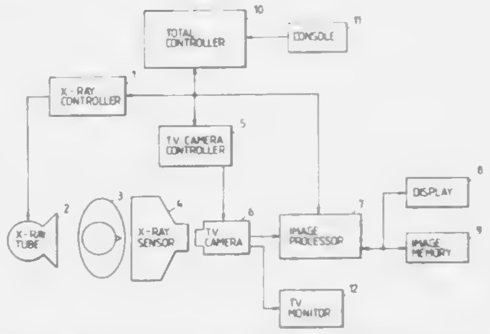
Hisatake Yokouchi, Nishitama; Yukio Takasaki, Mobara; Tadaaki Hirai, Koganei; Kouichi Koike; Masayuki Tsuneoka, both of Kashiwa; Yoichi Onodera, Hachiouji, and Takakazu Funo, Nishitama, all of Japan, assignors to Hitachi-Medical Corporation, Tokyo, Japan

Filed May 25, 1989, Ser. No. 356,419

Claims priority, application Japan, May 27, 1988, 63-129961

Int. Cl.⁵ H05G *1/58*

U.S. Cl. 378—99 **16 Claims**



1. An X-ray television apparatus comprising:

X-ray generating means for applying X-rays to an object to be inspected;

an X-ray sensor for converting an X-ray projection image of said object into an optical image and forming a real image thereof;

a TV camera including an image pick-up tube having a photoconductive layer with a structure enabling blocking of charge injection into said photoconductive layer due to an electric field, and enabling operations of avalanche multiplication and non-avalanche multiplication in said photoconductive layer, said TV camera receiving said real image and converting said real image into a video signal for each of the avalanche multiplication and non-avalanche multiplication operations in said photoconductive layer in said image pick-up tube;

VOL
1127
ISS
2
JE
11
1991
UMI

a TV monitor for displaying the video signal delivered out of said TV camera in real time;
recording means for recording a radiograph of said object by using the video signal delivered out of said TV camera; and
control means for enabling switching of the operations of said photoconductive layer between the operation enabling said avalanche multiplication and the operation enabling said non-avalanche multiplication;
wherein said control means enables said avalanche multiplication operation in said photoconductive layer in a first operation mode in which said video signal is displayed by said TV monitor in real time, and enables said non-avalanche multiplication in said photoconductive layer in a second mode in which said radiograph is recorded by said recording means.

5,023,897

DEVICE FOR GENERATING X-RADIATION WITH A PLASMA SOURCE

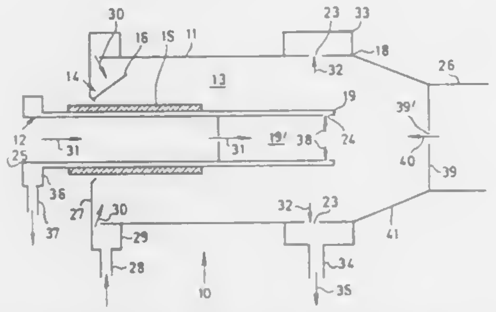
Willi Neff, Kelmis, Belgium; Raymond Holz, Herzogenrath, Fed. Rep. of Germany; Rainer Lebert, Aachen, Fed. Rep. of Germany, and Franz Richter, Olching, Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenbeim/Brenz, Fed. Rep. of Germany

Filed Aug. 16, 1990, Ser. No. 568,193

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1989, 3927089

Int. Cl.^{5} H01J *35/00*

U.S. Cl. 378—122 **12 Claims**



1. In a device for generating, X-radiation with a plasma source, said device having concentric inner and outer cylindrical electrodes (**11, 12**) separated by an insulator (**15**) and connected to a high-voltage electrical energy source with a controlled high-power switch, said electrodes forming between them an evacuated discharge space (**13**) closed at one end (**14**) and filled with low-pressure gas, and having means (**16**) for initiating a plasma discharge so that the plasma is accelerated to the other end (**18**) of the discharge space and, in the region of an open end (**19**) of the cylindrical inner electrode (**12**), is compressed into a plasma focus (**21**) emitting X-radiation, the improvement comprising:
a first duct for injecting a discharge gas, which is optimal for initiating and accelerating the plasma, into said discharge space;
a second duct for injecting an emitting gas, which is different from said discharge gas and which provides an optimal yield of X-radiation in a selected wavelength range, into said inner cylindrical electrode; and
an extraction duct, spaced from said first and second ducts, for evacuating said emitting and discharge gases for minimizing the intermixing of said gases in said discharge space.

5,023,898

X-RAY RADIOGRAPHIC SYSTEM

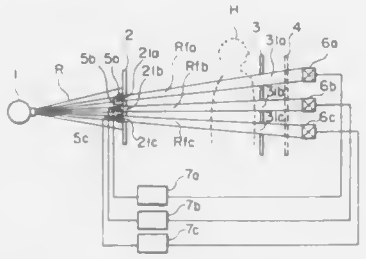
Mikio Kawasaki, and Masatoshi Iwata, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jan. 26, 1990, Ser. No. 470,979

Claims priority, application Japan, Feb. 2, 1989, 1-24964

Int. Cl.^{5} G21K *5/10*

U.S. Cl. 378—146 **11 Claims**



1. An X-ray radiography system comprising an exposure apparatus having;
(1) an X-ray radiating means
(2) a collimator for generating a fan-beam
(3) a regulator movable along the fan-beam scanning direction and for dividing the fan-beam into a plurality of angle section and controlling penetrating power, and
(4) a silver halide photosensitive material comprising at least one emulsion layer having a covering power of not less than 45.

5,023,899

METHOD AND ARRANGEMENT FOR X-RAY PHOTOGRAPHY OR THE LIKE

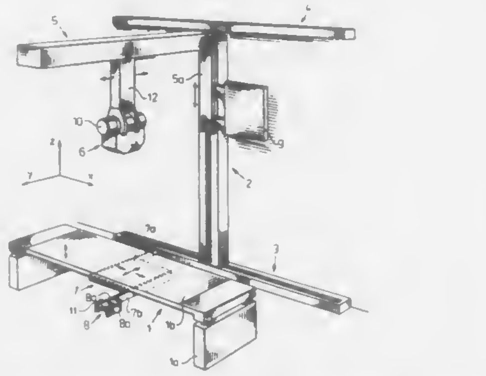
Carl-Eric Ohlson, Vintervagen 25, S-171 34 Solna, Sweden

PCT No. PCT/SE87/00288, § 371 Date Dec. 5, 1989, § 102(e) Date Dec. 5, 1989, PCT Pub. No. WO88/10095, PCT Pub. Date Dec. 29, 1988

PCT Filed Jun. 18, 1987, Ser. No. 435,467

Int. Cl.^{5} H05G *1/02*

U.S. Cl. 378—196 **15 Claims**



1. A method of X-ray photography in which there is used a beam or radiation source which is carried for movement in the X, Y and Z directions and can be rotated about a horizontal axis, a patient support table and a receptor unit which is carried beneath the table for movement in the X- and the Y-directions and which when displaced linearly results in automatic movement of said source, characterized in that activation of a secondary receptor associated with the receptor unit and extending in the vertical plane results in automatic movement of said source to a basic setting for a horizontal, centered beam path on the secondary receptor.

5,023,900

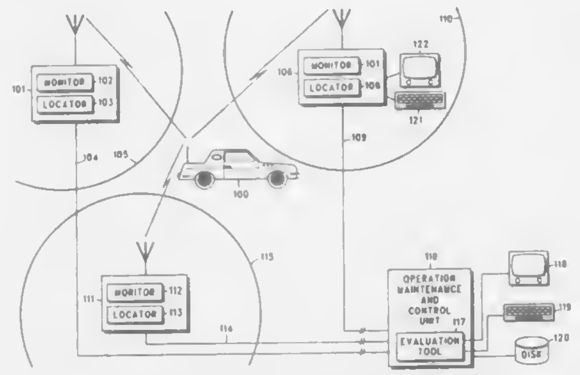
CELLULAR RADIOTELEPHONE DIAGNOSTIC SYSTEM

Daniel R. Tayloe, 1109 E. Kensington Rd., and Jeffrey D. Bonta, 1300 E. Mayfair, both of Arlington Heights, Ill. 60004

Filed Dec. 7, 1989, Ser. No. 447,455

Int. Cl.^{5} H04M *3/24, 11/00;* **H04B** *11/00*

U.S. Cl. 379—32 **31 Claims**



1. A method of evaluating the electromagnetic coverage of a geographic area serviced by a communication system having a plurality of base stations each having a transmitter and a receiver for transmitting to and receiving communicating message signals from a plurality of mobile units each having transmitters and receivers comprising the steps of:
locating the position of at least one mobile unit operating within the geographic area;
monitoring the signal strength and the signal quality of transmissions between said base stations and the mobile unit; and
providing a computer generated representation of characteristics of the electromagnetic coverage determined by monitoring, whereby an operator is assisted in planning, diagnosing, or optimizing the electromagnetic coverage of that communication system.

5,023,901

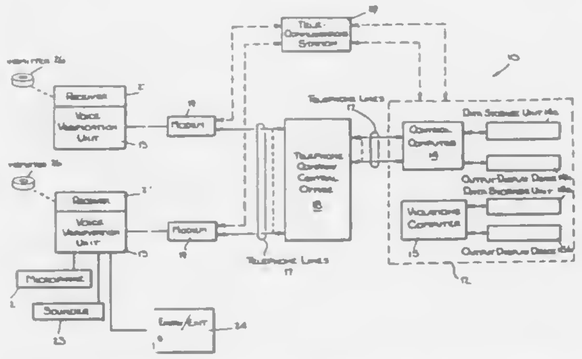
SURVEILLANCE SYSTEM HAVING A VOICE VERIFICATION UNIT

Paul Sloan, Croton, N.Y.; Gregory Tuai, Seattle, Wash.; Julio Jimenez, and Raymond Jimenez, both of New City, N.Y., assignors to Vorec Corporation, Tarrytown, N.Y.

Filed Aug. 22, 1988, Ser. No. 235,085

Int. Cl.^{5} H04M *11/04;* **G08B** *23/00, 26/00;* **H04Q** *7/00*

U.S. Cl. 379—38 **73 Claims**



1. A surveillance system comprising
a central station for storing data regarding the status of each individual under surveillance, said station having an input to receive data and an output to transmit data and command signals;
a plurality of remote stations, each located at a designated locality for a respective individual and having a first input to receive data and command signals from said central station, a second input to receive active monitoring signals from a respective individual, a third input to receive passive monitoring signals from a respective individual, test means to analyze the active and passive monitoring signals according to the data and command signals received from said central station, storage means connected to said test means for receiving and storing the analysis results from said test means; an output to transmit data and the analysis results from said storage means to said central station, and monitoring means for monitoring the condition of a power line which supplies operating power for said remote station, said monitoring means being connected to said output to transmit the data from said monitoring means to said central station; and
means for selectively connecting said central station with each said remote stations.

5,023,902

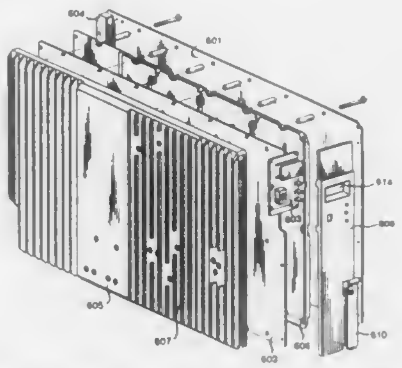
RADIO CHANNEL UNIT MESSAGE AND CONTROL SIGNAL PROCESSING ARCHITECTURE

Carl R. Anderson, Summit; Paul R. Comrie, Irvington; Peretz M. Feder, Englewood, and George I. Zysman, Mendham, all of N.J., assignors to AT&T Bell Laboratories, Muray Hill, N.J.

Filed Jan. 31, 1990, Ser. No. 473,011

Int. Cl.^{5} H04M *11/00*

U.S. Cl. 379—59 **7 Claims**



1. A cellular mobile telephone system, comprising:
a signal processing module for processing speech and control signals,
a radio transceiver module for transmitting and receiving radio signals,
the signal processing moldule and radio transceiver module combined mechanically and electrically into a single package, and the signal processing module being electrically connected between the radio transceiver module and a mobile telephone switching office,
the single package including;
first and second circuit boards for supporting the signal processing module and the radio transceiver module and being connected together,
a connector block mechanically mounted on at least one of the first and second circuit boards and operative for electrically coupling the radio transceiver module and the signal processing module to a supporting frame backplane of the cellular mobile telephone system and being electrically connected to the signal processing module and the radio transceiver module and having pin receptacle connections for data and control signals of the signal processing module and coaxial connectors for rf signals of the radio transceiver module.

VOL
1127
ISS
2
JE
11
1991
UMI

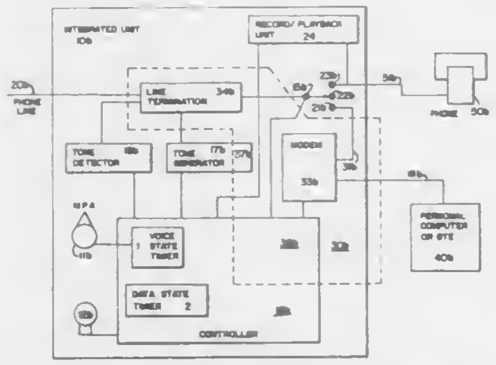
5,023,903
IMPROVED VOICE & DATA TELECOMMUNICATIONS APPARATUS

Frederic W. Bowen, 518 N. Waterman St., Arlington Heights, Ill. 60004

Continuation-in-part of Ser. No. 192,103, May 9, 1988, abandoned. This application Jul. 7, 1989, Ser. No. 376,750

Int. Cl.⁵ H04M *1/64, 11/00*

U.S. Cl. 379—67 **26 Claims**



1. Apparatus for transmitting analog voice and data communications on a phone line utilizing a telephone, a data terminal and a modem, the modem being connected to the data terminal, said apparatus comprising:

(a) a mode switch adapted to be connected to the phone line, to the modem and to the telephone, said mode switch having at least first and second positions, when in said first position the phone line being connected to the modem and the telephone being disconnected and when in the second position the phone line being connected to the telephone and the modem being disconnected;
(b) a controller connected to said mode switch for placing said mode switch in said first position or in said second position;
(c) a data transition tone generator connected to said controller and adapted to be connected to the phone line; and
(d) a transition button means for actuating said tone generator to produce a unique tone signal other than modem carrier on the phone line just prior to the time that said controller changes the position of said mode switch.

5,023,904
DIRECT TELEPHONE DIAL ORDERING SERVICE

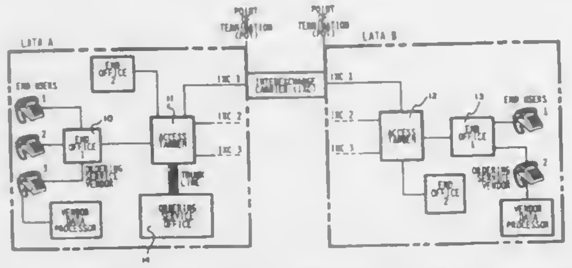
Murray Kaplan, Cherry Hill, and Robert W. Humes, Moorestown, both of N.J., assignors to Science Dynamics Corporation, Cherry Hill, N.J.

Continuation-in-part of Ser. No. 294,877, Jan. 9, 1989, abandoned, which is a continuation-in-part of Ser. No. 81,670, Aug. 4, 1987, Pat. No. 4,797,913. This application Oct. 12, 1989, Ser. No. 420,547

The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

Int. Cl.⁵ H04M *11/00*

U.S. Cl. 379—91 **12 Claims**



1. A system providing for automated ordering of products and services by a calling customer by direct telephone dialing to provide customer identification and vendor and product or service identification originating within a Local Access and Transport Area (LATA) switching network which network provides Feature Group D services having a predetermined dialing plan which establishes an Interexchange Carrier (IXC) designation and called number and which network, through Feature Group D services, also provides Automatic Number Identification (ANI) of the calling customer wherein the system utilizes the ANI information for customer identification and the called number information for vendor, product or service identification and the IXC designation is used by the LATA switching network for routing to the system comprising:

data receiving and storage means assigned an IXC number and interconnected to the LATA switching network to receive calls at a point of termination as an IXC based upon the IXC designation and to store the called number and the ANI information; and
data processing means programmed to receive and process, from the data receiving and storage means, the ANI information representing the calling customer and the called number information representing the vendor and products or services ordered by the calling customer.

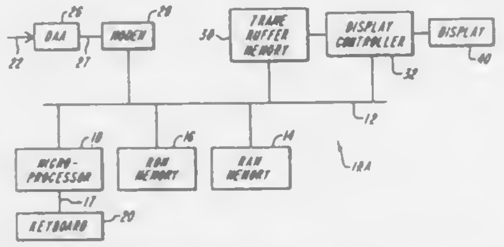
5,023,905
POCKET DATA RECEIVER WITH FULL PAGE VISUAL DISPLAY

Benjamin A. Wells, Newton, and Neil Golden, Sharon, both of Mass., assignors to Reflection Technology, Inc., Waltham, Mass.

Filed Jul. 25, 1988, Ser. No. 223,833

Int. Cl.⁵ H04M *11/00*

U.S. Cl. 379—96 **21 Claims**



1. A pocket-size data receiver comprised of:

signal receiving means arranged to receive signals representing data;
signal processing means arranged to process signals from the signal receiving means;
a means for selectively controlling the operation of said data receiver, and, in particular, the display of said data;
display means, responsive to said data, for generating a magnified, virtual-image visual data display comprised of a number of picture elements, said display means comprising a number of light-emitting elements wherein said number of light-emitting elements is less than said number of picture elements; and
a pocket-size housing enclosing said signal receiving means, said signal processing means, said controlling means and said display means.

5,023,906
METHOD FOR MONITORING TELEPHONE CALL PROGRESS

Robert G. Novas, Rockville, Md., assignor to The Telephone Connection, Rockville, Md.

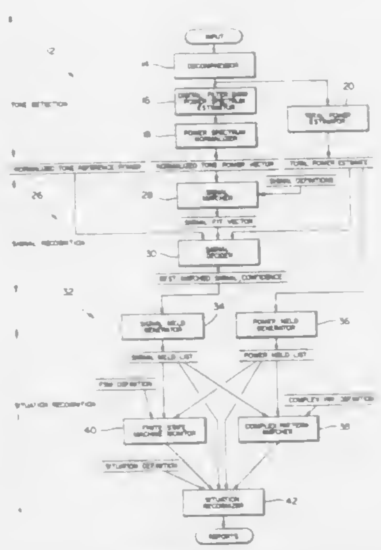
Filed Apr. 24, 1990, Ser. No. 513,857

Int. Cl.⁵ H04M *11/00, 1/26*

U.S. Cl. 379—372 **37 Claims**

25. A system for monitoring the progress of a phone call placed by a host or other automated device, the system comprising:

a host for placing a phone call over the phone lines and issuing a Recognize Situation Command specifying a particular situation to be detected;
call progress monitor means responsive to said Recognize Situation Command and generating a Recognize Command Termination Report; and
means for communicating said Recognize Situation Command from said host to said call progress monitor means and for communicating said Recognize Command Termination Report from said call progress monitor means to said host;
said call progress monitor means:
detecting audio signals on a phone line, determining a power spectrum of said audio signals periodically over a predetermined period of time, said power spectrum being defined by the presence of power at each of a predetermined number of select frequencies from the detected audio signals
determining the total power of said audio signals periodically over said predetermined period of time;
providing a plurality of signal definitions corresponding to possible signals to be recognized each of which being defined by the presence of power at a unique combination of said predetermined number of select frequencies and the absence of power at unique combination of said predetermined number of select frequencies;
comparing the power spectrum with each of said signal definitions periodically over said predetermined period of time;
identifying the possible signal from said plurality of signal definitions which most closely matches the power spectrum;
storing data corresponding to the possible signal which most closely matches the power spectrum in a signal meld list at the end ot said predetermined period of time;
storing the power of said audio data in a power meld list at the end of said predetermined period of time;
accumulating data of matched signals in said signal meld list over time;
accumulating data of the total power of said audio signals over time;
providing a plurality of situation definitions, each situation definition comprising commands for examining said signal meld list and said power meld list for detecting select ones of said possible signals, each situation definition dedicated to detecting the presence of a particular one or ones of said possible signals in said audio data in preset patterns or for preset time durations;
examining said signal meld list and said power meld list periodically at said predetermined period of time according to said particular situation specified in said Recognize Situation Command which corresponds to a particular situation definition;
identifying which of said possible signals or preset patterns of possible signals match with the contents of said signal meld list and said power meld list; and
reporting to the host the possible signal or preset pattern of possible signals that match with the contents of said signal meld list and said power meld list in said Recognize Command Termination Report.



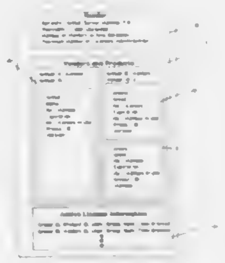
5,023,907
NETWORK LICENSE SERVER

Herrick J. Johnson, Marblehead, Mass.; Margaret Olson, Nashua, N.H.; Stuart Jones, Cambridge, Mass.; Stephanie Bodoff, Somerville, Mass.; Stephen C. Bertrand, Waltham, Mass., and Paul H. Levine, Carlisle, Mass., assignors to Apollo Computer, Inc., Chelmsford, Mass.

Filed Sep. 30, 1988, Ser. No. 252,556

Int. Cl.⁵ H04L *9/00*

U.S. Cl. 380—4 **26 Claims**



1. A network license server comprising:

a license database;
a user database;
means for generating a digital signal in response to a user's request for access to selected software, said signal being transmitted via a network to which said license server is connected;
a license server daemon having access to said license database and said user database;
said license server daemon operative to compare said signal generated by said means for generating a digital signal with information in said license and user databases to determine whether access to said selected software should be granted to said user; and
means for generating a second digital signal permitting access to said selected software if access is permitted, said second digital signal being transmitted via a network to which said license server is connected.

5,023,908
METHOD AND APPARATUS FOR PERSONAL IDENTIFICATION

Kenneth Weiss, 7 Park Avenue, Newton, Mass. 02158

Continuation-in-part of Ser. No. 802,579, Nov. 27, 1985, Pat. No. 4,885,778, which is a continuation-in-part of Ser. No. 676,626, Nov. 30, 1984, Pat. No. 4,720,860. This application Apr. 21, 1989, Ser. No. 341,932

Int. Cl.⁵ H04L *9/32*

U.S. Cl. 380—23 **15 Claims**

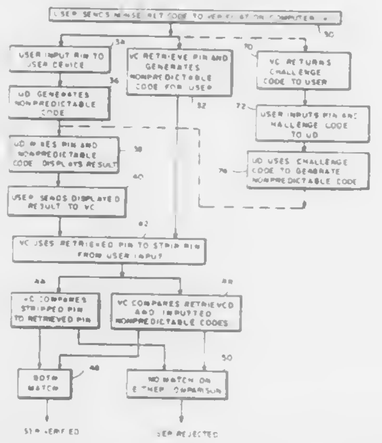
9. A method for identifying an individual comprising the steps of:

utilizing a device int he possession of the individual to generate a unique time-varying, nonpredictable code;
mixing the nonpredictable code generated at a given time

VOL 1127 ISS 2 JE 11 1991 UMI

with a secret PIN for the individual to generate a combined code; and

communicating a nonsecret identifying code for the individual and the combined code to a central verification computer;

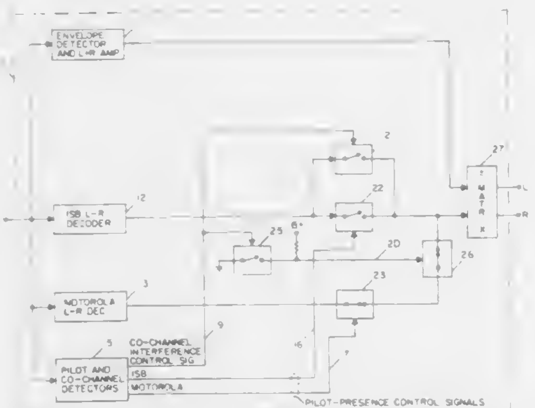

USER SENDS NONSECRET CODE TO VERIFICATION COMPUTER
30
USER INPUT PIN TO USER DEVICE
34
VC RETRIEVE PIN AND GENERATES NONPREDICTABLE CODE FOR USER
70
VC RETURNS CHALLENGE CODE TO USER
36
UD GENERATES NONPREDICTABLE CODE
32
72
USER INPUTS PIN AND CHALLENGE CODE TO UD
UD MIXES PIN AND NONPREDICTABLE CODE DISPLAYS RESULT
38
40
UD USES CHALLENGE CODE TO GENERATE NONPREDICTABLE CODE
74
USER SENDS DISPLAYED RESULT TO VC
42
VC USES RETRIEVED PIN TO STRIP PIN FROM USER INPUT
44
46
VC COMPARES STRIPPED PIN TO RETRIEVED PIN
VC COMPARES RETRIEVED AND INPUTTED NONPREDICTABLE CODES
50
BOTH MATCH
48
NO MATCH ON EITHER COMPARISON
USER VERIFIED
USER REJECTED

the verification computer utilizing the nonsecret identifying code to retrieve the PIN and appropriate nonpredictable code for the individual, stripping the PIN from the communicated combined code, and utilizing the retrieved PIN and nonpredictable code, the stripped PIN and the remaining nonpredictable code to perform a verification operation.

5,023,909
MULTI-SYSTEM AM STEREO RECEIVER HAVING PREFERRED MODE OF OPERATION

Leonard R. Kahn, 137 E. 36th St., Apt. 6A, New York, N.Y. 10016

Filed Sep. 25, 1989, Ser. No. 412,035
Int. Cl.^{5} H04H *5/00*
U.S. Cl. 381—15 3 Claims


ENVELOPE DETECTOR AND L+R AMP
INPUT
ISB L-R DECODER
12
MOTOROLA L-R DEC
3
PILOT AND CO-CHANNEL DETECTORS
5
CO-CHANNEL INTERFERENCE CONTROL SIG
ISB
MOTOROLA
9
PILOT-PRESENCE CONTROL SIGNALS
2
22
25
20
23
26
27
MATRIX
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R

1. An improved stereo decoder, for use in an AM stereo receiver for AM stereo signals which have been generated in accordance with a selected AM stereo system and which are adversely affected by co-channel type interference, comprising:

means for supplying an intermediate-frequency signal corresponding to a received radio-frequency AM stereo signal;

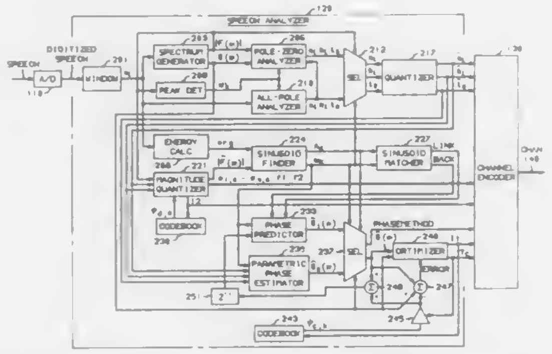
means for detecting the presence of co-channel type interference in said intermediate-frequency signal and for developing a control signal indicative thereof;

and means, responsive to said IF signal and to said control signal and capable of at least two different modes of stereo signal decoding, for decoding received AM stereo signals in a first stereo mode which suffers adverse effects from the presence of co-channel type interference, said first stereo mode using envelope detection to develop a signal representative of stereo sum signal (L+R) information in said intermediate frequency signal, and for switching to a second stereo mode when the presence of co-channel type interference is indicated by said control signal, said second stereo mode using synchronous detection to develop an (L+R) representative signal and being less adversely affected by co-channel type interference.

5,023,910
VECTOR QUANTIZATION IN A HARMONIC SPEECH CODING ARRANGEMENT

David L. Thomson, Lisle, Ill., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 8, 1989, Ser. No. 321,119
Int. Cl.^{5} G10L *7/02*
U.S. Cl. 381—37 20 Claims



20. A harmonic coding arrangement for processing speech comprising

means responsive to said speech for determining a spectrum comprising a Fourier transform of said speech,

means responsive to said determining means for calculating, based on said determined spectrum, a set of parameters modeling said speech, at least one parameter of said parameter set comprising an index to a codebook of vectors,

means for communicating said calculated parameter set including said index,

means for receiving said communicated parameter set including said index,

means for processing said received parameter set including said index to determine a plurality of sinusoids corresponding to harmonics of said speech, and

means for synthesizing speech as a sum of said sinusoids.

5,023,911
WORD SPOTTING IN A SPEECH RECOGNITION SYSTEM WITHOUT PREDETERMINED ENDPOINT DETECTION

Ira A. Gerson, Hoffman Estates, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 817,645, Jan. 10, 1986, abandoned. This application Oct. 31, 1988, Ser. No. 266,293
Int. Cl.^{5} G10L *7/08*
U.S. Cl. 381—43 23 Claims

1. In a speech recognition system, wherein one or more templates each having a plurality of states representing each template are stored for comparing to a series of input frames, said speech recognition system being able to accumulate distance measures for each comparison of the plurality of states to each frame of the series of input frames, a method for identifying a speech utterance from the series of input frames without using predetermined endpoints, comprising the steps of:

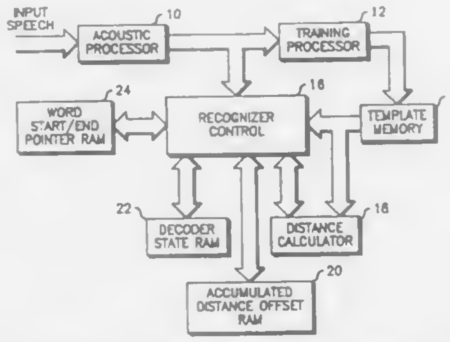
a) identifying a beginning input frame for a first state of a template to identify the potential beginning of the speech utterance;

b) determining a first plurality of distance measures from the comparisons of a first set of states to said beginning input frame;

c) determining a second plurality of distance measures from the comparisons of a second set of states to a second input frame;

d) determining a first normalization amount for said first plurality of distance measures and determining a second normalization amount for said second plurality of distance measures;

e) normalizing said first plurality of distance measures by subtracting said first normalization amount from each distance measure of said first plurality of distance measures and normalizing said second plurality of distance measures by subtracting said second normalization amount from each distance measure of said second plurality of distance measures;



f) accumulating each said determined distance measure of said first plurality of distance measures and accumulating each said accumulated distance measure of said second plurality of distance measures in accordance with a corresponding state from said first and second set of states; and

g) determining a similarity measure between said template and a subset of the series of input frames, including said beginning input frame, said second input frame, and a third input frame, said subset identified from said beginning input frame through said third input frame, said similarity measure being based on accumulated distance measures corresponding to the plurality of states representing said template and a summation of the normalization amounts including at least said first normalization amount and said second normalization amount.

5,023,912
PATTERN RECOGNITION SYSTEM USING POSTERIOR PROBABILITIES

Hideo Segawa, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 31, 1989, Ser. No. 331,287
Claims priority, application Japan, Mar. 31, 1988, 63-78827
Int. Cl.^{5} G01L *7/08*
U.S. Cl. 381—43 7 Claims

1. A pattern recognition system comprising:

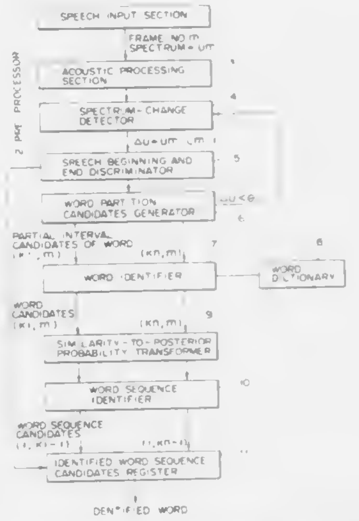
feature extracting means for extracting a feature of an input pattern;

memory means for storing a respective reference pattern for categories of patterns to be recognized;

similarity calculating means for calculating a similarity value between the feature extracted by said feature extracting means and one of the reference patterns stored in said memory means;

posterior probability transforming means for transforming the similarity value calculated by said similarity calculating means into a posterior probability,

wherein said posterior probability transforming means includes means for calculating the posterior probability by using a parameter set required for calculating the posterior probability on the basis of the similarity value calculated by said similarity calculating means, said parameter set obtained in advance via recognition processing from training similarity value data; and

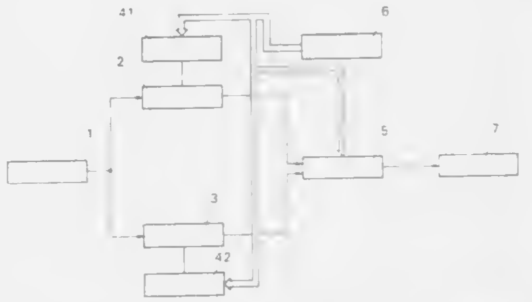


means for recognizing said input pattern on the basis of said posterior probability.

5,023,913
APPARATUS FOR CHANGING A SOUND FIELD

Masaharu Matsumoto, Hirakata; Katsuaki Satoh, Osaka; Seiichi Ishikawa; Mitsuhiko Serikawa, both of Hirakata; Akihisa Kawamura, Hirakata, and Hikari Hashimoto, Kobe, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 26, 1989, Ser. No. 358,282
Claims priority, application Japan, May 27, 1988, 63-130670; May 27, 1988, 63-130671; May 27, 1988, 63-130672; May 27, 1988, 63-130673; Aug. 31, 1988, 63-216561; Sep. 30, 1988, 63-248120
Int. Cl.^{5} H04S *1/00*
U.S. Cl. 381—63 14 Claims



1. An apparatus for changing a sound field comprising:

a signal input means for receiving digital audio signals reproduced by a sound reproducing device;

at least two signal processing means for processing the input digital signals by performing time delay and feedback operations on them according to a predetermined procedure;

a processing instruction means for giving instructions to said signal processing means as to the way of processing the signals;

a signal switching means for smoothly switching signals output from a plurality of said signal processing means at the time of a change in the processing procedure;

a system control means for modifying the instructions of said processing instruction means and for controlling said signal switching means; and

VOL
1127
ISS
2
JE
11
1991
UMI

a signal output means for delivering digital signals output from said signal switching means.

5,023,914

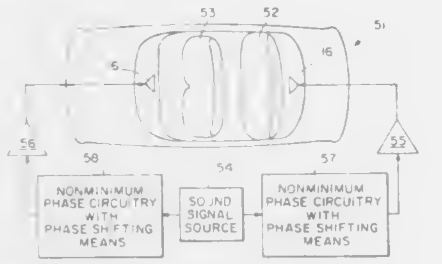
ACOUSTICAL FREQUENCY RESPONSE IMPROVING WITH NONMINIMUM PHASE CIRCUITRY

Finn A. Arnold, Harvaro, Mass., assignor to Bose Corporation, Framingham, Mass.

Filed Mar. 11, 1988, Ser. No. 167,303

Int. Cl.^{5} H03G *5/00*

U.S. Cl. 381—97 **9 Claims**


53
52
51
16
56
55
58
54
57
NONMINIMUM PHASE CIRCUITRY WITH PHASE SHIFTING MEANS
SOUND SIGNAL SOURCE
NONMINIMUM PHASE CIRCUITRY WITH PHASE SHIFTING MEANS

1. A sound system comprising,

at least first and second spaced loudspeaker drivers,

first and second amplifiers in first and second signal paths respectively connected to said first and second loudspeaker drivers respectively,

said first and second loudspeaker drivers operating over frequency ranges at least part of which are in common,

and nonminimum phase circuitry in at least one of said signal paths including means for introducing phase shift for modifying the signal applied to said first loudspeaker driver relative to the signal applied to said second loudspeaker driver to provide a more uniform frequency response in the common frequency range at a listening position spaced from said first and second loudspeaker drivers.

5,023,915

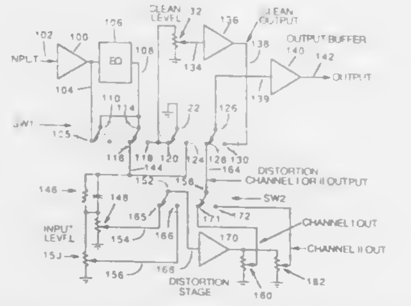
SPECIALIZED AMPLIFIER SYSTEMS FOR MUSICAL INSTRUMENTS

James W. Brown, Sr., and Jack C. Sondermeyer, both of Meridian, Miss., assignors to Peavey Electronics Corporation, Meridian, Miss.

Continuation of Ser. No. 142,020, Jan. 11, 1988, Pat. No. 4,890,331. This application Aug. 24, 1989, Ser. No. 397,875

Int. Cl.^{5} H03F *1/34;* **H03G** *3/02*

U.S. Cl. 381—120 **9 Claims**



1. An amplifier system having an audio signal input terminal and an amplified audio signal output terminal, which comprises the combination of rhythm mode amplification means connected to the input terminal for producing an amplified clean sound channel from the input terminal to the output terminal and including a plurality of amplifier stages in cascade, lead mode amplification means connected to the input terminal for producing an amplified and clipped sound channel from the input terminal to the output terminal and including a plurality of amplifier stages in cascade, and switching means for selectively connecting the input terminal to the output terminal through either the amplified clean sound channel or through the amplified and clipped sound channel, the rhythm mode amplification means having adjustable input audio signal level control means which is confined to the amplified clean sound channel for independently adjusting only the input audio signal level of the amplified clean sound channel and the lead mode amplification means having (1) adjustable input signal level control means for independently adjusting only the input audio signal level of the amplified and clipped sound channel and (2) adjustable audio signal volume control means for independently adjusting only the output signal level of the amplified and clipped sound channel and which are confined to the amplified and clipped sound channel whereby the amplified clean sound channel and the amplified and clipped sound channel are independently controllable with respect to each other.

5,023,916

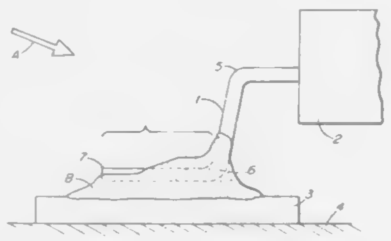
METHOD FOR INSPECTING THE LEADS OF ELECTRICAL COMPONENTS ON SURFACE MOUNT PRINTED CIRCUIT BOARDS

Heinz Breu, Mountain View, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 28, 1989, Ser. No. 399,688

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—8 **5 Claims**



1. A method for inspecting a joint used to connect leads of a surface mount electronic component onto a pad of a printed circuit board, comprising the steps of:

taking an image of the leads;

chain encoding regions of the image which have intensity values above a predetermined intensity threshold;

computing minimum area bounding boxes for each of the chain encoded regions;

modeling an expected region for each lead and pad combination;

determining those chain encoded bounding boxes which intersect each expected region;

computing a lead bounding box for each lead on the basis of the chain encoded bounding boxes to form a segmented image of the leads;

testing the segmented image consisting of the lead bounding boxes for missing leads and lead bridges;

projecting each lead bounding box as a measured waveform onto an axial dimension of the lead's bounding box;

comparing the measured waveform for each lead with a corresponding model waveform to enable inspection; and.

classifying each lead as being either satisfactory or unsatisfactory on the basis of said comparison.

5,023,917

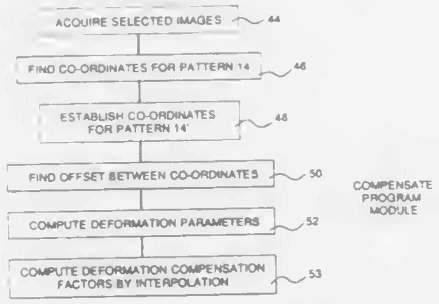
METHOD AND APPARATUS FOR PATTERN INSPECTION

Chinmoy B. Bose, Green Brook, and Rajarshi Ray, Princeton, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 15, 1988, Ser. No. 232,033

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—8 **5 Claims**


ACQUIRE SELECTED IMAGES
44
FIND CO-ORDINATES FOR PATTERN 14
46
ESTABLISH CO-ORDINATES FOR PATTERN 14'
48
FIND OFFSET BETWEEN CO-ORDINATES
50
COMPENSATE PROGRAM MODULE
COMPUTE DEFORMATION PARAMETERS
52
COMPUTE DEFORMATION COMPENSATION FACTORS BY INTERPOLATION
53

1. A method of inspecting a pattern comprising the steps of:

(a) capturing the image of each of a plurality of reference points within a pattern with an image-acquisition device;

(b) establishing the amount of deformation of the pattern from the spacing between the reference points:

(c) stepping the image-acquisition device between each of a plurality of discrete areas of interest in the pattern by a distance varying in accordance with the pattern deformation to place the image-acquisition device in registration with a successive one of such discrete areas of interest within the pattern;

(d) capturing the image of a particular discrete area of interest;

(e) comparing the captured image of the discrete area of interest to the image of the same discrete area within a defect-free master pattern corresponding to the pattern undergoing inspection and reporting if the area of interest in the pattern does not match that in the defect free pattern; and

(f) repeating steps (c), (d) and (e) until the image acquisition device has been stepped so as to be in registration with each of a predetermined number of the discrete areas of interest in the pattern and the image thereof has been captured and compared to the corresponding area within the master pattern.

5,023,918

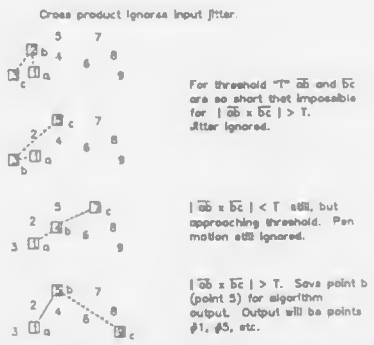
CROSS-PRODUCT FILTER

James S. Lipscomb, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 3, 1989, Ser. No. 416,564

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—24 **9 Claims**


Cross product ignores input jitter.
For threshold "T" ab and bc are so short that impossible for | ab x bc | > T. Jitter ignored.
| ab x bc | < T still, but approaching threshold. Pen motion still ignored.
| ab x bc | > T. Save point b (point 5) for algorithm output. Output will be points #1, #5, etc.

1. A method of filtering a first series of indicia comprised of n indicium representing a stroke of a writing instrument on a writing surface, said method comprising the steps of:

detecting said first series of indicia generated by said writing instrument on said writing surface; and

taking the cross-product of successive vectors formed between successive indicium in said first series of indicia comprising said stroke, to provide a filtered stroke having a second series of indicia comprised of m indicia where $m<n$.

5,023,919

APPARATUS AND METHOD FOR TREATING ENCODED IMAGE DATA INCLUDING CORRECTION FOR ENCODING/DECODING DETERIORATION

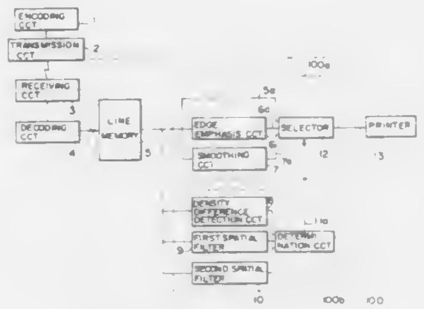
Masafumi Wataya, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 20, 1988, Ser. No. 146,084

Claims priority, application Japan, Jan. 28, 1987, 62-015945

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—54 **28 Claims**



1. A decoding apparatus for decoding encoded image data, comprising:

decoding means for decoding encoded image data;

first correction means for performing a first correction on the image data decoded by said decoding means;

second correction means for performing a second correction on the image data decoded by said decoding means, the second correction being performed in parallel with the first correction; and

selection means for selecting between using output from said first correction means and using output from said second correction means in accordance with characteristic of the image data decoded by said decoding means.

5,023,920

METHOD FOR FINDING THE MEDIAL AXIS TRANSFORM OF AN IMAGE

Heinz Breu, Mountain View, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 28, 1989, Ser. No. 400,211

Int. Cl.^{5} G06K *9/36*

U.S. Cl. 382—55 **4 Claims**

1. In conjunction with a data processing system including a memory, a method for finding maximal squares in a two-dimensional array of pixels, each said pixel having either a value of one or zero, said two-dimensional array comprising a plurality of sequentially numbered rows and a plurality of sequentially numbered columns, said method comprising

sequentially processing the rows of said two-dimensional array, said procesing of each row comprising the steps of:

defining a list S identifying squares, said list being empty at the start of the processing of said row;

adding to S those squares having bottoms on said row for

VOL
1127
ISS
2
JE
11
1991
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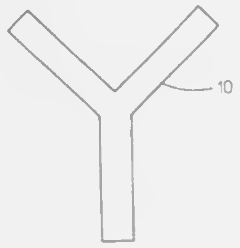
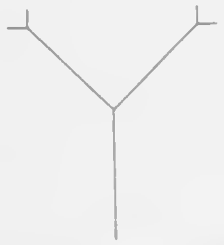
which the northeast and northwest squares are not filled; and





examining the next row of said two-dimensional array to determine the squares in S which squares have southeast and southwest squares that are not filled.

5,023,921

METHOD AND A DEVICE FOR PROCESSING ELECTRIC SIGNALS COMING FROM THE ANALYSIS OF THE LINE OF AN IMAGE

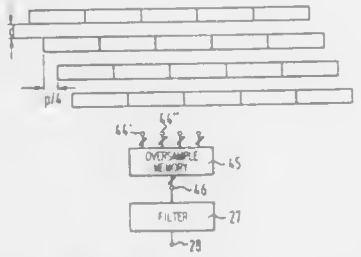
Robert Goutte, Caluire; Gilles Jacquemod, Villeurbanne, and Christophe Odet, Vienne, all of France, assignors to European Coal and Steel Community, Luxembourg

Filed May 18, 1989, Ser. No. 353,435

Claims priority, application Luxembourg, Jun. 27, 1988, 87259

Int. Cl.^{5} G06K *7/00, 9/20;* **H04N** *3/14, 5/355*

U.S. Cl. 382—58 8 Claims



4. A device for analyzing a line of an image by processing an electric signal issued by linear detectors carrying out the sampling of a signal at a constant pitch by carrying out k analyses of the same line with lateral shifts respectively 1/k steps of the linear detectors, and generating an oversampled signal by multiplexing the case samples and time filtering the oversampled signal, said device comprising k strips of adjacent photodetectors forming said linear detectors and disposed in parallel for analyzing successively k times the same line of the image, a means for shifting each strip laterally with respect to the adjacent strip by a distance corresponding to 1/k of the pitch of the photodetectors, a means connecting the k strips by serial outputs thereof to a common oversampling memory and a means supplying the output of the oversampling memory to a filter having a transfer function of which is inverse to that of the filtering inherent to the spatial smoothing of the photodetectors.

5,023,922

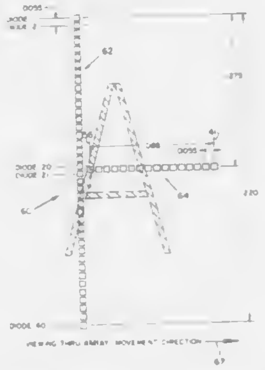
OPTICAL CHARACTER READER

Robert G. Abramovitz, Eugene; Robert L. Anderson, Jr., Tigard; Frederick L. Busse; Stuart A. Celarier, both of Portland; Jean-Yves H. Poublan, Beaverton, and Lawrence R. Shorthill, West Linn, all of Oreg., assignors to Soricon Corporation, Boulder, Colo.

Division of Ser. No. 940,294, Dec. 11, 1986, Pat. No. 4,809,351, which is a continuation-in-part of Ser. No. 742,417, Jun. 7, 1985, abandoned. This application Feb. 24, 1989, Ser. No. 316,118

Int. Cl.^{5} G06K *9/22*

U.S. Cl. 382—59 5 Claims



1. In an apparatus for optically sensing an optical data pattern on a surface as the apparatus and the surface move relative to each other in a scanning direction, the improvement comprising:

optical imaging means including an array of optical imaging elements for sensing the optical data pattern and providing output data corresponding to the optical data pattern;

edge detecting means responsive to the output data for detecting edges characterizing the sensed optical data pattern and for providing edge position signals indicative of positions of the edges in the array;

motion detecting means responsive to the edge position signals for providing a valid move signal indicative of the comparative relationships of the positions of the edges at different times as the apparatus and surface move relative to each other, the motion detecting means developing the valid move signal whenever the number of edges changing positions at the different times exceeds a predetermined standard value; and

transferring means for transferring output data for storage in response to a valid move signal.

5,023,923

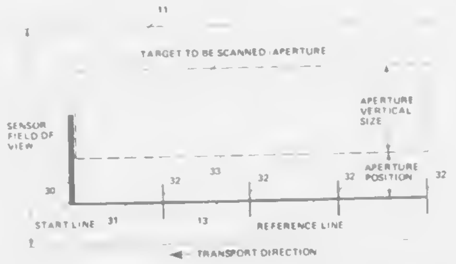
PROGRAMMABLE SENSOR APERTURE

M. Duane Sanner, Irving, Tex.; Leonard J. Nunley, Farmington Hills, Mich., and Barry M. Wallace, Garland, Tex., assignors to Light Signatures, Inc., Los Angeles, Calif.

Filed Feb. 11, 1987, Ser. No. 13,485

Int. Cl.^{5} G06K *9/20*

U.S. Cl. 382—61 6 Claims



1. A system for characterizing a select target area of variable size and location on a document, said select target area being programmable in size and location with respect to a position reference in a larger area on said document, said larger area also encompassing any select target area, said system comprising:

a sensor array means for scanning said larger area of said document to provide pixel signals representative of said larger area encompassing said select target area and said position reference;

position reference detector means connected to receive said pixel signals for providing position reference signals manifesting the location of said position reference with respect to said pixel signals representative of said larger area;

program means for providing select target area signals to indicate the defined size and location of said select target area with reference to said position reference of said document; and

integrator means connected to receive said pixel signal representative of said larger area, said position reference signals and said select target area signals, said integrator means being controlled by said select target area signals and said position reference signals to selectively process those pixel signals that lie within said select target area to provide output signals representative solely of the characteristic of said select target area to identify said document.

5,023,924

SPEED CONTROL APPARATUS FOR MOVABLE EQUIPMENT

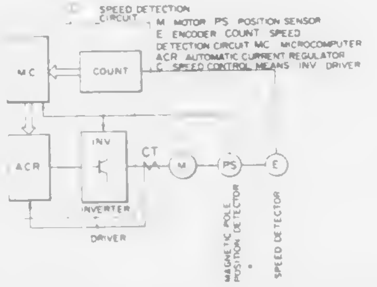
Fumio Tajima, Ibaraki; Hiroshi Katayama, Hitachi; Kunio Miyashita, Hitachi; Shigeki Morinaga, Hitachi, and Seiichi Narushima, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 2, 1990, Ser. No. 473,915

Claims priority, application Japan, Feb. 6, 1989, 1-025814; Mar. 18, 1989, 1-066732

Int. Cl.^{5} H02P *6/00*

U.S. Cl. 388—811 11 Claims


SPEED DETECTION CIRCUIT
M MOTOR PS POSITION SENSOR
E ENCODER COUNT SPEED DETECTION CIRCUIT MC MICROCOMPUTER
ACR AUTOMATIC CURRENT REGULATOR
C SPEED CONTROL MEANS INV DRIVER
MC
COUNT
ACR
INV
INVERTER
DRIVER
CT
M
PS
E
MAGNETIC POLE POSITION DETECTOR
SPEED DETECTOR

1. A speed control apparatus for a movable equipment comprising:

a movable equipment;

a speed detecting element for detecting a moving speed of said movable equipment; and

speed control means for providing a current or a voltage to said movable equipment on the basis of a speed instruction signal;

said speed control means including a driver for providing a current or a voltage having a magnitude corresponding to the speed instruction signal to said movable equipment, a speed detection circuit for detecting said moving speed of said movable equipment on the basis of a signal from said speed detecting element, and a microcomputer for driving said driver on the basis of a result of a comparison between said speed instruction signal and a speed signal obtained from said speed detection circuit;

said microcomputer including harmonic wave component detecting means for detecting a harmonic wave component of a variation in said moving speed of said movable equipment on the basis of the speed signal obtained from said sped detection circuit, and gain varying means for varying a gain of a speed control system composed of said movable equipment, said speed detecting element, and said speed control means on the basis of said harmonic wave component detected by said harmonic wave component detecting means.

5,023,925

HOT AIR HAND WELDING DEVICE

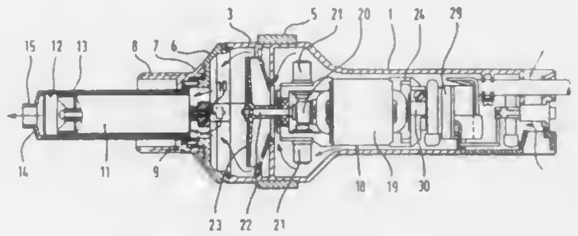
Günther Goll, Hochdorf; Peter Vater, Gruibingen; Siegfried Keusch, Plochingen, and Günter Kratz, Hochdorf, all of Fed. Rep. of Germany, assignors to Zinser Schweisstechnik GmbH & Co., Fed. Rep. of Germany

Filed Oct. 3, 1989, Ser. No. 416,476

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1988, 3833677

Int. Cl.^{5} H05B *1/00;* **F24H** *3/04;* **A45D** *20/10*

U.S. Cl. 392—384 9 Claims



1. A hot air welding device comprising:

a plastic housing that forms a rod-like grip portion that is provided with air inlet openings;

a commutator motor which includes a stator and a rotor, said commutator motor having a commutator and carbon brushes secured in said housing and driving a blower wheel which is surrounded by a section of the housing adjoining the grip portion but of a greater diameter, the stator and rotor of said commutator motor being positioned within said grip portion;

said greater diameter housing section being connected to an end section on the side opposite the grip portion, which end section has a connection device connected to a heating cartridge and a protection and connecting tube surrounding said connection device and said heating cartridge; wherein

said blower wheel (23) is arranged adjacent to the commutator (20) of the commutator motor (18);

and wherein the commutator (20) and the carbon brushes that contact said commutator are arranged with the associated brush holders (21) in the section (3) of the housing surrounding the blower wheel (23).

5,023,926

STEAM GENERATOR FOR STEAM BATHS

Josef B. Arnold, Altegghalde 2 CH-6045, Meggen, Switzerland

Continuation of Ser. No. 250,704, Sep. 28, 1988, Pat. No. 4,939,343. This application Jun. 29, 1990, Ser. No. 546,430

Int. Cl.^{5} F24F *3/14*

U.S. Cl. 392—402 12 Claims

1. A steam generator for steam baths, comprising:

a column shaped housing;

a first inlet in said housing for entry of ambient air to said housing;

a water bath in said housing for boiling water therein;

a ventilator for causing said ambient air to enter said housing via said first inlet and for delivering said air to said water bath;

a second inlet in said housing, said second inlet communicating with and providing access to said water bath;

a closure to open and close said second inlet;

means for supplying additives to said water bath, said means for supplying being removably positionable in said bath through said second inlet, said means for supplying being subject to positioning and removal when said steam gener-

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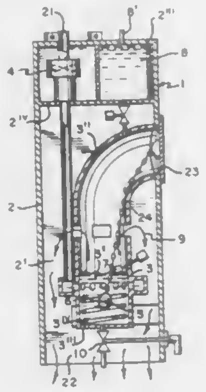
ator is in an operating state and when in non-operating state;

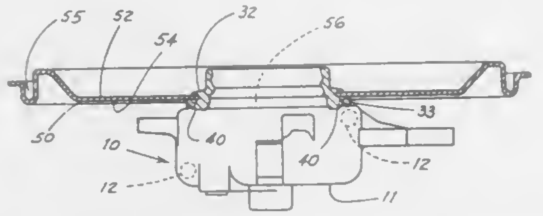


an outlet from said housing, said outlet communicating with said water bath, a mixture of heated air, boiled water and additives exiting said housing through said outlet during operation of said steam generator.

5,023,927
STRUCTURE TO SECURE CAST CUP CONTAINING HEATING ELEMENT TO PERCOLATOR RESERVOIR BOTTOM

Kenneth P. Bardell, West Bend, Wis., assignor to Regal Ware, Inc., Kewaskum, Wis.

Filed Oct. 23, 1989, Ser. No. 425,096
Int. Cl.^{5} A47J *27/00, 31/54;* **F24H** *1/18*
U.S. Cl. 392—442 **3 Claims**



I. A reservoir base plate having a top surface, a lower surface, and an opening;

the improvement comprising;
cup means for holding liquid having an outer wall shaped to fit closely into said opening;
said cup means resting in said opening;
said cup means having a circumferentially thick swageable upper wall extending above said top surface of said base plate, for securing said cup means to said base plate;

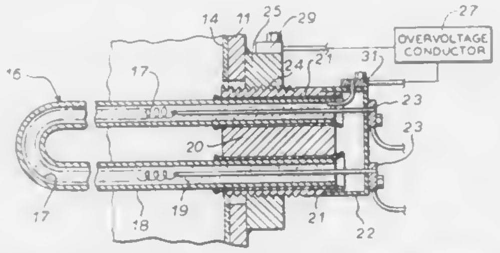
a portion of the thickness of said upper wall means being swaged into uniform tight sealing engagement with said top surface of said base plate; and said cup means also having at least one lower flange means, extending radially around said outer wall beneath said lower surface of said base plate, for securing said cup means to said lower surface of said base plate.

5,023,928
APPARATUS FOR REDUCING THE CURRENT DRAIN ON THE SACRIFICIAL ANODE IN A WATER HEATER

Timothy H. Houle, Wauwatosa, and Daher T. Wardy, Milwaukee, both of Wis., assignors to A. O. Smith corporation, Milwaukee, Wis.

Filed Aug. 30, 1989, Ser. No. 400,364
Int. Cl.^{5} F24H *1/20;* **H05B** *3/78*
U.S. Cl. 392—457 **7 Claims**

1. In an electrically-heated water supply including a metal tank for heating and storing water, a protective anode within the tank to reduce electrolytic corrosion of exposed interior portions of the tank wall, and an electric heating element enclosed in a metal jacket mounted in the tank wall and extending into the tank, an apparatus for reducing the anode current as a result of the cathodic effect of the heating element jacket comprising:

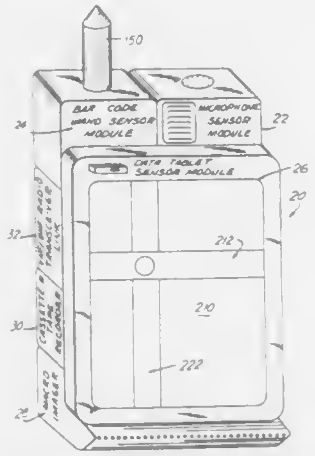


insulating means for providing an electrically insulated separation between the metal jacket and the tank wall; and
voltage responsive semiconductor means connecting the jacket and the tank for preventing current flow at low voltage below the range of 18 to 100 volts and allowing bidirectional current flow at higher overvoltage above said range.

5,023,929
AUDIO FREQUENCY BASED MARKET SURVEY METHOD

James Call, Larchmont, N.Y., assignor to NPD Research, Inc., Port Washington, N.Y.

Filed Sep. 15, 1988, Ser. No. 245,739
Int. Cl.^{5} H04B *17/00;* **H04N** *7/10*
U.S. Cl. 455—2 **46 Claims**

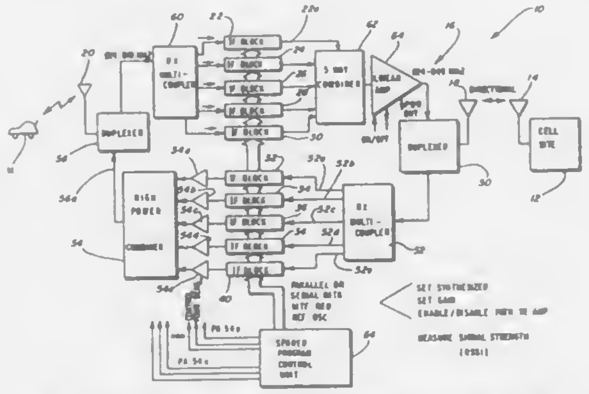


1. A method for obtaining market survey data from a plurality of diverse locations for accumulative processing by a remote data processor at a central location, said method comprising the steps of:
recording a plurality of audio signals at each of said diverse locations which correspond to predetermined market survey data categories associated with a respondent at each of said diverse locations;
providing said plurality of audio signals from said diverse locations to said remote data processor;
accumulatively processing said provided plurality of audio signals at said central location for providing an accumulatively processed survey report corresponding to said market survey data categories, said accumulative processing step comprising the step of converting said provided audio signals into data categories for providing said accumulatively processed survey report; said audio signal recording step comprising the steps of bar code scanning a bar code of market survey data, generating an audio signal therefrom, and recording said generated audio signal at said diverse location; and providing a master audio signal recording at said central location of ambient sounds corresponding to the audio outputs of a predetermined plurality of different radio and/or television channels to be surveyed for said listening audience survey, said master audio signal recording being synched to said diverse location audio signal recording for recording said ambient sounds corresponding to said audio outputs by said master recording at substantially the same regular discrete predetermined sampling intervals as at said diverse locations for providing a substantially like plurality of spaced apart sampling windows over said predetermined measurement intervals; whereby a unified accumulative survey response to audience listening preference and other market survey preferences may be provided from recording audio signals at said plurality of diverse locations.

5,023,930
BOOSTER WITH DETECTABLE BOOST OPERATION

Samuel A. Leslie, Forest, Va., assignor to Orion Industries, Inc., Solen, Ohio

Continuation-in-part of Ser. No. 81,120, Aug. 3, 1987, Pat. No. 4,941,200. This application May 16, 1988, Ser. No. 194,179
Int. Cl.^{5} H04B *7/26*
U.S. Cl. 455—9 **28 Claims**



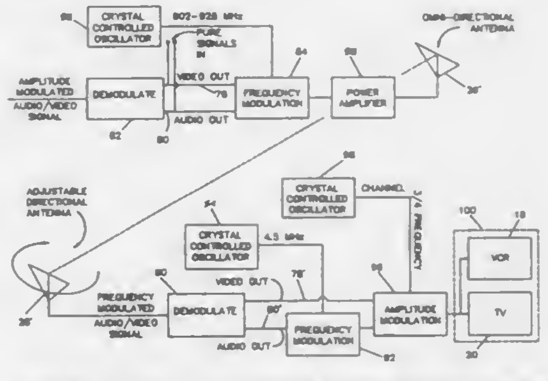
1. A method of measuring the relative contributions to a composite received signal of a signal communicated from a transmitter to a receiver across a first, signal path and the signal simultaneously communicated from the same transmitter to the same receiver across a second, different signal path which includes a booster transceiver having a coverage area, the method comprising:
modifying the signal within the booster transceiver with an information tag;
detecting at the receiver the information tag within the composite received signal; detecting the strength of the tag relative to the strength of the composite signal, the detected tag strength being usable for determining the coverage area of the booster transceiver.

5,023,931
TELEVISION LOCAL WIRELESS TRANSMISSION AND CONTROL

Donald A. Streck, 832 Country Dr., Ojai, Calif. 93023, and Jerry R. Iggulden, 21600 Cleardale St., Newhall, Calif. 91321, assignors to Jerry Iggulden, Santa Clarita and Donald Streck, Ojai, both of, Calif., part interest

Division of Ser. No. 96,929, Sep. 15, 1987. This application Dec. 27, 1989, Ser. No. 457,843
Int. Cl.^{5} H04N *7/00*
U.S. Cl. 455—21 **7 Claims**

1. In a television system including a source of a signal including a video portion modulated onto a first frequency from any of the standard UHF and VHF frequencies used for normal television broadcasting and a television monitor for displaying a video picture, the improvement for wirelessly locally transmitting the video portion of the signal from the source to the monitor comprising:
a) first demodulating means disposed at the source and connected to receive the signal for demodulating the first frequency and for producing the video portion thereof as an output;
b) oscillator means disposed at the source for generating a second frequency above any standard UHF and VHF frequencies used for normal television broadcasting;
c) first modulating means disposed at the source for modulating said second frequency with the video portion of the signal to produce a modulated second frequency signal as an output thereof;



d) amplifying and transmitting means connected to said output of said first modulating means for amplifying and transmitting said modulated second frequency signal from a transmitting antenna;
e) receiving antenna means disposed at the monitor for receiving said modulated second frequency signal;
f) second demodulating means connected to said antenna means for demodulating said modulated second frequency signal as received and for reproducing the video portion of the signal as an output; and,
g) means interconnecting said output of said second demodulating means to the monitor for conducting the video portion of the signal to the monitor to be used thereby in producing a video picture.

5,023,932
RADIO COMMUNICATION SYSTEM COMPRISING A PORTABLE UNIT CARRYING OUT A BATTERY SAVING OPERATION RELATED TO A SCANNING OPERATION OF A FIXED UNIT

Akira Wakana, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 217,108, Jul. 11, 1988, abandoned, which is a continuation of Ser. No. 762,892, Aug. 6, 1985, abandoned. This application Jun. 30, 1989, Ser. No. 373,593
Claims priority, application Japan, Aug. 7, 1984, 49-164261
Int. Cl.^{5} H04B *1/16*
U.S. Cl. 455—34 **12 Claims**

1. In a radio communication system comprising a fixed unit and a portable unit communicable with said fixed station through a plurality of radio channels, said fixed unit carrying out a first scanning operation to successively and repeatedly scan all of said radio channels one at a time every channel scanning period, said portable unit being repeatedly put into an active and an inactive state for an active and an inactive duration, respectively, the improvement wherein said portable unit comprises:
duration determining means for determining lengths of said active and said inactive durations, said duration determin-

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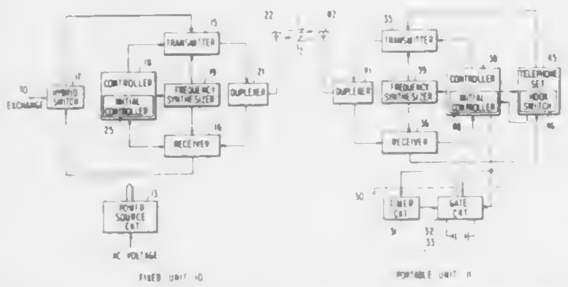
ing means operating in synchronism with said first scanning operation; and

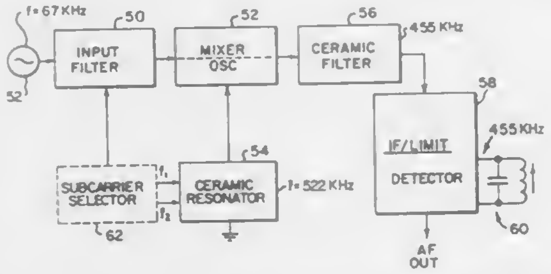


power source means coupled to said duration determining means for producing electric power to said portable unit only for said active duration to put said portable unit into said active state.

5,023,933
SUPERHETERODYNE SCA RECEIVER AND METHOD FOR THE MANUFACTURE THEREOF

Frank P. Karkota, Jr., Cowdry Hill Rd., P.O. Box 3251, Westford, Mass. 01886

Filed Oct. 13, 1988, Ser. No. 257,512
Int. Cl.^{5} H04B *1/10*
U.S. Cl. 455—45 **9 Claims**



1. A superheterodyne subcarrier FM receiver operating in the 53–100 KHz SCA band for receiving music and voice transmission comprising:

means for detecting a signal having a carrier and an FM-modulated subcarrier, said subcarrier having a first predetermined frequency;

input filter means tuned to said subcarrier having a first predetermined frequency;

an oscillator providing a fixed frequency output signal having a second predetermined frequency, said oscillator including a ceramic resonator;

means for heterodyning said filtered subcarrier signal with said output signal so as to produce a resultant signal having a third predetermined frequency;

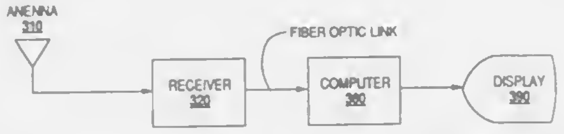
ceramic bandpass filter means having a bandwidth commensurate with said music and voice transmission, said filter means tuned to said third predetermined frequency and coupled to the output of said heterodyning means for producing a filtered output signal; and,

FM demodulating means coupled to the output of said bandpass filter for demodulating said last-mentioned output signal to retrieve the audio components thereof such that the use of said ceramic resonator and said ceramic bandpass filter provides a receiver bandpass characteristic for low group delay, improved impulse noise rejection and improved high-end audio frequency response due to a resulting flat receiver bandpass response over the signal bandwidth.

5,023,934
APPARATUS AND METHOD FOR COMMUNICATION OF VISUAL GRAPHIC DATA WITH RADIO SUBCARRIER FREQUENCIES

Jesse Wheeless, San Antonio, Tex., assignor to Radair, Inc., San Antonio, Tex.

Continuation of Ser. No. 163,364, Mar. 2, 1988, abandoned. This application Jul. 2, 1990, Ser. No. 547,521
Int. Cl.^{5} H04B *7/26*
U.S. Cl. 455—45 **23 Claims**



1. A portable receiving unit for generating a visual graphic display from data transmitted from a subsidiary communication authorized FM radio site, using a subcarrier channel having a narrow bandwidth, comprised of:

a receiver for receiving said data at a remote location, said receiver being especially designed for receipt of subcarrier channel transmissions;

a post-transmission processing system for processing said data at said remote location, so that said data may be displayed in visual form, said post-transmission processing system being in in-line communication with said receiver;

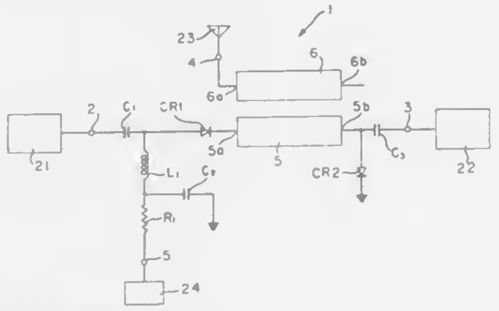
wherein said receiver and said post-transmission processor are housed at the same receiving station in close physical proximity to each other, said receiver having means for shielding said receiver from interference such that said receiver may operate simultaneously with said post-transmission processor; and

a display for displaying said data in visual graphic form at said remote location, said display being in in-line communication with said post-transmission processing system.

5,023,935
COMBINED MULTI-PORT TRANSMIT/RECEIVE SWITCH AND FILTER

Jan Vancraeynest, White Plains, N.Y., assignor to Nynex Corporation, New York, N.Y.

Filed Nov. 17, 1989, Ser. No. 438,737
Int. Cl.^{5} H03H *7/46;* **H04B** *1/50*
U.S. Cl. 455—80 **12 Claims**



7. In combination:

an antenna;

a transmitter;

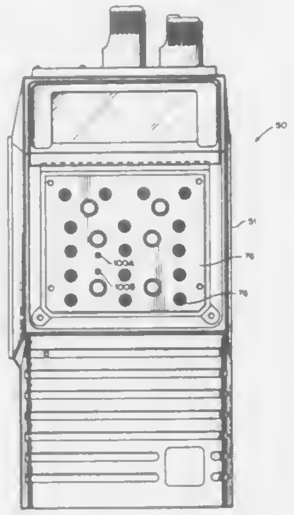
a receiver;

a combined switch and filter for providing coupling among said antenna, transmitter and receiver in response to a control signal comprising: first, second and third ports connected to said transmitter, receiver and antenna, respectively; first and second electromagnetically coupled quarter-wave transmission line sections, said first transmission line section having first and second ends and said second transmission line section having a first end electrically coupled to said third port and a second end which is open circuited; first and second electrical means responsive to said control signal for electrically coupling said first and second ends of said first transmission line section to said first and second ports, respectively, said first electrical means including a first switching element responsive to said control signal and connected between said first port and said first end of said first transmission line section and said second electrical means including a second switching element responsive to said control signal and connected between said second end of said first transmission line and ground; and said first and second transmission line sections selected to provide filtering of signals coupled between said first and third ports and said second and third ports of said switch, respectively.

5,023,936
METHOD AND APPARATUS FOR EXTERNALLY DEFINING THE OPERATIONAL MODE OF A DIGITAL RADIO TRANSCEIVER

Craig F. Szczutkowski, Forest, and Clyde R. Butler, Jr., Lynchburg, both of Va., assignors to General Electric Company, Lynchburg, Va.

Filed Aug. 7, 1989, Ser. No. 390,257
Int. Cl.^{5} H04B *1/38*
U.S. Cl. 455—90 **10 Claims**



1. In a digital radio transceiver of the type including interchangeable user control arrangements disposed on an outer surface of a housing, said transceiver including digitally controlled circuitry disposed within said housing, a method of preventing someone from obtaining additional transceiver functionality by substituting user control arrangements, said method including the following steps:

(a) substantially irreversibly modifying said transceiver from outside of said housing so as to specify a particular user control arrangement, said particular user control arrangement having a corresponding set of functions associated therewith;

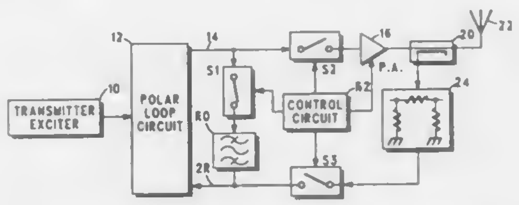
(b) detecting the particular user control arrangement specified by said substantially irreversible modification; and

(c) disabling said digitally controlled circuitry from performing any functions other than said corresponding set of functions associated with said particular user control arrangement in response to said detected specified arrangement.

5,023,937
TRANSMITTER WITH IMPROVED LINEAR AMPLIFIER CONTROL

George F. Opas, Park Ridge, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 9, 1989, Ser. No. 349,479
Int. Cl.^{5} H04B *1/04*
U.S. Cl. 455—126 **16 Claims**



1. A radio frequency (RF) transmitter comprising:

first means for generating a first RF signal;

RF power amplifier (PA) that linearly amplifies an input signal to produce an output signal;

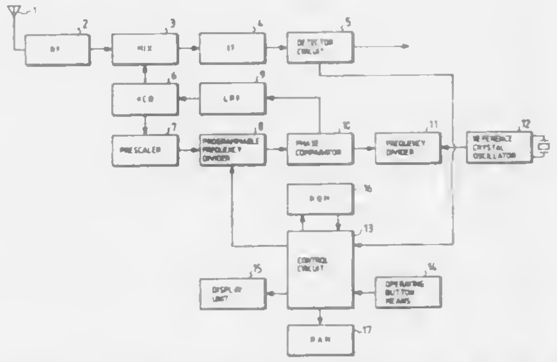
second means for generating said input signal based upon said first signal and a second signal, said input signal consisting of a predistorted signal that compensates for the nonlinear characteristics of the PA so that nonlinear difference between said first signal and said output signal are minimized, said second means including a phase locked loop (PLL) having locked and unlocked states, said PLL having a reference signal based on said input signal and a feedback signal based on said second signal; and

third means for generating said second signal such that said second signal is based upon said input signal while said PLL changes from an unlocked state to a locked state and changing the basis of said second signal from said input signal to said output signal so that said PLL remains in the locked state, said third means inhibiting transmissions from the PA when said PLL is in its unlocked state to minimize undesired transmissions.

5,023,938
STATION SELECTING DEVICE IN TUNER FOR AUTOMATIC SELECTION ACCORDING TO INPUT INFORMATION

Tomohiro Takegawa; Akira Tasaki, and Hiroshi Koinuma, all of Tokyo, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 310,568
Claims priority, application Japan, Jun. 3, 1988, 63-135670; Jun. 3, 1988, 63-135671
Int. Cl.^{5} H04B *1/16*
U.S. Cl. 455—183 **3 Claims**



1. A tuner having a programmable frequency divider for selecting a broadcast station in accordance with a frequency division number, the tuner comprising:

input means for inputting at least a part of a frequency num-

VOL
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1991
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ber representing a desired broadcast station from an operator;

detector means for detecting a broadcasted tuned signal which is generated when the programmable frequency divider is supplied with a frequency division number corresponding to a broadcasting station;

memory means for storing frequency numbers representing a plurality of broadcast stations, and for storing a plurality of frequency division numbers respectively corresponding to the frequency numbers; and

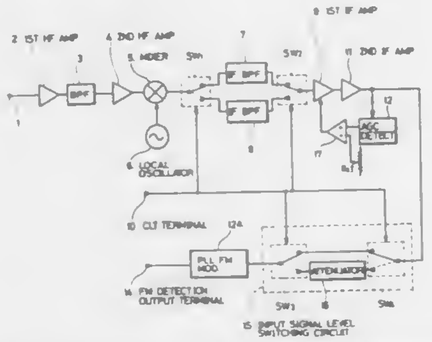
control means for reading from said memory means the frequency division number corresponding to the inputted frequency number, and for supplying the read frequency division number to the programmable frequency divider so that the programmable frequency divider selects a broadcast station in accordance with the supplied frequency division number;

wherein when said detector means does not detect the tuned signal after the frequency division number corresponding to the inputted frequency number is supplied to the programmable frequency divider, said control means automatically performs an operation cycle of adjusting the inputted frequency number, reading the frequency division number corresponding to the adjusted frequency number and supplying the frequency division number corresponding to the adjusted inputted frequency number to the programmable divider, said control circuit repeating said operation cycle with a different adjusted inputted frequency number until said detector means detects a tuned signal.

5,023,939
FM TUNER WITH BAND EXTRACTION AND OPTIMIZATION OF A PLL FM DEMODULATOR

Makoto Hori, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 2, 1989, Ser. No. 415,657
Claims priority, application Japan, Oct. 5, 1988, 63-251372
Int. Cl.⁵ H04B *1/16*
U.S. Cl. 455—188 15 Claims



1. A FM tuner for receiving a FM signal and developing a FM detected output in response to a select signal for controlling the filter characteristics of the FM tuner, comprising:

band converting means for converting the band of said FM signal from a high frequency band into an intermediate frequency band;

band component extracting means for extracting a portion of a band component from the FM signal converted in band by said band converting means in response to said select signal;

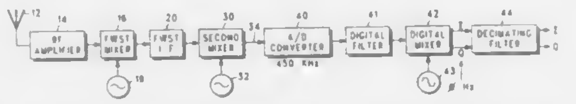
demodulating means having a phase locked loop for FM demodulating said FM signal by employing said phase locked loop in response to said select signal; and

optimizing means responsive to a bandwidth of the signal extracted by said band component extracting means for optimizing a lock range of the phase locked loop of said demodulating means in response to said select signal.

5,023,940
LOW-POWER DSP SQUELCH

Mark J. Johnson, Algonquin, and James D. Solomon, Hoffman Estates, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 1, 1989, Ser. No. 401,699
Int. Cl.⁵ H04B *1/10*
U.S. Cl. 455—212 10 Claims



1. In a frequency modulation (FM) receiver receiving FM signals on a channel, a method of identifying information bearing signals and identifying non-information bearing noise on said channel and for squelching the receiver in the absence of information bearing signals on said channel comprised of the steps of:

converting said FM signals to a stream of temporally adjacent digital samples, said samples representative of said FM signals, each of said temporally adjacent digital samples in said stream of samples being complex and having I (real) and Q (imaginary) components corresponding to the in-phase and quadrature components of complex phasors, each phasor having a magnitude and phase;

determining phase differences between each temporally adjacent pair of samples in said stream of samples;

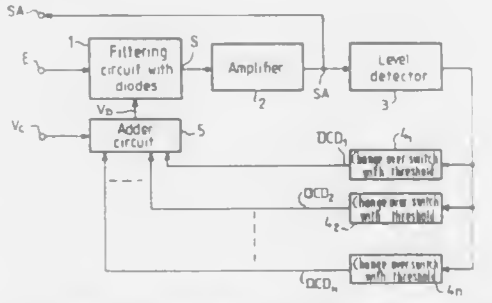
identifying the contents of said channel as either signal or noise based on statistical evaluation of a plurality of said phase differences; and

de-activating signal processing of said FM signals in said receiver upon the determination of the absence of desired signal on said channel.

5,023,941
SWITCHING-OVER, AUTOMATIC MATCHING FILTER FOR RADIO TRANSMITTER AND/OR RECEIVER

Jean-Michel Trumpff; Michel Byzery, and Gilles Raineteau, all of Cholet, France, assignors to Thomson-CSF, Paris, France

Filed Feb. 14, 1989, Ser. No. 310,361
Claims priority, application France, Feb. 17, 1988, 88 01859
Int. Cl.⁵ H04B *1/10*
U.S. Cl. 455—307 4 Claims


SA
1
E
Filtering circuit with diodes
S
Amplifier
2
SA
Level detector
3
V_D
V_c
Adder circuit
5
DCD_1
4_1
Change over switch with threshold
DCD_2
Change over switch with threshold
4_2
Change over switch with threshold
DCD_n
4n

1. An automatic matching filter for a radio transmitter and/or receiver station, comprising:

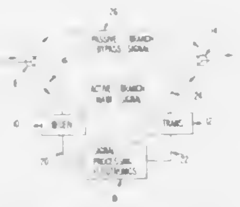
means for filtering first interference signals having a frequency outside at least one pass-band associated with at least one matching frequency to output a filtered signal of said filtering means, said filtering means including variable capacitance diodes for establishing a matching frequency;

feedback means coupled to said filtering means for stabilizing said at least one matching frequency by supplying to said variable capacitance diodes a feedback voltage to stabilize said at least one matching frequency established by said variable capacitance diodes when second interference signals having a frequency substantially close to and within said at least one pass-band are present.

5,023,942
FAULT TOLERANT DATA TRANSMISSION NETWORK

Charles A. Goepel, Severna Park, Md., assignor to Martin Marietta, Bethesda, Md.

Filed Jun. 26, 1987, Ser. No. 66,500
Int. Cl.⁵ H04B *10/16*
U.S. Cl. 455—601 27 Claims



1. A repeater for a fault tolerant data tarnsmission network receiving an input signal at a transmit level, comprising:

splitting means for splitting te input signal at a predetermined split ratio of 71 to 29 into an active path signal and a bypass path signal where 71% of the energy is routed to an active branch and 29% of the energy is routed to a passive branch;

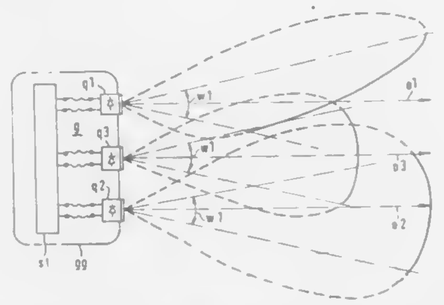
retransmit means for retransmitting the active path signal at the transmit level; and

combiner means for combining the retransmitted active path signal and the bypass path signal at a predetermined combining ratio producing an output signal having a 10^{-9} bit error rate.

5,023,943
ELECTROOPTICAL POINTING DEVICE FOR REMOTELY CONTROLLING ELECTRONIC APPARATUS

Klaus Heberle, Reute, Fed. Rep. of Germany, assignor to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

Filed Dec. 15, 1989, Ser. No. 450,971
Claims priority, application European Pat. Off., Dec. 31, 1988, 88121922.4
Int. Cl.⁵ G08F *1/00;* **H04H** *1/00*
U.S. Cl. 455—603 11 Claims



1. An electrooptical arrangement for remotely controlling an electronic apparatus with a remote control unit comprising:

a first radiation source in said remote control unit for emitting a first signal along a first optical axis thereof, said first signal having a radiation pattern in a first reference plane determined by said first optical axis and a first direction which has a monotonically rising/falling intensity characteristic in a first angular range including said first optical axis;

a second radiation source in said remote control unit for emitting a second signal along a second optical axis thereof, said second signal having a radiation pattern in a second reference plane determined by said second optical axis and a second direction which has a monotonically rising/falling intensity characteristic in a second angular range including said second optical axis;

a third radiation source in said remote control unit for emitting a third signal along a third optical axis thereof, said third signal having a radiation pattern which has a flat intensity characteristic in said first and said second angular ranges compared with the intensity characteristics of said first and second radiation sources, respectively;

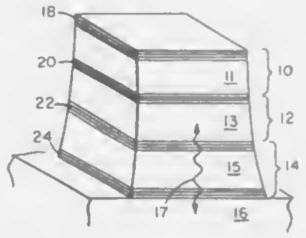
wherein said first, second, and third optical axes of said first, second, and third radiation sources are aligned in parallel to each other; and

a radiation detector linked with said electronic apparatus for detecting the received intensities of said first signal comparatively to said third signal in order to derive a first reference signal indicative of the angular orientation of said remote control unit relative to said radiation detector in said first angular range of said first reference plane, and for detecting the received intensities of said second signal comparatively to said third signal in order to derive a second reference signal indicative of the angular orientation of said remote control unit relative to said radiation detector in said second angular range of said second reference plane.

5,023,944
OPTICAL RESONATOR STRUCTURES

Eric M. Bradley, San Diego, Calif., assignor to General Dynamics Corp./Electronics Division, San Diego, Calif.

Filed Sep. 5, 1989, Ser. No. 402,508
Int. Cl.⁵ G02F *1/00;* **H01L** *33/00;* **G02B** *27/10*
U.S. Cl. 455—611 18 Claims



1. An integrated optical device for use in communications and computation systems employing signals of optical frequency comprising:

a plurality of optical components fabricated monolithically in a stack upon a substrate, each of said components processing optical signals;

wherein said optical components are stacked parallel and intimately adjacent to one another such that they each are aligned with a common optical axis which is substantially perpendicular to the surface forming the top of said stack;

wherein at least one of said optical components comprises a surface emitting laser for generating said optical signals; and

wherein at least one other of said optical components forms a Fabry-Perot resonator optically coupled to said surface emitting laser comprising:

an optical cavity having dimensions to permit resonance of an optical signal at selected optical wavelengths;

a first and second multi-layer mirror disposed on opposite ends of said optical cavity for reflecting selected wavelengths of light within said optical cavity, wherein said first and second multi-layer mirrors form surfaces substantially parallel to one another; and

wherein said other optical component cavity is formed primarily of a semiconductor material having an optical response of a saturable absorber, said other optical

VOL
1127
ISS
2
JE
11
1991
UMI

component for mode locking of a plurality of optical modes generated by said surface emitting laser.

5,023,945

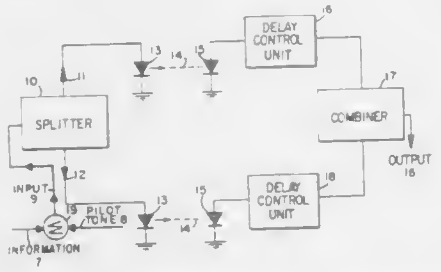
TRANSMISSION SYSTEM USING PARALLEL OPTIC LINKS TO ACHIEVE ENHANCED DYNAMIC RANGE

Richard B. Childs, Harvard, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Dec. 21, 1989, Ser. No. 454,679

Int. Cl.^{5} H04B *10/00*

U.S. Cl. 455—617 **14 Claims**



1. An optical transmission system for improving signal to noise ratio, comprising:

summation means for additively combining a pilot tone with an electrical input information signal to produce a composite electrical signal;

splitter means adapted to receive said composite signal and divide signals each coupled to a respective one of a plurality of optical links;

each of said optical links including:

generator means adapted to receive said respective intermediate signal and generate an optical signal representative of said respective intermediate signal,

optical pathway means coupled to the generator means of said one optical link for guiding said respective optical signal wherein said optical pathway means has an associated signal propagation delay time,

detector means adapted to receive the guided optical signal from the optical pathway means of said respective optical link and generate a detected electrical signal representative of said guided optical signal wherein said respective detected signal has an associated phase shift component proportional to the propagation delay time of said respective optical pathway means, and

a delay equalization circuit adapted to receive the detected signal from the detector means of said one optical link and equalize the phase shift component of said detected signal with the phase shift component of each detected signal in each remaining optical link of said plurality of optical links; and

means adapted to receive the equalized detected signal from the respective delay equalization circuit of each optical link and combine said equalized detected signals into a single output signal.

5,023,946

POLARIZATION DIVERSITY OPTICAL HETERODYNE RECEIVER WITH PHASE ADJUSTMENT OF TWO I.F. SIGNALS FOR CONTROL OF A LOCAL OPTICAL SOURCE

Shuntaro Yamazaki, and Makoto Shibutani, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jul. 28, 1989, Ser. No. 386,072

Claims priority, application Japan, Jul. 29, 1988, 63-191496; Jul. 29, 1988, 62-191497

Int. Cl.^{5} H04J *10/06*

U.S. Cl. 455—619 **3 Claims**

1. A polarization diversity optical heterodyne receiver for receiving a signal beam, comprising:

a local optical source for generating a local beam of a controllable frequency;

a beam splitting part supplies with said signal and said local beam for producing first and second coupled beams which are orthogonally polarized, said beam splitting part comprising:

a polarization beam splitter for splitting said signal beam into first and second signal beam components which are orthogonally polarized:

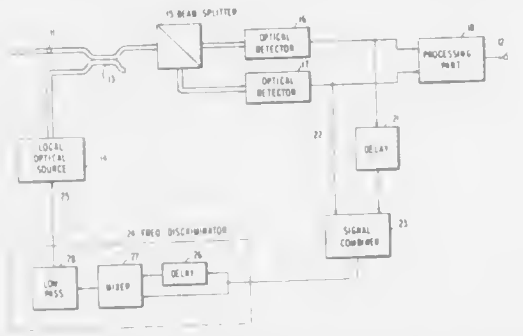
beam splitting means for splitting said local beam into first and second local beams which are orthogonally polarized·

a first beam coupler for coupling said first signal and said first local beam components into said first coupled beam:

a second beam coupler for coupling said second signal and said second local beam components into said second coupled beam:

a first optical detector for detetcing said first coupled beam to produce a first intermediate frequency;

a second optical detector for detecting said second coupled beam to produce a second intermediate frequency signal;



a processing part for subjecting said first and said second intermediate frequency signals to demodulation combination to produce a baseband signal;

delay introducing means for introducing a delay between said first and second intermediate frequency signals to produce first and second delay introduced signals, respectively, wherein said first and second delay introduced signals are delayed with respect to each other, said delay introducing means comprising:

an optical delay line for introducing a delay to said first local beam component to produce a delayed beam component;

means for supplying said delayed beam component to said first beam coupler to make said first beam coupler couple said first signal and said delayed beam component into said first coupled beam;

a combiner for combining said first and second delay introduced signals into a combined signal;

a frequency discriminator for frequency discriminating said combined beam to produce a control signal; and

means for supplying said control signal to said local optical source to control said controllable frequency.

5,023,947

OPTICAL EQUALIZATION RECEIVER FOR LIGHTWAVE COMMUNICATION SYSTEMS

Leonard J. Cimini, Jr., Howell; Larry J. Greenstein, Edison, and Adel A. M. Saleh, Holmdel, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 1, 1989, Ser. No. 430,041

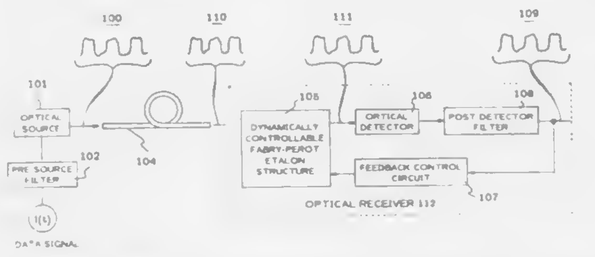
Int. Cl.^{5} H04B *10/06*

U.S. Cl. 455—619 **14 Claims**

1. A lightwave receiver responsive to a lightwave signal from a transmission medium, said lightwave signal including a delay distortion component introduced by said transmission medium, said lightwave receiver comprising:

a Fabry-Perot etalon having first and second opposing ends for filtering said lightwave signal to produce a filtered output signal at said first opposing end;

means coupled to said Fabry-Perot etalon for dynamically varying an optical path length of said Fabry-Perot etalon in response to a control signal, wherein a variation of said optical path length causes a corresponding change in a delay characteristic for said Fabry-Perot etalon; and



feedback control means responsive to the delay distortion component in said filtered output signal for generating said control signal to cause said delay characteristic for said Fabry-Perot etalon to substantially compensate said delay distortion component for equalization of said lightwave signal.

5,023,948

POLARIZATION MODULATION OF OPTICAL SIGNALS USING BIREFRINGENT MEDIUM

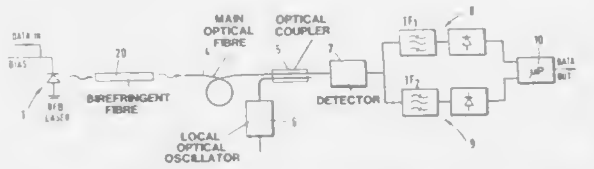
David W. Smith, Woodbridge, England, assignor to British Telecommunications public limited company, England

Division of Ser. No. 14,046, Feb..18, 1987, Pat. No. 4,831,663. This application Mar. 1, 1989, Ser. No. 317,655

Claims priority, application United Kingdom, Jun. 19, 1985, 8515499

Int. Cl.^{5} H04B *10/04*

U.S. Cl. 455—616 **20 Claims**



1. A method of transmitting digital information comprising:

frequency modulating a polarized electromagnetic signal in response to said information to produce a frequency modulated electromagnetic signal

causing said frequency modulated electromagnetic signal to be incident on a birefringent medium so as to generate a polarization modulated signal having a polarization which corresponds to the frequency of said frequency modulated electromagnetic signal; and

transmitting said polarization modulated signal.

5,023,949

APPARATUS FOR GENERATING AN FSK-MODULATED OPTICAL SIGNAL HAVING TWO DIFFERENT POLARIZATION CONDITIONS FOR AN OPTICAL TRANSMISSION SYSTEM HAVING AN OPTICAL TWO-FILTER FSK SUPER-HETERODYNE RECEIVER

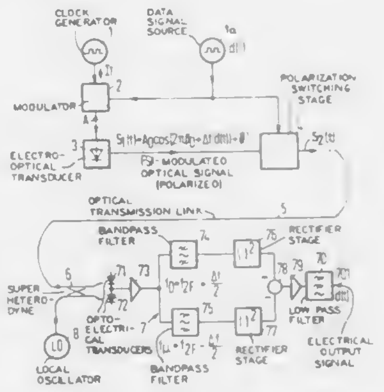
Franz Auracher, Baierbrunn; Alfred Ebberg, Munich; Bernd Noil, Munich; Eckhard Meissner, Munich, and Hermann J. Rodler, Bergen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Sep. 20, 1989, Ser. No. 409,820

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1988, 3833273

Int. Cl.^{5} H01S *3/00;* H04B *10/00*

U.S. Cl. 455—618 **3 Claims**



1. A transmitter for an optical transmission system for transmitting an optical transmission signal corresponding to an electronic data input signal, said electronic data input signal having first and second states, said transmitter comprising:

modulator means connected to a clock generator and to which said electronic data input signal is supplied for generating an FSK electronic signal having components at a first frequency when said data signal is in said first state and at a second frequency when said data signal is in said second state;

electro-optical transducer means for converting said electronic data signal into a polarized FSK-modulated optical signal; and

a polarization switching means to which said polarized FSK-modulated optical signal and said electronic data input signal are supplied for generating an optical transmission signal polarized in a first direction and corresponding to said FSK signal components at said first frequency when said data signal is in said first state and polarized in a second direction, orthogonal to said first direction, and corresponding to said FSK signal components at said second frequency when said data signal is in said second state.

5,023,950

OPTICAL TRANSMITTER, OPTICAL RECEIVER AND OPTICAL TRANSMISSION APPARATUS AND CONTROL METHOD OF OPTICAL RECEIVER

Hideaki Tsushima, Hachioji, and Shinya Sasaki, Kodaira, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 19, 1989, Ser. No. 298,946

Claims priority, application Japan, Jan. 20, 1988, 63-8314

Int. Cl.^{5} H04B *10/06*

U.S. Cl. 455—619 **30 Claims**

1. An opto-electrical communication receiver device, comprising:

means for receiving a frequency shift keying optical input information signal;

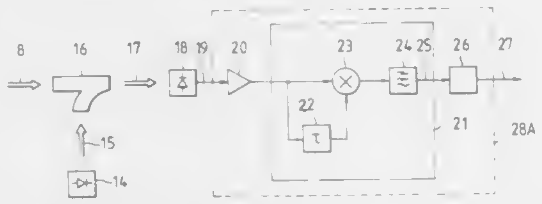
means for superheterodyne-converting the received optical input information signal into an electrical output unipolar

VOL
1127
ISS
2
JE
11
1991
UMI

information signal, and including an optical-to-electrical transducer means for converting the received optical input information signal into an electrical information signal and demodulation means for converting an alternate mark inversion of the electrical information signal into a unipolar electrical information signal;

said optical to electrical transducer means including means for converting a frequency shift keying optical signal into a frequency shift keying electrical information signal;

said demodulation means including means for separating the frequency shift keying electrical information signal into first and second signal components;



means for delaying one of said components by a fixed amount to produce a delayed signal;

means for mixing said delayed signal and the other of said components to produce a mixed signal;

means for filtering the positive mark signal, negative mark signal and space signal from the mixed frequency shift keying electrical signal from said mixing means for eliminating other frequencies and producing a multipolar baseband signal; and

means for alternate mark inversion decoding the multipolar baseband signal to output the unipolar electrical information signal.

5,023,951

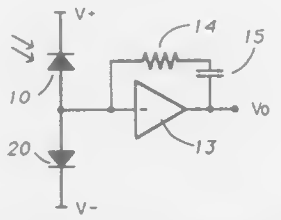
OPTICAL RECEIVERS

David A. Kahn, Nepean, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Apr. 14, 1989, Ser. No. 337,810

Int. Cl.^{5} G02F ***1/00;*** **H01S** ***3/00***

U.S. Cl. 455—619 **20 Claims**



1. A filter for an optical receiver arrangement including an amplifier, the filter comprising a bipolar transistor having a base coupled to the output of said amplifier, a collector from which an output signal is derived, and an emitter; an emitter impedance; and a transmission line having a predetermined length, one end of the transmission line being coupled via the emitter impedance to the emitter and the other end of the transmission line being an open circuit, the emitter impedance being matched to a characteristic impedance of the transmission line.

DESIGN PATENTS

GRANTED JUN. 11, 1991

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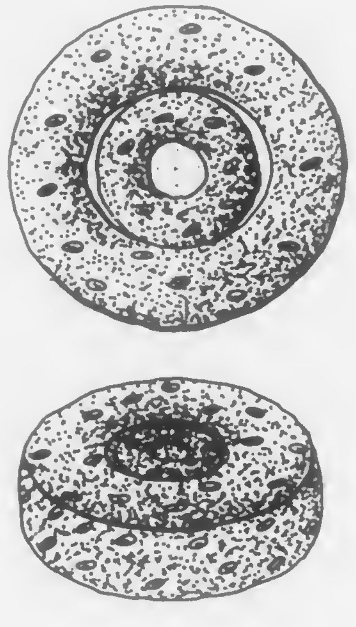
For CLASS	See PATENT NO.
D18-013	317,420

VOL
1127
ISS
2
JE
11
1991
UMI

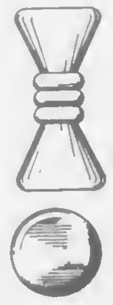
DESIGNS

JUNE 11, 1991

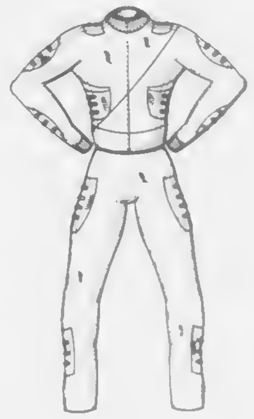
317,372
CEREAL
Richard J. Rothamel, Morrisville, Pa.; Doreen Stephens, New York, N.Y., and Dennis Hurley, Hightstown, N.J., assignors to Kraft General Foods, Inc., Glenview, Ill.
Filed Nov. 7, 1988, Ser. No. 269,107
Term of patent 14 years
U.S. Cl. D1—120



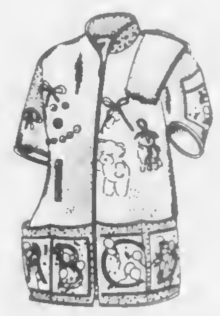
317,373
CONFECTION
Minnie O. Turner, 35-21 109 St., Corona, N.Y. 11368
Filed Apr. 25, 1988, Ser. No. 185,434
Term of patent 14 years
U.S. Cl. D1—127



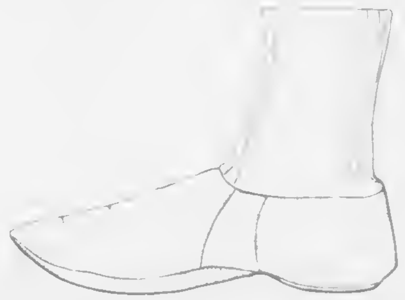
317,374
WORK-OUT WEIGHT SUIT
Rodney E. Anderson, 4420 Danforth Rd., Atlanta, Ga. 30331
Filed Jan. 25, 1988, Ser. No. 147,681
Term of patent 14 years
U.S. Cl. D2—29



317,375
SMOCK
Emily M. Severinsen, Pasadena, Calif., assignor to All That Joy, Inc., Los Angeles, Calif.
Filed Nov. 30, 1989, Ser. No. 445,321
Term of patent 14 years
U.S. Cl. D2—228

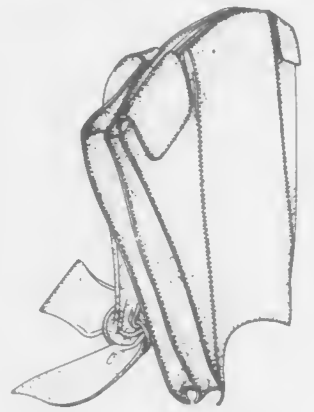


317,376
SLIPPER SOCK
William D. McGivney, Sneden's Landing, Palisades, N.Y. 10964
Filed Mar. 2, 1988, Ser. No. 163,063
Term of patent 14 years
U.S. Cl. D2—335

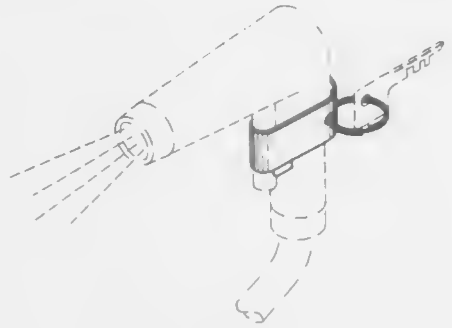


VOL
1127
ISS
2
JE
11
1991
UMI

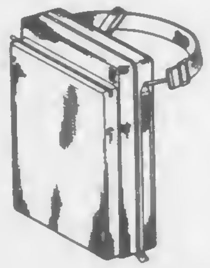
317,377
SHOULDER BAG
Maria Boitani, Via Bissolati 54, Rome 00187, Italy
Filed Jan. 14, 1987, Ser. No. 3,250
Claims priority, application Italy, Aug. 6, 1986, 36009-B/86
Term of patent 14 years
U.S. Cl. D3—48



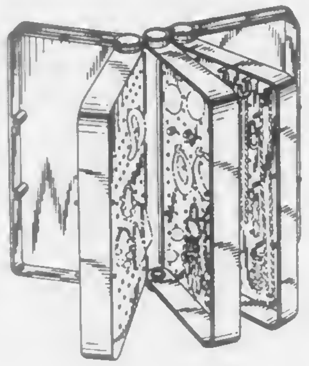
317,378
COMBINED KEY CHAIN AND TRIGGER HOLDER
Francis Addy, 13240 Belcher Rd. South, Largo, Fla. 33543
Filed Apr. 6, 1987, Ser. No. 34,583
Term of patent 14 years
U.S. Cl. D3—62



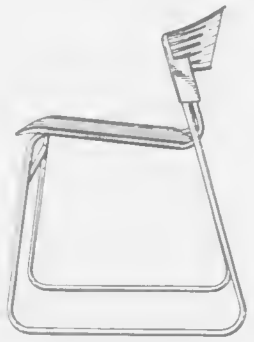
317,379
FIRST RESPONDER BAG
Joseph T. Whitworth, Kalispell, Mont., assignor to G.B. Communications, Inc., Kalispell, Mont.
Filed Oct. 11, 1988, Ser. No. 256,368
Term of patent 14 years
U.S. Cl. D3—74



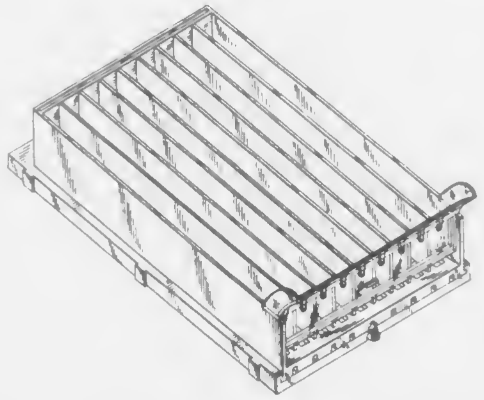
317,380
JEWELRY CASE
Jeffrey Snyder, New York, N.Y., assignor to Etna Products Co., Inc., New York, N.Y.
Filed Sep. 20, 1988, Ser. No. 246,645
Term of patent 14 years
U.S. Cl. D3—75



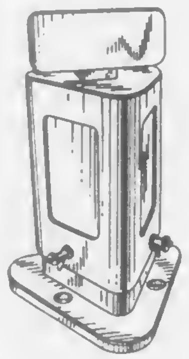
317,381
CHAIR
Renato Fulcheri, Turin, Italy, assignor to Press S.p.A., Italy
Filed Jan. 14, 1988, Ser. No. 143,963
Claims priority, application Italy, Jul. 14, 1987, 53519 B/87[U]
Term of patent 14 years
U.S. Cl. D6—373



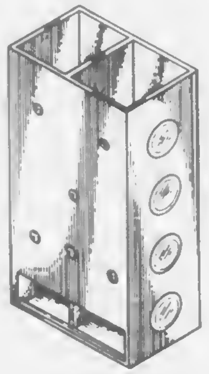
317,382
RACK FOR DISPENSING ARTICLES
Dennis J. Polvere, 151 Prospect Ave., Apt. 15C, Hackensack, N.J. 07601
Filed Sep. 15, 1987, Ser. No. 96,389
Term of patent 14 years
U.S. Cl. D6—408



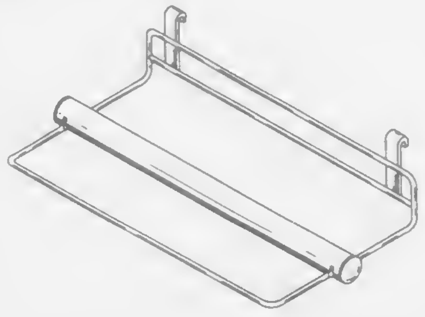
317,383
COUNTERTOP DISPENSER OF FRAGRANT LIQUID, LOTION AND POWDER
Janice Brill, and Deborah M. Kelly, both of New York, N.Y., assignors to Liz Claiborne, Inc., New York, N.Y.
Filed Sep. 12, 1988, Ser. No. 243,648
Term of patent 14 years
U.S. Cl. D6—455



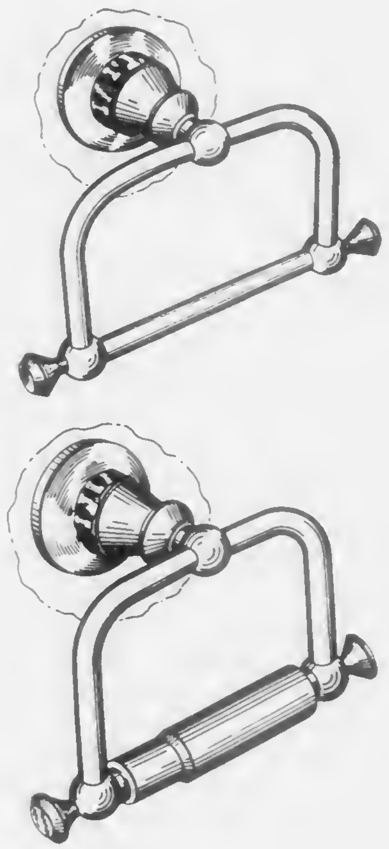
317,384
DISPENSER OR SIMILAR ARTICLE
Mark Powell, P.O. Box 5265, Burlington, Vt. 05402-5265
Filed Aug. 9, 1988, Ser. No. 230,127
Term of patent 14 years
U.S. Cl. D6—515



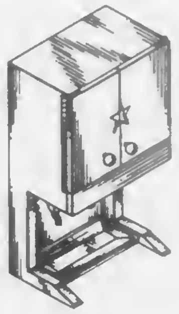
317,385
PAPER TOWEL HOLDER
Robert A. Wolff, Middleburg, and John F. Troxell, Jr., Northumberland, both of Pa., assignors to Wood-Mode, Incorporated, Kreamer, Pa.
Filed Nov. 8, 1989, Ser. No. 433,319
Term of patent 14 years
U.S. Cl. D6—522



317,386
SUPPORT ACCESSORY
William C. McKeone, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Mar. 30, 1989, Ser. No. 332,664
Term of patent 14 years
U.S. Cl. D6—524



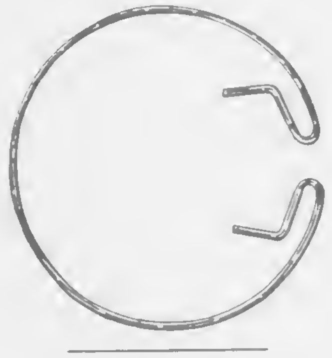
317,387
REFRESHMENT DISPENSER
Victor L. D. R. Conner, 554 N. Elm, Jenks, Okla. 74037
Filed Sep. 8, 1988, Ser. No. 241,570
Term of patent 14 years
U.S. Cl. D7—301



VOL
1127
ISS
2
JE
11
1991
UMI

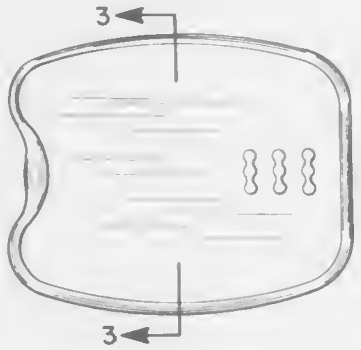
317,388
RETAINER SPRING CLAMP FOR A COFFEE FILTER

T. Neal White, 2716 Pittmantown Rd., Suffolk, Va. 23438
Filed Jul. 29, 1988, Ser. No. 225,949
Term of patent 14 years
U.S. Cl. D7—400



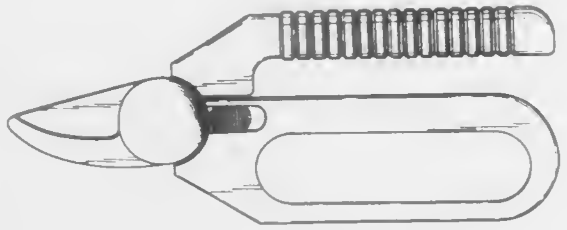
317,389
RESTAURANT SERVING TRAY

Robin D. Penaluna, and Kathleen D. Hill, both of 9216 217th St. SW., Edmonds, Wash. 98020
Filed Nov. 17, 1988, Ser. No. 272,303
Term of patent 14 years
U.S. Cl. D7—543



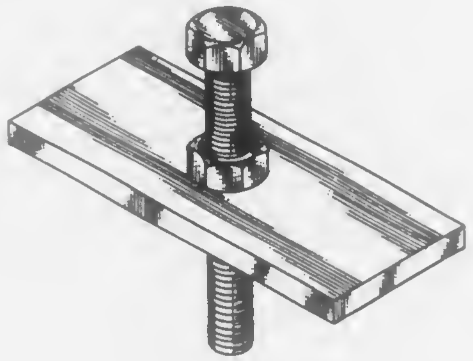
317,390
PRUNING SCISSORS

Takenobu Igarashi, Tokyo, Japan, assignor to Kai R&D Center Co., Ltd., Gifu, Japan
Filed Feb. 15, 1989, Ser. No. 311,719
Claims priority, application Japan, Oct. 8, 1988, 63-39616
Term of patent 14 years
U.S. Cl. D8—4



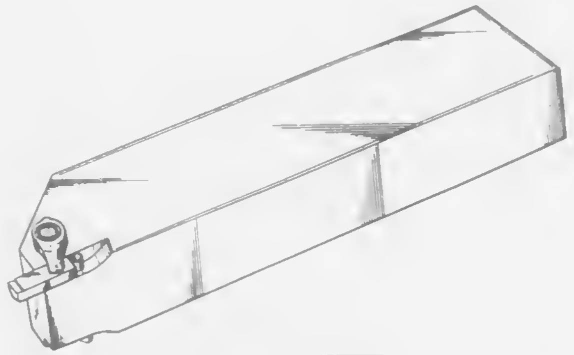
317,391
BRAKE PISTON TOOL

Gilbert Gonzales, 4301 Euclid St., E. Chicago, Ind. 46312
Filed Jan. 29, 1988, Ser. No. 149,200
Term of patent 14 years
U.S. Cl. D8—14



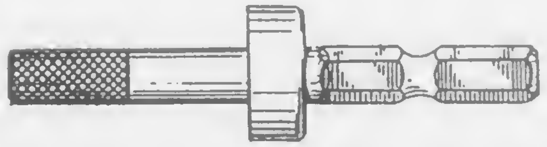
317,392
COMBINED CUTTING TOOL HOLDER AND CUTTING TIP

Wlajko Mihic, Tegnérvägen 9, S-802 28, Gäve, Sweden
Division of Ser. No. 888,312, Jul. 21, 1986, Pat. No. D. 311,194. This application Jul. 9, 1990, Ser. No. 549,720
Claims priority, application Sweden, Jan. 29, 1986, 86-0222
Term of patent 14 years
U.S. Cl. D8—41



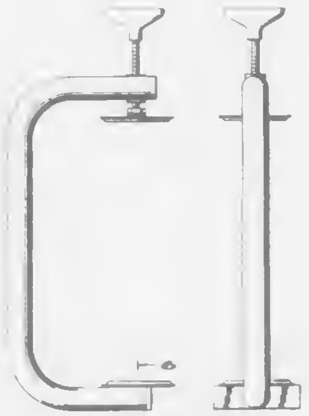
317,393
TOOL SHANK FOR AN ABRASIVE ARTICLE

Nobuo Nishiki, #406, 15-7, Izuo 4-Chome, Sanko Dai-Roku Heights, Taisho-ku, Osaka-shi, Osaka-fu, Japan
Filed Sep. 4, 1987, Ser. No. 92,935
Term of patent 14 years
U.S. Cl. D8—70



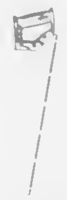
317,394
HAND-HELD DISPENSER FOR STRETCH WRAP FILM

Joseph Goldstein, Pacific Palisades, Calif.
Filed Jul. 21, 1988, Ser. No. 222,241
Term of patent 14 years
U.S. Cl. D8—71



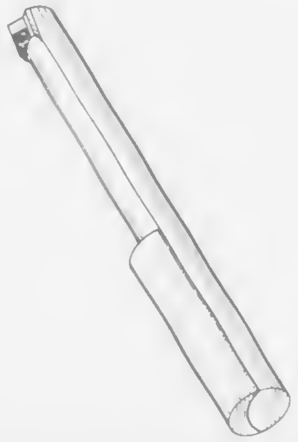
317,395
HANDLE FOR A HAND SAW

Richard Landahl, Malmö, Sweden, assignor to Sandvik AB, Sandviken, Sweden
Filed Jul. 20, 1988, Ser. No. 221,632
Claims priority, application Sweden, Feb. 12, 1988, 880350
Term of patent 14 years
U.S. Cl. D8—97



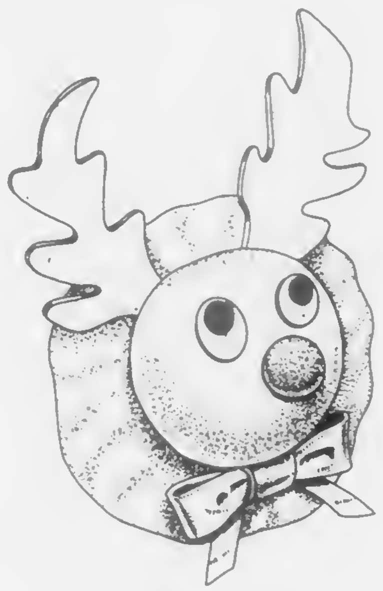
317,396
HOLE SHAPING CUTTER

George F. Bacigalupo; Joseph G. Bacigalupo, and Blease M. Matthews, all of Georgia, Vt., assignors to Tri Tech, U.S.A., Inc., Williston, Vt.
Filed Jun. 29, 1988, Ser. No. 214,094
Term of patent 14 years
U.S. Cl. D8—98



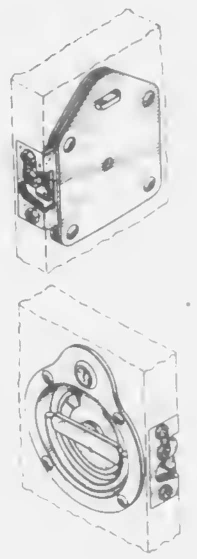
317,397
REINDEER DOOR KNOB COVER

Mary C. Guberman, c/o Kensington Designs, Inc., 11508 Applejack Ct., Cincinnati, Ohio 45241
Filed May 5, 1988, Ser. No. 191,654
Term of patent 14 years
U.S. Cl. D8—322



317,398
ROTARY LOCK

Randall C. Hansen, Lake Forest, Ill., and Gilbert H. Krahn, Kenosha, Wis., assignors to A.L. Hansen Manufacturing Company, Waukegan, Ill.
Filed Jan. 13, 1989, Ser. No. 297,538
Term of patent 14 years
U.S. Cl. D8—336



VOL
1127
ISS
2
JE
11
1991
UMI

317,399

CURTAIN RAIL

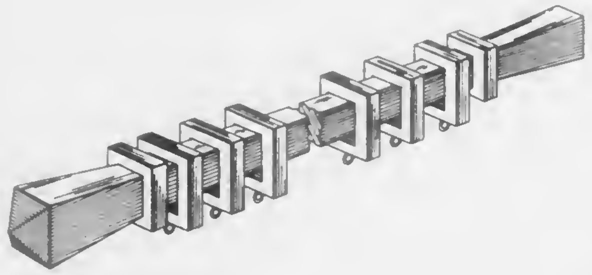
John E. Varley, The Old Coastguards, Abbotsbury, Dorset, England, and Ronald E. Draper, Prospect Place, West Milton, Near Bridport, Dorset, England

Filed Jun. 1, 1988, Ser. No. 200,877

Claims priority, application United Kingdom, Dec. 3, 1987, 1046825

Term of patent 14 years

U.S. Cl. D8—376



317,400

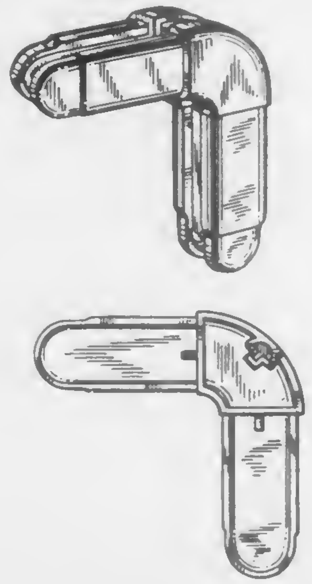
CORNER FRAME HOLDER

Jonathon Loew, East Meadow, N.Y., assignor to Design Display Group, Inc., N.J.

Filed Aug. 11, 1989, Ser. No. 393,327

Term of patent 14 years

U.S. Cl. D8—382



317,401

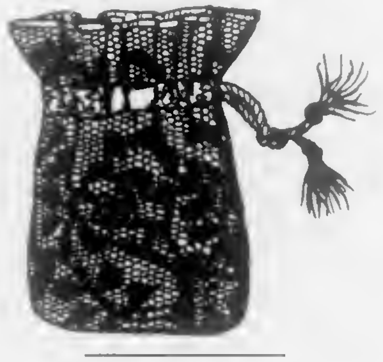
BAG FOR CONTAINING SOAP

Charles V. Earnest, 2200 N. TorreyPines #2079, Las Vegas, Nev. 89108

Filed Feb. 1, 1988, Ser. No. 150,702

Term of patent 14 years

U.S. Cl. D7—305



317,402

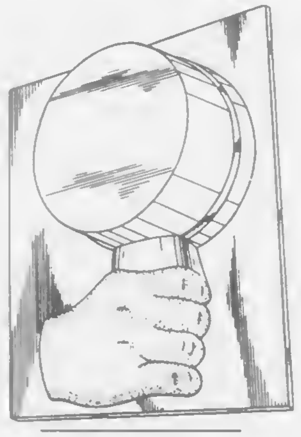
DISPLAY PACKAGE

William J. Segal, Torrance, Calif., assignor to Mr. Gasket Company, Cleveland, Ohio

Filed Mar. 31, 1988, Ser. No. 175,726

Term of patent 14 years

U.S. Cl. D9—314



317,403

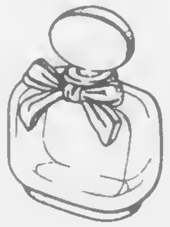
BOTTLE

Friedbelm J. Farsch, 2774 S. Melbourne St., Salt Lake City, Utah 84106

Filed Jun. 2, 1988, Ser. No. 201,611

Term of patent 14 years

U.S. Cl. D9—334



317,404

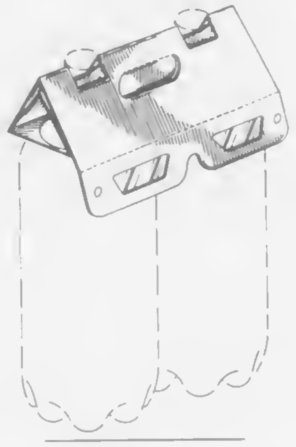
COMBINED BOTTLE CARRIER AND 3-D GLASSES

Richard L. Schuster, Monroe, La., assignor to Manville Forest Products Corporation, Denver, Colo.

Filed Nov. 30, 1988, Ser. No. 278,075

Term of patent 14 years

U.S. Cl. D9—344



317,405

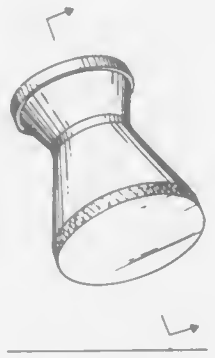
MEDICAMENT CONTAINER

Douglas P. Yasika, P.O. Box 698, Danville, N.H. 03819

Filed Apr. 10, 1989, Ser. No. 335,975

Term of patent 14 years

U.S. Cl. D9—347



317,406

COMBINED PERFUME BOTTLE AND CAP

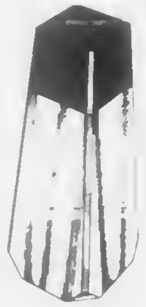
Joel Desgrippes, Paris, France, assignor to Albion Cosmetics Co., Ltd., Tokyo, Japan

Filed Apr. 17, 1987, Ser. No. 40,202

Claims priority, application Japan, Jan. 13, 1987, 62-583

Term of patent 14 years

U.S. Cl. D9—377



317,407

COMBINED BOTTLE AND CAP

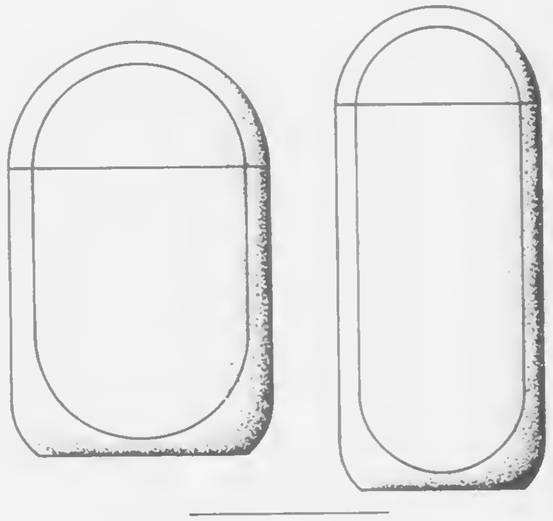
Ian Gray, Blyth; Russell T. Watts, London, and William R. Stewart, Bromley, all of England, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 7, 1988, Ser. No. 166,841

Claims priority, application United Kingdom, Sep. 7, 1987, 1044644; Sep. 7, 1987, 1044645

Term of patent 14 years

U.S. Cl. D9—377



317,408

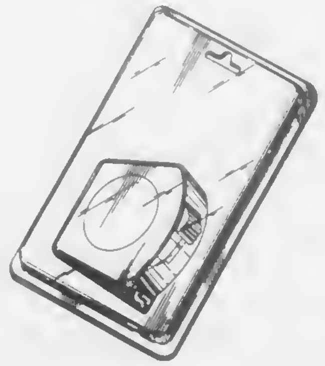
PACKAGE FOR TAPE AND THE LIKE

Kenneth W. Loungren, West Greenwich, R.I.; David F. O'Brien, North Woodstock, Conn., and James Mattiucci, Cranston, R.I., assignors to The Stanley Works, New Britain, Conn.

Filed Jul. 17, 1989, Ser. No. 381,009

Term of patent 14 years

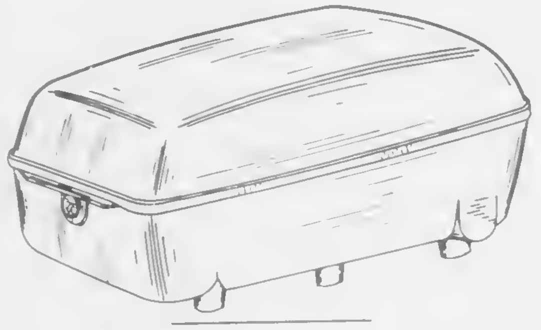
U.S. Cl. D9—415



VOL
1127
ISS
2
JE
11
1991
UMI

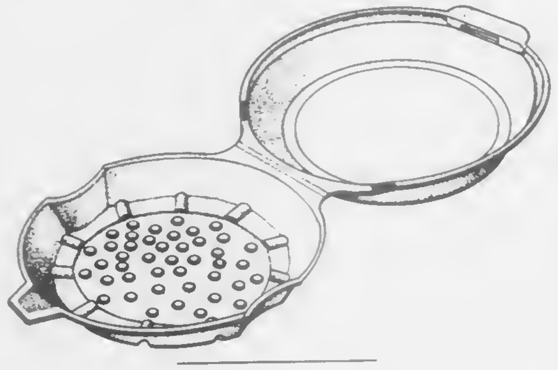
317,409
STORAGE BOX

Michele A. Chiarella, Via Vall 'Orba 22, Lugano, Switzerland
Filed Jul. 22, 1987, Ser. No. 76,261
Term of patent 14 years
U.S. Cl. D9—424



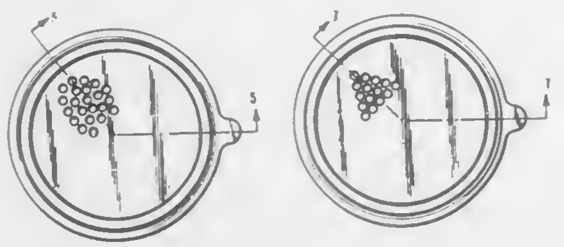
317,410
PIZZA CONTAINER

Edward L. Ott, Oak Park; Timothy F. Conway, Riverside, and Thomas S. Kubala, Chicago, all of Ill., assignors to Restaurant Technology, Inc., Oak Brook, Ill.
Filed Nov. 2, 1988, Ser. No. 266,031
Term of patent 14 years
U.S. Cl. D9—426



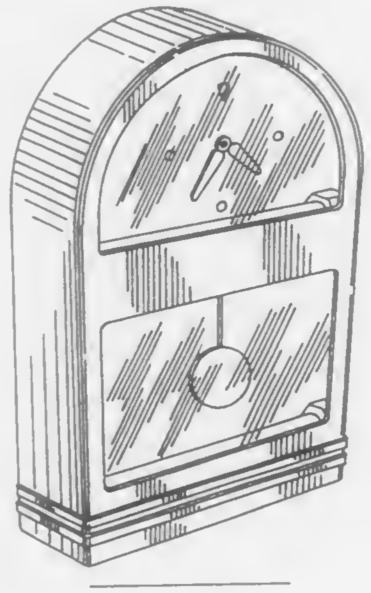
317,411
CLOSURE

Otto S. Holmes, 1706 Bellefontaine, Indianapolis, Ind. 46202
Filed Mar. 18, 1988, Ser. No. 169,763
Term of patent 14 years
U.S. Cl. D9—435



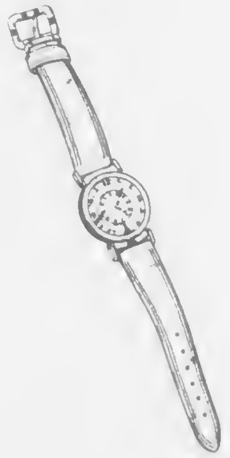
317,412
CLOCK

Dominic LeVita, Roselle, Ill., assignor to Geminii Display Ltd., Elk Grove Village, Ill.
Filed Apr. 18, 1988, Ser. No. 182,571
Term of patent 14 years
U.S. Cl. D10—28



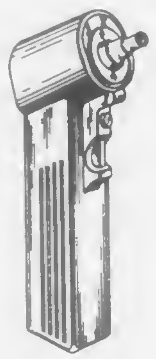
317,413
COMBINED WRIST WATCH AND STRAP

Giuseppe Veronesi, Via Berengario da Carpi 29, 40141 Bologna, Italy
Filed Feb. 4, 1988, Ser. No. 152,214
Claims priority, application Italy, Aug. 12, 1987, 4944/87[U]
Term of patent 14 years
U.S. Cl. D10—32



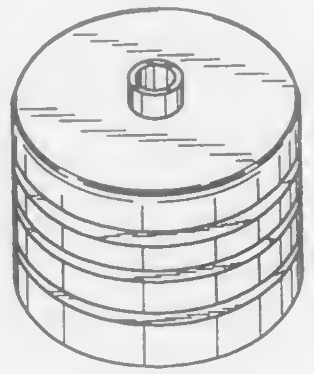
317,414
HANDHELD INFRARED THERMOMETER

Dennis M. Lanci, San Diego; David G. Matsuura, Encinitas; Michael P. DeFrank, Temecula, and Charles E. Everest, Santa Ana, all of Calif., assignors to Ivac Corporation, San Diego, Calif.
Filed May 8, 1989, Ser. No. 349,259
Term of patent 14 years
U.S. Cl. D10—57



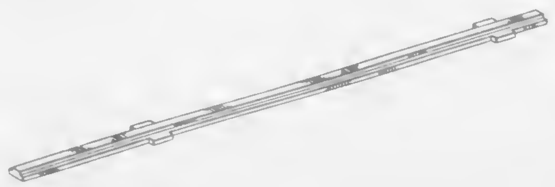
317,415
TEMPERATURE PROBE

Terry A. Gambill, Madison, Ohio, assignor to Tegam, Inc., Madison, Ohio
Filed Jun. 5, 1989, Ser. No. 361,580
Term of patent 14 years
U.S. Cl. D10—60



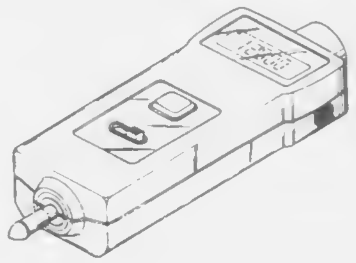
317,416
TEMPLATE FOR ELECTRICAL BOX PLACEMENT

Daniel L. Biglin, 2250 E. Smiley, Shelby, Ohio 44875
Filed Apr. 3, 1989, Ser. No. 332,111
Term of patent 14 years
U.S. Cl. D10—64



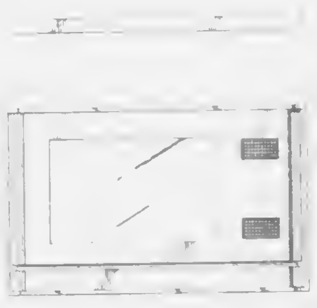
317,417
COMBINED PHOTOELECTRIC AND CONTACT DIGITAL TACHOMETER

Dong-Chang Lin, No. 189, Minchuan West Rd., Taipei, Taiwan, Taiwan
Filed Aug. 18, 1988, Ser. No. 233,609
Term of patent 14 years
U.S. Cl. D10—98



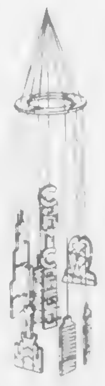
317,418
GRAPHIC AND INFORMATION DISPLAY MODULE FACE PLATE FOR HALL MOUNTED LOCATION AND ELEVATOR CARS

Steven B. Davis, New Hartford, and William Weirsman, Woodbridge, both of Conn., assignors to Otis Elevator Company, Farmington, Conn.
Filed May 12, 1989, Ser. No. 351,141
Term of patent 14 years
U.S. Cl. D10—108



317,419
WIND CHIME

Sandra L. Ronzheimer, 27 W. 430 Fischer La., Winfield, Ill. 60190
Filed Nov. 30, 1988, Ser. No. 278,322
Term of patent 14 years
U.S. Cl. D10—116



VOL
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ISS
2
JE
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1991
UMI

317,420

PRINTER

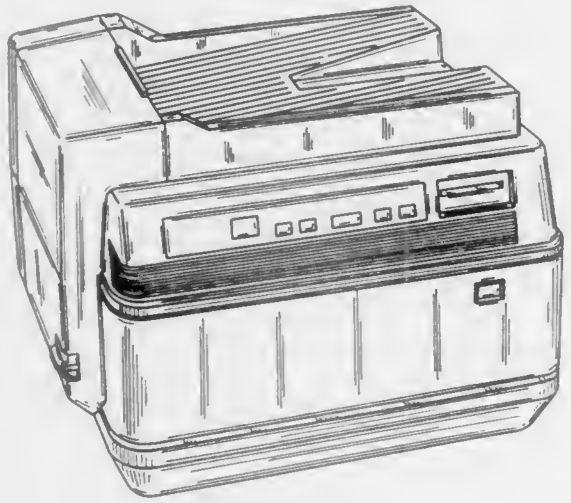
Mikio Kosako, and Kanji Mizusugi, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Apr. 21, 1988, Ser. No. 184,484

Claims priority, application Japan, Oct. 30, 1987, 62-44582

Term of patent 14 years

U.S. Cl. D18—13



317,421

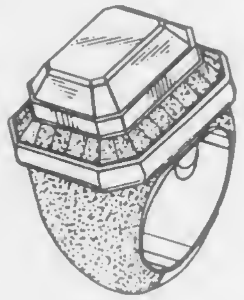
FINGER RING

Scott B. Meyrowitz, 3030 McKinney, Dallas, Tex. 75204

Filed Jul. 15, 1988, Ser. No. 219,161

Term of patent 14 years

U.S. Cl. D11—35



317,422

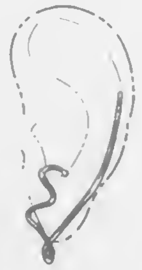
EARRING

Bridget Hardy, 606 W. Howe St., Seattle, Wash. 98119

Filed Mar. 13, 1989, Ser. No. 322,712

Term of patent 14 years

U.S. Cl. D11—42



317,423

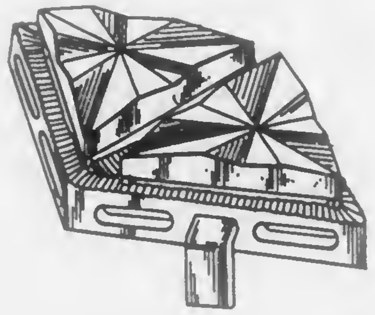
JEWELRY LINK

Meang Chia, and Cheo Chia, both of Chain & Charm Manufacturers, 412 W. 6th St., Suite #1104, Los Angeles, Calif. 90014

Filed Nov. 15, 1989, Ser. No. 436,669

Term of patent 14 years

U.S. Cl. D11—93



317,424

FLOWER POT COVER

Donald E. Weder, Highland, Ill., assignor to Highland Supply Corporation, Highland, Ill.

Filed Apr. 13, 1989, Ser. No. 337,449

Term of patent 14 years

U.S. Cl. D11—164

317,425

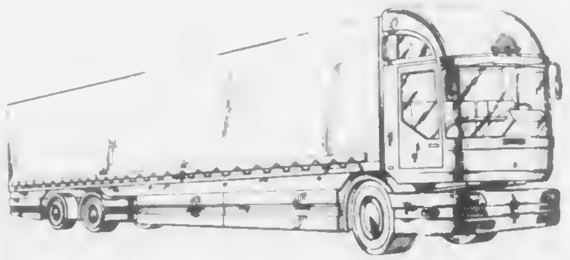
TRACTOR TRAILER

Mikhail S. Vysotsky, ul. Vostochnaya, 30,87, Minsk, U.S.S.R. 220091 ; Viktor N. Sivolobov, pr. Rokossovskogo 125,13, Minsk, U.S.S.R. 220085 ; Stanislav F. Polonevich, ul. Kozlova 10,1,48, Minsk, U.S.S.R. 220038 ; Georgy A. Isaevich, ul. Nesterova 72,120, Minsk, U.S.S.R. 220047 ; Sergei I. Vantukh, ul. Kalinoskogo 59,84, Minsk, U.S.S.R. 220103 ; Jury N. Zhutyaev, ul. Serdicha 7,33, Minsk, U.S.S.R. 220082 ; Stanislav A. Ivanjushenko, ul. Eniseiskaya, 7,39; Alexandr P. Myshko, ul. Eniseiskaya 11,3, both of Minsk, U.S.S.R. 220102 ; Taisia N. Pilosyan, pr. Partizansky, 137,15, Minsk, U.S.S.R. 220021 ; Anatoly I. Ovsyannikov, ul. Slavinskogo 29,39, Minsk, U.S.S.R. 220086 ; Viktor L. Solntse, pr. Gazety Izvestia 32,1,50, Minsk, U.S.S.R. 220055 ; Svetlana A. Khleborodova, ul. Kazintsa, 66,66, Minsk, U.S.S.R. 220108 , and Mark Y. Elkind, ul. Surganova 21,30, Minsk, U.S.S.R. 220012

Filed Sep. 26, 1988, Ser. No. 249,164

Term of patent 14 years

U.S. Cl. D12—97



317,426

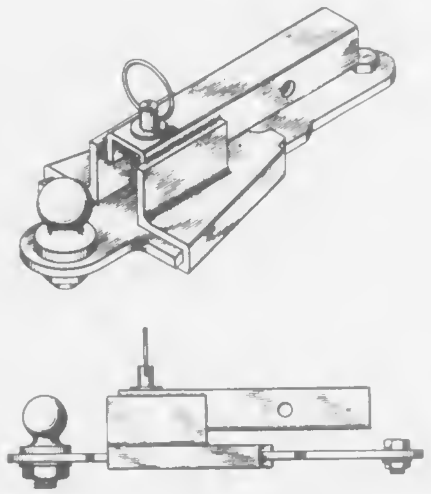
TRAILER HITCH

William R. Lytle, 50 Fairview Cir., Chico, Calif. 95927

Filed May 3, 1989, Ser. No. 346,870

Term of patent 14 years

U.S. Cl. D12—162



317,427

AUTOMOBILE TIRE

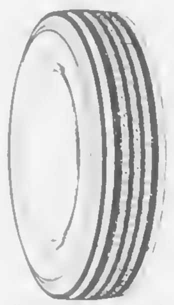
Yasutaka Enoki, Sayama; Shigeo Makino, Tokorozawa, and Yasutoshi Aoki, Kodaira, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Oct. 4, 1988, Ser. No. 253,288

Claims priority, application Japan, Apr. 4, 1988, 63-13507

Term of patent 14 years

U.S. Cl. D12—143



317,428

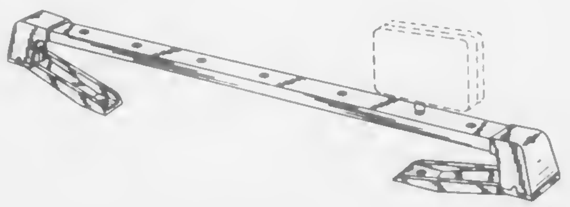
AUXILIARY VEHICLE LIGHT BAR

Jeff A. Carr, Downey, Calif., assignor to Carr Pattern Co., Inc., South Gate, Calif.

Filed Oct. 17, 1988, Ser. No. 258,447

Term of patent 14 years

U.S. Cl. D12—156



317,429

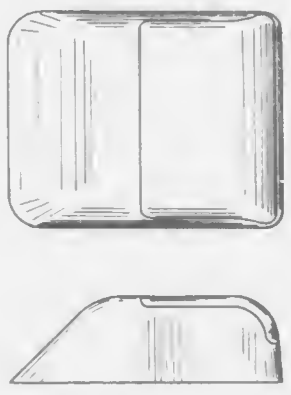
CAR TOP CARRIER OR SIMILAR ARTICLE

John B. Seaver, Elkhart, Ind., assignor to Seaco, Inc., Elkhart, Ind.

Division of Ser. No. 101,273, Sep. 25, 1987, Pat. No. D. 312,996. This application Aug. 20, 1990, Ser. No. 570,285

Term of patent 14 years

U.S. Cl. D12—157



317,430

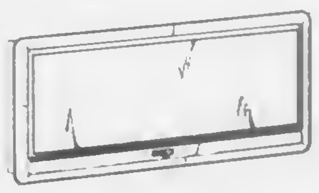
AUTOMOBILE SUN VISOR MIRROR UNIT

James D. Dowd, Farmington Hills; Stephen P. McGarry, Rochester Hills; Robert S. Migrin, Dearborn, and Robert C. Burdick, Romulus, all of Mich., assignors to United Technologies Automotive, Dearborn, Mich.

Filed Oct. 14, 1988, Ser. No. 258,252

Term of patent 14 years

U.S. Cl. D12—191



317,431

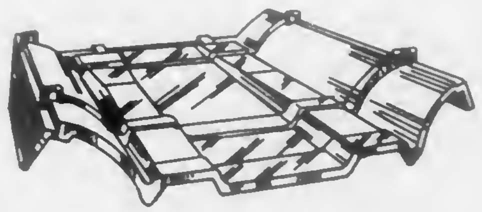
JET SKI RIDE PLATE

Kenneth F. Klus, 34191 Camino Capistrano, Capistrano Beach, Calif. 92624

Filed Sep. 6, 1988, Ser. No. 240,569

Term of patent 14 years

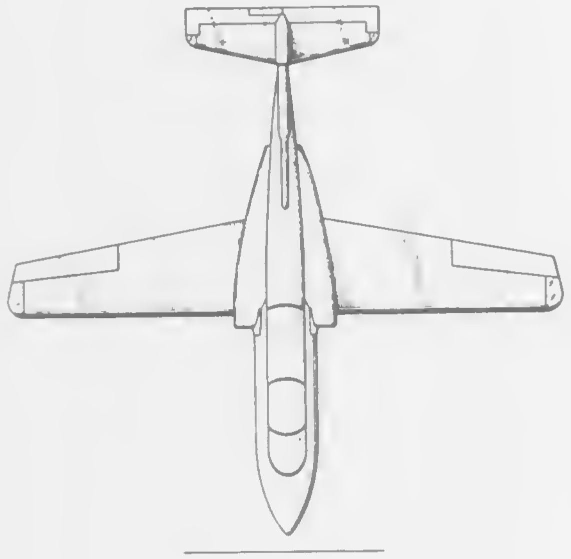
U.S. Cl. D12—317



VOL
1127
ISS
2
JE
11
1991
UMI

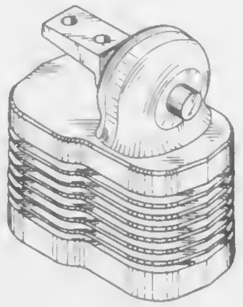
317,432
AIRPLANE

Darold B. Cummings, Hawthorne, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.
Filed Jun. 12, 1989, Ser. No. 365,052
Term of patent 14 years
U.S. Cl. D12—337



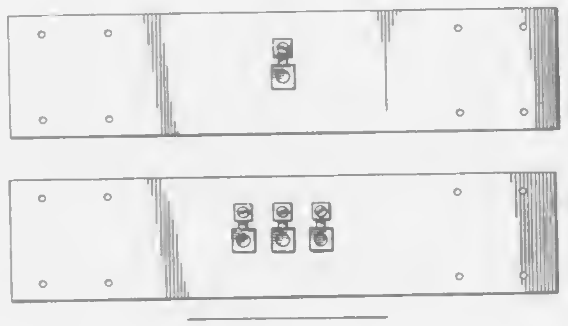
317,433
ELECTRICAL INSULATOR WITH INTEGRAL CIRCUIT-PARAMETER SENSING FEATURES

Henry W. Scherer, Mt. Prospect; Bruce A. Biller, Chicago, and Roy T. Swanson, North Riverside, all of Ill., assignors to S&C Electric Company, Chicago, Ill.
Filed Mar. 30, 1989, Ser. No. 331,570
Term of patent 14 years
U.S. Cl. D13—132



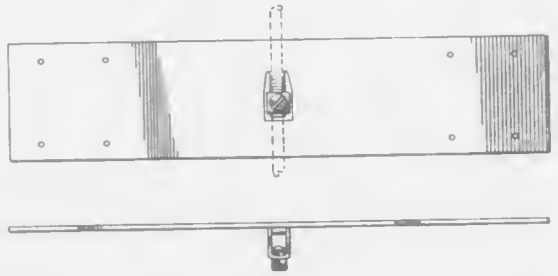
317,434
FLEXIBLE GROUNDING PLATE FOR OVERHEAD UTILITY LINES

Eugene W. McGrane, Ormond Beach, Fla., assignor to Homac Mfg. Company, Ormond Beach, Fla.
Division of Ser. No. 65,474, Jun. 23, 1987, abandoned. This application Feb. 16, 1988, Ser. No. 155,939
Term of patent 14 years
U.S. Cl. D13—133



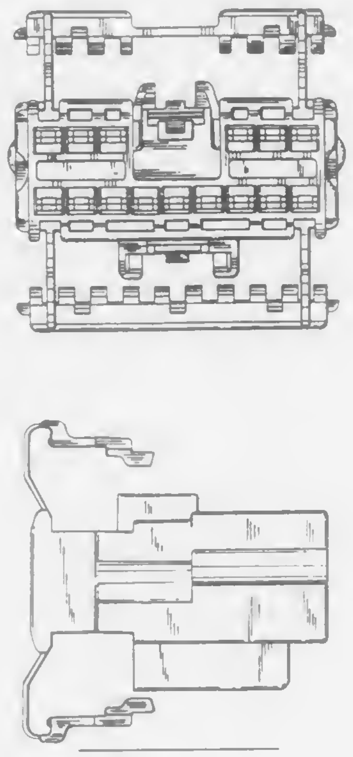
317,435
FLEXIBLE GROUNDING PLATE FOR OVERHEAD UTILITY LINES

Eugene W. McGrane, Ormond Beach, Fla., assignor to Homac Mfg. Company, Ormond Beach, Fla.
Filed Feb. 25, 1988, Ser. No. 162,374
Term of patent 14 years
U.S. Cl. D13—133



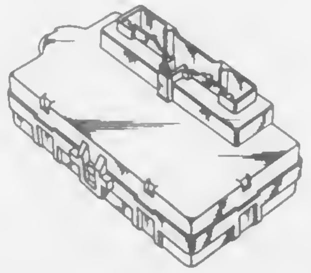
317,436
ELECTRICAL CONNECTOR

Hajime Okada, Nagoya, Japan, assignor to Sumitomo Wiring Systems, Ltd., Suzuka, Japan
Filed Sep. 29, 1987, Ser. No. 102,521
Claims priority, application Japan, Mar. 30, 1987, 62-12035
Term of patent 14 years
U.S. Cl. D13—147



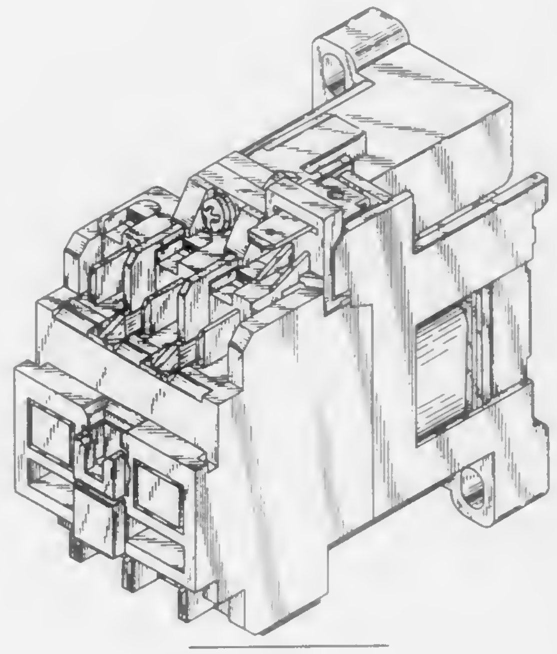
317,437
HOUSING FOR AN ELECTRICAL CONNECTING BOARD FOR USE IN AN AUTOMOBILE

Kikuo Ogawa, Shizuoka, Japan, assignor to Yazaki Corporation, Japan
Filed Mar. 23, 1988, Ser. No. 172,910
Claims priority, application Japan, Aug. 26, 1987, 62-34482
Term of patent 14 years
U.S. Cl. D13—147



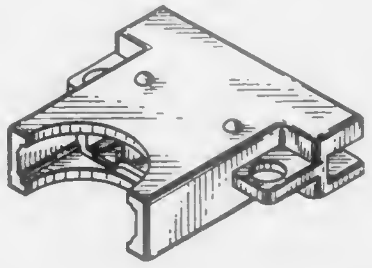
317,438
PLUG-IN TERMINAL TYPE ELECTROMAGNETIC CONTACTOR

Yuji Sako, Nagoya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Dec. 9, 1988, Ser. No. 282,460
Claims priority, application Japan, Sep. 9, 1988, 63-35699
Term of patent 14 years
U.S. Cl. D13—158



317,439
FUSE HOLDER

Kun-Yao Kao, No. 205, Gong Jiann Rd., Hsi Chi Town, Taipei, Taiwan
Filed Jun. 9, 1988, Ser. No. 204,402
Term of patent 14 years
U.S. Cl. D13—160

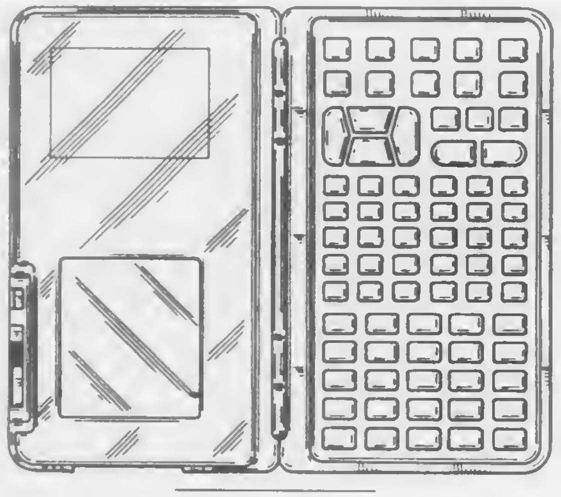


VOL
1127
ISS
2
JE
11
1991
UMI

317,440

MEMORANDUM INPUT/OUTPUT DEVICE

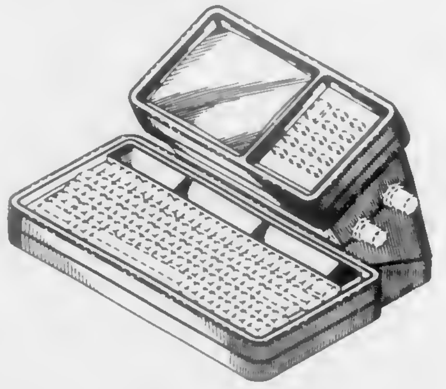
Masaji Sawada, and Kuniyasu Matsumoto, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Dec. 15, 1988, Ser. No. 285,949
Claims priority, application Japan, Jul. 11, 1988, 63-27735
The portion of the term of this patent subsequent to Jul. 31, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—100



317,441

MOBILE DATA TERMINAL OR SIMILAR ARTICLE

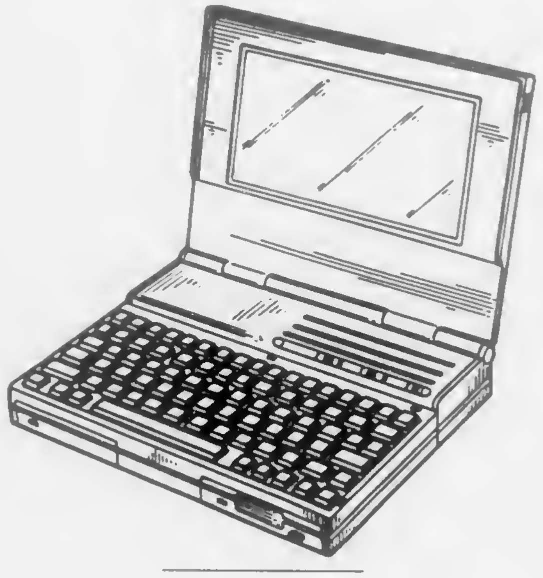
William E. Fenton, Port Coquitlam, and Roman P. Rak, Delta, both of Canada, assignors to Motorola, Inc., Schaumburg, Ill.
Filed Aug. 1, 1989, Ser. No. 389,235
Term of patent 14 years
U.S. Cl. D14—100



317,442

LOW PROFILE LAPTOP PERSONAL COMPUTER

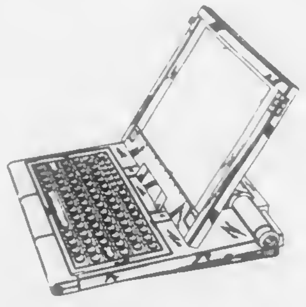
Christopher J. Gintz, Spring; Gary W. Pankonien, Houston; Donald S. Goodrich, The Woodlands, and John E. Youens, Spring, all of Tex., assignors to Compaq Computer Corporation, Houston, Tex.
Filed Apr. 21, 1989, Ser. No. 341,333
Term of patent 14 years
U.S. Cl. D14—106



317,443

COMPUTER

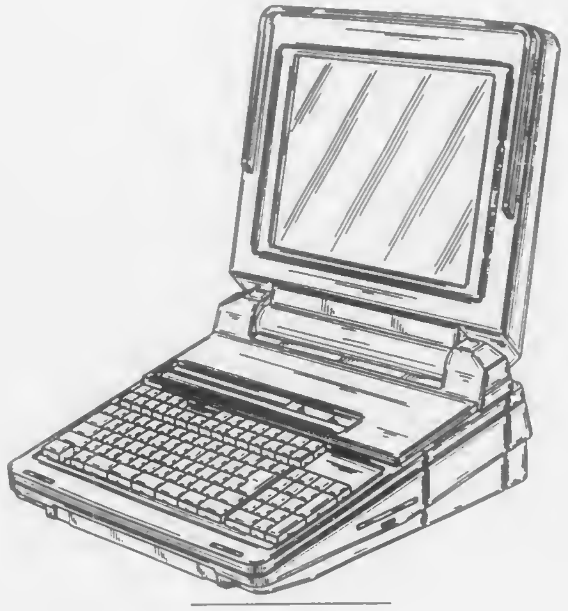
Jay Wilson, Portla Valley; Michael R. Barry, Palo Alto, both of Calif., and Yosuke Yamamoto, Morioka, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan
Filed Jun. 22, 1989, Ser. No. 370,512
Claims priority, application Japan, Jan. 31, 1989, 1-3268
Term of patent 14 years
U.S. Cl. D14—106



317,444

COMPUTER

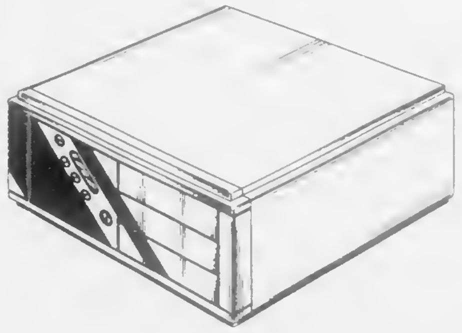
Kanji Mizusugi, and Kouki Fukuda, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Sep. 15, 1989, Ser. No. 407,793
Claims priority, application Japan, Mar. 28, 1989, 1-11370
Term of patent 14 years
U.S. Cl. D14—106



317,445

COMPUTER PROCESSOR MODULE

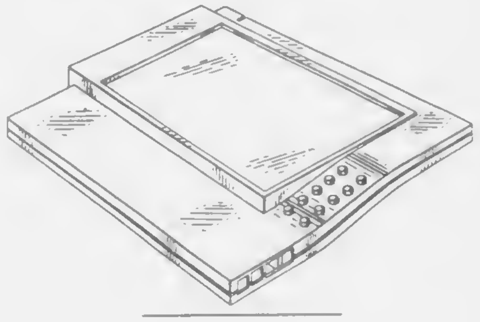
James E. Sacherman, Palo Alto, Calif., assignor to Wyse Technology, Inc., San Jose, Calif.
Filed May 16, 1988, Ser. No. 194,581
Term of patent 14 years
U.S. Cl. D14—107



317,446

ELECTRONIC DATA DISPLAY PANEL FOR USE WITH AN OVERHEAD PROJECTOR

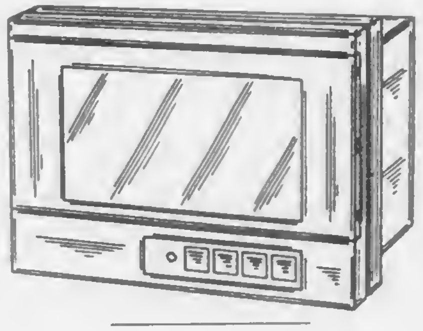
Sohrab Vossoughi; Christopher A. Alviar, both of Portland; Steven R. Hix, Lake Oswego, and Paul E. Gulick, Tualatin, all of Oreg., assignors to In Focus Systems, Inc., Tualatin, Oreg.
Filed Nov. 17, 1988, Ser. No. 273,224
Term of patent 14 years
U.S. Cl. D14—113



317,447

DISPLAY FOR PROGRAMMABLE CONTROLLER

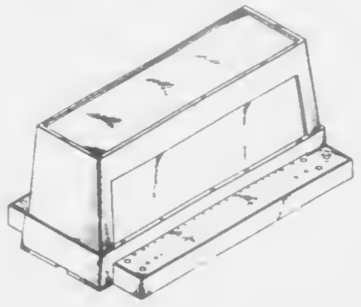
Katsuhiro Ishida, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Feb. 6, 1989, Ser. No. 307,584
Claims priority, application Japan, Sep. 7, 1988, 63-35295
Term of patent 14 years
U.S. Cl. D14—113



317,448

INPUT/OUTPUT MODULE

Ronald A. Straw, Eliot, Me., and Walter L. Bennett, Andover, Mass., assignors to Transition Technology, Andover, Mass.
Filed Nov. 14, 1988, Ser. No. 270,494
Term of patent 14 years
U.S. Cl. D14—114



VOL
1127
ISS
2
JE
11
1991
UMI

317,449

RELAY MACHINE FOR WIRELESS TELEPHONE

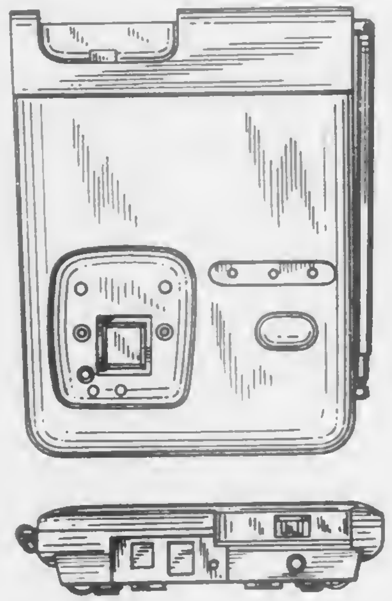
Masakazu Kanatani, Mitaka, and Satoshi Masamitsu, Kawaguchi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 22, 1989, Ser. No. 454,840

Claims priority, application Japan, Jun. 29, 1989, 1-24095

Term of patent 14 years

U.S. Cl. D14—138



317,450

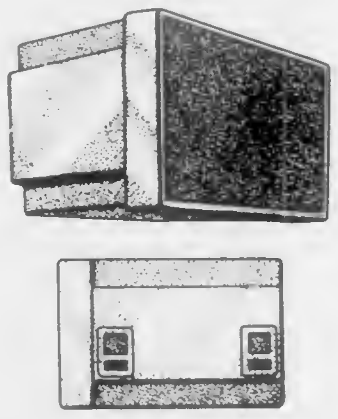
LOUDSPEAKER

Tracy E. Crawford, Foster City, Calif.; Rogelio Delgado, Jr., Rosston, and Michael T. Oliver, Mineral Springs, both of Ark., assignors to Klipsch and Associates, Inc., Hope, Ark.

Filed May 18, 1989, Ser. No. 353,501

Term of patent 14 years

U.S. Cl. D14—214



317,451

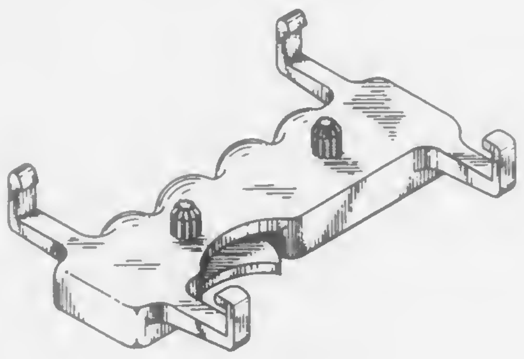
CASSETTE TAPE REWINDER

Max F. Corzo, 780 Flamingo Ct., West, West Palm Beach, Fla. 33406

Filed May 25, 1989, Ser. No. 356,399

Term of patent 14 years

U.S. Cl. D14—217



317,452

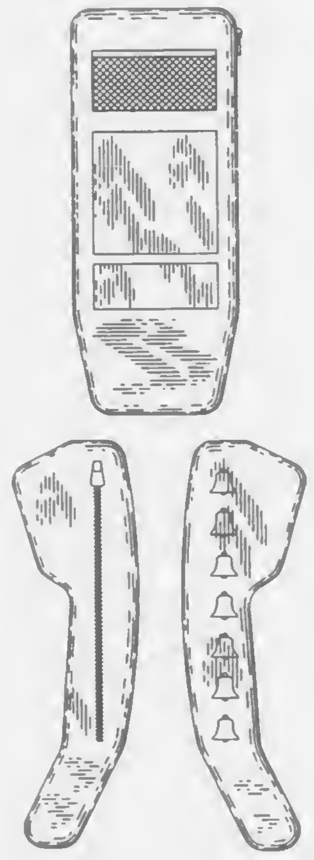
COVER FOR TELEPHONE HANDSET OR SIMILAR ARTICLE

Kevin E. Garab, 1925 D Windsor Hill Dr., Matthews, N.C. 28105

Filed Oct. 19, 1990, Ser. No. 600,071

Term of patent 14 years

U.S. Cl. D14—250



317,453

SEWING MACHINE

Yoshiaki Uguchi, Tokyo, Japan, assignor to Janome Sewing Machine Co. Ltd., Tokyo, Japan

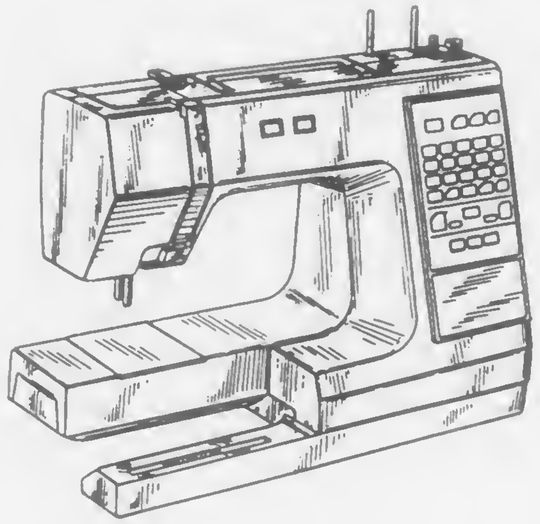
Filed Oct. 13, 1987, Ser. No. 108,480

Claims priority, application Japan, Aug. 12, 1987, 62-32719

The portion of the term of this patent subsequent to Feb. 5, 2005, has been disclaimed.

Term of patent 14 years

U.S. Cl. D15—70



317,454

REFRIGERATOR

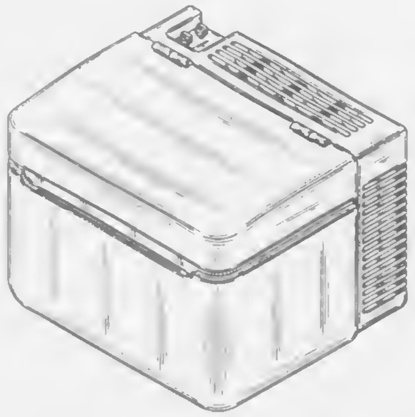
Katsuya Matsumura, and Youichi Tatsuta, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Jul. 13, 1989, Ser. No. 380,073

Claims priority, application Japan, Jan. 13, 1989, 1-1041

Term of patent 14 years

U.S. Cl. D15—83



317,455

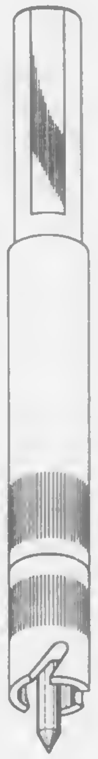
HOLE CUTTER

Louis G. Martin, 12139 N. Linden Rd., Clio, Mich. 48420

Filed Jan. 21, 1988, Ser. No. 146,749

Term of patent 14 years

U.S. Cl. D15—139



317,456

TELEVISION CAMERA

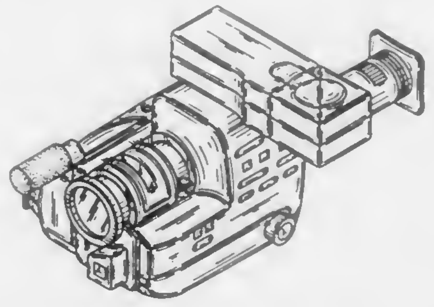
Hiroshi Ooi; Fumitoshi Sakata, and Sho Okamura, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Nov. 22, 1988, Ser. No. 274,941

Claims priority, application Japan, May 26, 1988, 63-20780

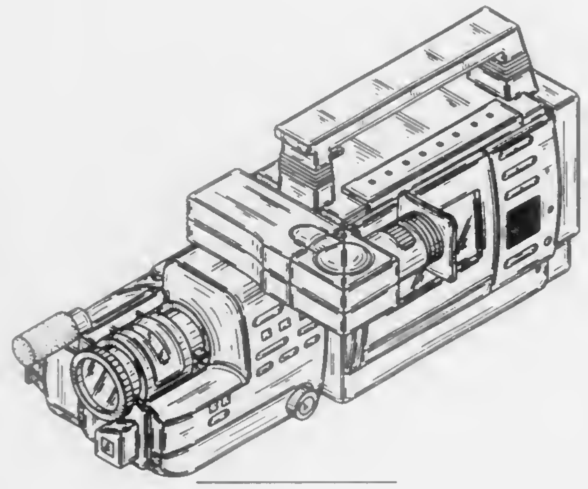
Term of patent 14 years

U.S. Cl. D16—202

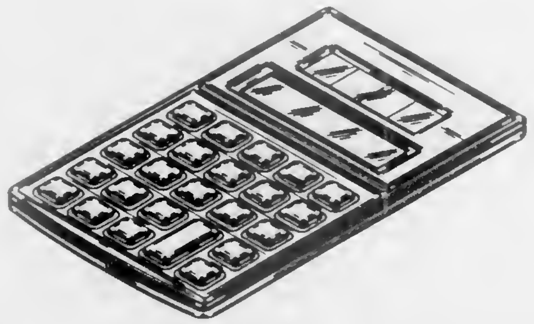


VOL
1127
ISS
2
JE
11
1991
UMI

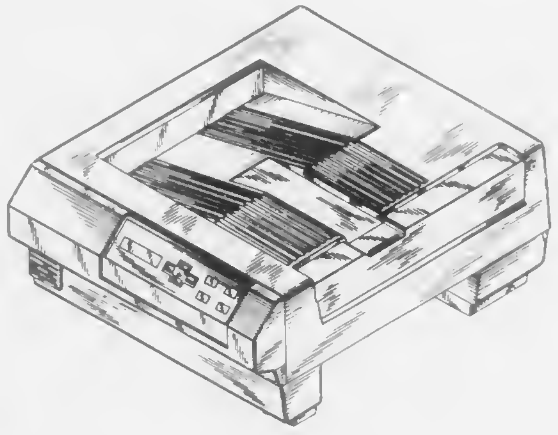
317,457
CAMERA WITH LCD TELEVISION AND VIDEO TAPE RECORDER
Hiroshi Ooi; Fumitoshi Sakata, and Sho Okamura, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Nov. 22, 1988, Ser. No. 274,948
Claims priority, application Japan, May 26, 1988, 63-20782
Term of patent 14 years
U.S. Cl. D16—202



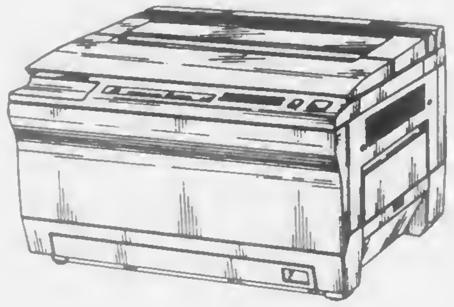
317,458
ELECTRONIC CALCULATOR WITH SOLAR CELL
Masaji Sawada, and Yoko Ikuzawa, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jun. 21, 1988, Ser. No. 209,777
Claims priority, application Japan, Dec. 26, 1987, 62-53661
Term of patent 14 years
U.S. Cl. D18—7



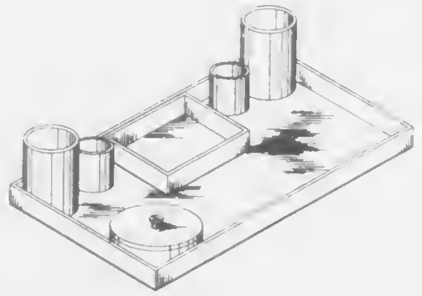
317,459
PRINTER FOR COMPUTER
Toshiaki Ono, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan
Filed Sep. 22, 1988, Ser. No. 248,408
Claims priority, application Japan, Apr. 28, 1988, 63-17447
Term of patent 14 years
U.S. Cl. D18—13



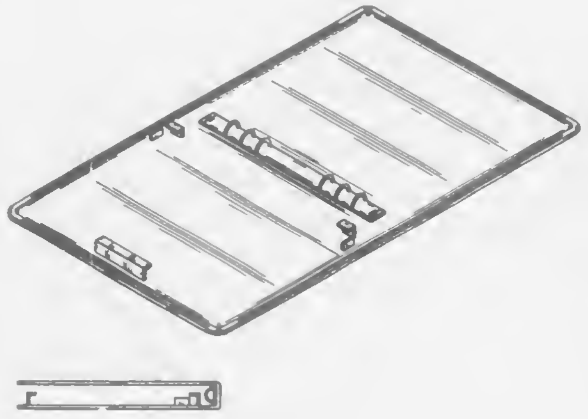
317,460
ELECTRONIC COPYING MACHINE
Atsushi Tani, Yokohama, and Kunio Hara, Chiba, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Apr. 20, 1989, Ser. No. 340,589
Claims priority, application Japan, Oct. 21, 1988, 63-41080
Term of patent 14 years
U.S. Cl. D18—36



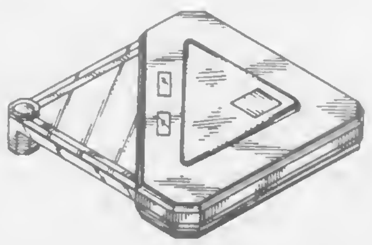
317,461
ORGANIZER FOR A PLURALITY OF ARTICLES
Janet A. Willie, 1226 Park La., Texas City, Tex. 77590
Filed Nov. 20, 1987, Ser. No. 123,665
Term of patent 14 years
U.S. Cl. D19—75



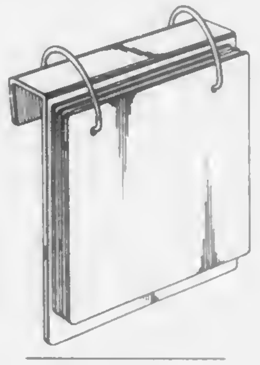
317,462
BINDER
Masaji Sawada, and Kuniyasu Matsumoto, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jun. 14, 1989, Ser. No. 366,035
Term of patent 14 years
U.S. Cl. D19—27



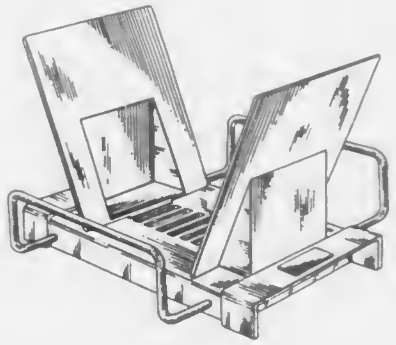
317,463
ELECTRONIC TEST SENSOR UNIT
Martin P. Riddiford; Stephen O. Frazer, and Seamus A. Sharkey, all of London, England, assignors to Price Stern Sloan Inc., Los Angeles, Calif.
Filed Jun. 22, 1988, Ser. No. 210,021
Claims priority, application United Kingdom, Dec. 22, 1987, 1047292
Term of patent 14 years
U.S. Cl. D19—59



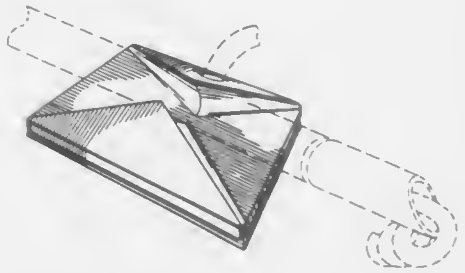
317,464
COMBINED HOLDER AND VISUAL STIMULATOR FOR INFANTS
Debra L. Goodman, 11623 W. 100th St., Overland Park, Kans. 66214, and Darlene Stubbs, 8400 W. 81st St., Overland Park, Kans. 66204
Filed Sep. 26, 1988, Ser. No. 248,567
Term of patent 14 years
U.S. Cl. D19—59



317,465
POSTING TRAY
Andrew K. Wadams, Wychbold, United Kingdom, assignor to Kalamazoo plc, Birmingham, United Kingdom
Filed Dec. 29, 1987, Ser. No. 139,050
Claims priority, application United Kingdom, Jul. 11, 1987, 1043437
Term of patent 14 years
U.S. Cl. D19—76

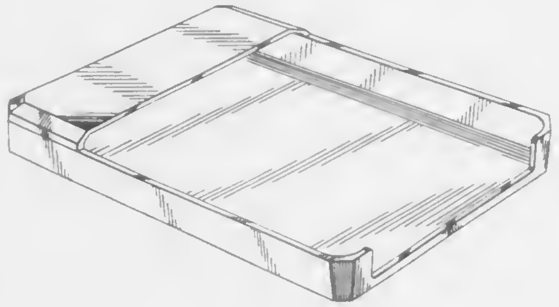


317,466
BASE FOR A WRITING INSTRUMENT
Gerald J. Klodt, Madison, Wis., assignor to W. T. Rogers Company, Madison, Wis.
Filed Nov. 3, 1988, Ser. No. 266,930
Term of patent 14 years
U.S. Cl. D19—83

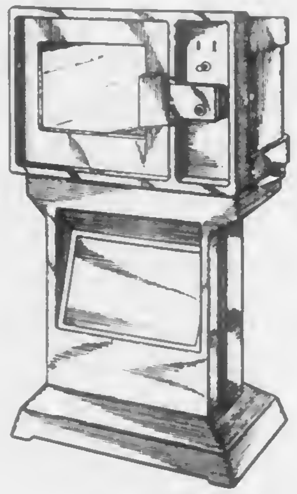


VOL
1127
ISS
2
JE
11
1991
UMI

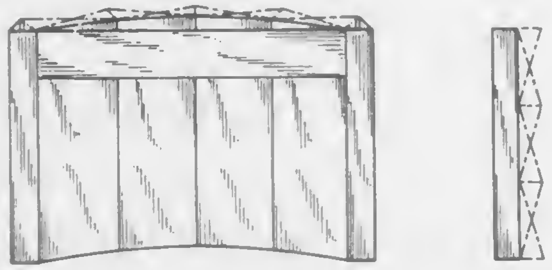
317,467
MEMO PAPER TRAY
Heng G. Khcng, Singapore, Singapore, assignor to Metro Plastic Industry Pte. Ltd., Singapore, Singapore
Filed Jun. 2, 1988, Ser. No. 201,621
Term of patent 14 years
U.S. Cl. D19—92



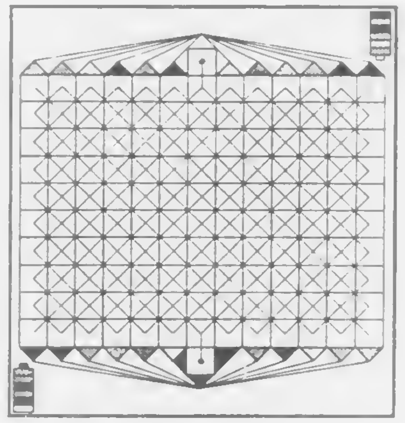
317,468
VENDING MACHINE FOR NEWSPAPERS OR THE LIKE
John B. Olson, Waukesha; Richard L. Jeanson, Watertown, and John D. Sinchok, Oconomowoc, all of Wis., assignors to Fortec, Inc., Waukesha, Wis.
Filed Jun. 28, 1988, Ser. No. 212,727
Term of patent 14 years
U.S. Cl. D20—6



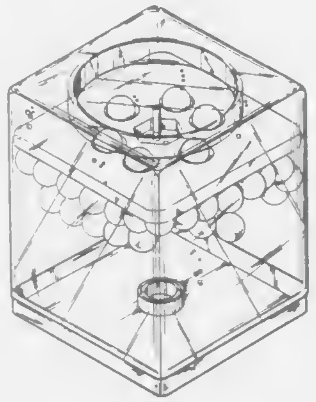
317,469
PORTABLE EXHIBIT DISPLAY
Bryan J. Beaulieu, Burnsville, Minn., assignor to Skyline Displays, Inc., Burnsville, Minn.
Filed Mar. 24, 1989, Ser. No. 328,442
Term of patent 14 years
U.S. Cl. D20—10



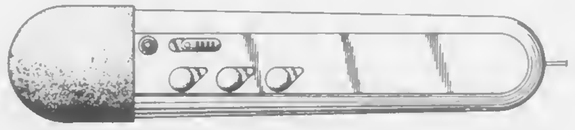
317,470
GAME BOARD
Geoffrey W. Michel, Paradise Point, Australia, assignor to Portout Limited, Solihull, United Kingdom
Filed Aug. 31, 1988, Ser. No. 238,513
Term of patent 14 years
U.S. Cl. D21—34



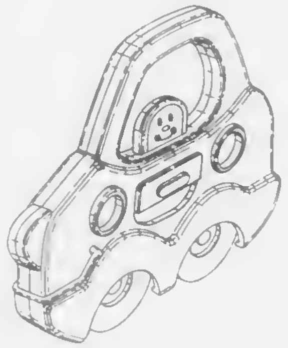
317,471
LIQUID FILLED RANDOM NUMBER BALL TUMBLER
Mike Rizzo, and Camille Rizzo, both of 16783 Stallion Pl., Riverside, Calif. 92503
Filed Nov. 15, 1988, Ser. No. 271,484
Term of patent 14 years
U.S. Cl. D21—37



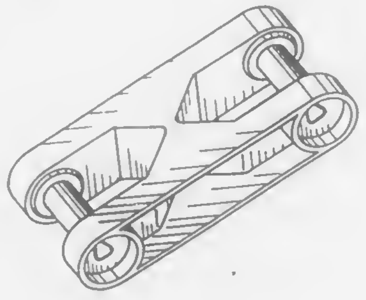
317,472
VOICE CHANGING AMUSEMENT MICROPHONE
Masatsune Sasaki, and Akio Ozawa, both of Tokyo, Japan, assignors to Tomy Company, Ltd., Tokyo, Japan
Filed May 10, 1989, Ser. No. 350,683
Claims priority, application Japan, Nov. 11, 1988, 63-44209
Term of patent 14 years
U.S. Cl. D21—64



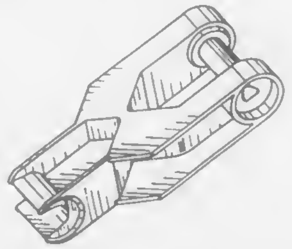
317,473
RATTLE TOY
James O. Capper, Cheadle Hulme, and Ian T. Revell, Knutsford, both of England, assignors to Hestair Kiddicraft Limited, Bristol, England
Filed Apr. 20, 1989, Ser. No. 341,055
Claims priority, application United Kingdom, Nov. 22, 1988, 1055138
Term of patent 14 years
U.S. Cl. D21—65



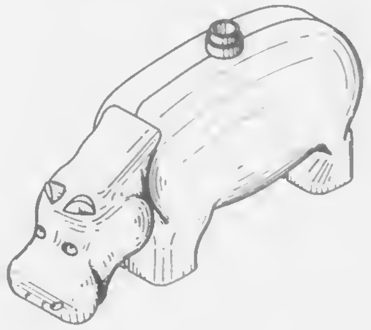
317,474
TOY CONSTRUCTION ELEMENT
Flemming H. Olsen, Espergaerde, Denmark, assignor to Interlego A.G., Switzerland
Filed Aug. 15, 1989, Ser. No. 394,190
Claims priority, application Denmark, Feb. 24, 1989, MA02221989
Term of patent 14 years
U.S. Cl. D21—108



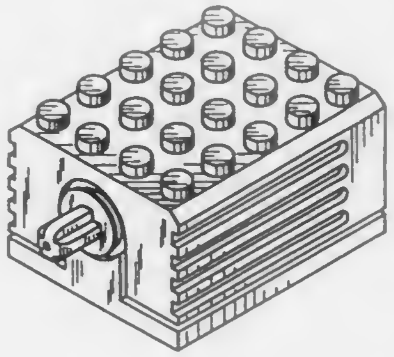
317,475
TOY CONSTRUCTION ELEMENT
Flemming H. Olsen, Espergaerde, Denmark, assignor to Interlego A.G., Switzerland
Filed Aug. 15, 1989, Ser. No. 394,191
Claims priority, application Denmark, Feb. 24, 1989, MA02221989
Term of patent 14 years
U.S. Cl. D21—108



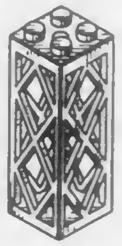
317,476
TOY HIPPOPOTAMUS
Christian Stephensen, Marstal, and Jacob Nielsen, Copenhagen, both of Denmark, assignors to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 443,227
Term of patent 14 years
U.S. Cl. D21—108



317,477
ELECTRIC TOY MOTOR
Ole V. Poulsen, Vejle, Denmark, assignor to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 443,232
Term of patent 14 years
U.S. Cl. D21—108



317,478
TOY BUILDING ELEMENT
Kim P. Larsen, Vandel, and Erling T. Dideriksen, Billund, both of Denmark, assignors to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 443,235
Term of patent 14 years
U.S. Cl. D21—108



VOL
1127
ISS
2
JE
11
1991
UMI

317,479

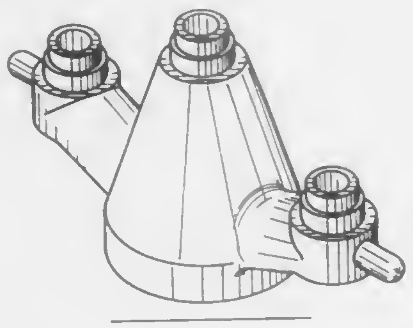
TOY TREE ELEMENT

Flemming H. Olsen, Espergaerde, Denmark, assignor to Interlego A.G., Switzerland

Filed Nov. 29, 1989, Ser. No. 443,237

Term of patent 14 years

U.S. Cl. D21—108



317,480

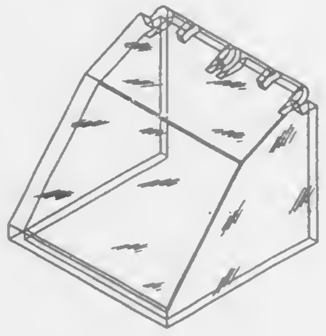
TOY BUILDING ELEMENT

Ib T. Skov, and Erling T. Dideriksen, both of Billund, Denmark, assignors to Interlego A.G., Switzerland

Filed Nov. 29, 1989, Ser. No. 443,238

Term of patent 14 years

U.S. Cl. D21—108



317,481

TOY BUILDING ELEMENT

Charlotte Buch, Hvalso, Denmark, assignor to Interlego A.G., Switzerland

Filed Nov. 29, 1989, Ser. No. 443,239

Term of patent 14 years

U.S. Cl. D21—108

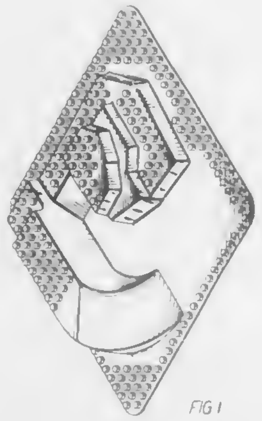


FIG 1

317,482

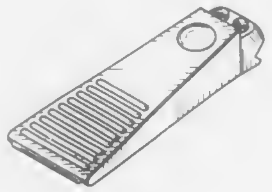
SEPARATING TOOL FOR TOY BUILDING ELEMENTS

Carsten Michaelsen, and Ole V. Poulsen, both of Vejle, Denmark, assignors to Interlego A.G., Switzerland

Filed Nov. 29, 1989, Ser. No. 443,274

Term of patent 14 years

U.S. Cl. D21—108



317,483

TOY TELEPHONE

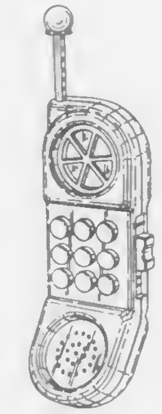
Christopher C. Wiggs, and Christopher J. C. Taylor, both of London, England, assignors to Hestair Kiddicraft Limited, Bristol, England

Filed May 19, 1989, Ser. No. 354,679

Claims priority, application United Kingdom, Nov. 22, 1988, 1055141

Term of patent 14 years

U.S. Cl. D21—111



317,484

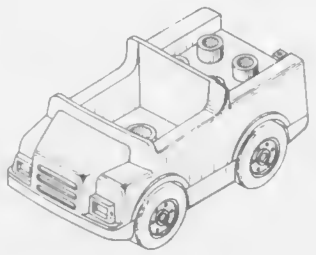
TOY TRUCK

Ib H. Berggreen, Vedbaek, Denmark, assignor to Interlego A.G., Switzerland

Filed Nov. 29, 1988, Ser. No. 277,908

Term of patent 14 years

U.S. Cl. D21—136



317,485

TOY RACING CAR

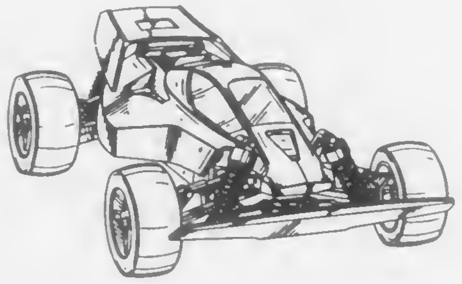
Takashi Mochizuki, Shimizu, Japan, assignor to Kabushiki Kaisha Tamiya Mokei, Shizuoka, Japan

Filed Jun. 13, 1989, Ser. No. 365,983

Claims priority, application Japan, Jan. 17, 1989, 1-804

Term of patent 14 years

U.S. Cl. D21—137



317,486

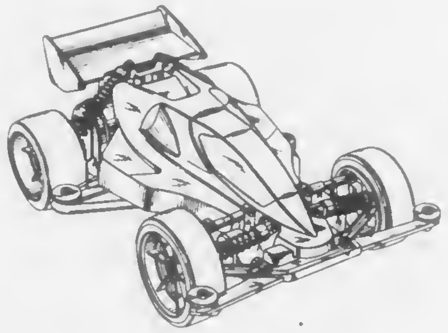
TOY RACING CAR

Yoshio Fujinami, Shizuoka, Japan, assignor to Kabushiki Kaisha Tamiya Mokei, Shizuoka, Japan

Filed Aug. 1, 1989, Ser. No. 387,882

Term of patent 14 years

U.S. Cl. D21—137



317,487

STUFFED TOY CAT FIGURE

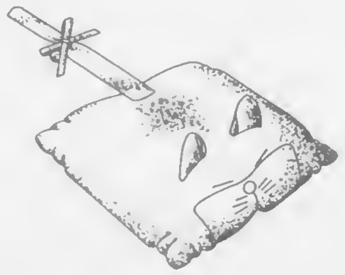
Hiroki Tsukada, Tokyo, Japan, assignor to Iwaya Corporation, Tokyo, Japan

Filed Jun. 24, 1988, Ser. No. 211,300

Claims priority, application Japan, May 19, 1988, 63-19719

Term of patent 14 years

U.S. Cl. D21—163



317,488

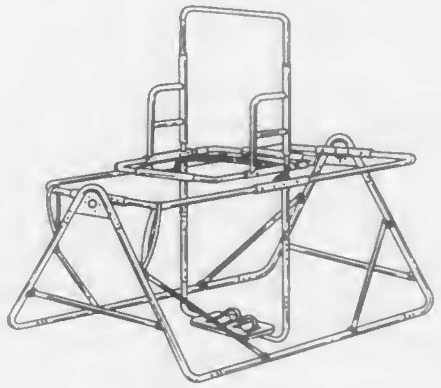
PHYSICAL EXERCISER

Taichi Inada, 10F-5 No. 417 Kwang Fu S. Rd., Taipei, Taiwan

Filed Feb. 17, 1988, Ser. No. 161,186

Term of patent 14 years

U.S. Cl. D21—191



317,489

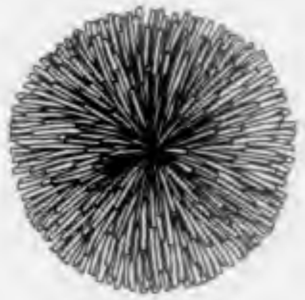
THROWING TOY

Scott H. Stillinger, 16121 Azalea Way, Los Gatos, Calif. 95030

Filed Apr. 11, 1988, Ser. No. 180,280

Term of patent 14 years

U.S. Cl. D21—203



317,490

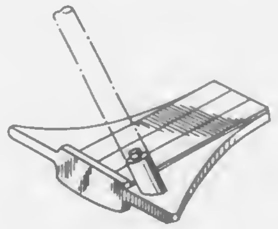
GOLF CLUB HEAD

David T. Pelz, 436 Seawind, Austin, Tex. 78746

Filed Jul. 22, 1988, Ser. No. 225,153

Term of patent 14 years

U.S. Cl. D21—219

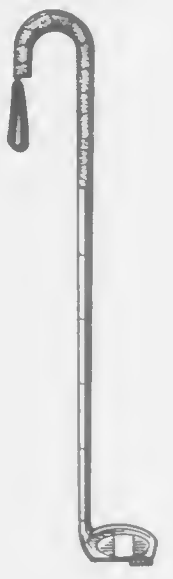


VOL
1127
ISS
2
JE
11
1991
UMI

317,491

COMBINATION GOLF CLUB AND WALKING STICK

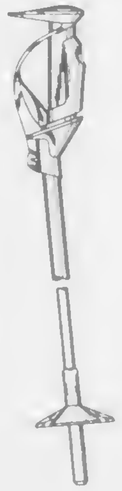
Travis D. Rhodes, P.O. Box 2526, Morgan City, La. 70381
Filed Mar. 22, 1988, Ser. No. 171,539
Term of patent 14 years
U.S. Cl. D21—234



317,492

SKI POLE

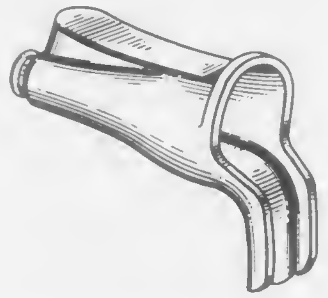
Patricia Pugnat, Sallanches, and Claude Fougerousse, Annecy, both of France, assignors to Sports Booster, Le Fayet, France
Filed Mar. 18, 1988, Ser. No. 170,291
Claims priority, application France, Sep. 28, 1987, 875629
Term of patent 14 years
U.S. Cl. D21—229



317,493

FOREGRIP FOR A FISHING ROD

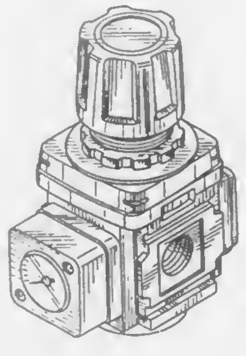
Casey J. Childre; George V. Walker, and Michael Speh, all of Foley, Ala., assignors to Lew Childre & Sons, Inc., Foley, Ala.
Filed Jun. 21, 1988, Ser. No. 209,534
Term of patent 14 years
U.S. Cl. D22—142



317,494

PRESSURE REGULATOR

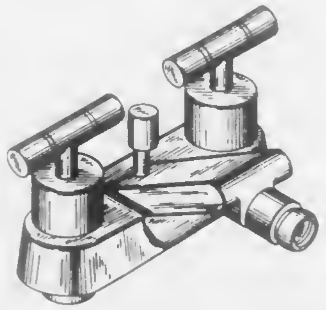
Kouichi Miyake, Kani; Kazuya Hosoda, Aichi, and Hisanobu Niwa, Komaki, all of Japan, assignors to CKD Kabushiki Kaisha, Komaki, Japan
Filed Mar. 30, 1989, Ser. No. 330,737
Claims priority, application Japan, Sep. 30, 1988, 63-38445
Term of patent 14 years
U.S. Cl. D23—235



317,495

FAUCET

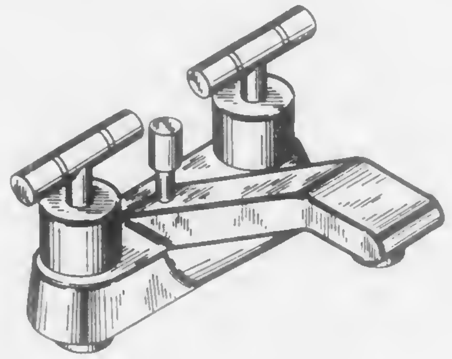
Herbert V. Kohler, Jr., Kohler; Mary J. Reid, Sheboygan; Bruce M. Sauter, Kohler, and Alan D. Bengtson, Sheboygan, all of Wis., assignors to Kohler Co., Kohler, Wis.
Filed Jan. 12, 1988, Ser. No. 144,440
Term of patent 14 years
U.S. Cl. D23—241



317,496

FAUCET

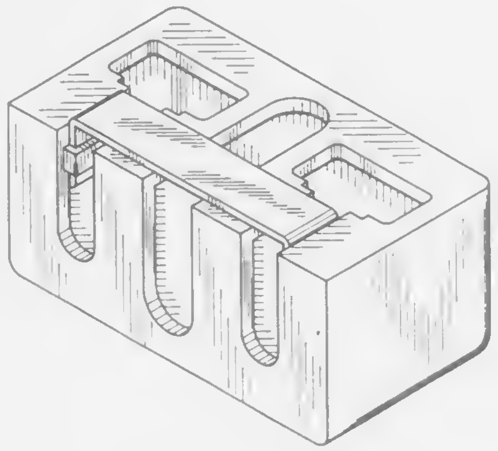
Herbert V. Kohler, Jr., Kohler; Mary J. Reid, Sheboygan; Bruce M. Sauter, Kohler, and Alan D. Bengtson, Sheboygan, all of Wis., assignors to Kohler Co., Kohler, Wis.
Filed Jan. 12, 1988, Ser. No. 144,441
Term of patent 14 years
U.S. Cl. D23—241



317,497

FAUCET PROTECTOR FOR TODDLERS

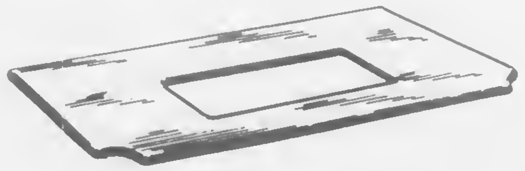
Clarence Mast, Jr., Box 278A, R.D. #3, Tunkhannock, Pa. 18657
Filed Oct. 5, 1987, Ser. No. 104,482
Term of patent 14 years
U.S. Cl. D23—249



317,498

LAVATORY TABLE TOP

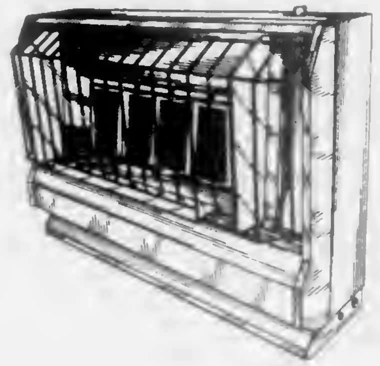
Mary J. Reid, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.
Continuation-in-part of Ser. No. 3,215, Jan. 14, 1987, abandoned. This application May 1, 1987, Ser. No. 45,255
Term of patent 14 years
U.S. Cl. D23—308



317,499

GAS FIRED HEATER

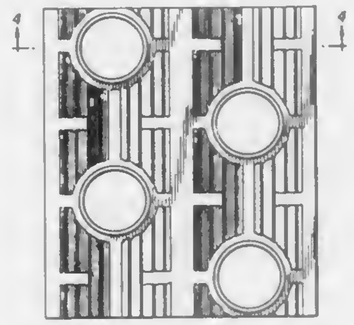
Jeffery R. Tonks, Birmingham; Mark D. Humphries, Arierley Hill, and Paul A. Gillam, Birmingham, all of England, assignors to Valor Heating Limited, London, England
Filed Oct. 17, 1988, Ser. No. 258,445
Claims priority, application United Kingdom, Apr. 20, 1988, 1050126
The portion of the term of this patent subsequent to May 7, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—339



317,500

FINNED HEAT EXCHANGER PLATE

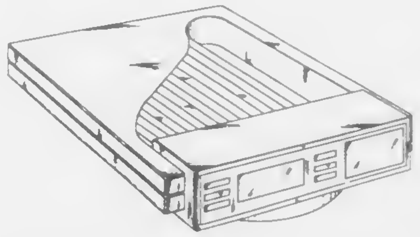
Shuji Ueda, Ueda, Japan, assignor to Hidaka Engineering Co., Ltd., Tokyo, Japan
Filed Jan. 31, 1986, Ser. No. 824,651
Term of patent 14 years
U.S. Cl. D23—386



317,501

PULSE OXIMETER

Peter W. Cheung, Mercer Island, and Gary J. Selke, Kirkland, both of Wash., assignors to SiMed Corporation, Bothell, Wash.
Filed Oct. 9, 1987, Ser. No. 107,511
Term of patent 14 years
U.S. Cl. D24—169



VOL
1127
ISS
2
JE
11
1991
UMI

317,502

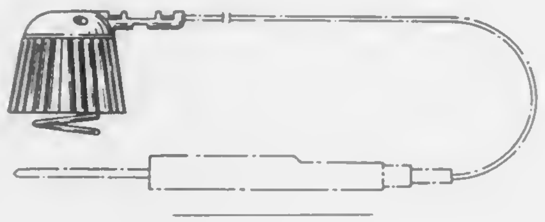
UNIPOLAR SPIRAL COIL ELECTRODE FOR MONITORING THE ELECTRICAL ACTIVITY OF THE BRAIN

James R. Doty, 1181 Kaluanui Rd., Honolulu, Hi. 96825, and Thomas W. Furlow, Jr., P.O. Box 6367, Annapolis, Md. 21401

Filed Oct. 15, 1987, Ser. No. 108,576

Term of patent 14 years

U.S. Cl. D24—187



317,503

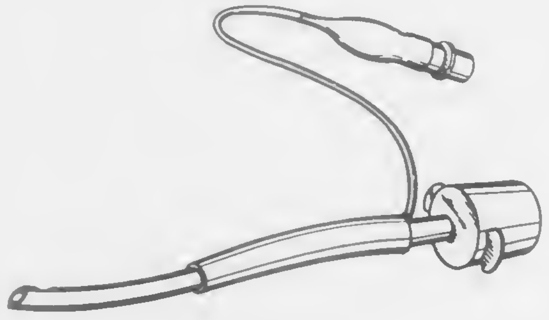
ENDOTRACHEAL TUBE WITH AN INFLATABLE SUCKING DEVICE

Olajire Idowu, 1734 Mettler Rd., Lodi, Calif. 95242, and Karen H. Sousa, 3135 Seagull La., Stockton, Calif. 95209

Filed Nov. 21, 1988, Ser. No. 274,133

Term of patent 14 years

U.S. Cl. D24—115



317,504

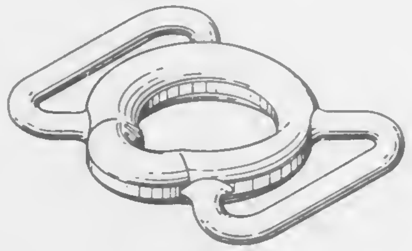
MALE ERECTION SUSTAINER

Robert E. Osbon, Taylors, S.C., assignor to Osbon Medical Systems, Ltd., Augusta, Ga.

Filed Sep. 8, 1989, Ser. No. 404,444

Term of patent 14 years

U.S. Cl. D24—143



317,505

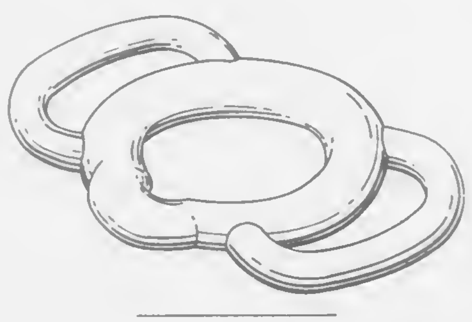
MALE ERECTION SUSTAINER

Robert E. Osbon, Taylors, S.C., assignor to Osbon Medical Systems, Ltd., Augusta, Ga.

Continuation-in-part of Ser. No. 404,444, Sep. 8, 1989. This application Jul. 31, 1990, Ser. No. 559,590

Term of patent 14 years

U.S. Cl. D24—143



317,506

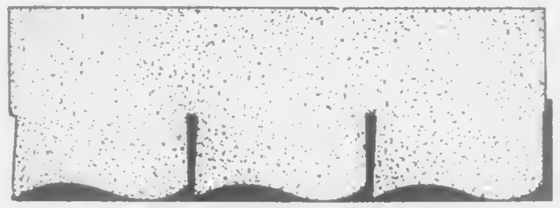
SHINGLE

Robert L. Jenkins, Coatesville; Husnuo M. Kalkanoglu, Swarthmore, both of Pa.; John R. Klein, deceased, late of Malvern, Pa. by Helen B. Klein, executrix ; Michael J. Noone, Wayne; Kermit E. Stahl, North Whales, both of Pa., and Phillip H. Whitford, Casselberry, Fla., assignors to CertainTeed Corporation, Valley Forge, Pa.

Division of Ser. No. 174,022, Mar. 28, 1988. This application Aug. 22, 1990, Ser. No. 570,722

Term of patent 14 years

U.S. Cl. D25—139



317,507

LAMP

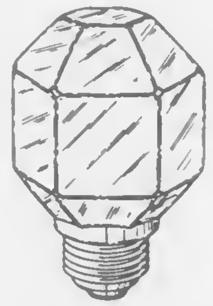
Reinhard Mayr, Vorchdorf, Austria, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 9, 1990, Ser. No. 491,364

Claims priority, application World Int. Prop. O., Sep. 11, 1989, 014.J44

Term of patent 14 years

U.S. Cl. D26—2



317,508

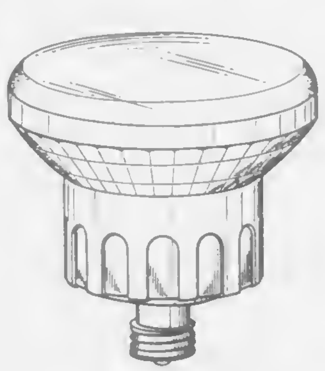
FLUORESCENT REFLECTOR LAMP

Kenneth S. Lim, 47 St. James Pl., Piedmont, Calif. 94611

Filed Mar. 8, 1989, Ser. No. 320,452

Term of patent 14 years

U.S. Cl. D26—3



317,509

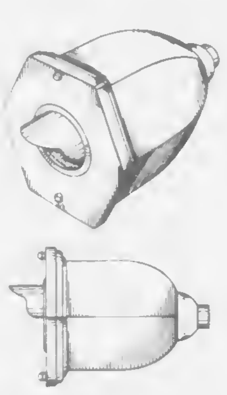
EXTERIOR LIGHTING FIXTURE

Kevork P. Hazerjian, West Roxbury, Mass., and Amos Levitt, South Orange, N.J., assignors to Sturdy Lantern Mfg. Co., Inc., North Attleboro, Mass.

Filed Aug. 31, 1989, Ser. No. 400,972

Term of patent 14 years

U.S. Cl. D26—67



317,510

LIGHTING FIXTURE

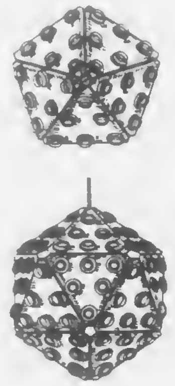
Achille Castiglioni, Milan, Italy, assignor to FLOS S.p.A., Brescia, Italy

Filed Oct. 11, 1988, Ser. No. 256,387

Claims priority, application Italy, Apr. 11, 1988, 6978/88[U]

Term of patent 14 years

U.S. Cl. D26—88



317,511

CEILING LAMP

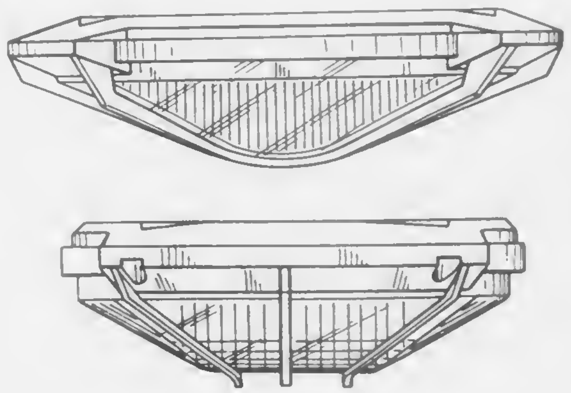
Graziella Ciceri, Via Amendola (Pavia), Landriano (PV), and Pagliarini Franco, Via Martiri Liberta 81R, Iseo (Brescia), both of Italy

Filed Apr. 21, 1989, Ser. No. 341,686

Claims priority, application Int'l Pat. Institute, Dec. 8, 1988, DM/012358

Term of patent 14 years

U.S. Cl. D26—89



317,512

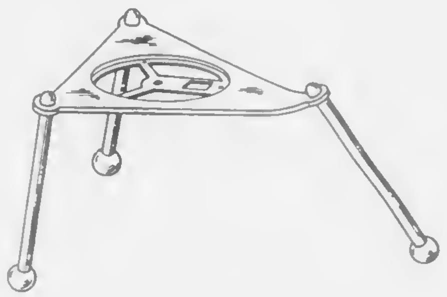
LAMP SHADE HOLDER

Marc Nugent, 155 E. 23rd St., New York, N.Y. 10010

Filed Jun. 8, 1988, Ser. No. 203,870

Term of patent 14 years

U.S. Cl. D26—111



317,513

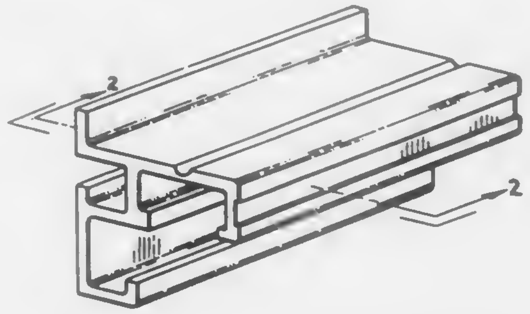
SUPPORTING CHANNEL FOR WALL MOUNTED TRACK LIGHTING SYSTEM

Ruth E. Miller, and Jack V. Miller, both of 700 N. Auburn Ave., Sierra Madre, Calif. 91024

Filed Aug. 10, 1989, Ser. No. 391,840

Term of patent 14 years

U.S. Cl. D26—140



VOL
1127
ISS
2
JE
11
1991
UMI

317,514

WALL MOUNTED HAIR DRYER

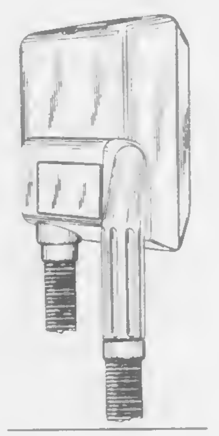
Pasquale Sasso, Saronno, Italy, assignor to Elite S. r. l., Senago, Italy

Filed May 3, 1989, Ser. No. 347,952

Claims priority, application Italy, Nov. 4, 1988, 22104B/88

Term of patent 14 years

U.S. Cl. D28—12



317,515

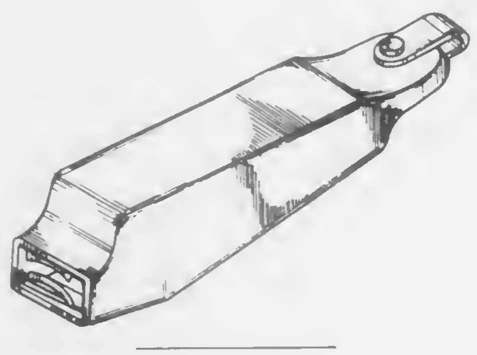
FINGERNAIL CLIPPER AND POUCH

Joseph T. Miller, Mehlville, and Edward F. Brown, Bonne Terre, both of Mo., assignors to MOCAP, St. Louis, Mo.

Filed Jul. 3, 1989, Ser. No. 375,343

Term of patent 14 years

U.S. Cl. D28—60



317,516

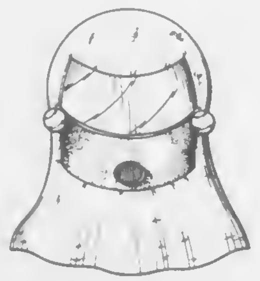
RESCUE HELMET

Theodore H. Ford, and Mary A. Ford, both of 6416 Lakepoint Pl., Parker, Colo. 80134

Filed Jan. 15, 1988, Ser. No. 144,870

Term of patent 14 years

U.S. Cl. D29—15



317,517

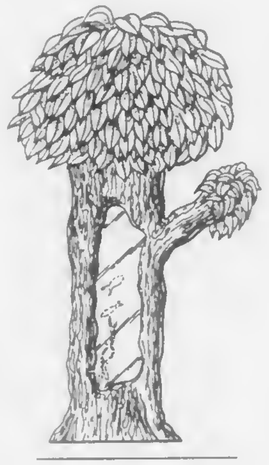
AQUARIUM

Tony DeLuna, 11613 SW. 4th Ter., Yukon, Okla. 73099

Filed Apr. 19, 1989, Ser. No. 340,573

Term of patent 14 years

U.S. Cl. D30—102



317,518

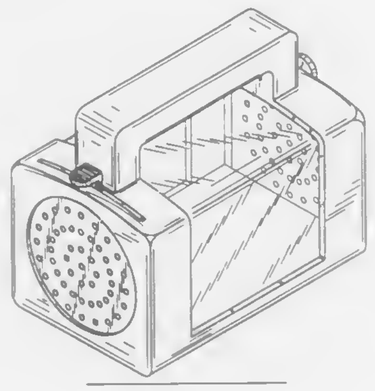
INSECT HABITAT

Louis M. Kohus, 1312 Mayland Dr., Cincinnati, Ohio 45230-2715

Filed Jan. 30, 1989, Ser. No. 303,830

Term of patent 14 years

U.S. Cl. D30—109



317,519

ELECTRIC IRON

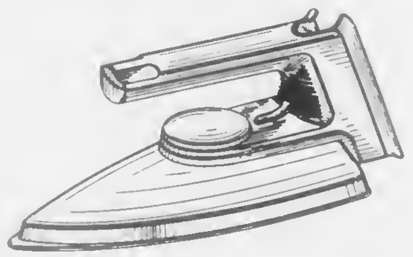
Gerrit-Jan Van Surksum, Eindhoven, Netherlands, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Feb. 22, 1988, Ser. No. 159,028

Claims priority, application Benelux, Aug. 28, 1987, 62467-01

Term of patent 14 years

U.S. Cl. D32—70



317,520

JACK FOR SUPPORTING AUTOMOBILES WHEN UNDER REPAIR

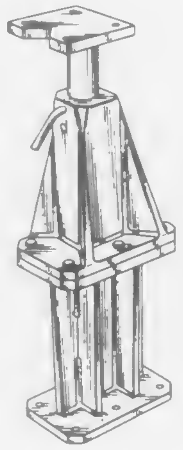
Germain Celette, Vienne, France, assignor to Celette S.A., France

Filed Aug. 1, 1989, Ser. No. 388,136

Claims priority, application Hague, Feb. 2, 1989, DM 012741

Term of patent 14 years

U.S. Cl. D34—31



317,521

SUPPORTING BEAM FOR CONVEYOR ELEMENTS OR THE LIKE

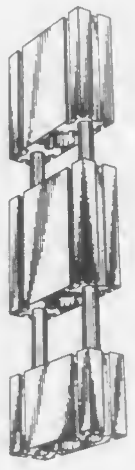
Kenneth Fasth, Harplinge, Sweden, assignor to SKF Specialty Products Aktiebolag, Gothenburg, Sweden

Filed Feb. 15, 1989, Ser. No. 311,675

Claims priority, application Sweden, Aug. 15, 1988, 88-1845

Term of patent 14 years

U.S. Cl. D34—38



VOL
1127
ISS
2
JE
11
1991
UMI

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF JUNE, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name
(in accordance with city and telephone directory practice).

- A. Ahlstrom Corporation: *See—*
  - Simonen, Liisa I., 5,022,331, Cl. 110-297.000.
- A.I.R. Foundation: *See—*
  - Muller, George H., 5,022,414, Cl. 128-898.000.
- A. O. Smith corporation: *See—*
  - Houle, Timothy H.; and Wardy, Daher T., 5,023,928, Cl. 392-457.000.
  - Johnson, J. Herbert, 5,023,502, Cl. 310-261.000.
- A/S Niro Atomizer: *See—*
  - Hansen, Ove; and Thrasher, C. Douglas, 5,022,164, Cl. 134-57.00B.
- A.T. Cross Company: *See—*
  - Kageyama, Hidehei; and Lozeau, Robert V., 5,022,772, Cl. 401-65.000.
- Abbes, Claude: *See—*
  - Fages, Jean; de Villepoix, Raymond; Abbes, Claude; and Rouaud, Christian, 5,022,663, Cl. 277-236.000.
- Abbey Biosystems Limited: *See—*
  - Hall, Peter R.; Trebearne, Jack; Parker, Dawood; and Clancy, Paul, 5,022,410, Cl. 128-695.000.
- Abbott, Roy W. Method and apparatus for making a looped fin heat exchanger. 5,022,149, Cl. 29-890.048.
- Abdulally, Iqbal F., to Foster Wheeler Energy Corporation. Fluidized bed steam temperature enhancement system. 5,022,893, Cl. 48-76.000.
- Abe, Hirotoshi, to Kabushiki Kaisha Toshiba. Printed circuit. 5,023,753, Cl. 361-400.000.
- Abe, Masaru; Kawai, Yoichi; Maki, Masami; and Wada, Katuo, to Mitsui Toatsu Chemicals, Inc. Polypropylene resin compositions. 5,023,286, Cl. 524-128.000.
- Abe, Shigenobu: *See—*
  - Hayashi, Yasuyuki; and Abe, Shigenobu, 5,022,501, Cl. 188-300.000.
- Abe, Takafumi; Ebata, Shuji; Machida, Hiroshi; and Kida, Koichi, to Mitsubishi Gas Chemical Company, Inc. Process for production of 2,6-dimethylnaphthalene. 5,023,390, Cl. 585-320.000.
- Abe, Youji, to Teac Corporation. Flexible circuit board for motor position adjustment. 5,023,498, Cl. 310-71.000.
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- ABU Garcia Produktion AB: *See—*
  - Carlsson, Karl L., 5,022,605, Cl. 242-233.000.
- Acco World Corporation: *See—*
  - Perdue, Thomas F., Jr.; Bransky, Jeffrey D.; Carvell, William S.; Dettloff, David E.; Ischay, Duane K.; and Oberg, Kenneth H., 5,022,689, Cl. 292-19.000.
- Acetylene Gas Company: *See—*
  - Bird, Robert E., 5,022,442, Cl. 141-100.000.
- Ackerman, Bruce; Albright, Scot P.; and Jordan, John F., to Photon Energy, Inc. Thin film photovoltaic panel and method. 5,022,930, Cl. 136-251.000.
- Ackerman, David A.; Blonder, Greg E.; and Mac Donald, William M., to AT&T Bell Laboratories. Photonics module and alignment method. 5,023,881, Cl. 372-46.000.
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- Adachi, Tatsuya; and Kaito, Takashi, to Seiko Instruments, Inc. Apparatus for preparation and observation of a topographic section. 5,023,453, Cl. 250-309.000.
- Adam, John D., to Westinghouse Electric Corp. Compact frequency selective limiter configuration. 5,023,573, Cl. 333-17.200.
- Adams & Coltrin, Inc.: *See—*
  - Coltrin, George E.; and Ilami, Siamak, 5,022,690, Cl. 292-21.000.
- Adams, Harold W., to Sultech, Inc. Process for destruction of toxic organic chemicals and the resultant inert polymer by-product. 5,023,317, Cl. 528-389.000.
- Adams, Jerry L.; Gallagher, Timothy F.; Mayer, Ruth J.; and Metcalf, Brian W., to SmithKline Beecham Corporation. Steroidal 14alpha-carboxy-alkyl derivatives as regulators of HMG-COA reductase. 5,023,250, Cl. 514-179.000.
- Adolph Coors Company: *See—*
  - Schultz, Robert H., 5,023,112, Cl. 427-287.000.
- Adrion, Robert F.; Curry, Joan W.; and Levine, Robert A., to Becton & Dickinson Co. Hematology - diagnosis apparatus employing expert system technology. 5,023,785, Cl. 364-413.080.
- Advanced Engineering Systems, Operation & Products, Inc.: *See—*
  - Saidin, Zain; and Slocum, Alexander H., 5,023,528, Cl. 318-254.000.
- Advanced Holographic Imaging Technologies, Inc.: *See—*
  - Smith, Steven L.; and Jeong, Tung H., 5,022,727, Cl. 350-3.760.
- Advanced Micro Devices, Inc.: *See—*
  - Annamalai, Kadiresan, 5,023,872, Cl. 371-5.100.
  - Fung, Jimmy; An, Jiu; Campbell, David L.; and Shyu, Steven, 5,023,614, Cl. 341-144.000.
  - Leung, Ho-Ming; and Pak, Edward T., 5,023,893, Cl. 377-117.000.
  - Sharpe-Geisler, Bradley A., 5,023,701, Cl. 357-71.000.
- Aeroquip Corporation: *See—*
  - Cakmakci, Mehmet Y., 5,023,033, Cl. 264-161.000.
- Aeschlimann, Peter: *See—*
  - Tzikas, Athanassios; and Aeschlimann, Peter, 5,023,325, Cl. 534-618.000.
- AG Communication Systems Corporation: *See—*
  - Kem, Han, 5,023,870, Cl. 370-85.200.
- Agostine, Anthony. Hat container. 5,022,515, Cl. 206-8.000.
- Ahmed, Shaffiq: *See—*
  - McKannan, Eugene C.; McPherson, William B.; Ahmed, Shaffiq; and Chandler, Shirley S., 5,023,050, Cl. 420-448.000.
- Air Products and Chemicals, Inc.: *See—*
  - Listemann, Mark L., 5,023,375, Cl. 564-159.000.
- Aisin AW Co., Ltd.: *See—*
  - Inagaki, Hidemitsu; Kawamoto, Mutsumi; and Tanaka, Satoru, 5,022,480, Cl. 180-79.100.
- Aisin Seiki Kabushiki Kaisha: *See—*
  - Kuwabara, Yasuo; Fujie, Naofumi; and Saeki, Takao, 5,023,526, Cl. 318-116.000.
  - Nishikawa, Masumi, 5,022,282, Cl. 74-493.000.
  - Shimei, Masato, 5,022,284, Cl. 74-844.000.
  - Terazawa, Tadashi, 5,022.369, Cl. 123-399.000.
  - Wakabayashi, Hideaki, 5,022,503, Cl. 192-0.02R.
- Aitken, Bruce G., to Corning Incorporated. Phosphate glasses for glass molds. 5,022,921, Cl. 106-38.900.
- Ajinomoto Co., Inc.: *See—*
  - Komoda, Yasuo; Yokogawa, Yasunori; Okunishi, Masahiko; Ishii, Koichi; Shibai, Hiroshiro; and Noumi, Ryosaku, 5,023,079, Cl. 424-120.000.
- Akagi, Kousuke, to Osaka Gas Co., Ltd. Fuel cell assembly. 5,023,152, Cl. 429-32.000.
- Akao, Mutsuo, to Fuji Photo Film Co., Ltd. Packaging material for photosensitive materials. 5,023,120, Cl. 428-35.900.
- Akasaki, Yutaka: *See—*
  - Mukai, Toshio; Yamashita, Yoshiro; Suzuki, Takanori; Akasaki, Yutaka; Sato, Katsuhiro; Yabuuchi, Naoya; Tanaka, Hiroyuki; and Nukada, Katsumi, 5,023,356, Cl. 552-210.000.
- Akimoto, Kazuhiro; Ogiue, Katsumi; and Uchiyama, Takeo, to Hitachi, Ltd. Semiconductor memory system for use in logic LSI's. 5,023,835, Cl. 365-155.000.
- Akimoto, Kengo; Shinmen, Yoshifumi; Yamada, Hideaki; and Shimizu. Sakayu, to Suntory Limited. Process for production of highly unsaturated fatty acid having odd number of carbon atoms. 5,023,177, Cl. 435-134.000.
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- Akrout, Chekib; Coppens, Pierre; Denis, Bernard; and Urena, Pierre-Yves, to International Business Machines Corporation. Double stage sense amplifier for random access memories. 5,023,841, Cl. 365-205.000.
- Aktiebolaget Electrolux: *See—*
  - Ohman, Carl, 5,023,444, Cl. 250-221.000.
- Aktiebolaget Sefors: *See—*
  - Claussen, Lennart, 5,023,456, Cl. 250-374.000.
- Akutsu, Eiichi: *See—*
  - Soga, Hiroo; and Akutsu, Eiichi, 5,023,627, Cl. 346-76.0PH.
- Akzo America Inc.: *See—*
  - Sherif, Fawzy G., 5,023,071, Cl. 423-592.000.
- Akzo N.V.: *See—*
  - Gimpel, Moritz; and Roelofsen, Jan W., 5,023,066, Cl. 423-328.000.

VOL 1127 ISS 2 JE 11 1991 UMI

  - Wang, Bor-Ping E.; Band, Elliot I.; and Amata, Richard J., 5,023,385, Cl. 568-851.000.
- Albanese, Victor. Rodent trap. 5,022,180, Cl. 43-114.000.
- Alberta Telecommunications Research Centre: *See—*
  - Grover, Wayne D.; Fong, Tommy; Dubuc, Joe P.; Krzymien, Witold A.; and Fraser, George D., 5,023,869, Cl. 370-84.000.
- Albright, Scot P.: *See—*
  - Ackerman, Bruce; Albright, Scot P.; and Jordan, John F., 5,022,930, Cl. 136-251.000.
- Alcan International Limited: *See—*
  - Wellman, Keith R.; Crellin, Robert L.; and Ostle, William L., 5,022,252, Cl. 72-260.000.
- Alcatel Thomson Faisceaux Hertziens: *See—*
  - Argintaru, Lazare; Arnassand, Daniel; and Leclair, Philippe, 5,023,821, Cl. 364-602.000.
- Alfred Teves GmbH: *See—*
  - Schonlau, Juergen, 5,022,715, Cl. 303-9.680.
- Ali, Eren, to Nomix Manufacturing Company Limited. Equipment for delivering a fluid. 5,022,864, Cl. 439-192.000.
- Alich, Gunther. Apparatus for adjusting the roll gap between cooperating rolls. 5,022,318, Cl. 100-47.000.
- Aljoe, Ronald R.: *See—*
  - Rhodes, John C.; Aljoe, Ronald R.; and Ellers, Berne F., 5,022,945, Cl. 156-253.000.
- Allan, G. Graham, to Melamine Chemicals, Inc. Liquid herbicidally active compositions. 5,022,917, Cl. 71-93.000.
- Allan, James C.: *See—*
  - Fisher, Robert D.; and Allan, James C., 5,023,148, Cl. 428-694.000.
- Allegro, Joseph. Barrel-shaped solar roofing element and method for its assembly. 5,022,381, Cl. 126-432.000.
- Allen, Gary R.; Davenport, John M.; and Hansler, Richard L., to General Electric Company. Single arc discharge headlamp with light switch for high/low beam operation. 5,023,758, Cl. 362-61.000.
- Allen, Leslie H.: *See—*
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  - Hobart, James L.; Sasnett, Michael W.; Mefferd, Wayne S.; and Allen, Peter N., 5,023,886, Cl. 372-99.000.
- Allergan, Inc.: *See—*
  - Chandraratna, Roshantha A. S., 5,023,341, Cl. 549-23.000.
- Allied-Signal Inc.: *See—*
  - Ficalora, Joseph P., 5,022,759, Cl. 356-350.000.
  - Hoopes, Jay N.; Eick, Christopher D.; and Williamson, John R., 5,022,228, Cl. 60-734.000.
  - O'Halloran, Bernard, 5,022,817, Cl. 415-115.000.
  - Portolese, Larry A., 5,022,436, Cl. 137-625.350.
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  - Zelenak, Daniel G., Jr.; and Watson, Michael J., 5,022,675, Cl. 280-743.000.
- Alpermann, Hans-Georg: *See—*
  - Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans-Georg; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 5,023,357, Cl. 544-132.000.
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  - Waggoner, Richard L., 5,022,314, Cl. 98-32.000.
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  - Hartnett, G. Robert, 5,022,207, Cl. 52-537.000.
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  - Witczak, Stanley, 5,022,321, Cl. 101-142.000.
- Amata, Richard J.: *See—*
  - Wang, Bor-Ping E.; Band, Elliot I.; and Amata, Richard J., 5,023,385, Cl. 568-851.000.
- Ambrosius, Klaus: *See—*
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  - Pereira, Oswy Z.; Ramsay, Michael V. J.; and Freeman, Stephen, 5,023,348, Cl. 549-264.000.
- American Farm Implement & Specialty, Inc.: *See—*
  - Decker, William, 5,022,903, Cl. 55-404.000.
- American Home Products Corporation: *See—*
  - Caufield, Craig E.; Musser, John H.; and Rinker, James M., 5,023,262, Cl. 514-291.000.
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  - Von Burg, Gregory F., 5,023,263, Cl. 514-291.000.
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  - Crum, Lynn B., 5,022,526, Cl. 206-459.000.
- American Sterilizer Company: *See—*
  - Olon, Thomas E.; and Krihwan, Carl C., 5,023,515, Cl. 315-88.000.
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  - Finlan, Martin F., 5,023,053, Cl. 422-82.050.
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  - Kourimsky, Friedrich J. A.; and Romak, Paul E., 5,022,867, Cl 439-395.000.
  - Tanaka, Hiromi; and Osaka, Tadashi, 5,022,138, Cl. 29-564.800.
  - Walker, Kevin E., 5,022,869, Cl. 439-526.000.
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  - Amstutz, Douglas D.; and Vanderboegh, Ronald A., 5,022,719, Cl 312-140.000.
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- An, Jiu: *See—*
  - Fung, Jimmy; An, Jiu; Campbell, David L.; and Shyu, Steven, 5,023,614, Cl. 341-144.000.
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- Anderson, Robert E.: *See—*
  - Erickson, Frank L.; Anderson, Robert E.; and Landis, Phillip S., 5,023,312, Cl. 558-160.000.
- Anderson, Robert L., Jr.: *See—*
  - Abramovitz, Robert G.; Anderson, Robert L., Jr.; Busse, Frederick L.; Celarier, Stuart A.; Poublan, Jean-Yves H.; and Shorthill, Lawrence R., 5,023,922, Cl. 382-59.000.
- Andersson, Bo; and Holmgren, Anders, to Bahco Hydrauto AB. Hydraulic steering system for electrically driven motor vehicles. 5,022,482, Cl. 180-133.000.
- Ando, Akitsugu: *See—*
  - Ohno, Kazuhisa; Kosugi, Tetsushi; Sugimori, Kenichiro; Ando, Akitsugu; Yamamoto, Masaru; Suzuki, Fukuji; Nakamura, Masahiro; and Tsujita, Nobuhisa, 5,023,065, Cl. 423-326.000.
- Ando, Eiichi: *See—*
  - Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Ohashi, Masashi; Shirai, Masanari; and Ando, Eiichi, 5,023,658, Cl. 355-72.000.
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- Andrews, E. Wayne: *See—*
  - Raythatha, Rasik H.; Suitch, Paul R.; and Andrews, E. Wayne, 5,022,924, Cl. 106-486.000.
- Ang, Joseph, to Hope Industries, Inc. Shoelace locking device. 5,022,127, Cl. 24-712.200.
- Angenent, Johannes H.; Khoe, Giok D.; Mahon, Gathal J.; Van De Grijp, Abram; Potters, Cornelis J. T.; and Wright, Kieran G., to U.S. Philips Corporation. Low-reflection ball lens connector part. 5,022,733, Cl. 350-96.180.
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- Anseau, Michael R.; Lawson, James M.; and Slasor, Shaun, to Cookson Group PLC. Ceramic material. 5,023,216, Cl. 501-98.000.
- Anthony, Thomas R.; and Fleischer, James F., to General Electric Company, The. CVD diamond coated twist drills. 5,022,801, Cl. 408-144.000.
- Antonio, Lavezzo: *See—*
  - Roberto, Giani; Ettore, Parini; Massimiliano, Borsa; and Antonio, Lavezzo, 5,023,256, Cl. 514-253.000.
- Anzai, Hisao; Sasaki, Isao; Nishida, Kozi; Makino, Hideaki; Ohtani, Masami; and Shimada, Katsuhiko, to Mitsubishi Rayon Company, Ltd. Process for preparation of methacrylimide group containing polymer and light-transmitting fiber comprising polymer made by the process. 5,023,302, Cl. 525-378.000.
- AOI Studio Kabushiki Kaisha: *See—*
  - Kita, Kunio; Kuwashima, Shigesumi; Suzuki, Takahito; and Seki, Chikashi, 5,023,709, Cl. 358-125.000.
- Aoki, Hisao; and Yamaguchi, Toru, to Sanden Corporation. Condenser. 5,022,464, Cl. 165-176.000.
- Aoki, Hitoshi: *See—*
  - Meguro, Hiroshi; Takahashi, Tsugio; Aoki, Hitoshi; and Kosaka, Toru, 5,023,648, Cl. 354-420.000.
- Aoki, Kazuo: *See—*
  - Murakami, Azuma; Aoki, Kazuo; Yamanami, Tsuguya; Tomofuji, Yoshiaki; Tanaka, Takeshi; Inashima, Satoshi; Funahashi, Takahiko; Chikami, Toshihide; and Senda, Toshiaki, 5,023,408, Cl. 178-19.000.
- Aoto, Kozo, to Nisshin Parts Co., Ltd. Rotary antenna connector. 5,022,861, Cl. 439-13.000.
- Aoyagi, Osamu: *See—*
  - Itoh, Kenji; and Aoyagi, Osamu, 5,022,959, Cl. 156-643.000.

- Aphton Corporation: *See—*
  - Gevas, Philip C.; Karr, Stephen L., Jr.; Grimes, Stephen; and Littenberg, Richard L., 5,023,077, Cl. 424-88.000.
- Apollo Computer, Inc.: *See—*
  - Johnson, Herrick J.; Olson, Margaret; Jones, Stuart; Bodoff, Stephanie; Bertrand, Stephen C.; and Levine, Paul H., 5,023,907, Cl. 380-4.000.
- Appelbaum, Edward R.; Hennecke, Hauke; Lamb, Joseph W.; and Gottfert, Michael, to Lubrizol Genetics, Inc. Bradyrhizobium japonicum nodulation regulatory protein and gene. 5,023,180, Cl. 435-172.300.
- Applied ImmuneSciences: *See—*
  - Okarma, Thomas B.; Chang, Chin-Hai; Clark, Brian R.; and Lerch, L. Bernard, 5,022,988, Cl. 210-321.840.
- Aragona, Joel. Stairway safety bars. 5,022,197, Cl. 52-29.000.
- Arai, Hirokazu: *See—*
  - Ueno, Hiroshi; Hatabu, Shoji; and Arai, Hirokazu, 5,022,279, Cl. 74-422.000.
- Arai, Yoshinobu: *See—*
  - Imaki, Katsuhiro; Okegawa, Tadao; and Arai, Yoshinobu, 5,023,268, Cl. 514-400.000.
- Arakawa, Yasuo: *See—*
  - Aso, Toshiyuki; Arakawa, Yasuo; and Kato, Junichi, 5,023,420, Cl. 219-69.120.
- Arashi, Norio: *See—*
  - Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl. 431-2.000.
- Aretz, Adam N.: *See—*
  - Fasiska, Edward J.; and Aretz, Adam N., 5,022,700, Cl. 276-98.000.
- Argintaru, Lazare; Arnassand, Daniel; and Leclair, Philippe, to Alcatel Thomson Faisceaux Hertziens. Digital filter operating at intermediate frequency. 5,023,821, Cl. 364-602.000.
- Ariga, Toshiki, to Yokohama Aeroquip Corporation. Pipe coupling. 5,022,687, Cl. 285-321.000.
- Arima, Tadao: *See—*
  - Masuko, Takayuki; Okamoto, Akira; Moriya, Kaoru; Okamura, Koji; and Arima, Tadao, 5,023,447, Cl. 250-227.240.
- Arjo Mecanaids Limited: *See—*
  - Richards, Derek J., 5,022,106, Cl. 5-86.000.
- Armco Steel Company, L.P.: *See—*
  - Boston, Steven L.; Kilbane, arrell M.; Lee, Danny E.; Kilbane, Farrell M.; and Lee, Danny E., 5,023,113, Cl. 427-320.000.
  - Neiheisel, Gary L.; and McGraw, David C., 5,023,427, Cl. 219-121.820.
- Armstrong World Industries, Inc.: *See—*
  - Glotfelter, Craig A.; and Ryan, Robert P., 5,023,140, Cl. 428-413.000.
- Arnassand, Daniel: *See—*
  - Argintaru, Lazare; Arnassand, Daniel; and Leclair, Philippe, 5,023,821, Cl. 364-602.000.
- Arnaud, Johnny, to Hydrotreat, Inc. Method for treating fluids. 5,022,998, Cl. 210-675.000.
- Arnold, Finn A., to Bose Corporation. Acoustical frequency response improving with nonminimum phase circuitry. 5,023,914, Cl. 381-97.000.
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- Arnoldt, Peter J., to Ductmate Industries, Inc. Flange type duct joint assembly and seal arrangement therefor. 5,022,688, Cl. 285-363.000.
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  - Altemose, George A.; Consi, Michael; Joscelyn, Edwin R.; Wiemann, William; Giguere, David B.; Gully, Wilfred J.; and Spencer, Stanley E., 5,023,531, Cl. 318-471.000.
- Asahi Glass Company Ltd.: *See—*
  - Shinozaki, Yasuo; Horie, Noritoshi; Hamashima, Kazuo; and Imakawa, Makoto, 5,022,919, Cl. 75-238.000.
- Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
  - Doi, Yoshinao; and Matsumura, Haruo, 5,022,990, Cl. 210-500.420.
- Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
  - Negishi, Kiyoshi; Negoro, Ikuo; and Kita, Masahiro, 5,023,631, Cl. 346-154.000.
  - Negoro, Ikuo; Takano, Masatoshi; Chikama, Atsushi; and Negishi, Kiyoshi, 5,023,667, Cl. 355-274.000.
- Asano, Kuniyoshi: *See—*
  - Moriyama, Takamasa; and Asano, Kuniyoshi, 5,023,296, Cl. 525-58.000.
- Asano, Makoto: *See—*
  - Yamaguchi, Keizaburo; Tanabe, Yoshimitsu; Asano, Makoto; and Yamaguchi, Akihiro, 5,023,366, Cl. 560-71.000.
- Asano, Michiaki: *See—*
  - Machida, Hiroji; Asano, Michiaki; Watanabe, Yozo; Tokuhiro, Tomoya; Satoh, Hiroshi; Iwahashi, Motoyuki; Yamaguchi, Norihiro; Kikuchi, Koshin; and Watanabe, Hiroaki, 5,023,020, Cl. 261-18.100.
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  - Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; Asano, Yuji; Yamamoto, Takemi; and Nakata, Takashi, 5,023,654, Cl. 355-27.000.
- Asea Brown Boveri Ltd.: *See—*
  - Davcev, Stojan, 5,023,575, Cl. 333-105.000.
  - Zimmermann, Hans, 5,023,501, Cl. 310-258.000.
- Ashbrook-Simon-Hartley Corporation: *See—*
  - Schiene, Thomas M.; Christie, William; Johnson, Harold W.; and Black, Robert C., 5,023,178, Cl. 435-170.000.
- Ashikawa, Yoshiaki: *See—*
  - Horino, Shigeo; Omura, Hideo; Maruyama, Nobusato; Ashikawa, Yoshiaki; Shioya, Masatoshi; Miyano, Toshiyuki; and Wakou, Jiro, 5,022,531, Cl. 209-552.000.
- Ashizawa, Tatsuro: *See—*
  - Inaba, Masashi; Hamana, Ryozo; Hase, Hideyuki; and Ashizawa, Tatsuro, 5,023,383, Cl. 568-815.000.
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- ASMO Co., Ltd.: *See—*
  - Yamamura, Kengo; Saito, Tutomu; and Higuchi, Youji, 5,022,184, Cl. 49-352.000.
- Asmussen, Bodo: *See—*
  - Sattler, Henning; and Asmussen, Bodo, 5,023,251, Cl. 514-179.000.
- Aso, Toshiyuki; Arakawa, Yasuo; and Kato, Junichi, to Fanuc Ltd. Wire tension controlling method in a wire cut electric discharge machine. 5,023,420, Cl. 219-69.120.
- Associated Mills Inc.: *See—*
  - Foster, Robert W., Jr.; and Gentry, Jefferson L., 5,023,460, Cl. 250-455.100.
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  - Schumacher, Wolfgang; Respondek, Johannes; Engel, Jurgen; Pohl, Jorg; Voegeli, Rainer; and Hilgard, Peter, 5,023,335, Cl. 548-104.000.
- AT&T Bell Laboratories: *See—*
  - Ackerman, David A.; Blonder, Greg E.; and Mac Donald, William M., 5,023,881, Cl. 372-46.000.
  - Anderson, Carl R.; Comrie, Paul R.; Feder, Peretz M.; and Zysman, George I., 5,023,902, Cl. 379-59.000.
  - Berthold, Kurt; and Levi, Anthony F. J., 5,023,878, Cl. 372-20.000.
  - Bose, Chinmoy B.; and Ray, Rajarshi, 5,023,917, Cl. 382-8.000.
  - Chamzas, Christodoulos; and Duttweiler, Donald L., 5,023,611, Cl. 341-51.000.
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  - Cimini, Leonard J., Jr.; Greenstein, Larry J.; and Saleh, Adel A. M., 5,023,947, Cl. 455-619.000.
  - Cloonan, Thomas J.; Jahns, Jurgen; McCormick, Frederick B., Jr.; and Murdocca, Miles J., 5,023,864, Cl. 370-1.000.
  - Davidson, Wayne A.; and Winter, Diana S., 5,023,868, Cl. 370-62.000.
  - Favreau, David P.; Swiderski, Jane A.; and Vitkavage, Daniel J., 5,022,958, Cl. 156-643.000.
  - Lieu, Winston H., 5,023,565, Cl. 330-151.000.
  - McCall, Samuel L., Jr.; and Tai, Kuochou, 5,023,673, Cl. 357-16.000.
  - Moran, Joseph M.; and Russell, Thomas C., 5,023,557, Cl. 324-537.000.
  - Strege, Keith E., 5,023,198, Cl. 437-129.000.
  - Thomson, David L., 5,023,910, Cl. 381-37.000.
- Atlantic Richfield Company: *See—*
  - Bohon, W. Mark, 5,022,850, Cl. 431-207.000.
  - Torres, Daniel L.; Murphy, Timothy J.; Maakad, Guy A., Roberts, Jeffrey R.; and Murray, Kent S., 5,022,799, Cl. 408-1.00R.
- Atlas Copco Tools Aktiebolag: *See—*
  - Westerberg, Sven P. J., 5,022,469, Cl. 173-170.000.
- Atmel Corporation: *See—*
  - Gongwer, Geoffrey S., 5,023,486, Cl. 307-465.000.
- Atochem: *See—*
  - Benefice-Malouet, Sylvie; and Blancou, Hubert, 5,023,370, Cl. 562-125.000.
- Atsugi Unisia Corporation: *See—*
  - Io, Shinichi, 5,022,505, Cl. 192-12.0BA
- Attenni, Johann: *See—*
  - Weber, Rainer J.; and Attenni, Johann, 5,022,830, Cl. 417-423.140.
- Au, Lai C.; Schaben, John W.; Hamer, Robert G.; and Banks, Larry H., to Xerox Corporation. Jam history and diagnostics. 5,023,817, Cl. 364-550.000.
- Audi AG: *See—*
  - Weber, Rainer J.; and Attenni, Johann, 5,022,830, Cl. 417-423.140.
- Aufderhar, Kevin R.: *See—*
  - Prokosch, Steve A.; and Aufderhar, Kevin R., 5,023,426, Cl. 219-121.630.
- Aug, Conrad J.; Casanova, Wayne J.; Corfits, William D.; Dimmick, Roger F.; and Wheeler, Stephen E., to International Business Machines Corporation. Double-sided backplane assembly. 5,023,754, Cl. 361-415.000.
- Augustiniak, Hermann: *See—*
  - Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert; Kunze, Brigitte; Hofle, Gerhard; Augustiniak, Hermann; Bedorf, Norbert; Jansen, Rolf; Trowitzsch-Kienast, Wolfram; and Steinmetz, Heinrich, 5,023,184, Cl. 435-252.100.
- Aune, Jan E.; and So, Peter K. L., to MacMillan Bloedel Limited. Log scanner. 5,023,805, Cl. 364-507.000.
- Auracher, Franz; Meissner, Eckhard; Noll, Bernd; and Wittmann, Julius, to Siemens Aktiengesellschaft. External optical resonator for a semiconductor laser. 5,023,885, Cl. 372-92.000.
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VOL 1127
ISS 2
JE 11
1991
UMI

polarization conditions for an optical transmission system having an optical two-filter FSK super-heterodyne receiver. 5,023,949, Cl. 455-618.000.

- Ausimont, S.R.L.: *See—*
  - Desmarteau, Darryl D.; Kotun, Stefan P.; and Malacrida, Alessandro, 5,023,377, Cl. 564-301.000.
- Austin, Russell; and Dickey, Eric R., to Viratec Thin Films, Inc. Magnesium film reflectors. 5,022,726, Cl. 350-1.700.
- Austpole Industries Limited: *See—*
  - George, Ross J., 5,022,134, Cl. 29-402.080.
- Auto Wrap, Inc.: *See—*
  - Fasiska, Edward J.; and Aretz, Adam N., 5,022,700, Cl. 276-98.000.
- Automated Chemical Management, Inc.: *See—*
  - Burgess, Donald A., 5,022,585, Cl. 239-70.000.
- Automobiles Citroen: *See—*
  - Philippe, Chretien, 5,022,506, Cl. 192-53.00G.
- Automobiles Peugeot: *See—*
  - Philippe, Chretien, 5,022,506, Cl. 192-53.00G.
- Auyeung, Sean: *See—*
  - Violette, John A.; and Auyeung, Sean, 5,022,824, Cl. 416-230.000.
- Avery, Norman R.; Spangenberg, Dale J., Jr.; Buth, Jimmy D.; and Seuffer, Kenneth C., Jr., to Kinetico Incorporated. Fluid treatment system. 5,022,994, Cl. 210-670.000.
- Aviation Petroleum Inc.: *See—*
  - Vilines, Edward J., 5,022,428, Cl. 137-209.000.
- Awano, Katsuya: *See—*
  - Ohashi, Mitsuo; Awano, Katsuya; Tanaka, Toshio; and Kimura, Tetsuya, 5,023,364, Cl. 560-53.000.
- Ayer, Atul D.; and Hamel, Lawrence G., to Alza Corporation. Lamina comprising carboxyvinyl polymer. 5,023,076, Cl. 424-78.000.
- Ayers, Joe W., to Texas Instruments Incorporated. Semiconductor slice holder. 5,022,695, Cl. 294-88.000.
- Azionaria Costruzioni Macchine Automatiche A.C.M.A. S.p.A.: *See—*
  - Gorrieri, Giordano; Balestra, Ivo; Nannini, Luciano; and Mondani, Alberto, 5,022,511, Cl. 198-460.000.
- Azon Systems, Inc.: *See—*
  - Ford, Jeffrey R., 5,022,205, Cl. 52-309.160.
- Azuhata, Shigeru: *See—*
  - Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl. 431-2.000.
- B. F. Goodrich Company, The: *See—*
  - Amjad, Zahid; and Masler, William F., III, 5,023,001, Cl. 210-699.000.
  - Weisend, Norbert A., Jr.; and Tritt, Paul G., 5,022,611, Cl. 244-134.00A.
- B-Line Systems, Inc.: *See—*
  - Rinderer, Eric R., 5,022,614, Cl. 248-62.000.
- Baba, Akira: *See—*
  - Tokumitsu, Kiyonori; Baba, Akira; and Hirano, Sadanori, 5,022,836, Cl. 418-76.000.
- Baba, Hideki: *See—*
  - Sugihara, Hirosi; Hidaka, Hiroshi; Doi, Akira; Okawauchi, Toshitaka; Kawabata, Yasushi; and Baba, Hideki, 5,023,101, Cl. 426-603.000.
- Babb, David A.; Ezzell, Bobby R.; and Clement, Katherine S., to Dow Chemical Company, The. Perfluorovinyl compounds. 5,023,380, Cl. 568-34.000.
- Babcock & Wilcox Company, The: *See—*
  - Feldstein, Joel G.; and Merker, David E., 5,022,148, Cl. 29-890.031.
  - Negron, Scott B., 5,023,044, Cl. 376-213.000.
  - Rackley, John M.; and Vecci, Stanley J., 5,022,329, Cl. 110-234.000.
  - Speight, Charles W., 5,023,046, Cl. 376-261.000.
- Bachot, Jean; and Kiefer, Jean-Claude, to Rhone-Poulenc Chimie De Base. Microporous composites and electrolytic applications thereof. 5,023,127, Cl. 428-137.000.
- Backus, Allan L.: *See—*
  - Waldinger, Richard; and Backus, Allan L., 5,022,773, Cl. 401-107.000.
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- Baddet, Peter T.: *See—*
  - Kendall, Thomas D.; and Baddet, Peter T., 5,022,444, Cl. 141-248.000.
- Badger Northland Inc.: *See—*
  - Bruecker, Gerald J.; and Smith, Robert W., 5,022,348, Cl. 119-57.600
- Bagaria, Suresh C.; and Lordi, Nicholas G., to Research Corporation. Aqueous dispersions of waxes and lipids for pharmaceutical coating. 5,023,108. Cl. 427-3.000.
- Bagley, Harold R., Jr.: *See—*
  - Osborn, D. Bruce; and Bagley, Harold R., Jr., 5,023,459, Cl. 250-332.000.
- Bahco Hydrauto AB: *See—*
  - Andersson, Bo; and Holmgren, Anders, 5,022,482, Cl. 180-133.000.
- Baier, Erich: *See—*
  - Koefferlein, Rainer; Schlageter, Bernhard; and Baier, Erich, 5,023,664, Cl. 355-245.000.
- Bailard, James A.: *See—*
  - DeVries, Jack; Bailard, James A.; and Hanes, Daniel M., 5,022,784, Cl. 405-15.000.
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- Bailey, Kirk A.: *See—*
  - Simon, Robert C., Jr.; Deutscher, Dale W.; Grimm, Charles M., Thompson, Dennis D.; and Bailey, Kirk A., 5,023,778, Cl 364-200.000.
- Bailey, Richard G.; and Leggott, Merton R., to Flakee Mills, Inc. Vessel and method for thermally processing bulk material. 5,023,429, Cl. 219-388.000.
- Bailey, Thomas F.; and Campbell, John E., to MASX Energy Services Group, Inc. Hydraulic clamp for rotary drilling head. 5,022,472, Cl. 175-195.000.
- Baines, William F. Radiator baffle gasket. 5,022,465, Cl. 165-176.000.
- Baird, James C.: *See—*
  - Muckenfuhs, Delmar R.; and Baird, James C., 5,022,216, Cl. 53-438.000.
- Baird, James R. Subductive waste disposal method. 5,022,788, Cl. 405-128.000.
- Baits, Paul, to Sundstrand Corporation. Low frequency feeder fault protection. 5,023,537, Cl. 318-732.000.
- Bajgrowicz, Edward J.: *See—*
  - Heckaman, Douglas E.; Frisco, Jeffrey A.; Rieder, Gregory C., and Bajgrowicz, Edward J., 5,023,624, Cl. 343-860.000.
- Baker, Charles L., Jr.: *See—*
  - Cody, George D.; Elzinga, Eugene R., Jr.; and Baker, Charles L., Jr., 5,022,266, Cl. 73-579.000.
- Baker, Walter A.: *See—*
  - Stroud, Roy C.; and Baker, Walter A., 5,022,762, Cl. 356-372.000.
- Bakke, Bart F.: *See—*
  - Bielecki, Edwin J.; Romberger, Karl A.; Bakke, Bart F.; Hobin, Martin A.; and Clark, Charles R., 5,023,059, Cl. 423-9.000.
- Balcar, Gerald P.; Krumrine, Paul; Schwartz, Neal; Sutker, Burton J.; and Wood, Gail J., to Potters Industries, Inc.; and Roth Bros. Smelting Corp. Method for hazardous waste removal and neutralization. 5,022,897, Cl. 55-96.000.
- Balcerek, Gregory: *See—*
  - Smith, Clark L.; and Balcerek, Gregory, 5,022,813, Cl. 414-790.000
- Balcewicz, Joseph F., to General Electric Company. Satellite communications system. 5,023,619, Cl. 342-361.000.
- Baldoz, Danny L.: *See—*
  - Schmoegner, John C.; and Baldoz, Danny L., 5,022,898, Cl. 55-210.000.
- Baldwin, Roger E.: *See—*
  - Kessler, David; and Baldwin, Roger E., 5,023,448, Cl. 250-235.000.
- Balestra, Ben M., to Glasstech, Inc. Gas fired radiant heater for furnace floor. 5,022,911, Cl. 65-349.000.
- Balestra, Ivo: *See—*
  - Gorrieri, Giordano; Balestra, Ivo; Nannini, Luciano; and Mondani, Alberto, 5,022,511, Cl. 198-460.000.
- Band, Elliot I.: *See—*
  - Wang, Bor-Ping E.; Band, Elliot I.; and Amata, Richard J., 5,023,385, Cl. 568-851.000.
- Bando, Masahiro: *See—*
  - Kurano, Shinichi; Bando, Masahiro; Mitsuya, Yasuhiro; and Tanabe, Takeshi, 5,023,585, Cl. 336-69.000.
- Bangert, Norman E. Auxiliary tractor wheel for increased traction. 5,022,711, Cl. 301-47.000.
- Banks, Larry H.: *See—*
  - Au, Lai C.; Schaben, John W.; Hamer, Robert G.; and Banks, Larry H., 5,023,817, Cl. 364-550.000.
- Banno, Yoshikazu: *See—*
  - Nomura, Ichiro; Kaneko, Tetsuya; Banno, Yoshikazu; and Takeda, Toshihiko, 5,023,110, Cl. 427-49.000.
- Banura, George A., to United States of America, Navy. Current limiting arrangement in a power converter. 5,023,542, Cl. 323-284.000.
- Bao, Yongde: *See—*
  - Chang, Stephen S.; Bao, Yongde; and Pelura, Timothy J., 5,023,100, Cl. 426-601.000.
- Bar-Sela, Gad: *See—*
  - Bar-Yona, Itzchak; and Bar-Sela, Gad, 5,022,900, Cl. 55-316.000.
- Bar-Yona, Itzchak; and Bar-Sela, Gad, to Eagle, Military Gear Overseas Ltd. Forced ventilation filtration device. 5,022,900, Cl. 55-316.000.
- Barbiero, Roberto, to Ferrari S.P.A. Esercizio Fabbriche Automobile E. Motor vehicle seat featuring two seat belts. 5,022,677, Cl. 280-801.000.
- Barbour, William P. Check insert and envelope. 5,022,683, Cl. 283-58.000.
- Bardell, Kenneth P., to Regal Ware, Inc. Structure to secure cast cup containing heating element to percolator reservoir bottom. 5,023,927, Cl. 392-442.000.
- Bardonner, Hans: *See—*
  - Felder, Ernst; Romer, Michael; Bardonner, Hans; Hartner, Hartmut; and Fruhstorfer, Wolfgang, 5,023,379, Cl. 564-472.000.
- Bardwell, Allen E. Multiple blow percussion drill assembly with rapid field maintenance and adjustment capability. 5,022,474, Cl. 175-299.000.
- Bares, Steven J.; and Leban, Marzio A., to Hewlett-Packard Company. Ink flow control system and method for an ink jet printer. 5,023,625, Cl. 346-1.100.
- Barker, Charles J.: *See—*
  - Grey, Thaddeus J.; Kirton, Raymond E.; English, George A.; Liggert, Michael D.; Meyer, Karen M.; and Barker, Charles J., 5,022,431, Cl. 137-375.000.

- Barkouskie, Ronnie, to Dutton-Lainson Company. Spare tire rack. 5,022,573, Cl. 224-42.210.
- Baron, Sint, to U.S Philips Corporation. Shaving apparatus. 5,022,153, Cl. 30-34.100.
- Barone, Michael A Exercise and training tensioning device for sporting racquets. 5,022,651, Cl. 273-73.00D.
- Barrett, Michael E.; Laughon, Thomas C.; and Nicholson, Roy V., to McCalla/Lackey Products Corporation. Mailbox support apparatus. 5,022,618, Cl. 248-146.000.
- Bartee, Edward C.; and Chapman, Donald L., to Square D Company. Pop-up service fitting. 5,023,396, Cl. 174-48.000.
- Bartlow, Howard D., to Microwave Modules & Devices, Inc. Method of thermal balancing RF power transistor array. 5,023,189, Cl. 437-8.000.
- Barton, Daniel W. Pivotable lamp bracket for linear lighting fixture. 5,023,765, Cl. 362-429.000.
- BASF Aktiengesellschaft: *See—*
  - Boyd, Jack D., 5,023,310, Cl. 528-89.000.
  - Kast, Juergen; Kolassa, Dieter; Meyer, Norbert; Schirmer, Ulrich; Harreus, Albrecht; Wild, Jochen; Westphalen, Karl-Otto, and Wuerzer, Bruno, 5,022,914, Cl. 71-88.000.
  - Urban, Otfried; and Koob, Dieter, 5,022,516, Cl. 206-45.130.
- BASF Corporation: *See—*
  - Kirk, Paula S., 5,023,095, Cl. 426-250.000.
- BASF Magnetics GmbH. *See—*
  - Schulz, Horst, 5,022,758, Cl. 356-319.000.
- Basic Bio Systems, Inc.: *See—*
  - Gupta, Kashmiri L., 5,023,080, Cl. 424-405.000.
- Baskin, Kermit L. Ventilator for attachment to deck hatches. 5,022,339, Cl. 114-211.000.
- Bassett, Ronald M.; and Kyrk, Carl, to Zenith Controls, Inc. Interlock system for bypass/isolation automatic transfer switch. 5,023,469, Cl. 307-64.000.
- Batcheller, Barry D.: *See—*
  - Brekkestran, Kevin L.; and Batcheller, Barry D., 5,023,430, Cl. 219-486.000.
- Batts, Inc.: *See—*
  - Blanchard, Russell O., 5,022,571, Cl. 223-95.000.
- Bauch, Karl: *See—*
  - Heel, Helmut; Bauch, Karl; Reisacher, Bartholomaus; and Worner, Stefan, 5,022,686, Cl. 285-134.000.
- Bauer, Klaus: *See—*
  - Willms, Lothar; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,022,916, Cl 71-92.000.
- Bauer, Richard G.: *See—*
  - Burlett, Donald J.; Bauer, Richard G.; and Kelley, Mellis M., 5,023,301, Cl. 525-232.000.
- Baum, Eric B.; Moody, John E.; and Wilczek, Frank A., to California Institute of Technology, by said Eric B. Baum. Feed forward neural network for unary. 5,023,833, Cl. 365-49.000.
- Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Page, David R.; Plambeck, Kenneth E.; Scalzi, Casper A.; and Schmalz, Richard J., to International Business Machines Corporation. Authorization for selective program access to data in multiple address spaces. 5,023,773, Cl. 364-200.000.
- Baum, Scott A., to Beloit Corporation. System for monitoring roll density. 5,023,820, Cl. 364-562.000.
- Baum, Thomas H.; Brock, Phillip J.; and Dawson, Daniel J., to International Business Machines Corporation. Simplified synthesis of dialkylgold(III) beta-diketonates. 5,023,360, Cl. 556-117.000.
- Baumac International: *See—*
  - Sorenson, J. Frank, 5,022,151, Cl. 29-890.143.
- Bavaria Cargo Technologie GmbH: *See—*
  - Huber, Thomas, 5,022,513, Cl. 198-782.000.
- Baxter, Alan R., to Waterloo Metal Stampings Ltd. Moulded roller bearings and retainer cage and method of assembling drawer slides. 5,022,768, Cl. 384-19.000.
- Baxter Diagnostics Inc.: *See—*
  - Herring, Kathryn D., 5,023,186, Cl. 436-11.000.
- Bayer Aktiengesellschaft: *See—*
  - Haas, Peter; and Hettel, Hans, 5,023,280, Cl. 521-106.000.
  - Immel, Otto; Schwarz, Hans-Helmut; and Thiel, Reinhard, 5,023,226, Cl. 502-313.000.
  - Lindner, Werner; and Haberkorn, Axel, 5,023,260, Cl. 514-269.000.
  - Meuer, Kurt P.; Waniczek, Helmut, Sylvester, Gerd; and Witte, Josef, 5,023,299, Cl. 525-146.000.
  - Pollinger, Norbert; Serno, Peter; Hofmann, Wolfram; and Beermann, Dieter, 5,023,257, Cl. 514-254.000.
  - Schon, Norbert; and Buysch, Hans-Josef, 5,023,346, Cl. 549-231.000.
- Bayston, Thomas E., to Martin Marietta Corporation. Pulse code recognition method and system. 5,023,888, Cl. 375-23.000.
- Bazel, Teresa: *See—*
  - Frantom, Richard L.; Bishop, Robert J.; Kremer, Robert; Ocker, Klaus; Brown, Roy; Rose, James; Renfroe, Donald; and Bazel, Teresa, 5,022,674, Cl. 280-741.000.
- Beam, Norman E., to Hughes Aircraft Company. Lightweight missile guidance system. 5,022,608, Cl. 244-3.180.
- Beasely, Thomas T. Combination registration pin. 5,023,659, Cl. 355-85.000.
- Beatty, James A.: *See—*
  - Erdman, David M.; Beatty, James A.; and Patel, Amritlal H., 5,023,527, Cl. 318-254.000.
- Beaty, Keith D.: *See—*
  - Lazzara, Richard J.; and Beaty, Keith D., 5,022,860, Cl. 433-174.000.
- Beaulieu, Josette. Garment hanger for simultaneously display of upper and lower body covering garments interchangeably. 5,022,569, Cl. 223-88.000.
- Beauvais, Randall; and Meade, Albert J., to Life Force Associates, L.P. Vehicle safety device. 5,022,707, Cl. 297-216.000.
- Beaver, Commodore E. Collapsible beverage cooler holder. 5,022,549, Cl. 220-85.00H.
- Beavers, Ellington M.: *See—*
  - Halpern, Gregory; Campbell, Charles; Beavers, Ellington M . and Cheh, Huk Y., 5,023,114, Cl. 427-338.000.
- Beck, Charles E. J.: *See—*
  - Sprecker, Mark A.; Belko, Robert P.; Hanna, Marie R.; Beck, Charles E. J.; and Brucato, Salvatore M., 5,023,352, Cl. 549-345.000.
- Beck, J. Frederick. Holder for spare set of keys. 5,022,247, Cl. 70-456.00R.
- Beckhausen, Karlheinz. Safety edge switch. 5,023,418, Cl. 200-511.000.
- Becton & Dickinson Co.: *See—*
  - Adrion, Robert F.; Curry, Joan W.; and Levine, Robert A., 5,023,785, Cl. 364-413.080.
- Bedorf, Norbert: *See—*
  - Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert; Kunze, Brigitte; Hofle, Gerhard; Augustiniak, Hermann; Bedorf, Norbert; Jansen, Rolf; Trowitzsch-Kienast, Wolfram; and Steinmetz, Heinrich, 5,023,184, Cl. 435-252.100.
- Beerli, Markus; Bollen, Manfred; Iten, Jakob; Koslowski, Gerhard; Probst, Willy; and Wildi, Edwin, to Benninger AG Method and device for yarn division on a warping machine. 5,022,128, Cl. 28-191.000.
- Beermann, Dieter: *See—*
  - Pollinger, Norbert; Serno, Peter; Hofmann, Wolfram; and Beermann, Dieter, 5,023,257, Cl. 514-254.000.
- Beghelli, Gian Pietro, to G.P.B. Beghelli S.R.L. Sign projecting from vertical walls or horizontal beams. 5,022,627, Cl 248-558.000.
- Behler, Matthew L.: *See—*
  - D'Entremont, John R.; Behler, Matthew L.; and Swanson, Gordon S., 5,023,586, Cl. 337-104.000.
- Behlmer, Robert F.; Schanke, Robert L.; and DeSmidt, Robert G., to W. H. Brady Co. Label removal and applicator hand tool. 5,022,951, Cl. 156-379.000.
- Beideck, Mark E. Post pulling apparatus with interchangeable working heads for pulling different types of posts. 5,022,632, Cl. 254-30.000.
- Beier, Dale A., to Harnischfeger Corporation. Crane leg connection. 5,022,542, Cl. 212-219.000.
- Beiersdorf AG: *See—*
  - Sattler, Henning; and Asmussen, Bodo, 5,023,251, Cl. 514-179.000.
- Beland, Robert, to Electromed International Ltd. X-ray tube high-voltage power supply with control loop and shielded voltage divider. 5,023,769, Cl. 363-86.000.
- Belanger, Normand, to United States of America, Navy. Apparatus and method for underwater acoustic receiving system installation in diving helmet. 5,022,100, Cl. 2-422.000.
- Belec, Glenn R.: *See—*
  - Billingsley, Henry C.; and Belec, Glenn R., 5,022,355. Cl. 123-52.0MB.
- Belko, Robert P.: *See—*
  - Sprecker, Mark A.; Belko, Robert P.; Hanna, Marie R.; Beck, Charles E. J.; and Brucato, Salvatore M., 5,023,352, Cl. 549-345.000.
- Bell Communications Research, Inc.: *See—*
  - Donnelly, Kim F.; and Gluck, Kurt A., 5,023,811, Cl. 364-518.000.
- Bell, David S.: *See—*
  - Kreinheder, Donald E.; and Bell, David S., 5,023,623, Cl. 343-725.000.
- Bell, Florian G.: *See—*
  - Goll, Jeffrey H.; Trent, William A.; Lane, Richard I.; Bell, Florian G.; and Marineau, Mark D., 5,023,445, Cl. 250-227.150.
- Bell, Ronald D., to Radian Corporation. Low NO_x cogeneration process and system. 5,022,226, Cl. 60-274.000.
- Bellavance, Joseph T., to North American Philips Corp. ISL to TTL translator. 5,023,482, Cl. 307-456.000.
- Beloit Corporation: *See—*
  - Baum, Scott A., 5,023,820, Cl. 364-562.000.
- Belvederi, Bruno; Ghini, Eranco; and Dall'Osso, Davide, to G.D. Societa per Azioni. Machine for simultaneously manufacturing two continuous cigarette rods. 5,022,415, Cl. 131-84.100.
- Bendix Atlantic Inflator Company: *See—*
  - Frantom, Richard L.; Bishop, Robert J.; Kremer, Robert; Ocker, Klaus; Brown, Roy; Rose, James; Renfroe, Donald; and Bazel, Teresa, 5,022,674, Cl. 280-741.000.
- Bendix Espana S.A.: *See—*
  - Guasch, Esteve C., 5,022,770, Cl. 384-477.000.
- Benechim, S.A.: *See—*
  - Bounias, Michel; and Dufour, Jean F., 5,023,359, Cl. 556-114.000.
- Beneficе-Malouet, Sylvie; and Blancou, Hubert, to Atochem. Functionalization of iodopolyfluoroalkanes by electrochemical reduction and new fluorinated compounds thereby obtained. 5,023,370, Cl. 562-125.000.
- Benfey, Philip N.: *See—*
  - Lam, Eric; Benfey, Philip N.; Gilmartin, Philip M.; and Chua, Nam-Hai, 5,023,179, Cl. 435-172.300.
- Benitez, Abel G. Bar soap wrap. 5,022,517, Cl. 206-77.100.

VOL
1127
ISS
2
JE
11
1991
UMI

- Benko, David A.. *See—*
  - Evans, Larry R.; Waddell, Walter H., Harris, Frank W.; and Benko, David A., 5,023,287, Cl. 524-255.000.
- Bennett, Charles S. Mail arrival signal system. 5,023,595, Cl. 340-569.000.
- Bennett, Reginald B.; and Bennett, Reginald S. Direction indicating reflector with planar reflector panels including cube corners. 5,022,739, Cl. 350-102.000.
- Bennett, Reginald S.: *See—*
  - Bennett, Reginald B.; and Bennett, Reginald S , 5,022,739, Cl. 350-102.000.
- Benninger AG: *See—*
  - Beerli, Markus; Bollen, Manfred; Iten, Jakob; Koslowski, Gerhard; Probst, Willy; and Wildi, Edwin, 5,022,128, Cl. 28-191.000.
- Bentivenga, Michael J.: *See—*
  - Bentivenga, Salvatore; and Bentivenga, Michael J., 5,023,579, Cl. 333-203.000.
- Bentivenga, Salvatore; and Bentivenga, Michael J., to Radio Frequency Systems, Inc. Integrated bandpass/lowpass filter. 5,023,579, Cl. 333-203.000.
- Benveniste, Victor M.; and McIntyre, Edward K., Jr., to Eaton Corporation. Ion beam control system. 5,023,458, Cl. 250-396.00R.
- Benvenuti, Manuela; and Lenz, Robert W., to Exxon Chemical Patents, Inc. Catalytic polyermization of beta-substituted-beta-propiolactones by oligomeric isobutylaluminoxane. 5,023,316, Cl. 528-357.000.
- Berger, Leo, to Idea+Invent AG. Liquid filled device for playing a game of chance. 5,022,654, Cl. 273-145.0CA.
- Bergeron, Robert M., to Land & Sea, Inc. Variable pitch propeller 5,022,820, Cl. 416-89.000.
- Bergquist, Per-Marcus; and Troberg, Henrik E., to Electrolux Research & Innovation Aktiebolag. Arm for electric switches and the like controlled by electricity. 5,023,587, Cl. 337-123.000.
- Berke, Joseph J.: *See—*
  - Muller, George H., 5,022,414, Cl. 128-898 000.
- Berkson, Stephen P.· *See—*
  - Murray, Donna F.; Pringle, Joseph M.; Strope, Gerald C., and Berkson, Stephen P., 5,023,851, Cl. 368-41.000.
- Bernklau, James W.: *See—*
  - Lynch, Marine D.; Bernklau, James W.; Paulson, Richard D., and Reeck, Steven L., 5,023,643, Cl. 354-299.000.
- Berson, Berle D. Electro-expulsive boots. 5,022,612, Cl. 244-134.00D.
- Berthold, Kurt; and Levi, Anthony F. J., to AT&T Bell Laboratories. Apparatus comprising a quantum well device and method of operating the apparatus. 5,023,878, Cl. 372-20.000.
- Bertin, Jean: *See—*
  - Langer, Salomon Z.; Frost, Jonathan R.; Schoemaker, Johannes, Gaudilliere, Bernard; Bertin, Jean, Rousseau, Jean; Dupont, Regis; and Wick, Alexander E., 5,023,266, Cl. 514-317.000.
- Bertram, Leo; Schemmann, Hugo; and Bukoschek, Romuald L., to U.S Philips Corporation. Small electric household utensil for the production of foods by mixing by stirring 5,022,315, Cl. 99-348.000.
- Bertrand, Stephen C.· *See—*
  - Johnson, Herrick J , Olson, Margaret, Jones, Stuart, Bodoff, Stephanie; Bertrand, Stephen C., and Levine, Paul H., 5,023,907, Cl. 380-4.000.
- Beswick, Frank, to West Company, Incorporated, The. Sterilization tunnel 5,022,165, Cl. 34-62.000.
- Bethea, Clyde G.; Hasnain, Ghulam, Levine, Barry F.; and Malik, Roger J Quantum-well radiation-interactive device, and methods of radiation detection and modulation. 5,023,685, Cl. 357-30.000.
- Betz Laboratories, Inc.. *See—*
  - Roling, Paul V., 5,023,372, Cl 562-598 000.
- Beyer, Bruce R. Wall marking layout device. 5,022,158, Cl 33-413.000.
- Bezigian, Thomas, and Nebel, George T., to James River Corporation. Polypropylene-coated microwaveable waxed paper 5,023,134, Cl 428-336.000.
- BF Goodrich Company, The: *See—*
  - Lee, Bing-Lin; Sullivan, Francis R , and Mertzel, Elaine Audrey, 5,023,036, Cl. 264-211 230.
- Bhasavanich, Daun: *See—*
  - Bratkowski, Walter V., Bhasavanich, Daun, and Davies, Norman, 5,023,583, Cl. 335-195.000.
- Bhatia, Kamlesh K., to Du Pont de Nemours, E. I., and Company. Continuous process for rapid conversion of oligomers to cyclic esters 5,023,349, Cl. 549-274 000
- Bhatia, Kamlesh K., to Du Pont de Nemours, E. I., and Company Process for the purification of cyclic esters. 5,023,350, Cl. 549-274.000.
- Biass, David, to Cibeles International, Inc Clamping assembly with self-clamping jaws, in particular for a linear hydraulic winch 5,022,125, Cl. 24-136.00R.
- Biegeleiser., Ken P. Venoscope. 5,022,399, Cl. 128-662 060.
- Bielecki, Edwin J , Romberger, Karl A. Bakke, Bart F , Hobin, Martin A.; and Clark, Charles R Recovery of metal values and hydrofluoric acid from tantalam and columbium waste sludge. 5,023,059, Cl. 423-9.000.
- Bienkowski, Lynda J *See—*
  - Farbood, Mohamad I.; Morris, James A , Sprecker, Mark A , Bienkowski, Lynda J., Miller, Kevin P., Vock, Manfred H , and Hagedorn, Myrna L., 5,023,347, Cl. 549-263.000.
- Bieringer, Hermann. *See—*
  - Willms, Lothar, Bauer, Klaus, Bieringer, Hermann, and Burstell, Helmut, 5,022,916, Cl. 71-92.000
- Big Dutchman Cyclone, Inc · *See—*
  - DenBleyker, James R., 5,022,347, Cl. 119-54.000.
- Bijker, Romke: *See—*
  - Hulsbergen, Cornelis H., and Bijker, Romke, 5,022,262, Cl. 73-170.00A.
- Bil-Jax, Inc.: *See—*
  - Wyse, Steven J., 5,022,490, Cl. 182-17.000.
- Billingsley, Henry C.; and Belec, Glenn R., to Outboard Motor Corporation. Internal combustion engine. 5,022,355, Cl 123-52.0MB.
- Billmers, Meyer: *See—*
  - Ramakrishna, Kamesh; Billmers, Meyer; and Theriault, Daniel, deceased, 5,023,807, Cl. 364-513.000.
- Bimex Corporation: *See—*
  - Lomax, Donald P.; Patzer, Gregory N.; and Rajendran, Giri, 5,023,145, Cl. 428-614.000.
- Biondetti, Mario, to Sulzer-Escher Wyss GmhH. Apparatus for neutralizing overhanging loads. 5,022,319, Cl. 100-170.000.
- Biosys Corporation: *See—*
  - Friedman, Milton J.; Langston, Susan E.; and Pollitt, Sonia, 5,023,183, Cl. 435-240.300.
- Bird, Robert E., to Acetylene Gas Company. Apparatus and method for high pressure gas mixing. 5,022,442, Cl. 141-100.000.
- Birnboim, Meyer H.; and Neeves, Arthur E., to Research Corporation Technologies, Inc. Nonlinear optical materials. 5,023,139, Cl 428-402.000.
- Bishop, Robert J.. *See—*
  - Frantom, Richard L.; Bishop, Robert J.; Kremer, Robert, Ocker, Klaus; Brown, Roy; Rose, James; Renfroe, Donald; and Bazel, Teresa, 5,022,674, Cl. 280-741.000
- Bissell Healthcare/Bissell Am Fab, Inc.: *See—*
  - Solomon, Robert A., 5,022,327, Cl. 108-147.000.
- Black Clawson Company, The: *See—*
  - Pimley, John J.; Vitori, Christopher M , Phillippe, Irenee J.; and Marsh, Paul G., 5,022,984, Cl. 209-170.000.
- Black, Robert C.: *See—*
  - Schiene, Thomas M.; Christie, William; Johnson, Harold W.; and Black, Robert C., 5,023,178, Cl. 435-170.000.
- Blaese, Herbert R. On-glass antenna with center-fed dipole operation 5,023,622, Cl. 343-715.000.
- Blake, James N : *See—*
  - Engan, Helge E.; Kim, Byoung Y.; Blake, James N.; and Shaw, Herbert J., 5,022,732, Cl. 350-96.150.
- Blanc, Floreal; and Lordet, Jacques, to Commissariat A L'Energie Atomique. Winder-unwinder for optical fibre cables. 5,022,600, Cl. 242-107.100.
- Blanchard, Russell O., to Batts, Inc. Internal garment hanger with tensioning springs and straps. 5,022,571, Cl. 223-95.000.
- Blancou, Hubert. *See—*
  - Benefice-Malouet, Sylvie; and Blancou, Hubert, 5,023,370, Cl 562-125.000
- Blanford, Denis M.: *See—*
  - Wittensoldner, Christopher J.; Burkey, John K., and Blanford, Denis M., 5,023,818, Cl. 364-551 010.
- Blasko, Michael; and Wenning, Hans-Peter, to Veba Oel Entwicklungs-Gesellschaft mbH. Rotary kiln. 5,022,852, Cl. 432-115.000.
- Blewer, Robert S., Gullinger, Terry R.; Kelly, Michael J.; and Tsao, Sylvia S., to United States of America, Energy Formation of multiple levels of porous silicon for buried insulators and conductors in silicon device technologies. 5,023,200, Cl. 437-187.000.
- Blonder, Greg E · *See—*
  - Ackerman, David A , Blonder, Greg E ; and Mac Donald, William M., 5,023,881, Cl 372-46.000.
- Bluege, John, to United Technologies Corporation. Solid-to-liquid phase change cooled mirror arrangement 5,022,746, Cl. 350-610.000
- Blum, Albert; and Tadday, Horst. Storing system with a conveying device. 5,022,808, Cl. 414-280.000.
- Boardman, John D , Sadler, Jimmie L.; and Trimble, Richard A , to E-Systems, Inc Photonic array bus for data processing and communication systems. 5,023,463, Cl. 250-551.000.
- BOC Group plc, The· *See—*
  - De Haan, Gerrit, 5,022,829, Cl. 417-423.200.
- Bock, Normann, to Edelhoff M S T.S GmbH Container for the storage and transport of in particular, bulk materials such as construction debris, rubbish, industrial waste and the like. 5,022,546, Cl. 220-4 030.
- Bodoff, Stephanie *See—*
  - Johnson, Herrick J.; Olson, Margaret; Jones, Stuart, Bodoff, Stephanie; Bertrand, Stephen C , and Levine, Paul H., 5,023,907, Cl. 380-4.000.
- Boeckmann, Hugo; and Van Erden, Donald L., to Minigrip, Inc Easy open bag structure. 5,023,122, Cl. 428-43.000.
- Boehm, Donald G., to Nabisco Brands, Inc. Method for producing soft cookies having bloom resistance. 5,023,099, Cl 426-549 000.
- Boeing Company, The. *See—*
  - Ensign, Thomas R., 5,022,610, Cl. 244-118 300
  - Herzberg, Garry G ; and Reynolds, Robert C , 5,023,791, Cl 364-424.040.
  - McGrady, Michael B., and Robinson, Jon K., 5,022,393, Cl 128-205.230
- Bogert, David C *See—*
  - Dight, Lawrence B., Bogert, David C , and Leskowicz, Mark A , 5,023,220, Cl. 502-65.000.
- Boggess, Thomas F., Jr. *See—*
  - Valley, George C., and Boggess, Thomas F , Jr , 5,023,477, Cl 307-425.000.
- Bohlmann, Lothar E , to Kord Products Limited Flower pot carrying tray with restraining means for plural pots. 5,022,183, Cl. 47-86.000.
- Bohon, W. Mark, to Atlantic Richfield Company Pilot flame apparatus 5,022,850. Cl. 431-207.000.

- Boiko, Leonid S.; Korotkin, Viktor I.; Veretennikov, Viktor Y.; Roslivker, Efim G.; Fedyakin, Roman V.; Chesnokov, Viktor A.; Yakovlev, Anatoly S., Kharitonov, Jury D.; Fei, Valery M.; and Galichenko, Emma N. Novikov gearing. 5,022,280, Cl. 74-462.000.
- Boisture, Thomas B., to Ohmstede Mechanical Services, Inc. Multi-hose flexible lance tube cleaning system. 5,022,463, Cl. 165-95.000.
- Bolivar, LeRoy E.; and Bolivar, Sharyn L., to Thee Birdie Bordello. Bird toys. 5,022,345, Cl. 119-29.000.
- Bolivar, Sharyn L.: *See—*
  - Bolivar, LeRoy E.; and Bolivar, Sharyn L., 5,022,345, Cl. 119-29.000.
- Bollen, Manfred: *See—*
  - Beerli, Markus; Bollen, Manfred; Iten, Jakob; Koslowski, Gerhard, Probst, Willy; and Wildi, Edwin, 5,022,128, Cl. 28-191.000.
- Bolton, Barbara A.: *See—*
  - Wells, Gregory J.; and Bolton, Barbara A., 5,022,755, Cl. 356-307.000.
- Bombrini, Carlo, to C.P. Company S.p.A Motorcyclist's jacket with a rear helmet-carrying pouch. 5,022,092, Cl. 2-94.000.
- Bonke, Carl; and Jen, Han, to Western Digital Corporation. Intelligent disk drive having configurable controller subsystem providing drive-status information via host-computer expansion bus. 5,023,831, Cl. 364-900.000.
- Bonnes, David R , and Male, Philip J., to Union Fork and Hoe Company, The. Lawn rake with improved spring anchoring. 5,022,221, Cl. 56-400.170.
- Bonta, Jeffrey D.. *See—*
  - Tayloe, Daniel R.; and Bonta, Jeffrey D., 5,023,900, Cl. 379-32.000.
- Borden, Terry L.: *See—*
  - Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James, Mall, Michael G., Page, David R.; Plambeck, Kenneth E.; Scalzi, Casper A.; and Schmalz, Richard J., 5,023,773, Cl. 364-200.000.
- Boris, Gregory F : *See—*
  - Roy, Bryan A.; Boris, Gregory F.; Campbell, John J.; Funk, John G.; Wozniak, David J.; Gibson, James D.; and McCauley, Robert M., 5,022,995, Cl. 210-651.000.
- Boron Biologicals, Inc.: *See—*
  - Spielvogel, Bernard F.; and Sood, Anup, 5,023,513, Cl. 514-64.000.
- Boron, Marcus P.: *See—*
  - Brun, Milivoj K.; Boron, Marcus P.; Miller, Steven A., Szala, Lawrence E.; and Svec, Paul S., 5,022,150, Cl. 29-890.053.
- Borst, Erich, to Robert Bosch GmbH Clamping fixture for detachably fixing a tool, in particular a disc. 5,022,188, Cl. 51-168.000.
- Borzone, Luis A *See—*
  - Klinzing, George E.; Borzone, Luis A., and Yang, Wen-Ching, 5,022,274, Cl. 73-861.040.
- Bosch, Erhard; Wolfer, Dietrich; and Maier, Reinhard, to Wacker-Chemie GmbH. Compositions suitable for coating the surface of electrical high-voltage insulators. 5,023,295, Cl. 524-783.000.
- Bose, Chinmoy H.; and Ray, Rajarshi, to AT&T Bell Laboratories. Method and apparatus for pattern inspection. 5,023,917, Cl. 382-8.000.
- Bose Corporation: *See—*
  - Arnold, Finn A., 5,023,914, Cl. 381-97.000.
- Bosomworth, Paul: *See—*
  - Everhart, Richard; Bosomworth, Paul; Butcher, Kenneth; and Hoffmann, Matthias, 5,023,217, Cl. 501-103.000.
- Boston, Steven L.; Kilbane, arrell M.; Lee, Danny E., Kilbane, Farrell M.; and Lee, Danny E., to Armco Steel Company, L.P. Hot dip aluminum coated chromium alloy steel. 5,023,113, Cl. 427-320.000.
- Bouchoud, Marcel, to Charmilles Technologies SA. Device for limiting the withdrawal of the electrode of a die sinking machine. 5,023,421, Cl. 219-69.130.
- Boudon, Gerard; Mollier, Pierre; Ogura, Seiki, Omet, Dominique; Tannhof, Pascal; and Wallart, Franck, to International Business Machines Corporation. Complementary emitter follower drivers. 5,023,478, Cl. 307-446.000.
- Boulanger, Jean-Paul; Lupuyo, Jacques; and Klug, Francois, to Insecta Paint, Inc. Insecticidal coating composition and processes for making and using it. 5,023,247, Cl. 514-89.000.
- Bounias, Michel; and Dufour, Jean F., to Benechim, S.A. Use of organic salts of copper for the treatment of honeybee's parasitic diseases. 5,023,359, Cl. 556-114.000.
- Boutni, Omar M., to General Electric Company. Impact and solvent resistant polycarbonate composition. 5,023,297, Cl. 525-67.000.
- Bowen, Frederic W. Improved voice & data telecommunications apparatus. 5,023,903, Cl. 379-67.000.
- Bowlin, Roger L.: *See—*
  - West, David H.; Hebert, Lawrence A.; Bowlin, Roger L.; and Holbrook, Michael T., 5,023,387, Cl. 570-252.000.
- Bowling, Roy E.: *See—*
  - Cote, James L.; and Bowling, Roy E., 5,022,670, Cl. 280-32.600.
- Boyd, Ian A. R.; Rose, William J.; and Schaeffer, George A., to Boyd, Ian A. R. Method and device for producing a substantially continuous composite video signal. 5,023,727, Cl. 358-310.000.
- Boyd, Jack D., to BASF Aktiengesellschaft. Propenylphenoxy-terminated oligomeric tougheners and their use in bismaleimide resin compositions. 5,023,310, Cl. 528-89.000.
- Boyd, Thomas J., to Louis Berkman Company, The. Vent ridge assembly. 5,022,203, Cl. 52-199.000.
- Boykin, T. Brooks; and Boykin, Timothy B. Programmable hot water heater control device. 5,023,432, Cl. 219-497.000.
- Boykin, Timothy B.: *See—*
  - Boykin, T. Brooks; and Boykin, Timothy B., 5,023,432, Cl. 219-497.000.
- Bracco, Frediano V.: *See—*
  - Abraham, John; and Bracco, Frediano V., 5,022,366, Cl. 123-205.000.
- Bradfield, James Y.: *See—*
  - Summers, Max D.; Bradfield, James Y ; and Keeley, Larry L., 5,023,328, Cl. 536-27.000.
- Bradford-White Corporation: *See—*
  - West, Eugene L.; and Marcinkewicz, Robert J., 5,023,031, Cl 264-46.500.
- Bradley, Eric M., to General Dynamics Corp./Electronics Division. Optical resonator structures. 5,023,944, Cl. 455-611.000.
- Brady, Stephen F.: *See—*
  - Nutt, Ruth F.; Brady, Stephen F.; and Veber, Daniel F., 5,023,233, Cl. 514-11.000.
- Braeutigam, Robert O., to FMC Corporation. Book container. 5,022,527, Cl. 206-522.000.
- Brake and Clutch Industries Australia Pty. Ltd.: *See—*
  - Wang, Nui, 5,022,500, Cl. 188-73.310.
- Brandenburger, Jurgen: *See—*
  - Roll, Rudolf; Brandenburger, Jurgen; and Hempel, Horst, 5,022,976, Cl. 204-297.00R.
- Brandis, Helmut; Huchtemann, Bernd; Schuler, Peter; and Werner, Dietrich, to Thyssen Edelstahlwerke AG. Process for annealing boron-containing steels and product thereof. 5,022,933, Cl. 148-16.000.
- Branovich, Louis E.; Freeman, Gerard L.; Eckart, Donald W.; and Smith, Bernard, to United States of America, Army. Method of making a long life high current density cathode from aluminum oxide and tungsten oxide powders. 5,022,883, Cl. 445-50.000.
- Bransky, Jeffrey D.: *See—*
  - Perdue, Thomas F., Jr.; Bransky, Jeffrey D., Carvell, William S.; Dettloff, David E.; Ischay, Duane K.; and Oberg, Kenneth H , 5,022,689, Cl. 292-19.000.
- Bratkowski, Walter V.; Bhasavanich, Daun; and Davies, Norman, to Westinghouse Electric Corp. Circuit breaker contact operating structure. 5,023,583, Cl. 335-195.000.
- Braun, Hans: *See—*
  - Pano, Joseph; and Braun, Hans, 5,022,796, Cl. 407-113.000
- Brawerman, Michael, deceased (by Orian, Emilia, executrix), and Orian, Itamar. Method of constructing a gas turbine. 5,022,145, Cl. 29-88.800.
- Brazeway, Inc.: *See—*
  - Miller, Donald E.; and Virsik, Milan A., 5,022,135, Cl. 29-421.100.
- Brearley, John R., to Northern Telecom Limited. Method of operating a packet switching network. 5,023,780, Cl. 364-200.000.
- Breda, Michael A.; Snyder, George K.; and Lyon, Peter A., to General Motors Corporation. Jump indexing pallet and method for heat exchanger assembly. 5,022,814, Cl. 414-799.000.
- Breen, Michael T., to Eaton Corporation. Tractor trailer anti-trailer swing system and method. 5,022,714, Cl. 303-7.000.
- Brekkestran, Kevin L.; and Batcheller, Barry D., to Environwear, Inc. Hybrid electronic control system and method for cold weather garment. 5,023,430, Cl. 219-486.000.
- Brennan, Louis G., to Cornucopia Medical Products, Inc. Nasal splint device. 5,022,389, Cl. 128-76.00C.
- Breton S.p.A.: *See—*
  - Toncelli, Luca, 5,022,193, Cl. 51-283.00R.
- Breu, Heinz, to Hewlett-Packard Company. Method for inspecting the leads of electrical components on surface mount printed circuit boards. 5,023,916, Cl. 382-8.000.
- Breu, Heinz, to Hewlett-Packard Company. Method for finding the medial axis transform of an image. 5,023,920, Cl. 382-55.000.
- Brewin, Garry: *See—*
  - Sharpe, Steven E.; Brewin, Garry; and Sharpe, Richard, 5,022,160, Cl. 30-475.000.
- Briant, Geoffrey M.; McDonald, Alistair; Cockings, Peter; and Dhokia, Vijay, to British Aerospace Public Limited Company Image label updating device using serially connected modules. 5,023,810, Cl. 364-518.000.
- Bridgestone Corporation: *See—*
  - Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi; and Suzuki, Hiroyuki, 5,022,475, Cl. 177-211.000.
- Briet, Gilles: *See—*
  - Potier, Michel; and Briet, Gilles, 5,022,461, Cl. 165-76.000.
- Brigati, David J.: *See—*
  - Koebler, Douglas J.; Cuomo, Carlo; and Brigati, David J., 5,023,187, Cl. 436-180.000.
- Briggs, Charles C. Gun locking device. 5,022,534, Cl. 211-4.000.
- Briggs, James B., to Media Transference International, Ltd. System for combining multiple audio channels into the baseband video signal and the recovery of the audio channels therefrom. 5,023,707, Cl. 358-343.000.
- Briggs, Milton: *See—*
  - Dundas, Dennis L.; Moore, Eugene L., Oles, Paul M.; and Briggs, Milton, 5,022,544, Cl. 215-31.000.
- Briggs & Stratton Corporation: *See—*
  - Lavender, Stephen J., 5,022,495, Cl. 184-105.100.
- Brim, Walter L. Lawn mower shade apparatus. 5,022,420, Cl. 135-88.000.
- Brinker, Reiner G.: *See—*
  - Ingalls, John L.; Brinker, Reiner G.; and Hawkins, Jesse L., Jr., 5,022,950, Cl. 156-361.000.
- Briot International: *See—*
  - Longuet, Raynald G. M.; and Pecot, Jean-Yves F. P., 5,022,187, Cl. 51-165.740.

VOL
1127
ISS
2
JE
11
1991
UMI

- British Aerospace Public Limited Company: *See—*
  - Briant, Geoffrey M.; McDonald, Alistair; Cockings, Peter; and Dhokia, Vijay, 5,023,810, Cl. 364-518.000.
  - Varnham, Malcolm P., 5,022,754, Cl. 356-300.000.
- British Aerospace Public Lmited Company: *See—*
  - Grant, Michael; and Robson, David, 5,023,865, Cl. 370-3.000.
- British Petroleum Company, p.l.c., The: *See—*
  - Brown, Stephen L., 5,023,318, Cl. 528-392.000.
  - McAteer, Colin H., 5,023,277, Cl. 518-715.000.
- British Telecommunications public limited company: *See—*
  - Kashyap, Raman, 5,022,734, Cl. 350-96.150.
  - Keeble, Peter J., 5,022,634, Cl. 254-134.400.
  - Laidler, Graham A., 5,023,766, Cl. 363-16.000.
  - Smith, David W., 5,023,948, Cl. 455-616.000.
- Britt, Franklin J. Safety valve. 5,022,423, Cl. 137-68.100.
- Brock, David W.: *See—*
  - Aklufi, Monti E.; and Brock, David W., 5,023,056, Cl. 422-186.000.
- Brock, Phillip J.: *See—*
  - Baum, Thomas H.; Brock, Phillip J.; and Dawson, Daniel J., 5,023,360, Cl. 556-117.000.
- Broido, Georges H. G., to Lam-Plan S.A. Polishing plate. 5,022,191, Cl. 51-209.0DL.
- Brois, Stanley J.: *See—*
  - Thaler, Warren A.; Brois, Stanley J., and Hall, Henry K., 5,023,005, Cl. 252-47.500.
- Bronowicki, Allen J.; and Mendenhall, Todd L., to TRW Inc. Locally compensated deformation sensor. 5,022,272, Cl. 73-772.000.
- Brooks, Gene R.; and Hiland, Terrence T., to Caterpillar Inc. Press brake apparatus with powered adjustable female die jaws. 5,022,248, Cl. 72-21.000.
- Brother Kogyo Kabushiki Kaisha: *See—*
  - Kitazawa, Hiroshi, 5,022,239, Cl. 66-127.000.
  - Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; Asano, Yuji; Yamamoto, Takemi; and Nakata, Takashi, 5,023,654, Cl. 355-27.000.
  - Yoshihara, Hideo, 5,023,653, Cl. 355-27.000.
- Broughton, Dan Q.; and Norris, Nicholas O., to Ortho Organizers. Orthodontic bracket. 5,022,854, Cl. 433-8.000.
- Brower, Richard. Automatic, self-cleaning, water saving, toilet system. 5,022,098, Cl. 4-233.000.
- Brown, Bernard T., to Emerson Electric Co. Control of staged heating and cooling apparatus by a four-wire thermostat. 5,022,460, Cl. 165-12.000.
- Brown Boveri Reaktor GmbH *See—*
  - Potz, Franz; and Daum, Dieter, 5,022,437, Cl. 138-89.000.
- Brown, James W., Sr.; and Sondermeyer, Jack C., to Peavey Electronics Corporation. Specialized amplifier systems for musical instruments. 5,023,915, Cl. 381-120.000.
- Brown, John K., III, to International Business Machines Corporation. Non-volatile memory usage. 5,023,813, Cl. 364-519.000.
- Brown, Lewis M., to Essex Group, Inc. Ignition wire core conductive irregularity detector. 5,023,558, Cl. 324-515.000.
- Brown, Roy: *See—*
  - Frantom, Richard L.; Bishop, Robert J.; Kremer, Robert; Ocker, Klaus; Brown, Roy; Rose, James; Renfroe, Donald; and Bazel, Teresa, 5,022,674, Cl. 280-741.000.
- Brown, Stephen L., to British Petroleum Company, p.l.c., The. Process for preparing polyketones from carbon monoxide/olefin with amide or aceto nitrile. 5,023,318, Cl. 528-392.000.
- Brown, Steven W. Protective cover for portable bicycle tire pumps 5,022,572, Cl. 224-30.00R.
- Brox, Steven E. Passive infrared/acoustic pool security system. 5,023,593, Cl. 340-522.000.
- Brucato, Salvatore M.: *See—*
  - Sprecker, Mark A.; Belko, Robert P.; Hanna, Marie R.; Beck, Charles E. J.; and Brucato, Salvatore M., 5,023,352, Cl. 549-345.000.
- Bruecker, Gerald J.; and Smith, Robert W., to Badger Northland Inc. Livestock feeder with traveling hopper. 5,022,348, Cl. 119-57.600.
- Bruens, Jean-Marie. Register blade mover. 5,022,583, Cl. 236-49.500.
- Brun, Milivoj K.; Boron, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., to General Electric Company. Method for producing heat transfer tube with insitu heater. 5,022,150, Cl. 29-890.053.
- Brunsvold, William R.; Chiu, Philip; Conley, Willard E., Jr.; Crockatt, Dale M.; Montgomery, Melvin W.; and Moreau, Wayne M., to International Business Machines Corporation. Highly sensitive dry developable deep UV photoresist. 5,023,164, Cl. 430-270.000.
- Brunswick Corporation: *See—*
  - Karls, Michael A., 5,022,875, Cl. 440-49.000.
  - Staerzl, Richard E., 5.022,363, Cl. 123-179.0BG.
- Brussel, Richard, to Fried. Krupp GmbH. Device for cleaning a molding tool in plastics processing machines. 5,022,839, Cl. 425-161.000.
- Brust, Gerald M.: *See—*
  - Nozel, Richard J.; Trombley, Ulric W.; and Brust, Gerald M., 5,022,626, Cl. 248-311.200.
- Bryan, Jed A. Adjustable keyboard chair. 5,022,706, Cl. 297-162.000.
- Bryant, William C.; and Lowe, Robert K., to Empire Brushes, Inc. Bird feeder tree. 5,022,349, Cl. 119-57.800.
- Bu-Abbud, George, to Reliance Comm/Tec Corporation. Echo cancelling circuit for use with laser. 5,022,752, Cl. 356-73.100.
- Buchan, Leon: *See—*
  - Buchan, Pieter W. W.; and Buchan, Leon, 5,023,012, Cl. 25-181.000.
- Buchan, Pieter W. W.; and Buchan, Leon, to Buchan, Pieter Walter William. Purification of water. 5,023,012, Cl. 25-181.000.
- Buchan, Pieter Walter William: *See—*
  - Buchan, Pieter W W.; and Buchan, Leon, 5,023,012, Cl 25-181.000.
- Buchanan, William: *See—*
  - Yarrington, Robert M.; and Buchanan, William, 5,023,276, Cl. 514-703.000.
- Bucher-Guyer AG Maschinenfabrik: *See—*
  - Zullig, Heinz, 5,023,037, Cl. 264-261.000.
- Buckelew, William E. Method and apparatus for lubricating cables 5,022,493, Cl. 184-16.000.
- Buckman Laboratories International, Inc.: *See—*
  - Rayudu, S. Rao, 5,023,332, Cl. 544-185.000.
- Buckmaster, Marlin D.; and Randa, Stuart K., to Du Pont de Nemours, E. I., and Company. Nucleating agents for thermoplastic resins 5,023,279, Cl. 521-85.000.
- Buell Industries, Inc.: *See—*
  - Peterson, Francis C., 5,022,804, Cl. 411-104.000.
- Buforn, Albert. *See—*
  - Massonneau, Viviane; Mulhauser, Michel; and Buforn, Albert, 5,023,361, Cl. 558-32.000.
- Buist, Richard J. Thermoelectric heat pump/power source device 5,022,928, Cl. 136-212.000.
- Bukoschek, Romuald L.: *See—*
  - Bertram, Leo; Schemmann, Hugo; and Bukoschek, Romuald L. 5,022,315, Cl. 99-348.000.
- Bull HN Information Systems Inc.: *See—*
  - Patel, Shirish, 5,023,826, Cl. 364-736.000.
- Bull, S.A.: *See—*
  - Vilas Boas, Jean-Claude; and Fromion, Andre, 5,022,217, Cl. 53-472.000.
- Bumpus, Patrick D. U.V Detectable flame retardant. 5,023,019, Cl 252-607.000.
- Buntrock Industries, Inc.: *See—*
  - Buntrock, Kermit A.; English, Daniel R.; and Jones, Wescomb R., 5,022,920, Cl. 106-38.300.
- Buntrock, Kermit A.; English, Daniel R.; and Jones, Wescomb R., to Buntrock Industries, Inc. Method and composition for investment casting of laminar ceramic shell molds. 5,022,920, Cl. 106-38.300.
- Burch, Homer A.; Castellion, Alan W.; and Pelosi, Stanford S., Jr., to Norwich Eaton Pharmaceuticals, Inc. Use of 5-phenyl-2-furan esters and amides as antiepileptic agents. 5,023,272, Cl. 514-471.000.
- Burch, Richard J.; and Oxley, Brian W., to Gilchrist Studios Group Limited. Method of and apparatus for re-creating images. 5,023,651, Cl. 355-1.000.
- Burge, Norbert, to Ferag AG Method and apparatus for forming an imbricated formation of printed products arriving in an imbricated stream. 5,022,644, Cl. 271-270.000.
- Burgess, Donald A., to Automated Chemical Management, Inc. Automatic chemigation. 5,022,585, Cl. 239-70.000.
- Burgess, J. Stuart; Spink, Donald R.; and Stein, Jerry Y., to Turbotak Inc. Method for removing sulfur oxide. 5,023,064, Cl. 423-242.000.
- Burgher, Stephen K.; and Spector, George. Garbage melter. 5,022,330, Cl. 110-235.000.
- Burkey, John K.: *See—*
  - Wittensoldner, Christopher J.; Burkey, John K.; and Blanford, Denis M., 5,023,818, Cl. 364-551.010.
- Burkhart, Jerald E. Arrow penetrator brake assembly. 5,022,658, Cl 273-416.000.
- Burlett, Donald J.; Bauer, Richard G.; and Kelley, Mellis M., to Goodyear Tire & Rubber Company, The. Polypropylene reinforced rubber. 5,023,301, Cl. 525-232.000.
- Burley, Harvey A., to General Motors Corporation. Indicia contrast enhancement for vehicle borne infrared vision system. 5,023,451, Cl 250-330.000.
- Burnell, James R.: *See—*
  - Dillard, Ewell F.; and Burnell, James R., 5,022,913, Cl. 71-34.000.
- Burns, Christopher D.: *See—*
  - Detter, Gary C.; Rodondi, Andrew F.; Burns, Christopher D; Norling, Samuel A.; Garretson, Jay H.; and Landries, Richard V., 5,023,752, Cl. 361-399.000.
- Burns, Fredrick B., to Newell Operating Company. Paint brush with microcellular synthetic bristles. 5,022,112, Cl. 15-159.00A.
- Burns, Gary T., to Dow Corning Corporation. Methylpolysilanes having controllable rheology and method for their preparation. 5,023,307, Cl. 528-29.000.
- Burrell, Jere S. Rolling fire door. 5,022,452, Cl. 160-7.000.
- Burroughs Wellcome Co.: *See—*
  - Nicholson, Russell A., 5,023,073, Cl. 424-10.000.
- Burstell, Helmut: *See—*
  - Willms, Lothar; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,022,916, Cl. 71-92.000.
- Burton, Bobby H.: *See—*
  - Reynolds, John W.; Burton, Bobby H.; and Kays, Jerry W., 5,022,424, Cl. 137-68.100.
- Burzan, Vernon J.: *See—*
  - Hines, Gordon E.; Salenbien, Leonard J.; and Burzan, Vernon J., 5,022,665, Cl. 279-2.00R.
- Busch, Bruce D.; and Nicholls, Jeffrey R., to Fremont Industries, Inc. Cooling water treatment system. 5,023,011, Cl. 252-180.000.
- Busch-Sorensen, Thomas, to Eskofot A/S. Ultrasonic detector for detecting a thin film. 5,023,846, Cl. 367-127.000.
- Buschor, Karl, to Ransburg-Gema AG. Spray gun for electrostatic spray coating. 5,022,590, Cl. 239-708.000.

- Busse, Frederick L. *See—*
  - Abramovitz, Robert G.; Anderson, Robert L., Jr.; Busse, Frederick L.; Celarier, Stuart A.; Poublan, Jean-Yves H.; and Shorthill, Lawrence R., 5,023,922, Cl. 382-59.000.
- Bussiere, Daniel J.: *See—*
  - Bussiere, Joseph P.; Bussiere, Richard A.; Bussiere, Paul L.; Bussiere, Daniel J.; and Lindop, Christopher, 5,022,657, Cl. 273-201.000.
- Bussiere, Joseph P., Bussiere, Richard A.; Bussiere, Paul L.; Bussiere, Daniel J.; and Lindop, Christopher, to 373470 Alberta Ltd. Golf practice tee apparatus. 5,022,657, Cl. 273-201.000.
- Bussiere, Paul L.: *See—*
  - Bussiere, Joseph P.; Bussiere, Richard A.; Bussiere, Paul L.; Bussiere, Daniel J.; and Lindop, Christopher, 5,022,657, Cl. 273-201.000.
- Bussiere, Richard A.: *See—*
  - Bussiere, Joseph P.; Bussiere, Richard A.; Bussiere, Paul L.; Bussiere, Daniel J.; and Lindop, Christopher, 5,022,657, Cl. 273-201.000.
- Butcher, Kenneth: *See—*
  - Everhart, Richard, Bosomworth, Paul; Butcher, Kenneth; and Hoffmann, Matthias, 5,023,217, Cl. 501-103.000.
- Buth, Jimmy D.: *See—*
  - Avery, Norman R.; Spangenberg, Dale J., Jr., Buth, Jimmy D.; and Seuffer, Kenneth C., Jr , 5,022,994, Cl. 210-670.000.
- Butkovich, Thomas J.: *See—*
  - Horansky, John; and Butkovich, Thomas J., 5,022,692. Cl. 293-128.000.
- Butler, Brent K. Tube overdrive pedal operable using low voltage dc battery elminator. 5,022,305, Cl. 84-711.000.
- Butler, Clyde R., Jr.: *See—*
  - Szczutkowski, Craig F.; and Butler, Clyde R., Jr., 5,023,936, Cl. 455-90.000.
- Butt, Timothy R.; and Zolin, Sergio, to Keiper Recaro GmbH & Co. Vehicle seat. 5,022,698, Cl. 296-65 100.
- Butwell, Justin R.: *See—*
  - Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Page, David R.; Plambeck, Kenneth E.; Scalzi, Casper A.; and Schmalz, Richard J., 5,023,773, Cl. 364-200.000.
- Butzen, James K., to Snap-on Tools Corporation. Ratchet tool with flattened pocket. 5,022,289, Cl. 81-57.390.
- Buysch, Hans-Josef: *See—*
  - Schon, Norbert: and Buysch. Hans-Josef, 5,023,346, Cl. 549-231.000.
- Byrd, Thomas M., Jr.: *See—*
  - Schlotterer, John C.; Johnston, Paul M.; Rusnak, Mark F ; Pillage, Lawrence T.; and Byrd, Thomas M , Jr., 5,023,822, Cl. 364-703.000.
- Byrne, Barry F., to Wormald International Limited. Automatic sprinkler activator. 5,022,468, Cl. 169-40.000.
- Bythell, Valerie: *See—*
  - Hok, J. Bertil W.; and Bythell. Valerie, 5,022,405, Cl. 128-715.000.
- Byzery, Michel: *See—*
  - Trumpff, Jean-Michel; Byzery, Michel; and Raineteau, Gilles, 5,023,941, Cl. 455-307.000.
- C & K Systems, Inc.: *See—*
  - Wallace, John D., 5,023,594, Cl. 340-552.000.
- C.P. Company S.p.A.: *See—*
  - Bombrini, Carlo, 5,022,092, Cl. 2-94.000.
- Cabell, Paul, to Doral Technical Services, Inc. Method for diagnosing serum deficiencies. 5,023,784, Cl. 364-413.070.
- Cakmakci, Mehmet Y., to Aeroquip Corporation. Decorative plastic trim strip and method and apparatus for forming. 5,023,033, Cl. 264-161.000.
- Calamari, James A., Jr.: *See—*
  - Deal, Samuel B.; and Calamari, James A., Jr., 5,023,509. Cl. 313-430.000.
- Calbo, Leonard J , Jr., and Gallacher, Lawrence V., to King Industries, Inc. Linear, low-molecular-weight polyester-based polyol 5,023,367, Cl. 560-193.000.
- Caldwell, Richard A. Lift producing device exhibiting low drag and reduced ventilation potential and method for producing the same. 5,022,337, Cl. 114-39.200.
- Caldwell, Stephen P.; Korn, David S.; and Hopwood, Francis W., to Westinghouse Electric Corp. Voltage-controlled oscillator with rapid tuning loop and method for tuning same. 5,023,572, Cl. 331-10.000.
- Calibro Corporation: *See—*
  - Povilaitis, Darius A., 5,022,242, Cl. 70-14.000.
- California Biotechnology Inc.: *See—*
  - Vigne, Jean-Louis; and Kane, John P., 5,023,271, Cl. 514-458.000.
- California Institute of Technology: *See—*
  - Baum, Eric B.; Moody, John E.; and Wilczek, Frank A. (said Eric B Baum assors. to), 5,023,833, Cl. 365-49.000.
  - Divsalar, Dariush; and Simon, Marvin K., 5,023,889, Cl. 375-27.000.
  - Seraji, Homayoun, 5,023,808, Cl. 364-513.000.
- Call, James, to NPD Research, Inc. Audio frequency based market survey method. 5,023,929, Cl. 455-2.000.
- Calundann, Gordon W.: *See—*
  - Gupta, Balaram; and Calundann, Gordon W . 5,023,314, Cl. 528-190.000.
- Campbell, Charles: *See—*
  - Halpern, Gregory; Campbell, Charles; Beavers, Ellington M.; and Cheh, Huk Y., 5,023,114, Cl. 427-338.000.
- Campbell, David L.: *See—*
  - Fung, Jimmy; An, Jiu; Campbell, David L and Shyu, Steven, 5,023,614, Cl. 341-144.000.
- Campbell, John E.: *See—*
  - Bailey, Thomas F.; and Campbell, John E., 5,022,472, Cl. 175-195.000.
- Campbell, John J.: *See—*
  - Roy, Bryan A.; Boris, Gregory F.; Campbell, John J.; Funk, John G.; Wozniak, David J.; Gibson, James D.; and McCauley, Robert M., 5,022,995, Cl. 210-651.000.
- Campbell, Paul B., to Ingersoll-Rand Company. Variable frequency control for percussion actuator. 5,022,309, Cl. 91-285.000.
- Campbell, William P. Spigot and wrench combination for a beverage dispenser. 5,022,560, Cl. 222-131.000.
- Campisi, Carl, to Zenith Electronics Corporation. Unitary chassis for television receivers with two circuit boards and method of manufacture. 5,023,726, Cl. 358-254.000.
- Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
  - Meunier, Pierre P., 5,022,901, Cl. 55-316.000.
- Canale, Joseph E.; Dunn, John P.; and Narby, William R., to North American Philips Corporation. Explosion proof high pressure discharge lamp. 5,023,506, Cl. 313-25.000.
- Canon Kabushiki Kaisha: *See—*
  - Date, Nobuaki; and Saito, Syuichiro, 5,023,723, Cl. 358-225.000.
  - Ebata, Tokihide; and Onoda, Shigeyoshi, 5,023,660, Cl 355-200.000.
  - Hieda, Teruo; Shimizu, Hiroyuki, and Masuda, Kazunori, 5,023,704, Cl. 358-29.00C.
  - Kawamura, Hideaki, 5,023,626, Cl. 346-33.0TP.
  - Kiyohara, Takehiko, 5,023,629, Cl. 346-140.00R.
  - Moriyama, Jiro, 5,023,630, Cl. 346-140.00R.
  - Nakayama, Tadayoshi; Ishikawa, Hisashi; Kozuki, Susumu; Takahashi, Koji; Yoshimura, Katsuji; Nagasawa, Kenichi; and Sasatani, Tomohiko, 5,023,716, Cl. 358-138.000.
  - Nimura, Mitsuo; and Tanaami, Hideyuki, 5,023,728, Cl. 358-437.000.
  - Nomura, Ichiro; Kaneko, Tetsuya; Banno, Yoshikazu; and Takeda, Toshihiko, 5,023,110, Cl. 427-49.000.
  - Owada, Mitsuru; and Ishii, Yoshiki, 5,023,715, Cl. 358-133.000.
  - Sakata, Tsuguhide; Kimura, Norio; and Takei, Masahiro, 5,023,730, Cl. 360-48.000.
  - Shiomi, Yasuhiko; and Tsuboi, Takayuki, 5,023,647, Cl 354-414.000.
  - Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi, Shiratori, Tatsuya; Ohashi, Masashi; Shirai, Masanari; and Ando, Eiichi, 5,023,658, Cl. 355-72.000.
  - Wataya, Masafumi, 5,023,919, Cl. 382-54.000.
- Capitol Systems: *See—*
  - Freels, Jack; and Milton, David, 5,022,384, Cl. 128-33.000.
- Caporusso, Alessandro; and Caporusso, Mario. Portable manually-controlled three-speed pipe-bending machine 5.022,249, Cl. 72-149.000.
- Caporusso, Mario: *See—*
  - Caporusso, Alessandro; and Caporusso, Mario, 5,022,249, Cl. 72-149.000.
- Caraha, Budrick S. Portable mechanical burglar alarm. 5.022,340, Cl 116-77.000.
- Caramiciu, Marius A.: *See—*
  - Dency, George G.; and Caramiciu, Marius A., 5,022,556, Cl. 222-1.000.
- Cardiac Pacemakers, Inc.: *See—*
  - Russie, Renold J., 5,022,395, Cl. 128-419.0PG
- Cardulla, Richard. Self supporting trash hag. 5,022,767, Cl. 383-33.000.
- Cargin, Keith K., Jr.; and Hanson, George E., to Norand Corporation Multiple channel communications system and packaging configuration therefor. 5,023,823, Cl. 364-708.000.
- Caribbean Stud Enterprises, Inc.: *See—*
  - Suttle, James P.; and Jones, Daniel A , 5,022,653, Cl. 273-85.0CP
- Carl Schenck AG: *See—*
  - Thelen, Dieter, 5,022,276, Cl. 73-865.300
- Carl-Zeiss-Stiftung: *See—*
  - Neff, Willi; Holz, Raymond; Lebert, Rainer; and Richter, Franz, 5,023,897, Cl. 378-122.000.
- Carlson, Donald P. Fishing rig. 5,022,178, Cl. 43-44.820.
- Carlsson, Karl L., to ABU Garcia Produktion AB Detachable trigger mechanism in an open-face fishing reel of the fixed-spool type. 5,022,605, Cl. 242-233.000.
- Carrier Corporation: *See—*
  - Etemad, Shahrokh; Yannascoli, Donald, Fraser, Howard H., Jr , and Lane, William R., 5,022,834, Cl. 418-55.100.
  - Gray, Kenneth P.; and McDonough, Michael L., 5,022,161, Cl 33-548.000.
  - Murphy, Paul F.; and Marriott, Brian M., 5,022,147, Cl. 29-890.148.
- Carson, Daniel M., to Continental White Cap, Inc. Tamper evident closure. 5,022,545, Cl. 215-230.000.
- Carter, Daniel C. Emergency power steering backup apparatus and method. 5,022,481, Cl. 180-133.000
- Carvell, William S.: *See—*
  - Perdue, Thomas F., Jr.; Bransky, Jeffrey D.; Carvell, William S.; Dettloff, David E.; Ischay, Duane K.; and Oberg, Kenneth H., 5,022,689, Cl. 292-19.000.
- Carver, Larry L.; Zamzow, Charles E.; Mladenoff, Donald D., and Lovrien, Glenn A., to Northrop Corporation. Assembly data model system. 5,023,800, Cl. 364-474.240.
- CAS Medical Systems, Inc.: *See—*
  - LaViola, John, 5,022,403, Cl 128-680.000.

VOL
1127
ISS
2
JE
11
1991
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- Casad Manufacturing Corp.. *See—*
  - Casad, Thomas R., 5,022,878, Cl. 441-103.000.
- Casad, Thomas R., to Casad Manufacturing Corp. Wet suit style personal flotation device. 5,022,878, Cl. 441-103.000.
- Casagrande, Roberto: *See—*
  - Perdoncin, Giulio; Giordano, Claudio, Paiocchi, Maurizio; and Casagrande, Roberto, 5,023,381. Cl. 568-322.000.
- Casanova, Wayne J.: *See—*
  - Aug, Conrad J.; Casanova, Wayne J.; Corfits, William D.; Dimmick, Roger F.; and Wheeler, Stephen E., 5,023,754. Cl. 361-415.000.
- Casimir Kast GmbH & Co., KG *See—*
  - Nopper, Herbert, 5,023,027, Cl. 264-37.000.
- Castaldi, Graziano: *See—*
  - Giordano, Claudio; Castaldi, Graziano; and Paiocchi, Maurizio, 5,023,365, Cl. 560-56.000.
- Castellini, Franco, to Castellini, S.P.A Portable dental instrument sterilizing container. 5,022,858, Cl. 433-97.000.
- Castellini, S.P.A.: *See—*
  - Castellini, Franco, 5,022,858, Cl 433-97.000.
- Castellion, Alan W.: *See—*
  - Burch, Homer A.; Castellion, Alan W.; and Pelosi, Stanford S., Jr., 5,023,272, Cl. 514-471.000.
- Caterpillar Inc.: *See—*
  - Brooks, Gene R.; and Hiland, Terrence T., 5,022,248, Cl 72-21.000.
  - Diekevers, Mark S., 5,022,718, Cl. 305-24 000.
- Catoe, Michael. Mobile lift-assisted patient transport device for field use. 5,022,105, Cl. 5-11.000.
- Cattelain, Camille M; and Girard, Francis, to Societe Anonyme Dite Hispano-Suiza. Method and apparatus for machining centering chamfers. 5,022,195, Cl. 51-290.000.
- Caufield, Craig E.; Musser, John H., and Rinker, James M., to American Home Products Corporation. Hydrogenated rapamycin derivatives. 5,023,262, Cl. 514-291.000.
- Caufield, Craig E.; and Failli, Amedeo A., to American Home Products Corporation. Rapamycin oximes. 5,023,264, Cl. 514-291.000.
- CBM Systems Inc.: *See—*
  - Crawford, William L.; and Morton, James M., 5,022,643, Cl 271-267.000.
- Cederlund, Anders: *See—*
  - Norstrom, Lars-Åke; Cederlund, Anders: and Jespersson, Henrik, 5,023,049, Cl. 420-91.000.
- Cegelec: *See—*
  - Pauly, Jean, 5,023,471, Cl. 307-149.000.
- Celarier, Stuart A.: *See—*
  - Abramovitz, Robert G., Anderson, Robert L., Jr.; Busse, Frederick L.; Celarier, Stuart A.; Pouhlan, Jean-Yves H.: and Shorthill, Lawrence R., 5,023,922, Cl. 382-59.000.
- Central Glass Company, Limited *See—*
  - Kawaguchi, Masayuki; Kita, Yasushi; Yamamoto, Kayoko; and Nozaki, Koji, 5,023,308, Cl. 528-423.000.
- Century Electric, Inc.: *See—*
  - Sisk, Hollis D., 5,023,500, Cl. 310-218.000.
- Century Wrecker Corporation: *See—*
  - Thomison, Ted D., 5,022,694, Cl. 294-82.200.
- Cesari, Jeffrey. Utility bag. 5,022,574, Cl. 224-153.000.
- Ceurvorst, Joseph G., to Phillips Peteroleum Company. Process for preparing arylene sulfide polymers. 5,023,315, Cl. 528-323.000.
- CGR MEV: *See—*
  - Milcamps, Jacques; Pourre, Jean-Louis; and Thiebaut, Jean-Pierre, 5,023,743, Cl. 361-1.000.
- Chadima, George E., Jr.; Schultz, Darald R.; Krunnfusz, Jeffrey S.; and Gibbs, William T., to Norand Corporation. Hand-held computerized data collection terminal with indented hand grip and conforming battery drawer. 5,023,824, Cl. 364-708.000.
- Champagne, Patrick J.; and Sander, Ingolf, to Literal Corporation. Single stage tracking actuator apparatus for optical beam information storage drive system. 5,023,861, Cl. 369-215.000.
- Champlin, George: *See—*
  - Dunford, Joseph R.; Champlin, George; and Sylvia, Milton, 5,022,660, Cl. 277-9.000.
- Chamzas, Christodoulos; and Duttweiler, Donald L., to AT&T Bell Laboratories. Entropy encoder/decoder including a context extractor. 5,023,611, Cl. 341-51.000.
- Chandler, Shirley S.: *See—*
  - McKannan, Eugene C.; McPherson, William B.; Ahmed, Shaffiq; and Chandler, Shirley S., 5,023,050, Cl. 420-448.000.
- Chandraratna, Roshantha A. S., to Allergan, Inc. Compounds having a disubstituted acetylene moiety and retinoic acid-like biological activity. 5,023,341, Cl. 549-23.000.
- Chang, Andy. Transmission mechanism for scroll sawing machine. 5,022,157, Cl. 30-394.000.
- Chang, Changtung P.: *See—*
  - Horwitz, Arnold; and Chang, Changtung P., 5,023,173, Cl. 435-29.000.
- Chang, Chin-Hai: *See—*
  - Okarma, Thomas B.; Chang, Chin-Hai; Clark, Brian R.; and Lerch, L. Bernard, 5,022,988, Cl 210-321.840.
- Chang, Ha Y., to Hyundae Environment Energy Management Corp. Ltd. Method or purifying pollutant gases and apparatus thereof. 5,022,896, Cl. 55-85.000.
- Chang, Stephen S.; Bao, Yongde; and Pelura, Timothy J., to Kabi Vitrum AB. Fish oil. 5,023,100, Cl. 426-601.000.
- Chao, Chung-Yao: *See—*
  - Lin, Lifun; and Chao, Chung-Yao, 5,022,968, Cl. 204-28.000.
- Chapman, Derek D.: *See—*
  - Evans, Steven; and Chapman, Derek D., 5,023,229, Cl. 503-227 000
- Chapman, Donald L.: *See—*
  - Bartee, Edward C.; and Chapman, Donald L., 5,023,396, Cl 174-48.000.
- Charkey, Allen; and Januszkiewicz, Stanley, to Energy Research Corporation. Nickel electrode for alkaline batteries. 5,023,155, Cl 429-223.000.
- Charles Stark Draper Laboratory, Inc., The: *See—*
  - Dahlgren, Robert P., 5,022,735, Cl. 350-96.210.
- Charlot, Lincoln H., Jr., to Security Tag Systems, Inc. Pin-clutch mechanism for theft-deterrent device. 5,022,244, Cl. 70-57.100
- Charlson, Sandra M.; Kotula, Steven J; and McCloy, Michael R., to Hercules Incorporated. Segmented mandrel for forming composite articles. 5,022,845, Cl. 425-403.000
- Charmilles Technologies SA *See—*
  - Bouchoud, Marcel, 5,023,421, Cl. 219-69 130
- Charquet, Daniel: *See—*
  - Mardon, Jean-Paul; Charquet, Daniel; Perez, Marc, and Senevat, Jean, 5,023,048, Cl. 376-416.000.
- Chef'N Corporation: *See—*
  - Cressman, Christopher C.; and Holcomb, David A, 5,022,159, Cl 30-418.000.
- Cheh, Huk Y.: *See—*
  - Halpern, Gregory: Campbell, Charles; Beavers, Ellington M. and Cheh, Huk Y., 5,023,114, Cl 427-338.000.
- Chen, Chengjun J., to International Business Machines Corporation Apparatus and method for self-induced repair of circuit shorts and near-shorts. 5,022,955, Cl 156-627.000.
- Cheng, Huai N., to Hercules Incorporated Oxide superconductors encased in pan-derived carbon matrix. 5,023,230, Cl. 505-1.000.
- Cheng, Kenneth T., to University of New Mexico. Paramagnetic/-superparamagnetic/ferromagnetic sucrose sulfate compositions for magnetic resonance imaging of the gastrointestinal tract. 5,023,072, Cl. 424-9.000.
- Cheng, Peter S. C. Artificial flower with inflatable petals and/or inflatable multiple petal assemblies. 5,023,118, Cl. 428-24.000
- Chern, Wen-Foo: *See—*
  - Douglas, Kurt P., and Chern, Wen-Foo, 5,023,465, Cl. 365-203.000
- Cherukuri, Subraman R.; and Mansukhani, Gul, to Warner-Lambert Company. Reduced calorie chewing gum base and compositions containing the same. 5,023,093, Cl. 426-3.000.
- Chesapeake Consumer Products Company: *See—*
  - Heeter, William B.; and Hickey, Katherine F., 5,022,554, Cl. 220-456.000.
- Chesnokov, Viktor A.. *See—*
  - Boiko, Leonid S.; Korotkin, Viktor I.; Veretennikov, Viktor Y. Roslivker, Efim G.; Fedyakin, Roman V.; Chesnokov, Viktor A. Yakovlev, Anatoly S.; Kharitonov, Jury D.; Fei, Valery M : and Galichenko, Emma N., 5,022,280, Cl. 74-462.000.
- Cheung, Mo-Fung; Golovoy, Amos; and van Oene, Henk, to Ford Motor Company. Phosphate/epoxy stabilizer for extrudable polyester blends. 5,023,284, Cl. 524-109.000.
- Chevron Research Company: *See—*
  - Irani, Cyrus A.; Harris, Thomas V., and Pretzer, Wayne R. 5,022,467, Cl. 166-273.000.
- Chhabra, Navjot: *See—*
  - Powell, Eric; and Chhabra, Navjot, 5,022,853, Cl. 432-200.000.
- Chick Machine Tool Inc.: *See—*
  - Swann, George R., 5,022,636, Cl 269-43.000.
- Chien, Te-Yen: *See—*
  - Chien, Yie W.; and Chien, Te-Yen, 5,023,084, Cl. 424-448.000.
- Chien, Yie W.; and Chien, Te-Yen, to Rutgers, The State University of New Jersey. Transdermal estrogen/progestin dosage unit, system and process. 5,023,084, Cl. 424-448.000.
- Chikama, Atsushi: *See—*
  - Negoro, Ikuo; Takano, Masatoshi; Chikama, Atsushi; and Negishi, Kiyoshi, 5,023,667, Cl. 355-274.000.
- Chikami, Toshihide: *See—*
  - Murakami, Azuma; Aoki, Kazuo; Yamanami, Tsuguya; Tomofuji, Yoshiaki; Tanaka, Takeshi; Inashima, Satoshi; Funahashi, Takahiko; Chikami, Toshihide; and Senda, Toshiaki, 5,023,408, Cl. 178-19.000.
- Chikuma, Kiyofumi: *See—*
  - Uenishi, Naota; Uemiya, Takafumi; Mizoguchi, Akira; Ogaki, Yasuji; Hattori, Yasuhiro; Tohma, Teruo; Chikuma, Kiyofumi; and Okamoto, Sota, 5,022,738, Cl. 350-96.340.
- Childs, Richard B., to GTE Laboratories Incorporated. Transmission system using parallel optic links to achieve enhanced dynamic range 5,023,945, Cl. 455-617.000.
- Chiles, Daniel T.; and Chiles, Richard M. Flexible hose heat exchanger construction with combination locating and thawing wire. 5,022,459, Cl. 165-11.100.
- Chiles, Richard M.: *See—*
  - Chiles, Daniel T.; and Chiles, Richard M., 5,022,459, Cl. 165-11.100.
- Chin, Jack; Goforth, Robert R.; and Ohkawa, Tihiro, to General Atomics. Deposition of synthetic diamonds. 5,023,109, Cl. 427-45.100.
- Chin, Shaoan: *See—*
  - Tero, John; Chin, Shaoan; and Ma, Bing F., 5,023,481, Cl. 307-456.000.
- Chinoin Gyogyszer Es Vegyeszeti Termekek Gyara Rt: *See—*
  - Dekany, Gyula; and Frank, Judit, 5,023,242, Cl. 514-31.000.
  - Sperber, Ferenc; Huszar, Csaba; Nemeth, Attila; Somfai, Eva; and Pali nee Ivanics, Iren, 5,023,337, Cl. 548-306.000.

- Chips and Technologies, Incorporated: *See—*
  - May, Bradley A., 5,023,483, Cl. 307-463.000.
- Chisso Corporation: *See—*
  - Inouye, Satoshi, 5,023,181, Cl. 435-189.000.
- Chiu, Philip: *See—*
  - Brunsvold, William R.; Chiu, Philip; Conley, Willard E., Jr.; Crockatt, Dale M.; Montgomery, Melvin W.; and Moreau, Wayne M., 5,023,164, Cl. 430-270.000.
- Chmielinski, Mark A., to HomeCare of Dearborn. Heat and moisture exchanger device for tracheostomy patients. 5,022,394, Cl. 128-207.140.
- Cho, Zang-Hee; and Wong, Edward K., Jr., to Reagents of the University of California, The. Fringe field MRI. 5,023,554, Cl. 324-309.000.
- Choi, Sangsoo, to Korea Electronics & Telecommunications Research Institute et al. Method of patterning fine line width semiconductor topology using a spacer. 5,023,203, Cl. 437-228.000.
- Cholewczynski, Ludwik, to Chrysler Corporation. Valve actuator for overhead camshaft engine. 5,022,360, Cl. 123-90.270.
- Chong, Yong-Bo: *See—*
  - Izumi, Akira; Toei, Keiji; Watanabe, Nobuatsu; and Chong, Yong-Bo, 5,022,961, Cl. 156-646.000.
- Christenberry, Carl C.: *See—*
  - Pockat, Gregory R.; Christenberry, Carl C.; and Satterwhite, Paul J., 5,023,121, Cl. 428-36.900.
- Christie, William: *See—*
  - Schiene, Thomas M.; Christie, William; Johnson, Harold W.; and Black, Robert C., 5,023,178, Cl. 435-170.000.
- Chrysler Corporation: *See—*
  - Cholewczynski, Ludwik, 5,022,360, Cl. 123-90.270.
  - Hammer, Russell C.; Silage, Gregory J.; and Pietron, Casimir P., 5,022,292, Cl. 81-426.000.
  - Horansky, John; and Butkovich, Thomas J., 5,022,692, Cl. 293-128.000
- Chu, David L.: *See—*
  - Wolf, H Alan; and Chu, David L., 5,022,268, Cl. 73-602.000.
- Chua, Nam-Hai: *See—*
  - Lam, Eric; Benfey, Philip N.; Gilmartin, Philip M.; and Chua, Nam-Hai, 5,023,179, Cl. 435-172.300.
- Churchman, Ronald K.; Meaders, Michael W.; and Van Le, Nam, to Otis Engineering Corporation. Annular safety system for gas lift production. 5,022,427, Cl. 137-155.000.
- Ciba-Geigy Corporation: *See—*
  - Gsell, Laurenz, 5,023,259, Cl. 514-256.000.
  - Hubele, Adolf, 5,023,333, Cl. 546-175.000.
  - Puntener, Alois; Lehmann, Urs; Scheibli, Peter; and Koller, Josef, 5,023,274, Cl. 534-618.000.
  - Ravichandran, Ramanathan; and Seltzer, Raymond, 5,023,283, Cl. 524-101.000
  - Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert; Kunze, Brigitte; Hofle, Gerhard; Augustiniak, Hermann; Bedorf, Norbert, Jansen, Rolf; Trowitzsch-Kienast, Wolfram; and Steinmetz, Heinrich, 5,023,184, Cl. 435-252.100.
  - Tzikas, Athanassios; and Aeschlimann, Peter, 5,023,325, Cl. 534-618.000.
  - Tzikas, Athanassios; and Seiler, Herbert, 5,023,326, Cl. 534-638.000.
- Cibeles International, Inc.: *See—*
  - Biass, David, 5,022,125, Cl. 24-136.00R.
- Cimenti, Giovanni: *See—*
  - Lonardi, Emile; Cimenti, Giovanni; and Mailliet, Pierre, 5,022,806, Cl. 414-208.000.
- Cimini, Leonard J.; Habbab, Isam M. I.; and Woodward, Sheryl L., to AT&T Bell Laboratories. Wavelength tunable optical filter. 5,022,730, Cl. 350-96.130.
- Cimini, Leonard J., Jr.; Greenstein, Larry J.; and Saleh, Adel A. M., to AT&T Bell Laboratories. Optical equalization receiver for lightwave communication systems. 5,023,947, Cl. 455-619.000.
- Cimini, Peter D. Individualized flossing mouthpiece assembly and method of preparing and using same. 5,022,417, Cl. 132-323.000.
- Cincinnati Milacron Inc.: *See—*
  - Vaniglia, Milo M., 5,022,952, Cl. 156-441.000.
- Circa Telecommunications Inc.: *See—*
  - Tomes, Alex; and McPhedran, Gordon, 5,023,397, Cl. 174-50.000.
- Citizen Watch Co., Ltd.: *See—*
  - Hoshino, Kazuhiko; and Ishii, Akio, 5,022,793, Cl 406-153.000.
- Clancy, Paul: *See—*
  - Hall, Peter R.; Trebearne, Jack; Parker, Dawood; and Clancy, Paul, 5,022,410, Cl. 128-695.000.
- Clark, Brian R.: *See—*
  - Okarma, Thomas B.; Chang, Chin-Hai; Clark, Brian R.; and Lerch, L. Bernard, 5,022,988, Cl. 210-321.840.
- Clark, Carl E.: *See—*
  - Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganck, Alan G., Lum, James; Mall, Michael G.; Page, David R.; Plambeck, Kenneth E.; Scalzi, Casper A.; and Schmalz, Richard J., 5,023,773, Cl. 364-200.000.
- Clark, Charles R.: *See—*
  - Bielecki, Edwin J.; Romberger, Karl A.; Bakke, Bart F.; Hobin, Martin A.; and Clark, Charles R., 5,023,059, Cl. 423-9.000.
- Clarkson, Douglas; Clifford, Richard P.; and Marshall, Alan, to W. R. Grace & Co.-Conn. Microbiological control agent. 5,023,267, Cl. 514-372.000.
- Claussen, Lennart, to Aktiebolaget Sefors. Radiation detector system. 5,023,456, Cl. 250-374.000.
- Clay, Roy T., Jr., to Whiting Roll-Up Door Mfg Corp. Side lock for a roll-up door. 5,022,691, Cl. 292-121.000.
- Clean-Pak, Inc.: *See—*
  - Rhodes, John C.; Aljoe, Ronald R.; and Ellers, Berne F., 5,022,945, Cl. 156-253.000.
- Clement, Heinz, to Rieter Machine Works, Ltd. Combing machine. 5,022,122, Cl. 19-225.000.
- Clement, Katherine S.: *See—*
  - Babb, David A.; Ezzell, Bobby R.; and Clement, Katherine S., 5,023,380, Cl. 568-34.000.
- Cleveland, Joseph J., to GTE Products Corporation. Cordierite-silicon nitride body. 5,023,215, Cl. 501-98.000.
- Clifford, Richard P.: *See—*
  - Clarkson, Douglas; Clifford, Richard P., and Marshall, Alan, 5,023,267, Cl. 514-372.000.
- Clifton, Richard B., to Minnesota Mining and Manufacturing Company. Twist-on spring connector with breakaway wings. 5,023,401, Cl. 174-87.000.
- Clinton, Peter M.: *See—*
  - Zakheim, Howard; Clinton, Peter M.; Goldschneider, James D.; Kasmer, Christopher A.; Zahn, Markus; and Hoffmeyer, Charles L., 5,022,592, Cl. 241-172.000.
- Cloonan, Thomas J.; Jahns, Jurgen; McCormick, Frederick B., Jr.; and Murdocca, Miles J., to AT&T Bell Laboratories. Crossover network utilizing two-dimensional arrays of nodes. 5,023,864, Cl. 370-1.000.
- Coca-Cola Company, The: *See—*
  - Kirschner, Jonathan; Stembridge, William F.; Stembridge, W. Frank, III; and Deeds, Douglas A., 5,022,233, Cl. 62-138.000.
- Cockings, Peter: *See—*
  - Briant, Geoffrey M.; McDonald, Alistair; Cockings, Peter; and Dhokia, Vijay, 5,023,810, Cl. 364-518.000.
- Cody, George D.; Elzinga, Eugene R., Jr.; and Baker, Charles L., Jr., to Exxon Research and Engineering Company. Passive acoustics process to monitor fluidized bed flow 5,022,266, Cl. 73-579.000.
- Cogema: *See—*
  - Mardon, Jean-Paul; Charquet, Daniel; Perez, Marc; and Senevat, Jean, 5,023,048, Cl. 376-416.000.
- Cohen, Lawrence T.; and Rickards, Field W., to University of Melbourne, The. Evoked response audiometer for testing sleeping subjects. 5,023,783, Cl. 364-413.020.
- Coherent, Inc.: *See—*
  - Hobart, James L.; Sasnett, Michael W.; Mefferd, Wayne S.; and Allen, Peter N., 5,023,886, Cl. 372-99.000.
- Coleman, John R.: *See—*
  - Pugh, Cecil C.; and Coleman, John R., 5,022,713, Cl. 303-1.000.
- Colgate-Palmolive Company: *See—*
  - Morton, Anthony J.; Stewart, Ian W.; and Harvey, Kenneth, 5,023,074, Cl. 424-52.000.
- Collier, John C., to Varian Associates, Inc. High voltage high power DC power supply. 5,023,768, Cl. 363-68.000.
- Coltrin, George E.; and Ilami, Siamak, to Adams & Coltrin, Inc. Quick release latch mechanism. 5,022,690, Cl. 292-21.000.
- Commissariat A L'Energie Atomique: *See—*
  - Blanc, Floreal; and Lordet, Jacques, 5,022,600, Cl. 242-107.100.
- Commissariat a l3 Energie Atomique: *See—*
  - Fages, Jean; de Villepoix, Raymond; Abbes, Claude; and Rouaud, Christian, 5,022,663, Cl. 277-236.000.
- Commonwealth Scientific and Industrial Research Organisation: *See—*
  - Wingate-Hill, Robin; and MacArthur, Ian J., 5,022,446, Cl. 144-208.00F.
- Compagnie des Montres, Longines, Francillon, S.A.. *See—*
  - Vaucher, Frank, 5,023,849, Cl. 368-15.000.
- Compagnie Europeenne du Zirconium dite Cezus: *See—*
  - Mardon, Jean-Paul; Charquet, Daniel; Perez, Marc; and Senevat, Jean, 5,023,048, Cl. 376-416.000.
- Competitive Athletics Technology, Inc.: *See—*
  - Fatool, Wade T., 5,023,128, Cl. 428-172.000.
- Comrie, Paul R.: *See—*
  - Anderson, Carl R.; Comrie, Paul R.; Feder, Peretz M. and Zysman, George I., 5,023,902, Cl. 379-59.000.
- Conax Florida Corporation: *See—*
  - Miller, Francis M., 5,023,556, Cl. 324-439.000.
- Conder, George A.: *See—*
  - Rector, Douglas L.; Conder, George A., and Folz, Sylvester D., 5,023,334, Cl. 546-268.000.
- Condon, Duane R. Liquid dispensing container. 5,022,559, Cl. 222-109.000.
- Conley, Willard E., Jr.: *See—*
  - Brunsvold, William R.; Chiu, Philip; Conley, Willard E., Jr., Crockatt, Dale M.; Montgomery, Melvin W.; and Moreau, Wayne M., 5,023,164, Cl. 430-270.000.
- Conrad, Richard H. Cartridge venturi. 5,023,021, Cl. 261-76.000.
- Conrad, Robert A.: *See—*
  - Gieseke, Bruce A.; Conrad, Robert A., Montanaro, James J.; and Dobberpuhl, Daniel W., 5,023,480, Cl. 307-448.000.
- Conrex Pharmaceutical Corporation: *See—*
  - Hseih, Dean, 5,023,252, Cl. 514-183.000.
- Consi, Michael: *See—*
  - Altemose, George A.; Consi, Michael; Joscelyn, Edwin R.; Wiemann, William; Giguere, David B.; Gully, Wilfred J.; and Spencer, Stanley E., 5,023,531, Cl. 318-471.000.
- Consiglo Nazionale Delle Ricerche: *See—*
  - Mattera, Adriano; Fornari, Roberto; Magnanini, Renato; Paorici, Carolo; Zanotti, Lucio; and Zuccalli, Giovanni, 5,023,801, Cl. 364-480.000.
- Consolier Industries, Inc.: *See—*
  - Shaffer, James E., 5,022,277, Cl. 74-424.8NA.

VOL
1127
ISS
2
JE
11
1991
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- Conti, Albert B.; and Egan, Richard G., to Polaroid Corporation. Programmable limited play video tape cassette. 5,023,741, Cl. 360-132.000.
- Conti, Natale: *See—*
  - Cozzi, Ennio; and Conti, Natale, 5,023,294, Cl. 524-547.000.
- Continental White Cap, Inc.: *See—*
  - Carson, Daniel M., 5,022,545, Cl. 215-230.000.
- Continuous Hose Co.: *See—*
  - Hockett, Wayne B., 5,022,155, Cl. 30-93.000.
- Cook, Ronald L.; and Sammells, Anthony F., to Gas Research Institute. Photoelectrochemical reduction of carbon oxides. 5,022,970, Cl. 204-72.000.
- Cookson Group PLC: *See—*
  - Anseau, Michael R.; Lawson, James M.; and Slasor, Shaun, 5,023,216, Cl. 501-98.000.
- Coons, Robert A., Jr., to Xerox Corporation. Finishing apparatus for use with electronic printers. 5,022,637, Cl. 270-53.000.
- Cooper Industries, Inc.: *See—*
  - Hudson, Sharon J., Jr.; and Taylor, James D., 5,022,376, Cl. 123-572.000.
  - Myers, Wayne K., 5,022,828, Cl. 417-362.000.
  - Nagy, William L., 5,022,881, Cl. 445-7.000.
- Copeland, Tom D., Jr.: *See—*
  - Kilgore, James S., Jr., 5,022,764, Cl. 356-404.000.
- Copley, Stephen M.; Tao, Hongyi; and Todd-Copley, Judith A., to University of Southern California. Etching process for improving the strength of a laser-machined silicon-based ceramic article. 5,022,957, Cl. 156-643.000.
- Coppens, Pierre: *See—*
  - Akrout, Chekib; Coppens, Pierre; Denis, Bernard; and Urena, Pierre-Yves, 5,023,841, Cl. 365-205.000.
- Cordell Manufacturing, Inc.: *See—*
  - Rubow, Keith A.; and Wachel, Robert D., 5,023,610, Cl. 341-51.000.
- Cordier, Georges, to Rhone-Poulenc Chimie. Process for the preparation of trifluoroethanol. 5,023,384, Cl. 568-842.000.
- Corfits, William D.: *See—*
  - Aug, Conrad J.; Casanova, Wayne J.; Corfits, William D.; Dimmick, Roger F.; and Wheeler, Stephen E., 5,023,754, Cl. 361-415.000.
- Cornell Research Foundation, Inc.: *See—*
  - Loveless, Kenneth L., 5,022,693, Cl. 294-1 100.
  - Stanasolovich, David; Allen, Leslie H.; and Mayer, James W., 5,023,201, Cl. 437-192 000.
- Corning France S.A.: *See—*
  - Grateau, Luc; and Prassas, Michel, 5,023,209, Cl. 501-13.000.
- Corning Incorporated: *See—*
  - Aitken, Bruce G., 5,022,921, Cl. 106-38 900.
  - Day, John P.; and Johnson, Timothy V., 5,022,991, Cl. 210-506.000.
  - MacDowell, John F., 5,023,207, Cl. 501-8.000.
- Cornucopia Medical Products, Inc.: *See—*
  - Brennan, Louis G., 5,022,389, Cl. 128-76.00C.
- Corvas, Inc.: *See—*
  - Edgington, T. Scott; and Pepe, Michael G., 5,023,236, Cl. 514-18.000.
- Costa, Larry J, to Valmont Industries, Inc. Ballast connector 5,023,520, Cl. 315-276.000.
- Cosworth Casting Processes Limited: *See—*
  - Smith, Robert A., 5,022,458, Cl. 164-457.000.
- Cote, James L.; and Bowling, Roy E. Separable creeper having a non-planar support surface. 5,022,670, Cl. 280-32.600.
- Coughlan, Joel B.; Farnstrom, Kenneth A.; Harvey, Howard W.; Upton, R. Glen; White, John R.; and Walker, Kenneth L., to Remotec, Inc. Small all terrain mobile robot. 5,022,812, Cl. 414-729.000.
- Coulter Electronics, Inc.: *See—*
  - Spangler, Charles W.; Dominick, George G.; Ross, Edward A.; and Fish, Darrell D., 5,022,547, Cl. 220-234.000.
- Council for Mineral Technology: *See—*
  - Mehmet, Ahmet, 5,023,060, Cl. 423-27.000.
- Cozzi, Ennio; and Conti, Natale, to Presidenza Del Consiglio Dei Ministri. Aqueous dispersions of urethane-acrylic polymers and the use thereof as paints. 5,023,294, Cl. 524-547.000.
- CPM Energy Systems Corporation: *See—*
  - Greeley, Robert H., 5,022,982, Cl 209-12.000.
- Craig, Doyle J., Jr.. *See—*
  - Kilgore, James S., Jr., 5,022,764, Cl. 356-404.000.
- Crane, L. Paul; Lind, H. Clark; and Frederix, Martine E., to Dexter Corporation, The; and Hoechst Celanese Corporation. Nonwoven fibrous web for tobacco filter. 5,022,964, Cl. 162-146.000.
- Crane, Roger M.; and Fischer, Eugene C., to United States of America, Navy. Embedded fiber optic beam displacement sensor. 5,023,845, Cl. 364-505.000.
- Cranston, Robert J., to Lockheed Corporation. Landing gear. 5,022,609, Cl. 244-102.00R.
- Crawford, William L.; and Morton, James M, to CBM Systems Inc Universal signature feeder/conveyor. 5,022,643, Cl. 271-267.000
- Creative Presentations, Inc.: *See—*
  - Nordella, Tim M., and Sieber, William J., 5,022,708, Cl. 297-327.000.
- Crellin, Robert L.: *See—*
  - Wellman, Keith R.; Crellin, Robert L.; and Ostle, William L., 5,022,252, Cl. 72-260.000.
- Cressman, Christopher C.; and Holcomb, David A., to Chef'N Corporation Hand-held can opener. 5,022,159, Cl 30-418.000.
- Crockatt, Dale M.: *See—*
  - Brunsvold, William R.; Chiu, Philip; Conley, Willard E., Jr. Crockatt, Dale M.; Montgomery, Melvin W.; and Moreau, Wayne M., 5,023,164, Cl. 430-270.000.
- Cros, Gerard: *See—*
  - Lazaro, Rene ; Cros, Gerard; McNeill, John H, and Serrano, Jean-Jacques, 5,023,358, Cl. 556-42.000.
- Croucher, Melvin D.: *See—*
  - Drappel, Stephan; Mayo, James D.; and Croucher, Melvin D., 5,023,160, Cl. 430-114.000.
- Crowell, Christopher: *See—*
  - Penick, Ib, 5,022,681, Cl. 281-15.110.
- Crowley, Burlon C.: *See—*
  - Kruse, Uno; Crowley, Burlon C.; and Mardis, Wilbur S., 5,023,309, Cl. 528-49.000.
- Crown Equipment Corporation: *See—*
  - Klopfleisch, Kim A.; and Wellman, Tim A., 5,022,496, Cl. 187-9.00E.
- Crum, Lynn B., to American Labelmark Company. Label-containing package assembly. 5,022,526, Cl. 206-459.000.
- Cryo-Cell International, Inc.: *See—*
  - Knippscheer, Hermann; and Richard, Daniel D., 5,022,236, Cl. 62-529.000.
- Csovak, Erno: *See—*
  - Farkas, Jozsef; Vekony, Sandor; Vekony, Sandorne; Csovak, Erno; and Fodor, Sandor, 5,022,293, Cl. 82-1.110.
- CTS Corporation: *See—*
  - Mitchell, Steven R.; and Daly, Vernon M., Jr., 5,023,599, Cl. 340-467.000.
- Cummings, Daniel G.: *See—*
  - McCaffrey, Robert R.; and Cummings, Daniel G., 5,022,996, Cl 210-654.000.
- Cuomo, Carlo: *See—*
  - Koebler, Douglas J.; Cuomo, Carlo; and Brigati, David J., 5,023,187, Cl. 436-180.000.
- Curry, Joan W.: *See—*
  - Adrion, Robert F.; Curry, Joan W.; and Levine, Robert A., 5,023,785, Cl. 364-413.080.
- Cutler, David N.: *See—*
  - Kehl, Theodore H.; and Cutler, David N., 5,023,827, Cl 364-744.000.
- Cymer Laser Technologies: *See—*
  - Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,023,884, Cl. 372-57.000.
- Cypress Semiconductor Corporation: *See—*
  - Pathak, Jagdish; Douglass, Stephen M.; Vider, Dov-Ami; and Kurkowski, Hal, 5,023,484, Cl. 307-465.000.
- Cziep, Werner; Kuenzel, Ulrich; and Ruh, Wolf-Dieter, to International Business Machines Corporation. Producing viaholes in plastic sheets and application of the method. 5,022,956, Cl. 156-643.000.
- D. D. Williamson & Co., Inc.: *See—*
  - Ramaswamy, Setlur R., 5,023,103, Cl. 426-626.000.
- Da Costa, Caio, to Empresa Brasileira De Compressores S/A - Embraco. Hermetic compressor with crankshaft having eccentric piston portion with hydrodynamic wedge. 5,022,835, Cl. 418-63.000.
- Dagenais, Mario; and Sharfin, Wayne F., to GTE Laboratories Incorporated. Optical bistable devices based on bound exciton nonlinearity. 5,022,741, Cl. 350-353.000.
- Dahlgren, Robert P., to Charles Stark Draper Laboratory, Inc., The Fiber splice coating system. 5,022,735, Cl. 350-96.210.
- Daikin Industries Ltd.: *See—*
  - Yamaoka, Ryohei; Hayashiya, Keizo; Yoshimura, Tohru; Seki, Eiji; Masutani, Tetsuya; and Kitahara, Katsuhiko, 5,023,327, Cl. 536-18.400.
- Dainippon Screen Mfg. Co., Ltd.: *See—*
  - Izumi, Akira; Toei, Keiji; Watanabe, Nobuatsu; and Chong, Yong-Bo, 5,022,961, Cl. 156-646.000.
- Daiwa Seiko, Inc.. *See—*
  - Hashimoto, Hiroshi, 5,022,606, Cl. 242-307.000.
- Dall'Osso, Davide: *See—*
  - Belvederi, Bruno; Ghini, Eranco; and Dall'Osso, Davide, 5,022,415, Cl. 131-84.100.
- Daly, Paul D., to Siemens-Bendix Automotive Electronics L.P. Molded plastic fuel rail for an internal combustion engine. 5,022,371, Cl. 123-468.000.
- Daly, Vernon M., Jr.: *See—*
  - Mitchell, Steven R.; and Daly, Vernon M., Jr., 5,023,599, Cl 340-467.000.
- Dambricourt, Richard: *See—*
  - Badaoui, Mohamed; Dambricourt, Richard; Franquenouille, Jean-Paul; Garcia, Christian; Granger, Yves; and Spalmacin-Roma, Sylvie, 5,023,867, Cl. 370-56.000.
- Daniels, Thomas E. Convertible tethering system. 5,022,351, Cl. 119-124.000.
- Danielson, Orland H.; and Gross, Joseph R., to Whirlpool Corporation Cord reel contacts for a vacuum cleaner. 5,023,410, Cl. 191-12 20R
- Danko, Joseph J.: *See—*
  - Lawrence, Anthony W.; and Danko, Joseph J., 5,022,760, Cl 356-350.000.
- Danno, Yoshiaki: *See—*
  - Kitada, Taizo; Danno, Yoshiaki; Takagi, Masahiko; Uchida, Toshihiko; and Yamamoto, Yutaka, 5,022,664, Cl. 277-236.000.
- Data Pad Corporation: *See—*
  - House, V. Dean, 5,022,170, Cl. 40-358.000.
- Datatool Alarms Limited: *See—*
  - Sirman, James B.; and Foti, Ivan F. S., 5,023,596, Cl. 340-571.000

- Date, Nobuaki; and Saito, Syuichiro, to Canon Kabushiki Kaisha. Image sensing apparatus having plural image sensors and plural shutters. 5,023,723, Cl. 358-225.000.
- Dau, Gary J.; Schiltz, David C.; and Schneider, William R., to Electric Power Research Institute, Inc. Eddy current probe with sensor supporting expandable elastic membrane for inspecting hollow cylindrical structures. 5,023,549, Cl. 324-220.000.
- Daum, Dieter: *See—*
  - Potz, Franz; and Daum, Dieter, 5,022,437, Cl. 138-89.000.
- DaVanzo, John P.; and Paul, Joseph W., Jr., to Hoechst-Roussel Pharmaceuticals Inc. Nerve growth induction, stimulation and maintenance and enzyme potentiation. 5,023,238, Cl. 514-21.000.
- Davcev, Stojan, to Asea Brown Boveri Ltd. Coaxial antenna selector matrix. 5,023,575, Cl. 333-105.000.
- Davenport, John M.: *See—*
  - Allen, Gary R.; Davenport, John M.; and Hansler, Richard L., 5,023,758, Cl. 362-61.000.
- David, Agoston; Kenez nee Da, Marai; and Racz, Istvan, to MTA Kutatasi Eszkozoket Kivitelezo Vallata. Process for measuring and determining zeta-potential in a laminarly flowing medium for practical purposes. 5,022,972, Cl. 204-183.300.
- Davidson, Thomas F.; Spear, Guy B.; and Ludlow, Timothy L., to United States of America, Navy. Thermal insulation chemical composition and method of manufacture. 5,023,006, Cl. 252-62.000.
- Davidson, Wayne A.; and Winter, Diana S., to AT&T Bell Laboratories. Automated call handling apparatus. 5,023,868, Cl. 370-62.000.
- Davies, Norman: *See—*
  - Bratkowski, Walter V.; Bhasavanich, Daun; and Davies, Norman, 5,023,583, Cl. 335-195.000.
- Davis, Alton B. Bookmark apparatus. 5,022,342, Cl. 116-236.000.
- Davis, James D.: *See—*
  - Straub, Martin L.; and Davis, James D., 5,022,702, Cl. 296-181.000.
- Davis, Tommy G., to Edward Weck Incorporated. One-piece plastic towel clamp. 5,022,126, Cl. 24-543.000.
- Dawson, Daniel J.: *See—*
  - Baum, Thomas H.; Brock, Phillip J.; and Dawson, Daniel J., 5,023,360, Cl. 556-117.000.
- Day, John P.; and Johnson, Timothy V., to Corning Incorporated. Thermite coated filter. 5,022,991, Cl. 210-506.000.
- Daye, Ronald E.: *See—*
  - Lee, William L.; McLean, Alexander; and Daye, Ronald E., 5,022,259, Cl. 73-64.200.
- Deal, Samuel B.; and Calamari, James A., Jr., to RCA Licensing Corp. Color CRT-yoke combination having conforming corrective magnetic field means attached to the CRT. 5,023,509, Cl. 313-430.000.
- DeCaussin, David E., to Fadal Engineering Co., Inc. Draw bar mechanism. 5,022,278, Cl. 74-110.000.
- Decker, William, to American Farm Implement & Specialty, Inc. Air-precleaner. 5,022,903, Cl. 55-404.000.
- Deeds, Douglas A.: *See—*
  - Kirschner, Jonathan; Stembridge, William F.; Stembridge, W. Frank, III; and Deeds, Douglas A., 5,022,233, Cl. 62-138.000.
- Deere & Company: *See—*
  - Wanie, Lee J., 5,022,477, Cl. 180-6.340.
- Deering, Richard K., to General Motors Corporation. Vehicle forward sensor antenna steering system. 5,023,617, Cl. 342-70.000.
- Degooyer, Lonnie C. Drainage disk for protecting weep channels of masonry floor drain construction. 5,022,430, Cl. 137-362.000.
- Deguchi, Hiroyuki. *See—*
  - Kita, Hideki; Nakakuma, Akira; Fukui, Hidehiro; and Deguchi, Hiroyuki, 5,023,670, Cl 355-326.000.
- De Haan, Gerrit, to BOC Group plc, The. Vacuum apparatus. 5,022,829, Cl. 417-423.200.
- Deininger, Anton: *See—*
  - Faerber, Karlheinz; Deininger, Anton; Plester, George; Guenther, Manfred; and Troska, Georg, 5,022,558, Cl. 222-105.000.
- Deininger, David D.: *See—*
  - Ocain, Timothy D.; and Deininger, David D., 5,023,338, Cl. 548-336.000.
- Dekany, Gyula; and Frank, Judit, to Chinoin Gyogyszer Es Vegyeszeti Termekek Gyara Rt. Primycin salts. 5,023,242, Cl. 514-31.000.
- de Lange, Raymond D Lighted cooking utensil holder accessory. 5,023,761, Cl. 362-120.000.
- Delco Electronics Corp.: *See—*
  - Simon, Robert C., Jr.; Deutscher, Dale W., Grimm, Charles M., Thompson, Dennis D.; and Bailey, Kirk A., 5,023,778, Cl 364-200.000.
- Delia, Richard: *See—*
  - Lutz, William A.; Wright, John B.; Moss, Noel; and Delia, Richard, 5,023,782, Cl. 364-405.000.
- Delisle, Robert L., Jr.; and Goss, Douglas J., to Delisle, Robert L., Jr. Fuel filler alarm for boats. 5,023,608, Cl 340-984.000.
- Demura, Nobutaka: *See—*
  - Goto, Masayoshi; Demura, Nobutaka; and Osaki, Tsutomu, 5,023,244, Cl. 514-46.000.
- Demura, Takayuki: *See—*
  - Sawada, Hiroshi; Ueda, Tatehito, Nakanishi, Kiyoshi; and Demura, Takayuki, 5,022,225, Cl. 60-274.000.
- De Muro, David M., to Motorola, Inc. Duplexer filter having harmonic rejection to control flyback. 5,023,866, Cl. 370-24.000.
- DenBleyker, James R., to Big Dutchman Cyclone, Inc. Dry feed dispensing device for hogs. 5,022,347, Cl. 119-54.000.
- Den Boef, Johannes H.: *See—*
  - Mehlkopf, Antoon F.; Den Boef, Johannes H.; and Lioen, Rolf J M., 5,023,552, Cl. 324-309.000.
- Dency, George G.; and Caramiciu, Marius A., to Raytheon Company. Programmable volume dispensing apparatus. 5,022,556, Cl. 222-1.000.
- Deniger, David B. Response form processing system. 5,023,435, Cl. 235-375.000.
- Denis, Bernard: *See—*
  - Akrout, Chekib; Coppens, Pierre; Denis, Bernard; and Urena, Pierre-Yves, 5,023,841, Cl. 365-205.000.
- D'Entremont, John R.; Behler, Matthew L.; and Swanson, Gordon S., to Texas Instruments Incorporated. Hermetic motor protector. 5,023,586, Cl. 337-104.000.
- Denz, Helmut; Grieser, Klemens; Stock, Jurgen; Moz, Rudolf; and Uttenweiler, Winifred, to Robert Bosch GmbH. Method for sequentially injecting fuel. 5,022,374, Cl. 123-490.000.
- Deslandes, Mark R. Turn signal auxiliary lever apparatus. 5,022,283, Cl. 74-523.000.
- Desmarteau, Darryl D.; Kotun, Stefan P.; and Malacrida, Alessandro, to Ausimont, S.R.L. Process for preparing fluorinated compounds. 5,023,377, Cl. 564-301.000.
- DeSmidt, Robert G.: *See—*
  - Behlmer, Robert F.; Schanke, Robert L.; and DeSmidt, Robert G., 5,022,951, Cl. 156-379.000.
- Desmond, Betsy J. Book with transparent pages with mirrored images on front and back. 5,022,682, Cl. 281-38.000.
- Desormiere, Bernard: *See—*
  - Maerfeld, Charles; and Desormiere, Bernard, 5,022,731, Cl. 350-96.140.
- Detroit Neurosurgical Foundation: *See—*
  - Muller, George H., 5,022,414, Cl. 128-898.000.
- Detter, Gary C.; Rodondi, Andrew F.; Burns, Christopher D., Norling, Samuel A.; Garretson, Jay H.; and Landries, Richard V., to General Motors Corporation. Electrical power distribution center. 5,023,752, Cl. 361-399.000.
- Dettloff, David E.: *See—*
  - Perdue, Thomas F., Jr.; Bransky, Jeffrey D.; Carvell, William S.; Dettloff, David E.; Ischay, Duane K., and Oberg, Kenneth H., 5,022,689, Cl. 292-19.000.
- Deubelbeiss, Urs: *See—*
  - Ehrat, Rainer; Deubelbeiss, Urs; and Kolliker, Willy, 5,022,208, Cl. 52-586.000.
- Deutsche ITT Industries GmbH: *See—*
  - Heberle, Klaus, 5,023,943, Cl. 455-603.000.
  - Micic, Lyubomir; Gartlein, Gunter; Schmitt, Eberhard, Muller, Axel; Seng, Egon; and Spindler, Siegfried, 5,023,702, Cl. 357-74.000.
  - Reich, Werner, 5,023,609, Cl. 341-50.000.
- Deutscher, Dale W.: *See—*
  - Simon, Robert C., Jr.; Deutscher, Dale W; Grimm, Charles M.; Thompson, Dennis D.; and Bailey, Kirk A., 5,023,778, Cl. 364-200.000.
- de Villepoix, Raymond: *See—*
  - Fages, Jean; de Villepoix, Raymond, Abbes, Claude; and Rouaud, Christian, 5,022,663, Cl. 277-236.000.
- DeVries, Jack; Bailard, James A.; and Hanes, Daniel M., to United States of America, Navy. Undertow reduction system for shoreline protection. 5,022,784, Cl. 405-15.000.
- Dexter Corporation, The: *See—*
  - Crane, L. Paul; Lind, H. Clark; and Frederix, Martine E., 5,022,964, Cl. 162-146.000.
- Dey, Thomas W., to Eastman Kodak Company. Modified Foucault method for uniquely profiling an imaging device. 5,022,753, Cl. 356-124.000.
- Dhokia, Vijay: *See—*
  - Briant, Geoffrey M.; McDonald, Alistair; Cockings, Peter; and Dhokia, Vijay, 5,023,810, Cl. 364-518.000.
- Diafoil Company, Limited: *See—*
  - Sakamoto, Seiji; and Shudo, Nobuyasu, 5,023,291, Cl. 524-430.000
- Diagnospine Research Inc.: *See—*
  - Gracovetsky, Serge; and Frost, Rudolf U., 5,022,412, Cl. 128-781.000.
- Dickey, Eric R.: *See—*
  - Austin, Russell; and Dickey, Eric R., 5,022,726, Cl 350-1.700.
- Diedrichs, Bernd: *See—*
  - Eckardt, Rudolf; and Diedrichs, Bernd, 5,023,403, Cl. 174-94.00R.
- Diehl, Conrad, to Eastman Kodak Company. Film metering apparatus and method. 5,023,640, Cl. 354-173.100.
- Diekevers, Mark S., to Caterpillar Inc. Idler wheel assembly 5,022,718, Cl. 305-24.000.
- Dielectrics Industries: *See—*
  - Pekar, Robert W., 5,022,109, Cl. 5-449.000.
- Dienes, Edward K.. *See—*
  - Williams, David L.; Russ, Karl J.; Dienes, Edward K.; and Laufer, George A., 5,023,225, Cl. 502-304.000.
- DiForte, Mario P. Inflatable life belt. 5,022,879, Cl. 441-113.000.
- Dight, Lawrence B.; Bogert, David C.; and Leskowicz, Mark A, to Engelhard Corporation. Ultra high zeolite content FCC catalysts and method for making same from microspheres composed of a mixture of calcined kaolin clays. 5,023,220, Cl. 502-65.000.
- Digital Equipment Corporation: *See—*
  - Gieseke, Bruce A.; Conrad, Robert A., Montanaro, James J., and Dobberpuhl, Daniel W., 5,023,480, Cl. 307-448.000.
  - Grundmann, William J.; Madden, William C.; and Uhler, George M., 5,023,828, Cl. 364-900.000.
  - Kehl, Theodore H.; and Cutler, David N, 5,023,827, Cl. 364-744.000.
  - Ramakrishna, Kamesh; Billmers, Meyer; and Theriault, Daniel, deceased, 5,023,807, Cl 364-513.000

VOL
1127
ISS
2
JE
11
1991
UMI

- Dillard, Ewell F.; and Burnell, James R., to Tennessee Valley Authority. Stabilized ammonium orthophosphate suspensions. 5,022,913, Cl. 71-34.000.
- Dimmick, Roger F.: *See—*
  - Aug, Conrad J.; Casanova, Wayne J.; Corfits, William D.; Dimmick, Roger F.; and Wheeler, Stephen E., 5,023,754, Cl. 361-415.000.
- Ding, Maynard G., to Union Carbide Industrial Gases Technology Corporation. Combustion method for improved endothermic dissociation. 5,022,332, Cl. 110-346.000.
- Dingwall, Andrew G. F., to Harris Semiconductor Patents, Inc. Decoder error prevention apparatus for use in flash analog-to-digital converters. 5,023,613, Cl. 341-118.000.
- di Palma, Giorgio, to IMED Corporation. Ball valve. 5,022,422, Cl. 137-15.000.
- D'Iribarne, Benoit: *See—*
  - Vanaschen, Luc; Kuster, Hans-Werner; Havenith, Hubert; and D'Iribarne, Benoit, 5,022,906, Cl 65-104.000.
- Di Simone, I. Sergio: *See—*
  - Kneller, James F.; Fair, Barbara E.; Mazzani, Gianfranco F.; and Di Simone, I. Sergio, 5,023,000, Cl. 210-697.000.
- Dittmar, Walter: *See—*
  - Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans-Georg; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 5,023,357, Cl. 544-132.000.
- DiVincenzo, David P.; Lee, Kim Y.; and Smith, Theoren P., III, to International Business Machines Corporation. Microstructures which provide superlattice effects and one-dimensional carrier gas channels. 5,023,671, Cl. 357-4.000.
- Divsalar, Dariush; and Simon, Marvin K., to California Institute of Technology. Trellis coded multilevel DPSK system with doppler correction for mobile satellite channels. 5,023,889, Cl. 375-27.000.
- Djokic, Slobodan: *See—*
  - Narandja, Amalija; Suskovic, Bozidar; Djokic, Slobodan; and Lopotar, Nevenka, 5,023,240, Cl. 514-30.000.
- Djordjevic, Bozidar, to Research Foundation of State University of New York, The. Predictive assay for tumor control. 5,023,172, Cl. 435-29.000.
- Dobberpuhl, Daniel W.: *See—*
  - Gieseke, Bruce A.; Conrad, Robert A.; Montanaro, James J.; and Dobberpuhl, Daniel W., 5,023,480, Cl. 307-448.000.
- Dr Ing. h.c.F. Porsche AG: *See—*
  - Heizmann, Helmut, 5,022,281, Cl. 74-473.00R.
- Doduco GmbH & Co. Dr. Eugen Durrwachter: *See—*
  - Uhl, Gunter, 5,023,467, Cl. 307-10.100.
- Doheny, Anthony J., Jr.; and Noonan, James R., to Kendall Company, The. Closure device for shrinkwraps. 5,022,941, Cl. 156-85.000.
- Doi, Akira: *See—*
  - Sugihara, Hirosi; Hidaka, Hiroshi; Doi, Akira; Okawauchi, Toshitaka; Kawabata, Yasushi; and Baba, Hideki, 5,023,101, Cl 426-603.000.
- Doi, Yoshinao; and Matsumura, Haruo, to Asahi Kasei Kogyo Kabushiki Kaisha. Polyvinylidene fluoride porous membrane and a method for producing the same. 5,022,990, Cl 210-500.420.
- Dolan, Clarence F.: *See—*
  - Walton, Derrick N.; Dolan, Clarence F.; and Shah, Mahesh J., 5,023,540, Cl. 322-58.000.
- Dolby, Debra J.: *See—*
  - Schreck, John F.; and Dolby, Debra J , 5,023,837, Cl. 365-185.000.
- Dominick, George G.: *See—*
  - Spangler, Charles W., Dominick, George G., Ross, Edward A.; and Fish, Darrell D., 5,022,547, Cl. 220-234.000.
- Dompe Farmaceutici S.p.A : *See—*
  - Roberto, Giani; Ettore, Parini; Massimiliano, Borsa: and Antonio, Lavezzo, 5,023,256, Cl. 514-253.000
- Donnelly, Kim F.; and Gluck, Kurt A., to Bell Communications Research, Inc. Method and apparatus for selectively processing paginated output. 5,023,811, Cl. 364-518.000.
- Donovan, Sean P.: *See—*
  - Rogerson, William E.; and Donovan, Sean P., 5,022,676, Cl. 280-743.000.
- Doral Technical Services, Inc.: *See—*
  - Cabell, Paul, 5,023,784, Cl. 364-413.070.
- Dorogy, William E., Jr ; and St. Clair, Anne K., to United States of America, National Aeronautics and Space Administration. Wet spinning of solid polyamic acid fibers. 5,023,034, Cl 264-184.000.
- Doryokuro Kakunenryo Kaihatsu Jigyodan: *See—*
  - Watanabe, Kenshiu; and Tamayama. Kiyoshi. 5,023,045, Cl. 376-215.000.
- Dougherty, Lawrence W.; and Roberts, William N., to Zenith Electronics Corporation. Tension mask color cathode ray tube with improved color selection electrode support structure. 5,023,507, Cl. 313-407.000.
- Douglas, Kurt P.; and Chern, Wen-Foo, to Micron Technology, Inc. High efficiency charge pump circuit. 5,023,465, Cl. 365-203.000.
- Douglas, Lawrence M., to Polaroid Corporation. Pivotally mounted spread roller assembly. 5,023,636, Cl. 354-86.000.
- Douglass, Stephen M.: *See—*
  - Pathak, Jagdish, Douglass, Stephen M.; Vider, Dov-Ami; and Kurkowski, Hal, 5,023,484, Cl. 307-465.000.
- Dow Chemical Company, The: *See—*
  - Babb, David A., Ezzell, Bobby R.; and Clement, Katherine S., 5,023,380, Cl. 568-34.000.
  - Hallworth, Gerald, 5,022,948, Cl. 156-291.000
  - West, David H.; Hebert, Lawrence A.; Bowlin, Roger L.; and Holbrook, Michael T., 5,023,387, Cl. 570-252.000.
  - Zieke, Larry M., 5,022,530, Cl. 206-618.000.
- Dow Corning Corporation: *See—*
  - Burns, Gary T., 5,023,307, Cl. 528-29.000.
- Dower, William V.: *See—*
  - Kluy, Dennis J.; Zwadlo, Gregory L.; Marty, John L., and Dower, William V., 5,023,668, Cl. 355-281.000.
- Dowey, Mark E.: *See—*
  - Stevens, William P.; and Dowey, Mark E., 5,023,126, Cl. 428-126.000.
- Dowle, Michael D.; Middlemiss, David; Finch, Harry; Naylor, Alan; and Lunts, Lawrence H. C., to Glaxo Group Limited. Amine derivatives. 5,023,378, Cl. 564-340.000.
- Dragerwerk Aktiengesellschaft: *See—*
  - Heckmann, Johannes, 5,023,055, Cl. 422-83.000.
- Draghetti, Fiorenzo; and Gamberini, Antonio, to G.D. Societa Per Azioni. Machine for wrapping substantially parallelepiped commodities. 5,022,213, Cl. 53-234.000.
- Drake, Richard G., to United States of America, Navy. Feedthrough radio frequency filter. 5,023,577, Cl. 333-182.000.
- Drappel, Stephan; Mayo, James D.; and Croucher, Melvin D., to Xerox Corporation. Liquid developer compositions. 5,023,160, Cl. 430-114.000.
- Drell, William. Azarbine composition. 5,023,083, Cl. 424-439.000.
- Dresser Industries, Inc.: *See—*
  - Eckman, Richard E., 5,022,798, Cl. 408-1.00R.
  - Prescott, Robert C.; and Robinson, Robert J., 5,022,425, Cl. 137-82.000.
- Drobny, Wolfgang; Nitschke, Werner; Taufer, Peter; and Weller, Hugo, to Robert Bosch GmbH. Safety device for car passengers. 5,023,468, Cl. 307-10.100.
- Drucker, Frank: *See—*
  - Szklany, Craig R.; and Drucker, Frank, 5,023,600, Cl. 340-572.000.
- Dry Forming Processes AB: *See—*
  - Rhodes, John C.; Aljoe, Ronald R.; and Ellers, Berne F., 5,022,945, Cl. 156-253.000.
- DuBois, R. Clark. Document feeder with improved recyclable document control. 5,022,639, Cl. 271-3.000.
- Dubots, Dominique; and Toulouse, Pierre, to Pechiney Electrometallurgie. Electrically melted multiphase material based on alumina and aluminium oxycarbide and oxynitride. 5,023,212, Cl. 501-87.000.
- Dubuc, Joe P.: *See—*
  - Grover, Wayne D.; Fong, Tommy; Dubuc, Joe P., Krzymien, Witold A.; and Fraser, George D., 5,023,869, Cl. 370-84.000.
- Ducourant, Thierry, to U.S. Philips Corporation. IC D-type master/slave flip-flop. 5,023,475, Cl. 307-272.200.
- Ducroo, Paul, to Gist-Brocades N.V. Production of glucose syrups and purified starches from wheat and other cereal starches containing pentosans. 5,023,176, Cl. 435-105.000.
- Ductmate Industries, Inc.: *See—*
  - Arnoldt, Peter J., 5,022,688, Cl. 285-363.000.
- Duffin, Henry: *See—*
  - Golding, Peter; Jayaweera-Bandara, Asoka M ; and Duffin, Henry, 5,023,386, Cl. 568-931.000.
- Duffy, Thomas F. Adjustable locking wrench. 5,022,290, Cl. 81-355.000.
- Dufour, Jean F.: *See—*
  - Bounias, Michel; and Dufour, Jean F., 5,023,359, Cl. 556-114 000.
- Dumoulin, Charles L., to General Electric Company. Multiple-echo NMR angiography with multiple-velocity images. 5,022,397, Cl. 128-653.0AF.
- Dumoulin, Charles L., to General Electric Company. Multiple-echo NMR angiography for enhancement of signal-to noise ratio 5,022,398, Cl. 128-653.0AF
- Du Moulin, Edward. Mulcher. 5,022,220, Cl. 56-16.900.
- Dundas, Dennis L.; Moore, Eugene L.; Oles, Paul M.: and Briggs, Milton, to Graham Engineering Corporation. Sealed bottle 5,022,544, Cl. 215-31.000.
- Dunford, Joseph R.; Champlin, George, and Sylvia, Milton. Lantern ring coil. 5,022,660, Cl. 277-9.000.
- Dunn, John P.: *See—*
  - Canale, Joseph E.; Dunn, John P., and Narby, William R , 5,023,506, Cl. 313-25.000.
- Du Pont de Nemours, E. I., and Company: *See—*
  - Bhatia, Kamlesh K., 5,023,349, Cl. 549-274.000.
  - Bhatia, Kamlesh K., 5,023,350, Cl. 549-274.000.
  - Buckmaster, Marlin D., and Randa, Stuart K., 5,023,279, Cl 521-85.000.
  - Hommes, William J.; and Schmidt, Alfred J., 5,022,297, Cl 83-35.000.
  - Hsu, Che-Hsiung, 5,023,231, Cl. 505-1.000.
  - Krespan, Carl G., 5,023,362, Cl. 560-183.000.
  - Kwok, Wo K., 5,023,131, Cl. 428-288.000.
  - Merchant, Abid N., 5,023,009, Cl. 252-171.000.
  - Merchant, Abid N., 5,023,010, Cl. 252-171.000
  - Morganti, Steven J.; and Thirtle, James H., 5,023,129, Cl 428-195.000.
  - Shin, Hyunkook, 5,023,025, Cl. 264-13.000
  - Simpson, Penny C., and Smith, Larry M., 5,023,130, Cl 428-227.000.
  - Willey, Monroe M., 5,023,141, Cl. 428-458.000.
  - Yang, Hung H., 5,023,035, Cl. 264-184.000.
  - Zakheim, Howard; Clinton, Peter M.; Goldschneider, James D., Kasmer, Christopher A., Zahn, Markus; and Hoffmeyer, Charles L., 5,022,592, Cl. 241-172.000.

- Dupont, Regis: *See—*
  - Langer, Salomon Z.; Frost, Jonathan R.; Schoemaker, Johannes; Gaudilliere, Bernard; Bertin, Jean; Rousseau, Jean; Dupont, Regis; and Wick, Alexander E., 5,023,266, Cl. 514-317.000.
- DuRoss, James W., to ICI Americas Inc. Mannitol having gamma sorbitol polymorph. 5,023,092, Cl. 426-3.000.
- D'Urso, Carmelo, to Xeda International. Unit for grading produce, such as fruits. 5,022,532, Cl. 209-564.000.
- Dussack, Laurie L.: *See—*
  - Shehad, Noel S.; Dussack, Laurie L.; and van Hemelrijk, Dirk, 5,023,376, Cl. 564-298.000.
- Dutton-Lainson Company: *See—*
  - Barkouskie, Ronnie, 5,022,573, Cl. 224-42.210.
- Duttweiler, Donald L.: *See—*
  - Chamzas, Christodoulos; and Duttweiler, Donald L., 5,023,611, Cl. 341-51.000.
- Duvierre, Gerard; and Recasens, Joseph, to Societe Europeenne des Produits Refractaires. Feeder trough for transferring molten glass from a furnace to a forming station. 5,022,910, Cl. 65-325.000.
- E. M B. Corporation: *See—*
  - Staples, Paul R., 5,023,413, Cl. 200-61 760.
- E. R. Carpenter Company, Inc.: *See—*
  - Fenner, William G., Sr , 5,022,111, Cl. 5-481.000.
- E-Systems, Inc.: *See—*
  - Boardman, John D.; Sadler, Jimmie L.; and Trimble, Richard A., 5,023,463, Cl. 250-551.000.
- Eagle Industry Co., Ltd.: *See—*
  - Sakamari, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi, and Tanzawa, Kenji, 5,022,842, Cl. 418-257.000.
- Eagle, Military Gear Overseas Ltd.: *See—*
  - Bar-Yona, Itzchak; and Bar-Sela, Gad, 5,022,900, Cl. 55-316.000.
- Eagon, James F. BNB clamp. 5,022,684, Cl. 285-12.000.
- Eastman Kodak Company: *See—*
  - Aslam, Muhammad; Farnand, Thomas J.; and Tamary, Ernest J., 5,023,038, Cl. 264-293.000.
  - Dey, Thomas W., 5,022,753, Cl. 356-124.000.
  - Diehl, Conrad, 5,023,640, Cl. 354-173.100.
  - Erhardt, Herbert J., 5,023,711, Cl. 358-76.000.
  - Evans, Steven; and Chapman, Derek D., 5,023,229, Cl. 503-227.000.
  - Grady, Ralph E., 5,022,524, Cl. 206-395.000.
  - Green, Michael H., 5,022,645, Cl. 271-276.000.
  - Henzel, Richard P., 5,023,228, Cl. 503-227.000.
  - Kessler, David; and Baldwin, Roger E., 5,023,448, Cl. 250-235.000.
  - Nealon, James V., 5,023,635, Cl. 354-76.000.
  - Pagano, Daniel M., 5,023,642, Cl. 354-275.000.
- Eaton Corporation: *See—*
  - Benveniste, Victor M.; and McIntyre, Edward K., Jr., 5,023,458, Cl. 250-396.00R.
  - Breen, Michael T., 5,022,714, Cl. 303-7.000.
  - Eckenrode, Robert T., 5,023,759, Cl. 362-66.000.
  - Kenny, Andrew A., and Stahly, Daniel C., 5,022,368, Cl. 123-342.000.
- Ebara, Takeshi; Sasaki, Toshio; and Kawai, Kiyoshi, to Sumitomo Chemical Company, Limited. Process for producing highly stereospecific alpha-olefin polymers. 5,023,223, Cl. 502-116.000.
- Ebata, Shuji: *See—*
  - Abe, Takafumi; Ebata, Shuji; Machida, Hiroshi; and Kida, Koichi, 5,023,390, Cl. 585-320.000.
- Ebata, Tokihide; and Onoda, Shigeyoshi, to Canon Kabushiki Kaisha. Image bearing member and driving mechanism therefor. 5,023,660, Cl. 355-200.000.
- Ebberg, Alfred: *See—*
  - Auracher, Franz; Ebberg, Alfred; Noll, Bernd; Meissner, Eckhard; and Rodler, Hermann J., 5,023,949, Cl. 455-618.000.
- Ebbing, David M.: *See—*
  - Shontz, Kimball C.; Gavlak, Michael A.; and Ebbing, David M., 5,022,313, Cl. 92-248.000.
- ECC America Inc.: *See—*
  - Raythatha, Rasik H.; Suitch, Paul R.; and Andrews, E. Wayne, 5,022,924, Cl. 106-486.000.
- Eckardt, Rudolf; and Diedrichs, Bernd, to Flachglas Aktiengesellschaft. Device for connecting an electrical cable to a window pane having electrical conductors. 5,023,403, Cl. 174-94.00R.
- Eckart, Donald W.: *See—*
  - Branovich, Louis E.; Freeman, Gerard L.; Eckart, Donald W.; and Smith, Bernard, 5,022,883, Cl. 445-50.000.
- Eckenhoff, James B.: *See—*
  - Wong, Patrick S. L.; Theeuwes, Felix; Eckenhoff, James B.; Larsen, Steven D.; and Huynh, Hoa T., 5,023,088, Cl. 424-473.000.
- Eckenrode, Robert T., to Eaton Corporation. Vehicle headlight position adjustment assembly. 5,023,759, Cl. 362-66.000.
- Eckhardt, Gunter: *See—*
  - Hensel, Bernd; Kopacz, Uwe; Hofmann, Dieter; Schussler, Hans; and Eckhardt, Gunter, 5,022,978, Cl. 204-298.190.
- Eckman, Richard E., to Dresser Industries, Inc. Thrust-responsive two-speed drill and method of operation. 5,022,798, Cl. 408-1.00R.
- Eddio Corporation: *See—*
  - Yamazaki, Makoto; Ueda, Kazumi; Isobe, Shinichi; and Sato, Katsunari, 5,023,550, Cl. 324-262.000.
- Edelhoff M.S.T.S. GmbH: *See—*
  - Bock, Normann, 5,022,546, Cl. 220-4.030.
- Edelmayer, Thomas C., to Teledyne Industries, Inc. Rotor attachment assembly. 5,022,823, Cl. 416-244.00A.
- Eden, Alec, to Eden Medizinische Elektronik GmbH Apparatus for positioning a measuring element. 5,022,401, Cl. 128-662.030.
- Eden, James G.; and Kushner, Mark J., to United States of America, Air Force. Miniature, optically pumped narrow line solid state laser. 5,023,877, Cl. 372-7.000.
- Eden Medizinische Elektronik GmbH. *See—*
  - Eden, Alec, 5,022,401, Cl. 128-662.030.
- Edgington, T. Scott; and Pepe, Michael G., to Corvas, Inc. Factor VII/VIIA active site inhibitors. 5,023,236, Cl. 514-18.000
- Edward Weck Incorporated: *See—*
  - Davis, Tommy G., 5,022,126, Cl. 24-543.000.
- Edwards, Allen V., to Edwards, Allen V. Anti-theft control apparatus. 5,023,591, Cl. 340-426.000.
- Edwards, Bill R. Acrylic resin composition. 5,023,313, Cl. 524-166.000.
- EerNisse, Errol P.; Ward, Roger W., and Wood, O. Lew, to Quartztronics, Inc. Method of manufacturing crystal resonators having low acceleration sensitivity. 5,022,130, Cl. 29-25.350.
- Efferding, Gary. Flexible mold for making seamless sailboards. 5,023,042, Cl. 264-511.000.
- EFI Electronics Corporation: *See—*
  - Lindsay, Roger K., 5,023,747, Cl. 361-117.000.
- Eften, Inc.: *See—*
  - Zaima, Harold H., 5,022,943, Cl. 156-222.000.
- Egan, Richard G.: *See—*
  - Conti, Albert B.; and Egan, Richard G., 5,023,741, Cl. 360-132.000.
- Ehnholm, Gosta J., to Instrumentarium Corporation. Magnetic resonance imaging. 5,023,555, Cl. 324-318.000.
- Ehrat, Rainer; Deubelbeiss, Urs; and Kolliker, Willy, to Swiss Aluminium Ltd. Butt joints for panels and/or sections. 5,022,208, Cl 52-586.000.
- Ehrman, Albert M.; Seiden, Paul; Weitzel, Rose M ; and White, Robert L., to Procter & Gamble Co., The. Process for tempering flavored confectionery compositions containing reduced calorie fats and resulting tempered products. 5,023,106, Cl. 426-660.000.
- Eich, Manfred; Rau, Norbert; and Wendorff, Joachim, to Rohm GmbH Chemische Fabrik. Optical data storage apparatus and method utilizing an amorphous polymer which exhibits photochromic properties 5,023,859, Cl. 365-113.000.
- Eick, Christopher D.: *See—*
  - Hoopes, Jay N.; Eick, Christopher D.; and Williamson, John R., 5,022,228, Cl. 60-734.000.
- Eino, Teruo: *See—*
  - Sakiyama, Katsunori; Sato, Tomoaki, and Eino, Teruo, 5,022,383, Cl. 128-6.000.
- Eklund, Louis E., Jr., to Fleet Engineers, Inc. Spray-suppressant splash guard for vehicles. 5,022,680, Cl. 280-851.000.
- El-Op Electro-Optics Industries: *See—*
  - Shechterman, Mark, 5,022,724, Cl. 350-1.300.
- Electric Power Research Institute, Inc.. *See—*
  - Dau, Gary J.; Schiltz, David C., and Schneider, William R., 5,023,549, Cl. 324-220.000.
- Electro-Films, Inc.: *See—*
  - Hall, Allen T., 5,023,589, Cl. 338-308.000.
- Electrolux Research & Innovation Aktiebolag: *See—*
  - Bergquist, Per-Marcus; and Troberg, Henrik E., 5,023,587, Cl. 337-123.000.
- Electromed International Ltd.: *See—*
  - Beland, Robert, 5,023,769, Cl. 363-86.000.
- Electron Fusion Devices, Inc.: *See—*
  - Marchitto, Michael; and Lord, Steven F., 5,022,563, Cl. 222-327.000.
- Elenewski, Allen. Method of forming curved transparent cellulose diacetate visor having silk screened electric heating conductor. 5,023,023, Cl. 264-1.700.
- Elgood, Mark C.; and Jales, Richard J., to Sigmex Limited. Raster graphical display apparatus. 5,023,602, Cl. 340-701.000.
- El-Hamamsy, Sayed-Amr A.; and Jernakoff, George, to General Electric Company. Driver for a high efficiency, high frequency Class-D power amplifier. 5,023,566, Cl. 330-251.000.
- Eli Lilly and Company: *See—*
  - Robertson, David W.; Wong, David T.; and Krushinski, Joseph H., Jr., 5,023,269, Cl. 514-438.000.
- Elitex Koncern Textilniho Strojirenstvi: *See—*
  - Velechovsky, Petr, 5,022,440, Cl. 139-116.200.
- Ellers, Berne F.: *See—*
  - Rhodes, John C.; Aljoe, Ronald R.; and Ellers, Berne F., 5,022,945, Cl. 156-253.000.
- Ellis, Frank; Naylor, Alan; Wallis, Christopher J.; and Waterhouse, an, to Glaxo Group Limited. Chemical compounds. 5,023,255, Cl. 514-242.000.
- Elzinga, Eugene R., Jr.: *See—*
  - Cody, George D.; Elzinga, Eugene R., Jr.; and Baker, Charles L., Jr., 5,022,266, Cl. 73-579.000.
- Emanuel, George: *See—*
  - Jacobs, Theodore A.; and Emanuel, George, 5,023,883, Cl. 372-56.000.
- Emerson Electric Co.: *See—*
  - Brown, Bernard T., 5,022,460, Cl. 165-12.000.
- Empire Brushes, Inc.: *See—*
  - Bryant, William C.; and Lowe, Robert K., 5,022,349, Cl. 119-57.800.
- Empresa Brasileira De Compressores S/A - Embraco: *See—*
  - Da Costa, Caio, 5,022,835, Cl. 418-63.000.
- Endo, Hiroshi: *See—*
  - Hosoya, Hideo; Kimura, Masayuki; Endo, Hiroshi; Hiraki, Yoshio; Yamamoto, Shoji; Yoshikawa, Satoshi; Omine, Hidetaka; and Miyazaki, Koji, 5,023,175, Cl. 435-101.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Endo, Kenichi: *See—*
  - Koga, Yoshiro; Gomi, Akihiro; Miyasaka, Takashi; Miyazawa, Yasunaga; Endo, Kenichi; Shinozaki, Junichiro; Yoda, Kaneo; Ichikawa, Takashi; Miyasaka, Hitoshi; and Kaburagi, Chiharu, 5,023,733, Cl. 360-77.040.
- Endou, Michio: *See—*
  - Mitsuya, Teruaki; Fujiwara, Shigetaka; Endou, Michio; and Terakado, Akira, 5,023,464, Cl. 355-283.000.
- Energy Absorption Systems, Inc.: *See—*
  - Gertz, David C.; and Krage, William G., 5,022,782, Cl 404-6.000.
- Energy Research Corporation: *See—*
  - Charkey, Allen; and Januszkiewicz, Stanley, 5,023,155, Cl. 429-223.000.
- Engan, Helge E.; Kim, Byoung Y.; Blake, James N.; and Shaw, Herbert J., to Leland Stanford Junior University, The Board of Trustees of the. Fiber optic intermode coupling single sideband frequency shifter. 5,022,732, Cl. 350-96.150.
- Engel, Jurgen: *See—*
  - Schumacher, Wolfgang; Respondek, Johannes, Engel, Jurgen; Pohl, Jorg; Voegeli, Rainer; and Hilgard, Peter, 5,023,335, Cl. 548-104.000.
- Engelbach, Brian W., to Therm-O-Disc, Incorporated. Bubbler valve. 5,022,432, Cl 137-495.000.
- Engelhard Corporation: *See—*
  - Dight, Lawrence B.; Bogert, David C.; and Leskowicz, Mark A., 5,023,220, Cl. 502-65.000.
  - Yarrington, Robert M.; and Buchanan, William, 5,023,276, Cl. 514-703.000.
- England, Melvin G., to Thorn Microwave Devices Limited. Coaxial magnetrons with dielectrically loaded output cavity 5,023,514, Cl. 315-39.510.
- English, Daniel R.: *See—*
  - Buntrock, Kermit A.; English, Daniel R.; and Jones, Wescomb R., 5,022,920, Cl. 106-38.300.
- English, George A.: *See—*
  - Grey, Thaddeus J.; Kirton, Raymond E.; English, George A ; Liggett, Michael D.; Meyer, Karen M.; and Barker, Charles J., 5,022,431, Cl. 137-375.000.
- English, James H , to General Motors Corproation Battery terminal protector. 5,023,154, Cl. 429-182.000.
- Eno, Timothy R.: *See—*
  - Lorton, Tina L. E.; and Eno, Timothy R . 5,023,637, Cl 354-106.000.
- Ensco, Inc.: *See—*
  - Robertson, James C., 5,022,328, Cl. 110-232.000.
- Ensign, Thomas R., to Boeing Company, The. Retracting ramp toe. 5,022,610, Cl. 244-118.300.
- Enso-Gutzeit Oy: *See—*
  - Orivuori, Juhani, 5,022,962, Cl. 162-29 000
- Environwear, Inc.: *See—*
  - Brekkestran, Kevin L.; and Batcheller, Barry D., 5,023,430, Cl 219-486.000.
- Epitope, Inc.: *See—*
  - Goldstein, Andrew S.; Thieme, Thomas R.; and Gavojdea, Stefan, 5,022,409, Cl. 128-760.000.
- Epstein, Barry M. Suppression of transients by current sharing. 5,023,746, Cl. 361-56.000.
- Erdman, David M.; Beatty, James A., and Patel, Amritlal H., to General Electric Company. Control circuits, electronically commutated motor systems and methods. 5,023,527, Cl. 318-254.000.
- Erhardt, Herbert J., to Eastman Kodak Company. Line scanning apparatus using staggered linear segments with adjoining overlap regions. 5,023,711, Cl. 358-76.000.
- Erickson, Frank L.; Anderson, Robert E.; and Landis, Phillip S. Meadowfoam oil and meadowfoam oil derivatives as lubricant additives. 5,023,312, Cl. 558-160.000.
- Erickson, Frederick L.; and Richeson, William E., to North American Philips Corporation. Actuator with energy recovery return. 5,022,359, Cl. 123-90.140.
- Erico International Corporation: *See—*
  - Glass, John C., 5,023,745, Cl 361-56.000.
- ESAB Welding Products, Inc.: *See—*
  - Severance, Wayne S., Jr., 5,023,425, Cl. 219-121 590.
- Eschauzier, Francois R.; and Lim, Guy H., to Hunter Douglas International N V. Method and apparatus for the automatic manufacture of portions of a given length of strip material having a repetitively patterned surface. 5,022,296, Cl. 83-27.000.
- Eskofot A/S: *See—*
  - Busch-Sorensen, Thomas, 5,023,846, Cl 367-127.000.
- Esmet, Inc.: *See—*
  - Shaw, Charles R., 5,022,780, Cl. 403-275.000.
- Espirito Santo, Antonio F., to Metagal Industria e Comercia Ltda. Support for an external rearview mirror for motor vehicles. 5,022,748, Cl. 350-639.000.
- Esselte Meto International Produktions GmbH *See—*
  - Koch, Ulf, 5,023,628, Cl. 346-76.0PH.
- Essex Group, Inc.: *See—*
  - Brown, Lewis M., 5,023,558, Cl. 324-515.000.
- ETA SA Fabriques d'Ebauches: *See—*
  - Stampfli, Jean-Marcel, 5,023,751, Cl. 361-398.000
- Etemad, Shahrokh; Yannascoli, Donald, Fraser, Howard H., Jr.; and Lane, William R., to Carrier Corporation. Scroll compressor with enhanced discharge port. 5,022,834, Cl. 418-55.100.
- Ethyl Corporation: *See—*
  - Fisher, Hugh A.; Landry, Susan D , and Smith, Troy L., Jr., 5,023,278, Cl. 521-85.000.
- Etter, D. Christopher. Transmission means. 5,022,876, Cl. 440-63.000.
- Ettore, Parini: *See—*
  - Roberto, Giani; Ettore, Parini; Massimiliano, Borsa; and Antonio, Lavezzo, 5,023,256, Cl. 514-253.000.
- European Coal and Steel Community: *See—*
  - Goutte, Robert; Jacquemod, Gilles; and Odet, Christophe, 5,023,921, Cl. 382-58.000.
- Euy, Hong C.: *See—*
  - Yeol, Ryu M.; Ki, Ryu D.; Kyun, Yun D.; Kyu, An J.; Kuk, Hong S.; Euy, Hong C.; and Sun, Ryu S., 5,022,520, Cl. 206-315.100.
- Evans, Alfred G., to United States Surgical Corporation. Apparatus and method for testing the bending strength of needles. 5,022,273, Cl 73-849.000.
- Evans, Barry L.: *See—*
  - Horch, Kenneth W.; Fisher, John H.; and Evans, Barry L., 5,022,407, Cl. 128-739.000.
- Evans, Larry R.; Waddell, Walter H., Harris, Frank W.; and Benko, David A., to Goodyear Tire & Rubber Company, The. Rubber containing matrix-antidegradants. 5,023,287, Cl. 524-255.000.
- Evans, Steven; and Chapman, Derek D., to Eastman Kodak Company Mixture of dyes for magenta dye donor for thermal color proofing 5,023,229, Cl. 503-227.000.
- Eveanowsky, Stanley J., Jr.; and Whitley, Mark J. Horn. 5,022,341, Cl. 116-142.0FP
- Evelyn-Veere, Rene H., to Rainbird Sprinkler Mfg. Corp. Irrigation control and flow management system. 5,023,787, Cl. 364-420.000.
- Everhart, Richard; Bosomworth, Paul; Butcher, Kenneth; and Hoffmann, Matthias, to Swiss Aluminum Ltd. Ceramic bodies formed from partially stabilized zirconia. 5,023,217, Cl. 501-103.000.
- Exar Corporation: *See—*
  - Gianella, Piccolo G., 5,023,194, Cl. 437-31.000.
- Explosive Fabricators, Inc.: *See—*
  - Hingorany, Prem R., 5,022,144, Cl. 29-854.000.
- Exxon Chemical Patents, Inc.: *See—*
  - Benvenuti, Manuela; and Lenz, Robert W., 5,023,316, Cl 528-357.000.
  - Huff, Terrence; and McAlpin, James J., 5,023,300, Cl. 525-194.000.
- Exxon Research and Engineering Company: *See—*
  - Cody, George D.; Elzinga, Eugene R., Jr.; and Baker, Charles L., Jr., 5,022,266, Cl. 73-579.000.
  - Serrand, Willibald, 5,023,069, Cl. 423-574.00R.
  - Thaler, Warren A.; Brois, Stanley J.; and Hall, Henry K., 5,023,005, Cl. 252-47.500.
  - Wolf, H. Alan; and Chu, David L., 5,022,268, Cl. 73-602.000.
- Ezel, Inc.: *See—*
  - Kumagai, Ryohei, 5,023,729, Cl. 358-457.000.
- Ezzell, Bobby R.: *See—*
  - Babb, David A.; Ezzell, Bobby R., and Clement, Katherine S., 5,023,380, Cl. 568-34.000.
- Fadal Engineering Co., Inc.: *See—*
  - DeCaussin, David E., 5,022,278, Cl. 74-110.000.
- Faerber, Karlheinz; Deininger, Anton; Plester, George; Guenther, Manfred; and Troska, Georg. Arrangement for the supply and metered dispensing of liquids. 5,022,558, Cl. 222-105.000.
- Fages, Jean; de Villepoix, Raymond; Abbes. Claude; and Rouaud, Christian, to Commissariat a 13 Energie Atomique. Metal gasket or joint provided with an extremely high unit-area pressure. 5,022,663, Cl. 277-236.000.
- Failli, Amedeo A.: *See—*
  - Caufield, Craig E.; and Failli, Amedeo A., 5,023,264, Cl. 514-291.000.
- Fair, Barbara E.: *See—*
  - Kneller, James F.; Fair, Barbara E.; Mazzani, Gianfranco F., and Di Simone, I. Sergio, 5,023,000, Cl. 210-697.000.
- Faist, Kenneth B., to Quick, Thomas E. Shower arm extension. 5,022,103, Cl. 4-596.000.
- Fandrich, Heinz-Jurgen. Device composed of a light guide plate. 5,022,728, Cl. 350-96 100.
- Fanuc Ltd.: *See—*
  - Aso, Toshiyuki; Arakawa, Yasuo; and Kato, Junichi, 5,023,420, Cl. 219-69.120.
  - Kamiguchi, Masao; and Kobayashi, Minoru, 5,023,028, Cl. 264-40.100.
- Faraon-Chaul, Cesar. Fluids rate of flow saving or limiting device. 5,022,438, Cl. 138-42.000.
- Farbood, Mohamad I.; Morris, James A.; Sprecker, Mark A.; Bienkowski, Lynda J.; Miller, Kevin P.; Vock, Manfred H.; and Hagedorn, Myrna L., to International Flavors & Fragrances Inc. Process for preparing compositions containing unsaturated lactones, products produced thereby and organoleptic uses of said products. 5,023,347, Cl. 549-263.000.
- Farkas, Jozsef; Vekony, Sandor; Vekony, Sandorne; Csovak, Erno; and Fodor, Sandor, to Innofinance Altalanos Innovacios Penzintezet. Method and working machine for producing surfaces of non-circular but regular cross sections. 5,022,293, Cl. 82-1.110.
- Farnand, Thomas J.: *See—*
  - Aslam, Muhammad; Farnand, Thomas J.; and Tamary, Ernest J., 5,023,038, Cl. 264-293.000.
- Farnstrom, Kenneth A.: *See—*
  - Coughlan, Joel B.; Farnstrom, Kenneth A.; Harvey, Howard W., Upton, R. Glen; White, John R.; and Walker, Kenneth L., 5,022,812, Cl 414-729.000.
- Farrar, Grover L.: *See—*
  - Swofford, Howard W.; Rice, Sandra W.; Farrar, Grover L.; and Rudd, David, 5,022,944, Cl. 156-244.110.

- Fasiska, Edward J.; and Aretz, Adam N., to Auto Wrap, Inc. Mounting system for an automobile cover. 5,022,700, Cl. 276-98.000.
- Fassman, Arnold; and Nobile, John R., to Pitney Bowes Inc. Moisture applying apparatus having a removable moisture applicator. 5,022,953, Cl. 156-441.500.
- Fatool, Wade T., to Competitive Athletics Technology, Inc. Impact-absorbing pad. 5,023,128, Cl. 428-172.000.
- Faurel, Jacques; and Violi, Raymond, to Societe Cooperative de Production Bourgeois. Oven with double door. 5,022,380, Cl. 126-190.000.
- Favreau, David P.; Swiderski, Jane A.; and Vitkavage, Daniel J., to AT&T Bell Laboratories. Method of etching for integrated circuits with planarized dielectric. 5,022,958, Cl. 156-643.000.
- Feder, Peretz M.: *See—*
  - Anderson, Carl R.; Comrie, Paul R.; Feder, Peretz M.; and Zysman, George I., 5,023,902, Cl. 379-59.000.
- Federico, Anthony M.; and Ippolito, Ronald A., to Xerox Corporation. Distributed processing environment fault isolation. 5,023,779, Cl. 364-200.000.
- Fedorov, Eduard L.: *See—*
  - Gordon, Anatoly M.; Fedorov, Eduard L.; and Grachev, Anatoly F., 5,022,594, Cl. 241-282.200.
- Fedyakin, Roman V.: *See—*
  - Boiko, Leonid S.; Korotkin, Viktor I.; Veretennikov, Viktor Y.; Roslivker, Efim G.; Fedyakin, Roman V.; Chesnokov, Viktor A.; Yakovlev, Anatoly S.; Kharitonov, Jury D.; Fei, Valery M.; and Galichenko, Emma N., 5,022,280, Cl. 74-462.000.
- Fei, Valery M.: *See—*
  - Boiko, Leonid S.; Korotkin, Viktor I.; Veretennikov, Viktor Y., Roslivker, Efim G.; Fedyakin, Roman V.; Chesnokov, Viktor A.; Yakovlev, Anatoly S.; Kharitonov, Jury D.; Fei, Valery M.; and Galichenko, Emma N., 5,022,280, Cl. 74-462.000.
- Felder, Ernst; Romer, Michael; Bardonner, Hans; Hartner, Hartmut; and Fruhstorfer, Wolfgang, to Merck Patent Gesellschaft mit beschraenkter Haftung. Process for the preparation of hydroxyamines. 5,023,379, Cl. 564-472.000.
- Feldstein, Joel G.; and Merker, David E., to Babcock & Wilcox Company, The. Method for explosively welding a sleeve into a heat exchanger tube. 5,022,148, Cl. 29-890.031.
- Fender, William D.; and Jeromin, Lothar S., to Xerox Corporation. Precharging of the X-ray photoreceptor to eliminate the fatigue artifact. 5,023,661, Cl. 355-210.000.
- Fenderson, William D. Apparatus and methods for promoting the inflation of tires. 5,022,451, Cl. 157-1.000.
- Fenner, William G., Sr., to E. R. Carpenter Company, Inc. Pressure reduction mattress. 5,022,111, Cl. 5-481.000.
- Fenton, Frank, to Spalding & Evenflo Companies. Lightweight steel golf shaft. 5,022,652, Cl. 273-80.00B.
- Fenton, James E.: *See—*
  - Miller, John M.; Fenton, James E.; and Spring, Harold G., 5,023,539, Cl. 322-28.000.
- Ferag AG: *See—*
  - Burge, Norbert, 5,022,644, Cl. 271-270.000.
  - Honegger, Werner, 5,022,523, Cl. 206-390.000.
- Ferco International Usine de Ferrures de Batiment: *See—*
  - Kautt, Jean-Jacques, 5,022,143, Cl. 29-783.000.
- Ferguson, Arthur R.; and Rawlings, David E., to Outboard Marine Corporation. Ignition system for marine propulsion device. 5,022,370, Cl. 123-425.000.
- Ferguson, Janice L.: *See—*
  - Miller, Cedric C., 5,022,104, Cl. 4-558.000.
- Ferrari S.P.A. Esercizio Fabbriche Automobile E: *See—*
  - Barbiero, Roberto, 5,022,677, Cl. 280-801.000.
- Ferren, Bran. Focus enhancing method. 5,023,724, Cl. 358-227.000.
- Ferret Instruments, Inc.: *See—*
  - McKinnon, Donald C.; and Gauthier, Thomas F., 5,023,764, Cl. 362-299.000.
- Fevig, Robert J.; Holleman, Randall S.; and Seaver, Duane L., to Structural Concepts Corporation. Display case. 5,022,720, Cl. 312-223.000.
- Ficalora, Joseph P., to Allied-Signal Inc. Ring laser gyroscope arranged for maintaining ionized gas discharge transverse to the optical axis of the gyroscope. 5,022,759, Cl. 356-350.000.
- Fields, Donald L., Jr., to Monsanto Company. Process for producing N-phosphonomethylglycine. 5,023,369, Cl. 562-17.000.
- Fike, Richard A. Line storage and dispensing cartridge. 5,022,577, Cl. 225-47.000.
- Finch, Harry: *See—*
  - Dowle, Michael D.; Middlemiss, David; Finch, Harry; Naylor, Alan; and Lunts, Lawrence H. C., 5,023,378, Cl. 564-340.000.
- Finlan, Martin F., to Amersham International PLC. Biological sensors. 5,023,053, Cl. 422-82.050.
- Finn-Aqua: *See—*
  - Voss, Gunter, 5,022,265, Cl. 73-40.700.
- Fischer, Andrew P. Pressure operated sequencing valve. 5,022,426, Cl. 137-119.000.
- Fischer, Eugene C.: *See—*
  - Crane, Roger M.; and Fischer, Eugene C., 5,023,845, Cl. 364-508.000.
- Fischer, Robert R.; and Fischer, W. James, to Urschel Laboratories Incorporated. Method of making a knife having a scalloped cutting edge. 5,022,299, Cl. 83-676.000.
- Fischer, W. James: *See—*
  - Fischer, Robert R.; and Fischer, W. James, 5,022,299, Cl. 83-676.000.
- Fish, Darrell D.: *See—*
  - Spangler, Charles W.; Dominick, George G.; Ross, Edward A.; and Fish, Darrell D., 5,022,547, Cl. 220-234.000.
- Fisher, Hugh A.; Landry, Susan D.; and Smith, Troy L., Jr., to Ethyl Corporation. Phosphonitrilic polymers with curability by sulfur accelerated cures or radiation cures. 5,023,278, Cl. 521-85.000.
- Fisher, John H.: *See—*
  - Horch, Kenneth W.; Fisher, John H.; and Evans, Barry L., 5,022,407, Cl. 128-739.000.
- Fisher, Richard L., to RMI Titanium Company. Deoxidation of a refractory metal. 5,022,935, Cl. 148-126.100.
- Fisher, Robert D.; and Allan, James C., to Seagate Technology, Inc. Tine film cobalt-containing recording medium. 5,023,148, Cl. 428-694.000.
- Fisher Scientific Company: *See—*
  - Koebler, Douglas J.; Cuomo, Carlo; and Brigati, David J., 5,023,187, Cl. 436-180.000.
  - Richmond, Frank M.; and Vanderveen, Timothy, 5,022,538, Cl. 211-113.000.
- Flachglas Aktiengesellschaft: *See—*
  - Eckardt, Rudolf; and Diedrichs, Bernd, 5,023,403, Cl. 174-94.00R.
- Flakee Mills, Inc.: *See—*
  - Bailey, Richard G.; and Leggott, Merton R., 5,023,429, Cl. 219-388.000.
- Flasck, Richard A., to RAF Electronics Corp. Active matrix reflective projection system. 5,022,750, Cl. 353-31.000.
- Fleche, Guy: *See—*
  - Salome, Jean-Paul; and Fleche, Guy, 5,023,354, Cl. 549-364.000.
- Fleet Engineers, Inc.: *See—*
  - Eklund, Louis E., Jr., 5,022,680, Cl. 280-851.000.
- Fleet, George W. J., to Monsanto Company. Pyrroliziomes and synthesis thereof. 5,023,340, Cl. 548-453.000.
- Fleischer, James F.: *See—*
  - Anthony, Thomas R.; and Fleischer, James F., 5,022,801, Cl. 408-144.000.
- Fleury, Richard L., to GKR Industries, Inc. Disposable liner for hard hats. 5,022,095, Cl. 2-190.000.
- Flexxaire Manufacturing Inc.: *See—*
  - Isert, Clarence A., 5,022,821, Cl. 416-167.000.
- Flint, Ephraim B.; Grebe, Kurt R.; Gruber, Peter A.; and Zingher, Arthur R., to International Business Machines Corp. Flexible finned heat exchanger. 5,022,462, Cl. 165-80.400.
- Flores, Ruben: *See—*
  - Monderer, Thea B.; and Flores, Ruben, 5,022,237, Cl. 63-23.000.
- FMC Corporation: *See—*
  - Braeutigam, Robert O., 5,022,527, Cl. 206-522.000.
  - Lotto, Ronald L., 5,022,298, Cl. 83-509.000.
- Fodor, Sandor: *See—*
  - Farkas, Jozsef; Vekony, Sandor, Vekony, Sandorne; Csovak, Erno; and Fodor, Sandor, 5,022,293, Cl. 82-1.110.
- Folz, Sylvester D.: *See—*
  - Rector, Douglas L.; Conder, George A.; and Folz, Sylvester D., 5,023,334, Cl. 546-268.000.
- Fong, Tommy: *See—*
  - Grover, Wayne D.; Fong, Tommy; Dubuc, Joe P.; Krzymien, Witold A.; and Fraser, George D., 5,023,869, Cl. 370-84.000.
- Ford Aerospace & Communications Corporation: *See—*
  - Osborn, D. Bruce; and Bagley, Harold R., Jr., 5,023,459, Cl. 250-332.000.
- Ford, Jeffrey R., to Azon Systems, Inc. Thermal barrier extrusions. 5,022,205, Cl. 52-309.160.
- Ford Microelectronics: *See—*
  - Paquette, Thomas E., 5,023,672, Cl. 357-15.000.
- Ford Motor Company: *See—*
  - Cheung, Mo-Fung; Golovoy, Amos; and van Oene, Henk, 5,023,284, Cl. 524-109.000.
  - Miller, John M.; Fenton, James E.; and Spring, Harold G., 5,023,539, Cl. 322-28.000.
- Formax, Inc.: *See—*
  - Lindee, Scott A., 5,022,888, Cl. 452-174.000.
- Fornari, Roberto: *See—*
  - Mattera, Adriano; Fornari, Roberto; Magnanini, Renato; Paorici, Carolo; Zanotti, Lucio; and Zuccalli, Giovanni, 5,023,801, Cl. 364-480.000.
- Forsvarets Forskningsanstalt: *See—*
  - Nissborg, Kurt, 5,023,441, Cl. 250-206.200.
- Fort Howard Corporation: *See—*
  - Stevens, William P.; and Dowey, Mark E., 5,023,126, Cl. 428-126.000.
- Forte, Paulino, to UOP. Aromatic extraction process using mixed polyalkylene glycol/glycol ether solvents. 5,022,981, Cl. 208-334.000.
- Forthner, Steve: *See—*
  - Maziorka, Jack, 5,022,740, Cl. 350-114.000.
- Fortmann, Norbert; Gottling, Helmut; Meyer, Hans F.; Moller, Rudolf; and Scharnowski, Gerhard, to WABCO Westinghouse Steuerungstechnik GmbH & Co. Compact fluid actuated working cylinder with spring loaded tensioning member. 5,022,311, Cl. 92-137.000.
- Foster, Robert W., Jr.; and Gentry, Jefferson L., to Associated Mills Inc. Toothbrush sanitizer. 5,023,460, Cl. 250-455.100.
- Foster Wheeler Energy Corporation: *See—*
  - Abdulally, Iqbal F., 5,022,893, Cl. 48-76.000.
- Foti, Ivan F. S.: *See—*
  - Sirman, James B.; and Foti, Ivan F. S., 5,023,596, Cl. 340-571.000.
- Fotoking Passbildsysteme: *See—*
  - Siegesleuthner, Franz; and Hebeisen, Walter, 5,023,638, Cl. 354-126.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Fowler, Benjamin P. Apparatus and method for heating a waste disposal system 5,022,848, Cl. 431-2.000.
- Framatome: *See—*
  - Mardon, Jean-Paul; Charquet, Daniel; Perez, Marc; and Senevat, Jean, 5,023,048, Cl. 376-416.000.
- Francoeur, Michael L.; and Potts, Russell O., to Pfizer Inc. Transdermal flux enhancers in combination with iontophoresis in topical administration of pharmaceuticals. 5,023,085, Cl. 424-449.000.
- Frank, Judit: *See—*
  - Dekany, Gyula; and Frank, Judit, 5,023,242, Cl. 514-31.000.
- Franquenouille, Jean-Paul: *See—*
  - Badaoui, Mohamed; Dambricourt, Richard; Franquenouille, Jean-Paul; Garcia, Christian; Granger, Yves; and Spalmacin-Roma, Sylvie, 5,023,867, Cl. 370-56.000.
- Frantom, Richard L.; Bishop, Robert J.; Kremer, Robert; Ocker, Klaus; Brown, Roy; Rose, James; Renfroe, Donald; and Bazel, Teresa, to Bendix Atlantic Inflator Company. Dual pyrotechnic hybrid inflator 5,022,674, Cl. 280-741.000.
- Franz, Klaus D. *See—*
  - Rau, Axel; Ambrosius, Klaus, and Franz, Klaus D . 5,022,923, Cl. 106-415.000.
- Fraser, George D.: *See—*
  - Grover, Wayne D.; Fong, Tommy; Dubuc, Joe P.; Krzymien, Witold A.; and Fraser, George D., 5,023,869, Cl. 370-84.000.
- Fraser, Howard H., Jr.: *See—*
  - Etemad, Shahrokh; Yannascoli, Donald; Fraser, Howard H., Jr , and Lane, William R., 5,022,834, Cl. 418-55.100.
- Frater, Georg; and Schmidt, Harald, to Givaudan Corporation. Mixtures of bicyclic ethers and fragrance compositions containing same. 5,023,232, Cl. 512-19.000.
- Frazer, John S. Funnel and integrated funnel/container package. 5,022,567, Cl. 222-475.000.
- Frazier, Tonie R.: *See—*
  - Osborne, Robert E.; and Frazier, Tonie R., 5,022,352, Cl 122-17.000.
- Frederix, Martine E.: *See—*
  - Crane, L. Paul; Lind, H. Clark, and Frederix, Martine E., 5,022,964. Cl 162-146.000.
- Freels, Jack; and Milton, David, to Capitol Systems. Vibrating/massage chair. 5,022,384, Cl. 128-33.000.
- Freeman, Dean W., to Texas Instruments Incorporated Semiconductor device with adjacent non-oxide layers and the fabrication thereof 5,023,206, Cl 437-228.000.
- Freeman, Gerard L.: *See—*
  - Branovich, Louis E.; Freeman, Gerard L.; Eckart, Donald W.; and Smith, Bernard, 5,022,883, Cl. 445-50 000.
- Freeman, Stephen: *See—*
  - Pereira, Oswy Z.; Ramsay, Michael V. J , and Freeman, Stephen, 5,023,348, Cl. 549-264.000.
- Fremont Industries, Inc.: *See—*
  - Busch, Bruce D., and Nicholls, Jeffrey R., 5,023,011, Cl 252-180.000.
- French State represented by the Minister of Post, Telecommunications and Space: *See—*
  - Haond, Michel, and Galvier, Jean, 5,023,197, Cl. 437-40.000.
- Frey, Eric M.; and Lamb, Joseph A , to Highes Aircraft Company Solder wave dwell timer. 5,023,848, Cl 368-1.000.
- Frey, Peter *See—*
  - Stampfli, Peter; and Frey, Peter, 5,022,795, Cl. 407-47.000.
- Fried. Krupp GmbH *See—*
  - Brussel, Richard, 5,022,839, Cl 425-161.000.
- Friedman, Michael; Steinberg, Doron; and Soskolne, Aubrey, to Yissum Research Development Company of the Hebrew University of Jerusalem. Sustained-release pharmaceutical compositions. 5,023,082, Cl. 424-426.000.
- Friedman, Milton J.; Langston, Susan E.; and Pollitt, Sonia, to Biosys Corporation. Mass production in liquid culture of insect-killing nematodes. 5,023,183, Cl. 435-240.300
- Friedrich Grohe Armaturenfabrik GmbH & Co.: *See—*
  - Wagner, Friedrich; and Grau, Walter, 5,022,631, Cl. 251-185.000.
- Frigon, Phillip E.; and Rott, Robert D Gun barrel ramrod holder 5,022,176, Cl. 42-90.000.
- Frisco, Jeffrey A.: *See—*
  - Heckaman, Douglas E.; Frisco, Jeffrey A.; Rieder, Gregory C ; and Bajgrowicz, Edward J., 5,023,624, Cl 343-860.000.
- Fromion, Andre: *See—*
  - Vilas Boas, Jean Claude; and Fromion, Andre, 5,022,217, Cl. 53-472.000.
- Frost, Jonathan R.: *See—*
  - Langer, Salomon Z.; Frost, Jonathan R., Schoemaker, Johannes; Gaudilliere, Bernard; Bertin, Jean; Rousseau, Jean; Dupont, Regis; and Wick, Alexander E., 5,023,266, Cl. 514-317.000.
- Frost, Rudolf U.: *See—*
  - Gracovetsky, Serge; and Frost, Rudolf U., 5,022,412, Cl 128-781.000.
- Fruhstorfer, Wolfgang: *See—*
  - Felder, Ernst; Romer, Michael; Bardonner, Hans; Hartner, Hartmut; and Fruhstorfer, Wolfgang, 5,023,379, Cl. 564-472.000.
- Fuhrmann, Barrett J.: *See—*
  - Jones, Jackie D.; Murphy, Guy C.; Mesing, Thomas C., and Fuhrmann, Barrett J., 5,023,041, Cl. 264-510.000.
- Fuji Electric Co., Ltd.: *See—*
  - Oyama, Jun; Uchida, Naoshi; Unuma, Makoto; Takahashi, Tatsunori; Shinohara, Hisaji; and Kandatsu, Kiyoshi, 5,023,416, Cl. 200-244.000.
  - Sakurai, Kenya, 5,023,191, Cl. 437-27.000.
  - Takabayashi, Yasuhiro, 5,023,150, Cl. 429-22.000.
- Fuji Jukogyo Kabushiki Kaisha: *See—*
  - Morikawa, Koji, 5,022,367, Cl. 123-324.000.
- Fuji Oil Company, Limited: *See—*
  - Nagatomo, Shinichiro; Terashima, Masahiko; and Taniguchi, Hitoshi, 5,023,104, Cl. 426-634.000.
  - Sugihara, Hirosi; Hidaka, Hiroshi, Doi, Akira; Okawauchi, Toshitaka; Kawabata, Yasushi; and Baba, Hideki, 5,023,101, Cl. 426-603.000.
- Fuji Photo Film Co., Ltd.. *See—*
  - Akao, Mutsuo, 5,023,120, Cl. 428-35.900.
  - Fujita, Shinsaku, 5,023,802, Cl. 364-496.000.
  - Hasumi, Kazuo; Mochizuki, Kouichi; and Fujiyama, Masaaki, 5,023,135, Cl. 428-336.000.
  - Iwasa, Masakazu; Morita, Kazuhiko; and Kawamata, Toshio, 5,022,519, Cl. 206-313.000.
  - Nagatomo, Shigeru; and Tanaka, Mitsutoshi, 5,023,052, Cl 422-56.000.
  - Nakamura, Takashi, 5,022,167, Cl. 34-160.000.
  - Onozuka, Haruo; Umezu, Takao, Sato, Muneyoshi, and Takada, Seiji, 5,023,470, Cl. 307-108.000.
  - Simizu, Tooru; and Kataoka, Hideaki, 5,023,163, Cl. 430-207.000
  - Terashita, Takaaki, 5,023,656, Cl. 355-41.000.
  - Toda, Hiroyuki; Miyahara, Junji; and Takahashi, Kenji, 5,023,014, Cl. 252-301.40H.
  - Ushiro, Seimei; and Ohmura, Hiroshi, 5,023,639, Cl. 354-132.000.
  - Yamanouchi, Junichi; Shiratsuchi, Kentaro; Karino, Yukio; and Shibata, Takeshi, 5,023,162, Cl. 430-203.000.
  - Yoshida, Yutaka; Umetsu, Takao; and Iwamoto, Junichi, 5,023,645. Cl. 354-400.000.
- Fuji Xerox Co., Ltd.. *See—*
  - Mukai, Toshio; Yamashita, Yoshiro, Suzuki, Takanori; Akasaki, Yutaka; Sato, Katsuhiro; Yabuuchi, Naoya; Tanaka, Hiroyuki, and Nukada, Katsumi, 5,023,356, Cl. 552-210.000.
  - Soga, Hiroo; and Akutsu, Eiichi, 5,023,627, Cl. 346-76.0PH
- Fujie, Naofumi: *See—*
  - Kuwabara, Yasuo; Fujie, Naofumi; and Saeki, Takao, 5,023,526, Cl 318-116.000.
- Fujii, Hiroshi: *See—*
  - Mutoh, Nobuyoshi; Sakai, Keijiro; Ueda, Akiteru; and Fujii, Hiroshi, 5,023,538, Cl. 318-811.000.
- Fujikake, Yasushi: *See—*
  - Kanzawa, Yoshikazu; Fujikake, Yasushi; Ito, Osami; Ito, Shuho; Oikawa, Hironobu; Otsubo, Makoto; Morikawa, Iwao; Shiratori, Yuichi; and Tsukada, Kiyoshi, 5,022,456, Cl. 164-119.000.
- Fujikawa, Junichi, to Toray Industries, Inc. Printing plate having photosensitive polymer composition. 5,023,165, Cl. 430-285.000.
- Fujikawa, Shigeaki *See—*
  - Kyogoku, Nobuo; Saeki, Takeshi, and Fujikawa, Shigeaki, 5,023,024, Cl. 264-4.300.
- Fujikawa, Takao; and Ishii, Takahiko, to Kabushiki Kaisha Kobe Seiko Sho. Impregnating carbonizing process and apparatus. 5,022,343, Cl. 118-47.000.
- Fujikura, Tsuneo *See—*
  - Ogino, Masanori; Fujikura, Tsuneo; Shinagawa, Yuji; and Yamada, Takeo, 5,023,524, Cl. 315-383.000.
- Fujinaga, Tomosburo: *See—*
  - Miyazaki, Akira; Kikuchi, Yuichi; Ohara, Yoshiyuki, Fujinaga, Tomosburo, Kawata, Takashi; Mizutani, Fumitoshi, Iida, Tsugio; and Shimazaki, Shiroyasu, 5,022,789, Cl. 405-133.000.
- Fujita, Shinsaku, to Fuji Photo Film Co., Ltd Method for processing information on chemical reactions. 5,023,802, Cl. 364-496.000.
- Fujita, Takashi: *See—*
  - Shinohara, Koichi; Suzuki, Takashi; Kawagishi, Masao, Satoh, Nobuo; Murakami, Takeshi, and Fujita, Takashi, 5,023,739, Cl. 360-132.000.
- Fujitec Co., Ltd.: *See—*
  - Sasaki, Kenji; Yokota, Kenji; Hattori, Hiroshi, and Sata, Nobuyuki, 5,022,498, Cl. 187-127.000.
- Fujitsu Limited *See—*
  - Hidaka, Norio; Yamamura, Shigeyuki; and Fukuta, Masumi, 5,023,703, Cl. 357-74.000.
  - Hikosaka, Kohki; and Hirachi, Yasutake, 5,023,674, Cl. 357-16.000.
  - Ishikawa, Tomonori, 5,023,675, Cl. 357-22.000.
  - Masuda, Shigefumi, 5,023,863, Cl. 370-1.000.
  - Masuko, Takayuki; Okamoto, Akira; Moriya, Kaoru; Okamura, Koji; and Arima, Tadao, 5,023,447, Cl. 250-227.240.
  - Mori, Toshihiko, 5,023,836, Cl 365-174.000.
  - Tatsuta, Shigeru, 5,023,676, Cl. 357-22.000.
  - Yamada, Akio; Sakamoto, Kiichi; Kudou, Jinko, and Yasuda, Hiroshi, 5,023,462, Cl. 250-492.200.
- Fujiwara, Shigetaka: *See—*
  - Mitsuya, Teruaki; Fujiwara, Shigetaka; Endou, Michio; and Terakado, Akira, 5,023,464, Cl. 355-283.000.
- Fujiyama, Masaaki: *See—*
  - Hasumi, Kazuo; Mochizuki, Kouichi; and Fujiyama, Masaaki, 5,023,135, Cl. 428-336.000.
- Fukazawa, Toshio: *See—*
  - Nagata, Yuji; Fukazawa, Toshio; Wada, Kumiko; and Tosaki, Yoshihiro, 5,022,141, Cl. 29-603.000.
- Fukuda, Masatoshi: *See—*
  - Matsutani, Kanji; and Fukuda, Masatoshi, 5,022,579, Cl. 227-177.000.
  - Matsutani, Kanji; and Fukuda, Masatoshi, 5,022,857, Cl. 433-85.000.
- Fukuda, Yoshinobu, to Kubushiki Kaisha Daikin Seisakusho. Clutch cover assembly. 5,022,508, Cl. 192-70.270.

- Fukuhara, Masafumi: *See—*
  - Kleinberg, Robert L.; Sezginer, Abdurrahman; and Fukuhara, Masafumi, 5,023,551, Cl. 324-303.000.
- Fukui, Hidehiro: *See—*
  - Kita, Hideki; Nakakuma, Akira; Fukui, Hidehiro; and Deguchi, Hiroyuki, 5,023,670, Cl. 355-326.000.
- Fukui, Wataru, to Mitsubishi Denki Kabushiki Kaisha. Ignition timing controlling apparatus for internal combustion engine. 5,022,362, Cl. 123-146.50D.
- Fukumoshi, Yoji: *See—*
  - Kugimiya, Shuzo; Suzuki, Hitoshi; Fukumoshi, Yoji; Sata, Ichiko; Hirai, Tokuyuki; and Nishida, Yumi, 5,023,786, Cl. 364-419.000.
- Fukushima, Yoshihisa: *See—*
  - Satoh, Isao; Fukushima, Yoshihisa; Ichinose, Makoto; Kuroki, Yuzuru; and Takagi, Yuji, 5,023,854, Cl. 369-32.000.
- Fukuta, Masumi: *See—*
  - Hidaka, Norio; Yamamura, Shigeyuki; and Fukuta, Masumi, 5,023,703, Cl. 357-74.000.
- Fukutani, Iwao: *See—*
  - Sakamoto, Yukio; Fukutani, Iwao; and Hori, Toshio, 5,022,870, Cl. 439-608.000.
- Fulcher, Garland J. Upper torso and limb exercising device. 5,022,647, Cl. 272-117.000.
- Fulcher, Leonard S., Jr.; and Galbraith, Richard R., to Honeywell Inc. Method of maintaining asynchronous real-time data. 5,023,832, Cl. 364-900.000.
- Fullmer, Douglas E.; Seibel, Michael J.; and Sheppard, Roger D., to Hewlett-Packard Company. Digitally-synchronized sweep signal source. 5,023,571, Cl. 331-4.000.
- Fulton, Steven J.; Peters, Gerald T., Jr.; Spehrley, Charles W., Jr.; and Young, Lawrence R., to Spectra, Inc. Treatment of hot melt ink images. 5,023,111, Cl. 427-164.000.
- Funahashi, Takahiko: *See—*
  - Murakami, Azuma; Aoki, Kazuo; Yamanami, Tsuguya; Tomofuji, Yoshiaki; Tanaka, Takeshi; Inashima, Satoshi; Funahashi, Takahiko; Chikami, Toshihide; and Senda, Toshiaki, 5,023,408, Cl 178-19.000.
- Funato, Reiko: *See—*
  - Watanabe, Naotaka; Itoda, Hiroshi; and Funato, Reiko 5,022,999, Cl. 210-692.000.
- Fung, Jimmy; An, Jiu; Campbell, David L.; and Shyu, Steven, to Advanced Micro Devices, Inc. Switchable DAC with current surge protection. 5,023,614, Cl 341-144.000.
- Funk, John G.: *See—*
  - Roy, Bryan A.; Boris, Gregory F.; Campbell, John J , Funk, John G.; Wozniak, David J., Gibson, James D.; and McCauley, Robert M , 5,022,995, Cl. 210-651.000.
- Funk, Jurgen: *See—*
  - Skowasch, Gerhard, Sabranski, Udo; Funk, Jurgen; and Quick, Siegfried, 5,022,325, Cl 102-226.000.
- Funo, Takakazu: *See—*
  - Yokouchi, Hisatake; Takasaki, Yukio; Hirai, Tadaaki; Koike, Kouichi; Tsuneoka, Masayuki Onodera, Yoichi; and Funo, Takakazu, 5,023,896, Cl. 378-99.000.
- Fursier, Roger: *See—*
  - Keens, Gary; and Fursier, Roger, 5,022,863, Cl 439-108.000.
- Furuhata, Kimio: *See—*
  - Ogura, Haruo; Furuhata, Kimio, Sato, Shingo; Ito, Masayoshi, Shitori, Yoshiyasu, and Nagai, Yoshitaka, 5,023,239, Cl 514-26.000.
- Furuyama, Tohru: *See—*
  - Watanabe, Yohji; and Furuyama, Tohru, 5,023,476, Cl. 307-296.100.
- Fuse, Kazuyoshi: *See—*
  - Tsutaki, Shoji; Fuse, Kazuyoshi; and Ohta, Toshihiko, 5,022,140, Cl. 29-603.000.
- G.D. Societa per Azioni: *See—*
  - Belvederi, Bruno; Ghini, Franco; and Dall'Osso, Davide. 5,022,415, Cl 131-84 100.
  - Draghetti, Fiorenzo; and Gamberini, Antonio, 5,022,213, Cl. 53-234.000.
- G E Specialty Chemicals: *See—*
  - Horn, William E., 5,023,285, Cl 524-120.000.
- G P.B. Beghelli S.R L.: *See—*
  - Beghelli, Gian Pietro, 5,022,627, Cl 248-558.000.
- Gabbay, Steven: *See—*
  - Kallens, Nicholas, and Gabbay, Steven, 5,022,156, Cl. 30-125.000
- Gaidis, James M., to W. R. Grace & Co.-Conn. Compositions and methods for waterproofing wet structures formed from water-penetrable construction materials. 5,023,290, Cl. 524-320.000.
- Gajewski, Vincent J , Goddard, Wallace I.; Palinkas, Richard L., and Nybakken, George H., to Uniroyal Chemical Company, Inc. Method of making a polyurethane non-pneumatic tire 5,023,040, Cl. 264-328.300.
- Gakenholz, Werner, to SWF Auto-Electric GmbH Drive mechanism for windshield wiper systems on motor vehicles. 5,023,532, Cl. 318-541.000.
- Galbraith, Richard R : *See—*
  - Fulcher, Leonard S., Jr , and Galbraith, Richard R., 5,023,832, Cl 364-900.000.
- Galichenko, Emma N *See—*
  - Boiko, Leonid S., Korotkin, Viktor I.; Veretennikov, Viktor Y.; Roshivker, Efim G., Fedyakin, Roman V.; Chesnokov, Viktor A ; Yakovlev, Anatoly S.; Kharitonov, Jury D.; Fei, Valery M.; and Galichenko, Emma N., 5,022,280, Cl. 74-462.000.
- Gallacher, Lawrence V.; Gustavsen, Alfen J ; and Kugel, Robert L., to King Industries, Inc. Thermally stable sulfonate compositions. 5,023,016, Cl. 252-389.520.
- Gallacher, Lawrence V.: *See—*
  - Calbo, Leonard J., Jr.; and Gallacher, Lawrence V., 5,023,367, Cl. 560-193.000.
- Gallagher, John G. Device for moisture measurement of particulate material. 5,023,560, Cl. 324-664.000.
- Gallagher, Timothy F.: *See—*
  - Adams, Jerry L.; Gallagher, Timothy F.; Mayer, Ruth J.; and Metcalf, Brian W., 5,023,250, Cl 514-179.000.
- Gallois-Montbrun, Roger. Solar collector. 5,022,929, Cl. 136-246.000.
- Galvier, Jean *See—*
  - Haond, Michel; and Galvier, Jean, 5,023,197, Cl. 437-40.000.
- Gamberini, Antonio: *See—*
  - Draghetti, Fiorenzo; and Gamberini, Antonio, 5,022,213, Cl. 53-234.000.
- Gander, Michael; Rapp, Knut M.; and Schiweck, Hubert, to Suedzucker-Aktiengesellschaft. Process for preparing 1,6-β-D-anhydroglucopyranose (levoglucosan) in high purity. 5,023,330, Cl 536-124.000.
- Ganek, Alan G.. *See—*
  - Baum, Richard I.; Borden, Terry L.; Butwell, Justin R ; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Page, David R.; Plambeck, Kenneth E.; Scalzi, Casper A , and Schmalz, Richard J., 5,023,773, Cl. 364-200.000.
- Gannaway, Edwin L.; and Ortiz, Arturo L., to Tecumseh Products Company. Twin rotary compressor with suction accumulator 5,022,146, Cl. 29-888.020.
- Gao, Yun: *See—*
  - Sharpless, K. Barry; and Gao, Yun, 5,023,342, Cl. 549-34 000.
- Gapinski, Richard E.: *See—*
  - Yodice, Richard; and Gapinski, Richard E., 5,023,133, Cl 428-332.000.
- Garcia, Christian: *See—*
  - Badaoui, Mohamed; Dambricourt, Richard, Franquenouille, Jean-Paul; Garcia, Christian; Granger, Yves, and Spalmacin-Roma, Sylvie, 5,023,867, Cl. 370-56.000.
- Gargas, Eugene F., to Wooster Brush Company, The. Paint sprayer apparatus including rapidly changeable prime movers. 5,022,827, Cl. 417-360.000.
- Garretson, Jay H.: *See—*
  - Detter, Gary C.; Rodondi, Andrew L., Burns, Christopher D , Norling, Samuel A ; Garretson, Jay H , and Landries, Richard V., 5,023,752, Cl. 361-399.000.
- Gartlein, Gunter: *See—*
  - Micic, Lyubomir; Gartlein, Gunter, Schmitt, Eberhard; Muller, Axel; Seng, Egon; and Spindler, Siegfried, 5,023,702, Cl. 357-74.000.
- Gas Research Institute: *See—*
  - Cook, Ronald L., and Sammells, Anthony F., 5,022,970, Cl 204-72 000.
  - Wilkinson, William H., 5,022,241, Cl. 62-271.000
- Gatzemeyer, Dwight L. *See—*
  - Sorensen, Joseph A.; and Gatzemeyer, Dwight L., 5,022,137, Cl. 29-559.000.
- Gaudilliere, Bernard *See—*
  - Langer, Salomon Z.; Frost, Jonathan R , Schoemaker, Johannes, Gaudilliere, Bernard, Bertin, Jean, Rousseau, Jean; Dupont, Regis; and Wick, Alexander E., 5,023,266, Cl. 514-317.000.
- Gauthier, Thomas F.: *See—*
  - McKinnon, Donald C.; and Gauthier, Thomas F , 5,023,764, Cl. 362-299.000.
- Gavlak, Michael A.: *See—*
  - Shontz, Kimball C.; Gavlak, Michael A , and Ebbing, David M., 5,022,313, Cl. 92-248.000.
- Gavojdea, Stefan: *See—*
  - Goldstein, Andrew S.; Thieme, Thomas R., and Gavojdea, Stefan, 5,022,409, Cl. 128-760.000.
- Gear Company of America, Inc.: *See—*
  - Morel, Edward J., Jr., and Morel, Joe W , 5,022,356, Cl. 123-90.500.
- GEC Alsthom SA: *See—*
  - Tremmel, Dieter, 5,022,136, Cl 29-426.400.
- GEC - Marconi Limited *See—*
  - Johnson, Frederick A ; and Swinbanks, Malcolm A . 5,022,628, Cl. 248-638.000.
- Gehl Company: *See—*
  - Knurr, Randal; and Groeneveld, Wilbur, 5,022,219, Cl. 56-16.400.
- GenCorp Inc.. *See—*
  - Neubert, Terry C., 5,023,282, Cl 524-59.000.
- General Atomics: *See—*
  - Chin, Jack; Goforth, Robert R.; and Ohkawa, Tihiro, 5,023,109, Cl. 427-45.100.
- General Dynamics Corporation, Convair Division *See—*
  - Swanson, Kurt W., 5,022,803, Cl. 411-19.000.
- General Dynamics Corp./Electronics Division: *See—*
  - Bradley, Eric M., 5,023,944, Cl. 455-611.000.
- General Electric Company: *See—*
  - Allen, Gary R.; Davenport, John M . and Hansler, Richard L., 5,023,758, Cl. 362-61.000.
  - Anthony, Thomas R.; and Fleischer, James F., 5,022,801, Cl 408-144.000.
  - Balcewicz, Joseph F., 5,023,619, Cl. 342-361.000.
  - Boutni, Omar M., 5,023,297, Cl. 525-67.000.
  - Brun, Milivoj K.; Boron, Marcus P.; Miller, Steven A., Szala, Lawrence E.; and Svec, Paul S., 5,022,150, Cl 29-890.053.

VOL
1127
ISS
2
JE
11
1991
UMI

- Dumoulin, Charles L., 5,022,397, Cl. 128-653.0AF.
- Dumoulin, Charles L., 5,022,398, Cl. 128-653.0AF.
- El-Hamamsy, Sayed-Amr A.; and Jernakoff, George, 5,023,566, Cl. 330-251.000.
- Erdman, David M.; Beatty, James A., and Patel, Amritlal H., 5,023,527, Cl. 318-254.000.
- Gittinger, Norman C., 5,023,490, Cl 307-492.000.
- Jones, Jackie D.; Murphy, Guy C.; Mesing, Thomas C.; and Fuhrmann, Barrett J., 5,023,041, Cl. 264-510.000.
- Laskaris, Evangelos T., 5,023,584, Cl. 335-216.000.
- Szczutkowski, Craig F.; and Butler, Clyde R., Jr., 5,023,936, Cl. 455-90.000.
- Vagarali, Suresh S.; and Hoyle, Bobby G., 5,022,894, Cl. 51-293.000.
- Williams, Laura A.; Magnon, Gary D.; von Kannewurff, Michael C.; and Seymour, Raymond K., 5,023,582, Cl. 335-167.000.

- General Motors Corporation: *See—*
  - Breda, Michael A.; Snyder, George K., and Lyon, Peter A., 5,022,814, Cl. 414-799.000.
  - Burley, Harvey A., 5,023,451, Cl. 250-330.000.
  - Deering, Richard K., 5,023,617, Cl. 342-70.000.
  - Detter, Gary C.; Rodondi, Andrew F.; Burns, Christopher D., Norling, Samuel A.; Garretson, Jay H., and Landries, Richard V., 5,023,752, Cl. 361-399.000.
  - Goubeaux, Ronald J.; and Spurney, Joseph L., 5,022,234, Cl. 62-228.500.
  - Grey, Thaddeus J.; Kirton, Raymond E., English, George A., Liggett, Michael D.; Meyer, Karen M.; and Barker, Charles J., 5,022,431, Cl. 137-375.000.
  - Jozefczak, Thadius F., 5,022,113, Cl. 15-250.420.
  - Kennedy, Lawrence C.; and Lambert, Harvey J., 5,022,507, Cl. 192-58.00B.
  - Pawlak, Andrzej M.; and Shirai, Takeshi, 5,023,546, Cl. 324-174.000.
  - Pawlak, Andrzej M.; and Shirai, Takeshi, 5,023,547, Cl. 324-174.000.
  - Pugh, Cecil C.; and Coleman, John R., 5,022,713, Cl. 303-1.000.
  - Schut, Jan, 5,022,361, Cl. 123-90.550.
  - Shellhause, Ronald L., 5,022,502, Cl. 188-333.000.
  - Shontz, Kimball C.; Gavlak, Michael A., and Ebbing, David M., 5,022,313, Cl. 92-248.000.
  - Simon, Robert C., Jr.; Deutscher, Dale W.; Grimm, Charles M.; Thompson, Dennis D.; and Bailey, Kirk A., 5,023,778, Cl. 364-200.000.
- General Motors Corproation: *See—*
  - English, James H., 5,023,154, Cl. 429-182.000.
- Gennum Corporation: *See—*
  - Tse, Lawrence T., 5,023,543, Cl. 323-314.000.
- Gentry, Elvin O. Crankshaft-forming apparatus and method 5,022,129, Cl. 29-6.010.
- Gentry, Jefferson L.: *See—*
  - Foster, Robert W., Jr.; and Gentry, Jefferson L., 5,023,460, Cl. 250-455.100.
- George, Edward K.: *See—*
  - Mills, Brian P.; and George, Edward K., 5,023,399, Cl. 174-73.100.
- George, Ross J., to Austpole Industries Limited. Method of repairing-/replacing a pole and associated pole replacement system. 5,022,134, Cl. 29-402.080.
- Gerardi, Michael W.: *See—*
  - Shattuck, Charles W.; Lestinsky, Joseph J.; and Gerardi, Michael W., 5,022,267, Cl. 73-593.000.
- Gerhards, Hermann J.: *See—*
  - Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans-Georg; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 5,023,357, Cl. 544-132.000.
- Geng, John S. Microphone amplifier detector. 5,023,616, Cl. 342-52.000.
- Gerlach, C. Richard; and Schroeder, Edgar C., to Hypro Corporation. Positive displacement pump with rotating reciprocating piston. 5,022,831, Cl. 417-500.000.
- German, Hassan J. Setting for fine and costume jewelry. 5,022,238, Cl. 63-26.000.
- Gerretz, Josef; and Stinnertz, Horst, to Mannesmann AG. Method of pilgrim step rolling. 5,022,250, Cl. 72-214.000.
- Gerson, Ira A., to Motorola, Inc. Word spotting in a speech recognition system without predetermined endpoint detection. 5,023,911, Cl. 381-43.000.
- Gerth, Klaus: *See—*
  - Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert; Kunze, Brigitte; Hofle, Gerhard; Augustiniak, Hermann; Bedorf, Norbert; Jansen, Rolf; Trowitzsch-Kienast, Wolfram; and Steinmetz, Heinrich, 5,023,184, Cl. 435-252.100.
- Gertz, David C.; and Krage, William G., to Energy Absorption Systems, Inc. Vehicle crash barrier. 5,022,782, Cl. 404-6.000.
- Gesellschaft fur Biotechnologische Forschung mbH: *See—*
  - Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert; Kunze, Brigitte; Hofle, Gerhard; Augustiniak, Hermann; Bedorf, Norbert; Jansen, Rolf; Trowitzsch-Kienast, Wolfram; and Steinmetz, Heinrich, 5,023,184, Cl. 435-252.100.
- Gevas, Philip C.; Karr, Stephen L., Jr.; Grimes, Stephen; and Littenberg, Richard L., to Aphton Corporation. Immunogenic compositions and methods for the treatment and prevention of gastric and duodenal ulcer disease. 5,023,077, Cl. 424-88.000.
- Ghini, Eranco: *See—*
  - Belvederi, Bruno; Ghini, Eranco; and Dall'Osso, Davide, 5,022,415, Cl. 131-84.100.
- Gianella, Piccolo G., to Exar Corporation. Method of making a multicollector vertical pnp transistor. 5,023,194, Cl. 437-31.000.
- Gibbons, Gould, Jr.; Watson, Jerry L.; and Lawrence, William, to United States of America, Army. Light weight attenuator of blast and shock from detonating munitions. 5,022,307, Cl. 89-36.020.
- Gibbs, William T.: *See—*
  - Chadima, George E., Jr.; Schultz, Darald R.; Krunnfusz, Jeffrey S.; and Gibbs, William T., 5,023,824, Cl. 364-708.000.
- Gibson, James D.: *See—*
  - Roy, Bryan A.; Boris, Gregory F.; Campbell, John J., Funk, John G.; Wozniak, David J.; Gibson, James D.; and McCauley, Robert M., 5,022,995, Cl. 210-651.000.
- Gibson, Thomas R. Fishing lure harness structure. 5,022,177, Cl. 43-42.110.
- Gieseke, Bruce A.; Conrad, Robert A.; Montanaro, James J.; and Dobberpuhl, Daniel W., to Digital Equipment Corporation Push-pull cascode logic. 5,023,480, Cl. 307-448.000.
- Giguere, David B.: *See—*
  - Altemose, George A.; Consi, Michael; Joscelyn, Edwin R.; Wiemann, William; Giguere, David B.; Gully, Wilfred J., and Spencer, Stanley E., 5,023,531, Cl. 318-471.000.
- Gilchrist Studios Group Limited: *See—*
  - Burch, Richard J.; and Oxley, Brian W., 5,023,651, Cl. 355-1.000.
- Gill, Joseph. Collapsible fire escape ladder. 5,022,491, Cl. 182-95.000.
- Gill, Manzur; and Tigelaar, Howard L., to Texas Instruments Incorporated. Floating-gate memory array with silicided buried bitlines and with single-step-defined floating gates. 5,023,680, Cl. 357-23.500
- Gilles, Leo: *See—*
  - Heibel, Helmut; and Gilles, Leo, 5,022,717, Cl. 303-119.000.
- Gillson, Robert K. Multiple configuration seating device. 5,022,667, Cl 280-1.188.
- Gilmartin, Philip M.: *See—*
  - Lam, Eric; Benfey, Philip N.; Gilmartin, Philip M.; and Chua, Nam-Hai, 5,023,179, Cl. 435-172.300.
- Gimpel, Moritz; and Roelofsen, Jan W., to Akzo N.V. Process for introduction of silicon atoms instead of aluminum atoms in the crystal lattice of a zeolite of the faujasite type. 5,023,066, Cl. 423-328.000.
- Giordano, Claudio; Castaldi, Graziano; and Paiocchi, Maurizio, to Zambon Group S.p.A. Process for preparing an intermediate 5,023,365, Cl. 560-56.000.
- Giordano, Claudio: *See—*
  - Perdoncin, Giulio; Giordano, Claudio; Paiocchi, Maurizio, and Casagrande, Roberto, 5,023,381, Cl. 568-322.000.
- Girard, Francis: *See—*
  - Cattelain, Camille M.; and Girard, Francis, 5,022,195, Cl. 51-290.000.
- Gist-Brocades N.V: *See—*
  - Ducroo, Paul, 5,023,176, Cl. 435-105.000.
  - Van Eijk, Johannes H., 5,023,094, Cl. 426-20.000.
- Gittinger, Norman C., to General Electric Company. Analog signal compression circuit. 5,023,490, Cl. 307-492.000.
- Givaudan Corporation: *See—*
  - Frater, Georg; and Schmidt, Harald, 5,023,232, Cl. 512-19.000.
- Given, Peter S., Jr., to Nabisco Brands, Inc. Method and composition for inhibiting fat bloom in fat based compositions and hard butter 5,023,102, Cl. 426-610.000.
- GKR Industries, Inc.: *See—*
  - Fleury, Richard L., 5,022,095, Cl. 2-190.000.
- Glass, John C., to Erico International Corporation. Surge arrestor apparatus and method. 5,023,745, Cl 361-56.000.
- Glasstech, Inc.: *See—*
  - Balestra, Ben M., 5,022,911, Cl. 65-349.000.
- Glaxo Group Limited: *See—*
  - Dowle, Michael D.; Middlemiss, David; Finch, Harry; Naylor, Alan; and Lunts, Lawrence H. C., 5,023,378, Cl. 564-340.000.
  - Ellis, Frank; Naylor, Alan; Wallis, Christopher J.; and Waterhouse, an, 5,023,255, Cl. 514-242.000.
- Glebar Company, Inc.: *See—*
  - Schumacher, Frederick A., 5,022,194, Cl. 51-290.000.
- Gleine, Wolfgang, to Messerschmitt-Boelkow-Blohm GmbH. Apparatus for measuring distances with a measuring element operating on an optical basis. 5,023,446, Cl. 250-227.160.
- Glidden, Wayne A.: *See—*
  - Vallone, Giacinto; Janisiewicz, Stanley W.; Snyder, Michael D.; Hemmelgarn, Gerald B.; and Glidden, Wayne A., 5,023,544, Cl. 324-158.00F.
- Globus, Alfred R.; and Vernice, Joseph. Stabilized B-carotene. 5,023,355, Cl. 549-478.000.
- Glotfelter, Craig A.; and Ryan, Robert P., to Armstrong World Industries, Inc. Floor covering having a modified glass wear layer. 5,023,140, Cl. 428-413.000.
- Gluck, Kurt A.: *See—*
  - Donnelly, Kim F.; and Gluck, Kurt A., 5,023,811, Cl. 364-518.000.
- Goans, Kip B., to Lazes, Richard J. Floating barrier method and apparatus. 5,022,785, Cl. 405-69.000.
- Goddard, Wallace I.: *See—*
  - Gajewski, Vincent J.; Goddard, Wallace I.; Palinkas, Richard L.; and Nybakken, George H., 5,023,040, Cl. 264-328.300.
- Goekler, R. G. Tensioning device. 5,022,595, Cl. 242-7.230.
- Goepel, Charles A., to Martin Marietta. Fault tolerant data transmission network. 5,023,942, Cl. 455-601.000.
- Goff, Todd A. Railroad car identification plate holder. 5,022,174, Cl. 40-649.000.

- Goforth, Robert R.: *See—*
  - Chin, Jack; Goforth, Robert R.; and Ohkawa, Tihiro, 5,023,109, Cl. 427-45.100.
- Gold, Randy, to Halliburton Logging Services, Inc. Method for discriminating microphonic noise in proportional counters. 5,023,450, Cl. 250-261.000.
- Golden, Neil: *See—*
  - Wells, Benjamin A.; and Golden, Neil, 5,023,905, Cl. 379-96.000.
- Golding, Peter; Jayaweera-Bandara, Asoka M.; and Duffin, Henry, to Secretary of State for Defence in her Britannic Majesty's Government. Production of hexanitrostilbene (HNS). 5,023,386, Cl. 568-931.000.
- Goldschneider, James D.: *See—*
  - Zakheim, Howard; Clinton, Peter M.; Goldschneider, James D.; Kasmer, Christopher A.; Zahn, Markus; and Hoffmeyer, Charles L., 5,022,592, Cl. 241-172.000.
- Goldstar Co., Ltd.: *See—*
  - Shin, Jae H., 5,022,604, Cl. 242-203.000.
- Goldstein, Andrew S.; Thieme, Thomas R.; and Gavojdea, Stefan, to Epitope, Inc. Oral rinse immunoglobulin collection kit for immunoassay and method thereof. 5,022,409, Cl. 128-760.000.
- Goll, Gunther; Vater, Peter; Keusch, Siegfried; and Kratz, Gunter, to Zinser Schweisstechnik GmbH & Co. Hot air hand welding device. 5,023,925, Cl. 392-384.000.
- Goll, Jeffrey H.; Trent, William A.; Lane, Richard I.; Bell, Florian G.; and Marineau, Mark D., to Tektronix, Inc Signal acquisition method and automatic masking system for an OTDR. 5,023,445, Cl. 250-227.150.
- Golovchenko, Igor V.: *See—*
  - Surguchev, Viktor G.; Kuraev, Oleg V.; Surgucheva, Raisa N.; Makhnovsky, Leonid P.; Troschenovsky, Anatoly P.; Tetior, Alexandr N.; Golovchenko, Igor V.; and Scherbina, Tatyana V., 5,022,925, Cl. 106-631.000.
- Golovoy, Amos: *See—*
  - Cheung, Mo-Fung; Golovoy, Amos; and van Oene, Henk, 5,023,284, Cl. 524-109.000.
- Gomi, Akihiro. *See—*
  - Koga, Yoshiro; Gomi, Akihiro; Miyasaka, Takashi; Miyazawa, Yasunaga; Endo, Kenichi; Shinozaki, Junichiro; Yoda, Kaneo; Ichikawa, Takashi; Miyasaka, Hitoshi; and Kaburagi, Chiharu, 5,023,733, Cl. 360-77.040.
- Gonen, Jerry: *See—*
  - Klein, John F.; Kearns, Joel; and Gonen, Jerry, 5,023,058, Cl. 422-248.000.
- Gongwer, Geoffrey S., to Atmel Corporation. Logic output control circuit for a latch. 5,023,486, Cl. 307-465.000.
- Gonzalez, Fernando: *See—*
  - Lee, Ruojia; and Gonzalez, Fernando, 5,023,190, Cl. 437-56.000.
- Goodyear Tire & Rubber Company, The: *See—*
  - Burlett, Donald J.; Bauer, Richard G.; and Kelley, Mellis M., 5,023,301, Cl. 525-232.000.
  - Evans, Larry R.; Waddell, Walter H.; Harris, Frank W.; and Benko, David A., 5,023,287, Cl. 524-255.000.
  - Smith, Richard R.; and Johnston, Walter F., 5,023,137, Cl. 428-34.100.
- Gordon, Anatoly M.; Fedorov, Eduard L.; and Grachev, Anatoly F. Mincer knife head. 5,022,594, Cl. 241-282.200.
- Gordon, Arnold Z., to 16R Enterprises, Inc. Solid state electrochemical pollution control device. 5,022,975, Cl. 204-277.000.
- Gordon, Richard A. Electrical heating unit. 5,023,433, Cl. 219-548.000.
- Gorrieri, Giordano; Balestra, Ivo; Nannini, Luciano; and Mondani, Alberto, to Azionaria Costruzioni Macchine Automatiche A.C.M.A. S.p.A. System for equally spacing and transferring items from a first to a second conveyor. 5,022,511, Cl. 198-460.000.
- Goss, Douglas J.: *See—*
  - Delisle, Robert L., Jr.; and Goss, Douglas J., 5,023,608, Cl. 340-984.000.
- Gosselin, Jeffrey E.; and Gosselin, Lisa A. Thermal cover for a spa. 5,022,101, Cl. 4-498.000.
- Gosselin, Lisa A.: *See—*
  - Gosselin, Jeffrey E.; and Gosselin, Lisa A., 5,022,101, Cl. 4-498.000.
- Goto, Masahiro: *See—*
  - Matsuda, Mikio; Inagaki, Mitsuo; Hayashi, Ikuo; Goto, Masahiro; Kojima, Akikazu; Taya, Toshiki; and Miura, Nobuhiro, 5,022,826, Cl. 417-63.000.
- Goto, Masayoshi; Demura, Nobutaka; and Osaki, Tsutomu, to Hoechst Japan Limited. Anti-dementia agents. 5,023,244, Cl. 514-46.000.
- Goto, Nobutaka: *See—*
  - Kurematsu, Masayuki; Koboshi, Shigeharu; and Goto, Nobutaka, 5,023,644, Cl. 354-320.000.
- Goto, Tsuyoshi; Hatamura, Kouichi; and Seike, Shinji, to Mazda Motor Corporation. Supercharging device of an engine. 5,022,375, Cl. 123-564.000.
- Gottfert, Michael: *See—*
  - Appelbaum, Edward R.; Hennecke, Hauke; Lamb, Joseph W.; and Gottfert, Michael, 5,023,180, Cl. 435-172.300.
- Gottling, Helmut: *See—*
  - Fortmann, Norbert; Gottling, Helmut; Meyer, Hans F.; Moller, Rudolf; and Scharnowski, Gerhard, 5,022,311, Cl. 92-137.000.
- Goubeaux, Ronald J.; and Spurney, Joseph L., to General Motors Corporation. Control method for a variable displacement air conditioning system compressor. 5,022,234, Cl. 62-228.500.
- Goupil, Jean-Jacques. Antidepressant method of use. 5,023,270, Cl. 514-455.000.
- Goutte, Robert; Jacquemod, Gilles; and Odet, Christophe, to European Coal and Steel Community. Method and a device for processing electric signals coming from the analysis of the line of an image. 5,023,921, Cl. 382-58.000.
- Grachev, Anatoly F.: *See—*
  - Gordon, Anatoly M.; Fedorov, Eduard L.; and Grachev, Anatoly F., 5,022,594, Cl. 241-282.200.
- Gracovetsky, Serge; and Frost, Rudolf U., to Diagnospine Research Inc. Connection kit for skin-markers and electrodes. 5,022,412, Cl. 128-781.000.
- Grady, Ralph E., to Eastman Kodak Company. Light-tight package. 5,022,524, Cl. 206-395.000.
- Graham Engineering Corporation: *See—*
  - Dundas, Dennis L.; Moore, Eugene L.; Oles, Paul M.; and Briggs, Milton, 5,022,544, Cl. 215-31.000.
- Grandvallet, Pierre; Kortbeek, Andras Guus Theodorus George; Van Den Berg, Johannes Petrus; and Robschlager, Karl-Heinz, to Shell Oil Company. Process for preparing normally liquid oxygenate and hydrocarbonaceous products from a hydrocarbon feed containing linear- and branched olefins. 5,023,389, Cl. 585-304.000.
- Granger, Yves: *See—*
  - Badaoui, Mohamed; Dambricourt, Richard; Franquenouille, Jean-Paul; Garcia, Christian; Granger, Yves; and Spalmacin-Roma, Sylvie, 5,023,867, Cl. 370-56.000.
- Grant, Michael; and Robson, David, to British Aerospace Public Lmited Company. Beam pointing mechanism. 5,023,865, Cl. 370-3.000.
- Grapha-Holding Ag: *See—*
  - Linder, Heinz, 5,022,807, Cl. 414-278.000.
- Grass Valley Group, Inc., The: *See—*
  - Jardins, Philip D., 5,023,720, Cl. 358-183.000.
- Grateau, Luc; and Prassas, Michel, to Corning France S.A. Fast fading, high refractive index photochromic glass. 5,023,209, Cl. 501-13.000.
- Grau, Walter: *See—*
  - Wagner, Friedrich; and Grau, Walter, 5,022,631, Cl. 251-185.000.
- Grava, Arturs; and Jolley, Scott T., to Lubrizol Corporation, The. Liquid refrigerant compositions. 5,023,007, Cl. 252-67.000.
- Graver Company, The: *See—*
  - Salem, Eli; Libutti, Bruce L.; and Kunin, Robert, 5,022,997, Cl 210-670.000.
- Gray, Jordan B., to Nouveaux Corporation. Fastening means for custon-fit seat covers. 5,023,125, Cl. 428-100.000.
- Gray, Kenneth P.; and McDonough, Michael L., to Carrier Corporation. Plate fin collar gauging apparatus. 5,022,161, Cl. 33-548.000.
- Great Plains Manufacturing Incorporated: *See—*
  - McClure, J. Michael; and Johnson, Eric, 5,022,333, Cl. 111-194.000.
- Grebe, Kurt R.: *See—*
  - Flint, Ephraim B.; Grebe, Kurt R.; Gruber, Peter A.; and Zingher, Arthur R., 5,022,462, Cl. 165-80.400.
- Grecksch, Hans: *See—*
  - Wey, Edmund; Grecksch, Hans; Pesch, Albert T.; Knors, Herbert, Zitzen, Wilhelm; and Marquardt, Manfred, 5,022,596, Cl. 242-36.000.
- Greco, Jr. Robert L., to Xerox Corporation Auto-duplex/simplex feeder module. 5,022,640, Cl. 271-31.000.
- Greeley, Robert H., to CPM Energy Systems Corporation. Rotary drum solid waste air classifier. 5,022,982, Cl. 209-12.000.
- Green, James A., II: *See—*
  - Young, Donald C.; and Green, James A., II, 5,022,912, Cl. 71-30.000.
- Green, Michael H., to Eastman Kodak Company. Disengageable coupling usable in a sheet transport mechanism. 5,022,645, Cl. 271-276.000.
- Greenbaum, George. Comply system. 5,022,555, Cl. 220-401.000.
- Greenberg, Charles E.: *See—*
  - Lappos, Nicholas D.; Walsh, David M.; Sweet, David H.; and Greenberg, Charles E., 5,023,797, Cl. 364-442.000.
- Greenstein, Larry J.: *See—*
  - Cimini, Leonard J., Jr.; Greenstein, Larry J.; and Saleh, Adel A. M., 5,023,947, Cl. 455-619.000.
- Gregor, Steven L., to International Business Machines, Corp. Store queue for a tightly coupled multiple processor configuration with two-level cache buffer storage. 5,023,776, Cl. 364-200.000.
- Grey, Thaddeus J.; Kirton, Raymond E.; English, George A.; Liggett, Michael D.; Meyer, Karen M.; and Barker, Charles J., to General Motors Corporation. Exhaust gas recirculation valve assembly. 5,022,431, Cl. 137-375.000.
- Griat, Jacqueline: *See—*
  - N'Guyen, Quang L.; Griat, Jacqueline; and Millecamps, Francois, 5,023,235, Cl. 514-18.000.
- Grieser, Klemens: *See—*
  - Denz, Helmut; Grieser, Klemens; Stock, Jurgen; Moz, Rudolf; and Uttenweiler, Winifred, 5,022,374, Cl. 123-490.000.
- Grill, Benjamin: *See—*
  - Sturman, Oded E.; Grill, Benjamin; and Harrison, Walter L., 5,022,565, Cl. 222-396.000.
- Grimes, Stephen: *See—*
  - Gevas, Philip C.; Karr, Stephen L., Jr.; Grimes, Stephen; and Littenberg, Richard L., 5,023,077, Cl. 424-88.000.
- Grimm, Charles M.: *See—*
  - Simon, Robert C., Jr.; Deutscher, Dale W.; Grimm, Charles M.; Thompson, Dennis D., and Bailey, Kirk A., 5,023,778, Cl. 364-200.000.
- Grissom, Tovey L. Beverage cooler apparatus. 5,022,235, Cl. 62-457.400.
- Groeneveld, Wilbur: *See—*
  - Knurr, Randal; and Groeneveld, Wilbur, 5,022,219, Cl. 56-16.400

VOL
1127
ISS
2
JE
11
1991
UMI

- Groothoff, Adriaan J., to U.S. Philips Corporation. Picture tube having an electro-magnetic deflection unit. 5,023,510, Cl. 313-440.000.
- Groppo, Domenico. Wheel cover for motor vehicles. 5,022,710, Cl 301-37.00S.
- Gross, Joseph R.. *See—*
  - Danielson, Orland H.; and Gross, Joseph R., 5,023,410, Cl. 191-12.20R.
- Grosser, Frank R.: *See—*
  - Scardera, Michael, and Grosser, Frank R., 5,023,008, Cl. 252-106.000.
- Grover, Wayne D.; Fong, Tommy; Dubuc, Joe P.; Krzymien, Witold A.; and Fraser, George D., to Alberta Telecommunications Research Centre. Method and apparatus for maximizing the transmission capacity of a multi-channel bidirectional communications link. 5,023,869, Cl. 370-84.000.
- Gruber, Peter A.: *See—*
  - Flint, Ephraim B.; Grebe, Kurt R.; Gruber, Peter A.; and Zingher, Arthur R., 5,022,462, Cl. 165-80.400.
- Grumman Aerospace Corporation: *See—*
  - Klein, John F.; Kearns, Joel; and Gonen, Jerry, 5,023,058, Cl. 422-248.000.
- Grundfos International A/S. *See—*
  - Jensen, Niels D., 5,022,139, Cl. 29-596.000.
- Grundmann, William J.; Madden, William C.; and Uhler, George M., to Digital Equipment Corporation. Microinstruction addressing in high-speed CPU. 5,023,828, Cl. 364-900.000.
- Grundy, Barry T.; Hargreaves, Edward; and Whitfield, Peter J., to Pilkington PLC. Method and apparatus for coating glass. 5,022,905, Cl. 65-60.510.
- Gruning, Burghard; Hoffmann, Klaus; Koerner, Gotz; and Kollmeier, Hans-Joachim, to Th. Goldschmidt AG. Betaine group-containing derivatives of carboxymethylcellulose, their synthesis and their use in cosmetic preparations. 5,023,246, Cl. 514-57.000.
- Gsell, Laurenz, to Ciba-Geigy Corporation. Nitroenamines. 5,023,259, Cl. 514-256.000.
- GTE Laboratories Incorporated: *See—*
  - Childs, Richard B., 5,023,945, Cl. 455-617.000.
  - Dagenais, Mario; and Sharfin, Wayne F., 5,022,741, Cl. 350-353.000.
  - McColl, James R., 5,023,605, Cl. 340-825.310.
- GTE Products Corporation: *See—*
  - Cleveland, Joseph J., 5,023,215, Cl. 501-98.000.
  - Lagos, Costas C., 5,023,015, Cl. 252-301.40R.
  - Ratliff, Paul A.; and Karlotski, Robert J., 5,023,505, Cl. 313-25.000.
  - Shaffer, John W., 5,022,880, Cl. 445-6.000.
  - White, Philip J.; and Shinn, Dennis B., 5,022,882, Cl. 445-21.000.
- GTE Sylvania N.V.: *See—*
  - Schaaf, Walter A. L., 5,023,512, Cl. 313-560.000.
- Guasch, Esteve C., to Bendix Espana S.A. Rotating and sealed bearing assembly of a first member rotating in a second member. 5,022,770, Cl. 384-477.000.
- Guenther, Manfred: *See—*
  - Faerber, Karlheinz; Deininger, Anton, Plester, George; Guenther, Manfred; and Troska, Georg, 5,022,558, Cl. 222-105.000.
- Guidotti, Daniel; Tan, Swie-in; and Wilman, John G., to International Business Machines Corporation. Nulling optical bridge for contactless measurement of changes in reflectivity and/or transmissivity. 5,022,765, Cl. 356-435.000.
- Guillemin, Jean-Pierre H. B. Method and apparatus for countertyping a tint from a collection of base tints. 5,023,814, Cl. 364-526.000.
- Guirguis, Raouf A., to La Mina Ltd. Modular fluid testing device. 5,022,411, Cl. 128-771.000.
- Gullinger, Terry R.: *See—*
  - Blewer, Robert S.; Gullinger, Terry R.; Kelly, Michael J.; and Tsao, Sylvia S., 5,023,200, Cl. 437-187.000.
- Gully, Wilfred J.: *See—*
  - Altemose, George A.; Consi, Michael; Joscelyn, Edwin R.; Wiemann, William; Giguere, David B.; Gully, Wilfred J.; and Spencer, Stanley E., 5,023,531, Cl. 318-471.000.
- Gumussoy, Murat, to Orbitel Mobile Communications Limited. Digitizing circuit for demodulated digital data signals. 5,023,562, Cl. 329-303.000.
- Gunda, Rajamouli: *See—*
  - Miller, John A.; Leemhuis, Richard S.; and Gunda, Rajamouli, 5,023,535, Cl. 318-599.000.
- Gundlach, Robert W., to Xerox Corporation. Excess liquid carrier removal apparatus. 5,023,665, Cl. 355-256.000.
- Gunning, William F., to Xerox Corporation. Drivers and receivers for interfacing VLSI CMOS circuits to transmission lines. 5,023,488, Cl. 307-475.000.
- Gupta, Balaram; and Calundann, Gordon W., to Hoechst Celanese Corp. Novel polyarylate compositions having improved properties. 5,023,314, Cl. 528-190.000.
- Gupta, Kashmiri L., to Basic Bio Systems, Inc. Time release protein. 5,023,080 Cl. 424-405.000.
- Gustavsen, Alfen J.: *See—*
  - Gallacher, Lawrence V.; Gustavsen, Alfen J.; and Kugel, Robert L., 5,023,016, Cl. 252-389.520.
- Guyon, Vincent. Damper mechanism for upright piano. 5,022,302, Cl. 84-255.000.
- GV S.A.: *See—*
  - Vuagnat, Louis, 5,022,763, Cl. 356-400.000.
- Gymer, Geoffrey E.; Narayanaswami, Subramaniyan; and Richardson, Kenneth, to Pfizer Inc. Triazole antifungal agents. 5,023,258, Cl. 514-255.000.
- H. Weidmann AG: *See—*
  - Isler, Erwin, 5,022,791, Cl. 405-260.000.
- Ha, Chang W., to Hyundai Electronics Industries Co., Ltd. Method for arranging EEPROM cells and a semiconductor device manufactured by the method. 5,023,681, Cl. 357-23.500.
- Haas, Peter; and Hettel, Hans, to Bayer Aktiengesellschaft. Process for the production of polyurethane foams. 5,023,280, Cl. 521-106.000.
- Haase, Gerald A. Water toy having umbrella spray pattern. 5,022,588, Cl. 239-211.000.
- Habbab, Isam M. I.: *See—*
  - Cimini, Leonard J.; Habbab, Isam M. I.; and Woodward, Sheryl L., 5,022,730, Cl. 350-96.130.
- Haberkorn, Axel: *See—*
  - Lindner, Werner; and Haberkorn, Axel, 5,023,260, Cl. 514-269.000.
- Hafner, Curtis R., to Marquette Electronics. Inc. Cardiac monitoring method and apparatus. 5,022,404, Cl. 128-696.000.
- Hagedorn, Myrna L.: *See—*
  - Farbood, Mohamad I.; Morris, James A.; Sprecker, Mark A., Bienkowski, Lynda J.; Miller, Kevin P.; Vock, Manfred H.; and Hagedorn, Myrna L., 5,023,347, Cl. 549-263.000
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  - Sherrow, Lionel; Rosenthal, Harold; Spitz, Joseph M.; and Haines, Stephen W., 5,022,810, Cl. 414-501.000.
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- Haivala, Erkki Method and apparatus for electrolytic treatment of liquids, especially waste water. 5,022,974, Cl. 204-275.000.
- Hall, Allen T., to Electro-Films, Inc. Gold diffusion thin film resistors and process. 5,023,589, Cl. 338-308.000.
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  - Thaler, Warren A.; Brois, Stanley J.; and Hall, Henry K., 5,023,005, Cl. 252-47.500.
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  - Wright, James R.; Hall, James R.; and Theobald, Keith D., 5,022,865, Cl. 439-279.000.
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  - Pitts, Alan J., 5,023,819, Cl. 364-558.000.
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  - Gold, Randy, 5,023,450, Cl. 250-261.000.
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- Hallworth, Gerald, to Dow Chemical Company, The. Method of bonding layers using discrete areas of adhesive. 5,022,948, Cl. 156-291.000.
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  - Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi; and Suzuki, Hiroyuki, 5,022,475, Cl. 177-211.000.
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  - Ishida, Tokuji; Hamada, Masataka; Ishibashi, Kenji; Taniguchi, Nobuyuki; Ootsuka, Hiroshi; Norita, Toshio; and Karasaki, Toshihiko, 5,023,646, Cl. 354-402.000.
- Hamamatsu Photonics K.K.: *See—*
  - Yamashita, Takaji; Watanabe, Mitsuo; Okada, Hiroyuki; and Shimizu, Keiji, 5,023,894, Cl. 378-4.000.
- Hamana, Ryozo: *See—*
  - Inaba, Masashi; Hamana, Ryozo; Hase, Hideyuki; and Ashizawa, Tatsuro, 5,023,383, Cl. 568-815.000.
- Hamaoka, Tetsuya: *See—*
  - Mihara, Haruhiko; Ida, Norihiro; and Hamaoka, Tetsuya, 5,023,414, Cl. 200-61.910.
- Hamashima, Kazuo: *See—*
  - Shinozaki, Yasuo; Horie, Noritoshi; Hamashima, Kazuo; and Imakawa, Makoto, 5,022,919, Cl. 75-238.000.
- Hamel, Lawrence G.: *See—*
  - Ayer, Atul D.; and Hamel, Lawrence G., 5,023,076, Cl. 424-78.000.
- Hamer, Robert G.: *See—*
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- Hammer, Russell C.; Silage, Gregory J.; and Pietron, Casimir P., to Chrysler Corporation. Tool for installation of clip. 5,022,292, Cl. 81-426.000.
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- Hansler, Richard L.: *See—*
  - Allen, Gary R.; Davenport, John M., and Hansler, Richard L., 5,023,758, Cl. 362-61.000.
- Hanson, George E.: *See—*
  - Cargin, Keith K., Jr., and Hanson, George E., 5,023,823, Cl. 364-708.000.
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  - Hanyu, Susumu; Kasuga, Noboru; Koike, Mikio; Hara, Kazumasa; Nishijima, Mitsuru; and Sasano, Akiyoshi, 5,022,335, Cl. 112-255.000.
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- Harada, Hiromu: *See—*
  - Kamijo, Tetsuhide; Ujiie, Arao; Harada, Hiromu; Tsutsumi, Naoyuki; Tsubaki, Atsushi; Yamaguchi, Toshiaki; and Nagata, Hideo, 5,023,261, Cl. 514-285.000.
- Harakawa, Takeshi. *See—*
  - Nakayashiki, Susumu; Harakawa, Takeshi, and Kashio, Jiro, 5,023,871, Cl. 370-85.500.
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  - Kawahara, Tsugio; Harashima, Hiromasa, Ubukata, Shunji; Kameda, Kazuo; Moriya, Hirohito, and Inamura, Yoshihisa, 5,022,172, Cl. 40-503.000.
- Harben, Grover S., III. Apparatus for removing oil bag from fowl. 5,022,120, Cl. 452-115.000.
- Harbert, Earl W., to Vernay Laboratories, Inc. Marine exhaust system. 5,022,877, Cl. 440-89.000.
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  - Grundy, Barry T.; Hargreaves, Edward; and Whitfield, Peter J., 5,022,905, Cl. 65-60.510.
- Harman International Industries, Incorporated: *See—*
  - House, William N., 5,022,488, Cl. 181-156.000.
- Harnischfeger Corporation: *See—*
  - Beier, Dale A., 5,022,542, Cl. 212-219.000.
- Harreus, Albrecht: *See—*
  - Kast, Juergen; Kolassa, Dieter; Meyer, Norbert, Schirmer, Ulrich; Harreus, Albrecht; Wild, Jochen; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,022,914, Cl. 71-88.000.
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  - Heckaman, Douglas E.; Frisco, Jeffrey A.; Rieder, Gregory C., and Bajgrowicz, Edward J., 5,023,624, Cl. 343-860.000.
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  - Evans, Larry R.; Waddell, Walter H., Harris, Frank W., and Benko, David A., 5,023,287, Cl. 524-255.000.
- Harris, Marvin L.: *See—*
  - Nguyen, Dong D.; and Harris, Marvin L., 5,022,166, Cl 34-120.000.
- Harris Semiconductor Patents, Inc.: *See—*
  - Dingwall, Andrew G. F., 5,023,613, Cl. 341-118.000.
  - Wodarczyk, Paul J., Wheatley, Carl F., Jr.; Neilson, John M. S.; and Jones, Frederich P., 5,023,692, Cl. 357-43.000.
- Harris, Thomas V.: *See—*
  - Irani, Cyrus A.; Harris, Thomas V.; and Pretzer, Wayne R., 5,022,467, Cl. 166-273.000.
- Harrison, Walter L.: *See—*
  - Sturman, Oded E.; Grill, Benjamin; and Harrison, Walter L., 5,022,565, Cl. 222-396.000.
- Harter, Robert T., to Health Care Manufacturing, Inc. Patient table apparatus. 5,022,388, Cl. 128-74.000.
- Harting, Dietmar; and Piewitt, Gunter, to Harting Elektronik GmbH Electrical plug and socket connector with U-shaped locking hoop. 5,022,866, Cl. 439-372.000.
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  - Harting, Dietmar; and Piewitt, Gunter, 5,022,866, Cl. 439-372.000.
- Hartl, Lyn W.: *See—*
  - Schield, Edward L.; Reeves, Myron D.; Nehiba, Marjorie A.; and Hartl, Lyn W., 5,022,206, Cl. 52-455.000.
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- Hartner, Hartmut: *See—*
  - Felder, Ernst; Romer, Michael; Bardonner, Hans; Hartner, Hartmut; and Fruhstorfer, Wolfgang, 5,023,379, Cl. 564-472.000.
- Hartnett, G. Robert, to Aluminum Company of America. Building panel having locking flange and locking receptacle. 5,022,207, Cl 52-537.000.
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  - Kato, Kenji; Koga, Nariyoshi, and Haruta, Yukinori, 5,023,339, Cl 548-401.000.
- Harvey, Howard W.: *See—*
  - Coughlan, Joel B.; Farnstrom, Kenneth A., Harvey, Howard W. Upton, R. Glen; White, John R., and Walker, Kenneth L., 5,022,812, Cl 414-729.000.
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  - Morton, Anthony J., Stewart, Ian W., and Harvey, Kenneth, 5,023,074, Cl. 424-52.000.
- Harvey, Robert J., to Scientific Design Company, Inc. Preparation of alkylene carbonates. 5,023,345, Cl. 549-230.000.
- Harvey, Robin J.; and Palmer, A. Jay, to Hughes Aircraft Company Upshifted free electron laser amplifier. 5,023,563, Cl. 330-4.300.
- Harza, Richard D. Ergonomic anti-fatigue seating device and method 5,022,385, Cl. 128-33.000.
- Hasbro, Inc.. *See—*
  - Jenkins, Barbara P., 5,022,886, Cl. 446-268.000
  - Schultheis, Douglas A., 5,022,323, Cl. 101-219.000.
- Hase, Hideyuki: *See—*
  - Inaba, Masashi; Hamana, Ryozo, Hase, Hideyuki; and Ashizawa, Tatsuro, 5,023,383, Cl. 568-815.000.
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- Hasegawa, Takanori, and Negishi, Hideo, to Riso Kagaku Corporation Sheet feeding device for a image developing and processing machine. 5,022,642, Cl. 271-10.000.
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  - Matsumoto, Masaharu; Satoh, Katsuaki; Ishikawa, Seiichi, Serikawa, Mitsuhiko; Kawamura, Akihisa; and Hashimoto, Hikari, 5,023,913, Cl. 381-63.000.
- Hashimoto, Hiroshi, to Daiwa Seiko, Inc. Click sound generator for fishing reel. 5,022,606, Cl. 242-307.000.
- Hashimoto, Masashi; and Kwon, Oh-Kyong, to Texas Instruments Incorporated. Capacitor-driven signal transmission circuit. 5,023,472, Cl. 307-270.000.
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  - Bethea, Clyde G.; Hasnain, Ghulam; Levine, Barry F., and Malik, Roger J., 5,023,685, Cl. 357-30.000
- Hasty, James H., to Kendall Company, The. Antiembolism stocking used in combiantion with an intermittent pneumatic compression device. 5,022,387, Cl. 128-64.000.
- Hasumi, Kazuo; Mochizuki, Kouichi, and Fujiyama, Masaaki, to Fuji Photo Film Co., Ltd. Magnetic recording medium which contains a binder of nitrogen containing vinyl chloride polymer and an amino group containing polyurethane. 5,023,135, Cl. 428-336.000.
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  - Ueno, Hiroshi; Hatabu, Shoji; and Arai, Hirokazu, 5,022,279, Cl. 74-422.000.
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  - Suzuki, Mariko; Itaya, Kazuhiko; Ishikawa, Masayuki; Watanabe, Yukio; and Hatakoshi, Genichi, 5,023,880, Cl. 372-45.000
- Hatamura, Kouichi: *See—*
  - Goto, Tsuyoshi; Hatamura, Kouichi; and Seike, Shinji, 5,022,375, Cl. 123-564.000.
- Hatano, Masaru; and Tabata, Yoshiaki, to Mita Industrial Co., Ltd. Image forming apparatus having an intermediate sheet alignment and receiving unit. 5,023,669, Cl. 355-319.000.
- Hattori, Hiroshi: *See—*
  - Sasaki, Kenji; Yokota, Kenji; Hattori, Hiroshi, and Sata, Nobuyuki, 5,022,498, Cl. 187-127.000.
- Hattori, Yasuhiro: *See—*
  - Uenishi, Naota; Uemiya, Takafumi; Mizoguchi, Akira; Ogaki, Yasuji; Hattori, Yasuhiro; Tohma, Teruo; Chikuma, Kiyofumi; and Okamoto, Sota, 5,022,738, Cl. 350-96.340.
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  - Kuhrts, Eric H., 5,023,245, Cl. 514-54.000.
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  - Vanaschen, Luc; Kuster, Hans-Werner; Havenith, Hubert; and D'Iribarne, Benoit, 5,022,906, Cl. 65-104.000.
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  - Ingalls, John L.; Brinker, Reiner G., and Hawkins, Jesse L., Jr., 5,022,950, Cl. 156-361.000.
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  - Yamamoto, Shigeru; Mori, Satoru; and Hayashi, Akira, 5,023,144, Cl. 428-606.000.
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  - Matoba, Gensuke; Ishida, Katsuhiko; Tani, Hisashi; and Hayashi, Hiroo, 5,023,227, Cl. 503-214.000.
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  - Matsuda, Mikio; Inagaki, Mitsuo; Hayashi, Ikuo; Goto, Masahiro; Kojima, Akikazu; Taya, Toshiki; and Miura, Nobuhiro, 5,022,826, Cl. 417-63.000.
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VOL 1127 ISS 2 JE 11 1991 UMI

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Hayashi, Osamu: *See—*
- Adachi, Etsushi; Adachi, Hiroshi; Hayashi, Osamu; and Okahashi, Kazuo, 5,023,204, Cl. 437-228.000.

Hayashi, Tatsuo: *See—*
- Nishida, Koji; Yokomizo, Osamu; Masuhara, Yasuhiro; Nakao, Toshitsugu; Kashiwai, Shin-ichi; Tomiyama, Akio; Yamashita, Junichi; and Hayashi, Tatsuo, 5,023,047, Cl. 376-370.000.

Hayashi, Tetsuya: *See—*
- Takeda, Yoshinobu; Odani, Yusuke; Hayashi, Tetsuya; Kaji, Toshihiko; and Itoh, Yoshiaki, 5,022,455, Cl. 164-46.000.

Hayashi, Yasuyuki; and Abe, Shigenobu, to Kabushiki Kaisha Showa Seisakusho. Hydraulic type vehicle height adjusting device for attachment to vehicle shock absorber. 5,022,501, Cl. 188-300.000.

Hayashiya, Keizo: *See—*
- Yamaoka, Ryohei; Hayashiya, Keizo; Yoshimura, Tohru; Seki, Eiji; Masutani, Tetsuya; and Kitahara, Katsuhiko, 5,023,327, Cl. 536-18.400.

Health Care Manufacturing, Inc.: *See—*
- Harter, Robert T., 5,022,388, Cl. 128-74.000.

Hebeisen, Walter: *See—*
- Siegesleuthner, Franz; and Hebeisen, Walter, 5,023,638, Cl. 354-126.000.

Heberle, Klaus, to Deutsche ITT Industries GmbH. Electrooptical pointing device for remotely controlling electronic apparatus. 5,023,943, Cl. 455-603.000.

Hebert, Lawrence A.: *See—*
- West, David H.; Hebert, Lawrence A.; Bowlin, Roger L.; and Holbrook, Michael T., 5,023,387, Cl. 570-252.000.

Heckaman, Douglas E.; Frisco, Jeffrey A.; Rieder, Gregory C.; and Bajgrowicz, Edward J., to Harris Corporation. Microwave chip carrier package having cover-mounted antenna element. 5,023,624, Cl. 343-860.000.

Heckmann, Johannes, to Dragerwerk Aktiengesellschaft. Flow tester. 5,023,055, Cl. 422-83.000.

Heel, Helmut; Bauch, Karl; Reisacher, Bartholomaus; and Worner, Stefan, to Ott Maschinentechnik GmbH. Rotating union for two different fluids. 5,022,686, Cl. 285-134.000.

Heeter, William B.; and Hickey, Katherine F., to Chesapeake Consumer Products Company. Paper tableware with metallized layer 5,022,554, Cl. 220-456.000.

Hegedus, Edit: *See—*
- Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre; Teplan, Istvan; Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt; Hegedus, Edit; Makara, Gabor; and Rappay, Gyorgy, 5,023,322, Cl. 530-324.000.

Hegstad, Bjorn. Surface coating. 5,023,428, Cl. 219-213.000.

Hehl, Karl. Injecting unit for use in an injection molding machine. 5,022,847, Cl. 425-578.000.

Heibel, Helmut; and Gilles, Leo, to Lucas Industries public limited company. Pressure control unit, especially for motor vehicle brake systems. 5,022,717, Cl. 303-119.000.

Heidelberger Druckmaschinen AG: *See—*
- Pfeiffer, Nikolaus, 5,023,812, Cl. 364-519.000.
- Salice, Luciano, 5,022,116, Cl. 16-258.000.

Heithoff, Robert B.: *See—*
- Krumwiede, John F.; Kopp, Paul W.; and Heithoff, Robert B., 5,023,210, Cl. 501-71.000.

Heitzig, Claus-Peter; and Schuetz, Dietmar, to Siemens Aktiengesellschaft. Holder for a tubular safety fuse. 5,023,588, Cl. 337-195.000.

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Heldman, Henrich; and Wallwey, Erich, to Wegmann & Co. GmbH. Ammunition magazine for a combat vehicle. 5,022,308, Cl. 89-45.000.

Hellwig, John. Newspaper bundler with recyclable straps. 5,022,316, Cl. 100-34.000.

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Hemmelgarn, Gerald B.: *See—*
- Vallone, Giacinto; Janisiewicz, Stanley W.; Snyder, Michael D.; Hemmelgarn, Gerald B.; and Glidden, Wayne A., 5,023,544, Cl. 324-158.00F

Hempel, Horst: *See—*
- Roll, Rudolf; Brandenburger, Jurgen; and Hempel, Horst, 5,022,976, Cl. 204-297.00R.

Henderson, Robert M. Collapsible valet. 5,022,617, Cl. 248-125.000.

Hennecke, Hauke: *See—*
- Appelbaum, Edward R.; Hennecke, Hauke; Lamb, Joseph W.; and Gottfert, Michael, 5,023,180, Cl. 435-172.300.

Henriquez. Kenneth R. Bin locking system. 5,022,537, Cl. 211-88.000.

Henry, Wayne L.: *See—*
- Kreh, Robert P.; Lundquist, Joseph T.; Henry, Wayne L.; Kelly, John A.; and Kuhn, Vincent R., 5,022,926, Cl. 134-2.000.

Hensel, Bernd; Kopacz, Uwe; Hofmann, Dieter; Schussler, Hans; and Eckhardt, Gunter, to Leybold Aktiengesellschaft. Apparatus for coating three dimensional substrates by means of cathode spruttering. 5,022,978, Cl. 204-298.190.

Henzel, Richard P., to Eastman Kodak Company. Subbing layer for dye-donor element used in thermal dye transfer. 5,023,228, Cl. 503-227.000.

Herbert, Brian K., to NCR Corporation. Random access memory device with integral logic capability. 5,023,838, Cl. 365-189.080.

Hercules Incorporated: *See—*
- Charlson, Sandra M.; Kotula, Steven J.; and McCloy, Michael R., 5,022,845, Cl. 425-403.000.
- Cheng, Huai N., 5,023,230, Cl. 505-1.000.
- Matsumoto, Roger L. K.; and Rosenthal, Allan B., 5,023,214, Cl 501-97.000.
- Rice, John H., Jr., 5,022,324, Cl. 102-201.000.

Herlihy, Joseph P.: *See—*
- Jeppson, John, III; and Herlihy, Joseph P., 5,022,168, Cl. 36-43.000.

Herring, Kathryn D., to Baxter Diagnostics Inc. Blood gas/electrolytes calibrator and methods of making and using the same. 5,023,186, Cl. 436-11.000.

Herzberg, Garry G.; and Reynolds, Robert C., to Boeing Company, The. Automated test apparatus for aircraft flight controls. 5,023,791, Cl. 364-424.040.

Hettel, Hans: *See—*
- Haas, Peter; and Hettel, Hans, 5,023,280, Cl. 521-106.000.

Hettwer, James C., to U-Haul International, Inc. Truck ramp anti-theft system. 5,022,697, Cl. 296-37.600.

Hetzler, Kevin G.; Wegner, Wayne M.; and Munger, Billie C., to Reynolds Consumer Products, Inc. Non-telescoping polyethylene film roll and method for producing same. 5,023,142, Cl. 428-500.000.

Hewlett-Packard Company: *See—*
- Anklam, William J.; and Kunz, William E., 5,023,574, Cl. 333-20.000.
- Bares, Steven J.; and Leban, Marzio A., 5,023,625, Cl 346-1.100.
- Breu, Heinz, 5,023,916, Cl. 382-8.000.
- Breu, Heinz, 5,023,920, Cl. 382-55.000.
- Fullmer, Douglas E.; Seibel, Michael J.; and Sheppard, Roger D., 5,023,571, Cl. 331-4.000.
- Rhodes, Robert P., 5,022,756, Cl. 356-316.000.
- Yosinski, Neil J., 5,023,541, Cl. 323-275.000.

Hexel, Gunter, to Schmalbach-Lubeca AG. Easy-open package with cover tab. 5,022,551, Cl. 220-270.000.

Hickey, Katherine F.: *See—*
- Heeter, William B.; and Hickey, Katherine F., 5,022,554, Cl. 220-456.000.

Hicks, Ray. Apparatus for printing information on a substantially continuous roll of photographic paper. 5,023,655, Cl. 355-39.000.

Hida, Tsugio: *See—*
- Miyazaki, Akira; Kikuchi, Yuichi, Ohara, Yoshiyuki; Fujinaga, Tomosburo; Kawata, Takashi; Mizutani, Fumitoshi; Hida, Tsugio; and Shimazaki, Shiroyasu, 5,022,789, Cl. 405-133.000.

Hidaka, Hiroshi: *See—*
- Sugihara, Hirosi; Hidaka, Hiroshi; Doi, Akira; Okawauchi, Toshitaka; Kawabata, Yasushi; and Baba, Hideki, 5,023,101, Cl 426-603.000.

Hidaka, Norio; Yamamura, Shigeyuki; and Fukuta, Masumi, to Fujitsu Limited. Semiconductor device. 5,023,703, Cl. 357-74.000.

Hieda, Teruo; Shimizu, Hiroyuki; and Masuda, Kazunori, to Canon Kabushiki Kaisha. Color temperature detecting device wherein comparison is made between color component levels and reference levels which vary with the illuminance of incident light. 5,023,704, Cl. 358-29.00C.

Highes Aircraft Company: *See—*
- Frey, Eric M.; and Lamb, Joseph A., 5,023,848, Cl. 368-1.000.

Higuchi, Toshiro; Izumi, Hazime; and Tanaka, Minoru, to Izumi Industries, Ltd. Cutting apparatus for a noncircular cross section 5,022,294, Cl. 82-18.000.

Higuchi, Youji: *See—*
- Yamamura, Kengo; Saito, Tutomu; and Higuchi, Youji, 5,022,184, Cl. 49-352.000.

Hijikata, Isamu; Uehara, Akira; and Samezawa, Mitsuo, to Tokyo Ohka Kogyo Co., Ltd. Electrode for use in the treatment of an object in a plasma. 5,022,979, Cl. 204-298.330.

Hikosaka, Kohki; and Hirachi, Yasutake, to Fujitsu Limited Field effect transistor. 5,023,674, Cl. 357-16.000.

Hiland, Terrence T.: *See—*
- Brooks, Gene R.; and Hiland, Terrence T., 5,022,248, Cl. 72-21.000.

Hilgard, Peter: *See—*
- Schumacher, Wolfgang; Respondek, Johannes; Engel, Jurgen; Pohl, Jorg; Voegeli, Rainer; and Hilgard, Peter, 5,023,335, Cl. 548-104.000.

Hill, Joe A. Adjustable support for hot water tanks, or the like. 5,022,624, Cl. 248-274.000.

Hillard, Robert J., to Solid State Measurements, Inc. Apparatus and method for non-invasive measurement of electrical properties of a dielectric layer in a semiconductor wafer. 5,023,561, Cl. 324-719.000.

Hineline, Thomas A.: *See—*
- Woelfel, James A.; and Hineline, Thomas A., 5,022,712, Cl. 301-63.0PW.

Hines, Gordon E.; Salenbien, Leonard J.; and Burzan, Vernon J., to Hines Industries, Inc. Workpiece support tool. 5,022,665, Cl. 279-2.00R.

Hines Industries, Inc.: *See—*
- Hines, Gordon E.; Salenbien, Leonard J.; and Burzan, Vernon J., 5,022,665, Cl. 279-2.00R.

Hingorany, Prem R., to Explosive Fabricators, Inc. Method of manufacture power hybrid microcircuit. 5,022,144, Cl. 29-854.000.

Hinson, Teddy P., to Solite Corporation. Truck for alternately handling bulk and palletized cargo. 5,022,809, Cl. 414-494.000.

Hinton, Glenn J.: *See—*
- Arnold, James M.; Hinton, Glenn J.; and Smith, Frank S., 5,023,844, Cl. 365-230.050.

Hippely, Keith A.; and Ostendorff, Eric C., to Mattel, Inc. Temperature activated toy vehicle. 5,022,884, Cl. 446-14.000.

Hirabayashi, Shigeto; Tsuruta, Mayumi; and Mizukura, Noboru, to Konica Corporation. Light-sensitive silver halide color photographic material. 5,023,169, Cl. 430-505.000.

Hirachi, Yasutake: *See—*
- Hikosaka, Kohki; and Hirachi, Yasutake, 5,023,674, Cl. 357-16.000

Hirai, Kazuo; and Kasuya, Akira, to Toray Silicone Company, Ltd Silicone rubber adhesive. 5,023,288, Cl. 524-268.000.

Hirai, Tadaaki: *See—*
- Yokouchi, Hisatake; Takasaki, Yukio; Hirai, Tadaaki; Koike, Kouichi; Tsuneoka, Masayuki, Onodera, Yoichi; and Funo, Takakazu, 5,023,896, Cl. 378-99.000.

Hirai, Tokuyuki *See—*
- Kugimiya, Shuzo; Suzuki, Hitoshi; Fukumoshi, Yoji; Sata, Ichiko; Hirai, Tokuyuki; and Nishida, Yumi, 5,023,786, Cl 364-419.000.

Hirakawa Kogyosha Co., Ltd: *See—*
- Yamashita, Miyuki, 5,022,300, Cl. 83-743.000.

Hiraki, Yoshio: *See—*
- Hosoya, Hideo; Kimura, Masayuki; Endo, Hiroshi; Hiraki, Yoshio; Yamamoto, Shoji; Yoshikawa, Satoshi; Omine, Hidetaka; and Miyazaki, Koji, 5,023,175, Cl. 435-101.000.

Hirano, Sadanori: *See—*
- Tokumitsu, Kiyonori; Baba, Akira; and Hirano, Sadanori, 5,022,836, Cl. 418-76.000.

Hirano, Sadayuki: *See—*
- Murano, Katsuaki; Hirano, Sadayuki, Yamashita, Yoshinori; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,022,287, Cl. 74-866.000.

Hiratsuka, Katsuo; Odaka, Yoshiyuki; and Sakamoto, Takayuki, to SSMC Inc. Presser bar lifter in a button perforating sewing machine. 5,022,334, Cl. 112-238.000.

Hirayama, Makoto, to Mitsubishi Denki Kabushiki Kaisha. Electronic component having improved low resistance contact and manufacturing method therefor. 5,023,750, Cl. 361-313.000.

Hirotsuji, Takayuki: *See—*
- Kaneko, Toshimi; Yamamoto, Hidetoshi; and Hirotsuji, Takayuki, 5,023,578, Cl. 333-185.000.

Hitachi Chemical Company, Ltd.. *See—*
- Hamada, Keishi; Tashiro, Fumio; Otani, Shigemasa, Nomaguchi, Kanemasa; Murakami, Tomiguyu; and Iijima, Sadayoshi, 5,023,136, Cl. 428-341.000.

Hitachi Koki Co., Ltd.: *See—*
- Mitsuya, Teruaki; Fujiwara, Shigetaka; Endou, Michio; and Terakado, Akira, 5,023,464, Cl 355-283.000.

Hitachi, Ltd.: *See—*
- Akimoto, Kazuhiro; Ogiue, Katsumi; and Uchiyama, Takeo, 5,023,835, Cl. 365-155.000.
- Hara, Yuji; Ito, Satoru; and Toya, Tatsuro, 5,023,699, Cl. 357-68.000.
- Itoh, Syunji; Kozawa, Hiroshi; and Seki, Takahide, 5,023,415, Cl. 200-148.00R.
- Kobayashi, Shiro; Murofushi, Emiko; and Itoh, Masahiko, 5,023,698, Cl. 357-67.000.
- Mitsuya, Teruaki; Fujiwara, Shigetaka; Endou, Michio; and Terakado, Akira, 5,023,464, Cl. 355-283.000.
- Mutoh, Nobuyoshi; Sakai, Keijiro; Ueda, Akiteru; and Fujii, Hiroshi, 5,023,538, Cl. 318-811.000.
- Nakayashiki, Susumu; Harakawa, Takeshi; and Kashio, Jiro, 5,023,871, Cl. 370-85.500.
- Nishida, Koji; Yokomizo, Osamu; Masuhara, Yasuhiro; Nakao, Toshitsugu; Kashiwai, Shin-ichi, Tomiyama, Akio; Yamashita, Junichi; and Hayashi, Tatsuo, 5,023,047, Cl. 376-370.000.
- Ogino, Masanori; Fujikura, Tsuneo; Shinagawa, Yuji; and Yamada, Takeo, 5,023,524, Cl. 315-383.000.
- Sakai, Naohumi; Tsuchida, Masashi, Ohmachi, Kazuhiko; Imai, Yasuhiro; and Honma, Toshio, 5,023,774, Cl. 364-200.000.
- Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki, 5,023,553, Cl. 324-309.000.
- Sato, Kazuo; Kikuchi, Yuji; Ohki, Hiroshi; and Kaneko, Toshio, 5,023,054, Cl. 422-82.090.
- Sawa, Masashi; Masuda, Masami; Maeda, Yukio; and Itoh, Ryu, 5,022,797, Cl. 407-119.000.
- Sawamoto, Hideo, 5,023,777, Cl. 364-200.000.
- Shibata, Yoshikazu, 5,023,829, Cl. 364-900.000.
- Shirai, Mitugu; Katayama, Kaoru; Sasaki, Hideaki; Kazui, Shinichi; Satoh, Ryohei; Miyauchi, Tateoki; and Kobayashi, Mamoru, 5,023,407, Cl. 174-257.000.
- Tajima, Fumio; Katayama, Hiroshi; Miyashita, Kunio; Morinaga, Shigeki; and Narushima, Seiichi, 5,023,924, Cl. 388-811.000.
- Takase, Akihiko; and Takasaki, Yoshitaka, 5,023,604, Cl. 340-825.030.
- Tanoue, Tomonori; Kusano, Chushirou; and Takahashi, Susumu, 5,023,687, Cl. 357-34.000.
- Toyooka, Takashi; Maruyama, Yoji; and Suzuki, Ryo, 5,023,473, Cl. 307-270.000.
- Tsujimura, Hiroshi; Tamai, Yasumasa, Saito, Hideyo; and Kobayashi, Masahiro, 5,022,936, Cl. 148-135.000.
- Tsushima, Hideaki; and Sasaki, Shinya, 5,023,950, Cl 455-619.000.
- Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl. 431-2.000.

Hitachi-Medical Corporation: *See—*
- Yokouchi, Hisatake; Takasaki, Yukio; Hirai, Tadaaki; Koike, Kouichi; Tsuneoka, Masayuki; Onodera, Yoichi; and Funo, Takakazu, 5,023,896, Cl 378-99.000.

Hitachi Metals & Shicoh Engine: *See—*
- Ohsaka, Masayuki; and Miyao, Osami, 5,023,495, Cl. 310-12.000.

Hitachi Software Engineering Co., Ltd.: *See—*
- Sakai, Naohumi; Tsuchida, Masashi; Ohmachi, Kazuhiko; Imai, Yasuhiro; and Honma, Toshio, 5,023,774, Cl 364-200.000.

Ho, Sa V., to Monsanto Company. Method of somatotropin naturation 5,023,323, Cl. 530-399.000.

Ho, Steffan N.; and Horton, Robert M., to Mayo Foundation for Medical Education and Research. Method for gene splicing by overlap extension using the polymerase chain reaction. 5,023,171, Cl 435-6.000.

Hobart, James L.; Sasnett, Michael W.; Mefferd, Wayne S.; and Allen, Peter N., to Coherent, Inc. High power laser with focusing mirror sets. 5,023,886, Cl. 372-99.000.

Hobbs, Edwin L. Tool bit selection device. 5,022,131, Cl. 29-40.000.

Hobin, Martin A.: *See—*
- Bielecki, Edwin J.; Romberger, Karl A., Bakke, Bart F.; Hobin, Martin A.; and Clark, Charles R., 5,023,059, Cl. 423-9.000.

Hochstein, Peter A Battery powered nebulizer. 5,022,587, Cl 239-72.000.

Hockett, Wayne B., to Continuous Hose Co. Hose trimming apparatus 5,022,155, Cl. 30-93.000.

Hoechst Aktiengesellschaft: *See—*
- Luker, Hartmut, 5,023,388, Cl. 585-9.000.
- Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans-Georg. Gerhards, Hermann J.; Usinger, Patricia, Schacht, Ulrich, Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 5,023,357, Cl. 544-132.000.
- Willms, Lothar; Bauer, Klaus; Bieringer, Hermann; and Burstell, Helmut, 5,022,916, Cl. 71-92.000.

Hoechst Celanese Corporation: *See—*
- Crane, L. Paul; Lind, H. Clark; and Frederix, Martine E., 5,022,964, Cl. 162-146.000.
- Gupta, Balaram; and Calundann, Gordon W., 5,023,314, Cl 528-190.000.
- Johnson, Robert E., 5,023,168, Cl. 430-495.000.
- Kalyanaraman, Palaiyur S.; and Onorato, Frank J. 5,023,167, Cl 430-495.000.
- Swofford, Howard W.; Rice, Sandra W.; Farrar, Grover L.; and Rudd, David, 5,022,944, Cl. 156-244.110.

Hoechst CeramTec Aktiengesellschaft *See—*
- Roll, Rudolf; Brandenburger, Jurgen; and Hempel, Horst, 5,022,976, Cl. 204-297.00R.

Hoechst Japan Limited: *See—*
- Goto, Masayoshi; Demura, Nobutaka; and Osaki, Tsutomu, 5,023,244, Cl. 514-46.000.

Hoechst-Roussel Pharmaceuticals Inc.. *See—*
- DaVanzo, John P.; and Paul, Joseph W, Jr., 5,023,238, Cl 514-21.000.
- Shutske, Gregory M., 5,023,344, Cl. 549-229.000.

Hoffmann, Klaus: *See—*
- Gruning, Burghard; Hoffmann, Klaus; Koerner, Gotz; and Kollmeier, Hans-Joachim, 5,023,246, Cl. 514-57.000.

Hoffmann, Matthias: *See—*
- Everhart, Richard; Bosomworth, Paul; Butcher, Kenneth; and Hoffmann, Matthias, 5,023,217, Cl. 501-103.000.

Hoffmeyer, Charles L.: *See—*
- Zakheim, Howard; Clinton, Peter M.; Goldschneider, James D.; Kasmer, Christopher A.; Zahn, Markus; and Hoffmeyer, Charles L., 5,022,592, Cl 241-172.000.

Hofle, Gerhard: *See—*
- Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert; Kunze, Brigitte; Hofle, Gerhard; Augustiniak, Hermann; Bedorf, Norbert. Jansen, Rolf; Trowitzsch-Kienast, Wolfram; and Steinmetz, Heinrich, 5,023,184, Cl. 435-252.100.

Hofman, Richard W.: *See—*
- Song, John S.; and Hofman, Richard W., 5,022,566, Cl. 222-480.000.

Hofmann, Dieter: *See—*
- Hensel, Bernd, Kopacz, Uwe; Hofmann, Dieter; Schussler, Hans; and Eckhardt, Gunter, 5,022,978, Cl. 204-298.190.

Hofmann, Wolfram: *See—*
- Pollinger, Norbert; Serno, Peter; Hofmann, Wolfram; and Beermann, Dieter, 5,023,257, Cl. 514-254.000.

Hofsass, Peter. Temperature switching device 5,023,744. Cl. 361-26.000.

Hogan, Joseph M.: *See—*
- Stiskin, Hal; Hogan, Joseph M., and Jones, Thomas A., 5,022,685, Cl. 285-45.000.

Hohlfeld, Robert G.; and Thomas, Edward H., to Hohlfeld, Robert G Sonic debubbler for liquids. 5,022,899, Cl. 55-277.000.

Hok Instrument AB: *See—*
- Hok, J. Bertil W.; and Bythell, Valerie, 5,022,405, Cl. 128-715.000.

Hok, J. Bertil W.; and Bythell, Valerie, to Hok Instrument AB. Stethoscope for use in nuclear magnetic resonance diagnostics. 5,022,405, Cl. 128-715.000.

Holbrook, Michael T.: *See—*
- West, David H.; Hebert, Lawrence A.; Bowlin, Roger L., and Holbrook, Michael T., 5,023,387, Cl. 570-252.000.

Holcomb, David A: *See—*
- Cressman, Christopher C.; and Holcomb, David A, 5,022,159, Cl. 30-418.000.

Holden, Irving H: *See—*
- Mooney, Charles W.; and Holden, Irving H., 5,023,504, Cl. 310-322.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Holenka, Jacques M., and Sloan, W. R., to Schlumberger Technology Corporation. Nuclear spectroscopy signal stabilization and calibration method and apparatus. 5,023,449, Cl. 250-252.100.
- Holestine, William H. Log splitter and exit conveyor. 5,022,445, Cl. 144-193.00A.
- Hollandse Signaalapparaten B.V.: *See—*
  - Reits, Bernard J., 5,023,618, Cl 342-128.000.
- Holleman, Randall S.: *See—*
  - Fevig, Robert J.; Holleman, Randall S.; and Seaver, Duane L., 5,022,720, Cl. 312-223.000.
- Holley, Carl A. Agglomeration device. 5,022,840, Cl. 425-222.000.
- Hollingsworth GmbH: *See—*
  - Rutz, Hans, 5,022,121, Cl. 19-102.000.
- Hollis, Samuel D.; and Johnson, Robert W., Jr., to Union Camp Corporation. Stabilization of modified rosin 5,023,319, Cl. 530-212.000.
- Holmgren, Anders: *See—*
  - Andersson, Bo; and Holmgren, Anders, 5,022,482, Cl. 180-133.000.
- Holset Engineering Company: *See—*
  - Lauterbach, Jerre F.; Ritchie, Nathan; and Miller, Richard F., 5,022,832, Cl. 417-571.000.
- Holster, Peter L.: *See—*
  - Jacobs, Johannes A. H. M.; and Holster, Peter L., 5,022,769, Cl. 384-118.000.
- Holz, Raymond: *See—*
  - Neff, Willi; Holz, Raymond; Lebert, Rainer; and Richter, Franz, 5,023,897, Cl. 378-122.000.
- HomeCare of Dearborn: *See—*
  - Chmielinski, Mark A., 5,022,394, Cl. 128-207.140.
- Hommes, William J.; and Schmidt, Alfred J., to Du Pont de Nemours, E. I., and Company. Method and apparatus for preparing sheet stacks. 5,022,297, Cl. 83-35.000.
- Honda Giken Kogyo Kabushiki Kaisha: *See—*
  - Kanzawa, Yoshikazu; Fujikake, Yasushi; Ito, Osami; Ito, Shuho; Oikawa, Hironobu; Otsubo, Makoto; Morikawa, Iwao; Shiratori, Yuichi; and Tsukada, Kiyoshi, 5,022,456, Cl. 164-119.000.
  - Koike, Seiichi; Horimura, Hiroyuki; Ichikawa, Masao; and Matsumoto, Noriaki, 5,022,918, Cl. 75-229.000.
  - Sekino, Yousuke; and Minakawa, Masaaki, 5,022,673, Cl. 280-673.000.
  - Tsujii, Gen; and Murakawa, Toshihiro, 5,023,423, Cl. 219-108 000.
- Honda, Tetsuya: *See—*
  - Noda, Kazuo; Yamazaki, Koichi, Nakamura, Eiichi; and Honda, Tetsuya, 5,023,439, Cl. 250-201.500.
- Honegger, Werner, to Ferag AG Method of preparing a shipment package of printed products arriving in an imbricated formation and package obtained thereby. 5,022,523, Cl. 206-390.000.
- Honeywell Inc.: *See—*
  - Fulcher, Leonard S., Jr.; and Galbraith, Richard R., 5,023,832, Cl. 364-900.000.
  - Kahler, Jeffrey A., 5,023,796, Cl. 364-434.000.
  - Patton, Paul B.; and Kidder, Kenneth B., 5,023,816, Cl. 364-550.000.
  - Prokosch, Steve A.; and Aufderhar, Kevin R., 5,023,426, Cl. 219-121 630.
- Hong, Sung W.; and Wheeler, Edward L., to Uniroyal Chemical Company, Inc. Tire compounds. 5,023,292, Cl. 524-432.000.
- Honjo, Seiichiro; and Okajima, Yasunori, to Nippon Sheet Glass Co., Ltd. Apparatus for bending glass sheet. 5,022,908, Cl. 65-268.000.
- Honma, Kazuya: *See—*
  - Kitazume, Masahiro; and Honma, Kazuya, 5,023,788, Cl 364-424.010.
- Honma, Toshio: *See—*
  - Sakai, Naohumi; Tsuchida, Masashi; Ohmachi, Kazuhiko; Imai, Yasuhiro; and Honma, Toshio, 5,023,774, Cl. 364-200.000.
- Hoopes, Jay N.; Eick, Christopher D.; and Williamson, John R., to Allied-Signal Inc. Over the shaft fuel pumping system. 5,022,228, Cl. 60-734.000.
- Hope Industries, Inc.: *See—*
  - Ang, Joseph, 5,022,127, Cl. 24-712.200.
- Hopwood, Francis W.: *See—*
  - Caldwell, Stephen P.; Korn, David S.; and Hopwood, Francis W., 5,023,572, Cl. 331-10.000.
- Horansky, John; and Butkovich, Thomas J., to Chrysler Corporation. Spring mounted molding for a vehicle. 5,022,692, Cl. 293-128.000.
- Horch, Kenneth W.; Fisher, John H.; and Evans, Barry L., to Topical Testing, Inc. Apparatus for automated tactile testing. 5,022,407, Cl. 128-739.000.
- Hori, Keishirou: *See—*
  - Kobayashi, Mitsuru; and Hori, Keishirou, 5,022,454, Cl. 160-202.000.
- Hori, Makoto, to Sharp Kabushiki Kaisha. FM tuner with band extraction and optimization of a PLL FM demodulator. 5,023,939, Cl. 455-188.000.
- Hori, Toshio: *See—*
  - Sakamoto, Yukio; Fukutani, Iwao; and Hori, Toshio, 5,022,870, Cl. 439-608.000.
- Horie, Noritoshi: *See—*
  - Shinozaki, Yasuo; Horie, Noritoshi, Hamashima, Kazuo; and Imakawa, Makoto, 5,022,919, Cl. 75-238.000.
- Horii, Shigeru: *See—*
  - Ito, Kazuhiko; Miyazaki, Kouji; Kichibayashi, Masakatsu; Horii, Shigeru; and Ozawa, Masataka, 5,023,516, Cl. 315-101.000.
- Horii, Shuji; and Teraoku, Hiroshi, to Ohbayashi Corporation. Construction apparatus and construction method. 5,022,199, Cl 52-123.100.
- Horikoshi, Yukio: *See—*
  - Sakamari, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi, and Tanzawa, Kenji, 5,022,842, Cl. 418-257.000.
- Horimura, Hiroyuki: *See—*
  - Koike, Seiichi; Horimura, Hiroyuki; Ichikawa, Masao; and Matsumoto, Noriaki, 5,022,918, Cl. 75-229.000.
- Horino, Shigeo; Omura, Hideo; Maruyama, Nobusato; Ashikawa, Yoshiaki; Shioya, Masatoshi; Miyano, Toshiyuki; and Wakou, Jiro, to Kabushiki Kaisha Toshiba. Pack-comprising bundle processing apparatus with pack counting means. 5,022,531, Cl. 209-552.000.
- Horinouchi, Shinichi: *See—*
  - Takeuchi, Kunihiko; Oba, Masao; and Horinouchi, Shinichi, 5,023,887, Cl. 375-1.000.
- Horn, William E., to G E Specialty Chemicals. Bis (tri-tertiary-alkylphenoxy) diphosphaspiroundecanes. 5,023,285, Cl. 524-120.000.
- Horton, Robert M.: *See—*
  - Ho, Steffan N.; and Horton, Robert M., 5,023,171, Cl. 435-6.000.
- Horvath, Judit: *See—*
  - Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre, Teplan, Istvan; Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt, Hegedus, Edit; Makara, Gabor; and Rappay, Gyorgy, 5,023,322, Cl. 530-324.000.
- Horwitz, Arnold; and Chang, Changtung P., to Xoma Corporation Device for assessing nematode vitality and method for using same. 5,023,173, Cl. 435-29.000.
- Hoshino, Kazuhiko; and Ishii, Akio, to Citizen Watch Co., Ltd. Scrap collection system. 5,022,793, Cl. 406-153.000.
- Hoshino, Yasushi; Sugiyama, Kazuhiro; Ohta, Yoshitaka; and Shimada, Masaki, to Konica Corporation. Silver halide film type camera. 5,023,650, Cl. 354-441.000.
- Hosiden Corporation: *See—*
  - Sekiguchi, Shigemi, 5,022,871, Cl. 439-609.000.
- Hosiden Electronics Co., Ltd.: *See—*
  - Shichida, Akihito, 5,022,872, Cl. 439-668.000.
- Hosoya, Hideo; Kimura, Masayuki; Endo, Hiroshi; Hiraki, Yoshio; Yamamoto, Shoji; Yoshikawa, Satoshi; Omine, Hidetaka; and Miyazaki, Koji, to Kabushiki Kaisha Yakult Honsha. Novel production process of hyaluronic acid and bacterium strain therefor. 5,023,175, Cl. 435-101.000.
- Houle, Timothy H.; and Wardy, Daher T., to A. O. Smith corporation Apparatus for reducing the current drain on the sacrificial anode in a water heater. 5,023,928, Cl. 392-457.000.
- Hoult, Robert A., to Perkin-Elmer Corporation, The. Method and apparatus for comparing spectra. 5,023,804, Cl. 364-498.000.
- Houng, S. Gene: *See—*
  - Tsukii, Toshikazu; Houng, S. Gene; Miller, Michael D.; and McOwen, Sherwood A., Jr., 5,023,494, Cl. 307-571.000.
- House, V. Dean, to Data Pad Corporation. Work surface information display pad. 5,022,170, Cl. 40-358.000.
- House, William N., to Harman International Industries, Incorporated Transducer enclosure. 5,022,488, Cl. 181-156.000.
- Houston, Theodore M., to Texas Instruments Incorporated. Screening logic circuits for preferred states. 5,023,874, Cl. 371-21.200.
- Howard, Bruce S., to Sundstrand Data Control, Inc Portable localizer siting system. 5,022,751, Cl. 356-1.000.
- Howard Florey Institute of Experimental Physiology & Medicine: *See—*
  - Hudson, Peter J.; Niall, High D.; and Tregear, Geoffrey W., 5,023,321, Cl. 530-324.000.
- Hoya Corporation: *See—*
  - Onozuka, Shigeharu; Yokoyama, Yuuichi; and Tsuchiya, Makoto, 5,023,305, Cl. 526-194.000.
- Hoyle, Bobby G.: *See—*
  - Vagarali, Suresh S.; and Hoyle, Bobby G., 5,022,894, Cl. 51-293.000.
- Hseih, Dean, to Conrex Pharmaceutical Corporation. Transdermal and trans-membrane delivery of drugs. 5,023,252, Cl. 514-183.000.
- Hsu, Che-Hsiung, to Du Pont de Nemours, E. I., and Company. Method for preparing a superconductive fiber of film. 5,023,231, Cl. 505-1.000.
- Hu, Hung-Tzaw, to Measurex Corporation. Process for controlling properties of travelling sheets. 5,022,966, Cl. 162-198.000.
- Hubele, Adolf, to CIBA-GEIGY Corporation. Derivatives of 8-hydroxyquinoline. 5,023,333, Cl. 546-175.000.
- Huber, Thomas, to Bavaria Cargo Technologie GmbH. Drive roller unit. 5,022,513, Cl. 198-782.000.
- Hubert, Alexis; and Shepic, John A., to United States of America, Army. Capacitive angle sensor improvement. 5,023,749, Cl. 361-292.000.
- Huchtemann, Bernd: *See—*
  - Brandis, Helmut; Huchtemann, Bernd; Schuler, Peter; and Werner, Dietrich, 5,022,933, Cl. 148-16.000.
- Hudson, Hugh F.; Munsch, Joseph F.; McArdle, Joseph A.; Kammer, Jackie L.; and Jermyn, Robert W., to Johnson Service Company. Wiring duct. 5,023,404, Cl. 174-97.000.
- Hudson, Peter J.; Niall, High D.; and Tregear, Geoffrey W., to Howard Florey Institute of Experimental Physiology & Medicine. Molecular cloning and characterization of a further gene sequence coding for human relaxin. 5,023,321, Cl. 530-324.000.
- Hudson, Sharon J., Jr.; and Taylor, James D., to Cooper Industries, Inc. Oil separator for crankcase fumes. 5,022,376, Cl. 123-572.000.
- Huff, Terrence; and McAlpin, James J., to Exxon Chemical Patents Inc. Thermoplastic olefin alloys and method for producing the same. 5,023,300, Cl. 525-194.000.
- Hughes Aircraft Company: *See—*
  - Beam, Norman E., 5,022,608, Cl 244-3.180.

  - Harvey, Robin J.; and Palmer, A Jay, 5,023,563, Cl. 330-4.300.
  - Kreinheder, Donald E.; and Bell, David S., 5,023,623, Cl. 343-725.000.
  - Lee, Gene W.; and Underwood, George D., 5,023,875, Cl. 371-25.100.
  - LoStracco, Gregory, 5,022,602, Cl. 242-159.000.
  - Purcell, Lauren M.; and Lawrence, Albert F., 5.023,452, Cl. 250-306.000.
  - Schotter, Daniel K., 5,022,607, Cl. 244-3.120.
  - Valley, George C.; and Boggess, Thomas F., Jr., 5,023,477, Cl. 307-425.000.
  - Zwirn, Robert, 5,023,719, Cl. 358-180.000.
- Huls Aktiengesellschaft: *See—*
  - Kelkenberg, Heike; and Ruback, Wulf, 5,023,018, Cl. 252-527.000.
- Hulsbergen, Cornelis H.; and Bijker, Romke, to Hulsbergen, Cornelis H.; and Bijker, Romke. Process and apparatus for determining the erodability of soil, in particular soil belonging to the underwater floor. 5,022,262, Cl. 73-170.00A.
- Humes, Robert W.: *See—*
  - Kaplan, Murray; and Humes, Robert W., 5,023,904, Cl. 379-91.000.
- Hunter Automated Machinery Corporation: *See—*
  - Hunter, William A., 5,022,512, Cl. 198-718.000.
- Hunter Douglas International N.V.: *See—*
  - Eschauzier, Francois R.; and Lim, Guy H., 5,022,296, Cl. 83-27.000.
- Hunter, William: *See—*
  - Williams, Larry; and Hunter, William, 5,023,116, Cl. 427-424.000.
- Hunter, William A., to Hunter Automated Machinery Corporation. Automatic matchplate molding system. 5,022,512, Cl. 198-718.000.
- Husak, Ladislav. Light controller apparatus. 5,023,517, Cl 315-200.00A.
- Huszar, Csaba: *See—*
  - Sperber, Ferenc; Huszar, Csaba; Nemeth, Attila; Somfai, Eva; and Pali nee Ivanics, Iren, 5,023,337, Cl. 548-306.000.
- Hutchins, Alma A., to Hutchins Manufacturing Company. Wet sanding tool. 5,022,190, Cl. 51-170.0MT.
- Hutchins Manufacturing Company: *See—*
  - Hutchins, Alma A., 5,022,190, Cl. 51-170.0MT.
- Hutchinson: *See—*
  - Potier, Michel; and Briet, Gilles, 5,022,461, Cl. 165-76.000.
- Hutzenlaub, Armin; and Kaul, Burkhard, to Kampf GmbH & Co. Maschinenfabrik. Roll-handling machine for web material 5,022,598, Cl. 242-68.400.
- Huynh, Hoa T.: *See—*
  - Wong, Patrick S. L.; Theeuwes, Felix; Eckenhoff, James B.; Larsen, Steven D.; and Huynh, Hoa T., 5,023,088, Cl. 424-473.000.
- Hwang, Bor-Yuan: *See—*
  - Jeffery, Philip A.; and Hwang, Bor-Yuan, 5,023,479, Cl. 307-446.000.
- Hydro-Plan Engineering Ltd.: *See—*
  - Mehoudar, Raphael, 5,022,940, Cl. 156-64.000.
- Hydrotreat, Inc.: *See—*
  - Arnaud, Johnny, 5,022,998, Cl. 210-675.000.
- Hygrama Ag: *See—*
  - Lundqvist, Gunnar, 5,022,499, Cl. 188-67.000.
- Hypro Corporation: *See—*
  - Gerlach, C. Richard; and Schroeder, Edgar C., 5,022,831, Cl. 417-500.000.
- Hyundae Environment Energy Management Corp. Ltd.: *See—*
  - Chang, Ha Y., 5,022,896, Cl. 55-85.000.
- Hyundai Electronics Industries Co., Ltd.: *See—*
  - Ha, Chang W., 5,023,681, Cl. 357-23.500.
- Ibiden Co., Ltd.: *See—*
  - Takeyama, Takeshi; and Kondo, Mitsuhiro, 5,022,960, Cl. 156-643.000.
- Ichikawa, Masao: *See—*
  - Koike, Seiichi; Horimura, Hiroyuki; Ichikawa, Masao; and Matsumoto, Noriaki, 5,022,918, Cl. 75-229.000.
- Ichikawa, Takashi: *See—*
  - Koga, Yoshiro; Gomi, Akihiro; Miyasaka, Takashi; Miyazawa, Yasunaga; Endo, Kenichi; Shinozaki, Junichiro; Yoda, Kaneo; Ichikawa, Takashi; Miyasaka, Hitoshi; and Kaburagi, Chiharu, 5,023,733, Cl. 360-77.040.
- Ichinose, Makoto: *See—*
  - Satoh, Isao; Fukushima, Yoshihisa; Ichinose, Makoto; Kuroki, Yuzuru; and Takagi, Yuji, 5,023,854, Cl. 369-32.000.
- ICI Americas Inc.: *See—*
  - DuRoss, James W., 5,023,092, Cl. 426-3.000.
  - Prisbylla, Michael P., 5,022.915, Cl. 71-92.000.
- ICI Australia Operations Proprietary Limited: *See—*
  - Trau, Matt; and Truss, Rowan W., 5,023,081, Cl. 424-405.000.
- Ida, Norihiro. *See—*
  - Mihara, Haruhiko; Ida, Norihiro; and Hamaoka, Tetsuya, 5,023,414, Cl. 200-61.910.
- Idea+Invent AG: *See—*
  - Berger, Leo, 5,022,654, Cl 273-145.0CA.
- Idemitsu Kosan Company Limited: *See—*
  - Maezawa, Hiroshi; Tomotsu, Norio; and Kuramoto, Masahiko, 5,023,222, Cl. 502-103.000.
  - Takeuchi, Mizutomo; and Kuramoto, Masahiko, 5,023,304, Cl. 526-160.000.
- Ifkovits, Edward M., Jr., to Pitney Bowes Inc. Envelope transporting aligning and stacking module. 5,022,638, Cl. 271-2.000.
- Iggulden, Jerry: *See—*
  - Streck, Donald A.; and Iggulden, Jerry R., 5,023,931, Cl. 455-21.000.
- Iggulden, Jerry R.: *See—*
  - Streck, Donald A.; and Iggulden, Jerry R., 5,023,931, Cl. 455-21.000.
- Iida, Hiroshi, to Sumitomo Heavy Industries; and Sumitomo Precision Products, Co. Process for hot working article defining hole at the center thereof. 5,022,931, Cl. 148-12.00R.
- Iida, Yasuhiro: *See—*
  - Miura, Masayoshi; Inanaga, Kiyofumi; Sogawa, Hiroyuki; and Iida, Yasuhiro, 5,022,486, Cl. 181-132.000.
- Iijima, Sadayoshi: *See—*
  - Hamada, Keishi; Tashiro, Fumio; Otani, Shigemasa; Nomaguchi, Kanemasa; Murakami, Tomiguyu; and Iijima, Sadayoshi, 5,023,136, Cl. 428-341.000.
- Ikemura, Masayuki: *See—*
  - Hayashi, Kohtaro; Karasaki, Toshihiko; Yamano, Yasuteru; Mukai, Hiromu; Hata, Koji; and Ikemura, Masayuki, 5,023,649, Cl. 354-434.000.
- Ilami, Siamak: *See—*
  - Coltrin, George E.; and Ilami, Siamak, 5,022,690, Cl. 292-21.000.
- Ilvespaa, Heikki; Liedes, Allan; and Viitanen, Olavi, to Valmet Paper Machinery Inc. Method and device for drawing a web through a group of drying cylinders. 5,022,163, Cl. 34-23.000.
- Imai, Yasuhiro: *See—*
  - Sakai, Naohumi; Tsuchida, Masashi; Ohmachi, Kazuhiko; Imai, Yasuhiro; and Honma, Toshio, 5,023,774, Cl. 364-200.000.
- Imakawa, Makoto: *See—*
  - Shinozaki, Yasuo; Horie, Noritoshi; Hamashima, Kazuo; and Imakawa, Makoto, 5,022,919, Cl. 75-238.000.
- Imaki, Katsuhiro; Okegawa, Tadao; and Arai, Yoshinobu, to Ono Pharmaceutical Co., Ltd. 3-phenoxy (or phenylthio)-cyclopentanecarbonylamino acid analogues. 5,023,268, Cl. 514-400.000.
- IMED Corporation: *See—*
  - di Palma, Giorgio, 5,022,422, Cl. 137-15.000.
- Immel, Otto; Schwarz, Hans-Helmut; and Thiel, Reinhard, to Bayer Aktiengesellschaft. Ruthenium supported catalyst, its preparation and its use in the preparation of substituted or unsubstituted cyclohexylamine and substituted or unsubstituted dicyclohexylamine. 5,023,226, Cl. 502-313.000.
- Imperial Chemical Industries PLC: *See—*
  - Roberts, Thomas A., 5,023,107, Cl. 427-2.000.
- Implant Innovations, Inc.: *See—*
  - Lazzara, Richard J.; and Beaty, Keith D., 5,022,860, Cl. 433-174.000.
- Imura, Izumi; Uesugi, Tatsuhiko; and Yoshimura, Toshiaki, to Usui Kokusai Sangyo Kaisha Ltd. Fuel delivery rail assembly. 5,022,372, Cl. 123-469.000.
- Inaba, Masashi; Hamana, Ryozo; Hase, Hideyuki; and Ashizawa, Tatsuro, to Mitsubishi Petrochemical Co., Ltd. Method for producing aromatic alcohol. 5,023,383, Cl. 568-815.000.
- Inada, Tooru: *See—*
  - Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl. 431-2.000.
- Inagaki, Hidemitsu; Kawamoto, Mutsumi; and Tanaka, Satoru, to Aisin AW Co., Ltd. Steering safety mechanism. 5,022,480, Cl. 180-79.100.
- Inagaki, Mitsuo: *See—*
  - Matsuda, Mikio; Inagaki, Mitsuo; Hayashi, Ikuo; Goto, Masahiro; Kojima, Akikazu; Taya, Toshiki; and Miura, Nobuhiro, 5,022,826, Cl. 417-63.000.
- Inami, Kazuyoshi: *See—*
  - Nishioka, Yasuhiko; Kawano, Hazime; and Inami, Kazuyoshi, 5,023,634, Cl. 342-368.000.
- Inamura, Yoshihisa: *See—*
  - Kawahara, Tsugio; Harashima, Hiromasa; Ubukata, Shunji; Kameda, Kazuo; Moriya, Hirohito; and Inamura, Yoshihisa, 5,022,172, Cl. 40-503.000.
- Inanaga, Kiyofumi: *See—*
  - Miura, Masayoshi; Inanaga, Kiyofumi, Sogawa, Hiroyuki; and Iida, Yasuhiro, 5,022,486, Cl. 181-132.000.
- Inashima, Satoshi: *See—*
  - Murakami, Azuma; Aoki, Kazuo; Yamanami, Tsuguya; Tomofuji, Yoshiaki; Tanaka, Takeshi; Inashima, Satoshi, Funahashi, Takahiko; Chikami, Toshihide; and Senda, Toshiaki, 5,023,408, Cl. 178-19.000.
- Ingalls, John L.; Brinker, Reiner G.; and Hawkins, Jesse L., Jr., to Philip Morris Incorporated. On-line embossing apparatus for a labeling machine. 5,022,950, Cl. 156-361.000.
- Ingersoll-Rand Company: *See—*
  - Campbell, Paul B., 5,022,309, Cl. 91-285.000.
- Innofinance Altalanos Innovacios Penzintezet: *See—*
  - Farkas, Jozsef; Vekony, Sandor; Vekony, Sandorne; Csovak, Erno; and Fodor, Sandor, 5,022,293, Cl 82-1.110.
- Innovative Imaging Systems, Inc.: *See—*
  - McCroskey, William K.; and Vickers, David S., 5,023,895, Cl. 378-4.000.
- Inoue, Shigeyasu; Ozu, Tatsuya; and Nakatani, Yasunori, to Kabushiki Kaisha Sakura Kurepasu. Writing inplement with magnetic closure. 5,022,775, Cl. 401-107.000.
- Inoue, Shiroh: *See—*
  - Ueda, Satoshi; Sudare, Masahiro; Suyama, Yasuyuki; Kishimoto, Kazuhiko; Suzuki, Kenshi; Inoue, Shiroh; and Sakura, Shunji, 5,023,534, Cl. 318-587.000.
- Inouye, Satoshi, to Chisso Corporation. Process for preparing a calcium-dependent oxygenase. 5,023,181, Cl. 435-189 000.

VOL 1127
ISS 2
JE 11
1991
UMI

Insecta Paint, Inc.. *See—*
  Boulanger, Jean-Paul, Lupuyo, Jacques, and Klug, Francois, 5,023,247, Cl. 514-89.000.
Instrumentarium Corporation: *See—*
  Ehnholm, Gosta J., 5,023,555, Cl. 324-318.000.
Intel Corporation: *See—*
  Arnold, James M., Hinton, Glenn J. and Smith, Frank S., 5,023,844, Cl. 365-230.050.
  Poret, Mark, 5,023,775, Cl. 364-200 000.
Interface, Inc.: *See—*
  Tibbals, Edward C., Jr., 5,022,629, Cl 251-129.020.
InterMetro Industries Corporation: *See—*
  Kolvites, Albert, 5,022,777, Cl 403-14.000.
International Business Machines Corporation. *See—*
  Akrout, Chekib; Coppens, Pierre; Denis, Bernard, and Urena, Pierre-Yves, 5,023,841, Cl. 365-205 000
  Aug, Conrad J.; Casanova, Wayne J., Corfits, William D.; Dimmick, Roger F.; and Wheeler, Stephen E., 5,023,754, Cl. 361-415.000.
  Badaoui, Mohamed; Dambricourt, Richard; Franquenouille, Jean-Paul; Garcia, Christian; Granger, Yves; and Spalmacin-Roma, Sylvie, 5,023,867, Cl. 370-56.000.
  Baum, Richard I.; Borden, Terry L., Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G., Lum, James; Mall, Michael G.; Page, David R.; Plambeck, Kenneth E.; Scalzi, Casper A., and Schmalz, Richard J., 5,023,773, Cl 364-200.000
  Baum, Thomas H.; Brock, Phillip J.; and Dawson, Daniel J., 5,023,360, Cl. 556-117.000.
  Boudon, Gerard; Mollier, Pierre; Ogura, Seiki; Omet, Dominique; Tannhof, Pascal; and Wallart, Franek, 5,023,478, Cl. 307-446.000.
  Brown, John K., III, 5,023,813, Cl. 364-519.000.
  Brunsvold, William R.; Chiu, Philip; Conley, Willard E., Jr. Crockatt, Dale M.; Montgomery, Melvin W.; and Moreau, Wayne M., 5,023,164, Cl 430-270.000.
  Chen, Chengjun J., 5,022,955, Cl. 156-627.000.
  Cziep, Werner; Kuenzel, Ulrich; and Ruh, Wolf-Dieter, 5,022,956, Cl. 156-643.000.
  DiVincenzo, David P.; Lee, Kim Y. and Smith, Theoren P, III, 5,023,671, Cl. 357-4.000.
  Flint, Ephraim B.; Grebe, Kurt R.; Gruber, Peter A., and Zingher, Arthur R., 5,022,462, Cl. 165-80.400.
  Gregor, Steven L., 5,023,776, Cl. 364-200.000
  Guidotti, Daniel, Tan, Swie-in, and Wilman, John G., 5,022,765, Cl 356-435.000.
  Ishikawa, Hiroshi; and Kawase, Kei, 5,023,533, Cl 318-568 210.
  King, Richard P., 5,023,772, Cl. 364-200.000.
  Lipscomb, James S., 5,023,918, Cl. 382-24 000.
  Murray, Donna F; Pringle, Joseph M.; Strope, Gerald C.; and Berkson, Stephen P., 5,023,851, Cl. 368-41.000.
  Stevenson, John G.; and Williams, Raymond C., 5,023,873, Cl. 371-8.200.
International Flavors & Fragrances Inc. *See—*
  Farbood, Mohamad I.; Morris, James A.; Sprecker, Mark A., Bienkowski, Lynda J.; Miller, Kevin P; Vock, Manfred H., and Hagedorn, Myrna L., 5,023,347, Cl 549-263 000.
  Sprecker, Mark A. Belko, Robert P; Hanna, Marie R.; Beck, Charles E. J.; and Brucato, Salvatore M., 5,023,352, Cl. 549-345.000.
International Fuel Cells Corporation. *See—*
  Landau, Michael B.; Vartanian, George: and Matsuzawa, Kazuyuki, 5,023,151, Cl. 429-24 000.
International Rectifier Corporation: *See—*
  Kinzer, Daniel M., 5,023,678, Cl 357-23.400.
Interox America: *See—*
  Shehad, Noel S.; Dussack, Laurie L.: and van Hemelrijk, Dirk, 5,023,376, Cl. 564-298.000.
Interuniversitair Micro-Elektronica Centrum vzw *See—*
  Vanstraelen, Guy F. R J., 5,023,455, Cl 250-370.010.
Inuishi, Masahide: *See—*
  Shimizu, Masahiro; Shimano, Hiroki, Inuishi, Masahide: and Tsukamoto, Katsuhiro, 5,023,682, Cl 357-23.600.
Io, Shinichi, to Atsugi Unisia Corporation. One-way clutch for transmitting only rotation of first member to second member 5,022,505, Cl. 192-12.0BA.
Iovine, Carmine P.: *See—*
  Leighton, John C.; and Iovine, Carmine P, 5,023,368, Cl 560-195.000.
Iowa State University Research Foundation *See—*
  Mayfield, John E.; and Tabatabai, Louisa B., 5,023,174, Cl 435-91.000.
Ippolito, Ronald A *See—*
  Federico, Anthony M., and Ippolito, Ronald A., 5,023,779, Cl 364-200.000.
Irani, Cyrus A., Harris, Thomas V; and Pretzer, Wayne R., to Chevron Research Company. Polymer containing pendant silyl ether groups useful in enhanced oil recovery using CO_2 flooding. 5,022,467, Cl. 166-273.000.
Irie, Masao: *See—*
  Ohashi, Yasuo; and Irie, Masao, 5,023,530, Cl. 318-446.000.
Irie, Yutaka: *See—*
  Shibazaki, Kenji; Irie, Yutaka; Ito, Masazumi, and Murata, Tomoji, 5,023,663, Cl. 355-243.000.
Irschik, Herbert: *See—*
  Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert, Kunze, Brigitte; Hofle, Gerhard, Augustiniak, Hermann; Bedorf, Norbert, Jansen, Rolf. Trowitzsch-Kienast, Wolfram: and Steinmetz, Heinrich, 5,023,184, Cl. 435-252 100
Irwin, William P., Jr.: *See—*
  Stanley, William J.; and Irwin, William P, Jr. 5,023,132 Cl 428-234.000.
Iscar, Ltd.: *See—*
  Pano, Joseph; and Braun, Hans, 5,022,796, Cl. 407-113 000.
Ischay, Duane K: *See—*
  Perdue, Thomas F., Jr.; Bransky, Jeffrey D: Carvell, William S Dettloff, David E.; Ischay, Duane K.; and Oberg, Kenneth H. 5,022,689, Cl. 292-19.000.
Isert, Clarence A., to Flexxaire Manufacturing Inc Variable pitch fan 5,022,821, Cl. 416-167.000.
Ishibashi, Kenji: *See—*
  Ishida, Tokuji; Hamada, Masataka; Ishibashi, Kenji, Taniguchi, Nobuyuki; Ootsuka, Hiroshi, Norita, Toshio; and Karasaki, Toshihiko, 5,023,646, Cl 354-402.000.
Ishibashi, Yoji: *See—*
  Yoshii, Yasuo, Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi, Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki, Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl 431-2.000.
Ishida, Katsuhiko: *See—*
  Matoba, Gensuke; Ishida, Katsuhiko; Tani, Hisashi, and Hayashi, Hiroo, 5,023,227, Cl. 503-214.000.
Ishida, Syuichi, to Toyoda Gosei Co., Ltd Horn switch on steering wheel. 5,023,412, Cl 200-61.540.
Ishida, Tokuji; Hamada, Masataka; Ishibashi, Kenji; Taniguchi, Nobuyuki; Ootsuka, Hiroshi; Norita, Toshio; and Karasaki, Toshihiko, to Minolta Camera Kabushiki Kaisha. Automatic focus detection system 5,023,646, Cl 354-402.000.
Ishiguro, Yoichi; Kanamori, Hiroo; Urano, Akira; and Kyoto, Michihisa, to Sumitomo Electric Industries, Ltd Method of making optical glass article. 5,022,904, Cl. 65-2 000.
Ishihara Sangyo Kaisha Ltd.: *See—*
  Shigehara, Itaru; Nakajima, Toshio; Nishimura, Shigeyuki, and Ohshima, Takeshi, 5,023,336, Cl. 548-110.000.
Ishii, Akio: *See—*
  Hoshino, Kazuhiko; and Ishii, Akio, 5,022,793, Cl 406-153.000
Ishii, Koichi: *See—*
  Komoda, Yasuo; Yokogawa, Yasunori; Okunishi, Masahiko, Ishii, Koichi; Shibai, Hiroshiro; and Noumi, Ryosaku, 5,023,079, Cl 424-120.000.
Ishii, Koji: *See—*
  Kobori, Takuji; Sakamoto, Mitsuo; Yamada, Toshikazu, Nishimura, Isao; Ishii, Koji; and Tagami, Jun, 5,022,201, Cl 52-167.0DF
Ishii, Takahiko: *See—*
  Fujikawa, Takao; and Ishii, Takahiko, 5,022,343, Cl. 118-47.000.
Ishii, Tsuneo: *See—*
  Naito, Ryuichi; and Ishii, Tsuneo, 5,023,876, Cl. 371-40.100.
Ishii, Yoshiki: *See—*
  Owada, Mitsuru; and Ishii, Yoshiki, 5,023,715, Cl. 358-133.000.
Ishikawa Gaset Co., Ltd. *See—*
  Yasui, Hisashi, 5,022,662, Cl 277-235.00B.
Ishikawa Gasket Co., Ltd.: *See—*
  Nakasone, Hidetaka; and Udagawa, Tsunekazu, 5,022,661, Cl 277-213 000
Ishikawa, Hiroshi; and Kawase, Kei, to International Business Machines Corporation. Method and system for compliance control. 5,023,533, Cl. 318-568.210.
Ishikawa, Hisashi: *See—*
  Nakayama, Tadayoshi; Ishikawa, Hisashi, Kozuki, Susumu, Takahashi, Koji; Yoshimura, Katsuji; Nagasawa, Kenichi; and Sasatani, Tomohiko, 5,023,716, Cl. 358-138.000.
Ishikawa, Masayuki: *See—*
  Suzuki, Mariko; Itaya, Kazuhiko; Ishikawa, Masayuki, Watanabe, Yukio; and Hatakoshi, Genichi, 5,023,880, Cl. 372-45.000.
Ishikawa, Seiichi: *See—*
  Matsumoto, Masaharu; Satoh, Katsuaki; Ishikawa, Seiichi. Serikawa, Mitsuhiko; Kawamura, Akihisa, and Hashimoto, Hikari, 5,023,913, Cl. 381-63.000.
Ishikawa, Takao: *See—*
  Murakami, Yoichi; Okawa, Yoshihisa; and Ishikawa, Takao, 5,023,732, Cl. 360-77.080.
Ishikawa, Tomonori, to Fujitsu Limited Semiconductor device. 5,023,675, Cl 357-22.000.
Isler, Erwin, to H. Weidmann AG Process, anchoring member, and clamping device for clamping a rod. 5,022,791, Cl. 405-260.000.
Iso Concept S.A.: *See—*
  Saint Martin, Bernard, 5,022,794, Cl. 406-171.000.
Isobe, Shinichi: *See—*
  Yamazaki, Makoto; Ueda, Kazumi; Isobe, Shinichi; and Sato, Katsunari, 5,023,550, Cl. 324-262.000.
Isobe, Toshifumi: *See—*
  Maruyama, Hiroyuki; Kishimoto, Tadao; Isobe, Toshifumi; and Yokobori, Jun, 5,023,708, Cl. 358-75.000.
Isono, Keinosuke: *See—*
  Yoshida, Takao; Isono, Keinosuke; and Suzuki, Tatsuo, 5,023,026, Cl. 264-22.000.
Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha Coaxial starter. 5,023,466, Cl. 290-48.000.
Isuzu Ceramics Research Institute Co., Ltd: *See—*
  Kamamura, Hideo, 5,022,353, Cl. 123-21.000.

Isuzu Motors Limited: *See—*
  Kawamura, Hideo, 5,022,357, Cl. 123-90.110.
  Kuwahara, Touru, 5,023,499, Cl. 310-105.000.
Itagaki, Akinari; Yamaya, Masaaki; Yoshioka, Hiroshi; Watanabe, Akihiko; and Miyazato, Keita, to Shin-Etsu Chemical Co., Ltd.; and Nitto Boseki Co., Ltd. Agent for improving composite materials. 5,022,922, Cl. 106-287.110.
Itaya, Kazuhiko: *See—*
  Suzuki, Mariko; Itaya, Kazuhiko; Ishikawa, Masayuki; Watanabe, Yukio; and Hatakoshi, Genichi, 5,023,880, Cl. 372-45.000.
Iten, Jakob: *See—*
  Beerli, Markus; Bollen, Manfred; Iten, Jakob; Koslowski, Gerhard; Probst, Willy; and Wildi, Edwin, 5,022,128, Cl. 28-191.000.
Ito, Kazuhiko; Miyazaki, Kouji; Kichibayashi, Masakatsu; Horii, Shigeru; and Ozawa, Masataka, to Matsushita Electric Industrial Co., Ltd. Discharge lamp operation apparatus. 5,023,516, Cl. 315-101.000.
Ito, Masayoshi: *See—*
  Ogura, Haruo; Furuhata, Kimio; Sato, Shingo; Ito, Masayoshi; Shitori, Yoshiyasu; and Nagai, Yoshitaka, 5,023,239, Cl. 514-26.000.
Ito, Masazumi *See—*
  Shibazaki, Kenji; Irie, Yutaka; Ito, Masazumi; and Murata, Tomoji, 5,023,663, Cl. 355-243.000.
Ito, Osami: *See—*
  Kanzawa, Yoshikazu; Fujikake, Yasushi; Ito, Osami; Ito, Shuho; Oikawa, Hironobu; Otsubo, Makoto; Morikawa, Iwao; Shiratori, Yuichi; and Tsukada, Kiyoshi, 5,022,456, Cl. 164-119.000.
Ito, Satoru: *See—*
  Hara, Yuji; Ito, Satoru, and Toya, Tatsuro, 5,023,699, Cl. 357-68.000.
Ito, Shuho: *See—*
  Kanzawa, Yoshikazu; Fujikake, Yasushi; Ito, Osami; Ito, Shuho; Oikawa, Hironobu; Otsubo, Makoto; Morikawa, Iwao; Shiratori, Yuichi; and Tsukada, Kiyoshi, 5,022,456, Cl. 164-119.000.
Ito, Toyozo, to Kabushiki Kaisha Sato. Electrostatic printer using continuous paper. 5,023,633, Cl 346-160.000.
Itoda, Hiroshi *See—*
  Watanabe, Naotaka; Itoda, Hiroshi; and Funato, Reiko, 5,022,999, Cl. 210-692.000.
Itoh, Hisato: *See—*
  Tanaka, Eishi; Nishizawa, Tsutomu; Yamada, Yasuyuki; Itoh, Hisato; Yamaguchi, Akihiro; and Nakatsuka, Masakatsu, 5,023,343, Cl. 549-74.000.
Itoh, Kenji; and Aoyagi, Osamu, to Semiconductor Energy Laboratory Co., Ltd. Method of wet etching by use of plasma etched carbonaceous masks. 5,022,959, Cl. 156-643.000.
Itoh, Kiyohiko: *See—*
  Ushiyama, Katsumi; Sakamoto, Sadafumi; and Itoh, Kiyohiko, 5,023,621, Cl. 343-702.000.
Itoh, Masahiko: *See—*
  Kobayashi, Shiro; Murofushi, Emiko; and Itoh, Masahiko, 5,023,698, Cl. 357-67.000.
Itoh, Ryu: *See—*
  Sawa, Masashi; Masuda, Masami; Maeda, Yukio; and Itoh, Ryu, 5,022,797, Cl. 407-119.000.
Itoh, Syunji; Kozawa, Hiroshi; and Seki, Takahide, to Hitachi, Ltd. Switch apparatus. 5,023,415, Cl. 200-148.00R.
Itoh, Toshiyuki: *See—*
  Nakayama, Okihiko; Tsuda, Hiroshi; Itoh, Toshiyuki; and Ueno, Hiroshi, 5,023,799, Cl. 364-449.000.
Itoh, Yoshiaki: *See—*
  Takeda, Yoshinobu; Odani, Yusuke; Hayashi, Tetsuya; Kaji, Toshihiko; and Itoh, Yoshiaki, 5,022,455, Cl. 164-46.000.
ITT Corporation: *See—*
  Phillips, Earle N., 5,023,511, Cl. 313-524.000.
Iwahashi, Motoyuki: *See—*
  Machida, Hiroji; Asano, Michiaki; Watanabe, Yozo; Tokuhiro, Tomoya, Satoh, Hiroshi; Iwahashi, Motoyuki; Yamaguchi, Norihiro; Kikuchi, Koshin; and Watanabe, Hiroaki, 5,023,020, Cl. 261-18.100.
Iwamoto, Junichi: *See—*
  Yoshida, Yutaka; Umetsu, Takao; and Iwamoto, Junichi, 5,023,645, Cl. 354-400.000.
Iwamoto, Norihiro; Tsuboi, Hiroyuki; and Kaneko, Toshihiko, to Toshiba Machine Co., Ltd. Casting control system of die cast machine. 5,022,457, Cl. 164-155.000.
Iwasa, Masakazu; Morita, Kazuhiko; and Kawamata, Toshio, to Fuji Photo Film Co., Ltd. Flexible disk jacket. 5,022,519, Cl. 206-313.000.
Iwase, Yukio, to Prince Sewing Machine Co., Ltd. Pin type conveyor fabric feeding apparatus for a sewing machine. 5,022,336, Cl. 112-304.000.
Iwata, Masatoshi: *See—*
  Kawasaki, Mikio; and Iwata, Masatoshi, 5,023,898, Cl. 378-146.000.
Izuchi, Shingo: *See—*
  Saitou, Tosio; Matsui, Kenji; Tamura, Keiichi; Mori, Shinji; and Izuchi, Shingo, 5,022,601, Cl. 242-107.40A.
Izumi, Akira; Toei, Keiji; Watanabe, Nobuatsu; and Chong, Yong-Bo, to Dainippon Screen Mfg. Co., Ltd. Method for removing a film on a silicon layer surface. 5,022,961, Cl. 156-646.000.
Izumi, Hazime: *See—*
  Higuchi, Toshiro; Izumi, Hazime; and Tanaka, Minoru, 5,022,294, Cl. 82-18.000.
Izumi Industries, Ltd.: *See—*
  Higuchi, Toshiro; Izumi, Hazime; and Tanaka, Minoru, 5,022,294, Cl. 82-18.000.
Izumi, Yoshito: *See—*
  Kumaki, Akihico; and Izumi, Yoshito, 5,023,211, Cl. 501-87.000.
Izuno, Herb, to Paccar Inc. Retractable turn signal assembly for trucks. 5,023,760, Cl. 362-66.000.
J. Eberspacher: *See—*
  Reiser, Peter; Mohring, Fritz, and Schodt, Adolf, 5,022,851, Cl. 431-215.000.
Jacobs, Johannes A. H. M.; and Holster, Peter L., to U.S. Philips Corporation. Static bearing. 5,022,769, Cl. 384-118.000.
Jacobs, Theodore A.; and Emanuel, George. Continuous wave chemically pumped visible ultraviolet laser based on controlled condensation. 5,023,883, Cl. 372-56.000.
Jacquemod, Gilles: *See—*
  Goutte, Robert; Jacquemod, Gilles; and Odet, Christophe, 5,023,921, Cl. 382-58.000.
Jahns, Jurgen: *See—*
  Cloonan, Thomas J.; Jahns, Jurgen; McCormick, Frederick B., Jr., and Murdocca, Miles J., 5,023,864, Cl. 370-1.000.
Jales, Richard J.: *See—*
  Elgood, Mark C.; and Jales, Richard J., 5,023,602, Cl. 340-701.000.
James River Corporation: *See—*
  Bezigian, Thomas; and Nebel, George T., 5,023,134, Cl. 428-336.000.
Janisiewicz, Stanley W.: *See—*
  Vallone, Giacinto; Janisiewicz, Stanley W.; Snyder, Michael D.; Hemmelgarn, Gerald B.; and Glidden, Wayne A., 5,023,544, Cl. 324-158.00F.
Janome Sewing Machine Industry Co., Ltd.: *See—*
  Hanyu, Susumu; Kasuga, Noboru; Koike, Mikio; Hara, Kazumasa; Nishijima, Mitsuru; and Sasano, Akiyoshi, 5,022,335, Cl 112-255.000.
Jansen, Rolf: *See—*
  Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert, Kunze, Brigitte; Hofle, Gerhard; Augustiniak, Hermann; Bedorf, Norbert, Jansen, Rolf; Trowitzsch-Kienast, Wolfram; and Steinmetz, Heinrich, 5,023,184, Cl. 435-252.100.
Jansky, Jaroslav; and Temmesfeld, Angelika B. M., to Temtech Fahrzeugtechnik Entwicklungsgesellschaft MBH. Shut-off valve. 5,022,433, Cl. 137-588.000.
Januszkiewiez, Stanley: *See—*
  Charkey, Allen; and Januszkiewicz, Stanley, 5,023,155, Cl 429-223.000.
Jardins, Philip D., to Grass Valley Group, Inc., The. Single channel video push effect. 5,023,720, Cl. 358-183.000.
Jaw-Shiunn, Tsay. Gas regulator with safety device. 5,022,435, Cl 137-613.000.
Jayaweera-Bandara, Asoka M.: *See—*
  Golding, Peter; Jayaweera-Bandara, Asoka M.; and Duffin, Henry, 5,023,386, Cl. 568-931.000.
Jeckel, Norbert. Intraoral orthodontic directional force applicator 5,022,855, Cl. 433-18.000.
Jefferson Smurfit Corporation: *See—*
  Ritter, Karl M., 5,022,582, Cl. 229-157.000.
Jeffery, Philip A.; and Hwang, Bor-Yuan, to Motorola, Inc. Low power output gate. 5,023,479, Cl. 307-446.000.
Jen, Han: *See—*
  Bonke, Carl; and Jen, Han, 5,023,831, Cl 364-900.000.
Jengo, James. Variable volume etching machine. 5,022,949, Cl. 156-345.000.
Jenkins, Barbara P., to Hasbro, Inc. Toy doll and accessories therefor. 5,022,886, Cl. 446-268.000.
Jenq, Jin-Huoo. Lever-operated protective cover for a saw tooth-shaped cutter. 5,022,576, Cl. 225-20.000.
Jensen Holding AG: *See—*
  Jensen, Jorn M., 5,022,169, Cl. 38-56.000.
Jensen, Jorn M., to Jensen Holding AG Apparatus for ironing laundry. 5,022,169, Cl. 38-56.000.
Jensen, Kaj. Circuit for starting and operating a gas discharge lamp. 5,023,519, Cl. 315-242.000.
Jensen, Niels D., to Grundfos International A/S. Method of inserting a stator winding into a stator. 5,022,139, Cl. 29-596.000.
Jeong, Tung H.: *See—*
  Smith, Steven L.; and Jeong, Tung H., 5,022,727, Cl. 350-3.760.
Jeppson, John, III; and Herlihy, Joseph P. Footwear insert. 5,022,168, Cl. 36-43.000.
Jermyn, Robert W.: *See—*
  Hudson, Hugh F.; Munsch, Joseph F.; McArdle, Joseph A.; Kammer, Jackie L.; and Jermyn, Robert W., 5,023,404, Cl. 174-97.000.
Jernakoff, George: *See—*
  El-Hamamsy, Sayed-Amr A.; and Jernakoff, George, 5,023,566, Cl. 330-251.000.
Jeromin, Lothar S.: *See—*
  Fender, William D.; and Jeromin, Lothar S., 5,023,661, Cl 355-210.000.
Jespersson, Henrik: *See—*
  Norstrom, Lars-Åke; Cederlund, Anders, and Jespersson, Henrik, 5,023,049, Cl. 420-91.000.
Jidosha Denki Kogyo K.K.: *See—*
  Ohashi, Yasuo; and Irie, Masao, 5,023,530, Cl. 318-446.000.
Jimenez, Julio: *See—*
  Sloan, Paul; Tuai, Gregory; Jimenez, Julio; and Jimenez, Raymond, 5,023,901, Cl. 379-38.000.
Jimenez, Raymond: *See—*
  Sloan, Paul; Tuai, Gregory; Jimenez, Julio; and Jimenez, Raymond, 5,023,901, Cl. 379-38.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Jinnouchi, Takeshi. *See—*
  - Sakamari, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi. and Tanzawa, Kenji, 5,022,842, Cl. 418-257.000.
- Jobling, David T., to Motorola, Inc Amplfier circuit 5,023,564, Cl 330-107.000.
- John Deere Technologies International, Inc.: *See—*
  - Abraham, John, and Bracco, Frediano V. 5,022,366, Cl. 123-205.000.
- John R Nalbach Engineering Co., Inc · *See—*
  - Warner, Graeme W., 5,022,443, Cl. 141-129.000.
- Johnsen, Robert J.; and Sanders, Paul W , to Motorola Inc. Method for forming a MOSFET with substrate source contact 5,023,196, Cl. 437-40.000.
- Johnson, Alfred E., Jr High strength post framed enclosure. 5,022,202, Cl. 52-169.600.
- Johnson, Dwight N Fluid connection method and assembly. 5,022,421, Cl. 137-15.000.
- Johnson, Eric: *See—*
  - McClure, J Michael; and Johnson, Eric, 5,022,333, Cl. 111-194.000
- Johnson, Frederick A.; and Swinbanks, Malcolm A , to GEC - Marconi Limited. Mounting for machinery 5,022,628, Cl. 248-638.000.
- Johnson, Harold W : *See—*
  - Schiene, Thomas M., Christie, William; Johnson, Harold W.; and Black, Robert C., 5,023,178, Cl. 435-170.000.
- Johnson, Herrick J.; Olson, Margaret; Jones, Stuart; Bodoff, Stephanie; Bertrand, Stephen C ; and Levine, Paul H., to Apollo Computer, Inc Network license server. 5,023,907, Cl. 380-4.000.
- Johnson, Hoke S., III, to SF2 Corporation. Method and circuit for decoding a Manchester code signal 5,023,891, Cl. 375-87.000.
- Johnson, J Herbert, to A O Smith Corporation. Switched reluctance motor rotor. 5,023,502, Cl. 310-261.000.
- Johnson, John R.; and Thexton, Melvin W., to Loral Aerospace Corp. 17-bit cascadable comparator using generic array logic. 5,023,590, Cl. 340-146.200.
- Johnson, Mark J.; and Solomon, James D., to Motorola, Inc Low-power DSP squelch. 5,023,940, Cl. 455-212 000.
- Johnson, Preston. Child travel seat 5,022,669, Cl 280-30.000.
- Johnson, Robert E., to Hoechst Celanese Corp Synthesis of polysiloxy containing naphthalocyanine compounds using cyclosiloxanes. 5,023,168, Cl. 430-495.000
- Johnson, Robert W., Jr : *See—*
  - Hollis, Samuel D.; and Johnson, Robert W , Jr., 5,023,319, Cl. 530-212.000.
- Johnson Service Company: *See—*
  - Hudson, Hugh F.; Munsch, Joseph F.; McArdle, Joseph A.; Kammer, Jackie L.; and Jermyn, Robert W., 5,023,404, Cl. 174-97.000.
- Johnson, Timothy V.: *See—*
  - Day, John P.; and Johnson, Timothy V., 5,022,991, Cl 210-506.000
- Johnson, Wayne A. Reaper razor. 5,022,154, Cl. 30-34 200.
- Johnston, Paul M. *See—*
  - Schlotterer, John C.; Johnston, Paul M.; Rusnak, Mark F.; Pillage, Lawrence T.; and Byrd, Thomas M., Jr., 5,023,822, Cl 364-703.000.
- Johnston, Walter F.: *See—*
  - Smith, Richard R.; and Johnston, Walter F., 5,023,137, Cl. 428-34.100.
- Jolley, Scott T.: *See—*
  - Grava, Arturs; and Jolley, Scott T., 5,023,007, Cl. 252-67.000.
- Jones, Allan B., Jr. Hand pedalled tricycle with improved steering 5,022,671, Cl. 280-250.000.
- Jones, Barbara L. Diamond growth. 5,023,068, Cl. 423-446.000.
- Jones, Daniel A.: *See—*
  - Suttle, James P.; and Jones, Daniel A , 5,022,653, Cl. 273-85.0CP
- Jones, Frederich P.: *See—*
  - Wodarczyk, Paul J.; Wheatley, Carl F., Jr.; Neilson, John M. S., and Jones, Frederich P., 5,023,692, Cl. 357-43.000.
- Jones, Jackie D.; Murphy, Guy C.; Mesing, Thomas C.; and Fuhrmann, Barrett J., to General Electric Company. Method for making a fiber reinforced composite article. 5,023,041, Cl. 264-510.000.
- Jones, Kenneth L. Cementious pattern imparting tool. 5,022,783, Cl 404-122.000.
- Jones, Stuart: *See—*
  - Johnson, Herrick J.; Olson, Margaret, Jones, Stuart; Bodoff, Stephanie; Bertrand, Stephen C ; and Levine, Paul H., 5,023,907, Cl. 380-4.000.
- Jones, Thomas A.. *See—*
  - Stiskin, Hal; Hogan, Joseph M., and Jones, Thomas A., 5,022,685, Cl. 285-45.000.
- Jones, Wescomb R.: *See—*
  - Buntrock, Kermit A.; English, Daniel R.; and Jones, Wescomb R., 5,022,920, Cl. 106-38.300.
- Jordan, Deborah A.: *See—*
  - Jordan, William D.; and Jordan, Deborah A., 5,022,245, Cl. 70-94.000.
- Jordan, John F.: *See—*
  - Ackerman, Bruce; Albright, Scot P.; and Jordan, John F., 5,022,930, Cl. 136-251.000.
- Jordan, William D.; and Jordan, Deborah A. Locking device for sliding doors and the like. 5,022,245, Cl 70-94.000.
- Joscelyn, Edwin R.: *See—*
  - Altemose, George A.; Consi, Michael; Joscelyn, Edwin R.; Wiemann, William; Giguere, David B.; Gully, Wilfred J.; and Spencer, Stanley E., 5,023,531, Cl. 318-471 000.
- Josowicz, Mira; and Potje-Kamloth, Karin. Process for encasing an electronic component 5,022,969, Cl. 204-56.100.
- Josquin, Wilhelmus J , and Van Dijk, Jan, to U.S Philips Corporation Method of manufacturing a bipolar transistor 5,023,192, Cl 437-31 000.
- Joy Research, Incorporated: *See—*
  - Reyner Ellis M., 5,022,564, Cl. 222-386.500.
- Jozefczak, Thadius F , to General Motors Corporation Compact side mounted wiper 5,022,113, Cl. 15-250 420.
- Juhl, Daniel L., and Wood, Raymond B., to Stanhope Products Company. Adsorbent package that is resistant to high temperature 5,022,902, Cl 55-387.000
- Jung, Mankil. *See—*
  - McChesney, James D. and Jung, Mankil. 5,023,353, Cl. 549-348.000.
- Justice, David D *See—*
  - Loftus, Donald B., and Justice, David D., 5,023,803, Cl 364-497.000.
- Kabi Vitrum AB· *See—*
  - Chang, Stephen S. Bao, Yongde: and Pelura, Timothy J. 5,023,100, Cl. 426-601.000.
- Kaburagi, Chiharu· *See—*
  - Koga, Yoshiro, Gomi, Akihiro; Miyasaka, Takashi; Miyazawa, Yasunaga; Endo, Kenichi; Shinozaki, Junichiro; Yoda, Kaneo, Ichikawa, Takashi; Miyasaka, Hitoshi; and Kaburagi, Chiharu, 5,023,733, Cl. 360-77.040.
- Kabushiki Kaisha Kobe Seiko Sho: *See—*
  - Fujikawa, Takao; and Ishii, Takahiko, 5,022,343, Cl. 118-47.000
- Kabushiki Kaisha Ouyo Keisoku Kenkyusho· *See—*
  - Kita, Kunio; Kuwashima, Shigesumi; Suzuki, Takahito; and Seki, Chikashi, 5,023,709, Cl 358-125.000.
- Kabushiki Kaisha Sakura Kurepasu *See—*
  - Inoue, Shigeyasu; Ozu, Tatsuya, and Nakatani, Yasunori, 5,022,775, Cl. 401-107.000.
- Kabushiki Kaisha Sato: *See—*
  - Ito, Toyozo, 5,023,633, Cl. 346-160.000.
- Kabushiki Kaisha Shinkoseisakusho: *See—*
  - Yokoi, Takao, 5,022,802, Cl. 409-52.000.
- Kabushiki Kaisha Showa Seisakusho: *See—*
  - Hayashi, Yasuyuki; and Abe, Shigenohu, 5,022,501, Cl 188-300.000.
- Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho: *See—*
  - Saitou, Tosio; Matsui, Kenji; Tamura, Keiichi; Mori, Shinji; and Izuchi, Shingo, 5,022,601, Cl. 242-107.40A.
- Kabushiki Kaisha Toshiba: *See—*
  - Abe, Hirotoshi, 5,023,753, Cl 361-400.000.
  - Ando, Kazumasa, Sakai, Hideo; and Sakai, Miki, 5,023,688, Cl. 357-42.000.
  - Horino, Shigeo; Omura, Hideo; Maruyama, Nobusato; Ashikawa, Yoshiaki; Shioya, Masatoshi; Miyano, Toshiyuki; and Wakou, Jiro, 5,022,531, Cl. 209-552.000.
  - Konishi, Kazuo, 5,023,890, Cl. 375-34.000.
  - Kuzuhara, Takashi, 5,023,735, Cl. 360-104.000.
  - Ogino, Masanobu, 5,023,696, Cl. 357-60.000.
  - Ohshoji, Hiroshi; Ohshima, Fumio; and Matsuo, Satoshi, 5,022,382, Cl. 128-4.000.
  - Okada, Yoshio, 5,023,842, Cl. 365-205.000.
  - Segawa, Hideo, 5,023,912, Cl. 381-43.000.
  - Shihata, Hideki, 5,023,679, Cl. 357-23 400.
  - Shimazaki, Takashi; and Tsuneeda, Kenichi, 5,023,666, Cl 355-269.000.
  - Suzuki, Mariko; Itaya, Kazuhiko; Ishikawa, Masayuki; Watanabe, Yukio; and Hatakoshi, Genichi, 5,023,880, Cl. 372-45.000.
  - Suzuki, Noriaki; Miyamoto, Junichi; and Ohtsuka, Nobuaki, 5,023,839, Cl. 365-200.000.
  - Tanaka, Akiko; and Takiguchi, Toshio, 5,022,980, Cl 204-400.000
  - Tsunoda, Tetsujiro, 5,023,684, Cl. 357-27.000.
  - Tsutaki, Shoji; Fuse, Kazuyoshi; and Ohta, Toshihiko, 5,022,140, Cl. 29-603.000.
  - Watanabe, Yohji; and Furuyama, Tohru, 5,023,476, Cl 307-296.100.
  - Yamada, Takashi, 5,023,683, Cl. 357-23.600.
- Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
  - Mori, Shogo; and Tateishi, Tetsuo, 5,023,693, Cl. 357-46.000.
- Kabushiki Kaisha Yakult Honsha: *See—*
  - Hosoya, Hideo; Kimura, Masayuki; Endo, Hiroshi; Hiraki, Yoshio, Yamamoto, Shoji; Yoshikawa, Satoshi; Omine, Hidetaka; and Miyazaki, Koji, 5,023,175, Cl. 435-101.000.
- Kageyama, Fumio: *See—*
  - Tsuyama, Toshiaki; Nobumoto, Kazutoshi; Kageyama, Fumio; Sone, Akira; and Kawamura, Makoto, 5,022,483, Cl. 180-197.000.
- Kageyama, Hidehei; and Lozeau, Robert V., to Kotobuki & Co., Ltd.; and A T. Cross Company. Rotary knock type mechanical pencil. 5,022,772, Cl. 401-65.000.
- Kageyama, Hiroshi: *See—*
  - Okamoto, Sueaki; Yoshida, Seitaro; Kageyama, Hiroshi; and Ogaki, Shinji, 5,023,748, Cl. 361-229.000.
- Kageyama, Keisuke, to Sumitomo Special Metal Co. Ltd. Dielectric ceramic composition for electronic devices. 5,023,219, Cl. 501-136.000.
- Kageyama, Shuhei; Kageyama, Toshihiko; Nakazato, Youichi; and Mitsuya, Yoshihide, to Kotobuki & Co., Ltd Writing tool with eraser dispenser. 5,022,774, Cl. 401-52.000.
- Kageyama, Toshihiko: *See—*
  - Kageyama, Shuhei; Kageyama, Toshihiko; Nakazato, Youichi, and Mitsuya, Yoshihide, 5,022,774, Cl. 401-52 000.

- Kagiura, Kazuo: *See—*
  - Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Ohashi, Masashi; Shirai, Masanari; and Ando, Eiichi, 5,023,658, Cl. 355-72.000.
- Kahler, Jeffrey A., to Honeywell, Inc. Flight control apparatus with predictive heading/track hold command. 5,023,796, Cl. 364-434.000.
- Kahn, David A., to Northern Telecom Limited. Optical receivers. 5,023,951, Cl. 455-619.000.
- Kahn, Leonard R. Multi-system AM stereo receiver having preferred mode of operation. 5,023,909, Cl. 381-15.000.
- Kaito, Takashi: *See—*
  - Adachi, Tatsuya; and Kaito, Takashi, 5,023,453, Cl. 250-309.000.
- Kaji, Toshihiko: *See—*
  - Takeda, Yoshinobu; Odani, Yusuke; Hayashi, Tetsuya; Kaji, Toshihiko; and Itoh, Yoshiaki, 5,022,455, Cl. 164-46.000.
- Kajima Corporation: *See—*
  - Kobori, Takuji; Sakamoto, Mitsuo; Yamada, Toshikazu; Nishimura, Isao; Ishii, Koji; and Tagami, Jun, 5,022,201, Cl. 52-167.0DF.
  - Konno, Shozo; and Matsui, Nobuyuki, 5,022,792, Cl. 405-267.000.
- Kajiwara, Makoto: *See—*
  - Miyoshi, Masanobu; Kajiwara, Makoto; and Onodera, Kaoru, 5,023,170, Cl. 430-558.000.
- Kajiwara, Yasuya, to Mitsubishi Denki K.K Tracking distance-measuring equipment system with means for setting a window and means for sampling image signals at predetermined time intervals. 5,023,712, Cl. 358-105.000.
- Kakeya, Noboru: *See—*
  - Yoshida, Hiroshi; Kakeya, Noboru; and Kashiwagi, Masanori, 5,023,351, Cl. 549-321.000.
- Kalamazoo Holdings, Inc.: *See—*
  - Todd, Paul H., Jr., 5,023,017, Cl. 252-407.000.
- Kallens, Nicholas; and Gabbay, Steven, to Kallens, Nicholas. Handle fastener assembly and method of making same. 5,022,156, Cl. 30-125.000.
- Kalyanaraman, Palaiyur S.; and Onorato, Frank J., to Hoechst Celanese Corp. Optical information card. 5,023,167, Cl. 430-495.000.
- Kamamura, Hideo, to Isuzu Ceramics Research Institute Co., Ltd. Variable-cycle engine. 5,022,353, Cl. 123-21.000.
- Kameda, Kazuo: *See—*
  - Kawahara, Tsugio; Harashima, Hiromasa, Ubukata, Shunji; Kameda, Kazuo, Moriya, Hirohito; and Inamura, Yoshihisa, 5,022,172, Cl. 40-503.000.
- Kamiguchi, Masao; and Kobayashi, Minoru, to Fanuc Ltd. Method and apparatus for controlling a back pressure of a motor-driven injection molding machine. 5,023,028, Cl. 264-40.100.
- Kamijo, Tetsuhide; Ujiie, Arao; Harada, Hiromu; Tsutsumi, Naoyuki; Tsubaki, Atsushi; Yamaguchi, Toshiaki; and Nagata, Hideo, to Kissei Pharmaceutical Co., Ltd. Acylated benzofuro[3,2-c]quinoline compounds with utility as treatments for osteoporosis. 5,023,261, Cl. 514-285.000.
- Kammer, Jackie L.: *See—*
  - Hudson, Hugh F.; Munsch, Joseph F.; McArdle, Joseph A.; Kammer, Jackie L.; and Jermyn, Robert W., 5,023,404, Cl 174-97.000.
- Kampe, Klaus-Dieter: *See—*
  - Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans-Georg; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 5,023,357, Cl. 544-132.000.
- Kampf GmbH & Co. Maschinenfabrik: *See—*
  - Hutzenlaub, Armin; and Kaul, Burkhard, 5,022,598, Cl. 242-68.400.
- Kanamori, Hiroo: *See—*
  - Ishiguro, Yoichi; Kanamori, Hiroo; Urano, Akira; and Kyoto, Michihisa, 5,022,904, Cl. 65-2.000.
- Kandatsu, Kiyoshi: *See—*
  - Oyama, Jun; Uchida, Naoshi; Unuma, Makoto; Takahashi, Tatsunori; Shinohara, Hisaji; and Kandatsu, Kiyoshi, 5,023,416, Cl. 200-244.000.
- Kandpal, Tara C.; Paczuski, Andrew W.; and Siewert, Herbert G., to Tecumseh Products Company. Single piece gasket valve plate assembly 5,022,833, Cl. 417-571.000.
- Kane, Beverly A. Flexible medical implement utility pouch. 5,022,521, Cl. 206-370.000.
- Kane, John P.: *See—*
  - Vigne, Jean-Louis; and Kane, John P., 5,023,271, Cl. 514-458.000.
- Kaneko, Tetsuya: *See—*
  - Nomura, Ichiro; Kaneko, Tetsuya; Banno, Yoshikazu; and Takeda, Toshihiko, 5,023,110, Cl. 427-49.000.
- Kaneko, Toshihiko: *See—*
  - Iwamoto, Norihiro; Tsuboi, Hiroyuki; and Kaneko, Toshihiko, 5,022,457, Cl. 164-155.000.
- Kaneko, Toshimi; Yamamoto, Hidetoshi; and Hirotsuji, Takayuki, to Murata Manufacturing Co., Ltd. Filter array having a plurality of capacitance elements. 5,023,578, Cl. 333-185.000.
- Kaneko, Toshio: *See—*
  - Sato, Kazuo; Kikuchi, Yuji; Ohki, Hiroshi; and Kaneko, Toshio, 5,023,054, Cl. 422-82.090.
- Kang, Seong I, to Pacific Chemical Co., Ltd. Casing for compact. 5,022,529, Cl. 206-581.000.
- Kano, Akiko: *See—*
  - Nakazawa, Masayuki; Nitta, Masaaki; Tsuchino, Hisanori; and Kano, Akiko, 5,023,461, Cl. 250-484.100.
- Kanzaki Paper Mfg. Co., Ltd.: *See—*
  - Matoba, Gensuke; Ishida, Katsuhiko; Tani, Hisashi; and Hayashi, Hiroo, 5,023,227, Cl. 503-214.000.
- Kanzawa, Yoshikazu; Fujikake, Yasushi; Ito, Osami; Ito, Shuho; Oikawa, Hironobu; Otsubo, Makoto; Morikawa, Iwao; Shiratori, Yuichi; and Tsukada, Kiyoshi, to Honda Giken Kogyo Kabushiki Kaisha. Body frame, and production process and apparatus thereof. 5,022,456, Cl. 164-119.000.
- Kao Corporation: *See—*
  - Kobayashi, Takatoshi, 5,023,124, Cl. 428-76.000.
  - Yamamura, Masaaki; Okabe, Kazuhiko; Sotoya, Kohshiro; and Murata, Moriyasu, 5,023,003, Cl. 252-8.800.
- Kaplan, Murray; and Humes, Robert W., to Science Dynamics Corporation. Direct telephone dial ordering service. 5,023,904, Cl. 379-91.000.
- Kaplinsky, Cecil H., to Plus Logic, Inc. Programmable logic device with ganged output pins. 5,023,606, Cl. 340-825.800.
- Karasaki, Toshihiko: *See—*
  - Hayashi, Kohtaro; Karasaki, Toshihiko; Yamano, Yasuteru; Mukai, Hiromu; Hata, Koji; and Ikemura, Masayuki, 5,023,649, Cl. 354-434.000.
  - Ishida, Tokuji; Hamada, Masataka; Ishibashi, Kenji; Taniguchi, Nobuyuki; Ootsuka, Hiroshi; Norita, Toshio; and Karasaki, Toshihiko, 5,023,646, Cl. 354-402.000.
- Karino, Yukio: *See—*
  - Yamanouchi, Junichi; Shiratsuchi, Kentaro; Karino, Yukio; and Shibata, Takeshi, 5,023,162, Cl. 430-203.000.
- Karkota, Frank P., Jr. Superheterodyne SCA receiver and method for the manufacture thereof. 5,023,933, Cl. 455-45.000.
- Karl Lautenschlager GmbH & Co. KG: *See—*
  - Lautenschlager, Karl; and Lautenschlager, Gerhard W., 5,022,117, Cl. 16-288.000.
- Karlotski, Robert J.: *See—*
  - Ratliff, Paul A.; and Karlotski, Robert J., 5,023,505, Cl. 313-25.000.
- Karls, Michael A., to Brunswick Corporation. Marine propeller locking tab washer. 5,022,875, Cl. 440-49.000.
- Karr, Stephen L., Jr.: *See—*
  - Gevas, Philip C.; Karr, Stephen L., Jr.; Grimes, Stephen; and Littenberg, Richard L., 5,023,077, Cl. 424-88.000.
- Kars, Herman P., to Koninklijke Emballage Industrie van Leer B.V. Method for producing of a closure for a container, closure, container as well as threaded ring. 5,022,552, Cl. 220-288.000.
- Kashio, Jiro: *See—*
  - Nakayashiki, Susumu; Harakawa, Takeshi; and Kashio, Jiro, 5,023,871, Cl. 370-85.500.
- Kashiwagi, Masanori: *See—*
  - Yoshida, Hiroshi; Kakeya, Noboru; and Kashiwagi, Masanori, 5,023,351, Cl. 549-321.000.
- Kashiwai, Shin-ichi: *See—*
  - Nishida, Koji; Yokomizo, Osamu; Masuhara, Yasuhiro; Nakao, Toshitsugu; Kashiwai, Shin-ichi; Tomiyama, Akio; Yamashita, Junichi; and Hayashi, Tatsuo, 5,023,047, Cl. 376-370.000.
- Kashyap, Raman, to British Telecommunications public limited company. Method of modifying an optical waveguide and waveguide so modified. 5,022,734, Cl. 350-96.150.
- Kasmer, Christopher A.: *See—*
  - Zakheim, Howard; Clinton, Peter M.; Goldschneider, James D.; Kasmer, Christopher A.; Zahn, Markus; and Hoffmeyer, Charles L., 5,022,592, Cl. 241-172.000.
- Kasper, Gary A., to Rexair, Inc. Intake nozzle assembly for a liquid bath vacuum cleaner. 5,022,115, Cl. 15-353.000.
- Kast, Juergen; Kolassa, Dieter; Meyer, Norbert, Schirmer, Ulrich; Harreus, Albrecht; Wild, Jochen; Westphalen, Karl-Otto; and Wuerzer, Bruno, to BASF Aktiengesellschaft. Cyclohexenone oxime ethers, their preparation and their use as herbicides. 5,022,914, Cl. 71-88.000.
- Kasuga, Noboru: *See—*
  - Hanyu, Susumu; Kasuga, Noboru; Koike, Mikio; Hara, Kazumasa; Nishijima, Mitsuru; and Sasano, Akiyoshi, 5,022,335, Cl. 112-255.000.
- Kasuya, Akira: *See—*
  - Hirai, Kazuo; and Kasuya, Akira, 5,023,288, Cl. 524-268.000.
- Kataoka, Hideaki: *See—*
  - Simizu, Tooru; and Kataoka, Hideaki, 5,023,163, Cl. 430-207.000.
- Kataoka, Kenji: *See—*
  - Yamakage, Hisaaki; Nomura, Kenhachiro; Maruyama, Tadayoshi; Kataoka, Kenji; and Yamashita, Nobuyuki, 5,022,494, Cl. 184-104.100.
- Katayama, Hiroshi: *See—*
  - Tajima, Fumio; Katayama, Hiroshi; Miyashita, Kunio; Morinaga, Shigeki; and Narushima, Seiichi, 5,023,924, Cl. 388-811.000.
- Katayama, Kaoru: *See—*
  - Shirai, Mitugu; Katayama, Kaoru; Sasaki, Hideaki; Kazui, Shinichi; Satoh, Ryohei; Miyauchi, Tateoki; and Kobayashi, Mamoru, 5,023,407, Cl. 174-257.000.
- Kato, Junichi: *See—*
  - Aso, Toshiyuki; Arakawa, Yasuo; and Kato, Junichi, 5,023,420, Cl. 219-69.120.
- Kato, Kenji; Koga, Nariyoshi; and Haruta, Yukinori, to Nippon Oil and Fats Co., Ltd. Stabilized maleimide composition and process for preparing same. 5,023,339, Cl. 548-401.000.
- Kato, Takatsugu: *See—*
  - Yano, Tadashi; and Kato, Takatsugu, 5,022,439, Cl. 139-1.00R.
- Kauffeldt, Horst; and Kauffeldt, Thomas. Device for suctioning up and removing a contaminated liquid. 5,022,114, Cl. 15-353.000.
- Kauffeldt, Thomas: *See—*
  - Kauffeldt, Horst; and Kauffeldt, Thomas, 5,022,114, Cl. 15-353.000.
- Kaul, Burkhard: *See—*
  - Hutzenlaub, Armin; and Kaul, Burkhard, 5,022,598, Cl. 242-68.400.
- Kautt, Jean-Jacques, to Ferco International Usine de Ferrures de Batiment. Window frame finishing installation. 5,022,143, Cl. 29-783.000

VOL
1127
ISS
2
JE
11
1991
UMI

Kawabata, Yasushi: *See—*
Sugihara, Hirosi; Hidaka, Hiroshi; Doi, Akira; Okawauchi, Toshitaka; Kawabata, Yasushi; and Baba, Hideki, 5,023,101, Cl. 426-603.000.

Kawagishi, Masao: *See—*
Shinohara, Koichi; Suzuki, Takashi; Kawagishi, Masao; Satoh, Nobuo; Murakami, Takeshi; and Fujita, Takashi, 5,023,739, Cl. 360-132.000.

Kawaguchi, Masayuki; Kita, Yasushi; Yamamoto, Kayoko; and Nozaki, Koji, to Central Glass Company, Limited. Aminotriazine polymers and method of preparing same. 5,023,308, Cl. 528-423.000.

Kawahara, Tsugio; Harashima, Hiromasa; Ubukata, Shunji; Kameda, Kazuo; Moriya, Hirohito; and Inamura, Yoshihisa, to Sanyo Electric Co., Ltd. Display apparatus for an automatic vending machine. 5,022,172, Cl. 40-503.000.

Kawai, Kiyoshi: *See—*
Ebara, Takeshi; Sasaki, Toshio; and Kawai, Kiyoshi, 5,023,223, Cl. 502-116.000.

Kawai, Mamoru, to Sansin Engineering, Inc. Theftproof quick-release type clamping assembly for mounting bicycle part. 5,022,672, Cl. 280-281.100.

Kawai, Yoichi: *See—*
Abe, Masaru; Kawai, Yoichi; Maki, Masami; and Wada, Katuo, 5,023,286, Cl. 524-128.000.

Kawamata, Toshio: *See—*
Iwasa, Masakazu; Morita, Kazuhiko; and Kawamata, Toshio, 5,022,519, Cl. 206-313.000.

Kawamoto, Mutsumi: *See—*
Inagaki, Hidemitsu; Kawamoto, Mutsumi; and Tanaka, Satoru, 5,022,480, Cl. 180-79.100.

Kawamura, Akihisa: *See—*
Matsumoto, Masaharu; Satoh, Katsuaki; Ishikawa, Seiichi; Serikawa, Mitsuhiko; Kawamura, Akihisa; and Hashimoto, Hikari, 5,023,913, Cl. 381-63.000.

Kawamura, Hideaki, to Canon Kabushiki Kaisha. Printer capable of temperature compensation of the optical density of a printed image after a complete image is printed. 5,023,626, Cl. 346-33.0TP.

Kawamura, Hideo, to Isuzu Motors Limited. Control system for internal combustion engine. 5,022,357, Cl. 123-90.110.

Kawamura, Makoto: *See—*
Tsuyama, Toshiaki; Nobumoto, Kazutoshi; Kageyama, Fumio; Sone, Akira; and Kawamura, Makoto, 5,022,483, Cl. 180-197.000.

Kawano, Hazime: *See—*
Nishioka, Yasuhiko; Kawano, Hazime; and Inami, Kazuyoshi, 5,023,634, Cl. 342-368.000.

Kawasaki, Mikio; and Iwata, Masatoshi, to Konica Corporation. X-ray radiographic system. 5,023,898, Cl. 378-146.000.

Kawase, Kei: *See—*
Ishikawa, Hiroshi; and Kawase, Kei, 5,023,533, Cl. 318-568.210.

Kawata, Masayuki; and Tsukada, Nobuo. Electric apparatus with silent alarm. 5,023,853, Cl. 368-230.000.

Kawata, Takashi: *See—*
Miyazaki, Akira; Kikuchi, Yuichi; Ohara, Yoshiyuki; Fujinaga, Tomosburo; Kawata, Takashi; Mizutani, Fumitoshi; Hida, Tsugio; and Shimazaki, Shiroyasu, 5,022,789, Cl. 405-133.000.

Kays, Jerry W.: *See—*
Reynolds, John W.; Burton, Bobby H.; and Kays, Jerry W., 5,022,424, Cl. 137-68.100.

Kazui, Shinichi: *See—*
Shirai, Mitugu; Katayama, Kaoru; Sasaki, Hideaki; Kazui, Shinichi; Satoh, Ryohei; Miyauchi, Tateoki; and Kobayashi, Mamoru, 5,023,407, Cl. 174-257.000.

Kearns, Joel: *See—*
Klein, John F.; Kearns, Joel; and Gonen, Jerry, 5,023,058, Cl. 422-248.000.

Keeble, Peter J., to British Telecommunications public limited company. Optical fibre installation. 5,022,634, Cl. 254-134.400.

Keeley, Larry L.: *See—*
Summers, Max D.; Bradfield, James Y.; and Keeley, Larry L., 5,023,328, Cl. 536-27.000.

Keens, Gary; and Fursier, Roger, to Rittal-Werk Loh GmbH & Co. KG. Apparatus for an electrical connection of a printed circuit board to a module rail of a component rack. 5,022,863, Cl. 439-108.000.

Kehl, Theodore H.; and Cutler, David N., to Digital Equipment Corporation. Radix-16 divider using overlapped quotient bit selection and concurrent quotient rounding and correction. 5,023,827, Cl. 364-744.000.

Keiper Recaro GmbH & Co.: *See—*
Butt, Timothy R.; and Zolin, Sergio, 5,022,698, Cl. 296-65.100.

Kelkenberg, Heike; and Ruback, Wulf, to Huls Aktiengesellschaft. Use of polyhydroxyalkylamine-N,N-dicarboxylic acids and their salts as builders in detergents and cleaning agents. 5,023,018, Cl. 252-527.000.

Keller, James J. Metering roller control apparatus. 5,022,322, Cl. 101-148.000.

Keller, Stephen A.: *See—*
Verret, Douglas P.; Smayling, Michael C.; Sachdeva, Abnash C.; and Keller, Stephen A., 5,023,690, Cl. 357-43.000.

Kelley, Mellis M.: *See—*
Burlett, Donald J.; Bauer, Richard G.; and Kelley, Mellis M., 5,023,301, Cl. 525-232.000.

Kelly, John A.: *See—*
Kreh, Robert P.; Lundquist, Joseph T.; Henry, Wayne L.; Kelly, John A.; and Kuhn, Vincent R., 5,022,926, Cl. 134-2.000.

Kelly, Michael J.: *See—*
Blewer, Robert S.; Gullinger, Terry R.; Kelly, Michael J.; and Tsao, Sylvia S., 5,023,200, Cl. 437-187.000.

Kelsic, Gary; and Martinez, Jim, to MiniScribe Corporation. Magnetic latch for disk drive actuator. 5,023,736, Cl. 360-105.000.

Kem, Han, to AG Communication Systems Corporation. Interface circuit for data transmission between a microprocessor system and a time-division-multiplexed system. 5,023,870, Cl. 370-85.200.

Kemp, Richard A., to Shell Oil Company. Alkoxylation process catalyzed by lanthanum silicates and metasilicates. 5,023,224, Cl. 502-214.000.

Kendall Company, The: *See—*
Doheny, Anthony J., Jr.; and Noonan, James R., 5,022,941, Cl. 156-85.000.
Hasty, James H., 5,022,387, Cl. 128-64.000.

Kendall, Margaret J.: *See—*
Kendall, Thomas D.; and Baddet, Peter T., 5,022,444, Cl. 141-248.000.

Kendall, Thomas D.; and Baddet, Peter T., to Kendall, Thomas D.; and Kendall, Margaret J. Apparatus for filling predetermined quantities of material into containers. 5,022,444, Cl. 141-248.000.

Kenez nee Da, Marai: *See—*
David, Agoston; Kenez nee Da, Marai; and Racz, Istvan, 5,022,972, Cl. 204-183.300.

Kennedy, Kimberly C. Book and sound recording holder. 5,022,522, Cl. 206-387.000.

Kennedy, Lawrence C.; and Lambert, Harvey J., to General Motors Corporation. Anti-flowback check valve for a viscous fluid clutch. 5,022,507, Cl. 192-58.00B.

Kennedy, Thomas W. Ring laser gyroscope with a tube assembly. 5,022,761, Cl. 356-350.000.

Kenny, Andrew A.; and Stahly, Daniel C., to Eaton Corporation. Throttle cable intervention servoactuator. 5,022,368, Cl. 123-342.000.

Kenny, Bradley T., to Kenny, Bradley Thomas. Skateboard axle mounting apparatus. 5,022,668, Cl. 280-7.140.

Kenny, Bradley Thomas: *See—*
Kenny, Bradley T., 5,022,668, Cl. 280-7.140.

Kenyon Consortium, The: *See—*
Sandberg, Thomas M., 5,023,706, Cl. 358-254.000.

Kessler, Brian D., to Maui Toys, Inc. Fluid filled jumping stick. 5,022,646, Cl. 272-75.000.

Kessler, David; and Baldwin, Roger E., to Eastman Kodak Company. Beam position sensor for a light beam scanner. 5,023,448, Cl. 250-235.000.

Keusch, Siegfried: *See—*
Goll, Gunther; Vater, Peter; Keusch, Siegfried; and Kratz, Gunter, 5,023,925, Cl. 392-384.000.

Kharitonov, Jury D.: *See—*
Boiko, Leonid S.; Korotkin, Viktor I.; Veretennikov, Viktor Y.; Roslivker, Efim G.; Fedyakin, Roman V.; Chesnokov, Viktor A.; Yakovlev, Anatoly S.; Kharitonov, Jury D.; Fei, Valery M.; and Galichenko, Emma N., 5,022,280, Cl. 74-462.000.

Khoe, Giok D.: *See—*
Angenent, Johannes H.; Khoe, Giok D.; Mahon, Gathal J.; Van De Grijp, Abram; Potters, Cornelis J. T.; and Wright, Kieran G., 5,022,733, Cl. 350-96.180.

Ki, Ryu D.: *See—*
Yeol, Ryu M.; Ki, Ryu D.; Kyun, Yun D.; Kyu, An J.; Kuk, Hong S.; Euy, Hong C.; and Sun, Ryu S., 5,022,520, Cl. 206-315.100.

Kichibayashi, Masakatsu: *See—*
Ito, Kazuhiko; Miyazaki, Kouji; Kichibayashi, Masakatsu; Horii, Shigeru; and Ozawa, Masataka, 5,023,516, Cl. 315-101.000.

Kida, Koichi: *See—*
Abe, Takafumi; Ebata, Shuji; Machida, Hiroshi; and Kida, Koichi, 5,023,390, Cl. 585-320.000.

Kidd, Christopher: *See—*
Rushing, Tatsuo; and Kidd, Christopher, 5,022,539, Cl. 211-133.000.

Kidder, Kenneth B.: *See—*
Patton, Paul B.; and Kidder, Kenneth B., 5,023,816, Cl. 364-550.000.

Kiefer, Jean-Claude: *See—*
Bachot, Jean; and Kiefer, Jean-Claude, 5,023,127, Cl. 428-137.000.

Kikuchi, Hideo: *See—*
Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl. 431-2.000.

Kikuchi, Koshin: *See—*
Machida, Hiroji; Asano, Michiaki; Watanabe, Yozo; Tokuhiro, Tomoya; Satoh, Hiroshi; Iwahashi, Motoyuki; Yamaguchi, Norihiro; Kikuchi, Koshin; and Watanabe, Hiroaki, 5,023,020, Cl. 261-18.100.

Kikuchi, Yuichi: *See—*
Miyazaki, Akira; Kikuchi, Yuichi; Ohara, Yoshiyuki; Fujinaga, Tomosburo; Kawata, Takashi; Mizutani, Fumitoshi; Hida, Tsugio; and Shimazaki, Shiroyasu, 5,022,789, Cl. 405-133.000.

Kikuchi, Yuji: *See—*
Sato, Kazuo; Kikuchi, Yuji; Ohki, Hiroshi; and Kaneko, Toshio, 5,023,054, Cl. 422-82.090.

Kilbane, arrell M.: *See—*
Boston, Steven L.; Kilbane, arrell M.; Lee, Danny E.; Kilbane, Farrell M.; and Lee, Danny E., 5,023,113, Cl. 427-320.000.

Kilbane, Farrell M.: *See—*
Boston, Steven L.; Kilbane, arrell M.; Lee, Danny E.; Kilbane, Farrell M.; and Lee, Danny E., 5,023,113, Cl. 427-320.000.

Kilgore, James S., Jr., to Craig, Doyle J., Jr.; and Copeland, Tom D., Jr., a part interest to each. Easel for optimizing photographic color prints. 5,022,764, Cl. 356-404.000.

Killmeyer, Richard P.: *See—*
Klima, Mark S.; Maronde, Carl P.; and Killmeyer, Richard P., 5,022,892, Cl. 44-621.000.

Kim, Byoung Y.: *See—*
Engan, Helge E.; Kim, Byoung Y.; Blake, James N.; and Shaw, Herbert J., 5,022,732, Cl. 350-96.150.

Kim, Jin D.; and Waldie, William T., to Motorola, Inc. Surface-mount filter. 5,023,580, Cl. 333-206.000.

Kim, Ko-Hyun, to SamSung Electronics Co., Ltd. Apparatus for locking a pickup unit of a disc player for a vehicle. 5,023,862, Cl. 369-215.000.

Kim, Man U., to Samsung Electronics Co., Ltd. Packaging machine with box-flap folding device. 5,022,214, Cl. 53-242.000.

Kimura, Kazuyoshi, to Shelter Home Co. Ltd. Method for construction of building and joint apparatus for construction members. 5,022,209, Cl. 52-646.000.

Kimura, Masayuki: *See—*
Hosoya, Hideo; Kimura, Masayuki; Endo, Hiroshi; Hiraki, Yoshio; Yamamoto, Shoji; Yoshikawa, Satoshi; Omine, Hidetaka; and Miyazaki, Koji, 5,023,175, Cl. 435-101.000.

Kimura, Norio: *See—*
Sakata, Tsuguhide; Kimura, Norio; and Takei, Masahiro, 5,023,730, Cl. 360-48.000.

Kimura, Tetsuya *See—*
Ohashi, Mitsuo; Awano, Katsuya; Tanaka, Toshio; and Kimura, Tetsuya, 5,023,364, Cl. 560-53.000.

Kimura, Yasuo: *See—*
Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; Asano, Yuji; Yamamoto, Takemi; and Nakata, Takashi, 5,023,654, Cl. 355-27.000.

Kineret Engineering: *See—*
Sturman, Oded E.; Grill, Benjamin; and Harrison, Walter L., 5,022,565, Cl. 222-396.000.

Kinetic Concepts, Inc.: *See—*
Stroh, Glenn C., 5,022,110, Cl. 5-455.000.

Kinetico Incorporated: *See—*
Avery, Norman R.; Spangenberg, Dale J., Jr.; Buth, Jimmy D.; and Seuffer, Kenneth C., Jr., 5,022,994, Cl. 210-670.000.

King, David E.; and Marietta, Walter E., to Sta-Rite Industries, Inc. Seal arrangement for a gear machine. 5,022,837, Cl. 418-132.000.

King Industries, Inc.: *See—*
Calbo, Leonard J., Jr.; and Gallacher, Lawrence V., 5,023,367, Cl. 560-193.000.
Gallacher, Lawrence V.; Gustavsen, Alfen J.; and Kugel, Robert L., 5,023,016, Cl. 252-389.520.

King, James H.: *See—*
Kiser, David M.; and King, James H., 5,022,479, Cl. 180-68.300.

King, Lloyd H., Jr.; and King, Thomas A., to King Technology of Missouri, Inc. Waterproof wire connector. 5,023,402, Cl. 174-87.000.

King, Richard P., to International Business Machines Corporation. Method and system for storing messages based upon a non-queried name assignment. 5,023,772, Cl. 364-200.000.

King Technology of Missouri, Inc.: *See—*
King, Lloyd H., Jr.; and King, Thomas A., 5,023,402, Cl. 174-87.000.

King, Thomas A.: *See—*
King, Lloyd H., Jr.; and King, Thomas A., 5,023,402, Cl. 174-87.000.

Kino, Gordon S.; and Xiao, Guooing, to Leland Stanford Junior University, The Board of Trustees of the. Scanning confocal optical microscope. 5,022,743, Cl. 350-507.000.

Kinzer, Daniel M., to International Rectifier Corporation. High power MOSFET and integrated control circuit therefor for high-side switch application. 5,023,678, Cl. 357-23.400.

Kirchner, Ulrich, to Kirchner & Wilhelm GmbH & Co. Stethoscope. 5,022,487, Cl. 181-137.000.

Kirchner & Wilhelm GmbH & Co.: *See—*
Kirchner, Ulrich, 5,022,487, Cl. 181-137.000.

Kirk, Paula S., to BASF Corporation. Color stabilization system for beta-carotene in dry food mixes. 5,023,095, Cl. 426-250.000.

Kirschner, Jonathan; Stembridge, William F.; Stembridge, W. Frank, III; and Deeds, Douglas A., to Coca-Cola Company, The. Ice bank control system for beverage dispenser. 5,022,233, Cl. 62-138.000.

Kirton, Raymond E.: *See—*
Grey, Thaddeus J.; Kirton, Raymond E.; English, George A.; Liggett, Michael D.; Meyer, Karen M.; and Barker, Charles J., 5,022,431, Cl. 137-375.000.

Kiser, David M.; and King, James H., to Navistar International Transportation Corp. Motor vehicle engine air intake system including moisture elimination apparatus. 5,022,479, Cl. 180-68.300.

Kishi, Takao, to NEC Corporation. Controller for two timers of a virtual machine system, one updated only in the VMOS mode. 5,023,771, Cl. 364-200.000.

Kishimoto, Kazuhiko: *See—*
Ueda, Satoshi; Sudare, Masahiro; Suyama, Yasuyuki; Kishimoto, Kazuhiko; Suzuki, Kenshi; Inoue, Shiroh; and Sakura, Shunji, 5,023,534, Cl. 318-587.000.

Kishimoto, Tadao: *See—*
Maruyama, Hiroyuki; Kishimoto, Tadao; Isobe, Toshifumi; and Yokobori, Jun, 5,023,708, Cl. 358-75.000.

Kissei Pharmaceutical Co., Ltd.: *See—*
Kamijo, Tetsuhide; Ujiie, Arao; Harada, Hiromu; Tsutsumi, Naoyuki; Tsubaki, Atsushi; Yamaguchi, Toshiaki; and Nagata, Hideo, 5,023,261, Cl. 514-285.000.

Kita, Hideki; Nakakuma, Akira; Fukui, Hidehiro; and Deguchi, Hiroyuki, to Mita Industrial Co., Ltd. Developing apparatus having developing units with a sliding member contacting a guide member. 5,023,670, Cl. 355-326.000.

Kita, Kunio; Kuwashima, Shigesumi; Suzuki, Takahito; and Seki, Chikashi, to AOI Studio Kabushiki Kaisha; and Kabushiki Kaisha Ouyo Keisoku Kenkyusho. Automatic follow-up lighting system. 5,023,709, Cl. 358-125.000.

Kita, Masahiro: *See—*
Negishi, Kiyoshi; Negoro, Ikuo; and Kita, Masahiro, 5,023,631, Cl. 346-154.000.

Kita, Yasushi: *See—*
Kawaguchi, Masayuki; Kita, Yasushi; Yamamoto, Kayoko; and Nozaki, Koji, 5,023,308, Cl. 528-423.000.

Kitabatake, Yasuo; Nakamura, Tadashi; Takahashi, Yoshiaki; and Maeda, Kazuya, to Sharp Kabushiki Kaisha. Method of making a toner for use in electrophotography. 5,023,161, Cl. 430-137.000.

Kitada, Taizo; Danno, Yoshiaki; Takagi, Masahiko; Uchida, Toshihiko; and Yamamoto, Yutaka, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Metal gasket for joint structure. 5,022,664, Cl. 277-236.000.

Kitahara, Katsuhiko: *See—*
Yamaoka, Ryohei; Hayashiya, Keizo; Yoshimura, Tohru; Seki, Eiji; Masutani, Tetsuya; and Kitahara, Katsuhiko, 5,023,327, Cl. 536-18.400.

Kitazawa, Hiroshi, to Brother Kogyo Kabushiki Kaisha. Yarn exchange device for a flat-bed knitting machine. 5,022,239, Cl. 66-127.000.

Kitazume, Masahiro; and Honma, Kazuya, to Tokyo Keiki Company Ltd. Control apparatus of working robot to flatten and finish the concreted floor. 5,023,788, Cl. 364-424.010.

Kiyohara, Takehiko, to Canon Kabushiki Kaisha. Ink jet recording apparatus with a member for absorbing waste ink created by insertion and removal of an ink container. 5,023,629, Cl. 346-140.00R.

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Klopfleisch, Kim A.; and Wellman, Tim A., to Crown Equipment Corporation. Slowdown during staging of a turret stockpicker. 5,022,496, Cl. 187-9.00E.

Klug, Francois: *See—*
Boulanger, Jean-Paul; Lupuyo, Jacques, and Klug, Francois, 5,023,247, Cl. 514-89.000.

Kluy, Dennis J.; Zwadlo, Gregory L.; Marty, John L.; and Dower, William V., to Minnesota Mining and Manufacturing. Method and apparatus for adhesive transfer. 5,023,668, Cl. 355-281.000.

Kmiecik-Lawrynowicz, Grazyna: *See—*
Ong, Beng S.; and Kmiecik-Lawrynowicz, Grazyna, 5,023,159, Cl. 430-109.000.

Kneller, James F.; Fair, Barbara E.; Mazzani, Gianfranco F.; and Di Simone, I. Sergio, to Nalco Chemical Company. Oligomer-containing phosphate scale inhibitors. 5,023,000, Cl. 210-697.000.

Kneringer, Gunter: *See—*
Kotzlowski, Heinz E.; and Kneringer, Gunter, 5,023,043, Cl. 376-150.000.

Knippscheer, Hermann; and Richard, Daniel D., to Cryo-Cell International, Inc. Storage apparatus, particularly with automatic insertion and retrieval. 5,022,236, Cl. 62-529.000.

Knors, Herbert: *See—*
Wey, Edmund; Grecksch, Hans; Pesch, Albert T.; Knors, Herbert; Zitzen, Wilhelm; and Marquardt, Manfred, 5,022,596, Cl. 242-36.000.

Knotts, Richard A. Beach mattress. 5,022,107, Cl. 5-419.000.

Knurr, Randal; and Groeneveld, Wilbur, to Gehl Company. Conditioner roller pressure release system for mower conditioner. 5,022,219, Cl. 56-16.400.

Kobayashi, Hironobu: *See—*
Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl. 431-2.000.

Kobayashi, Mamoru: *See—*
Shirai, Mitugu; Katayama, Kaoru; Sasaki, Hideaki; Kazui, Shinichi; Satoh, Ryohei; Miyauchi, Tateoki; and Kobayashi, Mamoru, 5,023,407, Cl. 174-257.000.

VOL
1127
ISS
2
JE
11
1991
UMI

Kobayashi, Masahiro: *See—*

Tsujimura, Hiroshi; Tamai, Yasumasa; Saito, Hideyo; and Kobayashi, Masahiro, 5,022,936, Cl. 148-135.000.

Kobayashi, Minoru: *See—*

Kamiguchi, Masao; and Kobayashi, Minoru, 5,023,028, Cl. 264-40.100.

Kobayashi, Mitsuru; and Hori, Keishirou, to Toyo Exterior Kabushiki Kaisha. Multi-panel collapsible door assembly having a door storage system. 5,022,454, Cl. 160-202.000.

Kobayashi, Satoshi, to Nissan Motor Co., Ltd., No. 2. Column shift with safety device. 5,022,504, Cl. 192-4.00A.

Kobayashi, Seiji; and Ohsato, Kiyoshi, to Sony Corporation. Optical disc access control system that counts tracks using tracking control signal. 5,023,855, Cl. 369-44.280.

Kobayashi, Shiro; Murofushi, Emiko; and Itoh, Masahiko, to Hitachi, Ltd. Semiconductor device. 5,023,698, Cl. 357-67.000.

Kobayashi, Takatoshi, to Kao Corporation. Absorbent article. 5,023,124, Cl. 428-76.000.

Kobayashi, Yoshikazu; and Ooshio, Takeaki, to Nitto Kohki Co., Ltd. Pipe connector for a high-pressure fluid pipe. 5,022,630, Cl. 251-149.600.

Kobayashi, Yoshiyuki, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Fuel injection control apparatus for internal combustion engine. 5,022,373, Cl. 123-488.000.

Kobori, Takuji; Sakamoto, Mitsuo; Yamada, Toshikazu; Nishimura, Isao; Ishii, Koji; and Tagami, Jun, to Kajima Corporation. Apparatus for accelerating response time of active mass damper earthquake attenuator 5,022,201, Cl. 52-167.0DF.

Koboshi, Shigeharu: *See—*

Kurematsu, Masayuki; Koboshi, Shigeharu; and Goto, Nobutaka, 5,023,644, Cl. 354-320.000.

Koch, Ulf, to Esselte Meto International Produktions GmbH Thermal head mounting/positioning assembly. 5,023,628, Cl. 346-76.0PH

Koda, Masuo. Nonskid device for automobile tires having annular elastic buffer members. 5,022,449, Cl. 152-226.000.

Koebler, Douglas J.; Cuomo, Carlo; and Brigati, David J., to Fisher Scientific Company. Method and device for accelerated treatment of thin sample on surface. 5,023,187, Cl. 436-180.000.

Koefferlein, Rainer; Schlageter, Bernhard; and Baier, Erich, to Siemens Aktiengesellschaft. Non-mechanical printer or copier means comprising an exposure means arranged in the development region. 5,023,664, Cl. 355-245.000.

Koerner, Gotz· *See—*

Gruning, Burghard: Hoffmann, Klaus, Koerner, Gotz; and Kollmeier, Hans-Joachim, 5,023,246, Cl. 514-57.000.

Koga, Nariyoshi: *See—*

Kato, Kenji; Koga, Nariyoshi; and Haruta, Yukinori, 5,023,339, Cl 548-401.000.

Koga. Yoshiro; Gomi, Akihiro; Miyasaka, Takashi; Miyazawa, Yasunaga; Endo, Kenichi; Shinozaki, Junichiro; Yoda, Kaneo; Ichikawa, Takashi; Miyasaka, Hitoshi; and Kaburagi, Chiharu, to Seiko Epson Corporation. Head positioning control for a spindle motor disk drive. 5,023,733, Cl. 360-77.040

Kohmoto, Osamu: *See—*

Yajima, Koichi; Kohmoto, Osamu, and Yoneyama, Tetsuhito, 5,022,939, Cl. 148-302.000.

Koike, Kouichi: *See—*

Yokouchi, Hisatake; Takasaki, Yukio; Hirai, Tadaaki; Koike, Kouichi; Tsuneoka, Masayuki; Onodera, Yoichi; and Funo, Takakazu, 5,023,896, Cl. 378-99 000.

Koike, Mikio: *See—*

Hanyu. Susumu; Kasuga, Noboru: Koike, Mikio; Hara, Kazumasa; Nishijima, Mitsuru; and Sasano, Akiyoshi, 5,022,335, Cl. 112-255.000.

Koike, Seiichi; Horimura, Hiroyuki; Ichikawa, Masao; and Matsumoto, Noriaki, to Honda Giken Kogyo Kabushiki Kaisha. Heat-resistant aluminum alloy sinter and process for production of the same. 5,022,918, Cl. 75-229 000.

Koinuma, Hiroshi: *See—*

Takegawa, Tomohiro; Tasaki, Akira, and Koinuma, Hiroshi, 5,023,938, Cl. 455-183.000.

Koito Manufacturing Co., Ltd : *See—*

Yoshida, Yoshihide, 5,022,699, Cl. 296-97.500.

Koizumi, Hideaki: *See—*

Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki. 5,023,553, Cl. 324-309.000.

Kojima, Akikazu: *See—*

Matsuda, Mikio; Inagaki, Mitsuo; Hayashi. Ikuo; Goto, Masahiro, Kojima, Akikazu; Taya. Toshiki, and Miura, Nobuhiro. 5,022,826. Cl 417-63.000.

Kokusai Electric Co., Ltd.: *See—*

Ushiyama, Katsumi; Sakamoto, Sadafumi. and Itoh, Kiyohiko, 5,023,621, Cl. 343-702.000.

Kolassa, Dieter: *See—*

Kast, Juergen; Kolassa. Dieter; Meyer, Norbert; Schirmer, Ulrich. Harreus, Albrecht; Wild. Jochen; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,022,914. Cl. 71-88.000.

Koller, Josef: *See—*

Puntener, Alois; Lehmann, Urs; Scheibli, Peter; and Koller, Josef, 5,023,274, Cl. 534-618.000.

Kolliker, Willy: *See—*

Ehrat, Rainer; Deubelbeiss, Urs, and Kolliker, Willy, 5,022,208. Cl 52-586.000.

Kollmann, Hans J., to Wago Verwaltungsgesellschaft mbH. Ground conductor series terminal. 5,022,873, Cl. 439-716.000.

Kollmeier, Hans-Joachim: *See—*

Gruning, Burghard; Hoffmann, Klaus; Koerner, Gotz; and Kollmeier, Hans-Joachim, 5,023,246, Cl. 514-57.000.

Kolozsvari, Guy: *See—*

Martin, Jean-Paul; and Kolozsvari, Guy, 5,022,862, Cl. 439-83.000.

Kolvites, Albert, to InterMetro Industries Corporation Post connector. 5,022,777, Cl. 403-14.000.

Komatsu, Katsuaki; Watanabe, Hideo; and Takahashi, Atsushi, to Konica Corporation. Image sensor and its driving method. 5,023,443, Cl. 250-208.100.

Komatsu, Toshiaki: *See—*

Umezawa, Kazuhiko; Komatsu, Toshiaki; and Kubokawa, Jun, 5,023,695, Cl. 357-82.000.

Komoda, Yasuo; Yokogawa, Yasunori; Okunishi, Masahiko; Ishu, Koichi; Shibai, Hiroshiro; and Noumi, Ryosaku, to Ajinomoto Co., Inc. Heptaene V-28-3 antibiotic derivative. 5,023,079, Cl. 424-120.000.

Kondo, Mitsuhiro: *See—*

Takeyama, Takeshi, and Kondo, Mitsuhiro, 5,022,960, Cl 156-643.000.

Kondo, Shoji; and Kyoden, Yasuhiro, to Minolta Camera Kabushiki Kaisha. Apparatus for forming a three color image including a first, a second, and a black color from two complimentary colors. 5,023,705, Cl. 358-80.000.

Kondo, Tetsujiro; Nagai, Michio; and Shirota, Norihisa, to Sony Corporation. Highly efficient coding apparatus. 5.023,710, Cl 358-133.000.

Kondo, Yoshikazu; Suzuki, Shuetu; and Kuboyama, Morio, to Morinaga Milk Industry Co., Ltd. Fertility drug and method of producing the same. 5,023,249, Cl. 514-170.000.

Konica Corporation: *See—*

Hirabayashi, Shigeto; Tsuruta, Mayumi; and Mizukura, Noboru, 5,023,169, Cl. 430-505.000.

Hoshino, Yasushi; Sugiyama, Kazuhiro; Ohta, Yoshitaka; and Shimada, Masaki, 5,023,650, Cl. 354-441.000.

Kawasaki, Mikio; and Iwata, Masatoshi, 5,023,898, Cl. 378-146.000

Komatsu, Katsuaki; Watanabe, Hideo; and Takahashi, Atsushi, 5,023,443, Cl. 250-208.100.

Kurematsu, Masayuki; Koboshi, Shigeharu; and Goto, Nobutaka, 5,023,644, Cl. 354-320.000.

Maruyama, Hiroyuki; Kishimoto, Tadao; Isobe, Toshifumi; and Yokobori, Jun, 5,023,708, Cl. 358-75.000.

Nakazawa, Masayuki; Nitta, Masaaki; Tsuchino, Hisanori, and Kano, Akiko, 5,023,461, Cl. 250-484 100.

Tomono, Makoto; Tarumi, Noriyoshi; and Sato, Masayuki, 5,023,158, Cl. 430-99.000.

Koninklijke Emballage Industrie van Leer B.V.· *See—*

Kars, Herman P., 5,022,552, Cl. 220-288.000.

Konishi, Kazuo, to Kabushiki Kaisha Toshiba. Digital peak noise reduction circuit. 5,023,890, Cl. 375-34 000.

Konishi, Sakuichi: *See—*

Miwa, Hiroshi; Okude. Yoshitaka; Watanabe. Masakazu; and Konishi, Sakuichi, 5,023,298, Cl. 525-103.000.

Konishiroku Photo Industry Co., Ltd.. *See—*

Miyoshi, Masanobu; Kajiwara, Makoto; and Onodera, Kaoru, 5,023,170, Cl. 430-558.000.

Konno, Shozo; and Matsui, Nohuyuki, to Kajima Corporation Undergrond continuous impervious wall and method for installing same 5,022,792, Cl. 405-267.000.

Kono, Yoshikazu· *See—*

Mizuno, Eiichi; Sakiyama. Noritaka; Matsui, Yukito; Kono, Yoshikazu· and Yamada, Kiyoshige, 5,022.704, Cl. 296-195 000

Koob, Dieter: *See—*

Urban, Otfried; and Koob, Dieter, 5,022,516, Cl 206-45 130.

Kopacz, Uwe: *See—*

Hensel, Bernd; Kopacz. Uwe; Hofmann, Dieter; Schussler, Hans and Eckhardt. Gunter, 5.022.978. Cl 204-298 190

Kopp, Paul W.. *See—*

Krumwiede, John F.; Kopp. Paul W., and Heithoff, Robert B., 5,023,210, Cl. 501-71.000.

Kord Products Limited: *See—*

Bohlmann, Lothar E., 5,022,183, Cl. 47-86.000.

Kordecki, John. System for bottle feeding an infant 5,022,616. Cl. 248-106.000.

Korea Electronics & Telecommunications Research Institute et al *See—*

Choi, Sangsoo, 5,023,203. Cl 437-228.000.

Korn, David S.. *See—*

Caldwell, Stephen P.; Korn, David S . and Hopwood. Francis W 5,023,572, Cl. 331-10.000.

Korotkin, Viktor I.: *See—*

Boiko, Leonid S.; Korotkin. Viktor I.; Veretennikov, Viktor Y Roslivker, Efim G., Fedyakin, Roman V.; Chesnokov, Viktor A., Yakovlev, Anatoly S.; Kharitonov, Jury D.; Fei, Valery M . and Galichenko, Emma N., 5,022.280, Cl. 74-462.000.

Kortbeek, Andras Guus Theodorus George: *See—*

Grandvallet, Pierre; Kortbeek. Andras Guus Theodorus George. Van Den Berg, Johannes Petrus; and Rohschlager, Karl-Heinz. 5,023,389, Cl 585-304.000.

Korytkowski, Alfred S.: *See—*

Nachbar, Henry D.; and Korytkowski, Alfred S., 5,022,192, Cl 51-241.00A.

Kosaka, Toru: *See—*

Meguro, Hiroshi; Takahashi, Tsugio; Aoki, Hitoshi, and Kosaka, Toru, 5,023,648, Cl. 354-420.000.

Koslowski, Gerhard: *See—*

Beerli, Markus; Bollen, Manfred; Iten, Jakob; Koslowski, Gerhard; Probst, Willy; and Wildi, Edwin, 5,022,128, Cl. 28-191.000.

Kosugi, Tetsushi: *See—*

Ohno, Kazuhisa; Kosugi, Tetsushi; Sugimori, Kenichiro; Ando, Akitsugu; Yamamoto, Masaru; Suzuki, Fukuji; Nakamura, Masahiro; and Tsujita, Nobuhisa, 5,023,065, Cl. 423-326.000.

Kotobuki & Co., Ltd.: *See—*

Kageyama, Hidehei; and Lozeau, Robert V., 5,022,772, Cl. 401-65.000.

Kageyama, Shuhei; Kageyama, Toshihiko; Nakazato, Youichi; and Mitsuya, Yoshihide, 5,022,774, Cl. 401-52.000.

Kotula, Steven J.: *See—*

Charlson, Sandra M.; Kotula, Steven J.; and McCloy, Michael R., 5,022,845, Cl. 425-403.000.

Kotun, Stefan P.: *See—*

Desmarteau, Darryl D.; Kotun, Stefan P.; and Malacrida, Alessandro, 5,023,377, Cl. 564-301.000.

Kotzlowski, Heinz E.; and Kneringer, Gunter, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.; and Schwarzkopf Development Corporation. Actively cooled device. 5,023,043, Cl. 376-150.000.

Kourimsky, Friedrich J. A.; and Romak, Paul E., to AMP Incorporated. Electrical terminal. 5,022,867, Cl. 439-395.000.

Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre; Teplan, Istvan; Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt; Hegedus, Edit; Makara, Gabor; and Rappay, Gyorgy, to MTA Kutatas-es Szervezetelemzo Intezete. Analogs of growth hormone releasing factor (GRF) and a method for the preparation thereof. 5,023,322, Cl. 530-324.000.

Koyama, Jun, to NEC Corporation. Filter circuit arrangements with automatic adjustment of cut-off frequencies. 5,023,491, Cl. 307-521.000.

Koyo Seiko Co., Ltd.: *See—*

Ueno, Hiroshi; Hatabu, Shoji; and Arai, Hirokazu, 5,022,279, Cl. 74-422.000.

Kozawa, Hiroshi: *See—*

Itoh, Syunji; Kozawa, Hiroshi; and Seki, Takahide, 5,023,415, Cl. 200-148.00R.

Kozuki, Susumu: *See—*

Nakayama, Tadayoshi; Ishikawa, Hisashi; Kozuki, Susumu; Takahashi, Koji; Yoshimura, Katsuji; Nagasawa, Kenichi; and Sasatani, Tomohiko, 5,023,716, Cl. 358-138.000.

Krage, William G.: *See—*

Gertz, David C.; and Krage, William G., 5,022,782, Cl. 404-6.000.

Kramer, Antonio H. Method and device for the manufacture of can bodies by extension, including expansion of the diameter and reduction of the thickness of the sheet metal, starting out from a can body with smaller diameter, made of thicker sheet metal. 5,022,254, Cl. 72-393.000.

Krantz America, Inc.: *See—*

Morizzo, Nicholas L., 5,022,597, Cl. 242-56.00R.

Kratz, Gunter: *See—*

Goll, Gunther; Vater, Peter; Keusch, Siegfried; and Kratz, Gunter, 5,023,925, Cl. 392-384.000.

Kreh, Robert P.; Lundquist, Joseph T.; Henry, Wayne L.; Kelly, John A.; and Kuhn, Vincent R., to W. R. Grace & Co.-Conn. Corrosion control. 5,022,926, Cl. 134-2.000.

Kreinheder, Donald E.; and Bell, David S., to Hughes Aircraft Company. Dual mode antenna apparatus having slotted waveguide and broadband arrays. 5,023,623, Cl. 343-725.000.

Kremer, Robert: *See—*

Frantom, Richard L.; Bishop, Robert J.; Kremer, Robert; Ocker, Klaus; Brown, Roy; Rose, James; Renfroe, Donald; and Bazel, Teresa, 5,022,674, Cl. 280-741.000.

Krespan, Carl G., to Du Pont de Nemours, E. I., and Company. Alkyl perfluoro(2-methyl-5-oxo-3-oxahexanoate). 5,023,362, Cl. 560-183.000.

Krihwan, Carl C.: *See—*

Olon, Thomas E.; and Krihwan, Carl C., 5,023,515, Cl. 315-88.000.

Kriz, J. Stanley, to MegaScan Technology, Inc. Magnetic deflection circuit with stabilized retrace. 5,023,525, Cl. 315-408.000.

Kroy Inc.: *See—*

Paque, Michael W., 5,022,771, Cl. 400-120.000.

Krumrine, Paul: *See—*

Balcar, Gerald P.; Krumrine, Paul; Schwartz, Neal; Sutker, Burton J.; and Wood, Gail J., 5,022,897, Cl. 55-96.000.

Krumwiede, John F.; Kopp, Paul W.; and Heithoff, Robert B., to PPG Industries, Inc. Neutral gray, low transmittance, nickel-free glass. 5,023,210, Cl. 501-71.000.

Krunnfusz, Jeffrey S.: *See—*

Chadima, George E., Jr.; Schultz, Darald R.; Krunnfusz, Jeffrey S.; and Gibbs, William T., 5,023,824, Cl. 364-708.000.

Krupicka, Ulrich: *See—*

Maresch, Gerald; and Krupicka, Ulrich, 5,022,971, Cl. 204-145.00R.

Krupp Widia (Schweiz) AG: *See—*

Stampfli, Peter; and Frey, Peter, 5,022,795, Cl. 407-47.000.

Kruse, Uno; Crowley, Burlon C.; and Mardis, Wilbur S., to Rheox, Inc. Water dispersible, modified polyurethane thickener with improved high shear viscosity in aqueous systems. 5,023,309, Cl. 528-49.000.

Krushinski, Joseph H., Jr.: *See—*

Robertson, David W.; Wong, David T.; and Krushinski, Joseph H., Jr., 5,023,269, Cl. 514-438.000.

Krzymien, Witold A.: *See—*

Grover, Wayne D.; Fong, Tommy; Dubuc, Joe P.; Krzymien, Witold A.; and Fraser, George D., 5,023,869, Cl. 370-84.000.

KT Products, Inc.: *See—*

Madock, Michael F., 5,022,650, Cl. 273-32.00A.

KT Technologies Inc.: *See—*

O'Connor, Lawrence J., 5,023,395, Cl. 174-36.000.

Kubokawa, Jun: *See—*

Umezawa, Kazuhiko; Komatsu, Toshiaki; and Kubokawa, Jun, 5,023,695, Cl. 357-82.000.

Kubota, Takashi, to Toray Industries, Inc. High-molecular-weight soluble novolak resin and process for preparation thereof. 5,023,311, Cl. 528-153.000.

Kuboyama, Morio: *See—*

Kondo, Yoshikazu; Suzuki, Shuetu; and Kuboyama, Morio, 5,023,249, Cl. 514-170.000.

Kubushiki Kaisha Daikin Seisakusho: *See—*

Fukuda, Yoshinobu, 5,022,508, Cl. 192-70.270.

Kudou, Jinko: *See—*

Yamada, Akio; Sakamoto, Kiichi; Kudou, Jinko; and Yasuda, Hiroshi, 5,023,462, Cl. 250-492.200.

Kuenzel, Ulrich: *See—*

Cziep, Werner; Kuenzel, Ulrich; and Ruh, Wolf-Dieter, 5,022,956, Cl. 156-643.000.

Kugel, Robert L.: *See—*

Gallacher, Lawrence V.; Gustavsen, Alfen J.; and Kugel, Robert L., 5,023,016, Cl. 252-389.520.

Kugimiya, Shuzo; Suzuki, Hitoshi; Fukumoshi, Yoji; Sata, Ichiko; Hirai, Tokuyuki; and Nishida, Yumi, to Sharp Kabushiki Kaisha. Language translator which recognizes and indicates prepositional or indefinite phrases and relative clauses. 5,023,786, Cl 364-419.000.

Kugler, Dieter: *See—*

Lanfer, Hermann; and Kugler, Dieter, 5,023,434, Cl. 235-375.000.

Kuhn, Vincent R.: *See—*

Kreh, Robert P.; Lundquist, Joseph T.; Henry, Wayne L.; Kelly, John A.; and Kuhn, Vincent R., 5,022,926, Cl. 134-2.000.

Kuhrts, Eric H., to Hauser-Kuhrts, Inc. Improved niacin formulation. 5,023,245, Cl. 514-54.000.

Kuijpers, Franciscus L. J. M.: *See—*

Raaymakers, Wilhelmus P. M.; and Kuijpers, Franciscus L. J. M., 5,023,856, Cl. 369-32.000.

Kuk, Hong S.: *See—*

Yeol, Ryu M.; Ki, Ryu D.; Kyun, Yun D.; Kyu, An J.; Kuk, Hong S.; Euy, Hong C.; and Sun, Ryu S., 5,022,520, Cl. 206-315.100.

Kumagai, Ryohei, to Ezel, Inc. Method and system for generating a density concurrent matrix. 5,023,729, Cl. 358-457.000.

Kumaki, Akihico; and Izumi, Yoshito, to Onoda Cement Co., Ltd Super-hard ceramics. 5,023,211, Cl. 501-87.000.

Kundis, Dieter E., to Siecor Corporation Method and apparatus for applying particulate matter to a cable core. 5,022,344, Cl. 118-56.000.

Kunin, Robert: *See—*

Salem, Eli; Libutti, Bruce L., and Kunin, Robert, 5,022,997, Cl 210-670.000.

Kuniskis, Casemiro A. Portable massage table. 5,022,386, Cl. 128-57.000.

Kunz, William E.: *See—*

Anklam, William J.; and Kunz, William E., 5,023,574, Cl 333-20.000.

Kunze, Brigitte: *See—*

Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert; Kunze, Brigitte; Hofle, Gerhard; Augustiniak, Hermann; Bedorf, Norbert, Jansen, Rolf; Trowitzsch-Kienast, Wolfram; and Steinmetz, Heinrich, 5,023,184, Cl. 435-252.100.

Kunze, Norbert, to U.S. Philips Corporation. Magnetic-tape-cassette apparatus including pinch roller-operated switching elements for producing muting and/or track direction detection. 5,023,742, Cl. 360-137.000.

Kuppenheimer, John D., Jr., to Lockheed Sanders, Inc. Tracker using angle-converting cones. 5,023,440, Cl 250-203.600.

Kuraev, Oleg V.: *See—*

Surguchev, Viktor G.; Kuraev, Oleg V.; Surgucheva, Raisa N.; Makhnovsky, Leonid P.; Troschenovsky, Anatoly P.; Tetior, Alexandr N.; Golovchenko, Igor V.; and Scherbina, Tatyana V., 5,022,925, Cl. 106-631.000.

Kuragasaki, Mutsuo; Tahara, Mamoru; and Tazaki, Shunsei, to Mitsubishi Jukogyo Kabushiki Kaisha. Method of returning geothermal gases to the underground. 5,022,787, Cl. 405-128.000.

Kuramoto, Masahiko: *See—*

Maezawa, Hiroshi; Tomotsu, Norio; and Kuramoto, Masahiko, 5,023,222, Cl. 502-103.000.

Takeuchi, Mizutomo; and Kuramoto, Masahiko, 5,023,304, Cl. 526-160.000.

Kuramoto, Yukimasa: *See—*

Yamamoto, Hajime; Kuramoto, Yukimasa; Takashima, Yuji; Nakamura, Masahiko; and Nakano, Kenichi, 5,023,632, Cl 346-157.000.

Kurano, Shinichi; Bando, Masahiro; Mitsuya, Yasuhiro; and Tanabe, Takeshi, to Murata Manufacturing Co., Ltd. Common-mode choking coil. 5,023,585, Cl. 336-69.000.

Kurematsu, Masayuki; Koboshi, Shigeharu; and Goto, Nobutaka, to Konica Corporation. Small-sized automatic developer of photographic material. 5,023,644, Cl. 354-320.000.

Kuriyama, Masaaki, to Minolta Camera Kabushiki Kaisha. Micro-image handling apparatus with automatic focusing function. 5,023,657, Cl. 355-45.000.

Kurkowski, Hal: *See—*

Pathak, Jagdish; Douglass, Stephen M.; Vider, Dov-Ami; and Kurkowski, Hal, 5,023,484, Cl. 307-465.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Kuroda, Michio: *See—*
  - Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl. 431-2.000.
- Kurokawa, Toshikazu: *See—*
  - Okita, Junichi; and Kurokawa, Toshikazu, 5,022,354, Cl. 123-41.100.
- Kuroki, Yuzuru: *See—*
  - Satoh, Isao; Fukushima, Yoshihisa; Ichinose, Makoto; Kuroki, Yuzuru; and Takagi, Yuji, 5,023,854, Cl. 369-32.000.
- Kusano, Chushirou: *See—*
  - Tanoue, Tomonori; Kusano, Chushirou; and Takahashi, Susumu, 5,023,687, Cl. 357-34.000.
- Kushner, Mark J.: *See—*
  - Eden, James G.; and Kushner, Mark J., 5,023,877, Cl. 372-7.000.
- Kuster, Hans-Werner: *See—*
  - Vanaschen, Luc; Kuster, Hans-Werner; Havenith, Hubert; and D'Iribarne, Benoit, 5,022,906, Cl. 65-104.000.
  - Vanaschen, Luc; Radermacher, Herbert; and Kuster, Hans-Werner, 5,022,907, Cl. 65-163.000.
- Kusumoto, Keiji; and Nagata, Kenzo, to Minolta Camera Co., Ltd. Image formation with manual and automatic exposure adjustment. 5,023,662, Cl. 355-228.000.
- Kuwabara, Yasuo; Fujie, Naofumi; and Saeki, Takao, to Aisin Seiki Kabushiki Kaisha. Vibratory motor. 5,023,526, Cl. 318-116.000.
- Kuwahara, Touru, to Isuzu Motors Limited. Eddy current type brake system. 5,023,499, Cl. 310-105.000.
- Kuwashima, Shigesumi: *See—*
  - Kita, Kunio; Kuwashima, Shigesumi; Suzuki, Takahito; and Seki, Chikashi, 5,023,709, Cl. 358-125.000.
- Kuzuhara, Takashi, to Kabushiki Kaisha Toshiba. Magnetic head support device with double gimbal structure. 5,023,735, Cl. 360-104.000.
- Kwast, Ekkehard, to U.S. Philips Corporation. Electric cable comprising a braid surrounding the cable core. 5,023,405, Cl. 174-109.000.
- Kwok, Wo K., to Du Pont de Nemours, E. I., and Company. Cotton/-polyester fiber blends and batts. 5,023,131, Cl. 428-288.000.
- Kwon, Oh-Kyong: *See—*
  - Hashimoto, Masashi; and Kwon, Oh-Kyong, 5,023,472, Cl. 307-270.000.
- Kyoden, Yasuhiro: *See—*
  - Kondo, Shoji; and Kyoden, Yasuhiro, 5,023,705, Cl. 358-80.000.
- Kyogoku, Nobuo; Saeki, Takeshi; and Fujikawa, Shigeaki, to Suntory Limited. Process for producing microcapsules. 5,023,024, Cl. 264-4.300.
- Kyorin Pharmaceutical Co., Ltd.: *See—*
  - Ohashi, Mitsuo; Awano, Katsuya; Tanaka, Toshio; and Kimura, Tetsuya, 5,023,364, Cl. 560-53.000.
- Kyoto, Michihisa: *See—*
  - Ishiguro, Yoichi; Kanamori, Hiroo; Urano, Akira; and Kyoto, Michihisa, 5,022,904, Cl. 65-2.000.
- Kyrk, Carl: *See—*
  - Bassett, Ronald M.; and Kyrk, Carl, 5,023,469, Cl. 307-64.000.
- Kyu, An J.: *See—*
  - Yeol, Ryu M.; Ki, Ryu D.; Kyun, Yun D.; Kyu, An J.; Kuk, Hong S.; Euy, Hong C.; and Sun, Ryu S., 5,022,520, Cl. 206-315.100.
- Kyun, Yun D.: *See—*
  - Yeol, Ryu M.; Ki, Ryu D.; Kyun, Yun D.; Kyu, An J.; Kuk, Hong S.; Euy, Hong C.; and Sun, Ryu S., 5,022,520, Cl. 206-315.100.
- La Mina Ltd.: *See—*
  - Guirguis, Raouf A., 5,022,411, Cl. 128-771.000.
- Laarman, Christopher J. Hanging device for brick walls. 5,022,623, Cl. 248-231.900.
- Labrie, Fernand. Combination male breast cancer therapy. 5,023,234, Cl. 514-15.000.
- Lachat Instruments: *See—*
  - Stieg, Scott, 5,022,967, Cl. 202-197.000.
- La Gasse, Russ; and Lopez, Lance. Anti-theft nozzle lock. 5,022,561, Cl. 222-153.000.
- Lagos, Costas C., to GTE Products Corporation. Method of phosphor preparation. 5,023,015, Cl. 252-301.40R
- Laidler, Graham A., to British Telecommunications Public Limited Company. Power supply utilizing transformerless optical driving control circuit. 5,023,766, Cl. 363-16.000.
- Lam, Eric; Benfey, Philip N.; Gilmartin, Philip M.; and Chua, Nam-Hai. Promoter enhancer element for gene expression in plant roots. 5,023,179, Cl. 435-172.300.
- Lam-Plan S.A.: *See—*
  - Broido, Georges H. G., 5,022,191, Cl. 51-209.0DL.
- Lamb, Joseph A.: *See—*
  - Frey, Eric M.; and Lamb, Joseph A., 5,023,848, Cl 368-1.000.
- Lamb, Joseph W.: *See—*
  - Appelbaum, Edward R.; Hennecke, Hauke; Lamb, Joseph W.; and Gottiert, Michael, 5,023,180, Cl. 435-172.300.
- Lambert, Harvey J.: *See—*
  - Kennedy, Lawrence C.; and Lambert, Harvey J., 5,022,507, Cl. 192-58.00B.
- Lamnabhi, Moustanir; and Lhuillier, Jean-Jacques, to U.S. Philips Corporation. Television standard conversion arrangement which converts directly to a second standard from a first standard without an intermediary conversion. 5,023,717, Cl. 358-140.000.
- Lampe, Steven W.; and Mehr-Ayin, Kourosh, to Sundstrand Corporation. Temperature compensated closed loop control of a hydraulically controlled clutch and APU starting system. 5,023,789, Cl. 364-424.100.
- Land & Sea, Inc.: *See—*
  - Bergeron, Robert M., 5,022,820, Cl. 416-89.000.
- Landau, Michael B.; Vartanian, George; and Matsuzawa, Kazuyuki, to International Fuel Cells Corporation. Power plant cogeneration control. 5,023,151, Cl. 429-24.000.
- Landis, Phillip S.: *See—*
  - Erickson, Frank L.; Anderson, Robert E., and Landis, Phillip S., 5,023,312, Cl. 558-160.000.
- Landries, Richard V.: *See—*
  - Detter, Gary C.; Rodondi, Andrew F.; Burns, Christopher D.; Norling, Samuel A.; Garretson, Jay H.; and Landries, Richard V., 5,023,752, Cl. 361-399.000.
- Landry, Susan D.: *See—*
  - Fisher, Hugh A.; Landry, Susan D.; and Smith, Troy L., Jr., 5,023,278, Cl. 521-85.000.
- Lane, Richard I.: *See—*
  - Goll, Jeffrey H.; Trent, William A.; Lane, Richard I.; Bell, Florian G.; and Marineau, Mark D., 5,023,445, Cl. 250-227.150.
- Lane, William R.: *See—*
  - Etemad, Shahrokh; Yannascoli, Donald, Fraser, Howard H., Jr.; and Lane, William R., 5,022,834, Cl. 418-55.100.
- Lanfer, Hermann; and Kugler, Dieter, to R. Stahl Fordertechnik GmbH. Position indicating apparatus for transporters on tracks. 5,023,434, Cl. 235-375.000.
- Lang, Gerard: *See—*
  - Maignan, Jean; Lang, Gerard; Malle, Gerard; Restle, Serge; and Shroot, Braham, 5,023,363, Cl. 560-52.000.
- Lang, John. Manifold and disposable filter assembly. 5,022,986, Cl. 210-94.000.
- Langer, Salomon Z.; Frost, Jonathan R.; Schoemaker, Johannes; Gaudilliere, Bernard; Bertin, Jean; Rousseau, Jean; Dupont, Regis; and Wick, Alexander E., to Synthelabo. Method of treatment of psychotic disorders. 5,023,266, Cl. 514-317.000.
- Langstedt, Goran. Device for the induction heating of a workpiece. 5,023,419, Cl. 219-10.570.
- Langston, Susan E.: *See—*
  - Friedman, Milton J.; Langston, Susan E.; and Pollitt, Sonia, 5,023,183, Cl. 435-240.300.
- Lappos, Nicholas D.; Walsh, David M.; Sweet, David H., and Greenberg, Charles E., to United Technologies Corporation. Range maximizing, stable, helicopter cruise fuel conservation. 5,023,797, Cl. 364-442.000.
- Larsen, Steven D.: *See—*
  - Wong, Patrick S. L.; Theeuwes, Felix; Eckenhoff, James B.; Larsen, Steven D.; and Huynh, Hoa T., 5,023,088, Cl. 424-473.000.
- Larson, Donald G.: *See—*
  - Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,023,884, Cl. 372-57.000.
- Larson, Lynn D. Waterbed mattress with heater pad pocket. 5,022,108, Cl. 5-422.000.
- Laskaris, Evangelos T., to General Electric Company. Magnet cartridge for magnetic resonance magnet. 5,023,584, Cl. 335-216.000.
- Lau, Philip Y.: *See—*
  - Schweizer, Richard W.; Patel, Kantilal P.; and Lau, Philip Y., 5,023,002, Cl. 210-710.000.
- Laufer, George A.: *See—*
  - Williams, David L.; Russ, Karl J.; Dienes, Edward K.; and Laufer, George A., 5,023,225, Cl. 502-304.000.
- Laughon, Thomas C.: *See—*
  - Barrett, Michael E.; Laughon, Thomas C.; and Nicholson, Roy V., 5,022,618, Cl. 248-146.000.
- Laughton, Laurence J.; and Ratcliffe, Edward, to Rolls-Royce plc. Method of and apparatus for forming a slot in a workpiece. 5,023,422, Cl. 219-69.200.
- Lautenschlager, Gerhard W.: *See—*
  - Lautenschlager, Karl; and Lautenschlager, Gerhard W., 5,022,117, Cl. 16-288.000.
- Lautenschlager, Karl; and Lautenschlager, Gerhard W., to Karl Lautenschlager GmbH & Co. KG. Cabinet hinge with closing mechanism. 5,022,117, Cl. 16-288.000.
- Lauterbach, Christl: *See—*
  - Helmut, Albrecht; and Lauterhach, Christl, 5,023,686, Cl. 357-30.000.
- Lauterbach, Jerre F.; Ritchie, Nathan; and Miller, Richard F., to Holset Engineering Company. Ring valve type air compressor. 5,022,832, Cl. 417-571.000.
- Lavelle Aircraft Company, Inc.: *See—*
  - Sherrow, Lionel; Rosenthal, Harold; Spitz, Joseph M.; and Haines, Stephen W., 5,022,810, Cl. 414-501.000.
- Lavender, Stephen J., to Briggs & Stratton Corporation. Oil fill tube assembly. 5,022,495, Cl. 184-105.100.
- LaViola, John, to CAS Medical Systems, Inc. Automatic blood pressure measuring device and method with cuff size determination 5,022,403, Cl. 128-680.000.
- Lawrence, Albert F.: *See—*
  - Purcell, Lauren M.; and Lawrence, Albert F., 5,023,452, Cl. 250-306.000.
- Lawrence, Anthony W.; and Danko, Joseph J., to Northrop Corporation. Compound resonator for improving'optic gyro scale factor. 5,022,760, Cl. 356-350.000.
- Lawrence, William: *See—*
  - Gibbons, Gould, Jr.; Watson, Jerry L.; and Lawrence, William, 5,022,307, Cl. 89-36.020.
- Lawson, James M.: *See—*
  - Anseau, Michael R.; Lawson, James M.; and Slasor, Shaun, 5,023,216, Cl. 501-98.000.

- Lawson, LaJean, to Playtex Apparel, Inc. Hard cup brassiere. 5,022,887, Cl. 450-54.000.
- Lazaro, Rene ; Cros, Gerard; McNeill, John H.; and Serrano, Jean-Jacques, to Panmedica S.A. Vanadyl organo-mineral compound, method for obtaining such a compound, pharmaceutical composition containing this organo-mineral compound. 5,023,358, Cl. 556-42.000.
- Lazarus, Arnold. *See—*
  - Norfolk, Roy; and Lazarus, Arnold, 5,022,171, Cl. 40-447.000.
- Lazes, Richard J.: *See—*
  - Goans, Kip B., 5,022,785, Cl. 405-69.000.
- Lazzara, Richard J.; and Beaty, Keith D., to Implant Innovations, Inc. Ultra-slim dental implant fixtures. 5,022,860, Cl. 433-174.000.
- Leban, Marzio A.: *See—*
  - Bares, Steven J.; and Leban, Marzio A., 5,023,625, Cl. 346-1.100.
- Lebert, Rainer: *See—*
  - Neff, Willi; Holz, Raymond; Lebert, Rainer; and Richter, Franz, 5,023,897, Cl. 378-122.000.
- Leclair, Philippe: *See—*
  - Argintaru, Lazare; Arnassand, Daniel; and Leclair, Philippe, 5,023,821, Cl. 364-602.000.
- Lee, Biing-Lin; Sullivan, Francis R.; and Mertzel, Elaine Audrey, to BF Goodrich Company, The. Method of manufacturing electrostatic dissipating composition. 5,023,036, Cl 264-211.230.
- Lee, Danny E.: *See—*
  - Boston, Steven L.; Kilbane, arrell M.; Lee, Danny E.; Kilbane, Farrell M.; and Lee, Danny E., 5,023,113, Cl. 427-320.000.
  - Boston, Steven L.; Kilbane, arrell M.; Lee, Danny E.; Kilhane, Farrell M.; and Lee, Danny E., 5,023,113, Cl. 427-320.000.
- Lee, Ernest D.: *See—*
  - Snyder, Thomas S.; and Lee, Ernest D., 5,023,061, Cl. 423-70.000.
- Lee, Gene W.; and Underwood, George D., to Hughes Aircraft Company. Interlaced scan fault detection system. 5,023,875, Cl. 371-25.100.
- Lee, Kim Y.: *See—*
  - DiVincenzo, David P.; Lee, Kim Y.; and Smith, Theoren P., III, 5,023,671, Cl. 357-4.000.
- Lee, Robert A., to United States of America, Air Force. Boom event analyzer recorder. 5,023,847, Cl. 367-136.000.
- Lee, Ruojia; and Gonzalez, Fernando, to Micron Technology, Inc. Improved CMOS processes. 5,023,190, Cl. 437-56.000.
- Lee, William L.; McLean, Alexander; and Daye, Ronald E. Automated vapour pressure analyzer. 5,022,259, Cl. 73-64.200.
- Leemhuis, Richard S.: *See—*
  - Miller, John A.; Leemhuis, Richard S.; and Gunda, Rajamouli, 5,023,535, Cl. 318-599.000.
- Leenhouts, David E.: *See—*
  - Schneider, Roy W.; and Leenhouts, David E., 5,023,793, Cl. 364-431.020.
- Le Gars, Monsieur J., to Societe d'Etudes pour le Developpement des Productions Electroniques. Illuminated display panel. 5,023,763, Cl. 362-240.000.
- Legge, Ronald; and Moyer, Curtis D., to Motorola, Inc. Super high frequency oscillator/resonator. 5,023,503, Cl. 310-311.000.
- Leggett & Platt Incorporated. *See—*
  - Lindberg, Richard S., 5,023,051, Cl. 420-549.000.
- Leggott, Merton R.: *See—*
  - Bailey, Richard G.; and Leggott, Merton R., 5,023,429, Cl. 219-388.000.
- Legrady, Janos, to Zierick Manufacturing Corporation. Torsion insulation displacement connector. 5,022,868, Cl 439-399.000.
- Lehmann, Urs: *See—*
  - Puntener, Alois; Lehmann, Urs; Scheibli, Peter; and Koller, Josef, 5,023,274, Cl. 534-618.000.
- Leighton, John C.; and Iovine, Carmine P., to National Starch and Chemical Investment Holding Corporation. Aminophosphonate-containing polymers. 5.023,368, Cl. 560-195.000.
- Leiter, Herbert, to Wild Leitz GmbH. Microscope with a camera and automatic color temperature balance. 5,022,744, Cl 350-530.000.
- Leland Stanford Junior University, The Board of Trustees of the: *See—*
  - Engan, Helge E.; Kim, Byoung Y.; Blake, James N.; and Shaw, Herbert J., 5,022,732, Cl. 350-96.150.
  - Kino, Gordon S.; and Xiao, Guooing, 5,022,743, Cl. 350-507.000.
- Le Loarer, Jean-Luc, to Rhone-Poulenc Chimie. Process for obtaining a ceric oxide. 5,023,070, Cl. 423-592.000.
- Lemelson, Jerome H. Methods and systems for scanning and inspecting images. 5,023,714, Cl. 358-107.000.
- Lenz, Robert W.: *See—*
  - Benvenuti, Manuela; and Lenz, Robert W., 5,023,316, Cl. 528-357.000.
- Leoni, Emile: *See—*
  - Traub, Barry H.; and Leoni, Emile, 5,022,649, Cl. 273-1.50R.
- Lerch, L. Bernard: *See—*
  - Okarma, Thomas B.; Chang, Chin-Hai; Clark, Brian R.; and Lerch, L. Bernard, 5,022,988, Cl. 210-321.840.
- Leskowicz, Mark A.: *See—*
  - Dight, Lawrence B.; Bogert, David C.; and Leskowicz, Mark A., 5,023,220, Cl. 502-65.000
- Leslie, Samuel A., to Orion Industries, Inc. Booster with detectable boost operation. 5,023,930, Cl. 455-9.000.
- Lestinsky, Joseph J.: *See—*
  - Shattuck, Charles W.; Lestinsky, Joseph J.; and Gerardi, Michael W., 5,022,267, Cl. 73-593.000.
- Leung, Ho-Ming; and Pak, Edward T., to Advanced Micro Devices, Inc. Two phase non-overlapping clock counter circuit to be used in an integrated circuit. 5,023,893. Cl. 377-117.000.
- Leven, Margret: *See—*
  - Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans-Georg; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 5,023,357, Cl. 544-132.000.
- Levi, Anthony F. J.: *See—*
  - Berthold, Kurt; and Levi, Anthony F. J., 5,023,878, Cl. 372-20.000.
- Levin, Robert H. Topical compositions containing LYCD and other topically active medicinal ingredients for the treatment of ACNE. 5,023,090, Cl. 424-520.000.
- Levine, Barry F.: *See—*
  - Bethea, Clyde G.; Hasnain, Ghulam; Levine, Barry F.; and Malik, Roger J., 5,023,685, Cl. 357-30.000.
- Levine, Paul H.: *See—*
  - Johnson, Herrick J.; Olson, Margaret; Jones, Stuart, Bodoff, Stephanie; Bertrand, Stephen C.; and Levine, Paul H., 5,023,907, Cl. 380-4.000.
- Levine, Robert A.: *See—*
  - Adrion, Robert F.; Curry, Joan W.; and Levine, Robert A., 5,023,785, Cl. 364-413.080.
- Lew, Hyok S. Impulse sensor with amplitude calibration means. 5,022,257, Cl. 73-3.000.
- Lew, Hyok S. Resonance frequency position sensor 5,022,269, Cl 73-702.000.
- Leybold Aktiengesellschaft: *See—*
  - Hensel, Bernd; Kopacz, Uwe; Hofmann, Dieter; Schussler, Hans; and Eckhardt, Gunter, 5,022,978, Cl. 204-298.190.
- Lhuillier, Jean-Jacques: *See—*
  - Lamnabhi, Moustanir; and Lhuillier, Jean-Jacques, 5,023,717, Cl. 358-140.000.
- Libutti, Bruce L.: *See—*
  - Salem, Eli; Libutti, Bruce L.; and Kunin, Robert, 5,022,997, Cl. 210-670.000.
- Liedes, Allan: *See—*
  - Ilvespaa, Heikki; Liedes, Allan; and Viitanen, Olavi, 5,022,163, Cl. 34-23.000.
- Lieu, Winston H., to AT&T Bell Laboratories. Linear amplifier with automatic adjustment of feed forward loop gain and phase. 5,023,565, Cl. 330-151.000.
- Life Force Associates, L.P.: *See—*
  - Beauvais, Randall; and Meade, Albert J., 5,022,707, Cl 297-216.000.
- Liggett, Michael D.: *See—*
  - Grey, Thaddeus J.; Kirton, Raymond E.; English, George A.; Liggett, Michael D.; Meyer, Karen M., and Barker, Charles J., 5,022,431, Cl. 137-375.000.
- Light Signatures, Inc.: *See—*
  - Sanner, M. Duane; Nunley, Leonard J., and Wallace, Barry M., 5,023,923, Cl. 382-61.000.
- Lim, Guy H.: *See—*
  - Eschauzier, Francois R.; and Lim, Guy H., 5,022,296, Cl. 83-27.000.
- Lin, Lifun; and Chao, Chung-Yao, to Olin Corporation. Method and composition for depositing a chromium-zinc anti-tarnish coating on copper foil. 5,022,968, Cl. 204-28.000.
- Lin, Yung-Chi. Moving display rack. 5,022,533, Cl. 211-1.500.
- Lind, H. Clark: *See—*
  - Crane, L. Paul; Lind, H. Clark; and Frederix, Martine E., 5,022,964, Cl. 162-146.000.
- Lindberg, Richard S., to Leggett & Platt Incorporated. Hypoeutectic aluminum silicon magnesium nickel and phosphorus alloy. 5,023,051, Cl. 420-549.000.
- Lindee, Scott A., to Formax, Inc. Co-forming apparatus for food patty molding machine. 5,022,888, Cl. 452-174.000.
- Linder, Heinz, to Grapha-Holding Ag. Depository for accumulations of paper sheets. 5,022,807, Cl. 414-278.000.
- Lindner, Werner; and Haberkorn, Axel, to Bayer Aktiengesellschaft Substituted uracils, processes for their preparation and their use against parasitic protozoa. 5,023,260, Cl. 514-269.000.
- Lindop, Christopher: *See—*
  - Bussiere, Joseph P.; Bussiere, Richard A., Bussiere, Paul L.; Bussiere, Daniel J.; and Lindop, Christopher, 5,022,657, Cl. 273-201.000.
- Lindsay, Roger K., to EFI Electronics Corporation. Meter base surge suppresion system. 5,023,747, Cl. 361-117.000.
- Linn, Bruce O.; and Mrozik, Helmut, to Merck & Co., Inc. Avermectin derivatives. 5,023,241, Cl. 514-30.000.
- Lioen, Rolf J. M.: *See—*
  - Mehlkopf, Antoon F.; Den Boef, Johannes H.; and Lioen, Rolf J M., 5,023,552, Cl. 324-309.000.
- Liposome Technology, Inc.: *See—*
  - Yau-Young, Annie, 5,023,087, Cl. 424-450.000.
- Lippolt, Thomas. Molding structure. 5,022,212, Cl. 52-815.000.
- Lipscomb, James S., to International Business Machines Corporation. Cross-product filter. 5,023,918, Cl. 382-24.000.
- Listemann, Mark L., to Air Products and Chemicals, Inc. Process for the synthesis of amides from vinyl acetate. 5,023,375, Cl. 564-159.000.
- Literal Corporation: *See—*
  - Champagne, Patrick J.; and Sander, Ingolf, 5,023,861, Cl. 369-215.000.
- Littenberg, Richard L.: *See—*
  - Gevas, Philip C.; Karr, Stephen L., Jr.; Grimes, Stephen; and Littenberg, Richard L., 5,023,077, Cl. 424-88.000.
- Liu, Kuo-Hui, to Pacific Bell. Illegal sequence detection and protection circuit. 5,023,612, Cl. 341-94.000.

VOL 1127
ISS 2
JE 11
1991
UMI

- Lochbronner, Hubert. *See—*
  - Rupert, Karl; Mayer, Walter; and Lochbronner, Hubert, 5,022,222, Cl. 57-263.000.
- Lockheed Corporation: *See—*
  - Cranston, Robert J., 5,022,609, Cl. 244-102.00R.
- Lockheed Sanders, Inc.: *See—*
  - Kuppenheimer, John D., Jr., 5,023,440, Cl. 250-203.600.
- Lofberg, Lars C., to Nestec S.A. Conveyor frame assembly. 5,022,514, Cl. 198-813.000.
- Loftis, Donald B.; and Justice, David D., to Olin Corporation. Process to control the addition of carbonate to electrolytic cell brine systems. 5,023,803, Cl. 364-497.000.
- Lomax, Donald P.; Patzer, Gregory N.; and Rajendran, Giri, to Bimex Corporation. Multi carbide alloy for bimetallic cylinders. 5,023,145, Cl. 428-614.000.
- Lonardi, Emile; Cimenti, Giovanni; and Mailliet, Pierre, to Paul Wurth S.A. Apparatus for charging a shaft furnace. 5,022,806, Cl. 414-208.000.
- Long, Jon M.; and Steidl, Michael J., to LSI Logic Corporation. Rigid strip carrier for integrated circuits. 5,023,202, Cl. 437-206.000.
- Longstaff, Eric, to R. E. I., Inc. Method and apparatus for use in plant growth promotion and flower development. 5,022,181, Cl. 47-31.000.
- Longuet, Raynald G. M.; and Pecot, Jean-Yves F. P., to Briot International. Device for regulating the grinding weight for an ophthalmic glass grinding machine. 5,022,187, Cl. 51-165.740.
- Looker, Jack D. Apparatus for separating sludge. 5,022,992, Cl. 210-521.000.
- Lopes, Edward L. One-handed cam action fish tape puller. 5,022,633, Cl. 254-134.3FT.
- Lopez, Javier E. M.; and Palaske, Mark G., to Quest Electronics, SA Highly efficient conversion circuit for power supplies. 5,023,767, Cl. 363-17.000.
- Lopez, Lance: *See—*
  - La Gasse, Russ; and Lopez, Lance, 5,022,561, Cl 222-153 000.
- Lopotar, Nevenka: *See—*
  - Narandja, Amalija; Suskovic, Bozidar; Djokic, Slobodan; and Lopotar, Nevenka, 5,023,240, Cl. 514-30.000.
- Loral Aerospace Corp.: *See—*
  - Johnson, John R.; and Thexton, Melvin W., 5,023,590, Cl. 340-146.200.
- Lord Corporation: *See—*
  - Sherrick, James W., 5,022,584, Cl 238-282.000.
- Lord, Steven F : *See—*
  - Marchitto, Michael; and Lord, Steven F., 5,022,563, Cl. 222-327.000.
- Lordet, Jacques: *See—*
  - Blanc, Floreal; and Lordet, Jacques, 5,022,600, Cl 242-107.100.
- Lordi, Nicholas G.: *See—*
  - Bagaria, Suresh C.; and Lordi, Nicholas G., 5,023,108, Cl 427-3.000.
- L'Oreal: *See—*
  - Maignan, Jean; Lang, Gerard; Malle, Gerard; Restle, Serge; and Shroot, Braham, 5,023,363, Cl. 560-52.000.
  - N'Guyen, Quang L.; Griat, Jacqueline; and Millecamps, Francois, 5,023,235, Cl. 514-18.000.
- Lorton, Tina L. E.; and Eno, Timothy R Film marking apparatus. 5,023,637, Cl. 354-106.000.
- LoStracco, Gregory, to Hughes Aircraft Company. Fiber dispenser 5,022,602, Cl. 242-159.000.
- Lostumo, Arthur J., to Zenith Electronics Corporation. Miniature high voltage connector 5,022,874, Cl. 439-724.000.
- Lotto, Ronald L., to FMC Corporation. Rotary handle cutout with heated knife. 5,022,298, Cl. 83-509 000.
- Louis Berkman Company, The: *See—*
  - Boyd, Thomas J., 5,022,203, Cl. 52-199.000.
- Louisville Stoneware Inc.: *See—*
  - Robertson, John M., 5,022,346, Cl. 119-52.200.
- Louvaris, Maria. Inflatable bathing devices. 5,022,102, Cl. 4-516.000.
- Love, Andrew M., to Texas Instruments Incorporated. Bonding pad programmable integrated circuit. 5,023,843, Cl. 365-222.000.
- Loveless, Kenneth L., to Cornell Research Foundation, Inc. Ostomy bag holder. 5,022,693, Cl. 294-1.100.
- Lovrien, Glenn A.: *See—*
  - Carver, Larry L.; Zamzow, Charles E.; Mladenoff, Donald D., and Lovrien, Glenn A., 5,023,800, Cl. 364-474.240.
- Lowe, Robert K.: *See—*
  - Bryant, William C.; and Lowe, Robert K., 5,022,349 Cl. 119-57.800.
- Lower, J. Donald. Stair edge identifier 5,022,198, Cl. 52-105.000.
- Lozeau, Robert V.: *See—*
  - Kageyama, Hidehei; and Lozeau, Robert V., 5,022,772, Cl. 401-65.000.
- LSI Logic Corporation: *See—*
  - Long, Jon M.; and Steidl, Michael J., 5,023,202, Cl. 437-206.000.
- Lu, Sheng N. Pivot shaft. 5,022,778, Cl. 403-120.000.
- Lubrizol Corporation, The: *See—*
  - Grava, Arturs; and Jolley, Scott T., 5,023,007, Cl. 252-67.000.
  - Yodice, Richard; and Gapinski, Richard E., 5,023,133, Cl. 428-332.000.
- Lubrizol Genetics, Inc.: *See—*
  - Appelbaum, Edward R.; Hennecke, Hauke; Lamb, Joseph W.; and Gottfert, Michael, 5,023,180, Cl. 435-172.300.
- Lucas Industries public limited company: *See—*
  - Heibel, Helmut; and Gilles, Leo, 5,022,717, Cl. 303-119.000.
- Ludlow, Timothy L.. *See—*
  - Davidson, Thomas F.; Spear, Guy B.; and Ludlow, Timothy L., 5,023,006, Cl. 252-62.000.
- Luikko, Henrik, to Thomesto Oy. General purpose measuring implement usable in the field, and its data transfer method 5,022,162, Cl. 33-784.000.
- Luisi, Domenic: *See—*
  - Rollini, Pietro; and Luisi, Domenic, 5,022,429, Cl. 137-218 000.
- Luke, Walter, Jr., to WHS Robotics. Automatic guided vehicle system 5,023,790, Cl. 364-424.020.
- Luker, Hartmut, to Hoechst Aktiengesellschaft. Polyethylene wax, and a process for the preparation thereof. 5,023,388, Cl. 585-9.000
- Lum, James. *See—*
  - Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G ; Lum, James; Mall, Michael G.; Page, David R., Plambeck, Kenneth E.; Scalzi, Casper A , and Schmalz, Richard J., 5,023,773, Cl. 364-200.000.
- Lundquist, Joseph T.: *See—*
  - Kreh, Robert P., Lundquist, Joseph T.; Henry, Wayne L., Kelly, John A.; and Kuhn, Vincent R., 5,022,926, Cl 134-2.000.
- Lundqvist, Gunnar, to Hygrama Ag. Axially slit pressure cylinder with brake means. 5,022,499, Cl. 188-67.000.
- Lunts, Lawrence H. C.: *See—*
  - Dowle, Michael D.; Middlemiss, David, Finch, Harry, Naylor, Alan; and Lunts, Lawrence H C., 5,023,378, Cl. 564-340.000
- Lupke, Manfred A. A. Method and apparatus for producing pipe with annular ribs. 5,023,029, Cl. 264-40.500.
- Lupuyo, Jacques: *See—*
  - Boulanger, Jean-Paul; Lupuyo, Jacques; and Klug, Francois, 5,023,247, Cl. 514-89.000.
- Lurkis, Jeffry L.; and Solomon, Stanley B. Combination protective cap and valve opener. 5,022,562, Cl. 222-182.000.
- Luthra, Ajay K.; and Rajan, Ganesh, to Tektronix, Inc. Coefficient reduction in a low ratio sampling rate converter. 5,023,825, Cl 364-724.100.
- Lutz, William A., Wright, John B.; Moss, Noel; and Delia, Richard, to MasterCard International Inc. Travelers cheque transaction terminal 5,023,782, Cl. 364-405.000.
- Luzaich, Greg: *See—*
  - Schieberl, Daniel L.; and Luzaich, Greg, 5,022,402, Cl 128-671.000.
- Lyman, Ronald L. Toy construction set featuring radiating face and complementary edge connectors. 5,022,885, Cl. 446-95.000.
- Lynch, Eric R., to Monsanto Europe, S.A. Rubber compositions having improved processability. 5,023,289, Cl. 524-302.000.
- Lynch, Marine D.; Bernklau, James W.; Paulson, Richard D , and Reeck, Steven L., to Wing-Lynch, Inc. Automatic photo processor 5 023,643, Cl. 354-299.000.
- Lyon, Peter A.: *See—*
  - Breda, Michael A.; Snyder, George K.; and Lyon, Peter A . 5,022,814, Cl. 414-799.000.
- M. E. Cunningham Company: *See—*
  - Speicher, Edwin W., 5,023,437, Cl. 235-432.000.
- Ma, Bing F.: *See—*
  - Tero, John; Chin, Shaoan, and Ma, Bing F., 5,023,481, Cl 307-456.000.
- Maakad, Guy A : *See—*
  - Torres, Daniel L.; Murphy, Timothy J.; Maakad, Guy A , Roberts, Jeffrey R.; and Murray, Kent S., 5,022,799, Cl. 408-1.00R
- MacArthur, Ian J . *See—*
  - Wingate-Hill, Robin; and MacArthur, Ian J., 5,022,446, Cl 144-208.00F.
- Macbeth, Ian C., to U.S. Philips Corporation. Integrator circuit. 5,023,489, Cl. 307-490.000.
- Macchio, Ralph A.; Russ, Julio G.; Slobody, Brent; and Tietjen, Mariene, to Revlon, Inc. Microfine cosmetic powder comprising polymers, silicone, and lecithin. 5,023,075, Cl. 424-63.000.
- MacDiarmid, Alan G.; and Somasiri, Nanayakkara L. D., to University Patents, Inc. Electrochemistry employing polyaniline. 5,023,149, Cl 429-27.000.
- Mac Donald, William M *See—*
  - Ackerman, David A.; Blonder, Greg E.; and Mac Donald, William M., 5,023,881, Cl. 372-46.000.
- MacDowell, John F., to Corning Incorporated. Slawsonite-containing glass-ceramics. 5,023,207, Cl. 501-8.000.
- Machida, Hiroji; Asano, Michiaki; Watanabe, Yozo; Tokuhiro, Tomoya; Satoh, Hiroshi; Iwahashi, Motoyuki; Yamaguchi, Norihiro; Kikuchi, Koshin; and Watanabe, Hiroaki, to Shimizu Construction Co., Ltd. Method for supplying aromas, apparatus therefore and facilities provided with same. 5,023,020, Cl. 261-18.100.
- Machida, Hiroshi: *See—*
  - Abe, Takafumi; Ebata, Shuji; Machida, Hiroshi; and Kida, Koichi, 5,023,390, Cl. 585-320.000
- Machinefabriek Wila B.V.. *See—*
  - van der Meulen, Jan, 5,022,256, Cl. 72-481.000.
- MacMillan Bloedel Limited: *See—*
  - Aune, Jan E.; and So, Peter K. L., 5,023,805, Cl. 364-507.000.
- Madden, William C.: *See—*
  - Grundmann, William J.; Madden, William C.; and Uhler, George M., 5,023,828, Cl. 364-900.000.
- Madock, Michael F., to KT Products, Inc. Golf tool. 5,022,650, Cl 273-32.00A.
- Maeda, Kazuya: *See—*
  - Kitabatake, Yasuo; Nakamura, Tadashi; Takahashi, Yoshiaki; and Maeda, Kazuya, 5,023,161, Cl. 430-137.000.

- Maeda, Yukio: *See—*
  - Sawa, Masashi; Masuda, Masami; Maeda, Yukio; and Itoh, Ryu, 5,022,797, Cl. 407-119.000.
- Maerfeld, Charles; and Desormiere, Bernard, to Thomson-CSF. Device for optical frequency translation and a modulator in which said device is employed. 5,022,731, Cl. 350-96.140.
- Maezawa, Hiroshi; Tomotsu, Norio; and Kuramoto, Masahiko, to Idemitsu Kosan Company Limited. Catalyst for producing syndiotactic configuration styrene-based polymers. 5,023,222, Cl. 502-103.000.
- Magenta Corporation: *See—*
  - Song, John S.; and Hofman, Richard W., 5,022,566, Cl. 222-480.000.
- Magiera, Joseph. Switch assembly having a rocker switch connected to a remote actuator. 5,023,417, Cl. 200-331.000.
- Magnanini, Renato: *See—*
  - Mattera, Adriano; Fornari, Roberto; Magnanini, Renato; Paorici, Carolo; Zanotti, Lucio; and Zuccalli, Giovanni, 5,023,801, Cl. 364-480.000.
- Magnon, Gary D.: *See—*
  - Williams, Laura A.; Magnon, Gary D.; von Kannewurff, Michael C.; and Seymour, Raymond K., 5,023,582, Cl. 335-167.000.
- Mahon, Gathal J.: *See—*
  - Angenent, Johannes H.; Khoe, Giok D.; Mahon, Gathal J.; Van De Grijp, Abram; Potters, Cornelis J. T.; and Wright, Kieran G., 5,022,733, Cl. 350-96.180.
- Mahulikar, Deepak; and Popplewell, James M., to Olin Corporation. Aluminum alloy semiconductor packages. 5,023,398, Cl. 174-52.400.
- Maier, Mark S.; and Wilson, Jack W., Jr., to United Technologies Corporation. Gas turbine blade shroud support. 5,022,816, Cl. 415-115.000.
- Maier, Reinhard: *See—*
  - Bosch, Erhard; Wolfer, Dietrich; and Maier, Reinhard, 5,023,295, Cl. 524-783 000.
- Maignan, Jean; Lang, Gerard; Malle, Gerard; Restle, Serge; and Shroot, Braham, to L'Oreal. Aromatic compounds, a process for their preparation and their use in human and veterinary medicine and for cosmetic compositions. 5,023,363, Cl. 560-52.000.
- Mailliet, Pierre: *See—*
  - Lonardi, Emile; Cimenti, Giovanni; and Mailliet, Pierre, 5,022,806, Cl. 414-208.000.
- Makara, Gabor: *See—*
  - Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre; Teplan, Istvan; Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt; Hegedus, Edit; Makara, Gabor; and Rappay, Gyorgy, 5,023,322, Cl. 530-324.000.
- Makhnovsky, Leonid P.: *See—*
  - Surguchev, Viktor G.; Kuraev, Oleg V.; Surgucheva, Raisa N.; Makhnovsky, Leonid P.; Troschenovsky, Anatoly P.; Tetior, Alexandr N.; Golovchenko, Igor V.; and Scherbina, Tatyana V , 5,022,925, Cl. 106-631.000.
- Maki, Masami: *See—*
  - Abe, Masaru; Kawai, Yoichi; Maki, Masami; and Wada, Katuo, 5,023,286, Cl. 524-128.000.
- Makino, Hideaki: *See—*
  - Anzai, Hisao; Sasaki, Isao; Nishida, Kozi; Makino, Hideaki; Ohtani, Masami; and Shimada, Katsuhiko, 5,023,302, Cl. 525-378.000.
- Malacrida, Alessandro: *See—*
  - Desmarteau, Darryl D.; Kotun, Stefan P.; and Malacrida, Alessandro, 5,023,377, Cl. 564-301.000.
- Male, Philip J.: *See—*
  - Bonnes, David R.; and Male, Philip J., 5,022,221, Cl. 56-400.170.
- Malik, Roger J.: *See—*
  - Bethea, Clyde G.; Hasnain, Ghulam; Levine, Barry F.; and Malik, Roger J., 5,023,685, Cl. 357-30.000.
- Mall, Michael G.: *See—*
  - Baum, Richard I., Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Page, David R.; Plambeck, Kenneth E.; Scalzi, Casper A.; and Schmalz, Richard J., 5,023,773, Cl. 364-200.000.
- Malle, Gerard: *See—*
  - Maignan, Jean; Lang, Gerard; Malle, Gerard; Restle, Serge; and Shroot, Braham, 5,023,363, Cl. 560-52.000.
- Mamada, Sakae, to Tokyo Aircraft Instrument Co., Ltd. Positioning device of table for semiconductor wafers. 5,022,619, Cl. 248-178.000.
- Mannesmann AG: *See—*
  - Gerretz, Josef; and Stinnertz, Horst, 5,022,250, Cl. 72-214.000.
- Manoliu, Juliana; and Tuntasood, Prateep, to National Semiconductor Corp. Method for simultaneously fabricating bipolar and complementary field effect transistors using a minimal number of masks. 5,023,193, Cl. 437-31.000.
- Mans, Wayne K.; and Rizzo, Vincent J., to Urda, Joseph A. Ballast circuit for gaseous discharge lamp. 5,023,518, Cl. 315-219.000.
- Mansour, George A Dimmer for table lamps. 5,023,522, Cl. 315-291.000.
- Mansukhani, Gul: *See—*
  - Cherukuri, Subraman R., and Mansukhani, Gul, 5,023,093, Cl. 426-3.000.
- Manville Forest Products Corporation: *See—*
  - Schuster, Richard L., 5,022,525, Cl. 206-434.000.
- Marchino, Piero. Springing and wrap-around element for a seat and/or backrest, and seat embodying the same. 5,022,709, Cl. 297-452.000.
- Marchitto, Michael; and Lord, Steven F., to Electron Fusion Devices, Inc. Dispenser-gun assembly for viscous fluids and dispenser therefor. 5,022,563, Cl. 222-327.000.
- Marcinkewicz, Robert J.: *See—*
  - West, Eugene L.; and Marcinkewicz, Robert J., 5,023,031, Cl. 264-46.500.
- Mardis, Wilbur S.: *See—*
  - Kruse, Uno; Crowley, Burlon C.; and Mardis, Wilbur S., 5,023,309, Cl. 528-49.000.
- Mardon, Jean-Paul; Charquet, Daniel; Perez, Marc; and Senevat, Jean, to Framatome; Cogema; Compagnie Europeenne du Zirconium dite Cezus; and Societe en Nom Collectif Zircotube. Rod for a fuel assembly of a nuclear reactor resisting corrosion and wear. 5,023,048, Cl. 376-416.000.
- Maree, Michel; and Moreau, Patrick, to Societe Nationale Industrielle et Aerospatiale. Coil of very long optical fibre usable on a wire-guided missile. 5,022,603, Cl. 242-167.000.
- Maresch, Gerald; and Krupicka, Ulrich, to Maschinefabrik Andritz Actiengesellschaft. Process for the electrolytic pickling of high-grade steel strip. 5,022,971, Cl. 204-145.00R.
- Marietta, Walter E.: *See—*
  - King, David E.; and Marietta, Walter E., 5,022,837, Cl. 418-132.000.
- Marineau, Mark D.: *See—*
  - Goll, Jeffrey H.; Trent, William A.; Lane, Richard I ; Bell, Florian G.; and Marineau, Mark D., 5,023,445, Cl. 250-227.150.
- Marlboro Marketing, Inc.: *See—*
  - Rushing, Tatsuo; and Kidd, Christopher, 5,022,539, Cl. 211-133.000.
- Maronde, Carl P.: *See—*
  - Klima, Mark S.; Maronde, Carl P.; and Killmeyer, Richard P., 5,022,892, Cl. 44-621.000.
- Marquardt, Manfred: *See—*
  - Wey, Edmund, Grecksch, Hans; Pesch, Albert T.; Knors, Herbert; Zitzen, Wilhelm; and Marquardt, Manfred, 5,022,596, Cl. 242-36.000.
- Marques, Anthony M., to United States of America, America Circuit probing system. 5,023,545, Cl. 324-158.00P
- Marquette Electronics. Inc.: *See—*
  - Hafner, Curtis R., 5,022,404, Cl. 128-696.000.
- Marriott, Brian M.: *See—*
  - Murphy, Paul F.; and Marriott, Brian M., 5,022,147, Cl. 29-890.148.
- Marsh, Paul G.: *See—*
  - Pimley, John J.; Vitori, Christopher M.; Phillippe, Irenee J . and Marsh, Paul G., 5,022,984, Cl. 209-170.000.
- Marshall, Alan: *See—*
  - Clarkson, Douglas; Clifford, Richard P., and Marshall, Alan, 5,023,267, Cl. 514-372.000.
- Marsili, Leonardo, to Rifar S.R.L. Cefadroxil solvates. 5,023,331, Cl 540-230.000.
- Martin Archery, Inc.: *See—*
  - Rhodehouse, Nolin C.; Martin, Terry G.; and Newbold, George T., 5,022,378, Cl. 124-44.500.
- Martin, Jean-Paul; and Kolozsvari, Guy, to Societe C E T R A. Modular connector. 5,022,862, Cl. 439-83.000.
- Martin, Klenk, to Robert Bosch GmbH. Method and apparatus for an internal combustion engine with learning closed-loop control. 5,023,794, Cl. 364-431.040.
- Martin Marietta: *See—*
  - Goepel, Charles A., 5,023,942, Cl. 455-601.000.
- Martin Marietta Corporation: *See—*
  - Bailey, Alex E.; Winzer, Stephen R.; Sutherland, Audrey E., and Ritter, Andrew P., 5,023,032, Cl. 264-63.000.
  - Bayston, Thomas E., 5,023,888, Cl. 375-23.000.
- Martin, Terry G.: *See—*
  - Rhodehouse, Nolin C.; Martin, Terry G.; and Newbold, George T., 5,022,378, Cl. 124-44.500.
- Martinez, George, Jr. Pump optimization. 5,022,231, Cl. 62-99.000.
- Martinez, Jim: *See—*
  - Kelsic, Gary; and Martinez, Jim, 5,023,736, Cl. 360-105.000.
- Marty, John L.: *See—*
  - Kluy, Dennis J.; Zwadlo, Gregory L.; Marty, John L.; and Dower, William V., 5,023,668, Cl. 355-281.000.
- Maruyama, Hiroyoshi: *See—*
  - Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Ohashi, Masashi; Shirai, Masanari; and Ando, Eiichi, 5,023,658, Cl. 355-72.000.
- Maruyama, Hiroyuki; Kishimoto, Tadao; Isobe, Toshifumi; and Yokobori, Jun, to Konica Corporation. Color image forming apparatus for superposing a plurality of images. 5,023,708, Cl. 358-75.000.
- Maruyama, Nobusato: *See—*
  - Horino, Shigeo; Omura, Hideo; Maruyama, Nobusato; Ashikawa, Yoshiaki; Shioya, Masatoshi; Miyano, Toshiyuki; and Wakou, Jiro, 5,022,531, Cl. 209-552.000.
- Maruyama, Tadayoshi: *See—*
  - Yamakage, Hisaaki; Nomura, Kenhachiro; Maruyama, Tadayoshi; Kataoka, Kenji; and Yamashita, Nobuyuki, 5,022,494, Cl. 184-104.100.
- Maruyama, Yoji: *See—*
  - Toyooka, Takashi; Maruyama, Yoji; and Suzuki, Ryo, 5,023,473, Cl. 307-270.000.
- Masaki, Kazuo, to Yamaha Corporation. Musical tone signal generating apparatus. 5,022,304, Cl. 84-607.000.
- Maschinefabrik Andritz Actiengesellschaft: *See—*
  - Maresch, Gerald; and Krupicka, Ulrich, 5,022,971, Cl. 204-145.00R.
- Maschinenfabrik Rieter AG: *See—*
  - Mena, Jose, 5,022,223, Cl 57-267.000.

VOL 1127 ISS 2 JE 11 1991 UMI

Masler, William F., III: *See—*

Amjad, Zahid; and Masler, William F., III, 5,023,001, Cl. 210-699.000.

Mass-Tex Company, Ltd.: *See—*

Parlatore, Rocco, 5,022,253, Cl. 72-325.000.

Massachusetts Institute of Technology: *See—*

Roberge, James K., 5,023,431, Cl. 219-494.000.

Sharpless, K. Barry; and Gao, Yun, 5,023,342, Cl. 549-34.000.

Zayhowski, John J.; and Mooradian, Aram, 5,022,745, Cl 350-608.000.

Massimiliano, Borsa: *See—*

Roberto, Giani; Ettore, Parini; Massimiliano, Borsa; and Antonio, Lavezzo, 5,023,256, Cl. 514-253.000.

Massonneau, Viviane; Mulhauser, Michel; and Buforn, Albert, to Rhone-Poulenc Sante. Process for preparing hydroxyalkylating agents, the agents so obtained, and their use. 5,023,361, Cl. 558-32.000.

MasterCard International Inc.: *See—*

Lutz, William A.; Wright, John B.; Moss, Noel; and Delia, Richard, 5,023,782, Cl. 364-405.000.

Mastrogany, Michael G.: *See—*

Porter, William F.; Mastrogany, Michael G.; and Porter, Michael J., 5,022,963, Cl. 162-116.000.

Masuda, Kazunori: *See—*

Hieda, Teruo; Shimizu, Hiroyuki; and Masuda, Kazunori, 5,023,704, Cl. 358-29.00C.

Masuda, Masami: *See—*

Sawa, Masashi; Masuda, Masami, Maeda, Yukio; and Itoh, Ryu, 5,022,797, Cl. 407-119.000.

Masuda, Shigefumi, to Fujitsu Limited. Optical switching system. 5,023,863, Cl. 370-1.000.

Masuhara, Yasuhiro: *See—*

Nishida, Koji; Yokomizo, Osamu; Masuhara, Yasuhiro; Nakao, Toshitsugu; Kashiwai, Shin-ichi; Tomiyama, Akio; Yamashita, Junichi; and Hayashi, Tatsuo, 5,023,047, Cl. 376-370.000.

Masuko, Takayuki; Okamoto, Akira; Moriya, Kaoru; Okamura, Koji; and Arima, Tadao, to Fujitsu Limited. Photo-semiconductor module employing semi-spherical lens to enhance detection. 5,023,447, Cl. 250-227.240.

Masutani, Stephen M.: *See—*

Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl. 431-2.000.

Masutani, Tetsuya: *See—*

Yamaoka, Ryohei; Hayashiya, Keizo; Yoshimura, Tohru; Seki, Eiji; Masutani, Tetsuya; and Kitahara, Katsuhiko, 5,023,327, Cl. 536-18.400.

MASX Energy Services Group, Inc.: *See—*

Bailey, Thomas F.; and Campbell, John E., 5,022,472, Cl. 175-195.000.

Material Engineering Technology laboratory, Inc.: *See—*

Yamakoshi, Kenichi, 5,023,119, Cl. 428-35.200.

Yoshida, Takao; Isono, Keinosuke; and Suzuki, Tatsuo, 5,023,026, Cl 264-22.000.

Mathew, Jacob, to Petrolite Corporation. Synthesis of 2,3-disubstituted-2-cyclopentenones via lithiomethylmercapto compounds. 5,023,382, Cl. 568-352.000.

Matoba, Gensuke; Ishida, Katsuhiko; Tani, Hisashi; and Hayashi, Hiroo, to Kanzaki Paper Mfg. Co., Ltd. Heat-sensitive recording material. 5,023,227, Cl. 503-214.000.

Matsuda, Mikio; Inagaki, Mitsuo; Hayashi, Ikuo; Goto, Masahiro; Kojima, Akikazu; Taya, Toshiki; and Miura, Nobuhiro, to Nippondenso Co., Ltd.; and Nippon Soken, Inc. Variable capacity type swash plate compressor. 5,022,826, Cl. 417-63.000.

Matsui, Kenji: *See—*

Saitou, Tosio; Matsui, Kenji; Tamura, Keiichi; Mori, Shinji; and Izuchi, Shingo, 5,022,601, Cl. 242-107.40A

Matsui, Nobuyuki: *See—*

Konno, Shozo; and Matsui, Nobuyuki, 5,022,792, Cl. 405-267.000

Matsui, Yukito: *See—*

Mizuno, Eiichi; Sakiyama, Noritaka; Matsui, Yukito; Kono, Yoshikazu; and Yamada, Kiyoshige, 5,022,704, Cl. 296-195.000.

Matsumoto, Hideo: *See—*

Ohno, Hideaki; Yoshitugu, Takao; Yoshida, Chuuryoh; and Matsumoto, Hideo, 5,022,492, Cl. 184-5.000.

Matsumoto, Kouichi, to NEC Corporation. Emitter-follower circuit. 5,023,570, Cl. 330-299.000.

Matsumoto, Masaharu; Satoh, Katsuaki; Ishikawa, Seiichi; Serikawa, Mitsuhiko; Kawamura, Akihisa; and Hashimoto, Hikari, to Matsushita Electric Industrial Co., Ltd. Apparatus for changing a sound field. 5,023,913, Cl. 381-63.000.

Matsumoto, Noriaki: *See—*

Koike, Seiichi; Horimura, Hiroyuki; Ichikawa, Masao; and Matsumoto, Noriaki, 5,022,918, Cl. 75-229.000.

Matsumoto, Roger L. K.; and Rosenthal, Allan B., to Hercules Incorporated. Silicon nitride ceramics containing a metal silicide phase. 5,023,214, Cl. 501-97.000.

Matsumoto, Tsuruyoshi: *See—*

Yamamoto, Takashi; Matsumoto, Tsuruyoshi; Shimada, Katsuhiko; Uozu, Yoshihiro; and Murata, Ryuji, 5,022,737, Cl. 350-96.290.

Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; Asano, Yuji; Yamamoto, Takemi; and Nakata, Takashi, to Brother Kogyo Kabushiki Kaisha. Thermal fixing device for image recording apparatus. 5,023,654, Cl. 355-27.000.

Matsumura, Haruo: *See—*

Doi, Yoshinao; and Matsumura, Haruo, 5,022,990, Cl 210-500.420

Matsumura, Toshio; and Nanyoshi, Yasutoshi, to Nissan Motor Company, Limited. Fuel injection control system for internal combustion engine with compensation of fuel amount consumed for wetting induction path. 5,023,795, Cl. 364-431.060.

Matsunami, Takao; and Okuda, Hidenori, to Matsushita Electric Industrial Co., Ltd. Optical sensor. 5,022,725, Cl. 350-1 400

Matsuo, Satoshi: *See—*

Ohshoji, Hiroshi; Ohshima, Fumio; and Matsuo, Satoshi, 5,022,382, Cl 128-4.000.

Matsuoka, Morito; and Ono, Kenichi, to Nippon Telegraph and Telephone Corporation. Ion generation apparatus and thin film forming apparatus and ion source utilizing the ion generation apparatus 5,022,977, Cl. 204-298.160.

Matsushita Electric Industrial Co., Ltd.: *See—*

Ito, Kazuhiko; Miyazaki, Kouji; Kichibayashi, Masakatsu, Horii, Shigeru; and Ozawa, Masataka, 5,023,516, Cl. 315-101.000.

Matsumoto, Masaharu; Satoh, Katsuaki; Ishikawa, Seiichi, Serikawa, Mitsuhiko; Kawamura, Akihisa; and Hashimoto, Hikari, 5,023,913, Cl. 381-63.000.

Matsunami, Takao; and Okuda, Hidenori, 5,022,725, Cl. 350-1.400.

Nagata, Yuji; Fukazawa, Toshio; Wada, Kumiko; and Tosaki, Yoshihiro, 5,022,141, Cl. 29-603.000.

Nishigori, Yoshihisa, 5,023,713, Cl. 358-105.000.

Ohno, Hideaki; Yoshitugu, Takao; Yoshida, Chuuryoh; and Matsumoto, Hideo, 5,022,492, Cl. 184-5.000.

Satoh, Isao; Fukushima, Yoshihisa; Ichinose, Makoto; Kuroki, Yuzuru; and Takagi, Yuji, 5,023,854, Cl. 369-32.000.

Shinohara, Koichi, Suzuki, Takashi; Kawagishi, Masao; Satoh, Nobuo; Murakami, Takeshi; and Fujita, Takashi, 5,023,739, Cl. 360-132.000.

Uriu, Eiichi; Nishida, Koji, and Tabata, Munehiro, 5,022,263, Cl 73-295.000.

Yamamoto, Hajime; Kuramoto, Yukimasa; Takashima, Yuji, Nakamura, Masahiko; and Nakano, Kenichi, 5,023,632, Cl. 346-157.000.

Matsushita Electric Works, Ltd.: *See—*

Mihara, Haruhiko; Ida, Norihiro; and Hamaoka, Tetsuya. 5,023,414, Cl. 200-61.910.

Yamada, Shuji; Tsuji, Koji; Takegawa, Yoshinobu; Tanimura, Akira; Menju, Akira; and Yano, Nobuyoshi, 5,022,932, Cl 148-13.100.

Matsutani, Kanji; and Fukuda, Masatoshi, to Matsutani Seisakusho Co., Ltd. Surgical stapler. 5,022,579, Cl. 227-177.000.

Matsutani, Kanji; and Fukuda, Masatoshi, to Matsutani Seisakusho Co., Ltd. Dental burr and dental handpiece. 5,022,857, Cl. 433-85.000.

Matsutani Seisakusho Co., Ltd.: *See—*

Matsutani, Kanji; and Fukuda, Masatoshi, 5,022,579, Cl. 227-177.000.

Matsutani, Kanji; and Fukuda, Masatoshi, 5,022,857, Cl. 433-85.000.

Matsuura, Toru, to NEC Corporation. Cross-polarization interference cancellation system capable of stably carrying out operation 5,023,620, Cl. 342-362.000.

Matsuzawa, Kazuyuki: *See—*

Landau, Michael B.; Vartanian, George; and Matsuzawa, Kazuyuki, 5,023,151, Cl 429-24.000.

Mattel, Inc.: *See—*

Hippely, Keith A. and Ostendorff, Eric C., 5,022,884, Cl. 446-14.000.

Mattera, Adriano; Fornari, Roberto; Magnanini, Renato; Paorici, Carolo; Zanotti, Lucio; and Zuccalli, Giovanni, to Montedison S.p.A.; and Consiglo Nazionale Delle Ricerche. Programmable - voltage - generator interface for decreasing the minimum voltage step. 5,023,801, Cl. 364-480.000.

Maui Toys, Inc.: *See—*

Kessler, Brian D., 5,022,646, Cl. 272-75.000.

Maurer Engineering, Inc.: *See—*

Maurer, William C.; and McDonald, William J., 5,022,471, Cl. 175-75.000.

Maurer, William C.; and McDonald, William J., to Maurer Engineering, Inc. Deviated wellbore drilling system and apparatus. 5,022,471, Cl. 175-75.000.

Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*

Kotzlowski, Heinz E.; and Kneringer, Gunter, 5,023,043, Cl. 376-150.000.

Max-Planck-Gesellschaft zur Forderung der Wissenschafter e.V.: *See—*

Weppner, Werner, 5,023,153, Cl. 429-40.000.

May, Bradley A., to Chips and Technologies, Incorporated. Apparatus and method for decoding four states with one pin. 5,023,483, Cl. 307-463.000.

Maya, Leon, to United States of America, Energy. Precursors in the preparation of transition metal nitrides and transition metal carbonitrides and their reaction intermediates. 5,023,213, Cl. 501-96.000.

Mayer, James W.: *See—*

Stanasolovich, David; Allen, Leslie H.; and Mayer, James W., 5,023,201, Cl. 437-192.000.

Mayer, Ruth J.: *See—*

Adams, Jerry L.; Gallagher, Timothy F.; Mayer, Ruth J., and Metcalf, Brian W., 5,023,250, Cl. 514-179.000.

Mayer, Walter: *See—*

Rupert, Karl; Mayer, Walter; and Lochbronner, Hubert, 5,022,222, Cl. 57-263.000.

Mayfield, John E.; and Tabatabai, Louisa B., to Iowa State University Research Foundation. Recombinant *Brucella abortus* gene expressing immunogenic protein. 5,023,174, Cl. 435-91.000.

Mayfield, Timothy N. Ski sleeve. 5,022,678, Cl. 280-815.000.

Mayo Foundation for Medical Education and Research: *See—*

Ho, Steffan N.; and Horton, Robert M., 5,023,171, Cl. 435-6.000.

Mayo, James D.: *See—*

Drappel, Stephan; Mayo, James D.; and Croucher, Melvin D., 5,023,160, Cl. 430-114.000.

Mazda Motor Corporation: *See—*

Goto, Tsuyoshi; Hatamura, Kouichi; and Seike, Shinji, 5,022,375, Cl. 123-564.000.

Mizuno, Eiichi; Sakiyama, Noritaka; Matsui, Yukito; Kono, Yoshikazu; and Yamada, Kiyoshige, 5,022,704, Cl. 296-195.000.

Okita, Junichi; and Kurokawa, Toshikazu, 5,022,354, Cl 123-41.100.

Tsuyama, Toshiaki; Nobumoto, Kazutoshi; Kageyama, Fumio; Sone, Akira; and Kawamura, Makoto, 5,022,483, Cl. 180-197.000.

Maziorka, Jack, to Forthner, Steve. Instrument gauge light projection device. 5,022,740, Cl. 350-114.000.

Mazzani, Gianfranco F.: *See—*

Kneller, James F.; Fair, Barbara E.; Mazzani, Gianfranco F.; and Di Simone, I. Sergio, 5,023,000, Cl. 210-697.000.

McAlpin, James J.: *See—*

Huff, Terrence; and McAlpin, James J., 5,023,300, Cl. 525-194.000.

McArdle, Joseph A.: *See—*

Hudson, Hugh F.; Munsch, Joseph F.; McArdle, Joseph A.; Kammer, Jackie L.; and Jermyn, Robert W., 5,023,404, Cl. 174-97.000.

McAteer, Colin H., to British Petroleum Company p.l.c., The. Syngas conversion catalyst its production and use thereof. 5,023,277, Cl. 518-715.000.

McBain, Corey L. Pliers having a pivotal jaw. 5,022,291, Cl. 81-424.000.

McBride, Daniel T., to Milliken Research Corporation. Jet reduction discharge of dye color. 5,022,891, Cl. 8-457.000.

McCaffrey, Robert R.; and Cummings, Daniel G., to United States of America, Energy. Method of separating organic contaminants from fluid feedstreams with polyphosphazene membranes. 5,022,996, Cl. 210-654.000.

McCall, Samuel L., Jr.; and Tai, Kuochou, to AT&T Bell Laboratories. Semiconductor mesa structured optical processing devices, with added side-surface recombination centers to improve the speed of operation. 5,023,673, Cl. 357-16.000.

McCalla/Lackey Products Corporation: *See—*

Barrett, Michael E.; Laughon, Thomas C.; and Nicholson, Roy V., 5,022,618, Cl. 248-146.000.

McCanse, James E. Heavy duty hinge. 5,022,119, Cl. 16-387.000.

McCauley, Robert M.: *See—*

Roy, Bryan A.; Boris, Gregory F.; Campbell, John J.; Funk, John G.; Wozniak, David J.; Gibson, James D.; and McCauley, Robert M., 5,022,995, Cl. 210-651.000.

McChesney, James D.; and Jung, Mankil. Deoxoartemisinin: new compound and composition for the treatment of malaria. 5,023,353, Cl. 549-348.000.

McCloy, Michael R.: *See—*

Charlson, Sandra M.; Kotula, Steven J.; and McCloy, Michael R., 5,022,845, Cl. 425-403.000.

McClure, J. Michael; and Johnson, Eric, to Great Plains Manufacturing Incorporated. Universal press wheel arm assembly. 5,022,333, Cl. 111-194.000.

McColl, James R., to GTE Laboratories, Inc. Patterned transducer apparatus for correcting spurious signals in said devices. 5,023,605, Cl. 340-825.310.

McCormick, Frederick B., Jr.: *See—*

Cloonan, Thomas J.; Jahns, Jurgen; McCormick, Frederick B., Jr.; and Murdocca, Miles J., 5,023,864, Cl. 370-1.000.

McCroskey, William K.; and Vickers, David S., to Innovative Imaging Systems, Inc. Three dimensional tomographic system. 5,023,895, Cl. 378-4.000.

McCutchen, David. Method and apparatus for dodecahedral imaging system. 5,023,725, Cl. 358-231.000.

McDonald, Alistair: *See—*

Briant, Geoffrey M.; McDonald, Alistair; Cockings, Peter; and Dhokia, Vijay, 5,023,810, Cl. 364-518.000.

McDonald, Mack P. Side-handle baton rack. 5,022,575, Cl. 224-273.000.

McDonald, William J.: *See—*

Maurer, William C.; and McDonald, William J., 5,022,471, Cl. 175-75.000.

McDonough, Michael L.: *See—*

Gray, Kenneth P.; and McDonough, Michael L., 5,022,161, Cl. 33-548.000.

McGannon, Patrick J. Smoke detector for TV. 5,023,601, Cl. 340-628.000.

McGrady, Michael B.; and Robinson, Jon K., to Boeing Company, The. Apparatus for warning a pilot of life-support system failures. 5,022,393, Cl. 128-205.230.

McGraw, David C.: *See—*

Neiheisel, Gary L.; and McGraw, David C., 5,023,427, Cl. 219-121.820.

McIntyre, Edward K., Jr.: *See—*

Benveniste, Victor M.; and McIntyre, Edward K., Jr., 5,023,458, Cl. 250-396.00R.

McIntyre, Frederic S., to Acumeter Laboratories, Inc. Method of in-line production of successive barrier-and silicone-coated inexpensive porous and absorbent paper and similar substrates, and products produced thereby. 5,023,138, Cl. 428-352.000.

McKannan, Eugene C.; McPherson, William B.; Ahmed, Shaffiq; and Chandler, Shirley S., to United States of America, National Aeronautics and Space Administration. Superalloy for high-temperature hydrogen environmental applications. 5,023,050, Cl. 420-448.000.

McKinnon, Donald C.; and Gauthier, Thomas F., to Ferret Instruments, Inc. Stroboscopic lamp optical system. 5,023,764, Cl. 362-299.000.

McLean, Alexander: *See—*

Lee, William L.; McLean, Alexander; and Daye, Ronald E., 5,022,259, Cl. 73-64.200.

McMorran, William, to TDM Tape Services, Ltd. Method and apparatus for verifying a helical scan recording tape using a plurality of linear recording heads. 5,023,548, Cl. 324-212.000.

McNeill, John H.: *See—*

Lazaro, Rene; Cros, Gerard, McNeill, John H.; and Serrano, Jean-Jacques, 5,023,358, Cl. 556-42.000.

McOwen, Sherwood A., Jr.: *See—*

Tsukii, Toshikazu; Houng, S. Gene; Miller, Michael D.; and McOwen, Sherwood A., Jr., 5,023,494, Cl. 307-571.000.

McPhedran, Gordon: *See—*

Tomes, Alex; and McPhedran, Gordon, 5,023,397, Cl. 174-50.000.

McPherson, William B.: *See—*

McKannan, Eugene C.; McPherson, William B.; Ahmed, Shaffiq; and Chandler, Shirley S., 5,023,050, Cl. 420-448.000.

MDT Corporation: *See—*

Schmoegner, John C.; and Baldoz, Danny L., 5,022,898, Cl. 55-210.000.

Mead Corporation, The: *See—*

Spamer, William S., 5,022,535, Cl 211-59.200.

White, O. Timothy, 5,022,541, Cl. 211-186.000.

Meade, Albert J.: *See—*

Beauvais, Randall; and Meade, Albert J., 5,022,707, Cl 297-216.000.

Meaders, Michael W.: *See—*

Churchman, Ronald K.; Meaders, Michael W.; and Van Le, Nam, 5,022,427, Cl. 137-155.000.

Measurex Corporation: *See—*

Hu, Hung-Tzaw, 5,022,966, Cl. 162-198.000.

Mechanical Technology Incorporated: *See—*

Vitale, Nicholas G., 5,022,229, Cl. 62-6.000.

MECT Corporation: *See—*

Ogura, Haruo; Furuhata, Kimio; Sato, Shingo; Ito, Masayoshi; Shitori, Yoshiyasu; and Nagai, Yoshitaka. 5,023,239, Cl. 514-26.000.

Media Transference International, Ltd.: *See—*

Briggs, James B., 5,023,707, Cl. 358-343.000.

Medioni, Gerard G. R.: *See—*

Wilson, Monti R.; and Medioni, Gerard G. R., 5,023,815, Cl 364-526.000.

Mefferd, Wayne S.: *See—*

Hobart, James L.; Sasnett, Michael W.; Mefferd, Wayne S.; and Allen, Peter N., 5,023,886, Cl. 372-99.000.

MegaScan Technology, Inc.: *See—*

Kriz, J. Stanley, 5,023,525, Cl. 315-408.000.

Meguro, Hiroshi; Takahashi, Tsugio; Aoki, Hitoshi; and Kosaka, Toru, to Nikon Corporation. Flash taking lens shutter camera. 5,023,648, Cl. 354-420.000.

Mehlkopf, Antoon F.; Den Boef, Johannes H.; and Lioen, Rolf J. M., to U.S. Philips Corp. Magnetic resonance device with a selectable gain signal amplifier. 5,023,552, Cl. 324-309.000.

Mehmet, Ahmet, to Council for Mineral Technology. Recovery of gold by a carbon-in-pulp process. 5,023,060, Cl. 423-27.000.

Mehoudar, Raphael, to Hydro-Plan Engineering Ltd. Process of making a drip irrigation conduit. 5,022,940, Cl. 156-64.000.

Mehr-Ayin, Kourosh: *See—*

Lampe, Steven W.; and Mehr-Ayin, Kourosh, 5,023,789, Cl. 364-424.100.

Meiji Seika Kaisha: *See—*

Sumi, Naoki; Mochizuki, Keizo; Moriyama, Yoshio; and Sakurai, Mitsuhiro, 5,023,098, Cl. 426-474.000.

Meissner, Eckhard: *See—*

Auracher, Franz; Meissner, Eckhard; Noll, Bernd; and Wittmann, Julius, 5,023,885, Cl. 372-92.000.

Auracher, Franz; Ebberg, Alfred; Noll, Bernd; Meissner, Eckhard; and Rodler, Hermann J., 5,023,949, Cl. 455-618.000.

Melamine Chemicals, Inc.: *See—*

Allan, G. Graham, 5,022,917, Cl. 71-93.000.

Melgers, George. Furniture construction system. 5,022,721, Cl. 312-257.100.

Mena, Jose, to Maschinenfabrik Rieter AG. Method of and apparatus for automatically exchanging bobbins at a flyer. 5,022,223, Cl. 57-267.000.

Mendenhall, Todd L.: *See—*

Bronowicki, Allen J.; and Mendenhall, Todd L., 5,022,272, Cl. 73-772.000.

Menju, Akira: *See—*

Yamada, Shuji; Tsuji, Koji; Takegawa, Yoshinobu; Tanimura, Akira; Menju, Akira; and Yano, Nobuyoshi, 5,022,932, Cl. 148-13.100.

Mentor Corporation: *See—*

Yan, John Y. J.; and Purkait, Bobby K., 5,022,942, Cl. 156-219.000.

Merchant, Abid N., to Du Pont de Nemours, E. I., and Company. Binary azeotropic compositions of 1,1,1,2,3,3-hexafluoro-3-methoxypropane and 2,2,3,3,3-pentafluoropropanol-1. 5,023,009, Cl. 252-171.000.

Merchant, Abid N., to Du Pont de Nemours, E. I., and Company. Binary azeotropic compositions of 1,1,1,2,3,3-hexafluoro-3-methoxypropane with methanol or isopropanol or N-propanol. 5,023,010, Cl 252-171.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Merck & Co., Inc.: *See—*
  - Linn, Bruce O.; and Mrozik, Helmut, 5,023,241, Cl. 514-30.000.
  - Nutt, Ruth F.; Brady, Stephen F.; and Veber, Daniel F., 5,023,233, Cl. 514-11.000.
- Merck Patent Gesellschaft mit beschraenkter Haftung: *See—*
  - Felder, Ernst; Romer, Michael; Bardonner, Hans; Hartner, Hartmut; and Fruhstorfer, Wolfgang, 5,023,379, Cl. 564-472.000.
- Merck Patent Gesellschaft Mit Beschrankter Haftung: *See—*
  - Rau, Axel; Ambrosius, Klaus; and Franz, Klaus D., 5,022,923, Cl. 106-415.000.
- Merker, David E.: *See—*
  - Feldstein, Joel G.; and Merker, David E., 5,022,148, Cl. 29-890.031.
- Merrick, Frank J. Pinhole camera with adjustable focal length. 5,023,641, Cl. 354-195.100.
- Mertzel, Elaine Audrey: *See—*
  - Lee, Biing-Lin; Sullivan, Francis R.; and Mertzel, Elaine Audrey, 5,023,036, Cl. 264-211.230.
- Mesing, Thomas C.: *See—*
  - Jones, Jackie D.; Murphy, Guy C.; Mesing, Thomas C.; and Fuhrmann, Barrett J., 5,023,041, Cl. 264-510.000.
- Messerschmitt-Boelkow-Blohm GmbH: *See—*
  - Gleine, Wolfgang, 5,023,446, Cl. 250-227.160.
- Metagal Industria e. Comercia Ltda.: *See—*
  - Espirito Santo, Antonio F., 5,022,748, Cl. 350-639.000.
- Metcalf, Brian W.: *See—*
  - Adams, Jerry L.; Gallagher, Timothy F.; Mayer, Ruth J.; and Metcalf, Brian W., 5,023,250, Cl. 514-179.000.
- Metts, Rodney H.; and Thomas, Barry D. Clock for keeping time at a rate other than human time. 5,023,850, Cl. 368-28.000.
- Metzger, Jean, to Societe Atochem. Apparatus for the preparation of carbon polymonofluoride. 5,023,057, Cl. 422-202.000.
- Meuer, Kurt P.; Waniczek, Helmut; Sylvester, Gerd; and Witte, Josef, to Bayer Aktiengesellschaft. Polyolefinecarboxylic acids, their preparation and their use for preparing polyolefine-polycarbonate block copolymers. 5,023,299, Cl. 525-146.000.
- Meunier, Pierre P., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Compression seal canister. 5,022,901, Cl. 55-316.000.
- Meyer, Hans F.: *See—*
  - Fortmann, Norbert; Gottling, Helmut; Meyer, Hans F.; Moller, Rudolf; and Scharnowski, Gerhard, 5,022,311, Cl. 92-137.000.
- Meyer, Karen E. Jigsaw puzzle and technique. 5,022,655, Cl. 273-157.00R.
- Meyer, Karen M.: *See—*
  - Grey, Thaddeus J.; Kirton, Raymond E.; English, George A., Liggett, Michael D.; Meyer, Karen M.; and Barker, Charles J., 5,022,431, Cl. 137-375.000.
- Meyer, Norbert: *See—*
  - Kast, Juergen; Kolassa, Dieter; Meyer, Norbert; Schirmer, Ulrich; Harreus, Albrecht, Wild, Jochen; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,022,914, Cl. 71-88.000.
- Mezo, Imre: *See—*
  - Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre; Teplan, Istvan; Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt; Hegedus, Edit; Makara, Gabor; and Rappay, Gyorgy, 5,023,322, Cl. 530-324.000.
- Micic, Lyubomir; Gartlein, Gunter; Schmitt, Eberhard, Muller, Axel; Seng, Egon; and Spindler, Siegfried, to Deutsche ITT Industries GmbH Semiconductor device, method of manufacturing the same, and apparatus for carrying out the method. 5,023,702, Cl. 357-74.000.
- Micro-Pak, Inc.: *See—*
  - Wallach, Donald F. H., 5,023,086, Cl. 424-450.000.
- Micron Technology, Inc.: *See—*
  - Douglas, Kurt P.; and Chern, Wen-Foo, 5,023,465, Cl. 365-203.000.
  - Lee, Ruojia; and Gonzalez, Fernando, 5,023,190, Cl. 437-56.000
  - Powell, Eric; and Chhabra, Navjot, 5,022,853, Cl. 432-200.000.
- Microwave Modules & Devices, Inc.: *See—*
  - Bartlow, Howard D., 5,023,189, Cl. 437-8.000.
- Middlemiss, David: *See—*
  - Dowle, Michael D.; Middlemiss, David, Finch, Harry; Naylor, Alan; and Lunts, Lawrence H. C., 5,023,378, Cl. 564-340.000.
- Midwest Hydro-Blasting, Inc.: *See—*
  - Seidel, Jurgen F., 5,022,927, Cl. 134-34.000.
- Mihara, Haruhiko; Ida, Norihiro; and Hamaoka, Tetsuya, to Matsushita Electric Works, Ltd. Electrical switch for detecting positions of an automatic transmission of an automobile. 5,023,414, Cl. 200-61.910.
- Mikels, Peter. Resettable gravity timer. 5,023,852, Cl. 368-93.000.
- Milcamps, Jacques, Pourre, Jean-Louis; and Thiebaut, Jean-Pierre, to CGR MEV. Device for protecting a delay-line modulator. 5,023,743, Cl. 361-1.000
- Millecamps, Francois: *See—*
  - N'Guyen, Quang L.; Griat, Jacqueline; and Millecamps, Francois, 5,023,235, Cl. 514-18.000.
- Miller, Bearge D.: *See—*
  - Miller, Norman K.; and Miller, Bearge D., 5,023,411, Cl. 200-61.430.
- Miller, Cedric C., to Miller, Cedric C.; and Ferguson, Janice L. Shower curtain support. 5,022,104, Cl. 4-558.000.
- Miller, Donald E.; and Virsik, Milan A., to Brazeway, Inc. Method of manufacturing a fluid conduit having exterior detail. 5,022,135, Cl 29-421.100.
- Miller Edge, Inc.: *See—*
  - Miller, Norman K.; and Miller, Bearge D., 5,023,411, Cl. 200-61.430.
- Miller, Francis M., to Conax Florida Corporation. Sensor circuit response to different fluid conductivities and having time delay feature. 5,023,556, Cl. 324-439.000.
- Miller, John A.; Leemhuis, Richard S.; and Gunda, Rajamouli, to Vickers, Incorporated. High resolution pulse width modulation. 5,023,535, Cl. 318-599.000.
- Miller, John M.; Fenton, James E.; and Spring, Harold G., to Ford Motor Company. Alternator voltage transient minimization method and apparatus. 5,023,539, Cl. 322-28.000.
- Miller, Kevin P.: *See—*
  - Farbood, Mohamad I.; Morris, James A.; Sprecker, Mark A., Bienkowski, Lynda J.; Miller, Kevin P.; Vock, Manfred H.; and Hagedorn, Myrna L., 5,023,347, Cl. 549-263.000.
- Miller, Michael D.: *See—*
  - Tsukii, Toshikazu; Houng, S. Gene; Miller, Michael D.; and McOwen, Sherwood A., Jr., 5,023,494, Cl. 307-571.000.
- Miller, Norman K.; and Miller, Bearge D., to Miller Edge, Inc. Sensing edgeswitch for a door. 5,023,411, Cl. 200-61.430.
- Miller, Richard F.: *See—*
  - Lauterbach, Jerre F.; Ritchie, Nathan; and Miller, Richard F., 5,022,832, Cl. 417-571.000.
- Miller, Steven A.: *See—*
  - Brun, Milivoj K.; Boron, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., 5,022,150, Cl. 29-890.053
- Milliken Research Corporation: *See—*
  - McBride, Daniel T., 5,022,891, Cl. 8-457.000.
- Mills, Brian P.; and George, Edward K., to Telephone Cables Limited. Support assembly including a stress limiter for non-metallic cable, and method of fitting the stress limiter. 5,023,399, Cl. 174-73.100.
- Milton, David: *See—*
  - Freels, Jack; and Milton, David, 5,022,384, Cl. 128-33.000.
- Minakawa, Masaaki: *See—*
  - Sekino, Yousuke; and Minakawa, Masaaki, 5,022,673, Cl. 280-673.000.
- Minigrip, Inc.: *See—*
  - Boeckmann, Hugo; and Van Erden, Donald L., 5,023,122, Cl. 428-43.000.
- MiniScribe Corporation: *See—*
  - Kelsic, Gary; and Martinez, Jim, 5,023,736, Cl. 360-105.000.
- Minnesota Mining and Manufacturing: *See—*
  - Kluy, Dennis J.; Zwadlo, Gregory L.; Marty, John L.; and Dower, William V., 5,023,668, Cl. 355-281.000.
- Minnesota Mining and Manufacturing Company: *See—*
  - Clifton, Richard B., 5,023,401, Cl. 174-87.000.
- Minolta Camera Co., Ltd.: *See—*
  - Kusumoto, Keiji; and Nagata, Kenzo, 5,023,662, Cl. 355-228.000.
- Minolta Camera Kabushiki Kaisha: *See—*
  - Hayashi, Kohtaro; Karasaki, Toshihiko; Yamano, Yasuteru; Mukai, Hiromu; Hata, Koji; and Ikemura, Masayuki, 5,023,649, Cl 354-434.000.
  - Ishida, Tokuji; Hamada, Masataka; Ishibashi, Kenji; Taniguchi, Nobuyuki; Ootsuka, Hiroshi; Norita, Toshio; and Karasaki, Toshihiko, 5,023,646, Cl. 354-402.000.
  - Kondo, Shoji; and Kyoden, Yasuhiro, 5,023,705, Cl. 358-80.000.
  - Kuriyama, Masaaki, 5,023,657, Cl. 355-45.000.
  - Shibazaki, Kenji; Irie, Yutaka; Ito, Masazumi; and Murata, Tomoji. 5,023,663, Cl. 355-243.000.
- Misawa, Junichi: *See—*
  - Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi, and Suzuki, Hiroyuki, 5,022,475, Cl. 177-211.000.
- Misawa Shokai Co., Ltd.: *See—*
  - Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi; and Suzuki, Hiroyuki, 5,022,475, Cl. 177-211.000.
- Mita Industrial Co., Ltd.: *See—*
  - Hatano, Masaru; and Tahata, Yoshiaki, 5,023,669, Cl. 355-319.000
  - Kita, Hideki; Nakakuma, Akira; Fukui, Hidehiro; and Deguchi, Hiroyuki, 5,023,670, Cl. 355-326.000.
  - Okamoto, Sueaki; Yoshida, Seitaro; Kageyama, Hiroshi; and Ogaki. Shinji. 5,023,748, Cl. 361-229.000.
- Mitchell, Donald K. Method and apparatus for detonation of distributed charges. 5,022,485, Cl. 181-106.000.
- Mitchell, Steven R.; and Daly, Vernon M., Jr., to CTS Corporation. Throttle position sensor advanced brake light device. 5,023,599, Cl. 340-467.000.
- Mitsuba Electric Manufacturing Co., Ltd.: *See—*
  - Sato, Masaei, 5,022,815, Cl. 415-107.000.
- Mitsubishi Denki K.K.: *See—*
  - Kajiwara, Yasuya, 5,023,712, Cl. 358-105.000
- Mitsubishi Denki Kabushiki Kaisha: *See—*
  - Adachi, Etsushi; Adachi, Hiroshi; Hayashi, Osamu, and Okahashi, Kazuo, 5,023,204, Cl. 437-228.000.
  - Fukui, Wataru, 5,022,362, Cl. 123-146.50D.
  - Hagino, Hiroyasu, 5,023,691, Cl. 357-43.000.
  - Hirayama, Makoto, 5,023,750, Cl. 361-313.000.
  - Isozumi, Shuzoo, 5,023,466, Cl. 290-48.000.
  - Murakami, Takashi; and Motoda, Takashi, 5,023,199, Cl. 437-167.000.
  - Murano, Katsuaki; Hirano, Sadayuki; Yamashita, Yoshinori; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,022,287, Cl. 74-866.000.
  - Nishioka, Yasuhiko; Kawano, Hazime; and Inami, Kazuyoshi. 5,023,634, Cl. 342-368.000.
  - Satoh, Hiroshi; and Utsui, Yoshihiko, 5,022,275, Cl. 73-862.360
  - Shimizu, Masahiro; Shimano, Hiroki; Inuishi, Masahide; and Tsukamoto, Katsuhiro, 5,023,682, Cl. 357-23.600.
  - Sugiyama, Takeshi, 5,023,581, Cl. 335-126.000.
  - Tachibana, Miyuki, 5,023,536, Cl. 318-638.000.

  - Takeuchi, Susumu; and Yoshioka, Nobuyuki, 5,023,156, Cl. 430-5.000.
  - Tanaka, Hiroshi, 5,023,188, Cl. 437-8.000.
  - Tobita, Youichi, 5,023,840, Cl. 365-201.000.
  - Tokumitsu, Kiyonori; Baba, Akira; and Hirano, Sadanori, 5,022,836, Cl. 418-76.000.
  - Tsumura, Kiyoaki, 5,023,697, Cl. 357-65.000.
  - Wakimoto, Kingo; and Takeda, Kousaku, 5,023,603, Cl. 340-793.000.
  - Yamakage, Hisaaki; Nomura, Kenhachiro; Maruyama, Tadayoshi; Kataoka, Kenji; and Yamashita, Nobuyuki, 5,022,494, Cl. 184-104.100.
- Mitsubishi Gas Chemical Company, Inc.: *See—*
  - Abe, Takafumi; Ebata, Shuji; Machida, Hiroshi; and Kida, Koichi, 5,023,390, Cl. 585-320.000.
- Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
  - Kitada, Taizo; Danno, Yoshiaki; Takagi, Masahiko; Uchida, Toshihiko; and Yamamoto, Yutaka, 5,022,664, Cl. 277-236.000.
- Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
  - Kuragasaki, Mutsuo; Tahara, Mamoru; and Tazaki, Shunsei, 5,022,787, Cl. 405-128.000.
- Mitsubishi Metal Corporation: *See—*
  - Yamamoto, Shigeru; Mori. Satoru; and Hayashi, Akira, 5,023,144, Cl. 428-606.000.
- Mitsubishi Petrochemical Co., Ltd.: *See—*
  - Inaba, Masashi; Hamana, Ryozo; Hase, Hideyuki; and Ashizawa, Tatsuro, 5,023,383, Cl. 568-815.000.
- Mitsubishi Rayon Company, Ltd.: *See—*
  - Anzai, Hisao; Sasaki, Isao; Nishida, Kozi; Makino, Hideaki; Ohtani, Masami; and Shimada, Katsuhiko, 5,023,302, Cl. 525-378.000.
  - Nakata, Akira; Yamamoto, Naoki; Mori, Hiroshi; and Ueno, Takuya, 5,023,293, Cl. 524-539.000.
  - Yamamoto, Takashi; Matsumoto, Tsuruyoshi; Shimada, Katsuhiko; Uozu, Yoshihiro; and Murata, Ryuji, 5,022,737, Cl. 350-96.290.
- Mitsui-Cyanamid, Ltd.: *See—*
  - Watanabe, Naotaka; Itoda, Hiroshi; and Funato, Reiko, 5,022,999, Cl. 210-692.000.
- Mitsui Toatsu Chemicals, Inc.: *See—*
  - Abe, Masaru; Kawai, Yoichi; Maki, Masami; and Wada, Katuo, 5,023,286, Cl. 524-128.000.
  - Tanaka, Eishi; Nishizawa, Tsutomu; Yamada, Yasuyuki; Itoh, Hisato; Yamaguchi, Akihiro; and Nakatsuka, Masakatsu, 5,023,343, Cl. 549-74.000.
  - Yamaguchi, Keizaburo; Tanabe, Yoshimitsu; Asano, Makoto; and Yamaguchi, Akihiro, 5,023,366, Cl. 560-71.000.
- Mitsuya, Teruaki; Fujiwara, Shigetaka; Endou, Michio; and Terakado, Akira, to Hitachi, Ltd.; and Hitachi Koki Co., Ltd. Fixing apparatus and recording apparatus. 5,023,464, Cl. 355-283.000.
- Mitsuya, Yasuhiro: *See—*
  - Kurano, Shinichi; Bando, Masahiro; Mitsuya, Yasuhiro; and Tanabe, Takeshi, 5,023,585, Cl. 336-69.000.
- Mitsuya, Yoshihide: *See—*
  - Kageyama, Shuhei; Kageyama, Toshihiko; Nakazato, Youichi; and Mitsuya, Yoshihide, 5,022,774, Cl. 401-52.000.
- Mitutoyo Corporation: *See—*
  - Andermo, Nils I., 5,023,559, Cl. 324-662.000.
- Miura, Masayoshi; Inanaga, Kiyofumi; Sogawa, Hiroyuki; and Iida, Yasuhiro, to Sony Corporation. Sound reproducing apparatus. 5,022,486, Cl. 181-132.000.
- Miura, Nobuhiro: *See—*
  - Matsuda, Mikio; Inagaki, Mitsuo; Hayashi, Ikuo; Goto, Masahiro; Kojima, Akikazu; Taya, Toshiki; and Miura, Nobuhiro, 5,022,826, Cl. 417-63.000.
- Miwa, Hiroshi; Okude, Yoshitaka; Watanabe, Masakazu; and Konishi, Sakuichi, to Nippon Paint Co., Ltd. Curable composition. 5,023,298, Cl. 525-103.000.
- Miyahara, Junji: *See—*
  - Toda, Hiroyuki; Miyahara, Junji; and Takahashi, Kenji, 5,023,014, Cl. 252-301.40H.
- Miyamoto, Junichi: *See—*
  - Suzuki, Noriaki; Miyamoto, Junichi; and Ohtsuka, Nobuaki, 5,023,839, Cl. 365-200.000.
- Miyano, Toshiyuki: *See—*
  - Horino, Shigeo; Omura, Hideo; Maruyama, Nobusato; Ashikawa, Yoshiaki, Shioya, Masatoshi; Miyano, Toshiyuki; and Wakou, Jiro, 5,022,531, Cl. 209-552.000.
- Miyao, Osami: *See—*
  - Ohsaka, Masayuki; and Miyao, Osami, 5,023,495, Cl. 310-12.000.
- Miyasaka, Hitoshi: *See—*
  - Koga, Yoshiro; Gomi, Akihiro; Miyasaka, Takashi; Miyazawa, Yasunaga; Endo, Kenichi; Shinozaki, Junichiro; Yoda, Kaneo; Ichikawa, Takashi; Miyasaka, Hitoshi; and Kaburagi, Chiharu, 5,023,733, Cl. 360-77.040.
- Miyasaka, Takashi: *See—*
  - Koga, Yoshiro; Gomi, Akihiro; Miyasaka, Takashi; Miyazawa, Yasunaga; Endo, Kenichi; Shinozaki, Junichiro; Yoda, Kaneo; Ichikawa, Takashi; Miyasaka, Hitoshi; and Kaburagi, Chiharu, 5,023,733, Cl. 360-77.040.
- Miyashita, Kunio: *See—*
  - Tajima, Fumio; Katayama, Hiroshi; Miyashita, Kunio; Morinaga, Shigeki; and Narushima, Seiichi, 5,023,924, Cl. 388-811.000.
- Miyauchi, Tateoki: *See—*
  - Shirai, Mitugu; Katayama, Kaoru; Sasaki, Hideaki; Kazui, Shinichi; Satoh, Ryohei; Miyauchi, Tateoki; and Kobayashi, Mamoru, 5,023,407, Cl. 174-257.000.
- Miyauchi, Yujiro: *See—*
  - Saito, Katsushi; Miyauchi, Yujiro; Murata, Toshimichi; and Shindo, Yoshio, 5,023,146, Cl. 428-623.000.
- Miyazaki, Akira; Kikuchi, Yuichi; Ohara, Yoshiyuki; Fujinaga, Tomosburo; Kawata, Takashi; Mizutani, Fumitoshi; Hida, Tsugio; and Shimazaki, Shiroyasu, to Shimizu Construction Co., Ltd. Method and machine for constructing shafts. 5,022,789, Cl. 405-133.000.
- Miyazaki, Koji: *See—*
  - Hosoya, Hideo; Kimura, Masayuki; Endo, Hiroshi; Hiraki, Yoshio; Yamamoto, Shoji; Yoshikawa, Satoshi, Omine, Hidetaka; and Miyazaki, Koji, 5,023,175, Cl. 435-101.000.
- Miyazaki, Kouji: *See—*
  - Ito, Kazuhiko; Miyazaki, Kouji; Kichibayashi, Masakatsu; Horii, Shigeru; and Ozawa, Masataka, 5,023,516, Cl. 315-101.000.
- Miyazato, Keita: *See—*
  - Itagaki, Akinari; Yamaya, Masaaki; Yoshioka, Hiroshi; Watanabe, Akihiko; and Miyazato, Keita, 5,022,922, Cl. 106-287.110.
- Miyazawa, Yasunaga: *See—*
  - Koga, Yoshiro; Gomi, Akihiro; Miyasaka, Takashi; Miyazawa, Yasunaga; Endo, Kenichi; Shinozaki, Junichiro; Yoda, Kaneo; Ichikawa, Takashi; Miyasaka, Hitoshi; and Kaburagi, Chiharu, 5,023,733, Cl. 360-77.040.
- Miyoshi, Masanobu; Kajiwara, Makoto; and Onodera, Kaoru, to Konishiroku Photo Industry Co., Ltd. Light-sensitive silver halide color photographic material. 5,023,170, Cl. 430-558.000.
- Mizoguchi, Akira: *See—*
  - Uenishi, Naota; Uemiya, Takafumi; Mizoguchi, Akira; Ogaki, Yasuji; Hattori, Yasuhiro; Tohma, Teruo; Chikuma, Kiyofumi, and Okamoto, Sota, 5,022,738, Cl. 350-96.340.
- Mizuhashi, Toshihiko, to Usui Kokusai Sangyo Kaisha, Ltd Method of forming coatings in coated tubular metal members. 5,023,115, Cl. 427-388.200.
- Mizukura, Noboru: *See—*
  - Hirabayashi, Shigeto; Tsuruta, Mayumi; and Mizukura, Noboru, 5,023,169, Cl. 430-505.000.
- Mizuno, Eiichi; Sakiyama. Noritaka; Matsui, Yukito; Kono, Yoshikazu; and Yamada, Kiyoshige, to Mazda Motor Corporation. Structure of an automobile body in the vicinity of a roof panel, a rear fender panel and a quarter panel and including a reinforcement member. 5,022,704, Cl. 296-195.000.
- Mizutani, Fumitoshi: *See—*
  - Miyazaki, Akira; Kikuchi, Yuichi; Ohara, Yoshiyuki; Fujinaga, Tomosburo; Kawata, Takashi; Mizutani, Fumitoshi; Hida, Tsugio; and Shimazaki, Shiroyasu, 5,022,789, Cl. 405-133.000
- Mladenoff, Donald D.: *See—*
  - Carver, Larry L.; Zamzow, Charles E.; Mladenoff, Donald D.; and Lovrien, Glenn A., 5,023,800, Cl. 364-474.240.
- Mobil Oil Corp.: *See—*
  - Han, Scott; Palermo, Robert E.; Pearson, Judith A., and Walsh, Dennis E., 5,023,391, Cl. 585-500.000.
  - Han, Scott; Palermo, Robert E.; Pearson, Judy A.; and Walsh, Dennis E., 5,023,392, Cl. 585-500.000.
  - Han, Scott; Palermo, Robert E.; Pearson, Judith A.; and Walsh, Dennis E., 5,023,393, Cl. 585-500.000.
  - Shu, Paul; and Shu, Winston R., 5,022,466, Cl. 166-263.000.
- Mochizuki, Keizo: *See—*
  - Sumi, Naoki; Mochizuki, Keizo; Moriyama, Yoshio; and Sakurai, Mitsuhiro, 5,023,098, Cl. 426-474.000.
- Mochizuki, Kouichi: *See—*
  - Hasumi, Kazuo; Mochizuki, Kouichi; and Fujiyama, Masaaki, 5,023,135, Cl. 428-336.000.
- Modell, Mark D. Heterodyne system and method for sensing a target substance. 5,022,757, Cl. 356-318.000.
- Module Truck Service, Inc.: *See—*
  - Westbrook, James E., 5,022,703, Cl. 296-183.000.
- Mohajer, Reza S. Combination exo/endocervical sampler. 5,022,408, Cl. 128-756.000.
- Mohring, Fritz: *See—*
  - Reiser, Peter; Mohring, Fritz; and Schodt, Adolf, 5,022,851, Cl. 431-215.000.
- Mold-Masters Limited: *See—*
  - Schmidt, Harald H., 5,022,846, Cl. 425-564.000.
- Molecular Biosystems, Inc.: *See—*
  - Tullis, Richard H., 5,023,243, Cl. 514-44.000.
- Moller, Jan. Sideboard control mechanism. 5,022,696, Cl. 296-36.000.
- Moller, Rudolf: *See—*
  - Fortmann, Norbert; Gottling, Helmut; Meyer, Hans F., Moller, Rudolf; and Scharnowski, Gerhard, 5,022,311, Cl. 92-137.000.
- Mollier, Pierre: *See—*
  - Boudon, Gerard; Mollier, Pierre; Ogura, Seiki; Omet, Dominique; Tannhof, Pascal; and Wallart, Franck, 5,023,478, Cl. 307-446.000.
- Mondani, Alberto: *See—*
  - Gorrieri, Giordano; Balestra, Ivo; Nannini, Luciano; and Mondani, Alberto, 5,022,511, Cl. 198-460.000.
- Monderer, Thea B.; and Flores, Ruben, to Superior Diamond Corporation. Attachment apparatus to removably retain a charm on a bracelet without obstructing the view of gemstones on the bracelet. 5,022,237, Cl. 63-23.000.
- Monobe, Juzaburo, to Ryobi Ltd. Safeguard apparatus for cutter of joint planer. 5,022,447, Cl. 144-251.00R.
- Monsanto Company: *See—*
  - Fields, Donald L., Jr., 5,023,369, Cl. 562-17.000.
  - Fleet, George W. J., 5,023,340, Cl. 548-453.000.
  - Ho, Sa V., 5,023,323, Cl. 530-399.000.
- Monsanto Europe, S.A.: *See—*
  - Lynch, Eric R., 5,023,289, Cl. 524-302.000.

VOL 1127 ISS 2 JE 11 —1991 UMI

Montanaro, James J.: *See—*
Gieseke, Bruce A.; Conrad, Robert A.; Montanaro, James J.; and Dobberpuhl, Daniel W., 5,023,480, Cl. 307-448.000.

Montedison S.p.A.: *See—*
Mattera, Adriano; Fornari, Roberto; Magnanini, Renato; Paorici, Carolo; Zanotti, Lucio; and Zuccalli, Giovanni, 5,023,801, Cl. 364-480.000.

Montgomery, Melvin W.: *See—*
Brunsvold, William R.; Chiu, Philip; Conley, Willard E., Jr.; Crockatt, Dale M.; Montgomery, Melvin W.; and Moreau, Wayne M., 5,023,164, Cl. 430-270.000.

Moody, John E.: *See—*
Baum, Eric B.; Moody, John E.; and Wilczek, Frank A., 5,023,833, Cl. 365-49.000.

Moon-Hwan, Seo, to SamSung Electronics Co. Ltd. TV of internal PiP type for receiving the character multibroadcasting. 5,023,721, Cl. 358-147.000.

Mooney, Charles W.; and Holden, Irving H., to Motorola, Inc. Piezoelectric resonant vibrator for selective call receiver. 5,023,504, Cl. 310-322.000.

Mooradian, Aram: *See—*
Zayhowski, John J.; and Mooradian, Aram, 5,022,745, Cl. 350-608.000.

Moore, Eugene L.: *See—*
Dundas, Dennis L.; Moore, Eugene L.; Oles, Paul M.; and Briggs, Milton, 5,022,544, Cl. 215-31.000.

Moore, Paul A.; Perry, Colin L.; and Voorman, Johannes O., to U.S. Philips Corporation. Combined current differencing and operational amplifier circuit. 5,023,568, Cl. 330-257.000.

Moore, Richard T.: *See—*
Wellheuser, Christopher M.; and Moore, Richard T., 5,023,487, Cl. 307-475.000.

Mor-Flo Industries, Inc.: *See—*
Osborne, Robert E.; and Frazier, Tonie R., 5,022,352, Cl. 122-17.000.

Moran, Joseph M.; and Russell, Thomas C., to AT&T Bell Laboratories. Testing process for electronic devices. 5,023,557, Cl. 324-537.000.

Moreau, Patrick: *See—*
Maree, Michel; and Moreau, Patrick, 5,022,603, Cl. 242-167.000.

Moreau, Wayne M.: *See—*
Brunsvold, William R.; Chiu, Philip; Conley, Willard E., Jr.; Crockatt, Dale M.; Montgomery, Melvin W.; and Moreau, Wayne M., 5,023,164, Cl. 430-270.000.

Morel, Edward J., Jr.; and Morel, Joe W., to Gear Company of America, Inc. Roller valve lifter with anti-rotation member. 5,022,356, Cl. 123-90.500.

Morel, Joe W.: *See—*
Morel, Edward J., Jr.; and Morel, Joe W., 5,022,356, Cl. 123-90.500.

Morganti, Steven J.; and Thirtle, James H., to Du Pont de Nemours, E. I., and Company. Element as a receptor for nonimpact printing. 5,023,129, Cl. 428-195.000.

Mori, Hideshi: *See—*
Ueda, Yutaka; Mori, Hideshi; and Tanaka, Manzo, 5,022,123, Cl. 19-260.000.

Mori, Hiroshi: *See—*
Nakata, Akira; Yamamoto, Naoki; Mori, Hiroshi; and Ueno, Takuya, 5,023,293, Cl. 524-539.000.

Mori, Kei. Solar ray device for illumination. 5,022,736, Cl. 350-96.240.

Mori, Satoru: *See—*
Yamamoto, Shigeru; Mori, Satoru; and Hayashi, Akira, 5,023,144, Cl. 428-606.000.

Mori, Shinji: *See—*
Saitou, Tosio; Matsui, Kenji; Tamura, Keiichi; Mori, Shinji; and Izuchi, Shingo, 5,022,601, Cl. 242-107.40A.

Mori, Shogo; and Tateishi, Tetsuo, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Transistor with current sensing function. 5,023,693, Cl. 357-46.000.

Mori, Toshihiko, to Fujitsu Limited Semiconductor memory device. 5,023,836, Cl. 365-174.000.

Morikawa, Iwao: *See—*
Kanzawa, Yoshikazu; Fujikake, Yasushi; Ito, Osami; Ito, Shuho; Oikawa, Hironobu; Otsubo, Makoto; Morikawa, Iwao; Shiratori, Yuichi; and Tsukada, Kiyoshi, 5,022,456, Cl. 164-119.000.

Morikawa, Koji, to Fuji Jukogyo Kabushiki Kaisha. Engine brake system of a two-cycle engine for a motor vehicle. 5,022,367, Cl. 123-324.000.

Morinaga Milk Industry Co., Ltd.: *See—*
Kondo, Yoshikazu; Suzuki, Shuetu; and Kuboyama, Morio, 5,023,249, Cl. 514-170.000.

Morinaga, Shigeki: *See—*
Tajima, Fumio; Katayama, Hiroshi; Miyashita, Kunio; Morinaga, Shigeki; and Narushima, Seiichi, 5,023,924, Cl. 388-811.000.

Morisaki, Kazuhiko, to Victor Company of Japan, Ltd. Magnetic recording and playback apparatus. 5,023,731, Cl. 360-64.000.

Morita, Kazuhiko: *See—*
Iwasa, Masakazu; Morita, Kazuhiko; and Kawamata, Toshio, 5,022,519, Cl. 206-313.000.

Moriya, Hirohito: *See—*
Kawahara, Tsugio; Harashima, Hiromasa; Ubukata, Shunji; Kameda, Kazuo; Moriya, Hirohito; and Inamura, Yoshihisa. 5,022,172, Cl. 40-503.000.

Moriya, Kaoru: *See—*
Masuko, Takayuki; Okamoto, Akira; Moriya, Kaoru; Okamura, Koji; and Arima, Tadao, 5,023,447, Cl. 250-227.240.

Moriyama, Jiro, to Canon Kabushiki Kaisha. Ink jet recording head having a surface inclined toward the nozzle for acting on the ink 5,023,630, Cl. 346-140.00R.

Moriyama, Takamasa; and Asano, Kuniyoshi, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Resin composition. 5,023,296, Cl. 525-58.000.

Moriyama, Yoshio: *See—*
Sumi, Naoki; Mochizuki, Keizo; Moriyama, Yoshio; and Sakurai, Mitsuhiro, 5,023,098, Cl. 426-474.000.

Morizzo, Nicholas L., to Krantz America, Inc. Sheet winding apparatus. 5,022,597, Cl. 242-56.00R.

Morris, James A.: *See—*
Farbood, Mohamad I.; Morris, James A.; Sprecker, Mark A., Bienkowski, Lynda J.; Miller, Kevin P.; Vock, Manfred H.; and Hagedorn, Myrna L., 5,023.347, Cl. 549-263.000.

Morton, Anthony J.; Stewart, Ian W.; and Harvey, Kenneth, to Colgate-Palmolive Company Stabilized amine fluoride dental cream. 5,023,074, Cl. 424-52.000.

Morton International, Inc.: *See—*
Rei, Nuno M.; and Wilson, Ronald C., 5,023,281, Cl. 523-122.000.

Morton, James M.: *See—*
Crawford, William L.; and Morton, James M., 5,022,643, Cl 271-267.000.

Moser, Helmut, to Sandoz Ltd. Biscationic disazo and trisazo compounds having optionally further substituted 6-hydroxy-4-methy-3-N-pyridiniumpyridone-2 coupling component radicals, dyes compositions comprising them and their use. 5,023,324, Cl. 534-606.000.

Moss, Noel: *See—*
Lutz, William A.; Wright, John B.; Moss, Noel; and Delia, Richard, 5,023,782, Cl. 364-405.000.

Motoda, Takashi: *See—*
Murakami, Takashi; and Motoda, Takashi, 5,023,199, Cl. 437-167.000.

Motor Wheel Corporation: *See—*
Weeks, J. B., 5,022,450, Cl. 152-381.600.
Woelfel, James A.; and Hineline, Thomas A., 5,022,712, Cl. 301-63.0PW.

Motorola, Inc.: *See—*
De Muro, David M., 5,023,866, Cl. 370-24.000.
Gerson, Ira A., 5,023,911, Cl. 381-43.000.
Jeffery, Philip A.; and Hwang, Bor-Yuan, 5,023,479, Cl. 307-446.000.
Jobling, David T., 5,023,564, Cl. 330-107.000.
Johnsen, Robert J.; and Sanders, Paul W., 5,023,196, Cl. 437-40.000.
Johnson, Mark J.; and Solomon, James D., 5,023,940, Cl. 455-212.000.
Kim, Jin D.; and Waldie, William T., 5,023,580, Cl. 333-206.000.
Legge, Ronald; and Moyer, Curtis D., 5,023,503, Cl. 310-311.000.
Mooney, Charles W.; and Holden, Irving H., 5,023,504, Cl. 310-322.000.
Opas, George F., 5,023,937, Cl. 455-126.000.
Raven, Gregory S., 5,023,569, Cl. 330-285.000.
Staudinger, Joseph; and Seely, Warren L., 5,023,576, Cl. 333-118.000.
Wrzesinski, Stanley, 5,023,493, Cl. 307-570.000.

Motoyoshi, Kenya: *See—*
Nakata, Hirohiko; Nishioka, Takao; Oooka, Nobuya; and Motoyoshi, Kenya, 5,023,147, Cl. 428-627.000.

Mount Vernon Mills, Inc.: *See—*
Stanley, William J.; and Irwin, William P., Jr., 5,023,132, Cl. 428-234.000.

Moyer, Curtis D.: *See—*
Legge, Ronald; and Moyer, Curtis D., 5,023,503, Cl. 310-311.000.

Moz, Rudolf: *See—*
Denz, Helmut; Grieser, Klemens; Stock, Jurgen; Moz, Rudolf; and Uttenweiler, Winifred, 5,022,374, Cl. 123-490.000.

Mrozik, Helmut: *See—*
Linn, Bruce O.; and Mrozik, Helmut, 5,023,241, Cl. 514-30.000.

MTA Kutatas-es Szervezetelemzo Intezete: *See—*
Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre; Teplan, Istvan, Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt; Hegedus, Edit; Makara, Gabor; and Rappay, Gyorgy, 5,023,322, Cl. 530-324.000.

MTA Kutatasi Eszkozoket Kivitelezo Vallata: *See—*
David, Agoston; Kenez nee Da, Marai; and Racz, Istvan, 5,022,972, Cl. 204-183.300.

Mtu Motoren-und Turbinen-Union Friedrichshafen GmbH: *See—*
Sudmanns, Hans, 5,022,227, Cl. 60-320.000.

Muckenfuhs, Delmar R.; and Baird, James C., to Procter & Gamble Company, The. Method and apparatus for making easy open flexible bag filled with compressed flexible articles. 5,022,216, Cl. 53-438.000.

Mueller, Klaus: *See—*
Siegel, Heinz; and Mueller, Klaus, 5,022,716, Cl. 303-104.000.

Mukai, Hiromu: *See—*
Hayashi, Kohtaro; Karasaki, Toshihiko; Yamano, Yasuteru; Mukai, Hiromu; Hata, Koji; and Ikemura, Masayuki, 5,023,649, Cl. 354-434.000.

Mukai, Toshio; Yamashita, Yoshiro; Suzuki, Takanori; Akasaki, Yutaka; Sato, Katsuhiro; Yabuuchi, Naoya; Tanaka, Hiroyuki; and Nukada, Katsumi, to Fuji Xerox Co., Ltd.; and Toshio Mukai. Novel tetracyanoanthraquinodimethane derivatives and process for producing same. 5,023,356, Cl. 552-210.000.

Mulhauser, Michel: *See—*
Massonneau, Viviane; Mulhauser, Michel; and Buforn, Albert, 5,023,361, Cl. 558-32.000.

Muller, Axel: *See—*
Micic, Lyubomir; Gartlein, Gunter; Schmitt, Eberhard; Muller, Axel; Seng, Egon; and Spindler, Siegfried, 5,023,702, Cl. 357-74.000.

Muller, George H., to Berke, Joseph J., a part interest; A.I.R. Foundation; and Detroit Neurosurgical Foundation Tissue separator method. 5,022,414, Cl. 128-898.000.

Munger, Billie C.: *See—*
Hetzler, Kevin G.; Wegner, Wayne M.; and Munger, Billie C., 5,023,142, Cl. 428-500.000.

Munsch, Joseph F.: *See—*
Hudson, Hugh F.; Munsch, Joseph F.; McArdle, Joseph A.; Kammer, Jackie L.; and Jermyn, Robert W., 5,023,404, Cl 174-97.000.

Murakami, Azuma; Aoki, Kazuo; Yamanami, Tsuguya; Tomofuji, Yoshiaki; Tanaka, Takeshi; Inashima, Satoshi; Funahashi, Takahiko; Chikami, Toshihide; and Senda, Toshiaki, to Wacom Co., Ltd. Electronic blackboard and accessories such as writing tools. 5,023,408, Cl. 178-19.000.

Murakami, Tadayoshi: *See—*
Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl. 431-2.000.

Murakami, Takashi; and Motoda, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Method of diffusing Zn into compound semiconductor 5,023,199, Cl. 437-167.000.

Murakami, Takeshi: *See—*
Shinohara, Koichi; Suzuki, Takashi; Kawagishi, Masao; Satoh, Nobuo; Murakami, Takeshi; and Fujita, Takashi, 5,023,739, Cl. 360-132.000.

Murakami, Tomiguyu: *See—*
Hamada, Keishi; Tashiro, Fumio; Otani, Shigemasa; Nomaguchi, Kanemasa, Murakami, Tomiguyu; and Iijima, Sadayoshi, 5,023,136, Cl. 428-341.000.

Murakami, Yoichi; Okawa, Yoshihisa; and Ishikawa, Takao, to NEC Corporation. Magnetic disk apparatus having a circuit for detecting the position of servo information recorded on a magnetic disk. 5,023,732, Cl. 360-77.080.

Murakawa, Toshihiro: *See—*
Tsujii, Gen; and Murakawa, Toshihiro, 5,023,423, Cl. 219-108.000.

Murano, Katsuaki; Hirano, Sadayuki; Yamashita, Yoshinori; Tatsumi, Takumi; and Yamamoto, Hiroaki, to Suzuki Jidosha Kogyo Kabushiki Kaisha; and Mitsubishi Denki Kabushiki Kaisha Method of controlling clutch of continuously variable transmission system. 5,022,287, Cl. 74-866.000.

Murata Kikai Kabushiki Kaisha: *See—*
Ueda, Yutaka; Mori, Hideshi, and Tanaka, Manzo, 5,022,123, Cl. 19-260.000.

Murata Manufacturing Co., Ltd.: *See—*
Kaneko, Toshimi; Yamamoto, Hidetoshi; and Hirotsuji, Takayuki, 5,023,578, Cl. 333-185.000.
Kurano, Shinichi; Bando, Masahiro; Mitsuya, Yasuhiro; and Tanabe, Takeshi, 5,023,585, Cl. 336-69.000.
Sakamoto, Yukio; Fukutani, Iwao; and Hori, Toshio, 5,022,870, Cl. 439-608.000.

Murata, Moriyasu: *See—*
Yamamura, Masaaki; Okabe, Kazuhiko; Sotoya, Kohshiro; and Murata, Moriyasu, 5,023,003, Cl. 252-8.800.

Murata, Ryuji: *See—*
Yamamoto, Takashi; Matsumoto, Tsuruyoshi; Shimada, Katsuhiko; Uozu, Yoshihiro; and Murata, Ryuji, 5,022,737, Cl. 350-96.290.

Murata, Tomoji: *See—*
Shibazaki, Kenji; Irie, Yutaka; Ito, Masazumi; and Murata, Tomoji 5,023,663, Cl. 355-243.000.

Murata, Toshimichi: *See—*
Saito, Katsushi; Miyauchi, Yujiro; Murata, Toshimichi; and Shindo, Yoshio, 5,023,146, Cl. 428-623.000.

Murcin, Daniel; and Murcin, Neva. Air fragrance device for ceiling. 5,022,819, Cl. 416-62.000.

Murcin, Neva: *See—*
Murcin, Daniel; and Murcin, Neva, 5,022,819, Cl. 416-62.000.

Murdocca, Miles J.: *See—*
Cloonan, Thomas J.; Jahns, Jurgen; McCormick, Frederick B., Jr.; and Murdocca, Miles J., 5,023,864, Cl. 370-1.000.

Murofushi, Emiko: *See—*
Kobayashi, Shiro; Murofushi, Emiko; and Itoh, Masahiko, 5,023,698, Cl. 357-67.000.

Murphy, Guy C.: *See—*
Jones, Jackie D.; Murphy, Guy C.; Mesing, Thomas C.; and Fuhrmann, Barrett J., 5,023,041, Cl. 264-510.000.

Murphy, Paul F.; and Marriott, Brian M., to Carrier Corporation. Method of assembling a suction strainer. 5,022,147, Cl 29-890.148.

Murphy, Timothy J.: *See—*
Torres, Daniel L.; Murphy, Timothy J.; Maakad, Guy A.; Roberts, Jeffrey R.; and Murray, Kent S., 5,022,799, Cl. 408-1.00R.

Murray, Donna F.; Pringle, Joseph M.; Strope, Gerald C.; and Berkson, Stephen P., to International Business Machines Corporation. Method for presenting electronic calendar information in an interactive information handling system. 5,023,851, Cl. 368-41.000.

Murray, Kent S.: *See—*
Torres, Daniel L.; Murphy, Timothy J.; Maakad, Guy A.; Roberts, Jeffrey R.; and Murray, Kent S., 5,022,799, Cl. 408-1.00R.

Musser, John H.: *See—*
Caufield, Craig E.; Musser, John H.; and Rinker, James M., 5,023,262, Cl. 514-291.000.

Mutoh, Nobuyoshi; Sakai, Keijiro; Ueda, Akiteru; and Fujii, Hiroshi, to Hitachi, Ltd. PWM inverter apparatus for controlling rotating magnetic flux in a.c. motors. 5,023,538, Cl. 318-811.000.

Myers, Cal Y.; and Read, Richard B., to Southern Illinois University Foundation. Process for cleaning of coal and separation of mineral matter and pyrite therefrom, and composition useful in the process 5,022,983, Cl. 209-167.000.

Myers, Wayne K., to Cooper Industries, Inc. Cooler fan orifice assembly. 5,022,828, Cl. 417-362.000.

Nabisco Brands, Inc.: *See—*
Boehm, Donald G., 5,023,099, Cl. 426-549.000.
Given, Peter S., Jr., 5,023,102, Cl. 426-610.000.
Warseck, Michael R., 5,023,105, Cl. 426-650 000.

Nachbar, Henry D.; and Korytkowski, Alfred S., to United States of America, Energy. Conduit grinding apparatus. 5,022,192, Cl. 51-241.00A.

Nagai, Michio: *See—*
Kondo, Tetsujiro; Nagai, Michio; and Shirota, Norihisa, 5,023,710, Cl. 358-133.000.

Nagai, Yoshitaka: *See—*
Ogura, Haruo; Furuhata, Kimio; Sato, Shingo; Ito, Masayoshi, Shitori, Yoshiyasu; and Nagai, Yoshitaka, 5,023,239, Cl 514-26.000.

Nagasawa, Kenichi: *See—*
Nakayama, Tadayoshi; Ishikawa, Hisashi; Kozuki, Susumu; Takahashi, Koji; Yoshimura, Katsuji; Nagasawa, Kenichi, and Sasatani, Tomohiko, 5,023,716, Cl. 358-138.000.

Nagata, Hideo: *See—*
Kamijo, Tetsuhide; Ujiie, Arao; Harada, Hiromu; Tsutsumi, Naoyuki; Tsubaki, Atsushi; Yamaguchi, Toshiaki; and Nagata, Hideo, 5,023,261, Cl. 514-285.000.

Nagata, Kenzo: *See—*
Kusumoto, Keiji; and Nagata, Kenzo, 5,023,662, Cl. 355-228.000.

Nagata, Yuji; Fukazawa, Toshio; Wada, Kumiko; and Tosaki, Yoshihiro, to Matsushita Electric Industrial Co., Ltd. Method for manufacturing multiturn thin film coil. 5,022,141, Cl. 29-603.000.

Nagatomo, Shigeru; and Tanaka, Mitsutoshi, to Fuji Photo Film Co., Ltd. Element for analyzing body fluids. 5,023,052, Cl. 422-56.000

Nagatomo, Shinichiro; Terashima, Masahiko; and Taniguchi, Hitoshi, to Fuji Oil Company, Limited. Defatted soybeans and soybean protein obtained from the same. 5,023,104, Cl. 426-634.000.

Nagle, David P.: *See—*
Violette, John A.; and Nagle, David P., 5,022,825, Cl. 416-500.000.

Nagura, Hiroyuki: *See—*
Tate, Takuo; Watanabe, Taketoshi; and Nagura, Hiroyuki, 5,022,441, Cl. 139-383.00A.

Nagy, William L., to Cooper Industries, Inc. Method for making a spark plug with a predetermined spark gap. 5,022,881, Cl. 445-7.000.

Naito, Ryuichi; and Ishii, Tsuneo, to Pioneer Electronic Corporation. Method and apparatus for detecting finally recorded sector. 5,023,876, Cl. 371-40.100.

Nakade, Kiyoshi, to Tsudakoma Kogyo Kabushiki Kaisha. Controller for a winding machine. 5,022,599, Cl. 242-75.510.

Nakajima, Toshio: *See—*
Shigehara, Itaru; Nakajima, Toshio; Nishimura, Shigeyuki, and Ohshima, Takeshi, 5,023,336, Cl. 548-110.000.

Nakakuma, Akira: *See—*
Kita, Hideki; Nakakuma, Akira; Fukui, Hidehiro; and Deguchi, Hiroyuki, 5,023,670, Cl. 355-326.000.

Nakamura, Eiichi: *See—*
Noda, Kazuo; Yamazaki, Koichi; Nakamura, Eiichi; and Honda, Tetsuya, 5,023,439, Cl. 250-201.500.

Nakamura, Masahiko: *See—*
Yamamoto, Hajime; Kuramoto, Yukimasa; Takashima, Yuji; Nakamura, Masahiko; and Nakano, Kenichi, 5,023,632, Cl. 346-157.000.

Nakamura, Masahiro: *See—*
Ohno, Kazuhisa; Kosugi, Tetsushi; Sugimori, Kenichiro; Ando, Akitsugu; Yamamoto, Masaru; Suzuki, Fukuji; Nakamura, Masahiro; and Tsujita, Nobuhisa, 5,023,065, Cl. 423-326.000.

Nakamura, Tadashi: *See—*
Kitabatake, Yasuo; Nakamura, Tadashi; Takahashi, Yoshiaki; and Maeda, Kazuya, 5,023,161, Cl. 430-137.000.

Nakamura, Takashi, to Fuji Photo Film Co., Ltd. Photosensitive material drying apparatus. 5,022,167, Cl. 34-160.000.

Nakanishi, Kiyoshi: *See—*
Sawada, Hiroshi; Ueda, Tatehito; Nakanishi, Kiyoshi; and Demura, Takayuki, 5,022,225, Cl. 60-274.000.

Nakano, Kenichi: *See—*
Yamamoto, Hajime· Kuramoto, Yukimasa; Takashima, Yuji; Nakamura, Masahiko; and Nakano, Kenichi, 5,023,632, Cl. 346-157.000.

Nakao, Makoto: *See—*
Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi, and Suzuki, Hiroyuki, 5,022,475, Cl. 177-211.000.

Nakao, Toshitsugu: *See—*
Nishida, Koji; Yokomizo, Osamu; Masuhara, Yasuhiro; Nakao, Toshitsugu; Kashiwai, Shin-ichi; Tomiyama, Akio; Yamashita, Junichi; and Hayashi, Tatsuo, 5,023,047, Cl. 376-370.000.

Nakasone, Hidetaka; and Udagawa, Tsunekazu, to Ishikawa Gasket Co., Ltd. Laminate type manifold gasket 5,022,661, Cl. 277-213.000.

Nakata, Akira; Yamamoto, Naoki; Mori, Hiroshi; and Ueno, Takuya, to Mitsubishi Rayon Co., Ltd. Polyarylene sulfide resin paint composition. 5,023,293, Cl. 524-539.000.

VOL 1127
ISS 2
JE 11 1991
UMI

- Nakata, Hirohiko; Nishioka, Takao; Oooka, Nobuya, and Motoyoshi, Kenya, to Sumitomo Electric Industries, Ltd. Ceramics-metal jointed body. 5,023,147, Cl. 428-627.000.
- Nakatz, Takashi: *See—*
  - Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; Asano, Yuji, Yamamoto, Takemi; and Nakata, Takashi, 5,023,654, Cl 355-27.000.
- Nakatani, Yasunori: *See—*
  - Inoue, Shigeyasu, Ozu, Tatsuya; and Nakatani, Yasunori, 5,022,775, Cl. 401-107.000.
- Nakatsuka, Masakatsu: *See—*
  - Tanaka, Eishi; Nishizawa, Tsutomu; Yamada, Yasuyuki; Itoh, Hisato; Yamaguchi, Akihiro; and Nakatsuka, Masakatsu, 5,023,343, Cl. 549-74.000.
- Nakayama, Kazuya: *See—*
  - Tomita, Masatoshi; Yamamoto, Susumu; Tominaga, Chikara; and Nakayama, Kazuya, 5,022,937, Cl. 148-277.000.
- Nakayama, Masahiko, to Ricoh Company, Ltd Separation type optical pickup device. 5,023,858, Cl. 369-112.000.
- Nakayama, Okihiko; Tsuda, Hiroshi; Itoh, Toshiyuki; and Ueno, Hiroshi, to Nissan Motor Company, Limited. Vehicular traveling direction measuring system. 5,023,799, Cl. 364-449.000.
- Nakayama, Tadayoshi, Ishikawa, Hisashi; Kozuki, Susumu; Takahashi, Koji; Yoshimura, Katsuji; Nagasawa, Kenichi; and Sasatani, Tomohiko, to Canon Kabushiki Kaisha. Image information signal transmitting system. 5,023,716, Cl. 358-138.000.
- Nakayashiki, Susumu; Harakawa, Takeshi; and Kashio, Jiro, to Hitachi, Ltd. Method of controlling the operation of stations in a ring network. 5,023,871, Cl. 370-85.500.
- Nakazato, Youichi: *See—*
  - Kageyama, Shuhei; Kageyama, Toshihiko; Nakazato, Youichi; and Mitsuya, Yoshihide, 5,022,774, Cl. 401-52.000.
- Nakazawa, Masayuki; Nitta, Masaaki, Tsuchino, Hisanori; and Kano, Akiko, to Konica Corporation. Radiation image storage panel having low refractive index layer and protective layer. 5,023,461, Cl. 250-484.100.
- Nalco Chemical Company: *See—*
  - Kneller, James F.; Fair, Barbara E.; Mazzani, Gianfranco F.; and Di Simone, I. Sergio, 5,023,000, Cl. 210-697.000.
- Nambu, Masao; and Yamada, Naoaki, to Nippon Oil Co., Ltd. Method for determining resolution power or discrimination capacity of an NMR imaging apparatus. 5,023,185, Cl. 436-8.000.
- Nannini, Luciano: *See—*
  - Gorrieri, Giordano; Balestra, Ivo; Nannini, Luciano; and Mondani, Alberto, 5,022,511, Cl. 198-460.000.
- Nanyoshi, Yasutoshi: *See—*
  - Matsumura, Toshio; and Nanyoshi, Yasutoshi, 5,023,795, Cl. 364-431.060.
- Narandja, Amalija; Suskovic, Bozidar; Djokic, Slobodan; and Lopotar, Nevenka, to Sour Pliva. Derivatives of tylosin and 10,11,12,13-tetrahydro tylosin and their use in pharmaceuticals. 5,023,240, Cl. 514-30.000.
- Narato, Kiyoshi. *See—*
  - Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl. 431-2.000.
- Narayanaswami, Subramaniyan: *See—*
  - Gymer, Geoffrey E.; Narayanaswami, Subramaniyan; and Richardson, Kenneth, 5,023,258, Cl. 514-255.000.
- Narby, William R.: *See—*
  - Canale, Joseph E.; Dunn, John P, and Narby, William R., 5,023,506, Cl. 313-25.000.
- Nariyama, Yoshihiro, to Yamaha Hatsudoki Kabushiki Kaisha. Accessory drive arrangement for V-type engine. 5,022,365, Cl. 123-198.00R.
- Narushima, Seiichi: *See—*
  - Tajima, Fumio; Katayama, Hiroshi; Miyashita, Kunio; Morinaga, Shigeki; and Narushima, Seiichi, 5,023,924, Cl. 388-811.000.
- National Semiconductor Corp.: *See—*
  - Manoliu, Juliana; and Tuntasood, Prateep, 5,023,193, Cl. 437-31.000.
  - Wilcox, Milton E., 5,023,474, Cl. 307-270.000.
- National Starch and Chemical Investment Holding Corporation: *See—*
  - Leighton, John C.; and Iovine, Carmine P., 5,023,368, Cl. 560-195.000.
- NatureStar Foods, Inc.: *See—*
  - Plochman, Frederic W., 5,023,096, Cl 426-89 000.
- Navistar International Transportation Corp.: *See—*
  - Kiser, David M.; and King, James H., 5,022,479, Cl. 180-68.300.
- Naylor, Alan: *See—*
  - Dowle Michael D.; Middlemiss, David; Finch, Harry; Naylor, Alan; and Lunts, Lawrence H C., 5,023,378, Cl. 564-340.000.
  - Ellis, Frank; Naylor, Alan; Wallis, Christopher J ; and Waterhouse, an, 5,023,255, Cl. 514-242.000.
- NCR Corporation: *See—*
  - Herbert, Brian K., 5,023,838, Cl. 365-189.080.
  - Takada, Kazuo; and Shimoyama, Osamu, 5,023,436, Cl. 235-380.000.
  - Wittenscldner, Christopher J.; Burkey, John K.; and Blanford, Denis M., 5,023,818, Cl. 364-551.010.
- Nealon, James V., to Eastman Kodak Company. Dual film and still video studio portrait system using parallel dedicated magnetic tracks on film. 5,023,635, Cl. 354-76.000.
- Nebel, George T.: *See—*
  - Bezigian, Thomas; and Nebel, George T., 5,023,134, Cl 428-336.000.
- NEC Corporation. *See—*
  - Kishi, Takao, 5,023,771, Cl 364-200.000.
  - Koyama, Jun, 5,023,491, Cl. 307-521.000.
  - Matsumoto, Kouichi, 5,023,570, Cl. 330-299.000.
  - Matsuura, Toru, 5,023,620, Cl. 342-362.000.
  - Murakami, Yoichi; Okawa, Yoshihisa; and Ishikawa, Takao, 5,023,732, Cl. 360-77.080.
  - Sugawara, Yukari, 5,023,689, Cl 357-42.000.
  - Umezawa, Kazuhiko; Komatsu, Toshiaki; and Kubokawa, Jun, 5,023,695, Cl. 357-82.000.
  - Wakana, Akira, 5,023,932, Cl. 455-34 000.
  - Yamazaki, Shuntaro; and Shibutani, Makoto, 5,023,946, Cl 455-619.000.
- Neeves, Arthur E.: *See—*
  - Birnboim, Meyer H. and Neeves, Arthur E., 5,023,139, Cl 428-402.000.
- Neff, Willi; Holz, Raymond; Lebert, Rainer; and Richter, Franz, to Carl-Zeiss-Stiftung. Device for generating X-radiation with a plasma source. 5,023,897, Cl. 378-122.000.
- Negishi, Hideo: *See—*
  - Hasegawa, Takanori; and Negishi, Hideo, 5,022,642, Cl. 271-10.000.
- Negishi, Kiyoshi; Negoro, Ikuo; and Kita, Masahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Stopping process control device 5,023,631, Cl. 346-154.000.
- Negishi, Kiyoshi: *See—*
  - Negoro, Ikuo; Takano, Masatoshi; Chikama, Atsushi; and Negishi, Kiyoshi, 5,023,667, Cl. 355-274.000.
- Negoro, Ikuo; Takano, Masatoshi; Chikama, Atsushi, and Negishi, Kiyoshi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Apparatus for preventing damage to both an electrophotographic printer and a recording form used with the printer. 5,023,667, Cl. 355-274.000.
- Negoro, Ikuo: *See—*
  - Negishi, Kiyoshi; Negoro, Ikuo; and Kita, Masahiro, 5,023,631, Cl 346-154.000.
- Negron, Scott B., to Babcock & Wilcox Company, The Nuclear reactor control assembly. 5,023,044, Cl. 376-213.000.
- Negrussi, Luigi, to Sted Engineering S.r.l. Fast coupling for roller replacement. 5,022,251, Cl. 72-239.000.
- Nehiba, Marjorie A.: *See—*
  - Schield, Edward L.; Reeves, Myron D.; Nehiba, Marjorie A., and Hartl, Lyn W., 5,022,206, Cl. 52-455.000.
- Neiditch, David S.; Vernon, Nicholas M.; and Wingard, Robert E., Jr, to Noramco, Inc. Sucrose-6-ester production process. 5,023,329, Cl. 536-119.000.
- Neiheisel, Gary L.; and McGraw, David C., to Armco Steel Company, L.P. Method and apparatus for automatically aligning proximal edges of sheets to be butt welded. 5,023,427, Cl. 219-121.820.
- Neilson, John M S.: *See—*
  - Wodarczyk, Paul J.; Wheatley, Carl F., Jr.; Neilson, John M S. and Jones, Frederich P., 5,023,692, Cl. 357-43.000.
- Nelson, Martindale, to W. R. Grace & Co. - Conn. Low shrink force shrink film. 5,023,143, Cl. 428-516.000.
- Nemeth, Attila: *See—*
  - Sperber, Ferenc; Huszar, Csaba; Nemeth, Attila; Somfai, Eva; and Pali nee Ivanics, Iren. 5,023,337, Cl. 548-306.000.
- Nestec S.A.: *See—*
  - Lofberg, Lars C., 5,022,514, Cl. 198-813.000.
- Neubert, Terry C., to GenCorp Inc. Asphalt containing gilsonite, reactive oil and elastomer. 5,023,282, Cl. 524-59.000.
- Neukirchner, Ernst-Peter; and Schlogl, Dietmar, to Robert Bosch GmbH. Method of and apparatus for determining a position of a land vehicle. 5,023,798, Cl. 364-449.000.
- Newbold, George T.: *See—*
  - Rhodehouse, Nolin C.; Martin, Terry G.; and Newbold, George T., 5,022,378, Cl. 124-44.500.
- Newell Operating Company: *See—*
  - Burns, Fredrick B., 5,022,112, Cl. 15-159.00A.
- NGK Insulators, Ltd.: *See—*
  - Takeuchi, Yukihisa; Watanabe, Tetsuo; Yamamoto, Azuma, Shirakawa, Kazuo; and Segawa, Takao, 5,023,700, Cl 357-70.000.
- Nguyen, Dong D.; and Harris, Marvin L., to Union Camp Corporation Flutter suppression air foils. 5,022,166, Cl. 34-120.000.
- N'Guyen, Quang L.; Griat, Jacqueline; and Millecamps, Francois, to L'Oreal. Antioxidant system based on an ascorbyl ester in combination with a complexing agent and a thiol and to compositions containing the same. 5,023,235, Cl. 514-18.000.
- Niall, High D.: *See—*
  - Hudson, Peter J.; Niall, High D.; and Tregear, Geoffrey W., 5,023,321, Cl. 530-324.000.
- Nicholls, Jeffrey R.: *See—*
  - Busch, Bruce D.; and Nicholls, Jeffrey R., 5,023,011, Cl. 252-180.000.
- Nicholson, Roy V.: *See—*
  - Barrett, Michael E.; Laughon, Thomas C.; and Nicholson, Roy V., 5,022,618, Cl. 248-146.000.
- Nicholson, Russell A., to Burroughs Wellcome Co. Method of combating flupropadine poisoning using phenothiazines. 5,023,073, Cl. 424-10.000.
- Niikura, Hideo, to Sony Corporation. Linear motor. 5,023,496, Cl. 310-12.000.

- Nikko Aen Kabushiki Kaisha: *See—*
  - Tomita, Masatoshi; Yamamoto, Susumu; Tominaga, Chikara; and Nakayama, Kazuya, 5,022,937, Cl. 148-277.000.
- Nikon Corporation: *See—*
  - Meguro, Hiroshi; Takahashi, Tsugio; Aoki, Hitoshi; and Kosaka, Toru, 5,023,648, Cl. 354-420.000.
- Nimura, Mitsuo; and Tanaami, Hideyuki, to Canon Kabushiki Kaisha. Image forming apparatus. 5,023,728, Cl. 358-437.000.
- Nippon Conlux Co., Ltd.: *See—*
  - Noda, Kazuo; Yamazaki, Koichi; Nakamura, Eiichi; and Honda, Tetsuya, 5,023,439, Cl. 250-201.500.
- Nippon Filcon Co., Ltd.: *See—*
  - Tate, Takuo; Watanabe, Taketoshi; and Nagura, Hiroyuki, 5,022,441, Cl. 139-383.00A.
- Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See—*
  - Moriyama, Takamasa; and Asano, Kuniyoshi, 5,023,296, Cl. 525-58.000.
- Nippon Mining Co., Ltd.: *See—*
  - Tomita, Masatoshi; Yamamoto, Susumu; Tominaga, Chikara; and Nakayama, Kazuya, 5,022,937, Cl. 148-277.000.
- Nippon Oil Co., Ltd.: *See—*
  - Nambu, Masao; and Yamada, Naoaki, 5,023,185, Cl. 436-8.000.
- Nippon Oil and Fats Co., Ltd.: *See—*
  - Kato, Kenji; Koga, Nariyoshi; and Haruta, Yukinori, 5,023,339, Cl. 548-401.000.
- Nippon Paint Co., Ltd.: *See—*
  - Miwa, Hiroshi; Okude, Yoshitaka; Watanabe, Masakazu; and Konishi, Sakuichi, 5,023,298, Cl. 525-103.000.
- Nippon Sheet Glass Co., Ltd.: *See—*
  - Honjo, Seiichiro; and Okajima, Yasunori, 5,022,908, Cl. 65-268.000.
- Nippon Soken, Inc.: *See—*
  - Matsuda, Mikio; Inagaki, Mitsuo; Hayashi, Ikuo; Goto, Masahiro; Kojima, Akikazu; Taya, Toshiki; and Miura, Nobuhiro, 5,022,826, Cl. 417-63.000.
- Nippon Steel Corporation: *See—*
  - Saito, Katsushi; Miyauchi, Yujiro; Murata, Toshimichi; and Shindo, Yoshio, 5,023,146, Cl. 428-623.000.
- Nippon Telegraph and Telephone Corporation: *See—*
  - Matsuoka, Morito; and Ono, Kenichi, 5,022,977, Cl. 204-298.160.
- Nippondenso Co., Ltd.: *See—*
  - Matsuda, Mikio; Inagaki, Mitsuo; Hayashi, Ikuo; Goto, Masahiro; Kojima, Akikazu; Taya, Toshiki; and Miura, Nobuhiro, 5,022,826, Cl. 417-63.000.
- Nishida, Koji; Yokomizo, Osamu; Masuhara, Yasuhiro; Nakao, Toshitsugu; Kashiwai, Shin-ichi; Tomiyama, Akio; Yamashita, Junichi; and Hayashi, Tatsuo, to Hitachi, Ltd. Nuclear reactor having an ascending cooling path much greater than the descending cooling path. 5,023,047, Cl. 376-370.000.
- Nishida, Koji: *See—*
  - Uriu, Eiichi; Nishida, Koji; and Tabata, Munehiro, 5,022,263, Cl. 73-295.000.
- Nishida, Kozi: *See—*
  - Anzai, Hisao; Sasaki, Isao; Nishida, Kozi; Makino, Hideaki; Ohtani, Masami; and Shimada, Katsuhiko, 5,023,302, Cl. 525-378.000.
- Nishida, Yumi: *See—*
  - Kugimiya, Shuzo; Suzuki, Hitoshi; Fukumoshi, Yoji; Sata, Ichiko; Hirai, Tokuyuki; and Nishida, Yumi, 5,023,786 Cl. 364-419.000.
- Nishigori, Yoshihisa, to Matsushita Electric Industrial Co., Ltd. Motion detection circuit for use in a television. 5,023,713, Cl. 358-105.000.
- Nishijima, Mitsuru: *See—*
  - Hanyu, Susumu; Kasuga, Noboru; Koike, Mikio; Hara, Kazumasa; Nishijima, Mitsuru; and Sasano, Akiyoshi, 5,022,335, Cl. 112-255.000.
- Nishikawa, Masumi, to Aisin Seiki Kabushiki Kaisha. Tilt steering apparatus. 5,022,282, Cl. 74-493.000.
- Nishimura, Isao: *See—*
  - Kobori, Takuji; Sakamoto, Mitsuo; Yamada, Toshikazu; Nishimura, Isao; Ishii, Koji; and Tagami, Jun, 5,022,201, Cl. 52-167.0DF.
- Nishimura, Shigeyuki: *See—*
  - Shigehara, Itaru; Nakajima, Toshio; Nishimura, Shigeyuki; and Ohshima, Takeshi, 5,023,336, Cl. 548-110.000.
- Nishioka, Takao. *See—*
  - Nakata, Hirohiko; Nishioka, Takao; Oooka, Nobuya; and Motoyoshi, Kenya, 5,023,147, Cl. 428-627.000.
- Nishioka, Yasuhiko; Kawano, Hazime; and Inami, Kazuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Antenna system 5,023,634, Cl. 342-368.000.
- Nishizawa, Tsutomu: *See—*
  - Tanaka, Eishi; Nishizawa, Tsutomu; Yamada, Yasuyuki; Itoh, Hisato; Yamaguchi, Akihiro; and Nakatsuka, Masakatsu, 5,023,343, Cl. 549-74.000.
- Nissan Motor Company, Limited: *See—*
  - Matsumura, Toshio; and Nanyoshi, Yasutoshi, 5,023,795, Cl. 364-431.060.
  - Nakayama, Okihiko; Tsuda, Hiroshi; Itoh, Toshiyuki; and Ueno, Hiroshi, 5,023,799, Cl. 364-449.000.
  - Sakamoto, Hideyuki; and Nose, Toshimitsu, 5,022,232, Cl 62-133.000.
  - Shioyama, Giichi, 5,023,792, Cl. 364-426.040.
  - Suzuki, Yutaka, 5,022,285, Cl. 74-866.000.
  - Takizawa, Satoshi, 5,022,286, Cl. 74-866.000.
  - Yano, Tadashi; and Kato, Takatsugu, 5,022,439, Cl. 139-1.00R.
- Nissan Motor Co., Ltd., No. 2: *See—*
  - Kobayashi, Satoshi, 5,022,504, Cl. 192-4.00A
- Nissborg, Kurt, to Forsvarets Forskningsanstalt. Method to measure the angle of incidence for radiation and a detector to carry out the method. 5,023,441, Cl. 250-206.200.
- Nisshin Parts Co., Ltd.: *See—*
  - Aoto, Kozo, 5,022,861, Cl. 439-13.000.
- Nitschke, Werner: *See—*
  - Drobny, Wolfgang; Nitschke, Werner; Taufer, Peter; and Weller, Hugo, 5,023,468, Cl. 307-10.100.
- Nitta, Masaaki: *See—*
  - Nakazawa, Masayuki; Nitta, Masaaki; Tsuchino, Hisanori; and Kano, Akiko, 5,023,461, Cl. 250-484.100.
- Nitto Boseki Co., Ltd.: *See—*
  - Itagaki, Akinari; Yamaya, Masaaki; Yoshioka, Hiroshi; Watanabe, Akihiko; and Miyazato, Keita, 5,022,922, Cl. 106-287.110.
- Nitto Kohki Co., Ltd.: *See—*
  - Kobayashi, Yoshikazu; and Ooshio, Takeaki, 5,022,630, Cl. 251-149.600.
  - Wakatsuki, Yoshio; Okuyama, Toshiharu; Takeuchi, Hajime; Shimizu, Giichiro; and Shimizu, Misao, 5,023,438, Cl. 235-472.000.
- Nobile, John R.: *See—*
  - Fassman, Arnold; and Nobile, John R., 5,022,953, Cl. 156-441.500.
- Nobumoto, Kazutoshi: *See—*
  - Tsuyama, Toshiaki; Nobumoto, Kazutoshi; Kageyama, Fumio; Sone, Akira; and Kawamura, Makoto, 5,022,483, Cl. 180-197.000.
- Noda, Kazuo; Yamazaki, Koichi; Nakamura, Eiichi; and Honda, Tetsuya, to Nippon Conlux Co., Ltd. Arrangement for detecting a signal for effecting a focus control of an optical head. 5,023,439, Cl. 250-201.500.
- Noll, Bernd: *See—*
  - Auracher, Franz; Meissner, Eckhard; Noll, Bernd; and Wittmann, Julius, 5,023,885, Cl. 372-92.000.
  - Auracher, Franz; Ebberg, Alfred; Noll, Bernd; Meissner, Eckhard; and Rodler, Hermann J., 5,023,949, Cl. 455-618.000.
- Nomaguchi, Kanemasa: *See—*
  - Hamada, Keishi; Tashiro, Fumio; Otani, Shigemasa; Nomaguchi, Kanemasa; Murakami, Tomiguyu; and Iijima, Sadayoshi, 5,023,136, Cl. 428-341.000.
- Nomix Manufacturing Company Limited: *See—*
  - Ali, Eren, 5,022,864, Cl. 439-192.000.
- Nomura, Ichiro; Kaneko, Tetsuya; Banno, Yoshikazu; and Takeda, Toshihiko, to Canon Kabushiki Kaisha. Process for producing electron emission device. 5,023,110, Cl. 427-49.000.
- Nomura, Kenhachiro: *See—*
  - Yamakage, Hisaaki; Nomura, Kenhachiro; Maruyama, Tadayoshi; Kataoka, Kenji; and Yamashita, Nobuyuki, 5,022,494, Cl. 184-104.100.
- Noonan, James R.: *See—*
  - Doheny, Anthony J., Jr.; and Noonan, James R., 5,022,941, Cl. 156-85.000.
- Nopper, Herbert, to Casimir Kast GmbH & Co., KG. Process for producing fibrous mats as a starting material for compression moulded articles. 5,023,027, Cl. 264-37.000.
- Noramco, Inc.: *See—*
  - Neiditch, David S.; Vernon, Nicholas M.; and Wingard, Robert E., Jr., 5,023,329, Cl. 536-119.000.
- Norand Corporation: *See—*
  - Cargin, Keith K., Jr.; and Hanson, George E., 5,023,823, Cl. 364-708.000.
  - Chadima, George E., Jr.; Schultz, Darald R.; Krunnfusz, Jeffrey S.; and Gibbs, William T., 5,023,824, Cl. 364-708.000.
- Nordella, Tim M.; and Sieber, William J., to Creative Presentations, Inc. Mechanical seat apparatus for simulating motion. 5,022,708, Cl. 297-327.000.
- Norfolk, Roy; and Lazarus, Arnold, to Staver Company Inc., The. Matrix display assembly having multiple point lighting. 5,022,171, Cl. 40-447.000.
- Norita, Toshio: *See—*
  - Ishida, Tokuji; Hamada, Masataka; Ishibashi, Kenji; Taniguchi, Nobuyuki; Ootsuka, Hiroshi; Norita, Toshio; and Karasaki, Toshihiko, 5,023,646, Cl. 354-402.000.
- Norling, Samuel A.: *See—*
  - Detter, Gary C.; Rodondi, Andrew F.; Burns, Christopher D.; Norling, Samuel A.; Garretson, Jay H.; and Landries, Richard V., 5,023,752, Cl. 361-399.000.
- Norris, Nicholas O.: *See—*
  - Broughton, Dan Q.; and Norris, Nicholas O., 5,022,854, Cl. 433-8.000.
- Norstrom, Lars-Åke; Cederlund, Anders; and Jespersson, Henrik, to Uddeholm Tooling Aktiebolag. Precipitation hardening tool steel for moulding tools and moulding tool made from the steel. 5,023,049, Cl. 420-91.000.
- North American Philips Corp.: *See—*
  - Bellavance, Joseph T., 5,023,482, Cl. 307-456.000.
  - Canale, Joseph E.; Dunn, John P.; and Narby, William R., 5,023,506, Cl. 313-25.000.
  - Erickson, Frederick L.; and Richeson, William E., 5,022,359, Cl. 123-90.140.
  - Richeson, William E., 5,022,358, Cl. 123-90.120.
  - Tero, John; Chin, Shaoan; and Ma, Bing F., 5,023,481, Cl 307-456.000.
- Northern Telecom Limited: *See—*
  - Brearley, John R., 5,023,780, Cl. 364-200.000.
  - Kahn, David A., 5,023,951, Cl. 455-619.000.
- Northrop Corporation: *See—*
  - Carver, Larry L.; Zamzow, Charles E.; Mladenoff, Donald D.; and Lovrien, Glenn A., 5,023,800, Cl. 364-474.240.

VOL
1127
ISS
2
JE
11
1991
UMI

Lawrence, Anthony W., and Danko, Joseph J., 5,022,760, Cl. 356-350.000.

Norwich Eaton Pharmaceuticals, Inc.. *See—*
Burch, Homer A.; Castellion, Alan W ; and Pelosi, Stanford S., Jr., 5,023,272, Cl. 514-471.000.

Nose, Toshimitsu: *See—*
Sakamoto, Hideyuki; and Nose, Toshimitsu, 5,022,232, Cl 62-133.000.

Noumi, Ryosaku: *See—*
Komoda, Yasuo; Yokogawa, Yasunori; Okunishi, Masahiko; Ishii, Koichi; Shibai, Hiroshiro; and Noumi, Ryosaku, 5,023,079, Cl. 424-120.000.

Nouveaux Corporation: *See—*
Gray, Jordan B., 5,023,125, Cl. 428-100.000.

Novas, Robert G., to Telephone Connection, The. Method for monitoring telephone call progress. 5,023,906, Cl. 379-372.000.

Nozaki, Koji: *See—*
Kawaguchi, Masayuki; Kita, Yasushi; Yamamoto, Kayoko; and Nozaki, Koji, 5,023,308, Cl. 528-423.000.

Nozel, Richard J.; Trombley, Ulric W ; and Brust, Gerald M. Vehicle accessory stand. 5,022,626, Cl. 248-311.200.

NPD Research, Inc.: *See—*
Call, James, 5,023,929, Cl. 455-2.000.

Nugent, Duane C., to Plastic Recovery Systems, Inc. Process for the separation and recovery of plastics. 5,022,985, Cl. 209-172.500.

Nukada, Katsumi: *See—*
Mukai, Toshio; Yamashita, Yoshiro; Suzuki, Takanori; Akasaki, Yutaka; Sato, Katsuhiro; Yabuuchi, Naoya; Tanaka, Hiroyuki; and Nukada, Katsumi, 5,023,356, Cl. 552-210.000.

Nunley, Leonard J.: *See—*
Sanner, M. Duane; Nunley, Leonard J.; and Wallace, Barry M., 5,023,923, Cl. 382-61.000.

Nutt, Ruth F.; Brady, Stephen F.; and Veber, Daniel F., to Merck & Co., Inc. Fibrinogen receptor antagonists. 5,023,233, Cl. 514-11.000.

Nybakken, George H.: *See—*
Gajewski, Vincent J.; Goddard, Wallace I.; Palinkas, Richard L.; and Nybakken, George H., 5,023,040, Cl. 264-328.300.

Nynex Corporation: *See—*
Vancraeynest, Jan, 5,023,935, Cl. 455-80.000.

Oatman, Dean K. Gate pulley guard 5,022,185, Cl. 49-425.000.

Oba, Masao: *See—*
Takeuchi, Kunihiko; Oba, Masao; and Horinouchi, Shinichi, 5,023,887, Cl. 375-1.000.

Oberg, Kenneth H.: *See—*
Perdue, Thomas F., Jr.; Bransky, Jeffrey D., Carvell, William S.; Dettloff, David E.; Ischay, Duane K.; and Oberg, Kenneth H., 5,022,689, Cl. 292-19.000.

Obrea, Andrei: *See—*
Zemlok, Kenneth C.; and Obrea, Andrei, 5,023,598, Cl. 340-572.000.

Ocain, Timothy D.; and Deininger, David D., to American Home Products Corporation. Renin inhibitors. 5,023,338, Cl 548-336.000.

Occelli, Mario L., to Union Oil Company of California. Middle distillate hydrocracking catalyst and process. 5,023,221, Cl. 502-66.000.

Ocean Systems Research, Inc.: *See—*
Andersen, James K.; and White, James W., 5,022,470, Cl. 175-14.000.

Ochiai, Kiyoshi, to Sumitomo Rubber Industries, Ltd. Pneumatic tire including lateral tread grooves with a bridge thereacross. 5,022,448, Cl. 152-209.00R.

Ocker, Klaus: *See—*
Frantom, Richard L.; Bishop, Robert J.; Kremer, Robert; Ocker, Klaus; Brown, Roy; Rose, James; Renfroe, Donald; and Bazel, Teresa, 5,022,674, Cl. 280-741.000.

O'Connell, Mark: *See—*
Rozek, Roy J.; and O'Connell, Mark, 5,022,312, Cl. 92-240.000.

O'Connor, Lawrence J., to KT Technologies Inc. Cable shielding tape. 5,023,395, Cl. 174-36.000

Odaka, Yoshiyuki: *See—*
Hiratsuka, Katsuo; Odaka, Yoshiyuki; and Sakamoto, Takayuki, 5,022,334, Cl. 112-238.000.

Odani, Yusuke: *See—*
Takeda, Yoshinobu; Odani, Yusuke; Hayashi, Tetsuya; Kaji, Toshihiko; and Itoh, Yoshiaki, 5,022,455, Cl. 164-46.000.

Odet, Christophe: *See—*
Goutte, Robert; Jacquemod, Gilles; and Odet, Christophe, 5,023,921, Cl. 382-58.000.

Ogaki, Shinji: *See—*
Okamoto, Sueaki; Yoshida, Seitaro; Kageyama, Hiroshi; and Ogaki, Shinji, 5,023,748, Cl. 361-229.000.

Ogaki, Yasuji: *See—*
Uenishi, Naota; Uemiya, Takafumi; Mizoguchi, Akira; Ogaki, Yasuji; Hattori, Yasuhiro; Tohma, Teruo; Chikuma, Kiyofumi, and Okamoto, Sota, 5,022,738, Cl. 350-96.340.

Ogata, Hiromi: *See—*
Taniguchi, Hideo; Ogata, Hiromi; Sawase, Kensuke; Yokoyama, Manabu; and Tujikawa, Munekazu, 5,023,442, Cl. 250-208.100.

Ogino, Masanobu, to Kabushiki Kaisha Toshiba. Semiconductor device having composite substrate formed by fixing two semiconductor substrates in close contact with each other. 5,023,696, Cl. 357-60.000.

Ogino, Masanori; Fujikura, Tsuneo; Shinagawa, Yuji; and Yamada, Takeo, to Hitachi, Ltd. Grid-drive type display apparatus. 5,023,524, Cl. 315-383.000.

Ogiue, Katsumi: *See—*
Akimoto, Kazuhiro; Ogiue, Katsumi; and Uchiyama, Takeo, 5,023,835, Cl. 365-155.000.

Ogura, Haruo; Furuhata, Kimio; Sato, Shingo; Ito, Masayoshi, Shiton, Yoshiyasu, and Nagai, Yoshitaka, to MECT Corporation Sialosyl cholesterol, process for producing the same, and neuropathy remedy comprising the same. 5,023,239, Cl. 514-26.000.

Ogura, Nobunori, to Rainbow Optical Laboratory Co., Ltd. Auxiliary instrument for examining eyes. 5,022,749, Cl. 351-219.000.

Ogura, Seiki: *See—*
Boudon, Gerard; Mollier, Pierre; Ogura, Seiki; Omet, Dominique, Tannhof, Pascal; and Wallart, Franck, 5,023,478, Cl. 307-446.000

O'Halloran, Bernard, to Allied-Signal Inc. Thermostatic control of turbine cooling air. 5,022,817, Cl. 415-115.000.

Ohara, Yoshiyuki: *See—*
Miyazaki, Akira; Kikuchi, Yuichi; Ohara, Yoshiyuki; Fujinaga, Tomosburo; Kawata, Takashi; Mizutani, Fumitoshi; Hida, Tsugio; and Shimazaki, Shiroyasu, 5,022,789, Cl. 405-133.000.

Ohashi, Masashi: *See—*
Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi, Shiratori, Tatsuya; Ohashi, Masashi; Shirai, Masanari, and Ando, Eiichi, 5,023,658, Cl. 355-72.000.

Ohashi, Mitsuo; Awano, Katsuya; Tanaka, Toshio; and Kimura, Tetsuya, to Kyorin Pharmaceutical Co., Ltd. Phenoxyalkylcarboxylic acid derivatives and process for their preparation. 5,023,364, Cl 560-53.000.

Ohashi, Yasuo; and Irie, Masao, to Jidosha Denki Kogyo K K Windshield wiper motor. 5,023,530, Cl. 318-446.000.

Ohbayashi Corporation: *See—*
Horii, Shuji; and Teraoku, Hiroshi, 5,022,199, Cl. 52-123 100.

Ohi Seisakusho Co., Ltd : *See—*
Takahashi, Jun, 5,022,705, Cl. 296-213.000.

Ohkawa, Tihiro: *See—*
Chin, Jack; Goforth, Robert R.; and Ohkawa, Tihiro, 5,023,109, Cl 427-45.100.

Ohki, Hiroshi: *See—*
Sato, Kazuo; Kikuchi, Yuji; Ohki, Hiroshi; and Kaneko, Toshio, 5,023,054, Cl. 422-82.090.

Ohlson, Carl-Eric. Method and arrangement for X-ray photography or the like. 5,023,899, Cl. 378-196.000.

Ohmachi, Kazuhiko: *See—*
Sakai, Naohumi; Tsuchida, Masashi; Ohmachi, Kazuhiko; Imai, Yasuhiro; and Honma, Toshio, 5,023,774, Cl. 364-200.000.

Ohman, Carl, to Aktiebolaget Electrolux. Machine proximity sensor 5,023,444, Cl. 250-221.000.

Ohmstede Mechanical Services, Inc.: *See—*
Boisture, Thomas B., 5,022,463, Cl. 165-95.000.

Ohmura, Hiroshi: *See—*
Ushiro, Seimei; and Ohmura, Hiroshi, 5,023,639, Cl. 354-132.000.

Ohno, Hideaki; Yoshitugu, Takao; Yoshida, Chuuryoh; and Matsumoto, Hideo, to Matsushita Electric Industrial Co., Ltd. Fluid-bearing apparatus. 5,022,492, Cl. 184-5.000.

Ohno, Kazuhisa; Kosugi, Tetsushi; Sugimori, Kenichiro; Ando, Akitsugu; Yamamoto, Masaru; Suzuki, Fukuji; Nakamura, Masahiro; and Tsujita, Nobuhisa, to Shiseido Co., Ltd.; and Topy Kogyo K K Synthetic mica powder, manufacturing method thereof and cosmetics having the synthetic mica powder blended therein. 5,023,065, Cl. 423-326.000.

Ohsaka, Masayuki; and Miyao, Osami, to Hitachi Metals & Shicoh Engine. Moving-magnet type linear d.c. brushless motor having plural moving elements. 5,023,495, Cl. 310-12.000.

Ohsaki, Ryoukei, to Oki Electric Industry Co., Ltd. Sheet feeder for feeding continuous print paper having sprocket holes. 5,022,578, Cl 226-74.000.

Ohsato, Kiyoshi: *See—*
Kobayashi, Seiji; and Ohsato, Kiyoshi, 5,023,855, Cl 369-44.280.

Ohshima, Fumio: *See—*
Ohshoji Hiroshi, Ohshima, Fumio; and Matsuo, Satoshi, 5,022,382, Cl. 128-4.000.

Ohshima, Takeshi: *See—*
Shigehara, Itaru; Nakajima, Toshio; Nishimura, Shigeyuki; and Ohshima, Takeshi, 5,023,336, Cl. 548-110.000.

Ohshoji, Hiroshi; Ohshima, Fumio; and Matsuo, Satoshi, to Kabushiki Kaisha Toshiba. Endoscope. 5,022,382, Cl. 128-4.000.

Ohta, Toshihiko: *See—*
Tsutaki, Shoji; Fuse, Kazuyoshi; and Ohta, Toshihiko, 5,022,140, Cl. 29-603.000.

Ohta, Yoshitaka: *See—*
Hoshino, Yasushi; Sugiyama, Kazuhiro; Ohta, Yoshitaka: and Shimada, Masaki, 5,023,650, Cl. 354-441.000.

Ohtani, Masami: *See—*
Anzai, Hisao; Sasaki, Isao; Nishida, Kozi; Makino, Hideaki; Ohtani, Masami; and Shimada, Katsuhiko, 5,023,302, Cl. 525-378.000

Ohtsuka, Nobuaki: *See—*
Suzuki, Noriaki; Miyamoto, Junichi; and Ohtsuka, Nobuaki, 5,023,839, Cl. 365-200.000.

Oikawa, Hironobu: *See—*
Kanzawa, Yoshikazu; Fujikake, Yasushi, Ito, Osami; Ito, Shuho, Oikawa, Hironobu; Otsubo, Makoto; Morikawa, Iwao; Shiraton, Yuichi; and Tsukada, Kiyoshi, 5,022,456, Cl. 164-119.000.

Okabe, Kazuhiko: *See—*
Yamamura, Masaaki; Okabe, Kazuhiko; Sotoya, Kohshiro; and Murata, Moriyasu, 5,023,003, Cl. 252-8.800.

Okada, Hiroyuki: *See—*
Yamashita, Takaji; Watanabe, Mitsuo; Okada, Hiroyuki; and Shimizu, Keiji, 5,023,894, Cl. 378-4.000.

Okada, Naofumi, to Sharp Kabushiki Kaisha. Recirculating feeder of sheets. 5,022,641, Cl. 271-3.100.

Okada, Yoshio, to Kabushiki Kaisha Toshiba. Semiconductor memory having improved sense amplifiers. 5,023,842, Cl. 365-205.000.

Okahashi, Kazuo: *See—*
Adachi, Etsushi; Adachi, Hiroshi; Hayashi, Osamu; and Okahashi, Kazuo, 5,023,204, Cl. 437-228.000.

Okajima, Yasunori: *See—*
Honjo, Seiichiro; and Okajima, Yasunori, 5,022,908, Cl. 65-268.000.

Okamoto, Akira: *See—*
Masuko, Takayuki; Okamoto, Akira; Moriya, Kaoru; Okamura, Koji; and Arima, Tadao, 5,023,447, Cl. 250-227.240.

Okamoto, Sota: *See—*
Uenishi, Naota; Uemiya, Takafumi; Mizoguchi, Akira; Ogaki, Yasuji; Hattori, Yasuhiro; Tohma, Teruo; Chikuma, Kiyofumi; and Okamoto, Sota, 5,022,738, Cl. 350-96.340.

Okamoto, Sueaki; Yoshida, Seitaro; Kageyama, Hiroshi; and Ogaki, Shinji, to Mita Industrial Co., Ltd. Corona wire cleaning device for a corona unit. 5,023,748, Cl. 361-229.000.

Okamura, Koji: *See—*
Masuko, Takayuki; Okamoto, Akira; Moriya, Kaoru; Okamura, Koji; and Arima, Tadao, 5,023,447, Cl. 250-227.240.

Okarma, Thomas B.; Chang, Chin-Hai; Clark, Brian R.; and Lerch, L. Bernard, to Applied ImmuneSciences. Device for plasma modification—composition and remodeling. 5,022,988, Cl 210-321.840.

Okawa, Yoshihisa: *See—*
Murakami, Yoichi; Okawa, Yoshihisa; and Ishikawa, Takao, 5,023,732, Cl. 360-77.080.

Okawauchi, Toshitaka: *See—*
Sugihara, Hirosi; Hidaka, Hiroshi; Doi, Akira; Okawauchi, Toshitaka; Kawabata, Yasushi; and Baba, Hideki, 5,023,101, Cl. 426-603.000.

Okegawa, Tadao: *See—*
Imaki, Katsuhiro; Okegawa, Tadao; and Arai, Yoshinobu, 5,023,268, Cl. 514-400.000.

Oki Electric Industry Co., Ltd.: *See—*
Ohsaki, Ryoukei, 5,022,578, Cl. 226-74.000.

Okita, Junichi, and Kurokawa, Toshikazu, to Mazda Motor Corporation. Cooling system for V-type engine. 5,022,354, Cl 123-41.100.

Oklahoma Safety Equipment Co.: *See—*
Reynolds, John W.; Burton, Bobby H.; and Kays, Jerry W , 5,022,424, Cl. 137-68.100.

Okuda, Hidenori: *See—*
Matsunami, Takao; and Okuda, Hidenori, 5,022,725, Cl 350-1.400.

Okude, Yoshitaka: *See—*
Miwa, Hiroshi; Okude, Yoshitaka; Watanabe, Masakazu; and Konishi, Sakuichi, 5,023,298, Cl. 525-103.000.

Okunishi, Masahiko: *See—*
Komoda, Yasuo; Yokogawa, Yasunori; Okunishi, Masahiko; Ishii, Koichi; Shibai, Hiroshiro; and Noumi, Ryosaku, 5,023,079, Cl. 424-120.000.

Okuyama, Toshiharu: *See—*
Wakatsuki, Yoshio; Okuyama, Toshiharu; Takeuchi, Hajime; Shimizu, Giichiro; and Shimizu, Misao, 5,023,438, Cl. 235-472.000.

Old, Lloyd J. *See—*
Haranaka, Katsuyuki; Old, Lloyd J.; Richards, Elizabeth C.; and Williamson, Barbara, 5,023,320, Cl. 530-350.000.

Oles, Paul M.: *See—*
Dundas, Dennis L.; Moore, Eugene L.; Oles, Paul M., and Briggs, Milton, 5,022,544, Cl. 215-31.000.

Olin Corporation: *See—*
Lin, Lifun; and Chao, Chung-Yao, 5,022,968, Cl. 204-28.000.
Loftis, Donald B.; and Justice, David D., 5,023,803, Cl. 364-497.000.
Mahulikar, Deepak; and Popplewell, James M., 5,023,398, Cl. 174-52.400.
Scardera, Michael; and Grosser, Frank R., 5,023,008, Cl. 252-106.000.

Oliva, Richard A. Gingival rectractor instrument. 5,022,859, Cl. 433-141.000.

Olon, Thomas E.; and Krihwan, Carl C., to American Sterilizer Company. Redundant lamp control circuit. 5,023,515, Cl. 315-88 000.

Olson, Earle L., to Olson Products, Inc. Insect trapping device. 5,022,179, Cl. 43-114.000.

Olson, Margaret: *See—*
Johnson, Herrick J.; Olson, Margaret; Jones, Stuart; Bodoff, Stephanie; Bertrand, Stephen C.; and Levine, Paul H., 5,023,907, Cl. 380-4.000.

Olson Products, Inc.: *See—*
Olson, Earle L., 5,022,179, Cl. 43-114.000.

Olympus Optical Co., Ltd.: *See—*
Sakiyama, Katsunori; Sato, Tomoaki; and Eino, Teruo, 5,022,383, Cl. 128-6.000.

Omet, Dominique: *See—*
Boudon, Gerard; Mollier, Pierre; Ogura, Seiki; Omet, Dominique; Tannhof, Pascal; and Wallart, Franck, 5,023,478, Cl. 307-446.000.

OMI International Corporation: *See—*
Wieczerniak, Walter J., 5,022,938, Cl. 148-267.000.

Omine, Hidetaka: *See—*
Hosoya, Hideo; Kimura, Masayuki; Endo, Hiroshi; Hiraki, Yoshio; Yamamoto, Shoji; Yoshikawa, Satoshi; Omine, Hidetaka; and Miyazaki, Koji, 5,023,175, Cl. 435-101.000.

Omron Tateisi Electronics Co.: *See—*
Yamato, Masaki, 5,023,781, Cl. 364-405.000.

Omura, Hideo: *See—*
Horino, Shigeo; Omura, Hideo; Maruyama, Nobusato; Ashikawa, Yoshiaki; Shioya, Masatoshi; Miyano, Toshiyuki; and Wakou, Jiro, 5,022,531, Cl. 209-552.000.

Oncke, Ockert P. H.; and Van der Merwe, Sarel B. Safety arrangement for firearms. 5,022,175, Cl. 42-70.110.

Ong, Beng S.; and Kmiecik-Lawrynowicz, Grazyna, to Xerox Corporation. Encapsulated electrophotographic toner compositions. 5,023,159, Cl. 430-109.000.

Ono, Kenichi: *See—*
Matsuoka, Morito; and Ono, Kenichi, 5,022,977, Cl. 204-298.160.

Ono Pharmaceutical Co., Ltd.: *See—*
Imaki, Katsuhiro; Okegawa, Tadao; and Arai, Yoshinobu, 5,023,268, Cl. 514-400.000.

Onoda Cement Co., Ltd.: *See—*
Kumaki, Akihico; and Izumi, Yoshito, 5,023,211, Cl 501-87.000.

Onoda, Shigeyoshi: *See—*
Ebata, Tokihide; and Onoda, Shigeyoshi, 5,023,660, Cl. 355-200.000.

Onodera, Kaoru: *See—*
Miyoshi, Masanobu; Kajiwara, Makoto; and Onodera, Kaoru, 5,023,170, Cl. 430-558.000.

Onodera, Yoichi: *See—*
Yokouchi, Hisatake; Takasaki, Yukio; Hirai, Tadaaki, Koike, Kouichi; Tsuneoka, Masayuki; Onodera, Yoichi; and Funo, Takakazu, 5,023,896, Cl. 378-99.000.

Onorato, Frank J.: *See—*
Kalyanaraman, Palaiyur S.; and Onorato, Frank J , 5,023,167, Cl. 430-495.000.

Onozuka, Haruo; Umezu, Takao; Sato, Muneyoshi, and Takada, Seiji, to Fuji Photo Film Co., Ltd. Electronic flash charging circuit. 5,023,470, Cl. 307-108.000.

Onozuka, Shigeharu; Yokoyama, Yuuichi; and Tsuchiya, Makoto, to Hoya Corporation. Oxygen-permeable hard contact lens material with excellent impact resistance. 5,023,305, Cl. 526-194.000.

Oooka, Nobuya: *See—*
Nakata, Hirohiko; Nishioka, Takao; Oooka, Nobuya; and Motoyoshi, Kenya, 5,023,147, Cl. 428-627.000.

Ooshio, Takeaki: *See—*
Kobayashi, Yoshikazu; and Ooshio, Takeaki, 5,022,630, Cl 251-149.600.

Ootsuka, Hiroshi: *See—*
Ishida, Tokuji; Hamada, Masataka; Ishibashi, Kenji, Taniguchi, Nobuyuki; Ootsuka, Hiroshi; Norita, Toshio; and Karasaki, Toshihiko, 5,023,646, Cl. 354-402.000.

Opas, George F., to Motorola, Inc. Transmitter with improved linear amplifier control. 5,023,937, Cl. 455-126.000.

Orange Water and Sewer Authority: *See—*
Williamson, Ronald E., 5,022,993, Cl 210-605.000.

Orbitel Mobile Communications Limited: *See—*
Gumussoy, Murat, 5,023,562, Cl. 329-303.000.

Orian, Emilia, executrix: *See—*
Brawerman, Michael, deceased; and Orian, Itamar, 5,022,145, Cl 29-88.800.

Orian, Itamar: *See—*
Brawerman, Michael, deceased; and Orian, Itamar, 5,022,145, Cl 29-88.800.

Orion Industries, Inc.: *See—*
Leslie, Samuel A., 5,023,930, Cl. 455-9.000.

Orion Laboratories, Inc.: *See—*
Pope, Edward J. A.; Sano, Yoji; Wang, Shi-ho; and Sarkar, Arnab, 5,023,208, Cl. 501-12.000.

Orivuori, Juhani, to Enso-Gutzeit Oy. Method for the treatment of spent liquors in pulp production. 5,022,962, Cl. 162-29.000.

Ortho Organizers: *See—*
Broughton, Dan Q.; and Norris, Nicholas O., 5,022,854, Cl. 433-8.000.

Ortiz, Arturo L.: *See—*
Gannaway, Edwin L.; and Ortiz, Arturo L., 5,022,146, Cl. 29-888.020.

Osaka Gas Co., Ltd.: *See—*
Akagi, Kousuke, 5,023,152, Cl. 429-32.000.

Osaka, Tadashi: *See—*
Tanaka, Hiromi; and Osaka, Tadashi, 5,022,138, Cl. 29-564.800.

Osaki, Tsutomu: *See—*
Goto, Masayoshi; Demura, Nobutaka; and Osaki, Tsutomu, 5,023,244, Cl. 514-46.000.

Osborn, D. Bruce; and Bagley, Harold R., Jr., to Ford Aerospace & Communications Corporation. Miniature multi-temperature radiometric reference. 5,023,459, Cl. 250-332.000.

Osborne, Robert E.; and Frazier, Tonie R., to Mor-Flo Industries, Inc. Burner for forced draft controlled mixture heating system using a closed combustion chamber. 5,022,352, Cl. 122-17.000.

O'Shaughnessy, Timothy G.; and Spaur, Mike, to Western Digital Corporation. Stability-compensated operational amplifier. 5,023,567, Cl. 330-253.000.

Ostendorff, Eric C.: *See—*
Hippely, Keith A.; and Ostendorff, Eric C., 5,022,884, Cl. 446-14.000.

Ostle, William L.: *See—*
Wellman, Keith R.; Crellin, Robert L.; and Ostle, William L., 5,022,252, Cl. 72-260.000.

Otani, Shigemasa: *See—*
Hamada, Keishi; Tashiro, Fumio; Otani, Shigemasa; Nomaguchi, Kanemasa; Murakami, Tomiguyu; and Iijima, Sadayoshi, 5,023,136, Cl. 428-341.000.

Otis Elevator Company: *See—*
Thanagavelu, Kandasamy, 5,022,497, Cl. 187-124.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Otis Engineering Corporation: *See—*
  - Churchman, Ronald K.; Meaders, Michael W., and Van Le, Nam, 5,022,427, Cl. 137-155.000.
- Otsubo, Makoto: *See—*
  - Kanzawa, Yoshikazu; Fujikake, Yasushi; Ito, Osami; Ito, Shuho; Oikawa, Hironobu; Otsubo, Makoto; Morikawa, Iwao; Shiratori, Yuichi; and Tsukada, Kiyoshi, 5,022,456, Cl. 164-119.000.
- Ott Maschinentechnik GmbH: *See—*
  - Heel, Helmut; Bauch, Karl; Reisacher, Bartholomaus; and Worner, Stefan, 5,022,686, Cl. 285-134.000.
- Otto, Dennis L., to Timken Company, The. Seal assembly for antifriction bearings. 5,022,659, Cl. 277-1.000.
- Outboard Marine Corporation: *See—*
  - Ferguson, Arthur R.; and Rawlings, David E., 5,022,370, Cl. 123-425.000.
- Outboard Motor Corporation: *See—*
  - Billingsley, Henry C.; and Belec, Glenn R., 5,022,355, Cl 123-52.0MB.
- Owada, Mitsuru; and Ishii, Yoshiki, to Canon Kabushiki Kaisha. Method of and apparatus for transmitting image information. 5,023,715, Cl. 358-133.000.
- Owczarz, Aleksander: *See—*
  - Thompson, Raymon F.; and Owczarz, Aleksander, 5,022,419, Cl. 134-102.000.
- Oxley, Brian W.: *See—*
  - Burch, Richard J.; and Oxley, Brian W., 5,023,651, Cl. 355-1.000.
- Oy Partek Ab: *See—*
  - Rantanen, Heikki, 5,023,030, Cl. 264-40.500.
- Oyama, Jun; Uchida, Naoshi; Unuma, Makoto; Takahashi, Tatsunori; Shinohara, Hisaji; and Kandatsu, Kiyoshi, to Fuji Electric Co., Ltd. Circuit breaker. 5,023,416, Cl. 200-244.000.
- Ozawa, Masataka: *See—*
  - Ito, Kazuhiko; Miyazaki, Kouji; Kichibayashi, Masakatsu; Horii, Shigeru; and Ozawa, Masataka, 5,023,516, Cl. 315-101.000.
- Ozu, Tatsuya: *See—*
  - Inoue, Shigeyasu; Ozu, Tatsuya; and Nakatani, Yasunori, 5,022,775, Cl. 401-107.000.
- P V. Tool, Inc.: *See—*
  - Vindez, Pierre G., 5,022,800, Cl. 408-14.000.
- Pacanowsky, David J., to W. L. Gore & Associates, Inc. Waterproof breathable wader. 5,022,096, Cl. 2-227.000.
- Paccar Inc.: *See—*
  - Izuno, Herb, 5,023,760, Cl. 362-66.000.
- Pacific Bell: *See—*
  - Liu, Kuo-Hui, 5,023,612, Cl. 341-94.000.
- Pacific Chemical Co., Ltd.: *See—*
  - Kang, Seong I, 5,022,529, Cl. 206-581.000.
- Paczuski, Andrew W.: *See—*
  - Kandpal, Tara C.; Paczuski, Andrew W.; and Siewert, Herbert G., 5,022,833, Cl. 417-571.000.
- Pagano, Daniel M., to Eastman Kodak Company. Sensor apparatus to read film information. 5,023,642, Cl. 354-275.000.
- Page, David R.: *See—*
  - Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Page, David R.; Plambeck, Kenneth E.; Scalzi, Casper A.; and Schmalz, Richard J., 5,023,773, Cl. 364-200.000.
- Paiocchi, Maurizio: *See—*
  - Giordano, Claudio; Castaldi, Graziano; and Paiocchi, Maurizio, 5,023,365, Cl. 560-56.000.
  - Perdoncin, Giulio; Giordano, Claudio; Paiocchi, Maurizio; and Casagrande, Roberto, 5,023,381, Cl. 568-322.000.
- Pak, Edward T.: *See—*
  - Leung, Ho-Ming; and Pak, Edward T., 5,023,893, Cl. 377-117.000.
- Palaske, Mark G.: *See—*
  - Lopez, Javier E. M.; and Palaske, Mark G., 5,023,767, Cl. 363-17.000.
- Palermo, Robert E.: *See—*
  - Han, Scott; Palermo, Robert E.; Pearson, Judith A.; and Walsh, Dennis E., 5,023,391, Cl. 585-500.000.
  - Han, Scott; Palermo, Robert E.; Pearson, Judy A.; and Walsh, Dennis E., 5,023,392, Cl. 585-500.000.
  - Han, Scott; Palermo, Robert E.; Pearson, Judith A.; and Walsh, Dennis E., 5,023,393, Cl. 585-500 000.
- Pali nee Ivanics, Iren: *See—*
  - Sperber, Ferenc; Huszar, Csaba; Nemeth, Attila; Somfai, Eva; and Pali nee Ivanics, Iren, 5,023,337, Cl. 548-306.000.
- Palinkas, Richard L.: *See—*
  - Gajewski, Vincent J.; Goddard, Wallace I.; Palinkas, Richard L.; and Nybakken, George H., 5,023,040, Cl. 264-328.300.
- Palmer, A. Jay: *See—*
  - Harvey, Robin J.; and Palmer, A Jay, 5,023,563, Cl. 330-4.300.
- Pan, Wie-Hin. *See—*
  - Spencer, Nicholas D.; Pan, Wie-Hin; and Rudesill, John A., 5,023,067, Cl. 423-420.000.
- Panetta, Pascal; and Tromelin, Jacques, to Schlumberger Technology Corporation. Logging method and apparatus using a sonde equipped with measuring pads. 5,022,484, Cl. 181-102.000.
- Pang, Liu Chia. Structure of punch for venetian blind manufacture. 5,022,255, Cl. 72-444.000.
- Panmedica S.A.: *See—*
  - Lazaro, Rene ; Cros, Gerard; McNeill, John H.; and Serrano, Jean-Jacques, 5,023,358, Cl. 556-42.000.
- Pano, Joseph; and Braun, Hans, to Iscar, Ltd. Cutting insert. 5,022,796, Cl. 407-113.000.
- Paoli, Thomas L., to Xerox Corporation. Phased locked arrays with single lobe output beam. 5,023,882, Cl. 372-50.000.
- Paorici, Carolo: *See—*
  - Mattera, Adriano; Fornari, Roberto; Magnanini, Renato; Paorici, Carolo; Zanotti, Lucio; and Zuccalli, Giovanni, 5,023,801, Cl. 364-480.000.
- Pappas, S. Peter. Alpha, beta-diacid/N,N-substituted diamine adduct catalyst for epoxy resin and acid polyester. 5,023,303, Cl. 525-438.000.
- Paque, Michael W., to Kroy Inc. Thermal printing apparatus and tape supply cartridge therefor. 5,022,771, Cl. 400-120.000.
- Paquette, Thomas E., to Ford Microelectronics. Electrostatic discharge protection device for gallium arsenide resident integrated circuits. 5,023,672, Cl. 357-15.000.
- Park, In-gyu. to Samsung Electron Devices Co., Ltd. In-line type electron gun for color cathode ray tube. 5,023,508, Cl. 313-414.000.
- Parker, Dawood: *See—*
  - Hall, Peter R.; Trebearne, Jack; Parker, Dawood; and Clancy, Paul, 5,022,410, Cl. 128-695.000.
- Parks, Thomas L. Communication wire support apparatus. 5,022,615, Cl. 248-74.100.
- Parlatore, Rocco, to Mass-Tex Company, Ltd. Hand-held punch pliers. 5,022,253, Cl. 72-325.000.
- Patel, Amritlal H : *See—*
  - Erdman, David M.; Beatty, James A.; and Patel, Amritlal H., 5,023,527, Cl. 318-254.000.
- Patel, Kantilal P.: *See—*
  - Schweizer, Richard W.; Patel, Kantilal P.; and Lau, Philip Y., 5,023,002, Cl. 210-710.000.
- Patel, Naresh P. Telecommunication system for remote LP gas inventory control. 5,023,806, Cl. 364-509.000.
- Patel, Shirish, to Bull HN Information Systems Inc. Apparatus for skipping arithmetic calculations involving leading zeros. 5,023,826, Cl 364-736.000.
- Pathak, Jagdish; Douglass, Stephen M.; Vider, Dov-Ami; and Kurkowski, Hal, to Cypress Semiconductor Corporation. Architecture of high speed synchronous state machine. 5,023,484, Cl. 307-465.000.
- Patton, Paul B.; and Kidder, Kenneth B., to Honeywell Inc. Method and apparatus for conditioning AC input signals. 5,023,816, Cl. 364-550.000.
- Patzer, Gregory N.: *See—*
  - Lomax, Donald P.; Patzer, Gregory N.; and Rajendran, Giri, 5,023,145, Cl. 428-614.000.
- Paul, Joseph W., Jr.: *See—*
  - DaVanzo, John P.; and Paul, Joseph W., Jr., 5,023,238, Cl. 514-21.000.
- Paul Wurth S.A.: *See—*
  - Lonardi, Emile; Cimenti, Giovanni; and Mailliet, Pierre, 5,022,806, Cl. 414-208.000.
- Paulson, Richard D.: *See—*
  - Lynch, Marine D.; Bernklau, James W.; Paulson, Richard D.; and Reeck, Steven L., 5,023,643, Cl. 354-299.000.
- Pauly, Jean, to Cegelec. Testable input/output circuit for a load decoupled by a transformer. 5,023,471, Cl. 307-149.000.
- Pawlak, Andrzej M.; and Shirai, Takeshi, to General Motors Corporation. Variable reluctance rotation sensor with changing coil linkages and a pair of flux producing magnets. 5,023,546, Cl. 324-174.000.
- Pawlak, Andrzej M.; and Shirai, Takeshi, to General Motors Corporation. Variable reluctance rotation sensor with changing flux linkages and including a pair of oppositely poled magnets. 5,023,547, Cl. 324-174.000.
- Payne, LeRoy. Multi-axis rotational distributing apparatus. 5,022,838, Cl. 425-145.000.
- Pazik, John A. Vehicle gas tank. 5,022,679, Cl. 280-833.000.
- Pearson, Judith A.: *See—*
  - Han, Scott; Palermo, Robert E.; Pearson, Judith A.; and Walsh, Dennis E., 5,023,391, Cl. 585-500.000.
  - Han, Scott; Palermo, Robert E.; Pearson, Judith A.; and Walsh, Dennis E., 5,023,393, Cl. 585-500.000.
- Pearson, Judy A.: *See—*
  - Han, Scott; Palermo, Robert E.; Pearson, Judy A., and Walsh, Dennis E., 5,023,392, Cl. 585-500.000.
- Peavey Electronics Corporation: *See—*
  - Brown, James W., Sr.; and Sondermeyer, Jack C., 5,023,915. Cl 381-120.000.
- Pechiney Electrometallurgie: *See—*
  - Dubots, Dominique; and Toulouse, Pierre, 5,023,212, Cl. 501-87.000.
- Pecot, Jean-Yves F. P.: *See—*
  - Longuet, Raynald G. M.; and Pecot, Jean-Yves F. P., 5,022,187, Cl. 51-165.740.
- Pedder, David J., to Plessey Overseas Limited. Vernier structure for flip chip bonded devices. 5,022,580, Cl. 228-56.300.
- Peel, Richard V., to Safetran Systems Corporation. AC and battery backup supply for a railroad crossing gate. 5,022,613, Cl. 246-125.000.
- Pekar, Robert W., to Dielectrics Industries. Inflatable bladder 5,022,109, Cl. 5-449.000.
- Peleg, Eliezer, to Sara Lee Corporation. Garment blank and brief 5,022,240, Cl. 66-177.000.
- Pelosi, Stanford S., Jr.: *See—*
  - Burch, Homer A.; Castellion, Alan W., and Pelosi, Stanford S., Jr., 5,023,272, Cl. 514-471.000.
- Pelura, Timothy J.: *See—*
  - Chang, Stephen S.; Bao, Yongde; and Pelura, Timothy J., 5,023,100, Cl. 426-601.000.
- Penick, Ib, to Crowell, Christopher. Paper pop-up devices and method of making the same. 5,022,681, Cl. 281-15.110.

- Pepe, Michael G.: *See—*
  - Edgington, T. Scott; and Pepe, Michael G., 5,023,236, Cl. 514-18.000.
- Perdoncin, Giulio; Giordano, Claudio; Paiocchi, Maurizio; and Casagrande, Roberto, to Zambon Group S.p.A. Process for preparing an organic synthesis intermediate. 5,023,381, Cl. 568-322.000.
- Perdue, Thomas F., Jr.; Bransky, Jeffrey D.; Carvell, William S.; Dettloff, David E.; Ischay, Duane K.; and Oberg, Kenneth H., to Acco World Corporation. Suspendable hinged lockable lid storage box. 5,022,689, Cl. 292-19.000.
- Pereira, Oswy Z.; Ramsay, Michael V. J.; and Freeman, Stephen, to American Cyanamid Company. Process for the preparation of macrolide compounds. 5,023,348, Cl. 549-264.000.
- Pereny, Franklin C. Magnetic force generating system. 5,023,497, Cl. 310-36.000.
- Perez, Marc: *See—*
  - Mardon, Jean-Paul; Charquet, Daniel; Perez, Marc; and Senevat, Jean, 5,023,048, Cl. 376-416.000.
- Perkin-Elmer Corporation, The: *See—*
  - Hoult, Robert A., 5,023,804, Cl. 364-498.000.
- Perry, Colin L.: *See—*
  - Moore, Paul A.; Perry, Colin L., and Voorman, Johannes O., 5,023,568, Cl. 330-257.000.
- Perstorp AB: *See—*
  - Siren, Matti, 5,023,248, Cl. 514-103.000.
- Pesch, Albert T.: *See—*
  - Wey, Edmund; Grecksch, Hans; Pesch, Albert T., Knors, Herbert; Zitzen, Wilhelm; and Marquardt, Manfred, 5,022,596, Cl. 242-36.000.
- Peters, Gerald T., Jr.: *See—*
  - Fulton, Steven J.; Peters, Gerald T., Jr.; Spehrley, Charles W., Jr., and Young, Lawrence R., 5,023,111, Cl. 427-164.000.
- Petersen Manufacturing Co., Inc.. *See—*
  - Sorensen, Joseph A.; and Gatzemeyer, Dwight L., 5,022,137, Cl. 29-559.000.
- Peterson, Francis C., to Buell Industries, Inc. Self-mounting fastener 5,022,804, Cl. 411-104.000.
- Petrolite Corporation: *See—*
  - Mathew, Jacob, 5,023,382, Cl. 568-352.000.
- Pfeiffer, Brian E., to Pittsburgh Tag Company Suspended ceiling grid sign with locking, cantilevered/counterbalanced bracket. 5,022,173, Cl. 40-617.000.
- Pfeiffer, Nikolaus, to Heidelberger Druckmaschinen AG. Printing with a limitation of layer thickness and of tonal-value increase. 5,023,812, Cl. 364-519.000.
- Pfizer Inc.: *See—*
  - Francoeur, Michael L.; and Potts, Russell O., 5,023,085, Cl. 424-449.000.
  - Gymer, Geoffrey E.; Narayanaswami, Subramaniyan; and Richardson, Kenneth, 5,023,258, Cl. 514-255.000.
- Phelps, Peter M. Cooling tower with multiple fill sections of different types. 5,023,022, Cl. 261-111.000.
- Philip Morris Incorporated: *See—*
  - Ingalls, John L.; Brinker, Reiner G.; and Hawkins, Jesse L., Jr., 5,022,950, Cl. 156-361.000.
  - Watson, John, 5,022,416, Cl. 131-305.000.
- Philippe, Chretien, to Automobiles Peugeot; and Automobiles Citroen. Double synchronizer having integrated axial locking means. 5,022,506, Cl. 192-53.00G.
- Phillippe, Irenee J.: *See—*
  - Pimley, John J.; Vitori, Christopher M.; Phillippe, Irenee J.; and Marsh, Paul G., 5,022,984, Cl. 209-170.000.
- Phillips, Claude F., to UIS, Inc. Fuel injector cleaning method and apparatus. 5,022,364, Cl. 123-198.00A.
- Phillips, Earle N., to ITT Corporation. Optical element output for an image intensifier device. 5,023,511, Cl. 313-524.000.
- Phillips Peteroleum Company: *See—*
  - Ceurvorst, Joseph G., 5,023,315, Cl. 528-323.000.
- Philo, Kenneth W. Method and apparatus for the recovery and treatment of ground water contaminated by hazardous waste. 5,022,786, Cl. 405-128.000.
- Phipps, Jack M. Temperature sensing device. 5,022,766, Cl. 374-209.000.
- Photon Energy, Inc.: *See—*
  - Ackerman, Bruce; Albright, Scot P.; and Jordan, John F., 5,022,930, Cl 136-251.000.
- Pickart, Loren R., to ProCyte Corporation. Methods and compositions for healing ulcers. 5,023,237, Cl. 514-18.000.
- Pierson, William J. Firearm locking system. 5,022,536, Cl. 211-4.000.
- Pietron, Casimir P.: *See—*
  - Hammer, Russell C.; Silage, Gregory J.; and Pietron, Casimir P., 5,022,292, Cl. 81-426.000.
- Piewitt, Gunter: *See—*
  - Harting, Dietmar; and Piewitt, Gunter, 5,022,866, Cl. 439-372.000.
- Pilkington PLC: *See—*
  - Grundy, Barry T.; Hargreaves, Edward; and Whitfield, Peter J., 5,022,905, Cl. 65-60.510.
- Pillage, Lawrence T.: *See—*
  - Schlotterer, John C.; Johnston, Paul M ; Rusnak, Mark F.; Pillage, Lawrence T.; and Byrd, Thomas M., Jr., 5,023,822, Cl. 364-703.000.
- Pimley, John J.; Vitori, Christopher M.; Phillippe, Irenee J.; and Marsh, Paul G., to Black Clawson Company, The. Froth flotation apparatus and method. 5,022,984, Cl. 209-170.000.
- Pioneer Electronic Corporation: *See—*
  - Naito, Ryuichi; and Ishii, Tsuneo, 5,023,876, Cl 371-40.100.
  - Takegawa, Tomohiro; Tasaki, Akira, and Koinuma, Hiroshi, 5,023,938, Cl. 455-183.000.
  - Uenishi, Naota; Uemiya, Takafumi; Mizoguchi, Akira; Ogaki, Yasuji; Hattori, Yasuhiro; Tohma, Teruo; Chikuma, Kiyofumi; and Okamoto, Sota, 5,022,738, Cl. 350-96.340.
- Pitkajarvi, to Valmet Paper Machinery Inc. Method and device in a head box of a paper machine for controlling distribution of fiber orientation in a paper web. 5,022,965, Cl. 162-192.000.
- Pitney Bowes Inc.: *See—*
  - Fassman, Arnold; and Nobile, John R., 5,022,953, Cl. 156-441.500.
  - Ifkovits, Edward M., Jr., 5,022,638, Cl. 271-2.000.
  - Zemlok, Kenneth C.; and Obrea, Andrei, 5,023,598, Cl. 340-572.000.
- Pitts, Alan J., to Halliburton Company Linear shaped filter. 5,023,819, Cl. 364-558.000.
- Pittsburgh Tag Company: *See—*
  - Pfeiffer, Brian E., 5,022,173, Cl. 40-617.000.
- Plaessmann, Frederick A., to Seal Spout Corporation. Apparatus for applying labels to containers. 5,022,954, Cl. 156-542.000.
- Plambeck, Kenneth E.: *See—*
  - Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Page, David R., Plambeck, Kenneth E.; Scalzi, Casper A.; and Schmalz, Richard J., 5,023,773, Cl. 364-200.000.
- Plastic Recovery Systems, Inc.: *See—*
  - Nugent, Duane C., 5,022,985, Cl. 209-172.500.
- Playtex Apparel, Inc.: *See—*
  - Lawson, LaJean, 5,022,887, Cl. 450-54 000
- Plessey Overseas Limited: *See—*
  - Pedder, David J., 5,022,580, Cl. 228-56.300.
- Plester, George: *See—*
  - Faerber, Karlheinz; Deininger, Anton; Plester, George; Guenther, Manfred; and Troska, Georg, 5,022,558, Cl. 222-105.000.
- Plochman, Frederic W., to NatureStar Foods, Inc. Food product and method for making the same. 5,023,096, Cl. 426-89.000.
- Plus Logic, Inc.: *See—*
  - Kaplinsky, Cecil H., 5,023,606, Cl. 340-825.800.
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- Pohl, Jorg: *See—*
  - Schumacher, Wolfgang; Respondek, Johannes; Engel, Jurgen; Pohl, Jorg; Voegeli, Rainer; and Hilgard, Peter, 5,023,335, Cl. 548-104.000.
- Polanyi, Michael L.; and Polanyi, Thomas G Device for adjusting automobile side view mirror. 5,022,747, Cl. 350-612.000.
- Polanyi, Thomas G.: *See—*
  - Polanyi, Michael L.; and Polanyi, Thomas G., 5,022,747, Cl. 350-612.000.
- Polaroid Corporation: *See—*
  - Conti, Albert B.; and Egan, Richard G., 5,023,741, Cl. 360-132.000.
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- Pollinger, Norbert; Serno, Peter; Hofmann, Wolfram; and Beermann, Dieter, to Bayer Aktiengesellschaft. Intramuscular injection forms of gyrase inhibitors. 5,023,257, Cl. 514-254.000.
- Pollitt, Sonia: *See—*
  - Friedman, Milton J.; Langston, Susan E.; and Pollitt, Sonia, 5,023,183, Cl. 435-240.300.
- Polycon: *See—*
  - Reche, John J., 5,023,205, Cl. 437-228.000.
- Pontius, Jeffrey S. Temporary diaper storage container. 5,022,553, Cl. 220-410.000.
- Pope, Edward J. A.; Sano, Yoji; Wang, Shi-ho; and Sarkar, Arnab, to Orion Laboratories, Inc. Sol-gel process for glass and ceramic articles. 5,023,208, Cl. 501-12.000.
- Popplewell, James M.: *See—*
  - Mahulikar, Deepak; and Popplewell, James M., 5,023,398, Cl. 174-52.400.
- Poret, Mark, to Intel Corporation. Software programmable logic array utilizing "and" and "or" gates. 5,023,775, Cl. 364-200.000.
- Porter, Michael J.: *See—*
  - Porter, William F.; Mastrogany, Michael G.; and Porter, Michael J., 5,022,963, Cl. 162-116.000.
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- Portolese, Larry A., to Allied-Signal Inc. Balanced dual poppet valve. 5,022,436, Cl. 137-625.350.
- Posso Corporation: *See—*
  - Savoy, Steven, 5,022,528, Cl. 206-545.000.
- Potier, Michel; and Briet, Gilles, to Valeo Thermique Moteur; and Hutchinson. Rapid action coupling system for a heat exchanger fluid tank. 5,022,461, Cl. 165-76.000.
- Potje-Kamloth, Karin: *See—*
  - Josowicz, Mira; and Potje-Kamloth, Karin, 5,022,969, Cl. 204-56.100.
- Potters, Cornelis J. T.: *See—*
  - Angenent, Johannes H.; Khoe, Giok D.; Mahon, Gathal J.; Van De Grijp, Abram; Potters, Cornelis J. T.; and Wright, Kieran G., 5,022,733, Cl. 350-96.180.
- Potters Industries, Inc.: *See—*
  - Balcar, Gerald P.; Krumrine, Paul; Schwartz, Neal; Sutker, Burton J.; and Wood, Gail J., 5,022,897, Cl. 55-96.000.
- Potts, Russell O.: *See—*
  - Francoeur, Michael L.; and Potts, Russell O., 5,023,085, Cl. 424-449.000.

VOL
1127
ISS
2
JE
11
1991
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Potz, Franz, and Daum, Dieter, to Brown Boveri Reaktor GmbH Hollow plug for blocking a heat exchanger tube. 5,022,437, Cl. 138-89.000.

Poublan, Jean-Yves H.: *See—*
Abramovitz, Robert G.; Anderson, Robert L., Jr.; Busse, Frederick L.; Celarier, Stuart A.; Poublan, Jean-Yves H ; and Shorthill, Lawrence R., 5,023,922, Cl. 382-59.000.

Pourre, Jean-Louis: *See—*
Milcamps, Jacques; Pourre, Jean-Louis; and Thiebaut, Jean-Pierre, 5,023,743, Cl. 361-1.000.

Povilaitis, Darius A., to Calibro Corporation. Adjustable lock for a cassette tape player. 5,022,242, Cl 70-14.000.

Powell, Eric; and Chhabra, Navjot, to Micron Technology, Inc. Semiconductor processing furnace tube and alignment jig. 5,022,853, Cl. 432-200.000.

PPG Industries, Inc.: *See—*
Krumwiede, John F.; Kopp, Paul W.; and Heithoff, Robert B., 5,023,210, Cl. 501-71.000.

Prakken, Bouwe. Device for filling outers with filled bags. 5,022,218, Cl. 53-529.000.

Prassas, Michel: *See—*
Grateau, Luc; and Prassas, Michel, 5,023,209, Cl. 501-13.000.

Precision Pulley, Inc.: *See—*
Valster, Karl C.; and Reicks, Allen V., 5,022,132, Cl. 29-116.100.

Precision Screen Machines, Inc.: *See—*
Szarka, Sandor, 5,022,320, Cl. 101-123.000.

Precision Technology Inc.: *See—*
Spackman, Kerry P.; and Whale, Henry A . 5,023,809, Cl. 364-516.000.

Prenosil, Michael B., to Seagate Technology, Inc. Corrosion resistant magnetic recording read. 5,023,738, Cl. 360-122.000.

Prescott, Robert C.; and Robinson, Robert J., to Dresser Industries Inc. Sensitive electrical to mechanical transducer. 5,022,425, Cl. 137-82.000.

Presidenza Del Consiglio Dei Ministri: *See—*
Cozzi, Ennio; and Conti, Natale, 5,023,294, Cl. 524-547 000.

Pretzer, Wayne R.: *See—*
Irani, Cyrus A.; Harris, Thomas V.; and Pretzer, Wayne R., 5,022,467, Cl. 166-273.000.

Primtec: *See—*
Sorensen, Jens O., 5,023,039, Cl. 264-297.200.

Prince Sewing Machine Co., Ltd.: *See—*
Iwase, Yukio, 5,022,336, Cl. 112-304.000.

Pringle, Joseph M.: *See—*
Murray, Donna F.; Pringle, Joseph M.; Strope, Gerald C.; and Berkson, Stephen P., 5,023,851, Cl. 368-41.000

Printer Systems Corporation: *See—*
Stoica, Adrian, 5,023,892, Cl. 375-118.000.

Prisbylla, Michael P., to ICI Americas Inc. Substituted 2,4-diarylpyrimidines and their use as herbicides. 5,022,915, Cl. 71-92.000.

Probst, Willy: *See—*
Beerli, Markus; Bollen, Manfred; Iten, Jakob; Koslowski, Gerhard; Probst, Willy; and Wildi, Edwin, 5,022,128, Cl. 28-191.000.

Procter & Gamble Co., The: *See—*
Ehrman, Albert M.; Seiden, Paul; Weitzel, Rose M ; and White, Robert L., 5,023,106, Cl. 426-660.000.
Muckenfuhs, Delmar R.; and Baird, James C., 5,022,216, Cl. 53-438.000.

ProCyte Corporation: *See—*
Pickart, Loren R., 5,023,237, Cl. 514-18.000.

Productech Inc.: *See—*
Zimmer, Gero, 5,022,581, Cl. 228-164 000.

Prokosch, Steve A.; and Aufderhar, Kevin R., to Honeywell Inc. Robotic laser soldering apparatus for automated surface assembly of microscopic components. 5,023,426, Cl. 219-121.630.

Promac Industries, Ltd.: *See—*
Anderson, Neil C., 5,022,182, Cl. 47-48.500.

Pugh, Cecil C.; and Coleman, John R., to General Motors Corporation. Venting master cylinder reservoir diaphragm. 5,022,713, Cl. 303-1.000.

Puntener, Alois; Lehmann, Urs; Scheibli, Peter; and Koller, Josef, to Ciba-Geigy Corporation. Fibre-reactive formazan dyes containing β-halogenethyl or vinylsulfonyl-alkanoylamino fiber-reactive groups. 5,023,274, Cl. 534-618.000.

Purcell, Lauren M.; and Lawrence, Albert F., to Hughes Aircraft Company. Method and apparatus for detecting trace contaminents. 5,023,452, Cl. 250-306.000.

Purkait, Bobby K.: *See—*
Yan, John Y. J., and Purkait, Bobby K., 5,022,942, Cl. 156-219.000.

Purro, Norina M Method and apparatus for photographic printing. 5,023,652, Cl. 355-1.000.

Pusic, Pavo. Automated toilet seat cleaning system. 5,022,097, Cl. 4-233.000.

Put, Frederik W., to Strategic American Markets, Inc. Belt filter press and belt for same. 5,022,989, Cl. 210-386.000.

Putnam, William R. Gutter cleaning device. 5,022,586, Cl. 239-71.000.

Quartztronics, Inc.: *See—*
EerNisse, Errol P.; Ward, Roger W.; and Wood, O. Lew, 5,022,130, Cl. 29-25.350.

Quest Electronics, SA: *See—*
Lopez, Javier E. M.; and Palaske, Mark G., 5,023,767, Cl. 363-17.000.

Quest, Thomas A. Multi-hooks bracket for cantileverly supporting office equipment. 5,022,621, Cl. 248-225.200.

Quick, Siegfried: *See—*
Skowasch, Gerhard; Sabranski, Udo; Funk, Jurgen; and Quick, Siegfried, 5,022,325, Cl. 102-226.000.

Quick, Thomas E.: *See—*
Faist, Kenneth B., 5,022,103, Cl. 4-596.000.

R. E. I., Inc.: *See—*
Longstaff, Eric, 5,022,181, Cl. 47-31.000.

R. Stahl Fordertechnik GmbH: *See—*
Lanfer, Hermann; and Kugler, Dieter, 5,023,434, Cl. 235-375.000.

Raaymakers, Wilhelmus P. M.; and Kuijpers, Franciscus L. J. M., to U.S. Philips Corporation. Optically readable record carrier for recording information, apparatus for manufacturing such a record carrier, apparatus for recording information on such a record carrier, and apparatus for reading information recorded on such a record carrier. 5,023,856, Cl. 369-32.000.

Rackley, John M.; and Vecci, Stanley J., to Babcock & Wilcox Company, The. Cyclone furnace for hazardous waste incineration and ash vitrification. 5,022,329, Cl. 110-234.000.

Racz, Istvan: *See—*
David, Agoston; Kenez nee Da, Marai; and Racz, Istvan, 5,022,972, Cl. 204-183.300.

Radair, Inc.: *See—*
Wheeless, Jesse, 5,023,934, Cl. 455-45.000.

Radermacher, Herbert: *See—*
Vanaschen, Luc; Radermacher, Herbert; and Kuster, Hans-Werner, 5,022,907, Cl. 65-163.000.

Radian Corporation: *See—*
Bell, Ronald D., 5,022,226, Cl. 60-274.000.

Radio Frequency Systems, Inc.: *See—*
Bentivenga, Salvatore; and Bentivenga, Michael J., 5,023,579, Cl 333-203.000.

Radionic Industries, Inc.: *See—*
Sridharan, Sri P., 5,023,521, Cl. 315-290.000.

Raether, Wolfgang: *See—*
Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans-Georg; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 5,023,357, Cl. 544-132.000.

RAF Electronics Corp.: *See—*
Flasck, Richard A., 5,022,750, Cl. 353-31.000.

Rainbird Sprinkler Mfg. Corp.: *See—*
Evelyn-Veere, Rene H., 5,023,787, Cl. 364-420.000.

Rainbow Optical Laboratory Co., Ltd.: *See—*
Ogura, Nobunori, 5,022,749, Cl. 351-219.000.

Raineteau, Gilles: *See—*
Trumpff, Jean-Michel; Byzery, Michel; and Raineteau, Gilles, 5,023,941, Cl. 455-307.000.

Rajan, Ganesh: *See—*
Luthra, Ajay K.; and Rajan, Ganesh, 5,023,825, Cl. 364-724.100.

Rajendran, Giri. *See—*
Lomax, Donald P.; Patzer, Gregory N.; and Rajendran, Giri, 5,023,145, Cl. 428-614.000.

Ramakrishna, Kamesh; Billmers, Meyer; and Theriault, Daniel, deceased (by Theriault, Michael J., administrator), to Digital Equipment Corporation. System and method for producing discrimination nets for expert systems. 5,023,807, Cl. 364-513.000.

Ramaswamy, Setlur R., to D. D. Williamson & Co., Inc. Fiber and method of making. 5,023,103, Cl. 426-626.000.

Ramsay, Michael V. J.: *See—*
Pereira, Oswy Z.; Ramsay, Michael V. J.; and Freeman, Stephen, 5,023,348, Cl. 549-264.000.

Randa, Stuart K.: *See—*
Buckmaster, Marlin D.; and Randa, Stuart K., 5,023,279, Cl 521-85.000.

Ransburg-Gema AG: *See—*
Buschor, Karl, 5,022,590, Cl. 239-708.000

Ransom, Richard D.: *See—*
Hames, Noel J.; and Ransom, Richard D., 5,022,094, Cl. 2-161.00A

Rantanen, Heikki, to Oy Partek Ab. Method for casting one or several concrete products placed side by side. 5,023,030, Cl. 264-40.500.

Rapp, Joachim. Stacking device for coins or similar disk-shaped objects. 5,022,890, Cl. 453-56.000.

Rapp, Knut M : *See—*
Gander, Michael; Rapp, Knut M.; and Schiweck, Hubert, 5,023,330, Cl. 536-124.000.

Rappay, Gyorgy: *See—*
Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre; Teplan, Istvan; Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt; Hegedus, Edit; Makara, Gabor; and Rappay, Gyorgy, 5,023,322, Cl. 530-324.000.

Ratcliffe, Edward: *See—*
Laughton, Laurence J.; and Ratcliffe, Edward, 5,023,422, Cl. 219-69.200.

Ratliff, Paul A.; and Karlotski, Robert J., to GTE Products Corporation. Electric lamp with improved frame support and method of producing same. 5,023,505, Cl. 313-25.000.

Rau, Axel; Ambrosius, Klaus; and Franz, Klaus D., to Merck Patent Gesellschaft Mit Beschrankter Haftung. Pearl luster pigments stable to glaze and enamel. 5,022,923, Cl. 106-415.000.

Rau, Norbert: *See—*
Eich, Manfred; Rau, Norbert; and Wendorff, Joachim, 5,023,859, Cl. 365-113.000.

Raven, Gregory S., to Motorola, Inc. Variable gain amplifier. 5,023,569, Cl. 330-285.000.

Ravichandran, Ramanathan; and Seltzer, Raymond, to Ciba-Geigy Corporation. N,N-bis(acyloxyethyl)hydroxylamine derivatives. 5,023,283, Cl. 524-101.000.

Rawlings, David E.: *See—*
Ferguson, Arthur R.; and Rawlings, David E., 5,022,370, Cl. 123-425.000.

Ray, Rajarshi: *See—*
Bose, Chinmoy B.; and Ray, Rajarshi, 5,023,917, Cl. 382-8.000.

Raychem Limited: *See—*
Thornley, David W. M., 5,023,406, Cl. 174-209.000.

Raythatha, Rasik H.; Suitch, Paul R.; and Andrews, E. Wayne, to ECC America Inc. Method for reducing the abrasion of calcined clay. 5,022,924, Cl. 106-486.000.

Raytheon Company: *See—*
Dency, George G.; and Caramiciu, Marius A., 5,022,556, Cl. 222-1.000.
Tsukii, Toshikazu; Houng, S. Gene; Miller, Michael D.; and McOwen, Sherwood A., Jr., 5,023,494, Cl. 307-571.000.

Rayudu, S. Rao, to Buckman Laboratories International, Inc. 1-methyl-3,5,7-triaza-1-azoniatricyclodecane triiodide. 5,023,332, Cl. 544-185.000.

RCA Licensing Corp.: *See—*
Deal, Samuel B.; and Calamari, James A., Jr., 5,023,509, Cl. 313-430.000.

Read, Richard B.: *See—*
Myers, Cal Y.; and Read, Richard B., 5,022,983, Cl. 209-167.000.

Reagents of the University of California, The: *See—*
Cho, Zang-Hee; and Wong, Edward K., Jr., 5,023,554, Cl. 324-309.000.

Recasens, Joseph: *See—*
Duvierre, Gerard; and Recasens, Joseph, 5,022,910, Cl. 65-325.000.

Reche, John J., to Polycon. Method of fabricating hybrid circuit structures. 5,023,205, Cl. 437-228.000.

Rector, Douglas L.; Conder, George A.; and Folz, Sylvester D., to Upjohn Company, The. Anthelmintic pyridinyl acylhydrazones. 5,023,334, Cl. 546-268.000.

Reeck, Steven L.: *See—*
Lynch, Marine D.; Bernklau, James W.; Paulson, Richard D.; and Reeck, Steven L., 5,023,643, Cl. 354-299.000.

Reeves, Myron D.: *See—*
Schield, Edward L.; Reeves, Myron D.; Nehiba, Marjorie A.; and Hartl, Lyn W., 5,022,206, Cl. 52-455.000.

Reflection Technology, Inc.: *See—*
Wells, Benjamin A.; and Golden, Neil, 5,023,905, Cl. 379-96.000.

Regal Ware, Inc.: *See—*
Bardell, Kenneth P., 5,023,927, Cl. 392-442.000.

Regester, Gary L. Light diffusion box. 5,023,756, Cl. 362-16.000.

Rei, Nuno M.; and Wilson, Ronald C., to Morton International, Inc. Microbiocidal compositions comprising an aryl alkanol and a microbiocidal compound dissolved therein. 5,023,281, Cl. 523-122.000.

Reich, Werner, to Deutsche ITT Industries GmbH. Digital deemphasis circuit. 5,023,609, Cl. 341-50.000.

Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert; Kunze, Brigitte; Hofle, Gerhard; Augustiniak, Hermann; Bedorf, Norbert; Jansen, Rolf; Trowitzsch-Kienast, Wolfram; and Steinmetz, Heinrich, to Ciba-Geigy Corporation; and Gesellschaft fur Biotechnologische Forschung mbH. Antibiotics from myxococcus. 5,023,184, Cl. 435-252.100.

Reicks, Allen V.: *See—*
Valster, Karl C.; and Reicks, Allen V., 5,022,132, Cl. 29-116.100.

Reisacher, Bartholomaus: *See—*
Heel, Helmut; Bauch, Karl; Reisacher, Bartholomaus; and Worner, Stefan, 5,022,686, Cl. 285-134.000.

Reiser, Peter; Mohring, Fritz; and Schodt; Adolf, to J. Eberspacher. Fuel pre-heater for liquid fueled engine. 5,022,851, Cl. 431-215.000.

Reits, Bernard J., to Hollandse Signaalapparaten B.V. FM-CW radar apparatus. 5,023,618, Cl. 342-128.000.

Reliance Comm/Tec Corporation: *See—*
Bu-Abbud, George, 5,022,752, Cl. 356-73.100.

Remers, William A.; and Sami, Salah M., to University Patents, Inc. 6-substituted mitomycin analogs. 5,023,253, Cl. 514-228.200.

Remotec, Inc.: *See—*
Coughlan, Joel B.; Farnstrom, Kenneth A.; Harvey, Howard W.; Upton, R. Glen; White, John R.; and Walker, Kenneth L., 5,022,812, Cl. 414-729.000.

Renfroe, Donald: *See—*
Frantom, Richard L.; Bishop, Robert J.; Kremer, Robert; Ocker, Klaus; Brown, Roy; Rose, James; Renfroe, Donald; and Bazel, Teresa, 5,022,674, Cl. 280-741.000.

Research Corporation: *See—*
Bagaria, Suresh C.; and Lordi, Nicholas G., 5,023,108, Cl. 427-3.000.

Research Corporation Technologies, Inc.: *See—*
Birnboim, Meyer H.; and Neeves, Arthur E., 5,023,139, Cl. 428-402.000.

Research Foundation of State University of New York, The: *See—*
Djordjevic, Bozidar, 5,023,172, Cl. 435-29.000.

Respondek, Johannes: *See—*
Schumacher, Wolfgang; Respondek, Johannes; Engel, Jurgen; Pohl, Jorg; Voegeli, Rainer; and Hilgard, Peter, 5,023,335, Cl. 548-104.000.

Restle, Serge: *See—*
Maignan, Jean; Lang, Gerard; Malle, Gerard; Restle, Serge; and Shroot, Braham, 5,023,363, Cl. 560-52.000.

Revlon, Inc.: *See—*
Macchio, Ralph A.; Russ, Julio G.; Slobody, Brent; and Tietjen, Mariene, 5,023,075, Cl. 424-63.000.

Rexair, Inc.: *See—*
Kasper, Gary A., 5,022,115, Cl. 15-353.000.

Reyner, Ellis M., to Joy Research, Incorporated. Regulated pressurized dispenser and method. 5,022,564, Cl. 222-386.500.

Reynolds Consumer Products, Inc.: *See—*
Hetzler, Kevin G.; Wegner, Wayne M.; and Munger, Billie C., 5,023,142, Cl. 428-500.000.

Reynolds, John W.; Burton, Bobby H.; and Kays, Jerry W., to Oklahoma Safety Equipment Co. Tension loaded composite rupture disk. 5,022,424, Cl. 137-68.100.

Reynolds, Robert C.: *See—*
Herzberg, Garry G.; and Reynolds, Robert C., 5,023,791, Cl. 364-424.040.

Rheinmetall GmbH: *See—*
Skowasch, Gerhard; Sabranski, Udo; Funk, Jurgen; and Quick, Siegfried, 5,022,325, Cl. 102-226.000.

Rheox, Inc.: *See—*
Kruse, Uno; Crowley, Burlon C.; and Mardis, Wilbur S., 5,023,309, Cl. 528-49.000.

Rhodehouse, Nolin C.; Martin, Terry G.; and Newbold, George T., to Martin Archery, Inc. Arrow rest/overdrawn apparatus for an archery bow. 5,022,378, Cl. 124-44.500.

Rhodes, John C.; Aljoe, Ronald R.; and Ellers, Berne F., to Clean-Pak, Inc.; and Dry Forming Processes AB. Method for constructing absorbent pad. 5,022,945, Cl. 156-253.000.

Rhodes, Robert P., to Hewlett-Packard Company. Method and apparatus for spectrochemical analysis having maximum repeatability. 5,022,756, Cl. 356-316.000.

Rhone-Poulenc Chimie: *See—*
Cordier, Georges, 5,023,384, Cl. 568-842.000.
Le Loarer, Jean-Luc, 5,023,070, Cl. 423-592.000.

Rhone-Poulenc Chimie De Base: *See—*
Bachot, Jean; and Kiefer, Jean-Claude, 5,023,127, Cl. 428-137.000.

Rhone-Poulenc Sante: *See—*
Massonneau, Viviane; Mulhauser, Michel; and Buforn, Albert, 5,023,361, Cl. 558-32.000.

Rice, John H., Jr., to Hercules Incorporated. Piezoelectric crystal powered ignition device. 5,022,324, Cl. 102-201.000.

Rice, Sandra W.: *See—*
Swofford, Howard W.; Rice, Sandra W.; Farrar, Grover L.; and Rudd, David, 5,022,944, Cl. 156-244 110.

Richard, Daniel D.: *See—*
Knippscheer, Hermann; and Richard, Daniel D., 5,022,236, Cl. 62-529.000.

Richards, Derek J., to Arjo Mecanaids Limited. Invalid hoists. 5,022,106, Cl. 5-86.000.

Richards, Elizabeth C.: *See—*
Haranaka, Katsuyuki; Old, Lloyd J.; Richards, Elizabeth C.; and Williamson, Barbara, 5,023,320, Cl. 530-350.000.

Richardson, Kenneth: *See—*
Gymer, Geoffrey E.; Narayanaswami, Subramaniyan; and Richardson, Kenneth, 5,023,258, Cl. 514-255.000.

Richeson, William E., to North American Philips Corporation. Low energy hydraulic actuator. 5,022,358, Cl. 123-90.120.

Richeson, William E.: *See—*
Erickson, Frederick L.; and Richeson, William E., 5,022,359, Cl. 123-90.140.

Richmond, Frank M.; and Vanderveen, Timothy, to Fisher Scientific Company. I.V. bag organizer. 5,022,538, Cl. 211-113.000.

Richter, Franz: *See—*
Neff, Willi; Holz, Raymond; Lebert, Rainer; and Richter, Franz, 5,023,897, Cl. 378-122.000.

Rickards, Field W.: *See—*
Cohen, Lawrence T.; and Rickards, Field W., 5,023,783, Cl 364-413.020.

Ricoh Company, Ltd.: *See—*
Nakayama, Masahiko, 5,023,858, Cl. 369-112.000.
Ueda, Aki, 5,023,860, Cl. 369-116.000.

Rieder, Gregory C.: *See—*
Heckaman, Douglas E.; Frisco, Jeffrey A ; Rieder, Gregory C.; and Bajgrowicz, Edward J., 5,023,624, Cl. 343-860.000.

Rieter Machine Works, Ltd.: *See—*
Clement, Heinz, 5,022,122, Cl. 19-225.000.

Rifar S.R.L.: *See—*
Marsili, Leonardo, 5,023,331, Cl. 540-230.000

Rinderer, Eric R., to B-Line Systems, Inc. One piece conduit clip. 5,022,614, Cl. 248-62.000.

Rinker, James M.: *See—*
Caufield, Craig E.; Musser, John H.; and Rinker, James M., 5,023,262, Cl. 514-291.000.

Riso Kagaku Corporation: *See—*
Hasegawa, Takanori; and Negishi, Hideo, 5,022,642, Cl. 271-10.000.

Ristvedt, Mark E.: *See—*
Ristvedt, Victor G.; and Ristvedt, Mark E., 5,022,889, Cl 453-6.000.

Ristvedt, Victor G.; and Ristvedt, Mark E. Coin sorter. 5,022,889, Cl. 453-6.000.

Ritchie, Nathan: *See—*
Lauterbach, Jerre F.; Ritchie, Nathan; and Miller, Richard F., 5,022,832, Cl. 417-571.000.

Rittal-Werk Loh GmbH & Co. KG: *See—*
Keens, Gary; and Fursier, Roger, 5,022,863, Cl. 439-108.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Ritter, Andrew P.: *See—*
  - Bailey, Alex E.; Winzer, Stephen R.; Sutherland, Audrey E.; and Ritter, Andrew P., 5,023,032, Cl. 264-63.000.
- Ritter, Karl M., to Jefferson Smurfit Corporation. Corrugated box flap locking feature for produce and the like. 5,022,582, Cl. 229-157.000.
- Rizzi, Francesco. Chain die assembly for making hard and stuffed sugar drops. 5,022,841, Cl. 425-235.000.
- Rizzo, Vincent J.: *See—*
  - Mans, Wayne K.; and Rizzo, Vincent J., 5,023,518, Cl. 315-219.000.
- RMI Titanium Company: *See—*
  - Fisher, Richard L., 5,022,935, Cl. 148-126.100.
- Robbins, Edward S., III: *See—*
  - Schwertner, Gary T.; and Robbins, Edward S., III, 5,022,844, Cl. 425-302.100.
- Roberge, James K., to Massachusetts Institute of Technology. Linearized thermal feedback circuit and temperature controller circuit utilizing the same. 5,023,431, Cl. 219-494.000.
- Robert Bosch GmbH: *See—*
  - Borst, Erich, 5,022,188, Cl. 51-168.000.
  - Denz, Helmut; Grieser, Klemens; Stock, Jurgen; Moz, Rudolf; and Uttenweiler, Winifred, 5,022,374, Cl. 123-490.000.
  - Drobny, Wolfgang; Nitschke, Werner; Taufer, Peter; and Weller, Hugo, 5,023,468, Cl. 307-10.100.
  - Martin, Klenk, 5,023,794, Cl. 364-431.040.
  - Neukirchner, Ernst-Peter; and Schlogl, Dietmar, 5,023,798, Cl. 364-449.000.
  - Siegel, Heinz; and Mueller, Klaus, 5,022,716, Cl. 303-104.000.
- Roberto, Giani; Ettore, Parini; Massimiliano, Borsa; and Antonio, Lavezzo, to Dompe Farmaceutici S.p.A. Pharmacologically active aminoimidazopyridines. 5,023,256, Cl. 514-253.000.
- Roberts, Jeffrey R.: *See—*
  - Torres, Daniel L.; Murphy, Timothy J.; Maakad, Guy A.; Roberts, Jeffrey R.; and Murray, Kent S., 5,022,799, Cl. 408-1.00R.
- Roberts, Martyn G., to Rolls-Royce Incorporated. Cantilever mounting system for structural members having dissimilar coefficients of thermal expansion. 5,022,805, Cl. 411-468.000.
- Roberts, Thomas A., to Imperial Chemical Industries PLC. Hard tissue surface treatment. 5,023,107, Cl 427-2.000.
- Roberts, William N : *See—*
  - Dougherty, Lawrence W.; and Roberts, William N., 5,023,507, Cl. 313-407.000.
- Robertson, David W.; Wong, David T.; and Krushinski, Joseph H., Jr., to Eli Lilly and Company. 3-aryloxy-3-substituted propanamines. 5,023,269, Cl. 514-438.000.
- Robertson, James C., to Ensco. Inc. Shredder/compactor auger system 5,022,328, Cl. 110-232.000.
- Robertson, John M., to Louisville Stoneware Inc. Birdfeeder arrangements. 5,022,346, Cl. 119-52.200.
- Robinson, Jon K.: *See—*
  - McGrady, Michael B., and Robinson, Jon K., 5,022,393, Cl. 128-205.230.
- Robinson, Robert J.: *See—*
  - Prescott, Robert C.; and Robinson, Robert J., 5,022,425, Cl 137-82.000.
- Robschlager, Karl-Heinz: *See—*
  - Grandvallet, Pierre; Kortbeek, Andras Guus Theodorus George: Van Den Berg, Johannes Petrus; and Robschlager, Karl-Heinz, 5,023,389, Cl. 585-304.000.
- Robson, David: *See—*
  - Grant, Michael; and Robson, David, 5,023,865, Cl 370-3.000.
- Rodler, Hermann J.: *See—*
  - Auracher, Franz; Ehberg, Alfred; Noll, Bernd; Meissner, Eckhard, and Rodler, Hermann J., 5,023,949, Cl. 455-618.000.
- Rodondi, Andrew F.: *See—*
  - Detter, Gary C.; Rodondi, Andrew F., Burns, Christopher D.; Norling, Samuel A.; Garretson, Jay H.; and Landries, Richard V., 5,023,752, Cl. 361-399.000.
- Roelofsen, Jan W.: *See—*
  - Gimpel, Moritz; and Roelofsen, Jan W., 5,023,066, Cl. 423-328.000.
- Rogers, Clarence L., Jr Tire uniformity correction. 5,022,186, Cl 51-165.00R.
- Rogerson, William E.; and Donovan, Sean P., to Allied-Signal Inc. Air bag assembly and method therefor 5,022,676, Cl. 280-743 000.
- Rohm Co., Ltd.: *See—*
  - Taniguchi, Hideo: Ogata, Hiromi; Sawase, Kensuke; Yokoyama, Manabu; and Tujikawa, Munekazu, 5,023,442, Cl. 250-208.100.
- Rohm GmbH: *See—*
  - Siol, Werner; and Terbrack, Ulrich, 5,023,123, Cl. 428-392.000.
- Rohm GmbH Chemische Fabrik: *See—*
  - Eich, Manfred; Rau, Norbert, and Wendorff, Joachim, 5,023,859, Cl. 365-113.000.
- Rohm and Haas Company: *See—*
  - Amick, David R., 5,023,275, Cl. 514-627.000.
- Roling, Paul V , to Betz Laboratories, Inc. Methods and compositions for inhibiting (meth)acrylic acid polymerization. 5,023,372, Cl. 562-598.000.
- Roll, Rudolf; Brandenburger, Jurgen; and Hempel, Horst, to Hoechst CeramTec Aktiengesellschaft. Process and jig for plating pin grid arrays. 5,022,976, Cl. 204-297.00R.
- Rollini, Pietro; and Luisi, Domenic, to Rubinet Brass Canada Limited. Valve assembly for plumbing fixture. 5,022,429, Cl. 137-218.000.
- Rolls-Royce Incorporated: *See—*
  - Roberts, Martyn G., 5,022,805, Cl. 411-468.000.
- Rolls-Royce plc: *See—*
  - Laughton, Laurence J.; and Ratcliffe, Edward, 5,023,422, Cl. 219-69.200.
- Rolyn Productions Inc.: *See—*
  - Stevenson, Robert A., 5,022,790, Cl. 405-186.000.
- Romak, Paul E.: *See—*
  - Kourimsky, Friedrich J A.; and Romak, Paul E., 5,022,867, Cl. 439-395.000.
- Romberger, Karl A.: *See—*
  - Bielecki, Edwin J.; Romberger, Karl A.; Bakke, Bart F.; Hobin, Martin A.; and Clark, Charles R., 5,023,059, Cl. 423-9.000.
- Romer, Michael: *See—*
  - Felder, Ernst; Romer, Michael; Bardonner, Hans; Hartner, Hartmut; and Fruhstorfer, Wolfgang, 5,023,379, Cl. 564-472.000.
- Roquette Freres: *See—*
  - Salome, Jean-Paul; and Fleche, Guy, 5,023,354, Cl. 549-364.000.
- Rose, James: *See—*
  - Frantom, Richard L.; Bishop, Robert J , Kremer, Robert; Ocker, Klaus; Brown, Roy; Rose, James; Renfroe, Donald, and Bazel, Teresa, 5,022,674, Cl. 280-741.000.
- Rose, William J.: *See—*
  - Boyd, Ian A. R.; Rose, William J.; and Schaeffer, George A., 5,023,727, Cl. 358-310.000.
- Rosemount Inc.: *See—*
  - Rud, Stanley E., Jr., 5,022,270, Cl. 73-706.000.
- Rosenberg, Rex W. Support system. 5,023,755, Cl 362-12.000.
- Rosenberger, John R. Configurable wind powered vessel. 5,022,338, Cl 114-39.100.
- Rosenthal, Allan B.: *See—*
  - Matsumoto, Roger L. K.; and Rosenthal, Allan B., 5,023,214, Cl 501-97.000.
- Rosenthal, Harold: *See—*
  - Sherrow, Lionel; Rosenthal, Harold, Spitz, Joseph M.; and Haines, Stephen W., 5,022,810, Cl. 414-501.000.
- Roslivker, Efim G.: *See—*
  - Boiko, Leonid S.; Korotkin, Viktor I.; Veretennikov, Viktor Y , Roslivker, Efim G.; Fedyakin, Roman V.; Chesnokov, Viktor A., Yakovlev, Anatoly S.; Kharitonov, Jury D.; Fei, Valery M.; and Galichenko, Emma N., 5,022,280, Cl. 74-462.000.
- Ross, Edward A.: *See—*
  - Spangler, Charles W.; Dominick, George G.; Ross, Edward A., and Fish, Darrell D., 5,022,547, Cl. 220-234.000.
- Roth Bros. Smelting Corp.: *See—*
  - Balcar, Gerald P.; Krumrine, Paul; Schwartz, Neal, Sutker, Burton J.; and Wood, Gail J., 5,022,897, Cl. 55-96.000.
- Rott, Robert D.: *See—*
  - Frigon, Phillip E.; and Rott, Robert D., 5,022,176, Cl. 42-90.000
- Rouaud, Christian: *See—*
  - Fages, Jean; de Villepoix, Raymond; Abbes, Claude; and Rouaud, Christian, 5,022,663, Cl. 277-236.000.
- Rousseau, Jean: *See—*
  - Langer, Salomon Z.; Frost, Jonathan R.; Schoemaker, Johannes, Gaudilliere, Bernard, Bertin, Jean; Rousseau, Jean; Dupont, Regis; and Wick, Alexander E., 5,023,266, Cl. 514-317.000.
- Roy, Bryan A.; Boris, Gregory F.; Campbell, John J.; Funk, John G., Wozniak, David J.; Gibson, James D.; and McCauley, Robert M., to Westinghouse Electric Corp. Apparatus and method for removing liquid from a composition and for storing the deliquified composition 5,022,995, Cl. 210-651.000.
- Rozek, Roy J.; and O'Connell, Mark, to Thomas Industries. Plastic piston head assembly. 5,022,312, Cl. 92-240.000.
- Rozon, David P., to 139088 Canada Ltee. Sliding link system for vertical blinds. 5,022,453, Cl. 160-168.100.
- Ruback, Wulf: *See—*
  - Kelkenberg, Heike; and Ruhack, Wulf, 5,023,018, Cl. 252-527.000.
- Rubinet Brass Canada Limited: *See—*
  - Rollini, Pietro; and Luisi, Domenic, 5,022,429, Cl. 137-218.000.
- Rubow, Keith A.; and Wachel, Robert D., to Cordell Manufacturing, Inc. Data compression method using textual substitution. 5,023,610, Cl. 341-51.000.
- Rud, Stanley E., Jr., to Rosemount Inc. Extended measurement capability transmitter having shared overpressure protection means 5,022,270, Cl. 73-706.000.
- Rudd, David: *See—*
  - Swofford, Howard W.; Rice, Sandra W.; Farrar, Grover L., and Rudd, David, 5,022,944, Cl. 156-244 110.
- Rudesill, John A.: *See—*
  - Spencer, Nicholas D.; Pan, Wie-Hin, and Rudesill, John A., 5,023,067, Cl. 423-420.000.
- Ruh, Wolf-Dieter: *See—*
  - Cziep, Werner; Kuenzel, Ulrich; and Ruh, Wolf-Dieter, 5,022,956, Cl. 156-643.000.
- Ruiz, Peter R. Cooking utensil with nested lid. 5,022,550, Cl. 220-94.00R.
- Rupert, Karl; Mayer, Walter; and Lochbronner, Hubert, to Schubert & Salzer Maschinenfabrik Aktiengesellschaft. Process and device for piecing yarn to an open-end spinning device. 5,022,222, Cl. 57-263.000.
- Rushing, Tatsuo; and Kidd, Christopher, to Marlboro Marketing, Inc Two-way tray display. 5,022,539, Cl. 211-133.000.
- Rusnak, Mark F.: *See—*
  - Schlotterer, John C.; Johnston, Paul M.; Rusnak, Mark F.; Pillage, Lawrence T.; and Byrd, Thomas M., Jr., 5,023,822, Cl. 364-703.000.
- Russ, Julio G.: *See—*
  - Macchio, Ralph A.; Russ, Julio G.; Slobody, Brent; and Tietjen, Marlene, 5,023,075, Cl 424-63.000.

- Russ, Karl J.: *See—*
  - Williams, David L.; Russ, Karl J.; Dienes, Edward K.; and Laufer, George A., 5,023,225, Cl. 502-304.000.
- Russell, Thomas C.: *See—*
  - Moran, Joseph M.; and Russell, Thomas C., 5,023,557, Cl. 324-537.000.
- Russie, Renold J., to Cardiac Pacemakers, Inc. Implantable cardiac device with dual clock control of microprocessor. 5,022,395, Cl. 128-419.0PG.
- Rutgers, The State University of New Jersey: *See—*
  - Chien, Yie W.; and Chien, Te-Yen, 5,023,084, Cl. 424-448.000.
- Rutz, Hans, to Hollingsworth GmbH. Carding machine or scribbler with transversely moving carding element sets. 5,022,121, Cl. 19-102.000.
- Ryan, Robert P.: *See—*
  - Glotfelter, Craig A.; and Ryan, Robert P., 5,023,140, Cl. 428-413.000.
- Ryobi Ltd.: *See—*
  - Monobe, Juzaburo, 5,022,447, Cl. 144-251.00R.
- Ryu, Seong-Bae, to SamSung Electronics Co. Ltd. Circuit for generating a center point of a view finder. 5,023,722, Cl. 358-224.000.
- Sabranski, Udo: *See—*
  - Skowasch, Gerhard; Sabranski, Udo; Funk, Jurgen; and Quick, Siegfried, 5,022,325, Cl. 102-226.000.
- Sachdeva, Abnash C.: *See—*
  - Verret, Douglas P.; Smayling, Michael C.; Sachdeva, Abnash C.; and Keller, Stephen A., 5,023,690, Cl. 357-43.000.
- Sachse, Burkhard: *See—*
  - Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans-Georg; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margrel; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 5,023,357, Cl. 544-132.000.
- Sadler, Jimmie L.: *See—*
  - Boardman, John D.; Sadler, Jimmie L.; and Trimble, Richard A., 5,023,463, Cl. 250-551.000.
- Saeki, Takao: *See—*
  - Kuwabara, Yasuo; Fujie, Naofumi; and Saeki, Takao, 5,023,526, Cl. 318-116.000.
- Saeki, Takeshi: *See—*
  - Kyogoku, Nobuo; Saeki, Takeshi; and Fujikawa, Shigeaki, 5,023,024, Cl. 264-4.300.
- Safetran Systems Corporation: *See—*
  - Peel, Richard V., 5,022,613, Cl. 246-125.000.
- Saidin, Zain; and Slocum, Alexander H., to Advanced Engineering Systems, Operation & Products, Inc. Method of three-phase winding motor control of rotary motor-driven linear actuators, linear motor-actuated carriages, and similar systems, and apparatus for practicing the same. 5,023,528, Cl. 318-254.000.
- St Clair, Anne K.: *See—*
  - Dorogy, William E., Jr.; and St. Clair, Anne K., 5,023,034, Cl. 264-184.000.
- Saint-Gobain Vitrage International: *See—*
  - Vanaschen, Luc; Kuster, Hans-Werner; Havenith, Hubert; and D'Iribarne, Benoit, 5,022,906, Cl. 65-104.000.
  - Vanaschen, Luc; Radermacher, Herbert; and Kuster, Hans-Werner, 5,022,907, Cl. 65-163.000.
- Saint Martin, Bernard, to Iso Concept S.A. Fast discharge and introduction devices for a tight insulator. 5,022,794, Cl. 406-171.000.
- Saito, Hideyo. *See—*
  - Tsujimura, Hiroshi; Tamai, Yasumasa; Saito, Hideyo; and Kobayashi, Masahiro, 5,022,936, Cl. 148-135.000.
- Saito, Katsushi; Miyauchi, Yujiro; Murata, Toshimichi, and Shindo, Yoshio, to Nippon Steel Corporation Black surface-treated steel sheet 5,023,146, Cl. 428-623.000.
- Saito, Syuichiro: *See—*
  - Date, Nobuaki; and Saito, Syuichiro, 5,023,723, Cl. 358-225.000.
- Saito, Tutomu: *See—*
  - Yamamura, Kengo; Saito, Tutomu; and Higuchi, Youji, 5,022,184, Cl. 49-352.000.
- Saitoh, Masaki: *See—*
  - Tamada, Hitoshi; and Saitoh, Masaki, 5,022,729, Cl. 350-96.120.
- Saitou, Tosio; Matsui, Kenji; Tamura, Keiichi; Mori, Shinji; and Izuchi, Shingo, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Locking mechanism for webbing retractor. 5,022,601, Cl. 242-107.40A.
- Sakai, Hideo: *See—*
  - Ando, Kazumasa; Sakai, Hideo; and Sakai, Miki, 5,023,688, Cl. 357-42.000.
- Sakai, Keijiro: *See—*
  - Mutoh, Nobuyoshi; Sakai, Keijiro; Ueda, Akiteru; and Fujii, Hiroshi, 5,023,538, Cl. 318-811.000.
- Sakai, Miki: *See—*
  - Ando, Kazumasa; Sakai, Hideo; and Sakai, Miki, 5,023,688, Cl 357-42.000.
- Sakai, Naohumi; Tsuchida, Masashi; Ohmachi, Kazuhiko; Imai, Yasuhiro; and Honma, Toshio, to Hitachi Software Engineering Co., Ltd.; and Hitachi Ltd. Data I/O transaction method and system. 5,023,774, Cl. 364-200.000.
- Sakama, Masao: *See—*
  - Suzuki, Hideo; and Sakama, Masao, 5,022,303, Cl. 84-600.000.
- Sakamari, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, to Eagle Industry Co., Ltd. Vane pump with rotatable annular ring means to control vane extension. 5,022,842, Cl. 418-257.000.
- Sakamoto, Hideyuki; and Nose, Toshimitsu, to Nissan Motor Company, Ltd. Automatic air conditioning system with variable displacement compressor for automotive vehicles. 5,022,232, Cl. 62-133.000.
- Sakamoto, Kiichi: *See—*
  - Yamada, Akio; Sakamoto, Kiichi, Kudou, Jinko; and Yasuda, Hiroshi, 5,023,462, Cl. 250-492.200.
- Sakamoto, Mitsuo: *See—*
  - Kobori, Takuji; Sakamoto, Mitsuo; Yamada, Toshikazu; Nishimura, Isao; Ishii, Koji; and Tagami, Jun, 5,022,201, Cl. 52-167.0DF.
- Sakamoto, Sadafumi: *See—*
  - Ushiyama, Katsumi; Sakamoto, Sadafumi; and Itoh, Kiyohiko, 5,023,621, Cl. 343-702.000.
- Sakamoto, Seiji; and Shudo, Nobuyasu, to Diafoil Company, Limited. Polyester composition. 5,023,291, Cl. 524-430.000.
- Sakamoto, Takayuki: *See—*
  - Hiratsuka, Katsuo; Odaka, Yoshiyuki; and Sakamoto, Takayuki, 5,022,334, Cl. 112-238.000.
- Sakamoto, Teruo; Takeda, Toyohiko; and Suzuki, Yusuke, to Shionogi & Co., Ltd. Sustained-release preparations and the process thereof 5,023,089, Cl. 424-502.000.
- Sakamoto, Yukio; Fukutani, Iwao; and Hori, Toshio, to Murata Manufacturing Co., Ltd. Retainer for connector terminals. 5,022,870, Cl. 439-608.000.
- Sakata, Tsuguhide; Kimura, Norio; and Takei, Masahiro, to Canon Kabushiki Kaisha. Information recording system and apparatus. 5,023,730, Cl. 360-48.000.
- Sakiyama, Katsunori; Sato, Tomoaki; and Eino, Teruo, to Olympus Optical Co., Ltd. Winding type endoscope apparatus. 5,022,383, Cl. 128-6.000.
- Sakiyama, Noritaka: *See—*
  - Mizuno, Eiichi; Sakiyama, Noritaka; Matsui, Yukito; Kono, Yoshikazu; and Yamada, Kiyoshige, 5,022,704, Cl. 296-195.000.
- Sakura, Shunji: *See—*
  - Ueda, Satoshi; Sudare, Masahiro; Suyama, Yasuyuki; Kishimoto, Kazuhiko; Suzuki, Kenshi; Inoue, Shiroh; and Sakura, Shunji, 5,023,534, Cl. 318-587.000.
- Sakurai, Kenya, to Fuji Electric Co., Ltd. Method of producing a semiconductor device using a single mask method for providing multiple masking patterns. 5,023,191, Cl. 437-27.000.
- Sakurai, Mitsuhiro: *See—*
  - Sumi, Naoki; Mochizuki, Keizo; Moriyama, Yoshio; and Sakurai, Mitsuhiro, 5,023,098, Cl. 426-474 000.
- Saleh, Adel A. M.: *See—*
  - Cimini, Leonard J., Jr.; Greenstein, Larry J.; and Saleh, Adel A M., 5,023,947, Cl. 455-619.000.
- Salem, Eli; Libutti, Bruce L.; and Kunin, Robert, to Graver Company, The. Method for treating aqueous solutions. 5,022,997, Cl. 210-670.000.
- Salenbien, Leonard J.: *See—*
  - Hines, Gordon E.; Salenbien, Leonard J.; and Burzan, Vernon J., 5,022,665, Cl. 279-2.00R.
- Salice, Luciano, to Heidelberger Druckmaschinen AG. Hinge bracket assembly. 5,022,116, Cl. 16-258.000.
- Salisbury, Richard. Detection apparatus for safety eyewear. 5,023,597, Cl. 340-572.000.
- Salome, Jean-Paul; and Fleche, Guy, to Roquette Freres. High purity alditol diacetals, free from organic solvent traces and processes for preparing same. 5,023,354, Cl. 549-364.000.
- Samezawa, Mitsuo. *See—*
  - Hijikata, Isamu; Uehara, Akira, and Samezawa, Mitsuo, 5,022,979, Cl. 204-298.330.
- Sami, Salah M.: *See—*
  - Remers, William A.; and Sami, Salah M., 5,023,253, Cl. 514-228.200.
- Sammells, Anthony F.: *See—*
  - Cook, Ronald L.; and Sammells, Anthony F., 5,022,970, Cl 204-72.000.
- Samsung Electron Devices Co., Ltd : *See—*
  - Park, In-gyu, 5,023,508, Cl. 313-414 000.
- SamSung Electronics Co., Ltd.: *See—*
  - Kim, Ko-Hyun, 5,023,862, Cl 369-215.000.
  - Kim, Man U., 5,022,214, Cl. 53-242.000.
  - Moon-Hwan, Seo, 5,023,721, Cl. 358-147.000.
  - Ryu, Seong-Bae, 5,023,722, Cl. 358-224.000.
- Sandberg, Thomas M., to Kenyon Consortium, The. Television, radio and binocular system. 5,023,706, Cl. 358-254 000.
- Sanden Corporation: *See—*
  - Aoki, Hisao; and Yamaguchi, Toru, 5,022,464, Cl. 165-176.000.
- Sander, Ingolf: *See—*
  - Champagne, Patrick J.; and Sander, Ingolf, 5,023,861, Cl. 369-215.000.
- Sanders, Paul W.: *See—*
  - Johnsen, Robert J.; and Sanders, Paul W., 5,023,196, Cl. 437-40.000.
- Sanders, Robert L. Cordless pepper mill 5,022,591, Cl. 241-169.100.
- Sandoz Ltd.: *See—*
  - Moser, Helmut, 5,023,324, Cl. 534-606.000.
- Sandstrom, Richard L.: *See—*
  - Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,023,884, Cl. 372-57.000.
- Sanitation Equipment Limited: *See—*
  - Stewart, John M., 5,022,946, Cl. 156-272.400.
- Sanner, M. Duane; Nunley, Leonard J.; and Wallace, Barry M., to Light Signatures, Inc. Programmable sensor aperture. 5,023,923, Cl 382-61.000.
- Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki, to Hitachi, Ltd. Method and apparatus for body motion corrective imaging. 5,023,553, Cl. 324-309.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Sano, Yoji: *See—*
  - Pope, Edward J. A.; Sano, Yoji. Wang, Shi-ho; and Sarkar, Arnab, 5,023,208, Cl. 501-12.000.
- Sansin Engineering, Inc.: *See—*
  - Kawai, Mamoru, 5,022,672, Cl. 280-281.100.
- Santasalo, Lauri, to Sterilinja Oy. Method and apparatus for storing and transporting a solution of peracetic acid. 5,022,215, Cl. 53-420.000.
- Sanyo Electric Co., Ltd.: *See—*
  - Kawahara, Tsugio; Harashima, Hiromasa; Ubukata, Shunji; Kameda, Kazuo; Moriya, Hirohito; and Inamura, Yoshihisa, 5,022,172, Cl. 40-503.000.
  - Sekikawa, Nobuyuki; and Takada, Tadayoshi, 5,023,195, Cl. 437-31.000.
- Sara Lee Corporation: *See—*
  - Peleg, Eliezer, 5,022,240, Cl. 66-177.000.
- Sarkar, Arnab: *See—*
  - Pope, Edward J. A.; Sano, Yoji; Wang, Shi-ho; and Sarkar, Arnab, 5,023,208, Cl. 501-12.000.
- Sasaki, Hideaki: *See—*
  - Shirai, Mitugu; Katayama, Kaoru; Sasaki, Hideaki; Kazui, Shinichi; Satoh, Ryohei; Miyauchi, Tateoki; and Kobayashi, Mamoru, 5,023,407, Cl. 174-257.000.
- Sasaki, Isao: *See—*
  - Anzai, Hisao; Sasaki, Isao; Nishida, Kozi; Makino, Hideaki; Ohtani, Masami; and Shimada, Katsuhiko, 5,023,302, Cl. 525-378.000.
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  - Tsushima, Hideaki; and Sasaki, Shinya, 5,023,950, Cl. 455-619.000.
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  - Ebara, Takeshi; Sasaki, Toshio; and Kawai, Kiyoshi, 5,023,223, Cl. 502-116.000.
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  - Hanyu, Susumu; Kasuga, Noboru; Koike, Mikio; Hara, Kazumasa; Nishijima, Mitsuru; and Sasano, Akiyoshi, 5,022,335, Cl. 112-255.000.
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  - Nakayama, Tadayoshi; Ishikawa, Hisashi; Kozuki, Susumu; Takahashi, Koji; Yoshimura, Katsuji; Nagasawa, Kenichi; and Sasatani, Tomohiko, 5,023,716, Cl. 358-138.000.
- Sasnett, Michael W.: *See—*
  - Hobart, James L.; Sasnett, Michael W.; Mefferd, Wayne S.; and Allen, Peter N., 5,023,886, Cl. 372-99.000.
- Sata, Ichiko: *See—*
  - Kugimiya, Shuzo; Suzuki, Hitoshi; Fukumoshi, Yoji; Sata, Ichiko; Hirai, Tokuyuki; and Nishida, Yumi, 5,023,786, Cl. 364-419.000.
- Sata, Nobuyuki: *See—*
  - Sasaki, Kenji; Yokota, Kenji; Hattori, Hiroshi; and Sata, Nobuyuki, 5,022,498, Cl. 187-127.000.
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  - Mukai, Toshio; Yamashita, Yoshiro; Suzuki, Takanori; Akasaki, Yutaka; Sato, Katsuhiro; Yabuuchi, Naoya; Tanaka, Hiroyuki; and Nukada, Katsumi, 5,023,356, Cl. 552-210.000.
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  - Yamazaki, Makoto; Ueda, Kazumi; Isobe, Shinichi; and Sato, Katsunari, 5,023,550, Cl. 324-262.000.
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  - Yamazaki, Shunpei; and Sato, Masahiko, 5,023,013, Cl. 252-299.670.
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  - Tomono, Makoto; Tarumi, Noriyoshi; and Sato, Masayuki, 5,023,158, Cl. 430-99.000.
- Sato, Muneyoshi: *See—*
  - Onozuka, Haruo; Umezu, Takao; Sato, Muneyoshi; and Takada, Seiji, 5,023,470, Cl. 307-108.000.
- Sato, Shingo: *See—*
  - Ogura, Haruo; Furuhata, Kimio; Sato, Shingo; Ito, Masayoshi; Shitori, Yoshiyasu; and Nagai, Yoshitaka, 5,023,239, Cl. 514-26.000.
- Sato, Tomoaki: *See—*
  - Sakiyama, Katsunori; Sato, Tomoaki; and Eino, Teruo, 5,022,383, Cl. 128-5.000.
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  - Machida, Hiroji; Asano, Michiaki; Watanabe, Yozo; Tokuhiro, Tomoya; Satoh, Hiroshi; Iwahashi, Motoyuki; Yamaguchi, Norihiro; Kikuchi, Koshin; and Watanabe, Hiroaki, 5,023,020, Cl. 261-18.100.
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  - Matsumoto, Masaharu; Satoh, Katsuaki; Ishikawa, Seiichi; Serikawa, Mitsuhiko; Kawamura, Akihisa; and Hashimoto, Hikari, 5,023,913, Cl. 381-63.000.
- Satoh, Nobuo: *See—*
  - Shinohara, Koichi; Suzuki, Takashi; Kawagishi, Masao; Satoh, Nobuo; Murakami, Takeshi; and Fujita, Takashi, 5,023,739, Cl. 360-132.000.
- Satoh, Ryohei: *See—*
  - Shirai, Mitugu; Katayama, Kaoru; Sasaki, Hideaki; Kazui, Shinichi; Satoh, Ryohei; Miyauchi, Tateoki; and Kobayashi, Mamoru, 5,023,407, Cl. 174-257.000.
- Satterwhite, Paul J.: *See—*
  - Pockat, Gregory R.; Christenberry, Carl C.; and Satterwhite, Paul J., 5,023,121, Cl. 428-36.900.
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- Sauber Mfg. Co.: *See—*
  - Sauber, Charles J., 5,022,489, Cl. 182-3.000.
- Saul, Earl W. Sander extension device. 5,022,189, Cl. 51-170.0TL.
- Savoy, Steven, to Posso Corporation. Bags for storing electronic recording devices and liquid containers. 5,022,528, Cl. 206-545.000.
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- Sawase, Kensuke: *See—*
  - Taniguchi, Hideo; Ogata, Hiromi; Sawase, Kensuke; Yokoyama, Manahu; and Tujikawa, Munekazu, 5,023,442, Cl. 250-208.100.
- Sayles, David C., to United States of America, Army. Method of ejecting an interceptor missile from its silo. 5,022,306, Cl. 89-1.800.
- Scalzi, Casper A.: *See—*
  - Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Page, David R.; Plambeck, Kenneth E.; Scalzi, Casper A.; and Schmalz, Richard J., 5,023,773, Cl. 364-200.000.
- Scalzo, Augustine J., to Westinghouse Electric Corp. Compressor diaphragm assembly. 5,022,818, Cl. 415-209.300.
- Scardera, Michael; and Grosser, Frank R., to Olin Corporation. Antimicrobial composition containing aliphatic polygycidol adducts. 5,023,008, Cl. 252-106.000.
- Schaaf, Walter A. L., to GTE Sylvania N.V. Getter means and lamp including same. 5,023,512, Cl. 313-560.000.
- Schaben, John W.: *See—*
  - Au, Lai C.; Schaben, John W.; Hamer, Robert G.; and Banks, Larry H., 5,023,817, Cl. 364-550.000.
- Schacht, Ulrich: *See—*
  - Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans-Georg. Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard. 5,023,357, Cl. 544-132.000.
- Schaeffer, George A.: *See—*
  - Boyd, Ian A. R.; Rose, William J.; and Schaeffer, George A., 5,023,727, Cl. 358-310.000.
- Schaevitz, Lester P. Support for the body of a worker. 5,022,622, Cl. 248-231.700.
- Schanke, Robert L.: *See—*
  - Behlmer, Robert F.; Schanke, Robert L.; and DeSmidt, Robert G., 5,022,951, Cl. 156-379.000.
- Scharnowski, Gerhard. *See—*
  - Fortmann, Norbert; Gottling, Helmut; Meyer, Hans F.; Moller, Rudolf; and Scharnowski, Gerhard, 5,022,311, Cl. 92-137.000.
- Scheibli, Peter: *See—*
  - Puntener, Alois; Lehmann, Urs; Scheibli, Peter; and Koller, Josef, 5,023,274, Cl. 534-618.000.
- Schemmann, Hugo: *See—*
  - Bertram, Leo; Schemmann, Hugo; and Bukoschek, Romuald L., 5,022,315, Cl. 99-348.000.
- Scherbina, Tatyana V.: *See—*
  - Surguchev, Viktor G.; Kuraev, Oleg V.; Surgucheva, Raisa N.; Makhnovsky, Leonid P.; Troschenovsky, Anatoly P.; Tetior, Alexandr N.; Golovchenko, Igor V.; and Scherbina, Tatyana V., 5,022,925, Cl. 106-631.000.
- Schering Aktiengesellschaft: *See—*
  - Klar, Ulrich; Skuballa, Werner; Vorbruggen, Helmut; Sturzebecher, Claus-Steffen; Thierauch, Karl-Heinz; and Schillinger, Ekkehard, 5,023,273, Cl. 514-530.000.
  - von Angerer, Erwin, 5,023,254, Cl. 514-235.500.
- Schering Corporation: *See—*
  - Scherlock, Margaret H.; and Tom, Wing C., 5,023,265, Cl. 514-300.000.
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- Schieberl, Daniel L.; and Luzaich, Greg. Bladder device for monitoring pulse and respiration rate. 5,022,402, Cl. 128-671.000.
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- Schiene, Thomas M.; Christie, William; Johnson, Harold W.; and Black, Robert C., to Ashbrook-Simon-Hartley Corporation. Composting method and apparatus utilizing air assist to aid in movement of organic matter. 5,023,178, Cl. 435-170.000.
- Schillinger, Ekkehard: *See—*
  - Klar, Ulrich; Skuballa, Werner; Vorbruggen, Helmut; Sturzebecher, Claus-Steffen; Thierauch, Karl-Heinz; and Schillinger, Ekkehard, 5,023,273, Cl. 514-530.000.
- Schiltz, David C.: *See—*
  - Dau, Gary J.; Schiltz, David C.; and Schneider, William R., 5,023,549, Cl. 324-220.000.
- Schimweg, John J.; Sunnen, Robert M.; and Wilken, Rickey K., to Sunnen Products Company. Expandable honing tool. 5,022,196, Cl. 51-338.000.
- Schirmer, Ulrich: *See—*
  - Kast, Juergen; Kolassa, Dieter; Meyer, Norbert, Schirmer, Ulrich; Harreus, Albrecht; Wild, Jochen; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,022,914, Cl. 71-88.000.
- Schiweck, Hubert: *See—*
  - Gander, Michael; Rapp, Knut M.; and Schiweck, Hubert, 5,023,330, Cl. 536-124.000.
- Schlageter, Bernhard: *See—*
  - Koefferlein, Rainer; Schlageter, Bernhard; and Baier, Erich, 5,023,664, Cl. 355-245.000.
- Schlogl, Dietmar: *See—*
  - Neukirchner, Ernst-Peter; and Schlogl, Dietmar, 5,023,798, Cl. 364-449.000.
- Schlotterer, John C.; Johnston, Paul M.; Rusnak, Mark F.; Pillage, Lawrence T.; and Byrd, Thomas M., Jr. Pulse ratio system 5,023,822, Cl. 364-703.000.
- Schlumberger-Doll Research. *See—*
  - Kleinberg, Robert L.; Sezginer, Abdurrahman; and Fukuhara, Masafumi, 5,023,551, Cl. 324-303.000.
- Schlumberger Technology Corporation: *See—*
  - Holenka, Jacques M.; and Sloan, W. R., 5,023,449, Cl. 250-252.100.
  - Panetta, Pascal; and Tromelin, Jacques, 5,022,484, Cl. 181-102.000.
- Schmalbach-Lubeca AG: *See—*
  - Hexel, Gunter, 5,022,551, Cl. 220-270.000.
- Schmalz, Richard J.: *See—*
  - Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Page, David R.; Plambeck, Kenneth E.; Scalzi, Casper A.; and Schmalz, Richard J., 5,023,773, Cl. 364-200.000.
- Schmidt, Alfred J.: *See—*
  - Hommes, William J.; and Schmidt, Alfred J., 5,022,297, Cl. 83-35.000.
- Schmidt, Harald: *See—*
  - Frater, Georg; and Schmidt, Harald, 5,023,232, Cl. 512-19.000.
- Schmidt, Harald H., to Mold-Masters Limited. Pneumatic actuating mechanism for injection molding. 5,022,846, Cl. 425-564.000.
- Schmidt, Horst; and Schmidt, Reinhold, to Wild Leitz GmbH. Panoramic periscope for two spectrum ranges. 5,022,723, Cl. 350-1.200.
- Schmidt, Reinhold: *See—*
  - Schmidt, Horst; and Schmidt, Reinhold, 5,022,723, Cl. 350-1.200.
- Schmitt, Eberhard: *See—*
  - Micic, Lyubomir; Gartlein, Gunter; Schmitt, Eberhard; Muller, Axel; Seng, Egon; and Spindler, Siegfried, 5,023,702, Cl. 357-74.000.
- Schmoegner, John C.; and Baldoz, Danny L., to MDT Corporation. Exhaust filter system for sterilizers. 5,022,898, Cl. 55-210.000.
- Schneider, Roy W.; and Leenhouts, David E., to United Technologies Corporation. Apparatus and method for dynamic compensation of a propeller pitch speed control governor. 5,023,793, Cl. 364-431.020.
- Schneider, William R.: *See—*
  - Dau, Gary J.; Schiltz, David C.; and Schneider, William R., 5,023,549, Cl. 324-220.000.
- Schnitzler, Franz D., to TRW Ehrenreich GmbH & Co., KG. Ball joint. 5,022,779, Cl. 403-138.000.
- Schodt, Adolf: *See—*
  - Reiser, Peter; Mohring, Fritz; and Schodt, Adolf, 5,022,851, Cl. 431-215.000.
- Schoemaker, Johannes: *See—*
  - Langer, Salomon Z.; Frost, Jonathan R.; Schoemaker, Johannes; Gaudilliere, Bernard; Bertin, Jean; Rousseau, Jean; Dupont, Regis; and Wick, Alexander E., 5,023,266, Cl. 514-317.000.
- Schon, Norbert; and Buysch, Hans-Josef, to Bayer Aktiengesellschaft. Process for the production of cyclic carbonic acid esters. 5,023,346, Cl. 549-231.000.
- Schonlau, Juergen, to Alfred Teves GmbH. Pressure control device for brake systems of automotive vehicles. 5,022,715, Cl. 303-9.680.
- Schotter, Daniel K., to Hughes Aircraft Company. Bend limiting stiff leader and retainer system. 5,022,607, Cl. 244-3.120.
- Schreck, John F.; and Dolby, Debra J., to Texas Instruments Incorporated. Bitline segmentation in logic arrays. 5,023,837, Cl. 365-185.000.
- Schroeder, Edgar C.: *See—*
  - Gerlach, C. Richard; and Schroeder, Edgar C., 5,022,831, Cl. 417-500.000.
- Schubert & Salzer Maschinenfabrik Aktiengesellschaft: *See—*
  - Rupert, Karl; Mayer, Walter; and Lochbronner, Hubert, 5,022,222, Cl. 57-263.000.
- Schuetz, Dietmar: *See—*
  - Heitzig, Claus-Peter; and Schuetz, Dietmar, 5,023,588, Cl. 337-195.000.
- Schuler, Peter: *See—*
  - Brandis, Helmut; Huchtemann, Bernd; Schuler, Peter; and Werner, Dietrich, 5,022,933, Cl. 148-16.000.
- Schultheis, Douglas A., to Hasbro, Inc. Printing toy sewing machine. 5,022,323, Cl. 101-219.000.
- Schultz, Darald R.: *See—*
  - Chadima, George E., Jr; Schultz, Darald R.; Krunnfusz, Jeffrey S.; and Gibbs, William T., 5,023,824, Cl. 364-708.000.
- Schultz, Robert H., to Adolph Coors Company. Apparatus and method for applying a coating to a can body. 5,023,112, Cl. 427-287.000.
- Schulz, Horst, to BASF Magnetics GmbH Arrangement for determining the degree of dispersion of magnetic pigments in a dispersion. 5,022,758, Cl. 356-319.000.
- Schumacher, Frederick A., to Glebar Company, Inc. Method and apparatus for finishing elastic O-ring gaskets. 5,022,194, Cl. 51-290.000.
- Schumacher, Larry L. Turn signal actuator for motor vehicle hand controls. 5,023,592, Cl. 340-475.000.
- Schumacher, Wolfgang; Respondek, Johannes; Engel, Jurgen; Pohl, Jorg; Voegeli, Rainer; and Hilgard, Peter, to ASTA Pharma Aktiengesellschaft. 1,2-bis (aminomethyl) cyclobutane-platinum complexes. 5,023,335, Cl. 548-104.000.
- Schussler, Hans: *See—*
  - Hensel, Bernd; Kopacz, Uwe; Hofmann, Dieter; Schussler, Hans; and Eckhardt, Gunter, 5,022,978, Cl. 204-298.190.
- Schuster, Richard L., to Manville Forest Products Corporation. Wraparound carrier with adjustable bottle neck openings. 5,022,525, Cl. 206-434.000.
- Schut, Jan, to General Motors Corporation. Valve-lash adjustment system. 5,022,361, Cl. 123-90.550.
- Schwartz, Neal: *See—*
  - Balcar, Gerald P.; Krumrine, Paul, Schwartz, Neal; Sutker, Burton J.; and Wood, Gail J., 5,022,897, Cl. 55-96.000.
- Schwarz, Hans-Helmut: *See—*
  - Immel, Otto; Schwarz, Hans-Helmut; and Thiel, Reinhard, 5,023,226, Cl. 502-313.000.
- Schwarzkopf Development Corporation. *See—*
  - Kotzlowski, Heinz E.; and Kneringer, Gunter, 5,023,043, Cl. 376-150.000.
- Schweiger, Klaus, to Zahnradfabrik Friedrichshafen AG. Semiautomatic shifter for a motor vehicle. 5,022,509, Cl. 192-73.000.
- Schweizer, Richard W.; Patel, Kantilal P.; and Lau, Philip Y., to ACS Industries, Inc. Method and apparatus for recovering oil from an oil spill on the surface of a body of water. 5,023,002, Cl. 210-710.000.
- Schwertner, Gary T.; and Robbins, Edward S., III, to Robbins, Edward S., III. Apparatus for forming foldable plastic products. 5,022,844, Cl. 425-302.100.
- Schwing, Ewald; Sommer, Peter; and Uhrner, Horst, to Schwing, Ewald; and Uhrner, Horst. Heat treating a metallic workpiece in a fluidized bed. 5,022,934, Cl. 148-16.500.
- Science Dynamics Corporation: *See—*
  - Kaplan, Murray; and Humes, Robert W., 5,023,904, Cl. 379-91.000.
- Scientific Design Company, Inc.: *See—*
  - Harvey, Robert J., 5,023,345, Cl. 549-230.000.
- Scott, Christopher R. Construction systems and elements thereof. 5,022,210, Cl. 52-729.000.
- Scott, Christopher R. Construction systems and elements thereof. 5,022,211, Cl. 52-729.000.
- Scott, George B. Molded merchandise display base. 5,022,620, Cl. 248-188.600.
- Scriven, Ricky R., to Tri-Star Manufacturing & Service, Inc. Removeable cover for a hot metal transfer car. 5,022,635, Cl. 266-165.000.
- Seagate Technology, Inc.: *See—*
  - Fisher, Robert D.; and Allan, James C., 5,023,148, Cl. 428-694.000.
  - Prenosil, Michael B., 5,023,738, Cl. 360-122.000.
  - Yaeger, John R., 5,023,737, Cl. 360-105.000.
- Seal Spout Corporation: *See—*
  - Plaessmann, Frederick A., 5,022,954, Cl. 156-542.000.
- Seaver, Duane L.: *See—*
  - Fevig, Robert J.; Holleman, Randall S.; and Seaver, Duane L., 5,022,720, Cl. 312-223.000.
- Secondiak, Loretta, to 303576 Alberta Ltd Pyrohy maker. 5,022,843, Cl. 425-289.000.
- Secretary of State for Defence in her Britannic Majesty's Government: *See—*
  - Golding, Peter; Jayaweera-Bandara, Asoka M.; and Duffin, Henry, 5,023,386, Cl. 568-931.000.
- Security Tag Systems, Inc.: *See—*
  - Charlot, Lincoln H., Jr., 5,022,244, Cl. 70-57 100.
- Seely, Warren L.: *See—*
  - Staudinger, Joseph; and Seely, Warren L., 5,023,576, Cl. 333-118.000.
- Segawa, Hideo, to Kabushiki Kaisha Toshiba. Pattern recognition system using posterior probabilities. 5,023,912, Cl. 381-43.000.
- Segawa, Takao: *See—*
  - Takeuchi, Yukihisa; Watanabe, Tetsuo; Yamamoto, Azuma; Shirakawa, Kazuo; and Segawa, Takao, 5,023,700, Cl. 357-70.000.
- Seibel, Michael J.: *See—*
  - Fullmer, Douglas E.; Seibel, Michael J.; and Sheppard, Roger D., 5,023,571, Cl. 331-4.000.
- Seidel, Jurgen F., to Midwest Hydro-Blasting, Inc. Method for hydraulic ceiling-concrete removal. 5,022,927, Cl 134-34.000.
- Seiden, Paul: *See—*
  - Ehrman, Albert M.; Seiden, Paul; Weitzel, Rose M.; and White, Robert L., 5,023,106, Cl. 426-660.000.
- Seike, Shinji: *See—*
  - Goto, Tsuyoshi; Hatamura, Kouichi; and Seike, Shinji, 5,022,375, Cl. 123-564.000.

VOL 1127 ISS 2 JE 11 1991 UMI

Seiko Epson Corporation: *See—*

Koga, Yoshiro; Gomi, Akihiro; Miyasaka, Takashi; Miyazawa, Yasunaga; Endo, Kenichi; Shinozaki, Junichiro; Yoda, Kaneo; Ichikawa, Takashi; Miyasaka, Hitoshi; and Kaburagi, Chiharu, 5,023,733, Cl. 360-77.040.

Seiko Instruments, Inc.: *See—*

Adachi, Tatsuya; and Kaito, Takashi, 5,023,453, Cl. 250-309.000.

Yonezawa, Akira, 5,023,457, Cl. 250-396.0ML.

Seiler, Herbert: *See—*

Tzikas, Athanassios; and Seiler, Herbert, 5,023,326, Cl. 534-638.000.

Seki, Chikashi: *See—*

Kita, Kunio; Kuwashima, Shigesumi; Suzuki, Takahito; and Seki, Chikashi, 5,023,709, Cl. 358-125.000.

Seki, Eiji: *See—*

Yamaoka, Ryohei; Hayashiya, Keizo; Yoshimura, Tohru, Seki, Eiji; Masutani, Tetsuya; and Kitahara, Katsuhiko, 5,023,327, Cl. 536-18.400.

Seki, Takahide: *See—*

Itoh, Syunji; Kozawa, Hiroshi; and Seki, Takahide, 5,023,415, Cl. 200-148.00R.

Sekiguchi, Shigemi, to Hosiden Corporation. Multipolar connector socket. 5,022,871, Cl. 439-609.000.

Sekikawa, Nobuyuki; and Takada, Tadayoshi, to Sanyo Electric Co., Ltd. Method for manufacturing a semiconductor integrated circuit including a bipolar transistor. 5,023,195, Cl. 437-31.000.

Sekino, Yousuke; and Minakawa, Masaaki, to Honda Giken Kogyo Kabushiki Kaisha. Wheel suspension system for automobiles. 5,022,673, Cl. 280-673.000.

Select Service & Supply Co., Inc.: *See—*

Traub, Barry H.; and Leoni, Emile, 5,022,649, Cl. 273-1.50R.

Seltzer, Raymond. *See—*

Ravichandran, Ramanathan; and Seltzer, Raymond, 5,023,283, Cl. 524-101.000.

Semiconductor Energy Laboratory Co., Ltd.: *See—*

Itoh, Kenji; and Aoyagi, Osamu, 5,022,959, Cl. 156-643.000.

Yamazaki, Shunpei; and Sato, Masahiko, 5,023,013, Cl. 252-299.670.

Semitool, Inc.: *See—*

Thompson, Raymon F.; and Owczarz, Aleksander, 5,022,419, Cl 134-102.000.

Senda, Toshiaki: *See—*

Murakami, Azuma; Aoki, Kazuo; Yamanami, Tsuguya; Tomofuji, Yoshiaki; Tanaka, Takeshi; Inashima, Satoshi; Funahashi, Takahiko; Chikami, Toshihide; and Senda, Toshiaki, 5,023,408, Cl. 178-19.000.

Senevat, Jean: *See—*

Mardon, Jean-Paul; Charquet, Daniel; Perez, Marc; and Senevat, Jean, 5,023,048, Cl. 376-416.000.

Seng, Egon: *See—*

Micic, Lyubomir; Gartlein, Gunter: Schmitt, Eberhard; Muller, Axel; Seng, Egon; and Spindler, Siegfried, 5,023,702, Cl. 357-74.000.

Sengupta, Uday K.: *See—*

Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,023,884, Cl. 372-57.000.

Sensormatic Electronics Corporation: *See—*

Szklany, Craig R.; and Drucker, Frank, 5,023,600, Cl. 340-572.000.

Seprodi, Janos: *See—*

Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre; Teplan, Istvan; Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt; Hegedus, Edit; Makara, Gabor: and Rappay, Gyorgy, 5,023,322, Cl. 530-324.000.

Sequist, David B. Horse mane grooming device. 5,022,350, Cl. 119-85.000.

Seraji, Homayoun, to California Institute of Technology. Dual-arm manipulators with adaptive control. 5,023,808, Cl. 364-513.000.

Serikawa, Mitsuhiko: *See—*

Matsumoto, Masaharu; Satoh, Katsuaki; Ishikawa, Seiichi; Serikawa, Mitsuhiko; Kawamura, Akihisa; and Hashimoto, Hikari, 5,023,913, Cl. 381-63.000.

Serno, Peter: *See—*

Pollinger, Norbert; Serno, Peter; Hofmann, Wolfram, and Beermann, Dieter, 5,023,257, Cl. 514-254.000.

Serrand, Willibald, to Exxon Research & Engineering Company. Process for removing sulfur moieties from Claus tail-gas. 5,023,069, Cl 423-574.00R.

Serrano, Jean-Jacques: *See—*

Lazaro, Rene ; Cros, Gerard; McNeill, John H.; and Serrano, Jean-Jacques, 5,023,358, Cl. 556-42.000.

Sertain, Emmanuel J.: *See—*

Zanoli, Alain P. B.; and Sertain, Emmanuel J., 5,023,218, Cl. 501-105.000.

Seuffer, Kenneth C., Jr.: *See—*

Avery, Norman R.; Spangenberg, Dale J., Jr.; Buth, Jimmy D.; and Seuffer, Kenneth C., Jr., 5,022,994, Cl. 210-670.000.

Severance, Wayne S., Jr., to ESAB Welding Products, Inc. Electrode for plasma arc torch and method of fabricating same. 5,023,425, Cl. 219-121.590.

Seymour, Raymond K.: *See—*

Williams, Laura A.; Magnon, Gary D.; von Kannewurff, Michael C.; and Seymour, Raymond K., 5,023,582, Cl. 335-167.000.

Sezginer, Abdurrahman: *See—*

Kleinberg, Robert L.; Sezginer, Abdurrahman; and Fukuhara, Masafumi, 5,023,551, Cl. 324-303.000.

SF2 Corporation: *See—*

Johnson, Hoke S., III, 5,023,891, Cl. 375-87.000.

Shaffer, James E., to Consolier Industries, Inc. Screw and nut machine. 5,022,277, Cl. 74-424.8NA.

Shaffer, John W., to GTE Products Corporation. Method of constructing an electric lamp using carbon monoxide as a forming gas 5,022,880, Cl. 445-6.000.

Shah, Mahesh J.: *See—*

Walton, Derrick N.; Dolan, Clarence F.; and Shah, Mahesh J., 5,023,540, Cl. 322-58.000.

Sharfin, Wayne F.: *See—*

Dagenais, Mario; and Sharfin, Wayne F., 5,022,741, Cl 350-353.000.

Sharp Kabushiki Kaisha: *See—*

Hori, Makoto, 5,023,939, Cl. 455-188.000.

Kitabatake, Yasuo; Nakamura, Tadashi; Takahashi, Yoshiaki; and Maeda, Kazuya, 5,023,161, Cl. 430-137.000.

Kugimiya, Shuzo; Suzuki, Hitoshi; Fukumoshi, Yoji, Sata, Ichiko; Hirai, Tokuyuki; and Nishida, Yumi, 5,023,786, Cl. 364-419.000

Okada, Naofumi, 5,022,641, Cl. 271-3.100.

Sharpe-Geisler, Bradley A., to Advanced Micro Devices, Inc. Gate array structure and process to allow optioning at second metal mask only. 5,023,701, Cl. 357-71.000.

Sharpe, Richard: *See—*

Sharpe, Steven E.; Brewin, Garry; and Sharpe, Richard, 5,022,160, Cl 30-475.000.

Sharpe, Steven E.; Brewin, Garry; and Sharpe, Richard Hand-operated power tool. 5,022,160, Cl. 30-475.000.

Sharpless, K. Barry; and Gao, Yun, to Massachusetts Institute of Technology. Cyclic sulfate compounds. 5,023,342, Cl. 549-34.000.

Shattuck, Charles W.; Lestinsky, Joseph J.; and Gerardi, Michael W., to Torrington Company, The. Bearing roller gauge. 5,022,267, Cl. 73-593.000.

Shaw, Charles R., to Esmet, Inc. End clamp for textile rope with a metallic core. 5,022,780, Cl. 403-275.000.

Shaw, Herbert J.: *See—*

Engan, Helge E.; Kim, Byoung Y.; Blake, James N.; and Shaw, Herbert J., 5,022,732, Cl. 350-96.150.

Shechterman, Mark, to El-Op Electro-Optics Industries. Zoom system 5,022,724, Cl. 350-1.300.

Shehad, Noel S.; Dussack, Laurie L.; and van Hemelrijk, Dirk, to Interox America. Reduction of nitrosamine formation. 5,023,376, Cl. 564-298.000.

Shell Oil Company: *See—*

Grandvallet, Pierre; Kortbeek, Andras Guus Theodorus George, Van Den Berg, Johannes Petrus; and Robschlager, Karl-Heinz, 5,023,389, Cl. 585-304.000.

Kemp, Richard A., 5,023,224, Cl. 502-214.000.

Shellhause, Ronald L., to General Motors Corporation. Tee anchor for duo servo drum brakes. 5,022,502, Cl. 188-333.000.

Shelter Home Co. Ltd.: *See—*

Kimura, Kazuyoshi, 5,022,209, Cl. 52-646.000.

Shepic, John A.: *See—*

Hubert, Alexis; and Shepic, John A., 5,023,749, Cl. 361-292.000.

Sheppard, Roger D.: *See—*

Fullmer, Douglas E.; Seibel, Michael J., and Sheppard, Roger D., 5,023,571, Cl. 331-4.000.

Sherif, Fawzy G., to Akzo America Inc. Process for forming metal oxide powders from the metal alkoxide. 5,023,071, Cl. 423-592.000.

Sherrick, James W., to Lord Corporation. Rail-fastening for rails. 5,022,584, Cl. 238-282.000.

Sherrow, Lionel; Rosenthal, Harold; Spitz, Joseph M.; and Haines, Stephen W., to Lavelle Aircraft Company, Inc. Gurney. 5,022,810, Cl. 414-501.000.

Sherwin, Martin B.: *See—*

Tsui, Mosum E.; and Sherwin, Martin B., 5,023,371, Cl. 562-512.000.

Shibai, Hiroshiro: *See—*

Komoda, Yasuo; Yokogawa, Yasunori; Okunishi, Masahiko; Ishii, Koichi; Shibai, Hiroshiro; and Noumi, Ryosaku, 5,023,079, Cl. 424-120.000

Shihata, Hideki, to Kabushiki Kaisha Toshiba. Semiconductor device 5,023,679, Cl. 357-23.400.

Shibata, Takeshi. *See—*

Yamanouchi, Junichi; Shiratsuchi, Kentaro; Karino, Yukio; and Shibata, Takeshi, 5,023,162, Cl. 430-203.000.

Shibata, Yoshikazu, to Hitachi, Ltd. Data transfer system having a channel adapter with varying data transfer lengths. 5,023,829, Cl. 364-900.000.

Shibazaki, Kenji, Irie, Yutaka; Ito, Masazumi; and Murata, Tomoji, to Minolta Camera Kabushiki Kaisha. Copying magnification setting device for an electrophotographic copying apparatus. 5,023,663, Cl 355-243.000.

Shibutani, Makoto: *See—*

Yamazaki, Shuntaro; and Shibutani, Makoto, 5,023,946, Cl. 455-619.000.

Shichida, Akihito, to Hosiden Electronics Co., Ltd. Jack. 5,022,872, Cl 439-668.000.

Shigehara, Itaru; Nakajima, Toshio; Nishimura, Shigeyuki; and Ohshima, Takeshi, to Ishihara Sangyo Kaisha Ltd. Imidazole compound and process for preparing the same. 5,023,336, Cl. 548-110.000.

Shimada, Katsuhiko: *See—*

Anzai, Hisao; Sasaki, Isao; Nishida, Kozi; Makino, Hideaki; Ohtani, Masami; and Shimada, Katsuhiko, 5,023,302, Cl. 525-378.000.

Yamamoto, Takashi; Matsumoto, Tsuruyoshi; Shimada, Katsuhiko; Uozu, Yoshihiro; and Murata, Ryuji, 5,022,737, Cl. 350-96.290.

Shimada, Masaki: *See—*

Hoshino, Yasushi; Sugiyama, Kazuhiro; Ohta, Yoshitaka; and Shimada, Masaki, 5,023,650, Cl. 354-441.000.

Shimano, Hiroki: *See—*

Shimizu, Masahiro; Shimano, Hiroki; Inuishi, Masahide; and Tsukamoto, Katsuhiro, 5,023,682, Cl. 357-23.600.

Shimazaki, Shiroyasu: *See—*

Miyazaki, Akira; Kikuchi, Yuichi; Ohara, Yoshiyuki; Fujinaga, Tomosburo; Kawata, Takashi; Mizutani, Fumitoshi; Hida, Tsugio; and Shimazaki, Shiroyasu, 5,022,789, Cl. 405-133.000.

Shimazaki, Takashi; and Tsuneeda, Kenichi, to Kabushiki Kaisha Toshiba. Image forming apparatus using an image carrier with multiple layers. 5,023,666, Cl. 355-269.000.

Shimei, Masato, to Aisin Seiki Kabushiki Kaisha. Automatic transmission control system. 5,022,284, Cl. 74-844.000.

Shimizu Construction Co., Ltd.: *See—*

Machida, Hiroji; Asano, Michiaki; Watanabe, Yozo; Tokuhiro, Tomoya; Satoh, Hiroshi; Iwahashi, Motoyuki; Yamaguchi, Norihiro; Kikuchi, Koshin; and Watanabe, Hiroaki, 5,023,020, Cl. 261-18.100.

Miyazaki, Akira; Kikuchi, Yuichi; Ohara, Yoshiyuki; Fujinaga, Tomosburo; Kawata, Takashi; Mizutani, Fumitoshi; Hida, Tsugio; and Shimazaki, Shiroyasu, 5,022,789, Cl. 405-133.000.

Shimizu, Giichiro: *See—*

Wakatsuki, Yoshio; Okuyama, Toshiharu; Takeuchi, Hajime; Shimizu, Giichiro; and Shimizu, Misao, 5,023,438, Cl. 235-472.000.

Shimizu, Hiroyuki: *See—*

Hieda, Teruo; Shimizu, Hiroyuki; and Masuda, Kazunori, 5,023,704, Cl. 358-29.00C.

Shimizu, Keiji: *See—*

Yamashita, Takaji; Watanabe, Mitsuo; Okada, Hiroyuki; and Shimizu, Keiji, 5,023,894, Cl. 378-4.000.

Shimizu, Masahiro; Shimano, Hiroki; Inuishi, Masahide; and Tsukamoto, Katsuhiro, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device. 5,023,682, Cl. 357-23.600.

Shimizu, Misao: *See—*

Wakatsuki, Yoshio; Okuyama, Toshiharu; Takeuchi, Hajime; Shimizu, Giichiro; and Shimizu, Misao, 5,023,438, Cl. 235-472.000.

Shimizu, Sakayu: *See—*

Akimoto, Kengo; Shinmen, Yoshifumi; Yamada, Hideaki; and Shimizu, Sakayu, 5,023,177, Cl. 435-134.000.

Shimizume, Kazutoshi: *See—*

Yamada, Takaaki; and Shimizume, Kazutoshi, 5,023,615, Cl. 341-152.000.

Shimoyama, Osamu: *See—*

Takada, Kazuo; and Shimoyama, Osamu, 5,023,436, Cl. 235-380.000.

Shin Etsu Chemical Co., Ltd.: *See—*

Itagaki, Akinari; Yamaya, Masaaki; Yoshioka, Hiroshi; Watanabe, Akihiko; and Miyazato, Keita, 5,022,922, Cl. 106-287.110.

Shin-Etsu Polymer Co., Ltd.: *See—*

Hasegawa, Masamitsu; Tamura, Satoshi; Sugiyama, Isao; and Wakashima, Takashi, 5,022,947, Cl. 156-277.000.

Shin, Hyunkook, to Du Pont de Nemours, E. I., and Company. Halocarbons for flash-spinning polymeric plexifilaments. 5,023,025, Cl. 264-13.000.

Shin, Jae H., to Goldstar Co., Ltd. Reel servo device for video cassette recorder in direct drive reel system. 5,022,604, Cl. 242-203.000.

Shinagawa, Yuji: *See—*

Ogino, Masanori; Fujikura, Tsuneo; Shinagawa, Yuji; and Yamada, Takeo, 5,023,524, Cl. 315-383.000.

Shindo, Yoshio: *See—*

Saito, Katsushi; Miyauchi, Yujiro; Murata, Toshimichi; and Shindo, Yoshio, 5,023,146, Cl. 428-623.000.

Shinmen, Yoshifumi: *See—*

Akimoto, Kengo; Shinmen, Yoshifumi; Yamada, Hideaki; and Shimizu, Sakayu, 5,023,177, Cl. 435-134.000.

Shinn, Dennis B.: *See—*

White, Philip J.; and Shinn, Dennis B., 5,022,882, Cl. 445-21.000.

Shinohara, Hisaji: *See—*

Oyama, Jun; Uchida, Naoshi; Unuma, Makoto; Takahashi, Tatsunori; Shinohara, Hisaji, and Kandatsu, Kiyoshi, 5,023,416, Cl 200-244.000.

Shinohara, Koichi; Suzuki, Takashi; Kawagishi, Masao; Satoh, Nobuo; Murakami, Takeshi; and Fujita, Takashi, to Matsushita Electric Industrial Co., Ltd. Tape cassette with a trapping layer having a corrosiveness which is equal to or higher than that of the magnetic recording layer on the tape. 5,023,739, Cl. 360-132.000.

Shinozaki, Junichiro: *See—*

Koga, Yoshiro; Gomi, Akihiro; Miyasaka, Takashi; Miyazawa, Yasunaga; Endo, Kenichi; Shinozaki, Junichiro; Yoda, Kaneo: Ichikawa, Takashi; Miyasaka, Hitoshi; and Kaburagi, Chiharu, 5,023,733, Cl. 360-77.040.

Shinozaki, Yasuo; Horie, Noritoshi; Hamashima, Kazuo; and Imakawa, Makoto, to Asahi Glass Company Ltd. Complex boride cermets and processes for their production. 5,022,919, Cl. 75-238.000.

Shiomi, Yasuhiko; and Tsuboi, Takayuki, to Canon Kabushiki Kaisha. Automatic status discriminator. 5,023,647, Cl. 354-414.000.

Shionogi & Co., Ltd.: *See—*

Sakamoto, Teruo; Takeda, Toyohiko; and Suzuki, Yusuke, 5,023,089, Cl. 424-502.000.

Shioya, Masatoshi: *See—*

Horino, Shigeo; Omura, Hideo; Maruyama, Nobusato; Ashikawa, Yoshiaki; Shioya, Masatoshi; Miyano, Toshiyuki; and Wakou, Jiro, 5,022,531, Cl. 209-552.000.

Shioyama, Giichi, to Nissan Motor Company, Limited. System and method for controlling vehicle speed to cruise at desired speed for vehicle. 5,023,792, Cl. 364-426.040.

Shirai, Masanari: *See—*

Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Ohashi, Masashi, Shirai, Masanari; and Ando, Eiichi, 5,023,658, Cl. 355-72.000.

Shirai, Mitugu; Katayama, Kaoru; Sasaki, Hideaki; Kazui, Shinichi; Satoh, Ryohei; Miyauchi, Tateoki; and Kobayashi, Mamoru, to Hitachi, Ltd. Printed circuit board with a uniform conductive layer formed by equalization of metals therein 5,023,407, Cl 174-257.000.

Shirai, Takeshi: *See—*

Pawlak, Andrzej M.; and Shirai, Takeshi, 5,023,546, Cl. 324-174.000.

Pawlak, Andrzej M.; and Shirai, Takeshi, 5,023,547, Cl. 324-174.000.

Shirakawa, Kazuo: *See—*

Takeuchi, Yukihisa; Watanabe, Tetsuo; Yamamoto, Azuma, Shirakawa, Kazuo; and Segawa, Takao, 5,023,700, Cl 357-70.000.

Shiratori, Tatsuya: *See—*

Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Ohashi, Masashi; Shirai, Masanari; and Ando, Eiichi, 5,023,658, Cl. 355-72.000.

Shiratori, Yuichi: *See—*

Kanzawa, Yoshikazu; Fujikake, Yasushi; Ito, Osami; Ito, Shuho; Oikawa, Hironobu; Otsubo, Makoto; Morikawa, Iwao; Shiratori, Yuichi; and Tsukada, Kiyoshi, 5,022.456, Cl. 164-119.000.

Shiratsuchi, Kentaro: *See—*

Yamanouchi, Junichi; Shiratsuchi, Kentaro; Karino, Yukio; and Shibata, Takeshi, 5,023,162, Cl. 430-203.000.

Shirilla, John. Umbrella type reflector for photographic reflection. 5,023,757, Cl. 362-16.000.

Shirota, Norihisa: *See—*

Kondo, Tetsujiro; Nagai, Michio; and Shirota, Norihisa, 5,023,710, Cl. 358-133.000.

Shiseido Co., Ltd.: *See—*

Ohno, Kazuhisa; Kosugi, Tetsushi; Sugimori, Kenichiro; Ando, Akitsugu; Yamamoto, Masaru; Suzuki, Fukuji; Nakamura, Masahiro; and Tsujita, Nobuhisa, 5,023,065, Cl. 423-326.000.

Shitori, Yoshiyasu: *See—*

Ogura, Haruo; Furuhata, Kimio; Sato, Shingo; Ito, Masayoshi; Shitori, Yoshiyasu; and Nagai, Yoshitaka, 5,023,239, Cl. 514-26.000.

Shontz, Kimball C.; Gavlak, Michael A.; and Ebbing, David M., to General Motors Corporation. Composite piston assembly for automotive air conditioning compressor. 5,022,313, Cl. 92-248.000.

Shorthill, Lawrence R.: *See—*

Abramovitz, Robert G.; Anderson, Robert L., Jr.; Busse, Frederick L.; Celarier, Stuart A.; Poublan, Jean-Yves H.; and Shorthill, Lawrence R., 5,023,922, Cl. 382-59.000.

Shroot, Braham: *See—*

Maignan, Jean; Lang, Gerard; Malle, Gerard, Restle, Serge; and Shrcot, Braham, 5,023,363, Cl. 560-52.000.

Shu, Paul; and Shu, Winston R., to Mobil Oil Corporation. Method for steam flooding profile control 5,022,466, Cl. 166-263.000.

Shu, Winston R.: *See—*

Shu, Paul, and Shu, Winston R., 5,022,466, Cl 166-263.000.

Shudo, Nobuyasu: *See—*

Sakamoto, Seiji; and Shudo, Nobuyasu, 5,023,291, Cl. 524-430.000.

Shutske, Gregory M., to Hoechst-Roussel Pharmaceuticals Incorporated. 12-halogenated forskolin derivatives. 5,023,344. Cl 549-229.000.

Shyu, Steven: *See—*

Fung, Jimmy; An, Jiu; Campbell, David L.; and Shyu, Steven, 5,023,614, Cl. 341-144.000.

Sico Incorporated: *See—*

Wilson, Kermit H.; and Skistad, Warren, 5,022,200, Cl. 52-127 900.

Sieber, William J.: *See—*

Nordella, Tim M.; and Sieber, William J., 5,022,703, Cl 297-327.000.

Siecor Corporation: *See—*

Kundis, Dieter E., 5,022,344, Cl 118-56.000.

Siegel, Heinz; and Mueller, Klaus, to Robert Bosch GmbH Brake system. 5,022,716, Cl. 303-104.000.

Siegel, Herbert; Kampe, Klaus-Dieter, Alpermann, Hans-Georg; Gerhards, Hermann J.; Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, to Hoechst Aktiengesellschaft. Arylmethylazole preparation processes. 5,023,357, Cl. 544-132.000.

Siegesleuthner, Franz; and Hebeisen, Walter, to Fotoking Passhildsysteme. Photographic portrait shooting apparatus. 5,023,638, Cl 354-126.000.

Siemens Aktiengesellschaft: *See—*

Auracher, Franz; Meissner, Eckhard, Noll, Bernd; and Wittmann, Julius, 5,023,885, Cl. 372-92.000.

Auracher, Franz; Ebberg, Alfred; Noll, Bernd, Meissner, Eckhard, and Rodler, Hermann J., 5,023,949, Cl. 455-618.000.

Heitzig, Claus-Peter; and Schuetz, Dietmar, 5,023,588, Cl. 337-195.000.

Helmut, Albrecht; and Lauterbach, Christl, 5,023,686, Cl. 357-30.000.

Koefferlein, Rainer; Schlageter, Bernhard, and Baier, Erich, 5,023,664, Cl. 355-245.000.

Siemens-Bendix Automotive Electronics L.P.: *See—*

Daly, Paul D., 5,022,371, Cl. 123-468.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Siewert, Herbert G : *See—*
  - Kandpal, Tara C.; Paczuski, Andrew W , and Siewert, Herbert G , 5,022,833. Cl. 417-571.000.
- Sigmex Limited: *See—*
  - Elgood, Mark C.; and Jales, Richard J., 5,023,602, Cl 340-701.000.
- Silage, Gregory J.: *See—*
  - Hammer, Russell C.; Silage, Gregory J., and Pietron, Casimir P., 5,022,292, Cl. 81-426.000.
- Silvia, Denis A., to United States of America, Navy Asynchronous explosive logic safing device. 5,022,326, Cl. 102-275.900.
- Simizu, Tooru; and Kataoka, Hideaki, to Fuji Photo Film Co., Ltd Monosheet self-processing film unit and method of making the same. 5,023,163, Cl. 430-207.000.
- Simmonds Precision Products, Inc.: *See—*
  - Wright, James R.; Hall, James R ; and Theobald, Keith D., 5,022,865, Cl. 439-279.000.
- Simon, Gregory L. Facade for child's play vehicle. 5,022,666, Cl 280-1.160.
- Simon, Marvin K.: *See—*
  - Divsalar, Dariush; and Simon, Marvin K , 5,023,889, Cl 375-27.000.
- Simon, Robert C., Jr.; Deutscher, Dale W.; Grimm, Charles M.; Thompson, Dennis D.; and Bailey, Kirk A., to General Motors Corporation; and Delco Electronics Corp. Interprocessor communication method. 5,023,778, Cl 364-200.000.
- Simon, Wilhelm, to Willi Moller, Firma. Dicarboxylic acid diamides, process for their preparation, ion selective members and test means containing them as well as lithium complexes of the dicarboxylic acid amides 5,023,374, Cl. 564-152.000.
- Simonen, Liisa I., to A. Ahlstrom Corporation. Method and apparatus for introducing combustion air into a furnace. 5,022,331, Cl. 110-297.000.
- Simpson, Penny C.; and Smith, Larry M., to Du Pont de Nemours, E. I., and Company. Hydroentangled polyolefin web. 5,023,130, Cl. 428-227.000.
- Sincere, Steven M., to United Technologies Corporation. Compressor blade attachment assembly. 5,022,822, Cl. 416-219.00R.
- Siol, Werner; and Terbrack, Ulrich, to Rohm GmbH Compatible polymer mixtures. 5,023,123, Cl. 428-392.000.
- Siren, Matti, to Perstorp AB. Method of treating diabetes with inositol triphosphate. 5,023,248, Cl. 514-103.000.
- Sirman, James B.; and Foti, Ivan F. S., to Datatool Alarms Limited Bicycle alarm. 5,023,596, Cl. 340-571.000.
- Sisk, Hollis D., to Century Electric, Inc. Stator lamination with alignment structure for controlled skewing. 5,023,500, Cl. 310-218.000.
- Siverling, Erich H., to Square D Company High-speed press control system. 5,023,770, Cl. 364-140.000.
- Sivyer Steel Corporation: *See—*
  - Stelk, John C., 5,022,593, Cl. 241-194.000.
- SKC Limited: *See—*
  - Yeol, Ryu M.; Ki, Ryu D., Kyun, Yun D ; Kyu, An J.; Kuk, Hong S.; Euy, Hong C.; and Sun, Ryu S., 5,022,520, Cl. 206-315.100.
- Skistad, Warren: *See—*
  - Wilson, Kermit H.; and Skistad, Warren, 5,022,200, Cl. 52-127.900.
- Skowasch, Gerhard; Sabranski, Udo; Funk, Jurgen; and Quick, Siegfried, to Rheinmetall GmbH. Fuze for bomblet projectile. 5,022,325, Cl. 102-226.000.
- Skuballa, Werner: *See—*
  - Klar, Ulrich; Skuballa, Werner; Vorbruggen, Helmut; Sturzebecher, Claus-Steffen; Thierauch, Karl-Heinz, and Schillinger, Ekkehard, 5,023,273, Cl. 514-530.000.
- Slasor, Shaun: *See—*
  - Anseau, Michael R., Lawson, James M.; and Slasor, Shaun, 5,023,216, Cl. 501-98.000.
- Sloan-Kettering Institute For Cancer Research: *See—*
  - Haranaka, Katsuyuki; Old, Lloyd J.; Richards, Elizabeth C.; and Williamson, Barbara, 5,023,320, Cl. 530-350.000.
- Sloan, Paul; Tuai, Gregory; Jimenez, Julio; and Jimenez, Raymond, to Vorec Corporation. Surveillance system having a voice verification unit. 5,023,901, Cl. 379-38.000.
- Sloan, W. R.: *See—*
  - Holenka, Jacques M.; and Sloan, W. R., 5,023,449, Cl. 250-252.100.
- Slobody, Brent: *See—*
  - Macchio, Ralph A.; Russ, Julio G.; Slobody, Brent; and Tietjen, Mariene, 5,023,075, Cl. 424-63.000.
- Slocum, Alexander H.: *See—*
  - Saidin, Zain; and Slocum, Alexander H., 5,023,528, Cl. 318-254.000
- Smayling, Michael C.: *See—*
  - Verret, Douglas P.; Smayling, Michael C.; Sachdeva, Abnash C ; and Keller, Stephen A., 5,023,690, Cl. 357-43.000.
- Smith, Bernard: *See—*
  - Branovich, Louis E.; Freeman, Gerard L.; Eckart, Donald W ; and Smith, Bernard, 5,022,883, Cl. 445-50.000.
- Smith, Clark L.; and Balcerek, Gregory, to Stacker Machine Co. Stacker bundler shuttle system. 5,022,813, Cl. 414-790.000.
- Smith, David W., to British Telecommunications public limited company. Polarization modulation of optical signals using birefringent medium 5,023,948, Cl. 455-616.000.
- Smith, Frank S.: *See—*
  - Arnold, James M.; Hinton, Glenn J., and Smith, Frank S., 5,023,844, Cl. 365-230.050.
- Smith, Jesse W., to United Technologies Corporation. Acceleration control with duct pressure loss compensation. 5,022,224, Cl. 60-39.161.
- Smith, Larry M. *See—*
  - Simpson, Penny C., and Smith, Larry M., 5,023,130, Cl. 428-227.000
- Smith, Richard R.; and Johnston, Walter F., to Goodyear Tire & Rubber Company, The. Polyester composition which is particularly suitable for use in thermoforming dual-ovenable trays. 5,023,137, Cl 428-34.100.
- Smith, Robert A., to Cosworth Casting Processes Limited. Controlling the position of liquid metal in a vessel. 5,022,458, Cl. 164-457.000.
- Smith, Robert W.: *See—*
  - Bruecker, Gerald J., and Smith, Robert W., 5,022,348, Cl. 119-57.600.
- Smith, Steven L.; and Jeong, Tung H., to Advanced Holographic Imaging Technologies, Inc. Method and apparatus for producing full color stereographic holograms. 5,022,727, Cl. 350-3.760
- Smith, Theoren P., III: *See—*
  - DiVincenzo, David P., Lee, Kim Y.; and Smith, Theoren P., III, 5,023,671, Cl. 357-4.000.
- Smith, Timothy S Anti-glare modules adaptable to highway median barriers. 5,022,781, Cl. 404-6.000.
- Smith, Troy L., Jr.: *See—*
  - Fisher, Hugh A.; Landry, Susan D., and Smith, Troy L , Jr , 5,023,278, Cl. 521-85.000.
- SmithKline Beecham Corporation: *See—*
  - Adams, Jerry L.; Gallagher, Timothy F., Mayer, Ruth J , and Metcalf, Brian W., 5,023,250, Cl. 514-179.000
- Snap-on Tools Corporation: *See—*
  - Butzen, James K., 5,022,289, Cl. 81-57.390.
- Snyder, George K.: *See—*
  - Breda, Michael A.; Snyder, George K , and Lyon, Peter A , 5,022,814, Cl. 414-799.000.
- Snyder, Michael D.: *See—*
  - Vallone, Giacinto; Janisiewicz, Stanley W.; Snyder, Michael D , Hemmelgarn, Gerald B ; and Glidden, Wayne A., 5,023,544, Cl 324-158.00F.
- Snyder, Thomas S.; and Lee, Ernest D., to Westinghouse Electric Corp. Chromatographic separation of zirconium isotopes with anhydrous readily recyclable eluents 5,023,061, Cl. 423-70.000.
- So, Peter K. L.: *See—*
  - Aune, Jan E.; and So, Peter K. L., 5,023,805, Cl. 364-507.000.
- Societe Anonyme Dite Hispano-Suiza *See—*
  - Cattelain, Camille M.; and Girard, Francis, 5,022,195, Cl. 51-290.000.
- Societe Atochem *See—*
  - Metzger, Jean, 5,023,057, Cl. 422-202.000.
- Societe C E T R A: *See—*
  - Martin, Jean-Paul; and Kolozsvari, Guy, 5,022,862, Cl. 439-83.000.
- Societe Cooperative de Production Bourgeois: *See—*
  - Faurel, Jacques; and Violi, Raymond, 5,022,380, Cl. 126-190.000
- Societe d'Etudes pour le Developpement des Productions Electroniques: *See—*
  - Le Gars, Monsieur J., 5,023,763, Cl. 362-240.000.
- Societe en Nom Collectif Zircotube: *See—*
  - Mardon, Jean-Paul; Charquet, Daniel, Perez, Marc; and Senevat, Jean, 5,023,048, Cl. 376-416.000.
- Societe Europeenne des Produits: *See—*
  - Zanoli, Alain P B.; and Sertain, Emmanuel J., 5,023,218, Cl 501-105.000.
- Societe Europeenne des Produits Refractaires: *See—*
  - Duvierre, Gerard; and Recasens, Joseph, 5,022,910, Cl 65-325.000.
- Societe Nationale Industrielle et Aerospatiale: *See—*
  - Maree, Michel, and Moreau, Patrick, 5,022,603, Cl. 242-167.000.
- Soga, Hiroo; and Akutsu, Eiichi, to Fuji Xerox Co., Ltd. Printing head 5,023,627, Cl. 346-76.0PH
- Sogawa, Hiroyuki: *See—*
  - Miura, Masayoshi; Inanaga, Kiyofumi; Sogawa, Hiroyuki; and Iida, Yasuhiro, 5,022,486, Cl. 181-132.000.
- Sohma, Kenichi: *See—*
  - Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi, Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl. 431-2.000.
- Solid State Measurements, Inc.: *See—*
  - Hillard, Robert J., 5,023,561, Cl. 324-719.000.
- Solite Corporation: *See—*
  - Hinson, Teddy P., 5,022,809, Cl. 414-494.000.
- Soloff, Jonathan M., to Sony Corporation. Storing digital video signals. 5,023,718, Cl. 358-160.000.
- Solomon, James D.: *See—*
  - Johnson, Mark J.; and Solomon, James D., 5,023,940, Cl 455-212.000.
- Solomon, Robert A., to Bissell Healthcare/Bissell Am Fab, Inc. Crank top overbed table. 5,022,327, Cl. 108-147.000.
- Solomon, Stanley B. *See—*
  - Lurkis, Jeffry L.; and Solomon, Stanley B., 5,022,562, Cl. 222-182.000.
- Somasiri, Nanayakkara L. D.: *See—*
  - MacDiarmid, Alan G ; and Somasiri, Nanayakkara L D., 5,023,149, Cl. 429-27.000.
- Somfai, Eva: *See—*
  - Sperber, Ferenc; Huszar, Csaba; Nemeth, Attila; Somfai, Eva, and Pali nee Ivanics, Iren, 5,023,337, Cl. 548-306.000.
- Sommer, Peter: *See—*
  - Schwing, Ewald; Sommer, Peter; and Uhrner, Horst, 5,022,934, Cl 148-16.500.

- Sondermeyer, Jack C.: *See—*
  - Brown, James W., Sr.; and Sondermeyer, Jack C., 5,023,915, Cl. 381-120.000.
- Sone, Akira: *See—*
  - Tsuyama, Toshiaki; Nobumoto, Kazutoshi; Kageyama, Fumio; Sone, Akira; and Kawamura, Makoto, 5,022,483, Cl. 180-197.000.
- Song, John S.; and Hofman, Richard W., to Magenta Corporation. Press-open side dispensing closure. 5,022,566, Cl. 222-480.000.
- Sony Corporation: *See—*
  - Kobayashi, Seiji; and Ohsato, Kiyoshi, 5,023,855, Cl. 369-44.280.
  - Kondo, Tetsujiro; Nagai, Michio; and Shirota, Norihisa, 5,023,710, Cl. 358-133.000.
  - Miura, Masayoshi; Inanaga, Kiyofumi; Sogawa, Hiroyuki; and Iida, Yasuhiro, 5,022,486, Cl. 181-132.000.
  - Niikura, Hideo, 5,023,496, Cl. 310-12.000.
  - Soloff, Jonathan M., 5,023,718, Cl. 358-160.000.
  - Tamada, Hitoshi; and Saitoh, Masaki, 5,022,729, Cl. 350-96.120.
  - Tomita, Hideo, 5,023,523, Cl. 315-364.000.
  - Yamada, Takaaki; and Shimizume, Kazutoshi, 5,023,615, Cl. 341-152.000.
- Sood, Anup: *See—*
  - Spielvogel, Bernard F.; and Sood, Anup, 5,023,513, Cl. 514-64.000.
- Sorensen, Jens O., to Primtec. Hold-pressure control in multi-parting injection molding system. 5,023,039, Cl. 264-297.200.
- Sorensen, Joseph A.; and Gatzemeyer, Dwight L., to Petersen Manufacturing Co., Inc. Method of operating a quick-action bar clamp. 5,022,137, Cl. 29-559.000.
- Sorenson, J. Frank, to Baumac International. Method of making an aerosol nozzle assembly. 5,022,151, Cl. 29-890.143.
- Soricon Corporation: *See—*
  - Abramovitz, Robert G.; Anderson, Robert L., Jr.; Busse, Frederick L.; Celarier, Stuart A.; Poublan, Jean-Yves H.; and Shorthill, Lawrence R., 5,023,922, Cl. 382-59.000.
- Soskolne, Aubrey: *See—*
  - Friedman, Michael; Steinberg, Doron; and Soskolne, Aubrey, 5,023,082, Cl. 424-426.000.
- Sotoya, Kohshiro: *See—*
  - Yamamura, Masaaki; Okabe, Kazuhiko; Sotoya, Kohshiro; and Murata, Moriyasu, 5,023,003, Cl. 252-8.800.
- Sour Pliva: *See—*
  - Narandja, Amalija; Suskovic, Bozidar; Djokic, Slobodan; and Lopotar, Nevenka, 5,023,240, Cl. 514-30.000.
- Southern Illinois University Foundation: *See—*
  - Myers, Cal Y.; and Read, Richard B., 5,022,983, Cl. 209-167.000.
- Spackman, Kerry P.; and Whale, Henry A., to Precision Technology Inc. Target tracking device. 5,023,809, Cl. 364-516.000.
- Spalding & Evenflo Companies: *See—*
  - Fenton, Frank, 5,022,652, Cl. 273-80.00B.
- Spalmacin-Roma, Sylvie: *See—*
  - Badaoui, Mohamed; Dambricourt, Richard; Franquenouille, Jean-Paul; Garcia, Christian; Granger, Yves; and Spalmacin-Roma, Sylvie, 5,023,867, Cl. 370-56.000.
- Spamer, William S., to Mead Corporation, The. Gravity feed shelf. 5,022,535, Cl. 211-59.200.
- Spangenberg, Dale J., Jr.: *See—*
  - Avery, Norman R.; Spangenberg, Dale J., Jr.; Buth, Jimmy D.; and Seuffer, Kenneth C., Jr., 5,022,994, Cl. 210-670.000.
- Spangler, Charles W.; Dominick, George G.; Ross, Edward A.; and Fish, Darrell D., to Coulter Electronics, Inc. Multiple fluid container assembly. 5,022,547, Cl. 220-234.000.
- Spaur, Mike: *See—*
  - O'Shaughnessy, Timothy G.; and Spaur, Mike, 5,023,567, Cl. 330-253.000.
- Spear, Guy B : *See—*
  - Davidson, Thomas F.; Spear, Guy B.; ánd Ludlow, Timothy L., 5,023,006, Cl. 252-62.000.
- Spector, George: *See—*
  - Burgher, Stephen K.; and Spector, George, 5,022,330, Cl. 110-235.000.
- Spectra, Inc.: *See—*
  - Fulton, Steven J.; Peters, Gerald T., Jr.; Spehrley, Charles W., Jr.; and Young, Lawrence R., 5,023,111, Cl. 427-164.000.
- Spehrley, Charles W., Jr.: *See—*
  - Fulton, Steven J.; Peters, Gerald T., Jr.; Spehrley, Charles W., Jr.; and Young, Lawrence R., 5,023,111, Cl. 427-164.000.
- Speicher, Edwin W., to M. E. Cunningham Company. Bar code marking the surface of an object. 5,023,437, Cl. 235-432.000.
- Speight, Charles W., to Babcock & Wilcox Company, The. Drive unit for inspecting nuclear fuel rods. 5,023,046, Cl. 376-261.000.
- Spencer, Nicholas D.; Pan, Wie-Hin; and Rudesill, John A., to W. R. Grace & Co.-Conn. Manufacturing method for ceramics and products thereof. 5,023,067, Cl. 423-420.000.
- Spencer, Stanley E.: *See—*
  - Altemose, George A.; Consi, Michael; Joscelyn, Edwin R.; Wiemann, William; Giguere, David B.; Gully, Wilfred J.; and Spencer, Stanley E., 5,023,531, Cl. 318-471.000.
- Sperber, Ferenc; Huszar, Csaba; Nemeth, Attila; Somfai, Eva; and Pali nee Ivanics, Iren, to Chinoin Gyogyszer- Es Vegyeszeti Termekek Gyara Rt. Chemical process for the preparation of pharmaceutically active compounds. 5,023,337, Cl. 548-306.000.
- Spielvogel, Bernard F.; and Sood, Anup, to Boron Biologicals, Inc. Amine-alkylborane derivatives and methods. 5,023,513, Cl. 514-64.000.
- Spina, Joseph, Jr.; and Weibel, Michael K. Intralenticular cataract surgical procedure. 5,022,413, Cl. 128-898.000.
- Spindler, Siegfried: *See—*
  - Micic, Lyubomir; Gartlein, Gunter; Schmitt, Eberhard; Muller, Axel; Seng, Egon; and Spindler, Siegfried, 5,023,702, Cl. 357-74.000.
- Spink, Donald R.: *See—*
  - Burgess, J. Stuart; Spink, Donald R.; and Stein, Jerry Y., 5,023,064, Cl. 423-242.000.
- Spitz, Joseph M.: *See—*
  - Sherrow, Lionel; Rosenthal, Harold; Spitz, Joseph M.; and Haines, Stephen W., 5,022,810, Cl. 414-501.000.
- Sprecker, Mark A.; Belko, Robert P.; Hanna, Marie R.; Beck, Charles E. J.; and Brucato, Salvatore M., to International Flavors & Fragrances Inc. Alkyl-substituted tetra- or hexahydrobenzopyran derivatives, organoleptic uses thereof and process for preparing same. 5,023,352, Cl. 549-345.000.
- Sprecker, Mark A.: *See—*
  - Farbood, Mohamad I.; Morris, James A.; Sprecker, Mark A.; Bienkowski, Lynda J.; Miller, Kevin P.; Vock, Manfred H.; and Hagedorn, Myrna L., 5,023,347, Cl. 549-263.000.
- Spring, Harold G.: *See—*
  - Miller, John M.; Fenton, James E.; and Spring, Harold G., 5,023,539, Cl. 322-28.000.
- Spurney, Joseph L.: *See—*
  - Goubeaux, Ronald J.; and Spurney, Joseph L., 5,022,234, Cl. 62-228.500.
- Square D Company: *See—*
  - Bartee, Edward C.; and Chapman, Donald L., 5,023,396, Cl. 174-48.000.
  - Siverling, Erich H., 5,023,770, Cl. 364-140.000.
- Sridharan, Sri P., to Radionic Industries, Inc. Lamp ballast system. 5,023,521, Cl. 315-290.000.
- SSMC Inc.: *See—*
  - Hiratsuka, Katsuo; Odaka, Yoshiyuki; and Sakamoto, Takayuki, 5,022,334, Cl. 112-238.000.
- Sta-Rite Industries, Inc.: *See—*
  - King, David E.; and Marietta, Walter E., 5,022,837, Cl. 418-132.000.
- Stacker Machine Co.: *See—*
  - Smith, Clark L.; and Balcerek, Gregory, 5,022,813, Cl. 414-790.000.
- Staerzl, Richard E., to Brunswick Corporation. Positive starting circuit. 5,022,363, Cl. 123-179.0BG.
- Stahly, Daniel C.: *See—*
  - Kenny, Andrew A.; and Stahly, Daniel C., 5,022,368, Cl. 123-342.000.
- Stahnke, Wayne L. Multiplexed multiple intensity reproducing piano. 5,022,301, Cl. 84-21.000.
- Stakis, Anthony D. Separation and disposal of medical and dental biological waste. 5,022,548, Cl. 220-23.830.
- Stampfli, Jean-Marcel, to ETA SA Fabriques d'Ebauches. Method of producing a tape for providing electronic modules, and tape obtained by this method. 5,023,751, Cl. 361-398.000.
- Stampfli, Peter; and Frey, Peter, to Krupp Widia (Schweiz) AG. Cutting rotor. 5,022,795, Cl. 407-47.000.
- Stanasolovich, David; Allen, Leslie H.; and Mayer, James W., to Cornell Research Foundation, Inc. Selective deposition of tungsten on $TiSi_2$. 5,023,201, Cl. 437-192.000.
- Stanhope Products Company: *See—*
  - Juhl, Daniel L.; and Wood, Raymond B., 5,022,902, Cl. 55-387.000.
- Stanley, William J.; and Irwin, William P., Jr., to Mount Vernon Mills, Inc. Press felt for use in papermaking machine. 5,023,132, Cl. 428-234.000.
- Staples, Paul R., to E. M. B. Corporation. Plunger switch. 5,023,413, Cl. 200-61.760.
- Star Lock Company: *See—*
  - Stillwagon, Woodrow C., 5,022,243, Cl. 70-34.000.
- Staten, Roy G. Pedestrian crossing safety apparatus. 5,023,607, Cl. 340-908.100.
- Stauber, Siegfried T., to Wyler AG. Instrument for measuring accelerations, particularly gravitation components for goniometry. 5,022,264, Cl. 73-382.00R.
- Staudinger, Joseph; and Seely, Warren L., to Motorola, Inc. Broadband 180 degree hybrid. 5,023,576, Cl. 333-118.000.
- Staver Company Inc., The: *See—*
  - Norfolk, Roy; and Lazarus, Arnold, 5,022,171, Cl. 40-447.000.
- Sted Engineering S.r.l.: *See—*
  - Negrussi, Luigi, 5,022,251, Cl. 72-239.000.
- Steidl, Michael J.: *See—*
  - Long, Jon M.; and Steidl, Michael J., 5,023,202, Cl. 437-206.000.
- Stein, Jerry Y.: *See—*
  - Burgess, J. Stuart; Spink, Donald R.; and Stein, Jerry Y., 5,023,064, Cl. 423-242.000.
- Steinberg, Doron: *See—*
  - Friedman, Michael; Steinberg, Doron; and Soskolne, Aubrey, 5,023,082, Cl. 424-426.000.
- Steinmetz, Heinrich: *See—*
  - Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert; Kunze, Brigitte; Hofle, Gerhard; Augustiniak, Hermann; Bedorf, Norbert; Jansen, Rolf; Trowitzsch-Kienast, Wolfram; and Steinmetz, Heinrich, 5,023,184, Cl. 435-252.100.
- Stelk, John C., to Sivyer Steel Corporation. Heavy duty spider assembly for a hammermill. 5,022,593, Cl. 241-194.000.
- Stembridge, W. Frank, III: *See—*
  - Kirschner, Jonathan; Stembridge, William F.; Stembridge, W. Frank, III; and Deeds, Douglas A., 5,022,233, Cl. 62-138.000.

VOL 1127 ISS 2 JE 11 1991 UMI

Stembridge, William F.: *See—*

Kirschner, Jonathan; Stembridge, William F.; Stembridge, W. Frank, III; and Deeds, Douglas A., 5,022,233, Cl. 62-138.000.

Stemmler, Kurt, to Winkler & Dunnebier Maschinenfabrik und Eisengiesserei KG. Method and apparatus for maintaining the cutting conditions of a rotary punch constant. 5,022,295, Cl. 83-16.000.

Stephens, Kimetha L. Novelty item and method of manufacture. 5,023,117, Cl. 428-17.000.

Sterilinja Oy: *See—*

Santasalo, Lauri, 5,022,215, Cl. 53-420.000.

Stevens, Richard L. Portable bow press. 5,022,377, Cl. 124-23.100.

Stevens, William P.; and Dowey, Mark E., to Fort Howard Corporation. Composite towels and method for making composite towels. 5,023,126, Cl. 428-126.000.

Stevenson, John G.; and Williams, Raymond C., to International Business Machines Corporation. Method and apparatus for communication link management. 5,023,873, Cl. 371-8.200.

Stevenson, Robert A., to Rolyn Productions Inc. Audible signalling system for divers. 5,022,790, Cl. 405-186.000.

Stewart, Carlene M.: *See—*

Stewart, Robert M.; and Stewart, Carlene M., 5,022,310, Cl. 91-501.000.

Stewart, Ian W.: *See—*

Morton, Anthony J.; Stewart, Ian W.; and Harvey, Kenneth, 5,023,074, Cl. 424-52.000.

Stewart, John M., to Sanitation Equipment Limited. Padded toilet seat lid. 5,022,946, Cl. 156-272.400.

Stewart, Robert M.; and Stewart, Carlene M. Fluid power transmission. 5,022,310, Cl. 91-501.000.

Stieg, Scott, to Lachat Instruments. Microdistillation apparatus. 5,022,967, Cl. 202-197.000.

Stiles, Alvin B., to University of Delaware, The. Acid rain abatement. 5,023,063, Cl. 423-239.000.

Stillwagon, Woodrow C., to Star Lock Company. Latching system. 5,022,243, Cl. 70-34.000.

Stinnertz, Horst: *See—*

Gerretz, Josef; and Stinnertz, Horst, 5,022,250, Cl. 72-214.000.

Stiskin, Hal; Hogan, Joseph M.; and Jones, Thomas A. Secondary containment system and method. 5,022,685, Cl. 285-45.000.

Stock, Jurgen *See—*

Denz, Helmut; Grieser, Klemens; Stock, Jurgen; Moz, Rudolf, and Uttenweiler, Winifred, 5,022,374, Cl. 123-490.000.

Stoica, Adrian, to Printer Systems Corporation. System for detecting and correcting signal distortion. 5,023,892, Cl. 375-118.000.

Strategic American Markets, Inc.: *See—*

Put, Frederik W., 5,022,989, Cl. 210-386.000.

Straub, Martin L.; and Davis, James D. Reduced height upper rail for curtainside truck trailers. 5,022,702, Cl. 296-181.000.

Streck, Donald: *See—*

Streck, Donald A.; and Iggulden, Jerry R., 5,023,931, Cl. 455-21.000.

Streck, Donald A.; and Iggulden, Jerry R., to Iggulden, Jerry; and Streck, Donald, part interest. Television local wireless transmission and control. 5,023,931, Cl. 455-21.000.

Strege, Keith E., to AT&T Bell Laboratories. Method for fabricating self-stabilized semiconductor gratings. 5,023,198, Cl. 437-129.000.

Stroh, Glenn C., to Kinetic Concepts, Inc. Low air loss mattress. 5,022,110, Cl. 5-455.000.

Strope, Gerald C.: *See—*

Murray, Donna F.; Pringle, Joseph M.; Strope, Gerald C., and Berkson, Stephen P., 5,023,851, Cl. 368-41.000.

Stroud, Roy C.; and Baker, Walter A. Apparatus for optically inspecting printer die motifs. 5,022,762, Cl. 356-372.000.

Structural Concepts Corporation: *See—*

Fevig, Robert J.; Holleman, Randall S.; and Seaver, Duane L., 5,022,720, Cl. 312-223.000.

Sturman, Oded E.; Grill, Benjamin; and Harrison, Walter L., to Kineret Engineering. Soft drink dispenser. 5,022,565, Cl. 222-396.000.

Sturzebecher, Claus-Steffen: *See—*

Klar, Ulrich; Skuballa, Werner; Vorbruggen, Helmut; Sturzebecher, Claus-Steffen; Thierauch, Karl-Heinz; and Schillinger, Ekkehard, 5,023,273, Cl. 514-530.000.

Sudare, Masahiro: *See—*

Ueda, Satoshi; Sudare, Masahiro; Suyama, Yasuyuki; Kishimoto, Kazuhiko; Suzuki, Kenshi; Inoue, Shiroh; and Sakura, Shunji, 5,023,534, Cl. 318-587.000.

Sudmanns, Hans, to Mtu Motoren-und Turbinen-Union Friedrichshafen GmbH. Pipe carrying hot gases for an internal-combustion engine. 5,022,227, Cl. 60-320.000.

Suedzucker-Aktiengesellschaft: *See—*

Gander, Michael; Rapp, Knut M., and Schiweck, Hubert, 5,023,330, Cl. 536-124.000.

Sugawara, Yukari, to NEC Corporation Complementary integrated circuit device equipped with latch-up preventing means. 5,023,689, Cl. 357-42.000.

Sugihara, Hirosi; Hidaka, Hiroshi; Doi, Akira; Okawauchi, Toshitaka; Kawabata, Yasushi; and Baba, Hideki, to Fuji Oil Company, Limited. Shortening for hard butter product and process for producing hard butter product. 5,023,101, Cl. 426-603.000.

Sugimori, Kenichiro: *See—*

Ohno, Kazuhisa; Kosugi, Tetsushi; Sugimori, Kenichiro; Ando, Akitsugu; Yamamoto, Masaru; Suzuki, Fukuji; Nakamura, Masahiro; and Tsujita, Nobuhisa, 5,023,065, Cl. 423-326.000.

Sugimoto, Yasuhiko: *See—*

Watanabe, Kozo; and Sugimoto, Yasuhiko, 5,023,394, Cl. 174-35.00R.

Sugiyama, Isao: *See—*

Hasegawa, Masamitsu; Tamura, Satoshi; Sugiyama, Isao; and Wakashima, Takashi, 5,022,947, Cl. 156-277.000.

Sugiyama, Kazuhiro: *See—*

Hoshino, Yasushi; Sugiyama, Kazuhiro; Ohta, Yoshitaka; and Shimada, Masaki, 5,023,650, Cl. 354-441.000.

Sugiyama, Takeshi, to Mitsubishi Denki Kabushiki Kaisha. Electromagnetic switch. 5,023,581, Cl. 335-126.000.

Suitch, Paul R.: *See—*

Raythatha, Rasik H.; Suitch, Paul R.; and Andrews, E. Wayne, 5,022,924, Cl. 106-486.000.

Sullivan, Francis R.: *See—*

Lee, Biing-Lin; Sullivan, Francis R.; and Mertzel, Elaine Audrey, 5,023,036, Cl. 264-211.230.

Sultech, Inc.: *See—*

Adams, Harold W., 5,023,317, Cl. 528-389.000.

Sulzer-Escher Wyss GmbH: *See—*

Biondetti, Mario, 5,022,319, Cl. 100-170.000.

Sumi, Naoki; Mochizuki, Keizo; Moriyama, Yoshio; and Sakurai, Mitsuhiro, to Meiji Seika Kaisha. Method of producing pressurized gas-entrapping candy. 5,023,098, Cl. 426-474.000.

Sumitomo Chemical Company, Limited: *See—*

Ebara, Takeshi; Sasaki, Toshio; and Kawai, Kiyoshi, 5,023,223, Cl 502-116.000.

Sumitomo Electric Industries, Ltd.: *See—*

Ishiguro, Yoichi; Kanamori, Hiroo; Urano, Akira; and Kyoto, Michihisa, 5,022,904, Cl. 65-2.000.

Nakata, Hirohiko; Nishioka, Takao; Oooka, Nobuya; and Motoyoshi, Kenya, 5,023,147, Cl. 428-627.000.

Takeda, Yoshinobu; Odani, Yusuke; Hayashi, Tetsuya, Kaji, Toshihiko; and Itoh, Yoshiaki, 5,022,455, Cl. 164-46.000.

Uenishi, Naota; Uemiya, Takafumi; Mizoguchi, Akira; Ogaki, Yasuji; Hattori, Yasuhiro; Tohma, Teruo; Chikuma, Kiyofumi; and Okamoto, Sota, 5,022,738, Cl. 350-96.340.

Sumitomo Heavy Industries: *See—*

Iida, Hiroshi, 5,022,931, Cl. 148-12.00R.

Sumitomo Precision Products, Co.: *See—*

Iida, Hiroshi, 5,022,931, Cl. 148-12.00R.

Sumitomo Rubber Industries, Ltd.: *See—*

Ochiai, Kiyoshi, 5,022,448, Cl. 152-209.00R.

Sumitomo Special Metal Co. Ltd.: *See—*

Kageyama, Keisuke, 5,023,219, Cl. 501-136.000.

Summers, Max D.; Bradfield, James Y.; and Keeley, Larry L., to Texas A&M University System, The. Lepidopteran AKH signal sequence. 5,023,328, Cl. 536-27.000.

Sun, Ryu S.: *See—*

Yeol, Ryu M., Ki, Ryu D.; Kyun, Yun D.; Kyu, An J.; Kuk, Hong S.; Euy, Hong C.; and Sun, Ryu S., 5,022,520, Cl. 206-315.100.

Sundstrand Corporation: *See—*

Baits, Paul, 5,023,537, Cl. 318-732.000.

Lampe, Steven W.; and Mehr-Ayin, Kourosh, 5,023,789, Cl 364-424.100.

Walton, Derrick N.; Dolan, Clarence F.; and Shah, Mahesh J., 5,023,540, Cl. 322-58.000.

Sundstrand Data Control, Inc.: *See—*

Howard, Bruce S., 5,022,751, Cl. 356-1.000.

Sunnen Products Company: *See—*

Schimweg, John J.; Sunnen, Robert M.; and Wilken, Rickey K., 5,022,196, Cl. 51-338.000.

Sunnen, Robert M.: *See—*

Schimweg, John J.; Sunnen, Robert M.; and Wilken, Rickey K., 5,022,196, Cl. 51-338.000.

Suntory Limited: *See—*

Akimoto, Kengo; Shinmen, Yoshifumi; Yamada, Hideaki; and Shimizu, Sakayu, 5,023,177, Cl. 435-134.000.

Kyogoku, Nobuo; Saeki, Takeshi; and Fujikawa, Shigeaki, 5,023,024, Cl. 264-4.300.

Superior Diamond Corporation: *See—*

Monderer, Thea B.; and Flores, Ruben, 5,022,237, Cl. 63-23.000.

Surguchev, Viktor G.; Kuraev, Oleg V.; Surgucheva, Raisa N.; Makhnovsky, Leonid P.; Troschenovsky, Anatoly P.; Tetior, Alexandr N., Golovchenko, Igor V.; and Scherbina, Tatyana V. Composition for preparing artificial stone materials. 5,022,925, Cl. 106-631.000.

Surgucheva, Raisa N.: *See—*

Surguchev, Viktor G.; Kuraev, Oleg V.; Surgucheva, Raisa N.; Makhnovsky, Leonid P.; Troschenovsky, Anatoly P.; Tetior, Alexandr N.; Golovchenko, Igor V.; and Scherbina, Tatyana V., 5,022,925, Cl. 106-631.000.

Suskovic, Bozidar: *See—*

Narandja, Amalija; Suskovic, Bozidar; Djokic, Slobodan; and Lopotar, Nevenka, 5,023,240, Cl. 514-30.000.

Sutherland, Audrey E.: *See—*

Bailey, Alex E.; Winzer, Stephen R.; Sutherland, Audrey E.; and Ritter, Andrew P., 5,023,032, Cl. 264-63.000.

Sutker, Burton J.: *See—*

Balcar, Gerald P.; Krumrine, Paul; Schwartz, Neal; Sutker, Burton J.; and Wood, Gail J., 5,022,897, Cl. 55-96.000.

Suttle, James P.; and Jones, Daniel A., to Caribbean Stud Enterprises, Inc. Electronic poker game. 5,022,653, Cl. 273-85.0CP.

Suyama, Yasuyuki: *See—*

Ueda, Satoshi; Sudare, Masahiro; Suyama, Yasuyuki; Kishimoto, Kazuhiko; Suzuki, Kenshi; Inoue, Shiroh; and Sakura, Shunji, 5,023,534, Cl. 318-587.000.

Suzuki, Fukuji: *See—*

Ohno, Kazuhisa; Kosugi, Tetsushi; Sugimori, Kenichiro; Ando, Akitsugu; Yamamoto, Masaru; Suzuki, Fukuji; Nakamura, Masahiro; and Tsujita, Nobuhisa, 5,023,065, Cl 423-326.000.

Suzuki, Hideo; and Sakama, Masao, to Yamaha Corporation. Musical tone control apparatus employing predicted angular displacement. 5,022,303, Cl 84-600.000.

Suzuki, Hiroyuki: *See—*

Sato, Akira; Hama, Kazuaki; Nakao, Makoto; Misawa, Junichi; and Suzuki, Hiroyuki, 5,022,475, Cl. 177-211.000.

Suzuki, Hitoshi: *See—*

Kugimiya, Shuzo; Suzuki, Hitoshi; Fukumoshi, Yoji; Sata, Ichiko; Hirai, Tokuyuki; and Nishida, Yumi, 5,023,786, Cl. 364-419.000.

Suzuki Jidosha Kogyo Kabushiki Kaisha: *See—*

Kobayashi, Yoshiyuki, 5,022,373, Cl. 123-488.000.

Murano, Katsuaki; Hirano, Sadayuki; Yamashita, Yoshinori; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,022,287, Cl. 74-866.000.

Suzuki, Kenshi: *See—*

Ueda, Satoshi; Sudare, Masahiro; Suyama, Yasuyuki; Kishimoto, Kazuhiko; Suzuki, Kenshi; Inoue, Shiroh; and Sakura, Shunji, 5,023,534, Cl. 318-587.000.

Suzuki, Mariko; Itaya, Kazuhiko; Ishikawa, Masayuki; Watanabe, Yukio; and Hatakoshi, Genichi, to Kabushiki Kaisha Toshiba. Semiconductor laser device. 5,023,880, Cl. 372-45.000.

Suzuki, Noriaki; Miyamoto, Junichi; and Ohtsuka, Nobuaki, to Kabushiki Kaisha Toshiba. Redundant semiconductor memory device. 5,023,839, Cl. 365-200.000.

Suzuki, Ryo: *See—*

Toyooka, Takashi; Maruyama, Yoji, and Suzuki, Ryo, 5,023,473, Cl. 307-270.000.

Suzuki, Shuetu: *See—*

Kondo, Yoshikazu; Suzuki, Shuetu; and Kuboyama, Morio, 5,023,249, Cl. 514-170.000.

Suzuki, Takahito: *See—*

Kita, Kunio; Kuwashima, Shigesumi, Suzuki, Takahito; and Seki, Chikashi, 5,023,709, Cl. 358-125.000.

Suzuki, Takanori: *See—*

Mukai, Toshio; Yamashita, Yoshiro; Suzuki, Takanori; Akasaki, Yutaka; Sato, Katsuhiro; Yabuuchi, Naoya; Tanaka, Hiroyuki; and Nukada, Katsumi, 5,023,356, Cl. 552-210.000.

Suzuki, Takashi: *See—*

Shinohara, Koichi, Suzuki, Takashi; Kawagishi, Masao; Satoh, Nobuo; Murakami, Takeshi; and Fujita, Takashi, 5,023,739, Cl. 360-132.000.

Suzuki, Tatsuo: *See—*

Yoshida, Takao; Isono, Keinosuke; and Suzuki, Tatsuo, 5,023,026, Cl. 264-22.000.

Suzuki, Yusuke: *See—*

Sakamoto, Teruo; Takeda, Toyohiko, and Suzuki, Yusuke, 5,023,089, Cl. 424-502 000.

Suzuki, Yutaka, to Nissan Motor Co., Ltd. Transient reduction ratio control during shift between two mode operations. 5,022,285, Cl 74-866.000.

Svec, Paul S.: *See—*

Brun, Milivoj K.; Boron, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., 5,022,150, Cl. 29-890.053.

Swann, George R., to Chick Machine Tool Inc Workholding apparatus. 5,022,636, Cl. 269-43.000.

Swanson, Douglas L., to Swanson Systems, Inc. Tube processing machine. 5,022,909, Cl. 65-278.000.

Swanson, Gordon S.: *See—*

D'Entremont, John R.; Behler, Matthew L.; and Swanson, Gordon S., 5,023,586, Cl. 337-104.000.

Swanson, Kurt W., to General Dynamics Corporation, Convair Division. Pin type carbon-carbon fastener. 5,022,803, Cl. 411-19.000

Swanson Systems, Inc.: *See—*

Swanson, Douglas L., 5,022,909, Cl. 65-278.000.

Sweeney, Frank J., to Texas Instruments Incorporated Method and circuitry for testing a programmable logic device. 5,023,485, Cl. 307-465.000.

Sweet, David H.: *See—*

Lappos, Nicholas D.; Walsh, David M.; Sweet, David H., and Greenberg, Charles E., 5,023,797, Cl. 364-442.000.

SWF Auto-Electric GmbH: *See—*

Gakenholz, Werner, 5,023,532, Cl. 318-541.000.

Swiderski, Jane A.: *See—*

Favreau, David P., Swiderski, Jane A.; and Vitkavage, Daniel J., 5,022,958, Cl. 156-643.000

Swinbanks, Malcolm A.: *See—*

Johnson, Frederick A.; and Swinbanks, Malcolm A., 5,022,628, Cl. 248-638.000.

Swiss Aluminium Ltd.: *See—*

Ehrat, Rainer; Deubelbeiss, Urs; and Kolliker, Willy, 5,022,208, Cl 52-586.000.

Swiss Aluminum Ltd.: *See—*

Everhart, Richard, Bosomworth, Paul; Butcher, Kenneth; and Hoffmann, Matthias, 5,023,217, Cl. 501-103.000.

Swofford, Howard W.; Rice, Sandra W.; Farrar, Grover L.; and Rudd, David, to Hoechst Celanese Corporation. In-line extrusion coatable polyester film having an aminofunctional silane primer. 5,022,944, Cl 156-244.110.

Sylvester, Gerd: *See—*

Meuer, Kurt P.; Waniczek, Helmut; Sylvester, Gerd, and Witte, Josef, 5,023,299, Cl. 525-146.000.

Sylvia, Milton: *See—*

Dunford, Joseph R.; Champlin, George; and Sylvia, Milton, 5,022,660, Cl. 277-9.000.

Synthelabo: *See—*

Langer, Salomon Z.; Frost, Jonathan R.; Schoemaker, Johannes; Gaudilliere, Bernard; Bertin, Jean; Rousseau, Jean; Dupont, Regis; and Wick, Alexander E., 5,023,266, Cl. 514-317.000.

Szala, Lawrence E.: *See—*

Brun, Milivoj K.; Boron, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., 5,022,150, Cl. 29-890.053.

Szarka, Sandor, to Precision Screen Machines, Inc. Adjustable parallel motion linkage system for screen printer. 5,022,320, Cl. 101-123.000.

Szczutkowski, Craig F.; and Butler, Clyde R., Jr., to General Electric Company. Method and apparatus for externally defining the operational mode of a digital radio transceiver. 5,023,936, Cl. 455-90.000.

Szklany, Craig R.; and Drucker, Frank, to Sensormatic Electronics Corporation. Electronic article surveillance system with adaptiveness for synchronization with companion systems. 5,023,600, Cl. 340-572.000.

Szoke, Balazs: *See—*

Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre; Teplan, Istvan; Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt; Hegedus, Edit; Makara, Gabor; and Rappay, Gyorgy, 5,023,322, Cl. 530-324.000.

Tabata, Munehiro: *See—*

Uriu, Eiichi; Nishida, Koji; and Tabata, Munehiro, 5,022,263, Cl. 73-295.000.

Tabata, Yoshiaki: *See—*

Hatano, Masaru; and Tabata, Yoshiaki, 5,023,669, Cl. 355-319.000

Tabatabai, Louisa B.: *See—*

Mayfield, John E.; and Tabatabai, Louisa B., 5,023,174, Cl. 435-91.000.

Tachibana, Miyuki, to Mitsubishi Denki Kabushiki Kaisha. Servo-controller. 5,023,536, Cl 318-638.000.

Tadday, Horst: *See—*

Blum, Albert; and Tadday, Horst, 5,022,808, Cl. 414-280.000.

Tagami, Jun: *See—*

Kobori, Takuji; Sakamoto, Mitsuo; Yamada, Toshikazu; Nishimura, Isao; Ishii, Koji; and Tagami, Jun, 5,022,201, Cl. 52-167.0DF.

Tahara, Mamoru: *See—*

Kuragasaki, Mutsuo; Tahara, Mamoru; and Tazaki, Shunsei, 5,022,787, Cl. 405-128.000.

Tai, Kuochou: *See—*

McCall, Samuel L., Jr.; and Tai, Kuochou, 5,023,673, Cl. 357-16.000.

Tai, William K. Method for making improved support arms for golf swing training aids. 5,022,152, Cl. 29-897.000.

Tajima, Fumio; Katayama, Hiroshi; Miyashita, Kunio; Morinaga, Shigeki; and Narushima, Seiichi, to Hitachi, Ltd. Speed control apparatus for movable equipment. 5,023,924, Cl. 388-811.000.

Takabayashi, Yasuhiro, to Fuji Electric Co., Ltd. Method and apparatus for controlling a fuel cell. 5,023,150, Cl. 429-22.000.

Takada, Kazuo; and Shimoyama, Osamu, to NCR Corporation. Credit card handling apparatus and method. 5,023,436, Cl. 235-380.000

Takada, Seiji: *See—*

Onozuka, Haruo; Umezu, Takao; Sato, Muneyoshi; and Takada, Seiji, 5,023,470, Cl. 307-108.000.

Takada, Tadayoshi: *See—*

Sekikawa, Nobuyuki; and Takada, Tadayoshi, 5,023,195, Cl 437-31.000.

Takagi, Masahiko: *See—*

Kitada, Taizo; Danno, Yoshiaki; Takagi, Masahiko; Uchida, Toshihiko; and Yamamoto, Yutaka, 5,022,664, Cl. 277-236.000.

Takagi, Osamu: *See—*

Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; Asano, Yuji; Yamamoto, Takemi, and Nakata, Takashi, 5,023,654, Cl 355-27.000.

Takagi, Yuji: *See—*

Satoh, Isao; Fukushima, Yoshihisa; Ichinose, Makoto. Kuroki, Yuzuru; and Takagi, Yuji, 5,023,854, Cl 369-32.000.

Takahashi, Atsushi: *See—*

Komatsu, Katsuaki, Watanabe, Hideo; and Takahashi, Atsushi, 5,023,443, Cl. 250-208.100.

Takahashi, Jun, to Ohi Seisakusho Co., Ltd. Lid guide structure for sun roof device. 5,022,705, Cl. 296-213.000.

Takahashi, Kenji: *See—*

Toda, Hiroyuki; Miyahara, Junji; and Takahashi, Kenji, 5,023,014, Cl. 252-301.40H

Takahashi, Koji: *See—*

Nakayama, Tadayoshi; Ishikawa, Hisashi, Kozuki, Susumu, Takahashi, Koji; Yoshimura, Katsuji; Nagasawa, Kenichi; and Sasatani, Tomohiko, 5,023,716, Cl. 358-138.000.

Takahashi, Susumu: *See—*

Tanoue, Tomonori; Kusano, Chushirou, and Takahashi, Susumu, 5,023,687, Cl 357-34 000.

Takahashi, Tatsunori: *See—*

Oyama, Jun; Uchida, Naoshi; Unuma, Makoto; Takahashi, Tatsunori; Shinohara, Hisaji, and Kandatsu, Kiyoshi, 5,023,416, Cl. 200-244.000.

Takahashi, Tsugio: *See—*

Meguro, Hiroshi; Takahashi, Tsugio; Aoki, Hitoshi; and Kosaka, Toru, 5,023,648, Cl. 354-420.000.

Takahashi, Yoshiaki: *See—*

Kitabatake, Yasuo; Nakamura, Tadashi; Takahashi, Yoshiaki; and Maeda, Kazuya, 5,023,161, Cl. 430-137.000.

VOL
1127
ISS
2
JE
11
1991
UMI

Takakura, Kouichi, to Think Laboratory Co., Ltd. Method for forming plate characters in a half-tone gravure platemaking process. 5,023,166, Cl. 430-307.000.

Takano, Masatoshi: *See—*
- Negoro, Ikuo; Takano, Masatoshi; Chikama, Atsushi; and Negishi, Kiyoshi, 5,023,667, Cl. 355-274.000.

Takasaki, Yoshitaka: *See—*
- Takase, Akihiko; and Takasaki, Yoshitaka, 5,023,604, Cl. 340-825.030.

Takasaki, Yukio: *See—*
- Yokouchi, Hisatake; Takasaki, Yukio; Hirai, Tadaaki; Koike, Kouichi; Tsuneoka, Masayuki; Onodera, Yoichi; and Funo, Takakazu, 5,023,896, Cl. 378-99.000.

Takase, Akihiko; and Takasaki, Yoshitaka, to Hitachi, Ltd. Communication system. 5,023,604, Cl. 340-825.030.

Takashima, Yuji: *See—*
- Yamamoto, Hajime; Kuramoto, Yukimasa; Takashima, Yuji; Nakamura, Masahiko; and Nakano, Kenichi, 5,023,632, Cl. 346-157.000.

Takeda, Kousaku: *See—*
- Wakimoto, Kingo; and Takeda, Kousaku, 5,023,603, Cl. 340-793.000.

Takeda, Toshihiko: *See—*
- Nomura, Ichiro; Kaneko, Tetsuya; Banno, Yoshikazu; and Takeda, Toshihiko, 5,023,110, Cl. 427-49.000.

Takeda, Toyohiko: *See—*
- Sakamoto, Teruo; Takeda, Toyohiko; and Suzuki, Yusuke, 5,023,089, Cl. 424-502.000.

Takeda, Yoshinobu; Odani, Yusuke; Hayashi, Tetsuya; Kaji, Toshihiko; and Itoh, Yoshiaki, to Sumitomo Electric Industries, Ltd. Method of producing aluminum base alloy containing silicon. 5,022,455, Cl. 164-46.000.

Takegawa, Tomohiro; Tasaki, Akira; and Koinuma, Hiroshi, to Pioneer Electronic Corporation. Station selecting device in tuner for automatic selection according to input information. 5,023,938, Cl. 455-183.000.

Takegawa, Yoshinobu: *See—*
- Yamada, Shuji; Tsuji, Koji; Takegawa, Yoshinobu; Tanimura, Akira; Menju, Akira; and Yano, Nobuyoshi, 5,022,932, Cl. 148-13.100.

Takei, Masahiro: *See—*
- Sakata, Tsuguhide; Kimura, Norio; and Takei, Masahiro, 5,023,730, Cl. 360-48.000.

Takeuchi, Hajime: *See—*
- Wakatsuki, Yoshio; Okuyama, Toshiharu; Takeuchi, Hajime; Shimizu, Giichiro; and Shimizu, Misao, 5,023,438, Cl. 235-472.000.

Takeuchi, Kunihiko; Oba, Masao; and Horinouchi, Shinichi, to Tokyo Keiki Company Ltd. Data transmission system using spread spectrum communication. 5,023,887, Cl. 375-1.000.

Takeuchi, Mizutomo; and Kuramoto, Masahiko, to Idemitsu Kosan Co., Ltd. Process for producing styrene-based polymer. 5,023,304, Cl. 526-160.000.

Takeuchi, Susunu; and Yoshioka, Nobuyuki, to Mitsubishi Denki Kabushiki Kaisha. Mask for X-ray lityhography and method of manufacturing the same. 5,023,156, Cl 430-5.000.

Takeuchi, Yukihisa; Watanabe, Tetsuo; Yamamoto, Azuma; Shirakawa, Kazuo; and Segawa, Takao, to NGK Insulators, Ltd.; and Toppan Printing Co., Ltd. Minutely patterned structure. 5,023,700, Cl. 357-70.000.

Takeyama, Takeshi; and Kondo, Mitsuhiro, to Ibiden Co., Ltd. Method of manufacturing circuit board for mounting electronic components. 5,022,960, Cl. 156-643.000.

Takiguchi, Toshio: *See—*
- Tanaka, Akiko; and Takiguchi, Toshio, 5,022,980, Cl 204-400 000.

Takizawa, Satoshi, to Nissan Motor Co., Ltd. System for and method of controlling shifting in gear position in automatic transmission 5,022,286, Cl. 74-866.000.

Taktakian, Harry, to Taktakian, Harry. Crimped cap removal and return assist device. 5,022,288, Cl. 81-3.400.

Tamada, Hitoshi; and Saitoh, Masaki, to Sony Corporation. Optical waveguide and second harmonic generator. 5,022,729, Cl. 350-96.120.

Tamai, Yasumasa: *See—*
- Tsujimura, Hiroshi; Tamai, Yasumasa; Saito, Hideyo; and Kobayashi, Masahiro, 5,022,936, Cl. 148-135.000.

Tamaki, Yoshihiro, to Victor Company of Japan, Ltd. Cylindrical rotary transducer 5,023,734, Cl. 360-84.000.

Tamary, Ernest J.: *See—*
- Aslam, Muhammad, Farnand, Thomas J.; and Tamary, Ernest J., 5,023,038, Cl. 264-293.000.

Tamayama, Kiyoshi: *See—*
- Watanabe, Kenshiu; and Tamayama, Kiyoshi, 5,023,045, Cl. 376-215.000.

Tamura, Keiichi: *See—*
- Saitou, Tosio; Matsui, Kenji; Tamura, Keiichi; Mori, Shinji; and Izuchi, Shingo, 5,022,601, Cl. 242-107.4QA.

Tamura, Satoshi: *See—*
- Hasegawa, Masamitsu; Tamura, Satoshi; Sugiyama, Isao; and Wakashima, Takashi, 5,022,947, Cl. 156-277.000.

Tan, Swie-in: *See—*
- Guidotti, Daniel; Tan, Swie-in, and Wilman, John G., 5,022,765, Cl. 356-435.000.

Tanaami, Hideyuki: *See—*
- Nimura, Mitsuo; and Tanaami, Hideyuki, 5,023,728, Cl. 358-437.000.

Tanabe, Takeshi: *See—*
- Kurano, Shinichi; Bando, Masahiro; Mitsuya, Yasuhiro; and Tanabe, Takeshi, 5,023,585, Cl. 336-69.000.

Tanabe, Yoshimitsu: *See—*
- Yamaguchi, Keizaburo; Tanabe, Yoshimitsu; Asano, Makoto; and Yamaguchi, Akihiro, 5,023,366, Cl. 560-71.000.

Tanaka, Akiko; and Takiguchi, Toshio, to Kabushiki Kaisha Toshiba. System for determining concentration of an electrolyte. 5,022,980, Cl 204-400.000.

Tanaka, Eishi; Nishizawa, Tsutomu; Yamada, Yasuyuki; Itoh, Hisato; Yamaguchi, Akihiro; and Nakatsuka, Masakatsu, to Mitsui Toatsu Chemicals, Incorporated. P-amino substituted tetraphenylthiophenes and electrophotographic photoreceptors containing them. 5,023,343, Cl. 549-74.000.

Tanaka, Hiromi; and Osaka, Tadashi, to AMP Incorporated. Flat cable terminating apparatus. 5,022,138, Cl. 29-564.800.

Tanaka, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Method of determining the depth of trenches formed in a semiconductor wafer 5,023,188, Cl. 437-8.000.

Tanaka, Hiroyuki: *See—*
- Mukai, Toshio; Yamashita, Yoshiro; Suzuki, Takanori; Akasaki, Yutaka; Sato, Katsuhiro; Yabuuchi, Naoya; Tanaka, Hiroyuki, and Nukada, Katsumi, 5,023,356, Cl. 552-210.000.

Tanaka, Manzo: *See—*
- Ueda, Yutaka; Mori, Hideshi; and Tanaka, Manzo, 5,022,123, Cl 19-260.000.

Tanaka, Minoru: *See—*
- Higuchi, Toshiro; Izumi, Hazime; and Tanaka, Minoru, 5,022,294, Cl. 82-18.000.

Tanaka, Mitsutoshi: *See—*
- Nagatomo, Shigeru; and Tanaka, Mitsutoshi, 5,023,052, Cl 422-56.000.

Tanaka, Satoru: *See—*
- Inagaki, Hidemitsu, Kawamoto, Mutsumi, and Tanaka, Satoru, 5,022,480, Cl. 180-79.100.

Tanaka, Takeshi: *See—*
- Murakami, Azuma, Aoki, Kazuo; Yamanami, Tsuguya, Tomofuji, Yoshiaki; Tanaka, Takeshi; Inashima, Satoshi; Funahashi, Takahiko; Chikami, Toshihide; and Senda, Toshiaki, 5,023,408, Cl. 178-19.000.

Tanaka, Toshio: *See—*
- Ohashi, Mitsuo; Awano, Katsuya; Tanaka, Toshio; and Kimura, Tetsuya, 5,023,364, Cl 560-53.000.

Tani, Hisashi: *See—*
- Matoba, Gensuke; Ishida, Katsuhiko; Tani, Hisashi; and Hayashi, Hiroo, 5,023,227, Cl. 503-214.000.

Taniguchi, Hideo; Ogata, Hiromi; Sawase, Kensuke; Yokoyama, Manabu; and Tujikawa, Munekazu, to Rohm Co., Ltd Apparatus for optically writing information. 5,023,442, Cl. 250-208.100

Taniguchi, Hitoshi: *See—*
- Nagatomo, Shinichiro; Terashima, Masahiko; and Taniguchi, Hitoshi, 5,023,104, Cl. 426-634.000.

Taniguchi, Masayuki: *See—*
- Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., 5,022,849, Cl 431-2.000.

Taniguchi, Nobuyuki: *See—*
- Ishida, Tokuji; Hamada, Masataka; Ishibashi, Kenji; Taniguchi, Nobuyuki; Ootsuka, Hiroshi; Norita, Toshio; and Karasaki, Toshihiko, 5,023,646, Cl. 354-402.000.

Tanimura, Akira: *See—*
- Yamada, Shuji; Tsuji, Koji; Takegawa, Yoshinobu; Tanimura, Akira; Menju, Akira; and Yano, Nobuyoshi, 5,022,932, Cl. 148-13.100.

Tannhof, Pascal: *See—*
- Boudon, Gerard; Mollier, Pierre; Ogura, Seiki; Omet, Dominique, Tannhof, Pascal; and Wallart, Franck, 5,023,478, Cl. 307-446.000

Tanoue, Tomonori; Kusano, Chushirou; and Takahashi, Susumu, to Hitachi, Ltd. Semiconductor device. 5,023,687, Cl. 357-34.000.

Tanzawa, Kenji: *See—*
- Sakamari, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi, and Tanzawa, Kenji, 5,022,842, Cl. 418-257.000.

Tao, Hongyi: *See—*
- Copley, Stephen M.; Tao, Hongyi; and Todd-Copley, Judith A., 5,022,957, Cl. 156-643.000.

Tarumi, Noriyoshi: *See—*
- Tomono, Makoto; Tarumi, Noriyoshi; and Sato, Masayuki, 5,023,158, Cl. 430-99.000.

Tasaki, Akira: *See—*
- Takegawa, Tomohiro; Tasaki, Akira; and Koinuma, Hiroshi, 5,023,938, Cl. 455-183.000.

Tashiro, Fumio: *See—*
- Hamada, Keishi; Tashiro, Fumio; Otani, Shigemasa; Nomaguchi, Kanemasa; Murakami, Tomiguyu; and Iijima, Sadayoshi, 5,023,136, Cl. 428-341.000.

Tate, Takuo; Watanabe, Taketoshi; and Nagura, Hiroyuki, to Nippon Filcon Co., Ltd. Papermakers's double layer fabric with high warp and weft volume per repeat. 5,022,441, Cl. 139-383.00A.

Tateishi, Tetsuo: *See—*
- Mori, Shogo; and Tateishi, Tetsuo, 5,023,693, Cl. 357-46.000

Tatsumi, Takumi: *See—*
- Murano, Katsuaki; Hirano, Sadayuki; Yamashita, Yoshinori; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,022,287, Cl 74-866.000.

Tatsuta, Shigeru, to Fujitsu Limited. Compound semiconductor mesfet device with passivation film. 5,023,676, Cl. 357-22.000.

Taufer, Peter: *See—*
- Drobny, Wolfgang; Nitschke, Werner; Taufer, Peter; and Weller, Hugo, 5,023,468, Cl. 307-10.100.

Taya, Toshiki: *See—*
- Matsuda, Mikio; Inagaki, Mitsuo; Hayashi, Ikuo; Goto, Masahiro; Kojima, Akikazu; Taya, Toshiki; and Miura, Nobuhiro, 5,022,826, Cl. 417-63.000.

Tayloe, Daniel R.; and Bonta, Jeffrey D. Cellular radiotelephone diagnostic system. 5,023,900, Cl. 379-32.000.

Taylor, James D.: *See—*
- Hudson, Sharon J., Jr.; and Taylor, James D., 5,022,376, Cl. 123-572.000.

Taylor, William T. Adjustable fishing jar. 5,022,473, Cl. 175-299.000.

Tazaki, Shunsei: *See—*
- Kuragasaki, Mutsuo; Tahara, Mamoru; and Tazaki, Shunsei, 5,022,787, Cl. 405-128.000.

TDK Corporation: *See—*
- Yajima, Koichi; Kohmoto, Osamu; and Yoneyama, Tetsuhito, 5,022,939, Cl. 148-302.000.

TDM Tape Services, Ltd.: *See—*
- McMorran, William, 5,023,548, Cl. 324-212.000.

Teac Corporation: *See—*
- Abe, Youji, 5,023,498, Cl. 310-71.000.

Tecumseh Products Company: *See—*
- Gannaway, Edwin L.; and Ortiz, Arturo L., 5,022,146, Cl. 29-888.020
- Kandpal, Tara C.; Paczuski, Andrew W.; and Siewert, Herbert G., 5,022,833, Cl. 417-571.000.

Tektronix, Inc.: *See—*
- Goll, Jeffrey H.; Trent, William A.; Lane, Richard I.; Bell, Florian G.; and Marineau, Mark D., 5,023,445, Cl. 250-227.150.
- Luthra, Ajay K.; and Rajan, Ganesh, 5,023,825, Cl. 364-724 100.

Teledyne Industries, Inc.: *See—*
- Edelmayer, Thomas C., 5,022,823, Cl. 416-244.00A

Telephone Cables Limited: *See—*
- Mills, Brian P.; and George, Edward K., 5,023,399, Cl. 174-73.100.

Telephone Connection, The: *See—*
- Novas, Robert G., 5,023,906, Cl. 379-372.000.

Temmesfeld, Angelika B. M.: *See—*
- Jansky, Jaroslav; and Temmesfeld, Angelika B. M., 5,022,433, Cl. 137-588.000.

Temtech Fahrzeugtechnik Entwicklungsgesellschaft MBH: *See—*
- Jansky, Jaroslav; and Temmesfeld, Angelika B. M., 5,022,433, Cl. 137-588.000.

Tencor Instruments: *See—*
- Vaught, John L., 5,023,424, Cl. 219-121.600.

Tennant, James A., to Therm-O-Disc, Incorporated. Control circuit. 5,023,529, Cl. 318-266.000.

Tennessee Valley Authority: *See—*
- Dillard, Ewell F.; and Burnell, James R., 5,022,913, Cl. 71-34.000.

Teplan, Istvan: *See—*
- Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre; Teplan, Istvan; Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt; Hegedus, Edit; Makara, Gabor; and Rappay, Gyorgy, 5,023,322, Cl. 530-324.000.

Terakado, Akira: *See—*
- Mitsuya, Teruaki; Fujiwara, Shigetaka; Endou, Michio; and Terakado, Akira, 5,023,464, Cl. 355-283.000.

Teraoku, Hiroshi: *See—*
- Horii, Shuji; and Teraoku, Hiroshi, 5,022,199, Cl. 52-123.100.

Terashima, Masahiko: *See—*
- Nagatomo, Shinichiro; Terashima, Masahiko; and Taniguchi, Hitoshi, 5,023,104, Cl. 426-634.000.

Terashita, Takaaki, to Fuji Photo Film Co., Ltd. Photographic printing method. 5,023,656, Cl. 355-41.000.

Terazawa, Tadashi, to Aisin Seiki Kabushiki Kaisha. Throttle control apparatus. 5,022,369, Cl. 123-399.000.

Terbrack, Ulrich: *See—*
- Siol, Werner; and Terbrack, Ulrich, 5,023,123, Cl. 428-392.000.

Tero, John; Chin, Shaoan; and Ma, Bing F., to North American Philips Corporation. Totem pole circuit with additional diode coupling. 5,023,481, Cl. 307-456.000.

Testa, Perluigi, to Videocolor. Method for the illumination of a color television mask tube screen, and device for implementation thereof. 5,023,157, Cl. 430-24.000.

Tetior, Alexandr N.: *See—*
- Surguchev, Viktor G.; Kuraev, Oleg V.; Surgucheva, Raisa N.; Makhnovsky, Leonid P.; Troschenovsky, Anatoly P.; Tetior, Alexandr N.; Golovchenko, Igor V.; and Scherbina, Tatyana V., 5,022,925, Cl. 106-631.000.

Texas A&M University System, The: *See—*
- Summers, Max D.; Bradfield, James Y.; and Keeley, Larry L., 5,023,328, Cl. 536-27.000.

Texas Instruments Incorporated: *See—*
- Ayers, Joe W., 5,022,695, Cl. 294-88.000.
- D'Entremont, John R.; Behler, Matthew L.; and Swanson, Gordon S., 5,023,586, Cl. 337-104.000.
- Freeman, Dean W., 5,023,206, Cl. 437-228.000.
- Gill, Manzur; and Tigelaar, Howard L., 5,023,680, Cl. 357-23.500.
- Hashimoto, Masashi; and Kwon, Oh-Kyong, 5,023,472, Cl. 307-270.000.
- Houston, Theodore M., 5,023,874, Cl. 371-21.200.
- Love, Andrew M., 5,023,843, Cl. 365-222.000.
- Schreck, John F.; and Dolby, Debra J., 5,023,837, Cl. 365-185.000.
- Sweeney, Frank J., 5,023,485, Cl. 307-465.000.
- Truitt, George A., 5,023,677, Cl. 357-22.000.
- Verret, Douglas P.; Smayling, Michael C.; Sachdeva, Abnash C.; and Keller, Stephen A., 5,023,690, Cl. 357-43.000.
- Wellheuser, Christopher M.; and Moore, Richard T., 5,023,487, Cl. 307-475.000.

Th. Goldschmidt AG: *See—*
- Gruning, Burghard; Hoffmann, Klaus; Koerner, Gotz; and Kollmeier, Hans-Joachim, 5,023,246, Cl. 514-57.000.

Thaler, Warren A.; Brois, Stanley J.; and Hall, Henry K., to Exxon Research & Engineering Company. Solution of oil and sulfone adduct. 5,023,005, Cl. 252-47.500.

Thanagavelu, Kandasamy, to Otis Elevator Company. "Artificial intelligence" based crowd sensing system for elevator car assignment. 5,022,497, Cl. 187-124.000.

Thee Birdie Bordello: *See—*
- Bolivar, LeRoy E.; and Bolivar, Sharyn L., 5,022,345, Cl. 119-29.000.

Theeuwes, Felix: *See—*
- Wong, Patrick S. L.; Theeuwes, Felix, Eckenhoff, James B.; Larsen, Steven D.; and Huynh, Hoa T., 5,023,088, Cl. 424-473.000.

Thelen, Dieter, to Carl Schenck AG. Device for holding a rotor. 5,022,276, Cl. 73-865.300.

Theobald, Keith D.: *See—*
- Wright, James R.; Hall, James R.; and Theobald, Keith D., 5,022,865, Cl. 439-279.000.

Theriault, Daniel, deceased: *See—*
- Ramakrishna, Kamesh; Billmers, Meyer; and Theriault, Daniel, deceased, 5,023,807, Cl. 364-513.000.

Theriault, Michael J., administrator: *See—*
- Ramakrishna, Kamesh; Billmers, Meyer; and Theriault, Daniel, deceased, 5,023,807, Cl. 364-513.000.

Therm-O-Disc, Incorporated: *See—*
- Engelbach, Brian W., 5,022,432, Cl. 137-495.000.
- Tennant, James A., 5,023,529, Cl. 318-266.000.

Therrien, Norman W. Storage container for precious coins, medals, bars and similar pieces. 5,022,518, Cl. 206-0.820.

Thexton, Melvin W.: *See—*
- Johnson, John R.; and Thexton, Melvin W., 5,023,590, Cl. 340-146.200.

Thiebaut, Jean-Pierre: *See—*
- Milcamps, Jacques; Pourre, Jean-Louis, and Thiebaut, Jean-Pierre, 5,023,743, Cl. 361-1.000.

Thiel, Reinhard: *See—*
- Immel, Otto; Schwarz, Hans-Helmut; and Thiel, Reinhard, 5,023,226, Cl. 502-313.000.

Thieme, Thomas R.: *See—*
- Goldstein, Andrew S.; Thieme, Thomas R.; and Gavojdea, Stefan, 5,022,409, Cl. 128-760.000.

Thierauch, Karl-Heinz: *See—*
- Klar, Ulrich; Skuballa, Werner; Vorbruggen, Helmut; Sturzebecher, Claus-Steffen; Thierauch, Karl-Heinz; and Schillinger, Ekkehard, 5,023,273, Cl. 514-530.000.

Think Laboratory Co., Ltd.: *See—*
- Takakura, Kouichi, 5,023,166, Cl. 430-307.000.

Thirtle, James H.: *See—*
- Morganti, Steven J.; and Thirtle, James H., 5,023,129, Cl. 428-195.000.

Thomas, Barry D.: *See—*
- Metts, Rodney H.; and Thomas, Barry D., 5,023,850, Cl. 368-28.000.

Thomas, Edward H.: *See—*
- Hohlfeld, Robert G.; and Thomas, Edward H., 5,022,899, Cl. 55-277.000.

Thomas Industries: *See—*
- Rozek, Roy J.; and O'Connell, Mark, 5,022,312, Cl 92-240.000.

Thomesto Oy: *See—*
- Luikko, Henrik, 5,022,162, Cl. 33-784.000.

Thomison, Ted D., to Century Wrecker Corporation. Safety line latch for use with towing systems. 5,022,694, Cl 294-82.200.

Thompson, Dennis D.: *See—*
- Simon, Robert C., Jr.; Deutscher, Dale W.; Grimm, Charles M.; Thompson, Dennis D.; and Bailey, Kirk A., 5,023,778, Cl. 364-200.000.

Thompson, Jesse P., II. Glareblocker. 5,022,701, Cl 296-152.000.

Thompson, Raymon F.; and Owczarz, Aleksander, to Semitool, Inc. Rinser dryer system. 5,022,419, Cl. 134-102.000.

Thomson-CSF: *See—*
- Maerfeld, Charles; and Desormiere, Bernard, 5,022,731, Cl. 350-96.140.
- Trumpff, Jean-Michel; Byzery, Michel, and Raineteau, Gilles, 5,023,941, Cl. 455-307.000.

Thomson, David L., to AT&T Bell Laboratories. Vector quantization in a harmonic speech coding arrangement. 5,023,910, Cl. 381-37.000.

Thorn Microwave Devices Limited: *See—*
- England, Melvin G., 5,023,514, Cl. 315-39.510.

Thornley, David W. M., to Raychem Limited. High voltage insulator. 5,023,406, Cl. 174-209.000.

Thornton, John D., to United Kingdom Atomic Energy Authority. Method of electrostatically enhanced solvent extraction and apparatus therefor. 5,022,973, Cl. 204-186.000.

Thrasher, C. Douglas: *See—*
- Hansen, Ove; and Thrasher, C. Douglas, 5,022,164, Cl. 134-57.00B.

Thyssen Edelstahlwerke AG: *See—*
- Brandis, Helmut; Huchtemann, Bernd; Schuler, Peter; and Werner, Dietrich, 5,022,933, Cl. 148-16.000.

VOL
1127
ISS
2
JE
11
1991
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- Tibbals, Edward C., Jr., to Interface, Inc. Valve construction. 5,022,629, Cl. 251-129.020.
- Tieszen, Dwayne, to Vista Manufacturing, Inc. Channel with locking tip for decorative strip lighting. 5,023,762, Cl. 362-223.000.
- Tietjen, Mariene: *See—*
  - Macchio, Ralph A.; Russ, Julio G.; Slobody, Brent; and Tietjen, Mariene, 5,023,075, Cl. 424-63.000.
- Tigelaar, Howard L.: *See—*
  - Gill, Manzur; and Tigelaar, Howard L., 5,023,680, Cl. 357-23.500.
- Tiller, Ralph. Training device for putting. 5,022,656, Cl. 273-186.00A.
- Timken Company, The: *See—*
  - Otto, Dennis L., 5,022,659, Cl. 277-1.000.
- Tobita, Youichi, to Mitsubishi Denki Kabushiki Kaisha Semiconductor memory device having testing function and testing method thereof. 5,023,840, Cl. 365-201.000.
- Toda, Hiroyuki; Miyahara, Junji; and Takahashi, Kenji, to Fuji Photo Film Co., Ltd. Phosphor. 5,023,014, Cl. 252-301.40H.
- Todack, James J. Method and apparatus for reclaiming a refrigerant 5,022,230, Cl. 62-77.000.
- Todd-Copley, Judith A.: *See—*
  - Copley, Stephen M.; Tao, Hongyi; and Todd-Copley, Judith A., 5,022,957, Cl. 156-643.000.
- Todd, Paul H., Jr., to Kalamazoo Holdings, Inc. Stable alkaline labiatae antioxidant extracts. 5,023,017, Cl. 252-407.000.
- Toei, Keiji: *See—*
  - Izumi, Akira; Toei, Keiji; Watanabe, Nobuatsu; and Chong, Yong-Bo, 5,022,961, Cl. 156-646.000.
- Tohma, Teruo: *See—*
  - Uenishi, Naota; Uemiya, Takafumi; Mizoguchi, Akira; Ogaki, Yasuji; Hattori, Yasuhiro; Tohma, Teruo; Chikuma, Kiyofumi; and Okamoto, Sota, 5,022,738, Cl. 350-96.340.
- Tokuhiro, Tomoya: *See—*
  - Machida, Hiroji; Asano, Michiaki; Watanabe, Yozo; Tokuhiro, Tomoya; Satoh, Hiroshi; Iwahashi, Motoyuki; Yamaguchi, Norihiro; Kikuchi, Koshin; and Watanabe, Hiroaki, 5,023,020, Cl. 261-18.100.
- Tokumitsu, Kiyonori; Baba, Akira; and Hirano, Sadanori, to Mitsubishi Denki Kabushiki Kaisha. Sealing device for oil rotary vacuum pump. 5,022,836, Cl. 418-76.000.
- Tokyo Aircraft Instrument Co., Ltd.: *See—*
  - Mamada, Sakae, 5,022,619, Cl. 248-178.000.
- Tokyo Keiki Company Ltd.: *See—*
  - Kitazume, Masahiro; and Honma, Kazuya, 5,023,788, Cl 364-424.010.
  - Takeuchi, Kunihiko; Oba, Masao; and Horinouchi, Shinichi, 5,023,887, Cl. 375-1.000.
- Tokyo Ohka Kogyo Co., Ltd.: *See—*
  - Hijikata, Isamu; Uehara, Akira; and Samezawa, Mitsuo, 5,022,979, Cl. 204-298.330.
- Tom, Wing C.: *See—*
  - Scherlock, Margaret H.; and Tom, Wing C., 5,023,265, Cl. 514-300.000.
- Tomes, Alex; and McPhedran, Gordon, to Circa Telecommunications Inc. Entry box. 5,023,397, Cl. 174-50.000.
- Tominaga, Chikara: *See—*
  - Tomita, Masatoshi; Yamamoto, Susumu; Tominaga, Chikara; and Nakayama, Kazuya, 5,022,937, Cl. 148-277.000.
- Tomita, Hideo, to Sony Corporation. Horizontal deflection circuit. 5,023,523, Cl. 315-364.000.
- Tomita, Masatoshi; Yamamoto, Susumu; Tominaga, Chikara; and Nakayama, Kazuya, to Nippon Mining Co., Ltd.; and Nikko Aen Kabushiki Kaisha. Colored zinc coating. 5,022,937, Cl. 148-277.000.
- Tomiyama, Akio: *See—*
  - Nishida, Koji; Yokomizo, Osamu; Masuhara, Yasuhiro; Nakao, Toshitsugu; Kashiwai, Shin-ichi; Tomiyama, Akio; Yamashita, Junichi; and Hayashi, Tatsuo, 5,023,047, Cl. 376-370.000.
- Tomlinson, Harold W. Module for determining diffusing capacity of the lungs for carbon monoxide and method. 5,022,406, Cl. 128-719.000.
- Tomofuji, Yoshiaki: *See—*
  - Murakami, Azuma; Aoki, Kazuo; Yamanami, Tsuguya; Tomofuji, Yoshiaki; Tanaka, Takeshi; Inashima, Satoshi; Funahashi, Takahiko; Chikami, Toshihide; and Senda, Toshiaki, 5,023,408, Cl. 178-19.000.
- Tomono, Makoto; Tarumi, Noriyoshi; and Sato, Masayuki, to Konica Corporation. Toner for use in developing electrostatic images. 5,023,158, Cl. 430-99.000.
- Tomotsu, Norio: *See—*
  - Maezawa, Hiroshi; Tomotsu, Norio; and Kuramoto, Masahiko, 5,023,222, Cl. 502-103.000.
- Toncelli, Luca, to Breton S.p.A. Method of automatically gauging articles of granite, hard stones and the like of disired thickness, with discontinuous motion. 5,022,193, Cl. 51-283.00R.
- Topical Testing, Inc.: *See—*
  - Horch, Kenneth W.; Fisher, John H.; and Evans, Barry L., 5,022,407, Cl. 128-739.000.
- Toppan Printing Co., Ltd.: *See—*
  - Takeuchi, Yukihisa; Watanabe, Tetsuo; Yamamoto, Azuma; Shirakawa, Kazuo; and Segawa, Takao, 5,023,700, Cl. 357-70.000.
- Topy Kogyo K.K.: *See—*
  - Ohno, Kazuhisa; Kosugi, Tetsushi; Sugimori, Kenichiro; Ando, Akitsugu; Yamamoto, Masaru; Suzuki, Fukuji; Nakamura, Masahiro; and Tsujita, Nobuhisa, 5,023,065, Cl. 423-326.000.
- Toray Industries, Inc.: *See—*
  - Fujikawa, Junichi, 5,023,165, Cl. 430-285.000.
  - Kubota, Takashi, 5,023,311, Cl. 528-153.000.
- Toray Silicone Company, Ltd.: *See—*
  - Hirai, Kazuo; and Kasuya, Akira, 5,023,288, Cl. 524-268.000.
- Torres, Daniel L.; Murphy, Timothy J.; Maakad, Guy A.; Roberts, Jeffrey R.; and Murray, Kent S., to Atlantic Richfield Company Coke drum drill stem alignment device. 5,022,799, Cl. 408-1.00R.
- Torrington Company, The: *See—*
  - Shattuck, Charles W.; Lestinsky, Joseph J.; and Gerardi, Michael W., 5,022,267, Cl. 73-593.000.
- Tosaki, Yoshihiro: *See—*
  - Nagata, Yuji; Fukazawa, Toshio; Wada, Kumiko; and Tosaki, Yoshihiro, 5,022,141, Cl. 29-603.000.
- Toshiba Machine Co., Ltd.: *See—*
  - Iwamoto, Norihiro; Tsuboi, Hiroyuki; and Kaneko, Toshihiko, 5,022,457, Cl. 164-155.000.
  - Tsukimoto, Toshiaki, 5,022,434, Cl. 137-596.200.
- Toshio Mukai: *See—*
  - Mukai, Toshio; Yamashita, Yoshiro; Suzuki, Takanori; Akasaki, Yutaka; Sato, Katsuhiro; Yabuuchi, Naoya; Tanaka, Hiroyuki, and Nukada, Katsumi, 5,023,356, Cl. 552-210.000.
- Toulouse, Pierre: *See—*
  - Dubots, Dominique; and Toulouse, Pierre, 5,023,212, Cl 501-87.000.
- Toya, Tatsuro: *See—*
  - Hara, Yuji; Ito, Satoru; and Toya, Tatsuro, 5,023,699, Cl 357-68.000.
- Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Ohashi, Masashi; Shirai, Masanari; and Ando, Eiichi, to Canon Kabushiki Kaisha. Image forming apparatus. 5,023,658, Cl. 355-72.000.
- Toyo Exterior Kabushiki Kaisha: *See—*
  - Kobayashi, Mitsuru; and Hori, Keishirou, 5,022,454, Cl. 160-202.000.
- Toyoda Gosei Co., Ltd.: *See—*
  - Ishida, Syuichi, 5,023,412, Cl. 200-61.540.
- Toyooka, Takashi; Maruyama, Yoji; and Suzuki, Ryo, to Hitachi, Ltd. Drive circuit for Bloch line memory. 5,023,473, Cl. 307-270.000.
- Toyota Jidosha Kabushiki Kaisha: *See—*
  - Sawada, Hiroshi; Ueda, Tatehito; Nakanishi, Kiyoshi; and Demura, Takayuki, 5,022,225, Cl. 60-274.000.
- Trau, Matt; and Truss, Rowan W., to ICI Australia Operations Proprietary Limited. Controlled release hydroxybutyrate polymer microspheres. 5,023,081, Cl. 424-405.000.
- Traub, Barry H.; and Leoni, Emile, to Select Service & Supply Co., Inc. Quick change device for a basketball hoop. 5,022,649, Cl. 273-1.50R
- Travis, Steed. Aerobic wand. 5,022,648, Cl. 272-137.000.
- Trebearne, Jack: *See—*
  - Hall, Peter R.; Trebearne, Jack; Parker, Dawood; and Clancy, Paul, 5,022,410, Cl. 128-695.000.
- Tregear, Geoffrey W.: *See—*
  - Hudson, Peter J.; Niall, High D.; and Tregear, Geoffrey W, 5,023,321, Cl. 530-324.000.
- Tremmel, Dieter, to GEC Alsthom SA. Method and a device for removing an elongate shrink-fitted core made of a tough material from a hole. 5,022,136, Cl. 29-426.400.
- Trent, William A.: *See—*
  - Goll, Jeffrey H.; Trent, William A.; Lane, Richard I.; Bell, Florian G.; and Marineau, Mark D., 5,023,445, Cl. 250-227.150.
- Tri-Star Manufacturing & Service, Inc.: *See—*
  - Scriven, Ricky R., 5,022,635, Cl. 266-165.000.
- Trimble, Richard A.: *See—*
  - Boardman, John D.; Sadler, Jimmie L.; and Trimble, Richard A., 5,023,463, Cl. 250-551.000.
- Tritt, Paul G.: *See—*
  - Weisend, Norbert A., Jr.; and Tritt, Paul G., 5,022,611, Cl 244-134.00A.
- Troberg, Henrik E.: *See—*
  - Bergquist, Per-Marcus; and Troberg, Henrik E., 5,023,587, Cl. 337-123.000.
- Trombley, Ulric W.: *See—*
  - Nozel, Richard J.; Trombley, Ulric W.; and Brust, Gerald M., 5,022,626, Cl. 248-311.200.
- Tromelin, Jacques: *See—*
  - Panetta, Pascal; and Tromelin, Jacques, 5,022,484, Cl. 181-102.000.
- Troschenovsky, Anatoly P.: *See—*
  - Surguchev, Viktor G.; Kuraev, Oleg V.; Surgucheva, Raisa N.; Makhnovsky, Leonid P.; Troschenovsky, Anatoly P.; Tetior, Alexandr N.; Golovchenko, Igor V.; and Scherbina, Tatyana V., 5,022,925, Cl. 106-631.000.
- Troska, Georg: *See—*
  - Faerber, Karlheinz; Deininger, Anton; Plester, George; Guenther, Manfred; and Troska, Georg, 5,022,558, Cl. 222-105.000.
- Trowitzsch-Kienast, Wolfram: *See—*
  - Reichenbach, Hans; Gerth, Klaus; Irschik, Herbert; Kunze, Brigitte; Hofle, Gerhard; Augustiniak, Hermann; Bedorf, Norbert; Jansen, Rolf; Trowitzsch-Kienast, Wolfram; and Steinmetz, Heinrich, 5,023,184, Cl. 435-252.100.
- Truitt, George A., to Texas Instruments Incorporated. Low parasitic fet topology for power and low noise Gaas fets. 5,023,677, Cl. 357-22.000.
- Trumpff, Jean-Michel; Byzery, Michel; and Raineteau, Gilles, to Thomson-CSF. Switching-over, automatic matching filter for radio transmitter and/or receiver. 5,023,941, Cl. 455-307.000.
- Truss, Rowan W.: *See—*
  - Trau, Matt; and Truss, Rowan W., 5,023,081, Cl. 424-405.000.
- TRW Ehrenreich GmbH & Co., KG: *See—*
  - Schnitzler, Franz D., 5,022,779, Cl. 403-138.000.

- TRW Inc.: *See—*
  - Bronowicki, Allen I.; and Mendenhall, Todd L., 5,022,272, Cl. 73-772.000.
- Tsao, Sylvia S.: *See—*
  - Blewer, Robert S.; Gullinger, Terry R.; Kelly, Michael J.; and Tsao, Sylvia S., 5,023,200, Cl 437-187.000.
- Tse, Lawrence T., to Gennum Corporation. Temperature compensated voltage regulator and reference circuit. 5,023,543, Cl. 323-314.000.
- Tsubaki, Atsushi: *See—*
  - Kamijo, Tetsuhide; Ujiie, Arao; Harada, Hiromu; Tsutsumi, Naoyuki; Tsubaki, Atsushi; Yamaguchi, Toshiaki; and Nagata, Hideo, 5,023,261, Cl. 514-285.000.
- Tsubakimoto Chain Co.: *See—*
  - Ueda, Satoshi; Sudare, Masahiro; Suyama, Yasuyuki; Kishimoto, Kazuhiko; Suzuki, Kenshi; Inoue, Shiroh; and Sakura, Shunji, 5,023,534, Cl. 318-587.000.
- Tsuboi, Hiroyuki: *See—*
  - Iwamoto, Norihiro; Tsuboi, Hiroyuki; and Kaneko, Toshihiko, 5,022,457, Cl. 164-155.000
- Tsuboi, Takayuki: *See—*
  - Shiomi, Yasuhiko; and Tsuboi, Takayuki, 5,023,647, Cl. 354-414.000.
- Tsuchida, Masashi: *See—*
  - Sakai, Naohumi; Tsuchida, Masashi; Ohmachi, Kazuhiko; Imai, Yasuhiro, and Honma, Toshio, 5,023,774, Cl. 364-200.000.
- Tsuchino, Hisanori: *See—*
  - Nakazawa, Masayuki; Nitta, Masaaki; Tsuchino, Hisanori; and Kano, Akiko, 5,023,461, Cl. 250-484.100.
- Tsuchiya, Makoto: *See—*
  - Onozuka, Shigeharu; Yokoyama, Yuuichi; and Tsuchiya, Makoto, 5,023,305, Cl. 526-194.000.
- Tsuchiya Patent Office: *See—*
  - Sasaki, Shin, 5,023,740, Cl 360-132.000
- Tsuda, Hiroshi: *See—*
  - Nakayama, Okihiko; Tsuda, Hiroshi; Itoh, Toshiyuki; and Ueno, Hiroshi, 5,023,799, Cl. 364-449.000.
- Tsudakoma Kogyo Kabushiki Kaisha: *See—*
  - Nakade, Kiyoshi, 5,022,599, Cl. 242-75.510.
- Tsui, Mosum E.; and Sherwin, Martin B., to W. R. Grace & Co.-Conn. Synthesis of thioglycolic acid. 5,023,371, Cl. 562-512.000.
- Tsuji, Koji: *See—*
  - Yamada, Shuji; Tsuji, Koji; Takegawa, Yoshinohu; Tanimura, Akira; Menju, Akira; and Yano, Nobuyoshi, 5,022,932, Cl. 148-13.100.
- Tsujii, Gen; and Murakawa, Toshihiro, to Honda Giken Kogyo Kabushiki Kaisha. Transformer apparatus with rectifiers. 5,023,423, Cl. 219-108.000.
- Tsujimura, Hiroshi; Tamai, Yasumasa; Saito, Hideyo; and Kobayashi, Masahiro, to Hitachi, Ltd. Method for improving property of weld of austenitic stainless steel. 5,022,936, Cl. 148-135.000.
- Tsujita, Nobuhisa: *See—*
  - Ohno, Kazuhisa; Kosugi, Tetsushi; Sugimori, Kenichiro; Ando, Akitsugu; Yamamoto, Masaru; Suzuki, Fukuji; Nakamura, Masahiro; and Tsujita, Nobuhisa, 5,023,065, Cl. 423-326.000.
- Tsukada, Kiyoshi: *See—*
  - Kanzawa, Yoshikazu, Fujikake, Yasushi; Ito, Osami; Ito, Shuho; Oikawa, Hironobu; Otsubo, Makoto; Morikawa, Iwao; Shiratori, Yuichi; and Tsukada, Kiyoshi, 5,022,456, Cl. 164-119.000.
- Tsukada, Nobuo: *See—*
  - Kawata, Masayuki; and Tsukada, Nobuo, 5,023,853, Cl. 368-230.000.
- Tsukamoto, Katsuhiro: *See—*
  - Shimizu, Masahiro; Shimano, Hiroki; Inuishi, Masahide; and Tsukamoto, Katsuhiro, 5,023,682, Cl. 357-23.600.
- Tsukii, Toshikazu; Houng, S. Gene; Miller, Michael D.; and McOwen, Sherwood A., Jr., to Raytheon Company. High isolation passive switch. 5,023,494, Cl. 307-571.000
- Tsukimoto, Toshiaki, to Toshiba Machine Co., Ltd. Directional control valve. 5,022,434, Cl. 137-596.200.
- Tsumura, Kiyoaki, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device with copper wire ball bonding. 5,023,697, Cl. 357-65.000.
- Tsuneeda, Kenichi: *See—*
  - Shimazaki, Takashi; and Tsuneeda, Kenichi, 5,023,666, Cl. 355-269.000.
- Tsuneoka, Masayuki: *See—*
  - Yokouchi, Hisatake; Takasaki, Yukio; Hirai, Tadaaki; Koike, Kouichi; Tsuneoka, Masayuki; Onodera, Yoichi; and Funo, Takakazu, 5,023,896, Cl. 378-99.000.
- Tsunoda, Tetsujiro, to Kabushiki Kaisha Toshiba. Composite semiconductor device having function for overcurrent detection 5,023,684, Cl. 357-27.000.
- Tsuruta, Mayumi: *See—*
  - Hirabayashi, Shigeto; Tsuruta, Mayumi; and Mizukura, Noboru, 5,023,169, Cl. 430-505.000.
- Tsushima, Hideaki; and Sasaki, Shinya, to Hitachi, Ltd. Optical transmitter, optical receiver and optical transmission apparatus and control method of optical receiver. 5,023,950, Cl. 455-619.000.
- Tsutaki, Shoji; Fuse, Kazuyoshi; and Ohta, Toshihiko, to Kabushiki Kaisha Toshiba. Method of manufacturing magnetic head. 5,022,140, Cl. 29-603.000.
- Tsutsumi, Naoyuki: *See—*
  - Kamijo, Tetsuhide; Ujiie, Arao; Harada, Hiromu; Tsutsumi, Naoyuki; Tsubaki, Atsushi; Yamaguchi, Toshiaki; and Nagata, Hideo, 5,023,261, Cl 514-285.000.
- Tsuyama, Toshiaki; Nobumoto, Kazutoshi; Kageyama, Fumio; Sone, Akira; and Kawamura, Makoto, to Mazda Motor Corporation. Slip control system for a vehicle. 5,022,483, Cl. 180-197.000.
- Tuai, Gregory: *See—*
  - Sloan, Paul; Tuai, Gregory; Jimenez, Julio; and Jimenez, Raymond, 5,023,901, Cl 379-38.000.
- Tujikawa, Munekazu: *See—*
  - Taniguchi, Hideo; Ogata, Hiromi; Sawase, Kensuke; Yokoyama, Manabu; and Tujikawa, Munekazu, 5,023,442, Cl 250-208.100.
- Tullis, Richard H., to Molecular Biosystems, Inc. Oligonucleotide therapeutic agent and method of making same. 5,023,243, Cl 514-44.000.
- Tuntasood, Prateep: *See—*
  - Manoliu, Juliana; and Tuntasood, Prateep, 5,023,193, Cl. 437-31.000.
- Turbotak Inc.: *See—*
  - Burgess, J. Stuart; Spink, Donald R.; and Stein, Jerry Y., 5,023,064, Cl. 423-242.000.
- Turner, Charles S. Computerized beverage dispensing system. 5,022,557, Cl. 222-54.000.
- Tyson, George J., to Xylan, Inc. Delignification of non-woody biomass. 5,023,097, Cl. 426-271.000.
- Tzikas, Athanassios; and Aeschlimann, Peter, to Ciba-Geigy Corporation. Fibre-reactive dyes containing a substituted aminocarbonylphenylamino or naphthylamino reactive moiety. 5,023,325, Cl 534-618.000.
- Tzikas, Athanassios; and Seiler, Herbert, to Ciba-Geigy Corporation. Reactive dyes containing the 2-(cyano, carbonamido, sulfo-, hydroxy- or sulfato-C_2-C_5-alkyleneamino)-6-sulfo- or 3,6-disulfo-8-hydroxynaphthyl-(1) coupling component. 5,023,326, Cl. 534-638.000.
- U-Haul International, Inc.: *See—*
  - Hettwer, James C., 5,022,697, Cl. 296-37.600.
- Ube Industries, Ltd.: *See—*
  - Yoshida, Hiroshi; Kakeya, Noboru; and Kashiwagi, Masanori, 5,023,351, Cl. 549-321.000.
- Ubukata, Shunji: *See—*
  - Kawahara, Tsugio; Harashima, Hiromasa; Ubukata, Shunji; Kameda, Kazuo; Moriya, Hirohito; and Inamura, Yoshihisa, 5,022,172, Cl. 40-503.000.
- Uchida, Naoshi: *See—*
  - Oyama, Jun; Uchida, Naoshi; Unuma, Makoto; Takahashi, Tatsunori; Shinohara, Hisaji; and Kandatsu, Kiyoshi, 5,023,416, Cl. 200-244.000.
- Uchida, Toshihiko: *See—*
  - Kitada, Taizo; Danno, Yoshiaki; Takagi, Masahiko; Uchida, Toshihiko; and Yamamoto, Yutaka, 5,022,664, Cl. 277-236.000.
- Uchiyama, Takeo: *See—*
  - Akimoto, Kazuhiro; Ogiue, Katsumi; and Uchiyama, Takeo, 5,023,835, Cl. 365-155.000.
- Udagawa, Tsunekazu: *See—*
  - Nakasone, Hidetaka; and Udagawa, Tsunekazu, 5,022,661, Cl. 277-213.000.
- Uddeholm Tooling Aktiebolag: *See—*
  - Norstrom, Lars-Åke; Cederlund, Anders; and Jespersson, Henrik, 5,023,049, Cl. 420-91.000.
- Ueda, Aki, to Ricoh Company, Ltd. Multi-beamed optical pick-up. 5,023,860, Cl. 369-116.000.
- Ueda, Akiteru: *See—*
  - Mutoh, Nobuyoshi; Sakai, Keijiro; Ueda, Akiteru; and Fujii, Hiroshi, 5,023,538, Cl. 318-811.000.
- Ueda, Kazumi: *See—*
  - Yamazaki, Makoto; Ueda, Kazumi; Isobe, Shinichi; and Sato, Katsunari, 5,023,550, Cl. 324-262.000.
- Ueda, Satoshi; Sudare, Masahiro; Suyama, Yasuyuki; Kishimoto, Kazuhiko; Suzuki, Kenshi; Inoue, Shiroh; and Sakura, Shunji, to Tsubakimoto Chain Co. Automatic guided vehicle, method for positioning said vehicle, and loading table having positioning device. 5,023,534, Cl. 318-587.000.
- Ueda, Tatehito: *See—*
  - Sawada, Hiroshi; Ueda, Tatehito; Nakanishi, Kiyoshi; and Demura, Takayuki, 5,022,225, Cl. 60-274.000.
- Ueda, Yutaka; Mori, Hideshi; and Tanaka, Manzo, to Murata Kikai Kabushiki Kaisha. Draft mechanism having roller pairs connected to draft ratio controlled motors by timing belts. 5,022,123, Cl. 19-260.000.
- Uehara, Akira: *See—*
  - Hijikata, Isamu; Uehara, Akira; and Samezawa, Mitsuo, 5,022,979, Cl. 204-298.330.
- Uemiya, Takafumi: *See—*
  - Uenishi, Naota; Uemiya, Takafumi; Mizoguchi, Akira; Ogaki, Yasuji; Hattori, Yasuhiro; Tohma, Teruo; Chikuma, Kiyofumi; and Okamoto, Sota, 5,022,738, Cl. 350-96.340.
- Uenishi, Naota; Uemiya, Takafumi; Mizoguchi, Akira; Ogaki, Yasuji; Hattori, Yasuhiro; Tohma, Teruo; Chikuma, Kiyofumi; and Okamoto, Sota, to Sumitomo Electric Industries, Ltd.; and Pioneer Electronic Corporation. Optical fiber nonlinear wavelength modulator device. 5,022,738, Cl. 350-96.340.
- Ueno, Hiroshi; Hatabu, Shoji; and Arai, Hirokazu, to Koyo Seiko Co., Ltd. Rack and pinion steering device. 5,022,279, Cl. 74-422.000.
- Ueno, Hiroshi: *See—*
  - Nakayama, Okihiko; Tsuda, Hiroshi; Itoh, Toshiyuki; and Ueno, Hiroshi, 5,023,799, Cl. 364-449.000.
- Ueno, Takuya: *See—*
  - Nakata, Akira; Yamamoto, Naoki; Mori, Hiroshi; and Ueno, Takuya, 5,023,293, Cl. 524-539.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Uesugi, Tatsuhiko: *See—*
  - Imura, Izumi; Uesugi, Tatsuhiko; and Yoshimura, Toshiaki, 5,022,372, Cl. 123-469.000.
- Uhl, Gunter, to Doduco GmbH & Co. Dr. Eugen Durrwachter. Method and an interval switch comprising a circuit arrangement for controlling the interval of time between wiping movements of wipers in vehicles. 5,023,467, Cl. 307-10.100.
- Uhler, George M.: *See—*
  - Grundmann, William J.; Madden, William C.; and Uhler, George M., 5,023,828, Cl. 364-900.000.
- Uhrner, Horst: *See—*
  - Schwing, Ewald; Sommer, Peter; and Uhrner, Horst, 5,022,934, Cl. 148-16.500.
- UIS, Inc.: *See—*
  - Phillips, Claude F., 5,022,364, Cl. 123-198.00A.
- Ujiie, Arao: *See—*
  - Kamijo, Tetsuhide; Ujiie, Arao; Harada, Hiromu; Tsutsumi, Naoyuki; Tsubaki, Atsushi; Yamaguchi, Toshiaki; and Nagata. Hideo, 5,023,261, Cl. 514-285.000.
- Umetsu, Takao: *See—*
  - Yoshida, Yutaka; Umetsu, Takao; and Iwamoto, Junichi, 5,023,645, Cl. 354-400.000.
- Umezawa, Kazuhiko; Komatsu, Toshiaki; and Kubokawa, Jun, to NEC Corporation. Flat cooling structure of integrated circuit. 5,023,695, Cl. 357-82.000.
- Umezu, Takao: *See—*
  - Onozuka, Haruo; Umezu, Takao; Sato, Muneyoshi; and Takada, Seiji, 5,023,470, Cl. 307-108.000.
- Underwood, George D.: *See—*
  - Lee, Gene W.; and Underwood, George D., 5,023,875, Cl. 371-25.100.
- Union Camp Corporation: *See—*
  - Hollis, Samuel D.; and Johnson, Robert W., Jr., 5,023,319, Cl. 530-212.000.
  - Nguyen, Dong D.; and Harris, Marvin L., 5,022,166, Cl. 34-120.000.
- Union Carbide Industrial Gases Technology Corporation: *See—*
  - Ding, Maynard G., 5,022,332, Cl. 110-346.000.
- Union Fork and Hoe Company, The: *See—*
  - Bonnes, David R.; and Male, Philip J., 5,022,221, Cl. 56-400.170.
- Union Oil Company of California: *See—*
  - Occelli, Mario L., 5,023,221, Cl. 502-66.000.
  - Young, Donald C.; and Green, James A., II, 5,022,912, Cl. 71-30.000.
- Uniroyal Chemical Company, Inc.: *See—*
  - Gajewski, Vincent J.; Goddard, Wallace I.; Palinkas, Richard L.; and Nybakken, George H., 5,023,040, Cl. 264-328.300.
  - Hong, Sung W.; and Wheeler, Edward L., 5,023,292, Cl. 524-432.000.
- United Catalysts Inc.: *See—*
  - Williams, David L.; Russ, Karl J.; Dienes, Edward K.; and Laufer, George A., 5,023,225, Cl. 502-304.000.
- United Kingdom Atomic Energy Authority: *See—*
  - Thornton, John D., 5,022,973, Cl. 204-186.000.
- United States of America
  - Agriculture: *See—*
    - Vail, Patrick V., 5,023,182, Cl. 435-235.100.
  - Air Force: *See—*
    - Eden, James G.; and Kushner, Mark J., 5,023,877, Cl. 372-7.000.
    - Lee, Robert A., 5,023,847, Cl. 367-136.000.
  - America: *See—*
    - Marques, Anthony M., 5,023,545, Cl. 324-158.00P.
  - Army: *See—*
    - Branovich, Louis E.; Freeman, Gerard L.; Eckart, Donald W.; and Smith, Bernard, 5,022,883, Cl. 445-50.000.
    - Gibbons, Gould, Jr.; Watson, Jerry L.; and Lawrence, William, 5,022,307, Cl. 89-36.020.
    - Hubert, Alexis; and Shepic, John A., 5,023,749, Cl. 361-292.000.
    - Sayles, David C., 5,022,306, Cl. 89-1.800.
  - Energy: *See—*
    - Blewer, Robert S.; Gullinger, Terry R.; Kelly, Michael J.; and Tsao, Sylvia S., 5,023,200, Cl. 437-187.000.
    - Klima, Mark S.; Maronde, Carl P.; and Killmeyer, Richard P., 5,022,892, Cl. 44-621.000.
    - Maya, Leon, 5,023,213, Cl. 501-96.000.
    - McCaffrey, Robert R.; and Cummings, Daniel G., 5,022,996, Cl. 210-654.000.
    - Nachbar, Henry D.; and Korytkowski, Alfred S., 5,022,192, Cl. 51-241.00A.
  - National Aeronautics and Space Administration: *See—*
    - Dorogy, William E., Jr.; and St. Clair, Anne K., 5,023,034, Cl. 264-184.000.
    - McKannan, Eugene C.; McPherson, William B.; Ahmed, Shaffiq; and Chandler, Shirley S., 5,023,050, Cl. 420-448.000.
  - Navy: *See—*
    - Aklufi, Monti E.; and Brock, David W., 5,023,056, Cl. 422-186.000.
    - Banura, George A., 5,023,542, Cl. 323-284.000.
    - Belanger, Normand, 5,022,100, Cl. 2-422.000.
    - Crane, Roger M.; and Fischer, Eugene C., 5,023,845, Cl. 364-508.000.
    - Davidson, Thomas F.; Spear, Guy B.; and Ludlow, Timothy L., 5,023,006, Cl. 252-62.000.
    - DeVries, Jack; Bailard, James A.; and Hanes, Daniel M., 5,022,784, Cl. 405-15.000.
    - Drake, Richard G., 5,023,577, Cl 333-182.000.
    - Hains, Franklin D., 5,022,742, Cl. 350-355.000.
    - Silvia, Denis A., 5,022,326, Cl. 102-275.900.
- U.S. Philips Corporation: *See—*
  - Angenent, Johannes H.; Khoe, Giok D.; Mahon, Gathal J.; Van De Grijp, Abram; Potters, Cornelis J. T.; and Wright, Kieran G., 5,022,733, Cl. 350-96.180.
  - Baron, Sint, 5,022,153, Cl. 30-34.100.
  - Bertram, Leo; Schemmann, Hugo; and Bukoschek, Romuald L., 5,022,315, Cl. 99-348.000.
  - Ducourant, Thierry, 5,023,475, Cl. 307-272.200.
  - Groothoff, Adriaan J., 5,023,510, Cl. 313-440.000.
  - Jacobs, Johannes A. H. M.; and Holster, Peter L., 5,022,769, Cl. 384-118.000.
  - Josquin, Wilhelmus J.; and Van Dijk, Jan, 5,023,192, Cl. 437-31.000.
  - Kunze, Norbert, 5,023,742, Cl. 360-137.000.
  - Kwast, Ekkehard, 5,023,405, Cl. 174-109.000.
  - Lamnabhi, Moustanir; and Lhuillier, Jean-Jacques, 5,023,717, Cl. 358-140.000.
  - Macbeth, Ian C., 5,023,489, Cl. 307-490.000.
  - Mehlkopf, Antoon F.; Den Boef, Johannes H.; and Lioen, Rolf J M., 5,023,552, Cl. 324-309.000.
  - Moore, Paul A.; Perry, Colin L.; and Voorman, Johannes O., 5,023,568, Cl. 330-257.000.
  - Raaymakers, Wilhelmus P. M.; and Kuijpers, Franciscus L. J M., 5,023,856, Cl. 369-32.000.
  - Verboom, Johannes J., 5,023,857, Cl. 369-44.250.
- United States Surgical Corporation: *See—*
  - Evans, Alfred G., 5,022,273, Cl. 73-849.000.
- United Technologies Corporation: *See—*
  - Bluege, John, 5,022,746, Cl. 350-610.000.
  - Lappos, Nicholas D.; Walsh, David M.; Sweet, David H.; and Greenberg, Charles E., 5,023,797, Cl. 364-442.000.
  - Maier, Mark S.; and Wilson, Jack W., Jr., 5,022,816, Cl. 415-115.000.
  - Schneider, Roy W.; and Leenhouts, David E., 5,023,793, Cl. 364-431.020.
  - Sincere, Steven M., 5,022,822, Cl. 416-219.00R.
  - Smith, Jesse W., 5,022,224, Cl. 60-39.161.
  - Violette, John A.; and Auyeung, Sean, 5,022,824, Cl. 416-230.000
  - Violette, John A.; and Nagle, David P., 5,022,825, Cl. 416-500.000.
- Unitika, Ltd.: *See—*
  - Yamada, Shuji; Tsuji, Koji; Takegawa, Yoshinobu; Tanimura, Akira; Menju, Akira; and Yano, Nobuyoshi, 5,022,932, Cl. 148-13.100.
- Universal Instruments Corporation: *See—*
  - Vallone, Giacinto; Janisiewicz, Stanley W.; Snyder, Michael D.; Hemmelgarn, Gerald B.; and Glidden, Wayne A., 5,023,544, Cl. 324-158.00F.
- University of California, The Regents of the: *See—*
  - Wang, Kang L.; and Yuh, Perng-Fei, 5,023,879, Cl. 372-43.000.
- University of Delaware, The: *See—*
  - Stiles, Alvin B., 5,023,063, Cl. 423-239.000.
- University of Melbourne, The: *See—*
  - Cohen, Lawrence T.; and Rickards, Field W., 5,023,783, Cl. 364-413.020.
- University of Nebraska, The Board of Regents of the: *See—*
  - Winowiski, Thomas S., 5,023,091, Cl. 426-2.000.
- University of New Mexico: *See—*
  - Cheng, Kenneth T., 5,023,072, Cl. 424-9.000.
- University of Pittsburgh: *See—*
  - Klinzing, George E.; Borzone, Luis A.; and Yang, Wen-Ching, 5,022,274, Cl. 73-861.040.
- University of Southern California: *See—*
  - Copley, Stephen M.; Tao, Hongyi; and Todd-Copley, Judith A., 5,022,957, Cl. 156-643.000.
- University Patents, Inc.: *See—*
  - MacDiarmid, Alan G.; and Somasiri, Nanayakkara L. D., 5,023,149, Cl. 429-27.000.
  - Remers, William A.; and Sami, Salah M., 5,023,253, Cl. 514-228.200.
- Unuma, Makoto: *See—*
  - Oyama, Jun; Uchida, Naoshi, Unuma, Makoto; Takahashi, Tatsunori; Shinohara, Hisaji; and Kandatsu, Kiyoshi, 5,023,416, Cl. 200-244.000.
- UOP: *See—*
  - Forte, Paulino, 5,022,981, Cl. 208-334.000.
- Uozu, Yoshihiro: *See—*
  - Yamamoto, Takashi; Matsumoto, Tsuruyoshi; Shimada, Katsuhiko; Uozu, Yoshihiro; and Murata, Ryuji, 5,022,737, Cl. 350-96.290.
- Upjohn Company, The: *See—*
  - Rector, Douglas L.; Conder, George A.; and Folz, Sylvester D., 5,023,334, Cl. 546-268.000.
- Upton, R. Glen: *See—*
  - Coughlan, Joel B.; Farnstrom, Kenneth A.; Harvey, Howard W., Upton, R. Glen; White, John R.; and Walker, Kenneth L., 5,022,812, Cl. 414-729.000.
- Urano, Akira: *See—*
  - Ishiguro, Yoichi; Kanamori, Hiroo; Urano, Akira; and Kyoto, Michihisa, 5,022,904, Cl. 65-2.000.
- Urban, Otfried; and Koob, Dieter, to BASF Aktiengesellschaft. Substantially rectangular storage container, in particular for flat articles. 5,022,516, Cl. 206-45.130.
- Urda, Joseph A.: *See—*
  - Mans, Wayne K.; and Rizzo, Vincent J., 5,023,518, Cl. 315-219.000

- Urena, Pierre-Yves: *See—*
  - Akrout, Chekib; Coppens, Pierre; Denis, Bernard; and Urena, Pierre-Yves, 5,023,841, Cl. 365-205.000.
- Uriu, Eiichi; Nishida, Koji; and Tabata, Munehiro, to Matsushita Electric Industrial Co., Ltd. Thermal fuel level detector. 5,022,263, Cl. 73-295.000.
- Urschel Laboratories Incorporated: *See—*
  - Fischer, Robert R.; and Fischer, W James, 5,022,299, Cl. 83-676.000.
- USG Interiors, Inc.: *See—*
  - Porter, William F.; Mastrogany, Michael G.; and Porter, Michael J., 5,022,963, Cl. 162-116.000.
- Ushiro, Seimei; and Ohmura, Hiroshi, to Fuji Photo Film Co., Ltd. Slave electronic flash unit for a camera. 5,023,639, Cl. 354-132.000.
- Ushiyama, Katsumi; Sakamoto, Sadafumi; and Itoh, Kiyohiko, to Kokusai Electric Co., Ltd.; and Itoh, Kiyohiko. Small antenna. 5,023,621, Cl. 343-702.000.
- Usinger, Patricia: *See—*
  - Siegel, Herbert; Kampe, Klaus-Dieter; Alpermann, Hans-Georg; Gerhards, Hermann J., Usinger, Patricia; Schacht, Ulrich; Leven, Margret; Raether, Wolfgang; Dittmar, Walter; and Sachse, Burkhard, 5,023,357, Cl 544-132.000.
- Usui Kokusai Sangyo Kaisha Ltd : *See—*
  - Imura, Izumi; Uesugi, Tatsuhiko; and Yoshimura, Toshiaki, 5,022,372, Cl. 123-469.000.
  - Mizuhashi, Toshihiko, 5,023,115, Cl. 427-388.200.
- Utsui, Yoshihiko: *See—*
  - Satoh, Hiroshi; and Utsui, Yoshihiko, 5,022,275, Cl. 73-862.360.
- Uttenweiler, Winifred: *See—*
  - Denz, Helmut; Grieser, Klemens; Stock, Jurgen; Moz, Rudolf; and Uttenweiler, Winifred, 5,022,374, Cl. 123-490.000.
- Vadasz, Zsolt. *See—*
  - Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre; Teplan, Istvan; Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt; Hegedus, Edit; Makara, Gabor; and Rappay, Gyorgy, 5,023,322, Cl. 530-324.000.
- Vagarali, Suresh S.; and Hoyle, Bobby G., to General Electric Company. Diamond compacts for rock drilling and machining. 5,022,894, Cl. 51-293.000.
- Vail, Kenneth E., Jr.: *See—*
  - Vail, Kenneth E., Sr.; and Vail, Kenneth E., Jr., 5,022,540, Cl. 211-181.000.
- Vail, Kenneth E., Sr.; and Vail, Kenneth E., Jr. Stackable wire cubes for use in a modular display rack. 5,022,540, Cl. 211-181.000.
- Vail, Patrick V., to United States of America, Agriculture. Novel virus composition to protect agricultural commodities from insects. 5,023,182, Cl. 435-235.100.
- Valeo Thermique Moteur: *See—*
  - Potier, Michel; and Briet, Gilles, 5,022,461, Cl. 165-76.000.
- Valley, George C.; and Boggess, Thomas F., Jr., to Hughes Aircraft Company. Transient energy self-pumped conjugator and method. 5,023,477, Cl. 307-425.000.
- Vallone, Giacinto; Janisiewicz, Stanley W.; Snyder, Michael D.; Hemmelgarn, Gerald B.; and Glidden, Wayne A., to Universal Instruments Corporation. Extended input and testing of electrical components for onsertion machines. 5,023,544, Cl 324-158.00F.
- Valmet Paper Machinery Inc.: *See—*
  - Ilvespaa. Heikki; Liedes, Allan; and Viitanen, Olavi, 5,022,163, Cl. 34-23.000.
  - Pitkajarvi, 5,022,965, Cl. 162-192.000.
- Valmont Industries, Inc.: *See—*
  - Costa, Larry J., 5,023,520, Cl. 315-276.000.
- Valster, Karl C.; and Reicks, Allen V., to Precision Pulley, Inc. Apparatus for rotatably mounting idlers and pulleys of various sizes. 5,022,132, Cl. 29-116.100.
- Vanaschen, Luc; Kuster, Hans-Werner; Havenith, Hubert, and D'Iribarne, Benoit, to Saint-Gobain Vitrage International. Process for obtaining bent-tempered motor vehicle glazings. 5,022,906, Cl. 65-104.000.
- Vanaschen, Luc; Radermacher, Herbert; and Kuster, Hans-Werner, to Saint-Gobain Vitrage International. Apparatus for bending glass panes in a horizontal position. 5,022,907, Cl. 65-163.000.
- Vancraeynest, Jan, to Nynex Corporation. Combined multi-port transmit/receive switch and filter. 5,023,935, Cl. 455-80.000.
- Van De Grijp, Abram. *See—*
  - Angenent, Johannes H.; Khoe, Giok D., Mahon, Gathal J.; Van De Grijp, Abram; Potters, Cornelis J. T.; and Wright, Kieran G., 5,022,733, Cl. 350-96.180.
- Van Den Berg, Johannes Petrus: *See—*
  - Grandvallet, Pierre; Kortbeek, Andras Guus Theodorus George; Van Den Berg, Johannes Petrus; and Robschlager, Karl-Heinz, 5,023,389, Cl. 585-304.000.
- Vanderboegh, Ronald A.: *See—*
  - Amstutz, Douglas D., and Vanderboegh, Ronald A., 5,022,719, Cl. 312-140.000.
- Van der Merwe, Sarel B.: *See—*
  - Oncke, Ockert P. H.; and Van der Merwe, Sarel B., 5,022,175, Cl 42-70.110.
- van der Meulen, Jan, to Machinefabriek Wila B.V Clamping device 5,022,256, Cl 72-481.000.
- Vanderveen, Timothy: *See—*
  - Richmond, Frank M., and Vanderveen, Timothy, 5,022,538, Cl. 211-113.000.
- Van Dijk, Jan *See—*
  - Josquin, Wilhelmus J.; and Van Dijk, Jan, 5,023,192, Cl 437-31.000.
- Van Eijk, Johannes H., to Gist-Brocades N.V Retarding the firming of bread crumb during storage. 5,023,094, Cl 426-20.000.
- Van Erden, Donald L.: *See—*
  - Boeckmann, Hugo; and Van Erden, Donald L., 5,023,122, Cl. 428-43.000.
- van Hemelrijk, Dirk: *See—*
  - Shehad, Noel S.; Dussack, Laurie L.; and van Hemelrijk, Dirk, 5,023,376, Cl. 564-298.000.
- Vaniglia, Milo M., to Cincinnati Milacron Inc. Fiber placement machine. 5,022,952, Cl. 156-441.000.
- Van Le, Nam: *See—*
  - Churchman, Ronald K.; Meaders, Michael W.; and Van Le, Nam, 5,022,427, Cl. 137-155.000.
- van Oene, Henk: *See—*
  - Cheung, Mo-Fung; Golovoy, Amos; and van Oene, Henk, 5,023,284, Cl. 524-109.000.
- Vanstraelen, Guy F. R. J., to Interuniversitair Micro-Elektronica Centrum vzw. Radiation-sensitive detector array and pre-amplification readout integrated circuit. 5,023,455, Cl. 250-370.010.
- Varian Associates, Inc.: *See—*
  - Collier, John C., 5,023,768, Cl. 363-68 000.
  - Wells, Gregory J.; and Bolton, Barbara A., 5,022,755, Cl 356-307.000.
- Varnham, Malcolm P., to British Aerospace Public Limited Company. Determining the wavelength of optical radiation 5,022,754, Cl. 356-300.000.
- Vartanian, George: *See—*
  - Landau, Michael B.; Vartanian, George; and Matsuzawa, Kazuyuki, 5,023,151, Cl. 429-24.000.
- Vater, Peter: *See—*
  - Goll, Gunther; Vater, Peter; Keusch, Siegfried; and Kratz, Gunter, 5,023,925, Cl. 392-384.000.
- Vaucher, Frank, to Compagnie des Montres, Longines, Francillon, S.A Astronomic timepiece and disc intended for use therein. 5,023,849, Cl. 368-15.000.
- Vaughan, Quentin D., IV, to Visicon, Inc. Method and apparatus for processing and transporting sheet materials. 5,022,418, Cl. 134-64.00R.
- Vaught, John L., to Tencor Instruments. Shock wave particle removal method and apparatus. 5,023,424, Cl. 219-121.600.
- Veba Oel Entwicklungs-Gesellschaft mbH. *See—*
  - Blasko, Michael; and Wenning, Hans-Peter, 5,022,852, Cl. 432-115.000.
- Veber, Daniel F.: *See—*
  - Nutt, Ruth F.; Brady, Stephen F.; and Veber, Daniel F., 5,023,233, Cl. 514-11.000.
- Vecci, Stanley J.: *See—*
  - Rackley, John M.; and Vecci, Stanley J., 5,022,329, Cl. 110-234.000.
- Vekony, Sandor: *See—*
  - Farkas, Jozsef; Vekony, Sandor; Vekony, Sandorne; Csovak, Erno; and Fodor, Sandor, 5,022,293, Cl. 82-1.110.
- Vekony, Sandorne: *See—*
  - Farkas, Jozsef; Vekony, Sandor; Vekony, Sandorne; Csovak, Erno, and Fodor, Sandor, 5,022,293, Cl. 82-1.110.
- Velechovsky, Petr, to Elitex Koncern Textilniho Strojirenstvi. Brush device for removing a beat-up weft. 5,022,440, Cl. 139-116.200.
- Verboom, Johannes J., to U.S. Philips Corporation Optical information storage apparatus including eccentricity compensator. 5,023,857, Cl. 369-44.250.
- Veretennikov, Viktor Y.: *See—*
  - Boiko, Leonid S.; Korotkin, Viktor I.; Veretennikov, Viktor Y.; Roslivker, Efim G.; Fedyakin, Roman V., Chesnokov, Viktor A., Yakovlev, Anatoly S.; Kharitonov, Jury D.; Fei, Valery M., and Galichenko, Emma N., 5,022,280, Cl. 74-462.000.
- Vernay Laboratories, Inc.: *See—*
  - Harbert, Earl W., 5,022,877, Cl 440-89.000.
- Vernice, Joseph: *See—*
  - Globus, Alfred R.; and Vernice, Joseph, 5,023,355, Cl. 549-478.000.
- Vernon, Nicholas M.: *See—*
  - Neiditch, David S.; Vernon, Nicholas M.; and Wingard, Robert E., Jr., 5,023,329, Cl. 536-119.000.
- Verret, Douglas P.; Smayling, Michael C.; Sachdeva, Abnash C., and Keller, Stephen A., to Texas Instruments Incorporated. Merged bipolar and complementary metal oxide semiconductor transistor device. 5,023,690, Cl. 357-43.000.
- Versteeg, Gijsbert, to Vervako B.V Positioning gear for moving a load suspended by at least one cable of a lifting system in the vertical direction. 5,022,543, Cl. 212-271.000.
- Vervako B.V.: *See—*
  - Versteeg, Gijsbert, 5,022,543, Cl. 212-271.000.
- Vickers, David S.: *See—*
  - McCroskey, William K.; and Vickers, David S., 5,023,895, Cl. 378-4.000.
- Vickers, Incorporated. *See—*
  - Miller, John A.; Leemhuis, Richard S. and Gunda, Rajamouli. 5,023,535, Cl. 318-599.000.
- Victor Company of Japan, Ltd.: *See—*
  - Morisaki, Kazuhiko, 5,023,731, Cl. 360-64.000
  - Tamaki, Yoshihiro, 5,023,734, Cl 360-84 000.
- Videocolor: *See—*
  - Testa, Perluigi, 5,023,157, Cl. 430-24 000
- Vider, Dov-Ami: *See—*
  - Pathak, Jagdish; Douglass, Stephen M. Vider, Dov-Ami; and Kurkowski, Hal, 5,023,484, Cl 307-465.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Vigh, Sandor: *See—*
  - Kovacs, Magdolna; Horvath, Judit; Vigh, Sandor; Mezo, Imre; Teplan, Istvan; Szoke, Balazs; Seprodi, Janos; Vadasz, Zsolt; Hegedus, Edit, Makara, Gabor; and Rappay, Gyorgy, 5,023,322, Cl. 530-324.000.
- Vigne, Jean-Louis; and Kane, John P., to California Biotechnology Inc. Pharmaceutical microemulsions. 5,023,271, Cl. 514-458.000.
- Viitanen, Olavi: *See—*
  - Ilvespaa, Heikki; Liedes, Allan; and Viitanen, Olavi, 5,022,163, Cl. 34-23.000.
- Vilas Boas, Jean-Claude; and Fromion, Andre, to Bull, S.A. Packaging method, packaging bolster, and packaging line. 5,022,217, Cl. 53-472.000.
- Vilines, Edward J., to Aviation Petroleum Inc. Additive injection system. 5,022,428, Cl. 137-209.000.
- Vindez, Pierre G., to P.V Tool, Inc. Rapid advance feed drill with idle mode. 5,022,800, Cl. 408-14.000.
- Violette, John A.; and Auyeung, Sean, to United Technologies Corporation. Pinned airfoil propeller blade. 5,022,824, Cl. 416-230.000.
- Violette, John A.; and Nagle, David P., to United Technologies Corporation. Pitch retention member. 5,022,825, Cl. 416-500.000.
- Violi, Raymond: *See—*
  - Faurel, Jacques; and Violi, Raymond, 5,022,380, Cl. 126-190.000.
- Viratec Thin Films, Inc.: *See—*
  - Austin, Russell; and Dickey, Eric R., 5,022,726, Cl. 350-1.700.
- Virsik, Milan A.: *See—*
  - Miller, Donald E., and Virsik, Milan A., 5,022,135, Cl. 29-421.100.
- Visicon, Inc.: *See—*
  - Vaughan, Quentin D., IV, 5,022,418, Cl. 134-64.00R.
- Vista Manufacturing, Inc.: *See—*
  - Tieszen, Dwayne, 5,023,762, Cl. 362-223.000.
- Vitale, Nicholas G., to Mechanical Technology Incorporated. Stirling free piston cryocoolers. 5,022,229, Cl. 62-6.000.
- Vitkavage, Daniel J.: *See—*
  - Favreau, David P.; Swiderski, Jane A.; and Vitkavage, Daniel J., 5,022,958, Cl. 156-643.000.
- Vitori, Christopher M.: *See—*
  - Pimley, John J.; Vitori, Christopher M.; Phillippe, Irenee J.; and Marsh, Paul G., 5,022,984, Cl. 209-170.000.
- Vock, Manfred H.: *See—*
  - Farbood, Mohamad I., Morris, James A.; Sprecker, Mark A.; Bienkowski, Lynda J.; Miller, Kevin P.; Vock, Manfred H.; and Hagedorn, Myrna L., 5,023,347, Cl. 549-263.000.
- Voegeli, Rainer: *See—*
  - Schumacher, Wolfgang; Respondek, Johannes; Engel, Jurgen; Pohl, Jorg; Voegeli, Rainer; and Hilgard, Peter, 5,023,335, Cl. 548-104.000.
- von Angerer, Erwin, to Schering Aktiengesellschaft. Aminoalkylindoles, their production, and pharmaceutical preparations based thereon. 5,023,254, Cl. 514-235.500.
- Von Burg, Gregory F., to American Home Products Corporation. 42-oxorapamycin. 5,023,263, Cl. 514-291.000.
- von Kannewurff, Michael C.: *See—*
  - Williams, Laura A.; Magnon, Gary D.; von Kannewurff, Michael C.; and Seymour, Raymond K., 5,023,582, Cl. 335-167.000.
- Voorman, Johannes O.: *See—*
  - Moore, Paul A.; Perry, Colin L., and Voorman, Johannes O., 5,023,568, Cl. 330-257.000
- Vorbruggen, Helmut: *See—*
  - Klar, Ulrich; Skuballa, Werner; Vorbruggen, Helmut, Sturzebecher, Claus-Steffen; Thierauch, Karl-Heinz; and Schillinger, Ekkehard, 5,023,273, Cl. 514-530.000.
- Vorec Corporation: *See—*
  - Sloan, Paul; Tuai, Gregory; Jimenez, Julio; and Jimenez, Raymond, 5,023,901, Cl. 379-38.000.
- Voss, Gunter, to Finn-Aqua. Method and apparatus for leak testing fluid conducting freeze-drying apparatus. 5,022,265, Cl. 73-40.700.
- Vuagnat, Louis, to GV S.A. Receiver for rotating lasers used for guiding machines, particularly public works machines. 5,022,763, Cl. 356-400.000.
- W. H Brady Co.: *See—*
  - Benlmer, Robert F.; Schanke, Robert L.; and DeSmidt, Robert G., 5,022,951, Cl. 156-379.000.
- W. L. Gore & Associates, Inc.: *See—*
  - Pacanowsky, David J., 5,022,096, Cl. 2-227.000.
- W. R. Grace & Co.-Conn.: *See—*
  - Clarkson, Douglas; Clifford, Richard P.; and Marshall, Alan, 5,023,267, Cl. 514-372.000.
  - Gaidis, James M., 5,023,290, Cl. 524-320.000.
  - Kreh, Robert P.; Lundquist, Joseph T.; Henry, Wayne L.; Kelly, John A.; and Kuhn, Vincent R., 5,022,926, Cl. 134-2.000.
  - Nelson, Martindale, 5,023,143, Cl. 428-516.000.
  - Pockat, Gregory R.; Christenberry, Carl C.; and Satterwhite, Paul J., 5,023,121, Cl. 428-36.900.
  - Spencer, Nicholas D.; Pan, Wie-Hin; and Rudesill, John A., 5,023,067, Cl. 423-420.000.
  - Tsui, Mosum E.; and Sherwin, Martin B., 5,023,371, Cl 562-512.000.
- W. Schlafhorst AG & Co.: *See—*
  - Wey, Edmund; Grecksch, Hans; Pesch, Albert T.; Knors, Herbert; Zitzen, Wilhelm; and Marquardt, Manfred, 5,022,596, Cl. 242-36.000.
- WABCO Westinghouse Steuerungstechnik GmbH & Co.: *See—*
  - Fortmann, Norbert; Gottling, Helmut; Meyer, Hans F.; Moller, Rudolf, and Scharnowski, Gerhard, 5,022,311, Cl. 92-137.000.
- Wachel, Robert D.. *See—*
  - Rubow, Keith A.; and Wachel, Robert D., 5,023,610, Cl. 341-51.000.
- Wacker-Chemie GmbH. *See—*
  - Bosch, Erhard; Wolfer, Dietrich; and Maier, Reinhard, 5,023,295, Cl. 524-783.000.
- Wacom Co., Ltd.. *See—*
  - Murakami, Azuma; Aoki, Kazuo; Yamanami, Tsuguya; Tomofuji, Yoshiaki; Tanaka, Takeshi; Inashima, Satoshi; Funahashi, Takahiko; Chikami, Toshihide; and Senda, Toshiaki, 5,023,408, Cl. 178-19.000.
- Wada, Katuo: *See—*
  - Abe, Masaru; Kawai, Yoichi; Maki, Masami; and Wada, Katuo, 5,023,286, Cl. 524-128.000.
- Wada, Kumiko: *See—*
  - Nagata, Yuji; Fukazawa, Toshio; Wada, Kumiko; and Tosaki, Yoshihiro, 5,022,141, Cl. 29-603.000.
- Waddell, Walter H : *See—*
  - Evans, Larry R.; Waddell, Walter H.; Harris, Frank W . and Benko, David A., 5,023,287, Cl. 524-255.000.
- Waggoner, Richard L., to Alumax Inc. Roof ventilating apparatus. 5,022,314, Cl. 98-32.000.
- Wagner, Friedrich; and Grau, Walter, to Friedrich Grohe Armaturenfabrik GmbH & Co. Flow-control and shutofff valve 5,022,631, Cl. 251-185.000.
- Wago Verwaltungsgesellschaft mbH: *See—*
  - Kollmann, Hans J , 5,022,873, Cl. 439-716.000.
- Wakabayashi, Hideaki, to Aisin Seiki Kabushiki Kaisha. Electrically actuated wheel hub clutch apparatus. 5,022,503, Cl. 192-0.02R.
- Wakana, Akira, to NEC Corporation. Radio communication system comprising a portable unit carrying out a battery saving operation related to a scanning operation of a fixed unit. 5,023,932, Cl. 455-34.000.
- Wakashima, Takashi: *See—*
  - Hasegawa, Masamitsu; Tamura, Satoshi; Sugiyama, Isao; and Wakashima, Takashi, 5,022,947, Cl. 156-277.000.
- Wakatsuki, Yoshio; Okuyama, Toshiharu; Takeuchi, Hajime; Shimizu, Giichiro; and Shimizu, Misao, to Nitto Kohki Co., Ltd. Portable data input apparatus with different display modes. 5,023,438, Cl. 235-472.000.
- Wakimoto, Kingo; and Takeda, Kousaku, to Mitsubishi Denki Kabushiki Kaisha. Display control device. 5,023,603, Cl. 340-793.000.
- Wakou, Jiro: *See—*
  - Horino, Shigeo; Omura, Hideo; Maruyama, Nobusato; Ashikawa, Yoshiaki; Shioya, Masatoshi; Miyano, Toshiyuki; and Wakou, Jiro, 5,022,531, Cl. 209-552.000.
- Waldie, William T.: *See—*
  - Kim, Jin D.; and Waldie, William T., 5,023,580, Cl. 333-206.000.
- Waldinger, Richard; and Backus, Allan L. Retractable pen with self sealing writing tip opening. 5,022,773, Cl. 401-107.000.
- Walker, Kenneth L.: *See—*
  - Coughlan, Joel B.; Farnstrom, Kenneth A.; Harvey, Howard W . Upton, R. Glen; White, John R.; and Walker, Kenneth L., 5,022,812, Cl. 414-729.000.
- Walker, Kevin E., to AMP Incorporated. Adapter for use with a bumperless chip carrier. 5,022,869, Cl. 439-526.000.
- Wallace, Barry M.: *See—*
  - Sanner, M. Duane; Nunley, Leonard J.; and Wallace, Barry M , 5,023,923, Cl. 382-61.000.
- Wallace, John D., to C & K Systems, Inc. Ceiling mount microwave transceiver with 360 degree radiation pattern. 5,023,594, Cl. 340-552.000.
- Wallach, Donald F. H., to Micro-Pak, Inc. Encapsulated ionophore growth factors. 5,023,086, Cl. 424-450.000.
- Wallart, Franck: *See—*
  - Boudon, Gerard; Mollier, Pierre; Ogura, Seiki; Omet, Dominique; Tannhof, Pascal; and Wallart, Franck, 5,023,478, Cl 307-446.000.
- Wallin, Maynard A. Portable closet. 5,022,722, Cl. 312-309.000.
- Wallis, Christopher J.: *See—*
  - Ellis, Frank; Naylor, Alan; Wallis, Christopher J.; and Waterhouse, an, 5,023,255, Cl. 514-242.000.
- Wallman, Lennart K. O. Assembly for moving heavy objects. 5,022,811, Cl. 414-607.000.
- Wallwey, Erich: *See—*
  - Heldman, Henrich; and Wallwey, Erich, 5,022,308, Cl. 89-45.000.
- Walsh, David M.: *See—*
  - Lappos, Nicholas D.; Walsh, David M.; Sweet, David H . and Greenberg, Charles E., 5,023,797, Cl. 364-442.000.
- Walsh, Dennis E.: *See—*
  - Han, Scott; Palermo, Robert E.; Pearson, Judith A.; and Walsh, Dennis E., 5,023,391, Cl. 585-500.000.
  - Han, Scott; Palermo, Robert E.; Pearson, Judy A.; and Walsh, Dennis E., 5,023,392, Cl. 585-500.000.
  - Han, Scott; Palermo, Robert E.; Pearson, Judith A.; and Walsh, Dennis E., 5,023,393, Cl. 585-500.000.
- Walters, Glenn A. Large time bandwidth echographic signal processor. 5,022,400, Cl. 128-661.090.
- Walton, Charles A. Radiation helmet. 5,022,099, Cl. 2-410.000.
- Walton, Derrick N.; Dolan, Clarence F.; and Shah, Mahesh J., to Sundstrand Corporation. Brushless power generating system having reduced conducted emissions in output power. 5,023,540, Cl 322-58.000.
- Wan Dean Industry Co.: *See—*
  - Wan-Li, Chang, 5,022,118, Cl. 16-327.000.
- Wan-Li, Chang, to Wan Dean Industry Co. Ladder joint with engagement spring member. 5,022,118, Cl. 16-327.000.

- Wang, Bor-Ping E.; Band, Elliot I., and Amata, Richard J., to Akzo nv. Novel halide-arylalkoxy-containing magnesium compounds. 5,023,385, Cl. 568-851.000.
- Wang, Kang L.; and Yuh, Perng-Fei, to University of California, The Regents of the. Optically pumped step quantum well IR source. 5,023,879, Cl. 372-43.000.
- Wang, Nui, to Brake and Clutch Industries Australia Pty. Ltd. Disc brake caliper. 5,022,500, Cl. 188-73.310.
- Wang, Shi-ho: *See—*
  - Pope, Edward J. A ; Sano, Yoji; Wang, Shi-ho; and Sarkar, Arnab, 5,023,208, Cl. 501-12.000.
- Wang, Song M Automobile steering lock. 5,022,246, Cl. 70-209.000.
- Waniczek, Helmut *See—*
  - Meuer, Kurt P.; Waniczek, Helmut; Sylvester, Gerd; and Witte, Josef, 5,023,299, Cl. 525-146.000.
- Wanie, Lee J., to Deere & Company. System and method for controlling the ground speed and enhancing the maneuverability of an off-road vehicle. 5,022,477, Cl. 180-6.340.
- Ward, Roger W.: *See—*
  - EerNisse, Errol P.; Ward, Roger W.; and Wood, O. Lew, 5,022,130, Cl. 29-25.350.
- Wardy, Daher T.: *See—*
  - Houle, Timothy H.; and Wardy, Daher T , 5,023,928, Cl. 392-457.000.
- Warner, Graeme W., to John R. Nalbach Engineering Co., Inc Measuring flask construction for use in a filling machine. 5,022,443, Cl. 141-129.000.
- Warner-Lambert Company *See—*
  - Cherukuri, Subraman R.; and Mansukhani, Gul, 5,023,093, Cl. 426-3.000.
- Warseck, Michael R., to Nabisco Brands, Inc Food products containing non-pungent dijon mustard flavoring and a process for making mustard paste. 5,023,105, Cl. 426-650.000.
- Watanabe, Akihiko: *See—*
  - Itagaki, Akinari; Yamaya, Masaaki; Yoshioka, Hiroshi; Watanabe, Akihiko; and Miyazato, Keita, 5,022,922, Cl. 106-287.110.
- Watanabe, Hideo: *See—*
  - Komatsu, Katsuaki; Watanabe, Hideo; and Takahashi, Atsushi, 5,023,443, Cl. 250-208.100.
- Watanabe, Hideto. Catheter for simultaneously measuring monophasic action potential and endocardiac cavity pressure. 5,022,396, Cl. 128-642.000.
- Watanabe, Hiroaki: *See—*
  - Machida, Hiroji; Asano, Michiaki; Watanabe, Yozo; Tokuhiro, Tomoya; Satoh, Hiroshi; Iwahashi, Motoyuki; Yamaguchi, Norihiro; Kikuchi, Koshin; and Watanabe, Hiroaki, 5,023,020, Cl. 261-18.100.
- Watanabe, Kenshiu; and Tamayama, Kiyoshi, to Doryokuro Kakunenryo Kaihatsu Jigyodan. Plant malfunction diagnostic method. 5,023,045, Cl. 376-215.000.
- Watanabe, Kozo; and Sugimoto, Yasuhiko, to Yoshida Kogyo K.K. Slide fastener chain for shielding the electromagnetic wave. 5,023,394, Cl. 174-35.00R.
- Watanabe, Masakazu: *See—*
  - Miwa, Hiroshi; Okude, Yoshitaka; Watanabe, Masakazu; and Konishi, Sakuichi, 5,023,298, Cl. 525-103.000.
- Watanabe, Mitsuo: *See—*
  - Yamashita, Takaji; Watanabe, Mitsuo; Okada, Hiroyuki; and Shimizu, Keiji, 5,023,894, Cl. 378-4.000.
- Watanabe, Naotaka; Itoda, Hiroshi; and Funato, Reiko, to Mitsui-Cyanamid, Ltd. Method of treating starch-containing water. 5,022,999, Cl. 210-692.000.
- Watanabe, Nobuatsu: *See—*
  - Izumi, Akira; Toei, Keiji; Watanabe, Nobuatsu; and Chong, Yong-Bo, 5,022,961, Cl. 156-646.000.
- Watanabe, Taketoshi: *See—*
  - Tate, Takuo; Watanabe, Taketoshi; and Nagura, Hiroyuki, 5,022,441, Cl. 139-383.00A
- Watanabe, Tetsuo: *See—*
  - Takeuchi, Yukihisa; Watanabe, Tetsuo; Yamamoto, Azuma; Shirakawa, Kazuo, and Segawa, Takao, 5,023,700, Cl. 357-70.000.
- Watanabe, Yohji, and Furuyama, Tohru, to Kabushiki Kaisha Toshiba. Semiconductor device with power supply mode-change controller for reliability testing. 5,023,476, Cl. 307-296.100.
- Watanabe, Yozo: *See—*
  - Machida, Hiroji; Asano, Michiaki; Watanabe, Yozo; Tokuhiro, Tomoya; Satoh, Hiroshi; Iwahashi, Motoyuki; Yamaguchi, Norihiro; Kikuchi, Koshin; and Watanabe, Hiroaki, 5,023,020, Cl. 261-18.100.
- Watanabe, Yukio: *See—*
  - Suzuki, Mariko; Itaya, Kazuhiko; Ishikawa, Masayuki; Watanabe, Yukio; and Hatakoshi, Genichi, 5,023,880, Cl. 372-45.000.
- Wataya, Masafumi, to Canon Kabushiki Kaisha. Apparatus and method for treating encoded image data including correction for encoding/decoding deterioration. 5,023,919, Cl 382-54.000.
- Waterhouse, an: *See—*
  - Ellis, Frank; Naylor, Alan; Wallis, Christopher J., and Waterhouse, an, 5,023,255, Cl. 514-242.000.
- Waterloo Metal Stampings Ltd.: *See—*
  - Baxter, Alan R., 5,022,768, Cl 384-19.000.
- Watford, Roger L. Collapsible garment hanger with corrugated tubing. 5,022,570, Cl. 223-94.000.
- Watson, Jerry L.: *See—*
  - Gibbons, Gould, Jr.; Watson, Jerry L.; and Lawrence, William, 5,022,307, Cl. 89-36.020.
- Watson, John, to Philip Morris Incorporated. Spray cylinder with retractable pins. 5,022,416, Cl. 131-305.000
- Watson, Michael J.: *See—*
  - Zelenak, Daniel G., Jr.; and Watson, Michael J., 5,022,675, Cl. 280-743.000.
- Weather Shield Mfg., Inc.: *See—*
  - Schield, Edward L.; Reeves, Myron D.; Nehiba, Marjorie A., and Hartl, Lyn W., 5,022,206, Cl. 52-455.000.
- Weber, Rainer J.; and Attenni, Johann, to Audi AG Submerged fuel pump. 5,022,830, Cl. 417-423.140.
- Weege, Rolf-Dieter, to Wilhelm Meyer GmbH & Co., K.G Wheelchair. 5,022,476, Cl. 180-6.500.
- Weeks, J. B., to Motor Wheel Corporation. Safety tire and take-apart wheel construction. 5,022,450, Cl. 152-381.600.
- Wegmann & Co. GmbH: *See—*
  - Heldman, Henrich; and Wallwey, Erich, 5,022,308, Cl. 89-45.000.
- Wegner, Wayne M *See—*
  - Hetzler, Kevin G.; Wegner, Wayne M , and Munger, Billie C., 5,023,142, Cl. 428-500.000.
- Weibel, Michael K.: *See—*
  - Spina, Joseph, Jr.; and Weibel, Michael K., 5,022,413, Cl. 128-898.000.
- Weidenburner, William K. Knee orthosis. 5,022,391, Cl. 128-80.00F.
- Weisend, Norbert A., Jr.; and Tritt, Paul G , to B. F. Goodrich Company, The. De-icer. 5,022,611, Cl 244-134.00A
- Weiss, Kenneth. Method and apparatus for personal identification. 5,023,908, Cl. 380-23.000.
- Weitekamp, James B Wheel mounting tool. 5,022,133, Cl. 29-273.000
- Weitzel, Rose M.: *See—*
  - Ehrman, Albert M.; Seiden, Paul; Weitzel, Rose M., and White, Robert L., 5,023,106, Cl. 426-660.000.
- Weller, Hugo: *See—*
  - Drobny, Wolfgang; Nitschke, Werner; Taufer, Peter; and Weller, Hugo, 5,023,468, Cl. 307-10.100.
- Wellheuser, Christopher M.; and Moore, Richard T., to Texas Instruments Incorporated. ECL/TTL-CMOS translator bus interface architecture. 5,023,487, Cl. 307-475.000.
- Wellman, Keith R.; Crellin, Robert L.; and Ostle, William L., to Alcan International Limited. Extruding apparatus for extruding stepped products. 5,022,252, Cl. 72-260.000.
- Wellman, Tim A.: *See—*
  - Klopfleisch, Kim A.; and Wellman, Tim A., 5,022,496, Cl. 187-9.00E.
- Wells, Benjamin A.; and Golden, Neil, to Reflection Technology, Inc Pocket data receiver with full page visual display. 5,023,905, Cl. 379-96.000.
- Wells, Gregory J.; and Bolton, Barbara A., to Varian Associates, Inc. Photodiode configurations for simultaneous background correction and specific wavelength detection. 5,022,755, Cl. 356-307.000.
- Wells, Robert C. Apparatus and method for separating and removal of floating pollutants from a water surface. 5,022,987, Cl. 210-173.000.
- Wendorff, Joachim: *See—*
  - Eich, Manfred; Rau, Norbert; and Wendorff, Joachim, 5,023,859, Cl. 365-113.000.
- Wenning, Hans-Peter: *See—*
  - Blasko, Michael, and Wenning, Hans-Peter, 5,022,852, Cl. 432-115.000.
- Weppner, Werner, to Max-Planck-Gesellschaft zur Forderung der Wissenschafter e.V. Solid electrode in an electrolytic cell. 5,023,153, Cl. 429-40.000.
- Werner, Dietrich: *See—*
  - Brandis, Helmut; Huchtemann, Bernd; Schuler, Peter; and Werner, Dietrich, 5,022,933, Cl. 148-16.000.
- West Company, Incorporated, The: *See—*
  - Beswick, Frank, 5,022,165, Cl. 34-62.000.
- West, David H.; Hebert, Lawrence A.; Bowlin, Roger L.; and Holbrook, Michael T., to Dow Chemical Company, The. Liquid feed injection in a chloromethanes process. 5,023,387, Cl. 570-252.000.
- West, Eugene L.; and Marcinkewicz, Robert J., to Bradford-White Corporation. Method of making a foam insulated water heater. 5,023,031, Cl. 264-46.500.
- Westbrook, James E., to Module Truck Service, Inc. Retractable rear bumper. 5,022,703, Cl. 296-183.000.
- Westerberg, Sven P. J., to Atlas Copco Tools Aktiebolag. Exhaust means for pneumatic power tool. 5,022,469, Cl. 173-170.000.
- Western Digital Corporation: *See—*
  - Bonke, Carl; and Jen, Han, 5,023,831, Cl 364-900.000.
  - O'Shaughnessy, Timothy G.; and Spaur, Mike, 5,023,567, Cl. 330-253.000.
- Westinghouse Electric Corp.: *See—*
  - Adam, John D., 5,023,573, Cl. 333-17.200.
  - Bratkowski, Walter V.; Bhasavanich, Daun; and Davies, Norman, 5,023,583, Cl. 335-195.000.
  - Caldwell, Stephen P.; Korn, David S ; and Hopwood, Francis W., 5,023,572, Cl. 331-10.000.
  - Roy, Bryan A.; Boris, Gregory F.; Campbell, John J.; Funk, John G.; Wozniak, David J.; Gibson, James D.; and McCauley, Robert M., 5,022,995, Cl. 210-651.000.
  - Scalzo, Augustine J., 5,022,818, Cl. 415-209.300.
  - Snyder, Thomas S.; and Lee, Ernest D., 5,023,061, Cl. 423-70.000.
  - Widener, Wade H., 5,022,142, Cl. 29-723.000.
- Westphalen, Karl-Otto: *See—*
  - Kast, Juergen; Kolassa, Dieter; Meyer, Norbert; Schirmer, Ulrich; Harreus, Albrecht; Wild, Jochen; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,022,914, Cl. 71-88.000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Wey, Edmund; Grecksch, Hans; Pesch, Albert T., Knors, Herbert, Zitzen, Wilhelm; and Marquardt, Manfred, to W. Schlafhorst AG & Co. Method and apparatus for detecting the feed properties of feed bobbins. 5,022,596, Cl. 242-36.000.
- Whale, Henry A.: *See—*
  - Spackman, Kerry P.; and Whale, Henry A., 5,023,809, Cl. 364-516.000.
- Wheatley, Carl F., Jr.: *See—*
  - Wodarczyk, Paul J.; Wheatley, Carl F., Jr.; Neilson, John M. S., and Jones, Frederich P., 5,023,692, Cl. 357-43.000.
- Wheeler, Edward L.: *See—*
  - Hong, Sung W.; and Wheeler, Edward L., 5,023,292, Cl. 524-432.000.
- Wheeler, Stephen E.: *See—*
  - Aug, Conrad J.; Casanova, Wayne J., Corfits, William D.; Dimmick, Roger F.; and Wheeler, Stephen E., 5,023,754, Cl. 361-415.000.
- Wheeless, Jesse, to Radair, Inc. Apparatus and method for communication of visual graphic data with radio subcarrier frequencies. 5,023,934, Cl. 455-45.000
- Whirlpool Corporation: *See—*
  - Danielson, Orland H.; and Gross, Joseph R., 5,023,410, Cl. 191-12 20R
- White, James W.: *See—*
  - Andersen, James K., and White, James W., 5,022,470, Cl. 175-14.000.
- White, John R.: *See—*
  - Coughlan, Joel B.; Farnstrom, Kenneth A.; Harvey, Howard W., Upton, R. Glen; White, John R. and Walker, Kenneth L., 5,022,812, Cl. 414-729.000.
- White, O. Timothy, to Mead Corporation, The. Merchandising gondola with convertible base. 5,022,541, Cl. 211-186.000.
- White, Philip J.; and Shinn, Dennis B., to GTE Products Corporation. Arc tube dosing process for unsaturated high pressure sodium lamp. 5,022,882, Cl. 445-21.000.
- White, Robert L.: *See—*
  - Ehrman, Albert M.; Seiden, Paul, Weitzel, Rose M., and White, Robert L., 5,023,106, Cl. 426-660.000.
- Whiteside, Stacey A. Orthotic device for limiting limb notion at a joint 5,022,390, Cl. 128-80.00H.
- Whitfield, Peter J.: *See—*
  - Grundy, Barry T.; Hargreaves, Edward, and Whitfield, Peter J., 5,022,905, Cl 65-60.510.
- Whiting Roll-Up Door Mfg. Corp. *See—*
  - Clay, Roy T., Jr., 5,022,691, Cl. 292-121.000.
- Whitlev, Mark J.: *See—*
  - Eveanowsky, Stanley J., Jr., and Whitley, Mark J., 5,022,341, Cl. 116-142.0FP.
- WHS Robotics: *See—*
  - Luke, Walter, Jr., 5,023,790, Cl. 364-424.020.
- Wiand, Ronald C. Multilayer abrading tool and process 5,022,895, Cl 51-295.000.
- Wick, Alexander E.: *See—*
  - Langer, Salomon Z., Frost, Jonathan R.; Schoemaker, Johannes; Gaudilliere, Bernard; Bertin, Jean; Rousseau, Jean; Dupont, Regis; and Wick, Alexander E., 5,023,266, Cl. 514-317.000.
- Widener, Wade H., to Westinghouse Electric Corp. Apparatus and method for loading pellets into fuel rods. 5,022,142, Cl. 29-723.000.
- Wieczerniak, Walter J., to OMI International Corporation. Method for preparing corrosion-resistant zinc-cobalt surfaces. 5,022,938, Cl. 148-267.000
- Wiedemer, John D. Automated eprom and eeprom reading, erasing, and writing system. 5,023,834, Cl 365-52.000.
- Wiemann, William: *See—*
  - Altemose, George A.; Consi, Michael; Joscelyn, Edwin R.; Wiemann, William; Giguere, David B., Gully, Wilfred J.; and Spencer, Stanley E., 5,023,531, Cl. 318-471.000.
- Wilcox, Milton E., to National Semiconductor Corp. Adaptive gate charge circuit for power fets. 5,023,474, Cl. 307-270.000.
- Wilczek, Frank A.: *See—*
  - Baum, Eric B.; Moody, John E., and Wilczek, Frank A., 5,023,833, Cl. 365-49.000.
- Wild, Jochen: *See—*
  - Kast, Juergen; Kolassa, Dieter, Meyer, Norbert; Schirmer, Ulrich; Harreus, Albrecht; Wild, Jochen; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,022,914, Cl. 71-88.000.
- Wild Leitz GmbH: *See—*
  - Leiter, Herbert, 5,022,744, Cl. 350-530.000.
  - Schmidt, Horst; and Schmidt, Reinhold, 5,022,723, Cl. 350-1.200.
- Wildi, Edwin: *See—*
  - Beerli, Markus, Bollen, Manfred; Iten, Jakob; Koslowski, Gerhard; Probst, Willy; and Wildi, Edwin, 5,022,128, Cl. 28-191.000.
- Wilhelm Meyer GmbH & Co., K G.: *See—*
  - Weege, Rolf-Dieter, 5,022,476, Cl. 180-6.500
- Wilken, Rickey K.: *See—*
  - Schimweg, John J., Sunnen, Robert M., and Wilken, Rickey K., 5,022,196, Cl 51-338.000.
- Wilkinson, William H., to Gas Research Institute. Residential hybrid air conditioning system. 5,022,241, Cl. 62-271.000.
- Willey, Monroe M., to Du Pont de Nemours, E. I., and Company. High solids primer composition. 5,023,141, Cl. 428-458.000.
- Willi Moller, Firma: *See—*
  - Simon, Wilhelm, 5,023,374, Cl. 564-152.000.
- Williams, David L.; Russ, Karl J.; Dienes, Edward K.; and Laufer, George A., to United Catalysts Inc. Dehydrogenation catalyst and process for its preparation 5,023,225, Cl. 502-304.000.
- Williams, Kenneth J Fodder conditioning process. 5,022,317, Cl. 100-35.000.
- Williams, Larry; and Hunter, William. Environmentally acceptable process and apparatus for ventilation of continuous paint lines. 5,023,116, Cl. 427-424.000.
- Williams, Laura A.; Magnon, Gary D.; von Kannewurff, Michael C.; and Seymour, Raymond K., to General Electric Company Molded case circuit breaker compact latch asssembly. 5,023,582, Cl 335-167.000.
- Williams, Raymond C.: *See—*
  - Stevenson, John G.; and Williams, Raymond C., 5,023,873, Cl 371-8.200.
- Williamson, Barbara *See—*
  - Haranaka, Katsuyuki; Old, Lloyd J.; Richards, Elizabeth C.; and Williamson, Barbara, 5,023,320, Cl. 530-350.000.
- Williamson, John R.: *See—*
  - Hoopes, Jay N.; Eick, Christopher D.; and Williamson, John R., 5,022,228, Cl. 60-734.000.
- Williamson, Ronald E., to Orange Water and Sewer Authority Process for treating wastewater. 5,022,993, Cl. 210-605.000.
- Willms, Lothar; Bauer, Klaus, Bieringer, Hermann; and Burstell, Helmut, to Hoechst Aktiengesellschaft. Substituted sulfonyldiamides, processes for their preparation, and their use as herbicides and plant growth regulators. 5,022,916, Cl. 71-92.000.
- Wilman, John G.: *See—*
  - Guidotti, Daniel, Tan, Swie-in; and Wilman, John G., 5,022,765, Cl 356-435.000.
- Wilson, Gardner P Gas gage with zero net gas flow. 5,022,258, Cl 73-37 500.
- Wilson, Jack W., Jr.: *See—*
  - Maier, Mark S.; and Wilson, Jack W., Jr., 5,022,816, Cl 415-115.000.
- Wilson, James C., Jr Coaxial dual primary heat exchanger 5,022,379, Cl. 126-116.00R.
- Wilson, Jim Elevator control safety device. 5,023,409, Cl 187-130.000.
- Wilson, Kermit H.; and Skistad, Warren, to Sico Incorporated. Interlocking sections for portable floors and the like. 5,022,200, Cl 52-127.900.
- Wilson, Monti R.; and Medioni, Gerard G. R. Method and apparatus for registering color film separations. 5,023,815, Cl. 364-526.000
- Wilson, Ronald C.: *See—*
  - Rei, Nuno M.; and Wilson, Ronald C., 5,023,281, Cl. 523-122.000.
- Wing-Lynch, Inc.: *See—*
  - Lynch, Marine D.; Bernklau, James W.; Paulson, Richard D.; and Reeck, Steven L., 5,023,643, Cl. 354-299.000.
- Wingard, Robert E., Jr.: *See—*
  - Neiditch, David S.; Vernon, Nicholas M.; and Wingard, Robert E., Jr., 5,023,329, Cl. 536-119.000.
- Wingate-Hill, Robin; and MacArthur, Ian J., to Commonwealth Scientific and Industrial Research Organisation. Compression log debarking apparatus. 5,022,446, Cl. 144-208.00F.
- Winkler & Dunnehier Maschinenfabrik und Eisengiesserei KG. *See—*
  - Stemmler, Kurt, 5,022,295, Cl. 83-16.000.
- Winowiski, Thomas S., to University of Nebraska, The Board of Regents of the. Ruminant feed method of making and method of using 5,023,091, Cl. 426-2.000.
- Winter, Diana S.: *See—*
  - Davidson, Wayne A., and Winter, Diana S., 5,023,868, Cl 370-62.000.
- Winzer, Stephen R.: *See—*
  - Bailey, Alex E.; Winzer, Stephen R.; Sutherland, Audrey E.; and Ritter, Andrew P., 5,023,032, Cl. 264-63.000.
- Witczak, Stanley, to AM International, Inc. Distribution roller drive system for printing or duplicating machines. 5,022,321, Cl. 101-142.000.
- Witte, Josef: *See—*
  - Meuer, Kurt P.; Waniczek, Helmut; Sylvester, Gerd: and Witte, Josef, 5,023,299, Cl. 525-146.000.
- Wittensoldner, Christopher J.; Burkey, John K.; and Blanford, Denis M., to NCR Corporation. Laser scanner safety apparatus and method. 5,023,818, Cl. 364-551.010.
- Wittmann, Julius: *See—*
  - Auracher, Franz; Meissner, Eckhard; Noll, Bernd, and Wittmann, Julius, 5,023,885, Cl. 372-92.000.
- Wodarczyk, Paul J.; Wheatley, Carl F., Jr.; Neilson, John M. S.; and Jones, Frederich P., to Harris Semiconductor Patents, Inc. Power MOSFET transistor circuit. 5,023,692, Cl. 357-43.000.
- Woelfel, James A.; and Hineline, Thomas A., to Motor Wheel Corporation. Fiber-reinforced resin vehicle wheel mounting. 5,022,712, Cl 301-63.0PW.
- Wolf, H Alan; and Chu, David L., to Exxon Research and Engineering Company. Passive acoustics system to monitor fluidized bed systems. 5,022,268, Cl. 73-602.000.
- Wolfer, Dietrich: *See—*
  - Bosch, Erhard; Wolfer, Dietrich; and Maier, Reinhard, 5,023,295, Cl. 524-783.000.
- Wolfson, Jason; and Wolfson, William. Aneroid volume determining system 5,022,261, Cl. 73-149 000.
- Wolfson, William: *See—*
  - Wolfson, Jason; and Wolfson, William. 5,022,261, Cl. 73-149.000.
- Wong, David T.: *See—*
  - Robertson, David W.; Wong, David T., and Krushinski, Joseph H., Jr., 5,023,269, Cl. 514-438.000.
- Wong, Edward K., Jr.: *See—*
  - Cho, Zang-Hee; and Wong, Edward K., Jr., 5,023,554, Cl. 324-309 000.

- Wong, Patrick S. L.; Theeuwes, Felix, Eckenhoff, James B.; Larsen, Steven D.; and Huynh, Hoa T., to Alza Corporation. Multi-unit delivery system. 5,023,088, Cl. 424-473.000.
- Wood, Gail J.: *See—*
  - Balcar, Gerald P.; Krumrine, Paul; Schwartz, Neal; Sutker, Burton J.; and Wood, Gail J., 5,022,897, Cl. 55-96.000.
- Wood, O. Lew: *See—*
  - EerNisse, Errol P.; Ward, Roger W.; and Wood, O. Lew, 5,022,130, Cl. 29-25.350.
- Wood, Raymond B.: *See—*
  - Juhl, Daniel L.; and Wood, Raymond B., 5,022,902, Cl. 55-387.000.
- Woodward, Sheryl L.: *See—*
  - Cimini, Leonard J.; Habbab, Isam M. I.; and Woodward, Sheryl L., 5,022,730, Cl. 350-96.130.
- Wooster Brush Company, The: *See—*
  - Gargas, Eugene F., 5,022,827, Cl. 417-360.000.
- Wormald International Limited: *See—*
  - Byrne, Barry F., 5,022,468, Cl. 169-40.000.
- Worner, Stefan: *See—*
  - Heel, Helmut; Bauch, Karl; Reisacher, Bartholomaus, and Worner, Stefan, 5,022,686, Cl. 285-134.000.
- Wozniak, David J.: *See—*
  - Roy, Bryan A.; Boris, Gregory F.; Campbell, John J.; Funk, John G.; Wozniak, David J.; Gibson, James D.; and McCauley, Robert M., 5,022,995, Cl. 210-651.000.
- Wright, James R.; Hall, James R.; and Theobald, Keith D., to Simmonds Precision Products, Inc. Hermetically sealing connector and method of use thereof. 5,022,865, Cl. 439-279.000.
- Wright, John B.: *See—*
  - Lutz, William A.; Wright, John B.; Moss, Noel; and Delia, Richard, 5,023,782, Cl. 364-405.000.
- Wright, Kieran G.: *See—*
  - Angenent, Johannes H.; Khoe, Giok D.; Mahon, Gathal J.; Van De Grijp, Abram; Potters, Cornelis J. T.; and Wright, Kieran G., 5,022,733, Cl. 350-96.180.
- Wrzesinski, Stanley, to Motorola, Inc. FET and bipolar transistor bridge circuit for driving a load. 5,023,493, Cl. 307-570.000.
- Wuerzer, Bruno: *See—*
  - Kast, Juergen; Kolassa, Dieter; Meyer, Norbert; Schirmer, Ulrich; Harreus, Albrecht; Wild, Jochen; Westphalen, Karl-Otto; and Wuerzer, Bruno, 5,022,914, Cl. 71-88.000.
- Wyler AG: *See—*
  - Stauber, Siegfried T., 5,022,264, Cl 73-382.00R.
- Wyse, Steven J., to Bil-Jax, Inc. Safety base for scaffolding. 5,022,490, Cl. 182-17.000.
- Xeda International: *See—*
  - D'Urso, Carmelo, 5,022,532, Cl 209-564.000.
- Xerox Corporation: *See—*
  - Au, Lai C.; Schaben, John W.; Hamer, Robert G.; and Banks, Larry H., 5,023,817, Cl. 364-550.000.
  - Coons, Robert A., Jr., 5,022,637, Cl. 270-53.000.
  - Drappel, Stephan; Mayo, James D.; and Croucher, Melvin D., 5,023,160, Cl. 430-114.000.
  - Federico, Anthony M.; and Ippolito, Ronald A., 5,023,779, Cl. 364-200.000.
  - Fender, William D.; and Jeromin, Lothar S., 5,023,661, Cl. 355-210.000.
  - Greco, Jr. Robert L., 5,022,640, Cl. 271-31.000
  - Gundlach, Robert W., 5,023,665, Cl. 355-256.000.
  - Gunning, William F., 5,023,488, Cl. 307-475.000.
  - Ong, Beng S.; and Kmiecik-Lawrynowicz, Grazyna, 5,023,159, Cl. 430-109.000.
  - Paoli, Thomas L., 5,023,882, Cl. 372-50.000.
- Xiao, Guooing: *See—*
  - Kino, Gordon S.; and Xiao, Guooing, 5,022,743, Cl. 350-507.000.
- Xicor, Inc.: *See—*
  - Yeh, Bing, 5,023,694, Cl. 357-54.000.
- Xoma Corporation: *See—*
  - Horwitz, Arnold; and Chang, Changtung P., 5,023,173, Cl. 435-29.000.
- Xylan, Inc.: *See—*
  - Tyson, George J., 5,023,097, Cl. 426-271.000.
- Yabuuchi, Naoya: *See—*
  - Mukai, Toshio; Yamashita, Yoshiro; Suzuki, Takanori; Akasaki, Yutaka; Sato, Katsuhiro; Yabuuchi, Naoya; Tanaka, Hiroyuki; and Nukada, Katsumi, 5,023,356, Cl. 552-210.000.
- Yaeger, John R., to Seagate Technology, Inc. Disc drive slider lifter using shape memory materials. 5,023,737, Cl. 360-105.000.
- Yajima, Koichi; Kohmoto, Osamu; and Yoneyama, Tetsuhito, to TDK Corporation. Permanent magnets. 5,022,939, Cl. 148-302.000.
- Yakovlev, Anatoly S.: *See—*
  - Boiko, Leonid S.; Korotkin, Viktor I.; Veretennikov, Viktor Y.; Roslivker, Efim G.; Fedyakin, Roman V.; Chesnokov, Viktor A.; Yakovlev, Anatoly S.; Kharitonov, Jury D.; Fei, Valery M.; and Galichenko, Emma N., 5,022,280, Cl. 74-462.000.
- Yamada, Akio; Sakamoto, Kiichi; Kudou, Jinko; and Yasuda, Hiroshi, to Fujitsu Limited. Photo-cathode image projection apparatus for patterning a semiconductor device. 5,023,462, Cl. 250-492.200.
- Yamada, Hideaki: *See—*
  - Akimoto, Kengo; Shinmen, Yoshifumi; Yamada, Hideaki; and Shimizu, Sakayu, 5,023,177, Cl. 435-134.000.
- Yamada, Kiyoshige: *See—*
  - Mizuno, Eiichi; Sakiyama, Noritaka; Matsui, Yukito; Kono, Yoshikazu; and Yamada, Kiyoshige, 5,022,704, Cl. 296-195.000.
- Yamada, Naoaki: *See—*
  - Nambu, Masao; and Yamada, Naoaki, 5,023,185, Cl. 436-8.000.
- Yamada, Shuji; Tsuji, Koji; Takegawa, Yoshinobu; Tanimura, Akira, Menju, Akira; and Yano, Nobuyoshi, to Matsushita Electric Works, Ltd.; and Unitika, Ltd. Rapid solidification of metal-metal composites having Ag, Au or Cu atrix. 5,022,932, Cl. 148-13.100.
- Yamada, Takaaki; and Shimizume, Kazutoshi, to Sony Corporation Large scale integrated circuit for converting pulse code modulated data to an analog signal. 5,023,615, Cl. 341-152.000.
- Yamada, Takashi, to Kabushiki Kaisha Toshiba. Semiconductor memory device with pillar-shaped insulating film. 5,023,683, Cl 357-23.600.
- Yamada, Takeo: *See—*
  - Ogino, Masanori; Fujikura, Tsuneo; Shinagawa, Yuji; and Yamada, Takeo, 5,023,524, Cl. 315-383.000.
- Yamada, Toshikazu: *See—*
  - Kobori, Takuji; Sakamoto, Mitsuo; Yamada, Toshikazu; Nishimura, Isao; Ishii, Koji; and Tagami, Jun, 5,022,201, Cl. 52-167.0DF.
- Yamada, Yasuyuki: *See—*
  - Tanaka, Eishi; Nishizawa, Tsutomu; Yamada, Yasuyuki; Itoh, Hisato; Yamaguchi, Akihiro; and Nakatsuka, Masakatsu, 5,023,343, Cl. 549-74.000.
- Yamaguchi, Akihiro: *See—*
  - Tanaka, Eishi; Nishizawa, Tsutomu; Yamada, Yasuyuki; Itoh, Hisato; Yamaguchi, Akihiro; and Nakatsuka, Masakatsu, 5,023,343, Cl. 549-74.000.
  - Yamaguchi, Keizaburo; Tanabe, Yoshimitsu; Asano, Makoto; and Yamaguchi, Akihiro, 5,023,366, Cl. 560-71.000.
- Yamaguchi, Keizaburo; Tanabe, Yoshimitsu; Asano, Makoto; and Yamaguchi, Akihiro, to Mitsui Toatsu Chemicals, Incorporated Salicylic acid copolymers and their metal salts, production process thereof, color-developing agents comprising metal salts of the copolymers, and color-developing sheets employing the agents. 5,023,366, Cl. 560-71.000.
- Yamaguchi, Norihiro: *See—*
  - Machida, Hiroji; Asano, Michiaki; Watanabe, Yozo; Tokuhiro, Tomoya; Satoh, Hiroshi; Iwahashi, Motoyuki; Yamaguchi, Norihiro; Kikuchi, Koshin; and Watanabe, Hiroaki, 5,023,020, Cl. 261-18.100.
- Yamaguchi, Toru: *See—*
  - Aoki, Hisao; and Yamaguchi, Toru, 5,022,464, Cl. 165-176.000.
- Yamaguchi, Toshiaki: *See—*
  - Kamijo, Tetsuhide; Ujiie, Arao; Harada, Hiromu; Tsutsumi, Naoyuki; Tsubaki, Atsushi; Yamaguchi, Toshiaki; and Nagata, Hideo, 5,023,261, Cl. 514-285.000.
- Yamaha Corporation: *See—*
  - Masaki, Kazuo, 5,022,304, Cl. 84-607.000.
  - Suzuki, Hideo; and Sakama, Masao, 5,022,303, Cl. 84-600.000.
- Yamaha Hatsudoki Kabushiki Kaisha: *See—*
  - Nariyama, Yoshihiro, 5,022,365, Cl. 123-198.00R.
- Yamakage, Hisaaki; Nomura, Kenhachiro; Maruyama, Tadayoshi; Kataoka, Kenji; and Yamashita, Nobuyuki, to Mitsubishi Denki Kabushiki Kaisha. Heat exchanger for oil. 5,022,494, Cl. 184-104.100.
- Yamakoshi, Kenichi, to Material Engineering Technology laboratory, Inc. Medical solution container and method of making the same. 5,023,119, Cl. 428-35.200.
- Yamamoto, Azuma: *See—*
  - Takeuchi, Yukihisa; Watanabe, Tetsuo; Yamamoto, Azuma, Shirakawa, Kazuo; and Segawa, Takao, 5,023,700, Cl. 357-70.000.
- Yamamoto, Hajime; Kuramoto, Yukimasa; Takashima, Yuji; Nakamura, Masahiko; and Nakano, Kenichi, to Matsushita Electric Industrial Co., Ltd. Electrophotographic image forming method. 5,023,632, Cl. 346-157.000.
- Yamamoto, Hidetoshi: *See—*
  - Kaneko, Toshimi; Yamamoto, Hidetoshi; and Hirotsuji, Takayuki, 5,023,578, Cl. 333-185.000.
- Yamamoto, Hiroaki: *See—*
  - Murano, Katsuaki; Hirano, Sadayuki; Yamashita, Yoshinori; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,022,287, Cl. 74-866.000.
- Yamamoto, Kayoko: *See—*
  - Kawaguchi, Masayuki; Kita, Yasushi; Yamamoto, Kayoko; and Nozaki, Koji, 5,023,308, Cl. 528-423.000.
- Yamamoto, Masaru: *See—*
  - Ohno, Kazuhisa; Kosugi, Tetsushi; Sugimori, Kenichiro; Ando, Akitsugu; Yamamoto, Masaru; Suzuki, Fukuji; Nakamura, Masahiro; and Tsujita, Nobuhisa, 5,023,065, Cl. 423-326.000.
- Yamamoto, Naoki: *See—*
  - Nakata, Akira; Yamamoto, Naoki; Mori, Hiroshi; and Ueno, Takuya, 5,023,293, Cl. 524-539.000.
- Yamamoto, Shigeru; Mori, Satoru; and Hayashi, Akira, to Mitsubishi Metal Corporation. Silver alloy foil for interconnector for solar cell. 5,023,144, Cl. 428-606.000.
- Yamamoto, Shoji: *See—*
  - Hosoya, Hideo; Kimura, Masayuki; Endo, Hiroshi; Hiraki, Yoshio; Yamamoto, Shoji; Yoshikawa, Satoshi; Omine, Hidetaka; and Miyazaki, Koji, 5,023,175, Cl. 435-101.000.
- Yamamoto, Susumu: *See—*
  - Tomita, Masatoshi; Yamamoto, Susumu; Tominaga, Chikara; and Nakayama, Kazuya, 5,022,937, Cl. 148-277.000.
- Yamamoto, Takashi; Matsumoto, Tsuruyoshi; Shimada, Katsuhiko; Uozu, Yoshihiro; and Murata, Ryuji, to Mitsubishi Rayon Company Ltd. Plastic cladding composition for plastic core optical fiber, and plastic core optical fiber prepared therefrom. 5,022,737, Cl. 350-96.290.

VOL
1127
ISS
2
JE
11
1991
UMI

Yamamoto, Takemi: *See—*

Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; Asano, Yuji; Yamamoto, Takemi; and Nakata, Takashi, 5,023,654, Cl. 355-27.000.

Yamamoto, Yutaka: *See—*

Kitada, Taizo; Danno, Yoshiaki; Takagi, Masahiko; Uchida, Toshihiko; and Yamamoto, Yutaka, 5,022,664, Cl. 277-236.000.

Yamamura, Kengo; Saito, Tutomu; and Higuchi, Youji, to ASMO Co., Ltd. Manual window regulator. 5,022,184, Cl. 49-352.000.

Yamamura, Masaaki; Okabe, Kazuhiko; Sotoya, Kohshiro; and Murata, Moriyasu, to Kao Corporation. Softener composition containing cis- and trans- isomers of ethylenically unsaturated quaternary ammonium salts. 5,023,003, Cl. 252-8.800.

Yamamura, Shigeyuki: *See—*

Hidaka, Norio; Yamamura, Shigeyuki; and Fukuta, Masumi, 5,023,703, Cl. 357-74.000.

Yamanami, Tsuguya: *See—*

Murakami, Azuma; Aoki, Kazuo; Yamanami, Tsuguya; Tomofuji, Yoshiaki; Tanaka, Takeshi; Inashima, Satoshi; Funahashi, Takahiko; Chikami, Toshihide; and Senda, Toshiaki, 5,023,408, Cl. 178-19.000.

Yamano, Yasuteru: *See—*

Hayashi, Kohtaro; Karasaki, Toshihiko; Yamano, Yasuteru; Mukai, Hiromu; Hata, Koji; and Ikemura, Masayuki, 5,023,649, Cl. 354-434.000.

Yamanouchi, Junichi; Shiratsuchi, Kentaro; Karino, Yukio; and Shibata, Takeshi, to Fuji Photo Film Co., Ltd. Photographic element. 5,023,162, Cl. 430-203.000.

Yamaoka, Ryohei; Hayashiya, Keizo; Yoshimura, Tohru; Seki, Eiji; Masutani, Tetsuya; and Kitahara, Katsuhiko, to Daikin Industries Ltd. Fluorine-containing glycoside and its use. 5,023,327, Cl. 536-18.400.

Yamashita, Junichi: *See—*

Nishida, Koji; Yokomizo, Osamu; Masuhara, Yasuhiro; Nakao, Toshitsugu; Kashiwai, Shin-ichi; Tomiyama, Akio; Yamashita, Junichi; and Hayashi, Tatsuo, 5,023,047, Cl. 376-370.000.

Yamashita, Miyuki, to Hirakawa Kogyosha Co., Ltd. Jig for use with punch press. 5,022,300, Cl. 83-743.000.

Yamashita, Nobuyuki: *See—*

Yamakage, Hisaaki; Nomura, Kenhachiro; Maruyama, Tadayoshi; Kataoka, Kenji; and Yamashita, Nobuyuki, 5,022,494, Cl. 184-104.100.

Yamashita, Takaji; Watanabe, Mitsuo; Okada, Hiroyuki; and Shimizu, Keiji, to Hamamatsu Photonics K.K. Data correcting device for use with computed tomography apparatus. 5,023,894, Cl. 378-4.000.

Yamashita, Yoshinori: *See—*

Murano, Katsuaki; Hirano, Sadayuki; Yamashita, Yoshinori; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,022,287, Cl. 74-866.000.

Yamashita, Yoshiro: *See—*

Mukai, Toshio; Yamashita, Yoshiro; Suzuki, Takanori; Akasaki, Yutaka; Sato, Katsuhiro; Yabuuchi, Naoya; Tanaka, Hiroyuki; and Nukada, Katsumi, 5,023,356, Cl. 552-210.000.

Yamato, Masaki, to Omron Tateisi Electronics Co. Electric cash register. 5,023,781, Cl. 364-405.000.

Yamaya, Masaaki: *See—*

Itagaki, Akinari; Yamaya, Masaaki; Yoshioka, Hiroshi; Watanabe, Akihiko; and Miyazato, Keita, 5,022,922, Cl. 106-287.110.

Yamazaki, Koichi: *See—*

Noda, Kazuo; Yamazaki, Koichi; Nakamura, Eiichi; and Honda, Tetsuya, 5,023,439, Cl. 250-201.500.

Yamazaki, Makoto; Ueda, Kazumi; Isobe, Shinichi; and Sato, Katsunari, to Eddio Corporation. Rotating head mechanism of rotary type AC magnetic flux leakage flaw detector. 5,023,550, Cl. 324-262.000.

Yamazaki, Shunpei; and Sato, Masahiko, to Semiconductor Energy Laboratory Co., Ltd. Liquid crystal electro-optical device and manufacturing method therefor. 5,023,013, Cl. 252-299.670.

Yamazaki, Shuntaro; and Shibutani, Makoto, to NEC Corporation. Polarization diversity optical heterodyne receiver with phase adjustment of two I.F. signals for control of a local optical source. 5,023,946, Cl. 455-619.000.

Yan, John Y. J.; and Purkait, Bobby K., to Mentor Corporation. Method of making textured surface prosthesis implants. 5,022,942, Cl. 156-219.000.

Yang, Hung H., to Du Pont de Nemours, E. I., and Company. Cyclic tensioning of never-dried yarns. 5,023,035, Cl. 264-184.000.

Yang, Wen-Ching: *See—*

Klinzing, George E.; Borzone, Luis A.; and Yang, Wen-Ching, 5,022,274, Cl. 73-861.040.

Yannascoli, Donald: *See—*

Etemad, Shahrokh; Yannascoli, Donald; Fraser, Howard H., Jr.; and Lane, William R., 5,022,834, Cl. 418-55.100.

Yano, Nobuyoshi. *See—*

Yamada, Shuji; Tsuji, Koji; Takegawa, Yoshinobu; Tanimura, Akira; Menju, Akira; and Yano, Nobuyoshi, 5,022,932, Cl. 148-13.100.

Yano, Tadashi; and Kato, Takatsugu, to Nissan Motor Co., Ltd. Cloth roller replacing system for loom. 5,022,439, Cl. 139-1.00R.

Yarrington, Robert M.; and Buchanan, William, to Engelhard Corporation. Preparation of normally liquid hydrocarbons and a synthesis gas to make the same, from a normally gaseous hydrocarbon feed. 5,023,276, Cl. 514-703.000.

Yasuda, Hiroshi: *See—*

Yamada, Akio; Sakamoto, Kiichi; Kudou, Jinko; and Yasuda, Hiroshi, 5,023,462, Cl. 250-492.200.

Yasui, Hisashi, to Ishikawa Gaset Co., Ltd. Gasket with a fluid hole regulation device. 5,022,662, Cl. 277-235.00B.

Yau-Young, Annie, to Liposome Technology, Inc. Efficient method for preparation of prolonged release liposome-based drug delivery system. 5,023,087, Cl. 424-450.000.

Yeakel, Joseph D. Apparatus for secretion deflection during intubation. 5,022,392, Cl. 128-202.280.

Yeh, Bing, to Xicor, Inc. Side wall contact in a nonvolatile electrically alterable memory cell. 5,023,694, Cl. 357-54.000.

Yeol, Ryu M.; Ki, Ryu D.; Kyun, Yun D.; Kyu, An J.; Kuk, Hong S.; Euy, Hong C.; and Sun, Ryu S., to SKC Limited. Slider locking device of digital audio tape cartridge. 5,022,520, Cl. 206-315.100.

Yiin, Chwen-Chaur. Clip device. 5,022,124, Cl. 24-67.900.

Yissum Research Development Company of the Hebrew University of Jerusalem: *See—*

Friedman, Michael; Steinberg, Doron; and Soskolne, Aubrey, 5,023,082, Cl. 424-426.000.

Yoda, Kaneo: *See—*

Koga, Yoshiro; Gomi, Akihiro; Miyasaka, Takashi; Miyazawa, Yasunaga; Endo, Kenichi; Shinozaki, Junichiro; Yoda, Kaneo; Ichikawa, Takashi; Miyasaka, Hitoshi; and Kaburagi, Chiharu, 5,023,733, Cl. 360-77.040.

Yodice, Richard; and Gapinski, Richard E., to Lubrizol Corporation, The. Acid sensor. 5,023,133, Cl. 428-332.000.

Yokobori, Jun: *See—*

Maruyama, Hiroyuki; Kishimoto, Tadao; Isobe, Toshifumi; and Yokobori, Jun, 5,023,708, Cl. 358-75.000.

Yokogawa, Yasunori: *See—*

Komoda, Yasuo; Yokogawa, Yasunori; Okunishi, Masahiko; Ishii, Koichi; Shibai, Hiroshiro; and Noumi, Ryosaku, 5,023,079, Cl. 424-120.000.

Yokohama Aeroquip Corporation: *See—*

Ariga, Toshiki, 5,022,687, Cl. 285-321.000.

Yokoi, Takao, to Kabushiki Kaisha Shinkoseisakusho. System for generating a tooth profile used in a differential speed reduction apparatus. 5,022,802, Cl. 409-52.000.

Yokomizo, Osamu: *See—*

Nishida, Koji; Yokomizo, Osamu; Masuhara, Yasuhiro; Nakao, Toshitsugu; Kashiwai, Shin-ichi; Tomiyama, Akio; Yamashita, Junichi; and Hayashi, Tatsuo, 5,023,047, Cl. 376-370.000.

Yokota, Kenji: *See—*

Sasaki, Kenji; Yokota, Kenji; Hattori, Hiroshi; and Sata, Nobuyuki, 5,022,498, Cl. 187-127.000.

Yokouchi, Hisatake; Takasaki, Yukio; Hirai, Tadaaki; Koike, Kouichi; Tsuneoka, Masayuki; Onodera, Yoichi; and Funo, Takakazu, to Hitachi-Medical Corporation. X-ray television apparatus. 5,023,896, Cl. 378-99.000.

Yokoyama, Manabu: *See—*

Taniguchi, Hideo; Ogata, Hiromi; Sawase, Kensuke; Yokoyama, Manabu; and Tujikawa, Munekazu, 5,023,442, Cl. 250-208.100.

Yokoyama, Tetsuo: *See—*

Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki, 5,023,553, Cl. 324-309.000.

Yokoyama, Yuuichi: *See—*

Onozuka, Shigeharu; Yokoyama, Yuuichi; and Tsuchiya, Makoto, 5,023,305, Cl. 526-194.000.

Yoneyama, Tetsuhito: *See—*

Yajima, Koichi; Kohmoto, Osamu; and Yoneyama, Tetsuhito, 5,022,939, Cl. 148-302.000.

Yonezawa, Akira, to Seiko Instruments, Inc. Electron beam device. 5,023,457, Cl. 250-396.0ML.

Yoshida, Chuuryoh: *See—*

Ohno, Hideaki; Yoshitugu, Takao; Yoshida, Chuuryoh; and Matsumoto, Hideo, 5,022,492, Cl. 184-5.000.

Yoshida, Hiroshi; Kakeya, Noboru; and Kashiwagi, Masanori, to Ube Industries, Ltd. α-(ω-cyanoalkanoyl-γ-butyrolactone and method for producing the same. 5,023,351, Cl. 549-321.000.

Yoshida Kogyo K.K.: *See—*

Watanabe, Kozo; and Sugimoto, Yasuhiko, 5,023,394, Cl. 174-35.00R.

Yoshida, Seitaro: *See—*

Okamoto, Sueaki; Yoshida, Seitaro; Kageyama, Hiroshi; and Ogaki, Shinji, 5,023,748, Cl. 361-229.000.

Yoshida, Takao; Isono, Keinosuke; and Suzuki, Tatsuo, to Material Engineering Technology Laboratory, Incorporated. Method for hydrophilication treatment of synthetic resin object, and culture devices an inspection apparatus treated by same. 5,023,026, Cl. 264-22.000.

Yoshida, Yoshihide, to Koito Manufacturing Co., Ltd. Covered illuminated vanity mirror. 5,022,699, Cl. 296-97.500.

Yoshida, Yutaka; Umetsu, Takao; and Iwamoto, Junichi, to Fuji Photo Film Co., Ltd. Lens position detecting device for camera. 5,023,645, Cl. 354-400.000.

Yoshihara, Hideo, to Brother Kogyo Kabushiki Kaisha. Image recording apparatus having sheet slack absorbing means. 5,023,653, Cl. 355-27.000.

Yoshii, Yasuo; Azuhata, Shigeru; Arashi, Norio; Sohma, Kenichi; Inada, Tooru; Kikuchi, Hideo; Taniguchi, Masayuki; Narato, Kiyoshi; Kobayashi, Hironobu; Murakami, Tadayoshi; Kuroda, Michio; Ishibashi, Yoji; and Masutani, Stephen M., to Hitachi, Ltd. Low NOx burning method and low NOx burner apparatus. 5,022,849, Cl. 431-2.000.

Yoshikawa, Satoshi: *See—*

Hosoya, Hideo; Kimura, Masayuki; Endo, Hiroshi; Hiraki, Yoshio; Yamamoto, Shoji; Yoshikawa, Satoshi; Omine, Hidetaka; and Miyazaki, Koji, 5,023,175, Cl. 435-101.000.

Yoshimura, Katsuji: *See—*

Nakayama, Tadayoshi; Ishikawa, Hisashi; Kozuki, Susumu; Takahashi, Koji, Yoshimura, Katsuji; Nagasawa, Kenichi; and Sasatani, Tomohiko, 5,023,716, Cl. 358-138.000.

Yoshimura, Tohru: *See—*

Yamaoka, Ryohei; Hayashiya, Keizo; Yoshimura, Tohru; Seki, Eiji; Masutani, Tetsuya; and Kitahara, Katsuhiko, 5,023,327, Cl. 536-18.400.

Yoshimura, Toshiaki: *See—*

Imura, Izumi; Uesugi, Tatsuhiko; and Yoshimura, Toshiaki, 5,022,372, Cl. 123-469.000.

Yoshioka, Hiroshi: *See—*

Itagaki, Akinari; Yamaya, Masaaki; Yoshioka, Hiroshi; Watanabe, Akihiko; and Miyazato, Keita, 5,022,922, Cl. 106-287.110.

Yoshioka, Nobuyuki: *See—*

Takeuchi, Susumu; and Yoshioka, Nobuyuki, 5,023,156, Cl. 430-5.000.

Yoshitugu, Takao: *See—*

Ohno, Hideaki; Yoshitugu, Takao; Yoshida, Chuuryoh; and Matsumoto, Hideo, 5,022,492, Cl. 184-5.000.

Yosinski. Neil J., to Hewlett-Packard Company. Power supply control circuit having constant voltage and constant current modes. 5,023,541, Cl. 323-275.000.

Young, Donald C.; and Green, James A., II, to Union Oil Company of California. Methods for fertilizing with ammoniacal fertilizers. 5,022,912, Cl. 71-30.000.

Young, Lawrence R.: *See—*

Fulton, Steven J.; Peters, Gerald T., Jr.; Spehrley, Charles W., Jr.; and Young, Lawrence R., 5,023,111, Cl. 427-164.000.

Yuh, Perng-Fei: *See—*

Wang, Kang L.; and Yuh, Perng-Fei, 5,023,879, Cl. 372-43.000.

Zahn, Markus *See—*

Zakheim, Howard; Clinton, Peter M.; Goldschneider, James D.; Kasmer, Christopher A.; Zahn, Markus; and Hoffmeyer, Charles L., 5,022,592, Cl. 241-172.000.

Zahnradfabrik Friedrichshafen AG: *See—*

Schweiger, Klaus, 5,022,509, Cl. 192-73.000.

Zaima, Harold H., to Eften, Inc. Method of making thermoformably shaped fibreboard sandwich structures. 5,022,943, Cl. 156-222.000.

Zakheim, Howard; Clinton, Peter M.; Goldschneider, James D.; Kasmer, Christopher A.; Zahn, Markus; and Hoffmeyer, Charles L., to Du Pont de Nemours, E. I., and Company. Magnetic media mill. 5,022,592, Cl. 241-172.000.

Zambon Group S.p.A.: *See—*

Giordano, Claudio; Castaldi, Graziano; and Paiocchi, Maurizio, 5,023,365, Cl. 560-56.000.

Perdoncin, Giulio; Giordano, Claudio; Paiocchi, Maurizio; and Casagrande, Roberto, 5,023,381, Cl. 568-322.000.

Zamzow, Charles E.: *See—*

Carver, Larry L.; Zamzow, Charles E.; Mladenoff, Donald D.; and Lovrien, Glenn A., 5,023,800, Cl. 364-474.240.

Zanoli, Alain P. B.; and Sertain, Emmanuel J., to Societe Europeenne des Produits. Fused and cast refractory products having a high zirconium dioxide content. 5,023,218, Cl. 501-105.000.

Zanotti, Lucio: *See—*

Mattera, Adriano; Fornari, Roberto; Magnanini, Renato; Paorici, Carolo; Zanotti, Lucio; and Zuccalli, Giovanni, 5,023,801, Cl. 364-480.000.

Zayhowski, John J.; and Mooradian, Aram, to Massachusetts Institute of Technology. Electrostatically deformable single crystal dielectrically coated mirror. 5,022,745, Cl. 350-608.000.

Zelenak, Daniel G., Jr.; and Watson, Michael J., to Allied-Signal Inc. Air bag and folding technique. 5,022,675, Cl 280-743.000.

Zemlok, Kenneth C.; and Obrea, Andrei, to Pitney Bowes Inc. Digital signal processor for electronic article gates. 5,023,598, Cl. 340-572.000.

Zenith Controls, Inc.: *See—*

Bassett, Ronald M.; and Kyrk, Carl, 5,023,469, Cl. 307-64.000.

Zenith Electronics Corporation: *See—*

Campisi, Carl, 5,023,726, Cl. 358-254.000.

Dougherty, Lawrence W.; and Roberts, William N., 5,023,507, Cl 313-407.000.

Lostumo, Arthur J., 5,022,874, Cl. 439-724.000.

Zieke, Larry M., to Dow Chemical Company, The. Modified zipper elements for easy open containers. 5,022,530, Cl. 206-618.000.

Zierick Manufacturing Corporation: *See—*

Legrady, Janos, 5,022,868, Cl. 439-399.000.

Zimble, Alan. Dental probe assembly. 5,022,856, Cl. 433-72.000.

Zimmer, Gero, to Productech Inc. Welding parts having different thermal expansion. 5,022,581, Cl. 228-164.000.

Zimmermann, Hans, to Asea Brown Boveri Ltd. Horizontal axis electrical machine with radial support bolts. 5,023,501, Cl. 310-258.000.

Zingher, Arthur R.: *See—*

Flint, Ephraim B.; Grebe, Kurt R.; Gruber, Peter A.; and Zingher, Arthur R., 5,022,462, Cl. 165-80.400.

Zinser Schweisstechnik GmbH & Co.: *See—*

Goll, Gunther; Vater, Peter; Keusch, Siegfried, and Kratz, Gunter, 5,023,925, Cl. 392-384.000.

Zitzen, Wilhelm: *See—*

Wey, Edmund; Grecksch, Hans; Pesch, Albert T.; Knors, Herbert; Zitzen, Wilhelm; and Marquardt, Manfred, 5,022,596, Cl. 242-36.000.

Zolin, Sergio: *See—*

Butt, Timothy R.; and Zolin, Sergio, 5,022,698, Cl. 296-65.100.

Zuccalli, Giovanni: *See—*

Mattera, Adriano; Fornari, Roberto; Magnanini, Renato; Paorici, Carolo; Zanotti, Lucio; and Zuccalli, Giovanni, 5,023,801, Cl. 364-480.000.

Zullig, Heinz, to Bucher-Guyer AG Maschinenfabrik. Method of and arrangement for manufacturing enclosed blocks. 5,023,037, Cl. 264-261.000.

Zwadlo, Gregory L.: *See—*

Kluy, Dennis J.; Zwadlo, Gregory L.; Marty, John L.; and Dower, William V., 5,023,668, Cl. 355-281.000.

Zwirn, Robert, to Hughes Aircraft Company. Imaging system for providing multiple simultaneous real time images. 5,023,719, Cl. 358-180.000.

Zysman, George I.: *See—*

Anderson, Carl R.; Comrie, Paul R.; Feder, Peretz M.; and Zysman, George I., 5,023,902, Cl. 379-59.000.

139088 Canada Ltee: *See—*

Rozon, David P., 5,022,453, Cl. 160-168.100.

16R Enterprises, Inc.: *See—*

Gordon, Arnold Z., 5,022,975, Cl. 204-277.000.

303576 Alberta Ltd.: *See—*

Secondiak, Loretta, 5,022,843, Cl. 425-289.000.

373470 Alberta Ltd.: *See—*

Bussiere, Joseph P.; Bussiere, Richard A.; Bussiere, Paul L.; Bussiere, Daniel J.; and Lindop, Christopher, 5,022,657, Cl. 273-201.000.

VOL
1127
ISS
2
JE
11
1991
UMI

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF JUNE, 1991

NOTE —Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Casio Computer Co. Ltd.: *See—*
  Yuzawa, Keiji; Matsumoto, Naoaki; Kayahara, Takehiko; Tateishi, Naofumi; and Fukuda, Makoto, Re. 33,607, Cl. 84-609.000.
Fukuda, Makoto: *See—*
  Yuzawa, Keiji; Matsumoto, Naoaki; Kayahara, Takehiko; Tateishi, Naofumi; and Fukuda, Makoto, Re. 33,607, Cl. 84-609.000.
Fukuda, Misao: *See—*
  Kamiyama, Yoshihiko; Fukuda, Misao; and Nagata, Akihiro, Re. 33,606, Cl. 29-411.000.
Gavagan, James A.: *See—*
  Lobanoff, Mark; and Gavagan, James A., Re. 33,610, Cl. 296-97.500.
Kamiyama, Yoshihiko; Fukuda, Misao; and Nagata, Akihiro, to Mitsuboshi Belting Ltd. Method of fabricating a power transmission belt and apparatus therefor. Re. 33,606, Cl. 29-411.000.
Kayahara, Takehiko: *See—*
  Yuzawa, Keiji; Matsumoto, Naoaki; Kayahara, Takehiko; Tateishi, Naofumi; and Fukuda, Makoto, Re. 33,607, Cl. 84-609.000.
Lobanoff, Mark; and Gavagan, James A., to Takata Inc. Spring-loaded hinge assembly for vehicle accessories. Re. 33,610, Cl. 296-97.500.
Matsumoto, Naoaki: *See—*
  Yuzawa, Keiji; Matsumoto, Naoaki; Kayahara, Takehiko; Tateishi, Naofumi; and Fukuda, Makoto, Re. 33,607, Cl. 84-609.000.
Michaels, Leonard H.; and Miller, Robert A., to Molex Incorporated. Environmentally sealed grounding backshell with strain relief. Re. 33,611, Cl. 439-610.000.
Miller, Robert A.: *See—*
  Michaels, Leonard H.; and Miller, Robert A., Re. 33,611, Cl. 439-610.000.
Mitsuboshi Belting Ltd.: *See—*
  Kamiyama, Yoshihiko; Fukuda, Misao; and Nagata, Akihiro, Re. 33,606, Cl. 29-411.000.
Mobay Corporation: *See—*
  Nodelman, Neil H., Re. 33,609, Cl. 264-53.000.
Molex Incorporated: *See—*
  Michaels, Leonard H.; and Miller, Robert A., Re. 33,611, Cl. 439-610.000.
Nagata, Akihiro: *See—*
  Kamiyama, Yoshihiko; Fukuda, Misao; and Nagata, Akihiro, Re. 33,606, Cl. 29-411.000.
Nodelman, Neil H., to Mobay Corporation. Production of polyurethane moldings by the reaction injection molding process. Re. 33,609, Cl. 264-53.000.
Primtec: *See—*
  Sorensen, Jens O., Re. 33,608, Cl. 206-519.000.
Sorensen, Jens O., to Primtec. Hollow stackable plastic products. Re. 33,608, Cl. 206-519.000.
Takata Inc.: *See—*
  Lobanoff, Mark; and Gavagan, James A., Re. 33,610, Cl. 296-97.500.
Tateishi, Naofumi: *See—*
  Yuzawa, Keiji; Matsumoto, Naoaki; Kayahara, Takehiko; Tateishi, Naofumi; and Fukuda, Makoto, Re. 33,607, Cl. 84-609.000.
Yuzawa, Keiji; Matsumoto, Naoaki; Kayahara, Takehiko; Tateishi, Naofumi; and Fukuda, Makoto, to Casio Computer Co. Ltd. Auto-playing apparatus. Re. 33,607, Cl. 84-609.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

AVX Corporation: *See—*
  Stevenson, Robert A.; and Dey, Albert W., B1 4,424,551, Cl. 361-302.000.
Berguer, Ramon, to Lunax Corporation. Isothermic protective boot. B1 1,033,090, 6-11-91, Cl. 36-9.00R.
Brisson, Maurice J., to Weyerhaeuser Company. Three delimbing apparatus. B1 4,214,616, 6-11-91, Cl. 144-2.00Z.
Dearwester, Donald D., to Procter & Gamble Company. Compact, core-wound paper product. B1 4,886,167, 6-11-91, Cl. 206-389.000.
Dey, Albert W.: *See—*
  Stevenson, Robert A.; and Dey, Albert W., B1 4,424,551, Cl. 361-302.000.
Lunax Corporation: *See—*
  Berguer, Ramon, B1 1,033,090, Cl. 36-9.00R.
Procter & Gamble Company: *See—*
  Dearwester, Donald D., B1 4,886,167, Cl. 206-389.000.
Stevenson, Robert A.; and Dey, Albert W., to AVX Corporation. Highly-reliable feed through/filter capacitor and method for making same. B1 4,424,551, 6-11-91, Cl. 361-302.000.
Szymanek, Donald D., to Thin-Lite Corporation. Recessed lighting fixture. B1 8,307,059, 6-11-91, Cl. D26-74.000.
Thin-Lite Corporation: *See—*
  Szymanek, Donald D., B1 8,307,059, Cl. D26-74.000.
Von Kohorn, Henry. System for evaluation and recording of responses to broadcast transmissions. B1 4,745,468, 6-11-91, Cl. 358-84.000.
Weyerhaeuser Company: *See—*
  Brisson, Maurice J., B1 4,214,616, Cl. 144-2.00Z.

LIST OF DESIGN PATENTEES

A.L. Hansen Manufacturing Company: *See—*
  Hansen, Randall C., and Krahn, Gilbert H., 317,398, Cl. D8-336.000.
Addy, Francis. Combined key chain and trigger holder. 317,378, 6-11-91, Cl. D3-62.000.
Albion Cosmetics Co., Ltd.: *See—*
  Desgrippes, Joel, 317,406, Cl. D9-377.000.
All That Joy, Inc.: *See—*
  Severinsen, Emily M., 317,375, Cl. D2-228.000.
Alps Electric Co., Ltd.: *See—*
  Wilson, Jay; Barry, Michael R.; and Yamamoto, Yosuke, 317,443, Cl. D14-106.000.
Alviar, Christopher A.: *See—*
  Vossoughi, Sohrab; Alviar, Christopher A.; Hix, Steven R.; and Gulick, Paul E., 317,446, Cl. D14-113.000.
Anderson, Rodney E. Work-out weight suit. 317,374, 6-11-91, Cl. D2-29.000.
Aoki, Yasutoshi: *See—*
  Enoki, Yasutaka; Makino, Shigeo; and Aoki, Yasutoshi, 317,427, Cl. D12-143.000.
Bacigalupo, George F.; Bacigalupo, Joseph G.; and Matthews, Blease M., to Tri Tech, U.S.A., Inc. Hole shaping cutter. 317,396, 6-11-91, Cl. D8-98.000.

Bacigalupo, Joseph G . *See—*
  Bacigalupo, George F.; Bacigalupo, Joseph G.; and Matthews, Blease M., 317,396, Cl. D8-98.000.
Barry, Michael R.: *See—*
  Wilson, Jay; Barry, Michael R.; and Yamamoto, Yosuke, 317,443, Cl. D14-106.000.
Beaulieu, Bryan J., to Skyline Displays, Inc. Portable exhibit display. 317,469, 6-11-91, Cl. D20-10.000.
Bengtson, Alan D.: *See—*
  Kohler, Herbert V., Jr.; Reid, Mary J.; Sauter, Bruce M.; and Bengtson, Alan D., 317,495, Cl. D23-241.000.
  Kohler, Herbert V., Jr.; Reid, Mary J.; Sauter, Bruce M.; and Bengtson, Alan D., 317,496, Cl. D23-241.000.
Bennett, Walter L.: *See—*
  Straw, Ronald A.; and Bennett, Walter L., 317,448, Cl. D14-114.000.
Berggreen, Ib H., to Interlego A.G Toy truck. 317,484, 6-11-91, Cl. D21-136.000
Biglin, Daniel L. Template for electrical box placement. 317,416, 6-11-91, Cl. D10-64.000.
Biller, Bruce A.: *See—*
  Scherer, Henry W.; Biller, Bruce A.; and Swanson, Roy T., 317,433, Cl. D13-132.000.
Boitani, Maria. Shoulder bag. 317,377, 6-11-91, Cl. D3-48.000.
Bridgestone Corporation: *See—*
  Enoki, Yasutaka; Makino, Shigeo; and Aoki, Yasutoshi, 317,427, Cl. D12-143.000.
Brill, Janice; and Kelly, Deborah M., to Liz Claiborne, Inc. Countertop dispenser of fragrant liquid, lotion and powder. 317,383, 6-11-91, Cl. D6-455.000
Brown, Edward F.: *See—*
  Miller, Joseph T.; and Brown, Edward F., 317,515, Cl. D28-60.000.
Buch, Charlotte, to Interiego A G Toy building element. 317,481, 6-11-91, Cl. D21-108.000.
Burdick, Robert C.: *See—*
  Dowd, James D.; McGarry, Stephen P.; Migrin, Robert S.; and Burdick, Robert C., 317,430, Cl. D12-191.000.
Capper, James O.; and Revell, Ian T., to Hestair Kiddicraft Limited. Rattle toy. 317,473, 6-11-91, Cl. D21-65.000.
Carr, Jeff A., to Carr Pattern Co., Inc. Auxiliary vehicle light bar. 317,428, 6-11-91, Cl. D12-156.000.
Carr Pattern Co., Inc.: *See—*
  Carr, Jeff A., 317,428, Cl. D12-156.000.
Castiglioni, Achille, to FLOS S.p.A. Lighting fixture. 317,510, 6-11-91, Cl. D26-88.000.
Celette, Germain, to Celette S.A. Jack for supporting automobiles when under repair. 317,520, 6-11-91, Cl. D34-31.000.
Celette S.A.: *See—*
  Celette, Germain, 317,520, Cl. D34-31.000.
CertainTeed Corporation: *See—*
  Jenkins, Robert L.; Kalkanoglu, Husnuo M.; Klein, John R., deceased; Noone, Michael J.; Stahl, Kermit E.; and Whitford, Phillip H., 317,506, Cl. D25-139.000.
Cheung, Peter W.; and Selke, Gary J., to SiMed Corporation. Pulse oximeter. 317.501, 6-11-91, Cl. D24-169.000.
Chia, Cheo: *See—*
  Chia, Meang; and Chia, Cheo, 317,423, Cl. D11-93.000.
Chia, Meang; and Chia, Cheo. Jewelry link. 317,423, 6-11-91, Cl. D11-93.000.
Chiarella, Michele A. Storage box. 317,409, 6-11-91, Cl. D9-424.000.
Childre, Casey J.; Walker, George V.; and Speh, Michael, to Lew Childre & Sons, Inc. Foregrip for a fishing rod. 317,493, 6-11-91, Cl. D22-142.000.
Ciceri, Graziella; and Franco, Pagliarini. Ceiling lamp. 317,511, 6-11-91, Cl. D26-89.000.
CKD Kabushiki Kaisha: *See—*
  Miyake, Kouichi; Hosoda, Kazuya; and Niwa, Hisanobu, 317,494, Cl. D23-235.000.
Compaq Computer Corporation: *See—*
  Gintz, Christopher J.; Pankonien, Gary W.; Goodrich, Donald S.; and Youens, John E., 317,442, Cl. D14-106.000.
Conner, Victor L. D. R. Refreshment dispenser. 317,387, 6-11-91, Cl. D7-301.000.
Conway, Timothy F.: *See—*
  Ott, Edward L.; Conway, Timothy F.; and Kubala, Thomas S., 317,410, Cl. D9-426.000.
Corzo, Max F. Cassette tape rewinder. 317,451, 6-11-91, Cl. D14-217.000.
Crawford, Tracy E.; Delgado, Rogelio, Jr.; and Oliver, Michael T., to Klipsch and Associates, Inc. Loudspeaker. 317,450, 6-11-91, Cl. D14-214.000.
Cummings, Darold B., to Rockwell International Corporation. Airplane. 317,432, 6-11-91, Cl. D12-337.000.
Davis, Steven B.; and Weirsman, William, to Otis Elevator Company. Graphic and information display module face plate for hall mounted location and elevator cars. 317,418, 6-11-91, Cl. D10-108.000.
DeFrank, Michael P.: *See—*
  Lanci, Dennis M.; Matsuura, David G.; DeFrank, Michael P.; and Everest, Charles E., 317,414, Cl. D10-57.000.
Delgado, Rogelio, Jr.: *See—*
  Crawford, Tracy E.; Delgado, Rogelio, Jr.; and Oliver, Michael T., 317,450, Cl. D14-214 000.
DeLuna, Tony. Aquarium. 317,517, 6-11-91, Cl. D30-102.000.
Desgrippes, Joel, to Albion Cosmetics Co., Ltd. Combined perfume bottle and cap. 317,406, 6-11-91, Cl. D9-377.000.
Design Display Group, Inc.: *See—*
  Loew, Jonathon, 317,400, Cl. D8-382.000.
Dideriksen, Erling T.: *See—*
  Larsen, Kim P.; and Dideriksen, Erling T., 317,478, Cl. D21-108.000.
  Skov, Ib T.; and Dideriksen, Erling T., 317,480, Cl. D21-108.000.
Doty, James R.; and Furlow, Thomas W., Jr. Unipolar spiral coil electrode for monitoring the electrical activity of the brain. 317,502, 6-11-91, Cl. D24-187.000.
Dowd, James D.; McGarry, Stephen P.; Migrin, Robert S.; and Burdick, Robert C., to United Technologies Automotive. Automobile sun visor mirror unit. 317,430, 6-11-91, Cl. D12-191.000.
Draper, Ronald E.: *See—*
  Varley, Jahn E.; and Draper, Ronald E., 317,399, Cl. D8-376.000.
Earnest, Charles V. Bag for containing soap. 317,401, 6-11-91, Cl. D7-305.000.
Elite S. r. l.: *See—*
  Sasso, Pasquale, 317,514, Cl. D28-12.000.
Elkind, Mark Y.: *See—*
  Vysotsky, Mikhail S.; Sivolobov, Viktor N.; Polonevich, Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N.; Ivanjushenko, Stanislav A.; Myshko, Alexandr P.; Pilosyan, Taisia N.; Ovsyannikov, Anatoly I.; Solntse, Viktor L.; Khleborodova, Svetlana A.; and Elkind, Mark Y., 317,425, Cl. D12-97.000.
Enoki, Yasutaka; Makino, Shigeo; and Aoki, Yasutoshi, to Bridgestone Corporation. Automobile tire. 317,427, 6-11-91, Cl. D12-143.000.
Etna Products Co., Inc.: *See—*
  Snyder, Jeffrey, 317,380, Cl. D3-75.000.
Everest, Charles E.: *See—*
  Lanci, Dennis M.; Matsuura, David G.; DeFrank, Michael P.; and Everest, Charles E., 317,414, Cl. D10-57.000.
Farsch, Friedhelm J. Bottle. 317,403, 6-11-91, Cl. D9-334.000.
Fasth, Kenneth, to SKF Specialty Products Aktiebolag. Supporting beam for conveyor elements or the like. 317,521, 6-11-91, Cl. D34-38.000.
Fenton, William E.; and Rak, Roman P., to Motorola, Inc. Mobile data terminal or similar article. 317,441, 6-11-91, Cl. D14-100.000.
FLOS S.p.A.: *See—*
  Castiglioni, Achille, 317,510, Cl. D26-88.000.
Ford, Mary A.: *See—*
  Ford, Theodore H.; and Ford, Mary A., 317,516, Cl. D29-15.000.
Ford, Theodore H.; and Ford, Mary A. Rescue helmet. 317,516, 6-11-91, Cl. D29-15.000.
Fortec, Inc.: *See—*
  Olson, John B.; Jeanson, Richard L., and Sinchok, John D., 317,468, Cl. D20-6.000.
Fougerousse, Claude: *See—*
  Pugnat, Patricia; and Fougerousse, Claude, 317,492, Cl. D21-229.000.
Franco, Pagliarini: *See—*
  Ciceri, Graziella; and Franco, Pagliarini, 317,511, Cl. D26-89.000.
Frazer, Stephen O.: *See—*
  Riddiford, Martin P.; Frazer, Stephen O.; and Sharkey, Seamus A., 317,463, Cl. D19-59.000.
Fujinami, Yoshio, to Kabushiki Kaisha Tamiya Mokei. Toy racing car. 317,486, 6-11-91, Cl. D21-137.000.
Fukuda, Kouki: *See—*
  Mizusugi, Kanji; and Fukuda, Kouki, 317,444, Cl. D14-106.000.
Fulcheri, Renato, to Press S.p.A. Chair. 317,381, 6-11-91, Cl. D6-373.000.
Furlow, Thomas W., Jr.: *See—*
  Doty, James R.; and Furlow, Thomas W., Jr., 317,502, Cl. D24-187.000.
G.B. Communications, Inc.: *See—*
  Whitworth, Joseph T., 317,379, Cl. D3-74 000.
Gambill, Terry A., to Tegam, Inc. Temperature probe. 317,415, 6-11-91, Cl. D10-60.000.
Garab, Kevin E. Cover for telephone handset or similar article. 317,452, 6-11-91, Cl. D14-250.000.
Geminii Display Ltd.: *See—*
  LeVita, Dominic, 317,412, Cl. D10-28.000.
Gillam, Paul A.: *See—*
  Tonks, Jeffery R.; Humphries, Mark D.; and Gillam, Paul A., 317,499, Cl. D23-339.000.
Gintz, Christopher J.; Pankonien, Gary W.; Goodrich, Donald S.; and Youens, John E., to Compaq Computer Corporation. Low profile laptop personal computer. 317,442, 6-11-91, Cl. D14-106.000.
Goldstein, Joseph. Hand-held dispenser for stretch wrap film. 317,394, 6-11-91, Cl. D8-71.000.
Gonzales, Gilbert. Brake piston tool. 317,391, 6-11-91, Cl. D8-14.000.
Goodman, Debra L.; and Stubbs, Darlene. Combined holder and visual stimulator for infants. 317,464, 6-11-91, Cl. D19-59.000.
Goodrich, Donald S.: *See—*
  Gintz, Christopher J.; Pankonien, Gary W.; Goodrich, Donald S.; and Youens, John E., 317,442, Cl. D14-106.000.
Gray, Ian; Watts, Russell T.; and Stewart, William R., to Procter & Gamble Company, The. Combined bottle and cap. 317,407, 6-11-91, Cl. D9-377.000.
Guberman, Mary C. Reindeer door knob cover. 317,397, 6-11-91, Cl. D8-322.000.
Gulick, Paul E.: *See—*
  Vossoughi, Sohrab; Alviar, Christopher A.; Hix, Steven R.; and Gulick, Paul E., 317,446, Cl. D14-113.000.
Hansen, Randall C.; and Krahn, Gilbert H., to A.L. Hansen Manufacturing Company. Rotary lock. 317,398, 6-11-91, Cl. D8-336.000.

VOL 1127
ISS 2
JE 11 1991
UMI

- Hara, Kunio: *See—*
  - Tani, Atsushi; and Hara, Kunio, 317,460, Cl. D18-36.000.
- Hardy, Bridget. Earring. 317,422, 6-11-91, Cl. D11-42.000.
- Hazerjian, Kevork P.; and Levitt, Amos, to Sturdy Lantern Mfg. Co., Inc. Exterior lighting fixture. 317,509, 6-11-91, Cl. D26-67.000.
- Hestair Kiddicraft Limited: *See—*
  - Capper, James O.; and Revell, Ian T., 317,473, Cl. D21-65.000.
  - Wiggs, Christopher C.; and Taylor, Christopher J C., 317,483, Cl. D21-111.000.
- Hidaka Engineering Co., Ltd.: *See—*
  - Ueda, Shuji, 317,500, Cl. D23-386.000.
- Highland Supply Corporation: *See—*
  - Weder, Donald E., 317,424, Cl. D11-164 000.
- Hill, Kathleen D.: *See—*
  - Penaluna, Robin D.; and Hill, Kathleen D., 317,389, Cl. D7-543.000.
- Hix, Steven R.: *See—*
  - Vossoughi, Sohrab; Alviar, Christopher A.; Hix, Steven R.; and Gulick, Paul E., 317,446, Cl. D14-113.000.
- Holmes, Otto S. Closure. 317,411, 6-11-91, Cl. D9-435.000.
- Homac Mfg. Company: *See—*
  - McGrane, Eugene W., 317,434, Cl. D13-133.000.
  - McGrane, Eugene W., 317,435, Cl D13-133.000.
- Hosoda, Kazuya: *See—*
  - Miyake, Kouichi; Hosoda, Kazuya; and Niwa, Hisanobu, 317,494, Cl. D23-235.000.
- Humphries, Mark D.: *See—*
  - Tonks, Jeffery R.; Humphries, Mark D., and Gillam, Paul A., 317,499, Cl. D23-339.000.
- Hurley, Dennis: *See—*
  - Rothamel, Richard J.; Stephens, Doreen; and Hurley, Dennis, 317,372, Cl. D1-120.000.
- Idowu, Olajire; and Sousa, Karen H Endotracheal tube with an inflatable sucking device. 317,503, 6-11-91, Cl. D24-115.000.
- Igarashi, Takenobu, to Kai R&D Center Co., Ltd. Pruning scissors. 317,390, 6-11-91, Cl. D8-4.000.
- Ikuzawa, Yoko: *See—*
  - Sawada, Masaji; and Ikuzawa, Yoko, 317,458, Cl. D18-7.000.
- In Focus Systems, Inc.: *See—*
  - Vossoughi, Sohrab; Alviar, Christopher A.; Hix, Steven R.; and Gulick, Paul E., 317,446, Cl. D14-113.000.
- Inada, Taichi. Physical exerciser. 317,488, 6-11-91, Cl D21-191.000.
- Interlego A.G : *See—*
  - Berggreen, Ib H., 317,484, Cl. D21-136.000.
  - Buch, Charlotte, 317,481, Cl. D21-108.000.
  - Larsen, Kim P.; and Dideriksen, Erling T., 317,478, Cl. D21-108.000.
  - Michaelsen, Carsten; and Poulsen, Ole V., 317,482. Cl. D21-108.000.
  - Olsen, Flemming H., 317,474, Cl. D21-108.000.
  - Olsen, Flemming H., 317,475, Cl. D21-108.000.
  - Olsen, Flemming H., 317,479, Cl. D21-108.000
  - Poulsen, Ole V., 317,477, Cl. D21-108.000.
  - Skov, Ib T.; and Dideriksen, Erling T., 317,480, Cl. D21-108.000.
  - Stephensen, Christian; and Nielsen, Jacob, 317,476, Cl. D21-108.000.
- Isaevich, Georgy A.: *See—*
  - Vysotsky, Mikhail S.; Sivolobov, Viktor N.; Polonevich, Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N.; Ivanjushenko, Stanislav A.; Myshko, Alexandr P.; Pilosyan, Taisia N.; Ovsyannikov, Anatoly I.; Solntse, Viktor L.; Khleborodova, Svetlana A.; and Elkind, Mark Y., 317,425, Cl D12-97.000.
- Ishida, Katsuhiro, to Sharp Corporation. Display for programmable controller. 317,447, 6-11-91, Cl. D14-113.000.
- Ivac Corporation: *See—*
  - Lanci, Dennis M.; Matsuura, David G.; DeFrank, Michael P.; and Everest, Charles E., 317,414, Cl. D10-57.000.
- Ivanjushenko, Stanislav A.. *See—*
  - Vysotsky, Mikhail S.; Sivolobov, Viktor N.; Polonevich, Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N.; Ivanjushenko, Stanislav A.; Myshko, Alexandr P.; Pilosyan, Taisia N.; Ovsyannikov, Anatoly I.; Solntse, Viktor L.; Khleborodova, Svetlana A ; and Elkind, Mark Y., 317,425, Cl. D12-97.000.
- Iwaya Corporation: *See—*
  - Tsukada, Hiroki, 317,487, Cl. D21-163.000.
- Janome Sewing Machine Co. Ltd.: *See—*
  - Uguchi, Yoshiaki, 317,453, Cl. D15-70.000.
- Jeanson, Richard L.: *See—*
  - Olson, John B.; Jeanson, Richard L.; and Sinchok, John D., 317,468, Cl D20-6.000.
- Jenkins, Robert L.; Kalkanoglu, Husnuo M.; Klein, John R., deceased (by Klein, Helen B., executrix); Noone, Michael J.; Stahl, Kermit E.; and Whitford, Phillip H., to CertainTeed Corporation. Shingle. 317,506, 6-11-91, Cl. D25-139.000.
- Kabushiki Kaisha Tamiya Mokei: *See—*
  - Fujinami, Yoshio, 317,486, Cl. D21-137.000.
  - Mochizuki, Takashi, 317,485, Cl. D21-137.000.
- Kabushiki Kaisha Toshiba: *See—*
  - Tani, Atsushi; and Hara, Kunio, 317,460, Cl. D18-36.000.
- Kai R&D Center Co., Ltd.: *See—*
  - Igarashi, Takenobu, 317,390, Cl. D8-4.000.
- Kalamazoo plc: *See—*
  - Wadams, Andrew K., 317,465, Cl. D19-76.000.
- Kalkanoglu, Husnuo M.: *See—*
  - Jenkins, Robert L.; Kalkanoglu, Husnuo M.; Klein, John R., deceased, Noone, Michael J.; Stahl, Kermit E.; and Whitford, Phillip H., 317,506, Cl. D25-139.000.
- Kanatani, Masakazu; and Masamitsu, Satoshi, to Sony Corporation Relay machine for wireless telephone. 317,449, 6-11-91, Cl D14-138.000.
- Kao, Kun-Yao. Fuse holder. 317,439, 6-11-91, Cl. D13-160.000.
- Kelly, Deborah M.: *See—*
  - Brill, Janice; and Kelly, Deborah M., 317,383, Cl D6-455.000
- Kheng, Heng G., to Metro Plastic Industry Pte. Ltd Memo paper tray 317,467, 6-11-91, Cl. D19-92.000.
- Khleborodova, Svetlana A.: *See—*
  - Vysotsky, Mikhail S.; Sivolobov, Viktor N.; Polonevich, Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N . Ivanjushenko, Stanislav A.; Myshko, Alexandr P.; Pilosyan. Taisia N.; Ovsyannikov, Anatoly I.; Solntse, Viktor L , Khleborodova, Svetlana A.; and Elkind, Mark Y., 317,425, Cl D12-97.000.
- Klein, Helen B., executrix: *See—*
  - Jenkins, Robert L.; Kalkanoglu, Husnuo M., Klein, John R., deceased; Noone, Michael J.; Stahl, Kermit E.; and Whitford. Phillip H., 317,506, Cl. D25-139.000.
- Klein, John R., deceased: *See—*
  - Jenkins, Robert L.; Kalkanoglu, Husnuo M.; Klein, John R., deceased; Noone, Michael J.; Stahl, Kermit E.; and Whitford, Phillip H., 317,506, Cl. D25-139.000.
- Klipsch and Associates, Inc.: *See—*
  - Crawford, Tracy E.; Delgado, Rogelio, Jr.; and Oliver, Michael T , 317,450, Cl. D14-214.000.
- Klodt, Gerald J., to W. T. Rogers Company. Base for a writing instrument. 317,466, 6-11-91, Cl. D19-83.000.
- Klus, Kenneth F. Jet ski ride plate. 317,431, 6-11-91, Cl. D12-317.000.
- Kohler Co.: *See—*
  - Kohler, Herbert V., Jr.; Reid, Mary J.; Sauter, Bruce M , and Bengtson, Alan D., 317,495, Cl. D23-241.000.
  - Kohler, Herbert V., Jr.; Reid, Mary J.; Sauter, Bruce M . and Bengtson, Alan D., 317,496, Cl. D23-241.000.
  - McKeone, William C., 317,386, Cl. D6-524.000.
  - Reid, Mary J., 317,498, Cl. D23-308.000.
- Kohler, Herbert V., Jr.; Reid, Mary J.; Sauter, Bruce M.; and Bengtson. Alan D., to Kohler Co. Faucet. 317,495, 6-11-91, Cl. D23-241.000.
- Kohler, Herbert V., Jr.; Reid, Mary J.; Sauter, Bruce M.; and Bengtson, Alan D., to Kohler Co. Faucet. 317,496, 6-11-91, Cl. D23-241.000.
- Kohus, Louis M. Insect habitat. 317,518, 6-11-91, Cl. D30-109.000.
- Kosako, Mikio; and Mizusugi, Kanji, to Sharp Corporation. Printer 317,420, 6-11-91, Cl. D18-13.000.
- Kraft General Foods, Inc.: *See—*
  - Rothamel, Richard J.; Stephens. Doreen; and Hurley, Dennis, 317,372, Cl. D1-120.000.
- Krahn, Gilbert H.: *See—*
  - Hansen, Randall C.; and Krahn, Gilbert H., 317,398, Cl. D8-336.000.
- Kubala, Thomas S.: *See—*
  - Ott, Edward L.; Conway, Timothy F.; and Kubala, Thomas S., 317,410, Cl. D9-426.000.
- Lanci, Dennis M., Matsuura, David G.; DeFrank, Michael P.; and Everest, Charles E., to Ivac Corporation. Handheld infrared thermometer. 317,414, 6-11-91, Cl. D10-57.000.
- Landahl, Richard, to Sandvik AB. Handle for a hand saw 317,395, 6-11-91, Cl. D8-97.000.
- Larsen, Kim P.; and Dideriksen, Erling T., to Interlego A.G. Toy building element. 317,478, 6-11-91, Cl. D21-108.000.
- LeVita, Dominic, to Geminii Display Ltd. Clock. 317,412, 6-11-91, Cl. D10-28.000.
- Levitt, Amos: *See—*
  - Hazerjian, Kevork P.; and Levitt, Amos, 317,509, Cl. D26-67.000.
- Lew Childre & Sons, Inc.: *See—*
  - Childre, Casey J., Walker, George V., and Speh, Michael, 317,493, Cl. D22-142.000.
- Lim, Kenneth S. Fluorescent reflector lamp. 317,508, 6-11-91, Cl. D26-3.000.
- Lin, Dong-Chang. Combined photoelectric and contact digital tachometer. 317,417, 6-11-91, Cl. D10-98.000.
- Liz Claiborne, Inc.: *See—*
  - Brill, Janice; and Kelly, Deborah M., 317,383, Cl. D6-455.000.
- Loew, Jonathon, to Design Display Group, Inc. Corner frame holder 317,400, 6-11-91, Cl. D8-382.000.
- Lonngren, Kenneth W.; O'Brien, David F.; and Mattiucci, James, to Stanley Works, The. Package for tape and the like. 317,408, 6-11-91, Cl. D9-415.000.
- Lytle, William R. Trailer hitch. 317,426, 6-11-91, Cl. D12-162.000.
- Makino, Shigeo: *See—*
  - Enoki, Yasutaka; Makino, Shigeo; and Aoki, Yasutoshi, 317,427, Cl. D12-143.000.
- Manville Forest Products Corporation: *See—*
  - Schuster, Richard L., 317,404, Cl. D9-344.000.
- Martin, Louis G. Hole cutter. 317,455, 6-11-91, Cl. D15-139.000.
- Masamitsu, Satoshi: *See—*
  - Kanatani, Masakazu; and Masamitsu, Satoshi, 317,449, Cl. D14-138.000.
- Mast, Clarence, Jr. Faucet protector for toddlers 317,497, 6-11-91, Cl D23-249.000.
- Matsumoto, Kuniyasu: *See—*
  - Sawada, Masaji; and Matsumoto, Kuniyasu, 317,440, Cl D14-100.000.

  - Sawada, Masaji; and Matsumoto, Kuniyasu, 317,462, Cl. D19-27.000.
- Matsumura, Katsuya; and Tatsuta, Youichi, to Sharp Corporation. Refrigerator. 317,454, 6-11-91, Cl. D15-83.000.
- Matsuura, David G.: *See—*
  - Lanci, Dennis M.; Matsuura, David G.; DeFrank, Michael P.; and Everest, Charles E., 317,414, Cl. D10-57.000.
- Matthews, Blease M.: *See—*
  - Bacigalupo, George F.; Bacigalupo, Joseph G.; and Matthews, Blease M., 317,396, Cl. D8-98.000.
- Mattiucci, James: *See—*
  - Lonngren, Kenneth W.; O'Brien, David F.; and Mattiucci, James, 317,408, Cl. D9-415.000.
- Mayr, Reinhard, to U.S. Philips Corporation. Lamp. 317,507, 6-11-91. Cl. D26-2.000.
- McGarry, Stephen P.: *See—*
  - Dowd, James D.; McGarry, Stephen P.; Migrin, Robert S.; and Burdick, Robert C., 317,430, Cl. D12-191.000.
- McGivney, William D. Slipper sock. 317,376, 6-11-91, Cl. D2-335.000.
- McGrane, Eugene W., to Homac Mfg. Company. Flexible grounding plate for overhead utility lines. 317,434, 6-11-91, Cl. D13-133.000.
- McGrane, Eugene W., to Homac Mfg. Company. Flexible grounding plate for overhead utility lines. 317,435, 6-11-91, Cl. D13-133.000.
- McKeone, William C., to Kohler Co. Support accessory. 317,386, 6-11-91, Cl. D6-524.000.
- Metro Plastic Industry Pte. Ltd.: *See—*
  - Kheng, Heng G., 317,467, Cl. D19-92.000.
- Meyrowitz, Scott B. Finger ring. 317,421, 6-11-91, Cl. D11-35.000.
- Michaelsen, Carsten; and Poulsen, Ole V., to Interlego A.G. Separating tool for toy building elements. 317,482, 6-11-91, Cl. D21-108.000.
- Michel, Geoffrey W., to Portout Limited. Game board. 317,470, 6-11-91, Cl. D21-34.000.
- Migrin, Robert S.: *See—*
  - Dowd, James D.; McGarry, Stephen P.; Migrin, Robert S.; and Burdick, Robert C., 317,430, Cl. D12-191.000.
- Mihic, Wlajko. Combined cutting tool holder and cutting tip. 317,392, 6-11-91, Cl. D8-41.000.
- Miller, Jack V.: *See—*
  - Miller, Ruth E.; and Miller, Jack V., 317,513, Cl. D26-140.000.
- Miller, Joseph T.; and Brown, Edward F., to MOCAP. Fingernail clipper and pouch. 317,515, 6-11-91, Cl. D28-60.000.
- Miller, Ruth E.; and Miller, Jack V. Supporting channel for wall mounted track lighting system. 317,513, 6-11-91, Cl. D26-140.000.
- Mr. Gasket Company: *See—*
  - Segal, William J., 317,402, Cl. D9-314.000.
- Mitsubishi Denki Kabushiki Kaisha *See—*
  - Sako, Yuji, 317,438, Cl. D13-158.000.
- Miyake, Kouichi, Hosoda, Kazuya; and Niwa, Hisanobu, to CKD Kabushiki Kaisha. Pressure regulator. 317,494. 6-11-91, Cl. D23-235.000.
- Mizusugi, Kanji; and Fukuda, Kouki, to Sharp Corporation. Computer. 317,444, 6-11-91, Cl. D14-106.000.
- Mizusugi, Kanji: *See—*
  - Kosako, Mikio; and Mizusugi, Kanji, 317,420, Cl D18-13.000.
- MOCAP: *See—*
  - Miller, Joseph T.; and Brown, Edward F., 317,515, Cl. D28-60.000.
- Mochizuki, Takashi, to Kabushiki Kaisha Tamiya Mokei. Toy racing car. 317,485, 6-11-91, Cl. D21-137.000.
- Motorola, Inc.: *See—*
  - Fenton, William E.; and Rak, Roman P., 317,441, Cl. D14-100.000.
- Myshko, Alexandr P.: *See—*
  - Vysotsky, Mikhail S ; Sivolobov, Viktor N ; Polonevich. Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I., Zhutyaev, Jury N.; Ivanjushenko, Stanislav A.; Myshko. Alexandr P.; Pilosyan, Taisia N.; Ovsyannikov, Anatoly I ; Solntse, Viktor L.; Khleborodova, Svetlana A.; and Elkind, Mark Y , 317,425, Cl. D12-97.000.
- Nielsen, Jacob: *See—*
  - Stephensen, Christian; and Nielsen, Jacob, 317,476, Cl. D21-108.000.
- Nishiki, Nobuo. Tool shank for an abrasive article. 317,393, 6-11-91, Cl D8-70.000.
- Niwa, Hisanobu: *See—*
  - Miyake, Kouichi; Hosoda, Kazuya, and Niwa, Hisanobu, 317,494, Cl. D23-235.000.
- Noone, Michael J.: *See—*
  - Jenkins, Robert L.; Kalkanoglu. Husnuo M.; Klein, John R., deceased; Noone, Michael J.; Stahl, Kermit E.; and Whitford, Phillip H., 317,506, Cl. D25-139.000.
- Nugent, Marc. Lamp shade holder. 317,512, 6-11-91, Cl. D26-111 000.
- O'Brien, David F.: *See—*
  - Lonngren, Kenneth W.; O'Brien, David F.; and Mattiucci, James, 317,408, Cl. D9-415.000.
- Ogawa, Kikuo, to Yazaki Corporation. Housing for an electrical connecting board for use in an automobile. 317,437, 6-11-91, Cl. D13-147.000.
- Okada, Hajime, to Sumitomo Wiring Systems, Ltd. Electrical connector. 317,436, 6-11-91, Cl D13-147.000.
- Okamura, Sho: *See—*
  - Ooi, Hiroshi; Sakata, Fumitoshi; and Okamura, Sho, 317,456, Cl. D16-202.000.
  - Ooi, Hiroshi; Sakata, Fumitoshi, and Okamura, Sho, 317,457, Cl. D16-202.000.
- Oliver, Michael T.: *See—*
  - Crawford. Tracy E., Delgado, Rogelio, Jr . and Oliver, Michael T , 317,450, Cl. D14-214 000.
- Olsen, Flemming H., to Interlego A.G Toy construction element. 317,474, 6-11-91, Cl. D21-108.000.
- Olsen, Flemming H., to Interlego A.G. Toy construction element. 317,475, 6-11-91, Cl. D21-108.000.
- Olsen, Flemming H., to Interlego A.G. Toy tree element. 317,479, 6-11-91, Cl. D21-108.000.
- Olson, John B.; Jeanson, Richard L.; and Sinchok, John D., to Fortec, Inc. Vending machine for newspapers or the like. 317,468, 6-11-91, Cl. D20-6.000.
- Ono, Toshiaki, to Seiko Epson Corporation. Printer for computer. 317,459, 6-11-91, Cl. D18-13.000.
- Ooi, Hiroshi; Sakata, Fumitoshi; and Okamura, Sho, to Sharp Corporation. Television camera. 317,456, 6-11-91, Cl. D16-202.000.
- Ooi, Hiroshi; Sakata, Fumitoshi; and Okamura, Sho, to Sharp Corporation. Camera with LCD television and video tape recorder. 317,457, 6-11-91, Cl. D16-202.000.
- Osbon Medical Systems, Ltd.: *See—*
  - Osbon, Robert E., 317,504, Cl. D24-143.000.
  - Osbon, Robert E., 317,505, Cl. D24-143.000.
- Osbon, Robert E., to Osbon Medical Systems, Ltd. Male erection sustainer. 317,504, 6-11-91, Cl. D24-143.000.
- Osbon, Robert E., to Osbon Medical Systems, Ltd. Male erection sustainer. 317,505, 6-11-91, Cl. D24-143.000.
- Otis Elevator Company: *See—*
  - Davis, Steven B.; and Weirsman, William, 317,418, Cl. D10-108.000.
- Ott, Edward L.; Conway, Timothy F.; and Kubala, Thomas S., to Restaurant Technology, Inc. Pizza container 317,410, 6-11-91, Cl. D9-426.000.
- Ovsyannikov, Anatoly I.: *See—*
  - Vysotsky, Mikhail S.; Sivolobov, Viktor N.; Polonevich, Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N , Ivanjushenko, Stanislav A.; Myshko, Alexandr P.; Pilosyan, Taisia N.; Ovsyannikov, Anatoly I.; Solntse, Viktor L., Khleborodova, Svetlana A ; and Elkind, Mark Y., 317,425, Cl. D12-97.000.
- Ozawa, Akio: *See—*
  - Sasaki, Masatsune; and Ozawa, Akio, 317,472, Cl. D21-64.000.
- Pankonien, Gary W.: *See—*
  - Gintz, Christopher J.; Pankonien, Gary W.; Goodrich, Donald S.; and Youens, John E., 317,442, Cl. D14-106.000.
- Pelz, David T. Golf club head. 317,490, 6-11-91, Cl. D21-219.000.
- Penaluna, Robin D.; and Hill, Kathleen D. Restaurant serving tray. 317,389, 6-11-91, Cl. D7-543.000.
- Pilosyan, Taisia N.: *See—*
  - Vysotsky, Mikhail S.; Sivolobov, Viktor N.; Polonevich, Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N.; Ivanjushenko, Stanislav A.; Myshko, Alexandr P.; Pilosyan. Taisia N.; Ovsyannikov, Anatoly I.; Solntse, Viktor L.; Khleborodova, Svetlana A.; and Elkind, Mark Y., 317,425, Cl D12-97.000.
- Polonevich, Stanislav F.: *See—*
  - Vysotsky, Mikhail S.; Sivolobov. Viktor N ; Polonevich, Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N., Ivanjushenko, Stanislav A , Myshko, Alexandr P.; Pilosyan, Taisia N.; Ovsyannikov, Anatoly I.; Solntse, Viktor L.; Khleborodova, Svetlana A., and Elkind, Mark Y., 317,425, Cl D12-97.000.
- Polvere, Dennis J Rack for dispensing articles. 317,382, 6-11-91. Cl D6-408.000.
- Portout Limited: *See—*
  - Michel, Geoffrey W., 317,470, Cl. D21-34 000.
- Poulsen, Ole V., to Interlego A G Electric toy motor 317,477, 6-11-91. Cl. D21-108.000.
- Poulsen, Ole V.: *See—*
  - Michaelsen, Carsten; and Poulsen, Ole V., 317,482, Cl D21-108.000.
- Powell, Mark. Dispenser or similar article. 317,384. 6-11-91, Cl. D6-515.000.
- Press S.p.A.: *See—*
  - Fulcheri, Renato, 317,381, Cl. D6-373 000.
- Price Stern Sloan Inc.: *See—*
  - Riddiford, Martin P.; Frazer, Stephen O., and Sharkey, Seamus A , 317,463, Cl. D19-59.000.
- Procter & Gamble Company, The *See—*
  - Gray, Ian; Watts, Russell T.; and Stewart, William R., 317,407, Cl D9-377.000.
- Pugnat, Patricia, and Fougerousse, Claude, to Sports Booster Ski pole 317,492, 6-11-91, Cl. D21-229.000
- Rak, Roman P.: *See—*
  - Fenton, William E., and Rak, Roman P , 317,441, Cl D14-100 000
- Reid, Mary J., to Kohler Co. Lavatory table top 317,498, 6-11-91. Cl. D23-308.000.
- Reid, Mary J.: *See—*
  - Kohler, Herbert V., Jr., Reid, Mary J.; Sauter, Bruce M.; and Bengtson, Alan D., 317,495, Cl. D23-241 000.
  - Kohler, Herbert V., Jr.; Reid. Mary J.; Sauter, Bruce M . and Bengtson, Alan D., 317,496, Cl. D23-241.000.
- Restaurant Technology, Inc. *See—*
  - Ott, Edward L.; Conway, Timothy F , and Kubala, Thomas S., 317,410, Cl. D9-426.000
- Revell, Ian T.: *See—*
  - Capper, James O., and Revell, Ian T . 317,473, Cl D21-65.000.
- Rhodes. Travis D Combination golf club and walking stick 317,491, 6-11-91, Cl. D21-234 000.

VOL
1127
ISS
2
JE
11
1991
UMI

- Riddiford, Martin P.; Frazer, Stephen O.; and Sharkey, Seamus A., to Price Stern Sloan Inc. Electronic test sensor unit. 317,463, 6-11-91, Cl. D19-59.000.
- Rizzo, Camille: *See—*
  - Rizzo, Mike; and Rizzo, Camille, 317,471, Cl. D21-37.000.
- Rizzo, Mike, and Rizzo, Camille. Liquid filled random number ball tumbler. 317,471, 6-11-91, Cl. D21-37.000.
- Rockwell International Corporation: *See—*
  - Cummings, Darold B., 317,432, Cl. D12-337.000.
- Ronzheimer, Sandra L. Wind chime. 317,419, 6-11-91, Cl. D10-116.000.
- Rothamel, Richard J.; Stephens, Doreen; and Hurley, Dennis, to Kraft General Foods, Inc. Cereal. 317,372, 6-11-91, Cl D1-120.000.
- S&C Electric Company: *See—*
  - Scherer, Henry W.; Biller, Bruce A.; and Swanson, Roy T., 317,433, Cl. D13-132.000.
- Sacherman, James E., to Wyse Technology, Inc Computer processor module. 317,445, 6-11-91, Cl. D14-107.000.
- Sakata, Fumitoshi: *See—*
  - Ooi, Hiroshi; Sakata, Fumitoshi; and Okamura, Sho, 317,456, Cl. D16-202.000.
  - Ooi, Hiroshi; Sakata, Fumitoshi; and Okamura, Sho, 317,457, Cl. D16-202.000.
- Sako, Yuji, to Mitsubishi Denki Kabushiki Kaisha. Plug-in terminal type electromagnetic contactor. 317,438, 6-11-91, Cl. D13-158.000.
- Sandvik AB. *See—*
  - Landahl, Richard, 317,395, Cl. D8-97.000.
- Sasaki, Masatsune; and Ozawa, Akio, to Tomy Company, Ltd. Voice changing amusement microphone. 317,472, 6-11-91, Cl. D21-64.000.
- Sasso, Pasquale, to Elite S r. l. Wall mounted hair dryer 317,514, 6-11-91, Cl. D28-12.000.
- Sauter, Bruce M.: *See—*
  - Kohler, Herbert V., Jr.; Reid, Mary J., Sauter, Bruce M . and Bengtson, Alan D., 317,495, Cl. D23-241.000.
  - Kohler, Herbert V., Jr.; Reid, Mary J.; Sauter, Bruce M . and Bengtson, Alan D., 317,496, Cl. D23-241.000.
- Sawada, Masaji; and Matsumoto, Kuniyasu, to Sharp Corporation. Memorandum input/output device. 317,440, 6-11-91, Cl. D14-100.000.
- Sawada, Masaji; and Ikuzawa, Yoko, to Sharp Corporation. Electronic calculator with solar cell. 317,458, 6-11-91, Cl. D18-7.000.
- Sawada, Masaji; and Matsumoto, Kuniyasu, to Sharp Corporation. Binder 317,462, 6-11-91, Cl. D19-27.000.
- Scherer, Henry W.; Biller, Bruce A.; and Swanson, Roy T., to S&C Electric Company. Electrical insulator with integral circuit-parameter sensing features. 317,433, 6-11-91, Cl. D13-132.000.
- Schuster, Richard L., to Manville Forest Products Corporation. Combined bottle carrier and 3-D glasses. 317,404, 6-11-91, Cl. D9-344.000.
- Seaco, Inc.: *See—*
  - Seaver, John B., 317,429, Cl. D12-157.000.
- Seaver, John B., to Seaco, Inc. Car top carrier or similar article. 317,429, 6-11-91, Cl. D12-157.000.
- Segal, William J., to Mr. Gasket Company Display package. 317,402, 6-11-91, Cl. D9-314.000.
- Seiko Epson Corporation: *See—*
  - Ono, Toshiaki. 317,459, Cl. D18-13.000.
- Selke, Gary J.: *See—*
  - Cheung, Peter W.; and Selke, Gary J., 317,501, Cl D24-169.000.
- Severinsen, Emily M., to All That Joy, Inc Smock 317,375, 6-11-91, Cl. D2-228.000.
- Sharkey, Seamus A : *See—*
  - Riddiford, Martin P.; Frazer, Stephen O , and Sharkey, Seamus A., 317,463, Cl. D19-59.000
- Sharp Corporation: *See—*
  - Ishida, Katsuhiro, 317,447, Cl. D14-113.000.
  - Kosako, Mikio; and Mizusugi, Kanji, 317,420, Cl. D18-13.000.
  - Matsumura, Katsuya; and Tatsuta, Youichi, 317,454, Cl. D15-83.000.
  - Mizusugi, Kanji; and Fukuda, Kouki, 317,444, Cl. D14-106.000.
  - Ooi, Hiroshi; Sakata, Fumitoshi, and Okamura, Sho, 317,456, Cl D16-202.000.
  - Ooi, Hiroshi; Sakata, Fumitoshi; and Okamura, Sho, 317,457, Cl. D16-202.000
  - Sawada, Masaji; and Matsumoto, Kuniyasu, 317,440, Cl. D14-100.000.
  - Sawada, Masaji; and Ikuzawa, Yoko, 317,458, Cl. D18-7.000.
  - Sawada, Masaji; and Matsumoto, Kuniyasu, 317,462, Cl. D19-27.000.
- SiMed Corporation: *See—*
  - Cheung, Peter W.; and Selke, Gary J., 317,501, Cl. D24-169.000
- Sinchok, John D.: *See—*
  - Olson, John B.; Jeanson, Richard L.; and Sinchok, John D , 317,468, Cl. D20-6.000
- Sivolobov, Viktor N : *See—*
  - Vysotsky, Mikhail S.; Sivolobov, Viktor N.; Polonevich, Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N ; Ivanjushenko, Stanislav A., Myshko, Alexandr P.; Pilosyan, Taisia N.; Ovsyannikov, Anatoly I.; Solntse, Viktor L., Khleborodova, Svetlana A., and Elkind, Mark Y., 317,425, Cl. D12-97.000.
- SKF Specialty Products Aktiebolag: *See—*
  - Fasth, Kenneth, 317,521, Cl D34-38.000.
- Skov, Ib T.; and Dideriksen, Erling T., to Interlego A G Toy building element. 317,480, 6-11-91, Cl. D21-108.000.
- Skyline Displays, Inc.: *See—*
  - Beaulieu, Bryan J., 317,469, Cl. D20-10.000.
- Snyder, Jeffrey, to Etna Products Co., Inc. Jewelry case 317,380, 6-11-91, Cl. D3-75.000.
- Solntse, Viktor L.: *See—*
  - Vysotsky, Mikhail S.; Sivolobov, Viktor N ; Polonevich, Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N Ivanjushenko, Stanislav A . Myshko, Alexandr P ; Pilosyan, Taisia N.; Ovsyannikov, Anatoly I.; Solntse, Viktor I . Khleborodova, Svetlana A ; and Elkind, Mark Y , 317,425, Cl. D12-97.000.
- Sony Corporation: *See—*
  - Kanatani, Masakazu; and Masamitsu, Satoshi, 317,449, Cl. D14-138.000.
- Sousa, Karen H.. *See—*
  - Idowu, Olajire; and Sousa, Karen H., 317,503, Cl. D24-115.000.
- Speh, Michael: *See—*
  - Childre, Casey J.; Walker, George V.; and Speh, Michael, 317,493, Cl. D22-142.000.
- Sports Booster: *See—*
  - Pugnat, Patricia; and Fougerousse, Claude, 317,492, Cl D21-229.000.
- Stahl, Kermit E.: *See—*
  - Jenkins, Robert L.; Kalkanoglu, Husnuo M ; Klein, John R., deceased; Noone, Michael J.; Stahl, Kermit E., and Whitford, Phillip H., 317,506, Cl. D25-139.000
- Stanley Works, The: *See—*
  - Lonngren, Kenneth W., O'Brien, David F ; and Mattiucci, James, 317,408, Cl. D9-415.000.
- Stephens, Doreen: *See—*
  - Rothamel, Richard J.; Stephens, Doreen; and Hurley, Dennis, 317,372, Cl. D1-120.000.
- Stephensen, Christian; and Nielsen, Jacob, to Interlego A G Toy hippopotamus. 317,476, 6-11-91, Cl. D21-108.000.
- Stewart, William R.: *See—*
  - Gray, Ian, Watts, Russell T.; and Stewart, William R , 317,407, Cl D9-377.000.
- Stillinger, Scott H. Throwing toy. 317,489, 6-11-91, Cl D21-203.000
- Straw, Ronald A.; and Bennett, Walter L., to Transition Technology Input/output module. 317,448, 6-11-91, Cl. D14-114.000.
- Stubbs, Darlene: *See—*
  - Goodman, Debra L.; and Stubbs, Darlene, 317,464, Cl D19-59.000.
- Sturdy Lantern Mfg. Co., Inc.: *See—*
  - Hazerjian, Kevork P.; and Levitt, Amos, 317,509. Cl. D26-67.000
- Sumitomo Wiring Systems, Ltd : *See—*
  - Okada, Hajime, 317,436, Cl. D13-147.000.
- Swanson, Roy T.. *See—*
  - Scherer, Henry W.; Biller, Bruce A., and Swanson, Roy T., 317,433, Cl. D13-132.000.
- Tani, Atsushi; and Hara, Kunio, to Kabushiki Kaisha Toshiba. Electronic copying machine. 317,460, 6-11-91, Cl. D18-36.000.
- Tatsuta, Youichi: *See—*
  - Matsumura, Katsuya; and Tatsuta, Youichi, 317,454, Cl. D15-83.000.
- Taylor, Christopher J. C.: *See—*
  - Wiggs, Christopher C ; and Taylor, Christopher J C , 317,483, Cl D21-111.000.
- Tegam, Inc.: *See—*
  - Gambill, Terry A , 317,415, Cl D10-60.000.
- Tomy Company, Ltd.: *See—*
  - Sasaki, Masatsune; and Ozawa, Akio, 317,472, Cl. D21-64.000.
- Tonks, Jeffery R.; Humphries, Mark D., and Gillam, Paul A., to Valor Heating Limited. Gas fired heater. 317,499, 6-11-91, Cl. D23-339.000.
- Transition Technology: *See—*
  - Straw, Ronald A.; and Bennett, Walter L , 317,448, Cl D14-114.000.
- Tri Tech, U.S.A., Inc : *See—*
  - Bacigalupo, George F., Bacigalupo, Joseph G., and Matthews, Blease M., 317,396, Cl. D8-98.000.
- Troxell, John F., Jr.: *See—*
  - Wolff, Robert A.; and Troxell, John F., Jr., 317,385, Cl. D6-522.000.
- Tsukada, Hiroki, to Iwaya Corporation. Stuffed toy cat figure 317,487, 6-11-91, Cl. D21-163.000.
- Turner, Minnie O. Confection. 317,373, 6-11-91, Cl. D1-127.000.
- Ueda, Shuji, to Hidaka Engineering Co., Ltd Finned heat exchanger plate. 317,500, 6-11-91, Cl. D23-386.000.
- Uguchi, Yoshiaki, to Janome Sewing Machine Co. Ltd. Sewing machine. 317,453, 6-11-91, Cl. D15-70.000.
- U S Philips Corporation: *See—*
  - Mayr, Reinhard, 317,507, Cl. D26-2.000.
  - Van Surksum, Gerrit-Jan, 317,519, Cl. D32-70.000.
- United Technologies Automotive: *See—*
  - Dowd, James D.; McGarry, Stephen P.; Migrin, Robert S and Burdick, Robert C., 317,430, Cl D12-191.000.
- Valor Heating Limited: *See—*
  - Tonks, Jeffery R.; Humphries, Mark D.; and Gillam, Paul A , 317,499, Cl. D23-339.000.
- Van Surksum, Gerrit-Jan, to U. S. Philips Corporation Electric iron 317,519, 6-11-91, Cl. D32-70.000.
- Vantukh, Sergei I.: *See—*
  - Vysotsky, Mikhail S.; Sivolobov, Viktor N.; Polonevich, Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N . Ivanjushenko, Stanislav A.; Myshko, Alexandr P., Pilosyan, Taisia N , Ovsyannikov, Anatoly I ; Solntse, Viktor L . Khleborodova, Svetlana A.; and Elkind, Mark Y., 317,425, Cl D12-97.000.

- Varley, Jahn E., and Draper, Ronald E. Curtain rail. 317,399, 6-11-91, Cl. D8-376.000.
- Veronesi, Giuseppe. Combined wrist watch and strap. 317,413, 6-11-91, Cl. D10-32.000.
- Vossoughi, Sohrab; Alviar, Christopher A.; Hix, Steven R ; and Gulick, Paul E., to In Focus Systems, Inc. Electronic data display panel for use with an overhead projector. 317,446, 6-11-91, Cl. D14-113.000.
- Vysotsky, Mikhail S.; Sivolobov, Viktor N.; Polonevich, Stanislav F.; Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N.; Ivanjushenko, Stanislav A ; Myshko, Alexandr P.; Pilosyan, Taisia N.; Ovsyannikov, Anatoly I.; Solntse, Viktor L.; Khleborodova, Svetlana A.; and Elkind, Mark Y Tractor trailer. 317,425, 6-11-91, Cl. D12-97.000.
- W. T Rogers Company: *See—*
  - Klodt, Gerald J., 317,466, Cl. D19-83.000.
- Wadams, Andrew K., to Kalamazoo plc. Posting tray. 317,465, 6-11-91, Cl. D19-76.000.
- Walker, George V.. *See—*
  - Childre, Casey J.; Walker, George V ; and Speh, Michael, 317,493, Cl. D22-142.000.
- Watts, Russell T : *See—*
  - Gray, Ian, Watts, Russell T., and Stewart, William R , 317,407, Cl. D9-377.000.
- Weder, Donald E., to Highland Supply Corporation Flower pot cover. 317,424, 6-11-91, Cl. D11-164.000.
- Weirsman, William: *See—*
  - Davis, Steven B.; and Weirsman, William, 317,418, Cl. D10-108.000.
- White, T Neal. Retainer spring clamp for a coffee filter 317,388, 6-11-91, Cl. D7-400.000.
- Whitford, Phillip H.: *See—*
  - Jenkins, Robert L.; Kalkanoglu, Husnuo M., Klein, John R., deceased; Noone, Michael J.; Stahl, Kermit E.; and Whitford, Phillip H., 317,506, Cl. D25-139.000.
- Whitworth, Joseph T., to G.B. Communications, Inc. First responder bag. 317,379, 6-11-91, Cl. D3-74.000.
- Wiggs, Christopher C.; and Taylor, Christopher J. C., to Hestair Kiddicraft Limited. Toy telephone. 317,483, 6-11-91, Cl. D21-111.000.
- Willie, Janet A. Organizer for a plurality of articles. 317,461, 6-11-91, Cl. D19-75.000.
- Wilson, Jay; Barry, Michael R.; and Yamamoto, Yosuke, to Alps Electric Co., Ltd. Computer. 317,443, 6-11-91, Cl. D14-106.000.
- Wolff, Robert A.; and Troxell, John F , Jr., to Wood-Mode, Incorporated. Paper towel holder. 317,385, 6-11-91, Cl. D6-522.000.
- Wood-Mode, Incorporated: *See—*
  - Wolff, Robert A.; and Troxell, John F., Jr., 317,385, Cl D6-522.000.
- Wyse Technology, Inc.: *See—*
  - Sacherman, James E., 317,445, Cl. D14-107.000
- Yamamoto, Yosuke: *See—*
  - Wilson, Jay; Barry, Michael R.; and Yamamoto, Yosuke, 317,443, Cl. D14-106.000.
- Yasika, Douglas P. Medicament container 317,405, 6-11-91, Cl. D9-347.000.
- Yazaki Corporation: *See—*
  - Ogawa, Kikuo, 317,437, Cl. D13-147.000
- Youens, John E.: *See—*
  - Gintz, Christopher J.; Pankonien, Gary W , Goodrich, Donald S., and Youens, John E., 317,442, Cl. D14-106.000.
- Zhutyaev, Jury N : *See—*
  - Vysotsky, Mikhail S.; Sivolobov, Viktor N ; Polonevich, Stanislav F., Isaevich, Georgy A.; Vantukh, Sergei I.; Zhutyaev, Jury N , Ivanjushenko, Stanislav A.; Myshko, Alexandr P.; Pilosyan, Taisia N.; Ovsyannikov, Anatoly I , Solntse, Viktor L.; Khleborodova, Svetlana A : and Elkind, Mark Y , 317,425, Cl. D12-97.000.

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- Barbour, John H.: *See—*
  - Glenn, Michael M . Barbour, John H.; and Dirr, Michael A., 7,552, Cl. 51.000.
- Brackin, Randall L. Wax Myrtle named Lane. 7,555, 6-11-91, Cl 51.000.
- DeVor Nurseries, Inc.: *See—*
  - Lammerts, Walter, 7,549, Cl. 20.000.
  - Marciel, Stanley G., 7,548, Cl. 20.000.
- Dirr, Michael A.. *See—*
  - Glenn, Michael M.; Barbour, John H.; and Dirr, Michael A., 7,552, Cl. 51.000.
- Glenn, Michael M., to Tree Introductions, Inc. Chinese elm tree named 'Emer I'. 7,551, 6-11-91, Cl. 51.000.
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- Halka, Chester J., to J Frank Schmidt & Son Co. Pagodatree 'Halka'. 7,554, 6-11-91, Cl. 51.000.
- J Frank Schmidt & Son Co : *See—*
  - Halka, Chester J , 7,554, Cl. 51.000.
- Lammerts, Walter, to DeVor Nurseries, Inc Rose plant named Marmalade Mist 7,549, 6-11-91, Cl. 20.000.
- Marciel, Stanley G., to DeVor Nurseries, Inc Rose plant named Devicio. 7,548, 6-11-91, Cl. 20.000.
- Sheehan, Timothy P.: *See—*
  - Weinberger, John H ; and Sheehan, Timothy P , 7,550, Cl 39.000
- Sun World, Inc.: *See—*
  - Weinberger, John H.; and Sheehan, Timothy P., 7,550, Cl 39.000.
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  - Glenn, Michael M., 7,551, Cl 51.000
  - Glenn, Michael M., Barbour, John H . and Dirr, Michael A , 7,552, Cl. 51.000.
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    - Wells, Stephen P., 7,553, Cl. 50.000
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VOL
1127
ISS
2
JE
11
1991
UMI

CLASSIFICATION OF PATENTS

ISSUED JUNE 11, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2	
94	5,022,092
158	5,022,093
161 A	5,022,094
190	5,022,095
227	5,022,096
410	5,022,099
422	5,022,100
CLASS 4	
233	5,022,097
	5,022,098
498	5,022,101
516	5,022,102
558	5,022,104
596	5,022,103
CLASS 5	
11	5,022,105
86	5,022,106
419	5,022,107
422	5,022,108
449	5,022,109
455	5,022,110
481	5,022,111
CLASS 8	
457	5,022,891
CLASS 15	
159 A	5,022,112
250.42	5,022,113
353	5,022,114
	5,022,115
CLASS 16	
258	5,022,116
288	5,022,117
327	5,022,118
387	5,022,119
CLASS 19	
102	5,022,121
225	5,022,122
260	5,022,123
CLASS 24	
67.9	5,022,124
136 R	5,022,125
543	5,022,126
712.2	5,022,127
CLASS 25	
181	5,023,012
CLASS 28	
191	5,022,128
CLASS 29	
6.01	5,022,129
25.35	5,022,130
40	5,022,131
88.8	5,022,145
116.1	5,022,132
273	5,022,133
402.08	5,022,134
411	Re.33,606
421.1	5,022,135
426.4	5,022,136
559	5,022,137
564.8	5,022,138
596	5,022,139
603	5,022,140
	5,022,141
723	5,022,142
783	5,022,143
854	5,022,144
888.02	5,022,146
890.031	5,022,148
890.048	5,022,149
890.053	5,022,150
890.143	5,022,151
890.148	5,022,147
897	5,022,152
CLASS 30	
34.1	5,022,153
34.2	5,022,154
93	5,022,155
125	5,022,156
394	5,022,157
418	5,022,159
475	5,022,160
CLASS 33	
413	5,022,158
548	5,022,161
784	5,022,162
CLASS 34	
23	5,022,163
62	5,022,165
120	5,022,166
160	5,022,167
CLASS 36	
9 R	B1 Re.33,090
43	5,022,168
CLASS 38	
56	5,022,169
CLASS 40	
358	5,022,170
447	5,022,171
503	5,022,172
617	5,022,173
649	5,022,174
CLASS 42	
70.11	5,022,175
90	5,022,176
CLASS 43	
42.11	5,022,177
44.82	5,022,178
114	5,022,179
	5,022,180
CLASS 44	
621	5,022,892
CLASS 47	
31	5,022,181
48.5	5,022,182
86	5,022,183
CLASS 48	
76	5,022,893
CLASS 49	
352	5,022,184
425	5,022,185
CLASS 51	
165 R	5,022,186
165.74	5,022,187
168	5,022,188
170 MT	5,022,190
170 TL	5,022,189
209 DL	5,022,191
241 A	5,022,192
283 R	5,022,193
290	5,022,194
	5,022,195
293	5,022,894
295	5,022,895
338	5,022,196,
CLASS 52	
29	5,022,197
105	5,022,198
123.1	5,022,199
127.9	5,022,200
167 DF	5,022,201
169.6	5,022,202
199	5,022,203
211	5,022,204
309.16	5,022,205
455	5,022,206
537	5,022,207
586	5,022,208
646	5,022,209
729	5,022,210
	5,022,211
815	5,022,212
CLASS 53	
234	5,022,213
242	5,022,214
420	5,022,215
438	5,022,216
472	5,022,217
529	5,022,218
CLASS 55	
85	5,022,896
96	5,022,897
210	5,022,898
277	5,022,899
316	5,022,900
	5,022,901
387	5,022,902
404	5,022,903
CLASS 56	
16.4	5,022,219
16.9	5,022,220
400.17	5,022,221
CLASS 57	
263	5,022,222
267	5,022,223
CLASS 60	
39.161	5,022,224
274	5,022,225
	5,022,226
320	5,022,227
734	5,022,228
CLASS 62	
6	5,022,229
77	5,022,230
99	5,022,231
133	5,022,232
138	5,022,233
228.5	5,022,234
271	5,022,241
457.4	5,022,235
529	5,022,236
CLASS 63	
23	5,022,237
26	5,022,238
CLASS 65	
2	5,022,904
60.51	5,022,905
104	5,022,906
163	5,022,907
268	5,022,908
278	5,022,909
325	5,022,910
349	5,022,911
CLASS 66	
127	5,022,239
177	5,022,240
CLASS 70	
14	5,022,242
34	5,022,243
57.1	5,022,244
94	5,022,245
209	5,022,246
456 R	5,022,247
CLASS 71	
30	5,022,912
34	5,022,913
88	5,022,914
92	5,022,915
	5,022,916
93	5,022,917
CLASS 72	
21	5,022,248
149	5,022,249
214	5,022,250
239	5,022,251
260	5,022,252
325	5,022,253
393	5,022,254
444	5,022,255
481	5,022,256
CLASS 73	
3	5,022,257
37.5	5,022,258
40.7	5,022,265
64.20	5,022,259
149	5,022,261
170 A	5,022,262
295	5,022,263
382 R	5,022,264
579	5,022,266
593	5,022,267
602	5,022,268
702	5,022,269
706	5,022,270
730	5,022,271
772	5,022,272
849	5,022,273
861.04	5,022,274
862.36	5,022,275
865.3	5,022,276
CLASS 74	
110	5,022,278
422	5,022,279
424.8 NA	5,022,277
462	5,022,280
473 R	5,022,281
493	5,022,282
523	5,022,283
844	5,022,284
866	5,022,285
	5,022,286
	5,022,287
CLASS 75	
229	5,022,918
238	5,022,919
CLASS 81	
3.4	5,022,288
57.39	5,022,289
355	5,022,290
424	5,022,291
426	5,022,292
CLASS 82	
1.11	5,022,293
18	5,022,294
CLASS 83	
16	5,022,295
27	5,022,296
35	5,022,297
509	5,022,298
676	5,022,299
743	5,022,300
CLASS 84	
21	5,022,301
255	5,022,302
600	5,022,303
607	5,022,304
609	Re.33,607
711	5,022,305
CLASS 89	
1.8	5,022,306
36.02	5,022,307
45	5,022,308
CLASS 91	
285	5,022,309
501	5,022,310
CLASS 92	
137	5,022,311
240	5,022,312
248	5,022,313
CLASS 98	
32	5,022,314
CLASS 99	
348	5,022,315
CLASS D26	
74	B1 8,307,059
CLASS 100	
34	5,022,316
35	5,022,317
47	5,022,318
170	5,022,319
CLASS 101	
123	5,022,320
142	5,022,321
148	5,022,322
219	5,022,323
CLASS 102	
201	5,022,324
226	5,022,325
275.9	5,022,326
CLASS 106	
38.3	5,022,920
38.9	5,022,921
287.11	5,022,922
415	5,022,923
486	5,022,924
631	5,022,925
CLASS 108	
147	5,022,327
CLASS 110	
232	5,022,328
234	5,022,329
235	5,022,330
297	5,022,331
346	5,022,332
CLASS 111	
194	5,022,333
CLASS 112	
238	5,022,334
255	5,022,335
304	5,022,336
CLASS 114	
39.10	5,022,338
39.2	5,022,337
211	5,022,339
CLASS 116	
77	5,022,340
142 FP	5,022,341
236	5,022,342
CLASS 118	
47	5,022,343
56	5,022,344
CLASS 119	
29	5,022,345
52.2	5,022,346
54	5,022,347
57.6	5,022,348
57.8	5,022,349
85	5,022,350
124	5,022,351
CLASS 122	
17	5,022,352
CLASS 123	
21	5,022,353
41.1	5,022,354
52 MB	5,022,355
90.11	5,022,357
90.12	5,022,358
90.14	5,022,359
90.27	5,022,360
90.5	5,022,356
90.55	5,022,361
146.5 D	5,022,362
179 BG	5,022,363
198 A	5,022,364
198 R	5,022,365
205	5,022,366
324	5,022,367
342	5,022,368
399	5,022,369
425	5,022,370
468	5,022,371
469	5,022,372
488	5,022,373
490	5,022,374
564	5,022,375
572	5,022,376
CLASS 124	
23.1	5,022,377
44.5	5,022,378
CLASS 126	
116 R	5,022,379
190	5,022,380
432	5,022,381
CLASS 128	
4	5,022,382
6	5,022,383
33	5,022,384
	5,022,385
57	5,022,386
64	5,022,387
74	5,022,388
76 C	5,022,389
80 F	5,022,391
80 H	5,022,390
202.28	5,022,392
205.23	5,022,393
207.14	5,022,394
419 PG	5,022,395
642	5,022,396
653 AF	5,022,397
	5,022,398
661.09	5,022,400
662.03	5,022,401
662.06	5,022,399
671	5,022,402
680	5,022,403
695	5,022,410
696	5,022,404
715	5,022,405
719	5,022,406
739	5,022,407
756	5,022,408
760	5,022,409
771	5,022,411
781	5,022,412
898	5,022,413
	5,022,414
CLASS 131	
84.1	5,022,415
305	5,022,416
CLASS 132	
323	5,022,417
CLASS 134	
2	5,022,926
34	5,022,927
57 B	5,022,164
64 R	5,022,418
102	5,022,419
CLASS 135	
88	5,022,420
CLASS 136	
212	5,022,928
246	5,022,929
251	5,022,930
CLASS 137	
15	5,022,421
	5,022,422
68.1	5,022,423
	5,022,424
82	5,022,425
119	5,022,426
155	5,022,427
209	5,022,428
218	5,022,429
362	5,022,430
375	5,022,431
495	5,022,432
588	5,022,433
596.2	5,022,434
613	5,022,435
625.35	5,022,436
CLASS 138	
42	5,022,438
89	5,022,437
CLASS 139	
1 R	5,022,439
116.2	5,022,440
383 A	5,022,441
CLASS 141	
100	5,022,442
129	5,022,443
248	5,022,444
CLASS 144	
2 Z	B1 4,214,616
193 A	5,022,445
208 F	5,022,446
251 R	5,022,447
CLASS 148	
12 R	5,022,931
13.1	5,022,932
16	5,022,933
16.5	5,022,934
126.1	5,022,935
135	5,022,936
267	5,022,938
277	5,022,937
302	5,022,939
CLASS 152	
209 R	5,022,448

VOL
1127
ISS
2
JE
11
1991
UMI

226	5,022,449
381 6	5,022,450
CLASS 156	
64	5,022,940
85	5,022,941
219	5,022,942
222	5,022,943
244 11	5,022,944
253	5,022,945
272 4	5,022,946
277	5,022,947
291	5,022,948
345	5,022,949
361	5,022,950
379	5,022,951
441	5,022,952
441 5	5,022,953
542	5,022,954
627	5,022,955
643	5,022,956
	5,022,957
	5,022,958
	5,022,959
	5,022,960
646	5,022,961
CLASS 157	
1	5,022,451
CLASS 160	
7	5,022,452
168 1	5,022,453
202	5,022,454
CLASS 162	
29	5,022,962
116	5,022,963
146	5,022,964
192	5,022,965
198	5,022,966
CLASS 164	
46	5,022,455
119	5,022,456
155	5,022,457
457	5,022,458
CLASS 165	
11.1	5,022,459
12	5,022,460
76	5,022,461
80.4	5,022,462
95	5,022,463
176	5,022,464
	5,022,465
CLASS 166	
263	5,022,466
273	5,022,467
CLASS 169	
40	5,022,468
CLASS 173	
170	5,022,469
CLASS 174	
35 R	5,023,394
36	5,023,395
48	5,023,396
50	5,023,397
52.4	5,023,398
73.1	5,023,399
87	5,023,401
	5,023,402
94 R	5,023,403
97	5,023,404
109	5,023,405
209	5,023,406
257	5,023,407
CLASS 175	
14	5,022,470
75	5,022,471
195	5,022,472
299	5,022,473
	5,022,474
CLASS 177	
211	5,022,475
CLASS 178	
19	5,023,408
CLASS 180	
6.34	5,022,477
6 5	5,022,476
53.1	5,022,478
68.3	5,022,479
79.1	5,022,480
133	5,022,481
	5,022,482
197	5,022,483
CLASS 181	
102	5,022,484
106	5,022,485
132	5,022,486
137	5,022,487
156	5,022,488
CLASS 182	
3	5,022,489
17	5,022,490
95	5,022,491
CLASS 184	
5	5,022,492
16	5,022,493
104.1	5,022,494
105.1	5,022,495
CLASS 187	
9 E	5,022,496
124	5,022,497
127	5,022,498
130	5,023,409
CLASS 188	
67	5,022,499
73.31	5,022,500
300	5,022,501
333	5,022,502
CLASS 191	
12 20 R	5,023,410
CLASS 192	
0.02 R	5,022,503
4 A	5,022,504
12 BA	5,022,505
53 G	5,022,506
58 B	5,022,507
70.27	5,022,508
73	5,022,509
CLASS 198	
460	5,022,511
718	5,022,512
782	5,022,513
813	5,022,514
CLASS 200	
61.43	5,023,411
61 54	5,023,412
61.76	5,023,413
61 91	5,023,414
148 R	5,023,415
244	5,023,416
331	5,023,417
511	5,023,418
CLASS 202	
197	5,022,967
CLASS 204	
28	5,022,968
56.1	5,022,969
72	5,022,970
145 R	5,022,971
183 3	5,022,972
186	5,022,973
275	5,022,974
277	5,022,975
297 R	5,022,976
298.16	5,022,977
298.19	5,022,978
298 33	5,022,979
400	5,022,980
CLASS 206	
0.82	5,022,518
8	5,022,515
45.13	5,022,516
77.1	5,022,517
313	5,022,519
315.1	5,022,520
370	5,022,521
387	5,022,522
389	B1 4,886,167
390	5,022,523
395	5,022,524
434	5,022,525
459	5,022,526
519	Re 33,608
522	5,022,527
545	5,022,528
581	5,022,529
618	5,022,530
CLASS 208	
334	5,022,981
CLASS 209	
12	5,022,982
167	5,022,983
170	5,022,984
172.5	5,022,985
552	5,022,531
564	5,022,532
CLASS 210	
94	5,022,986
173	5,022,987
321 84	5,022,988
386	5,022,989
500 42	5,022,990
506	5,022,991
521	5,022,992
605	5,022,993
651	5,022,995
654	5,022,996
670	5,022,994
	5,022,997
675	5,022,998
692	5,022,999
697	5,023,000
699	5,023,001
710	5,023,002
CLASS 211	
1 5	5,022,533
4	5,022,534
	5,022,536
59.2	5,022,535
88	5,022,537
113	5,022,538
133	5,022,539
181	5,022,540
186	5,022,541
CLASS 212	
219	5,022,542
271	5,022,543
CLASS 215	
31	5,022,544
230	5,022,545
CLASS 219	
10.57	5,023,419
69.12	5,023,420
69 13	5,023,421
69 2	5,023,422
108	5,023,423
121 59	5,023,425
121.6	5,023,424
121.63	5,023,426
121.82	5,023,427
213	5,023,428
388	5,023,429
486	5,023,430
494	5,023,431
497	5,023,432
548	5,023,433
CLASS 220	
4.03	5,022,546
23.83	5,022,548
85 H	5,022,549
94 R	5,022,550
234	5,022,547
270	5,022,551
288	5,022,552
401	5,022,555
410	5,022,553
456	5,022,554
CLASS 222	
1	5,022,556
54	5,022,557
105	5,022,558
109	5,022,559
131	5,022,560
153	5,022,561
182	5,022,562
327	5,022,563
386.5	5,022,564
396	5,022,565
475	5,022,567
480	5,022,566
CLASS 223	
88	5,022,569
94	5,022,570
95	5,022,571
CLASS 224	
30 R	5,022,572
42.21	5,022,573
153	5,022,574
273	5,022,575
CLASS 225	
20	5,022,576
47	5,022,577
CLASS 226	
74	5,022,578
CLASS 227	
177	5,022,579
CLASS 228	
56.3	5,022,580
164	5,022,581
CLASS 229	
157	5,022,582
CLASS 235	
375	5,023,434
	5,023,435
380	5,023,436
432	5,023,437
472	5,023,438
CLASS 236	
49 5	5,022,583
CLASS 238	
282	5,022,584
CLASS 239	
70	5,022,585
71	5,022,586
72	5,022,587
211	5,022,588
708	5,022,590
CLASS 241	
169 1	5,022,591
172	5,022,592
194	5,022,593
282 2	5,022,594
CLASS 242	
7 23	5,022,595
36	5,022,596
56 R	5,022,597
68 4	5,022,598
75.51	5,022,599
107.1	5,022,600
107.4 A	5,022,601
159	5,022,602
167	5,022,603
203	5,022,604
233	5,022,605
307	5,022,606
CLASS 244	
3 12	5,022,607
3 18	5,022,608
102 R	5,022,609
118.3	5,022,610
134 A	5,022,611
134 D	5,022,612
CLASS 246	
125	5,022,613
CLASS 248	
62	5,022,614
74.1	5,022,615
106	5,022,616
125	5,022,617
146	5,022,618
178	5,022,619
188.6	5,022,620
225.2	5,022,621
231 7	5,022,622
231.9	5,022,623
274	5,022,624
309 2	5,022,625
311 2	5,022,626
558	5,022,627
638	5,022,628
CLASS 250	
201.5	5,023,439
203.6	5,023,440
206 2	5,023,441
208.1	5,023,442
	5,023,443
221	5,023,444
227.15	5,023,445
227.16	5,023,446
227 24	5,023,447
235	5,023,448
252.1	5,023,449
261	5,023,450
306	5,023,452
309	5,023,453
330	5,023,451
332	5,023,459
370.01	5,023,455
374	5,023,456
396 ML	5,023,457
396 R	5,023,458
455.1	5,023,460
484 1	5,023,461
492.2	5,023,462
551	5,023,463
CLASS 251	
129.02	5,022,629
149.6	5,022,630
185	5,022,631
CLASS 252	
8.8	5,023,003
47.5	5,023,005
62	5,023,006
67	5,023,007
106	5,023,008
171	5,023,009
	5,023,010
180	5,023,011
299 67	5,023,013
301.4 H	5,023,014
301.4 R	5,023,015
389 52	5,023,016
407	5,023,017
527	5,023,018
607	5,023,019
CLASS 254	
30	5,022,632
134 3 FT	5,022,633
134 4	5,022,634
CLASS 261	
18 1	5,023,020
76	5,023,021
111	5,023,022
CLASS 264	
1 7	5,023,023
4 3	5,023,024
13	5,023,025
22	5,023,026
37	5,023,027
40 1	5,023,028
40.5	5,023,029
	5,023,030
46.5	5,023,031
53	Re.33,609
63	5,023,032
161	5,023,033
184	5,023,034
	5,023,035
211.23	5,023,036
261	5,023,037
293	5,023,038
297.2	5,023,039
328.3	5,023,040
510	5,023,041
511	5,023,042
CLASS 266	
165	5,022,635
CLASS 269	
43	5,022,636
CLASS 270	
53	5,022,637
CLASS 271	
2	5,022,638
3	5,022,639
3.1	5,022,641
10	5,022,642
31	5,022,640
267	5,022,643
270	5,022,644
276	5,022,645
CLASS 272	
75	5,022,646
117	5,022,647
137	5,022,648
CLASS 273	
1.5 R	5,022,649
32 A	5,022,650
73 D	5,022,651
80 B	5,022,652
85 CP	5,022,653
145 CA	5,022,654
157 R	5,022,655
186 A	5,022,656
201	5,022,657
416	5,022,658
CLASS 276	
98	5,022,700
CLASS 277	
1	5,022,659
9	5,022,660
213	5,022,661
235 B	5,022,662
236	5,022,663
	5,022,664
CLASS 279	
2 R	5,022,665
CLASS 280	
1.16	5,022,666
1.188	5,022,667
7.14	5,022,668
30	5,022,669
32 6	5,022,670
250	5,022,671
281.1	5,022,672
673	5,022,673
741	5,022,674
743	5,022,675
	5,022,676
801	5,022,677
815	5,022,678
833	5,022,679
851	5,022,680
CLASS 281	
15.11	5,022,681
38	5,022,682
CLASS 283	
58	5,022,683
CLASS 285	
12	5,022,684
45	5,022,685
134	5,022,686
321	5,022,687
363	5,022,688
CLASS 290	
48	5,023,466
CLASS 292	
19	5,022,689
21	5,022,690
121	5,022,691
CLASS 293	
128	5,022,692
CLASS 294	
1 1	5,022,693
82.2	5,022,694
88	5,022,695
CLASS 296	
36	5,022,696
37.6	5,022,697
65.1	5,022,698
97.5	Re.33,610
	5,022,699
152	5,022,701
181	5,022,702
183	5,022,703
195	5,022,704
213	5,022,705
CLASS 297	
162	5,022,706
216	5,022,707
327	5,022,708
452	5,022,709
CLASS 301	
37 S	5,022,710
47	5,022,711
63 PW	5,022,712
CLASS 303	
1	5,022,713
7	5,022,714
9 68	5,022,715
104	5,022,716
119	5,022,717
CLASS 305	
24	5,022,718
CLASS 307	
10.1	5,023,467
	5,023,468
64	5,023,469
108	5,023,470
149	5,023,471
270	5,023,472
	5,023,473
	5,023,474
272.2	5,023,475
296.1	5,023,476
425	5,023,477
446	5,023,478
	5,023,479
448	5,023,480
456	5,023,481
	5,023,482
463	5,023,483
465	5,023,484
	5,023,485
	5,023,486
475	5,023,487
	5,023,488
490	5,023,489
492	5,023,490
521	5,023,491
570	5,023,493
571	5,023,494
CLASS 310	
12	5,023,495
	5,023,496
36	5,023,497
71	5,023,498
105	5,023,499
218	5,023,500
258	5,023,501
261	5,023,502
311	5,023,503
322	5,023,504
CLASS 312	
140	5,022,719
223	5,022,720
257 1	5,022,721
309	5,022,722

CLASS 313	
25	5,023,505
	5,023,506
407	5,023,507
414	5,023,508
430	5,023,509
440	5,023,510
524	5,023,511
560	5,023,512
CLASS 315	
39.51	5,023,514
88	5,023,515
101	5,023,516
200 A	5,023,517
219	5,023,518
242	5,023,519
276	5,023,520
290	5,023,521
291	5,023,522
364	5,023,523
383	5,023,524
408	5,023,525
CLASS 318	
116	5,023,526
254	5,023,527
	5,023,528
266	5,023,529
446	5,023,530
471	5,023,531
541	5,023,532
568.21	5,023,533
587	5,023,534
599	5,023,535
638	5,023,536
732	5,023,537
811	5,023,538
CLASS 322	
28	5,023,539
58	5,023,540
CLASS 323	
275	5,023,541
284	5,023,542
314	5,023,543
CLASS 324	
158 F	5,023,544
158 P	5,023,545
174	5,023,546
	5,023,547
212	5,023,548
220	5,023,549
262	5,023,550
303	5,023,551
309	5,023,552
	5,023,553
	5,023,554
318	5,023,555
439	5,023,556
515	5,023,558
537	5,023,557
662	5,023,559
664	5,023,560
719	5,023,561
CLASS 329	
303	5,023,562
CLASS 330	
4.3	5,023,563
107	5,023,564
151	5,023,565
251	5,023,566
253	5,023,567
257	5,023,568
285	5,023,569
299	5,023,570
CLASS 331	
4	5,023,571
10	5,023,572
CLASS 333	
17.2	5,023,573
20	5,023,574
105	5,023,575
118	5,023,576
182	5,023,577
185	5,023,578
203	5,023,579
206	5,023,580
CLASS 335	
126	5,023,581
167	5,023,582
195	5,023,583
216	5,023,584
CLASS 336	
69	5,023,585
CLASS 337	
104	5,023,586
123	5,023,587
195	5,023,588
CLASS 338	
308	5,023,589
CLASS 340	
146.2	5,023,590
426	5,023,591
467	5,023,599
475	5,023,592
522	5,023,593
552	5,023,594
569	5,023,595
571	5,023,596
572	5,023,597
	5,023,598
	5,023,600
628	5,023,601
701	5,023,602
793	5,023,603
825.03	5,023,604
825.31	5,023,605
825.8	5,023,606
908.1	5,023,607
984	5,023,608
CLASS 341	
50	5,023,609
51	5,023,610
	5,023,611
94	5,023,612
118	5,023,613
144	5,023,614
152	5,023,615
CLASS 342	
52	5,023,616
70	5,023,617
128	5,023,618
361	5,023,619
362	5,023,620
368	5,023,634
CLASS 343	
702	5,023,621
715	5,023,622
725	5,023,623
860	5,023,624
CLASS 346	
1.1	5,023,625
33 TP	5,023,626
76 PH	5,023,627
	5,023,628
140 R	5,023,629
	5,023,630
154	5,023,631
157	5,023,632
160	5,023,633
CLASS 350	
1.2	5,022,723
1.3	5,022,724
1.4	5,022,725
1.7	5,022,726
3.76	5,022,727
96.10	5,022,728
96.12	5,022,729
96.13	5,022,730
96.14	5,022,731
96.15	5,022,732
	5,022,734
96.18	5,022,733
96.21	5,022,735
96.24	5,022,736
96.29	5,022,737
96.34	5,022,738
102	5,022,739
114	5,022,740
353	5,022,741
355	5,022,742
507	5,022,743
530	5,022,744
608	5,022,745
610	5,022,746
612	5,022,747
639	5,022,748
CLASS 351	
219	5,022,749
CLASS 352	
31	5,022,750
CLASS 354	
76	5,023,635
86	5,023,636
106	5,023,637
126	5,023,638
132	5,023,639
173.1	5,023,640
195.1	5,023,641
275	5,023,642
299	5,023,643
320	5,023,644
400	5,023,645
402	5,023,646
414	5,023,647
420	5,023,648
434	5,023,649
441	5,023,650
CLASS 355	
1	5,023,651
	5,023,652
27	5,023,653
	5,023,654
39	5,023,655
41	5,023,656
45	5,023,657
72	5,023,658
85	5,023,659
200	5,023,660
210	5,023,661
228	5,023,662
243	5,023,663
245	5,023,664
256	5,023,665
269	5,023,666
274	5,023,667
281	5,023,668
283	5,023,464
319	5,023,669
326	5,023,670
CLASS 356	
1	5,022,751
73.1	5,022,752
124	5,022,753
300	5,022,754
307	5,022,755
316	5,022,756
318	5,022,757
319	5,022,758
350	5,022,759
	5,022,760
	5,022,761
372	5,022,762
400	5,022,763
404	5,022,764
435	5,022,765
CLASS 357	
4	5,023,671
15	5,023,672
16	5,023,673
	5,023,674
22	5,023,675
	5,023,676
	5,023,677
23.4	5,023,678
	5,023,679
23.5	5,023,680
	5,023,681
23.6	5,023,682
	5,023,683
27	5,023,684
30	5,023,685
	5,023,686
34	5,023,687
42	5,023,688
	5,023,689
43	5,023,690
	5,023,691
	5,023,692
46	5,023,693
54	5,023,694
60	5,023,696
65	5,023,697
67	5,023,698
68	5,023,699
70	5,023,700
71	5,023,701
74	5,023,702
	5,023,703
82	5,023,695
CLASS 358	
29 C	5,023,704
75	5,023,708
76	5,023,711
80	5,023,705
84	B1 4,745,468
105	5,023,712
	5,023,713
107	5,023,714
125	5,023,709
133	5,023,710
	5,023,715
138	5,023,716
140	5,023,717
147	5,023,721
160	5,023,718
180	5,023,719
183	5,023,720
224	5,023,722
225	5,023,723
227	5,023,724
231	5,023,725
254	5,023,706
	5,023,726
310	5,023,727
343	5,023,707
437	5,023,728
457	5,023,729
CLASS 360	
48	5,023,730
64	5,023,731
77.04	5,023,733
77.08	5,023,732
84	5,023,734
104	5,023,735
105	5,023,736
	5,023,737
122	5,023,738
132	5,023,739
	5,023,740
	5,023,741
137	5,023,742
CLASS 361	
1	5,023,743
26	5,023,744
56	5,023,745
	5,023,746
117	5,023,747
229	5,023,748
292	5,023,749
302	B1 4,424,551
313	5,023,750
398	5,023,751
399	5,023,752
400	5,023,753
415	5,023,754
CLASS 362	
12	5,023,755
16	5,023,756
	5,023,757
61	5,023,758
66	5,023,759
	5,023,760
120	5,023,761
223	5,023,762
240	5,023,763
299	5,023,764
429	5,023,765
CLASS 363	
16	5,023,766
17	5,023,767
68	5,023,768
86	5,023,769
CLASS 364	
140	5,023,770
200	5,023,771
	5,023,772
	5,023,773
	5,023,774
	5,023,775
	5,023,776
	5,023,777
	5,023,778
	5,023,779
	5,023,780
405	5,023,781
	5,023,782
413.02	5,023,783
413.07	5,023,784
413.08	5,023,785
419	5,023,786
420	5,023,787
424.01	5,023,788
424.02	5,023,790
424.04	5,023,791
424.1	5,023,789
426.04	5,023,792
431.02	5,023,793
431.04	5,023,794
431.06	5,023,795
434	5,023,796
442	5,023,797
449	5,023,798
	5,023,799
474.24	5,023,800
480	5,023,801
496	5,023,802
497	5,023,803
498	5,023,804
507	5,023,805
508	5,023,845
509	5,023,806
513	5,023,807
	5,023,808
516	5,023,809
518	5,023,810
	5,023,811
519	5,023,812
	5,023,813
526	5,023,814
	5,023,815
550	5,023,816
	5,023,817
551.01	5,023,818
558	5,023,819
562	5,023,820
602	5,023,821
703	5,023,822
708	5,023,823
	5,023,824
724.10	5,023,825
736	5,023,826
744	5,023,827
900	5,023,828
	5,023,829
	5,023,831
	5,023,832
CLASS 365	
49	5,023,833
52	5,023,834
113	5,023,859
155	5,023,835
174	5,023,836
185	5,023,837
189.08	5,023,838
200	5,023,839
201	5,023,840
203	5,023,465
205	5,023,841
	5,023,842
222	5,023,843
230.05	5,023,844
CLASS 367	
127	5,023,846
136	5,023,847
CLASS 368	
1	5,023,848
15	5,023,849
28	5,023,850
41	5,023,851
93	5,023,852
230	5,023,853
CLASS 369	
32	5,023,854
	5,023,856
44.25	5,023,857
44.28	5,023,855
112	5,023,858
116	5,023,860
215	5,023,861
	5,023,862
CLASS 370	
1	5,023,863
	5,023,864
3	5,023,865
24	5,023,866
56	5,023,867
62	5,023,868
84	5,023,869
85.2	5,023,870
85.500	5,023,871
CLASS 371	
5.1	5,023,872
8.2	5,023,873
21.2	5,023,874
25.1	5,023,875
40.1	5,023,876
CLASS 372	
7	5,023,877
20	5,023,878
43	5,023,879
45	5,023,880
46	5,023,881
50	5,023,882
56	5,023,883
57	5,023,884
92	5,023,885
99	5,023,886
CLASS 374	
209	5,022,766
CLASS 375	
1	5,023,887
23	5,023,888
27	5,023,889
34	5,023,890
87	5,023,891
118	5,023,892
CLASS 376	
150	5,023,043
213	5,023,044
215	5,023,045
261	5,023,046
370	5,023,047
416	5,023,048
CLASS 377	
117	5,023,893
CLASS 378	
4	5,023,894
	5,023,895
99	5,023,896
122	5,023,897
146	5,023,898
196	5,023,899
CLASS 379	
32	5,023,900
38	5,023,901
59	5,023,902
67	5,023,903
91	5,023,904
96	5,023,905
372	5,023,906
CLASS 380	
4	5,023,907
23	5,023,908
CLASS 381	
15	5,023,909
37	5,023,910
43	5,023,911
	5,023,912
63	5,023,913
97	5,023,914
120	5,023,915
CLASS 382	
8	5,023,916
	5,023,917
24	5,023,918
54	5,023,919
55	5,023,920
58	5,023,921
59	5,023,922
61	5,023,923
CLASS 383	
33	5,022,767
CLASS 384	
19	5,022,768
118	5,022,769
477	5,022,770
CLASS 388	
811	5,023,924
CLASS 392	
384	5,023,925
402	5,023,926
442	5,023,927
457	5,023,928
CLASS 400	
120	5,022,771
CLASS 401	
52	5,022,774
65	5,022,772
107	5,022,773
	5,022,775
CLASS 403	
14	5,022,777
120	5,022,778
138	5,022,779
275	5,022,780
CLASS 404	
6	5,022,781
	5,022,782
122	5,022,783
CLASS 405	
15	5,022,784
69	5,022,785
128	5,022,786
	5,022,787
	5,022,788
133	5,022,789
186	5,022,790
260	5,022,791
267	5,022,792
CLASS 406	
153	5,022,793
171	5,022,794
CLASS 407	
47	5,022,795
113	5,022,796
119	5,022,797
CLASS 408	
1 R	5,022,798
	5,022,799
14	5,022,800
144	5,022,801
CLASS 409	
52	5,022,802
CLASS 411	
19	5,022,803
104	5,022,804
468	5,022,805
CLASS 414	
208	5,022,806
278	5,022,807
280	5,022,808
494	5,022,809
501	5,022,810
607	5,022,811

VOL
1127
ISS
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CLASSIFICATION OF PATENTS

729 5,022,812
790 5,022,813
799 5,022,814

CLASS 415

107 5,022,815
115 5,022,816
5,022,817
209.3 5,022,818

CLASS 416

62 5,022,819
89 5,022,820
167 5,022,821
219 R 5,022,822
230 5,022,824
244 A 5,022,823
500 5,022,825

CLASS 417

63 5,022,826
360 5,022,827
362 5,022,828
423.14 5,022,830
423.2 5,022,829
500 5,022,831
571 5,022,832
5,022,833

CLASS 418

55.1 5,022,834
63 5,022,835
76 5,022,836
132 5,022,837
257 5,022,842

CLASS 420

91 5,023,049
448 5,023,050
549 5,023,051

CLASS 422

56 5,023,052
82.05 5,023,053
82.09 5,023,054
83 5,023,055
186 5,023,056
202 5,023,057
248 5,023,058

CLASS 423

9 5,023,059
27 5,023,060
70 5,023,061
239 5,023,063
242 5,023,064
326 5,023,065
328 5,023,066
420 5,023,067
446 5,023,068
574 R 5,023,069
592 5,023,070
5,023,071

CLASS 424

9 5,023,072
10 5,023,073
52 5,023,074
63 5,023,075
78 5,023,076
88 5,023,077
94.64 5,023,078
120 5,023,079
405 5,023,080
5,023,081
426 5,023,082
439 5,023,083
448 5,023,084
449 5,023,085
450 5,023,086
5,023,087
473 5,023,088
502 5,023,089
520 5,023,090

CLASS 425

145 5,022,838
161 5,022,839
222 5,022,840
235 5,022,841
289 5,022,843
302.1 5,022,844
403 5,022,845
564 5,022,846
578 5,022,847

CLASS 426

2 5,023,091
3 5,023,092
5,023,093
20 5,023,094
89 5,023,096
250 5,023,095
271 5,023,097
474 5,023,098
549 5,023,099
601 5,023,100
603 5,023,101
610 5,023,102
626 5,023,103
634 5,023,104
650 5,023,105
660 5,023,106

CLASS 427

2 5,023,107
3 5,023,108
45 1 5,023,109
49 5,023,110
164 5,023,111
287 5,023,112
320 5,023,113
338 5,023,114
388.2 5,023,115
424 5,023,116

CLASS 428

17 5,023,117
24 5,023,118
34.1 5,023,137
35.2 5,023,119
35 9 5,023,120
36 9 5,023,121
43 5,023,122
76 5,023,124
100 5,023,125
126 5,023,126
137 5,023,127
172 5,023,128
195 5,023,129
227 5,023,130
234 5,023,132
288 5,023,131
332 5,023,133
336 5,023,134
5,023,135
341 5,023,136
352 5,023,138
392 5,023,123
402 5,023,139
413 5,023,140
458 5,023,141
500 5,023,142
516 5,023,143
606 5,023,144
614 5,023,145
623 5,023,146
627 5,023,147
694 5,023,148

CLASS 429

22 5,023,150
24 5,023,151
27 5,023,149
32 5,023,152
40 5,023,153
182 5,023,154
223 5,023,155

CLASS 430

5 5,023,156
24 5,023,157
99 5,023,158
109 5,023,159
114 5,023,160
137 5,023,161
203 5,023,162
207 5,023,163
270 5,023,164
285 5,023,165
307 5,023,166
495 5,023,167
5,023,168
505 5,023,169
558 5,023,170

CLASS 431

2 5,022,848
5,022,849
207 5,022,850
215 5,022,851

CLASS 432

115 5,022,852
200 5,022,853

CLASS 433

8 5,022,854
18 5,022,855
72 5,022,856
85 5,022,857
97 5,022,858
141 5,022,859
174 5,022,860

CLASS 435

6 5,023,171
29 5,023,172
5,023,173
91 5,023,174
101 5,023,175
105 5,023,176
134 5,023,177
170 5,023,178
172 3 5,023,179
5,023,180
189 5,023,181
235.1 5,023,182
240.3 5,023,183
252 1 5,023,184

CLASS 436

8 5,023,185
11 5,023,186
180 5,023,187

CLASS 437

8 5,023,188
5,023,189
27 5,023,191
31 5,023,192
5,023,193
5,023,194
5,023,195
40 5,023,196
5,023,197
56 5,023,190
129 5,023,198
167 5,023,199
187 5,023,200
192 5,023,201
206 5,023,202
228 5,023,203
5,023,204
5,023,205
5,023,206

CLASS 439

13 5,022,861
83 5,022,862
108 5,022,863
192 5,022,864
279 5,022,865
372 5,022,866
395 5,022,857
399 5,022,868
526 5,022,869
608 5,022,870
609 5,022,871
610 Re.33,611
668 5,022,872
716 5,022,873
724 5,022,874

CLASS 440

49 5,022,875
63 5,022,876
89 5,022,877

CLASS 441

103 5,022,878
113 5,022,879

CLASS 445

6 5,022,880
7 5,022,881
21 5,022,882
50 5,022,883

CLASS 446

14 5,022,884
95 5,022,885
268 5,022,886

CLASS 450

54 5,022,887

CLASS 452

115 5,022,120
174 5,022,888

CLASS 453

6 5,022,889
56 5,022,890

CLASS 455

2 5,023,929
9 5,023,930
21 5,023,931
34 5,023,932
45 5,023,933
5,023,934
80 5,023,935
90 5,023,936
126 5,023,937
183 5,023,938
188 5,023,939
212 5,023,940
307 5,023,941
601 5,023,942
603 5,023,943
611 5,023,944
616 5,023,948
617 5,023,945
618 5,023,949
619 5,023,946
5,023,947
5,023,950
5,023,951

CLASS 501

8 5,023,207
12 5,023,208
13 5,023,209
71 5,023,210
87 5,023,211
5,023,212
96 5,023,213
97 5,023,214
98 5,023,215
5,023,216
103 5,023,217
105 5,023,218
136 5,023,219

CLASS 502

65 5,023,220
66 5,023,221
103 5,023,222
116 5,023,223
214 5,023,224
304 5,023,225
313 5,023,226

CLASS 503

214 5,023,227
227 5,023,228
5,023,229

CLASS 505

1 5,023,230
5,023,231

CLASS 512

19 5,023,232

CLASS 514

11 5,023,233
15 5,023,234
18 5,023,235
5,023,236
5,023,237
21 5,023,238
26 5,023,239
30 5,023,240
5,023,241
31 5,023,242
44 5,023,243
46 5,023,244
54 5,023,245
57 5,023,246
64 5,023,513
89 5,023,247
103 5,023,248
170 5,023,249
179 5,023,250
5,023,251
183 5,023,252
228.2 5,023,253
235.5 5,023,254
242 5,023,255
253 5,023,256
254 5,023,257
255 5,023,258
256 5,023,259
269 5,023,260
285 5,023,261
291 5,023,262
5,023,263
5,023,264
300 5,023,265
317 5,023,266
372 5,023,267
400 5,023,268
438 5,023,269
455 5,023,270
458 5,023,271
471 5,023,272
530 5,023,273
627 5,023,275
703 5,023,276

CLASS 518

715 5,023,277

CLASS 521

85 5,023,278
5,023,279
106 5,023,280

CLASS 523

122 5,023,281

CLASS 524

59 5,023,282
101 5,023,283
109 5,023,284
120 5,023,285
128 5,023,286
166 5,023,313
255 5,023,287
268 5,023,288
302 5,023,289
320 5,023,290
430 5,023,291
432 5,023,292
539 5,023,293
547 5,023,294
783 5,023,295

CLASS 525

58 5,023,296
67 5,023,297
103 5,023,298
146 5,023,299
194 5,023,300
232 5,023,301
378 5,023,302
438 5,023,303

CLASS 526

160 5,023,304
194 5,023,305

CLASS 528

29 5,023,307
49 5,023,309
89 5,023,310
153 5,023,311
190 5,023,314
323 5,023,315
357 5,023,316
389 5,023,317
392 5,023,318
423 5,023,308

CLASS 530

212 5,023,319
324 5,023,321
5,023,322
350 5,023,320
399 5,023,323

CLASS 534

606 5,023,324
618 5,023,274
5,023,325
638 5,023,326

CLASS 536

18.4 5,023,327
27 5,023,328
119 5,023,329
124 5,023,330

CLASS 540

230 5,023,331

CLASS 544

132 5,023,357
185 5,023,332

CLASS 546

175 5,023,333
268 5,023,334

CLASS 548

104 5,023,335
110 5,023,336
306 5,023,337
336 5,023,338
401 5,023,339
453 5,023,340

CLASS 549

23 5,023,341
34 5,023,342
74 5,023,343
229 5,023,344
230 5,023,345
231 5,023,346
263 5,023,347
264 5,023,348
274 5,023,349
5,023,350
321 5,023,351
345 5,023,352
348 5,023,353
364 5,023,354
478 5,023,355

CLASS 552

210 5,023,356

CLASS 556

42 5,023,358
114 5,023,359
117 5,023,360

CLASS 558

32 5,023,361
160 5,023,312

CLASS 560

52 5,023,363
53 5,023,364
56 5,023,365
71 5,023,366
183 5,023,362
193 5,023,367
195 5,023,368

CLASS 562

17 5,023,369
125 5,023,370
512 5,023,371
598 5,023,372

CLASS 564

152 5,023,374
159 5,023,375
298 5,023,376
301 5,023,377
340 5,023,378
472 5,023,379

CLASS 568

34 5,023,380
322 5,023,381
352 5,023,382
815 5,023,383
842 5,023,384
851 5,023,385
931 5,023,386

CLASS 570

252 5,023,387

CLASS 585

9 5,023,388
304 5,023,389
320 5,023,390
500 5,023,391
5,023,392
5,023,393

CLASSIFICATION OF DESIGNS

D1— 120 317,372
127 317,373
D2— 29 317,374
228 317,375
335 317,376
D3— 48 317,377
62 317,378
74 317,379
75 317,380
D6— 373 317,381
408 317,382
455 317,383
515 317,384
522 317,385
524 317,386
D7— 301 317,387
305 317,401
400 317,388
543 317,389
D8— 4 317,390
14 317,391
41 317,392
70 317,393
71 317,394
97 317,395
98 317,396
322 317,397
336 317,398
376 317,399
382 317,400
D9— 314 317,402
334 317,403
344 317,404
347 317,405
377 317,406
317,407
415 317,408
424 317,409
426 317,410
435 317,411
D10— 28 317,412
32 317,413
57 317,414
60 317,415
64 317,416
98 317,417
108 317,418
116 317,419
D11— 35 317,421
42 317,422
93 317,423
164 317,424
D12— 97 317,425
143 317,427
156 317,428
157 317,429
162 317,426
191 317,430
317 317,431
337 317,432
D13— 132 317,433
133 317,434
317,435
147 317,436
317,437
158 317,438
160 317,439
D14— 100 317,440
317,441
106 317,442
317,443
317,444
107 317,445
113 317,446
317,447
114 317,448
138 317,449
214 317,450
217 317,451
250 317,452
D15— 70 317,453
83 317,454
139 317,455
D16— 202 317,456
317,457
D18— 7 317,458
13 317,420
317,459
36 317,460
D19— 27 317,462
59 317,463
317,464
75 317,461
76 317,465
83 317,466
92 317,467
D20— 6 317,468
10 317,469
D21— 34 317,470
37 317,471
64 317,472
65 317,473
108 317,474
317,475
317,476
317,477
317,478
317,479
317,480
317,481
317,482
111 317,483
136 317,484
137 317,485
317,486
163 317,487
191 317,488
203 317,489
219 317,490
229 317,492
234 317,491
D22— 142 317,493
D23— 235 317,494
241 317,495
317,496
249 317,497
308 317,498
339 317,499
386 317,500
D24— 115 317,503
143 317,504
317,505
169 317,501
187 317,502
D25— 139 317,506
D26— 2 317,507
3 317,508
67 317,509
88 317,510
89 317,511
111 317,512
140 317,513
D28— 12 317,514
60 317,515
D29— 15 317,516
D30— 102 317,517
109 317,518
D32— 70 317,519
D34— 31 317,520
38 317,521

CLASSIFICATION OF PLANTS

P.— 20 7,548
7,549
39 7,550
50 7,553
51 7,551
7,552
7,554
7,555

VOL
1127
ISS
2
JE
11
1991
UMI

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 5,022,094
5,022,306
5,022,823
5,022,913
5,023,050
02 5,022,451
04 5,022,228
5,022,386
5,022,390
5,022,465
5,022,555
5,022,602
5,022,607
5,022,771
5,022,817
5,022,987
5,023,196
5,023,253
5,023,479
5,023,503
5,023,576
5,023,593
5,023,775
5,023,796
5,023,832
5,023,848
5,023,870
05 5,022,202
5,022,328
06 Re.33,608
5,022,098
5,022,099
5,022,131
5,022,151
5,022,156
5,022,190
5,022,210
5,022,211
5,022,237
5,022,258
5,022,272
5,022,278
5,022,288
5,022,291
5,022,301
5,022,314
5,022,316
5,022,317
5,022,340
5,022,345
5,022,384
5,022,389
5,022,391
5,022,400
5,022,402
5,022,421
5,022,422
5,022,426
5,022,478
5,022,536
5,022,540
5,022,559
5,022,560
5,022,561
5,022,562
5,022,565
5,022,572
5,022,575
5,022,581
5,022,609
5,022,612
5,022,613
5,022,624
5,022,633
5,022,656
5,022,669
5,022,685
5,022,690
5,022,706
5,022,708
5,022,722
5,022,726
5,022,743
5,022,750
5,022,755
5,022,782
5,022,783
5,022,784
5,022,786
5,022,790
5,022,800
5,022,854
5,022,859
5,022,884
5,022,885
5,022,898
5,022,912
5,022,915
5,022,942
5,022,957
5,022,966
5,022,988
5,023,021
5,023,022
5,023,039
5,023,056
5,023,076
5,023,078
5,023,080
5,023,083
5,023,087
5,023,088
5,023,109
5,023,116
5,023,125
5,023,148
5,023,173
5,023,182
5,023,183
5,023,189
5,023,193
5,023,194
5,023,202
5,023,205
5,023,206
5,023,208
5,023,221
5,023,236
5,023,243
5,023,245
5,023,271
5,023,310
5,023,341
5,023,360
5,023,424
5,023,452
5,023,459
5,023,474
5,023,477
5,023,481
5,023,482
5,023,483
5,023,484
5,023,486
5,023,488
5,023,494
5,023,517
5,023,542
5,023,549
5,023,554
5,023,563
5,023,567
5,023,571
5,023,574
5,023,577
5,023,590
5,023,592
5,023,594
5,023,597
5,023,606
5,023,607
5,023,610
5,023,612
5,023,614
5,023,623
5,023,659
5,023,661
5,023,678
5,023,694
5,023,701
5,023,707
5,023,719
5,023,720
5,023,725
5,023,737
5,023,760
5,023,765
5,023,787
5,023,789
5,023,800
5,023,808
5,023,831
5,023,833
5,023,861
5,023,872
5,023,875
5,023,879
5,023,882
5,023,884
5,023,886
5,023,889
5,023,891
5,023,893
5,023,916
5,023,920
5,023,931
5,023,944
4,424,551
8,307,059
08 5,022,144
5,022,257
5,022,269
5,022,305
5,022,524
5,023,112
5,023,315
5,023,672
5,023,736
5,023,749
5,023,756
5,023,838
5,023,857
09 5,022,101
5,022,267
5,022,273
5,022,403
5,022,417
5,022,497
5,022,545
5,022,638
5,022,639
5,022,804
5,022,824
5,022,825
5,022,834
5,022,953
5,022,964
5,023,008
5,023,016
5,023,040
5,023,085
5,023,151
5,023,155
5,023,292
5,023,317
5,023,367
5,023,398
5,023,444
5,023,551
5,023,582
5,023,598
5,023,727
5,023,793
5,023,797
5,023,804
4,745,468
10 5,022,297
5,022,856
5,023,009
5,023,010
5,023,025
5,023,063
5,023,092
5,023,131
5,023,214
5,023,230
5,023,231
5,023,349
5,023,350
5,023,362
11 5,022,767
5,023,067
12 5,022,103
5,022,107
5,022,155
5,022,171
5,022,224
5,022,244
5,022,247
5,022,277
5,022,337
5,022,381
5,022,420
5,022,537
5,022,547
5,022,597
5,022,651
5,022,671
5,022,693
5,022,746
5,022,816
5,022,818
5,022,819
5,022,822
5,022,860
5,022,877
5,023,042
5,023,186
5,023,504
5,023,556
5,023,600
5,023,624
5,023,824
5,023,888
13 5,022,120
5,022,181
5,022,233
5,022,243
5,022,331
5,022,535
5,022,541
5,022,618
5,022,649
5,022,694
5,022,805
5,023,319
5,023,329
15 5,023,077
5,023,528
16 5,022,378
5,022,812
5,022,853
5,023,190
5,023,465
17 Re.33,611
5,022,095
5,022,102
5,022,119

VOL
1127
ISS
2
JE
11
1991
UMI

	5,022,129
	5,022,133
	5,022,207
	5,022,242
	5,022,248
	5,022,289
	5,022,321
	5,022,364
	5,022,368
	5,022,370
	5,022,385
	5,022,387
	5,022,443
	5,022,489
	5,022,512
	5,022,526
	5,022,538
	5,022,550
	5,022,566
	5,022,582
	5,022,614
	5,022,616
	5,022,620
	5,022,650
	5,022,681
	5,022,689
	5,022,718
	5,022,727
	5,022,828
	5,022,874
	5,022,888
	5,022,920
	5,022,927
	5,022,963
	5,022,970
	5,022,983
	5,023,000
	5,023,051
	5,023,096
	5,023,102
	5,023,122
	5,023,417
	5,023,460
	5,023,469
	5,023,493
	5,023,507
	5,023,520
	5,023,521
	5,023,527
	5,023,537
	5,023,540
	5,023,580
	5,023,622
	5,023,726
	5,023,820
	5,023,864
	5,023,866
	5,023,868
	5,023,877
	5,023,900
	5,023,903
	5,023,910
	5,023,911
	5,023,937
	5,023,940
18	5,022,235
	5,022,299
	5,022,358
	5,022,359
	5,022,436
	5,022,479
	5,022,488
	5,022,832
	5,022,876
	5,023,154
	5,023,269
	5,023,297
	5,023,558
19	5,022,132
	5,022,549
	5,022,593
	5,022,711
	5,023,174
	5,023,823
20	5,022,174
	5,022,176
	5,022,333
	5,022,610
	5,022,658
	5,023,313
	5,023,429
	5,023,755
	5,023,784
	5,023,815
21	5,022,149
	5,022,346
	5,022,952
	5,023,103
	5,023,117
	5,023,225
	5,023,410
	5,023,413
	5,023,813
22	5,022,231
	5,022,525
	5,022,781
	5,022,785
	5,023,278
	5,023,387
24	5,022,096
	5,022,164
	5,022,307
	5,022,326
	5,022,411
	5,022,470
	5,022,683
	5,022,879
	5,022,926
	5,023,032
	5,023,210
	5,023,290
	5,023,371
	5,023,572
	5,023,845
	5,023,892
	5,023,906
	5,023,942
25	5,022,109
	5,022,168
	5,022,253
	5,022,261
	5,022,425
	5,022,518
	5,022,521
	5,022,528
	5,022,556
	5,022,652
	5,022,682
	5,022,735
	5,022,741
	5,022,745
	5,022,747
	5,022,757
	5,022,760
	5,022,880
	5,022,882
	5,022,899
	5,022,941
	5,022,968
	5,022,996
	5,023,015
	5,023,086
	5,023,138
	5,023,281
	5,023,333
	5,023,342
	5,023,431
	5,023,440
	5,023,458
	5,023,480
	5,023,545
	5,023,586
	5,023,605
	5,023,636
	5,023,741
	5,023,807
	5,023,826
	5,023,828
	5,023,905
	5,023,907
	5,023,908
	5,023,914
	5,023,933
	5,023,945
26	Re.33,610
	5,022,113
	5,022,115
	5,022,135
	5,022,146
	5,022,205
	5,022,292
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	5,022,347
	5,022,371
	5,022,376
	5,022,394
	5,022,408
	5,022,414
	5,022,450
	5,022,530
	5,022,571
	5,022,587
	5,022,635
	5,022,665
	5,022,674
	5,022,675
	5,022,676
	5,022,680
	5,022,692
	5,022,702
	5,022,712
	5,022,714
	5,022,719
	5,022,720
	5,022,833
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	5,022,895
	5,022,911
	5,022,938
	5,022,943
	5,022,992
	5,023,017
	5,023,031
	5,023,033
	5,023,095
	5,023,134
	5,023,284
	5,023,307
	5,023,334
	5,023,451
	5,023,535
	5,023,539
	5,023,546
	5,023,547
	5,023,599
	5,023,617
	5,023,641
	5,023,655
	5,023,764
	5,023,778
	1,033,090
27	5,022,158
	5,022,200
	5,022,270
	5,022,395
	5,022,625
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	5,022,679
	5,022,697
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	5,023,011
	5,023,171
	5,023,426
	5,023,668
	5,023,706
	5,023,738
	5,023,754
	5,023,816
28	5,022,271
	5,022,310
	5,023,353
	5,023,409
	5,023,915
29	5,022,177
	5,022,196
	5,022,245
	5,022,388
	5,022,442
	5,022,459
	5,022,460
	5,022,707
	5,022,945
	5,023,323
	5,023,369
	5,023,382
	5,023,402
	5,023,500
	5,023,505
30	5,022,419
	5,022,838
31	5,022,108
	5,022,137
	5,022,621
	5,022,632
32	5,022,653
	5,023,714
33	5,022,820
	5,023,111
34	5,022,097
	5,022,166
	5,022,189
	5,022,194
	5,022,266
	5,022,268
	5,022,320
	5,022,339
	5,022,341
	5,022,366
	5,022,466
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	5,022,954
	5,022,995
	5,022,997
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	5,023,093
	5,023,100
	5,023,105
	5,023,108
	5,023,167
	5,023,168
	5,023,198
	5,023,220
	5,023,241
	5,023,262
	5,023,263
	5,023,264
	5,023,265
	5,023,276
	5,023,309
	5,023,314
	5,023,338
	5,023,344
	5,023,345
	5,023,347
	5,023,352
	5,023,368
	5,023,391
	5,023,392
	5,023,393
	5,023,518
	5,023,541
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	5,023,904
	5,023,917
	5,023,947
35	5,023,200
36	5,022,127
	5,022,150
	5,022,161
	5,022,180
	5,022,192
	5,022,197
	5,022,204
	5,022,212
	5,022,229
	5,022,234
	5,022,236
	5,022,240
	5,022,290
	5,022,313
	5,022,330
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	5,022,397
	5,022,398
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	5,023,179
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38	5,023,303
	5,023,430
39	5,022,148
	5,022,179
	5,022,186
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	5,022,241
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40	5,022,424
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	5,022,595
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41	5,022,342
	5,022,409
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	5,022,623
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	5,023,445
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	5,022,892
	5,022,909
	5,022,958
	5,022,982
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	5,023,128
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	5,023,141
	5,023,149
	5,023,187
	5,023,215
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	5,023,252
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44	5,022,100
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	5,023,072
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	5,023,132
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	5,023,377
	5,023,425
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47	5,022,352
	5,022,418
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	5,022,648
	5,022,844
	5,022,889
	5,023,213
	5,023,332
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48	5,022,110
	5,022,126
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	5,022,198
	5,022,226
	5,022,230
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	5,022,351
	5,022,377
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	5,022,467
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	5,022,481
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	5,022,928
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	5,023,002
	5,023,178
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	5,023,376
	5,023,380
	5,023,401
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	5,023,450
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	5,023,472
	5,023,485
	5,023,487
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	5,023,677
	5,023,680
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	5,023,761
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	5,023,834
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49	5,022,130
	5,022,170
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	5,023,747
50	5,022,283
	5,022,350
51	5,022,104
	5,022,111
	5,022,309
	5,022,416
	5,022,474
	5,022,608
	5,022,615
	5,022,643
	5,022,742
	5,022,762
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	5,023,006
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	5,023,130
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	5,023,525
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	5,023,930
	5,023,936
53	5,022,152
	5,022,159
	5,022,393
	5,022,445
	5,022,666
	5,022,684
	5,022,751
	5,022,799
	5,022,803
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	5,023,312
	5,023,559
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	5,023,791
	5,023,827
54	5,022,203
	5,022,324
	5,023,279
55	5,022,112
	5,022,178
	5,022,206
	5,022,219
	5,022,298
	5,022,312
	5,022,348
	5,022,355
	5,022,363
	5,022,404
	5,022,477
	5,022,495
	5,022,515
	5,022,542
	5,022,554
	5,022,837
	5,022,875
	5,022,903
	5,022,951
	5,022,967
	5,023,023
	5,023,091
	5,023,097
	5,023,126
	5,023,142
	5,023,145
	5,023,180
	5,023,404
	5,023,770
	5,023,852
	5,023,927
	5,023,928

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01 :	317,493
06 :	317,375
	317,394
	317,402
	317,414
	317,423
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	317,428
	317,431
	317,432
	317,443
	317,445
	317,450
	317,471
	317,489
	317,503
	317,508
	317,513
08 :	317,516
09	317,418
12	317,378
	317,434
	317,435
	317,451
13	317,374
15	317,502
17	317,398
	317,410
	317,412
	317,419
	317,424
	317,433
18	317,391
	317,411
	317,429
20	317,464
22	317,404
	317,491
23	317,448
25	317,509
26	317,430
	317,455
27	317,469
29	317,515
30	317,379
32	317,401
33 :	317,405
34 :	317,382
36	317,373
	317,376
	317,380
	317,383
	317,400
	317,512
37	317,452
39	317,397
	317,415
	317,416
	317,518
40	317,387
	317,517
41	317,446
42	317,372
	317,385
	317,497
	317,506
44	317,408
45	317,504
	317,505
48	317,421
	317,442
	317,461
	317,490
49	317,403
50	317,384
	317,396
51	317,388
53	317,389
	317,501
55	317,386
	317,466
	317,468
	317,495
	317,496
	317,498
56	317,422

PLANT PATENTS

01 :	7,555
06 :	7,548
	7,549
	7,550
13	7,551
	7,552
16 :	7,553
34	7,554

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VOL
1127

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3

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Vol. 1127 Number 3

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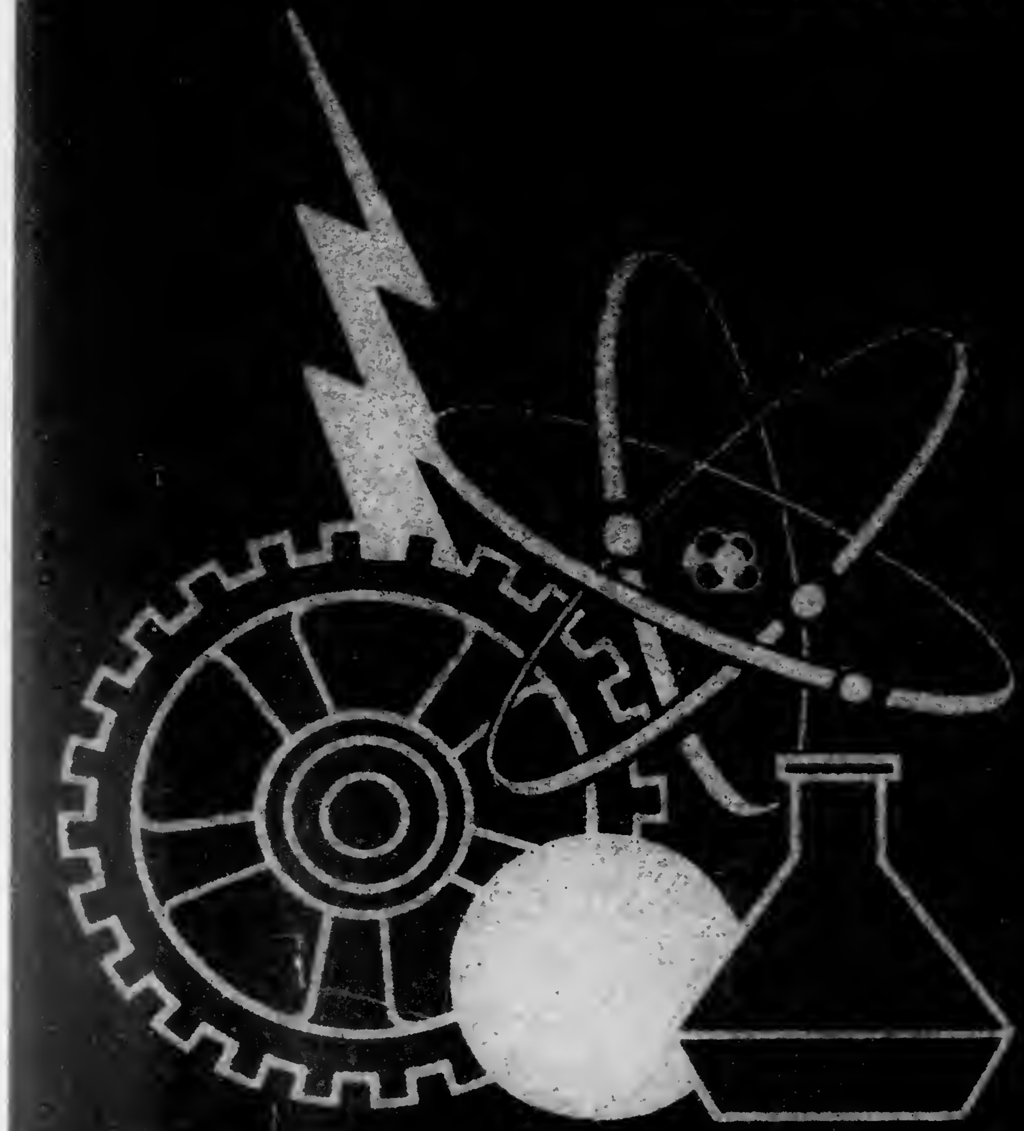

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VOL
1127
ISS
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1991
UMI

OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE
June 18, 1991 Volume 1127 Number 3

CONTENTS

Page

Patent and Trademark Office Notices

- Patent Cooperation Treaty (PCT) Information .... 1127 OG 42
- Notice of Maintenance Fees Payable .... 1127 OG 42
- Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees .... 1127 OG 43
- Reissue Applications Filed .... 1127 OG 45
- Requests for Reexaminations Filed .... 1127 OG 46
- Error in Code of Federal Regulations .... 1127 OG 46
- Errata .... 1127 OG 46
- Service by Publication .... 1127 OG 47
- Patent Certificates of Correction .... 1127 OG 49
- Special Boxes for Mail .... 1127 OG 50

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries .... 1127 OG 51

Patent Examining Corps .... 1127 OG 53

Reexaminations 1343

Reissue Patents Granted (33,612) 1345

Plant Patents Granted (7,556) 1349

Patents Granted

- General and Mechanical (5,023,952) 1351
- Chemical (5,024,673) 1601
- Electrical (5,025,114) 1735

Design Patents Granted (317,522) 1871

Index of Patentees .... PI 1

Indices of Reissue, Reexamination, Design and Plant Patents .... PI 64

Classification of

- Patents (Including Reissues and Reexaminations) .... PI 69
- Designs, and Plants Applications .... PI 72

Geographical Index of Residence of Inventors

- Patents (Including Reissues and Reexaminations) .... PI 73
- Designs and Plant Applications .... PI 75

Change of Address Form and Subscription Order Form .... PI 77

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VOL
1127
ISS
3
JE
18
1991
UMI

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1126 O.G. 2 on May 7, 1991.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the amount of the fee in German marks and the exchange rate of the U.S. dollar in relation to the German mark as of Jan. 3, 1991, and was announced in the *Official Gazette* at 1122 O.G. 564 on Jan. 1, 1991.

International fees were changed on March 1, 1991 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss franc and were announced in the *Official Gazette* at 1122 O.G. 629 on Jan. 22, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
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U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
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—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1492.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	400.00
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Basic fee	559.00
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Designation fee per country or region for the first 10 national or regional offices	135.00
Designation fee for 11th and subsequent designations	No Charge
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U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

April 11, 1991

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner
of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on June 14, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,750,218 through 4,751,745
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on June 12, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,453,271 through 4,454,610
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant..........$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant..........$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))..........$415.00
By other than a small entity..........$830.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f))..........$835.00
By other than a small enttity..........$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982..........$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f))..........$60.00
By other than a small entity..........$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable..........$550.00"

Notice of Expiration of Patents
Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED APRIL 7, 1991
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,378,606	06/309,986	4/05/83
4,378,613	06/313,384	4/05/83
4,378,624	06/234,479	4/05/83
4,378,632	06/219,994	4/05/83
4,378,641	06/231,967	4/05/83
4,378,650	06/273,477	4/05/83
4,378,668	06/264,678	4/05/83
4,378,671	06/356,384	4/05/83
4,378,674	06/247,706	4/05/83
4,378,681	06/299,715	4/05/83
4,378,685	06/228,697	4/05/83
4,378,687	06/227,368	4/05/83
4,378,724	06/284,621	4/05/83
4,378,743	06/305,672	4/05/83
4,378,751	06/306,710	4/05/83
4,378,757	06/267,728	4/05/83
4,378,759	06/279,679	4/05/83
4,378,772	06/278,298	4/05/83
4,378,781	06/255,162	4/05/83
4,378,782	06/259,420	4/05/83
4,378,785	06/267,946	4/05/83
4,378,786	06/232,910	4/05/83
4,378,789	06/284,524	4/05/83
4,378,790	06/262,565	4/05/83
4,378,795	06/253,627	4/05/83
4,378,805	06/336,552	4/05/83
4,378,827	06/268,017	4/05/83
4,378,829	06/267,711	4/05/83
4,378,830	06/268,018	4/05/83
4,378,834	06/278,497	4/05/83
4,378,839	06/249,189	4/05/83
4,378,846	06/216,425	4/05/83
4,378,856	06/237,627	4/05/83
4,378,857	06/225,664	4/05/83
4,378,866	06/241,341	4/05/83
4,378,874	06/247,168	4/05/83
4,378,876	06/291,085	4/05/83
4,378,877	06/253,250	4/05/83
4,378,889	06/247,853	4/05/83
4,378,903	06/305,493	4/05/83
4,378,912	06/320,257	4/05/83
4,378,922	06/252,102	4/05/83
4,378,924	06/271,523	4/05/83
4,378,936	06/264,098	4/05/83
4,378,941	06/240,758	4/05/83
4,378,946	06/227,155	4/05/83
4,378,950	06/217,969	4/05/83
4,378,969	06/260,273	4/05/83
4,378,973	06/337,563	4/05/83
4,379,000	06/225,604	4/05/83
4,379,010	06/316,623	4/05/83
4,379,012	06/226,587	4/05/83
4,379,016	06/254,015	4/05/83
4,379,020	06/311,850	4/05/83
4,379,023	06/353,908	4/05/83
4,379,026	06/341,108	4/05/83
4,379,027	06/334,346	4/05/83
4,379,029	06/301,071	4/05/83
4,379,033	06/241,536	4/05/83
4,379,041	06/250,019	4/05/83
4,379,045	06/261,075	4/05/83
4,379,049	06/281,430	4/05/83
4,379,072	06/309,653	4/05/83
4,379,086	06/383,050	4/05/83
4,379,095	06/349,184	4/05/83
4,379,097	06/249,892	4/05/83
4,379,101	06/313,106	4/05/83
4,379,104	06/243,872	4/05/83
4,379,107	06/283,281	4/05/83
4,379,112	06/253,999	4/05/83
4,379,132	06/405,223	4/05/83
4,379,145	06/216,709	4/05/83
4,379,146	06/318,221	4/05/83
4,379,147	06/344,280	4/05/83
4,379,150	06/331,897	4/05/83
4,379,162	06/232,766	4/05/83
4,379,173	06/251,096	4/05/83
4,379,174	06/278,197	4/05/83
4,379,184	06/299,880	4/05/83
4,379,212	06/237,692	4/05/83
4,379,217	06/231,734	4/05/83
4,379,223	06/337,525	4/05/83
4,379,227	06/255,096	4/05/83
4,379,237	06/303,066	4/05/83

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Patent Number	Serial Number	Issue Date
4,379,239	06/391,351	4/05/83
4,379,253	06/229,084	4/05/83
4,379,270	06/238,154	4/05/83
4,379,275	06/281,936	4/05/83
4,379,303	06/287,874	4/05/83
4,379,316	06/272,493	4/05/83
4,379,323	06/221,073	4/05/83
4,379,345	06/281,424	4/05/83
4,654,897	06/803,071	4/07/87
4,654,898	06/786,507	4/07/87
4,654,900	06/800,397	4/07/87
4,654,902	06/847,756	4/07/87
4,654,903	06/797,701	4/07/87
4,654,904	06/783,046	4/07/87
4,654,907	06/822,251	4/07/87
4,654,909	06/811,764	4/07/87
4,654,915	06/753,683	4/07/87
4,654,922	06/738,275	4/07/87
4,654,923	06/804,925	4/07/87
4,654,926	06/721,061	4/07/87
4,654,927	06/678,346	4/07/87
4,654,929	06/898,975	4/07/87
4,654,931	06/758,218	4/07/87
4,654,936	06/867,077	4/07/87
4,654,945	06/791,925	4/07/87
4,654,946	06/865,104	4/07/87
4,654,957	06/623,678	4/07/87
4,654,968	06/807,398	4/07/87
4,654,972	06/762,730	4/07/87
4,654,973	06/789,517	4/07/87
4,654,974	06/811,007	4/07/87
4,654,975	06/869,280	4/07/87
4,654,977	06/799,406	4/07/87
4,654,979	06/826,556	4/07/87
4,654,981	06/702,554	4/07/87
4,654,985	06/686,148	4/07/87
4,654,991	06/734,111	4/07/87
4,654,992	06/779,098	4/07/87
4,654,994	06/827,646	4/07/87
4,655,000	06/727,051	4/07/87
4,655,002	06/887,744	4/07/87
4,655,003	06/852,839	4/07/87
4,655,004	06/769,643	4/07/87
4,655,006	06/692,235	4/07/87
4,655,008	06/811,071	4/07/87
4,655,011	06/649,624	4/07/87
4,655,016	06/776,657	4/07/87
4,655,024	06/553,014	4/07/87
4,655,030	06/830,634	4/07/87
4,655,032	06/714,522	4/07/87
4,655,040	06/712,960	4/07/87
4,655,042	06/916,961	4/07/87
4,655,052	06/832,339	4/07/87
4,655,058	06/477,632	4/07/87
4,655,080	06/782,992	4/07/87
4,655,086	06/728,890	4/07/87
4,655,087	06/767,099	4/07/87
4,655,090	06/859,482	4/07/87
4,655,094	06/647,750	4/07/87
4,655,097	06/790,063	4/07/87
4,655,099	06/705,748	4/07/87
4,655,106	06/784,788	4/07/87
4,655,108	06/776,353	4/07/87
4,655,109	06/363,024	4/07/87
4,655,110	06/824,966	4/07/87
4,655,113	06/345,798	4/07/87
4,655,119	06/286,101	4/07/87
4,655,120	06/812,848	4/07/87
4,655,123	06/792,052	4/07/87
4,655,124	06/752,959	4/07/87
4,655,126	06/730,673	4/07/87
4,655,146	06/636,680	4/07/87
4,655,147	06/826,045	4/07/87
4,655,149	06/858,415	4/07/87
4,655,158	06/703,035	4/07/87
4,655,162	06/707,449	4/07/87
4,655,170	06/803,241	4/07/87
4,655,171	06/800,804	4/07/87
4,655,185	06/762,508	4/07/87
4,655,198	06/733,763	4/07/87
4,655,204	06/612,900	4/07/87
4,655,205	06/732,359	4/07/87
4,655,206	06/585,848	4/07/87
4,655,212	06/720,454	4/07/87
4,655,215	06/712,271	4/07/87
4,655,236	06/751,059	4/07/87
4,655,240	06/716,846	4/07/87
4,655,243	06/801,302	4/07/87
4,655,252	06/229,637	4/07/87
4,655,260	06/849,686	4/07/87
4,655,262	06/806,262	4/07/87
4,655,270	06/709,526	4/07/87
4,655,272	06/634,698	4/07/87
4,655,273	06/762,554	4/07/87
4,655,277	06/605,024	4/07/87
4,655,282	06/645,807	4/07/87
4,655,296	06/765,946	4/07/87
4,655,297	06/691,629	4/07/87
4,655,308	06/777,944	4/07/87
4,655,313	06/769,486	4/07/87
4,655,322	06/860,420	4/07/87
4,655,333	06/733,388	4/07/87
4,655,339	06/685,925	4/07/87
4,655,346	06/766,484	4/07/87
4,655,351	06/848,777	4/07/87
4,655,369	06/586,210	4/07/87
4,655,371	06/822,262	4/07/87
4,655,377	06/761,034	4/07/87
4,655,379	06/729,600	4/07/87
4,655,389	06/635,443	4/07/87
4,655,399	06/713,791	4/07/87
4,655,402	06/334,305	4/07/87
4,655,409	06/719,222	4/07/87
4,655,410	06/812,591	4/07/87
4,655,423	06/740,154	4/07/87
4,655,426	06/755,323	4/07/87
4,655,428	06/817,042	4/07/87
4,655,442	06/713,436	4/07/87
4,655,444	06/848,966	4/07/87
4,655,448	06/740,729	4/07/78
4,655,451	06/579,579	4/07/87
4,655,452	06/695,296	4/07/87
4,655,455	06/741,212	4/07/87
4,655,456	06/457,697	4/07/87
4,655,458	06/811,832	4/07/87
4,655,469	06/812,806	4/07/87
4,655,479	06/787,580	4/07/87
4,655,480	06/762,953	4/07/87
4,655,483	06/609,919	4/07/87
4,655,488	06/782,946	4/07/87
4,655,497	06/676,865	4/07/87
4,655,506	06/698,010	4/07/87
4,655,510	06/838,646	4/07/87
4,655,511	06/695,141	4/07/87
4,655,512	06/788,320	4/07/87
4,655,514	06/841,085	4/07/87
4,655,530	06/819,367	4/07/87
4,655,533	06/343,973	4/07/87
4,655,539	06/664,392	4/07/87
4,655,549	06/704,401	4/07/87
4,655,555	06/675,735	4/07/87
4,655,559	06/792,111	4/07/87
4,655,563	06/801,440	4/07/87
4,655,567	06/837,188	4/07/87
4,655,569	06/804,504	4/07/87
4,655,587	06/781,185	4/07/87
4,655,592	06/567,407	4/07/87
4,655,605	06/708,244	4/07/87
4,655,619	06/277,477	4/07/87
4,655,632	06/838,259	4/07/87
4,655,636	06/733,777	4/07/87
4,655,641	06/789,237	4/07/87
4,655,644	06/617,884	4/07/87
4,655,654	06/809,772	4/07/87
4,655,663	06/672,354	4/07/87
4,655,669	06/747,274	4/07/87

Patent Number	Serial Number	Issue Date
4,655,688	06/739,553	4/07/87
4,655,704	06/840,014	4/07/87
4,655,705	06/834,803	4/07/87
4,655,714	06/720,149	4/07/87
4,655,720	06/752,285	4/07/87
4,655,726	06/782,808	4/07/87
4,655,727	06/787,546	4/07/87
4,655,747	06/824,125	4/07/87
4,655,749	06/781,746	4/07/87
4,655,765	06/616,338	4/07/87
4,655,772	06/738,222	4/07/87
4,655,776	06/570,089	4/07/87
4,655,784	06/738,168	4/07/87
4,655,793	06/735,552	4/07/87
4,655,812	06/776,630	4/07/87
4,655,851	06/743,449	4/07/87
4,655,860	06/484,105	4/07/87
4,655,883	06/614,874	4/07/87
4,655,884	06/767,384	4/07/87
4,655,885	06/817,570	4/07/87
4,655,891	06/643,151	4/07/87
4,655,893	06/531,119	4/07/87
4,655,895	06/719,288	4/07/87
4,655,908	06/774,739	4/07/87
4,655,914	06/674,768	4/07/87
4,655,928	06/543,191	4/07/87
4,655,938	06/705,994	4/07/87
4,655,942	06/697,550	4/07/87
4,655,945	06/823,254	4/07/87
4,655,961	06/688,227	4/07/87
4,655,968	06/670,373	4/07/87
4,655,976	06/258,172	4/07/87
4,655,978	06/592,869	4/07/87
4,655,983	06/764,574	4/07/87
4,655,985	06/644,461	4/07/87
4,655,996	06/539,393	4/07/87
4,655,997	06/555,012	4/07/87
4,655,998	06/555,011	4/07/87
4,656,001	06/719,645	4/07/87
4,656,006	06/809,835	4/07/87
4,656,007	06/779,578	4/07/87
4,656,008	06/658,118	4/07/87
4,656,012	06/741,214	4/07/87
4,656,023	06/744,681	4/07/87
4,656,025	06/725,246	4/07/87
4,656,033	06/741,600	4/07/87
4,656,038	06/700,406	4/07/87
4,656,039	06/754,363	4/07/87
4,656,041	06/769,738	4/07/87
4,656,046	06/769,781	4/07/87
4,656,055	06/854,692	4/07/87
4,656,060	06/744,900	4/07/87
4,656,061	06/716,276	4/07/87
4,656,063	06/874,449	4/07/87
4,656,065	06/820,412	4/07/87
4,656,088	06/768,608	4/07/87
4,656,100	06/723,759	4/07/87
4,656,102	06/805,281	4/07/87
4,656,104	06/814,163	4/07/87
4,656,106	06/787,353	4/07/87
4,656,115	06/800,108	4/07/87
4,656,118	06/771,192	4/07/87
4,656,119	06/802,450	4/07/87
4,656,127	06/602,720	4/07/87
4,656,136	06/591,532	4/07/87
4,656,143	06/611,351	4/07/87
4,656,148	06/768,417	4/07/87
4,656,160	06/799,110	4/07/87
4,656,166	06/612,896	4/07/87
4,656,171	06/675,299	4/07/87
4,656,175	06/754,343	4/07/87
4,656,178	06/726,283	4/07/87
4,656,180	06/708,239	4/07/87
4,656,210	06/732,102	4/07/87
4,656,235	06/772,785	4/07/87
4,656,236	06/823,371	4/07/87
4,656,243	06/737,603	4/07/87
4,656,248	06/726,433	4/07/87
4,656,251	06/695,576	4/07/87
4,656,259	06/769,760	4/07/87
4,656,271	06/831,753	4/07/87
4,656,278	06/733,928	4/07/87
4,656,289	06/664,505	4/07/87
4,656,295	06/742,033	4/07/87
4,656,316	06/790,554	4/07/87
4,656,323	06/733,709	4/07/87
4,656,324	06/839,491	4/07/87
4,656,337	06/791,411	4/07/87
4,656,343	06/761,150	4/07/87
4,656,352	06/771,738	4/07/87
4,656,358	06/711,122	4/07/87
4,656,371	06/793,606	4/07/87
4,656,398	06/803,302	4/07/87
4,656,405	06/795,937	4/07/87
4,656,406	06/778,523	4/07/87
4,656,408	06/673,957	4/07/87
4,656,410	06/764,725	4/07/87
4,656,421	06/777,175	4/07/87
4,656,425	06/598,237	4/07/87
4,656,439	06/531,319	4/07/87
4,656,448	06/677,980	4/07/87
4,656,463	06/487,284	4/07/87
4,656,481	06/637,141	4/07/87
4,656,514	06/767,646	4/07/87
4,656,538	06/797,932	4/07/87
4,656,543	06/757,167	4/07/87
4,656,549	06/681,242	4/07/87
4,656,554	06/713,495	4/07/87
4,656,559	06/608,952	4/07/87
4,656,564	06/841,569	4/07/87
4,656,569	06/790,129	4/07/87
4,656,577	06/717,337	4/07/87
4,656,626	06/682,033	4/07/87
4,656,651	06/774,113	4/07/87
4,656,657	06/787,690	4/07/87

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,567,448, Re. S. N. 07/693,050, Filed Apr. 30, 1991, Cl. 331, VARIABLE FREQUENCY OSCILLATOR, Masayuki Ikeda, Owner of Record: *Epson Corp., Tokyo, Japan*, Attorney or Agent: Harold I. Kaplan, Ex. Gp.: 252

4,806,961, Re. S. N. 07/658,696, Filed Feb. 21, 1991, Cl. 354/195.1, PHOTOGRAPHIC CAMERA, Masatoshi Kamitani, et al., Owner of Record: *Minolta Camera Kabushiki Kaisha, Osaka, Japan*, Attorney or Agent: Matthew L. Schneider, Ex. Gp.: 211

4,809,230, Re. S. N. 07/662,663, Filed Feb. 28, 1991, Cl. 365/189, SEMICONDUCTOR MEMORY DEVICE WITH ACTIVE PULL UP, Yasuhiro Konishi, et al., Owner of Record: *Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan*, Attorney or Agent: Israel Gopstein, Ex. Gp.: 233

4,821,886, Re. S. N. 07/665,483, Filed March 6, 1991, Cl. 209/618, CLEANING DEVICE FOR AGRICULTURAL PRODUCTS, Herman P. Roethig, Owner of Record: *Inventor*, Attorney or Agent: Ross F. Hunt, Ex. Gp.: 312

4,827,757, Re. S. N. 07/696,936, Filed May 8, 1991, Cl. 72/420, ROBOTIZED HANDLING DEVICE AND SHEET METAL BENDING SYSTEM FEATURING SAME, Franco Sartorio, Owner of Record: *Amanda Co., Ltd., Ishida, Japan*, Attorney or Agent: Michael D. Wright, Ex. Gp.: 321

VOL
1127
ISS
3
JE
18
1991
UMI

4,852,365, Re. S. N. 07/694,224, Filed Apr. 3, 1991, Cl. 62/225, REFRIGERATION SYSTEM, Granville P. Elrod, et al., Owner of Record: *Standex International Corp., Salem, N H.*, Attorney or Agent: Lawrence A. Maxham, Ex. Gp.: 344

4,924,691, Re. S. N. 07/695,457, Filed May 3, 1991, Cl. 72/391, BREAKSTEM FASTENER INSTALLATION TOOL, Fredrick Arthur Summerlin, et al., Owner of Record: *Avdel Systems Ltd., Hertfordshire, England.* Attorney or Agent: Gregory J. Maier, Ex. Gp.: 321

4,927,556, Re. S. N. 07/694,448, Filed May 1, 1991, Cl. 252/173, AQUEOUS BASED COMPOSITION CONTAINING DIBASIC ESTER AND THICKENING AGENT FOR REMOVING COATINGS, Richard J. Pokorny, Owner of Record: *Minnesota Mining and Manufacturing Co., St. Paul, Minn.*, Attorney or Agent: Carolyn A. Bates, Ex. Gp.: 115

4,949,650, Re. S. N. 07/699,172, Filed May 13, 1991, Cl. 108/146, TABLE HAVING A PART OF WHICH IS ADJUSTABLE UPWARDLY, David D. Allard, Owner of Record: *Inventor*, Attorney or Agent: Joseph J. Kelly, Ex. Gp.: 357

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,557,774, Reexam. No. 90/002,341, Requested May 7, 1991, Cl. 156/071, SYSTEM FOR HOLDING CARPET IN PLACE WITHOUT STRETCHING, Merle R. Hoopengardner, Owner of Record: *Step Loc Corp., Lafayette, Calif.*, Attorney or Agent: Donald C. Feix, San Mateo, Calif., Ex. Gp.: 131, Requester: E. R. Carpenter Co., Richmond, Va.

4,622,977, Reexam. No. 90/002,337, Requested Apr. 30, 1991, Cl. 128/663, ULTRASONIC DIAGNOSTIC APPARATUS, Koroku Namekawa, et al., Owner of Record: *Aloka Co., Ltd., Tokyo, Japan*, Attorney or Agent: William L. Androlia, Koda & Androlia, Los Angeles, Calif., Ex. Gp.: 335, Requester: Owner

4,701,486, Reexam. No. 90/002,342, Requested May 8, 1991, Cl. 524/182, STABILIZER COMOSITIONS FOR PVC RESINS, Robert E. Bresser, et al., Owner of Record: *Morton Thiokol, Chicago, Ill.*, Attorney or Agent: Gerald K. White, Chicago, Ill., Ex. Gp.: 159, Requester: Owner

4,867,760, Reexam. No. 90/002,344, Requested May 13, 1991, Cl. 051/298, COATED ABRASIVE, Walter A. Yarbrough, Owner of Record: *Norton Co., Worcester, Mass.*, Attorney or Agent: David Bennett, Worcester, Mass., Ex. Gp.: 118, Requester: Owner

4,899,563, Reexam. No. 90/002,340, Requested May 6, 1991, Cl. 070/367, RE-KEYABLE PIN TUMBLER DRAWER LOCK AND PIN TUMBLER CABINET DOOR LOCK, Frank J. Martin, Owner of Record: *Frank J. Martin Co., Seattle, Wash.*, Attorney or Agent: Michael J. Folise, Stratton, Dwyer, Bellomy, et al., Seattle, Wash., Ex. Gp.: 358, Requester: Owner

4,916,726, Reexam. No. 90/002,329, Requested Apr. 25, 1991, Cl. 379/088, TELEPHONE ANSWERING SERVICE WITH INTEGRATED VOICE AND TEXTUAL MESSAGE STORAGE, John F. Morley, et al., Owner of Record: *American Tel-A-System, Inc., McFarland, Wisc.*, Attorney or Agent: Donald E. Stout, Antonelli, Terry, Stout & Kraus, Washington, D.C., Ex. Gp.: 261, Requester: Owner

4,917,465, Reexam. No. 90/002,339, Requested May 1, 1991, Cl. 350/335, COLOR DISPLAY SYSTEM, Arlie R. Conner, et al., Owner of Record: *In Focus Systems, Inc . Tualatin, Oreg.*, Attorney or Agent: Robert J. Bennett, Dirks B. Fosters, San Fransisco, Calif., Ex. Gp.: 254, Requester: Computer Accessories Corp., San Diego, Calif.

5,012,350, Reexam. No. 90/002,343, Requested May 9, 1991, Cl. 358/335.0, TELEVISION LOCAL WIRELESS TRANSMISSION AND CONTROL, Donald A. Streck, et al., Owner of Record: *Donald A. Streck, Ventura, Calif. & Jerry R. Iggulden, Newhall, Calif.*, Attorney or Agent: Donald A. Streck, Ventura, Calif., Ex. Gp.: 235, Requester: Gemini Industries, Inc., Clifton, N. J.

Error in *Code of Federal Regulations* (C. F. R.)
Rule 1.8, 37 C. F. R. 1.8

The following C. F. R. Correction appeared in the *Federal Register*, at 56 FR 14648, on April 11, 1991:

> In the July 1, 1990 revision of title 37 of the Code of Federal Regulations, on page 14, column two, § 1.8, paragraphs (a)(2)(xiv), (xv), and (xvi) were inadvertently placed after paragraph (b). These paragraphs should be correctly placed after paragraph (a)(2)(xiii) and before paragraph (b), in column one.

Rule 1.8 (37 C. F. R. § 1.8), which is entitled "Certificate of Mailing," sets out the conditions for the timely filing by first-class mail of papers utilizing the Certificate of Mailing procedure. Under Rule 1.8(a)(2), certain papers are excluded from the Certificate of Mailing procedure and will not be considered timely filed if received after the due date, unless deposited as Express Mail in compliance with Rule 1.10 (37 C. F. R. § 1.10). There are sixteen (16) exclusions, numbered 1.8(a)(2)(i) through (xvi). However, the list of exclusions, as printed in the July 1, 1990 revision of the C. F. R., is interrupted at 1.8(a)(2) (xiii) by paragraph 1.8(b), before it resumes with 1.8(a)(2)(xiv) through (xvi). Therefore, at first glance, it appears that there are only thirteen (13) exclusions. The exclusions for statements of use under Rule 2.88; extension requests under Rule 2.89 for filing a statement of use; and amendments to allege use in commerce under Rule 2.76 were inadvertently placed after paragraph (b).

Any appicant who relied to its detriment on the July 1, 1990 revision of the C. F. R. and utilized a Rule 1.8 Certificate of Mailing when filing either a statement of use or an extension request for filing a statement of use, resulting in abandonment of the application, may petition the Commissioner to revive its application. Further, any applicant who filed an amendment to allege use and relied to its detriment on the July 1, 1990 revision to the C. F. R., resulting in its amendment to allege use being considered untimely, may also petition the Commissioner for relief.

Pursuant to Rules 2.66 and 2.146(c), applicant must support its statement of detrimental reliance with an affidavit or declaration in accordance with Rule 2.20, averring that on a specific date between July 1, 1990 and the date of publication of this notice in the *Official Gazette*, petitioner filed one of the three relevant documents pursuant to Rule 1.8; relied on the 1990 revision of the C. F. R.; and believed that the relevant document was not excluded from filing under Rule 1.8 the petition fee is $100 per application. Rule 2.6(k).

May 15, 1991

JEFFREY M. SAMUELS
Assistant Commissioner
for Trademarks

Errata

The following registration numbers were inadvertantly listed as cancelled in the "Trademark Registration Cancelled, Section 8" and "Index of Registrants" sections of the Official Gazette:

TM 232 & TMI 17	1,254,520	Nov. 6, 1990
TM 205 & TMI 24	1,265,575	June 26, 1990
TM 191 & TMI 24	1,221,342	May 1, 1990
TM 199 & TMI 12	1,235,576	June 26, 1990
TM 191 & TMI 10	1,224,988	May 1, 1990
TM 171 & TMI 37	1,249,078	Jan. 9, 1990
TM 185 & TMI 37	1,259,545	May 22, 1990
TM 199 & TMI 7	1,342,162	June 26, 1990
TM 192 & TMI 27	1,257,470	May 1, 1990
TM 289 & TMI 25	1,252,832	Mar. 27, 1990
TM 191 & TMI 19	1,325,398	Mar. 12, 1990
TM 295 & TMI 7	1,400,783	Aug. 21, 1990
TM 229 & TMI 17	1,420,035	Feb. 12, 1991
TM 227 & TMI 1	1,379,200	Feb. 26, 1991
TM 206 & TMI 10	1,299,893	Jan. 15, 1991
TM 229 & TMI 20	1,235,257	July 24, 1990
TM 157 & TMI 30	1,265,259	July 3, 1990
TM 277 & TMI 9	1,251,839	Sept. 25, 1990
TM 271 & TMI 20	1,264,537	July 31, 1990
TM 237 & TMI 24	1,263,471	Oct. 2, 1990
TM 203 & TMI 24	1,286,960	Nov. 27, 1990
TM 264 & TMI 27	1,271,267	Sept. 11, 1990
TM 295 & TMI 13	1,274,315	Aug. 21, 1990
TM 216 & TMI 10	1,306,615	Apr. 10, 1990

Consequently, the above-identified registrations are still active.

May 17, 1991

PATRICIA M. DAVIS
Administrator
of Trademark
Operations

The following registration numbers were inadvertently listed as cancelled in the "Trademark Registraions Cancelled, Section 7d" and "Index of Registrants" sections of the Official Gazette:

TM 181 & TMI 29	1,302,099	Apr. 9, 1991
TM 168 & TMI 18	1,281,199	Jan. 1, 1991
TM 190 & TMI 4	230,702	Mar. 19, 1991
TM 190 & TMI 5	745,163	Mar. 19, 1991
TM 190 & TMI 4	745,150	Mar. 19, 1991
TM 190 & TMI 5	814,059	Mar. 19, 1991
TM 190 & TMI 18	1,313,148	Mar. 19, 1991
TM 198 & TMI 8	1,336,779	Mar. 19, 1991
TM 198 & TMI 11	1,347,777	Mar. 19, 1991
TM 198 & TMI 8	1,348,043	Mar. 19, 1991
TM 198 & TMI 16	1,349,835	Mar. 19, 1991
TM 198 & TMI 16	1,350,491	Mar. 19, 1991
TM 198 & TMI 16	1,360,926	Mar. 19, 1991
TM 198 & TMI 16	1,367,096	Mar. 19, 1991
TM 198 & TMI 16	1,421,280	Mar. 19, 1991
TM 198 & TMI 16	1,528,490	Mar. 19, 1990
TM 198 & TMI 16	1,534,625	Mar. 19, 1991
TM 198 & TMI 16	1,567,698	Mar. 19, 1991
TM 198 & TMI 16	1,576,964	Mar. 19, 1991
TM 198 & TMI 16	1,586,743	Mar. 19, 1991
TM 198 & TMI 16	1,598,574	Mar. 19, 1991
TM 198 & TMI 16	1,606,955	Mar. 19, 1991
TM 198 & TMI 16	1,607,462	Mar. 19, 1991
TM 198 & TMI 16	1,611,851	Mar. 19, 1991
TM 198 & TMI 16	1,582,206	Mar. 19, 1991

Consequently, the above-identified registrations are still active.

May 17, 1991

PATRICIA M. DAVIS
Administrator of
Trademark Operations

"All reference to Patent No. 5,000,986 to Chou H. Li of Roslyn, N. Y. for `METALLIZED COATINGS ON CERAMICS FOR HIGH-TEMPERATURE USES' appearing in the Official Gazette of March 19, 1991 should be deleted since no patent was granted."

Service by Publicatinn

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceeding sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Diva, Inc., Eatontown, N.J., Reg. No. 1,025,655, for the mark "DIVA" and design, Canc. No. 19,221.

Stahl-Urban Company, Brookhaven, Miss., Reg. No. 670,634, for the mark "WEEKENDERS" (stylized), Canc. No. 19,371.

Photo Promotion Associates, Inc., Monsey, N. Y., Reg. No. 1,003,742, for the mark "INSTA-PLAK", Canc. No. 19,425.

Contour Hosiery, Inc., Kenosha, Wisc., Reg. No. 357,615, for the mark "CONTOUR" (stylized), Canc. No. 19,444.

I Need A Vacation Inc., El Paso, Tex., Reg. No. 1,492,626, for the mark "I NEED A VACATION INC." and design, Canc. No. 19,463.

Michael Anderson, Los Angeles, Calif., Reg. No. 1,439,165, for the mark "TAXI" and design, Canc. No. 19,496.

Schaak Electronics, Inc., St. Paul, Minn., Reg. No. 1,002,669, for the mark "DLK" and design, Canc. No. 19,510.

VOL
1127
ISS
3
JE
18
1991
UMI

United States Football League, New York, N. Y., Reg. No. 1,352,906, for the mark "L. A. EXPRESS" and design, Canc. No. 19,513.

Howland Chemical Products, Inc., Newark, N. J., Reg. No. 1,395,456, for the mark "ALPINE", Canc. No. 19,417.

Marquee Productions, Inc., Cincinnati, Ohio, Reg. No. 1,544,908, for the mark "DISCOVERY GIRL U. S. A." and design, Canc. No. 19,439.

JEAN BROWN
Administrator of the
Trademark Trial and
Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner
for Trademarks

Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceeding sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

West Bay Design Inc., Burlingame, Calif., Reg. No. 1,232,862, for the mark "RIVA", Canc. No. 19,525.

JEAN BROWN
Administrator, Trademark
Trial and Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

PATENT NOTICES

Certificates of Correction For Week of June 18, 1991

B1. Re. 32,521
B1. 4,381,056
D. 299,142
D. 308,986
D. 309,511
Re. 33,247
4,734,739
4,759,352
4,776,161
4,778,761
4,780,467
4,781,808
4,782,449
4,783,164
4,785,516
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4,968,979
4,973,307
4,979,915
4,994,337
5,006,685

VOL
1127
ISS
3
JE
18
1991
UMI

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	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861

VOL
1127
ISS
3
JE
18
1991
UMI

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PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner

PATENT EXAMINING GROUPS	Phone Number Area Code 703
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director.	308-0661
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director	308-1235
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director	308-0651
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	308-2351
BIOTECHNOLOGY, GROUP 180—EDWARD E. KUBASIEWICZ, Director	308-0196
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. KELLY, Director	308-1782
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director	308-0511
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—GERALD GOLDBERG, Director	308-0754
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—CARLTON CROYLE Director	308-0771
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—JOSEPH J. ROLLA, Director.	308-0956
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director	308-0962
DESIGN, GROUP 290—ROBERT E. GARRETT, Director	308-0511
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	308-1113
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Director	308-1148
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	308-0858
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—JOHN KITTLE, Director	308-0861
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director	308-0651

Expiration of patents: The patents within the range of numbers indicated below expire during May 1991 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,808,604 to 3,813,693 inclusive
Plant Patents	3,541 to 3,560 inclusive

VOL
1127
ISS
3
JE
18
1991
UMI

REEXAMINATIONS

JUNE 18, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,648,907 (1492nd)

HIGH COLOR STRENGTH DIARYLIDE YELLOW PIGMENT COMPOSITIONS

Byron G. Hays, Verona, and Robert J. Stanaback, Gladstone, both of N.J., assignors to BASF Corporation, Clifton, N.J.

Reexamination Request No. 90/002,054, Jun. 12, 1990.

Reexamination Certificate for Patent No. 4,648,907, issued Mar. 10, 1987, Ser. No. 722,976, Apr. 12, 1985.

Int. Cl.^{5} C09D *11/08*

U.S. Cl. 106—30

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1-6 are cancelled.

[1. A method of manufacturing diarylide yellow pigments comprising tetrazotizing 3,3′-dichlorobenzidine, then coupling the tetrazonium salt with an acetoacetarylide, and then filtering and washing the resulting pigment, wherein the improvement comprises:

modifying the tetrazotized 3,3′-dichlorobenzidine by reacting with about 3 mole % to about 5 mole % of an acetic acid solution of a first acetoacetarylide; and

then coupling the modified 3,3′-dichlorobenzidine tetrazonium salt into a slurry of a second acetoacetarylide,

thereby producing diarylide yellow pigment compositions having increased color strength over diarylide yellow compositions produced by conventional methods.]

B1 4,773,485 (1493rd)

FIRE EXTINGUISHING SYSTEM FOR COOKSTOVE AND RANGES

Robert R. Silverman, Panama City, Fla., assignor to Twenty First Century international Fire Equipment and Services, Corporation

Reexamination Request No. 90/002,108, Aug. 14, 1990.

Reexamination Certificate for Patent No. 4,773,485, issued Sep. 27, 1988, Ser. No. 27,919, Mar. 19, 1987.

Int. Cl.^{5} A62C *3/04*

U.S. Cl. 169—65

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-12 is confirmed.

1. A system for extinguishing a residential stove top fire which may occur on a residential stove range that has burners and is used in conjunction with a hood, cabinet and means for energizing the burners, the system comprising in combination:

an enclosure defined by the hood, the enclosure having a top wall, first and second side walls, a front wall and a rear wall; the walls joining at first and second front corners and first and second rear corners, the cabinet being positioned over and in juxtaposition with the hood;

a pair of nozzles positioned within the hood, and facing the burners of the stove range, the nozzles being in juxtaposition with the side walls of the hood;

a fire extinguisher positioned in the cabinet and connected to the nozzles via a pipe which passes through the wall of the cabinet and the top of the hood and has branches to the nozzles for dispensing fire suppressant material through the nozzles;

means for operating the fire extinguisher and means for biasing the operating means to a first position which causes the fire extinguisher to discharge the fire suppressant;

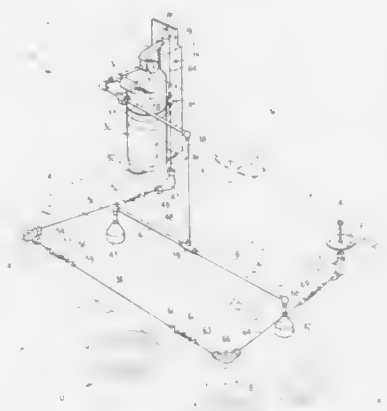
means for holding the operating means in a second position in opposition to the biasing means, wherein when the operating means is in the second position, the fire extinguisher is prevented from discharging;

the means for holding the operating means in the second position including a cable means segmented in a plurality of sections, each section being connected to adjacent sections by fusible links, the cable means including means for adjusting the length of the cable means;

pulley means positioned inside of the hood, the pulley means including a first pulley adjacent the first rear corner thereof, a second pulley adjacent the front wall and juxtaposed with the first front corner thereof, a third pulley adjacent the front wall and juxtaposed with a second front corner thereof and a fourth pulley adjacent the second rear corner thereof; the cable means being trained around the pulleys;

means for anchoring one end the cable means to the hood in a position adjacent to the fourth pulley; whereby the cable means is held in tension substantially around and in alignment with the inner periphery of the hood to hold the operating means in a second position, and whereby when there is a fire on the stove at least one of the fusible links separates, releasing tension on the cable and allowing the operator to move from the second position to the first position under a force exerted by the biasing means; and

a pressure sensor connected to the outlet of the fire extinguisher for detecting release of the fire suppressant and thus the occurrence of a fire, the pressure sensor being connected to a circuit, which circuit includes means for interrupting energy flowing from the energizing means to the burners of the stove.



VOL
1127
ISS
3
JE
18
1991
UMI

REISSUES

JUNE 18, 1991

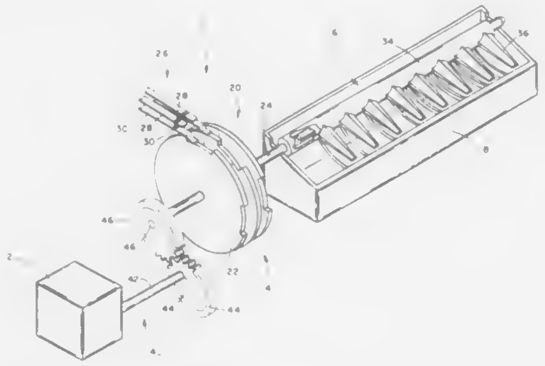
Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,612
ICE MAKER SYSTEM

Ronald E. Cole, 933 Sleepy Hollow Pl., Greenwood, Ind. 46142
Original No. 4,697,432, dated Oct. 6, 1987, Ser. No. 888,875, Jul. 24, 1986. Application for reissue Oct. 19, 1988, Ser. No. 259,961

Int. Cl.⁵ F25C *5/04*

U.S. Cl. 62—233 4 Claims



3. An ice making system comprising:

tray means for holding water while it is being frozen into ice;

rake means for mechanically removing said ice from said tray means; and

drive means for moving said rake from an initial position, through an ice removing range in which it removes ice from said tray means, and thereafter returning it to said initial position, said drive means including means for driving said rake means at a first non-zero speed when it is removing said ice from said tray means and at a second non-zero speed when it is being returned to said initial position, said second speed being faster than said first speed.

Re. 33,613
ROTARY APPARATUS

Ernest R. Bodnar, 2 Danrose Crescent, Toronto, Ontario M3B 3N5, Canada
Original No. 4,732,028, dated Mar. 22, 1988, Ser. No. 938,406, Dec. 5, 1986. Continuation-in-part of Ser. No. 811,442, Dec. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 598,978, Apr. 11, 1984, abandoned. Application for reissue Sep. 5, 1989, Ser. No. 402,658

Int. Cl.⁵ B21D *37/12*

U.S. Cl. 72—190 17 Claims

1. A rotary [cutting and] forming apparatus for forming strip material *having a major plane and* for use in association with [material forming] *material-forming* dies [comprising], *which dies have strip material-engaging forming planes and which apparatus comprises:*

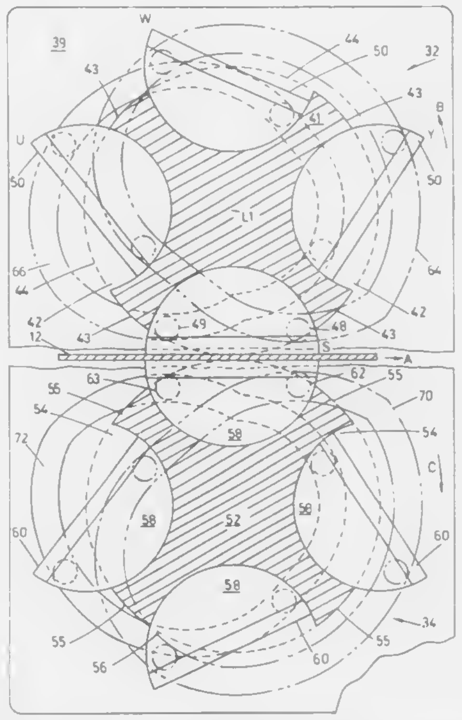
a rotatable upper roll unit and a corresponding rotatable lower roll unit, said units being connected for synchronous rotation *through rotary cycles*, each of said units comprising a [corner] *carrier* defining a central axis, said member having at least one recess extending along said member parallel to the central axis, said recess having bearing surface means of generally [semi-circular] *semi-cylindrical* shape, and [at least one] *a* die support block, rotatably received within said recess, said block defining two ends and a [platan] *platen* surface to which [at least one of] *a* said forming [dies] *die* may be affixed *for movement with said block through a position in which a said forming plane of said die is generally parallel to said major plane of such strip material;*

leading control pin means extending from a leading portion of a said end *of each said die support block* along a first axis *parallel to said central axis;*

trailing control pins means extending from a trailing portion of a said end [,] *of each said die support block* along a second axis *parallel to and* spaced *apart* from said first axis of said leading control pin means;

said upper and lower roll units being spaced apart whereby said *strip* material may pass therebetween for [formation] *deformation* by said *forming* dies;

upper and lower leading cam surface means positioned to engage said leading pin means *of respective said die support blocks*, and having [a] predetermined leading cam [profile] *profiles;*



upper and lower trailing cam surface means positioned [to avoid said leading pin means, and] to engage [only] said trailing pin means *of respective said die support blocks*, and having [a] predetermined trailing cam [profile] *profiles* different from said leading cam [profile] *profiles*, whereby to support said die support blocks during *at least* a *first* portion of [the] *each said* rotary cycle whereby [a die] *said upper and lower leading cam surfaces and said upper and lower trailing cam surfaces have such configurations that dies* affixed to said [block] *blocks* on said *upper and* lower [unit may] *units* register with each other [and cooperate together] *and are disposed with their strip material-engaging planes mutually parallel and parallel to the strip material during engagement with the strip material* for [the] deformation of [the] *that* material *and immediately prior to and immediately after such engagement*; and,

bearing means for supporting said *upper and lower* units.

VOL
1127
ISS
3
JE
18
1991
UMI

Re. 33,614

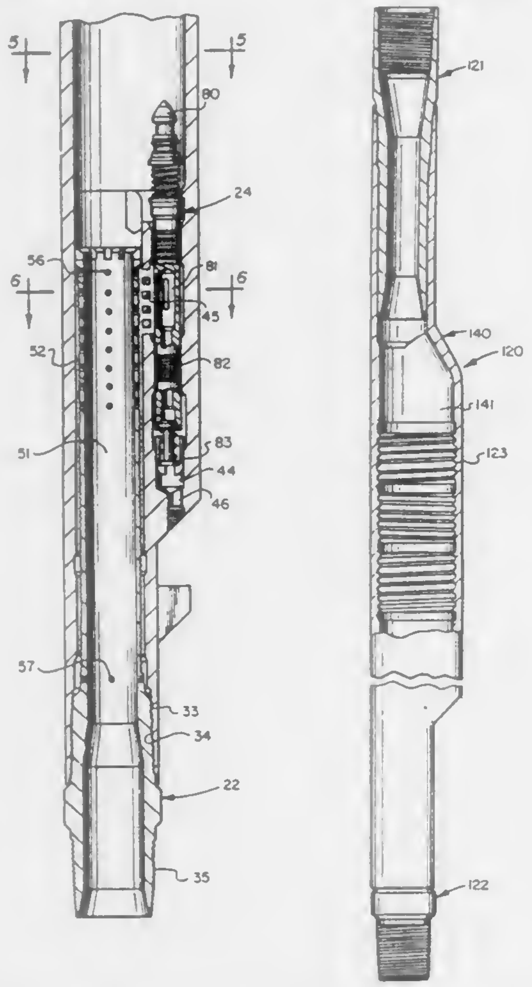
APPARATUS AND METHOD FOR ENHANCED OIL RECOVERY

Carl M. Schwab, Jr., Bakersfield; Clark E. Robison, and James B. Renfroe, Jr., both of Valencia, all of Calif., assignors to Otis Engineering Corp., Dallas, Tex.

Original No. 4,646,828, dated Mar. 3, 1987, Ser. No. 793,842, Nov. 1, 1985. Application for reissue Nov. 25, 1987, Ser. No. 793,842

Int. Cl.^{5} E21B *43/24*

U.S. Cl. 166—303 58 Claims



55. A method of injecting steam at a selected mass flow rate into a production formation of a subterranean well having a tubing string traversing the production formation comprising the steps of:

supplying a steam flow to the surface end of the tubing string;

diverting the downwardly flowing steam into two radially separated flow components within the tubing;

directing one of said flow components into the inlet end of a choke passage, the outlet end of the choke passage being in communication with the production formation; and

accelerating the flow rate of said one flow component by said choke passage to a selected mass flow rate.

56. Apparatus for injecting steam into a production formation of a subterrarean well at a selected mass flow rate comprising a tubular housing connectable in series relationship to the tubing string;

fluid diverting means in said tubular housing for dividing the steam flow into two radially separated components; and

means including a choke passage for accelerating the flow rate of one said flow component.

Re. 33,615

Patent Not Issued For This Number

Re. 33,616

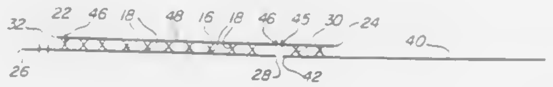
LABEL BEARING CONTINUOUS BUSINESS FORM

Bernhard J. Welsch, Cromwell, Conn., assignor to Uarco Incorporated, Barrington, Ill.

Original No. 4,627,994, dated Dec. 9, 1986, Ser. No. 819,380, Jan. 16, 1986. Application for reissue Sep. 19, 1988, Ser. No. 245,514

Int. Cl.^{5} B32B *3/06*

U.S. Cl. 428—41 18 Claims



10. A continuous business form comprising:

an elongated ply of label stock of a desired width and having one side coated with a pressure sensitive adhesive;

an elongated ply of release liner stock having a release side engaged with said adhesive on said one side;

said label stock ply including a narrow longitudinal strip of adhesive along one longitudinal edge and unengaged with said release liner; and

an elongated ply of record or message bearing stock having an edge adhered to said label stock at said narrow longitudinal strip of adhesive.

Re. 33,617

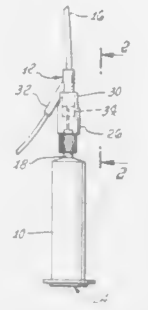
PROTECTED CANNULA

George B. Ogle, II, Alta Loma, Calif., assignor to International Medication Systems Limited, South El Monte, Calif.

Original No. 4,834,716, dated May 30, 1989, Ser. No. 74,721, Jul. 17, 1987. Application for reissue Apr. 4, 1990, Ser. No. 504,650

Int. Cl.^{5} A61M *5/32*

U.S. Cl. 604—192 7 Claims



1. The combination of an intravenous administration set having a Y-site, a first tubing extending therefrom and adapted to connect to a patient-indwelling terminus, a second length of tubing extending from said Y-site with a terminal means adapted to be connected to a first source of intravenous solution, said Y-site having an inlet port, a hypodermic syringe adapted to hold a second intravenous solution, the syringe [having a cannula with a scarf at one end, said cannula being carried by a boss spaced from the scarf;] *including an elongated barrel with a boss at one end and plunger extending from the other end to bolus said second solution out of the barrel through the boss,* and [a] *an elongated and generally cylindrical* protective [device] *sheath* carried by *and removable from* said hypodermic syringe [and positioned around said cannula, said]*; an elongated* cannula [connecting] *having a first end adapted to connect with* the interior of the *barrel of the* hypodermic syringe; *a scarf at the other end of the cannula adapted to connect* with the tubing leading to the patient indwelling terminus; [said protective device having a] *the* generally cylindrical sheath [portion] having a first open end and surrounding said cannula over its length and extending beyond the scarf end of

said cannula at the first open end of said sheath, [said sheath being affixed at its other end to said boss, said cylindrical portion] *the first end of the sheath* having at least one cutout [at said first open end which snugly receives] *extending toward a second end of the sheath, the cutout being adapted to receive* by lateral reception[,] one of the tubings of said intravenous administration set, while said scarf has punctured the said inlet port of said Y-site; whereby the user, in making said combination, is protected by the sheath of said protective device from inadvertent puncture of the hands and fingers by said [scarf.] *scarf; the second open end of the sheath having a socket with an internal opening less than that of the first open end of the sheath to be adapted to make a slip fit over the boss of the hypodermic syringe.*

VOL
1127
ISS
3
JE
18
1991
UMI

PLANT PATENTS

GRANTED JUNE 18, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,556

ROSE PLANT — AUSMAN

David C. H. Austin, Wolverhampton, England, assignor to David Austin Roses, Wolverhampton, England

Filed Nov. 9, 1989, Ser. No. 435,555

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—1 **1 Claim**

1. A new and distinct variety of rose plant of the shrub class, characterized as to novelty by its fully double flowers, of greyish—rose with light yellow streaks with abundant and continual blooming and the unusual blend of coloring and shaping of the flower being substantially as shown and described.

7,557

ROSE PLANT—AUSLEAF

David C. H. Austin, Albrighton, England, assignor to David Austin Roses, Albrighton, England

Filed Nov. 9, 1989, Ser. No. 435,556

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—1 **1 Claim**

1. A new and distinct variety of rose plant of the shrub class, characterized as to novelty by its fully double flowers of yellow and pale orange/red, with abundant and continual blooming and the unusual blend of colouring and shaping of the flower being substantially as shown and described.

7,558

MINIATURE POT ROSE NAMED DEVPRESA

Stanley G. Marciel, Aptos, Calif., assignor to DeVor Nurseries, Inc., Watsonville, Calif.

Filed Mar. 19, 1990, Ser. No. 495,902

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—7 **1 Claim**

1. The new and distinct miniature pot rose, substantially as herein shown and described, characterized by its profuse and continuous production of very small flowers borne on strong stems growing from a 4 in. pot and having an average height of about 19 cm. and abundant foliage when grown to the age of about 12 weeks.

7,559

MINIATURE ROSE NAMED DEVRICO

Stanley G. Marciel, Aptos, Calif., assignor to DeVor Nurseries, Inc., Watsooville, Calif.

Filed Apr. 9, 1990, Ser. No. 506,222

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—10 **1 Claim**

1. The new and distinct miniature rose variety substantially as herein shown and described, characterized by its profuse and continuous production of medium sized blooms on a small, compact bush having a height of about 17 cm. when grown on a 4 in. pot; the plant being free branching and having a vigorous, upright growth habit.

7,560

MINIATURE ROSE NAMED DEVCLAVEL

Stanley G. Marciel, Aptos, Calif., assignor to DeVor Nurseries, Inc., Watsonville, Calif.

Filed Apr. 11, 1990, Ser. No. 507,561

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—10 **1 Claim**

1. The new and distinct miniature rose variety, substantially as herein shown and described, characterized by its profuse and continuous production of relatively large flowers having a dark red coloration on a pot plant having a height of about 20 cm., a moderate quantity of foliage and a vigorous, upright, free branching growth habit.

7,561

ROSE PLANT NAMED TWODREAM

Jerry Twomey, Leucadid, Calif., assignor to DeVor Nurseries, Inc., Watsonville, Calif.

Filed Feb. 26, 1990, Ser. No. 488,738

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—18 **1 Claim**

1. The new and distinct rose variety substantially as herein shown and described, characterized by its profuse and continuous production of very large blossoms having a primary color appearance of Empire Rose bordered by large outside petals of a Spinel Red color; the plant having a vigorous, upright and free branching growth habit with abundant foliage.

7,562

ROSE PLANT NAMED DEVCALI

Stanley G. Marciel, Aptos, Calif., assignor to DeVor Nurseries, Inc., Watsonville, Calif.

Filed Dec. 18, 1989, Ser. No. 452,111

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—20 **1 Claim**

1. The new and distinct variety of greenhouse rose plant substantially as herein shown and described, characterized in particular by its continuous and profuse production of near tyrian purple flowers of medium size carried on strong upright stems, its free branching growth habit and its abundant production of foliage.

7,563

STRAWBERRY PLANT NAMED DARLIBELLE

Robert C. Hureau, Le Vaudoue, France, assignor to Societe Civile Darbonne, Milly-La-Foret, France

Filed Sep. 14, 1989, Ser. No. 407,049

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—49 **1 Claim**

1. A new variety of strawberry plant named Darlibelle, as illustrated and described.

VOL
1127
ISS
3
JE
18
1991
UMI

PATENTS

GRANTED JUN. 18, 1991

ERRATA

For CLASS	See PATENT NO.
452-177	5,023,974
452-135	5,023,975
291-032	5,023,985
70-456	5,024,078
164-169	5,024,161
137-219	5,024,254
222-001	5,024,347
277-035	5,024,364
236-093	5,024,378
294-068	5,024,397
425-121	5,024,558
425-406	5,024,559
446-268	5,024,611
604-036	5,024,612
604-004	5,024,613
604-119	5,024,615
604-192	5,024,616
606-047	5,024,617
606-053	5,024,618
439-631	5,024,627
604-390	5,024,672
428-001	5,024,850
424-052	5,024,855
252-174	5,025,069
568-033	5,025,090
568-601	5,025,093
568-623	5,025,094
568-652	5,025,095
570-206	5,025,110
568-909	5,025,113
392-451	5,025,131
219-010	5,025,489
313-479	5,025,490
340-825	5,025,491
342-044	5,025,492
342-374	5,025,493
357-023	5,025,494
358-140	5,025,495
358-153	5,025,496
358-425	5,025,497
361-156	5,025,498
364-165	5,025,499
370-085	5,025,500

VOL
1127
ISS
3
JE
18
1991
UMI

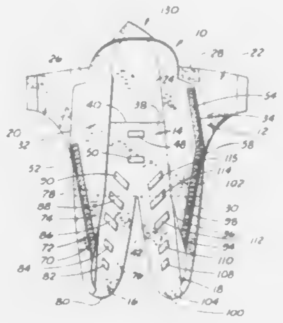
PATENTS

GRANTED JUNE 18, 1991

GENERAL AND MECHANICAL

5,023,952
CLOTHING ITEM

Marcia R. Palmer, 2309 Coachlight, Edmond, Okla. 73013
Filed Apr. 6, 1989, Ser. No. 334,673
Int. Cl.⁵ A41B *13/06;* **A41D** *11/06*
U.S. Cl. 2—69 **10 Claims**



1. A clothing item adapted to be worn by an individual comprising:

a body panel having an inner surface, an outer surface, a lower end and an upper end, a left side and a right side adapted to be wrapped generally about a substantial portion of the individual's torso;

a lower end panel having an inner surface, an outer surface, a left side and a right side; an upper end and a lower end, the lower end panel having an opened position wherein the lower end panel extends a distance from the body panel and a closed position wherein the lower end panel is folded over a portion of the body panel to a position wherein the inner surface of the lower end panel is disposed generally adjacent a portion of the inner surface of the body panel, the individual's torso being disposable on the inner surface of the body panel and the lower end panel being moveable generally toward the closed position to a position wherein the inner surface of the lower end panel is disposed generally adjacent a portion of the individual's torso and a portion of the body panel generally near the right side thereof being moveable over a portion of the individual's torso to a position wherein a portion of the inner surface of the body panel generally near the right side of the body panel is disposed generally over a portion of the outer surface of the lower end panel, and a portion of the body panel generally near the left side thereof being moveable over a portion of the individual's torso to a position wherein a portion of the inner surface of the body panel generally near the left side of the body panel is disposed generally over a portion of the outer surface of the lower end panel with the body panel covering a substantial portion of the lower end panel;

means for removably and adjustably connecting a portion of the left side of the body panel to a portion of the right side of the body panel or removably and adjustably connecting a portion of the body panel generally near the right side thereof to a portion of the lower end panel and removably and adjustably connecting a portion of the body panel generally near the left side thereof to a portion of the lower end panel whereby a size of a space encompassed by the body panel and the lower end panel is adjustably increasable or decreasable;

a right leg panel having a right side, a left side, an inner surface, an outer surface, an upper end and a lower end, a portion of the right leg panel generally at the right side of the right leg panel and extending a distance therefrom being connected to a portion of the lower end of the body panel generally at the right side thereof and extending a distance therefrom, and a portion of the right leg panel generally at the left side thereof and extending a distance therefrom being connected to a portion of the lower end of the lower end panel, the left side and the right side of the right leg panel being foldable to a position wherein the right side is disposed generally near the left side whereby a right leg space is formed which is shaped and adapted to receive the right leg of the individual;

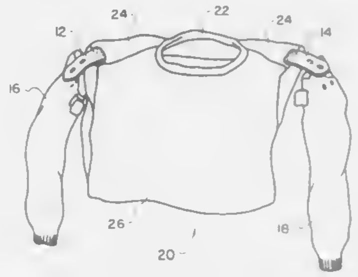
means for removably and adjustably connecting the left side of the right leg panel to the right side of the right leg panel whereby the size of the right leg space is increasable and decreasable;

a left leg panel having a right side, a left side, an inner surface, a outer surface, an upper end and a lower end, a portion of the left leg panel generally at the left side of the left leg panel and extending a distance therefrom being connected to a portion of the lower end of the body panel generally at the left side thereof and extending a distance therefrom, and a portion of the left leg panel generally at the right side thereof and extending a distance therefrom being connected to a portion of the lower end of the lower end panel, the left side and the right side of the left leg panel being foldable to a position wherein the right side is disposed generally near the left side whereby a left leg space is formed which is shaped and adapted to receive the left leg of the individual, the lower end panel being connected to the body panel by way of the right leg panel and the left leg panel at a position generally midway between the left side and the right side of the body panel; and

means for removably and adjustably connecting the left side of the left leg panel to the right side of the left leg panel whereby the size of the left leg space is increasable and decreasable.

5,023,953
GARMENT AND PROTECTIVE SLEEVE

Laurence A. Bettcher, Huron, Ohio, assignor to Bettcher Industries, Inc., Birmingham, Ohio
Continuation of Ser. No. 537,059, Jun. 12, 1990, abandoned. This application Dec. 12, 1990, Ser. No. 625,691
Int. Cl.⁵ A41D *27/10, 13/08, 27/12*
U.S. Cl. 2—126 **12 Claims**



1. The combination of a sleeveless shirt and a detachable cut-resistant protective sleeve for use in the meat packing industry, comprising:

a) a sleeveless shirt having
  i) a crew neck,
  ii) a single front panel and a single back panel, each substantially rectangular when flat and of a thin, light weight, low friction, wear-resistant, mesh material having significant give or stretch, and stitched together to form side seams of the shirt that extend from a tail end toward an upper end and that terminate before the upper end of the shirt to provide side openings at the

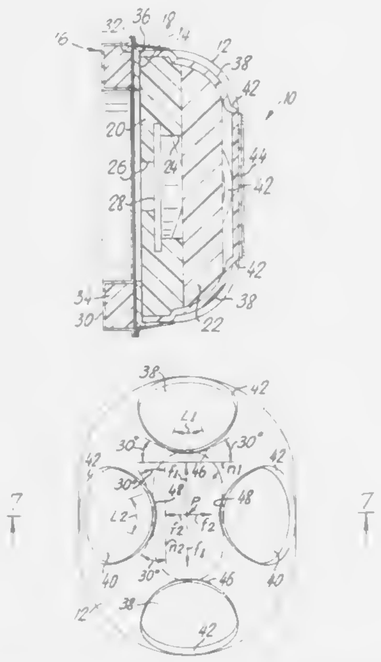
VOL
1127
ISS
3
JE
18
1991
UMI

upper end of the shirt for a wearer's arms to extend therethrough, the front panel forming a partial boundary of the neck,
  iii) a single yoke panel extending the width of the front and back panels, located essentially behind the neck and forming the remaining boundary of the neck and in part forming the side openings, said yoke panel being of a woven relatively heavy weight material and relatively non-stretchable compared to the front and back panels, and
  iv) two elongated tabs of elasticized webbing, each fastened at one end to the yoke, one on each side of the shirt and extending out from the shirt at the top of the side opening, substantially perpendicular to an edge of the yoke that in part forms the respective side opening and for a distance less than the distance from the neck to the side opening; and each having two fasteners that are each one part of a two-part system, the two fasteners being aligned and spaced along the length of the tab; and
b) an elongated protective tubular sleeve separable from the shirt, knit from a high strength cut-resistant yarn comprised of a core having a stainless steel strand 0.002 to 0.004 inches in diameter and a core of high strength stretched polyethylene of approximately 650 denier, a first wrap about the core of approximately 400 denier high strength aramid fiber, a second wrap of approximately 375 denier high strength stretched polyethylene fiber and a third wrap of approximately 440 denier polyester, said sleeve having
  i) an elasticized cuff portion at one end,
  ii) a non-elasticized other end with a placket and an elasticized tab secured at one end to the sleeve to extend across the placket and having a fastener at a free end to attach the free end to the sleeve to tighten the non-elasticized end,
  iii) four fasteners, each being the other part of the two-part system, secured to the sleeve at a location substantially diametrically opposite from the placket, arranged in two rows of two fasteners each, the rows being spaced peripherally about the sleeve and the fasteners of each row being spaced longitudinally of the sleeve.

5,023,954
FOREHEAD, TEMPLE, EAR, AND NECK PROTECTOR
Calvin R. Lyons, 7 Worthington Ct., Sterling, Va. 22170
Filed Dec. 18, 1989, Ser. No. 451,561
Int. Cl.⁵ A42B *1/16*
U.S. Cl. 2—174 **19 Claims**

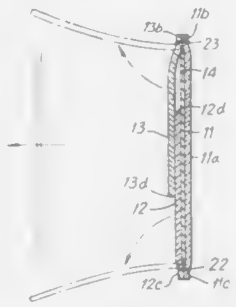
1. A protective device in the form of a band which covers the ears and skin located just below the entire hairline, comprising:
  (a) a band of flexible material adapted to be worn around the head of a wearer, the band comprising a forehead protector which includes an upwardly extending cover portion to meet the forehead hairline of a wearer, a temple protector portion connected with each end of the forehead protector, each temple protector portion having a smaller width than the width of the forehead protector, an ear protector portion slidably carried on each temple protector portion for sliding movement therealong, and a neck protector portion connected with each temple protector portion to simultaneously cover the skin of the wearer immediately below the hairline at the wearer's forehead, temples, ears, and neck;
  (b) adjustable connection means for joining the neck protector portions of said band of flexible material together to complete a closed loop structure around the wearer's head and to permit adjustability of the circumferential length of the device.

5,023,955
IMPACT-ABSORBING SOUND-ATTENUATING EARCUP
John A. Murphy, II, and Charles A. Westgate, both of Carbondale, Pa., assignors to Gentex Corporation, Carbondale, Pa.
Filed Apr. 13, 1989, Ser. No. 337,407
Int. Cl.⁵ A41D *21/00*
U.S. Cl. 2—209 **6 Claims**



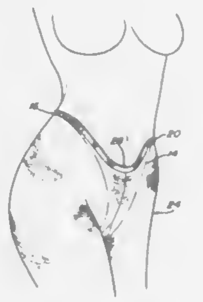
1. A sound attenuating earcup for insulating the ear of a wearer from ambient sound while inhibiting transmission to the wearer's head through the earcup of shocks of impact from severe bumps or the like which might otherwise injure the head of the wearer comprising a discrete hollow cup-shaped crushable shell forming a cavity for the wearer's ear to provide a sound-attenuating chamber around the ear, said shell having a periphery toward which stress resulting from a shock of impact travels along a path from a point of impact adjacent to the center of the shell, said shell being formed with stress concentrators, each of which has an appreciable extent in a direction across said path from said point of impact toward said periphery, said shell being formed of such a material and of such a thickness as to maintain its rigidity in ordinary use and to collapse upon impact from such severe bumps or the like to dissipate energy at an applied force less than that required to crush the skull of the wearer, said stress concentrators forming recesses in said shell, the surface of said shell having a center point, said recesses having edge portions extending generally tangentially relative to a line perpendicular to said path of stress resulting from a force applied at said point.

5,023,956
ELONGATED ARTICLE OF APPAREL
Flo Fox, New York, N.Y., assignor to Peter Weiss, New York, N.Y.
Filed Feb. 28, 1990, Ser. No. 487,352
Int. Cl.⁵ A41F *9/00*
U.S. Cl. 2—338 **6 Claims**



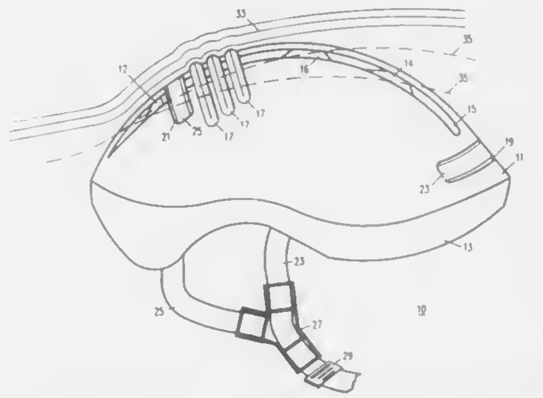
1. An elongated article of apparel adapted to at least substantially encircle a portion of the body of a wearer of the article of apparel, comprising three substantially longitudinally coextensive elongated strips of self-cohesive, pliable plastic sheeting, a first of the strips being transparent and having a surface forming an obverse face of the article of apparel and having mutually opposed later edges, the second and third strips each having a lateral edge attached to a respective one of the lateral edges of the first strip, the second and third strips each being narrower than the first strip and each having a free lateral edge, the combined widths of the second and third strips being greater than the width of the first strip whereby the second and third strips have mutually overlapping lateral portions, contiguous with their respective free lateral edges, the first, second and third strips thereby forming a transparent enveloping structure, the pliability of the sheeting permitting the overlapping portions of the second and third strips to be manually peeled away from each other thereby to provide access to the interior of the enveloping structure for the insertion or removal of flat decorative matter and then to be mutually overlapped again and the self-cohesiveness of the plastic sheeting causing the overlapping portions to cohere sufficiently to remain sealed when not being subjected to said manual peeling.

5,023,957
PANTY HOSE FOR WEARING UNDER AN ABBREVIATED OUTER GARMENT
Mary A. Harvey, 2358 Cloister Ct., Troy, Mich. 48084
Filed Dec. 20, 1990, Ser. No. 453,786
Int. Cl.⁵ A41B *9/04*
U.S. Cl. 2—409 **11 Claims**



5. A panty hose garment for wearing over the legs and lower torso area of a wearer and made from a stretchable, sheer material such that when the wearer puts on the garment it will ride on top of the wearer's hips and be stretched so the wearer's skin is clearly visible, through the material, said panty hose garment comprising:
  a panty portion including a crotch portion, a front portion and a back portion substantially enclosing the wearer's lower torso area between the wearer's hips and crotch;
  two leg portions extending from both sides of the crotch portion;
  a waistband completely encircling the upper edge of the panty portion and having a width which is readily concealable under a G-string type garment, said waistband having a V-shaped configuration across the front portion of the panty portion such that the waistband is supported by the wearer's hips and falls substantially below the wearer's navel at the apex of the V, and the apex of the V-shape front portion falling substantially below the lowest point of the back portion; and
  a crotch panel within the crotch portion, said crotch panel having a teardrop shape such that the wider end of the crotch panel is towards the front portion of the panty hose garment.

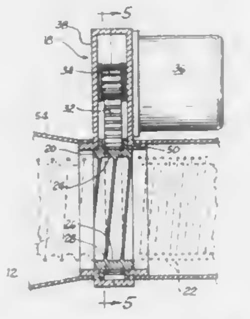
5,023,958
AERODYNAMIC BICYCLE HELMET
Stephen A. Rotzin, 32 Las Vegas Rd., Orinda, Calif. 94563
Filed Sep. 1, 1989, Ser. No. 402,605
Int. Cl.⁵ A42B *3/00*
U.S. Cl. 2—411 **10 Claims**

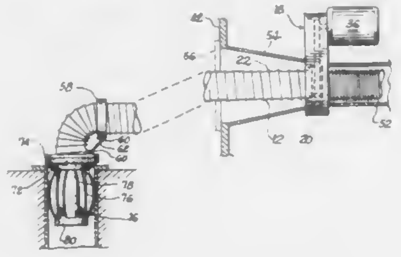


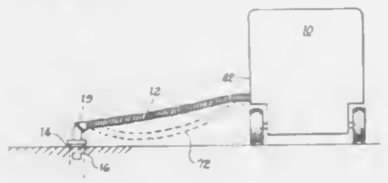
1. A bicycle safety helmet comprising a concave body internally shaped to conform to and be worn on a user's head and having stabilizing means for stabilizing said helmet on the user's head, said stabilizing means comprising:
  at least one ridge transversely disposed on a forward portion of the external surface of said helmet body;
  ventilation means including at least one front aperture formed in a forward portion of said helmet body and at least one rear aperture formed in a rear portion of said helmet body, said ventilation means providing an airflow through said helmet body, the airflow entering the helmet body through said front aperture and exiting the helmet body through said rear aperture and flowing over said rear portion of said helmet body;
  helmet retention straps including a forward strap and a rear strap, said forward and rear straps being routed through apertures formed in said helmet body and over the external surfaces of a forward portion of said helmet body and said rear portion, respectively, said retention straps coupled together in a buckle means under the chin of a user; and
  strap adjustment means for adjusting said helmet retention straps.

VOL
1127
ISS
3
JE
18
1991
UMI

5,023,959
EXTENDABLE WASTE HOSE SYSTEM
Albert E. Mercer, Jacumba, Calif., assignor to Thetford Corporation, Ann Arbor, Mich.
Filed Apr. 3, 1989, Ser. No. 331,965
Int. Cl.^{5} E03D *1/00*
U.S. Cl. 4—321 **17 Claims**



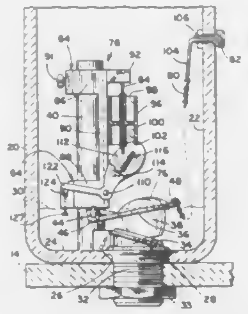




1. In a recreational vehicle having storage means for liquid waste, a hose member in communication with said storage means for use in discharging waste therefrom,
said hose member being of accordion construction with a ribbed external surface to enable said hose member to be longitudinally extended into an extended dumping mode and longitudinally collapsed into a compact stowage mode,
a housing for stowing said hose member in said compact stowage mode, said housing having an outlet opening through which said hose is extendable,
hose drive means located externally of said hose member adjacent said housing and physically engaging said hose member ribbed external surface for selectively extending said hose out of said housing through said opening into said hose member extended dumping mode and retracting said hose member through said opening back into said housing into said compact stowage mode and,
said hose member having an inner end for connection to said waste storage means and an outer end including a coupling for insertion into a waste inlet of a waste dump station.

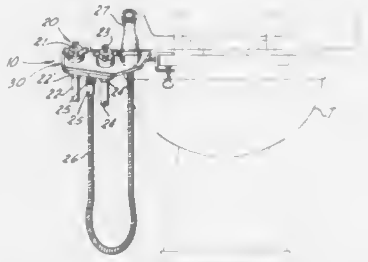
15. A waste hose system comprising: a storage housing
a longitudinally collapsible hose having a longitudinal axis, rib means forming a ribbed exterior surface on said hose of alternating ridges and grooves and coupling means at one end of said hose for coupling said hose to a waste inlet of a waste dump station, said hose being axially moveable between a collapsed position inside of said storage housing and an extended in use position; and
drive means located externally of said hose member adjacent said housing and including a rotatable drive member extending into said grooves and frictionally engaging said hose so that rotation of said drive member in one direction moves said hose longitudinally to said collapsed position and rotation of said drive member in the other direction moves said hose longitudinally to the extended position so that the length of hose between said coupling means and drive means can be varied to thereby prevent sagging in the hose when in the extended in-use position.

5,023,960
TOILET FLAPPER VALVE CONTROL APPARATUS
Srinkarn Ratanagsu, 7752 Bellaire Ave., North Hollywood, Calif. 91605
Continuation-in-part of Ser. No. 425,599, Oct. 23, 1989. This application Apr. 23, 1990, Ser. No. 512,427
Int. Cl.^{5} E03D *1/35, 1/14*
U.S. Cl. 4—393 3 Claims



1. In combination with a toilet, said toilet having a tank, said tank having an internal chamber adapted to contain water, a discharge opening found within said tank and connecting with said internal chamber, a flapper valve mounted on said discharge opening, said flapper valve being movable between an open position and a closed position, said open position permitting flow of water from said internal chamber through said discharge opening, said closed position preventing flow of water through said discharge opening, an overflow tube fixedly mounted to said tank, said overflow tube located within said internal chamber directly adjacent said discharge opening, when said flapper valve is located in said open position said flapper valve is designed to remain in said open position until said internal chamber is almost empty of water, the improvement comprising:
flapper valve control means mounted on said overflow tube, said flapper valve control means to contact said flapper valve and cause said flapper valve to move from said open position to said closed position prior to completely emptying of said internal chamber of water, said flapper valve control means including a mounting housing, a float block movably mounted on said mounting housing, said float block having an interior chamber, said interior chamber being adapted to contain a quantity of water, said quantity of water combined with the weight of said float block to be sufficient to cause said flapper valve to move to said closed position prior to complete emptying of water within said internal chamber, said float block having an air chamber, said air chamber to cause said float block to float when immersed within the water within said internal chamber; and
said flapper valve control means further including an arm assembly, said arm assembly being pivotally mounted on said mounting housing, said arm assembly being movable between an at-rest position and a latched position, said at-rest position being when said arm assembly is in physical contact with said flapper valve and as said flapper valve moves between said open and closed positions said arm assembly moves with said flapper valve maintaining said physical contact, said latched position being when said float block latchingly connects with said arm assembly permitting movement of said flapper valve away from said arm assembly which includes said closed position.

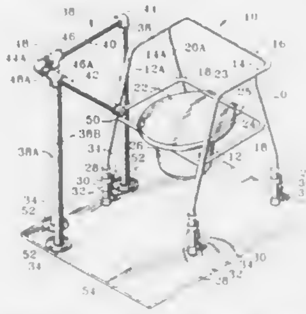
5,023,961
BIDET ACCESSORY
Nelson A. Alonso, 1701 SW. 32 Ct., Miami, Fla. 33145
Filed Dec. 5, 1988, Ser. No. 279,741
Int. Cl.^{5} A61H *35/00*
U.S. Cl. 4—448 5 Claims



1. A bidet accessory for installation in two piece toilets, the toilets having flanged section in the rear and the bidet accessory being connected to hot and cold water supplies, the bidet accessory comprising:
A. supporting means;
B. valve means connected to said hot and cold water supplies for regulating the temperature of the water and further including an outlet through which said temperature regulated water flows and said valve means being mounted in said support means;
C. flexible conduit means having two ends and connected to said outlet at one of the ends;
D. sprayer means connected at the other end of said conduit means;
E. mounting means for rigidly mounting said supporting means to said flanged section of a toilet comprising a J-shape bar member having curved and long ends, said curved end being rigidly attached to said supporting means, a U-shape bar member having curved and legged ends, whereby said long end of said J-shape bar is perpendicularly and slidably attached by a first fastening means to said curved end of said U-shape bar member, said legged end of said U-shape bar member being rigidly attached to an attaching means, and said attaching means being removably attachable to said flanged section of a toilet, the mounting means being assembled so that said J-shape bar member cooperates with the U-shape bar member allowing the supporting means to be slidably adjustable with respect to the toilet.

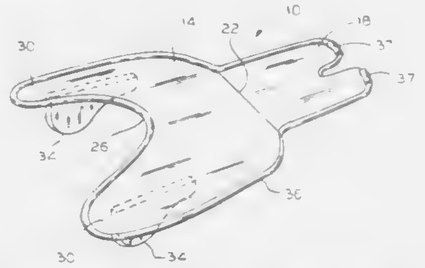
5,023,962
BEDSIDE COMMODE STATION FOR INVALID PATIENTS
Robert C. Steljes, P.O. Box 1479, Marion, N.C. 28752-1479
Filed Nov. 5, 1990, Ser. No. 609,478
Int. Cl.^{5} A47K *11/06;* A61G *7/08*
U.S. Cl. 4—480 8 Claims

1. A bedside commode station for location adjacent a patient's bed comprising in combination,
a rigid continuous sheet of material forming a horizontal platform defining a peripheral edge,
a bedside commode including a removable container and first frame means fastened to said platform for supporting said container above said platform, said first frame means being spaced from said peripheral edge,
a handrail and second frame means for supporting said handrail to said platform,
said handrail being spaced horizontally from said commode on said platform,
said platform being of sufficient size to support said handrail at a sufficient distance from said commode to allow a patient to freely move between said handrail and said commode,
said platform being of sufficient size to allow said peripheral edge adjacent said patient's bed to partially extend under said bed when said first frame is against said bed,



and the platform being of sufficient rigidity to enable said patient to grip the handrail and pull up to a standing position on said platform without the platform becoming unstable.

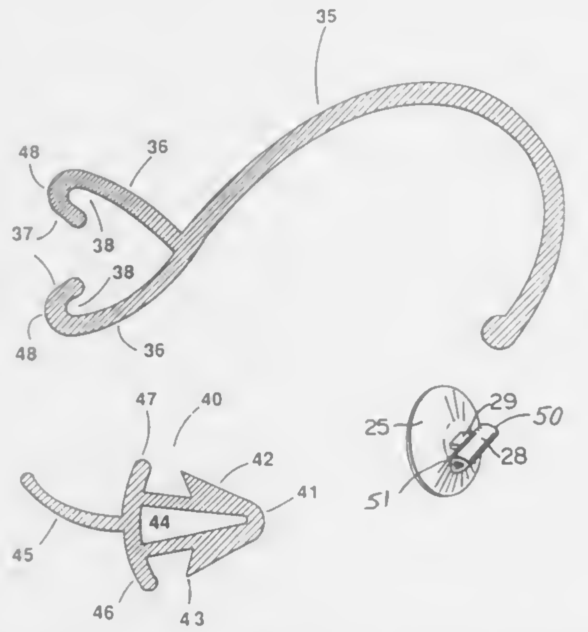
5,023,963
SELF ADJUSTING AND SELF SECURING SHAMPOO TRAY
Naomi R. Vogel, 2105 Berrywood La., Bloomington, Ill. 61704
Filed Jun. 21, 1990, Ser. No. 541,723
Int. Cl.^{5} A45D *44/08*
U.S. Cl. 4—521 12 Claims



10. A self adjusting and self securing shampoo tray for catching and discharging into a basin the run-off from shampoo operations of recipients of varying heights while the recipients may be seated in an upright position comprising:
a rigid body having run-off containing and directing first and second sections, the first section of the rigid body having a top and a bottom and a rim on its top defining a run-off containing periphery adapted to channel run-off to the second section of the rigid body for discharge into a basin during a shampoo operation;
a hinge joining the first and second sections in a manner allowing the first section to swing relative to the second section for accommodating recipients of varying heights;
the first section having a free end opposite the hinge with an arcuate neck receiving opening formed integrally therein and defining opposing channels disposed on each side of the neck receiving opening;
the second section having a free end opposite the hinge, the first and second sections together being of a length such that the free end of the second section will engage an inner surface of the basin to support the tray between the recipient and the basin; and a pair of elongated supports each depending from respective ends of the opposing channels and extending toward and generally perpendicular to the hinge, the supports being of greatest height proximate to the free end of the first section and of decreasing height as they extend toward the hinge, the height and slope of the platforms being sufficient to maintain the neck receiving opening against a recipient's neck while directing run-off flow towards the second section of the rigid body during a shampooing operation substantially independent of the recipient's height.

VOL
1127
ISS
3
JE
18
1991
UMI

5,023,964
SHOWER CURTAIN RETAINER
John Unsworth, Ste. 211, 14525 - 92 Street, Edmonton, Alberta, Canada T5E 3S7
Filed Jan. 25, 1990, Ser. No. 470,232
Claims priority, application Canada, Jan. 25, 1989, 589113
Int. Cl.^{5} A47K *3/22*
U.S. Cl. 4—558 **4 Claims**



1. A retainer device for holding a shower curtain in the closed position against the wall of a shower enclosure, the device comprising:

coupler means having first and second opposing sides, the first side including a suction cup and the second side including first lug means;

a longitudinally elongate sealing barrier having third and fourth opposing sides, the third side including a flexible curved body and the fourth side including second lug means extending transversely away from the body; and

a longitudinally elongate and transversely arcuate handle having a first side and a second side, the first side defining socket means for releasably receiving both the first lug means and the second lug means together with the shower curtain, the second side defining said handle;

whereby the shower curtain is releasably connectable between the coupler means and the handle, and the coupler means and therefore the shower curtain are releasably connectable to the wall.

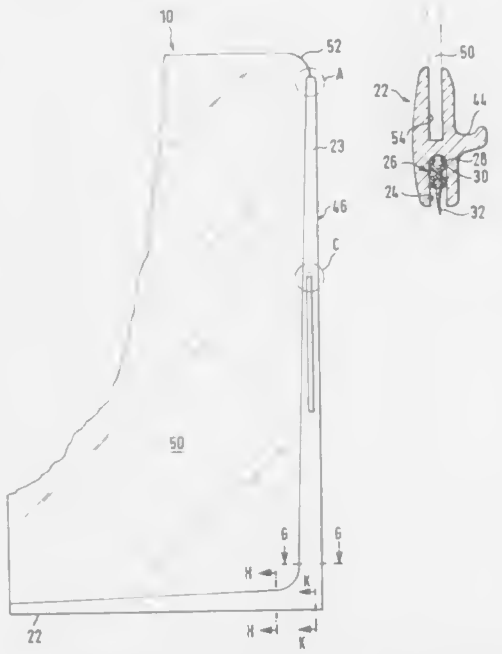
5,023,965
SHOWER UNIT PANEL
Gunter Reichel, Kreuzstrasse 19, D-3563 Dautphetal 5, Fed. Rep. of Germany
Filed Oct. 12, 1989, Ser. No. 421,676
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1989, 8903013[U]; Ang. 3, 1989, 8909357[U]
Int. Cl.^{5} A47K *3/22, 3/08*
U.S. Cl. 4—607 **14 Claims**

1. A panel for the closure of shower units and the like that has a front side and a back side and which is adapted to be vertically mounted by a hinged supporting means, said panel including

(a) a pane (50) having a front side and a backside as well as top, bottom, inner and outer edges,

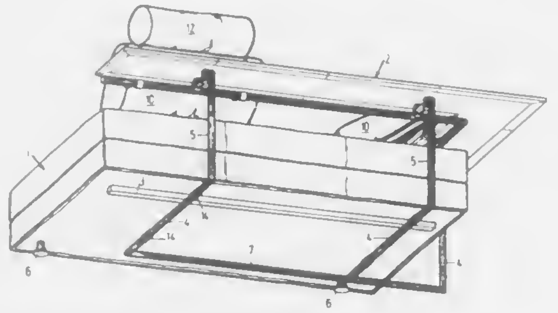
(b) an integral component bordering both the bottom edge and at least a part of the outer edge of said pane (50),

(c) a profiled ledge (22,23) containing a drain channel (44) for water that is a part of said integral component that is on the backside of the panel (10) and which extends along both the bottom edge of said pane (50) and at least a part of a corner formed by the bottom and outer edges of said pane (50), said profiled ledge (22, 23) sloping continuously downwardly from a point adjacent said outer edge of said pane (50) towards said inner edge of said pane so that water arriving in said channel will flow toward the interior of the shower unit regardless of whether the shower door is open or closed, and



(d) sealing means associated with the bottom edge of said integral component to seal off the passage of water from the backside to the front side of said panel.

5,023,966
PIECE OF FURNITURE
Jens J. Eilerseo, "Villa Malou" - Domaine de la Veroninere, Valbonne, France 06560
Filed Jul. 31, 1990, Ser. No. 560,169
Claims priority, application Denmark, Aug. 10, 1989, 3935/89
Int. Cl.^{5} A47C *17/13. 20/00*
U.S. Cl. 5—17 **14 Claims**

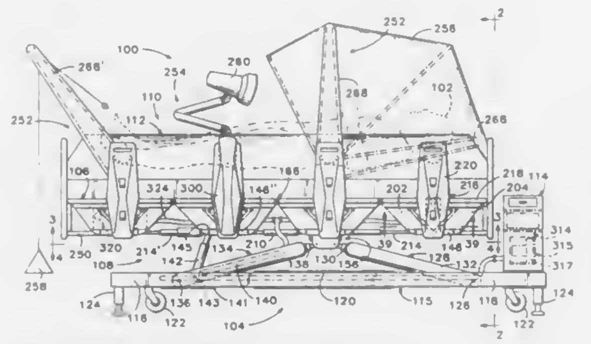


1. A piece of furniture, comprising:

a stationary back rest part having at least a substantially horizontal portion for resting on a floor;

a movable part for sitting or resting thereon, said movable part being subject to resting at least partially on said substantially horizontal portion, said movable part including support means for contacting with said substantially horizontal portion, said support means permitting relative motion between said back rest part and said movable part in any direction substantially parallel with said substantially horizontal portion.

5,023,967
PATIENT SUPPORT SYSTEM
Robert Ferrand, Burlingame, Calif., assignor to American Life Support Technology, Burlingame, Calif.
Continuation of Ser. No. 172,264, Mar. 23, 1988, abandoned. This application Apr. 20, 1990, Ser. No. 511,842
Int. Cl.^{5} A61G *7/06*
U.S. Cl. 5—62 **28 Claims**



1. A patient support system comprising:

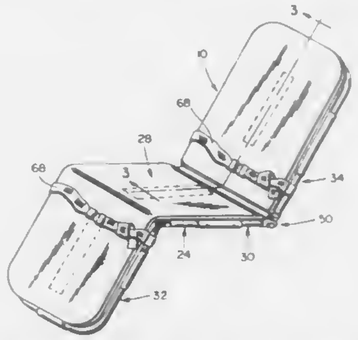
a base frame supportable relative to a floor;

an elongate platform extending along a longitudinal axis and relative to a platform plane generally parallel to the plane of the torso of a patient disposed in a supine or prone position relative to said platform along said longitudinal axis; and

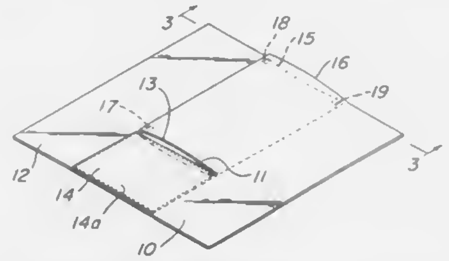
means for supporting said platform relative to said base frame comprising means defining three axes of pivoting of said platform relative to said frame, characterized in that none of said three axes are perpendicular to said platform plane, and on each axis there exists a first point that is closest to a first of the other axes and a second point, spaced from the first point, that is closest to the second of the other axes, and means for pivoting said platform independently about each of said three axes for varying the pitch, roll and distance of said platform relative to said base frame.

5,023,968
REMOVABLE LITTER CHAIR INSERT
Phillip C. Diehl, and James R. Coble, both of P.O. Box 694, Altoona, Pa. 16603
Filed Jul. 11, 1989, Ser. No. 377,962
Int. Cl.^{5} A61G *1/00, 1/04*
U.S. Cl. 5—82 R **4 Claims**

4. A litter chair insert for use with an ambulance cot and convertible from a straight stretcher to a chair configuration comprising a generally rectangular frame enclosing an open area, a flexible liner in the open area attached to the frame, said frame including a center section, a foot section and a head section, lockable hinge means interconnecting the center section and foot section and lockable hinge means interconnecting the center section and head section with the lockable hinge means enabling the sections to be oriented in alignment with each other to form a stretcher or in angular relation to each other to form a chair to enable a patient to be more effectively transported down stairways, through halls having confined areas and the like, each of said lockable hinge means including a female component and a male component, said female hinge component including an axial recess receiving an axial projection on the male hinge component, a transverse pin interconnecting said female hinge component and said male hinge component to enable the hinge components to move pivotally in relation to each other when moving between aligned and angular positions, and a locking member movably mounted on one of said hinge components in spaced but adjacent relation to the pin for locking engagement with the other hinge component in the aligned and angular positions of the hinge components, said locking hinge being confined to an area adjacent said transverse pin thereby leaving the areas above and below the frame unobstructed, said recess on the female hinge component and said projection on the male hinge component including engageable transverse surfaces parallel to and in spaced but adjacent relation to said pin for limiting pivotal movement of the female and male hinge components to an aligned position in one direction of pivotal movement and an angular position in the other direction of pivotal movement, said hinge component lockingly engaged by the movable locking member including transverse surface areas in addition to those limiting pivotal movement engageable by said locking member when said female and male hinge components are in their aligned and angular positions.



5,023,969
NOVEL BLANKET/SHEET FOR A DOUBLE BED
Douglas J. Nattrass, 80 Queens Cir., Chalfont, Pa. 18914
Filed Apr. 9, 1990, Ser. No. 506,225
Int. Cl.^{5} A47G *9/02*
U.S. Cl. 5—486 **14 Claims**



10. The combination comprising:

(a) at least one integrally formed cloth member for fitting on top of a double bed;

(b) at least one slit formed in said cloth member which does not destroy its integrity;

(c) means located upon said member and attached along said formed cut to form flaps; and

(d) said flaps in combination with a portion of said cloth member being utilized to maintain the comfort zone of persons occupying said double bed or alternatively being independently controllable in a sideway or a downward direction without effecting the comfort zone of an opposite person.

VOL
1127
ISS
3
JE
18
1991
UMI

5,023,970
BED COVER

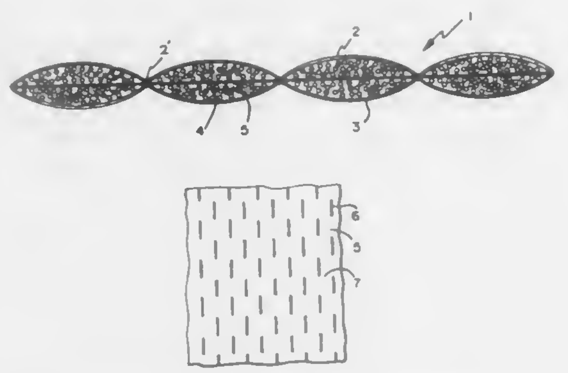
Günter Tesch, Avenue Jean-Marie-Musy 15, Fribourg, Switzerland CH-1700

Filed Mar. 14, 1989, Ser. No. 322,994

Claims priority, application Switzerland, Mar. 28, 1988, 01130/88

Int. Cl.⁵ A47G *9/00*

U.S. Cl. 5—502 **17 Claims**



1. A cover, in particular a bed cover, comprising:

a case having two outer sheets;

a filling between said two outer sheets; and

a single thin sheet located between said two outer sheets, said single thin sheet being formed from a plastic material and including a plurality of slits arranged in a predetermined patterned distribution over substantially the entire surface thereof, an opening formed by each slit in said thin sheet is such that the openings are closed when the thin sheet is not stressed.

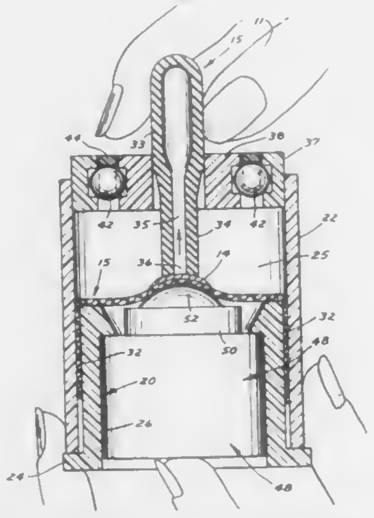
5,023,971
CONTACT LENS SURFACE TREATMENT APPARATUS

Larry W. Pompe, 115 ½ E. Litchfield Ave., Willmar, Minn. 56201

Continuation-in-part of Ser. No. 262,274, Oct. 25, 1988, abandoned. This application Aug. 28, 1989, Ser. No. 398,986

Int. Cl.⁵ G02C *13/00*

U.S. Cl. 15—97.1 **26 Claims**



1. A contact lens surface treatment apparatus comprising:

a housing having a first open end and a second open end generally aligned with the first open end;

a surface treatment pad retainer having side walls of dimension and shape to be inserted in the first end of the housing, said retainer having a central opening, a surface treatment pad having a central portion spanning the central opening of the retainer and having an edge extending from the central portion in overlapping relationship to the side walls of the retainer such that the edge is lodged between the side walls of the retainer and the inner walls of the first opening of the housing to frictionally hold the retainer in the housing;

a contact lens holder;

a contact lens holder mount having a outer portion and an inner portion rotatable with respect to the outer portion, said outer portion having an outer dimension and size to fit in the second open end of the housing in a light friction fit, said outer portion being releasably installed in the second open end of the housing;

said contact lens holder assembled to said inner portion of the contact lens holder mount for rotation with the inner portion of the contact lens holder mount with respect to the outer portion, said contact lens holder having a stem extending into the housing toward the central opening of the retainer, said stem having a tip and means on the tip for holding a contact lens in contact with the pad for rotation of the contact lens holder to perform a surface treatment procedure.

5,023,972
SPARE WIPER ELEMENT

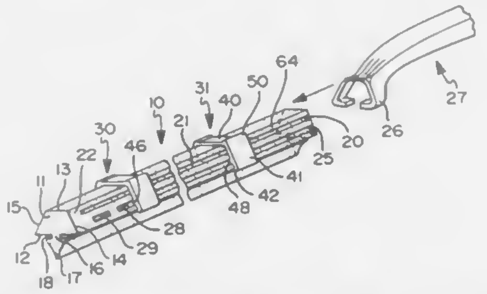
Kurt Bauer, Ingersheim, and Eckhardt Schmid, Bietigheim-Bissingen, both of Fed. Rep. of Germany, assignors to SWF-Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany

Filed Aug. 11, 1989, Ser. No. 393,352

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1988, 3827875

Int. Cl.⁵ B60S *1/02*

U.S. Cl. 15—250.42 **14 Claims**



1. A spare wiper element for a wiper blade, for motor vehicles, comprising a wiper rubber having a basic body and a wiper lip, which is held on the basic body by way of a tiltable web, and comprising two spring bars each of which is laterally inserted in an associated longitudinal groove worked into the basic body and are protected there against longitudinal displacement by integral holding elements on the wiper rubber and after the final assembly of the wiper blade are secured by holding claws on a supporting yoke system transversely to the longitudinal direction of the wiper rubber, wherein the basic body **(11)** of the wiper rubber **(10)** is encompassed by at least one holding clamp **(30, 31)** which secures the spring bars **(21)** in the longitudinal grooves during assembly of the wiper and wherein said holding clamp is removable after assembly of the wiper assembly by sliding it in said longitudinal direction.

5,023,973
VACUUM CLEANER

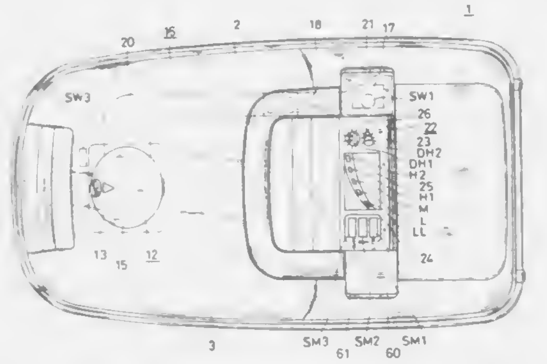
Yasuyuki Tsuchida, Hyogo, and Yuki Nakanishi, Kasai, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Dec. 18, 1989, Ser. No. 452,594

Claims priority, application Japan, Dec. 19, 1988, 63-320938

Int. Cl.⁵ A47L *9/28*

U.S. Cl. 15—319 **7 Claims**



1. A vacuum cleaner comprising:

a cleaner body provided with an air inlet and an air outlet;

a dust chamber provided in said cleaner body and communicating with said air inlet;

a housing provided in said cleaner body, communicating with said dust chamber and said air outlet and accommodating an electric air blower;

means for selecting inlet suction force levels produced by said electric air blower;

a pressure sensor in communication with the suction side of said electric air blower;

means for comparing an output of a detected pressure from said sensor with a reference value;

means for varying said reference value in proportion to the suction force level selected by said selecting means; and

means for indicating an accumulated state of dust in said dust chamber based upon the comparison result from said comparing means.

5,023,974
ROTATION METHOD AND APPARATUS

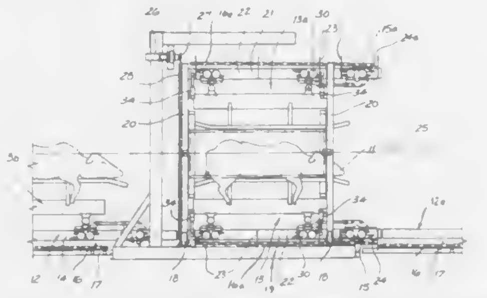
Kenneth G. Coles, Woollahra, Australia, assignor to Conveyor Co. of Australia Pty. Ltd., Waterloo, Australia

Filed Jan. 31, 1990, Ser. No. 472,717

Claims priority, application Australia, Feb. 1, 1989, PJ2501

Int. Cl.⁵ A22B *5/00*

U.S. Cl. 452—177 **21 Claims**



1. A method of rotating an article being conveyed on a first carrier travelling a track of a conveyor system, characterised by comprising the steps of:

(a) stopping said first carrier at a first longitudinal section of track;

(b) providing a second carrier on a second longitudinal section of track, the second carrier and second section being displaced at an angle relative to the first carrier and first section respectively in a plane normal to a longitudinal axis of rotation;

(c) keeping said angle substantially constant while rotating the first and second sections about the axis of rotation through said angle, such that the positions of the second section and second carrier after the rotation are substantially the same as the positions of the first section and first carrier respectively prior to the rotation and the article is rotated onto the second carrier.

5,023,975
BONING APPARATUS FOR REMOVING RIBS FROM A BELLY

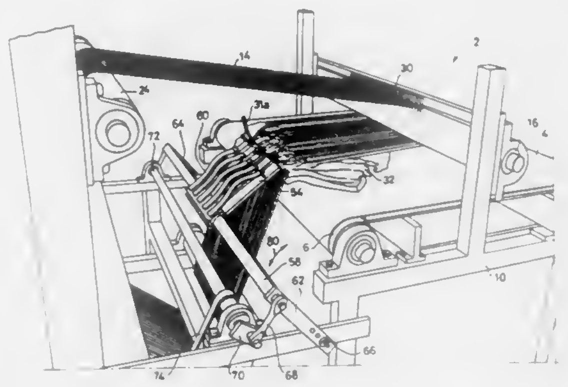
Rudolf J. Van Der Hoorn, Pylkruidhof 5, Nuenen, Netherlands 5672 BK ; Martinus J. Jaspers, Bloemhoefstraat 6, Nuenen, Netherlands 5674 NT , and Johannes J. Bak, Utrecht, all of Netherlands

Continuation of Ser. No. 277,225, Nov. 29, 1988, abandoned. This application Sep. 15, 1989, Ser. No. 408,405

Claims priority, application Netherlands, Nov. 30, 1987, 8702872

Int. Cl.⁵ A22C *17/04*

U.S. Cl. 17—46 **16 Claims**



1. Boning apparatus, for removing the ribs from a belly, comprising a flexible and drivable support surface, guided over a guide roller, for supporting the belly to be processed, a number of cords or strings disposed thereabove and side by side in the direction of the width thereof which include an acute angle with said surface in the direction of the guide roller, are guided over said roller and are driven in the same direction as the support surface, and a striker mechanism which is positioned in front of the guide roller, covering the part of the belly which is to be boned, and can be driven in a reciprocating movement in the direction of the guide roller, and acts on the ribs protruding from the belly.

5,023,976
FEED TABLE OF A DRAWFRAME ARRANGEMENT

Urs Meyer, Niederglatt; Niklaus Gartenmann, Winterthur, and Roland Fischer, Zürich, all of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed Nov. 3, 1989, Ser. No. 431,576

Claims priority, application Switzerland, Nov. 3, 1988, 048888/88

Int. Cl.⁵ D01G *31/00*

U.S. Cl. 19—0.25 **31 Claims**

1. A feed table for continuously feeding slivers to a textile processing machine, comprising:

(a) a plurality of sliver cans arranged in a row for supplying primary slivers to said textile processing machine;

(b) a plurality of reserve sliver cans disposed adjacent to said sliver cans for supplying reserve slivers to said textile processing machine;

(c) a first narrow flexible conveyor belt for each of said

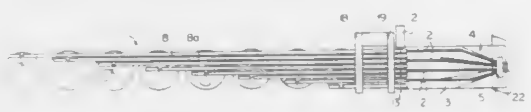
VOL 1127 ISS 3 JE 18 1991 UMI

primary slivers, said conveyor belts being supported by a driven roller and an idler roller for conveying said slivers to a common delivery point;

(d) a second flexible conveyor belt for each of said reserve slivers, said conveyor belts being supported by a driven support roller and an idler roller, adjacent to said first conveyor belt for alternately conveying said reserve slivers to said common delivery point;

(e) first detection means for detecting the presence of each of said primary slivers and said reserve slivers, individually;

(f) second detection means for detecting the absence of said primary slivers and said reserve slivers, individually;



(g) a continuously driven common conveyor belt for receiving said slivers at said common point and for conveying said slivers to said textile processing machine; and

(h) control means for receiving signals from said first and second detecting means, including means for selectively driving said driven rollers of said first and second conveyor belts to alternately deliver said primary sliver or its adjacent reserve sliver to said common point on said common conveyor, said control means commencing the delivery of a leading end of said reserve sliver to said common point at the same time that a trailing end of said primary sliver passes said common delivery point.

5,023,977
SLIVER GUIDE FOR A TEXTILE MACHINE

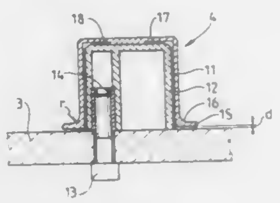
Helfried Lang, Winterthur, Switzerland, assignor to Riter Machine Works, Ltd., Winterthur, Switzerland

Filed Jun. 28, 1989, Ser. No. 372,315

Claims priority, application Switzerland, Jul. 4, 1988, 02536/88

Int. Cl.^{5} D01G *19/00*

U.S. Cl. 19—115 R **21 Claims**



1. A textile machine comprising

a table; and

a plurality of sliver guides for guiding at least one sliver over said table, each said guide including an inner element fixedly mounted on said table and a sleeve rotatably mounted on said inner element for rotation about an axis perpendicular to said table to receive and deflect a sliver passing thereover from one direction into a second direction, said sleeve having a radially outwardly projecting flange adjacent a surface of said table to support a sliver thereon.

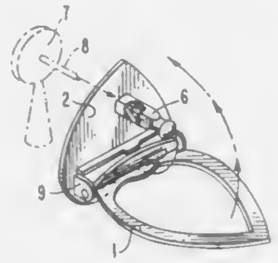
5,023,978
SCARF CLIP ADAPTER FOR BROOCH OR EARRING

Bobbie J. Thompson, Charlottesville, Va., and Tamela T. Thompson, 34 Canterbury Rd., Charlottesville, Va. 22901, assignors to Tamela T. Thompson, Charlottesville, Va.

Filed Jul. 7, 1989, Ser. No. 376,832

Int. Cl.^{5} A41F *1/00;* **A44B** *21/00*

U.S. Cl. 24—3 L **6 Claims**



1. A neckerchief clip adapter having, as the neckerchief-ends-encircling member, a generally-planar rear element through which said ends are threaded from above downward and from front to rear and which carries one portion of a hinge and a generally-planar front display element which carries the other portion of said hinge, pivotally hinged it to said rear element to engage said ends between said elements, and including a mounting fixture having a tubular bore carried by said front element adapted to retain and display, when attached thereto, a separately usable ornament.

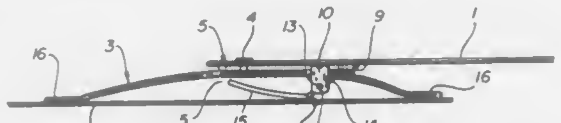
5,023,979
FASTENER FOR GARMENTS

Robert B. Bennett, 352 E. Linden, Englewood, N.J. 07631; Vincent Hung, 65 Fairfield Rd., Parsippany, N.J. 07054, and Ezra Sassoon, One Stanley Rd., White Plains, N.Y. 10605

Filed Dec. 6, 1989, Ser. No. 446,869

Int. Cl.^{5} A44B *11/00*

U.S. Cl. 24—68 R **10 Claims**



1. A hidden clasp fastener for a pair of overlapping members having an underlying member and an outer overlying member comprising:

a longitudinally-extending cloth tab secured at both free ends thereof to one of said overlapping members;

a closure clasp having a bottom, a pair of pivot arms projecting from said bottom and a closure clasp arm pivotally mounted between said pivot arms, said closure clasp bottom secured to the other of said overlapping members so that the closure clasp is hidden between the two overlapping members, wherein the cloth tab passes through the closure clasp between the bottom of said clasp and the closure clasp arm and the closure clasp is longitudinally shiftable along the cloth tab when the closure clasp arm is in an open position and when the closure clap arm is in a closed position the closure clasp arm securably engages the cloth tab against the bottom of said clasp preventing longitudinal shifting of the closure clasp along the cloth tab.

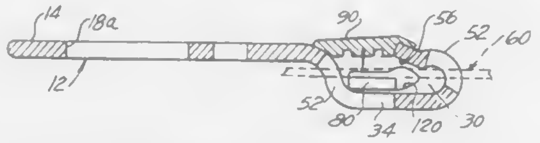
5,023,980
FREE RUNNING CINCHING LATCH PLATE

Rudy V. Thomas, Sterling Heights, Mich., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Aug. 31, 1989, Ser. No. 401,330

Int. Cl.^{5} A44B *11/10*

U.S. Cl. 24—196 **7 Claims**



1. A latch plate assembly comprising:

a plate having a tongue formed at one end thereof and at an opposite end a black portion, the back portion includes an end portion comprising open ends and defining an open recess;

the back portion including radially extending opposing openings through which may be received a substantially flat seat belt webbing;

lock bar means movable between first and second positions for releasing and compressing the webbing;

cap means for enclosing the open recess and open ends including guide means for positioning the lock bar means into compressive engagement with the webbing and for slidably securing the lock bar therein wherein the cap means includes first means for generating a frictional force of engagement with the webbing and a cap plate received in the open recess, opposingly situation inserts adapted to be received within the open ends of the back portion, each insert includes the guide means which compress a respective inwardly facing first recess into which respective ends of the lock bar means is received wherein each first recess includes a tapered surface such that as the lock bar means moves from the first position toward the second position, the lock bar means moves into compressive engagement with the webbing the wherein the webbing as same passes through the back portion is positioned between the cap means and the lock bar means.

5,023,981
BELT BUCKLE WITH INTERLOCKING DUAL TONGUE

James R. Anthony, Carmel; Michael A. Wiseman, Indianapolis, and Allan R. Lortz, Carmel, all of Ind., assignors to Indiana Mills & Manufacturing, Inc., Westfield, Ind.

Filed Jun. 22, 1989, Ser. No. 370,240

Int. Cl.^{5} A44B *11/25*

U.S. Cl. 24—573.5 **12 Claims**

1. A belt buckle-tongue combination comprising:

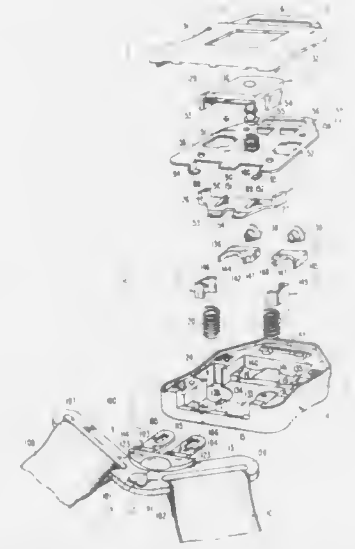
a buckle main body;

tongue means insertable into and releasable lockable with said buckle main body;

a latch positioned in said main body and held captive therein, said latch movable between a latched position with said tongue means and an unlatched position;

a push button slidably mounted to said buckle main body and operable associated with said latch to move said latch back and forth between said latched position and said unlatched position; and,

an indicator slidably mounted to said buckle main body, said indicator being an element separate from said push button and movable independently of said push button, said indicator in contact with said latch and movable to a first indicating position when said latch is in said latched position and to move a second position when said latch is in said unlatched position thereby said indicator readily reveals when said tongue means is lockingly engaged with said buckle main body.



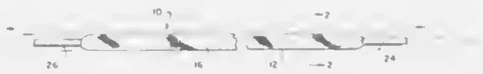
5,023,982
SHOE LACE FOR ATHLETIC SHOES

Charles T. Mehan, 1949 N. 11th St., Sheboygan, Wis. 53081

Filed Jan. 16, 1990, Ser. No. 465,805

Int. Cl.^{5} A43C *9/00*

U.S. Cl. 24—715.3 **3 Claims**



1. A shoe lace for use in an athletic shoe, said lace being stretchable along its entire length and comprising

a plurality of rubber strands, each of said strands being individually covered by a textile material,

said covered rubber strands being woven into a hollow tubular configuration having a pair of straight planar sections along substantially its entire length with said straight planar sections integrally connected by a pair of curved sections disposed at opposite sides of said straight sections,

plastic tip at each end of the strip to provide a reduced cross-sectional dimension for the lace ends; and

the entire length of the lace is stretchable.

5,023,983
DEVICE FOR PRODUCING MOUNTING BORES OR VALVE BORES IN A WHEEL DISK

Hans-Henning Winkler, Tuttlingen, and Eugen Rütschle, Mühlheim, both of Fed. Rep. of Germany, assignors to Chiron-Werke GmbH & Co. KG, Tuttlingen, Fed. Rep. of Germany

Filed Oct. 11, 1988, Ser. No. 255,904

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1987, 3735858

Int. Cl.^{5} B23B *7/00;* **B23C** *1/14;* **B23P** *23/00*

U.S. Cl. 29—27 R **15 Claims**

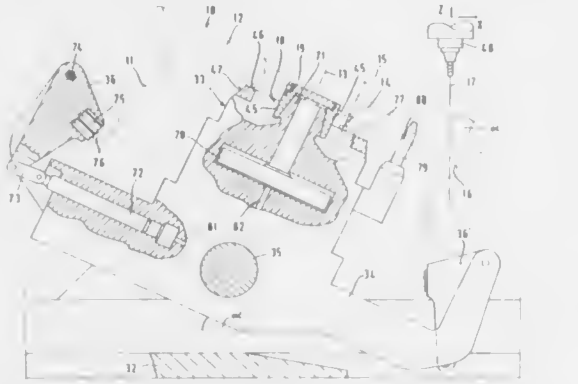
1. An apparatus for machining wheel bolt bores and valve bores into a rim of a motor vehicle wheel, said wheel bolt bores extending in a direction essentially parallel to a wheel axis and said valve bores extending in a direction inclined thereto by a predetermined angle, the apparatus comprising:

a base member defining a plane;

VOL
1127
ISS
3
JE
18
1991
UMI

a spindle stock means with a machining tool arranged therein said spindle stock means being displaceable along a first and second coordinate direction relative to said base member and parallel to said plane, and along a third coordinate direction perpendicular thereto;

chucking means mounted on said base member for holding said rim during machining of said bores, said chucking means being provided with a reference surface for supporting a reference plane of said rim when held in said chucking means, said reference surface and said reference plane extending radially relative to said wheel axis, said



chucking means including holding means for pressing said rim with said reference plane upon said reference surface, said holding means being pivotable about an axis extending in a parallel direction relative to said pivot axis and operable by means of a first piston-and-cylinder unit to engage said rim at a flange thereof located distant from said reference plane;

swivel means for pivoting said chucking means about a pivot axis between a first position with said wheel bolt bores extending parallel to said third coordinate direction and into a second position with said valve bores extending parallel to said third coordinate direction.

5,023,984

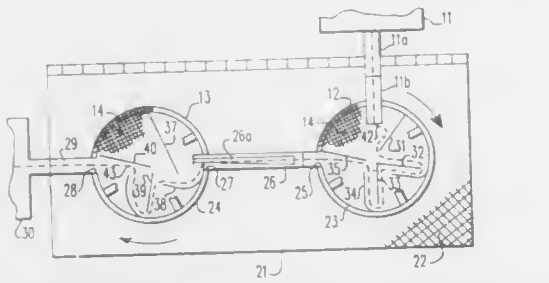
DEBURRING METHOD AND MACHINE

Max D. Bitton, and Randall W. Wahlquist, both of Ogden, Utah, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 22, 1990, Ser. No. 483,562

Int. Cl.^{5} B23D *79/02;* **B23P** *9/00*

U.S. Cl. 29—81.05 **12 Claims**



6. A machine for deburring a product of material having burrs after being formed, comprising a substantially horizontal screen mounted for endless movement in a substantially horizontal plane and adapted to have such a product deposited on its upper surface; means for supporting and for moving said screen endlessly; confining wall means and a series of baffles within said confining wall means, both the baffles of said series and said confining wall means being associated with and spaced and supported above said screen so as to confine on said screen a product to be deburred that is deposited on and carried by said screen and so as to cause and guide movement of said product relative to, and back and forth across, said screen as the screen moves and carries the product with it; and means for removing the product from the screen.

5,023,985

COATED ROLL FOR A PAPER MAKING MACHINE

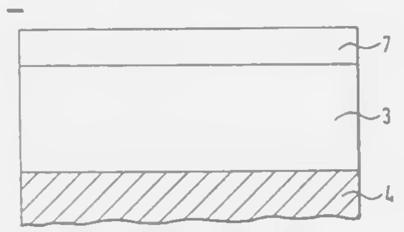
Jukka Salo, and Pentti Lehtonen, both of Jyväskylä, Finland, assignors to Valmet Paper Machinery Inc., Finland

Filed Feb. 20, 1990, Ser. No. 481,881

Claims priority, application Finland, Feb. 28, 1989, 890953

Int. Cl.^{5} B21B *31/08*

U.S. Cl. 29—132 **14 Claims**



1. A roll for a pulp machine, paper machine or paper finishing machine comprising:

a roll or cylinder mantle;

a resilient polymer coating which is formed on an outer surface of said mantle, said resilient polymer coating having a thickness within a range of 2 to 35 millimeters; and

another coating which is formed on an outer surface of said resilient polymer coating of a harder and more wear-resistant material than said resilient polymer coating, another coating having a thickness within a range of 1 to 150 microns.

5,023,986

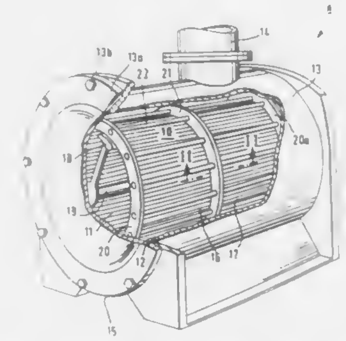
METHOD OF MANUFACTURING A WAVE SCREEN PLATE

William Gero, Lanesboro, and Frank Paskowski, Pittsfield, both of Mass., assignors to Beloit Corporation, Beloit, Wis.

Division of Ser. No. 206,151, Jun. 10, 1988, Pat. No. 4,954,249. This application Apr. 17, 1990, Ser. No. 510,332

Int. Cl.^{5} B07B *1/18*

U.S. Cl. 29—163.6 **7 Claims**



1. A method for making a modular screen plate for use in a pulp pressure screening apparatus, said method comprising:

forming undulations in relatively thin sheet material by bending;

shaping said formed sheet material into a generally cylindrical shape;

creating openings through said material;

placing rigid support members at opposite ends of said cylindrically shaped material; and

securing the position of said rigid support members relative to each other by fastening therebetween releasable tieing members.

5,023,987

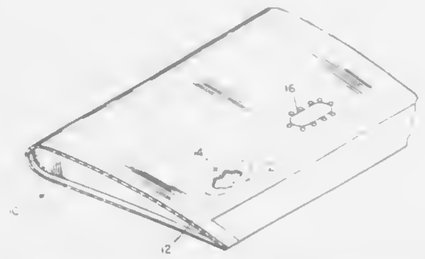
STRATO STREAK FLUSH PATCH

Karl J. Wuepper; Jerald L. Swanson, and Dale E. Hartz, all of King County, Wash., assignors to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 401,556, Aug. 28, 1989, abandoned, which is a continuation of Ser. No. 206,566, Jun. 14, 1988, abandoned. This application May 30, 1990, Ser. No. 530,432

Int. Cl.^{5} B23P *6/00*

U.S. Cl. 29—402.11 **10 Claims**



1. A field repair method for forming a structural blind patch in a sheet of anisotropic load-bearing material having a known thickness, comprising the steps of:

providing an anisotropic flush patch having a major axis and a minor axis of substantially different dimensions, a filler portion having a thickness equal to the thickness of the material to be patched, and a circumferential backing lip extending from the perimeter of the filler portion so as to form a circumferential shoulder therewith;

providing a grasping member extending from the filler portion;

trimming a damaged area of the material to be patched to the same shape as that of the filler portion, thereby providing a trimmed area having a major axis and a minor axis;

aligning the major axis of the flush patch with the minor axis of the trimmed area;

inserting the minor axis of the flush patch through the major axis of the trimmed area, thereby inserting the patch through the trimmed area;

aligning the filler portion with the trimmed area after the flush patch has been inserted so that the trimmed area is flushly filled by the filler portion, and so that the circumferential shoulder is closely received by the trimmed area, and so that the backing lip abuts the material adjacent to the trimmed area;

fixing the backing lip to the material while holding the flush patch in place with the grasping member; and

removing the grasping member whereby compressive loads are transferred across the trimmed area through the filler portion and tensile loads are transferred across the trimmed area through the backing lip.

5,023,988

METHOD FOR REMOVING A BOWLING BALL FINGERTIP INSERT FROM A BOWLING BALL FINGER HOLE

Thomas W. Lamond, 1647 S. 27th St., Philadelphia, Pa. 19145

Division of Ser. No. 918,347, Oct. 4, 1986, abandoned. This application Nov. 19, 1990, Ser. No. 617,414

Int. Cl.^{5} B23P *19/00;* **B26B** *3/00*

U.S. Cl. 29—426.1 **20 Claims**

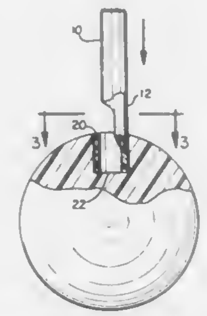
1. A method for removing a bowling ball fingertip insert from a bowling ball finger hole in which said insert is secured by an adhesive joint between said insert and said finger hole, said method comprising the steps of:

providing a tool having:

(a) a handle, and

(b) a grooved blade extending away from said handle and having (i) a pair of sharpened edges extending along the length of said blade merging into a point at the free end of said blade and (ii) an outside diameter equal to the diameter of said bowling ball finger hole;

breaking partially said adhesive joint between said fingertip insert and said bowling ball finger hole by inserting said blade into said finger hole between said insert and said finger hole;



breaking the remainder of said adhesive joint between said fingertip insert and said bowling ball finger hole by turning said tool about its axis while said blade is between said insert and said finger hole;

removing said blade from said bowling ball finger hole; and

removing said fingertip insert intact from said bowling ball finger hole.

5,023,989

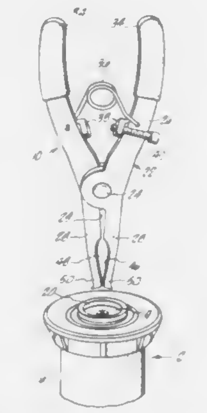
TOOL FOR REPAIRING POP-UP SPRINKLERS

David L. Hargrave, 5036 Walmar Ave., La Canada, Calif. 91011

Filed Nov. 22, 1989, Ser. No. 440,992

Int. Cl.^{5} B25B *7/12*

U.S. Cl. 29—426.5 **8 Claims**



1. A method for adjusting and repairing a pop-up sprinkler having a shaft biased downwardly into a cavity in the sprinkler, the sprinkler shaft comprising an outside wall and a recess having an inside wall, the method comprising the steps of:

(a) selecting a hand tool comprising:

  (i) a pair of elongated members pivotally connected to each other at a pivot point to form a pair of opposed elongated handles and a pair of opposed grippers, wherein pivoting the handles together causes the grippers to pivot apart;

  (ii) biasing means for biasing the handles apart and the grippers together; and wherein

  (iii) each gripper comprises:

    a) a tip at its end;

    b) an inner surface proximate to the other gripper;

    c) an opposed outer surface distal from the other gripper, each outer surface including a nose section distant from the pivot point and sized to fit into the shaft recess when the grippers are together;

    d) a projection projecting outwardly from the outer

VOL
1127
ISS
3
JE
18
1991
UMI

surface of the tip of the nose section for gripping the inside wall of the sprinkler shaft; and

e) a cut-out portion on the inner surface shaped so that the opposed cut-out portions of the grippers form an opening shaped to firmly grip the outside wall of the extracted sprinkler shaft;

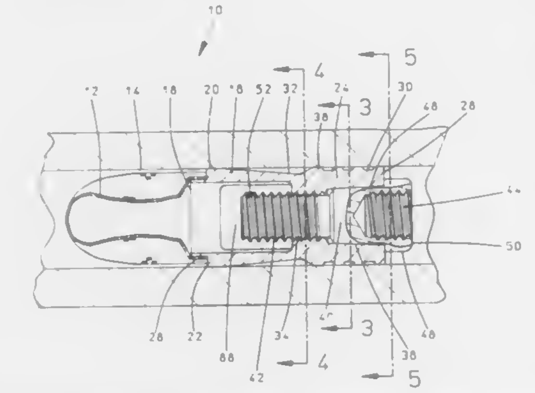
(b) extracting the sprinkler shaft upwardly from the recess by inserting the grippers into the shaft recess with the grippers closed, pressing the handles together to open the grippers so that the projections firmly grip the inside wall of the shaft recess, and pulling the tool upwardly; and

(c) maintaining the shaft in its extracted position with the tool by releasing the handles so that they are biased by the spring into an open position so that the grabbers can be removed from the inside of the shaft recess, then removing the tool from the inside of the shaft recess, pressing the handles together a sufficient amount to open the grabbers so that the grabbers can fit around the sprinkler shaft with the sprinkler shaft located in the opening, and then releasing the handles so that the biasing means biases the grabbers firmly against the extracted shaft.

5,023,990
DEVICE AND METHOD FOR REMOVABLY RETAINING COMPONENTS IN A SMOOTH BORE

Leighton Lee, II, Guilford, and Robert J. Kolp, Jr., Ivoryton, both of Conn., assignors to The Lee Company, Westbrook, Conn.

Filed May 5, 1989, Ser. No. 347,736
Int. Cl.⁵ F16B *13/06;* **B23P** *11/02*
U.S. Cl. 29—525.1 **21 Claims**



1. The method of removably retaining a component in an installation bore comprising

A. attaching a component to a device comprising an expansion means and body means that comprises a plurality of axially extending bore engaging means each having female screw threads, interior surfaces that are conically curved and axially tapered and exterior surfaces that are cylindrically curved, wherein the expansion means comprises a section formed with male screw threads engageable with the female screw threads of the bore engaging means and a conical. tapered section coaxial with and of slightly greater average diameter than the curved interior section of the bore engaging means, wherein the expansion means is adapted to engage a means for applying rotational torque and to engage a means for retaining and removing said device from the installation bore,

B. inserting the removal means into the torque means,

C. engaging the removal means with the expansion means,

D. inserting the device into the installation bore,

E. engaging the expansion means with the torque means,

F. applying clockwise rotational torque to the torque means,

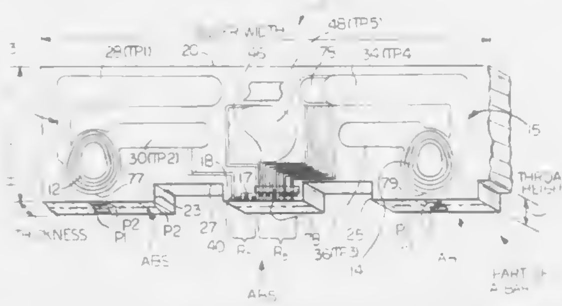
G. disengaging the removal means of and the torque means from the expansion means, and

H. removing the removal means and the torque means from the installation bore.

5,023,991
ELECTRICAL GUIDE FOR TIGHT TOLERANCE MACHINING

Alan B. Smith, Lincoln, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Aug. 31, 1988, Ser. No. 238,868
Int. Cl.⁵ G11B *5/127;* **B23Q** *17/00, 15/00*
U.S. Cl. 29—603 **20 Claims**



1. In a machining process for machining the surface of a workpiece to a height above a minimum height plane, which workpiece has an electronic machining guide having an analog resistive sensor with a near and far plane relative to and substantially parallel to the machining plane and a discrete resistive sensor having a plurality of contacts each respectively meant to be broken during machining as a calibration event, a method for determining present machining height of said surface during machining with respect to said minimum height plane, comprising the steps of:

(a) determining before machining a constant K which relates the resistance value Rp of said analog sensor to a known height h of said analog sensor, and

(b) determining present machined height z with respect to location of said minimum height plane in view of constant K.

5,023,992
CABLE LOADING MACHINE

Takashi Masaki, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan

Filed Dec. 28, 1990, Ser. No. 611,050
Claims priority, application Japan, Nov. 17, 1989, 1-297712
Int. Cl.⁵ B23P *19/00, 21/00*
U.S. Cl. 29—705 **1 Claim**

1. A cable loading machine for connecting a plurality of insulated conductors of a multiconductor cable to terminals of a connector one at a time, which comprises:

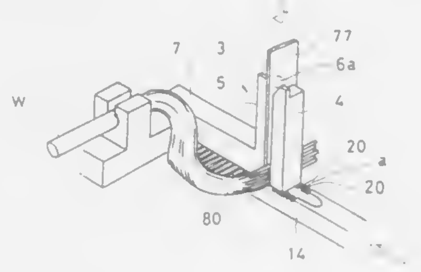
a conductor separation unit having a conductor separation assembly with a gap sufficiently large to receive separated conductors;

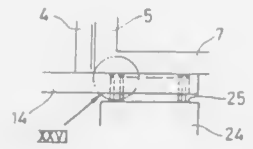
a conductor pressure unit for applying a pressure on said conductors in said conductor separation assembly in a direction from an inlet to an outlet;

a conductor separation member having a row of teeth with conductor receiving channels therebetween and laterally movable over said conductor outlet for inserting said conductors pushed out of said outlet into said conductor receiving channels one at a time and positioning said inserted conductors on an outlet side of said conductor receiving channels;

a probe having probing pins for contact with said separated conductors to identify line pairs and line numbers; and

a conductor push up unit for pushing up said conductor from said outlet side of said conductor receiving channels to said inlet of said conductor separation unit to transfer it to a gripping unit.

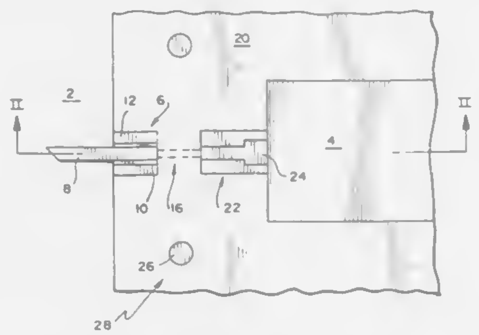




5,023,993
METHOD FOR MANUFACTURING A HIGH-PERFORMANCE PACKAGE FOR MONOLITHIC MICROWAVE INTEGRATED CIRCUITS

Raymond S. Fengelly, Lawrenceville, N.J., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Division of Ser. No. 251,446, Sep. 30, 1988, Pat. No. 4,901,041. This application Dec. 19, 1989, Ser. No. 452,308
Int. Cl.⁵ H05K *3/00*
U.S. Cl. 29—843 **3 Claims**



1. A method for manufacturing a monolithic integrated circuit package having a perimeter, comprising the steps of:

(a) printing at least one feedthrough on a first surface of a ceramic substrate having first and second opposed surfaces;

(b) firing the ceramic;

(c) forming a plurality of visa in the ceramic substrate, each said via extending from said first surface to said second surface;

(d) cutting a die cavity in the ceramic for each package to be formed so that each via is located at a point distant from both said die cavity and the perimeter of each said package;

(e) metallizing at least one electrical conductor on the ceramic substrate, each said electrical conductor corresponding to a printed feedthrough;

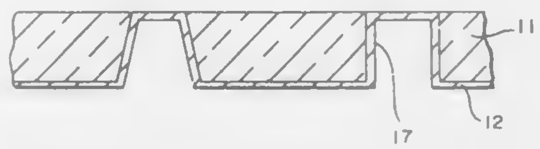
(f) metallizing the vias; and

(g) brazing a ground plane base to the ceramic substrate on a second surface opposite said first surface.

5,023,994
METHOD OF MANUFACTURING A MICROWAVE INTERGRATED CIRCUIT SUBSTRATE INCLUDING METAL LINED VIA HOLES

Marina Bujatti, and Franco N. Sechi, both of Palo Alto, Calif., assignors to Microwave Power, Inc., Santa Clara, Calif.

Filed Sep. 29, 1988, Ser. No. 251,539
Int. Cl.⁵ H05K *3/00*
U.S. Cl. 29—852 **4 Claims**



1. The method of forming a substrate for microwave integrated circuits which comprises the steps of:

a) forming in a body of insulating material through holes at preselected locations to extend between the upper and lower surface of said body;

b) providing a removable layer on the upper surface of said body which covers at least the upper end of said holes;

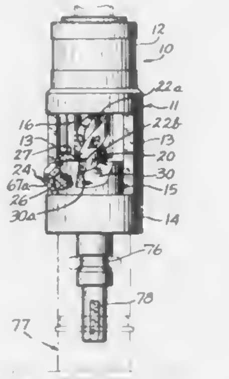
c) depositing a metal layer on the bottom surface of said body, the walls of said holes and the underside of said removable layer; and

d) removing said removable layer to leave an insulating body having a planar upper surface composed of the insulating material and metal layer at said holes.

5,023,995
CABLE STRIPPING DEVICE

Steve E. Kaplan, Elyria, Ohio, assignor to Multilink, Inc., Elyria, Ohio

Filed Mar. 5, 1990, Ser. No. 488,119
Int. Cl.⁵ B21F *13/00;* **H02G** *1/12*
U.S. Cl. 30—90.1 **23 Claims**



1. In a stripping device which is rotated about an axis relative to a cable to strip an end of the cable, the cable having a center conductor and dielectric between the center conductor and an outside sheath, said device comprising a tool mounting member for separately and removably supporting a sheath severing cutter and a coring tool for coring dielectric material from the end of the cable with the outer sheath telescoping over the coring tool and the center conductor moving in a central passageway through the coring tool as the device is rotated to core dielectric material from the end of a cable with the coring tool comprising a coring blade section having an outside diameter to be received inside the sheath of the cable to core the dielectric of the cable and the coring blade section extending rearwardly from the forward end of the coring tool and terminating at its rearward end in a reduced portion providing a rearwardly extending shank of reduced diameter to be received in the tool mounting member for holding the coring

VOL
1127
ISS
3
JE
18
1991
UMI

tool in said tool mounting member, said tool mounting member having an axial passageway, approximately the diameter of the tool shank, which opens into the forward end of the tool mounting member for receiving the shank extending from the coring blade section section to support the coring tool along the axis of the device with rearward end of the blade section disposed adjacent the forward end of the tool mounting member and the shank extending inwardly of the tool mounting member from the forward end of said axial passageway, said tool mounting member having cutter mounting means on its forward end for removably mounting a sheath severing cutter independently of said coring tool in a position adjacent the rearward end of the blade section of a coring tool mounted in said tool holding member with the severing edge of the cutter extending angularly at a chamfering angle across the path of a sheath moving from the end of said coring blade section, the severing edge extending to a position inwardly of the outside surface of the coring blade section of the coring tool to sever and chamfer the sheath as the coring action moves the sheath past the cutter.

5,023,996

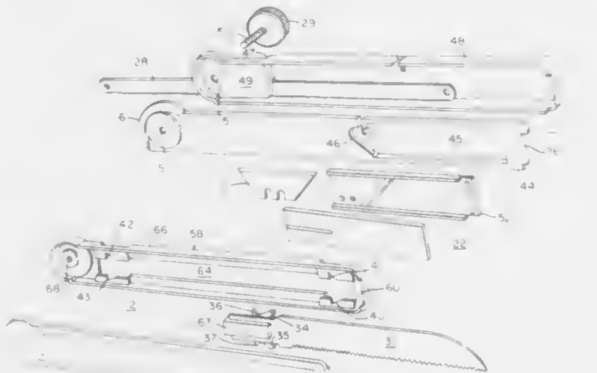
MULTIPLE BLADE HANDSAW

Robert Pape, Newtown; William Rose, Hartford, both of Conn.; Frank Burgel, Scarsdale, N.Y., and Chip Adams, Deep River, Conn., assignors to Sonin, Inc., Scarsdale, N.Y.

Filed Mar. 9, 1990, Ser. No. 491,472

Int. Cl.⁵ B25F *3/00*

U.S. Cl. 30—144 **7 Claims**



1. A combination handsaw comprising:

first blade housing having on an inside face thereof a longitudinal slot for supporting a first blade for movement along a longitudinal axis of said blade housing so that said blade may be moved from a retracted position within said housing to an extended position, whereby a major portion of said blade extends through one end of said housing;

a second blade housing supporting a second blade for longitudinal movement through one end of said second blade housing to an extended position, whereby a major portion of said blade extends outside one end of said housing; and

pivot support for connecting first ends of said housings together, permitting opening of said housings from a coextensive closed position in facing relationship to an open position with spaced apart second ends.

5,023,997

PAIR OF NIPPERS

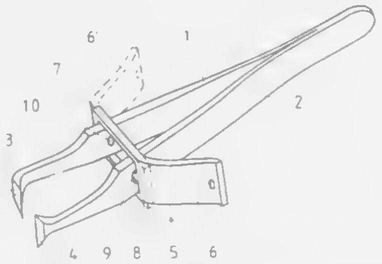
Jean-Francois Salvi, Vesenaz, Switzerland, assignor to Sipel Electronics S.A., Vesenaz, Switzerland

Filed Dec. 4, 1989, Ser. No. 445,435

Claims priority, application Switzerland, Dec. 7, 1988, 4532/88

Int. Cl.⁵ B26B *12/00*

U.S. Cl. 30—175 **6 Claims**



1. A pair of nippers, comprising:

a first flexible arm, a second flexible arm having one end connected to an end of said first arm;

an auxiliary actuating lever having first and second portions with a bend therebetween, said first portion having a cutout and being oriented transversely to the lengthwise dimension of said arms, each of said flexible arms extending through said cutout, a second portion of said actuating lever being subject to application of a force that pivots said lever relative to said first arm, the unconnected ends of said arms moving toward each other when said lever pivots by action of said lever on said second arm;

means for pivotably engaging said lever with said first flexible arm at an intermediate point along the length of said arm.

5,023,998

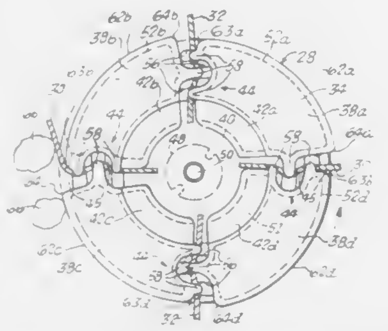
FILAMENT HOLDER FOR A ROTATING FILAMENT VEGETATION CUTTER

Andrew M. Masciarella, Pompano Beach, and George R. Whistler, Fort Meyers, both of Fla., assignors to Advanced Products International, Inc., Pompano Beach, Fla.

Filed Apr. 7, 1989, Ser. No. 335,055

Int. Cl.⁵ B26B *7/00*

U.S. Cl. 30—276 **25 Claims**



1. A filament holder for a vegetation cutter of a type coupled to rotating means for rotating said holder and at least one filament extending therefrom at a rotational speed sufficient to permit said rotating filament to cut said vegetation, said holder comprising:

a disk shaped member having a center and further having means for holding one portion of a filament while at least one other portion of said filament extends from at least one opening in the periphery of said member, each opening having first and second peripheral edges extending by respective first and second differing distances from the center of said member, the distance from the periphery of said member to the center of said member not decreasing from said first peripheral edge to the next adjacent second peripheral edge along the periphery of said member.

5,023,999

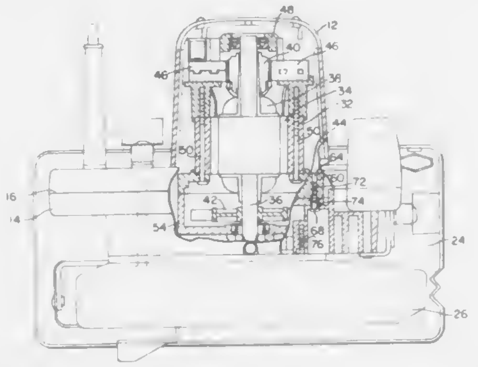
UNITIZED TOOL CONSTRUCTION

Timothy J. Looper, and James R. Sistare, both of Pickens, S.C., assignors to Ryobi Motor Products Corp., Pickens, S.C.

Filed Aug. 9, 1990, Ser. No. 565,251

Int. Cl.⁵ B23D *45/16*

U.S. Cl. 30—390 **9 Claims**



5. A power tool comprising:

a motor assembly including a field subassembly, an armature subassembly including an armature shaft, a fan mounted on one end of said armature shaft, a bearing support member holding the other end of said armature shaft, a fan shroud, and motor assembly securing means for securing said bearing support member to one end of said field subassembly and said fan shroud to the other end of said field subassembly;

a two part housing; and

means for securing each part of the two part housing to the fan shroud from a different respective side thereof.

5,024,000

MATERIAL-REMOVAL WOODWORKING TOOL

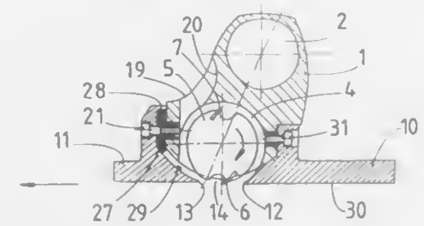
André Casal, 84 B rue Ancienne, 1227 Carouge/Geneva, Switzerland

Filed Mar. 15, 1990, Ser. No. 493,976

Claims priority, application Switzerland, Mar. 21, 1989, 1043/89

Int. Cl.⁵ B27C *1/10*

U.S. Cl. 30—475 **14 Claims**



1. A material removal woodworking tool comprised of:

a) a body having an opening on its underside;

b) an electric motor;

c) a rotor driven by the motor, the rotor having an axis of rotation, the rotor being provided with means for removing material, the means projecting through the opening on the underside of the body;

d) two removable guide pieces, the guide pieces being arranged so that an edge of each of the guide pieces are parallel and opposite each other, thereby defining the opening, with at least one of the guide pieces being provided with adjustment means to permit adjustability;

e) gripping means attached to the body and extending on either side of the body forming an axis parallel to the axis of rotation of the rotor, the axis formed by the gripping means lying within the planar area formed by the outer dimensions of the rotor.

5,024,001

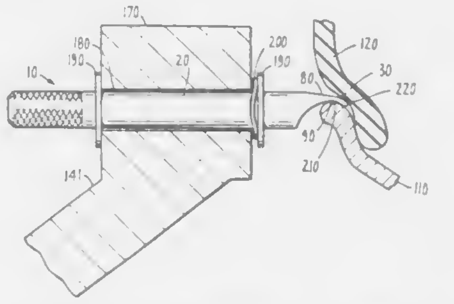
WHEEL ALIGNMENT RIM CLAMP CLAW

Willy Borner, Cupertino, and Kenneth A. McQueeney, Los Gatos, both of Calif., assignors to Balco, Incorporated, San Jose, Calif.

Filed Oct. 7, 1988, Ser. No. 255,116

Int. Cl.⁵ G01B *21/26*

U.S. Cl. 33—203.18 **7 Claims**



1. A claw for use in a wheel alignment rim clamp and capable of engaging the outer rim of a tire-carrying wheel said claw including a cylindrical arcing claw body for rotatable mounting in the rim clamp with the axis of the body being perpendicular to the plane defined by the outer rim of the wheel and terminating in a rim-engaging inwardly continuously curving arcing bladelike tip the inward curve of the arcing tip defining a rim clearing relieved region in the body with the cross sectional thickness of the body in the tip and relieved region being small enough for the tip to fit between the rim and the tire.

5,024,002

APPARATUS WITH A SUPPORTING FRAME AND PROCESS FOR MANUFACTURING SUCH A FRAME

Mario Possati, Bologna, Italy, assignor to MARPOSS Societa' per Azioni, S. Marino di Bentivoglio, Italy

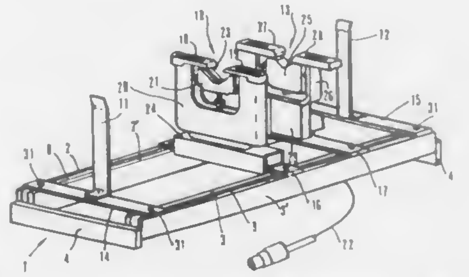
Division of Ser. No. 423,740, Oct. 19, 1989, abandoned, which is a continuation of Ser. No. 191,536, May 9, 1988, abandoned.

This application Jul. 19, 1990, Ser. No. 554,168

Claims priority, application Italy, Jun. 16, 1987, 3521 A/87; Nov. 9, 1987, 3683 A/87

Int. Cl.⁵ G01B *5/20*

U.S. Cl. 33—549 **13 Claims**



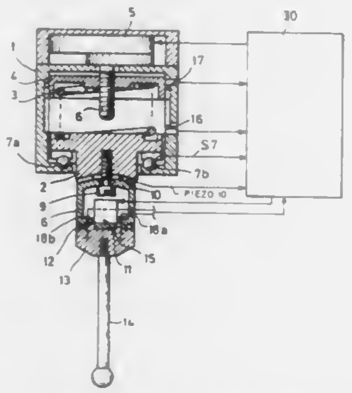
1. A gauge for checking linear dimensions of pieces with rotational symmetry, comprising positioning means for positioning the piece to be checked; gauging heads for checking linear dimensions of the piece support means for carrying out the positioning means and the gauging heads, the support means comprising a support base that defines two longitudinal

VOL
1127
ISS
3
JE
18
1991
UMI

parallel guides and intermediate support means with at least two transversal members longitudinally adjustable with respect to the support base; and fastening means with at least two pairs of rapid fastening devices, for clamping the transversal members to the support base, wherein said support base comprises two pairs of longitudinal parallel bars and two transversal bars welded to the longitudinal bars for locally connecting them to one another, the longitudinal bars and the transversal bars having substantially rectangular cross-sections, each guide being defined by the associated bars of one of the two pairs and by the through space between these two bars, each rapid fastening device comprising a through element passing through the through space of an associated guide, a first limit stop element associated to an end of the through element and adapted for cooperating with the two bars of the associated pair of bars and a second limit stop element coupled in a movable way to the other end of the through element for cooperating with an end of an associated transversal member, in a position opposed to the first limit stop element with respect to the bars, for locking the end of the transversal member to the support base.

5,024,003
WORK-CONTACTING PROBE SYSTEM FOR A COORDINATE-MEASURING INSTRUMENT

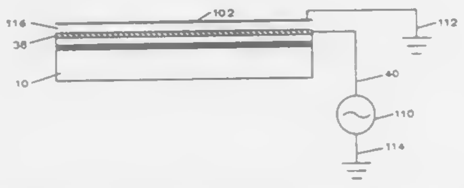
Karl-Hermann Breyer, Heidenheim, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Oberkochen, Fed. Rep. of Germany
Continuation of Ser. No. 234,510, Aug. 22, 1988, Pat. No. 4,916,825. This application Apr. 5, 1990, Ser. No. 505,905
Claims priority, application Fed. Rep. of Germany, Aug. 27, 1987, 3728578
The portion of the term of this patent subsequent to Apr. 17, 2007, has been disclaimed.
Int. Cl.^{5} G01B *7/28*
U.S. Cl. 33—561 **11 Claims**



1. A probe system for a coordinate-measuring instrument, comprising a first probe head having a movable part with receptacle means for interchangeable accommodation of a selected one of a plurality of rigid probe pins, said first probe head producing a first electrical signal in response to a condition of workpiece contact via a probe pin mounted to said receptacle means, and a second probe head for optional use in said system, said second probe head being adapted for selective mounting to said receptacle means, said second probe head having means producing a second electrical signal in response to a condition of workpiece contact, and associated electronics for delivering probe-signal outputs to said instrument, said electronics including switching means operative (a) in a first mode to deliver said first electrical signal as its work-contact output as long as said receptacle means accommodates a rigid probe pin, and (b) in a second mode to deliver said second electrical signal as its work-contact output as long as said receptacle means accommodates said second probe head.

5,024,004
RADIO FREQUENCY AIR FLOAT BAR

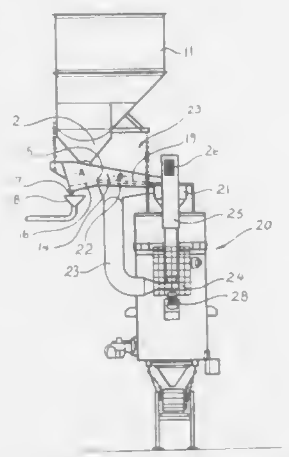
Hugh D. Jaeger, Deephaven, Minn., assignor to W.R. Grace & Co.-Conn., New York, N.Y.
Filed Mar. 7, 1990, Ser. No. 490,063
Int. Cl.^{5} B01K *5/00*
U.S. Cl. 34—1 **8 Claims**



1. An air bar for supporting and curing a traveling web of material having a width comprising:
- a. means for providing a pressurized gas;
- b. means coupled to said providing means to direct said pressurized gas into contact with said traveling web of material;
- c. source of radio frequency energy;
- d. means responsibly coupled to said source of radio frequency energy for uniformly coupling said radio frequency energy across said width of said traveling web of material; and,
- e. means for capacitively coupling said radio frequency energy to said traveling web of material.

5,024,005
DEWATERING MEANS

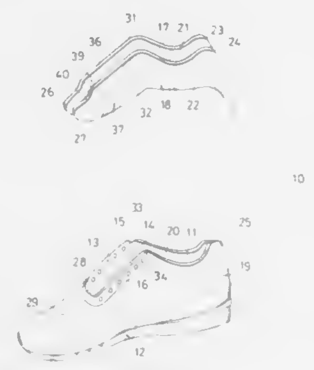
Peter J. Stewart, Maddington, Australia, assignor to Seaford Nominees Pty Ltd., Australia
Filed Nov. 22, 1989, Ser. No. 440,225
Claims priority, application Australia, Nov. 23, 1988, PJ1603
Int. Cl.^{5} F26B *9/00*
U.S. Cl. 34—164 **8 Claims**



1. A pulp dewatering means comprising a fluid bed, said fluid bed comprising a delivery zone for receipt of said pulp from a hopper and a drying zone, said delivery zone being separated from said drying zone by a weir and said delivery zone having a porous floor associated with a drain, said drying zone comprising a vibrating surface downwardly inclined from said weir, the lower end of said drying zone depositing particulate material at a delivery outlet, said porous surface being associated with a plenum chamber below said porous surface, said plenum chamber being connected to a source of hot gaseous fluid.

5,024,006
ATHLETIC SHOE

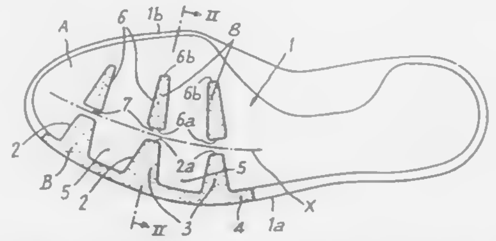
Junichi Kiyosawa, Kobe, Japan, assignor to Asics Corporation, Hyogo, Japan
Filed Oct. 27, 1989, Ser. No. 427,565
Claims priority, application Japan, Jan. 26, 1989, 1-8061[U]
Int. Cl.^{5} A43B *23/26*
U.S. Cl. 36—83 **19 Claims**



1. An athletic shoe comprising:
a sole;
an upper body disposed on said sole and having a throat opening for insertion of a foot;
said upper body including a vamp portion having a U-shaped forward opening elongated from said throat opening and defined by a pair of opposed side rims and a bottom rim; and
first and second tongue pieces which collectively cover said U-shaped forward opening from said bottom rim to said throat opening, wherein
- (i) said first shoe tongue piece is secured to said vamp portion and is disposed along one of said pair of opposed side rims for covering a part of said U-shaped forward opening; and
- (ii) said second shoe tongue piece is secured to said vamp portion and is disposed along another one of said pair of opposed side rims for covering a remaining part of said U-shaped forward opening.

5,024,007
SOLE FOR A SPORT SHOE

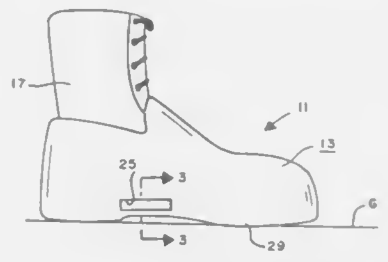
Pierre DuFour, Menthon-St-Bernard, France, assignor to Salomon S. A., Chavanod, France
Filed Apr. 25, 1990, Ser. No. 514,435
Claims priority, application France, Apr. 25, 1989, 89 05475
Int. Cl.^{5} A43B *3/00, 13/14*
U.S. Cl. 36—127 **19 Claims**



1. Walking sole for a sport shoe, especially a golf shoe, comprising a principal element made of a relatively stiff, molded plastic material and which has, in the front portion of at least one of its lateral edges (1*a*) extending along the front area of the sole on which the front part of the wearer's foot gains support, a succession of substantially transverse spaced notches (2) which open into the edge (1*a*) of the sole, and extend toward the central part of the latter, these notches (2) being filled with a material (B) whose degree of elasticity exceeds that of the material (A) composing the main part of the sole, and which forms individual elastic filling elements (3) lodged in the respective notches (2) delimiting between each pair at least one tongue (5) which is transversely flexible around a line (X) located in proximity to the inner ends (2*a*) of the notches (2), wherein said sole has at least one opening elongated substantially transversely (6) associated with at least one of its notches (2), this opening being aligned with this notch (2) in the lateral edge (1*a*) and at a distance from it, and an element made of an elastic material (8) which fills the elongated opening (6).

5,024,008
FOOTWEAR DEVICE FOR HUNTERS

D. Ray Maples, 3603 Chester La., Memphis, Tenn. 38119
Filed May 29, 1990, Ser. No. 529,279
Int. Cl.^{5} A43B *23/24, 5/18, 7/12, 1/10*
U.S. Cl. 36—136 **7 Claims**



1. A footwear device for use by hunters comprising, in combination:
- a) rubber overshoe means for removably wearing over a boot worn by a hunter with the sole of the boot being covered by said overshoe means whereby the boot will not come in contact with the ground as the hunter walks;
- b) scent source means for dispensing animal attracting scent onto the ground as the hunter walks, said scent source means being attached to said overshoe means and removable with said overshoe means from the boot; and,
- c) means isolating said scent source means from the boot whereby when said overshoe means with said scent source means is removed from the boot, the boot can be worn without emitting the animal attracting scent therefrom;

said overshoe means including a pocket formed therein, said pocket including a cavity for receiving said scent source means and a mouth establishing an entrance to said cavity from the outside of said overshoe means through which said scent means may be moved from and to said cavity, a bottom portion of said overshoe for contacting the ground as the hunter walks, and at least one slot extending from said cavity and through said bottom portion of said overshoe means through which scent from said scent source means may be emitted to the ground when said overshoe means is disposed on said boot.

5,024,009
APPARATUS AND METHOD FOR COLLECTING SHELLFISH AND THE LIKE

Kenneth G. Kirkman, 217 Heintzleman, Anchorage, Ak. 99503
Filed Dec. 5, 1989, Ser. No. 446,139
Int. Cl.^{5} E02F *5/00;* **A01K** *75/00*
U.S. Cl. 37—55 **13 Claims**

1. An apparatus for collecting shellfish and the like comprising:
- (a) a rectangular frame having a length greater than its width and being open in the center of the frame;
- (b) a lightweight net having a first end and a second end and a center, said first end being attached to said frame and extending outwardly therefrom and perpendicularly thereto such that said frame creates a structure to hold the

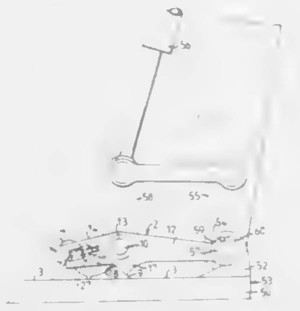
VOL
1127
ISS
3
JE
18
1991
UMI

net open to allow shellfish to be collected therein, said second end being fitted with a release means;
(c) tine means removably connected to said frame and extending downwardly therefrom;
(d) adjustable weighting means, being constructed of lightweight material, attached to said frame to provide a large downward force on said frame when said frame is being dragged along a scallop bed, but provides no such force when the net is not being dragged;
(e) yoke means, rotatably attached to said frame means to allow the apparatus to be pulled; and
(f) pulling means to pull said apparatus along the sea bottom.

5,024,010

DEVICE IN A QUICK COUPLING

Fritiof Huldén, Molkom, Sweden, assignor to Svets- & Maskinprodukter i Lidkoping AB, Lidkoping, Sweden
PCT No. PCT/SE88/00378, § 371 Date Dec. 29, 1989, § 102(e) Date Dec. 29, 1989, PCT Pub. No. WO89/00632, PCT Pub. Date Jan. 26, 1989
PCT Filed Jul. 14, 1988, Ser. No. 457,686
Claims priority, application Sweden, Jul. 20, 1987, 8702910
Int. Cl.^{5} E02F *3/28*
U.S. Cl. 37—118 R 6 Claims

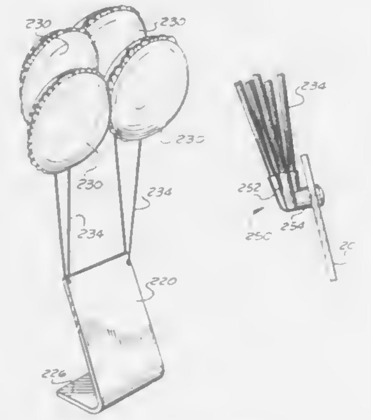


1. A device in a quick coupling for detachably coupling a working implement to the operating arm of an excavating machine, said quick coupling comprising two parallel link arms supported by said operating arm, each link arm having an abutment portion with a support surface, and a locking means comprising a stationary wedge support attached to said working implement with an engagement surface facing the working implement and a movable tension pin displaceable by a power cylinder and having an engagement surface for wedging cooperation with the engagement surface of the wedge support, said locking means having support surfaces to engage by means of pressure the support surfaces of the link arms, and comprising a locking unit supported by said link arms, said locking unit having a rigid housing extending between the link arms, in which the tension pin is axially displaceable by said power cylinder between an outer free position clear of said wedge support and an inner locking position engaged with said wedge support, said housing having an opening located at a central portion thereof and disposed vertically in line with said wedge support of the working implement for receipt of the wedge support therein when the tension pin is in its free position, said tension pin in said locking position transverses said central portion, and said housing being provided with opposite supporting pins axially aligned to each other and arranged to be removably received with clearance in opposite openings in said link arms, said supporting pins and openings being provided with said pressure-cooperating support surfaces, said tension pin being of such sufficient length that its front end portion located at said engagement surface in locking position of the tension pin is positioned in a cavity of the housing and as a support surface for pressure-cooperation with a support surface in the cavity, and one of said supporting pins being provided with a through-hole to receive a rear end portion of said tension pin in its locking position.

5,024,011

DECORATIVE MESSAGE DISPLAY

Dane H. Collins, 2650 East South Fork Drive, Phoenix, Arizona 85044
Continuation-in-part of Ser. No. 202,325, Jun. 6, 1988, Pat. No. 4,879,823. This application Nov. 13, 1989, Ser. No. 435,626
Int. Cl.^{5} G09F *1/00*
U.S. Cl. 40—124.1 3 Claims



1. A display apparatus, comprising:
a front panel having an image area;
a base for maintaining said front panel in a substantially upright position;
at least one decorative appendage;
at least one rigid rod having a first end coupled to said at least one decorative appendage and a second end coupled to said front panel; and
holder means for coupling said at least one rod to said front panel, said holder means including
- at least one tube having an inner diameter approximately equal to the diameter of said at least one rod, said tube having a longitudinal axis;
- a stem secured to said tube, said stem having a longitudinal axis extending in a substantially perpendicular direction with respect to the longitudinal axis of said tube; and
- an opening formed in said front panel for receiving said stem.

5,024,012

EXPANDABLE BALLOON WRAPPED MEDIA DISPLAY SYSTEM

Craig J. Lovik, 8565 Custer School Rd., Custer, Wash. 98240
Filed Mar. 20, 1989, Ser. No. 325,882
Int. Cl.^{5} G09F *21/06, 1/06, 1/12*
U.S. Cl. 40—212 21 Claims

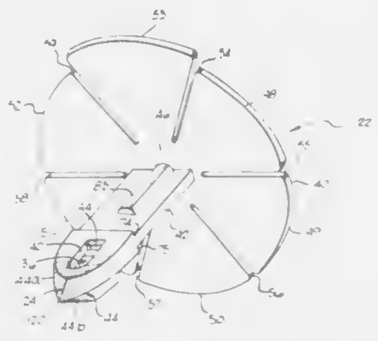
1. A media display device adapted to be inserted into, and secured to opposite polar extremities of, an uninflated conventional transparent balloon, said media display device comprising, in combination:
a) a media display element comprising at least one sheet of flexible foldable material capable of bearing thereon visually observable media in the form of a printed message, a picture, a graphic design, a graphic display, and combinations of the foregoing, said at least one sheet of flexible foldable material being folded in opposite directions along parallel fold lines into a lineally oriented, accordion pleated configuration having first and second exposed opposite edges;
b) first attachment means secured to said first exposed opposite edge of said at least one accordion pleated sheet;
c) second attachment means having a tubular portion and a generally axially extending flange, said flange being fixedly secured to said second exposed opposite edge of said at least one accordion pleated sheet; and,
d) said at least one lineally oriented accordion pleated sheet being folded upon itself at its midpoint so as to orient the left and right halves of the folded portions of said accordion pleated sheet in essentially parallel, slightly diverging, coaxial relation with said first attachment means projecting axially from one end of said at least one folded over accordion pleated sheet and said second attachment means projecting axially from the opposite end of said at least one folded over accordion pleated sheet;

whereby, when said media display element is inserted axially into the interior of a conventional inflated transparent balloon through the inflation aperture and constricted neck portion thereof, said axially projecting portion of said first attachment means can be fixedly secured to the inner surface of the balloon sidewall at a polar location remote from the balloon's inflation aperture and said tubular portion of said second attachment means can be fixedly secured to the inner surface of the balloon's constricted neck portion, whereupon inflation of the balloon causes the balloon sidewall to stretch and enlarge, thereby gradually unfolding and exposing said accordion pleated media display element so as to gradually expose the visually observable media formed thereon to observers through the balloon's transparent sidewall.

5,024,013

IDENTIFICATION TAG ASSEMBLY

Norman J. Hayes, Cody, Wyo., and Raymond B. Avedon, Boulder, Colo., assignors to Identification Technology Corporation, Longmont, Colo.
Filed Nov. 30, 1988, Ser. No. 277,886
Int. Cl.^{5} G09F *3/00*
U.S. Cl. 40—301 22 Claims



1. An animal ear tag assembly for mounting on the ear of a domestic animal to identify and distinguish the animal from other animals and the assembly comprising:
a one-piece tag retaining member made of molded plastic material, with a generally transversely extending central slot means therein, adapted to be located on one side of the animal ear in a substantially vertical attitude opposite a generally horizontally extending slit in the animal ear;
an one-piece identification member made of flexible plastic material and comprising:
- an enlarged identification portion adapted to be located on the other side of the animal ear, in generally vertically extending parallel relationship thereto;
- an elongated strap portion connected to a central core portion of said identification portion and having a longitudinal axis extending transversely away from said identification portion and having a non-circular cross-sectional configuration and size and shape adapted to enable resilient flexible displacement relative to the identification portion and to extend through the generally horizontally extending slit in the animal ear and the generally horizontally extending central slot means in said one-piece tag retaining member;
- an enlarged head portion connected to said strap portion and having a larger cross-sectional size and shape than said strap portion and adapted to be inserted through said slit and said central slot means and located in abutting engagement with a generally vertically extending portion of said one-piece tag retaining member;
- said identification portion being separated into a plurality of separately flexible movable segmental portions by a plurality of slot means which are located radially outwardly of said central core portion and extend generally radially outwardly relative to said central longitudinal axis of said strap portion from said central core portion to the outer periphery of said identification portion and are located in circumferentially spaced relationship to one another;

said identification member having a central core portion located between said segmental portions and said strap portion;
each of said segmental portions comprising:
- a curved radially outermost edge portion, a pair of circumferentially spaced radially extending straight edge portions, and a straight radially innermost edge portion extending between said radially extending edge portions; said central core portion comprising:
- a plurality of straight outer peripheral edge portions which are inclined relative to one another and con-

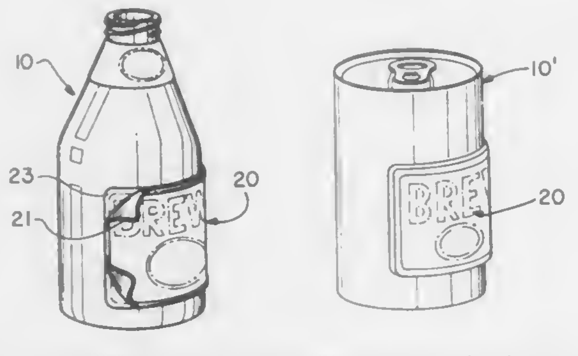
VOL
1127
ISS
3
JE
18
1991
UMI

nected to one another by intermediate connecting portions;
said radially extending slot means being radially aligned with said intermediate connection portions;
said central core portion having a polygonal peripheral configuration providing a plurality of straight side edge portions equal in number to the number of segmental portions and located opposite and in spaced parallel relationship to said straight inner side edge portions of said segmental portions; and
hinge groove means for each of said segmental portions being located between and defined in part by said outer side edge portions of said central core portion and said inner side edge portions of said segmental portions.

5,024,014

INTEGRAL LABEL AND COASTER

Remi D. Swierczek, 6399 Ledge Lake Ct., Concord, Ohio 44077
Continuation-in-part of Ser. No. 349,051, May 8, 1989, abandoned. This application Dec. 20, 1989, Ser. No. 453,250
Int. Cl.⁵ G09F *3/00*
U.S. Cl. 40—310 **12 Claims**



1. In combination with a beverage container a label/coaster device comprising:
(a) a label/coaster having a first side directed toward said container and a second side directed out and away from said container wherein at least one surface of said label/-coaster being resistant to water;
(b) adhesive means disposed on a substantial portion of said first side of said label/coaster for removably securing said label/coaster to said beverage container, said adhesive means providing for easy removal of said label/coaster without damage to said label/coaster; and
(c) said label/coaster having printed matter on at least said second side thereof.

5,024,015

LIGHTWEIGHT ARTICULATED ADVERTISING DISPLAY

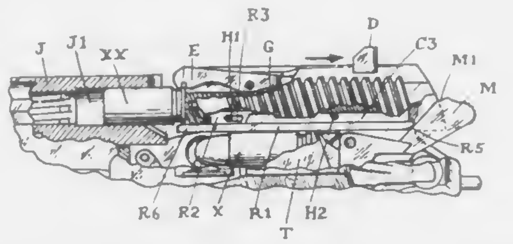
William B. Quarles, Jr., 1133 Dearing Down Dr., Helena, Ala. 35080
Filed Jan. 16, 1990, Ser. No. 465,393
Int. Cl.⁵ G09F *7/00*
U.S. Cl. 40—605 **20 Claims**

1. A display for advertisement comprising a plurality of lightweight panels pivotally secured to one another by a plurality of hinges mounted intermediate a plurality of channel members which co-extend and receive therein a lateral marginal edge of one of said plurality of panels, wherein said channel member comprises a base, two sides connected in perpendicular relation to said base and a clasping edge connected to either of said sides in perpendicular extension therefrom, said clasping edge being securably engaged within a clasping groove located in an adjacent face of said panel.

5,024,016

SELF-LOADING PISTOLS

David E. Smith, Ramsey, Isle of Man, assignor to Victory Arms Co., Limited, London, England
Continuation-in-part of Ser. No. 274,203, Nov. 21, 1988, abandoned. This application Oct. 27, 1989, Ser. No. 428,224
Claims priority, application United Kingdom, Dec. 1, 1987, 8728052
Int. Cl.⁵ F41A *15/10*
U.S. Cl. 42—25 6 Claims

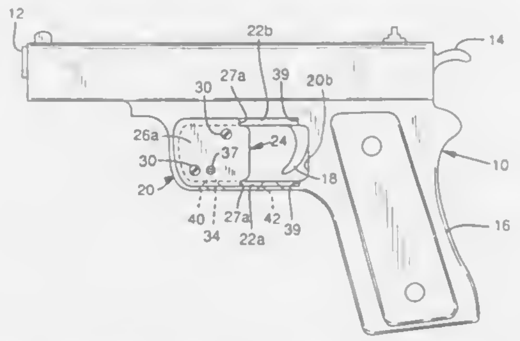


1. A firearm of the self-loading type having a chamber for receipt of a cartridge to be fired and comprising:
(a) a frame
(b) a reciprocating breech block slide mounted for reciprocating movement in the frame between a forward battery position and a retracted position, said breech block slide having an undersurface and including means defining longitudinally extending slot, said breech block slide comprising a detachable breech insert in which said slot is provided;
(c) a cartridge extractor and a firing pin carried by the breech block slide;
(d) a floating under rib having a projection received within said slot, the longitudinal extend of said projection being less than the longitudinal extent of said slot whereby said floating rib is longitudinally movable between a forward position and a rearward position relative to the breech block slide, said floating rib having a forward end which in the forward position of the rib projects beyond the undersurface of the breech block slide to underlie the lower edge of the rear of a cartridge in said chamber when said breech block slide is in its forward battery position, said floating rib forward end cooperating with said lower edge of the rear of the cartridge during initial retraction of the breech block to support the cartridge in order that the cartridge may properly be engaged by the extractor during extraction thereof; and
(e) a cockable hammer, means being provided for forcing the floating rib forwardly in said slot by the action of cocking the hammer.

5,024,017

TRIGGER COVER

Jim Z. Nishioka, 1268 Hemlock NW, Salem, Oreg. 97304
Filed Jul. 20, 1990, Ser. No. 555,837
Int. Cl.⁵ F41A *17/54*
U.S. Cl. 42—70.07 **15 Claims**



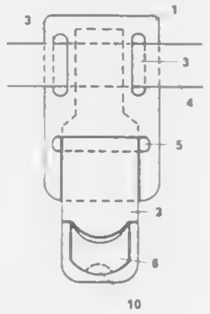
1. In combination, a gun and a trigger cover, said gun having a trigger, a trigger guard and an elongated barrel extending longitudinally in a shooting direction of the gun, said trigger cover for covering said trigger,
said trigger cover including an open position and a closed position, said open position being a position of said trigger cover for exposing said trigger and allowing access to and operation of the latter, said closed position being a position of said trigger cover for covering and restricting access to said trigger,
said combination also including connecting means for slidably connecting said trigger cover to said gun,
said connecting means, when said trigger cover is in said closed position, positioning said trigger cover to cover and to restrict access to said trigger,
said connecting means, when said trigger cover is in said open position, positioning said trigger cover to allow access to said trigger,
said connecting means allowing said trigger cover to slide forwardly from said closed position to said open position,
said trigger cover, in said open position, being positioned forwardly of said trigger.

5,024,018

ADJUSTABLE BELT-ATTACHED FISHING ROD HOLDER

Michael R. Ferrigno, 96 Stratford Rd., Tinton Falls, N.J. 07724
Filed Apr. 19, 1990, Ser. No. 511,017
Int. Cl.⁵ A01K *97/10*
U.S. Cl. 43—21.2 **3 Claims**

1. A two-piece adjustable belt-attached fishing rod holder comprising:
an upper portion having a front and a back with an integral belt-attaching means and an integral horizontally-oriented slot located in the lower central region of said upper portion, with one side of a hook and barb fastener centrally located on the back above the horizontal slot and between the belt-attaching means; and
a lower rod support flap having a front and a back with the front of the flap having an integral upwardly-opening and outwardly-extending cup located at the lower area of said flap to serve as a means for receiving and securing the butt end of the fishing rod and also having the complementary side of the hook and barb fastener located along the upper central portion of the front of said flap;

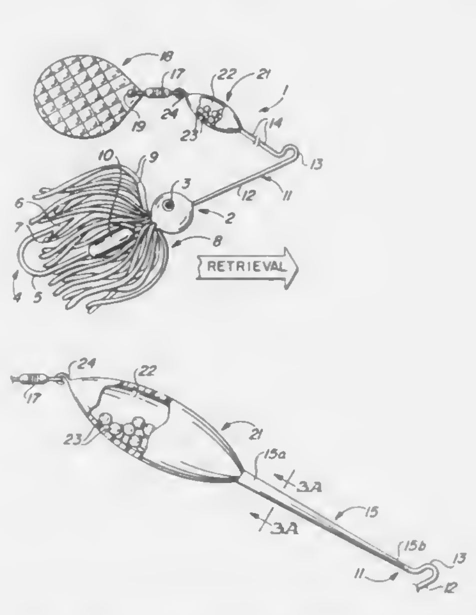


wherein the lower rod support flap is threaded through the integral horizontal slot in the upper portion such that the flap threads from the front to the back of the upper portion, the two sides of the hook and barb fastener being mated together on the back of the upper flap thus providing adjustability.

5,024,019

SPINNER BAIT LURE WITH RATTLE POD

Mark H. Rust, 2721 Frostwood, Shreveport, La. 71108, and Brian J. Kramer, 1815 Lake St., Bossier City, La. 71112
Filed Jun. 19, 1989, Ser. No. 369,034
Int. Cl.⁵ A01K *85/00*
U.S. Cl. 43—42.31 **4 Claims**



4. A spinner bait lure comprising a shaped lure body; a hook having a shank portion embedded in said lure body, said shank portion projecting from said lure body in curved relationship to define a sharp hook tip; a skirt attached to said lure body in close proximity to said hook; a substantially rigid, L-shaped harness having one end carried by said lure body and the opposite spinner end adapted to receive at least one spinner; a line eye provided in said harness intermediate said one end and said spinner end, with that portion of said harness which is located between said line eye and said lure body defining a body segment of said harness; and that portion of said harness which extends from said line eye in angular relationship with respect to said body segment to said spinner end defining a

VOL 1127
ISS 3
JE 18
1991
UMI

spinner segment, said spinner segment tapered from a first diameter at the spinner end thereof to a smaller second diameter at said line eye; and a rattle pod rigidly carried by said spinner segment of said harness, said rattle pod having a pod cavity and at least one shot located in said pod cavity for emitting said rattling noise, whereby retrieval of said spinner bait lure through a water body causes said spinner to rotate and said rattle pod to vibrate and emit a rattling noise.

5,024,020
SUPER SETTER PLASTIC FISHING HOOK

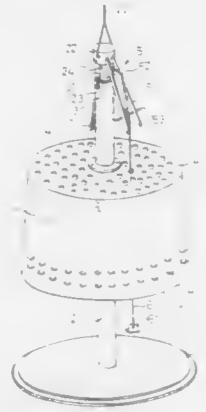
Gary L. Sitton, 6025 Pinkstaff, Beaumont, Tex. 77006
Continuation-in-part of Ser. No. 483,719, Apr. 11, 1983. This application May 18, 1984, Ser. No. 611,742
The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.
Int. Cl.^{5} A01K *83/00*
U.S. Cl. 43—43.16 1 Claim

1. A fishing hook formed as a monolithic molded plastic member for supporting fishing bait, said hook comprising:

(a) an elongated body of uniform cross-sectional area and having a line of action extending longitudinally therethrough;
(b) a connection part adapted to connect with a fishing line at one end of said body;
(c) one or more spurs mounted on said connection part extending outwardly therefrom inclined obliquely with respect to the line of action of said body for securing fishing bait to the hook;
(d) a looping curved part forming reverse curve connecting said body to a barbed point;
(e) said barbed point adapted for penetration of an encountered animal form in the direction of said connection part;
(f) said barbed point having a penetration axis residing substantially in a plane common to said body;
(g) said looping curved part having a cross-sectional area not greater than said body;
(h) said cross-sectional areas of said body and said looping curved part adjusted in relative beam-strength whereby the total line pulling force required to straighten out said looping curved part and release said barbed point from an engaged object such as an animal form is approximately 95% of the tensite strength of the fishing line secured to said connection part and whereby said penetration axis of said barbed point is deflective outwardly past parallel with said line-of-action when the line pulling force at said connection part approaches a predetermined level less than that required to straighten out said looping curved part and release said barbed point from an engaged object.

5,024,021
LAMPSHADE-SHAPED ANIMAL TRAP

Chin-Teh Wang, P.O. Box 10160, Taipei, Taiwan
Filed Apr. 4, 1990, Ser. No. 503,912
Int. Cl.^{5} A01M *23/02*
U.S. Cl. 43—62 5 Claims

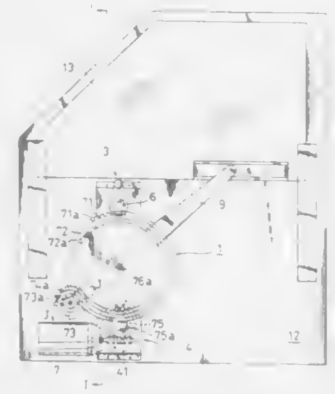


1. An animal trap comprising:
a vertical supporting pipe having a base plate formed on a bottom portion of said supporting pipe;
a catching cup secured with an outer pipe thereon movably jacketed on said supporting pipe; and
a trigger means formed on an upper portion of said supporting pipe having a bait rope of which a bait is mounted on a lower end of said bait rope, said trigger means normally hanging said outer pipe said catching cup on an upper portion of said supporting pipe, said trigger means including: a pair of fixed levers inclinedly secured to an upper portion of said supporting pipe, a biasing lever pivotally secured to said fixed levers having an upper rod portion of said biasing lever operatively hanging a U-shaped hanger formed on an upper portion of said outer pipe and a lower rod portion protruding downwardly outwardly to operatively form an acute angle with said fixed levers, and a horizontal bar secured with an upper portion of said bait rope, said horizontal bar being clamped between said fixed levers and said biasing lever within said acute angle defined by said lower rod portion of said biasing lever and said fixed levers, whereby upon a taking of the bait to release the rope and the horizontal bar, the biasing lever will not be obstructed on the fixed levers and still be biased to downwardly move the upper rod portion to drop the outer pipe and the cup for catching an animal.

5,024,022
AUTOMOBILE WINDOW OPENING AND CLOSING DEVICE

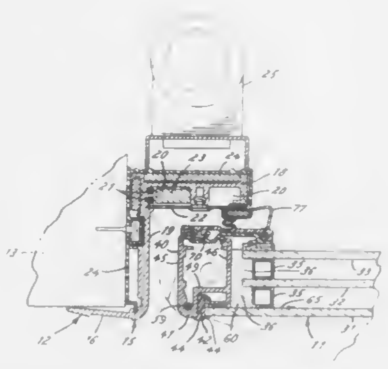
Kazuo Ito, No. 102, Daiichi Fujinoki-soh, 2888, Haze-cho, Sakai-shi, Osaka-fu, Japan
Filed Jun. 19, 1990, Ser. No. 540,351
Claims priority, application Japan, Jul. 19, 1989, 1-85390[U]; Feb. 2, 1990, 2-10049[U]
Int. Cl.^{5} E05F *15/00*
U.S. Cl. 49—139 2 Claims

1. An automobile window opening and closing device for lifting and lowering a window through pivotal movement of a driving arm under a drive force from a manually operated drive unit or a power-operated drive unit, comprising an up-and-down movable gear rotatably supported at one end of said driving arm and held in mesh with concentrically rotatably supported two gears so as to be pivotally movable along the outer peripheries of said two gears, said two drive units each being interlockingly connected with a corresponding one of said two gears, said two drive units each being equipped with a follow movement preventing mechanism for preventing the one drive unit from rotating on its own axis when it is subjected to a drive force from the other drive unit, so that said manually operated and power-operated drive units can be selectively operated for window lifting and lowering.



5,024,023
INSULATED REFRIGERATOR DOOR ASSEMBLY WITH SUBSTANTIALLY ALL GLASS FRONT DOORS

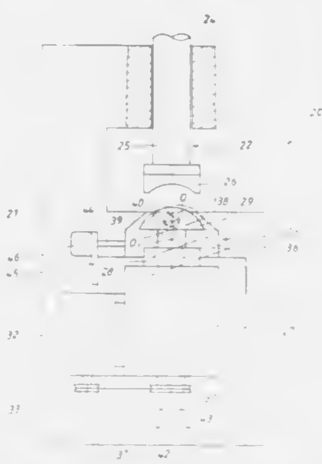
Jeffery Kostos; Melvin Kaspar, both of La Grange Park, and Paul Artwohl, Flossmoor, all of Ill., assignors to Ardco, Inc., Chicago, Ill.
Division of Ser. No. 448,328, Dec. 11, 1989, Pat. No. 4,998,382. This application Oct. 24, 1990, Ser. No. 602,791
The portion of the term of this patent subsequent to Mar. 12, 2008, has been disclaimed.
Int. Cl.^{5} E06B *3/00*
U.S. Cl. 49—501 13 Claims



1. A refrigerator door assembly comprising a cabinet frame for mounting in an opening of a refrigerator cabinet, an insulated glass door mounted for movement relative to said cabinet frame, said glass door comprising an insulated glass unit having a plurality of glass panes disposed in side-by-side relation and including a forward pane and a pane disposed rearwardly of said forward pane, a spacer interposed between at least some of said panes for maintaining said panes in parallel relation with an air space therebetween, an outer door support frame about the periphery of said glass unit for supporting the weight of said glass unit, said forward glass pane being larger in size than said rearwardly disposed pane and extending outwardly substantially to the outer perimeter of said door, said support frame having at least a portion being disposed rearwardly of said forward glass pane and being without any portion extending in overlapping relation to a front side of said forward glass pane, and masking means on said forward glass pane about the periphery thereof for preventing viewing of said spacer through said forward glass pane from a front side thereof while permitting unobstructed viewing of the interior of the refrigerator cabinet within which said door is mounted.

5,024,024
GRINDING AND FINISHING APPARATUS AND METHOD

Masaki Watanabe, Hachiohji, Japan, assignor to Olympus Optical Company Limited, Japan
Filed Sep. 20, 1989, Ser. No. 410,081
Claims priority, application Japan, Oct. 20, 1988, 63-265080
Int. Cl.^{5} B24B *13/02*
U.S. Cl. 51—124 L 18 Claims



9. An apparatus for grinding a workpiece comprising: a rotatable workpiece shaft for carrying a workpiece to be ground so as to rotate the workpiece about a center axis thereof, the workpiece shaft having a longitudinal center axis; a rotatable tool shaft for carrying a tool having a curved grinding surface with a center of curvature lying on the center axis of the workpiece shaft; means for axially displacing the workpiece shaft relative to the tool shaft; first means mounting the tool shaft and the workpiece shaft for lateral movement relative to one another; second means mounting the tool shaft for swinging movement about a swing axis extending perpendicular to and intersecting the center axis of the workpiece shaft; and means for swinging the tool shaft about the swing axis in synchronism with lateral movement of the tool shaft and the workpiece shaft relative to one another so as to maintain the center of curvature of the tool grinding surface on the center axis of the workpiece shaft during grinding of the workpiece.

5,024,025
CONTROL SYSTEM OF GRINDING MACHINE

Hiroyuki Kihara, and Hideki Omori, both of Narashino, Japan, assignors to Seiko Seiki Kabushiki Kaisha, Japan
Filed Oct. 4, 1989, Ser. No. 416,842
Claims priority, application Japan, Oct. 4, 1988, 63-130099[U]; Oct. 14, 1988, 63-134236[U]; Oct. 14, 1988, 63-259004[U]
Int. Cl.^{5} B24B *49/02*
U.S. Cl. 51—165.77 5 Claims

1. A control system of a grinding machine, comprising: electromagnets;
a spindle having a rotor shaft provided with a grinding stone, said rotor shaft being rotatively driven while being held afloat by magnetic forces of the electromagnets;
a head stock for supporting a workpiece;
an undercut table for adjusting an amount of variations in grinding dimensions by moving either of said spindle and said head stock;
a sizing detector for measuring an amount of variations in workpiece dimensions; and
control means for controlling said rotor shaft so that said rotor shaft is held afloat in a reference target position by adjusting exciting currents of said electromagnets and for controlling a movement of said undercut table which is moved back in such a direction that said grinding stone

VOL
1127
ISS
3
JE
18
1991
UMI

separates from said workpiece when detecting that dimensional values of said workpiece reach predetermined values from a detection output of said sizing detector, said control means including a target position modifying

means for modifying a reference target levitating position of said rotor shaft in a retreating direction of said undercut table when detecting that said workpiece dimensional values reach said predetermined values.

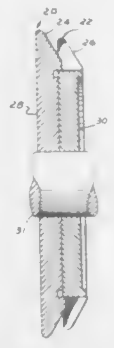
5,024,026
SEGMENTAL GRINDING WHEEL

William B. Korb, Melrose, Conn., assignor to American Saw & Mfg. Company, East Longmeadow, Mass.

Filed Jul. 17, 1989, Ser. No. 380,585

Int. Cl.^{5} B24D *5/00*

U.S. Cl. 51—206.4 **2 Claims**



1. A segmental rotary grinding wheel for forming saw teeth on the edge of a blade comprising at least one array of circumferentially-spaced grinding segments having first and second angularly oriented grinding surfaces, at least one other array of such grinding segments disposed in partially coextensive and fixed axial relationship with the angularly oriented grinding surfaces of adacent segments of the two arrays defining the configuration of a saw tooth, the first and second grinding surface of the segments, in each array, having generally the same surface area as the corresponding surface of the other segments in that array, each of said arrays of grinding segments extending from the periphery of a circular disc with the discs being disposed in abutting coaxial relation and the grinding segments of one disc interdigitated between the segments of the other disc.

5,024,027
TOOL MOUNTING MECHANISM FOR A MACHINE TOOL

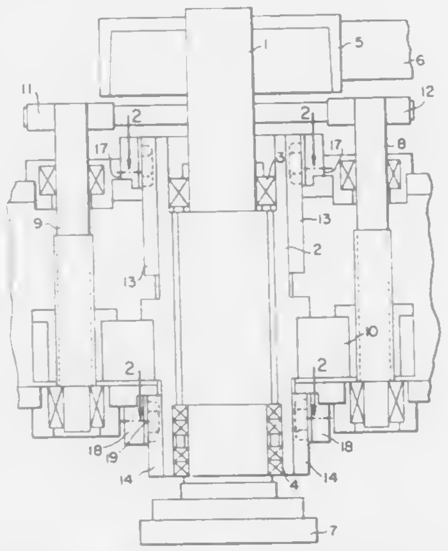
Alexander Hofsess, Dreieich, and Phon Dao-Xuan, Frankfurt, both of Fed. Rep. of Germany, assignors to Diskus Werke Frankfurt am Main Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Jun. 21, 1990, Ser. No. 541,589

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1989, 3923156

Int. Cl.^{5} B24B *41/04*

U.S. Cl. 51—34 H **7 Claims**



1. In a tool mounting mechanism for a machine tool comprising

- a spindle carrier having at least two axially spaced apart sleeve guiding means,
- a spindle sleeve axially slidably and non-rotatably mounted in said spindle carrier by said sleeve guiding means,
- a tool spindle, which extends through and is axially coupled to and rotatably mounted in said sleeve and has two opposite end portions axially protruding from said sleeve, one of said end portions being adapted to carry a tool,
- a belt pulley fixed to the other of said end portions, and
- screw means for axially adjusting said sleeve in said spindle carrier,
- the improvement residing in that
- at least one of said sleeve guiding means comprises at least three axially extending recesses, which are angularly spaced around said sleeve and each of which is provided on opposite sides with two axially extending linear roller bearings and
- said sleeve has an outside peripheral surface and is provided on said surface with at least three axially extending ribs, each of which extends into one of said recesses and is in contact therein with two of said linear roller bearings.

5,024,028
AIRLESS BLAST CLEANING WHEEL AND HOUSING

Kirby L. Pierce, Hartford, and Richard C. Kanouse, Dousman, both of Wis., assignors to Midwest Blast Products, Inc., Brookfield, Wis.

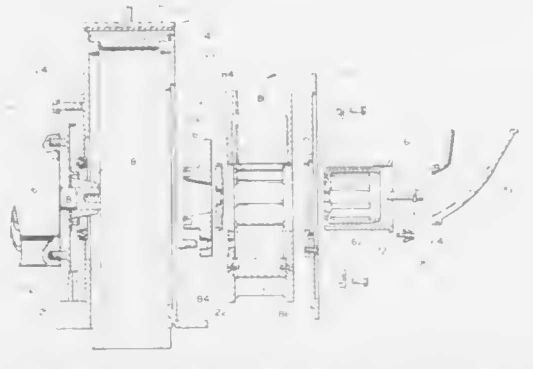
Continuation of Ser. No. 4,378, Jan. 16, 1987. This application Feb. 27, 1989, Ser. No. 316,552

Int. Cl.^{5} B24C *5/06*

U.S. Cl. 51—432 **7 Claims**

1. In a centrifugal blast cleaning system having an impeller blade wheel axially fed with blast cleaning abrasive, an improvement comprising:

- a front access plate means having a feed funnel projecting therethrough for delivering abrasive to the axis of the cleaning wheel, said front access plate means being removable from the remainder of the housing by removal of fastener means, said front access plate means being of sufficiently large dimensions to permit access to and removal of the wheel and to permit access to and insertion and removal of impeller blades;
- a motor mounting plate for supporting a motor directly connected thereto and having a motor output shaft receiving aperture therethrough and having an output shaft directly connected to drive the impeller blade wheel and having primary and secondary seals, the secondary seal comprising a metal to metal labyrinth seal, said seals having a separation therebetween positioned between the motor shaft and the interior of the housing, such that the motor is protected from exposure to blast cleaning abrasive;



- in combination first and second blade mounting disks held parallel to each other by standoffs, each of said disks bearing on an innerface thereof cooperating channels in the surface thereof for receiving shoulder projections from side edges of impeller blades and supporting the shoulders of the impeller blades in the channels for rotation about the axis of the disks, each of the disks having axial apertures therethrough for feeding abrasive onto the blades when the wheel is rotated, said slots being constructed and arranged for engaging the projecting shoulders on the blades, said slots terminating prior to the circumference of the disks, and said slots thereby centrifugally securing the blades in position as the wheel is rotated; and
- only three interior replaceable abrasive resistant liner elements.

5,024,029
ABRASIVE MEDIA VALVE SYSTEM

Kenneth E. Abbott, and Patrick J. Lyons, both of Tucson, Ariz., assignors to Stripping Technologies Inc., Tucson, Ariz.

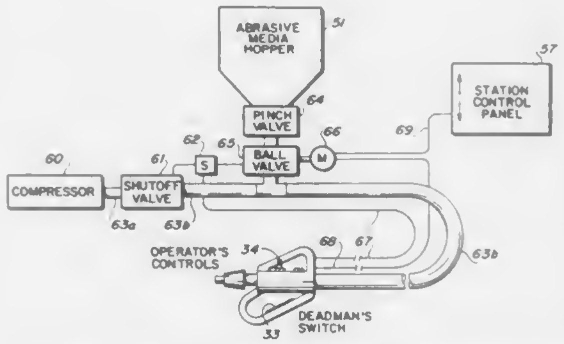
Continuation-in-part of Ser. No. 253,237, Oct. 4, 1988, Pat. No. 4,901,928. This application Oct. 30, 1989, Ser. No. 429,052

Int. Cl.^{5} B24C *7/00*

U.S. Cl. 51—438 **10 Claims**

1. A media mixing valve system for an abrasive blasting system, said media mixing valve system comprising:

(a) a remotely regulated valve for the selective delivery of abrasive media to a pressurized air stream and wherein said remotely regulated valve is activatable by a station control panel and an operator control panel; and,



(b) a pinch valve for blocking access of the abrasive media from a blast generator to said remotely regulated valve.

5,024,030
SPACE DIVIDER SYSTEM

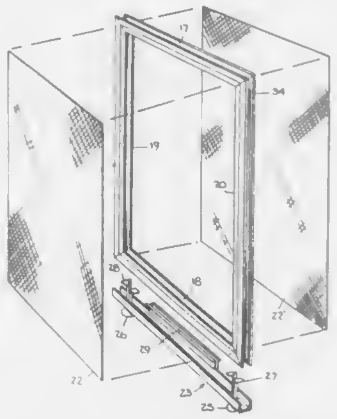
Andrew I. Morrison, East Setauket, N.Y., assignor to Knoll International, Inc., New York, N.Y.

Division of Ser. No. 560,877, Dec. 13, 1983. This application Dec. 2, 1985, Ser. No. 803,552

The portion of the term of this patent subsequent to Feb. 4, 2003, has been disclaimed.

Int. Cl.^{5} B24B *7/00*

U.S. Cl. 52—36 **1 Claim**



1. In an office system of interconnected panels and posts, the improvement for interconnecting a first panel to an adjacent second panel or post and also providing a support for accessory components in the region between said first panel and adjacent second panel or post comprising a standard adapted to be positioned between said first panel and said adjacent second panel or post, said standard having opposing sides and front and rear faces, wedging means at both ends of said standard for placing said standard in tension by drawing said first panel and said adjacent second panel or post against the opposing sides of said standard, said standard also including support means on at least one face thereof for supporting one or more accessory components therefrom, which support means are exposed when said first panel is interconnected to an adjacent second panel or post, each component accessory being provided with a bracket that hooks onto the exposed support means on the face of the standard, the other exposed face of the standard being provided with support means for supporting a component accessory therefrom, which support means are exposed when said first panel is interconnected to an adjacent second panel or post.

VOL
1127
ISS
3
JE
18
1991
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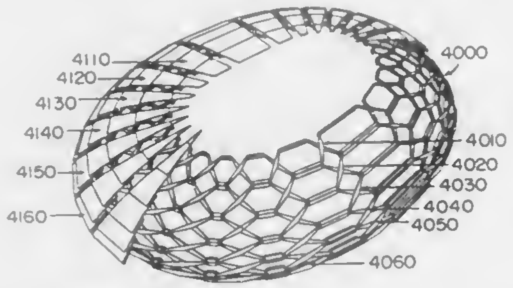
5,024,031
RADIAL EXPANSION/RETRACTION TRUSS STRUCTURES

Charles Hoberman, 472 Greenwich St., New York, N.Y. 10013
Continuation-in-part of Ser. No. 263,582, Oct. 27, 1988, Pat. No. 4,942,700. This application Apr. 6, 1990, Ser. No. 505,804
The portion of the term of this patent subsequent to Sep. 4, 2007, has been disclaimed.
Int. Cl.⁵ E04B *1/32, 1/00*

U.S. Cl. 52—81 **24 Claims**



1. A loop-assembly comprising:

at least three scissors-pairs, at least two of the pairs comprising:

two essentially identical rigid angulated strut elements, each having a central and two terminal pivot points which do not lie in a straight line, each strut being pivotally joined to the other of its pair by their central pivot points,

each pair being pivotally joined by two terminal pivot points to two terminal pivot points of another pair such that both scissors pairs lie essentially in the same plane,

whereby a closed loop-assembly is thus formed of scissors pairs, and this loop-assembly can fold and unfold, and

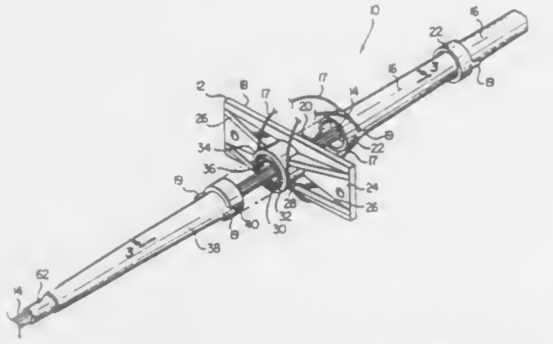
a line that intersects and is perpendicular to the axes of any two terminal pivot points is non-parallel with at least two other similarly formed lines in the assembly,

the angles formed between said lines remaining constant as the loop assembly is folded and unfolded.

5,024,032
POST-TENSIONING ANCHOR

Alan Rodriguez, 3025 Montego, Plano, Tex. 75023
Continuation of Ser. No. 88,795, Aug. 24, 1987, Pat. No. 4,821,474. This application Apr. 11, 1989, Ser. No. 336,254
The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.
Int. Cl.⁵ E04C *3/10*

U.S. Cl. 52—223 L **3 Claims**



1. An improved post-tensioning anchor plate assembly of the type constructed for securement in a concrete structure defined by pour forms and the receipt of a tensioning tendon therethrough, having means for securing said tensioning tendon therein in taut engagement, wherein said improvement comprises:

an anchor plate housing having first and second faces, said first face being adapted for facing inwardly toward said concrete with said second oppositely disposed face adapted for facing outwardly therefrom;

said anchor plate housing further being constructed with a central aperture formed therethrough, said aperture having a first collar region formed on said first face and a second oppositely disposed face adapted for facing outwardly therefrom;

said anchor plate housing further being constructed with a central aperture formed therethrough, said aperture having a first collar region formed on said first face and a second collar region formed on said second face, said first and second collar regions being concentrically aligned one with the other;

a tubular member adapted for engagement with said first anchor plate face for extension outwardly therefrom into said concrete with said tendon extending therethrough, said tubular member having at least one ear formed thereon and adapted for receipt of a filament therearound for securement to said plate, a second ear formed thereon substantially opposite said first ear for facilitating receipt of a filament therearound;

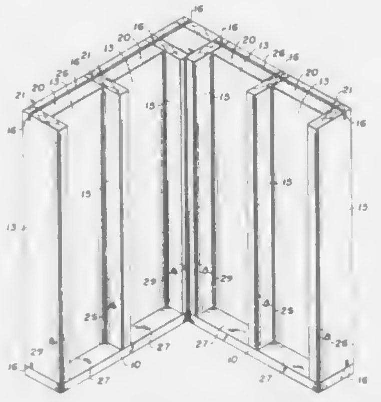
said first collar region having a first tubular engaging surface with an outside diameter substantially equivalent to an inside diameter of said tubular member and adapted for the press fit engagement thereof for the sealing of said tendon therein; and

said second collar region having a second tubular member engaging surface of substantially equivalent diameter to said first tubular member engaging surface for permitting securement of a second member thereon.

5,024,033
PREFABRICATED CONSTRUCTION UNIT WITH INSULATION

Ray L. Anderson, Box 3031, Langley, British Columbia V3A, 4R3, Canada
Continuation of Ser. No. 114,516, Oct. 30, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 323,171
Int. Cl.⁵ E04B *2/46*

U.S. Cl. 52—407 **10 Claims**



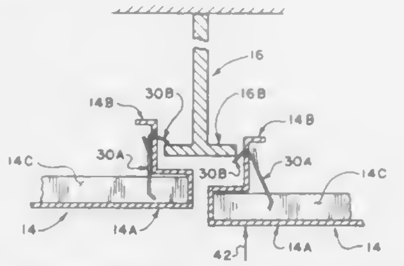
1. A pre-formed insulated wall construction unit comprising:

a support framework utilizing spaced spanning members mounted between upper and lower cross members to form a wall unit having a series of open compartments with first and second pairs of opposed edges defined by said spaced, spanning members and said upper and lower cross members, respectively, said open compartments being occupied by rigid insulation having grooved edges, sealing strips with a T shaped cross-section attached to said first pair of opposed edges of said compartment, the head of the T being an attachment flange to secure said strip to a framework member, and the leg of the T being an engagement flange formed with a single angled flexible finger at an acute angle to the plane of the engagement flange to seat in said grooves in said rigid insulation in order to hold said insulation securely within said open compartments, said second pair of opposed edges being bonded directly to the adjacent edges of said rigid insulation.

5,024,034
NON-DIRECTIONAL SUSPENDED CEILING PANELS

J. Lynn Gailey, Clover, S.C., assignor to Alcan Aluminum Corporation, Cleveland, Ohio
Filed Dec. 1, 1989, Ser. No. 444,624
Int. Cl.⁵ E06B *3/54*

U.S. Cl. 52—484 **13 Claims**



1. Apparatus comprising an inverted T-beam support member, a ceiling panel, and a latch structure for suspending the ceiling panel from the inverted T-beam support member;

said latch structure being coupled with said ceiling panel and being movable therewith relative to said inverted T-beam support member;

said latch structure being moveable relative to said ceiling panel and being biased by gravity toward a locking position;

said latch structure being adapted to engage the inverted T-beam support member to suspend said portion of said ceiling panel therefrom when said ceiling panel is in a predetermined orientation relative to said inverted T-beam support member and said latch structure is in said locking position; and

said latch structure being adapted to be moved relative to said ceiling panel and away from said locking position to enable said ceiling panel to be suspended from or separated from the inverted T-beam support member;

wherein said latch structure includes a locking portion extending away from said ceiling panel when said latch structure is in said locking position;

said locking portion being disposed to be engaged by an inverted T-beam support member as said ceiling panel is being moved to said predetermined orientation relative to said inverted T-beam support member;

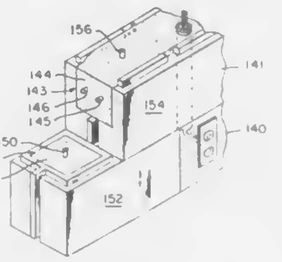
said latch structure being movable away from said locking position by engagement of said locking portion of said latch structure with said inverted T-beam support member as said ceiling panel is being moved to said predetermined orientation; and

said latch structure being biased by gravity to its locking position when said ceiling panel has been moved to said predetermined orientation, to enable said latch structure to support said ceiling panel from said inverted T-beam member when said ceiling panel has been moved to said predetermined orientation.

5,024,035
BUILDING BLOCK AND STRUCTURES FORMED THEREFROM

Gary N. Hanson, and Keith W. Inness, both of Seattle, Wash., assignors to Insulock Corporation, Seattle, Wash.
Continuation of Ser. No. 85,871, Oct. 18, 1979, abandoned, which is a continuation of Ser. No. 966,082, Dec. 4, 1978, abandoned. This application Apr. 28, 1981, Ser. No. 258,052
Int. Cl.⁵ E04C *1/10*

U.S. Cl. 52—591 **3 Claims**



1. A wall structure, comprising:

a) a plurality of lightweight, non-cementitious, resilient, plastic foam material, first blocks, each first block having a generally rectangular exterior configuration and comprising a pair of opposed first side walls; a pair of opposed first end walls having heights equal to that of the first side walls; a first interior wall having a height equal to that of the first side walls and extending between the first side walls approximately parallel to the first end walls, the first interior wall forming two first vertical passages through the first blocks of approximately equal, rectangular cross-sections; first projections on the upper surfaces of the first end, side and interior walls, the firt projections being formed into two identical first patterns respectively associated with said two first passages; and the lower surfaces of the first side, end and interior walls being shaped so as to form first recesses identical to the first projections in size and shape, and directly below the first projections in position, the first blocks being positioned side by side to form first horizontal rows;

b) a plurality of lightweight, non-cementitious, resilient, plastic foam material second blocks, each second block having an exterior size and configuration similar to the first blocks and comprising a pair of opposed second side walls; a pair of opposed second end walls having heights appreciably less than that of the second side walls; a second interior wall having a height equal to that of the second end walls and extending between the second side walls approximately parallel to the second end walls; the second interior wall forming two second vertical passages through the second forms of approximately equal, rectangular cross-sections; second projections on the upper surface of each second side wall, the second projections being formed into two identical second patterns respectively associated with the two second passages; and the lower surfaces of the second side, end and interior walls being shaped so as to form second recesses, a portion of such second recesses being identical to the second projections in size and shape and directly below the second projections in position, the second blocks being positioned side by side to form second horizontal rows and horizontal passages through said horizontal row of second blocks, said first and second rows being positioned one on top of another such that the projections of the forms in each row are received within the recesses of the forms in the row above and the passages in successive rows are aligned to form vertical openings extending through more than one row; and

c) load bearing structures extending at least through one of said vertical openings.

VOL
1127
ISS
3
JE
18
1991
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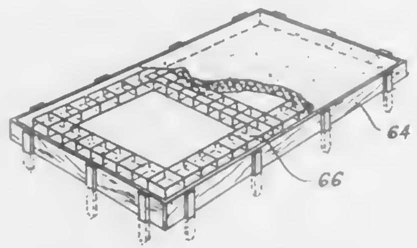
5,024,036
INTERLOCKING SUPPORT STRUCTURES

David W. Johnson, 1884 Sunset Blvd., San Diego, Calif. 92103
Continuation-in-part of Ser. No. 231,379, Aug. 12, 1988. This application Jun. 21, 1990, Ser. No. 541,547
Int. Cl.^{5} E04H *12/18*
U.S. Cl. 52—600 **37 Claims**

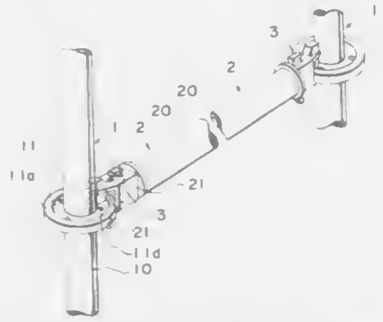


1. A multi-celled support lattice comprising:
(a) a plurality of adjacent cells defining a support surface;
(b) each of said cells having twelve edges and each edge being defined by a pair of elongated structural members, with each cell sharing common member pairs with any adjacent cells;
(c) each of said cells having eight corner joints, each being defined by the intersection of three interlocking structural member pairs;
(d) said joints each defining X, Y, and Z directions and comprising:
(i) said elongated structural member pairs being formed into an X-directional parallel contiguous pair, a Y-directional parallel contiguous pair, and a Z-directional parallel contiguous pair;
(ii) said parallel contiguous pairs intersecting one another to define said joint between said six elongated structural members such that said joint has:
(1) three elongated structural members that are each only full notched to define a full notch, said full notch being of length substantially equal to twice the thickness of said structural members and of depth substantially equal to half the thickness of said structural members such that when paired with an oppositely-directed full-notched member a pass-through opening is defined which will snugly fit a pair of members inserted orthogonally therethrough;
(2) two of said members having similar full notches and also having an additional half notch, said half notch being formed at 90 degrees to the full notch and substantially at mid-span of the full notch; and,
(3) the sixth elongated structural member having no notches at said joint and being the key post that holds the remaining five members together as a joint; and,
(iii) said joint comprising an interlocking joint held together by the interlocking configurations of the elongated structural members themselves such that said lattice is rigid without the use of fasteners at the joints.

35. A concrete reinforcing structure to be imbedded in wet concrete comprising:
(a) a plurality of intersecting elongated member pairs interlocking at the intersections to define joints;
(b) said joints each defining X, Y, and Z directions and comprising:
(i) a plurality of elongated structural member pairs formed into an X-directional parallel contiguous pair, a Y-directional parallel contiguous pair, and a Z-directional parallel contiguous pair;
(ii) said parallel contiguous pairs intersecting one another to define said joint between said six elongated structural members such that said joint has:
(1) three elongated structural members that are each only full notched to define a full notch, said full notch being of length substantially equal to twice the thickness of said structural members and of depth substantially equal to half the thickness of said structural members such that when paired with an oppositely-directed full-notched member a pass-through opening is defined which will snugly fit a pair of members inserted orthogonally therethrough;
(2) two of said members having similar full notches and also having an additional half notch, said half notch being formed at 90 degrees to the full notch and substantially at mid-span of the full notch; and,
(3) the sixth elongated structural member having no notches at said joint and being the key post that holds the remaining five members together as a joint; and,
(iii) said joint comprising an interlocking joint held together by the interlocking configurations of the elongated structural members themselves such that said lattice is rigid without the use of fasteners at the joints.

5,024,037
PROCESS FOR CONNECTION OF SUPPORTS, AND SUPPORT SYSTEM

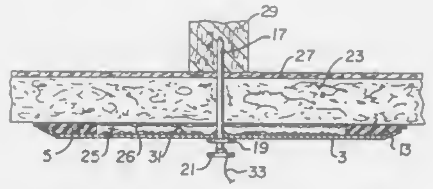
Tatsuo Ono, 5-20-13, Matsugaoka Funabashi, Chiba, Japan
Filed Apr. 5, 1989, Ser. No. 333,465
Claims priority, application Japan, Dec. 28, 1988, 63-331310
Int. Cl.^{5} E04H *12/18*
U.S. Cl. 52—646 **17 Claims**



1. A support system which comprises cloumnar members each provided with a plurality of flanges spaced apart along the longitudinal direction of the columnar members, connecting members each provided with joint shoes at end portions thereof, and wedges to be driven into the joint shoes, wherein the flanges are each provided with a supporting piece along the circumferential direction thereof, and the joint shoes each comprises a hollow housing having a pair of opposed wall bodies, and a hook fitted loosely and movably in the housing, the wall bodies and the hook being provided with respective wedge insertion holes opposed to each other, and the hook being provided at an end portion thereof with a catch portion to be disengageably engaged with the supporting place of the flange, whereby when the wedge is driven into each of the wedge insertion holes in the condition where the catch portion is opposed to the supporting piece, the hook is retracted to engage the catch portion with the supporting piece, an end portion of each of the wall bodies is pushed outward into contact with the outer surface of the columnar member and an elastic member is provided at an inner rear portion of the housing to constantly bias the hook to the outside of the housing.

5,024,038
APPARATUS AND METHOD FOR PROVING AN ANCHOR IN WALLS AND CEILINGS COMPOSED OF FRIABLE ASBESTOS CONTAINING MATERIAL

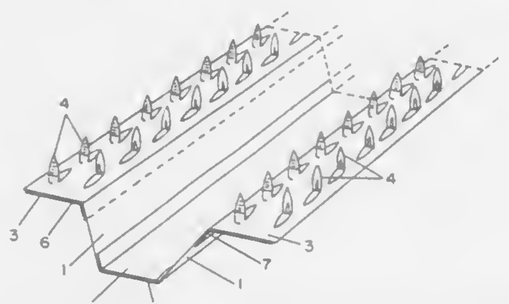
Donald D. DePellegrini, Pittsburgh; William E. Acker, Allison Park, and Richard Hoff, Coraopolis, all of Pa., assignors to University of Pittsburgh, Pittsburgh, Pa.
Filed Apr. 16, 1990, Ser. No. 509,475
Int. Cl.^{5} E04B *2/00. 9/00*
U.S. Cl. 52—700 **16 Claims**



1. Apparatus for providing an anchor in walls and ceilings containing friable asbestos containing materials, said apparatus comprising:
a plate member which is placed against the wall or ceiling and generally centered over a selected anchor point, a peripheral seal between the plate and the wall or ceiling providing an airtight seal completely around said plate member, and a fastener having a shaft which is driven through said plate placed against said wall or ceiling and which penetrates and securely engages said wall or ceiling behind the plate member at said selected anchor point, said fastener dislodging friable material from a disturbed portion of said wall or ceiling surrounding said anchor point as the shaft penetrates the wall or ceiling, said fastener also having an anchor member secured to said shaft outside said plate and having a flange which bears against and clamps said plate member and peripheral seal permanently against said wall or ceiling, said plate member covering the entire disturbed portion of said wall or ceiling surrounding said anchor point from which friable asbestos containing material is dislodged as said shaft penetrates said wall to trap and permanently contain said dislodged friable asbestos containing material.

5,024,039
ENGAGEMENT PROFILE OR BEAM

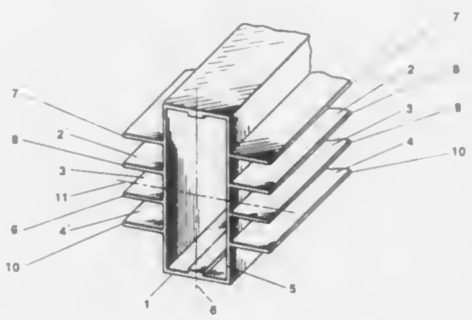
Markku Karhumäki, Erkyläntie, SF-11130 Riihimäki, Finland
Continuatioo of Ser. No. 162,391, Mar. 4, 1988, abandoned. This application Dec. 6, 1989, Ser. No. 449,379
Claims priority, application Finland, Jul. 4, 1986, 862835
Int. Cl.^{5} E04C *3/07*
U.S. Cl. 52—735 **9 Claims**



1. A beam for use in construction for fastening to a building construction element in a bearing portion of a joint structure comprising:
a beam-shaped member made of a substantially thin sheet metal and including:
two side members;
two fastening strips, each fastening strip extending outwardly in an angular position from a first edge of one of said respective side members;
an intermediate strip extending between second edges of said side members to define a bottom of said beam-shaped member; said side members and said intermediate strip forming a substantially flat-bottomed V-shaped configuration;
a plurality of fastening means being provided at said each fastening strip and substantially closely spaced along the surface of said fastening strip, said fastening means being shaped such as to penetrate into the building construction element upon pressing of said fastening strip against the building construction element for fastening said beam-shaped member to said building construction element; and
at least one reinforcement member made as a separate piece and being provided on at least said intermediate strip at least in the interior of said V-shaped configuration, said reinforcement member extending in the longitudinal direction of said intermediate strip for increasing the bending strenght of said beam-shaped member, said reinforcement member being arranged across said intermediate strip to reach at least said second edges of said side members and being affixed to said V-shaped configuration or said thin-sheet metal member.

5,024,040
CURVED TUBULAR PROFILE

Henri G. Leurent, Tourcoing, France, ussignor to Brelan, S.A., Luxembourg, Luxembourg
Filed Feb. 17, 1989, Ser. No. 312,858
Claims priority, application France, Feb. 18, 1988, 88 01913
Int. Cl.^{5} E04B *2/00*
U.S. Cl. 52—738 **5 Claims**



1. A metal profile for forming arches used in covering structures, comprising:
a curvilinearly extending tubular central bearing body having opposed sides and having, in a transverse cross section veiw, a vertical axis of symmetry and a horizontal axis of symmetry; and
a plurality of fins arranged on above the other and together defining at least three grooves on each side of said body, said fins extending from each of said opposed sides of said body, being perpendicular to said vertical axis and being distributed symmetrically with respect to said horizontal axis; wherein each of said fins extends from the body to an end and exhibits, in a transverse cross sectional view, a straight top edge extending from the body to the end of a straight bottom edge extending from the body to the end, said top and bottom edges each extending perpendicular to the vertical axis and wherein said profile comprises a single piece.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,041

PROCESS FOR FILLING TUBULAR CASINGS

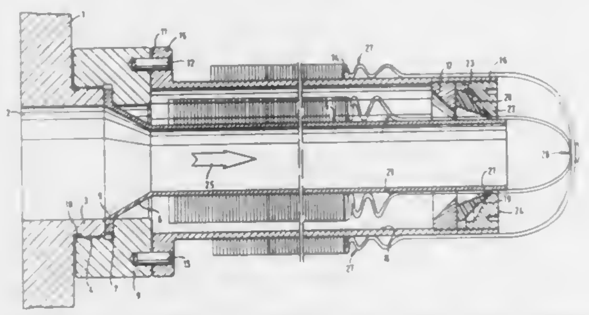
Rudolf Urban; Josef Fritsch, both of Taunusstein, and Klaus-Peter Schoen, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 345,182

Claims priority, application Fed. Rep. of Germany, May 6, 1988, 8806038[U]

Int. Cl.^{5} B65B *11/58, 9/12;* **A22C** *11/00*

U.S. Cl. 53—449 4 Claims



1. A process for filling a tubular casing with a pasty product and simultaneously applying a tubular net thereto, which comprises the steps of

mounting a tubular casing on a stuffing horn which includes an orifice and an outer surface,

mounting a tubular net on a support tube having an end in the vicinity of said orifice and coaxially surrounding said stuffing horn,

passing a first end of said casing between a brake and said outer surface of said stuffing horn, wherein said brake is disposed entirely within the interior of said support tube in the vicinity of said orifice and encircles said stuffing horn,

pulling a first end of said tubular net over the end of said support tube,

closing said first end of said casing, together with said first end of said tubular net, at said orifice,

introducing a pasty product into said stuffing horn,

extruding said pasty product through said stuffing horn into a length of said casing, and

closing said casing together with said tubular net at a point defined by said length of said casing.

5,024,042

BAG FILLING AND CLOSING APPARATUS

Hans-H. Meyer, Rotkehlchenstrasse 1, D-4804 Versmold, Fed. Rep. of Germany

Filed Mar. 30, 1990, Ser. No. 501,803

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1989, 3910208

Int. Cl.^{5} B65B *43/14, 5/04*

U.S. Cl. 53—168 6 Claims

1. A bag filling and closing apparatus comprising:

a bag filling station for receiving an opened bag to be filled and for filling in a material into the opened bag;

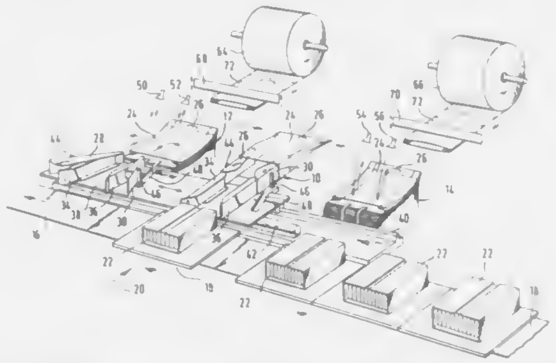
a first bag supplying station disposed on a first side of said bag filling station;

a second bag supplying station disposed on a second side of said bag filling station;

a movable carriage means movable back and forth between said bag filling station and said first and second bag supplying stations;

first opening means disposed on said movable carriage means for receiving and opening a bag when said first opening means is at said first bag supplying station, said first opening means including a first spreading open and holding device for gripping, spreading open, and holding a bag to provide an opened bag; said first opening means holding the opened bag to be filled when said first opening means is at said bag filling station;

second opening means disposed on said movable carriage means for receiving and opening a bag when said second opening means is at said second bag supplying station, said second opening means including a second spreading open and holding device for gripping, spreading open, and holding a bag to provide an opened bag; said second opening means holding the opened bag to be filled when said second opening means is at said bag filling station; and



said movable carriage means alternately moving said first opening means between said bag filling station and said first bag supplying station, and said movable carriage means alternately moving said second opening means between said second bag supplying station and said bag filling station.

5,024,043

MACHINE FOR WRAPPING SUBSTANTIALLY PARALLELEPIPED COMMODITIES

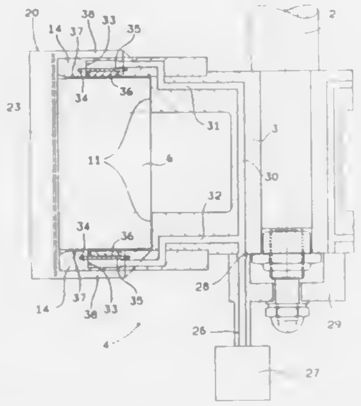
Fiorenzo Draghetti, Medicina, and Antonio Gamberini, Bologna, both of Italy, assignors to G.D. Societa Per Azioni, Bologna, Italy

Filed May 7, 1990, Ser. No. 519,457

Claims priority, application Italy, May 9, 1989, 3456 A/89

Int. Cl.^{5} B65B *11/32*

U.S. Cl. 53—234 7 Claims



1. A machine for wrapping substantially parallelepiped commodities, comprising:

a rotatable head with a plurality of radial pockets into respective ones of which respective commodities are singly insertable, each disposed with its two opposite end faces occupying relative planes normal to an axis of rotation of the head, together with a sheet of wrapping material located between a respective said commodity and respective said pocket;

pressing-type clamping means, designed to engage at least one of the opposite end faces of the commodity and hold the commodity in position within the pocket during transfer of the pocket from a point of entry into the head to a point of exit from the head, in such a way as to disallow movement of the commodity internally of the respective pocket and prevent any relative movement of the commodity and the respective sheet of wrapping material;

each said radial pocket being encompassed by a bottom wall, two substantially radial walls and two side walls normal to the axis of rotation of the head, and accommodates a respective commodity enveloped entirely by the sheet of wrapping material save for an area of the two end faces offered to the side walls;

said pressing-type clamping means comprising a source of compressed air, a pneumatic circuit associated with each pocket, valve means by which the circuit is connected to the source during occupation of the pocket by the commodity, and pad means located at one end of the pneumatic circuit associated with each pocket, operating in conjunction with the side walls of the pocket and directed against only said uncovered area of at least one of the opposite end faces of a commodity occupying the pocket.

5,024,044

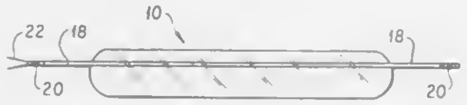
PROCESS FOR PRODUCING AN EASILY OPENED PACKAGE

Steven G. Friedrich, Greer, and Kent A. Davis, Travelers Rest, both of S.C., assignors to W. R. Grace & Co.-Conn., Duncan, S.C.

Division of Ser. No. 62,532, Jun. 12, 1987, Pat. No. 4,859,514. This application May 5, 1989, Ser. No. 348,319

Int. Cl.^{5} B65B *31/02, 47/02*

U.S. Cl. 53—433 4 Claims



1. A process for producing a package having a peel opening force of less than about 2.5 pounds per inch comprising:

(a) forming a first web having a sealant layer comprising a polymeric material selected from the group consisting of ionomer, and a blend of said ionomer and ethylene vinyl acetate copolymer;

(b) placing the article on the first formed web;

(c) disposing the second web having a sealant layer comprising a blend of ethylene vinyl acetate copolymer, ethylene butene copolymer, and polypropylene over the product to form an enclosure;

(d) heating the second web;

(e) vacuumizing the enclosure;

(f) forming a perimeter seal at or near the periphery of the package by heat sealing the first and second webs thereat; and

(g) forming a bonded area adjacent to said perimeter seal by causing the heated second web to tack to the first web so as to enclose the article between the webs.

5,024,045

PANEL PACKAGING SYSTEM

Stewart L. Fluent, Cedar Falls; Colin Hart, Waterloo, both of Iowa; Charles D. McCree, King of Prussia, Pa., and Charles F. Lotsch, Audubon, Pa., assignors to CertainTeed Corporation, King of Prussia, Pa.

Continuation of Ser. No. 317,744, Mar. 2, 1989, Pat. No. 4,941,309. This application May 17, 1990, Ser. No. 524,546

Int. Cl.^{5} B65B *35/50, 35/56*

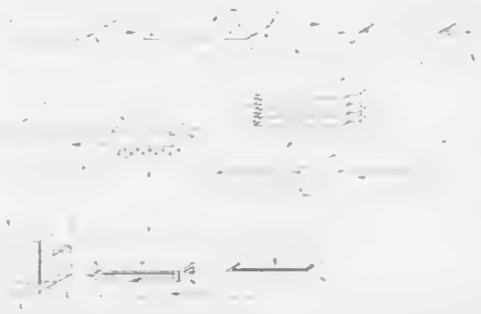
U.S. Cl. 53—443 2 Claims

1. A method for sequentially receiving extruded vinyl panels, re-orienting selected panels, combining panels pairs and packing the pairs in a waiting container, comprising the steps of:

(a) receiving a first panel in a horizontal orientation;

(b) transposing said first panel to a first orientation and depositing said first panel on an adjacent and movable surface;

(c) receiving a second panel in a horizontal orientation;



(d) transposing said second panel to a second orientation and depositing said second panel in a pre-determined position adjacent said first panel to form a combination therewith;

(e) moving the combination of said first and second panels into a container; and

(f) repeating steps a through e until a predetermined number of panel combinations have been moved into said container.

5,024,046

METHOD AND DEVICE FOR WRAPPING CYLINDRICAL PRODUCTS

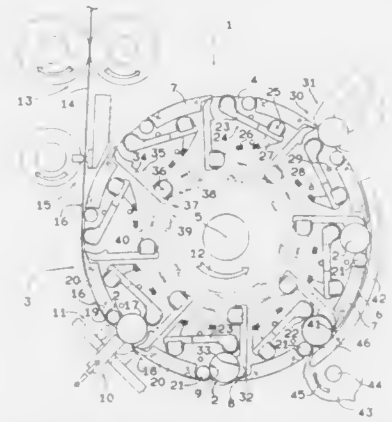
Mario Spatafora, and Antonio Gamberini, both of Bologna, Italy, assignors to G. D Societa per Azioni, Bologna, Italy

Filed Mar. 14, 1990, Ser. No. 494,157

Claims priority, application Italy, Mar. 14, 1989, 3375 A/89

Int. Cl.^{5} B65B *11/04*

U.S. Cl. 53—466 11 Claims



1. A method of wrapping cylindrical products (2), particularly groups of cylindrical sweet arranged side by side, characterised by the fact that it comprises stages consisting in:

successively feeding a conveyor (3) with portions of wrapping material (16); said conveyor (3) presenting a series of seats (9), each designed to receive a respective said product (2); each said seat (9) being arranged crosswise in relation to the travelling direction (12) of said conveyor (3), and having a lateral inlet (8); and each said portion of wrapping material (16) being retained on said conveyor in such a position as to substantially close a respective said inlet (8);

successively feeding, inside each said seat (9) at a loading station (11), an unwrapped product (2) together with a

VOL
1127
ISS
3
JE
18
1991
UMI

portion (17) of said respective portion of wrapping material (16); an inner surface of said seat (9) being defined, at least partially, by rollers (21, 22) mounted in idle manner on said conveyor (3) in such a manner that each turns about its axis perpendicular to said travelling direction (12); insertion of each said product (2) inside a respective said seat (9) causing a portion (17) of said respective portion of wrapping material (16) to fold in the form of a U about a portion of said product (2) and in contact with said rollers (21, 22);

feeding each said product (2) forward until a peripheral portion of the same engages a rolling surface (41) for rotating said product (2) about its axis inside said seat (9) and fully wrapping said portion of wrapping material (16) about the same;

unloading said wrapped product (2) from said seat (9) at an unloading station (30);

feeding each separated portion of wrapping material (16) onto said conveyor (3) so as to present an intermediate portion (17) facing the inlet (8) of the seat (9); and

folding back, via external folding means (43), the from end portion (18) of the separated portion of wrapping material (16), and maintaining the fron end portion (18) in contact with the product (2) as the same engages the rolling surface (41).

5,024,047

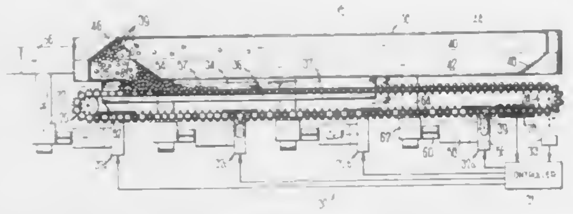
WEIGHING AND SORTING MACHINE AND METHOD

William H. Leverett, Greenville, Ga., assignor to Durand-Wayland, Inc., Lagrange, Ga.

Filed Mar. 8, 1990, Ser. No. 491,247

Int. Cl.^{5} B65B *5/10*

U.S. Cl. 53—502 12 Claims



1. An apparatus for filling a container to a predetermined weight with a plurality of articles having varied weights, comprising:

- a continuous conveyor driven in a horizontal plane through a loading zone, a weighing zone, and at least one discharge zone;
- a plurality of cups attached to said continuous conveyor, each cup passing through said loading zone so that each empty cup receives an article from a group of said articles;
- a scale in said weighing zone to determine the weight of said articles in each said cup;
- a discharge mechanism in said discharge zone selectively activated at least one of said plurality of cups so that said article moves from said cup into said container; and
- a controller to accumulate the sum of the weights of said articles discharged into said container until said sum exceeds a predetermined fraction of said predetermined weight and then to select at least one of said articles in said plurality of cups to discharge into said container. said selected article having a weight sufficient to increase the accumulated weight in said container to no less than said predetermined weight, each said article remaining in its respective cup and passing repeatedly through said weighing zone and said discharge zone until said article is discharged into a container.

5,024,048

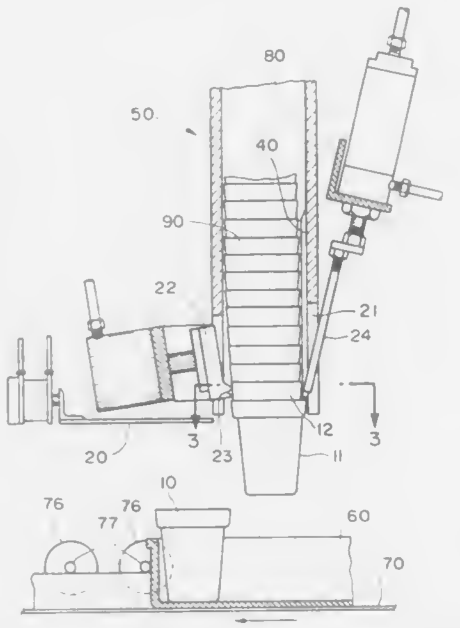
APPARATUS FOR DISPENSING CONTAINERS

Richard L. Moore, Fairhope, Ala., assignor to The Lerio Corporation, Mobile, Ala.

Filed Jun. 15, 1990, Ser. No. 538,907

Int. Cl.^{5} B65B *5/08;* **B65G** *59/06;* **B65H** *3/44*

U.S. Cl. 53—534 16 Claims



1. An apparatus for separating and dispensing individual containers from a stack of containers comprising:

at least one hollow column having an open upper and lower mouth for holding a stack of containers substantially vertical, each of said hollow columns being operatively associated with:

(a) a first extendable arm operatively associated with said hollow column whereby when said first extendable arm is extended into the lower mouth of said hollow column, said stack of containers will be prevented from falling out of said column;

(b) a second extendable arm operatively associated with said hollow column whereby after said first extendable arm is extended and thereafter said second extendable arm is extended, said second extendable arm will contact the penultimate container in the stack of containers and press said container against the side of said hollow column opposite to said second extendable arm;

(c) a wedge affixed to the inside of said hollow column on the side of said column opposite to said second extendable arm, the length of said wedge and the length of said column being substantially parallel, said wedge terminating above the bottom container in said stack of containers whereby when said second extendable arm is extended and said stack of containers is pressed against said wedge, the bottom container in the stack of containers will not be pressed against the wedge and the lip of the bottom container will extend in the direction opposite said second extendable arm further than the lips of the other containers in said stack of containers; and

(d) a third extendable arm operatively associated with said hollow column whereby said third extendable arm may extend to contact said bottom container in said stack of containers, whereby said bottom container is separated from said stack of containers.

5,024,049

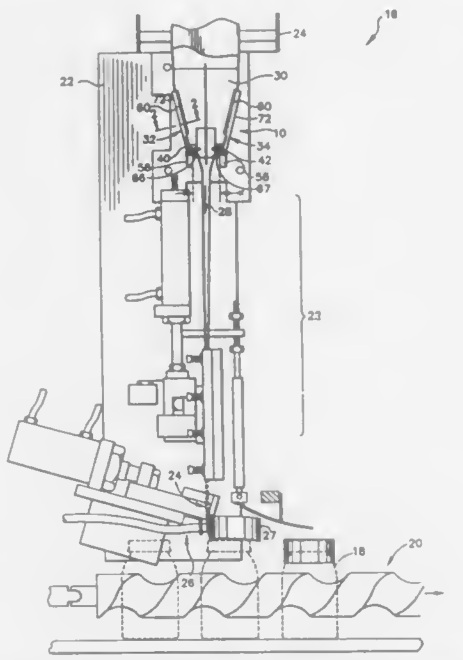
BAND GUIDING AND FORMING ASSEMBLY FOR BANDING APPARATUS

Eric W. Strub, 235 Rockhill Rd., Vista, Calif. 92084, and Kenneth M. Strub, 25670 Jesmond Dene, Escondido, Calif. 92026

Continuation-in-part of Ser. No. 160,848, Feb. 26, 1988, Pat. No. 4,914,893. This application Feb. 20, 1990, Ser. No. 481,965

Int. Cl.^{5} B65B *9/13*

U.S. Cl. 53—585 15 Claims



1. A band guiding and forming apparatus for opening and smoothing flattened tubular banding material having opposing creased lines, comprising:

guide means for opening out and guiding tubular banding material along a travel path;

the guide means including inner guide means extending along the travel path for positioning inside the tubing material, an outer opposed guide means on opposite sides of the travel path for supporting the inner guide means and for guiding opposed portions of the tubing walls between the inner and outer guide means;

the inner guide means comprising a wedge-like member having a first pair of opposed tapering portions of substantially continuously and uniformly reducing width extending along substantially the whole length of the wedge-like member in the travel direction contacting the band within said crease lines and a second pair of opposed tapering portions extending alongside the first pair of tapering portions in a plane perpendicular to said first pair and of substantially continously and uniformly increasing width extending along substantially the whole length of the wedge-like member in the travel direction for gradually spreading and opening the tubing material, and a pair of opposed inner pinch rollers, each inner pinch roller being mounted on a respective one of said first pair of opposed tapering portions for rotatably engaging respective opposed interior surface portions of said crease lines; and

the outer guide means including a pair of opposed outer pinch rollers located on opposite sides of the travel path adjacent respective ones of said inner pinch rollers for rotatably engaging opposite surface portions of said banding material and pressing said portions between respective inner and outer pinch rollers for flattening and smoothing said crease lines between said rollers.

5,024,050

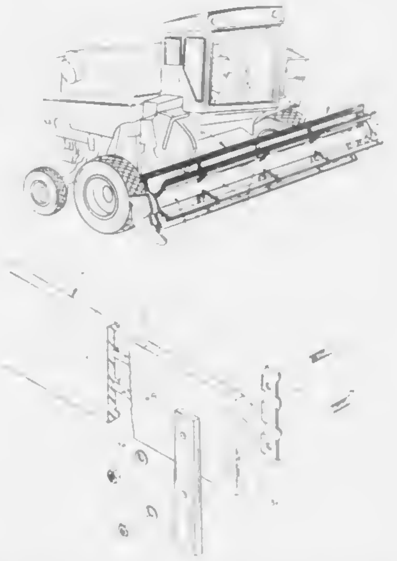
REEL BAT

Monte Leidenix, 2100 S. 29th St., Apt. 118, Grand Forks, N. Dak. 58201

Filed Feb. 14, 1990, Ser. No. 479,625

Int. Cl.^{5} A01D *57/02*

U.S. Cl. 56—220 5 Claims



1. In combination with a harvester having a harvester reel mounted thereon which is comprised of a plurality of reel arms extending radially outwardly from a central rotatable shaft, comprising:

a plurality of reel bats removably secured to said reel arms;

each of said reel bats comprising an elongated, generally rectangular plastic member having front and back surfaces, a leading edge and a trailing edge, and at least one longitudinally extending reinforcing member embedded in said plastic member extending substantially the entire length thereof;

said reel bat having at least one forwardly presented ridge created by the presence of said at least one reinforcing member;

an upper and lower ridge projecting forwardly from each reel bat front surface, parallel to said at least one ridge created by the reinforcing member;

means for removably securing each said reel bat between at least a pair of said reel arms with the back surface of the bats abutting a forward face of the reel arms; and

said means for removably securing said bats including:

an elongated spacer member extending transversely across the front surface of said bat, with depressions therein adapted to receive said upper and lower ridges and the at least one ridge created by the reinforcing member, and

connector means for removably connecting said bats between said reel arms and spacer members.

5,024,051

BOLTED DOUBLE SICKLE CUTTERBAR

Emmett F. Glass, Akron; Ernest A. Schoeneberger, and Stanley J. Makofka, both of New Holland, all of Pa., assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Jul. 2, 1990, Ser. No. 547,710

Int. Cl.^{5} A01D *34/14*

U.S. Cl. 56—297 15 Claims

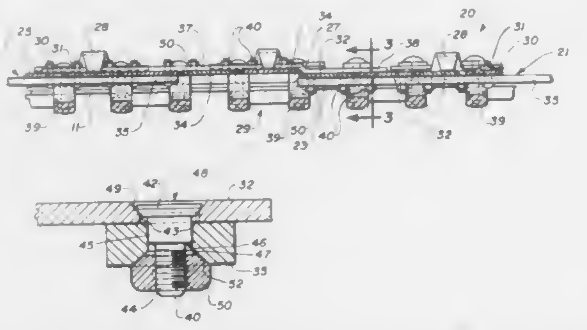
10. A fastener for attaching an overlap sickle section to a support bar of a double sickle reciprocating cutterbar, comprising:

a head portion forming one end of said fastener and being engageable with said overlap knife section having a hole

VOL
1127
ISS
3
JE
18
1991
UMI

therethrough adapted to permit said head portion to be countersunk into said overlap knife section;

a threaded portion forming the opposing end of said fastener and being adapted for engagement with a nut to effect a clamping of said overlap knife section and said support bar between said head portion and said nut, thereby detachably affixing said overlap knife section to said support bar; and



an intermediate portion positioned between said head portion and said threaded portion and having a non-circular cross-sectional configuration, said intermediate portion being smaller than the hole through said overlap knife section so that said intermediate portion can pass through said overlap knife section to be engageable with a corresponding opening through said support bar such that said fastener is restricted from rotating relative to said support bar when engaged therewith.

5,024,052
APPARATUS FOR HARVESTING BERRIES ON LOW PLANTS

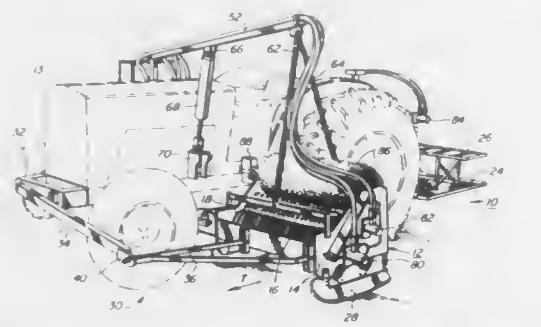
R. D. Bragg, and H. Lloyd Weatherbee, both of Collingwood, Nova Scotia, Canada, assignors to Doug Bragg Enterprises Ltd., Canada

Continuation-in-part of Ser. No. 753,524, Jul. 10, 1985, Pat. No. 4,862,683. This application May 23, 1988, Ser. No. 197,311

The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.

Int. Cl.^{5} A01D *45/22*

U.S. Cl. 56—330 5 Claims



1. Apparatus for harvesting berries on low plants especially strawberries comprising: a picking head including a frame movable along the ground over the crop of berries in a path of travel and a reel mounted on the frame for rotation about an axis transverse to the circumferentially spaced rows of tines thereon adapted to move and to enter into the berry plants and to engage the berries and to strip them from the plants, cam means for moving said tines relative to said reel to facilitate the stripping action and to facilitate deposit of the berries into the reel, conveyor means to carry the berries outwardly of the reel and thence into a container, and wherein said reel is rotated in a direction such that free end portions of those tines closest to the ground point in the forward direction of harvester travel, with the cam means and the tine shapes being selected to that, during use, at least said free end portions of the tines can travel generally parallel to the ground for a relatively extended distance to assist in recovery of berries lying close to the ground and further including a main rotary brush and drive means therefor for engaging said tines and removing debris therefrom adjacent an upper portion of the path of tine travel, and auxiliary brush means located in advance of the main brush means for engaging the successive rows of tines and sweeping away any berries that cling to the outside portions of the tines to sweep them inwardly so that they may be caught by the next following set of tines and then deposited into the conveyor means.

5,024,053
AGRICULTURAL MACHINE HAVING AT-LEAST ONE ROTOR FOR MOVING PRODUCTS LOCATED ON THE GROUND

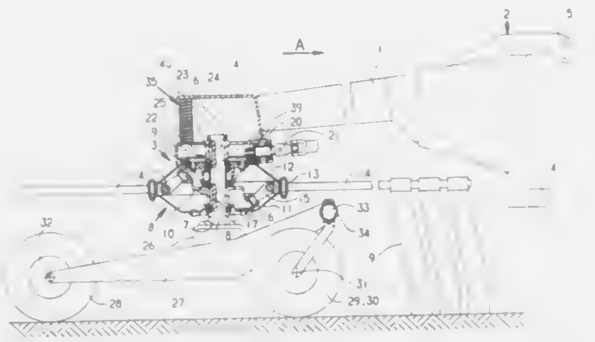
M. Jerome Aron, Dossenbeim - sur - Zinsel, France, assignor to Kuhn S.A., Saverne, France

Filed Mar. 15, 1990, Ser. No. 493,825

Claims priority, application France, Mar. 20, 1989, 89 03804

Int. Cl.^{5} A01D *78/10*

U.S. Cl. 56—367 14 Claims



1. Agricultural machine movable in a direction of advance and having a frame adapted to be hooked to a drive tractor, said agricultural machine comprising:

at least one rotor having work tools attached thereto for moving products located on the ground and comprising a control cam for controlling said tools, said at least one rotor being connected to the frame by a hinge pin located at its upper part, said pin being substantially perpendicular to the direction of advance of the machine, said rotor further comprising a central support pin guided in rotation in said rotor so that it can turn at least 180° around its longitudinal axis, said control cam being fixed on said central support pin;

at least one front and at least one rear carrying wheels positioned on at least two lines offset with respect to one another in the direction of advance of the machine, wherein said carrying wheels are connected to the central support pin and move on the ground during work; and

a pair of actuating means positioned between said frame and said central support pin for acting one or the other on said support pin as a function of the direction of advance of the machine to make said rotor pivot around said hinge pin, wherein, in a work position, a load supported by at least one of said front wheels, relative to the direction of advance, is decreased and at least one of the rear wheels, relative to the direction of advance, is pushed to the ground.

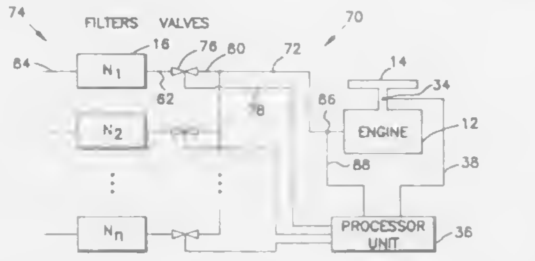
5,024,054
ENGINE EXHAUST SYSTEM WITH SEQUENTIAL LOADING OF MULTIPLE FILTERS

Marty A. Barris, Lakeville, and Wayne M. Wagner, Apple Valley, both of Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.

Continuation of Ser. No. 456,334, Dec. 26, 1989, abandoned. This application Oct. 31, 1990, Ser. No. 607,601

Int. Cl.^{5} G01N *3/02*

U.S. Cl. 60—274 9 Claims



1. A method of selecting among multiple filters for placement in an exhaust stream of an engine for loading with particulates and for removal from said stream for regeneration, comprising the steps of:

placing a first filter in said stream;

sensing backpressure in said stream between said filter and said engine;

placing a second filter in said stream when said backpressure is greater than a first predetermined value;

sensing air flow to said engine;

removing said second filter from said stream when said air flow is less than a second predetermined value.

5,024,055
DEVICE FOR DETECTING COMBUSTION CONDITIONS IN COMBUSTORS

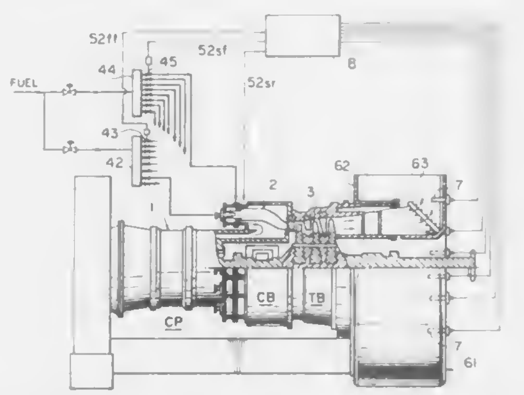
Isao Sato; Seiichi Kirikami; Akira Shimura; Fumiyuki Hirose; Hiroshi Inose; Haruo Urushidani, and Osamu Arai, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 4, 1989, Ser. No. 389,746

Claims priority, application Japan, Aug. 9, 1988, 63-198622

Int. Cl.^{5} F02C *9/16, 9/28*

U.S. Cl. 60—39.27 10 Claims



1. A device for detecting combustion conditions in a plurality of combustors in a gas-turbine apparatus including said combustors and a gas turbine driven by combustion gas from said combustors, said device comprising:

means disposed on a downstream side of said gas turbine for measuring a concentration of at least one unburnt component in said combustion gas;

means for obtaining a distribution pattern of said measured concentration; and

means for examining said obtained distribution pattern to detect combustion conditions in said combustors.

5,024,056
DUAL-CIRCUIT BRAKE BOOSTER

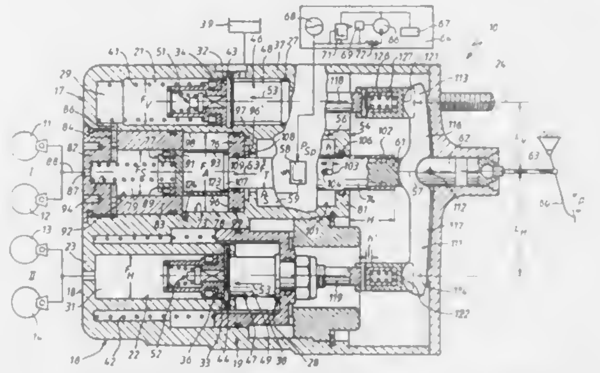
Milorad Zivkovic, Filderstadt, Fed. Rep. of Germany, assignor to Daimler-Benz, Fed. Rep. of Germany

Filed Dec. 19, 1988, Ser. No. 286,079

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1987, 3743190

Int. Cl.^{5} B60T *13/12*

U.S. Cl. 60—550 12 Claims



1. A brake apparatus for the pressure supply of brakes of a hydraulic two-circuit brake installation of a road vehicle, comprising two static brake circuits, outlet pressure spaces, the static brake circuits being operatively connected with respective ones of the outlet pressure spaces, brake force servo means including servo-piston means, two master cylinder pistons associated with respective ones of the two circuits, a brake pressure build-up taking place in said outlet pressure spaces as a result of displacement in the same direction of the servo-piston means and of the master cylinder pistons, the servo-piston means experiencing a pressure build-up displacement only when the brake force servo means operates properly, and the master cylinder pistons experiencing a pressure build-up displacement when the brake force servo means is operable and inoperable in which case an increase of the piston displacement travel and a pressure value correlated therewith occurs in relation to a predetermined magnitude of an actuating acting force engaging at the master cylinder pistons, the servo-piston means including an annular piston with a central opening, a plunger piston extending through the annular piston in the axial direction and being displaceable pressure-tight in the central opening, the plunger piston including an entrainment flange, the annular piston being urged into unilateral abutment with the entrainment flange of the plunger piston by pressure actuation of an actuation surface of the annular piston with an outlet pressure of the brake force servo means, the plunger piston being coupled for movement with a force transmitting means for introducing a component of the actuating force resulting from pedal actuation in the sense of a pressure build-up displacement to act on the master cylinder pistons, the master cylinder pistons being of twin-type construction and arranged in a common housing with their central longitudinal axis extending substantially parallel to one another, the brake force servo means being arranged between the two master cylinder pistons with its central axis extending parallel to the master cylinder piston axes, the force transmission means including a moment-compensated rocker means for the transmission both of the pedal force and of an auxiliary force produced by the brake force servo means, the rocker means being pivotally supported at a pressure member displaceable in the axial direction about an axis perpendicular to the axial plane, and the plunger piston being operatively coupled for movement with the pressure member by a control piston which is axially displaceable relative to the plunger piston within a range limited to a small fraction of the maximum pressure build-up stroke of

VOL
1127
ISS
3
JE
18
1991
UMI

the master cylinder pistons, said range being at least approximately equal to a closing stroke of central valves operatively arranged in a base position of respective ones of the two master cylinder pistons such that the outlet pressure spaces associated with the respective ones of the master cylinder pistons are communicatingly connected with follower spaces thereof, and the rocker means including rocker arms which are supported by a respective support spring operatively connected with respective ones of the two master cylinder pistons, wherein the support springs have a spring travel also approximately about equal to the closing stroke of the central valves.

5,024,057

EXHAUST-DRIVEN ELECTRIC GENERATOR SYSTEM FOR INTERNAL COMBUSTION ENGINES

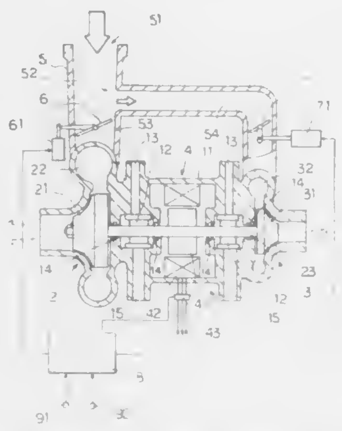
Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Jun. 23, 1989, Ser. No. 370,877

Claims priority, application Japan, Jun. 29, 1988, 63-161773

Int. Cl.^{5} F01D *15/10*

U.S. Cl. 60—597 8 Claims



1. An electric generator system drivable by the energy of exhaust gases emitted from an internal combustion engine, comprising:

two turbines drivable by the energy of exhaust gases from the internal combustion engine, said turbines having respective turbine scrolls;
a turbine shaft interconnecting said two turbines;
an electric generator mounted on said turbine shaft;
first and second exhaust gas inlet pipes having ends connected respectively to said turbine scrolls and having other ends adapted to be connected to an exhaust pipe of the internal combustion engines;
switching means for controlling communication between said first and second exhaust gas inlet pipes and the exhaust pipe of the internal combustion engine;
detecting means for detecting the rotational speed of said turbine shaft; and
control means for controlling said switching means based on a detected signal from said detecting means.

5,024,058

HOT GAS GENERATOR

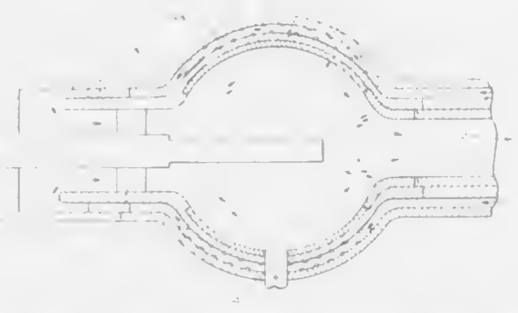
Jack R. Shekleton, San Diego, and Robert W. Smith, Lakeside, both of Calif., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 8, 1989, Ser. No. 447,654

Int. Cl.^{5} F02C *3/14*

U.S. Cl. 60—752 21 Claims

1. A hot gas generator, comprising:
a vessel having a wall defining narrow, spaced apart inlet and outlet ends interconnected by a relatively wide combustion chamber;
a liner positioned within said wall so as to be disposed substantially entirely about said combustion chamber, said liner being positioned relative to said wall to define means for controlling heat transfer from said combustion chamber through said liner and said wall, said heat transfer controlling means being adapted to limit stress on said liner through a preselected temperature range;
said heat transfer controlling means including a relatively uniform gap between said wall and said liner for controlling heat transfer from said combustion chamber through said liner and said wall entirely throughout said preselected temperature range, said liner being adapted to thermally expand under heat to close said gap at a preselected temperature with said gap being selected to accommodate thermal outward expansion of said liner in a manner producing relatively little stress thereon;
an oxidant inlet port at said inlet end of said wall; and
a fuel discharge port for directing fuel into said combustion chamber.



5,024,059

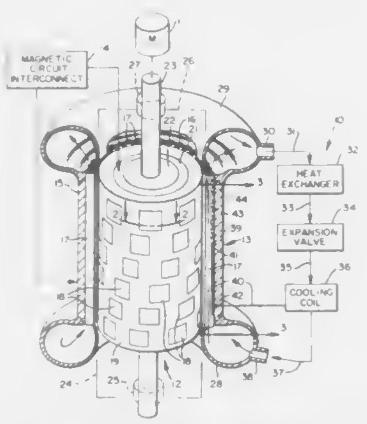
ELECTRONIC FORCE IONIZED GAS AIR CONDITIONING SYSTEM COMPRESSOR

Jerry D. Noble, 883A Dublin, Richardson, Tex. 75080

Filed Jun. 20, 1990, Ser. No. 540,762

Int. Cl.^{5} F25B *21/00*

U.S. Cl. 62—3.1 20 Claims



1. An ionized gas drive system comprising: gas passage means; multiple magnet elements mounted in a rotational carrier with the multiple magnet elements mounted in mutually spaced relation and in common polarity; drive means connected to drive said rotational carrier in rotation; a magnetic circuit with a gap through which said gas passage means extends substantially at right angles to the rotational direction of said rotational carrier and movement of the magnetic field lines of force emanating from common poles of the multiple magnet elemets and extended through the gap of the magnetic circuit.

5,024,060

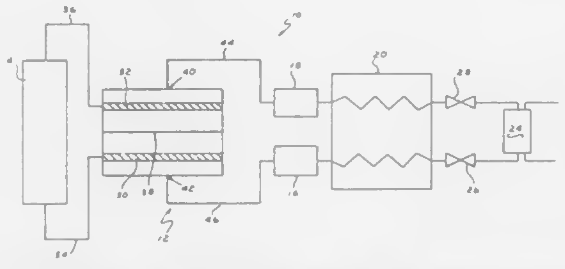
JOULE-THOMSON REFRIGERATION CYCLE EMPLOYING A REVERSIBLE DRIVE ELECTROCHEMICAL COMPRESSOR

Raymond B. Trusch, South Windsor, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jun. 27, 1990, Ser. No. 544,551

Int. Cl.^{5} F25B *19/02*

U.S. Cl. 62—51.2 13 Claims



1. A refrigeration cycle comprising: an electrochemical compressor having a low-pressure side, a high-pressure side and an electrolyte membrane between the low-pressure side and the high-pressure side; a working fluid having an electrochemically active component and a condensable component; a reverse-polarity power source for driving the electrochemical compressor for receiving working fluid at the low-pressure side, compressing the working fluid and delivering the compressed working fluid to the high-pressure side; a first regenerable sorbent bed downstream of the high-pressure side for receiving the compressed working fluid from the compressor and absorbing the condensable component therefrom; a second regenerable sorbent bed upstream of the low-pressure side for replacing the condensable component into the working fluid prior to the working fluid being fed to the low-pressure side of the compressor; a heat exchanger located between the first and second regenerable sorbent beds; a first thermal expansion means provided between the first regenerable sorbent bed and the heat exchanger; a second thermal expansion means provided between the second regenerable sorbent bed and the heat exchanger; and means for selectively reversing the polarity of the power source and correspondingly the flow of working fluid through the refrigeration cycle, thereby insuring that the electrolyte membrane is constantly wetted by the condensable component.

5,024,061

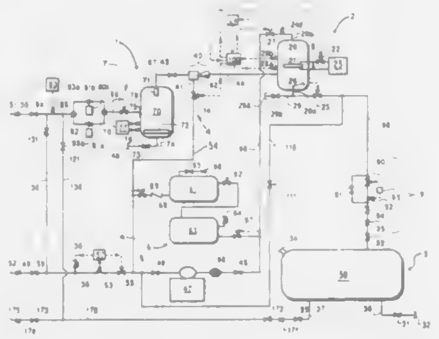
RECOVERY PROCESSING AND STORAGE UNIT

Richard A. Pfeil, Jr., Arlington, Va., and Charles M. Pirrera, Perry Hall, Md., assignors to Terrestrial Engineering Corporation, Arlington, Va.

Filed Dec. 12, 1989, Ser. No. 448,812

Int. Cl.^{5} F25B *45/00*

U.S. Cl. 62—77 110 Claims



1. A refrigerant recovery processing and storage unit, said unit recovering refrigerant fluid from a refrigeration system, said unit comprising:
a gas motivating and pressurizing means for supplying pressurized motivating gas to an inlet of a refrigeration system and for creating a substantial vacuum at an outlet of the refrigeration system, said motivating gas flowing through the refrigeration system due to the pressure difference between the inlet and the outlet and forcing refrigerant to flow from the outlet,
and a storage means for storing the refrigerant fluid.

5,024,062

MULTISTAGE ISOTHERMAL AIR DEHUMIDIFICATION

Lars G. Hellman, Norrtullsgatan 10, S-113 27 Stockholm, Sweden

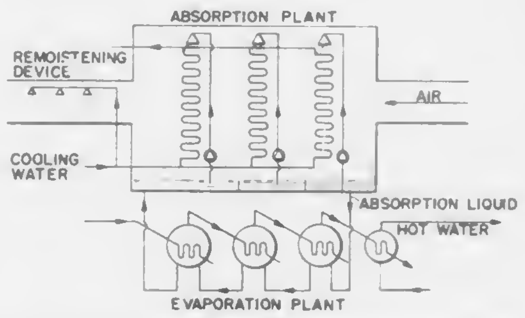
PCT No. PCT/SE88/00555, § 371 Date May 16, 1990, § 102(e) Date May 16, 1990, PCT Pub. No. WO89/04713, PCT Pub. Date Jun. 1, 1989

PCT Filed Oct. 21, 1988, Ser. No. 488,019

Claims priority, application Sweden, Nov. 20, 1987, 8704598

Int. Cl.^{5} F25D *17/06*

U.S. Cl. 62—92 4 Claims



1. A process for conditioning a gas containing the vapors of a volatile substance, which comprises:
placing a gas, containing the vapors of a volatile substance, sequentially in contact with successively more concentrated solutions of an absorption liquid on cooled surfaces, such absorption liquid consisting of a solution of said volatile substance and at least one non-volatile substance,
isothermally absorbing the vapors in the gas into the absorption liquid upon such contact, thereby diluting the concentration of the absorption liquid,
concentrating the diluted absorption liquid by multi-stage evaporation in a multi-stage evaporate, and
recycling the concentrated absorption liquid back to the cooled surfaces.

5,024,063

BRANCHED GAX ABSORPTION VAPOR COMPRESSOR

Donald C. Erickson, 1704 S. Harbor La., Annapolis, Md. 21401

Filed May 11, 1990, Ser. No. 521,994

Int. Cl.^{5} F25B *15/00*

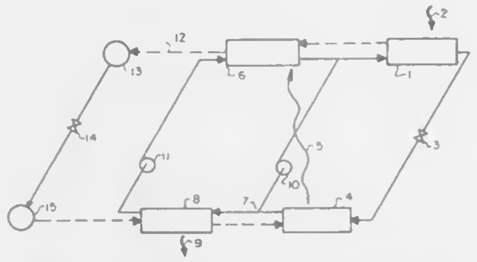
U.S. Cl. 62—101 17 Claims

12. A thermally activated process for at least one of compressing a vapor, heating, and cooling comprising:
a) absorbing said vapor into a circulating absorbent liquid over an absorbing temperature range,
b) cooling the absorbent liquid in the lower temperature portion of said absorbing step with an external source of cooling;
c) desorbing compressed vapor from said circulating absorbent liquid over a desorbing temperature range;
d) heating the absorbent liquid in the higher temperature portion of said desorbing step with an external source of heating;
e) heating the absorbent liquid in the lower temperature portion of said desorbing step and cooling the absorbent

VOL
1127
ISS
3
JE
18
1991
UMI

liquid in the higher temperature portion of said absorbing temperature range by exchanging heat there-between;

f) circulating a major fraction of a liquid absorbent comprised of absorbent component and condensed vapor sequentially through all of both of said absorbing and desorbing steps; and



g) circulating a minor fraction of said liquid absorbent between only the higher temperature portion of said absorbing step and the higher temperature portion of said desorbing step, whereby the amount of absorbent component circulated to those portions exceeds that circulated to the remaining portions.

5,024,064
METHOD OF OPERATING ADSORPTION REFRIGERATOR

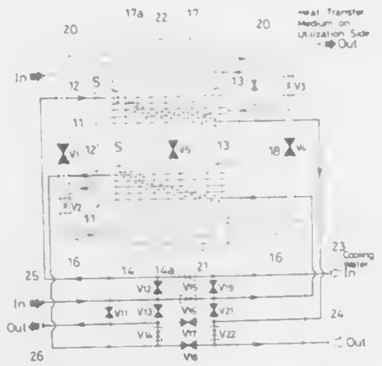
Yasuo Yonezawa, Nara; Toshiya Ohnishi, Sakai; Shin-ichi Okumura, Ohtsu; Akiyoshi Sakai, Toyonaka; Hiroki Nakano; Masao Matsushita, both of Neyagawa; Atsushi Morikawa, and Motoshi Yoshihara, both of Yawata, all of Japan, assignors to Nishiyodo Air Conditioner Co., Ltd., Osaka, Japan

Filed Feb. 14, 1990, Ser. No. 479,942

Claims priority, application Japan, Feb. 28, 1989, 1-48735

Int. Cl.^{5} F25B *17/00*

U.S. Cl. 62—106 6 Claims



1. A method of operating an adsorption refrigerator comprising two adsorption columns each housing therein a solid adsorbent and heat transfer tubes and sealed with a refrigerant, a condenser, an evaporator, and paths for refrigerant interconnecting the adsorption columns to the condenser and the evaporator so that the refrigerant may be circulated through the adsorption columns, which method comprises changing over periodically alternately adsorption and desorption phases between the adsorption columns in such a manner that the one adsorption column and the other adsorption column are at mutually different phases and that a heat transfer medium on a heat source side and a coolant are alternately routed through the heat transfer tubes of the one adsorption column and the other adsorption column in response to desorption and adsorption phases; and further comprises, shortly before one cycle of an adsorption and a desorption phases is terminated, shutting off the paths for refrigerant; further advancing the adsorption and desorption phases between the adsorption columns while continuing to supply the heat transfer medium and the coolant, thereby to finish the cycle of adsorption and desorption phases; and subsequently changing-over to a next cycle of just opposite phases.

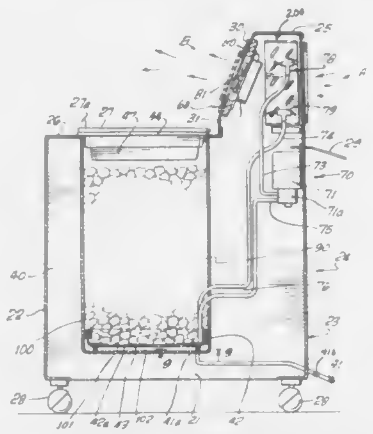
5,024,065
AIR CONDITIONING SYSTEM FOR CONFINED SPACES

David D. Barrett, P.O. Box 9516, Pompano Beach, Fla. 33075

Filed Mar. 13, 1986, Ser. No. 839,221

Int. Cl.^{5} F25D *3/02*

U.S. Cl. 62—285 7 Claims



1. An apparatus for cooling a confined space such as within a closed surveillance vehicle which does not betray the cooling operation within the vehicle through noise, electronic emission or liquid dripping comprising:

a cabinet having a front wall, a pair of side walls and a rear wall;

an ice and water containing chamber within said cabinet insulated from said cabinet walls;

a pan including heat conducting material having a multiplicity of fluid conduits, said pan mounted in the adjacent floor area of said chamber, said fluid conduits disposed within said ice and water containing chamber so that said fluid conduits are substantially surrounded by ice and water within said ice containing chamber thereby efficiently cooling said fluid conduits in said pan and cooling fluid within said fluid conduits;

an intake conduit and an outlet conduit connected to said pan fluid conduits;

a pump for circulating a fluid connected to said outlet conduit;

a heat exchanging radiator unit connected to said inlet conduit;

second fluid conduit connected to said pump and said radiator;

means to draw air through said radiator unit and pass it into the confined space within said surveillance vehicle;

said cabinet including a radiator housing means, said radiator being mounted within said radiator housing means;

means for storing food within said ice and water chamber;

means for controlling operation of said pump;

means for controlling the operation of said air drawing means connected to said air drawing means.

5,024,066
INSTALLATION FOR THE MAKING OF FOOD PRODUCTS, IN PARTICULAR EXPANDED FOOD PRODUCTS, SUCH AS ICE CREAM

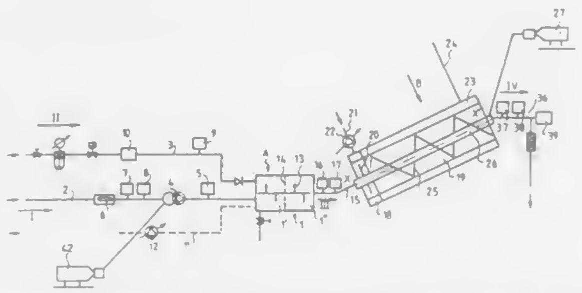
Jean-Jacques Goavec, Alencon, France, assignor to Goavec S.A., Alencon, France

Filed Sep. 22, 1988, Ser. No. 247,919

Int. Cl.^{5} A23G *9/20*

U.S. Cl. 62—306 24 Claims

1. An installation for the making of food products, in particular expanded food products such as ice cream, comprising a freezing system (B) to cool and homogenise the product before transportation to a packing system, this freezing system being made up of a cylindrical chamber forming a double-casing, inside which a refrigerating fluid circulates, and agitating means, which is mounted for rotation inside the cylinder, the



installation characterized in that the agitating means in the cylindrical chamber comprises an Archimedes' screw (25) the surface of which is grained and which is provided on its periphery with scraper knives (32) aligned in a longitudinal direction of the screw and touching an internal surface of the cylindrical chamber.

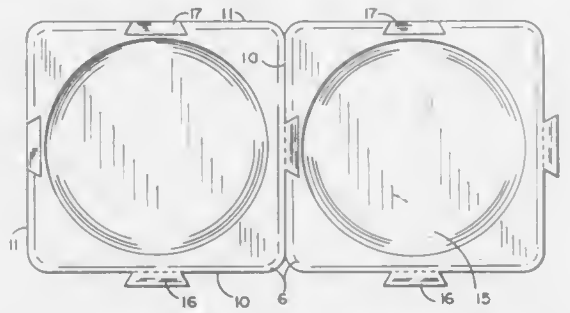
5,024,067
FIT AND COOL BEVERAGE CONTAINER

Simeon E. Maier, II, 1750 92nd St., Caledonia, Mich. 49316

Filed Aug. 30, 1989, Ser. No. 400,805

Int. Cl.^{5} F25D *3/08*

U.S. Cl. 62—457.4 1 Claim



1. A beverage container cooler comprising a shell constructed of plastic comprising an inner and outer wall, a liquid contained in the space between the inner and outer wall adapted to be frozen prior to use, A circular opening in the shell of a size to contain a beverage container, the exterior of said shell having four sides of equal length in the shape of a square, two of the adjoining sides containing a recessed dovetail joint slot and the other two adjoining sides containing protruding dovetails joints so that similar containers can be easily connected and removed.

5,024,068
NEEDLE PICKER RELEASING DEVICE

Borivoj Fucík, Markvartice; Milan Petránek, Starec, and Frantisek Smítal, Trebíc, all of Czechoslovakia, assignors to Elitex Koncern Textiln, Liberec, Czechoslovakia

Filed Oct. 5, 1988, Ser. No. 254,345

Claims priority, application Czechoslovakia, Oct. 6, 1987, 7169-87

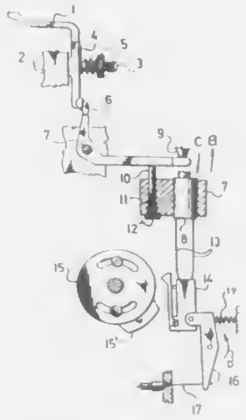
Int. Cl.^{5} D04B *9/20*

U.S. Cl. 66—53 2 Claims

1. Needle picker releasing device in a circular knitting machine for the production of hosiery goods and the like said device for the releasing of a needle picker from a non-operative into operative position, comprising

an electromagnet kinematically connected with the picker so that energizing the electromagnet changes the position of blocking means to release the picker to allow rocking motion;

a microswitch for energizing said electromagnet, said microswitch being actuated by a rotating cam;



said microswitch being mounted on a switch lever such that said microswitch is movable into and out of a path of said cam.

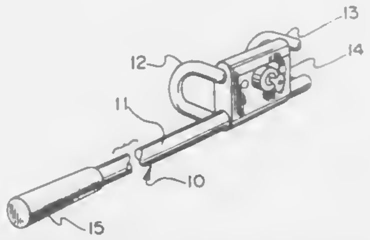
5,024,069
ANTI-THEFT LOCKING APPARATUS FOR STEERING WHEELS

Edwin J. Hull, Jr., 1652 Sheridan Rd., South Euclid, Ohio 44121, and Charles R. Johnson, 55 S. Chillicothe, Aurora, Ohio 44202

Filed Aug. 16, 1990, Ser. No. 568,216

Int. Cl.^{5} B60R *25/02*

U.S. Cl. 70—209 9 Claims



1. A lock apparatus for locking the steering wheel of a vehicle and limiting its rotation, said apparatus comprising: an elongate member; hook means fixedly secured to the elongate member for extending around a portion of the steering wheel of an automobile, said hook means extending transversely of the elongate member; locking means for cooperating with the hook means to secure the elongate member to the steering wheel, said locking means being pivotally mounted on the elongate member and being movable to a first position where it cooperates with a hook means and away from the first position to release the steering wheel, the axis of rotation of the locking means being disposed longitudinally of the elongate member.

5,024,070
LOCK MOUNTING PAD

George F. Toledo, Fall Brook, Calif., assignor to Thomas Industries, Inc., Los Angeles, Calif.

Filed Mar. 8, 1990, Ser. No. 490,443

Int. Cl.^{5} E05B *9/08*

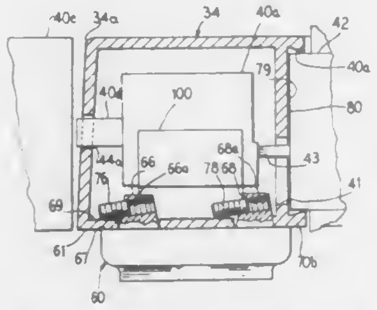
U.S. Cl. 70—370 23 Claims

1. A locking system for use with a door having a door stile with a wall defining an exterior surface and an interior surface

VOL
1127
ISS
3
JE
18
1991
UMI

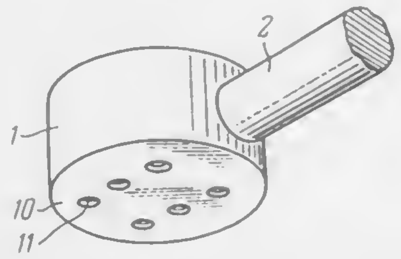
planarly parallel to said exterior surface with at least one aperture extending through said wall, and a passage through a lateral face of said door stile, said lateral face being perpendicular to said exterior surface, comprising:

a mounting pad comprising a body having at least one anchor portion projecting therefrom and extending through said aperture;



at least one rotational member carried by said anchor portion and having a portion engageable with said interior surface upon rotation of said member, to clamp said body against said wall, said member rotated by insertion of a tool into said passage.

5,024,071
ÇODING ASSEMBLY FOR LOCKLIKE DEVICES
David I. Shafirkin, ulitsa Egerskaya, 5, korpus 1, kv. 110, Moscow, U.S.S.R.
Filed Nov. 1, 1989, Ser. No. 430,530
Claims priority, application U.S.S.R., Oct. 14, 1988, 4493189
Int. Cl.⁵ E05B *35/04*
U.S. Cl. 70—387 **10 Claims**



1. A coding assembly of a locklike device, comprising:

a body;

a main cavity in said body;

additional cavities in said body, communicating with said main cavity, the axis of each of said additional cavities being perpendicular to the longitudinal axis of said main cavity;

securing pins, each of which is arranged for limited longitudinal displacement in each of said respective additional cavities, and wherein each of said securing pins moves within said respective additional cavities by gravity;

coding recesses, each of which is provided in the side surface of the respective one of said securing pins;

a removable cross bar;

a homing head of said cross bar designed to be received in said main cavity of said body and to interact with said securing pins;

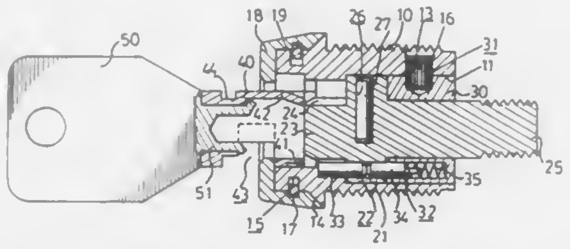
at least one longitudinal rib provided on the side surface of said homing head and having a cross-sectional profile corresponding to the cross-sectional profile of said coding recesses, the depth of which corresponds to the height of said longitudinal rib;

at least one additional recess provided in the side surface of each of said securing pins and having a cross-sectional profile corresponding to the cross-sectional profile of said longitudinal rib, the depth of each additional recess being smaller than the height of said longitudinal rib;

a key;

coding pins of said key, designed to interact with said securing pins and to allow free movement of said homing head out of said body owing to their location in one plane passing through the longitudinal axis of said homing head and the longitudinal rib thereof.

5,024,072
TUMBLER PIN LOCK SYSTEM
Miko Lee, No. 5, Li Hsing Lane, Chung Cheng Rd., Hsin Chuang City, Taipei Hsien, Taiwan
Filed Aug. 28, 1990, Ser. No. 573,701
Int. Cl.⁵ E05B *19/02, 27/08*
U.S. Cl. 70—491 **4 Claims**



1. A tumbler pin lock system for computers comprising a lock mechanism and a key, said lock mechanism comprising an outer tubular casing mounted to a frame of said computer, said tubular casing having an eccentric through hole for rotatably receiving a locking spindle, said locking spindle comprising a driver pin sleeve having a set of bore holes each for receiving a driver pin, a rotating shaft protruding from a first side of said driver pin sleeve, a protrusion with a keyway slot protruding from a second side of said driver pin sleeve, a tumbler sleeve being provided on said rotating shaft next to said first side of said driver pin sleeve and being fixed to said tubular casing by an anchoring means, said tumbler sleeve having a distributed annular set of blind holes each for receiving a tumbler spring and a tumbler pin and being alignable with said bore holes in said driver pin sleeve;

said key comprising a flattened key handle and a substantially cylindrical portion, a set of annularly disposed semi-cylindrical slots being formed on an outer periphery of a first end of said cylindrical portion, each of a proper depth to engage with corresponding driver pins disposed in said bore holes in said driver sleeve, a key guide lug being formed inside said set of semi-cylindrical slots to engage with said keyway slot to rotate said rotating shaft relative to said tumbler sleeve to provide a locking or unlocking function, a cutout portion being formed in a middle portion of said cylindrical portion, a groove being formed in an outer periphery of a rear portion of said cylindrical portion, a retaining flange being on an inner peripheral wall of said cylindrical portion for attaching an engaging piece of said flattened key handle in said cylindrical portion to form a complete key.

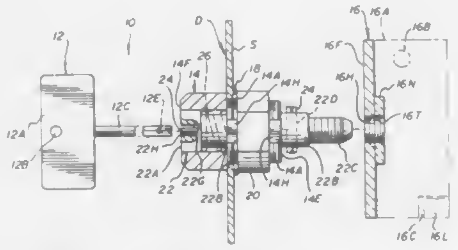
5,024,073
BEZEL LOCK, KEY AND RECEIVER ASSEMBLY
Russell M. Lloyd, York, Pa., assignor to Rusken Machine & Tool Service, York, Pa.
Filed Jan. 16, 1990, Ser. No. 465,315
Int. Cl.⁵ E05B *27/00*
U.S. Cl. 70—491 17 Claims

1. A lock assembly, comprising:

a. a lock body having a hole longitudinally therethrough;

b. a plunger arranged longitudinally in the hole through the lock body, said plunger having a head portion and a rear portion;

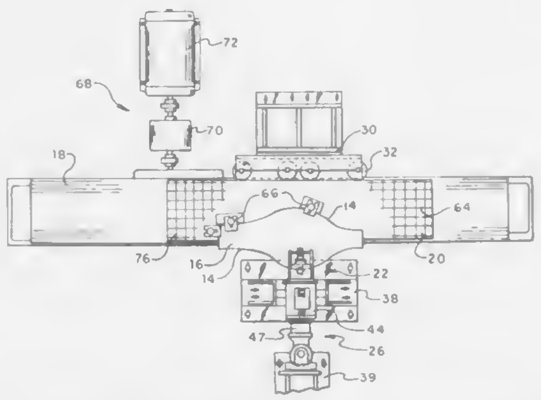
c. a single spring means, coiled around the plunger and arranged longitudinally in the hole inside the lock body, for pushing the head portion of the plunger so that the plunger is pulled back into the lock body to an open position;



d. key means, engagable with the head portion of the plunger, for turning the plunger to a closed position; and

e. plate means, engagable with the rear portion of the plunger, for receiving the rear portion of the plunger in the closed position.

5,024,074
APPARATUS AND METHOD FOR SELECTIVELY FORMING A THICKENED EDGE ON A PLATE OF FORMABLE MATERIAL
Dennis L. Blunier, Danvers; Phillip J. Shankwitz; Maurice L. Caudill, both of Peoria; Ronald C. Bowar, Chillicothe, and Dwight E. Aussieker, Varna, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.
Filed May 19, 1989, Ser. No. 354,187
Int. Cl.⁵ B21D *19/00, 19/04*
U.S. Cl. 72—16 20 Claims



1. A method of forming a thickened edge on a plate of formable material having a non-linear edge by working the non-linear edge of the plate into a prescribed thickness and shape, comprising:

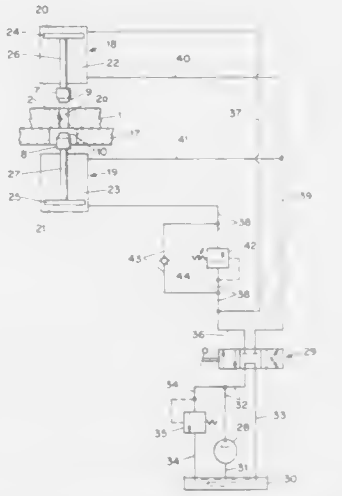
holding the plate and engaging the non-linear edge of the plate with a forming apparatus;

applying force to the forming apparatus in one direction toward the non-linear edge and in a magnitude sufficient to form the thickened edge;

moving the plate and the forming apparatus transversely relative to each other in a direction cross-wise of the one direction; and

sensing the non-linear edge and varying the force placed against the non-linear edge applied by the forming apparatus so that the magnitude thereof is substantially constant in a direction perpendicular to the non-linear edge of the plate to form a generally uniform thickened edge.

5,024,075
METHOD OF DEFORMING TWO OPPOSITE EDGES OF A SINGLE WORKPIECE BY MACHINING, AND APPARATUS FOR IMPLEMENTING THE METHOD
Charles M. Simonetto, Le Perreux, France, assignor to Rene Tourolle et Fils (Societe A Responsabilite Limitee), France
Filed Jun. 16, 1989, Ser. No. 368,037
Claims priority, application France, Jun. 22, 1988, 88 08394
Int. Cl.⁵ B21J *1/06;* **B21D** *19/10*
U.S. Cl. 72—38 3 Claims



1. An apparatus for implementing the deformation of two opposite edges of a workpiece by machining, comprising:

a support frame, first and second pressurized fluid actuators mounted thereon in opposed relation, said actuators having a means for supporting and moving a machining tool, whereby the shape of the tool gives each edge a desired final shape by contacting the workpiece, said tools having shapes complementary to said desired deformed shapes for the two edges and wherein said complementary shapes of the tools correspond solely to the deformation zones of the two edges of the workpiece;

a workpiece support separate from the tools;

a source of fluid under pressure for actuating said actuators, said actuators having a working chamber and a retraction chamber for receiving the pressurized fluid and activating said actuators;

a selective pressurized fluid distribution valve connected between the working chambers of the first and second actuators, and the source of fluid under pressure, said working chambers being connected in parallel to the source of fluid under pressure via respective feed ducts so that effective connection of said working chambers via said selective distribution device causes simultaneous translation of the two tools; and

a delivery valve rated to supply fluid when the fluid reaches a predetermined pressure, the delivery valve being located on the feed duct to the working chamber of one of said two actuators, in such a manner that when said effective connection is obtained via the selective distribution device, fluid is initially fed to one of said working chambers and thereafter to both working chambers simultaneously.

5,024,076
TOOL FOR FORMING SHEET METAL
Richard L. Warner, 17301 Polk St. NE., Anoka, Minn. 55303
Filed Jan. 23, 1989, Ser. No. 299,892
Int. Cl.⁵ B21D *5/08, 17/04*
U.S. Cl. 72—211 **15 Claims**

1. A creasing tool for forming a crease line on a workpiece of sheet metal, and the like, and for simultaneously creating a

VOL
1127
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1991
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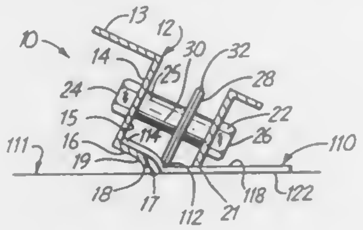
flange portion on the workpiece extending outwardly from the crease to the perimeter edge of the workpiece by rotation of the tool as it is extended along an edge of the workpiece, comprising: a first half and a second half, and the first half including a handle flange portion extending transversely from an upper end thereof for facilitating the rotating of the tool, and having guide means extending downwardly and transversely from the handle portion for cooperating with a perimeter edge of the workpiece for guiding the creasing tool along the perimeter edge and the first half having support means integral there with and extending transversely from the guide means in a direction generally opposite from the extension of the handle portion for supporting the workpiece perimeter edge, a creasing means secured between the first half and the second half for creasing the sheet metal and the creasing means having a peripheral edge for creasing the workpiece, and the peripheral edge extending adjacent the support means and the peripheral edge extending through a plane transverse to the plane of extension of the support means.



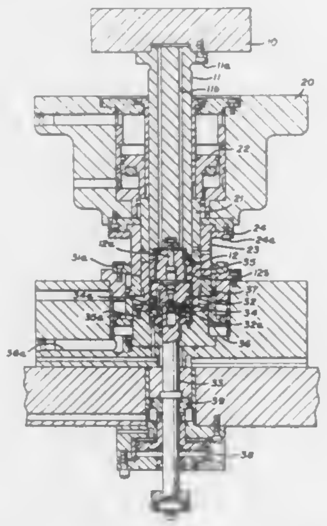
5,024,077
METHOD FOR FORMING CONTAINER WITH PROFILED BOTTOM

Joseph D. Bulso, Jr., Canton, and James A. McClung, North Canton, both of Ohio, assignors to Redicon Corporation, Canton, Ohio

Continuation-in-part of Ser. No. 141,826, Jan. 11, 1988, Pat. No. 4,826,382. This application Apr. 28, 1989, Ser. No. 345,477

Int. Cl.^{5} B21D *31/02, 51/44*

U.S. Cl. 72—336 **5 Claims**



1. A method of forming a container body from a supply of material at one forming station, comprising the steps of:
A) forming a blank from the supply of material;
B) drawing an inverted cup from said blank;
C) reverse drawing said inverted cup to form a flanged cup with an overlength sidewall which interconnects a flange with a bottom wall and forming a preliminary profile in the bottom wall of said inverted cup during the reversal; wherein step C includes first advancing a profiled punch against a profile pad supported by a low pressure piston and traveling said punch and said piston together; and second, engaging said low pressure piston with a high pressure piston disposed beneath said low pressure piston and continuing travel of said punch and said pistons to form the preliminary profile while holding pressure on the cup flange and
D) reforming the preliminary profile to a final profile by rolling material from the overlength sidewall into the bottom wall to deepen the profile and shorten the sidewall.

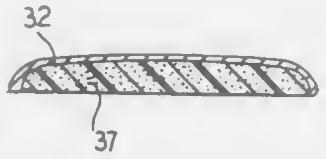
5,024,078
MAGNETIC KEY CHAIN

Lawrence M. Fenwick, 514 North East St., Kewanee, Ill. 61443

Filed Feb. 26, 1990, Ser. No. 484,508

Int. Cl.^{5} A47G *29/10*

U.S. Cl. 70—456 R **1 Claim**



1. A magnetic key ring comprising a body of plastic material in which magnetic particles are embedded and formed into a three dimensional shape of an animal or other device and formed with one side which is substantially planar and a key ring attached to said body of plastic material, and including a metallic cover member which has the same configuration as said body of plastic mate rial into which said body of plastic material is received.

5,024,079
TEST PLUG FOR FLANGED PIPES

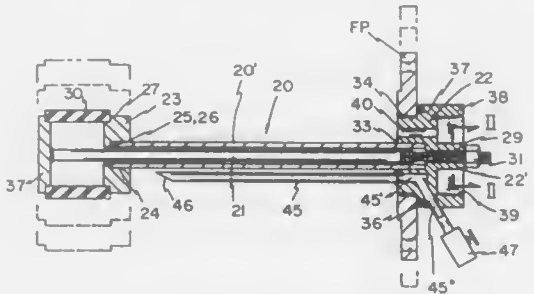
Mario C. Dufort, 308 Eureka, Petrolia, Ontario, Canada N0N 1R0

Filed Apr. 12, 1989, Ser. No. 338,936

Claims priority, application Canada, Jun. 8, 1988, 568992

Int. Cl.^{5} G01M *3/04*

U.S. Cl. 73—49.8 **11 Claims**



1. A test plug for proving the integrity of an annular weld of a pipe having an inner wall that sealingly attaches an annular flange, defining bolt accommodating apertures, comprising:
(a) a barrel defining a core channel and having a distal end and a proximate end;
(b) an annular pipe attachment member sealingly attached to the proximate end and adapted to seal with said annular flange and having exterior diameter greater than that defined by the barrel, the annular pipe attachment member defining:
(i) a central channel communicating with the barrel core channel;
(ii) first and second channels defined by and communicating through the annular pipe attachment member at a radius greater than the inner radius of the barrel;
(c) an annulus adapted to mate with the distal end of the barrel and providing a first seal seating means adapted to seal against the inner wall of the pipe to be tested at a predetermined distance from the flange;
(d) a shaft having at its distal end a disk carrying a second seal seating means, adapted to engage a resilient annular seal, the shaft adapted to extend through the barrel and to occupy the central channel and to protrude from the annular pipe attachment member and to provide thereon, at its protruding proximate end, means adapted for connection;
(e) the resilient annular seal adapted to mate with the seating means and the second seal seating means; and
(f) connection means adapted to engage the means adapted for connection and to urge against the annular pipe attachment member and to cause the relative positioning of the annulus and disk so as to flex the resilient seal into sealing engagement with the inner wall of the pipe to be tested.

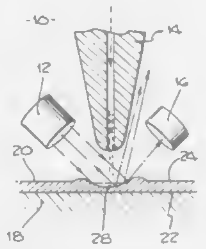
5,024,080
PAINT VISCOSITY MONITORING SYSTEM AND METHOD

Peter G. Backes, Canoga Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 3, 1990, Ser. No. 503,586

Int. Cl.^{5} G01N *11/00*

U.S. Cl. 73—54 **17 Claims**



1. A method for measuring the viscosity of a layer of wet paint comprising the steps of:
providing a substrate having a layer of wet paint thereon, said layer of wet paint having an inner surface adjacent to said substrate and an exposed outer surface having an original shape;
applying a deforming force to a predetermined area of the exposed outer surface of said layer of wet paint to depress said outer surface toward said inner surface to form a dimple in said layer of wet paint;
measuring the time required to deform said outer surface to form said dimple; and
determining the viscosity of the layer of wet paint based on said time measured.

5,024,081
LOCATING FLAT SPOTS ON RUBBER WIPE ROLLS

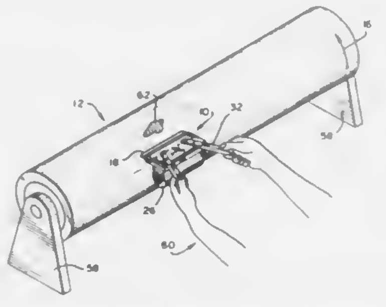
Anthony F. Razauskas, Pasadena, and Marlie A. Duncan, Upperco, both of Md., assignors to The Ward Machinery Company, Cockeysville, Md.

Filed Aug. 20, 1990, Ser. No. 570,016

Int. Cl.^{5} G01N *19/08*

U.S. Cl. 73—104 **16 Claims**

1. A method of testing a cylindrical surfaced roll for flat spots, comprising the sequential steps of:
applying a liquid film to the cylindrical surface of the roll;
wiping the liquid film off the roll with a blade; and



detecting any flat spot on the cylindrical surface of the roll by observing the presence of any puddle of liquid left on the cylindrical surface after said wiping.

5,024,082
ENGINE-START DISCRIMINATING APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

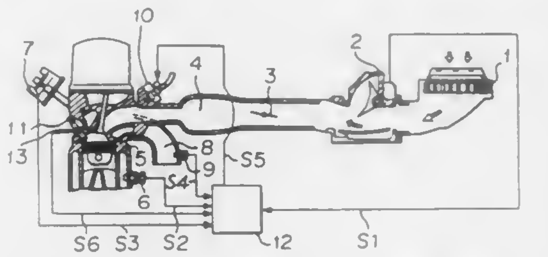
Satoru Ohkubo, and Shoichi Washino, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 13, 1989, Ser. No. 421,031

Claims priority, application Japan, Oct. 24, 1988, 63-267393

Int. Cl.^{5} G01M *15/00*

U.S. Cl. 73—117.3 **5 Claims**



1. An engine-start discriminating apparatus which comprises:
a cylinder pressure sensor for detecting a cylinder pressure in an internal combustion engine;
a combustion parameter operating means for extracting a parameter of combustion indicating a state of combustion in the engine on the basis of the output signal of said cylinder pressure sensor; and
a start discriminating means for discriminating the starting of the engine on the basis of the output of the operating means.

5,024,083
TERMINAL FLOW SENSOR

Masanori Inada, and Hichiro Ohtani, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 15, 1989, Ser. No. 451,058

Claims priority, application Japan, Dec. 16, 1988, 63-163900[U]

Int. Cl.^{5} G01F *1/68*

U.S. Cl. 73—204.26 **2 Claims**

1. A thermal flow sensor, comprising:
a heat-sensitive resistor disposed in a flow stream of a fluid, said resistor having a planar substrate (*7a*) and a planar heat-sensitive resistor portion (*7b*) whose resistance changes with temperature;
a bridge circuit including said heat-sensitive resistor and a plurality of other resistors; and
a control circuit for controlling said bridge circuit in such a

VOL
1127
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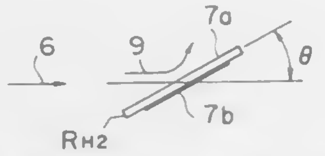
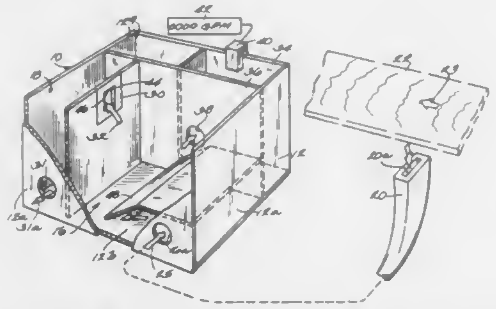
manner that said bridge circuit maintains a predetermined equilibrium state and for detecting the flow of the fluid from the equilibrium state,

wherein said substrate is disposed at an angle ranging from 20 to 60 degrees relative to the direction of fluid flow, and said heat-sensitive resistor portion is exclusively disposed on a surface of said substrate oriented downstream in the direction of fluid flow such that said resistor portion is sheltered from the fluid flow by the substrate to attendantly avoid the deposition of dust entrained in the fluid, said thermal flow sensor further comprising a housing allowing the passage therethrough of the fluid, a base (2) provided within said housing for supporting said heat-sensitive resistor, and a fluid temperature sensor provided on said base.



5,024,084
FLOW METER FOR LIQUID DOCTORED THROUGH FOURDRINIER FABRIC AT WET END OF FOURDRINIER PAPER MACHINE

Thomas E. Frawley, Jr., Appleton, Wis., assignor to Appleton Specialty Products, Inc., Appleton, Wis.
Filed Nov. 6, 1989, Ser. No. 432,165
Int. Cl.⁵ G01F *1/20*
U.S. Cl. 73—215 8 Claims



1. A testing device for determining the amount of liquid having been doctored from the pulp at the wet end of a Fourdrinier-type paper machine by foil blades having leading and trailing edges, comprising:

pick-up means positioned beneath the foil blades of said paper machine, having an opening therein positioned beneath said leading edge of one of said foil blades for collecting some of the liquid being doctored from the pulp, said pick-up means having an opening for catching the liquid being doctored through said Fourdrinier fabric, including means for changing the size of the opening;

a container in liquid communication with said pick-up means;

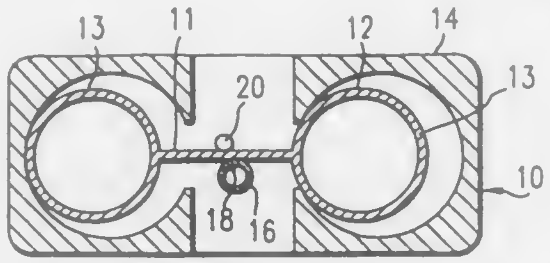
a weir positioned within said container to divide said container into a collection well upstream from said weir and a discharge well downstream from said weir;

a still well positioned in liquid communication with said collection well; and

sensing means positioned with respect to said still well to sense the level of liquid in said still well.

5,024,085
SIGNAL PICKUP MECHANISM

John E. Durand, 26581 Dolorosa, Mission Viejo, Calif. 92691
Filed Aug. 24, 1988, Ser. No. 235,563
Int. Cl.⁵ G01F *3/08*
U.S. Cl. 73—256 7 Claims



1. In a positive displacement nutating flow meter having a hollow fulcrum supporting a nutator, the nutator including two pistons connected by a barrier, the improvement comprising a magnetic signal pickup mechanism, comprising:

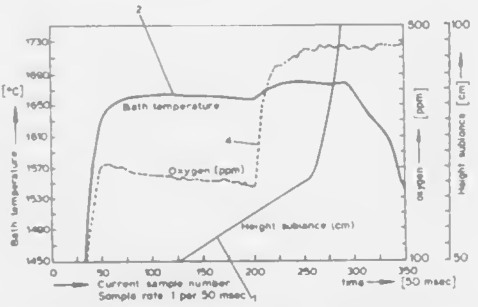
a moving magnetic element mass fixedly coupled to a moving element which moves in response to movement of the nutator and which by moving causes the magnetic element mass to move;

a moveable magnetic element wire coupled magnetically only to the magnetic element mass to track the mass and remain as close as possible to the mass and pass near at least one selected part of the movement path of the mass, wherein one of the mass and the wire is ferro magnetic and the other of the mass and the wire is a permanent magnet sufficiently powerful so that the wire moves as a function of proximate passes of the mass; and

a signal detector coupled to the wire to count selected movements of the wire.

5,024,086
METHOD OF MEASUREMENT OF THE LEVEL OF THE SURFACE OF A METAL BATH

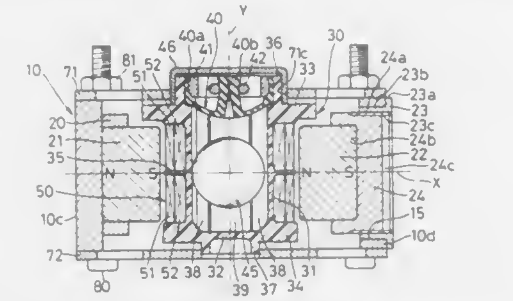
Wilhelmus Heijne, Uitgeest, Netherlands, assignor to Hoogovens Groep B.V., Ijmuiden, Netherlands
Continuation-in-part of Ser. No. 312,877, Feb. 21, 1989, abandoned. This application Jan. 16, 1990, Ser. No. 464,692
Claims priority, application Netherlands, Feb. 26, 1988, 8800491
Int. Cl.⁵ G01F *23/22, 23/00*
U.S. Cl. 73—292 5 Claims



5. In a method of measurement of the level of the surface of a bath of molten metal beneath a fluid layer of slag in a metallurgical vessel, using a detector which is moved through the slag layer into the metal bath and then withdrawn, the improvement that the detector used comprises an oxygen concentration sensor which emits signals indicating the boundary between the molten metal and the slag, whereby the height of said boundary is determined.

5,024,087
ACCELERATION SENSOR

Wataru Nagasaki; Takuro Endo; Susumu Taira, and Hajime Muramatsu, all of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan
Continuation-in-part of Ser. No. 375,886, Jul. 6, 1989, abandoned. This application Sep. 21, 1989, Ser. No. 410,722
Claims priority, application Japan, Jul. 28, 1988, 63-99151[U]; Sep. 22, 1988, 63-238490
Int. Cl.⁵ G01P *15/08*
U.S. Cl. 73—516 R 6 Claims



1. An acceleration sensor comprising:

(a) a tubular casing having one open end and another closed end;

(b) a lid which sealingly closes said open end of said casing so that said casing defines together with said lid an internal sealed space, said lid being made of an elastic material and being fixedly connected at its outer peripheral portion to one end portion of said casing including said open end of said casing, said lid being elastically deformable away from said another end of said casing, and said lid having a tubular portion at said outer peripheral portion of said lid, said tubular portion of said lid being received in said one end portion of said casing, wherein an annular compressing member is received in said tubular portion so that said tubular portion is compressed between said one end portion of said casing and said compressing member;

(c) a damper liquid filled in said sealed space;

(d) a magnetic member movably received within said sealed space;

(e) magnetic force-generating means mounted externally of said casing, a magnetic force generated by said magnetic force-generating means holding said magnetic member in a reference position within said casing, and said magnetic member being displaceable from said reference position against the magnetic force of said magnetic force-generating means when said acceleration sensor is subjected to acceleration; and

(f) detection means mounted externally of said casing for detecting displacement of said magnetic member from said reference position.

5,024,088
ELECTROMAGNETIC ACCELEROMETER

Fumito Komatsu; Hideo Usuki, and Yuzo Oguchi, all of Nagano, Japan, assignors to K.K. Sankto Seiki Seisakusho, Nagano, Japan
Filed Jun. 20, 1989, Ser. No. 368,622
Claims priority, application Japan, Jun. 20, 1988, 63-151582
Int. Cl.⁵ G01P *15/13*
U.S. Cl. 73—517 B 7 Claims

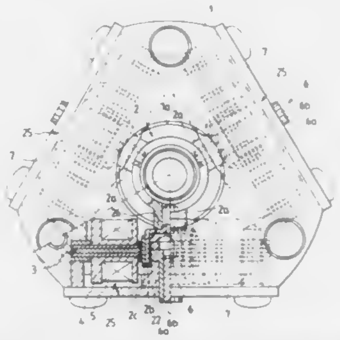
1. An accelerometer for detecting acceleration, comprising:

support means serving as a main support body for said accelerometer;

detection body means provided in and movable relative to said support means upon application of acceleration;

three electromagnet units, each comprising three electromagnets spaced at angles of 120 degrees in a plane, for causing said detection body means to float above said support means, said electromagnet units being combined in the form of a triangular prism;

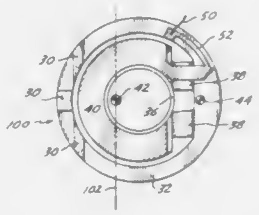
detection means for detecting the position of said detection body means relative to said support means to generate a detection signal; and

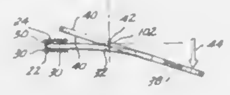


computing means for computing the magnitude and direction of the acceleration exerted upon said detection body means according to said detection signal from said detection means.

5,024,089
STRESS COMPENSATED TRANSDUCER

Brian L. Norling, Mill Creek, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.
Continuation of Ser. No. 212,785, Jun. 29, 1988, Pat. No. 4,932,258. This application May 8, 1990, Ser. No. 521,836
Int. Cl.⁵ G01P *15/08*
U.S. Cl. 73—517 B 11 Claims





1. A transducer comprising:

(a) a movable proof mass to which is applied a pick-off capacitance plate having a centroid of capacitance;

(b) a support within which the proof mass is mounted, said support including a fixed portion and a cantilevered portion, said proof mass being attached by a compliant cantilever arm to the cantilevered portion of the support and thus movable in a generally transverse direction relative to a plane aligned with a surface of the support;

(c) a stator assembly in which the fixed portion of the support is mounted, the cantilevered portion of the support deflecting around a deflection axis with respect to the stator assembly in response to an imbalanced force acting on the cantilevered portion of the support at a point proximate the compliant cantilever arm, where said imbalanced force has a component in the transverse direction;

(d) a plurality of pads disposed between the stator assembly and the fixed portion of the support, said pads being spaced apart from each other and positioned substantially away from the deflection axis such that the deflection axis is aligned with the centroid of capacitance, whereby displacement of the centroid of capacitance due to deflection of the cantilevered portion by the imbalanced force is substantially prevented.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,090

LOOSE ROCK DETECTOR

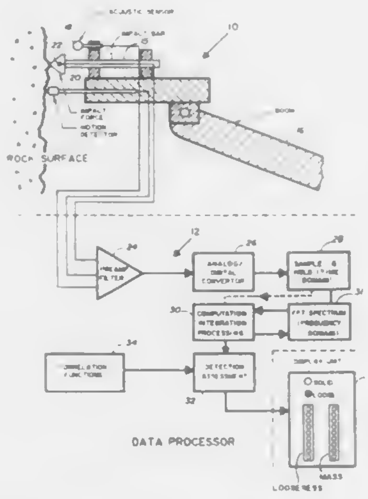
Michel J. Pettigrew; David B. Rhodes; Eric G. Lux, and Victor A. Mason, all of Deep River, Canada, assignors to HDRK Mining Research Limited, Copper Cliff, Canada

Filed Sep. 15, 1989, Ser. No. 407,866

Claims priority, application Canada, Sep. 30, 1988, 579030

Int. Cl.^{5} G01N *3/30*

U.S. Cl. 73—572 7 Claims



1. A loose rock detector comprising:

a) an impact tool for hitting the rock face;

b) at least one sensor responsive to vibrations generated in the rock and in the impact tool by movement of said impact tool against the face of the rock for generating acoustic signals representative of said vibrations;

c) a data processor responsive to said signals for correlating said signals in the frequency domain against a predetermined relationship to detect loose rocks, said relationship being F1×F2/F3, where F2 is the sum of the amplitude of the acoustic signals attributed to both the rock and impact tool vibrations in a frequency range of 0–2000 Hz minus the sum of the amplitude of the acoustic signal attributed to impact tool vibration, and F3 is the sum of the amplitude of the acoustic signal attributed to impact tool vibration in a frequency range of 0–5000 Hz; and

d) a display unit for displaying the results of the correlation.

5,024,091

NON-DESTRUCTIVE EVALUATION OF STRUCTURAL MEMBERS

Roy F. Pellerin, Pullman, Wash., and Robert J. Ross, Madison, Wis., assignors to Washington State University Research Foundation, Inc., Pullman, Wash.

Continuation-in-part of Ser. No. 843,717, Mar. 25, 1986, abandoned. This application Jun. 12, 1989, Ser. No. 365,218

Int. Cl.^{5} G01N *29/00*

U.S. Cl. 73—597 32 Claims

1. A method for automatically and nondestructively testing a structural member made of nonhomogeneous materials to quantitatively predict at least one mechanical property of the structural member, comprising:

automatically measuring the volume of the structural member to provide a structural member volume measure;

automatically weighing the structural member to provide a structural member weight measure;

automatically calculating density by dividing said structural member weight measure by said structural member volume measure to provide a structural member density measure which is indicative of the approximate density of the structural member;

automatically positioning the structural member into a testing position using a controlled positioning means;

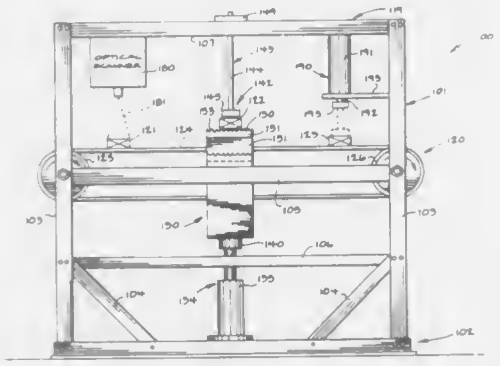
supporting the structural member in said testing position in a manner which provides yieldable mechanical coupling with the structural member;

producing a moving stress wave within the structural member;

measuring a first intensity of the moving stress wave at a first point in time;

measuring a second intensity of the moving stress wave at a second point in time after said first point in time; said stress wave having traversed through the entire structural member at least once;

automatically calculating from said measuring steps to provide at least one stress wave attenuation rate which is indicative of the approximate rate at which said moving stress wave was attenuated as it traveled through the structural member during a travel period between at least said first and second points in time;



automatically calculating from said measuring steps to provide at least one stress wave velocity measure which is indicative of the approximate velocity of the moving stress wave as it moved through the structural member;

automatically calculating a predicted structural member mechanical property value using said structural member density measure, said at least one stress wave attenuation rate, and said at least one stress wave velocity measure, and predetermined and experimentally-derived parameters which correlate tested values of said mechanical property based upon measures of structural member density, stress wave attenuation, and stress wave velocity.

5,024,092

METHOD AND APPARATUS FOR SELECTIVE TRANSMISSION AND REFLECTION OF SOUND THROUGH A SOLID

Ronald T. Harrold, Murrysville Boro, and Zal N. Sanjana, Mt. Lebanon, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 16, 1990, Ser. No. 568,281

Int. Cl.^{5} G01N *9/24*

U.S. Cl. 73—602 34 Claims

1. An apparatus for facilitating the complete transmission of sound waves through an object, the object having at least two walls forming a known distance therebetween, the apparatus comprising:

sound wave detection means affixed to a first wall of the object, the first wall being that which is closest to a source of initial sound waves;

first transducer means affixed to said sound wave detection means, said first transducer means adapted to transform said initial sound waves into electronic signals;

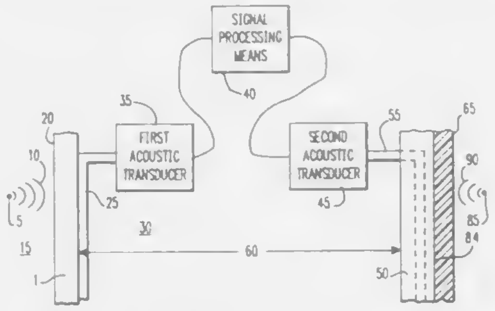
second transducer means for conversion of electronic signals into secondary sound waves;

sound wave emission means affixed to said second transducer means and a second wall of the object, the second wall being opposite said first wall; and

signal processing means, electronically connected to said first and second transducer means, said signal processing means adapted to:

calculate the wavelength of said initial sound waves impinging on said sound wave detection means,

calculate the time necessary to pass a distance one half of said wavelength minus the known distance between said walls, and



emit an electronic signal to said second transducer means, the electronic signal timed such that it will cause the emission of secondary sound waves of identical wavelength as said initial sound waves from said sound wave emission means at the time calculated.

5,024,093

FAN-SHAPE SCANNING ULTRASONIC FLAW DETECTING APPARATUS

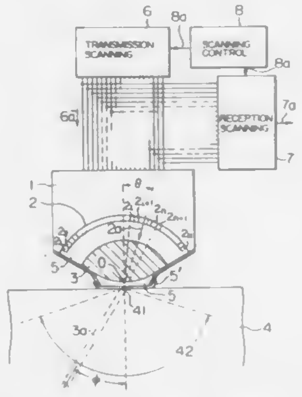
Souji Sasaki; Hirotoshi Kino, both of Hitachi; Yoshinori Musha, Hitachiota; Jun Kubota, and Hisao Okada, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 202,124, Jun. 3, 1988, abandoned. This application Mar. 2, 1990, Ser. No. 489,850

Claims priority, application Japan, Jun. 5, 1987, 62-139788; Nov. 11, 1987, 62-283304

Int. Cl.^{5} G01N *9/24*

U.S. Cl. 73—633 3 Claims



1. In a fan-shaped scanning flaw detecting apparatus comprising:

a probe provided with an ultrasonic wave transmitting-and-receiving array transducer arranged along a circular arc and an acoustic lens diverging and converting an ultrasonic beam transmitted/received by said array transducer into a substantially parallel beam, said array transducer having a circular arc; and

a scanning function section sequentially switching the transmitting and receiving operation of a group of operative transducer elements of said array transducer so as to make said ultrasonic beam perform fan-shaped scanning, whereby an echo signal from an object to be examined is obtained by the transmitting and receiving operation of said group of operative transducer elements so as to detect a flaw in the object, the improvement comprising:

a flexible material that provides a contact point to an object to be examined;

said acoustic lens being unitary and having a top portion, said top portion of said acoustic lens being convex and being positioned at a center of the circular arc of said array transducer, said acoustic lens being positioned between said array transducer and said flexible material, a surface of said acoustic lens on the side of said array transducer having a shape substantially the same as said circular arc of said array transducer; and

an ultrasonic wave transmitting fluid disposed between said top portion of said acoustic lens and said flexible material, said fluid having an ultrasonic wave velocity less than that of said acoustic lens.

5,024,094

ULTRASONIC IMAGING SYSTEM OF BONDING ZONE

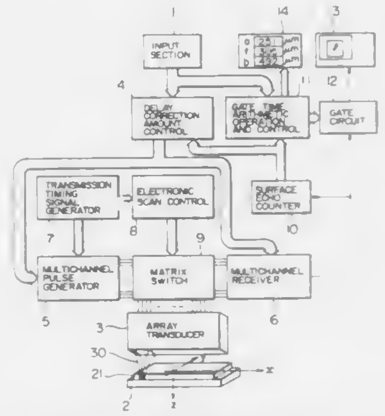
Jun Kubota; Hirotoshi Kino, both of Hitachi; Yosinori Musha, Hitachiota, and Hisao Okada, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 12, 1988, Ser. No. 282,496

Claims priority, application Japan, Dec. 15, 1987, 62-316882

Int. Cl.^{5} G01N *29/06*

U.S. Cl. 73—634 11 Claims



1. An ultrasonic imaging system comprising:

ultrasonic transmitting/receiving means including a plurality of vibrating elements for transmitting and receiving an ultrasonic beam;

pulse generating means for supplying at least one high frequency pulse at a predetermined time, said predetermined time being determined by said ultrasonic transmitting-/receiving means;

receiving means for receiving and amplifying an ultrasonic signal received by said ultrasonic transmitting/receiving means;

switching means for connecting said pulse generating means with said ultrasonic transmitting/receiving means when said ultrasonic transmitting/receiving means is in a transmitting mode and for connecting the ultrasonic transmitting/receiving means with said receiving means when said ultrasonic transmitting/receiving means is in a receiving mode;

wherein a liquid medium is interposed between an ultrasonic irradiating surface of the ultrasonic transmitting/receiving means and a test sample, and a predetermined portion in the sample is imaged by said imaging system;

input means for inputting predetermined parameters regarding said test sample and said liquid medium, said predetermined parameters including at least one of a sound velocity in said test sample, a sound velocity in said liquid medium, a physical dimension of said test sample and a physical dimension of said liquid medium;

VOL
1127
ISS
3
JE
18
1991
UMI

a surface echo counter for extracting an echo of the sample surface from an output signal of said receiving means and for measuring a distance between the ultrasonic irradiating surface and the test sample from a transmission time of the ultrasonic beam and a reception time of said surface echo; and

focal point arithmetic operation control means for controlling a focus of said ultrasonic beam into said predetermined portion in the sample based on said distance measured by said surface echo counter and an output signal from said input means.

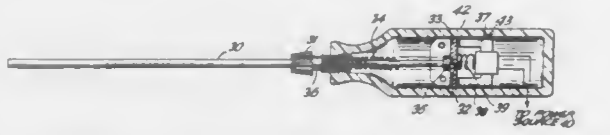
5,024,095
DIAGNOSTIC LOCATOR FOR MECHANICALLY MALFUNCTIONING ELECTRONIC CIRCUITRY

Brian Warner, 36 Austin St., Moonachie, N.J. 07074

Filed Dec. 5, 1989, Ser. No. 446,385

Int. Cl.^{5} G01N *3/34*

U.S. Cl. 73—661 2 Claims



1. A method for detecting kinetically locatable mechanically intermittent sources of electronic circuit malfunction with a diagnostic locator comprises the steps of:

applying a vibratory test probe form the locator to the electronic circuit,

monitoring performance of circuitry being tested to detect presence of mechanical intermittence when probe energy is applied,

adjusting the diagnostic locator for increased propagation of test probe transmitted kinetic energy,

activating the test probe upon generalized areas of circuitry to determine the presence of mechanically intermittent electronic circuit malfunction,

adjusting the diagnostic locator for reduced propagation of probe transmitted kinetic energy, in response to detecting the presence of a mechanically intermittent circuit malfunction, and

applying probe transmitted energy to the area of circuitry where presence of malfunction was detected to further localize specific source of mechanically intermittent electronic circuit malfunction, and

performing repeated diagnostic localization for further reductions of propagation with the test probe transmitted kinetic energy to determine the specific source of the kinetically locatable mechanically intermittent electronic circuit malfunction.

5,024,096
COMPOSITE SLIP TABLE OF DISSIMILAR MATERIALS FOR DAMPING LONGITUDINAL MODES

Danny L. Gregory, Albuquerque; Tommy G. Priddy; David O. Smallwood, and Tommy D. Woodall, all of Albuquerque, N. Mex., assignors to United States of America as represented by the Department of Energy, Washington, D.C.

Filed Jun. 30, 1989, Ser. No. 373,416

Int. Cl.^{5} G01M *7/00*

U.S. Cl. 73—663 8 Claims

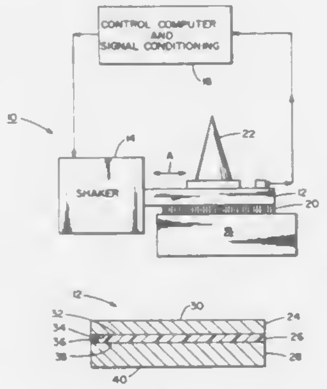
1. A slip table for use in a vibration testing apparatus, the table comprising a plurality of layers as follows:

a first planar layer of a metallic material having a characteristic acoustic velocity and a hard outer surface,

means for damping longitudinal vibration modes in the slip table comprising a second planar layer of a damping material, adjacent to said first layer,

a third planar layer of a material having a higher characteristic acoustic velocity than said metallic material of said first layer, adjacent to said second layer, and

means for attaching said plurality of layers to each other to transmit a shear force between said plurality of layers in contact,



whereby relative shear displacements between said first and third layers, created by different longitudinal modes in said first and third layers, said different longitudinal modes being caused by the different acoustic velocities of the materials of said first and third layers, are damped by said second layer, thereby reducing the overall table longitudinal vibration modes.

5,024,097
PRESSURE SENSOR COMPRISING A SILICON BODY

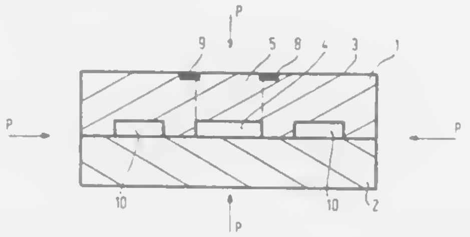
Volker Graeger, Buchholz, and Rolf U. D. Kobs, Tornesch, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 148,745, Jan. 27, 1988, abandoned. This application Sep. 20, 1989, Ser. No. 411,193

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1987, 3702412

Int. Cl.^{5} G01L *9/06*

U.S. Cl. 73—727 9 Claims



1. A pressure sensor for static pressure loads comprising a silicon body (**1**) which is arranged on a substrate (**2**) and which comprises a cavity (**4**) in the form of a blind hole or enclosed chamber which faces the substrate, thus forming a diaphragm (**5**) which extends parallel to the base of the silicon body and on the outer surface of which there is arranged a Wheatstone bridge including piezoresistive resistance elements (**6** to **9**; **11**, **12**), two resistance elements (**6**, **7**) thereof being centrally arranged on the diaphragm whereas the other two resistance elements (**8**, **9**; **11**, **12**) are arranged at the edge of the diaphragm,

wherein a separate cavity (**10**) which faces the substrate (**2**) is provided in the silicon body on both sides of the resistance elements (**8**, **9**; **11**, **12**) arranged at the edge of the diaphragm, and

all said resistance elements reside in a more centrally located portion of said silicon body than said separate cavity.

5,024,098
PRESSURE SENSOR USEABLE IN OIL WELLS

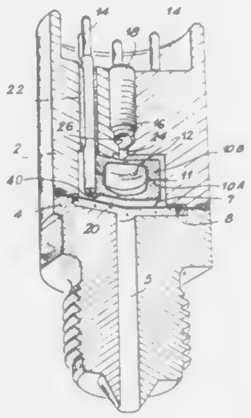
Luc Petitjean, Vincennes, and Michel Valdois, Cachan, both of France, assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Oct. 27, 1989, Ser. No. 428,304

Claims priority, application France, Oct. 27, 1988, 88 14005

Int. Cl.^{5} G01L *9/06*

U.S. Cl. 73—729 7 Claims



1. A pressure sensor comprising:

a cell comprising sapphire and having an outside surface which is subjectable to a pressure to be measured, said cell having two portions of the same material joined together at a join plane, at least one of said cell portions having a deformable outside plane surface parallel to said join plane;

a hermetically sealed chamber, located inside said cell, in which a predetermined pressure is contained; and

a strain-measuring device integrally deposited on said outside plane surface; wherein said cell comprises monocrystalline sapphire wherein the crystal axis thereof being perpendicular to said join plane.

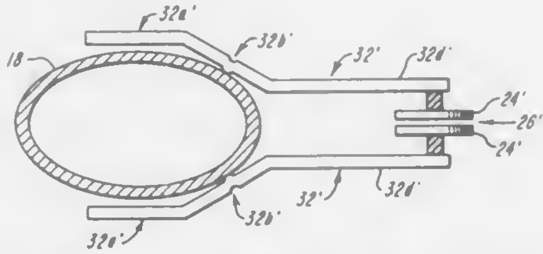
5,024,099
PRESSURE TRANSDUCER WITH FLOW-THROUGH MEASUREMENT CAPABILITY

Shih-Ying Lee, Lincoln, Mass., assignor to Setra Systems, Inc., Acton, Mass.

Filed Nov. 20, 1989, Ser. No. 439,617

Int. Cl.^{5} G01L *9/12*

U.S. Cl. 73—730 25 Claims



1. A transducer for measuring the pressure of a fluid in the transducer comprises

a hollow conduit having (i) an inlet portion, (ii) a portion disposed adjacent said inlet portion formed by deforming said conduit to a non-circular cross-section and (iii) a first transition region extending between said non-circular portion and said inlet portion,

the material forming said conduit having a tendency to displace radially from said non-circular cross-section toward a circular cross-section in response to the pressure of the fluid, the magnitude of said radial displacement and the surface stress and strain in at least a portion of said non-circular conduit corresponding to the pressure of the fluid,

at least one pair of spaced apart electrodes forming a variable capacitor,

means for mounting said electrodes to the exterior of said non-circular portion for converting said radial displacement into an electrical signal that corresponds to the fluid pressure through a corresponding movement of said mounting means and both of said electrodes.

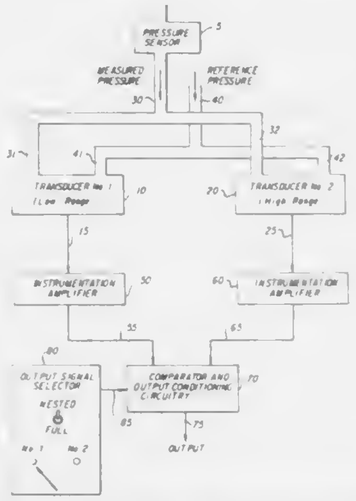
5,024,100
AUTOMATIC TRANSDUCER SELECTION SYSTEM FOR PRESSURE MEASUREMENT

Leonard M. Weinstein, Newport News, Va., assignor to Dynamic Engineering, Inc., Newport News, Va.

Filed Jun. 4, 1990, Ser. No. 532,697

Int. Cl.^{5} G01L *9/01, 9/10, 9/12*

U.S. Cl. 73—756 7 Claims


PRESSURE SENSOR
5
MEASURED PRESSURE
REFERENCE PRESSURE
30
40
32
31
41
42
TRANSDUCER No 1 (Low Range
10
20
TRANSDUCER No 2 (High Range
15
25
INSTRUMENTATION AMPLIFIER
50
60
INSTRUMENTATION AMPLIFIER
55
65
80
OUTPUT SIGNAL SELECTOR
NESTED
FULL
No 1
No 2
COMPARATOR AND OUTPUT CONDITIONING CIRCUITRY
70
85
75
OUTPUT

1. A fluid pressure measurement system comprising:

at least two pressure transducers having successively broader effective pressure sensing ranges, each of the strain gauges being capable of being subjected to an overpressure equal to a maximum pressure of the sensing ranges without an adverse effect therein;

means for connecting the transducers in parallel to the fluid pressure being measured and to a reference fluid pressure; and

comparator circuit means for receiving an output signal from each of the transducers, said circuit means functioning to select one of the transducer output signals which most closely approaches a full-range output signal of a corresponding transducer, said circuit means also functioning to generate an output signal from the selected transducer output signal.

5,024,101
POWER SOURCE CIRCUIT AND BRIDGE TYPE MEASURING DEVICE WITH OUTPUT COMPENSATING CIRCUIT UTILIZING THE SAME

Hiroaki Tanaka, Okazaki; Takeshi Enya, Nishio, and Katsumi Nakamura, Okazaki, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Nippon Soken, Inc., Nishio, both of Japan

Filed Feb. 9, 1990, Ser. No. 478,097

Claims priority, application Japan, Feb. 10, 1989, 1-31728

Int. Cl.^{5} G01B *7/16*

U.S. Cl. 73—766 8 Claims

1. A power source circuit for providing a reference constant voltage having given temperature characteristics at a predeter-

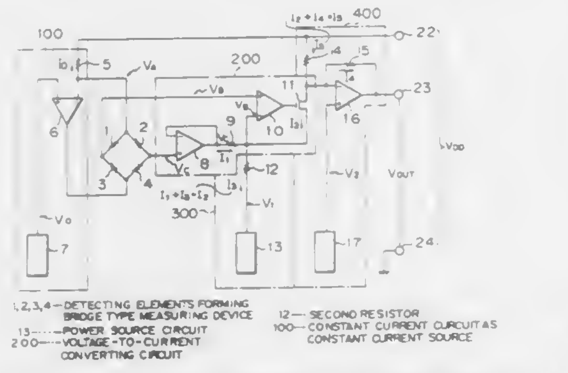
VOL
1127
ISS
3
JE
18
1991
UMI

mined temperature, the temperature characteristics of said reference constant voltage of the power source circuit being adjustable, comprising:

a voltage source for generating an adjustable constant voltage;

amplifying means for amplifying the adjustable constant voltage generated by the voltage source by an amplification factor at the predetermined temperature, the amplification factor being changed in response to a temperature difference between said predetermined temperature and a current temperature, said amplifying means outputting an amplified constant voltage at a predetermined temperature; and

output means for providing the reference constant voltage at the predetermined temperature and changing the reference constant voltage thereof in response to a difference between the amplified constant voltage output from said amplifying means and the adjustable constant voltage generated by the voltage source.


100
400
22
200
5
Va
Vb
Vc
11
15
23
6
1
2
9
10
16
3
4
8
12
300
V1
V2
VDD
VOUT
V0
7
13
17
24
1,2,3,4—DETECTING ELEMENTS FORMING BRIDGE TYPE MEASURING DEVICE
13—POWER SOURCE CIRCUIT
200—VOLTAGE-TO-CURRENT CONVERTING CIRCUIT
12—SECOND RESISTOR
100—CONSTANT CURRENT CIRCUIT AS CONSTANT CURRENT SOURCE

5,024,102

DEVICE FOR TESTING TRAILER COUPLINGS UNDER LOADING CONDITIONS RESEMBLING THOSE OCCURRING IN USE, PREFERABLY WITH INCLUSION OF THE CONSTRUCTION FOR FIXING THE TRAILER COUPLING

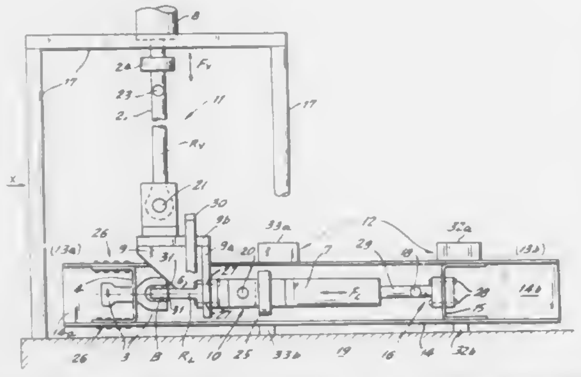
Jürgen Klock, Otzberg; Gerhard Fischer, Darmstadt, and Vatroslav Grubisic, Reinheim, all of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft, Fed. Rep. of Germany

Filed Nov. 3, 1989, Ser. No. 431,328

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1988, 3837886

Int. Cl.^{5} G01N *3/10*

U.S. Cl. 73—798 **14 Claims**



1. An apparatus for testing a trailer coupling assembly, wherein said assembly includes at least a trailer coupling and a trailer coupling ring engaged therewith and is subjected to testing under operational forces, including longitudinal and vertical operational forces, said apparatus comprising:

(a) first support means for supporting the coupling assembly and for positionally fixing said coupling;

(b) second support means for supporting the coupling ring of said coupling assembly;

(c) a longitudinal force actuator coupled to said second support means and effective for simulating the longitudinal operational forces and for applying the same to said second support means;

(d) a vertical force actuator coupled to said second support means and effective for simulating the vertical operational forces and for applying the same to said second support means;

(e) said second support means being a rigid force transmitting connecting member to which said longitudinal and said vertical force actuators are coupled such that the direction of action of said longitudinal operational forces and the direction of action of said vertical operational forces intersect each other in a region in which said coupling ring engages said trailer coupling.

5,024,103

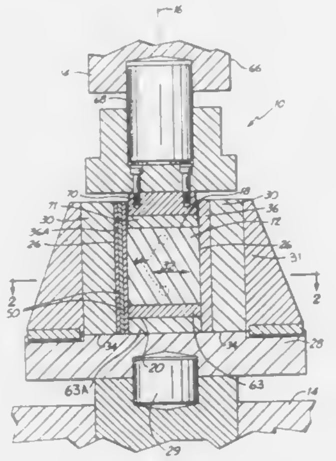
SURFACE INSTABILITY DETECTION APPARATUS

Ioannis Vardoulakis, Minneapolis; Joseph F. Labuz, and Euripides Papamichos, both of St. Paul, all of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Filed May 31, 1990, Ser. No. 531,111

Int. Cl.^{5} G01N *3/08*

U.S. Cl. 73—819 **15 Claims**



1. A surface instability detection apparatus for supporting a specimen in a load frame for testing geomaterial sample specimens for failure under load in a direction generally along a central axis of the specimen, the specimen having first and second end surfaces, front and back side surfaces, and a pair of substantially parallel lateral side surfaces, the specimen forming generally a right rectangular geometric prism configuration, the apparatus comprising:

a support plate supporting a first end surface of the specimen;

a pair of lateral side plates fixed with respect to the support plate and the adjacent two opposite lateral side surfaces of the specimen for restraining movement of the specimen in first lateral directions perpendicular to the axis;

means for loading such specimen on a second end surface under a load directed toward the support plate along the central axis of the specimen until such specimen fails;

a back side plate mounted relative to the support plate and the lateral side plates for restraining movement of the back side surface of the specimen to be tested in a second lateral direction perpendicular to the axis of loading, the back side plate being disposed in such a manner as to connect the pair of lateral side plates; and

the front side surface of the specimen being substantially unrestrained whereby upon loading of the specimen, the specimen is forced to fail by movement of the front side surface only.

5,024,104

COMBINED OUTPUT AND DRIVE CIRCUIT FOR A MASS FLOW TRANSDUCER

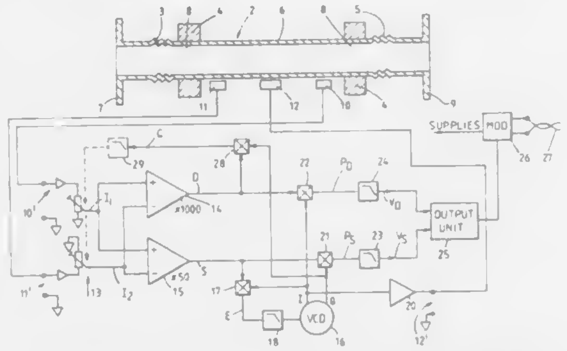
Andrew N. Dames, London, England, assignor to Schlumberger Industries Limited, Farnborough, England

Filed Dec. 21, 1989, Ser. No. 454,250

Claims priority, application United Kingdom, Dec. 21, 1988, 8829825

Int. Cl.^{5} G01F *1/84*

U.S. Cl. 73—861.37 **16 Claims**



1. A combined output and drive circuit for providing a drive signal for a drive transducer of a mass flow transducer in response to two input signals fed to the circuit from spaced pick-up transducers of the mass flow transducer, comprising means for forming a first signal from at least one of the two input signals and a difference signal from the input signals, a phase locked loop oscillator circuit controlled by the first signal and providing the drive signal and first and second multiplying signals in phase quadrature with each other, means for multiplying the first and difference signals by the first and second multiplying signals respectively to form two product signals, and low pass filter means for filtering the two product signals to provide two measurement voltages related to phase difference and hence to mass flow rate.

5,024,105

VISCOSITY-INSENSITIVE VARIABLE-AREA FLOWMETER

Michael L. Tentler, 11420 Luz Rd., San Diego, Calif. 92127, and Gerald L. Wheeler, 10390-D E. Briar Oaks, Stanton, Calif. 90680

Filed Mar. 28, 1989, Ser. No. 329,433

Int. Cl.^{5} G01F *1/26*

U.S. Cl. 73—861.58 **4 Claims**

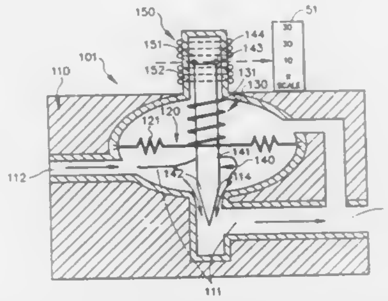
1. A variable area fluid flow regulator comprising:

a housing defining a chamber having a connection to an inlet port and two spaced-apart flow connections to an outlet port;

flexible diaphragm means, dividing the chamber at a position between the two spaced-apart outlet port connections so that one outlet port flow connection dead ends in the portion of the chamber on one side of the diaphragm while a channel for flowing fluid between the inlet port and the outlet port is defined in the remaining portion of the chamber on the other side of the diaphragm, for moving in response to differential pressure between the inlet port and the outlet port; and

a force biasing means, operatively connected between the flexible diaphragm means and the housing, for force biasing the movement of the flexible diaphragm means against the force of the differential pressure; and

a flow controller means, operatively connected to the flexible diaphragm means for moving therewith, for moving relative to the channel and relative to any fluid flowing therein in order to variably occlude the channel and to adjust the rate of fluid flow therein until the differential pressure across the flow controller means equals the force of the force biasing means;



the operative connection between the flexible diaphragm means and the flow controller being so that an increased fluid frictional drag force on the flow controller where it moves to variably occlude the channel acts mechanically oppositely to a change in a static differential pressure force on the flexible diaphragm means due to the same increased fluid frictional drag force, the mechanically oppositely-acting forces tending to cancel each other.

5,024,106

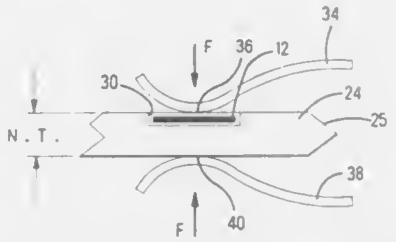
CONTACT SYSTEM NORMAL FORCE GAGE

Arthur C. Hettinger, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 13, 1990, Ser. No. 492,692

Int. Cl.^{5} G01L *1/18, 5/00*

U.S. Cl. 73—862.54 **5 Claims**



5. A gage for measuring normal forces of the type developed by spring elements including in combination a gage body of metal of a thickness approximating the nominal dimension of a terminal engaging the contact spring element in use, a relief within said body and a gage element fitted within the volume of said relief and flush with the upper surface thereof including a planar slice of silicon having an upper area broader than the thickness thereof to receive the contact spring under test bearing normally thereupon, a piezoresistive circuit means diffused into the material of said silicon along one edge thereof, and first means to apply voltage to said piezoresistive circuit with second means to measure the changes in resistivity as a function of the normal force applied to said silicon slice by virtue of engagement with said contact spring under test.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,107
PRESSURE OR FORCE SENSOR HAVING AN AXIALLY SYMMETRICAL PRESSURE OR FORCE-RECEIVING CIRCULAR PLATE SPRING

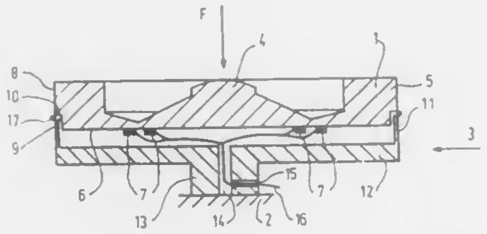
Klaus W. B. Bethe, Braunschweig, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 11, 1989, Ser. No. 378,343

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1988, 3823673

Int. Cl.^{5} G01L *1/22*

U.S. Cl. 73—862.65 **10 Claims**



1. A load sensor comprising a carrier, an axially symmetrical load receiving circular plate spring having a mainly flat side, an opposing profiled side, and a reinforced edge region supported on said carrier, and strain gauges disposed on said circular plate spring, characterized in that:

said circular plate spring is supported by said carrier at an annular zone of said reinforced edge region in which the radial expansion of said spring is substantially zero under load.

5,024,108
SAMPLE ANALYZER

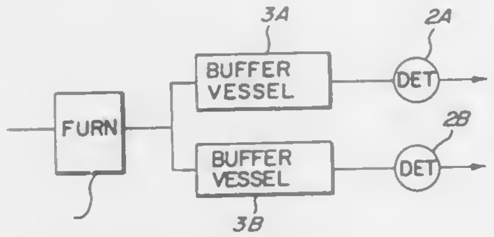
Yasuyuki Nishioka, Nagaokakyo, and Akihiro Hirano, Kyoto, both of Japan, assignors to Horiba, Ltd., Kyoto, Japan

Filed Dec. 28, 1989, Ser. No. 458,091

Claims priority, application Japan, Jan. 14, 1989, 1-2975

Int. Cl.^{5} G01N *1/22*

U.S. Cl. 73—863.11 **5 Claims**



4. A sample analyzer comprising

an extraction furnace for heating the sample to be analyzed;

a first detector for analyzing gaseous residues from said extraction furnace; and

a first buffer vessel having an adjustable volume capacity disposed between said extraction furnace and said first detector, said buffer vessel including a piston inside the vessel capable of being moved to adjust the internal volume capacity of the vessel, said piston having an outlet passage to permit gas to flow from the vessel.

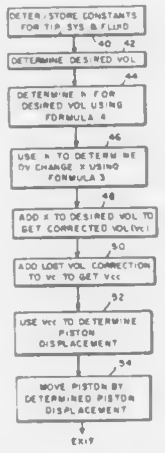
5,024,109
METHOD AND APPARATUS FOR PERFORMING HYDROSTATIC CORRECTION IN A PIPETTE

Hugo Romero, New Rochelle, N.Y., and Robert Anderson, Monroe, Conn., assignors to Medical Laboratory Automation, Inc., Pleasantville, N.Y.

Filed Feb. 8, 1990, Ser. No. 477,314

Int. Cl.^{5} G01N *1/14*

U.S. Cl. 73—864.16 **20 Claims**


DETER/STORE CONSTANTS FOR TIP SYS & FLUID
40
42
DETERMINE DESIRED VOL
44
DETERMINE h FOR DESIRED VOL USING FORMULA 4
46
USE h TO DETERMINE DV CHANGE x USING FORMULA 3
48
ADD x TO DESIRED VOL TO GET CORRECTED VOL (Vc)
50
ADD LOST VOL CORRECTION TO Vc TO GET Vcc
52
USE Vcc TO DETERMINE PISTON DISPLACEMENT
54
MOVE PISTON BY DETERMINED PISTON DISPLACEMENT
EXIT

1. Apparatus for correcting for hydrostatic dead volume error in a pipette system, which system includes a pipette tip, and means for moving a controlled volume of fluid either into or from the tip, said means including a piston and means for causing said piston to move in controlled increments, said dead volume being formed between the fluid and piston when fluid is drawn into said tip, the apparatus comprising:

means for determining the height h of fluid in said tip for a desired fluid volume;

means for determining the change in the dead volume resulting from having fluid of such height in the tip; and

means for determining the piston displacement required to achieve a volume equal to the sum of the desired volume plus the determined change in dead volume, this being the piston movement required to achieve the desired fluid volume.

5,024,110
CELL FOR SAMPLING AND STORING FLUID DEPOSITS

Roger Doussiet, Lezat S/Leze, and Louis Labadie, Montrejeau, both of France, assignors to Societe Nationale Elf Aquitaine (Production), Courbevoie, France

Filed Jan. 8, 1990, Ser. No. 462,034

Claims priority, application France, Jan. 10, 1989, 88 00219

Int. Cl.^{5} G01N *35/06*

U.S. Cl. 73—864.62 **11 Claims**

1. Cell for sampling and storing fluid deposits, comprising:

a pump body having a displaceable piston which divides an inner space of the pump body into a front chamber and a rear chamber; and

a control device for displacing the piston via a rod integral with the piston;

wherein the complementarity of the shapes of a rear face of the piston and of a corresponding inner face of the pump body make a volume of the rear chamber very small as compared to a volume of the rear chamber when the piston is in a storing position;

wherein, in the storing position, a unit formed by the rear chamber and the front chamber is insulated from an exterior of the cell by a seal formed automatically when the piston arrives at the storing position during sampling;

wherein the complementarity of the shapes of the rear face of the piston and the inner face of the pump body includes a recess in a rear part of the piston, the recess having a shape which substantially complements a front part of an extension of the pump body, the front part of the extension engaging the recess in the rear part of the piston at the storing position; and

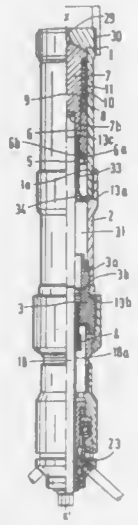
wherein a cylindrical part of the piston forming a portion of the recess in the rear part of the piston is force-fitted by its radial elasticity onto an outer part of the extension of the pump body, to form the seal which insulates the unit of the front and rear chambers from the exterior of the cell.

8. Cell for sampling and storing fluid deposits, comprising:

a pump body having a displaceable piston which divides an inner space of the pump body into a front chamber and a rear chamber; and

a control device for displacing the piston via a rod integral with the piston;

wherein the complementarity of the shapes of a rear face of the piston and of a corresponding inner face of the pump body make a volume of the rear chamber very small as compared to a volume of the front chamber when the piston is in a storing position;



wherein, in the storing position, a unit is formed by the rear chamber and the front chamber is insulated from an exterior of the cell by a seal formed automatically when the piston arrives at the storing position during sampling;

wherein the complementarity of the shapes of the rear face of the piston and the inner face of the pump body includes a recess in a rear part of the piston, the recess having a shape which substantially complements a front part of an extension of the pump body, the front part of the extension engaging the recess in the rear part of the piston at the storing position; and

wherein locking means for locking the piston in translational movement includes a series of cylindrically arranged plugs which are radially elastic and have an end flange which engages a throat of the extension so as to lock the piston in translational movement.

5,024,111
ADJUSTMENT OF ZERO SPRING RATE SUSPENSIONS

Thomas J. Harvey, Lompoc, Calif., assignor to AEC-Able Engineering Co., Inc., Goleta, Calif.

Filed Oct. 30, 1989, Ser. No. 428,395

Int. Cl.^{5} F16M *13/00*

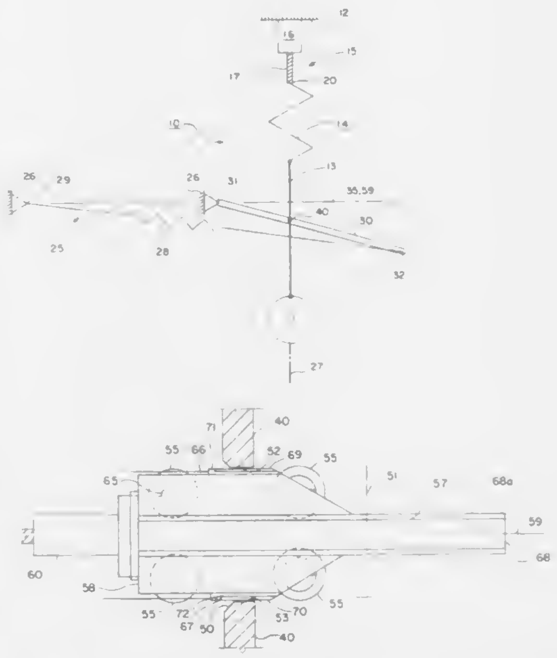
U.S. Cl. 73—865.6 **5 Claims**

1. An adjustment system for a zero spring rate suspension system, said suspension system having the property of providing a zero spring rate response to limited vertical excursions from a reference level, said suspension system including a load suspension spring supported from a load spring anchor; said adjustment system comprising:

a rigid reference element below the suspension spring whose elevation is a function of load spring extension and elevation of the load spring;

bi-directional drive means interposed between said load spring and said load spring anchor to move the upper end of said load spring up or down along a vertical axis, said drive means including a bi-directional motor, said reference element including an aperture, said aperture having an upper and a lower edge;

a probe insertable into and removable from said aperture, said probe including an upper and a lower electrical contact, said contacts being so disposed and arranged as to make conductive contact with a respective edge when the reference element is sufficiently above or below a reference level, there being a vertical dimension between said edges, the vertical spacing between said probe contacts being smaller than said vertical dimension to permit limited excursion of said reference element from said reference level, said contacts and edges being rigid and non-springing; and

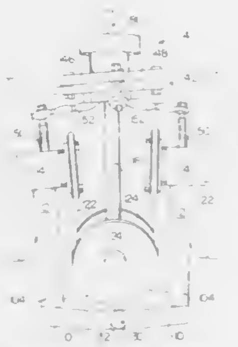


circuit means responsive to contact of said probe contacts and edges to power said motor to adjust the elevation of the load spring relative to the reference level to move the contact away from the respective edge and thereby to tend to restore the reference element to the reference level.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,112
GYROSCOPIC APPARATUS

Alexander D. Kidd, Barnhill, Scotland, assignor to Noel Carroll, Victoria, Australia, a part interest
PCT No. PCT/AU87/00418, § 371 Date Aug. 3, 1989, § 102(e) Date Aug. 3, 1989, PCT Pub. No. WO88/04363, PCT Pub. Date Jun. 16, 1988
PCT Filed Dec. 9, 1987, Ser. No. 378,236
Claims priority, application United Kingdom, Dec. 9, 1986, 8629405
Int. Cl.⁵ G01C *19/06;* F16H *27/04*
U.S. Cl. 74—5.37 **20 Claims**



1. A gyroscopic apparatus comprising:

a pair of rotatable masses disposed opposite one another;

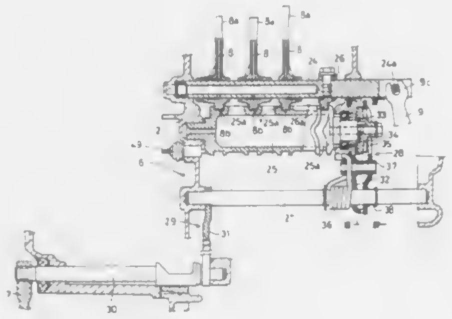
means for mounting said masses which enable said masses to pivot about a pivot axis, said pivot axis lying in a mirror image plane which is directly between said masses;

drive means for driving said masses so as to give said masses respective opposite angular momentums, having directions substantially perpendicular to and directed away from said plane second drive means, and for driving said apparatus so as to rotate said masses about a central axis which is in said plane and perpendicular to said pivot axis;

means for periodically forcing said masses towards one another from a predetermined position and allowing said masses to return to said predetermined position so as to generate a pulsatile force in said mounting means.

5,024,113
REVERSE DRIVE FOR VEHICLE

Toshifumi Ito; Atsuo Ohta, and Shoji Yamashita, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 244,332, Sep. 15, 1988, abandoned. This application Jun. 26, 1990, Ser. No. 542,649
Claims priority, application Japan, Sep. 19, 1987, 62-233748; Oct. 3, 1987, 62-151780
Int. Cl.⁵ F60K *23/00*
U.S. Cl. 74—6 **8 Claims**



1. A vehicle comprising:

a driving wheel;

an output shaft drivingly connected to said driving wheel;

an internal combustion engine operatively connectable to said output shaft through gear train means defining a variable forward motion transmission;

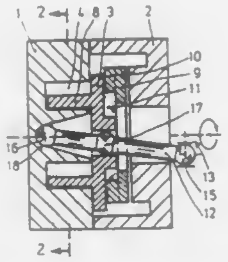
a reverse drive motor operatively connectable to said output shaft through a gear train defining a reverse motion transmission;

a speed change shift device for selectively connecting either said forward motion transmission or said reverse motion transmission to said output shaft, said speed change shift device including a movable operator containing a plurality of mutually spaced cam means including first cam means operable when said speed change shift device is in a first position to operably connect said forward motion transmission to said output shaft to the exclusion of said reverse motion transmission, and second cam means operable when said operator is in a second position spaced from said first position to operably connect said reverse motion transmission to said output shaft to the exclusion of said forward motion transmission; and

means for moving said speed change shift device operator between said positions.

5,024,114
WOBBLE DRIVE FOR A TRANSLATIONALLY MOVING STRUCTURAL PART

Kurt Güttinger, Murten, Switzerland, assignor to Gutag Innovations AG, Murten, Switzerland
Filed Sep. 19, 1989, Ser. No. 409,325
Claims priority, application Switzerland, Sep. 20, 1988, 03492/88-2
Int. Cl.⁵ F16H *23/08;* F04C *3/00*
U.S. Cl. 74—86 **4 Claims**



1. A wobble drive for a structural part moving in translation and being maintained relative to a stationary structural part in a predetermined angular relationship, said stationary structural part having a bearing bush and said translationally moving structural part having a hub, said wobble drive comprising:

a wobble rod;

a crank drive mechanism for driving said wobble rod, said crank drive mechanism having an axis and a bearing bush;

said wobble rod having a first spherical section mounted in the bearing bush of the crank drive mechanism;

said wobble rod having a second spherical section mounted coaxially relative to the crank drive mechanism in an articulation socket of the bearing bush of the stationary structural part;

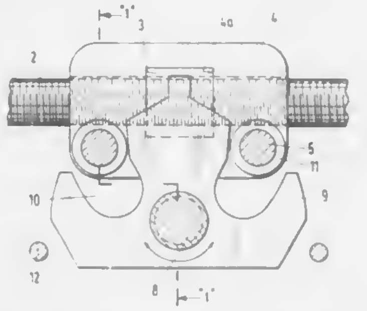
said wobble rod having a third spherical section located between opposite ends thereof, said third spherical section being supported rotatingly and pivotingly in an articulation socket of a bearing bush in the hub of the translationally moving structural part;

said bearing bushes for the second and third spherical sections being hemispherical articulation sockets located in the manner of a mirror image in the two structural parts;

spring means for ensuring full contact of the second and third spherical section in their respective articulation sockets.

5,024,115
SPINDLE DRIVE

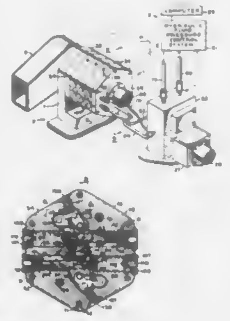
Walter Hahn, Frankfurt; Ferdinand Lutz, Heppenheim, and Manfred Jahn, Limeshain, all of Fed. Rep. of Germany, assignors to Asea Brown Boveri Aktiengesellschaft, Mannheim, Fed. Rep. of Germany
Filed Apr. 20, 1990, Ser. No. 511,624
Claims priority, application Fed. Rep. of Germany, Apr. 21, 1989, 3913080
Int. Cl.⁵ F16H *27/00*
U.S. Cl. 74—89.15 **12 Claims**



1. Spindle drive for generating a rotational motion, comprising a drive shaft, at least one sliding block disk being mounted on said drive shaft and having recesses formed therein, two retaining bolts, a carriage in which said retaining bolts are fastened, a single slide nut for moving said carriage, and a drive spindle for moving said retaining bolts through said slide nut and said carriage into engagement with said recesses.

5,024,116
MODULAR ROTARY ACTUATOR

Brett W. Kraft, 11667 W. 90th St., Overland Park, Kans. 66214
Filed Jun. 8, 1989, Ser. No. 363,171
Int. Cl.⁵ F16H *21/44;* F01B *9/00*
U.S. Cl. 74—109 **24 Claims**



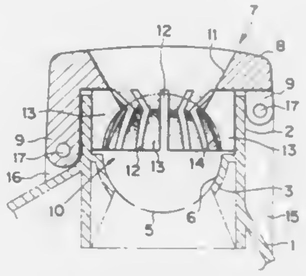
1. A rotary actuator comprising:

(a) an elongate drive shaft having pinion gear teeth mounted thereon and an axis of rotation; said shaft being adapted to join with and rotate a tool; and

(b) a plurality of modular and interchangeable drive units positioned axially along said shaft; each of said drive units including at least one fluid actuated member having drive teeth thereon mating with said shaft gear teeth so as to operably rotate said shaft when each of said drive units is activated; each of said drive units including aligned axial ports and interconnecting conduits to operably provide for actuating fluid to be simultaneously transferred among said drive units such that each of said members is simultaneously selectably actuated to rotate said drive shaft about the axis of rotation thereof in a common direction.

5,024,117
APPARATUS FOR SUPPORTING SHIFT LEVER FOR TRANSMISSION

Ichiji Yamada, Toyota, Japan; Yutaka Inuzuka, West Bloomfield, Mich.; Michiyuki Murakami, Toyoake; George Suzuki, Chiryu; Tyo Tanahashi, Aichi, and Takeshi Kondo, Nagoya, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Tsuda Industries Company, Ltd., Kariya, both of Japan
Filed Mar. 21, 1990, Ser. No. 496,942
Claims priority, application Japan, Mar. 30, 1989, 1-37014[U]
Int. Cl.⁵ G05G *8/16;* F16C *11/06;* F16D *1/12*
U.S. Cl. 74—473 P **5 Claims**



1. An apparatus for supporting a shift lever for a transmission, the shift lever including a ball-like portion provided at an intermediate portion of the shift lever, the ball-like portion having a lower spherical surface of a fixed curvature on at least a part of a lower side thereof and an upper spherical surface on a part of an upper side thereof, said apparatus for supporting a shift lever comprising:

a cylindrical shift-lever supporting section in which said ball-like portion is inserted;

a projecting section formed on the inner surface of said shift-lever supporting section to form a receiving surface, the receiving surface having a concave partial spherical surface of nearly the same curvature as the lower spherical surface of said ball-like portion and being in contact with said lower spherical surface;

a cap section detachably attached to an open upper end of said shift-lever supporting section; and

a plurality of tongue sections separated by slits and extending along a direction substantially parallel with a center axis of said shift lever, said tongue sections projecting downward from the cap section and being able to elastically deform, said tongue sections forming a retaining surface which has a concave partial spherical surface in surface contact with the upper spherical surface of said ball-like portion such that said ball-like portion is held between said concave spherical surface and said receiving surface, wherein the diameter of said retaining surface is smaller than the outer diameter of the ball-like portion, and wherein the tongue sections elastically deform when they touch and retain the upper spherical surface of the ball-like portion.

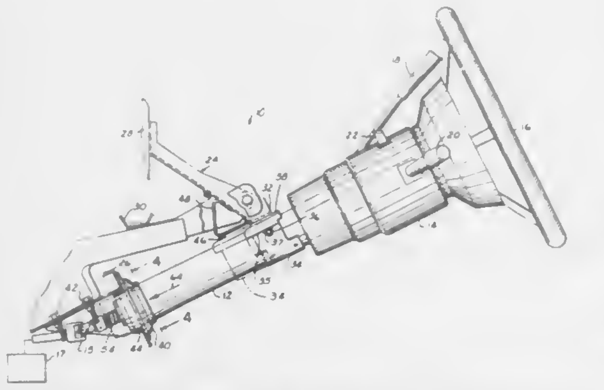
5,024,118
STEERING COLUMN GUIDE STRUCTURE

Mustafa A. Khalifa, Dearborn, and James Chapp, Jr., West Bloomfield, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.
Filed Jan. 22, 1990, Ser. No. 468,349
Int. Cl.⁵ B62D *1/18*
U.S. Cl. 74—492 **1 Claim**

1. A steering column guide structure for a collapsible vehicle steering column, the steering column including a sleeve, a steering wheel assembly secured to the upper end of the sleeve, a steering shaft extending from the steering wheel assembly through the sleeve, an upper support bracket secured to vehicle support structure, a sleeve bracket releasably connecting the upper portion of the sleeve to the upper support bracket,

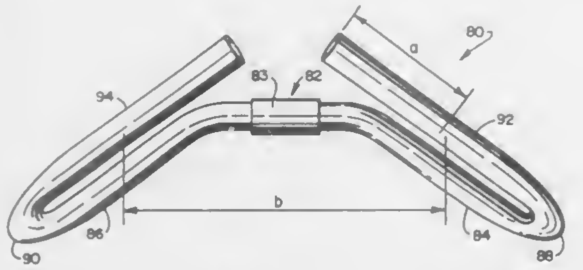
VOL
1127
ISS
3
JE
18
1991
UMI

the sleeve bracket including a pair of spaced apart flanges, a lower support bracket including a frangible retainer, the lower support bracket secured to vehicle support structure, the frangible retainer connected to the lower portion of the sleeve, the steering column guide structure comprising a pair of spaced apart triangular guide members, each triangular guide member being secured to the upper support bracket adjacent to and above one of the flanges of the sleeve bracket, each of said triangular guide members including a ramp surface formed by a leg thereof, and a guide collar connected to said lower support bracket, the guide collar including an axially extending cylindrical surface encircling the lower portion of said sleeve and being spaced slightly therefrom, whereby upon collapse of the steering column the flanges of the sleeve bracket will slide on the ramp surfaces of the triangular guide members thereby preventing upward movement of the upper portion of the sleeve and the lower portion of the sleeve will be axially guided by the guide collar thereby preventing undue axial deviation of the lower portion of the sleeve.



5,024,119
BICYCLE HANDLEBARS

Paul R. Linden, 221 Piedmont Rd., Columbus, Ohio 43214
Continuation-in-part of Ser. No. 867,773, May 28, 1986, abandoned. This application Nov. 17, 1986, Ser. No. 931,601
Int. Cl.^{5} B62K *21/12*
U.S. Cl. 74—551.1 15 Claims



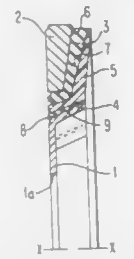
1. Handlebars for attachment to a bicycle having a front portion including a head assembly and a seat at given elevation rearwardly disposed therefrom and aligned therewith along a central axis of said bicycle for supporting a cyclist from beneath the pelvic region, comprising:

a support portion rigidly connectable with said head assembly; and

right- and left-hand grip portions for being gripped by the hands of said cyclist, each having a grip axis extending substantially in a common plane from respective right and left ends of said grip portions, said right and left grip portions being mutually laterally spaced in substantial correspondence with the widthwise interior spacing of the shoulders of said cyclist, supported by said support portion to position each to locate said right and left ends in spaced mutual adjacency and above said head assembly, said right- and left-hand grip portions extending rearwardly outwardly from respective said right and left ends to normally provide an angular orientation of each said grip axis of about 45° with respect to said central axis to be hand grippable by said cyclist in a manner generating minimal arm muscular tension, said left-hand and right-hand grip portions being positionable by said support portion along said axis a predetermined distance from said seat and at an elevation with respect to said seat elevation selected to cause said cyclist to lean slightly forwardly to an extent effecting forward rotation of said pelvic region while maintaining a posture effecting an elongation of the spinal column with a forward, naturally concave curving of the lumbar region.

5,024,120
TORSIONAL VIBRATION DAMPER WITH AN UNDULATING DAMPING RING

Rainer H. Andrä, Limburg, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany
Filed Aug. 1, 1989, Ser. No. 388,234
Claims priority, application Fed. Rep. of Germany, Aug. 1, 1988, 3826088
Int. Cl.^{5} F16F *15/10*
U.S. Cl. 74—574 10 Claims



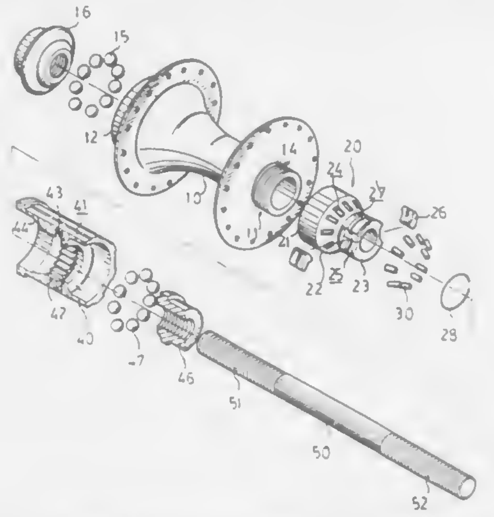
1. A torsional vibration damper having a longitudinal axis of rotation comprising:

(a) a central hub having means for connection to a part to be damped;
(b) a rotatable inertial ring surrounding the central hub to form a clearance space therebetween;
(c) a damping element disposed in said clearance space, said damping element including
  (i) a longitudinally flexible radially inner ring;
  (ii) a circumferentially flexible radially outer ring; and
  (iii) a flange ring disposed between said radially inner and radially outer rings;
(d) first and second substantially axially opposed, adhesive surfaces formed on said inertial ring and said flange ring, respectively, said radially outer ring being connected between said first and second adhesive surfaces to damp circumferential vibrations; and
(e) third and fourth substantially radially opposed, adhesive surfaces formed on said flange ring and said central hub, respectively, said radially inner ring being connected between said third and fourth adhesive surfaces to damp longitudinal vibrations, each of said third and fourth adhesive surfaces surrounding the longitudinal axis of rotation at a radial distance that continuously varies in the circumferential direction.

5,024,121
HUB ASSEMBLY OF A BICYCLE AND THE LIKE

Kin H. Hsieh, No. 125, Shih Chien St., Feng Yuan City, Taiwan
Filed Oct. 15, 1990, Ser. No. 597,018
Int. Cl.^{5} G05G *1/14*
U.S. Cl. 74—594.1 1 Claim

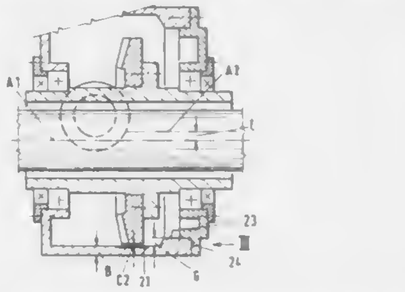
1. A hub assembly comprising an axle having an outer thread formed on each end thereof; a hub having a first belled end formed on one end thereof and a second belled end formed on another end thereof; a first cone threadedly engaged to one end of said axle; a first ball bearing received between said first belled end of said hub and said first cone; a collar having an enlarged diameter poriton and a reduced diameter portion integrally coupled together by a frustum, said enlarged diameter portion being threadedly engaged with said second belled end of said hub, a plurality of oblong holes being formed on an outer surface of said frustum, a roller being rotatably received in each of said oblong holes, at least one recess and an annular groove being formed on an outer peripheral surface of said reduced diameter portion of said collar, a pawl being received in each recess, a retaining ring being received in said annular groove for biasing a free end of each pawl outwards; a sleeve having an annular flange and an annular rib formed in an inner surface thereof, a tapered surface being formed on one end of said annular flange for sliding engagement with said rollers, a plurality of ratchet gear teeth being formed in an inner surface of said annular flange for engagement with said pawl so that said collar and said hub can be driven to rotate unidirectionally by an engagement between said pawl and said ratchet gear teeth; a second cone threadedly engaged to another end of said axle; a second ball bearing received between said second cone and said annular rib; and said annular flange and said rollers having a large contact surface so that said sleeve can be stably supported in rotational relationships with said collar.



5,024,122
TRANSMISSION HOUSING WITH A SUPPORT FOR A SHAFT CARRYING AT LEAST ONE GEAR

Franz Parzl, Woerthsee, and Johann Eichinger, Vaterstetten, both of Fed. Rep. of Germany, assignors to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co., Munich, Fed. Rep. of Germany
Continuation of Ser. No. 243,077, Sep. 9, 1988, abandoned. This application Jul. 18, 1990, Ser. No. 555,815
Claims priority, application Fed. Rep. of Germany, Oct. 3, 1987, 3733567
Int. Cl.^{5} F16H *57/02*
U.S. Cl. 74—606 R 4 Claims

1. In combination in a transmission for use as an axle drive unit for a railway vehicle: a shaft, a gear provided on said shaft, a transmission housing having side walls and a bottom wall, and support means for supporting said shaft carrying said gear, said support means including a bearing bracket and including a first roller bearing and a second roller bearing each having an outer ring, said outer ring of said first roller bearing being arranged in a corresponding first housing bore in said transmission housing and said outer ring of said second roller bearing being arranged in a corresponding bore of said bearing bracket, said bearing bracket being centered in a corresponding circular second housing bore in said transmission housing, the diameter of said second housing bore, in order to permit an axial introduction of said shaft into said transmission housing, being at least as large as the outside diameter of said gear, the improvement wherein said transmission housing is free of structure projecting below a plane containing said bottom wall, wherein a first axis of said first housing bore and a second axis of said second housing bore are radially offset in a first direction and by a first amount with respect to one another, said first axis being oriented closer to said bottom wall of said transmission housing than said second axis, and wherein a third axis of said bore in said bearing bracket is radially offset with respect to said second axis by the same first amount and in the same first direction so that said third axis will be coaxial with said first axis of said first housing bore, said gear having a radius greater than a radial distance from said third axis to a lowermost surface portion of said second housing bore and less than a radial distance from said third axis to said bottom wall so that the outer perimeter of said at least one gear on said shaft is immediately adjacent said bottom wall and is below said lowermost surface portion of said second housing bore to thereby facilitate an optimization of a minimum spacing between said first axis and an underside of said bottom wall of said transmission housing.

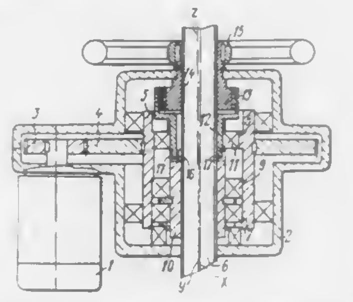


5,024,123

Patent Not Issued For This Number

5,024,124
ELECTRIC DRIVE WITH MANUAL DOUBLER

Nikolai P. Popov, prospekt Ispytatelei, 31, korpus 1, kv. 507; Andrei D. Plotnikov, Prospekt Nastavnikov, 25, korpus 3, kv. 101, and Grigory N. Klotsvog, Ulitsa Gavanskava, 11, kv. 43, all of Leningrad, U.S.S.R.
PCT No. PCT/SU88/00153, § 371 Date Dec. 15, 1989, § 102(e) Date Dec. 15, 1989, PCT Pub. No. WO90/01127, PCT Pub. Date Feb. 8, 1990
PCT Filed Jul. 27, 1988, Ser. No. 449,870
Int. Cl.^{5} F16K *31/143*
U.S. Cl. 74—625 3 Claims



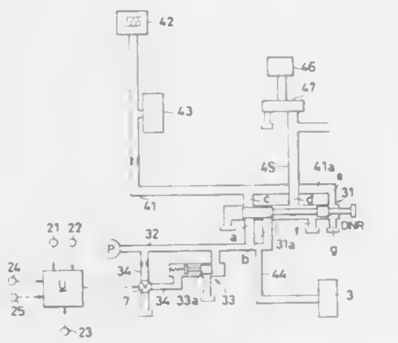
1. An electric drive with manual doubler, comprising an electric motor, a frame, a sleeve located in the frame, a lead screw, a sliding nut placed within the sleeve eccentric to the lead screw axis, a gear wheel arranged eccentric to the lead screw axis, connected with the sliding nut, and being in engagement with a gear bush arranged concentric with the lead screw and rotatably mounted inside the frame, a manually

VOL
1127
ISS
3
JE
18
1991
UMI

operated handwheel rigidly coupled to the gear bush, characterized in that said gear wheel and sliding nut are interconnected and capable of restricted angular displacement with respect to each other, and the inner surface of said gear bush serves as the datum surface for the lead screw.

5,024,125
SHIFT CONTROL SYSTEM FOR AN AUTOMATIC TRANSMISSION

Fumiaki Baba, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan
Filed Apr. 6, 1990, Ser. No. 505,608
Claims priority, application Japan, Apr. 7, 1989, 1-86993
Int. Cl.⁵ B60K *41/06*
U.S. Cl. 74—866 **25 Claims**



1. A shift control system for an automatic transmission, comprising:

a torque converter;

a multiple stage gear mechanism for performing a shift by shifting an operational state of a friction coupling element of a hydraulic pressure type, which is coupled to the torque converter;

a shift control means for controlling operation of the friction coupling element on the basis of a predetermined shift characteristic;

a temperature detecting means for detecting a temperature of an operating oil for the torque converter and the friction coupling element; and

a shift characteristic shifting means for shifting the shift characteristic so as to make a range of driving at least at a first speed stage narrow during a cold time period when the temperature of the operating oil detected by the temperature detecting means is equal to or lower than a predetermined value.

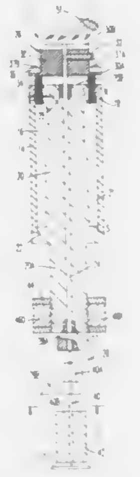
5,024,126
SLIP-RESISTANT PLASTIC SURFACE AND PROCESS FOR PRODUCING SUCH

Horst Holland-Letz, and Rainer Bubel, both of Neustadt/-Hessen, Fed. Rep. of Germany, assignors to Felo-Werkzeugfabrik, Fed. Rep. of Germany
Continuation of Ser. No. 157,894, Feb. 19, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 489,788
Claims priority, application Fed. Rep. of Germany, Feb. 19, 1987, 3705298
Int. Cl.⁵ B25G *1/01*
U.S. Cl. 81—489 **5 Claims**

5. A tool having a plastic handle with a slip-resistant gripping surface in which said surface is produced by coating the handle of said tool with a film of a solution of the polymer from which said handle is made, in which solution crystalline material has been dispersed and permitting the solvent in said film to evaporate after it has partially solvated and softened the surface of said plastic handle.

5,024,127
PUNCHING MECHANISM

Wolfgang F. Mueller, Wappingers Falls; George Popp, Pleasant Valley, and George B. Vandergheynst, Lagrangeville, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Oct. 10, 1989, Ser. No. 419,873
Int. Cl.⁵ B26D *1/00*
U.S. Cl. 83—13 **15 Claims**



1. Apparatus for driving a punch comprising:

a permanent magnet;

a pole-piece connected to one pole of said permanent magnet and spaced from the other pole of said permanent magnet by a gap;

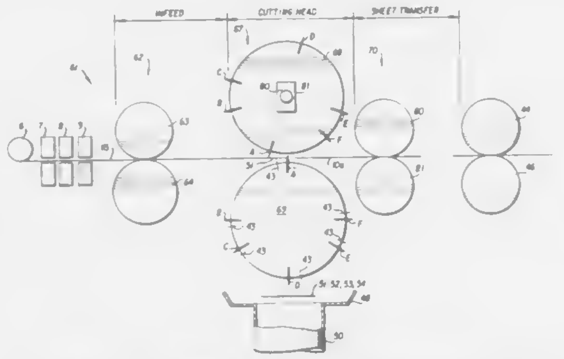
a movable coil disposed at least partially within said gap;

means connected to said movable coil for engaging and actuating said punch; and

means for conducting an electrical current to said coil.

5,024,128
SHEETER FOR WEB FED PRINTING PRESS

Gaines P. Campbell, Jr., 227 Fleetwood Dr., Lookout Mountain, Tenn. 37350
Filed Feb. 21, 1989, Ser. No. 312,913
Int. Cl.⁵ B26D *1/56*
U.S. Cl. 83—26 **5 Claims**



1. A method of cutting a web containing a plurality of portions of predetermined length fed through a printing press comprising:

feeding a continuous web into a first cutting head at a first surface speed;

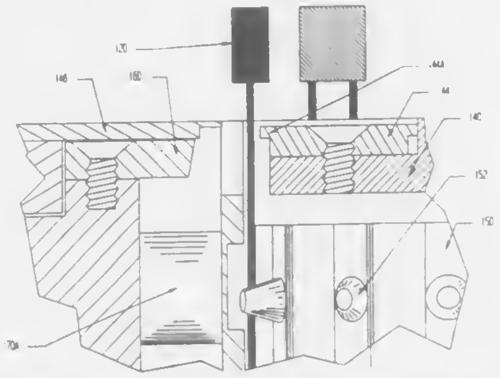
cutting the web transversely by said first cutting head rotating at a second higher surface speed to form a separated portion and an uncut portion of said web;

feeding the uncut portion of said web into a second cutting head rotating at said second higher surface speed; cutting said uncut portion of said web with said second cutting head to form a separated portion of predetermined length and a further uncut portion;

cutting a chip from the further uncut portion of said web by said first cutting head; removing said chip by said second cutting head; and removing said separated portion of predetermined length to a delivery system at a third surface speed higher than said first and second surface speeds.

5,024,129
RADIAL LEAD COMPONENT FEEDER HAVING A NARROW FOOTPRINT

Gregory W. Holcomb, 6336 Bryce Ave., Orange, Calif. 92667; Scott A. Hogan, and Samuel R. Holcomb, both of Orange, Calif., assignors to Gregory W. Holcomb, Orange, Calif.
Filed Jun. 29, 1989, Ser. No. 374,159
Int. Cl.⁵ B26D *7/18*
U.S. Cl. 83—107 **22 Claims**



1. A radial lead component feeder apparatus for clamping and cutting to a predetermined length the leads of electrical components secured to tape, the feeder characterized by a longitudinal center line, the electrical components being characterized by a component body and in that component lead or leads emerge from generally the same side or portion of the component body, the apparatus comprising:

a rotary tape drive means for driving the tape on which the electrical components are secured to sequentially position components at a lead clamping and cutting station, said drive means comprising a drive wheel having means for engaging the tape about the wheel periphery and mounted for rotation about a wheel axis which extends in a direction substantially perpendicular to said center line;

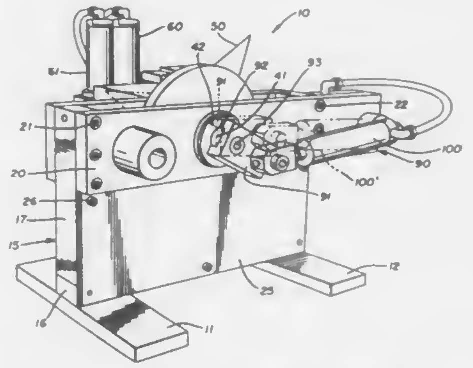
a lead clamping and cutting station fixed in position at the periphery of said wheel along said center line, said station comprising means for clamping at least one lead of the component positioned at the station and means for cutting to a predetermined length the component leads, wherein said component is held in place at said station after said lead has been cut in readiness for removal; and

means for guiding the tape to which the components are secured to the rotary tape drive means and means for guiding the spent tape away from the drive means after the leads of respective successive components have been clamped and cut to said predetermined length.

5,024,130
FLYKNIFE CUTTER FOR EXTRUDED MATERIALS

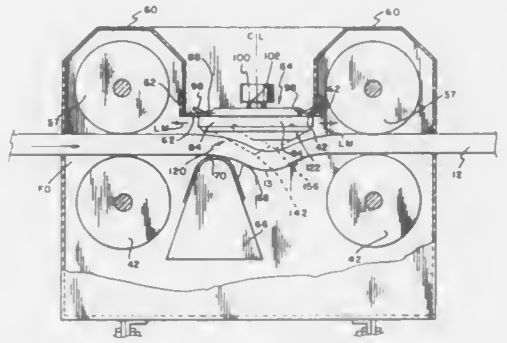
Donald F. Hays, Jr., Silver Lake Village, Ohio, assignor to Extrusion Services, Inc., Stow, Ohio
Filed Apr. 10, 1989, Ser. No. 335,832
Int. Cl.⁵ B26D *1/26, 5/12*
U.S. Cl. 83—444 **19 Claims**

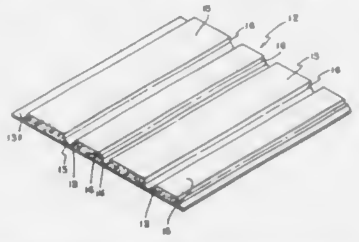
1. Apparatus for repeatedly severing rubber and plastic material at selected locations along a length thereof comprising, frame means, arbor means mounted on said frame means carrying a knife blade for rotation in a circular path, guide means for supporting the material to be severed in the path of rotation of said knife blade, means for selectively intermittently driving said arbor means for instituting rotation of said knife blade, and a single means for both supplementing the driving of said arbor means and for braking said arbor means to a stop after said knife blade has severed the material.



5,024,131
DUCT BOARD CUTTER

Roger F. Weldman, 2900 W. 55th St. South, Wichita, Kans. 67217
Filed Mar. 20, 1989, Ser. No. 326,088
Int. Cl.⁵ B26D *3/06*
U.S. Cl. 83—875 **5 Claims**





1. A machine for forming a formation in a sheet of material comprising:

a frame, said frame including a pair of spaced lips defining a generally rectangular opening having a center line;

a pair of upper rotatable rollers rotatably connected to said frame;

a pair of lower rotatable rollers rotatably connected to said frame;

a single stationary cutting bar secured to said frame underneath said rectangular opening and off-set with respect to said center line;

a powered means mounted to said frame for rotating said

VOL
1127
ISS
3
JE
18
1991
UMI

pair of upper rollers and said pair of lower rollers to move a sheet of material through said frame; and

a blade assembly removably and slidably mounted to said pair of spaced lips and adapted to adjust laterally across said rectangular opening;

said blade assembly comprises a blade support having a frame top, a guide frame secured to said frame top, and a clamping bar removably secured to said guide frame, said clamping bar extending beyond said guide frame to form a space between the frame top and said clamping bar wherein said pair of spaced lips removably and slidably lodges such that said blade assembly can be moved laterally across said rectangular opening and to and away from each lip of said pair of spaced lips.

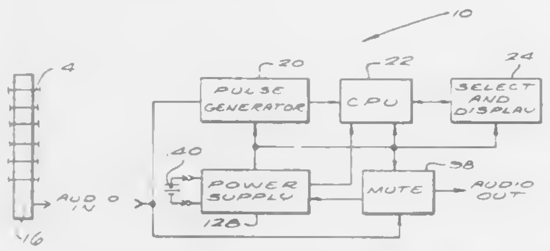
5,024,132
ELECTRONIC TUNER FOR A MUSICAL INSTRUMENT

Michael Anthony, 920 Cloverview, Glendora, Calif. 91740; Craig A. Ohler, Brea, Calif., and Arnold Christensen, Costa Mesa, Calif., assignors to Michael Anthony, Glendora, Calif.

Filed Nov. 27, 1989, Ser. No. 441,711

Int. Cl.^{5} G10D *3/14;* G10G *7/02*

U.S. Cl. 84—312 R **23 Claims**



19. An electronic tuner for a musical instrument having a plurality of strings wherein each of said strings is vibratable at a different fundamental frequency and at integer multiple harmonic frequencies of said fundamental frequency, means for transducing vibrations on each of said strings into an electrical analog signal, and means for tensioning each of said strings to tune said fundamental frequency to an in-tune frequency associated with each of said strings, said electronic tuner comprising:

a waveshaping circuit having an input to which said analog signal is applied and an output at which a pulse train signal is developed, said pulse train signal having a plurality of successive pulses, each of said pulses having a pulse width, said analog signal being transduced from vibrations on a selected one of said strings;

a central processing unit programmed to compute a current fundamental frequency on said one of said string as a function of a ratio between a numerical count of said pulses occurring between at least two of said pulses and including one of said two of said pulses and a sum of said pulse width of each of said pulses included in said count wherein said two of said pulses have a longest pulse width of said pulses in said pulse train signal, and further to compute a difference between said current fundamental frequency and said in-tune frequency associated with said selected one of said strings;

a display which displays said difference whereby said selected one of said strings can be tuned to minimize said difference; and

a power supply to provide power to said waveshaping circuit, said central processing unit and said display, said power supply being adapted to receive a battery.

5,024,133
ELECTRONIC MUSICAL INSTRUMENT WITH IMPROVED GENERATION OF WIND INSTRUMENTS

Masahiro Nakanishi, Yawata; Daisuke Mori, Kobe; Katsuyoshi Fujii, Moriguchi; Masahiko Hatanaka, Kadoma, and Hiroko Shinada, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed May 8, 1989, Ser. No. 348,526

Claims priority, application Japan, May 17, 1988, 63-119564

Int. Cl.^{5} G10H *1/18, 1/46, 7/10*

U.S. Cl. 84—615 **4 Claims**

1. An electronic musical instrument comprising:

a controller section which sends out, as playing information, sound generation information Kon, frequency information w, sound volume information Ps, tonguing information To, and embouchure information Am;

a lip movement section which calculates lip information s indicating a degree of opening of lips in accordance with the playing information (To,W,Am,Ps) sent out from said controller section;

a waveform generation section which generates desired waveform data Pout in accordance with the lip information s calculated from said lip movement section and the frequency information w, and the sound volume information Ps sent out from said controller section; and

a digital-to-analog converter for making digital-to-analog conversions of the waveform data Pout sent out from said waveform generation section.

5,024,134
PITCH CONTROL DEVICE FOR ELECTRONIC STRINGED INSTRUMENT

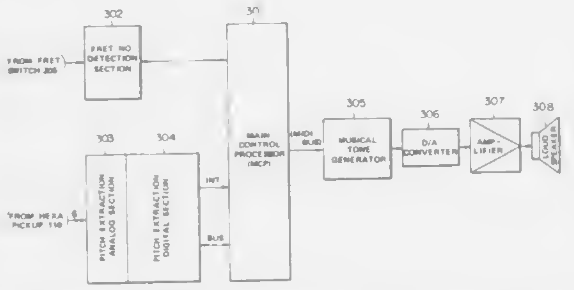
Shigeru Uchiyama, Sayama, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 28, 1989, Ser. No. 345,101

Claims priority, application Japan, May 2, 1988, 63-109625

Int. Cl.^{5} G01H *1/18*

U.S. Cl. 84—654 **20 Claims**



16. An electronic apparatus in which a vibration of at least one string is detected to cause an electronic circuit to generate a corresponding acoustic wave, comprising:

vibration start detecting means for detecting a start of a vibration of said string;

first pitch determining means for, when said vibration start detecting means detects the start of the vibration, detecting a depression position of said string to obtain an effective string length of said string and for determining a pitch of the acoustic wave the generation of which is to be started; and

second pitch determining means for, after said first pitch determining means determines the pitch of the acoustic wave when the generation of the acoustic wave is started, detecting a vibration period of said string and determining a pitch of the acoustic wave so as to sequentially change the pitch in accordance with the detected vibration period.

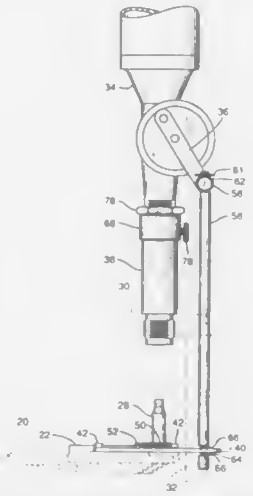
5,024,135
MULTI-STATION CARTRIDGE RELOADING PRESS WITH CONTROLLED POWDER DISPENSING

Walter W. Bender, Oroville, Calif., assignor to Blount, Inc., Portland, Oreg.

Filed Dec. 15, 1989, Ser. No. 451,128

Int. Cl.^{5} F42B *33/02*

U.S. Cl. 86—31 **5 Claims**



1. A multiple station reloading press for reloading spend cartridges comprising:

a support bracket;

a shell plate adapted to receive a plurality of cartridge cases to be reloaded;

indexing means for moving the shell plate and thereby indexing the cartridge cases to specified reloading positions, one of said positions being a powder loading station;

a die plate mounted on said support bracket above said shell plate, reloading members mounted in the die plate at the reloading positions, one of said reloading members being a lever actuated powder dispenser for dispensing powder into a cartridge case positioned at the powder loading station;

reciprocating means for producing relative reciprocal motion between the shell plate and die plate to move them toward and away from each other, and the improvement that comprises;

a drive element connected to a lever of the powder dispenser;

connecting means for selectively interconnecting said drive element to said reciprocating means to actuate the lever and thereby dispensing powder in response to operation of the reciprocating means, said connecting means including a portion moveable between positions projected into and out of a cartridge case space to be occupied by a cartridge case positioned at the powder loading station;

said connecting means disconnecting the drive element from the reciprocating means when said portion is projected into said cartridge case space when empty, and connecting said drive element to the reciprocating means when a cartridge case occupies said cartridge case space.

5,024,136
EQUIPMENT FOR GUN LOADER

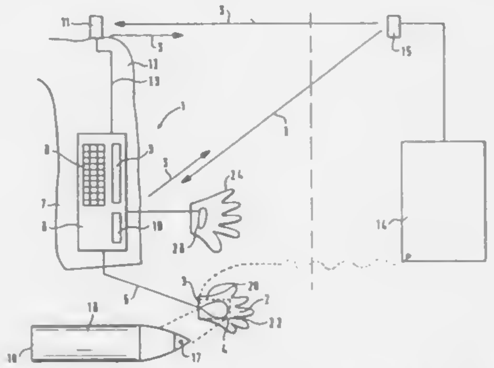
Erich Bock, Nuremberg, Fed. Rep. of Germany, assignor to DIEHL GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Mar. 22, 1990, Ser. No. 497,359

Claims priority, application Fed. Rep. of Germany, Apr. 14, 1989, 3912287

Int. Cl.^{5} F42C *17/04*

U.S. Cl. 89—6 **13 Claims**



1. Equipment for a gun loader; comprising a coil which is wire-connected to a plotting apparatus through which there can be set the fuze of an article of ammunition from the equipment of a gun layer during the loading sequence of the ammunition, said coil being fastened to a first location on equipment worn by a gun loader and in which the ammunition fuze comes into contact with said location during the loading sequence, said plotting apparatus being fastened to the equipment at a second location which is readily viewable by the gun loader, and wherein a signal transmitting path is formed between the plotting apparatus and the equipment of the gun layer.

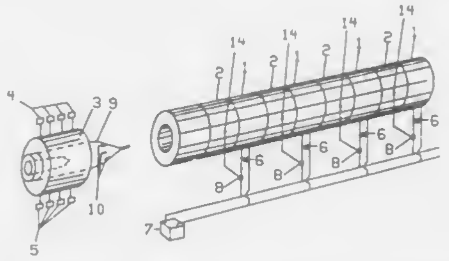
5,024,137
FUEL ASSISTED ELECTROMAGNETIC LAUNCHER

Jon M. Schroeder, 14301 Bagdad Rd., Leander, Tex. 78641

Filed Nov. 13, 1989, Ser. No. 435,616

Int. Cl.^{5} F41B *6/00*

U.S. Cl. 89—8 **16 Claims**



1. A fuel assisted electromagnetic launcher comprising:

a) a D.C. power source,

b) a minimum of three propellant coils means each with a central opening, and each with an external series connection to said D.C. power source,

c) a nano-second switch means located in said external series connection,

d) a first capacitor means connected in parallel with lines leading to each of said minimum of three propellant coil means,

e) a primary activation means to open said nano-second

VOL
1127
ISS
3
JE
18
1991
UMI

switch means as a forward tip of a cylindrical launch container means approaches said each of a minimum of three propellant coil means; said cylindrical launch container means having one con shaped end with said cone shaped end having a pointed end means and with a minimum of two thermopile ring means around said cylindrical launch container means and with said cylindrical launch container means containing a rocket fuel in a rearward compartment of said cylindrical launch container means and with said pointed end means interacting with said primary activation means to time activation of each of said propellant coil means to interact with said minimum of two thermopile means to constantly accelerate said cylindrical launch container means after said cylindrical launch container means is propelled by ignition of said rocket fuel into a gun barrel-like structure means holding said minimum of three electromagnetic propellant coils means;

f) a thermopile activation means in a structure to contain said cylindrical launch container means and align said cylindrical launch container means with an interior of said gun barrel-like structure;

g) a remote controlled guidance means in said cone shaped forward end of said cylindrical launch container means, said guidance means being furnished power by one of a group comprising said thermopile means, silicon wafer generation means, and gallium arsenide generation means.

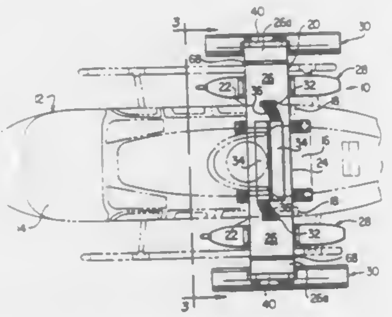
5,024,138
AIRCRAFT ARMAMENT APPARATUS

Paul H. Sanderson, 2019 Cripple Creek, Lewisville, Tex. 75067, and Richard C. Serkland, 1010 Meadowlake Dr., McKinney, Tex. 75069

Continuation of Ser. No. 297,970, Jan. 17, 1989, abandoned, which is a division of Ser. No. 144,873, Jan. 13, 1988, Pat. No. 4,893,545. This application Jun. 4, 1990, Ser. No. 532,172

Int. Cl.^{5} F41A *23/00*

U.S. Cl. 89—37.22 18 Claims



1. Armament apparatus for an aircraft having a cabin area, comprising:

an elongated support plant member having a longitudinally central portion positioned between outer end portions of the plank member,

each of said outer end portions of said plank member having an outer tip portion hingedly secured thereto and pivotable between an extended position in which the tip portion defines an outward extension of said outer end portion, and a retracted position in which the tip portion is pivoted upwardly and inwardly onto said outer end portion of the plank member;

means for securing said central portion of the plank member to the aircraft, within said cabin area thereof, in a manner such that said outer end portions of said support plank member project outwardly beyond opposite side portions of the aircraft;

a pair of support structures secured to and extending downwardly from said outer tip portions for supporting weaponry, each of said support structures being pivotable relative to the plank member about a first axis generally parallel to the longitudinal axis of said plank member;

means for operatively mounting said weaponry on said support structures;

means, associated with said support structures, for pivotally adjusting the mounted weaponry about vertical axes generally perpendicular to the support plank member;

means for selectively adjusting the pivotal orientations of said support structures, about said first axis, relative to the support plank member; and

means positioned on said outer end portions of the support plank member inwardly of said outer tip portions, for operatively supporting a pair of machine guns below said plank member.

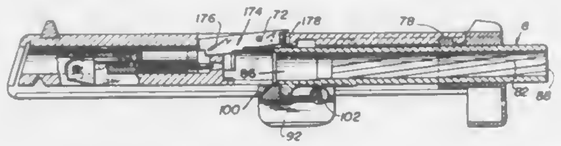
5,024,139
FIREARM WITH MOVABLE BARREL SAFETY

C. Reed Knight, Jr., Vero Beach, and Eugene M. Stoner, Palm City, both of Fla., assignors to Kniarmco Inc., Vero Beach, Fla.

Division of Ser. No. 447,601, Dec. 8, 1989. This application May 14, 1990, Ser. No. 523,481

Int. Cl.^{5} F41A *17/66*

U.S. Cl. 89—154 3 Claims



1. A semi-automatic, double action only firearm comprising:

an elongated frame having a generally U-shaped, axial cavity and an axial slideway defining an upwardly facing longitudinal opening therein,

an elongated slide mounted on said frame for movement along said slideway between a slide battery position and a slide recoil position,

a drive spring assembly housed in said cavity biasing said slide into said slide battery position,

a barrel rotatably and slidingly carried in said slide,

cam means to rotate said barrel between a barrel battery position and a barrel recoil position wherein said barrel can slide axially in said slide,

integral lugs that extend laterally from said barrel to prevent its axial movement in said slide when in said barrel battery position,

a firing pin assembly including a firing pin carried in said slide for axial movement between a retracted position and a firing position through a safety position, and

a firing pin safety block assembly that positively prevents said firing pin from reaching said firing position until said barrel has fully rotated into said barrel battery position including a stop lever pivoted on said slide.

5,024,140
HYDRAULIC CONTROL MECHANISM FOR A HYDRAULIC ACTUATOR

Douglas M. Gage, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Oct. 30, 1989, Ser. No. 429,442

Int. Cl.^{5} F15B *13/04*

U.S. Cl. 91—28 13 Claims

1. A hydraulic control mechanism comprising:

a first source of pressurized hydraulic fluid;

a hydraulic actuator;

a first hydraulic line hydraulically coupling the first source to the hydraulic actuator;

a pilot signal line for transmitting a hydraulic pilot signal, the pilot signal line having a pilot pressure sensing point;

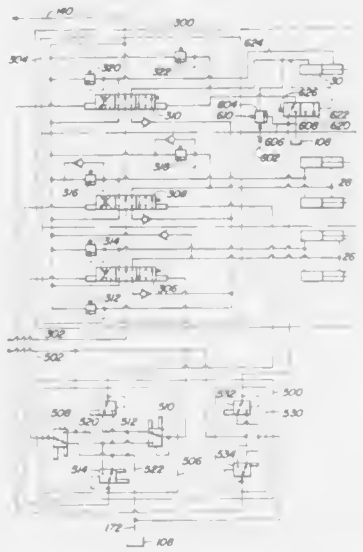
a pilot operated hydraulic control valve hydraulically positioned between the first source and the hydraulic actuator on the first hydraulic line, the hydraulic control valve regulating the flow of hydraulic fluid from the first source to the hydraulic actuator, the hydraulic control valve having at least one end cap hydraulically coupled to the pilot signal line for positioning the hydraulic control valve in response to a pilot signal;

a second source of pressurized hydraulic fluid;

a second hydraulic line hydraulically coupling the second source to the hydraulic actuator;

a first pressure sensing valve hydraulically positioned between the second source and the hydraulic actuator on the second hydraulic line, the first pressure sensing valve regulating the flow of hydraulic fluid from the second source to the hydraulic actuator, the first pressure sensing valve is provided with a first pressure sensing line that is hydraulically coupled to the pilot signal line at the pilot pressure sensing point for positioning the first pressure sensing valve in response to a pilot signal; and

a second pressure sensing valve hydraulically positioned between the sensing point on the pilot sensing line and the at least one end cap of the hydraulic control valve for coupling and decoupling the pilot signal to the end cap of the hydraulic control valve, the second pressure sensing valve is provided with a second pressure sensing line that is hydraulically coupled to the first hydraulic line for driving the second pressure sensing valve in response to the hydraulic pressure in the first hydraulic line, whereby when hydraulic pressure increases in the first hydraulic line the second pressure sensing valve shifts decoupling the at least one end cap of the hydraulic control valve from the pilot pressure signal.



5,024,141
METHOD FOR THE SYNCHRONOUS OPERATION OF JUXTAPOSED CYLINDER DEVICES

Hiroyuki Kawada, Hekinan, Japan, assignor to Sugiyasu Industries Co., Ltd., Aichi, Japan

Filed May 9, 1989, Ser. No. 349,253

Claims priority, application Japan, Nov. 10, 1988, 63-146815[U]

Int. Cl.^{5} F01B *25/04;* **F15B** *11/22;* **G01B** *7/14*

U.S. Cl. 91—171 11 Claims

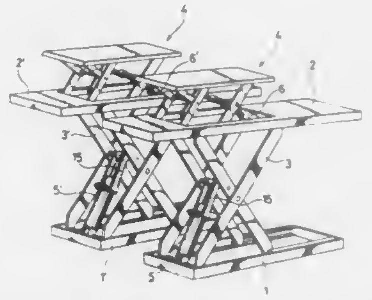
1. A method for synchronizing the operations of plural cylinder devices, each including a reciprocating part and a stationary part, which comprises

(a) providing one of said two parts of each said cylinder device with a scale having alternate projections and depressions which are arranged with regular pitches along a direction of reciprocation of said reciprocating part, as well as providing the other of said two parts at a given position thereof with a sensor that determines whether a portion of said scale which corresponds to said sensor in position at a particular point of time is a projection or a depression, said sensor producing pulses while making said determination,

(b) monitoring a pattern of the pulses produced by the sensor of each of the cylinder devices while the cylinder devices are operating,

(c) determining that the operations of the cylinder devices have become unsynchronized, if and when the relative patterns of occurrence of the pulses produced by the sensors disagree with the relative patterns of occurrence of pulses produced by the sensors when the cylinder devices are in synchronous operation, by more than a predetermined degree, and

(d) controlling the rate of supply of operating fluids to the cylinder devices until the disagreement of the relative patterns of the pulses has been eliminated, thereby synchronizing the operations of the cylinder devices.



5,024,142
CYCLICALLY OPERATING FLUID DRIVE MOTOR WITH MAGNETICALLY CONTROLLED DIAPHRAGM VALVES

Thomas Vrhel, Sr., 5782 Barnswell Way, San Jose, Calif. 95138, and Thomas Vrhel, Jr., 918 Clinton Rd., Los Altos, Calif. 94024

Filed Jul. 24, 1989, Ser. No. 384,323

Int. Cl.^{5} F01L *25/08*

U.S. Cl. 91—271 5 Claims

1. A fluid drive motor for producing rotary reciprocating motion, comprising:

a) a motor body arranged about a longitudinal axis and having fluid ingress and egress passageways including fluid distribution ports communicating with a pair of opposed piston cavities formed within the motor body and closed at their adjacent ends by a transverse wall and closed at their remote ends by seal walls detachably secured to the motor body;

b) a piston assembly mounted within the motor body and including a double-acting pair of pistons slidably disposed sealingly in said pair of opposed piston cavities, and a toothed rack interconnecting said pistons on opposite sides of said transverse wall;

c) a drive assembly mounted on said motor body and including an elongated drive shaft extending through said body transverse to the longitudinal axis thereof and having a pinion gear fixed thereon operatively engaged with said

VOL
1127
ISS
3
JE
18
1991
UMI

toothed rack whereby axial reciprocation of said piston assembly including said toothed rack effects rotary reciprocation of said drive assembly including said elongated drive shaft;

d) fluid distribution means mounted on said motor body for directing fluid alternatively to and from each of said piston cavities to effect axial reciprocation of said pistons within said piston cavities and including a fluid channel block having ports communicating with said fluid distribution ports in the motor body and a valve block operatively associated with said channel block and having valve means operable to control the flow of fluid through said channel block; and

e) a non-electrical control mechanism operatively associated with said valve block and said drive shaft and operable in cooperation with said valve means to control the flow of fluid under pressure through said motor body to effect axial reciprocation of said piston assembly and rotary reciprocation of said drive assembly;

f) said valve means including two pairs of diaphragm valves, one valve of each pair being open for the passage of fluid therepast while the remaining valve of each pair is closed to prevent passage of fluid therepast, one of said open valves admitting fluid under pressure to one of said piston cavities to effect displacement of the piston therein while the other open valve enables fluid to be discharged from the other of said piston cavities by displacement of the piston therein.

5,024,143

SWASHPLATE TYPE HYDRAULIC AXIAL PISTON MACHINE HAVING A TRACKING DEVICE FOR THE CAGE OF THE SEGMENTAL ROLLING CONTACT BEARING OF THE SWASHPLATE

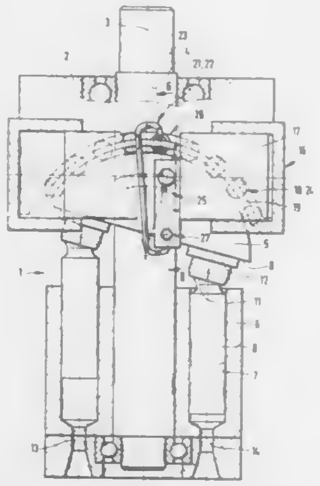
Reinhold Schniederjan, Neu-Ulm, Fed. Rep. of Germany, assignor to Hydromatik GmbH, Fed. Rep. of Germany

Filed May 15, 1990, Ser. No. 523,770

Claims priority, application Fed. Rep. of Germany, May 16, 1989, 3915904

Int. Cl.^{5} F01B *3/02*

U.S. Cl. 92—12.2 — 11 Claims



1. A swashplate type hydraulic axial piston machine wherein the swashplate is arranged on a rocker mounted to pivot in a segmental rolling contact bearing, said machine having a tracking device for the cage of said pivot bearing which comprises a rod-like guide element which is connected to said rocker in a first bearing in the rocker so that it can pivot parallel to the pivot plane and is connected to said cage in a second bearing so that it can pivot parallel to the pivot plane and can be displaced longitudinally, and is mounted to pivot parallel to the pivot plane in a third bearing, characterised in that said rocker can be adjusted by an adjustment member mounted so that it can be displaced transverse to the middle axis of the axial piston machine and that said third bearing is arranged on a guide member which is movably connected to the adjustment member and the rocker.

5,024,144

PISTON DRIVE

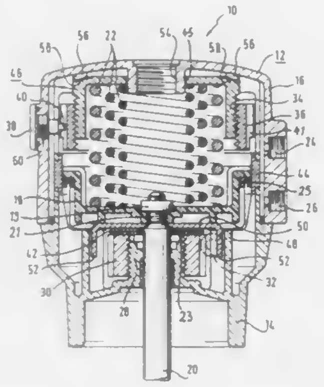
Fritz Müller, Neuer Wasen 6, 7118, Ingelfinger-Criesbach, Fed. Rep. of Germany

Filed Aug. 18, 1989, Ser. No. 395,486

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1988, 3829566

Int. Cl.^{5} F01B *31/14*

U.S. Cl. 92—13.5 — 13 Claims



1. A piston drive for actuating an element such as a valve, comprising:

a housing defining an axis and including a connecting piece provided with an external thread;

piston means operatively connected to the element and including a piston reciprocating in axial direction within said housing between two end positions;

first adjusting means for defining one of said end positions of said piston, said first adjusting means including a worm drive having a worm wheel acting upon said piston and provided with an internal thread in mesh with said external thread of said connecting piece so as to be movable in axial direction; and

second adjusting means accommodated in said housing for defining the other one of said end positions, said second adjusting means including a further connecting piece mounted to said housing and a gear extending in the path of movement of said piston and cooperating with said further connecting piece so as to be movable in axial direction, said gear being accessible from outside through an opening of said housing to permit adjustment thereof.

5,024,145

VIBRATORY BULK MATERIAL PROCESSOR AND METHOD

Richard G. Bailey, Overland Park, Kans., assignor to Flakee Mills, Inc., Lincoln, Nebr.

Filed Aug. 28, 1989, Ser. No. 399,258

Int. Cl.^{5} A23L *3/26;* **F26B** *23/08*

U.S. Cl. 99—451 — 24 Claims

1. A bulk material radiation processor, which includes:

(a) a framework assembly;

(b) a tray assembly, which includes:

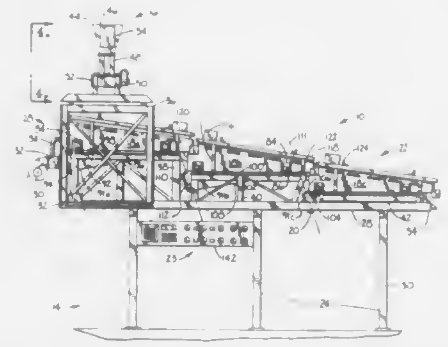
  (1) a pair of transversely-spaced side walls;

  (2) an upper plate extending transversely between said side walls and including a material-receiving upper surface and longitudinally-spaced upstream and downstream ends;

  (3) a lower plate extending transversely between said side walls and including a material-receiving upper surface and longitudinally-spaced upstream and downstream ends;

  (4) longitudinally-spaced upstream and downstream tray assembly ends;

  (5) a material flow path from said tray assembly upstream end to said tray assembly downstream end over said plate material-receiving upper surfaces and between said tray assembly side walls; and



  (6) mounting means for mounting said tray assembly on said framework assembly;

(c) a vibrator operably connected to said tray assembly;

(d) an infrared heater mounted on said frame assembly over said material flow path; and

(e) vibration dampening means comprising a pneumatic shock absorber connected to said frame assembly and said tray assembly.

5,024,146

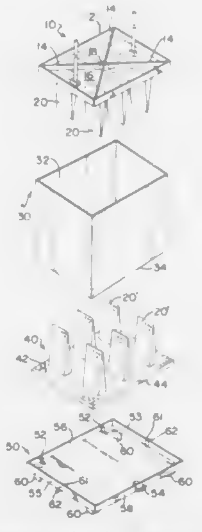
CHEESE DRAINER PAN ASSEMBLY

Gordon L. Dull, Soldiers Grove, Wis., assignor to Wisconsin Dairies Cooperative, Baraboo, Wis.

Filed Mar. 19, 1990, Ser. No. 495,686

Int. Cl.^{5} A01J *25/00;* **A23C** *19/00*

U.S. Cl. 99—458 — 11 Claims



1. A drainer pan assembly for large-scale cheese making comprising:

a pan having a drainer plate disposed therein and means for securely attaching said plate to said pan; wherein said attachment means comprises a plurality of restraints, including at least one releasable restraint, which secure said plate to said pan and are arranged with respect to each other so that when the releasable restraint is released said plate is easily removed from said pan and when engaged said plate is secured in said pan; wherein said releasable restraint comprises a dowel and spring means for urging said dowel into releasable engagement with said drainer plate and said dowel and spring means are associated with the pan.

5,024,147

DEVICE FOR PITTING FRUIT, PARTICULARLY PRUNES

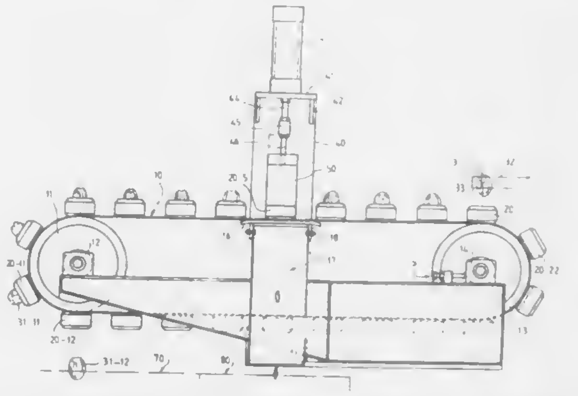
Gaston Petit, 8, rue des Coquelicots, 95000 Cergy, and Daniel Monteiro, Hautefage La Tour, 47340, La Roque Timbaut, both of France

Filed Jun. 30, 1988, Ser. No. 213,812

Claims priority, application France, Nov. 5, 1986, 86 15416; Jun. 4, 1987, 87 07828

Int. Cl.^{5} A23N *4/00, 4/08*

U.S. Cl. 99—549 — 17 Claims



1. A fruit-pitting device, particularly for prunes, comprising means for actuating a pitting rod (**46**), so that it goes down in a holding position where a prune is held, characterized in that said holding position is defined by an annular trough (**20**) for collecting and holding a prune in a substantially vertical position, and by a sleeve (**50**) mounted slidingly along said rod (**46**) and carried therewith under the effect of an elastic return in compression within said sleeve (**50**) when said prune is in said holding position, said sleeve (**50**) having hallowed-out free end (**60**) at the trough end and disposed opposite thereto, said trough end of said sleeve contacting said trough when said prune is in said holding position and said elastic return is compressed.

5,024,148

COATING REMOVAL DEVICE FOR GRANULAR MATERIALS

Darcy Moses, Rush City, Minn., assignor to Crown Iron Works Company, Minneapolis, Minn.

Filed Oct. 5, 1988, Ser. No. 253,769

Int. Cl.^{5} B02B *3/00, 3/04*

U.S. Cl. 99—618 — 7 Claims

1. Apparatus for removing skin-like coatings from nuclei of a material to be processed, which nuclei the coatings encase, comprising:

(a) a housing including a pair of opposite, generally-parallel side panels;

(b) a drum disposed between said housing side panels for rotation about an axis, said drum having an outwardly facing surface;

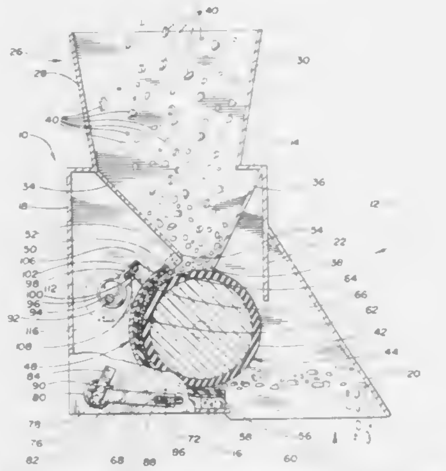
(c) an arcuate wall disposed between said housing side panels and positioned such that an inner concave surface of said wall is disposed closely proximate said outwardly facing surface of said drum to define a narrow processing space between said inner concave surface of said wall and said outwardly facing surface of said drum, said processing space narrowing downwardly along said outwardly facing surface of said drum;

VOL
1127
ISS
3
JE
18
1991
UMI

(d) means mounting said wall to enable variation of the distance at which said wall is disposed proximate said drum, said mounting means including:

(i) a shackle secured to an outer convex surface of said wall proximate a lower end thereof;

(ii) an eccentric cam mounted to one of said housing side panels and disposed for rotation about an axis generally perpendicular to said housing side panel to which said cam is mounted; and



(iii) an elongated linkage member pivotally attached to said shackle and extending to, and being in operative engagement with, said eccentric cam;

(iv) wherein, as said eccentric cam is rotated, said linkage member reciprocates to effect movement of said wall; and

(e) means for introducing material to be processed into said processing space.

5,024,149

BINDING STRAP OPERATING APPARATUS

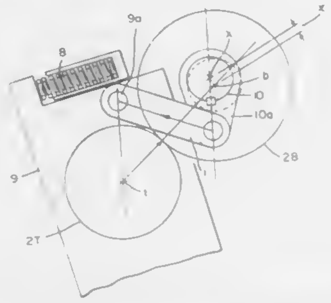
Kanami Kato, Saiai, Japan, assignor to Signode Corporation, Glenview, Ill.

Filed Apr. 10, 1989, Ser. No. 335,956

Claims priority, application Japan, Apr. 15, 1989, 63-94337

Int. Cl.^{5} B65B *13/22*

U.S. Cl. 100—32 **10 Claims**



1. Apparatus for feeding, taking up, and tensioning a binding strap, comprising:

a traction wheel;

a back-up wheel operatively associated with said traction wheel for defining a gap therebetween within which a portion of said binding strap can be disposed for movement in a forward feeding and reversed retraction directions so as to achieve feeding and tensioning binding operations;

a pivotable support plate upon which one of said traction and back-up wheels is mounted;

means for eccentrically mounting the other one of said traction and back-up wheels such that said two wheels can relatively approach, and separate from, each other so as to respectively retain said binding strap within said gap, and permit introduction of said binding strap into said gap;

lever means connected to said means for eccentrically mounting said other one of said traction and back-up wheels;

connecting link means for connecting said lever means to said support plate; and

spring means for biasing said support plate in a direction which will cause said eccentrically mounted wheel to be moved toward said one of said wheels in response to the biasing force of said spring means being transmitted to said eccentrically mounting means through said support plate, said connecting link means, and said lever means.

5,024,150

PROCESS FOR REDUCING VIBRATIONS OF SUCCESSIVE SETS OF ROLLS AND A ROLL ARRANGEMENT HAVING REDUCED VIBRATORY TENDENCIES

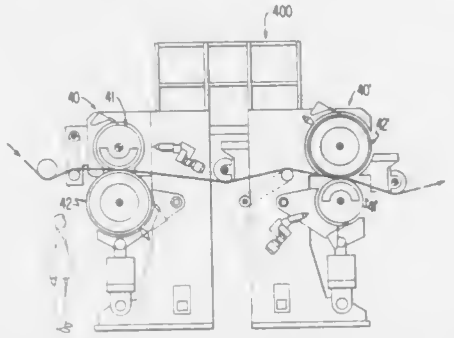
Berhard Brendel, Grefrath and Günter Schrörs, Tönisvorst, both of Fed. Rep. of Germany, assignors to Eduard Küsters Mashinenfabrik GMBH & Co. KG., Krefeld, Fed. Rep. of Germany

Filed May 8, 1989, Ser. No. 349,042

Claims priority, application Fed. Rep. of Germany, May 6, 1988, 3815445

Int. Cl.^{5} B30B *3/04, 13/00*

U.S. Cl. 100—35 **18 Claims**



1. A process for reducing vibrations of at least first and second pairs of rolls, each roll pair being of essentially similar construction and being immediately successive and spaced from each other in the direction of travel of a web, which is conducted through a first nip formed between rolls of the first roll pair and a second nip formed between rolls of the second roll pair, comprising altering the natural frequency of the one of the first and second pairs of rolls such that it differs from the natural frequency of the other roll pair whereby random vibrations of the first roll pair manifested in the web do not form a systematic excitation for the second roll pair.

5,024,151

REFUSE COMPACTOR

Guy Girardin, Ste Foy; Pierre Morin, Sillery; Duy Nguyen; Duc Nguyen, both of St Jean Chrysostome, and Louise Brunelle, Charlesbourg, all of Canada, assignors to Les Enterprises Julien Inc., Quebec, Canada

Filed May 31, 1989, Ser. No. 359,439

Int. Cl.^{5} B30B *15/14*

U.S. Cl. 100—53 **17 Claims**

1 A refuse compactor comprising:

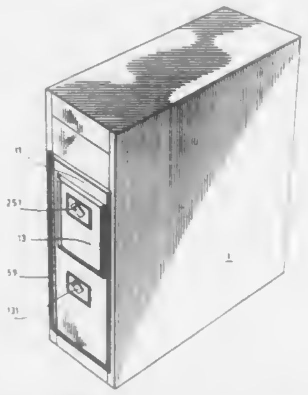
a cabinet defining a refuse-compaction chamber and having a front wall and two opposite side walls, and a service door to give access to the compactor chamber through its front wall;

a compaction mechanism mounted in the cabinet above the compaction chamber to compact refuse in a container removeably insertable into said compaction chamber through the service door;

a pressure-resisting wall penal moveably mounted inside said compaction chamber, said wall panel being adjacent and parallel to one of said side walls of said compaction chamber;

cam means mounted inside the compaction chamber, said cam means being capable of laterally moving the wall panel toward and away from the one side wall;

actuation means mechanically connected to the cam means to operate the same in order to reversibly move the wall panel between a first position where said wall panel is rigidly held at a distance from the one side wall of the compaction chamber and a second position where said wall panel extends close to said one side wall;



said service door being pivotally mounted onto said front wall about a set of hinges;

said cam means including opposite wedges fixed on said one side wall and said wall panel respectively in such a manner as to allow bodily motion of said wall panel toward and away from said one side wall when said wall panel is shifted perpendicularly to said front wall; and

said actuation means including means connecting said service door and said wall panel together to mechanically shift said wall panel perpendicularly to said front wall as soon as said service door actuated.

5,024,152

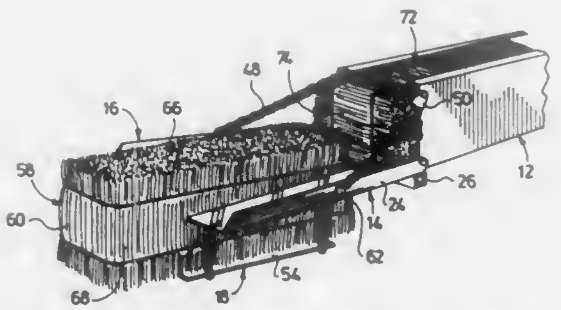
QUARTER TURN BALE DISCHARGE APPARATUS

David E. Girard, Goessel, Kans., assignor to Hay & Forage Industries, Hesston, Kans.

Filed May 14, 1990, Ser. No. 523,016

Int. Cl.^{5} B30B *1/00;* **A01D** *75/00;* **B65G** *11/00*

U.S. Cl. 100—188 R **10 Claims**



1. A bale discharge apparatus for use in guiding each of a plurality of bales of crop material between a bale forming chamber of a baler and the ground as each of the bales is delivered from the bale forming chamber, wherein each bale is of a generally parallelepipedal shape having a predetermined height and width and defining top and bottom sides, lateral sides, and front and rear ends, the bale chute apparatus including a bale turning assembly for turning each bale onto one of the lateral sides as the bale is delivered along a predetermined path from the bale forming chamber, wherein the improvement comprises:

a table for receiving each turned bale after the bale has been turned onto one of the lateral sides by the bale turning assembly; and

means for supporting the table beneath the bale turning assembly at a height adapted to position the turned bale at least partially within the predetermined path of the next delivered bale so that the front end of the next delivered bale engages the rear end of the turned bale and pushed the turned bale from the table onto the ground,

said supporting means including flexible means yieldably suspending the table beneath the turning assembly in a manner to permit the table to freely rise and fall and rock fore-and-aft and side-to-side as necessary to slide over obstructions in the field.

5,024,153

PRINT DRUM FOR A POSTAGE METER

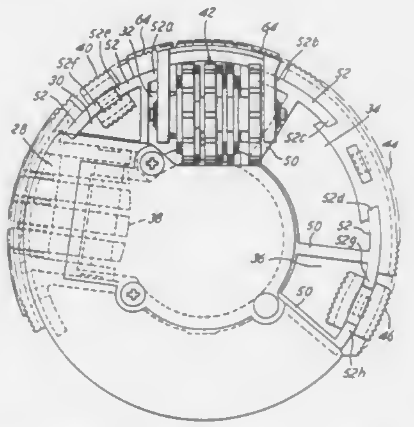
Raymond L. Bannister, Richmond; Frederick C. Close, Great Amwell, and Peter J. Loeber, Earith, all of United Kingdom, assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Sep. 10, 1986, Ser. No. 905,896

Claims priority, application United Kingdom, Sep. 16, 1985, 8522831

Int. Cl.^{5} B41F *13/10, 27/06*

U.S. Cl. 101—91 **15 Claims**



1. A print drum for a postage meter, comprising:

a drum structure defining a drum longitudinal axis, an outwardly facing print region and a plurality of recesses within said printing region,

a print wheel assembly housed within said drum structure having means for remotely adjusting the print wheels of said assembly,

longitudinal guide means associated with said recesses,

at least one imprinting die constructed for sliding movement on said longitudinal guide means in and out of one of said recesses in a direction substantially parallel to said print drum axis, and

resilient biassed detent means for releasably locking the imprinting die in its printing position within the respective drum recess.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,154

TRANSFER ROLLER SWITCHING MECHANISMS OF INK AND WATER SUPPLY APPARATUS FOR USE IN PRINTING PRESSES

Kiyoshi Ito, Imba, Japan, assignor to Komori Printing Machinery Co., Ltd., Tokyo, Japan

Filed Feb. 17, 1981, Ser. No. 235,421

Claims priority, application Japan, Feb. 28, 1980, 55-25054

Int. Cl.^{5} B40L *23/00*

U.S. Cl. 101—148 **3 Claims**

1. A transfer roller switching mechanism of ink and/or water supply apparatus for use in a printing press comprising a fountain roller for supplying ink or water, a swinging roller for supplying ink or water to a plate cylinder, a rubber cylinder brought into engagement with said plate cylinder and out of engagement therefrom, a transfer roller reciprocated between said fountain roller and said swinging roller, a swinging lever which is swung together with a supporting member of said transfer roller, a control member pivoted to said swinging lever near a free end thereof and interlocked with movements of said rubber cylinder into engagement and disengagement from said rubber cylinder so as to prevent swinging motion of said swinging lever, manual switching means for switching said control member between a position at which the movement of said swinging lever is prevented and a position at which said swinging lever is permitted to move, and buffer spring means interposed between said plate cylinder and said control member for transmitting motion therebetween and for enabling said rubber cylinder to disengage from said plate cylinder when said control member is fixed.

5,024,155

FINGER PROTECTING ELEMENT FOR CYLINDER NIP

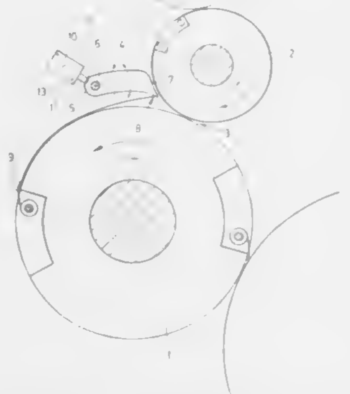
Hans-Georg Jahn, Wiesenbach, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Apr. 9, 1987, Ser. No. 36,351

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1986, 3613463

Int. Cl.^{5} B41F *33/00*

U.S. Cl. 101—216 **8 Claims**



1. In combination, a printing machine with counter-rotating cylinders having a nip therebetween formed with a sheet inlet and a sheet outlet, and means for gripping a leading edge of a sheet and transporting the sheet from one of the cylinders to the other of the cylinders successively through the sheet inlet and the sheet outlet of the nip, and a device comprising a finger protecting element pivotally mounted at an end thereof on a shaft extending parallel to axes of the cylinders in a danger zone in front of the sheet outlet of the nip, said finger protecting element having a guide surface on a side thereof facing towards the other cylinder for guiding a displaced trailing edge of the sheet after the sheet has been transported from the one cylinder to the other, said guide surface beginning at the other and free end of the finger protecting element in vicinity of the sheet outlet of the nip and extending towards said pivotally mounted end, said guide surface being concave and being spaced from the other cylinder, said concave guide surface being disposed approximately equidistantly from the circumference of the other cylinder.

5,024,156

SAFETY DEVICE FOR THE CONTROL OF WEB-FED ROTARY PRINTING MACHINES

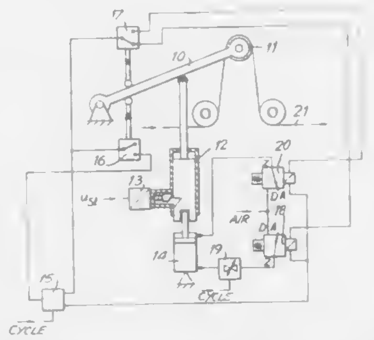
Dietrich Hank, Leipzig, and Jürgen Gottlebe, Karl-Marx-Stadt, both of German Democratic Rep., assignors to Veb Kombinat Polygraph "Werner Lamberz" Leipzig, Leipzig, Fed. Rep. of Germany

Filed Oct. 3, 1986, Ser. No. 915,312

Claims priority, application German Democratic Rep., Dec. 13, 1985, 284283

Int. Cl.^{5} B41F *5/00*

U.S. Cl. 101—216 **9 Claims**



1. A safety device for a control of a web-fed rotary printing machine including a printing means, a device for advancing a web having a predetermined tension past the printing means, drive means for driving the web advancing device to advance the web at a predetermined speed, waste paper removing means, and a central control station for controlling the printing press, said safety device comprising sensors positioned at least before and behind the web advancing device and operative for recognizing tears in a region of edges of the advancing web; an evaluation device having an input connected to said sensors and an output, at which an impulse-like control signal Ust, indicative of recognizing a tear in said web by said sensors, is issued; switching means connected to said output of said evaluation device and arranged in a path of said web of the printing machine and operative for an abrupt lowering of the web tension upon receiving said signal; said evaluation device having a further output at which a warning and control signal is issued, said signal starting timely upon the recognition of the tear at said region of the advancing web and ending when a time interval of a machine cycle of the printing machine has expired after a last recognition of a tear to the web at said region; an indication element for indicating danger of a web tear occurrence, said indication element being positioned at a central remote control station of the printing machine and being connected to said further output, a first switch element for lowering a speed of the drive means to thereby lower a speed of the advancing web and a second switch element for actuating the waste removing means, said first and second switch elements being connected to said further output.

5,024,157

SHOCK DETECTING DEVICE

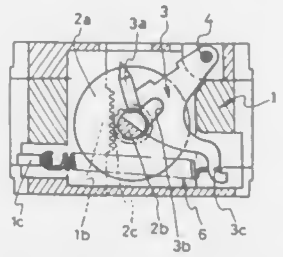
Masumi Nishikawa, Toyoake, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 13, 1990, Ser. No. 492,750

Claims priority, application Japan, Mar. 23, 1989, 1-71567

Int. Cl.^{5} F42C *15/24*

U.S. Cl. 102—252 **10 Claims**



1. A shock detecting device, comprising:
a housing;
a firing lever pivotably mounted in the housing to rotate in a first direction from a cocked to a fired position;
urging means interposed between the firing lever and the housing for constantly urging rotation of the firing lever in the first direction to the fired position; and
a weight, including a cam, rotatably and slidably mounted in the housing, said weight being caused to rotate and slide in response to an external shock which exceeds a predetermined amount of force, the cam engaging the firing lever when in a cocked position and disengaging the firing lever to permit rotation of the firing lever in the first direction to the fired position in response to the rotation and sliding movement of the weight in response to an external shock.

5,024,158

MULTI-DIRECTIONAL INITIATOR FOR EXPLOSIVES

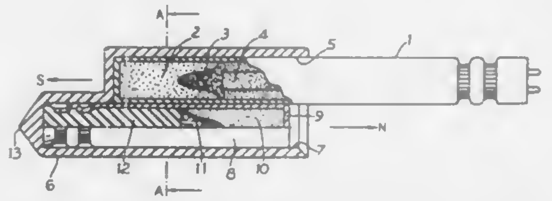
David L. Kennedy, Victoria, Australia; Donald C. True, Brownsburg, and David M. Welsh, South Brownsburg, both of Canada, assignors to Imperial Chemical Industries PLC, England

Division of Ser. No. 305,922, Feb. 3, 1989, Pat. No. 4,947,751. This application May 17, 1990, Ser. No. 524,475

Claims priority, application United Kingdom, Feb. 3, 1988, 8802328

Int. Cl.^{5} C06C *5/06*

U.S. Cl. 102—275.11 **4 Claims**



1. An initiator assembly suitable for use in detonating a column of cap-sensitive water-gel emulsion or pneumatically loaded ANFO explosives, comprising two blasting caps each containing an ignition charge of primary explosives material and a base charge of secondary explosives material, said caps being secured together side-by-side such that the base charge end of the first cap is at one end of the assembly and the base charge end of the second cap is at the opposite end of the assembly and the ignition charges are co-incident over a portion of the length of the assembly so that initiation of the ignition charge of the first cap causes substantially simultaneous initiation of the ignition charge in the second cap.

5,024,159

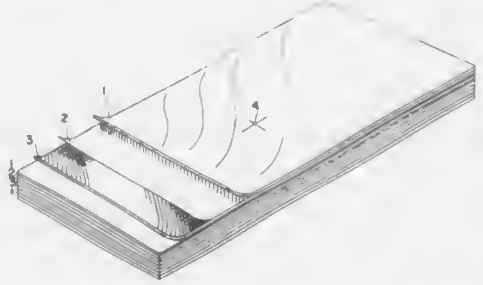
PLANE-WAVE FORMING SHEET EXPLOSIVE

David H. Walley, P.O. Box 396, Muskogee, Okla. 74402

Filed May 14, 1987, Ser. No. 49,547

Int. Cl.^{5} C06D *00/00*

U.S. Cl. 102—289 **16 Claims**



1. A point initiated geometric waveforming flexible explosive sheet comprising:
a recurring sequence of alternating layers of explosive, foil, and a spacer forming material in order.

5,024,160

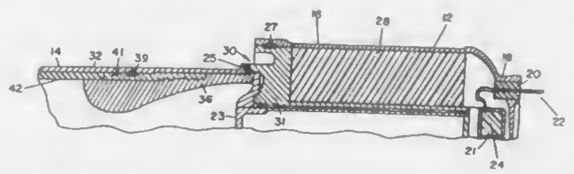
RAPID BURNING PROPELLANT CHARGE FOR AUTOMOBILE AIR BAG INFLATORS, ROCKET MOTORS, AND IGNITERS THEREFOR

J. B. Canterberry, Taft, Tenn., and David A. Flanigan, Ogden, Utah, assignors to Thiokol Corporation, Ogden, Utah

Division of Ser. No. 908,763, Sep. 18, 1986, Pat. No. 4,798,142. This application Feb. 11, 1988, Ser. No. 158,829

Int. Cl.^{5} B60R *21/28;* **F42B** *3/00*

U.S. Cl. 102—323 **9 Claims**



1. Apparatus comprising a vehicle inflatable crash protection bag means, a gas generant charge which is operable upon ignition to produce gas, said gas generant charge includes a reticulated substrate having a quantity of interconnected ligaments and a coating of solid gas generant composition on said ligaments, said coating has a thickness such that interstices are between coated ligaments which interstices define open gas generant surface area for supporting combustion, ignition means to ignite said gas generant composition, and means for flowing the gas into said vehicle inflatable crash protection bag means for inflation thereof.

5,024,161

MOLDING APPARATUS

Kurt Fischer, and Georges Louys, both of Schaffhausen, Switzerland, assignors to Georg Fischer AG, Schaffhausen, Switzerland

Continuation of Ser. No. 14,094, Jan. 29, 1987, abandoned, which is a continuation of Ser. No. 748,739, Jun. 25, 1988, abandoned. This application Jan. 26, 1988, Ser. No. 149,975

Claims priority, application Switzerland, Jun. 25, 1984, 3046/84

Int. Cl.^{5} B22C *15/00*

U.S. Cl. 164—149 **12 Claims**

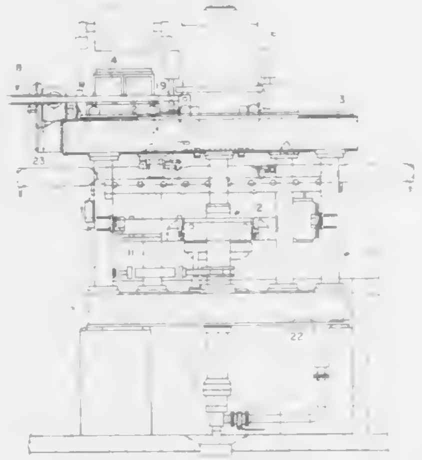
1. A forming apparatus for the manufacture of casting molds by means of a pressure shock wave from a gaseous medium, comprising,
a structural frame, said structural frame comprising columns, upper cross beams and longitudinal beams,

VOL
1127
ISS
3
JE
18
1991
UMI

a forming combination within said structural frame,

means for producing a pressure shock wave located above said forming combination, said means including an enclosed pressure vessel containing a supply of a pressurized gas supported by said upper cross beams of said structural frame,

a filling vessel having a bottom opening and being operable for holding sand or another moldable substance for delivery through said bottom opening to said forming combination,



said filling vessel being located above said forming combination and supported by said upper cross beams of said structural frame, wherein the topmost edges of said cross beams supporting said filling vessel lie in substantially the same plane as the bottom of said filling vessel, and

guide rails connected to said upper cross beams for supporting said filling vessel and said pressure vessel, said filling vessel and said pressure vessel being horizontally displaceable along said guide rails,

said structural frame being arranged so that the center of gravity of said structural frame is within said forming combination.

5,024,162
CABLE TRANSPORT APPARATUS

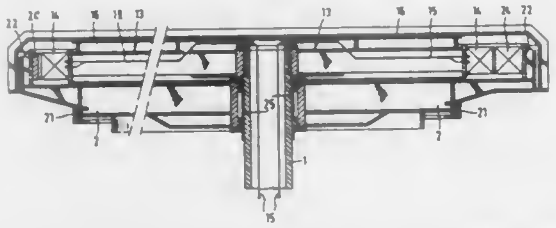
Ernst Nigg, and Elmar B. Fuchs, both of Schwarzach, Austria, assignors to Konrad Doppelmayr & Sohn Maschinenfabrik Gesellschaft m.b.H. & Co. KG, Wolfurt, Austria

Filed Feb. 2, 1990, Ser. No. 474,457

Claims priority, application Austria, Feb. 8, 1989, 267/89

Int. Cl.^{5} B61B *12/10*

U.S. Cl. 104—178 **4 Claims**



1. A cable railway having at least one station, a cable and at least one carrier displaceable on said cable, said station comprising:

a housing formed with a support;

an inner ring mounted on said support in said housing and having an axis, said inner ring being formed with an outer periphery provided with a first plurality of magnets spaced angularly from one another on said outer periphery;

an outer ring mounted rotatably on said support and coaxial with said inner ring, said outer ring being formed with a flange extending parallel to said axis, said flange being formed with an inner peripheral surface and an outer peripheral surface, said inner peripheral surface being juxtaposed with said outer periphery of said inner ring and carrying a second plurality of magnets spaced angularly and juxtaposed with said first plurality of magnets, said outer peripheral surface of said outer ring being formed with means for guiding said cable transporting said carrier to or from said station; and

circuit means for selectively energizing said first plurality of magnets, so that said outer ring is rotated causing the cable to be driven upon energizing said first plurality of magnets.

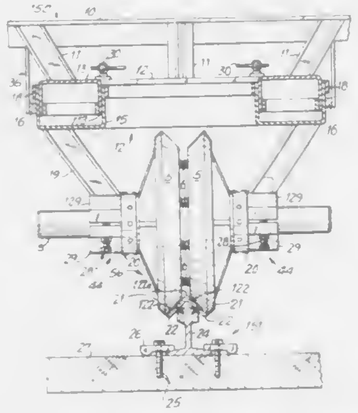
5,024,163
DERAILMENT RESISTING, TRACTIVE POWER RAILWAY SYSTEM

Erwin Lenz, 180 Cabrini Blvd., New York, N.Y. 10033

Continuation-in-part of Ser. No. 240,036, Sep. 2, 1988, Pat. No. 4,947,646. This application Mar. 5, 1990, Ser. No. 488,666

Int. Cl.^{5} B61C *11/00, 15/02*

U.S. Cl. 105—73 10 Claims



1. In a conventional railroad system comprising a pair of standard railroad rails and a standard railroad car riding along said rails, the improvement which comprises a supplementary central rail secured intermediate the pair of conventional railroad rails, the supplementary rail comprising a vertical support secured intermediate the two conventional rails and a pair of upwardly facing slanted track surfaces supported by the vertical support, the slanted track surfaces intersecting at a central portion of the supplementary rail; and, independently suspended from the railroad car, a supplementary traction wheel, separately secured to the railroad car along a line intermediate conventional pairs of wheels; a support system securing the supplementary traction wheel to the railroad car independently of the conventional pairs of wheels, so as to permit rotation about the horizontal axis of the supplementary traction wheel, limited vertical movement, and at least limited rotation about a vertical axis of the support system, the support system comprising horizontal axle means permitting rotation of the supplementary traction wheel about its horizontal axis, and vertical support means rotatably and slidably connected to the railroad car so as to permit rotation about the vertical axis and limited longitudinal motion along the vertical axis; the supplementary traction wheel comprising a pair of intersecting conical circumferential surfaces so juxtaposed as to mate with the slanting track surfaces when the conventional wheels are riding on the conventional rails.

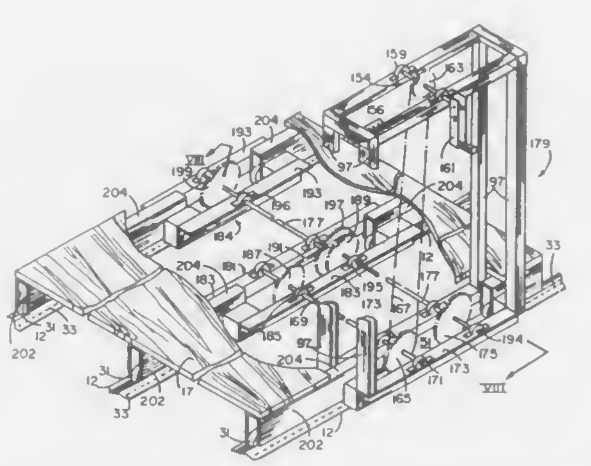
5,024,164
MOBILE STORAGE SYSTEM WITH IMPROVED DRIVING ASSEMBLIES

Alan R. Leist, Grand Rapids, Mich., assignor to Pipp Mobile Systems, Inc., Grand Rapids, Mich.

Division of Ser. No. 162,644, Feb. 29, 1988, Pat. No. 4,944,231. This application Jun. 4, 1990, Ser. No. 533,082

Int. Cl.^{5} B61C *11/04*

U.S. Cl. 105—101 15 Claims



1. A mobile storage system for movably supporting at least one mobile storage unit, wherein said system comprises:

at least three spaced apart track members including first and second outer track members and an inner track member disposed intermediate said outer track members positioned in parallel relationships with each other, each track member being formed as a unitary piece and including an upper surface having a series of openings which are aligned longitudinally along the length of each track member;

a plurality of support structures including first and second outer support structures and an inner support structure wherein one support structure is movably mounted upon each said track member for movement along the length of its respective track member, each support structure including means for supporting the mobile storage unit;

a first axle rotatably mounted to said support structures extending transversely across said first outer track member, said inner track member and said second outer track member;

a plurality of driving sprockets wherein at least one driving sprocket is fixedly mounted on said first axle for co-rotation therewith, each of said driving sprockets disposed in adjacency to one of said track members and having teeth in driving engagement with the series of openings in the track member;

a drive shaft extending substantially parallel to said first axle having a first end portion rotatably mounted to said first outer support structure and a second end portion rotatably mounted to said inner support structure;

first drive means disposed adjacent said first outer support structure for rotating said first end portion of said drive shaft; and

second drive means in operative association with said second end portion of said drive shaft and with the midsection of said first axle, whereby rotation of said drive shaft is drivingly transmitted to the midsection of said first axle and said driving sprockets are rotated so that said mobile storage unit is moved along the lengths of said track members.

5,024,165
SELF-STEERING BOGIE FOR A RAILWAY VEHICLE

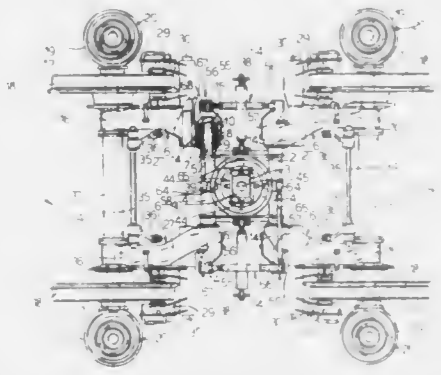
Romano Panagin, Turin, Italy, assignor to Fiat Ferroviaria S.p.A., Turin, Italy

Filed Oct. 11, 1989, Ser. No. 419,675

Claims priority, application Italy, Oct. 14, 1988, 67921 A/88

Int. Cl.^{5} B61F *5/44*

U.S. Cl. 105—168 10 Claims



1. A bogie having independent wheels for a railway vehicle, comprising:

a central support structure;

four independent arms carrying respective axles of the wheels;

resilient bushes for respectively articulating said arms to said support structure, two on one side and two on an opposite side, said resilient bushes respectively having horizontal axes extending transversely with respect to said bogie;

suspension means for suspending a body of the vehicle;

a center casting fixed to said support structure with the possibility of relative rotation about its vertical axis and adapted to be fixed rigidly to said vehicle body; and

a steering control device for steering said axles, said steering control device including at least one pair of linear actuators disposed longitudinally along the sides of said support structure and connected at their ends to said articulated arms of the corresponding side of said support structure, and means for actuating said linear actuators by a relative rotation between said bogie and said vehicle body, said linear actuators including at least one screw and nut pair means for producing a steering action.

5,024,166
BOGIE FOR RAIL VEHICLES

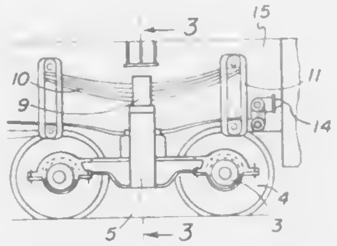
Günter Ahlborn, Siegen; Herbert Büdenbender, Netphen, and Alfred Lohmann, Siegen-Eisern, all of Fed. Rep. of Germany, assignors to Waggon Union GmbH, Siehe Anlage, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 389,777

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1988, 3839994

Int. Cl.^{5} B61F *5/14*

U.S. Cl. 105—453 7 Claims



7. A bogie arrangement for rail vehicle with a low-seated

VOL
1127
ISS
3
JE
18
1991
UMI

loading ramp of a vehicle body and having a rail vehicle structure gauge, comprising:

a bogie frame having opposed lateral cheeks and traverse member connecting said opposed lateral cheeks; a plurality of wheel sets, each wheel set including an axle defining a small axle base, said wheel sets being mounted to said bogie frame lateral cheeks via axle journals; spring brackets, one of said spring brackets connected to said lateral cheeks extending outwardly from said lateral cheeks of said bogie frame toward an outer limit of said structure gauge and including a first portion extending horizontally outward from said one of said side cheeks and having a second portion extending obliquely in an upward and outward direction and having a third portion extending vertically in an upward direction; suspension rings connected to said vehicle body; supported leaf springs connected to said spring bracket and having ends extending outwardly from said spring bracket; fixing elements associated with each of said suspension rings, said leaf spring ends each being connected to an associated suspension ring by one of said fixing elements such that said supporting leaf springs are arranged outside of said side cheeks extending laterally between the limit of said structure gauge and a cargo space of said vehicle body and extending above said wheel sets.

5,024,167

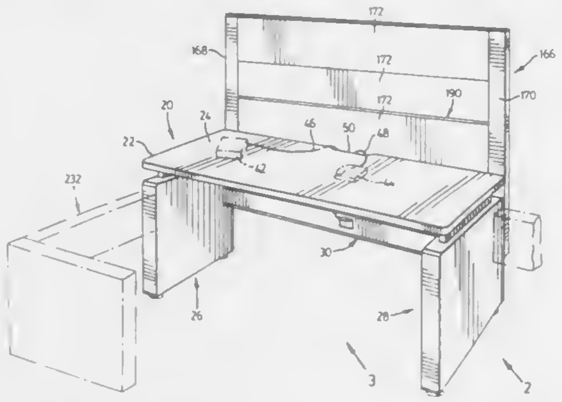
DESK SYSTEM

James E. Hayward, Richmond Hill, Canada, assignor to Innovative Metal Inc., Rexdale, Canada

Filed May 12, 1989, Ser. No. 350,812

Int. Cl.^{5} A47B *35/00*

U.S. Cl. 108—50 **14 Claims**



1. A desk comprising:

a work top having a work surface;

a structural frame supporting said work top and comprising: at least two spaced parallel gables disposed below respective end portions of said work top each said gable comprising a rigid structural unit including front and rear uprights; work top support means at an upper end of each said unit co-operating with a respective said work top end portion, whereby the work top is supported by said structural units; beam means extending between said gables at an outer edge of said work top and including at least one beam; and disconnectible coupling means between respective ends of said beam and the rigid structural units, said coupling means structurally connecting said beam and units to form said structural frame;

said beam defining at least two wiring channels which extend from end-to-end of the beam and which are electrically screened from one another, said channels being adapted to receive respective wiring sets and permitting access to said sets from a front face of said beam; said gables further including openings permitting communication with ends of said wiring channels from externally of the respective gables;

decorative cladding means comprising at least two cladding panels each overlying an outer face of one of said gables and providing a finished appearance to said gable; and,

cladding attachment means between inner faces of said cladding panels and said outer faces of the gables, removably attaching said panels to said gables.

5,024,168

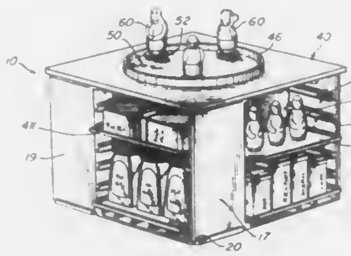
CAROUSEL STORAGE DEVICE WITH ROTATING OBJECTS ON TOP THEREOF

David M. Stravitz, 16 Park Ave., New York, N.Y. 10016

Filed Jun. 1, 1990, Ser. No. 532,011

Int. Cl.^{5} A47B *57/00*

U.S. Cl. 108—94 **23 Claims**



1. A carousel storage device, comprising:

a multi-sided storage arrangement having a plurality of storage cavities for receiving objects;

rotation means coupled to a lower portion of said multi-sided storage apparatus for permitting rotation of said storage apparatus, said rotation means including a stationary member adapted to be placed on a support surface, and a rotatable member coupled to said stationary member and rotatable relative to said stationary member, said rotatable member being coupled to said multi-sided storage arrangement for rotation therewith;

an upstanding member coupled to said stationary member so as to be immovable relative to said stationary member;

a platform secured to an upper portion of said upstanding member so as to be immovable relative to said upstanding member and relative to said stationary member;

a ring member coupled to either an upper portion of said multi-sided storage apparatus so as to be movable with said multi-sided storage arrangement upon rotation of said multi-sided storage apparatus, or said platform member so as to be stationary upon rotation of said multi-sided storage apparatus, said ring member having a bearing surface; and

at least one rotatable member rotatably coupled to the other of said platform member and said upper portion of said multi-sided storage apparatus, said at least one rotatable member including means for engaging said bearing surface of said ring member for imparting rotation to said at least one rotatable member relative to said platform member upon rotation of said ring member as a result of rotation of said multi-sided storage apparatus.

5,024,169

PROCESS TO REFINE FLYASH CAPTURED FROM PULVERIZED COAL FIRED BOILERS AND AUXILIARY EQUIPMENT

William J. Borowy, Innsbrook Technical Ctr. Virginia Power, 5000 Dominion Blvd., Glen Allen, Va. 23060

Filed Feb. 13, 1990, Ser. No. 479,266

Int. Cl.^{5} F23D *1/00*

U.S. Cl. 110—165 A **36 Claims**

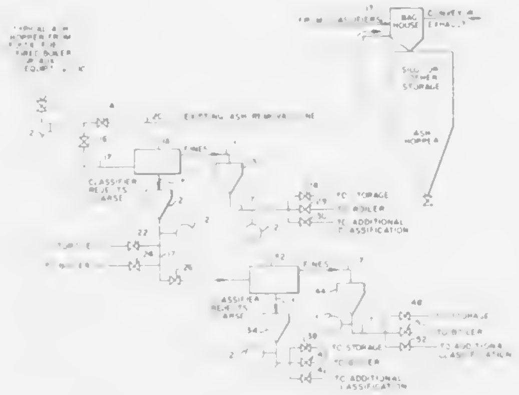
1. A separating and refining process for particulate that has been removed from the exhaust gasses of an organic fuel combustion process which comprises:

determining relative sizes of carbon rich and carbon lean particles that are found in the exhaust gasses of the combustion process;

supplying the particulate matter from the exhaust of the combustion process;

providing a means for conveying said particulate matter between the following steps;

separating, by size, coarse and fine particles in the exhaust particulate so as to yield carbon rich and carbon lean fractions;



separating, by density, any particles from previous separating steps so as to further separate carbon rich and carbon lean fractions;

collecting the carbon rich particles for one of reinjection, storage and subsequent density or size separation;

collecting the carbon lean particles for one of disposal and subsequent density or size separation;

testing samples of carbon lean particles collected during said collecting step for carbon content; and

repeating the foregoing separating operations until desired carbon content is achieved so as to allow recycling of flyash.

5,024,170

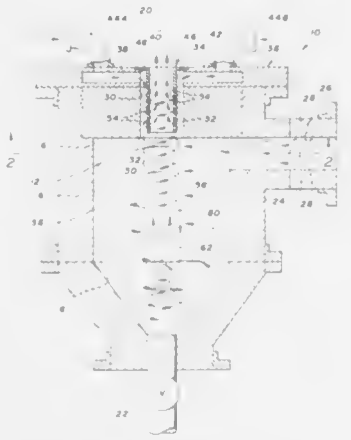
EXTERNAL COMBUSTOR FOR GAS TURBINE ENGINE

Chandran B. Santanam; William H. Thomas, both of Indianapolis, and Emil R. DeJulio, Columbus, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 31, 1990, Ser. No. 576,026

Int. Cl.^{5} F23D *1/02*

U.S. Cl. 110—264 **5 Claims**



1. An external combustor comprising:

a combustor housing with a cyclonic combustion chamber therein defined by a cylindrical side wall aligned on a vertical centerline of said housing and closed on top by a circular end wall and closed on the bottom by a conical wall,

means defining an inlet port through said cylindrical side wall adjacent said circular end wall for discharging into said cyclonic combustion chamber a combustible gas with solids entrained therein at a predetermined velocity generally tangent to said cylindrical side wall whereby a primary spiral swirl of combustion products and entrained solids is established in said cyclonic combustion chamber from said circular end wall toward said conical wall,

said entrained solids being inertially separated from said primary spiral swirl and said conical wall squeezing said primary spiral swirl toward said vertical centerline and reversing the longitudinal flow direction thereof toward said circular end wall,

means defining a cylindrical passage in said combustor housing aligned on said vertical axis and opening into said cyclonic combustion chamber through said circular end wall,

a metal draft sleeve supported on said combustor housing in said cylindrical passage and cooperating therewith in defining an annulus between said cylindrical passage and said draft sleeve opening into said cyclonic combustion chamber through said circular end wall,

said draft sleeve opening into said cyclonic combustion chamber for conducting therefrom a hot gas discharge stream and having an inboard end generally flush with said cylindrical end wall,

means for introducing secondary air into said cyclonic combustion chamber through said annulus at a velocity of between about three and five times said predetermined velocity whereby said secondary air defines a hollow cylindrical extension of said draft sleeve from said inboard end thereof into said cyclonic combustion chamber a distance of between about three and five times said diameter of said draft sleeve, and

means for diverting a portion of said secondary air from said annulus into said draft sleeve to dilute and cool said hot gas discharge stream therein.

5,024,171

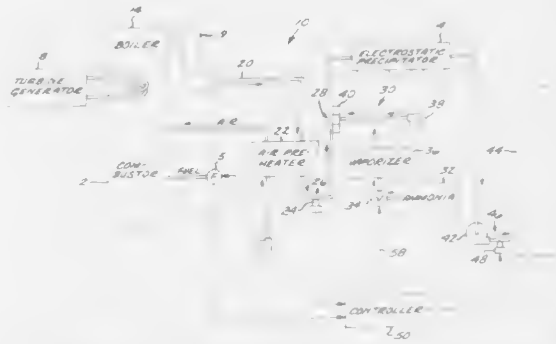
REDUCTION OF ACIDIC EMISSIONS FROM COMBUSTION OF SULFUR-LADEN FUELS

Henry V. Krigmont, Seal Beach; Everett L. Coe, Jr., Downey, and Barry J. Southam, Irvine, all of Calif., assignors to Wahlco, Inc., Santa Ana, Calif.

Filed Mar. 19, 1990, Ser. No. 496,872

Int. Cl.^{5} F23J *11/00, 15/00*

U.S. Cl. 110—345 **23 Claims**



1. A method for neutralizing at least a portion of the sulfur trioxide in a gas stream resulting from the combustion of fossil fuels within a boiler, comprising the steps of:

measuring a combustion gas stream at a first location to determine the sulfur trioxide content of the combustion gas stream;

adding ammonia to the combustion gas stream at a second

VOL
1127
ISS
3
JE
18
1991
UMI

location downstream of the first location in an amount responsive to the sulfur trioxide content determined in the step of measuring; and

measuring the ammonia content of the gas stream at a third location downstream of the second location.

5,024,172

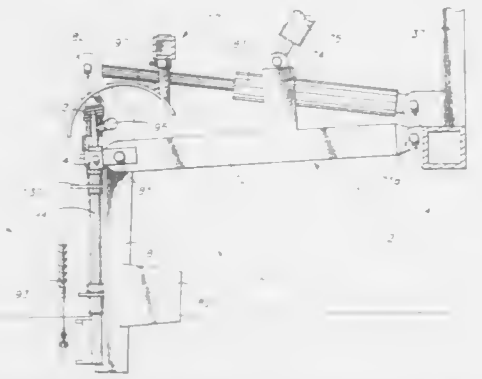
PLANT SEEDLING HOLDING AND DISPENSING MECHANISM

Ernst Huber, Prince George, Canada, assignor to J.E. Love Company, Garfield, Wash. and Agro Forest Technik North America, Inc., Prince George, Canada, a part interest

Filed May 7, 1990, Ser. No. 520,242

Int. Cl.^{5} A01C *11/02, 11/00*

U.S. Cl. 111—104 **14 Claims**



1. A seedling holder and dispenser for use in a seedling planter to hold a seedling during insertion of the seedling into the soil and to release the seedling when the seedling has been appropriately placed into the soil, comprising:

a planting arm having a distal end mounted for controlled extension into soil and retraction from soil; the planting arm having a leading edge which pierces the soil when the planting arm is extended for planting, and a trailing edge which is opposite to said leading edge;

at least first and second jaws connected to the planting arm in relative juxtaposition; at least one of said first and second jaws being a movable jaw which is movably connected to the planting arm to allow controlled clamping of a seedling between said first and second jaws;

at least one retraction position jaw operator for automatically operating said first and second jaws into an open loading position suitable for loading a seedling therebetween when the planting arm is in a retracted position;

at least one extension position jaw operator for automatically operating said first and second jaws into an open releasing position suitable for releasing a seedling from said first and second jaws when the planting arm is in an extended position; said at least one extension position jaw operator having components thereof different from said at least one retraction position jaw operator;

biasing means connected to bias said movable jaw to achieve clamping between said first and second jaws to hold a seedling therebetween.

5,024,173

CLUTCH FOR CHEMICAL DISPENSER FOR PLANTER

Harry C. Deckler, Williamsburg, Iowa, assignor to Kinze Manufacturing, Inc.. Williamsburg, Iowa

Filed Jan. 29, 1990, Ser. No. 471,504

Int. Cl.^{5} A01C *7/20;* **G01F** *11/10;* **F16D** *13/50*

U.S. Cl. 111—178 **9 Claims**

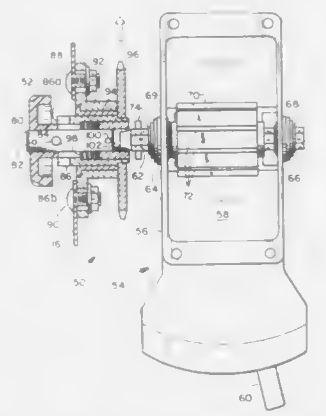
1. In an agricultural planter row unit having a frame, a hopper mounted to said frame for storing chemicals, a meter for metering said chemicals from said hopper for distribution and including a rotor, and drive means including a drive sprocket adapted to drive said rotor, an improved clutch for selectively coupling said drive sprocket to said rotor or uncoupling said drive sprocket from said rotor comprising:

sleeve means mounted to said drive sprocket for rotation therewith and axially aligned with said rotor, said sleeve means including a drive recess and a retainer recess spaced angularly apart on said sleeve means;

bearing means for rotatably mounting said sleeve means and said drive sprocket to said frame;

a shaft mounted for rotation and for selective axial movement in said sleeve means and including a drive coupler for selectively engaging said rotor in driving engagement;

biasing means for urging said shaft axially such that said drive coupler is urged into driving engagement with said rotor; and



a grip member mounted to said shaft, said shaft including drive pin means adapted to be received in one of said recesses, said drive and retainer recesses being spaced at different distances from said rotor and a cam surface extending between one end of said drive recess and the adjacent end of said retainer recess, said cam surface being arranged such that when said grip member is rotated in one direction, said drive pin rides along said cam surface from said drive recess to said retainer recess against the force of said biasing means, thereby moving said shaft axially and disengaging said coupler from said rotor, and when said grip member is rotated in a counter direction, said drive pin rides along said cam surface from said retainer recess to said drive recess and said biasing means moves said shaft axially to cause said coupler to engage said rotor.

5,024,174

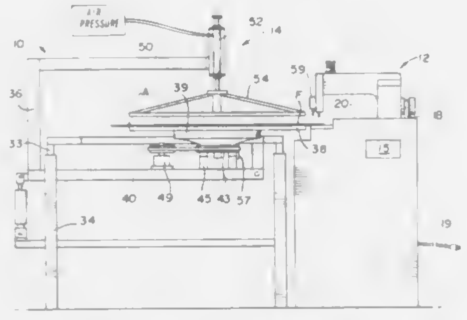
AIRBAG STITCHING DEVICE

Vivian Ferguson, Richmond, Va., assignor to Automated Machinery Systems, Inc., Richmond, Va.

Filed Sep. 29, 1989, Ser. No. 414,404

Int. Cl.^{5} D05B *3/00, 27/10*

U.S. Cl. 112—121.24 **9 Claims**



1. An airbag switching device comprising switching means

for stitching along a sewing plane and a rotatable support member for rotation about an axis disposed on a horizontal plane adjacent to said stitching means and adapted to receive a pair of superimposed circular cloth layers having outer edges thereon, clamp means for holding the superimposed circular layers of cloth on said rotatable support member, and positioning means for tilting said support member, said clamp means and circular cloth layers on an incline with respect to the sewing plane, means for activating said stitching means and means for rotating said support member, clamping means and cloth in a tilted position to thereby feed a peripheral portion of the superimposed circular layers of cloth into the stitching means so that the outer edges of the cloth are sewn together, and means for terminating rotation of the support member and cloth and for deactivation of the stitching means after completing 360° of rotation.

5,024,175

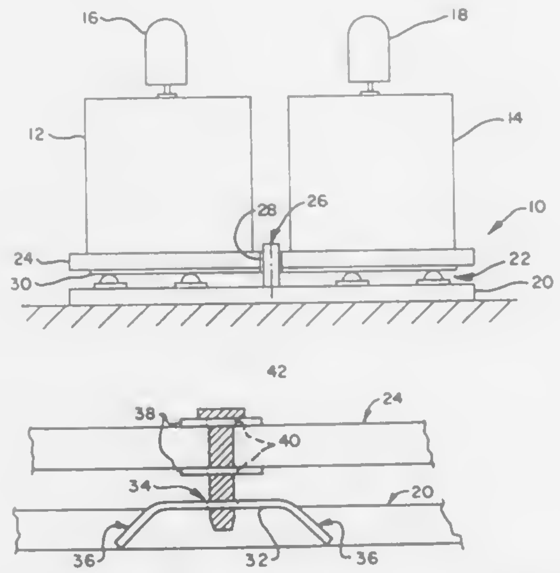
FLEXIBILITY ENHANCEMENT MULTI-MACHINE CAROUSEL

William E. Epstein, Rte. 4, Box 152, Anderson, S.C. 29624

Filed Nov. 15, 1989, Ser. No. 436,707

Int. Cl.^{5} D05B *75/00;* **A47B** *29/00*

U.S. Cl. 112—217.2 **19 Claims**



1. A multi-machine carousel assembly for supporting at least two machines and selectively positioning each machine for use at a work station comprising:

a base having an upper surface and a lower surface, the lower surface being supported by a ground surface;

a platform having an upper surface and a lower surface; pivot means for mounting the platform to the base and allowing rotating of the platform about an axis in common with the base;

bearing means for supporting the platform mounted upon the upper surface of the base and engaging the lower surface of the platform;

the platform supporting said at least two machines so that an operator can rotate the platform to selectively position one of said at least two machines in a position adjacent the operator;

at least one receiving member connected to the base including a retaining member having at least one inclined ramp located at an end of the retaining member, the retaining member having an aperture therethrough and being connected to the base; and

at least one extending member connected to the platform for selectively interlocking with the receiving member to prevent rotation of the platform; the inclined ramp operably serving to push and guide the extending means toward the aperture of the retaining member.

5,024,176

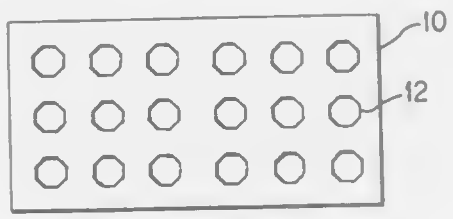
NEEDLEPOINT SHEET HAVING OCTAGONAL OPENINGS AND METHOD OF USE THEREOF

Louis P. Musante, Fairview, Pa., assignor to Louis P. Musante, Fairview, Pa. and Lynda S. Musante, Fairview, Pa.

Filed Jan. 16, 1990, Ser. No. 465,367

Int. Cl.^{5} D03D *29/00*

U.S. Cl. 112—266.1 **18 Claims**



1. A needlepoint sheet of flexible plastic material, comprising:

a sheet of flexible plastic material having a plurality of channels therethrough for receiving thread-like material,

each of said channels being enclosed by a channel wall having eight sides.

5,024,177

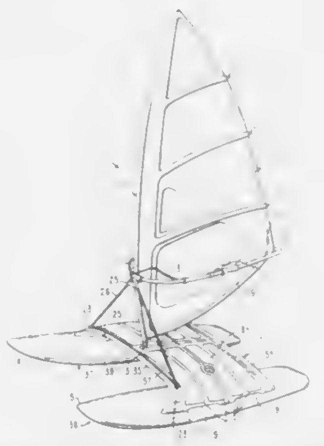
WIND SAILING SURF VESSEL WITH DUAL PLANAR SURFACES

Steven D. Winter, 47 Ilex Dr., Newbury Park, Calif. 91320; Michael J. Botich, 1307 Hanover Ct., Ventura, Calif. 93003, and Eric Adickes, 315 Anacapa View Dr., Malibu, Calif. 90265

Filed Apr. 26, 1989, Ser. No. 328,163

Int. Cl.^{5} B63B *1/00*

U.S. Cl. 114—61 **13 Claims**



1. A wind sailing vessel for sailing over a water surface comprising:

(a) a first elongated board defining an undersurface substantially planar, said first elongated board being buoyant in water;

(b) a second elongated board defining an undersurface substantially planar, said second elongated board being buoyant in water;

(c) platform means for joining said first and second elongated boards in parallel relationship, wherein said platform means is dissociable from each of said elongated boards and each of said elongated boards having slots for

VOL
1127
ISS
3
JE
18
1991
UMI

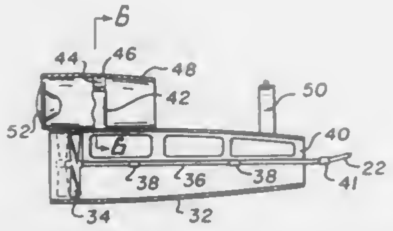
receiving a centerboard means, wherein said platform means defines a slot parallel to said elongated boards in an assembled condition and sized to allow a portion of said centerboard means to extend therethrough, whereby said centerboard means can be retracted or extended through said slot and retained therein during sailing, and wherein said platform means comprising independent sections which can be selectively dissociated from each other, wherein said platform means can be collapsed for ease of transportation or storage;

(d) centerboard means for providing sailing maneuverability operatively associated with said platform means, wherein said centerboard means is parallel to said elongated boards and provides substantial steerability yet remains fixed and rigid while sailing, wherein said planar undersurfaces of said elongated boards skim over the water surface and said elongated boards pivot about a point defined by said centerboard means upon turning the vessel; and

(e) sail means for catching gusts of wind and propelling the vessel, wherein said sail means is pivotally mounted on said platform means, and wherein said platform means provides a centrally located mounting for said sail means.

5,024,178
UNDERWATER PROPULSION DEVICE

Martin G. Bruce, Box 20011, #4-9764-5th St., Sidney, B.C., Canada V8L 5C9
Filed Feb. 14, 1990, Ser. No. 479,884
Int. Cl.^{5} B63C *11/46*
U.S. Cl. 114—315 **10 Claims**



1. An underwater propulsion device for a swimmer comprises in combination:

a power unit adapted to be attached to the body of a swimmer, the power unit containing a power supply and a sealed motor,

a propulsion unit having a propeller within a substantially cylindrical housing, hand grip means on the outside of the housing adapted to be held by the swimmer, strap means on the housing behind the hand grip means adapted to fit over a forearm of the swimmer to support the propulsion unit from the forearm, the handgrip means having operating controls thereon for the motor, and

flexible drive extending from the motor in the power unit to the propeller in the propulsion unit.

5,024,179
FOLDABLE SIGNAL FLAG AND STANDARD ASSEMBLY

Harold P. Leffel, E. 1245 Crystal Bay Rd., Post Falls, Id. 83854
Continuation-in-part of Ser. No. 402,829, Sep. 5, 1989, Pat. No. 4,962,720. This application Sep. 19, 1990, Ser. No. 585,301
Int. Cl.^{5} G09F *17/00*
U.S. Cl. 116—173 **18 Claims**

9. A self storing signal flag assembly for subsurface mounting to a support, comprising:

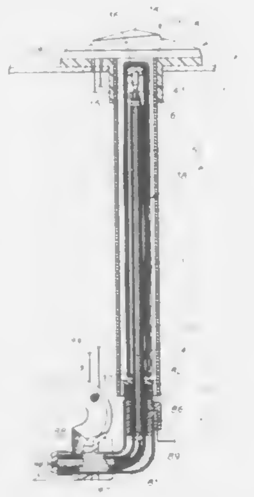
a retractable standard having telescoping standard sections extendable to an operative exposed elongated condition and retractable to a shortened storage condition and including a top section extending to a top end and an adjacent section slidably receiving the top section therein, the adjacent section including a top shoulder through which the top section extends;

a tubular connector member including a top end and a bottom end loosely receivable over at least a portion of the top section of the standard to enable at least a portion of the standard to be retracted into the connector member between the top and bottom edges thereof;

a fitting on the connector member for securing the connector member to the retractable standard;

a flag body formed of a flexible material and including a leading edge securable to the connector member, and a free trailing end;

a lanyard having a first end attached to the flag body between the free trailing end and the leading edge, and a second end;

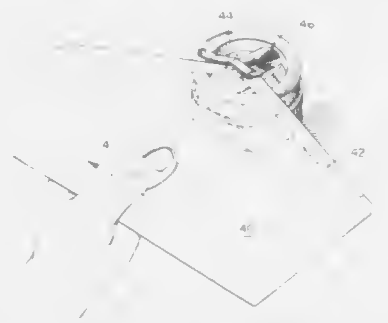


a clip on the second end of the lanyard, loosely receivable over the top section of the retractable standard and slidable along the length thereof within the connector member, for abutment with the top shoulder of the adjacent standard section so that when the standard sections are retracted, the adjacent section top shoulder will engage the clip and pull the lanyard into the connector member, thereby gathering the flag body inwardly toward the connector member; and

a surface mounting means for mounting the retractable standard and flag body to a support surface with the flag body standard situated underneath the surface when the standard is retracted to the shortened storage condition thereof.

5,024,180
STAMP AND ENVELOPE MOISTENER

Lorand J. Roman, 2734 Tech Ave., San Angelo, Tex. 76904
Filed Mar. 5, 1990, Ser. No. 488,936
Int. Cl.^{5} B05C *1/02, 1/08*
U.S. Cl. 118—244 **9 Claims**



1. A moistener for dried glue, said moistener comprising:

a cup,

a reservoir defined by the cup,

a shaft mounted in the cup and extending across the reservoir,

a roller rotatably mounted on the shaft, said roller having a longitudinal axis,

said roller including a knurled peripheral surface having raised diamond shaped projections formed by intersecting grooves,

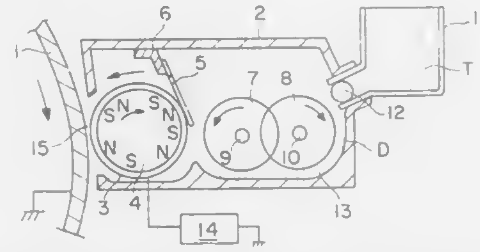
one set of parallel grooves being spaced approximately 1/32 inch apart and a second set of parallel grooves being spaced approximately 1/32 inch apart and extending transverse to said one set of grooves to form the intersecting grooves,

said projections including two opposing corners defining an angle of 60° and two opposing corners defining an angle of 120°,

said one set of grooves intersecting at an angle of 60° with respect to said second set of grooves and said one set and said second set intersecting the longitudinal axis of said roller at an angle of 30° and forming a plurality of pockets, said pockets formed by said one set and said second set of grooves being located between the projections so that a uniform film of water is formed across and above a peripheral surface of the roller during rotation of the roller through water held in the reservoir and applied directly to the dried glue of an article to be moistened.

5,024,181
METHOD FOR THE DEVELOPMENT OF AN ELECTROSTATIC LATENT IMAGE

Hisashi Shoji; Akihiko Tamura; Masahiko Itaya; Hiroshi Fuma, and Shinobu Soma, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan
Continuation of Ser. No. 228,772, Aug. 4, 1988, abandoned, which is a continuation of Ser. No. 900,399, Sep. 26, 1986, abandoned. This application May 7, 1990, Ser. No. 520,117
Claims priority, application Japan, Aug. 30, 1985, 60-192711; Aug. 30, 1985, 60-192713; Sep. 19, 1985, 60-208046; Jan. 24, 1986, 61-14537; Jan. 24, 1986, 61-14538; Jan. 24, 1986, 61-14539; Mar. 24, 1986, 61-66632
Int. Cl.^{5} G03G *15/09*
U.S. Cl. 118—658 **26 Claims**



3. A method of developing an electrostatic latent image on a rotatable image surface of an image carrying member, said method comprising;

supplying a developer containing a magnetic carrier and a toner to a developer transporting means, said transporting means including a rotatable cylindrical sleeve member and a magnetic member provided inside said sleeve member whereby the developer is attracted to and forms a developer layer on said sleeve member, said sleeve member facing said image surface with a distance therebetween so as to form a developing zone,

regulating the amount of developer to be transported to the developing zone by a developer-regulating means so that the amount of toner on said sleeve member [mt] in mg/cm^2, the peripheral speed of said image surface [Vd] and the peripheral speed of said sleeve member [Vsl] satisfying the following relation:

$$|Vsl/Vd| \times mt \geqq 0.4\ (mg/cm^2)$$

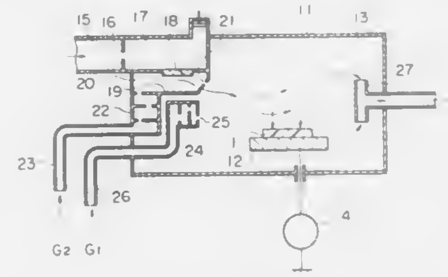
$$|Vsl/Vd| \leqq 10$$

said developer regulating means bearing against said developer layer whereby the thickness of said developer layer is less than said distance,

bringing the developer into close proximity to the electrostatic latent image formed on said image surface, and adhering the toner to a low potential portion of said electrostatic latent image.

5,024,182
THIN FILM FORMING APPARATUS HAVING A GAS FLOW SETTLING DEVICE

Toshiyuki Kobayashi; Masao Koshinaka; Yoshimi Kinoshita; Masao Oda, and Kenji Yoshizawa, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan
Filed Jul. 6, 1989, Ser. No. 376,015
Claims priority, application Japan, Jul. 15, 1988, 63-175231
Int. Cl.^{5} C23C *16/50*
U.S. Cl. 118—723 **11 Claims**



1. An apparatus for forming a thin film on a substrate by reacting first and second gases comprising.

a vessel enclosing a reaction chamber;

substrate holding means for holding a substrate in said reaction chamber;

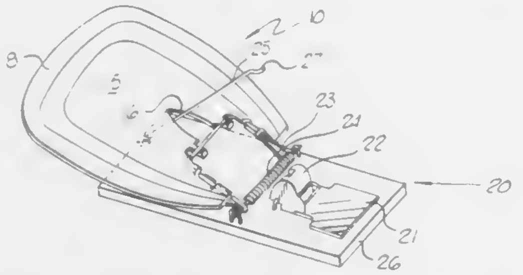
plasma generating means including a waveguide for transmitting microwave energy toward said reaction chamber, said waveguide including two substantially planar, generally parallel, electrically conducting walls that are elongated in a first direction transverse to the direction of propagation of microwaves in said waveguide, and an elongated dielectric window generally parallel to and extending in one of said walls in the first direction for transmitting microwave energy from the waveguide to a first gas inlet means;

first gas inlet means disposed between said plasma generating means and said reaction chamber including a plasma chamber extending in the first direction for receiving microwave energy transmitted through the dielectric window to establish and maintain a plasma in the first gas in said plasma chamber, a first gas inlet for supplying the first gas to said plasma chamber, first flow settling means disposed between said first gas inlet and said plasma chamber for settling flow of the first gas into the plasma chamber including plates disposed transverse to the flow of the first gas for establishing a tortuous flow path for the first gas, and including an elongated opening extending in the first direction for flow of the first gas from said plasma chamber into said reaction chamber; and

second gas inlet means including an outlet extending in the first direction in communication with said reaction chamber for supplying the second gas to said reaction chamber, said outlet being disposed proximate the opening of said first gas inlet means.

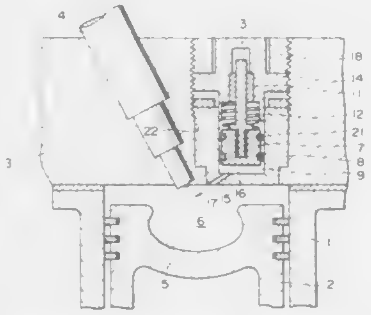
VOL
1127
ISS
3
JE
18
1991
UMI

5,024,183
ANIMAL TRAINING DEVICE
William G. Baer, 4500 Homestead, Littleton, Colo. 80123
Filed Apr. 24, 1990, Ser. No. 513.615
Int. Cl.⁵ A01K *29/00*
U.S. Cl. 119—29 **17 Claims**



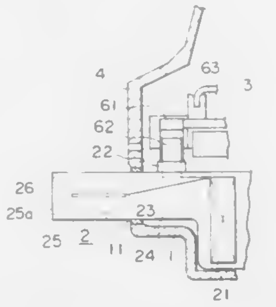
1. An animal training device comprising a generally thin, generally planar flapper portion having a generally broad face, a spring means for tensioning said flapper portion in a first tensioned position, a release means for releasing said spring means and for releasing said flapper portion from said tensioned position and causing said flapper portion to move in a path to a second released position.

5,024,184
DIRECT FUEL INJECTION INTERNAL COMBUSTION ENGINE
Susumu Nagano; Hiromitsu Kawazoe, and Katsuyuki Ohsawa, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan
Filed Dec. 22, 1989, Ser. No. 455,160
Claims priority, application Japan, Dec. 26, 1988, 63-168558[U]
Int. Cl.⁵ F02B *75/04*
U.S. Cl. 123—48 R **12 Claims**



1. A direct fuel injection internal combustion engine, comprising:
- a combustion chamber formed by a cylinder, a cylinder head opposed to said cylinder, and a piston slidably inserted in said cylinder;
- a piston cavity provided in said combustion chamber;
- a fuel injector secured in said cylinder head and adapted to inject and supply fuel into said piston cavity;
- an air chamber defined by an auxiliary cylinder formed in said cylinder head in proximity to said piston cavity and by an auxiliary piston inserted in said auxiliary cylinder, the maximum volume of said air chamber being about 0.1% to about 1.0% of the cylinder stroke volume;
- a communicating passage which allows said air chamber and said combustion chamber to communicate with each other and is oriented toward said piston cavity; and
- a spring which is adapted to urge said auxiliary piston in a direction of reducing the volume of said air chamber and which, during a pressure rise of said combustion chamber, is adapted to increase said volume of said air chamber and move said auxiliary piston in the direction of modulating a sharp pressure rise of said combustion chamber, and which, during a pressure drop of said combustion chamber, is adapted to decrease said volume of said air chamber and move said auxiliary piston in a direction of jetting air through said communicating passage;
- whereby said sharp pressure rise of said combustion chamber is modulated, and a turbulence is imparted to the combustion gas in said combustion chamber during a diffusive combustion.

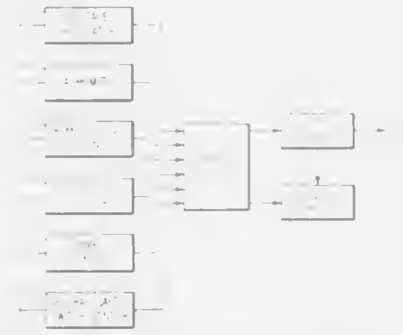
5,024,185
IGNITION DISTRIBUTOR OF INTERNAL COMBUSTION ENGINE
Yoshikuni Fujita, and Haruyuki Matsuo, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 15, 1990, Ser. No. 493,668
Claims priority, application Japan, Mar. 16, 1989, 1-29151; Mar. 16, 1989, 1-29152
Int. Cl.⁵ F02P *7/02*
U.S. Cl. 123—146.5 A **11 Claims**



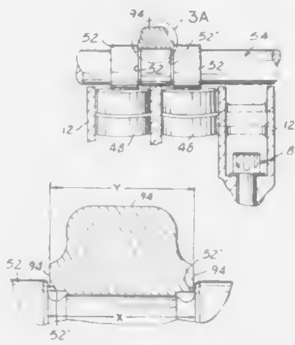
1. An ignition distributor for an internal combustion engine, comprising:
- a housing surrounding a shaft synchronously rotatable with a crankshaft of said engine, said housing containing at least one electrical device including terminals for an ignition coil, an igniter, and a rotational angle detector;
- means defining a through hole in said housing for electrically connecting said electrical device therethrough to the outside of said housing; and
- leading means including at least one connecting section connected electrically to said electrical device, a connector section arranged in said through hole defined in said housing, a lead wire section electrically connecting said connecting section and said connector section, and a mold section defining a rigid integral part by molding together said connecting section, said connector section and said lead wire section.

5,024,186
REMOTE AUTOMOBILE STARTER
Robert Long, New Carrolton, Md., and Mark Gottlieb, Annandale, Va., assignors to Design Tech International, Inc., Springfield, Va.
Filed Dec. 11, 1989, Ser. No. 448,289
Int. Cl.⁵ F02N *11/08*
U.S. Cl. 123—179 B **12 Claims**

1. An automobile installation diagnostic test system comprising:
- an add-on remote automobile starter said remote starter being connected to a starter motor of said automobile, and to to a plurality of pre-existing automobile electrical sensing circuits which electrically sense respective predetermined conditions of said automobile;
- an indicating means for receiving a signal from each of said pre-existing automobile and electrical sensing circuits for indicating that each of said predetermined conditions is being sensed, thereby ensuring that said remote starter is installed correctly.



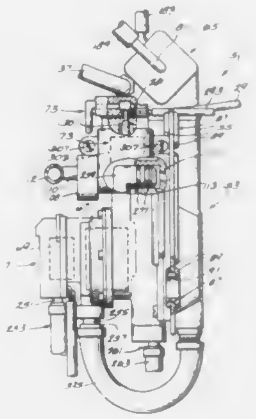
5,024,187
SYSTEM FOR AXIALLY LOCATING A CAMSHAFT
Emile A. M. Bakker, Windsor, Netherlands, assignor to Chrysler Corporation, Highland Park, Mich.
Filed Aug. 14, 1990, Ser. No. 566,921
Int. Cl.⁵ F02F *1/00;* **F01L** *1/00*
U.S. Cl. 123—193 H **5 Claims**



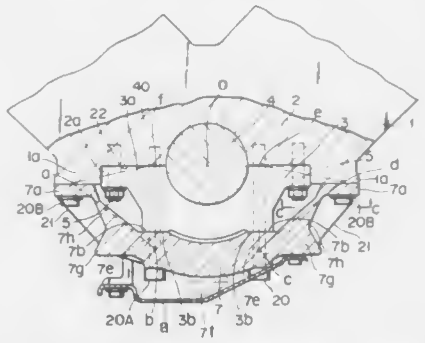
1. In an internal combustion engine of the type having a cylinder head assembly with at least one rotatable camshaft mounted thereon, an improved camshaft retention arrangement, comprising: a pair of cam lobes closely spaced in the axial direction of the camshaft; each lobe having an end thrust surface extending in a plane normal to the camshaft axis, the end thrust surfaces facing one another and being spaced axially apart a precise dimension to define an axially extending gap; a bearing retainer cap attached to the cylinder head and occupying the gap formed between the end thrust surfaces, the retainer cap having a pair of side surfaces defining a width dimension therebetween, the retainer cap width being just sufficient to fill the gap whereby engagement of abutting end and side surfaces of the lobes and retainer respectively prevents axial movement of the camshaft with respect to the bearing cap and the cylinder head.

5,024,188
FUEL SUPPLY SYSTEM COMPONENT ASSEMBLY
David J. Hartke, and Kathleen A. Appelt, both of Gurnee, Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.
Filed Mar. 2, 1990, Ser. No. 487,669
Int. Cl.⁵ F02F *7/00*
U.S. Cl. 123—195 A **8 Claims**

1. An engine comprising a crankcase cover, a bracket, a fuel supply component mounted on said bracket and comprising one of a fuel pump, an oil pump, a combined fuel and oil pump, a fuel vapor separator, a fuel vapor pump, a fuel filter, a primer fuel control valve, and a vacuum switch, and means mounting said bracket on said cover.



5,024,189
ENGINE UNIT
Sadakatsu Ushio, Otsu; Noboru Nakamura, Kyoto; Hirofumi Higashi, Kameoka; Masataka Iwata, Handa, and Fumiyasu Niwa, Nagoya, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 29, 1990, Ser. No. 471,945
Claims priority, application Japan, Jan. 31, 1989, 1-10701[U]
Int. Cl.⁵ F02F *7/00*
U.S. Cl. 123—195 R **9 Claims**



1. An engine unit in which a crankshaft is rotably arranged, comprising:
- a cylinder block including a pair of side walls extending parallel to said crankshaft, with said crankshaft between said side walls, a pair of first flanges formed on lower edges of the side walls, a plurality of first partition walls arranged between said side walls and connecting said first flanges to each other, and a plurality of crank journals formed on lower edges of said first partition walls and each receiving said rotatable crankshaft;
- a lower case fixed to said cylinder block and covering said crankshaft, said lower case including a substantially semi-cylindrical bottom wall located outside of a locus of rotation of said crankshaft and having a pair of side edges extending in parallel to the axis of the crankshaft, a pair of second flanges formed on said side edges of the bottom wall and abutting against said first flanges, and a plurality of second partition walls formed on said bottom wall and opposing and associtated with said first partition walls, respectively;
- a plurality of bearing caps holding said rotatable crankshaft in cooperation with said crank journals, each of said bearing caps clamped between said associated first partition wall and second partition wall; and

VOL
1127
ISS
3
JE
18
1991
UMI

a plurality of fixing means for fixing said lower case to said cylinder block, each of said fixing means having a pair of first fastening members fastening said associated first partition wall and second partition wall and said bearing cap clamped between the first and second partition walls together, and a pair of second fastening members each fastening said first and second flanges to each other, each of said first fastening members extending from under the lower case into said first partition wall, passing through said bearing cap and second partition wall, said pair of first fastening members being located between said pair of second fastening members, each of said second partition walls having at least two contact portions which contact the bearing cap and through which said pair of first fastening members respectively extend, said crankshaft being located between said pair of first fastening members, and said first and second fastening member of each fixing means being arranged on a common plane perpendicular to said axis of said crankshaft.

5,024,190

OIL SUPPLY DEVICE FOR TWO CYCLE ENGINE

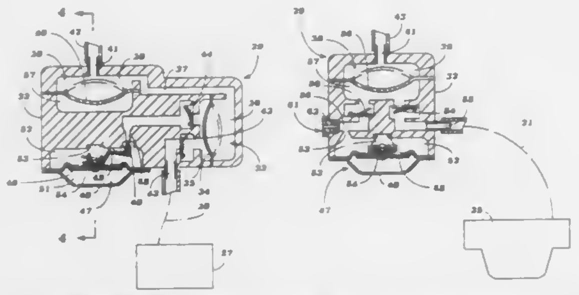
Takuma Kameyama, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabusbiki Kaisba, Hamamatsu, Japan

Filed Dec. 11, 1989, Ser. No. 448,704

Claims priority, application Japan, Dec. 12, 1988, 63-311865

Int. Cl.^{5} F01M *1/00*

U.S. Cl. 123—196 R 13 Claims



1. A lubricating system for an internal combustion engine comprising a lubricant pump for pumping lubricant, conduit means for conveying lubricant to the engine from said lubricant pump, and means for mixing a controlled amount of another fluid with said lubricant prior to delivery to said pump for pumping small amounts of lubricant.

5,024,191

CONTROL SYSTEM FOR A VARIABLE VALVE ACTUATING MECHANISM OF AN INTERNAL COMBUSTION ENGINE

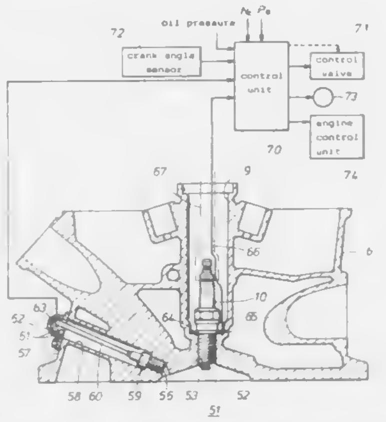
Kenicbi Nagahiro, and Takashi Moriya, botb of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1990, Ser. No. 483,255

Claims priority, application Japan, Feb. 22, 1989, 1-42268

Int. Cl.^{5} F02B *77/00*

U.S. Cl. 123—198 D 6 Claims



1. A control system for a variable valve actuating mechanism for an internal combustion engine having a camshaft for actuating intake or exhaust valves, and adjusting means for changing a lift or valve timing of said intake or exhaust valves, comprising:

sensor means for detecting a state of combustion in a cylinder of said engine so as to indirectly monitor an operating condition of said variable valve actuating mechanism;

a control unit which acts upon said valve actuating mechanism to force it to a certain fail safe condition when any abnormal condition is detected by said sensor means.

5,024,192

VARIABLE COMPRESSION RATIO INTERNAL COMBUSTION ROTATING ENGINE

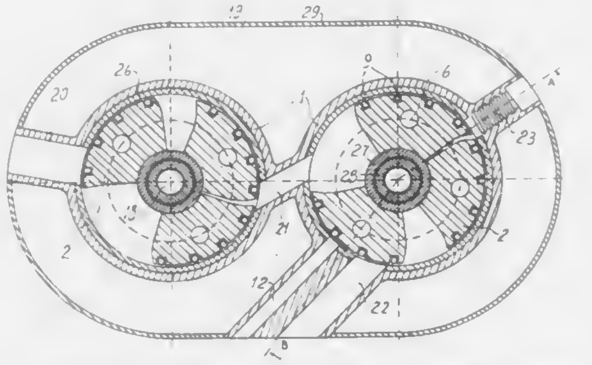
Eliodoro Pomar, Apartado de Correos 366, Torremolinos, Malaga, Spain

Continuation-in-part of Ser. No. 57,006, Jun. 1, 1987, abandoned. This application Apr. 3, 1989, Ser. No. 333,095

Claims priority, application Italy, Jun. 6, 1986, 20701 A/86

Int. Cl.^{5} F02B *53/08*

U.S. Cl. 123—245 4 Claims



1. A variable compression ratio internal combustion engine comprising first and second separated adjoining cylinders and first and second pluralities of pistons rotatably housed in each said first and second cylinders, said first and second cylinders

defining a plurality of variable volume chambers defined by a portion of inner walls of said first and second cylinders and by side walls of said pistons, said pistons having a substantially circular sector shape cross-section, each said piston rotating within each said cylinder with an uneven circular motion, a mechanism for rotating each said piston, said mechanism including a crank having a plurality of arms and an eccentric axis with respect to the axis of each said cylinder, and coupling rods between the arms of the crank and end portions of shaft members passing through said pistons, there being moreover provided means for changing the compression ratio of said engine, said means operating by changing the eccentricity of the axis of said crank with respect to the cylinder axis, said plurality of chambers comprising a first series of chambers associated with said first cylinder and a second series of chambers associated with said second cylinder, said first cylinder having intake port means for supplying an air-fuel mixture to said first series of chambers for compressing by said first plurality of pistons in said first series of chambers said air-fuel mixture, and transfer port means communicating said first cylinder with said second cylinder, said second cylinder having exhaust port means and scavenging port means for carrying out by said second plurality of pistons in said second series of chambers a further compression of said air-fuel mixture, a combustion thereof and an exhaust and scavenging of burnt gases from said second series of chambers.

5,024,193

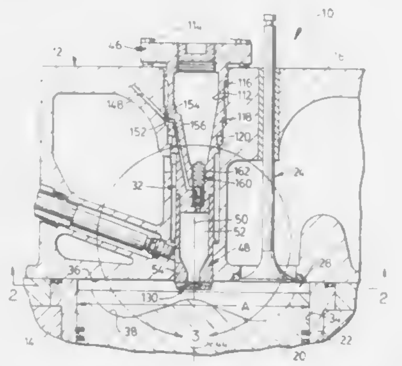
FUEL COMBUSTION SYSTEM, METHOD, AND NOZZLE MEMBER THEREFOR

Russell R. Graze, Jr., Dunlap, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Feb. 6, 1990, Ser. No. 475,517

Int. Cl.^{5} F02B *19/18*

U.S. Cl. 123—259 68 Claims



1. In a fuel combustion system for a gas engine defining a main combustion chamber above a reciprocating piston and a precombustion chamber assembly in communication therewith, defining a prechamber, and igniting means for igniting a mixture of gaseous combustible fuel and air in the prechamber and forming expanding burning gases, wherein the improvement comprises:

ejection passage means defining by the precombustion chamber assembly, the ejection passage means includes a plurality of ejection passages of a preselected geometric cross-section in communication with the prechamber for directing and controllably expanding the burning gases from the prechamber into the main combustion chamber at a velocity greater than the speed of sound.

5,024,194

FLAME DISPERSION ARRANGEMENT FOR SWIRL CHAMBER TYPE DIESEL ENGINE PISTON CROWN

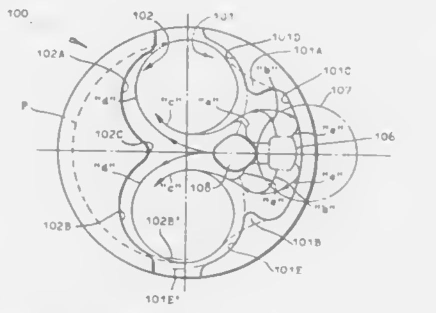
Motohiro Shinzawa, Yokosuka, and Yoshiki Sekiya, Yokohama, both of Japan, assignors to Nissan Motor Company, Ltd., Yokohama, Japan

Filed Jul. 6, 1990, Ser. No. 549,033

Claims priority, application Japan, Jul. 10, 1989, 1-177766; Jul. 10, 1989, 1-177767

Int. Cl.^{5} F02F *3/24*

U.S. Cl. 123—269 7 Claims



1. In an internal combustion engine

a piston reciprocatively disposed in a bore to define a variable volume combustion chamber;

a swirl chamber, said swirl chamber being fluidly communicated with the combustion chamber by a transfer port, said piston comprising:

an essentially flat crown;

a shaped cavity formed in said crown, said cavity being in part bounded by first and second opposed walls;

an island-like flame deflecting projection, said island-like flame deflecting projection comprising a member which projects up from the floor of said cavity and which is arranged in the path of the flame which ejects from said transfer passage during the expansion phase of the engine and when the piston is close to its TDC position;

said first wall being arranged to have first and second guide portions, said first and second guide portions extending inwardly toward one of the center of the piston crown or the island-like flame deflecting projection, said first wall further comprising a first curved section which merges with said first and second guide portions, said first and second guide portions and said curved portion defining in part a first flame dispersion zone in said cavity, said first curved wall portion being so constructed and arranged as to deflect a portion of the flame which flows theretoward and which promotes mixing of the flame with the air contained in said first flame dispersing zone;

second and third concavely curved wall portions formed in said first wall, said second and third wall portions being formed in said first wall at locations outboard of said first and second guide portions, respectively;

fourth and fifth concavely curved wall portions formed in said second wall, said fourth and fifth wall portions cooperating to define a nose portion which projects into said cavity, said nose portion being arranged in the path of the flame which ejects from said transfer passage after said piston descends from its TDC position by a predetermined amount, said fourth and fifth wall portions further cooperating with said second and third curved wall portions of said first wall in a manner to define second and third essentially circular flame dispersing zones in which spiralling flows are established; and

means embodied in the construction of said shaped cavity for modifying the spiralling characteristics of the spiralling flows in said second and third flame dispersing zones in a manner which improves combustion characteristics.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,195

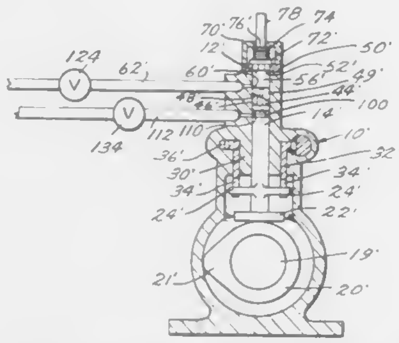
MULTI-FUEL COMPRESSION-IGNITION ENGINE AND FUEL INJECTION PUMP THEREFOR

Pao C. Pien, 1105 Marbelle Club, 840 S. Collier Boulevard, Marco Island, Fla. 33937

Filed Jun. 7, 1990, Ser. No. 536,016

Int. Cl.^{5} F02D *19/08*

U.S. Cl. 123—304 **22 Claims**



1. A multi-fuel compression-ignition internal combustion engine comprising a first source of primary fuel, a second source of secondary fuel, injection pump means including a body means having a bore therein, plunger means movably mounted within said bore, said plunger means having an end portion defining with a portion of said bore a mixing chamber, first supply means for supplying primary fuel from said first source to said mixing chamber, second supply means for supplying secondary fuel from said second source to said mixing chamber so that said primary and secondary fuels are mixed in said mixing chamber to provide a mixture of the primary and secondary fuels, said second supply means including means spaced from said end portion in a direction away from said mixing chamber for providing a seal between said bore and said plunger means to prevent leakage of primary fuel past the seal, valve means permitting flow of fuel from said mixing chamber but substantially preventing flow of fuel back into said mixing chamber, a cylinder having a piston reciprocably mounted therein and defining with said cylinder a combustion chamber, fuel injection means for injecting fuel into said combustion chamber, and means connecting said fuel injection means with said valve means so that said injection pump means provides fuel under high pressure to said fuel injection means.

5,024,196

IDLE SPEED ADJUSTING SYSTEM FOR INTERNAL COMBUSTION ENGINE

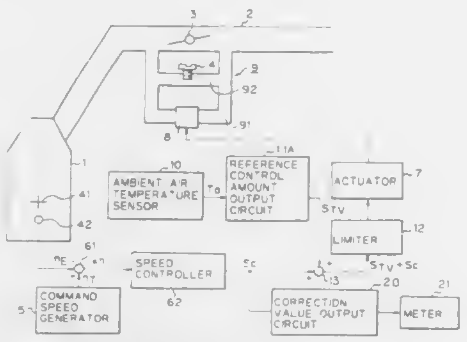
Hirofumi Obuchi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 8, 1990, Ser. No. 610,664

Claims priority, application Japan, Nov. 9, 1989, 1-293213

Int. Cl.^{5} F02D *41/16*

U.S. Cl. 123—339 **3 Claims**



1. An idle speed adjusting system for effecting feedback control of the idle speed of an internal combustion engine, comprising:

reference control amount output circuit means for producing and delivering a reference control signal necessary for maintaining a command engine speed;

speed control means for generating a speed correction signal representing the offset of the running speed of said engine from said command engine speed;

flow rate control means for controlling the flow rate of intake air supplied to said engine, in accordance with said reference control signal and said speed correction signal;

auxiliary flow rate control means for controlling the flow rate of the intake air in accordance with said speed correction signal and independently of said flow rate control means, so as to adjust said speed correction signal to a predetermined value; and

ambient air temperature sensing means for delivering an ambient air temperature signal to said reference control amount output circuit means so as to vary said reference control signal in accordance with a change in the ambient air temperature.

5,024,197

ENGINE IDLING CONTROL APPARATUS

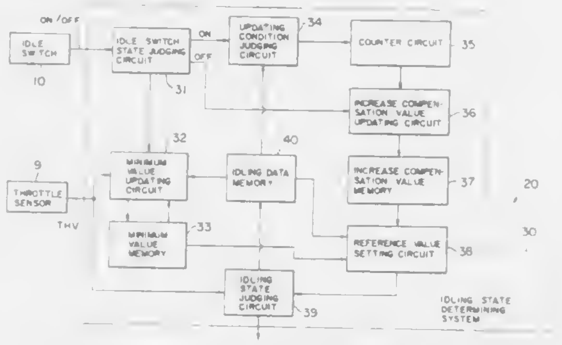
Akihisa Nakamura, Tokyo, Japan, assignor to Fuji Jukogyo Kabshiki Kaisha, Tokyo, Japan

Filed Apr. 26, 1990, Ser. No. 515,084

Claims priority, application Japan, Apr. 28, 1989, 1-110563; Apr. 28, 1989, 1-110564

Int. Cl.^{5} F02D *41/08, 41/16*

U.S. Cl. 123—339 **4 Claims**


ON/OFF
IDLE SWITCH
10
IDLE SWITCH STATE JUDGING CIRCUIT
ON
OFF
31
UPDATING CONDITION JUDGING CIRCUIT
34
COUNTER CIRCUIT
35
INCREASE COMPENSATION VALUE UPDATING CIRCUIT
36
32
40
9
THROTTLE SENSOR
THV
MINIMUM VALUE UPDATING CIRCUIT
IDLING DATA MEMORY
INCREASE COMPENSATION VALUE MEMORY
37
20
MINIMUM VALUE MEMORY
33
REFERENCE VALUE SETTING CIRCUIT
38
30
IDLING STATE JUDGING CIRCUIT
39
IDLING STATE DETERMINING SYSTEM

1. An engine idling control apparatus having a throttle position sensor for detecting an opening degree of the throttle valve, and an idle switch for changing a state thereof at a predetermined throttle opening degree near a fully closed state of the throttle valve; comprising

means for judging the state of the idle switch responsive to output from said idle switch;

means for updating a minimum value of output values from said throttle position sensor;

means for updating an increase compensation value to increase when said idle switch state judging means judges closed state of said idle switch, and for updating said increase compensation value to initialize when said idle switch state judging means judges open state of said idle switch;

means for setting a references value to judge an idling state by adding said increase compensation value from said increase compensation value updating means and a predetermined offset value to said minimum value from said minimum value updating means; and

means for judging said idling state by comparing said reference value which is set by said reference value setting means with said output value from said throttle position sensor.

5,024,198

FUEL DELIVERY RAIL ASSEMBLY

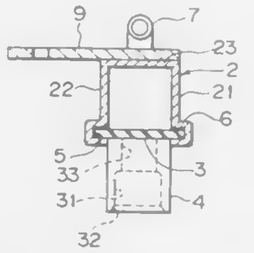
Masayoshi Usui, Numazu, Japan, assignor to Usui Kokusai Sangyo Kaisha Ltd., Shizuoka, Japan

Filed Jun. 1, 1990, Ser. No. 531,684

Claims priority, application Japan, Jun. 6, 1989, 1-65436[U]

Int. Cl.^{5} F02M *55/02*

U.S. Cl. 123—468 **2 Claims**



1. A fuel delivery rail assembly for an internal combustion engine comprising;

an elongated conduit having a fuel inlet at an end and a fuel exit at the other end, and

a plurality of sockets so formed as to receive fuel injectors,

the section of said conduit being formed in a hollow shape having four walls, one of said walls being made from aluminum die casting, and the other walls being integrally formed by steel materials,

opposing edges of said steel walls being provided with cavities for receiving respective edges of said aluminum wall,

abutment portions between said aluminum wall and said steel walls being mechanically shrinked from outside thereby being tightly combined,

each of said sockets being integrally formed with said aluminum wall.

5,024,199

AIR-FUEL RATIO CONTROL SYSTEM FOR AUTOMOTIVE ENGINE

Kunihiro Abe, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 414,451

Claims priority, application Japan, Oct. 7, 1988, 63-25359

Int. Cl.^{5} F02M *51/00;* **F02D** *41/14*

U.S. Cl. 123—489 **13 Claims**

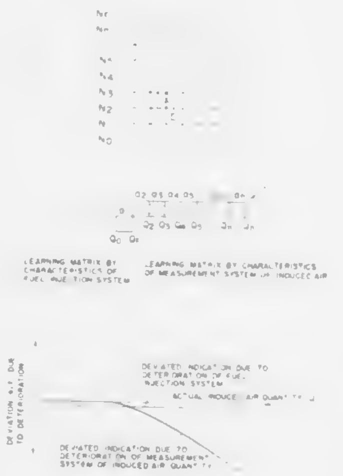


FIG 4(c)

1. An air-fuel ratio control system for an automotive engine, having a crank angle sensor for detecting an engine speed, an exhaust gas sensor for detecting an actual air-fuel ratio, a fuel injection system with an injector for injecting an air-fuel mixture into a combustion chamber of said engine, and an intake air quantity measurement system including an intake air quantity sensor for measuring an intake air quantity;

the control system comprising

means for setting a learning region by characteristics change of said fuel injection system and said air measurement system corresponding to an operational region;

learning means for representatively learning a correction quantity of said fuel injection system at a specified point of said operational region, and for learning a correction quantity of said air measurement system in other points of said operational region in dependency on an instruction from said means for setting a learning region on the basis of the difference between a reference value of an air-fuel ratio and the actual air-fuel ratio detected by the exhaust gas sensor;

basic fuel setting means for setting a basic fuel injection quantity in dependency on the engine speed, the intake air quantity measured by said air measurement system, and a learning value from said learning means corresponding to said operational region; and

fuel quality setting means for setting an actual fuel injection quantity which is corrected by said learning value corresponding to said operational region of said fuel injection system in dependency on said basic quantity.

5,024,200

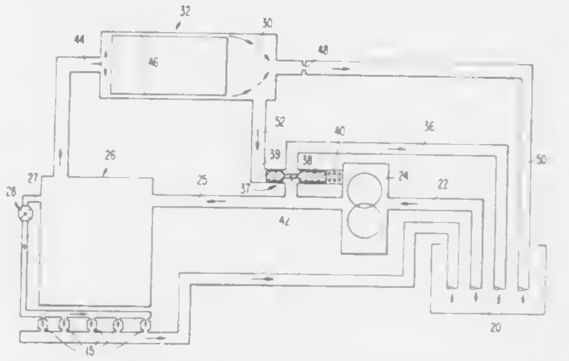
VISCOSITY RESPONSIVE PRESSURE REGULATOR AND TIMING CONTROL TAPPET SYSTEM INCORPORATING THE SAME

Paul D. Free; B. Doszpoly, both of Columbus, Ind.; Tibor J. Villanyi, Hanahan, S.C., and David A. Olson, Columbus, Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.

Filed Jul. 27, 1989, Ser. No. 385,745

Int. Cl.^{5} F02M *37/04*

U.S. Cl. 123—501 **19 Claims**



1. An engine timing control tappet system of the type having at least one expansible tappet for controlling timing of a fuel injector using oil that is supplied by a pump to an engine lubrication circuit, wherein said system includes viscosity sensitive means that is coupled to the engine lubrication circuit for producing a simulated pressure which varies in correspondence with the effect of changes in the viscosity of oil received from the engine lubrication circuit on the pressure regulating means responsive to changes in said simulated pressure for adjusting the pressure of oil supplied through said engine lubrication system to said tappets from said pump, wherein said viscosity sensitive means is coupled to the engine lubrication circuit by an oil rifle connection, and comprises a viscosity orifice, a pressure chamber, a regulator connection, and an exit orifice; said viscosity orifice being connected between the rifle connection and the pressure chamber and having a flow-through length and a cross-sectional area that produces a pressure drop from an upstream side to a downstream side thereof that is sensitive to changes in viscosity of oil passing therethrough; wherein said exit orifice has, in comparison to said viscosity orifice, a relatively short flow-through length and relatively small sensitivity to the viscosity of oil passing

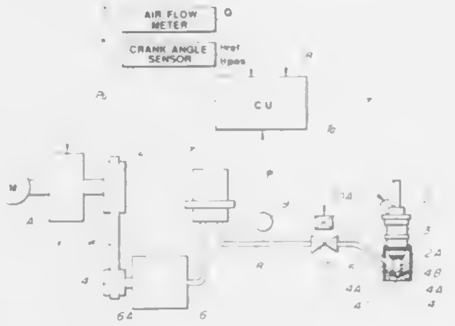
VOL
1127
ISS
3
JE
18
1991
UMI

therethrough, said exit orifice being connected to a downstream side of the pressure chamber as a means for controlling the quantity of flow through said viscosity orifice: and wherein said regulator connection communicates said pressure regulating means with said pressure chamber.

5,024,201
ASSIST AIR SUPPLY SYSTEM FOR INTERNAL COMBUSTION ENGINE

Kazumitsu Kobayashi, and Hiroki Sunou, both of Gunma, Japan, assignors to Japan Electronic Control Systems Co., Ltd., Isezaki, Japan

Filed Aug. 29, 1989, Ser. No. 399,875
Claims priority, application Japan, Aug. 29, 1988, 63-214644
Int. Cl.⁵ F02M *39/00*
U.S. Cl. 123—531 20 Claims



1. An assist air supply system for a fuel injection internal combustion engine comprising:

an assist air discharge nozzle provided for discharging a pressurized air in the vicinity of a fuel injected through a fuel injection valve;

a pressurized air supply means including means associated with an external driving power source to be driven by the driving force supplied therefrom, for generating a pressurized air having a pressure level higher than or equal to a predetermined level, and supplying a pressurized air to said assist air discharge nozzle in synchronism with fuel injection;

sensor means for monitoring preselected engine driving parameters affecting fuel injection amount and producing sensor signals representative of the monitored engine driving parameters; and

controlling means for receiving said sensor signals and determining assist air supply timing on the basis of said sensor signals so that the assist air is discharged in synchronism with fuel injection timing, said controlling means setting the timing of opening of a valve means so that the valve means opens at an earlier time than an opening time of said fuel injection valve, at a predetermined magnitude.

5,024,202
METERING OF FUEL

Michael L. McKay, Willeto.., Australia, assignor to Orbital Engine Company Proprietary Limited, Balcatta, Australia

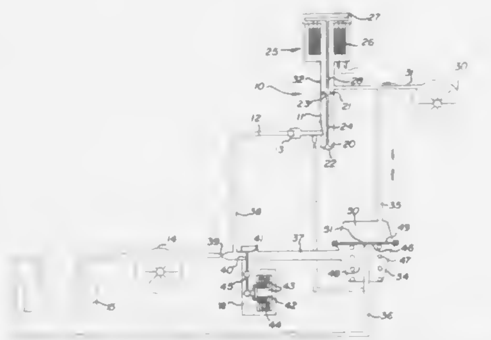
Division of Ser. No. 849,501, M 24, 6, Pat. 4,841,942.
This application May 5, 1989, Ser. No. 34,556
Claims priority, application Australia, Aug. 1, 1984, PG6327/84
Int. Cl.⁵ F02M *23/00*
U.S. Cl. 123—533 18 Claims

1. Apparatus for metering fuel to an engine, comprising:

a chamber having an open fuel port, a selectively openable gas port and a selectively openable delivery port;

regulating means for regulating a pressure differential between the fuel and gas supplies at the fuel and gas ports in response to engine load; and

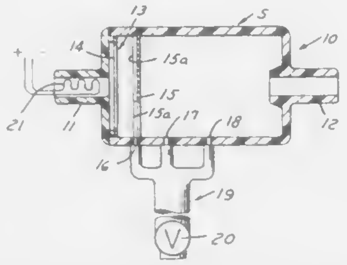
means for selectively opening said gas and delivery ports to deliver from the chamber when both said delivery and gas ports are open, the fuel in and fuel entering the chamber while the delivery port is open.



5,024,203
PCV OIL SEPARATOR SYSTEM

Stephen H. Hill, Muskegon, Mich., assignor to Sealed Power Technologies, L.P., Muskegon, Mich.

Filed Aug. 22, 1990, Ser. No. 571,322
Int. Cl.⁵ F02M *25/00*
U.S. Cl. 123—573 25 Claims



1. In a positive crankcase ventilation system wherein a direct flow path of vapors is provided between the engine crankcase and the intake manifold by inducing differential pressure between the intake manifold and the crankcase, the method of separating oil from fuel and water in the vapor which comprises:

passing the vapors through at least one chamfered orifice, directing the vapors toward an impactor plate,

impacting the vapors after they have passed through the orifice against an impactor plate,

controlling the temperature of the vapors, the size of the orifice, the distance between the orifice and the impactor plate such that the oil particles are separated from the vapor and the remaining vapor containing fuel and water passes on through the system.

5,024,204
CAPACITIVE DISCHARGE IGNITION SYSTEM WITH CONTINUOUS TIMING ADVANCE

Richard A. Dykstra, Cedar Grove, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed Jun. 29, 1990, Ser. No. 546,247
Int. Cl.⁵ F02P *3/08*
U.S. Cl. 123—602 17 Claims

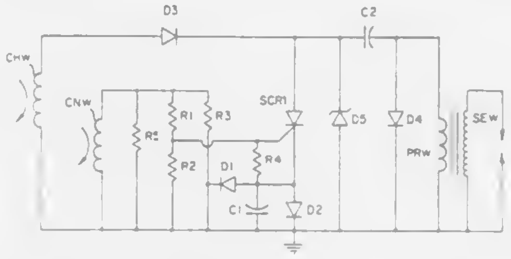
1. An advancing capacitive discharge ignition system for use with an internal combustion engine, comprising:

a charge capacitor whose discharge triggers ignition firing;

an ignition SCR in circuit connection with said charge capacitor and having a gate, an anode and a cathode, said charge capacitor discharging through said ignition SCR;

a control winding that generates an alternating signal waveform having positive and negative half-cycles; and

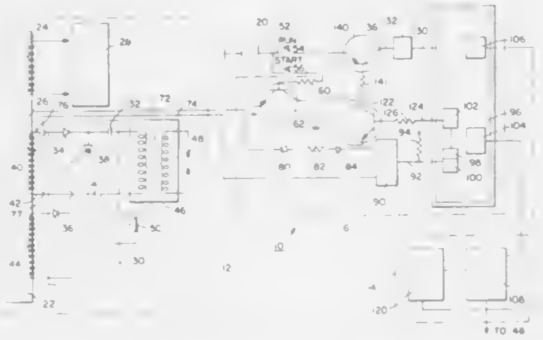
gate control means for receiving said alternating signal and for gating on said ignition SCR during said positive half-cycle at low engine speeds and for gating on said ignition SCR during said negative half-cycle at high engine speeds, said gate control means gating on said ignition SCR progressively earlier in a substantially continuous manner along said alternating signal waveform as engine speed increases to achieve timing advance.



5,024,205
METHOD AND APPARATUS FOR CONSERVING BATTERY POWER IN A SNOWMOBILE ELECTRICAL SYSTEM

Ward K. Gatza, and Ronald E. Chasteen, both of Colorado Springs, Colo., assignors to Injection Research Specialists, Inc., Colorado Springs, Colo.

Filed Mar. 30, 1990, Ser. No. 502,410
Int. Cl.⁵ F02P *11/00*
U.S. Cl. 123—632 23 Claims



1. In a snowmobile engine having a battery and at least one spark plug, an electronically controlled fuel system comprising:

fuel injection means for the delivery of fuel to said engine during the operation thereof;

ignition means for providing an electrical output to said spark plug sufficient to enable said plug to ignite said fuel delivered by said fuel injection means;

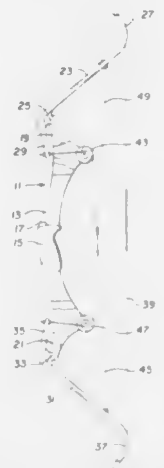
electronic control means electrically connected to said battery for controlling the operation of said fuel injection means, said electronic control means comprising a microprocessor having detector means therein electrically coupled to said ignition means for determining when said electrical output of said ignition means drops below a minimum threshold level, said microprocessor further comprising signal generator means for generating a battery disconnection signal when said detector means determines that said electrical output of said ignition means is below said threshold level; and

switch means electrically coupled between said battery and said microprocessor for receiving said battery disconnection signal from said signal generator means and disconnecting said electronic control means from said battery when said battery disconnection signal is received.

5,024,206
COMPOUND ARCHERY BOW

Wayne L. Lester, 3935 Willow Run, Flower Mound, Tex. 75028

Filed Dec. 16, 1988, Ser. No. 285,652
Int. Cl.⁵ F41B *5/00*
U.S. Cl. 124—23.1 8 Claims



1. A compound archery bow assembly, comprising:

a handle having an upper end and a lower end;

an upper limb having an upper end and a lower end, the upper limb being pivotably connected to the upper end of the handle at a pivot point between the upper and lower ends of the upper limb;

a lower limb having an upper end and a lower end, the lower limb being pivotably connected to the lower end of the handle at a pivot point between the upper and lower ends of the lower limb;

a bowstring strung between the upper end of the upper limb and the lower end of the lower limb, the bowstring being movable between an undrawn position and a fully drawn position;

an upper pulley mounted on the handle and having a helical groove that makes three turns around the upper pulley, the diameter of one of the turns being different from the diameters of the other turns;

a lower pulley mounted on the handle and having a helical groove that makes three turns around the lower pulley, the diameter of one of the turns being different from the diameters of the other turns;

an upper tension cable connected to the upper limb above the pivot point and traveling around the lower pulley and connected to the upper end of the lower limb; and

a lower tension cable connected to the lower limb below the pivot point and traveling around the upper pulley and connected to the lower end of the upper limb.

5,024,207
HEATING APPARATUS AND METHOD FOR SEMICONDUCTOR MATERIAL SLICING PROCESS

Josephine A. Harbarger; David Oliver, and Ella L. Anthony, all of Phoenix, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 428,568, Oct. 30, 1989, abandoned.
This application Sep. 10, 1990, Ser. No. 581,161
Int. Cl.⁵ B28D *7/04*
U.S. Cl. 125—35 4 Claims

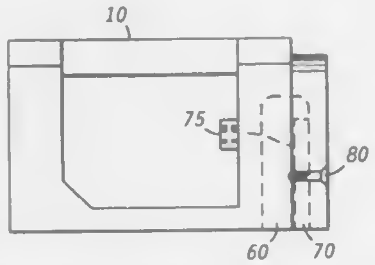
1. A method for slicing a material ingot comprising the steps of:

mounting said material ingot on a mounting face of a mounting block of a slicing apparatus with a thermally softenable adhesive to form a mounting block/material ingot combination;

inserting said mounting block/material ingot combination

VOL 1127
ISS 3
JE 18
1991
UMI

into said slicing apparatus for slicing of said material ingot, wherein a residue of said material ingot remains attached to said mounting block after a portion of said material ingot has been sliced; and



removing said residue of said material ingot from said mounting block by energizing a heating element mounted on said mounting block to heat only a localized portion of said mounting block near said mounting face to soften the adhesive between the material ingot and the mounting face.

5,024,208

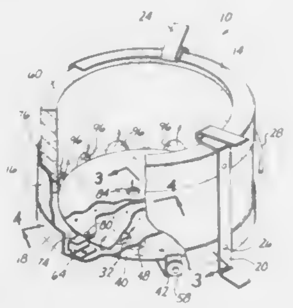
PORTABLE STOVE

Fred W. Hottenroth, Seal Beach, and Fred W. Hottenroth, III, Anaheim, both of Calif., assignors to ZZ Corp., Los Alamitos, Calif.

Filed Oct. 29, 1990, Ser. No. 605,081

Int. Cl.^{5} F24B *3/00*

U.S. Cl. 126—25 R **22 Claims**



1. A portable stove for burning charcoal and other solid fuels comprising:

a continuous vertically oriented insulative wall, said insulative wall having a continuous bottom edge, said insulative wall surrounding and defining in part a hollow fuel chamber, said fuel chamber having an open top;

a grate positioned adjacent said insulative wall proximal to said bottom edge of said insulative wall, said grate forming the bottom of said fuel chamber;

means for conducting combustion air between said bottom edge of said insulative wall and said grate;

a reflector plate positioned below said grate;

an air chamber means for channeling combustion air, said air chamber means surrounding said reflector and the under side of said grate and the bottom most portion of said side wall including said bottom edge and said means for conducting combustion air; and

air control means for introducing air into said air chamber means in a controlled manner.

5,024,209

GAS COOKING APPLIANCE WITH AT LEAST ONE RADIANT GAS BURNER ARRANGED UNDERNEATH A GLASS CERAMIC PLATE, AS WELL AS PROCESS FOR REDUCING THE HEATING-UP TIME OF SUCH A GAS COOKING APPLIANCE

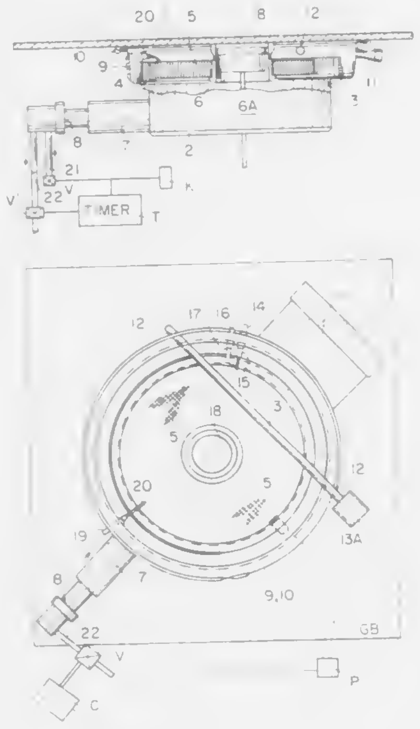
Kurt Schaupert, Hofheim-Wallau, Fed. Rep. of Germany, assignor to Schott Glaswerke, Mainz, Fed. Rep. of Germany

Filed Apr. 13, 1990, Ser. No. 508,616

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1989, 3912124

Int. Cl.^{5} F24C *3/00*

U.S. Cl. 126—39 H **15 Claims**



1. A gas cooking appliance with at least one radiant gas burner having an exhaust gas side, the burner being positioned underneath a glass ceramic plate with a burner plate having a single combustion chamber, the appliance including a gas supply controller as well as customary ignition, safety, and temperature monitoring devices, the improvement comprising: a supplemental gas feed means activated when the appliance is switched on and when the gas supply controller is positioned at full load, the supplemental gas feed means feeding the single combustion chamber of the burner with an increased amount of gas that exceeds the amount of gas normally fed in a full load position of the gas controller; and means for deactivating the supplemental gas feed means upon the ceramic plate reaching the predetermined temperature to interrupt the flow of gas therethrough.

10. A process for reducing the heating-up time of a gas cooking appliance having at least one radiant gas burner with a single combustion chamber, a glass ceramic cooling plate, and customary power and safety devices, the process comprising: after ignition and during switching to full load, feeding the single combustion chamber of the burner with an amount of gas increased with respect to full load in normal operation and capable of damaging the glass ceramic cooking plate until the operating temperature of the burner plate has been reached and thereafter stopping the feed of the amount of gas.

5,024,210

WATER HEATER CONSTRUCTION

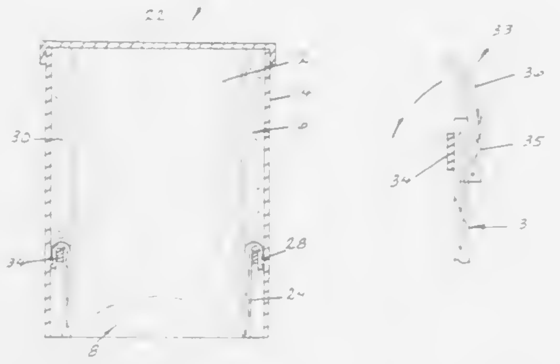
Thomas E. Nelson, Anchorage, Ky., assignor to Soltech, Inc., Shelbyville, Ky.

Continuation of Ser. No. 302,395, Feb. 23, 1989, Pat. No. 4,911,142, which is a division of Ser. No. 162,504, Mar. 1, 1988, Pat. No. 4,958,620, which is a division of Ser. No. 8,564, Jan. 29, 1987, Pat. No. 4,736,509. This application Jan. 22, 1990, Ser. No. 467,938

The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.

Int. Cl.^{5} F24H *1/00*

U.S. Cl. 126—344 **8 Claims**



1. A water heater comprising:

a water tank;

an outer shell concentrically located over the water tank defining an annular space therebetween;

a first annular sleeve of insulation material located in the annular space extending from approximately the bottom end of the water tank upwardly longitudinally thereof a predetermined distance less than the entire height of the water tank; and

a second annular sleeve of insulation material disposed in overlapping relation with said first annular sleeve of insulation material and folded into a cuff of double radial thickness which is disposed in overlapping relation with the top end of said first annular sleeve and compressed between said water tank and said outer shell.

5,024,211

HEAT EXCHANGE MEDIUM CONNECTOR FOR MOVABLE SOLAR HEATERS

Wilfried Winzen, Pforzheim, Fed. Rep. of Germany, assignor to Witzenmann GmbH Metallschlauch-Fabrik Pforzheim, Pforzheim, Fed. Rep. of Germany

Filed Jan. 2, 1990, Ser. No. 460,272

Claims priority, application Fed. Rep. of Germany, Jan. 5, 1989, 3900203

Int. Cl.^{5} F24J *2/00*

U.S. Cl. 126—424 **15 Claims**

1. Fluid connection system for a heat exchange fluid exposed to a movable solar heater,

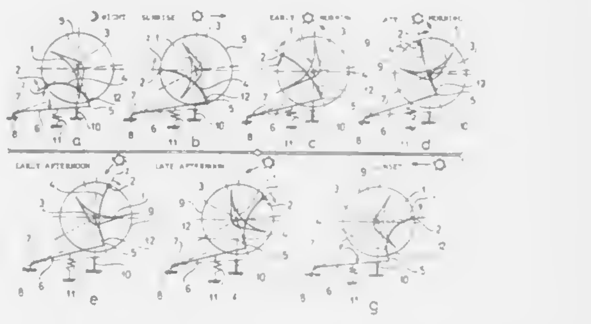
wherein said movable solar heater comprises

a movable mirror system (1) including a mirror which is pivotable about a mirror pivot axis (3) positionable in a direction at least approximately at right angles to the position of the sun at any given time during the day;

a heat exchange means (2) associated with the mirror system and positioned opposite said mirror pivot axis (3), with respect to said mirror, in a zone on which solar radiation reflected by said mirror is concentrated;

fluid connection means (7, 8) located at a fixed position with respect to said movable mirror system,:

a flexible hose (4) coupled to said heat exchange means (2) and bending upon movement of the mirror as the mirror follows the position of the sun; and



coupling means (5, 6) coupling the fixed fluid connection means (7, 8) to said flexible hose (4),

wherein, in accordance with the invention,

said coupling means is at least approximately radially movable with respect to said mirror pivot axis (3) and positioned opposite said mirror pivot axis, with respect to a connection of said flexible hose (4) with said heat exchange means.

5,024,212

ENDOSCOPE/RESECTOSCOPE AND SHIELD THEREFOR

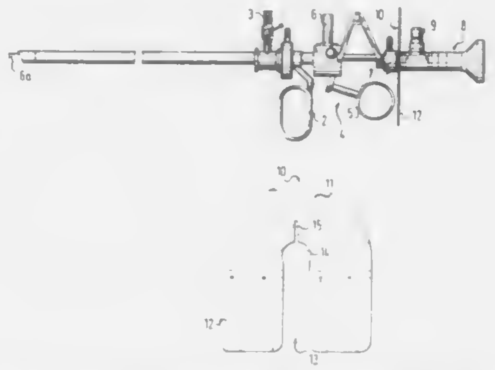
Ludwig Bonnet, Knittlingen, and Ulrich Wetterauer, Freiburg, both of Fed. Rep. of Germany, assignors to Richard Wolf GmbH, Knittlingen, Fed. Rep. of Germany

Filed Apr. 26, 1990, Ser. No. 514,908

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1989, 3918719

Int. Cl.^{5} A61B *1/00*

U.S. Cl. 128—4 **8 Claims**



1. An endoscope, in particular a resectoscope for excising tissue, said endoscope having proximal and distal ends and comprising a barrel which is insertable into a body cavity, for feeding in and draining out an irrigating liquid and for carrying a working element which is actuatable from the proximal end of the endoscope and which has a field of activity that can be monitored visually through an endoscope telescope positioned at the proximal end of the endoscope, wherein a protective shield is releasably secured on a lengthwise segment of the endoscope, said lengthwise segment comprising those segments of the working element and of the endoscope telescope

VOL
1127
ISS
3
JE
18
1991
UMI

which project proximally from the barrel of the endoscope, the protective shield having a U-shaped configuration, with the two legs of the U being created by a cutout whose width is less than the diameter of at least one of the working element and telescope which carries the protective shield.

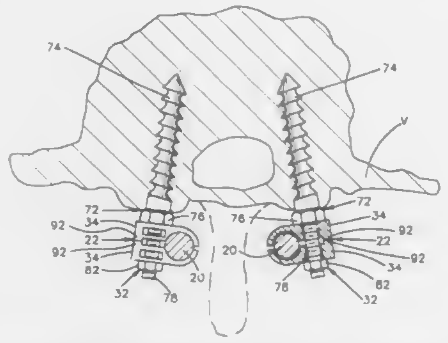
5,024,213
CONNECTOR FOR A CORRECTIVE DEVICE

Marc A. Asher, Prairie Village, Kans.; Walter E. Strippgen, Golden, Colo.; Charles F. Heinig, Charlotte, N.C., and William Carson, Columbia, Mo., assignors to AcroMed Corporation, Cleveland, Ohio

Filed Feb. 8, 1989, Ser. No. 308,430

Int. Cl.^{5} A61F *5/00*

U.S. Cl. 128—69 **17 Claims**



1. An apparatus for connecting a bendable elongate rod with a vertebra, said apparatus comprising:

a body portion including a pair of axially spaced projections located in an opening in said body portion;

a connector portion fixed to and extending from said body portion for connecting said body portion with the vertebra; and

said projections of said body portion defining an arcuate recess located between said projections of said body portion, said projections including surfaces for engaging parts of the rod at axially spaced locations when said connector portion acts to connect said body portion with the vertebra

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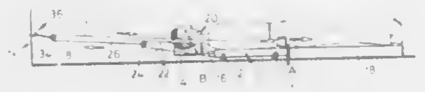
5,024,214
APPARATUS FOR USE IN RELIEVING NECK AND/OR BACK PAIN

Leon Hayes, Liverpool, United Kingdom, assignor to Backeze Limited, Liverpool, United Kingdom

Filed May 8, 1989, Ser. No. 350,330

Int. Cl.^{5} A61H *1/02*

U.S. Cl. 128—75 **13 Claims**



1. Apparatus for use in relieving neck and/or back pain in the person comprising a single movable support member on which the upper torso rests in use, and stationary support means next adjacent said support member on which the lower torso (buttocks) rests in use, a harness co-operable, in use, with the person and also secured to the movable support member, the apparatus further comprising a pulley adapted to be mounted on a stationary abutment, and means for applying a force to the harness which force it to act in use in a direction to urge the body and the movable support member in one and the same direction away from the stationary support means, which force applying means comprises at least one actuating line to which force is applied by the person through the arms thereof, in an opposite direction and which acts through said pulley to apply said force to the body and the movable support members.

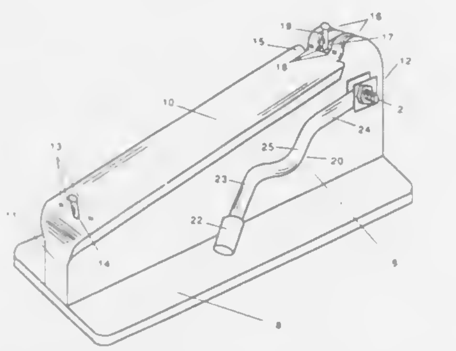
5,024,215
BACK RACK FOR ALLEVIATING MUSCULO-SKELETAL TENSION

Jason Wang, 2245 Watt St., Reno, Nev. 89509

Filed Oct. 13, 1989, Ser. No. 421,111

Int. Cl.^{5} A61H *1/02*

U.S. Cl. 128—75 **8 Claims**



1. A muscle relaxing device comprising:

a base plate adapted to rest in a stable position against a flat surface, said base plate having a longitudinal dimension of at least the length of a small person's back;

an inclined block mounted on said base plate, said block having a lower end and an upper end at a depth significantly higher than said lower end, said block having a longitudinal dimension approximately equal the longitudinal of said base plate;

a flat ramped surface extending along one side of said inclined block opposite from said base plate, said ramped surface having lower and upper ends, said ramped surface having a lateral dimension slightly wider than the width of a person's spine;

said inclined block further comprising projecting means extending upwardly from said higher end of said block, said projecting means having at least one curved surface which connects with said ramped surface at said upper end of said ramped surface, said projecting means having a lateral dimension slightly wider than the width of a person's thoracic area of the spine;

wherein tension within the muscles of a person's back may be relieved by lying down upon said curved surface of said projecting means;

wherein said ramped surface further comprises a hole, said hole extending downwardly into said block;

a pin of a dimension to be held by said hole,

wherein a point of pain within a person's neck or foot may be relieved by applying pressure to the point of pain against said pin when said pin is held within said hole.

5,024,216
KNEE SUPPORT

Katuaki Shiono, Hatogaya, Japan, assignor to Tokyo Eizai Laboratory Co., Ltd., Japan

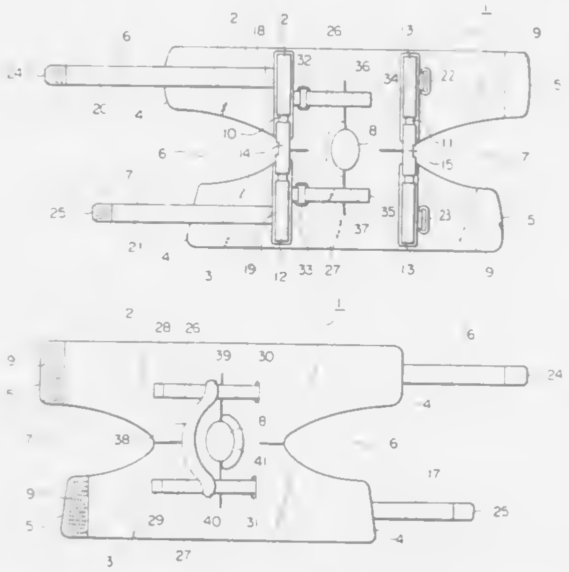
Filed Feb. 22, 1990, Ser. No. 483,910

Claims priority, application Japan, Feb. 23, 1989, 1-21169[U]

Int. Cl.^{5} A61F *3/00*

U.S. Cl. 128—80 C **11 Claims**

1. A knee support comprising a main body having a knee portion for covering the knee joint and with thigh and shank portions located above and below the knee portion, said knee portion including a patella opening two straps which are respectively disposed extending in a lateral direction above and below said patella opening, one end of each of said straps being fixed to the inside of said main body, while the other ends thereof are adapted to pass through and be detachably attached to the outside of said main body, and a patella pad fixed to said two straps so as to abut one side of said patella opening.



5,024,217
BANDAGE APPLICATOR

Dennis S. Spencer, Ingle Farm, Australia, assignor to Olemunda Pty. Ltd., Kilkenny, Australia

Filed Sep. 7, 1989, Ser. No. 404,419

Claims priority, application Australia, Sep. 14, 1988, PJ0422

Int. Cl.^{5} A61F *13/00, 15/00*

U.S. Cl. 128—82 **5 Claims**

1. An applicator for applying adhesive plastics film to extremities of the human body, comprising:

a pair of moulded trays, respective soft resilient foam pads in each said tray of depth greater than the depth of the tray, a hinge joining corresponding first ends of the trays such that the foam pads are openable away from each other or closable to lie in face-to-face contiguity, and when so closed, leave gaps between the sides of the trays,

latch means releasably joining second ends of the trays which are opposite the first ends when the foam pads are in their face-to-face contiguity, each second end having a recess flange which co-operates with the recess flange of the other second end to form an access opening at the second end into which a patient can insert an extremity,

and film retaining clips extending along opposite sides of at least one of the trays.

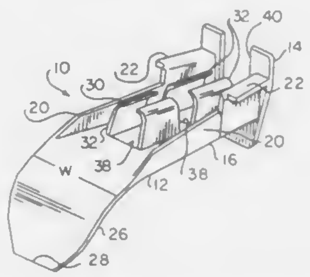
5,024,218
INTUBATING AIRWAY

Andranik Ovassapian, Northbrook, and John F. Dye, Elgin, both of Ill., assignors to The Kendall Company, Mansfield, Mass.

Continuation-in-part of Ser. No. 112,004, Oct. 21, 1987, abandoned, Continuation of Ser. No. 848,677, Apr. 4, 1986, abandoned. This application Oct. 27, 1988, Ser. No. 266,284

Int. Cl.^{5} A61M *16/00*

U.S. Cl. 128—200.26 **4 Claims**



1. An intubating airway adapted for insertion into the mouth of a patient, said airway comprising:

an elongated body having opposed first and second ends and a longitudinal axis extending therebetween;

a generally flat section adjacent to said first end;

faceplate means, transversely disposed across said first end of said body, for abutting against the lips, teeth or gums whereby to prevent said second end from advancing too far into the mouth;

curved, generally tongue-shaped portion means adjacent said second end, said curved portion means for permitting placement of said airway between the patient's maxillary and mandibular molars; and

flexible guide means for allowing insertion of a medical instrument in or removal of the instrument from said airway in a first, flexed, biased position but normally being in a second, relaxed, unbiased position, said guide means comprising at least one pair of opposed walls upstanding from only said flat section and extending longitudinally down said flat section, said walls being spaced apart and each said wall having an uppermost distal edge which is curved towards the opposed said wall, said distal edges being spaced apart whereby said edges may be flexed further apart to facilitate said insertion or said removal of the medical instrument within said airway.

5,024,219
APPARATUS FOR INHALATION THERAPY USING TRIGGERED DOSE OXYGENATOR EMPLOYING AN OPTOELECTRONIC INHALATION SENSOR

Henry G. Dietz, 80 Salisbury Ave., Garden City, N.Y. 11530

Continuation-in-part of Ser. No. 2,743, Jan. 12, 1987, abandoned. This application Jan. 30, 1989, Ser. No. 303,739

The portion of the term of this patent subsequent to May 24, 2005, has been disclaimed.

Int. Cl.^{5} A61M *16/00*

U.S. Cl. 128—204.21 **2 Claims**

1. An apparatus to trigger a dose of breathable gas, including oxygen, from a tank under high pressure, to a human user when the user inhales, said apparatus comprising:

first pressure regulator means for operable connection to the tank of breathable gas to reduce the pressure of the breathable gas to a second lower pressure which is still above atmospheric pressure;

second pressure regulator means for operable connection to the first pressure regulator means to reduce the pressure of the breathable gas to a third still lower pressure;

flowmeter means for operable connection to the second pressure regulator means to measure the flow of the breathable gas;

optoelectronic inhalation sensor means for operable connec-

VOL
1127
ISS
3
JE
18
1991
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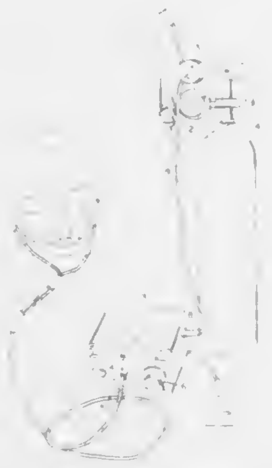
tion to the flowmeter means to receive the flow of the said breathable gas and to sense when inhalation occurs; said optoelectronic inhalation sensor having a flexible sensing diaphragm at a calibrated position for sensing individual negative pressures developed at each inhalation, optoelectronic means including sensing means for automatically sensing each movement of the diaphragm in response to said negative pressure developed during inhalation, means in said optoelectronic means for developing an electrical signal at each sensed movement of said diaphragm in response to sensing of the individual negative pressure developed at each said inhalation, means for connecting the sensor to a source of a breathable gas, and means to apply said electrical signal to said source of breathable gas for control of supply of said gas to the sensor;

triggered dose oxygenator means for operable connection to the optoelectronic inhalation sensor means and to trigger a dose of the said breathable gas when the optoelectronic sensor means detects inhalation;

cannula means for operable connection to the triggered dose oxygenator means to detect the negative pressure of inhalation of the human user and to deliver the flow of said breathable gas to the human user when inhalation occurs;

electrical power means for operable connection to the triggered dose oxygenator means to supply a direct current from a line voltage wall transformer.



5,024,220

NASOTRACHEAL TUBE INSERTION CONNECTOR

W. Corbett Holmgreen, and Leonid Bunegin, both of San Antonio, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Jul. 21, 1988, Ser. No. 222,550

Int. Cl.⁵ A61M *16/04, 25/02, 39/00*

U.S. Cl. 128—207.18 **31 Claims**

1. A connector for coupling a tracheal tube to a supply of anesthesia gas, comprising:

a tubular body including along its length a flexible, peripherally integrious portion, said body defining a remote end having means for connecting said body to a supply of anesthesia gas, and a patient end terminating in an expandable, tapered tip to facilitate insertion of said body in a tracheal tube; and

an expansion collar adapted to be inserted and secured totally within said tip and configured to increase the diameter of said tip when inserted in the tracheal tube, such that the insertion of said collar in said tip results in a secure, substantially airtight fit between said connector and said tube, said collar, when inserted totally within said tip, defining a first and second free end not used as a connecting means.

5,024,221

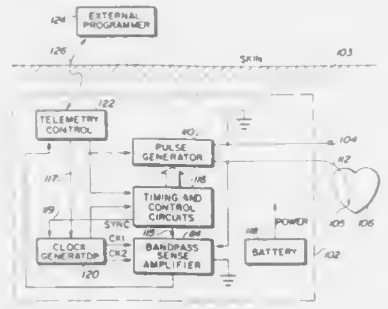
PROGRAMMABLE BAND-PASS AMPLIFIER FOR USE WITH IMPLANTABLE MEDICAL DEVICE

Wayne A. Morgan, Granada Hills, Calif., assignor to Siemens-Pacesetter, Inc., Sylmar, Calif.

Continuation-in-part of Ser. No. 735,251, May 17, 1985, abandoned. This application Nov. 17, 1987, Ser. No. 121,547

Int. Cl.⁵ A61N *1/00*

U.S. Cl. 128—419 PG **14 Claims**



1. A programmable implantable medical device comprising:

a pacemaker for generating stimulation pulses;

a pair of electrodes coupled to the pacemaker for sensing electrical signals developed therebetween and for delivering said stimulation pulses to a desired location;

programmable band-pass amplifier means coupled to said electrodes for sensing and processing electrical signals, said programmable band-pass amplifier means including:

an amplifier having an input terminal and an output terminal, said electrical signals sensed by said electrodes being applied to said input terminal, said amplifier causing said electrical signals to be amplified by a desired gain factor and presented at the output terminal of said amplifier,

capacitor means for coupling to the amplifier,

switching means for switchably coupling said capacitor means to said amplifier, said switching means limiting the electrical signals amplified by said gain factor to those electrical signals having a frequency that falls within a band of frequencies bounded by a lower cut-off frequency and an upper cut-off frequency, the upper and lower cut-off frequencies of said frequency band being controlled by the rate at which said capacitor means is switchably coupled to said amplifier by said switching means, said switching rate, in turn, being controlled by a clock signal applied to said switching means; and

clock signal generating means coupled to said switching means for generating said clock signal at one of a plurality of possible clock frequencies, said clock signal generating means responsive to a remotely telemetered signal for selecting one of the plurality of possible clock frequencies for controlling the rate at which said capacitor means is switchably coupled to said amplifier;

whereby the frequency band of said band-pass amplifier means can be changed to a desired value by remotely changing the frequency of the clock signal generated by said clock signal generating means.

5,024,222

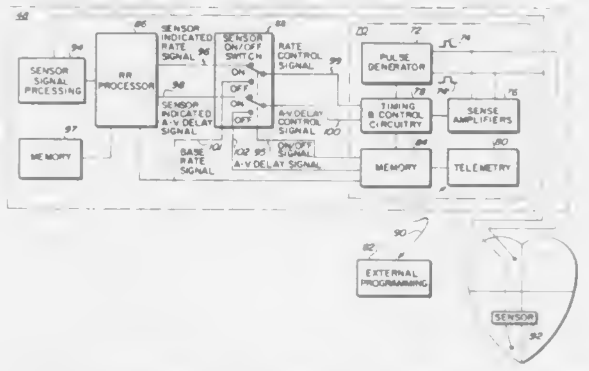
HEMODYNAMICALLY RATE RESPONSIVE PACEMAKER AND METHOD OF AUTOMATICALLY ADJUSTING THE ESCAPE AND A-V INTERVALS

James R. Thacker, Canyon Country, Calif., assignor to Siemens-Pacesetter, Inc., Sylmar, Calif.

Filed Feb. 21, 1990, Ser. No. 482,603

Int. Cl.⁵ A61N *1/00*

U.S. Cl. 128—419 PG **26 Claims**



1. In a dual chamber pacemaker, a system for optimizing cardiac output of a patient's heart, the pacemaker having a pulse generator for generating atrial and ventricular stimulation pulses and timing means for defining a pacing cycle having a stimulation rate and a A-V time interval between the atrial and the ventricular stimulation pulses, the stimulation rate and the A-V interval being adjustable in discrete steps, the system comprising:

a physiological sensor for sensing, during at least one cardiac cycle, a physiological parameter indicative of the cardiac output of the patient's heart;

means for determining an optimal stimulation rate corresponding to a maximum value of the physiological parameter;

means for adjusting the stimulation rate to a suboptimal stimulation rate, the suboptimal stimulation rate being at least one discrete step below the optimal stimulation rate;

means for determining an optimal A-V time interval, the optimal A-V time interval corresponding to a maximum value of the physiological parameter while the stimulation rate equals the suboptimal stimulation rate; and

means for adjusting the A-V time interval to the optimal A-V time interval while the stimulation rate is at the suboptimal stimulation rate.

5,024,223

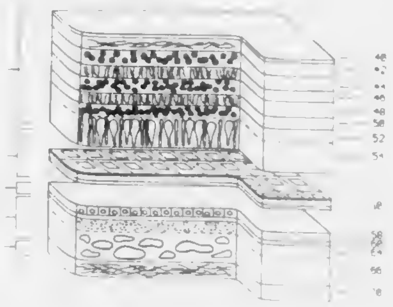
ARTIFICIAL RETINA DEVICE

Alan Y. Chow, 191 Palamino Pl., Wheaton, Ill. 60187

Continuation-in-part of Ser. No. 390,562, Aug. 8, 1989. This application Jul. 6, 1990, Ser. No. 549,094

Int. Cl.⁵ A61N *1/00;* **A61F** *2/14;* **A61B** *17/00*

U.S. Cl. 128—419 R **20 Claims**



1. An artificial retina device, comprising: a plurality of discrete photodiodes, disposed on one surface of a substrate said photodiodes each including an active electrode layer overlaying a photosensitive layer, each photodiode being connected to an electrical ground, wherein said active electrode layer and ground are made from materials selected from aluminum, platinum, chromium, gold, conductive silicon, or combinations thereof, said photodiodes having electrical outputs that correspond to the amplitude of light incident on said device, whereby said device can stimulate individual or small groups of cells in the inner retinal layer of the eye, corresponding to the light incident on said device.

5,024,224

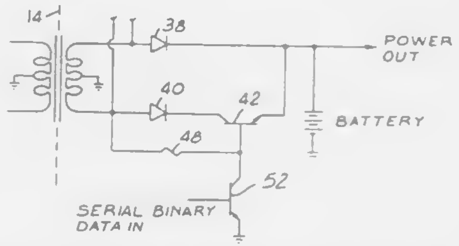
METHOD OF READOUT OF IMPLANTED HEARING AID DEVICE AND APPARATUS THEREFOR

A. Maynard Engebretson, Ladue, Mo., assignor to Storz Instrument Company, St. Louis, Mo.

Filed Sep. 1, 1988, Ser. No. 239,556

Int. Cl.⁵ A61N *1/00*

U.S. Cl. 128—420.6 **8 Claims**



1. A method of conveying signals from a hearing aid with an implanted device having an impedance to a device located external to the body of the implant wearer and inductively coupled to said implanted device, the improvement comprising:

modulating the impedance of said implanted device in accordance with a first signal to be conveyed;

using said externally located device to deliver energy to said implanted device in amounts which vary in accordance with the modulated impedance of said implanted device;

using said externally located device to ascertain the amounts of energy delivered to said implanted device, said amounts of energy being indicative of the modulated impedance of said implanted device;

from said ascertained amounts of energy delivered using said externally located device to ascertain said first signal, whereby said first signal is conveyed from said implanted device to said externally located device;

wherein said first device includes a rectification means

VOL
1127
ISS
3
JE
18
1991
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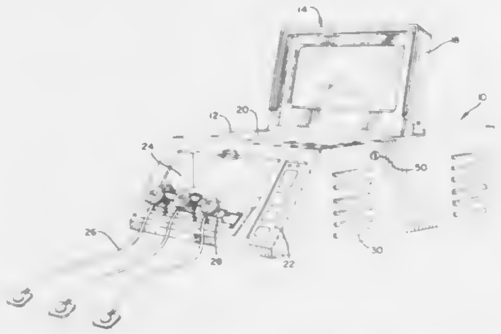
switchable between modes of half wave and full wave rectification and wherein said modulating step is performed by using said first signal to cause said rectification means to switch between said modes.

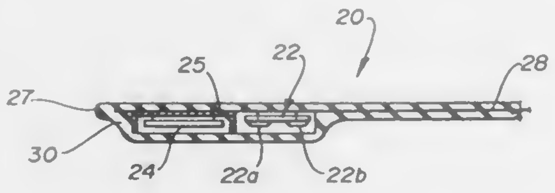
5,024,225
PERSONAL HEALTH MONITOR ENCLOSURE
William Fang, 1677 Apache Dr., Naperville, Ill. 60540
Filed Jan. 5, 1990, Ser. No. 461,249
Claims priority, application Canada, Sep. 26, 1989, 613,116
Int. Cl.^{5} A61B *5/04*
U.S. Cl. 128—630 **19 Claims**



1. In a personal health monitor of the type comprising a personal computer capable of implementing a program to determine one or more clinical parameters of a patient and further in which the personal computer includes a display screen portion that folds up from a keyboard portion, an improvement comprising:

a housing that comprises:
- a first compartment of a size adapted to contain the keyboard portion of the personal computer and allow the display screen portion of the personal computer to extend above said first compartment,
- a keyboard cover capable of covering the keyboard portion of the personal computer while the display screen portion of the personal computer is extended into position above said first compartment in order to prevent access to the keyboard portion while the display screen portion is viewable by the patient, and
- an input panel located outside of said first compartment and capable of conveying input signals from the patient to the personal computer.

5,024,226
EPIDURAL OXYGEN SENSOR
Josef K. S. Tan, Tampa, Fla., assignor to Critikon, Inc., Tampa, Fla.
Filed Aug. 17, 1989, Ser. No. 394,997
Int. Cl.^{5} A61B *5/00*
U.S. Cl. 128—633 **12 Claims**



1. A sensor for measuring cerebral oxygen availability through a burr hole in the skull by optical reflectance comprising:

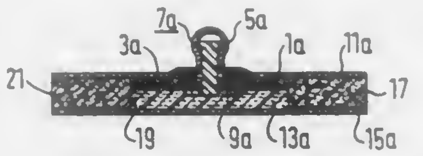
a length of flexible wiring having (a) a distal end and (b) a proximal end which is to be connected to an oximeter;

a photodetector electrically connected to said flexible wiring in the proximity of said distal end;

a pair of light emitting diodes connected to said flexible wiring adjacent to said photodetector; and

a coating encapsulating said photodetector, said light emitting diodes, and said flexible wiring in the proximity of said photodetector and said light emitting diodes, said coating including optical windows where said coating overlies the optical windows of said photodetector and said light emitting diodes which is transmissive to light at the wavelengths of said light emitting diodes, said encapsulated photodetector and said light emitting diodes having a width less than about 20 mm to fit through the diameter of said burr hole and a thickness less than about 4 mm to slide between the skull and dura.

5,024,227
BIOELECTRICAL ELECTRODE
Walter Schmid, Pfaffenhofen, Fed. Rep. of Germany, assignor to ARBO Medizin-Technologie GmbH, Braunschweig, Fed. Rep. of Germany
Continuation of Ser. No. 930,308, Oct. 31, 1986, abandoned. This application Apr. 29, 1988, Ser. No. 188,753
Claims priority, application Fed. Rep. of Germany, Mar. 1, 1985, 3507301
Int. Cl.^{5} A61B *5/04*
U.S. Cl. 128—640 **35 Claims**



1. A bioelectrical electrode, with an electrode body (1) consisting of metal at least on its skin-side contact surface and with a conductive adhesive layer (13) covering at least part of the skin-side contact surface, (3), wherein the conductive adhesive layer is formed as a layer (13) of an aqueous dispersion adhesive having the property of being pressure-sensitive and containing a substance which dissociates in aqueous solution wherein said adhesive comprises an aqueous dispersion of a thermoplastic acrylic resin and gelatin.

5,024,228
ELECTRODE ENDOTRACHEAL TUBE
Andrew C. Goldstone, 4000 N. Charles St., Apt. 511, Baltimore, Md. 21218, and Raymond L. Schettino, 8402 Chapel Hill Ct., Baltimore, Md. 21237
Filed Nov. 29, 1989, Ser. No. 442,901
Int. Cl.^{5} A61B *5/0488*
U.S. Cl. 128—642 **7 Claims**

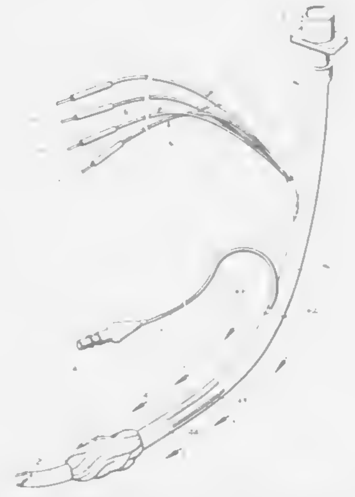
1. An apparatus for monitoring the EMG signals of the laryngeal muscles, said apparatus comprising:

an endotracheal tube formed from a flexible, nonelectrically conducting material and having a distal end, a proximal end, an exterior surface and a central axis;

at least one electrode wire composed of electrically conducting material running in a direction parallel to said central axis at a location between said distal end and said proximal end;

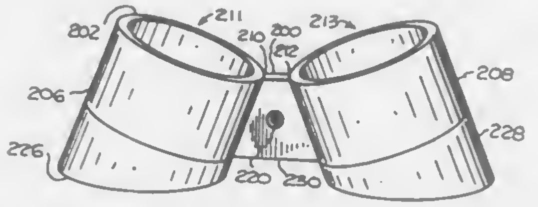
said electrode wire having an electrically insulated first wire portion located between said ends and an electrically uninsulated second wire portion, located between said first wire portion and said distal end, on the exterior surface of said endotracheal tube;

said second wire portion comprising means for contacting said laryngeal muscles when said endotracheal tube is placed in the trachea for ventilation; and



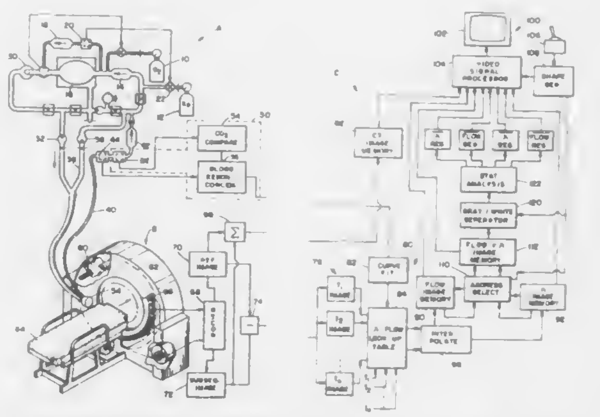
electrical connecting means for attaching said electrode wire to a machine which processes EMG signals.

5,024,229
RESONATORS FOR MAGNETIC RESONANCE IMAGING
Robert G. Bryant, Pittsford; Joseph P. Hornak, Scottsville, and Eric A. Marshall, Rochester, all of N.Y., assignors to The University of Rochester, Rochester, N.Y.
Continuation of Ser. No. 121,565, Nov. 16, 1987, abandoned. This application Jan. 24, 1990, Ser. No. 471,663
Int. Cl.^{5} A61B *5/055*
U.S. Cl. 128—653 SC **2 Claims**



1. A solenoidal resonator for use in magnetic resonance imaging of the breast of a subject, comprising a pair of tubular cylinders of dielectric material having bottom and top ends, a trapezoidal plate of dielectric material having opposite side edges each attached to and forming a bridge between said cylinders and locating said cylinders canted toward each other with their said top ends closer together than their said bottom ends, rectangular bands of conductive material extending around each of said cylinders and defining slits extending along the side edges of said plate, said bands also extending over opposite sides of said plates to define single turn solenoidal coils around said cylinders and a capacitor with said plate, said coils and capacitor defining a circuit in resonance at RF frequency, and means in electromagnetically coupled relationship with said circuit for supplying and sensing RF energy.

5,024,230
DUAL FLOW/LAMBDA DISPLAY FOR XENON ENHANCED TOMOGRAPHY
Walter W. Lindstrom, Shaker Hts., and Isaac Dinewitz, Cleveland Hts., both of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio
Continuation-in-part of Ser. No. 275,784, Nov. 23, 1988, which is a continuation-in-part of Ser. No. 933,781, Nov. 24, 1986, Pat. No. 4,793,357. This application Mar. 17, 1989, Ser. No. 325,206
Int. Cl.^{5} A61B *6/00*
U.S. Cl. 128—654 **18 Claims**



1. An apparatus for producing flow and partition coefficient data for gray and white matter brain tissue, the apparatus comprising:

a flow and partition coefficient producing means for producing corresponding flow and partition coefficient values for each of a plurality of spatial locations;

a selecting means for selecting a region of the spatial locations;

a means for separation a pair of flow and partition coefficient values corresponding to each spatial location in the selected region into a group representing gray matter brain tissue and a group representing white matter brain tissue;

a statistical analysis means for analyzing the flow and partition coefficient pairs for each of the gray and white matter groups to determine at least one of an average flow value

VOL
1127
ISS
3
JE
18
1991
UMI

for the gray matter group, an average flow value for the white matter group, and average partition coefficient value for the gray matter group, an average partition coefficient for the white matter group, a median flow value for the gray matter group, a median flow value for the white matter group, a median partition coefficient value for the gray matter group, a median partition coefficient value for the white matter group, a flow value distribution for the gray matter group, a flow value distribution for the white matter group, a partition coefficient value distribution for the gray matter group, and a partition coefficient value distribution for the white matter group.

5,024,231
AUTOMATED MULTI-POINT BLOOD VOLUME ANALYZER

Joseph Feldschuh, New York, and Jonathan A. Feldschuh, Barrytown, both of N.Y., assignors to Daxor Corporation, New York, N.Y.

Continuation of Ser. No. 203,715, Jun. 7, 1988, abandoned. This application May 14, 1990, Ser. No. 522,741

Int. Cl.^{5} A61B *6/00*

U.S. Cl. 128—654 12 Claims

1. A multi-point method of determining a time-zero blood volume by the indicator dilution technique comprising the steps of:

(A) injecting an indicator into the blood stream of a living being;

(B) removing a plurality of mixed samples of blood and indicator from the blood stream at a corresponding plurality of measured time intervals subsequent to the injecting step and determining the hematocrit of each mixed sample;

(C) providing means for automatically determining the level of indicator in a plasma portion of each of the mixed samples relative to prepared standards, for automatically calculating for each mixed sample the apparent plasma volume from the indicator level, for automatically calculating for each mixed sample the apparent blood volume from the apparent plasma volume and hematocrit, for automatically calculating a time-zero blood volume from the calculated apparent blood volumes and time intervals, and for recalculating the time-zero blood volume without using any calculated apparent blood volume which reflects an indicator level which is out of line with the others; and

(D) providing as input to such means plasma portions of the mixed samples, the hematocrits, and the time intervals and causing said means to automatically calculate the time-zero blood volume.

5,024,232
NOVEL RADIOPAQUE HEAVY METAL POLYMER COMPLEXES, COMPOSITIONS OF MATTER AND ARTICLES PREPARED THEREFROM

Johannes Smid, Lafayette; Israel Cabasso; Alan Obligin, both of Syracuse, all of N.Y., and H. Ralph Rawls, Boston, Mass., assignors to The Research Foundation of State University of NY, Albany, N.Y.

Division of Ser. No. 273,662, Nov. 18, 1988, Pat. No. 4,882,392, which is a continuation of Ser. No. 916,182, Oct. 7, 1986, abandoned. This application Jul. 25, 1989, Ser. No. 385,237

Int. Cl.^{5} A61B *6/00*

U.S. Cl. 128—654 22 Claims

1. A medical device fabricated at least in part from a composition comprising a radiopaque polymer, said polymer derived from a heavy metal Lewis acid radiopacifying salt and at least one Lewis base monomer selected from the group consisting of alkyl and vinyl alkyl ketones, alkyl and aryl esters of unsaturated carboxylic acids, vinyl esters of carboxylic acids, cellulose esters of carboxylic acids, linear and crosslinked polyesters, said salt being molecularly bound to said polymer to form a clear, homogeneous, substantially nonleachable material, said composition being substantially free of unbound radiopacifying salt.

5,024,233
APPARATUS FOR DISTRIBUTION EVALUATION OF REGIONAL LUNG VENTILATION

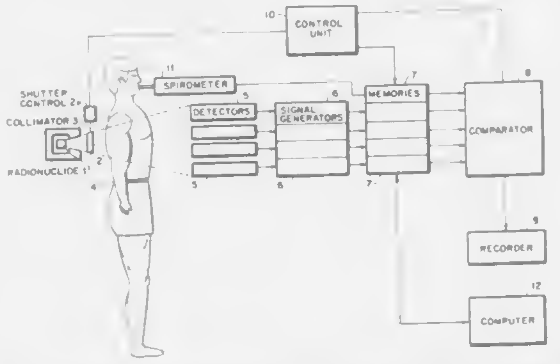
Cyril Simecek, Pilsen, and Jiri Ryba, Merklin, both of Czechoslovakia, assignors to TESLA, koncernovy podnik, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 356,324, Mar. 10, 1982, abandoned. This application Apr. 10, 1984, Ser. No. 598,805

Claims priority, application Czechoslovakia, Mar. 13, 1981, 1836-81

Int. Cl.^{5} A61B *5/08*

U.S. Cl. 128—659 3 Claims



1. Apparatus for the distribution evaluation of regional lung ventilation by means of the absorption of radioactive radiation comprising a radionuclide source of radiation fixedly mounted on one side of the subject being examined, and a plurality of scintillation detectors arranged on the opposite side of said subject in alignment with given fields of said lungs, respectively, for simultaneously sensing the passage of radiation through said subject, the outputs of said scintillation detectors being connected to an input of an associated evaluation unit, respectively, the output of each of said evaluation units being connected to the input of an associated sector of a memory, respectively, the output of each sector of said memory being connected to a comparison block, the output of said comparison block being connected to a recorder, said comparison block and said memory having further inputs connected to a controlling unit, thereby enabling successive comparison of the signals respectively associated with the given fields of said lungs, in which a spirometer is connected to an associated sector of the memory, and the respective output of the memory is connected to the comparison block.

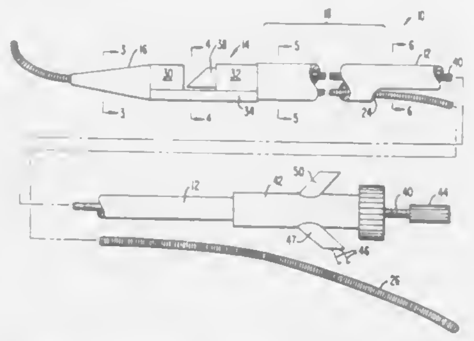
5,024,234
ULTRASONIC IMAGING CATHETER WITH GUIDEWIRE CHANNEL

James J. Leary, Sunnyvale, and John R. McKenzie, San Francisco, both of Calif., assignors to Cardiovascular Imaging Systems, Inc., Sunnyvale, Calif.

Filed Oct. 17, 1989, Ser. No. 422,935

Int. Cl.^{5} A61B *8/14*

U.S. Cl. 128—663.01 7 Claims



1 An imaging catheter comprising:

a flexible catheter body having proximal and distal ends and a channel capable of receiving a movable guidewire extending between a first port on the periphery of the catheter body located a preselected distance proximally of the distal end and a second port on the periphery of the catheter body located adjacent the distal end;

a substantially rigid housing secured to the distal end of the flexible catheter body, said housing having a substantially rigid radially-offset channel which is aligned with channel on the catheter body and capable of receiving the guidewire from the second port thereof;

means within the housing for scanning an ultrasonic imaging signal across an environment surrounding the housing, wherein the means for scanning includes a fixed ultrasonic transducer and a rotatable mirror; and

a flexible conical tip secured to a distal end of the housing and having a channel which is aligned with the channels on the catheter body and the housing and extending between a first port at the base of the tip and a second port at a conical apex of the tip, wherein the first port on the tip is capable of receiving the guidewire from the channel on the housing.

5,024,235
ELECTROENCEPHALIC NEUROFEEDBACK APPARATUS AND METHOD FOR BIOELECTRICAL FREQUENCY INHIBITION AND FACILITATION

Margaret A. Ayers, 10623 Bloomfield, Toluca Lake, Calif. 91602

Filed Feb. 26, 1990, Ser. No. 484,824

Int. Cl.^{5} A61B *5/0482*

U.S. Cl. 128—732 12 Claims

1. An improved method of inhibiting or facilitating analog bioelectrical frequencies in a person's body comprising the steps of:

(a) detecting an analog bioelectrical signal at a selected location of the person's body;

(b) amplifying said analog bioelectrical signal;

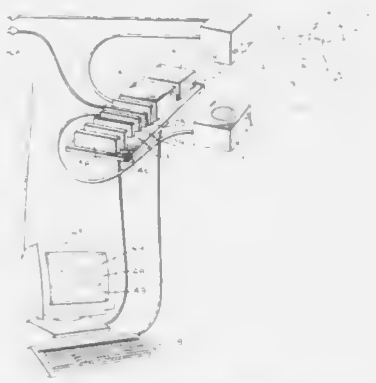
(c) converting the analog bioelectrical signal to digital signals representing particular frequencies;

(d) selecting a particular digital signal of interest;

(e) processing said particular digital signal of interest through a computing means using non-bandpass and non-power spectral analysis techniques and establishing an amplitude threshold voltage without delay and distortion resulting from bandpass and power spectral analysis for said particular digital signal;

(f) sending a signal to the person when said particular digital signal of interest falls within said amplitude threshold for a predetermined duration; and

(g) causing the person to mentally concentrate so as to affect the amplitude of said particular digital signal of interest, thereby affecting a certain corresponding analog bioelectrical frequency emitted at said selected location of the person's body.



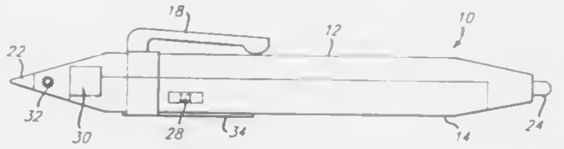
5,024,236
PHOTOPROBE ASSEMBLY

Ronald S. Shapiro, Toledo, Ohio, assignor to Advanced Medical Technology, Inc., Monroe, Mich.

Filed Oct. 5, 1988, Ser. No. 253,488

Int. Cl.^{5} A61B *5/05*

U.S. Cl. 128—735 9 Claims



1. An apparatus for detecting acupuncture points on the skin of a living subject by detecting an area of reduced skin impedance and for stimulating acupuncture points on the skin of a living subject by pulsed light radiation, comprising:

a housing;

a light emitting diode within said housing;

a probe provided on one end of said housing;

a source of electric current disposed within said housing:

first circuit means disposed within said housing for providing said light emitting diode with a pulsed current from said source of electric current; and

second circuit means disposed within said housing and connected with said probe,

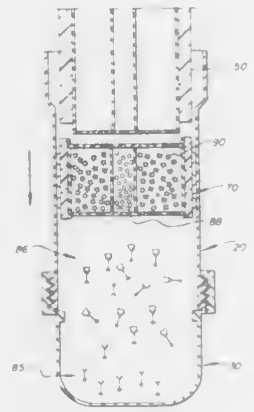
said second circuit means including means for measuring an initial reference impedance for said living subject when said probe is placed in contact with said skin of said living subject at a first location and thereafter being operative to provide a signal indicative of an impedance less than said initial reference impedance of said subject when said probe is moved to another location on said skin of said living subject, said signal being indicative of an acupuncture point to be stimulated by said light emitting diode.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,237

MODULAR FLUID SAMPLE PREPARATION ASSEMBLY

Raouf A. Guirguis, Rockville, Md., assignor to La Mina Ltd., British Virgin Isls.
Continuation-in-part of Ser. No. 308,763, Jan. 10, 1989, Pat. No. 4,961,432. This application Jun. 21, 1989, Ser. No. 369,610
Int. Cl.^{5} A61B *5/00*
U.S. Cl. 128—760 **23 Claims**

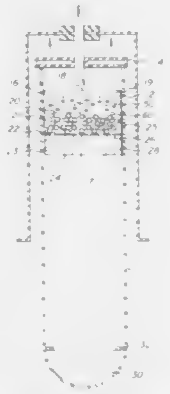


1. An apparatus for collecting molecular specimens from biological fluids comprising a tubular container; a specimen collection storage unit removably mounted in said tubular container, said specimen collection storage unit comprising a container divided into at least two separate testing compartments, a first test means with a predetermined antigen bound thereto positioned in one testing compartment and a control test means without said predetermined antigen positioned in another of said testing compartments; and membrane means mounted to said collection storage unit to visually indicate the presence of specific molecular specimens.

5,024,238

BLOOD WITHDRAWING APPARATUS AND ANTIGEN TESTING METHOD

Raouf A. Guirguis, Rockville, Md., assignor to Cancer Diagnostics, Inc., Rockville, Md.
Continuation-in-part of Ser. No. 308,763, Jan. 10, 1989. This application Sep. 18, 1989, Ser. No. 408,547
Int. Cl.^{5} A61B *5/00*
U.S. Cl. 128—771 **17 Claims**

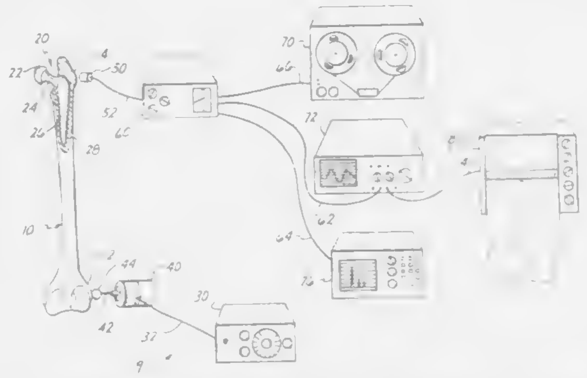


1. An apparatus for testing molecular specimens in biological fluids comprising a fluid container; a specimen treatment unit mounted in said fluid container, said specimen treatment unit comprising means defining a plurality of fluid treatment compartments which allow fluid flow therethrough, a primary labelled antibody means contained in one of said fluid treatment compartments, a predetermined antigen matched to said primary labelled antibody means is covalently bound to bead means contained in another of said fluid treatment compartments, and a solution carrying means containing a reactive colorization material is contained in another of said fluid treatment compartments.

5,024,239

METHOD AND APPARATUS FOR DETERMINING OSSEOUS IMPLANT FIXATION INTEGRITY

Alexander D. Rosenstein, 31862 Coast Hwy. Ste. 302, Laguna, Calif. 92677
Continuation of Ser. No. 290,240, Dec. 21, 1988, abandoned. This application Jan. 11, 1990, Ser. No. 463,427
Int. Cl.^{5} A61B *5/103, 7/00, 5/00;* **G01H** *13/00*
U.S. Cl. 128—774 **13 Claims**



1. A method for determining, without the utilization of base line information, the integrity of a heterogeneous composite substrate of an implant fixation in a bone of a limb of a patient, the substrate including a bone to cement interface and a cement to implant fixation interface, comprising:

using a vibrator having a smoothly contoured member;

compressing firmly with the contoured member, the flesh of the limb to the bone and to the implant fixation, of the substrate, over a large outer surface area of the limb, to enable vibrations to be imparted through the compressed flesh and through said heterogeneous composite substrate, to the bone, with little discomfort or damage to the limb;

supplying to said vibrator an input energizing electrical signal having a predetermined recurring pattern of a single non-resonant frequency;

vibrating the heterogeneous composite substrate, including each one of the interfaces thereof in response to the vibrator being energized by said input signal;

using a single pick-up device;

pressing the pick-up device into engagement with the outer surface of the limb spaced from the vibrator at the same bone, for detecting the vibratory motion of the bone implant heterogeneous composite substrate, to generate a single output electrical signal;

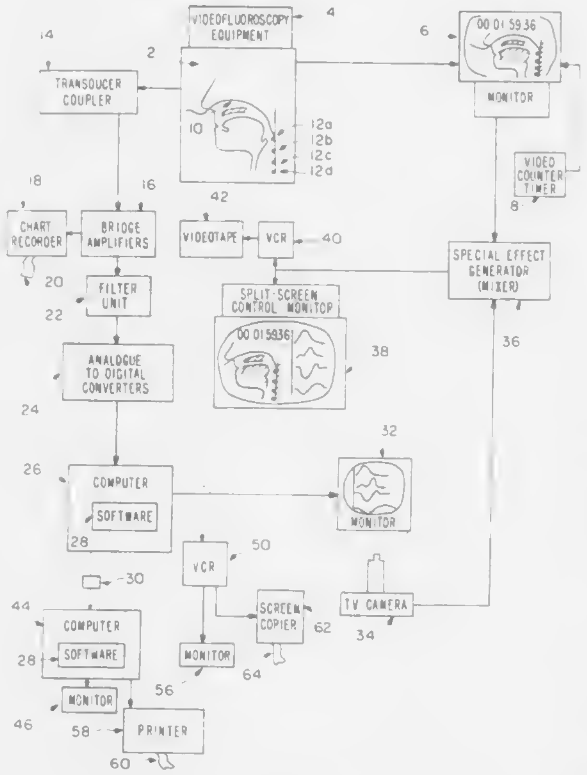
analyzing said input energizing electrical signal relative to the recurring pattern only of the single output electrical signal transmitted through the bone implant heterogeneous composite substrate and each one of said interfaces, without the utilization of base line information; and

determining implant loosening when said recurring pattern of said output signal is persistently distorted.

5,024,240

MANOFLUOROGRAPHY SYSTEM, METHOD FOR FORMING A MANOFLUOROGRAM AND METHOD FOR PREPARING A SWALLOWING PROFILE

Fred M. S. McConnel, 180 Blackland Dr., Atlanta, Ga. 30342
Filed Jan. 3, 1989, Ser. No. 293,049
Int. Cl.^{5} A61B *5/103*
U.S. Cl. 128—780 **38 Claims**



1. A system for forming a combined magnetic recording of (a) the location and movement of a radiopaque bolus in a patient's alimentary tract over a period of time and (b) data indicating pressures exerted on said bolus during said period of time, the system comprising:

a catheter carrying a plurality of radiopaque pressure sensors for inserting in an alimentary tract, each said sensor for outputting electronic signals in response to the application of pressure to the sensor, said signals being reflective of the amount of said pressure;

means for processing said electronic signals so as to output a series of first magnetically recordable signals representative of a plurality of synchronized graphs (one graph for each said sensor) of pressure-versus-time data points that indicate the magnitude and timing of the pressures experienced by said sensors;

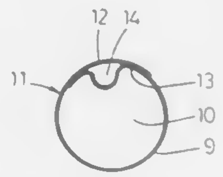
videofluoroscopy means for producing a series of second magnetically recordable signals representative of a series of images of at least a portion of an alimentary tract and a radiopaque bolus situated therein over a period of time; and

means for recording both said series of first and second magnetically recordable signals on a single magnetic medium, in such a manner that the resultant combined recording can be played back to simultaneously display on the same monitor screen said images and said graphs in the same sequence in which they were created, with each said displayed image lagging by less than 0.1 second the last-entered pressure-versus-time data point in each graph appearing therewith on the screen.

5,024,241

METHOD AND APPARATUS FOR MANUFACTURING A ROD OF TOBACCO OR THE LIKE ENCLOSED BY A PAPER STRIP, AND CIGARETTE MANUFACTURED BY SAID METHOD

Severien Hulsman, Doesburg, and Johannes H. A. G. Salemink, Aerdt, both of Netherlands, assignors to Turmac Tobacco Company B.V., Zevenaar, Netherlands
Filed Feb. 22, 1990, Ser. No. 483,354
Claims priority, application Netherlands, Mar. 31, 1989, 8900787
Int. Cl.^{5} A24C *5/18, 5/10;* **A24D** *1/02*
U.S. Cl. 131—84.2 **15 Claims**

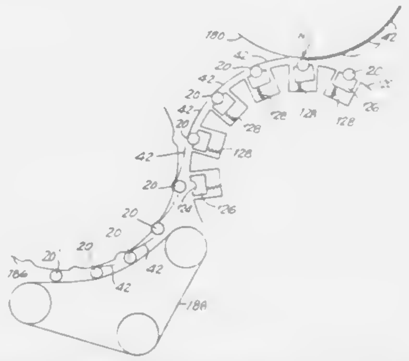


1. Method for manufacturing a rod of a material to be smoked enclosed by a paper strip, wherein a paper strip is supported and transported by a garniture tape and the material to be smoked is deposited on the paper strip, wherein the material to be smoked is compressed into a material core and a channel is formed in the material core, said paper strip having first and second longitudinal edge parts and being closed with its longitudinal edge parts around the compressed material core, wherein the channel is formed in the circumference of the rod during said compressing, wherein the second longitudinal edge part of the paper strip is folded into the channel and the first longitudinal edge part is subsequently laid over said channel.

5,024,242

METHODS AND APPARATUS FOR MAKING MULTIPLE COMPONENT SMOKING ARTICLES

Martin T. Garthaffner, Midlothian; Billy J. Keen, Jr., Chesterfield; Andrew J. Gillespie; Jack C. Wheless, both of Richmond, and George W. Dingus, Cartersville, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.
Filed Apr. 27, 1989, Ser. No. 343,732
Int. Cl.^{5} A24C *5/60*
U.S. Cl. 131—94 **41 Claims**



1. Apparatus for making smoking articles having at least one substantially cylindrical component having a longitudinal axis and a finite length, said component being radially relatively rigid but fragile and requiring circumferential wrapping with a web-like overwrap which is separately supplied to said apparatus, said apparatus comprising:

means for supporting and transporting said component toward said overwrap in a direction perpendicular to the

VOL 1127 ISS 3 JE 18 1991 UMI

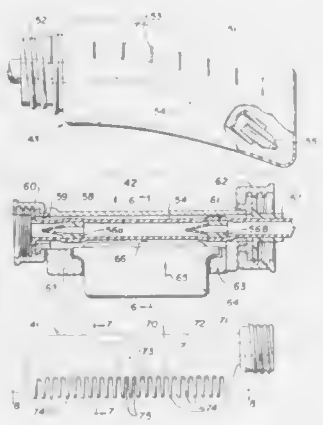
longitudinal axis of said component so that an axial portion of the outer surface of said component is initially exposed; and

means for supporting and transporting said overwrap toward said component in a direction perpendicular to the longitudinal axis of said component so that at least a portion of one of the web-like surfaces of said overwrap is initially exposed and so that said initially exposed portions of said component and said overwrap contact one another, at least one of said means for supporting and transporting being resiliently movable at the initial location of said contact (1) along an axis normal to the portion of the outer surface of said component which thus contacts said web-like surface portion of said overwrap and, (2) in the direction along said normal axis away from the other of said means for supporting and transporting to prevent excessive radial pressure on said component during said contact.

5,024,243

COMB FOR PRACTICING SELECTIVE HAIR COLORING

Susan L. Snyder, 5917 Erving St., Springfield, Va. 22150
Division of Ser. No. 857,347, Apr. 30, 1986, which is a continuation of Ser. No. 309,767, Oct. 8, 1981, abandoned, which is a continuation of Ser. No. 856,539, Dec. 1, 1977, abandoned. This application Jan. 10, 1990, Ser. No. 463,193
Int. Cl.^{5} A45D *24/22*
U.S. Cl. 132—116 **31 Claims**

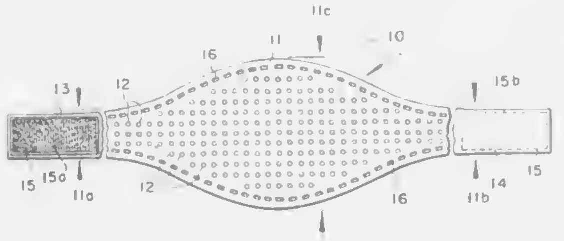


1. A hair coloring apparatus comprising:
a thixotropic hair coloring material;
a reservoir section adapted to contain said thixotropic hair coloring material;
a handle-pump section having means to pump hair coloring material;
manually actuated means in said handle-pump section to actuate said means to pump and to thereby suck thixotropic hair coloring material from one end of said handle-pump section and deliver it to the other end;
said means to pump delivering an amount of thixotropic hair coloring material and delivering it at a rate determined by the amount of movement and the speed of movement, respectively, of said manually actuated means;
whereby controlled continuous pumping of thioxtropic hair coloring material is achieved in accordance with progressive manual squeezing of said manually actuated means;
a comb-head section having a comb, bores in the spine of said comb for delivering thixotropic hair coloring material in said bores to the base of selected gullets between the teeth of said comb;
there being unselected gullets, located between said selected gullets having no bores and to which no thixotropic hair coloring materials is delivered;
means to detachably affix said reservoir section to the suctin end of sid handle-pump means can suck thirotropic hair coloring material from saaid reservoir section; and
means to detachably affix said comb-head to said delivery end of said handle-pump in operative relationship, whereby said pump means can deliver thixotropic hair coloring material sucked from said reservoir through the handle-pump to the bores in said spine and to said elected gullets.

5,024,244

ADJUSTABLE SCALP PROTECTION FOR HAIR DISCOLORATION

Kathleen L. Brown, 1004 2nd Ave. North, Onalaska, Wis. 54650
Filed Dec. 19, 1989, Ser. No. 452,708
Int. Cl.^{5} A45D *19/18*
U.S. Cl. 132—270 14 Claims

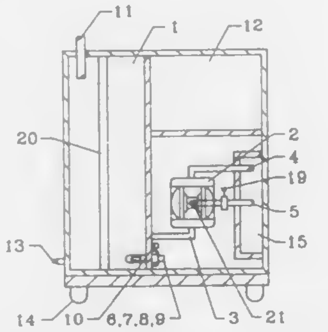


1. A protective covering device for partially covering the scalpal hair of a patron and selectively discoloring hair strands therewith which device comprises a substantially flat, thermoplastic body portion sized so as to partially cover a portion of the scalpal region of a patron, a multiplicity of indices throughout the body portion for providing an indexed body for the selective withdrawal of hair strands therethrough and the discoloration thereof, a first appending strap portion extending outwardly from said body portion and a second appending strap portion extending outwardly from said body portion and oppositely to said first strap portion, said first strap portion and said second strap portion in combination with said body portion being of sufficient length to circumscribe the head of the patron, and means for variably adjusting and securing together the first strap portion and second strap portion about the head of the patron.

5,024,245

PNEUMATIC DESEDIMENTATION MACHINE IMPROVEMENT

Jerry L. Jay, Sr., Rte. #3, Box 239, Newbern, Tenn. 38059, and William R. Holifield, III, 1001 Brentwood Pl., Nashville, Tenn. 37211
Filed Dec. 11, 1989, Ser. No. 448,238
Int. Cl.^{5} B08B *9/02*
U.S. Cl. 134—108 **2 Claims**

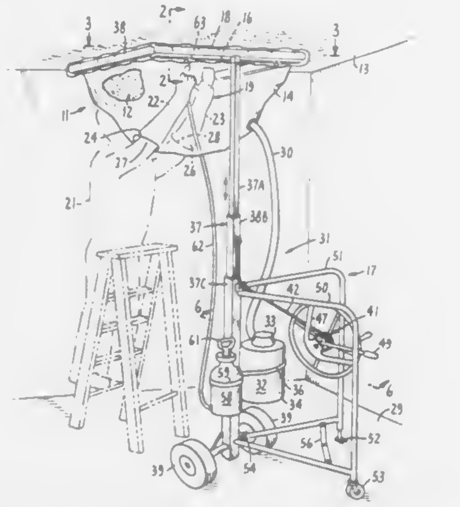


1. A device for the removal of deposits from the inside of remote machinery, equipment, or system where sedimentation may occur, by providing a constant flow of solvent or solution through the machinery equipment or system in an automatically compensated manner comprising: a reservoir supplied with heating elements for controling the temperatuare of the solution, or solvent, in the reservoir and interconnecting plumbing which connects the reservoir to a solution return line and a fluid input side of a pneumatic pump, the pump having an air inlet line connected to the air inlet side of the pump; the air inlet line being provided with an air pressure relief valve; the pump also being provided with a to process line which is connected to the fluid output side of the pump and an air outlet line which is connected to the air outlet side of the pump so that by connecting the to process line, by means of user supplied plumbing, to the fluid input side of any remote machinery, equipment, or system being cleaned, and connecting the fluid output side of the machinery, equipment, or system to the solution return line on the reservoir, by means of user supplied plumbing, and with user supplied compressed air supplied to the air inlet line, solution can be placed in the reservoir, heated to its most efficient temperature and pumped out of the reservoir, to, and thru the remote machinery, equipment or system being cleaned and back to the reservoir in a continuous and controlled manner, in which the pressure and volume of the solvent or solution is automatically compensated by the action of the air pressure relief valve, which will allow more or less air to pass through to the air inlet side of the pump to maintain a preset pressure that is established by adjusting the air pressure relief valve to the desired working pressure.

5,024,246

APPARATUS FOR PROTECTING CEILING WORK AREA FROM DISPERSAL OF ASBESTOS FIBERS

G. William Bain, 35860 Ashton, Fremont, Calif. 94536
Continuation of Ser. No. 337,140, Apr. 12, 1989, Pat. No. 4,911,191. This application Jan. 9, 1990, Ser. No. 462,599
The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.
Int. Cl.^{5} B08B *7/04*
U.S. Cl. 134—200 4 Claims

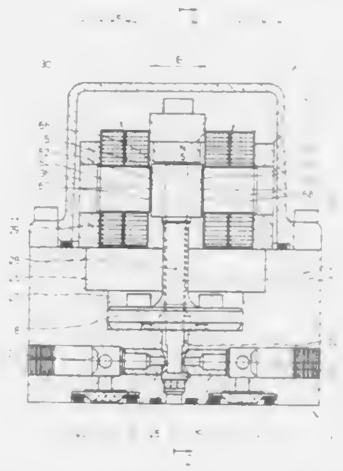


1. A containment for asbestos fibers and the like floating in the air adjacent to a ceiling as a consequence of removing or repairing materials on or near the ceiling, comprising
a substantially fiber-tight bag of flexible material having an open top adapted for placement in a position fitting in close proximity to a ceiling in surrounding relation to the ceiling area to be worked upon;
support means formed for removably holding said bag in the desired position relative to said ceiling;
evacuation means connected to said flexible bag and formed for creating a lower than atmospheric pressure condition in said flexible bag; and
glove means of flexible material sealed to said bag and extending into the interior thereof, said glove means being adapted for receiving and protecting a hand and arm inserted into said glove means.

5,024,247

CONTROL MOTOR FOR A SERVO VALVE

Herbert Lembke, Lohr, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany
Filed Apr. 23, 1990, Ser. No. 512,437
Claims priority, application Fed. Rep. of Germany, Apr. 21, 1989, 3913239
Int. Cl.^{5} G05D *16/20*
U.S. Cl. 137—82 9 Claims



1. A control motor for a servo valve, comprising, a support member (33) adapted to be mounted on a housing component (20),
at least first and second pole means (35,36) mounted at said support member (33),
control coils (4) adapted to receive a control signal and located on said pole means (35,36), an armature (5) made of a magnetically soft material and arranged in an armature space which is defined between said oppositely located first and second pole means (35,36), a resilient tube (7) having a mounting end with which the tube (7) is mounted to the housing component (20) and an opposite end which supports said armature (5),
a flapper element (6) fixedly mounted to said armature (5) and located within said tube (7) so as to extend out of said tube (7) at the tube mounting, and
two spaced nozzles (10,11) located in said housing component, with said flapper element extending between said nozzles, such that the movement of the armature (5) leads to a movement of the flapper element towards one or the other nozzle, so as to control the fluid flow which comes out of said nozzles, a permanent magnet (3) located adjacent said armature (5) for creating a magnetic field in the armature space and the adjacent air gaps, within which said magnetic field is superimposed by the magnetic field generated by the control coils, so as to cause a reciprocal movement of the armature, and, consequently of the flapper element (6) in accordance with a control signal applied to said control coils, said support member (33) having the form of an annular body (33) and having one end surface and oppositely thereto another end surface,
a flux-conducting member (40) carrying said permanent magnet being fixedly mounted to said one end surface, and the other end surface of the annular body (33) being fixedly connected with the housing member (20) which comprises a centrally located recess for the passage of said tube.

VOL
1127
ISS
3
JE
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1991
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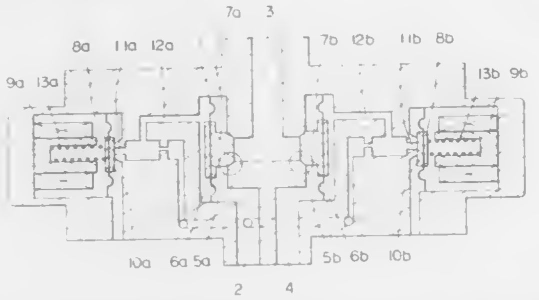
5,024,248
TWO-POSITION AND THREE-WAY VALVE

Chikanari Kubo, Sagamihara, Japan, assignor to Eishin Technology Company, Limited, Japan
Filed Aug. 24, 1989, Ser. No. 398,147
Claims priority, application Japan, Mar. 10, 1989, 1-56218
Int. Cl.^{5} F15B *13/043*
U.S. Cl. 137—596.16 **1 Claim**

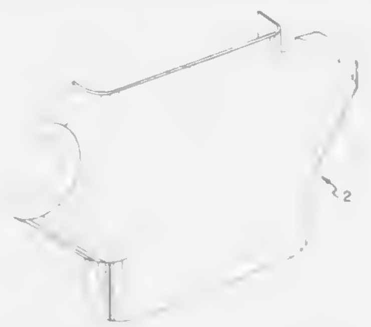


1. A two-position and three-way valve system, comprising:
a valve body having a fluid supply port for introducing pressurized fluid thereto, a fluid inlet port and a fluid outlet port, said fluid supply and outlet ports communicating through first and second passages, respectively, with said fluid inlet port;
valve means associated with said valve body and including a pair of movable valve members mounted to said valve body, each said valve member being adapted to open or close one of said first and second passages, and each said valve member comprising a diaphragm member mounted to said valve body and a poppet valve member secured to said diaphragm member, and wherein said first and second passages each include a valve seat for receiving one of said poppet valve members to close said passage; and
actuator means associated with said valve body for actuating each of said valve members in an independent manner, said actuator means being rapidly operable in response to a control signal; said actuator means comprising a pair of electromagnetic coils and a pair of movable core members, and a nozzle flapper connected to each said core member, each said movable core member and nozzle flapper being movable in response to deenergization and energization of said coil toward and away from a nozzle to selectively close and open said nozzle;
wherein each said movable core member and each said nozzle flapper are secured to an actuator diaphragm member mounted to said valve body, said actuator diaphragm member defining a portion of a flow path communicating between said nozzle and the exterior of said valve body.

5,024,249
SPECIALIZED ONE-PIECE PIPEFITTING COVER FOR INSULATED STRAINER AND LATERAL 45 DEGREE -Y

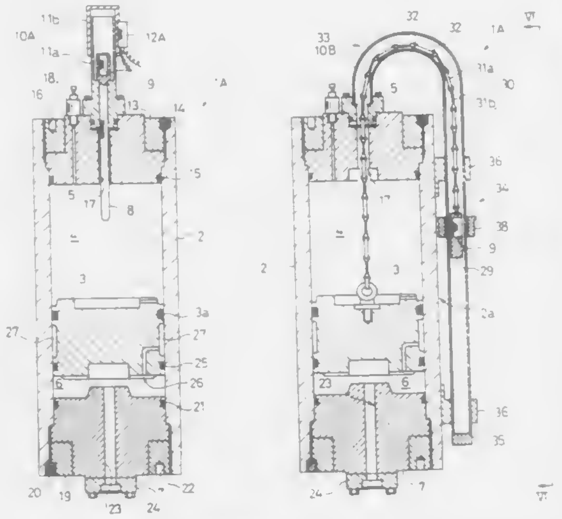
Christos J. Botsolas, Clearwater, Fla., assignor to Carol Botsolas, St. Petersburg, Fla.
Filed May 17, 1989, Ser. No. 352,871
Int. Cl.^{5} F16L *59/16*
U.S. Cl. 138—110 **7 Claims**

1. A one-piece pipe fitting over for strainers and lateral 45° -Y fittings comprising an essentially flat base, symmetrical about a center axis, with a centrally disposed section having a top, a bottom and sides and two oppositely facing Y-sections extending from said sides, the ends of said Y-sections terminating in a flat edge, said base terminating on the sides, including the sides of the Y-sections, with edge members extending from said base in a semi-circular form to greater than 90° from the flat plane of said base, the radius of said semi-circle relating generally to the radius of the fitting about which the cover conforms, the top and bottom of said base being without said edge members, wherein said cover comprises a thermoformed plastic whereby when rotated about the center axis said cover provides a configuration essentially the same as the Y-shaped fitting with an overlap of the edge members and further comprising means for attaching the cover about said fitting.



5,024,250
PISTON TYPE ACCUMULATOR FOR HYDRAULIC SYSTEM

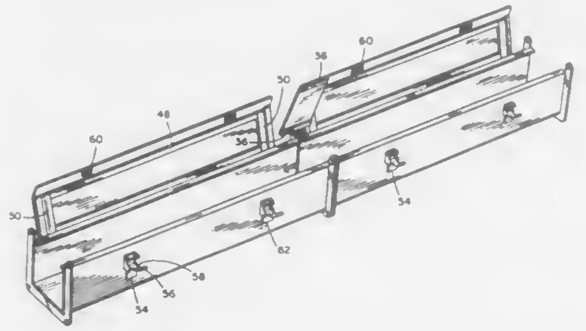
Masao Nakamura, Hyogo, Japan, assignor to Nakamura Koki Co., Ltd., Hyogo, Japan
Filed Jan. 9, 1990, Ser. No. 462,407
Claims priority, application Japan, Jan. 10, 1989, 1-4390
Int. Cl.^{5} F16L *55/04;* **F01B** *25/26*
U.S. Cl. 138—31 **7 Claims**



1. A piston type accumulator, provided with an oil chamber bounded by a piston reciprocatingly incorporated in a cylindrical containment shell for accumulating a pressurized hydraulic fluid in a hydraulic system communicating therewith, the accumulator also having a gas chamber precharged with pressurized gas, comprising:
a non-magnetic inductive detecting rod capable of movement in response to movement of said piston, inserted partially into said gas chamber through a guide hole of the containment shell;
a non-magnetic inductive gas-tight sealed tube means fixed to the outside of the containment shell for sealingly covering the range of movement of an end of said detecting rod, said sealed tube means communicating with said gas chamber;
a permanent magnet carried by said detecting rod, mounted on said end thereof;
a detecting switch means installed on said tube means to be actuated by a magnetic force of the permanent magnet brought close thereto in response to a movement of the piston due to an accumulation of said hydraulic fluid in the oil chamber.

5,024,251
LAY-IN WIREWAY ASSEMBLY

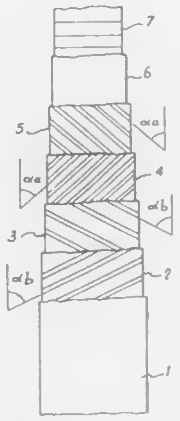
Donald L. Chapman, Liberty, Ind., assignor to Square D Company, Palatine, Ill.
Continuation of Ser. No. 465,582, Jan. 18, 1990, abandoned, which is a continuation of Ser. No. 220,913, Jul. 19, 1988, abandoned, which is a continuation of Ser. No. 096,802, Sep. 10, 1987, abandoned, which is a continuation of Ser. No. 752,864, Jul. 8, 1985, abandoned. This application Jul. 3, 1990, Ser. No. 547,425
Int. Cl.^{5} F16L *09/22;* **H02G** *03/04, 03/06*
U.S. Cl. 138—92 **12 Claims**



1. A lay-in wireway, comprising:
a pair of wireway sections connected end to end to form a junction, the wireway sections each having a corresponding open side;
a joint connector adapted to rest on the open sides of the wireway sections adjacent the junction between the two wireway sections when said joint connector is in a closed position;
first gasket means, carried underneath said joint connector and positioned between said joint connector and each of said wireway sections, for resiliently sealing between said joint connector and said wireway sections;
a pair of covers, each one of which is hingedly connected to a respective one of said wireway sections, said covers being movable between an open position wherein said open sides of said wireway sections are uncovered and a closed position wherein said covers overlie said joint connector and cover said open sides of said wireway sections;
second gasket means, positioned between each of said covers and said joint connector where said covers overlie said joint connector, for resiliently sealing between said covers and said joint connector;
latch means, operably associated with each of said covers, for latching said covers in their said closed positions and for compressing said first and second gasket means on opposite sides of said joint connector; and
a floating pivot means for pivotally connecting said joint connector to at least one of said wireway sections so that said joint connector can pivot relative to said wireway sections between its said closed position and an open position, and for allowing said joint connector to float between said covers and said wireway sections as said covers are moved to their said closed positions so that a substantially uniform sealing pressure is provided between said first gasket means and said wireway sections;
wherein said floating pivot means includes an elongated slot disposed in said joint connector, and a pivot pin attached to said pair of wireway sections, said elongated slot having a longer dimension oriented generally perpendicular to said open sides of said wireway sections, and said pin being received in said slot so that said pin defines a pivotal axis generally parallel to a length of said wireway sections and so that said joint connector is slidable along said longer dimension of said slot relative to said pin;
wherein adjacent ends of said wireway sections at said junction each include an outwardly extending flange; and
wherein said pivot pin is defined as a pivot pin portion of an elongated fastener extending between said flanges to connect said wireway sections, said pivot pin portion being an enlarged diameter portion of said fastener extending out from one of said flanges away from the other of said flanges.

5,024,252
HOSES STABLE IN LENGTH UNDER THE EFFECT OF AN INTERNAL PRESSURE

Richard Ochsner, Rosny-Sous-Bois, France, assignor to Coflexip, Paris, France
Filed Jul. 28, 1988, Ser. No. 225,120
Claims priority, application France, Aug. 3, 1987, 87 10997
Int. Cl.^{5} F16L *11/16*
U.S. Cl. 138—130 **9 Claims**



1. A hose comprising:
an internal leak tightness sheath,
an external protective sheath, and
an armoring between said sheaths,
said armoring comprising at least two pairs of layers of helically wound wires, each of said pair of layers comprising first and second layers made up of identical wires laid at the same helix angle, but in opposite helical directions, wherein all the wires are laid at one of two helix angles, one less than 55° (α_a) and the other greater than 550° (α_a), the wires of at least one of said pairs of layers exhibiting the same helix angle α_a such that

$$40° \leqq \alpha_a \leqq 53°$$

and the wires of at least one other pair of layers exhibiting the same helix angle α_a such that

$$57° \leqq \alpha_a\ 70° \text{ ''},$$

VOL
1127
ISS
3
JE
18
1991
UMI

said layers being arranged to satisfy the relation

$$0.5 < \frac{Rp}{Rpo} < 2$$

where:

$$Rp = \frac{\sum_{i=1}^{i=n_a} \frac{(k_a)_i}{(\phi'a)_i}}{\sum_{j=1}^{j=n_b} \frac{(k_b)_j}{(\phi'b)_j}}$$

and

$$Rpo = \frac{\frac{2\sin^2\alpha_b\cos^2\alpha_b}{Di} - \frac{\sin^4\alpha_b}{Dmb}}{\frac{\sin^4\alpha_a}{Dma} - \frac{2\sin^2\alpha_a\cos^2\alpha_a}{Di}}$$

where:

n_a is the number of pair of layers wound at angle α_a,

n_b is the number of pair of layers wound at angle α_b,

(k_a); and (k_b), respectively are the rigidity at axial elongation of the wires of each of the pairs of armoring layers i and j, respectively, wound at angles α_a and α_b, respectively,

k being defined by $k = T / \epsilon$, where T is the tension of the corresponding wire and $\epsilon$is the relative elongation of the wire,

(l'a), and (;'b), respectively are the average value of the width occupied by the wires, i.e., the width of the wire measured in the cross section of the wire, and in a plane tangent to the cylinder produced by the armoring layer, increased by the play between two successive wires, this width being determined by the formula

$$\phi'k = \frac{\pi D_k \cos\alpha_k}{N_k}$$

where

D_k is the average diameter of the layer of wires,

α_k is the sheathing angle, and

N_k is the number of sheathing wires;

Di is the inside diameter of the first layer of interior sheathing wires;

Dma is the average diameter of n_a pairs of sheathed layers at angle α_a; and

Dmb is the average diameter of n_b pairs of sheathed layers at angle α_b.

5,024,253

SYSTEM FOR CONTROLLING WARP TAKE UP AND LET OFF RATES

Susumu Kawabata; Kazunori Yoshida; Yoshikatsu Kisanuki; Hajime Suzuki, and Masao Shiraki, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi and Kabushiki Kaisha Toyoda Jidoshokki, Kariya, both of, Japan

Filed Dec. 28, 1989, Ser. No. 458,406

Claims priority, application Japan, Dec. 28, 1988, 63-334047

Int. Cl.^{5} D03D *49/10, 49/20*

U.S. Cl. 139—99 **9 Claims**

1. A system for controlling take-up and let-off rates or warp feed on a loom, having different weaving conditions, by taking the displacement of a cloth fell position into account when weaving conditions of the loom are changed; comprising;

a device for setting the weaving conditions of the loom;

a cloth fell position compensation circuit for issuing a cloth fell compensation signal for compensating a displacement of the cloth fell position caused by a change of at least one of the weaving conditions;

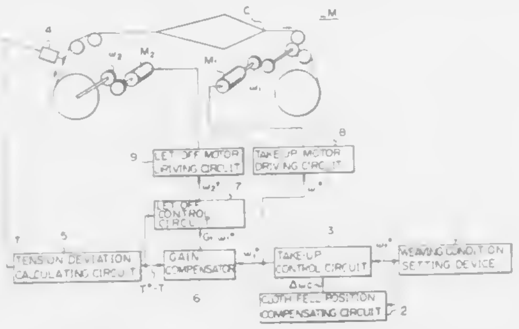
a take-up control circuit for forming a take-up rate control signal for controlling a rotational rate of a take-up motor for driving a take-up roller of the loom with reference to the weaving conditions and the cloth fell position compensation signal and for outputting the take-up control signal;

a tension detector for detecting a warp tension;

an arithmetic circuit for comparing a detected warp tension with a target warp tension and outputting a deviation therebetween;

a gain compensation circuit for outputting a gain compensation signal obtained by multiplication of the take-up rate control signal modified by the cloth fell compensation signal with a gain corresponding to the deviation between the detected warp tension and the target warp tension; and

a let-off control circuit for outputting a let-off rate control signal for controlling a rotational rate of a let-off motor for driving a let-off beam, comprising an adder for adding a signal proportional to the deviation between the detected warp tension and the target warp tension to the take-up rate control signal modified by the gain compensation circuit


4
C
M
M2
ω2
M1
ω1
9
LET OFF MOTOR DRIVING CIRCUIT
8
TAKE-UP MOTOR DRIVING CIRCUIT
7
LET OFF CONTROL CIRCUIT
5
3
TENSION DEVIATION CALCULATING CIRCUIT
GAIN COMPENSATOR
TAKE-UP CONTROL CIRCUIT
WEAVING CONDITION SETTING DEVICE
T*-T
6
Δωc
CLOTH FELL POSITION COMPENSATING CIRCUIT
2

5,024,254

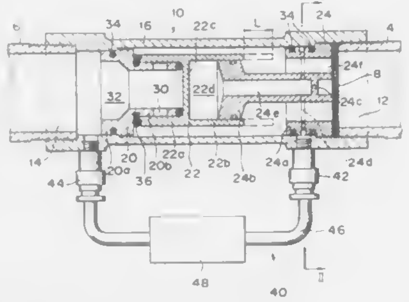
LIQUID SHUT-OFF VALVE

Tamio Yamagiwa, Tokyo, Japan, assignor to Hi-Sonic Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 344,088, Apr. 27, 1989, abandoned. This application Dec. 27, 1989, Ser. No. 453,029

Int. Cl.^{5} F16K *31/38*

U.S. Cl. 137—219 **1 Claim**



1. A liquid shut-off valve comprising:

a first shut-off valve unit which includes

a hollow cylindrical casing providing a liquid passage having at its one end a liquid inlet and at its other end a liquid outlet,

a hollow valve seat member disposed in the liquid passage in the casing adjacent to the liquid outlet and having a valve seat opening for allowing a liquid to pass therethrough,

a guide member disposed in the liquid passage in the casing adjacent to the liquid inlet and having a guide portion, an opening for allowing the liquid to pass therethrough at a given flow rate and a small hole, smaller than the opening, for allowing the liquid as a signal liquid to flow therethrough at a flow rate smaller the given flow rate, and

a hollow valve member slidable along the hollow valve seat member and guide portion of the guide member for defining a pressure chamber between the hollow valve member and the guide portion and communicating with the small hole whereby the signal liquid flows into the pressure chamber, the hollow valve member including means operating free of any mechanical biasing forces for selectively opening and closing the valve seat opening;

a communication pipe providing a communication between the pressure chamber and a portion of the liquid passage downstream of the hollow valve seat member; and

shut-off valve means for selectively relieving the signal liquid from the pressure chamber;

the hollow valve member further including a partition wall substantially dividing the hollow valve member into upstream and downstream parts with the upstream and downstream part being constructed so as to include axial end surfaces with the axial end surface of the downstream part being larger than the axial end surface of the upstream part whereby the hollow valve member is capable of movement, free of any mechanical biasing forces, between a position in which the axial end surface of the upstream part abuts the guide portion and a position in which the axial end surface of the downstream part abuts the hollow valve seat member by selectively relieving the signal liquid from the pressure chamber.

5,024,255

METHOD OF FILLING A LIQUID CRYSTAL DEVICE WITH FERROELECTRIC LIQUID CRYSTAL MATERIAL

Tosbio Watanabe; Masahiko Sato; Akio Osabe, all of Atsugi; Hiroyuki Sakayori, Souka, and Akira Mase, Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

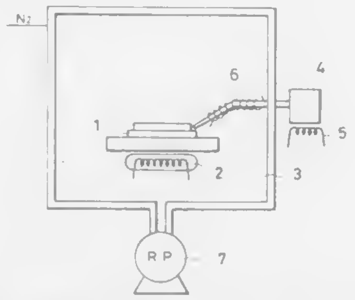
Filed Jul. 21, 1988, Ser. No. 222,636

Claims priority, application Japan, Jul. 27, 1987, 62-188442

The portion of the term of this patent subsequent to May 8, 2007, has been disclaimed.

Int. Cl.^{5} G09F *9/00, 1/13, 1/00;* **B67D** *5/37*

U.S. Cl. 141—11 **1 Claim**



1. A method of filling a liquid crystal device with a blended ferroelectric liquid crystal material comprising the step of disposing said blended ferroelectric liquid crystal material in an inner space formed in said liquid crystal device, wherein the temperature of said blended liquid crystal is maintained during the disposing step higher than the transition temperature of any constituents of said blended liquid crystal material so that the blended liquid crystal material is transformed in its isotropic phase.

5,024,256

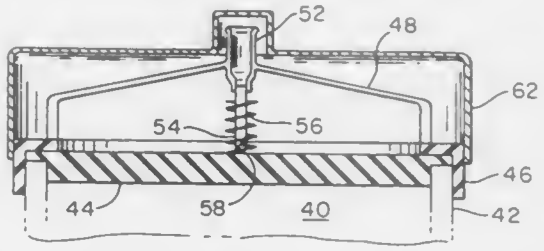
VIAL CONSTRUCTION AND METHOD

Dinesh L. Vadher, 48 Rte. 25A-Suite 303, Smithtown, N.Y. 11787

Filed Apr. 2, 1990, Ser. No. 502,711

Int. Cl.^{5} B65B *1/04;* **A61B** *19/00*

U.S. Cl. 141—329 **1 Claim**



1. A self-sealing closure for an open mouth vial comprising:

a. a vial assembly including a vial with an open mouth defining a rim and having closure means of penetratable, self-sealing material mounted on, extending into and closing said mouth for sealing the contents of said vial;

b. collar means forming an annular ring mounted on the rim of said open mouth for enclosing the edge of and supporting said closure means;

c. means mounted on said collar means above said closure means outside of the mouth of said vial for supporting a needle having a pointed end directed toward said closure means and permitting axial movement of said needle comprising a vertically extending hollow tube having integral therewith a narrow member spanning and joining said annular ring forming a resilient structure permitting vertical movement of said hollow tube, said needle joined at the top thereof to and communicating with the bottom of said hollow tube, said needle having a pointed bottom facing said closure means;

d. means for biasing said needle means away from said closure means comprising a spring wrapped around said needle extending between the top of said closure means and the bottom of said hollow tube;

e. adaptor means mounted on the top of said hollow tube for attachment to and permitting communication with syringe means for receiving the contents of said vial and to depress said needle overcoming said bias to penetrate said closure means to gain access to the contents of said vial through said needle, the removal of said syringe means permitting said needle to retract from said closure means thereby resealing the contents of said vial, said closure means, collar means and mounted means including said needle forming an integral, non-removable part of said vial assembly; and

f. dust cover means covering the top of said vial assembly including said collar means, mounted means, biasing means, and said adaptor means forming a vial assembly containing its own means for removing its contents.

5,024,257

WOODWORKING MACHINE

James E. Lloyd, Rte. #1, Tremont, Ill. 61568

Filed Apr. 18, 1990, Ser. No. 492,755

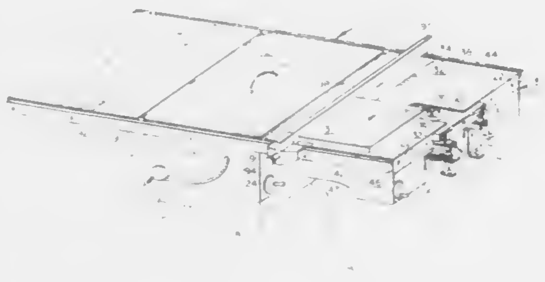
Int. Cl.^{5} B27C *9/00*

U.S. Cl. 144—1 R **23 Claims**

1. A woodworking machine for use with a motorized tool of the type having an axially projecting cutter, said machine comprising a relatively fixed table having an elongate opening extending transversely relative to and through one edge of said table, means for releasably supporting said tool beneath said table with said cutter projecting through said elongate opening, means for moving said tool horizontally beneath said table in a direction effective to shift said cutter longitudinally along

VOL
1127
ISS
3
JE
18
1991
UMI

and selectively position said cutter within said opening, and means movable longitudinally of said opening between various selective positions spaced from said cutter for engaging one edge of a work piece and restraining said work piece against backlash and vibration upon operational engagement between another edge of said work piece and said cutter.



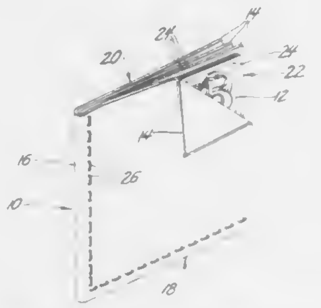
5,024,258
WALLET

William C. Morehead, 10341 Southwind Dr., Cincinnati, Ohio 45242

Continuation-in-part of Ser. No. 409,007, Sep. 18, 1989, abandoned. This application Mar. 6, 1990, Ser. No. 489,964

Int. Cl.⁵ A45C *1/06, 11/18*

U.S. Cl. 150—140 6 Claims



1. A wallet (**10**) for storing materials such as credit cards and money bills (**12**), said wallet (**10**) comprising:

a plurality of square sheets (**14**) stacked one upon the other; said sheets (**14**) having equal areas and coextensive peripheries defining first and second pairs of adjacent and perpendicular edges (**16, 18** and **20, 22**) of equal length, said wallet (**10**) characterized by

binding means (**26**) for binding said first pair of adjacent and perpendicular edges (**16, 18**) of all of said plurality of square sheets (**14**) for providing said square wallet (**10**) with open pockets (**24**) defined only by said second pair of adjacent and perpendicular edges (**20, 22**) for receiving materials (**12**) to be stored between every two of said square sheets (**14**).

5,024,259
GOLF CLUB RAIN SACK

C. Arthur Treadway, P.O. Box 1736, Greenville, S.C. 29607

Filed Dec. 8, 1989, Ser. No. 447,835

Int. Cl.⁵ A63B *55/00*

U.S. Cl. 150—159 10 Claims

1. A protective hood for golf clubs carried in a golf bag, said bag being of the type having a handle carried on a back side of said bag, wherein said protective hood comprises:

a hood including a front panel and a back panel;

said front panel having an upper edge and terminating in a lower free edge;

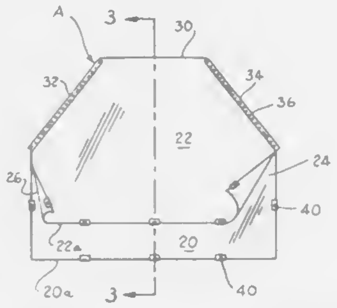
said back panel having an upper edge and terminating in a lower free edge;

means for joining said upper edges of said front and back panels together to form said hood;

a first split vent carried on a first side of said hood between said front and back panels defined by a non-closeable opening;

a second split vent carried on a second side of said hood between said front and back panels defined by a non-closeable opening; and

weight means carried by said lower free edges of said front and back panels.



5,024,260
RADIAL TIRE FOR HEAVY DUTY VEHICLES

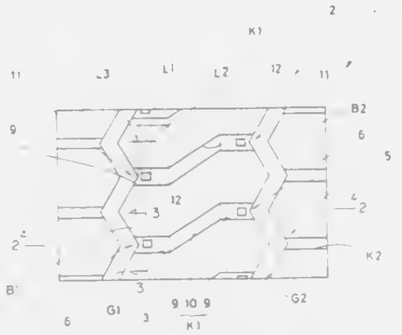
Kiyoshi Ochiai, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Jul. 3, 1989, Ser. No. 374,870

Claims priority, application Japan, Jul. 9, 1988, 63-171125

Int. Cl.⁵ B60C *11/08*

U.S. Cl. 152—209 R 22 Claims



1. A radial tire for heavy duty vehicles having a tread provided with blocks,

the blocks being defined by main grooves extending in the circumferential direction of the tire and lateral grooves extending between the main grooves,

each lateral groove provided between a main portion thereof and said main grooves with a deep portion one end of which is directly connected with the main groove, and which has a depth DO1 deeper than the depth DO of the main portion,

the deep portion being provided with a platform protruding from the base thereof near the main groove,

the ratio DO/DG of the depth DO of the lateral groove main portion to the depth DG of the main groove being more than 0.7 and less than 1.0,

the ratio DO1/DG of the depth DO1 of the deep portion to the depth DG of the main groove being more than 0.8 and less than 1.0,

the ratio D1/DO1 of the height D1 of the platform to the depth DO1 of the deep portion being more than 0.4 and less than 1.0,

the ratio W1/WO of the top width W1 of the platform to the open width WO of the lateral groove being more than 0.3 and less than 0.65 in the widthwise direction of the lateral groove, and

the ratio L2/L1 of the top length L2 of the platform to the length L1 of the deep portion being more than 0.2 and less than 0.7 in the longitudinal direction of the lateral groove.

5,024,261
HEAVY DUTY PNEUMATIC RADIAL TIRE WITH IMPROVED STEEL CORD BELT

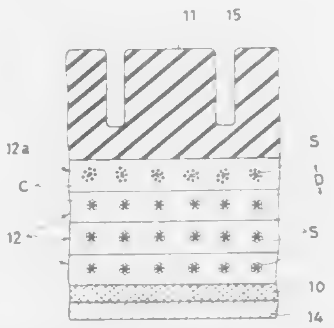
Eiji Igarashi; Susumu Imamiya, and Yasuo Suzuki, all of Hiratsuka, Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 124,204, Nov. 23, 1987, abandoned. This application Nov. 1, 1989, Ser. No. 430,026

Claims priority, application Japan, Nov. 25, 1986, 61-278805

Int. Cl.⁵ B60C *9/18, 9/20, 9/00*

U.S. Cl. 152—527 4 Claims



1. A heavy duty pneumatic radial tire including between a tread and at least one carcass layer comprising carcass cords arranged substantially perpendicular to the circumferential direction of the tire, at least two belt layers comprising steel cords including a least a pair of belt layers disposed adjacent to each other with steel cords in one layer crossing those in the other layer, wherein an outermost belt layer disposed most closely to the tread out of all belt layers comprises a steel cord which has a cord structure of 2+7 made of an element wire having a carbon content of 0.77 to 0.92% by weight and a diameter d of 0.28 to 0.40 mm and which has a tenacity at break of $(1700\sim2050)d^{1.872}$ (kgf/cord) and an elongation characteristic having a ratio of an elongation at break ϵ to an initial stage elongated, ϵ/P.L.E., of at least 30, and a coat rubber having a 50% modulus of 10 to 40 kg/cm², and wherein said outermost belt layer has a thickness of at least 1.67 times the minor diameter but at greatest 1.79 times the major diameter, of said steel cord.

5,024,262
COMPACTLY FOLDABLE AUTOMOBILE SUNSHADE

En L. Huang, 1280 Price St., Pomona, Calif. 91767

Filed Oct. 13, 1989, Ser. No. 420,936

Int. Cl.⁵ B60J *3/00*

U.S. Cl. 160—370.2 14 Claims

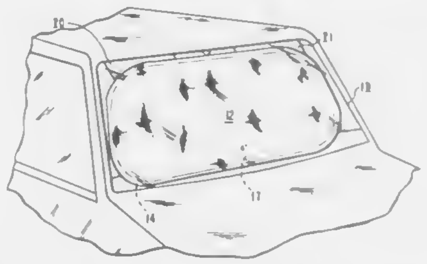
1. An automobile window sunshade comprising:

a sheet of at least one layer of a flexible first material, said sheet having front and back surfaces, with at least one of said surfaces including a material suitable for reflecting light and heat radiation; and

a single closed loop of a strip of a spring-like second material secured to said sheet throughout an entire perimeter thereof;

wherein said sunshade can be (1) deployed in a first, open configuration, said singular closed loop being continuously deformable to a predetermined contour of said automobile window, and, (2) twisted to form at least a pair of sections, said sections being foldable in layered fashion to form a second, compact configuration for storage; and

wherein restoring spring forces of said spring-like second material of said strip makes possible the retention of said sunshade inside a surrounding frame of a window in an automobile.



5,024,263
METHOD AND APPARATUS FOR THE CONTROL OF AIR FLOWS AND PRESSURES IN AIR-CONDITIONING

Juhani Laine; Mikko Nyman, both of Helsinki, and Tapio Paananen, Lohja, all of Finland, assignors to Ilmatera OY, Kauniainen, Finland

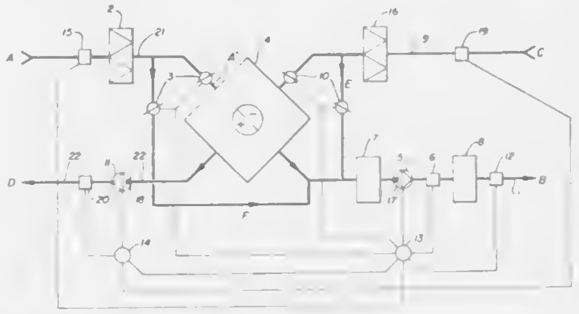
PCT No. PCT/FI88/00199, § 371 Date Sep. 18, 1989, § 102(e) Date Sep. 18, 1989, PCT Pub. No. WO89/05947, PCT Pub. Date Jun. 29, 1989

PCT Filed Dec. 16, 1988, Ser. No. 382,706

Claims priority, application Finland, Dec. 18, 1987, 875613

Int. Cl.⁵ F24F *11/02, 11/04;* **F24D** *5/00*

U.S. Cl. 165—1 16 Claims



1. In an air-conditioning system having:

a heat recovery exchanger;

fresh-air, input-air, exhaust-air, waste-air and return-air ducts coupled to the heat recovery exchanger;

a fresh-air bypass duct for bypassing the heat exchanger from the fresh-air duct to the input-air duct;

a power controllable input-air fan;

a power controllable waste-air fan;

closing and control mechanisms for the fresh air duct and the fresh-air bypass duct coupled to each other as an intake-air mechanism

closing and control mechanisms for the exhaust air duct and the return air duct coupled to each other as an outlet-air mechanism said return-air duct interconnecting said exhaust-air duct and said input-air duct;

wherein each of the intake- and outlet-air mechanisms have first and second interconnected control damper devices for controlling air flows in the two ducts, respectively, associated with the air mechanism;

wherein each control damper device is moveable from a first closed position to a second closed position through an open position; and

wherein the first and second control damper devices of at least one of the air mechanisms are opened out of phase with respect to each other such that the first control damper device is opened from a closed position when the

VOL
1127
ISS
3
JE
18
1991
UMI

second control damper device is opened from the first closed position and is beginning to move towards the second closed position;

a method for controlling fresh-air, input-air, exhaust-air, waste-air and return-air flows (A, B, C, D and E, respectively) in the fresh-air, input-air, exhaust-air, waste-air, and return-air ducts, respectively, as well as air pressure in the input-air duct and air pressure in the exhaust-air duct, the method comprising the steps of:

measuring, substantially continuously, the fresh-air, input-air and waste-air flows in the fresh-air, input-air and waste-air ducts, respectively, and the pressure of the input-air in the input-air duct; and

upon any one of the fresh-air flow, input-air flow, waste-air flow and input-air pressure measurements deviating from respective preset values, regulating the outlet-air mechanism and the intake-air mechanism to adjust to and maintain substantially at a predetermined constant at least one of the difference (A-D) between the fresh-air flow and the waste-air flow and their ratio (A/D).

5,024,264

METHOD OF COOLING A SEMICONDUCTOR DEVICE WITH A COOLING UNIT, USING METAL SHERBET BETWEEN THE DEVICE AND THE COOLING UNIT

Katsuhide Natori, Yokohama; Isao Watanabe, Sagamihara; Koji Katsuyama, Yokohama; Isao Kawamura, Yokohama; Karuhiko Yamamoto, Yokohama, and Takeshi Nagai, Yokohama, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

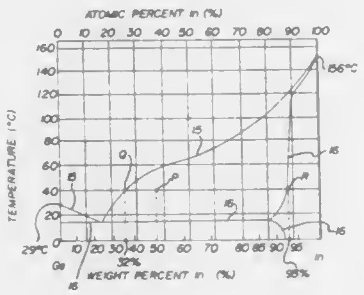
Continuation-in-part of Ser. No. 334,770, Apr. 10, 1989, which is a continuation of Ser. No. 106,842, Oct. 13, 1987, abandoned. This application May 8, 1989, Ser. No. 348,370

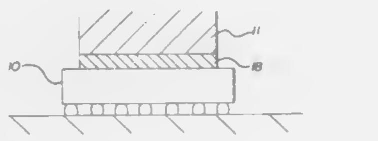
Claims priority, application Japan, Oct. 20, 1986, 61-248801

The portion of the term of this patent subsequent to May 7, 2008, has been disclaimed.

Int. Cl.^{5} H05K *7/20;* F28D *21/00*

U.S. Cl. 165—1 **15 Claims**





1. In a method for cooling a substance to be cooled, by using heat transfer means, the improvement comprising the use of a heat conducting body being in a two-phase state of liquid and solid uniformly throughout the body at a temperature of said substance and disposed between said substance and the heat transfer means, said heat conducting body having a coefficient of viscosity greater then 3,000 centipoise at the operating temperature of said substance.

5,024,265

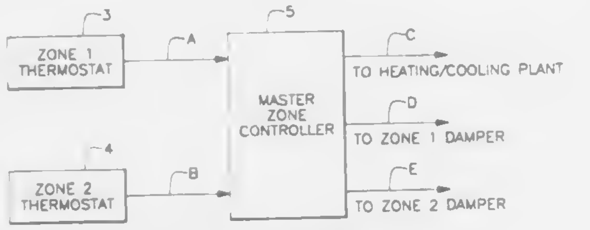
ZONE CONTROL SYSTEM PROVIDING SYNCHRONIZATION OF SYSTEM OPERATION WITH THE ZONE OF GREATEST DEMAND

Robert L. Buchholz, Eden Prairie; Eric W. Grald, Maple Plain; Lorne W. Nelson, Bloomington, and Dipak J. Shah, Eden Prairie, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 18, 1989, Ser. No. 451,705

Int. Cl.^{5} F24F *7/00*

U.S. Cl. 165—22 **22 Claims**



1. A zone control system comprising

a plurality of zone thermostats arranged to produce respective on/off output signals corresponding to the temperature induced demands of their respective zones,

a plurality of zone control devices with each of said device controlling a respective one of the zones,

zone controller means for determining a zone of greatest temperature induced demand distinct from a zone of lesser demand, for converting the length of the on-periods of said output signals representing the zone of lesser demand relative to the duty cycle of the zone of greatest demand and for synchronizing the start of the converted signals representing the zone of lesser demand with the start of the control signal for the zone of greatest demand and

means for applying the synchronized start signals to respective ones of said zone control devices.

5,024,266

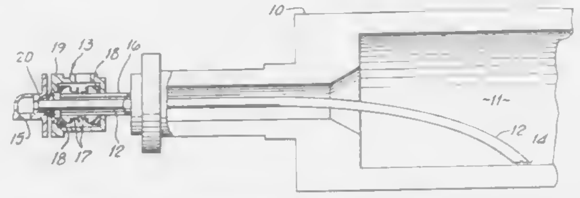
HEATED ROLL

Graham Critchlow, Cheadle Hulme, England, assignor to Simon Container Machinery Limited, Stockport, England

Filed Jul. 13, 1990, Ser. No. 552,076

Int. Cl.^{5} F28D *11/02;* F26B *11/04*

U.S. Cl. 165—89 **4 Claims**



1. A heated roll comprising a hollow cylindrical shell defining an internal chamber into which steam may be fed, a syphon pipe fixed within said chamber and having one open end near to the lowermost position therein, the pipe having a part of its length substantially concentric with the roll and located within a rotary sealed joint outside of the chamber for drainage of condensate therefrom, said pipe being fixed to a non-rotating part of the rotary joint; characterized in that said non-rotating part is mounted with a clearance fit on a pair of fixed guide bars; and in that a plurality of jacking screws are operable between said non-rotating part and said guide bars to adjust the position of the non-rotating part and thus the pipe relative to the rotational axis of the roll.

5,024,267

COOLING APPARATUS FOR HEAT EXCHANGER

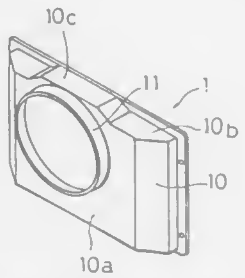
Shigeru Yamaguchi, Toyota, and Ken-ichiro Mizutani, Kariya, both of Japan, assignors to Aisin Kako Kabushiki Kaisha, Aichi and Aisin Seiki Kabushiki Kaisha, Kariya, both of Japan

Filed Jun. 14, 1990, Ser. No. 537,619

Claims priority, application Japan, Jun. 28, 1989, 1-76016[U]

Int. Cl.^{5} F28F *13/12;* F01P *7/10*

U.S. Cl. 165—122 **7 Claims**



3. A cooling apparatus for a heat exchanger comprising:

a shroud comprising a box-shaped main body disposed in a manner covering one of the surfaces of a heat exchanger, and a cylindrical portion disposed in a manner penetrating through said main body, wherein the axis of said cylindrical portion is disposed substantially perpendicular to the bottom surface of said main body and part of said cylindrical portion is protruded with respect to the outline of said heat exchanger; and

a fan disposed in said cylindrical portion of said shroud;

wherein said main body comprises an enlarged portion disposed adjacent to and corresponding to said protruding part of said cylindrical portion, and said bottom surface of said main body extends substantially from the entire periphery of the end portion of said cylindrical portion,

wherein the top of said enlarged portion is at least flush with the top of said protruding part of said cylindrical portion.

5,024,268

CORROSION INHIBITING COOLANT INHIBITOR CONTAINER

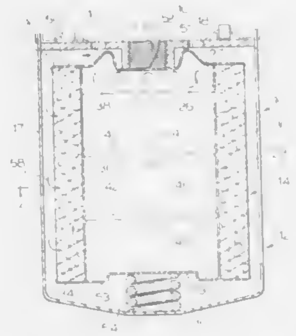
Brian E. Cheadle, Bramalea, and Richard J. Rusiniak, Richmond Hill, both of Canada, assignors to Long Manufacturing Ltd., Oakville, Canada

Continuation-in-part of Ser. No. 226,828, Aug. 1, 1988, abandoned, which is a division of Ser. No. 50,777, May 18, 1987, Pat. No. 4,782,891. This application Nov. 14, 1989, Ser. No. 436,916

Claims priority, application Canada, Dec. 23, 1986, 526256

Int. Cl.^{5} F28F *19/00*

U.S. Cl. 165—134.1 **6 Claims**



1. A container for the addition of corrosion inhibitor to the cooling system of an engine, comprising: a container member having a closed end and a tubular wall with a metallic inner surface; a partition member and extending between opposed sides of said tubular wall spaced from said closed end to define a compartment for a dosage of corrosion inhibitor material, the partition member having a peripheral edge portion being formed of metallic material anodic to the tubular wall inner surface; and the tubular wall being compressed into tight engagement with the partition member forming a fluid tight galvanic couple therebetween.

5,024,269

LAMINATED HEAT EXCHANGER

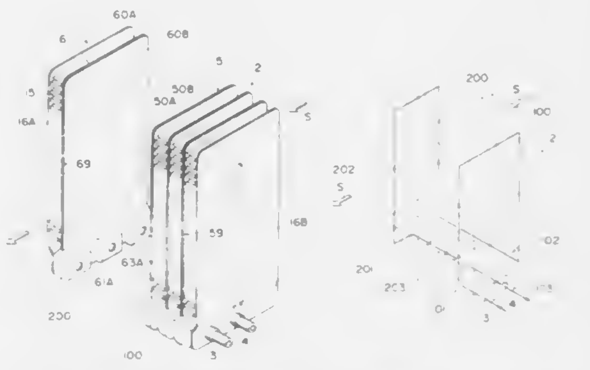
Ichiro Noguchi, and Futoshi Nakata, both of Konan, Japan, assignors to Zexel Corporation, Tokyo, Japan

Filed Aug. 24, 1990, Ser. No. 573,060

Claims priority, application Japan, Aug. 24, 1989, 1-98942; Nov. 30, 1989, 1-310910

Int. Cl.^{5} F28D *1/03*

U.S. Cl. 165—153 **16 Claims**



1. A laminated heat exchanger comprising:

a plurality of first heat exchanger elements, each said first heat exchanger element including a pair of first and second tanks, a first U-shaped channel interconnecting said first and second tanks, and a central third tank disposed between said first and second tanks and separated from said first and second tanks;

a plurality of second heat exchanger elements, each said second heat exchanger element including a pair of fourth and fifth tanks, a second U-shaped channel interconnecting said fourth and fifth tanks, and a central sixth tank disposed between said fourth and fifth tanks and communicating with one of said fourth and fifth tanks, and

a plurality of corrugated fins;

said first heat exchanger elements and a part of said plural corrugated fins being laminated alternately, with said first tanks, second tanks and third tanks of each adjacent pair of the laminated first heat exchanger elements communicating with each other, said laminated first heat exchanger elements having a first internal refrigerant flow passage extending between said first and second tanks and having a forward path and a return path;

said second heat exchanger elements and the remainder of

VOL
1127
ISS
3
JE
18
1991
UMI

said corrugated fins being laminated alternately, with said fourth tanks, fifth tanks and sixth tanks of each adjacent pair of the laminated second heat exchanger elements communicating with each other, said laminated second heat exchanger elements having a second internal refrigerant flow passage extending between said fourth and fifth tanks and having a forward path and a return path;

said laminated first heat exchanger elements and said laminated second heat exchanger elements being connected end to end, with said third tank of an endmost one of the laminated first heat exchanger elements communicating with said sixth tank of a confronting one of the laminated second heat exchanger elements so that said third and sixth tanks jointly forming a group of central tanks connected in series;

one of said first and second tanks of said endmost first heat exchanger element communicating with the other of said fourth and fifth tanks of said confronting second heat exchanger element to connect said first and second internal refrigerant flow passages in series to thereby form a combined refrigerant flow passage having two forward paths and two return paths, said combined refrigerant flow passage being connected at one end with an end of said group of series-connected central tanks.

5,024,270

WELL SEALING DEVICE

John Bostick, Rte. 5, Box 307, Victoria, Tex. 77901

Filed Sep. 26, 1989, Ser. No. 412,655

Int. Cl.^{5} E21B *23/04, 23/06, 33/129*

U.S. Cl. 166—63 **6 Claims**

1. A well sealing device comprising:

a cable head for attachment to a wire line;

an upper housing releasably attached to the cable head;

a pressure cylinder slidably mounted within the upper housing;

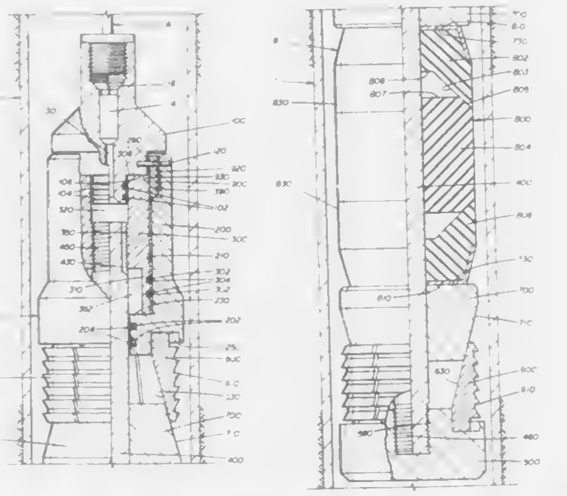
pressurizing means for creating an increased pressure within the pressure cylinder to cause the pressure cylinder to move relative to the upper housing and to cause the cable head to move relative to the upper housing;

a longitudinal mandrel attached at its upper end to the pressure cylinder;

a lower housing attached to the lower end of the mandrel;

expandable slip means slidably mounted on the mandrel between the upper housing and the lower housing for outward expansion upon vertical compression to set the slip means against a well casing; and

a releasing means connected to the cable head and the upper housing for releasably attaching the cable head to the upper housing, the releasing means responsive to the relative movement between the upper housing and the cable head developed as a result of the pressurizing means causing movement of the pressure cylinder to release the cable head from the upper housing prior to partial setting of the slip means also developed as a result of the pressurizing means causing movement of the pressure cylinder and as a result the mandrel.



5,024,271

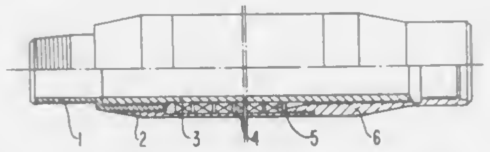
PERMANENT-MAGNET WAX-PROOF DEVICE

Wang Meihua, Baotou, China, assignor to Baotou Institute of Applied Design of New Materials, Baotou, China

Filed Jan. 9, 1989, Ser. No. 294,818

Int. Cl.^{5} E21B *37/00;* **F17D** *1/08*

U.S. Cl. 166—66.5 **15 Claims**



13. A permanent-magnet wax-proof device for magnetically treating crude oil streams to enhance their flow properties and to reduce their tendency to deposit paraffin on the interior surface of a conduit or pipe carrying said crude oil and to which the device is connected, said device comprising one or more pairs of magnetic pole pairs each provided with two magnetic circuit units, each such unit comprising radially oriented magnets cooperating with at least one of axially and circumferentially oriented magnets to produce a high concentration of magnetic field in the flowing oil so as effectively to decrease the oil viscosity and suppress the process of wax accumulation upon the walls of the conduit or pipe.

5,024,272

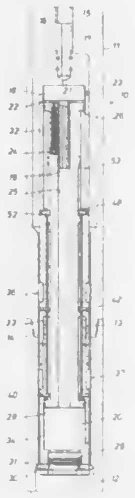
DRILL PIPE DOWNHOLE UNTHREADING APPARATUS

Dennis E. Roessler, Houston, Tex., assignor to Halliburton Logging Services, Inc., Houston, Tex.

Filed May 7, 1990, Ser. No. 520,324

Int. Cl.^{5} E21B *31/20*

U.S. Cl. 166—117.7 **13 Claims**



1. Apparatus for unthreading a threaded connection in a drill string, the apparatus comprising:

(a) an elongate shaft;

(b) fluid powered means for moving said shaft in repeated movement between first and second positions:

(c) upper and lower mandrels supporting said shaft and exposed to joints making up the drill string, said mandrels joining together to permit rotation therebetween;

(d) upper and lower pipe gripping means cooperatively engaging pipe joints in the drill string wherein said upper pipe gripping means engages a pipe joint above a threaded connection in the pipe string and said lower pipe gripping means engages a pipe joint below the threaded connection in the pipe string; and

(e) means coupling said shaft to impart repeated movement through said upper and lower mandrels and pipe gripping means to the pipe joints so that the threaded connection in the pipe string is rotated to unthread.

5,024,273

CEMENTING APPARATUS AND METHOD

Malcolm G. Coone, Katy; Jeffry C. Ehlinger, Houston, and Frank Cole, Sugarland, all of Tex., assignors to Davis-Lynch, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 415,670, Oct. 2, 1989, abandoned. This application Apr. 4, 1990, Ser. No. 504,337

Claims priority, application Canada, Sep. 29, 1989, 614995

Int. Cl.^{5} E21B *33/14, 34/10*

U.S. Cl. 166—289 **24 Claims**

1. Apparatus for use in placing cement at a desired location within the annulus between a casing string and a well bore, comprising

a body having a bore therethrough which is connectible as part of the casing string for lowering therewith into the well bore and a port connecting its bore with its outer side,

a packing element including an inflatable sleeve surrounding the body below the port,

said body having passageway means therein connecting its bore with a space between the sleeve and body,

a tubular member having a bore therethrough with an upwardly facing seat thereabout and passageway means therein connecting its bore with its outer side,

said member being disposed within the bore of the body for vertical reciprocation between an upper position in which it closes the port in the body and its passageway means connects with the passageway means in the body and a lower position in which it opens said port and closes the passageway means in each of the member and body,

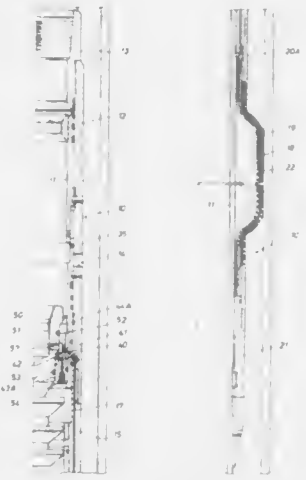
shear means releasably connecting the tubular member to the body in its upper position,

a plug lowerable through the casing string into a landed position on the seat in the member,

said plug having port means therethrough and being sealably engageable with the bore of the member, when landed on the seat, to connect the port means and thus the casing string thereabove with the passageway means in the member,

said member having means thereon for closing its passageway means but adapted to be moved to open position by the plug, as the plug is landed, whereby pressure fluid in the casing string above the plug may be supplied to the space in order to inflate and expand the sleeve of the packing element into engagement with the well bore beneath the port and then shear the releasable connection of the member to the body and move the member to its lower position in which cement may be circulated through the open port in the body and into the annulus above the inflated sleeve, and

means on the member and body for locating and holding the member in the lower position.



22. In a method of placing a column of cement at a desired location between a casing string and a well bore by means of a stage collar comprising a body having a bore therethrough connected to a pipe string, a sleeve reciprocable within the bore between an upper position in which it is releasably connected to the body to close a port in the body connecting its bore with its outer side and a lower position in which it opens the port to permit cement to be circulated therethrough, a plug lowerable through the pipe string and onto the sleeve to permit pressure fluid in the string above the plug to release the connection and lower the sleeve to its lower position, and an inflatable packer element mounted on the body beneath the port with its interior connectable to the bore of the body by normally closed passageway means, the steps of

lowering the stage collar body with the pipe string to dis-

VOL
1127
ISS
3
JE
18
1991
UMI

pose the packing element beneath the desired location within the well bore,
lowering the plug onto the sleeve to open the passageway means,
supplying fluid pressure to the pipe string above the plug and through the passageway means in order to inflate the packing element, and
raising the level of fluid pressure in the pipe string above the plug in order to release the sleeve from its connection to the body and move it with the plug to its lower position opening the port as well as closing the passageway means in order to contain pressure fluid therein and prevent the introduction of additional pressure fluid to the inflated packing element.

5,024,274

METHOD AND APPARATUS FOR ENHANCED OIL RECOVERY

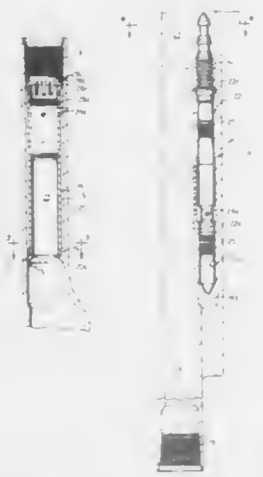
Carl M. Schwab, Jr., Bakersfield, Calif., assignor to Otis Engineering Corp., Dallas, Tex.

Continuation-in-part of Ser. No. 793,842, Nov. 1, 1985, Pat. No. 4,646,828. This application Aug. 29, 1986, Ser. No. 901,556

The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.

Int. Cl.^{5} E21B *43/24, 34/08, 23/03*

U.S. Cl. 166—303 54 Claims



1. A mandrel connectable in a conduit and having a longitudinal flow passage therethrough comprising:
(a) an upper tubular section having means therein for separating and collecting wetter steam and hot water from steam injected into said flow passage; and
(b) a lower body section having a receptacle therein offset from said flow passage, said receptacle communicating said flow passage with the mandrel exterior and ports in said lower body communicating said receptacle with said flow passage, said tubular section also including means for directing the separated and collected wetter steam and hot water to flow toward said receptacle or said flow passage through said mandrel.

33. A method of selectively providing steam or wet steam and hot water to one or more formations in an enhanced oil recovery injection well simultaneously comprising the steps of:
(a) drilling a hole through earth formations containing viscous petroleum deposits;
(b) running casing into said hole and perforating said casing at selected intervals adjacent each said formation;
(c) running one or more tubing strings into said casing having a selected mandrel or selected spaced apart mandrels and a packer therein above each mandrel, each said mandrel having means therein for separating and collecting wetter steam and water from steam injected into said tubing string and directing said collected steam and water exterior of or through each said mandrel; and
(d) operating said packers to seal above and between each formation and provide separate sealed tubing casing annular regions exterior of each of said mandrels, each said region communicating through a perforated interval with a formation.

5,024,275

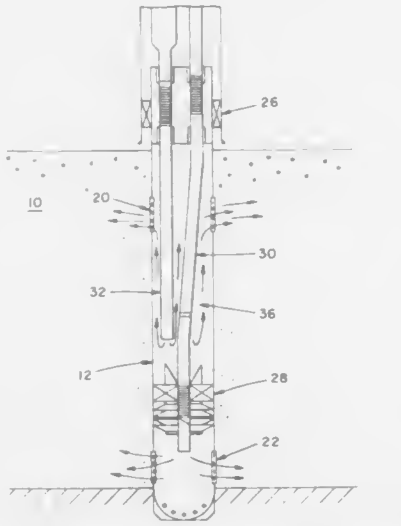
METHOD OF RECOVERING HYDROCARBONS USING SINGLE WELL INJECTION/PRODUCTION SYSTEM

Donald J. Anderson, Newport Beach; John H. Duerksen, Fullerton, both of Calif.; Doug J. McCallum, and Mark Petrick, both of Calgary, Canada, assignors to Chevron Research Company, San Francisco, Calif.

Filed Dec. 8, 1989, Ser. No. 447,733

Int. Cl.^{5} E21B *43/24*

U.S. Cl. 166—303 12 Claims



1. A method for enhancing the recovery of viscous hydrocarbons from a subterranean formation wherein said formation is traversed by a cased wellbore having a first tubing string, a first packer and a second tubing string, a second packer combination therein, said wellbore casing having a thermal communication path lying contiguous with the formation when a drive fluid is injected down said second tubing string and accesses a thermal zone parenthetically defined by said packers, said thermal communication path directing produced fluids from the formation to said first tubing string for recovery, the improvement comprising:
flowing said drive fluid down both said first and said second tubing string to expedite heating of said wellbore casing;
maintaining drive fluid flow down both the first and the second tubing string until said thermal communication path is established and the viscosity of at least a portion of the viscous hydrocarbons in said formation near the wellbore casing is reduced for direction along said thermal communication path;
reversing the flow within the first tubing string to produce said hydrocarbons from the formation to the surface as said hydrocarbons traverse the thermal communication path adjacent said wellbore casing.

5,024,276

HYDRAULIC FRACTURING IN SUBTERRANEAN FORMATIONS

John K. Borchardt, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 28, 1989, Ser. No. 442,265

Int. Cl.^{5} E21B *43/267*

U.S. Cl. 166—308 22 Claims

1. A process for the hydraulic fracturing of subterranean formations which comprises a step for the introduction into the formation at fracturing pressure of a fracturing fluid comprising solid particulate suspended in a fluid dispersion comprising (a) water, (b) a component selected from the group consisting of supercritical carbon dioxide and gaseous nitrogen, carbon dioxide and C_1 to C_3 hydrocarbons, and mixtures thereof, and (c) one or more polysaccharide surfactants of the formula $RO(R^1O)_xSacc_z$, wherein R is a monovalent organic radical having a carbon number in the range from about 7 to 24, R^1 represents a divalent hydrocarbon radical containing from about 2 to about 4 carbon atoms, x is a number having an average value in the range from 0 to about 12.0, and Saccz represents an average number z between about 0.7 and 10.0 of moieties derived from reducing saccharides containing 5 or 6 carbon atoms.

5,024,277

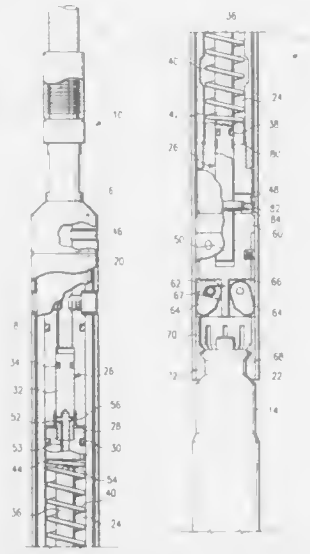
RUNNING TOOL FOR USE IN WELL BORES

Thomas D. Ricles, Kingwood, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Feb. 6, 1990, Ser. No. 475,689

Int. Cl.^{5} E21B *31/18*

U.S. Cl. 166—381 23 Claims



1. A running tool for use in locating releasable apparatus in a well bore comprising:
an elongated, hollow tool body;
a fixed length mandrel slidingly disposed in said tool body and movable therein from a running position, when connected to the well apparatus, to a release position when disconnected from the well apparatus;
an outer sleeve encircling said body and having a first end extending past one end of said body;
a resilient collet member carried by said mandrel and disposed within the first end of said sleeve when said mandrel is in said running position and outside said sleeve when said mandrel is in said release position;
a sealed chamber of fixed volume in said body;
a substantially incompressible fluid substantially filling said chamber;
a flange on said mandrel located in said chamber, said flange carrying a seal in sliding and sealing engagement with said body; and
a metering passageway in said mandrel providing restricted fluid flow from one side of said seal to the other as said mandrel moves therein, thereby determining the time required to move said mandrel between said positions.

18. A method for positioning apparatus in a well bore comprising the steps of:
extending a running tool with the apparatus releasably connected thereto to the desired location in the well bore;
compensating for the weight of the tool being lowered;
exerting a substantially constant tensile force on the tool for a predetermined time of not less than thirty seconds until the apparatus releases from the tool; and
withdrawing the disconnected running tool.

5,024,278

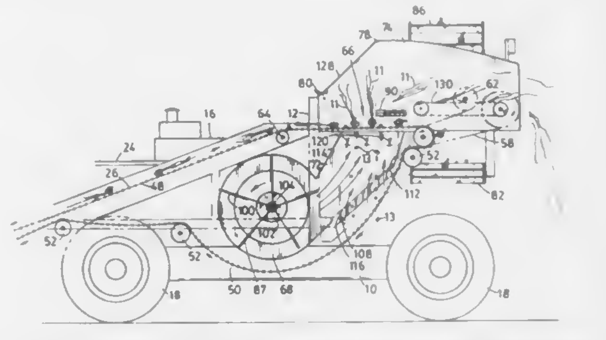
HARVESTING MACHINE HAVING BLOWER DAMAGE PREVENTION MEANS

Lee N. Shuknecht, Elba, N.Y., assignor to Lee Shuknecht & Sons, Inc., Elba, N.Y.

Filed Feb. 9, 1990, Ser. No. 479,141

Int. Cl.^{5} A01D *23/04, 33/02*

U.S. Cl. 171—17 26 Claims



23. In a harvester for a crop being harvested accompanied by debris, such as rocks and soil clumps, which passes from one side to the other side of a region in said harvester, said harvester having a blower, the improvement comprising an air flow apparatus for processing said crop which comprises a duct having sides which define said region and said sides of said region, said blower being deposed spaced from said sides and being in air communicating relationship with said duct, said duct having passageway below said region through which said debris falls.

5,024,279

FOLDABLE IMPLEMENT CARRIER

Steven D. Warner, Naperville, and John F. Stufflebeam, Romeoville, both of Ill., assignors to J.I. Case Corporation, Racine, Wis.

Filed Feb. 20, 1990, Ser. No. 481,271

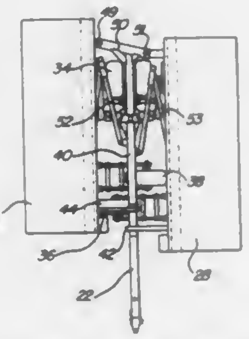
Int. Cl.^{5} A01B *73/06*

U.S. Cl. 172—1 19 Claims

15. A method of folding a foldable implement carrier comprising a frame and two opposed tool sections pivotally attached to the frame, the tool sections each having a wheel at a laterally outer portion, a main wheel set supporting the frame, comprising the steps of:
(1) forcing the main wheel set and the wheels on each tool section vertically downwardly, thus forcing the frame and the tool sections vertically upwardly;
(2) pivoting the tool sections about pivot axes on the frame to move the tool sections to a folded position;
(3) raising the wheels at the end of the tool sections vertically off of the ground, thus lowering latch members

VOL
1127
ISS
3
JE
18
1991
UMI

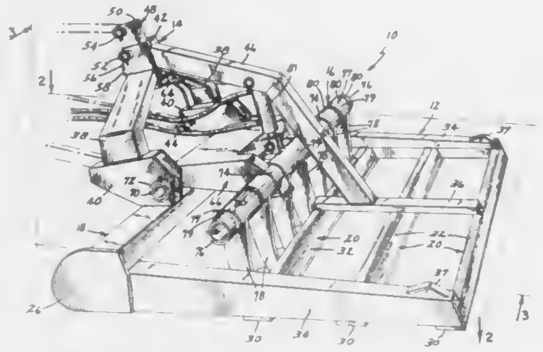
which are mounted to the tool sections vertically downwardly onto an upper surface of the frame, and continuing



to raise the wheels until they abut a lower surface of the frame.

5,024,280
SOIL LEVELING APPARATUS WITH IMPROVED FRAME AND HITCH

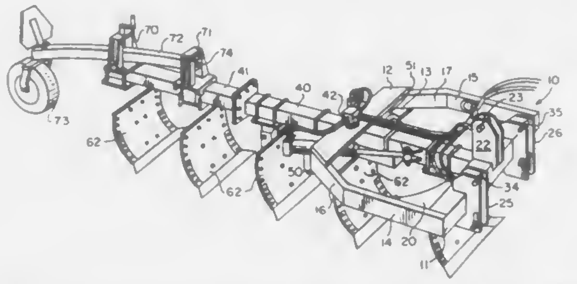
Orlan H. Mork, 6029 225th St. West, Farmington, Minn. 55024
Continuation of Ser. No. 163,178, Feb. 26, 1988, abandoned, which is a continuation of Ser. No. 856,818, Apr. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 570,347, Jan. 13, 1984, Pat. No. 4,585,075, which is a continuation-in-part of Ser. No. 224,458, Jan. 12, 1981, Pat. No. 4,448,258. This application Jun. 27, 1989, Ser. No. 372,027
Int. Cl.⁵ E02F *3/815;* **A01B** *49/02*
U.S. Cl. 172—197 **55 Claims**



1. An apparatus for leveling soil and the like, comprising:
a frame including a plurality of transverse elongate ground engaging members fixedly secured together in a mutually spaced apart relationship;
the ground engaging members of said frame being of inverted generally V-shaped cross section having an apex with downwardly diverging front and rear walls of different inclinations extending downwardly from the apex, and wherein the front wall is more steeply inclined than the rear wall, wherein the front and rear walls extend downwardly from the apex and terminate in lower edges which are substantially coplanar with one another in a substantially horizontal plane and which are in egagement with the ground when the frame is laid flat on the ground; and
hitch means carried on the frame for connecting the frame to a vehicle.

5,024,281
REVERSIBLE MOLDBOARD PLOW

Thomas D. Furlough, Tarboro, N.C., assignor to Long Manufacturing N.C., Inc., Tarboro, N.C.
Filed Aug. 2, 1990, Ser. No. 562,026
Int. Cl.⁵ A01B *3/40*
U.S. Cl. 172—219 **12 Claims**

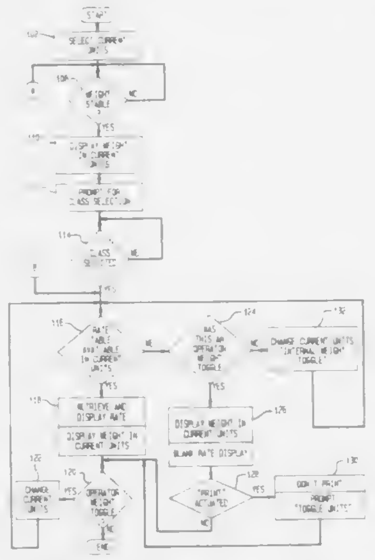


8. A reversible moldboard plow, comprising a generally planar frame having front and rear cross members, first and second lower hitch means carried by the front cross member, a longitudinal beam, means pivotally mounting said beam approximately centrally of said rear cross member for swinging movement in substantially the plane of the frame, moldboards mounted transversely of said beam in longitudinal spaced relation and depending beneath it for plowing the ground, and hydraulic cylinder and piston means mounted on said rear cross member beside said longitudinal beam and substantially in the plane thereof, said cylinder and piston means mounted for swinging movement in spaced relation from said beam, said cylinder and piston means pivotally connected to said beam forwardly of said rear cross member, whereby operation of the cylinder and piston means causes the beam to swing from side to side in order to change the angle of said moldboards with respect to the direction of travel, and first and second spaced bracket means depending from said front cross member, first and second cylinder and piston means mounted on said first and second bracket means, said first and second lower hitch means carried by said first and second cylinder and piston means, whereby operation of said first and second cylinder and piston means controls the angle of tilt of said frame.

5,024,282
ELECTRONIC POSTAL RATING SCALE OPERABLE IN METRIC AND AVOIRDUPOIS WEIGHT UNITS

Terry E. Raikes, Santa Rosa; William L. Kramer, Windsor; John B. Howard, Forestville, all of Calif.; Wayne D. Moore, North York, Canada; Louis Jackson, Milford, and Jeffrey D. Kotecki, Newtown, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.
Filed Jan. 16, 1990, Ser. No. 465,675
Int. Cl.⁵ G01G *19/40;* **G06F** *15/20*
U.S. Cl. 177—25.15 **15 Claims**

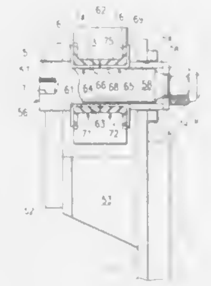
1. A postal scale comprising:
(a) weighing means for supplying a signal representative of the weight of an item;
(b) weight selecting means for selecting a current system of weights from a predetermined plurality of systems of weights;
(c) class selecting means for selecting a desired class of service from a predetermined plurality of classes of service;
(d) rate table memory means for storing a plurality of rate tables, said memory means storing at least one rate table for each of said classes of service, said plurality of rate tables comprising at least one rate table defined in a first of said systems of weights, said plurality of rate tables comprising at least one other rate table defined in a second of said systems of weights; and
(e) calculating means, responsive to said weighing means, said weight selecting means and said class selecting means, for calculating a postal rate for said item as a function of the weight of said item and in accordance with said desired class of service; said calculating means accessing said


START
SELECT CURRENT UNITS
WEIGHT STABLE
NO
YES
DISPLAY WEIGHT IN CURRENT UNITS
PROMPT FOR CLASS SELECTION
CLASS SELECTED
NO
YES
RATE TABLE AVAILABLE IN CURRENT UNITS
NO
HAS THIS AN OPERATION WEIGHT TOGGLE
NO
CHANGE CURRENT UNITS "INTERNAL WEIGHT TOGGLE"
YES
RETRIEVE AND DISPLAY RATE
DISPLAY WEIGHT IN CURRENT UNITS
DISPLAY WEIGHT IN CURRENT UNITS
BLANK RATE DISPLAY
CHANGE CURRENT UNITS
YES
OPERATOR WEIGHT TOGGLE
"PRINT" ACTUATED
YES
DON'T PRINT PROMPT "TOGGLE UNITS"
NO
END

at least one rate table if said current system is said first system of weights; said calculating means accessing said at least one other table if said current system is said second system of weights.

5,024,283
PIVOTABLE, RESILIENT MOUNTING

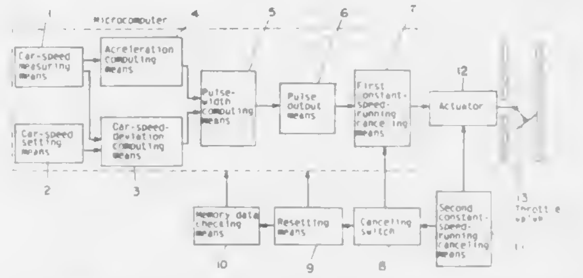
Jack M. Deli, Winfield, Ill., assignor to Komatsu Dresser Company, Libertyville, Ill.
Filed Feb. 6, 1990, Ser. No. 475,819
Int. Cl.⁵ B62D *33/067*
U.S. Cl. 180—89.14 **24 Claims**



1. In an apparatus comprising a body frame, a tiltable element, and a plurality of devices for pivotably mounting said tiltable element to said body frame, the improvement wherein each of said devices comprises:
first and second spaced apart, generally parallel bracket members secured to a first one of said body frame and said tiltable element, a support element secured to the second one of said body frame and said tiltable element, said support element having a first opening extending therethrough, a second opening located in said first bracket member in coaxial alignment with a third opening located in said second bracket member and with said first opening in said support element,
a generally cylindrical shaft positioned in said first, second and third openings, said shaft having first and second shaft end sections and an intermediate shaft section therebetween, the diameter of said first shaft end section being greater than the diameter of said intermediate shaft section so as to form a first shoulder therebetween, each of said first and second shaft end sections having external threads thereon, said first bracket member having internal threads in said second opening to matingly receive the threads on said first shaft end section,
an annular shell having an inner diameter at least as large as the diameter of said intermediate shaft section and less than the diameter of said first shaft end section,
an annular resilient sleeve mounted circumferentially about said annular shell and in contact with said annular shell and said support element,
an annular spacer sleeve positioned coaxially with said shaft and extending through said third opening with the outer diameter of said spacer sleeve being slightly less than the diameter of said third opening, and
an internally threaded retention element engaged with the threads on said second shaft end section to fixedly position said annular shell and said spacer sleeve between said first shoulder and said retention element.

5,024,284
APPARATUS FOR RUNNING A CAR AT CONSTANT SPEED

Shigeru Nakano, Daitou, and Yasuhiro Kondou, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co. Ltd., Kadoma, Japan
Filed May 31, 1989, Ser. No. 384,206
Continuation of PCT JP88/00756, Jul. 28, 1988, abandoned.
Claims priority, application Japan, Jul. 31, 1987, 62-192921
Int. Cl.⁵ B60K *31/04*
U.S. Cl. 180—179 **2 Claims**


1
Microcomputer
4
5
6
7
Car-speed measuring means
Acceleration computing means
Pulse-width computing means
Pulse output means
First constant-speed-running canceling means
12
Actuator
Car-speed setting means
Car-speed-deviation computing means
2
3
Memory data checking means
Resetting means
Canceling switch
Second constant-speed-running canceling means
13
Throttle valve
10
9
8

1. An apparatus for running a car at a constant speed, said apparatus comparing a desired speed with an actual running speed and controlling an opening of a throttle valve to equalize said actual running speed and said desired speed, said apparatus comprising:
car-speed measuring means for measuring said actual running speed of the car;
car-speed setting means for setting the desired speed of the car;
car-speed-deviation computing means for computing a deviation between said desired speed and said actual running speed;
acceleration computing means for computing an acceleration as a change in said actual running speed of the car;
pulse-width computing means for calculating a pulse width as a function of both said car-speed deviation computed by said car-speed deviation computing means and said acceleration computed by said acceleration computing means;
pulse output means for issuing a pulse signal having said pulse-width computed by said pulse-width computing means and having a predetermined period;
a microcomputer including first constant-speed-running canceling means disposed within the microcomputer for canceling a state of constant-speed running by receiving a signal of a canceling switch;
second constant-speed-running canceling means disposed outside said microcomputer for also canceling the state of constant-speed-running by receiving the signal of the canceling switch; and
an actuator which adjusts the opening of the throttle valve during the predetermined period in accordance with the

VOL
1127
ISS
3
JE
18
1991
UMI

pulse width of the pulse signals of said pulse output means, only when the constant-speed-running is not canceled.

5,024,285
SLIPPAGE PREVENTING APPARATUS FOR A VEHICLE

Nagahisa Fujita, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

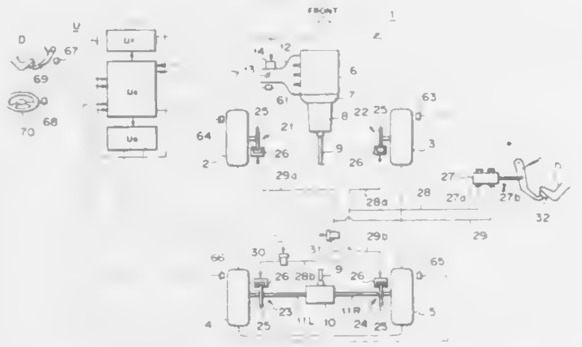
Filed Jul. 26, 1988, Ser. No. 224,372

Claims priority, application Japan, Jul. 30, 1987, 62-188827

The portion of the term of this patent subsequent to Oct. 25, 2005, has been disclaimed.

Int. Cl.⁵ B60K *31/00*

U.S. Cl. 180—197 **22 Claims**



1. A slippage preventing apparatus for a vehicle with one pair of either front or rear wheels being driven and the other pair being undriven, comprising:
   - driven wheel rotational speed detecting means for detecting a rotational speed of the driven wheel;
   - undriven wheel rotational speed detecting means for detecting a rotational speed of the undriven wheel;
   - cornering radius difference detecting means for detecting a difference in cornering radius between the driven wheel and the undriven wheel;
   - torque adjusting means for adjusting a torque to be applied to the driven wheel by increasing or decreasing the torque;
   - slip amount detecting means for detecting a slip amount or an amount of slippage of the driven wheel on a surface on the basis of the difference between the rotational speed of the driven wheel detected by said driven wheel rotational speed detecting means and the rotational speed of the undriven wheel detected by said undriven wheel rotational speed detecting means;
   - slip amount controlling means for controlling the amount of slippage by increasing or decreasing the torque applied to the driven wheel by said torque adjusting means so as to reach a target slip amount; and
   - correction means for correcting a control amount to be provided to said slip amount controlling means so as to compensate for deviations in detected slip amount resulting from the difference in cornering radius between the front and rear wheels detected by said cornering radius difference detecting means.

5,024,286
MOTOR ASSISTED PEDAL CYCLE

Gordon D. Lean, and Anthony H. K. Dennis, both of Church Lane, The Old Coach House, Fenny Compton, Great Britain

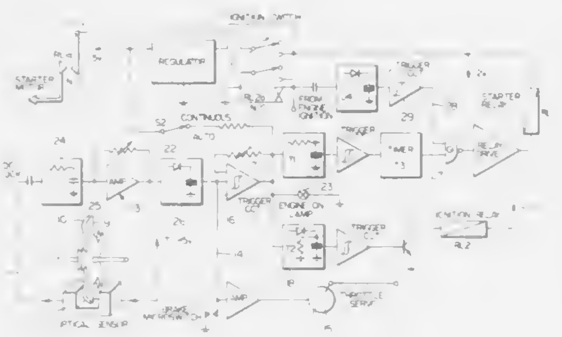
PCT No. PCT/GB89/00263, § 371 Date Jan. 16, 1990, § 102(e) Date Jan. 16, 1990, PCT Pub. No. WO89/08579, PCT Pub. Date Sep. 21, 1989

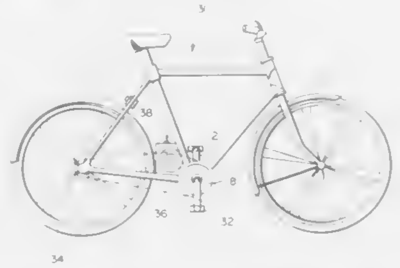
PCT Filed Mar. 14, 1989, Ser. No. 435,373

Claims priority, application United Kingdom, Mar. 14, 1988, 8806042

Int. Cl.⁵ B62M *7/00, 23/02*

U.S. Cl. 180—206 **17 Claims**





1. An engine assisted pedal cycle comprising: a pair of foot operated rotary pedals for applying a driving torque of varying magnitude to a wheel of the cycle; an engine for applying a driving torque of varying magnitude to a wheel of the cycle; means for sensing the magnitude of the torque produced by foot pressure on the pedals as the pedals are rotated to drive the cycle; and control means responsive to the torque sensing means for controlling the magnitude of the torque applied by the engine in response to the magnitude of the torque produced by foot pressure on the pedals.

5,024,287
ENGINE UNIT FOR VEHICLE

Kaoru Okui, and Manabu Kobayashi, both of Iwata, Japan, assignors to Yamaha Hatsudiki Kabushiki Kaisha, Iwata, Japan

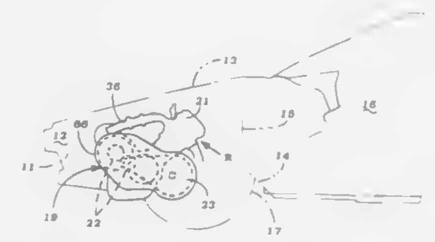
Filed Nov. 14, 1988, Ser. No. 270,357

Claims priority, application Japan, Mar. 31, 1987, 63-78535; Dec. 1, 1987, 62-301542; Dec. 1, 1987, 62-301543

Int. Cl.⁵ F16H *57/02*

U.S. Cl. 180—297 **40 Claims**

1. In a motor vehicle having a driven wheel rotating about a first axis that extends generally transversely to the vehicle, an engine supported within said vehicle, with its output shaft rotating about a second axis that extends generally parallel to said first axis, said first axis being disposed on one side of said second axis, the improvement comprising a transmission having a primary shaft rotatable about a third axis generally parallel to said second axis and on the other side thereof from said first axis, means for driving said transmission primary shaft from said engine output shaft, and means including said transmission for driving said wheel from said primary shaft.



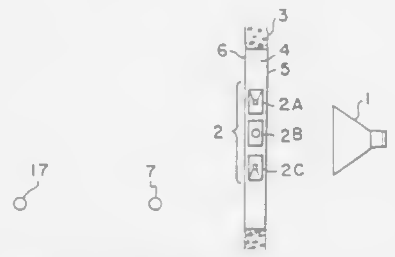
5,024,288
SOUND ATTENUATION APPARATUS

Kevin P. Shepherd, Yorktown, and Ferdinand M. W. A. Grosveld, Hampton, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Aug. 10, 1989, Ser. No. 392,165

Int. Cl.⁵ E04B *1/82;* **F01N** *1/06*

U.S. Cl. 181—206 **8 Claims**



1. A sound barrier comprising:
   - a multiple wall partition positioned between a primary acoustic source producing a first sound of a frequency and a zone wherein the sound of said primary acoustic source is to be attenuated;
   - a sound-transmitting medium within said partition; and
   - at least one secondary acoustic source positioned to generate a second sound within the partition, the second sound having a frequency, magnitude, and phase selected so as to achieve attenuation in said zone.

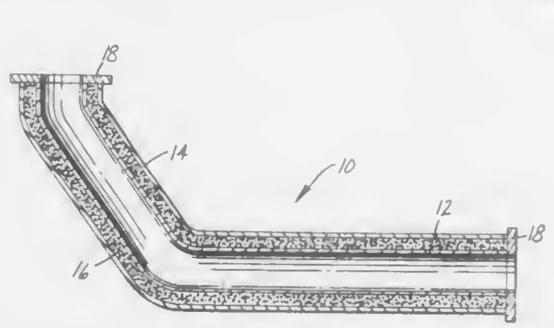
5,024,289
INSULATED DOUBLE-WALLED EXHAUST PIPE

Richard P. Merry, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 14, 1989, Ser. No. 407,401

Int. Cl.⁵ F01N *3/02, 3/06*

U.S. Cl. 181—231 **5 Claims**



1. An improved double-walled exhaust pipe including an inner pipe, an outer pipe surrounding the inner pipe to produce a uniform annular gap therebetween, and an annular flange attached to each end of the inner and outer pipes, wherein the improvement comprises:
   - filling the annular gap between the inner pipe, the outer pipe and the annular flanges with low-density, high-temperature resistant, inorganic, fired, hollow, ceramic spheroids comprising
     - A. a continuous phase made of a material selected from the group consisting of aluminum phosphate, sodium silicate ($Na_2Ox_1SiO_2$) in which x_1 is the molar ratio of SiO_2 to Na_2O and is between about 2.75 and 3.65 and potassium silicate ($K_2Ox_2SiO_2$) in which x_2 is the molar ratio of SiO_2 to K_2O and is between about 2.5 and 4; and
   - B. an insolubilizing agent, selected from the group consisting of kaolin clay, iron oxide, titanium dioxide, alumina trihydrate an zinc oxide, which combines with the continuous phase during firing to make the continuous phase insoluble in water;

said hollow, ceramic spheroids having a cellular shell, in which the shell material contains a multiplicity of irregular, non-spherical, hollow cells.

5,024,290
SOUND ABSORBING PANEL FOR INTERIOR WALLS

Otto Birker, K nacht, Switzerland, assignor to Lignoform Benken AG, Benken, Switzerland

Filed Mar. 16, 1990, Ser. No. 494,285

Claims priority, application Switzerland, Mar. 17, 1989, 993/89

Int. Cl.⁵ E04B *1/82*

U.S. Cl. 181—293 **12 Claims**

1. A sound absorbing panel for architectural styling, with several sound absorbing and piercing holes, wherein several grooves are incorporated in approximately parallel, opposite surfaces of the panel, the grooves of one surface intersecting with the grooves of the other surface, and said intersecting grooves having groove depths which form a sum greater than a thickness of the panel so as to form said holes at the intersections of the grooves, and wherein the grooves are V-shaped or funnel-shaped in cross-section.

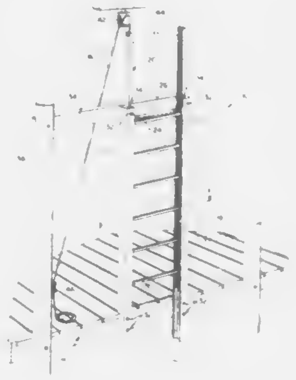
5,024,291
LADDER ASSEMBLY

Thomas W. Price, 30524 River Rd., Orange Beach, Ala. 36561

Filed Oct. 30, 1989, Ser. No. 428,899

Int. Cl.⁵ E06C *9/08*

U.S. Cl. 182—85 **6 Claims**



1. A ladder assembly for attachment to a wharf or pier comprising:
   - a pair of elongated frame members, each frame member

VOL
1127
ISS
3
JE
18
1991
UMI

having a channel extending the length of the frame member;

a ladder member mounted in said channels for movement along the length of said frame members, said ladder member including a pair of vertical side members interconnected by a plurality of rungs; and

a flat plate member attached to and extending from one of said rungs in a plane generally perpendicular to said side members, said ladder member being mounted in said channels for free movement along the length of said channels, and with said ladder member being of a material having sufficient weight and density so that said ladder member will fall into the water surrounding said wharf or pier until said plate member contacts said wharf or pier.

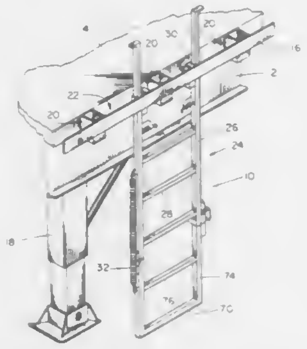
5,024,292
PORTABLE LADDER ASSEMBLY FOR TRUCK TRAILERS

John R. Gilbreath, and Bobbie L. Gilbreath, both of Pasadena, Tex., assignors to Bobbie Scope, Inc., Brownsville, Tex.

Continuation-in-part of Ser. No. 300,373, Jan. 23, 1989, abandoned. This application Nov. 2, 1989, Ser. No. 430,882

Int. Cl.^{5} E06C *5/00*

U.S. Cl. 182—90 **24 Claims**



24. A portable ladder assembly adapted to be removably mounted in a space between a body and a rail spaced therefrom, comprising:

a main ladder section having an elongated member and a plurality of step members transversely secured thereto;

means disposed adjacent a top end of said elongated member for removably securing an upper end of said main ladder section between the rail and the body with said main ladder section depending from the rail;

an extension member for extending above the rail, said extension member being retractable below the rail; and

a lower ladder section having at least one transverse step member supported by at least one elongated member attached to said main ladder section adjacent a lower end thereof, said lower ladder section being repositionable to at least two different elevations, wherein said lower ladder section is hingedly attached to said lower end of said main ladder section for pivoting between a lowered, operative position. and a raised, inoperative position.

5,024,293
EMERGENCY LADDER EQUIPMENT

Anthony Yang, and Victor Yang, both of 1594 Travois Cir., Las Vegas, Nev. 89119

Filed Jan. 8, 1990, Ser. No. 462,179

Int. Cl.^{5} E06C *9/06*

U.S. Cl. 182—93 **3 Claims**

1. Emergency ladder equipment comprising;

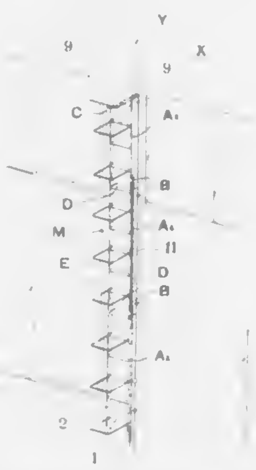
(a) a plurality of ladder members which form a complete ladder by being vertically suspended one after another,

(b) a storage case storing said ladder members under a stacked condition, said storage case mounted on an uppermost portion of an outside wall of a building,

(c) a plurality of ladder connecting devices each of which connects perpendicularly the bottom end of a preceeding ladder member and the top end of the lower ladder member, and

(d) a plurality of support stays which support the bottom of said respective ladder members in said storage case and release the bottom end of each ladder member by a suitable means release means,

whereby by releasing said support stays from the bottom end of the ladder members and making the first ladder member slide down from said storage case, other ladder members slide down one after another and said all ladder members are suspended in series while being connected by said connecting devices to form a complete ladder.



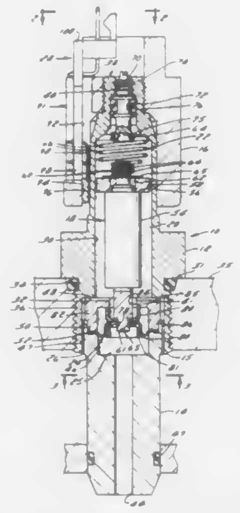
5,024,294
DIFFERENTIAL PRESSURE TRANSDUCER

Robert A. Van Fossen, Auburn, Ind.; Scott L. Spence, Port Washington, Wis., and Donald E. DeWitt, Syracuse, Ind., assignors to Johnson Service Company, Milwaukee, Wis.

Filed Jun. 7, 1990, Ser. No. 534,457

Int. Cl.^{5} F01M *11/10*

U.S. Cl. 184—108 **14 Claims**



1. A differential pressure sensing device for monitoring the pressure differential between the discharge pressure and the crankcase pressure of a lubricating pump for a compressor, said device comprising:

a housing having a high pressure chamber,

a nozzle mounted on said housing and having a low pressure chamber,

a diaphragm separating said high pressure chamber from said low pressure chamber,

a tension spring mounted in said high pressure chamber,

a magnet carrier assembly connecting said spring to said diaphragm, means in said device for connecting said high pressure chamber to the discharge side of said lubricating oil pump, means in said device for connecting said low pressure chamber to the crankcase, and

means mounted in said housing for sensing the axial position of said magnet carrier assembly.

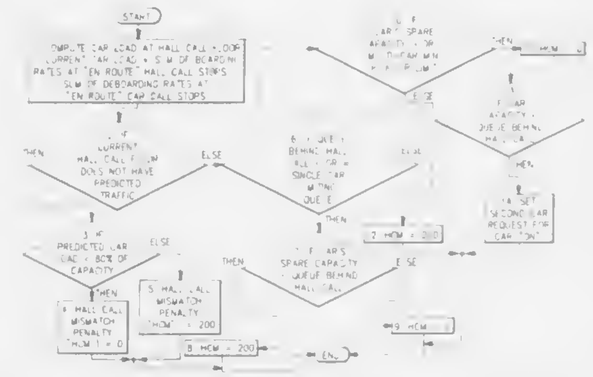
5,024,295
RELATIVE SYSTEM RESPONSE ELEVATOR DISPATCHER SYSTEM USING ARTIFICIAL INTELLIGENCE TO VARY BONUSES AND PENALTIES

Kandasamy Thangavelu, Avon, Conn., assignor to Otis Elevator Company, Farmington, Conn.

Continuation-in-part of Ser. No. 209,744, Jun. 21, 1988, Pat. No. 4,838,384. This application Mar. 3, 1989, Ser. No. 318,307

Int. Cl.^{5} B66B *1/18*

U.S. Cl. 187—125 **20 Claims**



1. A method of controlling the dispatching of elevator cars based on a system of bonuses and penalties, said penalties including a car load penalty for penalizing the stopping of a relatively loaded elevator car at a predetermined floor registering a hall call, said method comprising the steps of:

determining the load of the car when the car reaches the predetermined floor;

comparing said determined load to a predetermined car load limit; and

determining said car load penalty based on said comparison.

5,024,296
ELEVATOR TRAFFIC "FILTER" SEPARATING OUT SIGNIFICANT TRAFFIC DENSITY DATA

Nader Kameli, New Britain, Conn., assignor to Otis Elevator Company, Farmington, Conn.

Filed Sep. 11, 1990, Ser. No. 580,901

Int. Cl.^{5} B66B *1/20*

U.S. Cl. 187—132 **12 Claims**

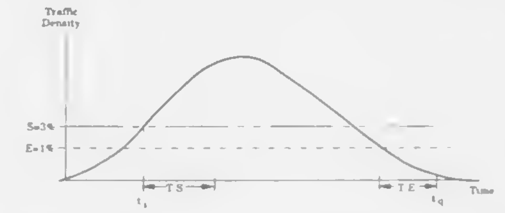
1. An elevator subsystem for use in association with a computer based elevator system having clock timing means and a historic data base, which data base includes at least passenger traffic indicative data, such as boarding and de-boarding counts for at least the past day maintained on a time-interval-by-time-interval, sequential basis, for processing the elevator passenger traffic data for use in the elevator system, comprising:

data "filtering" signal processing means for receiving and evaluating incoming elevator passenger traffic data having

at least two, preset elevator passenger traffic values, one greater than the other, indicative of two different levels of passenger traffic, and

at least two, preset time values, a first, minimum time value based on a minimum amount of time the incoming data must continuously have values great than said preset, greater traffic value, traffic data values fulfilling these conditions being indicative of significant traffic density in the elevator system, and a second, maximum time value based on the amount of time the incoming data remains below the lesser of said preset traffic values, after having remained above said minimum, greater traffic value for at least said minimum time value,

said data "filtering" means generating signals indicative of what part of the traffic data first exceeded said greater preset traffic value when the values of the data continued to be greater than said greater preset traffic value for at least said preset minimum time value, fulfilling a first condition, and indicative of what part of the traffic data thereafter had values below the lesser preset traffic value for a period of time exceeding said present maximum time value, said signals be usable to cause at least a substantial part of the traffic data existing in the incoming data stream for those intervals whose data fulfilled said conditions to be recorded for further use in the elevator system.



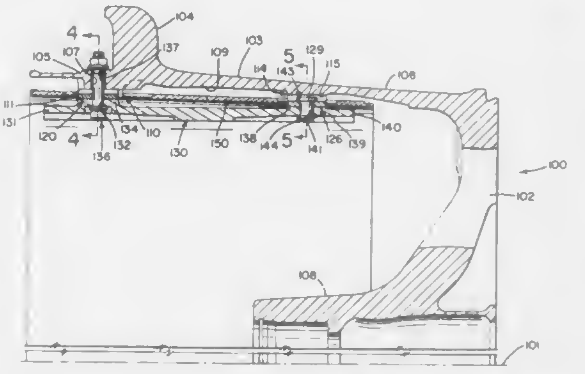
5,024,297
TORQUE TRANSMITTING BEAM FOR WHEEL HAVING BRAKE TORQUE DRIVES

Donald L. Russell, New Carlisle, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

Filed May 16, 1989, Ser. No. 352,786

Int. Cl.^{5} F16D *55/36, 65/12*

U.S. Cl. 188—18 A **22 Claims**



1. A rim construction for a wheel and multidisc brake assembly, the wheel including a web, the rim of said wheel being generally cylindrical and coaxial with the axis of said wheel and brake assembly, said rim having a rim flange and a chin adjacent the rim flange and a radially inner surface extending from the rim flange chin to the web of the wheel configured to mechanically support at least one torque-transmitting beam extending radially inward from and axially partially across said inner surface, said radially inner surface including adjacent the

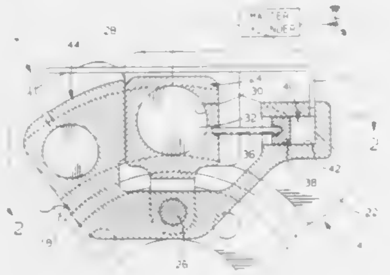
VOL
1127
ISS
3
JE
18
1991
UMI

wheel rim flange chin a first boss projecting radially inwardly relative to the surrounding radially inner surface of the rim and having a recess receiving a first spacer associated with said torque beam and a bore receiving a bolt assembly securing said first spacer and torque beam to the rim, and a discretely isolated second boss projecting radially inwardly relative to the surrounding radially inner surface of the rim and axially aligned with but distal from said first boss and proximal to a wheel web member, said second boss receiving a second spacer associated with said torque beam, said second spacer and torque beam having aligned apertures receiving a substantially radially extending shear pin passing through said aligned apertures in said second spacer and torque beam but not into said rim, said pin being the primary means of transferring torque-transmitting force applied to the beam into the second boss of the wheel rim.

5,024,298
APPARATUS AND METHOD OF AUTOMOTIVE BRAKE WITH BOOSTER PISTON

Donald E. Schenk, Vandalia; Edward J. DeHoff, Huber Heights, and Schuyler S. Shaw, Dayton, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed May 17, 1989, Ser. No. 353,040
Int. Cl.⁵ F16D *55/14*
U.S. Cl. 188—72.2 **16 Claims**



1. A vehicle wheel braking system activated by a master cylinder comprising:

a rotor fixably connected to said vehicle wheel, said rotor having a rotational axis;

a bracket having a position generally fixed with respect to said rotor rotational axis;

a caliper slidably mounted with respect to said bracket in a plane generally perpendicular to said rotor rotational axis;

first hydraulic cylinder means activated by pressure delivered by said master cylinder connected with said caliper, said first hydraulic cylinder means having a piston for frictionally engaging said rotor to retrain rotation thereof;

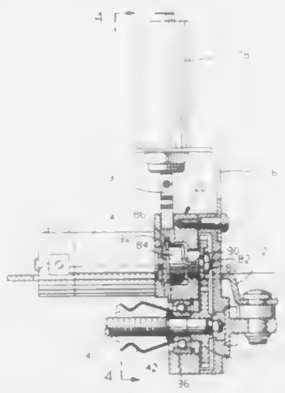
second hydraulic cylinder means positioned between said caliper and said bracket, said second hydraulic cylinder means having a piston being pressurized by a reaction force experienced between said caliper and said bracket when said first hydraulic cylinder means is activated;

third hydraulic cylinder means fluidly connected with said second hydraulic cylinder means to receive pressure therefrom, said third hydraulic cylinder means having a piston to frictionally engage said rotor to restrain rotation thereof.

5,024,299
ELECTRIC DRUM BRAKE

Schuyler S. Shaw, Dayton; Linda L. Hallinan, Centerville, both of Ohio; Robert J. Hammersmith, Rochester Hills, Mich.; Donald E. Schenk, Vandalia, Ohio; Edward J. DeHoff, Huber Heights, Ohio, and Alexander Kade, Grosse Pointe Woods, Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 353,120, May 17, 1990. This application May 18, 1990, Ser. No. 525,386
Int. Cl.⁵ F16D *65/27*
U.S. Cl. 188—156 **8 Claims**



1. An automotive vehicle drum brake comprising:

a brake drum for connection to said wheel;

a backing plate for connection to said vehicle;

at least one brake shoe connected with said backing plate and pivotally mounted with respect thereto;

at least one braking actuator including:

a non-rotative nut mounted for linear motion with respect to said backing plate and having means of pivotal connection with said brake shoe;

a power train including:

a power screw threadably engaged with said nut, said power screw being mounted to said plate; and

an electric motor with a shaft torsionally connected with said power screw to turn the same to actuate said brakes;

a drum connected with said power train;

a coil spring surrounding said drum and said spring being grounded at one end, and wherein activation of said motor in a direction to release said brake causes said drum to wind said spring and be restrained from rotation by said spring; and

an actuator operatively associated with another end of said spring for moving said spring into a position generally unwinding said spring and restraining said spring from engagement with said drum.

5,024,300
DISC BRAKE ROTOR AND WHEEL ASSEMBLY

Jon E. Miller, Spring Valley, and Donald E. Schenk, Vandalia, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed May 17, 1989, Ser. No. 353,412
Int. Cl.⁵ F16D *65/853*
U.S. Cl. 188—264 CC **2 Claims**

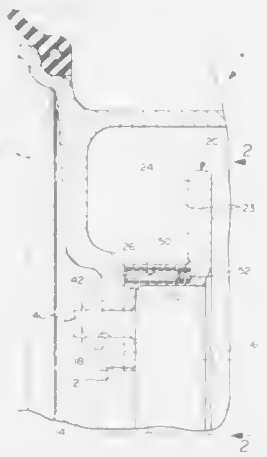
1. A vehicle wheel and rotor assembly for use with an automotive vehicle having an axle and an automotive disc-type brake having a fluid pressurized caliper with brake pads, said assembly in combination comprising;

a wheel for threaded connection with said axle via a plurality of studs;

a rotor having an annular ring section generally providing a flat surface for a friction surface for engagement with said caliper brake pads to restrain rotation of said wheel, said rotor having a core section joined to said annular ring section and said core section having apertures aligned for threadably joining said rotor to said wheel;

heat pipe means embedded within said rotor core, said heat pipe means providing a heat sink for said annular ring section of said rotor causing a fluid within said heat pipe means to vaporize on an end of said heat pipe means more adjacent to said annular ring section and to condense on an end of said heat pipe means more adjacent to said wheel to transfer heat from said annular ring section to said wheel for dispersement from said wheel by convection into the atmosphere;

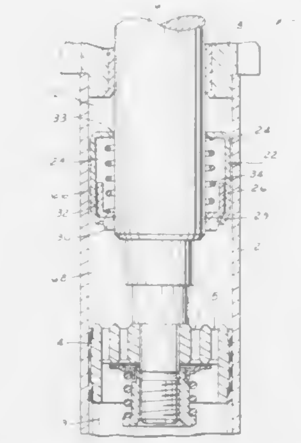
and spring means for biasing said heat pipe means into contact with said wheel.



5,024,301
HYDRAULIC REBOUND STOP ASSEMBLY FOR A SHOCK ABSORBER

Robert H. Cook, Farmington Hills, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed May 23, 1990, Ser. No. 527,629
Int. Cl.⁵ F16F *9/48*
U.S. Cl. 188—284 **24 Claims**



1. A hydraulic rebound stop assembly for use in a telescopic shock absorber having a working cylinder containing fluid, a piston slidably received within said working cylinder and defining a boundary for a rebound chamber within said cylinder, a piston rod connected to said piston and extending through one end of said working cylinder, closure means for closing said one end of said cylinder to define with said piston the rebound chamber and slidably mounting said piston rod, said hydraulic rebound stop assembly comprising:

a generally cylindrical, cup-shaped outer housing member slidably disposed within said working cylinder, said outer housing member including a central aperture at one end thereof for receiving said piston rod therethrough;

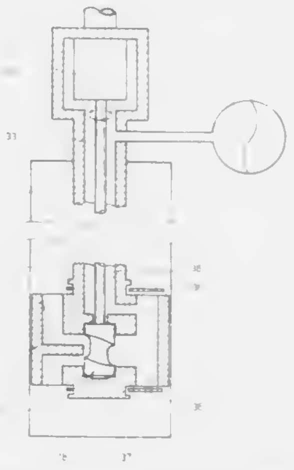
a generally cylindrical, cup-shaped inner housing member mounted to said piston rod and slidably disposed in said outer housing member and defining a damping chamber therebetween for receiving said fluid therein, said inner housing member including a central aperture at one thereof for receiving said piston rod therethrough;

damping means operatively associated with said inner and outer housing members for creating a damping force in said shock absorber after a predetermined amount of rebound stroke of said piston within said working cylinder.

5,024,302
APPARATUS FOR DAMPING COURSES OF MOTION

Dean Karnopp, Davis, Calif., assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Division of Ser. No. 379,700, Jul. 11, 1989, Pat. No. 4,936,423, which is a continuation of Ser. No. 73,872, Jul. 15, 1987, abandoned, which is a continuation of Ser. No. 851,982, Apr. 14, 1986, abandoned. This application Apr. 4, 1990, Ser. No. 504,201
Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 3513128; Jul. 12, 1985, 3524862
Int. Cl.⁵ F16F *9/46, 9/34, 9/52*
U.S. Cl. 188—299 **6 Claims**



1. An apparatus for damping courses of motion of two bodies or masses separated from each other and moving relative to one another and in their absolute positions at variable speeds, in particular for damping resilient wheel suspension systems in vehicles, road vehicles, buses, railways and the like, comprising a cylinder, a piston displaceable in said cylinder, first and second work chambers in said cylinder, said cylinder and said piston being connected to a respective one of said bodies, a single variable pressure medium damper control valve being arranged to effect a variable flow of a pressure medium to and fro between at least one work chamber of said first and second work chambers, a hydropneumatic reservoir connected relative to said control valve, a signal control means, first sensor means adapted to determine a relative speed of said two bodies relative to one another and to direct a corresponding first signal to said signal control means, second sensor means adapted to determine an absolute speed of at least one of the bodies independently of one another to thereby produce a corresponding second signal which is directed to said signal control means, said first and second signals representing a combined damping force ($F_d = B_A \cdot V + B_p V_{rel}$) having an active damping coefficient (B_A) and a passive damping coefficient (B_P) correlated to a body velocity V and a relative speed V_{rel} respectively, said variable pressure medium damper control valve including a valve opening adjusting member being configured such that said valve adjusting member rotates effec-

VOL
1127
ISS
3
JE
18
1991
UMI

tively to vary fluid flow of two branch lines connected thereto in accordance with a signal received from said signal control means, one rotational direction supplying a tension stage and one rotational direction supplying a compression stage, a first fluid line that connects said first work chamber via a first flow connection to one portion of said variable pressure medium damper control valve, at least one one-way check valve connected in series with at least one of said first and second work chambers and a connection of said hydropneumatic reservoir relative to said control valve, a position of said control valve adjusting member relative to said first fluid line being controlled via said first and second sensor means and said signal control means, said valve adjusting member being adapted to assume different rotational positions relative to said first flow connection thereby providing a lesser pressure medium flow relative to a second flow connection with a simultaneous greater pressure medium flow relative to said first flow connection and vice versa to generate different flow resistance for said damping force (F_d) applied and acting in different directions and further to generate asymmetrical damping properties for a respective predetermined position of said valve adjusting member as determined by said signal control means for said valve adjusting member to enable the movement of said valve adjusting member continuously out of a maximum opening position for at least one of said compression stage and said tension stage and into an arbitrary intermediate position to thereby attain a semi-active damper system, such that whenever a combined damping force determined by said signal control means in accordance with signals from said first and second sensor means has an algebraic sign (+ or −) opposite that of the damping forces made necessary by said courses of motion of the two bodies, said damping force is substantially reduced to zero ($F=0$) and said vehicle has a smooth ride.

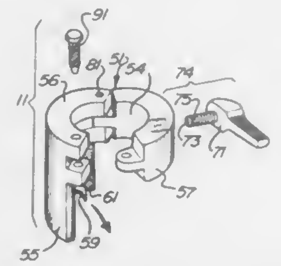
5,024,303
HATCHBACK LOCKING DEVICE

Ronald S. Kosloff, 15772 Luxenburg, Fraser, Mich. 48026

Filed Oct. 31, 1989, Ser. No. 428,919

Int. Cl.^{5} F16F *9/32*

U.S. Cl. 188—300 4 Claims



1. A locking device for retaining a liftgate support of a hatchback-type door for a vehicle in an open position, the liftgate support including a housing cylinder and an elongated piston rod, the elongated piston rod being slidably positionable relative to the housing cylinder along the longitudinal axis of the elongated piston rod, an end of the elongated piston rod being received within the housing cylinder, the locking device comprising:

- (a) a body member having a longitudinal axis and being generally toroidal in shape, the body member having an aperture formed therethrough through which the elongated piston rod is slidably moveable relative to the housing cylinder, the body member further comprising:
  - (1) a first portion having a first and second end, each end comprising a female end having an aperture disposed therethrough,
  - (2) a second portion having a first and second end, each end comprising a male end having an aperture formed therethrough, the apertures of each male end being matable with an associated aperture of an associated female end,
- (b) a flange attached to the body member extending along the longitudinal axis of the body member;
- (c) means for securing the body member onto the housing cylinder comprising two sided tape;
- (d) a locking member comprising: a threaded fastener disposed normally to the longitudinal axis of the body member and including a bearing surface, wherein the bearing surface of the threaded fastener bears directly against the elongated piston rod, and the elongated piston rod in turn bears against the body member when the locking member is in a locked position, thereby precluding the slidable movement of the elongated piston rod relative to the housing cylinder; and

wherein the longitudinal axis of the body member is coaxial with the elongated axis of the elongated piston rod and the securing means is disposed on the flange proximate to where the elongated piston rod is received by the housing cylinder.

5,024,304
VACUUM BRAKE FORCE BOOSTER WITH ACOUSTIC INSULATION

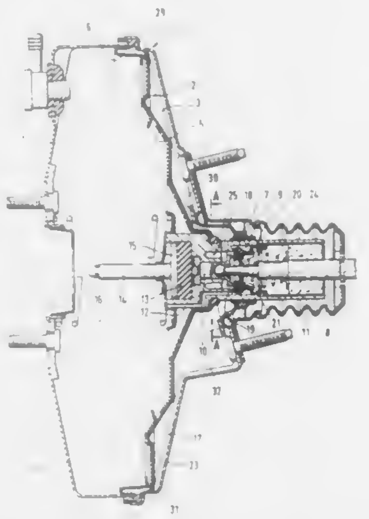
Sigmund Booten, Oberursel; Uwe Kley, and Cristiano Hoffmann, both of Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 13, 1989, Ser. No. 450,129

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1989, 3900416

Int. Cl.^{5} B60T *13/52*

U.S. Cl. 188—356 23 Claims



1. A vacuum brake force booster for automotive vehicles, comprising a booster housing having at least two housing sections and an axially movable partition sealingly subdividing said booster housing into a vacuum chamber and a ventable working chamber, said force booster further comprising an axially movable control valve housing including a control valve mechanically actuable by a control piston and operatively coupled to said booster housing for alternately communicating the working chamber with the vacuum chamber and the atmosphere, said axially movable control valve housing comprising, in the guiding area of the control piston, a plurality of intervals spaced from one another by radial reinforcing bridges, wherein the housing section defining the ventable working chamber and the intervals define first and second areas for support of insulating composition, respectively, and at least one of said areas is lined with an insulating composition for attenuating noise resulting from inflowing air upon actuation of said vacuum brake force booster.

5,024,305
METHOD FOR CONTROLLING VEHICLE TRANSMISSION SYSTEMS

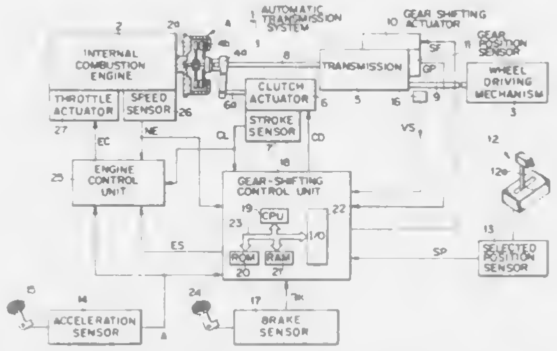
Kazumasa Kurihara, and Tsutomu Takahashi, both of Higashimatsuyama, Japan, assignors to Zexel Corporation, Japan

Filed Jul. 16, 1990, Ser. No. 552,499

Claims priority, application Japan, Jul. 28, 1989, 1-195722

Int. Cl.^{5} B60K *41/28*

U.S. Cl. 192—0.055 **7 Claims**



1. A method for electronically and automatically controlling a gear-shifting operation of a vehicle transmission system having a gear-type transmission and a clutch coupled with an internal combustion engine in response to at least the amount of the operation of an accelerator pedal and a running speed of a vehicle, said method comprising steps of:

- discriminating whether or not the clutch has engaged in response to an increase in the running speed of the vehicle after the clutch is once disengaged in the case where the gear-shifting operation is carried out in a control mode wherein the clutch is disengaged so as to prevent idle running of the vehicle when a rotational speed of the engine becomes lower than a first level which is a little higher than an idling speed of the engine;
- discriminating whether or not a brake pedal is depressed; and
- changing the control mode to another control mode in which the engaged state of the clutch is maintained unless the rotational speed of the engine becomes lower than a second level which is a little lower than the idling speed if the brake pedal is not depressed when the clutch has engaged in response to the increase in the running speed.

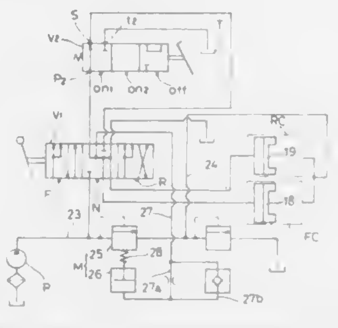
5,024,306
PROPELLING DRIVE CONTROL APPARATUS FOR WORKING VEHICLE

Tetsu Fukui; Takashi Yoshii; Toshihiko Takemura, all of Sakai, and Akio Hattori, Minamikawachi, all of Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Nov. 16, 1988, Ser. No. 272,037

Int. Cl.^{5} F16D *25/00*

U.S. Cl. 192—3.57 4 Claims



1. A propelling drive control apparatus for a working vehicle comprising:

- a pump for supplying hydraulic oil to said apparatus,
- hydraulically operable friction clutch means for providing a propelling drive transmission state,
- first clutch control means for operating said friction clutch means,
- second clutch control means connected in series to said first clutch control means and having three control positions (off, on1 and on2), wherein one of said control positions is a declutching position (off) which is established for stopping a hydraulic oil supply to said friction clutch means and for releasing hydraulic pressure oil from said friction clutch means, a second one of said control positions is a first clutch engaging position (onl) which is for supplying pressure oil supplied to said second clutch control means directly to said friction clutch means, and the third one of said control positions is a second clutch engaging position (on2) which is for stopping the hydraulic oil supply from said second clutch control means to said friction clutch means, means for releasing the hydraulic pressure oil from inside said friction clutch means in an amount corresponding to an amount of operation of a control device, and thereafter stopping release of the hydraulic pressure oil to maintain an oil pressure in said friction clutch means, and
- an oil pressure adjusting mechanism including a variable relief valve and an adjusting means mounted in an oil feed passage from said pump for the first and second clutch control means,
- said oil pressure adjusting mechanism being connected to the oil feed passage with the first clutch control means being in an operative position whereby relief pressure of the relief valve increases with increasing oil pressure supplied to the oil pressure adjusting mechanism,
- said oil pressure adjusting mechanism being connected to a return tank with the first clutch control means being in a neutral position whereby the relief pressure of the relief valve decreases to a lowest level, wherein
- said second clutch control means is disposed adjacent said friction clutch means and is supplied with hydraulic pressure oil from said first clutch control means,
- and said oil pressure adjusting mechanism cancels the hydraulic oil pressure for engaging said friction clutch means in response to a declutching operation of said first clutch control means and returns to an initial state.

5,024,307
FREE WHEEL HUB SYSTEM

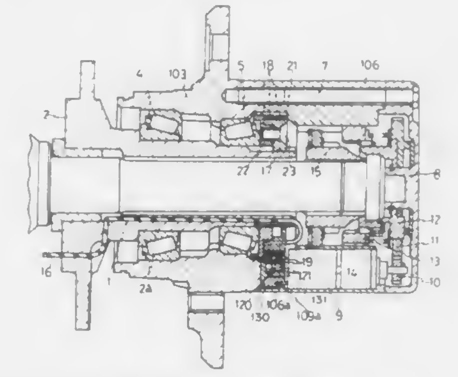
Hideaki Wakabayashi, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 26, 1989, Ser. No. 456,379

Claims priority, application Japan, Dec. 28, 1988, 63-168420[U]

Int. Cl.^{5} B60K *23/08;* F16D *41/00*

U.S. Cl. 192—40 8 Claims



1. A free wheel hub system, comprising:

- drive means carrying first electrical contact means,
- an axle hub rotatably mounted on said drive means by bearing means,

VOL
1127
ISS
3
JE
18
1991
UMI

- a hub body attachable to said axle hub, and
- a free wheel hub mechanism connected within said hub body for selectively drivably interconnecting said drive means and said axle hub for common rotation,
  - said free wheel hub mechanism including an electric motor and a contact case each connected to said hub body independently of said axle hub, whereby said hub body, said electric motor, and said contact case are attachable as a unit to said axle hub, said contact case carrying second electrical contact means electrically connected to said motor and arranged to make electrical contact with said first contact means when said hub body is attached to said axle hub, one of said first and second contact means being spring biased.

5,024,308

ONE-WAY CLUTCH AND HOLDER FOR TORQUE TRANSMITTING MEMBERS THEREOF

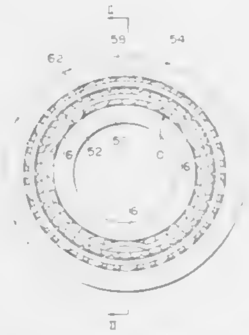
Yoshio Kinoshita, Ayase, and Mitsuharu Nawa, Fujisawa, both of Japan, assignors to NSK Warner K.K., Tokyo, Japan

Filed Jan. 19, 1989, Ser. No. 298,917

Claims priority, application Japan, Jan. 21, 1988, 63-11502

Int. Cl.^{5} F16D *41/07*

U.S. Cl. 192—41 A 11 Claims



1 A one-way clutch, comprising an inner race having a cylindrical outer contact surface, an outer race having an inner contact surface and disposed concentrically about said inner race, a plurality of torque transmitting members disposed in an annular space defined by said outer contact surface and said inner contact surface to allow relative rotation between said inner race and said outer race in one direction about a common axis of said inner race and said outer race and to prevent such relative rotation in an opposite direction, and an annular retainer disposed in said annular space for retaining said torque transmitting members in circumferentially spaced positions,

- said retainer including an annular main body having a plurality of circumferentially spaced holes each receiving a respective torque transmitting member, one axial end portion of said main body having a radially inwardly protruding guide portion contacting said contact surface of said inner race, an opposite axial end portion of said main body having a plurality of circumferentially spaced portions each slit in a circumferential direction of said main body and means including circumferential segments of said opposite end portion adjacent to the slits for guiding said retainer and providing a predetermined drag between said retainer and said contact surface of said inner race, said circumferential segments being bent radially inwardly from said main body into generally arch-like shape as viewed in an axial direction of said main body sufficiently that they engage said contact surface of said inner race resiliently, in an outwardly flexed state, with a predetermined force to effect said guiding of said retainer and to provide said predetermined drag between said retainer and said contact surface of said inner race.

5,024,309

ROTATIONAL SPEED DIFFERENTIAL RESPONSIVE TYPE CONTROL COUPLING

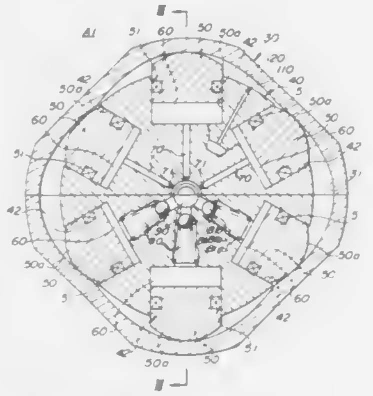
Toji Takemura, Yokohama, and Takashi Okubo, Yokosuka, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Sep. 20, 1989, Ser. No. 409,669

Claims priority, application Japan, Sep. 20, 1988, 63-123105[U]; Sep. 29, 1988, 63-245232

Int. Cl.^{5} F16D *31/02*

U.S. Cl. 192—60 7 Claims



1. A control coupling comprising:
- a first rotary member;
- a second rotary member rotatable relative to said first rotary member;
- oil discharge means responsive to a rotational speed differential between said first and second rotary members for discharging a quantity of oil proportional to said rotational speed differential;
- restriction means for restricting discharge of oil by said oil discharge means and thereby producing an oil pressure for urging one of said first and second rotary members against that other; and
- control means for controlling discharge of oil from said discharge means such that under a predetermined condition said discharge of oil from said discharge means is prevented thereby preventing substantial relative rotation of said first and second rotary members;
- said control means including a spool chamber concentrically formed in said first rotary member and a spool movable in said spool chamber;
- said oil discharge means including a plurality of discharge passages formed in said first rotary member and having ends directly connected to said spool chamber and equally spaced circumferentially along said first rotary member;
- said spool being axially movable to open and close said ends of said discharge passages,
- said discharge passages being grouped such that grouped two of said discharge passages have said ends opposed diametrically of said spool chamber and discharge oil of substantially the same pressure at any angle of said first rotary member relative to said second rotary member;
- said spool having an outer periphery which cooperates with said ends of said discharge passages to constitute a variable orifice variable in opening depending upon variation of position of said spool relative to said first rotary member;
- said control means including a rod installed concentrically on said first rotary member to extend between said spool chamber and outside of said first rotary member and movable together with said spool, and an electric actuator for actuating said rod and said spool to move relative to said first rotary member, said actuator being disposed outside of said first and second rotary members and supported on a stationary portion of an associated device.

5,024,310

CLUTCH PRESSURE CONTROL DEVICE FOR CONTINUOUSLY VARIABLE TRANSMISSION

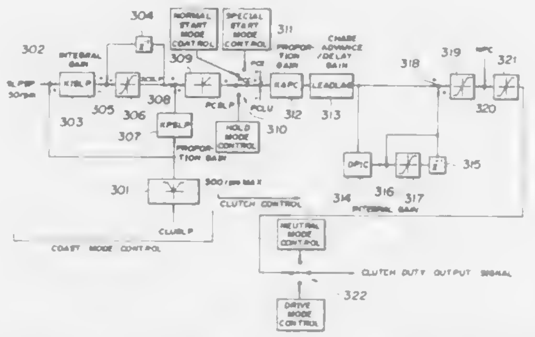
Katsuaki Murano; Yoshinori Yamashita; Sadayuki Hirano, all of Shizuoka; Takumi Tatsumi, and Hiroaki Yamamoto, both of Hyogo, all of Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka and Mitsubishi Denki Kabushiki Kaisha, Tokyo, both of Japan

Filed Nov. 29, 1989, Ser. No. 443,712

Claims priority, application Japan, Nov. 30, 1988, 63-302729

Int. Cl.^{5} F16D *25/14;* **B60K** *41/02*

U.S. Cl. 192—0.076 11 Claims



1. An apparatus comprising: a transmission which has a progressively engageable clutch and which is operable in a plurality of predetermined operational modes, including a coast mode; and control means for controlling engagement of said clutch, wherein said control means includes means for determining an actual current slip of said clutch, and for determining an adjusted actual slip by taking an absolute value of said actual current slip and by reducing said absolute value to a predetermined maximum slip value when said absolute value exceeds said predetermined maximum slip value; and wherein said control means includes means for effecting feedback control of engagement of said clutch as a function of said adjusted actual slip with respect to a predetermined target slip so as to maintain said actual current slip substantially at said predetermined target slip.

5,024,311

ELECTROMAGNETIC SPRING CLUTCH

Masanori Osawa, Iida, Japan, assignor to Tenryu Marusawa Kabushiki Kaisha, Nagano, Japan

PCT No. PCT/JP88/00055, § 371 Date Jul. 25, 1989, § 102(e) Date Jul. 25, 1989, PCT Pub. No. WO88/05958, PCT Pub. Date Aug. 11, 1988

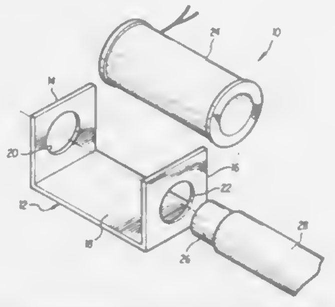
PCT Filed Jan. 25, 1988, Ser. No. 392,525

Claims priority, application Japan, Jan. 28, 1987, 62-011194

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.^{5} F16D *27/00*

U.S. Cl. 192—84 T 7 Claims



7. In an electromagnetic spring clutch for mutually engaging or disengaging a master driving axle and a slave driving axle by shift of an armature in the axial direction thereof,
- an electromagnetic coil accommodated in a field core for shifting said armature,
- said field core being made by cutting a rod which is U shape in section perpendicular to the axis of said rod, being of U shape in section and being in the form of a pair of mutually parallel, spaced end walls and a connecting wall perpendicular to said end walls and connecting said end walls together at a respective edge of each of said end walls, at least one of said end walls having an opening therethrough, said armature being rotatably received in each said opening.

5,024,312

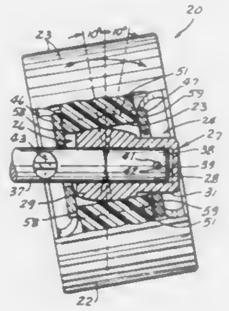
BOAT SUPPORT ROLLER ASSEMBLY

Byron L. Godbersen, Lake LaJune Estates, Ida Grove, Iowa 51445

Filed Apr. 12, 1990, Ser. No. 507,985

Int. Cl.^{5} B60P *3/10*

U.S. Cl. 193—37 10 Claims



1. A roller assembly for supporting a boat on a trailer comprising:
- annular hub means having a resilient circumferential surface for supportively engaging the hull of a boat when moved into contact therewith, said hub means having a bore formed axially therein;
- bushing forming means comprising an annular member having an open portion at one end and a closed portion at the other with a bore formed axially therein, the open end portion of said member having a diameter larger than the closed end portion and having opposed convexly shaped surfaces extended axially thereof whereby to provide for swiveling movement of said hub means relative to said bushing forming means upon engagement between said convexly shaped surfaces with surfaces of said hub means bore;
- a shaft inserted into said bushing means bore for placing said bushing means into contacting supportive engagement with said hub means bore surfaces;
- swivel limiting means placed on either side of said annular member open end portion relative to said shaft and to said annular member closed end portion whereby to limit the degree of swiveling of said hub means; and
- means connected to said shaft on either side of said swivel limiting means to locate and maintain said annular member open end portion within the axial extent of said hub means bore.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,313

COIN RETURN CONTROL SYSTEM FOR VENDING MACHINES

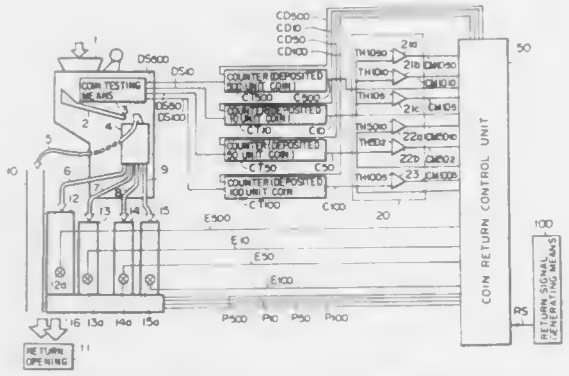
Tadashi Miyazawa, Tatebayashi, Japan, assignor to Sanden Coporation, Gunma, Japan

Filed Nov. 1, 1989, Ser. No. 430,171

Claims priority, application Japan, Nov. 2, 1988, 63-142682[U]; Nov. 11, 1988, 63-146676[U]; Nov. 11, 1988, 63-146677[U]

Int. Cl.⁵ G07D *1/06*

U.S. Cl. 194—217 **3 Claims**


COIN TESTING MEANS
COUNTER (DEPOSITED 500 UNIT COIN)
COUNTER (DEPOSITED 10 UNIT COIN)
COUNTER (DEPOSITED 50 UNIT COIN)
COUNTER (DEPOSITED 100 UNIT COIN)
COIN RETURN CONTROL UNIT
RETURN SIGNAL GENERATING MEANS
RETURN OPENING

1. A coin return control system for vending machines comprising:

coin testing means for testing the authenticity and type of deposited coins including relatively smaller denomination coins and relatively larger denomination coins;

a plurality of deposited coin counter means responsive to said coin testing means for counting the number of each type of deposited coin;

a plurality of change retaining means for retaining each type of deposited coin;

coin paying-out means for paying out coins from said change retaining means according to paying-out signals;

a plurality of change running-out detecting means, each corresponding to a particular type of coin, for detecting whether the number of coins retained in particular change retaining means has reached a number not less than predetermined number and for generating a change running-out detecting signal;

return signal generating means for generating a coin return signal;

comparison means for comparing a first value corresponding to the number of relatively smaller denomination coins counted by a corresponding coin counter with a second value corresponding to the number of the smaller denomination coins that corresponds to a denomination of a larger denomination coin, and for generating a control signal if the first value is not less than the second value; and

coin return control means for generating a paying-out signal to cause a larger denomination coin to be returned instead of smaller denomination coins if, when said coin return signal is generated, 1) a change running-out detecting signal from a change running-out detecting means corresponding to a smaller denomination coin is generated, 2) said control signal is generated and 3) a change running-out detecting signal from a change running-out detecting means corresponding to a larger denomination coin is not generated; and

means for outputting said paying-out signal to said coin paying-out means.

5,024,314

ESCALATOR SYSTEM WITH CONVERTIBLE STEPS FOR WHEEL CHAIR

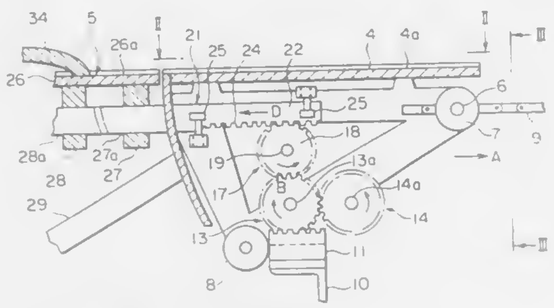
Shigeharu Kitamura; Haruhiko Nakamura, both of Inazawa, and Masaru Sanada, Osaka, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 8, 1989, Ser. No. 363,082

Claims priority, application Japan, Jun. 9, 1988, 63-142024; Jun. 30, 1988, 63-163414; Jun. 30, 1988, 63-163415

Int. Cl.⁵ B66B *23/12*

U.S. Cl. 198—333 **13 Claims**



1. An escalator system comprising:

a main frame defining a circulating path;

a first step disposed on the main frame for movement along the circulating path;

a second step disposed on the main frame adjoining the first step for movement along the circulating path, the second step having a movable tread movable between a raised position and a lowered position;

an operating mechanism mounted on the first step and comprising a support movable between a retracted position and an extended position in which it engages with and supports the movable tread;

a first rotatable member mounted on one of the steps and coupled with the operating mechanism for driving the operating mechanism to move the support from the retracted position to the extended position when rotated in a first direction;

a second rotatable member mounted on one of the steps and coupled with the operating mechanism for driving the operating mechanism to move the support from the extended position to the retracted position when rotated in the first direction;

a first engaging member mounted on the main frame for engaging with the first rotatable member and rotating the first rotatable member in the first direction; and

a second engaging member mounted on the main frame for engaging with the second engaging member and rotating the second rotatable member in the first direction.

5,024,315

METHOD OF DISTRIBUTING WORKPIECES BETWEEN A CONVEYOR AND WORKSTATIONS

William R. Ward, Columbus, Ohio, assignor to O-I Neg TV Products, Inc., Toledo, Ohio

Division of Ser. No. 766,721, Aug. 19, 1985, Pat. No. 4,760,671. This application Jul. 22, 1988, Ser. No. 223,454

Int. Cl.⁵ B65G *43/00*

U.S. Cl. 198—341 **13 Claims**

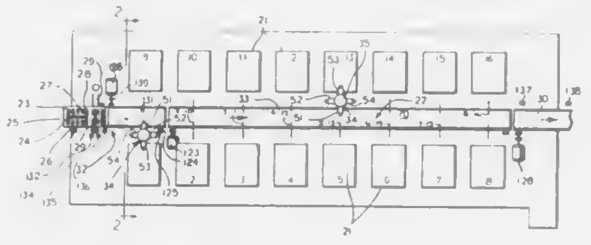
8. The method if distributing workpieces to predetermined delivery locations spaced at regular intervals along a path comprising:

designating each workpiece for odd or even delivery locations spaced along the path in spatial sequence;

initially advancing designated odd workpieces one interval along the path;

initially advancing designated even workpieces two intervals along the path;

advancing simultaneously all workpieces, which are along the path and which previously have been initially advanced, two intervals along the path in conjunction with each of said steps of initially advancing designated even workpieces two intervals along the path;



and alternately and cyclically performing the said steps of initially advancing designated odd workpieces and initially advancing designated even workpieces to position, between said advancing steps, designated odd workpieces at odd delivery locations along the path and designated even workpieces at even delivery locations along the path.

5,024,316

SORTING UNIT FOR BELT CONVEYOR SYSTEMS

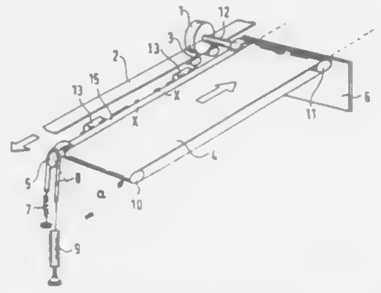
Mario Scata, and Adolfo Passero, both of Teramo, Italy, assignors to Meccanizzazione Postale E Automazione SpA, Piane di Sant'Atto, Italy

Filed Jul. 21, 1989, Ser. No. 382,759

Claims priority, application Italy, Jul. 21, 1988, 21432 A/88

Int. Cl.⁵ B65G *37/00, 47/38;* **B07C** *5/36*

U.S. Cl. 198—369 **4 Claims**



1. A sorting unit for a belt conveyor system of the type comprising at least a sorting conveyor belt extending between transmission rollers revolvingly supported by a bar hinged to a steady framework, said sorting belt being swingable about an oscillation axis extending parallelly and close to a longitudinal edge actuating means to operate the sorting conveyor belt and control means for oscillating the sorting conveyor belt about said oscillation axis, bringing it from a rest position, where it lays horizontally flush with further conveyor belts being parts of said conveyor system, to a delivery position where it is transversally sloped downwardly, and viceversa, characterized in that said actuating means comprise an actuating belt extending parallelly to said oscillation axis and running in a direction opposite to the advancing direction of an object, at least one driving roller axially coupled to one of said transmission rollers and revolvingly arranged above said actuating belt, friction-coupled thereto my means of two counter-rollers located underneath said actuating belt in a position symmetrical with respect to the tangency line of said driving roller in such a way to assure in the rest position, the presence of a friction strength between the actuating belt and the driving roller.

5,024,317

METHOD AND APPARATUS FOR CLOSING CARTONS

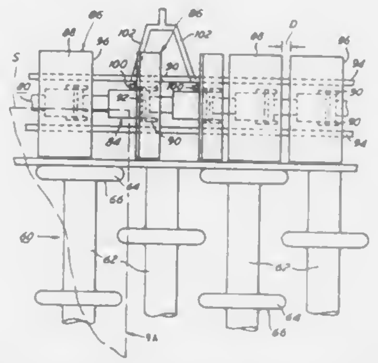
David S. Hemus, Cirencester, England, assignor to CMB Foodcan plc, Worcester, England

Filed Nov. 16, 1989, Ser. No. 437,631

Claims priority, application United Kingdom, Nov. 18, 1988, 8826962

Int. Cl.⁵ B65G *19/00, 47/24;* **B65B** *7/20*

U.S. Cl. 198—415 **27 Claims**



12. In a method of closing cartons wherein the cartons are turned while being moved along a predetermined path, the method comprising the steps of advancing the cartons along the path in spaced apart relationship while supported from beneath but rotatable in a generally horizontal plane; moving a plurality of raisable restraint members along the path beneath the cartons at a location adjacent a side of each carton, said side extending generally in the direction of said path, the restraint members being normally disposed in lowered positions and spaced apart by a distance less than a length of said side of each carton, applying a yieldable raising force sequentially to the restraint members as they pass a raising station, whereby restraint members situated between adjacent cartons are raised, and moving the restraint members at a slower speed than the cartons, whereby said side of a carton situated behind a slower moving raised restraint member abuts and rotates about the latter as a fulcrum through a substantial angle.

5,024,318

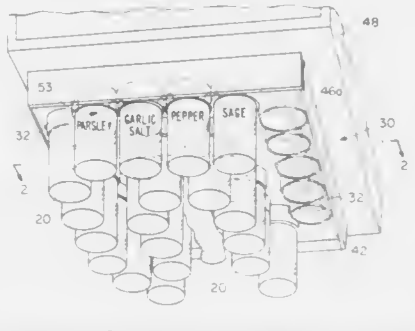
CONVEYOR STORAGE APPARATUS

Ralph W. Schwarze, 12468 Robleda Rd., Los Altos, Calif. 94022, and Thomas D. Dickson, Jr., 2427 Via De Los Milagros, Pleasanton, Calif. 94566

Continuation of Ser. No. 195,518, May 18, 1988, abandoned, which is a continuation of Ser. No. 47,153, May 6, 1987, abandoned. This application Jul. 18, 1989, Ser. No. 383,286

Int. Cl.⁵ B65G *25/00*

U.S. Cl. 198—465.2 **27 Claims**



15. An apparatus for storing containers of spices or the like having an end with a size within a predetermined range of sizes, said apparatus comprising

conveyor track means defining a continuous loop track and

VOL
1127
ISS
3
JE
18
1991
UMI

including a transfer station where containers are inserted into and removed from said apparatus;

a plurality of downwardly facing cups, each sized to receive a container having an end with a size within the predetermined range of sizes, a plurality of circumferentially spaced projections extending inwardly from the sides of said cup for engaging opposing edges of an end of a container received in said cup, said projections being radially movable and biased radially inwardly for engaging the edges of an end of a container received in said cup;

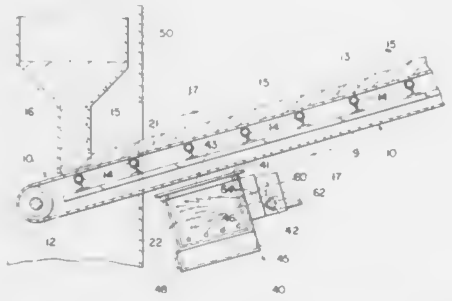
means extending from said cup into said track for supporting said cup in said track in a predetermined orientation relative to said track and allowing free movement of said cup along said track;

gear means having circumferentially spaced radially extending fingers and rotatable about an axis for moving said fingers along a drive region of said track, and thereby engaging a one of said cup-supporting means disposed in said track drive region for forcing said finger-engaged cup along said track in the direction of movement of said fingers along said track, there being a sufficient number of said cups supported in said track that movement of one cup along said drive track region moves said cups along said track sufficiently to move another cup into said track drive region for engaging by one of said fingers; and

motor means selectably operable in a first state for rotating said gear means in a first direction and in a second state for rotating said gear means in a second direction, and thereby moving said cups along said track in said first and second directions.

5,024,319
BELT HEATER FOR CONVEYORS

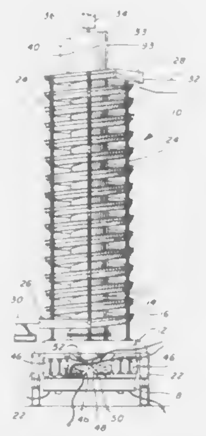
Steven C. Dixon, Rte. 3, Box 82D-4, and James W. Dixon, Rte. 3, Box 100, both of Oakland, Md. 21550
Filed Oct. 18, 1989, Ser. No. 423,014
Int. Cl.^{5} B65G *45/00*
U.S. Cl. 198—494 **17 Claims**



1. In combination, a belt conveyor adapted for carrying granular coal or ore from a mine or crushing station which has ice adhering to said belt conveyor, a belt heater means in the form of a fuel burner positioned adjacent said belt conveyor for heating the coal supporting surface of said belt conveyor to a temperature sufficient to melt the ice adhering to said belt surface and to convert said ice to liquid water as long as said belt conveyor is moving and control means to shut off said burner when said belt conveyor stops and which starts said burner when said belt conveyor starts.

5,024,320
VIBRATORY SPIRAL ELEVATOR

Albert Musschoot, Barrington, Ill., assignor to General Kinematics Corporation, Barrington, Ill.
Continuation of Ser. No. 399,350, Aug. 28, 1989, abandoned, which is a continuation of Ser. No. 47,778, May 8, 1987, abandoned. This application Jun. 21, 1990, Ser. No. 541,487
Int. Cl.^{5} B65G *27/02*
U.S. Cl. 198—756 **9 Claims**



1. In a drive for a spiral elevator having a base, isolation means for resiliently supporting the base on a surface, exciter means, means for resiliently supporting the exciter means on the base, said means for supporting the exciter means comprising a plurality of springs each extending angularly between and connected to the base and exciter means and rocker leg means extending angularly between and pivotally connected to the base and to the exciter means, said exciter means having associated therewith a pair of parallel shafts journaled thereon, said exciter means also having associated therewith vibration generating means mounted on each shaft and said exciter means further having associated therewith a pair of motors mounted thereon with one motor driving one shaft independent of the other motor driving the other shaft in resiliently associated relation to said base of said spiral elevator whereby in operation the shafts and vibration generating means reach an inertially synchronized state, whereby vibratory forces from said exciter means are transmitted through the springs to the base and to the spiral elevator and isolated from the support surface.

5,024,321
MODULAR CENTER DRIVE CONVEYOR BELT

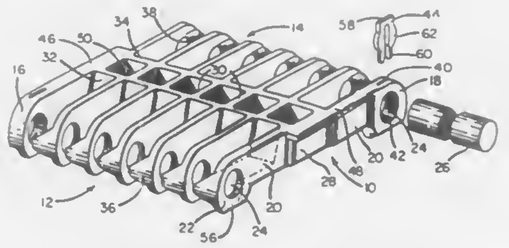
James M. Lapeyre, New Orleans, La., assignor to Laitram Corporation, Harahan, La.
Continuation of Ser. No. 363,354, Jun. 2, 1989, abandoned, which is a continuation of Ser. No. 118,309, Nov. 6, 1987, abandoned, which is a continuation of Ser. No. 179,523, Aug. 19, 1980, Pat. No. 4,832,187. This application Mar. 29, 1990, Ser. No. 501,963
The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.
Int. Cl.^{5} B65G *17/06*
U.S. Cl. 198—853 **48 Claims**

1. A module for use in constructing a linked conveyor belt comprising:

a body member having first and second pluralities of link ends;

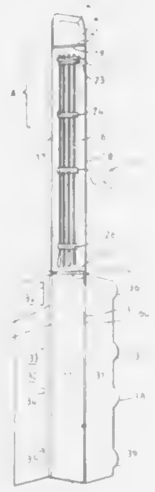
at least two of said link ends of said first and second pluralities including an opening to receive a pivot rod to permit pivotable rotation of said module thereabout, said openings in said first and second pluralities defining respective first and second pivot rod axes; and

an abutment attachable to and cooperative with at least one of said at least two link ends for occluding at least a portion of the respective opening to prevent the passage of a pivot rod through the opening, said abutment being in non-interlocking relation with said pivot rod, and being installable into and removable from a slot in said at least one link end, said slot extending in a direction transverse to a plane defined by said respective first and second pivot rod axes.



5,024,322
ARMED SUTURE PACKAGE

Henry A. Holzwarth, Weston, Conn., assignor to United States Surgical Corporation, Norwalk, Conn.
Filed Apr. 27, 1990, Ser. No. 515,197
Int. Cl.^{5} A61B *17/06*
U.S. Cl. 206—63.3 **12 Claims**



1. An armed suture package which comprises:

a) a cover panel defined by longitudinal sides and top and bottom transverse sides;

b) an armed suture-retaining panel defined by longitudinal sides and top and bottom transverse sides, the bottom transverse side of the armed suture-retaining panel being attached to the top transverse side of the cover panel, the length of the armed suture-retaining panel being greater than the length of the cover panel such that in the closed condition of the suture package, the cover panel will overlay less than the entire length of the armed suture-retaining panel thereby defining an open region for viewing and accessing the stored needles and their attached sutures;

c) needle-securing means attached to the armed suture-retaining panel at or near its top transverse side and within the open region thereof;

d) suture-securing means attached to the armed suture-retaining panel at one or more locations on said panel between the needle-securing means and its bottom transverse side;

e) first and second closure flaps, the first closure flap being attached to the cover panel along one longitudinal side thereof and the second closure flap being attached to the cover panel along the other longitudinal side thereof;

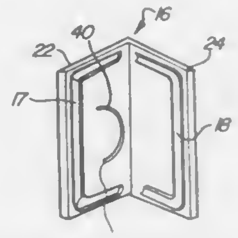
f) means for securing the first and second closure flaps in the closed condition of the suture package;

g) a third closure flap attached to the top transverse side of the armed suture-retaining panel, the length of the third closure flap being sufficient to cover the open region in the closed condition of the suture package; and,

h) means for securing the third closure flap in the closed condition of the suture package.

5,024,323
SUTURE EXTENDER AND NEEDLE GUARD

Bernard Bolton, 18444 Cornell, Southfield, Mich. 48075
Filed Sep. 25, 1989, Ser. No. 412,006
Int. Cl.^{5} A61B *17/06;* **B65D** *83/10*
U.S. Cl. 206—63.3 **14 Claims**



1. A suture-extender apparatus for the secure retention of a needle-type device, the needle type device having two ends, one end of the needle-type device being affixable to a suture, the apparatus comprising:

(a) a first member and a second member, the first member being large enough to encase both ends of the needle-type device, the first member and the second member each having an inner surface, the first and second member being sized and shaped to attain therewithin a surgical needle-type device;

(b) means for retaining the second member to the first member when the needle-type device is disposed therebetween, the retaining means having an engaged position and a disengaged position, both ends of the needle-type device being securely encaseable between the first member and the second member when the retaining means is in the engaged position;

the second member being permanently retainable with the first member when the retaining means is engaged; and wherein the suture-extender readily fits into a hand of a physician enabling the physician to complete a surgical procedure without exposure to puncture from the needle-type device.

5,024,324
SINGLE USE DENTAL FLOSS SPINDLE AND METHOD

Dale Whittaker, 1329 Quail Run Cir., Bentonville, Ark. 72712
Continuation-in-part of Ser. No. 461,846, Jan. 8, 1990, Pat. No. 4,972,946, and a continuation-in-part of Ser. No. 476,020, Feb. 6, 1990, Pat. No. Des. 312,710. This application Sep. 4, 1990, Ser. No. 577,146
Int. Cl.^{5} A45D *40/24;* **A65D** *85/00*
U.S. Cl. 206—63.5 **20 Claims**

1. Spindles holding a single use length of dental floss in the form of a generally rectangular sheet of semi-rigid material less than three inches long and less than one inch wide having about one to three feet of dental floss removably secured thereon produced by the process steps of

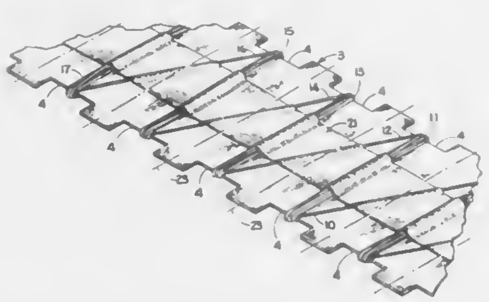
(a) winding from about 6 to about 30 turns of dental floss transversely at a winding position on a semi-rigid elongated strip of sheet material greater than ten inches long and less than three inches wide,

(b) then leading dental floss from the immediate previous

VOL
1127
ISS
3
JE
18
1991
UMI

winding position extending along a front face of said sheet material obliquely from one lateral edge of said strip at the immediate previous winding position to the opposite lateral edge at another winding position longitudinally at least one-fourth inch past the immediate previous winding position and winding from about 6 to about 30 turns of dental floss transversely on said strip at said another position,
- (c) repeating step (b) at least five times,
- (d) subsequent to step (b) removably adhering a portion of an elongated narrow pressure sensitive tape longitudinally over the front face of said sheet material and at least one dental floss winding thereon,
- (e) repeating step (d) at least five times,
- (f) subsequent to step (d) transversely cutting said elongated strip of sheet material, said dental floss and said web along a transverse line midway between successive ones of said winding positions,
- (g) repeating step (f) at least five times to produce at least one of said spindles,
- (h) sealing each spindle produced in an air-tight envelope, and
- (i) sterilizing the spindle, floss and interior of said envelope.

5. Spindles holding a single use length of dental floss in the form of a generally rectangular sheet of semi-rigid material having about one foot to about three feet of dental floss removably secured thereon produced by the process steps of
- (a) winding from about 6 to about 30 turns of dental floss transversely at a winding position on a semi-rigid elongated strip of sheet material,



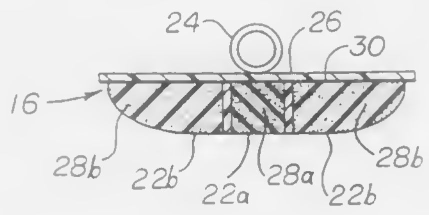
- (b) then leading dental floss from the immediate previous winding position extending along a front face of said sheet material obliquely from one lateral edge of said strip at the immediate previous winding position to the opposite lateral edge at another winding position longitudinally at least one-fourth inch from the immediate previous winding position and winding from about 6 to about 30 turns of dental floss transversely on said strip at the last said another winding position,
- (c) repeating step (b) at least once,
- (d) subsequent to step (b) removably securing at least a portion of an elongated web longitudinally over the front face of said sheet material and at least one dental floss winding thereon,
- (e) repeating step (d) at least once,
- (f) subsequent to step (d) severing said elongated strip of sheet material, said dental floss and said web along a transverse line between successive ones of said winding positions,
- (g) repeating step (f) at least once to produce at least one of said spindles.

9. A spindle holding a single use length of dental floss in the form of a generally flat sheet having at least about one foot of dental floss wound thereon produced by the process steps of
- (a) winding at least about 6 turns of dental floss transversely at a winding position on an elongated strip of sheet material,
- (b) leading dental floss from a previous winding position along a face of said sheet material from one lateral edge of said strip at said previous winding position to the opposite lateral edge at another winding position and winding at least about 6 turns of dental floss transversely on said strip at said another winding position,
- (c) repeating step (b) at least once,
- (d) subsequent to step (b) securing at least a portion of the dental floss lead from one to another of said winding positions on a face of said sheet material,
- (e) repeating step (d) at least once,
- (f) subsequent to step (d) severing said elongated strip of sheet material, and said dental floss between successive ones of said winding positions,
- (g) repeating step (f) at least once to produce at least one of said spindles.

16. Single-use dental floss spindle produced from a strip of sheet material having a plurality of indentations punched along the edge thereof, by process steps of
- (a) winding a strand of dental floss at the middle of a spindle position at least twice around the indentations of the first spindle position of said strip,
- (b) advancing the strip so that the floss is laid across the face of the spindle to the middle of a second spindle position.
- (c) taping the floss to the strip with pressure sensitive adhesive tape which runs perpendicular to the winding,
- (d) severing a finished spindle and floss from the card,
- (e) repeating the previous steps to produce additional spindles.

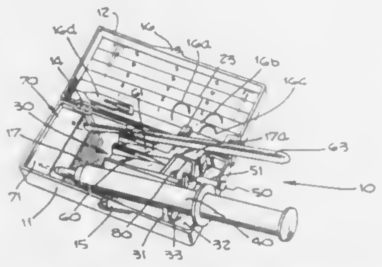
17. A method for producing spindles holding a single-use length of dental floss in the form of a generally flat sheet of material having dental floss wound thereon comprising the steps of
- (a) winding at least about 6 turns of dental floss from a continuous strand at least 10 feet long transversely at a winding position on an elongated strip of sheet material,
- (b) leading dental floss from a previous winding position along a face of said sheet material from one lateral edge of said strip at said immediate previous winding position to the opposite lateral edge at another winding position and winding at least about 6 turns of dental floss transversely on said strip at the last said another winding position,
- (c) repeating step (b) at least once,
- (d) subsequent to step (b) removably securing at least a portion of the dental floss extending between winding positions to the face of said sheet material,
- (e) repeating step (d) at least once,
- (f) subsequent to step (d) severing said elongated strip of sheet material, said dental floss and said web between successive ones of said winding positions,
- (g) repeating step (f) at least once to produce at least one of said spindles.

5,024,325
PREWETTED ABSORBENT PADS AND DISPENSING PACKAGE THEREFOR
Douglas P. Gundlach, Midland, Mich., assignor to DowBrands Inc., Indianapolis, Ind.
Filed Jan. 16, 1990, Ser. No. 465,854
Int. Cl.^{5} A45D *35/00;* A61M *35/00*
U.S. Cl. 206—229 **7 Claims**



1. An absorbent pad for the application and/or removal of a vaporizable material to and/or from a selected surface, comprising:
- an absorbent pad portion containing at least one absorptive material, and having at least two discrete sub-portions separated by a flexible barrier to said vaporizable material;
- a backing for at least a part of said absorbent pad portion, wherein said backing is resistant to permeation of said vaporizable material therethrough; and
- means joined to said backing for manually manipulating the pad.

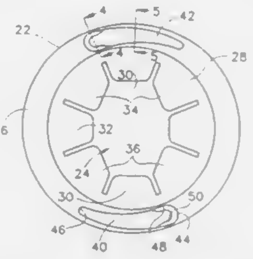
5,024,326
MEDICAL INSTRUMENT HOLDER AND SHARPS DISPOSAL CONTAINER
Dan Sandel, Tarzana, Calif.; Robert T. Horan, Tucson, Ariz.; Rodolfo Gaba, and Bruno J. Ramirez, both of Simi Valley, Calif., assignors to Devon Industries, Inc., Chatsworth, Calif.
Filed May 24, 1989, Ser. No. 356,131
Int. Cl.^{5} B65D *83/10*
U.S. Cl. 206—366 **5 Claims**



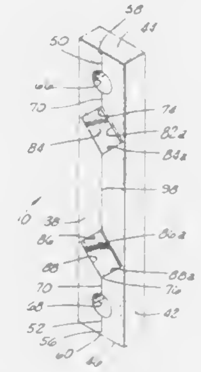
3. A disposable, sterilizable plastic material device for facilitating the positioning of medical instruments having sharps associated therewith such as syringe needles, scalpel blades and the like during use thereof which facilitates the counting of such sharps and the subsequent disposal thereof, said device comprising:
- a first container part having a magnetized material surface with indicia thereon for positioning, retaining and counting sharps laid thereon;
- a second container part having an instrument positioning rest extending above an adjacent surface of said second part to facilitate the positioning of a medical instrument on said second part with a portion at least of said instrument extending upwardly away from said adjacent surface;
- hinge means for hinging said first and second parts together to facilitate their being positioned in a side by side open position for receiving medical instruments thereon; and
- a safety cushion member provided on said second container part and positioned relative said rest so that at least the tip of a sharp associated with a medical instrument positioned on said rest penetrates said member as a protection to any inadvertent puncture of the skin of a person manipulating said instrument and/or device as might otherwise occur if said tip where not so protected.

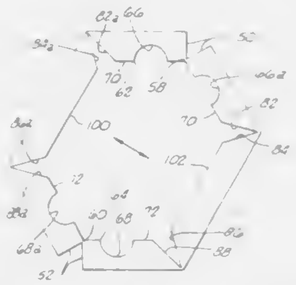
5,024,327
RESTRICTED ACCESS OPENING FOR DISPOSABLE SHARPS CONTAINERS
Richard A. Shillington, Leucadia, Calif., assignor to Med-Safe Systems, Inc., Carlsbad, Calif.
Filed Mar. 26, 1990, Ser. No. 499,021
Int. Cl.^{5} B65D *85/24*
U.S. Cl. 206—366 **17 Claims**

1. A limited access closure cover for an opening in a top of a disposable sharps container, comprising:
- an annular rim for securing to the periphery of an open top of a container;
- an opening in said closure, said opening having the configuration of a cross section axial view of a hypodermic syringe body and finger flanges on the syringe body for receiving the axial passage of the hypodermic syringe body when angularly oriented to conform thereto, said opening including an oblong central area and a plurality of radial slots extending outwardly therefrom.



5,024,328
FOAM PACKING FRAME AND BLANK FOR FORMING THE SAME
Rick L. Bontrager, Ripon, Calif., assignor to Great Western Foam Products Corporation, Hayward, Calif.
Filed Jul. 20, 1990, Ser. No. 556,320
Int. Cl.^{5} B65D *85/30, 81/04*
U.S. Cl. 206—453 **7 Claims**





1. A blank formed of a material to act as a cushion to protect a fragile part when said blank is opened to present a packing frame to receive said part therein to protect the same from damage during shipping, said blank comprising:
- a block of material having opposed ends and opposed sides extending between said ends and having front and rear surfaces wherein the thickness of said material between said front and rear surfaces corresponds to at least the thickness of said part, and the length of said block between said ends being greater than the width of said block between said sides;
- said block being formed with a central cut parallel with said sides and extending between said ends and passing through said block, said cut terminating prior to said ends of said block forming a hinge area between said ends and the end of said cuts respectively, said block further including, spaced apart two pair of opposed V shaped corner

VOL
1127
ISS
3
JE
18
1991
UMI

cutouts projecting on both sides of said central cut, said cutouts each terminating inwardly of said parallel sides forming hinge areas therebetween;

said block being capable of opening along said central cut and bending at said hinge areas forming a single piece quadrilateral packing frame wherein the length of said central cut between the respective ends and said respective V shaped cutouts forms two opposed interior sides of said frame, and the central cut between said pairs of V shaped cutouts forms two additional opposed interior sides of said frame as said V shaped cutouts are closed due to said opening of said frame forming mitered corners of said frame, and the exterior perimeter of said frame is governed by the length and width of said blank.

5,024,329

LOCKABLE CONTAINER FOR TRANSPORTING AND FOR STORING SEMICONDUCTOR WAFERS

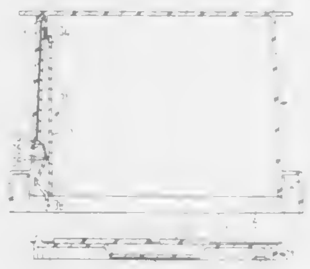
Peter Grohrock, Hoehenkirchen-Siegertsb, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 13, 1989, Ser. No. 322,112

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813674

Int. Cl.^{5} B65D *1/04*

U.S. Cl. 206—454 29 Claims



1 A container for transporting and storing semiconductor wafers in processing cassettes, comprising:

only one bottom plate;

only one hood, wherein said hood provides at an open end a perimeter sealing surface;

means for non-positive locking of the hood to the bottom plate, said means for non-positive locking comprising a receptacle means secured to said hood and a latching means engaging said receptacle means and said bottom plate;

means for sealing between said hood and said bottom plate, said means for sealing comprising a surface sealing lip joined to said bottom plate around an outer perimeter of said bottom plate, and extending laterally outward beyond said bottom plate in a cantilever fashion, said sealing lip pressed against said sealing surface when said container is closed; and

means for securing semiconductor wafers inside said container, said means for securing mounted to an inside surface of said hood, said means for securing moved into securing position adjacent said wafers by contact from said bottom plate when said container is closed.

5,024,330

PACKAGE FOR GROUPED ARTICLES

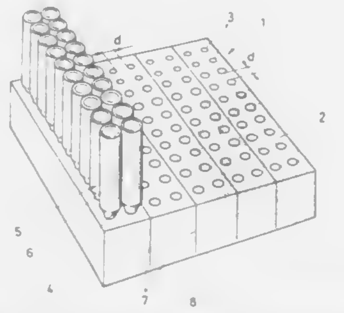
Philippe Servé, Overijse, Belgium, assignor to Societe Industrielle de Plastiques en abrege "Sipla", Brussels, Belgium

Continuation of Ser. No. 295,771, Jan. 11, 1989, abandoned. This application May 4, 1990, Ser. No. 518,331

Claims priority, application Belgium, Jan. 20, 1988, 08800076

Int. Cl.^{5} B65D *73/00*

U.S. Cl. 206—486 8 Claims



1. A package for grouped articles having at least one extreme portion having an outside cross-section which is less than any analogous cross-section essentially parallel to the first-named cross-section, of another portion of these articles, in particular a package for ampules, flasks, vials, syringes, bottles, which comprises:

a support plate made of a relatively resilient, semi-rigid cellular material such as polyethylene, polyurethane, polystyrene, rubber, in at least one face of which a number of holes are provided in each of which said extreme portion of said articles can be removably maintained, each said hole having an axis extending substantially perpendicularly to the support plate and being shaped so as to enable to introduce said extreme portion substantially according to the direction of this axis into the holes,

the other portion of the articles being thus located on the outside of the support,

the distance between two adjacent holes being such that the other portion of the articles can extend side by side so as to bear substantially against each other and to form with the support a substantially rigid assembly when their extreme portion is at least partially inserted in said holes,

said material having a sufficient rigidity, and the diameter of the holes being slightly less than the maximum diameter of said extreme portion of the articles, to be able, on the one hand, to elastically grip the above-mentioned extreme portion of the articles to be packaged in the holes and, on the other hand, to maintain these articles in position when they are arranged side by side with said extreme portion in the holes.

5,024,331

PACKING WRAPPER FOR PACKAGING PASTY PRODUCTS AND PASTY PRODUCT PACKAGED THEREWITH

Jean Litzler, Heimsbrunn, France, assignor to Fromageries Bel, Paris, France

Filed Apr. 26, 1989, Ser. No. 343,137

Claims priority, application France, Apr. 26, 1988, 88 05527

Int. Cl.^{5} B65D *65/34, 85/76*

U.S. Cl. 206—551 6 Claims

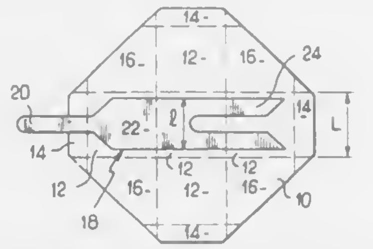
1. A packing wrapper for packaging pasty products of parallelepipedic form, said wrapper comprising a foldable foil forming five faces (12) with dimensions substantially equal to the faces of the parallelepiped, and an opening device (18) for opening said packing wrapper by tearing said packing wrapper, said device consisting in a foil of foldable material, wherein said opening device comprises:

an active portion (22) consisting in a single strip of a constant width extending over three consecutive said faces (12)

with parallel longitudinal outer edges arranged substantially along the sides of three consecutive said faces (12) to be torn;

a tongue (20) of reduced width, defined by two parallel longitudinal edges and a terminal edge, integral with said active portion (22), disposed at one end of the single strip and forming a grasping means extending beyond the wrapper and accessible from the outside; and

a central cutout (24), the profile of which matches that of the entire tongue and is defined by two parallel longitudinal edges and a terminal edge, disposed at the other end of said active portion.



5,024,332

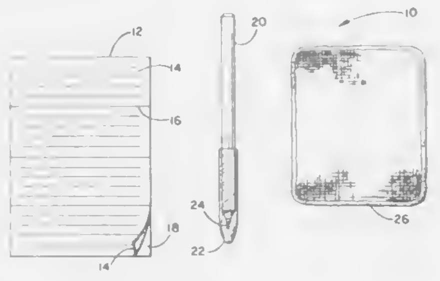
NON-SMEAR ERASABLE LABEL KIT

Richard J. Stachler, 11647 Red Gulch Ct., Gold River, Calif. 95679

Filed Aug. 6, 1990, Ser. No. 563,109

Int. Cl.^{5} B65D *85/00*

U.S. Cl. 206—575 8 Claims



1. An erasable label kit, comprising,

(a) a plurality of reusable self-adhesive labels having a fist side and a second side, said first side having an adhesive coating and said second side having a non-adhesive vinyl coating;

(b) a marking pen containing water soluble ink for placing identifying information on said second side of said labels, said ink when applied to said second side of said labels being smudge-resistant and smear-resistant and highly resistant to erasure under normal handling.

5,024,333

CIGARETTE SEGREGATING APPARATUS

Andre Brink, Pretoria, South Africa; Michael J. Cahill, Coventry, England; John Dawson, Coventry, England; Juilian W. Gardner, Coventry, England, and Alan A. Thierry, Coventry, England, assignors to Molins PLC, Milton Keynes, England

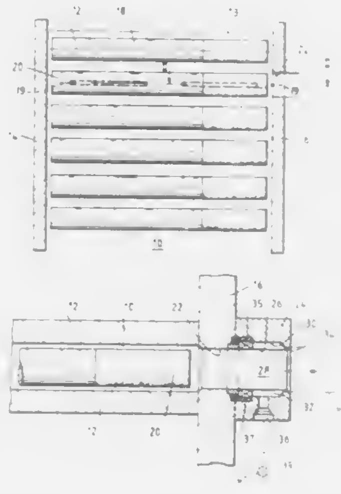
Filed Sep. 11, 1989, Ser. No. 405,261

Claims priority, application United Kingdom, Sep. 15, 1988, 8821652.8

Int. Cl.^{5} B07C *5/34;* A24C *5/345*

U.S. Cl. 209—535 25 Claims

1. Apparatus for segregating faulty cigarettes comprising a passage along which cigarettes are arranged to pass in a direction substantially transverse to their lengths in a single row, means for testing cigarettes to identify faulty cigarettes to be segregated, and means for ejecting faulty cigarettes from the passage, the ejecting means comprising suction means for initiating axial movement of faulty cigarettes from said passage.



5,024,334

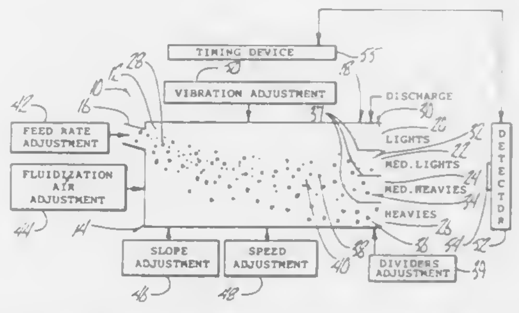
METHOD AND MEANS FOR GRAVITY TABLE AUTOMATION

Manjit K. Misra, and Yuh-Yuan Shyy, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Jun. 9, 1989, Ser. No. 363,727

Int. Cl.^{5} B07C *5/342;* B03B *4/00*

U.S. Cl. 209—557 13 Claims



1. A gravity separation table automation means comprising:

a gravity separation table for separating materials including one or more adjustment means for controlling operation of the table;

control particles having generally uniform movement characteristics relating to one or more of the set comprising size, weight, density, and specific gravity, and following a generally similar predictable movement through the table during operation;

detector means operatively associated with the gravity separation table for detecting the predictable movement of the control particles during operation of the gravity table, the control particles having at least one known detectability

VOL
1127
ISS
3
JE
18
1991
UMI

characteristic which is detectable by the detector means and which differentiates the control particles from the materials being separated; and

the detector means further comprising a timing means for the control particles movement through at least a portion of the gravity separation table.

5,024,335

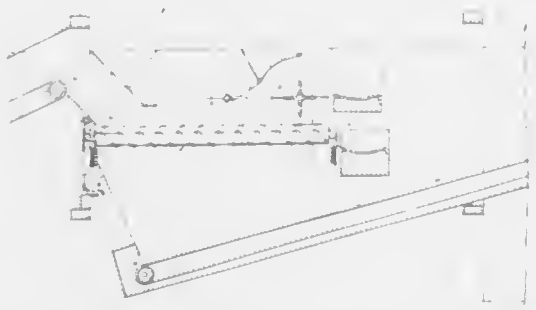
AUTOMATIC SORTER

Vernon J. Lundell, Box 171, Cherokee, Iowa 51012

Filed Nov. 30, 1988, Ser. No. 278,329

Int. Cl.^{5} B07B *13/05;* **B07C** *5/00*

U.S. Cl. 209—618 **13 Claims**



1. A sorter for separating generally cylindrical aluminum beverage cans from paper material, items larger than cans and material thicker than paper material comprising a plurality of generally horizontally disposed, parallel, adjacent, cylindrical rollers to form an upwardly facing surface to receive mixed paper material and aluminum beverage cans at one end of the rollers, the other end of said rollers discharging cans therefrom, means rotatably driving said rollers, each of said rollers including a spiral rib on the exterior surface thereof for gripping paper material and moving it downwardly between adjacent rollers, said ribs engaging the external, curved surfaces of the aluminum beverage cans and items larger than cans and moving the cans and larger items toward the discharge ends of the rollers and engaging and moving the beverage cans longitudinally of the rollers and off discharge ends thereof, means conveying the aluminum cans from the discharge ends of the rollers and means conveying the paper material from under the rollers, said rollers including a plurality of adjacent upper rollers supported for rotation about axes oriented generally in the same plane and a plurality of adjacent lower rollers supported for rotation about axes oriented in the same plane disposed below the axes of the upper rollers, said upper rollers being mounted for resilient movement away from a normal position to enable the space between adjacent upper rollers and between the upper rollers and adjacent lower rollers to be enlarged for passage of material thicker than paper material, said means driving the rollers including a single drive chain to drive adjacent rollers in opposite directions with the lower rollers being arranged in pairs and the upper rollers being arranged in pairs between the pairs of lower rollers, each pair of lower rollers including a first lower roller rotating clockwise a second lower roller rotating counterclockwise and forming an upwardly facing trough therebetween with the upwardly facing surfaces of the trough moving upwardly and outwardly, each pair of upper rollers including a first upper roller rotating counterclockwise and a second upper roller rotating clockwise and forming an upwardly facing trough therebetween with the upwardly facing surfaces of the trough moving upwardly and outwardly, said first upper roller of each pair of rollers being disposed adjacent the second lower roller of each pair and forming an upwardly facing trough therebetween with the upwardly facing surfaces forming the trough moving downwardly and inwardly to grip and pull paper material downwardly between adjacent upper and lower rollers.

5,024,336

COMPOSITE ORGANIZER

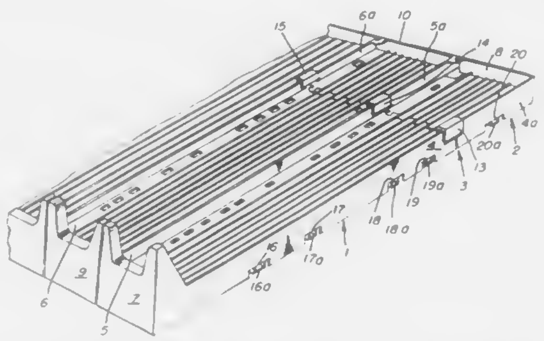
William S. Spamer, Roswell, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Jul. 24, 1990, Ser. No. 557,523

The portion of the term of this patent subsequent to Sep. 25, 2007, has been disclaimed.

Int. Cl.^{5} A47F *7/00*

U.S. Cl. 211—59.2 **8 Claims**



1. A composite structure for supporting and displaying articles and comprising a main support unit including a main rectangular planar element having front, rear and opposed side edges, an auxiliary support unit including an auxiliary rectangular planar element having front, rear and opposed side edges, one edge of said auxiliary rectangular planar element being of a configuration which is irregular and complementary to one irregular edge of said main rectangular planar element to define a disjointable irregular junction between said units, a reinforcing under structure integrally formed with the lower surfaces of said units and including a plurality of spaced apart longitudinal reinforcing ribs, each of said longitudinal ribs being severed at said disjointable irregular junction to accommodate separation of said units.

5,024,337

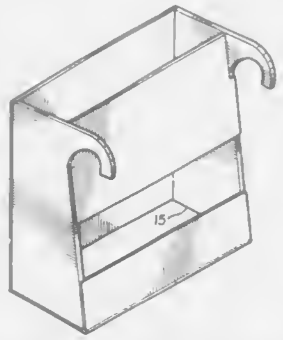
BAND AND LABEL CARRIER

Larry D. Bailey, 167 E. Pine Ave., Mobile, Ala. 36572

Filed Jul. 3, 1989, Ser. No. 375,276

Int. Cl.^{5} A47F *5/08*

U.S. Cl. 211—88 **8 Claims**



1. A rubberband and sensitive sticker dispenser for use with a dolly having bars or a level surface comprising:

(a) A bottom having a front and rear;

(b) A left side having a front and rear and a top and a bottom, the top defining a hanger member at the rear;

(c) A right side member having a front and rear and a top and a bottom with the top defining a hanger member at the rear so that both hanger members allow for mounting the device on the dolly bars attached along its lower end to the bottom at the side opposite the left side;

(d) An upper facing attached to the front of the left side and right side members opposite the hangers;

(e) A lower facing attached to to the front of the left side and right side opposite the hangers and contacting the front of the bottom so that the upper facing and lower facing define a space between the top of said lower facing and the bottom of the upper facing;

(f) An upper backing attached to the rear of the left and right side directly below the hangers and extending downward attached to the rear of the left and right sides;

(g) A lower backing attached to the rear right side and left side below the upper backing so as to define a back opening and attached to the bottom at the rear of the left and right side;

(h) A divider shelf extending between the upper facing and the upper backing above the back opening so as to separate the interior of the container so formed into an upper chamber and lower chamber.

5,024,338

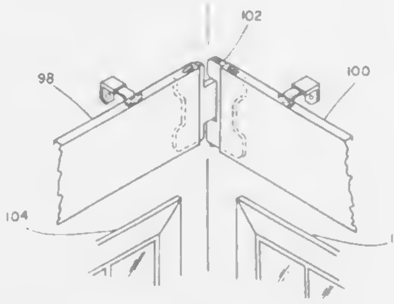
DRAPE ROD ASSEMBLY

Griffith D. Austin, Rte. 2, Box 143, Vilas, N.C. 28092

Filed Mar. 14, 1989, Ser. No. 322,897

Int. Cl.^{5} A47H *1/02*

U.S. Cl. 211—105.1 **6 Claims**



1. A drape rod assembly comprising:

first and second elongated drape rods each of which supporting drapery material;

a hinge; said first and second elongated drape rods connected together by said hinge forming a continuous mounting structure for said drapery material whereby said first and second elongated drape rods may be mounted at various angles with respect to each other thereby presenting an uninterrupted appearance for said drapery material; said hinge including first and second members and means for rotatably holding said members together thereby enabling said members to be moved relative to one another; each elongated drape rod including a receptacle on at least one end; at least a portion of said first member received in said receptacle of said first elongated drape rod and at least a portion of said second member received in said receptacle of said second elongated drape rod; each member having a pair of tabs; said tabs received in respective receptacles.

5,024,339

PLASTICS BOTTLE

Horst H. Riemer, Mid Glamorgan, England, assignor to Mendle Limited, United Kingdom

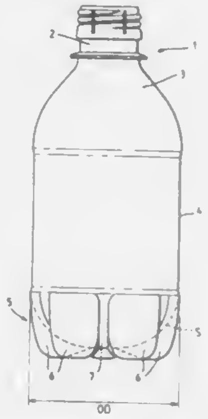
Filed Feb. 23, 1990, Ser. No. 484,092

Claims priority, application United Kingdom, Feb. 27, 1989, 8904417

Int. Cl.^{5} B65D *1/02, 23/00*

U.S. Cl. 215—1 C **18 Claims**

1. In a plastics bottle for carbonated drinks having a side wall, a base, a central area in said base, circumferentially spaced projecting feet in said base surrounding said central area, and substantially parallel-sided straps lying between and separating said spaced projecting feet, the improvement wherein said central area and said straps together define a continuous smooth domed surface with no re-entrant portions, and wherein a ratio of the combined width of said straps to the outside circumference of said base is in a range from 1:5.5 to 1:6.5.



5,024,340

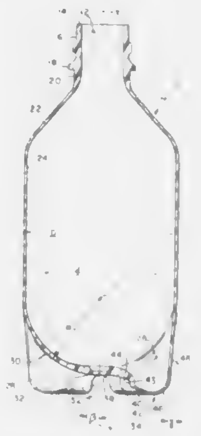
WIDE STANCE FOOTED BOTTLE

Alfred C. Alberghini, Dunwoody; David A. Brunson, Marietta, and Stephen R. Lynn, Douglasville, all of Ga., assignors to Sewell Plastics, Inc., Atlanta, Ga.

Continuation-in-part of Ser. No. 556,174, Jul. 23, 1990, abandoned. This application Oct. 4, 1990, Ser. No. 592,778

Int. Cl.^{5} B65D *1/02, 1/42, 23/00*

U.S. Cl. 215—1 C **24 Claims**

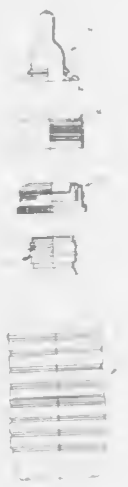


1. A blow-molded bottle of thermoplastic resin having a hollow body with a generally cylindrical side wall rotationally symmetric about a longitudinal axis of the bottle, and an integral base merging with the side wall, the base being defined by an outer surface comprising a plurality of arcuately extending downward projections separated from each other by hemispherical segments extending from the cylindrical side wall to the longitudinal axis of the bottle, each of said arcuately extending downward projections having a first inclined portion contiguous to the longitudinal axis, a second inclined portion situated radially outside of, and axially displaced downwardly from, the first inclined portion, a generally perpendicular ring segment having an upper edge united with the first inclined portion and a lower edge united with the second inclined portion, and a radially outwardly and upwardly curved portion defining the axially lower most extent of each downward projection and having an inner edge united with the second inclined portion and an outer edge united with the cylindrical side wall.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,341
NIPPLE ADAPTER FOR A BOTTLE COMPRISING A SCREW RING

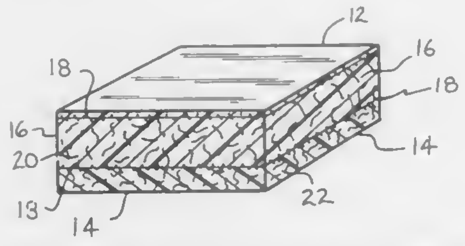
Benoit Dekerle, Evian, France, assignor to Societe Anonyme des Eaux Minerales d'Evian, Evian les Bains Cedex, France
Filed Apr. 25, 1990, Ser. No. 514,007
Claims priority, application France, Apr. 25, 1989, 89 05445
Int. Cl.⁵ A61J *11/04*; **B65D** *47/42, 51/24*
U.S. Cl. 215—11.1 **3 Claims**



1. An adapter for adapting a nipple end-piece having an internally threaded ring onto a bottle having an outer threaded neck, said adapter comprising an outer threaded sidewall for receiving said internally threaded ring of the endpiece, an internally threaded chimney within said sidewall adapted for cooperating with said neck of the bottle, and a skirt within said chimney and connected to said chimney, shaped and positioned so that it cooperates sealingly with an internal face of the neck of the bottle when the adapter is fixed thereon by screwing its chimney onto said neck of the bottle.

5,024,342
CORROSION RESISTANT CONTAINERS

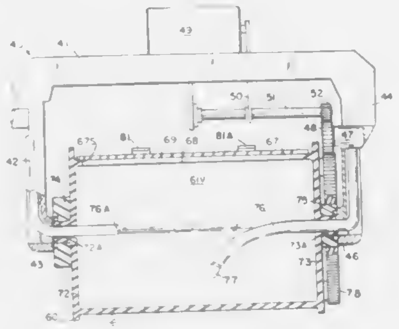
Barry J. Dallum, 1007 Cheyenne Dr., Montgomery, Tex. 77356, and David H. Bartlow, 272 Bellingrath, Conroe, Tex. 77301
Continuation of Ser. No. 267,889, Nov. 7, 1988, abandoned. This application Sep. 8, 1989, Ser. No. 404,798
Int. Cl.⁵ B65D *90/02, 25/14*
U.S. Cl. 220—468 **5 Claims**



1 A composite wall adaptable for use in the containment of an organic liquid consisting of:
- a structural outer layer composed of a resin reinforced with chopped glass strands; and,
- an inner layer positioned adjacent said outer layer, said inner layer being in contact with said organic liquid, said inner layer composed of a resin mixed with a surface-modified inorganic filler dispersed homogenously through said inner layer, wherein said filler and said resin are chemically linked to form a barrier to restrict penetration of said organic liquid into said inner layer thereby reducing the effect of said organic liquid on said wall.

5,024,343
CONTAINER ASSEMBLY AND METHOD

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840
Continuation-in-part of Ser. No. 631,619, Jul. 17, 1984, abandoned. This application Oct. 21, 1985, Ser. No. 789,648
Int. Cl.⁵ B65D *7/00*
U.S. Cl. 220—326 **19 Claims**

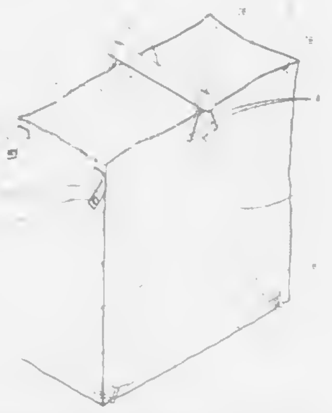


1. In a molded plating barrel container having a side wall formed with a plurality of facets extending substantially the length of said container and joined along their longitudinal edges, and respective end walls forming an integral and unitary molded plastic structure and wherein said side wall is provided with an opening in one of the facets thereof for charging and emptying said container, the improvements comprising:
- (a) a removable closure extending across said opening in said side wall of said container,
- (b) at least one elongated spring-like retainer for holding said closure in engagement with said container side wall across said opening, said spring-like retainer having a central portion and respective end portions extending at acute angles to said central portion,
- (c) said side wall of said container being formed with a plurality of retaining formations shaped for receiving and holding respective of said end portions of said retainer, each of said retaining formations being integrally molded as an extension of a respective facets of the side wall of said container, said molded retaining formations being located diametrically across said said container on opposite sides of said opening in said side wall so as to permit a retainer having its ends engaging respective of said retaining formations to cause the central portion wall of the container.

5,024,344
REUSABLE, FLEXIBLE BAG WITH FOLDABLE SUPPORT STRUCTURE

Kyle S. Paula, 140 S. Canon Dr., Beverly Hills, Calif. 90212
Filed Dec. 6, 1990, Ser. No. 622,846
Int. Cl.⁵ B65D *33/06*
U.S. Cl. 220—9.3 **16 Claims**

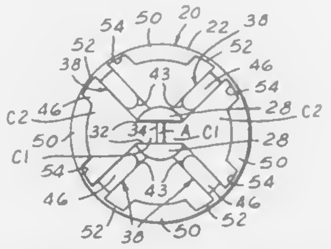
1. A reusable, flexible bag, incorporating a foldable support structure, to be used for containment of an item or items comprising:
- a) a bag body made of a sheet of flexible material having essentially vertical walls and an essentially horizontal bottom wall which form a container with an opening at the top;
- b) a handle;
- c) a pair of support members made of a semi-rigid material having horizontal portions which extend under said bottom wall and having upwardly extending portions with ends, said upwardly extending portions extending up along said vertical walls with said ends located above said opening of said bag body, said ends swingably attached to said handle;



- d) a bottom panel made of a rigid material formed to lie inside said bag body coextensive with said bottom wall freely attached to said bag body.

5,024,345
VEHICLE AIR VENTING CAP

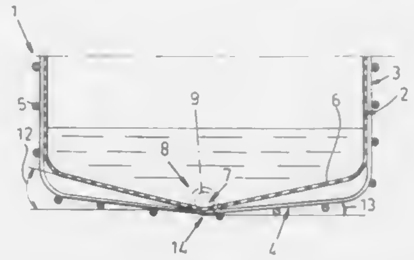
Kevin R. Deweerdt, Walled Lake, Mich., assignor to Chrysler Corporation, Highland Park, Mich.
Filed Dec. 10, 1990, Ser. No. 625,200
Int. Cl.⁵ B65D *51/16*; **F16H** *57/04*
U.S. Cl. 220—366 **4 Claims**



1. A one-piece vent cap adapted to be received on one end of a flexible hollow elastomeric tubular conduit having a cylindrical cross section, said tubular conduit having the other end thereof sealingly connected to a vent hole in a housing enclosing an automotive component, said one-piece vent cap comprising:
- an integrally formed flexible elastomeric cup-shaped vent cap having a cylindrical outer wall closed at one end thereof by an end wall, a central stem element projecting from said end wall inner surface thereof such that the symmetrical axis of said stem element coincides with the principal axis of said vent cap;
- said stem element comprising a pair of mirror image posts with each said post having a semi-circular cross section, said pair of posts disposed in spaced opposed relation on either side of a first transverse plane of symmetry which includes said vent cup principal axis, said pair of posts having two opposite outer semi-cylindrical surfaces and two opposing inner planar parallel surfaces interconnected by an axially coextensive web, said web defining a second plane oriented normal to said first plane whereby said web portion and said opposed inner surfaces define a pair of axially coextensive oppositely facing central stem channels;
- four uniformly spaced axially extending radial L-shaped ribs radiating from the principal axis of said vent cap, each said L-shaped rib comprising an axial leg portion and a radial foot, each said post semi-cylindrical outer surface joining radially inner vertical edge portions of an adjacent pair of said foot sections, said outer wall joining radially outer vertical edge portions of each said leg portion, whereby inner peripheral edge portions of the leg portions thereof and its associated post defining therebetween an intermediate concentric space having a predetermined radial extent adapted for fixedly receiving one end of the flexible hollow conduit therein, and whereby each said foot portion defining a radial inner edge providing a stop adapted to position said conduit one end in a predetermined axially spaced relation with said end wall, said end wall defining with said conduit free end two crossover radial passages;
- each pair of adjacent ribs defining with said vent cap outer wall a pair of diametrically opposed arcuate sectioned axially extending outer channels;
- said hollow conduit having a central passage of circular section sized to telescopically receive said pair of posts therein in a snug-fit manner, whereby said conduit central passage inner surface thereof defining with said pair of central stem channels a pair of sealed axially extending inner air passages and said conduit outer surface thereof defining with said pair of outer channels a pair of outer venting passages, such that said pair of crossover radial passages providing air flow communication between associated inner venting passages and associated outer venting passages so as to provide venting of said housing with the atmosphere.

5,024,346
CONTAINER FOR STORING AND TRANSPORTING A LIQUID WITH A DEFORMABLE LINER WHICH ASSISTS DRAINAGE

Georges Roser, Wingen/Moder, France, assignor to Sotralentz S. A., Drulingen, France
Filed Feb. 14, 1990, Ser. No. 479,709
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1989, 3905976
Int. Cl.⁵ B65D *33/56, 88/62*
U.S. Cl. 220—401 **2 Claims**



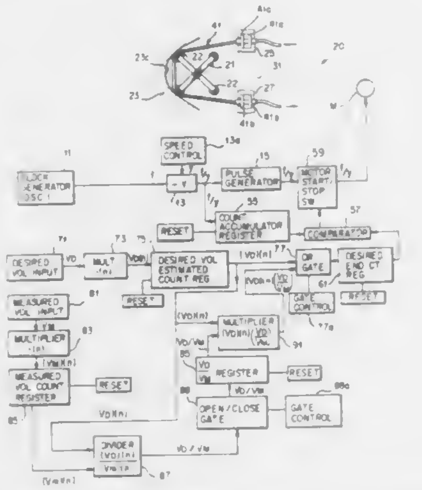
1. A storage and transport container for a fluent material, the container comprising:
- a stiff outer vessel having an upright side wall formed of a grid of steel bars and a floor, the floor being inclined with respect to the horizontal downward to a predetermined low point at the side wall; and
- an elastically deformable liner in the vessel having a side and a base respectively of shapes generally corresponding to the side wall and floor of the vessel and provided at the low point with a drain fitting, the base being elastically deformed to lie flatly on the floor of the vessel when the liner is completely filled with the fluent material, the base being inclined when the liner is only partially filled with the fluent material to the horizontal to the low point at an angle substantially greater than that between the vessel floor and the horizontal due to the inherent elasticity of the respective shapes of the side and base of the liner.

VOL 1127 ISS 3 JE 18 1991 UMI

5,024,347
ADJUSTABLY CONTROLLABLE ACCURACY-ENHANCING PUMP ARRANGEMENT AND METHOD

Brian E. Baldwin, 7891 S. Argonne St., Aurora, Colorado 80016

Filed Jun. 8, 1988, Ser. No. 203,924
Int. Cl.⁵ B67B *7/00*
U.S. Cl. 222—1 **31 Claims**



1. The method of reducing inaccuracy in total quantity of fluid pumped by a pump comprising:

actuating a pump through a first given amount of pump activity which is estimated will yield a first selected output quantity of a given fluid pumped through a given conduit based on assumed calibration factor of a selected amount of pump activity per unit volume dispensed,

measuring the amount of the actual output quantity of said fluid which is pumped through said conduit by said first given amount of pump activity,

and applying an adjustment factor to the amount of pump activity which would be calculated to be required based on said assumed calibration factor, for further pumping activity to effect selected further pumped output quantity production, said adjustment factor when applied as a multiplier being equal to the ratio of said first selected output quantity of fluid pumped relative to said measured actual output quantity of fluid pumped, for further pumping of a said selected further output quantity.

17. A pump arrangement enabling reduction of inaccuracy in the amount of output fluid pumped through a conduit by

a digitally incrementally operable pump, comprising

a digitally incrementally operable pump,

means for actuating said pump through a first given amount of pump activity represented by a first quantity of digital increments, which is estimated will yield a first selected output quantity of a given fluid pumped through a given conduit based on an assumed calibration factor of a selected amount of pump activity per unit volume dispensed,

means for applying an adjustment factor to the amount of pump activity which would be calculated to be required based on said assumed calibration factor, for further pumping activity to effect selected further pumped output quantity production,

said adjustment being applied as a multiplier which is equal to the ratio of said first selected output quantity of fluid pumped relative to an actual measured output quantity of fluid pumped through a given said conduit as a result of said estimated number of increments of actuation of said pump,

and means for subsequently pumping a selected output quantity of said given fluid through said conduit by actuating said pump a number of increments equal to the product of said adjustment factor and said estimated quantity of increments corresponding to said selected output quantity.

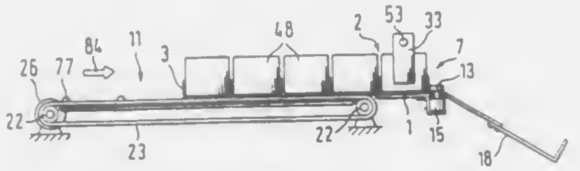
5,024,348
MAGAZINE ASSEMBLY FOR LABELS OR THE LIKE IN A LABELING MACHINE

Hermann Kronseder, Regensburger Strasse 42, D-8404 Wörth/Donau, Fed. Rep. of Germany

Division of Ser. No. 97,323, Sep. 11, 1987, Pat. No. 4,799,605, which is a continuation of Ser. No. 824,648, Jan. 31, 1986, abandoned. This application Jul. 14, 1988, Ser. No. 218,990

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1985, 3503621; Jul. 13, 1985, 3525035; Oct. 11, 1985, 3536294

Int. Cl.⁵ B65H *1/30*
U.S. Cl. 221—11 **13 Claims**



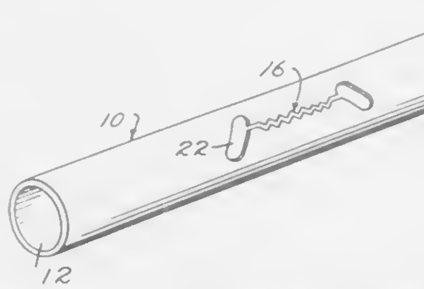
1. A magazine assembly for supplying labels to a labeling machine comprising a main magazine for holding a supply of labels in a stack, first feed means for feeding the labels from the main magazine to a take-out location, a support connected to the main magazine for holding a supply magazine containing a stack of labels in alignment with said main magazine, second feed means for feeding the labels from an aligned supply magazine on the support to the main magazine, said support having an entry opening along one longitudinal side thereof for receiving full replaceable supply magazines and an exit opening located on the opposite longitudinal side of the support from the entry opening for discharging empty supply magazines, a supply magazine feed device disposed adjacent said entry opening for supplying full replaceable supply magazines to said support, said feed device including a slideway extending laterally outwardly from the opening side of the support in a direction transverse to the label feed direction and the longitudinal side of the support, said slideway adapted to hold a plurlaity of full supply magazines in side-by-side and contacting relationship with one another, means for continuously feeding said full supply magazines while in said relationship along the slideway toward and onto said support in a direction transverse to the label feed direction, said magazine feeding means comprising at least one smooth, endless belt extending between return pulleys that engages with the underside of the magazines on the slideway and means for turning said belt, means for ejecting empty supply magazines from said support and stop means located on the longitudinal side of the support opposite from said opening side to arrest and align a full supply magazine on the support with the main magazine, said stop means comprising at least one vertically displaceable cam adapted to be raised above the level of said support to engage a side of a supply magazine on the support and lowered to a position below said support to permit an empty supply magazine to be ejected from said support and means for raising and lowering said cam.

5,024,349
TUBE DISPENSER FOR FLEXIBLE SHEET MATERIAL

Edwin W. Haenni, Hartsville, and Hans-Peter Bolz, Greenville, both of S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed May 9, 1989, Ser. No. 349,289
Int. Cl.⁵ B65H *1/00*
U.S. Cl. 221—46 **10 Claims**

9. A storage and dispensing tube for receiving a package of flexible bags joined in a continuous strip with transverse severance lines between adjacent bags, and for allowing the severance and dispensing of individual bags from the package in response to a continuous pull on said bags; said tube being elongate with a hollow interior and opposed ends, a dispensing slot defined in said tube centrally along the length thereof for the dispensing of bags therethrough from the tube interior, said slot being elongate, inwardly spaced from the opposed ends of the tube and of a length comprising a minor portion of the length of the tube, said slot to receive and dispense said bags along the full length of the slot, said slot including an elongate central portion with means for engaging the severance line between a leading bag and a following adjacent bag for resisting free movement of the following bag therethrough while allowing for a manual outward pulling of the leading bag through said full length of said slot with sufficient resistance to effect severance of the leading bag from the following bag and the strip of bags as the corresponding severance line engages said elongate central portion during a continuous pull on the leading bag, said slot including means for positioning the following bag and holding a side edge of the bag with a portion of the following bag retained by and outwardly projecting and holding from said slot, said means for positioning the following bag comprising an end portion of the slot to one end of the elongate central portion, said end portion, along the length of the slot, being of a length substantially less than the length of the central portion, said end portion being transversely enlarged relative to said central portion and including peripheral edges allowing passage of a leading portion of the following bag, adjacent a corner thereof, through the end portion of the slot with reduced resistance relative to the central portion and prior to severance of the leading bag from the following bag, whereby a corner of the following bag outwardly projects through the end portion of the slot to allow for a manual grasping of the projecting corner for withdrawal of the following bag through the slot with the corner manually retained for manipulation of the withdrawn bag and such that the side edge of the bag is held to effect a force on the package thereby tending to stabilize the package with the tube.



5,024,350
DISPENSING APPARATUS

Stephen P. Shoemaker, Jr., 123 International Boardwalk, Redondo Beach, Calif. 90277

Filed Jan. 10, 1990, Ser. No. 462,836
Int. Cl.⁵ G07F *11/36*
U.S. Cl. 221—75 **11 Claims**

5 A dispensing apparatus for dispensing items at a plurality of locations, comprising:

a series of support assemblies each comprising means for releasably supporting a plurality of items to be dispensed;

each support assembly being rotatable between a supporting position and a dispense position in which one item is released and dispensed;

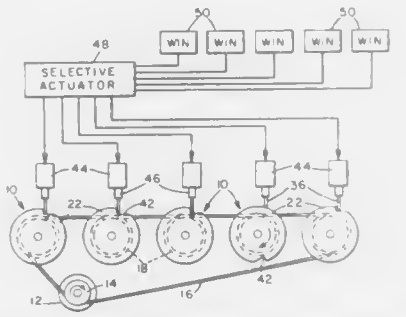
a single drive means for driving all of said support assemblies towards said dispense position;

transmission means for drivably connecting said drive means to each support assembly along a transmission path;

releasable stop means in the transmission path to each support assembly for selectively cutting off the drive to that assembly;

control means for controlling each stop means to selectively release one or more of said stop means for selectively actuating one or more of said support assemblies to dispense an item;

said drive means comprising a single drive gear motor, said transmission means including a series of driven rollers each associated with a respective one of said support assemblies, a continuous belt extending from said drive gear motor around each of said driven rollers, and clutch means between each driven roller and the respective support assembly for transmitting rotation of said driven roller to said support assembly; and

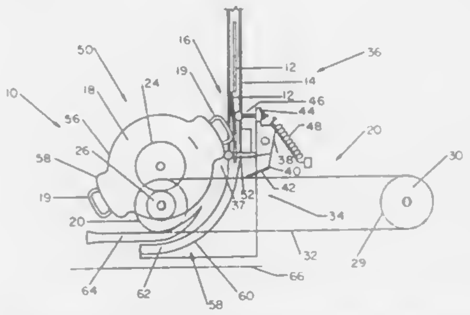


each support assembly including a rotatably mounted support plate, said clutch means being sandwiched between said support plate and said driven roller, said support plate having a recess and said stop means comprising a stop member moveable between a first position extending into said recess for preventing rotation of said support plate and a second position retracted from said recess to allow rotation of said support plate, and an actuator for controlling movement of said stop member between said two positions.

5,024,351
DISPENSER DEVICE FOR REMOVING PLANAR PANELS FROM A HOPPER

Byron L. Lowe; Robert T. Lewis; Kenneth M. Milliner, and Everett N. Finn, all of Macon, Ga., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Feb. 26, 1990, Ser. No. 485,022
Int. Cl.⁵ B65G *59/00;* **B65H** *3/00*
U.S. Cl. 221—277 **5 Claims**



1. A dispenser device for removing planar panels one at a time from a feed hopper in which the panels are stored in end-to-end vertical relationship comprising:

a panel engagement drum disposed at the discharge end of the feed hopper having a peripheral direction of rotation in adjacent tangential alignment with the direction of discharge of the panels from the feed hopper;

means for continuously rotating the panel engagement drum;

friction means located at preselected spaced apart intervals around the perimeter of the panel engagement drum for sequentially frictionally engaging subsequent bottom-most panels in the hopper and sequentially extracting the panels from the hopper as the drum continuously rotates;

positioner means, alternately movable between panel en-

VOL
1127
ISS
3
JE
18
1991
UMI

gagement and panel disengagement positions for engagement and disengagement with the bottom-most panel at the hopper discharge for positioning the bottom-most panel for engagement by the friction means of the drum; and,

stop means operatively responsive to the movement of the positioner means alternatively movable between panel disengagement and engagement positions for engagement with the penultimate one of the panels in the hopper when the positioner means is in the panel disengagement position and for disengagement with a penultimate panel when the positioner means is in the panel engagement position.

5,024,352
APPARATUS FOR THE AUTOMATIC DETERMINATION OF A CONTINUOUS BULK MATERIAL THROUGHPUT BY A CONTINUOUS BALANCE

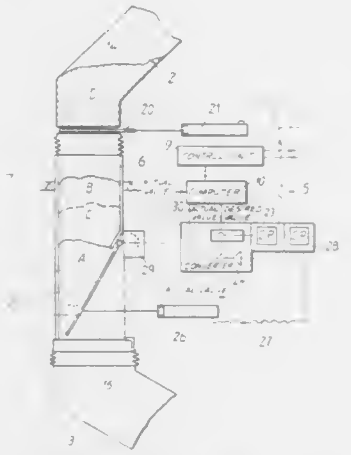
Bruno Gmür, St. Gallen, and Bernd Kühnemund, Flawil, both of Switzerland, assignors to Gebrueder Buehler AG, Uzwil, Switzerland

Continuation of Ser. No. 948,350, Nov. 6, 1986, Pat. No. 4,944,428. This application Feb. 22, 1990, Ser. No. 484,351

Claims priority, application Switzerland, Apr. 4, 1985, 01485/85

Int. Cl.^{5} G01G *11/14*

U.S. Cl. 222—1 17 Claims



1. Process for automatic determination of a bulk material flow throughput through a continuous balance and comprising the steps of feeding a bulk material into a weighing vessel of the continuous balance, providing an adjustable closure member in an outlet region of said weighing vessel as a movable wall part of said vessel and adjusting a size and a shape of an outlet opening of said weighing vessel by moving said adjustable closure member to position the adjustable closure member in said weighing vessel, said outlet region defining a substantially vertical pathway of said vessel for the bulk material flow and said movable wall part having a vertical component which partially defines said pathway; providing measuring means on said vessel and measuring the weight of said weighing vessel while feeding the bulk material into the weighing vessel, controlling the throughput of bulk material by control means which operatively interconnect said weight measuring means and said adjustable closure member, and controlling the adjustable closure member to provide a continuous mass flow of material through of said weighing vessel while simultaneously measuring the weight of said weighing vessel.

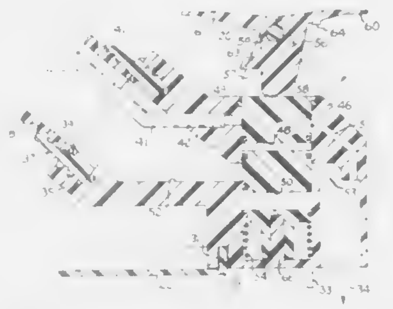
5,024,353
DISPENSER FOR REFRIGERATED LIQUIDS

David M. Horne, 4472 Garwood Dr., Ladson, S.C. 29456

Filed Dec. 11, 1989, Ser. No. 448,339

Int. Cl.^{5} B67D *3/00*

U.S. Cl. 222—185 4 Claims



1. A dispenser for a refrigerated carbonated liquid beverage, comprising a cradle adapted for positionment on the shelf of a refrigerator to removably support a beverage container in an inverted tilted condition, with the liquid discharge neck of the container located near the front edge of the refrigerator shelf below the general plane of the container bottom wall; a valve housing having an internally threaded section for screw-on attachment of the housing to the liquid discharge neck of the container; an elongated air tube having a first end thereof connected to said valve housing and a second end thereof locatable within the inverted beverage container in near proximity to the container bottom wall; a vertical axis socket formed in said valve housing; a plug valve element slidably arranged in the socket for movement in a vertical direction; an air supply passage system extending through the valve housing, said air supply passage system comprising an air passage (49) extending between said first end of the air tube and a side surface of said plug valve element; a liquid discharge passage system extending through the valve housing for conveying liquid from the container through the valve housing, said liquid discharge passage system comprising a liquid passage (52) extending between the internally threaded section of the housing and a side surface of said plug valve element; a first hole extending transversely through the plug valve element for potential communication with said air passage; a second hole extending transversely through the plug valve element for potential communication with said liquid passage; spring means located within said socket for biasing the plug valve element upwardly to a position wherein said first hole communicates with said air passage, and said second hole communicates with said liquid passage; and a manual operator means connected to said plug valve element for moving said valve element downwardly to a position wherein the transverse holes are out of fluid communication with the respective passages.

5,024,354
COLLAPSIBLE DISPENSING CONTAINER

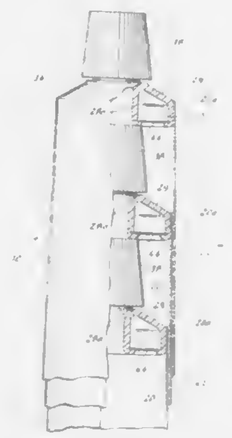
William Ledewitz, 31 Brookwood Dr., Woodbridge, Conn. 06525

Continuation-in-part of Ser. No. 891,057, Jul. 28, 1986, abandoned, which is a continuation of Ser. No. 607,731, May 9, 1984, abandoned, which is a division of Ser. No. 568,281, Jan. 4, 1984, Pat. No. 4,493,439, which is a continuation-in-part of Ser. No. 284,826, Jul. 20, 1981, abandoned, which is a continuation-in-part of Ser. No. 208,663, Nov. 20, 1980, abandoned. This application Sep. 1, 1987, Ser. No. 91,322

Int. Cl.^{5} B65D *35/22;* B67D *5/60*

U.S. Cl. 222—94 2 Claims

1. A method of packing a plurality of open ended collapsible dispensing tube-like containers in a nested assembly, each having a common longitudinal axis, and each being provided with a cap, for handling and shipping comprising: fabricating each tubular body of the collapsible tube with about a one degree external taper over the entire length of said tubular body and providing ahead portion having a neck with an extension which extends toward the bottom end of the tube and the end surface of said extension being proximate to the open end of said tube functioning as an abutment stop, the combined distance between the top surface of said cap and the bottom surface of said extension of each tube-like container being so selected to form a gap of 0.0055 inches between adjacent tube walls over the entire length thereof when the tubes have the same longitudinal axis, and nesting a series of said containers by inserting each successive container in the open end of a prior container with its cap abutting the abutment stop of said neck extension resulting in an elongated package of containers whereby each entire tubular body wall is spaced from the entire adjacent tubular body wall by 0.0055 inches to prevent lacking of the nested tubes and to facilitate high speed and automatic de-nesting, since less side pressure is required to be applied to each tubular body in order to separate the tubular body from the remainder of the nested assembly.



5,024,355
DEVICE FOR DISPENSING A LIQUID OR A CREAM IN SMALL-VOLUME DROPS, AND AN ASSOCIATED DISPENSING ASSEMBLY

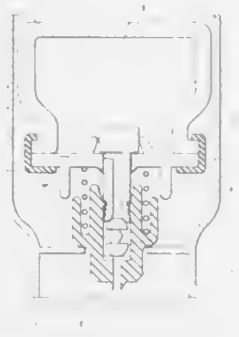
Claude Jouillat, Montigny Sur Avre, and Michel Brunet, Sainte Colombe La Commanderie, both of France, assignors to Societe Technique de Pulverisation—STEP, Paris, France

Filed Dec. 20, 1989, Ser. No. 454,652

Claims priority, application France, Dec. 20, 1988, 88 16867; Apr. 6, 1989, 89 04538

Int. Cl.^{5} B67D *5/64*

U.S. Cl. 222—162 27 Claims



1. A dispenser device for dispensing a liquid or cream type substance in the form of small volume drops, the device comprising:

a pump body having a pump chamber formed therein with a bottom wall and an enclosure whose end furthest from said bottom wall is open;

a piston adapted to engage an inside of said enclosure via said open end and to slide in sealed manner therein between a high, admission position for admitting said substance into said chamber and a low, rest position, said piston being fixed to a rod of smaller diameter which passes in a sealed manner through said bottom wall of said chamber and has a free end extending outside said pump body, said rod being pierced by a central channel communicating with a duct opening out laterally beneath said piston;

an endpiece having a dispensing orifice and adapted to be fastened in a sealed manner to said free end of said rod extending outside said pump body in such a manner that said central channel faces said orifice;

resilient means disposed between said pump body and said endpiece for returning said piston to said low, rest position in which it comes into abutment against said bottom wall of said chamber; and

an outlet valve disposed between said central channel of said rod and said dispensing orifice of said endpiece.

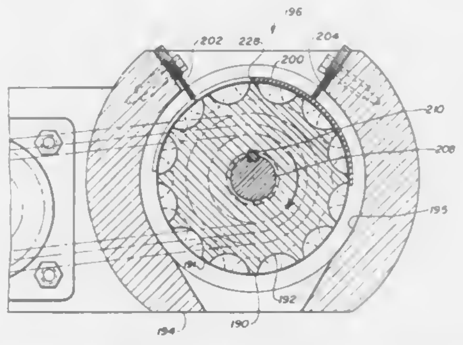
5,024,356
METHODS, SYSTEMS, APPARATUS AND ROTOR FOR APPLYING GRANULAR MATERIAL

Joseph F. Gerling, West Grove, Pa., and Raymond A. Kaczmarczyk, Jr., Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 16, 1989, Ser. No. 311,516

Int. Cl.^{5} B65D *88/54*

U.S. Cl. 222—312 11 Claims



6. An apparatus for metering granular material substantially without pulsing and attrition comprising:

a rotor having an axis of rotation and an outer circumferential surface having indentations arranged in the surface in circumferential rows with each of the rows offset with respect to adjacent rows such that any radial plane including the axis contains a substantially constant cross section of the indentations;

a housing for partially enclosing and supporting the rotor, the housing having a first and a second opening, each of the openings providing access to the rotor surface, the openings spaced from one another;

a gate having a cylindrical surface positionable between the housing and the rotor to selectively control the size of the first housing opening; and

a blocking mechanism positioned adjacent the rotor cylindrical surface to prevent excess material from entering the first housing opening,

whereby when the material is fed by gravity to the first housing opening, the rotor is rotated with respect to the gate and the housing, and the gate is positioned to open the first housing opening, then the material is metered through the apparatus and out the second housing opening.

VOL
1127
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1991
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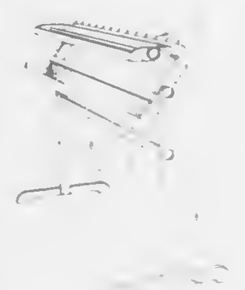
5,024,357
LATCH HOOK FRAME

Thomas F. Anderson, Star Route Box 87-A, Leonardtown, Md. 20650

Filed Apr. 17, 1990, Ser. No. 509,848

Int. Cl.⁵ A41H *5/00. 31/00*

U.S. Cl. 223—106 **12 Claims**



1. A latch hook frame comprising:

a harp having a rectangular frame including a left member, a right member, back, middle and front lateral members connected to said left member and right member, and a flat surface attached to the underside of the middle and front lateral members;

a plurality of pegs attached to said back lateral member of said harp and projecting therefrom, for holding canvas;

a left tray support attached near the rear end of said left member of said harp;

a right tray support attached near the rear end of said right member of said harp;

a tray pivotally connected to said left tray support and pivotally connected to said right tray support;

a left leg pivotally connected to said left member of said harp;

a right leg pivotally connected to said right member of said harp;

a main brace connected to said left leg and to said right leg;

a left foot connected to said left leg for supporting said left leg perpendicular to said left foot;

a right foot connected to said right leg for supporting said right leg perpendicular to said right foot; and

wherein said harp pivotally adjusts at an angle position for allowing a user hooking yarn to a canvas to view said canvas against said flat surface of said harp, and said tray pivotally adjusts to a horizontal position.

5,024,358
THERMAL-INSULATED FLUID RECEPTACLE REMOVABLY SUPPORTED ON BICYCLE FRAME

Ricardo H. Reichert, Pasadena, and Alberto J. Reichert, West Covina, both of Calif., assignors to Schlumberger Industries Limited, Hampshire, England

Filed Nov. 22, 1989, Ser. No. 440,340

Int. Cl.⁵ B62J *9/00*

U.S. Cl. 224—35 **7 Claims**

1. For use with a bicycle having a tubular frame including a forwardly extending first tube projecting forwardly from near the seat of the steering column, and a second tube projecting downwardly and rearwardly from the steering column at an angle relative to the first tube and toward the pedal rotor bearing, the two tubes defining an upright frame plane that extends forwardly, an improved liquid bottle apparatus comprising in combination:

(a) a substantially flat, relatively narrow bottle having opposite sides which are substantially parallel and adapted to extend in parallel relation to said frame plane when the bottle is positioned between said first and second tubes,

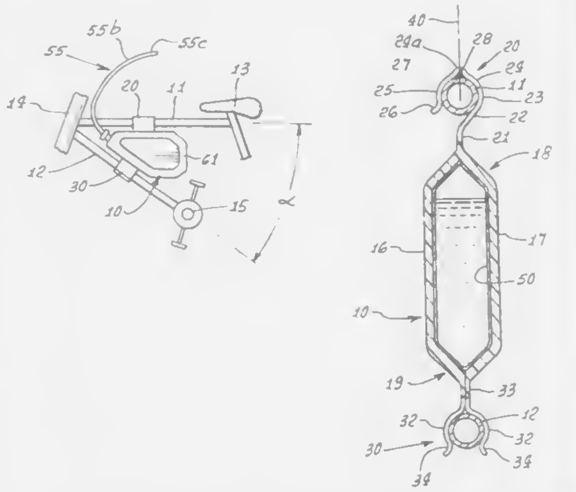
(b) the bottle having a forwardly elongated upper side adapted to extend parallel to and beneath the first tube,

(c) the bottle having a forwardly and upwardly elongated lower side adapted to extend parallel to and above the second tube,

(d) a first snap connector integral with the bottle and projecting above said upper side thereof to snap connect to the first tube, and a second snap connector integral with the bottle and projecting forwardly and downwardly below said lower side thereof to snap connect to the second tube,

(e) and duct means extending within the bottle interior and to the upper exterior of the bottle so that a bicyclist can insert the upper end of the duct means into his mouth to withdraw liquid from the bottle.

(f) said first snap connector having laterally opposed forwardly elongated sides with hook shape to hook over the first tube and to engage and grip opposite sides of the first tube, and said second snap connector has like laterally opposed, forwardly and upwardly elongated and spaced apart sides to resiliently spread apart and engage and grip opposite sides of the second tube, whereby the bottle is firmly positioned and held to the frame against rotation about either tube and against displacement lengthwise relative to either of the first and second tubes, the connectors having divergent portions adapted to receive the tubes therebetween and to be yieldably spread apart as said portions are snapped onto the tubes,



(g) the bottle having a relatively short forward corner side that extends downwardly at an angle relative to said bottle upper side, said corner side defining an opening to the bottle interior, and including a bottle neck registering with said opening, a cap rearwardly attached to said neck, and said duct extending through the cap.

5,024,359
BICYCLE COOLER

Jan B. Thomas, 22 Deallyon #40, Hilton Head, S.C. 29929

Filed Jan. 16, 1990, Ser. No. 465,913

Int. Cl.⁵ B62J *7/06, 7/00*

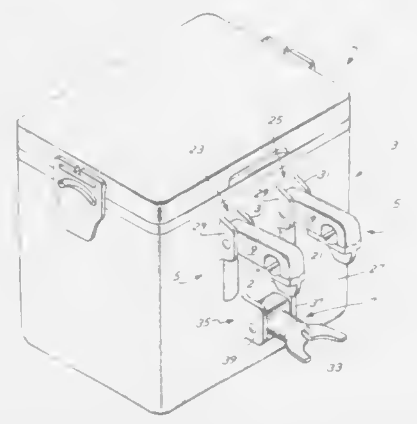
U.S. Cl. 224—36 **22 Claims**

1. A container for detachable connection to the head and handlebar intersection of a bicycle frame comprising:

a container having a back side,

the back side having a first securement arm member, a second securement arm member and a foot member;

the arm members being symmetrically positioned about a vertical centerline on the container back side and adapted to mount over the bicycle handlebar and for securement thereto; and



the foot member located below the arm members on the vertical centerline, said foot member having an extension member and a base member, said extension member being rotatable relative to said base member for extending the physical length of said foot member outwardly and against the bicycle head.

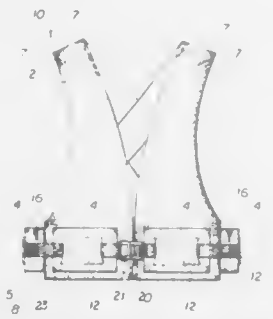
5,024,360
VEST OR LIKE ARTICLE OF CLOTHING FOR CARRYING RECHARGEABLE BATTERIES

Norton Rodriguez, 8782 SW. 12th St., #102, Miami, Fla. 33174

Filed Jan. 5, 1990, Ser. No. 461,395

Int. Cl.⁵ A45F *3/04;* **A41D** *1/00*

U.S. Cl. 224—215 **17 Claims**



1. An article of clothing designed for the support of a plurality of batteries about an upper portion of a person's body, said article comprising:

a base including a front portion and a rear portion each respectively dimensioned and configured to substantially cover an upper, frontal portion and an upper, rear portion of the user's body,

said front portion of said base including two front panels each joined to a separate one of two rear panels of said rear portion at corresponding upper ends to define shoulder portions disposed to overlie and be supported over a substantial surface of the shoulders of the user so as to equally distribute a load thereon,

said base further comprising a waist portion disposed in overlying and at least partially surrounding relation to a waist of the user,

a plurality of chambers mounted on an exterior of adjustable stabilizing means mounted on the exterior of said base in a substantially surrounding relation to said chambers and said waist portion thereof and structured and disposed for stabilizing the batteries within said plurality of chambers so as to prevent excessive movement of the batteries relative to the waist of the user and for selectively altering the size of said base relative to the waist portion of a wearer,

adjustment means on said base structured and disposed for selectively altering the length of said front and said rear panels relative to the length of the upper portion of the user's body, and plurality of batteries to be disposed within said chambers and a load to the batteries.

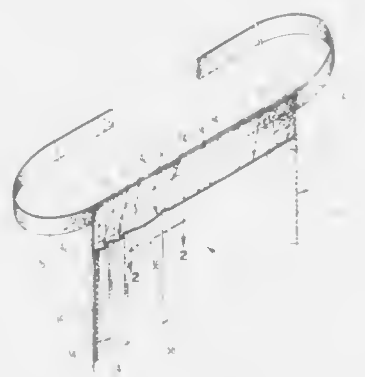
5,024,361
SUPPLY CADDY

Joyce D. Flowers, 6330 Beechwood St., Philadelphia, Pa. 19138

Filed Jul. 6, 1989, Ser. No. 376,129

Int. Cl.⁵ A45F *5/00*

U.S. Cl. 224—223 **5 Claims**



1 A supply caddy comprising:

a rectangularly-shaped continuous piece of material which is folded and defines a pocket, at least a portion of the inner walls of the pocket being comprised of loop pile material;

at least one double-faced strip which mates with the inner walls of the pocket, with at least a portion of hook pile material on both faces, and is repositionable within the pocket; and,

at least one single-faced strip which mates with the inner wall of the pocket, with at least a portion of hook pile material on the one face, and is repositionable within the pocket to further subdivide it.

5,024,362
TEAR-EDGE GUARD

Lars-Åke Karlsson, Skebokvarnsvägen, Sweden, assignor to Metsä-Serla OY, Mänttä, Finland

Filed Jan. 31, 1990, Ser. No. 472,740

Claims priority, application Sweden, Feb. 7, 1989, 8900418

Int. Cl.⁵ B26F *3/02*

U.S. Cl. 225—20 **6 Claims**

1. A tear-bar guard, which is elongated so as to extend along the entire length of a tear-edge of a tear-bar, and movable into an active protective position in which the guard extends externally beyond the tear-bar, said elongated tear-bar guard being abuttable with the tear-bar (2) when subjected to a force within an angle of 270°–360° relative to a coordinate system in which

VOL
1127

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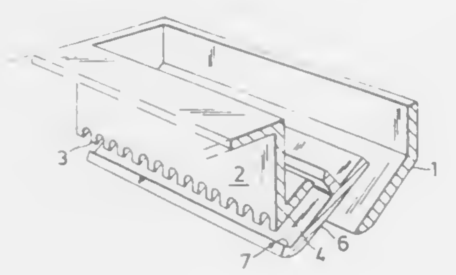
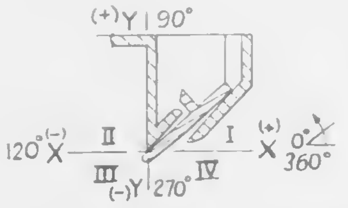
the tear-bar extends 180° from 90°–270° and faces an object to be severed, said guard being movable to one side when a force





is applied within an angle 185°–270° so as to expose the tear-bar (2) to permit severing of the object.

5,024,363

METHOD AND APPARATUS FOR CUTTING AN OPTICAL FIBER

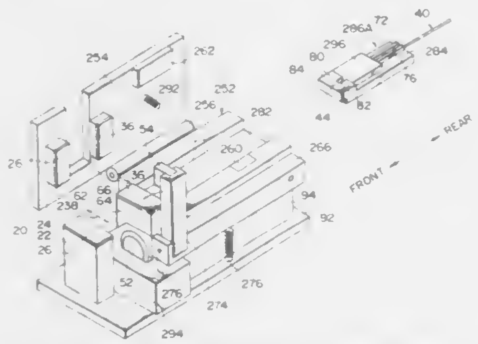
Hirohisa Suda; Katsumi Sasaki, both of Sakura, and Yasukuni Osato, Narashino, all of Japan, assignors to Fujikura Ltd., Tokyo, Japan

Filed Mar. 28, 1988, Ser. No. 174,072

Claims priority, application Japan, Jun. 16, 1987, 62-92322; Oct. 24, 1987, 62-163028; Oct. 24, 1987, 62-268727; Nov. 11, 1987, 62-284844

Int. Cl.⁵ C03B *37/16*

U.S. Cl. 225—96.005 **3 Claims**



1. An optical fiber cutting apparatus comprising:

a main body comprising at least three clamps for clamping an optical fiber set straight, each of said at least three clamps including a pincher and a table, said pinchers of said at least three clamps being mounted to a common support, a predetermined two adjacent clamps of said at least three clamps including means for clamping a bare portion of the fiber and a remaining one clamp of said at least three clamps including means for clamping a sheathed portion of the fiber;

said main body further comprising:

a scoring blade, provided between said predetermined two adjacent clamps of said at least three clamps, for making a score on at least one side of said optical fiber;

a pushing member for pushing said optical fiber from an opposite side of said score to cut said optical fiber;

a base on which said at least three clamps, said scoring blade and said pushing member are provided at predetermined positions; and

a set table provided on a straight alignment line of said at least three clamps on a side of an outermost one of said at least three clamps and having a guide groove formed on a top surface thereof;

an adapter comprising a plate having first and second guides formed in accordance with a type of an optical fiber to be cut, and detachably fitable in said guide groove of said set table; and

a stationary jig comprising a plate and a lid, for securing a multicore optical fiber therebetween, the sizes of said plate of said adapter and said plate of said stationary jig being substantially equal to each other.

5,024,364

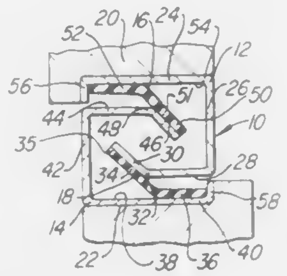
UNITIZED OIL SEAL AND METHOD OF MAKING A UNITIZED OIL SEAL

Stephen E. Nash, Lakeland, Mich., assignor to Federal-Mogul Corporation, Southfield, Mich.

Filed Feb. 13, 1989, Ser. No. 308,920

Int. Cl.⁵ F16J *15/32*

U.S. Cl. 277—35 **16 Claims**



1. A seal assembly, comprising:

an annular radially inner seal case having an axially extending radially inner wall, a first flange extending radially outwardly from said inner wall, and a first axial flange connected to the first flange and spaced from the inner wall;

an annular radially outer seal case having an axially extending outer wall, a second flange extending radially inwardly from said outer wall, and a second axial flange connected to the second flange and spaced from the outer wall;

a first annular wafer having a radially inner portion secured to said inner seal case at a position spaced radially outwardly from said inner wall and having a radially outer portion extending between the first axial flange and said outer wall, said radially outer portion circumferentially contacting said outer wall; and

a second annular wafer having a radially outer portion secured to said outer seal case at a position spaced radially inwardly from said outer wall and having a radially inner portion extending between the second axial flange and said inner wall, said radially inner portion circumferentially contacting said inner wall, said first and second wafers being spaced apart from one another in a non-contacting relationship during use.

5,024,365

APPARATUS FOR DISPENSING FASTENERS

Donald L. Bourque, Millis, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.

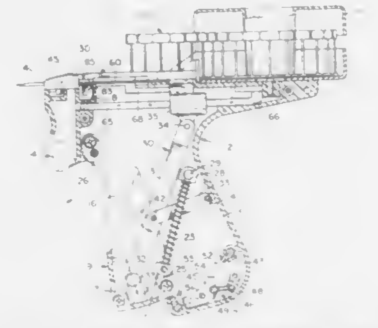
Filed Sep. 15, 1989, Ser. No. 407,629

Int. Cl.⁵ B25C *5/11*

U.S. Cl. 227—67 **15 Claims**

1. Apparatus for dispensing a fastener to a slotted hollow needle, from stock formed by a plurality of fasteners, each having a filament with an angularly disposed bar at one end, comprising

means, including a trigger, for advancing the fastener stock to a location within said apparatus at which an individual fastener is separated from said stock, and for forcing the bar of the individual fastener through the bore of the needle with its associated filament projecting through the slot of the needle;



an antiback mechanism which cooperates with the trigger so that when the trigger is partially depressed to a predetermined point the antiback mechanism engages the trigger and prevents its return, until the trigger is fully depressed forcing the antiback mechanism to an out-of-the way position.

5,024,366

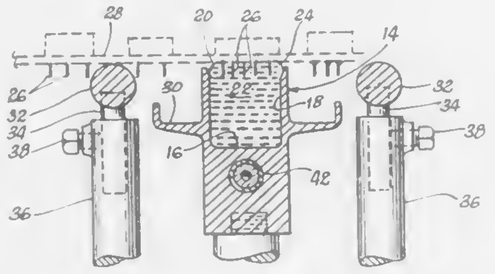
DESOLDERING VAT

Henry I. Kim, 12665 Salmon River Rd., San Diego, Calif. 92129

Continuation-in-part of Ser. No. 403,168, Sep. 5, 1989. This application Jul. 25, 1990, Ser. No. 557,682

Int. Cl.⁵ B23K *3/00, 3/06*

U.S. Cl. 228—56.1 6 Claims



1. A desoldering vat comprising:

(a) a stand;

(b) an elongated solder pot mounted on said stand and having an upper edge substantially defining a horizontal plane and a heating means to melt solder contained within said solder pot;

(c) a moat defined along at least one side of said pot to catch solder spilled out of said pot on said at least one side; and,

(d) a horizontal support brace supported on said stand substantially parallel to said elongated pot and substantially spanning the entire length thereof.

5,024,367

WIRE BONDING METHOD

Yoshimitsu Terakado, and Nobuto Yamazaki, both of Tokyo, Japan, assignors to Kabushiki Kaisha Shinkawa, Tokyo, Japan

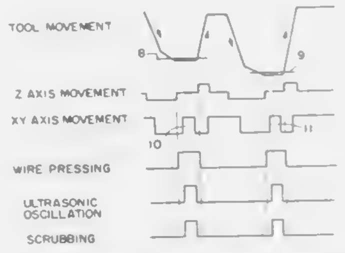
Filed May 14, 1990, Ser. No. 523,007

Claims priority, application Japan, May 15, 1989, 1-118599

Int. Cl.⁵ H01L *21/607*

U.S. Cl. 228—111 2 Claims

1. A wire bonding method in which a bonding wire is pressed against bonding surfaces by a bonding tool and bonding is performed by applying ultrasonic vibrations to said bonding tool, said method is further characterized in that said bonding tool is also moved in a lateral direction of the bonding



surface to make a scrubbing action while said bonding tool to which said ultrasonic vibrations is applied presses said wire against said bonding surfaces.

5,024,368

STOPPING-OFF METHOD FOR USE WITH DIFFUSION BONDING

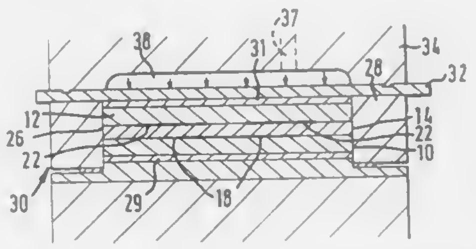
Ian E. Bottomley, and Graham A. Cooper, both of Preston, United Kingdom, assignors to British Aerospace, London, England

Filed Jul. 17, 1990, Ser. No. 553,321

Claims priority, application United Kingdom, Aug. 1, 1989, 8917613

Int. Cl.⁵ B23K *20/24*

U.S. Cl. 228—118 **19 Claims**



1. A method of diffusion bonding components together, which method comprises:

(a) plasma spraying a stopping-off material on at least one selected area of a first surface of a first component;

(b) juxtaposing the said first component with at least a second component to form a stack in which the said first surface of the said first component lies adjacent to the second component, and

(c) heating and pressing together the components in the stack to form a diffusion bond between the first component and the second component, the stopping-off material preventing such bonding in the said at least one selected area.

5,024,369

METHOD TO PRODUCE SUPERPLASTICALLY FORMED TITANIUM ALLOY COMPONENTS

Francis H. Froes, Xenia, and Daniel Eylon, Dayton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 5, 1989, Ser. No. 348,741

Int. Cl.⁵ B23K *20/20*

U.S. Cl. 228—157 9 Claims

1. A method for producing a titanium alloy honeycomb-core structural panel which comprises the steps of:

(a) forming a plurality of rapidly solidified titanium alloy strips into waveform structures;

VOL
1127
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18
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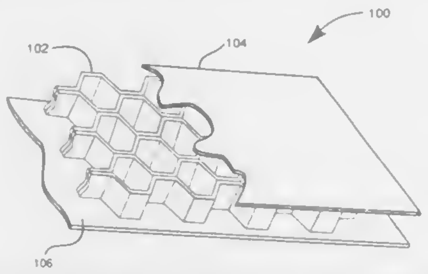
(b) assembling a plurality of said waveform structures to produce a honeycomb core;



(c) positioning said core between two cover pieces of rapidly solidified titanium alloy sheetstock; and

(d) diffusion bonding said core to each of said cover pieces.

5,024,370
AUTOMATIC SOLDERING METHOD AND THE APPARATUS THEREOF

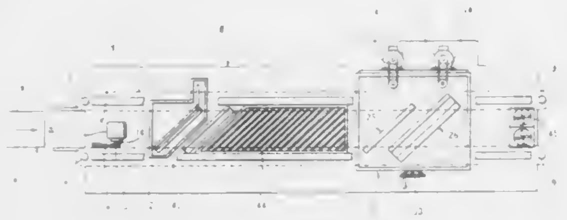
Senichi Yokota, Hachioji, Japan, assignor to Yokota Machinery Co., Ltd., Tokyo, Japan

Filed Dec. 21, 1989, Ser. No. 454,637

Claims priority, application Japan, Dec. 31, 1988, 63-335180; May 31, 1989, 1-139859

Int. Cl.^{5} H05K *3/34*

U.S. Cl. 228—180.1 **7 Claims**



1. An automatic soldering method including a provision for progressively moving up a horizontal position of a base board as the base board is transported to be soldered in a direction from a base board entrance side to a soldered base board exit side of a base board transporting path, the method comprising the steps of:

arranging a molten solder jetting nozzle laterally of the base board transporting path in a manner that the nozzle extends inclined with respect to a base board transporting direction in a horizontal plane with a positional variation to be progressively farther from the base board entrance side of the base board transporting path; and

transporting the base board while the base board is inclined in a vertical plane intersecting the base board transporting direction with a positional variation to be progressively lowered in one direction to which the nozzle extends to be progressively farther from the base board entrance side such that a distance between a lower side of the base board and the nozzle is constant all through a length of the nozzle as the base board is transported past over the nozzle.

5,024,371
WELDING PROCESS

Madhav A. Unde, P.O. Box 254474, Sacramento, Calif. 95865

Filed Dec. 26, 1989, Ser. No. 456,934

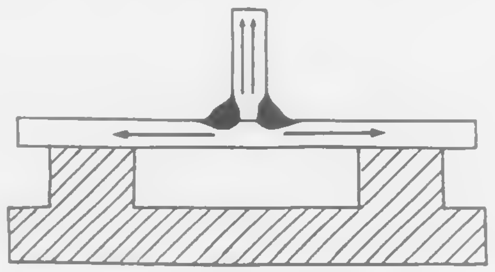
Int. Cl.^{5} B23K *37/04*

U.S. Cl. 228—216 **2 Claims**

1. A process for reducing the incidence of cracks and porosity generated during welding operation of metals/alloys—more specifically welds of aluminum or aluminum alloy parts comprising the steps of:

(a) providing stationary back-up support of material having higher conductivity than the base metal/s/ alloys.

(b) the same back-up support material contacting the weld seam in immediate contact and being free from contact with the said surface of base metals/alloys extending to either lateral side of the weld seam thereby providing an isolated transfer path for the heat;



(c) the back-up material having substantial heat-sink capacity;

(d) fusion welding the metal parts with minimal heat flow laterally of the weld seam due to use of the said back-up support.

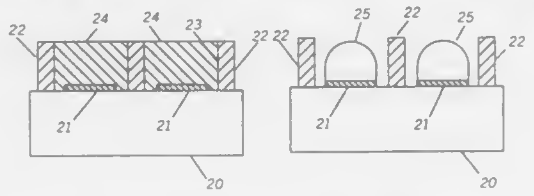
5,024,372
METHOD OF MAKING HIGH DENSITY SOLDER BUMPS AND A SUBSTRATE SOCKET FOR HIGH DENSITY SOLDER BUMPS

Leonard F. Altman, Coral Springs; Jill L. Flaugher, Margate; Anthony B. Suppelsa, Coral Springs, and William B. Mullen, III, Boca Raton, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 292,988, Jan. 3, 1989, abandoned. This application May 9, 1990, Ser. No. 520,995

Int. Cl.^{5} H01L *21/60;* H05K *3/34;* B23K *31/02*

U.S. Cl. 228—248 **6 Claims**



1. A method of forming solder bumps comprising the steps of:

applying a thick layer of resist on the substrate

forming wells in the resist by selectively removing portions thereof over solder pads on the substrate

applying solder paste only in the wells to contact the solder pads, and

reflowing the solder paste to form solder bumps on the solder pads.

5,024,373
CONTAINER FOR PULVERIZED AND GRANULAR PRODUCTS, SUCH AS MEDICINES

Leslie L. Riel, Van Alkemadelaan 1056,2597 BJ, The Hague, Netherlands, assignor to Leslie L. Riel; Hendrik van der Tak; Shafiq M. Ghafoerkhan and Power Pack International B.V. i.o., all of The Hague, Netherlands

Filed Mar. 19, 1990, Ser. No. 495,423

Int. Cl.^{5} B65D *27/14*

U.S. Cl. 229—68 R **8 Claims**

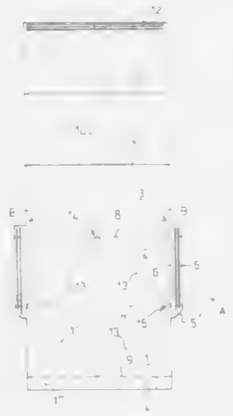
1. Container made up like an envelope, obtained by folding a stamped blank of sheet material and comprising:

a front sheet;

a back sheet connected therewith by means of a first folding line;

a flap having extreme edges and sides connected with the back sheet by means of a second folding line having a center which runs parallel to the first folding line, said flap at least partly overlapping the front sheet;

side strips which are connected with the back sheet by means of longitudinal folding lines perpendicular to said first folding line, the edges of the front sheet being adhered thereto by means of an adhesive path,



wherein said front and back sheets are substantially of the same size, and wherein two pairs of crease lines have been provided in these sheets, which crease lines, after manufacturing of the envelope, substantially extend from the center of the second folding line to points of intersection of the first folding line with the longitudinal folding lines; and

the flap having a slightly adhesive path on the extreme edge thereof.

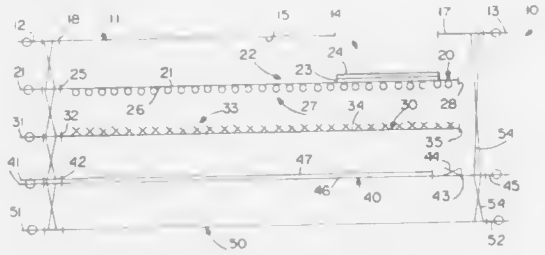
5,024,374
FLYLESS MAILER HAVING TOP SHEET WITH CUTOUT

Robert E. Ashby, Quakertown, Pa., assignor to Moore Business Forms, Inc., Del.

Filed Feb. 15, 1990, Ser. No. 479,704

Int. Cl.^{5} B65D *27/06, 27/10*

U.S. Cl. 229—71 **17 Claims**



1. A mailer type business form comprising:

a top ply having a top surface and a bottom surface, and having means defining a cutout therein, said cutout having an area and position comparable to an address area on a piece of mail;

a second, insert, ply underlying said top ply, including said cutout, and having a top surface in contact with the bottom surface of said top ply and a bottom face;

a localized coating of self-imaging material formed on said second ply top surface only in the area thereof overlaid by said cutout;

a third ply cooperating with said top ply to define an outgoing envelope, said second ply overlying said third ply; and

a fourth, insert, ply having a top face thereof in contact with said bottom face of said second ply;

said second ply having a capsule coat on the bottom face thereof, and said fourth ply having a resin coat on the top surface thereof aligned with said capsule coat on said second ply bottom face.

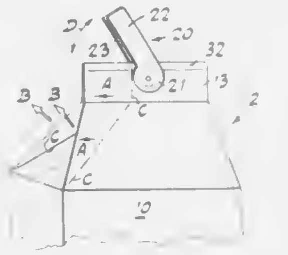
5,024,375
CLOSURE DEVICE FOR RECLOSING A GABLE-TOP CONTAINER

Wright, Christopher B., 2299 Pacific Ave., San Francisco, Calif. 94115

Filed Mar. 19, 1990, Ser. No. 495,109

Int. Cl.^{5} B65D *33/16*

U.S. Cl. 229—125.39 **17 Claims**



2. A closure device for use in combination with a gable-top container, of the type having container walls defining a refoldable gable top, the gable top having folded container walls defining a top ridge formed on a top side of the gable top having one openable side of a given length and width and a non-openable side opposite from said openable side, the top ridge being initially sealed and capable of having the one openable side thereof opened such that the gable top of the container can be unfolded on the one openable side into a spout and refolded for reclosure, comprising:

an elongated member having a holding portion and a mounting portion, said holding portion including walls defining an interior channel which has a width corresponding to the width of the top ridge of the container, said interior channel being open on a bottom side of said elongated member adapted to face toward the top ridge, and said mounting portion being formed at one end of said elongated member and being pivotably secured onto the top ridge at an intermediate position thereof adjacent and clear of the one openable side of the top ridge, wherein said elongated member is pivoted upwards to allow the one openable side of the top ridge to be initially opened or reopened, and pivoted downwards to engage the refolded top ridge on the one openable side in a friction fit in the interior channel of the elongated member to securely hold the top ridge closed,

wherein said elongated member has bar-shaped rectangular walls which are spaced apart by the width of the interior channel and have a length matched to the length of the one openable side of the top ridge to be secured.

5,024,376
WEB OF MATERIAL CONSISTING OF (PACK) BLANKS CONNECTED TO ONE ANOTHER

Heinz Focke, Verden, Fed. Rep. of Germany, assignor to Focke & Co., GmbH, Fed. Rep. of Germany

Filed May 23, 1990, Ser. No. 527,604

Claims priority, application Fed. Rep. of Germany, May 23, 1989, 3916756

Int. Cl.^{5} B65D *5/66*

U.S. Cl. 229—160.1 **5 Claims**

1. Web of material consisting of individual blanks (**14**) for the production of finished hinge-lid packs of the type having an internal collar,

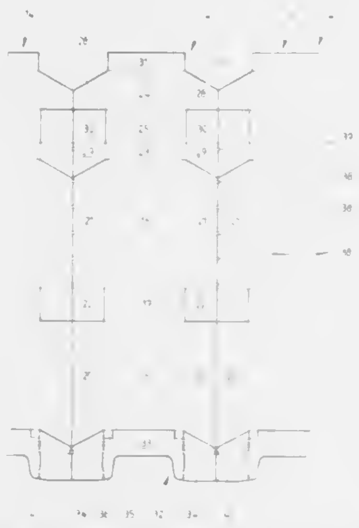
wherein each of the individual blanks (**14**) consists of a pack blank portion and of a collar blank portion (**32**) which is integrally connected to the pack blank portion and which has collar side walls (**34**);

wherein said blanks are arranged in series, and adjacent pack

VOL
1127
ISS
3
JE
18
1991
UMI

blank portions are connected to one another only at selected free blank edges by primary residual connecting webs **(38)** in the web of material;

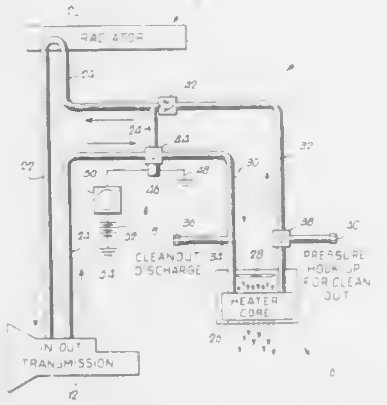
wherein adjacent individual blanks **(14)** are also connected to one another in a region of the collar blank portion **(32)** by at least one collar residual connecting web **(40)** between free mutually confronting edges of adjacent collar side walls **(34)**; and wherein adjacent blank edges are free and disconnected from one another in said web of material except for said primary and collar residual connecting webs.



5,024,377

VEHICLE HEATING SYSTEM

Frank Harrison, P.O. Box 1824, Kansas City, Mo. 64141
Filed Jan. 19, 1990, Ser. No. 467,570
Int. Cl.⁵ G05D *23/00*
U.S. Cl. 237—2 A — 7 Claims



1. A heating system for a vehicle having a transmission with fluid, the system comprising:

means for cooling the transmission fluid;

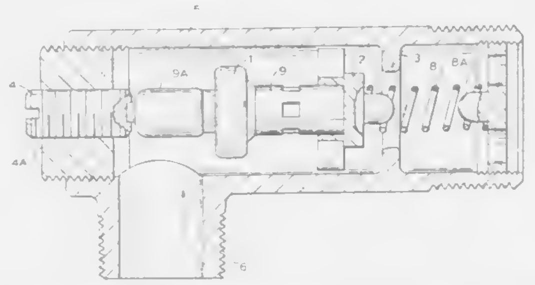
heat exchanger means including conduit structure operably coupling said cooling means and transmission with said heat exchanger means for two-way fluid communication therebetween; and

diversion means operably coupling said heat exchanger means with said cooling means and the transmission for selectively diverting transmission fluid when the fluid is placed in the transmission and the temperature of the interior of the vehicle reaches a predetermined minimum level, so that the heated transmission fluid is circulated through said heat exchanger means.

5,024,378

SHUT-OFF VALVE FOR SCALD PREVENTION

Konrad Bergmann; Josef Ems, both of Wittlich, and Hans Nikolayczik, Minheim, all of Fed. Rep. of Germany, assignors to American Standard Inc., New York, N.Y.
Continuation of Ser. No. 451,119, Dec. 14, 1989, which is a division of Ser. No. 406,043, Sep. 12, 1989, Pat. No. 4,917,294, which is a division of Ser. No. 253,859, Oct. 4, 1988, Pat. No. 4,981,261. This application Nov. 26, 1990, Ser. No. 619,185
Claims priority, application Austria, Oct. 18, 1987, 2661/87
Int. Cl.⁵ G05D *23/12*
U.S. Cl. 236—93 B — 2 Claims



2. An assembly for preventing water exceeding a preselected temperature from exiting a supply line, comprising:

a supply line including a housing, said housing including a front end and a rear end and defining a chamber therein;

an outlet defined by the front end of said housing and in fluid communication with said chamber;

a sanitary valve assembly positioned within said chamber, said valve assembly including a valve seat having a cylindrical opening extending therethrough and a cylindrical valve member having slightly smaller dimensions than said valve seat opening, said valve member being movable between a closed position wherein it is positioned within said valve seat such that a radial clearance is defined between said valve member and said valve seat, and an open position wherein a fluid may freely pass between said valve member and said valve seat;

an expandable, temperature sensitive element positioned within said chamber;

a set screw extending through the rear end of said housing, said expandable, temperature sensitive element being connected to said set screw;

a spring bearing against a wall of said housing and said valve member, said spring urging said valve member towards the open position; and

means connecting said expandable, temperature sensitive element with said valve member for urging said valve element detects a temperature exceeding a preselected value,

said set screw, said expandable, temperature sensitive element, said valve element, said valve seat opening and said spring all being substantially coaxial.

5,024,379

VARIABLE CAPACITY HEATING APPLIANCE

Daniel J. Dempsey, Carmel, Ind., assignor to Carrier Corporation, Syracuse, N.Y.
Continuation of Ser. No. 260,974, Oct. 21, 1988, abandoned. This application Aug. 21, 1989, Ser. No. 396,789
Int. Cl.⁵ F24H *3/06*
U.S. Cl. 237—16 — 4 Claims

1. In a heating system of the type having a heater for selectively adding heat to a first fluid for maintaining its temperature at a predetermined level, and a heat exchanger connected thereto for receiving a flow of said first fluid at said predetermined temperature and returning a flow thereof at another cooler temperature, an improved temperature control system comprising:

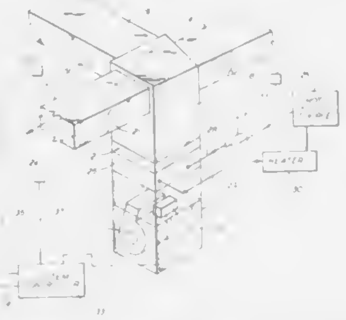
a fan for circulating a second fluid over said heat exchanger to facilitate the transfer of heat to said second fluid for delivery to a distribution system downstream thereof, said fan being capable of operating over a continuous and wide range of speeds;

means for determining, over a continuous range, the heating load requirements of said downstream distribution system; and

means for varying the speed of said fan in response to said heating load requirements, wherein said means for determining the heating load requirements comprises:

at least one thermostat for determining the thermostat error in said downstream distribution system; and

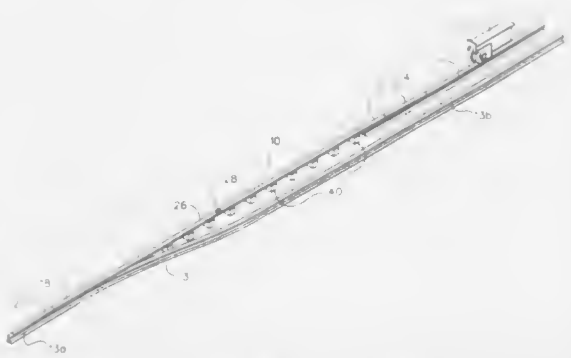
a controller for calculating the needed change in system capacity as a function of said thermostat error, and for further determining a new system capacity as a function of an old system capacity modified by said needed capacity change.



5,024,380

METHOD AND APPARATUS FOR CONTINUOUS WELDED RAIL

H. Anthony Newman, Chesterton, Ind., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.
Filed Jan. 5, 1990, Ser. No. 461,552
Int. Cl.⁵ E01B *23/00*
U.S. Cl. 238—218 — 8 Claims



1. A method of replacing old rail with new continuous welded rail where rolling stock is parked on the trackway at a location which prevents further removal of old rail and placement of new rail said method comprising the steps:

a) removing the old rail up to a location near the parked rolling stock,

b) placing new continuous welded rail along the trackwork where the said old rail has been removed and fastening the said new continuous welded rail to the trackwork up to a location near said parked rolling stock,

c) bending the remaining unfastened portion of said new continuous welded rail to extend substantially parallel along side of the remaining old worn rail on which said rolling stock is parked,

d) providing a temporary bridge to span the distance between the said remaining old rail and new fastened continuous welded rail,

e) transferring said parked rolling stock from said remaining old rail, across said temporary bridge and onto said fastened new continuous rail,

f) removing said temporary bridge,

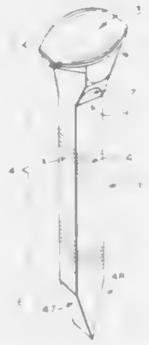
g) removing remaining said old worn rail, and

h) bending said remaining unfastened new continuous welded rail into alignment with, and along the centerline of, said fastened new continuous welded rail, and fastening said remaining unfastened new continuous welded rail to the said trackwork.

5,024,381

ACTIVE RAILROAD SPIKE AND TIE PLATE INTERCONNECTION THEREFOR

Richard J. Stafford, III, Charlotte, N.C., assignor to Stafford Rail Products, Inc., Lancaster, S.C.
Filed Mar. 10, 1989, Ser. No. 321,853
Int. Cl.⁵ E01B *13/00*
U.S. Cl. 238—367 — 5 Claims



1. In a railroad spike, intended for securing a tie plate to a tie, having a longitudinally elongated shank member with a top end, a bottom end, flat front, rear, left and right side walls, a head member proximate the top end of said shank member, a head member lower surface that extends transversely and overhangs said front wall, and a wedge-like bottom end with flat front and rear surfaces, the improvement which comprises a pair of wedge shoulders that extend upwardly and outwardly at an angle of approximately twenty-three degrees from the left and right side wall portions of the spike shank and connect with a reinforced portion of the spike that is below and proximate to the head member, the reinforced portion of said spike comprising a left and right side portion respectively extending substantially vertically above the left and right wedge shoulders, each wedge shoulder comprising substantially planar portions that define a wedge therebetween with at least one lateral dimension greater than an opening dimension between left and right sides of a tie plate rail hole, whereby upon driving of said spike into the tie plate rail hole, an inclined plane of contact is defined between said wedge shoulders and interior leading edge surfaces of the tie plate rail hole such that an increasing swaging action, occurring between said wedge shoulders and the edge surfaces of the tie plate rail hole, sufficient to prevent the head member lower surface from contacting, and the reinforced portion of the spike from contacting, an upper flange surface of the tie plate, is resisted by the left and right side portions of said reinforced portion of said spike.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,382

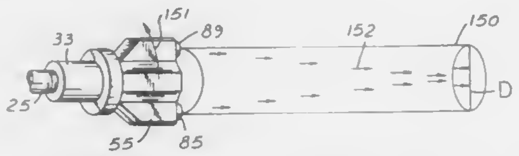
SELF-ROTATING NOZZLE AND METHOD OF USE

Forrest A. Shook, Fenton, and Terry L. Henshaw, Battle Creek, both of Mich., assignors to NLB Corp., Wixom, Mich.

Continuation-in-part of Ser. No. 175,805, Mar. 31, 1988, Pat. No. 4,821,961. This application Nov. 18, 1988, Ser. No. 273,396

Int. Cl.^{5} B05B *3/06, 9/01*

U.S. Cl. 239—11 **11 Claims**



1. A method of cleaning a surface to be cleaned by a high-velocity rotational jet of fluid, comprising:

mounting a rotating head upon a fixed shank in such a way that it is freely rotatable upon the fixed shank;
forming passages through the fixed shank, through the rotating head and into two nozzles attached to the head;
canting the nozzles with respect to a longitudinal axis; and
allowing high-pressure fluid to go through said passages in the shank into said passages in the rotating head, and out the fluid nozzles, thus changing the fluid into a high-velocity fluid with both a longitudinal component and a transverse component, the tranverse component being converted as a reactive force to the rotating head, causing the rotating head to rotate, the mounting of the rotating head upon the shank allowing the rotating head to rotate at a speed that approximates the transverse component of the fluid velocity:
the rotation of the rotating head at a speed that approximates the transverse component of the fluid velocity causing the rotating head to rotate in the opposite direction as the fluid and to cancel out the transverse component of the fluid velocity, thus creating a fluid jet that is nearly longitudinal and results in a nearly cylindrical jet of water being applied to the surface to be cleaned.

5,024,383

VEHICLE WITH A RESERVOIR INCORPORATED IN A STRUCTURAL ELEMENT OF THE VEHICLE BODY

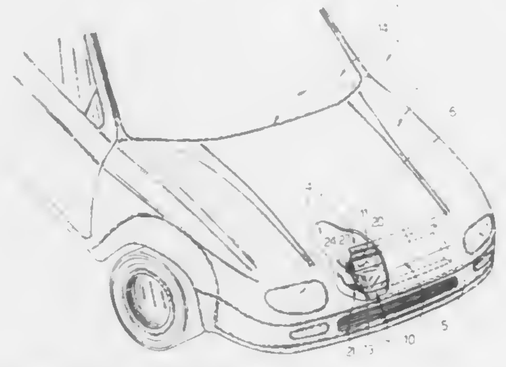
Lorenzo Vaschetto, Collegno, and Luigi Fazio, Turin, both of Italy, assignors to 501 Fiat Auto S.P.A., Turin, Italy

Filed Sep. 11, 1989, Ser. No. 405,312

Claims priority, application Italy, Sep. 13, 1988, 67812 A/88

Int. Cl.^{5} B60R *16/08;* **B60S** *1/46*

U.S. Cl. 239—284.1 **11 Claims**



1. A vehicle body, comprising:

(a) load-bearing means forming a portion of the vehicle body and contributing to the overall structure thereof;
(b) said load-bearing means including reservoir means for containing a fluid therein;
(c) said load-bearing means including a generally hollow cross-member defining therein said reservoir means; and
(d) said cross-member being disposed adjacent the front of a vehicle engine compartment and adjacent the front bumper of the vehicle.

5,024,384

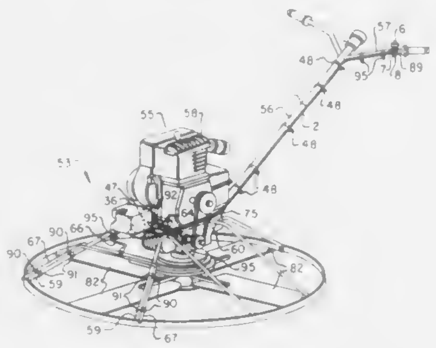
IMPROVED SPRAY APPARATUS FOR CONCRETE FINISHING MACHINES

Gerald W. Redmon, and Tina L. Redmon, both of 2000 W. Arkansas La., Lot 77, Arlington, Tex. 76013

Filed Nov. 13, 1989, Ser. No. 437,073

Int. Cl.^{5} B05B *9/00*

U.S. Cl. 239—289 4 Claims



1. An improved water spray apparatus for attachment to a concrete finishing machine having a handle bar, a motor, a frame, and a plurality of front braces, the improved apparatus comprising:

an electric pump having an inlet and an outlet;
a liquid reservoir having an inlet, an outlet, and a top cover;
a battery supported in a battery case holder and having positive and negative terminals, said battery case holder having a drainage hole;
an electric switch attached to the handle bar of the finishing machine,
a support universal bracket having a plurality of holes, said holes receiving bolts to secure the support bracket to the frame of the finishing machine;
supply tubing interconnecting the reservoir outlet and the pump inlet and extending from the pump outlet to a pair of spray outlets, said supply tubing being attached along the front braces of the finishing machine by clamps, said spray outlets being disposed close to the surface being finished to prevent winds from substantially disrupting the direction of the spray;
electrical wiring electrically connecting the battery, the pump, and the switch, said wiring including a pair of bullet connectors at the positive and the negative battery terminals to facilitate recharging of the battery;
wherein the battery case holder is secured to the back of the support bracket and the reservoir is secured to the front of the support bracket, said reservoir being secured to the support bracket by a plurality of bolts, and
wherein upon depression of the electrical switch, liquid from the reservoir is pumped to the spray outlets to spray the surface being finished.

5,024,385

INTERNAL COMBUSTION ENGINE FUEL SUPPLY SYSTEM

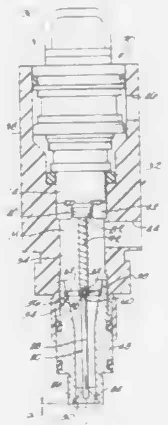
Jeffrey A. Olson, Vernon Hills, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Jan. 11, 1990, Ser. No. 463,439

Int. Cl.^{5} B05B *7/12*

U.S. Cl. 239—410 **32 Claims**

1. A fuel supply apparatus comprising a housing having therein a passageway adapted to communicate with a combustion chamber and including a valve seat, and a bore communicating with said passageway and adapted to communicate with a source of fuel under pressure, a valve member including a valve surface and a portion spaced from said valve surface at a fixed distance and partially extending into said bore to define therebetween a fuel flow controlling orifice, said valve member being movable relative to said housing between a closed



position wherein said valve surface engages said valve seat so as to close said passageway to the combustion chamber and said portion extends a first distance into said bore, and an open position wherein said valve surface is spaced from said valve seat so as to open said passageway to the combustion chamber and said portion extends a second distance less than said first distance into said bore, and means for adjusting the rate of fuel flow through said orifice and past said portion.

5,024,386

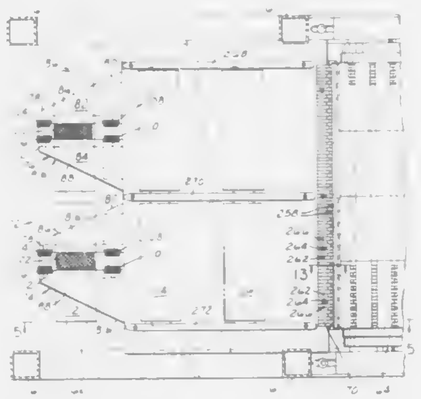
TIRE CONVERTING APPARATUS AND METHOD

Alvin L. Morris, Warren, Mich., assignor to PFM, Inc., Detroit, Mich.

Filed May 18, 1989, Ser. No. 354,148

Int. Cl.^{5} B02C *19/12*

U.S. Cl. 241—3 18 Claims



1. The method of converting tires comprising the steps of:
debeading the tires;
cutting each tire diametrically into at least two segments;
commencing at one end of each segment, spreading the sidewalls apart while the segment;
while holding the segment flattened, shredding it progressively from one end to the other; and
recovering the shredded pieces for further use.

5,024,387

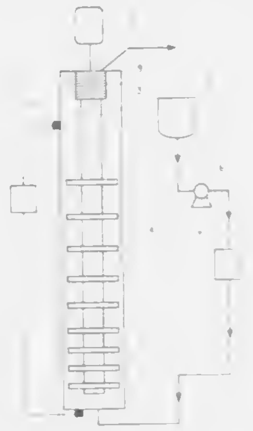
ON LINE CONTROL METHOD TO DETERMINE MEDIA FLUIDIZATION IN A MEDIA MILL

An-Gong Yeh, Broomall, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 384,814, Jul. 25, 1989, abandoned. This application Apr. 26, 1990, Ser. No. 515,697

Int. Cl.^{5} B02C *25/00*

U.S. Cl. 241—21 **4 Claims**



1. In a continuous method of grinding, deagglomerating or dispersing particulate solids in a liquid, said method comprising: introducing the liquid containing the particulate solids into a vessel containing grinding media; grinding the particulate solids in the liquid by forcing the liquid at a flow rate through the grinding media while rapidly moving the grinding media; and separating the liquid containing the particulate solids from the grinding media as it leaves the vessel; wherein the improvement comprises maintaining the media in a state of fluidization by monitoring a differential pressure measurement across some length of the vessel, the differential pressure being measured by at least two pressure sensors, and adjusting the liquid flow rate accordingly.

5,024,388

STONEWORK CRUSHER

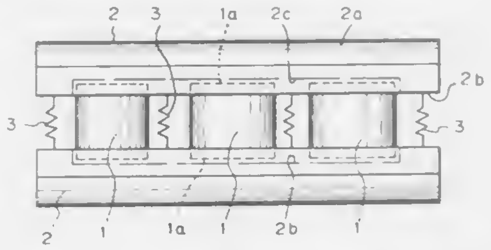
Katsuhiko Kaneko, and Minoru Nishida, both of Kumamoto, Japan, assignors to Nishimatsu Co., Ltd. and Tokin Corporation, both of, Japan

Filed Dec. 6, 1989, Ser. No. 446,754

Claims priority, application Japan, Dec. 9, 1988, 63-160262[U]

Int. Cl.^{5} B02C *19/00;* **E21C** *37/00*

U.S. Cl. 241—301 **13 Claims**



1. An improved stonework crusher comprising
at least one insert head made of shape memory alloy,
a pair of abutments attached at opposite outer faces of said at least one insert head,
means for connecting said pair of abutments while allowing for a change in distance between said abutments, and
means for heating said at least one insert head.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,389

CONVEYING APPARATUS FOR A TEXTILE WINDING MACHINE

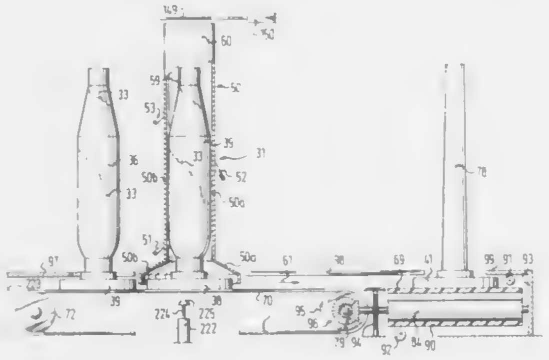
Hans Grecksch, and Dietmar Engelhardt, both of Monchen-Gladbach, Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Moenchengladbach, Fed. Rep. of Germany

Filed Dec. 26, 1989, Ser. No. 456,355

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, 3843553

Int. Cl.⁵ B65H *67/02. 67/06*

U.S. Cl. 242—35.50 A 12 Claims



1. In a textile machine of the type having a plurality of independently movable tube support members for individually supporting tubes in generally upright dispositions, an unwinding device for unwinding, at an unwinding location, packages of textile material such as yarn or the like wound on tubes supported on the tube support members, a yarn end loosening assembly disposed for acting on the periphery of a package at the unwinding location for preliminary loosening a yarn end on the package to facilitate unwinding of the yarn therefrom, a delivery assembly for delivering the tube support members to a preliminary location for feeding to the unwinding device, a discharge assembly for transporting tube support members from a discharge location to a further handling location, a tube support member conveying apparatus, comprising:

conveying means for conveying the tube support members along a cross path extending from the preliminary location through the unwinding location to the discharge location, said conveying means supporting a respective tube support member at the unwinding location in a predetermined disposition upstanding from said conveying means; and

tilt means selectively extendible into a position to effect tilting of said respective support member at an inclination to said upstanding disposition, whereby the yarn on the tube is moved into contact with the yarn end loosening assembly for facilitating loosening of the yarn end from the packages.

5,024,390

APPARATUS WITH ENDLESS SCREWS FOR FORMING FLAT LOOPS OF TEXTILE YARN

Robert Enderlin, Morschwiller-Le-Bas, France, assignor to Superba S.A., Mulhouse, France

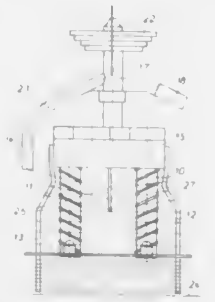
Continuation of Ser. No. 859,659, May 5, 1986, abandoned. This application Dec. 21, 1990, Ser. No. 633,158

Claims priority, application France, May 7, 1985, 85-07062

Int. Cl.⁵ B65H *51/20;* **D02G** *1/20*

U.S. Cl. 242—47 16 Claims

1. Apparatus for forming flat loops of textile yarn and depositing them on a moving conveyor belt, comprising a conveyor belt, at least two endless screws, means for driving said endless screws, at least two members for supporting and guiding yarn loops, said support and guide members being disposed on either side of said endless screws outwardly thereof, two deviating rods, said deviating rods being disposed in a plane parallel to the axes of said endless screws and equidistant therefrom, said plane being perpendicular to a plane defined by said support and guide members and perpendicular to a surface of said conveyor belt, a driven rotating arm arranged to rotate and coil yarn around said endless screws, said support and guide members and said deviating rods, said support and guide members being configured to permit inverting the yarn loops between the ends of said endless screws and a zone of deposition of said loops on said conveyor belt surface, and means for inverting the yarn loops comprising a surface on said conveyor belt adapted to provide friction for driving the yarn and means for displacing said conveyor belt surface at a speed greater than the speed of displacement of said yarn loops on said support and guide members.



5,024,391

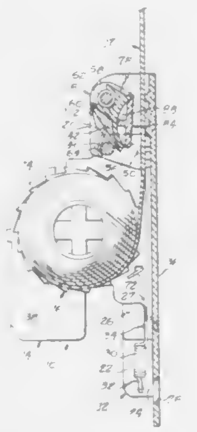
RETRACTOR WITH AUXILIARY BRAKING MECHANISM

James L. Zygutis, Frankfort, Ill., and Gerald A. Doty, Crown Point, Ind., assignors to Occupant Safety Systems, Inc., Olympia Fields, Ill.

Continuation-in-part of Ser. No. 341,440, Apr. 21, 1989. This application Feb. 22, 1990, Ser. No. 484,499

Int. Cl.⁵ A62B *35/00;* **B65H** *75/48*

U.S. Cl. 242—107.200 13 Claims



1. A safety belt retractor comprising:

a fixed base;

a braking mechanism supported on said base;

a frame supported on said base for cooperation with said braking mechanism;

a spring-biased reel assembly supported on the frame, said reel assembly having a reel supported for rotation in protractive and retractive directions, and an inertial locking mechanism for selectively preventing protractive rotation of said reel;

a belt made of filaments wound on said reel and extending past said braking mechanism for selective engagement by said braking mechanism; said belt having a length of webbing;

said braking mechanism having a brake shoe movable between an inactive position, wherein said webbing is movable past said braking mechanism in a longitudinal direction; and a braking position wherein a first side of the belt is engaged and constrained against protraction by said braking shoe;

said brake shoe having teeth and a non-compressible surface for engaging the first side of the belt with the teeth going into webbing between filaments; and

an elastomer pad positioned on said base to engage an opposite side of the belt and having a compressible surface into which filaments of the belt make impressions at high loads and a coefficient of friction of at least 0.5 and a tensile strength to withstand tearing when gripping and exerting a substantial restraining force on the opposite side of the belt.

5,024,392

KINK PREVENTING DEVICE FOR WINDER

Hiroshi Uchida, Oumihachiman, and Norio Kubota, Kyoto, both of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Jan. 18, 1990, Ser. No. 466,868

Claims priority, application Japan, Jan. 25, 1989, 1-6532[U]

Int. Cl.⁵ B65H *49/02, 59/02*

U.S. Cl. 242—128 9 Claims

1. A kink preventing device for preventing occurrence of a kink in a yarn drawn out from a yarn supply bobbin of a winder, comprising a pair of kink bars supported for opening and closing movement with the yarn supply bobbin interposed therebetween and each having a contacting portion which is arcuately extended along an outer peripheral portion of the bobbin, and having a free end and a kink bar opening and closing means for moving said kink bars to close until the contacting portions thereof are abutted with each other to connect said kink bars in a ring-like configuration to each other.

5,024,393

YARN THREADING APPARATUS FOR TUBE-TYPE TEXTILE YARN CREELS

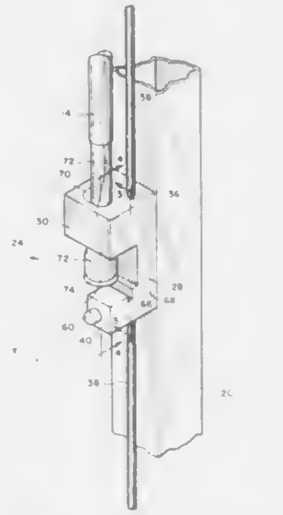
Alan Gutschmit, Troy, N.C., assignor to Alandale Industries, Inc., Troy, N.C.

Filed Apr. 27, 1990, Ser. No. 516,090

Int. Cl.⁵ B65H *49/14*

U.S. Cl. 242—131 15 Claims

1. In a textile yarn creel having a plurality of yarn package support locations and a respective plurality of yarn transport tubes, each tube extending from an entrance end disposed in association with a respective one of said package support locations to an exit end disposed at a remote yarn delivery location, the improvement comprising apparatus for threading a respective yarn through each yarn transport tube, said yarn threading apparatus including means for generating a moving gaseous stream, and a plurality of selectively openable and closeable fluid-transmitting valve means, each valve means being operatively associated with a respective one of said tubes for fluid communication interiorly therewith in the open condition of the valve means and each valve means being operatively communicated with said generating means for selectively directing a gaseous stream to flow through the respectively associated tube in the open condition of the valve means for entraining a yarn at the entrance end of the tube to thread the yarn through the tube, said plurality of valve means being arranged in groups each comprising a subplurality of said valve means, said generating means being operatively communicated with each said group of valve means to direct a common gaseous stream in series to the individual valve means in the respective group.



5,024,394

TAPE CASSETTE

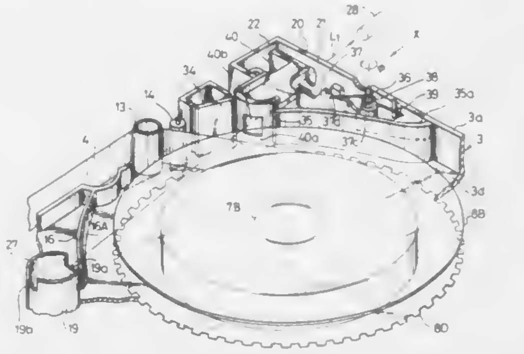
Kazuo Ozawa, Tokyo, and Masanori Sato, Miyagi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 14, 1989, Ser. No. 393,549

Claims priority, application Japan, Sep. 12, 1988, 63-228174

Int. Cl.⁵ G11B *23/06*

U.S. Cl. 242—198 13 Claims



1. An improved tape cassette of the type having an upper cassette half and a lower cassette half, and a light emitting element insertion portion located therebetween, a tape-shaped medium having a light transmissive portion wound between the upper and lower cassette halves and surrounding the light emitting element insertion portion, and a light receiving window through a side wall of the cassette so as to oppose the light emitting element insertion portion across the tape-shaped medium, whereby when the tape cassette is loaded into a recording and reproducing apparatus, a light emitting element can be inserted into the light emitting element insertion portion and a light receiving element can be located outside of the light receiving window, to thereby establish a light path therebe-

VOL
1127
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18
1991
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tween and allow detection of the predetermined portion of the tape-shaped medium, wherein the improvement comprises:

(a) light-shielding ribs, one of the ribs extending up to a substantially central portion of the cassette side wall having the light receiving window, the ribs being formed between the upper cassette half and the lower cassette half on opposite sides of the light path extending from the light receiving element insertion portion to the light receiving window; and

(b) a tunnel piece member provided between the light-shielding ribs and substantially extending to the side wall having the light receiving window so as to surround the light path.

5,024,395

STEPPING MECHANISM FOR ROTARY MOTIONS

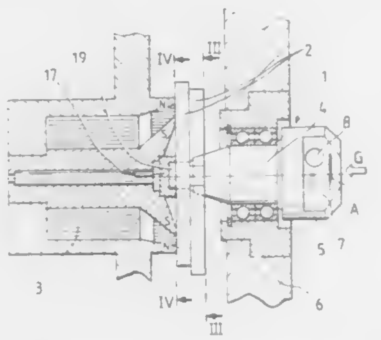
Walter Kranz, Taufkirchen, and Heinz Tillmann, Riemerling, both of Fed. Rep. of Germany, assignors to Messerschmitt Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 144,327, Jan. 14, 1988, abandoned. This application Jun. 6, 1989, Ser. No. 363,342

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1987, 3702240; Jun. 6, 1988, 3819190

Int. Cl.^{5} F42B *15/033*

U.S. Cl. 244—3.22 21 Claims



1. A stepping mechanism for rotary motions, which comprises:

(a) a switching wheel including at least one wheel-side stop,

(b) means for providing a continuous drive force on said switching wheel,

(c) at least one pawl arranged for operative engagement with said wheel-side stop of said switching wheel,

(d) an actuating device for controlling said operative engagement between said pawl and said wheel-side stop, and

(e) a displaceable brake element having at least one run-up edge positioned proximate to said pawl and arranged such that said wheel-side stop engages said run-up edge and displaces said brake element prior to said operative engagement between said wheel-side stop and said pawl caused by said actuating device.

5,024,396

AIR OR SUBMARINE ENGINE WITH IMPROVED CONTOUR

Pierre M. Guevel, Chateauneuf de Grasse, and Philippe R. Bardey, Mougins, both of France, assignors to Principia Recherche Developpement SA, Valbonne, France

Continuation of Ser. No. 220,909, Jul. 19, 1988, abandoned, which is a continuation-in-part of Ser. No. 876,764, Jun. 20, 1986, abandoned. This application Feb. 26, 1990, Ser. No. 489,746

Int. Cl.^{5} B64C *3/14;* **B63G** *8/00*

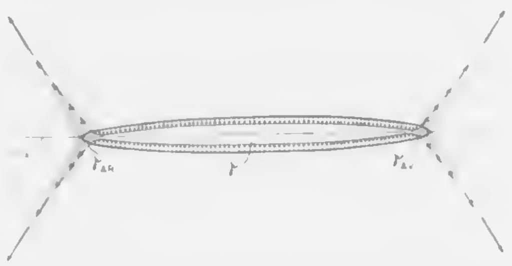
U.S. Cl. 244—35 R 3 Claims

1. A reduced-drag, axially symmetrical submarine hull having

a rounded, tapered bow portion (AV);

a rounded, tapered stern portion (AR); and

a rounded, central portion joining said bow and stern portions and tapered, for drag minimization, along a curve



defined by a Fredholm integral equation of the second kind.

5,024,397

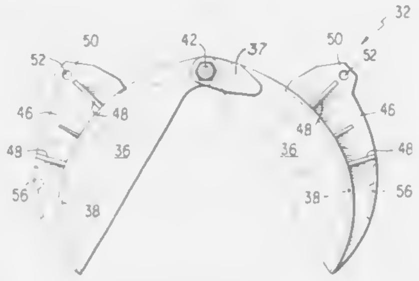
CLAMSHELL ATTACHMENT FOR LOG GRAPPLE

James C. Edwards, North Bend, and Edward E. Pritchard, Reedsport, both of Oreg., assignors to International Paper, Purchase, N.Y.

Filed Feb. 14, 1990, Ser. No. 479,771

Int. Cl.^{5} B66C *3/02*

U.S. Cl. 294—68.23 10 Claims



1. A clamshell attachment for a log grapple, the attachment adapted to be added to a log grapple having a pair of pivoted jaws to convert the log grapple into a clamshell grapple for scooping bulk material, the attachment including a pair of concave-convex scoops, said scoops having aligned hinges which couple upper portions thereof of each scoop together about an upper common axis so that the scoops are hinged together at the upper portions thereof, a convex side of each scoop provided with means for coupling a respective said log grapple jaw thereto, wherein the convex side of each scoop is also provided with a pocket to receive a portion of said respective jaw of the log grapple.

5,024,398

OFFICE MODULE FOR PASSENGER AIRCRAFT

Thomas R. Riedinger, Mercer Island, and Thomas H. White, Issaquah, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Jun. 28, 1989, Ser. No. 372,535

Int. Cl.^{5} B64D *11/00*

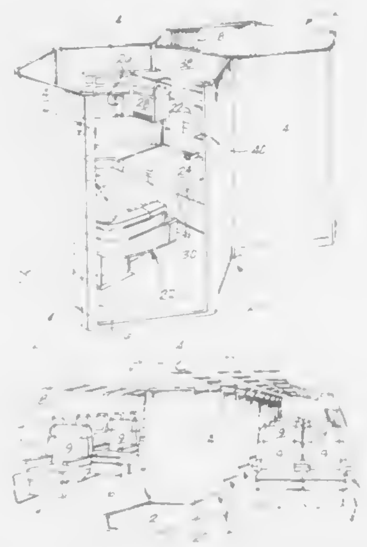
U.S. Cl. 244—118.5 15 Claims

1. An office module for use in an aircraft passenger cabin having a floor, a ceiling, and an aisle, said module comprising:

sidewalls positionable to define an office space adjacent to said aisle; said sidewalls being dimensioned to extend downwardly at least substantially to said floor of the cabin and upwardly a distance sufficient to screen said space from persons outside said space, and to be spaced from said ceiling a distance sufficient to allow circulation of air into and out from said space; said sidewalls having an opening therein to permit entry into and exit from said space from and to said aisle; and said sidewalls defining a recess to permit a person to step out of said aisle into said recess to allow a cart or another person to pass without intruding into said office space;

a seat mountable on said floor inside said space; and

a desk top carried by inside portions of said sidewalls and positioned to be used by an occupant of said seat;



said sidewalls and said space being configured, and said seat and said desk top being positioned, to maximize elbow room and leg room for said occupant within a predetermined floor area occupied by said space.

5,024,399

FRAME MADE OF A COMPOSITE MATERIAL, ESPECIALLY FOR THE FUSELAGE OF AN AIRCRAFT, AND ITS METHOD OF PRODUCTION

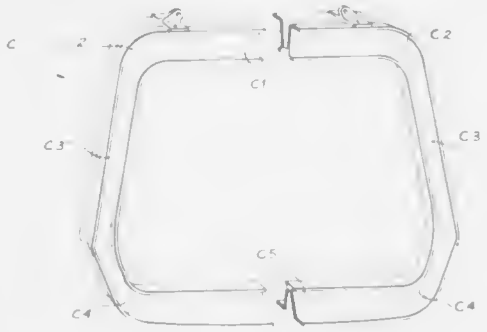
Henri Barquet, Chateauneuf les Martigues; Pierre-Paul Negroni, Marseilles, and Bernard Plissonneau, Aix en Provence, all of France, assignors to Societe Nationale Industrielle et Aetospatiale, Paris, France

Filed Jun. 2, 1989, Ser. No. 360,255

Claims priority, application France, Jun. 8, 1988, 88 07638

Int. Cl.^{5} B64C *1/10*

U.S. Cl. 244—119 14 Claims



1. Frame made of a composite material for a working hull, especially for the fuselage of an aircraft, wherein said frame has, at least in a part of its length, a monolithic structure constituted by a profile made of a composite stratified material formed of fibers with high mechanical resistance, said fibers being pre-impregnated by a hardened synthetic resin, said profile having in section an internal flange, two external half-flanges parallel to the internal flange and two webs connecting the internal flange to each external half-flange, the internal flange and the external half flanges mainly being constituted by laps of unidirectional fibers extending longitudinally without discontinuity on the whole length of the frame inside the profile, and the webs of the profile being formed by laps of fabrics made up of multidirectional fibers, these laps of fabrics covering the internal flange and the external half-flanges to connect the latter.

5,024,400

RELEASING DEVICE FOR A PARACHUTE

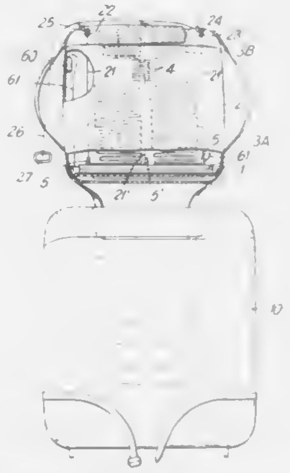
Helmut Cloth, 4790 Paderborn, Riemekester, 97a, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 164,152, Mar. 4, 1988, Pat. No. 4,858,856. This application May 11, 1989, Ser. No. 350,376

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1987, 3707294

Int. Cl.^{5} B64D *17/70*

U.S. Cl. 244—147 14 Claims



1. A releasing device for a parachute which is in a state ready for use, folded and disposed in a receptacle and held together by a securing member against the force of an unholding preloaded spring, said releasing device having means for disconnecting said securing member and control means for actuating said disconnecting means at predetermined conditions, wherein said disconnecting means comprises a breaking device for said securing member which is located in a container and an energy storage in the container and dischargeable in response to the electrical trigger signal to release said securing member by the force of the energy discharged, the energy acting on said disconnecting means is such a way that said securing member is either destroyed or released, wherein at least a part of the securing member consists of a combustible material which is the energy storage and a triggering device connected to at least part of the securing member for producing the trigger signal and comprising a cable for carrying an electic current from an ignition cable.

5,024,401

CONTROL APPARATUS FOR QUAD-LINE STUNT KITES

Hiroshi Nakashima, 1503 N. Hayden Island Dr., #20, Portland, Oreg. 97217

Filed Jun. 8, 1990, Ser. No. 535,338

Int. Cl.^{5} B64C *31/06*

U.S. Cl. 244—155 A 5 Claims

1. Apparatus to controlling quad-line stunt kites comprising:

a first handle member having a top portion, an intermediate portion and a bottom portion;

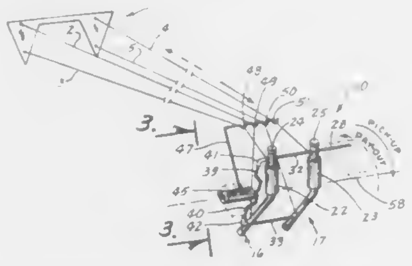
a second handle member having a top portion, an intermediate portion and a bottom portion;

means for attaching a first flexible line to the top portion of said first handle member;

means for attaching a second flexible line to the bottom portion of said first handle member;

VOL
1127
ISS
3
JE
18
1991
UMI

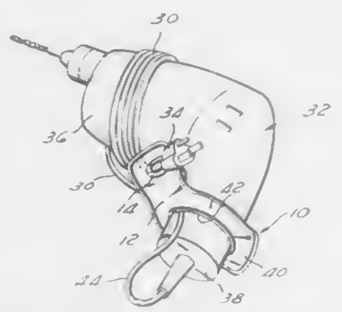
means for attaching a third flexible line to the top portion of said second handle member;
means for attaching a fourth flexible line to the bottom portion of said second handle member;
first connecting means for selectively interconnecting the first portion of the first handle member with the first portion of the second handle member;
second connecting means for selectively interconnecting the second portion of the second handle member;
an axle having an axis of rotation;
means for attaching said axle to said first and second connecting means;
crank means attached to said first connecting means and adapted to be grasped with one hand;



means for permitting said axle to be grasped with a person's other hand whereby rotation of said first and second handle members and said first and second connecting means about said axis is accomplished by a cranking motion with said one hand and whereby such rotation causes said first, second, third and fourth lines to wind around said first and second connecting means wherein said axle grasping means comprises a tubular member rotatably disposed on said axle whereby said axle rotates inside of said tubular member; and,
a guide means attached to said tubular member for guiding said first, second, third and fourth lines onto or off of said first and second connecting means as said crank means is rotated around said axis; including first, second, third and fourth partial loops in said guide means for receiving first, second, third and fourth lines respectively.

5,024,402
CORD RESTRAINT

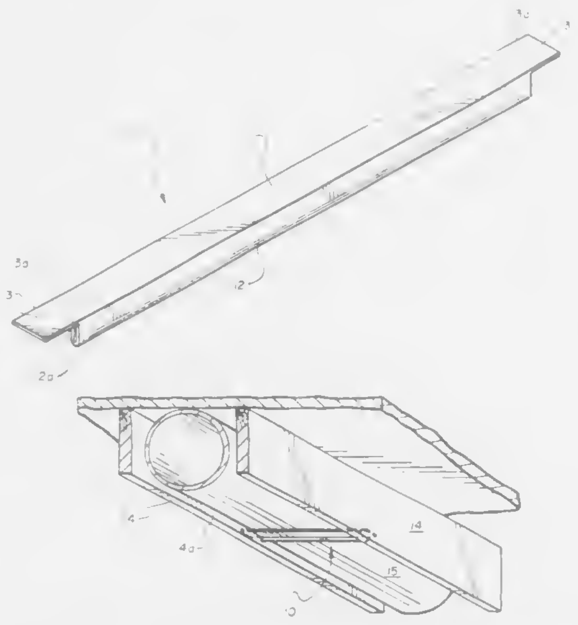
Leo F. Hamel, 11103 Moreno Ave., Lakeside, Calif. 92040
Continuation of Ser. No. 464,997, Jan. 16, 1990, abandoned, which is a continuation of Ser. No. 370,172, Jun. 20, 1989, abandoned, which is a continuation of Ser. No. 800,894, Nov. 21, 1985, abandoned, which is a continuation of Ser. No. 546,978, Oct. 31, 1983, abandoned. This application May 15, 1990, Ser. No. 524,336
Int. Cl.^{5} F16L *3/00*
U.S. Cl. 248—52 **7 Claims**



1. The combination of an electrical appliance and a device for retaining an electrical cord in a stowed configuration upon the appliance comprising:
an electrical appliance having a handle portion and an electrical cord extending outwardly from said handle portion;
an elongate strap having a first end and a second end;
a first aperture formed adjacent said first end of said strap having an inner diameter sized to permit said first aperture to be resiliently stretched to extend over a plug end of said cord and be retained at desired axial positions along the length of said cord; and
a second aperture, larger than said first aperture, formed adjacent the second end of said strap and defining an enlarged opening sufficient in size to be extended over said handle portion of the appliance;
said strap formed of a sufficiently resilient, readily stretchable material to permit said strap to be initially, axially stretched so that said second aperture may be positioned over said handle portion of the appliance and capture the cord against the handle portion and subsequently be maintained in tension resulting solely from the internal resiliency of the strap to return towards its original non-stretched configuration to tightly secure the cord against the appliance.

5,024,403
PIPE HANGER

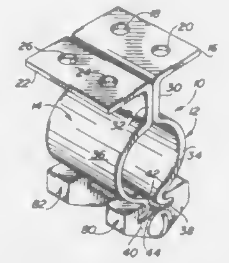
Jerry B. Carlston, Salt Lake City, Utah, assignor to Lynn S. Billeter, Salt Lake City, Utah
Filed Feb. 16, 1990, Ser. No. 481,905
Int. Cl.^{5} F16L *3/00*
U.S. Cl. 248—57 **3 Claims**



1. A pipe hanger comprising a straight plate having opposite ends that are spaced apart a greater distance than the distance between opposing faces of floor or ceiling joists, which said plate opposite ends are arranged to be driven into and along the grain of said opposing joist faces by an application of oppositely directed forces to said opposite plate ends; a leg secured to the undersurface of said plate that extends at approximately a right or normal angle therefrom and is of a length to closely fit between said joist opposite faces; and the plate and leg are formed from a single flat, rectangular section of a thin gauge material whose opposite ends are notched and the said material is folded longitudinally at approximately a right angle on line with aligned sides of which notches, and said folded portion is then again folded longitudinally upon itself to where said folded portion edge engages the undersurface of said plate, forming said leg.

5,024,404
PIPE CLAMP FOR OVERHEAD SPRINKLER HEADS AND THE LIKE

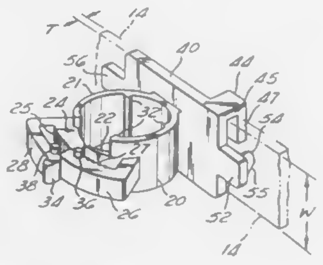
Estus E. Ballard, 6382 Bayhill Dr., Abilene, Tex. 79606
Continuation-in-part of Ser. No. 110,351, Oct. 19, 1987, Pat. No. 4,834,186. This application Apr. 6, 1989, Ser. No. 334,309
Int. Cl.^{5} F16L *3/00*
U.S. Cl. 248—62 **29 Claims**



1 A pipe clamp for engaging a pipe supporting an overhead sprinkler head, said pipe clamp comprising in combination:
(a) first and second pipe clamp halves for engaging and gripping the pipe, each of said clamp halves including a distal end and a proximal end;
(b) means disposed at the distal end of each of said clamp halves or anchoring said pipe clamp;
(c) a terminal end disposed at the proximal end of each of said clamp halves, each of said terminal ends being defined by a single fold extending across the respective one of said clamp halves;
(d) a pair of oppositely tapering ramps disposed at said terminal end of each of said clamp halves and proximally of said single fold, each pair of said oppositely tapering ramps including a first ramp tapered in one direction and a second ramp tapered in the opposite direction;
(e) first wedge means being C shaped in cross section and disposed upon the pair of said tapering first ramps for drawing the proximal ends of said clamp halves toward one another to clamp the pipe disposed between said clamp halves;
(f) second wedge means being C shaped in cross section and disposed upon the pair of said tapering second ramps for drawing the proximal ends of said clamp halves toward one another to clamp the pipe disposed between said clamp halves; and
(g) means interconnecting said first and second wedges for translating said first and second wedges in concert toward and away from one another to draw and to loosen, respectively, said pipe clamp about the engaged pipe.

5,024,405
PIPE CLAMP

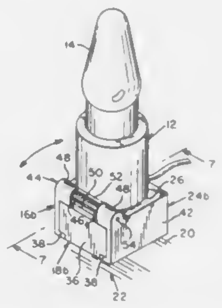
Robert H. McGuire, 991 S. Rutgers Cir., Anaheim, Calif. 92807
Filed May 12, 1989, Ser. No. 351,052
Int. Cl.^{5} F16L *3/08*
U.S. Cl. 248—73 **28 Claims**



1. A pipe clamp, comprising:
a base having lugs adapted to engage with a support bar in a manner to couple said base with said bar and prevent rotation of said base relative to said bar; and
a pipe gripper affixed to said base, said gripper being sized to surround a substantial portion of a pipe, said gripper including a fork having a guide prong spaced from a securing prong, and a tongue being sized to secure between said guide prong and said securing prong.

5,024,406
DEVICE FOR HANGING OUTDOOR CHRISTMAS LIGHTS

Raymond H. Ketcham, 169 Baur St., North Babylon, N.Y. 11704
Filed Jan. 31, 1990, Ser. No. 473,621
Int. Cl.^{5} F21V *21/00*
U.S. Cl. 248—149 **3 Claims**



1. A hanging outdoor christmas light holder comprising:
a) a lamp socket fixture;
b) a removably attaching member having a first component that is permanently attachable to a static structure on a building;
c) a second mating component that is carried on underside of the lamp socket fixture so that the lamp socket fixture can be quickly and simply removably attached thereto; and
d) means for adjustably affixing one top edge of said second component of said removably attaching member to one side of the underside of the lamp socket fixture so that the lamp socket fixture can be angularly positioned with respect to said removably attaching member, wherein said adjustably affixing means includes:
  i) said second component of said removably attaching member having a pair of spaced apart slots extending inwardly from the top edge thereof;
  ii) a pair of bosses each formed on the top edge of said second component of said removably attaching member between one of said slots and corner thereof;
  iii) an upwardly extending tooth formed on the top edge of said second component of said removably attaching member between said slots so that said tooth will be flexible;
  iv) a fixed gear-shaped part affixed to the one side of the underside of the lamp socket fixture so as to fit between said bosses to engage with said tooth; and
  v) a shaft to extend through said bosses and said fixed gear-shaped part so that said fixed gear-shaped part on the lamp socket fixture can pivot thereabout allowing said tooth to adjustably engage with said fixed gear-shaped part for holding the lamp socket fixture in any angular position.

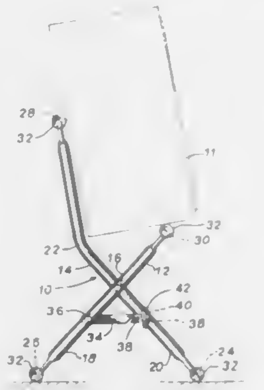
5,024,407
ADJUSTABLE SUPPORT FOR LOUDSPEAKER

John E. Bartley, Greenfield, Wis., assignor to Waukesha Specialties & Fabricators, New Berlin, Wis.
Filed Jul. 30, 1990, Ser. No. 560,412
Int. Cl.^{5} A47B *97/00*
U.S. Cl. 248—164 **3 Claims**

1. A support for holding a loudspeaker in an elevated and tilted position comprising a pivotable X-shaped frame formed of two legs pivotally connected together by a pivot pin at a point equal in distance from the respective bottom ends of said

VOL
1127
ISS
3
JE
18
1991
UMI

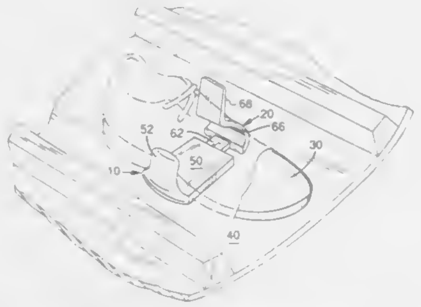
legs; the upper portions of said legs being of unequal length, with the shorter of said legs having its upper portion facing forwardly and its lower portion rearwardly; each of said legs having a foot rigidly, perpendicularly secured thereto its bottom end, the rearward foot, attached to said shorter leg, being of greater length than the forward foot; the upper end of said longer leg being bent forwardly at a point located approximately $\frac{1}{4}$ to $\frac{1}{3}$ of the distance from the pivot point to the top of said leg at an angle between about 20° and 45°; a tie member



pivotally attached to one of said legs at a point spaced below the pivot pin and adjustably attachable to the other leg at a similarly spaced point below the pivot pin; the upper end of each of said legs having an arm rigidly perpendicularly affixed to the upper end of said leg, the forwardmost arm being lower than the rearwardmost arm and being adapted to support the bottom of a loudspeaker, and said upper arm being adapted to support the rear of said speaker in a backwardly tilted orientation.

5,024,408
ATHLETIC SHOE HOLDER

Maynard Magee, 63195 O. B. Riley Rd., Bend, Oreg. 97701
Filed Apr. 30, 1990, Ser. No. 516,817
Int. Cl.⁵ A47G *29/00*
U.S. Cl. 248—206.5 5 Claims



1. A holder for removably securing a shoe to a ferromagnetic surface comprising:

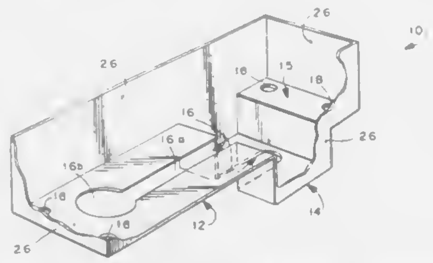
a first member molded of thermoplastic having an elongated base portion with a top and bottom surface, the top surface being generally flat, said base portion having a first end and a second end, the second end having an end surface generally perpendicular to the length of the base portion, said base portion having an elongated cavity therein extending inwardly from an aperture on said base second end, said cavity having a planar lower surface and an upper surface provided with a plurality of saw tooth elements the lower edges of which lie on a plane parallel to and spaced a predetermined distance from said lower surface, each element having a length generally equal to the width of the cavity, said aperture being defined in part by a lower lip extending upwardly with respect to the lower surface of said cavity and an upper lip the edge of which lies in said plane, said base portion having a plurality of magnets recessed into the bottom surface thereof, said first member also having an integral vertical curvilinear side portion projecting generally upwardly and over said base portion from the first end of the base toward the second end of the base;

a second member molded of thermoplastic comprising an elongated tongue comprising a shank portion of predetermined thickness, the shank having a distal end, a base end, and upper and lower parallel surfaces spaced apart a distance substantially equal to the spacing between said upper and lower lips, said tongue being slidably received in the cavity of the first member, the tongue having a latching tab projecting upwardly from said upper surface of said shank at the distal end thereof, the combined height of said tab and said shank being less than said predetermined distance, the tab being adapted to engage any of said saw tooth elements of the first member whereby to secure said tongue from sliding movement toward said aperture, the second member having an integral vertical curvilinear projection extending upwardly from said tongue base end, said projection being curved inwardly over the tongue and toward the distal end of the tongue, the projection having an upper end with a release handle integrally attached thereto and extending generally vertically therefrom;

whereby a shoe may be locked in said apparatus by placing a shoe with its mid-section between the side portion of the first member and the projection of the second member and manually pressing the tongue of the second member into the cavity of the first member so that said side portion and said projection engage the sides of the shoe, biasing the shoe downwardly against the flat surface of the base and biasing the distal end of said elongated tongue upwardly to engage the latching tabs with a saw tooth element within the elongated cavity to lock the first member in position relative to the second member, said first member being releasable by pressing the release handle toward the first member so that said tongue pivots on said lower lip to disengage said tab from said saw tooth elements to permit said second ember to be moved with respect to said first member to release a shoe held by said members.

5,024,409
SLIDABLY LOCKABLE BRACKET

David J. Bohnen, 1910 Ala Moana Blvd., #18-D, Honolulu, Hi. 96815
Filed Apr. 4, 1990, Ser. No. 504,547
Int. Cl.⁵ F16B *12/00*
U.S. Cl. 248—222.4 5 Claims



1. A slidably lockable bracket for a sliding member having a substantially cylindrical post having a post diameter and a head having a head height and a head diameter, attached to one end of said post, said head diameter being greater than said post diameter, comprising:

a base having a keyhole aperture, which keyhole aperture has:

a circular portion having a diameter greater than said head diameter; and

an elongated slot having a width intermediate between said post diameter and said head diameter extending away from said circular portion;

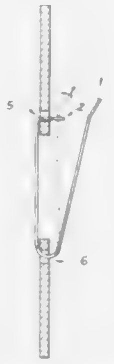
attachment means for attaching said base substantially parallel to a surface wherein said circular portion is spaced apart from said surface by a first distance greater than said head height; and

said base having a recess at a recessed end of said slot opposite said circular portion, said recessed end of said slot being recessed away from said surface by a second distance greater than said first distance and said recess being adapted to receive said head, wherein:

said base has a plurality of edges and said attachment means comprises a plurality of side members, each attached to one of said edges.

5,024,410
REAL ESTATE SIGN FASTENER

Donald W. Ripley, 10234 E. Emily Pl., Tucson, Ariz. 85730
Filed Feb. 2, 1990, Ser. No. 473,811
Int. Cl.⁵ A47H *1/16*
U.S. Cl. 248—302 1 Claim



1. A real estate sign display apparatus comprising:

first real estate sign having top and bottom edges and having circular holes located near the top and bottom edges of said sign;

support means having horizontal support member, said horizontal member capable of holding said first real estate sign from said holes located near the top edge of said sign;

second real estate sign having top and bottom edges and having circular holes located near the top and bottom edges of said sign;

attaching means comprising wire member bent near the middle of said member and having blunt ends, so as to form two. substantially parallel, wire portions, first parallel wire portion having J shaped portion near the end of said wire and said J shape defining a plane that is perpendicular to said parallel wire portions, second parallel wire portion having end bent away from said first parallel wire portion, so that said attaching means may join said signs together through said circular holes located near said bottom and said top edges via inserting said wire member through said circular holes located near said top edge of said second sign and through said circular holes located near said bottom edge of said first sign and joining said bent away portion within said J shaped portion.

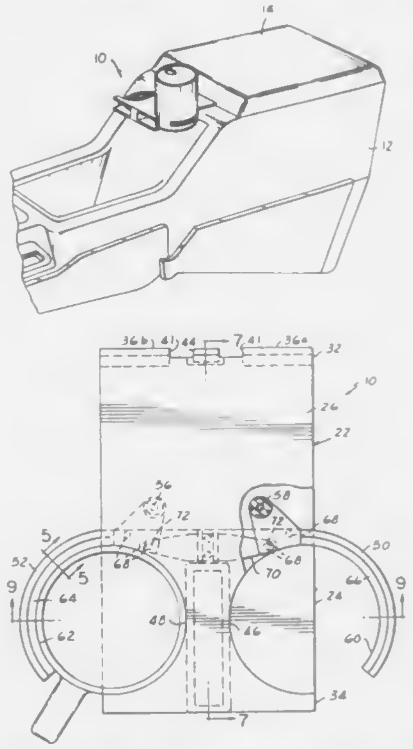
5,024,411
BEVERAGE CONTAINER HOLDER

John R. Elwell, Dearborn, Mich., assignor to Chrysler Corporation, Highland Park, Mich.
Filed Aug. 20, 1990, Ser. No. 570,254
Int. Cl.⁵ A47K *1/08*
U.S. Cl. 248—311.2 12 Claims

1. A beverage container holder adopted for use in:

a center console of a vehicle, said center console including: walls defining a storage compartment, said walls defining said storage compartment including a front wall, said front wall including a transversely extending lip portion extending into said storage compartment; and a hinged cover for covering of the top of said storage compartment; said beverage container holder assembly comprising:

a lower beverage container support portion and an upper elongate member vertically spaced from one another and connected at the center with an upstanding web member, said upper elongate member including a first connection end and a second container holding end, said first connection end including a means for removably engaging the transversely extending lip thereby supporting said beverage container holder in a useable position;



said second container holding end including a pair of outboard facing arcuate surfaces for forming concavities in said second container holding end for supporting a portion of the sides of a pair of beverage container;

a pair of pivotal arms pivotally connected to said upper elongate member; said pair of arms each including an arcuate end portion for engaging a side of a beverage container opposite said pair of opposed arcuate surfaces; and

a means operable between said web portion and said pivotal arms for holding the arms at various spaced locations from said arcuate surfaces of said upper elongate member.

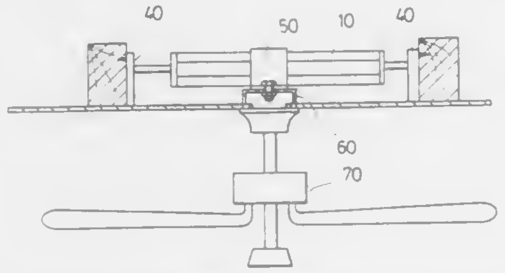
5,024,412
HANGER ASSEMBLY

Shih-Ho Hung, Taichung Hsien, and Tsui-Chen Hsu, Taichung, both of Taiwan, assignors to Llama Precision Inc., Taichung Hsien, Taiwan
Filed Oct. 15, 1990, Ser. No. 597,309
Int. Cl.⁵ B42F *13/00*
U.S. Cl. 248—343 3 Claims

1. An expansible load-bearing junction box hanger assembly adapted for installation from beneath the ceiling and through a junction box opening in the ceiling, including a first wall and a second wall spaced from said first wall, said first and said second walls having a plurality of spike protrusions to engage two spaced adjoining ceiling joists; an elongated linearly ex-

VOL
1127
ISS
3
JE
18
1991
UMI

panding brace means which is aligned with and connected between said first and said second walls, said brace means readily expanding in length to force said first and said second walls to contact and engage their respective ceiling joists, said brace means including a tubular member rotatably mounted to said first wall, a threaded rod member threadedly and telescopically connected to said tubular member, one end of said threaded rod member being in fixed non-rotative engagement with said second wall, said first and said second walls supporting said brace means in a direction substantially parallel to the plane of the ceiling; and a junction box connecting means to rigidly connect a junction box of a heavy load to the central section of said brace means; and improvements, which comprise:



each of said first and said second walls has a receiving groove adjacent to said spike protrusions; said hanger assembly further comprising an alarm device, a cell means, and a switching means including a contact switch disposed in each said receiving groove and actuated when said first and said second walls fully engage their respective ceiling joists, said switching means electrically connecting said alarm device to said cell means to operate said alarm device when said switching means is actuated, thereby indicating that said hanger assembly has fully engaged said ceiling joists.

5,024,413
SPRUNG BICYCLE SEAT POST

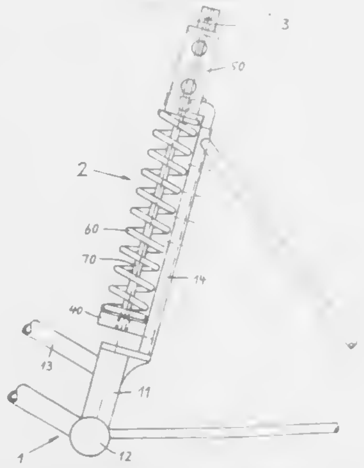
Karel Papp, Saumweg 2, Gebenhofen, 8901 Affing, Fed. Rep. of Germany

Filed Feb. 27, 1990, Ser. No. 485,502

Claims priority, application Fed. Rep. of Germany, Feb. 28, 1989, 8902327[U]

Int. Cl.^{5} A63K *3/00*

U.S. Cl. 248—623 12 Claims



1. A sprung bicycle seat post comprising:
seat mounting means for carrying a seat;
means for supporting the seat mounting means for guided movement in a lengthwise-displaceable fashion;
means cooperative between the seat mounting means and the supporting means for preventing relative rotation of one with respect to the other:
wherein the supporting means is in the shape of a U-shaped bracket with a main part extending lengthwise, and an upper and a lower flange located at respective upper and lower ends of the main part and extending at an angle thereto;
wherein the seat mounting means has a box-shaped guide body with two parallel side walls forming a guide channel therebetween, said side walls extending in the direction of lengthwise-displacement of the seat mounting means, the upper flange of the supporting means being positioned between the side walls of the guide body and having surfaces engaging the guide channel, the guide body including an upper end section and a lower end section, respectively joining upper and lower ends of the side walls:
a compression spring disposed between the lower flange of the supporting means and the lower end section of the seat mounting means; and
a guide rod, extending lengthwise along the displacement axis of the seat mounting means through axially aligned openings in the upper and the lower flange of the supporting means, the guide rod further extending between the upper and lower end sections of the guide body.

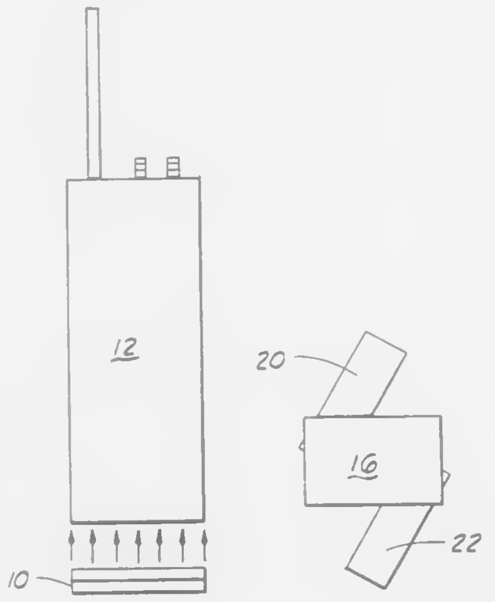
5,024,414
STABILIZING DEVICE FOR HAND-HELD/PORTABLE ELECTRONIC DEVICE

Dennis R. Drain, P.O. Box 95741, Oklahoma City, Okla. 73143

Filed Feb. 26, 1990, Ser. No. 484,812

Int. Cl.^{5} F16M *13/00*

U.S. Cl. 248—688 2 Claims



1. A stabilizer device for attachment to the bottom of an electronic unit to provide upright stability, comprising:
an upper layer member having opposite ends, top and bottom;
means secured on the top of the upper layer for affixure to the unit bottom; and
a bottom layer consisting of two leg members each pivotally affixed at respective opposite ends of said upper layer member and each being pivotable outward in a plane parallel to the upper layer to form approximately a 45° angle with said upper layer member to increase the support stabilization of said unit.

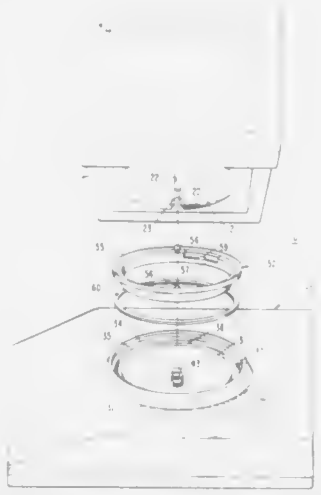
5,024,415
TILT AND SWIVEL APPARATUS FOR A DISPLAY MONITOR

Alfred Purens, Chicago, Ill., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 30, 1989, Ser. No. 429,239

Int. Cl.^{5} F16M *13/00*

U.S. Cl. 248—923 11 Claims



1. Apparatus for mounting a display monitor and for permitting and limiting the extent of tilting and swiveling of the monitor, said apparatus comprising:
a projection extending downwardly from the bottom surface of the monitor forming a convex spherically contoured surface with said spherically contoured surface having a pair of elongated slots located in predetermined locations at opposite sides thereof;
a support structure for the monitor having a cavity for accommodating said spherically contoured surface with said cavity surrounded by a collar having an annular groove therein;
a swivel ring located in said annular groove and arranged for rotation therein with said swivel ring having a beveled top surface for mating with said spherically contoured surface;
a pair of projections extending from a top surface of said swivel ring with each projection engaging its respective slot in the spherically contoured surface and wherein said projections slide within the slots permitting tilting of the monitor by allowing relative motion between the spherically contoured surface of the monitor and the beveled surface of said swivel ring and wherein said projections force said swivel ring to rotate with said spherically contoured surface during swiveling of the monitor and not allowing relative respectively swiveling motion between said spherically contoured and beveled surfaces.

5,024,416
VALVE ACTUATOR

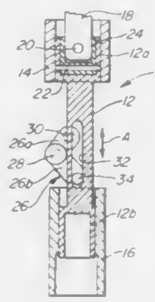
Mordechai Cohen, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jun. 22, 1989, Ser. No. 370,251

Int. Cl.^{5} F16K *31/44*

U.S. Cl. 251—78 12 Claims

1. An actuator system for a rotary valve operated by a rotatable shaft to select a desired flow rate through the valve, comprising:
an actuator member movable in a linear path transverse to the axis of said shaft through a stroke range for changing angular settings of the shaft about its axis; and
linkage means operatively connected between the actuator member and the shaft for transmitting linear movement of the actuator member to angular movement of the shaft, including lost motion means in the form of a pin-and-slot connection such that the actuator member moves through a portion of its stroke range without effecting angular movement of the shaft before effecting a change in the angular setting of the shaft, said linkage means including first and second link arms pivotally connected to each other at adjacent ends.



5,024,417
CONTROL CIRCUITRY FOR A SOLENOID OPERATED CONTROL VALVE

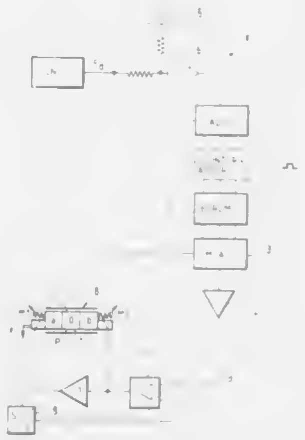
Walter Voxbrunner, Lohr/Main, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany

Filed Mar. 29, 1990, Ser. No. 501,271

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1989, 3911259

Int. Cl.^{5} F16K *31/06;* **G05D** *13/044*

U.S. Cl. 251—129.04 4 Claims



1. A control circuitry for a solenoid operated control valve comprising means for correcting the valve characteristic, said correcting means including an analog/digital converter, a table store and a digital/analog converter, to correct the electrical input signal for controlling the control valve by values stored in said table store, characterized by storing gain values in said store and correcting the input value by stepwise varying said input signal by said gain values called from said store.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,418

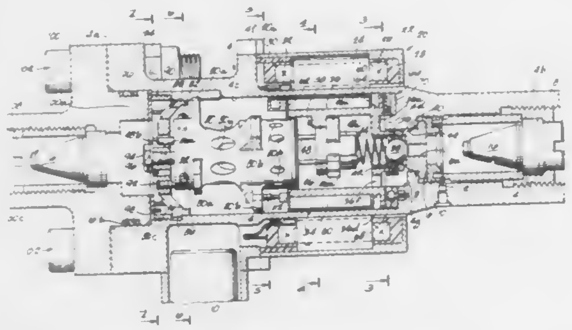
FLUID FLOW RATE CONTROL DEVICE

Robert H. Reinicke, Mission Viejo; Rafic Mobtar, Redondo Beach, and Richard O. Nelson, Torrance, all of Calif., assignors to Eaton Corporation, Cleveland, Ohio

Filed Sep. 7, 1989, Ser. No. 404,296

Int. Cl.^{5} F16K *31/04*

U.S. Cl. 251—129.11 **17 Claims**



1 A fluid flow rate control device comprising:

a housing having an inlet passage, an interior chamber communicating with said inlet passage, an outlet passage leading from said interior chamber, and a valve seat disposed in said outlet passage;

a brushless DC motor in said housing having a rotor supported in said interior chamber, bearing means providing for free rotary movement of said rotor about a rotational axis and for free axial sliding movement of said rotor along said rotational axis independent of said rotary movement thereof, openings in said rotor permitting fluid passage therethrough, said rotor carrying a poppet engaging said valve seat to close off said outlet passage from said interior chamber in an extreme axial position of said rotor; and

means effecting axial translation of said rotor in response to rotation thereof for moving said poppet away from said valve seat comprising a plurality of flexible bands having first ends attached to said rotor at angularly spaced intervals and second ends fixedly secured relative to said housing at points axially spaced from said rotor and correspondingly angularly spaced with said first ends, said bands being disposed parallel to said rotational axis in said extreme axial position of said rotor, rotation of said rotor twisting said bands from said parallel disposition to effect foreshortening thereof in an axial direction and translation of said rotor away from said valve seat.

5,024,419

FAUCET CONNECTOR ASSEMBLY

Philip Mulvey, St. Charles, Ill., assignor to Euroflex, S.A., Seine, France

Filed Jul. 24, 1989, Ser. No. 383,708

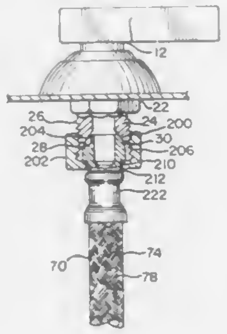
Int. Cl.^{5} F16K *51/00*

U.S. Cl. 251—148 **10 Claims**

1. A faucet connector assembly, comprising:

a flexible bendable elongated braided metallic hose assembly for flexibly extending downwardly from a base of a faucet to an outlet of a water supply distribution source selected from the group consisting of a water supply pipe, tubing, and a shutoff valve, said faucet inlet having an inner wall providing a downwardly diverging faucet seat, said hose assembly having a flexible braided metallic outer shell annularly surrounding a resilient flexible inner tube comprising a substantially water-impermeable elastomeric core, and said hose assembly having an upper faucet-facing end for positioning adjacent said faucet inlet and a lower water supply-facing end for positioning adjacent said outlet of said water supply distribution source; and

universal faucet fitting means comprising a faucet fitting assembly connected to said upper faucet-facing end of said braided metallic hose assembly for sealingly engaging and connection to said faucet inlet, said faucet fitting assembly having a rotatable internally threaded metal coupling nut for threadedly engaging said externally threaded faucet inlet and having a unitary universal stationary faucet fitting about which said coupling nut rotates, said unitary faucet fitting having a universal arcuate tubular faucet fitting head defining a substantially rigid cone-style connector with a convex outer face for seating and wedging against said inner wall of said inlet in press fitting engagement with said downwardly diverging faucet seat, a tubular shoulder extending integrally downwardly from said faucet fitting-head providing a bearing support surface for supporting said rotatable coupling nut, said shoulder having an upper portion and a lower portion, an elongated sleeve providing a main body portion extending integrally downwardly from said shoulder, said shoulder having a larger outside diameter than said sleeve but having a smaller outside diameter than the maximum outside diameter of said faucet-fitting head, at least one downwardly converging frustoconical tubular foot extending integrally downwardly from said sleeve for snugly fitting into said upper faucet-facing end of said braided metallic hose assembly, said foot, sleeve, shoulder and head of said unitary faucet fitting being integral and in coaxial alignment with each other along an axis, said faucet fitting defining an elongated inlet passageway extending along said axis through said foot, sleeve and lower portion of said shoulder and defining a larger outlet passageway extending along said axis through said arcuate faucet fitting head and upper portion of said shoulder, said outlet passageway communicating with said inlet passageway and said faucet inlet, said outlet passageway having a larger diameter than said inlet passageway, said faucet fitting defining an intermediate frustoconical passageway connecting said inlet passageway and said outlet passageway, and said faucet fitting assembly having a tubular crimping member.



5,024,420

FOLDABLE HANDRAIL ASSEMBLY

Gerald W. Downing, 4621 S. Galapago, Englewood, Colo. 80110

Filed Oct. 26, 1989, Ser. No. 435,733

Int. Cl.^{5} E04H *17/14*

U.S. Cl. 256—67 **17 Claims**

1. A foldable handrail assembly for use on either side of a doorway in a wall of an enclosure, said assembly comprising:

a handrail having an inner end portion and an outer end portion;

said inner end portion being pivotally mounted adjacent a doorway in a wall of an enclosure at a pivotal connection with said wall to pivot about a first pivot so that said handrail will swing between an outwardly projecting extended position and a downwardly extended folded position;

a length adjustable first support brace having a lower end portion and an upper end portion arranged for holding said handrail against vertical movement in said outwardly extended position, said first support brace being movable to a folded position;

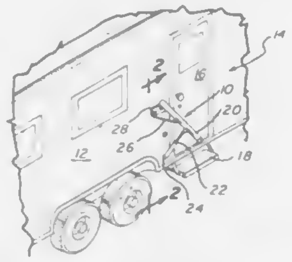
said lower end portion being pivotally mounted to said wall adjacent said doorway and in substantially vertical alignment with said first pivot to pivot about a second pivot;

said upper end portion being pivotally mounted at a pivotal connection with said handrail, and in substantially vertical alignment with said first pivot along said handrail to pivot about a third pivot;

said first support brace having locking means for locking said first support brace against lengthwise movement in said extended position;

a second support brace having an inner end and an outer end for holding said handrail and first support brace against lateral movement in said extended position;

said second support brace having said inner end pivotally mounted at a pivotal connection with said wall at a fourth pivot located at an upper position laterally out to one side of said inner end portion of said handrail and first support brace and said outer end pivotally mounted to a pivotal connection with said handrail at a fifth pivot;



the mounting for said handrail, first support brace and second support brace to said wall being provided by mounting bracket means mounted on said wall to secure said handrail, first support brace and second support brace to said wall,

said mounting bracket means including a first mounting bracket for pivotally mounting said inner end portion of said handrail and said inner end portion of said second support brace to said wall; and

said mounting bracket means including a second mounting bracket for pivotally mounting said lower end of said first support brace to said wall.

5,024,421

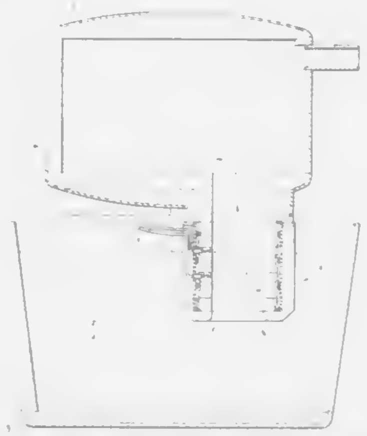
INTERLOCKING SNORKEL REFRACTORY

William G. Cooley, Valparaiso, Ind., assignor to USX Corporation, Pittsburgh, Pa.

Filed May 8, 1990, Ser. No. 520,478

Int. Cl.^{5} C21C *7/10*

U.S. Cl. 266—210 **12 Claims**



1. A degasser snorkel for circulating molten metal from a ladle to a vacuum vessel to attendantly degas the molten metal, said degasser snorkel comprising:

(a) a snorkel can having an inner and an outer surface and being secured to an underside of said vacuum vessel;

(b) a castable layer surrounding said outer surface of said snorkel can;

(c) a pressure grout layer disposed on said inner surface of said snorkel can; and

(d) an inner refractory lining defining a bore through which said molten metal circulates and including a plurality of interlocking refractory bricks fitted together around said inner surface of said snorkel can and being secured thereto by said pressure grout layer, a plurality of rows of said interlocking refractory bricks being built-up to form said inner refractory lining, wherein each of said interlocking refractory bricks includes interlocking means on opposite vertical side faces for interlocking with adjacent interlocking refractory bricks.

5,024,422

ONE-PIECE STOPPER ROD

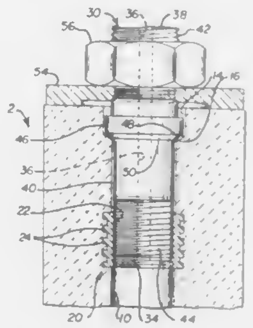
Mark K. Fishler, Tervuren; Jean-Marie Koten, Ostende, both of Belgium, and Pascal Dubois, Feignies, France, assignors to Vesuvius Crucible Company, Pittsburgh, Pa.

Continuation of Ser. No. 291,497, Dec. 29, 1988, Pat. No. 4,946,083. This application Jul. 6, 1990, Ser. No. 549,444

The portion of the term of this patent subsequent to Aug. 7, 2007, has been disclaimed.

Int. Cl.^{5} B22D *11/10*

U.S. Cl. 266—272 **12 Claims**



1. A stopper rod adapted for attachment to a lifting mechanism adjacent to a metallurgical vessel, comprising:

an elongated stopper rod body of a pressed and fired refractory material having an upper end and a lower end, and having an axial bore extending from the upper end toward said lower end; and

a metal bushing insert co-pressed and fired within the stopper rod body in a spaced relationship adjacent said upper end, said insert having a threaded bore positioned co-axially with the bore of the stopper rod body and adapted to threadably receive a threaded metal rod for attachment to said lifting mechanism.

5,024,423

SEMICONDUCTOR DIFFUSION FURNACE INNER TUBE

Fukuji Matsumoto, Takefu; Yoshio Tawara, Fukui; Michio Hayashi, Takefu, and Osamu Yamada, Fukui, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Aug. 15, 1989, Ser. No. 393,779

Claims priority, application Japan, Aug. 15, 1988, 63-202828

Int. Cl.^{5} C21B *7/02*

U.S. Cl. 266—283 **8 Claims**

1. An inner tube for use in a semiconductor diffusion furnace, comprising

a linear or diffusion tube formed of a silicon carbide, and

VOL
1127
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1991
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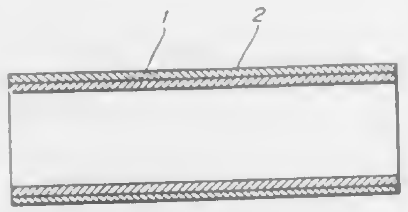
an insulating layer consisting essentially of a material selected from the group consisting of alumina, silica, zirconia, zircon and mixtures thereof,



said insulating layer being formed by spray depositing said material on the entire outer surface of said liner or diffusion tube at a thickness of about 0.1 mm to about 0.5 mm.

5,024,424
AIR-SPRING, IN PARTICULAR FOR THE USE UNDER EXTREME CONDITIONS

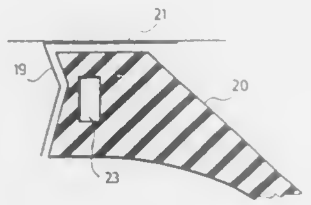
István Fejérdy; Ottó Farkas, and Gábor Havasi, all of Budapest, Hungary, assignors to TAURUS Gumiipari Vállalat, Budapest, Hungary

Filed Aug. 22, 1988, Ser. No. 234,885

Claims priority, application Hungary, Sep. 2, 1987, 3930/87

Int. Cl.^{5} F16F *9/04*

U.S. Cl. 267—64.27 **7 Claims**



1. An air spring comprising an impact surface, a substantially rigid flanged disk attached at its exterior surface in a plane to and disposed partially parallel to said impact surface, said flange disk having an edge which ranges from a first point on said exterior surface at which the flanged disk is no longer disposed parallel to said impact surface, in a direction outwardly from said first point to a second point on said exterior surface, said second point being on a line that is perpendicular relative to said plane, said flanged disk having a re-entrant portion from said second point inwardly to a third point that is spaced from said impact surface and that represents the edge of said flanged disk, and a deformable diaphragm adapted to be maintained at an edge thereof in a substantially fluid-tight, mating relationship to said flanged disk before said second point.

5,024,425
ELASTOMERIC SLEEVE SPRING

Hans-Werner Schwerdt, Laudenbach, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany

Filed Jan. 26, 1990, Ser. No. 471,181

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1989, 3905686

Int. Cl.^{5} F16F *13/00*

U.S. Cl. 267—140.1 **1 Claim**

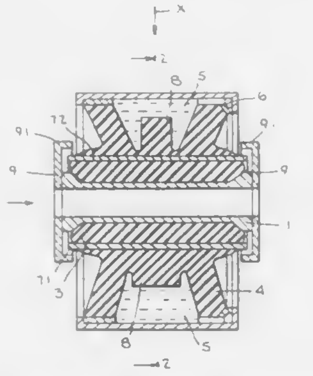
1. Elastomeric sleeve spring with an hydraulic damping, comprising:

two circumferential connecting pieces having parallel axes and one enclosing the other in a relationship parallel to their axes and the connecting pieces being radially spaced apart forming a gap therebetween;

in the gap two external and internal spring bodies successively disposed in a radial direction and made of an elastomeric material of which the external spring body encloses a plurality of liquid-filled chambers with a basically cross-like configured profile;

the external spring body having a damping opening connecting at least two chambers of the external spring body which are opposite to one another;

an intermediate mass being provided between the external and the internal spring bodies, the intermediate mass including two opposing half shells which are associated with a profile of the external spring body in a mirror-inverted relationship, the half shells and the external spring body being permanently attached to each other;



the half shells enclosing a free space and the internal spring body being pressed into the free space while radially pressing together the external spring body;

the sleeve spring including a guiding element and at least at one end the half shells being associated with the guiding element, the guiding element being attached to a connecting piece which supports the internal spring body at its inside; and

the guiding element being flange-like configured and having an annular projection, the annular projection externally enclosing the half shells.

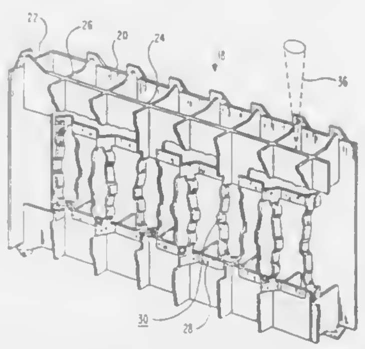
5,024,426
BIMETALLIC SPRING MEMBER FOR RADIATION ENVIRONMENT

Raymond A. Busch, Benton, and John F. Patterson, Richland, both of Wash., assignors to Advanced Nuclear Fuels Corporation, Richland, Wash.

Filed Mar. 17, 1989, Ser. No. 324,947

Int. Cl.^{5} F16F *1/18*

U.S. Cl. 267—158 **16 Claims**



1. A spring member for use in an environment having radiation of sufficient intensity to cause significant stress relaxation during the working life of the spring member, said spring member comprising:

at least first and second sheets of spring material fastened to each other as a layered structure, the first sheet having a first irradiation growth rate and the second sheet having a second irradiation growth rate, the second rate being significantly greater than the first rate.

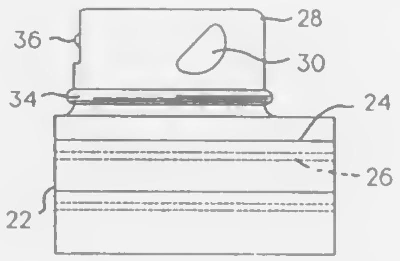
5,024,427
QUICK-CHANGE HEAD FOR PRECISION MACHINE VISE

George R. Swann, 336 Old Babcock Trail, Gibsonia, Pa. 15044

Filed Feb. 6, 1989, Ser. No. 306,511

Int. Cl.^{5} B25B *1/10*

U.S. Cl. 269—136 **15 Claims**



1. In a machine vise having a base, a first jaw secured to said base and a second jaw supported on said base for movement toward and away from said first jaw, the improvement which comprises:

- a. said second jaw comprises:
  - 1. a first element having an extended member having a first bore extending tranversely through said extended member, said first bore having a flat surface therethrough, said flat surface between disposed at an angle such that said flat surface faces in a direction that is toward said base and toward said first jaw; and
  - 2. a second element having a recessed area adapted to receive said extended member, said second element having a second bore aligned with said first bore; and
- b. a removable locking pin adapted for axial insertion into both of said second bore and said first bore, said removable locking pin having a planar portion that substantially corresponds to said flat surface of said first bore for engagement therewith to thereby couple said second element to said first element and said locking pin being further adapted for axial removal from said first and said second bores to uncouple said second element from said first element.

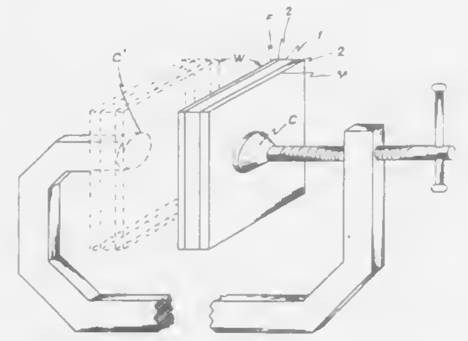
5,024,428
MAGNETIC WORKPIECE CLAMPING BLOCKS

Ronald Ramsay, Plymouth, N.H., assignor to Academy of Applied Science, Concord, N.H., a part interest

Filed Jul. 5, 1990, Ser. No. 548,135

Int. Cl.^{5} B25B *1/24*

U.S. Cl. 269—274 **6 Claims**



1. A relatively resiliently compressible block for ready attachment to and removal from a workpiece clamping surface of relatively hard ferrous metal, said block having opposing flat surfaces of area larger than that of the clamping surface; one surface being provided substantially throughout its area with a resilient magnetized plastic surface for contacting the ferrous metal clamping surface at variable desired subareas of said block surface and magnetically attaching thereto, said subareas being selected to accommodate for different shapes and orientations of the workpiece-to-be-clamped; and the opposite surface of the block providing for engaging the workpiece and cushioning the same from the hard metal clamping surface when operated to clamp the same; the force of magnetic attachment of the uncompressed resilient magnetized plastic surface to the clamping surface being sufficient to permit readily movable relative sliding adjustment of the position of the block over the clamping surface to select desired block subareas of attachment as in setting up the workpiece, and without magnetic detachment of block and clamping surface during such adjustment, but less than the increased magnetic attachment force resulting upon clamping compression of the resilient magnetized plastic which supplements the mechanical clamping force to secure the attachment of the block and clamping surface against relative movement in clamped condition.

5,024,429
METHOD AND APPARATUS FOR PILING PLURAL SHEETS OF MATERIAL HAVING A REPETITIVE PATTERN THEREON, WHILE ENSURING THE VERTICAL ALIGNMENT OF THE PATTERNS FROM ONE SHEET TO THE NEXT

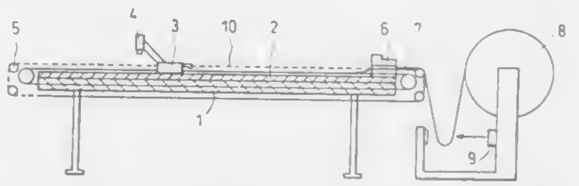
Jean Etcheparre, and Bernard Etchparre, both of Bordeaux, France, assignors to Lectra Systemes S.A., Cestas-Bourg, France

Filed Mar. 12, 1990, Ser. No. 493,008

Claims priority, application France, Mar. 16, 1989, 89 03493

Int. Cl.^{5} B65H *29/46*

U.S. Cl. 270—30 **12 Claims**



1. A method for piling, prior to a cutting-out process, a plurality of sheets of material having repetitive patterns theron while ensuring vertical alignment of said patterns from one sheet ply to the next, said method comprising the successive steps of:

laying down a relatively rigid sheet over a cutting table;

drawing out a first sheet of material having repetitive patterns thereon from a feeding device and laying down said sheet over said relatively rigid sheet;

recording an optimized disposition of all the pieces to be cut out;

introducing vertical perforating elements at predetermined locations of said first sheet to locate the patterns;

drawing out, laying down and fixing sheets of material one by one while maintaining the superposition of the patterns by inserting said sheets through said perforating elements, the latter already being in position; wherein:

said drawing out and laying down of each sheet is performed automatically;

a free end of a sheet is engaged in a gripping device mounted transversally on a main, longitudinally displaceable carriage to which is attached, at a rear portion thereof, a light transporting band;

said carriage is displaced to a front end of said cutting table, whereby a certain length of material is stretched out over said table, while said material is made to rest on said light

VOL
1127
ISS
3
JE
18
1991
UMI

transporting band to protect said material from said perforating elements;

said gripped free end is released while being maintained over said table;

said carriage and its light transporting band are returned to a rear portion end of said table; and

said material sheet is cut transversally to separate said sheet from said feeder.

5,024,430
PAPER HANDLING APPARATUS

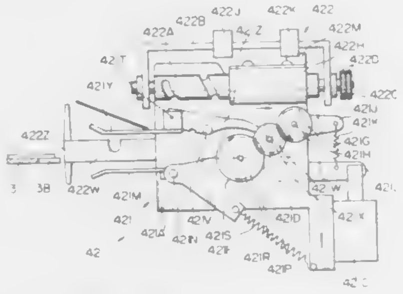
Nobuyoshi Seki; Nobuyuki Morii; Yoshihide Sugiyama; Takashi Komada; Masatoshi Hosoi; Atuhisa Hujiwara; Tsutomu Ichinose, all of Nagoya; Goro Mori, Tokyo; Toshiyuki Kikuchi, Tokyo, and Masahiro Minato, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jan. 4, 1990, Ser. No. 461,001

Claims priority, application Japan, Jan. 18, 1989, 1-7601; Jan. 18, 1989, 1-7602; Jan. 18, 1989, 1-7603; Jan. 18, 1989, 1-7604; Jan. 18, 1989, 1-7605; Jan. 18, 1989, 1-7606; Jan. 18, 1989, 1-7607; Dec. 4, 1989, 1-313506

Int. Cl.^{5} B42B *2/00*

U.S. Cl. 270—53 9 Claims



1. A paper handling apparatus comprising:

a plurality of bins arranged one above another;

paper moving means movable up and down along said plurality of bins for gripping an end of a stack of paper sheets having been received from external equipment, sorted and stacked on any one of said plurality of bins, pulling said stack out of said bin by a predetermined distance, and returning said stack into said bin; and

stapling means for stapling a portion of said stack pulled out by said paper moving means which is adjacent to said end;

said paper moving means comprising:

gripping and pulling means comprising a pair of gripping members located one above the other for gripping the end of the stack loaded on said bin; and

pushing means for pushing the end of the stack having been stapled to return said stack to an original position on said bin;

said gripping and pulling means and said pushing means being provided independently of each other.

5,024,431
SHEET TRANSPORT DEVICE WITH EASY SHEET JAM HANDLING

Tadafumi Shimizu, and Tadasbi Ohira, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 13, 1988, Ser. No. 257,517

Claims priority, application Japan, Oct. 16, 1987, 62-262315; Oct. 16, 1987, 62-262316; Oct. 16, 1987, 62-262317

Int. Cl.^{5} B65H *7/12*

U.S. Cl. 271—263 4 Claims

1. A sheet transport apparatus comprising:

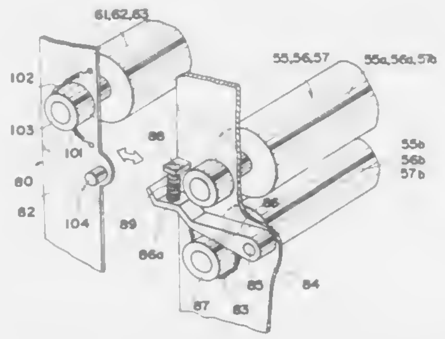
a first sheet transport mechanism including a first path and a first roller for transporting a sheet along the first path;

a second sheet transport mechanism including a first frame member having a second roller and a second frame member having a third roller, said second frame member being movable from a first position where said second and third rollers are pressing against each other to a second position where said second and third rollers are separate from each other, said first and second frame members constituting a second path connected to said first path when said second frame member is at the first position;

a drive source for rotating said first roller in a first direction to feed the sheet toward said second path and in a second direction reverse to said first direction;

a detector for detecting the second frame moving from the first position to the second position and for generating an opening signal; and

a controller for controlling said drive source so that said first roller is driven in the first direction in a normal state and in the second direction in response to said opening signal.



5,024,432
SHEET TRANSFER DEVICE FOR A PRINTING MACHINE

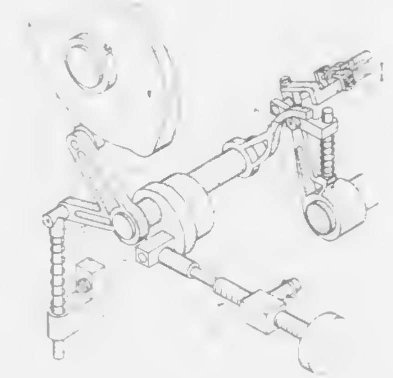
Norbert Thünker, Hirschberg; Gerhard Pollich, Heidelberg, and Heiner Luxem, Wilhelmsfeld, all of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Oct. 4, 1989, Ser. No. 417,706

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1988, 3833645

Int. Cl.^{5} B65H *5/12*

U.S. Cl. 271—268 4 Claims



1. Sheet transfer device for a printing machine for taking over sheets which have been aligned at front lays and for transferring the sheets to a sheet-guiding drum, comprising

a pregripper device disposed across a sheet travel path at a location between front lays of a printing machine and a sheet-guiding drum of the printing machine and swivellable between a sheet takeover position wherein a sheet aligned at the front lays is taken over by said pregripper device and a sheet transfer position wherein the sheet is released by said pregripper device to a sheet-guiding drum;

gripper pads carried by said pregripper device across the sheet travel path;

a gripper shaft swivel-mounted in said pregripper device and carrying gripper fingers in juxtaposed relationship with said gripper pads;

means for connecting said gripper shaft and said gripper fingers so that swivelling movements of said gripper shaft are transmitted to said gripper fingers;

a swivel device for swivelling said gripper shaft about a longitudinal axis thereof,

a cam segment having a control surface for controlling said swivel device, said control surface being formed by linear generatrices, said cam segment being adjustable so that a gap, formed between said gripper fingers and said gripper pads in the takeover position of the pregripper device and existing until alignment of the sheet at the front lays is terminated, is settable in accordance with the thickness of the sheets, said gap being so defined that said gripper fingers form top lays for a respective leading sheet edge; and

a control shaft for carrying said cam segment, said control shaft extending parallel to said generatrices of said control surface and being arranged so as to be adjustable parallel to itself.

5,024,433
MANUALLY ADJUSTABLE ROPES SUSPENDED THEREFROM

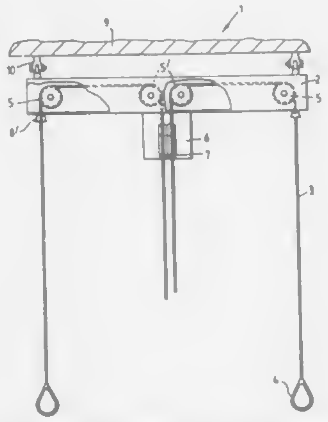
Kaare Mosberg, Turveien 20, Groosasen, N-4890 Grimstad, Norway

Continuation of Ser. No. 297,257, Jan. 5, 1989, abandoned. This application Mar. 20, 1990, Ser. No. 497,765

Claims priority, application Norway, May 14, 1987, 872013

Int. Cl.^{5} A63B *21/12;* **A61H** *1/02*

U.S. Cl. 272—120 4 Claims



1. A physical exercise apparatus with a bar having a pair of manually adjustable ropes, comprising

a bar having internally mounted guide means for turning the direction of a pair ropes;

means for suspending said bar from a ceiling structure, said suspension means having articulating means to enable a swinging movement of said bar in a direction transversely thereof by movement of a first section of each of a pair of ropes;

said pair of ropes mounted on said guide means, each of said ropes having said first section depending from a respective end portion of said bar and each having supporting loop means for user gripping at an end of said first section, and each of said ropes having a second section depending from a central portion of said bar;

means depending from said central portion of said bar for releasably clamping a portion of said second section of each of said ropes to individually adjust a vertical position of each of said supporting loop means, said means including a mechanical member depending from said bar, said member supporting two quick-releasable cleatlock type means for engaging said ropes.

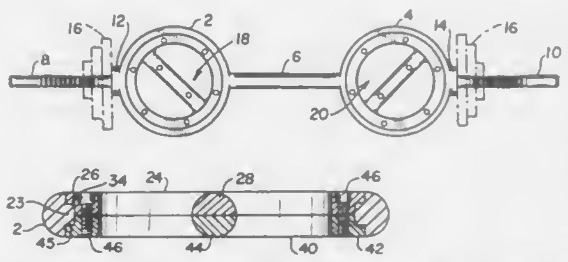
5,024,434
MULTIFLEX EXERCISE DEVICE

Mark R. Smith, 502 Stanely Ave., Clarksburg, W. Va. 26301

Filed Mar. 27, 1990, Ser. No. 499,797

Int. Cl.^{5} A63B *21/072*

U.S. Cl. 272—123 21 Claims



1. The weight lifting apparatus comprising: an elongated bar having a pair of spaced, open circular housings mounted thereto, each of said circular housings having a support member extending inwardly along at least a portion of an inner circumference of said housing, and a handle assembly positioned within each of said circular housings and rotatably mounted on the support member, with each handle assembly including a pair of rotating handle members positioned on opposite sides of said support member and removeably fastened together in sliding engagement with said support member.

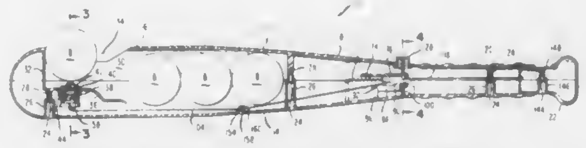
5,024,435
TOY BAT ASSEMBLY

William D. Robbins, 37 Ridge Rd., Succasunna, N.J. 07876

Continuation of Ser. No. 241,016, Sep. 2, 1988, abandoned. This application Mar. 27, 1990, Ser. No. 499,808

Int. Cl.^{5} A63B *59/06*

U.S. Cl. 273—26 B 5 Claims



1. A toy baseball bat assembly which comprises:

a hollow cylindrically-shaped bat including a barrel portion, an intermediate tapered portion and a handle portion, said barrel portion having an opening including an end wall member and defining a magazine to receive a plurality of balls;

a launching means disposed in said barrel portion including a coil means spring mounted on an axis substantially perpendicular to the longitudinal axis of said toy bat assembly for cooperating with said end wall member to expel a ball substantially perpendicular to the longitudinal axis of said toy bat assembly;

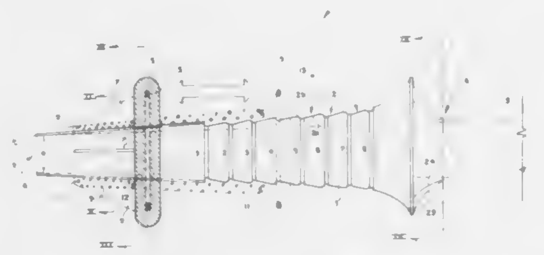
latching assembly means for compressing said coil means spring into a cocked position and comprising first, second and third latching element means and a handle member positioned for slidable movement within said handle portion of said toy bat, said handle member being connected to said first latching element means for placing in com-

VOL
1127
ISS
3
JE
18
1991
UMI

pression said coil means spring in said cocked position, said first latching element means being spring-loaded for loading to a loading position after placement of said launching assembly means into said cocked position thereby integrating said handle portion to said bat assembly, said first latching element means for driving said second latching element means, said second latching element means connected to said launching assembly means for compressing said coil means spring into said cocked position, said third latching element means for locking said second latching element means in said cocked position; and

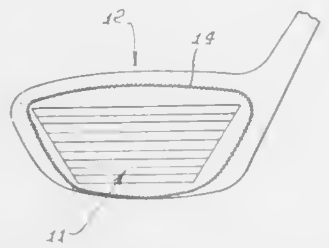
means disposed on an upper side of said handle portion for contacting said third latching element means of said latching assembly means to release said second latching element means thereby to expel said ball from said barrel portion of said toy baseball bat assembly.

5,024,436
BASEBALL BAT EXERCISING DEVICE
Sammy J. Vento, 8401 Sterling Ave., Raytown, Mo. 64138
Filed Sep. 5, 1990, Ser. No. 577,562
Int. Cl.^{5} A63B *69/00*
U.S. Cl. 273—26 R **8 Claims**



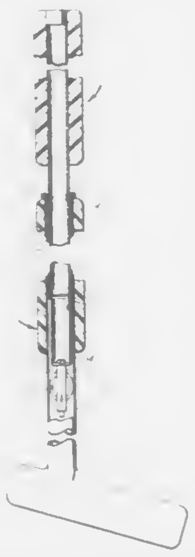
1. A baseball bat exercising device comprising:
(a) a sleeve having a generally cylindrical shape, said sleeve being sized to circumferentially engage a portion of a baseball bat;
(b) an annular weight, said annular weight being sized to surround said sleeve; and
(c) means to removably connect said annular weight to said sleeve and provide a resistive force against said annular weight traveling longitudinally along said sleeve,
(d) whereby said annular weight travels longitudinally along said sleeve when a said baseball bat is swung by a user and provides exercise for said user.

5,024,437
GOLF CLUB HEAD
Donald A. Anderson, Huntington Beach, Calif., assignor to Gear Fit Golf, Inc., Huntington Beach, Calif.
Continuation-in-part of Ser. No. 364,698, Jun. 12, 1989, abandoned. This application Mar. 13, 1990, Ser. No. 492,973
Int. Cl.^{5} A63B *53/04*
U.S. Cl. 273—78 **1 Claim**



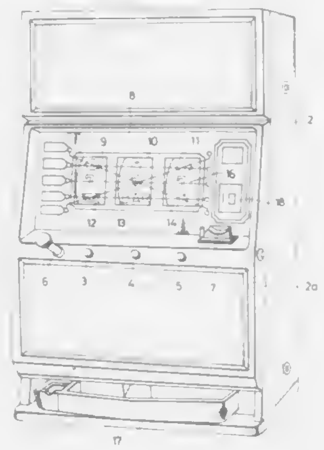
1. A golf club head comprising:
a) a main body portion formed by a steel casting,
b) a face plate formed of forged steel, and having a periphery, and
c) weld means joining said periphery of said face plate to said main body portion to form a high strength, forged face plate for said golf club head,
d) said main body portion having a recessed portion into which the periphery of the face plate is fitted, said weld means joining said face plate to said main body portion comprising weld joint structure formed along the periphery of said face plate and welding said face plate periphery to said recessed portion, and said weld means extending along the periphery of the face plate in looping configuration, and said weld means and face plate extending substantially to the bottom level of the head, and to the toe and heel of the head,
e) said weld means having generally trapezoidal configuration, with top and bottom elongated and curved extents; the top curved extent being upwardly convex, and the bottom curved extent being downwardly convex.

5,024,438
DETACHABLE GOLF PUTTER EXTENSION
A. J. Candow, 2721 Riverbluff Ct., Villa 99, Sarasota, Fla. 34231
Filed Apr. 6, 1990, Ser. No. 505,835
Int. Cl.^{5} A63B *53/14*
U.S. Cl. 273—81 R **2 Claims**



1. Apparatus for modifying a golf putter to provide a readily attachable and detachable putter shaft extension; the putter having a hollow shaft with a club head at one end and extending to a second end, a grip enclosing a portion of the hollow shaft extending from the second end towards the club head, and the grip having a hole in the end thereof exposing the hollow shaft end; comprising:
a putter modifying portion having a female ferrule sized to fit within the golf putter hollow shaft;
said female ferrule having a smooth, cylindrical inner surface extending from a first open end to a second end;
a flange element extending outwardly from said female ferrule first open end diametrically sized to extend at least over the golf putter hollow shaft at the second end of the golf putter hollow shaft, whereby said female ferrule first open end cannot extend into the gold putter hollow shaft;
said second end of said female ferrule, having an inwardly extending portion of reduced cross-sectional diameter with a threaded fastener shaft hole centrally located therein;
an anchor having a connection to said second end of said female ferrule;
said anchor having a portion expandable against the golf putter hollow shaft upon insertion of a threaded fastener through said threaded fastener shaft hole and into said anchor;
said putter shaft extension portion having a straight shaft with a first end formed as a male ferrule having a smooth outer surface fixed to fit snugly within said female ferrule;
said putter extension shaft extension grip connected over said putter extension shaft extending from said second end toward first end and ending above said male ferrule, whereby when said male ferrule is placed in said female ferrule said putter extension shaft will be coaxial with said putter hollow shaft.

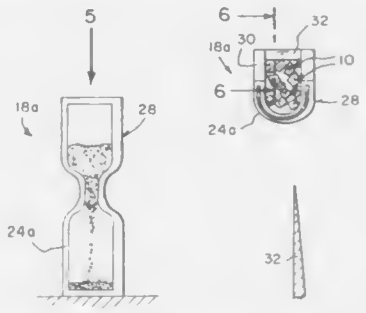
5,024,439
SLOT MACHINE
Kazuo Okada, Tokyo, Japan, assignor to Kabushiki Kaisha Universal, Tokyo, Japan
Filed Aug. 21, 1990, Ser. No. 570,593
Claims priority, application Japan, Aug. 21, 1989, 1-214595
Int. Cl.^{5} A63F *5/04*
U.S. Cl. 273—143 R **8 Claims**



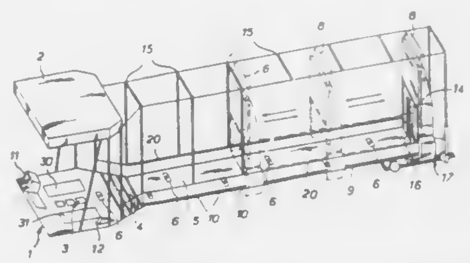
1. A slot machine having a plurality of series of symbols movable past a viewing window during the playing of a game, comprising:
hit determining means for determining before said symbol series stop moving whether said game can be a hit; and
speed setting means responsive to said hit determining means for changing the speed of movement of at least one of said symbol series in accordance with a determination made by said hit determining means so that the possibility of said hit can be visually suggested while the symbols are still moving.

5,024,440
DICE A WORD
Max B. Tidalgo, 12003 Alondra Blvd., Norwalk, Calif. 90650, and George Spector, 233 Broadway, New York, N.Y. 10007
Filed Mar. 5, 1990, Ser. No. 487,867
Int. Cl.^{5} A63F *9/04*
U.S. Cl. 273—145 A **2 Claims**

1. A word building game comprising:
(a) a plurality of playing cubes, each said cube having a letter with a score value on each side thereof; and
(b) means for timing the play of the game for a pre-set time after said cubes are cast upon a flat surface, so that a player can form at least one word from the letters on the top sides of said cubes and then add up the score values; further including a box-shaped container having a hinged lid for holding all of said playing cubes and said timing means therein; wherein said timing means includes an hourglass shaped timer to form a half portion of a housing, in combination with an other half portion of said housing having means for holding and casting said cubes.



5,024,441
GOLFCOURSE SIMULATOR DEVICE
Claude Rousseau, 24 rue Sainte Félicité, 75015 Paris, France
Filed Apr. 5, 1989, Ser. No. 333,258
Claims priority, application France, Apr. 7, 1988, 88 04617
Int. Cl.^{5} A63B *69/36*
U.S. Cl. 273—176 R **18 Claims**



1. A golfcource simulator device comprising a series of holes into which a player must direct a ball in corresponding successive stages in each of which one hole constitutes a stage of objective to which the ball advances from a start area, the player playing all his strokes from the same point and the progress of the ball along the course being simulated by displacement of the objective hole according to parameters of the preceding stroke, said device comprising a driving area, a first ball sensor in said driving area, an elongated track extending from said driving area, a plurality of selectively openable and closable holes on said track, a plurality of second ball sensors each associated with a respective hole, a plurality of third ball sensors disposed along the length of said track to determine the farthest position reached by a ball on said track after a stroke, a target closing said track sat the end opposite said driving area and separating a real space between it and said driving area and a virtual space on the side of said target opposite said driving area, a plurality of impact sensors on said target and control means including a programmed computer comprising means;
defining the series of stages each corresponding to a field extending from a start area to an objective hole and subdivided into an ordered plurality of contiguous cells memorized in said computer in the form of a file comprising plurality of blocks of information each associated with a respective one of said cells of said field and each containing data for identifying the associated cell relative to the start area and the objective hole for the stage in question;
determining stroke parameters either from conditions of impact on said target or from the position of the ball on said track after the stroke according to whether the objective hole for the cell in which the origin of the stroke is simulated is in said virtual space or in said real space, respectively;
determining the cell of said field in which the ball is located

VOL
1127
ISS
3
JE
18
1991
UMI

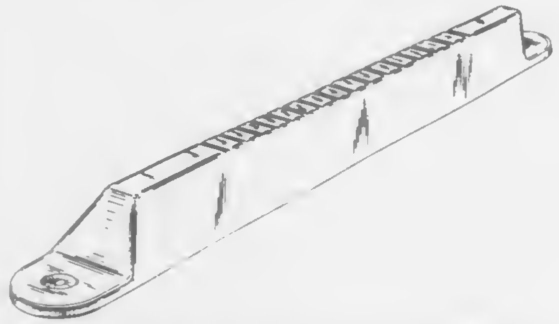
after a stroke from the stroke parameters and the cell reached after the preceding stroke;

retrieving from said file objective parameters associated with the cell reached after the preceding stroke, which parameters condition the opening of a particular hole on said track if said cell is in said real space; and

registering the end of a stage in response to activation of one of said second ball sensors corresponding to entry of the ball into the opened hole.

5,024,442
PUTTING PRACTICE DEVICE

Joseph L. Sindelar, Sr., 2121 Hancock Dr., Horseheads, N.Y.
Filed Jun. 19, 1990, Ser. No. 540,350
Int. Cl.⁵ A63B *69/36*
U.S. Cl. 273—186 C **21 Claims**



9. An apparatus for practicing golf strokes comprising:

an elongated element having a longitudinal axis and first and second longitudinal ends, the elongated element including a base portion having a bottom face and a club head guide portion and means for securing said base portion to a putting surface, said guide portion having a length less than the length of said base portion;

means defining a substantially vertical longitudinal side face on said guide portion extending along at least substantial portion of the length of said guide portion, said vertical side face being defined in a plane disposed at an angle of substantially 90° with respect to a plane of said bottom face of said base portion;

means defining an inclined longitudinal side face extending along at least a substantial portion of the length of said guide portion, said inclined side face having a length substantially co-extensive with said vertical side face and being defined in a plane disposed at an angle of less than 90° with respect to the plane of said bottom face of said base portion;

whereby, when said vertical side face is aligned with a target, the heel of a putter can be placed against and guided along said vertical side face so as to practice a straight method stroke and, when said inclined longitudinal side face is aligned with the target, the heel of a putter can be guided rearwardly, inwardly and upwardly along the inclined side face and forwardly, inwardly and upwardly along the inclined side face so as to practice an in to in method stroke.

5,024,443
ATHLETIC SWING PRACTICE APPARATUS

Miro D. Bellagamba, 5161 Vineland Rd., Orlando, Fla. 32811
Filed Nov. 26, 1990, Ser. No. 618,381
Int. Cl.⁵ A63B *69/36, 21/04, 21/12*
U.S. Cl. 273—188 R **7 Claims**

1. An athletic swing practice apparatus comprising:

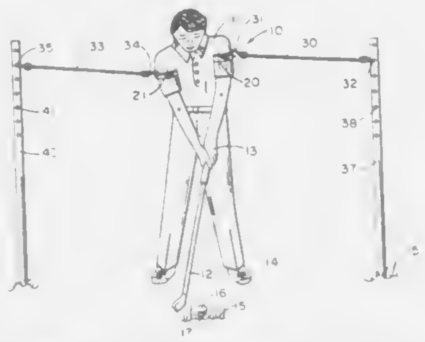
a pair of flexible arm encircling straps shaped to encircle the upper arm of an athlete during a practice swing;

an elastic strap extending from each of said pair of flexible arm encircling straps, each elastic strap having an elongated piece of cooperating hook or loop material attached thereto for interlocking with each other and attaching elastic straps together to form a single elastic strap connecting said pair of flexible arm encircling straps together by a predetermined distance;

a fastener member attached to each of said flexible arm encircling straps;

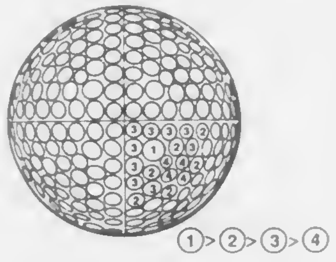
a pair of elastic cords, each said elastic cord having a fastener member attached to one end thereof removably attaching each said cord to one said, fastener member of said flexible arm encircling, straps; and

a pair of stationary members adapted to be positioned a predetermined distance apart and having means for attaching one said elastic cord to each stationary member at one end portion of each elastic cord member whereby a person can practice an athletic swing with each arm having an arm encircling strap thereon connected to each other by said pair of connected elastic straps extending across the person's back to place a predetermined force between the arms while a predetermined force is applied to the movement of the upper body during an athletic swing by said pair of elastic cords.



5,024,444
GOLF BALL

Hisashi Yamagishi; Shinichi Kakiuchi, both of Yokohama, and Seisuke Tomita, Tokorozawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed Nov. 9, 1989, Ser. No. 435,207
Claims priority, application Japan, Dec. 2, 1988, 63-305561
Int. Cl.⁵ A63B *37/12*
U.S. Cl. 273—232 **7 Claims**



1. A golf ball, comprising:

a plurality of dimples disposed about the spherical surface of the golf ball, wherein said plurality of dimples includes at least three types of dimples, said plurality of dimples having a total dimple surface area quotient Dst of at least 4, wherein the total dimple surface area quotient Dst is defined as:

$$Dst = \frac{\pi \sum_{k=1}^{n} [(Dmk^2 + Dpk^2) \times Vok \times Nk]}{4R^2}$$

wherein n is a positive integer of at least 3,

Group k is one of a plurality of discrete dimple groups covering the spherical surface of said golf ball,

Nk is the number of dimples belonging to a group k, wherein k is 1, 2, 3, . . . , through n,

Dmk is the diameter of dimples belonging to a selected group k,

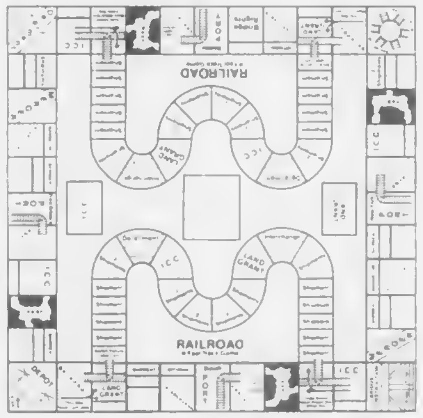
Dpk is the depth of dimples belonging to a selected group k,

R is the radius of the ball, and

Vo is a value obtained by dividing the volume of the dimple space defined between the surface of each dimple and a plane defined by the periphery of each dimple by the volume of a cylinder having said plane defined by the periphery of each dimple as its base and the maximum depth of each dimple as its height.

5,024,445
METHOD OF PLAYING A BOARD GAME

John D. Boelter, Jr., 1114 Benton Way, Arden Hills, Minn. 55112
Filed Sep. 9, 1985, Ser. No. 774,131
Int. Cl.⁵ A63F *9/04*
U.S. Cl. 273—256 **6 Claims**



1. A method of playing a board game in which a move comprises the steps of:

a. placement of one or more stop abridgement means, the stop abridgement means permitting avoidance of any consequences of the stop over which it is placed;

b. operating a means to generate the number of steps to be traversed during the move by a player's marker; and, if the stop abridgement means is traversed;

c. removing the stop abridgement means from play and avoiding the consequences of the stop on which it was placed.

5,024,446
INDICATING MEANS FOR TETHERBALL GAME

Neville M. Norman, 90 Sandyhurst La., Ashford, Kent, United Kingdom
Filed Jul. 3, 1990, Ser. No. 547,588
Int. Cl.⁵ A63B *67/00*
U.S. Cl. 273—413 **6 Claims**

1. Apparatus for a tetherball game including:

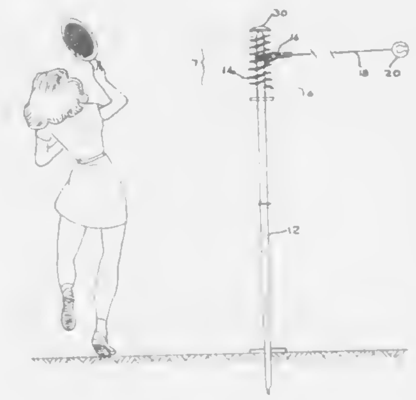
a vertically mounted pole;

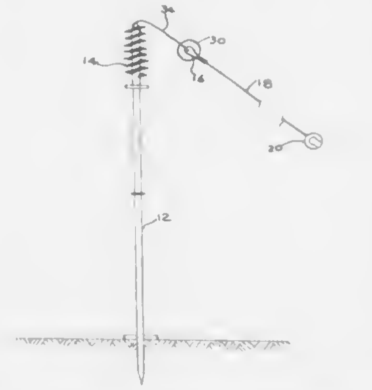
a ball;

a line connecting the ball to the pole;

a line attachment at the end of the line remote from the ball which couples the line to a helical guide on the pole and which is free to rotate about the helical guide to move up or down the helical guide depending on the direction in which the ball is struck; the helical guide being free at either end to permit the line attachment to emerge from the helical guide; and

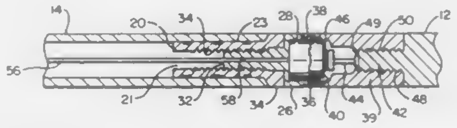
characterised by the inclusion of means to divert the line attachment from a terminal position on the helical guide to a temporary captive position immediately upon the line attachment emerging from the helical guide, the captive position being displaced from the axis of the helical guide.





5,024,447
TRANSMITTER IN ARROW

Arthur D. Jude, 7821 E. Dublin, Granville, Ohio 43054
Continuation-in-part of Ser. No. 822,779, Jun. 9, 1986, abandoned. This application Sep. 11, 1989, Ser. No. 405,761
Int. Cl.⁵ F42B *6/04*
U.S. Cl. 273—416 **6 Claims**



1. In the combination of an arrow, a transmitter and means forming an antenna for transmitting a signal from the transmitter, the improvement including:

(a) the arrow including an arrowhead connected to one end of a hollow aluminum shaft and fletchings at the other end of said shaft,

(b) the antenna means comprising a primary antenna and a secondary antenna,

  (1) said primary antenna comprising the aluminum shaft and

  (2) said secondary antenna connected to the transmitter and extending from near the arrowhead into the hollow shaft,

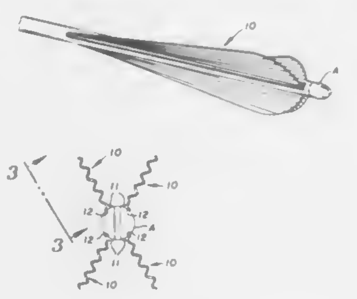
(c) the transmitter being located in means forming an electrically, conducting housing, said housing being electrically connected to the shaft,

(d) said arrowhead being threaded into one end of an inter-

VOL
1127
ISS
3
JE
18
1991
UMI

nally threaded connection means, said internally threaded connection means being threadedly connected to said transmitter housing means,
- (e) a longitudinally reciprocable push rod in said internally threaded connection means, said push rod being configured to move longitudinally to push a battery into electrical contact with the transmitter in response to an arrowhead being threaded into the internally threaded connection means,
- (f) the secondary antenna being connected to the transmitter through said housing, and
- (g) the primary antenna, being connected to the transmitter by the housing being threaded to said connection means on the end of the hollow shaft, said connection means being in electrical contact with the shaft.

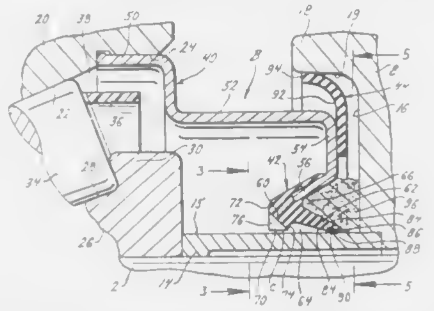
5,024,448
FLEXIBLE VANE FOR ARROWS
Robert L. Barrie, #2 Knoll Dr., Waseca, Minn. 56093
Filed Sep. 21, 1989, Ser. No. 410,300
Int. Cl.^{5} F42B *6/06*
U.S. Cl. 273—423 9 Claims



1. A collapsible vane for attachment to an archery arrow including:
- a. a first mounting member of a predetermined length providing a forwardmost and a rearmost end having an arcuately formed lower surface which conforms to the diameter of the arrow to which the vane will be attached;
- b. the collapsible vane extending from said forwardmost end of said lower mounting member surface to the rearmost end thereof and increasing in radial dimension from said forwardmost end to a point spaced from said rearmost end;
- c. the collapsible vane including a plurality of pleated, convolute section arranged and constructed to compress radially when a compressive force is applied to the outermost of said sections; and,
- d. each of the convolutes extending from the forwardmost end of said mounting member toward the rearmost end thereof.

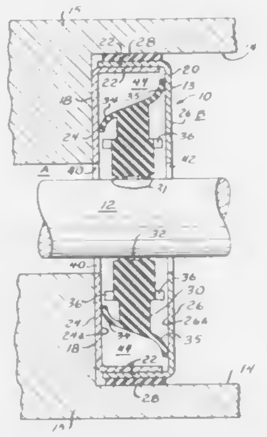
5,024,449
SEAL ASSEMBLY FOR USE WITH AN OVERHANG
Dennis L. Otto, Carroll County, Ohio, assignor to The Timken Company, Canton, Ohio
Continuation-in-part of Ser. No. 124,814, Nov. 23, 1987, Pat. No. 4,819,949, which is a continuation-in-part of Ser. No. 79,175, Jul. 29, 1987, Pat. No. 4,770,548, which is a continuation of Ser. No. 811,657, Dec. 19, 1985, abandoned. This application Apr. 6, 1989, Ser. No. 334,448
Int. Cl.^{5} F16J *15/32, 15/34*
U.S. Cl. 277—37 18 Claims

1. In combination with a circular sealing surface which is located around an axis of rotation with its center at the axis and an overhang which extends around the sealing surface concentrically with respect to that surface, yet is spaced outwardly from the surface and is fixed in position with respect to it,. an improved bal for establishing a barrier along the sealing surface and overhang while relative rotation occurs between the sealing surface and the seal, said seal comprising: a generally rigid case mounted concentrically with respect to the sealing surface, yet such that relative rotation can occur between the sealing surface and case; a first lip carried by the case and being presented toward and along the sealing surface to create a barrier to the passage of lubricant along the sealing surface, the first lip having an end face which is located at a substantial angle with respect to the axis of rotation and a circumferential face which is presented around and toward the sealing surface and intersects the end face at an edge, the circumferential face being generally separated form the sealing surface, the first lip having pumping cavities which open out of the end face and the circumferential face and interrupt the edge, the cavities being configured to impel lubricant which enters them generally axially in the direction toward which the cavities open out of the end face when relative rotation occurs between the sealing surface and seal; and a flexible shield carried by the case and directed outwardly away from the axis and toward the overhang, the shield having been deflected by the overhang as a result of the insertion of the seal into the overhang or the installation of the overhang around the seal and being along the overhang to establish a barrier to the passage of contaminants along the inwardly presented face of the overhang, the shield being formed form an elastomer that has low resistance to abrasion, the shield having been abraded significantly by the overhang to the extent that it does not contact the overhang or else bears against the overhang with a very light force, whereby the shield conforms generally to the inwardly presented surface of the overhang.

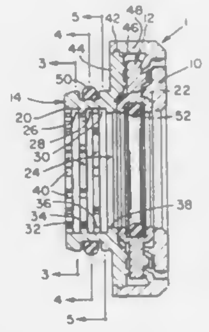


5,024,450
SEAL CARTRIDGE ASSEMBLY
Erwin T. Hawley, and Gregory S. Kladden, both of Indianapolis, Ind., assignors to Rexnord Corporation, Milwaukee, Wis.
Filed Dec. 5, 1989, Ser. No. 446,204
Int. Cl.^{5} F16J *15/34*
U.S. Cl. 277—37 14 Claims

1. A seal cartridge assembly for providing a seal between a non-rotatable member having an axial bore and a rotatable shaft mounted within the axial bore, including in combination:
- a housing comprised of a pair of annular case members, each case member including an outer peripheral wall portion and having an annular flange portion extending radially inwardly from said outer peripheral wall portion, with the outer peripheral wall portion of each case member press fit together in overlapping relationship to provide a substantially U-shaped housing, with said annular flange portions defining aligned annular seal facings,
- single member annular seal means extending around and contacting only the outer peripheral wall portion of said case members, with said housing and said annular seal means being adapted to be press fit and sealed to the axial bore of the non-rotatable member, and
- an annular sealing ring positioned within said housing and adapted to be positioned about said rotatable shaft and rotatable therewith, a first flexible lip formed on said annular sealing ring extending obliquely and radially inwardly from the body of said sealing ring to resiliently engage an annular seal facing of said housing to provide a seal therebetween,
- a second flexible lip formed on said annular sealing ring extending obliquely and radially outwardly from the body of said sealing ring to resiliently engage the other of said annular seal facings of said housing to provide a seal therebetween, whereby said first and said second lip extensions of said sealing ring are effective at times to prevent fluid flow through the seal cartridge assembly.

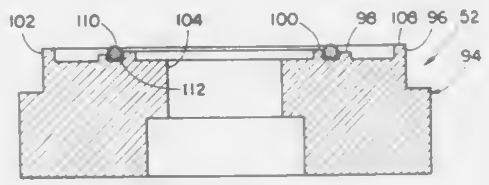


5,024,451
MULTI-POSITION LABYRINTH SEAL RING
Richard Borowski, Victor, N.Y., assignor to Garlock Inc., New York, N.Y.
Filed Jul. 5, 1990, Ser. No. 548,699
Int. Cl.^{5} F16J *15/34*
U.S. Cl. 277—53 19 Claims



1. A labyrinth ring comprising
- (a) an axially inner end,
- (b) an axially outer end,
- (c) an internal bore,
- (d) a series of radial lands and grooves formed in said bore at said inner end,
- (e) a plurality of axial drainage grooves extending across said lands at spaced intervals around the inner periphery of said lands to join said radial grooves, said axial grooves in adjacent lands being rotationally offset from one another sufficiently that none of said axial grooves extends continuously across more than two adjacent radial lands, and
- (f) at least one radial land at said axially outer end having no axial grooves extending thereacross.

5,024,452
REACTOR COOLANT PUMP HAVING THERMALLY STABILIZED HYDROSTATIC SEALING ASSEMBLY
Charles D. Bice, Clinton Township, Butler County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed Jan. 16, 1990, Ser. No. 466,143
Int. Cl.^{5} F16J *15/38*
U.S. Cl. 277—81 R 18 Claims



1. A hydrostatic sealing assembly, comprising:
- (a) a pair of sealing parts mountable for undergoing relative rotation;
- (b) at least one of said sealing parts including an annular support member and an annular faceplate member mountable to said support member, said members having respective one sides adjacent to and spaced from one another, one of said support and faceplate members having a sealing surface at its one side adjacent to and spaced from said one side of said other of said members;
- (c) said other of said support and faceplate members including
  - (i) an annular body having radially spaced outer and inner circumferential edges,
  - (ii) an outer raised circumferential rib defined on said annular body adjacent to said outer circumferential edge thereof at said one side of said other member for engagably supporting said one member at said adjacent side thereof when said faceplate member is mounted to said support member,
  - (iii) an inner raised circumferential rib defined on said annular body adjacent to said inner circumferential edge thereof at said one side of said other member for retaining a separate sealing element between the respective one adjacent sides of said faceplate and support members,
  - (iv) an annular flexible sealing element separate from and disposed on said annular body adjacent to and about said inner rib thereon; and
  - (v) an annular recessed cavity defined in said annular body at said adjacent side of said other member between said outer and inner ribs for substantially spacing said faceplate member from said support member at said respective one adjacent sides thereof to thermally insulate said faceplate member from said support member;
  - (vi) said sealing element having a cross-sectional diameter greater than the height of said inner rib so as to project from said one side of said other member, beyond said inner rib, and toward said adjacent side of said one member for sealably engaging said one member at said adjacent side thereof as said outer rib engagably supports said one member at said adjacent side thereof.

5,024,453
LIVELOAD ASSEMBLY FOR ROTARY OR RECIPROCATING SHAFT PACKING
Steven M. Suggs, Atlanta, Ga., assignor to Pressure Services, Inc., Doraville, Ga.
Filed Dec. 20, 1988, Ser. No. 287,079
Int. Cl.^{5} B65D *53/00;* **E21B** *33/00;* **F16J** *15/00;* **F16B** *43/02*
U.S. Cl. 277—106 15 Claims

1. A liveload assembly for positioning on a bolt extending from a stuffing box of a fluid flow apparatus and securing to the bolt with a nut, for communicating force to an axially

VOL
1127
ISS
3
JE
18
1991
UMI

translatable gland follower which compresses packing held in the stuffing box, comprising:

a stack guide having an open top and a bottom defining an aperture for receiving the bolt to position the liveload assembly against the gland follower;

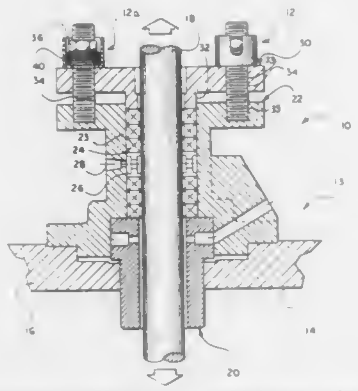
a plurality of compressed belleville washers stacked inside the stack guide; and

a retainer operably engaged with the stack guide for holding the belleville washers in a compressed relationship independent of the nut,

whereby the compressed force of the belleville washers is applied to the gland follower when:

the nut is threaded on the bolt and brought into contact with the stack of belleville washers to secure the liveload assembly to the gland follower, and

the retainer is disengaged from holding the belleville washers.



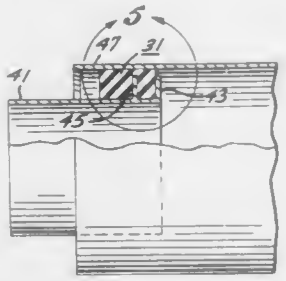
5,024,454
COMPENSATING SEAL

Kenneth J. McGilp, 10675 East Ave., Hesperia, Calif. 92345; Stephen N. Affa, 14644 Camelia Hill, Canyon Country, Calif. 91351, and Ira R. Newman, 10224 Falun Dr., Sun Valley, Calif. 91352

Continuation of Ser. No. 89,269, Aug. 25, 1987, abandoned. This application Jun. 30, 1989, Ser. No. 374,532

Int. Cl.^{5} F16L *21/02*

U.S. Cl. 277—207 A 7 Claims



1. An integral ring shaped seal for effecting sealing between telescoped inner and outer tubular members, comprising, in combination:

a body of flexible elastomer material;

at least a portion of said body adapted to fit between a pair of spaced apart flanges carried by one of said members with said flanges extending toward but terminating short of the other of said members;

an integral peripheral protrusion about the body extending outwardly thereof in the direction of the other member for resilient engaging contact therewith;

a compensating groove in the body adjacent said one member and opposite the protrusion whereby telescoping said members together squeezes the protrusion in a direction inwardly of the body permitted by alteration of the shape of the compensating groove to seal the telescoped members against both high pressure and low pressure leakage; and,

said body extending longitudinally beyond said flanges along the flanged member and that flange which is innermost on the member carrying the flanges thereby locking the seal in sealing position.

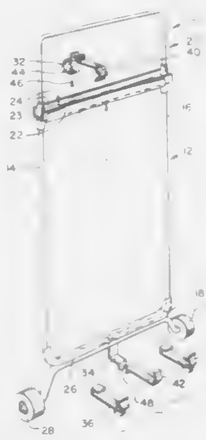
5,024,455
LUGGAGE CART

Ray B. Schrecongost, 2412 W. Sibley St., Park Ridge, Ill. 60068

Filed Jun. 11, 1990, Ser. No. 535,908

Int. Cl.^{5} B62B *1/04*

U.S. Cl. 280—37 9 Claims



1. A wheeled cart for transporting luggage having a first part with an exterior wall and a rim having a cross-sectional contour and a second part with a rim, said first part and said second part being interconnected by a hinge for movement between an open position and closed position in which the rim of said first part and the rim of said second part are in abutting relation to form a compartment, the cart comprising:

a supporting structure for supporting the luggage said supporting structure having a handle;

first and second brackets attached to the supporting structure in spaced relation for receiving the luggage therebetween, each of said first and second brackets having a profiled portion which encircles and conforms to the cross-sectional contour of the rim of said first part of said luggage for hooking over the rim of said first part at opposed points, said profiled portion being sufficiently resilient to provide a reaction force for urging the exterior wall of said first part against said supporting structure; and

a pair of wheels mounted on an axle attached to said supporting structure wherein said wheeled cart permits said second part to be opened relative to said first part while said supporting structure is attached to said first part.

5,024,456
TWO UNIT FOLDING HITCH STRUCTURES

Howard C. Hadley, Des Moines, and John R. Myers, Polk City, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jul. 12, 1989, Ser. No. 378,877

Int. Cl.^{5} B60D *1/00*

U.S. Cl. 280—412 20 Claims

1. Hitch structure for towing first and second framed implements forwardly one behind the other in a transport position and in a generally side-by-side relationship in a field-working position, the implements each having a frame with end members and front and rear frame members, the hitch structure comprising:

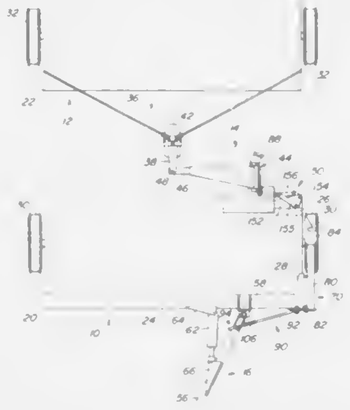
an elongated rear hitch having a forward end and a rearward end, the rearward end adapted for connection to and towing of the second implement;

hinge means for pivotally connecting the forward end of the rear hitch to one side of the rear frame member of the first implement adjacent a corresponding end member thereof;

a fore-and-aft extending forward hitch including an aft end pivotally connected to the front frame member of the first implement at a location offset toward the one side of the implement, and a forward towing end adapted for connection to a towing vehicle;

means for rocking the forward hitch about an upright axis between a first position corresponding to the transport position, wherein the forward towing end is generally centered with respect to the first implement, and a second position corresponding to the field-working position wherein the forward towing end is offset toward the one side generally centered between the implements, wherein the upright axis is centrally located between said corresponding end member and the center of the first implement adjacent the front frame member; and

means for rocking the rear hitch between first and second positions corresponding to the transport and field-working positions, respectively, wherein the rearward end is generally centered with respect to the first implement when the rear hitch is in the first position and is offset outwardly of the corresponding end member of the first implement when the rear hitch is in the second position.



5,024,457
SAFETY SKI BINDING

Martin Bogner, Ostfildern, Fed. Rep. of Germany, assignor to GEZE Sport International GmbH, Leonberg, Fed. Rep. of Germany

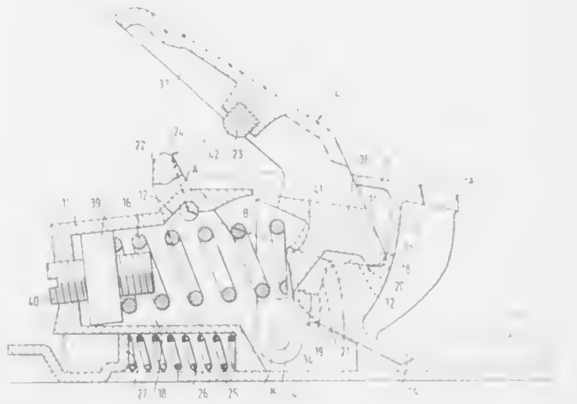
PCT No. PCT/EP89/00922, § 371 Date Mar. 26, 1990, § 102(e) Date Mar. 26, 1990, PCT Pub. No. WO90/01358, PCT Pub. Date Feb. 22, 1990

PCT Filed Aug. 3, 1989, Ser. No. 469,600

Int. Cl.^{5} A63C *9/084*

U.S. Cl. 280—632 14 Claims

1. Safety ski binding comprising a heel unit having a bearing housing (11) which is secured to the ski and is preferably displaceable rearwardly against a spring force, with a sole holder (13) capable of pivoting between a closed position and an open position about a first transverse axle (12) connected to the bearing housing and with a hand opening lever capable of pivoting between a close position and an open position about a second transverse axle (14) connected to the bearing housing, wherein a release spring (16) which is braced having one end against the bearing housing (11) and which biases a hand opening lever (15) to a closed position in a closing direction relative to the second axle provided in the bearing housing and a latch projection (17) is movable by means of the hand opening lever (15) and engages in the closed position into a first latch recess (18) and in an open position into a second latch recess (19) of a cam track (20) arranged on the sole holder (13) and provides for latching of the sole holder in the closed position and in the open position, with the cam track (20) having a culmination point (21) between the first latch recess and the second latch recess, characterized in that: an actuating abutment (22) is arranged on the sole holder (13) at a distance (A) from the first transverse axle (12) which is clearly smaller than a distance (B) of the culmination point (21) from the first transverse axle (12); in that a counter-abutment (23) which cooperates with the actuating abutment (22) is provided on the hand opening lever (15); in that at least one of the two abutments (22, 23) is made resiliently yielding; and in that the hand opening lever (15) is pivotally arranged on the bearing housing (11) relative to the sole holder (13), and the counter-abutment (23) is attached thereto, such that when the sole holder (13) is located in the closed position and when the hand opening lever is moved from the closed position into an open position, said hand opening lever first engages the actuating abutment (22) and then moves the sole holder (13) in the opening direction with an angular speed in relation to the first transverse axle (12) which is increased relative to the actual angular speed of the hand opening lever (15), in correspondence to the different distances (A, B) and the instantaneous phase of a circular movement of the hand opening lever (15), until the latch projection again contacts the cam track (20) prior to reaching the culmination point (21), whereupon the latch projection (17) slides with compression of the at least one resilient abutment over the culmination point (21) and the sole holder (13) springs into an over dead point position, wherein the counter-abutment (23) is resilient and the actuating abutment (22) is rigid.



5,024,458
PORTABLE LUGGAGE CARRIER WITH PIVOTABLE WHEELS

Eugene A. Kazmark, 5 Remin La., and Eugene A. Kazmark, Jr., 506 Manhattan Rd., both of Joliet, Ill. 60433

Filed Feb. 7, 1990, Ser. No. 476,311

Int. Cl.^{5} B62B *1/12*

U.S. Cl. 280—645 12 Claims

8. A portable luggage carrier comprising: a handle member having a first and second end; a grip means disposed at the first end of the handle member; a base member pivotally connected to the handle member at the second end of the handle member for supporting luggage; wheel means disposed at the second end of the handle member for rolling on a subtending surface; axle means disposed at the second end of the handle member for supporting the wheel means, said wheel means being rotatably mounted on the axle means, said axle means defining an axis of rotation for said wheel means, said axle means being pivotally mounted to said handle member; and a movable first

VOL
1127
ISS
3
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1991
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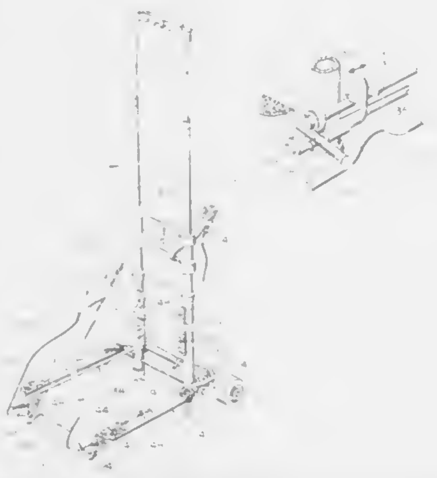
latching means secured tot he second end of the handle member for engaging the axle means and releasably securing the



axle means in a first location; said axle means being movable independently of the base member.

5,024,459

PRESSURE CONTROL SYSTEM FOR SUSPENSION

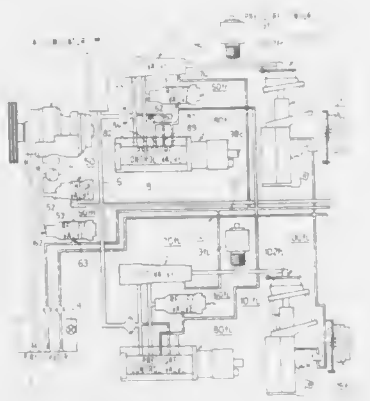
Kouichi Kokubo, Nagoya; Toshiaki Hamada, Toyota; Shinichi Tagawa, Toyota; Nobuyasu Suzumura, Toyota; Shuuichi Buma, Toyota; Toshio Aburaya, Toyota; Toshio Onuma; Kunihito Sato, both of Susono; Takashi Yonekawa, Mishima; Masaki Kawanishi, Toyota; Hiroyuki Ikemoto, Susono, and Kaoru Ohashi, Okazaki, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Aisin Seiki Kabushiki Kaisha, Kariya, both of, Japan

Filed Dec. 27, 1989, Ser. No. 457,957

Claims priority, application Japan, Dec. 28, 1988, 63-331041; Feb. 13, 1989, 1-33462; Aug. 28, 1989, 1-221240; Aug. 31, 1989, 1-226222

Int. Cl.^{5} B60G *17/00*

U.S. Cl. 280—707 **12 Claims**



1. Pressure control system for suspension comprising

a pressure source for supplying a fluid which is drawn from a reservoir to a high pressure piping under a high pressure which delivers a hydraulic fluid to a suspension which is adapted to extend and shrink in response to a pressure supplied thereto;

a pressure control valve including a line pressure port communicating with the high pressure piping, a low pressure port communicating with a low pressure, an output port for delivering a pressure to the suspension, a target pressure space communicating with the high pressure piping through an orifice, a spool responsive to a pressure from the output port applied to its one end to be driven in a direction to reduce a degree of communication between the line pressure port and the output port and to increase a degree of communication between the low pressure port and the output port and also responsive to a pressure from the target pressure space applied to its other end to be driven in a direction to increase a degree of communication between the line pressure port and the output port and to reduce a degree of communication between the low pressure port and the output port, a valve element for defining a degree of communication between the target pressure space and the low pressure, and electrical drive means for driving the valve element in a direction to increase/decrease the degree of communication;

pressure detecting means for detecting a pressure in the high pressure piping;

command means for commanding a pressure value to be applied to the suspension;

correction means for correcting the pressure value from the command means in a manner dependent on the pressure detected by the pressure detecting means so as to increase the output value when detected pressure is low;

and electrical energization means for electrically energizing the pressure control valve in accordance with the pressure value as corrected by the correction means so as to deliver a pressure corresponding to the pressure value to the suspension.

5,024,460

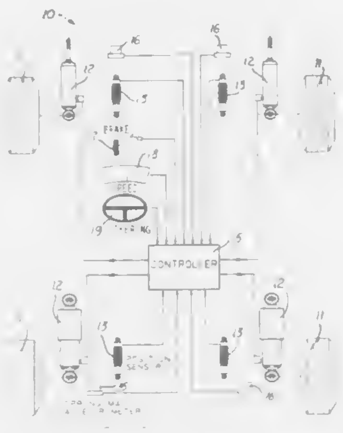
OUTPUT FILTER AND METHOD FOR ON/OFF SEMI-ACTIVE SUSPENSION CONTROL

Reed D. Hanson, Dayton, Ohio, and Scott T. Radcliffe, West Lafayette, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 26, 1989, Ser. No. 454,309

Int. Cl.^{5} B60G *17/04*

U.S. Cl. 280—707 **4 Claims**



1. A suspension control for a vehicle having a body and a road contacting wheel connected by a damper effective to apply a damping force therebetween, the damper including apparatus including a valve switchable in response to a binary filtered damper signal at frequencies within a desired activation frequency range between a first mode of operation characterized by a low damping force, in response to a first value of the filtered damper signal, and a second mode of operation having a high damping force, in response to a second value of the filtered damper signal, the suspension control comprising:

first means effective to repeatedly derive from one or more sensed vehicle suspension related operating variables, at a rate significantly greater than the desired activation frequency range, a binary unfiltered damper signal comprising a first value or a second value;

a timer active for a predetermined time after a reset and otherwise inactive; and

filter apparatus effective to derive the filtered damper signal from each successive unfiltered damper signal by (1) resetting the timer each time the unfiltered damper signal changes value, (2) causing the filtered damper signal to be the same value as the unfiltered damper signal while the timer is inactive, and (3) maintaining the filtered damper signal value unchanged while the timer is active, whereby unnecessary high frequency switching of the valve is reduced but the damper responds without unnecessary delay to signals within the desired activation frequency range.

5,024,461

UPPER SUPPORT FOR SHOCK ABSORBER IN SUSPENSION SYSTEM, HAVING ELASTICALLY SUPPORTED RESONANCE MEMBER

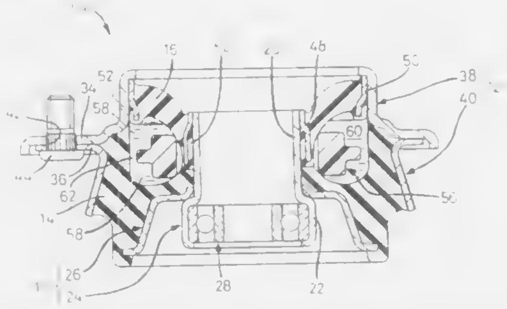
Shinji Miyakawa, Komaki, and Michio Ito, Inuyama, both of Japan, assignors to Tokai Rubber Industries, Ltd., Aichi, Japan

Filed Jul. 20, 1990, Ser. No. 554,876

Claims priority, application Japan, Jul. 25, 1989, 1-87007[U]

Int. Cl.^{5} B60G *11/62;* **F16F** *13/00, 15/04*

U.S. Cl. 280—710 **14 Claims**



1. An upper support for a suspension system, which is interposed between a body of a vehicle and a shock absorber of the vehicle, for elastically connecting the vehicle body and the shock absorber, comprising:

a generally cylindrical inner rigid member to which said shock absorber is fixed;

a generally cylindrical outer rigid member which is disposed radially outwardly of said inner rigid member and fixed t said body of the vehicle;

at least one generally annular elastic body interposed between said inner and outer rigid members for elastically connecting the inner and outer rigid members, said at least one elastic body defining a generally annular fluid chamber between the inner and outer rigid members, said fluid chamber being filled with a non-compressible fluid;

an annular resonance member which is accommodated in said fluid chamber, and which is supported by one of the inner and outer rigid members so as to radially extend toward the other of the inner and outer rigid members, so that said fluid chamber is substantially divided into two sections located on axially opposite sides of said resonance member, pressures of said fluid in said two sections changing relative to each other upon application of a vibrational load between said inner and outer rigid members, said resonance member having a circumferential surface which cooperates with an inner wall surface of said at least one elastic body to define a resonance portion through which said non-compressible fluid is forced to flow between said two sections upon application of the vibrational load; and

support means for elastically supporting said resonance member with respect to said one of the inner and outer rigid members, such that said resonance member can be aixally displaced relative to said one rigid member due to elastic deformation of said support means.

5,024,462

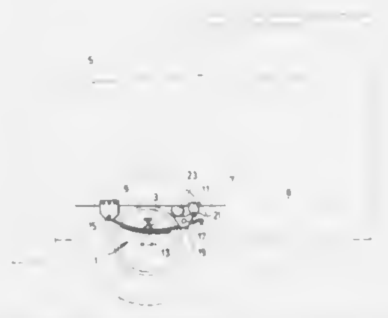
COMBINED AIR AND LEAF SPRING SUSPENSION FOR HEAVY WEIGHT VEHICLE

Daniel Assh, 1155 Turnball, Apt. 715, Quebec, Canada G1R 5G3

Filed May 9, 1989, Ser. No. 349,107

Int. Cl.^{5} B60G *11/38, 11/42*

U.S. Cl. 280—712 **14 Claims**



1. A shock-absorbing suspension for a road vehicle having a body, said suspension comprising:

a transverse wheel-axle beam;

a leaf spring having a top spring leaf;

means making said beam and said spring solid with one another;

means connecting one end of said top spring leaf to the vehicle body for pivotal movement of said leaf spring about a first axis extending transversely of said vehicle body;

a load and shock transmitting lever at the other end of said leaf spring;

means mounting one end of said lever to the vehicle body for pivotal movement thereof about a second axis parallel to said first axis;

a pneumatic balloon solid with the other end of said lever and with the vehicle body said pneumatic balloon comprising:

(a) a hollow body having resilient sidewall means defining an air chamber;

(b) a heavy shock-absorbing resilient damper element within said chamber, free from said sidewall means and solid with said transmitting lever; said damper element projecting up into said chamber and terminating short of the vehicle body to define therebetween a stroke of short predetermined length;

(c) wherein both high amplitude jolting due to road irregularities, the top of said damper element butts against the vehicle body and vibrations in the leaf spring are absorbed essentially by said leaf spring whereas any low amplitude jolt is absorbed by said heavy damper element; and

load and shock transfer means interconnecting said lever and said other end of said leaf spring solidly through said top spring leaf to transfer loads and shocks from said leaf spring to said lever.

5,024,463

MANUALLY POWER MECHANICAL ACTUATOR FOR PARALLEL AUXILIARY SPRING

James L. Oliver, Pontiac; James A. Juriga, Bloomfield Hills; Erlen B. Walton, Farmington Hills, and David M. Preston, Drayton Plains, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Dec. 26, 1989, Ser. No. 456,872

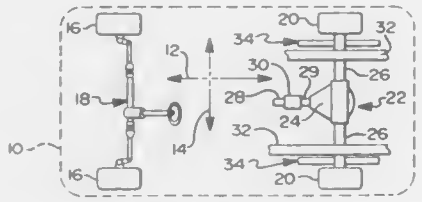
Int. Cl.^{5} B60G *11/02, 11/00*

U.S. Cl. 280—718 **25 Claims**

1. A vehicle comprising left and right ground engaging wheel mechanisms rotatably mounted on opposite ends of an axle assembly extending transverse to a longitudinal axis of a vehicle chassis assembly having front and rear ends; main spring means vertically supporting the chassis assembly on the

VOL 1127 ISS 3 JE 18 1991 UMI

axle assembly, the main spring means include first and second transversely spaced apart and generally longitudinally extending main leaf springs each having opposite ends in load supporting relation with the chassis and each having an intermediate portion affixed to the axle assembly; first and second transversely spaced apart and generally longitudinally extending auxiliary leaf springs each having a first and a second end respectively attached to the chassis and axle assemblies, the auxiliary leaf springs for vertically supporting the chassis on the axle assembly in parallel with the main spring means; and an actuator means affixed to one of the assemblies and selectively operative to position a reaction means between the one assembly and a portion intermediate the ends of each auxiliary leaf spring for varying the amount of vertical support provided by the auxiliary leaf springs; characterized by:



- the auxiliary leaf springs being of the single leaf type,
- bracket means rigidly affixed to the axial assembly for pivotally attaching the second ends of the auxiliary leaf springs and rigidly attaching the intermediate portions of the main leaf springs to opposite sides of the axial assembly relative to the vertical; and
- the actuator means includes at least one speed reduction gear assembly disposed in housing means affixed to the one assembly, the gear assembly including an input gear drivingly connected to a manually driven drive, an output gear driven by the input gear, the output gear drivingly connected to the reaction means and operative to move the reaction means into and out of contact with the portion of each auxiliary leaf spring in response to to-and-fro rotation of the manually driven drive.

5,024,464

VIBRATION SUPPRESSION APPARATUS FOR STEERING WHEEL WITH AIR BAG

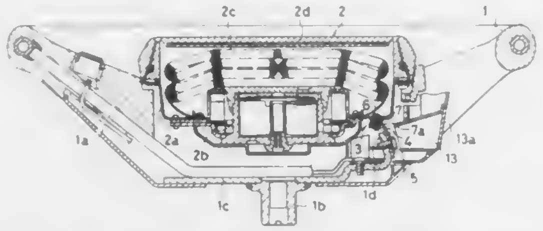
Masaaki Kawaguchi; Tomio Okamuro, and Keiichi Shirose, all of Utsunomiya, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 3, 1989, Ser. No. 388,873

Claims priority, application Japan, Aug. 8, 1988, 63-104032[U]

Int. Cl.⁵ B60R *21/16*

U.S. Cl. 280—731 **4 Claims**



1. A vibration suppression apparatus for a steering wheel having an air bag unit attached to the steering wheel body, the air body unit including a gas generator and a bag, characterized in that at least part of said air bag unit is attached to said steering wheel body through a resilient means, wherein a casing for accommodating said bag of said air bag unit is rigidly secured to said steering wheel body, said gas generator being attached to said casing through said resilient means.

5,024,465

AXLE SUSPENSION FOR VEHICLES, PARTICULARLY HEAVY VEHICLES WITH TWO OR MORE AXLES

Walter Baiker, Chälenstrasse 2, 8433 Weiach, Switzerland

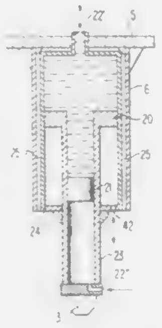
PCT No. PCT/CH88/00032, § 371 Date Dec. 7, 1988, § 102(e) Date Dec. 7, 1988, PCT Pub. No. WO88/06106, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 9, 1988, Ser. No. 271,756

Claims priority, application Switzerland, Feb. 12, 1987, 531/87

Int. Cl.⁵ B60G *11/26, 11/62*

U.S. Cl. 280—840 **14 Claims**



1. An axle suspension forming the connection between an axle housing and the chassis of a heavy or special vehicle having a longitudinal axis comprising the combination of

- at least two mounting tubes fixedly attached to the vehicle chassis; and
- a telescopic assembly operatively associated with each of said mounting tubes, each said telescopic assembly comprising
  - a jacket tube enclosed in said mounting tube,
  - a layer of resilient, elastic material between and in contact with said jacket tube and said mounting tube,
  - a telescopic tube axially displaceable within said jacket tube, said telescopic tube including at one end thereof a working piston slidable within said jacket tube, and
  - a pivot connection at the other end of said telescopic tube connected to said axle housing such that said housing is pivotable only about an axis parallel to the longitudinal axis of said vehicle.

5,024,466

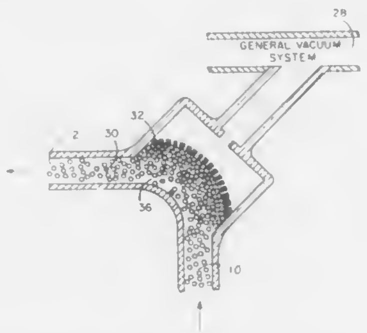
WEAR-PREVENTION STRUCTURE FOR PNEUMATIC CONVEYING PIPE ELBOW

Gregory R. Brotz, P.O. Box 1322, Sheboygan, Wis. 53081

Filed Apr. 23, 1990, Ser. No. 512,462

Int. Cl.⁵ F16L *55/00*

U.S. Cl. 285—16 **1 Claim**



1. A structure for installation at the junction of two pipes at angles to one another such as are joined by an elbow having an inner wall and an outer wall, such pipes usable for pneumatically conveying particulate material, comprising:

- a chamber disposed substantially along and replacing the outer wall of said elbow structure;
- a curved screen member having a plurality of openings therethrough smaller than the particulate material conveyed through said structure disposed in said chamber positioned away from where the outer wall of said elbow would be disposed;
- an accumulation area defined between said screen member and the former position of said outer wall of said elbow; and
- suction means disposed to the rear of said screen member to apply suction through said screen member, said suction means of sufficient strength to pull some of said particulate material against said screen member to form a particulate material accumulation in said accumulation area, said particulate accumulation forming a wear surface in place of the outer wall of said elbow, such particle accumulation being worn by particles passing through said pipes impinging on said wear surface, with worn portions of said particle accumulation being replaced by other particulate material sucked against said particle accumulation.

5,024,467

DEVICE FOR COUPLING ELEMENT-HOLDING PLATES OF MULTIPLE CONNECTIONS

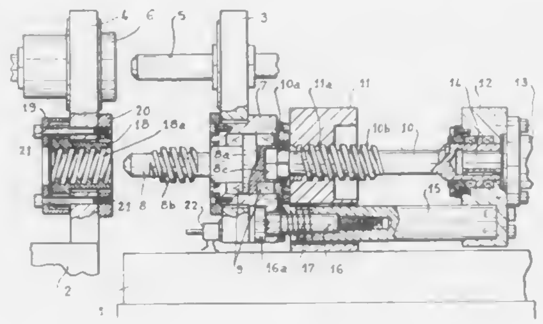
Gaston Truchet, Faverges, France, assignor to S.A. des Etablissements Staubli, Faverges, France

Filed Sep. 18, 1989, Ser. No. 408,365

Claims priority, application France, Sep. 21, 1988, 88 12557

Int. Cl.⁵ F16L *35/00*

U.S. Cl. 285—36 **9 Claims**



1. An apparatus for coupling opposing first and second connection elements by the axial movement of the first and second connection elements relative to one another comprising, a first plate means for supporting the first connection elements and a second plate means for supporting the second connection elements, a first threaded member carried by said first plate means and a second threaded member carried by said second plate means, said first and second threaded members being generally axially aligned and interengageable with one another, adjustment means connected to said first plate means for advancing and retracting said first plate means relative to said second plate means, means for rotating said second threaded member as said adjustment means moves said first plate means relative to said second plate means and resilient means for offsetting the advancement of said first plate means relative to said second plate means when said first and second threaded members are initially engaged until said first and second threaded members mesh with one another.

5,024,468

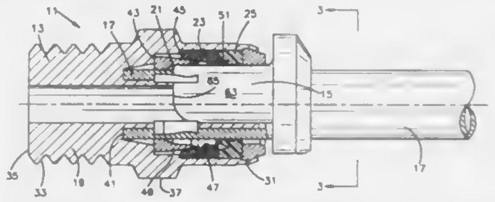
PUSH-IN TUBE FITTING AND RELEASE TOOL

Donald G. Burge, Plainwell, Mich., assignor to Parker Hannifin Corporation, Cleveland, Ohio

Filed Nov. 13, 1989, Ser. No. 434,194

Int. Cl.⁵ F16L *35/00*

U.S. Cl. 285—39 **7 Claims**



1. An improved push-in tube fitting and release tool for releasably receiving and retaining a tube, comprising:

- a metal body having:
  - a first end for connection to a fluid conduit;
  - a second end for connection to a tube;
  - a cavity disposed in second end of said body for receiving a tube therein;
  - a cylindrical tube support disposed within said tube receiving cavity for extending within and supporting a tube received in said cavity; and
  - a fluid conduit extending through said body from said first end of said body through said tube support;
- a split gripper ring disposed in said cavity of said body radially outside of said tube support, said ring having a sharp, radially inner edge which bites into a tube once it is inserted in said cavity and through said ring; said split gripper ring provided with a cylindrical inner surface axially spaced from and having a larger inner diameter than said inner edge and oriented toward said first end and being connected to said inner edge by an inclined surface;
- means for retaining said gripper ring in said cavity; and
- a release tool free of attachment to said body having a thin, cylindrical-section portion for being inserted between said gripper ring inner cylindrical surface and a tube gripped by said gripper ring to engage said inner cylindrical surface and to expand said gripper ring so that a tube can be thereby released from said gripper ring and removed from said tube fitting, said release tool having a length such that, when fully inserted, said cylindrical section portion does not extend between said sharp, radially inner edge of said ring and a tube retained in said body.

5,024,469

ADJUSTABLE LENGTH PIPING UNION

W. Sidney Aitken, and Ralph Gonzales, both of 2820 N. San Fernando Blvd., Burbank, Calif. 91504

Filed Feb. 23, 1990, Ser. No. 484,075

Int. Cl.⁵ F16L *27/12*

U.S. Cl. 285—302 **5 Claims**

1. A piping union having a central axis, and having a length adapted to be adjustably lengthened and shortened, said union comprising:

- an inner tube having a first end, a second end, an axial flow passage from end to end, an axially-extending circularly cylindrical outer wall having a diameter, said first end being adapted for connection to a next assembly, said

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5,024,470

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VOL
1127
ISS
3
JE
18
1991
UMI

outer wall having, adjacent to its second end, a plurality of peripheral ring grooves, each said groove having a side wall, said side walls being axially spaced apart by a reference distance, and a bottom wall which is tapered and enlarges as it extends toward said first end;

an outer tube having a first end, a second end, and an axial flow passage from end to end having an axially extending circularly cylindrical inner wall portion having a diameter, said first end being adapted for connection to a next assembly;

an O-ring seated in each of said ring grooves, said O-rings in their unconfined condition having a radial thickness greater than the distance between the shallowest portion of the ring groove and the diameter of said inner wall portion of the outer tube, and at least as large as the distance between the deepest portion of the ring groove and the diameter of said inner wall portion of said outer tube;

said O-ring having an axial thickness less than the spacing apart of the sidewalls;

whereby said O-rings will always make a seal between said inner and outer tubes, and can shift axially in said ring grooves, making it easier to move the inner tube inwardly relative to the outer tube, than to move it outwardly relative to the outer tube;

said passage in said outer tube having adjacent to its first end a cylindrical ledge of lesser diameter than the diameter of its respective inner walls, and substantially equal to the outer diameter of the inner tube to stabilize the tubes concentrically, the volume of said ring grooves being sufficient to receive the deformed O-ring as it passes through said ledge.

5,024,471

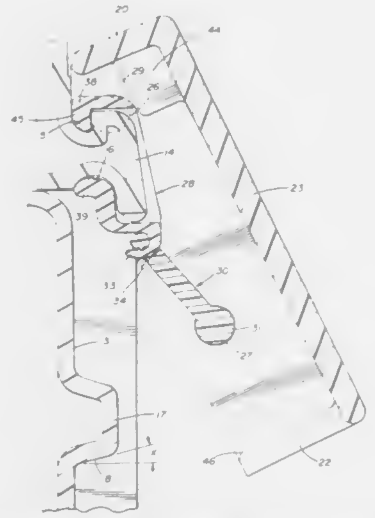
SAFETY RELEASE LATCH

W. Henry Kahl, Wooster, Ohio; David E. Price, Winfield, and Nai-Cheng Tsao, Arkansas City, both of Kans., assignors to Rubbermaid Incorporated, Wooster, Ohio

Filed Jul. 25, 1990, Ser. No. 557,965

Int. Cl.^{5} E05C *3/14*

U.S. Cl. 292—97 **10 Claims**



1. In combination with a container having a base portion and a cover abutting the top thereof, the base portion having laterally spaced outward extending projections on a sidewall, a latch assembly comprising:

a latch plate having laterally spaced vertical ribs;

a transverse upper lever bar having upper and lower edges and outer ends where a portion of its upper outer ends are pivoted on said ribs thereby defining an upper pivot;

means on said upper lever bar for attachment to said cover;

a transverse lower lever bar having upper and lower edges and outer ends where a portion of its lower outer ends are pivoted on said ribs thereby defining a lower pivot, said lower lever bar also having an upper horizontal edge hinge connected to the lower edge of said upper lever bar, the centerline of said hinge being laterally offset from a plane defining both said upper and lower pivots;

means on the bottom of said latch plate for releasably engaging said projections on the base portion for latching the cover thereto;

said hinge being adapted to swing over center with respect to the plane of said upper and lower pivots as the latch plate is swung to and from the latched and unlatched position.

5,024,472

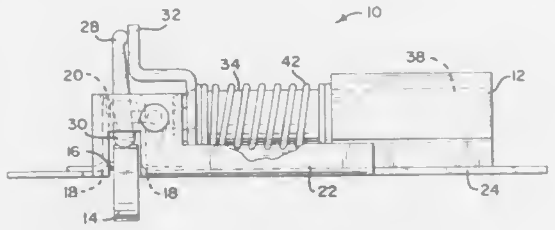
FLUSHBOLT ACTUATOR ASSEMBLY

Richard B. Cohrs, Indianapolis, Ind., assignor to Von Duprin, Inc., Indianapolis, Ind.

Filed Apr. 9, 1990, Ser. No. 506,210

Int. Cl.^{5} E05C *3/16*

U.S. Cl. 292—182 **16 Claims**



1. A flushbolt actuator assembly, comprising:

a housing; and

an auxiliary bolt; wherein

said auxiliary bolt is mounted in said housing for movement, relative to said housing, between (a) an extended disposition, and (b) a retracted disposition;

said housing has a longitudinal axis; and

a piston subassembly; wherein

said piston subassembly is mounted to said housing for movement, relative to said housing only, in opposite axial directions; and

means interpositioned between said bolt and said subassembly for moving said subassembly in one of said axial directions in response to a movement of said bolt to its retracted disposition; and wherein

said auxiliary bolt is pivotably mounted in said housing.

5,024,473

GATE LOCKING DEVICE FEATURING DEAD BOLT MEANS

Donald E. McQuade, 56 Jefferson St., Red Bank, N.J. 07701

Continuation-in-part of Ser. No. 310,349, Feb. 13, 1989, Pat. No. 4,919,463. This application Jan. 5, 1990, Ser. No. 461,169

The portion of the term of this patent subsequent to Apr. 24, 2007, has been disclaimed.

Int. Cl.^{5} E05C *19/10*

U.S. Cl. 292—120 **17 Claims**

1. A gate locking device for a fence comprising:

(a) security box means having a mounting plate means affixed within the box;

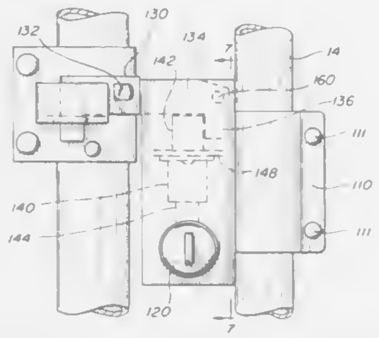
(b) mounting means for securely affixing the security box means to a first pole of the fence;

(c) an oarlock means hingeably mounted within the security box having an oarlock portion connected to a heel plate portion, the oarlock portion being capable of movement between an unlocked position and a locked position where the oarlock means receives a second pole of the fence;

(d) a dead bolt means fixedly disposed on the mounting plate within the security box having a dead bolt movable between an extended and unextended position and disposed

in mechanical relation to the heel plate so that when the dead bolt is moved to the extended position it substantially prevents the pivotal movement of the oarlock means; and

(e) barrel lock means mounted to the security box and being mechanically connected and adapted to the dead bolt means for moving it between the extended and unextended position,



whereby when the oarlock portion is moved to the locked position and the dead bolt is moved to the extended position the oarlock portion can not be moved back to the unlocked position and the gate is securely locked to prevent unauthorized intrusion.

5,024,474

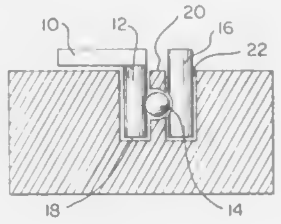
LOCKING CAM LATCH MECHANISM

Howard W. Selby, III, Boulder, Colo., assignor to Selsys Corporation, Boulder, Colo.

Filed Oct. 24, 1989, Ser. No. 425,862

Int. Cl.^{5} E05C *19/00*

U.S. Cl. 292—252 **8 Claims**



1. A latch mechanism comprising:

a. a cylindrically shaped rotating cam having a cylindrical outer cam surface, and having a small radius portion and a large radius portion that ar circumferentially spaced from each other along said cam surface;

b. a bolt seated against said cam surface and movable outward relative to said cam surface when seated in said small radius portion of said cam surface aad movable inward relative to said cam surface when seated in said large radius portion of said cam surface;

c. at least one latch pin with an indentation in at least one point on the outer surface into which said bolt can seat; and

d. housing means to support and facilitate movement of said cam, said bolt and said latch pin.

5,024,475

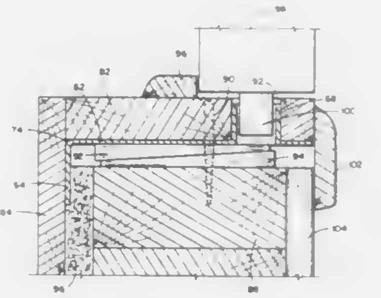
STRENGTHENING DOOR JAMB

Charles E. Francis, Claremore, Okla., assignor to John D. Gassett, Tulsa, Okla., a part interest

Continuation of Ser. No. 197,444, May 23, 1988, Pat. No. 4,865,370, which is a continuation-in-part of Ser. No. 944,933, Dec. 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 800,696, Nov. 22, 1985, abandoned. This application Jun. 5, 1989, Ser. No. 366,631

Int. Cl.^{5} E05C *21/02*

U.S. Cl. 292—340 **3 Claims**



1. A method of increasing the security of a door jamb having a front side and a back side in a wall opening which has a wall stud which comprises the steps of:

obtaining a deadbolt anchoring plate having a planar member and an anchor pocket having a first open end and a second end, said second end fixed to said planar member;

cutting a hole in said jamb of a size to receive said anchor pocket;

inserting said anchor pocket through said hole from the back side of said jamb;

positioning said planar member adjacent to and in contact with the back side of said jamb and spaced from said wall stud;

securing said planar member to said stud by at least extending a screw through said jamb from the front side thereof and on through said planar member and into said stud while maintaining said planar member against said back side of said jamb and in spaced position from said wall stud.

5,024,476

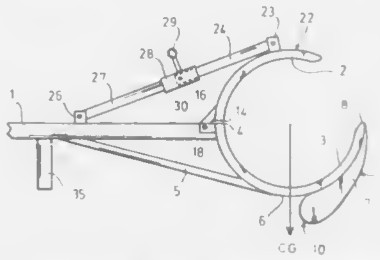
TOOL FOR HANDLING A HEAVY ELONGATE ARTICLE

Charles E. Massey, Cherry Tree House, Wragby Road, Lincoln, England

Filed Dec. 14, 1988, Ser. No. 284,946

Int. Cl.^{5} B65G *7/02;* B66F *15/00*

U.S. Cl. 294—16 **5 Claims**



1. A tool for lifting a heavy metal pipe, comprising:

a handle having first and second ends and having a stop means projecting from said handle,

a pair of co-acting first and second jaw members disposed at a first end of said handle and defining a pair of conjoined recesses for receiving the article to be raised longitudinally of said jaws extending transverse to said handle, wherein the jaws are part-cylindrical and have longitudinal edges and where the jaws are hinged together at their

VOL 1127
ISS 3
JE 18
1991
UMI

longitudinal edges adjacent to the handle, and wherein the conjoined recesses of said jaws are substantially cylindrical,

hand grip means provided at said second end of said handle,

fulcrum means provided on said first jaw member and projecting transverse to both said handle and the longitudinal direction of said jaws,

and means for holding said jaws together, wherein said means for holding said jaws together comprises a second handle having first and second ends and which is pivotally coupled to the first said handle intermediate to said first and second ends of both handles, said second jaw being joined to said first end of said second handle, and said second handle having hand grip means provided at said second end thereof, the arrangement being such that said first and second jaws are opened and closed by relative pivotal movement of the respective hand grip means of said first and second handles.

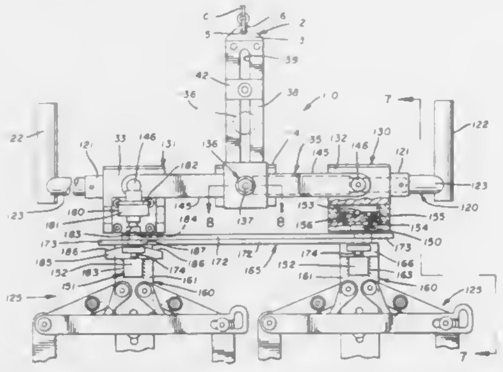
5,024,477
CREEL LOADING APPARATUS

Raymond J. Slezak, Barberton, Ohio, assignor to RJS Corporation, Akron, Ohio

Division of Ser. No. 193,355, May 12, 1988, Pat. No. 4,929,012. This application Jan. 19, 1990, Ser. No. 467,501

Int. Cl.⁵ B66C *1/44*

U.S. Cl. 294—81.2 9 Claims



1. A loading apparatus suspended by a cable and having a plurality of chucks, each adapted for grasping a containerized spool, including strand material disposed thereon, transporting the spool to a position proximate a creel and orienting the spool for positioning on a creel spindle comprising, suspension link means adapted for attachment to the cable, support means suspended by said suspension link means, a plurality of block means mounted on said support means, each of said block means carrying one of the chucks, means for selectively moving at least some of said block means along said support means for varying the distance between the chucks, means mounting the chucks for rotation relative to said block means, and chuck rotation actuator means for effecting coordinated, equiangular rotation of the chucks.

5,024,478
BOX BLANK HOLDING DEVICE IN A BOX-MAKING MACHINE

Daigoro Toriyama, Chiba, Japan, assignor to Tanabe Machinery Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 309,346, Feb. 10, 1989, Pat. No. 4,930,830. This application Feb. 23, 1990, Ser. No. 485,082

The portion of the term of this patent subsequent to Jun. 5, 2007, has been disclaimed.

Int. Cl.⁵ B66C *1/42*

U.S. Cl. 294—88 8 Claims

1. A box blank holding device for a box-making machine, comprising:

a main body;

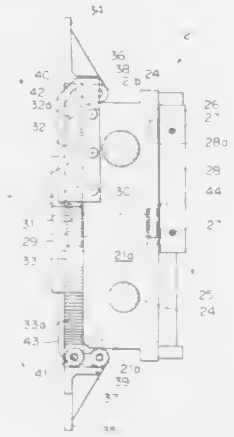
a driving rack;

motor means for reciprocally moving said driving rack relative to said main body;

a transmission shaft rotatably supported on said main body, said transmission shaft having a pair of pinions, one of said pinions being in meshing engagement with said driving rack;

a pair of holding-member actuating racks disposed in meshing engagement with the other said pinion;

each said holding-member actuating rack having a holding member pivotally mounted on an end thereof, whereby



said holding members are movable with said holding-member actuating racks, said holding-member actuating racks being moved by said motor means reciprocally moving said driving rack to turn said one of said pinions, thus turning said other of said pinions and moving said holding-member actuating racks; and

means for causing said holding members to move between a projecting position and a retracted position, said means comprising projecting and retracting guide grooves on said main body and rollers on said holding members for engagement with said guide grooves.

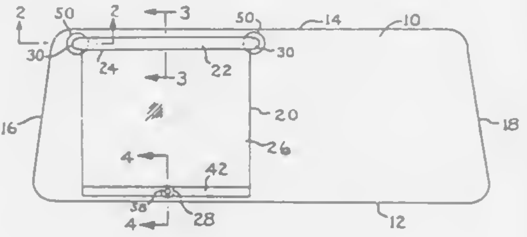
5,024,479
AUTOMOTIVE SUN SCREEN

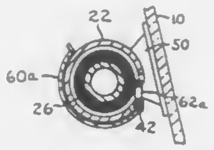
Gaylord D. Bryngelson, 811 E. School, Owatonna, Minn. 55060

Filed Nov. 16, 1989, Ser. No. 437,112

Int. Cl.⁵ B60J *3/00*

U.S. Cl. 296—97.7 2 Claims





1. For use on an automotive vehicle windshield: a sun screen

comprising an elongated hollow tube (**22**) having two ends and a longitudinal slot (**24**) extending between said tube ends; a suction cup attached to each end of the hollow tube for securement of the tube to an inner surface of the vehicle windshield; and elongated roller rotatably mounted within said tube; an opaque flexible sun-block sheet coiled around said roller for extension through the longitudinal slot, said sheet having a free edge (**40**); an anchor means (**28**) located on the windshield remote from said hollow tube; a stiffener strip (**42**) extending along the free edge of said flexible sheet; and a retainer means carried by said stiffener strip for engaging said anchor means to releasably retain the flexible sheet in an operating position extending along the windshield surface; said longitudinal slot (**24**) being located on the tube so that the slot faces the windshield, whereby the stiffener strip is at least partially concealed from persons seated within the vehicle when the flexible sheet is fully wound onto the roller within the hollow tube; said retainer means comprising a transversely curved handle structure extending partially around the hollow tube when the flexible sheet is fully wound onto the roller.

5,024,480
BODYWORK FOR AUTOMOBILES

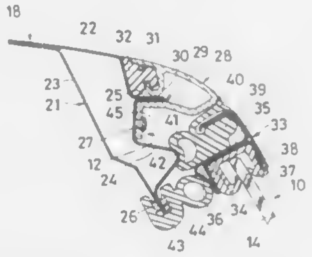
Luigi Petrelli, Legnano, Italy, assignor to Alfa Lancia Industriale S.p.A., Arese, Italy

Continuation of Ser. No. 282,492, Dec. 12, 1988, abandoned. This application May 11, 1990, Ser. No. 522,066

Claims priority, application Italy, Dec. 24, 1987, 23222 A/87

Int. Cl.⁵ B60J *10/08*

U.S. Cl. 296—146 4 Claims



1. Bodywork for an automobile, the automobile having a plurality of doors, each door having a glass window panel, the bodywork comprising a longitudinal member, the longitudinal member having a plurality of steel plates which are welded together to form a box-type beam, one of said steel plates having a substantially horizontal upper flange extending towards the doors, each door having a rim, the rim of each door being sealable with the longitudinal member, the rim having a first crosspiece, the first crosspiece being a structure formed of at least one first section bar, the first section bar having a substantially "C"-shaped cross-section and extending downward to receive the glass window panel, a longitudinal chamber being positioned between the longitudinal member and the first crosspiece structure of each door, a supplemental section bar being positioned and shaped to partially seal the longitudinal chamber, a first sealing gasket for sealing the first crosspiece of each door with the longitudinal member, and a second sealing gasket for sealing the supplemental section bar with the longitudinal member, the supplemental section bar being secured to the longitudinal member, and the supplemental section bar having a wall with an arcuate cross-section and being curved to conform to outer outlines of the longitudinal member and the first crosspiece whereby aerodynamic resistance of the automobile is improved.

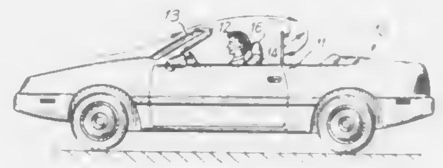
5,024,481
WIND BAFFLE ADJUSTABLE FOR DIFFERENT CAR WIDTHS

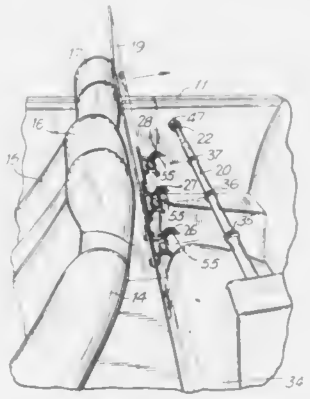
Robert S. Swersky, 72 Short Way, Roslyn, N.Y. 11577

Filed Sep. 24, 1990, Ser. No. 586,681

Int. Cl.⁵ B62D *39/00*

U.S. Cl. 296—180.1 22 Claims





1. A wind baffle for convertible automobiles comprising:

a sheet of substantially rigid, transparent material;

a rod having ends attachable to respective inner side body surfaces of a convertible automobile;

said rod including means for adjusting the length thereof; and

means for affixing said sheet to said rod such that said sheet can be held in place behind the front seat compartment of said convertible automobile to prevent wind currents from passing from the rear of said convertible automobile to the front seat compartment.

5,024,482
FRONT BODY STRUCTURE OF AUTOMOTIVE VEHICLE

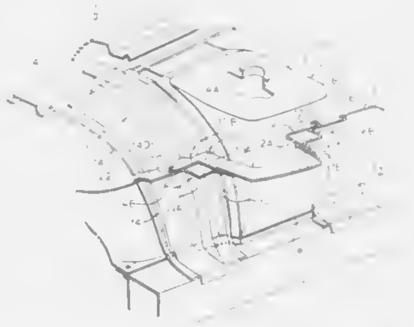
Hayatsugu Isukimi, Hiroshima, and Reiji Kikuchi, Yokohama, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jun. 4, 1990, Ser. No. 531,405

Claims priority, application Japan, Jun. 2, 1989, 1-64815

Int. Cl.⁵ B62D *27/00*

U.S. Cl. 296—194 4 Claims



1. A front body structure of a vehicle including a side frame and a front wheel reinforcement, both extending in a length-

VOL 1127
ISS 3
JE 18
1991
UMI

wise direction from front to back of the vehicle, a front wheel housing connected between the side frame and front wheel reinforcement for receiving therein a front wheel, and a suspension tower for supporting a suspension, said front body structure comprising:

wheel aprons secured to and located on opposite sides of, in said lengthwise direction, said suspension tower, said wheel aprons extending in said lengthwise direction and forming said front wheel housing;

a junction member secured between said suspension tower and each wheel apron to form hollow channel frames adjacent to said suspension tower;

a pair of holding means, each divided into a pair of parts, one of said parts integrally formed with one of said wheel aprons and the other of said parts integrally formed with one of the junction members; and

a bracket for a front suspension arm rigidly held between each pair of parts.

5,024,483

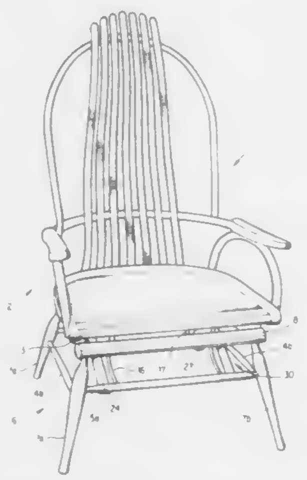
SWING ROCKER APPARATUS AND FURNITURE USING SAME

Zora R. Kamman, 19 Highland Dr., Peterborough, N.H. 03458

Continuation-in-part of Ser. No. 258,158, Oct. 14, 1988, abandoned. This application Nov. 20, 1989, Ser. No. 439,412

Int. Cl.^{5} A47D *13/10*

U.S. Cl. 297—273 10 Claims



1. A swing rocker apparatus adapted for attachment to a furniture piece said furniture piece having a base assembly and an upper portion assembly whereby said base assembly is in fixed position relative to a surface upon which said base assembly rests and said upper portion assembly is movable relative to said base assembly said rocker apparatus comprising:

four base assembly low rotational friction attaching means adapted to be securely affixed to said base assembly;

two pairs of hanger members a front pair and a rear pair each pair held in spaced relationship by a front hanger stretcher and a rear hanger stretcher, each of the four upper ends of said hanger members rotationally attached to said four base assembly attaching means affixed to said base assembly, each hanger member of said two pairs of hanger members being configured so that when they are attached to said furniture piece said piece will be free of spaces defined by moving components which spaces are sufficiently large whereby injury to small body parts does not occur;

a right and a left side frame each comprising a first and second side frame member said right and left side frames held in spaced relationship by a side frame stretcher, each of four bottom inward facing surfaces of said pairs of first and second side members having affixed thereto a frame member low rotational friction attaching means each of said four frame member attaching means adapted to receive a bottom end of one of said four hanger members and each of said first and second side frame members having an attaching surface which surface is rigidly affixed to said upper portion assembly;

said two pairs of hanger members each have an arcuately configured portion with an inward directed radius of curvature and said arcuate portion of said hanger members being located inwardly of said four frame member attaching means by a predetermined distance; and

a front to back spacing of said top ends of said front and rear hangers being substantially the same as a front to back spacing of said bottom ends of said front and rear hangers.

5,024,484

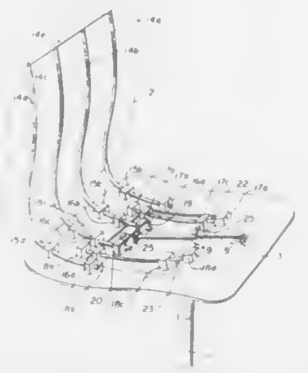
ADJUSTABLE SITTING DEVICE

Jurek Buchacz, "Lovli", N-2360 Ringsaker, Norway

Division of Ser. No. 474,311, Feb. 2, 1990, which is a continuation of Ser. No. 251,112, Sep. 29, 1988, abandoned, which is a continuation-in-part of Ser. No. 143,166, Jan. 1, 1988, abandoned. This application Aug. 15, 1990, Ser. No. 567,516

Int. Cl.^{5} A47C *1/024*

U.S. Cl. 297—300 6 Claims



1. An adjustable sitting device having a seat, a backrest and means to alter the mutual angle between the seat and the back rest, said seat and/or back rest being turnable about an imaginary axis located above the seat and in front of the backrest wherein the back rest comprises frame members extending downward from the back rest and into a respective curved portion, the seat comprises at least a pair of runners attached to a seat frame, and a support means is located underneath said seat frame, said seat frame having an opening therein to provide access from above to said support means and said support means being interconnected from below to a chair subframe, said frame members slidably engaging a set of slide shoes located at the rear of the seat frame and said runners slidably engaging sets of slide shoes located on said support and extending through the opening, and control means extending between and being attached to a front region of at least one of said frame members and a front region of said seat frame to control and selectively, set the distance between said regions.

5,024,485

FRONT AND BACK ADJUSTABLE ROCKING SEAT SUPPORT ARRANGEMENT FOR SEAT HAVING RELATIVELY ADJUSTABLE SECTIONS

Joseph A. Berg, 5353 Topanga Canyon Blvd., Ste. 310, Woodland Hills, Calif. 91364, and Loren W. Eames, 3718 Penn Mar Dr., El Monte, Calif. 91732

Filed Jul. 5, 1990, Ser. No. 548,267

Int. Cl.^{5} A47C *1/02;* **A61G** *15/00;* **B60N** *2/00*

U.S. Cl. 297—312 8 Claims

1. A seat comprising:

a. a body further comprising,

(i) a base having an upper surface, a front, a rear and two longitudinal sides;

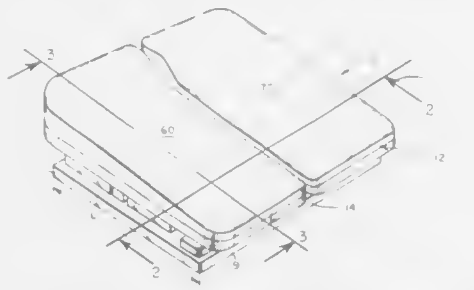
(ii) a pair of spaced apart resilient spacer members affixed transversely to the upper surface of said base and separated by a transverse gap which runs from one side of the base to the opposite side of the base;

(iii) two pairs of spaced apart resilient receiving means affixed to the upper surface of said base in said gap, each pair of resilient receiving means including a first resilient receiving means and a second resilient receiving means, with one of said first or second resilient receiving means positioned adjacent a side of the base and the other one of said first or second resilient receiving means positioned remote from the side;

b. a pair of longitudinally spaced apart seat cushion assemblies, each seat cushion assembly further comprising,

(i) a lower surface;

(ii) a seat rocking means attached to the lower surface, the seat rocking means configured to be resiliently and rotatably retained by one of the said pairs of resilient receiving means so that the seat cushion assembly can longitudinally rock back and forth with the intersection of the pair of resilient receiving means and engaged seat rocking means serving as the pivot about which the seat cushion assembly rocks; and



c. a pair of spaced apart rocker adjustment means attached to said base and aligned with a respective one of the seat cushion assemblies such that the rocker adjustment means can be positioned to adjust the amount of rocking arc obtainable by the seat cushion assemblies, where each rocker adjustment means further comprises a generally rectangular shaped block which is hingeably attached to the base such that the rocker adjustment means can be aligned in a multiplicity of separate positions including a first position wherein one side of the rocker adjustment means lies against the upper surface of the base, a second position wherein the rocker adjustment means lies parallel to and in the same plane as the base, and a third position wherein the rocker adjustment means is supported generally perpendicular to the base by a rocker support means slidably affixed to the base;

d. whereby each seat cushion assembly can be independently rocked back and forth longitudinally and can be individually adjusted to the desired amount of rocking, and the rocking on the base is cushioned by the pair of spacer members.

5,024,486

ALL-PURPOSE ROCKING, SWIVELING, RECLINING, AND LIFTING CHAIR

Carl C. Auel, 14 Fifth Ave., Herminie, Pa. 15637

Filed Apr. 3, 1990, Ser. No. 504,114

Int. Cl.^{5} A47C *1/02*

U.S. Cl. 297—330 19 Claims

1. A power operated, multi-position chair having a main frame, a seat attached in a pivotal manner to the mainframe, two armrests attached to the seat, a back attached at back pivots to the main frame, a footrest attached to the mainframe, and a switch to control the chair's positions comprising:

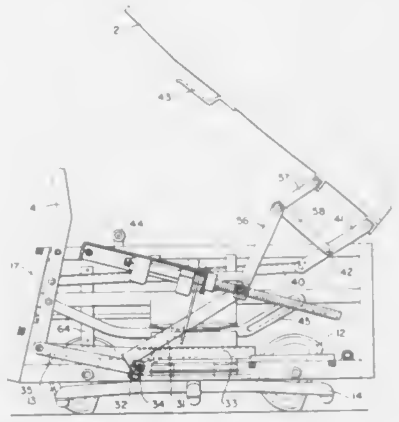
(a) a recline mechanical linkage that allows the chair to operate in a recline mode wherein it reclines the back, lifts the front of the seat, and lifts the footrest;

(b) a seat lift mechanical linkage that allows the chair to operate in a seat lift mode wherein it lifts the back of the seat;

(c) a guide roller mechanically linked to both the recline mechanical linkage and the seat lift mechanical linkage;

(d) a guide channel in which the guide roller operates to activate either the recline mechanical linkage or the seat lift mechanical linkage; and

(e) a power source with mechanical means to move the guide roller in the guide channel so that the chair can operate through its recline mode and seat lift mode; the power source with mechanical means comprising:



(f) a motor;

(g) a motor mount plate mounted in a pivotal manner on the main frame of the chair;

(h) a first power screw connected to the motor;

(i) a power cross bar with a first nut through which the power screw turns to move the power cross bar forward away from the motor as the screw turns counterclockwise (as viewed from the motor) and to pull the power cross bar toward the motor as the power screw turns clockwise (as viewed from the motor); and

(j) a lower power bar connected in a pivotal manner at its front end to the power cross bar and connected at its rear end to the guide roller.

5,024,487

METHOD OF CREATING AN UNDERGROUND BATCH RETORT COMPLEX

Henry J. Woestemeyer, Vista del Rio #2202, 200 Colorado Ave., Parachute, Colo. 81635, and Martha Oksuz, 1218 Carbide Court, Longmont, Colo. 80501

Filed Jan. 29, 1990, Ser. No. 471,426

Int. Cl.^{5} E21B *41/10;* **C10B** *53/06*

U.S. Cl. 299—2 1 Claim

1. A method for creating an underground complex of sealed batch retorts, said sealed batch retorts to be utilized for the pyrolysis of processed oil shale ore therein, comprising the steps of:

(a) establishing sites and levels underground for upper and lower main drifts, following the same course one above the other, to be centrally located across a land-holding in oil shale stratum that will be mined to become a complex of underground batch retorts, these main drifts to serve as access to and egress from the mine workings, and extending these drifts to the site of the first of a plurality of branch drifts that will intersect the main drifts at right angles and extend in both directions from the main drifts

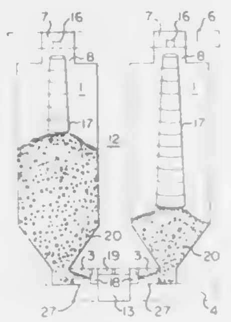
VOL
1127
ISS
3
JE
18
1991
UMI

to the boundaries of the planned complex of batch retorts, an upper branch drift to be centered in the lengthwise direction over a planned row of deep rectangular stopes that will extend to the level of a lower branch drift, and the lower branch drift centered in a wall that will divide the planned row of stopes from a second row of stopes to be established parallel to the first row of stopes centered along a second upper branch drift;

(b) extending said upper and lower branch drifts the length of the first of a plurality of rectangular stopes to be mined between the upper branch drift and the lower branch drift, and installing roof bolts in the roof of the upper branch drift to sustain the overburden;

(c) plotting the center of each lengthwise half of the planned rectangular stope at the bottom level, bearing in mind that the width of the rectangular stope will not be more than fifty feet, dividing the length of the planned stope by two, and excavating two ore chutes approximately ten foot square extending in a straight line above the floor of the lower branch drift to the center of the lower extremity of each half of the planned stope, then installing portable gates between the ore chutes and the lower branch drift;

(d) determining two centers of the rectangular stope in the upper branch drift, plotting as in (c), above, and creating by vertical crater retreat (VCR) stoping two centered ore passes, approximately ten feet square, from the centers established in the branch drift into the centered first ten square feet of the ore chutes that extend into the lower branch drift, then expanding the first ten square feet of the ore pass to the width of the branch drift, approximately twenty square feet, disposing of the mined ore through the ore pass;



(e) excavating by conventional means the top of the planned rectangular stope, to create work space, beginning excavation below the floor of the upper branch drift, disposing of the mined ore through the ore passes, and installing roof bolts in the roof of the mined work space to sustain the overburden;

(f) creating the planned stope by the VCR stoping method, drilling from the mined work space created in (e), above, to create vertical walls approximately three-quarters of the distance from the top to the bottom of the stope, then gradually increasing the length of blasting holes in each half of the planned stope to shape a chute that is an inverted, truncated pyramid converging on the horizontal ore chute created in (c), above;

(g) loading the blasting holes with an explosive charge and blasting the drilled stope, in stages from bottom to top, to fragment the ore in the stope and remove it by fallout, and transporting the fragmented ore through the lower branch drift and the lower main drift to be crushed and screened in order to obtain particles of an optimum size for retorting, and, if desired, to be graded and batched according to assay;

(h) removing the portable gates from between the ore chutes and the lower branch drift, placing oil dropout pipes in the bottom of the emptied ore chutes, these oil dropout pipes to extend from the ore chutes through the lower branch drift and the lower main drift to a recovery system, shielding the portion of the oil dropout pipes within the ore chutes to protect them from the entry of shale ore when the stope is loaded for retorting, and installing a suction gas pipe centered between the ore chutes and extending into each half of the stope through the tops of the ore chutes, then sealing the bottom openings of the stopes at the lip of each of the ore chutes, sealing around the pipes which have been installed;

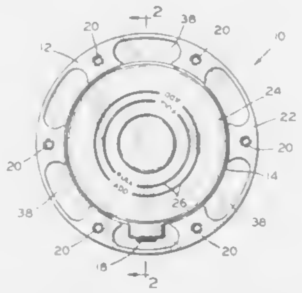
(i) loading the stope with crushed and screened shale ore through openings at the top of the stope, using portable, retractable loading pipes to effect loading in order to minimize free-fall and production of fines in the loading process, and loading shale ore to near the top of the entry into the stope, but leaving the shale bed at the top of each half of the stope rounded off, as it will fall from the loading device, to a depth of approximately ten feet in the center and around the outer peripheries of the stope to produce a cone-shaped shale bed in each half of the stope;

(j) inserting pipes that will bring compressed air from a surface source through the drifts into the upper portion of each half of the stope;

(k) sealing both openings into the stope at roof level, sealing around the compressed air pipes, at this point converting the stope to a batch retort wherein the temperature for pyrolysis can be controlled, and embedding in the seals observation hatches with an opening through which very hot air and exhaust gases, heated in a furnace by propane gas, or by other means, may be introduced into the top of the stope to ignite the shale bed;

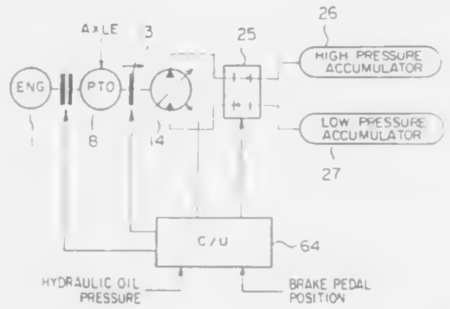
(l) repeating the above steps at subsequent retort sites, leaving separating walls between stopes, extending branch drifts to both sides of the main drifts to accommodate additional stopes extending to the boundaries of the planned complex of underground batch retorts, extending main drifts to accommodate additional branch drifts to the end of the planned complex, situating ore chutes that share a branch drift so that the chutes from each side of the shared drift are facing, and omitting the necessity to heat air and exhaust gases to ignite the shale bed, as succeeding batch retorts may be ignited by using the flammable gases remaining after shale oil has been removed in the recovery procedure from the first batch retort, and later from successive retorts.

5,024,488
HUB COVER ASSEMBLY
Thomas C. Lindhuber, Montgomery, Ala., and Edward N. Campbell, Oklahoma City, Okla., assignors to Dana Corporation, Toledo, Ohio
Filed Mar. 29, 1990, Ser. No. 501,686
Int. Cl.^{5} B60B *7/00*
U.S. Cl. 301—108 S 7 Claims



1. In a hub cover adapted for securement to a vehicular wheel end, said cover formed of a moldable material and including at least one cylindrical aperture defining an axis, and a threaded fastener comprising a shaft with threads having a defined root diameter, said fastener extending through said aperture for securement of said cover to said wheel end; an improvement comprising: said aperture comprising an integral flexible flange at one axial end of said aperture, said flange integrally attached to the cylindrical wall of said aperture, said flange comprising spaced segments extending orthogonally to said axis, said segments defining a lead-in hole for said fastener, said segments defining a plurality of V-shaped spaces between adjoining segments, the thickness of each segment being tapered such that the greatest thickness of each segment is at its integral attachment to the aperture wall, and wherein said lead-in hole comprises an undeflected diameter substantially equal to the root diameter of said shaft; whereby upon insertion of said fastener, said segments are axially deflected to permit axial passage of said fastener through said aperture, whereby said lead-in hole enlarges to enable said threads of said fastener to pass into and through the aperture.

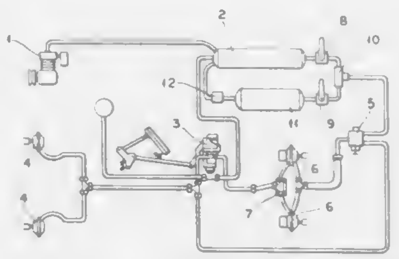
5,024,489
REGENERATIVE BRAKING SYSTEM FOR CAR
Koji Tanaka, and Takashi Shima, both of Tokyo, Japan, assignors to Isuzu Motors Limited, Tokyo, Japan
Filed Oct. 20, 1989, Ser. No. 424,554
Claims priority, application Japan, Oct. 27, 1988, 63-271526
Int. Cl.^{5} B60T *13/74, 1/10*
U.S. Cl. 303—3 12 Claims



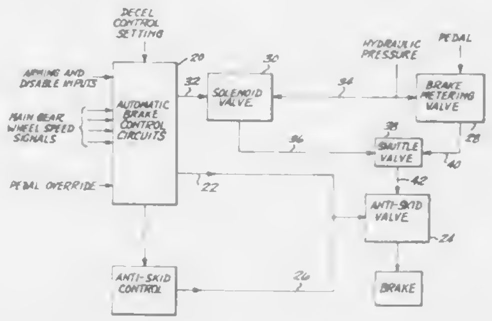
1. A regenerative braking system for a car having a brake pedal, a power take-off unit, and an engine, comprising:
- a hydraulic oil circuit formed of:
  - a high pressure accumlator;
  - a pump/motor;
  - a circuit valve coupled to said pump/motor and said high pressure accumulator; and
  - a low pressure accumulator coupled to said circuit valve;
  - an electromagnetic clutch, coupled to said pump/motor, for connecting or disconnecting said pump/motor to or from the power take-off unit;
- means for sensing the position of the brake pedal;
- means for sensing the pressure of said hydraulic oil circuit;
- control means for determining a braking torque corresponding to the sensed position of the brake pedal, and for determining a pumping capacity of said pump/motor from the determined braking torque and the sensed pressure of said hydraulic oil circuit, said control means decoupling the engine of the car, coupling said electromagnetic clutch, and closing said hydraulic oil circuit in which said pump/motor is controlled to obtain the determined pumping capacity in the braking mode of the car.

5,024,490
EMERGENCY COMPRESSED-AIR BRAKE FOR AUTOMOBILES
Tingyi Wang, Qingdao, China, assignor to Beijing Stone Group Co., Beijing, China
Filed Dec. 21, 1989, Ser. No. 454,694
Claims priority, application China, Dec. 27, 1988, 88216447.3
Int. Cl.^{5} B60T *15/16*
U.S. Cl. 303—9 **2 Claims**

1. A compressed-air brake for automobiles, which comprises a combined braking air-chamber (**6**) comprising a front fork (**27**), an adjusting screw (**26**), a push bar (**13**), a front shell (**17**) of the air-chamber, a front cavity (**19**), a diaphragm (**20**), at least one helical spring (**21, 28**), a back shell (**22**) of the air-chamber, a back cavity (**24**), said front cavity (**19**) and back cavity (**24**) being separated by said diaphragm (**20**), said spring (**21, 28**) being mounted within said back shell (**22**), and having one end bearing against a bottom of said back shell (**22**), and another end acting on said diaphragm (**20**) for applying a pulsed spring force during service braking to the wheels, in addition to a force produced by said compressed air.



5,024,491
AUTOMATIC AIRCRAFT BRAKING SYSTEM INCLUDING WHEELSPEED RESPONSIVE CONTROL APPARATUS
George E. Pease, Jr., Renton; Ervin G. Romero, Seattle, and Rudi K. H. Glasenapp, Bellevue, all of Wash., assignors to The Boeing Company, Seattle, Wash.
Continuation of Ser. No. 743,047, Nov. 18, 1976, abandoned, which is a continuation of Ser. No. 432,911, Jan. 14, 1974, abandoned, which is a continuation of Ser. No. 200,092, Nov. 18, 1971, abandoned. This application Oct. 25, 1977, Ser. No. 845,311
Int. Cl.^{5} B60T *8/78*
U.S. Cl. 303—93 **42 Claims**



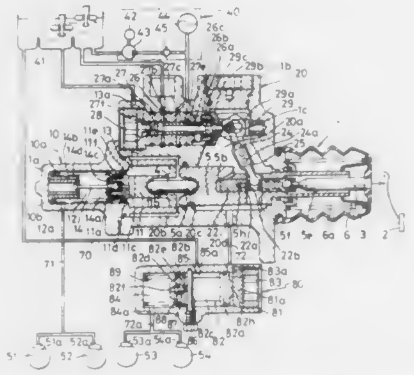
1. In an automatic wheel brake control system for a plurality of aircraft wheels, the combination comprising:
- automatic brake control circuit means for generating automatic brake control signals when the combined wheelspeed of at least two of said plurality of aircraft wheels exceeds a predetermined value;
- antiskid control circuit means for generating antiskid control signals;
- antiskid valve means responsive to said automatic brake control signals and said antiskid control signals for controlling brake pressure applied to at least one of said plurality of aircraft wheels;
- a shuttle valve having first and second input ports and an output port;
- solenoid valve means coupled to said automatic brake control circuit means and responsive thereto for transmitting main hydraulic system pressure to said first input port of said shuttle valve;
- pedal control means for manually metering brake pressure to said second input port of said shuttle valve;
- said shuttle valve shuttling either manually metered brake pressure or automatic system pressure through said shuttle valve output port to said antiskid valve means when the difference of said manually metered brake pressure and

VOL
1127
ISS
3
JE
18
1991
UMI

said automatic system pressure exceeds a predetermined value.

5,024,492
HYDRAULIC BRAKING SYSTEM FOR AN AUTOMOTIVE VEHICLE

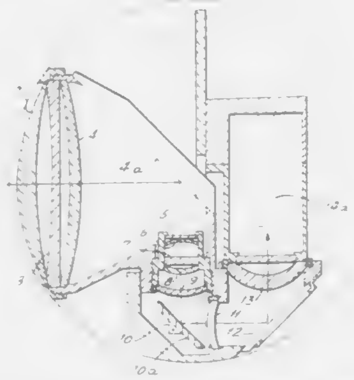
Michiharu Nisbii, Toyota; Genji Mizuno, Toyoake; Yoshihisa Nomura, Toyota, and Masahiko Kato, Nagoya, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of Japan
Filed Jul. 28, 1989, Ser. No. 386,250
Claims priority, application Japan, Jul. 30, 1988, 63-191475
Int. Cl.⁵ B60T *13/12*
U.S. Cl. 303—114 9 Claims



1. A hydraulic braking system for an automotive vehicle comprising:
- a power source for generating a hydraulic power pressure;
- a reservoir for storing an amount of brake fluid;
- a master cylinder for introducing said brake fluid thereinto from said reservoir and generating a hydraulic braking pressure in response to operation of a manually-operated member;
- a hydraulic booster for actuating said master cylinder by said hydraulic power pressure supplied from said power source in response to operation of said manually-operated member;
- a plurality of wheel brake cylinders for braking respective road wheels, said wheel brake cylinders being divided into a first group of wheel brake cylinders communicating with said master cylinder through a first hydraulic circuit and a second group of wheel brake cylinders communicating with said hydraulic booster through a second hydraulic circuit; and
- an auxiliary cylinder disposed in said second hydraulic circuit, said auxiliary cylinder comprising a cylinder body having a cylinder bore defined therein and a piston axially slidably disposed within said cylinder bore, said piston dividing said cylinder bore into a first chamber communicating with said hydraulic booster and a second chamber communicating with said second group of wheel brake cylinders, and said piston blocking a fluid communication between said first chamber and said second chamber, wherein said piston of said auxiliary cylinder forms within said cylinder bore a third chamber communicating with said reservoir through a drain circuit, and wherein said piston is equipped with a valve mechanism for normally communicating with second chamber with said third chamber, and blocking the communication therebetween when a hydraulic pressure supplied from said hydraulic booster to said first chamber exceeds a hydraulic pressure in said second chamber.

5,024,493
COMPACT INFRARED LENS ARRANGEMENT INCLUDING AT LEAST THREE REFLECTIONS

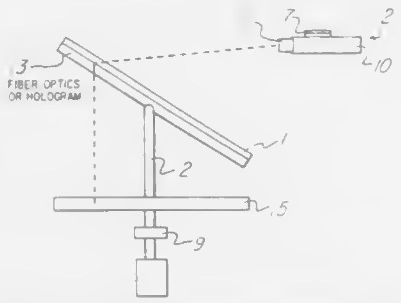
Louis R. Fantozzi, 4 Gordon Ave., Pelham, N.H. 03051; Lawrence Kessler, 173 8th St., Bethpage, N.Y. 11714, and Richard Draxler, West Babylon, N.Y., assignors to Louis R. Fantozzi, Pelham, N.H. and Lawrence Kessler, Bethpage, N.Y.
Division of Ser. No. 455,774, Dec. 28, 1989, Pat. No. 4,989,928. This application Aug. 17, 1990, Ser. No. 569,074
Int. Cl.⁵ G02B *13/14*
U.S. Cl. 350—1.3 4 Claims



1. A refractive lens arrangement comprising a plurality of optical elements for receiving input infrared radiation and providing an optical path for said input radiation,
- the effective focal length of said lens arrangement being at least about 240 mm, and the lens arrangement being fully contained in a spherical region no more than about 150 mm in diameter.

5,024,494
FOCUSSED LIGHT SOURCE POINTER FOR THREE DIMENSIONAL DISPLAY

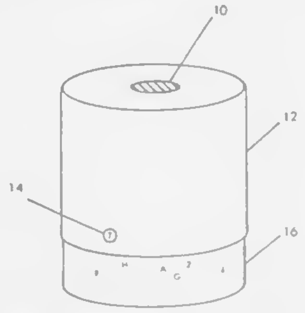
Rodney D. Williams, Plano, and Felix Garcia, Round Rock, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Continuation-in-part of Ser. No. 390,473, Aug. 3, 1989, which is a continuation of Ser. No. 231,638, Aug. 8, 1988, abandoned, which is a continuation of Ser. No. 105,924, Oct. 7, 1987, abandoned. This application Feb. 21, 1990, Ser. No. 482,471
Int. Cl.⁵ G03H *1/02*
U.S. Cl. 350—3.6 12 Claims



1. A pointer for a three dimensional display system, comprising:
- (a) a light source for generating a light beam,
- (b) means to form an image from said light beam in a predetermined two dimensional space and transmit said image along a predetermined path having an axis passing through said space;
- (c) rotating light receiving means having a rotating light receiving surface, the axis of rotation of said surface having a component continuously along said axis for receiving and displaying said image on said first surface, fixed points in said space impinging upon said surface displaying a substantially harmonic motion in a direction along said axis in response to said rotation of said surface; and
- (d) a modulated focused light source movable relative to said axis of said rotating light receiving means.

5,024,495
COMPUTER SOFTWARE PROTECTION, BY OPTICAL EFFECTS

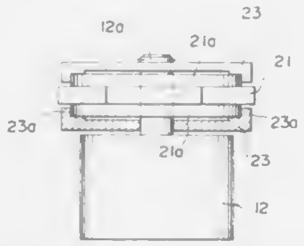
David B. Anderson, 1600 Hartford St., Ann Arbor, Mich. 48103
Filed Apr. 20, 1990, Ser. No. 512,642
Int. Cl.⁵ G02B *5/32*; G09C *1/04*
U.S. Cl. 350—3.7 6 Claims



1. An optical key, comprising:
- a) an optical element to modify an image displayed by a computer display device.
- b) a first enclosure means in the form of a cylinder that holds said optical element parallel to said computer display device.
- c) an opening in said first enclosure means for viewing code data.
- d) a printed means for storing said code data.
- e) a second enclosure means in the form of a cylinder for holding said printed means.
- f) a first alignment means for alignment of said second enclosure means in relation to said computer display device.
- g) a second alignment means for alignment of said first enclosure means in relation to said second enclosure means and to said computer display device.

5,024,496
POLYGONAL MIRROR FOR SCANNING LIGHT BEAM

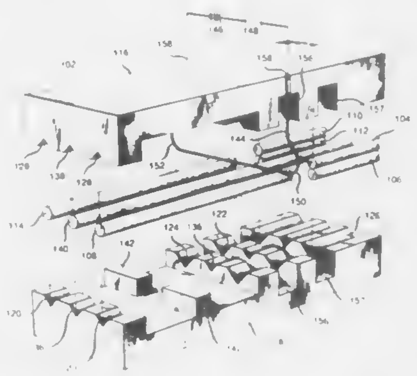
Tomohiro Oikawa, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed Dec. 29, 1989, Ser. No. 459,310
Claims priority, application Japan, Dec. 29, 1988, 63-332471; Apr. 4, 1989, 1-85514
Int. Cl.⁵ G02B *26/10*
U.S. Cl. 350—6.8 9 Claims



1. A polygonal mirror for scanning a light beam in an image exposure device, comprising:
- a polygonal prism body rotatable about its own axis;
- a plurality of reflecting flat mirror facets disposed on an outer circumference of said polygonal prism body, said mirror facets being movable along a circumferential path to deflect a light beam applied thereto;
- said polygonal prism body having a plurality of angular corners each positioned between adjacent two of the mirror facets;
- a first cylindrical member integrally formed with said polygonal prism body; and
- a support on which said polygonal prism body is mounted, said support including an annular flange positionally limiting said polygonal prism body in a radial direction at positions near said angular corners.

5,024,497
SHAPE MEMORY ALLOY OPTICAL FIBER SWITCH

Robert W. Jebens, Skillman, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.
Filed Feb. 15, 1989, Ser. No. 311,567
Int. Cl.⁵ G02B *6/36*
U.S. Cl. 350—96.2 24 Claims



1. An optical fiber switch comprising a switch housing having an internal first channel extending from an outside surface of the housing for receiving a first switchable fiber having a first end and a second channel extending from an outside surface of the housing for receiving a second fiber having a second end, the second channel including a first portion extending beyond the second end, the first end being movable into the first portion of the second channel and being in optical alignment with the second end when therein, the switch being characterized by
- a first member made of a shape memory material having the property of restoration substantially to an original state when heated above a first temperature after being distorted while below a second temperature, this member being arranged in the housing to exert a force on the switchable fiber during shape restoration in a direction tending to push the first end into the first portion, the force exerted by the first member when heated above the first temperature being sufficient to push the first end into the first portion, and
- means for heating and cooling the first member above and below the first and second temperatures, respectively.

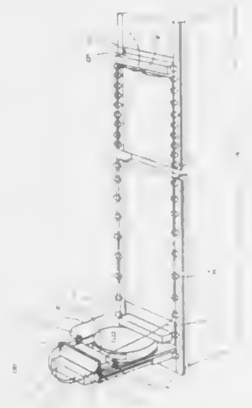
5,024,498
SWITCH BOX FOR PRODUCING FREELY SELECTABLE OPTICAL PLUG CONNECTIONS

Johann A. Becker, Overath; Peter G. Deusser, and Olaf W. R. Holzmann, both of Cologne, all of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.
Filed Nov. 9, 1989, Ser. No. 434,644
Claims priority, application Fed. Rep. of Germany, Nov. 12, 1988, 3838428
Int. Cl.⁵ G02B *6/00, 6/26*; B65D *85/38*
U.S. Cl. 350—96.10 13 Claims

1. A switch box for producing freely selectable optical plug connections between LWG groups (27) of incoming optical

VOL
1127
ISS
3
JE
18
1991
UMI

cables and LWG groups of outgoing optical cables by means of optical shunting lines (**7, 8**), wherein LWG groups (**27**) of the incoming optical cables are connected to a first group of adjacent termination units (**2**) and LWG groups of the outgoing optical cables are connected to a second group of adjacent terminating units (**5**), the individual LWGs of the incoming and the outgoing cables being connected to optical plug connector elements (**11, 12, 13, 14**) provided on the termination units (**2** and **5**, respectively), the shunting lines (**7, 8**) being connected at both ends to mating connectors (**20, 21**), and wherein storage elements (**9**) are provided for storage of excessive lengths of the shunting lines (**7, 8**) not required for the production of a connection.



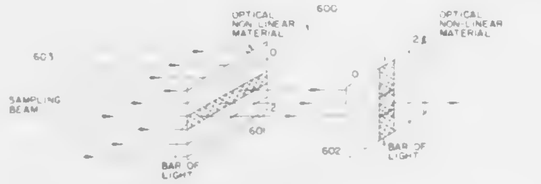
5,024,499
OPTICAL AND GATE FOR USE IN A CROSS-BAR ARITHMETIC/LOGIC UNIT

R. A. Falk, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 29, 1989, Ser. No. 414,475

Int. Cl.^{5} G02B *6/12;* **H03K** *17/80;* **G06E** *1/04*

U.S. Cl. 350—96.11 17 Claims



1. An optical apparatus comprising:
a first and second plurality of light sources;
a first optical substrate having a first plurality of optical paths associated therewith, said first optical substrate being operable for transmitting an incident light beam through at least one of said first plurality of optical paths which is illuminated by at least one of said first plurality of light sources; and
a second optical substrate located adjacent to said first optical substrate and having a second plurality of optical paths associated therewith, said second optical substrate operable for transmitting a portion of said incident light beam, which has passed through said first optical substrate, through at least one of said second plurality of optical paths which is illuminated by said second plurality of light sources.

5,024,500
CANTILEVER BEAM RADIATION DEFLECTOR ASSEMBLY

Ian W. Stanley, Ipswich; John N. Shepherd, Birmingham, and Peter S. Dobson, Stourport, all of England, assignors to British Telecommunications public limited company, United Kingdom

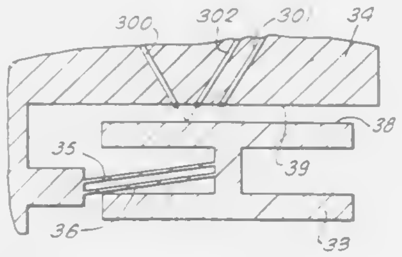
PCT No. PCT/GB88/00262, § 371 Date Dec. 2, 1988, § 102(e) Date Dec. 2, 1988, PCT Pub. No. WO88/07697, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 31, 1988, Ser. No. 282,337

Claims priority, application United Kingdom, Apr. 2, 1987, 8707854

Int. Cl.^{5} G02B *6/26*

U.S. Cl. 350—96.15 17 Claims



3. A radiation deflector assembly comprising:
at least three radiation waveguides;
a controllable radiation deflector positioned such that when the deflector is in a first position, radiation passes between one combination of two of the waveguides, and when the deflector is in a second position, radiation passes between another combination of two of the waveguides; and
control means responsive to control signals for controlling the position of the deflector
wherein the deflector comprises a cantilever beam having one end free and the other end integral with a supporting substrate on which are mounted waveguides and characterised in that the cantilever beam has its centre of mass closer to the free end of the beam than to the end hinged to the common substrate.

5,024,501
MANUFACTURING METHOD FOR POLARIZATION MAINTAINING OPTICAL FIBER COUPLERS

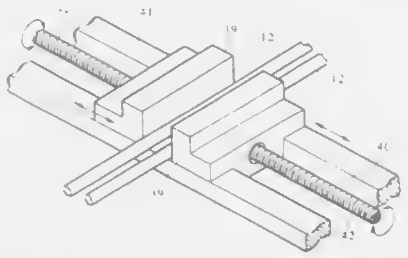
Hiroyuki Taya, Sakura; Mikio Yoshinuma, Yachiyo; Takeshi Yamada, Sakaura; Kenji Nishide, Kamakura; Fumio Suzuki, Sanbu; Hirohisa Fujimoto, Yokohama, and Ryozo Yamauchi, Sakura, all of Japan, assignors to Fujikura Ltd., Tokyo, Japan

Filed Apr. 9, 1990, Ser. No. 506,402

Claims priority, application Japan, Apr. 12, 1989, 1-92233

Int. Cl.^{5} G02B *6/02, 6/16, 6/26;* **C03B** *37/06*

U.S. Cl. 350—96.15 9 Claims



1. A manufacturing method for a polarization maintaining optical fiber coupler comprising: a first step in which a portion of two polarization maintaining optical fibers are positioned so that stress applying parts of each are mutually aligned with respect to one another, and a second step in which a portion of said polarization maintaining optical fibers so aligned and held

tightly in the alignment are subjected to a fusing-elongation process, wherein said first step comprises using an image sensor, examining the light intensity distribution profile of an image obtained from the image sensor of light transmitted through said polarization maintaining optical fibers from a light source, and based on said examining, rotating said polarization maintaining optical fibers about longitudinal axes thereof to carry out said mutual alignment of said stress applying parts of said polarization maintaining optical fibers.

5,024,502
SYSTEM TO TRANSMIT OPTICAL INFORMATION AND COMPRISING A PLURALITY OF TRANSMITTERS AND RECEIVERS CONNECTED BY OPTICAL FIBERS

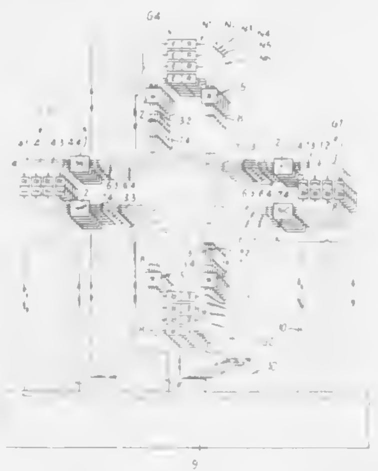
Jean-Michel Maisonneuve; Jean-Paul Domergue, both of Toulouse; Gabrielle Parize, Paris; Philippe Palandjian, Blagnac, and Jacques Isbert, Toulouse, all of France, assignors to Office National d'Etudes et de Recherche Aerospatiales (ONERA), Chatillon and Societe Nationale Industrielle et Aerospatiale, Paris, both of France

Filed Jun. 14, 1990, Ser. No. 538,152

Claims priority, application France, Jul. 10, 1989, 89 09242

Int. Cl.^{5} G02B *6/28;* **G02F** *1/00, 2/00, 3/00*

U.S. Cl. 350—96.16 9 Claims



1. A transmission system for transmitting optical information, said system comprising a plurality of networks, each network comprising
a plurality of transmitters and receivers connected by optical fibers,
a first coupler interconnecting all of the optical fibers arriving at said receivers, and
a second coupler interconnecting all of the optical fibers leaving said transmitters,
said system also comprising a third coupler interconnecting all of the fibers leaving the transmitters in all of the networks.

5,024,503
HERMETIC GLAND FOR OPTICAL FIBRES

Duncan A. Gunn, Widdington, and Stephen J. McManus, Bishop's Stortford, both of Great Britain, assignors to STC PLC, London, England

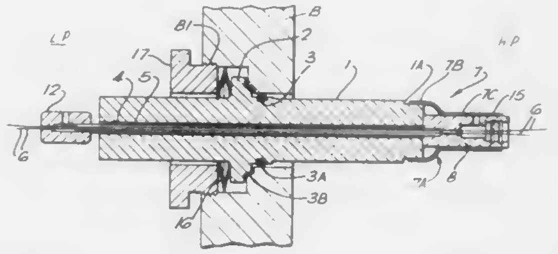
Filed Feb. 13, 1990, Ser. No. 479,119

Claims priority, application United Kingdom, Feb. 16, 1989, 8903560.4

Int. Cl.^{5} G02B *6/36*

U.S. Cl. 350—96.20 10 Claims

1. An hermetic gland for optical fibres comprising a rigid gas-tight member having a passageway from a high pressure end of the gland extending therethrough to a low pressure end of the gland, at least one optical fibre extending into the passageway at the high pressure end and emerging from the passageway at the low pressure end, a gas-blocking grease jelly or similarly viscous liquid material filling said passageway over such length as to provide the required gas blocking property in the passageway of the gland, and a plug in the passageway at the low pressure end whose purpose is to prevent leakage of said gas blocking material from the passageway and to provide the required hydraulic pressure-resisting property within said passageway of the gland.



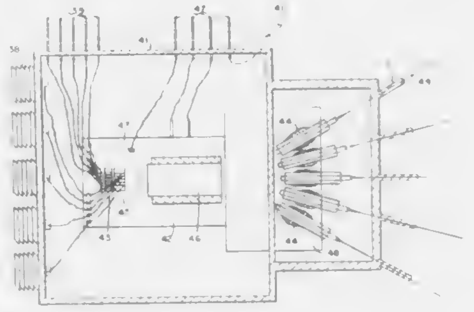
5,024,504
METHOD OF ALIGNING AND PACKAGING AN OPTOELECTRONIC COMPONENT WITH A SINGLE-MODE OPTICAL FIBER ARRAY

Robert A. Boudreau, Hampton, N.H., and William C. Rideout, Townsend, Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Nov. 20, 1989, Ser. No. 439,761

Int. Cl.^{5} G02B *6/32*

U.S. Cl. 350—96.18 39 Claims



1. A method for the precise alignment of multiple uptapered single-mode optical fibers to a single packaged optoelectronic array device having at least two light-emitting sources, comprising the steps of:
selecting a graded index lens having a numerical aperture sufficiently large to optically access the light-emitting sources of said optoelectronic array for optically coupling each uptapered optical fiber to a respective light emitting source of said array through said lens;
securing said graded index lens on a substrate of said package a fixed distance from said optoelectronic array such that the light beams from said light-emitting sources are magnified and the spacing between said beams is expanded;
sequentially aligning said optical fibers with said light-emitting sources by optically coupling the thick end of each of said uptapered single-mode optical fiber to a respective light beam emanating from said optoelectronic array after said beam has been magnified by said lens; and
securing said optical fibers to said package after alignment.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,505
ARRAY SPLICE FOR RIBBON-LIKE MULTI-CORE OPTICAL FIBERS

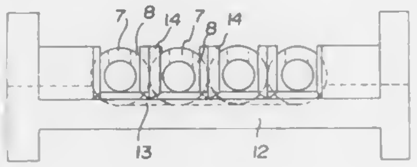
Junji Fujikawa, 1460-63, Oaza Minamizakura, Yasu-cho, Yasu-gun, Sigaken, and Fumiaki Tamura, 220, Ogawa, Notogawa-cho, Kanzaki-gun, Siga-ken, both, Japan

Filed Feb. 5, 1990, Ser. No. 474,952

Claims priority, application Japan, Feb. 10, 1989, 1-15112[U]

Int. Cl.^{5} G02B *6/26, 6/40*

U.S. Cl. 350—96.22 4 Claims



1. An array splice connector for ribbon-like multi-core optical fibers, comprising:

a plurality of capillary tubes of ultraviolet-transmitting glass, each having an inner diameter slightly larger than an outer diameter of a clad of an optical fiber, and including tapered portions on the opposite ends of said capillary tubes for guiding optical fiber bodies, and a groove formed in a middle upper surface region of each of said capillary tubes for discharging bubbles and adhesive agent therefrom;

a base including recesses formed in a middle upper surface region thereof for receiving and supporting lower portions of tube walls of said glass capillary tubes; and

a plurality of front-edged separators for guiding said optical fiber bodies into said capillary tubes, each respectively disposed at opposite ends of said receiving and supporting recess, said separators being disposed on said base with substantially the same pitch as that for said capillary tubes, wherein defined between adjacent separators are optical fiber insertion paths, each path having a width which increases with increasing distances from the opposite ends of each capillary tube.

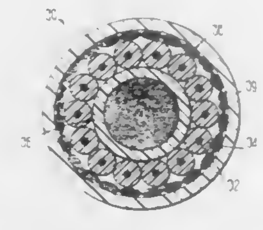
5,024,506
PLENUM CABLES WHICH INCLUDE NON-HALOGENATED PLASTIC MATERIALS

Tommy G. Hardin, Lilburn, Ga., and Behrooz A. Khorramian, New York, N.Y., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 303,212, Jan. 27, 1989, abandoned. This application Dec. 21, 1989, Ser. No. 449,229

Int. Cl.^{5} G02B *6/44*

U.S. Cl. 350—96.23 8 Claims



1. A communications cable, which comprises:

a core which comprises at least one communications transmission medium, said communications transmission medium being enclosed with a plastic material which is selected from the group consisting of a polyetherimide, a silicone-polyimide copolymer, and compositions which include a polyetherimide and a silicone-polyimide copolymer; and

a jacket which encloses said core and which comprises a plastic material comprising a silicone-polyimide copolymer.

5,024,507
PHOTOPOLYMERIZABLE COMPOSITION FOR CLADDING OPTICAL FIBERS

Richard A. Minns, Arlington; Iris B. K. Bloom, Quincy, both of Mass., and Roopram Rambarack, Queens, N.Y., assignors to Polaroid Corporation, Cambridge, Mass.

Filed May 10, 1990, Ser. No. 521,671

Int. Cl.^{5} G02B *1/04, 6/16*

U.S. Cl. 350—96.34 34 Claims

31. An optical fiber having a cladding comprising a solid solution of a copolymer of vinylidene fluoride and hexafluoropropylene, or a terpolymer of vinylidene fluoride, hexafluoropropylene and tetrafluoroethylene in a copolymer of an unsubstituted or fluorosubstituted diacrylate monomer with a fluorinated monofunctional acrylate monomer, the copolymer comprising from about 2 to about 12 parts by weight of the fluorinated monofunctional acrylate monomer per part by weight of the diacrylate monomer, the cladding having a refractive index of not more than about 1.43.

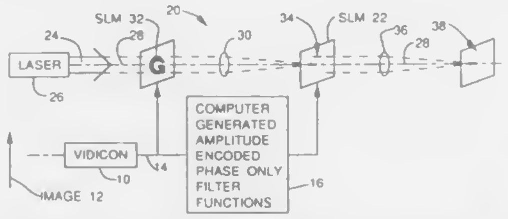
5,024,508
AMPLITUDE ENCODED PHASE-ONLY FILTERS FOR OPTICAL CORRELATORS

Joseph L. Horner, Cambridge, Mass., assignor to United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 4, 1989, Ser. No. 335,634

Int. Cl.^{5} G02B *27/46;* **G03H** *1/16;* **G06E** *3/00*

U.S. Cl. 350—162.13 19 Claims


SLM 32
20
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34
SLM 22
36
28
38
LASER
G
26
VIDICON
10
14
IMAGE 12
COMPUTER GENERATED AMPLITUDE ENCODED PHASE ONLY FILTER FUNCTIONS
16

1. Method of modifying and utilizing a continuous phase-only filter, suitable for use in the Fourier Transform plane of an optical correlator, to enable said filter to be written on a pure amplitude responsive writing device comprising the step of:

adding a bias term K2 to a first filter function $H_{AP}(u,v)=K\phi(u,v)$, said bias term having a value great enough to obtain a second amplitude encoded filter function $H_{AP}=K[k2+\phi(u,v)]$where all phase angles are positive real numbers or zero and K is a linear sealing factor.

5,024,509
STRUCTURAL COMBINATION OF PLASTIC LENSES

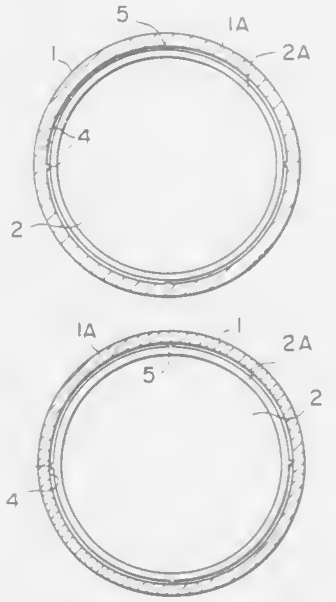
Etsuzou Kurihara, Hachioji, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Mar. 9, 1990, Ser. No. 491,230

Claims priority, application Japan, Mar. 14, 1989, 1-62681; Jan. 12, 1990, 2-5235

Int. Cl.^{5} G02B *7/02, 3/00*

U.S. Cl. 350—254 20 Claims



16. A compound lens constructed from a pair of lenses, at least one of which is made of plastic, said compound lens comprising;

a first lens having a cylindrical collar around its circumference,

a second lens having a circular wall shaped to be inlaid inside said cylindrical collar with a clearance therebetween, and

at least three engaging members fixed to either the inner wall of said cylindrical collar or the outer wall of said circular wall, each of said engaging members having a surface for coming into contact with the wall to which they are not fixed and sized to be larger than said clearance so that said first and second lenses are engaged by interference fit between said surfaces of the engaging members and said wall to which they are not fixed.

5,024,510
CARTRIDGE HOLDER SYSTEM

Paula M. Lubins, 1199 Glendon, Maplewood, Minn. 55119, and John C. Mroszak, Box 306, Soudan, Minn. 55782

Filed Sep. 26, 1988, Ser. No. 248,581

Int. Cl.^{5} G02B *27/00;* **G11B** *17/04*

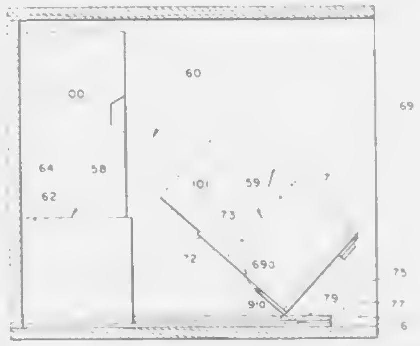
U.S. Cl. 350—321 17 Claims

1. A system for storing and selectively retrieving a recorded program on videocassette comprising:

an information disk for storing identification indicia on a recorded program;

an information disk viewer for viewing the information stored on said information disk; and

a storage rack for holding videocassettes or videocassette cartridges containing identification information, said storage rack including a first rear shelf for holding videocassettes or videocassette cartridges in a vertical position to expose the identification information on videocassettes or videocassette cartridges located on said rear shelf, a front compartment for holding videocassettes or videocassette cartridges in a vertical position for viewing the identification information on the cartridges, said front compartment having means for tipping said front compartment from a vertical position to a horizontal position to permit a user to remove a videocassette located on said rear shelf without having to remove a videocassette or videocassette cartridge in said front compartment.



5,024,511
DISPLAY APPARATUS

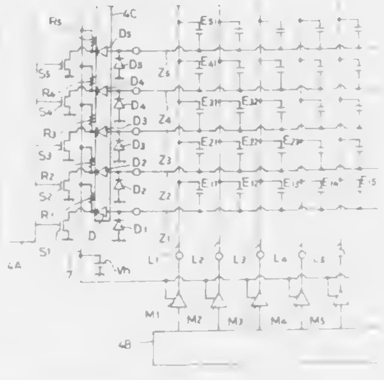
Ken Matsubara; Itaru Saito; Hirohisa Kitano; Kouichi Shingaki, and Tomohiko Masuda, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 25, 1989, Ser. No. 343,006

Claims priority, application Japan, Apr. 25, 1988, 63-102072

Int. Cl.^{5} G02F *1/03, 1/01;* **G02B** *5/30*

U.S. Cl. 350—356 20 Claims



1. A display apparatus comprising:

a plurality of light transmitting windows arranged in a matrix on a solid-state modulator substrate having an electro-optical effect, said matrix including a plurality of rows and a plurality of columns;

a plurality of electrode pairs formed on one of an entry side surface and an exit side surface of said solid-state modulator substrate for forming electric fields across said light transmitting windows, respectively;

voltage application means for applying a voltage to each of said electrode pairs;

a plurality of scanning lines each electrically interconnecting first electrodes in the electrode pairs associated with the light transmitting windows arranged in one of said rows;

a plurality of signal lines each electrically interconnecting second electrodes in the electrode pairs associated with the light transmitting windows arranged in one of said columns;

a scanning circuit for sequentially and individually electrifying said scanning lines;

a signal circuit operable in response to a synchronizing signal received from said scanning circuit and display information for electrifying one of said signal lines connected to the electrode pair associated with a selected light transmitting window for forming an electric field;

VOL
1127
ISS
3
JE
18
1991
UMI

an electric field control circuit for providing zero potential difference in the electrode pairs associated with the light transmitting windows except for said selected light transmitting window driven by said scanning circuit and said signal circuit for forming the electric field in accordance with said display information;

a first polarizer disposed on the entry side surface of said solid-state modulator substrate; and

a second polarizer disposed on the exit side surface of said solid-state modulator substrate.

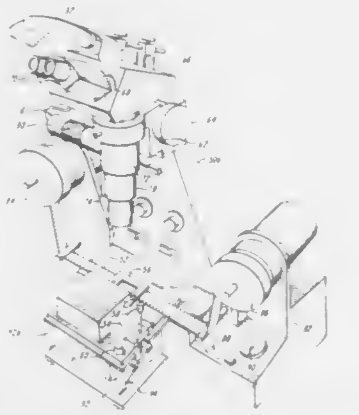
5,024,512
MICROFILM READER WITH MICROFILM AND RETICLE IMAGES PROVIDED TO EACH OF TWO BINOCULAR EYEPIECES

Arnold H. Greene, Newton, Mass., and Harold E. Holden, St. Johnsbury, Vt., assignors to American Photo Systems, Inc., St. Johnsbury, Vt.

Continuation of Ser. No. 888,114, Jul. 18, 1986, abandoned. This application Feb. 7, 1989, Ser. No. 309,007

Int. Cl.⁵ G02B *21/20, 27/02, 27/34*

U.S. Cl. 350—514 **12 Claims**



1. A high resolution microfilm reader including an optical system having no more than 0.1% total distortion, comprising:

a supporting chassis;

a focusing mount adjustably attached to said chassis;

a binocular microscope head attached to said focusing mount and having first and second eye piece tubes and corresponding first and second ultrawide-angle eye pieces;

a beam splitter assembly attached to said focusing mount and having a beam splitter housing;

a variable magnification objective lens, attached to said beam splitter housing, for providing said beam splitter assembly with an image of a microfilm being viewed;

a reticle assembly, attached to said beam splitter housing and having a rotatable calibrated reticle for measuring features of said microfilm image being viewed, and means including at least one optical component for projecting an image of said reticle into said beam splitter assembly; and

said beam splitter assembly further including a beam splitter, for receiving said image of a microfilm being viewed and said reticle image, and for simultaneously providing both of said first and second eye pieces with said image of a microfilm being viewed and said reticle image.

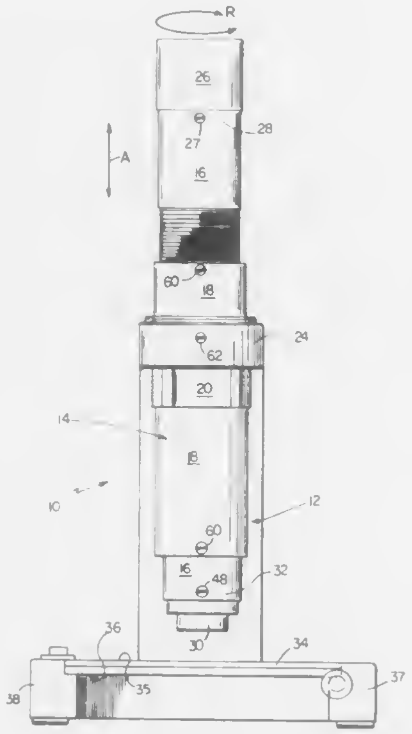
5,024,513
MICROSCOPE

George Hayashi, San Jose, Calif., assignor to Swift Instruments, Inc., Boston, Mass.

Filed Dec. 4, 1989, Ser. No. 444,962

Int. Cl.⁵ G02B *7/02, 21/24*

U.S. Cl. 350—518 **8 Claims**



1. A microscope comprising:

a microscope stand defining a specimen stage for holding a specimen for viewing;

an elongated microscope tube mounted upon said microscope stand, said elongated microscope tube comprising a first focusing element and a third focusing element, and having an eyepiece lens at a first, upper end and an objective lens at a second, lower end, said objective lens disposed generally in position adjacent said specimen stage;

means for adjustment of position of said microscope tube axially along an axis of said microscope tube and relative to said microscope stand in a manner to vary the position of said objective lens relative to a specimen disposed upon said specimen stage;

said means for adjustment comprising said first focusing element and a second focusing element mounted upon said microscope stand, said first focusing element co-axial with and mounted within said second focusing element and adapted for axial movement relative to said second focusing element upon application of axially directed force applied between said first focusing element and said second focusing element, said first focusing element and said second focusing element disposed in frictional engagement, and

said means for adjustment further comprising said third focusing element, said objective lens being fixedly mounted thereupon, said third focusing element co-axial with and mounted within said first focusing element and adapted for axial movement relative to said first focusing element upon application of rotational force applied between said third focusing element and said first focusing element, said third focusing element and said first focusing element disposed in threaded engagement.

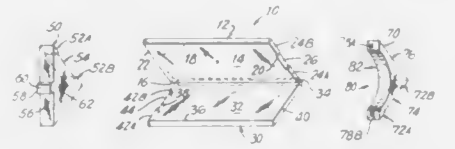
5,024,514
LATERAL TRANSFER RETROREFLECTOR AND ROOF MIRROR FOR SAME

Zvi Bleier, Wantagh, and Morton S. Lipkins, Bayside, both of N.Y., assignors to Precision Lapping & Optical Co., Inc., Valley Stream, N.Y.

Filed Apr. 18, 1990, Ser. No. 511,711

Int. Cl.⁵ G02B *5/08, 5/12, 7/18, 27/10*

U.S. Cl. 350—618 **39 Claims**



1 A hollow roof mirror comprising:

a first member having a first reflective planar surface, a first length defining edge, and a first edge surface;

a second member having a second reflective planar surface, a second length defining edge and a second edge surface;

said first member and said second member being positioned with respect to one another that said first length defining edge of said first member contacts said second planar surface of said second member;

a first support panel for engaging said first planar surface of said first member and said second edge surface of said second member; and

a second support panel for engaging said second planar surface of said second member and said first edge surface of said first member.

5,024,515
ORNAMENTS FOR EYE GLASSES

Steven D. Beckemeyer, and Lynn M. Beckemeyer, both of 335 Midridge, St. Louis, Mo. 63137

Filed Apr. 17, 1989, Ser. No. 339,512

Int. Cl.⁵ G02C *11/02, 1/00*

U.S. Cl. 351—52 **1 Claim**

1 A spring metal fixture for readily attaching and removing a dangling ornament from the frames of eye glasses, in combination with eyeglasses wherein the improvement comprises:

(a), a decorative ornament having a support ring attached to the top for attaching the ornament to the eye glass frame;

(b), a single turn of spring metal wire wrapped around the eye glass frame with the ends over lapping on the inside portion of the eye glass frame;

(c), the ends of the spring wire formed inwards to press upon the eye glass frame;

(d), the spring wire conforming to the contour of the eye glass frame except on the bottom where is tapers to a rounded point;

(e), the ring having space between the inside circumference and the bottom of the eye glass frame to accommodate the ornament support ring; and,

(f), the spring wire ring with the ornament attached being slidably adjustable along the eye glass frame.

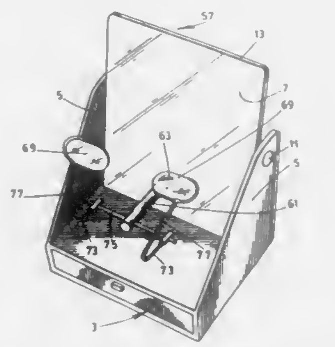
5,024,516
OPHTALMIC APPARATUS

Georges Zoueki, 4812 Verdun, Verdun, Quebec, Canada H4G 1N1

Continuation-in-part of Ser. No. 246,330, Sep. 19, 1988, abandoned. This application Jul. 12, 1989, Ser. No. 379,001

Int. Cl.⁵ G02C *7/08, 1/00*

U.S. Cl. 351—57 **13 Claims**



1. An apparatus for holding a pair of lenses in front of a mirror, comprising:

a support comprising a T-shaped member having a longitudinal arm and a cross arm, and a pair of spaced-apart lens carriers mounted onto said cross-arm;

a pair of opthalmic lenses mounted on said lens carriers to fit viewer's eyes and

means for mounting the longitudinal arm of the T-shaped member of the support onto the mirror in such a manner that the opthalmic lenses lie in a common plane in front of, and parallel to, said mirror.

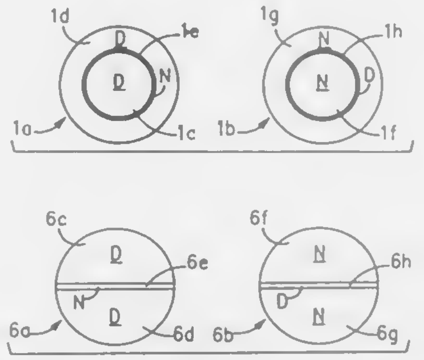
5,024,517
MONOVISION CORNEAL CONTACT LENSES

Leonard Seidner, St. John's Pl., Brooklyn, N.Y. 11217

Filed Dec. 7, 1989, Ser. No. 447,201

Int. Cl.⁵ G02C *7/04*

U.S. Cl. 351—161 **26 Claims**



1. A pair of corneal contact lenses, comprising:

a first contact lens for one eye of a patient, said lens having a first distant vision correction zone and a second distant vision correction zone separated from one another by a first auxiliary correction zone, said first distant correction

VOL
1127
ISS
3
JE
18
1991
UMI

zone and said second distant vision correction zone having a first common focal length, said auxiliary correction zone having a first additional focal length different from said common focal length; and

a second contact lens for the other eye of the patient, said second contact lens having a first near vision correction zone and a second near vision correction zone separated from one another by a second auxiliary correction zone, said first distant correction zone and said second distant vision correction zone having a second common focal length, said second auxiliary correction zone having a second additional focal length different from said second common focal length.

5,024,518

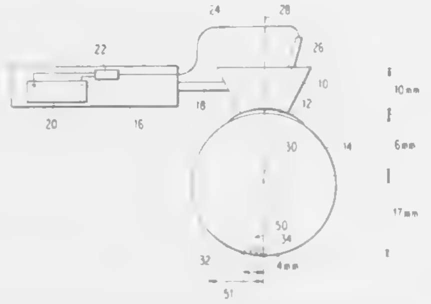
OPHTHALMIC CONTACT LENS WITH INTERNAL FIXATION LIGHT FOR EXAMINATION OF THE OPTIC NERVE

David W. Richards, Tampa, Fla., and Kent A. Murphy, Roanoke, Va., assignors to Center for Innovative Technology, Herndon; Virginia Commonwealth University, Richmond and Virginia Polytechnic Institute and State University, Blacksburg, all of Va.

Filed Mar. 22, 1990, Ser. No. 497,596

Int. Cl.^{5} A61B *3/00*

U.S. Cl. 351—219 **8 Claims**



1. An instrument for examining the optic nerve in a patient's eye, comprising:

a contact lens for placement on the cornea of said patient's eye;

a source of light for providing a fixation target in said contact lens for said patient's eye;

a means for collimating and directing a narrow diameter beam of light from said source of light to a point in said patient's eye a fixed distance away from the optic nerve head of said patient's eye; and

a means for observing the optic nerve of said patient's eye.

5,024,519

APPARATUS AND METHOD FOR VISUAL-FIELD TESTING

Dwight L. Howard, Winters, and Chris A. Johnson, Davis, both of Calif., assignors to Regents of the University of California, Oakland, Calif.

Filed Feb. 20, 1990, Ser. No. 482,278

Int. Cl.^{5} A61B *3/02*

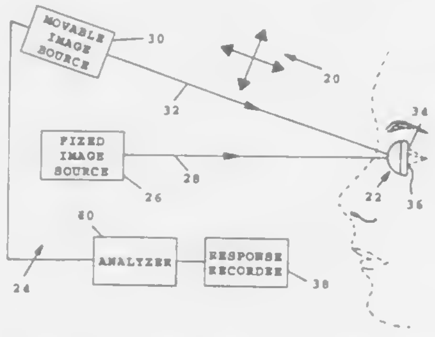
U.S. Cl. 351—226 **20 Claims**

1. Apparatus for measuring a subject's response to a light stimulus, over the subject's visual field, comprising:

an ocular device adapted to be placed over a subject's eye, including a transparent window defining an outwardly projecting, cavity-like inner surface dimensioned to encompass the subject's visual field in that eye,

an optical system for producing a fixed-position image at one position in the subject's visual field, and a series of transient light images at different selected positions in the subject's visual field, and

illuminating means for illuminating said surface to provide a substantially uniform glow on said inner surface, against which said fixed-position image and transient images may be perceived.



5,024,520

OPHTHALMIC MEASUREMENT APPARATUS

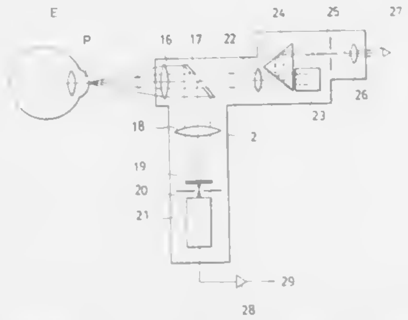
Koichi Akiyama, Hino, Japan, assignor to Kowa Company Ltd., Japan

Filed Jan. 16, 1990, Ser. No. 464,903

Claims priority, application Japan, Jan. 23, 1989, 1-12015

Int. Cl.^{5} A61B *3/10*

U.S. Cl. 351—221 **8 Claims**



1. An ophthalmic measurement apparatus in which a laser beam is projected at a selected spot in an eye under examination and laser light scattered therefrom is detected for ophthalmic measurement, comprising:

a laser light source for producing the laser beam;

a laser beam projector for projecting the laser beam at the selected spot in the eye under examination;

an optical slip projector for projecting a slit image onto the selected spot int he eye;

a light receiving section including photodetector means for detecting the laser light scattered from the eye;

a single-objective binocular type observation section for observing the selected spot in the eye where the laser beam and slit image are projected;

a mirror for splitting the optical path of the scattered laser light from the eye into a light path that directs light to the photodetector means and a light path that directs light to the observation section, wherein the mirror has a pair of apertures in the light path that directs light to the observation section and the ratio of the effective area of the mirror to the area of the apertures is about 1:1;

wherein the observation section includes a pair of lenses each configured to view substantially the same size area as each aperture; and

processing means for processing signals received from the photodetector means to perform the ophthalmic measurement.

5,024,521

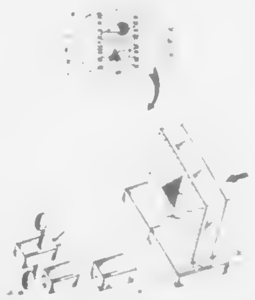
AUTOSTEREOSCOPIC PRESENTATION SYSTEM

Larry Zuchowski, 4706 Sepulveda #308, Sherman Oaks, Calif. 91403; Clyde I. Tichenor, 15524 Cohasset St., Van Nuys, Calif. 91406, and Irwin Ginsburgh, Newhall, Calif. 91321

Filed Nov. 19, 1990, Ser. No. 615,266

Int. Cl.^{5} G03B *21/32*

U.S. Cl. 352—86 **26 Claims**



1. An autostereoscopic presentation system comprising:

(a) An enhanced film strip having a multiplicity of photographic frames with each frame having a two-dimensional optical image, with the optical image of the first frame having a foreground appearing as a conventional image and the background appearing as a matted image, and where the second frame has an optical image having the background appearing as a conventional image and the foreground as a matted image, and where successive frames alternate as described above,

(b) at least two stationary screens juxtaposed in planar separation from each other, where each said screen operates in either a translucent mode or a clear mode,

(c) a projector having means for projecting the enhanced film strip onto said screens, at a rate of at least 96 images per second,

(d) means for selecting and controlling the operational modes of said screens, where at any one time period, only one of said screens is in its translucent mode,

(e) means for synchronizing the operational modes of said screens with the respective alternating projections of the two-dimensional optical images where at any one time period, only one conventional image is projected onto the specific said screen that is operating in its translucent mode, where the conventional image is viewed on said translucent screen through said screens which are operating in their clear mode, or projected through a clear screen to a translucent screen, thus be alternately projecting the optical images onto said screens operating in their respective operational mode the viewer is able to perceive a three-dimensional volumetric image without the need for a viewing implement, where the perceived image is due to the persistence of vision that allows the eyes to retain the first projected image while the second image is being projected to thus cause a fusion of the two images which results in the perceived three-dimensional image.

5,024,522

RETICLE MASKING APPARATUS FOR A CAMERA AND METHOD

Stanislav Maron, 7801 N. 54th St., Paradise Valley, Ariz. 85253

Filed Jun. 21, 1990, Ser. No. 542,260

Int. Cl.^{5} A63J *5/00;* G03B *23/02*

U.S. Cl. 352—89 **30 Claims**

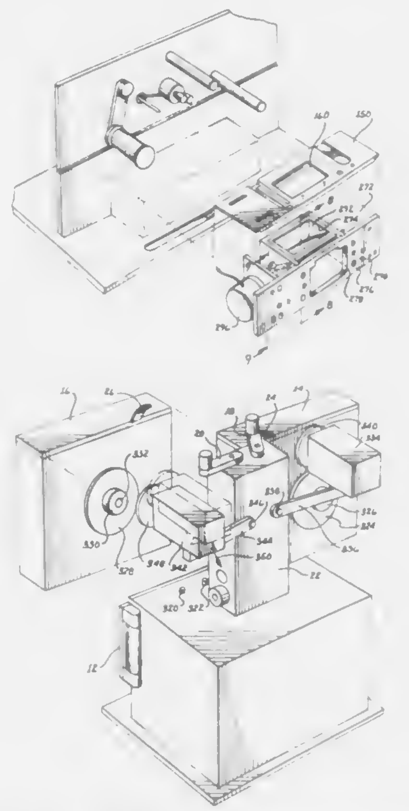
1. Apparatus for reticle masking a film strip in a camera, which camera includes a film transport mechanism disposed in a compartment having a rear wall and a bottom plate, said apparatus comprising in combination:

a) an aperture plate assembly for locating a film strip in predetermined registration;

b) mask retention means for retaining in registration with the film strip an image to be superimposed;

c) a sliding mirror mechanism having a first position for superimposing the image and a second position for exposing the film strip;

d) means for translating said sliding mirror mechanism from the first position to the second position and return; and



e) means for biasing said sliding mirror mechanism against both the rear wall and the bottom plate of the camera in each of the first and second positions and during transport of said sliding mirror mechanism between the first and second positions.

5,024,523

MAP PROJECTION SYSTEM

Hans G. Jerie, Enschede, Netherlands, assignor to Ambridge Limited, Hong Kong, Hong Kong

Continuation of Ser. No. 339,895, Apr. 18, 1989, abandoned, which is a continuation of Ser. No. 173,643, Mar. 25, 1988, abandoned, which is a continuation-in-part of Ser. No. 788,116, Oct. 16, 1985, abandoned. This application Oct. 19, 1989, Ser. No. 460,000

Claims priority, application Netherlands, Oct. 19, 1984, 8403193

Int. Cl.^{5} G08G *1/137;* G03B *21/23, 21/28*

U.S. Cl. 353—11 **6 Claims**

6. A map display assembly comprising a microfiche representation of spatially separate first and second map transparency images of the same terrain and having different scales to be examined individually through an optical lens projection system at fixed magnification to reveal details of corresponding portions of the map transparency images permitted by the individual scales of the two map transparency images and the fixed magnification; a substantially rigid support for the microfiche having a rack along one side edge thereof; a receptacle defining a slot for receiving the support, a motor carried by the receptacle and a driving gear rotated by the motor and engageable with the rack to draw the support into the receptacle

VOL
1127
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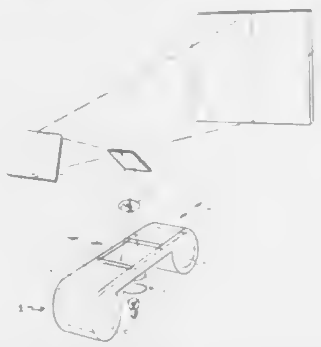


along one path and to translate the support back and forth along the one path; and a housing having guide slots extending along a second path orthogonal to the one path and a second rack extending along the second path, the receptacle having guides received in the guide slots, the housing including a second motor and a driving gear rotated by the second motor and engaeable with the second rack to draw the receptacle into the housing and to translate the receptacle back and forth along the second path.

5,024,524

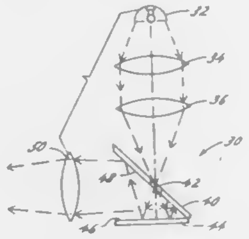
REFLECTIVE IMAGE PLANE MODULE

Richard A. Flasck, San Ramon, Calif., assignor to RAF Electronics Corp., San Ramon, Calif.

Filed Aug. 11, 1989, Ser. No. 392,747

Int. Cl.^{5} G03B *21/00;* G09G *3/36*

U.S. Cl. 353—31 **33 Claims**



1. A reflective image plane module, comprising:
reflective imaging means including a wafer based active matrix for forming a reflected light beam from light directed thereto and for imparting information onto said reflected light beam;
said wafer being a non light transmissive single crystal wafer substrate with said active matrix formed on one surface of said wafer; and
means for projecting said reflected light beam for viewing.

5,024,525

PHOTO SENSING DEVICE

Hajime Yoshida, Tokyo, Japan, assignor to Hajime Industries Ltd., Tokyo, Japan

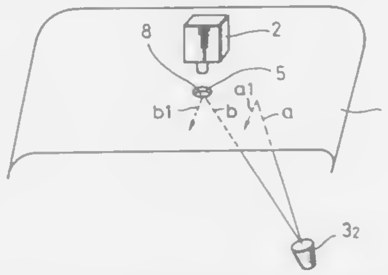
Filed Feb. 9, 1990, Ser. No. 478,200

Claims priority, application Japan, Feb. 17, 1989, 1-37664

Int. Cl.^{5} G03B *15/02*

U.S. Cl. 354—126 **7 Claims**

1. A photosensing device comprising:
a) means for photosensing the image of an object to be inspected;
b) a light diffuser reflection board located between said photosensing means and aid object and having a see-through-hole through which said photosensing means views said object;
c) a light source located between said light diffuser reflection board and said object and for indirectly irradiating said object; and
d) an insert member having a light reflectivity substantially the same as that of said light diffuser reflection board and the property of passing light therethrough, said insert member being tightly fit in said see-through-hole to permit the image of said object to be photosensed through said insert member.



5,024,526

MEASURING INSTRUMENT FOR DETERMINING THE SCATTERING AND ABSORPTION COEFFICIENT OF THE ATMOSPHERE

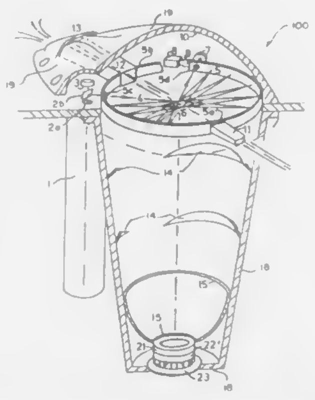
Heribert von Redwitz, Starnberg, Fed. Rep. of Germany, assignor to Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V., Cologne, Fed. Rep. of Germany

Filed Apr. 5, 1989, Ser. No. 333,392

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1988, 3811475

Int. Cl.^{5} G01N *21/47, 21/59, 1/02*

U.S. Cl. 356—73 **20 Claims**



1. A measuring instrument for determining the scattering and absorption coefficient of the atmosphere, comprising:
an emitter side comprising a light emitter having a light source which is a pulsed laser, and a device for varying the frequency associated with the laser;
an annular mirror (5) having an inlet slit (5*a*) and a first diametrically opposed outlet slit (5*b*) for the introduction and exiting of aerosol gas to be measured;
a receiver side having alight detector (27) and a sound detector (22') for receiving emitter light attenuated in the atmosphere;
a rotationally symmetrical ellipsoidal mirror (10) disposed such that a first focal point (6) of the ellipsoidal mirror is located in a substantially center point of a substantially center plane of the annular mirror (5) and a second focal point is located in a substantially middle position of the light detector (21) and the sound detector (22') associated with the light detector (21), and
wherein the light detector and the sound detector (22') are accommodated in a fluidicly shaped space, so that radiation of small divergence emitted by the light emitter is reflected a multiplicity of times, after introduction thereof into the annular mirror (5), ray segments of light reflected by the annular mirror interest concentrically about the first focal point (6) of the ellipsoidal mirror (10), and the attenuating gas to be measured are carried, via the first focal point (6) from the inlet (5*a*) slit to the first outlet slit (5*b*).

5,024,527

METHOD AND APPARATUS FOR REMOTE POSITION SENSING USING EDGE DIFFRACTION

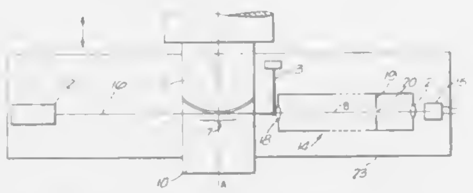
Andrew B. Harrison, Stevenage, United Kingdom, assignor to British Aerospace Public Limited Company, London, England

Continuation-in-part of Ser. No. 13,782, Feb. 12, 1987, abandoned. This application Mar. 31, 1989, Ser. No. 331,337

Claims priority, application United Kingdom, Feb. 12, 1986, 8603391

Int. Cl.^{5} G01B *11/00*

U.S. Cl. 356—124 **56 Claims**



1. An apparatus for detecting the presence of a surface or interface at a predetermined position within a sensing region, comprising:
illuminating means for directing a collimated beam of optical radiation along a sensing axis through said sensing region;
optical radiation detector means, aligned with said sensing axis and located on the side of said sensing region opposite said illuminating means, for detecting optical radiation from said illuminating means which has been deviated by a surface or interface at said predetermined position; and
blocking means located between said sensing region and said optical radiation detector means for preventing optical radiation from reaching said optical radiation detector means when said beam is not deviated by said surface or interface so that the presence of said surface or interface at said predetermined position may be determined from the optical radiation detected by said optical radiation detector means.

5,024,528

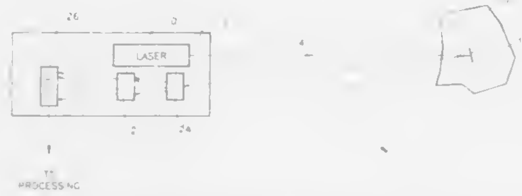
ALIGNMENT APPARATUS EMPLOYING A LASER LIGHT SCATTERER

Isaac Freund, Petach Tikva, and Michael Rosenbluh, Givat Shumel, both of Israel, assignors to Bar Ilan University, Israel, Israel

Filed Nov. 13, 1989, Ser. No. 435,019

Int. Cl.^{5} G01B *9/02*

U.S. Cl. 356—356 **28 Claims**



1. Alignment apparatus comprising:
a source of coherent radiation mounted at a reference location and arranged to provide an output beam extending along a reference axis;
a laser light reflector mounted at a location sought to be aligned with respect to at least one of the reference location and the reference axis;
a laser light scatterer arranged to receive reflected laser light from the reflector and to produce a speckle pattern; and
a detector arranged to sense the speckle pattern produced by the laser light scatterer in response to incident reflected laser light, whereby variations in the speckle pattern indicate changes in relative orientation between the reference location and the laser light reflector.

5,024,529

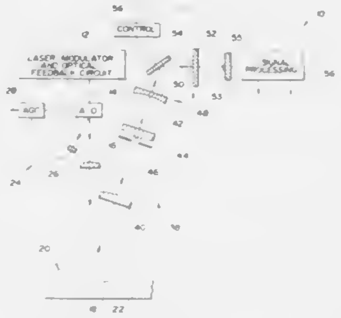
METHOD AND SYSTEM FOR HIGH-SPEED, HIGH-RESOLUTION, 3-D IMAGING OF AN OBJECT AT A VISION STATION

Donald J. Svetkoff, Ann Arbor, and Brian L. Doss, Ypsilanti, both of Mich., assignors to Synthetic Vision Systems, Inc., Ann Arbor, Mich.

Filed Jan. 29, 1988, Ser. No. 150,135

Int. Cl.^{5} G01B *11/24*

U.S. Cl. 356—376 **21 Claims**



1. A method for the high-speed, high-resolution, 3-D imaging of an object at a vision station to develop dimensional information associated with the object, the method including the steps of: scanning a beam of controlled light in a scanning direction at the surface of the object at a first predetermined angle to generate a corresponding reflected light signal; receiving said reflected light signal at a second angle with a set of optical components for creating a relatively small focused spot of light from the reflected light signal, the set of optical components including first and second lenses; filtering the received light signal with the set of optical components; measuring the amount of radiant energy in the reflected light signal with a small area position detector having a detector area and having a position-sensing direction substantially orthogonal to the scanning direction and producing at least one electrical signal proportional to the measurement; and computing a centroid value for the reflected light signal from the at least one electrical signal; wherein the improvement comprises:
converting the focused spot of light into an enlarged, elongated spot of light and imaging the filtered light signal to the small area position detector with an anamorphic magnification and field lens system, including a third lens for magnifying the focused spot of light in the position-sensing direction of the position detector and a fourth lens having a relatively short focal length for reducing the focused spot of light in the scanning direction to form the elongated spot of light, wherein the position detector comprises a single detector element including the detector area of less than 20 mm^2 and having a relatively small capacitance and dark current and wherein the entire elongated spot of light is uniformly imaged to a discrete extended region of the detector area, to obtain a relatively high signal to noise ratio, the extended region being elongated in a scan dimension substantially orthogonal to the position-sensing direction, wherein spatial noise resulting from variations in sensitivity from point to point in the detector area are averaged.

VOL
1127
ISS
3
JE
18
1991
UMI

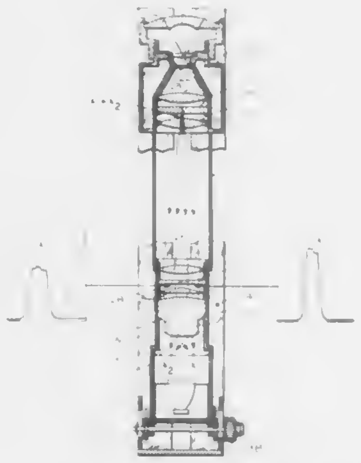
5,024,530
MULTICHANNEL TELECENTRIC FILTERED IMAGER

Stephen B. Mende, Los Altos, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Dec. 26, 1989, Ser. No. 457,079

Int. Cl.⁵ G01J *3/46;* **G01N** *21/25;* **G02B** *27/12*

U.S. Cl. 356—402 **16 Claims**



1. An apparatus for enabling a distant object that emits rays of optical radiation in a plurality of wavelength bands to be separately imaged upon a detector in a plurality of distinct wavelengths simultaneously, each distinct wavelength being within a corresponding one of said wavelength bands, said apparatus comprising:

a) a lens system comprising an objective lens means, a telecentric lens means and a reimaging lens means, all disposed coaxially with respect to each other along an optic axis; said objective lens means causing rays of optical radiation emitted by said object to form an image at a focal region; said telecentric lens means being positioned between said objective lens means and said focal region to cause chief rays emerging from a central portion of an exit pupil of said objective lens means to be substantially parallel to said optic axis; said reimaging lens means relaying said image onto said detector;

b) filter means disposed adjacent said focal region where said chief rays are substantially parallel to said optic axis, said filter means passing rays of said optical radiation within said wavelength bands to said reimaging lens means, said filter means suppressing optical radiation in wavelengths outside said wavelength bands; and

c) wavelength-discriminating means disposed between said filter means and said detector for causing said image of said object formed at said focal region and relayed onto said detector to appear simultaneously as a plurality of distinct images on said detector, said distinct images being spatially separated from each other on corresponding portions of said detector, each of said distinct images being formed by rays of a corresponding one of said plurality of distinct wavelengths.

5,024,531
DEVICE FOR CONTINUOUS DEGASSING OF MIXES

Manfred O. Will, Wülfrath, Fed. Rep. of Germany, assignor to KWM-Kunststoffmaschinen GmbH, Wulfrath, Fed. Rep. of Germany

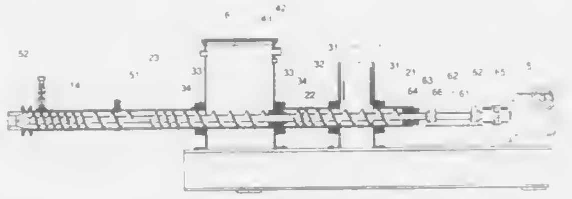
Filed May 18, 1989, Ser. No. 354,253

Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3818003

Int. Cl.⁵ B01F *7/02;* **B29B** *1/10*

U.S. Cl. 366—75 **16 Claims**

1. An apparatus for continuous degassing of a mix of liquid and solids, such as polymer binding agents and filler materials and/or fibers, said apparatus comprising an inlet housing, open to the atmosphere, a vacuum chamber adjustable to regulate the low pressure therein, and a unitary multi-zoned screw conveyor which provides a first conveying zone between said inlet housing and said vacuum chamber, wherein the mix is metered out of the area of the inlet housing and a vacuum seal is provided on the upstream side of said vacuum chamber by said mix residing in said inlet housing and in said first conveying zone; said screw conveyor also comprising a second conveying zone in said vacuum chamber for allowing said mix to remain in said vacuum section for a period of time sufficient for it to be degassed due to the low pressure in the vacuum chamber, said second zone also including means for conveying the resulting degassed mix out of the vacuum chamber; said multi-zoned screw conveyor also including a third conveying zone down stream of said vacuum chamber for transporting the resulting degassed mix to a discharge port for discharge of the degassed mix into the atmosphere wherein a vacuum seal is provided on the down-stream side of said vacuum chamber by said mix residing in said third conveying zone; said inlet housing, multi-zoned screw conveyor, and said vacuum chamber being joined together to provide a hermetically sealed path of travel for said mix; and said multi-zone screw conveyor providing metering, compression, decompression, and compression zones, in sequence, which zones are formed by respective differences in pitch of flights, and/or by respective differences in diameter of the screw core.



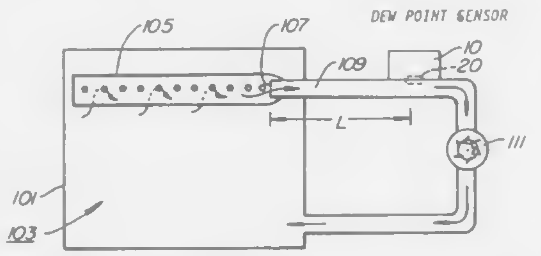
5,024,532
DEW POINT MEASURING APPARATUS INSTALLATION SYSTEM

Dieter Rall, Newport Beach, Calif., assignor to Luxtron Corporation, Mountain View, Calif.

Filed May 22, 1989, Ser. No. 354,739

Int. Cl.⁵ G01N *25/68*

U.S. Cl. 374—28 **5 Claims**



1. A system for measuring the dew point temperature of a gaseous atmosphere moving within a duct, comprising:

a sample flow channel of given inside dimensions having an open end terminating within said duct and extending outside thereof, said channel being substantially rectangular in cross-section with a height of "D" and a width that is much greater than D,

dew point temperature measuring apparatus including a pair of sensors positioned side-by-side in a top wall of said sample channel at a given distance "L" from said channel opened end,

means provided as part of said sample flow channel at a position therealong greater than L from said channel opened end for moving a sample of the gaseous atmosphere from within the duct and through said sample channel past said dew point measuring apparatus with a uniform velocity,

means connected to said sample flow channel within said duct for causing gases passing thereby to be withdrawn therefrom substantially in a line across said duct, and

said given inside dimensions of the sample flow channel and said uniform gas velocity being such that the gas flow past said pair of sensors is characterized by a Reynolds number of substantially 1000, whereby said flow past said pair of sensors is assured to be substantially laminar.

5,024,533
RADIATION CLINICAL THERMOMETER

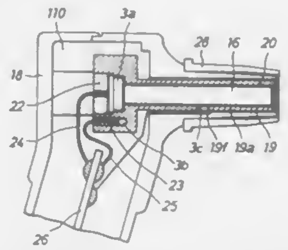
Shunji Egawa, Saitama, and Masato Yamada, Tokyo, both of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 335,616, Apr. 10, 1989, Pat. No. 4,932,789. This application May 10, 1990, Ser. No. 522,337

Claims priority, application Japan, Apr. 12, 1988, 63-88194; Mar. 17, 1989, 1-63552

Int. Cl.⁵ G01J *5/10;* **G01K** *7/00, 1/20*

U.S. Cl. 374—126 **8 Claims**



1. A radiation clinical thermometer comprising:

a probe including an optical means having an optical guide for collecting infrared radiation from an object to be measured, an infrared sensor for converting infrared radiation energy collected through said optical guide into an electrical signal, a first temperature-sensitive sensor for measuring a first temperature of said infrared sensor and an ambient temperature thereof, and a second temperature-sensitive sensor for measuring a second temperature of said optical guide;

detection signal processing means for receiving electrical signals from said infrared sensor and said temperature-sensitive sensors and outputting the electrical signals as digital infrared data and digital temperature-sensitive data, respectively;

body temperature operating means for calculating body temperature data by correcting an electrical signal from said infrared signal dependent on the extent of thermal equilibrium between said infrared sensor and said optical guide measured on the basis of electrical signals from said first temperature-sensitive sensor and said second temperature-sensitive sensor; and

a display unit for displaying a body temperature in accordance with the body temperature data.

5,024,534
TEMPERATURE SENSOR FOR USE IN A SPARK PLUG OF AN INTERNAL COMBUSTION ENGINE

Yoshihiro Matsubara, and Shuzo Matsumura, both of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Jul. 12, 1989, Ser. No. 378,711

Claims priority, application Japan, Sep. 27, 1988, 63-241581; Sep. 29, 1988, 63-245761

Int. Cl.⁵ G01K *1/14, 7/02;* **F02P** *17/00*

U.S. Cl. 374—144 **2 Claims**

1. A temperature sensor in which a thermocouple is embedded in a front end of a spark plug body, the front end of which is disposed in a combustion chamber of an internal combustion engine, and including an optical converter in which an output of the thermocouple is converter into an optical output signal when a temperature of the front end of the spark plug body exceeds a predetermined value,

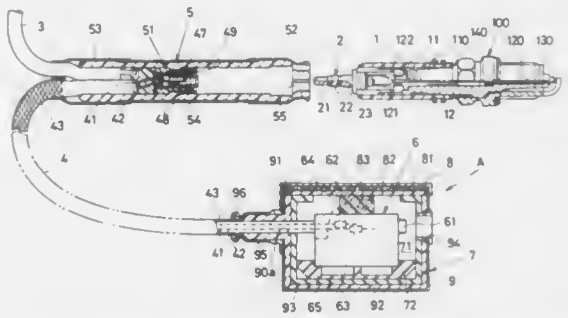
the temperature sensor comprising;

an inner insulator sleeve which is arranged to enclose a rear portion of the spark plug body;

tripolar coaxial plug or tripolar coaxial jack disposed to extend outside of a rear end of the inner insulator sleeve, and having outer, middle and inner shaft portion, the outer shaft portion being electrically connected to a center electrode of the spark plug body, while the middle and inner shaft portion being each connected to the thermocouple through lead wires;

an outer insulator sleeve covered by a metallic ring, the outer insulator sleeve being arranged to be detachably telescoped into the inner insulator sleeve, one end of the outer insulator sleeve being brought into engagement with a housing of the spark plug body when the outer insulator sleeve is telescope into the inner insulator sleeve;

the tripolar coaxial plug or tripolar coaxial jack being placed within the outer insulator sleeve to be electrically connected to the tripolar coaxial jack or the tripolar coaxial plug when the outer insulator sleeve is telescoped into the inner insulator sleeve;



a high tension cord provided to be electrically connected to the tripolar coaxial plug or tripolar coaxial jack of the outer insulator sleeve so as to supply a high voltage with the center electrode; a shield cord electrically connected to the tripolar coaxial plug or tripolar coaxial jack of the outer insulator sleeve;

the shield cord and the high tension cord being introduced outside from an end opposite to that in which the outer insulator sleeve is telescoped into the inner insulator;

the shield cord having a pair of coated wires covered by a shield coat respectively, each one end of which is electrically connected to a corresponding terminal of the thermocouple through the tripolar coaxial plug or the tripolar coaxial jack, the other end of each coated wire being electrically connected to a corresponding input terminal of the optical converter in which a resistor is adapted to be energized to emit light beams when the output of the thermocouple reaches to a predetermined value; and

a shield coating portions of the shield cord being electrically connected at one end to the metallic ring of the outer insulator sleeve.

5,024,535
SEMICONDUCTOR LIGHT SOURCE TEMPERATURE MEASUREMENT

Charles R. Winston, Jr., North Canton, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 20, 1989, Ser. No. 453,538

Int. Cl.⁵ G01K *01/14, 07/00*

U.S. Cl. 374—178 **11 Claims**

1. Apparatus, comprising:

a semiconductor substrate;

VOL
1127
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3
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18
1991
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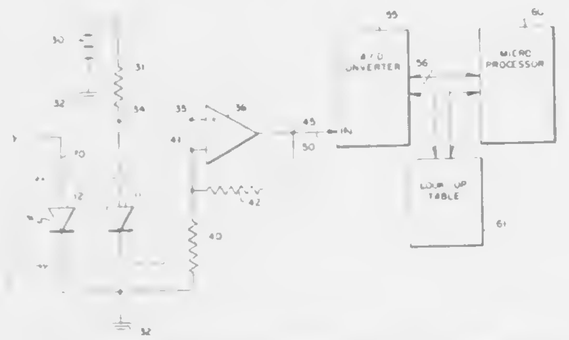
a semiconductor light source, formed in said semiconductor substrate; and

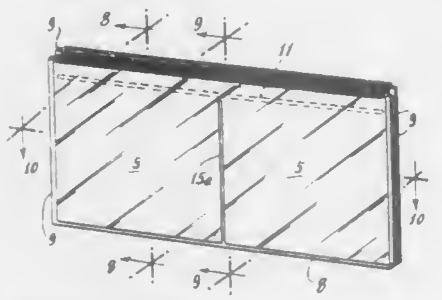
temperature sensing means, formed in said semiconductor substrate in proximity to said semiconductor light source,



for providing an electrical signal indicative of an electrical voltage across said temperature sensing means, said electrical signal varying as a function of the temperature of said semiconductor substrate, whereby the temperature of said substrate varies as said light source is operated.

5,024,536
RESEALABLE COMPARTMENTED BAGS

Diane E. Hill, 8040 E. Woodwind Ave., Orange, Calif. 92669
Filed Jul. 16, 1990, Ser. No. 553,238
Int. Cl.^{5} B65D *33/24, 30/22*
U.S. Cl. 383—38 **3 Claims**



1. A bag having a plurality of pockets, said bag including

at least four sheets of plastic sheet material of similar size and rectangular shape and overlying one another, said sheets being adhered to one another by a common seal line along the bottom edges thereof, and defining two front sheets and two back sheets,

said two front sheets being secured to one another by seal lines along their side edges and with a first resealable closure along their top edges, said two back sheets being secured to one another by seal lines along their side edges and with a second resealable closure along their top edges,

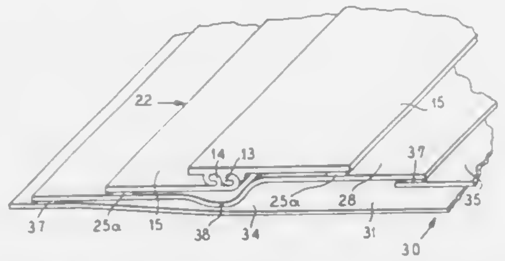
at least one first transverse seal line substantially parallel to said side edges of said two front sheets and running from said bottom edges thereof to said first resealable closure, said transverse seal line securing together said two front sheets, and

at least one second transverse seal line substantially parallel to said side edges of said two back sheets and running from said bottom edges thereof to said second resealable closure, said transverse seal line securing together said two back sheets,

whereby a bag is provided having a multiplicity of separate pockets.

5,024,537
TAPE CARRIED PRE-CUT ZIPPER

Paul A. Tilman, New York, N.Y., assignor to Zip-Pak Incorporated, Northbrook, Ill.
Filed Jan. 8, 1990, Ser. No. 461,651
Int. Cl.^{5} B65D *33/16, 33/34*
U.S. Cl. 383—63 **19 Claims**



18. A bag and reclosable zipper assembly, comprising:

a bag having opposite walls in a generally J-fold orientation with edges in offset relation and defining a mouth;

a carrier tape having opposite longitudinal edge portions, and means securing said opposite edge portions to respectively said offset wall edges;

straight substantially coextensive first and second extruded plastic zipper strips, each of which has a base flange of substantial width and with a respective zipper profile along one edge of the base flange complementary to the zipper profile of the other of said zipper strips;

said base flange of said first zipper strip extending in one lateral direction from its profile;

said base flange of said second zipper strip extending in opposite lateral direction from its profile and relative to said base flange of said first zipper strip;

said zipper profiles facing toward one another and being releasably interlocked;

said oppositely extending base flanges lying in a substantially parallel relation on said carrier tape;

means securing edges of said base flanges remote from said zipper profiles permanently to said carrier tape adjacent to said means securing said opposite edge portions of the carrier tape to said offset bag wall edges in such a manner that the assembly lies substantially flat; and

said carrier tape providing a rupturable sealing membrane in the span thereof between said zipper strip base sealing means.

5,024,538
PACKAGING BAG, ESPECIALLY FOR COOKED HAM, PROVIDED WITH DRAIN VALVE

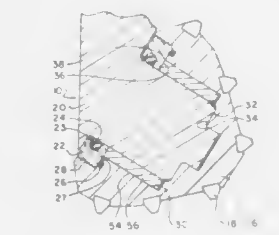
Luigi Goglio, Via Solari 10, Milan, Italy
Filed Mar. 2, 1989, Ser. No. 318,077
Claims priority, application Italy, Mar. 10, 1988, 20831/88[U]
Int. Cl.^{5} B65D *33/01*
U.S. Cl. 383—103 **5 Claims**

1. A packaging bag, in particular for cooked ham, characterized in that said bag (1) is made of thermoweldable material and is provided, in at least one of its walls (4), with a drainage hole (6), and is further provided, inside said bag, with a drainage valve secured to the wall of said bag, said drainage valve (10) comprising a disc of a plastic material, said disc having a center zone, and said disc further being provided with a plurality of radial, spaced ribs projecting from its surface (11) and facing the adjacent internal surface of the wall of said bag, said wall preferably being secured to said ribs by thermowelding,

whereby the center zone (20) of said disc is arranged in front of said drainage hole.

5,024,539
FRICTION BEARING AND CONE RETENTION THRUST SYSTEM FOR A ROCK BIT

Edward Vezirian, P.O. Box 215, Beaumont, Calif. 92223
Filed Aug. 13, 1990, Ser. No. 567,121
Int. Cl.^{5} F16C *17/10*
U.S. Cl. 384—92 **5 Claims**



1. A friction bearing and cone retention thrust system for a rock bit comprising:

a cantilevered journal shaft depending from a structural body of a rotary cone rock bit, said journal shaft extending downwardly and radially inward from said structural body, said journal shaft forming an axially extending radial bearing surface and forming a radially extending primary thrust bearing surface adjacent a distal end of said journal shaft,

an annular ring about said journal shaft adjacent a fixed end of said journal shaft, said annular ring forming a gland housing a grease seal, said grease seal impinging said journal shaft, a distal side of said annular ring forming a radially extending secondary thrust bearing surface,

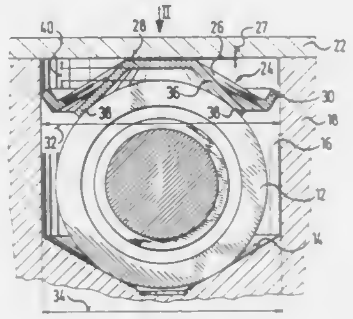
a secondary thrust member extending about said journal shaft, said secondary thrust member forming a radially extending thrust bearing surface adjacent said secondary thrust bearing surface of said annular ring, said secondary thrust member being axially located and secured to said journal shaft so as to trap said annular ring about said journal shaft,

a rock cutting cone, said rock cutting cone forming a bearing bore centrally entering base of said cone, said bearing bore extending to a radially extending primary thrust surface within said cone, said cone forming a counterbore about said enterance of said bearing bore,

means to rigidly secure said annular ring within said counterbore formed by said cone, said cone thus being axially located on said journal shaft between said primary and said secondary thrust surfaces.

5,024,540
SHAFT BEARING WITH A BALL SOCKET IN A FRAME-MOUNTED HOUSING

Friedrich Dreier, Lauf, and Ernst Fischer, Gernsbach, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany
Filed Aug. 4, 1989, Ser. No. 389,599
Claims priority, application Fed. Rep. of Germany, Aug. 4, 1988, 8809963[U]; Oct. 12, 1988, 3834691
Int. Cl.^{5} F16C *25/04*
U.S. Cl. 384—203 **6 Claims**



1. In a bearing for a shaft with a ball socket mounted in a substantially cylindrical cavity in a frame-mounted housing, said shaft being guided through said ball socket, said ball socket resting in a bearing seat in said housing formed at a bottom of said cavity and pressed in said bearing seat by a structural member having a prestressed spring means providing a spring force, whereby said ball socket is movable in a radial direction against said spring force from said bearing seat, the improvement wherein said structural member has a dish-like base, whose diameter is larger than a diameter of said cavity and has a plurality of resilient tongues acting as said spring means supported by said base of said structural member and extending at least approximately in opposite directions, said tongues having free ends extending away from each other to rest on said ball socket under compression and other ends facing toward each other connected with said base.

5,024,541
MANUALLY OPERABLE SWEEPING-TYPE PRINTING APPARATUS

Shuya Tsukada, Tachikawa; Nobuyuki Mochinaga, Kunitachi, and Yasuo Kanoe, Tanashi, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan
Continuation of Ser. No. 182,187, Apr. 15, 1988, abandoned.
This application Jan. 30, 1990, Ser. No. 474,626
Claims priority, application Japan, Apr. 17, 1987, 63-57515[U]; Apr. 20, 1987, 63-58649[U]; Apr. 20, 1987. 63-58652[U]; May 7, 1987, 63-109701; May 8, 1987, 63-67931[U]; May 8, 1987, 63-67932[U]
Int. Cl.^{5} B41J *3/36*
U.S. Cl. 400—88 **18 Claims**

1. A hand-held electronic printing apparatus, comprising:

housing means for containing components of the apparatus and for enabling the appartaus to be manually swept across a recording medium, said housing means including at least two cases arranged to be joined to one another;

a chassis including a single rigid base mounted in a mounting section of one of said cases of said housing means;

roller means fixed directly to said single rigid base for rotational movement and being adapted to protrude from said housing means to contact said recording medium, said roller means rotating when said housing means is swept across said recording medium;

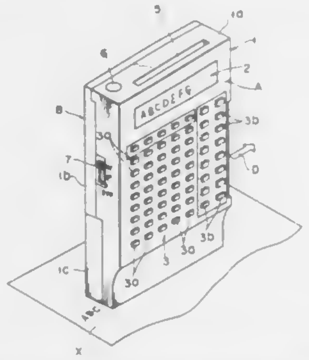
an ink-ribbon detachably mounted directly to said single rigid base and being arrange to contract said recording medium;

VOL
1127
ISS
3
JE
18
1991
UMI

ink-ribbon winding means fixed directly to said single rigid base for winding said ink-ribbon;

encoder means including an encoder disk fixed directly to said single rigid base, for generating a signal every time said housing means is swept over a predetermined distance with respect to said recording medium;

rotation-transmitting means fixed directly to said single rigid base, for transmitting rotation of said roller means to said ink-ribbon winding means and to said encoder disk; and



printing means provided in said housing means and for contacting said ink-ribbon, for transmitting ink of said ink-ribbon onto said recording medium;

wherein critical rotating components of the apparatus are fixed directly to said single rigid base for incorporation together within the housing means data storage means;

key input means mounted on said housing means for inputting data to said data storage means; and,

display means mounted on said housing means for displaying said data stored in said data storage means.

5,024,542
MAGNETIC ACTUATOR

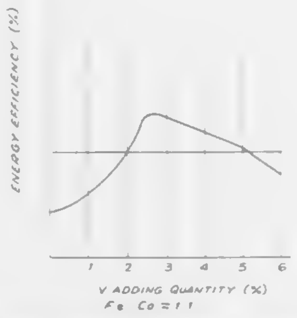
Minoru Tanaka, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Filed Aug. 30, 1989, Ser. No. 400,596

Claims priority, application Japan, Aug. 30, 1988, 63-215640

Int. Cl.⁵ B41J *1/60*

U.S. Cl. 400—124 11 Claims



1. A magnetic actuator for an impact print head, including a plurality of print wires selectively driven by the displacement of the actuator by magnetic attraction, comprising:

a core block having a ring-like protruded inner core within an interior portion of the core block formed of a soft magnetic material;

at least one coil disposed around the periphery of the inner core;

yoke means for being magnetically attracted to and moving towards the inner core when electric current flows through the coil;

the soft magnetic material including substantially equal amounts of iron and cobalt and from 2.4 to 2.8% vanadium.

5,024,543
IMPACT DOT PRINT HEAD

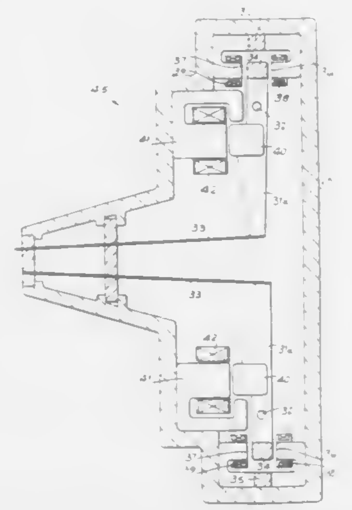
Akio Mitsuishi; Takashi Takeuchi, and Osamu Koshiishi, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Filed May 24, 1989, Ser. No. 356,822

Claims priority, application Japan, May 25, 1988, 63-129279; Jul. 18, 1988, 63-178578

Int. Cl.⁵ B41J *2/27*

U.S. Cl. 400—124 12 Claims



1. An impact dot print head comprising an arm; means for pivotably supporting the arm for movement between a non-print position and a print position, a print wire mounted on the arm, first means for driving the arm towards the print position, said first means being a first magnet means and second means for driving the arm towards the non-print position and maintaining the arm in the non-print position without causing the arm to impact the remainder of the print head when returning to the non-print position, the second means being a second magnet means for holding the arm at the non-print position without mechanical contact by applying a magnetic force in the direction of wire movement towards the print position.

5,024,544
METHOD AND SYSTEM FOR CONTROLLING MECHANISM SECTIONS OF PRINTING APPARATUS

Mitsuhiro Taketani, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 212,377, Jun. 27, 1988, abandoned. This application Dec. 15, 1989, Ser. No. 449,151

Claims priority, application Japan, Jun. 30, 1987, 62-163057

Int. Cl.⁵ B41J *29/02*

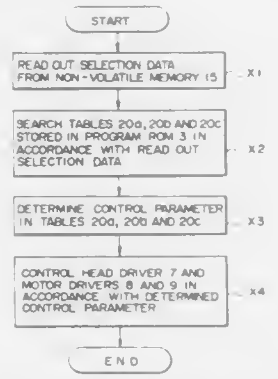
U.S. Cl. 400—692 15 Claims

1. A method for controlling operation of a print head, a carriage motor and a paper feed motor in a printing apparatus, the method comprising the steps of:

storing a plurality of control parameters for controlling the operation of the print head, carriage motor and paper feed motor;

non-volatilely storing selection data corresponding to the print head, carriage motor and paper feed motor for selecting predetermined control parameters of the stored control parameters;

reading out the stored control parameters in accordance with the non-volatilely stored selection data; and


START
READ OUT SELECTION DATA FROM NON-VOLATILE MEMORY 15
X1
SEARCH TABLES 20a, 20b AND 20c STORED IN PROGRAM ROM 3 IN ACCORDANCE WITH READ OUT SELECTION DATA
X2
DETERMINE CONTROL PARAMETER IN TABLES 20a, 20b AND 20c
X3
CONTROL HEAD DRIVER 7 AND MOTOR DRIVERS 8 AND 9 IN ACCORDANCE WITH DETERMINED CONTROL PARAMETER
X4
END

controlling the operation of at least one of the print head, carriage motor and paper feed motor in accordance with the readout control parameters.

5,024,545
MULTI-IMPACT CHARACTER ERASING APPARATUS WITH CONTROL OF CORRECTION RIBBON FEED

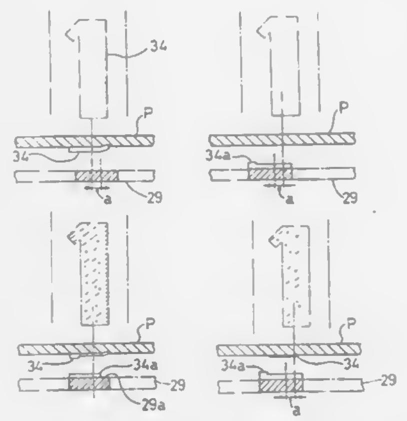
Satoshi Yoshimoto, Komaki, and Masaya Funamoto, Nagoya, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 173,544, Mar. 25, 1988, abandoned. This application Nov. 28, 1989, Ser. No. 442,307

Claims priority, application Japan, Mar. 28, 1987, 62-75200

Int. Cl.⁵ B41J *29/373*

U.S. Cl. 400—696 8 Claims



1. A character erasable printing apparatus comprising:

inputting means for inputting data of characters and symbols and various command data,

printing means which comprises a type-wheel having a plurality of type elements of characters and symbols, a print ribbon fed from a supply spool of a ribbon cassette and a hammering mechanism provided with an asymmetrical hammering weight with respect to a hammering center coincident with a center of a type element to be hammered and which prints characters and symbols corresponding to inputted data,

a carriage which mounts said printing means and is driven in a first direction and in a second direction opposite to said first direction along a printing line by a carriage drive motor,

erasing means which comprises said type-wheel, a correction ribbon and said hammering mechanism which are mounted on said carriage, and which erases a printed character or symbol by hammering the same type element plural times onto said printed character or symbol through said correction ribbon in response to an operation of a correction command key installed on said inputting means, and said correction ribbon being installed to move relative to said printed character or symbol together with said carriage corresponding to movement of said carriage, and

correction controlling means which, in erasing operation of said erasing means, controls said carriage to move to a first erasing position displaced by a predetermined minute distance from the printed position of said printed character or symbol in the first direction along said print line toward an over-inked edge portion of said printed character or symbol which is formed on an opposite side to a larger weight portion of said asymmetrical hammering weight with respect to said hammering center and then controls said erasing means to conduct a first erasing of said over-inked edge portion, and subsequently controls said carriage to move to a second erasing position in the second direction opposite to said first direction without feeding said correction ribbon relative to said carriage until a fresh portion of said correction ribbon facing said type element faces said over-inked edge portion and then controls said erasing means to conduct at least a second erasing of the over-inked edge portion.

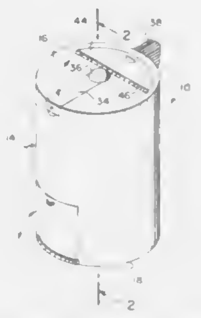
5,024,546
COMPRESSIBLE THREE CHAMBER DEVICE FOR DISPENSING POMADE

Julio Guzman, P.O. Box 3495, Ridgewood, N.Y. 11385, and George Spector, 233 Broadway Rm. 3815, New York, N.Y. 10007

Filed Oct. 22, 1987, Ser. No. 111,293

Int. Cl.⁵ A46B *11/00;* **A47L** *13/12*

U.S. Cl. 401—16 1 Claim



1. A device for dispensing pomade comprising a compressible container having a cover, a bottom and three chambers, wherein a first chamber is over the bottom storing a plurality of cotton balls, a compressible second chamber is under the cover for storing alcohol and a compressible third chamber extends from said cover to said bottom adjacent to said first and second chambers further comprising:

(a) a door hinged to said first chamber so that when said door is opened said cotton balls can be removed;

(b) a pivot spout mounted on said cover and fluidly connected to said second chamber said spout being pivotable to a raised open position communicating with said second chamber;

(c) a brush with a one way check valve fluidly connected to said third chamber so that when said third chamber is compressed pomade will exit to mix within said brush for application to said person's body;

(d) a second door hinged on said cover over said third chamber so that when said second door is opened said pomade can be filled therein; and

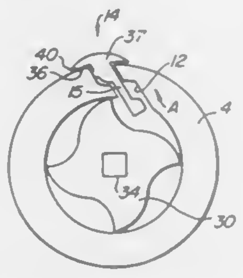
(e) said container having an annular track formed thereon in cooperation with said brush, making said brush rotatable, having means whereby said brush can be turned in one

VOL
1127
ISS
3
JE
18
1991
UMI

instance to a position to be fluidly connected to said third chamber and in another instance to another position not to be fluidly connected to said third chamber.

5,024,547
WRITING UTENSIL WITH NOTEPAPER

Paul Y. H. Mui, and Rosa Y. M. Tso, both of 118 Tammy Cir., W. Pittsburg, Calif. 94565
Filed Dec. 21, 1989, Ser. No. 455,702
Int. Cl.^{5} B43K *29/12, 29/00*
U.S. Cl. 401—195 **1 Claim**

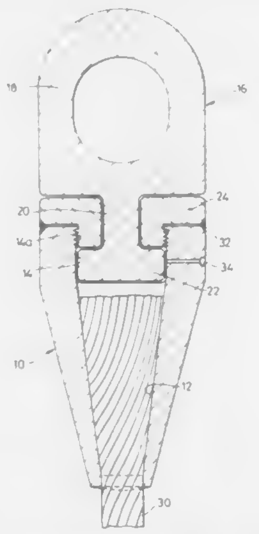


1. An apparatus for holding notepaper on a writing utensil comprising:
   a casing for retaining a writing means substantially centrally within said casing, said casing having a slot formed therein and a cap disposed at a first end of said casing;
   a hollow cylindrical pin for carrying notepaper within said casing and wherein the writing means is receivable within said pin, said pin being in communication with said slot for dispensing notepaper from said pin through said casing;
   a paper control lock for retaining the notepaper within said casing and restricting inadvertent movement of the notepaper, said paper control lock disposed adjacent an outer surface of said casing and including an extension extending into said slot; and
   means for advancing the notepaper including:
   a knob disposed on said cap for remotely dispensing the notepaper, said knob including a counterbore formed therein;
   a second, noncircular pin disposed on an end of said cylindrical pin adjacent said first end of said casing, said counterbore being configured to receive said second pin such that rotation of said knob rotates said second pin; and
   a toothed wheel for cooperating with said extension, said wheel including a bore formed therein for mating engagement with said second pin such that rotation of said second pin rotates said wheel, wherein movement of the teeth displaces said extension to thereby release said paper control lock and advance the notepaper.

5,024,548
END FITTINGS FOR WIRE ROPE

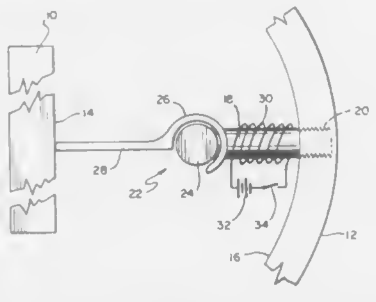
David A. Timmington, Shatterford, United Kingdom, assignor to Griffin-Woodhouse Limited, United Kingdom
Filed Jun. 28, 1990, Ser. No. 545,402
Claims priority, application United Kingdom, Jan. 4, 1990, 9000128
Int. Cl.^{5} F16D *1/12*
U.S. Cl. 403—78 **4 Claims**

1. A swivel end fitting for wire rope comprising:
   (a) a terminal element having a distal end for linking the rope to an object in use and an integral shank shaped to provide a coaxial unitary stem and enlarged headed end;
   (b) a unitary socket element defining a longitudinal coaxial bore having a distal end portion to accommodate said headed end of said shank and a proximal end portion which converges in internal dimension away from said distal end portion for receiving an end of the rope to be operatively secured therein, said socket element having a distal end face proximate said distal end portion; and
   (c) a retaining collar having a threaded portion for threaded engagement in said distal end portion of the bore and a flange portion disposed adjacent the distal end face of the socket element when said threaded portion is in threaded engagement in said bore, the outer diameters of the flange portion and the distal end portion of the socket element and the distal end of the terminal element being the same and flush with each other, to avoid snagging and being exteriorly accessible on assembly of said collar and socket element, the collar being split longitudinally into separable parts to permit positioning thereof about the stem of the shank preparatory to said threaded engagement, whereby said threaded engagement retains the shank in swivelling relationship in said bore and couples the terminal element to the socket element while said flange portion remains accessible from the exterior of the swivel end fitting for tightening, inspection and secondary securing, if desired, of said retaining collar.



5,024,549
METHOD AND APPARATUS FOR JOINING STRUCTURAL MEMBERS

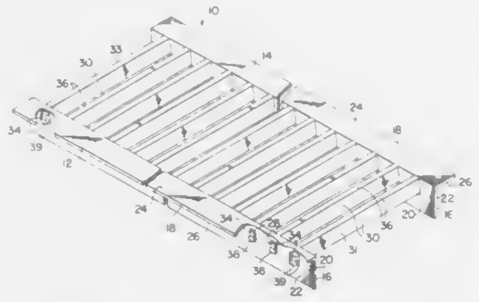
James F. Dalby, Reston, Va., assignor to MRJ Group, Inc., Oakton, Va.
Filed Jun. 28, 1989, Ser. No. 372,802
Int. Cl.^{5} F16D *1/00*
U.S. Cl. 403—404 **5 Claims**



2. Apparatus for permanently joining structural components, comprising:
   (a) a pair of disengageable, mechanically interlockable elements one of which is of elongated configuration and fabricated of a heat retractable material, each of said elements being integral with or adapted for securement to a respective structural component to be joined; and
   (b) means for heating said one element to a temperature sufficiently high to cause retraction thereof.

5,024,550
TRENCH GRATE

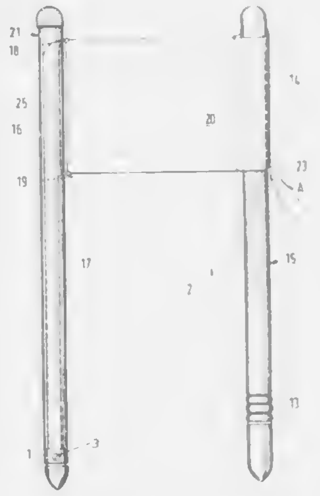
Jack Mainville, 25 Goffe St., North, Meriden, Conn.
Filed Sep. 26, 1989, Ser. No. 412,913
Int. Cl.^{5} E01C *11/22;* **E04C** *2/42*
U.S. Cl. 404—4 5 Claims



1 In combination with a drainage structure of the type having an external supporting surface and inner side wall surfaces disposed inwardly and below said external supporting surface, a trench grate comprising:
   a first and second elongated, angular frame member each having a downwardly extending leg and a supporting leg intersecting with and along the length of said downwardly extending leg and extending substantially perpendicular to said downwardly extending leg, said downwardly extending leg having an inner face surface and an oppositely disposed outer face surface, said supporting leg having a upwardly facing support surface face and a resting surface disposed opposite thereto;
   each of said supporting legs being sized to engage with the external supporting surface of said drainage structure and to space each of said outer face surfaces of said downwardly extending legs from said adjacently disposed inner wall surface of said drainage structure;
   each of said downwardly extending legs including a number of spaced apart, generally rectangularly shaped openings extending through said downwardly extending leg between said inner face surface and said outer face surface, said openings lying along a common axis extending longitudinally along said leg and substantially parallel to the intersection between said downwardly extending leg and said supporting leg;
   a plurality of elongated cross members having a generally rectangular shape and an upper face and lower face disposed opposite thereto, said cross member having two L-shaped, tabbed end portions having the same general shape as said rectangularly shaped openings in said downwardly extending leg;
   said cross members being located transversely between said first and second frame members and in a spaced, parallel relation to one another such that said cross members extend exclusively transversely across said trench grate, one of said L-shaped, tabbed end portions being received in one of said openings in said first frame member and the other of said L-shaped, tabbed end portions being received in one of said openings in said second frame member, said first and second frame members being arranged with the inner face surface of one facing the inner face surface of the other and said rectangularly shaped openings is one being in registry with the rectangularly shaped openings in the other, and
   means for interconnecting said first and second frame members and said cross members to form an integral trench grate structure such that when the load capacity of the trench grate is exceeded, each of said supporting legs bends and causing each of said downwardly extending legs to contact said adjacently disposed inner walls of the said drainage structure to provide additional support for the excessive load being applied.

5,024,551
RESILIENT SLALOM GATE

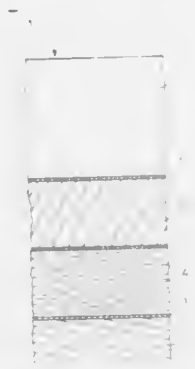
Hans Hinterholzer, Post Box 118, N-1545 Hvitsten, Norway
Filed Dec. 20, 1989, Ser. No. 453,949
Int. Cl.^{5} E01F *9/00*
U.S. Cl. 404—10 **15 Claims**



1. A slalom gate having a pair of parallel gate posts and a flag connected between the upper ends of said posts, the improvement comprising at least one hollow post and elastic cable means for connecting an edge of said flag to said hollow gate post, said cable extending down through said hollow post from said flag and being anchored near the lower end of said post.

5,024,552
METHOD OF OBTAINING A COMPOSITE SEALING STRUCTURE FOR PERMANENT ROADWAYS

Ghislaine Baillemont, Eaubonne, and Jean Beauverd, Lausanne/Suisse, both of France, assignors to Colas S.A., Paris, France
Filed Feb. 22, 1990, Ser. No. 482,951
Claims priority, application France, Feb. 23, 1989, 89 02366
Int. Cl.^{5} E01C *3/00*
U.S. Cl. 404—31 **20 Claims**



1. A method of obtaining a composite sealing structure for permanent comprising applying a draining mix layer between an at least partially concrete base support layer and at least one sealed layer, said draining mix layer having a high content of voids which enable air and/or water being released as vapor

VOL
1127
ISS
3
JE
18
1991
UMI

from the at least partially concrete base support layer to be diffused, so as to prevent appearance of deformities including bubbles and blisters in said at least one sealed layer.

5,024,553
NON-WATER-SPRINKLING TYPE SNOW MELTING METHOD AND SYSTEM

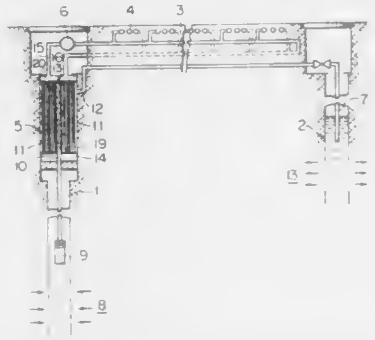
Kohei Katsuragi, Yamagata, Japan, assignor to Nihon Chikasui Kaihatsu Kabushiki Kaisha, Yamagata, Japan

Filed Jun. 19, 1989, Ser. No. 368,404

Claims priority, application Japan, Aug. 8, 1988, 63-197689

Int. Cl.^{5} E01C *11/26*

U.S. Cl. 404—71 **13 Claims**



1. A system for melting snow lying on a structure overlying a ground surface by utilizing underground water warmed up by geothermy in a deep region in a first artesian well, comprising

pumping means disposed in said artesian well for pumping up the underground water;

a second artesian well disposed apart from said first artesian well;

heat radiating means, filled with an anti-freezing fluid, adjacent said structure and said ground surface; and

heat exchanging means disposed in said first artesian well, above said pumping means, for carrying out a heat exchanging operation by bringing the pumped up underground water in contact with the heat exchanging means and discharging said underground water to said second artesian well after the heat exchanging operation has been completed, said heat exchanging means comprising an outer casing, plurality of heat exchanger tube means disposed in said casing and extending vertically and parallelly and separated into first and second groups of heat exchanging tube means, said outer casing having in a lower portion thereof ejector pipe means for ejecting the pumped underground water into the casing and into contact with at least one of said groups of tube means, and header means disposed at a lower portion of said heat exchanging means so that lower ends of said heat exchanging tube means are all opened in the header means, an upper portion of said first group of the heat exchanging tube means being communicatively connected to said heat radiating means so that the anti-freezing fluid may flow upward through the first group of the heat exchanger tube means into the heat radiating means, an upper portion of said second group of the heat exchanging tube means being communicatively connected to said heat radiating means so that the anti-freezing fluid may flow downward from the heat radiating means into said upper portion, whereby anti-freezing fluid circulates through said groups of the heat exchanging tube means and said heat radiating means.

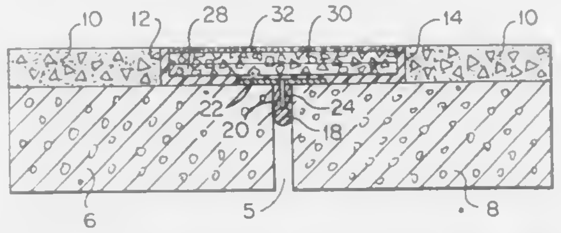
5,024,554
BRIDGE JOINT CONSTRUCTION

Douglas F. Benneyworth, East Sussex, England, and Richard J. Baker, Cincinnati, Ohio, assignors to Koch Materials Company, Wichita, Kans.

Filed Feb. 22, 1990, Ser. No. 483,575

Int. Cl.^{5} E01C *11/02*

U.S. Cl. 404—74 **10 Claims**



1. A method of constructing a bridge joint in a channel which has been lined with elastomeric material, said channel overlying the expansion gap between structural members, said method comprising:

applying a mixture of aggregate and elastomeric binder material as a base layer of said mixture in the bottom of said lined channel;

applying at least one or more succeeding layers of said mixture in the channel over said base layer to fill the channel to within ¾" of the top of said channel, the size of said aggregate in said base and succeeding layers being substantially uniform, the thickness of each layer being restricted to about the maximum size of said aggregate; and applying a top layer of said mixture to complete the filling of channel, the aggregate in said top layer being substantially smaller than the aggregate in the layers below said top layer.

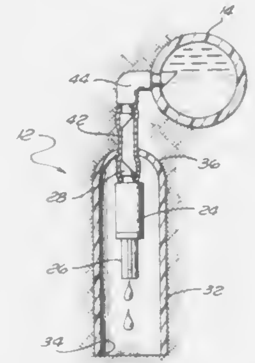
5,024,555
SUB-SURFACE IRRIGATION SYSTEM

Richard D. York, 8062 Aster Ave., Yucca Valley, Calif. 92284

Filed Apr. 9, 1990, Ser. No. 506,086

Int. Cl.^{5} E02B *13/00*

U.S. Cl. 405—48 **1 Claim**



1. For use in a sub-surface distribution system for irrigation having a conduit connected to a water supply, a plurality of fluid dispenser units connected to said conduit, each of said fluid dispenser units comprising:

a connector interconnected at one end to the interior of said conduit and the other end of said connector being coupled to a drip emitter being substantially recessed wholly in the interior of one end of an elongated hollow casing;

said elongated hollow casing having an enlarged opening at one and thereof and a reduced opening at the other end thereof adjacent which said drip emitter is positioned; and tubing interconnecting the other end of said connector to said casing a portion of said drip emitter positioned in said tubing adjacent said casing reduced opening end, said casing enlarged opening communicating directly with growth, said casing acting as a protection for preventing said drip emitter from being clogged.

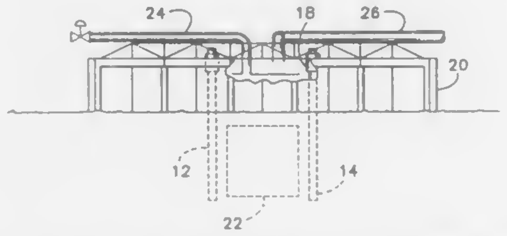
5,024,556
SYSTEM FOR ENHANCED DESTRUCTION OF HAZARDOUS WASTES BY IN SITU VITRIFICATION OF SOIL

Craig L. Timmerman, Richland, Wash., assignor to Battelle Memorial Institute, Richland, Wash.

Continuation-in-part of Ser. No. 255,057, Oct. 7, 1988, Pat. No. 4,956,535, which is a continuation-in-part of Ser. No. 60,253, Jun. 8, 1987, abandoned. This application Dec. 5, 1989, Ser. No. 446,384

Int. Cl.^{5} F02D *3/00*

U.S. Cl. 405—128 **12 Claims**



1. A method for in situ vitrification of soil (28) containing organic waste material, comprising the steps of:

inserting two or more electrodes (10, 12, 14, 16), having surface compositions adapted for adherence with liquefied soil materials, into the soil at spaced apart locations so as to span at least a portion of said waste material;

passing an electrical current through said soil and waste material along an electrically conductive resistance path (38) between said electrodes by applying a voltage across said electrodes in order to heat and liquefy said soil and waste material between and adjacent said electrodes;

pyrolyzing volatile contaminants within said waste material by increasing their residence time within the heated area between and adjacent said electrodes by forming and maintaining a cold cap structure (46) of resolidified soil and waste material (50) over said liquefied soil and waste material (40) during continued passage of current between said electrodes; and

terminating the application of voltage to the electrodes in order to discontinue the flow of said current and permit cooling and solidification of the melted soil and waste material into a densified mass.

5,024,557
METHOD AND APPARATUS FOR CONSTRUCTING AN OFFSHORE HOLLOW COLUMN

Martin E. Iorns, 1512 Lakewood Dr., West Sacramento, Calif. 95691

Filed Sep. 22, 1987, Ser. No. 99,406

Int. Cl.^{5} E02D *23/00*

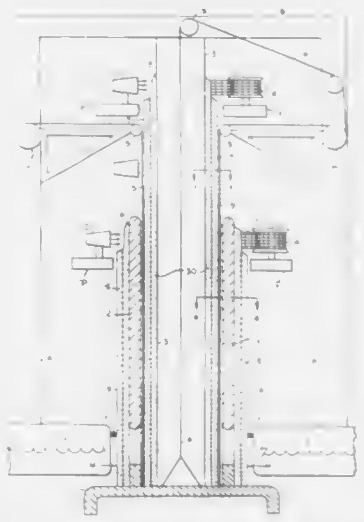
U.S. Cl. 405—223 **11 Claims**

1. An apparatus for slipforming tubing offshore comprising in combination:

means to support tubing extending from a single slipform,

means for alternatively applying cementitious material and reinforcing on one side of the single said slipform to form said tubing,

means to lower said tubing formed from said cementitious material and reinforcing into water,



and means to protect uncured cementitious material from washing away in water.

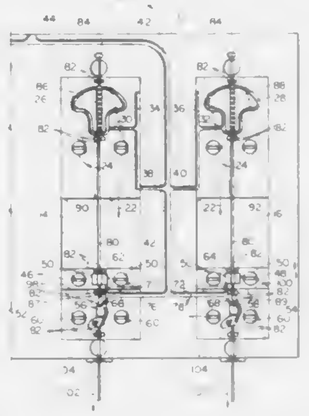
5,024,558
APPARATUS FOR MAKING INFLATOR PARTS

Glenn H. Mackal, 4923 59th Ave. S., St. Petersburg, Fla. 33715

Filed May 14, 1990, Ser. No. 523,102

Int. Cl.^{5} B29C *39/10, 45/14*

U.S. Cl. 425—121 **8 Claims**



1. A mold, comprising:

a base member of predetermined configuration and dimension;

a mating cover for said base member;

a channel formed in said base member;

a first slidable block member disposed within said channel and slidable lengthwise thereof;

a second block member disposed in said channel;

an article-defining groove formed in said block member;

an article-defining cavity formed in said second block member;

said blocks defining means for receiving a strand disposed between said article-defining groove and said cavity; and

means for delivering flowable plastic to said article-defining groove in said slidably mounted first block member at any preselected position of said first block member in said elongate channel.

VOL
1127
ISS
3
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1991
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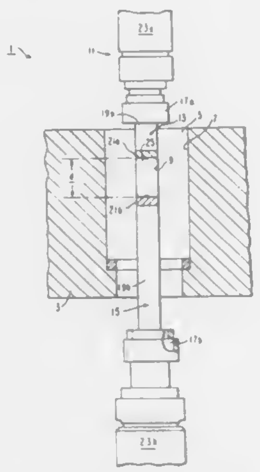
5,024,559
PUNCH FOR USE IN A PELLET PRESS

Peter H. Beuchel, Columbia, S.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 28, 1990, Ser. No. 486,231

Int. Cl.^{5} B30B *11/02*

U.S. Cl. 425—406 4 Claims



1. An apparatus for producing substantially uniform cylindrical uranium dioxide pellets with frusto-conical beveled ends useful for forming nuclear reactor fuel, said apparatus comprising a pair of reciprocating punch means for compressing and shaping granular uranium dioxide into said frusto-conical beveled end cylindrical pellets, each said punch means including a substantially flat face with a chamfered circumferential edge, wherein said face and said chamfered edge are formed from a substantially chip resistance alloy consisting essentially of substantially pure tungsten carbide having a grain size of less than one micron and 16.5 to 17.5% by weight cobalt and said substantially chip resistant alloy is substantially devoid of impurity interfaces.

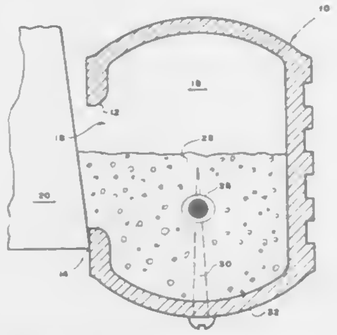
5,024,560
METHOD AND APPARATUS FOR PROTECTION AGAINST COASTAL EROSION

Joseph W. Reilly, 2552 Prancer, New Orleans, La. 70131

Filed Jun. 4, 1990, Ser. No. 532,855

Int. Cl.^{5} E02B *3/12*

U.S. Cl. 405—303 5 Claims



1. A method of forming a protection barrier member, comprising the following steps:

providing a vehicle tire casing having a central opening therethrough, a generally U-shaped interior chamber and a lower and upper beads facing the central opening;

providing a conical insert member having a wider base, a narrower top and an inclined continuous wall extending between the base and the top;

positioning the insert on a horizontal surface, so that the base rests on the horizontal surface;

placing the tire casing over the insert, such that the lower bead of the rim frictionally engages the wall of the insert;

forming a space between the inclined wall of the insert and the upper bead;

depositing a concrete mixture on the inclined wall of the insert and allowing the mixture to flow downwardly, under gravity, into the interior chamber formed by the tire casing;

at least partially filling the chamber with concrete;

allowing the concrete to harden within the tire casing; and

removing the tire casing from its engagement with the insert.

5,024,561
BULK MATERIAL FEEDER PROVIDED WITH INTERNAL CLEANING MECHANISM

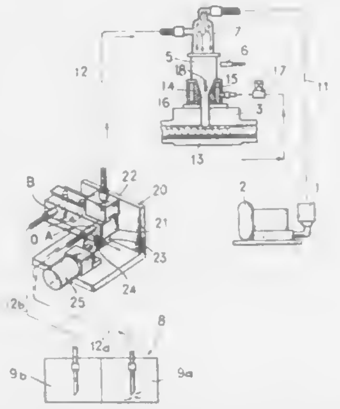
Isao Kitagawa, 110-4, Kamiwada-machi, Takasaki-shi, Gunma-ken, Japan

Filed May 25, 1989, Ser. No. 356,693

Claims priority, application Japan, Oct. 4, 1988, 63-129606[U]

Int. Cl.^{5} B65G *53/60*

U.S. Cl. 406—173 3 Claims



1. A bulk material feeder provided with an internal cleaning mechanism, comprising:

means for jetting out pressurized air for cleaning toward an inside of a vessel to supply molding materials to a molding machine,

at least one nozzle provided to form an air current from the pressurized air in the vessel, and

baffles installed so as to exert an influence upon the air current formed by the at least one nozzle inside the vessel, the baffles being movable so as to appear by moving outside and disappear by moving inside the vessel as required.

5,024,562
PRESSURE FOOT FOR PRINTED CIRCUIT BOARD DRILLING MACHINE

Kunio Arai, Atsugi; Yasuhiko Kanaya, Machida; both of Japan, assignors to Hitachi Seiko Ltd., Japan

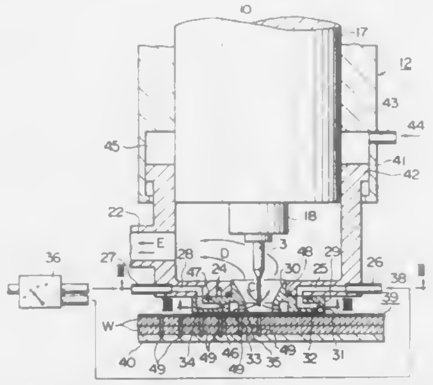
Filed Nov. 30, 1990, Ser. No. 619,991

Int. Cl.^{5} B23B *47/00*

U.S. Cl. 408—1 R 15 Claims

1. A pressure foot for a machine for drilling a printed circuit board, said pressure foot being supported to be slidable in an axial direction of a rotor shaft, connected to a vacuum suction source and adapted to depress the printed circuit board during a drilling comprising

a first air pathway formed from a first supply port in a side wall of said pressure foot; a plurality of first blow-out ports formed in a contact surface of said pressure foot with the printed circuit board and communicating with the first air pathway, the first supply port being connected with a pressure air source; a second air pathway extending from a second supply port formed in the side wall; a plurality of second blow-out ports opened toward an interior of said pressure foot and communicating with the second air pathway, said second air pathway being in communication with a supply source of pressurized air.



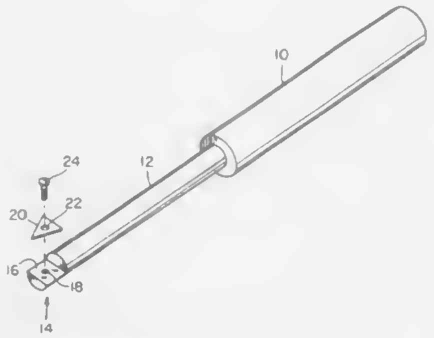
5,024,563
CUTTING APPARATUS

Joseph G. Randall, Concord, Mass., assignor to North East Form Engineering, Inc., Lowell, Mass.

Filed Sep. 8, 1989, Ser. No. 404,952

Int. Cl.^{5} B23B *51/00*

U.S. Cl. 408—1 R 9 Claims



1. Boring apparatus comprising:

a cutting piece having an aperture therethrough;

a handle having one end adapted to hold the cutting piece, the one end having an aperture alignable with the cutting piece aperture; and

a multiple start screw disengageably positioned in the apertures of the cutting piece and handle, for securing the cutting piece to the one end of the handle in a manner which prevents loosening and relative movement between the cutting piece and the handle during use by exerting from different sides of the screw equal pressures to the cutting piece.

8. A method of boring comprising the steps of:

positioning a cutting piece to a desired cutting position on a handle adapted to hold the cutting piece, the cutting piece having an aperture therethrough and the handle having an aperture alignable with the cutting piece aperture;

securing the cutting piece, in the desired cutting position, to the handle with a multiple start screw disengageably positioned in the apertures of the cutting piece and handle, the multiple start screw exerting equal pressures from different sides of the screw to the cutting piece to enhance securing and prevent slippage during use, said securing forming a boring tool; and

operating the boring tool on material of interest to bore desired holes in the material.

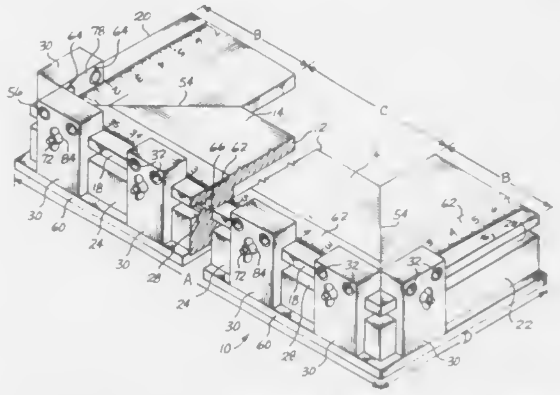
5,024,564
DOWEL DRILLING JIG

Larry K. Lloyd, 19708 65th Ave. East, Spanaway, Wash. 98387

Filed Nov. 13, 1989, Ser. No. 436,069

Int. Cl.^{5} B23B *47/28*

U.S. Cl. 408—115 R 14 Claims



1. A dowel jig for positioning a workpiece to guide the drilling of corresponding holes therein at preselected locations, said jig comprising:

a workpiece-supporting platform having a top surface and a pair of adjacent side edges extending substantially transverse each other and substantially transverse said top surface, said side edges of said platform being positioned for alignment with separate noncoplanar surfaces to be drilled on said workpiece;

a guideway extending along and adjacent to each of said side edges and being positioned entirely relatively below said top surface; and

a plurality of drill guides each including a guide opening and adapted to be removably engaged with said guideway and positionable at preselected locations along a selected one of either of said side edges and not engaging the nonselected side edge, each said drill guide including a portion which projects relatively upwardly beyond said top surface, said guide opening being positioned in said upwardly projecting portion,

wherein said workpiece may be positioned on said top surface and against said drill guides for drilling of holes in said workpiece substantially parallel to said top surface through a guide opening in each said drill guide.

5,024,565
HAND TOOL

Henry Pinand, 80 Upper Hibernia Rd., Rockaway, N.J. 07866

Filed Aug. 20, 1990, Ser. No. 569,203

Int. Cl.^{5} B23B *45/06;* **B25B** *15/06*

U.S. Cl. 408—121 14 Claims

1. A hand tool for removing burrs from an aperture in a workpiece, comprising:

a hollow handle having a race;

a shaft rotatably mounted in said handle to reciprocate axially therein;

thrust means for urging said shaft to extend axially;

rolling means mounted in said race in said handle for engaging and rolling on said race and on said shaft to rotate said shaft as it extends axially from said handle, said rolling

VOL
1127
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3
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1991
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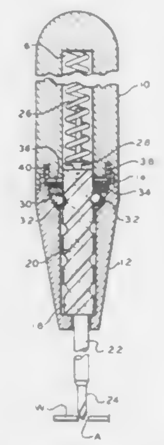
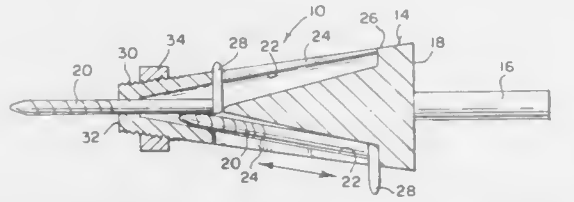
means being operable to allow axial retraction of said shaft into said handle without rotation; and



a deburring bit mounted at an outer end of said shaft, so that said bit turns when said shaft extends as said handle withdraws from said workpiece.

5,024,566
ALL IN ONE DRILL BIT

Guy F. Ippolito, 7322 Bent Oak Dr., Port Richey, Fla. 34668, and George Spector, 233 Broadway RM 3815, New York, N.Y. 10007
Filed Feb. 17, 1989, Ser. No. 311,971
Int. Cl.^{5} B23B *51/12*
U.S. Cl. 408—197 5 Claims



1. A selective drill bit attachment for a standard portable electric drill having a chuck head, said attachment comprising:

a) a frustum cone shaped housing with a wide end and a jaw with a narrow end having a shank extending rearwardly from said wide end thereof for removably connecting said housing to the chuck head of the standard portable electric drill;

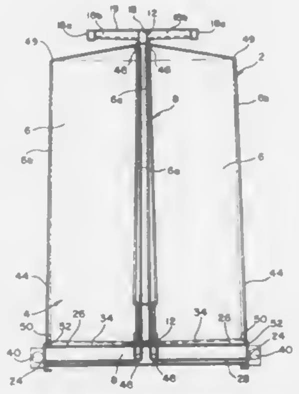
b) a plurality of different sized drill bits carried within said housing; each one of said bits selectively movable to an operable position in which a cutting end of the selected on bit protrudes from the narrow end of said housing;

c) means within said housing for selecting and manually extending each of said drill bits into said operable position and

d) means on said narrow end of said housing for clamping said jaw on said selected drill bit in said operable position so as to be used by the standard portable electric drill.

5,024,567
CENTER BEAM/CENTER PARTITION FLAT CAR AND RETENTION ASSEMBLY

Danilo A. Dominguez, 1867 Piedras Cir., Danville, Calif. 94526, and James F. Flores, 4 Overhill Rd., Mill Valley, Calif. 94941
Filed Oct. 17, 1989, Ser. No. 422,746
Int. Cl.^{5} B61D *45/00*
U.S. Cl. 410—100 12 Claims



1. A center beam/center partition flat railcar comprising body means including a longitudinal center sill and a plurality of side sill assemblies lying in parallel relationship on opposite sides of said center sill, said body means further having an upper beam assembly supported on vertical members arranged above said center sill,

floor means arranged adjacent said center sill and said plurality of side sill assemblies for carrying the lading on both sides of said upper beam assembly,

a plurality of tensioning means mounted along each side sill assembly,

a plurality of elongated members being respectively retained at one end portion to a respective one of said plurality of tensioning means and having a free end, and

securement means positioned substantially adjacent said tensioning means for selectively retaining said free end of a respective one of said elongated members at a position adjacent to said tensioning means, said plurality of elongated members being arranged to extend below, upward along a first side, over the top and downward along a second side of the lading being carried by said floor means, said free end being removeably retained by said securement means when the plurality of elongated members are extended over the top and along the second side of the lading.

5,024,568
BULK MATERIAL RECLAIMING APPARATUS

William H. Johnston, Montreal, Canada, assignor to The CSL Group Inc., Montreal, Canada
Continuation of Ser. No. 172,584, Mar. 24, 1988, abandoned, which is a continuation of Ser. No. 793,923, Nov. 1, 1985, Pat. No. 4,738,578, which is a continuation-in-part of Ser. No. 713,724, Mar. 19, 1985, abandoned. This application Nov. 1, 1989, Ser. No. 432,413
Claims priority, application Canada, Jan. 29, 1985, 473025
Int. Cl.^{5} B63B *27/00*
U.S. Cl. 414—142.2 10 Claims

1. An apparatus adapted to be fitted to a bulk solid storage container for reclaiming material from that container, comprising:

(a) A gantry adapted to be mounted on and movable along a track adjacent to the top of the container;

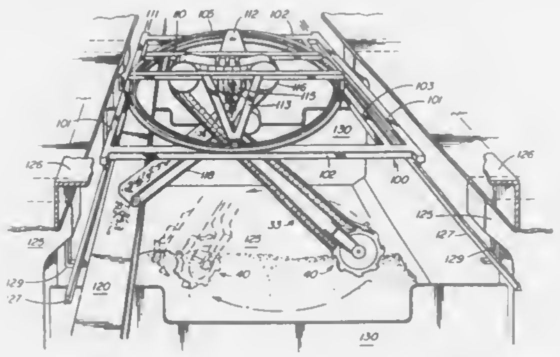
(b) a boom assembly mounted on the gantry and being comprised of a boom and a boom support structure, the boom having one end region pivotally connected to the boom

support structure and being movable in a vertical plane about a horizontal axis;

(c) a bucket wheel rotatable about an axis parallel to the horizontal axis being mounted on the other end region of the boom together with first rotatable drum means;

(d) a flexible belt extending in a closed loop along the boom and around the first drum means and also around second drum means on said boom support structure, the belt having pockets spaced apart therealong on the inwardly facing surface of the belt for receiving bulk material from the bucket wheel and conveying the bulk material along said boom to a region of discharge, characterized in that

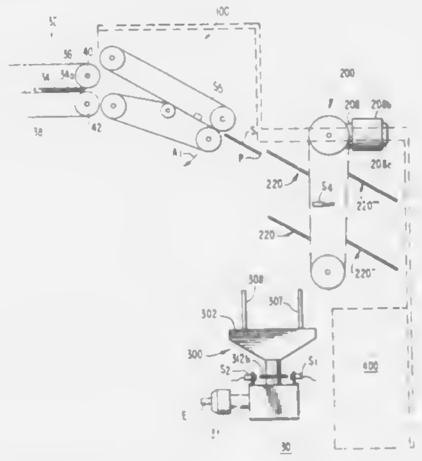
(e) said first drum means includes a pair of annular members each extending inwardly from opposing ends of said first drum means; and said flexible belt travelling along the boom longitudinally and being supported in its passage around the other end of the boom by said rotatable first drum means, the belt having a pair of flexible side members extending along its inner surface generally perpendicular to that inner surface, each flexible side member extending parallel to but spaced from a respective edge of the belt, the belt being supported in its movement around the first drum means by said pair of annular members which extend from opposite ends of the first drum means, that edge portion of the inner surface of the belt extending between a flexible side member and the respective edge of the belt riding on a respective one of the annular members during movement of the belt around the first drum means,



a series of slat members extending between the flexible side members and projecting outwardly from the inner surface of the belt in spaced relation to each other so as to form a series of said pockets along the inner surface of the belt, which pockets are flexible, so that bulk material gathered by the bucket wheel during its rotation is deposited on the inner surface of the belt within said flexible pockets as the belt moves around the first drum means on said other end region of the boom, the material being retained in the flexible pockets along the inner surface of the belt as the belt moves along said closed loop, the boom being capable of pivotal motion about said horizontal axis from a lowered position wherein the boom is substantially upright to a raised position wherein the boom is substantially horizontal, said bucket wheel having a plurality of scoop channels each having a mouth connected to a guide surface which directs bulk material entering the mouth radially and laterally inwardly on the bucket wheel during rotation thereof such that said material falls into said flexible belt pockets with the bulk material being transferred without substantial spillage from the bucket wheel into said belt pockets as the belt pockets move away from the first drum means regardless of the position of the boom between the raised and lowered positions; and in which said region of discharge is defined by said second drum means, the latter including a spaced apart pair of drums each having a pair of annular members extending from opposite end of each of said drums for supporting the belt, each edge portion of the inner surface of the belt which extends between the flexible side member and the respective edge of the belt riding on a respective one of said annular members of each of said pair of drums during movement of the belt around those drums, said pair of drums being constructed and arranged on the boom support structure such that material retained in the flexible pockets along the inner surface of the belt is emptied from that pocket by gravity and centrifugal force as the pocket moves between said pair of drums.

5,024,569
STACKING METHOD AND APPARATUS

Leonard A. Watts, North Miami Beach, and Medardo Espinosa, Hialeah, both of Fla., assignors to EDS Technologies, Inc., Hialeah, Fla.
Filed Jun. 20, 1986, Ser. No. 876,490
Int. Cl.^{5} B65G *57/09;* **B65H** *29/14*
U.S. Cl. 414—790.3 66 Claims



41. A method of stacking signatures comprising:

conveying signatures on an infeed conveyor to an intercept position;

driving a signature support of a batcher from an intercept ready position to the intercept position with a servomotor for intercepting signatures conveyed from the infeed conveyor; and

tracking movement of the signature support of the batcher from the intercept ready position to the intercept position with an encoder. conveyor.

5,024,570
CONTINUOUS SEMICONDUCTOR SUBSTRATE PROCESSING SYSTEM

Tadashi Kiriseko, Kanagawa; Hiromichi Tani, Kawasaki; Noriko Soma, Yokohama; Nobuhisa Shigemi, Kawasaki, and Takayuki Toyoda, Yokkaichi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan
Filed Sep. 6, 1989, Ser. No. 403,355
Claims priority, application Japan, Sep. 14, 1988, 63-230578; Jun. 30, 1989, 1-168333
Int. Cl.^{5} B65H *85/00*
U.S. Cl. 414—222 11 Claims

1. A continuous semiconductor wafer processing system for continuously performing a plurality of process steps, in accordance with one or more predetermined sequences of such process steps, on one or more lots of semiconductor wafers, comprising:

a wafer conveying mechanism;

plural carriers and means for moving each carrier independently of the conveying mechanism, each carrier having a capacity of receiving up to a predetermined number of semiconductor wafers to be conveyed thereby and being configured for automated transfer of semiconductor wafers to and from the carrier;

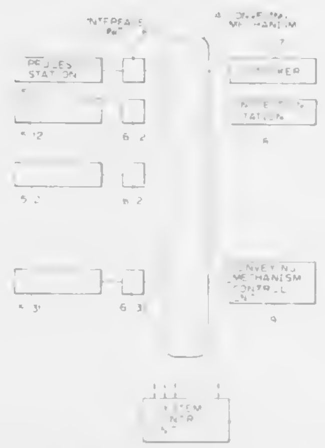
plural process stations for performing plural, successive process steps on semiconductor wafers to be processed by the processing system, each process station performing a respective, predetermined one of the process steps;

plural interface units respectively associated with said plural process stations, each interface unit coupling the respectively associated process station to the conveying mechanism and comprising a wafer discrimination section for discriminating semiconductor wafers, a buffer section for temporarily storing discriminated semiconductor wafers and adapted for mounting a carrier therein and being operable for selectively transferring semiconductor wafers to and from the carrier, and a transfer mechanism, the transfer mechanism of each interface unit coupling the conveying mechanism and the respectively associated process station and being selectively operable for transferring semiconductor wafers therebetween, the transfer mechanism being coupled to each of the buffer and wafer discrimination sections and being selectively and jointly operable with each thereof for transferring wafers to and from the buffer section and to and from the wafer discrimination section;

a stocker coupled to said conveying mechanism and selectively and jointly operable therewith for transferring semiconductor wafers therebetween, the stocker temporarily storing the semiconductor wafers, as transferred thereto, during time intervals intermediate the performance of successive processing steps thereon, the stocker comprising a wafer discrimination section for discriminating semiconductor wafers, a carrier feed-in/feed-out section adapted for mounting of a carrier therein and selectively operable for transfer of semiconductor wafers therebetween, a wafer storage section, and a transfer mechanism, the transfer mechanism being coupled to the conveying mechanism and being selectively operable therewith for transferring semiconductor wafers therebetween, and being coupled to each of the wafer storage section, the wafer discrimination section and the carrier feed-in/feed-out section and selectively and jointly operable with each said section for transfer of semiconductor wafers therebetween;

conveying mechanism control means for controlling the conveying mechanism, selectively, to convey semiconductor wafers to and from each of the respectively associated process stations and interface units and to and from the stocker; and

system control means, operable in accordance with a predetermined processing program which defines said one or more predetermined sequences of process steps to be performed on corresponding, discriminated lots of semiconductor wafers, for communicating with and thereby monitoring and controlling each of the interface units and respectively associated process stations, the stocker, and the conveying mechanism control means, selectively for each discriminated lot of semiconductor wafers and in accordance with the next process step of the sequence to be performed thereon, the system control means selecting the corresponding process station for performance of that next process step on each such discriminated lot and controlling the conveying of each such lot to the corresponding, selected process station, the transferring of each such lot by the transfer mechanism of the respectively associated interface unit to the selected process station for performance of the process step thereon and, upon completion of the performance of the process step, the transferring of each such lot from the process station and the further conveying thereof, alternatively, to a next selected process station or to the stocker for transfer thereto and temporary storage therein, and the transferring of each such lot from the stocker and the subsequent conveying thereof to a next process station, said system control means selectively controlling said conveying mechanism to effect said conveying and, alternatively, issuing instructions for moving each said carrier and thereby conveying the semiconductor wafers received therein, from and to successive, next selected process stations and said stocker, for all said lots of semiconductor wafers and in accordance with a priority order of processing of same as defined by the predetermined processing program.



5,024,571
MULTI-LEVEL STORAGE STRUCTURE

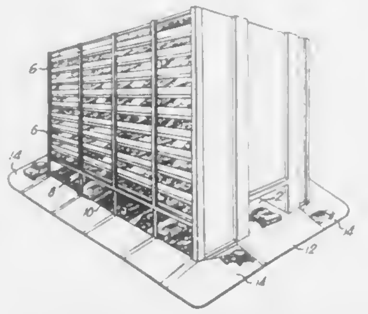
Moshe Shahar, and Gabriel Shahar, both of Sderot Jerusalem 96, Ramat-Gan, Israel

Filed Dec. 21, 1989, Ser. No. 454,590

Claims priority, application Israel, Dec. 26, 1988, 88806

Int. Cl.^{5} B65G *65/00*

U.S. Cl. 414—231 14 Claims



1. An automatic multi-level storage structure comprising:

a building structure having at least one entrance and exit station for respectively introducing an object for the storing thereof and withdrawing said object after retrieval thereof, a main floor directly accessible from said entrance station, and a plurality of storage levels:

a plurality of object pallets provided with wheels and adapted to carry objects to be stored, said pallets being movable along, and guided by, first track means fixedly attached to a floor of each level;

at least one storage elevator adapted to accommodate at least one of said object pallets at a time and vertically movable between said main floor and said plurality of storage levels;

at least one transfer platform permanently located in said at least one elevator and provided with second track means fixedly attached to said platform, said second track means adapted to accept and guide the wheels of said object pallet, and further provided with first drive means for moving said object pallet onto said transfer Platform and subsequently moving it off said platform,

second drive means for engaging said transfer platform enabling it to move longitudinally in both directions beyond the limits of said elevator far enough to ensure continuity, either on one side of said elevator or on the other side thereof, between said first track means fixedly attached to said floor of each level, and said second track means fixedly attached to said transfer platform, and

wherein an object to be stored is moved onto one of said object pallets at said at least one entrance station and, for the duration of its stay in said storage structure, remains standing on said one of said object pallets, and said one of said object pallets being moved from an entrance station onto an elevator and from said elevator to a storage location on one of said levels and subsequently from said storage location, via said elevator, to said exit station.

5,024,572
GOODS HANDLING METHOD AND APPARATUS THEREOF

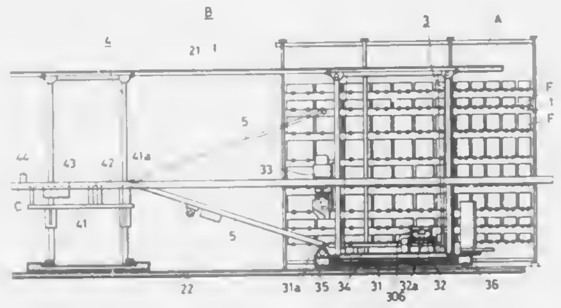
Nobuhiro Tanaka, Miyashiro; Eiji Hirata, Koshigaya; Hideyuki Moriguchi, Miyashiro; Ko Azekura, Funabashi; Akira Tsubone, Kita Kyushu, and Yasunori Ryu, Koga, all of Japan, assignors to Kao Corporation, Tokyo and Seibu Electric & Machinery Co., Ltd., Fukuoka, both of Japan

Continuation of Ser. No. 184,091, Apr. 20, 1988, abandoned, which is a division of Ser. No. 886,241, Jul. 16, 1986. This application Jan. 8, 1990, Ser. No. 464,679

Claims priority, application Japan, Jul. 16, 1985, 60-156354; Jul. 16, 1985, 60-156355; Mar. 7, 1986, 61-49694; Mar. 20, 1986, 61-60883; Mar. 26, 1986, 61-67738; May 13, 1986, 61-109253; May 13, 1986, 61-109254

Int. Cl.^{5} B65G *65/00*

U.S. Cl. 414—276 4 Claims



1 A goods handling apparatus for carrying in goods with respect to storage facilities having multirow and multistage storing spaces, said apparatus including a goods inlet apparatus adapted to carrying in goods by travelling in a vertical direction and in a horizontal direction along said storing spaces of said storage facilities, a goods carrier conveyor adapted to convey the goods within a plane parallel to a travelling plane of said goods inlet apparatus, a goods transfer conveyor adapted to connect said goods inlet apparatus to said goods carrier conveyor, said inlet apparatus being placed on a lifting section of a stacker crane which is movable in the horizontal direction along the storing spaces of said storage facilities, said goods transfer conveyor having a first end oscillatably mounted to said stacker crane for movement according to the lifting of said lifting section, and a second end thereof is positioned at the same height as said goods carrier conveyor, said goods carrier conveyor is disposed generally horizontally and generally the height of a storing space of a central stage located at an intermediate height level of the storage facilities,

a movable conveyor located between said first end of said goods transfer conveyor and said inlet apparatus to receive goods from said first end of said goods transfer conveyor and transmit them to said inlet apparatus,

said first end of said goods transfer conveyor being engaged with a vertically movable end of said movable conveyor,

said vertically movable end of said movable conveyor being supported by resilient means for movement to a second position, said resilient means returning said movable conveyor to its initial position after the passage of goods, and

said first end of said goods transfer conveyor and said movabie conveyor being mounted on said lifting section so that due to the lifting of said lifting section, said goods transfer conveyor is oscillated about said first end.

5,024,573
LIFTING DEVICE

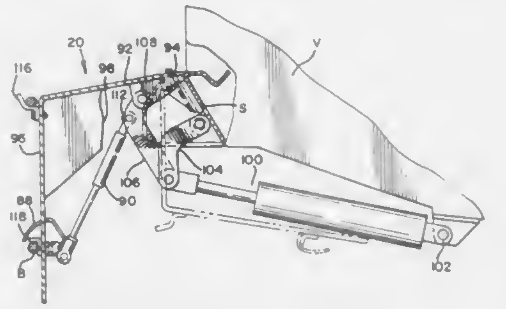
John W. Redding, Brookfield, and Robert F. Zelinka, Roselle, both of Ill., assignors to Perkins Manufacturing Company, Chicago, Ill.

Continuation-in-part of Ser. No. 126,593, Nov. 30, 1987, Pat. No. 4,911,600, which is a continuation of Ser. No. 862,015, May 12, 1986, Pat. No. 4,741,068, which is a continuation of Ser. No. 572,389, Jan. 20, 1989, abandoned. This application Nov. 17, 1988, Ser. No. 272,765

The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.

Int. Cl.^{5} B65F *3/02*

U.S. Cl. 414—408 14 Claims



1. A refuse collection vehicle comprising:

means defining a refuse receiving cavity, including sidewalls and a floor extending upwardly to a lower sill edge;

a receptacle lifter movably mounted below said sill, said lifter including means for capturing a portion of a selected type of receptacle;

means cooperatively associated with said lifter for moving said lifter between a first lifter position and a second lifter position, said lifter being located substantially entirely below a horizontal plane tangent to said sill edge and substantially entirely on the cavity side of a vertical plane tangent to said sill edge when in said first lifter position, wherein lateral access to said sill edge from a side of said vertical plane opposite said refuse receiving cavity is substantially unobstructed and said second position being above said sill edge for dumping a selected type of receptacle;

said means for capturing a portion of a selected type of receptacle being movable between a capture position for capturing a portion of the selected type of receptacle and a release position for releasing the receptacle portion; and

means cooperatively associated with said lifter moving means and said capture means for moving said capture means between said first and second positions, including automatically adjusting variable length means connecting said capture means and said moving means, said automatically adjusting variable length connecting means being resiliently biased to a reduced length position.

VOL
1127
ISS
3
JE
18
1991
UMI

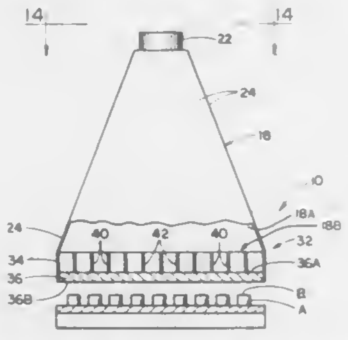
5,024,574

RANDOM FUEL PELLET VACUUM TRANSFER APPARATUS

John F. Wilson; Enrique R. Rosal, both of Columbia, S.C., and George D. Bucher, North East, Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 29, 1989, Ser. No. 373,074
Int. Cl.^{5} B65B *21/02*

U.S. Cl. 414—416 **9 Claims**



1. A vacuum transfer apparatus for use in en mass vacuum gripping nuclear fuel pellets, said apparatus comprising:

(a) an enclosure defining a vacuum chamber and having an open bottom;

(b) a rigid support structure spanning and attached to said open bottom of said enclosure; and

(c) a perforated mat attached to said structure along a side thereof opposite from said hood enclosure, said mat being composed of resiliently flexible material and having a matrix of spaced apart holes of a cross-sectional size substantially smaller than the diameter of the pellets;

(d) said support structure defining a plurality of passages of a cross-sectional size substantially larger than that of said holes in said mat and providing the sole path for communicating a vacuum from said chamber of said enclosure to said holes inn said mat for vacuum gripping and holding the pellets at end surfaces thereof against said mat, said passages being permanently open at their opposite ends for providing constant open communication of the vacuum from said vacuum chamber to said perforated mat;

(e) said support structure being composed of a criss-crossed arrangement of parallelly-disposed and spaced apart strips wherein the thickness of the surface of said strips which is in contact with said mat is less than the diameter of said holes in said mat such that said strips will not completely cover and thus block communication of a vacuum through any of said holes in said mat.

5,024,575

LIGHTWEIGHT GRIPPER FOR ROBOTIC TRANSFER OPERATIONS

Roger Anderson, Ridgefield, Conn., assignor to Robotic Originals, Inc., Danbury, Conn.

Filed Sep. 8, 1989, Ser. No. 405,634
Int. Cl.^{5} B65G *61/00*

U.S. Cl. 414—627 **11 Claims**

1. A light weight, re-configurable gripper for pick up, translational and rotational and rotational repositioning and deposit of a plurality of product items under robotic manipulation, which comprises

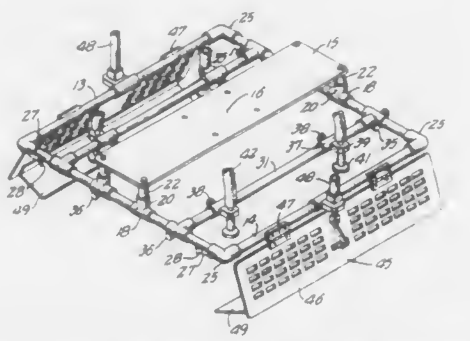
(a) a basic frame comprising a pair of spaced, longitudinally extending lateral supports formed of lightweight tubular material, and means rigidly interconnecting said lateral supports,

(b) a plurality of cross members slidably supported by and extending between said lateral supports,

(c) said cross members being formed of lightweight tubular material and mounting a T-shaped fitting at each end,

(d) said T-shaped fittings being tightly secured to said cross members and slidably mounted on said lateral supports for adjustable positioning of the cross members,

(e) a plurality of clamping members slidably mounted on said cross members for adjustable positioning thereon,



(f) a suction device mounted on each of said clamping members for engagement with a product item to be transported.

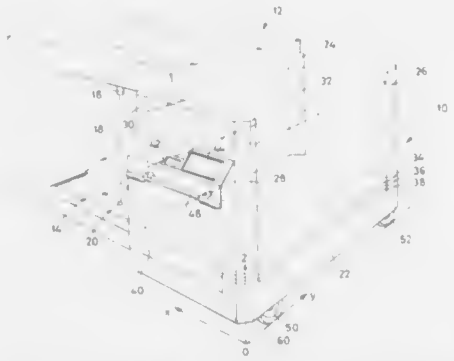
5,024,576

WORKING METHOD OF AN AUTOMATIC SERVICE TRUCK FOR MOVING SHEET PACKAGES

Luciano Meschi, Livorno, Italy, assignor to Industria Grafica Meschi S.r.l., Livorno, Italy

Filed May 31, 1989, Ser. No. 359,350
Claims priority, application Italy, Jan. 2, 1988, 20836 A/88
Int. Cl.^{5} B65G *67/00;* **B60P** *1/52*

U.S. Cl. 414—786 **2 Claims**



1. A method for loading an automatic service truck (10) associated with a tern (60) of cartesian axes having an origin in a given point on said truck for moving or carrying paper sheets packages in which a plurality of said packages are arranged side by side and superimposed one above the other according to how many package layers are loaded, comprising the steps of:

(a) supplying and loading along a first direction a first package to a first location on a first plane (34) of said truck, said first package being loaded onto said truck (10) along a first axis (x), then loading a second package along said first axis (x) which pushes the first package to go adjacent to the origin of said tern (60), to fill completely the available space along said first axis (x) on said first plane;

(b) shifting the truck (10) along a second axis (y) perpendicular with respect to the first axis (x) and providing a space large enough to house a second row of packages side by side arranged along said first axis (x) until the available space along the first axis (x) is completely filled, said first axis (x) and said second axis (y) defining said first plane (34);

(c) subsequently shifting the truck (10) along said second axis (y) again for housing on said first plane (34) four rows of packages side by side arranged along said first axis (x);

(d) lifting said first plane (34) along a third axis (z) at the end of the shifting along said second axis (y), said third axis (z) being perpendicular with respect to said first plane (34) defined by said first two axes (x, y), said first plane being lifted along said third axis (z) after being completely filled with packages to make available a second plane (36) onto which is loaded a second group of packages, according to the (a), (b) and (c) steps, until said second plane is completely filled; and

(e) lifting said first and second planes (34 and 36) together concurrently along said third axis (z) to make a third plane (38) available to be filled with sheet packages exactly as the first and second planes (34 and 36), said third plane (38) being delimitated by said first and said second axes (x, y), to be filled with a third group of packages according to the procedure used in the steps (a) to (c) for filling said first plane (34), the packaging collection on said truck (10) terminating when said third axis (z) is completely filled.

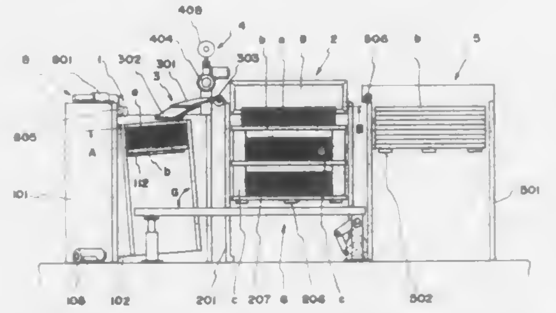
5,024,577

PAPER ARRANGING SYSTEM

Isamu Miura, 16-6, Ryusen 3-chome, Taitoh-ku, Tokyo, Japan

Filed Jul. 5, 1989, Ser. No. 375,438
Int. Cl.^{5} B65H *29/22*

U.S. Cl. 414—788.4 **11 Claims**



1. A paper arranging system for re-loading a bundle of paper sheets from a paper feed rack to a paper arranging device, comprising:

a paper feed rack having a front, a rear, and two sides for initially receiving a bundle of paper sheets;

a paper arranging device located adjacent to said paper feed rack for receiving and stacking said bundle of paper sheets after said bundle of paper sheets has been transferred from said paper feed rack to said paper arranging device; means for conveying said paper sheets from said paper feed rack to said paper arranging device;

a working platform pivotably disposed in front of said paper feed rack and said paper arranging device and means for moving said working platform between a first horizontally disposed position at which an operator may be supported thereon for performance of a paper stacking operation, and a second vertically disposed position at which said platform is moved away from said front of said paper feed rack and said paper arranging device so as to provide clear access to said paper feed rack and said paper arranging device.

5,024,578

REGENERATIVE PUMP WITH TWO-STAGE STRIPPER

Ghanshyamsinh D. Vansadia, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 10, 1989, Ser. No. 419,297
Int. Cl.^{5} F04D *5/00, 9/02*

U.S. Cl. 415—55.1 **4 Claims**

1. In an automotive fuel pump assembly, a regenerative rotary pump comprising:

a housing defining a circular cavity having a cylindrical side wall and a pair of circular end walls,

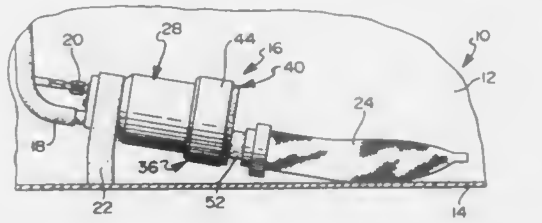
means on said housing defining a pair of annular grooves in respective ones of said circular end walls adjacent said cylindrical side wall and cooperating with said cylindrical side wall in defining an annular pumping chamber,

a disc-shaped impeller supported in said circular cavity for rotation in a pumping direction,

means on said impeller defining a plurality of circumferentially spaced vanes around said impeller in said pumping chamber separated by a plurality of pockets open to said pumping chamber,

means on said housing defining a fluid inlet connected to said pumping chamber and to a source of fluid at substantially ambient pressure,

means on said housing defining a fluid discharge from said pumping chamber angularly spaced from said inlet in said pumping direction of rotation of said impeller and connected to a flow restriction downstream of said fluid discharge so that said vanes cooperate with said pumping chamber in motivating said fluid from said inlet toward said discharge and in increasing the pressure of said fluid at said discharge,



means on said housing defining a high pressure stripper stage adjacent said discharge closely receiving said impeller so that direct communication between said discharge and said inlet in said pumping direction of rotation of said rotor is foreclosed,

means on said housing defining a low pressure stripper stage between said high pressure stripper stage and said inlet closely receiving said impeller,

means on said housing defining a vent chamber between said high pressure stripper stage and said low pressure stripper stage exposed to said pockets on said impeller, and

means defining a vapor bleed between said vent chamber and said source of fluid at ambient pressure at a location removed from said inlet.

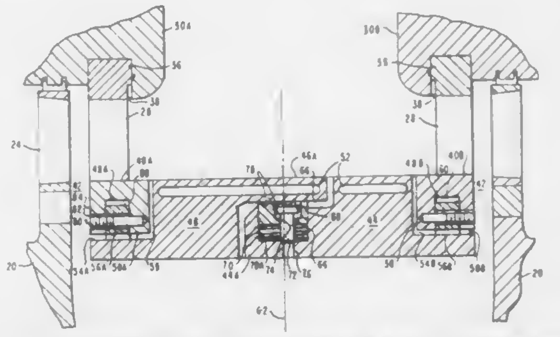
5,024,579

FULLY FLOATING INLET FLOW GUIDE FOR DOUBLE-FLOW LOW PRESSURE STEAM TURBINES

John C. Groenendaal, Jr., Winter Springs, and Randy T. Rudy, Orlando, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 18, 1990, Ser. No. 553,517
Int. Cl.^{5} F01D *25/26*

U.S. Cl. 415—108 **6 Claims**



1. In a double flow steam turbine having a rotor with annular

VOL
1127
ISS
3
JE
18
1991
UMI

rows of blades disposed about its periphery, a stator assembly connected about the rotor and having annular rows of stationary blades affixed thereto, the stator assembly including a steam inlet for directing a flow of steam onto at least a pair of first stage stationary blade rows in a desired steam flow path, each of the first stage stationary blade rows being positioned on opposite sides of the steam inlet and located for directing the flow of steam onto corresponding rows of rotor blades, at least the first stationary blade rows having an inner blade ring, apparatus for improving the efficiency of the steam turbine by reduction of steam bypassing the first stage blade rows via leakage around the inner blade rings including sealing means coupled between the inner blade rings of the first stage stationary blade rows, the sealing means including a first circumferential band coupled in sealing relationship to the inner blade ring of one of the first stage stationary blade rows and a second circumferential band coupled in sealing relationship to the inner blade ring of the other of the first stage stationary blade rows, at least a portion of the first band underlying at least a portion of the second band, a resilient seal positioned between the overlapping portions of the first and second bands and operative to prevent the leakage of steam therebetween, each of the first and second bands being connected to a corresponding one of the first stage stationary blade rows by connecting means allowing differential radial thermal expansion and contraction between the band and associated blade row, said connecting means comprising a circumferential groove formed in a radially inner surface of each of the inner blade rings, a tongue formed on each of the first and second bands and positioned to fit within a corresponding one of the grooves when the bands are assembled to a respective one of the inner blade rings, each of the tongues having a plurality of circumferentially spaced slots, a block positioned in each of the slots, each block being of a size to slidingly engage opposite circumferential sides of the slot and being shorter than a depth of the slot, the blocks being located within the groove when the bands are assembled to the inner blade rings, a plurality of pins each extending through the groove and a corresponding one of the blocks for fixing the blocks to the inner blade ring, whereby sliding motion of each of the blocks within its respective slot allows differential radial motion of the first and second bands with respect to their respective first and second inner blade rings while preventing circumferential rotation of the bands with respect to the blade rings.

5,024,580

CONTROL OF VARIABLE STATOR VANES

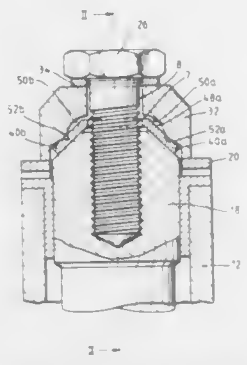
Clive E. Olive, Bristol, England, assignor to Rolls-Royce plc, London, England

Filed Jun. 15, 1990, Ser. No. 538,784

Claims priority, application United Kingdom, Jun. 17, 1989, 8913988

Int. Cl.⁵ F01D *17/00, 9/00*

U.S. Cl. 415—150 **5 Claims**



1. A vane actuator associated with each stator vane for use in a gas turbine engine having a set of variable stator vanes and a vane actuator ring, said vane actuator comprising:

an elongated metal vane actuator lever linking a vane stem to the ring, said lever being pivotally attached at one end to the ring and at the other end clamped to a respective vane stem so as to inhibit relative movement between said lever and the stem, said lever further comprising a first portion in the form of a strip extending from the ring towards the stem and a second portion in the form of a trough adapted to locate on a cooperatively shaped end of the stem; and

a clamp means to prevent relative movement between the stem and said lever, the arrangement being such that when the ring is rotated about its axis the strip portion of the lever is able to twist about its longitudinal axis and inhibit any tendency of the lever as a whole to twist about its longitudinal axis.

5,024,581

DEVICES FOR REDUCING DEFLECTION AND STRESS IN TURBINE DIAPHRAGMS

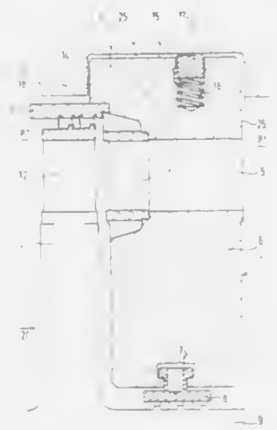
Gérard Foucher, Tremblay les Gonesse, France, assignor to GEC Alsthom SA, Paris, France

Filed Oct. 2, 1989, Ser. No. 415,731

Claims priority, application France, Oct. 6, 1988, 88 13117

Int. Cl.⁵ F01D *9/04*

U.S. Cl. 415—191 **6 Claims**



1. A turbine comprising at least one stage having a diaphragm which is split in two along a diametrical plane and which includes an outer ring and an inner ring interconnected by means serving to guide the turbine fluid, a downstream face of the outer ring being pressed against a ring of the turbine stator, said diaphragm being provided with sealing means providing sealing between the outer ring and the stator, wherein said sealing means are disposed on the outer edge of the outer ring, wherein the downstream face of said outer ring is provided with a land at a distance from the outer edge and bearing against the ring of the stator, and wherein communication means are provided for providing communication between the space situated between the land and the sealing means, and a space downstream from the diaphragm with the pressure in said space being less than the pressure P_1 existing over the upstream face of the diaphragm.

5,024,582

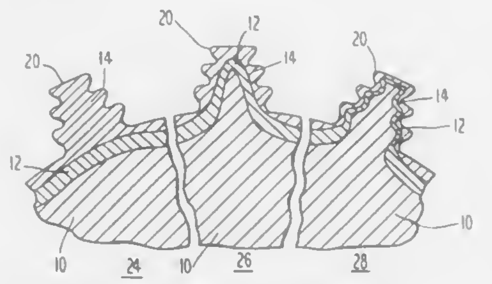
STEAM TURBINE ROTOR HAVING GRADED WELDMENTS

James C. Bellows, Maitland, and Rudolph Koubek, III, Casselberry, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 14, 1990, Ser. No. 567,032

Int. Cl.⁵ F01D *1/00, 25/00*

U.S. Cl. 416—213 R **22 Claims**



1. A steam turbine component comprising:

(a) a ring member comprising a low alloy ferrous base metal having less than about 6 wt. % alloying ingredients including Cr, Mo and V;

(b) a ferrous graded layer disposed on said ring member comprising a plurality of layered weldments in which there is disposed an increasing weight percentage of a layering metal containing Cr; and

(c) a steeple region including a Cr-containing steeple alloy disposed on said graded layer for optimizing a life extending property of said steeple region of the turbine component.

15. A method of preparing a steam turbine rotor for optimizing a life extending property of a steeple region of said rotor, comprising:

(a) providing a ring member comprising a low alloy ferrous base metal having less than about 6 wt. % alloying ingredients including Cr, Mo and V;

(b) disposing a ferrous graded layer onto said ring member, said ferrous graded layer comprising a plurality of layered weldments in which there is disposed an increasing weight percentage of a layering metal containing Cr;

(c) providing a steeple region including a Cr-containing steeple material disposed on said graded layer.

5,024,583

JET PUMP STRUCTURE FOR A FUEL TANK

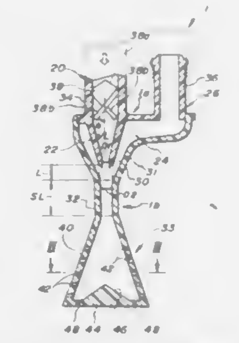
Michiaki Sasaki, and Kazuya Yuki, both of Kanagawa, Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed Dec. 1, 1989, Ser. No. 444,791

Claims priority, application Japan, Dec. 23, 1988, 63-326429

Int. Cl.⁵ F04F *5/46*

U.S. Cl. 417—198 **8 Claims**



1. A jet pump structure for a fuel tank having first and second chambers therein comprising:

a vacuum chamber provided within the fuel tank;

first means, connected to said vacuum chamber, for returning oversupplied fuel to said vacuum chamber;

second means, connected to said vacuum chamber, for transferring fuel from the first chamber into said vacuum chamber;

third means, connected to said vacuum chamber, for receiving fuel from said first and second means;

fourth means, connected to said third means, for receiving fuel from said third means and discharging fuel into the second chamber; and

fifth means, provided with said first means, receiving the returning oversupplied fuel for forming the returning oversupplied fuel into a swirl flow of fuel, said swirl flow of fuel being ejected from said first means as a jet swirl flow of fuel into said vacuum chamber and forming a vacuum around said first means within said vacuum chamber, said ejected swirl flow of fuel sealing said vacuum chamber relative to said third means and preventing the vacuum generated within said vacuum chamber from being released through said third and fourth means, such that the vacuum effectively sucks fuel from the first chamber through said second means,

said fourth means including an expansion chamber having a frusto-conical shape including a tapered circumferential side wall extending from an open top of relatively small area to a bottom wall of a relatively large area, connected at said top to said third means for receiving the swirl flow of fuel from said third means, for providing a gradual pressure reduction to the swirl flow of fuel, and including a plurality of through holes in said circumferential side wall, each of said through holes extending substantially along a swirling direction of the swirl flow of fuel for discharging fuel into the second chamber.

5,024,584

PUMP UNIT WITH ADJUSTABLE PISTON STROKE LENGTH

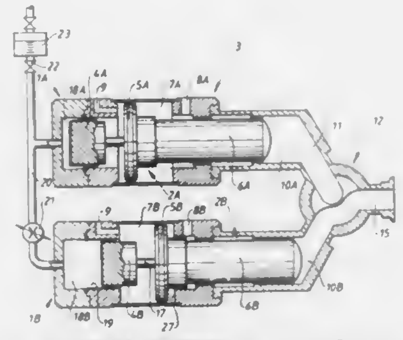
Giorgio Bordini, and Maurizio Vincenzi, both of Modena, Italy, assignors to Tetra Dev-Co, Modena, Italy

Filed Nov. 30, 1988, Ser. No. 277,870

Claims priority, application Italy, Nov. 30, 1987, 22816 A/87

Int. Cl.⁵ F04B *15/02, 1/28*

U.S. Cl. 417—342 **7 Claims**



1. A pump unit comprising a pair of reciprocating pumps communicating with a common inlet conduit and a common outlet conduit, said pair of reciprocating pumps each having a working piston mounted for reciprocating movement in a pump cylinder between an extended and a retracted position relative to said pump cylinder and a displacement piston and a hydraulic control piston, each of said pumps having a hydraulic control cylinder cooperating with said hydraulic control piston, pipe means interconnecting the hydraulic control cylinders of said pair of pumps to form a closed control system that includes a control fluid for synchronizing of said working pistons for alternating movement between said extended and retracted positions, pneumatic power means for providing a driving fluid for moving each of said displacement pistons

VOL
1127
ISS
3
JE
18
1991
UMI

alternately toward said retracted position, wherein said pipe means is communicable to an oil supply through a valve such that a predetermined quantity of oil may be introduced into said control system in order to adjust the length of stroke of each working piston, said predetermined quantity being selected according to a desired length of stroke of each working piston and said predetermined quantity of oil remaining substantially unchanged for a particular desired length of stroke during operation of said pump.

5,024,585

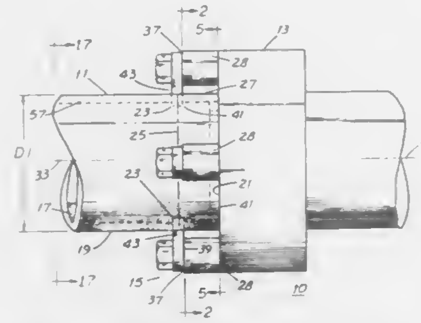
HOUSING COUPLING MECHANISM

William M. Kralovec, Delavan, Wis., assignor to Sta-Rite Industries, Inc., Milwaukee, Wis.

Filed Apr. 9, 1990, Ser. No. 506,198

Int. Cl.⁵ F04B *17/00;* **F16L** *23/032*

U.S. Cl. 417—360 **15 Claims**



1. An improved housing coupling mechanism including:

a non-pressurized, thin walled first housing having a non-flared first end and a plurality of perforate slots arranged in a spaced relationship about the perimeter of the first housing, each slot being disposed in a spaced relationship from the first end;

a second housing having a rabbet for aligning the first housing with respect to the second housing, such second housing being attached to the first housing in abutting contact to the first end, the second housing including a plurality of bosses integrally formed thereon, each boss being in overlapping relationship to the first end of the first housing, each boss being configured for coupling an attachment means thereto;

a plurality of attachment means, each being coupled to a single boss and including a plate extending to engage a slot;

each attachment means being positionally adjustable in a continuum for providing a force to couple the first housing to the second housing;

the second housing and the first housing being securely coupled to one another when each attachment means is adjusted to provide a clamping force between its plate and the slot engaged thereby;

the first housing being securely attached to and aligned on the second housing notwithstanding that the spaces between each slot and the first end of the first housing may be unequal to one another.

5,024,586

ACCURATE PERISTALTIC PUMP FOR NON ELASTIC TUBING

Samuel Meiri, 9438 Kedvale, Skokie, Ill. 60076

Filed Mar. 13, 1990, Ser. No. 492,860

Int. Cl.⁵ F04B *43/12*

U.S. Cl. 417—477 **1 Claim**

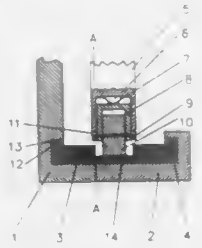
1. A peristaltic pump comprising:

a motor driving a rotor, said rotor carrying a plurality of spring biased rollers on its circumference;

a semi-circular back wall, said semi-circular back wall having a fixed part and a rotatable moveable part;

a pair of elastic semi-circular sections are retained through the entire semi-circular back wall, the first of said elastic semi-circular sections retained in the fixed part and the second of said elastic semi-circular sections retained in the rotatable moveable part;

a peristaltic tube is mounted between said plurality of rollers of said rotor and said semi-circular back wall, along said tubes peripheral edges are said pair of elastic semi-circular sections which continuously elastically support said tube along the entire race;



means for correcting the effects of creep in said peristaltic tube, wherein said means for correcting creep include said spring biased rollers, which apply a substantially constant force to pinch said tube, and said means for correcting creep further include said pair of elastic semi-circular sections which fully restore the initial cross-section of said tube in the areas of said race where said rollers are not pinching said tube; and

wherein said spring biased rollers apply a force which is substantially independent of minor tube wall thickness variations.

5,024,587

VALVELESS PUMP

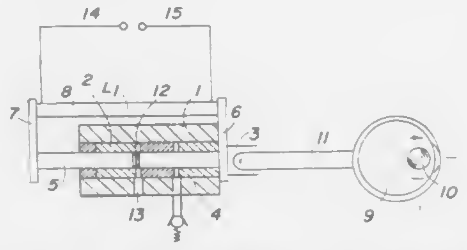
Christoph Maurer, Ringstrasse, Fed. Rep. of Germany, assignor to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed Dec. 26, 1989, Ser. No. 456,951

Claims priority, application Fed. Rep. of Germany, Jan. 12, 1989, 3900697

Int. Cl.⁵ F04B *19/22*

U.S. Cl. 417—488 **10 Claims**



1. A valveless pump comprising a cylinder having spaced apart inlet and outlet ports, first and second opposed axially aligned pistons moveable in said cylinder, a fastening member connected to each of said first and second pistons, a moveable slide connected to both said fastening members, and variable length means connected to at least one of said fastening members so as to be carried by one of said fastening members for adjusting the distance between said first piston and said second piston at selected times.

5,024,588

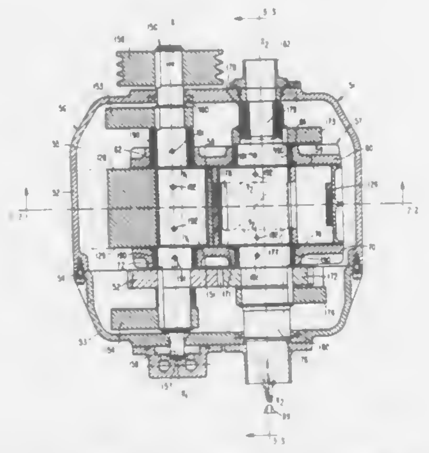
ROTARY COMPRESSOR AND PROCESS OF COMPRESSING COMPRESSIBLE FLUIDS WITH INTAKE AND DISCHARGE THROUGH PISTON SHAFT AND PISTON

Marek J. Lassota, Des Plaines, Ill., assignor to Unotech Corporation, Villa Park, Ill.

Filed Sep. 7, 1989, Ser. No. 404,271

Int. Cl.⁵ F04C *18/24, 29/02*

U.S. Cl. 418—1 **65 Claims**



1. In a rotary compressor of the type comprising:

a cylinder-piston comprising a body, two spaced walls extending from one end of said body and having opposing parallel surfaces, and a wall interconnecting said two spaced walls at their ends remote from said body to form an opening in said cylinder-piston, said cylinder-piston further having two side faces;

a piston positioned within said opening of said cylinder-piston and having spaced faces adjoining said opposing parallel surfaces of said spaced walls of said cylinder-piston, said piston further having two spaced side faces;

two axially spaced walls adjoining said side faces of said cylinder-piston and said spaced side faces of said piston;

a rotatable cylinder-piston shaft comprising an eccentric portion journaled in said body of said cylinder-piston;

a rotatable piston shaft comprising an eccentric portion journaled in said piston;

gearing means interconnecting said cylinder-piston shaft and said piston shaft so said shafts follow coordinated rotations in opposite directions and said cylinder-piston and said piston follow coordinated planetary rotations in opposite directions with and around said eccentric portions of said shafts;

said cylinder-piston and said piston forming moveable surfaces, and said axially spaced walls forming stationary surfaces of two compression chambers located between said body of said cylinder-piston and said piston and between said piston and said wall interconnecting said two spaced walls of said cylinder-piston and varying in volumes upon said coordinated planetary rotations in opposite directions of said cylinder-piston and said piston;

intake means comprising intake ports leading to said compression chambers; and

discharge means leading from said compression chambers, the improvement comprising:

said intake and discharge means comprising:

at least one port in each end face of said piston serving as intake and discharge ports;

an intake channel in said piston shaft in communication with at least one intake port located in said eccentric of said piston shaft, said intake port in said eccentric of said piston shaft communicating with said ports in said piston and leading to said compression chambers at intake positions of said cylinder-piston shaft, said cylinder-piston, said piston shaft and said piston; and

a discharge port in said eccentric of said piston shaft in communication with a discharge channel of said piston shaft, said discharge ports of said piston communicating with said discharge port of said eccentric of said piston shaft and leading from said compression chambers at discharge positions of said cylinder-piston shaft, said cylinder-piston, said piston shaft and said piston; and

a suitable housing enclosing said compressor with said compressor attached to said housing;

a suitable pressure seal between the end of said discharge channel of said piston shaft and said housing of said compressor to seal flow of compressed air or gas between said end of said discharge channel of said piston shaft and said compressor housing; and

an opening in at least one of said parallel walls of said cylinder-piston, said opening being sequentially opened and closed during the operation of said compressor by said piston to provide communication between said compression chambers and inside of said housing of said compressor when said compression chambers are at or close to their maximum volumes.

5,024,589

SPIRAL DISPLACEMENT MACHINE HAVING A LUBRICANT SYSTEM

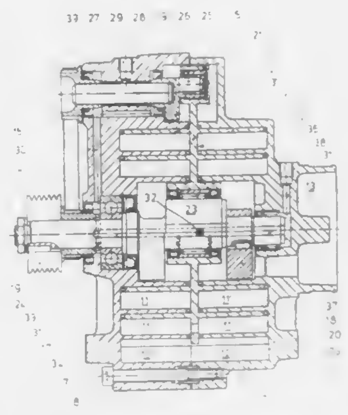
Gregor Jetzer, Nussbaumen; Roland Kolb, Dielsdorf, and Fritz Spinnler, Mellingen, all of Switzerland, assignors to Asea Brown Boveri Ltd., Baden, Switzerland

Filed Aug. 3, 1989, Ser. No. 388,822

Claims priority, application Switzerland, Aug. 3, 1988, 2939/88; Jun. 8, 1989, 2150/89

Int. Cl.⁵ F04C *18/04, 29/02*

U.S. Cl. 418—55.3 **11 Claims**



1. A displacement machine for compressing fluids, comprising:

a housing;

a rotor in said housing;

a drive shaft journalled in said housing and having first eccentric means for oscillating said rotor about the drive shaft axis;

a guide shaft rotatably coupled to said drive shaft and journalled in said housing by a slide bearing, said guide shaft having second eccentric means for guiding the oscillation of said rotor;

spiral means on said housing and said rotor for compressing a fluid during oscillation of said rotor; and

a lubricating system comprising:

a) means for supplying lubricant to said slide bearing,

b) drive shaft lubricating means, and

c) an intermediate line connecting lubricant outlets from said slide bearing to said drive shaft lubricating means,

whereby radial play in said slide bearing accommodates

VOL
1127
ISS
3
JE
18
1991
UMI

variations in a spacing between said drive shaft and said guide shaft.

5,024,590

ROTARY ENGINE OF THE TYPE HAVING A PLANETARY ROTOR WITH ROTOR AND SHAFT EQUAL ROTATION

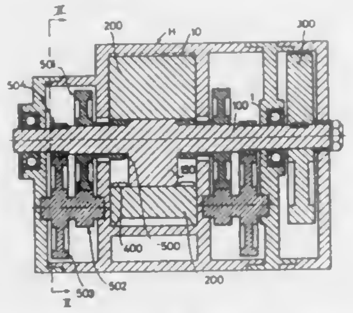
Sofyan Adiwinata, Jalan Kebalan VII No. 3, Kebayoran Baru, Jakarta, Indonesia

Continuation of Ser. No. 98,189, Sep. 17, 1987, abandoned. This application May 9, 1989, Ser. No. 349,873

Claims priority, application European Pat. Off., Sep. 18, 1986, 86201617.7

Int. Cl.^{5} F01C *1/22, 17/02*

U.S. Cl. 418—61.2 **4 Claims**



1. An apparatus equipped with a rotary engine comprising a housing defining a cavity with a n-lobed epitrochoidal shaped wall, a n+1 lobed rotor within said cavity and movable in a planetary fashion, n being 1, 2, 3, . . . and a main crank shaft with an eccentric supporting said rotor, the rotor being provided with an internal involute gear meshing with an internal involute gear pinion rotatably supported by the main crank shaft, the engine further comprising a transmission installed between the rotor and the main crank shaft, the transmission rotation of which is based on the formula

$$\frac{IIGP}{IIG} - \frac{a}{b} = P$$

in which

IIGP refers to the pitch diameter of the internal involute gear pinion,

IIG refers to the pitch diameter of the internal involute gear,

a/b designates the additional rotation of the internal involute gear on each rotation of the main crank shaft, and

p is the basic ratio for the specific type of rotary engine, being equal to $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, . . . for a 1-, 2-, 3-, . . . respectively lobed epitrochoidal shaped cavity wall, such that during rotation of the rotor the shape of the outer envelope of the rotating rotor is exactly the same as the shape of the wall of the cavity and wherein when n is one a/b is 1/6, when n is two a/b is 1/12 and when n is three a/b is 1/20.

5,024,591

VANE COMPRESSOR HAVING REDUCED WEIGHT AS WELL AS EXCELLENT ANTI-SEIZURE AND WEAR RESISTANCE

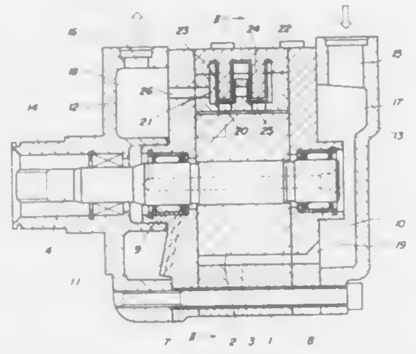
Nobuyuki Nakajima, Saitama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed May 15, 1989, Ser. No. 352,099

Int. Cl.^{5} F04C *18/344, 29/00*

U.S. Cl. 418—178 **5 Claims**

1. In a vane compressor including a cylinder formed by a cylinder block, and front and rear side blocks closing opposite ends of said cylinder block, a rotor rotatably received within said cylinder, said rotor having vane slits formed in an outer peripheral surface thereof, and vanes slidably fitted respectively in said vane slits, the improvement wherein said cylinder block, front and rear side blocks, rotor and vanes are formed of an aluminum-based alloy, and inner end surfaces of the front and rear side blocks on which the rotor and vanes slide, and outer surfaces of the vanes are each coated with Ni electroless composite plating layers having polytetrafluoroethylene (PTFE) dispersed therein.



5,024,592

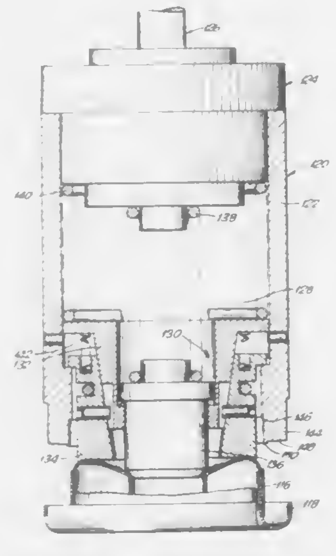
APPARATUS FOR FORMING AN AEROSOL CONTAINER CLOSURE

Robert H. Abplanalp, 10 Hewitt Ave., Bronxville, N.Y. 10708, and Virgil Naku, 264 Rutledge Ave., Hawthorne, N.Y. 10532

Continuation of Ser. No. 144,630, Jun. 11, 1988, abandoned, which is a continuation of Ser. No. 4,233, Dec. 31, 1986, abandoned, which is a continuation of Ser. No. 811,305, Dec. 16, 1985, abandoned, which is a continuation of Ser. No. 648,735, Nov. 19, 1984, abandoned, which is a division of Ser. No. 606,547, May 3, 1984, abandoned. This application Jun. 23, 1989, Ser. No. 371,685

Int. Cl.^{5} B29C *51/12*

U.S. Cl. 425—112 **17 Claims**



1. An apparatus for a mass production of a gasket-bearing aerosol mounting cup having a panel, a skirt depending from the periphery of the panel and an annular channel extending outwardly from the skirt comprising

(a) means for disposing a band of gasket material onto the skirt of the mounting cup such that an end of the band distal from the channel of the mounting cup extends beyond the panel of the mounting cup,

(b) primary plunger means for advancing the band of gasket material onto the skirt of the mounting cup such that the aforesaid distal end of the band is positioned at or below the periphery of the panel of the mounting cup,

(c) means for heating the band of gasket material, subsequent to the use of the primary plunger means,

(d) secondary plunger means having a retractable sleeve portion for advancing the heated band of gasket material to its ultimate position on the skirt and within the channel of the mounting cup, and for imparting a compressive deformation to the band of gasket material.

5,024,593

APPARATUS FOR TRANSPORTING MOLDINGS FROM AN INJECTION MOLDING MACHINE

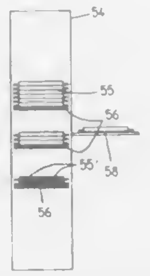
Karl Hehl, Arthur-Hehl-Str. 32, D-7298 Lossburg 1, Fed. Rep. of Germany

Filed Sep. 12, 1989, Ser. No. 406,265

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1988, 3830958

Int. Cl.^{5} B29C *45/40;* **B65G** *60/00*

U.S. Cl. 425—556 **18 Claims**



1. An apparatus for transporting moldings made by injection molding in an injection molding machine, which apparatus comprises

a plurality of molding receptacles,

a filling station, which is adapted to hold each of said molding receptacles in a predetermined receiving position for receiving a complement of said moldings from said machine, and

transfer means for moving said molding receptacles from said filling station,

the improvement residing in that

said molding receptacles consist of stackable pallets,

said transfer means comprise a pallet tower having vertical skeleton members, an elevator, which is vertically movable in said tower along a predetermined path along said vertical skeleton members, and a plurality of vertically spaced apart handling pallets, which are supported by said elevator and each of which is adapted to carry a stack of said stackable pallets to form a load unit in which said stack is supported by said handling pallet, and

said elevator is adapted to contain at least one of said load units comprising empty ones of said stackable pallets and is adapted to hold one of said handling pallets in consecutive vertically spaced apart positions for consecutively receiving from said filling station a plurality of said stackable pallets when they have received a complement of moldings in said filling station.

5,024,594

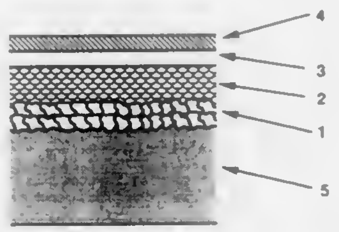
PROTECTIVE CLOTHING MATERIAL

Amulya L. Athayde, Mountain View, and Richard W. Baker, Palo Alto, both of Calif., assignors to Membrane Technology & Research, Inc., Menlo Park, Calif.

Continuation-in-part of Ser. No. 890,378, Jul. 23, 1986. This application Nov. 17, 1989, Ser. No. 438,527

Int. Cl.^{5} B32B *7/00*

U.S. Cl. 428—246 **25 Claims**



1. A protective material, comprising a laminate of:

a fabric layer having a skin proximal side and a skin distal side;

a sorbent layer, comprising a mixture of a sorbent material in a polymeric binder material; and

a thin-film composite membrane layer, comprising a microporous support membrane coated with an ultrathin permselective membrane.

5,024,595

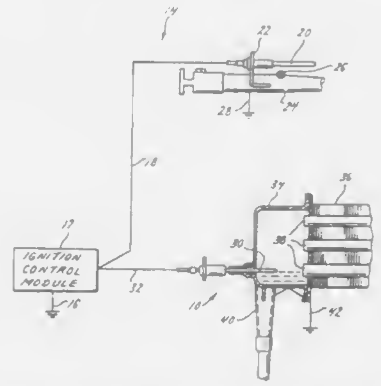
FURNACE PROTECTIVE DEVICE

David B. Schumacher, St. Louis, and Steven J. Bakowski, Richmond Heights, both of Mo., assignors to Snyder General Corporation, Red Bud, Ill.

Filed Jun. 5, 1989, Ser. No. 361,429

Int. Cl.^{5} F23N *1/00*

U.S. Cl. 431—18 **4 Claims**



1. In a burner control for a condensing furnace, a first circuit adapted to sense the presence of a burner flame and a second circuit to shunt out said first circuit, the second circuit being responsive to the buildup of condensate within the condensing furnace in response to the operation of the first circuit and its rendering operative of the burner, the second circuit comprising a shunt circuit for the first circuit when the condensate buildup reaches a certain point in the condensing furnace, which shunt circuit can render the first circuit inoperative thereby to stop the burner operation,

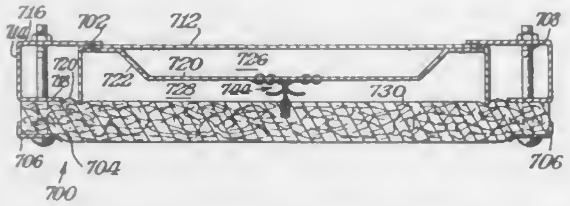
the condensing furnace has an outlet manifold where condensate can collect, a drain opening from the manifold, and wherein the second circuit includes electrical contacts that are closed by the presence of a predetermined liquid level in the manifold due to clogging of the drain.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,596
INFRA-RED EQUIPMENT

Thomas M. Smith, 1415 Golf Rd., Cinnaminson, N.J. 08077
Continuation-in-part of Ser. No. 752,908, Jul. 8, 1985, Pat. No. 4,604,054, Ser. No. 628,989, Jul. 9, 1984, Pat. No. 4,589,843, Ser. No. 592,793, Mar. 23, 1984, Pat. No. 4,654,000, Ser. No. 567,270, Dec. 30, 1983, abandoned, and Ser. No. 435,412, Oct. 20, 1982, abandoned, said Ser. No. 628,989, is a continuation-in-part of Ser. No. 509,161, Jun. 29, 1983, Pat. No. 4,500,283, said Ser. No. 592,793, is a continuation-in-part of Ser. No. 509,161, Ser. No. 312,730, Oct. 19, 1981, Pat. No. 4,443,185, and Ser. No. 292,167, Aug. 11, 1981, Pat. No. 4,474,552, said Ser. No. 567,270, is a continuation-in-part of Ser. No. 509,161, Ser. No. 312,730, and Ser. No. 292,167, said Ser. No. 435,412, is a continuation-in-part of Ser. No. 509,161, Ser. No. 312,730, Ser. No. 292,167, Ser. No. 279,081, Jun. 30, 1981, Pat. No. 4,416,618, Ser. No. 238,418, Feb. 26, 1981, Pat. No. 4,447,205, Ser. No. 186,491, Sep. 12, 1980, Pat. No. 4,378,207, and Ser. No. 178,121, Aug. 14, 1980, Pat. No. 4,373,904, said Ser. No. 509,161, is a continuation-in-part of Ser. No. 312,730, Ser. No. 292,167, Ser. No. 279,081, and Ser. No. 238,418, said Ser. No. 312,730, is a continuation-in-part of Ser. No. 292,167, Ser. No. 279,081, Ser. No. 234,418, Ser. No. 186,491. This application Sep. 3, 1985, Ser. No. 771,722
Int. Cl.⁵ F23D *14/12*

U.S. Cl. 431—328 3 Claims



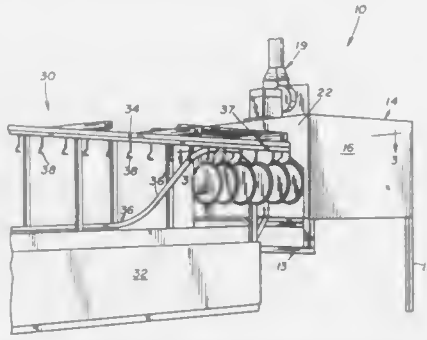
1. In an infra-red generator having a ceramic fiber mat directly covering a combustion mixture plenum from which a combustion mixture is passed through the thickness of the mat to emerge from a surface on which the mixture burns to heat to incandescence the fibers on that surface, the improvement according to which the mat has an intermediate portion adhered to a metal brace connected to the back of the plenum to support the mat, and the brace is essentially a metal sheet that extends into the mat and is adheres on both sides to the adjacent surfaces of the mat.

5,024,597
PROCESS AND APPARATUS FOR KOSHERING CONTAINER LIDS

Howard Skolnik, Chicago, Ill., and Jonah Gewirtz, Silver Spring, Md., assignors to Skolnik Industries Inc., Chicago, Ill.
Continuation-in-part of Ser. No. 550,298, Jul. 9, 1990, which is a continuation-in-part of Ser. No. 348,803, Aug. 8, 1988, which is a continuation-in-part of Ser. No. 131,291, Dec. 8, 1987, Pat. No. 4,830,675, which is a continuation of Ser. No. 872,016, Jun. 9, 1986, abandoned. This application Aug. 8, 1990, Ser. No. 564,094
Int. Cl.⁵ F27B *9/00*

U.S. Cl. 432—2 **16 Claims**

1. An apparatus for flame-treating metal lids of containers, drums, and the like, comprising:
- a main housing comprising a rear wall, a pair of side walls, a top wall, and a front wall, said main housing having a substantially hollow interior through which may be conveyed lids to be flame-treated, said front wall having at least one entrance opening through which may pass the lids to be flame-treated;
- a first flame means for producing flames, for flame-treating at least one surface face of a lid, mounted in said hollow interior;
- a second flame means for producing flames, for flame-treating at least the other side surface of a lid, also mounted in said hollow interior;
- conveyer means for conveying a series of lids to be flame-treated through said entrance of said front wall and into and out of said hollow interior of said main housing, said conveyer means comprising a first section for conveying lids into said hollow interior of said main housing, a second intermediate arcuate section for conveying the series of lids through said hollow interior, and a third section for conveying the series of lids out of said main housing after having been flame-treated by said first and second flame means;

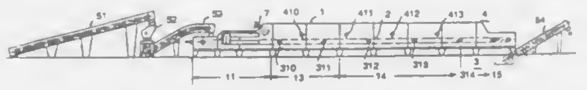


- said first flame means being mounted adjacent one of said pair of side walls, and said second flame means being mounted adjacent the other of said pair of flame means, each of said first and second flame means having a main directing portion through which exit the flames, each said main directing portion being directed toward said intermediate section of said conveyer means for directing the flames thereof toward the lids being transported thereby.

5,024,598
PROCESS AND DEVICE SUITABLE FOR THERMALLY PROCESSING A MATERIAL COMPRISING THERMALLY DEGRADABLE AND THERMALLY-RESISTANT SUBSTANCES

Franz Kettenbauer, Römerweg 16, D-7886 Murg/Baden, Fed. Rep. of Germany
Filed Dec. 16, 1988, Ser. No. 285,512
Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824615
Int. Cl.⁵ F27B *9/28*

U.S. Cl. 432—59 13 Claims



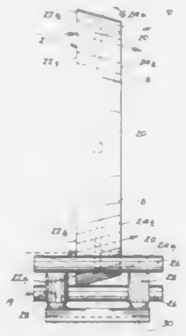
1. A device for thermally processing a material containing thermally degradable or alterable and thermally resistant materials to provide a mineral substance essentially free of organic contaminants, comprising:
- a closed furnace chamber internally encompassing at least a preheating zone and a baking zone;
- endless sintering belt structure within said chamber passing through said zones;
- a feed device for feeding unprocessed material into said furnace chamber and onto said belt structure;
- said sintering belt structure transferring said material through said preheating zone for predrying said material in the presence of a reduced quantity of oxygen and
- thereinafter through said baking zone wherein said material is baked in the presence of an increased quantity of oxygen and an indirect hot gas supply;
- a removal device for conveying processed material from said furnace chamber;
- a waste gas line for conveying waste gas from said furnace chamber;

- a plurality of bottom burners disposed below and along the length of said sintering belt structure;
- and a plurality of top burners arranged above said sintering belt structure;
- each said bottom burner comprising a combustion chamber and one or more burner nozzles;
- each said bottom burner in said baking zone comprising at least two burner nozzles protruding from said combustion chamber, said bottom burner nozzles being directed at an acute angle to said sintering belt structure for indirectly heating said material from below said sintering belt structure so as to ensure that hot gases are not expelled from said bottom burner directly onto material on said sintering belt structure;
- each said top burner being adapted to direct an additional stream of hot gases directly onto said material on the sintering belt structure in the baking zone and comprising a combustion chamber and a burner nozzle extending from said combustion chamber in orientation perpendicularly to said sintering belt structure, said top burner nozzles being located further from material on said sintering belt structure than said bottom burner nozzles supplying the hot gases from below said sintering belt structure.

5,024,599
SEMICONDUCTOR PROCESSING APPARATUS FOR CREATING BACK PRESSURE WITHIN A QUARTZ FURNACE TUBE

Navjot Chhabra, Boise, Id., assignor to Micron Technology, Inc., Boise, Id.
Filed Apr. 24, 1990, Ser. No. 513,557
Int. Cl.⁵ F24J *3/00*

U.S. Cl. 432—226 9 Claims



1. A semiconductor processing furnace flow restricting apparatus for insertion into a longitudinally elongated semiconductor wafer processing furnace to create back pressure and minimize streamlining flow of gas longitudinally along internal walls of the furnace to increase residence time of processing gases within the furnace, the apparatus comprising:
- at least two ring-like members, one of the ring-like members being mounted inside the other, the ring-like members each having a fore longitudinal end and an aft longitudinal end, at least one of the ring-like members having a varying diameter which tapers inwardly between the fore longitudinal end and the aft longitudinal end to create back pressure and restrict gas flow longitudinally through the furnace; and
- means for laterally supporting the two ring-like members within a longitudinally elongated semiconductor wafer processing furnace.

5,024,600
PERIODONTAL SCALER-LIKE MEDICINAL FLUID APPLICATOR

Joseph M. Kline, 3501 N. Valley St., Arlington, Va. 22207
Filed Jan. 26, 1990, Ser. No. 470,791
Int. Cl.⁵ A61C *1/10*

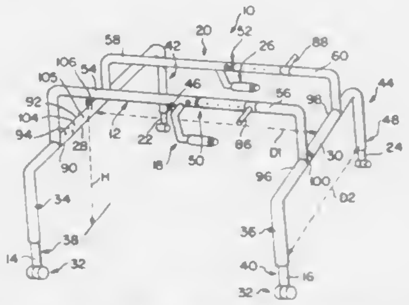
U.S. Cl. 433—82 22 Claims

19. A periodontal implement for applying a medicinal fluid to the tissue in a patient's mouth adjacent teeth to be treated comprising, a handle having at least one blade extending therefrom, a shank for connecting said blade to said handle, a fluid passageway within said handle, said fluid passageway extending within said shank, an opening in said shank which communicates with said fluid passageway, said opening being oriented so as to discharge fluid to said blade, said blade having opposite edge portions, and a plurality of grooves formed in said edge portions of said blade.

5,024,601
SUPPORT DEVICE FOR SUPPORTING A SKATER

Henry E. Barker, 1741 Porter Ave., Beloit, Wis. 53511
Continuation-in-part of Ser. No. 368,282, Jun. 19, 1989, abandoned. This application Feb. 28, 1990, Ser. No. 486,149
Int. Cl.⁵ G09B *19/00*

U.S. Cl. 434—255 6 Claims



1. A support device for supporting a skater, said device comprising:
- a first extensible frame of inverted U-shaped configuration, said first frame having a first and a second end;
- a first handle rigidly secured to said first frame between said first and second end for supporting the skater;
- a second extensible frame of inverted U-shaped configuration, said second frame being spaced and parallel relative to said first frame, said second frame having a first and a second extremity;

VOL
1127
ISS
3
JE
18
1991
UMI

a second handle rigidly secured to said second frame between said first and second extremities for supporting the skater such that in use of the device, the skater is disposed between the handles;

first and second laterally extensible supports extending between said first and second frames such that, in use of the device, the skater is disposed between said supports, the arrangement being such that adjustment of a first distance between said supports and a second distance between said frames is permitted so that the device provides adjustable support according to the size and skating ability of the skater;

caster means secured to said ends and said extremities for permitting the skater to develop balance and to practice skating techniques while the skater is supported by said handles;

said first handle including:

a hand grip disposed substantially horizontally;

a portion rigidly secured to said first frame and extending generally outwardly and then downwards relative to the skater such that said portion is disposed between said first frame and said hand grip;

said second handle including:

a further hand grip disposed substantially horizontally;

a further portion rigidly secured to said second frame and extending generally outwardly and then downwards relative to the skater such that said further portion is disposed between said second frame and said further hand grip, the arrangement being such that in use of the device, when the skater grips the respective handles, the wrists of the skater are braced and supported by said portion and further portion respectively so that the control and balance of the skater is enhanced;

said support device further including:

an auxiliary handle secured to said first frame and axially spaced relative to said first handle; and

a further auxiliary handle secured to said second frame and axially spaced relative to said second handle, the arrangement being such that in use of the device by a more experienced skater, the skater grips the respective auxiliary handles while said first and second handles support the upper arms of the skater.

5,024,602

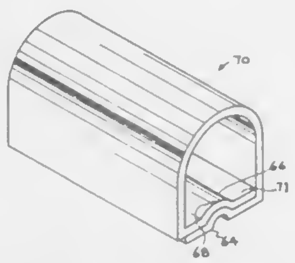
ELECTRICAL GROUNDING PRONG SOCKET

Robert Leong, Dublin, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Continuation-in-part of Ser. No. 406,005, Sep. 12, 1989, abandoned. This application May 31, 1990, Ser. No. 531,437

Int. Cl.^{5} H01R *13/11*

U.S. Cl. 439—107 **4 Claims**



1 A tubular socket for holding tubular and U-shaped grounding prongs, comprising:

a top wall of the tubular socket made of a conducting material;

a first side wall of the tubular socket made of a conducting material and joined to the top wall;

a second side wall of the tubular socket made of a conducting material and joined to the top wall;

a bottom wall of the tubular socket wherein a first side of the bottom wall is electrically connected to the first side wall and a second side of the bottom wall is electrically connected to the second side wall, said bottom wall further comprising a first foot point, wherein the first foot point is located a first vertical distance below the top wall and a first horizontal distance from the center of the top wall on a first side of the center of the top wall, a second foot point, wherein the second foot point is located a second vertical distance below the center of the top wall and a second horizontal distance from the center of the top wall on a second side of the center of the top wall, wherein the first vertical distance is substantially equal to the second vertical distance and the first horizontal distance is substantially equal to the second horizontal distance, and a first ridge with a first ridge top, wherein part of the ridge is horizontally located between the first and second foot points and the first ridge top is vertically located between the first foot point and the top wall, sot hat the vertical distance between the first ridge top and the top wall is less than the first vertical distance, and wherein the first side of the bottom wall overlaps with the second side of the bottom wall, wherein the ridge is formed where the first side of the bottom half overlaps with the second side of the bottom half so that the ridge is formed in both the first side of the bottom half and the second side of the bottom half.

5,024,603

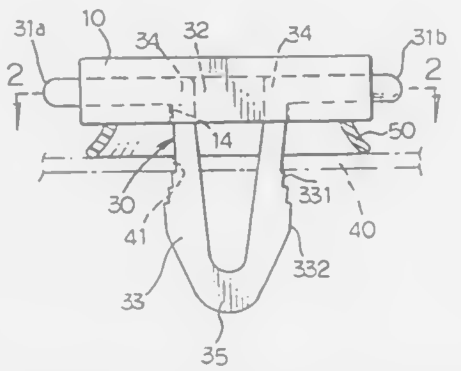
PROTECTION DEVICE FOR USE ON ELECTRICITY SOCKET

Shi-Nan Hsieh, P.O. Box 10780, Taipei, Taiwan

Filed Aug. 17, 1990, Ser. No. 568,896

Int. Cl.^{5} H01R *13/44*

U.S. Cl. 439—148 **2 Claims**



1. A protection device for use on an electricity socket comprising:

a case which has two side holes provided at two opposite sides of said case, a third hole provided at a third side of the case, and a pair of holes provided at the bottom of said case for a plugging element to stick through;

a plugging element having a pair of elastic set legs extending downwardly through said pair of holes at the bottom of said case; said set legs each comprises a pair of bases extending horizontally to project out from said side holes of said case to serve as pressing ends, and each set leg has zigzag edge at its outward side to be stuck against the inside wall of a socket; meanwhile the width of said set legs is generally greater than the length of the socket holes;

a locking element provided in said case having at one end a pair of symmetric claws for keeping said locking element constantly in place and at the other end a pressing end projecting out through said third hole of said case; said locking element further comprises a neck, a first shoulder, a waist, and a second shoulder arranged orderly between said pressing end and said pair of claws wherein the widths of said neck and said waist must be lesser than that of said shoulders;

said base of each set leg not being connected directly so as to form a preparing area and extending downwardly by enlarging gradually to form a protrudent part which enables the width of said set leg at this part to be generally greater than the length of the socket holes; said first and second shoulders are generally kept in said preparing area so as to stop said set legs from being pressed to shorten its width easily.

5,024,604

NO-LOAD BREAKABLE ELECTRICAL CONTACT ESPECIALLY FOR CONNECTED APPLIANCES OR VEHICLES

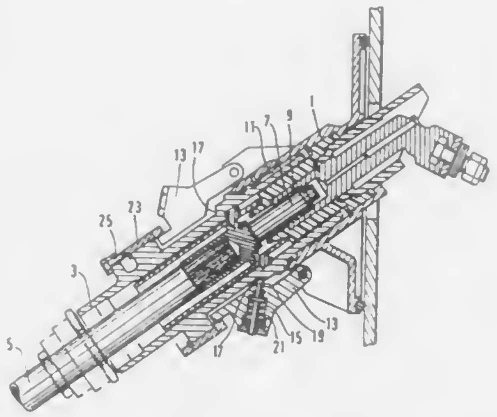
Antoine Savin, Paris, and Jacques Salaun, Le Mans, both of France, assignors to Carrier Kheops Bac., Nanterre Cedex, France

Filed Nov. 22, 1989, Ser. No. 440,226

Claims priority, application France, Nov. 25, 1988, 88 15453

Int. Cl.^{5} H01R *13/627*

U.S. Cl. 439—345 **4 Claims**



1. Electrical contact for electrically connecting at least two coupled appliances or vehicles; comprising a first electrical contact part and a second part located adjacent said electrical contact part and forming reversible mechanical junction means for the electrical contact, said mechanical junction means being configured so as not to affect the integrity of the electrical contact part during extraction or contact-breaking, said mechanical junction means including external engagement elements independently of the electrical contact part, said engagement elements including at least two articulated arms secured to the periphery of the electrical contact part diametrically opposite each other, said arms having spring pushers connected thereto for engaging elastically during the closing of the contact onto a retention profile on the body of a movable contact portion of said electrical contact part upon the arms being locked during operation and positioned along the body of a fixed contact portion of said electrical contact part, said spring pushers being calibrated to a specific force in order to allow the safety release of the said movable portion of the electrical contact part responsive to a specified separating force, whereby the junction is makeable manually under no voltage and breakable under no voltage in response to said separating force.

5,024,605

CONNECTING ELECTRODE

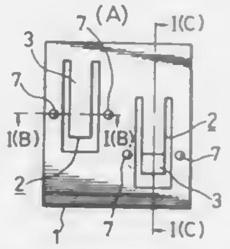
Yasushi Kasatani, and Toru Tachikawa, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jul. 13, 1990, Ser. No. 552,139

Claims priority, application Japan, Aug. 18, 1989, 1-213569

Int. Cl.^{5} H01R *3/00*

U.S. Cl. 439—500 **3 Claims**



1. A connecting electrode comprising:

an electrode substrate;

a contact extending from said substrate having a button-hook-shaped section and a convex surface, said convex surface of said contact projecting from said electrode substrate for depression by a battery; and

a projection limiting the amount of deformation of said contact by a battery, said projection projecting from the same side of the substrate as and beside said convex surface for engaging a battery urged against said battery contact.

5,024,606

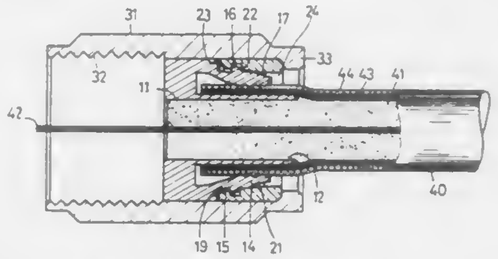
COAXIAL CABLE CONNECTOR

Yeh Ming-Hwa, No. 2, Lane 8, Hsin An Rd., Shih Lin District, Taipei, Taiwan

Filed Nov. 28, 1989, Ser. No. 442,129

Int. Cl.^{5} H01R *17/18*

U.S. Cl. 439—578 **5 Claims**



1. A coaxial cable connector, comprising:

a male clamping tube having a central hole and a rear projecting pipe, said male clamping tube having an inner diameter slightly larger than the outer diameter of an insulating portion of a concentric cable, and a rear clamping portion having several circularly arranged clamp sections extending rearward, the front ends of said clamp plates being formed with an annular groove so that said clamping section can be deformed and inwardly deflected; an annular projecting shoulder inwardly and rearwardly inclined, formed on said clamping sections, the rear ends of said clamp sections having an inwardly and rearwardly inclined face, the inner walls of said clamp plates being formed with a saw tooth portion;

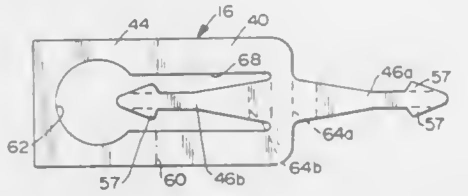
a female clamping tube having a rearwardly tapered interior surface and an annular groove; and

a screw threaded tube housing having threads formed on an inner wall of the front end, said screw threaded tube housing receiving and enclosing said male and female clamping tubes, an inward extending flange being formed at rear end of said screw threaded tube, said flange having an inner diameter smaller than outer diameters of said

VOL
1127
ISS
3
JE
18
1991
UMI

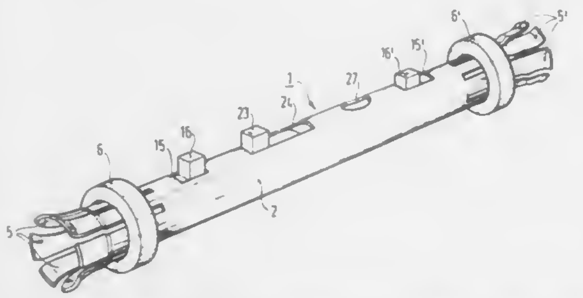
male and female clamping tube but larger than outer diameter of a coaxial cable, whereby when assembled, said screw thread tube and female clamping tube and male clamping tube are sequentially fitted over said coaxial cable with said insulating portion inserted into said projecting pipe and an axial wire of said coaxial cable protruding beyond front end of said male clamping tube, said female clamping tube engaging said clamping portion of said male clamping tube to press said clamping section until said annular projection engages said annular groove of said female clamping tube locking said male and female clamping tubes on said coaxial cable.

5,024,607
GROUNDING ELECTRICAL CONNECTOR
Jerry D. Kachlic, Clementi Park, Singapore, assignor to Molex Incorporated, Lisle, Ill.
Filed Jun. 14, 1990, Ser. No. 537,735
Int. Cl.^{5} H01R *13/73*
U.S. Cl. 439—567 **11 Claims**



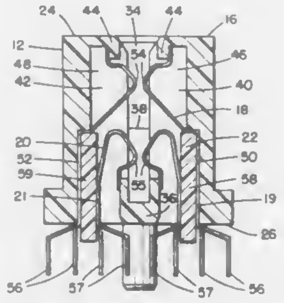
1. An electrical connector for mounting to a substrate such as a printed circuit board, comprising:
- an insulating housing having a peripheral flange defining a front face;
- a conductive shield positionable against the front face of the housing; and
- a conductive board lock member positionable on the housing for commoning the conductive shield to a ground trace on the printed circuit board, the board lock member including a body portion and a pair of legs positionable through a locking hole in the printed circuit board, one of the legs being bent form an edge of the body portion, and the other leg being bent out of an opening from another edge of said body portion defining said opening.

5,024,608
CONNECTION DEVICE FOR A COAXIAL CABLE AND A CORRESPONDING CONNECTION MODULE, IN PARTICULAR A JUNCTION BLOCK
Jean-Paul Heng, Lyons, and André Marmonier, Bron, both of France, assignors to Societe Anonyme dite: CEGELEC, Levallois-Perret, France
Filed Jan. 30, 1990, Ser. No. 472,542
Claims priority, application Japan, Jan. 30, 1989, 8901118
Int. Cl.^{5} H01R *9/05*
U.S. Cl. 439—578 **9 Claims**



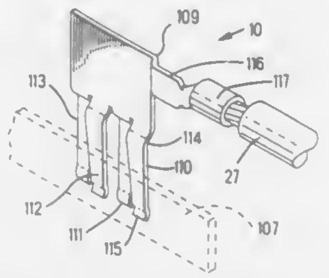
1. A connection device comprising at least one electrically conductive link tube (2) having at least one "connection" end arranged to receive one end of a coaxial cable (3) whose peripheral conductor (4) is stripped of its covering in order to be capable of being electrically connected to the tube into which it penetrates, said tube containing a conducting link part (10) on its axis, which part is fixed to the tube and is electrically insulated therefrom, and is shaped to be capable of axially receiving and holding the stripped end of the central conductor (9) of the cable, the said device being characterized in that it includes locking and electrical connection means for the peripheral conductor of a coaxial cable, said means being constituted by resilient peripheral tongues (5) provided at the connection end of the tube and alternating between being splayed apart and being close together depending on the position given to a first ring (6) sliding relative to the tube, and also includes looking and electrical connection means for the central conductor of the above-mentioned cable, said means being constituted by a connection head (12) of the clamping cone type provided with resiliently mounted jaws at the end of the link part, which jaws alternating between being splayed apart and being close together depending on the position given to a second ring (14) sliding on the link part, inside the tube, under the action of a pushbutton (16) projecting outside the tube through a longitudinal opening (15) therein.

5,024,609
HIGH-DENSITY BI-LEVEL CARD EDGE CONNECTOR AND METHOD OF MAKING THE SAME
Heinz Piorunneck, Trumbull, Conn., assignor to Burndy Corporation, Norwalk, Conn.
Filed Apr. 4, 1990, Ser. No. 504,762
Int. Cl.^{5} H01R *13/00*
U.S. Cl. 439—637 **24 Claims**



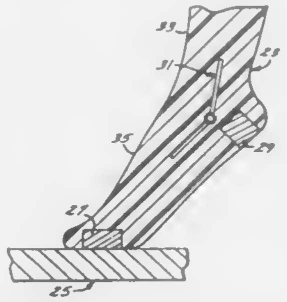
1. An electrical connector for mechanically and electrically connecting a mother printed circuit board and a removable daughter printed circuit board of the edge card type, the connector comprising:
- a first housing being comprised of an electrically insulating material and having a top surface with a slot for receiving a portion of a daughter printed circuit board and at least two rows of contact chambers on opposite sides of said slot;
- a plurality of a first type of electrically conductive contacts positioned in at least some of said contact chambers, said first type of contacts having a relatively tall height in said contact chambers;
- a plurality of a second type of electrically conductive contacts positioned in at least some of the same contact chambers as said first type of contacts, said second type of contacts having a relatively short height in said contact chambers and being spaced from said first type of contacts; and
- a contact separator stationarily connected to said housing and located, at least partially, inside said contact chambers between portions of said first and second types of contacts located in said same contact chambers.

5,024,610
LOW PROFILE SPRING CONTACT WITH PROTECTIVE GUARD MEANS
Jay L. French, Middletown; John L. Himes, Jr., Hummelstown; Ronald M. Weber, Lebanon, and James H. Wise, Palmyra, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.
Filed Aug. 16, 1989, Ser. No. 394,602
Int. Cl.^{5} H01R *13/00*
U.S. Cl. 439—857 **7 Claims**



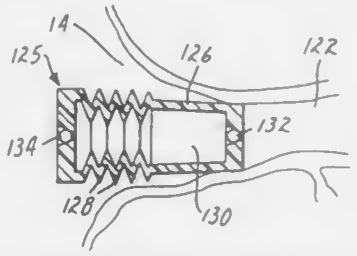
1. A contact for releasably engaging a conductor, combined with guard means for protecting said contact and said conductor against accidental touch by a human hand, said contact and said protective means comprising, in combination:
- an elongated contact body of resilient conductive material;
- a plurality of contact fingers formed integrally with said contact body, said fingers being spaced apart along an edge of said contact body and projecting in parallel from said edge of said body;
- a first insulating housing,
- said first housing enclosing said contact body with at least portions of each of said contact fingers extending through said first housing to the exterior thereof, said extending portions of said fingers being adapted to engage said conductor;
- an insulating silo for enclosing said portions of said contact fingers extending to the exterior of said first housing,
- said silo being formed in first and second sections,
- one of said sections being positioned above said contact fingers and extending laterally across said plurality of fingers,
- the other of said sections being positioned below said contact fingers and extending laterally across said plurality of fingers,
- both of said sections extending longitudinally coextensively with said portions of said contact fingers extending to the exterior of said first housing,
- both of said sections being corrugated in form and having channels open to the interior of said sections extending longitudinally over alternate ones of said contact fingers,
- said channels of said second section extending over those alternate ones of said fingers which are interspersed between those alternate ones of said fingers which are covered by said channels of said first section,
- the interior and exterior walls of said first and second sections extending substantially colinearly with one another so that the exterior surface of said silo is corrugated in form similar to the outline of the space enclosed by the interior walls of said first and second sections;
- a second insulating housing,
- said second housing enclosing said conductor to be engaged by said contact fingers;
- an opening in said second housing aligned with said conductor enclosed by said second housing,
- said opening having an outline which is complimentary to and congruent with the peripheral outline of the exterior of said silo so that said silo will fit closely within said opening,
- whereby said silo and said portions of said contact fingers enclosed thereby may be inserted through said opening with said conductor extending between said first and second sections of said silo and being engaged by said contact fingers.

5,024,611
POSEABLE DOLL MAGNETICALLY SECURED TO ITS STAND
Douglas W. Eckerle, 1310 N. Daisy, Escondido, Calif. 92027, and Frank P. Sainburg, P.O. Box 11133, Bakersfield, Calif. 93389
Filed Jul. 14, 1989, Ser. No. 380,151
Int. Cl.^{5} A63H *3/00, 33/26, 3/46;* **A43B** *13/14*
U.S. Cl. 446—268 **5 Claims**



1. Doll support apparatus comprising:
- a ferromagnetic platform formed with an upwardly facing support surface;
- a doll configured to stand in an erect position and including at least one leg including a foot device, including a foot portion having a heel section and forwardly projecting forefoot section, each section defining respective downward facing sole surfaces, said foot device including hinge means having sufficient flexibility to accommodate flexing of said foot portion between first and second positions, said foot device including magnetic inserts mounted in said forefoot and heel sections, respectively, and arranged to, when said hinge means is flexed to position said foot portion in said first position, dispose said forefoot magnetic insert in close proximity to said support surface to cooperate therewith to maintain said doll in an erect position and to, when said hinge mean is flexed to position said foot portion in said second position, dispose said heel magnetic insert in close proximity to said support surface to cooperate therewith to maintain said doll in an erect position.

5,024,612
EXTERNAL EAR CANAL PRESSURE REGULATING DEVICE AND TINNITUS SUPPRESSION DEVICE
Christopher van den Honert, Maplewood, and Paul H. Stypulkowski, North Oaks, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Continuation-in-part of Ser. No. 286,744, Dec. 19, 1988. This application May 30, 1989, Ser. No. 359,025
Int. Cl.^{5} A61F *11/00*
U.S. Cl. 604—36 **23 Claims**



1. A tinnitus suppression device adapted to be utilized in

VOL
1127
ISS
3
JE
18
1991
UMI

conjunction with a person having an auditory system with an external ear canal, said tinnitus suppression device comprising:

a body, sized and shaped for insertion into said external ear canal of said person, said body having an orifice allowing for the communication of fluids in and out of said external ear canal;

sealing means coupled to said body for sealing said external ear canal from ambient; and

pressure means incorporated within said body and operably coupled to said orifice of said body for creating a selected negative pressure, with respect to ambient, to be chronically applied to said external ear canal with said device in place;

whereby said tinnitus suppression device creates said selected negative pressure within said external ear canal suppressing said tinnitus.

5,024,613

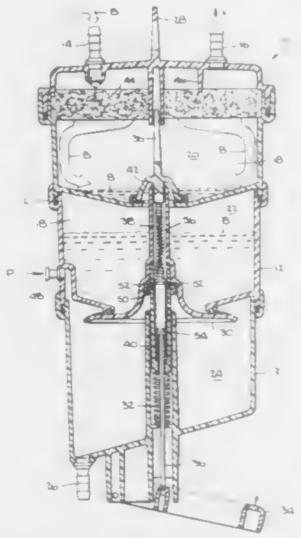
BLOOD RECOVERY SYSTEM AND METHOD

Alfred V. Vasconcellos, Edison, N.J., and Preston J. Keeler, III, Setauket, N.Y., assignors to Pfizer Hospital Products Group, Inc., New York, N.Y.

Division of Ser. No. 220,193, Jul. 18, 1988, Pat. No. 4,923,438. This application Apr. 27, 1990, Ser. No. 515,397

Int. Cl.^{5} A61M *37/00*

U.S. Cl. 604—4 16 Claims



1. An autologous blood collection method comprising the steps of

a) establishing a connection between a patient and an inlet of a housing including a collection chamber having a plurality of compartments, said inlet being in fluid flow communication with said collection chamber;

b) providing fluid flow communication between a first of said compartments and a second of said compartments;

c) creating a first fluid seal between said second compartment and a third of said compartments;

d) establishing a negative pressure in said first and said second compartments, with said negative pressure being sufficient for conveying and maintaining a flow of blood from said patient into said collection chamber;

e) establishing a positive pressure in said third compartment;

f) introducing said blood into said first compartment for passage therethrough and collection in said second compartment;

g) creating a second fluid seal between said first and said second compartments while maintaining said first fluid seal and collecting blood in said first compartment;

h) releasing said first fluid seal and providing fluid flow communication between said second and said third compartments, passing into said third compartment blood collected in said second compartment; and

i) establishing a connection between said patient and an outlet in said collection chamber for conveying and reinfusing the blood into said patient.

5,024,614

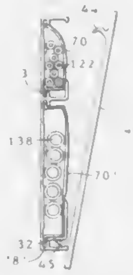
SURFACE ACCESSIBLE WIRING SYSTEM AND ASSEMBLY

Frank P. Dola; Steven Feldman; John H. Lauterbach, all of Hudson, and William G. Mengelson, Clearwater, all of Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 249,539, Sep. 26, 1988, abandoned. This application May 16, 1989, Ser. No. 352,792

Int. Cl.^{5} H01R *25/16*

U.S. Cl. 439—114 33 Claims



1. An enclosure comprising a channel of a given axial length having a transverse base with upstanding sides extending along said given length and terminated by lips directly inwardly parallel to said base, each lip including a rounded surface of a given radius, a further mating element adapted to be snap-fitted to said channel to form said enclosure, said mating element including an interior surface at each side thereof and there adjacent a pair of stiff projections, one for each side extending along the length thereof with each projection including a concave surface of a radius adapted to receive in mating engagement the said rounded surface of each lip, said further element being loaded in compression and said upstanding sides of said mating element being loaded in bending when the further element is mated with the upstanding sides of the transverse base, the length of said upstanding sides being substantially less than the height of said mating element so that the upstanding sides remain relatively inflexible, so that said further element is tightly secured to the base said further mating element being snap fittable between said upstanding sides by hand applied pressure and said further element being removable only upon the application of a force applied by a tool having a lever arm, wherein there is provided means allowing said further element to be positioned loosely attached to said channel at one side thereof permitting inspection of the interior of said channel prior to said further element being snapped into closing position on said enclosure.

5,024,615

SURGICAL ASPIRATION DEVICE

Udo P. Büchel, Billdal, Sweden, assignor to Astra Meditec Aktiebocag, Molndal, Sweden

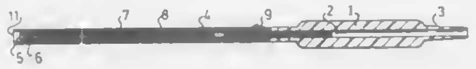
PCT No. PCT/SE81/00341, § 371 Date Jul. 19, 1982, § 102(e) Date Jul. 19, 1982, PCT Pub. No. WO82/01824, PCT Pub. Date Jun. 10, 1982

Continuation of Ser. No. 185,244, Apr. 19, 1988, abandoned, which is a continuation of Ser. No. 943,847, Dec. 24, 1986, abandoned, which is a continuation of Ser. No. 649,971, Sep. 12, 1984, abandoned, which is a continuation of Ser. No. 403,642, Jul. 19, 1982, abandoned. This PCT application Nov. 24, 1981, Ser. No. 456,045

Claims priority, application Sweden, Dec. 4, 1980, 8008525

Int. Cl.^{5} A61M *1/00*

U.S. Cl. 604—119 4 Claims



1. A surgical aspiration device comprising a tubular handle having a first end with an outlet for connection with a vacuum source and a second end, the second end being connected to a projecting point aspirator tube and supporting the aspirator tube for connection to the vacuum source, the aspirator tube being connected at a proximal terminus thereof to the handle and having a distal terminus open for point aspiration, an air supply tube extending along the aspirator tube, the air supply tube being in fluid communication with the aspirator tube through an interconnecting opening near the distal terminus of the aspirator tube, an inlet opening to atmosphere in the air supply tube near said handle, the air supply tube being imperforate throughout its extent except for the inlet opening so that ambient air can enter it only through the inlet opening, said inlet opening in the air supply tube being located to facilitate hand control and stoppage of the flow of air therethrough by a finger of the user during use of the aspirator device, whereby aspiration at a point is controlled by the user variably and selectively opening and closing the inlet opening to vary and stop selectively the air flow through the air supply tube to the aspirator tube via the interconnecting opening and thereby controllably vary the vacuum at the open distal terminus of the aspirator tube where point aspiration occurs.

5,024,616

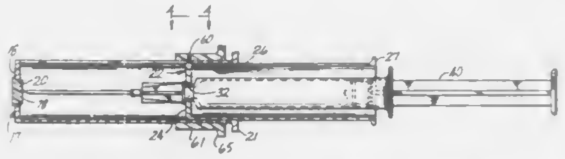
DISPOSABLE SHEATH FOR HYPODERMIC CANNULA USED WITH A SYRINGE

George Braddock Ogle, II, Alta Loma, Calif., assignor to International Medication Systems, Limited, South El Monte, Calif.

Filed Nov. 15, 1988, Ser. No. 271,749

Int. Cl.^{5} A61M *5/32*

U.S. Cl. 604—192 14 Claims



1. A protective device for a removable cannula used with a hypodermic syringe, the device comprising:

an elongated sheath open at a first end and having a longitudinally extending slot;

a hypodermic syringe barrel disposed within the sheath and having a plunger with a first end extending from a first end of the barrel and from the open end of the sheath;

a fitting at a second end of the barrel, the barrel fitting having an opening extending through it to communicate with the barrel interior;

an elongated hypodermic cannula having a longitudinal opening extending through it;

a fitting on the cannula, the fitting being constructed and arranged to mate with the barrel fitting and hold the cannula so the cannula opening communicates with the barrel interior through the opening in the barrel fitting;

a piston having a central opening and disposed in the sheath to be sandwiched between the two fittings and to be longitudinally slidable with the barrel, fittings, and cannula relative to the sheath between an extended position and a retracted position, the sheath being sufficiently long so that, when the piston is in the retracted position, the scarf end of the cannula is safely enclosed within the sheath; and

a pin secured to the piston and extending laterally into the slot.

5,024,617

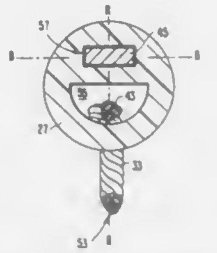
SPHINCTEROTOMY METHOD AND DEVICE HAVING CONTROLLED BENDING AND ORIENTATION

John Karpiel, Winston-Salem, N.C., assignor to Wilson-Cook Medical, Inc., Winston-Salem, N.C.

Filed Mar. 3, 1989, Ser. No. 318,724

Int. Cl.^{5} A61B *17/36*

U.S. Cl. 606—47 13 Claims



1. A medical sphincterotome, comprising:

an elongated multi-lumen tubular member having a proximal end and a distal end and being sized to be received in an endoscopic lumen;

a cutter having a cutting edge located along said distal end of said tubular member and oriented generally longitudinally with respect to said tubular member, wherein said cutting edge is movable in a cutting plane to cut a patient's sphincter, said cutter being connected to a conductor disposed in a first longitudinal lumen in said tubular member;

a second longitudinal lumen along the length of said tubular member for receiving reinforcing means; and

reinforcing means disposed in said second longitudinal lumen for resisting movement of said cutting edge out of said cutting plane, said reinforcing means having a first cross-sectional moment of inertia with respect to a bending axis normal to said cutting plane, said reinforcing means further having a second cross-sectional moment of inertia with respect to a resisting axis lying along said cutting plane and generally perpendicular to said tubular member, wherein said second moment of inertia is greater than said first moment of inertia along said distal end to resist bending out of said cutting plane to provided controlled cutting of the patient's sphincter along said cutting plane.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,618

EXTERNAL FIXATION DEVICE

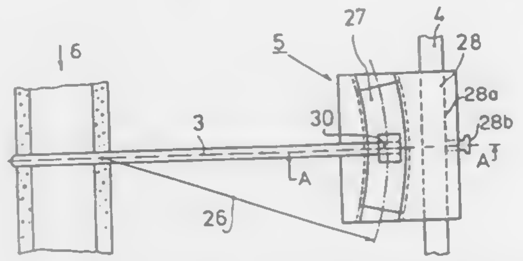
Slobodan Tepic, Davos, Switzerland, assignor to Synthes U.S.A., Paoli, Pa.

Continuation of Ser. No. 184,802, Apr. 22, 1988, abandoned. This application Jan. 18, 1990, Ser. No. 465,575

Claims priority, application PCT Int'l Appl. Apr. 30, 1987, PCT/EP87/00235

Int. Cl.^{5} A61F *5/04*

U.S. Cl. 606—53 16 Claims



1. A clamp for connecting a support rod to a bone pin in the external fixation of fractured bones, said clamp comprising a first section, means for fixing said first section to a support rod, a second section, connecting means for connecting said second section to said first section, a single bone pin having a longitudinal axis, said bone pin being positioned in said second section, said connecting means constraining movement of said second section relative to said first section to an arcuate path which is symmetrical relative to said first section.

5,024,619

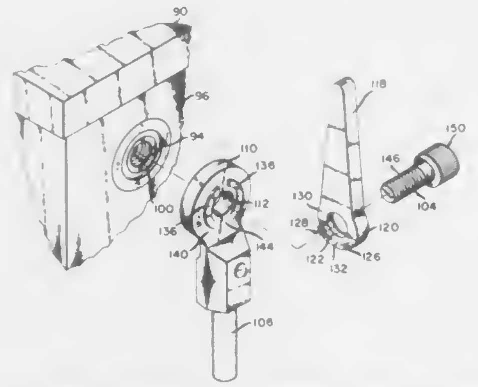
TERMINAL CONNECTOR ASSEMBLY

Damian F. Caraballo, 1250 Chorus Way, Royal Palm Beach, Fla. 33411

Continuation-in-part of Ser. No. 394,128, Aug. 15, 1989, Pat. No. 4,964,819. This application Oct. 22, 1990, Ser. No. 601,446

Int. Cl.^{5} H01R *13/631*

U.S. Cl. 439—755 8 Claims



1. A tool-free assembly for connecting battery cable terminals to batteries having side post terminals with female fittings, comprising:

a male connector member adapted for engagement to said female battery terminal fitting;

a lever member having substantially at one end thereof an aperture dimensioned to permit the passage of a portion of said male connector member, said lever member having a first inclined surface;

a battery cable terminal having an aperture dimensioned to permit the passage of a portion of said male connector member, and having a second inclined surface;

said male connector member being positionable through said apertures of said lever member and said battery cable terminal, and connectable to said female fitting of said battery terminal, to secure said battery cable terminal and said lever member in an abutting relation adjacent to said battery terminal with said inclined surfaces being substantially juxtaposed and angularly offset from one another, whereby rotation of said lever member relative to said battery cable terminal will cause sliding contact between said inclined surfaces and will move said battery cable terminal against said battery terminal.

5,024,620

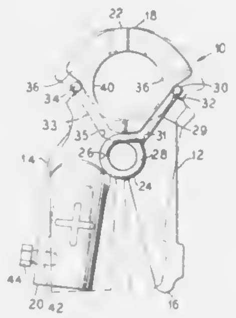
BATTERY TERMINAL POST CLAMP

Joseph Bell, 52 Pluto Cir., N. Fort Myers, Fla. 33903

Filed Jun. 11, 1990, Ser. No. 535,597

Int. Cl.^{5} H01R *4/48*

U.S. Cl. 439—759 3 Claims



1. A battery cable connector comprising:

first and second arcuate jaws each comprising a periphery, first and second side faces, a first recess extending between said first and second side faces facing the like first recess to form a generally cylindrical first bore for receiving a battery terminal post, a second recess spaced from said first recess and each extending between said first and second side faces and facing the like second recess to form a generally cylindrical second bore, a third recess in said periphery extending between said first and second side faces, and a groove in said first side face extending from said second recess to said third recess;

a pair of operating arms, each of said operating arms connected to a respective arcuate jaw, said operating arms extending divergently from said first and second arcuate jaws;

a spring including a spring coil mounted in said second cylindrical bore and a pair of spaced apart spring arms connected to said spring coil and located in respective ones of said grooves, each of said spring arms including a distal end portion extending at approximately a right angle thereto and located in and extending along and providing even forces along the length of the respective third recess;

said spring mounted to normally urge said jaws towards one another, and second operating arms movable towards one another against the force of said spring to open said jaws;

connection means on one of said operating arms for connecting a battery cable thereto; and

alignment aiding means including a first distal end on said first arcuate jaw, a second distal end on said second arcuate jaw, a tapered projection extending from said first distal end towards said second distal end, and recess means defining a tapered recess in said second distal end receiving and maintaining said tapered projection therein to aid in maintaining alignment of said jaws.

5,024,621

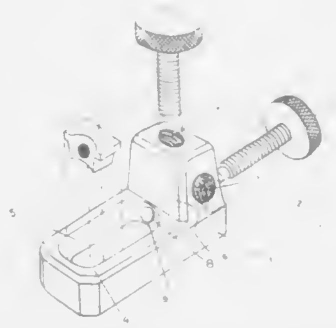
SINGLE BLOCK FOR FIXING ELECTROCONDUCTOR CABLES TO VEHICLE BATTERY TERMINALS

Francisco R. E. Mata, Avenida "F" con Avenida "D", El Pinar El Paraiso, Caracas, Venezuela

Filed Mar. 1, 1990, Ser. No. 486,762

Int. Cl.^{5} H01R *4/30*

U.S. Cl. 439—771 2 Claims



1. A single block piece for fixing electroconductor cables to vehicle battery terminals, comprising: an essentially hollow configuration formed in said single piece, said hollow configuration forming an essentially ellipsoidal shape for receiving a battery terminal; a front end portion of said single block piece extending upwardly defining an expanded region having a substantially hollow cross-section, said front end portion of said single block piece having a lower region defining a first hole with an inner threaded surface; a screw threadably inserted into said first hole; a circular plate positioned in said hollow region for sliding in said hollow region, said circular plate being fixable to said screw, movement of said screw in a direction toward said hollow region acting to urge said circular plate into engagement with a battery terminal, said expanded region having an upper end with a second threaded hole; a screw threadably positioned in said second threaded hole, said screw acting to exert pressure on a cable positioned in the hollow region of said expanded portion of said front end of said single piece.

5,024,622

DETACHABLE PROBE-TYPE ELECTRONIC CLINICAL THERMOMETER

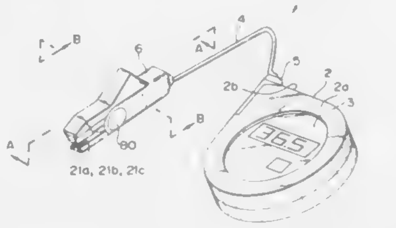
Tetsuya Ide, Fuji, Japan, assignor to Terumo Kabushiki Kaisha, Tokyn, Japan

Filed Jun. 6, 1989, Ser. No. 362,022

Claims priority, application Japan, Jun. 9, 1988, 63-140519

Int. Cl.^{5} H01R *7/06*

U.S. Cl. 439—829 6 Claims



1. A detachable probe-type electronic clinical thermometer comprising:

a temperature measuring probe equipped with at least a first connector; and

a clinical thermometer main body equipped with a cord to a distal end of which is attached a second, clip-type connector adapted for being connected with said first connector;

said first and second connectors each having a plurality of corresponding electrical contacts;

said plurality of electrical contacts of said second connector each comprising a spring body through which passes an electrical signal from said probe;

each of said plurality of spring bodies independently and directly engaging, due to a spring urging force thereof, the corresponding electrical contact of said first connector when the plurality of contacts of said first and second connectors are electrically connected to each other.

5,024,623

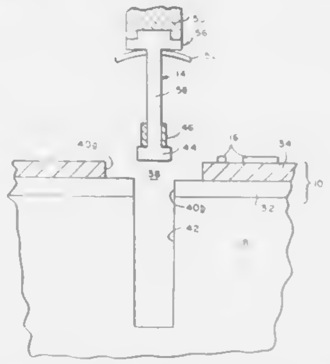
ELECTRICAL CIRCUIT BOARD MOUNTING METHOD

Ralph E. Bauman, Lancaster, and Horace W. Seymour, III, Landisville, both of Pa., assignors to Sanders Associates, Inc., Nashua, N.H.

Division of Ser. No. 391,681, Aug. 11, 1989, which is a continuation of Ser. No. 16,145, Feb. 18, 1987, abandoned. This application Jun. 27, 1990, Ser. No. 544,860

Int. Cl.^{5} H01R *4/02*

U.S. Cl. 439—876 4 Claims



1. An electrical circuit board assembly comprising.

A. an electrical circuit board having a mounting hole extending therethrough;

B. an electrical housing having a mounting bore therein; and

C. a pin having a pin shaft extending through said mounting hole into said mounting bore and secured by solidified solder in said mounting bore, said pin having a pin head and a leaf washer, said pin head having a greater diameter than said pin shaft, said leaf washer disposed between said pin head and said electrical circuit board and engaging the surface of the electrical circuit board to secure said electrical circuit board to said electrical housing.

5,024,624

Patent Not Issued For This Number

5,024,625

TOP AND PROPELLING ELEMENT

Patrick MacCarthy, 5263 Arbutus St., Arvada, Colo. 80002

Filed Aug. 9, 1988, Ser. No. 230,090

Int. Cl.^{5} A63H *1/02*

U.S. Cl. 446—259 14 Claims

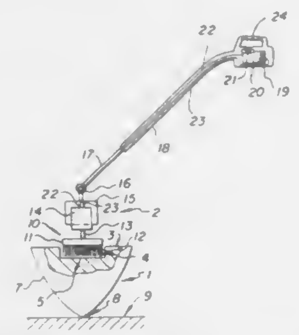
1. A toy spinning top system, comprising:

a spinning top having a first gripping section on an upper portion thereof; and

a movable impelling means for imparting rotational motion to said spinning top when said spinning top is at rest and when said spinning top is rotating without substantially interrupting the rotation of the spinning top, and for imparting translational motion to said top along a surface on which the top is spinning, wherein said impelling means includes a rotatable second gripping section cooperatively engageable with said first gripping section of said spinning top, such that said cooperative engagement between said gripping sections causes rotating motion and translational motion to be transmitted from said impelling means to said spinning top in response to rotation and movement of said

VOL
1127
ISS
3
JE
18
1991
UMI

impelling means, said impelling means having a drive means for rotating said second gripping section,



wherein one of said first and second gripping sections has a brush-like member having a plurality of bristles cooperatively engageable with the other of said gripping sections in a substantially co-axial manner.

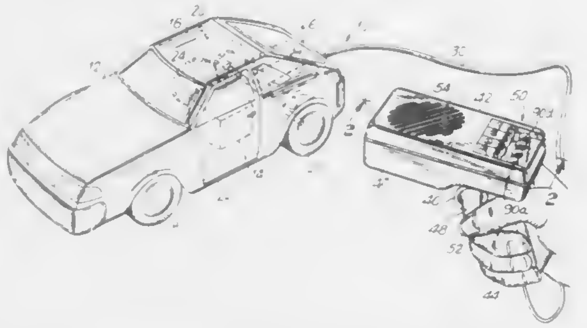
5,024,626
SOUND PRODUCING REMOTE CONTROL TOY VEHICLE

Jack Robbins, 197 Summit Ave., Pompton Lakes, N.J. 07442, and Dietmar Nagel, 147 South Rd., Chester, N.J. 07930

Filed Feb. 1, 1991, Ser. No. 649,407

Int. Cl.^{5} A63H *5/00, 17/34*

U.S. Cl. 446—409 **20 Claims**



1. A remote control toy vehicle system comprising a toy vehicle including motor means for selectively driving said toy vehicle, a remote control electrically coupled to said toy vehicle but remote therefrom including manually actuatable first control means for controlling said motor means, said remote control further including sound producing means for selectively producing sounds related to said toy vehicle and manually actuatable second control means for controlling the sounds producible by said sound producing means.

5,024,627
FLOAT MOUNTED RECEPTACLE CONTACT ASSEMBLY FOR CARD CAGE

Glenn E. Bennett; John E. Lucius; Roger N. Polk; Frederick H. Rider, and David S. Szczesny, all of Glendale, Ariz., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 29, 1990, Ser. No. 546,620

Int. Cl.^{5} H01R *23/70*

U.S. Cl. 439—631 **10 Claims**

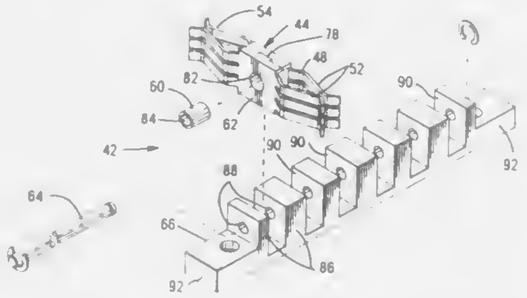
1. A contact assembly for use in a card cage to interconnect a power bussing system of the card cage with respective daughter cards inserted into said card cage at respective card locations to become electrically connected with circuit means of a backplane of the card cage, each daughter card including corresponding power bussing means along at least one of an upper and lower edge thereof defining source and return paths associated with source and return circuits of said cage power bussing system, and each source and return path of the card power bussing means including a blade-shaped contact section extending rearwardly from the card, comprising:

a plurality of contact members mounted to a clevis block mountable to framework of the card cage, said contact members being associated in pairs and insulated from each other, one said contact member of each pair being associated with a corresponding contact means of a source power circuit of the cage power bussing means and the other thereof being associated with a corresponding contact means of a return power circuit of the cage power bussing means;

each said contact member having a body section and including at least a first receptacle contact section facing forwardly at a card location and adapted to receive thereinto a respective said blade-shaped contact section of said card power bussing means, each said receptacle contact section defined by an array of paired opposed spring arms extending forwardly from said body section and having substantial stiffness to generate substantial contact normal force on side surfaces of a said blade-shaped contact section upon mating wherein said spring arms are deflectable apart thereby;

said body section of each said contact member is mounted between adjacent salients of said clevis block and having a width less than the distance between said adjacent salients whereby incremental lateral movement of said body section is permitted between said salients; and

each said body section includes a transverse aperture aligned with shaft-receiving apertures through said salients, and a shaft is inserted through all said aligned apertures in a manner adapted to permit rotatable motion of said contact members about said shaft and securing said contact members to said clevis block electrically isolated between respective pairs of said adjacent salients.



5,024,628
MATERNITY AND NURSING BRASSIERE WITH STRAP VARIATIONS

Mary M. Sanchez, 5246 S. Camino de la Tierra, Tucson, Ariz. 85746

Filed Feb. 20, 1990, Ser. No. 482,213

Int. Cl.^{5} A41C *3/04*

U.S. Cl. 450—36 **9 Claims**

1. A brassiere apparatus, said brassiere apparatus comprising:

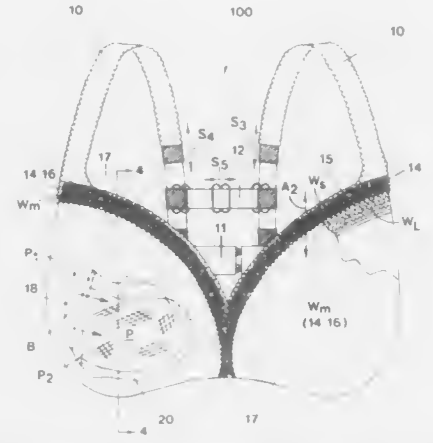
a pair of detachable breast cup means for facilitating breast feeding,

each of said breast cup means having breast size compensation means for accommodating variable breast sizes experienced by a wearer during a breast feeding phase,

said breast size compensation means comprising a first detachable closure member located on an upper perimeter portion of said breast cup means and a second mating closure member located on an upper brassiere support band,

said first closure member being controllably and detachably attached to selectable width portions on said second closure member to effect breast size fitting compensation such that said breast cup means comfortably conforms to said variable breast sizes;

a encircling band for securing said brassiere apparatus to a backside of a wearer, said encircling band having a plurality of horizontally spaced attachment points; and



a pair of shoulder straps attached at one end to said upper brassiere support band and detachably attached at other end to said encircling band at selected ones of said horizontal attachment points to effect controllable strap width setting, each of said shoulder straps having a plurality of corresponding vertically spaced attachment points located proximate said other end.

5,024,629
COIN HOLDER/DISPENSER

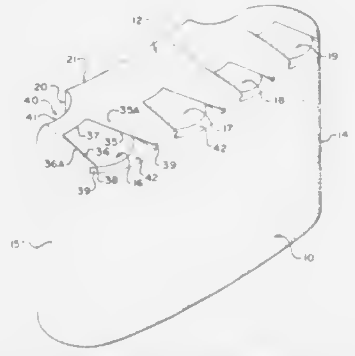
Darlene G. Murray, 1043 Wascana St., Regina, Saskatchewan, Canada S4T 4H8

Filed Oct. 23, 1989, Ser. No. 425,223

Claims priority, application Canada, Jan. 10, 1989, 587833

Int. Cl.^{5} G07D *1/00*

U.S. Cl. 453—54 **1 Claim**



1. A device for holding and dispensing coins comprising a molded plastics body having an upper surface, a lower surface, a front surface and a rear surface and defining a plurality of cylindrical bores through the body in parallel spaced relation along the body with each bore having upper and lower ends breaking out on the upper and a lower surfaces respectively of the body, each bore having a cross section which is constant along at least the majority of its length and arranged to receive and closely surround a particular denomination of coin, the bores being arranged side-by-side across a width of the body so that the body includes a front surface of the body and a rear surface of the body lying generally parallel to each other, a plurality of plug members each arranged to cooperate with a respective one of the bores and with the lower surface of the body to extend into and to removably plug a lower end of the bore, and a plurality of spring means each arranged in a respective one of the bores in engagement with the respective plug member so as to bias upwardly toward the upper surface any coins within the bore, the upper surface being molded to define for each bore breaking out thereon a pair of side shoulder means for engaging an uppermost one of the coins in the bore so as to prevent axial movement of said uppermost coin out of the upper end of the bore, the front surface of the body at said upper surface being free from said shoulder means such that the uppermost coin can be slid forwardly from the bore under said side shoulder means in a direction at right angles to the axis of the bore to be released from the bore for dispensing, the side shoulder means extending across the upper surface to a front edge of the side shoulder means at the front surface, the upper surface being shaped to define for each bore a channel extending thereacross from a position at the rear surface and rearward of the bore to a position at the front surface and forward of the bore, side edges of the channel being defined by innermost side edges of the side shoulder means such that the channel intersects with an exposed portion of the uppermost coin, the channel increasing in depth from a rear surface toward the front surface so that the finger of the user is guided along the channel into contact with the coin, the channel increasing in width from the rear surface toward the front surface, the rear surface including a vertical flange member rearwardly of the rear surface and spaced therefrom such that the flange member can be attached over a belt of a user.

5,024,630
HARVESTER THRESHER

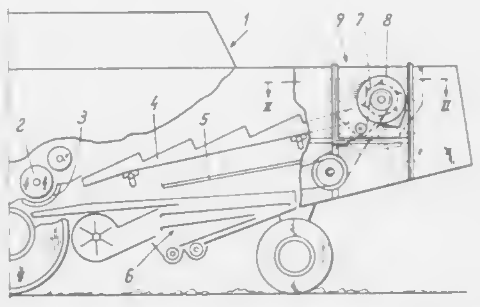
Horst Harig, Marienfeld, and Hermann Kersting, Oelde/Lette, both of Fed. Rep. of Germany, assignors to CLAAS OHG, Harsewinkel, Fed. Rep. of Germany

Filed May 29, 1990, Ser. No. 530,737

Claims priority, application Fed. Rep. of Germany, May 31, 1989, 3917605

Int. Cl.^{5} A01F *7/00, 12/18;* **A01D** *41/12*

U.S. Cl. 460—21 **13 Claims**



1. A harvester thresher, including a chassis; a housing; a threshing unit operating in accordance with the principle of a tangential flow; straw shaking means; and a threshing and separating unit located after said straw shaking means in said housing and operating in accordance with the principle of an axial flow so that said straw shaking means is located between said units, said threshing and separating unit being formed as a separate unit; means in said housing for supporting said separate unit exchangeably so that it can be exchanged by another structural unit.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,631
COMBINE HARVESTER

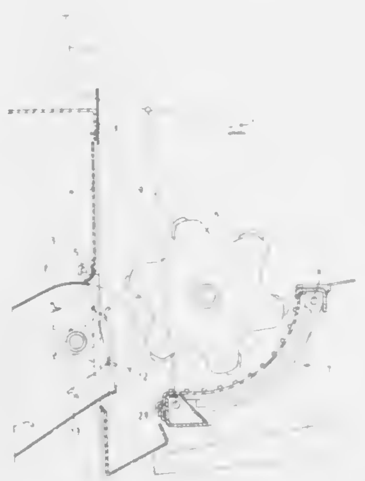
Franz Heidjann, Harsewinkel, and Karl-Josef Kleingraeber, Muenster, both of Fed. Rep. of Germany, assignors to Claas OHG, Harsewinkel, Fed. Rep. of Germany

Filed Apr. 23, 1990, Ser. No. 513,487

Claims priority, application Fed. Rep. of Germany, May 6, 1989, 3914962

Int. Cl.^{5} A01F *12/26, 12/28*

U.S. Cl. 460—75 7 Claims



1. A combine harvester having a threshing unit housing, a tangential-flow threshing unit installed transversely to the direction of travel and comprising a drum and a concave, an inclined conveyor entering the threshing unit housing and an inspection flap arranged in the front wall of the threshing unit housing above the inclined conveyor, the concave surrounding the drum over an arc having a sieve lining and a frame supporting the latter and comprising two longitudinal strips and two arcuate end strips, wherein the sieve lining is divided into a plurality of longitudinally abutting lining sections (**25, 26, 27**) having respective butt joints and which are supported at the butt joints by arcuate webs (**18**) of the frame (**14**) and are designed so as to be removable from the frame (**14**) in the circumferential direction and are accessible and removable through the opened inspection flap (**4**).

5,024,632
TRANSMISSION SHAFT WITH SHEAR SECTION AND DEBRIS RETAINER

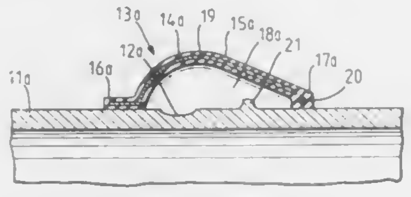
Vernon F. Cox, Somerton, and Phillip M. Hyde, Crewkerne, both of England, assignors to Westland Helicopters Limited, Yeovil, England

Filed Nov. 14, 1989, Ser. No. 435,715

Claims priority, application United Kingdom, Nov. 21, 1988, 8827169

Int. Cl.^{5} F16D *9/00*

U.S. Cl. 464—33 9 Claims



1. A transmission shaft for transmitting rotary movement includes a shear neck portion comprising a circumferential recess in the external surface of the shaft to attract a failure in the event of overload of the shaft and debris retention means comprising an annular retainer having one end portion rotationally fixed to the external surface of the shaft at one side of the shear neck portion and the other end portion of said annular retainer slidingly engaged with the surface of the shaft at the other side of the shear neck portion, said annular retainer having an internally concave shape between said end portions so as to define with the external surface of the shaft a debris retaining cavity.

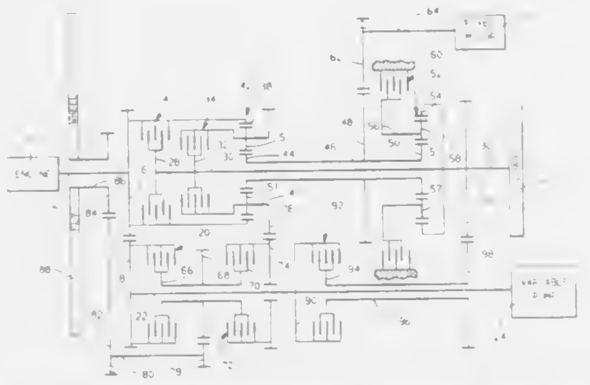
5,024,633
HYDROMECHANICAL TRANSMISSION WITH ADJUNCT FLYWHEEL

Michael R. Schmidt, Carmel, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 9, 1990, Ser. No. 549,839

Int. Cl.^{5} F16H *47/04*

U.S. Cl. 475—72 2 Claims



1. A hydromechanical transmission comprising: engine input means; flywheel input means; hydrostatic transmission means having a pump means and motor means; first planetary gear means having a first member drivingly connected with said engine input means, a second member connected with said motor means and a third member; second planetary gear means having a first member connected with said output means, a second member connected with said motor means and a third member; brake means for selectively restraining said third member of said second planetary gear means; means drivingly connecting said engine input means with said pump means; first clutch means for selectively connecting said engine input means with said output means; second clutch means for selectively connecting said engine input means with said flywheel input means; third clutch means for selectively connccting said engine input means to said output means through a speed increasing gear arrangement; fourth clutch means for selectively connecting said flywheel with said third member of said first planetary gear means; and fifth clutch means for selectively connecting said third member of said first planetary gear means with said output means.

5,024,634
HYDRAULIC VARIABLE LOCK DIFFERENTIAL WITH OIL RETURN IN FLOATING MANIFOLD

Martin G. Blessing, Fort Wayne, Ind., assignor to Dana Corporation, Toledo, Ohio

Continuation of Ser. No. 241,596, Sep. 8, 1988, abandoned. This application Apr. 23, 1990, Ser. No. 515,644

Int. Cl.^{5} F16H *1/44*

U.S. Cl. 475—86 8 Claims

1. A variable lock vehicle differential apparatus for driving a pair of vehicle half axles from a drive shaft, comprising:

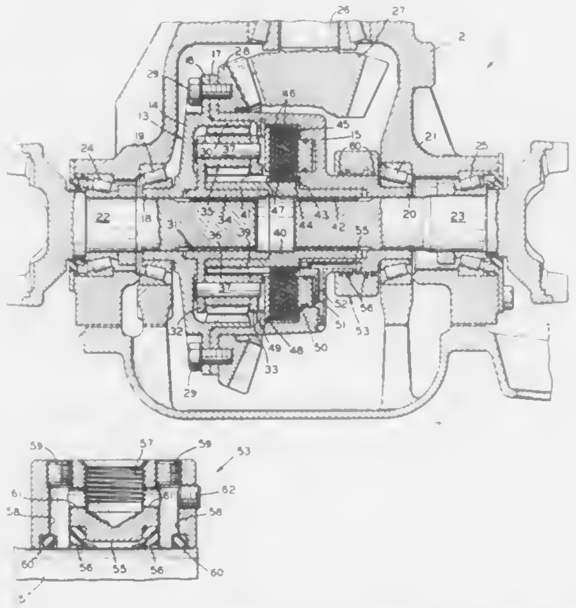
an outer housing;

a differential gear assembly in a case rotatably mounted in said housing and adapted to be coupled between a vehicle drive shaft and a pair of vehicle half axles, said differential gear assembly including a sun gear coupled to one of said half axles and an annular gear attached to said case and coupled to a planetary gear assembly mounted in said case and having a first plurality of planet gears each coupled for rotation by said case, a second plurality of planet gears each coupled for rotation by an associated one of said first plurality of planet gears and coupled to rotate said sun gear, and a hub portion coupled to the other one of said half axles, said sun gear and said annular gear rotating relative to one another during relative rotation between said half axles;

a clutch assembly coupled between said case and said sun gear for selectively resisting relative rotation between said case and said sun gear upon actuation;

actuating means for selectively hydraulically actuating said clutch assembly; and

a manifold for supplying hydraulic fluid to said actuating means, said manifold mounted inside said outer housing and having an annular body for rotatably accepting said case, said manifold adapted to be connected to a source of hydraulic fluid under pressure, said manifold having an inwardly facing annular channel formed therein and an inlet formed in said annular body and in fluid communication with said channel, said channel being in fluid communication with said actuating means, a pair of lip seals positioned on opposite sides of said channel and sealingly engaging an outer surface of said case to function as a primary seal, a pair of O-ring seals retained in grooves formed in said annular body and positioned outwardly of said lip seals to function as a secondary seal sealingly engaging said outer surface of said case and an outlet formed in said annular body and in fluid communication with an inwardly facing surface of said manifold positioned between said lip seals and said O-ring seals whereby fluid in said channel which leaks past said lip seals flows to said outlet.



5,024,635
RELATING TO RAM UNITS IN TRANSMISSIONS OF THE TOROIDAL RACE, ROLLING TRACTION TYPE

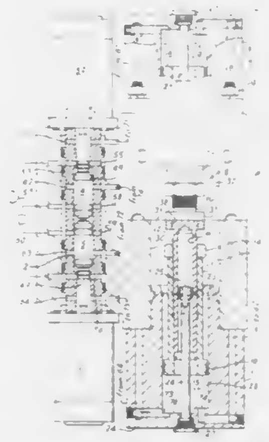
Leslie K. Robinson, 16 Cedarwood Drive, Leyland Preston, Lancashire PR5 1HN, England

Filed Aug. 4, 1989, Ser. No. 389,485

Claims priority, application United Kingdom, Aug. 4, 1988, 8818518

Int. Cl.^{5} F16H *15/36;* **F15B** *15/22*

U.S. Cl. 475—115 14 Claims



1. In or for a transmission of the toroidal-race, rolling-traction type:

A hydraulic ram comprising a cylinder, and a piston movable within that cylinder so that the piston and cylinder define between them a working space of variable volume, the space being bounded at one axial end by the piston and at the other by an axial end wall of the cylinder;

means to connect the piston to at least one roller of the transmission, whereby the angular orientation of the roller is related to the axial position of the piston within the cylinder;

inlet and outlet ports to the working space, the inlet port being connectable in use to a source of hydraulic fluid under pressure and the outlet port to exhaust; in which the inlet and outlet ports are both formed in the axial end wall of the cylinder, and in which:

the axial end wall of the cylinder provides a stepped boundary for the working space;

the outlet port is located on the step but the inlet port is located below it, and the outlet port lies axially protruding of the inlet port, whereby as the piston approaches the end wall it tends firstly to increase the flow resistance of the outlet port and secondly to contact it and so be prevented from further axial movement, without substantially obstructing the inlet port.

5,024,636
PLANETARY WHEEL HUB

Dan E. Phebus, Rossville; William A. Schrader, Lafayette, and Russell E. Summers, Jr., West Lafayette, all of Ind., assignors to Fairfield Manufacturing Company, Inc., Lafayette, Ind.

Filed Jun. 27, 1989, Ser. No. 372,020

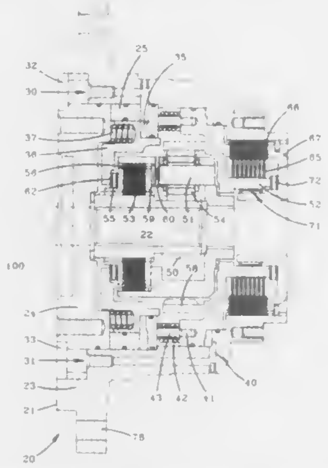
Int. Cl.^{5} F16H *57/10*

U.S. Cl. 475—141 33 Claims

1. A planetary transmission comprising a sun gear, means to rotate said sun gear, planet gears, said planet gears surrounding said sun gear, a planet carrier, means to connect said planet gears to said planet carrier, means to connect said planet carrier to an output for the transmission, a first clutch pack, a first set of springs, said first set of springs activating said first clutch pack to connect said planet carrier to said sun gear for rotation therewith, a first means to override said first set of springs to disconnect said planet carrier from said sun gear, a stationary

VOL
1127
ISS
3
JE
18
1991
UMI

housing, a ring gear, said ring gear surrounding said planet gears, a second clutch pack, a second set of springs, said second set of springs activating said second clutch pack to connect said ring gear to said stationary housing to prevent the rotation of said ring gear, a second means to override said second set of springs to disconnect said ring gear from said stationary housing and operation means to selectively operate said first and second means so as to alter the operative condition of the planetary transmission so as to provide a first drive condition with operation of said first means, a second drive condition with operation of said second means and a braking condition with both said first and second clutch packs activated.



5,024,637

AUTOMATIC MECHANICAL TRANSMISSION APPARATUS WITH CONTINUOUS VARIATION OF THE TRANSMISSION RATIO FROM AN INFINITE RATIO UP TO A RATIO LESS THEN 1/1

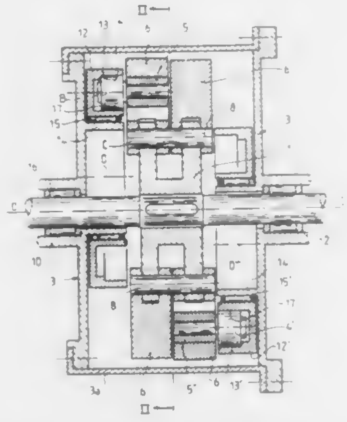
Louis Guichard, 10, Impasse Henry Bouchard, 21000 Dijon, France

Filed May 21, 1990, Ser. No. 525,919

Claims priority, application France, May 24, 1989, 89 06804

Int. Cl.^{5} F16H *3/70*

U.S. Cl. 475—166 **10 Claims**



1. In an automatic mechanical transmission apparatus with continuous variation of the transmission ratio from an infinite ratio up to a ratio less than 1/1, of the type employing centrifugal forces, comprising a driving shaft and a driven shaft having a common axis, a driving hub driven by the driving shaft, at least one driven plate fast with the driven shaft and bearing at least one continuous circular track, eccentric with respect to the common axis of the driving and driven shafts, rollers which roll inside the circular track, being mounted to rotate about respective longitudinal axes, each of these rollers being borne by a rod connected to a pivot pin on the driving hub, all these pivot axes being uniformly distributed over a circle whose center lies on the common axis of the two coaxial driving and driven shafts,

each rod bearing a roller is articulated on the outer part of a weight which is itself articulated on the hub fast with the driving shaft.

5,024,638

ACTUATOR FOR A FRICTIONAL ENGAGING DEVICE

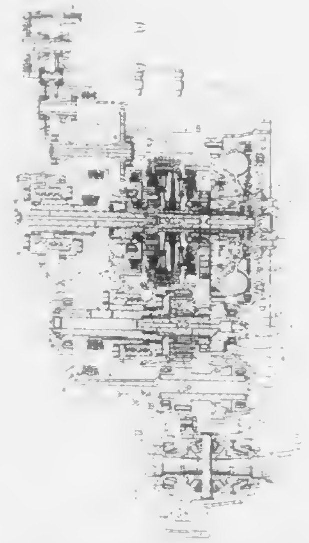
Shiro Sakakibara, Toyokawa; Masahiro Hasebe, and Masashi Hattori, both of Anjo, all of Japan, assignors to Aisin AW Co., Ltd., Anjo, Japan

Filed Dec. 22, 1988, Ser. No. 288,152

Claims priority, application Japan, Dec. 26, 1987, 62-330482; Nov. 18, 1988, 63-291634

Int. Cl.^{5} F16D *67/02;* **F16H** *57/00*

U.S. Cl. 475—210 **21 Claims**



1. An actuator for frictional engaging devices controlled by electric signals from a control device and disposed in a power transmission device, comprising:

a torque generating mechanism which converts electric energy into torque,

at least two movably mounted frictional engaging devices having respective initial first positions,

a torque-thrust conversion mechanism which converts torque generated from said torque generating mechanism into an augmented thrust force for moving said at least two frictional engaging devices from said respective initial first positions to different second positions respectively, said torque-thrust conversion mechanism having a given initial position,

a connecting means which transmits said augmented thrust force generated from said torque-thrust conversion mechanism to each respective one of said at least two frictional engaging devices, and

first spring means for urging at least one of said at least two frictional engaging devices to be in a compressed condition,

whereby said torque-thrust conversion mechanism can move said at least two frictional engaging devices from said respective initial first positions to the second positions respectively by rotation in one rotational direction from said given initial position.

5,024,639

"Z" TYPE STEERABLE BALANCED POWER TRANSMISSION

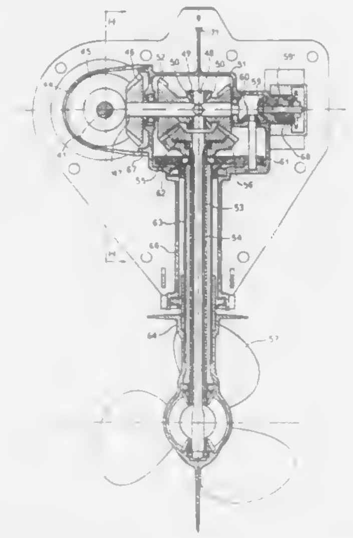
Cesare Crispo, Via Milano, 29, 20090 Cusago, Italy

Filed Feb. 8, 1990, Ser. No. 476,708

Claims priority, application Italy, Mar. 29, 1989, 19929 A/89

Int. Cl.^{5} F16H *1/38*

U.S. Cl. 475—221 **21 Claims**



1. A "Z" type power transmission for transmitting power from a first drive shaft to a second drive shaft comprising:

a first housing having said first drive shaft and steering control means mounted therein, wherein said first housing is mounted for selective pivotal movement about the axis of said first drive shaft; wherein said transmission may be pivoted about said axis of said first drive shaft while maintaining drive power and steering control;

a steerable second housing responsive to said steering control means rotatably mounted to said first housing and having said second drive shaft mounted therein; and

means for transmitting power from said first drive shaft in said first housing to said second drive shaft in said second housing, including counter rotating coaxial drive shaft means intermediate said first drive shaft and said second drive shaft.

5,024,640

METHOD AND APPARATUS FOR STORING FLAT-FOLDED CASES IN A PILE, AND FOR OPENING AND SEALING SAID CASES

Takashi Saitoh, Tokyo, Japan, assignor to Nagano Technical Service Co., Ltd., Nagano and Technical Products Co., Ltd., Tokyo, both of, Japan

Continuation of Ser. No. 256,391, Oct. 11, 1988, abandoned. This application May 29, 1990, Ser. No. 530,456

Claims priority, application Japan, Oct. 14, 1987, 62-259031; Sep. 15, 1988, 63-231188

Int. Cl.^{5} B31B *3/06, 3/72, 3/78*

U.S. Cl. 493—127 **16 Claims**

1. A method of opening flat folded cases, comprising the steps of:

storing a plurality of flat-folded cases horizontally in a magazine, said flat-folded cases forming a pile of cases in said magazine;

lifting an uppermost case from said pile in said magazine at a magazine station, with an end panel of said uppermost case attracted to and held by a suction cup;

said suction cup being mounted on a shaft which is slidably supported in a vertical direction on a pivotable arm, and wherein a spring means is coupled to the shaft to press the suction cup onto said end panel of said uppermost case;

said step of lifting an uppermost case comprising raising said pivotable arm and applying a compression force on said suction cup by means of said spring means such that said compression force applied on said suction cup decreases as said rotatable arm rises to lift said uppermost case;

forming a gap between said uppermost case and a next lower case as said uppermost case is lifted, thereby allowing air to flow in said gap in an increasing amount as said gap increases during said lifting, to prevent lifting of said next lower case with said uppermost case;

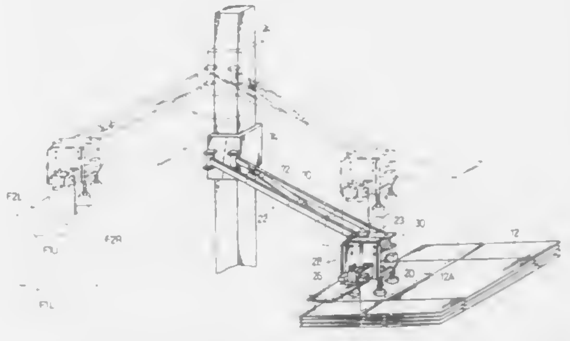
folding a bottom upper-inner flap of the end panel of said uppermost case downward at the same time said uppermost case is being lifted, while pressing said suction cup onto the end panel by said compression force;

transferring said uppermost case from said magazine station to a flap-folding station after said bottom upper-inner flap is folded downward so as to open the case in preparation for subsequent folding of other bottom flaps thereof;

folding a bottom lower-inner flap and a pair of bottom outer flaps of the opened case at said flap-folding station;

transferring the case from said flap-folding station to a sealing station; and

sealing the folded bottom outer flaps of the case at said sealing station to form an erected open case.



5,024,641

PROGRAMMABLE DYNAMICALLY ADJUSTABLE PLUNGER AND TRAY FORMER APPARATUS

Jean-Louis Boisseau, Courgerennes, France, assignor to Vega Automation, France

Division of Ser. No. 274,054, Oct. 7, 1988, Pat. No. 4,988,331. This application Aug. 1, 1990, Ser. No. 561,331

Int. Cl.^{5} B31B *3/44, 3/46*

U.S. Cl. 493—171 **5 Claims**

1. Apparatus for die-stamping cardboard blanks, including a supporting framework,

first and second die-stamping means for die-stamping blanks of pieces of cardboard for forming into trays, said first die-stamping means being mounted in said supporting framework and including a first tray-forming part having a selectively adjustable and lockable configuration,

said second die-stamping means being slidably mounted in said supporting framework in axial alignment with said first die-stamping means and including a second tray-forming part having a selectively adjustable and lockable configuration, one of said first and second tray-forming parts being a driving part and the other of said first and second tray-forming parts being a driven part, the configuration of said driven part being determined by the action of said driving part,

selectively lockable single-direction actuator means coupled to and acting on said driven part for urging said driven

VOL
1127
ISS
3
JE
18
1991
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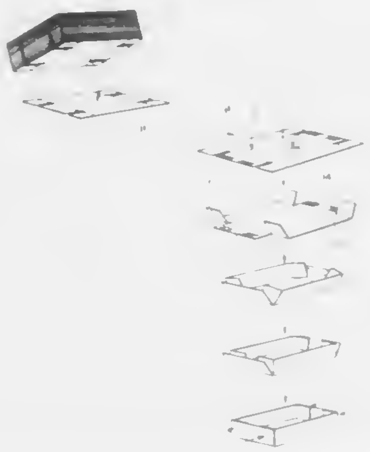
part into contact with said driving part when said actuator means is unlocked, and

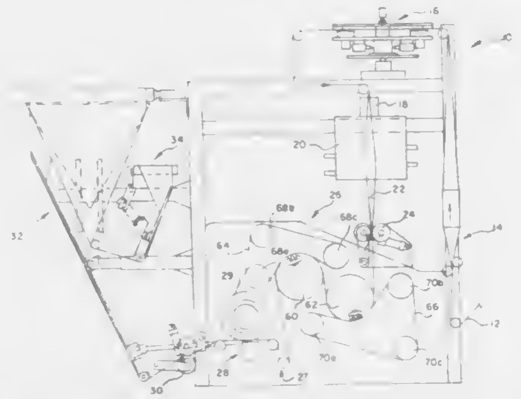


selectively lockable bi-directional drive means coupled to and acting on said driving part for adjusting the configurations of said driving and driven parts.

5,024,642
ROTARY DRAW TAPE BAG MAKING APPARATUS AND METHOD

James E. Buchman, and Kenneth C. Jahnke, both of Appleton, Wis., assignors to Presto Products, Incorporated, Appleton, Wis.

Filed Dec. 5, 1988, Ser. No. 280,027
Int. Cl.^{5} B31B *23/60*
U.S. Cl. 493—193 **30 Claims**



28. A method of sealing a thermoplastic draw tape to a thermoplastic bag at a discrete draw tape sealing section, wherein the bag composes one of a plurality of bags formed on a continuous web of thermoplastic material, the bag having a first and a second face and including a hem defining a channel and the draw tape disposed in the channel, thereby defining at least four layers in the section where the tape is disposed in the hem, the method comprising the steps of:

continuously moving the web through a sealing station;

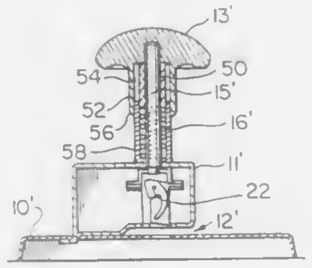
at a first sealing point in the sealing station, forming a heat seal through a portion of the at least four layers of the hem and tape, the seal being formed from the first face of the bag at the sealing section as the web is continuously moved through the sealing station; and

at a second sealing point in the sealing station disposed downstream of the first sealing point relative to the direction that the web is moved, forming a heat seal through the rest of the at least four layers of the hem and tape at the sealing section from the second opposite face of the bag as the web is continuously moved through the sealing station.

5,024,643
STAPLELESS STAPLER

Arnold Kastner, c/o 10220 Armand-Lavergne, Montreal North, Quebec, Canada H1H 3N5

Filed Sep. 20, 1989, Ser. No. 409,697
Claims priority, application Canada, Sep. 27, 1988, 578617
Int. Cl.^{5} B31F *5/02;* **B25B** *27/14;* **B25C** *5/00*
U.S. Cl. 493—351 9 Claims



1. A stapleless paper fastening apparatus comprising:

a base;

a housing mounted on said base;

a tubular member mounted on said housing, said tubular member having a inwardly extending annular flange at a bottom end, the flange defining a central aperture;

a shaft in tubular member, coaxial therewith and slidable axially through said central aperture into said housing;

a handle reciprocally mounted on said tubular member for movement towards and away from said housing, said handle including an outer annular member slidable on the outside of said tubular member, and also having an inner annular member slidable on the inside of said tubular member;

a spring positioned between said annular flange and a bottom end of said inner annular member, urging said handle away from said housing;

said shaft attached at an upper end to said handle for movement with said handle;

a punch and chisel reciprocally mounted in said housing for movement by said shaft, said punch having a hollow U-shaped cross-section adapted to cut a tongue-shaped section from said sheets;

a bending member pivotally mounted in said punch, said bending member including means for engaging on the bottom part of said housing to pivot the bending member;

the whole arranged such that initial actuation of said handle pushes down said punch and said chisel to cut tongue-shaped sections from said sheet and cut a slot in said sheet, continued actuation of the handle pivoting said bending member to bend up to the tongue for insertion into the slot cut by said chisel.

5,024,644
CONTINUOUS FORM STATIONERY FOLDING AND CUTTING MACHINE

Earnest B. Bunch, III, Glendale, Ariz., assignor to B. Bunch Company, Inc., Phoenix, Ariz.

Continuation-in-part of Ser. No. 279,426, Dec. 2, 1988, Pat. No. 4,915,644. This application Oct. 13, 1989, Ser. No. 421,515
The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.
Int. Cl.^{5} B65H *29/66, 35/06, 45/105*
U.S. Cl. 493—357 7 Claims

1. In combination with apparatus for producing continuous form stationery by folding a strip of paper along transverse lines of weakening formed therein,

said paper strip including

a first side, and

a second side opposite and spaced apart from said first side,

each of said transverse lines of weakening including

a first end which is nearer to said first side than said second side of said paper strip, and

a second end which is nearer to said second side than said first side of said paper strip,

said apparatus including

a frame,

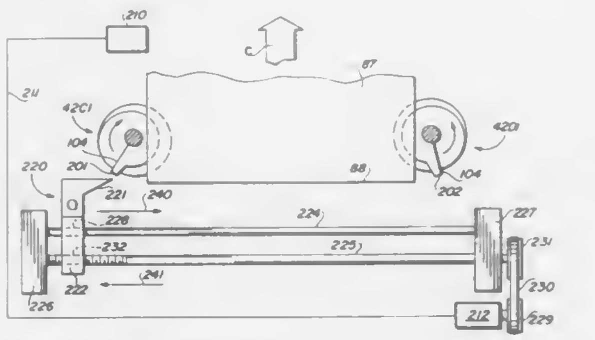
oscillating guide means mounted on said frame for alternately distributing said successive lines of weakening in said paper strip in substantially opposite directions,

means for feeding said paper strip into said guide means at a predetermined speed,

folding means carrier on said frame and operatively associated with said oscillating guide means for urging said paper distributed by said guide means into a folded condition, said folding means including a first spiral and a second spiral spaced apart from said first spiral, each of said spirals having helical flight means shaped and dimensioned and rotatably driven to receive said paper strip from said oscillating guide means to fold

said paper strip along said transverse lines of weakening, said first spiral being positioned on said first side of said paper strip, said second spiral being positioned on said second side of said paper strip,

said guide means, feeding means and folding means moving in synchronous relationship during the operation of said apparatus,



the improvement comprising means for severing the folded paper along at least a selected one of said folded transverse lines of weakening extending between said first side and said second side of said paper strip and extending between said first and said second spirals, said severing means including

(a) cutting means mounted for transverse movement between at least two operative positions,

(i) a first operative position located on said first side of said paper strip and adjacent said first end of said selected one of said transverse lines of weakening, and

(ii) a second operative position located on said second side of said paper strip and adjacent said second end of said selected one of said transverse lines of weakening; and,

(b) means for moving said cutting means from said first operative position to said second operative position at a selected time to cut said one of said folded transverse lines of weakening, said one of said folded transverse lines of weakening interconnecting paper having a portion extending from said one of said lines of weakening

(i) through and contacting said helical flight means of at least one of said first and second spirals, and

(ii) to a folded line of weakening selected from the group consisting of

the folded line of weakening immediately preceding said one of said folded transverse lines of weakening, and,

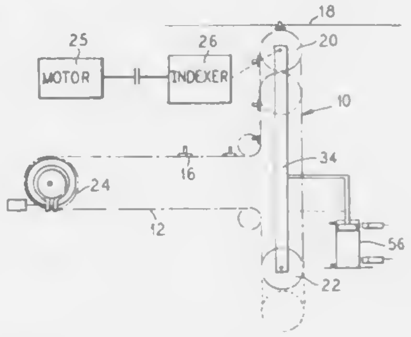
the folded line of weakening immediately succeeding said one of said folded transverse lines of weakening,

said immediately preceding and immediately succeeding lines of weakening being folded by said folding means.

5,024,645
APPARATUS FOR POSITIONING A PORT IN AN APERTURE IN A WEB OF FILM

Pierre Soubrier, Villecresnes, France, and Xavier Denis, Tournai, Belgium, assignors to Baxter International Inc., Deerfield, Ill.

Filed May 26, 1989, Ser. No. 358,281
Int. Cl.^{5} B31B *23/84;* **B65G** *47/84*
U.S. Cl. 493—380 **24 Claims**



1. An apparatus for positioning ports in an aperture of a web of film comprising:

transporting means, for transporting a port, including a plurality of means for releasably retaining a port;

at least a first rotatable means, for rotating to feed said transporting means, and a second rotatable means, for rotating to feed said transporting means, the transporting means being fed around the first and second rotatable means when the first and second rotatable means rotate, the first rotatable means being coupled to indexing means for accurately regulating the rotation of the first rotatable means; and

means for causing the first rotatable means, and a portion of the transporting means around same, to move automatically repetitively toward and away from a portion of the web of film in a substantially perpendicular direction to the portion of the web of film to position the ports in successive apertures of the film.

5,024,646
OPTIMUM FIXED ANGLE CENTRIFUGE ROTOR

Mark L. Lewis, Burlingame; Thomas D. Sharples, Atherton, and Stephen E. Little, Cupertino, all of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Oct. 6, 1989, Ser. No. 418,060
Int. Cl.^{5} B04B *5/02*
U.S. Cl. 494—16 **20 Claims**

1. A centrifuge rotor comprising:

a rotor body rotatable about a spin axis; and

means formed on the rotor body for supporting a generally cylindrical volume of diameter D and length L of sample solution for centrifugation about the spin axis such that the cylindrical volume is inclined with its axis at an angle θ to

VOL
1127
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18
1991
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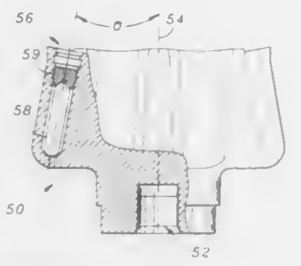
the spin axis, where θ, D and L approximately satisfy the relationship:



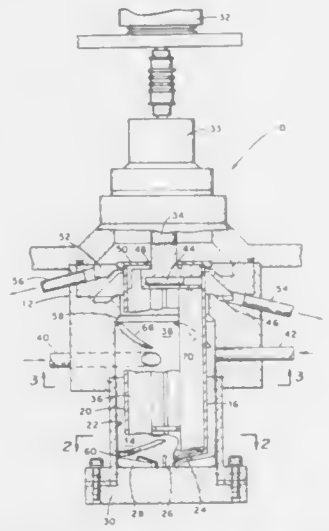
$$\theta=\mathrm{Tan}^{-1}(D/15L)^{0.50}$$

5,024,647

CENTRIFUGAL CONTACTOR WITH LIQUID MIXING AND FLOW CONTROL VANES AND METHOD OF MIXING LIQUIDS OF DIFFERENT PHASES

Robert T. Jubin, Powell, and John D. Randolph, Maryville, both of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 13, 1989, Ser. No. 365,400
Int. Cl.⁵ B01D *21/26;* B04B *1/00*
U.S. Cl. 494—37 11 Claims



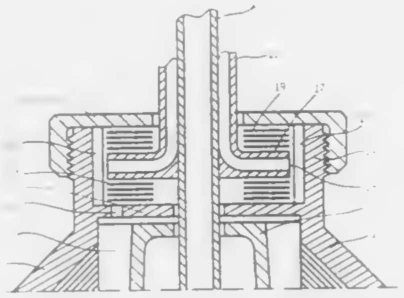
11 A method for mixing process liquids in a centrifugal contactor having an open vertically oriented housing with a vertically oriented rotor disposed therein at a location radially inwardly spaced from the housing so as to define therebetween an annular liquid mixing volume for process liquid of different phases introduced into the mixing volume through inlets in registry with the mixing volume at a location intermediate upper and lower regions thereof, said method comprising the steps of contacting process liquid in the lower region of the mixing volume with vane means disposed on said housing at a location underlying said inlets for urging the process liquid in an upward direction toward said inlets when process liquid is in said mixing volume for enhancing the mixing of the process liquid within the mixing volume and maintaining the level of the process liquid within the mixing volume at a sufficient height to inhibit the creation of vortices and air entrapment in the process liquid due to an insufficient volume of process liquid in the annular mixing volume, and contacting process liquid in an upper region of said mixing volume with further vane means disposed on said housing at a location overlying the inlets for urging the process liquid contacted thereby in a downward direction towards said inlets.

5,024,648

CENTRIFUGAL SEPARATOR WITH A DISCHARGE DEVICE

Claes Inge, Saltsjö-Duvnäs; Peter Franzen, Tullinge; Torgny Lagerstedt, Stockholm; Leonard Borgström, Bandhagen; Claes-Göran Carlsson, Tullinge; Hans Moberg, Stockholm, and Olle Nåbo, Tullinge, all of Sweden, assignors to Alfa-Laval Separation AB, Tumba, Sweden

PCT No. PCT/SE88/00510, § 371 Date Jan. 17, 1990, § 102(e) Date Jan. 17, 1990, PCT Pub. No. WO89/03250, PCT Pub. Date Apr. 20, 1989
PCT Filed Oct. 4, 1988, Ser. No. 458,622
Claims priority, application Sweden, Oct. 8, 1987, 87038840
Int. Cl.⁵ B04B *11/00*
U.S. Cl. 494—56 20 Claims



1. Centrifugal separator comprising: a rotor having an inlet for a liquid mixture, a separation chamber connected to the inlet, the separation chamber for separation of components of the liquid mixture, and a discharge chamber delimited by two axially separated end walls and a circumferential wall extending between the end walls, the discharge chamber having a discharge inlet connected to the separation chamber, a discharge device arranged in the discharge chamber, the discharge device having an outlet, and means which together with parts of the inner surfaces of the discharge chamber arranged, during operation of the rotor, to entrain into rotation a liquid component present in the discharge chamber so that it forms a rotating liquid body having a radially inward essentially circumferential free liquid surface positioned radially inside the circumferential wall, the discharge device during operation extending from a liquid free central part of the discharge chamber to a level radially inside the free liquid surface, said entraining means having at least one annular disc extending around the rotational axis of the rotor and fixedly joined to the rotor, at least one part of the entraining means extending radially outside the level of the free liquid surface but radially inside the level of the outermost part of the discharge device.

5,024,649

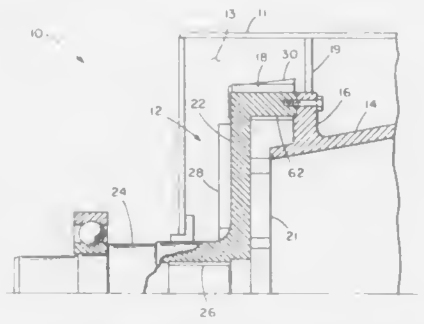
BOWL HEAD ASSEMBLY

Clement V. Smith, Attleboro, Mass., assignor to Bird Machine Company, South Walpole, Mass.

Filed Aug. 30, 1988, Ser. No. 238,761
Int. Cl.⁵ B04B *11/08*
U.S. Cl. 494—85 14 Claims

1. A centrifuge bowl head comprising,
- a bowl head plate,
- a bowl spoke attached to an outer circumference of said bowl head plate, said bowl spoke extending axially and perpendicularly from said bowl head plate,

- a bowl spoke plow attached to a first edge of said bowl spoke, said bowl spoke plow having a first surface, said first surface impinging on a wearing material at a first angle, said first angle being less than seventy-five degrees.

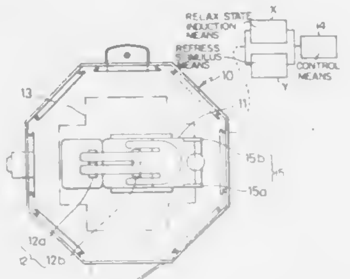


5,024,650

STRESS DISSOLVING REFRESHMENT SYSTEM

Hiroshi Hagiwara, Katano; Kazunori Araki, Kita Katsuragi, and Akihiro Michimori, Nishinomiya, all of Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Jan. 6, 1990, Ser. No. 475,990
Claims priority, application Japan, Feb. 15, 1989, 1-35224; Feb. 15, 1989, 1-35225; Jul. 15, 1989, 1-182793
Int. Cl.⁵ A61M *21/00*
U.S. Cl. 600—26 24 Claims



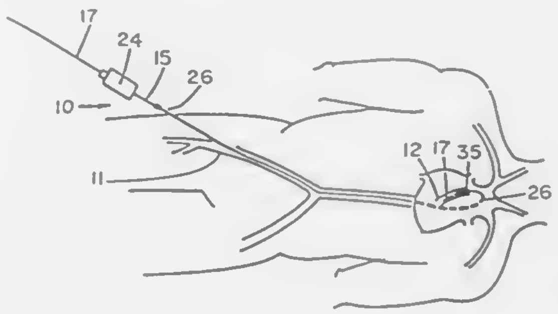
1. A stress dissolving refreshment system comprising a relaxed state induction means for providing to the user a stimulation which reduces the user's stress and leads the user to a relaxed state during a relaxing period, a refresh stimulus means for providing to the user a stimulation to elevate the level of the user's consciousness during a refreshing period which including a disillusion period following said relaxing period, and a control means for actuating said relaxed state induction means and thereafter said refresh stimulus means, wherein after said actuation of said relaxed state induction means during said relaxing period for inducing the user to said relaxed state, said control means actuates said refresh stimulus means so as to generate a weak stimulation during said disillusion period for gradually elevating the level of the user's consciousness and thereafter to generate a strong stimulation during remaining part of the refreshing period for elevating the level of the consciousness to a level good enough for allowing the user to immediately return to normal work.

5,024,651

ATHERECTOMY SYSTEM WITH A SLEEVE

Samuel Shiber, Woburn, Mass., assignor to Surgical Systems & Instruments, Inc., Mundelein, Ill.

Continuation-in-part of Ser. No. 286,509, Dec. 19, 1988, Pat. No. 4,894,051, which is a continuation-in-part of Ser. No. 243,900, Sep. 13, 1988, Pat. No. 4,886,490, which is a continuation-in-part of Ser. No. 78,042, Jul. 27, 1987, Pat. No. 4,819,634, and a continuation-in-part of Ser. No. 205,479, Jun. 13, 1988, Pat. No. 4,883,458, and a continuation-in-part of Ser. No. 225,880, Jul. 29, 1988, Pat. No. 4,842,579, said Ser. No. 78,042, and Ser. No. 205,479, and Ser. No. 225,880, each is a continuation-in-part of Ser. No. 874,546, Jun. 16, 1986, Pat. No. 4,732,154, which is a continuation-in-part of Ser. No. 609,846, May 14, 1984, abandoned. This application Mar. 13, 1989, Ser. No. 322,497
Claims priority, application European Pat. Off., Jun. 15, 1987, 87305277.3; Canada, Jun. 16, 1987, 539735; Japan, Jun. 16, 1987, 62-150056; Canada, Sep. 15, 1988, 577462; European Pat. Off., Sep. 16, 1988, 88308555.7; Japan, Sep. 30, 1988, 63-247261
The portion of the term of this patent subsequent to Jan. 16, 2007, has been disclaimed.
Int. Cl.⁵ A61B *17/32*
U.S. Cl. 604—22 14 Claims



1. An atherectomy system for removing an obstruction from within a patient's vessel, comprising in combination:
- a flexible guide-wire insertable into the vessel,
- a flexible rotary catheter for cutting and ingesting obstruction material, insertable into the vessel over said flexible guide-wire, said flexible rotary catheter having a blade at its distal end and coupling means for connecting it to a power source, at its proximal end,
- a sleeve, in which said flexible rotary catheter is slidably and rotatably disposed, having a window near its open distal end.

5,024,652

OPHTHALMOLOGICAL DEVICE

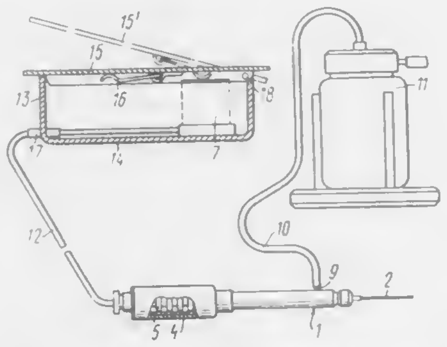
Vladimir A. Dumenek, prospekt Gagarina, 216, kv. 38, Gorky; Georgy E. Stolyarenko, ulitsa Ramenki, 9, korpus 1, kv. 1, Moscow, and Leopold V. Kossovsky, ulitsa Usilova, 1, korpus 3, kv. 15, Gorky, all of U.S.S.R.

Continuation of Ser. No. 248,968, Sep. 26, 1988, abandoned. This application May 17, 1990, Ser. No. 525,304
Int. Cl.⁵ A61B *17/20*
U.S. Cl. 604—22 13 Claims

1. An ophthalmological device, comprising:
- a surgical instrument comprising inner and outer, coaxial elements each having surgical means on one end for introduction into and performing a surgical procedure on a patient's eye and an opposite end;
- a housing fixedly connected to the opposite end of the outer element for holding the surgical instrument;
- hydraulic drive means operative in response to hydraulic pressure for moving the inner element relative to the outer element and
- pressure-exerting means for providing the hydraulic pressure, the pressure-exerting means forming a closed hydraulic system with the hydraulic drive means,

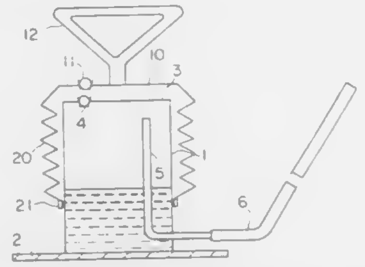
VOL
1127
ISS
3
JE
18
1991
UMI

wherein said hydraulic drive means comprises a first bellows accommodated inside said housing and connected to said inner element; a second bellows located in said pressure-exerting means; and piping communicating said first bellows with said second bellows to establish a closed hydraulic system.



5,024,653
ASPIRATOR

Ole B. Kohnke, Lyngby, Denmark, assignor to Testa-Laboratorium A/S, Glostrup, Denmark
Continuation of Ser. No. 227,457, Aug. 2, 1988, abandoned, which is a continuation of Ser. No. 49,213, May 13, 1987, abandoned. This application Oct. 25, 1989, Ser. No. 427,943
Claims priority, application Denmark, May 16, 1986, 2314/86
Int. Cl.^{5} A61M *1/00*
U.S. Cl. 604—35 8 Claims

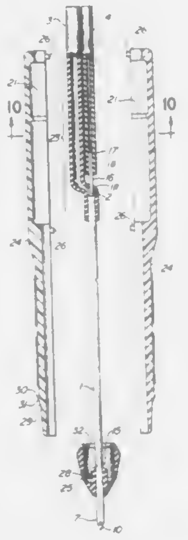


1. An aspirator for removing a body fluid from a body cavity comprising one receptacle for aspirated fluid, said one receptacle being at least partially surrounded by a reciprocable cap-shaped pump member connected with and capable of generating a vacuum within the one receptacle by displacement of the cap-shaped pump member relative to the one receptacle, the cap-shaped pump member comprising a one-way valve in communication with the ambient air and which closes when the pressure within the cap-shaped pump member falls below the ambient pressure, the one receptacle comprising a one-way valve in communication with the cap-shaped pump member and which closes when the pressure within the cap-shaped pump member exceeds the pressure within the one receptacle, and an inlet for aspirated liquid provided in the upper part of the one receptacle, said inlet being connected with an aspirating tube having a free end capable of being inserted into a body cavity.

5,024,654
INSULATED INFUSION AND ASPIRATION PROBE

Hugh J. Tyler, Santa Ana, Calif., assignor to Alcon Surgical, Inc., Fort Worth, Tex.
Filed Oct. 2, 1989, Ser. No. 415,904
Int. Cl.^{5} A61M *3/00*
U.S. Cl. 604—43 9 Claims

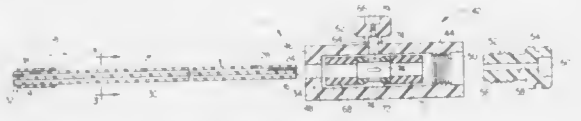
4. A surgical instrument comprising:
(a) an outer transfer tube having a proximal end and a tapered, open, distal end, said distal end having at least one opening formed in the wall thereof adjacent said open distal end;
(b) an inner transfer tube housed within and concentric to said outer tube, said inner tube having a proximal end and a tapered distal end, said distal end having a closed tip portion, and said inner tube having at least one opening formed in the wall thereof adjacent said closed tip portion, and having a segment extending proximally beyond the proximal end of said outer transfer tube,
an exterior portion of said tapered end of said inner tube engaging said open, distal, tapered end of said outer transfer tube, whereby said engagement between said tubes forms a seal proximal to said at least one opening of said inner transfer tube;



(c) a first supply tube connected to said proximal end of said outer transfer tube and having said proximally extending segment of said inner transfer tube extending through the wall of said first supply tube,
(d) a second supply tube connected to said proximal end of said inner tube; and
(e) an elongated, generally tubular housing, said housing contracting and supporting said tubes at the ends of said housing and substantially contacting said outer transfer tube, said inner transfer tube, and said first and second supply tubes, the walls of said housing being spaced from said transfer tubes and said supply tubes substantially throughout the length of said housing to minimize heat transfer from said housing to said tubes.

5,024,655
EPIDURAL CATHETER APPARATUS AND ASSOCIATED METHOD

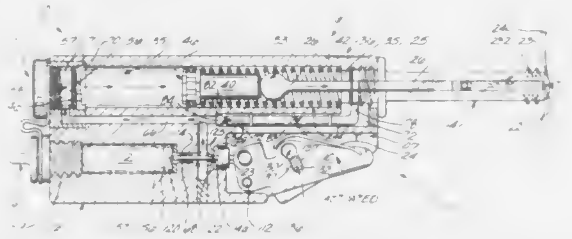
Andrew B. Freeman, 5525 Willow La., Dallas, Tex. 75230, and H. A. Tillmann Hein, 4346 Meadowdale La., Dallas, Tex. 75229
Filed Sep. 5, 1989, Ser. No. 403,107
Int. Cl.^{5} A61M *25/00*
U.S. Cl. 604—53 7 Claims



1. Catheter apparatus comprising:
an elongated flexible catheter member having distal and proximal end portions;
a first lumen extending longitudinally through said catheter member and having an outlet on said distal end portion and an inlet on said proximal end portion;
a second lumen extending longitudinally through said catheter member and having an outlet on said distal end portion and an inlet on said proximal end portion spaced longitudinally apart from said first lumen inlet; and
inlet fitting means removably securable over said proximal end portion for defining separated outward extensions of said first and second lumen inlets for receiving first and second fluids from sources thereof and respectively flowing the received first and second fluids into and through said first and second lumens, said inlet fitting means including:
a generally tubular body adapted to coaxially receive said proximal end portion,
a cap member threadable onto one end of said tubular body with said proximal end portion received therein, and
means, responsive to installation of said cap member, for frictionally retaining said proximal end portion within said tubular body and defining said separated outward extensions of said first and second lumen inlets, said means for frictionally retaining including a duality of hollow tubular compression members disposed within said generally tubular body for coaxially receiving said proximal end portion, and a hollow tubular rigid spacing member coaxially disposed between and separating said compression members within said tubular body, said spacing member being adapted to coaxially receive said proximal catheter end portion and having at least one side wall opening formed therethrough,
said cap member, in response to tightening thereof onto said tubular inlet fitting body, being adapted to axially and radially deform said compression members in a manner causing both of them to be radially compressed between the interior side surface of said tubular body and the exterior side surface of said proximal end portion of said catheter member to thereby create within said tubular body two separate fluid tight seals longitudinally spaced apart along said proximal end portion.

5,024,656
GAS-PRESSURE-REGULATED NEEDLELESS INJECTION SYSTEM

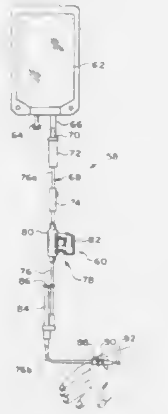
Jack S. Gasaway, Irvine; J. Stuart Parsons, Laguna Niguel, and Robert L. Harshman, Chino Hills, all of Calif.; assignors to Injet Medical Products, Inc., Irvine, Calif.
Filed Aug. 30, 1988, Ser. No. 238,360
Int. Cl.^{5} A61M *5/00*
U.S. Cl. 604—70 38 Claims



1. A gas-pressure-actuated needleless hypodermic device for injecting liquid medication through the skin of persons or animals, the device comprising:
(a) an ampule assembly comprising:
(i) a body having a cavity for holding liquid medication between first and second ends of the body;
(ii) an orifice in the first end of the body through which such liquid medication can flow into and out from the cavity; and
(iii) a plunger assembly movable within the cavity for drawing the liquid medication into the cavity and for forcing the liquid medication out from the cavity;
(b) an injector assembly for receiving and mounting the ampule assembly and for providing a force to move the plunger assembly to thereby force the liquid medication through the ampule assembly orifice, the injector assembly comprising:
(i) an injector body including a barrel closed at its back end, wherein the front end of the barrel is open and configured to receive the second end of the ampule assembly body to thereby mount the ampule assembly on the barrel;
(ii) a piston mounted for sliding movement in the barrel, the piston configured to be pushed by gas pressure from an at-rest position at the back end of the barrel toward the front end of the barrel;
(iii) a chamber in the injector body configured to house a compressed gas container;
(iv) a first passageway in the injector body through which gas flows from the gas container in the gas container chamber to the barrel to provide a force on the rearward-facing surface of the piston to move the piston toward the front end of the barrel;
(v) a second passageway in the injector body configured to be open for venting gas released from the gas container to the atmosphere when the end of the ampule assembly is not mounted in the injector assembly barrel;
(vi) means for sealing the second passageway to prevent venting gas through the passageway to the atmosphere, the seal provided only when the ampule assembly is mounted in the injector assembly barrel; and
(vii) means for releasing gas from the gas container to provide the force on the rearward-facing surface of the piston to thereby move the piston toward the front end of the barrel and into contact with the plunger assembly and for moving the plunger assembly toward the orifice to thereby eject the liquid medication from the cavity out through the orifice.

5,024,657
DRUG DELIVERY APPARATUS AND METHOD PREVENTING LOCAL AND SYSTEMIC TOXICITY

Thomas E. Needham, Deerfield; Jeremy C. Wright, Lake Forest; Steve Pearson, Ingleside; Rao Chilamkurti, West Chicago, and Clinton V. Kopp, Barrington, all of Ill., assignors to Baxter International Inc., Deerfield, Ill.
Continuation of Ser. No. 721,999, Dec. 3, 1984, abandoned. This application May 4, 1990, Ser. No. 518,272
Int. Cl.^{5} A61M *5/14*
U.S. Cl. 604—85 42 Claims



1. Apparatus for the safe delivery of a beneficial agent to a patient, comprising:
(a) means defining a chamber adapted for receiving a beneficial agent, said chamber having a fluid pathway there-

VOL
1127
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18
1991
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through said chamber-defining means including an inlet and an outlet defining part of said fluid pathway; and

(b) means for controlling the rate of delivery of the beneficial agent out of said outlet and into a patient, said control means being capable of producing first and second delivery modes for the beneficial agent when the beneficial agent is being delivered to a patient, such that in said first delivery mode the fluid flow rate through said chamber is high enough that the rate of delivery of the beneficial agent is substantially independent of the fluid flow rate through said chamber, wherein the rate of delivery of the beneficial agent, when the agent delivery rate is independent of fluid flow rate, is at a rate high enough to create, but for said second delivery mode, a locally toxic concentration of beneficial agent in the fluid delivered to the patient, and such that in said second delivery mode, the fluid flow rate through said chamber is slow enough that the rate of delivery of the beneficial agent is at least partially dependent upon the fluid flow rate through said chamber;

(c) said control means causing said second delivery mode to include fluid flow rates high enough to prevent a locally toxic concentration of beneficial agent in the fluid delivered to the patient, said control means furthermore causing said first delivery mode to include fluid flow rates low enough to prevent a systemically toxic concentration of beneficial agent in the bloodstream of the patient.

5,024,658

METHOD AND DEVICE FOR THE DIAGNOSIS AND TREATMENT OF NASAL DISEASES

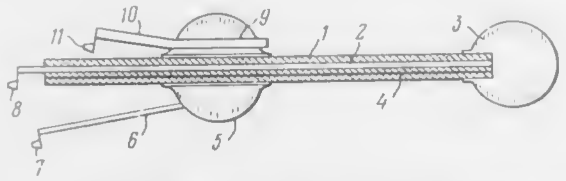
Vladimir S. Kozlov, Narodny pereulock, 6kv. 20; Gennady I. Markov, ulitsa Ukhtomskogo, 19, kv. 32, and Vladimir P. Bugrov, ulitsa Uglicheskava,6a, kv. 43, all of Yaroslavl, U.S.S.R.

Filed Jun. 7, 1989, Ser. No. 362,873

Claims priority, application U.S.S.R., Jun. 13, 1988, 4432024; Jun. 13, 1988, 4432025

Int. Cl.^{5} A61M *29/00*

U.S. Cl. 604—96 3 Claims



1. A device for the diagnosis and treatment of nasal diseases, comprising an elongated flexible body, a longitudinally extending through passage in said body, an inflatable cuff provided intermediate the ends of said elongated body for movement therealong, an inflatable vessel mounted at one end of said elongated body and communicating with said through passage; a tube means rigidly secured in said cuff for axial movement therewith with respect to the body and for communicating with a nasal passage to enable a medical instrument to pass therethrough, evacuate the contents of the nasal sinuses or to introduce medication into the sinuses.

5,024,659

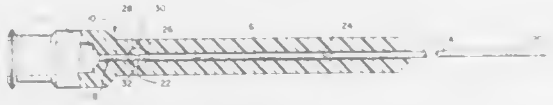
BREAKABLE NEEDLE AND HINGED NEEDLE GUIDE

Douglas D. Sjostrom, Wakefield, Mass., assignor to Smith & Nephew Dyonics Inc., Andover, Mass.

Filed Jan. 10, 1990, Ser. No. 463,176

Int. Cl.^{5} A61M *5/50*

U.S. Cl. 604—110 6 Claims



1. A needle guide comprising:

a hub having a longitudinal axis;

a needle having a longitudinal axis aligned coaxially with said longitudinal axis of said hub and having a proximal end connected to said hub and a distal end;

said needle having a transverse breaking section adjacent said hub, said breaking section being configured so that said needle breaks in two at said breaking section when a transverse breaking force is applied to said hub; and

a hollow handle extending distally from said hub over and concentric to said needle for a distance distal to said breaking section, said handle having a transverse hinge means adjacent said hub in alignment with said breaking section so that said handle flexes relative to said hub at said hinge means when said transverse force is applied

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5,024,660

SYRINGE SHIELD

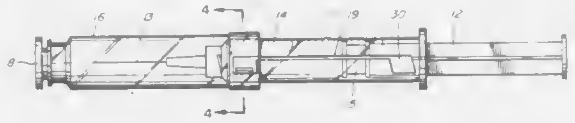
R. David McNaughton, 95 Dobler Ave., Alberta, Canada

Continuation-in-part of Ser. No. 130,277, Dec. 8, 1987, Pat. No. 4,874,383. This application Sep. 12, 1989, Ser. No. 406,276

Claims priority, application Canada, Mar. 17, 1987, 532233

Int. Cl.^{5} A61M *5/00*

U.S. Cl. 604—110 21 Claims



1. A syringe comprising:

a barrel having an hypodermic needle mounted on one end thereof, a piston mounted for movement longitudinally within the barrel and connected to a handle that projects from the opposite end of said barrel; wherein said barrel is tubular and at least partially transparent in a portion that extends over the major part of its length;

a tubular sleeve dimensioned to fit over the barrel, and guided to slide axially thereon between an extended position wherein it projects from said one end of the barrel beyond the tip of said needle and a retracted position wherein it coaxially surrounds said barrel and exposes said needle for use, said sleeve having a length that corresponds to that of said barrel and comprising a tubular wall that is at least partially transparent such that in said retracted position it affords unimpeded visibility of substantially the entire length of said transparent portion of said barrel;

retaining means to secure said sleeve when in the retracted position, said retaining means being effective to prevent any inadvertent axial or rotational movement of said sleeve relative to said barrel; and

locking means for securely and non-releasably locking the sleeve in said extended position, in which position the needle is fully covered to prevent injury to a user by the needle.

5,024,661

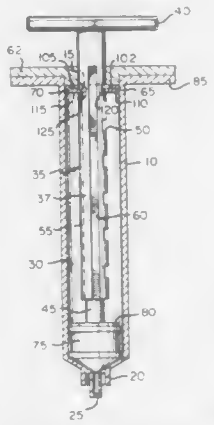
NON-REUSEABLE HYPODERMIC SYRINGE

Harry Wender, Forest Hills, and Augusto F. Avila, Long Island City, both of N.Y., assignors to Empire Research Corporation, Glendale, N.Y.

Filed Aug. 16, 1989, Ser. No. 394,325

Int. Cl.^{5} A61M *5/00*

U.S. Cl. 604—110 21 Claims



1. A hypodermic syringe for single usage, comprising:

a hollow barrel for containing liquid, said barrel having a needle hub for engaging a needle at a front end and having a rear end with an open face, and cover joining means proximate said open face, said barrel having a longitudinal axis;

a plunger shaft within said barrel, said shaft including a rear end, front end and body therebetween, said shaft being adapted to move longitudinally in said barrel when a force is applied thereto;

a cover connected to said cover joining means, said cover having an opening, said rear end of said shaft extending through said opening to be external of said barrel;

first means and second means for engaging said shaft, said first and second engagement means having fixed attachment in relation to said barrel;

third engagement means fixed on said shaft between said shaft ends, said first engagement means when engaged with said third engagement means permitting longitudinal sliding motion of said shaft only away from said needle hub, said second engagement means when engaged with said third engagement means permitting longitudinal sliding motions of said shaft only toward said needle hub, at a given time not more than one of said first and second engagement means being able to engage said third engagement means;

means for releasing said third engagement means simultaneously from said first and second engagement means only when said shaft is withdrawn from said hub, said shaft when released being rotatable about said longitudinal barrel axis from a first angular position where said third engagement means is subject to engagement with said first engagement means to a second angular position where said third engagement means is subject to engagement with said second engagement means, said shaft being subject to withdrawal from said needle hub only one time.

5,024,662

RESISTANCE SYRINGE FOR EPIDURAL ANESTHESIA

Cesar M. Menes, 12905 E. Wolverton, Cerritos, Calif. 90701, and Cenon M. Menes, 212 N. County Line Rd., Hinsdale, Ill. 60521

Filed Mar. 13, 1990, Ser. No. 492,749

Int. Cl.^{5} A61M *37/00*

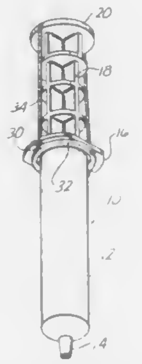
U.S. Cl. 604—131 18 Claims

1. A disposable syringe for single handed use in guiding an epidural needle into the epidural space of a patient for administration of anesthesia, comprising:

a disposable syringe including a syringe plunger slidable in a syringe barrel between a normal position and a drawn position for discharging fluid contained in said barrel through said needle;

said barrel being attachable to the hub of an epidural needle;

a band of elastomeric material having two ends secured to said barrel at diametrically opposed points thereof;



said band having a portion intermediate said secured ends stretchable over a thumb end of said plunger for biasing said plunger from said drawn position to said normal position;

wherein discharge of fluid from said barrel through said needle is normally unrestricted thereby to unambiguously signal the penetration of the epidural space by said needle by immediate and easily perceptible plunger movement from said drawn to said normal position under bias of said band as a result of uncontrolled injection of said fluid into the epidural space.

5,024,663

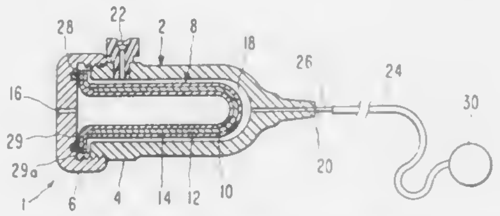
SELF-CONTAINED SUCTION PUMP

Su Il Yum, Los Altos, Calif., assignor to Alza Corporation, Palo, Calif.

Filed Feb. 21, 1990, Ser. No. 482,572

Int. Cl.^{5} A61M *37/00*

U.S. Cl. 604—131 20 Claims



1. A self-contained suction pump for drawing a fluid comprising:

a) an impermeable rigid housing;

b) a fluid imbibing means sealingly mounted within the housing and having an external surface which is at least in part permeable to an actuating fluid;

c) a space between the outer wall of the fluid imbibing means and the inner wall of the rigid housing adapted to contain an actuating fluid;

d) an injection port for injecting an actuating fluid in the space between the housing and the fluid imbibing means;

e) a suction port extending through the rigid housing and in communication with the space between the housing and the fluid imbibing means; and

f) sample receiving means adapted to be attached to the suction port and to a fluid sample source.

VOL
1127
ISS
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JE
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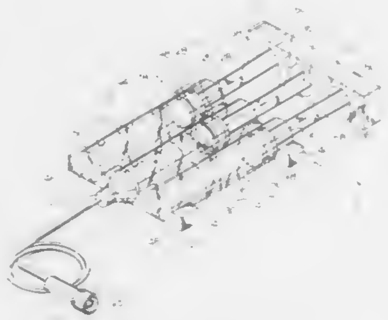
1991
UMI

5,024,664
VACUUM INFUSION DEVICE

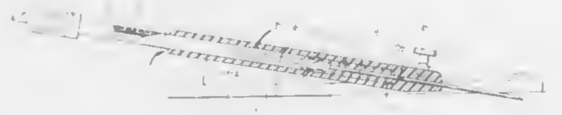
Richard J. Mitchell, Lindenhurst, Ill., assignor to Baxter International Inc., Deerfield, Ill.
Filed Apr. 26, 1990, Ser. No. 514,799
Int. Cl.^{5} A61M *31/00*
U.S. Cl. 604—143 10 Claims



1. A device for infusing liquid comprising:
- a liquid chamber adapted to receive a liquid under pressure, the liquid chamber having a liquid plunger contained within the liquid chamber and a fluid conduit extending from the liquid chamber;
- a vacuum chamber, the vacuum chamber having a vacuum plunger contained within the vacuum chamber;
- an arm connecting the liquid plunger and the vacuum plunger such that when liquid is introduced into the liquid chamber under pressure the vacuum plunger biases; and
- means for preloading the vacuum plunger such that the vacuum plunger does not abut an end of the vacuum chamber housing after infusion.

5,024,665
COMPOSITE CATHETER ASSEMBLY

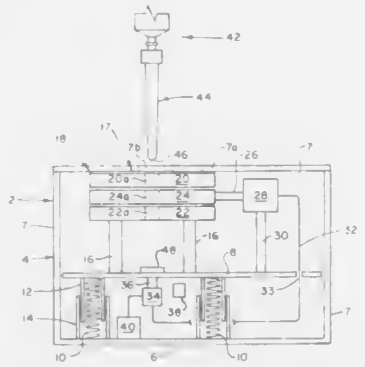
Jerry M. Kaufman, Eatontown, N.J., assignor to Hemedix International, Inc., Eatontown, N.J.
Continuation of Ser. No. 271,587, Nov. 14, 1988. This application May 11, 1990, Ser. No. 522,382
Int. Cl.^{5} A61M *5/32*
U.S. Cl. 604—179 11 Claims



1. A composite catheter assembly for inserting and removing an intravenous catheter including needle means and a ratchet member in a fluid-carrying conduit of a patient, said composite catheter assembly comprising a barrel member having an inner chamber for slidably accommodating said intravenous catheter, whereby said needle means may be maintained in a retracted position entirely within said barrel member and slidably moved from said retracted position entirely within said barrel member into an extended position into said fluid-carrying conduit of said patient, retraction means comprising a resilient assembly for operatively retracting and returning said needle means into said barrel member from said extended position to said retracted position, and latch means operatively associated with said resilient assembly for actuating said intravenous catheter to move said needle means from said extended position to said retracted position, said latch means including pivotally mounted lever means on said barrel member disposed for releasable engagement with said ratchet member on said intravenous catheter when said needle means is moved to said extended position to releasably lock said needle means in said extended position.

5,024,666
MEDICAL NEEDLE SHEATH HOLDING APPARATUS

Daniel W. Pituch, 3299 Kennett Sq., Pittsburgh, Pa. 15213
Filed Sep. 18, 1989, Ser. No. 408,992
Int. Cl.^{5} A61M *5/32*
U.S. Cl. 604—263 12 Claims



1. Apparatus for holding a sheath during unsheathing and resheathing of a needle or catheter, said apparatus permitting a user to perform said unsheathing and resheathing using one hand in a convenient linear stroke-like motion, said apparatus comprising:
- means for gripping said sheath, said gripping means being positionable to an operative sheath-gripping position and an inoperative non-gripping position; and
- actuator means controlled by a sensor for positioning said gripping means into said operative and inoperative positions,
- whereby said apparatus, when said gripping means are in said operative position, gently yet firmly holds said sheath so that the needle or catheter can be inserted into and removed from the sheath, and, when said gripping means are in said inoperative position, a sheathed needle or catheter be can be inserted into and removed from said apparatus.

5,024,667
DISPOSABLE ARTICLE CONSTRUCTION

David B. Malcolm, Maplewood, and William L. Bunnelle, Hugo Township, Washington County, both of Minn., assignors to H. B. Fuller Licensing & Financing, Inc., Wilmington, Del.
Filed Nov. 7, 1988, Ser. No. 268,003
Int. Cl.^{5} A61F *13/15*
U.S. Cl. 604—382 16 Claims

1. A disposable diaper comprising (i) a polymeric film substrate, (ii) at least one absorbent layer, and (iii) an elastic band, wherein the absorbent layer and the elastic band are independently bonded to the substrate with a hot melt adhesive composition, said adhesive comprising:

(a) about 5 to 14 wt-% of a radial block copolymer having a molecular weight of at least about 185,000, having the formula:

$$(AB)_{n1}—Y—(B)_{n2}$$

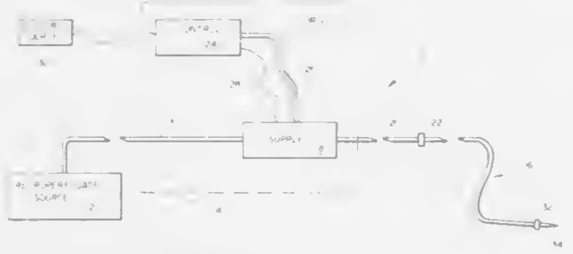
wherein Y is a multivalent coupling agent, A comprises a polyvinyl substituted aromatic block, B comprises a polybutadiene rubbery midblock, n1 is an inter of 3 to 10 and n2 is an integer of at least 0 to 10;

(b) about 45 to 85 wt-% of a compatible tackifying resin selected from the group consisting of a C_5 resin, a styrenated C_5 resin, a styrenated terpene resin, a hydrogenated C_9 resin, a rosin derivative, a styrenated terpene resin and mixtures thereof; and

(c) about 5 to 25 wt-% of a plasticizing oil.

5,024,668
RETROGRADE PERFUSION SYSTEM, COMPONENTS AND METHOD

Jeffrey L. Peters, and Jeffrey L. Orth, both of Salt Lake City, Utah, assignors to Rocky Mountain Research, Inc., Salt Lake City, Utah
Filed Jan. 20, 1987, Ser. No. 5,092
Int. Cl.^{5} A61M *29/02*
U.S. Cl. 606—194 51 Claims



1. A catheter comprising:
- cannula means having a proximal end, a distal end in fluid communication with a corporeal lumen, and a channel for communication of fluids between said distal and proximal ends, said cannula means being formed for positioning within said corporeal lumen and for connection to external means when positioned in said corporeal lumen;
- balloon means attached to said cannula means proximate said distal end and operable between an inflated condition in which said balloon means substantially occludes said corporeal lumen and a deflated condition in which said balloon means is collapsed about said cannula means, said balloon means being sized and shaped to facilitate fluid flow therepast in said lumen when in said deflated condition;
- connector means attached to said proximal end for connection to a fluid reservoir;
- balloon inflating means associated with said cannula means for operating said balloon means between said inflated and deflated conditions, said balloon inflating means including a second channel formed in said cannula means and a port formed in said cannula means in fluid communication between said second channel and the interior of said balloon means; and
- pressure sensing means to sense the pressure of fluids within said lumen and communicate signals reflective thereof at said proximal end, said pressure sensing means including a port formed in said cannula means between said balloon means and said distal end and a third channel formed in said cannula means in fluid communication with said port to communicate fluid pressure signals therethrough.

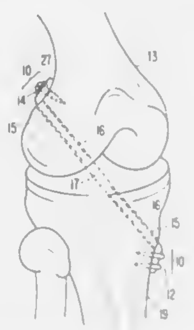
5,024,669
ARTIFICIAL LIGAMENT OF DIFFERENTIAL WEAVE STRUCTURE

Robert H. Peterson, Rancho Santa Margarita, and Erin McGurk-Burleson, San Clemente, both of Calif., assignors to Baxter International Inc., Deerfield, Ill.
Filed Sep. 9, 1988, Ser. No. 242,199
Int. Cl.^{5} A61F *2/08*
U.S. Cl. 623—13 17 Claims

1. An artificial ligament of a generally multilayered or tubular woven structure having weft and warp yarns of low elasticity, comprises:

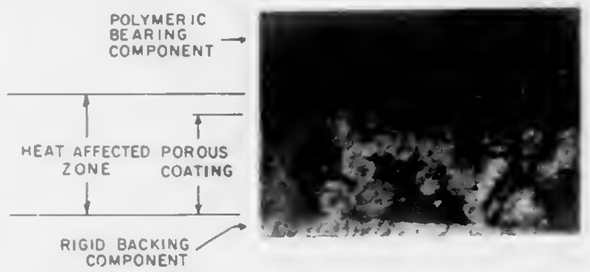
(a) an intra-articular region having highly crimped synthetic warp yarns, wherein the degree of crimping of the warp yarns is such that, within the range of normal physiological loads, the intra-articular region has an elongation at failure and an elasticity substantially the same as those of a normal neutral ligament of the type that the artificial ligament is intended to replace;

(b) a tunnel region having warp yarns wherein the degree of crimping of the warp yarns in the end region is substantially less than in the intra-articular region, such that the elongation of the end region under load is substantially less than that of the intra-articular region, thus providing a strong, stiff matrix for mechanical attachment of the end region to a bone.



5,024,670
POLYMERIC BEARING COMPONENT

Todd S. Smith, Warsaw, and David C. Kelman, Winona Lake, both of Ind., assignors to DePuy, Division of Boehringer Mannheim Corporation, Indianapolis, Ind.
Filed Oct. 2, 1989, Ser. No. 416,139
Int. Cl.^{5} A61F *2/30, 2/38*
U.S. Cl. 623—18 11 Claims



1. A load bearing support for an orthopedic prosthesis component comprising a rigid backing component presenting a rigid mating surface having interstices, a polymeric bearing component having a load supporting surface allowing for repeated movable contact with another prosthesis component and wherein said polymeric bearing component also has a corresponding mating surface, said bearing component and backing component being joined together by heating said backing component to a temperature sufficient to reduce the viscosity of the bearing component at its mating surface and by forcing said components together continuously along the mating surfaces with sufficient pressure to cause the bearing component mating surface to flow into the interstices of the backing component mating surface.

5,024,671
MICROPOROUS VASCULAR GRAFT

Roger Tu, Lake Forrest; David Chen, Irvine, and Wilfred F. Mathewson, Dana Point, all of Calif., assignors to Baxter International Inc., Deerfield, Ill.
Filed Sep. 19, 1988, Ser. No. 246,578
Int. Cl.^{5} A61F *2/06*
U.S. Cl. 623—1 30 Claims

2. An implantable vascular graft comprised of a tubular body formed from a porous, biocompatible material and having an

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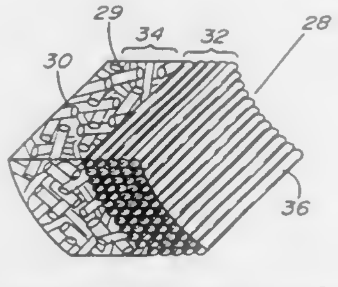
inner surface defining an open passageway through which a fluid can pass, said tubular body including porous hollow fibers



with at least a portion of said porous hollow fibers forming at least a portion of said inner surface.

5,024,672

DISPOSABLE DIAPER

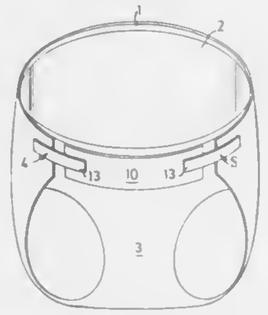
Leif U. R. Widlund, Luktärtsgatan 1C, S-431 32 Mölndal, Sweden

Continuation of Ser. No. 51,192, May 18, 1987, abandoned, which is a continuation of Ser. No. 844,268, Feb. 26, 1986, abandoned, which is a continuation of Ser. No. 543,894, Oct. 20, 1983, abandoned. This application Dec. 8, 1988, Ser. No. 281,457

Claims priority, application Sweden, Oct. 25, 1982, 8206042

Int. Cl.^{5} A61F *13/15*

U.S. Cl. 604—390 2 Claims



1. A disposable diaper which can be secured about the body of a user by means of pressure-sensitive adhesive tape tabs, said diaper having a first end and a second end opposite said first end, comprising:

a liquid permeable inner layer closest to the user during use of the diaper;

a liquid-tight outer layer having an inner surface and an outer surface;

an absorbent layer disposed between the inner layer and the liquid-tight outer layer;

a pair of tape tabs at said first end of the diaper, each tape tab being positioned close to a respective one of the corners of said first end of the diaper with a first end portion of each of said tape tabs being permanently joined to the liquid-tight outer layer at said first end of said diaper; and

a single plastic strip comprising a material selected from the group consisting of polypropylene and polyester glued on said outer surface of said liquid-tight outer layer, adjacent said second end of said diaper,

said plastic strip having an embassed exposed plastic surface away from the user serving as a tape-receiving surface for releasably fastening the pair of tape tabs when putting the diaper on the user,

said plastic strip comprising a material which has suitable properties for fastening of the pair of tape tabs thereto as well as easy removal of the tape tabs therefrom and refastening of the tape tabs thereto, without risk that the plastic strip will stretch and be broken by the removal of the tape tabs therefrom,

said plastic strip being elongated transversely to the diaper to permit adjustment of the tension of the diaper around the user by loosening at least one of said tape tabs from said plastic strip, adjusting the relative position of the loosened tape tab and the plastic strip, and refastening the tape tab to said plastic strip in the thus adjusted position,

each of said tape tabs having a width no greater than the width of the plastic strip, each of said tape tabs having a second end portion opposite from its first end portion, each said second end portion having a pressure sensitive adhesive on the side thereof that contacts said plastic strip, whereby said plastic strip extends as a belt continuously between the tape tabs when the diaper is secured about the body of the user,

said adhesive having a greater cohesion than the adhesion between said tape tabs and said plastic strip,

and the tear strength of said plastic strip being greater than the adhesive strength of said tape tab adhesive for the material of said plastic strip,

whereby the combination of said liquid-tight outer layer, said plastic strip and the glue therebetween allows said tape tabs with said adhesive thereon to be releasable from and refastenable to said plastic strip without stretching and breaking said plastic strip.

5,024,673

NITROANILINE DYES WITH A CYANO SUBSTITUENT GROUP

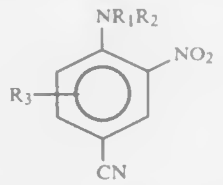
Yuh-Guo Pan, Stamford, and Lana Hochman, Westport, both of Conn., assignors to Clairol Incorporated, New York, N.Y.

Division of Ser. No. 333,528, Apr. 4, 1989, Pat. No. 4,980,158. This application Oct. 11, 1990, Ser. No. 596,120

Int. Cl.^{5} A61K *7/13*

U.S. Cl. 8—414 9 Claims

1. A hair dye composition comprising 0.001 to 5% of a cyano substituted nitroaniline dye compound having the structure



(I)

wherein R_1 and R_2 are each selected from the group consisting of hydrogen, alkyl, hydroxyalkyl, polyhydroxyalkyl, alkoxyalkyl, hydroxyalkoxyalkyl and aminoalkyl, and R_3 is selected from the group consisting of hydrogen, alkyl, hydroxy, hydroxyalkyl and halogen, the alkyl and alkoxy moietics having from 1 to about 6 carbons; from about 0.01 to about 10% of one or more other dye compounds, and an aqueous vehicle as the remainder.

5,024,674

PROCESS FOR IMPROVING THE DYEABILITY OF WOVEN OR NON-WOVEN TEXTILES: PRE-TREATMENT WITH AQUEOUS DISPERSION OF POLYURETHANE CONTAINING RANDOM CATIONIC GROUPS

Cesare Prelini, Milan; Aldo Trovati, Novara; Tiziana Gambini, Castellanza, and Vittorio Stefanoli, Busto Arsizio, all of Italy, assignors to Raffineria Olii Lubrificanti "R.O.L" S.p.A., Milan, Italy

Continuation of Ser. No. 267,645, Nov. 4, 1988, abandoned, and Ser. No. 135,042, Dec. 18, 1987, abandoned. This application Nov. 9, 1989, Ser. No. 433,993

Claims priority, application Italy, Dec. 24, 1986, 22864 A/86

Int. Cl.^{5} D06M *15/56;* **D06P** *1/52, 5/22;* **C08G** *18/48*

U.S. Cl. 8—554 11 Claims

1. Process for improving the dyeability of a woven or non-woven textile article which comprises treating the textile article, before dyeing, with an aqueous dispersion of polyurethanes comprising in the macromolecule cationic groups randomly distributed in amounts ranging from 15 to 100 meq per 100 g of dry polyurethane.

5,024,675

APPARATUS FOR FILLING AND SEALING ALKALI METAL ELECTRODE CONTAINERS FOR ALKALI METAL ENERGY CONVERSION DEVICES AND METHOD OF FILLING ALKALI METAL ELECTRODE CONTAINERS FOR ALKALI METAL ENERGY CONVERSION DEVICES

Michael Stackpool, Runcorn, and David Riley, Chester, both of United Kingdom, assignors to Chloride Silent Power Limited, Runcorn, United Kingdom

PCT No. PCT/GB88/00643, § 371 Date Apr. 28, 1989, § 102(e) Date Apr. 28, 1989, PCT Pub. No. WO89/01244, PCT Pub. Date Feb. 9, 1989

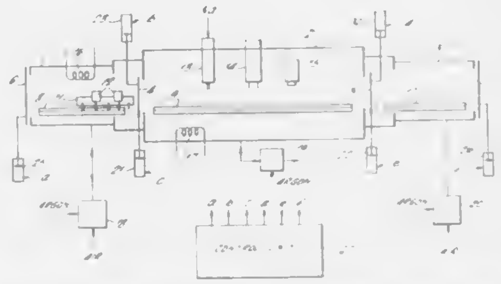
PCT Filed Aug. 3, 1988, Ser. No. 341,099

Claims priority, application United Kingdom, Aug. 3, 1987, 8718375; Aug. 3, 1987, 8718376

Int. Cl.^{5} H01M *4/16;* **B22D** *35/06*

U.S. Cl. 29—623.1 19 Claims

1. Apparatus for filling and sealing an alkali metal container for an alkali metal energy conversion device, comprising intercommunicating entry, filling and exit chambers, entry and exit doors which are closable to hermetically seal the filling chamber from the entry and exit chambers respectively, hermetically sealable entry and exit hatches to the entry and exit chambers respectively, interlock means to permit opening of said entry or exit hatch only when the respective said entry or exit door is closed, transfer means operable to transfer an alkali metal container to be filled and sealed successively from the entry chamber to the filling chamber and, when filled and sealed, from the filling chamber to the exit chamber, vacuum means arranged for independently controlling the atmosphere in each of the entry, filling and exit chambers to provide a respective pressure of inert gas in each of said changers, heating means arranged for independently controlling the temperatures in at least said entry and filling chambers, and filling and sealing means arranged to fill said container with molten alkali metal and seal said container in the filling chamber, the said transfer means comprising a carriage arranged to hold at least one said electrode container, and respective drive means in each of said chambers for guiding and propelling the carriage in the respective chamber, the respective drive means in adjacent communicating chambers being adapted to co-operate in supporting and propelling the carriage from one said chamber to the next through the open door between the chambers, the carriage having sufficient length in the direction of transfer to ensure full guided supporting engagement with one drive means is retained during transfer at least until the carriage engages the next drive means.



5,024,676

SUPER-HEAVY OIL EMULSION FUEL

Noboru Moriyama, Wakayama; Tsugitoshi Ogura, Kanagawa, and Akio Hiraki, Nagasaki, all of Japan, assignors to Kao Corporation and Mitsubishi Jukogyo Kabushiki Kaisba, both of Tokyo, Japan

Filed Aug. 16, 1989, Ser. No. 394,486

Int. Cl.^{5} C10L *1/32*

U.S. Cl. 44—301 16 Claims

1. A super-heavy oil emulsion fuel consisting essentially of 100 parts by weight of super-heavy oil, 30–80 parts by weight of water, 0.01–4 parts by weight of at least one anionic surface active agent selected from groups (i)–(vii) enumerated below, and at least one nonionic surface active agent having an HLB (hydrophilic-lipophilic balance) of 9–19 and selected from groups (I)–(VII) enumerated below, wherein the weight ratio of said anionic surface active agent/nonionic surface active agent is from 1/99–75/25;

VOL
1127
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anionic surface active agents:
- (i) the group consisting of formaldehyde condensation products of sulfonic acid or sulfonate salts of cyclic aromatic compounds in which the average degree of condensation of formaldehyde is 1.2-100, wherein the salts are lower amine salts, alkali metal salts or alkaline earth metal salts,
- (ii) the group consisting of formaldehyde condensation products of lignosulfonic acid, lignosulfonate salts, derivatives thereof and lignosulfonate and sulfonates of aromatic compounds, and salts thereof, wherein said salts are lower amine salts, alkali metal salts or alkaline earth metal salts, and wherein the average degree of condensation of formaldehyde is 1.2-50,
- (iii) the group consisting of copolymers and salts thereof of polystyrene sulfonic acid, salts thereof, or styrene sulfonic acid with other copolymerizable monomers, said copolymers having a molecular weight of 500–500,000, wherein said salts are lower amine salts, alkali metal salts or alkaline earth metal salts,
- (iv) the group consisting of dicyclopentadiene sulfonate polymers and salts thereof in which the molecular weight of the polymer is 500–500,000 and wherein said salts are lower amine salts, alkali metal salts or alkaline earth metal salts,
- (v) the group consisting of copolymers of maleic anhydride and/or itaconic anhydride, their acids and their salts with other copolymerizable monomers in which the molecular weight of the copolymer is 500–500,000, wherein said salts are ammonium salts or alkali metal salts,
- (vi) the group consisting of the maleic compounds and their salts of liquid polybutadiene in which the molecular weight of liquid butadiene is 500–200,000, wherein said salts are ammonium salts, or alkali metal salts,
- (vii) the group consisting of the following anionic surface active agents having 1 to 2 hydrophilic groups in the same molecule,
  - (a) sulfuric ester salts of alcohols having 4–18 carbon atoms wherein said salts are lower amine salts, alkali metal salts or alkaline earth metal salts,
  - (b) alkanes, alkenes and/or alkylaryl sulfonates or their salts having 4–18 carbon atoms in which said salts are lower amine salts, alkali metal salts or alkaline earth metal salts,
  - (c) sulfates or phosphate esters and salts of the alkylene oxide addition products of compounds having 1 or more active hydrogens in the same molecule,
  - (d) sulfosuccinate salts which are esters of saturated or unsaturated fatty acids having 4–22 carbon atoms,
  - (e) alkyldiphenylether disulfonates and their salts in which the alkyl groups have 8–18 carbon atoms,
  - (f) rosin acids and their salts, tall oil and mixtures of rosin acid and higher fatty acids and salts thereof, in which the salts are ammonium, sodium or potassium salts,
  - (g) alkane or alkene fatty acids having 4–18 carbon atoms and their salts in which the salts are ammonium, potassium or sodium;

nonionic surface active agents:
- (I) the group consisting of alkylene oxide addition products of compounds having phenolic hydroxyl groups, in which the alkylene oxide is ethylene oxide and/or propylene oxide, butylene oxide or styrene oxide,
- (II) the group consisting of the alkylene oxide addition products of formaldehyde condensation products of compounds having phenolic hydroxyl groups, in which a condensation degree is 1.2–100 and the alkylene oxide is ethylene oxide and/or propylene oxide, butylene oxide or styrene oxide,
- (III) the group consisting of the alkylene oxide addition products of monovalent aliphatic alcohols and/or aliphatic amines having 2–50 carbon atoms, in which the alkylene oxide is ethylene oxide and/or propylene oxide, butylene oxide or styrene oxide,
- (IV) the group consisting of the block or random addition polymers of ethylene oxide and propylene oxide and/or butylene oxide and styrene oxide,
- (V) the group consisting of the alkylene oxide addition products of polyhydric alcohols, or esters of said polyhydric alcohols and fatty acids having 8-18 carbon atoms, wherein the alkylene oxide is ethylene oxide and/or propylene oxide, butylene oxide or styrene oxide,
- (VI) alkylene oxide addition products of amines having a multiple number of active hydrogen atoms, wherein the alkylene oxide is ethylene oxide and/or propylene oxide, butylene oxide or styrene oxide,
- (VII) products of the reaction resulting from the addition of an alkylene oxide to a mixture of 1 mole of triglyceride oil and 1 or 2 or more polyhydric alcohols selected from the group consisting of glycerine, trimethylolpropane, pentaerythritol, sorbitol, sucrose, ethylene glycol, polyethylene glycol having a molecular weight of 1000 or less, propylene glycol, and polypropylene glycol having a molecular weight of 1000 or less, and/or 0.1–5 moles of water, wherein the alkylene oxide is ethylene oxide and/or propylene oxide, butylene oxide or styrene oxide.

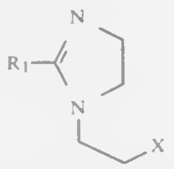
5,024,677
CORROSION INHIBITOR FOR ALCOHOL AND GASOHOL FUELS

Sophia L. Wang, Houston; George R. Meyer, Missouri City, and Kerry C. Brinkman, Houston, all of Tex., assignors to Nalco Chemical Company, Naperville, Ill.

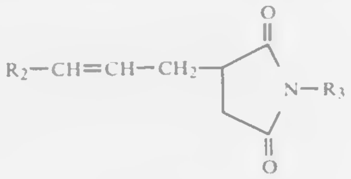
Filed Jun. 11, 1990, Ser. No. 536,288
Int. Cl.^{5} C10L *5/00*

U.S. Cl. 44—335 21 Claims

1. A fuel composition for internal combustion engines comprising (a) a major portion of a fuel selected from gasohol or alcohol, and (b) a corrosion inhibiting amount of a mixture of a substituted imidazoline (IM) having the structure



in which R_1 is C_7–C_{24} alkyl or alkenyl or C_6–C_{40} cycloaliphatic and X is —OH or —NH_2, and an alkenyl succinimide (AS) having the structure



wherein R_2—CH=CH—CH_2 is derived from a C_{10}–C_{30} alpha olefin and R_3-N is derived from a mixture of an aliphatic polyamine, a heterocyclic polyamine, a hydroxyalkylamine and oligomers thereof.

5,024,678
PROCESS FOR THE PREVENTION OR REDUCTION OF DEPOSITS IN CARBURETORS, INJECTION DEVICES AND SIMILAR DEVICES OF ENGINES

Dagmar Mertens-Gottselig, Frechen-Bachem; Hartmut Hammer, Cologne; Heinrich Muller, Wesseling, and Manfred Wildersohn, Eschweiler, all of Fed. Rep. of Germany, assignors to DEA Mineralol Aktiengesellschaft, Hamburg, Fed. Rep. of Germany

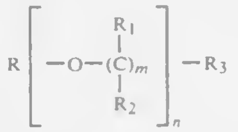
Filed Apr. 5, 1988, Ser. No. 177,623

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1987, 3711985

Int. Cl.^{5} C10L *1/18, 1/22*

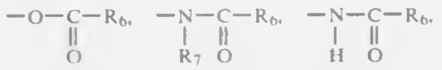
U.S. Cl. 44—348 37 Claims

1. Process for the prevention or reduction of deposits in carburetors, injection devices or similar devices of engines, which are operated with alcohol fuels comprising 99.9 to 75 Vol.-% methanol, ethanol or a mixture thereof and at least one corrosion inhibitor, in combination with lubricants, which are suitable for engines operated with hydrocarbon fuels, characterized in that one or several polyol ethers are added to the alcohol fuels in a quantity of 15 ppm to 1 weight-%, whereby the polyol ether(s) has (have) the general formula



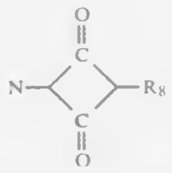
$$R\left[-O-\left(\overset{\overset{R_1}{|}}{\underset{\underset{R_2}{|}}{C}}\right)_m\right]_n-R_3$$

- wherein R is H, linear or branched C_1–C_{20}-alkyl, C_1–C_{20}-alkenyl, polyunsaturated C_1–C_{20}-alkyl, C_1–C_{20}-cycloalkyl, mono- or bicyclo-C_6–C_{14}-aryl, unsubstituted or substituted;
- wherein R_1 is H, C_1–C_8-alkyl, unsubstituted or substituted aryl;
- wherein R_2 is H, C_1–C_8-alkyl, unsubstituted or substituted aryl and wherein R_3 is Or_5, SR_5, $N(R_5)_2$, wherein R_5 is H, linear or branched C_1–C_{20}-alkyl, C_1–C_{20}-cycloalkyl, mono- and bicyclo-C_6–C_{14}-aryl, unsubstituted or substituted; or



$$-O-\underset{\underset{O}{\|}}{C}-R_6,\quad -\underset{\underset{R_7}{|}}{N}-\underset{\underset{O}{\|}}{C}-R_6,\quad -\underset{\underset{H}{|}}{N}-\underset{\underset{O}{\|}}{C}-R_6.$$

wherein R_6 is H, a linear or branched, saturated or unsaturated C_1–C_{20} alkyl- and mono- or bicycloalkyl group or a substituted or unsubstituted mono- or bicycloaryl group, an unsubstituted or substituted amino group, a substituted or unsubstituted alkoxy group, a substituted or unsubstituted thioether group;
- wherein R_7 is a linear, branched, saturated or unsaturated alkyl group, or



- wherein R_8 is R_6 and the C=O groups are not directly interconnected or are interconnected by unsubstituted or substituted saturated or unsaturated methylene bridges consisting of 2–5 methylene groups,
- or phosphoric esters or thiophosphoric esters;
- or alkylethylene diamine tetra acetic acid ester, amide or imide
- whereby m of the polyether molecule exclusively is 2 or 3 or 4 or combinations of these numbers, and
- n is 2–200.

5,024,679
OLEFINS ETHERIFICATION AND CONVERSION TO LIQUID FUELS WITH PARAFFINS DEHYDROGENATION

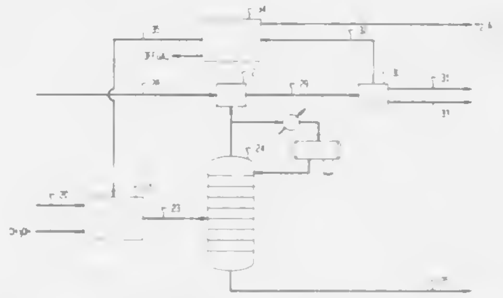
Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 179,729, Apr. 11, 1988, abandoned, which is a continuation-in-part of Ser. No. 130,261, Dec. 8, 1987, Pat. No. 4,826,507, and a continuation-in-part of Ser. No. 130,259, Dec. 8, 1987, Pat. No. 4,830,635. This application Feb. 15, 1990, Ser. No. 480,710

The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.

Int. Cl.^{5} C10L *1/18;* C07C *41/06*

U.S. Cl. 44—449 20 Claims



1. A process for the conversion of C_2+ hydrocarbons to ether-rich liquid fuels and olefinic gasoline comprising;
- (a) reacting a fresh hydrocarbon stream containing C_4+ iso-alkene with an excess of methanol in an etherification zone in contact with an acidic etherification catalyst under etherification conditions whereby an effluent stream containing methyl tertiary alkyl ether is produced;
- (b) separating said etherification effluent stream to provide a first stream comprising ether-rich gasoline range hydrocarbons and a second stream comprising unreacted methanol and C_4- or C_5- hydrocarbons;
- (c) contacting said second stream with an acidic metallosilicate catalyst in oxygenates and olefins conversion zone under olefins oligomerization conditions at elevated temperature;
- (d) separating said conversion zone olefins oligomerization effluent stream in a first stream comprising C_4-C_5 paraffinic hydrocarbon, C_3- hydrocarbons and light gases, and a liquid product stream comprising C_6+ olefinic gasoline;
- (e) contacting said C_4-C_5 hydrocarbon stream with a dehydrogenation catalyst under dehydrogenation conditions whereby C_4-C_5 paraffins are converted to C_4-C_5 olefins;
- (f) separating effluent from step (e) and passing a portion thereof comprising C_4+ olefins to said etherification zone in conjunction with said fresh hydrocarbon stream and methanol for conversion to methyl tertiary alkyl ethers.

5,024,680
MULTIPLE METAL COATED SUPERABRASIVE GRIT AND METHODS FOR THEIR MANUFACTURE

Sy-Hwa Chen, Salt Lake City, Utah, and Chien-Min Sung, Northboro, Mass., assignors to Norton Company, Worcester, Mass.

Filed Nov. 7, 1988, Ser. No. 261,236
Int. Cl.^{5} B24B *1/00*

U.S. Cl. 51—295 32 Claims

1. Coated diamond grit comprising:
- a diamond particles;
- a first coating layer consisting essentially of chromium carbide chemically bonded to said diamond particles; and

VOL
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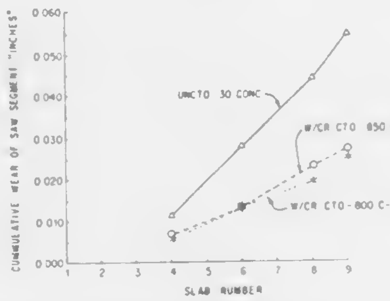
a second coating layer comprising an oxidation resistant carbide forming metal having a carbided inner portion



thereof chemically bonded directly to said first coating layer

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5,024,681

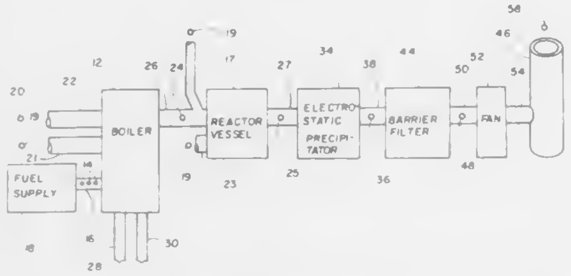
COMPACT HYBRID PARTICULATE COLLECTOR

Ramsay Chang, Los Altos, Calif., assignor to Electric Power Research Institute, Palo Alto, Calif.

Filed Dec. 15, 1989, Ser. No. 451,517

Int. Cl.^{5} B03C *3/00*

U.S. Cl. 55—6 9 Claims



1. A method for removing particulates from flue gas comprising the steps of:

flowing said flue gas through an electrostatic precipitator for removing 90–99% of said particulates, and for imparting a residual electric charge on remaining particulates exhausted from said electrostatic precipitator in said flue gas;

maintaining said residual electric charge on the remaining particulates while flowing said flue gas through a barrier filter placed downstream of said electrostatic precipitator at a high filtration velocity in the range of from 4.06–20.32 centimeters per second (8–40 feet per minute), said barrier filter collecting the charged particulates exhausted from said electrostatic precipitator in said flue gas before said residual electric charge substantially dissipates.

5,024,682

CAUSTIC-IMPREGNATED ACTIVATED CARBONS FOR REMOVAL OF HYDROGEN SULFIDE

Amos Turk, Danbury, Conn., assignor to J. Michael Brassey, Sherman, Conn.

Filed Sep. 4, 1990, Ser. No. 576,783

Int. Cl.^{5} B01D *53/00*

U.S. Cl. 55—73 5 Claims

1. In a process for removing hydrogen sulfide from an oxygen-containing gas stream by passing said gas stream through caustic-impregnated activated carbon, said stream containing from about 5 ppm to about 10,000 ppm by volume of hydrogen sulfide, the improvement in which the breakthrough capacity of the caustic-impregnated activated carbon for hydrogen sulfide is extended by the addition of ammonia to said gas stream about the time of breakthrough.

5,024,683

SORPTION OF TRIALKYL ARSINES

Patricia A. Tooley, Camden, Tenn.; Tin-Tack P. Cheung, Bartlesville, Okla.; Ted H. Cymbaluk, Bartlesville, Okla.; Gerhard P. Nowack, Bartlesville, Okla., and Marvin M. Johnson, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 12, 1990, Ser. No. 537,320

Int. Cl.^{5} B01D *53/04*

U.S. Cl. 55—74 17 Claims

1. A process for at least partially removing trialkyl arsines from fluids comprising the step of contacting a fluid feed which contains at least one trialkyl arsine with a solid sorbent material comprising (a) at least one copper sulfide and (b) an inorganic support material; wherein said contacting is carried out at such contacting conditions as to obtain a fluid product having a lower trialkyl arsine content than said feed, and wherein hydrogen sulfide and free oxygen are substantially absent from said fluid feed.

5,024,684

MULTI-STAGE VORTEX REACTOR

John T. Tank, San Diego, Calif., assignor to Pyropower Corporation, San Diego, Calif.

Continuation of Ser. No. 351,822, May 12, 1989, abandoned. This application Apr. 6, 1990, Ser. No. 506,593

Int. Cl.^{5} B01D *47/00*

U.S. Cl. 55—92 31 Claims

16. A method of mixing a fluid stream into a gas stream, utilizing a vortex reactor, having a first generally cylindrical vortex chamber having an inlet and an outlet end, a second generally cylindrical vortex chamber disposed concentrically outside said first vortex chamber, and transfer means for introducing a gas stream tangentially from the second vortex chamber into the first vortex chamber, comprising the steps of:

dividing a gas stream into at least a first and a second gas stream;

introducing said first gas stream through an inlet duct tangentially as a vortex flow into said first vortex chamber at the inlet end of said first vortex chamber;

introducing a fluid stream into said first vortex chamber at the inlet end of the first vortex chamber for mixing the fluid stream into the first gas stream;

directing the second gas stream tangentially as a vortex flow into said second vortex chamber in the inlet end of said first vortex chamber;

introducing gas from said second gas stream in the second vortex chamber through said transfer means into the first vortex chamber at a tangent thereto; and

continuously removing gas through the outlet end of the first vortex chamber.

5,024,685

ELECTROSTATIC AIR TREATMENT AND MOVEMENT SYSTEM

Vilmos Török, Lidingö, and Andrzej Loreth, Åkersberga, both of Sweden, assignors to Astra-Vent AB, Stockholm, Sweden

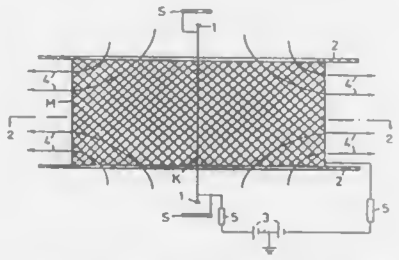
PCT No. PCT/SE87/00595, § 371 Date Jun. 19, 1989, § 102(e) Date Jun. 19, 1989, PCT Pub. No. WO88/04851, PCT Pub. Date Jun. 30, 1988

PCT Filed Dec. 11, 1987, Ser. No. 377,855

Claims priority, application Sweden, Dec. 19, 1986, 8605475; May 11, 1987, 8701916

Int. Cl.^{5} B03C *3/00*

U.S. Cl. 55—117 17 Claims



1. A system for generating an air flow comprising

a corona electrode including an elongate thin wire;

a hollow substantially cylindrical target electrode structure having

two axial ends with at least one of said axial ends being open,

and an air permeable cylindrical wall structure;

said corona electrode wire extending along and substantially coinciding with a longitudinal axis of said cylindrical target electrode structure;

a direct current voltage source having

a first terminal connected to said corona electrode,

a second terminal connected to said target electrode structure,

a voltage difference between said first and second terminals of said voltage source to cause an air-ion generating corona discharge at said corona electrode generating an airflow under the influence of air-ions travelling from said corona electrode to said target electrode structure, said airflow entering through said open axial end and exiting through said air permeable cylindrical wall structure;

ring-shaped screening electrodes connected to said corona electrode in axially spaced relationship with ends of said corona electrode wire.

5,024,686

RECYCLE SPRAY GAS-LIQUID CONTACTOR

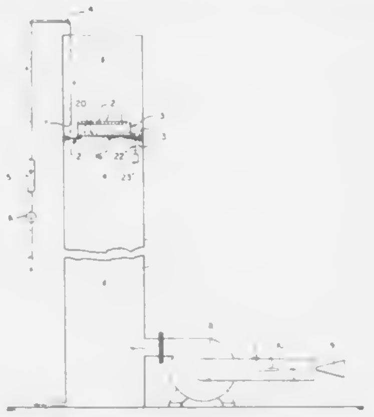
Bernard J. Lerner, 727 Orchard Hill Dr., Pittsburgh, Pa. 15238

Filed Apr. 20, 1990, Ser. No. 512,214

Int. Cl.^{5} B01D *47/00*

U.S. Cl. 55—259 13 Claims

13. Apparatus for effecting gas-liquid mass transfer comprising a vertically oriented gas-tight vessel having at the base thereof means for passage of a gas into the vessel and at its top means for passage of a gas therefrom, at least one horizontal tray contained therein, a vertical housing resting on each said tray, an array contained within the housing and occupying an open space in the tray of horizontally aligned spaced apart parallel elongated liquid conductors having liquid-delivery openings to the space between the conductors, said conductors being open to liquid flow from the surrounding tray outside the housing, and, supported upon the upper edges of said housing, an array of foraminous tubes in substantial parallel contact with each other, each said tube being open at at least one end thereof for liquid flow from the tubes; and means for flow of liquid into substantially the top of the said vessel and for flow of treated liquid from substantially the bottom of the vessel.



5,024,687

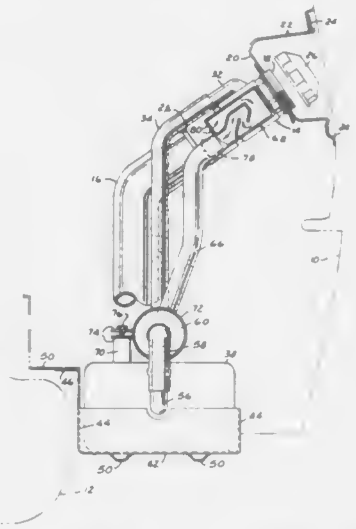
DRY AIR PURGE SYSTEM FOR VAPOR CANISTER

Roger A. Waller, Sterling Hts, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed May 29, 1990, Ser. No. 530,953

Int. Cl.^{5} B01D *45/00*

U.S. Cl. 55—316 6 Claims



1. In a vehicle having an internal combustion engine and a fuel vapor storage system including a vapor storage canister which has an air permeable fuel vapor storage medium therein, a purge system for the canister, comprising: air inlet means to the interior of the canister for introducing a flow of air therein during a vapor purge mode of operation; fluid outlet means to the interior of the canister for discharging air and any fuel vapor released from the vapor storage medium during the vapor purge mode of operation; the air inlet means including a water separation device to prevent water from being carried into the canister with the air flow during the vapor purge mode of operation, the water separation device having a thin walled enclosure with an air inlet and air outlet, the enclosure configured to require the air flow therethrough to abruptly change direction and then pass generally upwardly over a surface of an upwardly inclined internal separator wall so that water carried by the air is collected on the internal wall of the enclosure and the inclined walls surface whereby the water is collected in the

VOL
1127
ISS
3
JE
18
1991
UMI

region of the juncture between the enclosure wall and the internal separator wall, the separator device having a drain opening means through the enclosure wall which is positioned in the juncture region; the device being oriented so that gravity causes the water to collect in the juncture region and to pass through the drain opening means out from the separator.

5,024,688

METHOD FOR PRODUCING CARBON-COATED OPTICAL FIBER

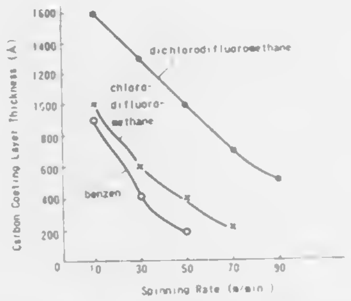
Keiji Oohashi; Shinji Araki, both of Sakura; Hideo Suzuki, Funabashi, and Tsuyoshi Shimomichi, Sakura, all of Japan, assignors to Fujikura Ltd., Tokyo, Japan

Filed Oct. 18, 1989, Ser. No. 423,308

Claims priority, application Japan, Nov. 30, 1988, 63-303758; Dec. 13, 1988, 63-314662

Int. Cl.^{5} C03C *25/02*

U.S. Cl. 65—3.12 **3 Claims**



1. A method for producing carbon-coated optical fiber, the method comprising
   (a) providing an uncoated non electrically conductive optical glass fiber to be coated with at least one carbon coating layer on the surface;
   (b) thermally decomposing a halogenated hydrocarbon compound, wherein said halogenated hydrocarbon compound is at least one compound selected from the group consisting of $CClF_3$, CCl_2F_2, $CCl_3FC_2Cl_2F_4$ and C_2ClF_5, to obtain carbon as a thermal decomposition product of said halogenated hydrocarbon; and
   (c) depositing said carbon as said thermal decomposition product on the surface of the uncoated optical fiber to form a protective coating thereon.

5,024,689

NITROGEN FERTILIZER

Allen R. Sutton, Corydon, Ky., and Richard L. Balser, Tulsa, Okla., assignors to Freeport McMoRan Resource Partners, New Orleans, La.

Filed Feb. 8, 1988, Ser. No. 153,594

Int. Cl.^{5} C05C *9/00;* **C05G** *3/00*

U.S. Cl. 71—29 **22 Claims**

1. A method of enhancing the growth of plants by applying to the area where the plants are to be grown an aqueous fertilizer solution comprising ammonium nitrate, urea, dicyandiamide, ammonium thiosulfate and an ammonium phosphate compound, wherein the dicyandiamide is included in the amount of about 1% to about 2% by weight based on the total weight of the solution.

5,024,690

SEED TREATMENT COMPOSITIONS

Charles C. Chollet, Caldwell, Id., assignor to Snake River Chemicals, Inc., Caldwell, Id.

Division of Ser. No. 290,236, Dec. 22, 1988, which is a continuation-in-part of Ser. No. 859,240, May 7, 1986, abandoned, which is a continuation of Ser. No. 696,443, Jan. 30, 1985, abandoned. This application Nov. 15, 1989, Ser. No. 437,276

Int. Cl.^{5} A01N *25/00;* **C05F** *11/00*

U.S. Cl. 71—77 **6 Claims**

1. A method of using comminuted Alder bark as a stimulator of germination which comprises:
   dusting a seed with a material consisting essentially of comminuted Alder bark; and
   planting the dusted seed.

5,024,691

SUBSTITUTED PHENOXY BENZAMIDE HERBICIDES AND METHODS OF USE

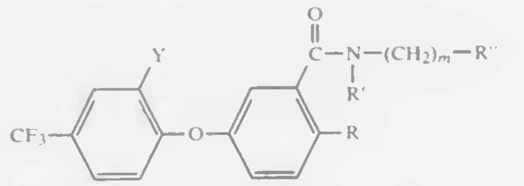
Sreeramulu Nagubandi, New City, N.Y., assignor to ICI Americas Inc., Wilmington, Del.

Division of Ser. No. 704,989, Feb. 25, 1985, Pat. No. 4,632,697. This application Aug. 4, 1986, Ser. No. 892,658

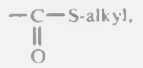
Int. Cl.^{5} A01N *37/34;* **C07C** *255/44*

U.S. Cl. 71—86 **9 Claims**

1. A compound having the formula



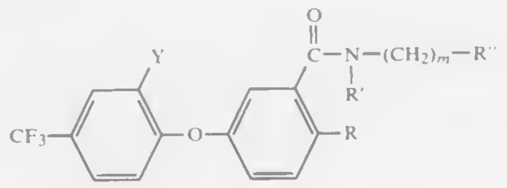
in which
   Y is chlorine, bromine, fluorine, iodine, methyl, cyano or hydrogen;
   R is nitro, hydrogen or halogen;
   R′ is hydrogen, lower alkyl having 1-10 carbon atoms, $—SCCl_3$,



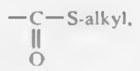
$$-\underset{\underset{\displaystyle O}{\|}}{C}-\text{S-alkyl},$$

   or $PO_3R^3{}_2$ wherein R^3 is hydrogen, alkyl having 1-10 carbon atoms, or herbicidally acceptable salts;
   R″ is cyano; and m is 2 or 3.

7. A method for controlling undesirable weed pests which comprises applying to the locus wherein control is desired a herbicidally effective amount of a compound having the formula



in which
   Y is chlorine, bromine, fluorine, iodine, methyl, cyano or hydrogen;
   R is nitro, hydrogen or halogen;
   R′ is hydrogen, lower alkyl having 1-10 carbon atoms, $—SCCl_3$,



$$-\underset{\underset{\displaystyle O}{\|}}{C}-\text{S-alkyl},$$

   or $PO_3R^3{}_2$ wherein R^3 is hydrogen, alkyl having 1-10 carbon atoms, or herbicidally acceptable salts;
   R″ is cyano; and m is 2 or 3.

5,024,692

HERBICIDAL COMPOSITION AND HERBICIDAL METHOD

Shoin Nagato, Tokyo; Ryusuke Taguchi, Yokohama; Kenji Hirai, Sagamihara; Hiroaki Hirose, and Masahiro Yokota, both of Ichihara, all of Japan, assignors to Kaken Pharmaceutical Co., Ltd.; Sagami Chemical Research Center, both of Tokyo and Chisso Corporation, Osaka, all of Japan

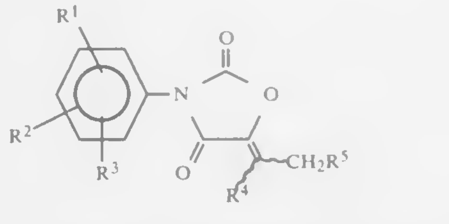
Filed Jul. 7, 1989, Ser. No. 376,570

Claims priority, application Japan, Jul. 14, 1988, 63-173838

Int. Cl.^{5} A01N *57/10*

U.S. Cl. 71—86 **8 Claims**

1. A herbicidal composition consisting essentially of a synergistically effective amount of the combination of an oxazolidinedione having the formula:



(I)

wherein R^1, R^2 and R^3 are, independently, halogen, lower alkenyloxy or lower alkynyloxy; R^4 and R^5 are, independently, hydrogen or lower alkyl; and a phosphorus-containing amino acid compound or its salt selected from the group consisting N-(phosphonomethyl) glycine, DL-homoalanin-4-yl-(methyl)-phosphinic acid, L-2-amino-4-{(hydroxy)(methyl)-phosphinyl}butyryl-L-alanyl-L-alanine and salts thereof, wherein the ratio of said oxazolidinedione to said phosphorus-containing amino acid compound or its salt is about 1:1.125 to about 1:10.

5,024,693

HERBICIDES

Peter S. Gates, Fulbourn, and Graham P. Jones, Sawston, both of England, assignors to Schering Agrochemicals Ltd., England

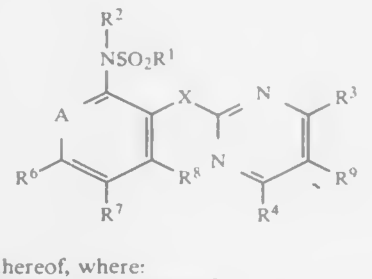
Filed Oct. 2, 1989, Ser. No. 416,153

Claims priority, application United Kingdom, Oct. 4, 1988, 8823288

Int. Cl.^{5} A01N *43/54;* **C07D** *401/12, 239/34, 239/52*

U.S. Cl. 71—92 **20 Claims**

1. A sulphonanilide of the formula:



(I)

and salts thereof, where:
   A is nitrogen or a group CR^5;
   X is oxygen or sulphur;
   R^1 is an $C_{1\text{-}6}$ alkyl, $C_{2\text{-}6}$ alkenyl, $C_{2\text{-}6}$ alkynyl, $C_{3\text{-}7}$ cycloalkyl, phenyl, pyrrolyl, pyridyl, furyl, thienyl, pyrimidinyl, triazolyl, imidazolyl, benzthiophenyl, dihydrogenzofuranyl, thiazolotriazoly, triazolopyrimidinyl or pyrazolopyrimidinyl or amino group;
   R^2 is hydrogen, $C_{1\text{-}6}$ alkyl or $C_{2\text{-}5}$ alkanoyl, or a group $—SO_2R^1$;
   R^3 and R^4, which may be the same or different, are each hydrogen, halo, $C_{1\text{-}6}$ alkyl, $C_{1\text{-}6}$ alkoxy, $C_{3\text{-}7}$ cycloalkyl, amino, pyrrolyl, pyrimidinyl, triazolyl, or imidazolyl;
   R^6, R^7 and R^8, which may be the same or different, are each hydrogen, halo, cyano, a group $COOR^{10}$, $C_{1\text{-}6}$ alkyl, $C_{1\text{-}6}$ alkoxy or amino group;
   R^5 is a group as defined above for R^6, R^7 and R^8, or is pyrimidyloxy or triazinyloxy;
   R^9 and R^{10} each represent hydrogen of $C_{1\text{-}6}$ alkyl group wherein
   any alkyl moiety which the groups R^1 to R^{10} represent or contain being optionally substituted by one of more halogen atoms, carboxy groups, cyano groups or alkoxycarbonyl groups of 1 to 4 carbon atoms;
   any amino group which the groups R^1 and R^3–R^8 represent being optionally mono- or di-substituted by alkyl of 1 to 4 carbon atoms, alkenyl or 2 to 4 carbon atoms, carbamoyl, or by alkanoyl, alkoxycarbonyl, alkylcarbamoyl or dialkylcarbamoyl in which any alkyl group is of 1 to 4 carbon atoms; and
   any phenyl group which group R^1 represents being optionally substituted by one or more alkyl, alkoxy carbonyl or alkylthio of 1 to 4 carbon atoms, halogen, cyano, aminosulphonyl or nitro.

10. A herbicidal composition which comprises an effective herbicidal amount of at least one compound according to claim 1 in combination with a carrier therefor.

5,024,694

HERBICIDAL N-ARYL NITROGEN HETEROCYCLES HAVING FLUORINE-CONTAINING SUBSTITUENTS

Otto Schallner, Monheim; Michael Negele, Cologne; Hans-Joachim Santel, Leverkusen; Klaus Lürssen, Bergisch-Gladbach; Robert R. Schmidt, Bergisch-Gladbach, and Birgit Krauskopf, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

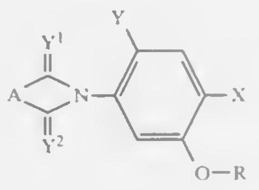
Filed Feb. 6, 1990, Ser. No. 476,224

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1989, 3905006

Int. Cl.^{5} C07D *209/48, 209/46, 207/452, 487/04*

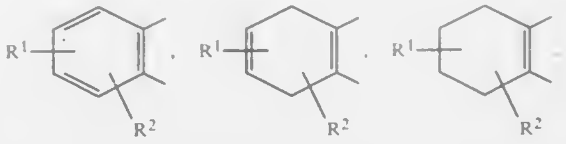
U.S. Cl. 71—95 **11 Claims**

1. An N-aryl nitrogen heterocycle having a fluorine-containing substituent of the formula



(I)

in which
   A represents one of the groupings



VOL
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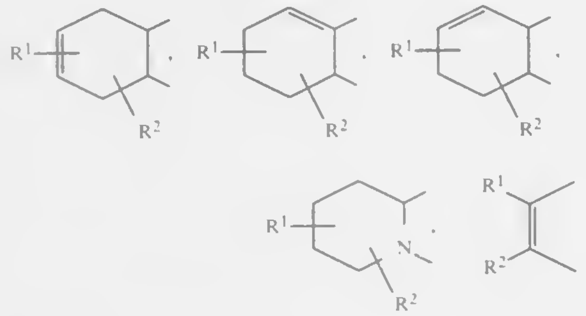


where

R^1 and R^2 in each case independently of one another represent hydrogen, halogen, halogenoalkyl or alkyl, and

Y^1 and Y^2 in each case represent oxygen or sulphur,

R represents in each case optionally branched alkyl, alkenyl, cycloalkyl, cycloalkenyl, cycloalkylalkyl or cyloalkenylalkyl in each case having a carbon-carbon bond interrupted by at least one oxygen atom and in each case substituted by at least one fluorine atom,

X represents hydrogen or halogen and

Y represents hydrogen or halogen.

10. A method of combating unwanted vegetation which comprises applying to such vegetation or to a locus from which it is desired to exclude such vegetation, a herbicidally effective amount of a compound according to claim 1.

5,024,695

FINE HOLLOW PARTICLES OF METALS AND METAL ALLOYS AND THEIR PRODUCTION

Charles P. Ashdown, Lowell; James G. Bewley, West Boxford, and George B. Kenney, Medfield, all of Mass., assignors to UltraFine Powder Technology, Inc., Ayer, Mass.

Continuation-in-part of Ser. No. 825,079, Jan. 31, 1986, abandoned, Division of Ser. No. 634,785, Jul. 19, 1984, Pat. No. 4,626,278. This application Oct. 26, 1988, Ser. No. 263,048

Int. Cl.^{5} B22F *9/06*

U.S. Cl. 75—338 5 Claims

1. A method of producing fine hollow metal particles from a melt material, the method comprising:

introducing into the melt material a melt-soluble gas, the gas being substantially more soluble in the liquid state than the solid state of the melt material, in concentration sufficient to cause the gas to come out of solution and form bubbles of the gas in droplets of the melt material formed after atomization thereof;

atomizing by kinetic spray atomization the melt material to produce atomized droplets of the melt material having the melt-soluble gas dissolved therein, the concentration of gas in the melt and the gas pressure and temperature outside of the droplets being in a range to cause the melt-soluble gas to come out of solution and so as to form the droplets into hollow metal particles.

3. A method for producing fine hollow metal particles from a melt material, the method comprising:

introducing into the melt material at least two melt soluble gases, the at least two soluble gases including a first gas and a second gas, wherein the second gas diffuses more slowly in the melt material than the first gas;

atomizing by kinetic spray atomization the melt material to produce a first yield of atomized droplets of the melt material having the at least two melt soluble gases dissolved therein, the concentration of the first and second gases in the melt, the partial pressures of the gases outside of the first yield of droplets, and the temperature outside of the first yield of droplets, being in a range to cause the diffusion of the first gas out of solution, forming bubbles in the first yield of droplets and bursting a substantial proportion thereof so as to form a second yield of droplets of the melt material, the droplets of the second yield being generally finer than those of the first yield, the temperature and the partial pressures of the gases outside of the second yield of droplets being in a range to cause solidification of a substantial proportion thereof only after the second gas begins to diffuse out of solution and so as to form the second yield of droplets into hollow metal particles.

5,024,696

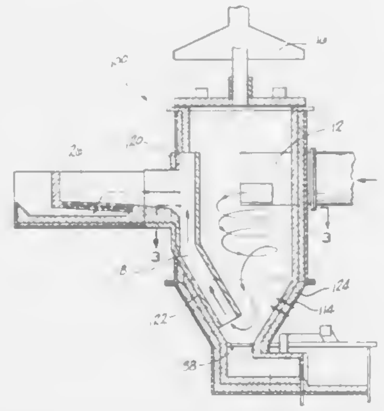
APPARATUS AND METHOD FOR DEGASSING MOLTEN METAL

Thomas J. Ryan, St. Clairsville, Ohio, assignor to Alusuisse-Lonza Services Ltd., Zurich, Switzerland

Filed Jul. 23, 1990, Ser. No. 556,308

Int. Cl.^{5} C22B *9/05;* **F27D** *3/14, 1/16*

U.S. Cl. 75—708 **11 Claims**



1. In an apparatus for use in degassing molten metal including a reaction chamber having an elongated sidewall portion and a central axis, a tangential inlet for the introduction of molten metal and a metal outlet for delivering molten metal to a casting station, and a plurality of fluxing gas nozzle inlets for passing fluxing gas through the molten metal as the molten metal passes through said reaction chamber from the inlet to the outlet, the improvement which comprises a portion of said elongated sidewall portion includes a hollow tube-like section forming said molten metal outlet, said hollow tube-like section having an inlet at a first height below said molten metal inlet and an outlet at a second height above said first height such that said molten metal in said hollow tube-like section passes in a heat exchange relationship with said molten metal in said reaction chamber as metal flows through said reaction chamber and said hollow tube-like section.

5,024,697

COATING COMPOSITION AND METHOD FOR FORMING A SELF-HEATING CORROSION PREVENTATIVE FILM

Perry E. Landers, Russell, and George F. Felton, Ashland, both of Ky., assignors to Ashland Oil, Inc., Ashland, Ky.

Continuation of Ser. No. 818,437, Jan. 13, 1986, abandoned, which is a continuation-in-part of Ser. No. 806,259, Dec. 6, 1985, abandoned.

Filed May 27, 1987, Ser. No. 57,677

Int. Cl.^{5} C04B *9/02*

U.S. Cl. 106—14.13 **6 Claims**

1. An oil-in-water emulsion prepared by diluting a concentrate, with additional water in the range of from about 1 to 20 parts water to each part by weight of the concentrate, the concentrate comprising:

A. about 20 to 95 wt. % of aliphatic or naphthenic oil having a viscosity of about 50 to 500 second (SSU @37° C., 100° F.);

B. about 0.1 to 15 wt. % of stabilizing agent comprising glycol or glycol ethers or derivatives thereof;

C. about 5 to 50 wt. % of emulsifying agent comprising a sulfonate salt of alkaline earth metals;

D. about 0.5 to 10 wt. % of siloxane comprising polyalkylsiloxane or alkylpolysiloxane or derivates thereof;

E. about 0.1 or more wt. % of water.

5,024,698

MONOAZO PIGMENT COMPOSITIONS

Russell J. Schwartz, and Manuel Z. Gregorio, both of Cincinnati, Ohio, assignors to Sun Chemical Corporation, Fort Lee, N.J.

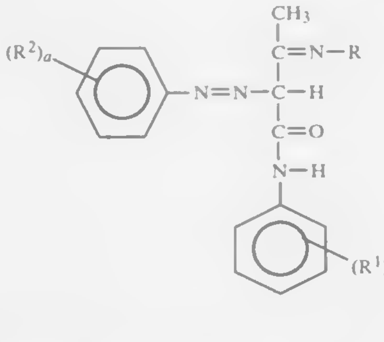
Filed Mar. 22, 1990, Ser. No. 497,385

The portion of the term of this patent subsequent to Aug. 7, 2007, has been disclaimed.

Int. Cl.^{5} C09D *11/00, 11/02, 11/16*

U.S. Cl. 106—20 **16 Claims**

1. An azomethine composition of matter having the formula:



wherein:

R is an alkylene oxide polymer;

R^1 is independently selected from the group consisting of Cl, OCH_3, CH_3, OC_2H_5, C_2H_5 and $CONH_2$;

R^2 is independently selected from the group consisting of Cl, OCH_3, CH_3, NO_2, OC_2H_5, C_2H_5, $CONH_2$, SO_3H, OH and COOH, and a and b are independently integers of 0 to 5.

5,024,699

LEUCO DYES AND RECORDING MATERIALS USING THE SAME

Kiyotaka Iiyama, Sakuramura; Kunio Hayakawa, Gotenba; Masahiro Nakata, Osaka; Kaoru Kodera, Osaka, and Osamu Miyazaki, Osaka, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

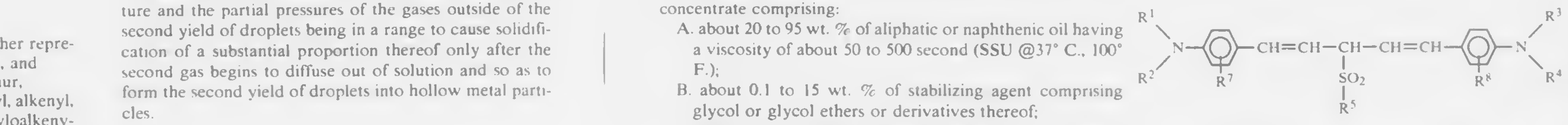
Division of Ser. No. 200,674, May 31, 1988, Pat. No. 4,925,828. This application Mar. 2, 1990, Ser. No. 487,138

Claims priority, application Japan, May 30, 1987, 62-136055; May 30, 1987, 62-137340

Int. Cl.^{5} C09D *11/00;* **B41M** *5/18*

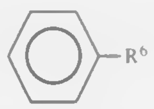
U.S. Cl. 106—21 **8 Claims**

1 A leuco dye having the formula (1),



(1)

wherein R^1, R^2. R^3 ad R^4 each represent a lower alkyl group; R^5 represents an α-naphthyl group, β-naphthyl group or



wherein R^6 represents $—NHCOR^9$, a halogen or an amino group which is unsubstituted or substituted by one or two C_1-C_4 alkyl groups which are the same or different; and R^7, R^8 and R^9 each represent hydrogen or a lower alkyl group, provided that when both R^7 and R^8 are hydrogen, R^6 represents $—NHCOR^9$ or bromine.

5,024,700

THIXOTROPIC PRINTING INK COMPOSITIONS AND METHODS OF PREPARING SAME

William E. Britton, Jr., Sacramento, Calif., assignor to The Ink Company, W. Sacramento, Calif.

Filed Sep. 5, 1989, Ser. No. 403,687

Int. Cl.^{5} C09D *11/02*

U.S. Cl. 106—32 **18 Claims**

1. An ink composition comprising:

(a) approx. 33.7% by weight of solvent petroleum-based ink solvent

(b) approx. 24.5% by Weight of naphthenic ink oil

(c) approx. 19.0% by weight of hydrocarbon resin(s)

(d) approx. 4.5% by weight of petroleum-process oil

(e) approx. 17.5% by weight of oil-based carbon black

(f) less than 1% by weight of aluminum gellant

(g) approximately 0.07% to 1.5% by weight of triethanolamine.

5,024,701

DENTURE ADHESIVE COMPOSITION

Armand J. Desmarais, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 671,277, Nov. 13, 1984, abandoned, which is a continuation-in-part of Ser. No. 519,331, Aug. 8, 1983, abandoned. This application Dec. 22, 1988, Ser. No. 291,412

Int. Cl.^{5} C09K *3/00*

U.S. Cl. 106—35 **13 Claims**

1. A denture adhesive composition consisting essentially of (a) from about 5% to about 50% of a hydrophobically modified water-soluble polymer selected from the group consisting of a hydrophobically modified cellulose ether wherein the cellulose ether is substituted with a hydrocarbon radical having 8 to 25 carbon atoms in an amount from about 0.2 weight

VOL
1127
ISS
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1991
UMI

percent to about the amount which renders the cellulose ether less than 1% by weight soluble in water and a copolymer of ethylene oxide and at least one long chain epoxyalkane having 8 to 25 carbon atoms; (b) from about 35% to about 85% of petrolatum; and (c) 0% to about 15% of a material selected from the group consisting of mineral oil and mineral oil admixed with a polyethylene.

5,024,702

SOIL OR AGGREGATE STABILIZING AGENT AND MATRIXES STABILIZED BY SAME

Ludvik Mazuch, 767 Walsred Road, Victoria, British Columbia, Canada V9C 2X3, and David R. Haughton, 2760 Dooley Road, Victoria, British Columbia, Canada V8Y 1R7

Continuation-in-part of Ser. No. 177,825, Mar. 24, 1988, abandoned, which is a continuation of Ser. No. 853,563, Apr. 18, 1986, abandoned. This application Feb. 9, 1989, Ser. No. 309,602

Claims priority, application Canada, Jun. 26, 1985, 485445

Int. Cl.^{5} C08L *95/00*

U.S. Cl. 106—277 **14 Claims**

1. An agent for stabilizing soil or aggregate, said agent being formed by mixing asphaltic emulsion, lignosulfonate and water, the volume ratio of lignosulfonate to asphaltic emulsion being in the range of 10:90 to 90:10.

5,024,703

METHOD FOR THE PRODUCTION OF A COMPOUND FOR INCREASING OF FROST-RESISTANCE OF HARDENED CONCRETE AND THE COMPOUND THUS PRODUCED

Gert-Ove Gustafsson, Billdal; Leif Berntsson, Göteborg, and Kåre Larsson, Bjärred, all of Sweden, assignors to Multistructure Sweden AB, Goteborg, Sweden

Filed Jul. 19, 1989, Ser. No. 382,241

Claims priority, application Sweden, Nov. 12, 1984, 8405646

Int. Cl.^{5} C04B *22/08, 22/14, 22/12*

U.S. Cl. 106—649 8 Claims

1. A method for the production of a compound for increasing the frost-resistance of hardened concrete, the steps comprising;
   - separating cereal storage proteins from wheat, triticale, barley or rye;
   - determining an amount of reducing agents to be added to the cereal storage proteins based upon the physical properties of the cereal storage proteins to entrain air in the concrete mass during its mixing;
   - adding reducing agents selected from the group consisting of ferro sulphate, tin chloride and copper chloride to the cereal storage proteins produced, in an amount of the reducing agents determined in said determining step;
   - testing the capacity of the compound formed by the cereal storage proteins and the reducing agents to entrain air in the concrete mass during its mixing compared to a standardized air-entraining capacity; and
   - adding a substance which is inert to air-entraining properties but which will dilute by weight percentage the air-entraining capacity of the compound.

5,024,704

METHOD AND APPARATUS FOR CLEANING CAN OPENERS

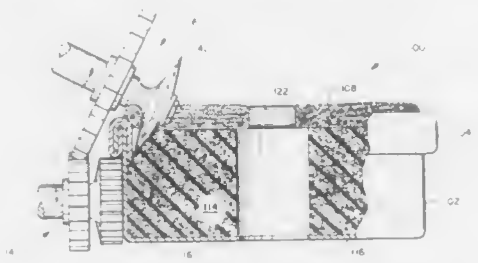
Lee J. Prouty, 176 Athol #8, Oakland, Calif. 94606-1737

Filed May 9, 1990, Ser. No. 521,356

Int. Cl.^{5} A47L *25/00*

U.S. Cl. 134—6 9 Claims

8. A method of cleaning a can opener having a driving wheel and a cutting element, the cutting element having inner and outer surfaces, comprising:
   - inserting a can opener cleaner having a first cleaning element between the driving wheel and the cutting element of the can opener;
   - rotating the driving wheel to rotate the can opener cleaner so that the inner surface of the cutting element is wiped clean by the first cleaning element of the can opener cleaner.



5,024,705

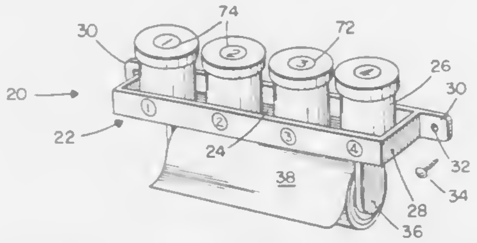
PAINT BRUSH CLEANING SYSTEM

Claire M. Cahill, 300 East Beach Road, Charlestown, R.I. 02813

Filed May 10, 1990, Ser. No. 521,837

Int. Cl.^{5} A47L *25/00*

U.S. Cl. 134—38 15 Claims



1. A process for cleaning paint brushes whose bristles have, from use, developed liquefied accumulations thereon of an oil base paint, said process comprising the steps of:
   - providing a plurality of vessels, each containing the same liquid solvent of a type capable of physically loosening and removing from a paint brush the accumulations of paint which have developed thereon;
   - assembling the vessels into a first predetermined serial relationship;
   - inserting a paint brush which has accumulations of paint thereon into a first one of the vessels;
   - vigorously agitating the paint brush in the first one of the vessels so as to physically remove from the brush a maximum amount of the paint accumulations;
   - removing the paint brush from the first one of the vessels;
   - wiping the paint brush with an absorbent towel so as to mechanically remove from the bristles of the brush a maximized amount of the paint accumulations;
   - repeating the preceding two steps in sequence at least one additional time;
   - thereby providing a brush with cleaned bristles, suitable for use once again.

5,024,706

PIN HETEROJUNCTION PHOTOVOLTAIC ELEMENTS WITH POLYCRYSTAL ALP(H,F) SEMICONDUCTOR FILM

Masahiro Kanai, Tokyo; Tatsuyuki Aoike; Koichi Matsuda, both of Nagahama, and Soichiro Kawakami, Hikone, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

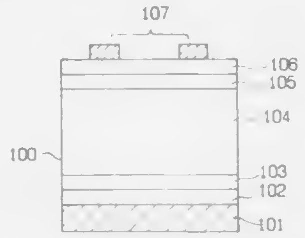
Filed Jan. 19, 1990, Ser. No. 467,523

Claims priority, application Japan, Jan. 21, 1989, 1-12504; Jan. 12, 1990, 2-3429

Int. Cl.^{5} H01L *31/075, 31/0368, 31/0376*

U.S. Cl. 136—258 4 Claims

1. A pin heterojunction photovoltaic element which generates photoelectromotive force by the junction of a p-type semiconductor layer, an i-type semiconductor layer and an n-type semiconductor layer, characterized in that at least one of said p-type and n-type semiconductor layers comprises a polycrystal semiconductor film comprised of aluminum atoms (Al), phosphorus atoms (P), hydrogen atoms (H), and atoms (M) of a p-type or n-type dopant element, said polycrystal semiconductor film contains crystal grains of an average size in the range of 50 to 1000 Å, and said polycrystal semiconductor film contains the hydrogen atoms (H) in an amount of 0.5 to 5 atomic %; and said i-type semiconductor layer comprises a non-single crystal semiconductor film containing silicon atoms (Si) as a matrix and at least one kind of atoms selected from the group consisting of hydrogen atoms (H) and fluorine atoms (F).



5,024,707

PROCESS OF DECREASING THE INCRUSTATION IN PHOSPHATING PLANTS

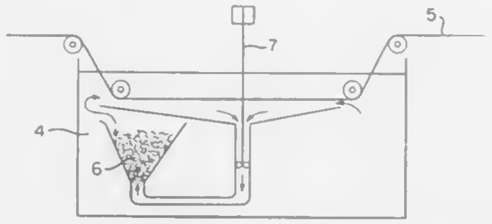
Werner Rausch, Oberursel, Fed. Rep. of Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 22, 1989, Ser. No. 369,743

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1988, 3824063

Int. Cl.^{5} C23C *22/07*

U.S. Cl. 148—253 11 Claims



1. A process for decreasing the incrustation on plant parts in contact with a phosphating solution in a phosphating plant, comprising: contacting the phosphating solution with a workpiece metal surface; and immediately thereafter while at its working temperature and prior to its contact with the surface of plant parts causing the phosphating solution to contact a second solid surface, which surface is presented in addition to the surface of the plant parts said additionally presented second solids surface being disposed outside of a contact area of the workpiece metal surface with the phosphating solution, the ratio of the second solid surface which is contacted by the phosphating solution to the surface of the plant parts in contact with the phosphating solution being at least 2.

5,024,708

CASTABLE AND/OR PRESSABLE GAS GENERATING PROPELLANTS

Eduard Gast, Kraiburg, and Peter Semmler, Aschau, both of Fed. Rep. of Germany, assignors to Contec Chemieanlagen GmbH, Aschau, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 301,542, Jan. 24, 1989, abandoned. This application Jul. 11, 1990, Ser. No. 551,189

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1988, 3804095

Int. Cl.^{5} C06B *45/10*

U.S. Cl. 149—19.1 2 Claims

1. A gas generating propellent composition with flame temperature below 1400° K. (isobaric) when are castable and/or pressable consisting essentially of at least one resin binder which is at least one member of the group consisting of polyurethane, polyesters, polybutadienes, ethyl cellulose, cellulose acetate and polybutylenes, optionally at least one additive selected from the group consisting of wetting agents, stabilizers, plasticizers and buring moderators and as the major gas generating constituent, 60 to 80% by weight of triaminoguanidine nitrate based total composition weight said composition being free of nitramine oxidizers, mitrocellulose binder, energetic plasticizers and recorcinol.

5,024,709

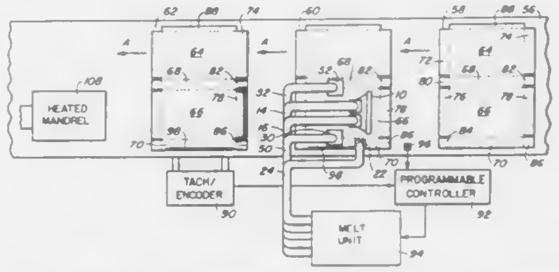
CONTACT-FREE METHOD OF FORMING SIFT-PROOF SEALS

W. Harrison Faulkner, III, and Douglas E. Colton, both of Salinas, Calif., assignors to Slautterback Corporation, Monterey, Calif.

Filed Jan. 22, 1990, Ser. No. 468,368

Int. Cl.^{5} B32B *31/06*

U.S. Cl. 156—69 19 Claims



1. A method of forming a sift-proof seal for a container having flaps comprising,
   - moving said container relative to a plurality of closely spaced outlets for extruding adhesive,
   - extruding adhesive from said nozzles to form a plurality of closely spaced parallel lines of adhesive on a portion of a first flap of said container, said lines of adhesive having gaps therebetween and having lengths generally parallel to said relative movement of said container, the sum of the areas of said gaps between said lines of adhesive being less than that area of said first flap covered by said lines of adhesive, and
   - compressing said lines of adhesive between said first flap and a second flap, said lines of adhesive being spaced apart such that said compressing causes merging of adjacent lines of adhesive.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,710
PROCESS OF APPLYING A SPECULAR SURFACE FINISH TO A CARBON-CARBON SUBSTRATE

Patrick M. Sheaffer, Hawthorne, and James A. Noblet, Gardena, both of Calif., assignors to The Aerospace Corporation, El Segundo, Calif.

Filed Mar. 9, 1990, Ser. No. 491,413

Int. Cl.^{5} **B05D** *3/02, 5/06;* **B32B** *31/12;* **G02B** *5/08*

U.S. Cl. 156—89 3 Claims

1. The process of applying a specular surface to a carbon-carbon (CC) composite substrate having an inherent micro-crack network, said process including:
   a. coating the CC composite substrate with a high char yield organic polymer resin lacquer and allowing the lacquer vehicle to evaporate;
   b. providing a conforming interlayer for the coated CC substrate, said interlayer being composed of a polycrystalline graphite (PCG) having a tough, fine-grain structure;
   c. coating the interlayer with a high char yield organic polymer resin lacquer and allowing the lacquer vehicle to evaporate;
   d. abutting the coated surfaces of the CC composite substrate and the interlayer under pressure and curing the polymer coatings, followed by pyrolysis to provide a carbonaceous mechanical bond between the CC composite substrate and the interlayer;
   e. applying a high char yield organic resin lacquer coating to an exposed surface of the interlayer, drying the coating and pyrolyzing the residual organic resin to form a glassy carbon specular surface on the interlayer.

5,024,711
METHOD FOR PREPARING A SUBSTRATE SURFACE FOR BONDING WITH A SYNTHETIC RESIN BY APPLYING A LAYER BY SAND BLASTING

Oswald Gasser; Rainer Guggenberger, both of Seefeld, and Bernd Burger, Alling, all of Fed. Rep. of Germany, assignors to Thera, Starnberg, Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 301,019

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1988, 3802042

Int. Cl.^{5} **B24C** *1/00*

U.S. Cl. 156—153 23 Claims

1. A method for preparing a substrate surface for bonding with a synthetic resin which comprises:
   applying a coupling layer on said substrate by sand blasting with a composition which, based on the weight of the entire sand blasting composition, comprises:
   (A) 0.01 to 90% by weight of an optionally silanized material having a particle size less than 5 μm and having a hardness exceeding that of the substrate surface, or
   (B) 20 to 100% by weight of a silanized siliceous material having an average particle size of about 2 to 200 μm, wherein
   (C) any remainder of the sand blasting composition, if present, has an average particle size greater than 5 μm, and thereafter, optionally silanizing said coupling layer.

5,024,712
PROCESS AND MACHINE FOR MANUFACTURING TUBULAR PIECES FROM AT LEAST ONE WEB OF SUPPLE MATERIAL AND TUBULAR PIECES THUS OBTAINED

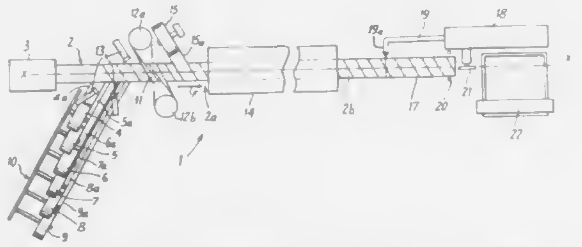
Guy Lecourt, Vauballan, and Jacques Riou, Verrueres le Buisson, both of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France

Continuation of Ser. No. 261,905, Oct. 25, 1988, abandoned. This application May 7, 1990, Ser. No. 520,122

Claims priority, application France, Nov. 3, 1987, 8715229

Int. Cl.^{5} **B31C** *13/00;* **B65H** *81/00*

U.S. Cl. 156—184 11 Claims



1. A process for manufacturing a tubular composite, comprising the steps of:
   (a) helically winding on a mandrel at least one web of material which does not adhere to said mandrel to form a tubular support layer on the mandrel;
   (b) helically winding on said tubular support layer at least one separator film for forming a tubular separation layer superimposed on the support layer;
   (c) helically winding on said tubular separation layer at least one web of a composite material comprising a fiber fabric impregnated with a polymerizable resin for forming a tubular composite layer;
   (d) driving and compacting said tubular support layer, said tubular separation layer and said tubular composite layer parallel to the longitudinal axis of said mandrel by a friction drive means;
   (e) adjusting the temperature of said polymerizable resin in a zone of said friction drive means so as to avoid transfer of said polymerizable resin on said drive means without substantial curing of said polymerizable resin, and to allow compacting of said composite layer by said drive means to form a tubular composite;
   (f) curing said polymerizable resin downstream of said friction drive means;
   (g) cutting said tubular composite into a desired length; and
   (h) separating said tubular support layer and said tubular separation layer from said tubular composite layer.

5,024,713
METHOD OF APPLYING ORNAMENTAL ELEMENT WITH A SHAFT OF MELT ADHESIVE

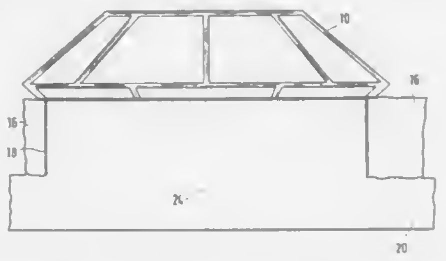
Burkhart Buchbauer, Wattens, Austria, assignor to D. Swarovski & Co., Wattens, Austria

Continuation of Ser. No. 164,179, Mar. 4, 1988, abandoned. This application Sep. 13, 1989, Ser. No. 406,765

Int. Cl.^{5} **A44B** *1/18;* **C09J** *5/02;* **B32B** *31/20*

U.S. Cl. 156—221 5 Claims

1. A method for applying ornamental elements, comprising the steps of:
   providing an ornamental element having a back side, and including a shaft of melt adhesive secured to said ornamental element back side, wherein a diameter of said melt adhesive shaft is of approximately the same size as a diameter of said ornamental element back side,
   providing a perforated application material having a front side and a back side,
   passing through a perforation of the application material said shaft of melt adhesive provided on the ornamental element,
   supplying heat to the shaft to soften the melt adhesive,
   forming the softened shaft by pressure into a flange on the back side of the application material wherein said step of forming the softened shaft into a flange continues until the flange has a diameter larger than a diameter of said ornamental element, and
   allowing the melt adhesive to cool.



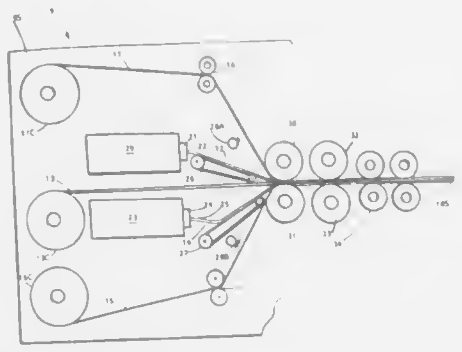
5,024,714
METHOD AND APPARATUS FOR FORMING A COMPOSITE MATERIAL

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Filed Jul. 10, 1985, Ser. No. 753,726

Int. Cl.^{5} **B29C** *47/06;* **B32B** *31/20*

U.S. Cl. 156—243 6 Claims



1. A method of forming a composite structural member comprising:
   (a) continuously feeding first, second and third sheets of metal from respective supplies thereof in a given direction whereby said first and third sheets are guided along respective converging paths in a given direction towards said second sheet which is disposed between said first and third sheets and said three sheets are driven at substantially the same speed,
   (b) guiding said first and third sheets along paths which extend substantially parallel to each other beyond the converging paths thereof and are space-separated from each other to account for the second sheet driven therebetween and to provide respective spacings between said first and second sheets and said second and third sheets,
   (c) continuously extrusion forming first and second extrusions of plastic having sheet configurations and driving said extrusion extrusions as respective discrete formations thereof along respective converging paths to dispose each respectively between said first and second metal sheets and said second and third metal sheets at a common location between a pair of laminating rolls, and
   (d) continuously driving said laminating rolls at said common location to compress said first, second and third metal sheets together with said first and second plastic extrusions disposed between said respective pairs of said sheets to form a laminated sheet-like assembly of said five sheets to provide a composite, high strength lamination of said metal and plastic sheets.

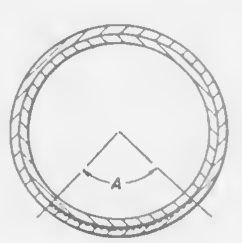
5,024,715
METHOD FOR FABRICATING SECONDARY CONTAINMENT CAPSULE FOR UNDERGROUND STORAGE TANK

Jared A. Trussler, Pismo Beach, Calif., assignor to Trusco Tank, Inc., San Luis Obispo, Calif.

Continuation of Ser. No. 099,546, Sep. 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 035,412, Apr. 6, 1987, abandoned. This application Nov. 16, 1989, Ser. No. 438,539

Int. Cl.^{5} **B32B** *31/04*

U.S. Cl. 156—245 38 Claims



1. A method for forming a secondary containment capsule for a primary fluid storage container, said primary container comprising first and second ends and a longitudinal middle portion, said secondary containment capsule comprising first and second halves slideably mountable over said first and second ends of said primary container such that said first and second halves of said secondary containment capsule can completely encompass said primary container, said first and second halves of said secondary containment capsule each comprising a free end, said free ends of said first and second halves abutting each other when said first and second halves are mounted on said primary container, said method comprising the steps of:
   providing mold means for forming said first and second secondary containment capsule halves;
   forming each of said first and second capsule halves by applying a curable plastic material to said mold means, allowing said curable plastic material to substantially cure, and removing said substantially cured capsule halves from said mold means;
   applying a texturizing agent to the inner surfaces of said first and said second capsule halves subsequent to said formation of said capsule halves, said texturizing agent including a mixture of a binder and solid particles for creating interstices that enhance fluid migration between the inner surfaces of said capsule halves and the outer surface of said primary container;
   slideably mounting said first and second capsule halves over said first and second ends of said primary container such that said first and second halves abut each other and completely encompass said primary container; and
   applying a curable plastic material over said abutting ends of said first and second halves.

5,024,716
PLASMA PROCESSING APPARATUS FOR ETCHING, ASHING AND FILM-FORMATION

Yasue Sato, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 298,362, Jan. 18, 1989, abandoned. This application Jan. 12, 1990, Ser. No. 464,592

Claims priority, application Japan, Jan. 20, 1988, 63-10081; Jan. 20, 1988, 63-10082

Int. Cl.^{5} **B44C** *1/22;* **B05B** *5/025;* **B05C** *5/02;* **C23C** *14/00*

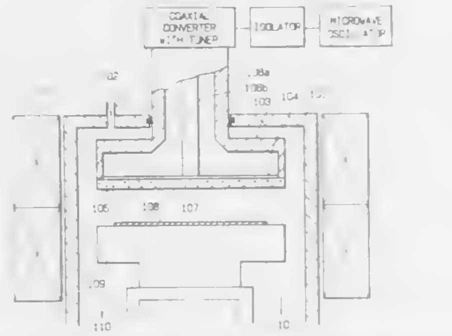
U.S. Cl. 156—345 7 Claims

1. A plasma processing apparatus comprising:
   a vacuum vessel defining a discharge chamber, provided at

VOL
1127
ISS
3
JE
18
1991
UMI

least with source gas supply means for supplying a source gas into the discharge chamber, magnetic field creating means, and microwave propagating and introducing means for propagating a microwave generated by a microwave oscillator and introducing the same into the discharge chamber;

characterized in that the microwave propagating and introducing means is encased in a conductive housing, microwave directing means is provided in a propagation path extending from the microwave oscillator to direct the microwave so that the microwave travels from the periphery of a microwave transmission window toward the center of the same, a microwave radiating member having a cut and formed in the shape of a flat plate is attached to the surface of the microwave transmission window exposed to the discharge chamber so that the microwave traveling from the periphery toward the center of the microwave transmission window is radiated completely into the discharge chamber before reaching the center of the microwave transmission window.



5,024,717
LABELLING APPARATUS

Horst Winter, Neutraubling, Fed. Rep. of Germany, assignor to Krones AG Hermann Kronseder Maschinenfabrik, Bobmerwaldstr, Fed. Rep. of Germany

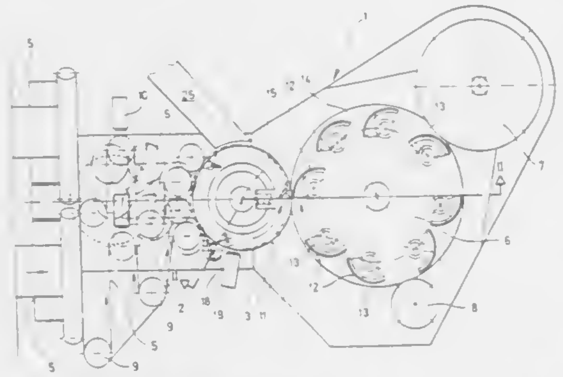
PCT No. PCT/EP88/00573, § 371 Date Nov. 30, 1989, § 102(e) Date Nov. 30, 1989, PCT Pub. No. WO89/00133, PCT Pub. Date Jan. 12, 1989

PCT Filed Jun. 30, 1988, Ser. No. 449,884

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1987, 3722220; Jun. 22, 1988, 8808030

Int. Cl.^{5} B26D *5/00;* **B32B** *31/00*

U.S. Cl. 156—354 **17 Claims**



1. A labelling apparatus for affixing labels to containers, wherein the labels are supplied as a strip material (**5, 50, 500**), said label strip being supplied to the cutting cylinder or vacuum cylinder, respectively, by a feeding mechanism having a controllable drive mechanism (**9, 90**), including a cutting mechanism for separating individual labels from said label strip, and a pallet rotor (**6, 60, 600**) provided with adhesion surfaces for receiving separated individual labels thereon, characterized in that

said cutting mechanism is composed of a stationary knife (**19, 190**) and a vacuum cylinder (**3, 30, 300**) equipped with revolving blades (**51, 401**), that the circumferential surfaces (**11, 110; 12, 120**) of said vacuum cylinder are disposed at a variable radial spacing with respect to those of said pallet rotor, so that in the operative position of said vacuum cylinder its circumferential surface extends tangentially closely adjacent that of said pallet rotor, and that in an inoperative position the circumferential surface of said vacuum cylinder is disposed at a radial spacing with respect to that of said pallet rotor.

5,024,718
LABEL APPLYING APPARATUS

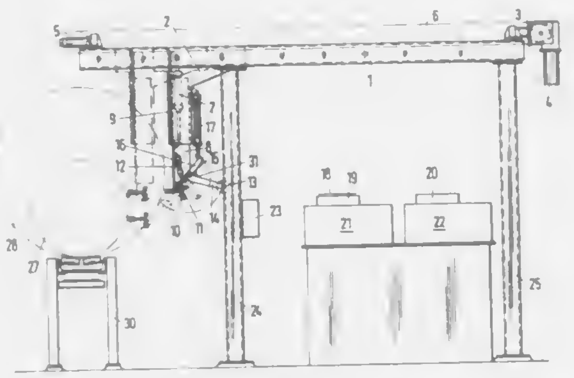
Jakob Hannen, Willich, Fed. Rep. of Germany, assignor to Kleinewefers GmbH, Krefeld, Fed. Rep. of Germany

Filed Oct. 13, 1989, Ser. No. 421,539

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1988, 3835407

Int. Cl.^{5} B65C *9/12, 9/26, 9/30*

U.S. Cl. 156—475 **22 Claims**



1. Apparatus for applying labels to stationary objects at a labelling station, comprising a carrier; means for transporting said carrier between different levels relative to as well as substantially horizontally toward and away from the labelling station; a label supplying device mounted on said carrier and including means for releasably holding a label during transport of said carrier toward the labelling station; a label applying device mounted on said carrier and having means for pressing a label against the stationary object at the labelling station during transport of said carrier between different levels so that said pressing means moves along the label while exerting a force on the same, said transporting means including means for moving said carrier in a first direction and then in a second direction while said pressing means bears against the label; and means for moving at least one of said devices relative to the other of said devices.

5,024,719
CONTINUOUS STAMPING MACHINE

Ernst Heck, Echandens, and Jean Horisberger, Ecublens, both of Switzerland, assignors to Nestec S. A., Vevey, Switzerland

Continuation of Ser. No. 73,493, Jul. 15, 1987, abandoned. This application Jan. 9, 1989, Ser. No. 296,409

Claims priority, application Switzerland, Aug. 7, 1986, 3178/86

Int. Cl.^{5} B32B *31/00, 31/04*

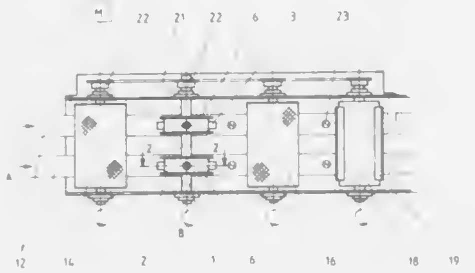
U.S. Cl. 156—522 **11 Claims**

1. A machine for continuously stamping at least one advancing product strip comprising:

a table having a stationary surface for supporting at least one product strip advancing in contact therewith;

at least one stamping wheel affixed to a rotatable shaft positioned above the surface of the table such that the shaft has a longitudinal axis perpendicular to a cross section of an outer circumference of each stamping wheel which, in turn, defines a plane perpendicular to a plane of the surface of the table, each stamping wheel having about its outer circumference at least one stamping die which is capable of being heated and being positioned for contacting the at least one stamping die with a product strip to be stamped advancing on the surface of the supporting table for stamping the advancing product strip;

a first pair of rollers, each roller being affixed to a rotatable shaft and being displaced vertically one from another and positioned upstream of the stamping wheel and table, for positioning at least one product strip to be stamped on the surface of the table for stamping;



a second pair of rollers, each roller being affixed to a rotatable shaft and being displaced vertically one from another and positioned downstream from the stamping wheel for receiving from the surface of the table at least one stamped product strip and for delivering each stamped product strip for being cut; and

a driving motor connected with the stamping wheel shaft and the roller shafts of the first and second pairs of rollers for driving the shafts for driving the stamping wheel and the pairs of rollers in synchronism at a peripheral speed equal to a linear speed of advance of the product strip.

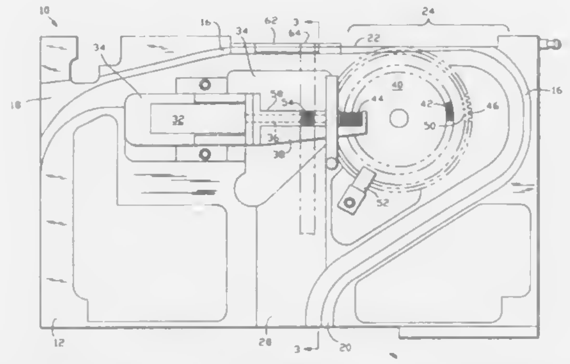
5,024,720
FEEDING APPARATUS FOR FEEDING BELTED COMPONENTS TO AN AUTOMATIC ASSEMBLY APPARATUS

Ernst Boss, Langenthal; Andreas R. Dill, Riedholzplatz, and Heinz Zimmermann, Aetigkofen, all of Switzerland, assignors to Zevatech AG, Roemerstrasse, Switzerland

Filed Nov. 8, 1989, Ser. No. 433,486

Int. Cl.^{5} B65H *5/28*

U.S. Cl. 156—584 **6 Claims**



1. A feeding apparatus for feeding components supported on a belt and packaged in a cover tape to an automatic component assembly means, including a component insertion apparatus, said feeding apparatus comprising:

a flat housing having at least two lateral surfaces mounted on said component insertion apparatus in vertical orientation including a guiding channel for guiding the belt containing the components to be fed, said guiding channel comprising a channel portion running horizontally along an upper edge of said housing and having a freely exposed component pick-up area;

driving means for stepwise forwarding said belt containing said components to be fed through said guiding channel, said driving means mounted in the interior of said housing and including a driving motor;

means for peeling off the cover tape from said belt containing said components to be fed;

said driving motor comprising a drive shaft running parallel to the lateral surfaces of said housing;

a first power transmission means fixed to said drive shaft and adapted to stepwise forward said belt;

a second power transmission means fixed to said drive shaft and adapted to forward said cover tape when it is peeled off from said belt containing said components, to be fed;

said means for peeling off said cover tape comprising a deflection means having an oblique deflection edge located in said horizontally running portion of said guiding channel, and further having a deflection pulley with a horizontally extending rotation shaft;

said cover tape of said belt containing said components to be fed being peeled off from said belt over said deflection edge in a horizontal direction and perpendicularly to the forwarding direction of said belt and running over said deflection pulley to be removed in a downward direction.

5,024,721
METHOD OF FORMING METAL SURFACE THIN FILM HAVING HIGH CORROSION RESISTANCE AND HIGH ADHESION

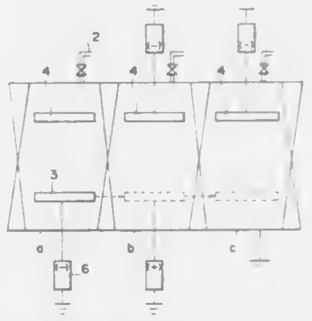
Hiroshi Yamagata, Tateyama, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed Aug. 10, 1990, Ser. No. 565,556

Claims priority, application Japan, Aug. 24, 1989, 1-216011

Int. Cl.^{5} B44C *1/22;* **C23F** *1/00;* **C23C** *14/00, 14/32*

U.S. Cl. 156—643 **1 Claim**



1. A method of forming a metal surface thin film having high corrosion resistance and high adhesion by carrying out sequentially the following steps a) through c):

a) an etching step carried out by applying a negative D.C. voltage to a metal substrate inside an apparatus having an inert gas atmosphere;

b) an oxide film formation step for forming an oxide film by generating an oxygen plasma inside an apparatus having an oxygen gas atmosphere and applying a positive voltage to the surface of said metal substrate; and

c) a durable film formation step for forming a durable film by vapor phase deposition of a corrosion-resistant material onto the surface of said metal substrate inside said apparatus having an inert gas atmosphere.

VOL
1127
ISS
3
JE
18
1991
UMI

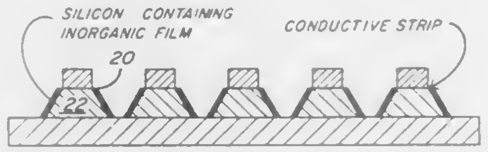
5,024,722
PROCESS FOR FABRICATING CONDUCTORS USED FOR INTEGRATED CIRCUIT CONNECTIONS AND THE LIKE

David A. Cathey, Jr., Boise, Id., assignor to Micron Technology, Inc., Boise, Id.

Filed Jun. 12, 1990, Ser. No. 536,733

Int. Cl.^{5} B44C *1/22;* **C23F** *1/02;* **H01L** *21/306*

U.S. Cl. 156—643 **7 Claims**



1. A process for fabricating metal conductors useful in integrated circuit construction which comprises the steps of:

a. depositing an etch mask on the surface of a selected metal substrate or layer,

b. dry etching the surfaces of said metal layer or substrate exposed by said etch mask in the presence of silicon tetrabromide, $SiBr_4$, and simultaneously

c. depositing a silicon-containing inorganic material on the side walls of metal conductors thus formed in the above etching process to thereby provide sidewall protection of said conductors and retard the horizontal etching or lateral undercutting thereof.

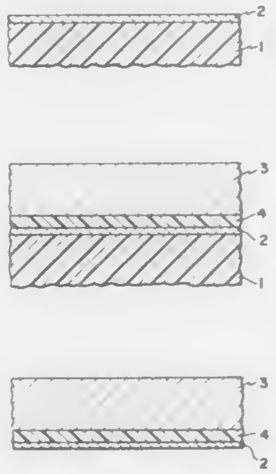
5,024,723
METHOD OF PRODUCING A THIN SILICON ON INSULATOR LAYER BY WAFER BONDING AND CHEMICAL THINNING

Ulrich M. Goesele, 3008 Eubanks Rd., Durham, N.C. 27707, and Volker E. Lehmann, Zweitorstr. 91 D-406, Viersen 1, Fed. Rep. of Germany

Filed May 7, 1990, Ser. No. 519,941

Int. Cl.^{5} H01L *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—628 **17 Claims**



1. A method of forming a thin silicon layer upon which semiconductor devices can subsequently be formed, comprising the steps of:

implanting carbon ions into a silicon substrate, to form an implanted layer;

bonding said silicon substrate to a mechanical support, to form a bonded wafer pair, such that the said implanted layer is adjacent said mechanical support;

annealing of said bonded wafer pair at such low temperatures that carbon remains in solid solution in silicon and no buried layer of silicon carbide is formed;

removing said silicon substrate without removing the implanted layer;

whereby said underlaying implanted layer remain on said mechanical support to form the thin silicon layer.

5,024,724
DRY-ETCHING METHOD

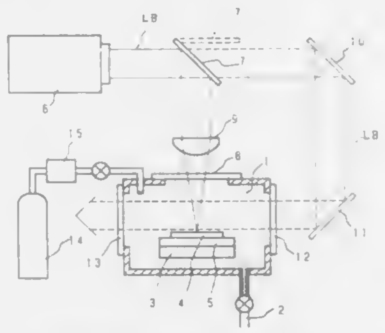
Yutaka Hirono; Seiichi Kiyama, both of Neyagawa, and Masato Osumi, Osaka, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Continuation of Ser. No. 172,381, Mar. 24, 1988, abandoned. This application Oct. 16, 1989, Ser. No. 423,535

Claims priority, application Japan, Mar. 27, 1987, 62-75368; Oct. 14, 1987, 62-262224

Int. Cl.^{5} C23F *1/02, 4/02*

U.S. Cl. 156—643 **16 Claims**



1. A dry-etching method for patterning a metallic film on a substrate, the metallic surface being provided with an oxidized film, into a desired configuration, comprising the steps of:

transforming an area of said oxidized film into a transmuted portion with physical cracks that extend through said oxidized film to said metallic film by irradiating with a convergence laser beam the area of said oxidized film according to an etching pattern, said oxidized film being exposed to an atmosphere of a reactive gas reactive for transforming the area of the oxidized film which is irradiated with the laser beam; and

thereafter exposing said metallic film through said physical cracks to an atmosphere of an activated etching gas, said activated etching gas being activated by a non-convergence laser beam and effecting a complete chemical reaction with said metallic film to form a gaseous reaction end product, the step of thereafter exposing including selectively etching and removing the area of said metallic film in correspondence to said area of said oxidized film that was irradiated by said convergence laser beam, said oxidized film being resistant to removal from exposure to said activated etching gas whereby said transmuted portion collapses as a result of the step of thereafter exposing.

5,024,725
METHOD FOR SELF-INDUCTED REPAIR OF CIRCUIT SHORTS AND NEAR-SHORTS

Chengjun J. Chen, Yorktown Heights, N.Y., assignor to International Business Machines Corp., Armonk, N.Y.

Filed Feb. 6, 1990, Ser. No. 475,583

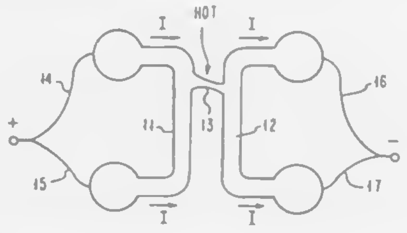
Int. Cl.^{5} B44C *1/22;* **C23F** *1/02;* **C03C** *15/00, 25/06*

U.S. Cl. 156—643 **10 Claims**

1. A method to repair electronic circuit shorts resulting from bridges between lines wherein said bridge is not thicker than said lines, comprising:

applying an appropriate voltage between the lines shorted by said bridge to cause said bridge temperature to be greater than the temperature of said lines and concurrently,

contacting said bridge site with a fluid capable of maintaining a heterolocalized etching process,



said etching continuing until a complete opening comprising a near-open between said lines is effected at the site where said bridge was broken, whereupon said method terminates automatically.

5,024,726
METHOD FOR PRODUCING A λ/4 SHIFT TYPE DIFFRACTION GRATING

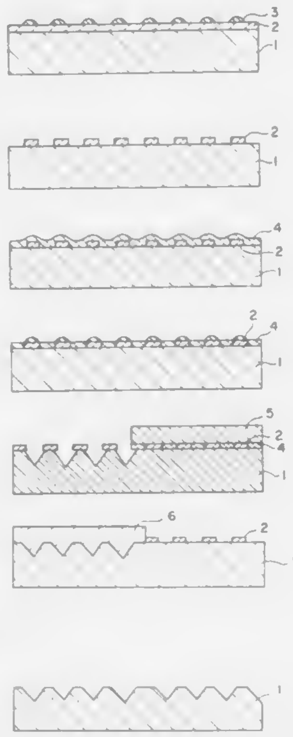
Masatoshi Fujiwara, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Dec. 8, 1989, Ser. No. 447,850

Claims priority, application Japan, Feb. 27, 1989, 1-46254

Int. Cl.^{5} H01L *21/308*

U.S. Cl. 156—653 **5 Claims**



1. A method for producing a diffraction grating including a ¼ wavelength shift in the grating in a substrate comprising:

depositing an electrically insulating film directly on a surface of a substrate;

depositing a first masking film on the electrically insulating film and forming the first masking film into a first grating pattern;

etching the electrically insulating film using the first grating pattern as a mask and subsequently removing the first grating pattern of the first masking film to leave a grating pattern of the electrically insulating film on the surface of the substrate;

depositing a second masking film on the surface of the substrate and on the grating pattern of the electrically insulating film, thereby burying the grating pattern of the electrically insulating film;

etching the second masking film to expose at least a portion of the grating pattern of the electrically insulating film without entirely removing the second masking film;

depositing a third masking film on the second masking film and the exposed portion of the grating pattern of the electrically insulating film;

removing the third masking film and the grating pattern of the electrically insulating film from a portion of the substrate, thereby providing a grating pattern of the second masking film on the portion of the substrate where the third masking film and the electrically insulating film is removed, and etching the substrate using the grating pattern of the second masking film and the remaining portion of the third masking film as masks to thereby form a first portion of a diffraction grating in the substrate;

removing the second and third masking films from the substrate without removing the remaining portion of the grating pattern of the electrically insulating film;

depositing a fourth masking film on the surface of the substrate and the electrically insulating film and then removing the fourth masking film from a portion of the surface of the substrate excluding the first portion of the diffraction grating, to thereby expose the remaining portion of the grating pattern of the electrically insulating film and adjacent portions of the surface of the substrate;

etching the substrate using the grating pattern of the electrically insulating film and the fourth masking film as masks to thereby form a second portion of a diffraction grating in the substrate which second portion is shifted ¼ wavelength from the first portion diffraction grating in the substrate; and

removing the remaining portions of the fourth masking film and the electrically insulating film to thereby form a ¼ wavelength shift diffraction grating.

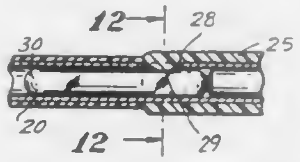
5,024,727
METHOD OF FORMING AN ANIMAL MARKER IMPLANTING SYSTEM

Neil E. Campbell, Hasbrouch Heights, and Chinsoo Park, Rutherford, both of N.J., assignors to Bio Medic Data Systems, Inc., Maywood, N.J.

Division of Ser. No. 248,451, Sep. 23, 1988, which is a continuation-in-part of Ser. No. 919,152, Oct. 6, 1986, Pat. No. 4,787,384. This application Oct. 4, 1989, Ser. No. 417,225

Int. Cl.^{5} B44C *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—663 **4 Claims**



2. A method for forming an electronic transponder capsule which prevents migration within an animal comprising the steps of embedding said electronic transponder in a glass capsule; partially inserting the glass capsule into a mold cavity; injecting a resin into said mold cavity; and curing the resin about said glass capsule.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,728

DEVOLATILIZATION OF LIQUID COMPOSITION CONTAINING POLYMER AND VOLATILE CONSTITUENTS

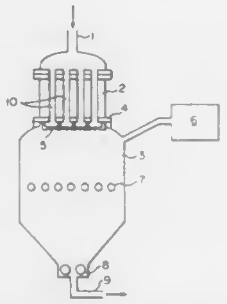
Tsuyoshi Morita; Kyotaro Shimazu, both of Chiba, and Masataka Furukawa, Koshigaya, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed Aug. 28, 1989, Ser. No. 399,003

Claims priority, application Japan, Aug. 29, 1988, 63-214075

Int. Cl.^{5} B01D *1/06*

U.S. Cl. 159—27.4 — 11 Claims



1. A method of devolatilizing a liquid composition containing a styrene-based polymer and volatile constituents which comprises

feeding the liquid composition to the inlet of a vertical multi-tube heat exchanger whereby a stream of the liquid composition flows downwardly through each of the tubes of said heat exchanger to thereby raise the temperature of said liquid composition in each said stream,

subdividing each of the heat exchanged liquid streams flowing from the outlet of each of said heat exchange tubes into a plurality of subdivided liquid streams by passing each liquid stream through an apertured distributor mounted directly to the outlet end of each respective heat exchanger tube,

and volatilizing the plurality of subdivided liquid streams flowing through the apertured distributors in a first volatilization zone located below the vertical multi-tube heat exchanger and apertured distributors.

8. An apparatus for devolatilizing liquid composition containing polymer and volatile constituents comprising a vertical multi-tube heat exchanger, a volatilizer coupled to the underside of said heat exchanger and vacuum means connected to said volatilizer, and a distributor provided between said heat exchanger and said volatilizer, wherein said distributor is directly mounted on the outlet of each tube of said vertical multi-tube heat exchanger.

5,024,729

SUCTION ROLL WITH TURBULENCE SUPPRESSION ELEMENT

Antti Kuhasalo; Olavi Viitanen, and Heikki Ilvespää, all of Jyväskylä, Finland, assignors to Valmet Paper Machinery Inc., Finland

Filed Aug. 14, 1990, Ser. No. 567,106

Claims priority, application Finland, Aug. 18, 1989, 893893

Int. Cl.^{5} D21F *5/02*

U.S. Cl. 162—372 — 6 Claims

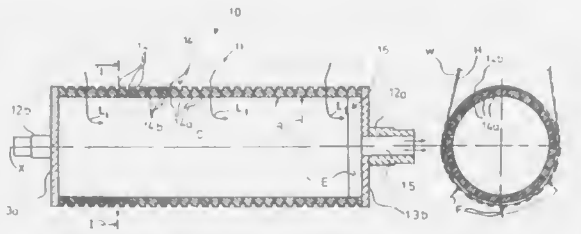
1. A suction roll comprising:

a roll shell, said roll shell comprising a plurality of recesses, each recess having a plurality of holes therein through which holes air is sucked to press a paper web toward the outer surface of the roll shell;

a pair of journals about which said roll shell is rotatable;

said suction roll having an internal space within said roll shell with no suction box therein and in which suction roll a suction condition is created by an external suction device directly connected to one of said journals;

an air turbulence suppression element connected to an end of said roll shell which is in proximity to said one journal directly connected to said external suction device, said turbulence suppression element comprising at least one shell member whose surface extends perpendicularly to the longitudinal axis of the roll and which directs air flow within said roll shell so as to reduce air turbulence therein and thus maintain a substantially constant suction condition along the inner surface of said roll shell throughout its entire width and to maintain a substantially constant flow of suction air through said recesses of said roll shell, said suction roll and device being arranged so that said suction condition is applied over the entire inner surface of the roll shell.



5,024,730

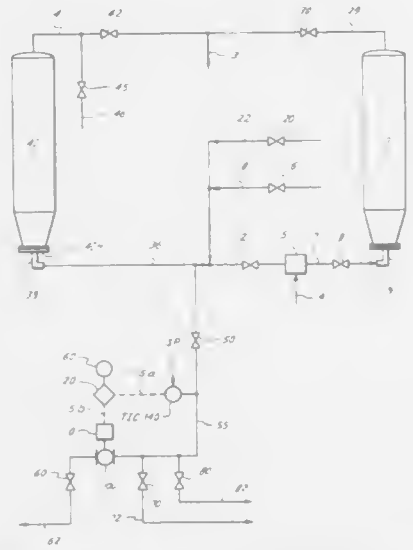
CONTROL SYSTEM FOR DELAYED COKER

James H. Colvert, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Jun. 7, 1990, Ser. No. 534,808

Int. Cl.^{5} B01D *3/42*

U.S. Cl. 196—132 — 3 Claims



3. A control system in combination with a delayed coker apparatus in which a heavy liquid hydrocarbon feedstock is converted to solid coke and fluid hydrocarbons in a coke drum and from which coke drum coke, fluid hydrocarbons and water are removed, said coker apparatus comprising:

the coke drum,

a manifold connected to said coke drum,

a coker fractionator conduit connected to said manifold for providing the flow of fluids from said manifold to a coker fractionator,

said control system comprising, a temperature sensor and transmitter positioned to sense the temperature of fluids in said manifold and to transmit a temperature signal corresponding thereto,

a valve means positioned to regulate fluid flow in said coker fractionator conduit,

a valve actuator being operable to adjust said valve means between fully open and fully closed positions,

comparing means for receiving a set point temperature and said temperature signal, being operable to impress a comparing means signal into said valve actuator for activating said valve means to the fully closed position in response to a temperature less than said set point temperature,

said set point temperature selected at a temperature above the temperature at which water can exist in the liquid state in the manifold, the control system thereby preventing the flow of liquid water into the coker fractionator by way of the coker fractionator conduit.

5,024,731

METHOD OF MANUFACTURING MATERIAL FOR MEDICAL AND PHARMACEUTICAL PRODUCTS FROM PYROLIGNEOUS ACID

Katsumi Nagata, 10-18, Iwaidani 4-chome, Matsuyama-shi, Ehime-ken, and Hisako Nagata, 2-10, Kyoyama 1-chome, Okayama-shi, Okayama-ken, both of Japan

Filed Nov. 29, 1989, Ser. No. 442,990

Claims priority, application Japan, Nov. 29, 1988, 63-302009

Int. Cl.^{5} B01D *3/00;* **C07C** *51/42*

U.S. Cl. 203—99 — 1 Claim

1. A method of manufacturing a purified pyroligneous acid for medical and pharmaceutical products from a pyroligneous acid material consisting essentially of the steps of

heating trees and barks at a temperature sufficient to produce a smoke containing water in which said water comprises pyroligneous acid therein;

cooling the smoke to liquify the water containing pyroligneous acid in said smoke;

heating said pyroligneous acid, extracting resultant evaporation gas at a temperature within the range consisting of from 98° to 103° C.; and liquifying said extracted gas by cooling, such that noxious components comprising of formaldehyde, methanol and 3,4 benzyprene are avoided, and purified pyroligneous acid for medical and pharmaceutical products is obtained.

5,024,732

METHOD OF AND DEVICE FOR COMPENSATING VARIATIONS OF BRANCH CURRENTS IN ELECTROPLATING BATHS

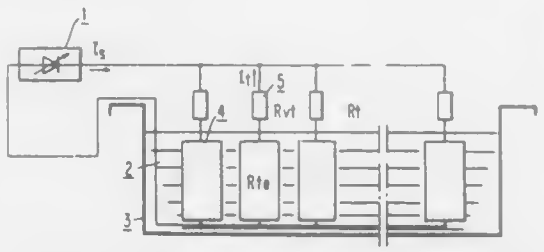
Egon Hübel, Feucht, Fed. Rep. of Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Sep. 7, 1988, Ser. No. 241,595

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 3732476

Int. Cl.^{5} C25D *21/12, 5/18*

U.S. Cl. 204—1.11 — 10 Claims



1. A method of compensating operational variations of nominal branch currents in a circuit for electroplating a plurality of articles, the circuit including an electrolytic bath in which the articles and corresponding anode plates are immersed, a source of total electroplating current having its positive electrode connected to an anode bus bar for supporting the anode plates and its negative electrode connected to cathode bus bar for supporting the articles, the method comprising the steps of connecting in series with each electroplating branch circuit a passive compensating resistor R_{vf} whose value exceeds the range of operation dependent electrolyte resistance R_{fe} of the corresponding branch circuit, and adjusting the total current I_s from said source to the sum of nominal operation dependent branch currents I_f of said branch circuits.

5,024,733

PALLADIUM ALLOY ELECTROPLATING PROCESS

Joseph A. Abys, Warren, and Heinrich K. Straschil, Summit, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 400,202, Aug. 29, 1989, abandoned. This application May 11, 1990, Ser. No. 523,290

Int. Cl.^{5} C25D *3/56*

U.S. Cl. 204—3 — 11 Claims

1. A process of electroplating a metallic substance onto a surface, said metallic substance comprising palladium and arsenic, said process comprising the step of passing current through a cathode, an electroplating bath and an anode, said electroplating bath comprising a source of palladium and a source of arsenic and having an electrical conductivity greater than 10^{-3} mho-cm and pH greater than 7, said source of palladium comprises a palladium complex ion with a complexing agent selected from the group consisting of ammonia, diaminopropane, 1,4-diamino butane, 1,6-diaminohexane, and 2-hydroxyl-1,3-diaminopropane, said source of arsenic is selected from the group consisting of As_2O_3, As_2O_5, KH_2AsO_4, K_2HAsO_4, K_3AsO_4, NaH_2AsO_4, Na_2HAsO_4, Na_3AsO_4, K_3AsO_3, $KAsO_2$, Na_3AsO_3, $NaAsO_2$ and $Na_4As_2O_7$, said electroplating bath having a palladium concentration of from 0.005 to 1.0 molar, and an arsenic concentration of from 0.01 molar to 0.1 molar.

5,024,734

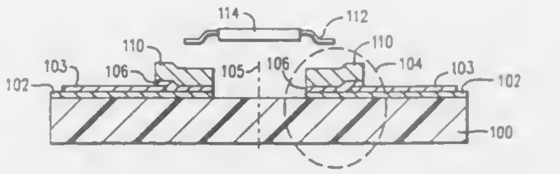
SOLDER PAD/CIRCUIT TRACE INTERFACE AND A METHOD FOR GENERATING THE SAME

Walter M. Downs, Lutherville, and Michael J. Ankrom, Baltimore, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 27, 1989, Ser. No. 457,421

Int. Cl.^{5} C25D *5/02, 5/48, 5/10;* **B05D** *5/12*

U.S. Cl. 204—15 — 8 Claims



1. A method of precisely depositing, upon a PWB, closely-spaced circuit traces and closely-spaced solder pads which are electrically connected to the traces and of a greater thickness than the traces such that during a solder reflow operation the solder will not migrate from the pad onto the circuit traces, the method comprising the steps of:

a) depositing circuit traces of a single component metal of nickel having a melting point greater than that of the solder and which is poorly wettable to the solder upon a conductive base layer on a dielectric substrate with a portion of each trace overlapping an area on the base layer onto which a solder pad for the lead of an electrical component is to be located;

b) activating the overlapping portion of each metal circuit trace;

c) depositing an intermediate layer of metal, which is wettable to both the trace metal and the solder, within the pad area at least upon the overlapping portion of each metal circuit trace;

d) depositing solder over each intermediate layer of metal to

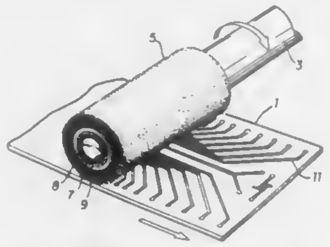
VOL
1127
ISS
3
JE
18
1991
UMI

a predetermined thickness greater than the thickness of the circuit trace and;

e) selectively removing portions of the conductive base layer adjacent to the circuit traces such that the circuit traces are not electrically interconnected by the base layer.

5,024,735
METHOD AND APPARATUS FOR MANUFACTURING INTERCONNECTS WITH FINE LINES AND SPACING

Igor V. Kadija, 118 Sherwood Rd., Ridgewood, N.J. 07450
Filed Feb. 15, 1989, Ser. No. 311,212
Int. Cl.⁵ C25D *5/02;* **C25F** *3/14*
U.S. Cl. 204—15 **19 Claims**



1. The method of making fine line and spacing interconnects comprising the steps of:

applying an electrolyte to an imaged substrate;

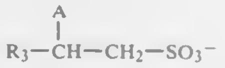
applying electricity to said imaged substrate via said electrolyte by contacting said substrate with an electrically conductive brush; and

moving said brush in a vibratory motion relative to the plane of said imaged substrate.

5,024,736
PROCESS FOR ELECTROPLATING UTILIZING DISUBSTITUTED ETHANE SULFONIC COMPOUNDS AS ELECTROPLATING AUXILIARIES AND ELECTROPLATING AUXILIARIES CONTAINING SAME

Wolfgang Clauss, Neustadt; Werner Kurze, Neuhofen; Ferdinand Leifeld, Ludwigshafen, and Willy Wassenberg, Neuhofen, all of Fed. Rep. of Germany, assignors to Raschig AG, Ludwigshafen, Fed. Rep. of Germany
Filed May 24, 1989, Ser. No. 357,044
Claims priority, application Fed. Rep. of Germany, May 25, 1988, 3817722
Int. Cl.⁵ C25D *3/12, 3/38;* **C07D** *213/00*
U.S. Cl. 204—49 **3 Claims**

1. A brightener for acid electroplating copper baths comprising a compound of the formula



$$R_3-\overset{\overset{\textstyle A}{|}}{C}H-CH_2-SO_3^-$$

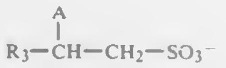
or an alkali or an ammonium salt thereof, wherein,

A represents a mercapto radical of the formula - S - R_4, in which R_4 is hydrogen and

R_3 represents an alkyl group having 1 to 4 carbon atoms.

2. A process for electroplating, comprising the step of:

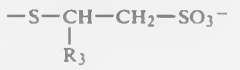
adding to a nickel electroplating bath, a compound of the formula



$$R_3-\overset{\overset{\textstyle A}{|}}{C}H-CH_2-SO_3^-$$

or an alkali or an ammonium salt thereof, wherein,

A represents a mercapto radical of the formula -S-R_4, in which R_4 denotes a substituent selected from the group consisting of hydrogen and the group:

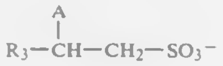


$$-S-\underset{\underset{\textstyle R_3}{|}}{C}H-CH_2-SO_3^-$$

R_3 represents an alkyl group having 1 to 4 carbon atoms said compound, or said alkali salt or said ammonium salt thereof, being an electroplating auxiliary.

3. A process for electroplating, comprising the step of:

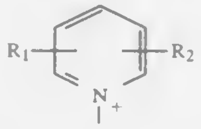
adding to a copper electroplating bath, a compound of the formula



$$R_3-\overset{\overset{\textstyle A}{|}}{C}H-CH_2-SO_3^-$$

or an alkali or an ammonium salt thereof, wherein,

A represents a pyridinium radical

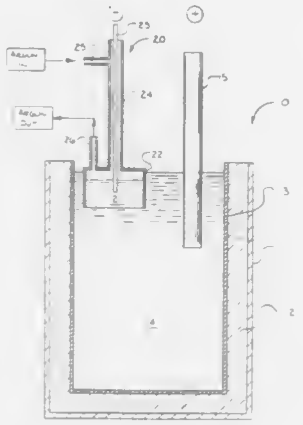


in which R_1 and R_2 independently denote hydrogen or an alkyl radical having 1 to 3 carbon atoms, R_1 and R_2 together with a pyridinium radical form a condensed six-membered aromatic ring,

R_3 represents an alkyl group having 1 to 4 carbon atoms said compound, or said alkali salt or said ammonium salt thereof, being an electroplating auxiliary.

5,024,737
PROCESS FOR PRODUCING A REACTIVE METAL-MAGNESIUM ALLOY

Kenneth G. Claus; Dwaine W. Schoppe, and Matthew R. Earlam, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.
Filed Jun. 9, 1989, Ser. No. 364,771
Int. Cl.⁵ C25C *3/36*
U.S. Cl. 204—71 **14 Claims**



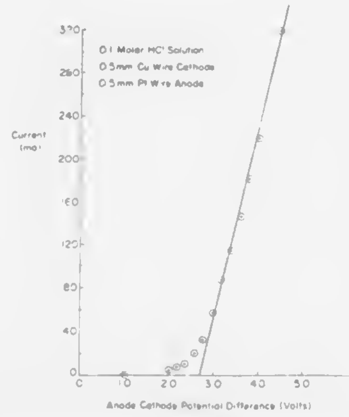
6. A process for producing a molten alloy of magnesium and a reactive metal said reactive metal being produced by electrolysis of a molten salt bath comprising the chloride of calcium, lithium, sodium, or potassium, wherein the said alloy is formed in a molten magnesium cathode,

said process comprising providing a molten magnesium metal cathode in said molten bath; electrolyzing a molten halide salt bath containing the chloride salt of the reactive metal, whereby said reactive metal produced by the electrolysis is deposited in said molten magnesium cathode and alloys therewith; and removing the molten alloy from said bath,

and wherein the process is operated using an electrical element comprising a solid magnesium rod enclosed in a tube made of an inert material and cooled by an inert gas, said element being in electrical contact with the molten magnesium cathode.

5,024,738
RECOVERY OF MERCURY FROM MERCURY COMPOUNDS VIA ELECTROLYTIC METHODS

Mark W. Grossman, Belmont, and William A. George, Rockport, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.
Continuation of Ser. No. 259,425, Oct. 7, 1988, Pat. No. 4,879,010, which is a continuation of Ser. No. 815,150, Dec. 31, 1985, abandoned. This application Aug. 18, 1989, Ser. No. 395,867
The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.
Int. Cl.⁵ C25C *1/16*
U.S. Cl. 204—105 R 6 Claims



1. A process for electrolytically recovering Hg from Hg_2Cl_2 which comprises:

(a) forming an electrolyte solution, said electrolyte solutions comprising concentrated HCl and H_2O;

(b) adding Hg_2Cl_2 to said electrolyte solution, said Hg_2Cl_2 dissolving in said electrolyte solution such that mercurous ions are formed in solution;

(c) placing an anode and a cathode into the electrolye solution;

(d) applying an electric voltage across said anode and cathode, thus, passing an electrode current from the anode through the electrolyte solution to the cathode whereby the mercurous ions in the electrolyte solution are reduced and elemental mercury plates onto the cathode; and thereafter

(e) recovering said elemental mercury.

5,024,739
NOVEL HYBRID ISOTOPE SEPARATION SCHEME AND APPARATUS

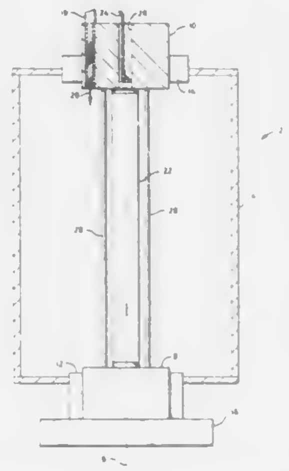
Jakob Maya, Brookline, Mass., assignor to GTE Products Corporation, Danvers, Mass.
Filed Mar. 15, 1989, Ser. No. 323,920
Int. Cl.⁵ B01D *5/00*
U.S. Cl. 204—157.2 **21 Claims**

1. A method of yielding selectively a desired enrichment in a specific isotope comprising the steps of:

inputting into a rotatable chamber a gaseous mixture including said specific isotope;

spinning said chamber and said gaseous mixture therein;

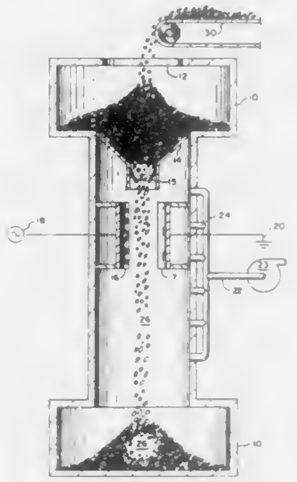
radiating said spinning gaseous mixture with frequencies characteristic of the absorption and ionization of said specific isotope of the atomic or molecular gas in said gaseous mixture, thereby ionizing the specific isotope and



collecting the ionized specific isotope from said spinning and radiated gaseous mixture.

5,024,740
MINERAL REFINEMENT BY HIGH RF ENERGY APPLICATION

Stephen M. Birken, 23 Mohawk Trail, and Karl Birken, 38 Grant Hill Ct., both of Clifton Park, N.Y. 12065
Continuation of Ser. No. 125,938, Nov. 27, 1987. This application Oct. 28, 1989, Ser. No. 423,142
Int. Cl.⁵ C01G *23/00;* **C22B** *1/00*
U.S. Cl. 204—157.15 **6 Claims**



1. A method for refining a base material by selectively removing inclusions therefrom, said method consisting of the steps of:

transporting said base material through a confinement apparatus, in an atmosphere characterized by the absence of air, said transporting providing determinable amounts of said base material to pass through said confinement means;

irradiating, simultaneously with said transporting and at predetermined frequencies, said base material with alternating RF energy of sufficient power to selectively vaporize a particular inclusion to thus free it from said base material; and

VOL
1127
ISS
3
JE
18
1991
UMI

removing immediately thereafter said irradiating step, any vaporized inclusion matter by suitable means.

5,024,741

HYBRID ISOTOPE SEPARATION SCHEME

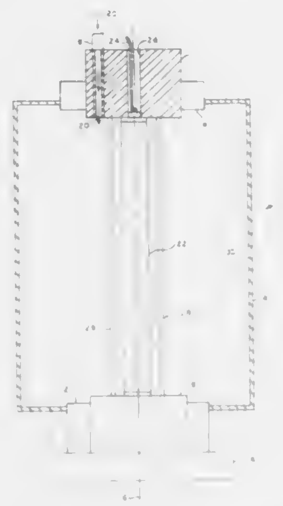
Jakob Maya, Brookline, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed Mar. 15, 1989, Ser. No. 323,930

The portion of the term of this patent subsequent to Jun. 18, 2008, has been disclaimed.

Int. Cl.^{5} B01D *5/00*

U.S. Cl. 204—157.22 22 Claims



1. A method of yielding selectively a desired enrichment in a specific isotope comprising the steps of:

inputting into a rotatable chamber a gas comprising a gaseous mixture including said specific isotope and a scavenger from which said specific isotope is to be isolated;

spinning said chamber and said gas therein;

radiating said spinning gas with a wave length or frequency characteristic of the absorption of a particular isotope of the atomic or molecular gas, thereby inducing a chemical reaction between said specific isotope and scavenger to form a scavenger compound; and

collecting the scavenger compound which includes the specific isotope from said spinning and radiated gas.

5,024,742

METHOD OF CROSSLINKING AMINO ACID CONTAINING POLYMERS USING PHOTOACTIVATABLE CHEMICAL CROSSLINKERS

Anthony B. Nesburn, Malibu, Calif.; Michael Gorin, Rockville, Md.; Marvin Martinez, Glendale, Calif.; M. Cristina Kenney, Malibu, and Ezra Maguen, Los Angeles, both of Calif., assignors to Cedars-Sinai Medical Center, Los Angeles, Calif.

Filed Feb. 24, 1988, Ser. No. 159,603

Int. Cl.^{5} B05D *3/06*

U.S. Cl. 204—157.68 21 Claims

1. A method of crosslinking amino acid containing polymers unto themselves for in vivo applications by means of photoactivatable heterobifunctional crosslinking agents, said crosslinking agents have a photoactivatable site and a conventional site, which comprises:

(a) selecting the amino acid containing polymers;

(b) combining said amino acid containing polymers with said photoactivatable heterobifunctional crosslinking agents such that the conventional site on the crosslinking agent is bound to the polymer, and the other photoactivatable site on the crosslinking agent is unbound, photoactivating the crosslinked polymer to bind to another amino acid containing polymer, thereby forming a crosslinked amino acid containing polymer for in vivo application.

5,024,743

METHYLENDIOXYPHENATHRENE AND STILBEN DERIVATIVES, PROCESS FOR THE PREPARATION THEREOF, PHARMACEUTICAL COMPOSITIONS USING THESE, AND THERAPEUTIC APPLICATIONS

Klaus Görler, Bergisch Gladbach; Günter Krumbiegel, Bergheim-Quadrat; Michael Hanack, Tubingen, and Lakshmina R. Subramanian, Gomaringen, all of Fed. Rep. of Germany, assignors to Madaus GmbH & Co., Cologne, Fed. Rep. of Germany

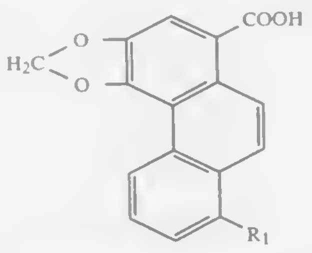
Division of Ser. No. 227,496, Aug. 1, 1988, abandoned, which is a continuation of Ser. No. 900,823, Aug. 27, 1986, abandoned. This application Dec. 27, 1989, Ser. No. 457,353

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1985, 3530718

Int. Cl.^{5} C07D *317/70*

U.S. Cl. 204—157.69 7 Claims

1. Process for preparation of a compound of the formula



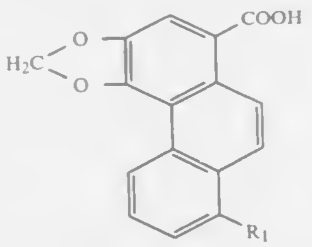
wherein R_1 is hydrogen, methoxy or ethoxy comprising:

(i) reacting 6-bromo piperonyl with triphenylphosphine in an anhydrous solvent under conditions favoring formation of a phosphonium salt,

(ii) reacting said phosphonium salt with a compound selected from the group consisting of benzaldehyde, o-methoxybenzaldehyde and o-ethoxybenzaldehyde in the presence of a strong base to produce a stilbene bromide, and

(iii) treating the stilbene bromide by either (a) reacting it with a metal cyanide in a polar aprotic solvent to form a nitrile followed by hydrolyzing said nitrile or (b) treating it with n-butyl lithium and CO_2, to form said compound.

6. Process for preparation of a compound of formula



wherein R_1 is hydrogen, methoxy or ethoxy, comprising:

(i) reacting 6-bromo piperonyl with triphenylphosphine in an anhydrous solvent under conditions favoring formation of a phosphonium salt,

(ii) reacting said phosphonium salt with a compound selected from the group consisting of benzaldehyde, o-methoxybenzaldehyde and o-ethoxybenzaldehyde in the presence of a strong base to produce a stilbene bromide, and

(iii) treating said stilbene bromide with ultraviolet radiation to yield said compound.

5,024,744

STAMPER CLEANING APPARATUS

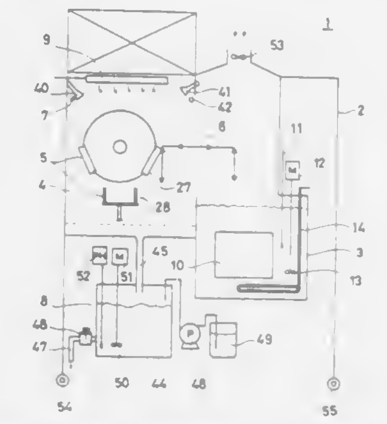
Norio Okabayashi, Himeji, Japan, assignor to Daicel Chemical Industries, Ltd., Sakai, Japan

Filed Jun. 11, 1990, Ser. No. 535,839

Claims priority, application Japan, Jun. 12, 1989, 1-149229

Int. Cl.^{5} C25D *7/00, 1/00;* B08B *3/00*

U.S. Cl. 204—194 11 Claims



1. A stamper cleaning apparatus, comprising:

an electrocleaning tank for performing electrocleaning;

a washing room adjacent to this cleaning tank;

washing water spraying means, disposed in the upper section of the washing room, for water-washing a stamper by spraying washing water onto the stamper while the stamper is positioned inside the washing room and is wet with the electrocleaning solution;

water drain means, disposed in the lower section of the washing room, for collecting water after the stamper is washed with water and for draining the water; and

drying means, disposed in the upper section of the washing room, for operating to dry the stamper after the washing water supply means has operated during a predetermined time the stamper is held in the washing room.

5,024,745

APPARATUS FOR TREATING STRIP-SHAPED ELEMENTS

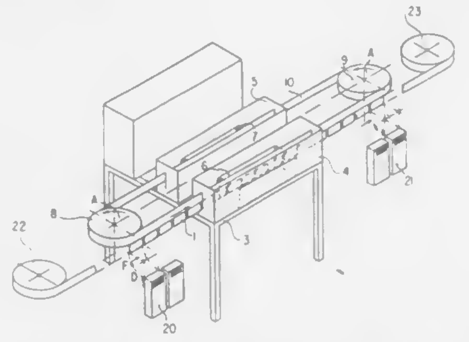
Jorg W. Rischke, Veldhoven; Peter J. G. Loermans, Bergharen, and Peter J. M. Huvenaars, Zeeland, all of Netherlands, assignors to MECO Equipment Engineers B.V., Hertogenbosch, Netherlands

Filed Jan. 30, 1990, Ser. No. 472,263

Claims priority, application Netherlands, Jan. 31, 1989, 8900229

Int. Cl.^{5} C25D *17/06*

U.S. Cl. 204—198 23 Claims



1. Apparatus for treating strip-shaped elements (1), said apparatus being provided with an endless belt (**10**) with resilient clamping means (**14, 36, 45, 51**) for clamping strip-shaped elements (**1**) on the endless belt (**10**), such that the strip-shaped elements (1) can be led through one or more treatment baths, characterized in that resilient clamping means (**14, 36, 45, 51**) are each connected near one end (**16, 41, 50, 52**) with the endless belt, and with their other free clamping end (**18, 39, 46, 56**) abut against the belt under the influence of their own resilience, whilst near one loading and/or unloading station the apparatus comprises means (**8, 9**) by means of which the free clamping ends (**18, 39, 46, 56**) of the clamping means can be pushed in a direction remote from the belt.

5,024,746

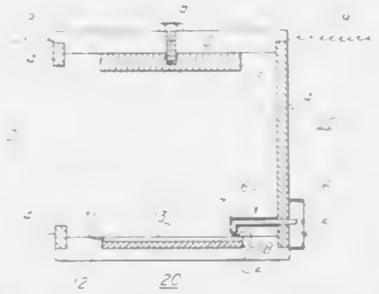
FIXTURE AND A METHOD FOR PLATING CONTACT BUMPS FOR INTEGRATED CIRCUITS

Roger J. Stierman, Richardson, and Robert J. Lessard, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 295,684, Jan. 10, 1989, Pat. No. 4,931,149, and a continuation-in-part of Ser. No. 37,760, Apr. 13, 1987, Pat. No. 4,861,452. This application May 14, 1990, Ser. No. 523,104

Int. Cl.^{5} C25D *17/06*

U.S. Cl. 204—297 W 10 Claims



1. A bump plating fixture for minimizing the number of trapped bubbles in the vias on a wafer, comprising:

(a) a base plate;

(b) a recess in an upper face of the base plate for holding a wafer in a face up orientation; and

(c) a pad in the recess for preventing the plating bath from coming into contact with the back of the wafer and being of sufficient thickness to cause an upper face of the wafer to be coplanar with the upper face of the base plate.

5,024,747

WAFER COATING SYSTEM

Frederick T. Turner, Sunnyvale; Martin A. Hutchinson, Santa Clara; R. H. Shaw, Palo Alto, and Lawrence T. Lamont, Jr., Mountain View, all of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Division of Ser. No. 106,343, Dec. 21, 1979, Pat. No. 4,756,815. This application Jun. 1, 1988, Ser. No. 183,013

The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.

Int. Cl.^{5} C23C *14/34, 14/56*

U.S. Cl. 204—298.09 17 Claims

1. Apparatus for processing semiconductor wafers held stationary during processing, said apparatus comprising:

processing chamber means comprising an entrance wall having an entrance opening for wafers;

wafer holding means inside said chamber means for holding a wafer with one face of the wafer being substantially exposed for processing;

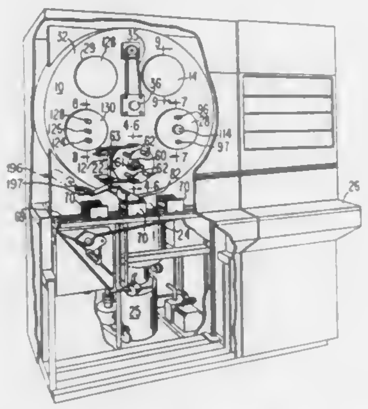
wafer processing means offset from said entrance opening for processing a wafer supported by said wafer holding means, said processing means having a surface adapted to contact a face of a wafer;

means for moving said wafer holding means along a first path for positioning said wafer holding means selectively in alignment with one or the other of said entrance open-

VOL
1127
ISS
3
JE
18
1991
UMI

ing and said processing means, said moving means including means for stopping said movement along said first path when said wafer holding means is in either of said alignment positions; and

means for causing relative movement between said processing means and said wafer holding means, one toward the other, in a direction transverse to said first path when said holding means is aligned with said processing means, so that a face of a wafer supported by said wafer holding means is caused to be in contact with said surface of said processing means.



5,024,748
MICROWAVE PLASMA PROCESSING APPARATUS

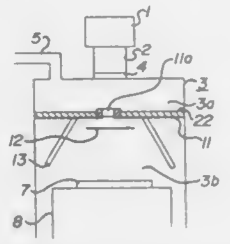
Shuzo Fujimura, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jan. 22, 1990, Ser. No. 468,459

Claims priority, application Japan, Jan. 26, 1989, 1-16901

Int. Cl.^{5} C23C *14/00*

U.S. Cl. 204—298.38 **8 Claims**



1. A microwave plasma processing apparatus, comprising:

a plasma generation chamber for generating plasma by irradiating microwave power to a reactive gas introduced therein,

a reaction chamber disposed on a downstream side of the reactive gas for receiving a substrate to be processed therein,

a plasma shield plate separating the reaction chamber from the plasma generation chamber, the plasma shield plate being of electrically conductive material and having at least a hole for allowing the plasma to flow into the reaction chamber and forming a portion of the plasma generation chamber, and

a separate cover member disposed on the surface of said plasma shield plate facing the plasma generation chamber, said cover member being of a sufficient thickness to prevent cracking or peeling phenomena due to thermal stresses, and made of an inactive material with respect to the active species included in the plasma.

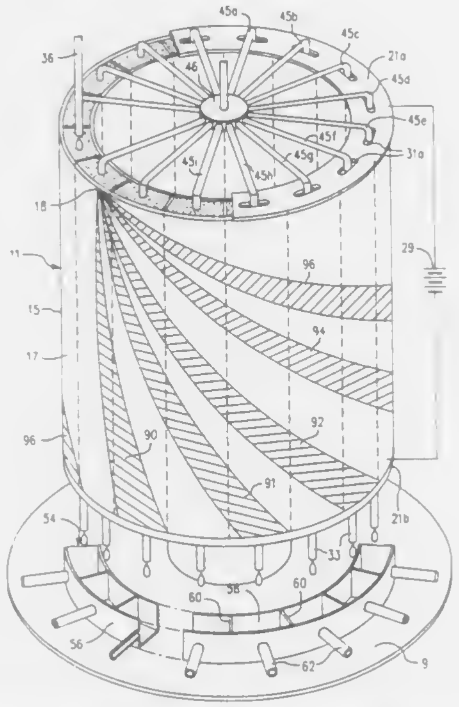
5,024,749
SYSTEM AND METHOD FOR CONTINUOUS SEPARATION OF ISOTOPES

Thomas S. Snyder, Oakmont; John F. Jackovitz, Monroeville Boro, and Harry M. Ferrari, Fox Chapel, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 20, 1990, Ser. No. 512,238

Int. Cl.^{5} B01D *61/42, 15/08*

U.S. Cl. 204—299 R **15 Claims**



1. An isotopic separation system for continuously separating the isotopes present in a sample containing a mixture of isotopes of a chemical element in ionic form, said system comprising:

(a) rotatable annulus means having a feed end spaced axially from a discharge end for holding a plurality of circumferentially spaced separation cell means packed with a separation medium for separating said isotopes, wherein each of said separation cell means extends axially from said feed end to said discharge end;

(b) an isotope-containing sample feed source having an outlet means for introducing said sample into each of said separation cell means;

(c) an eluant source having a plurality of outlet means, wherein each said outlet means corresponds to a separation cell means, for introducing eluant into each said separation cell means;

(d) a pair of annular electrode means, one of said pair being located at the feed end of said annulus means and the other of said pair being located at the discharge end of said annulus means, for applying an electric potential axially along said annulus means and each of said separation cell means while said annulus means is rotating, thereby causing the separation of lighter isotopes from heavier isotopes in said sample and the enrichment of said eluant with said isotopes; and

(e) drain assembly means at the discharge end of said annulus means for continuously collecting eluant enriched with one of said isotopes, including discharge outlet means associated with each said separation cell means for withdrawing isotopically enriched eluant from each said cell separation means.

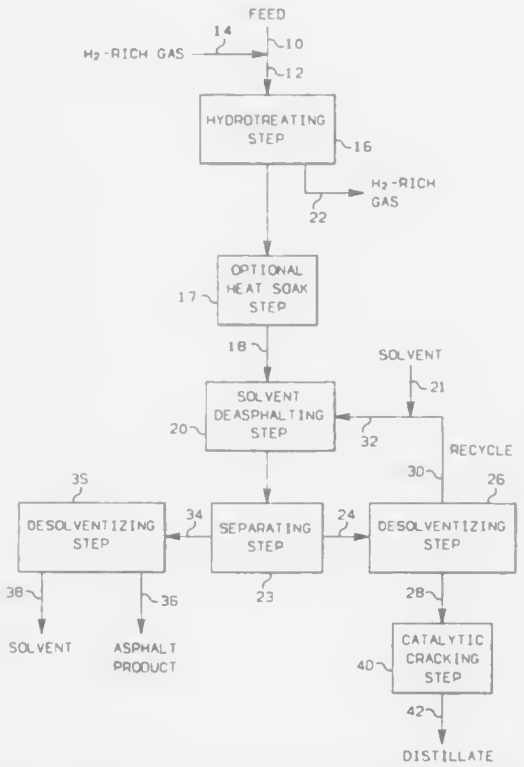
5,024,750
PROCESS FOR CONVERTING HEAVY HYDROCARBON OIL

Edward L. Sughrue, II; Patricia A. Tooley; Brent J. Bertus, and Bille S. Grayson, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 26, 1989, Ser. No. 457,411

Int. Cl.^{5} C10G *45/00*

U.S. Cl. 208—57 **18 Claims**



10. A process for treating a heavy hydrocarbon containing feed stream, which contains asphaltenes and impurity compounds of sulfur and metals, said process comprising:

(a) contacting said heavy hydrocarbon feed stream with a hydrogen-containing reactant gas in the presence of a hydrotreating catalyst having an average a pore diameter in a range of from about 40 to about 80 angstroms at conditions sufficient for removing a portion of sulfur and metal impurities from said feed stream and without substantially cracking said feed stream so as to provide an effluent having a reduced sulfur content;

(b) heating said reduced sulfur effluent under visbreaking conditions so as to lower the viscosity of said reduced sulfur effluent;

(c) thereafter contacting said reduced sulfur effluent with a solvent so as to form a mixture comprising at least two phases, wherein a first phase comprises an extract which is relatively lean in asphaltenes and metal content relative to said reduced sulfur effluent, and a second phase comprises a raffinate which is relatively rich in asphaltenes and metal content relative to said reduced sulfur effluent;

(d) separating said first phase and said second phase, and thereafter removing solvent from said first phase so as to provide an effluent stream essentially free of solvent;

(e) catalytically cracking said solvent free effluent stream, in the presence of a catalytic cracking catalyst and essentially in the absence of added hydrogen containing reactant gas so as to produce lower molecular weight hydrocarbon products.

5,024,751
CATALYTIC COMPOSITION COMPRISING A METAL SULFIDE SUSPENDED IN A LIQUID CONTAINING ASPHALTENES AND HYDROVISBREAKING PROCESS OF A HYDROCARBON CHARGE

Pierre Giuliani, Grenoble; Jean-Francois Le Page, Rueil Malmaison; Jean-Claude Plumail, Nanterre, and Marcellin Espaillac, Viroflay, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed May 18, 1989, Ser. No. 353,836

Claims priority, application France, May 19, 1988, 88 06839; May 19, 1988, 88 06840

Int. Cl.^{5} C10G *47/06*

U.S. Cl. 208—108 **7 Claims**

1. A process for catalytic hydrovisbreaking of a hydrocarbon charge comprising the following stages:

(a) mixing the charge with a gas containing hydrogen in amount sufficient to carry out the hydrovisbreaking reaction and bringing the mixture up to a temperature of at least 330° C.,

(b) introducing into the hydrogen-hydrocarbon charge mixture an amount of a catalytic composition that is sufficient to obtain a content of metal in the charge ranging from about 10 to 2,000 ppm by weight in relation to the weight of the charge, said catalytic composition being obtained with a method comprising the following stages:

(1) subjecting to a thermal treatment at a temperature ranging from 80° to 250° C. for a duration ranging from 0.1 to 24 hours, under a globally reducing atmosphere of a gas containing hydrogen, a mixture obtained by contacting, in any order, at least one compound other than a sulfide of at least one metal of groups VI B, and VII B of the periodic table of elements, with a hydrocarbon charge containing asphaltenes and with at least one organic polysulfide of the formula $R^1-(S)_n-R^2$, where R^1 and R^2 are identical or different, each representing a hydrocarbon radical having five to 150 carbon atoms and n being an intergral number from 2 to 20, the amounts of metal compound and of asphaltenes being such that the ratio by weight of metal to asphaltenes ranges from about 0.05:1 to 10:1 and the amount of organic polysulfide which is utilized being sufficient to introduce an amount of sulfur at least equal to the amount of sulfur necessary for the substantially complete conversion of the major part of the metal present into a sulfurized metallic compound which is a catalytic precursor, and

(2) heating the product resulting from stage (b) in the presence of a gas containing hydrogen under a partial hydrogen pressure ranging from about 0.5 to 20 MPa, at a temperature ranging from about 260° to 450° C. for 0.1 to 24 hours, and

(c) subjecting the product resulting from stage (b) to hydrovisbreaking conditions for a time sufficient for carrying out hydrovisbreaking of the charge.

5,024,752
UPGRADING OF RESIDS BY LIQUID PHASE MILD COKING

Tsoung Y. Yan, Philadelphia, Pa., assignor to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 105,987, Oct. 6, 1987, abandoned, which is a continuation of Ser. No. 854,952, Apr. 23, 1986, abandoned. This application Sep. 18, 1989, Ser. No. 408,353

Int. Cl.^{5} C10G *9/14*

U.S. Cl. 208—131 **7 Claims**

1. A process for upgrading a heavy hydrocarbon feedstock in the liquid phase to evolve at least one less dense liquid gas oil phase and one more dense liquid coke phase in the absence of substantial solid coke formation, said liquid phases being at least partially immiscible, said process comprising the steps of:

VOL
1127
ISS
3
JE
18
1991
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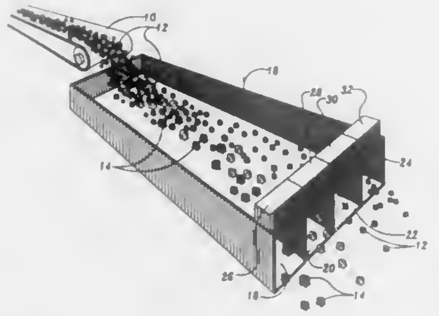
(a) determining the Conradson Carbon Residue weight percentage of said hydrocarbon feedstock;
(b) thermally treating said heavy hydrocarbon feedstock under conversion conditions including a combination of temperature and residence time sufficient to convert at least a portion of said heavy hydrocarbon feedstock, at the highest severity in equivalent reaction time which correlates with liquid coke being formed in a quantity of between about 1 wt. % and 200 wt. % of the heavy hydrocarbon feedstock Conradson Carbon Residue weight percentage in the absence of substantial solid coke formation;
(c) controlling the temperature of said thermally treated heavy hydrocarbon feedstock to prevent substantial formation of solid coke;
(d) holding said liquid of step (c) at said controlled temperature for a period of time sufficient for said liquid to separate into two at least partially immiscible liquid layers;
(e) continuously withdrawing gas oil from the upper layer of said liquid of step (d);
(f) continuously withdrawing liquid coke from the lower layer of said liquid of step (d).

5,024,753
MATERIAL SEPARATION EFFICIENCY DETERMINATION EMPLOYING FLUORESCING CONTROL PARTICLES

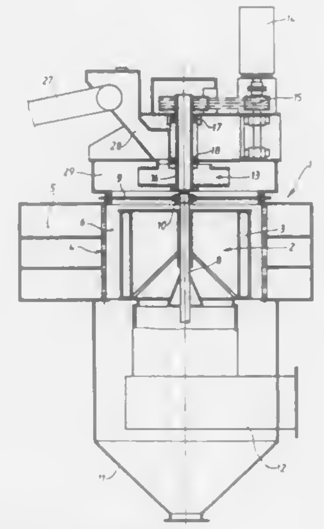
Colin D. Chriswell, Slater; Richard Markuszewski, Ames, and William H. Buttermore, Ames, all of Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa
Filed Oct. 3, 1989, Ser. No. 416,710
Int. Cl.^{5} B03B *13/02*
U.S. Cl. 209—1 **36 Claims**



1. A method for improved material separation comprising:
bonding a fluorescing dye to control particles of the material, the control particles having generally known and generally consistent physical properties;
mixing the control particles into the material which is to be separated on the basis of at least one physical property;
separating the material by a physical property;
imposing upon the separated material energy of sufficient properties to excite the fluorescing dye on the control particles; and
monitoring the separated material to detect the presence of and the amount of excited fluorescence to determine the amount of control particles in the separated material and to determine if the separation process is adequately separating the material.

5,024,754
SEPARATOR

Norbert Patzelt, Beckum, and Michael von Seebach, Ennigerloh, both of Fed. Rep. of Germany, assignors to Krupp Polysius AG, Fed. Rep. of Germany
Filed Dec. 5, 1989, Ser. No. 446,397
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1988, 3843338
Int. Cl.^{5} B07B *0/83*
U.S. Cl. 209—135 **14 Claims**

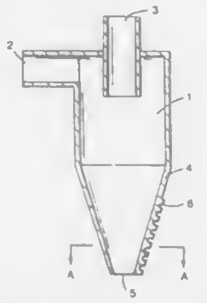


1. A separator comprising
(a) a driven rotor having a vertical axis and blades spaced from one another about its periphery,
(b) rotatable material distributor means above the rotor,
(c) means for delivering material to be separated to the material distributor means,
(d) a stationary guide unit encircling the rotor with a clearance therebetween and having adjustable guide vanes, a separating chamber between the guide unit and the rotor for receiving material thrown off by the material distributor means and through which may pass a stream of separating air delivered through the guide unit and drawn off through the rotor so as to entrain fines,
(e) a channel connected to one end of the rotor for removal of the stream of separating air and entrained fines,
(f) a tailings hopper below the rotor and the guide unit (4) for removal of tailings,
characterized in that:
(g) the material distributor is driven independently of the rotor by separate drive means for radially discharging the material to be separated, and
(h) an annular chamber radially encircling and radially spaced from the material distributor means, said chamber being open toward the material distributor means to form a material impact and disagglomeration zone for receiving the material discharged from the material distributor means and in which zone a heap of material may form to protect against wear of the chamber.

5,024,755
CONE WEAR DETECTION

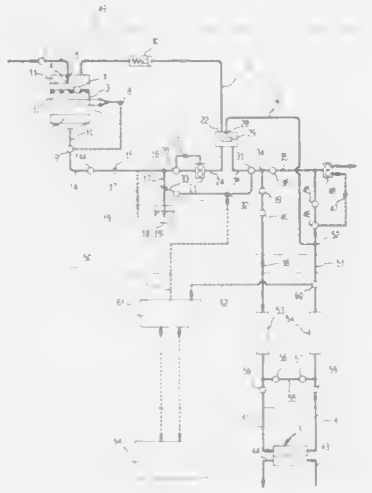
James D. Livsey, Rochester, Mass., assignor to Bird Escher Wyss, Mansfield, Mass.
Filed Nov. 22, 1989, Ser. No. 440,891
Int. Cl.^{5} B04C *5/08*
U.S. Cl. 209—211 **6 Claims**

1. A hydrocyclone for separating abrasive contaminants, said hydrocyclone comprising
a generally conical separation chamber having an outer wall subject to wear on its inside surface from said abrasive contaminants,
at least one area of reduced wall thickness on said outer wall, said area of reduced wall thickness allowing formation of a localized wear aperture as said abrasive contaminants wear said inside surface,
the outside surface of said outer wall being shaped for retaining a sealing member directly against said wear aperture and surrounding said outside surface of said wall to retard flow of liquid through said outer wall following formation of said wear aperture,
said area of reduced wall thickness being provided by a substantially tangential groove formed in said outer wall, said groove shaped to restrict the outward movement of said sealing member, and
said sealing member having a cross-sectional shape substantially matching that of said groove, so that said sealing member is mated with said groove by sliding in a tangential direction to said outer wall.



5,024,756
DIALYSIS SYSTEM AND METHOD THEREFOR

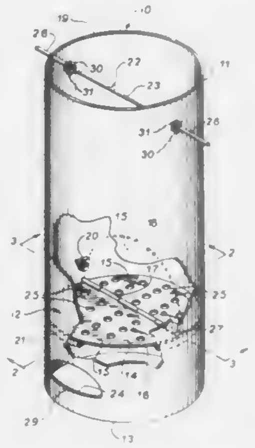
Jan P. Sternby, Lund, Sweden, assignor to Gambro AB, Sweden
Filed Feb. 28, 1989, Ser. No. 316,999
Claims priority, application Sweden, Mar. 3, 1988, 8800757
Int. Cl.^{5} B01D *61/32, 63/00*
U.S. Cl. 210—93 **16 Claims**



1. A dialysis system comprising a dialyzer having (i) a dialysis liquid input side and a dialysis liquid output side for the flow of a dialysis liquid therethrough, and (ii) a blood input side and a blood output side for the flow of blood therethrough, control means for controlling one or more parameters of the dialysis liquid at a non-measured desired set value on the dialysis liquid input side of said dialyzer, measuring means for measuring the value of at least one of said parameters of said dialysis liquid on the dialysis liquid output side of said dialyzer, and comparison means for comparing the value of the measured parameter with the non-measured desired set value of the corresponding parameter being controlled by said control means.

5,024,757
APPARATUS FOR REMOVING ICE FROM A CHOPPED OR CUT HOLE

Francis R. Malak, 3205 N. 29th St., Wausau, Wis. 54401
Filed May 3, 1990, Ser. No. 518,167
Int. Cl.^{5} B01D *35/02, 35/28*
U.S. Cl. 210—136 **11 Claims**



1. An apparatus for removing suspended solid material from a water filled hole comprising:
a thin-walled tubular body having a cross sectional size and shape corresponding to that of the hole;
check valve means in the lower end of said tubular body for admitting water and suspended solid material into said tubular body in response to downward insertion of the body into the hole and for closing and retaining the solid material in said tubular body in response to reverse upward withdrawal of the body from the hole; and,
strainer means formed integrally with said check valve means for permitting the water to drain from said tubular body in response to said upward withdrawal.

5,024,758
HORIZONTAL FLOW-THROUGH COIL PLANET CENTRIFUGE WITH MULTILAYER PLURAL COILS IN ECCENTRIC SYNCHRONOUS ROTATION, SUITABLE FOR COUNTER-CURRENT CHROMATOGRAPHY

Yoichiro Ito, Bethesda, Md., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.
Continuation of Ser. No. 287,664, Dec. 20, 1988, abandoned. This application Mar. 19, 1990, Ser. No. 496,144
Int. Cl.^{5} B01D *15/08*
U.S. Cl. 210—198.2 **17 Claims**

1. An apparatus suitable for eccentric continuous countercurrent chromatography of predetermined fluid flow therethrough and for providing stable retention of low interfacial tension, viscous two-phase systems therein, comprising:
a support;
frame means rotatably mounted to said support for rotation about a first stationary horizontal axis;
column assembly support means having opposite end portions disposed on a second axis parallel to and separated from said first axis by a first radius R_1, rotatably mounted to said frame means for enabling rotation of a column assembly with respect to said frame means about said second axis while said frame simultaneously rotates about said first axis;
a plurality of similar multilayer helical tubing coils each having respective tail and had ends selectively connected

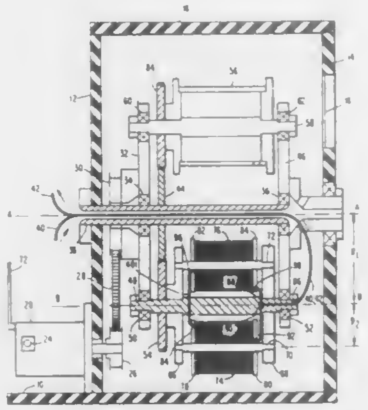
VOL
1127
ISS
3
JE
18
1991
UMI

to enable continuous fluid flow therethrough, each of said helical coils being wound about one of an equal number of cylindrical columns of said column assembly about corresponding third axes parallel to said first and second axes and symmetrically disposed therearound at a common second radius R_2;

said coils sized and dimensioned to reduce physical deformation due to centrifugal forces acting thereon, and for providing stable retention of low interfacial tension, viscous solvent system; and

means for simultaneously rotating said frame means about said first axis and said column assembly support means about said second axis,

thereby providing eccentric rotation of said column assembly.



5,024,759

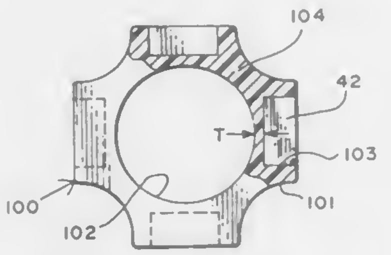
MAGNETIC TREATMENT OF FLUIDS

Thomas M. McGrath, Miami, and Arno W. Tilles, Hollywood, both of Fla., assignors to Hydroquip Technologies, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 287,230, Dec. 21, 1988, abandoned. This application Jun. 2, 1989, Ser. No. 361,674

Int. Cl.⁵ C02F *1/48*

U.S. Cl. 210—222 8 Claims



1. Magnetic apparatus for magnetically treating microcellular organisms such as algae and *escherichia coli* in flowing water over a wide range of flow rates comprising:

a frame member having a plurality of magnets attached therearound such that the same pole of each magnet faces inside said frame toward the other magnets wherein said frame comprises an eight-sided member with an outer periphery having four flat sides positioned at 90° to each other, and four concave surfaces each connecting adjacent flat sides, an opening through the center of said frame member and a magnet imbedded in each of the four flat sides.

5,024,760

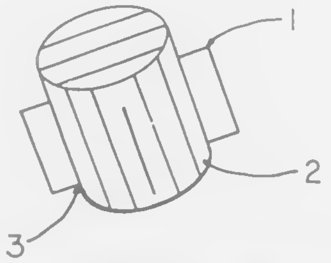
EASILY REMOVABLE OIL FILTER

John J. Kemper, 5512 Sara Dr., Torrance, Calif. 90503, assignor to John Joseph Kemper, Torrance, Calif.

Filed May 24, 1990, Ser. No. 473,636

Int. Cl.⁵ B01D *27/00*

U.S. Cl. 210—232 5 Claims



1. In an oil automotive filter comprising an outer filter body and an internal filter material wherein the improvement comprises means for enabling wrench free installation and removal of said oil filter comprising 3 or more permanently attached brackets of suitable material, said brackets being equally spaced around the circumference of said oil filter body and having a length, wherein the length of the brackets is about ¾ of the length of said filter body.

5,024,761

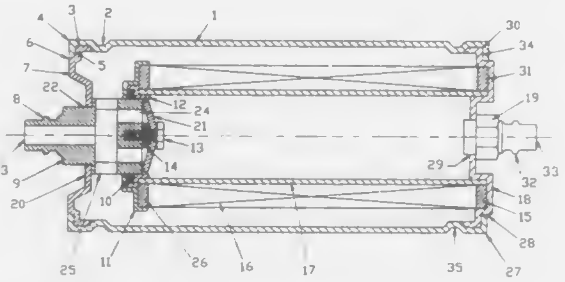
HIGH-STRENGTH QUICK-DISCONNECT TUBE FILTER

Richard J. Deibel, 501 Pine St., Bamberg, S.C. 29003

Filed Jan. 25, 1990, Ser. No. 470,052

Int. Cl.⁵ B01D *27/08*

U.S. Cl. 210—232 5 Claims



1. A high pressure quick change filter device comprising: a tubular metal housing having first and second ends; first and second metal end caps secured thereto by said housing being folded inwardly over the periphery of each respective said end cap; said first and second end caps including first and second male fittings, respectively; and a tubular filter element disposing internally of the housing between said first and second fittings and bonded to said first end cap.

5,024,762

CONCENTRATION OF SOLIDS IN A SUSPENSION

Douglas L. Ford, Eastwood; Eric W. Anderson, Dundas, and Clinton V. Kopp, Castle Hill, all of Australia, assignors to Memtec Limited, Parramatta, Australia

Division of Ser. No. 939,121, Oct. 27, 1986, Pat. No. 4,931,186. This application Jan. 5, 1990, Ser. No. 461,297

Claims priority, application Australia, Mar. 5, 1985, 9572; Mar. 13, 1985, 9692

Int. Cl.⁵ B01D *65/02*

U.S. Cl. 210—321.69 9 Claims

1. A concentrator for concentrating the fine solids of a liquid feed suspension comprising:

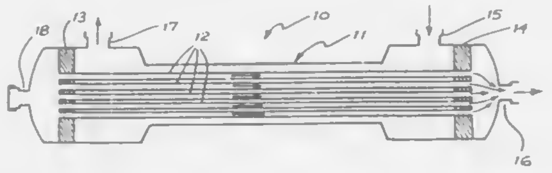
(i) a shell,

(ii) a plurality of elastic, hollow, microporous, polymer fibres within the shell,

(iii) means for supplying pressurised feed suspension to the outside of the fibres,

(iv) means for withdrawing clarified liquid from the fibre lumens,

(v) means for applying liquid followed by gas under pressure to the fibre lumens to effect a transmembrane cleaning of the fibres, the pressure of the liquid being sufficient to stretch substantially all of the pores of the fibres and the pressure of the gas being sufficient to ensure that the gas will pass through the larger pores of the fibres to dislodge any solids retained therein and to wash the external walls of the fibres and the interior of the shell to remove all solids from the shell to an external collection point.



5,024,763

FILTERING APPARATUS

Arthur Schlaginhaufen, Rothrist, Switzerland, assignor to Arthur Schlaginhaufen Ing., Switzerland

Filed Jan. 8, 1990, Ser. No. 462,063

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1989, 3900390

Int. Cl.⁵ B01D *29/64*

U.S. Cl. 210—333.01 12 Claims

1. A filtering apparatus for a house water main installation, comprising:

a housing having a water inlet and a water outlet;

a filter bell dome removably connected to said housing;

a cylindrically shaped main filter member having a water flow path therethrough and mounted in the interior of said filter bell dome;

a cylindrically shaped reversing flow filter member having a water flow path therethrough and superposed to said main filter member and mounted in the interior of said filter bell dome;

a tubular guiding member located in the interior of said reversing flow filter member and connecting the interior of said main filter member and said outlet of said housing;

a filter support member for mounting said main filter member and said reversing flow filter member, said filter support member being rotatable and axially adjustable between a backwashing position in which the flow path through the reversing flow filter member is open and a normal position in which the flow path through the reversing flow filter member is closed, said filter support member including first sealing means;

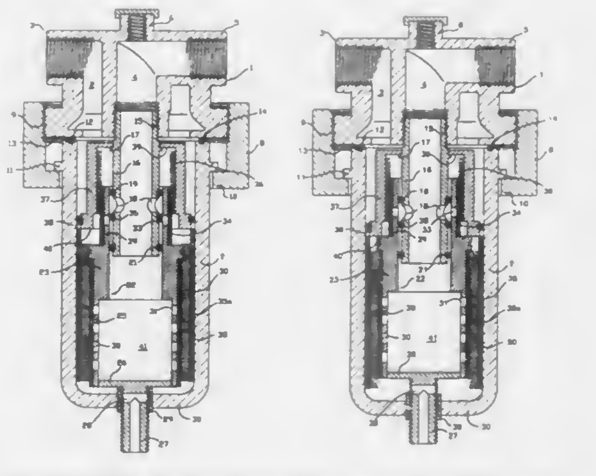
support means for directing water flow to said main filter member to flow from its exterior to its interior when the flow path through said reversing flow filter member is closed;

said support means including second sealing means cooperating with said first sealing means of said filter support member to block the flow path through said main filter member from its exterior to its interior when the flow path through said reversing flow filter member is open, the flow of water to the outer surface of said reversing flow filter member flowing through said reversing flow filter and then partially through said outlet and partially through said main filter member from its interior to its exterior when the flow path through said reversing flow filter member is open;

a first brush means for cleaning said main filter member, said first brush means fixedly mounted in the interior of said filter bell dome and located adjacent to said main filter member;

a second brush means for cleaning said reversing flow filter member, said second brush means fixedly mounted in the interior of said filter bell dome and located adjacent to said reversing flow filter member;

said first brush means engaging outer surfaces of said main filter member and said second brush means engaging outer surfaces of said reversing flow filter member;

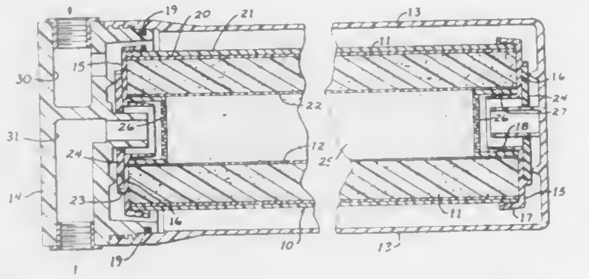


means for adjusting said main filter member and for causing said main filter member and said reversing flow filter member mounted on said filter support member to perform a spiral rotational movement when said filter support member is adjusted from its normal position to its backwashing position and vice versa whereby the outer surfaces of said main filter member and said reversing flow filter member, respectively, are mechanically cleaned by said first and second brush means, respectively.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,764
METHOD OF MAKING A COMPOSITE FILTER

Thomas D. Holler, Sheboygan, Wis., assignor to Ametek, Inc., Sheboygan, Wis.
Filed Mar. 17, 1989, Ser. No. 325,245
Int. Cl.^{5} B01D *27/14*
U.S. Cl. 210—484 5 Claims



4. A method for the in situ preparation of a granular deionizing resin bed in a filter chamber of a composite activated carbon/deionizing resin filter comprising the steps of:
(1) preparing an aqueous slurry of dionizing resin beads;
(2) filling the chamber with the slurry; and,
(3) removing the water from the slurry and drying the beads to cause the beads to fracture into a granular form.

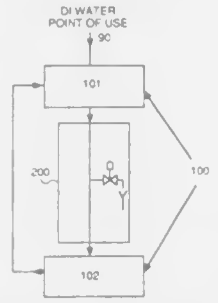
5,024,765
COMPOSITE MEMBRANES AND PROCESSES USING THEM

Charles Linder, Rehovot; Mordechai Perry, Petach Tikva; Mara Nemas, Neve Monosson, and Reuven Katraro, Rishon Lezion, all of Israel, assignors to Aligena AG, Basel, Switzerland
Filed Oct. 2, 1989, Ser. No. 416,224
Int. Cl.^{5} B01D *69/12*
U.S. Cl. 210—651 **34 Claims**

34. A reverse osmosis or ultrafiltration process which comprises the steps of:
disposing a solution on one side of a composite membrane as solution which it is desired to concentrate or resolve into components;
applying a hydraulic pressure which is greater than the osmotic pressure of the solution; and
recovering at least one member selected from the group consisting of solution which has passed through said membrane and solution which has remained on the said one side of said membrane;
and wherein said composite membrane comprises the following components (a), (b) and (c), namely:
(a) a porous semipermeable membrane substrate of an aromatic polysulfone,
(b) a superimposed coating thereon which has been coated onto substantially the whole of the external and internal surfaces of said substrate, said coating including at least one member selected from the group consisting of
polymers containing at least one diazonium group, and
polymers containing at least one primary amino group and which have been exposed to the action of at least one member selected from the group consisting of nitrous acid and other reagents which potentially react with primary amino groups to form diazonium groups, and wherein said coating has been subjected to at least one in situ chemical reaction with loss of any diazonium groups which may be present, and with formation of valence links in at least one of the modes (i), (ii) and (iii); namely:
(i) among different moieties of said at least one member between themselves,
(ii) between moieties of said at least one member and the material of the substrate, and
(iii) between moieties of said at least one member and a polyfunctional reactant, the reaction in this case having been effected so as to leave residual reactive functions, and
(c) a polymer which contains functions selected from the group consisting of cations, anions, $—NH—$, $—NH_2—$, $—OH$ and $—SH$, and which is selected from the group consisting of hydrophilic and polyelectrolyte polymers, which polymer has been reacted with said residual functions and subsequently has been subjected to reaction with at least one cross-linking agent.

5,024,766
POINT OF USE DEIONIZED WATER PURIFICATION UNIT

Shahzad Mahmud, 4050 Naomi Ct., San Jose, Calif. 95136
Filed Nov. 9, 1988, Ser. No. 269,219
Int. Cl.^{5} C02F *9/00*
U.S. Cl. 210—668 .21 Claims



1. A point of sue water purification apparatus for insertion in a purified water supply line at the location of another apparatus requiring high purity water, the water supply line normally supplying such another apparatus with deionized purified water, said deionized purified water having impurities such as bacteria, particulates, organic carbon contaminants, and a resistivity of about 17-18 megohm-cm, said point of use water purification apparatus comprising:
means, operatively connectable to such a water supply line, for generating a flow of water having an approximately constant pressure, the flow generating means having an inlet and an outlet wherein the inlet receives water from such a water supply line and the approximately constant water pressure is generated at the outlet;
means, operatively connected to said generating means, for reducing organic carbon contaminants and having an inlet and an outlet wherein water received at the inlet of the organic carbon contaminant reducing means from said generating means has a first level of organic carbon contaminants and water at the outlet of the organic contaminant reducing means has a second level of organic carbon contaminants, the second organic carbon contaminants level being less than the first organic carbon contaminants level;
means, operatively connected to the organic carbon contaminant reducing means, for filtering water and having an inlet and an outlet wherein water from said organic carbon contaminant reducing means, received by the inlet of said filtering means, has a first level of particulates and water at the outlet of said filtering means has a second level of particulates which is lower than said first level;
coupling means, operatively connected to said filtering means and operatively connectable to such another apparatus, for providing the water from the filter means to such another apparatus upon demand;
means, operatively coupled to the coupling means, for polishing water and having an inlet and an outlet wherein water from said coupling means is provided to the inlet of the polishing means and the polished water is provided at the outlet of the polishing means;
means, operatively connected to said polishing means, for sterilizing and having an inlet coupled to the outlet of said polishing means and an outlet, said outlet being coupled to the inlet of said generating means to form a recirculation path through said point of use water purification apparatus; and
control means, operatively coupled to said organic carbon contaminant reducing means, to said polishing means and to said sterilization means, for selecting the mode of operation of said point of use water purification apparatus wherein in a first mode of operation, the point of use water purification apparatus provides high purity water to such another apparatus, and in a second mode of operation, said recirculation path through the point of use water purification apparatus is sterilized.

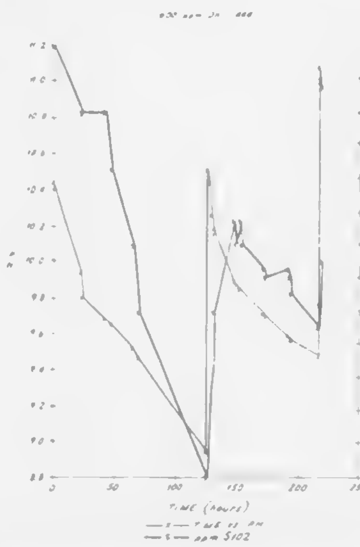
5,024,767
METHOD FOR PURIFYING LIQUIDS

Nami Kubo; Toshio Yoshioka, both of Otsu; Knuichi Saito, Kasatsu, and Syunroku Tohyama, Yasu, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan
Filed Jan. 3, 1990, Ser. No. 460,549
Claims priority, application PCT Int'l Appl., Apr. 4, 1988, PCT/JP88/00341
Int. Cl.^{5} B01D *15/04;* **C02F** *1/42*
U.S. Cl. 210—682 13 Claims

1. A method of purifying a contaminated liquid comprising bringing the liquid into contact with a mixture of (1) a graft polymer, having carboxyl groups grafted onto a polyamide or polyester, as a cation exchanger, and (2) an anion exchanger.

5,024,768
ORGANIC POLYMER ACTIVATOR FOR DETACKIFICATION

Gene A. Merrell, Huntingdon Valley, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.
Continuation-in-part of Ser. No. 327,846, Mar. 23, 1989, which is a continuation-in-part of Ser. No. 161,866, Feb. 29, 1988, Pat. No. 4,853,132. This application May 26, 1989, Ser. No. 358,296
Int. Cl.^{5} C02F *1/56*
U.S. Cl. 210—712 7 Claims

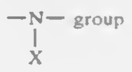


1 A process for detackifying and coagulating paint, lacquer or enamel in a spray booth in which water is used to wash air in said booth in order to remove oversprayed paints, lacquers or enamels from said water prior to the recirculation of said water for the further washing of air in said spray booth comprising the steps of adding to said water at least about 300ppm of a water-soluble or water-dispersible cationic organic polymer selected from the group consisting of:
dimethylamine-epichlorohydrin,
polydiallyldimethylammonium chloride,
condensation product of hexamethylenediamine still bottoms plus ethylene dichloride,
condensation product of dimethylamine plus epichlorohydrin plus ethylene diamine,
dimethylamine-epichlorohydrin/polydiallyl dimethyl ammonium chloride, in the ratio of about 3/1.
condensation product of hexamethylenediamine still bottoms plus ethylene dichloride/condensation product of dimethylamine plus epichlorohydrin plus ethylene diamine, in the ratio of about 3/1,
dimethylamine-epichlorohydrin/condensation product of dimethylamine plus epichlorohydrin plus ethylene diamine, in the ratio of about 1/1,
condensation product of dimethylamine plus epichlorohydrin plus ethylene diamine/polydiallyl dimethyl ammonium chloride, in the ratio of about 3/1,
in selective combination with a sufficient amount for the purpose of an anionic organic polymer selected from the group consisting of:
maleic anhydride,
maleic anhydride/diisobutylene, and
polyacrylic acid, wherein said sufficient amount of said maleic anhydride is at least about 1500ppm, wherein said sufficient amount of said maleic anhydride/diisobutylene is at least about 1000ppm, and wherein said polyacrylic acid has a molecular weight of at least about 243,000, and said sufficient amount of polyacrylic acid is at least about 1000pm.

5,024,769
METHOD OF TREATING AN ARSENIC-CONTAINING SOLUTION

Darrell L. Gallup, Chino, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.
Continuation-in-part of Ser. No. 345,177, May 1, 1989, and Ser. No. 226,039, Jul. 29, 1988. This application Jan. 31, 1990, Ser. No. 473,226
Int. Cl.^{5} C02F *1/76, 1/58*
U.S. Cl. 210—721 **50 Claims**

1. A method of treating an aqueous solution containing one or more arsenic compounds in a +3 oxidation state comprising, contacting the aqueous solution with an amount of an oxidizing agent to convert substantially all of the +3 oxidation state arsenic to a +5 oxidation state, said amount being substantially less than that which theoretically would be required to react with substantially all of the arsenic in the +3 oxidation state and any other oxidizable species in the aqueous solution, said oxidizing agent including at least one



$$\underset{\displaystyle X}{—\overset{}{N}—}\ \text{group}$$

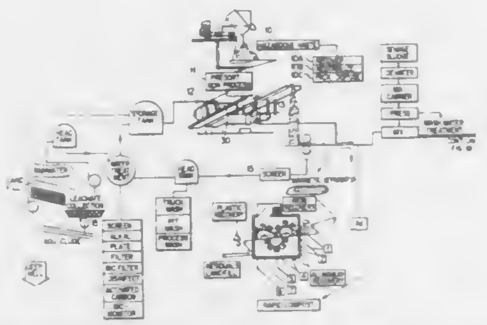
wherein X is a halogen.

5,024,770
WASTE SEPARATING, PROCESSING AND RECYCLING SYSTEM

John A. Boyd, Arlington, Va., and George M. Staples, III, Salisbury, Md., assignors to American Materials Recycling Inc., Arlington, Va.
Filed Jul. 15, 1988, Ser. No. 219,275
Int. Cl.^{5} B02C *11/08, 21/00, 23/08*
U.S. Cl. 210—747 **7 Claims**

1. A method for pulverizing and separating municipal solid waste into its component parts comprising collecting and pre-sorting municipal solid waste, processing and separating the pre-sorted waste in a wet mill rotary separator means into soluble, biodegradable material and non-soluble, non-biodegradable material, pumping and injecting groundwater from an aquifer beneath a landfill into said wet mill separator, said

aquifer comprising a mixture of groundwater and untreated leachate from said landfill, wherein said groundwater is utilized in process steps of softening and pulverizing the biodegradable material and utilizing two separate conveyor means to remove both the softened, pulverized biodegradable material and the non-biodegradable material to further processing.



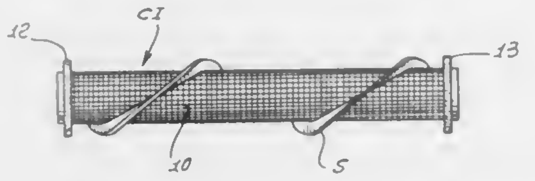
5,024,771
LIQUID FILTER AND METHODS OF FILTRATION AND CLEANING OF FILTER

Richard J. Chiarito, Corona, Calif., assignor to Everfilt Corporation, Corona, Calif.

Filed Feb. 14, 1990, Ser. No. 480,062

Int. Cl.^{5} B01D *24/46*

U.S. Cl. 210—791 **10 Claims**



9. A method of filtration of solid contaminants from a liquid by means of a screen filter and cleaning the screen, without removing the screen filter from the filter housing, including the steps of providing a filter housing for a screen filter to be accommodated therein with the liquid to be filtered being conveyed into the housing between the screen filter and the inner wall of the housing and the filtered liquid being conveyed through the screen filter, the housing having an inlet port for receiving a liquid to be filtered, a discharge port for the filtered liquid to exit the filter housing and a flush port for discharging contaminants in the liquid undergoing filtering separated from the liquid during filtering, mounting a screen filter in the filter housing in a spaced relationship with the housing for conveying a liquid to be filtered, the screen filter and the filter housing being constructed and designed relative to one another for increasing the velocity to the liquid to be filtered admitted into the housing at the inlet port and conveyed over the surface of the screen filter to the discharge port thereby causing the heavier contaminants to be forced towards the housing wall and the lighter contaminants to be conveyed along the outer surface of the screen filter, arranging an isolation control valve at the outlet port for controlling the flow of the filtered liquid therefrom, arranging a control valve at the flush port for controlling the flow of the contaminants through the flush port, closing the isolation control valve and the flush port control valve for equalizing the pressure on both sides of the screen filter and then opening the flush port control valve for creating a low pressure condition on the outside surface of the screen filter whereby the higher pressure on the opposite side of the screen filter will cause the solid contaminants to move away from the screen filter including the contaminants lodged in the screen filter while a higher velocity imparted with a directional flow towards the flush port to the liquid admitted into the inlet port, and admitting a liquid of a preselected velocity into the housing at the inlet port to be conveyed between the housing wall and the adjacent surface of the screen filter causing the liquid to flow through the screen filter and thereby filtering out the solid contaminants that are conveyed out of the flush port during the interval the isolation control valve is closed and the flush port control valve is open.

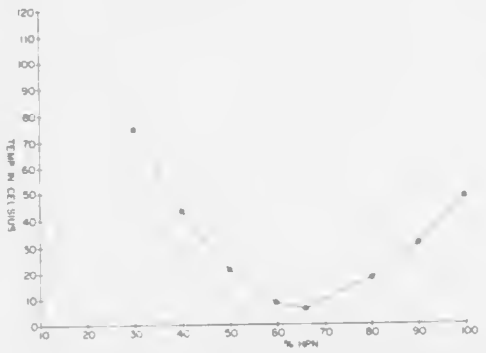
5,024,772
METHOD OF PRODUCING HPN AND MIXTURES THEREOF

Laurance R. Thurman, Clute; Joseph P. Dowd, and Kathy J. Fischer, both of Lake Jackson, all of Tex., assignors to BASF Corporation, Wyandotte, Mich.

Filed Jul. 10, 1989, Ser. No. 377,079

Int. Cl.^{5} C07C *69/66*

U.S. Cl. 252—1 **19 Claims**



1. A process for making a product mixture having a preselected concentration of a 2,2-dimethyl-3-hydroxypropyl-2,2-dimethyl-3-hydroxypropionate component comprising the steps of:

a) heating the reaction mixture having a hydroxypivalic acid component and a neopentyl glycol component to a preselected temperature ranging from about 120° C. to about 170° C., said neopentyl glycol component ranging from about 10 percent to about 85 percent by weight of said reaction mixture,

b) contacting said reaction mixture with a mineral acid having a preselected concentration ranging from about 0.2 percent to about 0.5 percent by weight of said reaction mixture, and

c) adding an amount of 2,2-dimethyl-3-hydroxypropyl-2,2-dimethyl-3-hydroxypropionate to said reaction mixture sufficient to produce said product mixture having said preselected concentration of said 2,2-dimethyl-3-hydroxypropyl-2,2-dimethyl-3-hydroxypropionate component.

5. A process as set forth in claim 1 wherein said product mixture is a liquid at a temperature ranging from about 10° C. to about 125° C.

5,024,773
METHODS FOR PREPARING, GROUP II METAL OVERBASED SULFURIZED ALKYLPHENOLS

Thomas V. Liston, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 195,559, May 16, 1988, Pat. No. 4,971,710, which is a continuation of Ser. No. 921,299, Oct. 21, 1986, Pat. No. 4,744,921. This application May 17, 1989, Ser. No. 353,288

The portion of the term of this patent subsequent to Nov. 20, 2007, has been disclaimed.

Int. Cl.^{5} C10M *129/00, 135/00*

U.S. Cl. 252—42.7 **11 Claims**

1. A method for preparing a Group II metal overbased sulfurized alkylphenol which comprises reacting in an inert diluent an alkylphenol, wherein the alkyl group contains a

sufficient number of carbon atoms to render oil-soluble the resulting Group II metal overbased sulfurized alkylphenol, sulfur, a Group II metal oxide,, hydroxide or C_1–C_6 alkoxide, a C_2–C_4 alkylene glycol, an alkanol of at least 8 carbon atoms and a compound selected from an oil-soluble Group II metal overbased hydrocarbyl sulfonate and an alkenyl succinimide, in the presence of a sulfurization catalyst, followed by reaction with carbon dioxide.

5,024,774
NITROGEN CONTAINING ANTI-OXIDANT COMPOSITIONS

Mary F. Salomon, Cleveland Heights, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Continuation of Ser. No. 210,603, Jun. 23, 1988, Pat. No. 4,915,858, which is a continuation of Ser. No. 59,884, Jun. 9, 1987, Pat. No. 4,798,684. This application Aug. 10, 1989, Ser. No. 391,758

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.^{5} C10M *135/28*

U.S. Cl. 252—47 **5 Claims**

1. A composition of the formula

$$R^1R^2N(AS_xAO)_yAS_xANR^3R^4$$

wherein A is an alkylene group, x is at least one, y is 0 and R^1R^2N and R^3R^4N are both phenothiazine structures or phenothiazine derivatives or mixtures thereof.

5,024,775
ALKYL PHENOL STABILIZER COMPOSITIONS FOR FUELS AND LUBRICANTS

J. Vincent Hanlon, St. Louis, Mo., and Scott A. Culley, Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Nov. 6, 1989, Ser. No. 432,164

Int. Cl.^{5} C10M *129/10*

U.S. Cl. 252—52 R **13 Claims**

1. A liquid mixture of alkyl phenols consisting essentially of:

a) from 1 to 8 wt% of 2-tert-butylphenol;

b) from 4 to 12 wt% of 2,6-di-tert-butylphenol:

c) from 4 to 12 wt% of 2-tert-butyl-4-n-butylphenol;

d) from 4 to 12 wt% of 2,4,6-tri-tert-butylphenol; and

e) from 65 to 80 wt.% of 2,6-di-tert-butyl-4-n-butyl-phenol.

5,024,776
MACHINE DISHWASHING COMPOSITIONS

Pieter H. Kreischer, Hellevoetsluis, Netherlands, assignor to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Continuation of Ser. No. 234,245, Aug. 19, 1988, abandoned. This application Oct. 10, 1990, Ser. No. 596,630

Claims priority, application United Kingdom, Aug. 21, 1987, 8719776

Int. Cl.^{5} C11D *9/42;* **D06L** *3/00*

U.S. Cl. 252—97 **5 Claims**

1. A thixotropic machine dishwashing composition structured in micellar form comprising:

(a) 0.1–35% by weight alkali-metal builder;

(b) 0.1–30% by weight alkali-metal silicate having a molar ratio of SiO_2/Na_2O and/or K_2O of from 2.0 to 3.25;

(c) 0.1–10 by weight chlorine bleach;

(d) 0.1–5% by weight surfactant system comprising 0.05–4.95% by weight of the composition of a non-soap anionic surfactant and soap, the anionic and soap being preseat at a ratio of from 4:1 to 1:4; and

(e) water;

the total level electrolyte in the composition being greater than 20% by weight of the composition, said composition having a yield point of between 5–50 Pa and a viscosity between 500–5000 mPas at $20s^{-1}$.

5,024,777
SYNERGISTIC LIME SOAP DISPERSING COMPOSITION

Kim R. Smith, and James E. Borland, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Jan. 23, 1990, Ser. No. 468,763

Int. Cl.^{5} C11D *9/30, 9/00*

U.S. Cl. 252—117 **8 Claims**

1. A bar soap composition having superior lime soap dispersing properties, said composition containing 5–95 weight percent of a fatty acid soap 1 to 40 wt. % of each of and a C_{8-20} alkyl dimethylamine oxide and sodium cocoyl isethionate in a synergistic weight ratio of 0.33–3.0 parts C_{8-20} alkyl dimethylamine oxide per part of sodium cocoyl isethionate.

5,024,778
SPRAY DRIED BASE BEADS FOR DETERGENT COMPOSITIONS CONTAINING ZEOLITE, BENTONITE AND POLYPHOSPHATE

John J. Grecsek, Trenton, N.J., assignor to Colgate-Palmolive Company, Piscataway, N.J.

Continuation of Ser. No. 523,642, Aug. 15, 1983, abandoned, which is a continuation of Ser. No. 332,004, Dec. 18, 1982, abandoned, which is a continuation-in-part of Ser. No. 279,550, Jul. 1, 1981, abandoned, which is a continuation-in-part of Ser. No. 238,619, Feb. 26, 1981, abandoned. This application Aug. 29, 1984, Ser. No. 645,463

Int. Cl.^{5} C11D *7/16, 3/06, 3/14, 17/00*

U.S. Cl. 252—140 **2 Claims**

1. Free flowing, zeolite-containing spray dried base beads, of a bulk density in the range of 0.2 to 0.8 g./cc. and particle sizes in the range of No's. 10 to 100, U.S. Sieve Series, useful for the manufacture of a particulate built synthetic nonionic organic detergent composition, which composition is mechanically stable and of reduced zeolite deposition characteristics due to the presence therein of bentonite and the absence of water soluble silicate, comprising 15 to 35% of zeolite A, 5 to 20% of beneficiated Wyoming bentonite, having a swelling capacity, in water, of 3 to 15 ml./g., having a viscosity of 3 to 30 centipoises at 6% concentration in water, and containing at least 4% of moisture therein, 15 to 40% of pentasodium tripolyphosphate, 0.05 to 5% of sodium polyacrylate of a molecular weight in the range of about 1,000 to 5,000, 5 to 10% of moisture and 0% of sodium silicate, in which the proportion of bentonite:zeolite is in the range of 1:6 to 1:2, that of tripolyphosphate:zeolite is within the range of 1:2 to 2:1 and that of bentonite:tripolyphosphate is within the range of 1:6 to 1:2.

5,024,779
CREAMY NAIL POLISH REMOVER CONTAINING HYDROLYZED AND NEUTRALIZED MALEIC ANHYDRIDE C_1–C_4 ALKYL VINYL ETHER COPOLYMER

Michael W. Helioff, Westfield; Mohammed Tazi, Wayne, both of N.J.; Yoon T. Kwak, Brooklyn, N.Y., and Robert B. Login, Oakland, N.J., assignors to GAF Chemicals Corporation, Wayne, N.J.

Filed Sep. 6, 1990, Ser. No. 578,173

Int. Cl.^{5} C11D *7/00*

U.S. Cl. 252—162 **8 Claims**

1. A creamy nail polish remover composition consisting essentially of

(a) about 50 to 95% by weight of a solvent selected from acetone, methyl ethyl ketone, ethyl acetate and butyrolactone, and mixtures thereof, in an amount effective to remove nail polish from a nail;

(b) about 0.25 to 3.0% by weight of a hydrolyzed and neutralized crosslinked maleic anhydride-C_1–C_4 alkyl vinyl ether copolymer gel said copolymer crosslinked with a polyethylenically unsaturated compound;

(c) about 0.20 to 2.4% by weight of a neutralizing agent;

(d) about 0–25% by weight of water; and

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(e) about 0–25% by weight of a humectant,

said composition having a viscosity of about 10,000 to 50,000 cps as measured by a Brookfield viscometer Model RVT at 10 rpm TD spindle at 25° C.

5,024,780
CLEANER FOR TREATING A SURFACE

Cassius W. Leys, Hartsdale, N.Y., assignor to A.G.P. Systems, Inc., Windham, N.Y.

Filed Aug. 30, 1989, Ser. No. 400,564

Int. Cl.^{5} C09D *9/00;* **C11D** *7/22, 7/50*

U.S. Cl. 252—162 **14 Claims**

1. A cleaner for removing graffiti, paint and other coatings from a surface, said cleaner comprising:

(a) N-methylpyrrolidone in an amount between about 20 to about 40 percent by volume of said cleaner:

(b) propylene carbonate in an amount between about 20 to about 50 percent by volume of said cleaner;

(c) a hydroxy propyl cellulose thixotropic thickening agent in an effective amount;

(d) a dispersing ingredient which is selected from the group consisting of dipropylene glycol monomethyl ether acetate and dipropylene glycol methyl ether;

(e) isocetyl alcohol, wherein said isocetyl alcohol and said dispersing ingredient are present in an amount which totals no more than 40 percent by volume of said cleaner; and

(f) a surfactant in an amount between about 1.6 to about 2.4 percent by volume of said cleaner.

5,024,781
AZEOTROPE-LIKE COMPOSITIONS OF 1,1-DICHLORO-1-FLUOROETHANE, DICHLOROTRIFLUOROETHANE, METHANOL AND A MONO- OR DI-CHLORINATED C_2 OR C_3 ALKANE

Peter B. Logsdon; Leonard M. Stachura, both of Erie; Ellen L. Swan, Niagara, and Rajat S. Basu, Erie, all of N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Nov. 13, 1989, Ser. No. 435,923

Int. Cl.^{5} C11D *7/30, 7/50*

U.S. Cl. 252—171 **51 Claims**

1. Azeotrope-like compositions consisting essentially of from about 25 to about 98 weight percent 1,1-dichloro-1-fluoroethane, from about 1 to about 69 weight percent dichlorotrifluoroethane selected from the group consisting of 1,1-dichloro-2,2,2-trifluoroethane, 1,2 dichloro-1,2,2-trifluoroethane and a mixture of 1,1-dichloro-2,2,2-trifluoroethane and 1,2-dichloro-1,2,2-trifluoroethane, from about 1 to about 4 weight percent methanol and from about 0.1 to about 4 weight percent of a mono- or di-chlorinated C_2 or C_3 alkane selected from the group consisting of 1l-chloropropane, 2-chloropropane and 1,1-dichloroethane, wherein said compositions with 1 chloropropane or 2-chloropropane boil at about 30.9° C. at 760 mn Hg and said compositions with 1,1-dichloroethane boil at about 29.8° C. at 760 mm Hg.

5,024,782
ZEOLITE AGGLOMERATION PROCESS AND PRODUCT

Leslie E. Finn, Fremont; Donald K. Swatling, El Cerrito, and Erle D. Mankin, Martinez, all of Calif., assignors to The Clorox Company, Oakland, Calif.

Filed Jun. 16, 1989, Ser. No. 367,392

Int. Cl.^{5} C11D *7/10, 7/20, 11/00, 17/06*

U.S. Cl. 252—174.13 **7 Claims**

1. A zeolite agglomerate for use as a detergent product, comprising

about 5–70 parts by wgt. zeolite,

about 10–94 parts by wgt. of low absorptivity sodium chloride, and

a binder effective amount of a zeolite binder,

the agglomerate formed therefrom having a particle size range of about 0.15–1.7 mm. and a density of at least about 0.6 gm/cc., the agglomerate further being characterized by mechanical particle strength suitable for resisting substantial particle fracture during transport by a dilute phase pneumatic conveying system and by a nucleus formed from the low absorptivity sodium chloride filler as a seed for the agglomerate with the zeolite and binder forming a shell adhering to the surface of the filler seed.

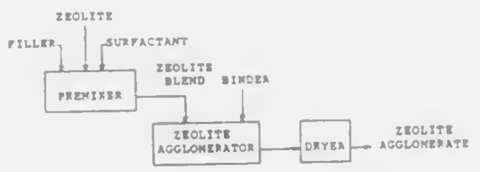
7. A method of forming a granular detergent product, comprising the steps of

blending zeolite particles of about 1–20 micron particle size with a filler to form a zeolite blend,

charging the zeolite blend to a first agglomerator,

spraying a zeolite binder onto the zeolite blend in the first agglomerator with agitation to form a zeolite agglomerate having about 5–70 parts by wgt. zeolite, about 10–94 parts by wgt. to filler, about 1–20 parts by wgt. surfactant, an amount of the zeolite binder effective for agglomerating the zeolite blend and at most about 20 parts by wgt. water,

drying the zeolite agglomerate to remove a portion of the water and form a dried zeolite agglomerate having a particle size of about 0.15–1.7 mm., a density of at least about 0.60 gm./cc. and characterized by mechanical particle strength sufficient to resist substantial particle fracture during transfer by a dilute phase pneumatic conveying system,



charging the zeolite agglomerate and other detergent components to a second agglomerator to form a detergent composition,

spraying the detergent composition with a detergent binder while agitating the detergent blend to produce a detergent agglomerate having a composition with at most about 20 parts by wgt. water, and

drying the detergent agglomerate to remove a portion of the water and form the detergent agglomerate having a generally uniform particle size and density while being characterized by substantial freedom from segregation and dusting and exhibiting good solubilization and dispersion qualities in aqueous solution.

5,024,783
BOILER AND BOILER WATER TREATMENT SYSTEM

Bruce D. Busch, Shakopee, and Jeffrey R. Nicholls, Prior Lake, both of Minn., assignors to Fremont Industries, Inc., Shakopee, Minn.

Continuation-in-part of Ser. No. 420,117, Oct. 10, 1989. This application Nov. 13, 1990, Ser. No. 611,779

Int. Cl.^{5} C02F *5/10*

U.S. Cl. 252—180 **1 Claim**

1. A chemical treatment to be utilized in steam-producing boiler systems providing for the prevention of scale and deposition and further providing for the in-service removal of scale and deposits present in the systems consisting essentially of a composition having the following formulation:

Ingredient	Percent by Weight
Tetrasodium salt of ethylene diamine tetraacetic acid (EDTA) (in 40% aqueous solution)	10%
1-hydroxyethane-1,1-diphosphonic acid (HEDP) (in a 60% active, aqueous solution)	10%
Polyacrylate (in a 50% active, aqueous solution) with a molecular weight of between 2000–6000	10%
Poly (acrylic acid-co-hypophosphite) sodium salt (50% solution) with a molecular weight of between 200–1500	2%
Sodium gluconate	1%
Sodium lignosulfonate	2%
Sodium hydroxide (in a 50% solution) which will normally achieve a boiler pH level of between about 10.5 and 12.5	15%
Water	balance.

5,024,784
DEVICE FOR REVERSIBLE OPTICAL DATA STORAGE USING POLYMERIC LIQUID CRYSTALS

Manfred Eich, Frankfurt am Main, and Joachim Wendorff, Naubeim, both of Fed. Rep. of Germany, assignors to Rohm GmbH Chemische Fabrik, Fed. Rep. of Germany

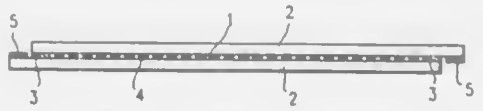
Filed Jul. 8, 1987, Ser. No. 71,192

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1986, 3623395

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.^{5} C09K *19/52*

U.S. Cl. 252—299.01 **16 Claims**



1. A method of reversible optical information storage using a device comprising (i) a substrate, and (ii) a film in an oriented or disoriented state in contact with said substrate, said film comprising a liquid crystalline polymer and photopolymerizable azo, azoxy or carbon-carbon double bond-containing photochromic groups capable of reversible light-induced isomerization, wherein said photochromic groups are contained in the monomers in said liquid crystalline polymer or are present in low molecular weight compounds added to said polymer, comprising the steps of:

(a) writing information in said device by locally reorienting said film by photoisomerizing said photochromic groups in said film, film is in the shape-stable state below the glass temperature of said polymer when the information is; and

(b) reading said stored information by illuminating said film with coherent monochromic light, wherein said film is in the shape-stable state below the glass transition temperature of said polymer during said writing and reading steps.

5,024,785
LIQUID CRYSTAL/RIGID RODLIKE POLYMER MODIFIED EPOXY/VINYL ESTER RESINS

Robert E. Hefner, Jr., Lake Jackson, and Deborah I. Haynes, Freeport, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 17, 1989, Ser. No. 298,432

Int. Cl.^{5} C09K *19/52, 19/32;* **C08F** *24/00;* **C08G** *8/30*

U.S. Cl. 252—299.01 **38 Claims**

1. A thermosettable vinyl ester composition containing a polymeric domain containing mesogenic or rigid rodlike moieties which composition is prepared by

(A) copolymerizing

(1) at least one epoxy resin having an average of more than one vicinal epoxy group per molecule wherein from about 0.01 to about 10 mole percent of the epoxide groups have been reacted with at least one compound containing a group reactive with an epoxide group and a polymerizable ethylenically unsaturated group and

(2) at least one polymerizable ethylenically unsaturated monomer, at least one of which contains at least one mesogenic or rigid rodlike moiety;

wherein component (1) is present in an amount of from about 50 to about 99 percent by weight based upon the combined weight of components (1) and (2) and component (2) is present in an amount of from about 1 to about 50 percent by weight based upon the combined weight of components (1) and (2); and then

(B) reacting the resulting copolymer with

(3) one or more polymerizable monounsaturated monocarboxylic acids in an amount which provides a ratio of epoxide groups to carboxylic acid groups of from about 0.7:1 to about 1.5:1.

5,024,786
DETERGENT COMPOSITIONS CONTAINING AN ANIONIC SURFACTANT AND A 4,4′-BIS(TRIAZINYLAMINO)-STILBENE DISULPHONIC ACID OPTICAL BRIGHTENER

John M. Farrar, Rawdon, and Mark D. Graham, Horsforth, both of Great Britain, assignors to Sandoz Ltd., Basel, Switzerland

Filed Oct. 27, 1988, Ser. No. 263,665

Claims priority, application United Kingdom, Oct. 30, 1987, 8725537; Feb. 4, 1988, 8802513; Jun. 7, 1988, 8813415

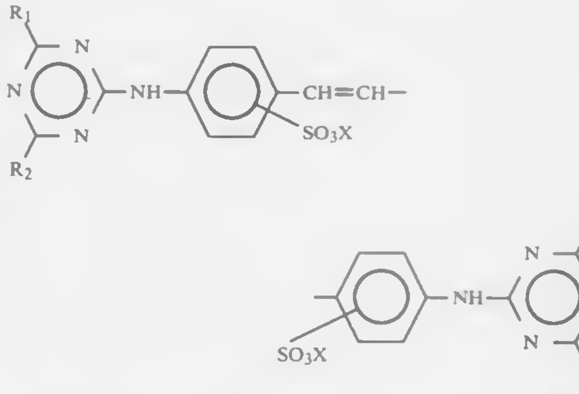
Int. Cl.^{5} C11D *3/42, 3/28, 3/34*

U.S. Cl. 252—543 **27 Claims**

1. An aqueous, isotropic liquid detergent composition comprising an aqueous solution of

(a) an anionic surfactant

and (b) and optical brightener of formula I



(I)

in which X is hydrogen, NH_4^+, or a cation of an alkali metal, an alkaline earth metal or an organic amine and

R_1 and R_2, independently, are selected from morpholino and anilino unsubstituted or substituted by 1, 2 or 3 groups selected from C_{1-4}alkyl, C_{1-4}alkoxy and halogen; piperidinyl, unsubstituted or substituted by 1 or 2 C_{1-4}alkyl groups; hexamethyleneimino; pyrrolidino; C_{1-8}alkylamino; C_{1-8}dialkylamino; and a 2,2,6,6-tetramethylpiperidinyl residue; provided that at least one R_1 is unsubstituted piperidinyl.

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PROCESS FOR THE PREPARATION OF FATTY ACID OR HYDROXY FATTY ACID ESTERS OF ISOPROPYLIDENE DERIVATIVES OF POLYGLYCEROLS

Gerald Jakobson; Werner Siemanowski, both of Rheinberg, and Karl-Heinz Uhlig, Krefeld-Traar, all of Fed. Rep. of Germany, assignors to Deutsche Solvay-Werke GmbH, Solingen, Fed. Rep. of Germany

Filed May 25, 1989, Ser. No. 357,006

Claims priority, application Fed. Rep. of Germany, May 30, 1988, 3818292

Int. Cl.^{5} C09F *5/08, 7/10*

U.S. Cl. 260—410.6 16 Claims

1. A process for preparing fatty acid or hydroxy fatty acid esters of an isopropylidene derivative of a polyglycerol, which comprises the steps of:

(a) reacting a C_1–C_4-alkyl ester of a C_6–C_{22}-fatty acid or mono- or polyhydroxy fatty acid, in alkaline medium, with one or more hydroxyl-containing isopropylidene derivatives of a polyglycerol, at a temperature in the range of about 140° to about 220° C., and at a pressure of 950–5 mbar, and removing the resultant C_1–C_4 alcohol by distillation; and

(b) recovering the resultant isopropylidene polyglycerol fatty acid or hydroxy fatty acid esters.

5,024,788

STRUCTURE FOR EFFECTING GAS-LIQUID AND PART THEREOF

Keith Brattan, Great Boughton, United Kingdom, assignor to Imperial Chemical Industries PLC, England

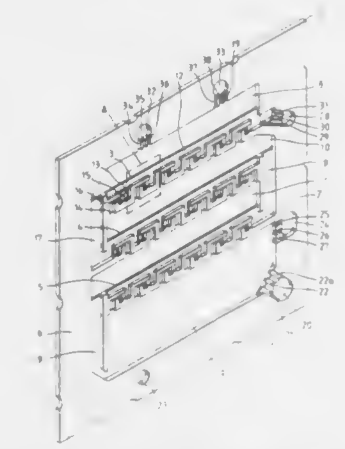
Filed Dec. 1, 1989, Ser. No. 444,790

Claims priority, application United Kingdom, Dec. 2, 1988, 8828221

The portion of the term of this patent subsequent to Jun. 4, 2008, has been disclaimed.

Int. Cl.^{5} B01F *3/04*

U.S. Cl. 261—114.1 22 Claims



1. A substantially planar plate, suitable for use in a structure comprising one or more substantially planar plates and in which direct contact may be effected between a gas and a liquid, the said plate comprising a frame part and at least one bridging part between opposite sides of the frame part, the bridging part dividing the plate into upper and lower cavities bounded by the frame part and the bridging part, and one or more apertures through the bridging part leading from the lower cavity to the upper cavity.

5,024,789

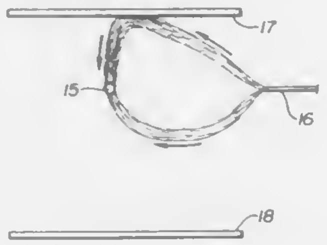
METHOD AND APPARATUS FOR MANUFACTURING ELECTROSTATICALLY SPUN STRUCTURE

John P. Berry, Wirral, England, assignor to Ethicon, Inc., Somerville, N.J. and The University of Liverpool

Continuation-in-part of Ser. No. 257,364, Oct. 13, 1988, abandoned, which is a continuation of Ser. No. 896,789, Aug. 15, 1986, abandoned. This application Jun. 19, 1989, Ser. No. 368,016

Int. Cl.^{5} B05B *5/00*

U.S. Cl. 264—6 12 Claims



1. A method of electrostatically spinning a tubular fibrous structure using an electrostatically charged, spinning mandrel and an electrostatically charged grid means in the region of the mandrel to produce an electrostatic field, which method comprises the steps of introducing into said electrostatic field a fiberizable material, collecting on said mandrel a first portion of said liquid in the form of fibers attracted directly to the mandrel and a second portion of said liquid in the form of fibers having been deflected towards said grid means to follow a longer path to said mandrel than the fibers from said first portion of liquid, whereby a tubular fibrous structure is produced having fibers of different diameters and varying fiber orientations.

9. Apparatus for electrostatically spinning a tubular fibrous structure, which apparatus comprises a mandrel to act as a collector for electrostatically spun fibers, means for electrostatically charging the mandrel and for varying the electrostatic charge thereon, means for rotating the mandrel, a pair of grid means in the region of the mandrel with one of said grid means disposed on one side of said mandrel and the other of said grid means disposed on the opposite side of said mandrel, means for electrostatically charging the grid means and for varying the electrostatic charge thereon, and means for introducing a fiberizable material into the electrostatic field, the surface of one of said grid means being closer to said mandrel than the surface of the other of said grid means.

5,024,790

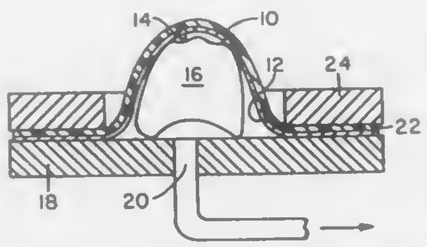
GLAZING DENTAL CONSTRUCTS

David G. Grossman, Corning; Michael A. Karnas, Big Flats, both of N.Y., and Ronald E. Johnson, Tioga, Pa., assignors to Corning Incorporated, Corning, N.Y.

Filed Jul. 9, 1990, Ser. No. 550,288

Int. Cl.^{5} A61C *13/09*

U.S. Cl. 264—16 25 Claims



1. A method of glazing a dental construct having a complex surface which comprises associating glazing material with a carrier, the carrier being composed of a highly flexible and stretchable film or sheet of organic material, assembling the construct and carrier so that the construct is positioned adjacent the carrier, subjecting the assembly to a differential pressure treatment to force the carrier into intimate contact with the construct surface, removing the organic carrier to leave the glazing material on the construct surface, and maturing the glazing material to a glaze on the construct surface.

5,024,791

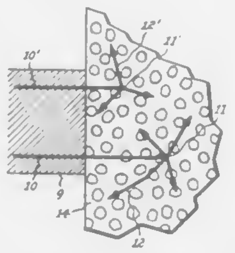
METHOD OF PRODUCING A PHOTOSTIMULABLE X-RAY IMAGE CONVERTOR

Dominic A. Cusano, and Gary W. Yeager, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 111,359, Oct. 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 46,442, May 6, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 300,132

Int. Cl.^{5} C09K *11/02;* **B29C** *67/02*

U.S. Cl. 264—21 8 Claims



1. A method to form an improved photostimulable storage member for digital radiography enabling recall of a latent radiographic image previously stored by X radiation with a moving beam of stimulating electromagnetic radiation selected from the class of ultraviolet, visible and infrared radiation so that minimal scattering of the moving beam occurs in the storage member beyond the width of the moving beam which comprises:

(a) forming a first solid physical mixture with crystals of a europium activated barium fluorohalide phosphor and a sufficient amount of a chemical compound containing an impurity ion selected from Group 1A and 3A elements in the periodic table of elements for incorporation of 0.3–3.0 weight percent impurity ion based on the weight of phosphor into said phosphor in order to reduce the optical refractive index of said phosphor,

(b) heating said first solid physical mixture causing the impurity ion to selectively diffuse into the phosphor matrix.

(c) forming a second solid physical mixture by combining the treated phosphor crystals with a thermoplastic synthetic organic polymer having an optical refractive index range extending from approximately 1.59 up to approximately 1.69 at the wavelength of stimulating electromagnetic radiation being employed.

(d) subjecting said second solid physical mixture to sufficiently elevated temperature and pressure conditions whereby said polymer is melted and a substantially void-free suspension of said phosphor crystals is formed, and

(e) cooling said molten phosphor suspension to ambient conditions whereby a solid storage member is formed, the storage member being further characterized by having a self-supporting layer configuration with a layer thickness sufficient to absorb 60–70% of the X radiation employed to form a latent radiograpic image therein.

5,024,792

ANTISTATIC THERMOPLASTIC/POLYAMIDE-POLYETHER COMPOSITIONS AND ANTISTATIC POLYMERIC FILMS MADE THEREFROM

Marvin R. Havens, Greer, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Division of Ser. No. 101,909, Sep. 28, 1987, Pat. No. 4,899,521, which is a continuation-in-part of Ser. No. 918,451, Oct. 14, 1986, Pat. No. 4,882,894. This application Oct. 19, 1989, Ser. No. 424,046

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.^{5} B29C *41/00*

U.S. Cl. 264—22 13 Claims

1. A method for the manufacture of a film having antistatic characteristics comprising admixing a polyether block amide copolymer having a degree of hydrophilicity suitable for packaging electronic devices with an aromatic sulfonamide antistatic agent, wherein said aromatic sulfonamide is substantially non-hygroscopic and substantially non-migratable, and forming a film having at least one layer of the admixture of polyether block amide copolymer with aromatic sulfonamide.

12. The method of claim 1, further including irradiating said film at a dosage up to about 20 MR.

5,024,793

METHOD FOR MANUFACTURING REFRACTORY OXIDE-CARBON BRICKS

Siegfried Wilkening, Alfter-Oedekoven, Fed. Rep. of Germany, assignor to Vereinigte Aluminum-Werke Aktiengesellschaft, Bonn, Fed. Rep. of Germany

Filed May 9, 1988, Ser. No. 191,607

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1987, 3715178

Int. Cl.^{5} C04B *35/64*

U.S. Cl. 264—29.7 16 Claims

1. A method for the manufacture of refractory bricks containing refractory oxides and carbon which comprises:

(A) mixing fine-particle refractory oxides with an effective amount of pitch to form a homogeneous green mixture,

(B) coking and calcining said green mixture to form a solid thermally stable sintered product of oxide and carbon,

(C) breaking up said sintered product to form grain fractions,

(D) binding said grain fractions with a mixture of oxide and pitch,

(E) compacting said bonded grain fractions into a green molded article, and

(F) firing said green molded article in a reducing atmosphere to form refractory bricks.

5,024,794

SELF-SUPPORTING CERAMIC STRUCTURES AND METHODS OF MAKING THE SAME

Marc S. Newkirk, and Jerry G. Weinstein, both of Newark, Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Continuation-in-part of Ser. No. 212,072, Jun. 24, 1988, Pat. No. 4,826,643, which is a continuation-in-part of Ser. No. 907,923, Sep. 16, 1986, abandoned. This application Mar. 15, 1988, Ser. No. 168,301

The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.

Int. Cl.^{5} C04B *35/60*

U.S. Cl. 264—57 21 Claims

1. A method of producing a self-supporting ceramic structure comprising the steps of:

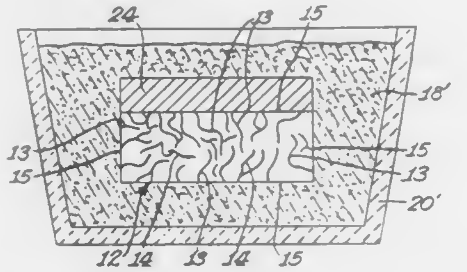
(a) providing a first self-supporting ceramic body comprising (i) a first polycrystalline oxidation reaction product formed upon oxidation of a first molten parent metal with a first oxidant, and (ii) interconnected porosity at least

VOL
1127
ISS
3
JE
18
1991
UMI

partially accessible from at least one surface of said first ceramic body;

(b) orienting a body of second parent metal and said first ceramic body relative to each other so that melting and oxidation reaction of said second parent metal with a second oxidant will cause formation of a second polycrystalline oxidation reaction product in a direction towards and into said interconnected porosity of said first ceramic body, wherein at least one of said first and second oxidant comprises at least one oxidant selected from the group consisting of a liquid oxidant and a solid oxidant; and

(c) heating said second parent metal to a temperature region above its melting point but below the melting points of both the first and second oxidation reaction products to form a body of molten second parent metal and, within said temperature region,



(i) reacting said body of molten second parent metal with said second oxidant to form said second polycrystalline oxidation reaction product;

(ii) maintaining at least a portion of said second oxidation reaction product in contact with and between said body of molten second parent metal and said second oxidant, whereby said second parent metal is drawn through said second polycrystalline material towards the oxidant so that said second oxidant reaction product continues to form at the interface between the second oxidant and previously formed second oxidation reaction product, and

(iii) continuing said reaction for a time sufficient to infiltrate at least a portion of said porosity of said first ceramic body with said second oxidation reaction product.

5,024,795

METHOD OF MAKING SHAPED CERAMIC COMPOSITES

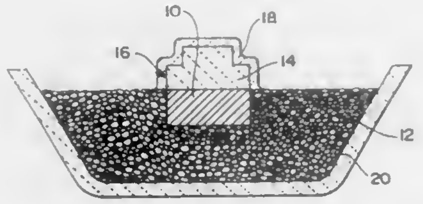
Christopher R. Kennedy, and Marc S. Newkirk, both of Newark, Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Continuation of Ser. No. 207,924, Jun. 13, 1988, Pat. No. 4,824,622, which is a continuation of Ser. No. 945,404, Dec. 22, 1986, abandoned. This application Dec. 6, 1988, Ser. No. 280,717

The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.

Int. Cl.^{5} C04B *33/32, 35/60*

U.S. Cl. 264—59 8 Claims



1. A method for producing a self-supporting ceramic composite body comprising a mass of filler material infiltrated by a ceramic matrix, said ceramic matrix being obtained by the oxidation of a parent metal to form a polycrystalline matrix comprising an oxidation reaction product of the parent metal, said method comprising:

(A) heating a parent metal to a temperature above its melting point but below the melting point of its oxidation reaction product to form a body of molten metal;

(B) contacting said body of molten metal with a permeable mass of filler material having at least one surface bearing a stratum, thereby forming an interface between the molten metal and the filler material, said stratum (a) substantially conforming to the geometry of at least a portion of said at least one surface of said mass of filler material, (b) being permeable to a vapor-phase oxidant, (c) comprising an unstabilizable material, and (d) being permeable to infiltration by growth of the oxidation reaction product, and said stratum being at least partially spaced from said interface such that formation of said oxidation reaction product will occur into said mass of filler material and in a direction toward and at least partially into said stratum; and at said temperature:

(i) reacting said molten metal with an oxidant to form an oxidation reaction product,

(ii) maintaining at least a portion of said oxidation reaction product in contact with and between said molten metal and said oxidant, to progressively transport molten metal through the oxidation reaction product toward the oxidant so that fresh oxidation reaction product continues to form at an interface between said oxidant and previously formed oxidation reaction product that has infiltrated said mass of filler material to produce a ceramic composite body, and

(iii) continuing said reacting to infiltrate at least a portion of said stratum with said oxidation reaction product to produce a ceramic stratum overlaying said ceramic composite body; and

(C) recovering a self-supporting ceramic composite body having said at least one surface established by said stratum.

5,024,796

WAVE DISSIPATING CAISSON AND METHOD FOR PRODUCING THEREOF

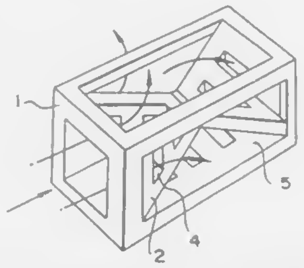
Nobuhiko Iwasa, 26-15, Zempukuji 1-chome, Suginami-ku Tokyo, Japan

PCT No. PCT/JP87/00255, § 371 Date Feb. 21, 1989, § 102(e) Date Feb. 21, 1989, PCT Pub. No. WO88/08469, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 21, 1987, Ser. No. 295,970

Int. Cl.^{5} E02B *3/06;* **B28B** *1/08*

U.S. Cl. 264—69 4 Claims



1. A method for producing a wave dissipating caisson comprising the steps of:

providing a mold for a bottom plate portion of said caisson;

depositing reinforced concrete into said mold for forming said bottom plate portion;

installing a plurality of steel rods onto said bottom plate portion, said plurality of steel rods extending from said bottom plate portion;

erecting wing frames, right and left side frames, front and back frames, and an upper frame around said plurality of steel rods, said frames extending from said bottom plate portion along with said plurality of steel rods;

depositing concrete into said frames;

thereby forming said caisson within said frames; and

removing said frames from said formed caisson.

5,024,797

PROCESSES FOR THE PRODUCTION OF MONO- AND MULTIFILAMENTS AND STAPLE FIBERS BASED ON POLYARYLENE SULFIDES

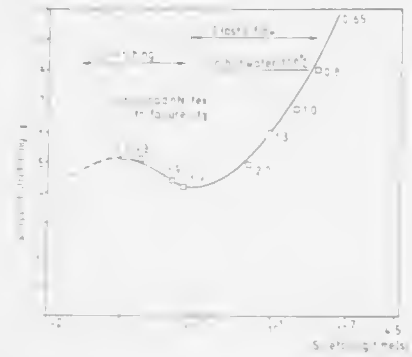
Wolfgang Anderheggen; Michael Kraemer, both of Dormagen; Roland Vogelsgesang, Leverkusen; Wolfram Wagner, Dormagen; Wolfgang Olges, Hilden, and Thomas Dragovic, Pulheim, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 11, 1990, Ser. No. 522,296

Claims priority, application Fed. Rep. of Germany, May 17, 1989, 3916010; Mar. 1, 1990, 4006397

Int. Cl.^{5} D01F *6/96*

U.S. Cl. 264—143 17 Claims



1. A process for the production of monofilaments and multifilaments based on linear polyarylene sulfide by melt spinning, stretching and setting, wherein

a) uncured granules of polyarylene sulfide having a melt viscosity of 30 to 300 Pa,s, as measured at 306° C. and at a shear rate γ of 1/1,000 sec, are melt spun through a nozzle to form a monofilament or a multifilament,

b) hot air at 50° C. to 150° C., or another inert gas, is blown onto the filaments beneath the nozzle during melt spinning

c) the mono- and multifilaments of the spun material are subjected after spinning to multistage stretching as follows:

1) a first stretching stage avoiding elongation with no significant orientation, in a stretching ratio γ_1 of 2.5 to 5.0, in a water bath with temperatures about 80° C. with residence times at that temperature of 0.1 to 5 seconds,

2) in a second stretching stage, the mono- or multifilaments are afterstretched, in a stretching bath at 80° C. to 100° C. with residence times at that temperature of 0.1 to 10 seconds so that the overall stretching ratio $\gamma_{1,2} = \gamma_1 \cdot \gamma_2 = 3.5$ to 7 and the material is thus partly crystallized and oriented so that

3) in a third stretching stage it can be afterstretched either continuously or discontinuously at temperatures of 150° C. to 260° C. in hot gases with a stretching ratio γ_3 in this stage of more than 1.05 with residence times at these temperatures of longer than 0.1 second to an overall stretching ratio $\gamma_{1,2,3}$, of 3.7 to 11.2 and

d) the mono- and multifilaments, after the multistage stretching, are heatset under tension or in the absence of tension.

5,024,798

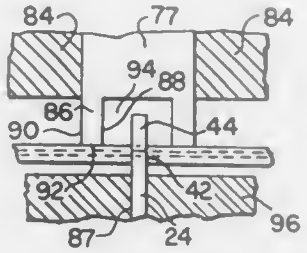
METHOD AND APPARATUS FOR MAKING A JUMPER CONNECTOR

Randy G. Cloud, Painesville, and David A. Pretchel, Madison, both of Ohio, assignors to Minnesota Mining & Manufacturing Company, Saint Paul, Minn.

Division of Ser. No. 901,762, Aug. 28, 1986, Pat. No. 4,869,684. This application Sep. 25, 1989, Ser. No. 411,663

Int. Cl.^{5} B29C *41/20, 41/38, 45/14*

U.S. Cl. 264—272.15 8 Claims



1. A method of producing in a molding machine a multiconductor electrical cable termination having a plurality of electrical contacts mounted within a base each connected by an electrical junction to the respective conductor of a multiconductor electrical cable, said method comprising the steps of supporting such plurality of electrical contacts within the open mold cavity of such molding machine, placing such multiconductor electrical cable in proper alignment upon such plurality of electrical contacts, forcing the mold parts of the molding machine together simultaneously to close the mold cavity and to form such electrical junctions between such electrical contacts and such respective conductors, the mold parts including a plurality of legs operative during of the mold engage the electrical cable to drive the cable against the electrical contacts to form the electrical junctions between the contacts and respective conductors in the cable, adding a molding material to such closed mold cavity, such mold parts allowing the molding material to flow freely with the material flowing freely between the legs and contacts in the regions of the electrical junctions so that the material surrounds and contains each of the electrical junctions to form such multiconductor electrical cable termination having a hermetically sealed junction zone surrounding each of such electrical junctions, allowing such molding material to solidify, and separating the mold parts of such molding machine to allow the removal of such multiconductor electrical cable termination.

5,024,799

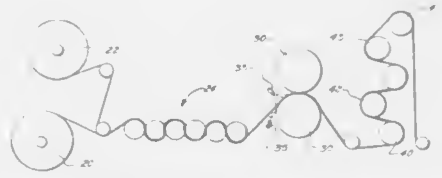
METHOD FOR PRODUCING AN EMBOSSED ORIENTED FILM

Raymond S. Harp, and Donald L. Smith, both of Terre Haute, Ind., assignors to Tredegar Industries, Inc., Richmond, Va.

Division of Ser. No. 205,643, Jun. 13, 1988, which is a continuation-in-part of Ser. No. 95,956, Sep. 14, 1987, abandoned. This application Dec. 19, 1989, Ser. No. 453,821

Int. Cl.^{5} B29C *59/04*

U.S. Cl. 264—284 27 Claims



1. A method of producing oriented or strength-enhanced embossed film which comprises: introducing into the nip between at least one pair of rotating compression rolls one or

VOL
1127
ISS
3
JE
18
1991
UMI

more orientable thermoplastic films having an inert liquid lubricant covering the film surfaces proximate to at least one pair of said compression rolls, the pressure between at least said one pair of compression rolls being sufficient to reduce the thickness of the film(s) and orient the film(s) passing through the nip thereof; and embossing at least one film surface within said nip as the film(s) is oriented.

5,024,800

TIRE-MAKING METHOD

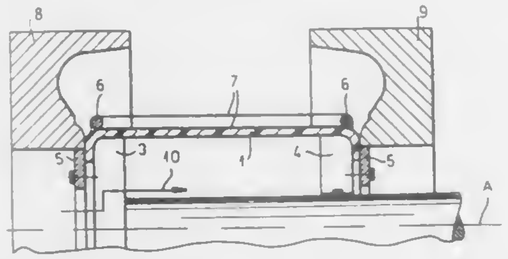
Oskar Schmidt, and Erich Grünner, both of Wien, Austria, assignors to Lim Kunststoff Technologic Gesellschaft M.B.H., Kittsee, Austria

Filed Jan. 16, 1990, Ser. No. 465,737

Claims priority, application Austria, Jan. 18, 1989, 89/89

Int. Cl.^{5} B29C *45/14;* B29D *30/18*

U.S. Cl. 264—502 10 Claims



1. A method of making a tire comprising the steps of sequentially:

providing a gas-impervious annular liner having a pair of end edges;

clamping each of the edges against a support so as to define between the liner and the support a pressurizable chamber;

fitting a pair of bead rings interconnected by reinforcement over the gas-impervious annular liner to form an annular core assembly having a pair of end edges;

displacing one of the clamped edges toward the other so as to outward bow the liner;

inflating the core assembly through direct contact by introducing gas into the chamber to impart to the core assembly an inwardly open U-shaped section;

spacedly enclosing the U-section core assembly in a mold;

filling the mold around the U-section core assembly with a hardenable elastomer and hardening the elastomer such that the elastomer bonds to the reinforcement, rings, and liner to form a tire; and

deflating and demolding the tire.

5,024,801

REACTOR CORE MODEL UPDATE SYSTEM

Albert J. Impink, Jr., Murrysville; Louis R. Grobmyer, North Huntingdon; Robert E. Sariscak, Monroeville; Toshio Morita, Wilkinsburg, all of Pa., and John L. Duryea, Bay City, Tex., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 1, 1989, Ser. No. 345,872

Int. Cl.^{5} G21C *7/36*

U.S. Cl. 376—217 7 Claims

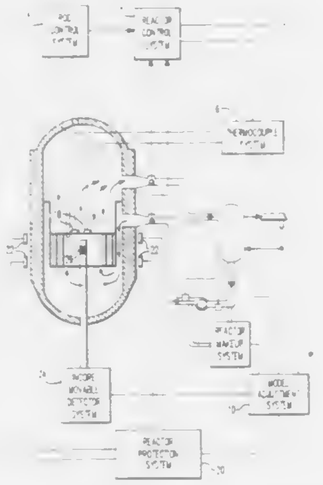
1. A method of updating a core model parameter for a system, comprising the steps of:

(a) calculating a calculated value which correlates to a parameter of the model;

(b) computing a measured value, which correlates to the parameter, from measured system values;

(c) determining a deviation between the calculated value and the measured value;

(d) compensating the parameter when the deviation exceeds a predetermined value; and



(e) updating the parameter of the model when the parameter is compensated.

5,024,802

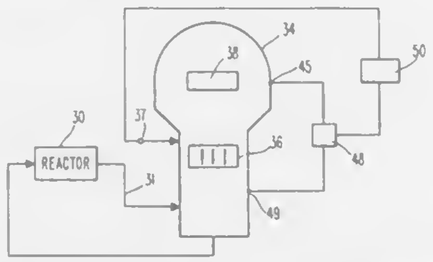
METHOD FOR STEAM GENERATOR WATER LEVEL MEASUREMENT

Jagannathan S. Srinivasan, Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 22, 1990, Ser. No. 600,951

Int. Cl.^{5} G21C *17/00*

U.S. Cl. 376—258 6 Claims



1. In a nuclear power plant, a method of controlling the steam generator water level, wherein the steam generator has an upper level tap corresponding to an upper level, a lower level tap corresponding to a lower level, a riser positioned between said lower and upper taps, and level sensor means for indicating water level between a first range limit and a second range limit, said sensor means being connected to at least said lower tap, comprising:

calculating a measure of velocity head at about the lower level tap;

calculating a measure of full water level as the upper level less said measure of velocity head;

calibrating said level sensor means to provide an output at said first limit corresponding to an input thereto representative of said measure of full level;

calculating a high level setpoint equal to the level of said riser less a bias amount which is a function of the position of said riser relative to the span between said taps; and

controlling said water level when said sensor means indicates that said high level setpoint has been reached.

5,024,803

EMERGENCY DEVICE FOR THE CONTROL OF THE DISPLACEMENT FOR A CARRIER CONVEYING A NUCLEAR FUEL ASSEMBLY

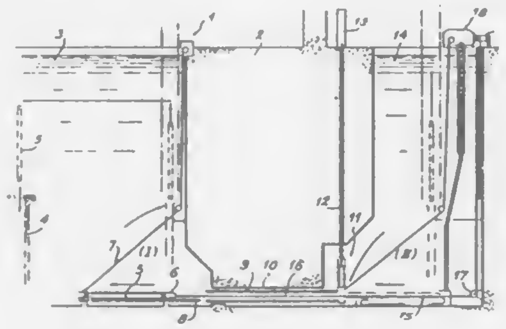
Robert Renaudin, 233, rue de Charenton, 75012 Paris, France, and Bruno Tchatalian, 34, rue deu Président Wilson, 78280 Le Pecq, France

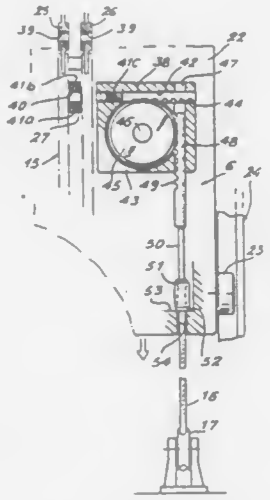
Filed Sep. 12, 1989, Ser. No. 406,013

Claims priority, application France, Sep. 14, 1988, 88 11979

Int. Cl.^{5} G21C *19/18*

U.S. Cl. 376—270 11 Claims





1. An emergency device for control of displacement of a conveying carrier for a nuclear fuel assembly, in which said conveying carrier moves under the effect of a push-pull chain actuated by a driving mechanism selectively causing winding of said chain on itself in spiral so as to pull said carrier, and unwinding of said chain by forming a rigid carrier pushing element, including a connecting member between said chain and said carrier, said connecting member being formed of two portions connected to each other by a pin adapted to be broken when required for disconnecting the two portions and to free the carrier from the chain, wherein the breaking of said pin is due to the effect of traction exerted remotely from said carrier on a control cable, such that, after breaking, the cable can apply a traction on said carrier so as to bring it back freely, independently of said chain, to a predetermined position, the connecting member between said chain and said carrier including a fastening member attached to said carrier and connected to two parallel flanges of a link of said chain by means of a transverse spindle, said fastening member and said spindle being connected by said pin, said pin being parallel to said flanges.

5,024,804

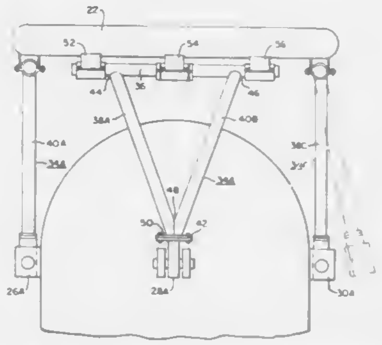
SWINGING SUPPORT FOR NUCLEAR POWER PLANT PRESSURIZER VALVES

Ronald M. Blaushild, Export, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 21, 1989, Ser. No. 383,392

Int. Cl.^{5} G21C *13/00*

U.S. Cl. 376—285 5 Claims



1. In a nuclear power plant including a pressurizer having a generally cylindrical vessel wall topped with a dome-like member, a relief and safety valve system having a manifold generally located above and extending about the periphery of the vessel wall of the pressurizer, and an arrangement for supporting the relief and safety valve system, said valve supporting arrangement comprising:

a plurality of lug means extending outwardly from and secured to said vessel wall at points spaced around the wall periphery;

a plurality of columnar support means, each of said columnar support means extending generally vertically upward from each of said lug means to the manifold;

a plurality of first elongated and generally cylindrical structural members extending generally in the horizontal direction for securing the lower end of each of said columnar support means relative to the associated lug means;

a plurality of second elongated and generally cylindrical structural members extending generally in the horizontal direction for supporting the upper end of each of said columnar support means relative to associated collar means;

a plurality of collar means projecting downwardly from said manifold for support of each of said second elongated structural members; and

means for disengaging one of said elongated structural members from its securance so that each of said columnar support means can be pivoted about its other elongated structural member and swung outwardly from said vessel.

5,024,805

METHOD FOR DECONTAMINATING A PRESSURIZED WATER NUCLEAR REACTOR SYSTEM

Alexander P. Murray, Murrysville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 9, 1989, Ser. No. 391,263

Int. Cl.^{5} G21C *9/00*

U.S. Cl. 376—305 13 Claims

1. The method of decontaminating metal surfaces having an oxide coating containing radioactive substances comprising:

providing an aqueous decontamination solution which comprises an aqueous solution of a weak chelating agent capable of forming multiligand complexes with metals, said chelating agent present in an amount of between about 0.1 to 2.0 percent based on the weight of the solution, and a ferrous salt in an amount to provide 50 to 500 parts per million iron based on the weight of the solution; and

passing said decontamination solution over the metal surfaces.

9. A method of dissolving radioactive corrosion products

VOL
1127
ISS
3
JE
18
1991
UMI

from the internal metallic surfaces of a pressurized water nuclear reactor comprising:

providing an aqueous decontamination solution which comprises an aqueous solution of a weak chelating agent capable of forming multiligand complexes with metals of said metallic surfaces, said chelating agent present in an amount of between about 0.1 to 2.0 percent based on the weight of the solution, and a ferrous salt in an amount to provide 50 to 500 parts per million iron based on the weight of the solution;

passing said decontamination solution over said metallic surfaces.

5,024,806

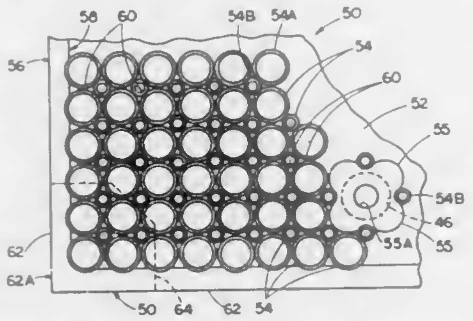
ENHANCED DEBRIS FILTER BOTTOM NOZZLE FOR A NUCLEAR FUEL ASSEMBLY

Joseph V. Cioffi, and John S. Kerrey, both of Columbia, S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 21, 1989, Ser. No. 410,574

Int. Cl.^{5} G21C *3/04, 15/00, 19/00*

U.S. Cl. 376—352 10 Claims



1. In a fuel assembly for a nuclear reactor including a plurality of nuclear fuel rods, at last one grid supporting said fuel rods in an organized array, and at least one guide thimble supporting said grid, a debris filter bottom nozzle spaced below said grid and said fuel rods, supporting said guide thimble and adapted to allow flow of liquid coolant into said fuel assembly, said debris filter bottom nozzle comprising:

(a) an enclosure defining a chamber having opposite open ends for coolant flow therethrough in an axial direction from one of said ends to the other of said ends; and

(b) an array of elongated hollow tubes disposed across said chamber of said enclosure in a consolidated side-by-side relation to one another and in abutting contact with one another and rigidly interconnected to said enclosure and to one another to form a unitary structure, said hollow tubes extending substantially parallel to one another and axially in the direction of coolant flow through said chamber;

(c) said array of elongated hollow tubes including a first plurality of tubes of a substantially constant first diameter size and a second plurality of tubes of a substantially constant second diameter size which is smaller than the first diameter size of said first plurality of tubes, said first plurality of tubes being interspersed with said second plurality of tubes in an ordered pattern, said first and second pluralities of elongated hollow tubes being substantially arranged in interconnected structural units wherein each unit includes one tube of said second plurality of tubes in abutting contact with at lest three tubes of said first plurality of tubes, said at least three tubes of said first plurality of tubes being circumferentially arranged around said one tube of said second plurality of tubes and in abutting contact with one another, said first and second pluralities of hollow tubes having hollow tubular cross-sectional configurations defining passages for coolant flow through said chamber, said first diameter size tubes of said first plurality of tubes having passages being of a size smaller than a substantial amount of damage-inducing debris contained in the coolant flow which thereby prevents travel of such debris with the coolant flow through the passages.

5,024,807

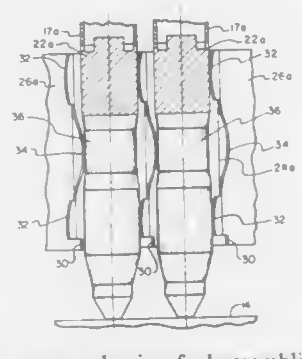
DEBRIS CATCHING SPRING DETENT SPACER GRID

Stephen C. Hatfield, Granby; Mena G. Andrews, Newington, and Richard P. Broders, North Granby, all of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 5, 1988, Ser. No. 279,687

Int. Cl.^{5} G21C *3/10, 19/30*

U.S. Cl. 376—352 6 Claims



1. In a nuclear reactor having fuel assemblies including an upper end fitting and a lower end fitting and spaced nuclear fuel rod spacer grids therebetween for supporting and spacing a plurality of elongated nuclear fuel rods, each of which includes a hollow active portion of nuclear fuel filled cladding intermediate the rod ends and a tapering end cap of solid material with a circumferential groove on the rod end which first encounters reactor coolant flow, a tall spacer grid relative to the grids adjacent the active portion being means for capturing and retaining deleterious debris carried by reactor coolant before it enters the active region of a fuel assembly through solid end caps compartments' corners and creates fuel rod cladding damage, comprising in combination:

a polygonal perimeter,

a plurality of fuel end cap compartments defined by pairs of first and second intersection and slottedly interlocked grid-forming strips attached to said perimeter and to each other,

fuel rod end caps each extending into a respective one of said end cap compartments,

at least some of said end cap compartments defined by two pairs of intersecting and slottedly interlocked strips which include integral springs for contact with said end caps in said circumferential grooves and for cooperation with opposing arched portions of said strips also in contact with said end caps,

leaves projecting out of said strips intermediate their intersections, each of said leaves being spaced from the fuel rod end caps and extending into the solid end caps compartments' corners and

each of said leaves being means for enhancing the spacer grid's ability to capture and retain debris in the regions of said solid end caps compartments' corners so that before said debris passing into said regions engages the active portion of the fuel rods it is captures.

5,024,808

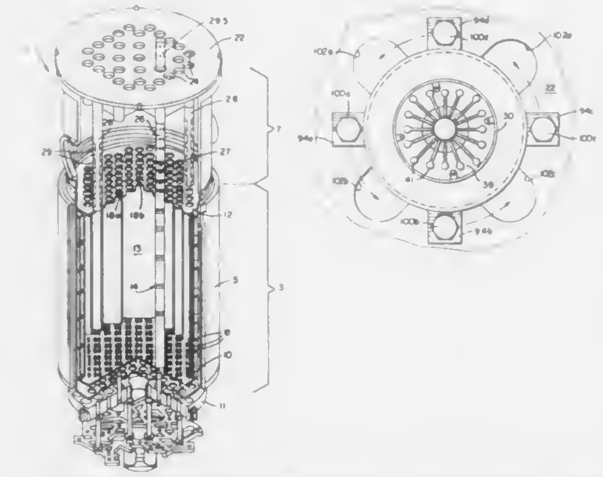
COMBINED SUPPORT COLUMN AND GUIDE TUBE FOR USE IN A NUCLEAR REACTOR

John T. Land, and Ronald J. Hopkins, both of Pensacola, Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 483,302, Feb. 21, 1990, abandoned, which is a continuation of Ser. No. 257,672, Oct. 14, 1988, abandoned. This application Jul. 17, 1990, Ser. No. 553,407

Int. Cl.^{5} G21C *7/08*

U.S. Cl. 376—353 14 Claims



1. An improved internals assembly for a nuclear reactor, said assembly including an upper support plate and an upper core plate, each of which includes apertures for conducting control rod assemblies into and out of fuel assemblies, each of the apertures of the upper support plate being aligned with one of the apertures of the upper core plate, wherein the improvement comprises at least one elongated and tubular support and guide tube member whose ends are connected between mutually aligned apertures in said support and core plates for both suspending said core plate from said support plate and for receiving and guiding a control rod assembly through said pair of mutually aligned apertures, and wherein the upper end of the tubular support and guide tube member includes an upper mounting means for detachably mounting said upper end around a selected aperture in the upper support plate, and wherein the improvement further comprises the provision of recesses along the perimeter of said selected aperture that are complementary in shape to the upper mounting means so that when the upper mounting means is detached from said upper support plate and oriented into alignment with said recesses, said support and guide tube member may be withdrawn through said selected aperture.

5,024,809

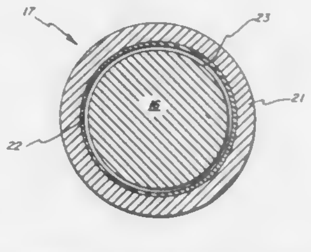
CORROSION RESISTANT COMPOSITE CLADDINGS FOR NUCLEAR FUEL RODS

Dale F. Taylor, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 356,482, May 25, 1989. This application Aug. 1, 1990, Ser. No. 561,135

Int. Cl.^{5} G21C *3/00*

U.S. Cl. 376—417 72 Claims



1. A corrosion resistant nuclear fuel element, comprising:

an elongated composite cladding container having a zirconium alloy tube consisting essentially of, by weight percent; 0.5 to 2.0 percent tin, 0.2 to 1.5 percent of a solute composed of molybdenum and tellurium and the balance zirconium, the container having a barrier layer of sponge zirconium metallurgically bonded to the inside surface of the alloy tube, the sponge zirconium being about 1 to 30 percent of the thickness of the alloy tube; and

a central core of a body of nuclear fuel material selected from the group consisting of compounds of uranium, plutonium, thorium and mixtures thereof disposed in and partially filling the container so as to leave a gap between the container and the core and an internal cavity at one end of the container, an enclosure integrally secured and sealed at each end of the container and a nuclear fuel material retaining means positioned in the cavity.

5,024,810

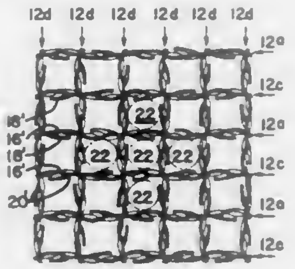
SUPPORT GRID WITH INTEGRAL INCLINED WAVES

William H. Bachman, Simsbury, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed May 22, 1989, Ser. No. 354,709

Int. Cl.^{5} G21C *3/34*

U.S. Cl. 376—438 1 Claim



1. In a fuel element support grid for supporting a plurality of nuclear fuel elements intermediate their ends in spaced relation for fluid flow therebetween, said grid including a polygonal perimeter and a plurality of fuel element compartments defined by pairs of first and second intersecting and slottedly interlocked wave defining grid-forming strips attached to said perimeter and to each other, the improvement comprising:

at least some of said strips having its waves defined by bends at spring bases inclined from the vertical and at least some of said strips having spring cantilevered into said compartments from the strips.

5,024,811

METHOD FOR MANUFACTURING DIMENSIONALLY CORRECT COMPACTS

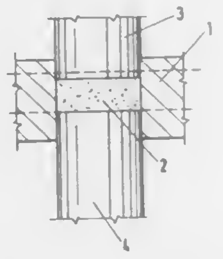
Gerd Hinzmann, Brüggen; Norbert Nies, Neuss, and Siegfried Radewahn, Mönchengladbach, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesllschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jun. 15, 1990, Ser. No. 539,065

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1989, 3919847

Int. Cl.^{5} B22F *7/00*

U.S. Cl. 419—66 **5 Claims**



1. A method of producing precision compacts from powdered material in a mold having at least one top plug and at least one bottom plug between which plugs said powdered material is compressed, the method comprising the steps of:

- detecting the course of the pressing force of at least one of the plugs as a function of the path of its travel during compression;
- comparing said course of pressing force with a predetermined path-dependent tolerance range of the pressing force;
- upon exceeding said tolerance range, changing the final pressing position of the plug in question in such a manner that the height of the compact in such final pressing position is reduced by an amount corresponding to the increased springing back of the compact upon its removal from the mold that results from the greater final pressing force; and
- in the absence of exceeding said tolerance range, changing the final pressing position of the plug in question in such a manner that the height of the compact in such final pressing position is increased by an amount corresponding to the decreased springing back of the compact upon its removal from the mold that results from the lesser final pressing force.

5,024,812

HYDROCHLORIC ACID RESISTANT STAINLESS STEEL

John H. Culling, St. Louis, Mo., assignor to Carondelet Foundry Company, St. Louis, Mo.

Filed Jul. 2, 1990, Ser. No. 547,034

Int. Cl.^{5} C22C *38/42, 38/44*

U.S. Cl. 420—49 **10 Claims**

1. A low nickel content alloy having good resistance to hydrochloric acid comprising:

Nickel	13–20% by weight
Chromium	13–15%
Molybdenum	7–9%
Copper	0.5–3.5%
Manganese	0.2–4.5%
Nitrogen	0.06–0.25%
Carbon	up to about 0.08% maximum
Iron	essentially balance.

5,024,813

MAGNESIUM-TITANIUM TYPE ALLOY AND METHOD FOR PRODUCING THE SAME

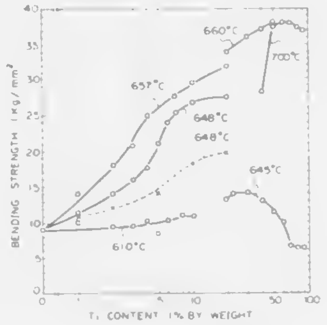
Katsuhiro Nishiyama, 1-89 Edogawadai-Higashi, Nagareyama-shi, Chiba, Japan

Filed Jun. 19, 1989, Ser. No. 368,286

Claims priority, application Japan, Nov. 8, 1988, 63-282182

Int. Cl.^{5} C22C *1/04, 1/65, 14/00, 23/00*

U.S. Cl. 420—402 3 Claims



1. A process for producing a Mg-Ti type alloy, comprising the steps of:

- compounding and mixing at least one of a powder of Ti and a powder of titanium hydride with a powder of Mg, so that the Ti composition in the final product may be in a range of 0.04 to 99.96% by weight;
- transferring the resulting mixture along a transfer path while heating and pressurizing it to melt Mg, pouring the molten mixture containing at least one of the Ti powder and the titanium hydride powder incorporated in the molten Mg into a forming mold; and
- cooling the mixture.

3. A process for producing a Mg-Ti alloy, comprising the steps of:

- compounding and mixing in either a dry manner or in a wet manner at least one of a powder of Ti and a powder of titanium hydride with a powder of Mg, so that the Ti composition in a sintered product may be a range of 0.04% to 99.96% by weight;
- forming the resulting mixture into a shape by a compression molding under a pressure of 0.1 to 5 tons/cm^2, and
- sintering the formed material at a temperature in a range of 300° to 800° C. from a solid phase to a liquid phase point in an inert atmosphere or in a vacuum under a pressure of 0 to 600 kg/cm^2.

5,024,814

COPPER ALLOY HAVING EXCELLENT HOT ROLLABILITY AND EXCELLENT ADHESION STRENGTH OF PLATED SURFACE THEREOF WHEN HEATED

Rensei Futatasuka; Yutaka Koshiba; Shunich Chiba; Toyoaki Orikasa; Seiji Noguchi, and Takuya Idoshita, all of Aizuwakamatsu, Japan, assignors to Mitsubishi Shindoh Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1989, Ser. No. 438,584

Claims priority, application Japan, Feb. 21, 1989, 1-40908

Int. Cl.^{5} C22C *9/04, 9/06*

U.S. Cl. 420—473 **13 Claims**

1. A copper alloy having excellent hot rollability consisting essentially by weight percent of 0.5 to 3% Ni, 0.7 to 2.3% Sn, 0.05 to 0.9% Si, 0.1 to 2% Zn, 0.025 to 0.25% Fe, and the balance being Cu and inevitable impurities, wherein the inevitable impurities include C in an amount of not more than 10 ppm.

5,024,815

COPPER ALLOY WITH PHOSPHORUS AND IRON

Yasusuke Ohashi; Toshihiro Fujino; Yasuhito Taki, and Tamotsu Nishijima, all of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed May 24, 1989, Ser. No. 356,097

Int. Cl.^{5} C22G *9/00*

U.S. Cl. 420—487 **4 Claims**

1. A copper alloy having conductivity equivalent to at least 80% IACS and tensile strength of more than 50 kg/mm^2 consisting essentially of:

(A) 0.15–1.0 wt% Fe,
(B) 0.05–0.3 wt% P, and
(C)
  (a) 0.01–0.1 wt% Ni and 0.01–0.05 wt% Si or
  (b) 0.01–0.1 wt% Ni and 0.005–0.05 wt% B or
  (c) 0.01–0.1 wt% Mn and 0.005–0.05 wt% Si,

with the balance being essentially composed of Cu.

5,024,816

APPARATUS FOR DETERMINING THE DEGREE OF FRESHNESS OF RAW, FROZEN AND PROCESSED FISH, POULTRY AND MEAT

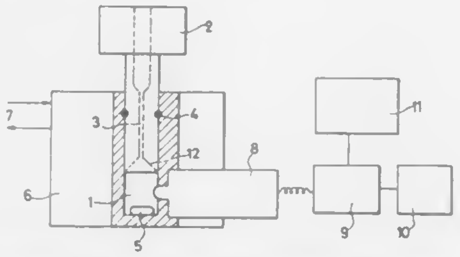
Kei Arai; Minoru Ohashi, both of Tokyo; Yoshio Utsugi, Hiki-gun; Osamu Oka, Kawagoe; Kenichi Numazawa, Ageo; Kenji Miwa, Tokorozawa, and Kenzo Sugawara, Yokohama, all of Japan, assignors to Zaidanhojin Shokuhin Sangyo Senta and Oriental Electric Company, Ltd., both of Tokyo, Japan

Continuation of Ser. No. 228,571, Aug. 5, 1988, abandoned, which is a continuation of Ser. No. 874,749, Aug. 6, 1986, abandoned, which is a continuation of Ser. No. 608,972, May 10, 1984, abandoned. This application Dec. 5, 1989, Ser. No. 445,924

Claims priority, application Japan, May 16, 1983, 58-84149

Int. Cl.^{5} G01N *7/00*

U.S. Cl. 422—68.1 **1 Claim**



1. Apparatus for determining the degree of freshness of raw, frozen and processed perishable foodstuffs by measuring a consumption of dissolved oxygen by the foodstuffs during a predetermined time period sufficient for the consumption to occur, comprising:

- a temperature controlled reaction cell having an opening;
- a removable stopper hermetically sealing the opening, said stopper having an open, a capillary extending therethrough for liquid injection; and
- an oxygen sensor mounted for measuring a value of dissolved oxygen in said cell,
- wherein said capillary has a minimum diameter of substantially 1 millimeter which is sufficiently small so that oxygen diffusion through said capillary during said time period is substantially zero, whereby measurements by said oxygen sensor are not affected.

5,024,817

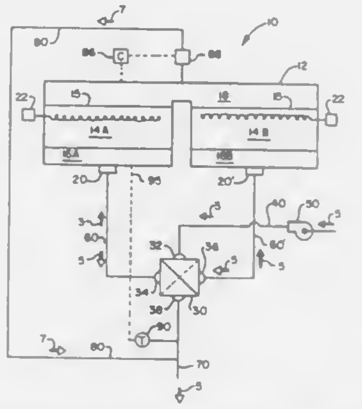
TWIN BED REGENERATIVE INCINERATOR SYSTEM

Glenn D. Mattison, Wellsville, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Dec. 18, 1989, Ser. No. 451,697

Int. Cl.^{5} G05D *7/00*

U.S. Cl. 422—111 **3 Claims**



1. A regenerative bed incinerator system for treating combustible contaminants in a process gas stream, comprising:

- a. incinerator means for receiving the contaminated process gas stream, preheating the contaminated process gas stream, incinerating the combustible contaminants in the preheated process gas stream, cooling the incinerated process gas stream, and discharging the cooled incinerated process gas stream, said incinerator means having a first gas permeable bed disposed in spaced relationship with a second gas permeable bed, and an unfired and uncooled dwell chamber disposed therebetween, each of said first and second gas permeable beds being formed of a particulate material having heat-accumulating and heat-exchanging properties; and
- b. gas flow directing means operatively associated with said incinerator means for receiving the contaminated process gas stream, alternately directing the contaminated process gas stream to and through said incinerator means in opposite, alternate directions so as to periodically reverse the direction of gas flow through said incinerator means, and for receiving a cooled incinerated process gas stream from said incinerator means and discharging said cooled incinerated process gas stream, whereby said first and second gas permeable beds alternate in function with the one of said gas permeable beds which is upstream with respect to gas flow being a contaminated process gas preheating bed and the one of said gas permeable beds which is downstream with respect to gas flow being an incinerated process gas cooling bed.

5,024,818

APPARATUS FOR FORMING CARBON FIBERS

Gary G. Tibbetts, Birmingham; Daniel W. Gorkiewicz, Washington, and Dean C. Hammond, Jr., Birmingham, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 9, 1990, Ser. No. 594,540

Int. Cl.^{5} B01J *19/24*

U.S. Cl. 422—158 **9 Claims**

1. An apparatus for forming carbon fibers by a continuous gas phase process comprising reaction of a gaseous carbonaceous compound in the presence of nuclei entrained in a gas stream, said apparatus comprising:

- (a) a reactor defining a reaction chamber having a vertical axis, a closed upper end and a lower outlet,
- (b) a reactant feed tube having an opening spaced from the reactor closed end, said feed tube extending generally axially upwardly within the reactor, whereupon said feed

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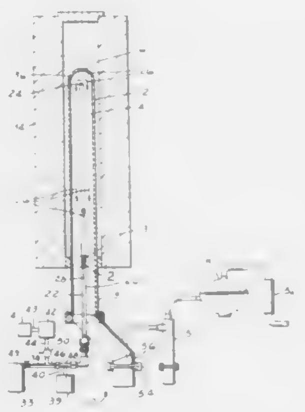
tube and said reactor cooperate to define a gas flow path that extends generally axially upward through the feed tube into the chamber and thereafter generally axially downward through the chamber,

(c) means for heating the reactor to establish a hot zone within the reaction chamber adjacent the closed end thereof at a temperature sufficient to sustain carbon fiber growth and a relatively cool zone adjacent the reactor outlet, thereby establishing a thermal gradient within the reactor that minimizes convective currents therewithin,



(d) means for continuously supplying a gaseous reactant stream comprising nuclei into the feed tube at a rate sufficient to entrain the nuclei within the gas stream for dispersion into the reactor hot zone, said reactor chamber having an average cross sectional area greater than said feed tube to accommodate said gas stream at a reduced downward flow rate suitable for sustained fiber growth, and

(e) means for collecting carbon fibers from exhaust gas exiting the reactor outlet.

5,024,819

APPARATUS FOR THE SURFACE TREATMENT OF SHEET-LIKE STRUCTURES BY ELECTRIC CORONA DISCHARGE

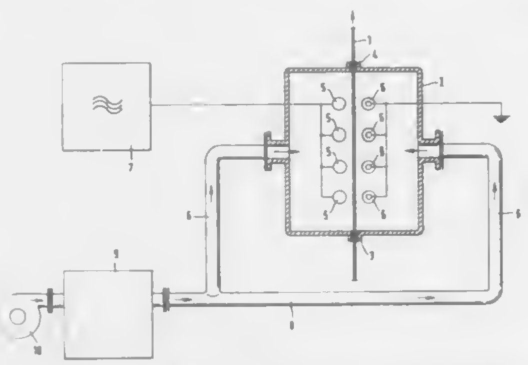
Peter Dinter, Oestrich-Winkel; Hermann Funke, Altoetting, and Klaus Matschke, Burgkirchen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 31, 1990, Ser. No. 473,257

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1989, 3903235

Iot. Cl.^{5} B01J *19/08*

U.S. Cl. 422—186.06 **5 Claims**



1. An apparatus for the surface treatment of a sheet-shaped or web-shaped substrate by means of electric corona discharge, comprising: a corona discharge device consisting of a generator; high voltage electrodes; to which a high frequency alternating current of high voltage can be applied by said generator; and grounded counter electrodes, arranged at a distance from said high voltage electrodes; an atomizer device for the atomization of liquid into a suspendable aerosol, which is connected to said corona discharge device via a transport line for the aerosol; and a blower, which can be regulated in the rate of throughput, is connected to said atomizer device and conveys the carrier gas for the aerosol through the atomizer device and the transport line to the corona discharge device, wherein said high voltage electrodes and said counter electrodes together form a gap, which is higher than the thickness of the substrate to be treated, on both opposite surfaces of which the carrier gas/aerosol mixture acts in the gap without direct or indirect contact with the electrodes and counter electrodes.

5,024,820

MECHANISM FOR CHARGING AND DISCHARGING A CLOSED CHAMBER UTILIZABLE AS AN EXTRACTION TANK OF A CONTINUOUS VEGETABLE MATERIAL EXTRACTION UNIT AND EXTRACTION PROCESS COMPRISING AN APPLICATION THEREOF

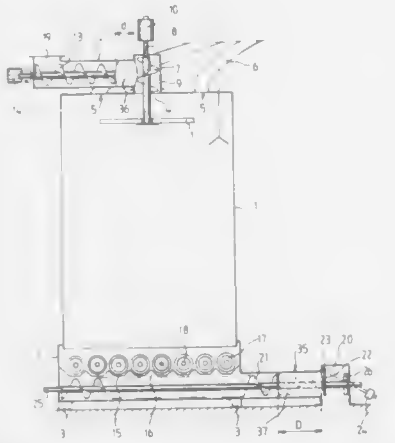
Dominique Coutiere, Labrit, France, assignor to Biolandes, Labrit, France

Filed Oct. 18, 1988, Ser. No. 259,140

Claims priority, application France, Oct. 19, 1987, 87 14353; Oct. 19, 1987, 87 14354

Int. Cl.^{5} B01D *11/02*

U.S. Cl. 422—261 **22 Claims**



1. Mechanism for charging and discharging a closed chamber utilizable as an extraction tank of a continuously operating unit in which the solid products for processing are charged through the top and discharged through the bottom after processing by a fluid and the evacuation system of which makes it possible to form a plug of product at the point of discharge, characterized in that the charging device comprises a complementary means designed to compress the product for processing to form a plug before it is introduced into the processing chamber (1), the plugs formed by the compressed product both at the point of charging and at the point of discharge being sufficiently tight to maintain inside the said chamber liquid or gaseous processing fluids.

5,024,821

SOLVENT EXTRACTION PROCESS

James N. Greenshields, Hockessin, Del., and Peter E. Tetlow, Phoenix, Ariz., assignors to ICI Americas Inc., Wilmington, Del.

Filed Feb. 28, 1990, Ser. No. 486,494

Int. Cl.^{5} C01G *43/00*

U.S. Cl. 423—23 **28 Claims**

1. A solvent extraction process of the recovery of a metal from an aqueous solution thereof which includes a stage in which the aqueous solution is contacted, in the presence of a wetting agent, with a solution of an extracting agent in a water-immiscible organic solvent.

5,024,822

STABILIZATION OF FLUORIDES OF SPENT POTLINING BY CHEMICAL DISPERSION

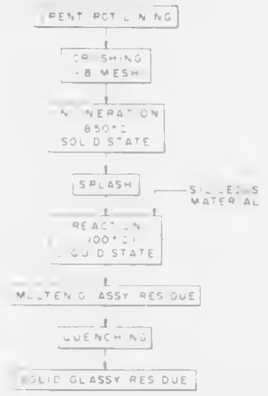
Herman J. Hittner, Lower Burrell, Pa., and Quyen C. Nguyen, Newburgh, Ind., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 174,863, Mar. 29, 1988, Pat. No. 4,956,158. This application Mar. 30, 1990, Ser. No. 502,185

The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.

Int. Cl.^{5} C01F *7/02*

U.S. Cl. 423—111 **24 Claims**



1. A process for treating spent potlining from the electrolytic smelting of aluminum comprising:

(a) incinerating spent potlinking at a temperature low enough to maintain a fluorine vapor pressure lower than about 5 mm Hg and high enough to combust carbonaceous material in the potlining to form an ash;

(b) admixing siliceous material with said potlining either before or after said ash-forming step; and

(c) heating said ash and siliceous material to form a glassy residue suitable for landfill.

5,024,823

COPPER SULFATE ABSORPTION MASS TO REMOVE ASH_3, PH_3, B_2H_6, GEH_4 AND SIH_4

Cetin Gökcek, Muhlheim, Fed. Rep. of Germany, assignor to Messer Griesheim GmbH, Fed. Rep. of Germany

Filed Dec. 5, 1988, Ser. No. 279,851

Int. Cl.^{5} B01D *47/00;* **B01J** *8/00;* **C01B** *3/00*

U.S. Cl. 423—210 **10 Claims**

1. A process to eliminate gases selected from the group consisting of AsH_3, PH_3, B_2H_6, GeH_4 and SiH_4 including the steps of forming an absorption mass by saturating a porous carrier in the form of silica gel or aluminum oxide with $CuSO_4$ in the form of monohydrate or $CuSO_4$ free from water of crystallization, contacting the gases with the absorption mass, and absorbing the gases in the absorption mass.

5,024,824

LAYERED AUTOMOTIVE CATALYTIC COMPOSITE

Michael G. Henk, and Jack C. Summers, II, both of Tulsa, Okla., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Division of Ser. No. 201,245, Jun. 1, 1988, Pat. No. 4,868,148, which is a continuation-in-part of Ser. No. 88,745, Aug. 24, 1987, abandoned. This application Jul. 25, 1989, Ser. No. 384,534

Int. Cl.^{5} B01D *53/36*

U.S. Cl. 423—213.5 **17 Claims**

1. A process for minimizing the content of hydrogen sulfide in an automotive exhaust gas which comprises contacting said exhaust gas with the catalytic composite comprising a first support which is a refractory inorganic oxide selected from the group consisting of alumina, silica, titania, zirconia, aluminosilicates and mixtures thereof, having dispersed thereon at least one noble metal component selected from the group consisting of platinum, palladium, rhodium, ruthenium, and iridium substantially in the absence of an oxygen storage component and having dispersed immediately thereon an overlayer separated from said noble metal component comprising at least one oxygen storage component which is an oxide of a metal selected from the group consisting of iron, nickel, cobalt, and the rare earths and optionally a second support which is a refractory inorganic oxide.

5,024,825

PROCESS FOR THE PREPARATION OF DICALCIUM PHOSPHATE

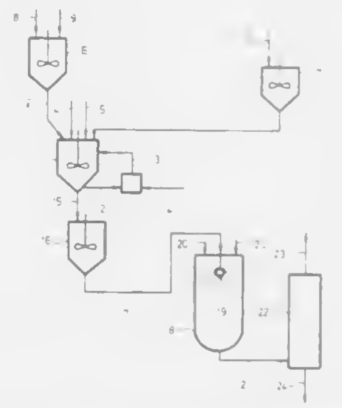
Horst Buhl; Josef Holz, and Franz-Josef Dany, all of Erftstadt, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed May 10, 1990, Ser. No. 521,737

Claims priority, application Fed. Rep. of Germany, May 13, 1989, 3915746

Int. Cl.^{5} C01B *15/16, 25/26*

U.S. Cl. 423—309 **8 Claims**



1. A process for the preparation of dicalcium phosphate dihydrate stabilized with dimagnesium phosphate trihydrate and sodium pyrophosphate, which comprises introducing an aqueous suspension of calcium carbonate into a reactor equipped with a stirrer and recirculating it by pumping at 3,500 to 8,000 rpm through a high-speed mixer flow-connected with a lower and upper portion of the reactor; introducing into the mixer an amount of phosphoric acid at least sufficient for the quantitative formation of dicalcium phosphate dihydrate; then introducing into the reactor an oxygen-containing magnesium compound; metering into the reactor lime milk having a $Ca(OH)_2$ content of 10 to 30% by weight up to a maximum pH of 6.9, before adding the sodium pyrophosphate to the reactor; finally atomizing the resulting suspension having a content of 20 to 33% by weight of stabilized dicalcium phosphate dihydrate by means of an atomizer wheel, and spray-drying the

VOL
1127
ISS
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1991
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atomized suspension by means of co-current hot air having a temperature of 150° to 350° C.

5,024,826

SILICA PARTICULATE COMPOSITION

Howard R. Linton, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 5, 1990, Ser. No. 489,273

Int. Cl.^{5} C01B *33/18*

U.S. Cl. 423—335 **7 Claims**

1. A silica powder composition in which the powder particles have an average size of from 0.05 to 15 microns, a specific surface area of from 25 to 400 m^2/g, and consist essentially of a shell of amorphous hydroxylated silica having a shape and a thickness in the range of from 10 to 50 nanometers.

5,024,827

FINE PARTICULATE MATERIAL

William J. Jones, Middlesbrough, and Ian P. Appleyard, Stockton on Tees, both of England, assignors to Tioxide Group, PLC, England

Filed May 30, 1989, Ser. No. 357,793

Claims priority, application United Kingdom, May 28, 1988, 8812759

Int. Cl.^{5} C01G *23/047*

U.S. Cl. 423—610 **9 Claims**

1. Fine particulate material consisting essentially of titanium dioxide the particles of which have a cross-section which is substantially rectangular so that the particles have a width to length ratio of at least 0.8:1.0 and that the particles have an average particle size of from 10 nm to 250 nm.

5,024,828

NOVEL RADIOACTIVE PYRETHRINOIDS AND USE THEREOF

Jean-Pierre Demoute, Montreuil-sous-Bois; Gaëtan Touyer, and Michel Mouren, both of Paris, all of France, assignors to Roussel Uclaf, Paris, France

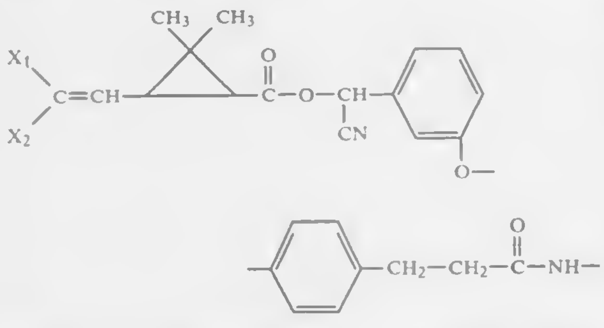
Filed Jan. 28, 1987, Ser. No. 7,648

Claims priority, application France, Jan. 29, 1986, 86 01220

Int. Cl.^{5} A61K *43/00*

U.S. Cl. 424—1.1 **10 Claims**

1. The optical isomers and racemic mixtures of novel radioactive pyrethrinoids marked with iodine of the formula

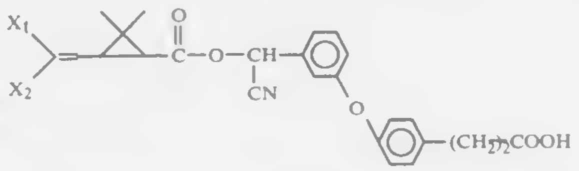


I

wherein X_1 is selected from the group consisting of halogen and —CF_3, X_2 is a halogen, RNH is the residue of a member selected from the group consisting of histidine, tyrosine, histidinol, histamine, tyramine and methyl tyrosinate marked with iodine^{125} or iodine^{131}.

5. In a process for the radioimmunological determination of pyrethrinoid esters of α-cyano-3-phenoxy-benzyl alcohol in biological fluids of man and warm-blooded animals, the improvement comprising using a compound of claim 1 of the pyrethrin as the said ester as reagent.

7. An antigen formed by conjugating through the carboxyl group a compound of the formula



II

with and immunogenic protein wherein X_2 is halogen and X_1 is halogen or —CF_3.

5,024,829

METHOD OF IMAGING CORONARY THROMBI

Harvey J. Berger, Devon, Pa.; Jamshid Maddahi, and Daniel Berman, both of Beverly Hills, Calif., assignors to Centocor, Inc., Malvern, Pa., by said Harvey J. Berger

Filed Nov. 21, 1988, Ser. No. 274,383

Int. Cl.^{5} A61K *49/02, 39/395*

U.S. Cl. 424—1.1 **12 Claims**

1. A method of imaging a coronary thrombus in a patient, comprising the steps of:

a. administering directly into a cornary artery of a patient suspected of having an coronary thrombus a radiolabeled monoclonal antibody or antibody fragment specific for a thrombus component;
b. allowing the radiolabeled monoclonal antibody or antibody fragment to accumulate at the thrombus site;
c. detecting the signal generated by the radiolabel with a photoscanning device;
d. converting the signal generated into a visual image of the thrombus.

5,024,830

METHOD FOR CRYOPREPARING BIOLOGICAL TISSUE FOR ULTRASTRUCTURAL ANALYSIS

John G. Linner, Houston, Tex., assignor to The Board of Regents, The University of Texas, Austin, Tex.

Division of Ser. No. 926,985, Nov. 4, 1986, Pat. No. 4,799,361, which is a continuation-in-part of Ser. No. 770,772, Aug. 29, 1985, Pat. No. 4,676,070, which is a continuation-in-part of Ser. No. 525,626, Aug. 23, 1983, Pat. No. 4,510,169. This application Aug. 9, 1988, Ser. No. 230,768

Int. Cl.^{5} G01N *1/30;* **A01N** *1/02*

U.S. Cl. 424—3 **2 Claims**

1. A method of cryopreparing biological tissue which comprises:

(a) rapidly cooling said tissue at a rate and to a temperature sufficient to vitrify the water in said tissue; and
(b) removing said water from said tissue by vaporization directly from its vitrified state.

2. A method of cryopreparing biological tissue which comprises:

(a) rapidly cooling said tissue at a rate and to a temperature sufficient to vitrify the water in said tissue;
(b) subjecting said tissue containing said vitrified water to a combination of vacuum and temperature conditions at which said water is capable of vaporizing directly from its vitrified state; and
(c) slowly adding energy to and in a quantity sufficient to dehydrate said tissue by vaporizing said vitrified water directly from said vitrified state.

5,024,831

POWDERY COSMETIC CONTAINING CELLULOSE POWDER IMPREGNATED WITH MOISTURIZING POLYMER

Hideo Kurisaki, and Masahiko Nishikawa, both of Kumamoto, Japan, assignors to Chisso Corporation, Japan

Filed Nov. 3, 1989, Ser. No. 431,249

Int. Cl.^{5} A61K *7/02*

U.S. Cl. 424—69 **11 Claims**

1. A powdery cosmetic comprising:

a spherical cellulose powder having an average particle diameter of at least 3 μm and present in an amount of 0.1 to 50% by weight based on the total weight of powdery cosmetic, said spherical cellulose powder coated, impregnated, or chemically linked with at least one high molecular weight moisture retentive substance selected from the group consisting of hyaluronic acid, chondroitin sulfuric acid, collagen, collagen hydrolyzate, elastin, elastin hydrolyzate, fibronectin and salts and derivatives of the aforementioned.

5,024,832

TERMITES TRAIL-FOLLOWING PHEROMONE AND A SAME COMPOSITION AND METHOD OF DETECTING CAPTURED TERMITES BY USING THIS COMPOSITION

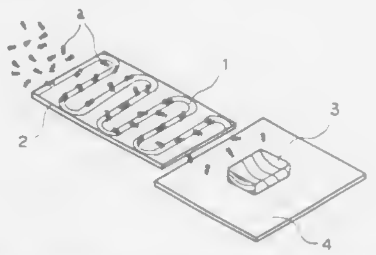
Tetsuo Omata; Shuji Senda; Tamaki Tanaka; Eriko Kumagai; Chikara Kajimoto, and Yutaka Nakazono, all of Osaka, Japan, assignors to Nitto Denko Co. Ltd., Osaka, Japan

Filed Dec. 13, 1989, Ser. No. 450,112

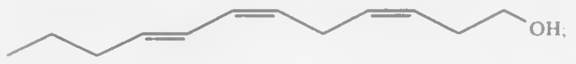
Claims priority, application Japan, Dec. 27, 1988, 63-334090; Apr. 1, 1989, 1-96998

Int. Cl.^{5} A01N *25/00, 25/08, 31/00*

U.S. Cl. 424—84 **2 Claims**



1. A termite trail-marking composition, comprising:
(a) (3Z,6Z,8E)-dodecatrienol of formula (1)



(1)

and (b) at least one member selected from the group consisting of n-hexanoic acid, p-hydroxysilicic acid, vanillic acid, protocatequinic acid, p-hydroxybenzoic acid, β-carotene and 3-hexen-1-ol.

5,024,833

COMBINED INTERFERON/ANTIESTROGEN THERAPY FOR TREATMENT OF BREAST CANCER

Sergio Del Bianco, and Gigliola Sica, both of Rome, Italy, assignors to Industria Farmaceutica Serono SPA, Italy

Continuation of Ser. No. 170,106, Mar. 10, 1988, abandoned, which is a continuation of Ser. No. 917,407, Oct. 10, 1986, abandoned. This application May 30, 1989, Ser. No. 358,475

Int. Cl.^{5} A61K *37/66*

U.S. Cl. 424—85.4 **13 Claims**

1. A method of inhibiting the proliferation of breast cancer cells which comprises sequentially administering to a host in need thereof an effective inhibiting amount of a combination of beta interferon and temoxifen wherein the interferon is administered intramuscularly in an amount of 2 to 10 million international units and temoxifen is orally administered in a daily amount of about 30 milligrams.

5,024,834

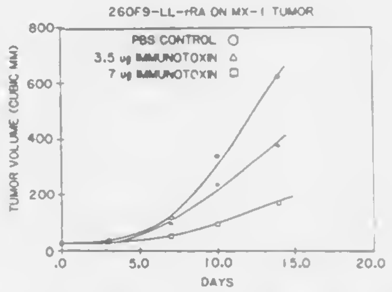
THIOETHER LINKED IMMUNOTOXIN CONJUGATES

L. L. Houston, Oakland; Lois Aldwin, San Mateo, and Danute E. Nitecki, Berkeley, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Division of Ser. No. 217,938, Jul. 12, 1988, abandoned. This application Oct. 15, 1990, Ser. No. 597,081

Int. Cl.^{5} A61K *39/44;* **C07K** *17/02*

U.S. Cl. 424—85.91 **5 Claims**



1. A method of killing cells, comprising contacting said cells with an immunotoxin consisting of at least one antibody and at least one cytotoxin linked by a thioether linkage by reaction with a linker comprising maleimido-6-aminocaproyl-spacer-glutaryl ester of 1-hydroxy-2-nitrobenzene.

5,024,835

CONJUGATES OF A VINCA DERIVATIVE CARRYING A DETERGENT CHAIN IN THE C-3 POSITION

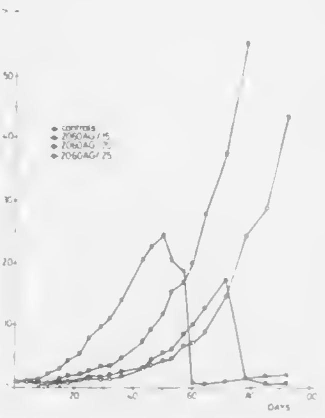
KSP Siva Bhushana Rao, Rosieres; Jean-Paul Dejonghe, Wawre; Marie-Paule Collard, Brussels, and Andre Trouet, Winksele-Herent, all of Belgium, assignors to Ire-Celltarg S.A., Fleurus, Belgium

Filed Feb. 3, 1989, Ser. No. 306,639

Claims priority, application France, Feb. 8, 1988, 88 01439

Int. Cl.^{5} A61K *39/44, 37/36, 37/04;* **C07K** *17/00*

U.S. Cl. 424—85.91 **16 Claims**



1. A conjugate of a vinca (indole-dihydroindole) derivative having a formula

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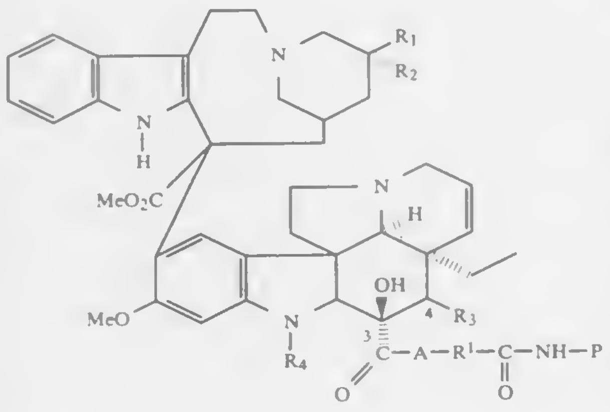
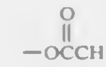


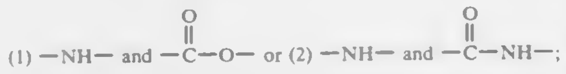
in which

- R_1 and R_2 together represent (1) —Et and —OH or (2) —H and —Et;
- R_3 represents —OH or



$-\overset{O}{\overset{\|}{C}}$: $-O\overset{\overset{O}{\|}}{C}CH_3;$

- A represents —NH— or a divalent radical of an amino acid found in a protein, wherein said divalent radical of said amino acid is terminated by



$(1)\ -NH-\ \text{and}\ -\overset{\overset{O}{\|}}{C}-O-\ \text{or}\ (2)\ -NH-\ \text{and}\ -\overset{\overset{O}{\|}}{C}-NH-;$

- R′ represents an aliphatic hydrocarbon radical having at least 7 aliphatic carbon atoms; and
- —NH—P represents a radical derived from NH_2P, wherein NH_2P represents a macromolecular carrier of polypeptide origin in which said NH_2 represents a free amino group.

5,024,836

STABLE LYOPHILIZED LIVE HERPES VIRUS VACCINE

William J. McAleer, Avalon, N.J.; Robert Z. Maigetter, Mechanicsville, and Henry Z. Markus, Wyncote, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 183,530, Apr. 14, 1988, abandoned, which is a continuation-in-part of Ser. No. 45,940, May 4, 1987, abandoned. This application Oct. 19, 1989, Ser. No. 423,658

Int. Cl.⁵ A61K *39/12;* **C12N** *7/00*

U.S. Cl. 424—89 8 Claims

1. A gas injected lyophilized live attenuated varicella virus vaccine which comprises 2% to 8% moisture.

5,024,837

COLEOPTERAN ACTIVE MICROORGANISMS, RELATED INSECTICIDE COMPOSITIONS AND METHODS FOR THEIR PRODUCTION AND USE

William P. Donovan, 650 Bayberry La., Yardley, Pa. 19067; Jose M. Gonzalez, Jr., 2211 Country La., West Trenton, N.J. 08628; Barry L. Levinson, 1 Millbrook La., and Anthony Macalnso, 2295 Princeton Pike, both of Lawrence, N.J. 08648

Filed May 6, 1987, Ser. No. 47,945

Int. Cl.⁵ C12N *15/00, 1/20;* **A61K** *33/74*

U.S. Cl. 424—93 12 Claims

1. A *Bacillus thuringiensis* bacterium that produces protein endotoxins having insecticidal activity against lepidopteran and coleopteran insects, the coleopteran-active endotoxin being produced by an acquired coleopteran toxin-encoding plasmid that is characteristic of *Bacillus thuringiensis* strain EG2158, deposited with the NRRL and assigned NRRL Accession No. B-18213.

5,024,838

COMPOSITIONS FOR THE TREATMENT OF SKIN INJURIES

Vicente Parrilla, Avenida Emperadores No. 132, Colonia Portales, 3300 Mexico City, Mexico

Filed May 10, 1988, Ser. No. 192,350

Claims priority, application Mexico, Mar. 2, 1988, 10622

Int. Cl.⁵ A61K *37/54, 31/705, 9/70*

U.S. Cl. 424—94.65 7 Claims

1. Composition for the treatment of skin injuries, comprising a local antiseptic, in a ration of 0.005 to 0.5 parts; a sapogenin, in a ratio of 0.005 to 0.5 parts; a proteolytic enzyme in a ration of 0.005 to 0.5 parts; and a suitable vehicle in a range to adjust to 100 parts of the composition,

wherein the sapogenin is filiferin.

5,024,839

DACTYLOCYCLINE A AND DACTYLOCYCLINE B

Carol A. Aklonis, Lawrenceville; Helen A. Ax, Hopewell; Donald R. Kirsch, Princeton; Joseph O'Sullivan, Belle Mead; Adrienne Tymiak, Hopewell, and J. Scott Wells, Ringoes, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Dec. 24, 1987, Ser. No. 137,635

Int. Cl.⁵ H61K *35/70*

U.S. Cl. 424—115 2 Claims

1. Dactylocycline A, which has the infrared spectrum in potassium bromide as shown in FIG. 1, the fast bombardment mass spectrum in the positive ion mode as shown in FIG. 2, the fast bombardment mass spectrum in the negative ion mode as shown in FIG. 3, the 67.5 MHz ^{13}C NMR spectrum as shown in FIG. 4, and the 400 MHz ^{1}H NMR spectrum as shown in FIG. 5.

5,024,840

ANTIMICROBIAL CARPET AND CARPET TILE

Lawrence W. Blakely; Michael A. Howe, both of LaGrange; Daniel F. Pinholster, Jr., Cartersville; Claude E. Terry, Kennesaw, all of Ga., and Robert H. McIntosh, Sr., Greensboro, N.C., assignors to Interface, Inc., Atlanta, Ga.

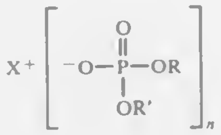
Continuation-in-part of Ser. No. 190,370, May 5, 1988, which is a continuation-in-part of Ser. No. 47,561, Apr. 27, 1987, which is a continuation-in-part of Ser. No. 781,710, Oct. 2, 1985, abandoned, Ser. No. 635,728, Oct. 9, 1984, abandoned, Ser. No. 713,445, Mar. 19, 1985, abandoned, Ser. No. 736,652, Apr. 21, 1985, Pat. No. 4,647,601, Ser. No. 744,730, Jun. 13, 1985, abandoned, each is a continuation-in-part of Ser. No. 570,952, Mar. 8, 1984, Pat. No. 4,608,289, which is a continuation of Ser. No. 523,734, Aug. 16, 1983, abandoned, which is a continuation of Ser. No. 226,006, Jan. 19, 1981, abandoned, which is a continuation of Ser. No. 930,879, Aug. 4, 1978, abandoned, Ser. No. 352,060, May 15, 1989, Continuation-in-part of Ser. No. 224,057, Jul. 25, 1988. This application May 15, 1989, Ser. No. 352,060

Int. Cl.⁵ A01N *25/34*

U.S. Cl. 424—404 22 Claims

1. An antimicrobial carpet comprising fibers attached to a primary backing with a primary adhesive that includes:

(i) a biocidally effective amount of a phosphoric acid ester of the general formula:



$$X^{+}\left[\,{}^{-}O-\underset{\underset{OR'}{|}}{\overset{\overset{O}{\|}}{P}}-OR\,\right]_n$$

wherein R and R′ are alkyl, oxyalkyl, polyoxyalkyl, aryl, aralkyl or alkaryl groups of C_1 to C_{24}, and one of R or R′ can be H; X is a Group I metal ion, Group II metal ion, transition metal ion, or $NY_1Y_2Y_3Y_4$, where $Y_{1\text{-}4}$ are hydrogen, a hydrocarbon of C_1 to C_{24}, or a hydroxyalkyl group of C_1 to C_{24}; and there is at least one free hydroxyl group; and when X is $NY_1Y_2Y_3Y_4$ or a Group I metal ion, n is 1, when X is a Group II metal ion, n is 2; and when X is a transition metal, n is equal to the valence of the metal; and

(ii) a latex polymer; and

wherein the phosphoric acid ester or its salt is capable of migration from the primary adhesive to the fibers.

5,024,841

COLLAGEN WOUND HEALING MATRICES AND PROCESS FOR THEIR PRODUCTION

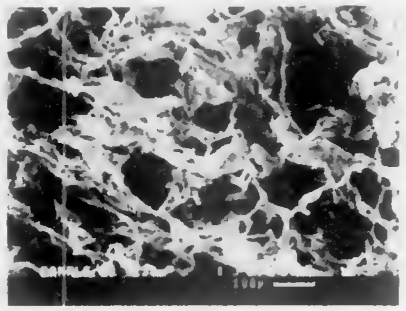
George H. Chu, Sunnyvale; Yasushi Ogawa, Pacifica, both of Calif.; John M. McPherson, Hopkinton, Mass.; George Ksander, Redwood City, Calif.; Bruce Pratt, Union City, Calif.; Diana Hendricks, Brea, Calif., and Hugh McMullin, San Bruno, Calif., assignors to Collagen Corporation, Palo Alto, Calif.

Filed Jun. 30, 1988, Ser. No. 213,726

The portion of the term of this patent subsequent to Aug. 21, 2007, has been disclaimed.

Int. Cl.⁵ A61F *13/00;* **A61K** *9/14, 37/12, 31/725*

U.S. Cl. 424—422 18 Claims



1. A collagen implant, comprising:

a matrix having a density of about 0.01 to about 0.3 g/cm³, a thickness of about 1–20 mm, and having pores at least 80% of which are at least 35 μm in diameter, wherein said matrix comprises

fibrillar atelopeptide collagen, wherein said fibrils are about 50–200 nm in diameter, and are not chemically cross-linked.

5,024,842

ANNEALED COATS

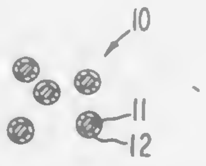
David E. Edgren, El Granada, and Felix Theeuwes, Los Altos, both of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 187,621, Apr. 28, 1988, Pat. No. 4,931,285. This application Apr. 2, 1990, Ser. No. 503,004

The portion of the term of this patent subsequent to Jun. 5, 2007, has been disclaimed.

Int. Cl.⁵ A61K *9/24*

U.S. Cl. 424—473 2 Claims



1. A dosage form for delivering a drug to a fluid environment of use, the dosage form comprising:

(a) a wall comprising an annealed subcoat and overcoat, said subcoat and overcoat annealed at about 20° C. to 75° C. for about 5 to 90 hours; and wherein;

(1) the subcoat comprises a member selected from the group consisting of a cellulose ether, a cellulose ester and a cellulose ester-ether emulsifiers which subcoat is permeable to the passage of fluid and maintains its physical and chemical integrity in fluid;

(2) the overcoat comprising a member selected from the group consisting of hydroxypropylcellulose, hydroxypropylmethylcellulose, carboxymethylcellulose, and methylcellulose, and wherein said overcoat loses its physical and chemical integrity in fluid; which wall surrounds;

(b) a compartment;

(c) a therapeutically effective amount of drug in the compartment; and

(d) at least one passageway in the wall connecting the exterior with the interior of the device for delivering the drug over time.

5,024,843

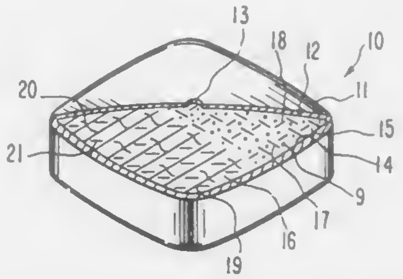
ORAL HYPOGLYCEMIC GLIPIZIDE GRANULATION

Anthony L. Kuczynski; Atul D. Ayer, and Patrick S.-L. Wong, all of Palo Alto, Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Filed Sep. 5, 1989, Ser. No. 402,314

Int. Cl.⁵ A61K *9/16, 31/50, 47/38, 47/32*

U.S. Cl. 424—499 2 Claims



1. A pharmaceutical granulation comprising granules of 2 mg to 50 mg of substantially aqueous insoluble glipizide, from 100 mg to 320 mg of a polyethylene oxide having a 80,000 to 350,000 molecular weight, and from 5 mg to 50 mg of a hydroxypropylmethylcellulose having a 9,200 to 2,000 molecular weight, which granules are useful for manufacturing an osmotic dosage form for dispensing the glipizide for up to 22 hours when the dosage form is in gastrointestinal tract of a patient.

5,024,844

PROCESS FOR THE PRODUCTION OF DRIED EARTHWORM POWDER AND ANTIHYPERLIPEMIC, ANTIDIABETIC, ANTIHYPERTENSIVE AND ANTIHYPOTENSIVE PREPARATIONS CONTAINING DRIED EARTHWORM POWDER AS ACTIVE INGREDIENT

Yoichi Ishii, and Hisashi Mihara, both of Miyazaki, Japan, assignors to Eimei Company, Ltd., Miyazaki, Japan

Filed Aug. 5, 1988, Ser. No. 228,672

Claims priority, application Japan, Aug. 18, 1987, 62-204904; Aug. 18, 1987, 62-204905; Apr. 19, 1988, 63-094541; Apr. 19, 1988, 63-094542

Int. Cl.⁵ A61K *35/56*

U.S. Cl. 424—520 4 Claims

1. A process for the production of dried earthworm powder which comprises the steps of

(a) cleaning a species of living earthworms by leaving the living earthworms in an aqueous solution containing not greater than 0.3% by weight of at least one compound selected from the group consisting of an organic acid, an

VOL
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inorganic acid, a sodium salt of an organic acid, a sodium salt of an inorganic acid, a potassium salt of an organic acid, and a potassium salt of an inorganic acid, until the alimentary canal thereof is freed of soil, and then washing the living earthworms with water to remove any dirt from the body surfaces thereof, or by washing the living earthworms with water to remove any dirt from the body surface thereof, and then leaving the living earthworms in said aqueous solution until the alimentary canal thereof is freed of soil;

(b) wet-grinding the living earthworms;

(c) freezing the resulting suspension at a temperature of −60° to −10° C.; and

(d) freeze-drying and then vacuum-drying the suspension under a vacuum of 10 mmHg or below for 10 to 100 hours while raising the temperature stepwise in the range of −60° to 80° C., the resulting powder being finally vacuum-dried at a temperature of 70° to 80° C. under a vacuum of 0.01 to 0.5 mmHg for 5 to 10 hours.

5,024,845

METHOD OF REDUCING L-MALIC ACID IN JUICE MEDIUM

Roy J. Thornton, and Susan B. Rodriguez, both of Palmerston North, New Zealand, assignors to Massey University, Palmerston, New Zealand

Continuation-in-part of Ser. No. 928,432, Nov. 10, 1986, Pat. No. 4,830,968. This application Dec. 23, 1987, Ser. No. 337,587

Claims priority, application New Zealand, Nov. 13, 1985, 214177

Int. Cl.^{5} C12G *1/00;* **A23L** *2/02*

U.S. Cl. 426—15 **9 Claims**

1. A method for reducing L-malic acid in a juice medium which comprises inoculating the juice medium with a mutant of strain (A) *Schizosaccharomyces malidevorans* #442 (CBS 5557) or (B) as deposited as (ATCC 46954), which mutant requires both glucose and L-malic acid for growth, and which is capable of completely utilizing L-malic acid when grown on a matrix comprising L-malic acid, glucose at concentrations greater than 10% by weight, a nitrogen source, vitamins and a pH indicator having gradual color change over the pH range of about 3 to about 6.5.

5,024,846

SEPARATION OF STEROLS FROM LIPIDS

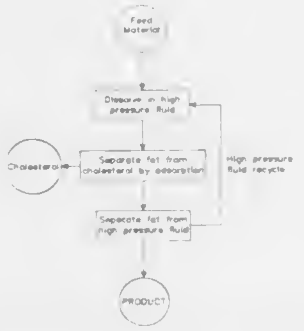
Corran N. S. McLachlan, 29 Summer Street, Devonport, Auckland; Owen J. Catchpole, and Bruce H. Hamilton, both of Wellington, all of New Zealand, assignors to Carran Norman Stuart McLachlan, Auckland, New Zealand

Continuation of Ser. No. 453,072, Dec. 18, 1989, abandoned, which is a continuation of Ser. No. 181,088, Apr. 14, 1988, abandoned. This application Aug. 2, 1990, Ser. No. 561,477

Claims priority, application New Zealand, Aug. 26, 1987, 221586

Int. Cl.^{5} C11B *3/06, 3/10, 7/00*

U.S. Cl. 426—312 **7 Claims**


Feed Material
Dissolve in high pressure fluid
Cholesterol
Separate fat from cholesterol by adsorption
High pressure fluid recycle
Separate fat from high pressure fluid
PRODUCT

1. A method of separating sterols from lipids, including:

(a) dissolving a sterol/lipid mixture in a high pressure physiologically acceptable fluid selected from the group consisting of a high pressure liquid, a high pressure subcritical gas or a high pressure supercritical gas, to form a high pressure fluid mixture,

(b) contacting the high pressure fluid mixture with an adsorbant material comprising oxygen containing salts of the basic metals to selectively adsorb the sterols on the adsorbant material, and then

(c) removing the substantially sterol free lipids from the high pressure fluid.

5,024,847

SULFUR CONTAINING ACYCLIC TERPENES

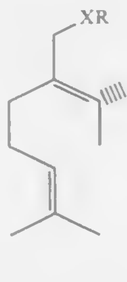
Philip A. Christenson, Midland Park, N.J.; Robert G. Eilerman, Merrick, N.Y.; Paul J. Riker, Lodi, and Brian J. Drake, Clifton, both of N.J., assignors to BASF K&F Corporation, Whippany, N.J.

Filed Sep. 18, 1989, Ser. No. 408,620

Int. Cl.^{5} A23L *2/26*

U.S. Cl. 426—535 **8 Claims**

1. A compound represented by the formula



I

wherein

X is sulfur;

R is H, lower alkyl or an acyl group of 1 to 3 carbons; and

~H indicates the presence of an E or Z configuration.

5,024,848

FREEZE DRIED SWEETENED CONDENSED MILK CRYSTALS AND PROCESS OF MAKING

Cindy E. Little, Orlando, Fla., assignor to Crystals International, Plant City, Fla.

Filed Mar. 9, 1990, Ser. No. 491,085

Int. Cl.^{5} A23C *9/00, 9/16*

U.S. Cl. 426—587 **5 Claims**

1. A method of producing a food ingredient, said method comprising:

forming a solution consisting of 100% sweetened condensed milk made of whole milk and sucrose diluting said solution with water to form a solution having 50°–65° brix and

drying said solution under a pressure of 2.5 to 4.0 mm Hg by freeze-drying, effected by a continuous vacuum dryer to produce a dry food ingredient of 100% sweetened condensed milk crystals,

said drying being effected at a temperature in the range of from 165°–220° F. to avoid carmelization of the 100% sweetened condensed milk.

5,024,849

LIQUID COFFEE WHITENER

Casimir E. Rasilewicz, Woodland Hills, Calif., assignor to Nestec S.A., Vevey, Switzerland

Filed May 1, 1990, Ser. No. 517,130

Int. Cl.^{5} A23D *7/00*

U.S. Cl. 426—656 **10 Claims**

1. A liquid coffee whitener which consists essentially of an aqueous fat emulsion system containing 3% to 18% by weight edible fat, 2.5% to 15% by weight carbohydrate, from 0.1% to 1% by weight of lipoidal emulsifier, and an amount of protein hydrolysate effective to stabilize the emulsion against fat separation and buffer the emulsion, with the whitener having a pH above 7.0.

5,024,850

METHOD OF MANUFACTURING A POLARIZATION FILTER AND A POLARIZATION FILTER SO OBTAINED

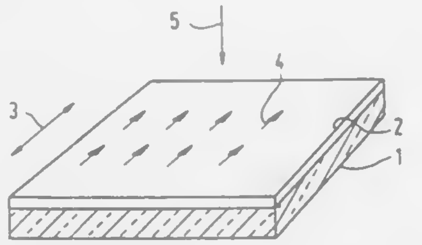
Dirk J. Broer, and Jan Van Der Veen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 6, 1989, Ser. No. 446,845

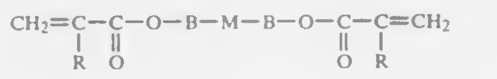
Claims priority, application Netherlands, May 10, 1989, 8901167

Int. Cl.^{5} C09K *19/00*

U.S. Cl. 428—1 **5 Claims**



1. A method of manufacturing a polarization filter, in which a mixture of a liquid crystalline monomer and a dichroic colorant is oriented on a substrate, and the monomer is polymerized by exposing it to uniform radiation, characterized in that a monomer is used which corresponds to the formula



$$CH_2{=}\underset{R}{\underset{|}{C}}{-}\underset{O}{\underset{\|}{C}}{-}O{-}B{-}M{-}B{-}O{-}\underset{O}{\underset{\|}{C}}{-}\underset{R}{\underset{|}{C}}{=}CH_2 \qquad (1)$$

wherein

B is a bridging group,

R is a hydrogen atom or a methyl group, and

M is a mesogenic group comprising at least a phenyl group and/or a cyclohexyl group, so that the monomer as a whole acquires a nematic or smectic phase.

5,024,851

PROCESS FOR PREPARING A WOVEN MEDICAL FABRIC

Conrad D. Goad, Greensboro, N.C., and Jeffrey L. Taylor, Cincinnati, Ohio, assignors to Precision Fabrics Group Inc., Greensboro, N.C. and Standard Textile Co., Inc., Cincinnati, Ohio

Continuation of Ser. No. 259,201, Dec. 1, 1988, abandoned, which is a division of Ser. No. 164,197, Mar. 4, 1988, Pat. No. 4,822,667. This application Oct. 10, 1989, Ser. No. 418,973

Int. Cl.^{5} A01N *1/02*

U.S. Cl. 427—2 **24 Claims**

1. A process of imparting water-resistent, flame-resistant, and low linting properties to a tightly woven medical fabric comprising the steps of:

(1) applying to a woven polyester fabric, constructed from polyester yarn of about 50 to about 450 denier with the sum of ends and picks of at least 100 per linear inch, an aqueous finish composition containing a fluorocarbon water repellent, and a flame retardant, and

(2) drying the fabric,

the resulting medical fabric having the following properties initially and following 100 laundering cycles:

	Initial	After 100 Cycles
linting (INDA 160-0-83) particles	at most 5,000	at most 5,000
flammability (NFPA 702)	Class II	Class II
[antimicrobial activity (CTM-0923)] [for Klebsiella pneumoniae]	[no growth]	[no growth]
Suter hydrostatic resistance (AATCC-127 centimeters/minutes	at least 45.0	at least 20.0
spraying rating (AATCC-22-1980)	at least 50.0	at least 20.0
air permeability (FTM 5450, Frazier method)	at most 5	at most 10

5,024,852

PROCESS FOR PREPARING A PROPHYLACTIC DEVICE MADE OF RUPTURABLE MICROCAPSULES AND LAYERS OF ELASTOMERIC MATERIAL

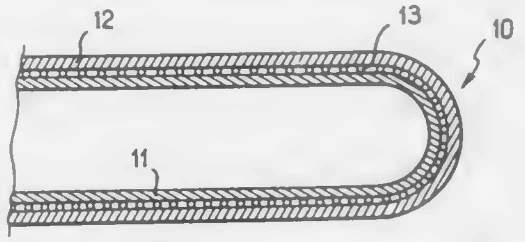
René-Guy Busnel, Bievres, and Gilles Argy, La Queue en Yvelines, both of France, assignors to Hutchinson, Paris, France

Division of Ser. No. 232,336, Aug. 15, 1988, Pat. No. 4,930,522. This application Mar. 28, 1990, Ser. No. 500,377

Claims priority, application France, Aug. 20, 1987, 87 11753

Int. Cl.^{5} A61K *9/50*

U.S. Cl. 427—2 **12 Claims**



1. A process for the manufacture of a prophylactic device having contained therein at least one pharmaceutically active substance, comprising:

(a) forming a first layer of elastomeric material into the desired shape of the prophylactic device;

(b) prevulcanizing the first layer;

(c) applying to one side of the first layer a layer or microcapsules having at least one pharmaceutically active substance encapsulated therein;

(d) depositing on the coating of microcapsules a second layer of elastomeric material; and

(e) vulcanizing the first and second layers of elastomeric material.

5,024,853

METHOD TO CONTROL THE THICKNESS OF AN ANTIREFLECTION COATING AND IMPLEMENTATION INSTALLATION

Jean Landreau, Antony, and Hisao Nakajima, Paris, both of France, assignors to Etat Francais represente par le Ministre, Moulineaux, France

Filed Jun. 28, 1990, Ser. No. 544,876

Claims priority, application France, Jul. 6, 1989, 89 09119

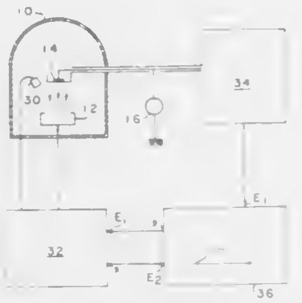
Int. Cl.^{5} C23C *14/54*

U.S. Cl. 427—10 **7 Claims**

1. Method to control the thickness of an antireflection coating when deposited on one of the faces of a semiconductive laser, wherein the laser is fed with a constant current during depositing, this method being characterized in that the voltage is measured at the laser terminals, the passage of this voltage through a maximum being detected, which indicates that the antireflection coating has a thickness providing it with minimum reflectivity.

VOL
1127
ISS
3
JE
18
1991
UMI

2. Installation for depositing an antireflection coating on one of the faces of a semiconductive laser and implementing the method according to claim 1, this installation including a depositing chamber equipped with an evaporation device and a laser support, a device to control the evaporation device and a



constant current source connected to a connection opening inside the chamber, wherein this installation further includes a device suitably adapted to detect the moment when the voltage at the terminals of the current source passes through a maximum.

5,024,854

METHOD OF MANUFACTURING PERPENDICULAR TYPE MAGNETIC RECORDING MEMBER

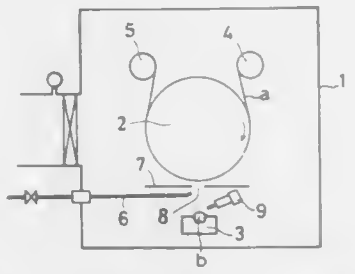
Kyuzo Nakamura; Yoshifumi Ota, and Taiki Yamada, all of Yachimata, Japan, assignors to Nihon Shinku Gijutsu Kabushiki Kaisha, Chigasaki, Japan

Continuation of Ser. No. 587,742, Mar. 8, 1984, abandoned. This application Sep. 22, 1989, Ser. No. 412,535

Claims priority, application Japan, Mar. 8, 1983, 58-36652; Mar. 8, 1983, 58-36653; Apr. 26, 1983, 58-72075; May 18, 1983, 58-85786; May 21, 1983, 58-38389

Int. Cl.^{5} H01F *10/02*

U.S. Cl. 427—38 **10 Claims**



1. A method for manufacturing a perpendicular-type magnetic recording member, comprising the steps of:

providing a substrate for said magnetic recording member in an evacuated vacuum chamber;

introducing oxygen gas into the vacuum chamber while simultaneously vaporizing in the vacuum chamber at least one magnetic metal selected from the group consisting of Fe, Co and Ni, thereby causing partial oxidation of the vapors of said magnetic metal and deposition of the partially oxidized metal vapors on the substrate, wherein the temperature of the substrate is approximately equal to room temperature during said deposition;

controlling the proportion of said magnetic metal and controlling the oxygen pressure so as to obtain a perpendicular magnetic film having a composition represented by $(Fe_xCo_yNi_z)_{1-m}O_m$, wherein $O<x\leqq 0.05$, $O\leqq z\leqq 0.40$, $x+y+z=1$, and $0.15\leqq m\leqq 0.50$, whereby said obtained perpendicular magnetic film comprises magnetic particles of said magnetic metal and non-magnetic particles of oxide of said metal, and the obtained magnetic film has a magnetic anisotropy in the direction perpendicular to the plane of the film which satisfies the following conditions.

$$Ku\perp > 2\pi Ms^2,$$

$$Hc\perp > Hc\,\|, \text{ and}$$

$$Br\perp > Br\,\|,$$

wherein Ku⊥ is the crystal magnetic anisotropy energy in the direction perpendicular to the film surface, Ms is the saturation magnetization, Hc⊥ is the coercive force in the direction perpendicular to the film surface, Hc || is the coercive force in the direction parallel to the film surface, Br⊥ is the residual magnetic flux density in the direction perpendicular to the film surface, and Br || is the residual magnetic flux density in the direction parallel to the film surface.

5,024,855

ORAL RINSE AND METHOD FOR PLAQUE REMOVAL

Sol Gershon, Teaneck; Charles Fox, Fairlawn, both of N.J., and Norton Garfinkle, Boca Raton, Fla., assignors to Cambridge Research Laboratories, Inc., New York, N.Y.

Filed Sep. 13, 1989, Ser. No. 406,460

Int. Cl.^{5} A61K *7/16, 7/18*

U.S. Cl. 424—52 **15 Claims**

1. An oral rinse composition for removing plaque present on dental surfaces consisting essentially of:

(a) a plaque disrupting component consisting essentially of an alkali metal or ammonium orthophosphate or mixtures thereof in an amount of from 1.2 to 10% by weight and from 0.05 to 8% by weight of one or more surfactants selected from among water-soluble salts of higher fatty acid monoglyceride monosulfates, higher alkyl sulfates, alkyl aryl sulfonates, higher fatty acid esters of 1,2-dihydroxypropane sulfonate, sodium and potassium N-lauroyl sarcosine, ethanolamine salts of N-lauroyl, N-myristyl and N-palmitoyl sarcosine, polyethylene oxide condensates of alkyl phenols, surfactants derived from the condensation of ethylene oxide with the reaction product of propylene oxide and ethylenediamine and ethylene oxide condensates with aliphatic alcohols and mixtures of esters of sorbitor and sorbitol anhydrides consisting predominantly of the monoester condensed with ethyleneoxide;

(b) optionally one or more auxiliary materials selected from among humectants, sweetness, flavoring agents, detergent builders, therapeutic agents and thickening agents; and

(c) an aqueous/alcoholic carrier; wherein the pH of said composition if 5.5 to 10.5.

5,024,856

METHOD AND APPARATUS FOR APPLYING A FLUX

Ernst Hohnerlein, Ringstrasse 7, 6983 Kreuzwertheim, Fed. Rep. of Germany

Continuation of Ser. No. 265,233, Oct. 31, 1988, abandoned. This application Dec. 29, 1989, Ser. No. 456,575

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1988, 3809156

Int. Cl.^{5} B05B *3/12*

U.S. Cl. 427—57 **9 Claims**

1. In a soldering method requiring applying a flux material to a small area point forming a joint to be soldered on an electrical component, the improvement comprising the following steps:

(a) transporting said electrical component in a given transport direction,

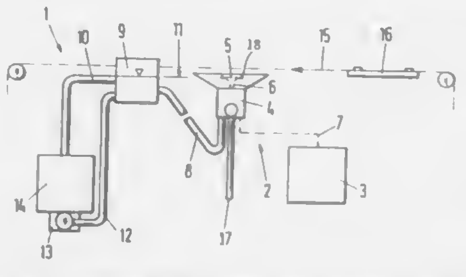
(b) ultrasonically atomizing said flux material in an ultrasonic atomizer (3, 5) in a substantially pressureless manner to provide a pressureless flux mist substantially without air turbulence,

(c) separately generating around said flux mist an airstream of hollow constant cross-section by an air nozzle (18) independently of said atomizing of said flux materials.

(d) moving said ultrasonic atomizer (3, 5) and said air nozzle (18) in a direction substantially perpendicular to said given transport direction, and

(e) entraining and carrying said pressureless flux mist inside said hollow constant cross-section airstream for supplying said pressureless flux mist to any small area point forming a joint to be soldered on said electrical component by directing said hollow constant cross-section airstream onto said small area point forming a joint to be soldered without substantial mixing between said flux mist and said airstream to avoid fouling said electrical component with flux even without masking.

3. An apparatus for applying flux to a small area point forming a joint to be soldered on an electrical component, comprising means (15) for transporting said electrical component in a given transport direction (19), ultrasonic atomizer means (3, 5) including an atomizing element (5) for producing a pressureless



flux mist in a substantially pressureless manner and substantially without air turbulence, means (8, 9, 10) for delivering flux material in a pressureless manner to said ultrasonic atomizer means, ring nozzle means (18) surrounding said atomizing element (5), said ring nozzle means (18) including a blower device for separately generating a hollow cross-section airstream of uniform diameter independtly of said atomizer means to surround said flux mist with said hollow cross-section airstream for entraining and carrying said pressureless flux mist from said atomizer means to said small area point, and means for moving said atomizer means and said ring nozzle means in a direction substantially perpendicularly to said given transport direction for locating said ring nozzle means (18) into a position for carrying said flux mist with said hollow cross-section airstream to any small area point forming a joint to be soldered, to avoid fouling said electrical component with flux even without masking.

5,024,857

METHOD FOR COATING THE ARMATURE OF A ROTARY ELECTRIC APPARATUS

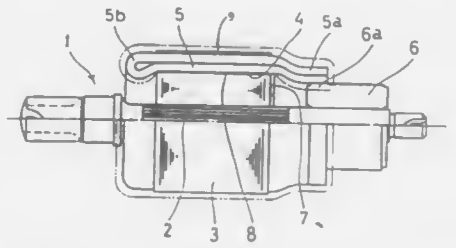
Ikuo Arakawa, Omama, Japan, assignor to Mitsuba Electric Manufacturing Co., Ltd., Gunma, Japan

Filed Feb. 14, 1990, Ser. No. 480,128

Claims priority, application Japan, Feb. 14, 1989, 1-34099

Int. Cl.^{5} C23C *26/00*

U.S. Cl. 427—104 **3 Claims**



1. A method for coating coils and slots of an armature of a rotary electric apparatus comprising the steps of:

dropping a first coating material onto deep areas within the slots and narrow areas between the coils of the armature;

heating the first coating material to a gelled state to prevent said first coating material from dripping off of said armature;

dropping a second coating material onto the coils and slots of the armature after the first coating material is gelled; and

hardening said first and second coating materials on said armature.

5,024,858

METALLIZED POLYMERS AND METHOD

Robert R. Burch, Exton, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 214,406, Jul. 7, 1988, abandoned. This application May 17, 1989, Ser. No. 351,962

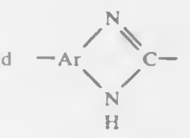
Int. Cl.^{5} B05D *3/10*

U.S. Cl. 427—123 **19 Claims**

1. A method for metallizing polymer substrate with a metal, comprising the steps (i), (ii) and (iii) or (i), (ii), and (iv):

(i) treating a polymer having at least one repeating unit selected from the group:

—NHRCO—, R^1—NHCONH— and



wherein:

R is selected from R^3 and R^1NHCOR^2,

R^1 and R^3, individually, are selected from m-phenylene, p-phenylene, 3,3'-biphenylene, 3,4'-biphenylene, 4,4'-biphenylene and 4,4'-diphenylene ether,

R^2 is selected from R^1 and $—CH_2—_x$,

Ar is a trisubstituted aromatic radical in which two of the three aryl bonds are adjacent to one another and attached to nitrogen atoms, and

x is 1 to 10; with a nonaqueous solution of strong base selected from alkali metal hydroxides; $R^4R^5N^-$, wherein R^4 and R^5 are each selected from the group consisting of C_1–C_{12} alkyl, C_6H_5, $C_{10}H_7$, $C_{12}H_9$, $C(=O)R^6$ wherein R^6 is C_1–C_{12} alkyl; CH_2CN^-; R^{7-} wherein R^7 is C_1–C_{12} alkyl; H^-; R^8SOR^9 wherein R^8 and R^9 are each C_1–C_{12} alkyl; $R^{10}O^-$ wherein R^{10} is C_1–C_{12} alkyl; and the polyanions of the polymers, or a combination thereof, alone or in the presence of alcohols, amines or nitrates; to generate anionic sites on the polymer surface,

(ii) contacting the polymer with a metal cation to electrostatically bond the cation to the anionic sites, and

(iii) reducing the meal cation to metal at the anionic sites on the polymer surface and forming metallic sites, or

(iv) treating the metal cation with a compound that forms a semiconductor therewith and forming a semiconductor imbibed polymer.

VOL
1127
ISS
3
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18
1991
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5,024,859

METHOD FOR APPLYING AN OXIDE BARRIER COATING TO A REINFORCING FIBER

Michael L. Millard, Sharonville; Michael G. Harrison, West Chester, and Andrew Szweda, Middletown, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Nov. 20, 1989, Ser. No. 440,575

Int. Cl.^{5} B05D *3/02*

U.S. Cl. 427—226 **7 Claims**

1. A method for applying an oxide barrier coating to a reinforcing fiber having a predetermined fiber diameter to provide the coating with a preselected coating microstructure and thickness, comprising the steps of:

(a) providing an aqueous solution including a concentration of a metal oxyhalide salt selected from the group consisting of zirconium oxyhalide, hafnium oxyhalide and mixtures thereof, the concentration of the metal salt in water being selected to provide the preselected coating microstructure;

(b) wetting the reinforcing fiber with the aqueous solution to apply a layer of the metal salt to the reinforcing fiber, which metal salt will decompose, upon heating in a predetermined decomposition temperature range, to a metal oxide which will not adversely react chemically with the reinforcing fiber at an intended operating temperature greater than 1000° C. in an oxidizing atmosphere wherein the thickness of the layer is selected to provide on the fiber, after heating in the decomposition temperature range, a coating of the metal oxide of a thickness in the range of about 0.05% to less than 7% of the fiber diameter; and subsequently;

(c) heating the layer in the decomposition temperature range to decompose the metal salt to the metal oxide and to provide on the reinforcing fiber the oxide barrier coating with the preselected coating microstructure and coating thickness.

5,024,860

ROCKET MOTOR INSULATION USING PHOSPHONITRILIC ELASTOMERIC COMPOSITIONS

Suae-Chen Chang, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

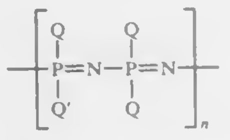
Filed May 24, 1989, Ser. No. 356,183

Int. Cl.^{5} B05D *7/22*

U.S. Cl. 427—230 **10 Claims**

1. A process for producing a low smoke, insulating liner for rocket motor casings comprising the steps of

- a. mixing a vulcanizable composition comprising
  - 1) from about 1 to about 60% by weight of an organic polymer fiber selected from the group polyaramid, polybenzimidazole and mixtures thereof;
  - 2) from about 1 to about 25 percent by weight of an inorganic powder filler having a specific surface area of from about 1 meter^2/gram to about 200 meter^2/gram;
  - 3) from about 0 to about 75 percent by weight of a vulcanizable hydrocarbon elastomer and;
  - 4) a non-fluorinated phosphazene polymer of the formula



$$-\!\!\left[\overset{\overset{Q}{|}}{\underset{\underset{Q'}{|}}{P}}{=}N-\overset{\overset{Q}{|}}{\underset{\underset{Q}{|}}{P}}{=}N\right]_n\!\!-$$

  where Q and Q' are the same or different and are substituted or unsubstituted alkoxy or aryloxy and Q" is a group having olefinic unsaturation;
- b. applying said mixture to the inner surface of the rocket motor casing:
- c. vulcanizing said mixture.

5,024,861

GASEOUS OR VAPOR PHASE TREATMENT OF WOOD WITH BORON PRESERVATIVES

Peter Vinden, Tarawera; Russell J. Burton, and Timote M. Vaioleti, both of Rotorua, all of New Zealand, assignors to Her Majesty the Queen In Right of New Zealand Acting by and Through the Minister of Forestry for New Zealand, Wellington, New Zealand

Filed Jun. 23, 1988, Ser. No. 210,638

Claims priority, application New Zealand, Jun. 23, 1987, 216746

Int. Cl.^{5} C23C *16/28;* **B05D** *3/02, 3/04*

U.S. Cl. 427—254 **19 Claims**

18. A process for the preservative or remedial treatment of wood or wood based products with a boron based preservative, comprising the steps of placing the wood to be treated in a common treatment vessel, drying the wood to a reduced moisture content of below 10% by weight of the dried wood, subsequently exposing the wood to a vapor of a boron compound under conditions of evacuation of the treatment vessel and elevated temperature in the treatment vessel and for a time sufficient for an amount of boron or a boron preservative compound to become deposited within the wood to an extent sufficient and effective for said boron or boron preservative compound to act as a preservative for the wood, and subsequently exposing the wood within the treatment vessel to steam conditioning thereof to raise the moisture content of the wood to a working moisture content therefor.

5,024,862

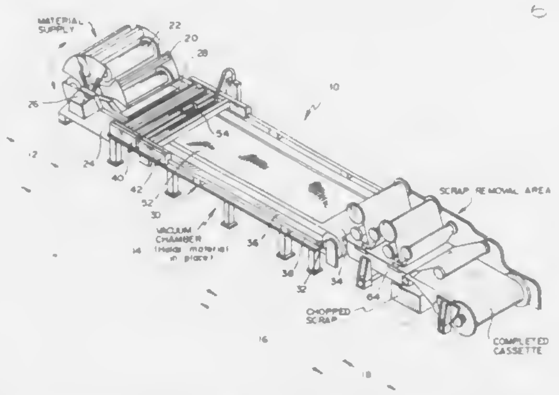
AUTOMATED CUTTING AND KITTING SYSTEM OF COMPOSITE MATERIAL AND METHOD

Ed Frank, Aston, Pa., assignor to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 252,488, Sep. 30, 1988, abandoned. This application Sep. 19, 1990, Ser. No. 587,604

Int. Cl.^{5} B05D *1/02, 3/12;* **B05B** *3/18;* **B05C** *11/00*

U.S. Cl. 427—264 **13 Claims**



1. An automated cutting and kitting system for at least two types of preimpregnated composite material, comprising:

preimpregnated composite material supply means containing a supply of each type of preimpregnated composite material;

means for indexing said supply means for presenting a selected type of preimpregnated composite material for cutting;

means for cutting a selected type of preimpregnated composite material presented from said supply means to form a series of cut plies;

means for sequentially shaping each cut ply by cutting each said ply in accordance with a preselected outline; and

means for kitting each shaped ply by storing each shaped ply for subsequent use in a layup in accordance with its position in the layup.

12. A method of cutting and kitting a layup of a plurality of plies of at least two types of preimpregnated composite material, comprising the steps of:

aligning each ply of a given type of preimpregnated composite material in the order in which it is to be positioned in the layup;

sequentially cutting each ply in accordance with a predetermined shape; and

kitting the cut plies by storing the cut plies such that the top ply of the layup is stored first.

5,024,863

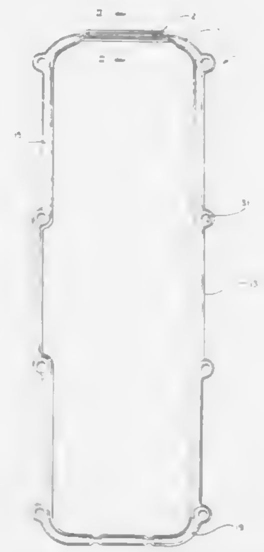
ENGINE GASKET WITH OIL IMPERMEABLE SURFACE

Robert M. Gibbon, Fort Worth, Tex., assignor to JMK International, Inc., Fort Worth, Tex.

Filed Feb. 2, 1990, Ser. No. 474,503

Int. Cl.^{5} B05D *3/02*

U.S. Cl. 427—387 **4 Claims**



2. A method for manufacturing an engine gasket for a vehicle engine having reduced oil permeability, the method comprising the steps of:

first, forming the engine gasket in the desired shape from a silicone rubber compound comprising a polyorganosiloxane gum, a filler and a catalyst, the engine gasket having an inner surface exposed to hot engine oil and an outer surface;

next, applying a silicone varnish coating to at least the inner surface of the engine gasket after the gasket is formed, whereby the inner surface is substantially coated by the silicone varnish coating to provide a flexible surface coating, the silicone varnish coating comprising a silicone resin, a solvent and a catalyst; and

wherein the engine gasket is formed in a generally rectangular configuration having a pair of oppositely arranged long sides and a pair of oppositely arranged short sides, at least one of the short sides having an intermediate fleshy portion of silicone rubber which is of a greater cross-sectional thickness than the remaining portions of the engine gasket, the silicone varnish being applied to the inner surface of the fleshy portion to decrease the oil permeability of the inner surface.

5,024,864

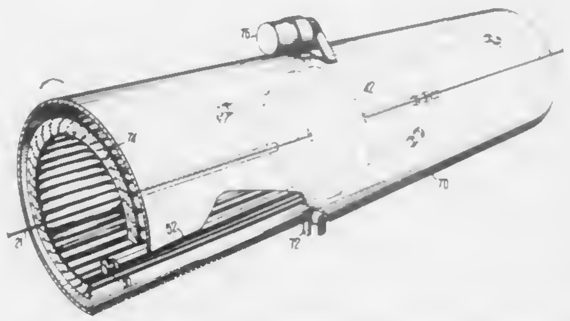
METHODS OF AND APPARATUS FOR MAKING AN INSULATED TRANSMISSION MEDIUM

Larry L. Bleich, Omaha, Nebr.; Jooi A. Roberts, Stone Mountain, Ga., and Stephen T. Zerbs, Gretna, Nebr., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 160,891, Feb. 26, 1988, Pat. No. 4,877,645. This application Oct. 30, 1989, Ser. No. 429,265

Int. Cl.^{5} B05D *1/02*

U.S. Cl. 427—424 **9 Claims**



1. A method of making an insulated elongated transmission medium, said method comprising the steps of:

moving an elongated transmission medium along a path of travel in a direction along the longitudinal axis of the elongated transmission medium; while

applying a molten, substantially non-porous plastic insulating material to the elongated transmission medium;

directing spray patterns of a coating material toward the elongated transmission medium wherein said spray patterns are directed toward the elongated transmission medium in such a manner that at least each of a plurality of the spray patterns occupies only an area of a plane and such that the direction of each of the plurality of spray patterns is at a predetermined angle to the path of travel, the plurality of spray patterns being staggered along and spaced generally equiangularly about the path of travel and cooperating to prevent unintended undulations of the elongated transmission medium as the elongated transmission medium is moved along the path of travel; then

exposing the plastic insulating material to a cooling medium; and

taking up the insulated elongated transmission medium.

5,024,865

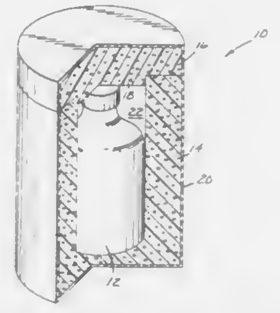
SORBENT, IMPACT RESISTANT CONTAINER

Thomas I. Insley, Lake Elmo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 335,202, Apr. 7, 1989, abandoned. This application Oct. 2, 1990, Ser. No. 593,308

Int. Cl.^{5} B32B *23/02*

U.S. Cl. 428—36.4 **27 Claims**



1. A container having structural rigidity, impact resistance, providing cushioning and absorbency properties comprising

VOL
1127
ISS
3
JE
18
1991
UMI

compressed particles of polyolefin microfibers, said container having a solidity of at least 20% and less than about 80%.

5,024,866

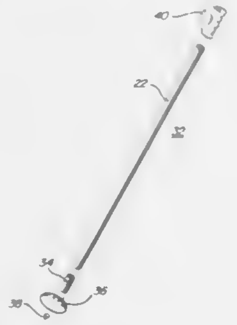
COMPOSITE SKI POLE AND METHOD OF MAKING SAME

David P. Goode, Bloomfield Hills, Mich., assignor to SKI Accessories, Inc., Waterford, Mich.

Filed Jan. 12, 1989, Ser. No. 296,222

Int. Cl.^{5} A63C *11/22*

U.S. Cl. 428—36.4 **6 Claims**



1. A strong, lightweight, flexible, ski pole comprising:
a shaft;
a basket mounted adjacent a first lower end of said shaft;
a tip mounted on said first lower end of said shaft; and
a grip mounted on the opposite end of said shaft;
said shaft comprising filament-reinforced, resin-matrix composite body having an anti-splinter veil located on said shaft radially outward of said filaments; wherein, said anti-splinter veil comprises a polyester layer wrapped about said reinforcing filaments and embedded in said resin-matrix, and said filaments run essentially rectilinearly along said shaft.

5,024,867

DOPANT FILM AND METHODS OF DIFFUSING IMPURITY INTO AND MANUFACTURING A SEMICONDUCTOR WAFER

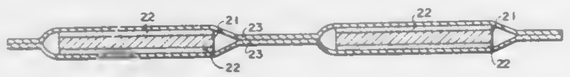
Masaburo Iwabuchi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 27, 1988, Ser. No. 263,202

Claims priority, application Japan, Oct. 28, 1987, 62-272114; Jul. 14, 1988, 63-173718

Int. Cl.^{5} C09J *7/02*

U.S. Cl. 428—40 **3 Claims**



1. A dopant film structure comprising:
a dopant film containing an organic binder, an inorganic binder and a compound of an impurity element for diffusion;
adhesive layers coated both surfaces of said dopant film; and
releasable sheets sandwiching said dopant film with said adhesive layers interposed therebetween.

5,024,868

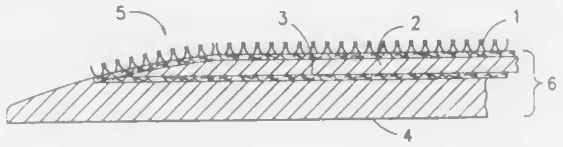
DUST CONTROL MAT AND METHOD OF MANUFACTURING SAME

Helle B. Petersen, Aarhus, Denmark, assignor to Milliken Denmark A/S, Morke, Denmark

Filed Oct. 19, 1989, Ser. No. 423,846

Int. Cl.^{5} B32B *3/02, 33/00;* **D03D** *27/00*

U.S. Cl. 428—88 **8 Claims**



1. A dust control mat comprising a pile layer, a backing layer of rubber or plastic material and a flexible nonwoven reinforcing layer embedded in said backing layer, said nonwoven layer having fibers of nonwoven and spun bonded materials which are heat set and crosslinked, said nonwoven layer extending to a point adjacent said pile layer and having one edge thereof abutting the underside of said pile layer preventing the exposure thereof to an area surrounding said dust control mat.

5,024,869

FLAME RETARDANT FIBERS FOR TEXTILE USE

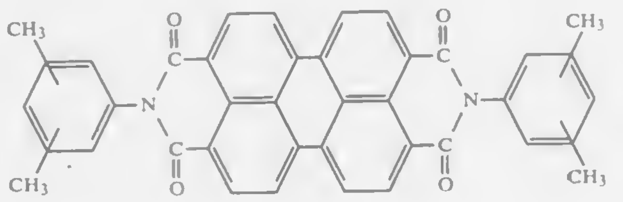
Ling Yeh, and Hugh G. Harrelson, Jr., both of Anderson, S.C., assignors to BASF Corporation, Williamsburg, Va.

Division of Ser. No. 130,763, Dec. 9, 1987, Pat. No. 4,853,272. This application Jun. 8, 1989, Ser. No. 363,024

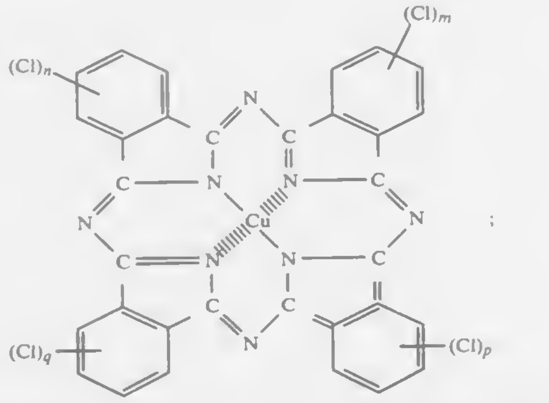
Int. Cl.^{5} B32B *3/02*

U.S. Cl. 428—97 **20 Claims**

1. A method of preparing one or more flame retardant fibers comprising:
(a) incorporating into a thermoplastically processable synthetic polymer a flame retardant amount of a flame retardant material consisting essentially of
(i) carbon black pigment;
(ii)



(iii)



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wherein: m, n, p, and q are each either 0 or an integer from 1 to about 4; or,

(iv) mixtures thereof; and,
(b) melt processing said synthetic polymer and said fire retardant material of step (a) into said one or more fibers.

5,024,870

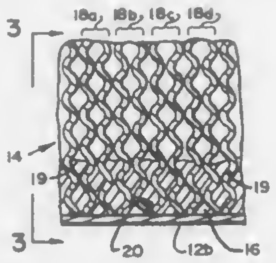
METHOD FOR POTTING PLEATED FILTER MEDIA AND FILTERS MADE THEREBY

William E. Jackson, Bloomington, Minn., assignor to Donaldson Company, Inc., Minneapolis, Minn.

Filed Feb. 19, 1987, Ser. No. 16,278

Int. Cl.^{5} B32B *3/28;* **B01D** *27/00;* **B65B** *7/00*

U.S. Cl. 428—181 **23 Claims**



3. A filter element comprising:
(a) a pair of end caps;
(b) pleated, corrugated panel filter media having edges thereon constructed and arranged for positioning proximate said end caps;
(c) potting material within said end caps for sealing said edges of said filter media therein, wherein said filter media edges are configured in a sine wave shape to permit substantially uniform penetration of said potting material into a region between adjacent corrugated panels of said pleated filter media within each of said end caps.
5. A filter element comprising:
(a) a pair of end caps;
(b) pleated, corrugated panel filter media having edges thereon constructed and arranged for positioning proximate said end caps;
(c) potting material within said end caps for sealing said edges of said filter media therein, wherein said filter media edges are configured in a saw tooth shape to permit substantially uniform penetration of said potting material into a region between adjacent corrugated panels of said pleated filter media within each of said end caps.
7. A filter element comprising:
(a) a pair of end caps;
(b) pleated, corrugated panel filter media having edges thereon constructed and arranged for positioning proximate said end caps;
(c) potting material within said end caps for sealing said edges of said filter media therein, wherein said filter media edges are configured in a square wave shape to permit substantially uniform penetration of said potting material into a region between adjacent corrugated panels of said pleated filter media within each of said end caps.

5,024,871

CERAMIC FILLED FLUOROPOLYMETRIC COMPOSITE MATERIAL

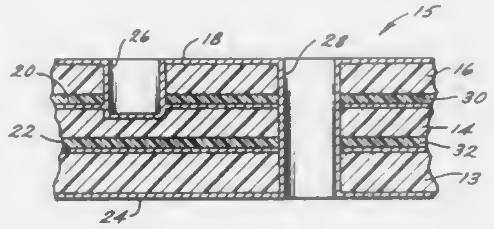
David J. Arthur, Norwood, and Gwo S. Swei, Northboro, both of Mass., assignors to Rogers Corporation, Rogers, Conn.

Filed Feb. 21, 1990, Ser. No. 483,501

Int. Cl.^{5} B32B *9/00*

U.S. Cl. 428—209 **28 Claims**

1. An electrical substrate material comprising:
fluoropolymeric material;
silaceous ceramic filler material, said filler material being in an amount of at least about 50 volume percent of the total substrate material; and
said ceramic filler being coated by a zirconate coating.



5,024,872

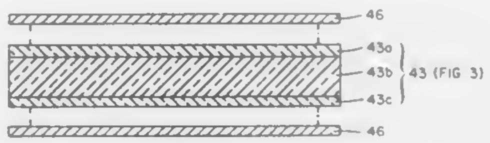
SHEETS OF STRETCHED AND POLARIZED POLYMER MATERIALS AND METHOD OF MANUFACTURER

David T. Wilson, Billerica, and Roger H. Tancrell, Cambridge, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 834,290, Feb. 27, 1986, abandoned. This application Aug. 13, 1987, Ser. No. 86,176

Int. Cl.^{5} B32B *7/02, 27/00*

U.S. Cl. 428—212 **13 Claims**



1. A sheet comprising:
a molecularly polarized polymer material having a multilayered structure comprising:
a pair of outer surface layers of said sheet each surface layer having a first modulus of elasticity, a first density, a first hydrostatic charge sensitivity and a first relative permittivity; and
an inner region of said sheet disposed between said pair of outer surface layers of the sheet having a second modulus of elasticity which is lower than the modulus of elasticity of each of said pair of outer surface layers, a second density which is lower than the density of said pair of outer surface layers, a second hydrostatic charge sensitivity which is higher than the hydrostatic charge sensitivity of said pair of outer surface layers, and a relative permittivity which is lower than the relative permittivity of said pair of outer surface layers.

3. The sheet as recited in claim 1 wherein said polymer material comprises polyvinyldene fluoride.

5,024,873

COMPOSITE FILMS WITH LANGMUIR-BLODGETT COMPONENT

John J. Burack, Elizabeth; Jane D. LeGrange, and Wesley P. Townsend, both of Princeton, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 5, 1988, Ser. No. 280,074

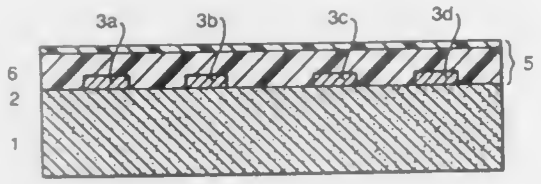
Int. Cl.^{5} B32B *27/00*

U.S. Cl. 428—220 **8 Claims**

1. The combination comprising:
a substrate body, a plurality of electroconductive elements disposed in spaced relation of the surface of said body, and a composite film adhering to said body and coating said electroconductive elements and surface areas therebetween of said body, said composite film comprising:

VOL
1127
ISS
3
JE
18
1991
UMI

a first film of dielectric material other than a Langmuir-Blodgett film and a second Langmuir-Blodgett film prepared from amphiphilic material and thinner than said first film, said two films being in superposed relation with each other, and said Langmuir-Blodgett film rendering said composite film more moisture resistant than either of said first and second films taken alone.



5,024,874

THREE DIMENSIONAL FABRIC WITH A LINKAGE STRUCTURE

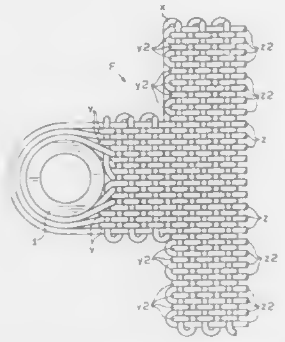
Yoshiharu Yasui; Meiji Anahara; Goro Asahi, all of Kariya, and Shiro Miyake, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya and Japan Defense Agency, Tokyo, both of Japan

Filed Feb. 13, 1990, Ser. No. 479,352

Claims priority, application Japan, Feb. 16, 1989, 1-36649; Feb. 16, 1989, 1-36650

Int. Cl.⁵ B32B *7/00*

U.S. Cl. 428—257 **15 Claims**



1. A three dimensional fabric comprising:

a multiplicity of strings arranged and woven to form a multiplicity of warps arranged in a plurality of rows and columns, a plurality of first wefts crossing the warp columns in the interstitial spaces between adjacent warp rows, and a plurality of second wefts crossing said warps and said first wefts in the interstitial spaces between adjacent warp columns; and

a solid member that is incorporated into the body of the three dimensional fabric by a plurality of said strings that are wound about the outer periphery of the solid member.

5,024,875

ANTIMICROBIAL MICROPOROUS COATING

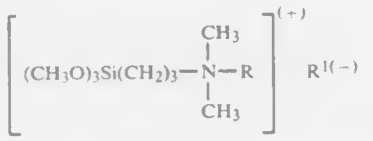
Berlie R. Hill, Cana, Va.; Thomas F. Watson, Sr., Greensboro, and Benny L. Triplett, Pleasant Garden, both of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Sep. 9, 1986, Ser. No. 905,135

Int. Cl.⁵ B05D *3/10;* **B32B** *5/18, 5/20*

U.S. Cl. 428—267 **6 Claims**

1. A process of making a waterproof, water-vapor-permeable, antimicrobial coated fabric having a durable, antimicrobial, microporous polyurethane layer thereon formed by the wet coagulation method, said process comprising applying a water-miscible, polar organic solvent solution of a polyurethane elastomer to a base fabric, immersing the thus-coated base fabric into an aqueous coagulation bath to extract the solvent from the polymer solution leaving a porous polyurethane matrix adhered to the base fabric, then washing and drying the coated fabric, wherein the polyurethane elastomer solution contains a bioactive amount of a bioactive silyl quaternary ammonium compound of the formula:

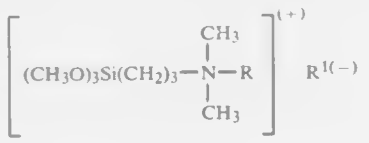


$$\left[(CH_3O)_3Si(CH_2)_3-\overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle CH_3}{|}}{N}}-R \right]^{(+)} R^{1(-)}$$

wherein R is an alkyl of 11 to 22 carbon atoms and R^1 is bromine or chlorine, the resulting coated fabric having a moisture vapor transmission of at least 800 $g/m^2/24$ hours and a hydrostatic pressure resistance of at least 10 psi.

5. A process of preparing a polyurethane-based coating solution for application to a fabric substrate to form a rainproof, water-vapor-permeable coated fabric with durable antimicrobial properties, a moisture-vapor transmission of at least 800 $g/m^2/24$ hours, and a hydrostatic pressure resistance of at least 10 psi, said process comprising the sequential steps of:

(a) mixing together a methanol solution of a bioactive silyl quaternary ammonium compound of the formula:



$$\left[(CH_3O)_3Si(CH_2)_3-\overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle CH_3}{|}}{N}}-R \right]^{(+)} R^{1(-)}$$

wherein R is an alkyl of 11 to 22 carbon atoms and R^1 is bromine or chlorine, with N,N-dimethylformamide and a surfactant to form a first solution;

(b) preparing a solution of at least one polyurethane resin in a water-miscible, compatible liquid vehicle; and

(c) combining the solutions of steps (a) and (b) to form a water-coagulable, polyurethane-based, bioactive coating composition for application to fabric substrates via the wet coagulation method to make microporous, rainproof, water vapor-permeable antimicrobial coated fabrics resistant to the spread of mildew.

5,024,876

REINFORCED PLASTIC COMPRISING POLY(ARYLENE SULFIDE SULFONE) POLYMER CONTAINING ETHER GROUPS MATRIX

Rex L. Bobsein, Bartlesville, Okla.; Mark L. Stone, Idaho Falls, Id., and Jon F. Geibel, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 28, 1990, Ser. No. 486,563

Int. Cl.⁵ B32B *7/00, 27/00, 9/00;* **C08G** *8/02*

U.S. Cl. 428—272 **15 Claims**

1. A reinforced plastic comprising:

(a) reinforcing material consisting essentially of continuous long fibers in

(b) an ether group-containing poly(arylene sulfide sulfone) polymer matrix.

5,024,877

FIRE RESISTANT MATERIALS

Francis P. McCullough, Jr., Lake Jackson; R. Vernon Snelgrove, Damon, both of Tex., and David M. Hall, Auburn, Ala., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 337,912, Apr. 14, 1989, abandoned, which is a continuation-in-part of Ser. No. 114,324, Oct. 28, 1987, Pat. No. 4,879,168, which is a continuation-in-part of Ser. No. 206,634, Jun. 14, 1988, which is a continuation-in-part of Ser. No. 108,255, Oct. 13, 1987, Pat. No. 4,898,783. This application Feb. 14, 1990, Ser. No. 479,828

Int. Cl.⁵ D04H *1/16*

U.S. Cl. 428—282 **36 Claims**

1. An improved ignition resistant structure comprising the combination of a non-graphitic carbonaceous material having an LOI value of greater than 40, a char formation greater than about 65% and a thermal conductivity of the material in fiber form less than 1 BTU ft/Hr ft^2 °F. with about 0.5 to 90% by weight of an organosilicone polymer comprising the following recurring units: $(Si—O—Si—O)_n$ in an amount to provide ignition resistance to said structure.

5,024,878

COMPOSITE MATERIAL WITH ZIRCONIA MATRIX

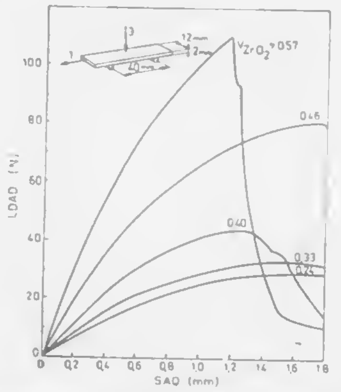
Christian Robinbrosse, Le Haillan; Roger Naslain, Pessac; Jacky Minet, and Francis Langlais, both of Gradignan, all of France, assignors to Societe Europeenne de Propulsion, Suresnes, France

Filed Aug. 28, 1989, Ser. No. 409,510

Claims priority, application France, Sep. 14, 1988, 88 12000

Int. Cl.⁵ G32G *5/06*

U.S. Cl. 428—297 **4 Claims**



1. Composite material with zirconia matrix comprising a fibrous reinforcement and a matrix deposited by chemical vapor infiltration through the porosity of the reinforcement, wherein the reinforcement is constituted by a fibrous fabric in fibers selected from carbon fibers and silicon carbide fibers, the matrix containing free carbon co-deposited with the zirconia.

5,024,879

PROCESS FOR CONSOLIDATING DISCONTINUOUS-STRUCTURED MATERIALS

Vincenzo Massa, Busto Arsizio; Aldo Cicuta, and Walter Cavigiolo, both of Novara, all of Italy, assignors to Ausimont S.p.A., Milan, Italy

Continuation of Ser. No. 134,846, Dec. 14, 1987, abandoned. This application Dec. 26, 1989, Ser. No. 453,173

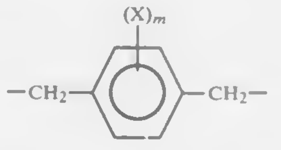
Claims priority, application Italy, Dec. 17, 1986, 22718 A/86

Int. Cl.⁵ C23C *16/04;* **B32B** *3/26*

U.S. Cl. 428—304.4 **6 Claims**

1. A process for consolidating, that is, adhering a solid material or article which exhibits at least one area of low cohesion exhibiting a mechanical strength value lower than 700 kg/cm^2 with respect to stretching or lower than 100 kg/cm^2 with respect to compression, the said solid material or article being associated with at least one structural discontinuity having a section dimension ranging from 0.01 micron to 100 microns, pervious from the outside and communicating with the outside through a port equal in size to or less than the size of the section dimension of the structural discontinuity, which process comprises:

(a) introducing into said low-cohesion area associated with a structural discontinuity vapors of at least one para-xylylene monomer or monomeric derivative thereof corresponding to formula I:



(I)

wherein X represents a C_1–C_6 alkyl group, a C_6–C_{10} aryl group, a C_7–C_{16} aralkyl group, a halogen-alkyl or halogen-aralkyl group, an acetoxy, alkenyl, aminoalkyl, arylamino, cyano, alkoxy, hydroxy, nitro group, a halogen atom, a sulphonic radical or a sulphonic ester, or a phosphorus-based substituent, a sulphonic, sulphuric, or alkyl-sulphoxide group, or a hydrogen atom, and m is an integer ranging from 0 to 4, including operating under vacuum at a pressure ranging from approximately 0.01 to 1 mm Hg; so the penetration depths of the vapors inside of the structural discontinuity are from one millimeter to one centimeter, and

(b) polymerizing said monomer vapors in situ inside said area of low-cohesion associated with said structural discontinuity to adhere to said structural discontinuity, thereby restoring said solid material or article substantially to its original condition.

5,024,880

CELLULAR PRESSURE-SENSITIVE ADHESIVE MEMBRANE

George F. Veasley, Hudson, Wis.; Jurgen Klingen, Schwalmtal, Fed. Rep. of Germany, and Donald T. Landin, Eagan, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 3, 1990, Ser. No. 460,621

Int. Cl.⁵ B32B *3/26, 7/12, 15/04*

U.S. Cl. 428—317.5 **19 Claims**

1. A phase-separated cellular pressure-sensitive adhesive membrane surrounding and thereby defining a multiplicity of small voids, constituting from 15% to 85% of the volume of said membrane, said membrane possessing improved internal strength and a high degree of compression recovery, said membrane consisting essentially of

(a) from about 70 parts to about 98 parts of an acrylic polymer of monomers containing:
  (i) at least about 75 parts of an alkyl acrylate monomer, the alkyl groups of which contain from 1 to 14 carbon atoms, having an average of 4 to 12 carbon atoms,
  (ii) from 0 to about 25 parts of a monoethylenically unsaturated polar copolymerizable monomer,
  (iii) from about 0.01 part to about 1 part of a photoinitiator, and
  (iv) from about 0.1 part to about 5 parts of a surfactant,
(b) correspondingly, from about 30 parts to about 2 parts of a hydrocarbon elastomer or blend of hydrocarbon elastomers containing only saturated segments, containing at least one segment having a lower T_g than the acrylic copolymer,

wherein the adhesive has at least a first phase and a second phase, the first phase consisting primarily of the elastomer, phase consisting primarily of the acrylic, at least one phase being a continuous phase.

VOL
1127
ISS
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JE
18
1991
UMI

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MATERIAL FOR USE IN COMPOSITE SLIDING SURFACE BEARINGS AND PROCESS OF MANUFACTURING THE MATERIAL

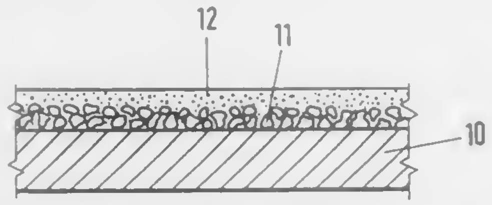
Karl-Heinz Matucha, Kelkheim; Thomas Steffens, Offenbach; Hans-Paul Baureis, Dielheim-Horrenberg; Wolfgang Bickle, Reilingen, and Jürgen Braus, Walldorf, all of Fed. Rep. of Germany, assignors to Kolbenschmidt Aktiengesellschaft, Neckarsulm, Fed. Rep. of Germany

Filed May 2, 1989, Ser. No. 346,058

Claims priority, application Fed. Rep. of Germany, May 5, 1988, 3815265

Int. Cl.^{5} B32B *5/16, 15/08*

U.S. Cl. 428—323 9 Claims



1. A material for use in composite sliding surface bearings having a plastic sliding layer, which material comprises a metallic backing layer and a sliding layer, which is bonded to the backing layer and has a thickness of 30 to 500 μm, and consists of a matrix-forming fluorine-containing polymer that contains a fine dispersion of 5 to 50% by weight, metal powder having a high affinity to fluorine and a particle size of ≦40 μm, wherein the fluorine-containing polymer contains 0.5 to 5.0% by weight metal fluoride and 0.5 to 5.0% by weight metal oxyfluoride and consists of 10 to 25% by weight monoclinally crystallized PVDF, 10 to 40% by weight amorphous PVDF and 10 to 30% by weight of novel polymer which, in an X-ray diffractogram prepared by CuKα radiation, has a sharp intensity peak at a double Bragg angle of $2\theta = 18.07° \pm 0.03°$ and has a melting range of 320° to 350° C. and is free of orthorhombically crystallized PVDF.

2. A material according to claim 1, wherein the metal powder consists of lead, tin, zinc, indium, thallium, cadmium, bismuth, barium, copper, silver or an alloy thereof, individually or in combination, and is dispersed in the fluorine-containing polymer.

5,024,882

MATERIAL FOR USE IN COMPOSITE SLIDING SURFACE BEARINGS AND PROCESS OF MANUFACTURING THE MATERIAL

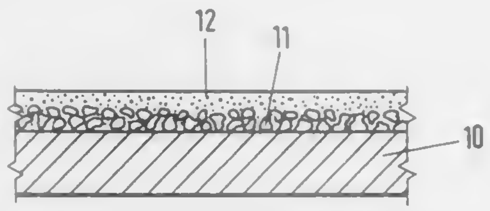
Karl-Heinz Matucha, Kelkheim; Thomas Steffens, Offenbach; Hans-Paul Baureis, Dielheim-Horrenberg; Wolfgang Bickle, Reilingen, and Jürgen Braus, Walldorf, all of Fed. Rep. of Germany, assignors to Kolbenschmidt Aktiengesellschaft, Neckarsulm, Fed. Rep. of Germany

Filed May 2, 1989, Ser. No. 346,059

Claims priority, application Fed. Rep. of Germany, May 5, 1988, 3815264

Int. Cl.^{5} B32B *5/16, 15/08*

U.S. Cl. 428—323 11 Claims



1. A material for use in composite sliding surface bearings having a plastic sliding layer, which material comprises a metallic backing layer and a sliding layer, which is bonded to the backing layer and has a thickness of 30 to 500 μm and consists of a matrix-forming fluorine-containing polymer that contains a fine dispersion of 5 to 50% by weight metal powder having a high affinity to fluorine and a particle size of ≦40 μm, wherein the fluorine-containing polymer has , in an X-ray diffractogram prepared by CuK α-radiation, a shaft intensity peak at a double Bragg angle of $2\theta = 18.07° \pm 0.03°$ and has a melting range of 320° to 350° C. and contains 5 to 30% by weight metal fluoride and 0.5 to 5.0% by weight metal oxyfluoride.

2. A material according to claim 1, wherein the metal powder consists of lead, tin, zinc, indium, thallium, cadmium, bismuth, barium, copper, silver or an alloy thereof, individually or in combination, and is dispersed in the fluorine-containing polymer.

5,024,883

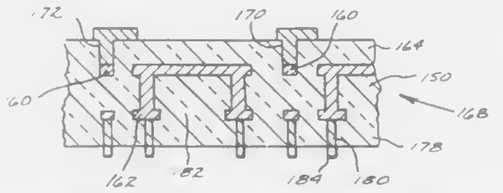
ELECTRONIC PACKAGING OF COMPONENTS INCORPORATING A CERAMIC-GLASS-METAL COMPOSITE

Narendra N. SinghDeo, New Haven; Deepak Mahulikar, Meriden, both of Conn., and Sheldon H. Butt, Godfrey, Ill., assignors to Olin Corporation, New Haven, Conn.

Division of Ser. No. 924,970, Oct. 30, 1986, Pat. No. 4,882,212. This application Sep. 14, 1989, Ser. No. 407,511

Int. Cl.^{5} B32B *9/00*

U.S. Cl. 428—323 22 Claims



1. A composite combined with a metallic component, comprising:
- a base component formed of a ceramic-glass-metal composite material;
- said composite material comprising an effective amount up to about 25 volume % of metallic particles for enhancing the flow characteristics of said composite;
- from about 15 to about 50 volume % of a glass for adhering said composite together; and
- the balance essentially ceramic particles wherein said glass reacts chemically with both said metallic particles and said ceramic particles and said metallic particles have a melting temperature greater than the melting temperature of said glass;
- said composite having a structure comprising substantially a matrix of said glass with said ceramic and metallic particles dispersed therein; and
- a metallic component, said component being embedded into said composite material.

5,024,884

ABRADABLE SEAL HAVING PARTICULATE EROSION RESISTANCE

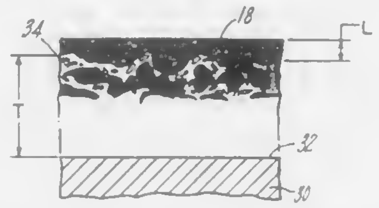
William F. Otfinoski, Meriden, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 686,176, Dec. 24, 1984, abandoned. This application Jan. 23, 1987, Ser. No. 9,623

Int. Cl.^{5} B32B *5/16, 15/04;* **B05D** *1/06, 1/10*

U.S. Cl. 428—328 14 Claims

1. An abradable seal structure of the multiple knife edge type comprises of a porous powder metal plasma arc sprayed deposit having 26–40 percent density on a metal substrate, wherein the deposit is characterized by having interlocked to its surface a layer material comprised of equiaxed particulates in a ceramic matrix, wherein the hardness of the particulates is no greater than the hardness of the metal of said sprayed deposit; the particulates are substantially smaller than the surface pores of said sprayed deposit, and some of said particulates are contained within said surface pores; sand said layer material improves the resistance of said sprayed deposit to erosion when the seal is rubbed by said knife edges.



2. The seal of claim 1 characterized by the layer having a thickness of at least 0.025 mm.

5,024,885

MAGNETIC RECORDING MEDIUM

Yasushi Endo; Mikihiko Kato; Toshio Kawamata, and Kouichi Masaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 30, 1988, Ser. No. 252,076

Claims priority, application Japan, Sep. 30, 1987, 62-244141

Int. Cl.^{5} G11B *23/00*

U.S. Cl. 428—329 7 Claims

1. A magnetic recording medium comprising a non-magnetic support having thereon a magnetic layer containing ferromagnetic particles which are hexagonal system tabular particles and which have an axis of easy magnetization in a direction perpendicular to the major axis of the plate and are dispersed in a binder, wherein said ferromagnetic particles have saturation magnetization of 60 emu/g or higher, a specific surface area (BET method) of from 25 to 70 m^2/g. an average particle diameter of from 0.01 to 0.2 μm, and a coercive force of from 400 to 2000 oersteds, and said binder contains a resin having at least one kind of polar group in an amount of 1×10^{-5} eq/g or more of the polar group, wherein said magnetic recording medium is a floppy disk in which thermocycle running durability is improved.

5,024,886

SEALING SHEETS FOR ROOFS

Pierre Geisen, Strasbourg, and Jean-Claude Reillaudoux, Souffelweyersheim, both of France, assignors to Soprema S.A., Strasbourg, France

Filed Sep. 22, 1988, Ser. No. 247,540

Claims priority, application France, Dec. 24, 1987, 87 18467

Int. Cl.^{5} B32B *11/04, 7/12;* **B05D** *1/36*

U.S. Cl. 428—332 13 Claims

1. A composite sealing sheet for roofs comprising two layers, the first layer comprising a non-adhesive asphalt-base sheet, with a film of a polymer having a high tear resistance applied directly to its upper surface; and
- the second sealing layer comprising an asphalt-base sealing sheet having a self-adhesive under-surface which si applied directly to said first sealing layer.

5,024,887

THERMO-SENSITIVE TRANSFER INK RIBBON TO BE USED FOR PRODUCING DRY TYPE TRANSFER MATERIAL

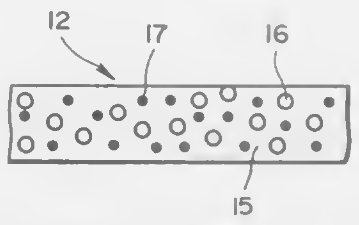
Mitsuo Yamane, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Jan. 23, 1989, Ser. No. 299,232

Claims priority, application Japan, Jan. 21, 1988, 63-11631

Int. Cl.^{5} B41M *5/26*

U.S. Cl. 428—335 29 Claims



1. A thermo-sensitive transfer ink ribbon to be used for producing a dry type transfer material comprising:
- a ribbon substrate material;
- an ink layer formed on one of opposite surfaces of said substrate material, said ink layer comprising a mixture of fine particles of a coloring agent, a binder and a pressure-sensitive adhesive; and
- a transfer property control layer formed on said ink layer and containing a thermo-sensitive adhesive and a tackiness agent.

5,024,888

MODIFIED POLYBUTYLENE-BASE HOT MELT COMPOSITIONS

Charles C. Hwo, Sugar Land, and Simone Mostert, Cypress, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 306,430, Feb. 3, 1989, Pat. No. 4,977,206, which is a continuation-in-part of Ser. No. 91,484, Aug. 31, 1987, abandoned. This application Jul. 30, 1990, Ser. No. 560,647

Int. Cl.^{5} C09J *151/00;* **B32B** *7/12, 15/04*

U.S. Cl. 428—355 15 Claims

1. A laminar structure comprising a substrate which is bonded with a hot melt adhesive capable of peelability, and wherein said hot melt adhesive comprises:
- from about 50 percent by weight to about 95 percent by weight of a modified ethylenic copolymer selected from the group: maleated ethylene methyl acrylate copolymer, and maleated ethylene acrylic acid copolymer;
- from about 50 percent by weight to about 5 percent by weight of a butene-1 homopolymer or copolymer; and
- up to about 1 phr of a stabilizer.

5,024,889

SURFACE TREATMENT FOR SILICON CARBIDE FILAMENTS AND PRODUCT

Raymond C. Loszewski, Windham, N.H., assignor to Avco Corporation, Providence, R.I.

Filed Mar. 16, 1989, Ser. No. 324,180

Int. Cl.^{5} B32B *9/00, 18/00;* **D02G** *3/00*

U.S. Cl. 428—368 7 Claims

1. A high strength silicon carbide monofilament comprising:
- a core;
- a stoichiometric bulk layer of SiC deposited on the core;
- a carbon-rich SiC layer deposited on the bulk layer forming an interface with the SiC bulk layer, said carbon-rich SiC layer having a ratio of silicon to carbon which decreases almost linearly from a maximum value of 1 (stoichiomet-

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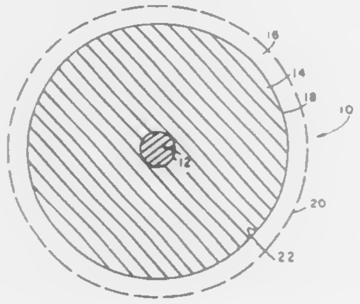
ric) at the interface of SiC bulk layer and the carbon-rich SiC layer to a minimum value of about 0.43 (70% carbon, 30% silicon) at the exterior surface of the carbon-rich SiC surface layer.



5,024,890
SIZE COMPOSITION FOR IMPREGNATING FILAMENT STRANDS AND GLASS FIBERS COATED THEREIN

Jean C. Pollet, Granville; Gary L. Williams; Gordon P. Armstrong, both of Newark, and Martin C. Flautt, Granville, all of Ohio, assignors to Owens-Corning Fiberglass Corporation, Toledo, Ohio

Continuation of Ser. No. 24,954, Mar. 12, 1987, abandoned. This application Nov. 22, 1988, Ser. No. 275,158

Int. Cl.⁵ B32B *9/00;* **D02G** *3/00*

U.S. Cl. 428—372 13 Claims

1. A glass fiber having a coating thereon, consisting essentially of a coupling agent, a film former material and a thermoplastic polymer resin powder wherein the coating is the dried residue formed by evaporation of water from an aqueous composition comprising, in weight percent, based on the weight of the aqueous composition, about 0.05 to about 5.0 wt. % coupling agent, about 0.5 to about 5.0 wt. % film former material and about 30 to about 50 wt. % thermoplastic polymer resin powder.

5,024,891
POLYAMIDE RESIN-METAL LAMINATE

Norio Yoshiga; Masahiro Kawamura, and Hiroshi Nonoyama, all of Nagahama, Japan, assignors to Mitsubishi Plastics Industries limited, Tokyo, Japan

Filed Sep. 19, 1989, Ser. No. 409,317

Claims priority, application Japan, Mar. 22, 1988, 63-67909

Int. Cl.⁵ B32B *27/38*

U.S. Cl. 428—414 7 Claims

1. A polyamide resin-metal laminate comprising a metal substrate having a heat-treated epoxy resin coating layer on its surface and a polyamide resin laminated on the coating layer of the substrate, said coating layer having been heat treated at a temperature of at least 350° C. for at least 3 seconds prior to lamination with said polyamide resin and having the following surface analytical spectrum values as measured by electron spectroscopy for chemical analysis (ESCA method):

(1) Relative elemental content of carbon element (C_{1s} spectrum): at least 50 atomic %,

(2) Relative contents based on the total content of C═O, C—O, C═C—C═C, CH and C—C functional groups of the C_{1s} spectrum, as determined by the respective waveform analyses: C═O group: at least 4.0 atomic %, and C—O group: at most 25 atomic %.

5,024,892
MAGNETIC RECORDING MEDIUM HAVING A BINDER COMPRISING A COPOLYMER WHICH INCLUDES A VINYL COMPOUND HAVING A DIALKYLAMINOALKYL GROUP

Hideomi Watanabe, and Tsutomu Okita, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 9, 1988, Ser. No. 192,036

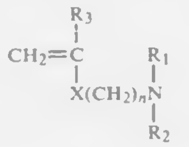
Claims priority, application Japan, May 8, 1987, 62-112084; May 8, 1987, 62-112086

The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.

Int. Cl.⁵ G11B *23/00*

U.S. Cl. 428—423.1 15 Claims

1. A magnetic recording medium comprising a non-magnetic support having provided thereon a magnetic layer containing ferromagnetic particles dispersed in a binder, wherein said binder comprises a copolymer comprising at least one vinyl compound having a dialkylaminoalkyl group and at least one copolymerizable vinyl monomer capable of being copolymerized with said vinyl compound, wherein said at least one vinyl compound containing a dialkylaminoalkyl group is selected from the compounds represented by formula (I):


(I)

$$CH_2{=}\overset{R_3}{\underset{X(CH_2)_n\overset{R_1}{\underset{R_2}{N}}}{C}}$$

wherein n represents an integer of from 1 to 4;

R_1 and R_2 each represents a hydrogen atom or an alkyl group having from 1 to 6 carbon atoms;

X represents —CONH—, —NHCONH—, or $—NHCO_2—$; and

R_3 represents a hydrogen atom or a methyl group.

5,024,893
HEAT-SENSITIVE RECORDING MEDIUM

Kazuyuki Hanada, Washinomiya; Kohichi Kuroda, Tokyo; Iwao Misaizu, Ageo; Masashi Kashimura, Tokyo; Tomoko Goto, Kawaguchi, and Katsumi Kuriyama, Koshigaya, all of Japan, assignors to Dainichiseika Color & Chemicals Mfg. Co., Ltd. and Ukima Colour & Chemicals Mfg. Co. Ltd., both of Tokyo, Japan

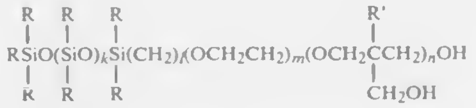
Division of Ser. No. 280,583, Dec. 6, 1988, Pat. No. 4,942,212. This application May 2, 1990, Ser. No. 517,619

Claims priority, application Japan, Jan. 20, 1988, 63-8234

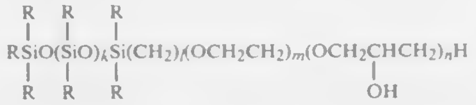
Int. Cl.⁵ B41M *5/26*

U.S. Cl. 428—423.1 7 Claims

1. A thermal recording material, comprising a base sheet, a thermal recording layer provided on one side of the base sheet and a heat-resistant layer applied on the other side of the base sheet, wherein the heat-resistant layer comprises a polyurethane resin which contains, as pendant groups, residual groups of a siloxane compound having the formula (I) or (II) or both:


(1)

$$R\overset{R}{\underset{R}{Si}}O(\overset{R}{\underset{R}{Si}}O)_k\overset{R}{\underset{R}{Si}}(CH_2)_l(OCH_2CH_2)_m(OCH_2\overset{R'}{\underset{CH_2OH}{C}}CH_2)_nOH$$


(2)

$$R\overset{R}{\underset{R}{Si}}O(\overset{R}{\underset{R}{Si}}O)_k\overset{R}{\underset{R}{Si}}(CH_2)_l(OCH_2CH_2)_m(OCH_2\underset{OH}{CH}CH_2)_nH$$

wherein R is an alkyl group, R' is a hydrogen atom or C_1–C_5 alkyl group, k, l and m are 1–250, 0–5 and 0–50, respectively, and n is an integer of 1–3 in the formula (I) and an integer of 2–3 in the formula (II), said siloxane polyol component being present in an amount sufficient to provide said polyurethane resin with tack-free and anti-blocking properties, while retaining resin flexibility.

5,024,894
METHOD OF PRODUCING SILICON AND SIMILAR WAFERS BUFFERED FOR THE DEPOSITION OF METAL OXIDE SUPERCONDUCTING (MOS) POLYMER COMPOSITES AND THE LIKE BY INSULATING METAL OXIDES (IMO) SUITABLE AS SUBSTRATES FOR MOS, AND NOVEL BUFFERED WAFERS PROVIDED THEREBY

James C. W. Chien, Amherst, Mass., assignor to Academy of Applied Science, Concord, N.H., a part interest

Continuation-in-part of Ser. No. 266,014, Nov. 2, 1988. This application Sep. 15, 1989, Ser. No. 407,912

Int. Cl.⁵ B32B *9/00*

U.S. Cl. 428—433 9 Claims

1. A semiconductor wafer suitable for MOS deposition upon a surface thereof comprising a thin insulating metal oxide buffer layer adhered to said surface and compatible with MOS materials deposited thereon.

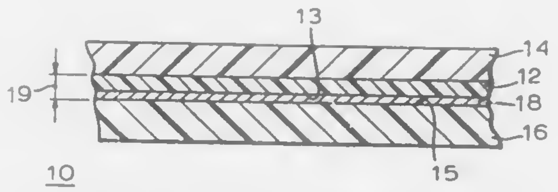
5,024,895
LAMINATE FOR A SAFETY GLAZING

Dean L. Kavanagh, and Robert H. M. Simnn, both of Longmeadow, Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Jun. 18, 1990, Ser. No. 539,252

Int. Cl.⁵ B32B *17/10*

U.S. Cl. 428—437 7 Claims



1. A flexible, draw-formed laminate capable of conforming to a surface with compound curvature for use in a safety glazing comprising a transparent, thermoplastic carrier film which is shrink-stable during laminating formation of said safety glazing, bonded to at least one layer of plasticized polyvinyl butyral, said film having a greater tensile modulus than that of the layer of plasticized polyvinyl butyral.

5,024,896
COLLIMATED METAL DEPOSITION

Gangadhara S. Mathad, Poughkeepsie; David Stanasolovich, Ithaca, both of N.Y., and Giorgio G. Via, McLean, Va., assignors to International Business Machines Corporation, Armonk, N.Y.

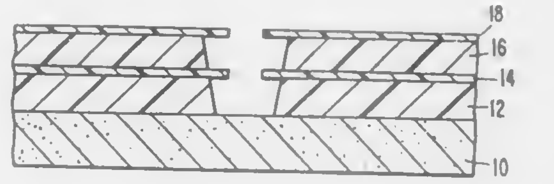
Filed Jul. 6, 1989, Ser. No. 350,182

Int. Cl.⁵ B32B *27/08*

U.S. Cl. 428—473.5 19 Claims

1. A dual overhang, lift-off structure depositing metal comprising:

- a substrate;
- a first lift-off layer deposited on said substrate;
- a first barrier layer deposited on said first lift-off layer, said first barrier layer having etch properties different from said first lift-off layer;
- a second lift-off layer deposited on said first barrier layer, said second lift-off layer having etch properties similar to said first lift-off layer; and
- a second barrier layer deposited on said second lift-off layer, said second barrier layer having etch properties similar to said first barrier layer, whereby undesired metal footing is prevented from being deposited on the substrate by the two barrier layers.



5,024,897
BLENDS OF POLYAMIDE, POLYOLEFIN, AND ETHYLENE VINYL ALCOHOL COPOLYMER

Charles D. Mason, Chatham; William Sacks, Gillette, both of N.J.; Theodore R. Engelmann, and Satyajit Verma, both of Baton Rouge, La., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Division of Ser. No. 309,009, Feb. 7, 1989. This application May 2, 1990, Ser. No. 518,058

Int. Cl.⁵ C08L *77/00, 29/02;* **B32B** *27/34, 27/28*

U.S. Cl. 428—474.4 8 Claims

1. A method to form a bottle from a composition comprising:
from 50 to 99.4 percent by weight of a polyolefin;
from 0.5 to 50 percent by weight of a polyamide; and
from 0.1 to 10 percent by weight of an ethylene vinyl alcohol copolymer comprising from 77.4 to 95 mole percent ethylene groups and from 5 to 22.6 mole percent vinyl alcohol groups and less than 2.0 mole percent unhydrolyzed vinyl acetate groups comprising forming the composition into a bottle having discontinuous regions of said polyamide in a matrix of said polyolefin, said polyamide regions being in the form of platelets and being from 5 to 500 micrometers in their longest dimension and having a thickness of from 1 to 50 micrometers.

5,024,898
ERASABLY MARKABLE ARTICLES AND METHODS OF MAKING SUCH ARTICLES

Warren R. Pitts, Needham; Hayden F. Estrada, W. Boylston, and Peter West, Wellesley, all of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Continuation-in-part of Ser. No. 360,962, Jun. 2, 1989. This application Feb. 6, 1990, Ser. No. 474,990

Int. Cl.⁵ B32B *27/10;* **B05D** *3/02, 3/06*

U.S. Cl. 428—511 18 Claims

1. An erasably markable luminescent article comprising a substrate having at least two surfaces, wherein at least one surface of the substrate is markable with dry wipe inks, said surface after marking being substantially fully erasable, and said markable surface being provided by a smooth coating of cured lacquer, and said luminescent appearance resulting from a phosphorescent material which is embedded within the cured lacquer.

5,024,899
RESILIENT METALLIC FRICTION FACING MATERIAL

Richard D. Lang, 412 Wallace Ave., Crawfordsville, Ind. 47933

Filed Oct. 22, 1990, Ser. No. 601,289

Int. Cl.⁵ B22F *3/10*

U.S. Cl. 428—550 6 Claims

1. An improved metallic friction facing material comprising a porous, resilient fused metallic matrix, said matrix comprising partially fused first metal particles and a second metal having a lower boiling point than the first metal, said second metal being infused into and alloyed with said metal particles.

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5,024,900
COMPOSITE NICKEL-PHOSPHORUS ALLOY PLATED METAL SHEET EXCELLENT IN STRIPPABILITY AND HAVING HIGH HARDNESS AND METHOD FOR MANUFACTURING SAME

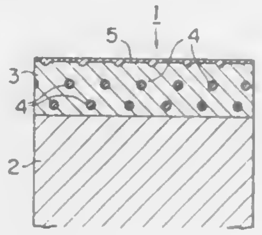
Kiyoshi Kuruma; Masaki Abe; Hiroshi Kagechika, and Shinichi Kagaya, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Oct. 17, 1990, Ser. No. 599,152

Claims priority, application Japan, Apr. 26, 1990, 2-111478

Int. Cl.^{5} B32B *15/08*

U.S. Cl. 428—626 7 Claims



1. A composite nickel-phosphorus alloy plated metal sheet excellent in strippability and having a Vickers hardness of at least 500 Hv, which comprises:

a composite nickel-phosphorus alloy mating plating layer formed on at least one surface of a metal sheet, in which Ni_3P particles and fluorocarbon polymer particles are uniformly dispersed, the sum of a phosphorus content in the matrix of said composite nickel-phosphorus alloy plating layer and a phosphorus content in said Ni_3P particles being within a range of from 1 to 15 wt. % relative to said composite nickel-phosphorus alloy plating layer and a content of said fluorocarbon polymer particles in said composite nickel-phosphorus alloy plating layer being within a range of from 0.3 to 15.2 wt. % relative to said composite nickel-phosphorus alloy plating layer; and

a fluorocarbon polymer layer formed on said composite nickel-phosphorus alloy plating layer by melting said fluorocarbon polymer particles which are exposed on the surface of said composite nickel-phosphorus alloy plating layer.

5,024,901
METHOD FOR DEPOSITING HIGHLY EROSIVE AND ABRASIVE WEAR RESISTANT COMPOSITE COATING SYSTEM ON A SUBSTRATE

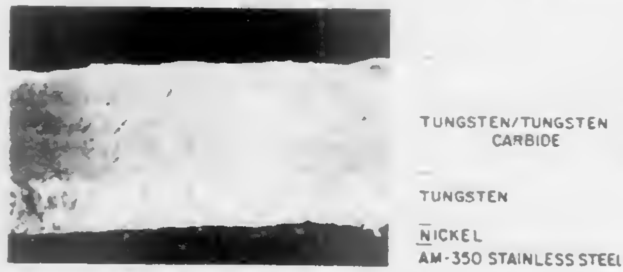
Diwakar Garg, Macungie; Paul N. Dyer, Allentown; Leslie E. Schaffer, Macungie; Ernest L. Wrecsics, Bethlehem, all of Pa.; Duane Dimos, Upper Mount Clair, N.J., and Carl F. Mueller, Easton, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 153,738, Feb. 8, 1988, Pat. No. 4,855,188. This application May 3, 1989, Ser. No. 346,774

The portion of the term of this patent subsequent to Apr. 9, 2008, has been disclaimed.

Int. Cl.^{5} B32B *15/04;* **C23C** *16/32, 16/14, 16/46*

U.S. Cl. 428—627 4 Claims



1. A method for producing a highly erosion and abrasion wear resistant composite coating system on a substrate selected from the group consisting of ferrous metals and alloys, non-ferrous metals and alloys, graphite, carbides and ceramics, comprising, chemical vapor depositing on the substrate a substantially columnar, intermediate layer of tungsten of sufficient thickness to confer substantial wear resistant characteristics on said coating system using a gaseous mixture of tungsten halide and hydrogen at pressures within the range of about 1 Torr. to about 1,000 Torr and a temperature of about 300° to about 650° C., and chemical vapor depositing on said intermediate layer a non-columnar, substantially lamellar outer layer of a mixture of tungsten and tungsten carbide using a gaseous mixture of tungsten halide, hydrogen and an oxygen-containing hydrocarbon at pressures within the range of 1 Torr to about 1,000 Torr and temperatures within the range of about 300° to about 650° C., with said tungsten carbide comprising W_2C, W_3C or a mixture of both, wherein the ratio of the thickness of the tungsten intermediate layer to the thickness of the outer layer is at least 0.35 in the case of tungsten plus W_2C in the outer layer, 0.60 in the case of tungsten plus W_3C in the outer layer and, 0.35 in the case of mixtures of tungsten and W_2C and W_3C in the outer layer.

5,024,902
FIBER-REINFORCED METAL

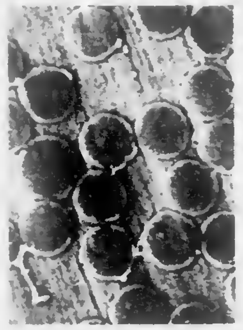
Katsuaki Suganuma, Yokosuka; Hiroyuki Fujii, Uji; Hiroyoshi Minakuchi, Kyoto; Katsuhiko Kada, Souraku; Haruo Osafune, Kameoka, and Kuniaki Kanamaru, Kyoto, all of Japan, assignors to Shimadzu Corporation, Kyoto, Japan

Filed Jun. 15, 1990, Ser. No. 538,436

Claims priority, application Japan, Jun. 27, 1989, 1-165554

Int. Cl.^{5} C03C *13/00*

U.S. Cl. 428—633 5 Claims



1. A fiber-reinforced metal comprising glass fibers and a matrix metal surrounding and wetting said glass fibers, said glass fibers having a nitrogen content of at least 8 atomic %.

5,024,903
MAGNETIC RECORDING MEDIUM HAVING A MAGNETIC LAYER OF A QUATERNARY ALLOY

Makoto Mizukami, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Japan

Filed Apr. 3, 1989, Ser. No. 331,790

Claims priority, application Japan, Apr. 4, 1988, 63-82778

Int. Cl.^{5} G11B *23/00*

U.S. Cl. 428—694 3 Claims

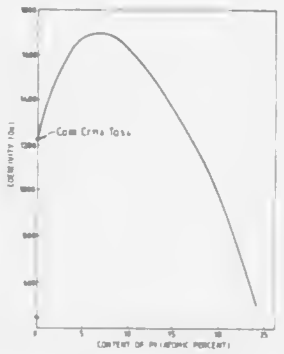
1. A magnetic recording medium suitable for high density recording, which comprises a non-magnetic substrate, a layer of Cr formed on the substrate and a layer of a CoCrTaPt quaternary alloy, said alloy consisting essentially of the following composition by atomic percent

$$1 \leqq Cr \leqq 18$$

$$2 \leqq Ta \leqq 9$$

$$73 \leqq Co \leqq 97$$

$$1 \leqq Pt \leqq 10$$



provided that the atomic percent of Cr, Ta and Co is 100 in total and the atomic percent of Pt is based on the total of Cr, Ta and Co.

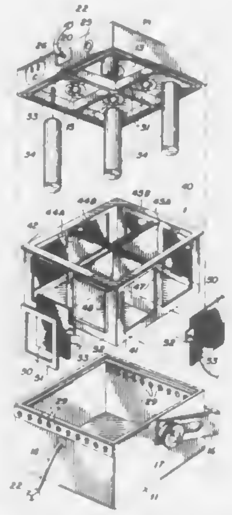
5,024,904
DIRECT CURRENT SALT WATER ACTIVATED GENERATOR

Ray Curiel, Scottsdale, Ariz., assignor to Envirolite Products, Inc., Vancouver, Canada

Filed Nov. 1, 1990, Ser. No. 607,514

Int. Cl.^{5} H01M *12/04*

U.S. Cl. 429—27 34 Claims



1. A portable direct current electric generator including in combination:

a lower outer housing member having enclosed sides, with an open top;

an inner housing member located within said lower outer housing member, said inner housing member having a bottom and closed sides and an open top, with at least a portion of a side of said inner housing member spaced from a side of said lower housing member to provide an air space adjacent said portion, and an aperture in said portion of said side of said inner housing member;

an air cathode member secured in said aperture in said portion of said side of said inner housing member, said air cathode member constructed to be impervious to water and permeable to air on the side thereof in contact with said air space, said inner housing member capable of holding water solutions with said air cathode member secured in said place in said aperture;

means for supplying air to said air space between said portion of said side of said inner housing member and said lower housing member;

cover means for removably covering the tops of said lower outer housing member and said inner housing member;

removable means extending into the interior of said inner housing member; and

means for interconnecting an electrical load between said air cathode member and said anode means.

5,024,905
PLATINUM ALLOY ELECTROCATALYST

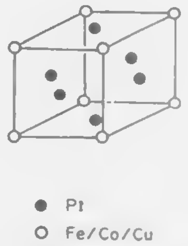
Takashi Itoh, Ichikawa, and Katsuaki Katoh, Matsudo, both of Japan, assignors to N. E. Chemcat Corporation, Tokyo, Japan

Filed Mar. 9, 1990, Ser. No. 491,421

Claims priority, application Japan, Mar. 9, 1989, 1-55109

Int. Cl.^{5} H01M *4/92;* **B01J** *23/40*

U.S. Cl. 429—44 22 Claims



1. A platinuim alloy electrocatalyst comprising an electrically conductive carrier and dispersed in, and deposited on it, a platinum-iron-cobalt-copper quaternary ordered alloy composed of 40 to 70 atomic % of platinum, 9 to 27 atomic % of iron, 9 to 27 atomic % of cobalt and 9 to 27 atomic % of copper.

5,024,906
RECHARGEABLE ELECTROCHEMICAL CELL

Morris Eisenberg, Redwood City, Calif., assignor to Electrochimica Corporation, Menlo Park, Calif.

Filed Sep. 21, 1990, Ser. No. 586,295

Int. Cl.^{5} H01M *10/40*

U.S. Cl. 429—101 6 Claims

1. A non-aqueous, rechargeable electrochemical cell comprising:

an active metal anode;

a reducible metal halide cathode with a positive electrode current collector; and

an electrolyte comprising a Lewis Acid salt of said active metal, an ionizing solvent comprising sulfur dioxide, and a co-solvent selected from the group consisting of methyl chloroformate (MCF), ethyl chloroformate (ECF) and sulfolane (SL).

5,024,907
SOLID ELECTROLYTE TUBE FOR SODIUM SULFUR CELLS AND SURFACE FINISHING PROCESS THEREOF

Masaaki Ohshima; Akira Kobayashi, both of Chofu; Senji Atsumi, Kakamigahara, and Hiromi Shimada, Nagoya, all of Japan, assignors to The Tokyo Electric Co., Tokyo and NGK Insulators, Ltd., Aichi, both of Japan

Filed Dec. 19, 1989, Ser. No. 452,430

Claims priority, application Japan, Dec. 19, 1988, 63-321336

Int. Cl.^{5} H01M *10/38*

U.S. Cl. 429—191 7 Claims

1. A surface finishing process for a solid electrolyte tube, comprising the steps of:

(a) compression molding a green body in the shape of said tube;

(b) bisque firing and calcining said green body to form an intermediate body in the shape of said tube;

VOL
1127
ISS
3
JE
18
1991
UMI

(c) firing said intermediate body to form a fired body; and mechanically finishing an outer surface of the body after any of steps (a) or (b) to such an extent that an outer surface of said fired body has a roughness value X;

wherein said roughness value X is defined by an arithmetical means deviation of the profile (R_a) of not greater than 2.0 microns and a maximum height of the profile (R_{max}) of not greater than 15 microns.

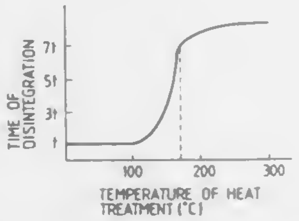
5,024,908
LEAD STORAGE BATTERY

Masayuki Terada, Hyogo; Shinji Saito, Mie, and Asahiko Miura, Nara, all of Japan, assignors to Shin-Kobe Electric Machinery Co., Ltd., Tokyo, Japan

Filed Mar. 6, 1990, Ser. No. 488,900

Int. Cl.^{5} H01M *4/68, 4/82*

U.S. Cl. 429—245 **4 Claims**



2. A lead storage battery comprising an anodic plate obtained by forming an integral plate piece of a Pb/Ca base alloy sheeting with a Pb/Sn base alloy sheeting, and dipping the thus formed piece in sulfuric acid.

5,024,909
DRY FILM PROCESS FOR ALTERING WAVELENGTH RESPONSE OF HOLOGRAMS

William K. Smothers, Hockessin; Krishna C. Doraiswamy, and Mark L. Armstrong, both of Wilmington, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 380,933, Jul. 14, 1989, Pat. No. 4,959,283, which is a continuation-in-part of Ser. No. 144,840, Jan. 15, 1988, abandoned. This application Jun. 12, 1990, Ser. No. 536,792

The portion of the term of this patent subsequent to Sep. 25, 2007, has been disclaimed.

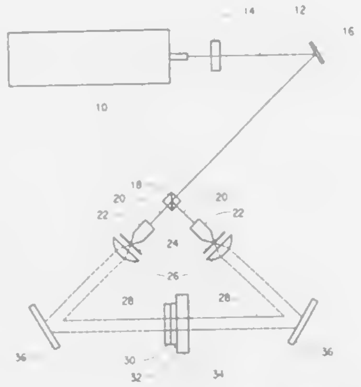
Int. Cl.^{5} G03H *1/04, 1/06*

U.S. Cl. 430—1 **31 Claims**

1. A process for forming a volume phase hologram in a substantially solid, transparent, photosensitive film element comprising, in sequence:

(a) holographically exposing said film element to coherent light to record a volume hologram within said element;

(b) flooding said film element with actinic radiation to fix the volume hologram; and



(c) contacting said film element with a diffusion element for a time sufficient to modify the wavelength of light response by the hologram.

5,024,910
OPTICAL INFORMATION RECORDING MEDIUM

Takeo Ohta, Nara; Masami Uchida, Osaka; Koichi Kotera, Kawanishi, and Kunihiro Matsubara, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

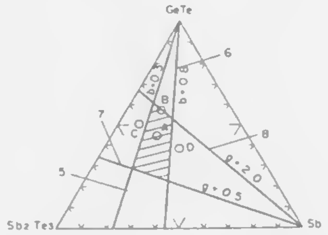
PCT No. PCT/JP88/00937, § 371 Date Jun. 21, 1989, § 102(e) Date Jun. 21, 1989, PCT Pub. No. WO89/04043, PCT Pub. Date May 5, 1989

PCT Filed Sep. 16, 1988, Ser. No. 378,521

Claims priority, application Japan, Oct. 28, 1987, 62-272502

Int. Cl.^{5} G03C *1/00*

U.S. Cl. 430—19 **6 Claims**



1. An erasable optical information recording medium characterized in that a recording thin film made of three components of a GeTe alloy, an Sb_2Te_3 alloy and excess Sb is selected such that 10 mole %$<$excess Sb$<$30% mole %, is formed on a substrate, said recording thin film having the capability of being heated, melted by irradiation of a laser beam and being converted into amorphization by quenching and having the capability of crystallization by heating the thin film in the amorphous state by irradiation of a laser beam.

5,024,911
ELECTROPHOTOGRAPHIC PHOTORECEPTOR HAVING AN ELECTRIC CHARGE GENERATING LAYER COMPRISING A PYRYLIUM COMPOUND

Yutaka Akasaki; Hidekazu Aonuma; Katsumi Nukada; Akihiko Tokita; Hidemi Suto; Katsuhiro Sato, and Hiroyuki Tanaka, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

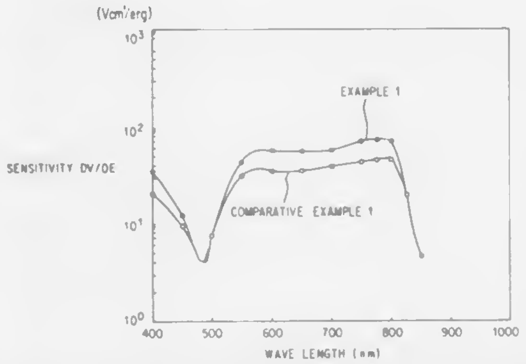
Filed Jun. 2, 1988, Ser. No. 201,203

Claims priority, application Japan, Jun. 3, 1987, 62-138289

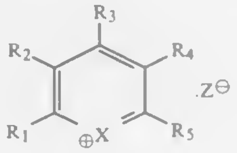
Int. Cl.^{5} G03G *15/02, 15/09, 15/00, 15/06*

U.S. Cl. 430—58 **14 Claims**

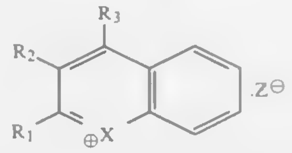
1. An electrophotographic photoreceptor comprising an electrically conductive substrate having thereon a light-sensitive layer, said light-sensitive layer comprising an electric charge generating layer and an electric charge transporting layer, wherein the electric charge generating layer contains an electric charge generating organic pigment having positive hole transporting properties and a pyrylium compound represented by the formula (I) or (II):



(I)



(II)



wherein X is an oxygen atom or a sulfur atom; R_1 and R_5 are each hydrogen, an alkyl group, a cycloalkyl group, an alkoxycarbonyl group, a benzyl group, a substituted or unsubstituted styryl group, or a substituted or unsubstituted phenyl group, and $Z^\ominus$ is an anion, wherein an adhesive layer is provided between the light-sensitive layer and the electrically conductive substrate, wherein said electric charge generating layer is formed from a dispersion of said pigment and said pyrylium compound in a binder resin, wherein said electric charge generating organic pigment is present in an amount of from 0.25 to 10 parts by weight per part by weight of said binder resin, and wherein said pyrylium compound is present in an amount of from 0.001 to 0.5 part by weight per part by weight of said pigment.

5,024,912
5H-DIBENZO(A,D) CYCLOHEPTANYLIDENE DERIVATIVE AND 5H-DIBENZO (A,D) CYCLOHEPTENYLIDENE DERIVATIVE, AND ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER USING THE SAME

Toshie Neishi, Kawasaki; Toshihiro Kikuchi, Yokohama; Takao Takiguchi, Tokyo; Koichi Suzuki, Kawasaki, and Masakazu Matsumoto, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 93,251, Sep. 4, 1987, abandoned. This application May 10, 1989, Ser. No. 351,304

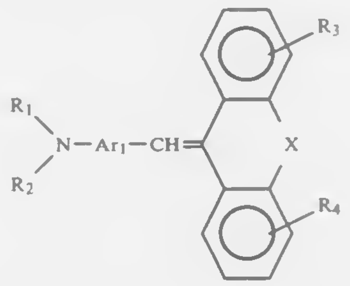
Claims priority, application Japan, Sep. 10, 1986, 61-213320; Aug. 25, 1987, 62-212152

Int. Cl.^{5} G03G *5/06, 5/09;* **C07C** *211/31*

U.S. Cl. 430—59 **13 Claims**

1. An electrophotographic photosensitive member, which comprises photosensitive layer containing a compound represented by the following general formula [1]:

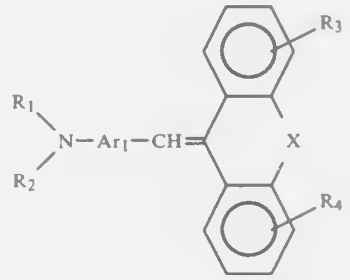
[I]



wherein X is $—CH_2CH_2—$ or $—CH{=}CH—$; R_1 and R_2 are alkyl groups, aralkyl groups, aromatic groups or heterocyclic groups; R_3 and R_4 are hydrogen atoms, alkyl groups, alkoxy groups or halogen atoms; and Ar_1 is an aromatic group or a heterocyclic group.

9. A 5H-dibenzo[a,d]cycloheptanylidene derivative and a 5H-dibenzo[a,d]cycloheptenylidene derivative represented by the following general formula [I]:

[I]



wherein X is $—CH_2—CH_2—$ or $—CH{=}CH—$; R_1 and R_2 are alkyl groups, aralkyl groups, aromatic groups or heterocyclic groups; R_3 and R_4 are hydrogen atoms, alkyl groups, alkoxy groups or halogen atoms; and Ar_1 is an aromatic group or a heterocyclic group.

5,024,913
ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MATERIAL

Takeshi Yoshida, Kawachinagano; Kaname Nakatani, Osaka; Toshiyuki Fukami, Sakai, and Nariaki Tanaka, Kishiwada, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Nov. 27, 1989, Ser. No. 441,263

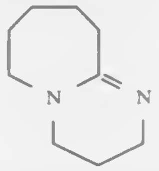
Claims priority, application Japan, Nov. 30, 1988, 63-302657; Nov. 30, 1988, 63-302659

Int. Cl.^{5} G03G *15/04, 5/00*

U.S. Cl. 430—67 **15 Claims**

1. An electrophotographic photosensitive material comprising a photosensitive layer and a surface protective layer containing a thermoset silicone resin, said photosensitive layer and said surface protective layer being laminated in this order on a conductive substrate surface, wherein the silicone resin of the surface protective layer is hardened by a hardening catalyst mainly comprised of a compound of the general formula (I)

(I)



or an acid salt thereof which is selected from the group consisting of: a phenol salt, an octylic acid salt, a ptoluenesulfonic acid salt and a formic acid salt.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,914
RESIN FOR TONER PARTICLE

Ryo Funato, Nagoya; Syuji Takahiro, Kasugai; Keiji Yoshida, Nagoya; Shinji Kubo, Toyohashi, and Motoshi Inagaki, Nagoya, all of Japan, assignors to Mitsubishi Rayon Company Limited, Tokyo, Japan

Filed Oct. 17, 1989, Ser. No. 422,772

Claims priority, application Japan, Oct. 18, 1988, 63-290224

Int. Cl.^{5} G03G *9/087*

U.S. Cl. 430—109 **6 Claims**

1. A toner resin for electrographic processes comprising particulate polymers having a softening temperature of higher than 120° C. and in which lower than 10% by weight of the polymer particles is less than 74 μ.

5,024,915
POSITIVELY CHARGEABLE DEVELOPER

Yukou Sato, Yokohama, and Tsutomu Kukimoto, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

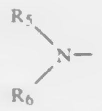
Filed Nov. 16, 1989, Ser. No. 437,207

Claims priority, application Japan, Nov. 17, 1988, 63-290475

Int. Cl.^{5} G03G *9/00, 9/083, 9/107*

U.S. Cl. 430—110 **36 Claims**

1. A developer for developing electrostatic latent images, comprising a toner and a fine silica powder; said fine silica powder being treated with an aminosilane coupling agent having a tertiary amino group represented by the formula:



wherein R_5 and R_6 represent the same or different substituents, provided that the total of the carbon atom number of R_5 and R_6 is not less than 8,

and having an oxidation potential of nOt more than 800 mV.

5,024,916
ORGANOMETAL-CONTAINING POLYMERS AND USE THEREOF IN A PHOTOSENSITIVE COMPOSITION WITH PHOTOACID GENERATORS

Alfred Steinmann, Praroman, Switzerland, assignor to CIBA-GEIGY Corporation, Ardsley, N.Y.

Division of Ser. No. 237,472, Aug. 29, 1988, Pat. No. 4,965,316. This application Sep. 24, 1990, Ser. No. 587,293

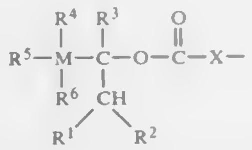
Claims priority, application Switzerland, Sep. 7, 1987, 3426/87

Int. Cl.^{5} G03C *1/76*

U.S. Cl. 430—270 **12 Claims**

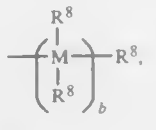
1. A composition comprising (a) a polymer having groupings of the formula I

(I)



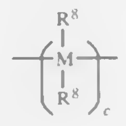
$$R^5-\underset{R^6}{\overset{R^4}{M}}-\underset{\underset{R^1\quad R^2}{CH}}{\overset{R^3}{C}}-O-\overset{O}{\overset{\|}{C}}-X-$$

in which R^1 to R^6 independently of one another are C_1–C_4alkyl, C_1–C_4alkoxy, phenyl, benzyl, phenoxy, a group $—M(R^8)_3$ or



$$-\left(\underset{R^8}{\overset{R^8}{M}}\right)_b-R^8,$$

or R^3 and R^4 together are



$$-\left(\underset{R^8}{\overset{R^8}{M}}\right)_c-$$

and R^1 to R^3 in addition are hydrogen, R^8 is C_1–C_4alkyl, C_1–C_4alkoxy, phenyl, benzyl or phenoxy, M is Si, Ge, Sn, CH_2Si or OSi and X is O, S or NR′, where R′ is hydrogen or a single bond, b is a whole number from 1 to 6 and c is a whole number from 3 to 6, wherein the polymer has an average molecular weight between 1,000 and 1,000,000 and (b) a compound liberating an acid under the influence of radiation.

5,024,917
OPTICAL RECORDING MEDIUM CONTAINING META-POSITION ALUMINIUM-TYPE IR-RAY ABSORPTIVE COMPOUND

Chieko Mihara, Kawaski; Tsuyoshi Santoh, Yokohama, and Hiroyuki Sugata, Yamato, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 22, 1989, Ser. No. 440,073

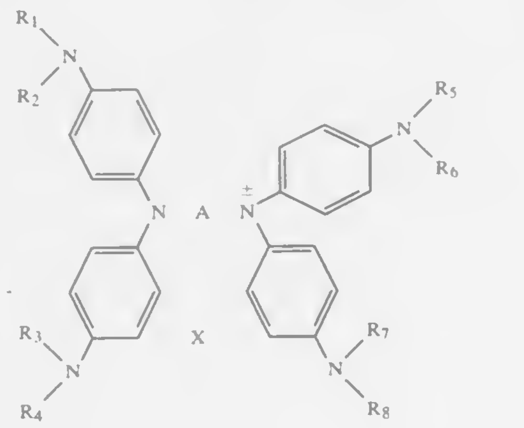
Claims priority, application Japan, Nov. 28, 1988, 63-298373

Int. Cl.^{5} G03C *1/00;* **B32B** *3/02;* **G11B** *11/03*

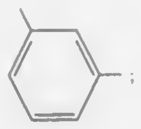
U.S. Cl. 430—271 **6 Claims**

1. An optical recording medium comprising a recording layer containing an IR-ray absorptive compound represented by formula (I):

(I)



wherein A is



R_1 to R_8 are hydrogen, halogen, or a univalent organic radical, or at least one of the combinations of the atomic groups of R_1 and R_2, R_3 and R_4, R_5 and R_6, and R_7 and R_8 forms together with the nitrogen a substituted or unsubstituted five-, six- or seven-membered heterocycle; R_1 to R_8 being the same or different, and the combinations of R_1 and R_2, R_3 and R_4, R_5 and R_6, and R_7 and R_8 being the same or different; and X^- is an anion.

5,024,918
HEAT ACTIVATED DRY DEVELOPMENT OF PHOTORESIST BY MEANS OF ACTIVE OXYGEN ATMOSPHERE

Vernon R. Porter, Plano, and Thomas C. Penn, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 23, 1976, Ser. No. 754,041

Int. Cl.^{5} G03C *5/24*

U.S. Cl. 430—269 **30 Claims**

1. In the fabrication of an electronic structure, wherein a layer of photoresist material is disposed on a substrate surface of different material, a method of forming a dry developed pattern in said layer of photoresist material, said method comprising:

selecting a photoresist material of a character subject to a chemical or physical change rendering the photoresist material resistant to heat volatilization in response to the exposure of the photoresist material to an energy source,

depositing a layer of said photoresist material on a substrate surface of different material,

selectively exposing said layer of photoresist material to an energy source for providing exposed and unexposed regions on the photoresist material defining a latent image,

subjecting the layer of photoresist material to a heat treatment,

partially volatizing the unexposed regions of the photoresist material to provide regions of reduced thickness relative to the exposed regions of the photoresist material in response to the heat treatment,

exposing said layer of photoresist material to a reactive gaseous atmosphere wherein the reactive character of the gaseous atmosphere is derived essentially from a gaseous reactive oxygen species of the group consisting of monatomic oxygen, ozone and mixtures thereof under conditions adapted for differentially reacting said gaseous reactive oxygen species with the exposed and unexposed regions of said layer of photoresist material,

selectively removing photoresist material from said layer thereof at respectively different rates of removal with the unexposed regions of reduced thickness of said layer of photoresist material having the greater rate of removal from said layer by the differential reaction of the gaseous reactive oxygen species therewith, and discontinuing the selective removal of photoresist material from said layer thereof when only the regions of reduced thickness of said layer of photoresist material have been completely removed down to the substrate surface by ceasing exposure of said layer of photoresist material to the gaseous reactive oxygen species, thereby dry developing the latent image defined in the photoresist material to produce a pattern in said layer of photoresist material.

5,024,919
PROCESS FOR FORMING FINE PATTERN IN SEMICONDUCTOR DEVICE

Takahiro Yamauchi, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Nov. 15, 1988, Ser. No. 271,301

Claims priority, application Japan, Nov. 16, 1987, 62-287288

Int. Cl.^{5} G03F *9/00*

U.S. Cl. 430—312 **6 Claims**

1. A process for forming a fine pattern in a semiconductor device, comprising the steps of:

(a) forming on an underlying layer an underlayer resist photosensitive to deep ultraviolet light, said underlayer resist being made of chloromethylated polystyrene and which is developed with a mixed solvent of isoamyl acetate and ethyl cellosolve acetate in the step of developing said underlayer resist;

(b) forming an interlayer as a barrier or isolation layer on said underlayer resist;

(c) forming on said interlayer an upper layer polymeric film comprising a material so photoresistive to ultraviolet light as to be rendered opaque to deep ultraviolet light upon exposure thereof to ultraviolet light to form a laminated structure;

(d) exposing said laminated structure through a mask to ultraviolet light to form in said upperlayer polymeric film an area transparent to deep ultraviolet light and an area opaque to deep ultraviolet light;

(e) subjecting said exposed laminated structure to blanket exposure to deep ultraviolet light;

(f) removing said upperlayer polymeric film;

(g) removing said interlayer; and

(h) developing said underlayer resist.

5,024,920
PROCESS FOR FORMING A PATTERN USING A PHOTOSENSITIVE AZIDE AND A HIGH-MOLECULAR WEIGHT COPOLYMER OR POLYMER

Hajime Morishita, Tokyo; Nobuaki Hayashi, Saitama; Saburo Nonogaki, Tokyo; Michiaki Hashimoto, Sayama; Masato Ito, Kokubunji; Masahiro Nishizawa; Kiyoshi Miura, both of Mobara, and Yoshiyuki Odaka, Chiba, all of Japan, assignors to Hitachi, Ltd., Japan

Filed May 23, 1989, Ser. No. 355,635

Claims priority, application Japan, May 31, 1988, 63-134177

Int. Cl.^{5} G03C *5/00, 16/95;* **G03F** *7/012*

U.S. Cl. 430—325 **1 Claim**

1. A process for forming a pattern which comprises the steps of:

forming, on a surface on which to form a desired pattern, a coating of a photosensitive composition comprising a copolymer containing at least a water-soluble nonphotosensitive monomer unit having an electrolytic functional group and another monomer unit having an azido group and an electrolytic functional group, and a water-soluble high molecular copolymer or polymer which reacts with said copolymer and exhibits reciprocity law failure characteristic and having an electrolytic functional group,

exposing the coating of the photosensitive composition according to a desired pattern under the conditions that oxygen is present, and

developing the coating to form the pattern of areas which are substantially smaller than irradiated areas.

5,024,921
THERMALLY STABLE LIGHT-SENSITIVE COMPOSITIONS WITH O-QUINONE DIAZIDE AND PHENOLIC RESIN USED IN A METHOD OF FORMING A POSITIVE PHOTORESIST IMAGE

Andrew J. Blakeney, Seekonk, Mass.; Alfred T. Jeffries, III, and Thomas R. Sarubbi, both of Providence, R.I., assignors to OCG Microelectronic Materials, Inc., Cheshire, Conn.

Division of Ser. No. 325,399, Mar. 20, 1989, Pat. No. 4,970,287, which is a division of Ser. No. 124,227, Nov. 23, 1987, Pat. No. 4,837,121. This application Sep. 21, 1990, Ser. No. 552,394

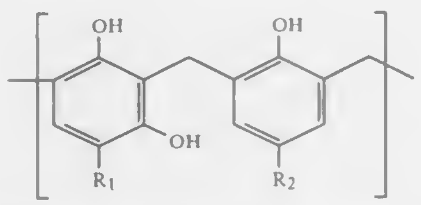
Int. Cl.^{5} G03C *5/18, 1/60, 1/54*

U.S. Cl. 430—326 **3 Claims**

1. The process of developing an image-wise exposed photoresist-coated substrate comprising:

(1) coating said substrate with a light-sensitive composition useful as a positive working photoresist, said composition comprising an admixture of o-quinonediazide compound and a binder resin comprising at least about 40% by weight of units of the formula (I):

VOL
1127
ISS
3
JE
18
1991
UMI



(I)

wherein R_1 is a halogen atom and R_2 is a lower alkyl group having 1 to 4 carbon atoms, the amount of said o-quinonediazide compound being about 5% to about 30% by weight and the amount of said binder resin being about 60% to 95% by weight, based on the total solid content of said photosensitive composition;

(2) subjecting said coating on said substrate to an image-wise exposure of radiant light energy; and

(3) subjecting said image-wise exposed coated substrate to a developing solution wherein the exposed areas of said light-exposed coating are dissolved and removed from the substrate, thereby resulting in positive image-wise pattern in the coating.

5,024,922

POSITIVE WORKING POLYAMIC ACID/IMIDE AND DIAZOQUINONE PHOTORESIST WITH HIGH TEMPERATURE PRE-BAKE

Mary G. Moss, Rte. 6, Box 455; Terry Brewer, Rte. 2, Box 297; Ruth M. Cuzmar, 1301 Powell, all of Rolla, Mo. 65401; Dan W. Hawley, 607 E. Springfield, St. James, Mo. 65401, and Tony D. Flaim, Rte. 3, Box 3257, St. James, Mo. 65559

Filed Nov. 7, 1988, Ser. No. 268,023

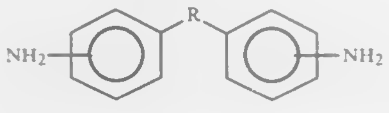
Int. Cl.⁵ G03F *7/023, 7/38*

U.S. Cl. 430—330 **9 Claims**

1. A method for making an improved positive-working polyamic acid/imide photoresist composition having improved dielectric properties comprising:

a. admixing,

(i) the condensation product of an aromatic dianhydride and an aromatic di-primary amine having from about 10 to about 50 mole percent of the di-primary amine having the formula:



wherein R, contains 1 or more phenyl rings connected by oxygen, SO_2, alkyl, fluoroalkyl, or biphenyl linkages and

(ii) diazoquinone photoactive sensitizer of the type "whose photosensitivity" normally degrades at temperatures above about 110° C., and

b. applying the mixture of sub-paragraph (a), as a thin film onto a microelectronic substrate;

c. pre-baking the composition at from about 130° C. to about 150° C.;

d. exposing the pre-baked composition to light through a mask image, and developing the light-exposed composition to obtain a positive image of high resolution.

5,024,923

INFRARED ABSORBENT COMPOSITIONS

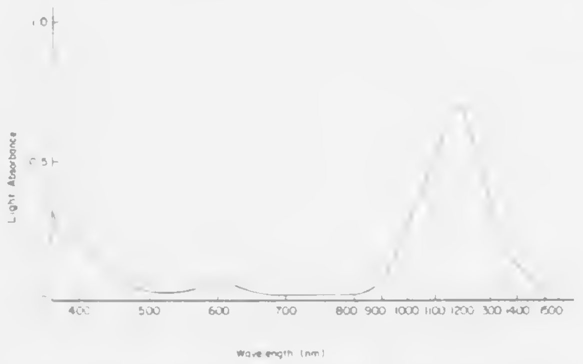
Yoshiaki Suzuki, and Gouichi Hayashi, both of Minamiashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 9, 1988, Ser. No. 242,691

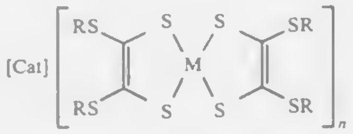
Claims priority, application Japan, Sep. 9, 1987, 62-226133; Sep. 19, 1987, 62-234103

Int. Cl.⁵ G02B *5/20;* **F21V** *9/04*

U.S. Cl. 430—372 **24 Claims**



1. An infrared absorbent composition comprising the metal complex compound represented by formula (I):



(1)

wherein represents a cation necessary for neutralizing the complex; n represents 1 or 2; M represents Cu, Co, Ni, Pd, or Pt; and R represents a substituted or an unsubstituted alkyl group, a substituted or an unsubstituted aryl group, or a substituted or an unsubstituted heterocyclic group; and two R's in the same ligand may combine with each other to form a ring, and a high molecular weight binder therefor.

5,024,924

METHOD FOR PROCESSING SILVER HALIDE COLOR PHOTOGRAPHIC MATERIALS

Hideaki Naruse; Osamu Takahashi; Nobutaka Ohki, and Micbio Ono, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

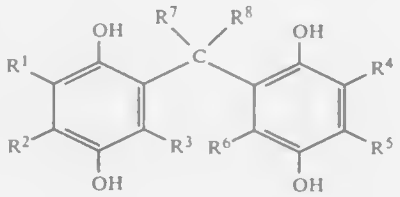
Filed Oct. 27, 1989, Ser. No. 427,381

Claims priority, application Japan, Oct. 28, 1988, 63-272131

Int. Cl.⁵ G03C *7/00*

U.S. Cl. 430—376 **3 Claims**

1. A method for continuously processing a silver halide color photographic material comprising a support having thereon at least one silver halide emulsion layer with a color developing bath which contains at least one primary aromatic amine color developing agent, wherein (1) at least one compound represented by formula (II) is present in said silver halide emulsion layer in an amount of from 3 to 10 mol % per mol of coupler in the layer in which the compound is added and (2) said silver halide emulsion layer contains silver chlorobromide or silver chloride having a silver iodide content of not more than 0.2 mol %, and said silver halide color photographic material is processed with said color developing bath where the replenishment rate is from 20 ml to 120 ml per square meter of the silver halide color photographic material processed:



(II)

wherein R^1, R^2, R^3, R^4, R^5 and R^6, which may be the same or different each represents a hydrogen atom, a halogen atom, a sulfo group, a carboxyl group, a cyano group, an alkyl group, an aryl group, an acyl group, an amino group, a sulfonamide group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an acyl group, an acyloxy group, a carbamoyl group, an alkoxy-carbonyl group or a sulfamoyl group, and R^1 and R^2, and R^4 and R^5, may together form a carbocyclic ring or a heterocycle ring; R^7 represents a hydrogen atom and R^8 represents a methyl group, an ethyl group or an n-propyl group.

5,024,925

METHOD OF FORMING COLOR IMAGE FROM A COLOR REVERSAL PHOTOGRAPHIC MATERIAL COMPRISING A SPECIFIED IODIDE CONTENT AND SPECTRAL DISTRIBUTION

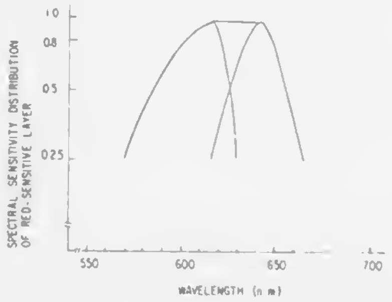
Naoyasu Deguchi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 21, 1989, Ser. No. 383,393

Claims priority, application Japan, Jul. 21, 1988, 63-182671

Int. Cl.⁵ G03C *7/16, 1/46*

U.S. Cl. 430—379 **12 Claims**



1. A method of forming a color image which comprises subjecting a silver halide color reversal photographic material to imagewise exposure and then to color reversal processing, said color reversal processing comprising a black-and-white development as a first development followed by a reversal and a color development, said color reversal photographic material comprising a support having provided thereon at least one cyan coupler-containing red-sensitive silver halide emulsion layer, at least one magenta coupler-containing green-sensitive silver halide emulsion layer and at least one yellow coupler-containing blue-sensitive silver halide emulsion layer with the light-sensitive silver halide emulsions in said photographic material having an average silver iodide content of up to 5 mol %, a wavelength corresponding to the peak of spectral sensitivity distribution of said red-sensitive emulsion layer is in a range between 615 nm and 640 nm, a wavelength in shorter wavelength side of the spectral sensitivity distribution at which the sensitivity is 80% of the peak is in the range between 600 and 633 nm, a wavelength at which the sensitivity is 50% of the peak is in a range between 585 and 625 nm, a wavelength at which the sensitivity is 25% of the peak is in a range between 570 and 615 nm, a wavelength in longer wavelength side of the spectral sensitivity distribution at which the sensitivity is 80% of the peak is in a range between 620 and 648 nm, a wavelength at which the sensitivity is 50% of the peak is in a range between 625 and 655 nm, a wavelength at which the sensitivity is 25% of the peak is in a range between 630 and 665 nm, and the wavelength difference between the wavelength on the longer wavelength side at which the sensitivity is 25% of the peak and that on the shorter wavelength side at which the sensitivity is 25% of the peak is in a range of 90 to 30 nm, and the light-sensitive emulsion layers and/or a substantially light-insensitive hydrophilic colloidal layer has a means for providing interimage effect.

5,024,926

ALKYLPHTHALOCYANINE NEAR-INFRARED ABSORBERS AND RECORDING/DISPLAY MATERIALS USING THE SAME

Hisato Itoh, Yokohama; Katashi Enomoto, Zushi; Takahisa Oguchi, and Tsutomu Nishizawa, both of Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo and Yamamoto Chemicals, Incorporated, Yao, both of Japan

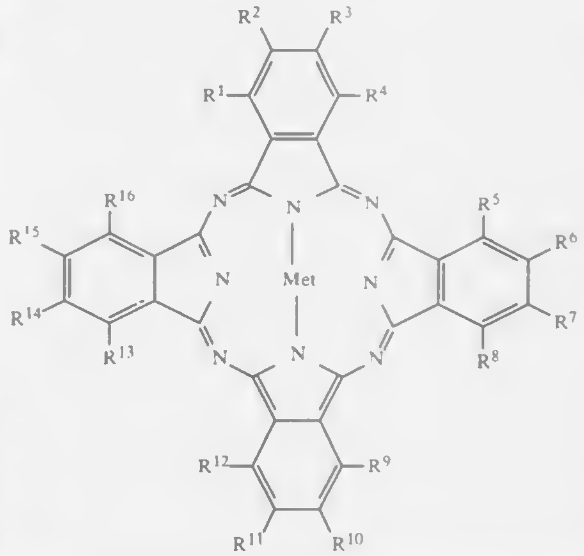
Continuation of Ser. No. 331,736, Apr. 3, 1989, abandoned. This application Oct. 1, 1990, Ser. No. 593,255

Claims priority, application Japan, Apr. 1, 1988, 63-78049; Jun. 2, 1988, 63-134446

Int. Cl.⁵ G03C *1/00;* C09B *47/04;* G11B *7/24*

U.S. Cl. 430—495 **8 Claims**

1. A near-infrared absorber comprising a phthalocyanine derivative of the formula (I)



(I)

wherein R^1, R^4, R^5, R^8, R^9, R^{12}, R^{13} and R^{16} independently are alkyl, arylmethyl, alkoxymethyl, alkylthiomethyl, alkylaminomethyl, dialkylaminomethyl, aryloxymethyl, arylthiomethyl, arylaminomethyl, diarylaminomethyl or alkylarylaminomethyl, wherein the total number of carbon, oxygen, nitrogen and sulfur atoms present in each of R^1, R^4, R^5, R^8, R^9, R^{12}, R^{13} and R^{16} is in the range of 5 to 12; R^2, R^3, R^6, R^7, R^{10}, R^{11}, R^{14} and R^{15} independently are hydrogen, alkyl, arylmethyl, alkoxymethyl, alkylthiomethyl, alkylaminomethyl, dialkylaminomethyl, aryloxymethyl, arylthiomethyl, arylaminomethyl, diarylaminomethyl, alkylarylaminomethyl, alkylthio, arylthio, alkoxy, aryloxy or aryl, but none of R^2, R^3, R^6, R^7, R^{10}, R^{11}, R^{14} and R^{15} is hydrogen when all of R^1, R^4, R^5, R^8, R^9, R^{12}, R^{13} and R^{16} are all either aryloxymethyl or arylthiomethyl; and Met is two hydrogen atoms, a divalent metal atom, a monosubstituted trivalent metal atom, a disubstituted tetravalent metal atom or an oxymetal group.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,927

INFORMATION RECORDING MEDIUM

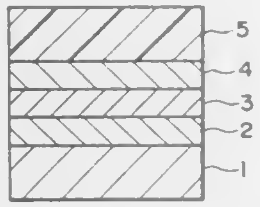
Katsuyuki Yamada, Yokohama; Yukio Ide, Mishima; Makoto Harigaya, Hiratsuka, and Hiroko Iwasaki, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 4, 1989, Ser. No. 417,541

Claims priority, application Japan, Oct. 6, 1988, 63-252764; Nov. 18, 1988, 63-290177; Mar. 10, 1989, 1-056188; Mar. 29, 1989, 1-074973; Mar. 29, 1989, 1-077838; May 16, 1989, 1-122039; Aug. 28, 1989, 1-218650

Int. Cl.^{5} G03C *1/00;* G11B *7/24*

U.S. Cl. 430—495 3 Claims



1. An information recording medium capable of recording information reversibly with application of electromagnetic waves with different powers or wavelengths, comprising a substrate, and a recording layer formed thereon which comprises (a) a carbon-based material and (b) an optically reversible material whose optical characteristics can be reversibly changed, with the thermal decomposition temperature of said carbon-based material being higher than the melting point of said optically reversible material, wherein said carbon-based material is a polymer prepared by subjecting a pigment to plasma polymerization.

5,024,928

SILVER HALIDE MULTILAYER COLOR REVERSAL PHOTOGRAPHIC MATERIAL HAVING IMPROVED COLOR REPRODUCIBILITY

Marco Loiacono, Albissola Superiore, and Giuseppe Loviglio, Savona, both of Italy, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

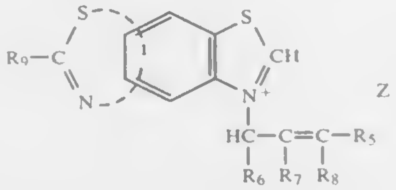
Filed Jul. 17, 1989, Ser. No. 381,098

Claims priority, application Italy, Jul. 19, 1988, 21411 A/88

Int. Cl.^{5} G03C *1/46*

U.S. Cl. 430—504 **7 Claims**

1. A silver halide color reversal multilayer photographic material comprising a support base having thereon a yellow dye image-forming unit containing at least one blue-sensitive silver halide emulsion layer associated with a yellow dye-forming coupler, a magenta dye image-forming unit containing at least one green-sensitive silver halide emulsion layer associated with a magenta dye-forming coupler and a cyan dye image-forming unit containing at least one red-sensitive silver halide emulsion layer associated with a cyan dye-forming coupler, characterized in that said at least one blue-sensitive silver halide emulsion layer comprises a monomethine cyanine spectral sensitizing dye and a thiazole quaternary salt compound having attached to a quaternary nitrogen atom thereof an alkenyl group having a double bond in β-position, said salt compound improving the color reproducibility of the yellow dye and said thiazole quaternary salt compound is represented by the general formula (IV)



wherein R_5, R_6, R_7, R_8 and R_9 each represents a hydrogen atom or a lower alkyl group and Z is an anion.

5,024,929

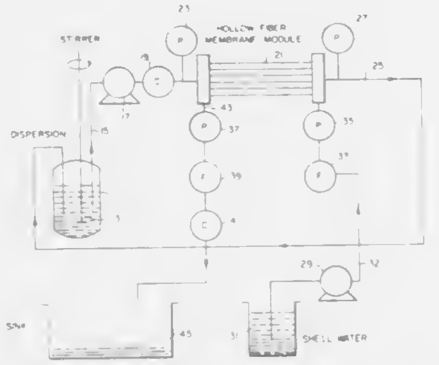
METHOD OF PREPARING COUPLER DISPERSIONS FOR PHOTOGRAPHIC USE

Edgar P. Lougheed, Byron; Carl B. Richenberg, Batavia, and Stephen P. Chen, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 30, 1990, Ser. No. 516,955

Int. Cl.^{5} G03C *7/32*

U.S. Cl. 430—546 9 Claims



1. A method of preparing a coupler dispersion in gelatin which comprises milling a coupler, a coupler solvent and an auxiliary coupler solvent with an aqueous gelatin solution to form a discontinuous organic phase of submicron droplets containing the coupler, coupler solvent and auxiliary coupler solvent in a continuous aqueous phase of gelatin in water, separating the auxiliary coupler solvent from the organic phase by passing the dispersion containing the auxiliary coupler solvent over one surface of a hydrophilic membrane having an average pore size of less than 175 angstroms while passing water over the other surface of the membrane, said separation step being conducted at a temperature above the point of incipient gelation and for a time sufficient to reduce the concentration of the auxiliary coupler solvent in the dispersion to a concentration less than 1 weight percent.

5,024,930

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A NOVEL PHOTOGRAPHIC COUPLER

Hiroshi Kita, Hachioji; Hajime Wada, Tokyo, and Yutaka Kaneko, Sagamihara, all of Japan, assignors to Konica Corporation, Tokyo, Japan

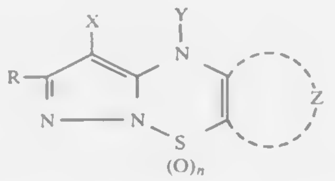
Filed May 16, 1990, Ser. No. 523,876

Claims priority, application Japan, May 18, 1989, 1-125052

Int. Cl.^{5} G03C *7/38*

U.S. Cl. 430—558 **9 Claims**

1. A silver halide light-sensitive photographic material comprising a support and provided thereon photographic component layers including a silver halide light-sensitive emulsion layer containing a compound represented by the following Formula I:



wherein R represents a hydrogen atom or a substituent; X and Y represent independently a hydrogen atom or a group capable of splitting off upon a reaction with an oxidation product of a developing agent; Z represents a nonmetallic group of atoms necessary to form a benzene ring, a naphthalene ring or a 5 to 7-membered heterocyclic ring; and n represents an integer of 1 or 2.

5,024,931

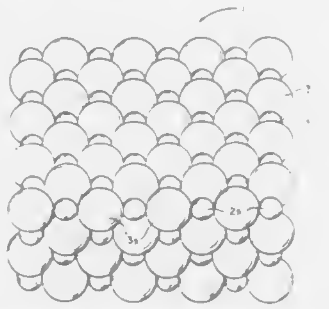
PHOTOGRAPHIC EMULSIONS SENSITIZED BY THE INTRODUCTION OF OLIGOMERS

Francis J. Evans, Rochester; Ralph W. Jones, Jr., Hilton, and Robert D. Wilson, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 5, 1990, Ser. No. 461,504

Int. Cl.^{5} G03C *1/035*

U.S. Cl. 430—567 20 Claims



1. A photographic silver halide emulsion comprised of radiation sensitive silver halide grains exhibiting a face centered cubic crystal lattice structure containing, on average, at least one pair of metal ions chosen from group VIII, periods 5 and 6, at adjacent cation sites of the crystal lattice.

5,024,932

LIGHT-SENSITIVE SILVER HALIDE PHOTOGRAPHIC MATERIAL

Masaki Tanji, and Toyoki Nishijima, both of Odawara, Japan, assignors to Konica Corporation, Tokyo, Japan

Continuation of Ser. No. 259,535, Oct. 18, 1988, abandoned. This application Feb. 26, 1990, Ser. No. 489,748

Claims priority, application Japan, Nov. 6, 1987, 62-281822

Int. Cl.^{5} G03C *1/02, 1/30*

U.S. Cl. 430—567 13 Claims

1. A light-sensitive silver halide photographic material comprising a support and provided thereon photographic component layers including at least one light-sensitive silver halide emulsion layer containing sillver halide grains having a silver chloride content of not less than 90 mole % and having been subjected to gold sensitization, said photographic component layer containing a gelatin of which isoelectric point being 4.0 to 5.0 and the film pH of said photographic component layer being not more than 6.0.

5,024,933

METHOD AND KIT FOR SAMPLE ADHERENCE TO TEST SUBSTRATE

Huey-Lang Yang, Tenafly, N.J.; John Todd, Mundelein, Ill., and Huey-Ling L. Jou, Harrison, N.J., assignors to Enzo Biochem, Inc., New York, N.Y.

Filed May 10, 1988, Ser. No. 192,256

Int. Cl.^{5} C12Q *1/68;* G01N *1/00, 1/28*

U.S. Cl. 435—6 **32 Claims**

1. A method of treating a sample suspected of containing a target polynucleotide so as to adhere the sample to a substrate under conditions suitable for nucleic acid hybridization, which method comprises:

(a) depositing onto said substrate an adhesive composition which comprises an isolate of a naturally occurring mussel adhesive protein;

(b) adhering said sample onto at least a portion of the substrate to which said adhesive composition has been deposited; and

(c) treating said adhered sample so as to prepare said sample for nucleic acid hybridization.

5,024,934

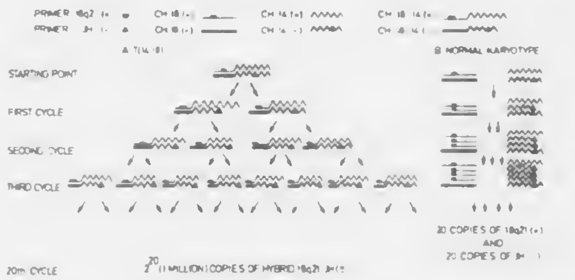
DETECTION OF MINIMAL NUMBERS OF NEOPLASTIC CELLS CARRYING DNA TRANSLOCATIONS BY DNA SEQUENCE AMPLIFICATION

Ming-Sheng Lee, Houston, Tex., assignor to The Board of Regents, The University of Texas System, Austin, Tex.

Filed Mar. 14, 1988, Ser. No. 167,585

Int. Cl.^{5} C12Q *1/68;* C07H *15/12;* C12N *15/00*

U.S. Cl. 435—6 26 Claims



1. A method for detecting neoplastic cells in an individual, said neoplastic cells being characterized by a t(14;18) chromosomal translocation related to a specific breakpoint clustering region, the method comprising the steps of:

incubating a mixture comprising deoxyribonucleotide triphosphates, DNA from a cell sample of the individual, DNA polymerase, a first oligonucleotide primer and a second oligonucleotide primer, consisting essentially of base sequence 5′-TTTGACCTTTAG-3′ or an oligonucleotide competing with said first primer for hybridizing to at least a portion of (−)-strand DNA of chromosome 18q21 immediately 5′ to a molecular breakpoint hot spot region located in exon 3 and said second primer consisting essentially of base sequence 3′-CAGAGGAGTCCA-5= or an oligonucleotide competing with said second primer for hybridizing to a sequence 3′ to an end of segment J_H of chromosome 14 immunoglobulin heavy chain gene wherein is located a breakpoint clustering region, said incubating promoting annealing of the primers to the translocation crossover site and synthesis of coding or non-coding translocation DNA sequences and a substantial portion of flanking DNA sequences, the incubation then being terminated by DNA denaturation;

repeating said incubation step without adding further cell sample in a cyclic manner to facilitate duplication of the original and newly synthesized translocated and substantial flanking DNA sequences, said repeating being carried out in a manner exponentially amplifying DNA sequences between and including DNA regions complementary to the first and second oligonucleotide primers; and

analyzing the exponentially amplified DNA for oligonucleotide sequences characterizing the translocation region by separating the exponentially amplified DNA and hybridizing the amplified DNA with the first and second primers and identifying neoplastic cells by the presence of said sequences.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,935
DYE-PROVIDING COMPOSITION, DIAGNOSTIC TEST KIT AND THEIR USE IN METHOD FOR LIGAND DETERMINATION USING PEROXIDASE LABELED-RECEPTOR

Gregory J. McClune, and John F. Bishop, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 18, 1987, Ser. No. 136,166

Int. Cl.^{5} G01N *33/53, 33/536;* **C12Q** *1/28;* **C12N** *9/96*

U.S. Cl. 435—7.1 **21 Claims**

1. An aqueous dye-providing composition comprising a water-soluble or -dispersible polymer, an electron transfer agent, and an imidazole leuco dye which provides a dye in the presence of hydrogen peroxide and a peroxidative substance,
   the weight ratio of polymer to leuco dye being from about 10,000:1 to about 100:1,
   said polymer selected from the group consisting of vinylpyrrolidone polymers, acrylamide polymers, acrylic and methacrylic acid polymers, polyethylene glycols and polyamines.

5,024,936
ASSESSING FETAL LUNG MATURITY

James Macri, 170 Sidney St., Oyster Bay, N.Y. 11771

Filed Sep. 26, 1988, Ser. No. 249,326

Int. Cl.^{5} C12Q *1/28*

U.S. Cl. 435—28 **4 Claims**

1. A method for the determination of whether the lungs of a fetus are mature by testing for the presence of phosphatidyl glycerol in amniotic fluid comprising the steps of:
   obtaining a sample of the amniotic fluid surrounding the fetus;
   adding phospholipase C to the sample to create a first mixture and to convert phosphatidyl glycerol to glycerol phosphate;
   adding glycerol-3-phosphate oxidase to the first mixture to create a second mixture and to convert the glycerol phosphate to dihydroxyacetone phosphate and hydrogen peroxide;
   adding a substrate that will react with the dihydroxyacetone phosphate and a peroxidase in a visibly detectable reaction to the second mixture to create a third mixture and to react the substrate with the dihydroxyacetone phosphate;
   passing the third mixture through a membrane having peroxidase bound thereto to create a visibly detectable spot on the membrane through the reaction of the peroxidase, the dihydroxyacetone phosphate, the hydrogen peroxide and the substrate; and,
   detecting the presence or absence of the visibly detectable spot on the membrane, the presence of the visibly detectable spot indicating that the fetal lungs are mature and the absence of the visibly detectable spot indicating that the fetal lungs are not mature.

5,024,937
METHOD FOR PROCESSING AQUEOUS FERMENTATION BROTHS

Amy M. Penticoff, and John D. Lyon, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Apr. 6, 1989, Ser. No. 333,677

Int. Cl.^{5} C12N *1/00, 1/34;* **C12R** *1/865*

U.S. Cl. 435—41 **6 Claims**

1. In a method for processing aqueous fermentation broths in a bioreactor vessel, in which a foam inhibitor is added to the fermentation broth in the bioreactor vessel in order to prevent the accumulation and buildup of foam in the bioreactor vessel caused by oxygen sparging of the fermentation broth contained therein, and in which the aqueous fermentation broth processed in the bioreactor vessel is conveyed as a feed solution to an ultrafiltration system including a membrane for concentrating the aqueous fermentation broth, the ultrafiltration system being located downstream of the bioreactor vessel, the improvement comprising reducing the amount of fouling of the membrane in the ultrafiltration system by adding to the aqueous fermentation broth in the bioreactor vessel as the foam inhibitor, an antifoam which is an oil based liquid in the form of droplets, the droplets of the oil based liquid antifoam being dispersed, encased, entrapped, and imbedded, within solid particles of a water soluble encapsulating material.

5,024,938
RECOMBINANT DNA INSERTED WITH HEPATITIS B VIRUS GENE, MAMMALIAN CELLS TRANSFORMED WITH CLONED VIRAL DNA, AND PRODUCTION OF HEPATITIS B VIRUS PROTEINS

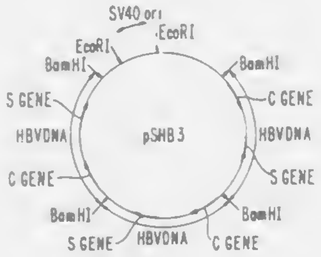
Chikateru Nozaki, Kumamoto; Atsushi Miyanohara, Neyagawa; Fukusaburo Hamada; Nobuya Ohtomo, both of Kumamoto, and Kenichi Matsubara, Osaka, all of Japan, assignors to Juridical Foundation The Chemo-Sero-Therapeutic Research Institute, Kumamoto, Japan

Continuation-in-part of Ser. No. 522,667, Aug. 12, 1983. This application Jul. 8, 1986, Ser. No. 883,138

Claims priority, application Japan, Aug. 20, 1982, 57-145092

Int. Cl.^{5} C12P *21/00*

U.S. Cl. 435—68.1 **8 Claims**



1. A recombinant DNA capable of replication in mammalian cells, which comprises
   3 fragments of Hepatitis B virus subtype adr (HBV) DNA recombined with a vector,
   said vector comprising essentially of 0.31 Kb replication origin SV40 DNA inserted into the EcoRI cleavage site of *Escherichia coli* plasmid pBR322, wherein said plasmid is deficient in the 1.426–2.521 Kb region of inhibiting replication in mammalian cells and has an antibiotic resistant gene as a selective marker,
   wherein each of said HBV DNA fragments is comprised of a 3.2 Kb DNA having the BamHI site at both terminal ends, said BamHI DNA consisting of a 1.9 Kb HBc gene and a 1.3 Kb HBs gene, wherein said HBV DNA fragments are arranged in a head-to-tail tandem relationship wherein the HBc gene positions at the head and the HBs gene positions at the tail.

5,024,939
TRANSIENT EXPRESSION SYSTEM FOR PRODUCING RECOMBINANT PROTEIN

Cornelia M. Gorman, San Francisco, Calif., assignor to Genentech, Inc., South San Francisco, Calif.

Continuation-in-part of Ser. No. 71,674, Jul. 9, 1987, abandoned, which is a continuation-in-part of Ser. No. 907,185, Sep. 12, 1986, abandoned. This application Sep. 25, 1987, Ser. No. 101,712

Int. Cl.^{5} C12N *15/67*

U.S. Cl. 435—69.1 **27 Claims**

1. A method for the enhanced transient expression of a desired protein in a host kidney cell comprising:
   a) providing a host kidney cell which expresses an adenovirus trans-activating protein;
   b) transfecting said host kidney cell with a vector comprising DNA encoding the desired protein under the control of a cytomegalovirus promoter; and,
   c) culturing said host kidney cell for a period comprising 1 to 14 days under conditions favorable for transient production of the desired protein.

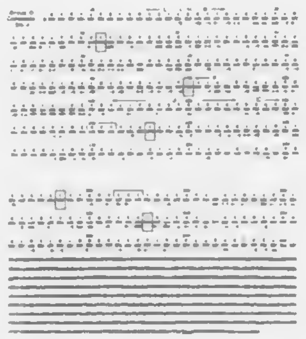
5,024,940
NUCLEIC ACIDS ENCODING THE DELTA CHAIN OF THE T CELL ANTIGEN RECEPTOR

Michael B. Brenner, Ashland; Jack L. Strominger, Lexington; Jonathan Seidman, Milton; Stephen H. Ip, Framingham, and Michael S. Krangel., Newtonville, all of Mass., assignors to T Cell Sciences, Inc., Cambridge; Dana-Farber Cancer Institute, Boston and President & Fellows of Harvard College, Cambridge, all of Mass.

Continuation-in-part of Ser. No. 16,252, Feb. 19, 1987, which is a continuation-in-part of Ser. No. 882,100, Jul. 3, 1986, abandoned. This application Oct. 29, 1987, Ser. No. 115,256

Int. Cl.^{5} C12N *15/12*

U.S. Cl. 435—69.1 **47 Claims**



1. A substantially pure nucleotide sequence comprising the nucleotide sequence substantially as shown in FIG. 15 designated "Group O Composite," encoding a delta chain of a T cell antigen receptor polypeptide.

5,024,941
EXPRESSION AND SECRETION VECTOR FOR YEAST CONTAINING A GLUCOAMYLASE SIGNAL SEQUENCE

Gregory T. Maine, Watertown; Robert S. Daves, Reading, and Robert R. Yocum, Arlington, all of Mass., assignors to BioTechnica International, Inc., Cambridge, Mass.

Filed Dec. 18, 1985, Ser. No. 810,423

Int. Cl.^{5} C12P *21/00;* **C12N** *15/00, 5/03*

U.S. Cl. 435—69.9 **10 Claims**

1. A vector comprising
   a DNA sequence encoding a secretory signal sequence of a DEX4 glucoamylase gene from *Saccharomyces diastaticus* or *S. cerevisiae;*
   upstream from said signal-encoding sequence, a DNA sequence capable of promoting transcription in yeast, transcription of said signal-encoding sequence being under the control of said transcription-promoting sequence; and
   downstream from said signal-encoding sequence, a site for the insertion into said vector of a heterologous DNA sequence, encoding a secretable protein in reading frame with said signal-encoding sequence.

5,024,942
BIOCHEMICAL PROCESS FOR REACTING HYDROPHOBIC AND HYDROPHILIC SUBSTRATES AND APPARATUS THEREFOR

Shoichi Shimizu, and Tsuneo Yamane, both of Aichi, Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

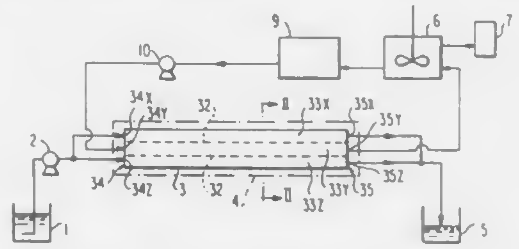
Filed Feb. 17, 1984, Ser. No. 581,018

Claims priority, application Japan, Feb. 21, 1983, 58-28325

Int. Cl.^{5} C12P *7/64, 7/62;* **C12M** *1/40*

U.S. Cl. 435—134 **8 Claims**

1. A biochemical process comprising reacting a (a) hydrophobic substrate with (b) a solution or dispersion comprising a hydrophilic substrate and an enzyme catalyst, wherein said reacting is carried out by contacting said hydrophilic substrate and said hydrophobic substrate, which are separated by a porous thin membrane and do not intermingle, through the micropores of said porous thin membrane, wherein said porous thin membrane has a pore size of about 0.05 to 10 μm and a thickness of about 10 to 100 μm, and wherein said hydrophilic substrate and said hydrophobic substrate are incompatible with each other.



5,024,943
REGULATORY REGION CLONING AND ANALYSIS PLASMID FOR BACILLUS

Jan H. Van Ee, Nieuwerkerk a/d Ijssel, Netherlands, assignor to Gist-brocades, Delft, Netherlands

Filed Nov. 4, 1986, Ser. No. 927,249

Claims priority, application Netherlands, Nov. 7, 1985, 8503074

Int. Cl.^{5} C12N *15/00, 1/20*

U.S. Cl. 435—172.3 **18 Claims**

1. A plasmid capable of replication in Bacillus useful for evaluating regulatory or signal sequences for expression of a hybrid gene, said plasmid comprising:
   a domain comprising at least one unique restriction site and as elements for substitution, in the direction of transcription,
   (1) a promoter region functional in Bacillus selected from the group consisting of:
      (i) the *B. licheniformis* promoter sequence from pROM-3-4C,
      (ii) the bacteriophage promoter of pROM SP02,
      (iii) the −10 or −35 region of a synthetic promoter comprising at least a portion of the sequence

```
AATTCTTGACAAAGCTTCTC
     GAACTGTTTCGAAGAG

                         GAGACTGATATAATGAGCT
                         CTCTGACTATATTAC
```

and (iv) the −10 or −35 region of a synthetic promoter comprising at least a portion of the sequence

```
AATTCAGGATTTATGAAGCTTCT
     GTCCTAAATACTTCGAAGA

                    TCTCGAGGGAATTGTTTGAGCT
                    AGAGCTCCCTTAACAAAC;
```

   (2) a ribosomal binding site, with the proviso that when said promoter region is absent, said ribosomal binding site is synthetic and consists essentially of:

```
GATCCAAGGAGGTGAT
      GTTCCTCCACTAGATC; and
```

   (3) a signal sequence functional in Bacillus; wherein unique restriction sites are located between the −10 and −35 consensus sequences of any synthetic promoter region, between the promoter region and the ribosomal binding site, proximal to the initiation codon and at the 3'-terminus

VOL
1127
ISS
3
JE
18
1991
UMI

of the signal sequence; wherein at least two of said elements are not naturally linked; and wherein when one of said elements other than said signal sequence is unique restriction site, said signal sequence is the α-amylase signal sequence joined in reading frame to a structural gene encoding mature α-amylase.

5,024,944

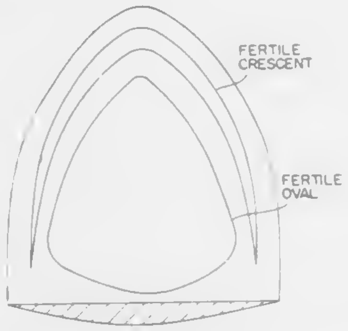
TRANSFORMATION, SOMATIC EMBRYOGENESIS AND WHOLE PLANT REGENERATION METHOD FOR GLYCINE SPECIES

Glenn B. Collins; David F. Hildebrand; Paul A. Lazzeri, all of Lexington, Ky.; Thomas R. Adams, North Stonington, Conn.; Wayne A. Parrott, Versailles, and Lynn M. Hartweck, Lexington, both of Ky., assignors to Lubrizol Genetics, Inc., Wickliffe, Ohio and The University of Kentucky Research Foundation, Inc., Lexington, Ky.

Continuation-in-part of Ser. No. 893,256, Aug. 4, 1986, abandoned. This application Jun. 15, 1987, Ser. No. 63,342

Int. Cl.⁵ C12N *15/00, 5/00*

U.S. Cl. 435—172.3 31 Claims



10. A method of producing a plant of *Glycine max* containing foreign DNA comprising:

a) macerating cotyledon tissue taken from immature embryos of said species comprising the "fertile crescent" region by crushing on mesh;

b) contacting said macerated tissue with said foreign DNA such that said DNA is incorporated into the cells of said tissue;

c) contacting said macerated tissue of step (b) with an embryogenic medium, which embryogenic medium comprises an auxin of the NAA family at a concentration between about 5 mg/l and about 50 mg/l, for said tissue to produce somatic embryos;

d) transferring said embryos to suitable media for regeneration of whole plants containing foreign DNA therefrom.

5,024,945

PROCESS FOR OBTAINING SARCOSINE OXIDASE FROM MICROORGANISMS

Ulrich Mayr, Rosenheim; Helmgard Gauhl, and Hans Seidel, both of Tutzing, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim-Waldorf, Fed. Rep. of Germany

Filed Jul. 10, 1984, Ser. No. 629,504

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1983, 3326888

Int. Cl.⁵ C12N *9/06;* **C12P** *13/04*

U.S. Cl. 435—191 8 Claims

1. Process for obtaining sarcosine oxidase which catalyzes the reaction between sarcosine and oxygen to form formaldehyde, glycine, and hydrogen peroxide, comprising:

(i) culturing a Pseudomonas strain capable of producing said sarcosine oxidase under conditions favoring production thereof, and

(ii) recovering said sarcosine oxidase.

5,024,946

HUMAN MONOCLONAL ANTIBODY TO ANTIGEN OF GASTRIC CANCER AND B-CELL LINE FOR PRODUCING THIS ANTIBODY, METHOD FOR PREPARING THIS B-CELL LINE AND ANTIBODY, ANTIGEN AND METHOD OF PREPARATION OF THIS ANTIGEN

Tsutomu Abe, Fuji, and Masayuki Fukumoto, Saitama, both of Japan, assignors to Asahi Kasei Kabushiki Kaisha, Osaka, Japan

Filed Sep. 29, 1986, Ser. No. 912,106

Claims priority, application Japan, Sep. 30, 1985, 60-214480; Jun. 4, 1986, 61-128016; Aug. 28, 1986, 61-200080

Int. Cl.⁵ C12N *5/24;* **C07K** *15/28*

U.S. Cl. 435—240.27 2 Claims

1. The human monoclonal antibody 418-59 produced by the B-cell line which has ECACC Deposit reference number 85071031 and which binds to a gastric cancer cell line.

5,024,947

SERUM FREE MEDIA FOR THE GROWTH ON INSECT CELLS AND EXPRESSION OF PRODUCTS THEREBY

Duane Inlow, and Brian Maiorella, both of Oakland, Calif., assignors to Cetus Corporation, Emeryville, Calif.

Filed Jul. 24, 1987, Ser. No. 77,303

Int. Cl.⁵ C12N *5/00*

U.S. Cl. 435—240.31 14 Claims

1. A serum free medium which supports the large scale growth of insect cells, excluding monolayer culture, and the production thereby of recombinant and viral products at levels comparable to those achieved in serum containing media, the serum free medium comprises:

(a) a basal medium;

(b) a lipid component;

(c) a peptone component; and

(d) a protective agent;

wherein:

the lipid component is in the form of a microemulsion;

the basal medium comprises a nutrient mixture of inorganic salts, sugars, amino acids, optionally also containing vitamins, organic acids and/or buffers;

the protective agent comprises an emulsifying, non-toxic, water soluble compound that protects the insect cells from damage and death under well-aerated culture conditions, wherein the protective agent is selected from the group consisting of hydroxyethyl starch, methyl cellulose, carboxymethyl cellulose, dextran sulfate, polyvinylpyrrolidone, ficoll, alginic acid, polypropyleneglycol and non-toxic polymeric detergents;

the lipid component further comprises an emulsifier, an organic solvent, and lipids esential for the growth of insect cells;

the emulsifier of the lipid component comprises a phospholipid and/or a non-toxic, nonionic polymeric detergent;

the organic solvent comprises an alcohol containing from one to three carbon atoms;

the lipids of the lipid component are selected from the group consisting of fatty acids, steroids and lipid soluble vitamins; and

the peptone component comprises a hydrolyzed protein product or a mixture of hydrolyzed protein products, the peptone component is at a total concentration of from about 1 g/l to about 12 g/l.

5,024,948

GENETIC SYSTEM FOR MICROMONOSPORA

David M. Rothstein, Rockland; Susan F. Love, Westchester, and Ellen Z. Baum, Rockland, all of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 787,066, Oct. 17, 1985, abandoned, and Ser. No. 672,031, Nov. 16, 1984, abandoned. This application Mar. 6, 1987, Ser. No. 22,455

Int. Cl.⁵ C12N *1/20, 15/01;* **C12P** *19/44*

U.S. Cl. 435—252.1 1 Claim

1. A culture comprising the microorganism *Micromonospora echinospora* ssp. calichensis DR 46 (ATCC-53591), said culture being capable of producing complementing factor in recoverable quantity upon aerobic fermentation in an aqueous medium containing assimilable sources of carbon, nitrogen, iodine and inorganic salts.

5,024,949

AEROBIC BACTERIAL REMEDIATION OF ALIPHATIC CHLORINATED HYDROCARBON CONTAMINATION

George D. Hegeman, Bloomington, Ind., and David G. Nickens, Eau Claire, Wis., assignors to BioTrol, Inc., Chaska, Minn.

Filed Feb. 17, 1989, Ser. No. 312,599

Int. Cl.⁵ C02F *3/34*

U.S. Cl. 435—262 22 Claims

1. A method of detoxifying a liquid contaminated with trichlorethylene (TCE), said method comprising the step of introducing a bacterium of the genus Pseudomonas into a contaminated medium comprising:

a) an amount of a branched chain alkyl-substituted aromatic hydrocarbon effective to sustain growth of the bacterium, and

b) TCE, wherein the bacterium is capable of substantially complete degradation of the TCE at a rate of up to about 32 nmol hr^{-1} mg $cells^{-1}$ based upon the dry weight of the cells, and further wherein the bacterium is capable of sustained growth solely on the branched chain alkyl-substituted aromatic hydrocarbon.

2. The method of claim 1 wherein the branched chain alkyl-substituted aromatic hydrocarbon is isobutylbenzene.

5,024,950

ACTINOMADURA FULVA SUBSP INDICA

Ann C Horan, Summit, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 227,963, Aug. 3, 1988, Pat. No. 4,904,644. This application Jan. 3, 1990, Ser. No. 460,417

Int. Cl.⁵ C12N *1/00*

U.S. Cl. 435—825 1 Claim

1. A biologically pure culture of the microorganism *Actinomadura fulva* subsp. *indica*, SCC 1840 having the identifying characteristics of ATCC 53714 said culture being capable of producing the antimicrobial complex in a recoverable quantity upon fermentation, under aerobic conditions in an aqueous medium containing assimilable sources of nitrogen and carbon.

5,024,951

METHOD OF CALIBRATING A SHEET TYPE ELECTRODE

Haruo Kotani, and Katsuhiko Tomita, both of Kyoto, Japan, assignors to Horiba, Ltd., Kyoto, Japan

Division of Ser. No. 124,629, Nov. 24, 1987, abandoned. This application Nov. 28, 1988, Ser. No. 276,779

Int. Cl.⁵ G01N *33/00*

U.S. Cl. 436—8 4 Claims

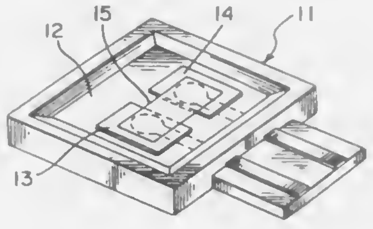
1. A method of calibrating an ion-concentration measuring device with an electrode, comprising the steps of:

providing a water-absorbing sheet of a chemically stabilized hygroscopic material that will not elute ions;

absorbing a calibrating solution of a predetermined concentration of pH calibrating material having a predetermined pH level into the sheet;

drying the water-absorbing sheet to leave it impregnated with the pH calibrating material from the calibrating solution;

bringing the water-absorbing sheet into contact with an electrode of the ion-concentration measuring device, and



adding an appointed quantity of pure water drop by drop to the sheet to rehydrate the calibrating solution to the predetermined concentration to enable a pH calibration of the measuring device.

5,024,952

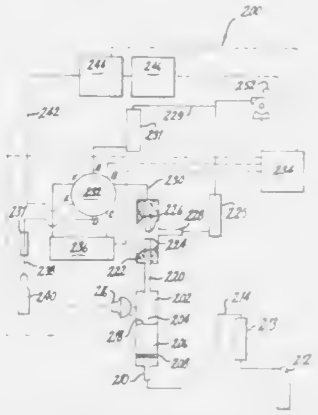
METHOD FOR OBTAINING ANALYTES FROM LIQUID MENSTRUA FOR ANALYSIS

George M. Alsop, South Charleston, W. Va., assignor to Union Carbide Chemicals and Plastics Technology Corporation, Danbury, Conn.

Filed Jun. 26, 1989, Ser. No. 371,112

Int. Cl.⁵ G01N *1/18, 35/08, 30/00;* **C02F** *1/30*

U.S. Cl. 436—177 30 Claims



17. A method for analyzing a menstruum from the presence of at least one solute which, in said menstruum tends to be at a higher concentration at an interface of the menstruum with a gas than in the menstruum as a whole comprising passing a gas in the form of finely-divided bubbles through the menstruum, said bubbles forming an interface with and passing from the menstruum into an immediately adjacent vapor space and entraining some of said menstruum; indicating the vapor space at least in the portion of the vapor space containing said entrained menstruum with an electromagnetic radiation which imparts to the at least one solute in an amount at least sufficient to maintain at least a portion of the at least one solute contained in the entrained menstruum in the vapor space; withdrawing from the vapor space a vapor stream comprising the gas passed through the menstruum and at least one solute; and subjecting at least a portion of the vapor stream to an analytical procedure to ascertain at least one of the presence and relative concentration of the at least one solute.

VOL
1127
ISS
3
JE
18
1991
UMI

5,024,953

METHOD FOR PRODUCING OPTO-ELECTRIC TRANSDUCING ELEMENT

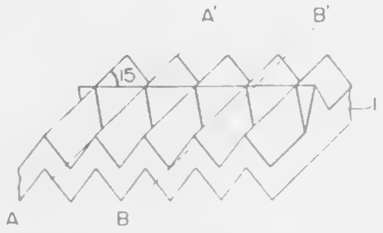
Tsuyoshi Uematsu, Koganei, and Tadashi Saitoh, Tokyo, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 20, 1989, Ser. No. 325,577

Claims priority, application Japan, Mar. 22, 1988, 63-65709; Sep. 12, 1988, 63-226613

Int. Cl.^{5} H01L *31/18*

U.S. Cl. 437—2 9 Claims



1. A process for producing an opto-electric transducing element, comprising the steps of;
- processing a semiconductor substrate having a first electrically conductive type into a corrugated structure;
- forming a semiconductor layer having a second electrically conductive type on the face of said substrate;
- forming a face electrode on a portion of said semiconductor layer having the second electrically conductive type; and
- forming a back electrode on the back of said substrate;
- wherein said semiconductor substrate is of a single crystal;
- wherein processing of said substrate is conducted by use of an anisotropic etching; and
- wherein the angle formed by the direction of a thin linear pattern of an etching mask for said anisotropic etching together with the direction of an intersection between a slowly etched face and the face of said substrate is more than 0° and less than an arctan {(a thin line width—a line width after etching)/a thin line length}.

5,024,954

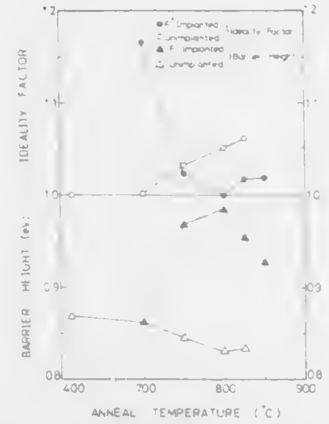
METHOD OF IMPROVING HIGH TEMPERATURE STABILITY OF PTSI/SI STRUCTURE

Mao-Chieh Chen; Bing-Yue Tsui, and Jiunn-Yann Tsai, all of Hsinchu, Taiwan, assignors to National Science Council, Taipei, Taiwan

Filed Apr. 6, 1990, Ser. No. 505,406

Int. Cl.^{5} H01L *21/265*

U.S. Cl. 437—24 21 Claims



1. In a method of forming a PtSi/Si structure having a PtSi/Si interface, which includes implanting fluorine-containing ions in the PtSi/Si structure and annealing, the improvement wherein any annealing prior to the implanting of fluorine-containing ions is low temperature annealing and high temperature annealing is performed after the implanting of fluorine-containing ions, whereby F^+ ions are concentrated at the PtSi/Si interface and the PtSi/Si structure is sustainable at high temperature.

5,024,955

VARIABLE-CAPACITANCE DIODE ELEMENT HAVING WIDE CAPACITANCE VARIATION RANGE

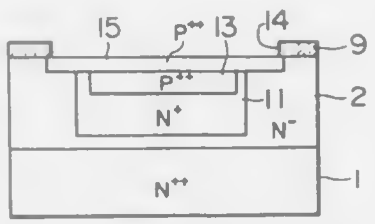
Takeshi Kasahara, Saitama, Japan, assignor to Toko, Inc., Tokyo, Japan

Division of Ser. No. 466,204, Jan. 17, 1990. This application Jun. 13, 1990, Ser. No. 537,689

Claims priority, application Japan, Jan. 19, 1989, 1-10885; Jan. 30, 1989, 1-20496

Int. Cl.^{5} H01L *21/74, 21/76*

U.S. Cl. 437—27 2 Claims



1. A method of making a variable-capacitance diode element, comprising the steps of:
- providing an epitaxial layer of a first conductivity type on a semiconductor substrate of the first conductivity type, said epitaxial layer having a higher resistivity than that of said semiconductor substrate;
- implanting an impurity element of the first conductivity type deeply into said epitaxial layer by means of ion implantation and carrying out a first diffusion step, thereby forming a first diffusion layer;
- implanting an impurity element of a second conductivity type into a area surrounded by said first diffusion layer, thereby forming a second diffusion layer of the second conductivity type which is shallower than said first diffusion layer and of a lower resistivity than that of said first diffusion layer; and
- forming a shallow diffusion layer of the second conductivity type by means of a lamp-annealing procedure in such a manner as to cover a KH portion of said first diffusion layer which is exposed at a major surface of said semiconductor substrate.

5,024,956

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE INCLUDING MESA BIPOLAR TRANSISTOR WITH EDGE CONTACTS

Johannes W. A. Van Der Velden; Henricus G. R. Maas, and Marguerite M. C. Van Iersel-Schiffmacher, all of Eindhoven, Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.

Division of Ser. No. 506,484, Apr. 6, 1990, Pat. No. 4,969,026, which is a continuation of Ser. No. 308,578, Jan. 24, 1989, abandoned. This application Jun. 7, 1990, Ser. No. 534,774

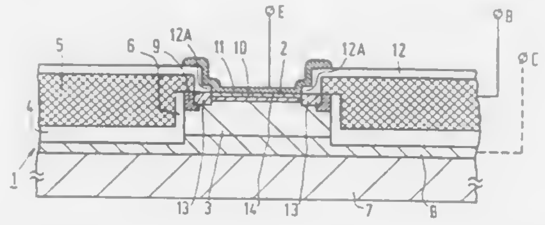
Claims priority, application Netherlands, Jan. 25, 1988, 8800157

Int. Cl.^{5} H01L *21/331*

U.S. Cl. 437—31 3 Claims

1. A method of manufacturing a semiconductor device characterized in that
1. a silicon oxide containing insulated intermediate layer is provided on the surface of a monocrystalline silicon region and a first silicon nitride layer is provided on said intermediate layer,

2. a first silicon layer is provided on said first silicon nitride layer,
3. a silicon pattern is etched from the first silicon layer,
4. at least the edge of said silicon pattern is provided by thermal oxidation with an oxide layer,
5. the uncovered part of the first silicon nitride layer, and the subjacent intermediate layer are removed,
6. a depression is etched into the exposed part of the silicon region,
7. the uncovered oxide is removed,
8. the uncovered silicon is provided by thermal oxidation with a further oxide layer,
9. the remaining exposed parts of said first silicon nitride layer and said intermediate layer are removed,
10. a second highly doped silicon layer is provided on the assembly, said second silicon layer being removed by planarization and etching down to a level lying below that of the oxide present on the first silicon layer,
11. the exposed silicon oxide is selectively removed by etching,
12. the exposed parts of said first silicon nitride layer are removed and at least one connection zone is formed by doping in the underlying parts of said silicon region,
13. said first silicon layer is selectively etched away, said second silicon layer and said connection zone are oxidized and at least one first zone is formed by diffusion from said second silicon layer,
14. said first silicon nitride layer is removed, and
15. an electrode is provided on the surface of a second zone located within the window thus formed, which is bounded by said further oxide layer.



5,024,957

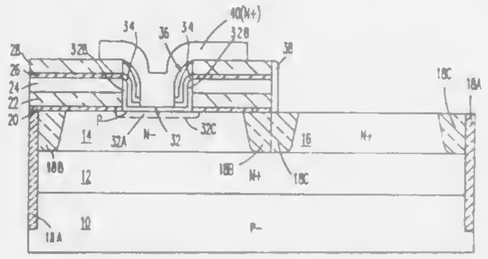
METHOD OF FABRICATING A BIPOLAR TRANSISTOR WITH ULTRA-THIN EPITAXIAL BASE

David L. Harame, Mohegan Lake, and Johannes M. C. Stork, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 13, 1989, Ser. No. 309,510

Int. Cl.^{5} H01L *21/306*

U.S. Cl. 437—31 12 Claims



5. A method of forming a bipolar transistor comprising the steps of:
- providing a semiconductor substrate including a first region of a first conductivity type;
- forming a first layer of insulative material having a first etch characteristic over a surface of said first region;
- forming a second layer of insulative material having a second etch characteristic over said first layer of insulative material;
- forming a first layer of conductive material over said second layer of insulative material;
- forming a third layer of insulative material over said first layer of conductive material;
- etching said first layer of conductive material and said second and third layers of insulative material with a first etchant to expose a portion of said first layer of insulative material;
- etching the exposed portion of said first layer of insulative material with a second etchant to form a generally vertical sidewall bounding an exposed portion of said first region surface;
- epitaxially depositing a base region of a second conductivity type over said exposed portion of said first region surface and said sidewall such that said base region is in electrical contact contact with said first layer of conductive material, and such that an intrinsic portion of said base region overlying said exposed portion of said first region is monocrystalline in structure and an extrinsic portion of said base region overlying said sidewall is polycrystalline in structure;
- patterning said extrinsic portion of said base region so that said extrinsic portion of said base region terminates over said layer of conductive material;
- forming an insulative spacer over said extrinsic portion of said base region and the exposed portions of said sidewall; and
- forming a second region of said first conductivity type over said base region and said spacer.

5,024,958

COMPOUND SEMICONDUCTOR DEVICE AND A MANUFACTURING METHOD THEREOF

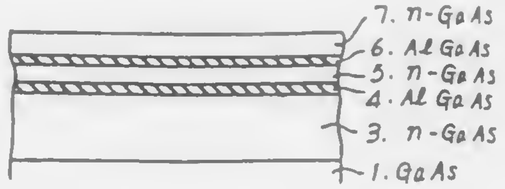
Yuji Awano, Tokyo, Japan, assignor to 501 Fujitsu Limited, Kawasaki, Japan

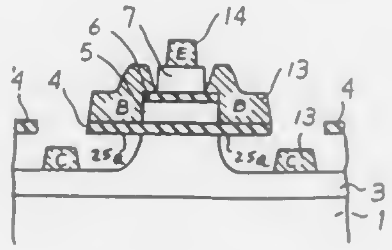
Division of Ser. No. 323,978, Mar. 15, 1989, Pat. No. 4,967,252. This application Oct. 25, 1990, Ser. No. 571,457

Claims priority, applicatioo Japan, Mar. 18, 1988, 63-66212

Int. Cl.^{5} H01L *21/283, 21/306, 29/73*

U.S. Cl. 437—31 11 Claims





1. A method of manufacturing a compound semiconductor device including a substrate, comprising the steps of:
- (a) forming a first layer of at least a first compound semiconductor on the substrate so as to form a mesa of the first layer, the mesa having a top area including a contact area;
- (b) forming an intermediate layer of a second compound semiconductor on said contact area of said first layer:

VOL
1127
ISS
3
JE
18
1991
UMI

(c) forming a second layer of at least said first compound semiconductor on a region of said intermediate layer overlying at least said contact area so as to form side walls and a top portion of said second layer;
(d) forming an electrode so as to contact said side walls and a part of said top portion of said second layer; and
(e) forming a third layer of said first compound semiconductor overlying said second layer.

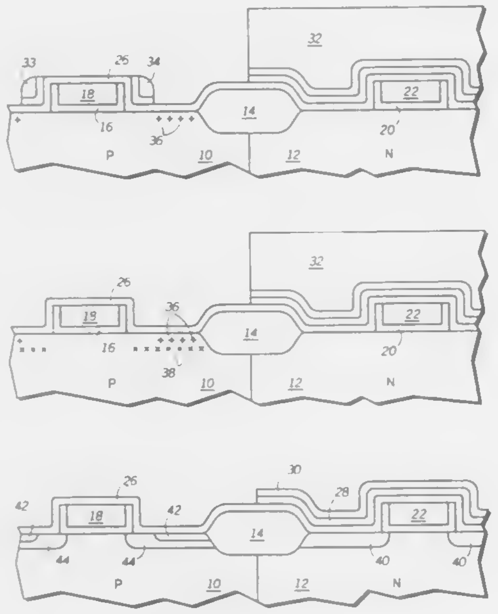
5,024,959
CMOS PROCESS USING DOPED GLASS LAYER

James R. Pfiester, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 25, 1989, Ser. No. 412,059

Int. Cl.⁵ H01L *21/225, 21/336*

U.S. Cl. 437—34 **8 Claims**



1. A method for fabricating a CMOS integrated device comprising the steps of:
providing a silicon substrate having a first surface region of first conductivity type and a second surface region of second conductivity type;
forming a first silicon gate electrode overlying said first surface region and a second silicon gate electrode overlying said second surface region;
depositing a dopant source layer containing dopant impurities of said first conductivity type overlying said first and second silicon gate electrodes;
patterning said dopant source layer overlying said first silicon gate electrode to form sidewall spacers at edges of said first silicon gate electrode;
doping portions of said first surface region with conductivity determining dopant impurities of said second conductivity type using said sidewall spacers as dopant masks; and
heating said dopant source layer to diffuse dopant impurities therefrom to dope portions of said second surface region with conductivity determining dopant of said first conductivity type.

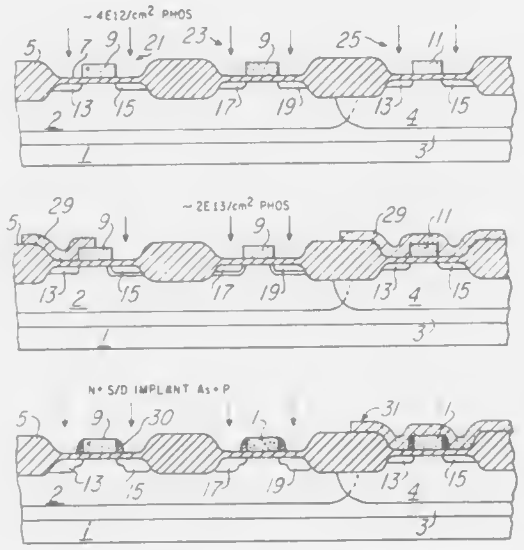
5,024,960
DUAL LDD SUBMICRON CMOS PROCESS FOR MAKING LOW AND HIGH VOLTAGE TRANSISTORS WITH COMMON GATE

Roger A. Haken, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 62,924, Jun. 16, 1987, abandoned. This application Oct. 18, 1988, Ser. No. 259,226

Int. Cl.⁵ H01L *21/265, 21/336*

U.S. Cl. 437—34 8 Claims



1. A method of making a CMOS integrated circuit comprising the steps of:
providing a substrate;
defining active regions in said substrate;
forming a gate oxide of a selected thickness over said active regions;
forming at least two gates over each of said active regions to define a source and drain region for a high voltage transistor and a source and drain region for a low voltage transistor;
lightly doping each of said source and drain regions of said high voltage and low voltage transistors with an impurity of a selected type;
doping said source regions of said high voltage and low voltage transistors and said drain region of said low voltage transistor of said active regions with additional impurity of said selected type;
forming a sidewall oxide on each said gate; and
further doping each of said source and drain regions of said high voltage and low voltage transistors with additional impurity of said selected type.

5,024,961
BLANKET PUNCHTHROUGH AND FIELD-ISOLATION IMPLANT FOR SUB-MICRON N-CHANNEL CMOS DEVICES

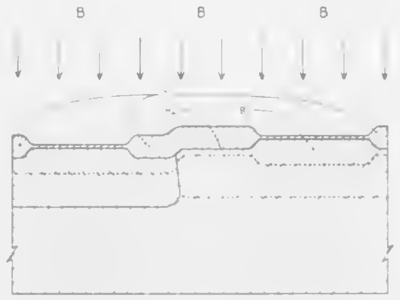
Ruojia Lee, and Aftab A. Ahmad, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Jul. 9, 1990, Ser. No. 550,000

Int. Cl.⁵ H01L *21/265*

U.S. Cl. 437—34 **6 Claims**

6. A method for creating punch-through-resistant regions for N-channel devices and channel-stop regions beneath field oxide regions for CMOS circuitry constructed on a silicon substrate, wherein said method consists of implanting boron atoms following N-well and P-well formation, and a high-temperature oxidation step which creates said field oxide regions, said implanting being performed in blanket fashion with N-well regions unmasked, and with sufficient energy to penetrate the field oxide regions and create a stratum of high boron atom concentration within the substrate that, in the field oxide regions, is subjacent the field oxide and in N-channel active areas is subject said implanting being performed at concentrations which are insufficient to counter dope the N-type doping within the N-well regions, and then forming N-channel transistor.



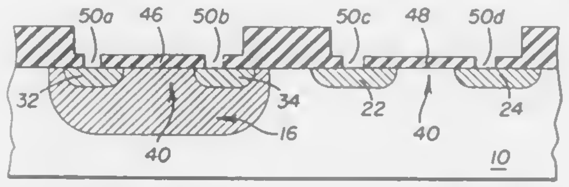
5,024,962
METHOD FOR PREVENTING AUTO-DOPING IN THE FABRICATION OF METAL GATE CMOS DEVICES

Roger W. Murray, Palo Alto, and Nevand Godhwani, Sunnyvale, both of Calif., assignors to Teledyne Industries, Inc., Mountain View, Calif.

Filed Apr. 20, 1990, Ser. No. 511,647

Int. Cl.⁵ H01L *21/336*

U.S. Cl. 437—40 8 Claims



4. A method of forming a gate oxide for a metal gate field effect transistor formed in a substrate, comprising the sequential steps of:
(a) oxidizing the substrate to form a sealing oxide layer having a thickness of approximately 100–150Å by rapid thermal annealing; and
(b) forming the gate oxide by oxidizing the substrate to form the gate oxide.

5,024,963
METHOD OF FABRICATING A BCCD CHANNEL WITH STAIR-CASE DOPING BY SELF-ALIGNMENT

Yong Park, Anyang, and Seo K. Lee, Seongnam, both of Rep. of Korea, assignors to Goldstar Electron Co., Cheongji, Rep. of Korea

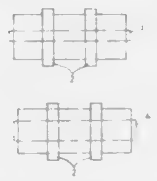
Filed Jul. 16, 1990, Ser. No. 553,170

Claims priority, application Rep. of Korea, Jan. 29, 1990, 948/1990

Int. Cl.⁵ H01L *21/263*

U.S. Cl. 437—41 **5 Claims**

1. A fabricating method for a CCD channel by self-alignment comprising the following steps of:
performing ion implantation in a selected active area of a semiconductor substrate;
depositing a first polysilicon layer on said active area;
etching out a selected area of said first polysilicon layer to create a first polysilicon gate;
depositing a layer of PR having an opening overlying a portion of said first polysilicon gate;
performing a second ion implantation using said first polysilicon gate as a mask to provide self-alignment;
forming another PR layer having an opening larger than and overlying said first opening;
performing a third ion implantation using said first polysilicon gate as a mask to provide self-alignment;
depositing a second layer of polysilicon atop said selected active area; and
etching out a selected area of said second layer of polysilicon to provide a second polysilicon gate over a portion of said active area adjacent to said first polysilicon gate.



5,024,964
METHOD OF MAKING FERROELECTRIC MEMORY DEVICES

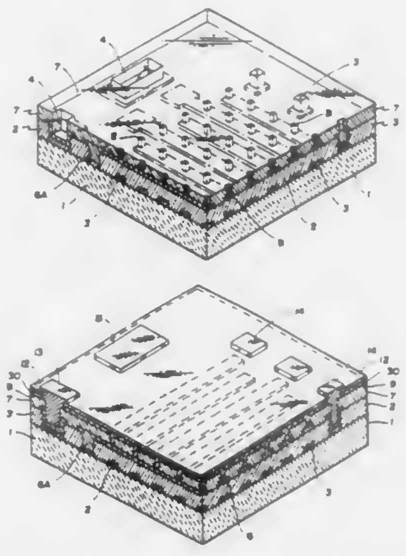
George A. Rohrer, Chassell, Mich., and Larry D. McMillin, Colorado Springs, Colo., assignors to Ramtron Corporation, Colorado Springs, Colo.

Division of Ser. No. 133,338, Mar. 24, 1980, Pat. No. 4,707,897, which is a continuation-in-part of Ser. No. 658,199, Feb. 17, 1976, Pat. No. 4,195,355, which is a continuation-in-part of Ser. No. 316,417, Dec. 18, 1972, Pat. No. 3,939,292, which is a continuation-in-part of Ser. No. 76,059, Sep. 28, 1970, Pat. No. 3,728,694. This application Oct. 31, 1985, Ser. No. 793,186

The portion of the term of this patent subsequent to Nov. 24, 2004, has been disclaimed.

Int. Cl.⁵ H01L *21/90, 29/95*

U.S. Cl. 437—47 **24 Claims**



1. A method of fabricating a monolithic ferroelectric memory device coupled to an integrated circuit comprising the steps of:
forming first layer interconnects coupled to the integrated circuit;
depositing a non-semiconductor dielectric and forming interconnect and bonding pad vias therein;
depositing a conductive layer and forming a bottom electrode;
applying a ferroelectric layer;
depositing a conductive layer and forming a top electrode; and

VOL
1127
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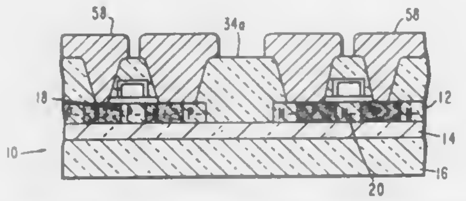
applying conductive material to the bonding and interconnect pads.

5,024,965
MANUFACTURING HIGH SPEED LOW LEAKAGE RADIATION HARDENED CMOS/SOI DEVICES

Chen-Chi P. Chang, 2515 Alta Vista Dr., Newport Beach, Calif. 92660, and Mei Li, 26572 Loma Verde, Mission Viejo, Calif. 92691

Filed Feb. 16, 1990, Ser. No. 481,148
Int. Cl.⁵ H01L *21/336*
U.S. Cl. 437—57 20 Claims



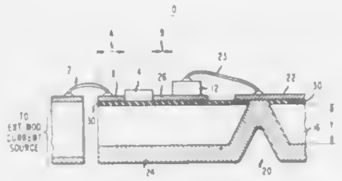
13. A method of manufacturing low leakage, radiation hardened semiconductor devices, said method comprising the steps of:

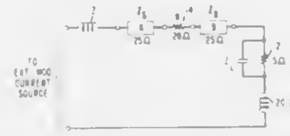
- providing a silicon on insulator substrate fabricated by means of a separation by ion implantation of oxygen process;
- masking a substrate with a separation mask that defines silicon islands thereon;
- etching the masked substrate to form the silicon islands;
- oxidizing the silicon islands to form a relatively thin oxide layer thereover;
- masking predetermined ones of the silicon islands and forming P-wells therein;
- masking the remainder of the silicon islands and forming N-wells therein;
- depositing a phosphoroborosilicate glass layer over the thin oxide layer and the surface of the substrate;
- masking and etching the phosphoroborosilicate glass layer to form active areas, such that the phosphoroborosilicate glass and thin oxide layers are disposed over the edges of the islands;
- disposing a gate oxide layer over the active areas;
- fabricating polysilicon gates and interconnects that are coupled to the gate oxide layer of each active area;
- forming an oxide layer on the fabricated polysilicon gates and interconnects;
- forming an N+ mask and implanting dopant ions into the unmasked portions of the substrate to form source and drain regions in P-well active areas;
- forming a P+ mask and implanting dopant ions into the unmasked portions of the substrate to form source and drain regions in N-well active areas;
- depositing a second phosphoroborosilicate glass layer over the surface of the substrate;
- heating the phosphoroborosilicate glass layers to a predetermined relatively low temperature to reflow the phosphoroborosilicate glass layers;
- masking and etching the phosphoroborosilicate glass layers to form contact locations to source and drain regions of the active areas; and
- depositing conductive metalization over the surface of the wafer and etching conductive interconnects that contact the source and drain regions of the devices fabricated therein.

5,024,966
METHOD OF FORMING A SILICON-BASED SEMICONDUCTOR OPTICAL DEVICE MOUNT

Norman R. Dietrich, Allentown; Ralph S. Moyer, Cumru Township, Berks County, both of Pa., and Yiu-Huen Wong, Summit, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 287,778, Dec. 21, 1988, Pat. No. 4,937,660.
This application Apr. 16, 1990, Ser. No. 510,338
Int. Cl.⁵ H01L *21/00*
U.S. Cl. 437—60 7 Claims





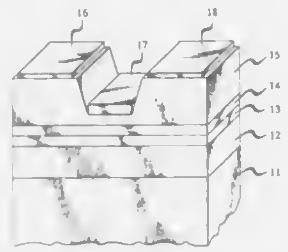
1. A method of forming a silicon-based stripline for providing an interconnection between a semiconductor optical device and a high frequency modulation signal source, said method comprising the steps of:

(a) providing a silicon substrate including first and second opposing major surfaces;
(b) depositing a thin film resistor on said first major surface of said substrate;
(c) forming a via through said silicon substrate at a spaced-apart location from said thin film resistor and;
(d) metallizing longitudinal portions of said first and second major surfaces of said substrate, as well as the via, the first longitudinal portion being of a predetermined width w, the combination of said first and second metallized longitudinal portions with said substrate thus forming a stripline transmission path with a characteristic impedance Z_s, and the via being utilized to provide electrical connection between the second metallization and the semiconductor device.

5,024,967
DOPING PROCEDURES FOR SEMICONDUCTOR DEVICES

Rose F. Kopf, Bound Brook; J. M. Kuo, Edison; Henry S. Luftman, Fanwood, and Erdmann F. Schubert, New Providence, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 30, 1989, Ser. No. 374,336
Int. Cl.⁵ H01L *21/20*
U.S. Cl. 437—95 17 Claims



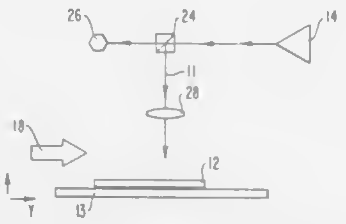
1. A process for fabricating a semiconductor device comprising a semiconductor body with a doped region having a doping profile, which comprises the steps of

- growing semiconductor material on a surface of a semiconductor body comprising a doped region with a doping profile, and
- minimizing or eliminating segregation effects of surface electric fields, formed by Fermi-level pinning, on the dopants in the doped region, said minimizing or elimination being effected by illuminating the surface of the semiconductor body, on which growth is taking place, with radiation at least some of which has energy greater than the band gap of the semiconductor so as to create electron-hole pairs and shield the surface electric field from the dopants in the doped region.

5,024,968
REMOVAL OF SURFACE CONTAMINANTS BY IRRADIATION FROM A HIGH-ENERGY SOURCE

Audrey C. Engelsberg, 61-B Sherwood Forest, Wappingers Falls, N.Y. 12590

Filed Jul. 8, 1988, Ser. No. 216,903
Int. Cl.⁵ H01L *21/268*
U.S. Cl. 437—173 12 Claims



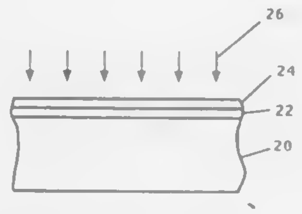
1. A method for removing surface contaminants from the surface of a substrate while preserving the crystal structure of the surface being treated, comprising the steps of:

- constantly flowing a gas across the substrate treatment surface, said gas being inert to the substrate treatment surface; and
- irradiating said substrate with high-energy irradiation, said irradiation characterized by an energy density and duration sufficient to release surface contaminants from the substrate treatment surface insufficient to alter the crystal structure of the substrate treatment surface.

5,024,969
HYBRID CIRCUIT STRUCTURE FABRICATION METHODS USING HIGH ENERGY ELECTRON BEAM CURING

John J. Reche, 8039 Agate, Ventura, Calif. 93004

Filed Feb. 23, 1990, Ser. No. 484,376
Int. Cl.⁵ H01L *21/00, 21/02;* **B05D** *3/00, 3/02*
U.S. Cl. 437—173 8 Claims



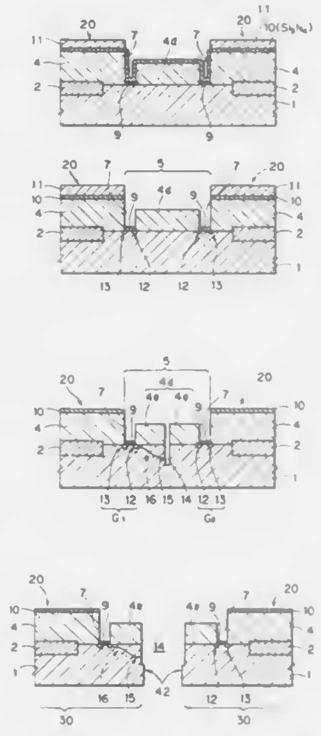
1. A method of fabricating a high density multichip interconnect having interconnect circuitry over a first surface of a substrate, the high density multichip interconnect having at least one cured polymer insulator layer in the structure thereof formed over a partially fabricated high density multichip interconnect, the method including the following steps of forming the cured polymer insulator layer:

(a) coating the partially fabricated high density multichip interconnect with a layer of uncured polymer;
(b) curing the polymer layer of step (a) by bombarding the same with high energy electrons; and
(c) wherein step (b) is performed at room temperature for approximately 1 to 120 seconds with the energy of the electrons in the region of 5 to 30 kilovolts.

5,024,970
METHOD OF OBTAINING SEMICONDUCTOR CHIPS

Masataka Mori, Fukuoka, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 5, 1989, Ser. No. 446,125
Claims priority, application Japan, Jun. 27, 1989, 1-164720
Int. Cl.⁵ H01L *21/302*
U.S. Cl. 437—226 9 Claims



1. A method of obtaining semiconductor chips by cutting a semiconductor wafer in which a plurality of electronic element regions are provided, comprising the steps of:

(a) forming first and second electronic element regions on a major surface of said semiconductor wafer such that said first and second electronic element regions are isolated from each other across an isolating zone on said major surface, wherein said isolating zone extends in a first direction perpendicular to an alignment direction of said first and second electronic element regions;
(b) forming N grooves in said isolating zone parallel to said first direction, wherein (N−1) intergroove spaces intervene between said N grooves and N is an integer larger than one; and
(c) cutting said semiconductor wafer along a cutting line which is set on one of said (N−1) intergroove spaces and extends in said first direction to thereby obtain semiconductor chips each having an electronic element region;

wherein step (a) comprises the steps of:

(a−1) forming first and second active regions in said major surface, each of said first and second active regions having at least one electronic element; and
(a−2) providing first and second insulating layers which

VOL
1127
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cover said first and second active regions, respectively, to thereby obtain said first and second electronic element regions;

step (b) comprises the steps of:

(b−1) forming an insulating strip layer which extends in said first direction is a middle portion of said isolating zone, whereby a first gap is defined between said first insulating layer and said insulating strip layer, and a second gap is defined between said second insulating layer and said insulating strip layer; and

(b−2) forming first and second grooves in said isolating zone such that said first groove is aligned with a first side wall of said insulating strip layer facing said first insulating layer across said first gap, and said second groove is aligned with a second side wall of said insulating strip layer facing said second insulating layer across said second gap, and

step (c) comprises the steps of:

(c−1) setting said cutting line on said insulating strip layer; and

(C−2) cutting said semiconductor wafer at said cutting line with a mechanical dicing tool.

5,024,971

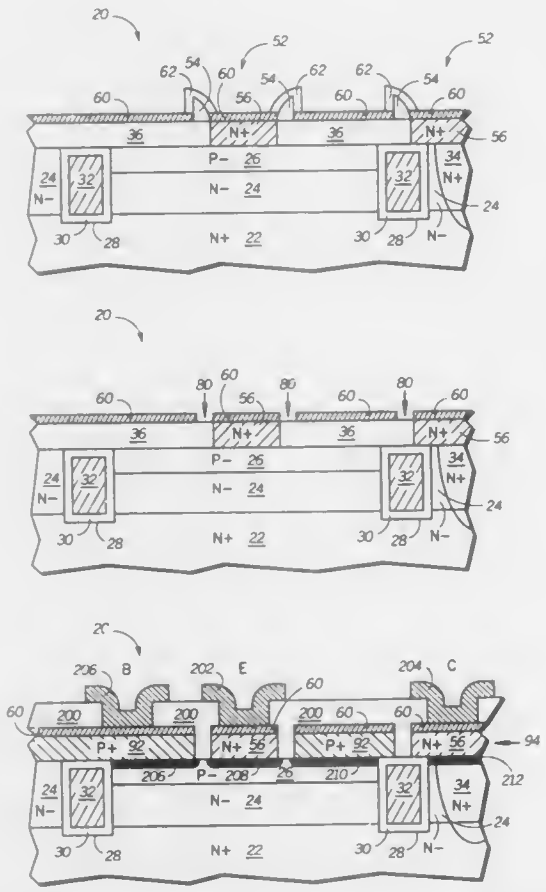
METHOD FOR PATTERNING SUBMICRON OPENINGS USING AN IMAGE REVERSAL LAYER OF MATERIAL

Frank K. Baker, and James D. Hayden, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 20, 1990, Ser. No. 570,180

Int. Cl.⁵ H01L *21/465*

U.S. Cl. 437—228 **16 Claims**



1. A method for patterning a submicron opening within a first layer of material in a semiconductor device, comprising the steps of:

patterning a second layer of material overlying the first layer of material to define a window of a first dimension;

forming at least one sidewall spacer from a third layer of material along an edge of the window;

etching the second material while leaving the at least one sidewall spacer substantially intact;

depositing a fourth layer of material which selectively reacts with the second layer of material but not the at least one sidewall spacer to form a compound which functions as a hard mask;

removing unreacted portions of the fourth layer of material and the at least one sidewall spacer to expose a pedetermined portion of the first layer having a second dimension less than the first dimension, and

selectively etching the first layer where exposed with an etch process which uses the hard mask provided by the fourth layer to form the small opening in the first layer.

5,024,972

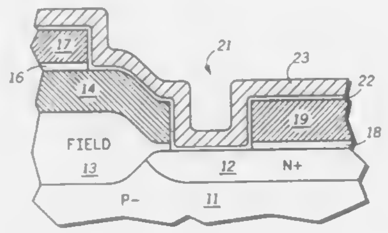
DEPOSITION OF A CONDUCTIVE LAYER FOR CONTACTS

Gary A. DePinto; Joe Steinberg; John G. Franka, and Michael R. Cherniawski, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 29, 1990, Ser. No. 471,451

Int. Cl.⁵ H01L *21/469*

U.S. Cl. 437—233 **13 Claims**



1. A method for making a semiconductor device structure, comprising:

providing a semiconductor substrate having a surface with an exposed portion thereof;

placing the substrate in a furnace, said furnace having a wafer area for receiving a plurality of semiconductor substrates;

raising the temperature to all points within the wafer area to a first temperature range, said first temperature including a first temperature;

depositing a relatively thin layer of material for use as a conductor on at least the exposed portion of the the surface of the substrate while all points within the wafer area are within the first temperature range;

stabilizing the temperature to all points within the wafer area to a second temperature range, said second temperature range being narrower than said first temperature range, said second temperature range including the first temperature; and

depositing a relatively thick layer of material for use as a conductor on the relatively thin layer of conductive material while all points within the wafer area are within the second temperature range.

5,024,973

CRYSTALLIZED GLASS TOOTH CROWN MATERIAL

Kazuo Kondo, and Masahiko Okuyama, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Continuation of Ser. No. 719,103, Apr. 2, 1985, abandoned. This application Dec. 17, 1986, Ser. No. 943,828

Claims priority, application Japan, Apr. 2, 1984, 59-65531

Iot. Cl.⁵ C03C *10/02*

U.S. Cl. 501—10 **7 Claims**

1. A crystallized glass tooth crown consisting essentially of from 40 to 75 mol% component X, from 20 to 55 mol% component Y and from 0.1 to 10 mol% component Z, wherein

component X is P_2O_5,

component Y is selected from ZnO, K_2O, B_2O_3, and Al_2O_3 in an amount of up to 20 mol% and additionally CaO and BaO in an amount to bring the total mol% of component Y to up to 55 mol%, and

component Z is selected from SrO, Ta_2O_5, La_2O_3, CeO_2 and Nb_2O_5.

5,024,974

GLASS HAVING ULTRAFINE PARTICLES OF CUCL AND/OR CUBR PRECIPITATED THEREIN AND PROCESS FOR ITS PRODUCTION

Arao Nakamura, Nagoya; Tsuneo Manabe, Yokohama; Naoki Sugimoto, Yokohama, and Hiroshi Usui, Yokohama, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed Mar. 22, 1990, Ser. No. 497,535

Claims priority, application Japan, Mar. 30, 1989, 1-76765; Sep. 19, 1989, 1-240581

Int. Cl.⁵ C03C *3/11, 3/089, 3/091, 3/064*

U.S. Cl. 501—57 **2 Claims**

1. Glass having ultrafine particles of CuCl and/or CuBr precipitated therein, which consists essentially of:

from 10 to 70 mol % of SiO_2,

from 30 to 90 mol % of B_2O_3,

from 0.1 to 50 mol % of $Li_2O+Na_2O+K_2O$, and

from 0.01 to 10 mol % of CuCl+CuBr.

5,024,975

CRYSTALLIZABLE, LOW DIELECTRIC CONSTANT, LOW DIELECTRIC LOSS COMPOSITION

Hans S. Hartmann, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Co., Inc., Wilmington, Del.

Filed Oct. 19, 1989, Ser. No. 423,366

Int. Cl.⁵ C03C *3/89, 3/91;* **B32B** *9/00*

U.S. Cl. 501—65 **18 Claims**

1. A composition for making low K, low dielectric loss dielectric layers, said composition comprising an admixture of finely divided solids comprising:

(a) 20–80% by weight, basis total solids, amorphous crystallizable glass;

(b) 20–60% by weight, basis total solids, amorphous borosilicate glass (1) in which the weight ratio of B_2O_3 to SiO_2 is 0.22–0.55, and (2) containing, basis total borosilicate glass, 0.2–1.0% by weight Al_2O_3, and 1.5–4.0% by weight of a mixture of oxides of alkali metals, alkaline earth metals or mixtures thereof, at least 0.5–1.2% by weight being Li_2O;

(c) 0.1 to 30% by weight, basis total solids, expansion control additive; and

(d) 0.05 to less than 1.0% by weight crystallization control additive.

5,024,976

ALUMINA-ZIRCONIA-SILICON CARBIDE-MAGNESIA CERAMIC CUTTING TOOLS

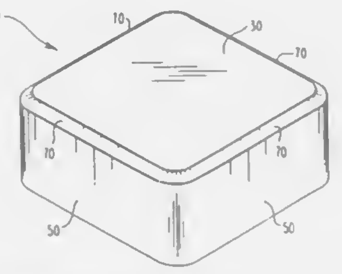
Pankaj K. Mehrotra, and Elizabeth R. Billman, both of Greensburg, Pa., assignors to Kennametal Inc., Latrobe, Pa.

Continuation of Ser. No. 266,959, Jan. 3, 1988, abandoned. This application Jul. 23, 1990, Ser. No. 560,484

The portion of the term of this patent subsequent to Sep. 25, 2007, has been disclaimed.

Int. Cl.⁵ C04B *35/56*

U.S. Cl. 501—89 **34 Claims**



1. A metalcutting insert comprising:

a rake face;

a flank face;

a cutting edge at a juncture of said rake face and said flank face;

said cutting insert having an alumina based ceramic composition consisting essentially of:

about 1.5 to 32.5 v/o silicon carbide whiskers;

about 5 to 17.5 v/o zirconia;

a residue of a magnesia addition added in the amount of about 0.03 to 3 v/o;

alumina forming essentially the remainder of said composition;

wherein said silicon carbide whiskers, said zirconia and said residue of said magnesia addition are substantially homogeneously dispersed in a matrix formed of said alumina; and

wherein at least about 2.0 v/o of said ceramic composition is tetragonal zirconia.

5,024,977

COMBINATION OF TWO SLIDING OR SEALING ELEMENTS AND A METHOD FOR PRODUCING THE SAME

Kilian Friederich, Plochingen, and Dirk Rogowski, Bünzwangen, both of Fed. Rep. of Germany, assignors to Feldmuehle Aktiengesellschaft, Duesseldorf, Fed. Rep. of Germany

Filed Oct. 4, 1988, Ser. No. 253,125

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1987, 3733730

Int. Cl.⁵ C04B *35/56*

U.S. Cl. 501—91 **10 Claims**

1. A combination of sliding or sealing elements with improved control of the bearing surface portion, said combination comprising at least one diphasic ceramic compact, sintered without pressure, in sliding or sealing contact with a countersurface, and containing silicon carbide, boron carbide, metal borides and optionally free carbon, where the sintered compact contains

44 to 89.5 wt.-% of α-silicon carbide

0.5 to 6 wt.-% of boron carbides, and

10 to 50 wt.-% of metal borides,

the metal borides being selected from groups 4b to 6b of the periodic system and form a second disperse phase in the sintered compact, and has a heightened metal boride content in the compact's functional surface in sliding or sealing engagement.

VOL
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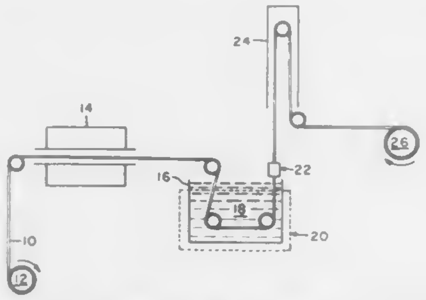
5,024,978
COMPOSITIONS AND METHODS FOR MAKING CERAMIC MATRIX COMPOSITES

Roger A. Allaire, Big Flats; Mark S. Friske; Sandra L. Hagg, both of Corning, and Victor F. Janas, Horseheads, all of N.Y., assignors to Corning Incorporated, Corning, N.Y.
Filed May 30, 1989, Ser. No. 358,589
Int. Cl.^{5} C04B *35/02, 35/08*
U.S. Cl. 501—95 **14 Claims**



1. A method for making a fiber-reinforced ceramic matrix composite comprising the step of combining inorganic reinforcing fibers with a liquid dispersion of a powder of a ceramic matrix material, wherein the liquid dispersion is a heated thermoplastic dispersion which is solid at room temperature.

5,024,979
METHOD OF FORMING A FIBROUS STRUCTURE COMPOSITE CERAMIC MATERIAL AND MATERIAL THUS OBTAINED

Caroline Debaig-Valade, Bordeaux; Claude Filliatre, Talence, and Christian Servens, St-Aubin de Medoc, all of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France
Filed Mar. 22, 1989, Ser. No. 327,037
Claims priority, application France, Apr. 6, 1988, 8804546
Int. Cl.^{5} C04B *35/80*
U.S. Cl. 501—95 **16 Claims**

14. A method for forming a composite ceramic material having a fibrous structure embedded in a ceramic matrix, comprising the steps of:
(a) impregnating said fibrous structure with a polymerization catalyst for polymerizing a polymerizable organometallic precursor of said ceramic matrix, said polymerizable catalyst selected from the group consisting of polyborodimethylsiloxane, polyborodiethylsiloxane, polyborodiphenylsiloxane, poyborodivinylsiloxane, trifluoromethanesulfonic acid, tribromomethanesulfonic acid, trifluoracetic acid and dodecacarbonyltriruthenium;
(b) placing said fibrous structure impregnated with said polymerization catalyst in contact with said polymerizable organometallic precursor selected from the group consisting of carbosilanes, silazanes, carbosilazanes, borazines, borazanes and aluminosilicate-silanes;
(c) polymerizing said organometallic precursor; and
(d) pyrolyzing said organometallic precursor so as to obtain said matrix.

5,024,980
CERAMIC DIELECTRIC ALLOY

Taki Negas, and Louis P. Dominques, both of Adamstown, Md., assignors to Alpha Industries, Woburn, Mass.
Filed May 15, 1987, Ser. No. 49,985
Int. Cl.^{5} C04B *35/46*
U.S. Cl. 501—134 **2 Claims**

1. A method of fine-tuning the dielectric constant value of an insulating sinterd ceramic alloy, said method comprising making an insulating, sintered ceramic alloy from 10 to 90 mol % of magnesium titanate and 90 to 10 mol % of magnesium aluminate, or from corresponding amounts of magnesium oxide or oxide precursor, titanium oxide or oxide precursor, and aluminum oxide or oxide precursor, and varying the mol ratio of the titanate to the aluminum, or of the corresponding metal oxides or oxide precursors, in order to vary the value of the dielectric constant of the alloy.

5,024,981
STAGED METAL-PROMOTED ZEOLITE CATALYSTS AND METHOD FOR CATALYTIC REDUCTION OF NITROGEN OXIDES USING THE SAME

Barry K. Speronello, Belle Mead; John W. Byrne, and James M. Chen, both of Edison, all of N.J., assignors to Engelhard Corporation, Iselin, N.J.
Filed Apr. 20, 1989, Ser. No. 340,992
Int. Cl.^{5} B01J *29/06*
U.S. Cl. 502—67 **8 Claims**

1. A catalyst composition effective for reducing nitrogen oxides with ammonia in a gaseous stream, the composition having a first catalyst and a second catalyst as sensed relative to the sequence of flow of the gaseous stream through the composition, the composition comprising:
(a) a first catalyst comprising a first zeolite and optionally including not more than about 1 percent by weight of a promoter selected from the group consisting of one or both of iron and copper, calculated as the metal and based on the weight of metal plus the first zeolite; and
(b) a second catalyst comprising a second zeolite including more than about 1% by weight of a promoter selected from the group consisting of iron and copper, calculated as the metal and based on the weight of metal plus the second zeolite.

5,024,982
SILICA-CONTAINING OLEFIN POLYMERIZATION CATALYSTS AND PROCESS

Gil P. Hawley, Dewey, and Max P. McDaniel, Bartlesville, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.
Filed Dec. 14, 1988, Ser. No. 284,280
Int. Cl.^{5} C08F *4/64*
U.S. Cl. 502—110 **19 Claims**

1. A method for the preparation of a crystalline olefin polymerization catalyst component which comprises:
(a) contacting a magnesium dihalide with at least one transition metal compound in the presence of a diluent under conditions suitable for the formation of a soluble complex;
(b) contacting said soluble complex produced in accordance with step (a) with about 0.1 to about 20 wt. percent based on said soluble complex of a particulate material consisting essentially of silica to produce a solid;
(c) contacting said solid with about 0.1 to about 10 mole per mole transition metal compound of an organoaluminum halide to produce said catalyst component.

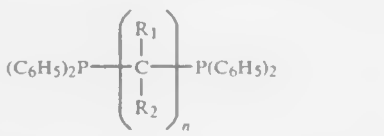
3. A method in accordance with claim 1 wherein said step a) further comprises the addition of an electron donor or mixture of electron donors selected from the group consisting of phenols and aromatic esters, wherein the molar ratio of said electron donor or mixture to said magnesium dihalide is in the range of 5:1 to 1:5.

10. A method in accordance with claim **3** wherein said crystalline olefin polymerization catalyst component is further contacted with a cocatalyst comprising an organoaluminum compound, wherein the molar ratio of cocatalyst to transition metal compound of said first catalyst component is in the range of 1:1 to 1500:1.

5,024,983
CATALYST SYSTEM, PROCESS FOR ITS PREPARATION AND ITS APPLICATION TO THE MANUFACTURE OF ALDEHYDES

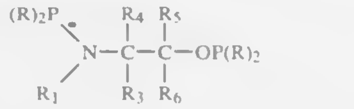
Eric Paumard, Cappel; Sylvain Mutez, Tourcoing; André Mortreux, Hem, and Francis Petit, Villeneuve D'Ascq, all of France, assignors to Norsolor, Paris, France
Filed Mar. 15, 1989, Ser. No. 323,718
Claims priority, application France, Mar. 30, 1988, 88 04192
Int. Cl.^{5} B01J *31/22, 31/24*
U.S. Cl. 502—167 **12 Claims**

1. Catalyst system comprising:
at least one platinum complex of formula $LPtX_2$ in which L is an organic compound containing at least two phosphorus atoms capable of coordinating platinum selected from (a) a bis(diphenylphosphino)-alkane of the formula



$$(C_6H_5)_2P-\left(\begin{array}{c}R_1\\|\\C\\|\\R_2\end{array}\right)_n-P(C_6H_5)_2 \qquad (I)$$

in which R_1 and R_2, which are identical or different, are chosen from the hydrogen atom and aliphatic hydrocarbon radicals, and n is greater than or equal to 4 and (b) an aminophosphinephosphinite of the formula



(II)

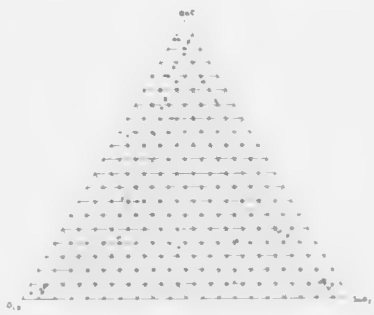
in which:
R is an aliphatic, cycloaliphatic or aromatic hydrocarbon radical,
R_1 is chosen from the hydrogen atom and hydrocarbon radicals,
R_3 and R_4 which necessarily differ from each other, are chosen from the hydrogen atom and hydrocarbon radicals optionally carrying at least one functional group chosen from alcohol, thiol, thioether, amine, imine, acid, ester, amide and ether functional groups,
R_5 and R_6 are chosen from the hydrogen atom and hydrocarbon radicals, and
R_1, R_3 and the nitrogen and carbon atoms which carry them respectively may together form a heterocyclic ring; and X is a halogen atom, and
at least one combination formed between iron and an alkene carbonate by electrochemical reduction.

5,024,984
CATALYSTS FOR THE OXIDATIVE CONVERSION OF METHANE TO HIGHER HYDROCARBONS

Mark P. Kaminsky, Lisle; Mark S. Kleefisch, Plainfield; George A. Huff, Naperville; Don M. Washecbeck, Naperville; Aileen E. Alvarado-Swaisgood, Naperville, and Mark K. Barr, Wheaton, all of Ill., assignors to Amoco Corporation, Chicago, Ill.
Continuation-in-part of Ser. No. 233,063, Aug. 17, 1988. This application Jul. 19, 1989, Ser. No. 382,479
Int. Cl.^{5} B01J *23/02*
U.S. Cl. 502—303 **13 Claims**

1. An oxidative coupling catalyst composition for converting methane to a higher hydrocarbon comprising a mixed oxide of: a) a Group IIIB metal selected from the group consisting of yttrium, lanthanum and scandium; b) a Group IIA metal selected from the group consisting of barium, calcium and strontium; and c) a Group IVA metal selected from the group consisting of tin, lead and germanium and wherein the cationic species of the Group IIIB metals, the Group IIA metals and the Group IVA metals are present in the approximate ratio of 1:0.5–3:2–4, respectively.

8. A process for preparing a catalyst represented by the approximate empirical formula $Y_1Ba_2Sn_3O_y$ wherein the value of y represents the number of oxygen anions required to balance the combined charge of the cationic species Y, Ba and Sn, comprising intimately mixing an oxygen-containing compound of each of yttrium, barium and tin, and thereafter calcining said mixture at a temperature of up to about 1000° C. to produce said catalyst.



5,024,985
SUPPORT MATERIAL FOR THREE-WAY CATALYSTS CONTAINING PLATINUM GROUP METAL AND HAVING REDUCED TENDENCY FOR H_2S EMISSION

Edgar Koberstein, Alzenau; Bernd Engler, Hanau; Rainer Domesle, Alzenau-Kälberau, and Peter Schubert, Hanau, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany
Filed Jan. 29, 1990, Ser. No. 471,486
Claims priority, application Fed. Rep. of Germany, Feb. 1, 1989, 3902913
Int. Cl.^{5} B01J *21/04, 23/10, 23/40*
U.S. Cl. 502—304 **17 Claims**

1. A support material for a three-way catalyst containing platinum group metal for the purification of exhaust gases of an internal combustion engine having reduced tendency for H_2S emission, comprising a mixture of active aluminum oxide and at least 10 wt.% of cerium oxide as the support or cerium oxide alone as the support, relative to the sum of all support constituents, produced by spray-drying an aqueous suspension of 0–90 parts by weight of an active, aluminum oxide and/or its particular precursor, and 10–100 parts by weight of cerium oxide or of a soluble and/or insoluble precursor of the cerium oxide, calculated as CeO_2, and by annealing the material thus obtained for 15 minutes to 24 hours at 350°-1,140° C.

5,024,986
HEAT SENSITIVE RECORDING PAPER

Toru Katsura; Hiroo Kaji, both of Tokyo; Kenji Hyodo, Tsuchiura, and Hirokazu Ohkura, Tokyo, all of Japan, assignors to Mitsubishi Paper Mills Limited, Tokyo, Japan
Filed May 26, 1989, Ser. No. 357,190
Claims priority, application Japan, May 27, 1988, 63-131274
Int. Cl.^{5} B41M *5/40*
U.S. Cl. 503—200 **4 Claims**

1. Heat sensitive recording paper comprising a heat sensitive recording layer which, upon heating, develops color, wherein

VOL
1127
ISS
3
JE
18
1991
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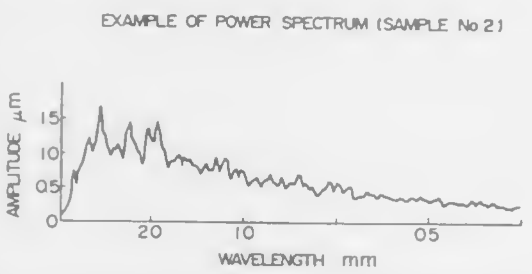
the average amplitude of paper thickness variation in the range of 0.2-mm and 1.0-mm wavelengths of paper thickness variation does not exceed 0.5 μm and wherein said paper has no distinctive variation peak in the above wavelength range.



5,024,987
RECORDING MATERIAL

Günter Klug, Monheim; Gert Jabs, Odenthal; Horst Berneth, Leverkusen, and Artur Botta, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 17, 1989, Ser. No. 438,921

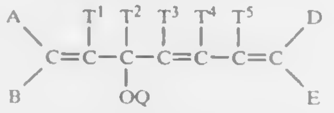
Claims priority, application Fed. Rep. of Germany, Dec. 7, 1988, 3841184

Int. Cl.^{5} B41M *5/136*

U.S. Cl. 503—211 **20 Claims**

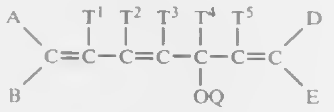
1. Pressure-sensitive reactive recording material containing color-forming agents and color developers as characteristic constituents, characterized in that

a) the dyestuff-forming agent is a tetraindolylheptamethine of the formula I/1, I/2, I/3 or I/4.



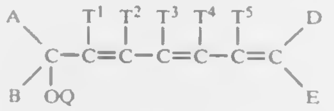
$\mathrm{(A)(B)C{=}C(T^1){-}C(T^2)(OQ){-}C(T^3){=}C(T^4){-}C(T^5){=}C(D)(E)}$

I/1



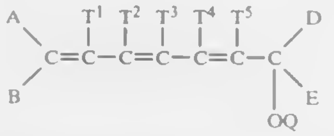
$\mathrm{(A)(B)C{=}C(T^1){-}C(T^2){=}C(T^3){-}C(T^4)(OQ){-}C(T^5){=}C(D)(E)}$

I/2



$\mathrm{(A)(B)(OQ)C{-}C(T^1){=}C(T^2){-}C(T^3){=}C(T^4){-}C(T^5){=}C(D)(E)}$

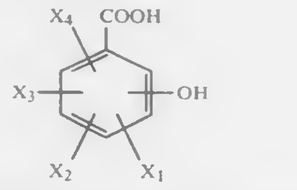
I/3



$\mathrm{(A)(B)C{=}C(T^1){-}C(T^2){=}C(T^3){-}C(T^4){=}C(T^5){-}C(D)(E)(OQ)}$

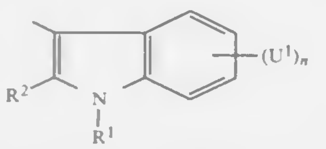
I/4

b) and the color developer is the salt of a polyvalent metal and an aromatic carboxylic acid having at least 10 carbon atoms, of the formula (II)



(II)

wherein, in the abovementioned formulae, A, B, D and E denote



and can be identical to or different from one another,

Q denotes hydrogen, alkyl, alkenyl, cycloalkyl, aralkyl, aryl or a heterocyclic radical which is bonded via alkyl,

R^1 denotes hydrogen, alkyl, alkenyl, cycloalkyl, aralkyl or a heterocyclic radical which is bonded via alkyl,

R^2 denotes hydrogen, alkyl, alkenyl, cycloalkyl, aralkyl aryl or a heterocyclic radical,

T^1 to T^5 denotte hydrogen, alkyl, alkenyl, cycloalkyl, aralkyl, halogen, alkoxy, dialkylamino, cyano, hydroxycarbonyl, alkoxycarbonyl, aryl or a heterocyclic radical, or in each case two of the radicals T^1 to T^5 denote the missing members of a 5- or 7-membered ring, which can be aromatic or partly hydrogenated and can contain up to 2 heteroatoms from the series comprising O, N or S,

U^1 denotes hydrogen, alkyl, alkenyl, cycloalkyl, aralkyl, aryl, hydroxyl, alkoxy, halogen, dialkylamino, nitro, cyano, alkylthio, alkoxycarbonyl, dialkylaminocarbonyl, alkoxycarbonyloxy or alkylsulphonyl, or, together with R^1, denote a C_2-or C_3-bridge,

denotes 1 or 2,

X_1, X_3 and X_4 denote hydrogen, halogen, hydroxyl, alkyl, cycloalkyl, aryl, alkaryl, aralkyl, alkoxy or aryloxy, or two adjacent radicals X_1, X_2, X_3 and X_4 together can form a ring,

and wherein all of the cyclic and non-cyclic radicals can carry nonionic substituents.

5,024,988
PRESSURE-OR HEAT-SENSITIVE RECORDING MATERIAL

Rudolf Zink, Alemannenstrasse, and Rox Phaff, Gstaadmattstrasse, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 28, 1989, Ser. No. 442,087

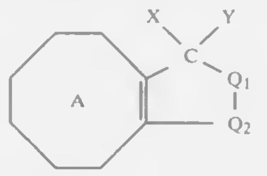
Claims priority, application Switzerland, Dec. 2, 1988, 4484/88; Jul. 6, 1989, 2510/89

Int. Cl.^{5} B41M *5/16, 5/18, 5/22*

U.S. Cl. 503—212 **32 Claims**

1. A pressure-sensitive or heat-sensitive recording material comprising a substrate and a color reactant system in which the color reactant system comprises

(A) a polycyclic compound of the formula



(I)

in which

X is a monocyclic or polycyclic aromatic or heteroaromatic radical,

Y is a substituent detachable as an anion,

Q_1 is —O—, —S—, >N—R or >N—NH—R,

Q_2 is $—CH_2—$, —CO—, —CS— or $—SO_2—$,

R is hydrogen, C_1-C_{12}alkyl, C_5-C_{10}cycloalkyl, aryl or aralkyl, and ring A is an aromatic or heterocyclic radical having 6 ring atoms, which can have an aromatic fused ring, it being possible for both ring A and the fused ring to be substituted,

(B) an organic condensation component and

(C) a colour-developing component.

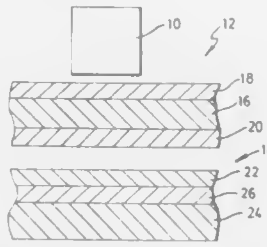
5,024,989
PROCESS AND MATERIALS FOR THERMAL IMAGING

Yunn H. Chiang, Andover, Mass., and Russell A. Gaudiana, Merrimack, N.H., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 25, 1990, Ser. No. 514,169

Int. Cl.^{5} B41M *5/035, 5/26*

U.S. Cl. 503—227 **32 Claims**



1. A process for thermal imaging using a donor sheet and a receiving sheet, the donor sheet comprising a support and a dye capable of being transferred by heat, the receiving sheet comprising a support and being adapted to receive the dye and thereby form an image, the process comprising placing the donor and receiving sheets adjacent one another, a polymeric liquid crystal being provided on at least one of the donor and receiving sheets so as to be present at the interface between the donor and receiving sheets, and heating selected portions of the donor sheet so as to transfer dye from the donor sheet to the receiving sheet, thereby forming an image on the receiving sheet.

5,024,990
MIXTURE OF DYES FOR CYAN DYE DONOR FOR THERMAL COLOR PROOFING

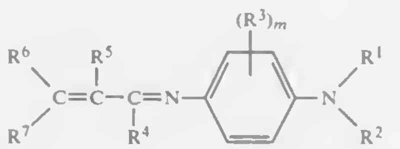
Derek D. Chapman, and Steven Evans, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1990, Ser. No. 606,395

Int. Cl.^{5} B41M *5/035, 5/26*

U.S. Cl. 503—227 **20 Claims**

13. In a process of forming a dye transfer image comprising imagewise-heating a cyan dye-donor element comprising a support having thereon a dye layer comprising a mixture of cyan dyes dispersed in a polymeric binder, at least one of the cyan dyes having the formula:



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wherein:

R^1 and R^2 each independently represents hydrogen; a substituted or unsubstituted alkyl group having from 1 to about 6 carbon atoms; a substituted or unsubstituted cycloalkyl group having from about 5 to about 7 carbon atoms or a substituted or unsubstituted allyl group;

or R^1 and R^2 can be joined together to form, along with the nitrogen to which they are attached, a 5- to 7-membered heterocyclic ring;

or either or both of R^1 and R^2 can be combined with R^3 to form a 5- to 7-membered heterocyclic ring;

each R^3 independently represents substituted or unsubstituted alkyl, cycloalkyl or allyl as described above for R^1 and R^2, alkoxy, aryloxy, halogen, thiocyano, acylamido, ureido, alkylsulfonamido, arylsulfonamido, alkylthio, arylthio or trifluoromethyl;

or any two of R^3 may be combined together to form a 5- or 6-membered carbocyclic or heterocyclic ring;

or one or two of R^3 may be combined with either or both of R^1 and R^2 to complete a 5- to 7-membered ring;

m is an integer of from 0 to 4;

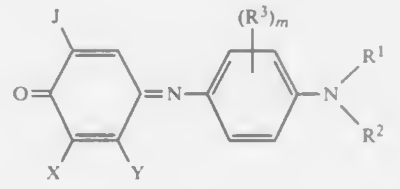
R^4 represents an electron withdrawing group;

R^5 represents a substituted or unsubstituted aryl group having from about 6 to about 10 carbon atoms or a substituted or unsubstituted hetaryl group having from about 5 to about 10 atoms;

R^6 and R^7 each independently represents an electron withdrawing group; and

R^6 and R^7 may be combined to form the residue of an active methylene compound;

and at least one of the other of the dyes having the formula:



II

wherein:

R^1, R^2, R^3 and m represent the same as above;

X represents hydrogen, halogen or may be combined together with Y to represent the atoms necessary to complete a 6-membered aromatic ring; with the proviso that when X is hydrogen, then J represents $NHCOR_F$, where R_F represents a perfluorinated alkyl or aryl group; and with the further proviso that when X is halogen, then J represents $NHCOR^8$, $NHCO_2R^8$, $NHCONHR^8$ or $NHSO_2R^8$; and with the further proviso that when X is combined with Y, then J represents $CONHR^8$, SO_2NHR^8, CN, SO_2R^8 or SCN, in which case, however, R^8 cannot be hydrogen;

R^8 is the same as R^1 and R^5 as described above; and

Y is R^1, R^5, acylamino or may be combined together with X as described above.

5,024,991
COMPOSITION USING SCHIFF BASE COPPER COMPLEX FOR PREPARING COMPOUND METAL OXIDES

Makoto Tsunashima, Tokyo; Hiroto Uchida, Omiya; Kazuhiro Sakai, Omiya, and Masato Miyauchi, Omiya, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 1, 1988, Ser. No. 226,999

Claims priority, application Japan, Jul. 31, 1987, 62-190203; Jul. 31, 1987, 62-190205; Sep. 1, 1987, 62-216514; Jan. 29, 1988, 63-17305

Int. Cl.^{5} C01G *3/00;* **C04B** *35/00;* **C23C** *18/12;* **H01L** *39/12*

U.S. Cl. 505—1 **4 Claims**

1. A composition for preparing a compound oxide of a rare earth metal, an alkaline earth metal and copper in a specific content ratio which comprises:

(1) an alkoxide of a rare earth metal,

(2) an alkoxide of an alkaline earth metal, and

(3) a Schiff base chelate complex of copper,

in such content ratio that the amount of the rare earth metal in said alkoxide, the amount of the alkaline earth metal in said alkoxide and the amount of copper in said complex correspond to the amounts of these metals in the object compound metal oxide.

3. A film-forming composition for forming a thin film of the compound metal oxide comprising

(1) an alkoxide of a rare earth metal,

(2) an alkoxide of an alkaline earth metal, and

(3) a Schiff base chelate complex of copper,

in such content ratio that the amount of the rare earth metal in

VOL
1127
ISS
3
JE
18
1991
UMI

said alkoxide, the amount of the alkaline earth metal in said alkoxide and the amount of copper in said complex correspond to the amounts of these metals in the object compound metal oxide,

(4) a film-forming resin, and

(5) an organic solvent.

5,024,992
PREPARATION OF HIGHLY OXIDIZED $RBA_2CU_4O_8$ SUPERCONDUCTORS

Donald E. Morris, Kensington, Calif., assignor to The Regents of the University of California, Oakland, Calif.

Continuation of Ser. No. 263,750, Oct. 28, 1988, abandoned. This application Jun. 22, 1990, Ser. No. 542,672

Int. Cl.⁵ C01B *13/14, 13/32;* **C01F** *11/02;* **H01L** *39/12*

U.S. Cl. 505—1 **14 Claims**

1. A process for producing a superconducting material, said process comprising:

(a) forming a composition by admixing (i) a compound of a metal selected from the group consisting of yttrium and rare earth metals with (ii) a compound of barium and (iii) a compound of copper, said compounds selected from the group consisting of oxides, nitrates and carbonates thereof, in relative amounts such that the atomic ratio of said metal to barium to copper in said composition is approximately 1:2:4;

(b) heating said composition in an oxygen-containing atmosphere having an oxidizing potential greater than 50% molecular oxygen at a pressure of at least 30 atmospheres to a temperature and for a length of time sufficient to effect interdiffusion of said compounds and the formation of a substantially single phase crystalline or polycrystalline lattice structure having approximately the empirical formula $RBa_2Cu_4O_8$ where R is said metal of compound (i), which lattice structure is temperature stable at temperatures below about 750° C.

5,024,993
SUPERCONDUCTING-SEMICONDUCTING CIRCUITS, DEVICES AND SYSTEMS

Harry Kroger, and Uttam S. Ghoshal, both of Austin, assignors to Microelectronics & Computer Technology Corporation, Austin, Tex.

Filed May 2, 1990, Ser. No. 518,004

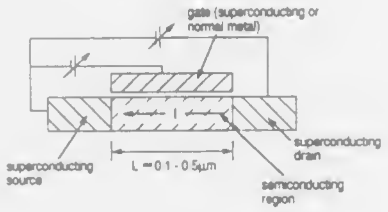
Int. Cl.⁵ H01L *27/00, 39/00;* **G06F** *7/00;* **H05G** *1/66*

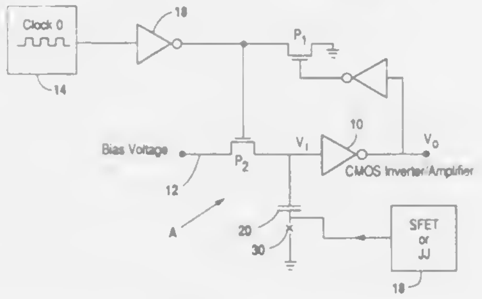
U.S. Cl. 505—1 **20 Claims**

1. A superconducting-semiconducting electrical circuit element comprising:

(a) a superconducting charge controlled three-terminal device, having a device control terminal, a second terminal and a third terminal, wherein the output current between the second and third terminals is controlled by the voltage applied to the control terminal, and wherein the output current exhibits superconducting characteristics as a function of temperature and input charge conditions; and

(b) a cryogenic semiconducting interconnect circuit, adapted to receive as an input an output signal from said superconducting device, and to provide a semiconductor switching voltage level output signal modulated by the input signal from said superconducting device.





5,024,994
RENIN INHIBITORS IV

Annette M. Doherty, Ann Arbor, Mich.; James P. Hudspeth, Newbury Park, Calif.; James S. Kaltenbronn, Ann Arbor; Joseph T. Repine, Ann Arbor, Mich.; William H. Roark, Ann Arbor, Mich.; Ila Sircar, Ann Arbor, Mich., and Francis J. Tinney, Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 113,278, Nov. 12, 1987, abandoned, which is a continuation-in-part of Ser. No. 945,582, Dec. 23, 1986, abandoned. This application Aug. 17, 1988, Ser. No. 233,320

Int. Cl.⁵ A61K *37/02;* **C07K** *5/00*

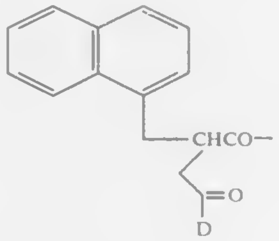
U.S. Cl. 514—18 **6 Claims**

1. A peptide of the formula

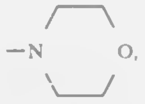
$$\text{ACYL—X—Y—W—U—V} \qquad (I)$$

or a pharmaceutically acceptable acid addition salt thereof, wherein

ACYL is BOC, IVA, NVA, DNMA, Z, MNPP, BMA, BBSP, or



wherein D is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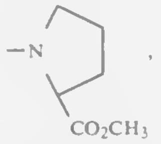
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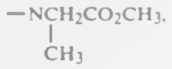
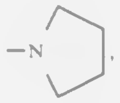


$$-\underset{\underset{CH_3}{|}}{N}CH_2CO_2CH_3,$$

$-OCH_3$,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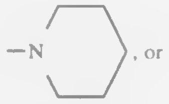
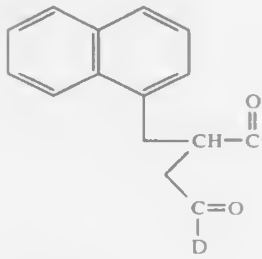

, or

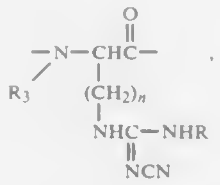
$-N(CH_3)_2$;

X is absent, PHE, HOMOPHE, NAPHTHYLALA, CYCLOHEXYLALA, O-MeTYR, TYR, or TRP, with the proviso that when ACYL is DNMA, BBSP, MNPP, or


wherein D is as above,

X is absent,

Y is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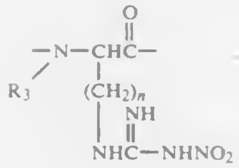

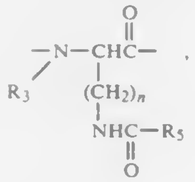
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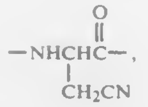

$$-NH\underset{\underset{CH_2CN}{|}}{C}H\overset{\overset{O}{\|}}{C}-,$$

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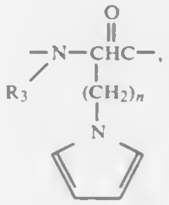
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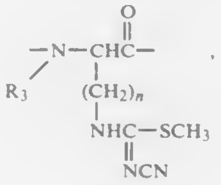
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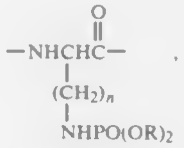
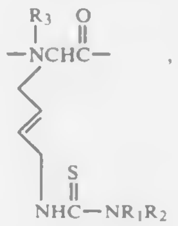


$$-NH\underset{\underset{\underset{NHPO(OR)_2}{|}}{\underset{(CH_2)_n}{|}}}{C}H\overset{\overset{O}{\|}}{C}-,$$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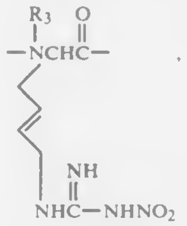
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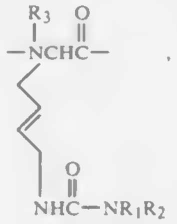
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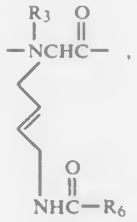
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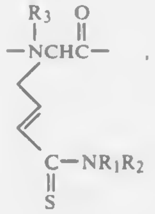
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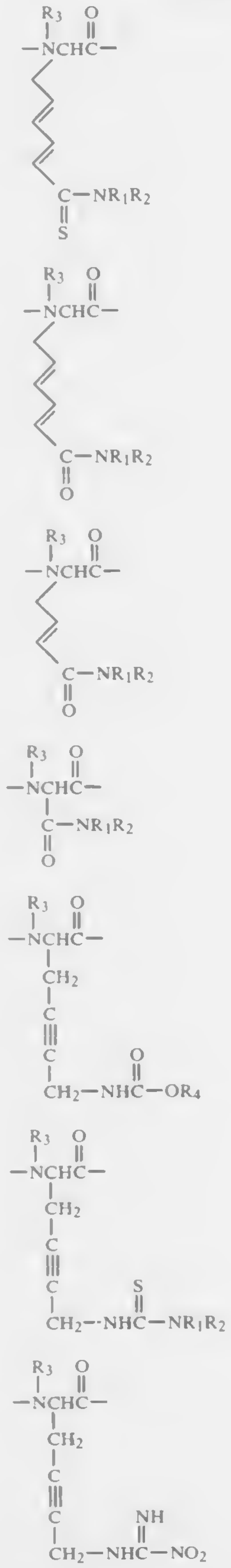

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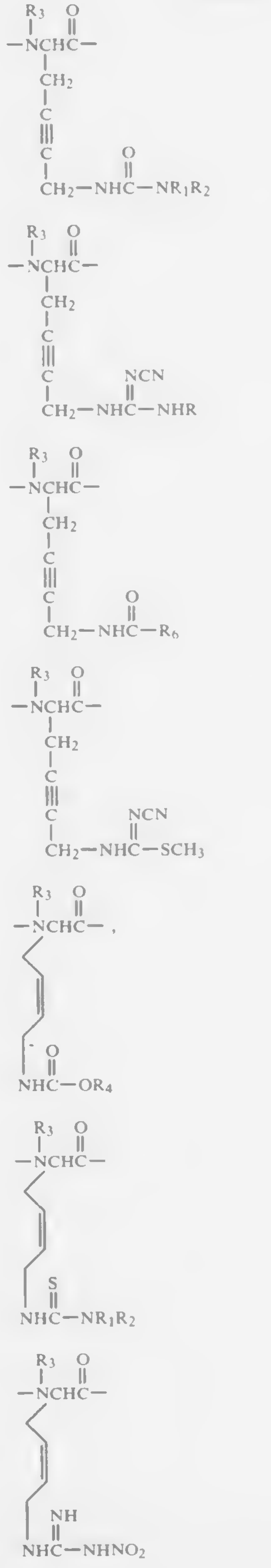

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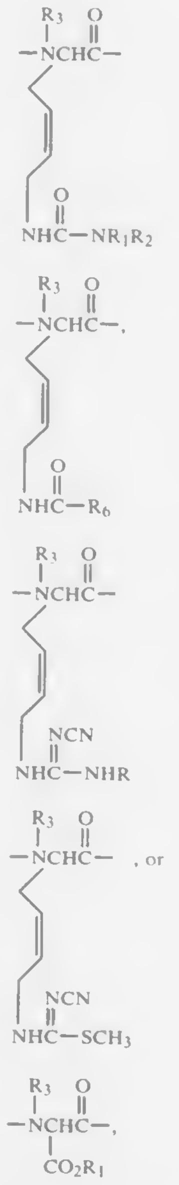


wherein n is an integer from 2 to 8, R is hydrogen or an alkyl of from 1 to 3 carbon atoms,

R_1 and R_2 are each independently hydrogen, lower alkyl of from 1 to 4 carbon atoms, or taken together form a 5 or 6 membered ring with the nitrogen to which they are attached, aralkyl, or aryl,

R_3 is hydrogen or methyl,

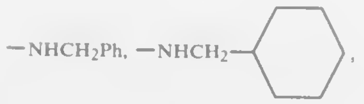
R_4 is lower alkyl or benzyl,

R_5 is CH_2SCH_3, CH_2SOCH_3, or $CH_2SO_2CH_3$,

R_6 is R_5, H, or lower alkyl;

W is STA, PHSTA, CYSTA, ASTA, ACYS, CHSTA, DFSTA, DFKSTA, DFCYS, DFKCYS, DFCHS, or DFKCHS;

U is absent, LEU, ILE, VAL, N-MeLEU, N-MeILE; and V is



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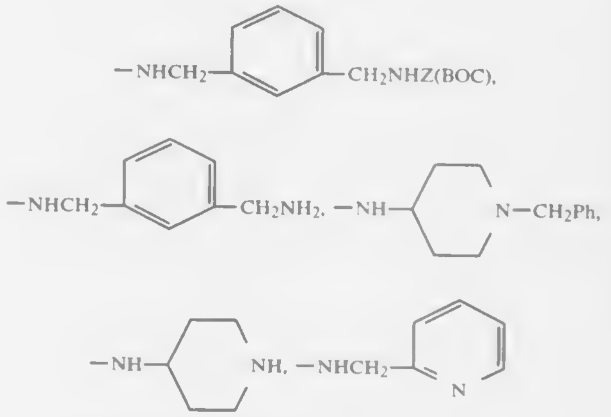
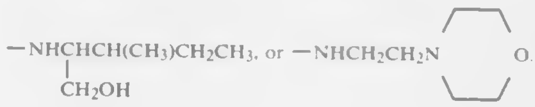


$-NHCH_2CH(CH_3)CH_2CH_3$, $-OCH_3$, $-OC_2H_5$,



5,024,995

NATURAL PULMONARY SURFACTANT, METHOD OF PREPARATION AND PHARAMCEUTICAL COMPOSITIONS

Bengt Robertson, and Tore Curstedt, both of Stockholm, Sweden, assignors to Chiesi Farmaceutici S.P.A., Perma, Italy

Filed Apr. 5, 1988, Ser. No. 177,771

Claims priority, application Italy, Apr. 8, 1987, 20032 A/87

Int. Cl.⁵ A61K *37/22, 31/685*

U.S. Cl. 514—21 **4 Claims**

1. An animal pulmonary surfactant which consists of polar lipids and proteins wherein the polar lipids are mainly phospholipids and the proteins are hydrophobic low molecular weight proteins of 3–14 KD (Kilodaltons), the polar lipid content is 98.5–99%, the protein content is less than 1.5%, and the phospholipid fraction contains at least 70–75% by weight of phosphatidylcholine, 40–45% of which consists of diplamitoylphosphatidylcholine, said surfactant is free of carbohydrates, cholesterol, triglycerides and cholesterol esters.

5,024,996

R-T-E CEREAL WITH SOLUBLE FIBERS

Mitchell L. Ringe, Maple Grove, Minn., assignor to General Mills, Inc., Minneapolis, Minn.

Filed Dec. 5, 1989, Ser. No. 446,247

Int. Cl.⁵ A23L *1/42, 1/29;* **A21D** *8/00, 13/00*

U.S. Cl. 514—54 **29 Claims**

1. A ready-to-eat R-T-E cereal which is high in total dietary fiber, comprising a cereal composition including:

A. about 20% to 80% by weight of the cereal composition of a starchy cereal ingredient;

B. about 10% to 70% by weight of the cereal composition of a barley flour extract having glucan content of about 18% to 50% by weight;

C. sufficient amounts of an insoluble fiber source so as to provide the cereal composition with a weight ratio of soluble fiber to insoluble fiber of about 1 to 5:1;

D. a moisture content of about 1% to 6% by weight of the cereal composition; and

wherein the minimum soluble fiber content is about 10% by weight of the cereal composition.

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5,024,997
PALATABLE IBUPROFEN SOLUTIONS

Solomon Motola, Marlton; Gary R. Agisim, Cherry Hill, and Annabelle Mogavero, Medford, all of N.J., assignors to American Home Products Corporation, New York, N.Y.

Filed Jun. 22, 1990, Ser. No. 542,453

Int. Cl.⁵ A01N *43/04, 37/10, 25/00*

U.S. Cl. 514—58 **5 Claims**

1. A palatable aqueous base ibuprofen solution suitable for oral administration having a pH of about 3 to 5 comprising about 2% to 5% weight ibuprofen by volume of the total composition, about 20% to about 70% weight by volume of at least one taste masking sweetening ingredient and about 22% to about 75% weight by volume of hydroxypropyl beta cyclodextrin having a degree of hydroxpropyl substitution of about 6 to about 7.5, the weight ratio of ibuprofen to hydroxypropyl beta cyclodextrin being 1:11 to 1:15, and water qs to 100% by volume of the composition.

5,024,998
PHARMACEUTICAL FORMULATIONS FOR PARENTERAL USE

Nicholas S. Bodor, Gainesville, Fla., assignor to University of Florida, Gainesville, Fla.

Continuation-in-part of Ser. No. 139,755, Dec. 30, 1987, and a continuation-in-part of Ser. No. 174,945, Mar. 29, 1988, and a continuation-in-part of Ser. No. 431,222, Nov. 3, 1989, which is a continuation-in-part of Ser. No. 139,755, and a continuation-in-part of Ser. No. 174,945, which is a continuation-in-part of Ser. No. 139,755. This application Dec. 11, 1989, Ser. No. 448,655

Claims priority, application Canada, Dec. 13, 1988, 585791; Ireland, Dec. 13, 1988, 3717/88; Mar. 14, 1989, 810/89

The portion of the term of this patent subsequent to Jan. 8, 2008, has been disclaimed.

Int. Cl.⁵ C08B *37/16;* **A61K** *31/735*

U.S. Cl. 514—58 **86 Claims**

1. A method for decreasing the incidence of precipitation of a lipophilic and/or water-labile drug occurring at or near the injection site and/or in the lungs or other organs following parenteral administration, said method comprising parenterally administering said drug in an aqueous solution containing from about 20% to about 50% cyclodextrin selected from the group consisting of hydroxyethyl, glucosyl, maltosyl and maltotriosyl derivatives of β-cyclodextrin and hydroxypropyl, hydroxyethyl, glucosyl, maltosyl and maltotriosyl derivatives of γ-cyclodextrin.

5,024,999
PYRAZOLOPYRIDINE TYPE MEVALONOLACTONES USEFUL AS PHARMACEUTICALS

Yoshihiro Fujikawa; Mikio Suzuki; Hiroshi Iwasaki, all of Funabashi; Mitsuaki Sakashita, and Masaki Kirahara, both of Shiroaoka, all of Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

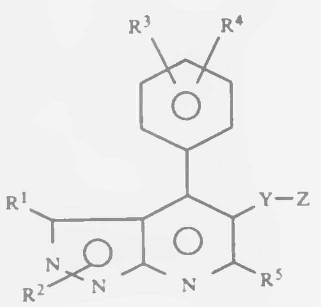
Filed Apr. 13, 1989, Ser. No. 337,411

Claims priority, application Japan, Apr. 26, 1988, 63-103090; Oct. 27, 1988, 63-271439; Jan. 26, 1989, 1-16846; Apr. 7, 1989, 1-88534

Int. Cl.⁵ A61K *31/435;* **C07D** *471/04*

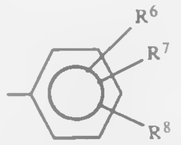
U.S. Cl. 514—63 **22 Claims**

1. A compound of the formula:

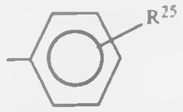


(1)

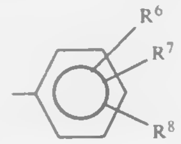
wherein R^2 is hydrogen, C_{1-8} alkyl, C_{1-6} alkoxy, C_{3-7} cycloalkyl, C_{2-6} alkenyl, α-or β-naphthyl, 2-, 3- or 4-pyridyl, 2- or 3-thienyl, 2- or 3-furyl, fluoro, chloro, bromo,



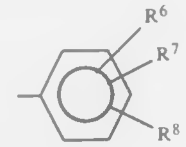
(wherein R^6, R^7 and R^8 are independently hydrogen, C_{1-8} alkyl, C_{1-8} alkoxy, C_{1-3} alkylthio, chloro, bromo, fluoro, $-NR^9R^{10}$ (wherein R^9 and R^{10} are independently C_{1-3} alkyl), chloromethyl, trichloromethyl, trifluoromethyl, trifluoromethoxy, trichloromethoxy, difluoromethoxy, phenoxy, benzyloxy, hydroxy, trimethylsilyloxy, diphenyl-t-butylsilyloxy, hydroxymethyl or $-O(CH_2)_kOR^{18}$ (wherein R^{18} is hydrogen or C_{1-3} alkyl, and k is 1, 2 or 3); when R^8 is hydrogen and when located at the ortho position to each other, R^6 and R^7 may together form $-OC(R^{19})(R^{20})O-$ wherein R^{19} and R^{20} are independently hydrogen or C_{1-3} alkyl); or when R^7 and R^8 are hydrogen at the same time, R^6 is



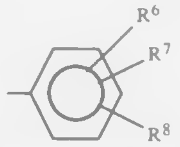
(wherein R^{25} is hydrogen, C_{1-4} alkyl, C_{1-3} alkoxy, trifluoromethyl, chloro, bromo, or fluoro)), phenyl-C_{2-3} alkenyl of which the phenyl group is unsubstituted or substituted by C_{1-4} alkyl, C_{1-3} alkoxy, fluorine, chlorine or bromine, or C_{1-3} alkyl substituted by one member selected from the group consisting of C_{1-3} alkoxy, naphthyl and



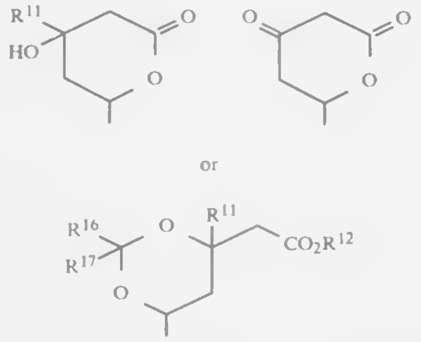
(wherein R^6, R^7 and R^8 are as defined above); R^2 is bonded to nitrogen at the 1- or 2-position of the pyrazolopyridine ring and is hydrogen, C_{1-8} alkyl, C_{1-3} alkyl substituted by 1 to 3 fluorine, C_{3-7} cycloalkyl, α- or β-naphthyl, 2-, 3- or 4-pyridyl, 2- or 3-thienyl, 2- or 3-furyl or



(wherein R^6, R^7 and R^8 are as defined above), or C_{1-3} alkyl substituted by one member selected from the group consisting of C_{1-3} alkoxy, hydroxy, naphthyl and



(wherein R^6, R^7 and R^8 are as defined above) R^3 and R^4 are independently hydrogen, C_{1-8} alkyl, C_{3-7} cycloalkyl, C_{1-3} alkoxy, n-butoxy, i-butoxy, sec-butoxy, $R^{23}R^{24}N-$ (wherein R^{23} and R^{24} are independently hydrogen or C_{1-3} alkyl), trifluoromethyl, trifluoromethoxy, difluoromethoxy, fluoro, chloro, bromo, phenyl, phenoxy, benzyloxy, hydroxy, trimethylsilyloxy, diphenyl-t-butylsilyloxy, hydroxymethyl or $-O(CH_2)_lOR^{15}$ (wherein R^{15} is hydrogen or C_{1-3} alkyl, and l is 1, 2 or 3); or when located at the ortho position to each other, R^3 and R^4 may together form $-CH{=}CH-CH{=}CH-$ or methylene dioxy; Y is $-CH_2-$, $-CH_2CH_2-$, $-CH{=}CH-$, $-CH_2-CH{=}CH-$, $-CH{=}CH-CH_2-$, $-C(CH_3){=}CH-$ or $-CH{=}C(CH_3)$; Z is $-Q-CH_2WCH_2-CO_2R^{12}$,



(wherein Q is $-C(O)-$, $-C(OR^{13})_2-$ or $-CH(OH)-$; W is $-C(O)-$, $-C(OR^{13})_2-$ or $-C(R^{11})(OH)-$; R^{11} is hydrogen or C_{1-3} alkyl; R^{12} is hydrogen or R^{14} (wherein R^{14} is alkyl moiety of chemically or physiologically hydrolyzable alkyl ester or M (wherein M is NH_4, sodium, potassium, ½ calcium or a hydrogen addition product to nitrogen of lower alkylamine, di-lower alkylamine or tri-lower alkylamine)): two R^{13} are independently primary or secondary C_{1-6} alkyl; or two R^{13} together form $-(CH_2)_2$ or $-(CH_2)_3-$; R^{16} and R^{17} are independently hydrogen or C_{1-3} alkyl; or R^{16} and R^{17} together form $-(CH_2)_2-$ or $-(CH_2)_3-$; and R^5 is cyclopropyl.

5,025,000
PHOSPHORUS-CONTAINING HMG-ÇOA REDUCTASE INHIBITOR COMPOUNDS

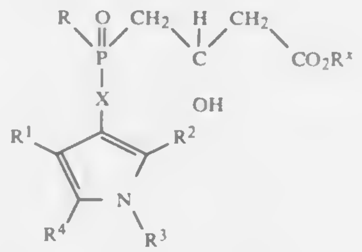
Donald S. Karanewsky, Robbinsville, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 2, 1990, Ser. No. 487,366

Int. Cl.⁵ C07D *471/04;* **A61K** *31/435*

U.S. Cl. 514—80 **14 Claims**

1. A compound having the structure



wherein X is $-(CH_2)_a-$, $-CH{=}CH-$, or $-C{\equiv}C-$; a is 1,2 or 3; R is OH or lower alkoxy; R^x is alkali metal, lower alkyl or H; one of R^1 and R^2 is substituted phenyl and the other of R^1 and R^2 is lower alkyl; R^3 and R^4 together are $-CH{=}CH-_2$ or $-CH_2-_4$ and are joined to complete a six-membered carbocyclic ring.

14. A method of inhibiting cholesterol biosynthesis which comprises administering to a patient in need of such treatment an effective cholesterol biosynthesis inhibiting amount of a compound as defined in claim **1**.

5,025,001
S-NITROSO DERIVATIVES OF ACE INHIBITORS AND THE USE THEREOF

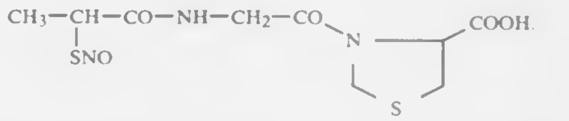
Joseph Loscalzo, Dedham, and John Cooke, Needham Heights, both of Mass., assignors to Brigham and Women's Hospital, Boston, Mass.

Continuation-in-part of Ser. No. 206,763, Jun. 15, 1988. This application Mar. 24, 1989, Ser. No. 328,397

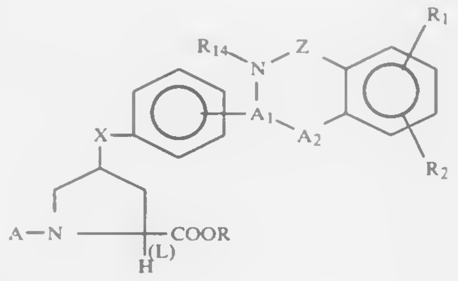
Int. Cl.⁵ A61K *31/505, 31/54, 31/425, 31/40*

U.S. Cl. 514—91 **22 Claims**

1. A pharmaceutically acceptable S-nitrosothiol having the formula:



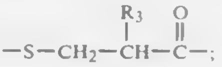
2. A pharmaceutically acceptable S-nitrosothiol having the formula:



wherein

X is oxygen or sulfur;

$-A_1-A_2-$ is $-CH-NH$ or $-C{=}N-$;

A is 
$ON-S-CH_2-\overset{R_3}{\overset{|}{CH}}-\overset{O}{\overset{\|}{C}}-$;

R is selected from hydrogen, lower C_1-C_4) alkyl, benzyl, benzhydryl, and salt forming ion;

R_1 and R_2 are independently selected from hydrogen, halogen, lower alkyl, lower alkoxy, halo substituted lower alkyl, nitro, and $-SO_2NH_2$;

Z id

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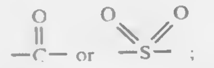
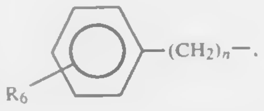


R₃ is hydrogen, lower alkyl, halo substituted lower alkyl, phenyl, benzyl, phenethyl, or cycloalkyl;

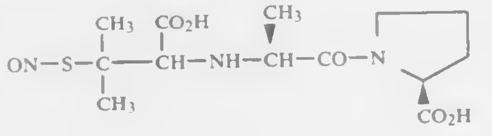
R₁₄ is hydrogen, lower alkyl, cycloalkyl-(CH₂)ₙ-, wherein n is one, two, three or four;

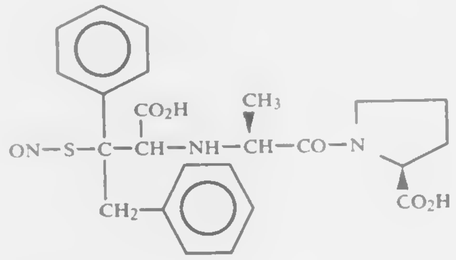


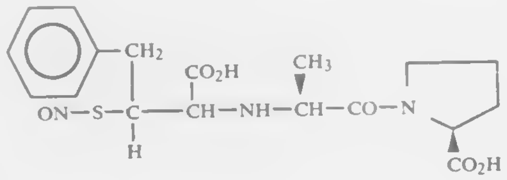
halo substituted lower alkyl, hydroxy substituted lower alkyl, —(CH₂)q—N(lower alkyl)₂, or —(CH₂)q—NH₂, wherein q is one, two, three or four; and

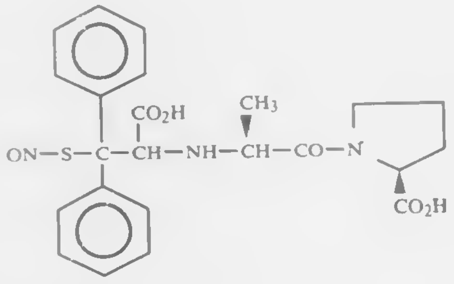
R₆ is hydrogen, lower alkyl, lower alkoxy, halogen, or hydroxy.

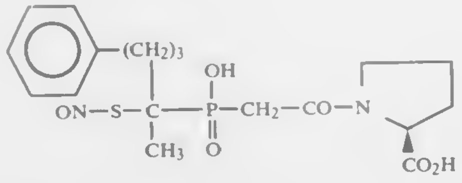
3. A pharmaceutically acceptable S-nitrosothiol selected from the group of the following formulae:











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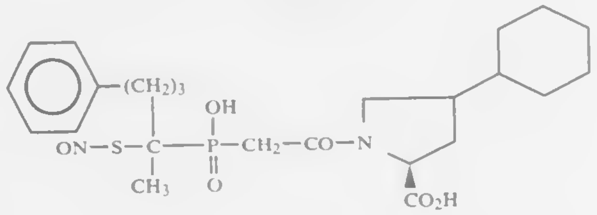
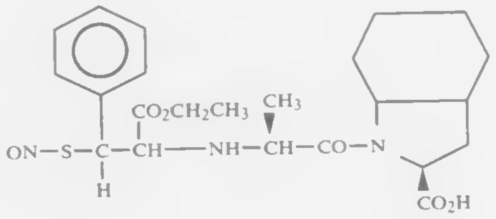
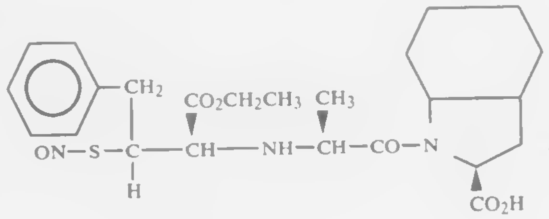
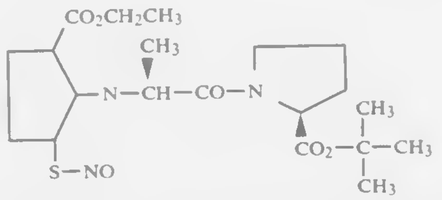






, and



5. A method for treating a cardiovascular-renal disease, comprising administering an effective amount of the S-nitrosothiol of any one of claims 1-3 to an animal in need of such treatment.

5,025,002

PROCESS FOR CONTROL OF MICROORGANISMS WITH PHOSPHORUS-BASED COMPOSITIONS

Reinhard Effenberger, Haifa, and David Direktor, Qiryat Ata, both of Israel, assignors to Bromine Compounds Ltd., Beer-Sheva, Israel

Filed Aug. 31, 1988, Ser. No. 238,722

Int. Cl.⁵ A01N *57/00*

U.S. Cl. 514—112 **8 Claims**

1. A method of killing or inhibiting the growth of harmful microorganisms selected from the group consisting of gram-negative bacteria, gram-positive bacteria and yeast, which comprises contacting said microorganisms with a biocidal composition comprising an effective biocidal or growth-inhibiting amount of at least one compound having the formula

$(RO)_2P(O)CXYZ$

wherein R is H, a C_{1-12} aliphatic hydrocarbon radical or a phenyl radical, X is H or halogen, Y is halogen, and Z is CN, with the proviso that X and Y cannot both be Cl.

5,025,003

ISOPRENOID PHOSPHINYLFORMIC ACID SQUALENE SYNTHETASE INHIBITORS

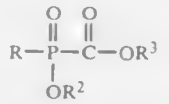
Scott A. Biller, Ewing, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sep. 18, 1989, Ser. No. 408,974

Int. Cl.⁵ C07F *9/38, 9/40;* **A61K** *31/66*

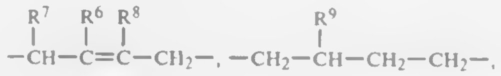
U.S. Cl. 514—120 **23 Claims**

1. A compound having the formula



$$R-\underset{OR^{2}}{\underset{|}{\overset{O}{\overset{\|}{P}}}}-\overset{O}{\overset{\|}{C}}-OR^{3}$$

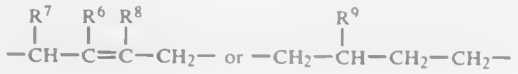
wherein R^2 is a metal ion, lower alkyl or H; R^3 is a metal ion or lower alkyl; R is $R^1—(CH_2)_n—$, $R^1—(CH_2)_mO—$ which contains at least 12 carbons in the carbon chain, or $R^1—(CH_2)_mOCH_2—$, wherein n is an integer from 1 to 4 and m is an integer from 0 to 3; and R^1 is $R^5—Q^1—Q^2—Q^3—$ wherein Q^1, Q^2 and Q^3 are independently:



$$-\overset{R^{7}}{\overset{|}{C}}H-\overset{R^{6}}{\overset{|}{C}}=\overset{R^{8}}{\overset{|}{C}}-CH_2-,\ -CH_2-\overset{R^{9}}{\overset{|}{C}}H-CH_2-CH_2-,$$

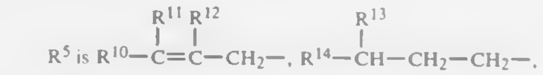
$—CH_2—C≡C—CH_2—,$

or a bond, at least one of Q^1 and/or Q^2 being other than a bond; if any of Q^1, Q^2 and Q^3 is



$$-\overset{R^{7}}{\overset{|}{C}}H-\overset{R^{6}}{\overset{|}{C}}=\overset{R^{8}}{\overset{|}{C}}-CH_2-\ \text{or}\ -CH_2-\overset{R^{9}}{\overset{|}{C}}H-CH_2-CH_2-$$

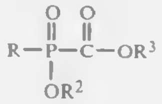
then R^6 is H, lower alkyl, fluoro or fluoroalkyl; R^7 is H, fluoro, lower alkyl or alkylthio; R^8 is H, fluoro, trimethylsilyl or lower alkyl; R^9 is H, or lower alkyl;



$$R^5\ \text{is}\ R^{10}-\overset{R^{11}}{\overset{|}{C}}=\overset{R^{12}}{\overset{|}{C}}-CH_2-,\ R^{14}-\overset{R^{13}}{\overset{|}{C}}H-CH_2-CH_2-.$$

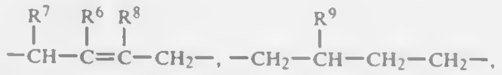
$R^{16}—C≡C—CH_2—$(wherein R^{16} is lower alkyl or H), or $CH_3(CH_2)_p—$ where p is 2 to 7; R^{10} and R^{11} are independently hydrogen, lower alkyl, fluoro, lower alkenyl or fluoroalkyl or R^{10} and R^{11} can be taken together to form $(CH_2)_s$, where s is 2 to 7; R^{12} is hydrogen, lower alkyl, fluoro or lower alkenyl; R^{13} and R^{14} are independently lower alkyl; including all stereoisomers thereof.

13. A method of inhibiting cholesterol biosynthesis, which comprises administering to a patient in need of such treatment an effective cholesterol biosynthesis inhibiting amount of a compound having the formula



$$R-\underset{OR^{2}}{\underset{|}{\overset{O}{\overset{\|}{P}}}}-\overset{O}{\overset{\|}{C}}-OR^{3}$$

wherein R^2 is a metal ion, lower alkyl or H; R^3 is a metal ion or lower alkyl; R is $R^1—(CH_2)_n—$, $R^1—(CH_2)_mO—$ which contains at least 12 carbons in the carbon chain, or $R^1—(CH_2)_mOCH_2—$, wherein n is an integer from 1 to 4 and m is an integer from 0 to 3; and R^1 is $R^5—Q^1—Q^2—Q^3—$ wherein Q^1, Q^2 and Q^3 are independently:

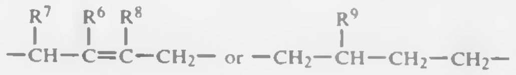


$$-\overset{R^{7}}{\overset{|}{C}}H-\overset{R^{6}}{\overset{|}{C}}=\overset{R^{8}}{\overset{|}{C}}-CH_2-,\ -CH_2-\overset{R^{9}}{\overset{|}{C}}H-CH_2-CH_2-,$$

-continued

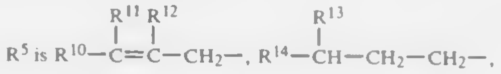
$—CH_2—C≡C—CH_2—,$

or a bond, at least one of Q^1 and/or Q^2 being other than a bond; if any of Q^1, Q^2 and Q^3 is



$$-\overset{R^{7}}{\overset{|}{C}}H-\overset{R^{6}}{\overset{|}{C}}=\overset{R^{8}}{\overset{|}{C}}-CH_2-\ \text{or}\ -CH_2-\overset{R^{9}}{\overset{|}{C}}H-CH_2-CH_2-$$

then R^6 is H, lower alkyl, fluoro or fluoroalkyl; R^7 is H, fluoro, lower alkyl or alkylthio; R^8 is H, fluoro, trimethylsilyl or lower alkyl; R^9 is H, or lower alkyl;



$$R^5\ \text{is}\ R^{10}-\overset{R^{11}}{\overset{|}{C}}=\overset{R^{12}}{\overset{|}{C}}-CH_2-,\ R^{14}-\overset{R^{13}}{\overset{|}{C}}H-CH_2-CH_2-,$$

$R^{16}—C≡C—CH_2—$(wherein R^{16} is lower alkyl or H), or $CH_3(CH_2)_p—$ where p is 2 to 7; R^{10} and R^{11} are independently hydrogen, lower alkyl, fluoro, lower alkenyl or fluoroalkyl or R^{10} and R^{11} can be taken together to form $(CH_2)_s$, where s is 2 to 7; R^{12} is hydrogen, lower alkyl, fluoro or lower alkenyl; R^{13} and R^{14} are independently lower alkyl; including all stereoisomers thereof.

5,025,004

WATER-DISPERSIBLE POLYMERIC COMPOSITIONS

Stephen H. W. Wu, Kingsport; Carol J. Greene, Mt. Carmel, and Mahendra K. Sharma, Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 205,765, Jun. 13, 1988, Pat. No. 4,960,814. This application Jun. 4, 1990, Ser. No. 532,826

Int. Cl.⁵ A61K *9/32*

U.S. Cl. 514—165 **45 Claims**

1. A polymeric composition comprising
(A) about 42.5 to about 98 weight % of at least one water insoluble polymer,
(B) about 0.5 to about 30 weight % of at least one oil-in-water emulsifier which is polymeric, water soluble or water dispersible and nonionic.
(C) about 1 to about 27.5 weight % of at least one water-in-oil emulsifier which is water insoluble; anionic or amphoteric; more hydrophobic than said oil-in-water emulsifier; substantially dispersible in a low molecular weight, more volatile than water, and substantially water immiscible organic solvent; and compatible with said oil-in-water emulsifier,

said polymeric composition being in the form of particles having an average particle size of about 0.1–0.8 μm.

10. A process for preparing a solid dosage form comprising:
(A) dispersing the polymeric composition of claim 1 in an aqueous solution which comprises at least about 85 weight % water to prepare a coating dope, and
(B) coating a solid medicament core with the coating dope of step (A).

VOL
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LIPID DERIVATIVES, THEIR PRODUCTION AND USE

Hiroaki Nomura, Takatsuki; Kohei Nishikawa, Kyoto; Susumu Tsushima, Suita, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 141,276, Jan. 6, 1988, abandoned, which is a division of Ser. No. 906,310, Sep. 12, 1986, Pat. No. 4,737,518, which is a continuation-in-part of Ser. No. 719,579, Apr. 3, 1985, abandoned. This application Jul. 23, 1990, Ser. No. 556,280

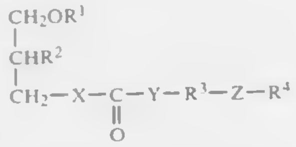
Claims priority, application PCT Int'l Appl., Apr. 3, 1984, PCT/JP84/00163; Oct. 11, 1984, PCT/JP84/00476; Feb. 15. 1985, PCT/JP85/00062; Japan, Oct. 1, 1985, 60-219874

The portion of the term of this patent subsequent to Apr. 12, 2005, has been disclaimed.

Int. Cl.⁵ A61K *31/33*

U.S. Cl. 514—183 **41 Claims**

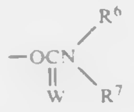
1. A compound of the formula:



$$\begin{array}{l} CH_2OR^1 \\ | \\ CHR^2 \\ | \\ CH_2-X-\underset{\underset{O}{\|}}{C}-Y-R^3-Z-R^4 \end{array}$$

wherein R^1 is C_{10-30} alkyl or a group of the formula R^5NHCO- in which R^5 is C_{10-30} alkyl;

R^2 is hydrogen, hydroxy, C_{1-5} alkoxy, phenyl-C_{1-5} alkoxy, C_{1-5} alkanoyloxy, benzoyloxy, phenoxycarbonyloxy, C_{1-5} alkoxycarbonyloxy, a group of the formula



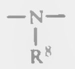
$$-O\underset{\underset{W}{\|}}{C}N\begin{smallmatrix}R^6\\ R^7\end{smallmatrix}$$

(in which W is oxygen or sulfur, and R^6 and R^7 are independently hydrogen or C_{1-5} alkyl or both, taken together with the adjacent nitrogen atom, form a 3- to 7-membered hetero ring selected from the class consisting of 1-aziridinyl, 1-azetidinyl, 1-pyrrolidinyl, piperidino, 1-perhydroazepinyl, 1-piperazinyl, morpholino, thiomorpholino, 1-perhydrodiazepinyl, 4-perhydrooxazepinyl and 4-perhydrothiazepinyl), amino, C_{1-5} alkanoylamino, benzoylamino, optionally oxo-substituted 3- to 7-membered monocyclic amino selected from the class consisting of 1-aziridinyl, 1-azetidinyl, 1-pyrrolidinyl, piperidino, 1-perhydroazepinyl, 1-piperazinyl, morpholino, thiomorpholino, 1-perhydroazepinyl, 1-piperazinyl, morpholino, thiomorpholino, 1-perhydrodiazepinyl, 4-perhydrooxazepinyl and 4-perhydrothiazepinyl, or optionally oxo-substituted 2-isoindolinyl;

R^3 is C_{1-8} alkylene;

R^4 is hydrogen, C_{1-6} alkyl or phenyl-C_{1-6} alkyl;

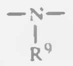
X is O, S or a group of the formula:



$$\underset{\underset{R^8}{|}}{-N-}$$

(in which R^8 is hydrogen, optionally carboxy or C_{1-5} alkoxycarbonyl substituted C_{1-5} alkyl, C_{1-5} alkanoyl, benzoyl, phenoxycarbonyl, C_{1-5} alkoxycarbonyl, carbamoyl, mono- or di-C_{1-5} alkylcarbamoyl or 3- or 7-membered cyclic aminocarbonyl selected from the class consisting of (aziridin-1-yl)carbonyl, (azetidin-1-yl)carbonyl, (pyrrolidin-1-yl)carbonyl, piperidino-carbonyl, (perhydroazepin-1-yl)carbonyl, (piperazin-1-yl)carbonyl, morpholinocarbonyl and thiomorpholinocarbonyl);

Y is O, S or a group of the formula



$$\underset{\underset{R^9}{|}}{-N-}$$

(in which R^9 is hydrogen, optionally carboxy or C_{1-5} alkoxycarbonyl substituted C_{1-5} alkyl, C_{1-5} alkanoyl, benzoyl, phenoxycarbonyl, C_{1-5} alkoxycarbonyl, carbamoyl, mono- or di-C_{1-5} alkylcarbamoyl or 3- to 7-membered cyclic aminocarbonyl selected from the class consisting of (aziridin-1-yl)carbonyl, (azetidin-1-yl)carbonyl, (pyrrolidin-1-yl)carbonyl. piperidino-carbonyl, (perhydroazepin-1-yl)carbonyl, (piperazin-1-yl)-carbonyl, morpholinocarbonyl and thiomorpholinocarbonyl); and R^8 and R^9 or R^4 and R^9 may form C_{1-4} alkenylene or alkylene unsubstituted or substituted by oxo; and

Z is a nitrogen-containing heterocyclic group selected from the class consisting of azetidinyl, pyrrolidinyl, piperidinyl, perhydroazepinyl, pyrrolinyl, pyrazolinyl, pyrrolyl, pyridyl, oxazolyl, thiazolyl, pyridazinyl, pyrimidyl, pyrazinyl, imidazolyl, morpholinyl, thiomorpholinyl, piperazinyl, pyrazolidinyl, indolyl, isoindolyl, 1H-indazolyl, purinyl, quinolinyl, isoquinolinyl, 1,2,3,4-tetrahydroquinolinyl, perhydroindolyl and perhydroisoquinolinyl, each of said groups being unsubstituted or substituted by optionally hydroxy- or amino-substituted C_{1-4} alkyl, hydroxy, amino, imino, mono-or di-C_{1-4} alkylamino, carbamoyl, ureido, carboxy, carboxylato or C_{1-4} alkoxycarbonyl, wherein a nitrogen atom in said nitrogen-containing heterocyclic group may be converted into a quaternary salt with R^4, wherein R^3 is bound to Z at a position adjacent to the nitrogen atom contained in said nitrogen-containing heterocyclic group represented by Z or a pharmaceutically acceptable salt thereof.

5,025,006

2-BIPHENYL-CARBAPENEM ANTIBACTERIAL AGENTS

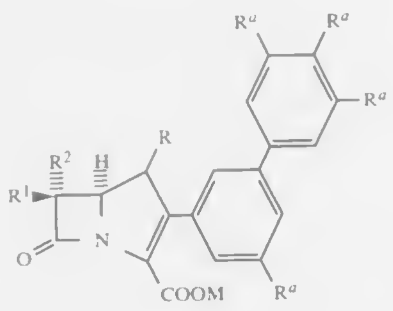
Frank P. Dininno, Old Bridge, and Thomas N. Salzmann, North Plainfield, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jun. 26, 1990, Ser. No. 543,946

Int. Cl.⁵ C07D *487/04;* **A01K** *31/40*

U.S. Cl. 514—210 16 Claims

1. A compound of the formula:



(I)

wherein:

R is H or CH_3;

R^1 and R^2 are independently H, CH_3-, CH_3CH_2-, $(CH_3)_2CH-$, $HOCH_2-$, $CH_3CH(OH)-$, $(CH_3)_2C(OH)--$, $FCH_2CH(OH)-$, $F_2CHCH(OH)-$, $F_3CCH(OH)-$, $CH_3CH(F)-$, CH_3CF_2-, or $(CH_3)_2C(F)-$;

R^a are independently selected from the group consisting of hydrogen and the radicals set out below:

(a) a trifluoromethyl group: $-CF_3$;

(b) a halogen atom: —Br, —Cl, —F, or —I;

(c) C_1–C_4 alkoxy radical: $-OC_{1-4}$ alkyl, wherein the alkyl is optionally mono-substituted by R^q, where

R^q is a member selected from the group consisting of —OH, $-OCH_3$, —CN, $-C(O)NH_2$, $-OC(O)NH_2$, CHO, $-OC(O)N(CH_3)_2$, $-SO_2NH_2$, $-SO_2N(CH_3)_2$, $-SOCH_3$, $-SO_2CH_3$, —F, $-CF_3$, $-COOM^a$ (where M^a is hydrogen, alkali metal, methyl or phenyl), tetrazolyl (where the point of attachment is the carbon atom of the tetrazole ring and one of the nitrogen atoms is mono-substituted by M^a as defined above) and $-SO_3M^b$ (where M^b is hydrogen or an alkali metal);

(d) a hydroxy group: —OH;

(e) a carbonyloxy radical: $-O(C{=}O)R^s$, where

R^s is C_{1-4} alkyl or phenyl, each of which is optionally mono-substituted by R^q as defined above;

(f) a carbamoloxy radical: $-O(C{=}O)N(R^y)R^z$ where

R^y and R^z are independently H, C_{1-4} alkyl (optionally mono-substituted by R^q as defined above), together a 3- to 5-membered alkylidene radical to form a ring (optionally substituted with R^q as defined above) or together a 2- to 4-membered alkylidene radical, interrupted by —O—, —S—, —S(O)— or $-S(O)_2-$, to form a ring (where the ring is optionally mono-substituted with R_q as defined above);

(g) a sulfur radical: $-S(O)_n-R^s$ where n=0–2, and R^s is defined above;

(h) a sulfamoyl group: $-SO_2N(R^y)R^z$ where R^y and R^z are as defined above;

(i) azido: N_3

(j) a formamido group: $-N(R^t)(C{=}O)H$, where

R^t is is H or C_{1-4} alkyl, and the alkyl thereof is optionally mono-substituted by R^q as defined above;

(k) a (C_1–C_4 alkyl)carbonylamino radical: $-N(R^t)(-C{=}O)C_{1-4}$ alkyl, where R^t is as defined above, and the alkyl group is also optionally mono-substituted by R^q as defined above;

(l) a (C_1–C_4 alkoxy) carbonylamino radical: $-N(R^t)(-C{=}O)OC_{1-4}$ alkyl, where R^t is as defined above, and the alkyl group is also optionally mono-substituted by R^q as defined above;

(m) a ureido group: $-N(R^t)(C{=}O)N(R^y)R^z$ where R^t, R^y and R^z are as defined above;

(n) a sulfonamido group: $-N(R^t)SO_2R^S$, where R^s and R^t are as defined above;

(o) a cyano group: —CN;

(p) a formyl or acetalized formyl radical: $-(C{=}O)H$ or $-CH(OCH_3)_2$;

(q) (C_1–C_4 alkyl)carbonyl radical wherein the carbonyl is acetalized: $-C(OCH_3)_2C_{1-4}$ alkyl, where the alkyl is optionally mono-substituted by R^q as defined above;

(r) carbonyl radical: $-(C{=}O)R^s$, where R^s is as defined above;

(s) a hydroximinomethyl radical in which the oxygen or carbon atom is optionally substituted by a C_1–C_4 alkyl group: $-(C{=}NOR^z)R^y$ where R^y and R^z are as defined above, except they may not be joined together to form a ring;

(t) a (C_1–C_4 alkoxy)carbonyl radical: $-(C{=}O)OC_{1-4}$ alkyl, where the alkyl is optionally mono-substituted by R^q as defined above;

(u) a carbamoyl radical: $-(C{=}O)N(R^y)R^z$ where R^y and R^z are as defined above;

(v) an N-hydroxycarbamoyl or N(C_1–C_4 alkoxy)carbamoyl radical in which the nitrogen atom may be additionally substituted by a C_1–C_4 alkyl group: $-(C{=}O)-N(OR^y)R^z$ where R^y and R^z are as defined above, except they may not be joined together to form a ring;

(w) a thiocarbamoyl group: $-(C{=}S)N(R^y)(R^z)$ where R^y and R^z are as defined above;

(x) carboxyl: $-COOM^b$, where M^b above;

(y) thiocyanate: —SCN;

(z) trifluoromethylthio: $-SCF_3$;

(aa) tetrazolyl, where the point of attachment is the carbon atom of the tetrazole ring and one of the nitrogen atoms is mono-substituted by hydrogen, an alkali metal or a C_1–C_4 alkyl optionally substituted by R^q as defined above;

(ab) an anionic function selected from the group consisting of: phosphono $[P{=}O(OM^b)_2]$; alkylphosphono $\{P{=}O(OM^b)-[O(C_1\text{–}C_4 \text{ alkyl})]\}$; alkylphosphinyl $[P{=}O(OM^b)-(C_1\text{–}C_4 \text{ alkyl})]$; phosphoramido $[P{=}O(OM^b)N(R^y)R^z$ and $P{=}O(OM^b)NHR^x]$; sulfino (SO_2M^b); sulfo (SO_3M^b); acylsulfonamides selected from the structures $CONM^bSO_2R^x$, $CONM^bSO_2N(R^y)R^z$, $SO_2NM^bCON(R^y)R^z$; and SO_2NM^bCN, where

R^x is phenyl or heteroaryl, where heteroaryl is a monocyclic aromatic hydrocarbon group having 5 or 6 ring atoms, in which a carbon atom is the point of attachment, in which one of the carbon atoms has been replaced by a nitrogen atom, in which one additional carbon atom is optionally replaced by a heteroatom selected from O or S, and in which from 1 to 2 additional carbon atoms are optionally replaced by a nitrogen heteroatom, and where the phenyl and heteroaryl are optionally mono-substituted by R^q, as defined above; M^b is as defined above; and R^y and R^z are as defined above;

(ac) C_5–C_7 cycloalkyl group in which one of the carbon atoms in the ring is replaced by a heteroatom selected from O, S, NH or N(C_1–C_4 alkyl) and in which one additional carbon atom may be replaced by NH or N(C_1–C_4 alkyl), and in which at least one carbon atom adjacent to each nitrogen heteroatom has both of its attached hydrogen atoms replaced by one oxygen thus forming a carbonyl moiety and there are one or two carbonyl moieties present in the ring;

(ad) C_2–C_4 alkenyl radical, optionally mono-substituted by one of the substituents (a) to (ac) above and phenyl which is optionally substituted by R^q as defined above;

(ae) C_2–C_4 alkynyl radical, optionally mono-substituted by one of the substituents (a) to (ac) above;

(af) C_1–C_4 alkyl radical;

(ag) C_1–C_4 alkyl mono-substituted by one of the substituents (a)–(ac) above;

(ah) a 2-oxazolidinonyl moiety in which the point of attachment is the nitrogen atom of the oxazolidinone ring, the ring oxygen atom is optionally replaced by a heteroatom selected from —S— and $>NR^t$ (where R^t is as defined above) and one of the saturated carbon atoms of the oxazolidinone ring is optionally mono-substituted by one of the substituents (a) to (ag) above;

M is selected from:

(i) hydrogen;

(ii) a pharmaceutically acceptable esterifying group or removable carboxyl protecting group; or

(iii) an alkali metal or other pharmaceutically acceptable cation.

5,025,007

2-(9-FLUORENONYL)-CARBAPENEM ANTIBACTERIAL AGENTS

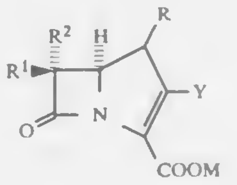
Mark L. Greenlee, Rahway; Frank P. DiNinno, Old Bridge; Lovji D. Cama, Tenafly, and James V. Heck, Scotch Plains, all of N.J., assignors to Merck & Co., Inc., Rahway, N.Y.

Filed Aug. 1, 1990, Ser. No. 561,541

Int. Cl.⁵ C07D *487/04;* **A61K** *31/40*

U.S. Cl. 514—210 **19 Claims**

1. A compound of formula



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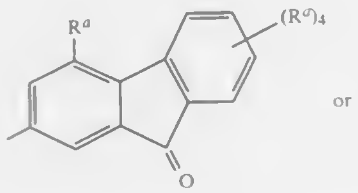
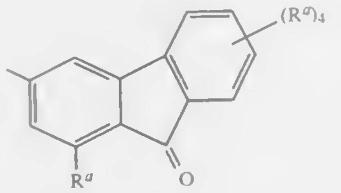
(a)



or

(b)



R is H or CH_3;

R^1 and R^2 are independently H, CH_3—, CH_3CH_2—, $(CH_3)_2CH$—, $HOCH_2$—, $CH_3CH(OH)$—, $(CH_3)_2C(OH)$—, $FCH_2CH(OH)$—, $F_2CHCH(OH)$—, $F_3CCH(OH)$—, $CH_3CH(F)$—, CH_3CF_2—, or $(CH_3)_2C(F)$—;

R^a are independently selected from the radicals set out below, provided that no more than four R^a substituents are other than hydrogen:

(a) hydrogen;

(b) a trifluoromethyl group; —CF_3;

(c) a halogen atom: —Br, —Cl, —F, or —1;

(d) C_1–C_4 alkoxy radical: —OC_{1-4} alkyl, wherein the alkyl is optionally mono-substituted by R^q, where

R^q is a member selected from the group consisting of: —OH, —OCH_3, —CN, —$C(O)NH_2$, —$OC(O)NH_2$, CHO, —$OC(O)N(CH_3)_2$, —SO_2NH_2, —$SO_2N(CH_3)_2$, —$SOCH_3$, —SO_2CH_3, —F, —CF_3, —$COOM^a$ (where M^a is hydrogen, alkali metal, methyl or phenyl), tetrazolyl (where the point of attachment is the carbon atom of the tetrazole ring and one of the nitrogen atoms is mono-substituted by M^a as defined above) and —SO_3M^b (where M^b is hydrogen or an alkali metal);

(e) a hydroxy group: —OH;

(f) a carbonyloxy radical of formula —$O(C{=}O)R^s$, where Rs is C_{1-4} alkyl or phenyl, each of which is optionally mono-substituted by R^q as defined above;

(g) a carbamoyloxy radical of formula —$O(C{=}O)N(R^y)R^z$ where

R^y and R^z are independently: H, C_{1-4} alkyl (optionally mono-substituted by R^q as defined above), together a 3- to 5-membered alkylidene radical to form a ring (optionally substituted with R^q as defined above) or together a 2- to 4-membered alkylidene radical, interrupted by —O—, —S—, —S(O)— or —$S(O)_2$—, to form a ring (where the ring is optionally mono-substituted with R^q as defined above);

(h) a sulfur radical: —$S(O)_n$—R^s where n=0–2, and R^s is defined above;

(i) a sulfamoyl group: —$SO_2N(R^y)R^z$ where R^y and R^z are as defined above;

(j) azido: N_3

(k) a formamido group: —$N(R^t)(C{=}O)H$, where

R^t is H or C_{1-4} alkyl, and the alkyl thereof is optionally mono-substituted by R^q as defined above;

(l) a (C_1–C_4 alkyl)carbonylamino radical: —$N(R^t)(C{=}O)C_{1-4}$ alkyl, where

R^t is as defined above, and the alkyl group is also optionally mono-substituted by R^q as defined above;

(m) a (C_1–C_4 alkoxy)carbonylamino radical: —$N(R^t)(C{=}O)OC_{1-4}$ alkyl, where

R^t is as defined above, and the alkyl group is also optionally mono-substituted by R^q as defined above;

(n) a ureido group: —$N(R^t)(C{=}O)N(R^y)R^z$ where R^t, R^y and R^z are as defined above;

(o) a sulfonamido group: —$N(R^t)SO_2R^s$, where R^s and R^t are as defined above;

(p) a cyano group: —CN;

(q) a formyl or acetalized formyl radical: —$(C{=}O)H$ or —$CH(OCH_3)_2$;

(r) (C_1–C_4 alkyl)carbonyl radical where the carbonyl is acetalized: —$C(OCH_3)_2C_{1-4}$ alkyl, where the alkyl is optionally mono-substituted by R^q as define above;

(s) carbonyl radical: —$(C{=}O)R^s$, where R^s is as defined above;

(t) a hydroximinomethyl radical in which the oxygen or carbon atom is optionally substituted by a C_1–C_4 alkyl group: —$(C{=}NOR^z)R^y$, where

R^y and R^z are as defined above, with the previse that they are not to be joined together to form a ring;

(u) a (C_1–C_4 alkoxy)carbonyl radical: —$(C{=}O)OC_{1-4}$ alkyl, where the alkyl is optionally mono-substituted by R^q as defined above;

(v) a carbamoyl radical: —$(C{=}O)N(R^y)R^z$ where R^y and R^z are as defined above;

(w) an N-hydroxycarbamoyl or N(C_1–C_4 alkoxy)carbamoyl radical in which the nitrogen atom may be additionally substituted by a C_1–C_4 alkyl group: —$(C{=}O)$—$N(OR^y)R^z$ where R^y and R^z are as defined above, except they may not be joined together to form a ring;

(x) a thiocarbamoyl group: —$(C{=}S)N(R^y)R^z$ where R^y and R^z are as defined above;

(y) carboxyl: —$COOM^b$, where M^b is as defined above;

(z) thiocyanate: SCN;

(aa) trifluoromethylthio: —SCF_3;

(ab) tetrazolyl, where the point of attachment is the carbon atom of the tetrazole ring and one of the nitrogen atoms is mono-substituted by hydrogen, an alkali metal or a C_1–C_4 alkyl optionally substituted by R^q as defined above;

(ac) an anionic function selected from the group consisting of: phosphono: $[P{=}O(OM^b)_2]$; alkylphosphono: $\{P{=}O(OM^b)$—$[O(C_1$–C_4 alkyl$)]\}$; alkylphosphinyl: $[P{=}O(OM^b)$—$(C_1$–C_4 alkyl$)]$; phosphoramido: $[P{=}O(OM^b)N(R^y)R^z$ and $P{=}O(OM^b)NHR^x]$; sulfino: (SO_2NM^b); sulfo: (SO_3M^b); acylsulfonamides: selected from the structures $CONM^bSO_2R^x$, $CONM^bSO_2N(R^y)R^z$, $SO_2M^bCON(R^y)R^z$; and SO_2NM^bCN, where

R^x is phenyl or heteroaryl, where heteroaryl is a monocyclic aromatic hydrocarbon group having 5 or 6 ring atoms, in which a carbon atom is the point of attachment, in which one of the carbon atoms has been replaced by a nitrogen atom, in which one additional carbon atom is optionally replaced by a heteroatom selected from O or S, and in which from 1 to 2 additional carbon atoms are optionally replaced by a nitrogen heteroatom, and where the phenyl and heteroaryl are optionally monosubstituted by R^q, as defined above; M^b is as defined above; and R^y and R^z are as defined above;

(ad) C_5–C_7 cycloalkyl group in which one of the carbon atoms in the ring is replaced by a heteroatom selected from O, S, NH, or N(C_1–C_4 alkyl) and in which one additional carbon may be replaced by the NH or N(C_1–C_4 alkyl), and in which at least one carbon atom adjacent to each heteroatom has both of its attached hydrogen atoms replaced by one oxygen thus forming a carbonyl moiety and there are one or two carbonyl moieties present in the ring;

(ae) C_2–C_4 alkenyl radical, optionally mono-substituted by one of the substituents (b) to (ad) above and phenyl which is optionally substituted by R^q as defined above;

(af) C_2–C_4 alkynyl radical, optionally mono-substituted by one of the substitutents (b) to (ad) above;

(ag) C_1–C_4 alkyl radical;

(ah) C_1–C_4 alkyl mono-substituted by one of the substituents (b) to (ad) above;

(ai) a 2-oxazolidinonyl moiey in which the point of attachment is the nitrogen atom of the oxazolidinone ring, the ring oxygen atom is optionally replaced by a heteroatom selected from S and NR^t (where R^t is as defined above) and one of the saturated carbon atoms of the oxazolidinone ring is optionally mono-substituted by one of the substituents (b) to (ah) above;

M is selected from:

(i) hydrogen;

(ii) a pharmaceutically acceptable esterifying group or removable carboxyl protecting group; or

(iii) an alkali metal or other pharmaceutically acceptable cation.

5,025,008

2-(SUBSTITUTED-DIBENZOFURANYL AND DIBENZOTHIENYL) CARBAPENEM ANTIBACTERIAL AGENTS

Frank P. DiNinno, Old Bridge; Thomas N. Salzmann, North Plainfield, and Mark L. Greenlee, Rahway, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

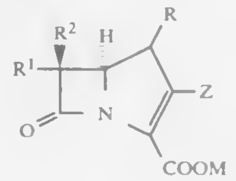
Continuation-in-part of Ser. No. 376,193, Jun. 30, 1989, abandoned, which is a continuation of Ser. No. 362,916, Jun. 8, 1989, abandoned. This application May 24, 1990, Ser. No. 526,534

Int. Cl.⁵ C07D *487/04*; A61K *31/40*

U.S. Cl. 514—210 **15 Claims**

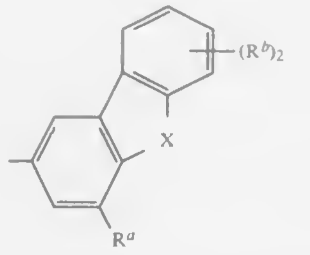
1. A compound of the formula:

(I.)



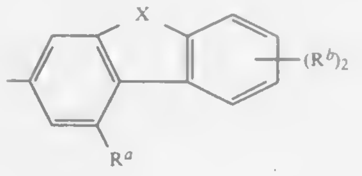
where Z is:

(A.)



or

(B.)



wherein:

X is O or $S(O)_{0\text{-}2}$;

R is H or CH_3;

R^1 and R^2 are independently H, CH_3—, CH_3CH_2—, $(CH_3)_2CH$—, $HOCH_2$—, $CH_3CH(OH)$—, $(CH_3)_2C(OH)$—, $FCH_2CH(OH)$—, $F_2CHCH(OH)$—, $F_3CCH(OH)$—, $CH_3CH(F)$—, CH_3CF_2—, or $(CH_3)_2C(F)$—;

R^a and R^b are independently selected from the group consisting of hydrogen and the radicals set out below:

(a) a trifluoromethyl group; —CF_3;

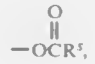
(b) a halogen atom: —Br, —Cl, —F, or —I;

(c) C_1–C_4 alkoxy radical; —$OC_{1\text{-}4}$ alkyl, wherein the alkyl is optionally mono-substituted by R^q, where

R^q is a member selected from the group consisting of —OH; —OCH_3; —CN; —$C(O)NH_2$; —$OC(O)NH_2$; CHO; —$OC(O)N(CH_3)_2$; —SO_2NH_2; —$SO_2N(CH_3)_2$; —$SOCH_3$; SO_2CH_3; —F; —CF_3; —$COOM^a$ (where M^a is hydrogen, alkali metal, methyl or phenyl); tetrazolyl (where the point of attachment is the carbon atom of the tetrazole ring and one of the nitrogen atoms is mono-substituted by M^a as defined above); and —SO_3M^b (where M^b is hydrogen or an alkali metal);

(d) a hydroxy group; —OH;

(e) a carbonyloxy radical;

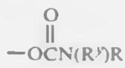


$$-O\overset{\overset{O}{\|}}{C}R^s,$$

where

R^s is $C_{1\text{-}4}$ alkyl, phenyl, or heteroaryl, each of which is optionally mono-substituted by R^q as defined above, and where heteroaryl is a monocyclic aromatic hydrocarbon group having 5 or 6 ring atoms in which one of the carbon atoms has been replaced by a nitrogen atom, one additional carbon atom is optionally replaced by a heteroatom selected from O and S, and from 1 to 3 additional carbon atoms are optionally replaced by a nitrogen heteroatom;

(f) a carbamoyloxy radical;

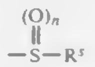


$$-O\overset{\overset{O}{\|}}{C}N(R^y)R^z$$

where

R^y and R^z are independently H, $C_{1\text{-}4}$ alkyl (optionally mono-substituted by R^q as defined above), together a 3- to 5-membered alkylidene radical to form a ring (optionally substituted with R^q as defined above), or together a 2- to 5-membered alkylidene radical, interrupted by —O—, —S—, —S(O)—, or —$S(O)_2$—, to form a ring (optionally mono-substituted with R^q as defined above);

(g) a sulfur radical;



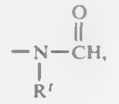
$$-\overset{\overset{(O)_n}{\|}}{S}-R^s$$

where n=0–2, and R^s is as defined above;

(h) a sulfamoyl group; —$SO_2N(R^y)R^z$ where R^y and R^z are as defined above;

(i) azido; N_3

(j) a formylamino group:

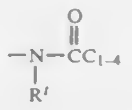


$$-\underset{\underset{R^t}{|}}{N}-\overset{\overset{O}{\|}}{C}H,$$

where

R^t is H or $C_{1\text{-}4}$ alkyl, and the alkyl thereof is optionally mono-substituted by R^q as defined above;

(k) (C_1–C_4 alkyl)carbonylamino radical:



$$-\underset{\underset{R^t}{|}}{N}-\overset{\overset{O}{\|}}{C}C_{1\text{-}4}$$

alkyl, where R^t is as defined above, and the alkyl group is also optionally mono-substituted by R^q as defined above;

(l) a (C_1–C_4 alkoxy) carbonylamino radical:

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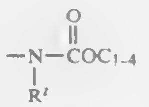
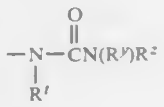


$-\underset{\underset{R^{t}}{|}}{N}-\overset{\overset{O}{\|}}{C}OC_{1-4}$

alkyl, where R^t is as defined above, and the alkyl group is also optionally mono-substituted by R^q as defined above;

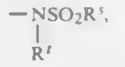
(m) a ureido group:



$-\underset{\underset{R^{t}}{|}}{N}-\overset{\overset{O}{\|}}{C}N(R^y)R^z$

where R^t, R^y and R^z are as defined above;

(n) a sulfonamide group:

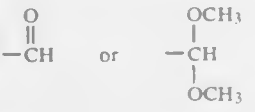


$-\underset{\underset{R^{t}}{|}}{N}SO_2R^s,$

where R^s and R^t are as defined above;

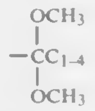
(o) a cyano group: —CN;

(p) a formyl or acetalized formyl radical:



$^{*}-\overset{\overset{O}{\|}}{C}H$ or $-\underset{\underset{OCH_3}{|}}{\overset{\overset{OCH_3}{|}}{C}}H$

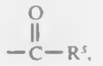
(q) $(C_1–C_4$ alkyl)carbonyl radical wherein the carbonyl is acetalized:



$-\underset{\underset{OCH_3}{|}}{\overset{\overset{OCH_3}{|}}{C}}C_{1-4}$

alkyl, where the alkyl is optionally mono-substituted by R^q as defined above;

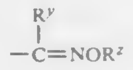
(r) carbonyl radical:



$-\overset{\overset{O}{\|}}{C}-R^s,$

where R^s is as defined above;

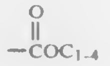
(s) a hydroximinomethyl radical in which the oxygen or carbon atom is optionally substituted by a $C_1–C_4$ alkyl group;



$-\overset{\overset{R^y}{|}}{C}=NOR^z$

where R^y and R^z are as defined above, except they may not be joined together to form a ring;

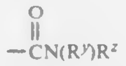
(t) a $(C_1–C_4$ alkoxy)carbonyl radical:



$-\overset{\overset{O}{\|}}{C}OC_{1-4}$

alkyl, where the alkyl is optionally mono-substituted by R^q as defined above;

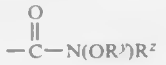
(u) a carbamoyl radical:



$-\overset{\overset{O}{\|}}{C}N(R^y)R^z$

where R^y and R^z are as defined above;

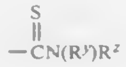
(v) an N-hydroxycarbamoyl or $N(C_1–C_4$ alkoxy)carbamoyl radical in which the nitrogen atom may be additionally substituted by a $C_1–C_4$ alkyl group:



$-\overset{\overset{O}{\|}}{C}-N(OR^y)R^z$

where R^y and R^z are as defined above, except that they may not be joined together to form a ring;

(w) a thiocarbamoyl group:



$-\overset{\overset{S}{\|}}{C}N(R^y)R^z$

where R^y and R^z are as defined above;

(x) carboxyl; $—COOM^b$, where M^b is as defined above;

(y) thiocyanate; —SCN;

(z) trifluoromethylthio: $—SCF_3$;

(aa) tetrazolyl, where the point of attachment is the carbon atom of the tetrazole ring and one of the nitrogen atoms is mono-substituted by hydrogen, an alkali metal or a $C_1–C_4$ alkyl optionally substituted by R^q as defined above;

(ab) an anionic function selected from the group consisting of: phosphone $[P{=}O(OM^b)_2]$; alkylphosphono $\{P{=}O(OM^b)—[O(C_1–C_4$ alkyl)]}; alkylphosphinyl $[P{=}O(OM^b)—(C_1–C_4$ alkyl)]; phosphoramido $[P{=}O(OM^b)N(R^y)R^z$ and $P{=}O(OM^b)NHR^x]$; sulfino $(SO_2MC^b$; sulfo (SO_3M^b); acylsulfonamides selected from the structures $CONM^bSO_2R^x$, $CONM^bSO_2N(R^y)R^z$, $SO_2NM^bCON(R^y)R^z$; and SO_2NM^bCN, where

R^x is phenyl or heteroaryl, where heteroaryl is as defined above under R^s, and the phenyl and heteroaryl are optionally mono-substituted by R^q, as defined above; M^b, R^y and R^z are as defined above;

(ac) $C_5–C_7$ cycloalkyl group in which one of the carbon atoms in the ring is replaced by a heteroatom selected from O, S, NH, or $N(C_1–C_4$ alkyl) and in which one additional carbon atom may be replaced by NH or $N(C_1–C_4$ alkyl), and in which at least one carbon atom adjacent to each nitrogen heteroatom has both of its attached hydrogen atoms replaced by one oxygen thus forming a carbonyl moiety and there are at most two carbonyl moieties present in the ring;

(ad) $C_2–C_4$ alkenyl radical, optionally monosubstituted by one of (1) the substituents (a) to (ac) above; or (2) phenyl, pyridyl, quinoline, or isoquinoline, each of which is optionally monosubstituted by R^q as defined above;

(ae) $C_2–C_4$ alkynyl radical, optionally monosubstituted by one of the substituents (a) to (ac) above;

(af) $C_1–C_4$ alkyl radical;

(ag) $C_1–C_4$ alkyl mono-substituted by one of the substituents (a)–(ac) above;

(ah) a 2-oxazolidinonyl moiety in which the point of attachment is the nitrogen atom of the oxazolidinone ring, the ring oxygen atom is optionally replaced by a heteroatom selected from S and NR^t (where R^t is as defined above) and one of the saturated carbon atoms of the oxazolidinone ring is optionally mono-substituted by one of the substituents (a) to (ag) above;

M is selected from:

(i) hydrogen;

(ii) a pharmaceutically acceptable esterifying group or removable carboxyl protecting group; or

(iii) an alkali metal or other pharmaceutically acceptable cation.

5,025,009
NOVEL BENZAZEPINE DERIVATIVES

Frederik Gronwald, Vedbaek; Peter H. Andersen; Peter Faarup, both of Vaerlose; Erling Guddal, Brondby; Kristian T. Hansen, Copenhagen; Louis B. Hansen, and Erik B. Nielsen, both of Vaerlose, all of Denmark, assignors to Novo Nordisk A/S, Bagsvaerd, Denmark

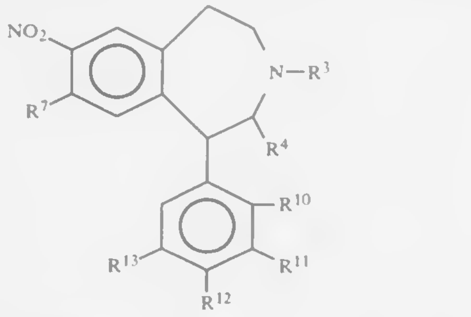
Division of Ser. No. 365,250, Jun. 12, 1989. This application Feb. 7, 1990, Ser. No. 477,450

Claims priority, application Denmark, Jun. 15, 1988, 3251/88

Int. Cl.^{5} C07D *223/14, 491/048, 491/052;* **A61K** *31/55*

U.S. Cl. **514—213** 17 Claims

1. A 2,3,4,5-tetrahydro-1H-3-benzazepine of the formula I



(I)

wherein R^3 represents H, C_{1-3}-alkyl or C_{3-7}-cycloalkyl; R^4 together with R^{10} represents a bridge which connects the positions to which R^4 and R^{10} are linked, said bridge being $—CH_2—CH_2—$, $—CH{=}CH—$, $—O—CH_2—$, or $—S—CH_2—$ with the proviso that, when the bridge contains a heteroatom, the bridge member linked to the benzazepine nucleus is always a carbon atom;

R^7 represents hydroxy or lower alkoxy;

R^{11} and R^{12} independently represent hydrogen, halogen, alkoxy, or alkyl, or R^{11} together with R^{12} represents a bridge, the bridge being chosen from among $—O—CH_2—CH—$, $—O—CH_2—CH_2—CH_2—$, $—O—CH{=}CH—$, $—CH_2—CH_2—CH_2—$, $—CH_2—CH{=}CH—$ or $—CH_2—CH_2—CH_2—CH_2—$; and wherein

R^{13} represents hydrogen, halogen, or lower alkyl, and pharmaceutically-acceptable acid addition salts.

8. A pharmaceutical composition useful for treating CNS ailments containing an effective amount of a benzazepine of claim 1 or a pharmaceutically-acceptable acid addition salt thereof.

5,025,010
BENZOTHIAZINONE DERIVATIVES, AND PHARMACEUTICALS CONTAINING THEM

Raymond Oekonomopulos, Wiesbaden; Rainer Henning, Hattersheim am Main; Ulrich Lerch, Hofheim am Taunus; Bernward Schölkens, and Wolfgang Linz, both of Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

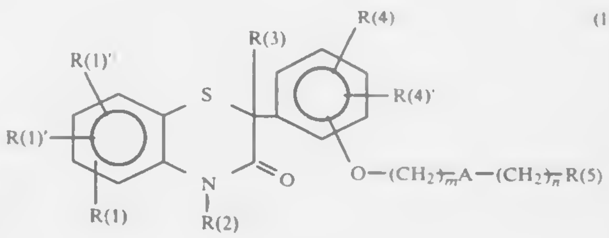
Continuation of Ser. No. 222,607, Jul. 21, 1988, abandoned. This application Oct. 17, 1989, Ser. No. 423,714

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1987, 3724366

Int. Cl.^{5} C07D *279/16;* **A61K** *31/54*

U.S. Cl. **514—224.2** 8 Claims

1. A compound I of the formula



(I)

in which formula I:

R(1), R(1)' and R(1)" are identical or different and denote, independently of one another, hydrogen, $(C_1–C_4)$-alkyl, $(C_1–C_3)$-alkoxy, F, Cl, Br, CF_3, nitro, hydroxyl, acetamido or amino,

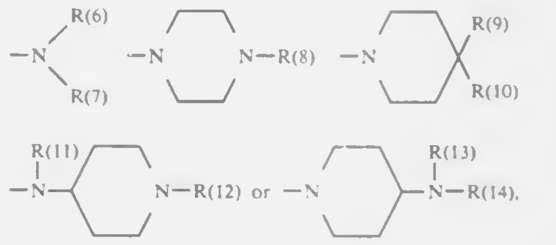
R(2) denotes hydrogen, $(C_1–C_{10})$-alkyl, straight-chain or branched, $(C_3–C_{10})$-alkenyl, straight-chain or branched, phenyl-$(C_1–C_4)$-alkyl, the phenyl ring being unsubstituted or substituted by one, two or three substituents from the group comprising $(C_1–C_4)$-alkyl, $(C_1–C_3)$-alkoxy, F, Cl, CF_3, $(C_1–C_2)$-alkylenedioxy or nitro,

R(3) denotes hydrogen, $(C_1–C_{15})$-alkyl, straight-chain or branched, $(C_3–C_{15})$-alkenyl, straight-chain or branched, $C_4–C_8)$-cycloalkyl, $C_4–C_8)$-cycloalkyl-$(C_1–C_4)$-alkyl, phenyl or phenyl-$(C_1–C_4)$-alkyl, each of the phenyl radicals being unsubstituted or substituted by one, two or three substituents from the group comprising $(C_1–C_4)$-alkyl, $(C_1–C_3)$-alkoxy, F, Cl, CF_3, $(C_1–C_2)$-alkylenedioxy or nitro,

R(4) and R(4)' are identical or different and denote, independently of one another, hydrogen, $(C_1–C_4)$alkyl, $(C_1–C_3)$-alkoxy, F, Cl, CF_3, nitro, hydroxyl, acetamido or amino,

A denotes a group $—C{\equiv}C—$or a group $—CH{=}CH—$ which has the cis or trans configuration,

R(5) denotes one of the following groups



in which

R(6) and R(7) are identical or different and denote, independently of one another, hydrogen, $(C_1–C_{10})$alkyl, $C_4–C_8)$-cycloalkyl, $C_4–C_8)$-cycloalkyl-$(C_1–C_4)$-alkyl, pyridyl-$(C_1–C_4)$-alkyl, phenyl-$(C_1–C_6)$alkyl, benzhydryl or benzhydryl-$(C_1–C_4)$-alkyl, each of the phenyl radicals being unsubstituted or substituted by one, two or three radicals from the group comprising $(C_1–C_4)$-alkyl, $(C_1–C_4)$-alkoxy, $(C_1–C_2)$-alkylenedioxy, F, Cl, Br, CF_3 or hydroxyl,

R(8) denotes hydrogen, $(C_1–C_{10})$-alkyl, straight-chain or branched, $C_1–C_8)$-alkanoyl, pyridyl, pyrimidinyl, phenyl, phenyl-$(C_1–C_4)$-alkyl, phenyl-$(C_3–C_5)$alkenyl, benzhydryl or benzhydryl-$(C_1–C_4)$-alkyl, phenyl-$(C_1–C_4)$-alkanoyl or benzoyl, each of the phenyl radicals being unsubstituted or substituted by one, two or three radicals from the group comprising $(C_1–C_4)$-alkyl, $(C_1–C_4)$-alkoxy, $(C_1–C_2)$-alkylenedioxy, F, Cl, Br, CF_3 or hydroxyl,

R(9) denotes hydrogen, $(C_1–C_{10})$-alkyl, phenyl, phenyl-$(C_1–C_4)$-alkyl, each of the phenyl radicals be unsubstituted or substituted by one, two or three radicals from the group comprising $(C_1–C_4)$-alkyl, $(C_1–C_4)$-alkoxy, $(C_1–C_2)$-alkylenedioxy, F, Cl, Br, CF_3 or hydroxyl,

R(10) denotes hydrogen, hydroxyl or $(C_1–C_4)$-alkoxy, and

R(11) and R(12) or R(13) and R(14) are identical or different

VOL
1127
ISS
3
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18
1991
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and denote, independently of one another, hydrogen, (C_1-C_{10})-alkyl, straight-chain or branched. (C_1-C_6)-alkanoyl, phenyl-(C_1-C_4)-alkyl, benzhydryl, or benzhydryl-(C_1-C_4)-alkyl, phenyl-(C_1-C_4)-alkanoyl or benzoyl, each of the phenyl radicals being unsubstituted or substituted by (C_1-C_2)-alkylenedioxy, F, Cl, Br, CF_3 or hydroxyl,

m denotes 1, 2 or 3, and

n denotes 1, 2 or 3,

and the salts of the compounds of the formula I with pharmaceutically acceptable acids.

4. A pharmaceutical composition effective in the treatment of disorders of the cardiovascular system or disturbances of the blood glucose balance which comprises an effective amount of at least one compound as claimed in claim 1 in a pharmaceutically acceptable carrier.

5,025,011

FUSED PYRIDINES ACTIVE ON THE CARDIOVASCULAR SYSTEM

Cesare Casagrande, Arese; Stefania Montanari, and Francesco Santangelo, both of Milan, all of Italy, assignors to SIMES, Societa Italiana Medicinali e Sintetici S.p.A., Vicenza, Italy

Filed Jul. 25, 1989, Ser. No. 390,018

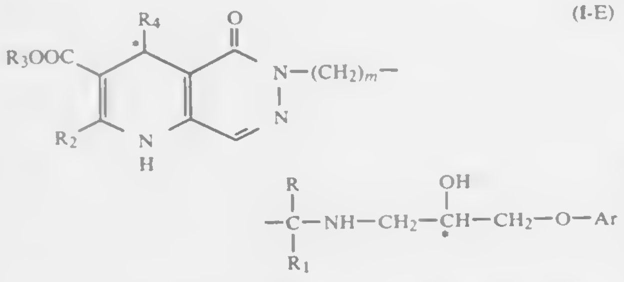
Claims priority, application Italy, Jul. 29, 1988, 21544 A/88

Int. Cl.⁵ A61K *31/435, 31/495, 31/50;* **C07D** *471/04*

U.S. Cl. 514—234.2 **4 Claims**

1. A pharmacologically-acceptable compound of the formula:

(I-E)



wherein Ar is a member selected from the group consisting of 2-methoxyphenyl, 2-allyloxyphenyl, 2-cyanophenyl, 2-methylphenyl, 2-allylphenyl, carbamoylmethylphenyl, 4-hydroxyphenyl, 4-morpholino-1,2,5-thiadiazol-3-yl, indol-4-yl and 3,4-dihydro- 1(H)-carbostyrl-5-yl;

each of R and R_1 is, independently, hydrogen or methyl, R_2 is methyl, R_3 is methyl, ethyl or isopropyl; R_4 is optionally-substituted phenyl any substituent of which is a member selected from the group consisting of halogen, hydroxy, C_1-C_5 alkyl, C_2-C_5 alkenyl, C_1-C_3 alkoxy, C_2-C_5 alkenyloxy, alkoxyalkyl having from 1 to 5 carbon atoms both in the alkyl and alkoxy moiety, C_2-C_5 alkanoyl, trifluoromethyl, amino, nitro, carbamoyl, cyano, C_1-C_3 alkylthio, carbamoyl (C_1-C_6) alkyl and C_1-C_6 alkanoylamino, m is 1; and

the asterisks denote asymmetric carbon atoms; or a salt thereof with a pharmaceutically-acceptable organic or inorganic acid.

5,025,012

NICOTINIC ACID DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS COMPRISING SAME

Katsutoshi Miura; Hiroyasu Koyama; Toshiji Sugai; Hiroaki Yamada, and Einosuke Sakurai, all of Saitama, Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan

Filed Feb. 22, 1990, Ser. No. 484,130

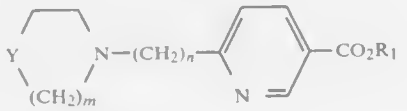
Claims priority, application Japan, Mar. 1, 1989, 1-46647

Int. Cl.⁵ A61K *31/495, 31/44, 31/445;* **C07D** *410/04*

U.S. Cl. 514—252 **12 Claims**

1. A compound of formula (I)

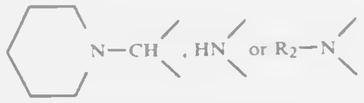
(I)



wherein

R_1 is hydrogen or C_1-C_6 alkyl;

Y is $—CH_2—$, —O—.



R_2 is C_1-C_6 alkyl; C_2-C_6 alkenyl; C_3-C_6 cycloalkyl; phenyl which may be mono- or di-substituted on the phenyl ring with C_1-C_6 alkoxy; aralkyl which may be mono- or di-substituted on the aromatic ring with C_1-C_6 alkoxy; diphenylmethyl; carbo(C_1-C_2) alkoxy; or furanyl or pyrrolidinyl which is linked to the nitrogen atom via carbonyl or carbonylmethylene;

m is 2 or 3;

and n is 0 or 1, or a physiologically acceptable salt thereof.

7. A pharmaceutical composition having a blood flow-increasing action which comprises a therapeutically effective amount of a compound of claim 1 or a physiologically acceptable salt thereof and a pharmaceutically acceptable carrier.

5,025,013

BENZOPYRAN DERIVATIVES, THEIR PREPARATION AND PHARMACEUTICAL . COMPOSITIONS CONTAINING THEM

Michel Barreau, Montgeron; Jean-Claude Hardy, Cergy Pontoise; Jean-Paul Martin, Colombes, and Christian Renault, Taverny, all of France, assignors to Rhone-Poulenc Sante, Antony, France

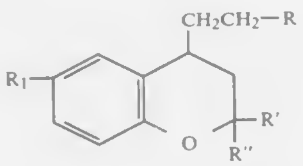
Filed Jan. 16, 1990, Ser. No. 465,330

Claims priority, application France, Jan. 20, 1989, 89 00657

Int. Cl.⁵ A61K *31/495, 31/445;* **C07D** *407/06*

U.S. Cl. 514—253 **8 Claims**

1. A benzopyran compound having the formula:

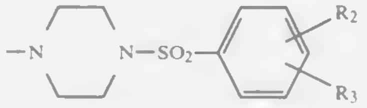


wherein

R_1 represents a hydrogen or halogen atom or a hydroxy, alkyloxy, nitro, amino, alkylsulphonamido or acylamino radical,

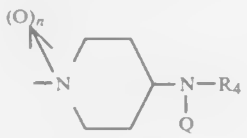
R represents

(1) a radical of formula:

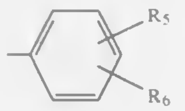


wherein R_2 and R_3, which may be identical or different, represent hydrogen or halogen atoms or hydroxy, alkyl, alkyloxy, amino, alkylsulphonamido or nitro radicals, or alternatively

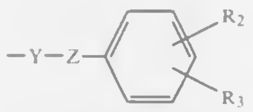
(2) a radical of formula:



wherein n equals 0 or 1, R_4 is a hydrogen atom, an alkyl radical or a radical of structure:

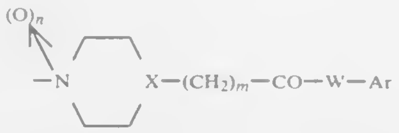


wherein R_5 and R_6 are hydrogen or halogen atoms or an alkyloxy radical, and Q represents an acyl or alkylsulphonyl radical or a radical of structure:



wherein R_2 and R_3 are defined as above, Y represents a carbonyl or sulphonyl radical and Z represents a single bond or a methylene or imino radical, or alternatively

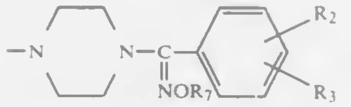
(3) a radical of formula:



wherein n equals 0 or 1, m equals 0 to 2, X is a carbon atom or X can be a nitrogen atom if $n=0$, W represents a single bond or an imino radical and Ar represents a pyridyl, indolyl, quinolyl or 2-alkylquinolyl radical or a phenyl radical optionally substituted with radicals R_2 and R_3 as defined above, provided that m is other than 0 when X is a nitrogen atom, or alternatively

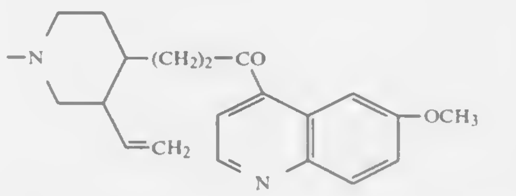
(4) a radical of formula:

(VI)



wherein R_2 and R_3 are defined as above and R_7 denotes a hydrogen atom or an alkyl radical, or alternatively

(5) a radical of formula:



and R' and R", which are identical, represent hydrogen atoms or alkyl radicals,

on the understanding that the alkyl and acyl radicals and portion mentioned above contain 1 to 4 carbon atoms in a straight or branched chain, in its isomeric forms and the mixtures thereof, as well as its pharmaceutically acceptable addition salts with acids.

8. A pharmaceutical composition, which comprises an effective amount benzopyran compound according to claim 1, in the pure state or in the form of a combination with one or more compatible and pharmaceutically acceptable adjuvants or diluents.

5,025,014

BICYCLIC HETEROCYCLYL CONTAINING N-(BICYCLIC HETEROCYCLYL)-4-PIPERIDINAMINES AS PHARMACEUTICALS

Frans E. Janssens, Bonheiden; Joseph L. G. Torremans, Beerse; Joze' F. Hens, Nijlen; and Theophilus T. J. M. Van Offenwert, Vosselaar, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

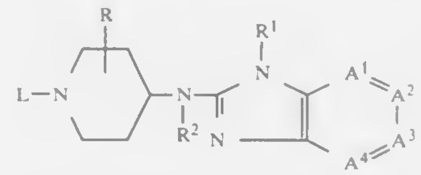
Division of Ser. No. 56,200, Jun. 1, 1987, Pat. No. 4,888,426, which is a division of Ser. No. 660,608, Oct. 12, 1987, Pat. No. 4,695,569, which is a continuation-in-part of Ser. No. 556,742, Nov. 30, 1988, abandoned. This application Dec. 7, 1989, Ser. No. 447,312

Int. Cl.⁵ A61K *31/505, 31/52;* **C07D** *487/04, 473/04*

U.S. Cl. 514—258 **18 Claims**

1. A compound of the formula:

(I)



a pharmaceutically acceptable acid addition salt or a possible stereochemically isomeric form thereof, wherein:

$A^1=A^2—A^3=A^4$ represents a bivalent radical of the formula:

$—CH=CH—CH=CH—$ (a);

$—N=CH—CH=CH—$ (b);

$—CH=N—CH=CH—$ (c);

$—CH=CH—N=CH—$ (d);ps

or

$—CH=CH—CH=N—$ (e),

wherein one or two hydrogen atoms in said radicals (a)-(e) may, each independently from each other, be replaced by halo, lower alkyl, lower alkyloxy, trifluoromethyl or hydroxy;

R represents a member selected from the group consisting of hydrogen and lower alkyl;

R^1 represents a member selected from the group consisting of hydrogen, alkyl, cycloalkyl, Ar^1 and lower alkyl substituted with one or two Ar^1 radicals, wherein:

Ar^1 represents a member selected from the group consisting of phenyl, being optionally substituted with up to three substituents, each independently selected from the group

VOL
1127
ISS
3
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18
1991
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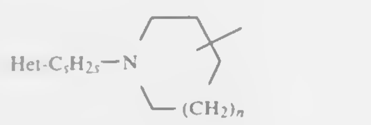
consisting of halo, hydroxy, nitro, cyano, trifluoromethyl, lower alkyl, lower alkyloxy, lower alkylthio, mercapto, amino, mono- and di(lower alkyl)amino, carboxyl, lower alkyloxycarbonyl and lower alkyl—CO—; thienyl; halothienyl; furanyl; lower alkyl substituted furanyl; pyridinyl; pyrazinyl; thiazolyl; and imidazolyl optionally substituted by lower alkyl;

R^2 represents a member selected from the group consisting of hydrogen, lower alkyl, cycloalkyl, (lower alkyl)—CO—, lower alkyl—O—(CO)— and Ar^2-lower alkyl, wherein;

Ar^2 represents a member selected from the group consisting of phenyl being optionally substituted with up to three substituents each independently selected from the group consisting of halo, hydroxy, nitro, cyano, trifluoromethyl, lower alkyl, lower alkyloxy, lower alkylthio, mercapto, amino, mono- and di(lower alkyl)amino, carboxyl, lower alkyloxycarbonyl, and (lower alkyl)—CO; and

L represents a member selected from the group consisting of radicals of the formula:



(f)

$Het\text{-}C_sH_{2s}—Y\text{-}Alk\text{-}$; and (g)

$Het\text{-}C_sH_{2s}—Z—(C{=}X)—Y\text{-}Alk\text{-}$, (h)

wherein:

n represents a number having a value of from 0 to 2;

s represents a number having a value of from 0 to 6;

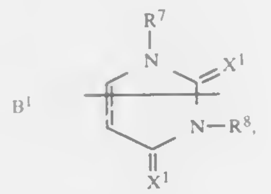
Alk represents lower alkanediyl;

Y represents O, S, NR^3, or a direct bond, wherein R^3 represents hydrogen, lower alkyl, (Ar^2) lower alkyl, 2-lower alkyloxy-1,2-dioxoethyl or a radical of formula $—C(=X)—R^6$, R^6 being hydrogen, lower alkyl, Ar^2, Ar^2-lower alkyl, lower alkyloxy, Ar^2-lower alkyloxy, mono- or di(lower alkyl)amino, Ar^2-amino, Ar^2-lower alkylamino, or Ar^2-lower alkyl(lower alkyl)amino, wherein Ar^2 is as defined above;

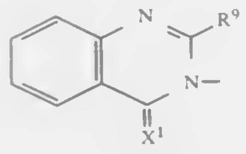
X represents O, S, $CH\text{-}NO_2$, or NR^4, wherein R^4 represents hydrogen, lower alkyl, cyano, nitro, Ar^2-sulfonyl, lower alkylsulfonyl, lower alkylcarbonyl, or Ar^2-carbonyl wherein Ar^2 is as defined above;

Z represents O, S, NR^5, or a direct bond wherein R^5 represents hydrogen or lower alkyl; and

Het represents a member of the group consisting of a radical of the formula:



(i-1)



(i-2)

and

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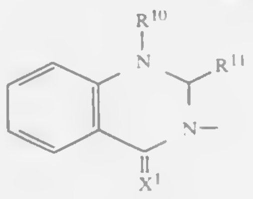


(i-3)

wherein:

each X^1 independently represents O or S;

R^7, R^8, and R^{10} are each independently hydrogen, lower alkyl, Ar^2-lower alkyl wherein Ar^2 is as defined above, hydroxylower alkyl, or lower alkyloxycarbonyl;

R^9 and R^{11} are each independently hydrogen, lower alkyl, hydroxy, mercapto, lower alkyloxy, lower alkylthio, halo, and (lower alkyloxycarbonyl)lower alkyl;

B^1 represents $—CH{=}CH—CH{=}CH—$, $—S—CH{=}CH—$, or $—N{=}CH—NH—$;

wherein one or two hydrogen atoms in said radical B^1 or in the benzene part of the radicals of formula (i-2) or (i-3) may be replaced by lower alkyl, lower alkylthio, lower alkyloxy, or halo where said hydrogen atom is bonded on a carbon atom, or by lower alkyl, lower alkyloxycarbonyl, Ar^2-lower alkyl wherein Ar^2 is as defined above, where said hydrogen is bonded on a nitrogen atom,

provided that the group R^7 or R^8, as the case may be, is absent where the radical of formula (i-1) is connected to C_sH_{2s} on the nitrogen atom bearing R^7 or R^8 in the formula, and further provided that (a) when L represents a radical either of formula (f) or of formula (g) wherein Y represents other than a direct bond, or (b) when L represents a radical of formula (h) wherein Z represents other than a direct bond, wherein in said radicals (f), (g), or (h) Het is connected to C_sH_{2s} on a nitrogen atom, then s is not 0.

5,025,015

THIOFORMAMIDINES, AND USE AS MEDICAMENTS

Jean F. Patoiseau, Castres; Jean-Marie Autin, Labruguiere; Henri Cousse, Castres; Véronique Sales, Dijon; Jacky Tisne-Versailles, Castres, and Jean-Pierre Bali, Montpellier Cédex, all of France, assignors to Pierre Fabre Medicament, Paris, France

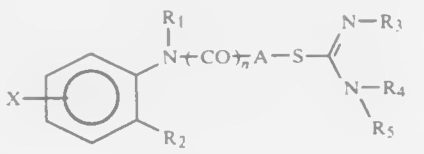
Filed Sep. 7, 1989, Ser. No. 404,337

Claims priority, application France, Sep. 8, 1988, 88 11747

Int. Cl.^{5} A61K *31/505, 31/415, 31/41;* **C07D** *239/38*

U.S. Cl. 514—274 **6 Claims**

1. A thioformamidine selected from those having formula I·



(I)

in which:

R_1 represents hydrogen or lower-alkyl containing 1 to 4 carbon atoms, inclusive,

R_2 represents benzoyl, benzyl, or alpha-hydroxybenzyl, the aromatic ring being optionally substituted by a halogen atom,

R_3 and R_4 form with the formamidine function a heterocycle selected from imidazole, imidazoline, benzimidazole, triazole, pyrimidine, and tetrahydropyrimidine;

R_5 represents hydrogen or lower-alkyl containing 1 to 4 carbon atoms, inclusive, or forms with R_4 a double bond $(—N{=}R_4)$ in the case of a pseudoaromatic heterocycle;

n equals 0 or 1;

A represents a linear or branched alkylene group having 1 to 4 carbon atoms, inclusive,

X represents hydrogen, halogen, lower C_{1-4} alkyl, lower C_{1-4} alkoxy, or nitro, and pharmaceuticallyacceptable organic and inorganic salts thereof.

5,025,016

PYRIMIDINE-THIOALKYL PYRIDINE DERIVATIVES, MEDICAMENTS CONTAINING THESE COMPOUNDS, AND METHOD OF TREATMENT

Kurt H. Abrens, Nuremberg; Helmut Schickaneder, Eckental; Heidrun Engler, Cadolzburg, and Istvan Szeleny, Schwaig, all of Fed. Rep. of Germany, assignors to Ludwig Heumann & Co. GmbH, Nuremberg, Fed. Rep. of Germany

Division of Ser. No. 16,564, Feb. 19, 1987, abandoned, which is a continuation of Ser. No. 605,926, May 1, 1984, abandoned.

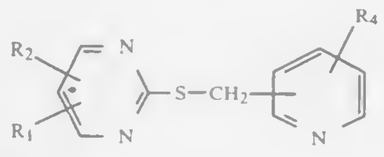
This application Sep. 26, 1988, Ser. No. 248,927

Claims priority, application Fed. Rep. of Germany, May 5, 1983, 83104452[U]

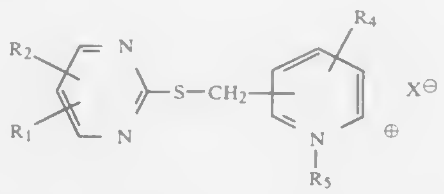
Int. Cl.^{5} A61K *31/505;* **C07D** *401/00, 403/00, 239/02*

U.S. Cl. 514—274 **32 Claims**

1. A pyrimidine-thioalkyl pyridine compound having the formula



or the formula



wherein R_1, R_2 and R_4 are the same or different and are selected from the group consisting of hydrogen, lower alkyl, halogen, amino and hydroxy with the proviso that at least one of R_1 or R_2 is amino or hydroxy, R_5 is a lower alkyl group, X is a halogen atom, the pyrimidine-thioalkyl group being bonded in the 2-, 3- or 4-position of the pyridine ring, or a pharmaceutically acceptable salt thereof.

32. A bronchosecretolytic or mucolytic composition of matter, comprising (i) a bronchosectetolytically or mucoltyically effective amount of a pyrimidine-thioalkyl pyridine compound as defined in claim 1, or a pharmaceutically effective salt thereof, and (ii) a pharmaceutically acceptable carrier or diluent thereof.

5,025,017

SECO-MEVINIC ACID DERIVATIVES USEFUL AS ANTIHYPERCHOLESTEROLEMIC AGENTS AND NEW INTERMEDIATES

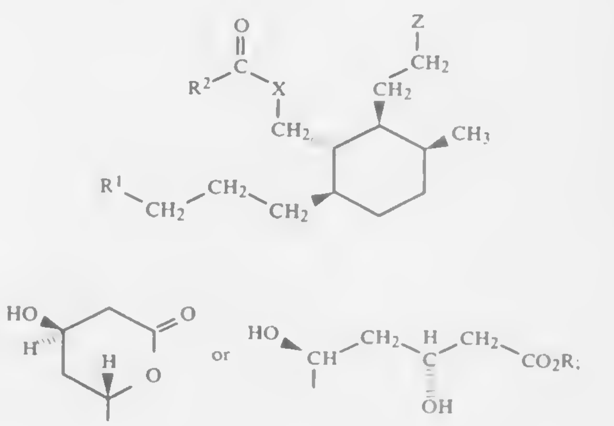
Donald S. Karanewsky, Robbinsville, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sep. 28, 1989, Ser. No. 413,656

Int. Cl.^{5} A61K *31/435*

U.S. Cl. 514—277 **22 Claims**

1. A compound having the structure



R is H, lower alkyl or metal ion;

R^1 is H, lower alkyl, aryl, lower alkoxy, cycloalkyl, aralkyl, heterocyclicalkyl or heterocyclic;

R^2 is lower alkyl, cycloalkyl or aralkyl;

X is O or NR^5, wherein R^5 is H or lower alkyl; wherein the term heterocyclic by itself or as part of another group represents a 5 to 10 membered monocyclic or bicyclic ring containing one or two heteroatoms which are N, S or O, wherein the term lower alkyl or alkyl by itself or as part of another group contains 1 to 12 carbons and is unsubstituted or substituted with a halo-substituent, trifluoromethyl, alkoxy, aryl, alkylaryl, haloaryl, cycloalkyl, alkylcycloalkyl, hydroxy, alkoxycarbonyl, alkanoyloxy, aroyloxy, alkylthio, alkylsulfinyl, alkylsulfonyl, arythio, arylsulfinyl and/or arylsulfonyl; the term cycloalkyl by itself or as part of another group contains 3 to 12 carbons and is unsubstituted or substituted with 1or 2 halogen, lower alkyl, hydroxy, lower alkoxycarbonyl, lower alkanoyl, aroyl, aryl, alkylthio, alkylsulfinyl, alkylsulfonyl, cycloalkylthio, cycloalkylsulfinyl, cycloalkylsulfonyl, arylthio and/or oxo groups; the term aryl by itself or as part of another group refers to monocyclic or bicyclic aromatic groups containing 6 to 10 carbons in the ring portion and is unsubstituted or substituted with 1 or 2 lower alkyl, halogen, trifluoromethyl, lower alkoxy, nitro and/or cyano groups.

5,025,018

CENTRAL NERVOUS SYSTEM INJURY TREATMENT WITH OPIATE-RECEPTOR ANTAGONIST

Alan I. Faden, Mill Valley, Calif., assignor to Medicis Corporation, New York, N.Y.

Continuation of Ser. No. 456,235, Dec. 27, 1989, abandoned, which is a continuation of Ser. No. 287,685, Dec. 20, 1988, abandoned, which is a continuation of Ser. No. 58,340, Jun. 5, 1987, abandoned. This application Aug. 22, 1990, Ser. No. 571,019

Int. Cl.^{5} A61K *31/435, 31/44*

U.S. Cl. 514—277 **6 Claims**

1. A method of inducing kappa-opiate-receptor antagonistic activity in a patient suffering from ischemic or traumatic central nervous system injury which comprises administering to said patient an effective amount of a kappa-opiate-receptor antagonist suitable to permit the induction of kappa-opiate receptor antagonistic activity.

VOL
1127
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1991
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5,025,019
COUGH/COLD MIXTURES COMPRISING NON-STEROIDAL ANTI-INFLAMMATORY DRUGS

Abraham Sunshine, New York; Eugene M. Laska, Larchmont, and Carole E. Siegel, Mamaroneck, all of N.Y., assignors to Analgesic Associates, Larchmont, N.Y.

Division of Ser. No. 144,099, Jan. 15, 1988, Pat. No. 4,920,149, which is a division of Ser. No. 887,205, Jul. 21, 1986, Pat. No. 4,738,966, which is a division of Ser. No. 752,546, Jul. 8, 1985, Pat. No. 4,619,934, which is a division of Ser. No. 598,502, Apr. 9, 1984, Pat. No. 4,552,899. This application Nov. 20, 1989, Ser. No. 438,074

Int. Cl.^{5} A61K *31/19, 31/44, 31/435, 31/445*

U.S. Cl. 514—277 **23 Claims**

1. A pharmaceutical composition of matter for use in the treatment of cough, cold, cold-like and/or flu symptoms in a mammalian organism, and adapted for unit dosage oral administration, said composition comprising (i) an analgesically and anti-inflammatoryily effective amount of a non-narcotic constituent consisting essentially of at least one of propionic acid NSAID s, ibuprofen, naproxen benoxaprofen, fluribiprofen, fenoprofen, fenbufen, ketoprofen, indoprofen, pirprofen, carprofen, oxaprozin, pranoprofen, miroprofen, tioxaprofen, suprofen, alminoprofen, tiaprofenic acid, fluprofen, bucloxic acid, or pharmaceutically acceptable salt thereof, in combinatory immixture with (ii) a sympathomimetically effective amount of at least one of the sympathomimetic amines, pseudoephedrine, phenylpropanolamine, phenylephrine, or pharmaceutically acceptable salt thereof, and (iii) an antihistaminically effective amount of at least one of the antihistamines, chlorpheniramine, brompheniramine, dexchlorpheniramine, dexbrompheniramine, triprolidine, doxylamine, tripelennamine, cyproheptadine, carbinoxamine, bromodiphenhydramine, phenindamine, pyrilamine, azatadine, or pharmaceutically acceptable salt thereof.

5,025,020
USE OF TETRANDRINE AND ITS DERIVATIVES TO TREAT MALARIA

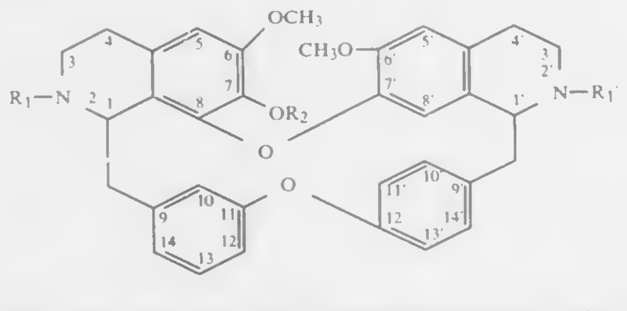
Knox Van Dyke, Morgantown, W. Va., assignor to Cancer Biologics of America, Inc., Lexington, Ky.

Filed Sep. 28, 1989, Ser. No. 413,711

Int. Cl.^{5} A61K *31/44*

U.S. Cl. 514—280 **5 Claims**

1. A method for treating malaria comprising: exposing malaria cells to effective concentrations of a compound having the following formula:



where R_1 and R_1' are the same or different shortchaned carbon based ligand; and R_2 and R_3 are the same or different CH_3 or hydrogen.

5,025,021
1,2-DIDEOXY-2-FLUORONOJIRIMYCIN AS GLYCOSIDASE INHIBITORS

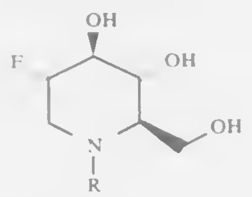
Daniel P. Getman, St. Louis, and Gary A. DeCrescenzo, St. Peters, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Jul. 27, 1989, Ser. No. 386,538

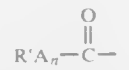
Int. Cl.^{5} A61K *31/445;* **C07D** *211/46, 491/056*

U.S. Cl. 514—302 **19 Claims**

1. Compound represented by the formula:



wherein R represents hydrogen, alkyl radicals having from 1 to about 10 carbon atoms, alkenyl radicals having from 2 to about 10 carbon atoms, aryl, alkaryl and aralkyl radicals having from about 6 to about 16 carbon atoms and radicals represented by the formula:



$$R'A_n-\overset{\overset{\displaystyle O}{\|}}{C}-$$

wherein R' represents alkyl radicals, having from about 1 to about 10 carbon atoms, and aryl, aralkyl and alkaryl radicals having from about 6 to about 26 carbon atoms. A represents oxygen, and n is 0 or 1.

5,025,022
METHOD OF TREATING OR PREVENTING SCHIZOPHRENIA AND/OR PSYCHOSIS USING S-N-(1-AZABICYCLO[2.2.2]OCT-3-YL)BENZAMIDES AND THIOBENZAMIDES

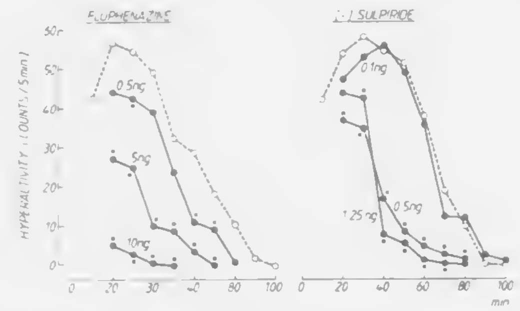
Robert J. Naylor; Brenda Naylor, both of The Old Rectory, Addingham, Ilkley, West Yorkshire, LS29 0QP, Great Britain; Alain Renaud, 16, Place des Arts, 92500 Rueil Malmaison, and Michel Langlois, 4, Place Cesar Franck, 78530 Buc, both of France

Filed Aug. 3, 1989, Ser. No. 389,364

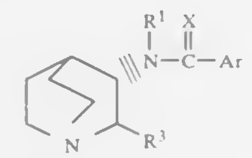
Claims priority, application European Pat. Off., Aug. 4, 1988, 88402042.1

Int. Cl.^{5} A61K *31/44, 31/495, 31/50*

U.S. Cl. 514—305 **4 Claims**



1. A method for treating or preventing schizophrenia and/or psychosis, the method comprising the administration to a mammal in need of antischizophrenic and/or antipsychotic treatment an effective amount of a compound of general formula I



(I)

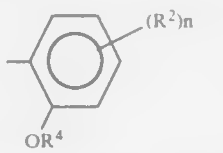
wherein:

X represents oxygen or sulphur;

each of R^1 and R^3 independently represents hydrogen or a C_4-C_4 alkyl group;

Ar represents

a phenyl ring optionally substituted by one, two or three C_1-C_4 alkoxy groups and/or by one or two halogen atoms; a phenyl ring of the general formula

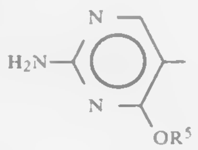


wherein R^2 represents halogen, 4-5-benzo, C_1-C_8 alkoxy, C_1-C_4 alkylcarbonyl or Am, wherein Am represents amino, methylamino or dimethylamino,

R^4 represents C_1-C_8 alkyl,

n is 1 or 2; or

a pyrimidinyl moiety of the general formula



wherein R_5 is C_1-C_4 alkyl;

or an N-oxide and/or pharmaceutically acceptable salt thereof.

5,025,023
PEPTIDE ANTIBIOTICS

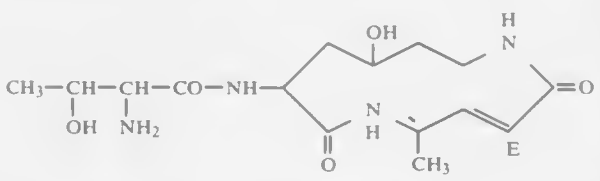
Masataka Konishi, Kawasaki; Koji Tomita, Setagaya; Masahisa Oka, Yokohama, and Ken-ichi Numata, Fuchu, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 309,527, Feb. 13, 1989, Pat. No. 4,898,940, which is a division of Ser. No. 51,433, May 19, 1987, Pat. No. 4,833,076, which is a continuation-in-part of Ser. No. 771,090, Aug. 30, 1985, abandoned. This application Sep. 29, 1989, Ser. No. 414,357

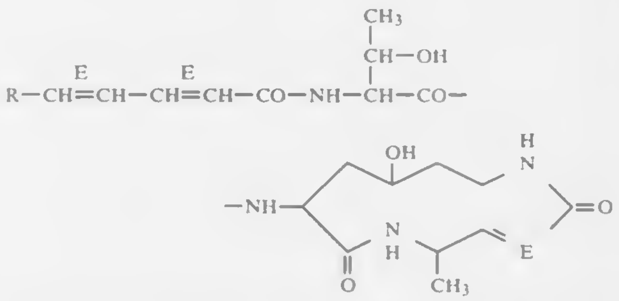
Int. Cl.^{5} A61K *31/395;* **C07D** *245/02*

U.S. Cl. 514—183 **2 Claims**

1. The compound of the formula



2. A composition comprising an amount effective as an antifungal or antitumor agent of at least one compound of the formula:



wherein R is $CH_3(CH_2)_6$, $CH_3—(CH_2)_4—CH=CH—(CH_2)_2$ or $CH_3—(CH_2)_8$, together with a pharmaceutically acceptable carrier.

5,025,024
THERAPEUTICALLY ACTIVE FLUORO-SUBSTITUTED COMPOUND

Arne E. Brändström, Göthenburg; Per L. Lindberg, Askim, and Gunnel E. Sunden, Göthenburg, all of Sweden, assignors to Aktiebolaget Hässle, Södertalje, Sweden

Filed Dec. 20, 1989, Ser. No. 453,960

Claims priority, application Sweden, Dec. 22, 1988, 8804629; Jun. 16, 1989, 8902170

Int. Cl.^{5} A61K *31/44;* **C07D** *213/68*

U.S. Cl. 514—338 **7 Claims**

1. 4-Fluoro-2-[[(4-methoxy-2-pyridinyl)methyl]sulfinyl]-1H-benzimidazole or physiologically acceptable salts thereof, or its optical enantiomers.

5. A pharmaceutical composition containing as active ingredient an effective amount of the compound according to claim 1 and a pharmaceutically acceptable carrier.

5,025,025
(ARYLSULFONAMIDO- AND PYRIDYL-)-SUBSTITUTED CARBOXYLIC ACIDS AND DERIVATIVES THEREOF AND USE FOR SUPPRESSING THROMBOXANE ACTIVITY

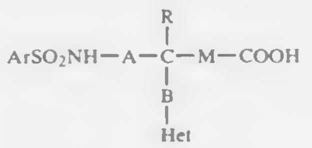
Shripad S. Bhagwat, Scotch Plains; Alan J. Main, Basking Ridge, both of N.J., and Herman R. Rodriguez, New York, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 373,125, Jun. 28, 1989. This application May 23, 1990, Ser. No. 528,018

Int. Cl.^{5} C07D *401/06, 401/12, 213/28;* **A61K** *31/41, 31/44*

U.S. Cl. 514—340 **60 Claims**

1. A compound of the formula



$$ArSO_2NH-A-\underset{\underset{\displaystyle Het}{|}}{\underset{\displaystyle B}{\underset{|}{\overset{\overset{\displaystyle R}{|}}{C}}}}-M-COOH \qquad (I)$$

wherein A represents lower alkylene; B represents oxygen, sulfur, lower alkylene, lower alkylene interrupted by oxygen, sulfur, sulfinyl or sulfonyl, (oxy-, sulfinyl-, sulfonyl- or thio)-lower alkylene, lower alkenylene, phenylene or a direct bond; M represents lower alkylene, lower alkylene interrupted by oxygen, sulfur, sulfinyl or sulfonyl, (oxy-, sulfinyl, sulfonyl- or thio)-lower alkylene, lower alkenylene or a direct bond; or one of A, B and M represents hydrogen unless A, B or M represents lower alkylidenylene in which case R represents the second bond to the adjacent alkylidenylene unsaturated carbon atom; Het represents 3-pyridyl, or 3-pyridyl substituted by lower alkyl; Ar represents carbocyclic aryl; a pharmaceuitically acceptable ester or amide derivative thereof wherein carboxy is esterified in form of a pharmaceutically acceptable ester or carboxy is derivatized in form of a pharmaceutically

VOL
1127
ISS
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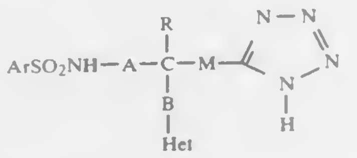
acceptable amide; the N-oxide thereof; or a pharmaceutically acceptable salt thereof; or a compound of the formula


(Ib)

wherein Ar, A, B, M, R and Het have meaning as defined above; the N-oxide of a said compound; or a pharmaceutically acceptable salt thereof.

47. A method of suppressing thromboxane activity in mammals which comprises administering to a mammal in need thereof an effective thromboxane suppressing amount of a compound according to claim 1.

5,025,026
HAIR RESTORER

Nakaguchi Osamu, Toyonaka, Japan, assignor to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

PCT No. PCT/JP88/01289, § 371 Date Aug. 21, 1989, § 102(e) Date Aug. 21, 1989, PCT Pub. No. WO89/05626, PCT Pub. Date Jun. 29, 1989

PCT Filed Dec. 21, 1988, Ser. No. 400,118

Claims priority, application Japan, Dec. 24, 1987, 62-329227

Int. Cl.^{5} A61K *31/425*

U.S. Cl. 514—356 **1 Claim**

1. A method of restoring hair in a subject in need thereof, which comprises administering to the subject an effective amount of n-pentadecyl nicotinate.

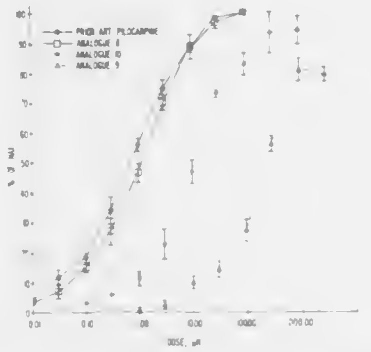
5,025,027
CYCLIC CARBAMATE ANALOGUES OF (+)-PILOCARPINE

Henry Rapoport, Berkeley, Calif., and Per Sauerberg, Valby, Denmark, assignors to Regents of the University of California, Berkeley, Calif.

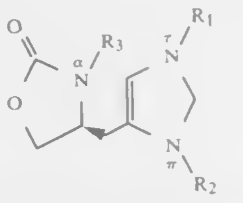
Continuation-in-part of Ser. No. 317,760, Mar. 2, 1989, abandoned. This application Dec. 5, 1989, Ser. No. 446,486

Int. Cl.^{5} A61K *31/42;* **C07D** *263/04*

U.S. Cl. 514—376 **6 Claims**



1. A biologically active compound having the structure



wherein R_1 or R_2 has less than about 12 carbon atoms and is a primary or secondary alkyl, a primary or secondary aralkyl or a cycloaklkyl and R_3 has from at least two carbon atoms to about 8 carbon atoms and is an alkyl, an alkenyl, an alkynyl or a cycloalkyl.

5,025,028
TETRAZOLYL SUBSTITUTED THIOETHERS, PHARMACEUTICAL COMPOSITIONS AND ANTI-ALLERGIC USE THEREOF

Erhard Reinholz; Walter-Gunar Friebe, both of Mannheim; Wolfgang Kampe, Heddesheim, all of Fed. Rep. of Germany; Jürgen Mertin, Walenstadt, Switzerland, and Otto-Henning Wilhelms, Weinheim-Rittenweier, Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

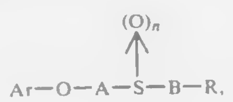
Division of Ser. No. 11,096, Feb. 5, 1987, Pat. No. 4,906,666. This application Jan. 17, 1990, Ser. No. 466,197

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1986, 3604050

Int. Cl.^{5} A61K *31/41;* **C07D** *257/04, 257/06*

U.S. Cl. 514—381 **20 Claims**

1. A compound of the formula:


(I)

$$\mathrm{Ar{-}O{-}A{-}}\overset{(O)_n}{\overset{\uparrow}{\mathrm{S}}}\mathrm{{-}B{-}R},$$

wherein

Ar is phenyl, phenyl substituted one or more times by a radical selected from the group consisting of C_1–C_6 alkyl, C_2–C_6 alkenyl, C_1–C_6 alkoxy, C_1–C_6 alkylthio, C_1–C_4 alkanoyl, hydroxyl, hydroxy-C_1–C_6-alkyl, carboxyl, C_1–C_6 alkoxycarbonyl, carbamoyl, nitro, amino or halogen,

A is a straight-chained or branched, saturated or unsaturated C_1–C_8 aliphatic hydrocarbon which is unsubstituted or substituted by a hydroxyl group,

n is 0, 1 or 2,

B is a straight-chained or branched, saturated or unsaturated C_1–C_8-aliphatic hydrocarbon and

R is 5-(1H)-tetrazolyl,

—CO—NH—tetrazolyl or

5—(1H)—tetrazolylthio; or

a pharmacologically acceptable salt thereof.

15. A pharmaceutical composition for combating allergic diseases containing an effective amount to combat allergic diseases of the compound of claim **1** in a pharmaceutically acceptable carrier.

16. The pharmaceutical composition of claim **15** wherein said compound is selected form one or more of the group consisting of 5-{S-[3-(4-acetyl-3-hydroxy-2-allylphenoxy)-propyl]-thiomethyl}1-(1H)-tetrazole; N-[(1H)-tetrazol-5-yl]-S-[3-(3,4-dichlorophenoxy)-propyl]-3-thiopropionic acid amide, 5-{S-[3-(4-acetyl-3-hydroxy-2-propylphenoxy)-propyl]-5-thiopentyl}-(1H)-tetrazole and 5-{S-[3-(4-acetyl-3-hydroxy-2-propylphenoxy)-propyl]-2-thioethyl}-1(1H)-tetrazole.

5,025,029
METHOD FOR AUGMENTING FETAL HEMOGLOBIN

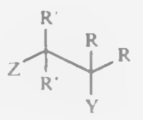
Susan Perrine, Richmond, Calif., assignor to Children's Hospital Medical Center of Northern California, Oakland, Calif.

Continuation-in-part of Ser. No. 277,151, Nov. 29, 1988, abandoned, which is a continuation-in-part of Ser. No. 917,805, Oct. 10, 1986, Pat. No. 4,811,821. This application May 4, 1990, Ser. No. 518,454

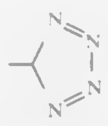
Int. Cl.^{5} A61K *31/19, 31/41, 31/255*

U.S. Cl. 514—381 **14 Claims**

1. A method for ameliorating β-globin disorders in a mammal comprising the step of introducing into the bloodstream of said mammal periodically during its gestation period and/or infancy, a compound of the formula I:



wherein R is $—CO_2R_1$, $—SO_2R_1$, $—SO_3R_1$, or



and R_1 is NH_2, H, M, branched or linear alkyl 1–4 carbons or partially or perfluorinated branched or linear alkyl of 1–4 carbon atoms, and M is a cation; Z is $—CH_3$, —X, or $—CX_3$; and X is H, Cl, F, Br, i or combinations thereof; Y is H, $—NH_2$, $—NH_3^+$, $—CX_3$ or F; and R' is H or F; or a mixture thereof, in an amount, frequency and duration of life sufficient to inhibit or reverse fetal γ to β-globin switching.

5,025,030
HYDROXYALKINYL-AZOLYL DERIVATIVES

Reinhard Lantzsch, Wuppertal; Ernst Kysela, Bergisch-Gladbach; Karl H. Büchel, Burscheid; Stefan Dutzmann, Duesseldorf; Wilhelm Brandes, Leichlingen, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 7, 1989, Ser. No. 376,721

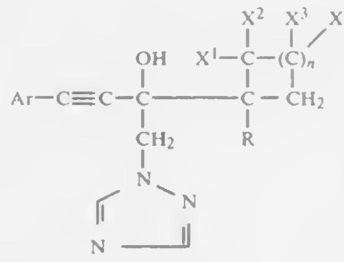
Claims priority, application Fed. Rep. of Germany, Jul. 19, 1988, 3824434

The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.

Int. Cl.^{5} A01N *43/653;* **C07D** *249/08*

U.S. Cl. 514—383 **11 Claims**

1. A hydroxyalkynyl-azolyl derivative of the formula


(I)

in which

Ar represents phenyl which can be monosubstitued to trisubstituted by

X^1 represents halogen,

X^2 represents hydrogen or halogen,

X^3 represents hydrogen or halogen, .

X^4 represents hydrogen or halogen and

n represents 0 or 1,

or an acid addition salt or metal salt complex thereof.

5,025,031
ARYL AND ARYLOXYALKYL SULFAMATE ESTERS USEFUL AS ANTICONVULSANTS

Young S. Lo; David A. Walsh, both of Richmond, and Ibrahim M. Uwaydah, Chesterfield, all of Va., assignors to A. H. Robins Co., Inc., Richmond, Va.

Filed Nov. 30, 1989, Ser. No. 443,146

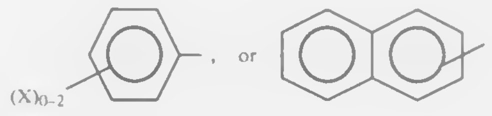
Int. Cl.^{5} A61K *31/415, 31/255*

U.S. Cl. 514—399 **14 Claims**

1. A method of treating convulsions in a mammal, comprising administering to said mammal an effective anticonvulsant amount of a compound having the formula:

$$(HO)_p—A—[OS(O)_2NR^1R^2]_z$$

wherein A is substituted on one or more carbon atoms by an aminosulfonyloxy radical, said A being selected from aryl, arylalkyl, or aryloxyalkyl with a proviso that when A is arylalkyl, and the aryl moiety is phenyl, z is always two; Aryl or aryl moieties are selected from:



X is selected from hydrogen, halo, phenyl, phenoxy, benzoyl, loweralkyl, loweralkoxy, carboxy, amino, loweralkyl amino, diloweralkyl amino, acetamido, cyano, nitro, loweralkoxycarbonyl, 1H-imidazol-1-yl, aminosulfonyl, 4-phenyl-1H-imidazol-1-yl, 4-methyl-1H-imidazol-1-yl, 1-triazolyl, 2-methyl-1H-imidazol-1-yl, phenylloweralkoxy, or hydroxy; z is 1 or 2 and is the number of $—OS(O)_2NR^1R^2$ groups, p is 0 or 1 and is the number of untreated hydroxyl groups, R^1 and R^2, same or different, are hydrogen or loweralkyl; the optical isomers thereof, when they can be formed; and the pharmaceutically acceptable addition salts thereof, when they can be formed.

5,025,032
PHENYL BUTYL NITRONE COMPOSITIONS AND METHODS FOR TREATMENT OF OXIDATIVE TISSUE DAMAGE

John M. Carney, Lexington, Ky., and Robert A. Floyd, Oklahoma City, Okla., assignors to Oklahoma Medical Research Foundation, Oklahoma City, Okla. and University of Kentucky Research Foundation, Lexington, Ky.

Filed Oct. 17, 1989, Ser. No. 422,651

Int. Cl.^{5} A61K *31/415*

U.S. Cl. 514—400 **18 Claims**

1. A method for in vivo treatment of oxidative CNS tissue damage resulting from ischemia or inflammation comprising:

providing α-phenyl t-butyl nitrone and derivatives thereof having spin trapping activity and preventing ATP depletion in vivo in tissue and

a pharmaceutically acceptable carrier for delivery of the α-phenyl t-butyl nitrone to the CNS of a patient.

5,025,033
ALKYLENE DIAMINES

Giichi Goto, Osaka, and Akinobu Nagaoka, Kawanishi, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

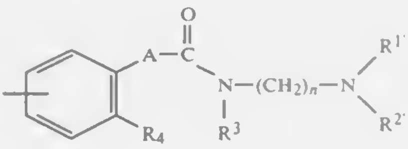
Filed Jan. 25, 1989, Ser. No. 301,065

Claims priority, application Japan, Jan. 29, 1988, 63-021009; May 10, 1988, 63-114360

Int. Cl.^{5} A61K *31/40;* **C07D** *487/02, 209/48;* **C07C** *233/64*

U.S. Cl. 514—417 **13 Claims**

1. A compound of the formula



wherein

$R^{1'}$ is a hydrogen atom or C_{1-4} alkyl group which may be substituted by a hydroxy group:

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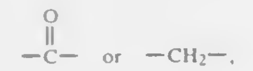
$R^{2'}$ is benzyl, naphthylmethyl, 1-phenylethyl or benzhydryl, each of which may be substituted by one to three substituents selected from the group S^1 consisting of

- (a) halogen, nitro, nitrile, hydroxy, C_{1-4} alkoxy, C_{1-4} alkylthio, amino, mono- or di-C_{4-4}-alkyl substituted amino, C_{1-4} alkoxycarbonyl, carboxy, C_{1-6} alkylcarbonyl, carbamoyl, mono- or di-C_{1-4} alkyl-substituted carbamoyl and adamantan-1-yl; and
- (b) phenyl, naphthyl, benzoyl, phenoxycarbonyl, phenyl-C_{1-4} alkylcarbamoyl or phenylcarbamoyl, wherein the substituent (b) has 0–4 further substituents on the phenyl or naphthyl group which are C_{1-4} alkyl, halogen, hydroxy, benzyloxy, amino, nitro, C_{1-4} alkoxycarbonyl or a phenyl which phenyl has 0–4 substituents of the group consisting of C_{1-4} alkyl, C_{1-4} alkoxy, halogen, hydroxy, benzyloxy, amino, mono- or di-C_{1-4} alkyl substituted amino, nitro or C_{1-4} alkoxycarbonyl;

R^3 is

- (1) a hydrogen atom,
- (2) a straight or branched C_{1-11} alkyl, C_{2-4} alkenyl, or C_{4-4} alkynyl, a monocyclic C_{3-7} cycloalkyl, bicyclo[3,2,1]oct-2-yl, bicyclo[3,3,1[non-2-yl, adamantan-1-yl, a phenyl or a naphthyl, each of which may be substituted by one to three substituents selected from the above defined group S^1, or
- (3) a C_{1-6} alkylcarbonyl, C_{3-8} cycloalkylcarbonyl, a C_{3-8} cycloalkyl-C_{1-6} alkylcarbonyl, a C_{2-6} alkenyl- or alkynyl-carbonyl, a benzoyl, a naphthoyl, carbamoyl, a mono- or di-C_{1-4} alkylcarbamoyl, a mono or di-C_{3-6} alkenyl- or alkynylcarbamoyl, phenylcarbamoyl, naphthylcarbamoyl, diphenylcarbonyl, sodiumsulfonyl, a C_{1-6} alkylsulfonyl, a C_{2-6} alkenyl or alkynylsulfonyl, phenylsulfonyl, naphthylsulfonyl, a C_{1-6} alkyloxycarbonyl, a C_{3-8} cycloalkyloxycarbonyl, a C_{2-7} alkenyl or alkynyl oxycarbonyl, a phenyloxycarbonyl or a benzyloxycarbonyl, each of which may be substituted by one to three substituents selected from the above-defined group S^1, and R^4 is a hydrogen atom, or

R^3 and R^4 combinedly form a group of the formula



$$-\overset{\overset{O}{\|}}{C}- \quad \text{or} \quad -CH_2-,$$

A is a bond or —CH=CH—;

X represents one substituent or two substituents selected from the group S^3 consisting of C_{1-4} alkyl, halogen atoms, nitro, nitrile, C_{1-4} alkoxy, phenoxy, C_{1-4} alkylcarbonyl amino, C_{1-4} alkylsulfonylamino, phenyl-C_{1-4} alkylsulfonylamino, phenylsulfonylamino, C_{1-4} alkylcarbonyl, C_{1-4} alkoxycarbonyl, phenoxycarbonyl, benzoyl, carbamoyl, mono- or di-C_{1-4} alkyl-substituted carbamoyl, phenylcarbamoyl, C_{1-4} alkylthio, phenyl C_{1-4} alkylthio, C_{1-6} alkylsulfinyl, phenyl C_{1-4} alkyl sulfinyl, C_{1-6} alkylsulfonyl, phenyl-C_{1-4} alkylsulfonyl, phenyl, and phenyl-C_{1-4} alkyl groups; and

n is an integer of 4 to 7;

or a pharmaceutically acceptable salt thereof.

13. A pharmaceutical agent for treatment of hypoxic cerebral dysfunction which contains an effective cholinesterase inhibiting amount of a compound of claim 1 and a pharmaceutically acceptable carrier.

5,025,034
PROSTAGLANDINS

Robert L. Jones, and Norman H. Wilson, both of Edinburgh, Scotland, assignors to National Research Development Corporation, London, England

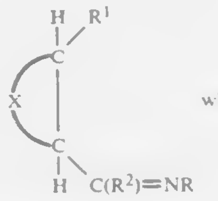
Division of Ser. No. 377,760, Jul. 5, 1989, Pat. No. 4,945,106, which is a continuation of Ser. No. 807,442, Dec. 10, 1985, abandoned, which is a division of Ser. No. 349,084, Feb. 12, 1982, Pat. No. 4,596,823. This application Feb. 7, 1990, Ser. No. 476,562

Claims priority, application United Kingdom, Jul. 1, 1980, 8021537

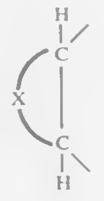
Int. Cl.^{5} C07C *177/00;* **A01K** *31/557*

U.S. Cl. 514—529 **36 Claims**

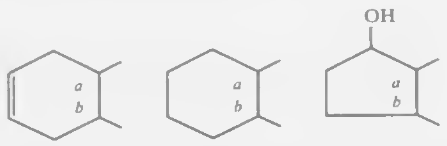
1. A compound of the formula (I)



wherein



represents one of the divalent groups



the letters a and b indicating in each case the points of attachment of the substituents R^1 and $C(R^2)=NR$, respectively: wherein

R^1 is a group of the formula $R'-COQ$ where R' is selected from the group consisting of $-(CH_2)_j-$ where j is an integer from 4 to 8; $-CH=CH-(CH_2)_k-$, where k is 2 or 3; $-CH_2-CH=CH-(CH_2)_m-$, where m is an integer from 1 to 5; $-CH_2-CH_2-CH=CH-(CH_2)_n-$, where n is 0 or an integer from 1 to 4; $-X-(CH_2)_p-$, where p is an integer from 3 to 7; $-CH_2-X-(CH_2)_q-$, where q is an integer from 2 to 6; and $CH_2-CH_2-X-(CH_2)_m-$, where X is O or S; and COQ is carboxy, a physiologically acceptable carboxylate salt, a C_1-C_5 alkyl ester or $CONHSO_2CH_3$;

R_2 is selected from the group consisting of hydrogen, C_{1-10} aliphatic hydrocarbon groups, and C_{1-10} aliphatic hydrocarbon groups substituted by Ar, OAr or SAr, where Ar represents a phenyl, naphthyl, fluorenyl, dibenzocyclohexyl, dibenzocycloheptyl, pyridyl, benzthiazolyl, dihydrobenzthiazolyl, N-methyldihydrobenzthiazolyl, benzoxazolyl, dihydrobenzoxazolyl or N-methydihydrobenzoxazolyl group or such a group substituted by one or more substituents selected from C_{1-10} alkoxy, halogen, C_{1-10} halogen-substituted alkyl, sulphamoyl, amino, hydroxyl, nitro and C_{1-10} alkyl groups; and

R is a group $-OR^3$, $-OR^4$, $-A-R^3$ or $-N=R^5$ in which A is —NH—, —NH.CO—, $-NH.CO.CH_2N(R^6)-$, $-NH.SO_2-$, —NH.CO.NH— or —NH.CS.NH— and wherein R^3 is a C_{1-10} aliphatic hydrocarbon group, a group Ar or a C_{1-10} aliphatic hydrocarbon group substituted by one or more groups selected from Ar, OAr, and SAr; R^4 is a C_{1-10} aliphatic hydrocarbon group which is substituted through an oxygen atom by a C_{1-10} aliphatic hydrocarbon group which is itself substituted by one or more groups Ar; R^5 is a C_{1-10} aliphatic hydrocarbon group, a group Ar′, where Ar′ represents a fluorenylidene, dibenzocyclohexylidene, dibenzocycloheptylidene, dihydrobenzthiazolylidene, N-methyldihydrobenzthiazolylidene, dihydrobenzoxazolylidene or N-methyldihydrobenzoxazolylidene group or such a group substituted on a benzene ring or rings thereof by one or more substituents selected from C_{1-10} alkoxy, halogen, C_{1-10} halogen-substituted alkyl, sulphamoyl, amino, hydroxyl, nitro and C_{1-10} alkyl groups, or a C_{1-10} aliphatic hydrocarbon group substituted by one or more groups selected from Ar, OAr and SAr; an R^6 is hydrogen, a C_{1-10} aliphatic hydrocarbon group, a group Ar or a C_{1-10} aliphatic hydrocarbon group substituted by one or more groups selected from Ar, POAr and SAr.

5,025,035
METHOD OF TREATING DEPRESSION

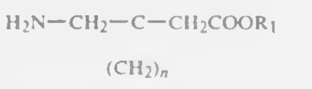
Jan D. Wallace, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 12, 1990, Ser. No. 596,270

Int. Cl.^{5} A61K *31/20, 31/205, 31/215*

U.S. Cl. 514—530 **3 Claims**

1 A method for treating depression which comprises administering a therapeutically effective amount of a compound of formula



$$H_2N-CH_2-\underset{(CH_2)_n}{C}-CH_2COOR_1 \qquad I$$

or a pharmaceutically acceptable salt thereof, wherein R_1 is hydrogen or a lower alkyl and n is 4, 5, or 6, in unit dosage form, to a mammal in need of said treatment.

5,025,036
CATECHOL CARBOXYLIC ACIDS

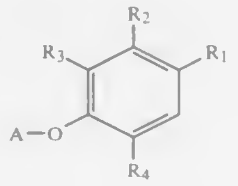
Matthew Carson, Nutley; Ru-Jen L. Han, Princeton Junction, and Ronald A. LeMahieu, North Caldwell, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 234,239, Aug. 19, 1988, abandoned, which is a continuation-in-part of Ser. No. 223,470, Jul. 22, 1988, abandoned, which is a continuation-in-part of Ser. No. 103,789, Oct. 1, 1987, abandoned. This application May 3, 1989, Ser. No. 347,109

Int. Cl.^{5} A61K *31/19*

U.S. Cl. 514—568 **59 Claims**

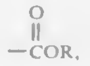
1. A compound of the formula



I

wherein,

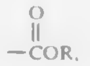
R_1 is



$$-\overset{\overset{O}{\|}}{C}OR,$$

hydrogen, acetyl, hydroxy or alkanoyloxy,

R_2 is



$$-\overset{\overset{O}{\|}}{C}OR,$$

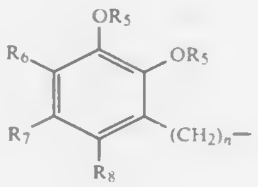
hydroxy, hydrogen or alkanoyloxy,

wherein R is hydrogen, lower alkyl or $-(CH_2)_n-N-($-lower alkyl$)_2$,

R_3 is hydrogen, lower alkyl or amino,

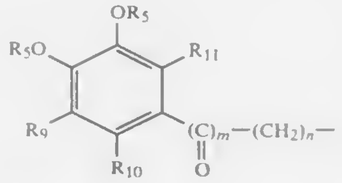
R_4 is hydrogen, lower alkyl, halogen or amino, and

A is



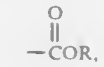
(A′)

or



(A″)

wherein, R_5 is hydrogen, benzoyl or alkanoyl of 1 to 7 carbon atoms, R_6 is hydrogen, halogen lower alkyl, cycloalkyl, phenyl or phenyl bearing one or two substituents independently selected from the group consisting of halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino, lower alkylamino and di-lower alkylamino, and R_7 and R_8, independently, are hydrogen, lower alkyl or halogen, R_9 is hydrogen or lower alkyl, R_{10} is lower alkyl, hydrogen or halogen R_{11} is hydrogen, lower alkyl, cycloalkyl or halogen, m is 0 or 1, n is an integer of 2 to 10, provided, that no more than one of R_1 or R_2 can be hydroxy, alkanoyloxy or



$$-\overset{\overset{O}{\|}}{C}OR,$$

or, when R is hydrogen, a salt thereof with a pharmaceutically acceptable base, or, when R is $-(CH_2)_n-N-(\text{lower alkyl})_2$, an addition salt thereof with a pharmaceutically acceptable acid.

5,025,037
USES FOR THE ORAL USE OF OAK POISON PREVENTATIVE IN THE TREATMENT OF: FELINE LEUKEMIA, INCREASED WOOL PRODUCTION IN SHEEP, AND REDUCTION OF SHIPPING FEVER IN STRESSED ANIMALS

William H. Livingston, 3003 N. 13th St., Artesia, N. Mex. 88210

Filed Nov. 3, 1989, Ser. No. 434,781

Int. Cl.^{5} A61K *31/19, 33/26*

U.S. Cl. 514—574 **3 Claims**

1. A method of using the Oak Poison Preventative to aid in the treatment of feline leukemia in cats comprising administering to said cats a therapeutically effective amount of the Oak Poison Preventative.

5,025,038
PROCESS FOR THE PREPARATION OF ANTIMICROBIAL FORMULATIONS OF 2-(ALKYLTHIO)ETHANAMINE HYDROHALIDES

Attila G. Relenyi, and Charles D. Gartner, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 318,787, Mar. 3, 1989, Pat. No. 4,982,004. This application Oct. 12, 1990, Ser. No. 596,431

Int. Cl.^{5} A01N *33/08, 37/18*

U.S. Cl. 514—665 **2 Claims**

1. An antimicrobial composition which comprises 1 to 40 weight percent of a 2-(alkylthio)ethanamine hydrohalide of the formula $R\text{-}SCH_2CH_2NH_3\oplus X\ominus$, wherein R represents a straight or branches chain alkyl group of 8 to 12 carbon atoms

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and X⊖ represents a chloride or bromide anion, 1 to 50 weight percent propylene glycol, 30 to 95 weight percent water, 0.25 to 10 weight percent propionic acid, and 0 to 10 weight percent potassium propionate, wherein the antimicrobial composition is prepared by a process which comprises the steps of:

(a) hydrolyzing an amide of the formula

$$R\text{-}S\text{-}CH_2CH_2\text{-}NH\text{-}C(O)\text{-}CH_2CH_3$$

wherein

R is as previously defined,

to the 2-(alkylthio)ethanamine hydrohalide and propionic acid by contacting the amide with aqueous hydrochloric or hydrobromic acid;

(b) neutralizing any remaining hydrochloric or hydrobromic acid and a part of the propionic acid formed by contacting the amide hydrolysate with aqueous potassium hydroxide; and

(c) diluting the neutralized hydrolysate with propylene glycol and, optionally, additional water.

5,025,039

PROCESS FOR THE PRODUCTION OF MOLDED POLYURETHANE FOAMS AND THE MOLDED FOAMS OBTAINED BY THIS PROCESS

Alfred Neuhaus, Leverkusen; Otto Ganster, Odenthal, and Richard Kopp, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 22, 1989, Ser. No. 440,627

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1988, 3840817

Int. Cl.^{5} C08G *18/14*

U.S. Cl. 521—51 **24 Claims**

1. A process for the production of a molded polyurethane foam having a density of at least 250 kg/m^3 and a compact surface which comprises foaming inside a closed mold at an isocyanate index of about 75 to 1500 a reaction mixture comprising

a) a polyisocyanate component comprising at least one aromatic polyisocyanate,

b) an isocyanate-reactive component comprising at least one organic compound containing at least two isocyanate-reactive groups,

c) a blowing agent comprising an organic carboxylic acid.

5,025,040

FLUID LOSS CONTROL ADDITIVES FOR OIL WELL CEMENTING COMPOSITIONS

Stefano C. Crema, Ypsilanti, Mich.; Clare H. Kucera, Tulsa, Okla.; Gerd Konrad, and Heinrich Hartmann, both of Limburgerhof, Fed. Rep. of Germany, assignors to BASF, Parsippany, N.J.

Filed Jun. 11, 1990, Ser. No. 535,625

Int. Cl.^{5} C09K *7/00;* **C08B** *11/193, 11/00, 11/12*

U.S. Cl. 523—130 **6 Claims**

1. A cementing composition useful in cementing oil, gas and water wells comprising:

a) water;

b) hydraulic cement; and

c) a fluid loss additive in an amount effective to reduce fluid loss, said fluid loss additive comprised of a blend of a copolymer of acrylamide and vinyl imidazole, in a weight percent ratio of from about 95:5 to 5:95, acrylamide to vinyl imidazole said copolymer having a molecular weight range of from about 10,000 to 3,000,000, and a terpolymer of acrylamide, acrylamidomethylpropane sulfonic acid sodium salt and vinyl imidazole in a weight percent ratio of 60:20:20; the ratio of copolymer to terpolymer being in the range of 20:80 to 80:20.

5,025,041

PEARLESCENT COATING COMPOSITIONS

Johannes Pfenninger; Edward E. Jaffe, both of Willmington, Del., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

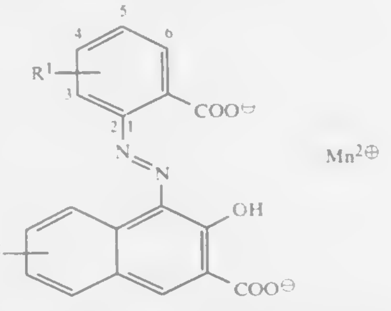
Filed Jun. 15, 1989, Ser. No. 366,900

Int. Cl.^{5} C09D *5/36, 133/08;* **C08K** *5/23*

U.S. Cl. 523—171 **11 Claims**

1. A pearlescent coating composition comprising a resin binder system selected from the group consisting of acrylic, alkyd, polyurethane, polyester and aminoplast resins, metallic oxide coated mica particles and a manganese salt of an azo pigment corresponding to the formula

(I)



wherein R^1 and R^2, independent of each other, are hydrogen, C$_1$–C$_4$-alkoxy, halogen, nitro, cyano, C$_1$–C$_4$-alkoxycarbonyl, carbamoyl or sulfamoyl.

5,025,042

FLAME RETARDANT COMPOSITION

Mamuru Yoshida, Yokohama; Hachiro Suya, Ayase; Shoji Hayashi, Yokohama; Takao Koshiyama, Sagamihara; Satoshi Hashimoto, and Katsuhiro Horita, both of Yokosuka, all of Japan, assignors to Nippon Unicar Company Limited, Danbury, Conn.

Filed Jul. 21, 1989, Ser. No. 382,919

Claims priority, application Japan, Jul. 29, 1988, 63-188179

Int. Cl.^{5} C08K *9/00, 3/10;* **C08L** *83/00*

U.S. Cl. 523—216 **19 Claims**

1. A composition comprising:

(i) a thermoplastic resin; and

(ii) magnesium hydroxide, the surface of which has been treated with an organic aminosilane, said magnesium hydroxide having (a) a strain in the <101> direction of no more than 3.0 a 10^{-3}; (b) a crystallite size in the <101> direction of more than 800 angstroms; and (c) a surface area, determined by the BET method, of less than 20 square meters per gram

wherein the aminosilane is present in an amount of about 0.1 to about 3 parts by weight of aminosilane per 100 parts by weight of resin.

5,025,043

POLYMERIZED FATTY ACID POLYAMIDE RESIN DISPERSIONS AND METHOD FOR THE MANUFACTURE THEREOF

George A. Smith, Langhorne, Pa., assignor to Union Camp Corporation, Wayne, N.J.

Continuation of Ser. No. 151,773, Feb. 3, 1988, abandoned. This application Jan. 16, 1990, Ser. No. 464,572

Int. Cl.^{5} C08J *3/03;* **C08K** *5/09;* **C08L** *77/08*

U.S. Cl. 523—326 **14 Claims**

1. In a method for the preparation of an aqueous dispersion of a polyamide resin which comprises heating said resin to at least its melting point to liquify said resin, adding said liquified resin to water and an effective amount of a surfactant effective in forming emulsions of said liquified resin in water to form a mixture, subjecting the mixture to comminuting forces, and cooling said mixture below the melting temperature of said resin; the improvement of providing aqueous polyamide resin dispersions stable against separation into separate phases at ambient temperatures in excess of 24 hours wherein: (1) said polyamide resin is an amorphous, non-solvated, un-neutralized, polymerized fatty acid polyamide resin, the polymerized fatty acid portion thereof obtained by polymerization of a saturated, ethylenically unsaturated or acetylenically unsaturated monobasic carboxylic acid containing 8 to 24 carbon atoms and the resin having an acid number of up to about 12 and an amine number of up to about 10, (2) the water is heated to a temperature such that the mixture will have a temperature above the melting point of said polyamide resin, the percentage of said resin in said mixture with water being between about 20 and about 60 percent, (3) said surfactant is other than the salt of an organic primary amine, and (4) the step of subjecting the mixture to comminuting forces forms an emulsion of droplets of said liquified resin in water having an average volume size distribution of less than 20 microns.

5,025,044

EXTRUSION ISOLATION OF BLENDS OF RUBBER AND ASPHALT

Lance A. Christell, Prospect, Ky., and Fred Y. Kafka, Parkersburg, W. Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 429,581, Oct. 31, 1989, abandoned. This application Sep. 25, 1990, Ser. No. 586,855

Int. Cl.^{5} C08J *3/20;* **C08L** *95/00*

U.S. Cl. 523—334 **13 Claims**

1. A process for blending elastomeric latices and asphalt comprising feeding an aqueous emulsion of elastomeric latex selected from the group consisting of chloroprene polymer latexes, polyisoprene latexes, polystyrene/butadiene latexes, and polybutadiene latexes containing 15 to 70 weight percent elastomer, and asphalt in the form of a melt or in the form of an emulsion containing 20–70 weight percent asphalt to a screw extruder having a flow restriction to apply a back pressure sufficient that water present in the aqueous emulsion is forced out of a vent provided in the extruder upstream from said flow restriction to apply back pressure, feeding asphalt and elastomer through said restriction and recovering the thus formed blend of 5 to 98 weight percent asphalt and 2 to 95 weight percent elastomer from said extruder.

5,025,045

DAMAGE TOLERANT COMPOSITES CONTAINING INFUSIBLE PARTICLES

Irena Gawin, Sandy, Utah, and Brian J. Swetlin, Wilmington, Del., assignors to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 137,846, Dec. 24, 1987, abandoned. This application Dec. 20, 1988, Ser. No. 286,840

Int. Cl.^{5} C08L *63/00*

U.S. Cl. 523—440 **5 Claims**

1. An epoxy resin composition comprising a polyepoxide component, a reactive oligomer, a curing agent and infusible particulate, said resin composition exhibiting phase separation upon cure into crosslinked glassy phases and made by a process comprising combining:

100 parts by weight of a polyepoxide component comprising a polyepoxide compound having a glass transition below 50° C. and having at least about two epoxide groups per molecule;

between about 10 and 200 parts by weight of a reactive oligomer component comprising a crosslinkable oligomer having at least about two crosslinkable groups per molecule and a molecular weight (number average) between about 2000 and 10,000;

between about 5 and 100 parts by weight of a curing agent for crosslinking said epoxy composition and having a molecular weight below about 1000; and

between about 1 and 16% by weight of said epoxy resin composition of infusible particles comprising a rubber polymer wherein said rubber polymer is not crosslinkable in said epoxy resin composition, an amount of said polymer being contained within said infusible particles that are dispersed throughout said resin composition and have a lower modulus than the matrix of said epoxy resin composition that is cured in absence of said infusible particles.

5,025,046

CREPING ADHESIVE COMPOSITION

Dave A. Soerens, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Dec. 15, 1989, Ser. No. 451,491

Int. Cl.^{5} C08L *97/00*

U.S. Cl. 524—72 **6 Claims**

1. A creping adhesive comprising from about 85 to about 99.5 weight percent water and from about 0.5 to about 15 weight percent dissolved or suspended solids, said solids comprising from about 65 to about 90 weight percent polyvinyl alcohol, from about 1 to about 15 weight percent polyethylene oxide, and from about 5 to about 35 weight percent lignin sulfonate.

5,025,047

USE OF N,N'- AND N,N',N'-SUBSTITUTED SILYL UREAS AS ANTIDEGRADATION AGENTS AND POLYMER BLENDS WHICH CONTAIN THEM

Siegfried Wolff, Bornheim-Merten, and Udo Goerl, Meckenheim, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 19, 1990, Ser. No. 615,267

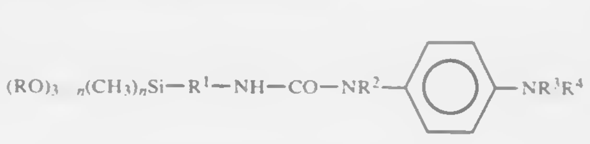
Claims priority, application Fed. Rep. of Germany, Nov. 20, 1989, 3938488

Int. Cl.^{5} C08K *5/54*

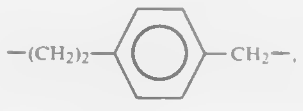
U.S. Cl. 524—99 **16 Claims**

1. A polymer blend comprising polymers and N,N'-and N,N',N'-substituted silyl ureas, as antidegradation agents in polymers, of the general formula I:

(I)



wherein n=0,1 or 2, R=C$_1$–C$_6$ alkyl, linear or branched, phenyl, C$_5$–C$_8$ cycloalkyl, R^1=—(CH$_2$)$_3$—,



R^2, R^3, R^4 which may be the same or different=hydrogen, C$_1$–C$_{18}$ alkyl, linear or branched, C$_5$–C$_8$ cycloalkyl, C$_1$–C$_3$ alkyl, terminally substituted by an amino, thio or cyano group, —(C$_2$H$_4$NH)$_m$H where m=2 or 3, C$_3$–C$_{18}$ alkenyl, linear or branched, benzyl, phenyl, naphthyl, pyridyl, triazyl, optionally singly or multiply substituted by an amino, hydroxyl, thio, C$_1$–C$_4$-alkyl, C$_1$–C$_4$-alkoxy, -nitro or carboxyl group.

5,025,048

ORGANOSILICON COMPOSITION COMPRISING STABILIZER

Julia S. Burnier, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Apr. 12, 1990, Ser. No. 508,323

Int. Cl.^{5} G08K *5/3435*

U.S. Cl. 524—99 **20 Claims**

1. A composition comprising:

(A) (i) a crosslinked organosilicon polymer or crosslinkable organosilicon prepolymer comprising alternating (a) cyclic polysiloxane or tetrahedral siloxysilane residues and (b)

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polycyclic hydrocarbon residues derived from polycyclic polyenes having at least two carbon-carbon double bonds in their rings linked through carbon to silicon bonds, wherein at least one of the cyclic polysiloxanes or tetrahedral siloxysilanes (a) or the polycyclic polyenes (b) used to form the polymer or prepolymer has more than two reactive sites; or (ii) a crosslinked or crosslinkable linear poly-(organohydrosiloxane) polymer having at least 30% of its ≡SiH groups reacted with hydrocarbon residues derived from polycyclic polyenes having at least two carbon-carbon double bonds in their rings; and

(B) as an antioxidant, a compound comprised of at least one hindered phenol and at least one hindered amine.

5,025,049

ALKOXYSILYLATED ACRYLIC OR VINYLIC RESIN CONTAINING PRIMER COMPOSITIONS

Mitsuhiro Takarada, Annaka, and Kazuharu Sato, Miyogimachi, both of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed May 30, 1990, Ser. No. 530,596

Claims priority, application Japan, Jun. 2, 1989, 1-140725

Int. Cl.^{5} C08K *5/47, 5/13, 5/29*

U.S. Cl. 524—91 **19 Claims**

1. A primer composition dilluted with an organic solvent comprising:

(A) 100 parts by weight of an organic copolymer comprising an alkoxysilylated acrylic and/or vinylic monomer, vinyl acetate and other monomers copolymerizable therewith;

(B) 10 to 100 parts by weight (both exclusive) of a polymer or copolymer comprising one or more monomers selected from the group consisting of alkyl acrylates and alkyl methacrylates, each alkyl group having 1 to 8 carbon atoms;

(C) 20 to 100 parts by weight (both exclusive) of a crosslinking agent for said organic copolymer (A); and

(D) 10 to 100 parts by weight (both exclusive) of an ultraviolet absorber.

5,025,050

ULTRAVIOLET-RADIATION STABILIZER AND FLAME RETARDANT SYSTEMS

James E. Torres, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Mar. 16, 1990, Ser. No. 494,398

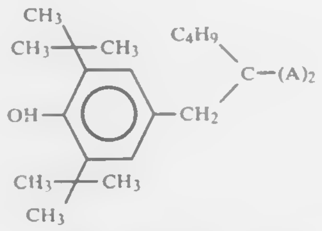
Int. Cl.^{5} C08K *5/3435, 5/3492, 5/521*

U.S. Cl. 524—91 **8 Claims**

1. An ultraviolet-radiation stabilizer and flame retardant system containing,

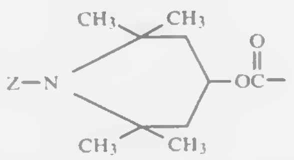
(a) a flame retardant amount of an N,N′-ethylene-bis (tetrabromophthalimide) or N,N′-bis (tetrabromophthalmide) predominate product, which product is characterized by having a Y.I. (ASTM 1925) no greater than about 16 after being exposed to oven aging at a temperature of from about 210° C. to about 230° C. for about 6 hours;

(b) a hindered-amine light stabilizer selected from a compound of the formula ABA or



or

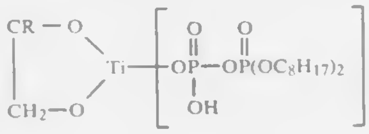
a mixture of such compounds, wherein A is



in which Z is, for each A, independently selected from H and —CH_3 and wherein B is —$(CH_2)_n$, with n being whole integer and with $2 \leqq n \leqq 10$;

(c) a 2-(2′-hydroxyphenyl)benzotriazole;

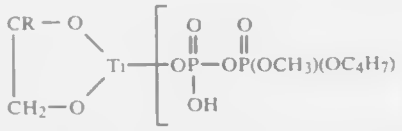
(d) a titanate selected from the group consisting of,



(I)

wherein $R=(\ H)_2$ or ^-O;

a methacrylate functional amine adduct of (I) when $R=(^-H)_2$, an acrylate functional amine adduct of,



(II)

and mixture of two or more of the foregoing; and,

(e) optionally, $Mg(OH)_2$ and or ZnO.

5,025,051

SYNTHETIC RESIN COMPOSITION

Yoshinori Sato, and Hiroshi Akamine, both of Kazo, Japan, assignors to Ferro Corporation, Cleveland, Ohio

Filed Jun. 15, 1989, Ser. No. 446,891

Claims priority, application Japan, Oct. 20, 1987, 62-265088; Sep. 13, 1988, 63-227604

Int. Cl.^{5} C08K *5/34*

U.S. Cl. 524—99 **9 Claims**

1. A synthetic resin composition comprising:

(A) 100 parts by weight of a synthetic resin; and

(B) 0.01 –10 parts by weight of a mixed product of
  (a) a compound having at least one piperidyl group and
  (b) perchloric acid
  (c) optionally, an inorganic substance other than perchloric acid.

5,025,052

FLUOROCHEMICAL OXAZOLIDINONES

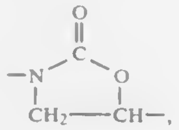
Davis H. Crater, White Bear Lake; Richard D. Howells, St. Paul; Richard M. Stern, Woodbury, and John A. Temperante, St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 235,757, Aug. 8, 1988, abandoned, which is a continuation of Ser. No. 906,817, Sep. 12, 1986, abandoned. This application Feb. 27, 1990, Ser. No. 486,598

Int. Cl.^{5} C08K *5/3417*

U.S. Cl. 524—104 **13 Claims**

1. Fibers comprising a fiber-forming synthetic organic polymer and a fluorochemical oxazolidone composition comprising normally solid, water-insoluble, fluoroaliphatic compounds comprising one or more 2-oxazolidinone moities,



at least one of which has a monovalen fluoroaliphatic radical, R_f, which is a fluorinated, stable, inert, non-polar, oleophobic, hydrophobic radical having 3 to 20 carbon atoms and 40 to 78 weight percent fluorine and the terminal portion of which has at least three fully fluorinated carbon atoms, bonded to the 5-position carbon atom thereof by an organic linking group, Q, said fibers being oil and water repellent.

5,025,053

DIORGANOPOLYSILOXANES CONTAINING DIBENZOYLMETHANE FUNCTIONAL GROUPS

Edith Canivenc, Lyon; Serge Forestier, Claye-Souilly; Michel Gay, Lyon; Gerard Lang, Saint-Gratien, and Herve Richard, Paris, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

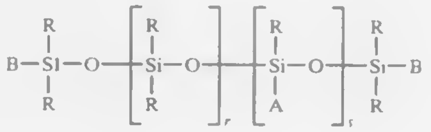
Filed Aug. 4, 1989, Ser. No. 389,780

Claims priority, application France, Aug. 4, 1988, 88 10778

Int. Cl.^{5} C08K *5/24*

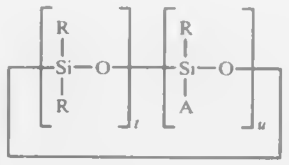
U.S. Cl. 524—265 **8 Claims**

1. A diorganopolysiloxane comprising dibenzoylmethane functional groups and having one of the following formulae (1) or (2):



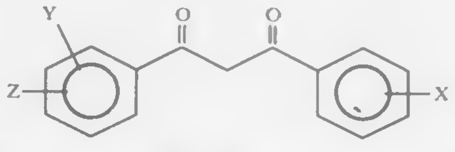
(1)

or



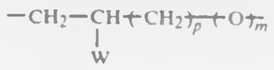
(2)

in which the symbols R, which may be identical or different, are each a C_1–C_{10} alkyl, vinyl, phenyl or 3,3,3-trifluoropropyl radical, at least 80% of the number of the radicals R being methyl radicals; the radicals B, which may be identical or different, are each a radical R or a radical A defined below; r is an integer ranging from 0 to 200; s is an integer ranging from 0 to 50, with the proviso that, if s is 0, at least one of the two symbols B is A; u is an integer ranging from 1 to 20; t is an integer ranging from 0 to 20; t+u is equal to or greater than 3; and the symbol A is a radical of the formula:



(3)

wherein X is a hydrogen atom, a linear or branched chain C_1–C_8 alkyl radical or a linear or branched chain C_1–C_8 alkoxy radical; Y is a hydrogen atom, a hydroxyl group or a C_1–C_4 alkoxy radical; and Z is a divalent radical of the formula:



$$-CH_2-\underset{W}{\underset{|}{CH}}-(CH_2)_p-(O)_m$$

in which m is 0 or 1, p is an integer ranging from 1 to 10 and W is a hydrogen atom or a C_1–C_4 alkyl radical, with the proviso that, when m is equal to 0, Y is an alkoxy radical or OH and is situated in a position ortho to Z.

5,025,054

POLISH CONTAINING A SILICONE RUBBER POWDER

Keiji Yoshida, Ichihara, and Mitsuo Hamada, Kisaratsu, both of Japan, assignors to Toray Silicone Company, Limited, Tokyo, Japan

Filed Nov. 9, 1989, Ser. No. 433,802

Claims priority, application Japan, Dec. 1, 1988, 63-304349

Int. Cl.^{5} C08K *5/54*

U.S. Cl. 524—267 **7 Claims**

1. A polish comprising a film forming wax material and a silicone rubber, the rubber being in the form of particles of an average diameter of 0.1–1000 μm mixed with the film forming wax, the silicone rubber particles containing about 0.5 to about 80.0 percent of a silicone oil based on the weight of the silicone rubber particles.

5,025,055

POLYMER MIXTURE COMPRISING AROMATIC POLYCARBONATE AND TWO AGENTS TO IMPROVE THE IMPACT STRENGTH; ARTICLES FORMED THEREFROM

Wilhelmus J. L. A. Hamersma; Torben P. Kempers, both of Bergen op Zoom, and Wilhemus M. M. Roovers, Steenbergen, all of Netherlands, assignors to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 6, 1989, Ser. No. 446,733

Claims priority, application Netherlands, Dec. 19, 1988, 8803113

Int. Cl.^{5} C08K *5/24*

U.S. Cl. 524—269 **8 Claims**

1. A polymer mixture which consists essentially of "A" an aromatic polycarbonate, "B" a first agent to improve the impact strength built up from a core which consists substantially of a diene rubber and on which at least one shell has been grafted consisting substantially of C_{1-6} alkyl acrylates and/or C_{1-6} alkyl-methacrylates, "C" a second agent to improve the impact strength consisting of a block copolymer with polycarbonate blocks and polysiloxane blocks, characterised in that the polymer mixture comprises moreover "D" a dialkyl silicone fluid polymer.

5,025,056

THERMOPLASTIC COMPOSITIONS HAVING IMPROVED MELT FLOW

Steven A. Jorissen, Mars, Pa.; Charles E. Lundy, Leverkusen Bayerwerk, Fed. Rep. of Germany; Sivaram Krishnan, Pittsburgh, Pa.; Robson Mafoti, Pittsburgh, Pa., and Robert A. Pyles, Bethel Park, Pa., assignors to Mobay Corporation, Pittsburgh, Pa.

Filed Aug. 16, 1990, Ser. No. 568,568

Int. Cl.^{5} C08L *69/00, 67/02*

U.S. Cl. 524—310 **9 Claims**

1. A thermoplastic molding composition comprising

(i) at least one member selected from the group consisting of polycarbonate resin and aromatic polyestercarbonate, and

(ii) a thermoplastic copolyetherester having a weight average molecular weight of about 2000 conforming to

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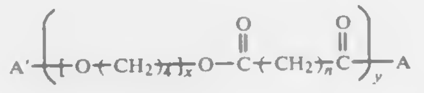


$$A'-\left(-(O-(CH_2)_4)_x-O-\overset{O}{\overset{\|}{C}}-(CH_2)_n-\overset{O}{\overset{\|}{C}}-\right)_y-A$$

wherein x is about 2 to 15, n is about 3 to 10 and y is about 1 to 10. A and A' are end groups which may independently be a hydroxy group, a carboxy radical, a C_1—C_8 alkoxy or a C_6—C_{10} aryloxy group, said (ii) being present in an amount sufficient to increase the melt flow index of said member.

5,025,057

4-METHYL-1-PENTENE POLYMER COMPOSITIONS

Hiromi Shigemoto, Iwakuni, Japan, assignor to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Dec. 13, 1988, Ser. No. 283,974

Claims priority, application Japan, Dec. 22, 1987, 62-324386; Dec. 22, 1987, 62-324387

Int. Cl.⁵ C08L *23/20, 23/10, 23/24*

U.S. Cl. 524—423 **3 Claims**

1. A 4-methyl-1-pentene polymer composition consisting essentially of:

(A) 90–10 parts by weight of 4-methyl-1-pentene polymer, which is crystalline homopolymer of 4-methyl-1-pentene or a α-olefin of 2–20 carbon atoms and which has at least 85 mol % 4-methyl-1-pentene and which has at least 85 mol % 4-methyl-1-pentene units;

(B) 90–10 parts by weight of propylene polymer which is crystalline homopolymer of propylene or a crystalline copolymer of propylene or a crystalline copolymer of propylene and less than 30% by weight of at least one other α-olefin having 2–20 carbon atoms, said propylene polymer having a melting point of at least 130° C. and a MFR of 0.1–80 g/10 min.;

(C) 70–10 parts by weight of an inorganic filler; and

(D) 20–3 parts by weight of α-olefin copolymer which is random copolymer of at least two different α-olefins, said random copolymer having a MFR of 0.1–50 g/10 min., a density of 0.850–0.900 g/cm³, a melting point of 40°–80° C. and a crystallinity index as measured by X-ray of less than 40%, said copolymer selected from the group consisting of ethylene/propylene copolymers, ethylene/1-butene copolymers, ethylene/1-hexene copolymers, ethylene/1-octane copolymers, ethylene/1-decene copolymers, ethylene/1-hexadecene copolymers, propylene/1-butene copolymers, propylene/1-hexene copolymers, propylene/1-octene copolymers, propylene/1-decene copolymers, 1-butene/1-octene copolymers, 1-hexene/1-octene copolymers, ethylene/propylene/1-hexene copolymers and ethylene/1-butene/1-hexene copolymers.

2. The composition as claimed in claim 1, wherein the inorganic filler is calcium carbonate, magnesium carbonate, hydrous basic magnesium carbonate, kaolin, pyrophyllite, talc, calcined clay, diatomaceous earth or barium sulfate.

5,025,058

FLAME-RESISTANT NON-DRYING PUTTY COMPOSITION

Atsuyoshi Senoo, Tokyo, Japan, assignor to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed May 23, 1990, Ser. No. 527,563

Int. Cl.⁵ C08K *3/10;* **C09K** *21/00*

U.S. Cl. 524—436 **12 Claims**

1. A flame-resistant, non-drying putty composition prepared by adding 2 to 20 parts by weight of an unvulcanized solid rubber, 10 to 50 parts by weight of a plasticizer, 300 to 800 parts by weight of a metal hydrate, 20 to 200 parts by weight of a filiated talc and 0.5 to 5 parts by weight of an organic fiber to 100 parts by weight of one liquid resin having a viscosity of 5,000 to 200,000 centipoise at room temperature or a mixture of two or more resins thereof and kneading the resultant composition.

5,025,059

PNEUMATIC TIRES WITH TREAD COMPRISING A BLEND OF ISOPRENE RUBBER, HIGH-TRANSPOLYBUTADIENE RUBBER AND CARBON BLACK

Hiroshi Mouri, and Shunji Araki, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Feb. 21, 1990, Ser. No. 482,606

Claims priority, application Japan, May 23, 1989, 1-127748

Int. Cl.⁵ C08K *3/04;* **C08L** *7/00, 9/00*

U.S. Cl. 524—495 **2 Claims**

1. A pneumatic tire comprising a tire casing, a thread portion covering a crown portion between both shoulders thereof and a sidewall portion covering each side part of the casing, characterized in that a rubber component of a rubber composition constituting a ground contact part of said thread portion consists of 0–25 parts by weight of an isoprene series rubber containing not less than 70% by weight of isoprene units and 100–75 parts by weight of a high-trans polybutadiene rubber containing 75–90% by weight of 1,4-trans bond units and having a weight average molecular weight Mw of not less than 250,000 and a molecular weight distribution of $1.2 \leqq Mw/Mn \leqq 1.9$, and said rubber composition contains 40–80 parts by weight of carbon black having a specific surface area of nitrogen adsorption of 110–160 m²/g and a compressed DBP oil absorption of 80–130 ml/100 per parts by weight of said rubber component.

5,025,060

DISPERSION OF FINE PARTICLES OF A POLYMER

Motoshi Yabuta; Yasushi Nakao; Shinji Sugiura; Mitsuhiro Fukuda, and Yuzo Miyamoto, all of Hiratsuka, Japan, assignors to Kansai Paint Co., Ltd., Hyogo, Japan

Filed Oct. 15, 1990, Ser. No. 596,327

Int. Cl.⁵ C08J *3/02;* **C08F** *2/16, 20/62*

U.S. Cl. 524—533 **17 Claims**

1. A dispersion of fine particles of a gelled polymer obtained by copolymerizing and crosslinking a vinyl monomer mixture containing at least 0.5% by weight each of at least two vinyl monomers in the presence of a macromonomer A, which has a molecular chain of poly(12-hydroxystearic acid) and has at least about one polymerizable unsaturated double bond per molecule in average, and a macromonomer B, which is a copolymer of an ethylenic unsaturated monomer and has a solubility parameter value of from 7.5 to 9.2 and about 1.0 to about 1.5 in average of polymerizable unsaturated double bonds, in an organic solvent which is capable of dissolving said macromonomers A and B but is substantially incapable of dissolving a polymer formed from said vinyl monomer mixture.

5,025,061

AQUEOUS DISPERSION COATING MATERIAL

Masahiro Ishidoya; Toru Soma, both of Yokohama, and Hisao Ogawa, Zushi, all of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 206,478, Jun. 13, 1988, abandoned. This application Sep. 17, 1990, Ser. No. 584,510

Int. Cl.⁵ C09D *167/02*

U.S. Cl. 524—539 **7 Claims**

1. An aqueous dispersion coating material containing, as a film-forming constituent, an aqueous dispersion prepared by a process comprising:

reacting a first resin consisting essentially of a carboxyl group-containing polyester resin capable of being rendered water-soluble when neutralized, said carboxyl group-containing polyester resin having an acid value of from 20 to 50, a hydroxyl value of from 50 to 200 and a number-average molecular weight of from 1,000 to 10,000, with a second resin consisting essentially of a hydrophobic linear polyester resin, said hydrophobic linear polyester resin being synthesized soley from a dicarboxylic acid constituent and a glycol constituent and having a softening point of from 40° C. to 200° C. and a number average molecular weight of from 10,000 to 100,000, said second resin containing a hydroxyl group or a carboxyl group only as a terminal group, said first resin being reacted with said second resin in a weight ratio of from 90:10 to 20:80 and at a temperature of from 150° C. to 200° C. in an ester-forming condensation reaction to form a resin reaction product having an acid value of from 10 to 30 and unesterified carboxyl groups;

neutralizing the resin reaction product with a base; and

emulsifying the neutralized resin reaction product in an aqueous medium to prepare said aqueous dispersion.

5,025,062

COATING MATERIALS BASED ON SYNTHETIC RESIN

Gregor Ley, Wattenheim; Wolfgang Schultze, Frankenthal; Johannes Vinke, Hockenheim, and Eckehardt Wistuba, Bad Durkheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 321,277, Mar. 9, 1989, abandoned. This application May 3, 1990, Ser. No. 518,337

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1988, 3809920

Int. Cl.⁵ C08L *31/02*

U.S. Cl. 524—556 **12 Claims**

1. A stone chip composition, comprising:

5–15 wt. % of a polymer binder consisting of

(A) from 60 to 100% by weight of a mono-or di- tert-butyl ester of an α,β-ethylenically unsaturated carboxylic acid or dicarboxylic acid of not more than 5 carbon atoms or a mixture thereof,

(B) from 0 to 40% by weight of an acrylate or methacrylate of a nontertiary C_{1-20}-alkanol or a mixture thereof,

(C) from 0 to 20% by weight of vinyl chloride, vinyl acetate, vinyl propionate or mixtures thereof, wherein $m_C \leqq 0.5\ m_B$, wherein m_C and m_B are the amounts of monomers C and B respectively,

(D) from 0 to 10% by weight of acrylic acid, methacrylic acid, acrylamide, methacrylamide and mixtures thereof, and

(E) from 0 to 5% by weight of other copolymerizable monomers; and

50–80 wt. % of stone chips having a mean particle size of 1–4.5 mm wherein said binder is in the form of an aqueous dispersion.

5,025,063

IONOMERIC COATINGS

Gary P. Craun, Berea, and Barbara L. Kunz, Strongsville, both of Ohio, assignors to The Glidden Company, Cleveland, Ohio

Filed Aug. 23, 1989, Ser. No. 397,278

Int. Cl.⁵ C08K *3/08, 3/22*

U.S. Cl. 524—560 **14 Claims**

1. A non-aqueous protective coating composition containing a thermosetting reactive polymeric binder, the binder comprising on a weight basis:

a carboxyl functional polymer having an Acid No. about 10 and a number average molecular weight between about 500 and 10,000, wherein the carboxyl functional polymer is an epoxy-ester copolymer comprising the reaction product of an epoxy resin with excess equivalents of dicarboyxlic acid comprising 1.3 to 4 equivalents of dicarboxylic acid per equivalent of epoxide, where said epoxy-ester copolymer contains hydroxyl group functionality and carboxyl group functionality; and

said coating composition being heat curable and said carboxyl polymer being self-curing to coreact said hydroxyl groups with said carboxyl groups to form a thermoset coating film.

5,025,064

PROCESS FOR THE PRODUCTION OF AQUEOUS POLYURETHANE DISPERSIONS

Helmut Reiff, Leverkusen, and Otto Lorenz, Roetgen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 3, 1990, Ser. No. 547,273

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1989, 3922493

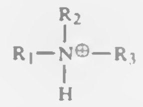
Int. Cl.⁵ C08L *75/04*

U.S. Cl. 524—591 **10 Claims**

1. A process for the production of an aqueous dispersion of polyurethanes containing chemically incorporated carboxylate groups wherein the counterions to the carboxylate groups are predominantly ammonium ions corresponding to the formula

$$\overset{\oplus}{NH_4}$$

which comprises mixing a starting aqueous dispersion of polyurethanes containing chemically incorporated carboxylate groups wherein the counterions to the carboxylate groups comprise ammonium ions corresponding to the formula



$$R_1-\underset{H}{\underset{|}{\overset{R_2}{\overset{|}{N^{\oplus}}}}}-R_3$$

wherein

R_1, R_2 and R_3 are the same or different and represent C_{1-4} alkyl groups, provided that the total number of carbon atoms in these substituents is 3 to 6,

with at least an equivalent quantity of ammonia, based on the trialkyl ammonium ions, and subsequently removing under vacuum at least a portion of the displaced trialkyl amines and the excess ammonia, if present.

5,025,065

FIRE-RETARDANT POLYCARBONATES AND POLYESTERS

Peter Tacke, Krefeld; Ulrich Grigo, Kempen; Werner Nouvertné, Krefeld; Dieter Freitag, Krefeld; Karsten-Josef Idel, Krefeld, and Uwe Westeppe, Mettmann, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

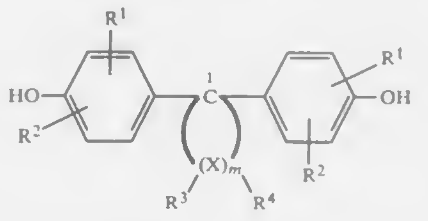
Filed Apr. 4, 1990, Ser. No. 504,487

Claims priority, application Fed. Rep. of Germany, Apr. 8, 1989, 3911558

Int. Cl.⁵ C08G *63/64;* **C08L** *69/00*

U.S. Cl. 524—611 **7 Claims**

1. A fire-retardant molding composition comprising a resin selected from the group consisting of polycarbonate, polyester carbonate and polyester, said resin being based on a dihydroxydiphenyl cycloalkane conforming to



in which

R^1 and R^2 independently of one another represent a hydro-

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gen or a halogen atom, C_{1-8} alkyl, C_{5-6} cycloalkyl, C_{6-10} aryl or C_{7-12} aralkyl,

m is an integer of 4 to 7,

R^3 and R^4 are individually selected for each X and independently of one another denote a hydrogen atom or a C_{1-6} alkyl and,

X is carbon,

with the proviso that for at least one atom X, both R^3 and R^4 are alkyl radicals, the flame-retardant finish being provided by an additive or a comonomer.

5,025,066

POLYCARBONATE AND POLYESTER BLENDS MODIFIED WITH POLYORGANOSILOXANE GRAFT POLYMERS COMBINED WITH DIENE RUBBER-BASED GRAFT POLYMERS

James L. DeRudder, Mt. Vernon, Ind., and I-Chung W. Wang, Williamstown, Mass., assignors to General Electric Company, Pittsfield, Mass.

Filed Nov. 14, 1988, Ser. No. 271,246

Int. Cl.⁵ C08G *63/47;* **C08L** *51/04*

U.S. Cl. 525—66 **34 Claims**

1. A composition comprising a polycarbonate resin (A); a mixture (A-1) comprising (i) a polycarbonate resin and (ii) a polyester resin; a mixture (A-2) comprising (i) a polycarbonate resin and (iii) a poly(etherester) elastomer, a poly(etherimide ester) elastomer or a mixture thereof; a mixture (A-3) comprising (i) a polycarbonate resin, (ii) a polyester resin and (iii) a poly(etherester) elastomer, a poly(etherimide ester) elastomer or a mixture thereof; or a mixture (A-4) of any of the foregoing; and

an effective low temperature ductility, gloss, impact resistance, discoloring, or thermal aging modifying amount of a modifier composition (B) comprising in combination

a multi-stage polyorganosiloxane-based graft polymer composition (B-1) comprising

(a) as a first stage, a substrate selected from

(i) an organosiloxane polymer, units derived from a cross-linking agent or agents and optionally units which serve as a graft-linking agent or agents;

(ii) a polymeric co-homopolymerized substrate comprised of, in combination, an organosiloxane polymer and at least one vinyl-based polymer;

(iii) a polymeric co-homopolymerized substrate comprised of, in combination, an organosiloxane polymer, at least one vinyl-based polymer, and units which are derived from a cross-linking agent or agents;

(iv) a polymeric co-homopolymerized substrate comprised of, in combination, an organosiloxane polymer, at least one vinyl-based polymer, and units which serve as a graft-linking agent or agents;

(v) a polymeric co-homopolymerized substrate comprised of, in combination, an organosiloxane polymer, at least one vinyl-based polymer, units which are derived from a cross-linking agent or agents and units from the same or different agent or agents which serve as a graft-linking agent or agents;

(vi) a polymeric co-homopolymerized substrate comprised of, in combination, an organo-siloxane polymer, at least one vinyl-based polymer, and a mixture of any of units which are derived from a cross-linking agent or agents, units which serve as a graft-linking agent or agents, or units derived from a cross-linking agent or agents and units from the same or different agent or agents which serve as a graft-linking agent or agents; or

(vii) a mixture of (i) and any of (ii), (iii), (iv), (v) or (vi); and

(b) at least one subsequent stage or stages graft polymerized in the presence of any previous stage and which is comprised of a vinyl-based polymer or a cross-linked vinyl-based polymer; and a diene rubber-based graft copolymer composition (B-2) comprising

(a) as a first stage a polymeric substrate comprised of units of a diene rubber and optionally units derived from a cross-linking agent or agents; and

(b) at least one subsequent stage graft polymerized in the presence of any previous stages and which is comprised of a vinyl-based polymer or a cross-linked vinyl-based polymer, the weight ratio of B-1 to B-2 being from 1 to 9:9 to 1.

5,025,067

PARTIALLY CURED EPOXY RESINS AND ELECTROSTATOGRAPHIC TONER CONTAINING THE SAME AS BINDER

Yohzoh Yamamoto; Goro Suzuki; Hideo Nakamura, and Kiyomi Yasuda, all of Chiba, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Nov. 16, 1988, Ser. No. 271,815

Claims priority, application Japan, Nov. 19, 1987, 62-292841; Nov. 20, 1987, 62-294795; Dec. 28, 1987, 62-333663

Int. Cl.⁵ C08L *63/02;* **C08G** *59/14, 59/68*

U.S. Cl. 525—109 **2 Claims**

1. An epoxy resin having a softening point of 60 to 130° C. as measured by Durran's method, which is prepared by reacting:

(a) 100 parts by weight of at least one epoxy resin selected from the group consisting of bisphenol and hydrogenated bisphenol epoxy resins;

(b) an active hydrogen compound having at least three active hydrogen atoms capable of reacting with an epoxy group in its molecule in an amount of about 0.05 to about 0.35 equivalent of active hydrogen per equivalent of epoxy group in (a), said amount being capable of partially curing the epoxy group of said component (a); and

(c) about 5 to 40 parts by weight of an oligomer based on at least one main monomer selected from the group consisting of butadiene and isoprene, said oligomer having on average at least 1.5 equivalents of active hydrogen capable of reacting with an epoxy group in its molecule wherein components (b) and (c) are not identical.

2. An epoxy resin which is prepared by reacting

(a) 100 parts by weight of at least one epoxy resin selected from the class consisting of bisphenol and hydrogenated bisphenol epoxy resins,

(d) a bisphenol,

(e) at least one member selected from the class consisting of active hydrogen compounds and acid anhydrides having at least 3 equivalents of active hydrogen or acid anhydride group capable of reacting with an epoxy group in the molecule, and

(f) about 2 to about 30 parts by weight of an oligomer based on at least one main monomer selected from the class consisting of butadiene and isoprene, said oligomer having on average at least 1.5 equivalents of active hydrogen and/or acid anhydride group capable of reacting with an epoxy group in its molecule,

the amounts of components (d) and (e) being defined by the equations:

$$400 \leqq \frac{W(a) + W(d)}{W(a)/EqO(a) - W(d)/EqOH(d)} \leqq 900 \qquad (1)$$

and

$$\alpha \geqq \frac{\gamma\rho}{1 - \gamma(1 - \rho)} \qquad (2)$$

wherein

$$\alpha = \frac{1}{N(e) - 1}$$

$$\gamma = \frac{N(d) + N(e)}{N(a)}$$

-continued

$$\rho = \frac{N(e)}{N(d) + N(e)}, \text{ and}$$

wherein

W(a) and W(d) are the weight of components (a) and (d) respectively,

EqO(a) is an epoxy equivalent of component (a), and

EqOH(d) is an OH equivalent of component (d).

N(a), N(d), and N(e) are the average functionality per molecule of components (a), (d), and (e), respectively wherein components (d), (e) and (f) are not identical.

5,025,068

REACTING NOVOLAC AND BISPHENOL F EPOXY RESINS WITH CARBOXY-TERMINATED BUTADIENE-ACRYLONITRILE

Gilbert Garcia, Westchester, and Larissa Domnikov, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 851,632, Apr. 14, 1986, abandoned. This application Feb. 3, 1988, Ser. No. 150,002

Int. Cl.⁵ C08G *59/14;* **C08L** *63/10*

U.S. Cl. 525—119 **5 Claims**

1. A process for preparing an epoxy resin, comprising:

preparing a mixture consisting essentially of from about 72 to about 79 parts per hundred of a novolac epoxy resin having a functionality from about 2.5 to 6.0, from about 23 to about 16 parts per hundred of bisphenol F epoxy resin having a functionality of 2, and from about 3 to about 10 parts per hundred of carboxy-terminated butadiene acrylonitrile;

heating the mixture to a temperature of from about 290 to about 350 degrees Fahrenheit for a time sufficient to form a reaction product; and

cooling the reaction product to ambient temperature, whereby the resulting epoxy is curable at ambient temperature but has high elevated temperature strength wher. cured

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5,025,069

MILD ALKYL GLYCOSIDE-BASED DETERGENT COMPOSITIONS, FURTHER COMPRISING TERPENE AND ISOTHIAZOLONE DERIVATIVES

Katsuhiko Deguchi; Kozo Saito; Hiroyuki Saijo, and Masaki Tosaka, all of Utsunomiya, Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Dec. 6, 1989, Ser. No. 446,815

Claims priority, application Japan, Dec. 19, 1988, 63-319906; Jan. 9, 1989, 1-2570

Int. Cl.⁵ C11D *1/83, 1/66, 3/18, 3/28*

U.S. Cl. 252—174.17 **4 Claims**

1. A detergent composition comprising:

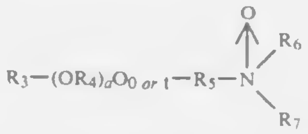
(a) 1-60% by weight of an alkyl glycoside represented by formula (I):

$$R_1(OR_2)_xG_y \qquad (I)$$

wherein R_1 is a linear or branched alkyl, alkenyl, or alkylphenyl group having 8 to 18 carbon atoms, R_2 is an alkylene group having 2 to 4 carbon atoms, G is a moiety derived from a reducing saccharide containing 5 to 6 carbon atoms, x is an average value of 0-5, and y is an average value of 1.0-1.42;

(b) 0.1-40% by weight of a surface active agent comprising a sulfate group, sulfonate group, or both;

(c) 0.1-10% by weight of an amine oxide represented by formula (II):



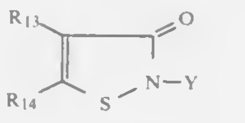
$$R_3{-}(OR_4)_aO_{0\text{ or }1}{-}R_5{-}\overset{\overset{O}{\uparrow}}{N}\begin{matrix}R_6\\R_7\end{matrix} \qquad (II)$$

wherein R_3 is a linear or branched alkyl or alkylamide group having 8 to 18 carbon atoms, R_4 is an alkylene group having 2 to 3 carbon atoms, a is a number from 0-30, R_5 is an alkylene group having 0 to 5 carbon atoms, and R_6 and R_7, which may be the same or different, are each a member selected from the group consisting of alkyl groups having 1 to 12 carbon atoms, alkanol groups having 1 to 3 carbon atoms, $-(C_2H_4O)_{1-6}H$ groups, and mixtures thereof,

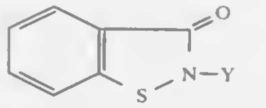
(d) 0.1-10% by weight of an ethoxylated nonionic surface active agent; wherein the ratio by weight of [(b)+(c)]/(a) is in the range of 1/25-10/1 and the ratio by weight of (c)/(b) is 1/10-3/1;

(e) 0.01-3% by weight of a terpene hydrocarbon selected from the group consisting of monoterpenes and sesquiterpenes, and

(f) 0.0001-0.1% by weight of one or more 3-isothiazolones represented by formulae (VI) and (VII), or their derivatives.



(VI)



(VII)

wherein R_{13} and R_{14}, individually, are a hydrogen atom, a halogen atom, or an alkyl group having 1 to 5 carbon atoms, and Y is a hydrogen atom or an alkyl group having 1 to 18 carbon atoms.

5,025,070

COPOLYMER POLYAMIDE RESIN FROM HYDROGENATED POLYOLEFIN CONDENSATE

Hajime Suzuki, Himeji, Japan, assignor to Daicel Chemical Industries Co., Ltd., Sakai, Japan

Continuation of Ser. No. 785,937, Oct. 9, 1985, abandoned, which is a division of Ser. No. 651,633, Sep. 14, 1984, Pat. No. 4,555,566, which is a continuation of Ser. No. 440,215, Oct. 12, 1982, abandoned. This application Jul. 17, 1986, Ser. No. 888,095

Claims priority, application Japan, Mar. 16, 1981, 56-38374; Jun. 30, 1981, 56-102047; Mar. 9, 1982, 57-36910

Int. Cl.⁵ C08G *69/26, 69/08, 69/48*

U.S. Cl. 525—184 **4 Claims**

1. A polyamide-modified, hydrogenated polyolefin, block copolymer resin which consists essentially of (A) 99 to 5 parts by weight of a polyamide component consisting essentially of repeating units selected from the group consisting of (1) $-NH(CH_2)_nCO-$, wherein n is an integer of from 5 to 11, and (2) $-NH-X-NHCO-Y-CO$, wherein X is $-C_mH_{2m}-$ in which m is an integer of from 6 to 12, isophorone, phenylene or cyclohexylene, and Y is $-C_lH_{2l}-$ in which l is an integer of from 4 to 10, phenylene, or cyclohexylene, copolymerized with (B) 1 to 95 parts by weight of blocks consisting essentially of a hydrogenated polyolefin condensate; said hydrogenated polyolefin blocks being derived from a condensation reaction of (3) hydrogenated polyolefin having a pair of terminal carboxylic acid groups or amino groups and derived from an olefin monomer having at least two double bonds, with (4) (i)

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a diamine when said hydrogenated polyolefin has terminal carboxylic acid groups or (ii) a dicarboxylic acid when said polyolefin has terminal amino groups, said diamine being selected from the group consisting of hexamethylenediamine, dodecamethylenediamine, cyclohexanediamine, phenylenediamine and isophoronediamine, said dicarboxylic acid being selected from the group consisting of adipic acid, sebacic acid, dodecanedioic acid, alicyclic dicarboxylic acids and aromatic dicarboxylic acids, said hydrogenated polyolefin blocks having a number-average molecular weight in the range of 500 to 10,000 and having a double bond hydrogenation ratio of greater than 70%, said block copolymer resin having a number-average molecular weight in the range of 5,000 to 500,000.

5,025,071
CROSSLINKABLE SILYL POLYMER COMPOSITION

David J. Bullen, Hackettstown, N.J., assignor to BP Chemicals Limited, London, England

Filed Jul. 5, 1989, Ser. No. 375,819

Claims priority, application United Kingdom, Jul. 13, 1988, 8816657

Int. Cl.^{5} C08F *8/00*

U.S. Cl. 525—326.5 8 Claims

1. A composition capable of being crosslinked by the action of water which comprises;
   (A) a silyl polymer which is an ethylene polymer containing hydrolyzable silane groups
   (B) an ester of a linear dibasic acid having from 4 to 14 carbon atoms and a branched alcohol having from 4 to 14 carbon atoms and,
   (C) an organometallic silanol condensation catalyst.

5,025,072
HIGHLY ACTIVE CATALYST COMPOSITION FOR POLYMERIZING ALPHA-OLEFINS

Thomas E. Nowlin, Kendall Park, and Klaus P. Wagner, East Windsor, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Division of Ser. No. 633,991, Jul. 24, 1984, Pat. No. 4,605,638, which is a division of Ser. No. 444,152, Nov. 24, 1982, Pat. No. 4,481,301, which is a continuation-in-part of Ser. No. 327,534, Dec. 4, 1981, abandoned. This application Nov. 22, 1985, Ser. No. 800,841

Int. Cl.^{5} C08F *4/608, 4/648, 210/02*

U.S. Cl. 526—129 27 Claims

1. A process for preparing a linear low density ethylene/alpha-olefin copolymer having a density of 0.94 g/cc or less comprising conducting the polymerization in the presence of a catalyst prepared by a process consisting essentially of the steps of:
   (i) contacting a solid, porous carrier having reactive OH groups with a liquid, said liquid containing at least one organomagnesium composition having the empirical formula

$$R_nMgR'_{(2-n)} \qquad (I)$$

where R is a C_1–C_{12} hydrocarbyl group, R′ is a halogen, and n is 1, the number of moles of said organomagnesium composition being in excess of the number of moles of said OH groups on said carrier, whereby said organomagnesium composition is reacted with said OH groups on said carrier;
   (ii) evaporating said liquid from step (i) to obtain a carrier, containing magnesium, in the form of a dry, free-flowing powder;
   (iii) reacting said powder of step (ii) with at least one transition metal compound in a liquid medium, the number of moles of said transition metal compound being in excess of the number of said OH groups on said carrier prior to the reaction of said carrier with said organomagnesium composition in step (i), said transition metal compound being soluble in said liquid medium, and the magnesium being substantially insoluble in said liquid medium, whereby a reacted form of transition metal which is insoluble in said liquid medium becomes supported on said carrier; and
   (iv) combining the product of step (iii) with a metal alkyl activator.

5,025,073
ONE PART HEAT CURABLE ORGANOPOLYSILOXANE COMPOSITIONS

Larry N. Lewis, Scotia, and Chris A. Sumpter, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 19, 1989, Ser. No. 424,022

Int. Cl.^{5} C08G *77/06*

U.S. Cl. 528—15 6 Claims

1. One part heat curable organoplysiloxane compositions comprising by weight:
   (A) 100 parts of a vinyl-substituted organopolysiloxane fluid,
   (B) 1 to 20 parts of a siloxane hydride and
   (C) an amount of an inclusion compound of a cyclodextrin and a complex of a platinum halide and a member selected from a cyclooctadiene or a norbornadiene which is effective as a latent platinum catalyst.

5,025,074
FLAME RETARDANT ORGANOPOLYSILOXANE-POLYCARBONATE TRIBLOCK COPOLYMERS

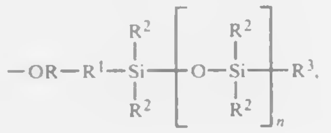
Gary C. Davis; Barbara E. McGrath, both of Albany, and Kevin M. Snow, Clifton Park, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 27, 1990, Ser. No. 572,283

Int. Cl.^{5} C08G *77/06*

U.S. Cl. 528—15 11 Claims

1. A flame retardant organopolysiloxanepolycarbonate triblock copolymer comprising an aromatic polycarbonate having terminal groups of the formula,



$$-OR-R^1-\underset{R^2}{\overset{R^2}{\mathrm{Si}}}-\left[O-\underset{R^2}{\overset{R^2}{\mathrm{Si}}}\right]_n-R^3,$$

where R is a $C_{(6-20)}$ divalent aromatic organic radical, R^1 is a $C_{(2-8)}$ aliphatic organic radical, R^2 is a $C_{(1-13)}$ monovalent hydrocarbon radical or a $C_{(1-13)}$ monovalent hydrocarbon radical substituted with radicals inert during equilibrium or condensation, R^3 is a $C_{(1-13)}$ monovalent organic radical and n is an integer equal to 0 to 100 inclusive.

5,025,075
METHYLPOLYSILANES AND METHOD FOR THEIR PREPARATION

Gary T. Burns, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Jul. 22, 1988, Ser. No. 222,897

The portion of the term of this patent subsequent to Jun. 11, 2008, has been disclaimed.

Int. Cl.^{5} C08G *77/04*

U.S. Cl. 528—33 21 Claims

1. A process for the preparation of an alkoxy-functional methylpolysilane comprising the steps of:
   (a) heating a mixture of alkoxydisilanes containing two, three, and four alkoxy-functional groups bonded to the silicon atoms, in the presence of a catalyst which is a source of alkoxide ions to form a reaction mixture;
   (b) reacting said mixture for a time sufficient for an alkoxy-functional methylpolysilane to form while separating by-produced volatile alkoxysilane materials from said reaction mixture; and

   (c) separating said catalyst from said alkoxy-functional methylpolysilane which has formed.

5,025,076
SILICONE-BASED FABRIC FINISHING AGENT

Masaki Tanaka; Hiroshi Ohashi, and Yoshinobu Takahashi, all of Gunma, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Feb. 27, 1989, Ser. No. 315,879

Claims priority, application Japan, Feb. 27, 1988, 63-45352

Int. Cl.^{5} C08G *77/04*

U.S. Cl. 528—33 6 Claims

1. A silicone-based fabric finishing agent which comprises, in admixture:
   (A) from 50 to 95 parts by weight of a diorganopolysiloxane having a viscosity in the range from 10,000 to 1,000,000 centistokes at 25° C. and having a substantially linear molecular structure represented by the general formula

$$XO—(—SiR_2—O—)_m—(—SiZR—O—)_n—X,$$

in which each R is a monovalent hydrocarbon group having 1 to 20 carbon atoms, Z is an amino-substituted alkyl group represented by the general formula $—R^1—(—NH—CH_2CH_2—)_a—NR^2{}_2$, R^1 being an alkylene group having 1 to 10 carbon atoms, each R^2 being a hydrogen atom or a monovalent hydrocarbon group and the subscript a being zero or a positive integer not exceeding 4, each X is a hydrogen atom or a monovalent hydrocarbon group having 1 to 10 carbon atoms, the subscript m is a positive integer in the range from 800 to 2000 and the subscript n is a positive integer not exceeding 20 with the proviso that $n/(m+n)$ is in the range from 0.0005 to 0.01;
   (B) from 5 to 50 parts by weight of an organopolysiloxane which is a reaction product of
      (B-a) an aminoalkyl-containing organopolysiloxane represented by the average unit formula

$$Z_bR_cSiO_{(4-b-c)/2},$$

in which Z and R each have the same meaning as defined above, the subscript b is a positive number not exceeding 1 and the subscript c is a positive number not exceeding 2 with the proviso that $b+c$ is in the range from 1.9 to 2.1, and
      (B-b) an epoxy-containing organic compound in an amount to provide from 0.01 to 20 moles of epoxy groups per mole of the amino-substituted alkyl groups denoted by Z in the reactant (B-a);
   (C) up to 30 parts by weight of an aminoalkyl-containing organopolysiloxane having a viscosity in the range from 100 to 5,000 centistokes at 25° C. and represented by the average unit formula

$$Z_bR_cSiO_{(4-b-c)/2},$$

in which each symbol has the same meaning as defined above; and
   (D) a hydrolysis product of an epoxy-containing hydrolyzable organosilane compound in an amount in the range from 1 to 50% by weight based on the total amount of the components (A), (B) and (C).

5,025,077
COMPOSITION FOR GLUING DISCONTINUOUS MINERAL FIBERS IN ORDER TO OBTAIN INSULATION PRODUCTS

Serge Tetart, Nogent sur Oise, and Bernard Lericque, Rantigny, both of France, assignors to Isover Saint-Gobain, Courbevoie, France

Filed Jul. 28, 1988, Ser. No. 226,202

Claims priority, application France, Aug. 3, 1987, 87 10978

Int. Cl.^{5} C08G *59/00*

U.S. Cl. 528—86 13 Claims

1. A base aqueous composition for gluing discontinuous mineral fibers comprising (a) at least one heat hardenable resin, (b) urea and (c) a polymethylol compound having a functionality of at least equal to three, wherein the polymethylol has the formula:

$$R—C\ (CH_2OH)_3 \text{ or}$$

$$R—C \quad (CH_2OH)_2 \quad CH_2—O—CH_2—(CH_2OH)_2—CR—R'$$

where R and R′, which may be identical or different, each represent a hydrocarbon aliphatic radical which may or may not contain a hydroxyl group and is selected from the group consisting of pentaerythritol, dipentaerythritol, trimethylolpropane, ditrimethylolpropane and mixtures thereof.

5,025,078
EPOXY RESIN SYSTEMS CONTAINING METHYL-2,6,-CYCLOHEXANEDIAMINE

Peter A. Lucas, Allentown, and Jeremiah P. Casey, Emmaus, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 2, 1990, Ser. No. 475,470

Int. Cl.^{5} C08G *59/50*

U.S. Cl. 528—120 7 Claims

1. In a polyepoxide resin composition comprising a glycidyl ether of a polyhydric phenol, glycidyl polyester or glycidyl amine cured with an amine curing agent, the improvement which comprises utilizing as said curing agent, or component thereof, 1-methyl-2,6-cyclohexanediamine.

5,025,079
ORTHO-ORTHO ARAMATIC BIS MALEIMILE-DIAMINE RESIN

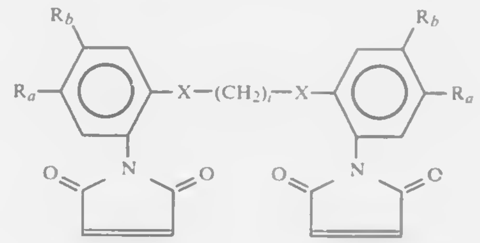
Joseph J. Zupancic, Bensenville; Raymond J. Swedo, Mt. Prospect, both of Ill.; Donald R. Jamieson, Merriam, Kans.; Elaine F. Schumacher, Arlington Hts., and Allyson J. Buehler, Indiana Hd. Pk., both of Ill., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jul. 10, 1989, Ser. No. 377,507

Int. Cl.^{5} C08G *73/12*

U.S. Cl. 528—170 4 Claims

1. A thermosetting resin reaction product of (a) a bismaleimide having the formula:



where
   R_a and R_b are independently selected from hydrogen, an alkyl or alkoxy group containing up to 4 carbon atoms, chlorine, or bromine, or R_a and R_b together form a fused 6-membered hydrocarbon aromatic ring, with the proviso

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that R_a and R_b are other than t-butyl or t-butoxy and where

X is O, S, or Se

i is 1-3

and the alkylene bridging group —$(CH_2)_i$— is optionally substituted by 1-3 methyl groups or by fluorine, with (b) a diamine.

5,025,080
RESIN COMPOSITION FROM DI(ARYLCYCLOBUTENEALKYL) ETHER OF DI(HYDROXYPHENYL) OLIGOMER

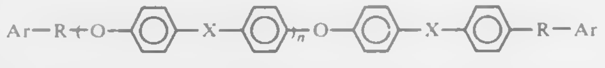
Puk K. Wong, Katy, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 30, 1990, Ser. No. 503,413

Int. Cl.^{5} C08G *73/10*

U.S. Cl. 528—170 **15 Claims**

1. A curable resin composition comprising an organic dicyanate, a bismaleimide and a di(arylcyclobutenealkyl) ether of di(hydroxyphenyl) oligmer of the formula



wherein Ar is an aromatic ring system of up to 4 aromatic rings and up to 30 carbon atoms inclusive connected to R from a carbon atom of a six-membered ring, R is alkylene of up to 4 carbon atoms inclusive, X is a direct valence bond or X is alkylene of up to 8 carbon atoms inclusive, oxy, thio, sulfonyl, carbonyl or carbonato and n is an average number from 0 to about 20.

5,025,081
PREPARATION OF POLYESTERCARBONATE FROM ALIPHATIC DICARBOXYLIC ACID

Luca P. Fontana, Evansville, and Paul W. Buckley, Mt. Vernon, both of Ind., assignors to General Electric Company, Mt. Vernon, Ind.

Continuation-in-part of Ser. No. 455,067, Dec. 22, 1989, abandoned. This application Jan. 30, 1990, Ser. No. 476,067

Int. Cl.^{5} C08G *63/64*

U.S. Cl. 528—176 **12 Claims**

1. A process for preparing a copolyestercarbonate which comprises reacting interfacially a dihydric phenol, a carbonate precursor, and an aliphatic alpha omega dicarboxylic acid having from 9 to about 20 carbon atoms wherein the said diacid is from about 2 to about 20 mole percent based on the dihydric phenol reactant content and wherein the initial pH is from about 8 to about 9 for about 70 to about 95% of the carbonate precursor addition time period and is then raised to a final pH of from about 10 to 12 for the remainder of the carbonate precursor addition time period.

5,025,082
AROMATIC POLYESTER, AROMATIC POLYESTER-AMIDE AND PROCESSES FOR PRODUCING THE SAME

Osamu Kishiro, Atsugi; Hiroshi Kamata, Yokohama, and Hideko Sakai, Tokyo, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Aug. 18, 1989, Ser. No. 395,683

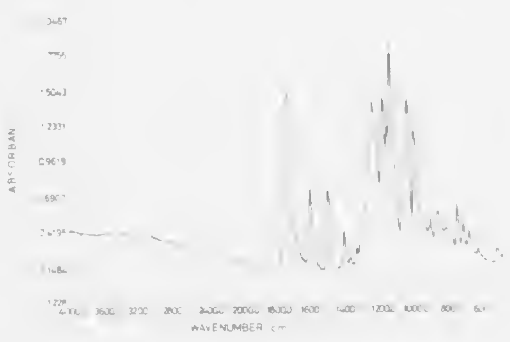
Claims priority, application Japan, Aug. 24, 1988, 63-210155; Oct. 11, 1988, 63-255590; May 9, 1989, 1-115829

Int. Cl.^{5} C08G *63/02, 63/18*

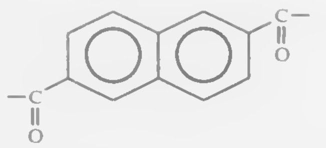
U.S. Cl. 528—190 **10 Claims**

1. An aromatic polyester which consists essentially of

(a) 3 to 15 mole % of 2,6-naphthalenedicarboxylic acid unit represented by the formula (1):

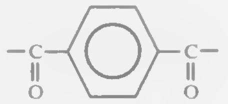


(1)



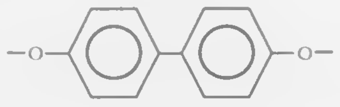
(b) 7 to 25 mole % of terephthalic acid unit represented by the formula (2):

(2)



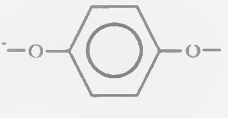
(c) 4 to 30 mole % of 4,4,'-dihydroxydiphenyl unit represented by the formula (3):

(3)

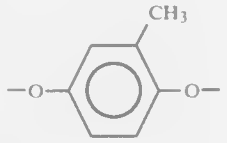


(d) 3 to 25 mole % of at least one member selected from the group consisting of aromatic diol units represented by the following formulae (4) and (5):

(4)



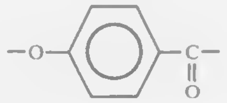
(5)



and

(e) 40 to 70 mole % of p-hydroxybenzoic acid represented by the formula (9):

(9)



wherein when molar numbers of the above constitutional units represented by (1), (2), (3), (4), (5) and (9) are represented by {1}, {2}, {3}, {4}, {5}, and {9}, respectively, the mole % is a value based on {1}+{2}+{3}+{4}+{5}+{9} and satisfies the following mathematical equation:

$$0.1 < \frac{\{4\}+\{5\}}{\{3\}} < 10$$

and has a soldering resistance at 260° C. for 10 sec and a melt viscosity of 10 poise or more at 320° C. and 100 sec^{-1}.

5,025,083
PROCESS FOR PREPARATION OF POLYCARBONATE

Mitsuru Ueda, Yamagata; Tatsuya Kanno, Hyogo; Yoshihiro Iguchi, Hyogo, and Yasuhiro Oshino, Hyogo, all of Japan, assignors to Daicel Chemical Industries, Ltd., Sakai, Japan

Continuation-in-part of Ser. No. 423,336, Oct. 18, 1989, abandoned. This application Feb. 2, 1990, Ser. No. 475,206

Claims priority, application Japan, Feb. 10, 1989, 1-31904; Jun. 23, 1989, 1-161039; Oct. 26, 1989, 1-279048

Int. Cl.^{5} C08G *64/28, 64/30*

U.S. Cl. 528—199 **5 Claims**

1. A process for preparing a polycarbonate comprising melt-polycondensing (A) at least one dihydric phenol with a comonomer selected from the group consisting of (B) bisphenyl carbonate, (C) bis(2,4,6-trichlorophenyl) carbonate, (D) bis(2,4-dichlorophenyl) carbonate and (E) bis(2-cyanophenyl) carbonate in the presence of a catalyst selected from among electron-donating amine compounds or salts thereof, with the proviso that said salt is other than a chloride.

5,025,084
POLYIMIDE-FORMING COMPOSITIONS

Bryan Dobinson, Duxford, and Mark R. Southcott, Chatteris, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 10, 1990, Ser. No. 550,429

Claims priority, application United Kingdom, Jul. 15, 1989, 8916259

Int. Cl.^{5} C08G *12/00*

U.S. Cl. 528—229 **22 Claims**

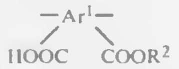
1. A polyimide-forming composition comprising

(A) a polycarboxylic acid partial ester of formula

$$HOOC-R^1-COOR^2 \qquad I$$

where R^1 denotes a divalent ethylenically unsaturated aliphatic or cycloaliphatic group of 2 to 20 carbon atoms, and R^2 denotes the residue, after removal of a hydroxyl group, of an alcohol having from 4 to 20 carbon atoms which has a cycloaliphatic, aromatic or heterocyclic ring and is polymerisable on heating in the presence of an acid,

(B) a partial ester of formula I above in which R^1 denotes a group of formula II



$$\underset{HOOC\qquad COOR^2}{\underset{/\qquad\backslash}{-Ar^1-}} \qquad II$$

where Ar^1 denotes a tetravalent aromatic group of 6 to 20 carbon atoms linked through aromatic carbon atoms thereof to the indicated carbon atoms, and R^2 is as defined above,

(C) an aromatic primary polyamine and

(D) a heat-activable substance which releases an acid at a temperature of 100° C. or above.

5,025,085
CURABLE AMINOPLAST COMPOSITIONS AND CATALYSTS FOR CURING SAME

Carlos A. Piedrahita, Mentor; Robert E. Quinn, Cleveland, and John S. Perz, Mentor, all of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Nov. 6, 1989, Ser. No. 432,233

Int. Cl.^{5} C08L *61/28*

U.S. Cl. 528—230 **51 Claims**

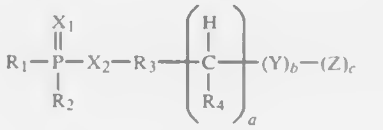
1. A curable composition comprising:

(A) at least one aminoplast resin; and

(B) an amount effective to cure the composition of at least one catalyst selected from the group consisting of

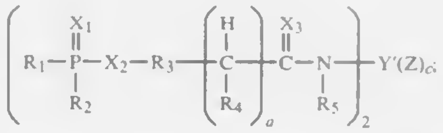
(B-1) an acid, or an anhydride, ester, ammonium salt or metal salt of the acid that is represented by one of the formulae

(I)



$$R_1-\underset{R_2}{\underset{|}{\overset{X_1}{\overset{\|}{P}}}}-X_2-R_3-\left(\underset{R_4}{\underset{|}{\overset{H}{\overset{|}{C}}}}\right)_a-(Y)_b-(Z)_c$$

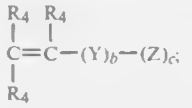
(II)



$$\left(R_1-\underset{R_2}{\underset{|}{\overset{X_1}{\overset{\|}{P}}}}-X_2-R_3-\left(\underset{R_4}{\underset{|}{\overset{H}{\overset{|}{C}}}}\right)_a-\overset{X_3}{\overset{\|}{C}}-\underset{R_5}{\underset{|}{N}}\right)_2-Y'(Z)_c;$$

(B-2) an acid, or an ester, a metal salt or ammonium salt of a sulfo compound represented by the formula:

(III)



$$\underset{R_4}{\underset{|}{\overset{R_4}{\overset{|}{C}}}}=\overset{R_4}{\overset{|}{C}}-(Y)_b-(Z)_c;$$

(B-3) an acid, or an ammonium or metal salt of a reaction product of at least one amine and the sulfo compound of (B-2); and mixtures thereof;

where in Formulae I and II

R_1 and R_2 are each independently hydrocarbyl or hydrocarbyloxy or hydrocarbylthio groups;

where in Formulae I, II and III

each X_1 and X_2 is independently sulfur or oxygen;

R_3 is a divalent hydrocarbyl group.

each R_4 and R_5 is independently a hydrogen or hydrocarbyl group;

a is 0 or 1;

b is 0 or 1;

c is 1 or 2;

Y is a divalent or trivalent hydrocarbyl group or —$C(X_3)NR_5Y'$;

X_3 is sulfur or oxygen;

Y' is a divalent, trivalent or tetravalent hydrocarbyl group provided that Y' is not divalent in Formula II;

Z is —S(O)OH, or —$S(O)_2OH$.

5,025,086
NOVEL TRIFUNCTIONAL MONOMER COMPOUNDS, POLYESTERS DERIVED THEREFROM AND THERMOSETTING COATING COMPOSITIONS CONTAINING THE POLYESTERS

William W. Blount, Jr., and Joseph R. Zoeller, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 13, 1990, Ser. No. 612,154

Int. Cl.^{5} C08G *63/02*

U.S. Cl. 528—272 **5 Claims**

1. A curable polyester comprising

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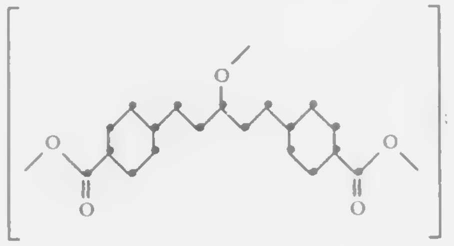
(1) about 1 mole percent to about 20 mole percent of a residue of the formula



(2) diol and/or polyol residues; and
(3) dicarboxylic acid residues.

5,025,087
66 NYLON FILAMENT WITH LOW CONTENT OF DODECANE DIOIC ACID UNITS

Franklin P. Williams, III, Columbia, S.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Feb. 13, 1990, Ser. No. 493,840
Int. Cl.^{5} C08G *69/26*

U.S. Cl. 528—339 **1 Claim**

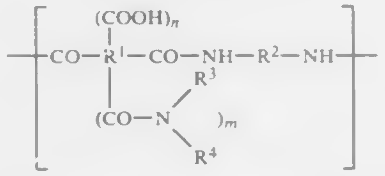
1. Filament of nylon 66 polymer having a content of about 50 to about 150 parts per million dodecanedioic acid units therein, said content based on total polymer weight, whereby said filament has improved dyeability.

5,025,088
PHOTOSENSITIVE POLY(AMIDE)IMIDE HEAT-RESISTANT POLYMER

Hirotoshi Maeda, Yokohama, and Kouichi Kunimune, Ichihara, both of Japan, assignors to Chisso Corporation, Osaka, Japan
Continuation of Ser. No. 329,727, Mar. 28, 1989, abandoned. This application Jul. 19, 1990, Ser. No. 554,434
Claims priority, application Japan, Nov. 4, 1988, 63-886112
Int. Cl.^{5} C08G *69/26;* **G03C** *1/725*

U.S. Cl. 528—353 **1 Claim**

1. A photosensitive polymer having an inherent viscosity of 0.1 to 5 dl/g when measured in a solvent at a temperature of 30±0.01° C. at a concentration of 0.5 g/dl and containing a repeating unit represented by the general formula (I):



$$\left[-\mathrm{CO}-\overset{(\mathrm{COOH})_n}{\underset{(\mathrm{CO}-\mathrm{N}(R^3)(R^4))_m}{R^1}}-\mathrm{CO}-\mathrm{NH}-R^2-\mathrm{NH}- \right] \quad (\mathrm{I})$$

wherein R^1 is independently a trivalent or tetravalent carbon cyclic aromatic group or heterocyclic group; R^2 is independently an aliphatic group having at least 2 carbon atoms, an alicyclic group, an aromatic aliphatic group, a carbon cyclic aromatic group, a heterocyclic group or a polysiloxane group; R^3 and R^4 are $CH_2—CH=CH_2$; m is 1 o 2; n is 0 or 1; and m and n satisfy $1 \leqq m+n \leqq 2$.

5,025,089
COPOLYIMIDES DERIVED FROM 2,2-BIS (AMINO PHENYL) HEXAFLUOROPROPANE

Rohitkumar H. Vora, Westfield, and Paul N. Chen, Sr., Gillette, both of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.
Continuation-in-part of Ser. No. 217,928, Jul. 12, 1988, Pat. No. 4,978,737. This application Nov. 13, 1989, Ser. No. 434,148
Int. Cl.^{5} C08G *69/26*

U.S. Cl. 528—353 **17 Claims**

1. A polyimide polymer soluble in N-methylpyrrolidone comprising the imidized condensation product of a mixture of diamines comprising:
(a) a diamine selected from the group consisting of 2, 2-bis(3-aminophenyl) hexafluouropropane and 2,2-bis(4-aminophenyl) hexafluoropropane;
(b) a second diamine having the formula $H_2N—R—NH_2$ wherein R is a divalent aromatic radical comprising a phenylene, napthalene or bis-phenlene group; and a mixture of dianhydrides comprising:
(c) pyromellitic dianhydride; and
(d) at least one additional dianhydride selected from the groups consisting of bis (3,4-dicarboxyphenyl) ether dianhydride, 3,3′, 4,4′ benzophenone tetracarboxylic dianhydride, 3,3′, 4,4′ diphenyl tetracarboxylic acid dianhydride and 2,2 bis (3,4 dicarboxy phenyl) hexafluoropropane dianhydride, the relative proportions of said dianhydrides present in the mixture being from about 35 to about 75 mole percent of (c) and from about 25 to about 65 mole percent of (d), and the relative molar proportion of said diamine (a) and said diamine (b) being in the range of from about 3:1 to 1:3 respectively.

5,025,090
DECOLORIZATION OF DIHYDROXYDIPHENYL SULFONE

Henry J. Barda, Brunswick, N.J., assignor to AKZO NV, Arnhem, Netherlands
Filed Feb. 1, 1990, Ser. No. 473,482
Int. Cl.^{5} C07C *315/04*

U.S. Cl. 568—33 **9 Claims**

1. A process for the production of a less colored dihydroxydiphenyl sulfone by reaction of phenol with a sulfonating agent or phenol sulfonic acid wherein the improvement comprises adding an effective amount of a trivalent phosphorus compound for color reduction during the reaction.

5,025,091
POLYMERIZATION OF CO/OLEFIN WITH HYDROCARBYL-PD HALIDE/BIDENTATE P LIGAND CATALYST COMPLEX

Petrus W. N. M. van Leeuwen, and Cornelis F. Roobeek, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.
Filed Jan. 17, 1990, Ser. No. 466,559
Claims priority, application Netherlands, Jan. 26, 1989, 8900184
Int. Cl.^{5} G08G *67/02*

U.S. Cl. 528—392 **12 Claims**

1. A process for the production of linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon by contacting the carbon monoxide and hydrocarbon under polymerization conditions in the presence of a reaction diluent and a catalyst complex comprising an equimolar complex of a hydrocarbylpalladium halide and a bidentate phosphorus ligand.

5,025,092
POLYMERIZATION OF CARBON MONOXIDE WITH ETHYLENICALLY UNSATURATED ALCOHOL

Eit Drent, and Anthonius J. M. Breed, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.
Filed Dec. 18, 1989, Ser. No. 451,920
Claims priority, application United Kingdom, Dec. 29, 1988, 8830334
Int. Cl.^{5} C08G *67/02*

U.S. Cl. 528—392 **9 Claims**

1. A process for producing a polymer by reacting an ethylenically unsaturated alcohol of up to 30 carbon atoms inclusive, wherein the alcohol has at least 4 carbon atoms between the hydroxyl and the ethylenic moiety, with carbon monoxide in an inert aprotic reaction diluent at a temperature below 140° C. and in the presence of a catalyst composition formed from a palladium salt, a tertiary aromatic monophosphine, and an oxygen-containing acid having a pKa below 2, with or without a bidentate phosphorus ligand, wherein the molar ratio of total phosphine to palladium is less than 10 and the molar ratio of acid to total phosphine is less than 1.

5,025,093
PYROLYSIS OF PERFLUOROPOLYETHERS

Richard J. Lagow, Georgetown; Thomas R. Bierschenk; Timothy J. Juhlke, both of Round Rock, and Hajimu M. Kawa, Austin, all of Tex., assignors to Exfluor Research Corporation, Austin, Tex.
Continuation of Ser. No. 92,465, Sep. 3, 1987, Pat. No. 4,894,484, which is a continuation-in-part of Ser. No. 796,624, Nov. 8, 1985, abandoned. This application Jan. 5, 1990, Ser. No. 461,543
The portion of the term of this patent subsequent to Jan. 16, 2007, has been disclaimed.
Int. Cl.^{5} C07C *41/01, 41/48*

U.S. Cl. 568—601 **12 Claims**

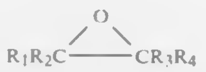
1. A method of cleaving perfluoropolyethers to lower molecular weight fragments, comprising the steps of:
(a) pyrolyzing a perfluoropolyether at a temperature above about 350° C. to cleave the perfluoropolyether into lower molecular weight linear perfluoropolyethers, in the absence of a metal oxide or metal fluoride catalyst;
(b) condensing and collecting vaporized lower molecular weight linear perfluoropolyethers; and
(c) treating the collected linear perfluoropolyethers with fluorine gas to eliminate acyl fluoride end groups and any unsaturation of the collected perfluoropolyethers.

5,025,094
HETEROGENEOUS ALKOXYLATION USING ANION-BOUND METAL OXIDES

Stephen W. King, Charleston, W. Va., assignor to Union Carbide Chemicals and Plastics Technology Corporation, Danbury, Conn.
Division of Ser. No. 119,690, Nov. 12, 1987, Pat. No. 4,873,017, which is a division of Ser. No. 753,543, Jul. 10, 1985, Pat. No. 4,727,199. This application Jun. 13, 1989, Ser. No. 365,359
Int. Cl.^{5} C07C *41/03*

U.S. Cl. 568—623 **12 Claims**

1. Process comprising reacting at least one molecule of a liquid or solid epoxide compound having the formula:



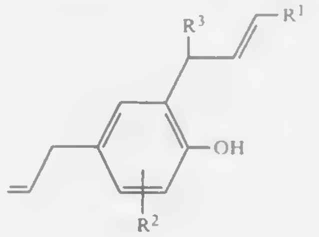
wherein R_1, R_2, R_3 and R_4 are each H or $—(CH_2)_nCH_3$, and wherein n is 0 to 3, with the proviso that R_1, R_2, R_3 and R_4 are the same or different, with at least one other molecule of said epoxide compound in the presence of catalytic amount of at least one solid anion-bound metal oxide heterogeneous catalyst, wherein said anion in said anion-bound metal oxide heterogeneous catalyst is SO_4, BF_4, CO_3, BO_3, HPO_4, SeO_4, MoO_4, B_4O_7 or PF_6, and the metal oxide is zirconium oxide, nickel oxide, aluminum oxide, tin oxide, magnesium oxide, iron oxide, titanium oxide, thorium oxide, hafnium oxide or rubidium oxide, said anion-bound metal oxide heterogeneous catalyst being an amorphous or primarily amorphous compound, and said molecules of said epoxide compound being the same epoxide compound or different epoxide compounds.

5,025,095
SUBSTITUTED DIALLYLPHENOL DERIVATIVES AS REACTIVE DILUENTS FOR BISMALEIMIDES

Yefim Blyakhman, Bronx, N.Y., and Byung H. Lee, Easton, Conn., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Continuation of Ser. No. 467,092, Jan. 18, 1990, abandoned. This application Oct. 12, 1990, Ser. No. 597,278
Int. Cl.^{5} C07C *43/78*

U.S. Cl. 568—652 **20 Claims**

1. A substituted diallylphenol of the formula (I)



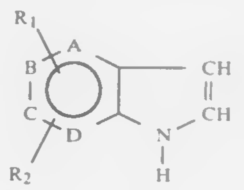
wherein R^1 is hydrogen, C_1-C_{20}alkyl or aryl, R^2 is C_1-C_{20}alkyl, aryl or OR^4 wherein R^4 is C_1-C_{20}alkyl or aryl and R^3 is hydrogen, C_1-C_{20}alkyl or aryl with the proviso that when R^2 is methoxy, one of R^1 and R^3 is not hydrogen.

5,025,096
PREPARATION OF INDOLE AND INDOLE DERIVATIVES

Kuen-Wai Chiu, Mars; Lin-Chen Yu, Allison Park, and John R. Strickler, Pittsburgh, all of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.
Filed Aug. 22, 1985, Ser. No. 768,461
Int. Cl.^{5} C07D *491/56, 209/8*

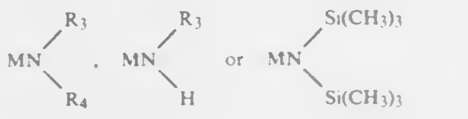
U.S. Cl. 544—234 **8 Claims**

1. A method of preparing indole and derivatives thereof of the formula



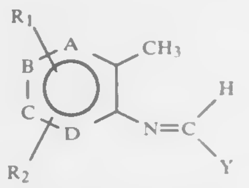
wherein not more than two of A, B, C, and D are nitrogen atoms and the remainder are carbon atoms; wherein R_1 and R_2 are independently a hydrogen atom, a halogen atom, a lower alkyl group, a lower alkoxy group, a hydroxymethyl group, an amino group, a mono-lower alkylamino group, a di-lower alkylamino group, a phenyl group or substituted phenyl group having a halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino, lower alkylamino, or di-lower alkylamino substitutent, a phenoxy group or substituted phenoxy group having a halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino, lower alkylamino, or di-lower alkylamino substituent, or a di-lower alkoxymethyl group, or R_1 and R_2 together are a lower alkylenedioxy group on adjacent carbon atoms,

which comprises the step of contacting an alkali metal amide of the formula



wherein M is an alkali metal and R_3 and R_4 are independently a lower alkyl group, a cycloalkyl group or R_3 and R_4 are a lower alkylene group;

with a formimidate derivative of the formula



wherein A, B, C, D, R_1 and R_2 are as defined above and Y is an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an alkylsulfonyl group, or an arylsulfonyl group, at a temperature between about −30° C. and 150° C., thereby forming an alkali metal salt of said indole or derivative thereof,

and converting the salt to indole or a derivative thereof by reaction with water or alcohol.

5,025,097

4-CHLOROOXAZOLE DERIVATIVES AND PROCESSES FOR THEIR PREPARATION AND USE

Rainer Wingen, Hattersheim; Dieter Guenther, Kelkheim, and Juergen Lingnau, Mainz-Laubenheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

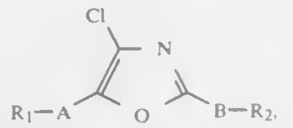
Division of Ser. No. 162,596, Mar. 1, 1988, Pat. No. 4,892,799. This application Oct. 20, 1989, Ser. No. 424,556

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1987, 3706880

Int. Cl.^{5} C07D *263/34*

U.S. Cl. 548—235 **4 Claims**

1. A 4-Chlorooxazole represented by formula I



(I)

wherein

A is a single bond or a —CH═CH— group,

B is a single bond when A is the —CH═CH— group, and a —CH═CH— or —CH═CH—CH═CH— group when A is a single bond,

R_1 is phenyl, which is unsubstituted or substituted in one or more positions by (C_1–C_4)-alkoxy or di-(C_1–C_4)-alkylamino radicals, and

R_2 is N-(C_1–C_4-alkyl)-carbazol-3-yl, which is unsubstituted or substituted in one or more positions by (C_1–C_4)-alkyl, (C_1–C_4)-alkoxy, halogen-(C_1–C_4)-alkoxy, hydroxy, halogen, di-(C_1–C_4)-alkylamino or dibenzylamino radicals.

5,025,098

METHOD OF PREPARING BICYCLIC TETRAHYDROXYLATED PYRROLIZIDINES

George W. J. Fleet, Oxford, United Kingdom, assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 404,800, Sep. 8, 1989, Pat. No. 4,992,460. This application Sep. 24, 1990, Ser. No. 586,916

Int. Cl.^{5} C07D *487/10*

U.S. Cl. 548—453 **1 Claim**

1. A method for the production of 1α,2α,6α,7α,7αβ-1,2,6,7-tetrahydroxypyrrolizidine comprising:

(a) reacting D-glycero-D-gulo-heptono-1,4-lactone with a silyl blocking agent to protect the primary hydroxyl group and give a protected lactone,

(b) reacting the protected lactone with 2,2-dimethoxypropane to provide a fully protected lactone,

(c) reacting the fully protected lactone with fluoride ion to cleave at C7 and thereby provide access to nitrogen in the ring and give a primary alcohol,

(d) esterifying the primary alcohol with triflic anhydride to afford a triflate,

(e) reacting the triflate with azide ion to give an azidolactone,

(f) reducing the azidolactone to given an azidodiol,

(g) reacting the azidodiol with methanesulfonyl chloride to provide an azidodimesylate,

(h) catalytically hydrogenating the azidodimesylate in ethanol at ambient temperature,

(i) heating the resulting product in ethanol in the presence of sodium acetate to give a tetracyclic pyrrolizidine, and

(j) removing the acetonide protecting groups of the tetracyclic pyrrolizidine by acid hydrolysis to give 1α,2α,6α,7α,-7αβ-1,2,6,7-tetrahydroxypyrrolizidine.

5,025,099

(3-AMINO-1-PROPYNYL)METHYLTHIOTHIOPHENE DERIVATIVES

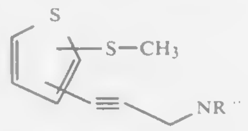
Eugene J. Trybulski, Park Ridge, N.J., and Herbert J. Brabander, Nanuet, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Feb. 2, 1990, Ser. No. 474,574

Int. Cl.^{5} C07D *409/06*

U.S. Cl. 548—527 **5 Claims**

1. A compound selected from the formula:



wherein NR''' is pyrrolidino; and the pharmaceutically acceptable acid addition salts thereof.

5,025,100

LIQUID AMINE TERMINATED DERIVATIVES OF DIGLYCIDYL ETHERS

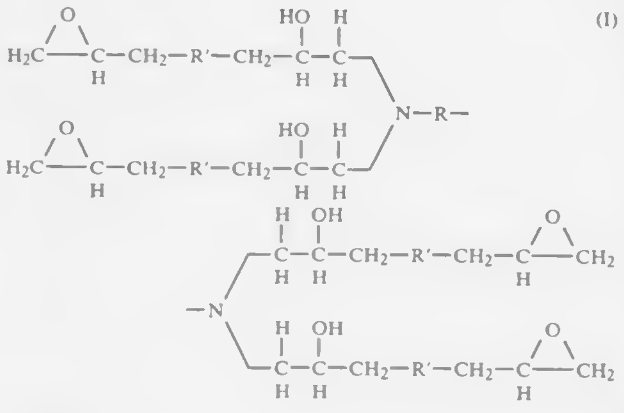
Jiang-Jen Lin, Houston, and George P. Speranza, Austin, both of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed Feb. 6, 1990, Ser. No. 475,516

Int. Cl.^{5} C07D *303/23*

U.S. Cl. 549—551 **4 Claims**

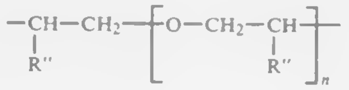
1. An epoxy terminated derivative of a diglycidyl ether having the formula:



(I)

wherein:

R represents a polyoxyalkylene group having the formula:



$$-\underset{\displaystyle R''}{\underset{|}{CH}}-CH_2-\left[O-CH_2-\underset{\displaystyle R''}{\underset{|}{CH}}\right]_n-$$

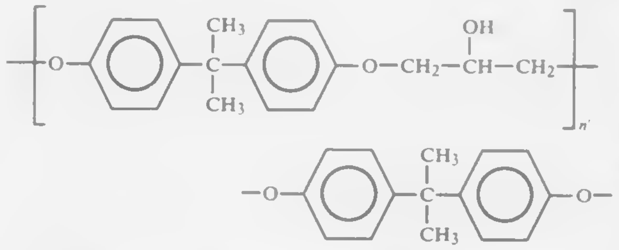
(II)

R'' represents hydrogen, methyl or ethyl,

n is a positive number having a value of about 2 to about 35,

R' represents a glycidyl ether having the formula:

(III)



wherein n' represents 0 or a positive number having a value of 1 or 2.

5,025,101

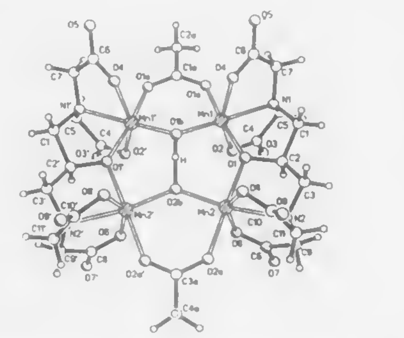
NOVEL TETRANUCLEAR MANGANESE COMPLEXES

Sergiu M. Gorun, Upper Montclair, and Robert T. Stibrany, Long Valley, both of N.J., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Jun. 21, 1990, Ser. No. 541,699

Int. Cl.^{5} C07F *13/00*

U.S. Cl. 556—50 **12 Claims**



1. A composition of matter having the formula:

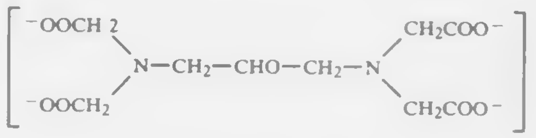
$M_2[Mn_4(O)(OH)(O_2CR)_2L_2]$

(I) wherein

M is Mg, Ca, Sr, Ba or mixtures thereof,

R is hydrogen or a hydrocarbyl group; and,

L is a ligand having the formula:



5,025,102

BIS(2-FLUORO-2,2-DINITROETHYL)CARBONATE PENTAFLUOROSULFANYLIMINE

Michael E. Sitzmann, Adelphi, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 18, 1990, Ser. No. 553,835

Int. Cl.^{5} C07C *257/06*

U.S. Cl. 558—6 **1 Claim**

1. A compound having the formula $SF_5N{=}C[OCH_2CF(NO_2)_2]_2$.

5,025,103

GLYCEROL AMINOCARBOXYLATES AND PREPARATION AND USE THEREOF

Alfred Oftring, Duerkheim; Stefan Birnbach; Rolf Fikentscher, both of Ludwigshafen; Richard Baur, Mutterstadt; Alexander Kud, Eppelsheim; Ulrich Goeckel, Boehl-Iggelheim, and Johannes Perner, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

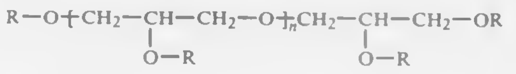
Filed Jan. 19, 1990, Ser. No. 467,204

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1989, 3901613

Int. Cl.^{5} C07C *229/26*

U.S. Cl. 560—170 **7 Claims**

1. A glycerol aminocarboxylate of formula

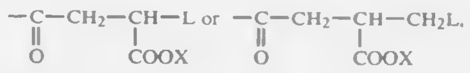


$$R-O\left[CH_2-\underset{\displaystyle O-R}{\underset{|}{CH}}-CH_2-O\right]_n CH_2-\underset{\displaystyle O-R}{\underset{|}{CH}}-CH_2-OR \qquad (I)$$

where

n is from 0 to 10 and

R is



$$-\underset{\displaystyle O}{\underset{\|}{C}}-CH_2-\underset{\displaystyle COOX}{\underset{|}{CH}}-L \text{ or } -\underset{\displaystyle O}{\underset{\|}{C}}-CH_2-\underset{\displaystyle COOX}{\underset{|}{CH}}-CH_2L,$$

where

L is iminodiacetate, asparate, glutamate, sarcosinate, glycinate, serinate, hydroxyaspartate, ethanolaminoacetate, diethanolamino, alanate or taurinate and

X is hydrogen, an alkali metal, ammonium or substituted ammonium.

5,025,104

2,4-PENTANEDIONE-1-SULFONIC ACID AND METHOD FOR PREPARING THE SAME

Stanley R. Sandler, Springfield, Pa., assignor to Atochem North America, Inc., Philadelphia, Pa.

Filed Sep. 28, 1989, Ser. No. 413,575

Int. Cl.^{5} C07C *303/00;* **B01J** *31/00*

U.S. Cl. 562—109 **2 Claims**

1. 2,4-pentanedione-1-sulfonic acid.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,105
PROCESS FOR PREPARING BROMODIFLUOROACETYLFLUORIDE

Silvana Modena, Monza, and Ezio Strepparola, Treviglio, both of Italy, assignors to AUSIMONT S.r.l., Milan, Italy
Filed Jun. 27, 1990, Ser. No. 544,581
Claims priority, application Italy, Jun. 28, 1989, 21016 A/89
Int. Cl.^{5} C07C *51/58*
U.S. Cl. 562—851 **9 Claims**

1. A process for preparing bromodifluoroacetylfluoride, comprising a gaseous stream of oxygen-diluted ozone is reacted, at a temperature ranging from −100° to +80° C., with 1,4-dibromohexafluorobutene-2, optionally dissolved in a solvent which is inert under the reaction conditions, with consequent obtainment of the corresponding ozonide and, subsequently, the ozonide is subjected to a heat treatment, at temperatures ranging from 100° to 300° C., with consequent obtainment of bromodifluoroacetylfluroide.

5,025,106
PREPARATION OF AQUEOUS SOLUTIONS OF ACETOACETAMIDE

Steven L. Cook, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Oct. 22, 1990, Ser. No. 600,648
Int. Cl.^{5} C07C *233/05*
U.S. Cl. 564—199 **4 Claims**

1. Process for the continuous preparation of an aqueous solution of acetoacetamide which comprises the steps of (1) continuously feeding to a reaction zone diketene and aqueous ammonia having an ammonia concentration of about 6.0° to 9.0 weight percent at rates which maintain in the reaction zone a pH of about 7.0° to 8.2 and a residence time of about 20 to 150 minutes while (i) maintaining the temperature of the reaction zone at about 40° to 75° C. and (ii) subjecting the contents of the reaction zone to vigorous agitation and (2) continuously removing from the reaction zone an aqueous product solution having an acetoacetamide concentration of about 25 to 35 weight percent.

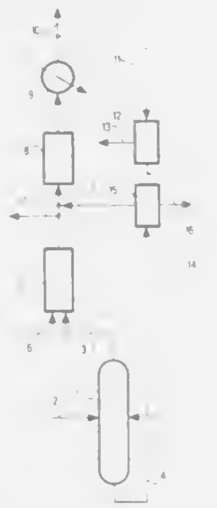
5,025,107
PROCESS FOR COPRODUCTION OF ARYLENE DIAMINE DIHALIDES AND ALKYL HALIDES

Kim S. Chamberlin, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.
Continuation-in-part of Ser. No. 155,171, Feb. 9, 1988, abandoned. This application Jul. 24, 1989, Ser. No. 383,503
Int. Cl.^{5} C07C *209/62*
U.S. Cl. 564—414 **4 Claims**

1. Process for the coproduction of an arylene diamine dihydrohalide and an alkyl halide which comprises the steps of:
(1) reacting an arylene dihalide with an amide or imide at a temperature of at least 160° C. in the presence of an alkali metal base and a copper catalyst to form an arylene bis-amide or arylene bis-imide;
(2) adding dialkyl sulfate to the reaction mixture resulting from step (1);
(3) distilling an alkyl halide from the reaction mixture obtained from step (2); and
(4) adding a hydrohalic acid to the remaining reaction mixture of step (3) and hydrolyzing the arylene bis-amide or arylene bis-imide to the corresponding arylene diamine hydrohalide,
wherein the arylenedihalide is a dibromide or diiodide and the alkyl halide is a bromide or iodide.

5,025,108
PROCESS FOR PRODUCING OLEFINS FROM NATURAL GAS

Charles Cameron, Paris; Hubert Mimoun; Alain Robine, both of Rueil Malmaison; Serge Bonnaudet, Paris; Patrick Chaumette, Bougival, and Quang Dang Vu, Neuilly, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France
Filed Apr. 4, 1989, Ser. No. 332,831
Claims priority, application France, Apr. 5, 1988, 88 04588
Int. Cl.^{5} C07C *2/00*
U.S. Cl. 585—500 15 Claims



1. A process for producing olefins from natural gas containing methane and ethane, comprising:
(a) separating the natural gas into two fractions, a first methane-enriched gas fraction and a second ethane-enriched gas fraction,
(b) oxidizing the first gas fraction with molecular oxygen, in the presence of a contact mass allowing the oxidizing coupling of the methane into superior hydrocarbons,
(c) mixing the effluent from stage (b) with the ethane-enriched gas fraction from stage (a), when at least about 80% by volume of the molecular oxygen has been already consumed in stage (b), and
(d) pyrolizing the mixture resulting from stage (c) to obtain a mixture containing corresponding olefins.

5,025,109
PROCESS FOR UPGRADING METHANE TO HIGHER HYDROCARBONS

Lorenzo C. DeCaul, Chester, Pa.; Scott Han, Lawrenceville, N.J.; Robert E. Palermo, New Hope, and Dennis E. Walsh, Richboro, both of Pa., assignors to Mobil Oil Corporation, Fairfax, Va.
Filed Dec. 29, 1989, Ser. No. 459,221
Int. Cl.^{5} C07C *2/00, 5/00*
U.S. Cl. 585—500 **8 Claims**

1. A process for synthesizing one or more hydrocarbons having at least two carbon atoms by the direct partial oxidation of methane, said process comprising contacting a mixture of methane and oxygen with a spinel oxide catalyst under sufficient conversion conditions, wherein said spinel oxide is of the formula AB_2O_4, where A is Li, Mg, Na, Ca, V, Mo, Mn, Fe, Co, Ni, Cu, Zn, Ge, Cd or Sn and B is Na, Al, Ti, V, Cr, Mn, Fe, Co, Ni, Zn, Ga, Ge, Rh, Ag or In, where A and B are different elements, and wherein said conversion conditions include a temperature of from about 300° C. to about 1200° C. and a reactant partial pressure of from about 0.1 atm to about 30 atm.

5,025,110
ALCOHOL REACTION MEDIA FOR PRODUCTION OF HEXABROMOCYCLODODECANE

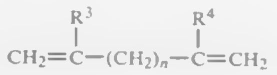
Phillip R. Beaver, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.
Filed Feb. 6, 1990, Ser. No. 475,445
Int. Cl.^{5} C07C *17/10*
U.S. Cl. 570—206 **19 Claims**

1. A solvent composition comprising
(a) one or more C_5-C_8 saturated linear or branched aliphatic alcohols, wherein each of said one or more alcohols independently has a solubility in water at 25° C. of about five weight percent or less or water has a solubility in each of said one or more alcohols at 25° C. of about fifteen weight percent or less, or
(b) one or more C_5-C_8 saturated linear or branched aliphatic alcohols, wherein each of said one or more alcohols independently has a solubility in water at 25° C. of about five weight percent or less or water has a solubility in each of said one or more alcohols at 25° C. of about fifteen weight percent or less and one or more halogenated hydrocarbons.

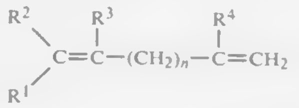
5,025,111
PRODUCTION OF NON-CONJUGATED DIOLEFINS

Nicholas J. Hazel, Hull, United Kingdom, assignor to BP Chemicals Limited, London, England
Filed Oct. 17, 1988, Ser. No. 258,477
Claims priority, application United Kingdom, Oct. 21, 1987, 8724628
Int. Cl.^{5} C07C *2/76*
U.S. Cl. 585—601 12 Claims

1. A process for the production of a non-conjugated diolefin having the formula:


$$CH_2{=}\overset{R^3}{\overset{|}{C}}{-}(CH_2)_n{-}\overset{R^4}{\overset{|}{C}}{=}CH_2 \qquad (I)$$

wherein R^3 and R^4 are either hydrogen, alkyl or substituted alkyl and n is an interger, which procsss comprises reacting a diolefin having the formula:


$$\begin{matrix}R^2 \\ \quad\diagdown \\ \end{matrix} C{=}\overset{R^3}{\overset{|}{C}}{-}(CH_2)_n{-}\overset{R^4}{\overset{|}{C}}{=}CH_2 \qquad (II)$$
$$R^1 \diagup$$

wherein R^3 and R^4 and n are the same as in formula (I) and R^1 and R^2 are either hydrogen, alkyl or substituted alkyl, with ethylene in the presence of a disproportionation catalyst which has been prepared by mixing (a) a disproportionation catalyst comprising rhenium heptoxide supported on a support comprising alumina and (b) a promoter selected from either a tetralkyl tin compound or a trialkyl aluminum compound.

5,025,112
PURIFICATION OF CUMENE RECYCLE STREAMS

John R. Sanderson, Leander; Edward T. Marquis, and John F. Knifton, both of Austin, all of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.
Filed Sep. 10, 1990, Ser. No. 580,035
Int. Cl.^{5} C07C *7/00, 7/17*
U.S. Cl. 585—852 **6 Claims**

1. A method for purifying a cumene recycle stream by removing 2-phenyl-2-propanol and cumene hydroperoxide before the cumene is distilled and recycled to the peroxidation reactor which comprises reacting the recycle cumene in the presence of an acid treated montmorillonite clay of the formula:

$$M_{x/n}{}^{n+}\ {}_yH_2O(Al_{4-x}Mg_x)(Si_8)O_{20}(OH)_4$$

5,025,113
CATALYTIC PREPARATION OF TERTIARY BUTYL ALCOHOL FROM TERTIARY BUTYL HYDROPEROXIDE

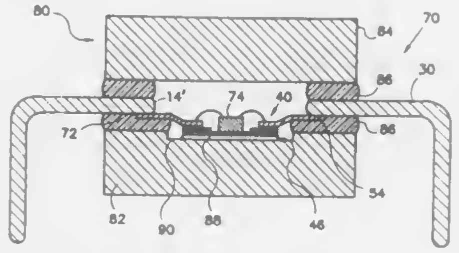
John R. Sanderson, Leander, and John F. Knifton, Austin, both of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.
Filed Jan. 29, 1990, Ser. No. 471,450
Int. Cl.^{5} C07C *29/132, 31/12*
U.S. Cl. 568—909.8 **6 Claims**

1. In a method wherein a solution of a t-butyl hydroperoxide charge stock in t-butyl alcohol is brought into contact with a catalytically effective amount of a hydroperoxide decomposition catalyst in a hydroperoxide decomposition reaction zone in liquid phase with agitation to convert said t-butyl hydroperoxide to decomposition products, principally t-butyl alcohol, the improvement which comprises:
(a) using, as said hydroperoxide decomposition catalyst, a soluble catalyst system consisting essentially of a soluble iron compound and a soluble ruthenium compound, and
(b) recovering said t-butyl alcohol from the products of said hydroperoxide decomposition reaction,
(c) said soluble iron compound being selected from the group consisting of ferrous and ferric salts of mineral acids and organic carboxylic acids,
(d) said soluble ruthenium compound being selected from the group consisting of ruthenium salts of mineral acids and organic carboxylic acids.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,114
MULTI-LAYER LEAD FRAMES FOR INTEGRATED CIRCUIT PACKAGES

Jeffrey S. Braden, Milpitas, Calif., assignor to Olin Corporation, New Haven, Conn.
Filed Oct. 30, 1989, Ser. No. 429,120
Int. Cl.^{5} H01L *23/02*
U.S. Cl. 174—52.4 — 32 Claims



1. A composite leadframe, comprising:

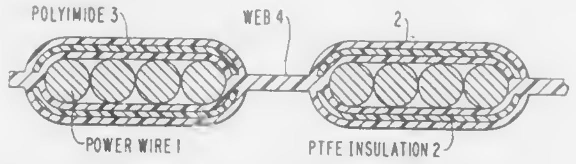
a rigid metal portion having a plurality of lead fingers extending in cantilever fashion about a centrally positioned aperture;

a flexible multi-layer portion comprising a plurality of metal foil layers supported and electrically isolated from one another by at least one dielectric layer wherein at least a first metal layer is patterned into a plurality of circuit traces which extend within said centrally positioned aperture, and said circuit traces capable of electrical interconnection to said rigid metal portion, an electronic device or both; and

a means for individually electrically interconnecting each of said circuit traces to a lead finger of said rigid metal portion.

5,025,115
INSULATED POWER CABLES

Emile G. Sayegh; James G. Vana, Jr., both of Austin, and Wendall D. Willey, Buda, all of Tex., assignors to W. L. Gore & Associates, Inc., Newark, Del.
Filed May 22, 1990, Ser. No. 526,918
Int. Cl.^{5} H01B *7/08*
U.S. Cl. 174—117 F — 8 Claims



1. A signal carrying flat ribbon cable having a flat, generally planar power pod as a component thereof, wherein the power pod comprises from inside to outside:

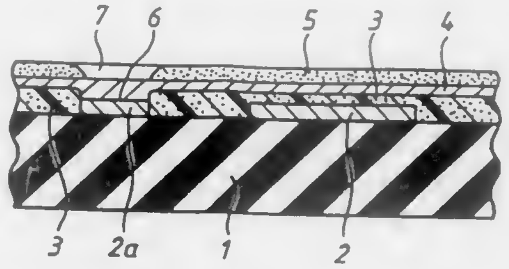
(a) a multiplicity of uninsulated electrically conducting wires arranged in generally parallel planar physical and electrical contact with one another along their axes surrounded by a first layer of polytetrafluororethylene insulation;

(b) a layer on each side of said multiplicity of generally parallel planar wires of a hard cut-through resistant polymer, said cut-through resistant polymer layers being separated from each other along their edges by polytetrafluororethylene insulation; and

(c) a second layer of polytetrafluoroethylene insulation surrounding said cut-through resistant polymer layers, said wires, and said first layer of polytetrafluororethylene insulation surrounding said wires and including a web, said second layer of polytetrafluoroethylene insulation connecting said power pod to an adjacent component of said ribbon cable by means of the web.

5,025,116
PRINTED WIRING BOARD HAVING ELECTROMAGNETIC WAVE SHIELDING LAYER

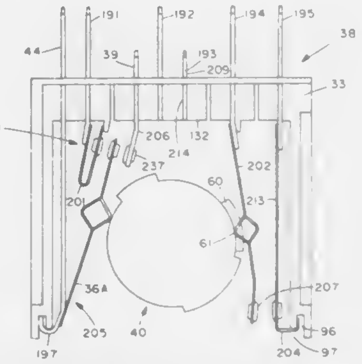
Shin Kawakami; Katsutomo Nikaido, and Junichi Ichikawa, all of Saitama, Japan, assignors to Nippon CMK Corp., Japan
Filed Jan. 26, 1990, Ser. No. 470,881
Claims priority, application Japan, Jan. 27, 1989, 18328/89
Int. Cl.^{5} H05K *01/00*
U.S. Cl. 174—250 — 8 Claims



1. A printed wiring board comprising: an insulating sheet; printed wiring circuit and a grounded wiring circuit on one surface of the insulating sheet; an insulating layer on the surface of the insulating sheet, the printed wiring circuit and a portion of the grounded wiring circuit; an electromagnetic wave shielding layer provided on the insulating layer and having a portion in direct contact with uncovered portions of the grounded wiring circuit; and an over-coating layer provided on the electromagnetic wave shielding layer; and wherein portions of the electromagnetic wave shielding layer over the portion in direct contact with the ground wiring circuit are exposed.

5,025,117
CAN OPERATED TIMER WITH IMPROVED HOUSING

Ronald E. Cole, Greenwood, and Daniel K. Amonett, Indianapolis, both of Ind., assignors to Emhart Industries Inc., Towson, Md.
Filed Mar. 29, 1989, Ser. No. 330,158
Int. Cl.^{5} H01H *43/00, 9/00*
U.S. Cl. 200—38 R — 7 Claims



1. An electromechanical timer comprising:

a housing body having a closed end and an open end, said housing body comprising a u-shaped member having two leg portions and a connecting portion forming said closed end, and said leg portions defining first and second opposed open sides;

a plurality of electrical switches, each switch comprising a pair of contacts, at least one of said contacts comprising a combination electrical terminal and switch blade attached to said housing body and passing through said closed end;

cam means rotatable about an axis for operating said switches;

motor means for driving said cam means; and

VOL
1127
ISS
3
JE
18
1991
UMI

cam support means for mounting said cam means in said housing body through said open end in a direction radial to said axis of said cam means.

5,025,118

METAL-CLAD, COMPRESSED GAS-BLAST CIRCUIT-BREAKER WITH A SHIFTING LINKAGE

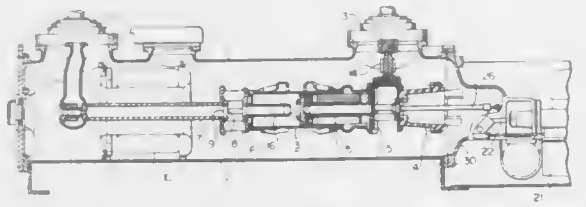
Manfred Meinherz; Freidrich-Wilh Veuhoff; Günther Gilmozzi, and Thomas Kelch, all of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jan. 22, 1990, Ser. No. 467,979

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1989, 3904146

Int. Cl.⁵ H01H *33/42*

U.S. Cl. 200—148 R **13 Claims**



1. A metal-clad, compressed gas-blast circuit-breaker having a gas-filled housing and an interrupter unit, the interrupter unit being supported, insulated in the housing and having contact conduits disposed so that they mutually oppose each other with a clearance and further comprising a movable switching contact for jumpering the contact conduits, and a shifting linkage connected to the switching contact for transmitting a switching motion, wherein the shifting linkage comprises at least one insulating drive rod coupled to the switching contact and a controlling element, for taking up and guiding the flow of switching gases at the time of the switching-off operation, the controlling element being mounted between the interrupter unit and a post insulator penetrated by at least one drive rod, and allowing only one portion of the switching gases to pass through in the direction of at least one drive rod and diverting the remaining portion in an at least radial direction.

5,025,119

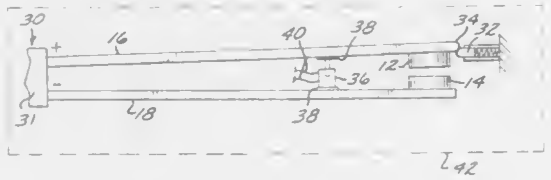
ONE-TIME-CLOSE RELAY USEFUL IN SPACECRAFT POWER SYSTEMS

Howard H. Rogers, Torrance, and Jerry J. Herrin, Santa Ana, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 23, 1990, Ser. No. 513,460

Int. Cl.⁵ H01H *1/02*

U.S. Cl. 200—262 **8 Claims**



1. A one-time-close relay, comprising:
- a first relay contact;
- a second relay contact;
- means responsive to an electrical control signal for urging said second relay contact into engagement with said first relay contact, to thereby close said relay and form an electrical circuit through said first and second relay contacts; and,
- wherein at least respective contact surfaces of said first and second relay contacts are made of conductive materials which form a metallurgical bond upon closing of said relay, whereby said relay is rendered permanently closed and insusceptible of being opened under the influence of electrical energy.

5,025,120

INSERT FOR A HYDRO POLE SWITCH

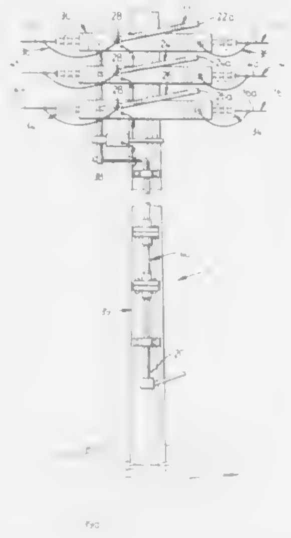
William E. Jackman, P.O. Box 493, 24 Stewart Drive, Lakefield, Ontario, Canada K0L 2H0

Filed Jan. 6, 1989, Ser. No. 293,937

Claims priority, application Canada, Jan. 8, 1988, 556080

Int. Cl.⁵ H01H *33/00;* **H01B** *17/00*

U.S. Cl. 200—49 **6 Claims**



1. An insert for a hydro pole switch of the type having a shaft extending the length of a hydro pole and having an upper end and a lower end, a handle joined to said lower end and a switch gear joined to said upper end and responsive to rotation of said shaft to actuate said switch gear, said shaft being formed from a pair of spaced inline shaft rod portions with adjacent end portions separated by a predetermined spacing, said insert comprising:
- a rod formed of electrically insulating material having a pair of ends; said rod having a length sufficient to be positioned in line between said end portions; said rod having a radially extending first flange mounted on each end thereof;
- a pair of coupling members to join said first flanges with said end portions; each of said coupling members including a second radially extending flange and attachment means to join said coupling member to said end portion; each of said coupling members being arranged to engage said first flanges when said rod is inserted in the space between said second flanges following the attachment of said coupling members to said adjacent end portions.

5,025,121

CIRCUIT BREAKER CONTACT ASSEMBLY

Frankie H. Allen, Acworth, and David A. Leone, Lawrenceville, both of Ga., assignors to Siemens Energy & Automation, Inc., Alpharetta, Ga.

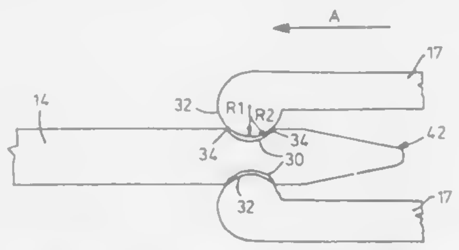
Filed Dec. 19, 1988, Ser. No. 286,544

Int. Cl.⁵ H01H *1/06*

U.S. Cl. 200—275 **6 Claims**

1. A primary disconnect assembly for a circuit breaker comprising:
- a terminal member defining a first side including a first depression and a second side including a second depression, wherein each depression opens away from the terminal member and each depression includes an arcuate contact surface having a first radius;

- at least two contact fingers each defining a contact portion having an arcuate contact surface having a second radius, wherein the second radii are greater than the first radii and the contact portions are adapted to engage the depressions of the terminal member such that at least two contact locations are present between each contact portion and the terminal member, and the terminal member is situated between the contact portions;
- means for holding the contact portions in engagement with the depressions of the terminal member, the contact portions being disposed within the depressions when the assembly is in a normal operating position; and
- means for coupling the contact fingers to the circuit breaker.



5,025,122

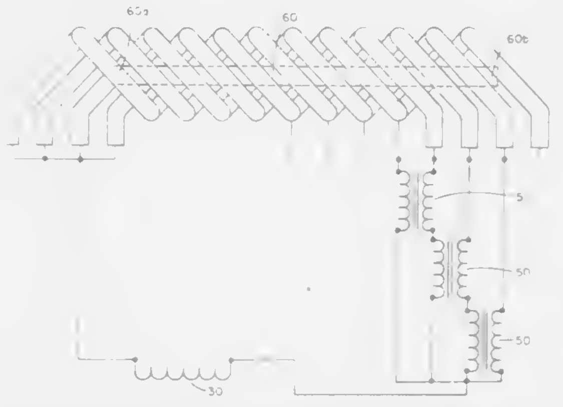
INDUCTION HEATER WITH AXIALLY-ALIGNED COILS

Charles N. Howell, Poland, Ohio, assignor to Ajax Magnethermic Corporation, Warren, Ohio

Filed Nov. 3, 1989, Ser. No. 431,334

Int. Cl.⁵ H05B *6/08*

U.S. Cl. 219—10.71 **16 Claims**



1. An electric induction coil assembly for heating associated workpieces of varying lengths which have been inserted therein, the coil assembly having a plurality of selectively energizable lengths, the coil assembly comprising:
- a plurality of axially-aligned induction coils, each coil having a plurality of turns and a pitch length, the coil turns being spaced along the axis of the coil assembly where within an axial distance necessary for a first coil to complete one turn, a portion of at least one other coil is interposed between corresponding points of the first coil, the energized length of the coil assembly being controllable by increments of less than the pitch length of any of the coils.

5,025,123

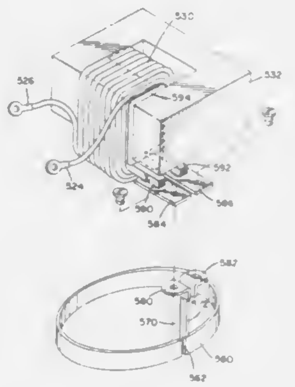
APPARATUS AND METHOD FOR SEALING A LID ONTO A CONTAINER

George D. Pfaffmann, Farmington Hills, Mich.; Charles S. Kubis, Palso Heights, Ill.; John P. Currie, Boaz, Ala.; Norbert R. Balzer, Warren, Mich.; John Walter, Evergreen Park, Ill., and Graham R. Adams, Boaz, Ala., assignors to Continental Can Company, Inc., Norwalk, Conn.

Continuation of Ser. No. 476,555, Feb. 7, 1990, abandoned, which is a division of Ser. No. 254,837, Oct. 7, 1988, Pat. No. 4,941,306. This application Dec. 24, 1990, Ser. No. 630,802

Int. Cl.⁵ H05B *6/10*

U.S. Cl. 219--10.75 **3 Claims**



1. A modular type replaceable heating unit for use in a device for sealing a flat lid with a lower layer of heat bondable material onto an upper, generally flat flange extending around the periphery of an access opening in a container, said sealing device including a plurality of said heating units, means for sequentially moving said modular heating units vertically to and away from said lid, a power supply, a connector for each heating unit electrically connected to said power supply having a first pair of electrical contacts which are stationary relative to said moving means, said modular heating unit comprising: (i) a housing adapted to be mounted to said moving means; (ii) an inductor extending from the lower portion of said housing and adapted to seat against said lid for heat sealing said lid to said flanges; (iii) a matching transformer within said housing, said transformer having a secondary connected to said inductor and a primary; (iv) a pair of bayonet type second contacts extending from said housing and electrically connected to said primary; and (v) cam means extending from said housing for selectively connecting said second contacts with said first contacts upon movement of said housing whereby said transformer and said inductor is energized by said power supply.

5,025,124

ELECTROMAGNETIC DEVICE FOR HEATING METAL ELEMENTS

Lennart A. Alfredeen, 3633 Deer Spring Dr., Bettendorf, Iowa 52722

Filed Jun. 1, 1990, Ser. No. 532,286

Int. Cl.⁵ H05B *6/10*

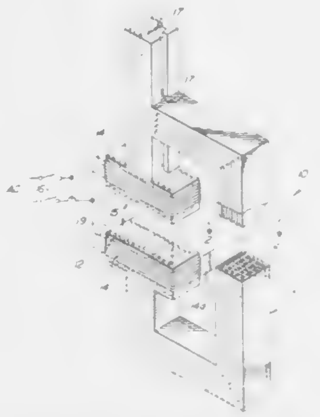
U.S. Cl. 219—10.75 **6 Claims**

1. A device for heating metal comprising a magnetic loop open at two facing ends with an open space therebetween;
- said magnetic loop comprising a plurality of parallel thin plates of high magnetic permeability conductive material;
- said platen closely spaced and insulated from each other;
- a plurality of core areas, each of said core areas adjacent each of said facing ends and comprising a second plurality of parallel thin plates of high magnetic permeability conductive material having a face at right angles to the plane

VOL
1127
ISS
3
JE
18
1991
UMI

of the plates larger in area than the area of the facing end of said loop; and,

a plurality of windings formed of conductive wires, each of said windings wound around each of said core areas adjacent said facing ends and connected to an alternating current source to reverse the magnetic field in said loop at the frequency of the alternating current source.



5,025,125

BRAZING OR SOLDERING METHOD AND DEVICE INCLUDING A LAMINAR FLOW OR GASEOUS FLUX

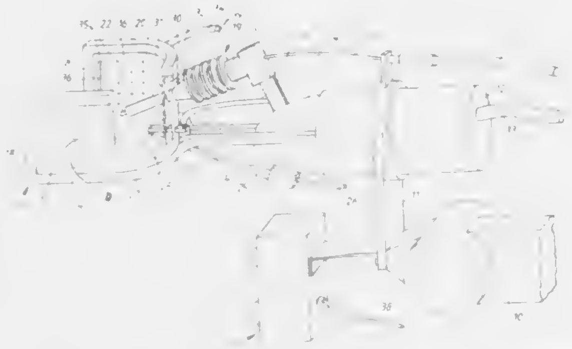
Christer C. I. Peterson, Lidingo, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Oct. 10, 1989, Ser. No. 419,608

Claims priority, application Sweden, Oct. 14, 1988, 8803679

Int. Cl.⁵ B23K *1/002*

U.S. Cl. 219—85.11 9 Claims



1. A method for joining work pieces by soldering or brazing in which an induction coil is brought to a position to define a soldering and brazing area where the coil at least partly surrounds the work pieces which, by means of induction, are heated to a suitable temperature for the soldering or brazing operation after which a solder is fed to the soldering or brazing area, including the step of blowing a gaseous flux into the soldering or brazing area in a free atmospheric environment before or while the solder is being fed to the soldering or brazing area, wherein the gaseous flux is supplied as a laminar stream of gas.

5,025,126

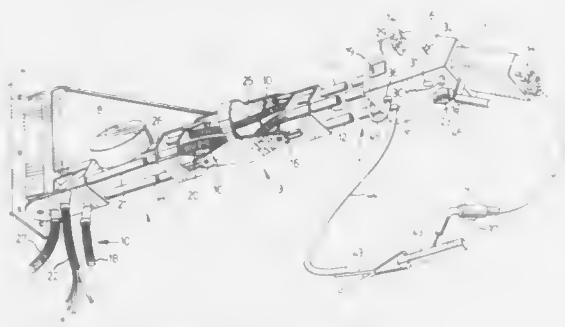
ARTICULATED SUPPORT ARM

Henning Hansen, 1470 Highbush Trail, Pickering, Ontario, Canada L1V 1N5

Filed May 30, 1990, Ser. No. 530,357

Int. Cl.⁵ B23K *9/32*

U.S. Cl. 219—125.1 19 Claims



1. Manual welding apparatus comprising:
(a) a support arm comprising:
an inner boom having a longitudinal axis;
mounting means, pivotally connected to the inner end of the boom, for pivotally mounting the boom to a stationary supporting structure;
an outer jib having a longitudinal axis;
a knuckle having an inner end pivotally connected to the outer end of the boom and having an outer end pivotally connected to the inner end of the jib; and
support means, connected to the outer end of the jib for supporting a suspended load;
said boom and said jib each constructed of rigid open-ended tube means for providing an at least partially encased access channel between the suspended load and the inner end of the boom;
and said pivotal connections each freely manually pivoting, about single vertical parallel pivoting axes, said inner boom relative to said supporting structure, said knuckle relative to said inner boom independently of the pivoting of said inner boom relative to said supporting structure, and said outer jib relative to said knuckle;
(b) a welding wire feeder connected to the support means;
(c) first welding control means, connected to the support means, for controlling a welding process and for controlling the wire feeder;
(d) a welding gun coacting with the wire feeder and first welding control means;
(e) a spool of welding wire rotatably mounted to the arm and passing through the wire feeder and welding gun; and
(f) a welding supply conductor connected to the first welding control means and associated welding supply source, the welding supply conductor passing through the rigid tube means of the boom and jib and spanning between the rigid tube means of the boom and jib adjacent the knuckle;
whereby welding and control of the welding process may be carried out at a distance from the power supply and whereby the welding supply conductors are partially encased and supported at an elevation within the rigid tube means.

5,025,127

ELECTRONIC WELDING STATION WITH AC AND REVERSIBLE POLARITY DC OUTPUTS

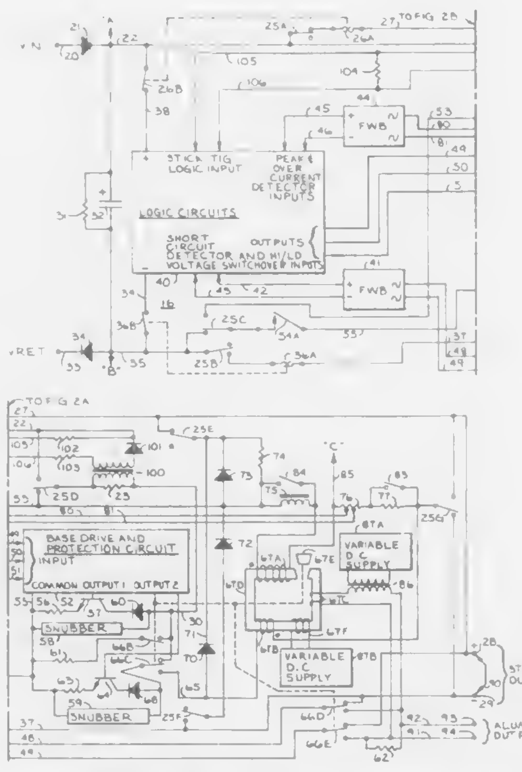
Malcolm T. Gilliland, 310 Pine Valley Rd., Marietta, Ga. 30067

Filed Jun. 30, 1989, Ser. No. 374,465

Int. Cl.⁵ B23K *9/10*

U.S. Cl. 219—130.1 58 Claims

14. A welding station for selectably providing for positive ground, negative ground, and AC output operation, comprising:
a positive power bus and a negative power bus for receiving input power;
a first output point and a second output point for providing for said positive ground and said negative ground operation;
a third output point and a fourth output point for providing for said AC output operation;
welding parameter selection and drive means for providing a first drive signal and a second drive signal having parameters desired for a selected welding operation;
first switching means having a first terminal and a second terminal and responsive to said first drive signal for conducting current between said first terminal and said second terminal;
second switching means having a first terminal and a second terminal and responsive to said second drive signal for conducting current between said first terminal and said second terminal;
an output transformer having a primary winding for receiving drive power, and a secondary winding for providing an output voltage and an output current to a welding operation, said secondary winding being connected to said third output point and said fourth output point;
third switching means for selectably providing for positive ground operation by connecting said positive power bus to said first output point and connecting said negative power bus to said second output point through a first series circuit comprising said first switching means and a first part of said primary winding, providing for negative ground operation by connecting said negative power bus to said second output point and connecting said positive power bus to said first output point through said first series circuit, and providing for AC output operation by connecting said first series circuit between said positive power bus and said negative power bus, connecting a second series circuit comprising said second switching means and a second part of said winding between said positive power bus and said negative power bus; and
means for connecting a welding torch and a workpiece to a selected pair of said output points for providing an output voltage and an output current to said selected welding operation.



5,025,128

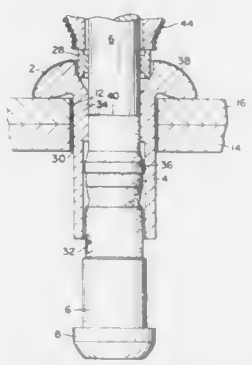
RIVET WITH INTEGRAL HEATER

Rodney L. Derbyshire, Menlo Park, Calif., assignor to Metcal, Inc., Menlo Park, Calif.

Filed Dec. 2, 1988, Ser. No. 278,774

Int. Cl.⁵ H05B *6/00*

U.S. Cl. 219—200 17 Claims



1. A heater system incorporated in a rivet and application tool comprising,
a rivet having a pin and a sleeve that are to extend through a hole to be sealed,
a rivet application tool having a member for gripping said pin,
a ferromagnetic material applied to said rivet adjacent said sleeve,
means associated with said tool to heat said ferromagnetic material to a temperature approaching its Curie temperature, and
a heat activated sealant disposed on said sleeve in a region of the hole in which the pin is to be seated,
said sealant being activated below said Curie temperature.

5,025,129

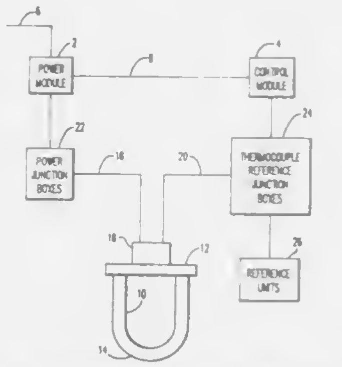
REACTOR VESSEL ANNEALING SYSTEM

Phillip E. Miller, Greensburg; Leonard R. Katz, Pittsburgh; Raymond J. Nath, Murrysville; Ronald M. Blaushild, Export, all of Pa.; Michael D. Tatch, Randolph, N.J.; Frank J. Kordalski, White Oak, Pa.; Donald T. Wykstra, Pittsburgh, Pa., and William M. Kavalkovich, Monroeville, Pa., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Jun. 19, 1989, Ser. No. 368,456

Int. Cl.⁵ C21D *9/00*

U.S. Cl. 219—201 27 Claims

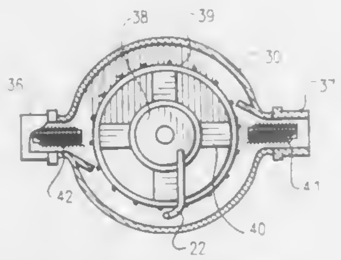


1. A system for annealing a vessel in situ by heating the

VOL
1127
ISS
3
JE
18
1991
UMI

vessel to a defined temperature, comprising: electrically operated heater means insertable into the vessel for heating the vessel to the defined temperature; temperature monitoring means positioned relative to said heater means for monitoring the temperature of the vessel; controllable electric power supply means for supplying electric power required by said heater means; control means for controlling the power supplied by said power supply means; a first vehicle containing said power supply means; a second vehicle containing said control means; power conductor means connectable between said power supply means and said heater means for delivering the power supplied by said power supply means to said heater means; signal conductor means connectable between said temperature monitoring means and said control means for delivering temperature indicating signals from said temperature monitoring means to said control means; and control conductor means connectable between said control means and said power supply means for delivering to said power supply means control signals for controlling the level of power supplied by said power supply means to said heater means.

5,025,130
VEHICLE HEATING DEVICE
Michael D. Slone, 5677 Crievewood Dr., Memphis, Tenn. 38135
Filed Dec. 11, 1989, Ser. No. 448,346
Int. Cl.^{5} B60L *1/02*
U.S. Cl. 219—203 **5 Claims**



1. A vehicle heating device, comprising:

a housing;

a rechargeable battery in said housing;

a recharging unit in said housing for recharging said battery;

means for selectively connecting said recharging unit to an AC or a DC power supply source;

a blower assembly;

an electric fan in said blower assembly;

at least one electrical resistance heating element in said blower assembly;

a pair of heated air outlet apertures provided on opposite sides of said blower assembly;

a pair of flexible corrugated elongated tubular vent conduits connected to respective ones of said heated air outlet apertures;

each of said vent conduits having a plurality of spaced vent apertures;

a first support stand for supporting said blower assembly in spaced relation above a vehicle dashboard;

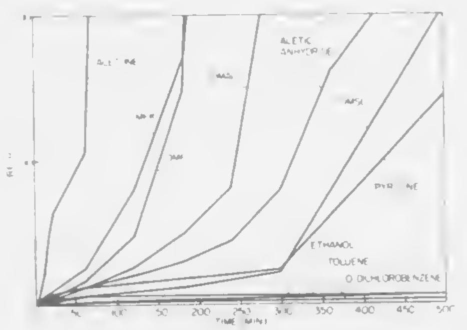
second and third support stands for supporting said vent conduits in spaced relation above a vehicle dashboard;

means for connecting said electrical resistance heating element and said fan to said battery;

timing means in said housing for actuating said fan and heating element at a predetermined time; and

a plurality of compartments in said housing dimensioned for removable reception of said blower assembly and said vent conduits.

5,025,131
METHOD OF HEATING DIESEL FUEL UTILIZING CONDUCTIVE POLYMER HEATING ELEMENTS
Peter H. van Konyenburg, Palo Alto, and Andrew Au, Fremont, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.
Division of Ser. No. 423,589, Sep. 27, 1982, Pat. No. 4,935,156, which is a continuation-in-part of Ser. No. 300,709, Sep. 9, 1981, abandoned. This application Jan. 5, 1990, Ser. No. 461,199
Int. Cl.^{5} H01G *9/04*
U.S. Cl. 392—451 **14 Claims**

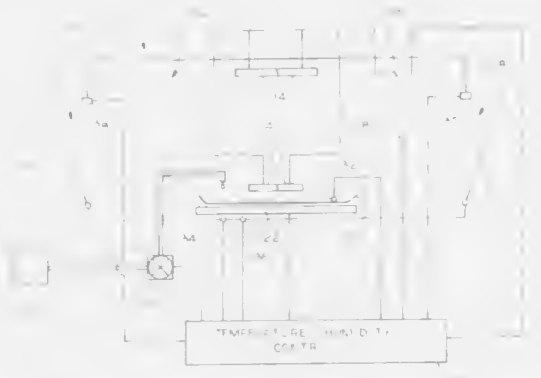


1. A method of heating diesel fuel which comprises passing current through a self-regulating heater which is immersed in the diesel fuel, wherein the heater is a self-regulating heater which comprises

(1) a conductive polymer element composed of a PTC conductive polymer composition comprising a particulate conductive filler dispersed in polyvinylidene fluoride which has a head-to-head content of less than 5%; and

(2) at least two electrodes which are connected to a power source to cause current to pass through the conductive polymer element.

5,025,132
MICROPROCESSOR CONTROLLED FOOD TREATMENT CABINET WITH FLASH STEAMER AND COMPENSATING HUMIDITY CONTROL ROUTINES
Robert C. Fortmann, Mundelein; Curtis C. Pinnow, Libertyville; Gustav Kuschewski, St. Charles, and William A. Joseph, Jr., Elburn, all of Ill., assignors to Carter-Hoffman Corporation, Mundelein, Ill.
Filed May 17, 1990, Ser. No. 524,650
Int. Cl.^{5} F27D *7/02*
U.S. Cl. 219—401 **37 Claims**



1. Apparatus for treating and holding food at a predetermined temperature and relative humidity for a finite period of time, comprising in combination:

a cabinet defining an interior storage space for food to be treated, said cabinet having an access opening to permit placement of food items in and removal of food items from said storage space, said cabinet having a door operatively mounted for selective movement between a closed position, wherein said access opening is covered, and an open position, wherein said access opening is uncovered;

means for sensing if said door is in the open position;

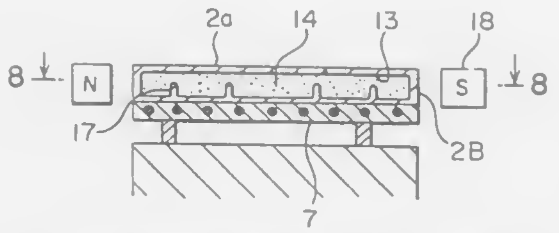
means for heating a heater apparatus, said heater apparatus having a heater surface, said heater surface located within said cabinet, said heater surface capable of being selectively heated to a sufficiently high temperature to effectively vaporize water on said heater surface in said storage space;

means for delivering water against said heater surface in a controlled method to provide water vapor in said storage space;

microprocessor control means coupled to said sensing means and said delivering means and including setpoint means for selecting a desired relative humidity level in said interior storage space for causing said delivering means to deliver a preselected metered volume of water to said heater surface according to said desired relative humidity level and the amount of time that said door has been in the open position to compensate for the loss of humidity from said storage space to the atmosphere upon said door being opened; and

memory means associated with said microprocessor control means, said memory means containing predetermined parameters relating to time and relative humidity characteristics for said storage space, said memory means providing said parameters to said microprocessor control means upon selective querying of said microprocessor control means.

5,025,133
SEMICONDUCTOR WAFER HEATING DEVICE
Kouichirou Tsutahara, and Hiroshi Tanaka, both of Itami City, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan
Filed Jul. 3, 1989, Ser. No. 374,824
Claims priority, application Japan, Apr. 4, 1989, 1-83974
Int. Cl.^{5} H05B *3/72*
U.S. Cl. 219—462 **5 Claims**



1. A semiconductor wafer heating device comprising:

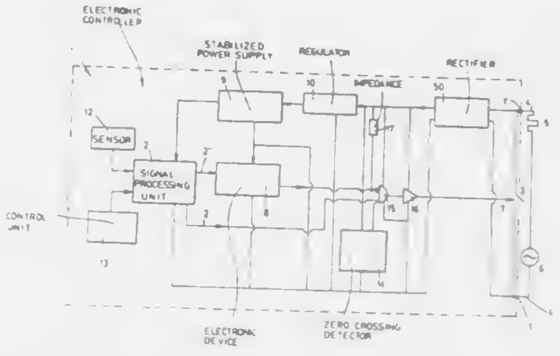
a hollow heating stage having opposed first and second surfaces, the first surface for supporting a semiconductor wafer;

an electrically conducting fluid of relatively high thermal conductivity disposed within the hollow heating stage;

a magnet movable relative to said stage for generating a rotating magnetic field within said stage directly coupled to said electrically conductive fluid to stir said fluid; and

heating means disposed on the second surface of said heating stage for heating the stage.

5,025,134
MEANS FOR REFRESHING A TRIAC CONTROL CIRCUIT POWER SUPPLY
David Bensoussan, 5170 Hingston, Montreal, Canada H3X 3R4, and Don Tardio, 6631 Paul-Pau, Montreal, Canada H1K 4R7
Continuation-in-part of Ser. No. 355,209, May 22, 1989, abandoned. This application Jan. 16, 1990, Ser. No. 465,734
Claims priority, application Canada, May 24, 1988, 567546
Int. Cl.^{5} H05B *1/02;* **G05F** *1/45*
U.S. Cl. 219—494 **7 Claims**



1. An electronic controller for controlling a supply of an alternating electrical power issued from a first power supply to an electrical load, comprising:

(a) two input terminals between which said first power supply and said load can be connected in series;

(b) an electronic switch connected between said two input terminals;

(c) a second power supply for generating a power supply voltage for said electronic controller, said second power supply voltage being derived from said two input terminals and consequently from said first power supply through said electrical load when said switch is open, said second power supply being provided with means for storing electrical energy;

(d) voltage detecting means having inputs connected to said means for storing electrical energy, and an output for generating a positive output signal when voltage across said means for storing electrical energy is higher than a predetermined voltage value;

(e) a sensor for detecting a measurable physical parameter, and generating a positive output signal when said physical parameter is not within a range of predetermined values;

(f) a zero crossing detector for detecting voltage provided by said first power supply and generating a positive output signal when said voltage of said first power supply crosses zero volt; and

(g) means for generating a command signal to control said supply of electrical power to said electrical load, said means for generating having inputs connected respectively to outputs of said voltage detecting means, said sensor and said zero crossing detector, said command signal having a closing state which causes said electronic switch to close and connect said two input terminals by means of said switch only when said three positive output signals are received at said inputs of said means for generating, in such a manner that said first power supply is connected in series with said load in closed loop and thus supplies said electrical power to said load, said command signal further having a normally open state which causes said electronic switch to open for a whole number of power supply cycles from said first power supply so that said means for storing electrical energy of said second power supply is charged from said first power supply, said command signal being maintained in the open state as long as the three positive output signals are not generated.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,135
CIRCUIT CONFIGURATION FOR THE RECOGNITION OF A PLASMA

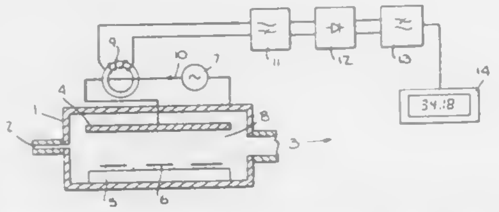
Roland Gesche, Seligenstadt, and Norbert Vey, Mittel-Gründau, both of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Jun. 9, 1989, Ser. No. 364,812

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1988, 3821208

Int. Cl.^{5} B23K *9/00*

U.S. Cl. 219—506 8 Claims



1. Method for the recognition of a plasma comprising: generating a high frequency ac current with preset frequency for generating a plasma; detecting with a circuit configuration the ac current (J); supplying a signal representative of the ac current (J) to a highpass filter which transmits frequencies lying above a preset frequency (fo); and evaluating the output signal of the highpass filter as criterion for the presence or absence of a plasma.

5,025,136
DEVICE FOR AND METHOD OF APPLYING VOLTAGE TO A HEATING RESISTOR IN A MOTOR VEHICLE IN DEPENDENCY ON OPERATING CONDITIONS OF THE VEHICLE

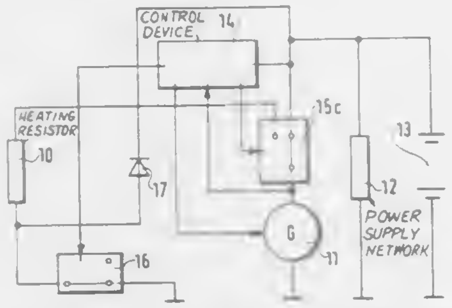
Mathias Doege, Korntal-Muenchingen, and Wunibald Frey, Schwieberdingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Apr. 27, 1990, Ser. No. 515,110

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1989, 3919562

Int. Cl.^{5} H05B *1/02*

U.S. Cl. 219—508 9 Claims



1 A device for applying voltage to a heating resistor in a motor vehicle having a power generator driven by the vehicle engine and a power supply network connected across terminals of a battery, comprising control means for delivering a heating control signal and signals corresponding to operational conditions of the motor vehicle inclusive of

standstill. running and temperature conditions of the motor vehicle; first switching means responsive to the heating control signal to connect said power generator in parallel to one of said power supply network and one end of said heating resistor when heating is demanded; and second switching means connected to the other end of said heating resistor and being responsive to one of said standstill and running condition signals, said second switching means connecting, when the parallel connection between the power generator and the power supply network is interrupted, said heating resistor parallel to said power generator in response to the standstill condition signal, and connecting said heating resistor in series with said power generator and said power supply network in response to the running condition signal.

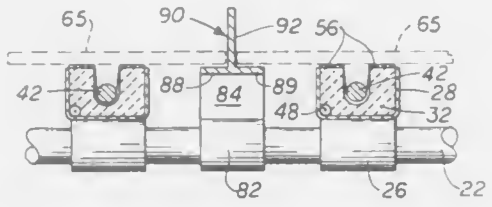
5,025,137
THERMOPLASTIC HEATING APPARATUS

Robert B. Ayrest, 6160 Cobble Stone Rd., Placerville, Calif. 95667

Filed Sep. 18, 1989, Ser. No. 409,606

Int. Cl.^{5} H05B *3/42*

U.S. Cl. 219—521 22 Claims



7. An apparatus for heating thermoplastic sheet material, comprising, in combination:

a knockdown frame assembly,

support means coupled to said frame assembly,

a heating rod housed within said support means,

said support means including a trough having a substantially U-shaped cross section along its length and end caps connected to extremities of said trough, said end caps configured as recesses of substantially hemispherical configuration, said heating rod resting in said trough on a plurality of saddles extending up from said trough, whereby said trough and end caps focus heat from said heating rod upwardly.

5,025,138
METHOD AND SYSTEM FOR PROVIDING VERIFIABLE LINE OF CREDIT INFORMATION

Vincent Cuervo, 4251 Aurora St., Coral Gables, Fla. 33146

Continuation-in-part of Ser. No. 739,690, May 31, 1985, Pat. No. 4,718,009, which is a continuation-in-part of Ser. No. 583,591, Feb. 27, 1984, abandoned. This application Jan. 6, 1987, Ser. No. 141,150

The portion of the term of this patent subsequent to Jan. 5, 2006, has been disclaimed.

Int. Cl.^{5} G06F *15/30*

U.S. Cl. 235—379 8 Claims

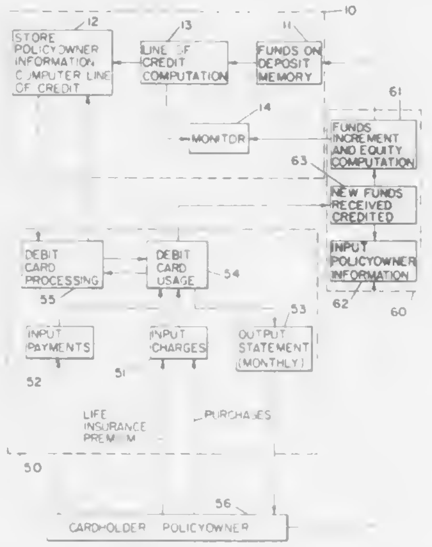
1. A method for providing line of credit information to participating banks that issue debit cards to owners of life insurance policies, wherein the cash surrender value of said life insurance policies has been assigned to a system, selected from the group consisting of a credit clearing house or a lender, which provides credit information to said participating bank, by said policy owner, to secure a line of credit to the owner of the .life insurance policies in excess of the debited account, comprising the steps of:

A. providing a system for storing and periodically updating the cash surrender values of the assigned life insurance policies in a computer memory;

B. computing said line of credit for a debit card holder based on said cash surrender values stored for each policy owner;

C. transmitting said line of credit information from said system to participating banks; and

D. monitoring periodically the assigned life insurance policies with said system for any incremental increase of said cash surrender values so that the line of credit for the debit card holder may be automatically upgraded.


10
12
STORE POLICYOWNER INFORMATION COMPUTER LINE OF CREDIT
13
LINE OF CREDIT COMPUTATION
11
FUNDS ON DEPOSIT MEMORY
61
14
MONITOR
FUNDS INCREMENT AND EQUITY COMPUTATION
63
NEW FUNDS RECEIVED CREDITED
INPUT POLICYOWNER INFORMATION
DEBIT CARD PROCESSING
DEBIT CARD USAGE
54
55
62
60
53
INPUT PAYMENTS
INPUT CHARGES
OUTPUT STATEMENT (MONTHLY)
52
51
LIFE INSURANCE PREMIUM
PURCHASES
50
56
CARDHOLDER POLICYOWNER

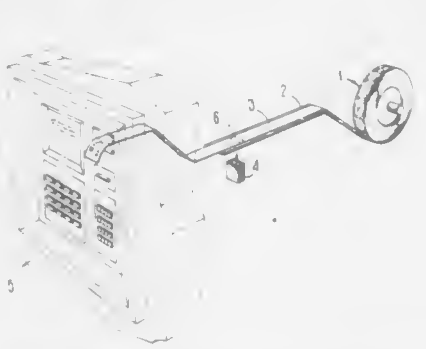
5,025,139
REDEEMABLE COUPON DISBURSEMENT CONTROL AND REPORTING SYSTEM

W. Ken Halliburton, Jr., 1618 Haynes Dr., Murfreesboro, Tenn. 37130

Filed Dec. 8, 1987, Ser. No. 130,088

Int. Cl.^{5} G06F *15/30*

U.S. Cl. 235—379 27 Claims



1. A redeemable coupon disbursement control and record system comprising:

(a) An automated teller machine including a user communication means for communication between the automated teller machine user and the automated teller machine, a means for preparing a paper receipt, a means for conveying said receipt paper through said automated teller machine, and a first means for recording information;

(b) Scanning means along the path of conveyance of said receipt paper for reading information recorded on at least one surface cf said receipt paper; and

(c) Means for relaying information from said scanning means to said first recording means.

5,025,140
APPARATUS FOR RECEIVING ARTICLES, STORING THEM AFTER PROCESSING AND SUBSEQUENTLY RE-ISSUING THEM

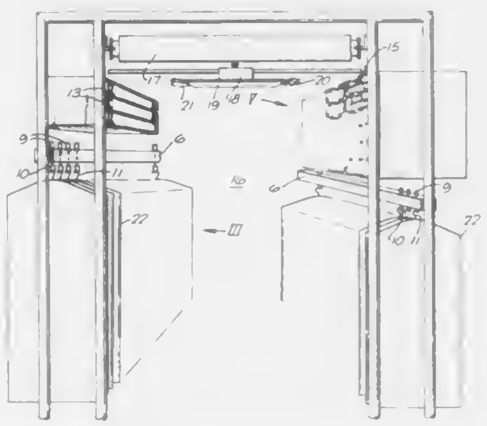
Clement Varley, 110 Gregories Road, Beaconsfield, Buckinghamshire, England

Filed Jul. 5, 1988, Ser. No. 215,035

Claims priority, application United Kingdom, Jul. 2, 1987, 8715543

Int. Cl.^{5} G06F *15/24, 7/08*

U.S. Cl. 235—385 10 Claims



1. An apparatus for receiving articles to be processed, for storing said articles prior and subsequent to said processing, and subsequently reissuing processed articles to appropriate customers in response to customer supplied information comprising:

a plurality of first article carriers for received articles;

at least one first article carrier storage means for storing at least one of said plurality of first article carriers;

first identification means for uniquely identifying each separate one of said plurality of first article carriers;

a plurality of second article carriers for processed articles;

at least one second article carrier storage means for storing at least one second article carrier;

second identification means for uniquely identifying each separate one of said second article carrier storage means;

transport means for selectively transporting at least one of said first article carriers from said first article carrier storage means to an article reception location for loading by said customer, and for selectively transporting at least one of said second article carriers from said second article carrier storage means to an article reissue location for retrieval by said customer; and

control means responsive to customer supplied information for selectively activating said transport means for automated handling of said articles, said control means having input means for receiving data corresponding to said first and second identification means and said customer supplied information, said control means further having central processing means for processing received data in accordance with a program stored in memory, said central processing means for creating and storing in memory a first temporary data relationship between said first identification means and said customer supplied information, generally in conjunction with presenting a first article carrier from said first article carrier storage means to said article reception location for loading with an article to be processed by a customer, said central processing means for further creating and storing in memory a second temporary data relationship between said customer supplied information and said second identification means, generally in conjunction with storing a processed article in said second article carrier storage means.

VOL
1127
ISS
3
JE
18
1991
UMI

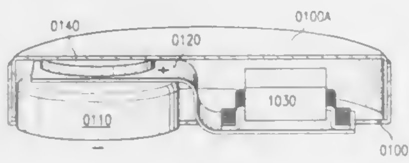
5,025,141
HAND-HELD WAND FOR READING ELECTRONIC TOKENS

Michael L. Bolan, Dallas, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Continuation of Ser. No. 352,598, May 15, 1989, Pat. No. 4,945,217. This application Jul. 18, 1990, Ser. No. 554,271

Int. Cl.^{5} G06K *7/10*

U.S. Cl. 235—472 **9 Claims**



1. A wand for rapidly manually contacting two-terminal thin round electronic token data modules, comprising:
a body of an nonconductive polymer material, including
a base portion shaped to be firmly supported by the hand of a user, and
a top portion extending from said base portion;
said top portion including a surface positioned so that a user can bring said surface into contact with the token to be contacted,
said surface including a recess therein which is shaped to mate with the token to be contacted,
the inner perimeter of said recess being bordered by a conductive ring of conductive material,
said ring of conductive material being connected to a first lead wire;
an additional exposed contact, positioned substantially in the middle of said recess, said additional contact being connected to a second lead wire;
whereby said first and second lead wires can be connected to a host computer to provide a data interface to randomly positioned tokens, as quickly as a user can make contact between said recess and the respective tokens.

5,025,142
LIGHT WAVEFORM CHANGING APPARATUS USING AN OPTICAL AMPLIFIER

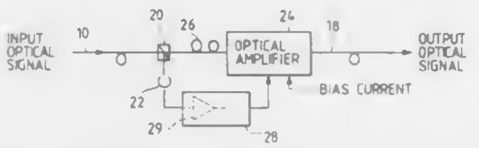
Shinichiro Aoshima; Tsuneyuki Urakami, and Yutaka Tsuchiya, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuko, Japan

Filed May 19, 1989, Ser. No. 353,948

Claims priority, application Japan, May 26, 1988, 63-129193

Int. Cl.^{5} H01J *40/00*

U.S. Cl. 250—201.9 **23 Claims**



1. A light waveform changing apparatus, comprising:
beam splitting means for branching an input optical signal into a first and second optical signal;
photoelectric converting means for converting said first optical signal into an electrical signal;
an optical amplifier whose gain is adjustable by a controlling optical signal for amplifying said second optical signal;
an input optical path for introducing said second optical signal to said optical amplifier; and
means for converting said electrical signal outputted from said photoelectric converting means into an optical signal and introducing said optical signal into said optical amplifier as said controlling optical signal; wherein
said second optical signal and said controlling optical signal are supplied to said optical amplifier at a predetermined timing of generally coincident arrival.

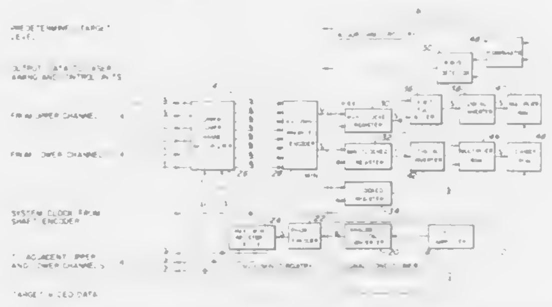
5,025,143
ENHANCED CLUTTER SUPPRESSION APPARATUS FOR USE WITH AN INFRARED SEARCH AND SURVEILLANCE SYSTEM

Edward S. Dayhoff, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 6, 1982, Ser. No. 395,223

Int. Cl.^{5} H04N *5/21*

U.S. Cl. 250—203.3 **5 Claims**



1. A clutter suppressor/target locator apparatus having (n) identical channels for examining infrared scanning data in the form of target video data (picture elements) from an associated infrared search and surveillance system which includes a shaft encoder, and laser aiming and control units, the (n^{th}) channel of said clutter suppressor/target locator apparatus comprising:
a signal conditioner for amplifying the target video data, which is continuously variable in terms of picture elements, and for converting the target video data, after amplification, into a proportional representation in a digital format:
max/min circuitry operatively connected to said signal conditioner, to the upper channel corresponding to the $(n+1)^{st}$ channel of the identical channels, the lower channel corresponding to the $(n-1)^{st}$ channel of the identical channels, and to a clock derived from the shaft encoder of the infrared search and surveillance system, said max/min circuitry operating to generate the maximum and minimum values in binary form, on two corresponding output buses, of the target video data corresponding to channels (n+1) (n), and (n−1); and
algorithm circuitry operatively connected to said max/min circuitry, to the clock derived from the shaft encoder, and to a predetermined target level, said algorithm circuitry operating so as to implement a predetermined algorithm digitally, the maximum and minimum values in binary form being manipulated according to the predetermined algorithm, which is,

$$T' = \frac{T_0}{\text{Max} - \text{Min} + 1} - \frac{\text{Max} + \text{Min}}{2},$$

where T_0 is the level of the picture element being tested, max and min are the highest and lowest levels, respectively, of the picture elements surrounding the picture element being tested, and T' is the adjusted target level, said algorithm circuitry operating to output "one" if the adjusted target level is above the predetermined target level.

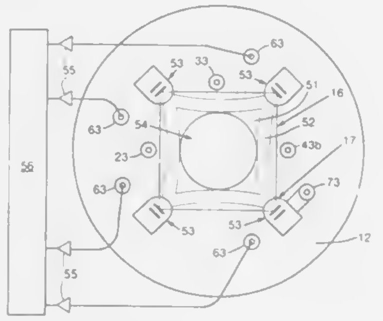
5,025,144
RESISTIVE ANODE ENCODER TARGET AND METHOD PRODUCING BATHS CHARGED AND VISUAL IMAGES

Robert W. Odom, 446 Jackson Ave., Redwood City, Calif. 94062, and Michael D. Strathman, 5616 S.E. Hawthorne Blvd., Portland, Oreg. 97215

Filed Oct. 6, 1988, Ser. No. 254,442

Int. Cl.^{5} H01J *40/14*

U.S. Cl. 250—207 **23 Claims**



1. An apparatus for imaging incident energetic radiation comprising:
means for detecting said radiation and for producing an amplified and accelerated electron image which corresponds spatially to the incident radiation,
a target disposed in the path of said amplified and accelerated electron image, and
means electrically coupled to said target for producing signals representative of at least one of the two spatial coordinates of the points of impact of the electrons upon said target which comprise said electron image,
said target being at least partially transparent for producing a visible light output.

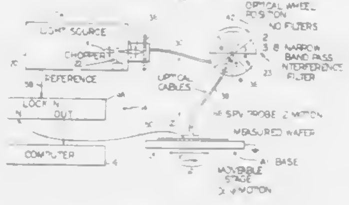
5,025,145
METHOD AND APPARATUS FOR DETERMINING THE MINORITY CARRIER DIFFUSION LENGTH FROM LINEAR CONSTANT PHOTON FLUX PHOTOVOLTAGE MEASUREMENTS

Jacek J. Lagowski, 7 Rag Rock Dr., Woburn, Mass. 01801

Filed Aug. 23, 1988, Ser. No. 235,305

Int. Cl.^{5} H01J *40/14*

U.S. Cl. 250—211 J **24 Claims**



1. A method for determining the minority carrier diffusion length of a sample of a semiconductor material comprising the steps of:
selecting a photon flux for determining said minority carrier diffusion length by illuminating a surface of said semiconductor with beams of radiation having at least two different photon flux values to induce photovoltages, detecting and analyzing said photovoltages as a function of photon flux and; selecting a photon flux based on said analysis;
determining said minority carrier diffusion length by illuminating a surface of said semiconductor successively with beams of monochromatic radiation having different photon energies to induce surface photovoltages;
said radiation at said different photon energies having a photon flux being substantially equal to said selected photon flux;
detecting said photovoltages and;
analyzing said photovoltages as a function of the absorption coefficients of said photon energies for said semiconductor to deduce said minority carrier diffusion length.

5,025,146
OPTICAL SENSOR LINE OF AMORPHOUS OR POLYCRYSTALLINE PHOTOELECTRIC MATERIAL HAVING A PLURALITY OF SENSOR ELEMENTS

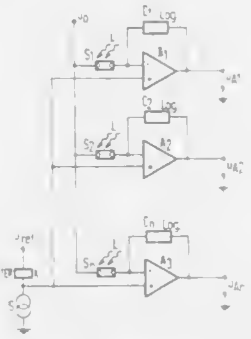
Peter Kleinschmidt, Munich, and Gerhard Mader, Unterhaching, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jul. 31, 1989, Ser. No. 386,604

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1988, 3833159

Int. Cl.^{5} H01J *40/14*

U.S. Cl. 250—214 L **36 Claims**



1. An optical sensor line of amorphous or polycrystalline, photo-electric material having a plurality of sensor elements, comprising at least one non-linear element connected to every sensor element as a first converter that converts photo-current (i_{ph}) proportional to the incident quantity of light into a signal voltage (u_s) that is at least approximately proportional to the logarithm of the photo-current (i_{ph}). the sensor element outputting the photo-current (i_{ph}) as a function of the quantity of light incident on the sensor.

5,025,147
SENSOR FOR CONVERTING A DISTANCE TO OPTICAL AND FURTHER TO ELECTRICAL ENERGY, AND SURFACE SCANNING APPARATUS USING SAME

Urs T. Dürig, Rüschlikon, Switzerland; Ulrich C. Fischer, Wetzlar, Fed. Rep. of Germany, and Wolfgang D. Pohl, Adliswil, Switzerland, assignors to Ernst Leitz Wetzlar, GmbH, Wetzlar, Fed. Rep. of Germany and International Business Machines Company, Armonk, N.Y.

Filed Sep. 22, 1988, Ser. No. 247,706

Claims priority, application European Pat. Off., Sep. 25, 1987, 87114008.3

Int. Cl.^{5} H01J *3/14*

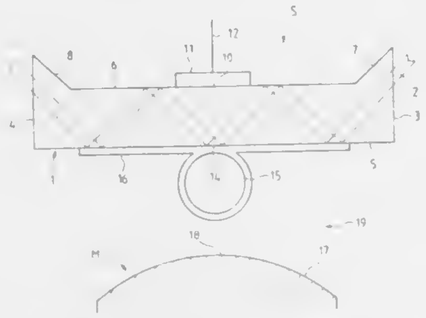
U.S. Cl. 250—216 **32 Claims**

1. An optical sensor for converting a distance value between a sensor and a body to be measured to a quantity of optical energy by using laser light of a predetermined wavelength and for converting said quantity of optical energy to an electrical value representative of said distance value, said sensor including a reference site, said body to be measured including a surface having a measurement site, said distance value being defined between the reference site of the sensor and the measurement site at the surface of the measured body located opposite the sensor and being small enough to be located, at a predetermined wavelength, in an optical near field of the reference site, the sensor comprising:
a sensor body formed as a light waveguide for said laser light and having a light entrance site, a first light exit site for the

VOL
1127
ISS
3
JE
18
1991
UMI

light guided through the sensor body and a second light exit site for the light diffracted within the sensor body, said second light exit site being located at a first surface of the sensor body on a side thereof which faces away from the measured body,

a detection particle acting as an antenna and located at a second surface of the sensor body between said light entrance site and said first light exit site and having a substantially convex and rounded off shape and a major dimension which is smaller than said predetermined wavelength, and



a detector means for converting the optical energy of a light portion which leaves the sensor body at the second light exit site into an electrical detector signal,

said sensor body being provided with a continuous thin film formed as a coating so as to substantially cover the detection particle and at least part of said second surface of the sensor body in the vicinity of the detection particle, said thin film having a thickness which is smaller than said predetermined wavelength.

5,025,148
LASER WARNING SENSOR WITH FREQUENCY-CODED POSITION INFORMATION

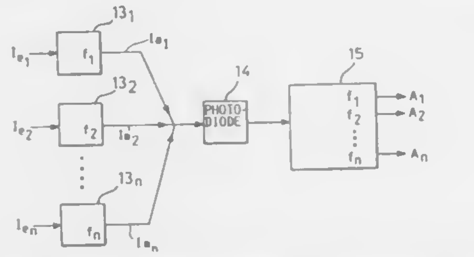
Hans Poisel, Dachau, and Gert Trommer, Munich, both of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Oct. 4, 1989, Ser. No. 416,911

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1988, 3833634

Int. Cl.^{5} H01J *5/16*

U.S. Cl. 250—227.12 7 Claims



1. A laser warning sensor having a directional resolution capability, comprising a plurality of laser light conductor feedback units (**13_1** to **13_n**), each feedback unit including an optical input element, an optical output element, and a signal delay glass fiber light conductor having a defined length differing from lengths of other signal delay light conductors of other feedback units, so that each feedback unit is tuned to a fixed separate frequency, each optical input element providing a different azimuth and elevation input information to its feedback unit, each of said plurality of feedback units (**13_1** to **13_n**) further comprising coupling means for coupling each of said signal delay glass fiber light conductors to its respective feedback unit for forming a signal delay light conductor closed loop (**11**), one end of which is coupled to said optical input element while another closed loop end is coupled to said optical output element, each closed loop producing at said optical output element a separate pulse train based on said separate frequency for identifying said different azimuth and elevation input information to provide said resolution capability.

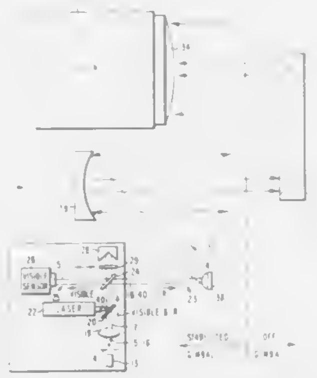
5,025,149
INTEGRATED MULTI-SPECTRAL BORESIGHT TARGET GENERATOR

Dean C. Hatfield, Jr., Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jun. 18, 1990, Ser. No. 539,116

Int. Cl.^{5} G01B *11/26*

U.S. Cl. 250—342 20 Claims



1. A multi-spectral boresight target generator comprising:

dual band boresight target generator means for simultaneously emitting visible and infrared frequency radiation along a first optical path;

a corner reflector disposed at the distal end of the first optical path that is adapted to retroreflect visible radiation;

a first beamsplitter disposed along the first optical path that is adapted to transmit visible and infrared radiation provided by the dual band boresight target generator means along the first optical path;

a second beamsplitter disposed along the first optical path between the first beamsplitter and the corner reflector that is adapted to reflect infrared radiation from a front surface thereof along a second optical path, transmit visible radiation toward the corner reflector, and reflect the visible radiation retroreflected by the corner reflector from a rear surface thereof along a third optical path;

an infrared sensor disposed along the second optical path that is adapted to image the infrared radiation reflected by the second beamsplitter; and

a visible sensor disposed along the third optical path that is adapted to image the visible radiation.

5,025,150
SITE SURVEY METHOD AND APPARATUS

James G. Oldham, Albuquerque, N. Mex.; Charles R. Spencer, Boise, Id.; Carl L. Begley, and H. Robert Meyer, both of Albuquerque, N. Mex., assignors to MK-Ferguson Company, Cleveland, Ohio and Chem-Nuclear Systems Inc., Columbia, S.C.

Filed Oct. 14, 1988, Ser. No. 257,732

Int. Cl.^{5} G01V *5/00*

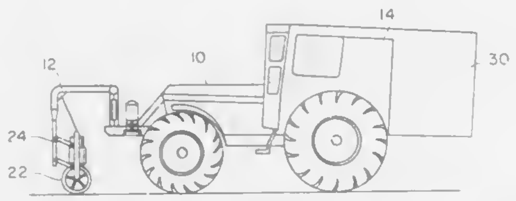
U.S. Cl. 250—253 53 Claims

1. A site survey apparatus for detecting a source material present on a site, the apparatus comprising:

a ground vehicle;

means for moving and guiding said ground vehicle on a selected path; and

means for following terrain disposed on said ground vehicle for automatically retaining and independently positioning each of a plurality of detectors above ground, said means being capable of automatically and independently positioning and retaining each of said detectors at a predetermined height above the ground and in a selected positional relationship to other detectors and maintaining the positions of said detectors as said vehicle transverses irregular terrain.



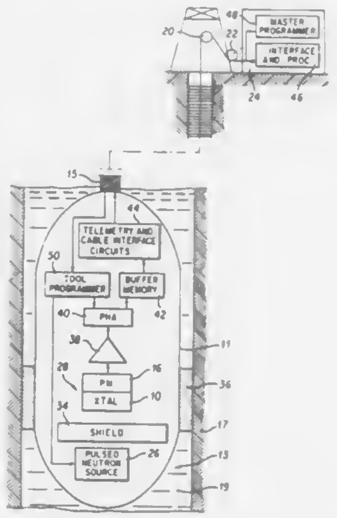
5,025,151
LUTETIUM ORTHOSILICATE SINGLE CRYSTAL SCINTILLATOR DETECTOR

Charles L. Melcher, West Redding, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Division of Ser. No. 389,502, Aug. 4, 1989, which is a continuation-in-part of Ser. No. 254,353, Oct. 6, 1988, abandoned. This application Aug. 30, 1990, Ser. No. 575,187

Int. Cl.^{5} G01V *5/10*

U.S. Cl. 250—269 8 Claims



1. Apparatus for investigation of subsurface earth formations comprising:

a sonde adapted for movement through a borehole;

detector means carried by said sonde for detecting radiation and including a lutetium oxyorthosilicate scintillator; and

means coupled to said detector means for generating and recording a signal representative of at least one characteristic of radiation detected by said detector means.

5,025,152
APPARATUS FOR SEPARATING ISOTOPES OF URANIUM

Erik H. P. Cordfunke, Schoorl, and Cornelis J. J. Tool, Wognum, both of Netherlands, assignors to Ultra-Centrifuge Nederland N.V., Almelo, Netherlands

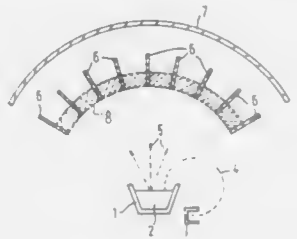
Filed Feb. 7, 1989, Ser. No. 306,899

Claims priority, application Netherlands, Feb. 10, 1988, 8800327

Int. Cl.^{5} B01D *59/50, 59/34*

U.S. Cl. 250—281 6 Claims

1. An apparatus for separating isotopes of uranium, comprising a vacuum chamber, a source of uranium placed within said chamber, means for evaporating uranium from the uranium source, means for selectively ionizing a selected isotope in the uranium vapor, means for applying an electric and/or a magnetic field in the vacuum chamber, as well as a set of collector plates for collecting the uranium ions and one or more collector plates for collecting un-ionized uranium atoms, the improvement comprising that the collector plates for the ions consist, at least at the collecting surface, of sintered yttrium oxide made electrically conductive by suitable doping.



5,025,153
SCANNING TUNNELING SPECTROSCOPE AND A SPECTROSCOPIC INFORMATION DETECTION METHOD

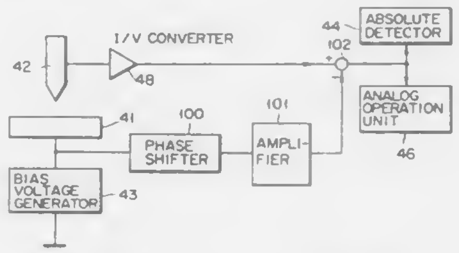
Takao Okada, Hachioji; Akira Yagi, Sagamihara; Seizo Morita, Morioka, and Nobuo Mikoshiba, Sendai, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jul. 6, 1990, Ser. No. 549,469

Claims priority, application Japan, Jul. 11, 1989, 1-177063

Int. Cl.^{5} H01J *37/00*

U.S. Cl. 250—306 20 Claims



1. A scanning tunnel spectroscope comprising

a probe settable close to a sample;

means for applying a bias voltage (V_T) of a preset waveform varying with time in a constant period between said sample and probe;

means for current-voltage converting a tunnel current flowing when said probe is set close to said sample, to a tunnel current signal (I_T);

means for detecting the absolute value of the tunnel current signal (I_T);

means for servo-controlling a distance between said sample and probe using the absolute value with the servo time constant set larger than five times the period of the bias voltage;

means for obtaining information concerning the unevenness of said sample based on an output of said servo control means; and

means for effecting the analog operation to derive a differential conductance based on the tunnel current on the real time basis and measuring the unevenness data and differential conductance data on the real time basis with the distance between said sample and probe kept constant.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,154
PROCEDURE AND MEANS FOR MEASURING PAPER FORMATION

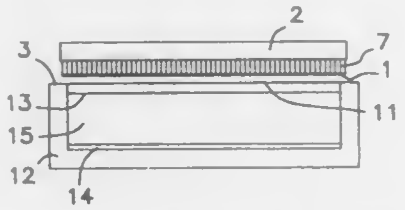
Risto Ritala, Helsinki; Mikko Laakso, and Jari Koponen, both of Espoo, Finland, assignors to Kagaani Elektroniikka OY, Kajaani, Finland

Filed Nov. 2, 1989, Ser. No. 430,670

Claims priority, application Finland, Nov. 3, 1988, 885067

Int. Cl.^{5} G01N *23/16*

U.S. Cl. 250—308 **14 Claims**



1. A procedure for measuring paper formation, wherein radiation is made to pass through a paper sample and the radiation that has passed through the paper is observed with a β radiation detector, for establishing a spectrum characterizing the formation of the sample, characterized in that for radiation source is used a linear β radiation source and that the β radiation that has passed through the paper is observed in one dimension with a position-sensitive wire chamber detector operating in limited streamer mode.

5,025,155
CHARGING DEVICE FOR ELECTROPHOTOGRAPHIC SYSTEMS

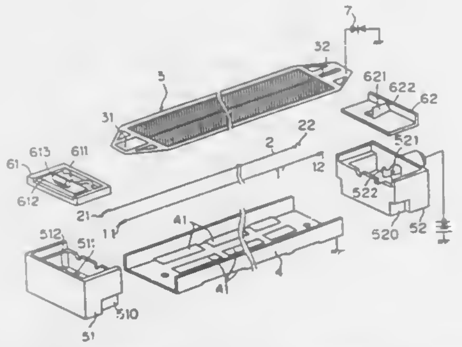
Yoshihiro Hatturi, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 10, 1989, Ser. No. 321,312

Claims priority, application Japan, Mar. 11, 1988, 63-58807

Int. Cl.^{5} H01T *19/04*

U.S. Cl. 250—326 **12 Claims**



1. A corona charging device for charging a surface of a moving member, the device comprising:

a plurality of wire electrodes extending in parallel with each other and axially with the moving member;

a high voltage power source for applying a high voltage to the wire electrodes so as to generate corona discharge; and

a grid electrode located between the moving member and the wire electrodes, wherein a distance between the grid electrode and the moving member is shortest immediately below the last downstream wire electrode with respect to the moving direction of the moving member.

5,025,156
RADIATION IMAGE READ-OUT APPARATUS

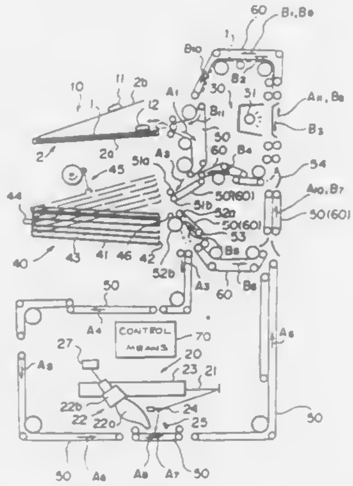
Makoto Ohgoda, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 246,483, Sep. 19, 1988, abandoned. This application Jan. 8, 1990, Ser. No. 462,183

Claims priority, application Japan, Sep. 17, 1987, 62-233423

Int. Cl.^{5} G03B *42/00*

U.S. Cl. 250—327.2 **7 Claims**



1. A radiation image read-out apparatus comprising:

(i) a cassette holding section for releasably holding a cassette which houses therein a stimulable phosphor sheet carrying a radiation image stored thereon, and feeding said stimulable phosphor sheet out of said cassette,

(ii) a read-out section for carrying out radiation image read-out by scanning said stimulable phosphor sheet by a light beam which causes said stimulable phosphor sheet to emit light carrying said radiation image stored on said stimulable phosphor sheet, and detecting the emitted light,

(iii) an erasing section for erasing radiation energy remaining on said stimulable phosphor sheet after the radiation image read-out from said stimulable phosphor sheet is finished at said read-out section,

(iv) a stacker capable of accommodating therein N-number of stimulable phosphor sheets and feeding out said accommodated stimulable phosphor sheets one by one,

(v) a first sheet conveyance means for conveying the stimulable phosphor sheet fed out of said cassette holding section into said stacker, and conveying the stimulable phosphor sheet fed out of said stacker to said read-out section and said erasing section,

(vi) a second sheet a conveyance means for conveying the stimulable phosphor sheet passing through said erasing section into said stacker, and conveying the stimulable phosphor sheet taken out of said stacker into the cassette at said cassette holding section, and

(vii) a control means for controlling the operation of said stacker and said first and second conveyance means so as to preset N−1 number of stimulable phosphor sheets which have been subjected to the erasing step in said stacker at the initial state, and to feed the stimulable phosphor sheet for the first cassette into said read-out section and feed one of the stimulable phosphor sheets out of the stacker into said fist cassette, and to feed the stimulable phosphor sheet form the second and subsequent cassettes into said stacker and feed one of the stimulable phosphor sheets out of the stacker into said second and the subsequent cassettes wherein said cassette holding section, read-out section, erasing section, and stacker are connected to a single reciprocating sheet conveyance path.

5,025,157
LIGHT SCANNING SYSTEM FOR A STIMULABLE SHEET INCLUDING VACUUM AND ROLLER SHEET HOLDING MEANS

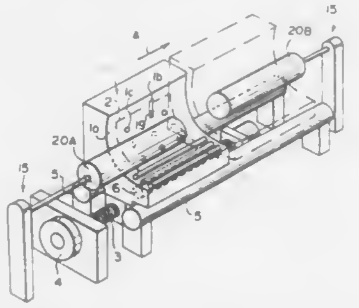
Muraishi Katsuaki, Kanagawa, Japan, assignor to Fuji Film Co., Ltd., Kanagawa, Japan

Filed Sep. 14, 1989, Ser. No. 408,014

Claims prinrity, application Japan, Sep. 14, 1988, 63-230598

Int. Cl.^{5} G03B *42/00*

U.S. Cl. 250—327.2 **3 Claims**



1. A light beam scanning system comprising a sheet holding means having a concave cylindrical sheet support surface on which a recording medium sheet is supported,

a sheet conveying means which conveys the recording medium sheet onto the sheet support surface and away from the same,

a suction means which draws the recording medium sheet against the sheet support surface by suction,

a scanning light beam source which emits a scanning light beam,

a spinner having a light deflector mirror which reflects the scanning light beam on the central axis of the cylindrical sheet support surface toward the recording medium sheet on the sheet support surface and a condenser lens system which converges the reflected scanning light beam on the recording medium sheet, the light deflector mirror and the condenser lens system being integrally rotated about the central axis of the cylindrical sheet support surface to cause the scanning light beam to scan the recording medium sheet in a main scanning direction,

a sub-scanning means which moves the sheet holding means in a sub-scanning direction parallel to the central axis relative to the spinner, and

a pair of holding rollers which are spaced from each other in the sub-scanning direction with the spinner intervening therebetween and are opposed to an intermediate portion of the sheet support surface at a distance slightly larger than the thickness of the recording medium sheet so that the recording medium sheet can be inserted between the rollers and the sheet support surface to attendantly prevent the recording medium sheet from lifting away from the sheet support surface beyond said distance, each of the holding rollers being fixedly supported relative to the spinner in the sub-scanning direction and being able to freely rotate about a rotational axis which is parallel to the central axis of the sheet support surface.

5,025,158
HYDROBALL DETECTOR STRING STEPPING DEVICE

Luciano Veronesi, O'Hara, and Douglas E. Ekeroth, Delmont, both of Pa., assignors to Westinghouse Electric Corp. Pittsburgh, Pa.

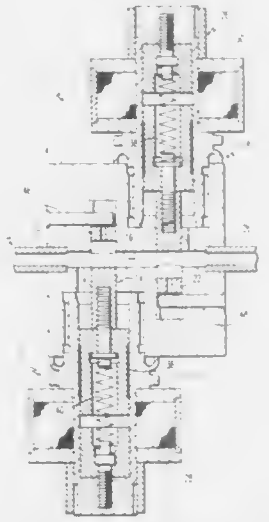
Filed Jan. 5, 1990, Ser. No. 461,576

Int. Cl.^{5} G21C *17/02*

U.S. Cl. 250—328 **12 Claims**

1. A stepping apparatus for advancing a hydroball detector string having a plurality of spaced apart balls on a cable and being movable in a direction of a counter through a tube under fluid pressure, comprising:

first and second gate means operably coupled to the tube upstream of the counter, for blocking movement of the spring without blocking fluid flow through the tube; and



actuator means for moving the first and second gate means in steps into and out of blocking positions in the tube to thereby advance the string one ball at a time to the counter.

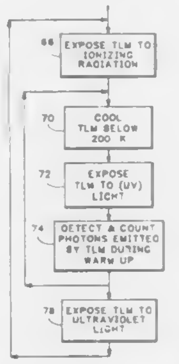
5,025,159
METHOD FOR DETECTING RADIATION DOSE UTILIZING THERMOLUMINESCENT MATERIAL

Steven D. Miller, Richland; Joseph C. McDonald, Pasco; Fred N. Eichner, Kennewick, and Paul L. Tomeraasen, Richland, all of Wash., assignors to Battelle Memorial Institute, Richland, Wash.

Continuation-in-part of Ser. No. 213,245, Jun. 29, 1988, Pat. No. 4,954,707. This application Oct. 11, 1989, Ser. No. 420,293

Int. Cl.^{5} G01T *1/115*

U.S. Cl. 250—337 **30 Claims**


66
EXPOSE TLM TO IONIZING RADIATION
70
COOL TLM BELOW 200 K
72
EXPOSE TLM TO (UV) LIGHT
74
DETECT & COUNT PHOTONS EMITTED BY TLM DURING WARM UP
78
EXPOSE TLM TO ULTRAVIOLET LIGHT

1. A method for measuring the dosage of ionizing radiation to which a thermoluminescent material has been exposed, comprising the steps of:

(a) cooling the thermoluminescent material down to a temperature substantially below 200 K,

(b) exposing the thermoluminescent material to ultraviolet light in order to photoconvert high temperature traps to low temperature traps, and

(c) detecting light released by the thermoluminescent material as it is allowed to warm.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,160
MEASUREMENT OF FLOW VELOCITY AND MASS FLOWRATE

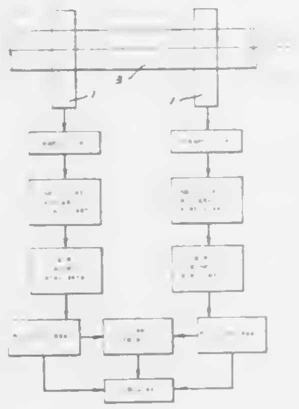
John S. Watt, New South Wales, Australia, assignor to Commonwealth Scientific and Industrial Research Organisation, Australia

Filed May 31, 1989, Ser. No. 359,377

Claims priority, application Australia, Jun. 3, 1988, 8611

Int. Cl.⁵ G01F *1/00*

U.S. Cl. 250—356.1 **22 Claims**



1. A method for measuring liquid flow velocity of a multiphase flow containing at least two liquid phases, said method comprising:

(i) passing said flow through a tube;

(ii) measuring at a first location the intensities of gamma-rays transmitted through a first volume of said flow at two different gamma-ray energies, at least one of said gamma-ray energies having substantially different mass absorption coefficients in each of said two liquids, and obtaining a time varying measurement indicative of the ratio of the mass absorption co-efficients of the first volume at said two energies;

(iii) measuring at a second location spaced from the first location in the direction of said flow the intensities of gamma-rays transmitted through a second volume of said flow at said two different gamma-ray energies and obtaining a time varying measurement indicative of the ratio of the mass absorption co-efficients of said second volume at said two energies;

(iv) cross correlating the time varying measurements obtained at said first and second locations to derive a liquid flow transmit time; and

(v) calculating said liquid flow velocity from the transit time and the spacing of said first and second locations.

5,025,161
DETECTING MULTIPLE PHASES IN LIQUID SCINTILLATION SAMPLES

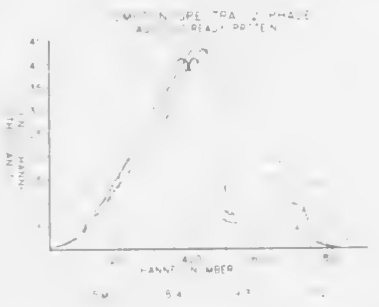
Charles L. Dodson, Orange, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Jul. 27, 1989, Ser. No. 386,303

Int. Cl.⁵ G01T *1/204*

U.S. Cl. 250—364 **29 Claims**

1. Apparatus for determining the phase content of a liquid scintillation sample comprising means for transforming at least a substantial portion of a Compton spectrum of data into a different geometric space, means for establishing a predetermined parameter in the selected geometric space, the predetermined parameter being indicative of the phase content of the sample, and means for comparing the data in the different geometric space to the predetermined parameter thereby to provide a determination of the phase content of the sample.



5,025,162
METHOD AND DEVICE FOR DETERMINING THE DISTRIBUTION OF β RAYS EMERGING FROM A SURFACE

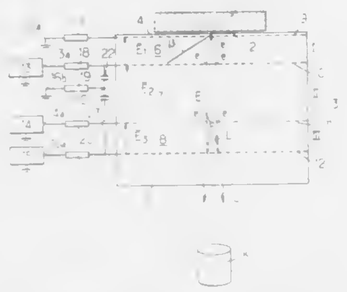
Georges Charpak, Paris, France, assignor to Biospace Instruments, Paris, France

Filed Apr. 25, 1990, Ser. No. 514,437

Claims priority, application France, Apr. 27, 1989, 89 05605

Int. Cl.⁵ G01T *1/185*

U.S. Cl. 250—385.2 **7 Claims**



1. Method for determining a distribution of β rays emerging from a surface,

which consists in causing these β rays to pass through:

a first substantially proportional preamplification stage formed by a first chamber defined by first and second electrode grids parallel to each other and between which a DC voltage is applied, in which the first electrode grid forms a cathode and said β ray emitting surface is applied thereagainst;

a second transfer stage formed by a second chamber disposed between the second electrode grid which forms an anode and a third electrode grid parallel to the second electrode grid and biased positively with respect thereto; and

a third multiplication stage formed by a third chamber disposed between the third electrode grid and a fourth electrode grid biased anodically by means of a DC voltage relatively to this third electrode grid;

these three chambers being filled with at least one gas;

and which is characterized in that

on the one hand, impedance coupling is provided between these four electrode grids, and

on the other hand, said at least one gas is chosen so that in an automatic way due to said impedance coupling the sparks produced by multiplication in the third chamber cannot, under the effect of the return of ions through the transfer stage to the first electrode grid of the first chamber cause a permanent discharge, and in that said sparks are in the form of brilliant localized points on a surface of the first electrode grid.

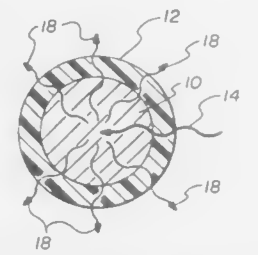
5,025,163
RADIOGRAPHIC IMAGING SCREEN

Frederick J. Jeffers, Escondido, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 1, 1989, Ser. No. 444,507

Int. Cl.⁵ G21K *4/00*

U.S. Cl. 250—483.1 **8 Claims**



1. A radiographic imaging screen comprising:

a substrate transparent to incident radiation photons;

a composite layer formed on a surface of the substrate including

(a) a substantially uniform distribution of discrete high-Z metal particles adapted to generate secondary electron emissions in any direction from the particle in response to incident high energy radiation photons; and

(b) electron responsive luminescent material completely surrounding and in direct contact with said discrete metal particles in the layer such that secondary electrons emitted from the metal particles encounter the luminescent material regardless of the direction of emission from the particles to thereby enable the generation of visible light photons therefrom.

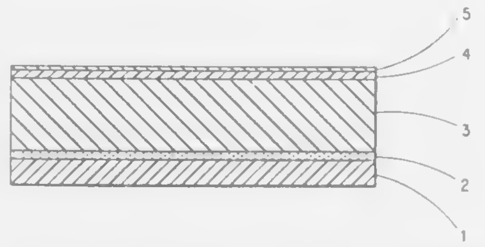
5,025,164
ANTISTATIC LEAD SCREENS FOR USE WITH X-RAY FILMS

Lloyd G. Sidwell, and Conrad E. Miller, both of Hendersonville, N.C., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 7, 1990, Ser. No. 490,071

Int. Cl.⁵ G03B *42/00;* **G03C** *5/17;* **G21K** *4/00*

U.S. Cl. 250—483.1 **4 Claims**



1. A lead absorbing screen for an X-ray photographic element which comprises a flexible, polymeric support; an adhesive layer applied to said support; a flexible layer of lead or lead oxide dispersed in a binder and applied over said adhesive layer; and an overcoat layer applied over said flexible layer; the improvement comprises overcoat layer containing on its surface a sufficient amount of a fluorosurfactant to reduce the propensity of the screen to produce static.

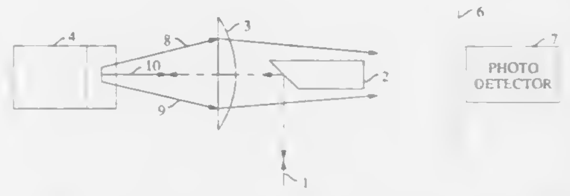
5,025,165
METHOD FOR PRODUCING A SEMICONDUCTOR DEVICE USING AN ELECTRON BEAM EXPOSURE TOOL AND APPARATUS FOR PRODUCING THE DEVICE

Chin-Chin Chen, Scotch Plains, N.J.; Martin Feldman, Baton Rouge, La., and Herbert A. Waggener, Pottersville, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 26, 1990, Ser. No. 499,153

Int. Cl.⁵ H01J *37/20*

U.S. Cl. 250—491.1 **9 Claims**



1. Method of producing a semiconductor device comprising:

a) providing a semiconductor body with a processing layer and at least one alignment mark on a major surface of the body;

b) introducing the body into an electron beam exposure tool, associated with the exposure tool being an electron beam reference axis;

c) aligning the body with respect to the electron beam reference axis;

d) exposing, in the exposure tool, a selected portion of the processing layer to an electron beam; and

e) carrying out one or more further steps toward completion of the semiconductor device;

characterized in that

the alignment mark on the body comprises a diffraction grating,

the electron beam exposure tool comprises optical alignment means, step (c) comprises

f) aligning the body relative to a beam of optical radiation associated with the optical alignment means, the beam of optical radiation being a predetermined distance in a predetermined direction from the electron beam reference axis; and further comprises

g) moving the body in the electron beam exposure tool such that the selected portion of the processing layer is aligned to the electron beam reference axis; and

step f) comprises diffracting light from the alignment mark, with the diffracted light comprising +1,0, and −1 orders of diffraction; spatially filtering the diffracted light, and detecting the +1, −1 diffracted orders of the spatially filtered light.

5,025,166
EXPOSURE APPARATUS FOR COLOR CATHODE RAY TUBES

Yukitaka Miyata, Kanagawa; Hiroyuki Wada, Chiba, and Takashi Nishimura, Saitama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 29, 1989, Ser. No. 459,429

Claims priority, application Japan, Feb. 1, 1989, 1-023274

Int. Cl.⁵ G03B *27/00*

U.S. Cl. 250—492.1 **7 Claims**

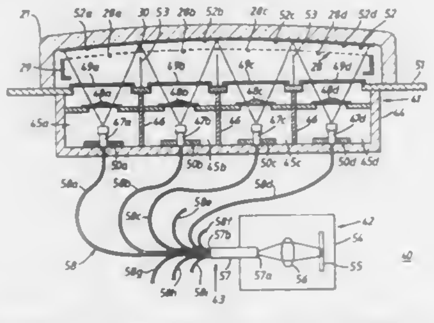
1. An exposure apparatus for color cathode ray tubes having a single faceplate with a phosphor screen on an inner surface thereof comprising:

light source means including an initial light source for emitting ultraviolet light;

exposure means including a base for supporting the faceplate with a photosensitive layer formed on the inner surface thereof to form the phosphor screen and having a plurality of sub-regions, a plurality of secondary light sources emit-

VOL
1127
ISS
3
JE
18
1991
UMI

ting exposure light for exposing respective sub-regions of the photosensitive layer, and moving means for shifting each position of the secondary light sources at predetermined positions; and



light distribution means for equally distributing a part of ultraviolet light emitted from the light source means to the secondary light sources.

5,025,167
ION IMPLANTATION APPARATUS

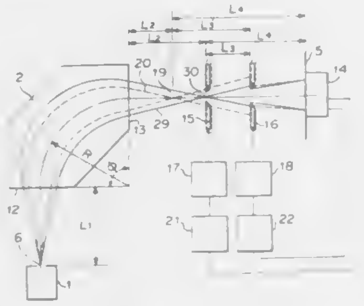
Soichiro Okuda; Tetsuya Nakanishi; Shigeo Sasaki, and Kazuhiko Noguchi, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 6, 1990, Ser. No. 533,769

Claims priority, application Japan, Jun. 6, 1989, 64-144967; Nov. 24, 1989, 64-305122

Int. Cl.^{5} H01J *37/317, 37/145*

U.S. Cl. 250—492.2 **6 Claims**



1. An ion implantation apparatus which comprises:

an ion beam measuring device to measure and analyze the shape of a beam projected on a substrate for ion implantation and the quantity of current obtained by the ion beam,

an analyzing slit member having an opening whose width is changeable, which is located in the ion beam track to extract only implantation ions, and

a shaping slit member having an opening whose width is changeable, which is located behind the analyzing slit member to determine the shape of beam to be projected on the substrate for ion implantation, wherein the widths of the openings of the analyzing slit member and the shaping slit member are changed on the basis of the shape of the beam and the quantity of current obtained as a result of the measurement by the ion beam measuring device.

5,025,168
ALIGNMENT APPARATUS INCLUDING THREE BEAMS AND THREE GRATINGS

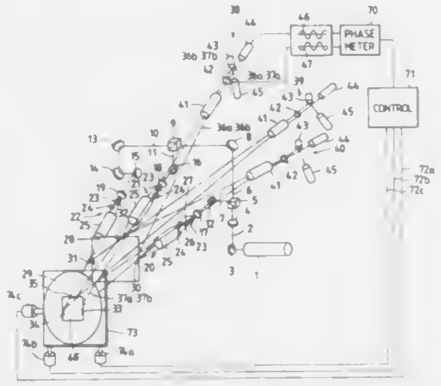
Shinichiro Aoki; Takeo Sato, both of Kawasaki; Katsumasa Yamaguchi, Sagamihara, and Masaki Yamamoto, Tokyo, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 3, 1990, Ser. No. 518,420

Claims priority, application Japan, May 12, 1989, 1-118986

Int. Cl.^{5} G01N *21/86;* **G01V** *9/04*

U.S. Cl. 250—548 **10 Claims**



1. An apparatus for aligning a mask and a wafer comprising:

a light source emitting light having two components which have slightly-different frequencies and which have different planes of polarization;

means for separating the light emitted from the light source into first, second, and third light parts travelling along different paths respectively;

first, second, and third reference gratings diffracting the first, second, and third light parts respectively;

first, second, and third illumination optical systems selectively transmitting the diffracted first, second, and third light parts coming from the first, second, and third gratings respectively;

first, second, and third mark gratings formed on the mask and illuminated with the first, second, and third light parts coming from the first, second, and third illumination systems respectively, wherein the first, second, and third mark gratings on the mask diffract the first, second, and third light parts coming from the first, second, and third illumination systems respectively, wherein the first and second mark gratings on the mask are directed in parallel, and wherein the third mark grating on the mask is directed perpendicular to the first and second mark gratings on the mask;

first, second, and third mark gratings formed on the wafer in correspondence with the first, second, and third mark gratings on the mask and illuminated with the first, second, and third light parts coming from the first, second, and third illumination systems respectively, wherein the first, second, and third mark gratings on the wafer diffract the first, second, and third light parts coming from the first, second, and third illumination systems respectively, wherein the first and second mark gratings on the wafer are directed in parallel, and wherein the third mark grating on the wafer is directed perpendicular to the first and second mark gratings on the wafer;

a first detecting device detecting first optical beat signals of the diffracted lights coming from the first mark grating on the mask and the first mark grating on the wafer, the first optical beat signals representing a positional error between the mask and the wafer;

means for comparing phases of the first detected beat signals and generating a first control signal dependent on a difference between the phases of the first beat signals;

a second detecting device detecting second optical beat signals of the diffracted lights coming from the second mark grating on the mask and the second mark grating on the wafer, the second optical beat signals representing a positional error between the mask and the wafer;

means for comparing phases of the second detected beat signals and generating a second control signal dependent on a difference between the phases of the second beat signals;

a third detecting device detecting third optical beat signals of the diffracted lights coming from the third mark grating on the mask and the third mark grating on the wafer, the third optical beat signals representing a positional error between the mask and the wafer;

means for comparing phases of the third detected beat signals and generating a third control signal dependent on a difference between the phases of the third beat signals; and

means for adjusting relative positions of the mask and the wafer in accordance with the first, second, and third control signals.

5,025,169
SENSOR IN IC FORMATION

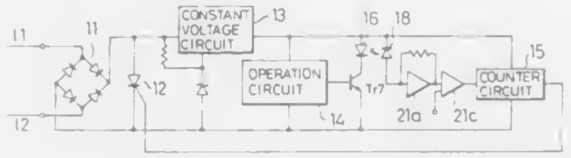
Masao Arakawa; Tomizo Terasawa; Masanobu Ogawa, and Hironori Kami, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Kadoma, Japan

Filed Oct. 18, 1989, Ser. No. 423,235

Claims priority, application Japan, Oct. 21, 1988, 63-265610

Int. Cl.^{5} G01N *15/06*

U.S. Cl. 250—574 **10 Claims**



1. A sensor in an IC formation, which comprises sensor circuit lines connected to a switching means for short-circuiting between the lines and a power source means for taking a power source voltage out of the lines, the power source means being connected at its post stage to an intermittent operating means, light emitting means and driving means for said light emitting means, the intermittent operating means being arranged to intermittently actuate the light emitting means, a light receiving means disposed for receiving a faint pulsed light generated by scattering of light emitted from said light emitting means, a comparing means of signals received as amplified from said light receiving means together with a reference signal, and a counter means for providing a trigger signal to said switching means in response to an output signal from said comparison means, wherein constituent elements of respective said means are in said IC formation and formed as integrated circuits on a dielectric isolation substrate.

5,025,170
UNDERWATER MAGNETIC SWITCH FOR ELECTRICAL CABLE TRANSMITTING A.C. ELECTRICAL CURRENT

Owen W. Sutton, San Diego, Calif., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 30, 1990, Ser. No. 516,964

Int. Cl.^{5} H01H *36/00*

U.S. Cl. 307—116 **4 Claims**

1. An underwater magnetic switch for electrical cable transmitting A.C. electrical current comprising:

a predetermined length of underwater electrical cable having a front end and a rear end;

at least three primary electrical conductors passing longitudinally through said cable from its front end to its rear end;

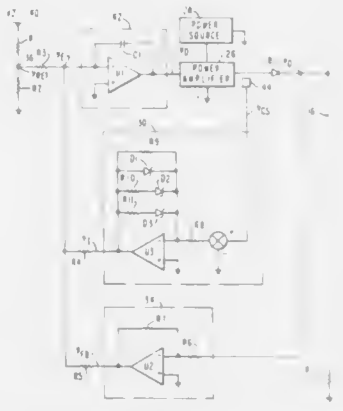
the first of said primary electrical conductors having a magnetic reed switch in the circuit intermediate its ends, said magnetic reed switch having first and second connection terminals;

the second of said primary electrical conductors being a current carrying conductor;

the third of said primary electrical conductors being a ground wire;

a triac having a source of electrical current input connection terminal, a load connection terminal and a trigger terminal;

the trigger terminal of said triac being electrically connected to the first connection terminal of said magnetic reed switch, the input terminal of said triac being connected to said first primary electrical conductor, the load connection terminal of said triac being connected to said first primary electrical conductor;



said second connection terminal of said magnetic reed switch being electrically connected to said first primary electrical conductor prior to the conductors connection to the input terminal of said triac;

said magnetic reed switch, said triac and a predetermined portion of said three primary electrical conductors being surrounded by an elongated tubular waterproof casing and said casing is filled with a hardened epoxy resin; and

a tubular collar, having a magnet mounted thereon, surround said tubular casing and it is mounted thereon so that it can be reciprocally moved to respective positions for opening and closing said magnetic reed switch.

5,025,171
METHOD AND ARRANGEMENT FOR PROVIDING POWER OPERATION OF SWITCHGEAR APPARATUS

Thomas O. Fanta, Melrose Park, and Leonard V. Chabala, Maywood, both of Ill., assignors to S&C Electric Company, Chicago, Ill.

Filed Sep. 22, 1989, Ser. No. 411,274

Int. Cl.^{5} H02B *1/04*

U.S. Cl. 307—150 **14 Claims**

1. A kit of component parts capable of being assembled with either an existing, installed switchgear arrangement or during manufacture of the switchgear arrangement to provide power operation of the switchgear, the switchgear including energizable input connections, an enclosure having predetermined components, one or more switches, each of the switches having a respective switch-operating shaft that extends through the enclosure, the switch-operating shaft being rotatable to operate a respective switch, the kit comprising:

first switch-operator means including a switch-operator enclosure, rechargeable power supply means, and drive output means defining a drive output for coupling to the switch-operating shaft;

means for attaching said first switch-operator means to the switchgear enclosure in a predetermined configuration about the switch-operating shaft;

power-deriving means adapted to be attached to a predeter-

VOL
1127
ISS
3
JE
18
1991
UMI

mined component of the switchgear apparatus and including an input for connection to energized portions of the switchgear for providing at a predetermined output power that is derived from the energized switchgear; and

means for connecting the output of said power-deriving means to said first switch-operator means.

5,025,172

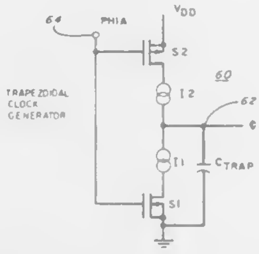
CLOCK GENERATOR GENERATING TRAPEZOIDAL WAVEFORM

Kenneth J. Carroll, San Jose, and Benjamin D. Pless, Menlo Park, both of Calif., assignors to Ventritex, Inc., Sunnyvale, Calif.

Division of Ser. No. 354,632, May 19, 1989. This application Feb. 8, 1990, Ser. No. 476,932

Int. Cl.^{5} H03K *5/00, 5/13*

U.S. Cl. 307—261 **6 Claims**



1. A clock generator for generating a trapezoidal clock waveform comprising:

first MOS switch means having a first end and a second end;

first current source means having a first end connected to the first end of said first switch means and a second means connected to an output node;

second MOS switch means having a first end and a second end;

second current source means having a first end connected to the first end of said second switch means and a second end connected to the output node;

the second end of said second MOS switch means being connected to an upper supply potential and the second end of said first MOS switch means being connected to a lower supply potential;

said first and second MOS switch means being responsive to a periodic control signal for turning on and off same; and

capacitor means coupled between the output node and the lower supply potential and being responsive to said first and second MOS switch means for producing a trapezoidal clock waveform.

5,025,173

EFM-SIGNAL COMPARATOR

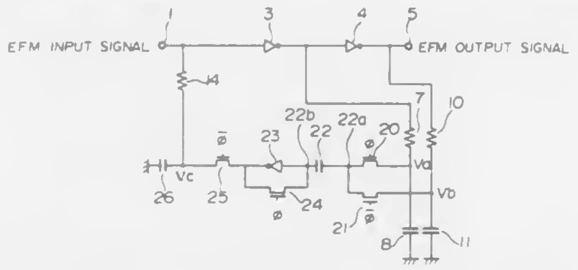
Takashi Ubayama; Eiichi Suzuki, and Morito Morishima, all of Hamamatsu, Japan, assignors to Yamaba Corporation, Hamamatsu, Japan

Filed Sep. 7, 1989, Ser. No. 403,826

Claims priority, application Japan, Sep. 8, 1988, 63-225454

Int. Cl.^{5} H03K *5/04*

U.S. Cl. 307—265 **5 Claims**



1. An EFM-signal comparator which superposes a direct voltage on an input EFM signal, and produces a square wave of a predetermined duty cycle by comparing the superposed signal of the direct voltage and the input EFM signal with a predetermined threshold voltage, said EFM-signal comparator comprising:

primary direct-voltage-output means which produces a direct voltage corresponding to a duration of a first level of said square wave;

secondary direct-voltage-output means which produces a direct voltage corresponding to a duration of a second level of said square wave, said second level being different from said first level;

switching means which selectively outputs one of said direct voltages either from said primary direct-voltage-output means or from said secondary direct-voltage-output means;

voltage-output means which outputs a voltage corresponding to the direct voltage outputted from said switching means; and

smoothing means which smoothes and superposes said voltage outputted from said voltage-output means on said input EFM signal.

5,025,174

FLIP-FLOP CIRCUIT

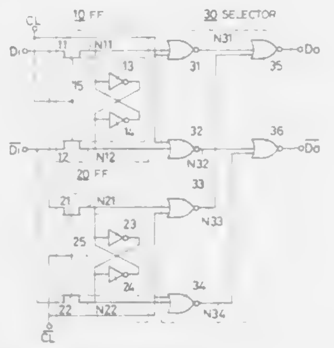
Makoto Shikata, Tokyo, Japan, assignor to Oki Electric Industry Ço., Ltd., Tokyo, Japan

Filed Feb. 21, 1989, Ser. No. 313,077

Claims priority, application Japan, Feb. 29, 1988, 63-47047

Int. Cl.^{5} H03K *3/289, 3/26, 3/29*

U.S. Cl. 307—272.2 **19 Claims**



1. A flip-flop circuit comprising:

first and second flip-flops each having respective first and second output nodes;

said first flip-flop being coupled for latching input data and inverted input data in synchronization with a clock signal and an inverted clock signal and for generating a first output signal and a first inverted output signal at said first output node and said second output node of said first flip-flop;

said second flip-flop being coupled for latching input data and inverted input data in synchronization with said inverted clock signal and clock signal and generating a second output signal and a second inverted output signal at said first output node and said second output node of said second flip-flop; and

a selector circuit coupled to said first and second flip-flops for selecting and outputting said first output signal and first inverted output signal responsive to said clock signal and selecting and outputting said second output signal and second inverted output signal responsive to said inverted clock signal;

wherein said first flip-flop comprises first and second transfer gates coupled for receiving said input data and inverted input data, respectively, responsive to said clock siganl, and first and second inverters cross-coupled across the output node of said first and second transfer gates, said output nodes of said first and second transfer gates comprising said first and second output nodes of said first flip-flop; and

wherein said second flip-flop comprises third and fourth transfer gates coupled for receiving said data and inverted input data, respectively, responsive to said inverted clock signal, and third and fourth inverters cross-coupled across the output nodes of said third and fourth transfer gates, said output nodes of said first and second transfer gates comprising said first and second output nodes of said second flip-flop.

5,025,175

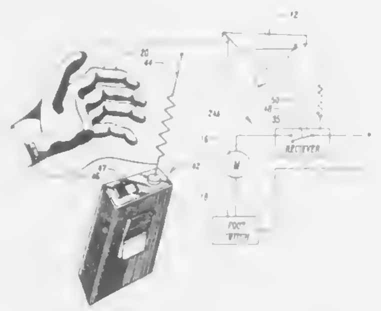
SAFETY MEANS FOR POWERED MACHINERY

Gerald N. Dubois, III, Pleasant Hill, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa

Filed Oct. 10, 1989, Ser. No. 419,124

Int. Cl.^{5} F16P *3/00;* **B26D** *7/22;* **A22C** *17/12;* **A22B** *5/16*

U.S. Cl. 307—326 **4 Claims**



1. A safety means for powered machinery, comprising,

a safety glove adapted for wearing by a machine operator, said glove having an electroconducting surface,

an electrically powered machine having a grounded frame, an electrical motor, and a control switch, said electrical motor being connected to a source of electrical energy through said control switch,

a control safety circuit connecting said glove and said motor, and bypassing said control switch, and including a circuit breaking means, whereby said circuit breaking means will open and deprive said motor from electrical power whenever the electroconducting surface of said glove comes into contact with said grounded frame,

said electroconductive surface of said glove being the antenna of a radio transmitter worn by said operator, and said circuit breaking means including a radio receiver means, whereby said circuit breaking means will remain closed when receiving a radio signal, but will open when said antenna is connected to said grounded frame through contact between said grounded frame and said electroconducting surface of said safety glove to interrupt the transmission of a radio signal from said radio transmitter to said radio receiver means, whereupon the supply of electrical power to said electrical motor will cease.

5,025,176

PEAK LEVEL DETECTION CIRCUIT

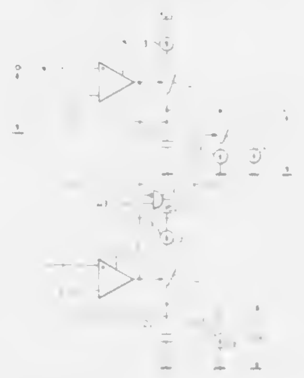
Minoru Takeno, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jan. 30, 1990, Ser. No. 472,151

Claims priority, application Japan, Jan. 31, 1989, 1-21318

Int. Cl.^{5} H03K *5/153*

U.S. Cl. 307—351 **11 Claims**



1. A peak level detection circuit comprising:

a first means for successively holding peak levels of pulses of input pulse trains by charging or discharging a capacitor in accordance with the peak levels of the pulses of the input pulse trains and for outputting the peak levels held as detection results of the peak level detection circuit;

a second means for detecting the peak levels of pulses of said input pulse trains and for generating a pulse detecting signal which indicates if the pulses exist or not; and

a third means for monitoring said pulse detection signals from said second means and for controlling said capacitor of said first means such that each time an input pulse train appears, a last peak level charged in the capacitor is reduced.

5,025,177

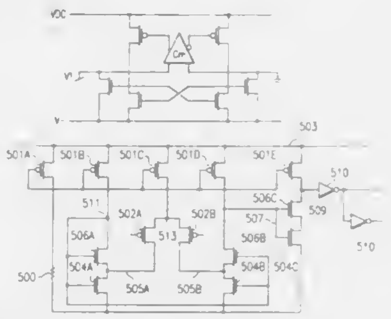
SENSITIVE LOW POWER COMPARATOR

Robert W. Mounger, Dallas, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Jul. 28, 1989, Ser. No. 387,471

Int. Cl.^{5} H03K *5/24*

U.S. Cl. 307—355 **6 Claims**



1. A MOS circuit, comprising:

P-channel first and second transistors, respective gates of said first and second transistors being connected to respective ones of a differential pair of input signals;

first, second, and third current sources,

current from said first current source being sinked through an N-channel third and fourth transistors connected in series,

current from said third current source being sinked

VOL
1127
ISS
3
JE
18
1991
UMI

through an N-channel fifth and sixth transistors connected in series,

the sources of both said first and second transistors being commonly connected to jointly sink current from said second current source, the drain of said first transistor being connected to a node between said fourth and third transistors, and the drain of said second transistor being connected to a node between said sixth and fifth transistors, so that input signals can steer current from said second current source into either said third transistor or said fifth transistor;

the drain of said fourth transistor being commonly connected to provide a gate voltage to said third, fourth, and sixth transistors,

said fourth and sixth transistors having substantially identical widths and lengths, and said third and fifth transistors having substantially identical widths and lengths;

and wherein the drain voltage of said sixth transistor is commonly connected to proivde an analog output voltage.

5,025,178

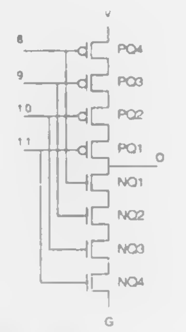
FAULT-RESISTANT SOLID-STATE LINE DRIVER

Patrick O. Nunally, Diamond Bar, Calif., assignor to General Dynamics Corp., Pomona Div., Pomona, Calif.

Filed Oct. 18, 1988, Ser. No. 259,386

Int. Cl.^{5} H03K *19/007, 17/687, 19/094, 17/60*

U.S. Cl. 307—442 **5 Claims**



1. An improved, fault-resistant line driver comprising:

a pair of P-type transistors connected in series between a bus output and a voltage source;

a pair of N-type transistors connected in series between the bus output and a connection to ground;

a first input line connecting both the gate of the P-type transistor closest to the voltage source and the gate of the N-type transistor closest to the bus output; and

a second input line connecting both the gate of the P-type transistor closest to the bus output and the gate of the N-type transistor closest to the connection to the ground.

5,025,179

ECL CLAMPED CUTOFF DRIVER CIRCUIT

Oscar W. Freitas, Portland, Me., assignor to National Semiconductor Corporation, Santa Clara, Calif.

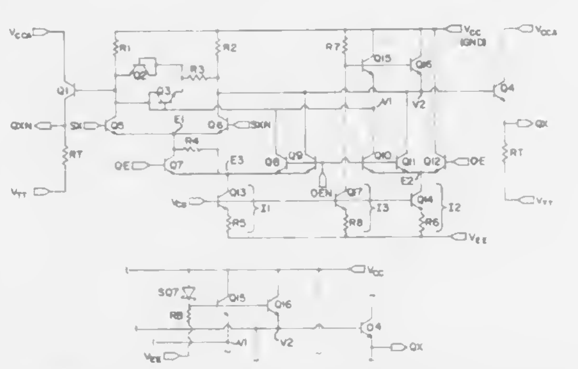
Filed Sep. 15, 1989, Ser. No. 407,544

Int. Cl.^{5} H03K *19/86, 5/12, 3/01*

U.S. Cl. 307—455 **26 Claims**

1. An ECL cutoff driver circuit for an ECL gate coupled between ECL high and low potential power rails, said ECL gate having differential input first and second gate transistor elements with differential signal inputs, said ECL gate having at least one output node (V1, V2) at a collector node of one of the first and second gate transistor elements, said output node being coupled to an ECL output (QXN, QX) by an output buffer transistor circuit for delivering ECL output signals of high and low potential levels V_{OH} and V_{OL} at the ECL output during operation of the ECL gate in a switching mode, said ECL cutoff driver circuit being operatively coupled to said output node for shifting down the ECL output to a cutoff potential level having a maximum upper value V_{OLZ} in a cutoff state, said ECL cutoff driver circuit comprising:

cutoff clamp circuit means comprising voltage drop components operatively coupled in series between the ECL high potential power rail and said output node (V1, V2) for clamping the ECL output (QXN, QX) at a voltage level having a minimum lower value substantially at said cutoff voltage level V_{OLZ} in the cutoff state for the fast return of the ECL gate to operation in the switching mode.



5,025,180

TTL TO ECL VOLTAGE LEVEL TRANSLATOR

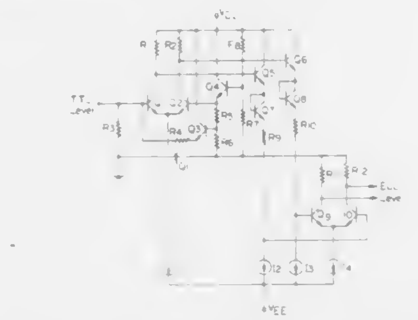
Heung S. Kim, Inchon, and Chan K. Myung, Seoul, both of Rep. of Korea, assignors to SamSung Semiconductor and Telecommunication Co. Ltd., Gumi, Rep. of Korea

Filed Jul. 5, 1988, Ser. No. 215,294

Claims priority, application Rep. of Korea, Jul. 7, 1987, 87-7260

Int. Cl.^{5} H03K *19/092, 19/086*

U.S. Cl. 307—475 **7 Claims**



1. A TTL to ECL signal translator circuit for interfacing between a TTL transfer-circuit and an ECL receive-circuit to translate a transfer-circuit signal, which varies between a first TTL input voltage level and a second TTL input voltage level, into an ECL level signal, which varies between a first ECL output voltage level and a second ECL output voltage level, which is compatible with said ECL receive-circuit, the circuit comprising:

reference voltage means for providing a reference voltage at a level between said first TTL input voltage level and said second TTL voltage level;

comparator means for comparing said reference voltage to said transfer-circuit signal and for generating a comparison signal which corresponds to said comparison;

voltage level shift means for converting said comparison signal into a level shifted signal varying between a first voltage level and a second voltage level wherein said level shifted signal is in phase with said transfer-circuit signal; and

active pull down means, operatively coupled to said reference voltage means, for selectively injecting current into said transfer-circuit when the transfer-circuit signal voltage level is the lower of said first TTL input voltage level or said second TTL input voltage level.

5,025,181

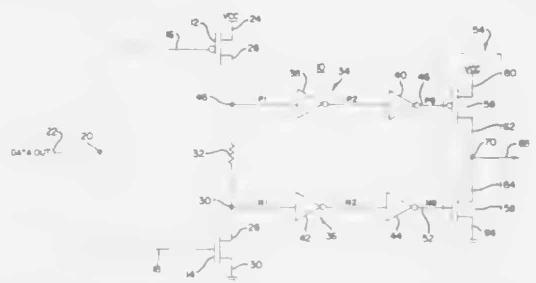
APPARATUS FOR GENERATING DIGITAL GATING SIGNALS IN RESPONSE TO A DIGITAL DATA SIGNAL

Charles Farmer, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Aug. 31, 1990, Ser. No. 576,060

Int. Cl.^{5} H03K *19/094*

U.S. Cl. 307—571 **4 Claims**



1. An apparatus for generating a pair of digital gating signals in response to a digital data signal, the apparatus comprising:

a first and a second digital switching means for switching digital signals;

a resistive means for establishing resistance in a circuit path; and

first and second threshold means for generating digital signals when receiving an input signal which exceeds a preestablished threshold value;

said first and second digital switching means commonly receiving said data signal at their respective gates;

said first digital switching means being operatively connected between a voltage source and said resistive means and generating a first gating signal of said pair of gating signals intermediate said first digital switching means and said resistive means;

said second digital switching means being operatively connected between said resistive means and ground and generating a second gating signal of said pair of gating signals intermediate said resistive means and said second digital switching means;

said first threshold means having a first preestablished threshold value receiving said first gating signal as said input signal, and generating a first digital signal representative of said first gating signal;

said second threshold means having a second preestablished threshold value, receiving said second gating signal as said input signal, and generating a second digital signal representative of said second gating signal;

said first digital switching means being configured as a pull-up digital switch, said second switching means being configured as a pull-down digital switch, and said first preestablished threshold value being lower than said second preestablished threshold value.

5,025,182

DIGITAL APPARATUS FOR GENERATING GATING SIGNALS IN RESPONSE TO A DATA SIGNAL

Charles Farmer, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Aug. 31, 1990, Ser. No. 576,610

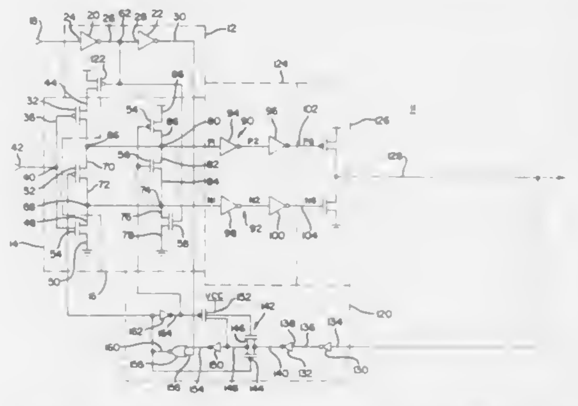
Int. Cl.^{5} H03K *19/094*

U.S. Cl. 307—571 **4 Claims**

1. A digital apparatus for generating digital gating signals in response to a data signal, said digital gating signals comprising a first gating signal and a second gating signal, said first gating signal and said second gating signal being selectively isolatable from each other according to a state signal; the apparatus comprising:

a gate signal means for receiving said data signal and generating said first and second gating signals, said first gating signal being presented on a first line, said second gating signal being presented on a second line;

a state input means for receiving said state signal and distributing a plurality of control signals to the apparatus, each of said plurality of control signals being representative of said state signal; and



an override means for imposing values on said first line and said second line, said imposing being effected in response to said control signals, said override means electrically isolating said first line and said second line in response to said control signals.

5,025,183

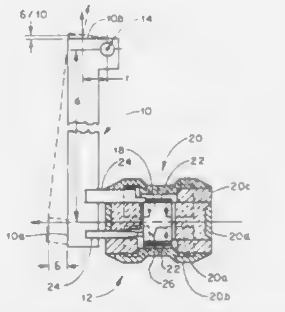
ELECTROMAGNETIC ACTUATOR DRIVER APPARATUS WITH PIVOT AXIS

Anthony N. Fuschetto, W. Redding, Conn., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 17, 1989, Ser. No. 353,121

Int. Cl.^{5} H02K *41/02;* **B23Q** *1/00;* **G02B** *26/00*

U.S. Cl. 310—20 **5 Claims**



1. A slidable electromagnetic actuator driver apparatus comprising in combination:

a drive arm having an input end and an output end, said drive arm operatively connected to a pivot axis for rotation thereabout, said drive arm having a predetermined length, said pivot axis being spaced a predetermined distance from the centerline of said drive arm, and

means for electrromagnetically driving said drive arm from a rest position to a displaced position, said electromagnetic drive means being responsive to a control signal to slidably displace said drive arm a predetermined amount, said electromagnetic drive means comprises an electrically actuated bobbin unit including a predetermined number of bobbin fingers extending in opposite directions away from the central portion of said bobbin unit, said central portion of said bobbin unit including means for receiving said

VOL
1127
ISS
3
JE
18
1991
UMI

control signal, and a magnetic flux generating means operatively engaged with said bobbin unit, said magnetic flux generating means generating a magnetic flux which operatively engages said central portion of said bobbin unit, said bobbin unit in response to said control signal and said magnetic flux operating to displace said drive arm, said magnetic flux generating means comprises:

an inner pole, said inner pole comprising a magnetic material, said inner pole having a substantially solid cylinder structure,

an outer pole having a substantially cylindrical shape, said outer pole having a first and second member, said first and second members being operatively engaged to form said outer pole, said outer pole surrounding said inner pole completely, said outer pole substantially enclosing said bobbin unit therein,

first and second permanent magnet means, said first and second permanent magnet means respectively having a cylindrical shape, said first and second permanent magnetic means operatively positioned respectively in said first and second member, said first and second permanent magnet means operatively positioned to respectively surround said inner pole, said outer pole surrounding said permanent magnet means, and

first and second bias end magnets operatively aligned with said inner pole inside the outer end of said permanent magnet means.

5,025,184
SMALL-SIZED ELECTRIC MOTOR

Shuji Sekine, and Naoto Harada, both of Yokohama, Japan, assignors to Jidoshi Denki Kogyo K.K., Kanagawa, Japan

Filed Mar. 13, 1990, Ser. No. 493,047

Claims priority, application Japan, Mar. 14, 1989, 1-28885[U]

Int. Cl.⁵ H02K *11/00, 7/10, 5/10*

U.S. Cl. 310—71 **1 Claim**

1. A small-sized electric motor comprising:

a gear case having an end bracket;

a holder base provided with a brush and fitted to said end bracket;

a pair of plate terminals provided to said holder base, connected with said brush at the base ends thereof and protruding through the end bracket in the opposite direction of the holder base at the tip ends thereof;

a sealing member fitted on the tip ends of said plate terminals;

a terminal container part formed in one body with the gear case contiguously to said end bracket for housing the tip ends of said plate terminals; and a container cover for covering said terminal container part;

said terminal container part being provided with a container-side projection having a tapered face inclined to the end bracket side;

said container cover being provided with a cover-side projection having a tapered face forming a lower pair with the tapered face of the container-side projection provided to said terminal container part and a sealing member-pressing face on the reverse side of said tapered face of the cover-side projection; and

said sealing member being pressed toward the end bracket with the sealing member-pressing face of the cover-side projection provided to the container cover by a lower pair of said both tapered faces at the state of connecting lead wires for power supply to the tip ends of said plate terminals and covering the terminal container part with said container cover.

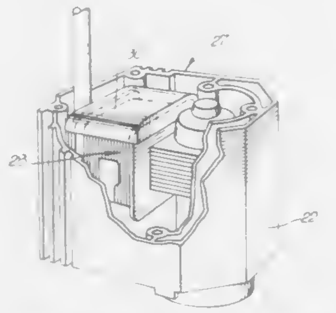
5,025,185
BUBBLE TRAP FOR EPOXY SEALANT IN A SUBMERSIBLE ELECTRIC MOTOR

Robert F. Reinoehl, Simi Valley, Calif., assignor to Aquaria, Inc., Simi Valley, Calif.

Filed Jun. 7, 1988, Ser. No. 203,731

Int. Cl.⁵ F04D *1/00;* **H02K** *5/04*

U.S. Cl. 310—87 **11 Claims**



1. A bubble trap for electric motors that include a motor housing with a cavity, a stator assembly received within the cavity, and a sealant material filling the cavity space between the stator assembly and the motor housing, thereby preventing moisture from reaching the coils of the stator assembly, wherein:

the bubble trap comprises a non-porous generally planar raised dome that fits in the cavity, is located substantially within the sealant material, and extends laterally across the cavity over the cross-sectional area of the stator assembly.

5,025,186
ULTRASONIC MOTOR

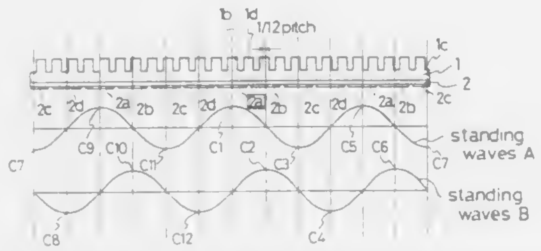
Nobuo Tsukada, Tokyo, Japan, assignor to Seiko Instruments Inc., Japan

Filed Jun. 15, 1990, Ser. No. 539,723

Claims priority, application Japan, Jun. 26, 1989, 1-162938

Int. Cl.⁵ H01L *41/08*

U.S. Cl. 310—323 **4 Claims**



1. An ultrasonic motor utilizing travelling wave generated in a vibrator for rotating a movable member comprising:

a vibrator provided on one surface thereof with a piezoelectric element;

comb-like projections arranged alternately in the circumferential direction thereof on the other surface of said vibrator;

a movable member provided on said vibrator;

a pressure-regulator provided on said movable member for generating suitable contact pressure between said movable member and said vibrator; and

fan-shaped electrode patterns provided on one surface of said piezoelectric element, the number of which is a multiple of 4, arranged at regular intervals in the circumferential direction thereof, wherein the number of said fan-shaped electrode patterns and that of said comb-like projections of said vibrator have no common divisor with respect to each other.

5,025,187
ACTUATOR AND CONTROL SYSTEM FOR CLEANING OF MIRROR-LIKE OBJECTS

Naofumi Fujie, Nagoya; Tomoaki Imaizumi, Hoi; Koji Ito, Kariya, and Shoji Okada, Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Continuation of Ser. No. 357,960, May 30, 1989, abandoned.

This application Aug. 23, 1990, Ser. No. 576,165

Claims priority, application Japan, May 30, 1988, 63-132205; May 31, 1988, 63-134920; Jul. 21, 1988, 63-182659

Int. Cl.⁵ H01L *41/08*

U.S. Cl. 310—323 **14 Claims**

1. A self-cleaning plate unit comprising a generally planar plate member, and vibrating means mounted on said plate member for producing in said plate member a standing wave substantially parallel to the plane of said plate member at a uniform frequency substantially equal to the corresponding resonant frequency of the plate unit, in order to remove foreign substances from said plate member, said vibrating means contacting said plate member over an area substantially smaller than the area of said plate member.

5,025,188
ELONGATE TUBULAR INCANDESCENT LAMP WITH FILAMENT SHORTING BARS

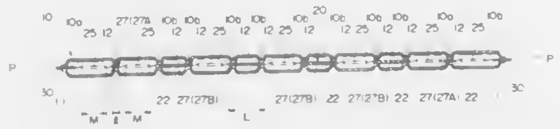
Toru Odagaki, Okayama, Japan, assignor to Ushio Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 2, 1990, Ser. No. 487,389

Claims priority, application Japan, Mar. 17, 1989, 1-29735[U]

Int. Cl.⁵ H01K *1/02, 1/24*

U.S. Cl. 313—273 **1 Claim**



1. In a tube type incandescent lamp having light-emitting parts and non-light-emitting parts, wherein a filament assembly comprises coiled filaments and short bars, which are arranged alternately, the short bars are separately held by corresponding constricted portions provided in a tube envelope made of glass, and each of light-emitting parts and the non-light-emitting parts is formed of a space portion surrounded by a part of the tube envelope between adjacent constricted portions, the improvement wherein the outermost ones of the short bars in the filament assembly are shorter than the other short bars and two light-emitting parts are continuously formed at each outer portion of the incandescent lamp.

5,025,189
DYNAMIC FOCUSING ELECTRON GUN

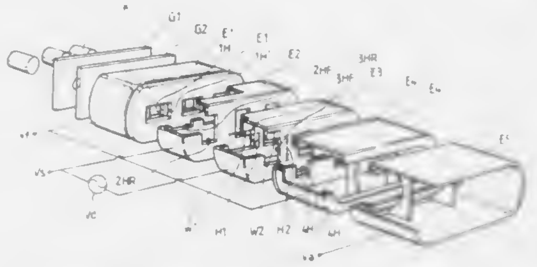
Wan-jae Son, Cheonan, Rep. of Korea, assignor to Samsung Electron Devices Co., Ltd., Rep. of Korea

Filed Nov. 3, 1989, Ser. No. 431,250

Claims priority, application Rep. of Korea, Nov. 5, 1988, 88-14575

Int. Cl.⁵ H01J *29/50*

U.S. Cl. 313—414 **4 Claims**



1. A dynamic focusing electron gun for producing a plurality of electron beams comprising a triode including a plurality of cathodes, a control grid, and a screen grid, and a main lens means including a plurality of electrodes for forming a dynamic quadrupole focusing lens for focusing the electron beams, said main lens means comprising a first focusing electrode disposed proximate said screen grid, a second focusing electrode disposed proximate a final acceleration anode, a static potential electrode disposed proximate said first focusing electrode, and a dynamic potential electrode, said static potential electrode and dynamic potential electrode being disposed between said first and second focusing electrodes and forming the dynamic quadrupole lens wherein said static potential electrode includes vertically elongate electron beam passing exit holes for passage of the electron beams out of said static potential electrode toward said dynamic potential electrode and said dynamic potential electrode includes laterally elongate electron beam passing entrance holes for passage of the electron beams into said dynamic potential electrode from said static potential electrode.

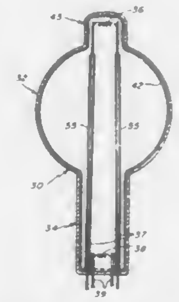
5,025,190
GLOW DISCHARGE LAMP

Andre C. Bouchard, Peabody; Paul A. Thibault, Danvers; Lagushenko Radomir, Brookline; Jakob Maya, Brookline, and Jakob Maya, Brookline, all of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Dec. 30, 1987, Ser. No. 139,396

Int. Cl.⁵ H01J *61/64*

U.S. Cl. 313—619 **18 Claims**



1. A glow discharge lamp comprising;

a light transmitting envelope containing a noble gas fill material and having a maximum cross-section bulbous

VOL
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region, a neck region, and a dome region at the top thereof outside said bulbous region,
a pair of electrodes disposed in said envelope,
and lead-in wires coupled to the electrodes and extending through and hermetically sealed in said envelope,
said electrodes being disposed in oppositely spaced positions in the envelope, one of said electrodes being disposed in said dome region, the other of said electrodes being positioned outside of said bulbous region at said neck region of the envelope such that a substantial portion of the evaporants originating from said other of said electrodes is confined to said neck region to thereby retard the formation of deposits at said bulbous region.

5,025,191

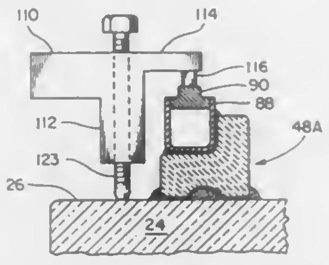
ADJUSTABLE-HEIGHT SHADOW MASK SUPPORT FOR A FLAT TENSION MASK COLOR CATHODE RAY TUBE

James R. Fendley, Arlington Heights, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Dec. 21, 1989, Ser. No. 454,223

Int. Cl.^{5} H01J *29/07*

U.S. Cl. 313—407 25 Claims



1. A tension mask color cathode ray tube including a glass faceplate having on its inner surface a centrally disposed, rectangular screen having on opposed sides thereof a shadow mask support structure including Q-height adjustment means for receiving and securing said mask, said Q-height adjustment means providing for Q-height adjustment prior to the securing of said mask.

5,025,192

END BASE CONSTRUCTION FOR A DISCHARGE LAMP

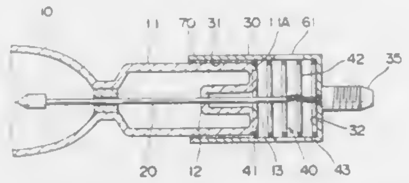
Manabu Okamoto, Kakogawa, Japan, assignor to Ushio Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 6, 1989, Ser. No. 375,873

Claims priority, application Japan, Jul. 26, 1988, 63-97989[U]

Int. Cl.^{5} H01J *61/36*

U.S. Cl. 313—623 2 Claims



1. In a discharge lamp comprising a light-emitting tubing, which is equipped with an envelope having a bulged portion defining a discharge space and side tube portions extending from both sides of the bulged portion and having a graded seal structure constructed by joining a plurality of glass members, each having progressively higher thermal coefficients of expansion in an order proceeding from said bulged portion, and has electrode rods hermetically extending through the respective side tube portions into the bulged portion; and cylindrical bases fitted on the respective side tube portions in such a manner that the bases cover respectively the outer end portions of the side tube portions with a gap between the outer peripheral surface of each side to portion and the base and fixed with a cement filling said gap on the respective side tube portions so as to define radiating spaces in which the outer surfaces of the ends of the side tube portions are respectively positioned, the improvement wherein cement-controlling members for avoiding the outflow of the cement from said gap into the radiating space are respectively provided in the bases, each of the cement-controlling members comprising a first ring portion received in an annular recess defined by the outer periphery of the end wall of the side tube portion and the inner peripheral surface of the base so as to be held in contact with both outer periphery of the end wall of the side tube portion and inner peripheral surface of the base, a second ring portion held in contact with the inner bottom surface of the base and a connecting portion adapted to connect the first ring portion and the second ring portion.

5,025,193

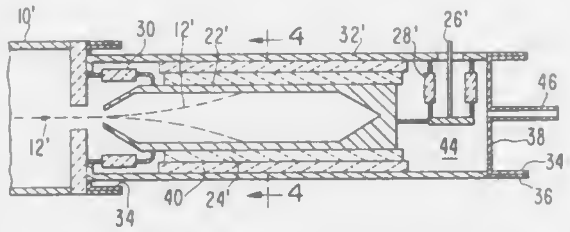
BEAM COLLECTOR WITH LOW ELECTRICAL LEAKAGE

Bertram G. James, Redwood City, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 244,546, Sep. 15, 1988, abandoned, which is a continuation of Ser. No. 7,232, Jan. 27, 1987, abandoned. This application Jun. 19, 1990, Ser. No. 540,409

Int. Cl.^{5} H01J *23/027, 23/033*

U.S. Cl. 315—5.38 36 Claims



1. A collector assembly for an electron tube having a vacuum envelope and outer casing comprising:
a conductive hollow collector electrode within said outer casing and spaced therefrom so as to define an annular space radially therebetween;
a first insulative support means at the entrance of said collector supporting said electrode within said casing and isolating said annular space from the vacuum envelope, said annular space being adaptable to confining a special environment differing from that of said vacuum envelope;
a first axially continuous dielectric zone surrounding and in contact with said collector within said isolated annular space;
a second axially continuous dielectric zone surrounding said collector and in contact with said casing and said first dielectric zone;
said zones defining one or more dielectric elements of circular cross-section throughout said entire annular space within said special environment, enhancing thermal transfer while minimizing current flow between collector and outer casing.

5,025,194

VAPOR AND ION SOURCE

Jacques Menet, Saint-Egreve, and Olivier de Gabrielli, Grenoble, both of France, assignors to Centre National de la Recherche Scientifique, Paris, France

Filed Nov. 30, 1988, Ser. No. 442,798

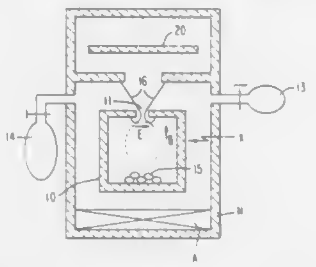
Claims priority, application France, Nov. 30, 1988, 88 16012

Int. Cl.^{5} H01J *27/02*

U.S. Cl. 315—111.81 7 Claims

1. In a low pressure chamber, a vapor and ion source comprising:

an anode;
an equipotential cavity cathode structure, said cathode structure including a front plate facing said anode, said front plate provided with an aperture;
means for introducing a gas into said chamber;
means for removing gas from said chamber;



ionizable material contained within said cathode cavity;
means for applying a magnetic field perpendicular to said front plate within said cathode cavity; and
means for generating an electrical field orthogonal to said magnetic field with said cathode cavity, whereby ion discharge is initiated within said cathode cavity.

5,025,195

CURRENT MONITORING

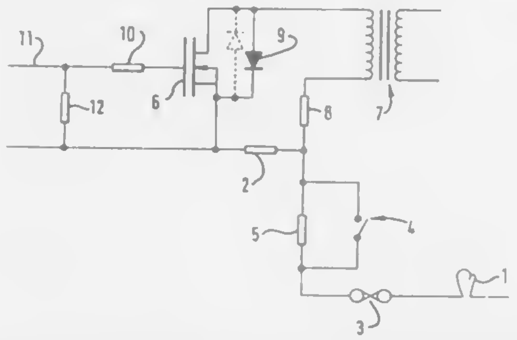
Malcolm R. Reeves, Chippenham, Great Britain, assignor to Westinghouse Brake and Signal Holdings Limited, Wiltshire, England

Filed Dec. 1, 1989, Ser. No. 444,289

Claims priority, application United Kingdom, Feb. 8, 1989, 8902793

Int. Cl.^{5} G08B *21/00*

U.S. Cl. 315—136 12 Claims



1. A circuit arrangement including a load, resistive means through which at least part of the current through the load flows and detection means for providing a signal dependent on the value of the said current, the detection means comprising a circuit branch connected across the resistive means and including a field-effect transistor (FET), a transformer having a primary winding which is connected to the FET and an input connected with the gate of the FET for receiving a voltage for use in turning on the FET, the circuit arrangement being such that, if the FET is turned on, the circuit branch provides said signal as an output voltage across said secondary winding of said transformer, said output voltage being substantially proportional to the value of the said current.

5,025,196

IMAGE FORMING DEVICE WITH BEAM CURRENT CONTROL

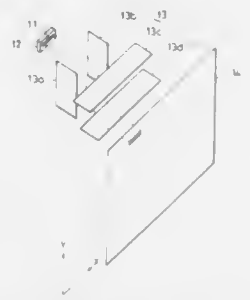
Hidetoshi Suzuki, Atsugi; Ichiro Nomura; Toshiaki Majima, both of Tokyo, and Mitsuru Yamamoto, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 55,935, Jun. 1, 1987, abandoned. This application Jun. 26, 1990, Ser. No. 545,115

Claims priority, application Japan, Jun. 2, 1986, 61-125917; Jun. 16, 1986, 61-138226; Jul. 31, 1986, 61-178664

Int. Cl.^{5} H05B *41/00*

U.S. Cl. 315—168 17 Claims



1. An image forming device comprising:
a cold cathode member, comprising a semiconductor, for generating an electron beam;
an accelerating electrode member for withdrawing the electron beam generated by said cathode member;
a member for modulating the electron beam;
a member for deflecting the electron beam;
an image forming member for forming an image by irradiation by the electron beam,
wherein the accelerating electrode member is integrally molded together with said cold cathode member on a side of said image forming member relative to said cold cathode member through an electrical isolator;
a detecting means for detecting a current flowing to said accelerating electrode member, which current is caused by a part of the electron beam generated by said cold cathode member; and
a control means for outputting a control signal in proportion to the current detected,
wherein variation with time of quantity of the electrons emitted per unit time from said cold cathode member to said image forming member is hindered by supplying the control signal from said control means to a power source of said cold cathode member or of said accelerating electrode member.

5,025,197

CIRCUIT ARRANGEMENT FOR A.C. OPERATION OF HIGH-PRESSURE GAS DISCHARGE LAMPS

Hans G. Ganser, Stolberg; Ralf Schäfer, Aachen, and Hans P. Stormberg, Stolberg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 5, 1985, Ser. No. 708,316

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1984, 3408426

Int. Cl.^{5} H05B *37/02*

U.S. Cl. 315—172 21 Claims

1. A circuit arrangement for A.C. operation of high-pressure gas discharge lamps comprising: a ballast current limiter coupled between the lamp and a mains alternating voltage source, a high-frequency oscillator supplied with direct current and producing a high-frequency current through the lamp superimposed on the mains alternating lamp current, said oscillator comprising a high-frequency transformer, a first transistor connected in series with a primary of the transformer, the first transistor being periodically switched on and switched off, means connecting a first secondary of the transformer in series

VOL
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ISS
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1991
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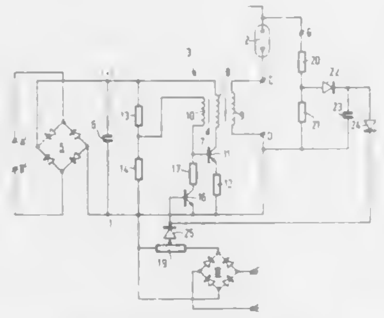
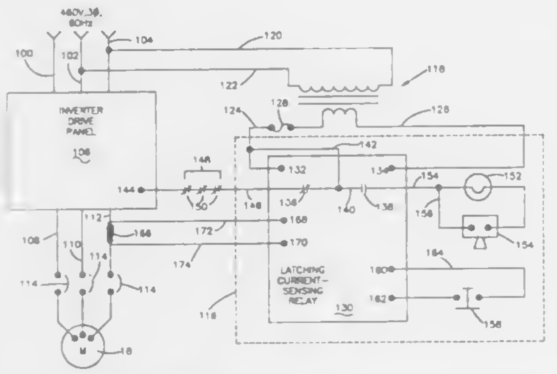
with the lamp, the ratio between switching-on time and switching-off time (duty cycle) of the first transistor being so small that the effective value of the high-frequency current coupled into the lamp during stable lamp operation lies between 0.05



and 5% of the mains alternating lamp current, and an auxiliary device connected to provide a low resistance shunt across the base-emitter path of the first transistor outside the proximity of the zero passages of the mains alternating lamp current.

5,025,198
TORQUE COUPLING SYSTEM FOR GRAPHITE IMPELLER SHAFTS

George S. Mordue, Ravenna, and Herbert L. Ritchie, Jr., North Ridgevill, both of Ohio, assignors to The Carborundum Company, Niagara Falls, N.Y.
Division of Ser. No. 315,533, Feb. 24, 1989. This application Apr. 9, 1990, Ser. No. 506,676
Int. Cl.^{5} H02H *7/085*
U.S. Cl. 318—434 **6 Claims**



1. A torque coupling system for molten metal pumps, mixers, or dispersers, comprising:

a graphite shaft having an impeller at one end;

an electric motor connected to the other end of the graphite shaft, the electric motor adapted to rotate the graphite shaft and the impeller;

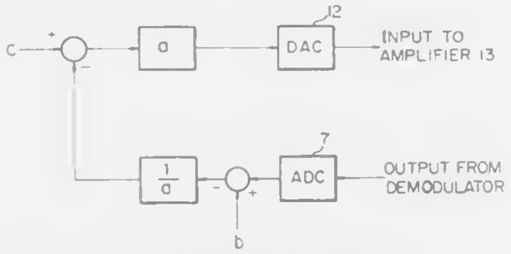
power supply means for supplying electrical current to the motor;

a current sensor electrically connected to the power supply means for sensing whenever current being drawn by the motor exceeds a predetermined limit; and

disabling means connected to the power supply means for disabling the power supply means, the disabling means being electrically connected to the current sensor and being activated upon receiving an electrical signal therefrom.

5,025,199
SERVO CONTROL APPARATUS

Hidenobu Ako, Ogaki, Japan, assignor to Teijin Seiki Company Limited, Osaka, Japan
Filed Aug. 14, 1989, Ser. No. 392,892
Claims priority, application Japan, Aug. 23, 1988, 63-209757
Int. Cl.^{5} G05B *13/00*
U.S. Cl. 318—561 **8 Claims**



1. A servo control apparatus comprising:

means for generating a required position value;

an actuator adapted to drive a load and having its maximum displacements in one direction and its minimum displacement in the other direction;

drive means for driving said actuator;

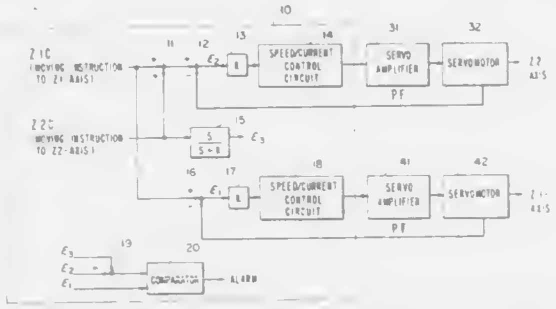
position detecting means for detecting a displacement of said actuator; and

control means for correcting said required position value on basis of said maximum and minimum displacements of said actuator and for computing a deviation between an output of said position detecting means and said corrected required position value;

said load being controlled by said deviation.

5,025,200
SYNCHRONOUS CONTROL SYSTEM

Mitsuo Kurakake, Hino, and Jiro Kinoshita, Yamanashi, both of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan
PCT No. PCT/JP89/00193, § 371 Date Oct. 10, 1989, § 102(e) Date Oct. 10, 1989, PCT Pub. No. WO89/08289, PCT Pub. Date Sep. 8, 1989
PCT Filed Feb. 23, 1989, Ser. No. 427,124
Claims priority, application Japan, Feb. 26, 1988, 63-043961
Int. Cl.^{5} G05B *19/18*
U.S. Cl. 318—569 **12 Claims**

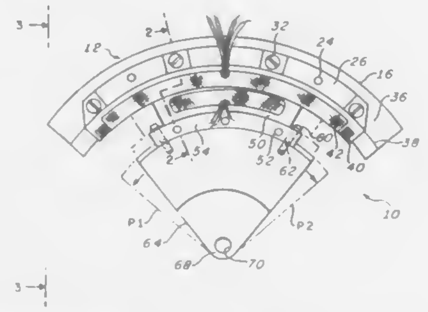


1. A synchronous control system for effecting a synchronous and superimposed operation among different channels of a multi-channel-control machine tool having servomotors, characterized in that a third follow-up error amount of a servomotor responsive to a superimposing instruction is simulated, a difference is determined by subtracting the third follow-up error amount to the superimposing instruction from a second follow-up error amount of a servomotor for a superimposed operation axis and said difference is compared with a first follow-up error amount of a servomotor for a synchronous operation axis to produce a comparison result, and determining an alarm condition when the operation of the servomotors is

synchronized and superimposed based on the comparison result.

5,025,201
SEGMENTED RESOLVER

Alexander Berger, San Diego, Calif., assignor to Vernitron Corporation, San Diego, Calif.
Filed Mar. 14, 1990, Ser. No. 507,123
Int. Cl.^{5} G05B *19/31*
U.S. Cl. 318—605 **11 Claims**



1. An electrical resolver, comprising:

an arcuate stator means, said stator means having a stator cylindrically curved magnetizable core with a predetermined circumferential length, said stator core having a concave side formed with a plurality of stator transverse slots;

a stator insulated coiled wire embedded in said stator slots, said stator coiled wire terminating in stator leads outside said stator core for connection to an external circuit;

an arcuate rotor means, said rotor means having a rotor cylindrically curved magnetizable core with a circumferential length shorter than that of said stator core, said rotor core having a convex side formed with a multiplicity of rotor transverse slots,

a rotor insulated coiled wire embedded in said rotor slots and terminating in rotor leads outside said rotor core, said rotor coiled wire inducing a first voltage in said stator coiled wire when said rotor leads are connected to an external electric power source,

said stator means and said rotor means being concentrically disposed with said convex side of said rotor core and said concave side of said stator core having a constant air gap thereinbetween; and

means connected to said rotor means for rotating same to a plurality of angular positions within an arc of predetermined length shorter than said circumferential length of said stator core, thereby changing said first voltage induced in said stator coiled wire to an extent determined by the extent of angular rotation of said rotor means, with respect to said stator means.

5,025,202
SOLAR CELL POWER SYSTEM WITH A SOLAR ARRAY BUS LOCKUP CANCELLING MECHANISM

Akihiko Ishii; Yukihiro Honda, and Toshio Matsui, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 7, 1990, Ser. No. 579,073
Claims priority, application Japan, Sep. 8, 1989, 1-233733; Oct. 13, 1989, 1-266559; Feb. 26, 1990, 2-44728
Int. Cl.^{5} H02J *7/00*
U.S. Cl. 320—32 **26 Claims**

1. A solar cell power system with a solar array bus lockup cancelling mechanism, comprising:

a common return line;

a solar cell means having an output terminal and a terminal connected to said return line;

a shunt device connected in parallel between the output terminal of said solar cell means and said return line;

a power bus;

a first unilateral current transmission means which has an input terminal connected to the output terminal of said solar cell means and an output terminal connected to said power bus and which allows a current to flow only from the output terminal of said solar cell means toward said power bus;

a storage battery means having an output terminal and a terminal connected to said return line;

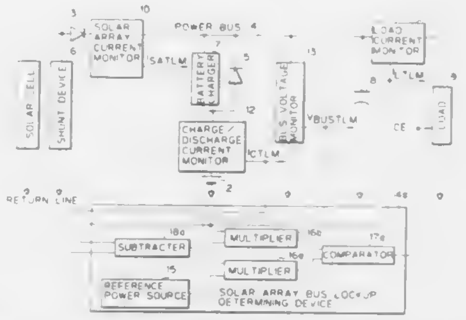
a charging means connected to said power bus and the output terminal of said storage battery means in series with said storage battery means;

a second unilateral current transmission means which has an input terminal connected to the output terminal of said storage battery means and an output terminal connected to said power bus and which allows a current to flow only from the output terminal of said storage battery means toward said power bus;

a charge storage means connected between said power bus and said return line;

a load which has a first terminal connected to said power bus, a second terminal connected to said return line, and a control terminal, said load reducing its own magnitude when a load power reducing signal is supplied to said control terminal;

a charge/discharge current monitor means which has an output terminal and which is connected to said storage battery means to monitor the charge/discharge current that charges said storage battery means or that is discharged therefrom, emitting through said output terminal a signal representing the charge/discharge current thus monitored;



a bus voltage monitor means which has an output terminal and which is inserted between said power bus and said return line to monitor the bus voltage in said power bus, emitting through said output terminal a signal representing the bus voltage thus monitored;

a solar array current monitor means which has an output terminal and which is connected to said first unilateral current transmission means to monitor the solar array current flowing from said first unilateral current transmission means to said power bus, emitting through said output terminal a signal representing the solar array current thus monitored, or a load current monitor means which has an output terminal and which is connected to said load to monitor the load current, emitting through said output terminal a signal representing the load current thus monitored; and

a solar array bus lockup determining means which has three input terminals and an output terminal, two of said three input terminals being respectively connected to the output terminal of said charge/discharge current monitor means and the output terminal of said bus voltage monitor means, the remaining one input terminal being connected to either said solar array current monitor means or said load current monitor means, said output terminal being con-

VOL
1127
ISS
3
JE
18
1991
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nected to said control terminal of said load, said solar array bus lockup determining means including a reference voltage generating means for generating a reference voltage representing the regulated bus voltage when the solar cell power system is not in the solar array bus lockup state with the bus voltage being regulated by said shunt device, said solar array bus lockup determining further calculating the effective generated power of said solar cell means and the load power consumed by said load on the basis of the regulated bus voltage, the monitored bus voltage, the monitored discharge current, and either of the monitored solar array current or the monitored load current to generate a load power reducing signal at said output terminal when said effective generated power is greater than said load power;

whereby the state is detected in which, during a period of sunlight, the bus voltage is fixed to the output voltage of said storage battery means and in which discharge from said storage battery means continues even though said solar cell means can manage to supply all the necessary load current so that the magnitude of said load is temporarily reduced to restore the state in which the bus voltage is regulated by said shunt device.

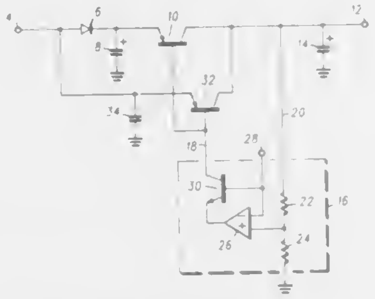
5,025,203
CIRCUIT FOR USE WITH A VOLTAGE REGULATOR

Arthur J. Edwards, Hoffmann Estates, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 2, 1989, Ser. No. 415,674

Int. Cl.^{5} G05F *1/44*

U.S. Cl. 323—268 **10 Claims**



1. A circuit for use with a voltage regulator, comprising:
a first node for receiving an input voltage;
a second node for producing a regulated output voltage and for coupling to the voltage regulator;
a third node for connection to the voltage regulator to receive a control signal therefrom;
first control means having a voltage input coupled to the first node, a voltage output coupled to the second node, and a control input coupled to the third node, the first control means controlling the flow of current therethrough between the first node and the second node;
diode means coupled between the first node and the first control means voltage input; the improvement comprising
second control means having a voltage input connected to the first node, a voltage output coupled to the second node, and a control input coupled to the third node, the second control means controlling the flow of current therethrough between the first node and the second node.

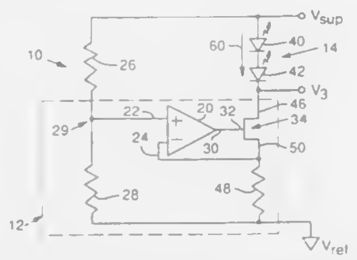
5,025,204
CURRENT MIRROR USING RESISTOR RATIOS IN CMOS PROCESS

David K. Su, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 5, 1990, Ser. No. 461,209

Int. Cl.^{5} G05F *1/575*

U.S. Cl. 323—274 **4 Claims**



1. A current control device for establishing a controlled current through an LED wherein the magnitude of the current through the LED is proportional to a reference current through a reference current sense resistor, the current control device comprising:
a series combination of circuit elements including a controlled current sense resistor and a variation resistor responsive to a control signal applied to a control terminal thereof, the series combination being adapted for series coupling with said LED and between first and second voltage terminals; and
operational amplifier means having an output terminal coupled to said control terminal for providing said control signal, a first input terminal coupled to a sense point on said series combination, and a second input terminal receiving a substantially constant voltage signal corresponding to a voltage present at said sense point when the desired magnitude of current passes through said sense resistor, said substantially constant voltage signal being provided by a voltage divider network including first and second series coupled resistive elements;
wherein the reference current sense resistor is connected between the second operational amplifier input terminal and one of the first and second voltage terminals and wherein the current sense resistor and the second series coupled resistive elements are both fabricated in integrated circuit form so that a desired ratio of resistances therebetween may be accurately set.

5,025,205
RECONFIGURABLE ARCHITECTURE FOR LOGIC TEST SYSTEM

Marc R. Mydill, Garland; Sam R. Pile, Dallas; Sheila O'Keefe, Garland; Neal F. Okerblom, and W. Russ Keenan, both of Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

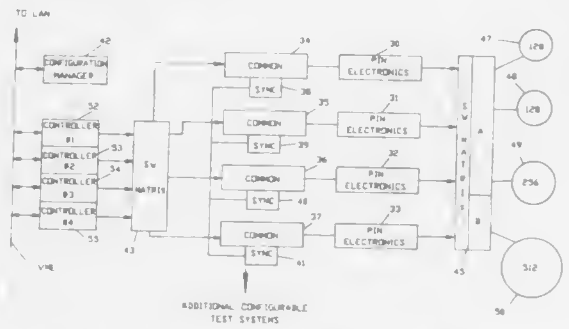
Filed Jun. 22, 1989, Ser. No. 372,506

Int. Cl.^{5} G01R *31/28, 31/02*

U.S. Cl. 324—73.1 **31 Claims**

1. A reconfigurable logic test system for testing integrated circuits, including at least two test modules, a test module comprising;
a program controller;
a first switching matrix;
a pin group electronic circuit, connected to said program controller by said first switching matrix;

a pin electronic circuit connected to the pin group electronic circuit;
a second switching matrix; and



at least one test head connectable to said pin electronic circuit by said second switching matrix.

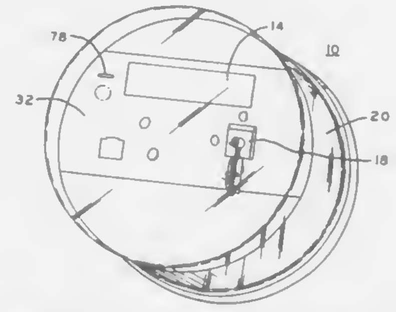
5,025,206
TEST MODE ACTUATOR AND INDICATOR FOR ELECTRONIC ENERGY METER

Warren R. Germer, Dover; Peter F. Coryea, Salem; Andrius A. Keturakis, Portsmouth, all of N.H.; David H. Masury, Kittery Point, and Thomas H. Stevens, Cape Neddick, both of Me., assignors to General Electric Company, Somersworth, N.H.

Filed Sep. 25, 1989, Ser. No. 411,940

Int. Cl.^{5} G01R *35/04, 21/00*

U.S. Cl. 324—74 **41 Claims**



1. An integral test mode actuator and indicator in an electric energy meter comprising:
a register to indicate the amount of electricity used including a bezel support member and an associated meter readout;
an actuator/indicator member movably mounted within a recess associated with said bezel and having an off position, and an on position, and bearing a test mode indicia flag;
said actuator/indicator member being substantially obscured from view in said off position and including a switching component;
switch means having a switch actuator positioned in the path of said switching component and said activator/indicator;
movement of said actuator/indicator member from said off position to said on position moving said switching component into contact with said switch actuator to switch said member to the test mode;
said movement of said actuator/indicator member to the on position also moving said test mode indicia flag into the visible region associated with said meter readout; and
return of said actuator indicator member to the off position substantially removing said test mode indicia from view and back into said recess in said bezel and simultaneously moving said switching component away from contact with said switch actuator to switch said test mode of said meter off.

5,025,207
METHOD FOR THE MEASUREMENT OF A STEADY LEVEL IN A NOISE-INFESTED SIGNAL AND AUTOMATIC MEASURING DEVICE FOR THE APPLICATION OF THIS METHOD

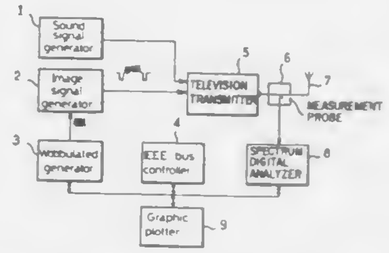
Dominique Gauthier, Ermont, France, assignor to Thomson-LGT Laboratoire General des Telecommunications, Conelans Sainte Honorine, France

Filed Jul. 19, 1989, Ser. No. 381,959

Claims priority, application France, Jul. 22, 1988, 88 09936

Int. Cl.^{5} G01R *23/16*

U.S. Cl. 324—77 A **6 Claims**



1. A method for the measurement of the amplitude of a steady level in a noise-infested signal comprising the steps of:
sampling the signal during a time interval corresponding to the duration of the steady level to be measured;
quantifying the samples of the signal, according to a plurality of pre-determined digital values;
counting the number of samples, having each pre-determined digital value ;
determining, in a range of fixed values, that value which corresponds to the greatest number of samples, said value forming the measured value of the amplitude of the steady level.

5,025,208
METHOD OF MEASURING RADIO-FREQUENCY INTERFERING VOLTAGES

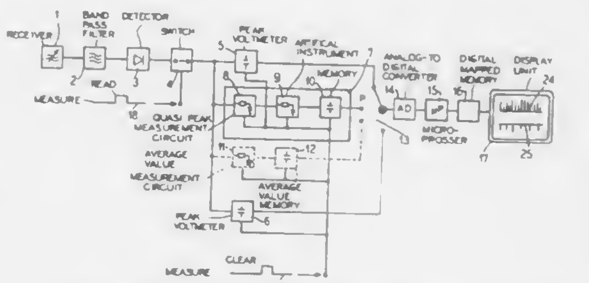
Klaus Danzeisen, Gräfelfing, Fed. Rep. of Germany, assignor to Rohde & Schwarz GmbH & Co KG, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 346,082

Claims priority, application Fed. Rep. of Germany, May 21, 1988, 3817500

Int. Cl.^{5} G01R *23/16;* H04B *17/00*

U.S. Cl. 324—77 R **4 Claims**



1. A method of measuring RFI voltages in a predetermined frequency range, comprising the steps of:
tuning the frequency range of a receiver and, during tuning of the frequency range, measuring the maximum and minimum peak voltage levels;
comparing the measured maximum peak voltage level with a predetermined limit value and interrupting tuning when the limit value is exceeded;
comparing the maximum peak voltage level with the minimum peak voltage level; and
evaluating the result of the comparison of the maximum peak voltage level with the minimum peak voltage level

VOL
1127
ISS
3
JE
18
1991
UMI

by deciding in dependence of this comparison whether or not an additional quasi-peak measurement shall be performed and evaluated at the instantaneous frequency of interruption.

5,025,209

APPARATUS FOR DETECTING SURFACE POTENTIAL DISTRIBUTION

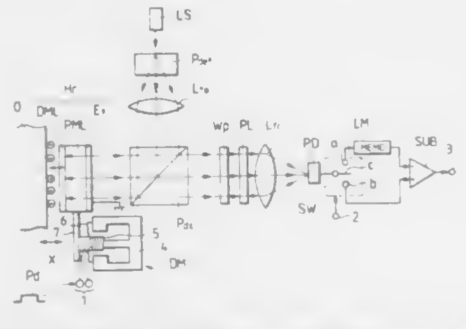
Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa; Hirobiko Shinonaga; Tsutou Asakura, both of Yokohama; Masato Furuya, and Hiromichi Tai, both of Yokosuka, all of Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Jun. 28, 1989, Ser. No. 372,507

Claims priority, application Japan, Jun. 30, 1988, 63-163477; Sep. 6, 1988, 63-223167; Sep. 20, 1988, 63-235407

Int. Cl.⁵ G01R *31/00;* **G02F** *1/03*

U.S. Cl. 324—96 2 Claims



1. An apparatus for detecting a distribution of a surface potential on a measured object, comprising:

a light source emitting light;

a sensing head opposing the measured object and including an optical modulator layer for modulating the light emitted from the light source and outputting light, a transparent electrode for applying an electric field to the optical modulator layer, and a dielectric mirror for reflecting the light after the light passes through the optical modulator layer;

means for applying the light from the light source to the sensing head;

means for detecting the light outputted from the sensing head;

means for periodically moving the sensing head relative to the measured object between a first position and a second position separated from the measured object by different distances respectively;

a line memory;

means for enabling the sensing head to scan one line of the measured object while the sensing head is in the first position;

means for writing an output signal from the light-detecting means into the line memory while the sensing head is in the first position;

means for enabling the sensing head to scan said line of the measured object while the sensing head is in the second position;

means for reading out the written signal from the line memory while the sensing head is in the second position; and

means for subtracting the output signal from the light-detecting means from the read out signal while the sensing head is in the second position.

5,025,210

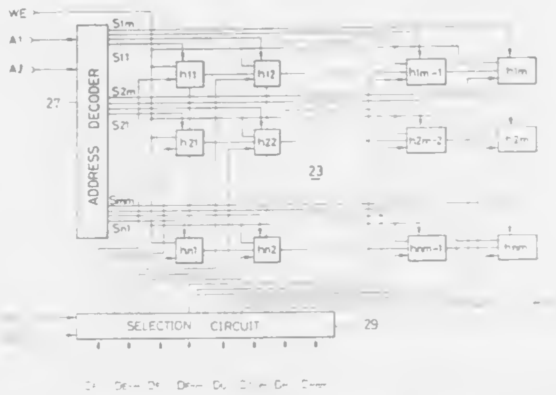
EVALUATION FACILITATING CIRCUIT DEVICE

Toshiyuki Yaguchi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation-in-part of Ser. No. 886,914, Jul. 18, 1986, abandoned. This application Oct. 11, 1988, Ser. No. 255,284

Int. Cl.⁵ G01R *19/00*

U.S. Cl. 324—158 R 2 Claims



1. An evaluation facilitating circuit for evaluating a logical circuit which is divided into a plurality of blocks, comprising:

(a) latch means for latching level signals at each of the nodes in one of said blocks of said logical circuit, said latch means comprising a plurality of latch circuits arranged in a matrix array and a data hold and transfer control circuit for controlling the latch operation of each of said latch circuits and a transfer operation in which latched level signals are transferred externally, latched data in said latch means reflecting an instant condition of said nodes in one block; and

(b) a selection circuit for selecting level signals of nodes of one block of said blocks from the level signals of nodes of the other blocks of said blocks and for supplying said selected level signals of said one block to said latch means in order to represent a condition of said one block by a condition of said latch means.

5,025,211

TECHNIQUE FOR REDUCING ELECTROMAGNETIC INTERFERENCE

Adam B. Craft, Red Bank, and Gabor P. Torok, Holmdel, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 20, 1989, Ser. No. 453,721

Int. Cl.⁵ G01R *31/02;* **H03H** *1/00*

U.S. Cl. 324—158 R 9 Claims

1. A method of reducing electromagnetic interference on a circuit pack including at least one conductive path formed on a circuit board having two sides, said method comprising the steps of

allocating, during design of said circuit pack, at least one pair of areas on said circuit board for placement of electromagnetic interference absorbing material;

routing a predetermined portion of said conductive paths between said pair of areas;

fabricating said circuit pack;

testing said assembled circuit pack for compliance with predetermined criteria, said testing providing either a first or a second result; and

adding, only in response to a first result of said testing, electromagnetic interference absorbing material which passes through holes in certain ones of said allocated pairs of areas, said material extending from said sides, the holes being formed at any time prior to the addition of said material.

5,025,212

CIRCUIT FOR MEASURING THE DYNAMIC CHARACTERISTICS OF A PACKAGE FOR HIGH-SPEED INTEGRATED CIRCUITS AND A METHOD FOR MEASURING SAID DYNAMIC CHARACTERISTICS

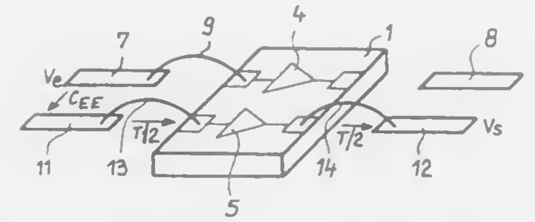
Maurice Gloanec, Bures sur Yvette; Jacques Jarry, St Cyr L'Ecole, and Jean L. Lailler, Bures sur Yvette, all of France, assignors to Thomson Hybrides et Microondes, Paris, France

Continuation of Ser. No. 122,125, Nov. 18, 1987. This application Nov. 3, 1989, Ser. No. 407,589

Claims priority, application France, Nov. 18, 1986, 86 15996

Int. Cl.⁵ G01R *19/155*

U.S. Cl. 324—158 R 3 Claims



2. A measuring circuit for measuring the dynamic characteristics of a package which is to be used for encapsulating an integrated circuit operated at or above one GHz, the integrated circuit having an input impedance and an output impedance, said measuring circuit comprising:

a supporting substrate of semiconductor material, said supporting substrate having a top portion, said top portion of said supporting substrate having a front and a back;

a first amplifier and a second amplifier connected to said top portion of said supporting substrate, said first amplifier and said second amplifier are identical and both have an input impedance and an output impedance identical to the input impedance and the output impedance of the integrated circuit;

a first metal contact of a first terminal of said first amplifier being located at the front of said top portion of said supporting substrate and a second metal contact of a second terminal of said first amplifier being located at the back of said top portion of said supporting substrate;

a first metal contact of a first terminal of said second amplifier being located at the front of said top portion of said supporting substrate and a second metal contact of a second terminal of said second amplifier being located at the back of said top portion of said amplifier;

said first and second metal contacts of said first amplifier being separated by a predetermined distance from said first and second metal contacts of said second amplifier;

wherein first amplifier and said second amplifier are mounted in an antiparallel manner; and

wherein the first metal contact of said first amplifier is an input metal contact and the first metal contact of said second amplifier is an output metal contact.

5,025,213

DEVICE FOR DETERMINING A LENGTH OF LINEAR MOVEMENT OR AN ANGLE OF ROTATION OF A MACHINE PART

Klaus Dobler, Gerlingen, and Hansjörg Hachtel, Weissach, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

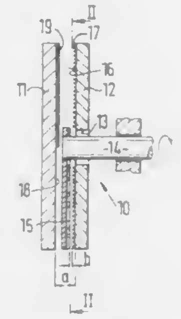
PCT No. PCT/DE88/00713, § 371 Date Jul. 26, 1989, § 102(e) Date Jul. 26, 1989, PCT Pub. No. WO89/05438, PCT Pub. Date Jun. 15, 1989

PCT Filed Nov. 17, 1988, Ser. No. 391,555

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1987, 3740800.3

Int. Cl.⁵ G01B *7/14;* **H01F** *21/02, 21/04*

U.S. Cl. 324—207.12 7 Claims



1. A device for determining one of a length of a linear movement and an angle of rotation of a machine part, said device comprising spaced stationary first and second bodies; at least one coil arranged on one of said first and second bodies, another of said first and second bodies having on a surface facing said first body a surface portion of an electrically conductive material; and a diaphragm connectable to the machine part for joint displacement therewith and arranged in space between said first and second bodies for movement relative to said first and second bodies, said diaphragm having regions formed of an electrically conductive non-ferromagnetic material and regions formed of ferromagnetic material, said electrically conductive non-ferromagnetic regions and ferromagnetic regions alternating in such a manner that an inductive effect and an eddy current effect which result from axial oscillation of said diaphragm, upon flow of an alternating current of a predetermined frequency through said coil, cancel each other with respect to their electrical action on said coil.

5,025,214

CIRCUIT AND PROCESS FOR CONVERTING A HALF BRIDGE TRANSDUCER OUTPUT SIGNAL TO AN LVDT TRANSDUCER OUTPUT SIGNAL

Jeffrey A. Ross, Bellbrook, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed Jun. 25, 1990, Ser. No. 542,509

Int. Cl.⁵ G01B *7/14;* **G01F** *5/14*

U.S. Cl. 324—207.19 6 Claims

1. A converter circuit (36) for converting the amplitude only varied output of a half bridge transducer output signal to the

VOL
1127
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JE
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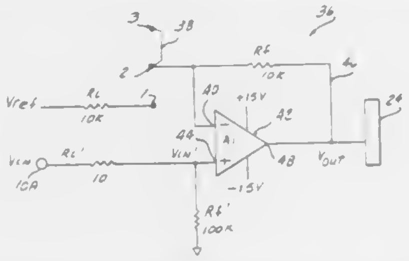
1991
UMI

amplitude and phase varied output signal of an LVDT transducer output, the half bridge transducer (**10B**) comprising a pair of in series secondary windings (**16A, 16B**) juxtaposed to a movable plunger (**12**) acting as a transformer core, means for applying an exciting AC signal (V_{ref}) across said secondary windings (**16A, 16B**) to generate an output signal (V_{out}) at a point intermediate said secondary windings, said converter circuit including connection means for selectively applying said output signal (V_{out}) to said converter circuit as V_{in}, and



said converter circuit including combining means for combining said signal V_{in} with said exciting signal (V_{ref}) in said converter circuit to produce a converted output signal V_{out} (converted) according to the following formula:

$$V_{out}(Converted) = 2V_{in} - V_{ref}$$

whereby said converted output signal is amplitude and phase varied with said plunger position corresponding with an LVDT transducer output signal.

5,025,215

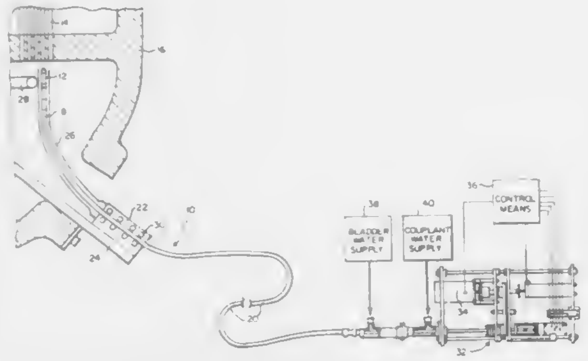
SUPPORT EQUIPMENT FOR A COMBINATION EDDY CURRENT AND ULTRASONIC TESTING PROBE FOR INSPECTION OF STEAM GENERATOR TUBING

William E. Pirl, Levelgreen, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 16, 1989, Ser. No. 394,702

Int. Cl.^{5} G01N *27/82, 29/06;* **G21C** *17/017*

U.S. Cl. 324—220 **36 Claims**



36. An apparatus for helically moving an inspection probe within a tube comprising:

a. a head assembly insertable in a tube to be inspected for helically moving an inspection probe therein along a longitudinal axis of the tube, said head assembly comprising a first portion fixable to the tube by a fixing means and a second portion movably connected to said first portion by means for helically moving said second portion in response to driven rotary movement of said second portion with respect to the longitudinal axis of the tube, said second portion including means for detachably connecting an inspection probe thereto for helical movement therewith within a tube for inspection thereof; and
b. a drive frame assembly with drive means slidably mounted thereon, said drive means drivingly connected to said second portion of said head assembly by a conduit means connected between said drive motor and said second portion for imparting the driven rotary movement to said second portion, wherein helical movement of said second portion causes said drive means to move linearly along said drive frame assembly.

5,025,216

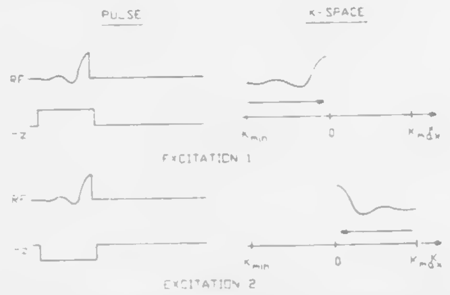
MAGNETIC RESONANCE IMAGING OF SHORT T_2 SPECIES

John M. Pauly, Menlo Park, and Dwight G. Nishimura, Palo Alto, both of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Jul. 28, 1989, Ser. No. 386,901

Int. Cl.^{5} G01R *33/20*

U.S. Cl. 324—309 **6 Claims**



1. A method of obtaining slice-selective magnetic resonance signals comprising the steps of

(a) applying a static magnetic field (B_0) to a body thereby aligning nuclear spins,
(b) applying a modulated magnetic gradient ($G(t)$) to said body,
(c) applying a first RF excitation pulse ($B_1(t)$) to said body to tip said nuclear spins,
(d) detecting first magnetic resonance signals from said body,
(e) applying a second RF excitation pulse ($B_1(t)$) to said body to tip said nuclear spins, said first RF excitation pulse and said second RF excitation pulse each being half of a conventional slice-selective pulse,
(f) detecting second magnetic resonance signals from said body, and
(g) combining said first magnetic resonance signals and said second magnetic resonance signals.

5,025,217

METHOD OF AND DEVICE FOR EDDY CURRENT COMPENSATION IN MR APPARATUS

Johannes J. Van Vaals, Eindhoven, Netherlands, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Sep. 8, 1989, Ser. No. 404,913

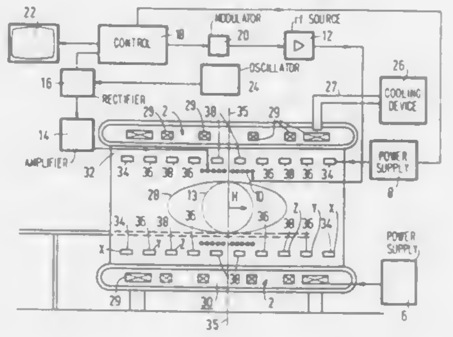
Claims priority, application Netherlands, Sep. 8, 1988, 8802212

Int. Cl.^{5} G01R *33/20*

U.S. Cl. 324—322 **16 Claims**

1. A method for compensating for object eddy current effects produced by magnetic fields in a magnetic resonance apparatus comprising:

measuring first rf resonance signals generated in response to a non-compensated gradient field applied to a measurement object occupying a space of a volume of interest within a measurement space of the apparatus;
measuring second rf resonant signals generated by said object in said measurement space in response to magnetic field phenomena in said measurement space in the absence of said gradient field;
comparing the first and second resonant signals; and



generating correction signals manifesting errors due to said field phenomena for said non-compensated gradient field to compensate for said eddy current effects on said object.

5,025,218

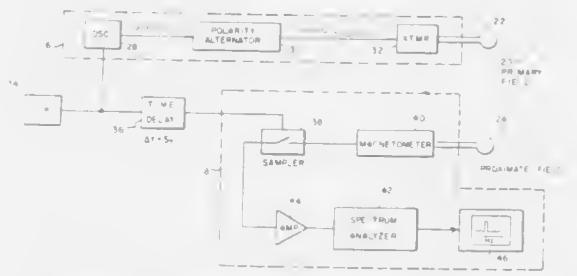
PULSED FIELD SYSTEM FOR DETECTING THE PRESENCE OF A TARGET IN A SUBSURFACE ENVIRONMENT

Clarence F. Ramstedt, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 23, 1979, Ser. No. 32,815

Int. Cl.^{5} G01V *3/08, 3/10, 3/12*

U.S. Cl. 324—334 **11 Claims**



1. A method for searching a subsurface environment to detect the presence of a target in the environment, said method comprising the steps of:

emitting an electromagnetic field comprising successive electromagnetic pulses of selected duty cycle, the time interval between pulses comprising a zero emission interval and a sampling interval, the sampling interval following the zero emission interval, the polarity of successive pulses alternating at a selected alternating frequency;
projecting said emitted field into said environment from a selected location;
sampling the electromagnetic field proximate to said selected location during each of said sampling intervals to provide a train of proximate field samples; and
spectrum analyzing said train of field samples to detect the presence in said proximate field of a field component having a frequency which is equal to said alternating frequency.

5,025,219

APPARATUS AND METHOD FOR CONTINUOUS MEASUREMENT OF THE ELECTRICAL CONDUCTIVITY OF LIQUID MEDIA IN A DYNAMIC CELL

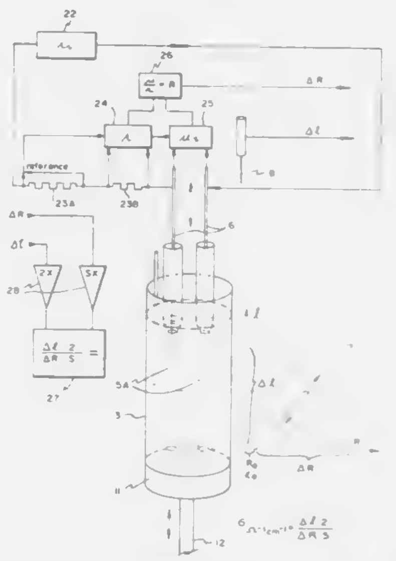
Jean R. Gaspard, St. Jean De Maurienne, France, assignor to Pechiney Recherche, Paris, France

Filed Sep. 19, 1989, Ser. No. 409,058

Claims priority, application France, Sep. 20, 1988, 88 12704

Int. Cl.^{5} G01N *27/02*

U.S. Cl. 324—447 **18 Claims**



1. Device for precise, continuous and dynamic measurement of the electrical resistivity σ of a liquid L, at a temperature which may range from low cryogenic temperatures to approximately 2000° C., characterized in that it includes in combination:

a dynamic measurement cell **2** including at least one conduit **5** of electrically insulating material in which a conductive electrode **6** can slide in an alternating periodic motion of amplitude **1**, the lower portion of the conduit **5** being calibrated over a length equal to at least **1**, and having a cross section s, said cell **2** being immersed in a crucible **3** containing the liquid L at the constant, and adjusted temperature;
a generator **22** of periodic current of frequency f, connected in series with the cell **2** that it supplies at an effective intensity i;
a device **10** for controlling, adjusting and measuring the amplitude of the displacement **1** of each electrode **6**;
a means **8** for measuring and adjusting the depth of immersion of each electrode or group of electrode **6** in the liquid L;
a device for adjusting and measuring the speed of displacement $\Delta 1/\Delta t$ of the electrode **6** in the conduit **5**;
a means of measuring the variation in ohmic resistance R of the cell as a function of the displacement of the electrode **6**: $\Delta R/\Delta 1$ based on the measurement of the voltage u at the terminals of the cell and of the effective intensity i of the current passing through it, by synchronous, in-phase detection of u and i;
the value of the conductivity o of the liquid L then being equal to:

$$\sigma = \frac{n \cdot \Delta l}{s \cdot \Delta R}$$

where n is the number of electrodes **6** of the cell **2**.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,220

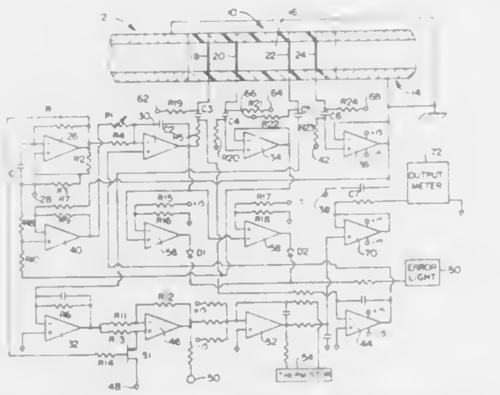
CONTINUOUS MEASUREMENT OF THE ABSOLUTE CONDUCTIVITY OF A LIQUID

Alex D. Colvin, Oak Park; Daniel J. Graham, Farmington, and Joseph C. Cassatta, Taylor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Sep. 21, 1989, Ser. No. 410,772

Int. Cl.^{5} G01N *27/02*

U.S. Cl. 324—449 9 Claims



1. A method of measuring the electrical conductivity of a liquid comprising the steps of:

forming an electrically insulating housing which defines a path through which the liquid flows;

inserting at least four electrodes into the path of said housing, two of said electrodes being current electrodes and two of said electrodes being voltage electrodes;

measuring the AC voltage across said voltage electrodes;

driving a first one of said current electrodes to maintain the AC voltage on said voltage electrodes at a constant value;

measuring the current flowing in a second one of said current electrodes to determine the electrical conductivity of the liquid;

providing a DC bias voltage source; and

coupling said DC bias voltage source to said at least four electrodes to prevent coating or plating said electrodes.

5,025,221

METHOD FOR MEASUREMENT OF ATTENUATION AND DISTORTION BY A TEST OBJECT

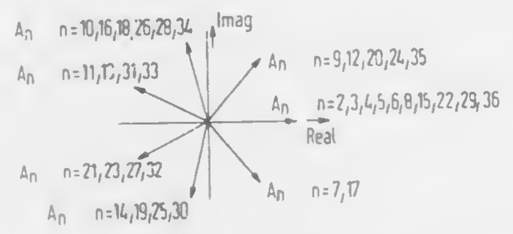
Gerhard Blaess, Olching, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 3, 1981, Ser. No. 269,991

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1980, 3024346

Int. Cl.^{5} H04B *3/46*

U.S. Cl. 324—603 8 Claims



1. A method for measuring the transmission properties of a test subject to which a test pulse of finite duration is supplied and the deformation of said test pulse caused by the test subject is interpreted, whereby the pulse reply is dissected with a computer with the assistance of Fourier analysis and whereby the transmission properties of the test subject are identified from said test pulse, comprising the steps of:

forming said test pule by superimposing for said duration. a series of (x) differing consecutive harmonics of a frequency f having amplitudes and starting phases according to the following equation

$$V(t) = \Sigma A_n \cos (2\pi \cdot n \cdot f \cdot t - \theta_n)$$

whereby A_n denotes the amplitude of the nth component and θ_n denotes the value of the starting phase of the nth harmonic n·f, whereby the values of the starting phase (θ_n) are distributed into an integral number k groups of components, with each group having an integral number of components equal to x/k, each group having a unique phase-spacing parameter m taken from the set (0, 1 . . . k−1) with m=0 for the first group and m32 k−1 for the kth group, whereby the starting phase θ_n of the harmonics is determined by the relationship

$$\theta_n = g(n) \frac{2\pi}{k} m,$$

in which g(n) represents a value increasing with increasing ordinal number n;

and applying said test pulse to said test subject, whereby the deformation of said test pulse caused by said test subject may be interpreted.

5,025,222

SYSTEM AND METHOD FOR MONITORING SUBSTANCES AND REACTIONS

Bentley N. Scott, Richardson, and Samuel R. Shortes, Lewisville, both of Tex., assignors to Phase Dynamics, Inc., Richardson, Tex.

Continuation-in-part of Ser. No. 376,782, Jul. 7, 1989, Pat. No. 4,996,490, which is a continuation-in-part of Ser. No. 932,068, Nov. 18, 1986, Pat. No. 4,862,060. This application Nov. 27, 1989, Ser. No. 442,980

Int. Cl.^{5} G01R *27/26*

U.S. Cl. 324—639 14 Claims

1. A system for controlling a process, comprising:

a voltage-controlled oscillator, which includes

a gain element capable of providing substantial gain at frequencies greater than 100 MHz;

a feedback path, coupling the output of said gain element to the input thereof, said feedback path including a tunable resonant circuit;

an electromagnetic propagation structure

which is RF-coupled to load said oscillator

and in which electromagnetic wave propagation is electrically loaded by a portion of a medium undergoing said process;

means for monitoring the frequency and insertion loss of said oscillator to ascertain changes in the composition of the medium; and

means for controlling one or more process variables in accordance with the output of said monitoring means.

5,025,223

FLATNESS TESTER

Tempel Smith, Jr.; Veselko Miletic, both of Chicago; George Bayer, Kildeer; Christopher A. Coutre, Addison; William L. Reichel, Chicago, and Mirek J. Chronowski, Niles, all of Ill., assignors to Tempel Steel Company, Niles. Ill.

Filed Jul. 24, 1989, Ser. No. 383,616

Int. Cl.^{5} G01R *27/26*

U.S. Cl. 324—662 13 Claims

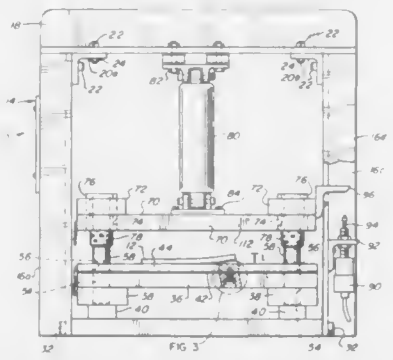
1. Apparatus for determining an overall dimension of an object, comprising:

a support surface for receiving the object;

an electrically conductive plate movable toward and away from the support surface along a path normal to such surface, the plate having a facing surface which faces the support surface;

means for forming an electrical characteristic between the object and the plate;

means for developing a distance signal representing the distance between the facing surface and the support surface;



means for moving the plate toward the object while the object is received by the support surface; and

means for detecting when the electrical characteristic between the object and the plate changes due to contact of the plate with the object whereby the distance signal at such time is representative of the overall dimension.

5,025,224

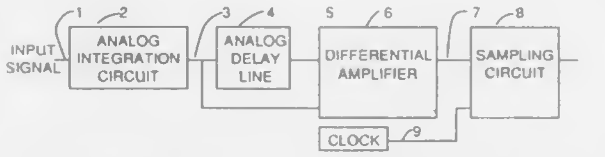
INCREMENTAL INTEGRATOR CIRCUIT

Melvin H. Rhodes, Cedar Rapids, Iowa, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 8, 1989, Ser. No. 447,749

Int. Cl.^{5} G06G *7/12. 7/14. 7/18*

U.S. Cl. 328—127 2 Claims



1. An incremental integrator which receives and integrates an input signal from a signal source to obtain an average value of said input signal over a sequence of time intervals, said incremental integrator comprising:

an analog integration circuit which produces an output signal by receiving and integrating said input signal from said signal source over said sequence of time intervals, said analog integration circuit thereby producing an integrated input signal for each time interval;

a means for delaying signals for a period of time which equals one of said time intervals, said delaying means being connected with and receiving said integrated input signal from said analog integration circuit, said delaying means thereby producing a delayed integrated signal;

a differential amplifier which receives and subtracts said delayed integrated signal from said delaying means, from the integrated input signal from said analog integration circuit during each time interval, said differential amplifier outputting a difference signal which is proportional to a value which equals a difference in amplitude between the delayed integrated signal and the integrated input signal of a current time interval,

a clock circuit which produces a clock signal which has pulses which have durations which equal said time intervals of said analog integration circuit and said delaying means; and

a means for sampling signals, said sampling means receiving and sampling said difference signal from said differential amplifier and said clock signal from said clock circuit to output a sampled signal proportionate to the average value of said input signal over each of said sequence of time intervals.

5,025,225

AMPLIFIER HAVING SUBSTANTIALLY CONSTANT D.C. TO R.F. CONVERSION EFFICIENCY

Yusuke Tajima, Acton, and Robert G. Gels, Boston, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Dec. 15, 1989, Ser. No. 452,165

Int. Cl.^{5} H03F *3/68*

U.S. Cl. 330—124 D 1 Claim

1. A high conversion efficiency power amplifier, comprising:

a plurality of amplifiers, each having an input fed by an input signal, and an output; and

a power combiner comprising:

a corresponding plurality of quarter wavelength transmission lines, each having a first end coupled to the output of the corresponding one of said plurality of amplifiers; and

a second, different plurality of quarter wavelength transmission lines, each having first and second ends, a first one of said second plurality of transmission lines having a first end thereof coupled to a second end of the first one of the first plurality of transmission lines, and the second end thereof coupled to the second end of the second one of the first plurality of transmission lines, and a succeeding one of said second plurality of transmission lines having a first end coupled to a preceding one of said first plurality of transmission lines and a second end coupled to succeeding one of said first plurality of transmission lines.

5,025,226

HIGH-GAIN LOW-NOISE AMPLIFIER

Stewart S. Taylor, Beaverton, Oreg., assignor to TriQuint Semiconductor, Inc., Beaverton, Oreg.

Filed Mar. 2, 1990, Ser. No. 487,360

Int. Cl.^{5} H03F *3/16*

U.S. Cl. 330—277 19 Claims

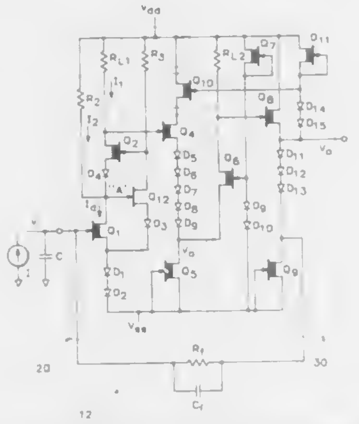
1. A high-gain, low-noise multiple stage solid-state amplifier, comprising:

phase-inverting input stage means including a first FET for

VOL
1127
ISS
3
JE
18
1991
UMI

receiving a time-varying input signal and an output FET configured as a source follower, wherein a source terminal of the output FET presents a relatively low output impedance and provides a first output signal representing a substantially phase-inverted version of the input signal having a magnitude amplified by an input stage gain value; and

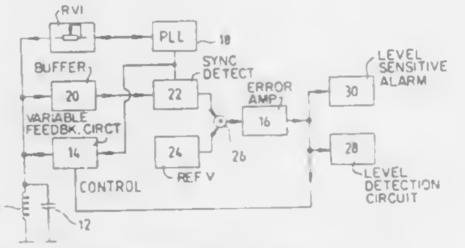
phase non-inverting output stage means receiving the first output signal for providing a second output signal representing a substantially phase-inverted version of the input signal having a magnitude amplified by the product of an output stage voltage gain and the input stage voltage gain, the output stage including a second FET connected in a common gate configuration having a source terminal for receiving the first output signal and an output terminal, the source terminal receiving the first output signal and the output terminal providing a non-inverted amplified version of the first output signal;



whereby the phase-inverting input stage means and phase non-inverting output stage means cooperate to provide the amplifier with high overall gain and wide bandwidth properties.

5,025,227
METAL DETECTION CIRCUIT

Richard J. Walton, Johannesburg, South Africa, assignor to William Young, Sandton, Transvaal, South Africa
Filed Oct. 11, 1989, Ser. No. 420,036
Claims priority, application South Africa, Oct. 11, 1988, 88/7568
Int. Cl.⁵ G01N ***27/00***
U.S. Cl. 331—65 **5 Claims**



1 Metal detection apparatus comprising:

an oscillator circuit including a detection coil

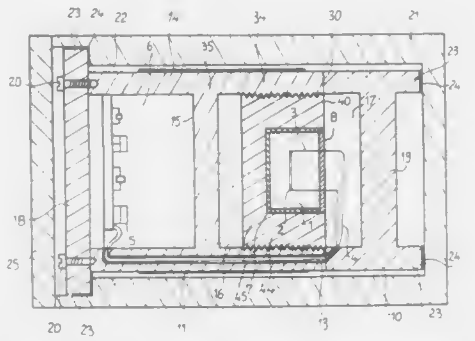
detector means for rectifying an output of the oscillator circuit synchronously with a frequency of oscillation thereof;

comparison means for comparing a rectified output of the oscillator circuit from the detector means with a reference signal and for generating an output signal having a value related to an amplitude of the output of the oscillator circuit; and

positive feedback means for generating a positive feedback signal and for applying it to the oscillator circuit to maintain oscillation thereof at a predetermined amplitude under quiescent conditions.

5,025,228
ULTRASTABLE OSCILLATOR FUNCTIONING AT ATMOSPHERIC PRESSURE AND UNDER VACUUM

Evelyne Gerard, Maisons-Lafitte; Roger Molle, Antony, and Andre Debaisieux, Herblay, all of France, assignors to Compagnie D'Electronique et de Piezo-Electricite C.E.P.E., Argenteuti, France
PCT No. PCT/FR89/00307, § 371 Date Apr. 11, 1990, § 102(e) Date Apr. 11, 1990, PCT Pub. No. WO89/12929, PCT Pub. Date Dec. 28, 1989
PCT Filed Jun. 16, 1989, Ser. No. 460,969
Claims priority, application France, Jun. 24, 1988, 8808523
Int. Cl.⁵ H03B ***5/32;*** **H03L** ***1/04***
U.S. Cl. 331—69 **16 Claims**



1. Oscillator of ultrastable frequency functioning at atmospheric pressure and under vacuum, comprising:

a piezoelectric resonator having a piezoelectric reed encased in a housing having a cap and a base;

the resonator being placed inside a thermostatically controlled containment comprising sides limited by a bottom and by at least one cover, wherein the thermostatically controlled containment comprises an outer cell possessing a bottom and sides and an inner cell possessing a bottom and sides, the inner cell being fitted into the outer cell in such a way that their sides are in direct contact; and

wherein the bottom of the thermostatically controlled containment has at least the bottom of the outer cell and the bottom of the inner cell.

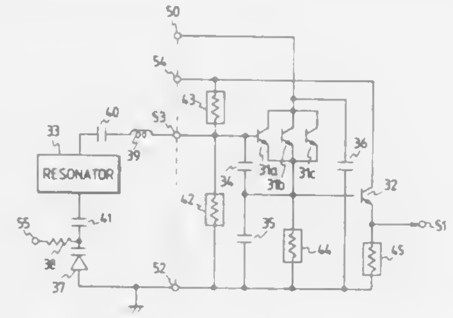
5,025,229
VOLTAGE-CONTROLLED OSCILLATOR USING A SURFACE ELASTIC WAVE RESONATOR

Makoto Hasegawa, Tokyo; Kazuaki Takahashi, Kawasaki; Mitsuo Makimoto, Yokohama; Masao Takahashi, Chigasaki, and Takayuki Shimazu, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan
Filed May 24, 1990, Ser. No. 528,079
Claims priority, application Japan, Jun. 1, 1989, 1-140452
Int. Cl.⁵ H03B ***5/30***
U.S. Cl. 331—107 A **2 Claims**

1. A Colpitts voltage-controlled oscillator comprising:

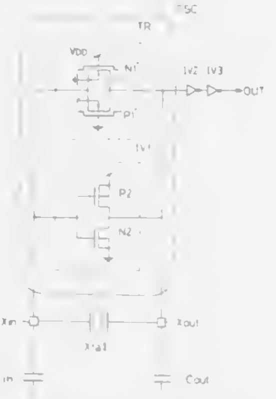
an integrated circuit including a transistor comprising a parallel combination of sub transistors, a bypass capacitor connected between a collector of the transistor and a ground, a first feedback capacitor connected between a base and an emitter of the transistor, a second feedback capacitor connected between the emitter of the transistor and the ground, and an emitter follower connected to the emitter of the transistor; and

a series combination of an inducer, a surface elastic wave resonator, and a variable capacitance diode, the series combination being disposed outside the integrated circuit and being connected between the base of the transistor and ground.



5,025,230
OSCILLATOR CIRCUIT INCORPORATED IN A SEMICONDUCTOR CIRCUIT

Hitoshi Kondo, Yokohama; Hiroyuki Suwabe, Odawara, and Aiki Kojima, Yamato, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed May 16, 1990, Ser. No. 524,017
Claims priority, application Japan, May 17, 1989, 1-123762
Int. Cl.⁵ H03B ***5/36***
U.S. Cl. 331—116 FE **8 Claims**



1. An oscillator circuit incorporated in a semiconductor integrated circuit and having an oscillation input terminal and an oscillator output terminal to which an external oscillator is connected, said oscillator circuit comprising:

an inverting logic circuit comprising transistors formed on the semiconductor substrate of said semiconductor integrated circuit, connected to receive a signal input through said oscillation input terminal, and adapted to supply an output signal through said oscillation output terminal;

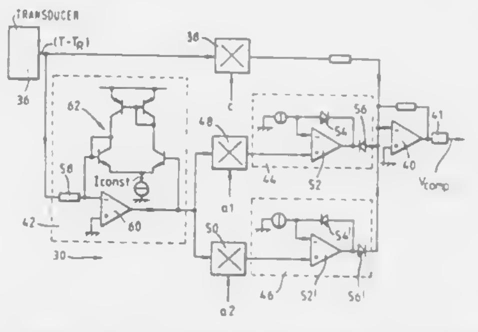
an N-type MOS transistor formed on said semiconductor substrate, and having a source electrode and a drain electrode one of which is connected to said oscillation input terminal, and the other of which is connected to said oscillation output terminal, and a gate electrode which is connected to receive a first potential for turning on the N-type MOS transistor; and

a P-type MOS transistor formed on said semiconductor substrate, and having a gate-insulating film, a source electrode and a drain electrode, one of which is connected to said oscillation input terminal, and the other of which is connected to said oscillation output terminal, and a gate electrode which is connected to receive a second potential for turning on the P-type MOS transistor,

wherein the gate-insulating film of at least one of said MOS transistors is thicker than those of other MOS transistors formed on said semiconductor substrate.

5,025,231
TEMPERATURE-CONTROLLED CRYSTAL OSCILLATOR CIRCUIT

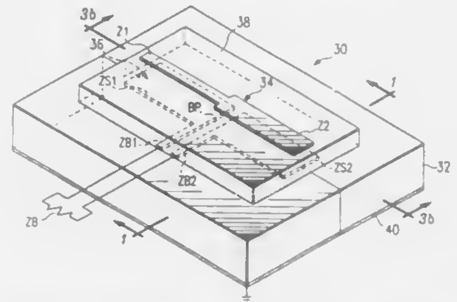
Bjarne Schwartzbach, Cambridge, England, assignor to U.S. Philips Corp., New York, N.Y.
Filed May 25, 1990, Ser. No. 529,044
Claims priority, application United Kingdom, Jun. 9, 1989, 8913322
Int. Cl.⁵ H03B ***5/36;*** **H03L** ***1/02***
U.S. Cl. 331—116 R **14 Claims**



1. A method of temperature controlling a crystal oscillator circuit including a crystal and a frequency pulling element, the method comprising generating a compensating voltage in accordance with a function formed by a linear term, an exponential term and an inverse exponential term, and applying the compensating voltage to the frequency pulling element.

5,025,232
MONOLITHIC MULTILAYER PLANAR TRANSMISSION LINE

Anthony M. Pavio, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Oct. 31, 1989, Ser. No. 429,679
Int. Cl.⁵ H01P ***5/10***
U.S. Cl. 333—26 **12 Claims**



1. A multilayer planar transmission line, comprising:

(a) a dielectric substrate with substantially planar opposing surfaces of a predetermined planar configuration;

(b) an interlevel conductive layer configured by at least one balance point gap, such that separate transmission lines are provided between each of the interlevel conductor sections and, respectively, a top conductive layer and a groundplane reference;

(c) an interlevel dielectric layer of a predetermined planar configuration disposed over said interlevel conductor with a predetermined dielectric constant significantly thinner than said substrate;

(d) said top conductive layer being of predetermined planar configuration disposed over said interlevel dielectric layer;

(e) said groundplane conductive layer disposed on the op-

VOL
1127
ISS
3
JE
18
1991
UMI

posing substantially planar surface of said substrate, providing a groundplane reference for said top conductive layer and said interlevel conductive layer to provide three transmission lines, a top/interlevel transmission line, an interlevel/groundplane transmission line, and a top/-groundplane transmission line with predetermined impedance characteristics;

(f) input terminals across one of said sections of said interlevel conductive layer and said top conductive layer; and

(g) a load coupled across said balance point gap.

5,025,233

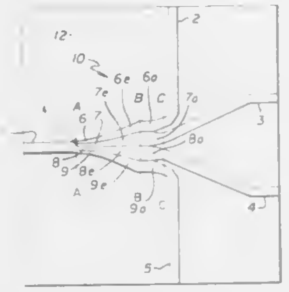
BROADBAND POWER DIVIDER

George L. Leonakis, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 31, 1989, Ser. No. 331,555

Int. Cl.^{5} H01P *5/02*

U.S. Cl. 333—128 **16 Claims**



1. A broadband power divider comprising:

an input section of conductive material;

N tapered sections of conductive material, where N is greater than or equal to 2, extending from and integral with said input section, each of said tapered sections including an even mode subsection having a first taper and an odd mode subsection having a second taper; and

N output sections of conductive material, each output section being electromagnetically decoupled from the other output sections and each output section extending from and integral with a respective one of said tapered sections.

5,025,234

TRANSVERSAL FILTER WITH WIDE BAND PHASE SHIFTERS IN SERIES WITH THE DELAY CELLS

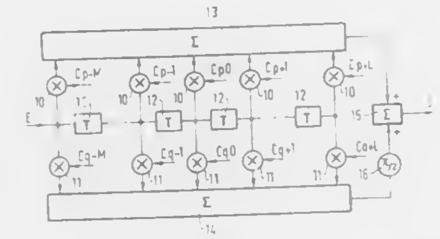
Olivier De Luca, Suresnes, France, assignor to Alcatel N.V., Amsterdam, Netherlands

Filed Feb. 8, 1989, Ser. No. 308,308

Claims priority, application France, Feb. 9, 1988, 88 01504

Int. Cl.^{5} H03H *15/00;* **H04B** *3/14*

U.S. Cl. 333—166 **7 Claims**



1. A transversal filter for filtering an input signal comprising an intermediate carrier having an in-phase portion and a quadrature portion, said filter comprising:

a linear array of $M+L+1$ branches and comprising

a central branch having an associated index $i=0$,

L trailing branches each having a respective positive index i where $+1 \leqq i \leqq +L$, and

M leading branches each having a respective negative index i where $-M \leqq i \leqq -1$;

wherein each of said $M+L+1$ branches further comprises

a branch midpoint which functions as a branch input terminal, with the input signal being directly input to the midpoint of the branch of index $-M$,

a first multiplier for multiplying any branch input signal present at the branch midpoint by a first coefficient Cp_i corresponding to said in-phase portion to provide a first branch output, and

a second multiplier for multiplying the branch input signal by a second coefficient Cq_i corresponding to said quadrature portion to thereby produce a second branch output;

$M+L$ delay cells each providing a delay T;

$M+L$ wideband phase shifters each connected in series with a respective one of said $M+L$ delay cells, the series connection of each phase shifter and its respective delay cell being coupled between the branch midpoint of a respective branch of index i and the branch midpoint of an immediately succeeding branch of index $i+1$ where $-M \leqq i < L$, each said phase shifter providing a phase shift $\delta\phi$ such that $\delta\phi = \Omega_O T$ (modulo 2π) where Ω_O is the angular frequency of the intermediate carrier;

a first summing circuit for summing the outputs of the first multipliers to provide a first summing circuit output;

a second summing circuit for summing the outputs of the second multipliers to provide a second summing circuit output;

a $\pi/2$ phase shifter responsive to the output of the second summing circuit to provide a $\pi/2$ phase shifter output; and

a third summing circuit for summing the output of the first summing circuit and the output of the $\pi/2$ phase shifter, said third summing circuit providing an output of the filter,

whereby any intermediate carrier signal present at the branch midpoint of index i is subjected to a delay of $i.T$ and a phase shift of $i.\delta\phi$ relative to a corresponding signal at the branch midpoint of index 0.

5,025,235

MICROSTRIPLINE INTERDIGITAL PLANAR FILTER

Protap Pramanick, Cambridge, Canada, assignor to Com Dev Ltd., Cambridge, Canada

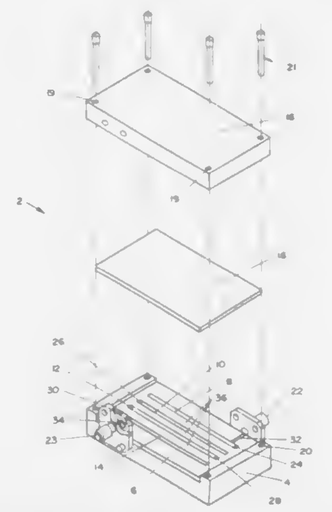
Filed Apr. 27, 1989, Ser. No. 343,801

Claims priority, application Canada, Feb. 9, 1989, 590567

Int. Cl.^{5} H01P *1/203*

U.S. Cl. 333—204 **11 Claims**

1. A microstripline interdigital planar filter comprising a housing containing a dielectric substrate having a moderate dielectric constant, a plurality of microstrip resonators being located on said substrate in the form of a metal pattern, all resonators of said filter being located in a common plane a cover for the metal pattern, said cover being spaced apart from said metal pattern when mounted on said housing to create a space therebetween, a dielectric superstrate of a size and thickness to completely cover said resonators and to fill said space being located between the metal pattern and said cover, said superstrate is ceramic having a high dielectric constant and a high Q, said filter having an input and output.



5,025,236

CIRCUIT BREAKER

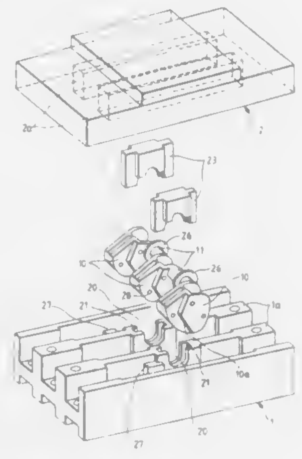
Masao Miura; Naoshi Uchida; Tatsunori Takahashi; Kouji Asakawa, and Eiji Nozawa, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Aug. 27, 1990, Ser. No. 572,467

Claims priority, application Japan, Sep. 7, 1989, 1-232068; Mar. 20, 1990, 2-71071; May 31, 1990, 2-142225

Int. Cl.^{5} H01H *75/00*

U.S. Cl. 335—46 **8 Claims**



1. A circuit breaker comprising:

an open-and-close shaft;

holder means for holding a movable contactor, said holder means being coupled to said open-and-close shaft;

support means for rotatably supporting said open-and-close shaft;

and stopper means for stopping said open-and-close shaft, said stopper means being coupled with said support means so as to restrict an open-and-separation position of said movable contactor, wherein said circuit breaker is disposed within a case, said stopper means are formed on side faces of between-phase partitions of said case and a portion of said holder means contacts said stopper means.

5,025,237

RELAY DEVICE FOR SWITCHING RADIO FREQUENCY SIGNAL

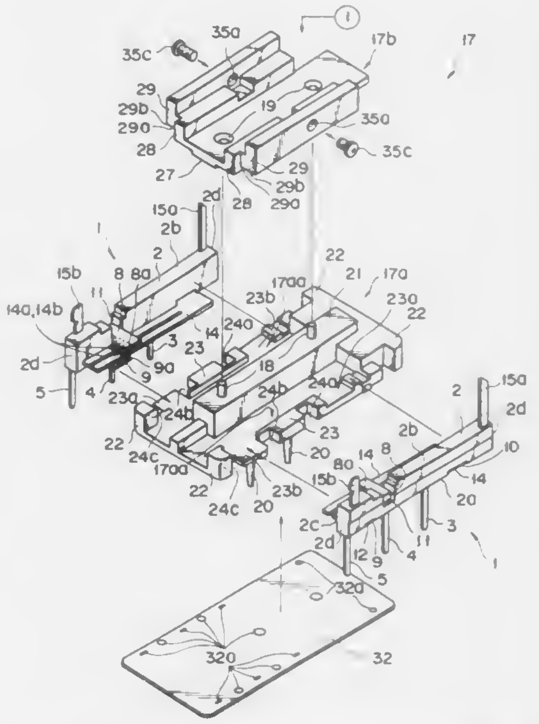
Syoji Yamazaki, Isehara; Toshikazu Oda, Hadano; Kenji Iwanaga, and Yoshitaka Gono, both of Atsugi, all of Japan, assignors to Anritsu Corporation, Tokyo, Japan

Filed Sep. 22, 1989, Ser. No. 411,548

Claims priority, application Japan, Sep. 28, 1988, 63-240769; Sep. 28, 1988, 63-240770; Aug. 28, 1989, 1-220676

Int. Cl.^{5} H01H *51/22*

U.S. Cl. 335—83 **16 Claims**



1. A relay device for switching a radio frequency signal, said device comprising:

first and second contact blocks each having a substantially rectangular insulating member, a pair of stationary contact members projecting inward from said insulating member and supported with a predetermined interval therebetween, a movable contact member arranged between said pair of stationary contact members and supported by said insulating member, and first, second, and third terminals for electrically extracting said pair of stationary contact members and said movable contact member, respectively, and projecting from a base portion of said insulating member with predetermined intervals therebetween;

an electromagnet having a movable member for commonly acting on said movable contact members of said first and second contact blocks to move each movable contact member toward one of said pair of stationary contact members of each of said first and second contact blocks;

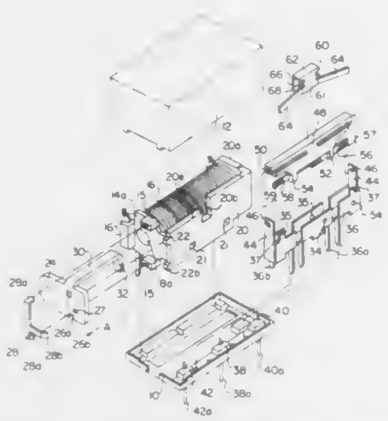
a shielding block member with a substantially H-shaped section, having two storage spaces for storing said first and second contact blocks, respectively, a support portion for mounting said electromagnet, and a predetermined number of notched portions for guiding said first, second, and third terminals of each of said first and second contact blocks, at least a surface of said shielding block member being conductive; and

a shielding case for shielding at least an edge of an opening portion of said shielding block member.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,238
ELECTROMAGNETIC RELAY

Ken-iti Matuo; Muneo Nakata; Mitukazu Hori, and Isaji Tanihara, all of Nagano, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan
Continuation of Ser. No. 334,631, Apr. 7, 1989, abandoned. This application Apr. 12, 1990, Ser. No. 508,494
Claims priority, application Japan, Apr. 7, 1988, 63-86156; Apr. 8, 1988, 63-86628; May 13, 1988, 63-63138[U]
Int. Cl.^{5} H01H *67/02*
U.S. Cl. 335—128 **14 Claims**



1. An electromagnetic relay, comprising:

a electromagnet consisting of an iron core and a solenoid wound thereon;

a yoke extending in parallel with said electromagnet and attached to one end of said iron core;

an armature pivotally attached to a part of said yoke adjacent to another end of said iron core at its base end;

a fixed contact unit provided adjacent to said electromagnet;

a movable contact carrier pivotally supported on each end by an axial projection along a pivot axis substantially parallel to said iron core, said movable contact carrier having at least one movable contact member substantially parallel to said pivot axis;

wherein at least one pair of fixed contact members is provided in said fixed contact unit and aligned along an axis parallel to said pivot axis;

an extension arm extending from said armature and having a free end adapted to abut an actuation point of said movable contact carrier located between said pivot axis and said movable contact member carried thereby;

said movable contact member being adapted to come into contact with and move apart from said pair of fixed contact members provided in said fixed contact unit by pivotally moving said movable contact carrier.

5,025,239
ELECTROMAGNETIC ACTUATOR FOR CAMERAS AND THE LIKE

Toshihiko Ishimura; Akira Okuno; Nobuharu Murashima; Hideo Kajita; Yasuo Hawai; Junichi Tanii, and Reiji Seki, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan
Filed Mar. 30, 1989, Ser. No. 330,450
Claims priority, application Japan, Apr. 1, 1988, 63-78093; Apr. 1, 1988, 63-78094; Apr. 11, 1988, 63-87386; May 11, 1988, 63-115401; May 11, 1988, 63-115402; May 11, 1988, 63-115403
Int. Cl.^{5} H01F *7/08, 3/00;* **G03B** *7/08*
U.S. Cl. 335—265 **5 Claims**

1. An electromagnetic actuator, comprising:

a core formed of a magnetic material;

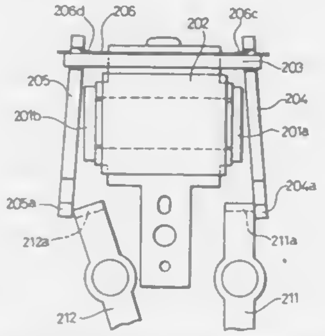
a coil wound around said core;

a yoke formed of a magnetic material and extended substantially in parallel to an axis of said core;

a first armature formed of a magnetic material and supported at one end thereof on one end of said yoke so as to be located opposite to one end of said core;

a second armature formed of a magnetic material and supported at one end thereof on the other end of said yoke so as to be located opposite to the other end of said core;

a first operating member which is actuated by said first armature;

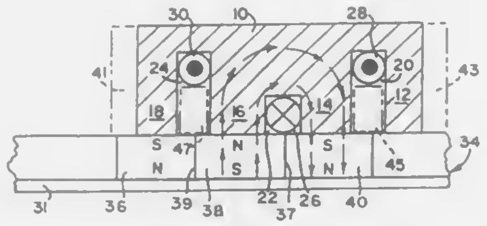


a second operating member which is actuated by said second armature; and

a positioning and holding device which positions and holds one of said armatures on a corresponding end of said core before the other armature is attracted to the other corresponding end of said core.

5,025,240
METHOD AND APPARATUS FOR FORMING MAGNETIZED ZONES ON A MAGNETIZABLE BODY

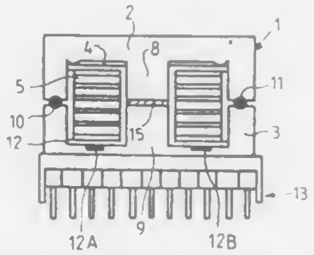
Mark E. La Croix, New Hartford, Conn., assignor to The Torrington Company, Torrington, Conn.
Filed Aug. 30, 1989, Ser. No. 400,635
Int. Cl.^{5} H01F *13/00*
U.S. Cl. 335—284 **10 Claims**



1. Apparatus for forming a series of magnetized zones on a magnetizable body comprising: a magnetizing conductor; an electric current pulse source for feeding electric current pulses through said magnetizing conductor to create a magnetic field; and at least one magnetic field dampening means having means spaced a predetermined distance from the magnetizing conductor and positioned so that the magnetic field created by the pulses fed through the magnetizing conductor is dampened adjacent said magnetic field dampening means whereby an electric current pulse fed through the magnetizing conductor creates a magnetic field which will penetrate that portion of the magnetizable body adjacent the magnetizing conductor with substantially no penetration of that portion of the magnetizable body adjacent the dampening means.

5,025,241
TRANSFORMER OF FERRITE CLOSED MAGNETIC CIRCUIT TYPE

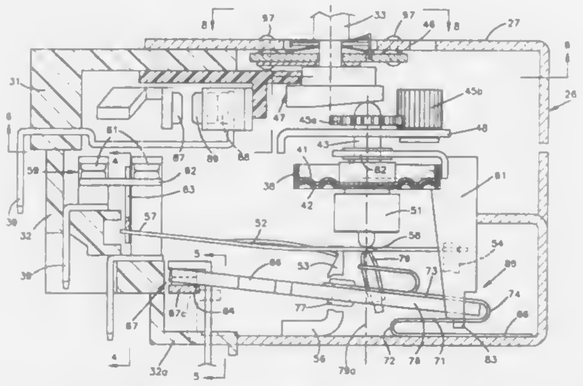
Jean-Michel Bouillot, Arc les Gray; Thierry Coutureau, Dole, and Patrick G. Decuyper, Dijon, all of France, assignors to Orega Electronique et Mecanique, Courbevoie, France
Filed Feb. 16, 1990, Ser. No. 480,763
Claims priority, application France, Mar. 28, 1989, 89 03985
Int. Cl.^{5} H01F *17/06, 27/26*
U.S. Cl. 336—100 3 Claims



1. A transformer comprising a ferrite closed magnetic circuit including a gap in the circuit and a winding support carrying at least one electrically separated coil, wherein the gap is filled with with a single component mastic selected from the group consisting of polysulfides and polyurethanes.

5,025,242
OVEN THERMOSTAT

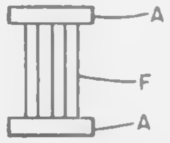
Calvin J. Holtkamp; George L. Hetrick, and Richard Warren, all of Mansfield, Ohio, assignors to Robertshaw Controls Company, Inc., Richmond, Va.
Filed Jul. 24, 1990, Ser. No. 558,324
Int. Cl.^{5} H01H *37/36, 37/12*
U.S. Cl. 337—309 29 Claims



1. An oven control for self-cleaning ovens comprising a body, a hydraulic sensing unit having a wafer-like bellows mounted in said body, said bellows providing first and second opposed side walls movable apart in response to increased sensed temperature and toward each other in response to decreases in sensed temperature, an elongated control shaft mounted in said body for rotation about its axis, cam means mounted on said shaft operating to adjustably position said first wall of said bellows relative to said body, first switch connected for operation by said second side wall for controlling the temperature of an associated oven, said cam means operating to move said first side wall relative to said body to adjust the temperature of operation of said first switch within a range of temperatures, and a second switch operated by said second side wall in response to a substantially fixed predetermined temperature regardless of the position of said cam means.

5,025,243
INFRARED DETECTIVE ELEMENT

Hiroshi Ichikawa, Yokohama, Japan, assignor to Nippon Carbon Co., Ltd.; Sogo Security Services Co. and Hiroaki Yanagida, all of Tokyo, Japan
Filed Oct. 5, 1989, Ser. No. 417,477
Int. Cl.^{5} H01L *31/08*
U.S. Cl. 338—18 **2 Claims**

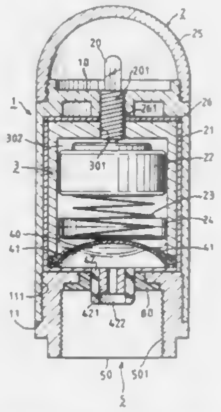


1. An infrared detective element for detecting a dose of infrared rays by a change in electrical resistance of monofilaments composed mainly of silicon carbide upon infrared radiation thereto,

the monofilaments having a resistivity of 1.0×10^5 to 1.0×10^3 Ω.cm at room temperature and a diameter of 3 to 200 μm, the monofilaments being arranged between electrodes without bringing them into contact with each other.

5,025,244
TIRE PRESSURE INDICATOR

Tien-Tsai Huang, No. 4, Lane 30, Wu-Chang St., Pan-Chiao City, Taiwan
Continuation of Ser. No. 407,351, Sep. 14, 1989, Pat. No. 4,945,357. This application Jul. 27, 1990, Ser. No. 558,647
Int. Cl.^{5} B60C *23/00*
U.S. Cl. 340—442 **2 Claims**



1. A tire pressure indicator having a hollow cylindrical body formed with a closed side at one end thereof and an open side at another end thereof for being positioned on a tire valve of an associated tire, comprising:

a pressure-indicating mechanism having a visible tire-deflated condition and a tire-inflated condition;

a sleeve member with a closed side located at a lower end thereof movably disposed in the hollow cylindrical body with a portion of said pressure-indicating mechanism being received therein;

a piston means movably disposed in an inner chamber of said pressure-indicating mechanism so as to be controlled by the tire pressure of an associated tire for operating said pressure-indicating mechanism to indicate the tire-deflated and tire-inflated conditions in conjunction with the tire pressure of the associated tire;

a pressure sensing means fixedly provided under said piston means for being detachably connected to the time valve of

VOL
1127
ISS
3
JE
18
1991
UMI

the associated tire to monitor and indicate the pressure of the associated tire; and

a supporting base, having an air chamber formed therein with internal and external threads provided therearound, screw-connected to the open side of the hollow cylindrical body for being detachably connected to the tire valve of the associated tire; whereby, with said tire pressure indicator being detachably connected to an associated tire, the pressure of the associated tire can be monitored and indicated via the pressure-indicating mechanism without incurring any air pressure leakage therefrom even when the hollow cylindrical body is damaged or loosened.

5,025,245

PEDESTRIAN SIGNAL SYSTEM FOR AUTOMOBILES

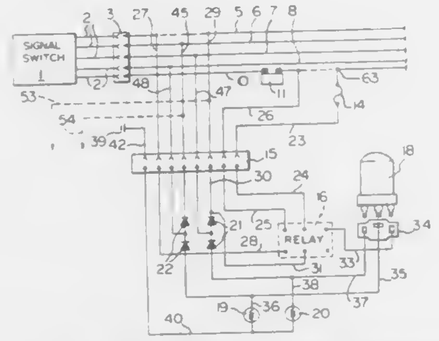
Otto Barke, 6423 - 14 Avenue, Edmonton, Alberta, Canada T6L 1Y1

Filed Jun. 26, 1989, Ser. No. 371,005

Claims priority, application Canada, Nov. 24, 1988, 584368

Int. Cl.^{5} B60Q *1/26*

U.S. Cl. 340—471 **3 Claims**



1. An auxiliary signal system for automobiles of the type including a main signal system defined by front and rear, right and left stop and amber turn indicators, and a flasher for indicating an emergency, said auxiliary signal system comprising relay means for connection to the main signal system to supply power to the auxiliary system and to render the main signal system inoperative when the auxiliary system is operating, auxiliary flasher means for supplying power alternately to the left and right vehicle turn indicators when the relay means is activated; timer means connected to said relay means for controlling the duration of operation and automatic shut-off of the auxiliary system; control circuit means connected to and receiving power from said main signal system and from the vehicle brake system, said control circuit means incorporating said relay means and said timer means for controlling operation of said flasher means, whereby actuation of the vehicle brakes and of the control circuit means by a driver causes alternating flashing of the vehicle front and rear turn indicator lights which continues for a predetermined period of time after the brake pedal is released.

5,025,246

EAS TAG WITH MOTION DETECTION FACILITY

Howard M. Schenkel, Boca Raton, Fla., assignor to Sensormatic Electronics Corporation, Deerfield Beach, Fla.

Filed Apr. 10, 1990, Ser. No. 507,655

Int. Cl.^{5} G08B *13/14;* **H01H** *35/02*

U.S. Cl. 340—572 **27 Claims**

1. In combination:

(a) an EAS tag inclusive of an electrical power source contained with said tag and circuitry powered by said electrical power source; and

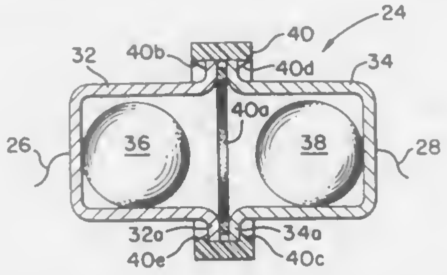
(b) a motion sensor operatively associated with said tag and contained therewith, said motion sensor being connected electrically between said electrical power source and such tag circuitry, said motion sensor comprising

I. first and second housings comprised of electrically conductive material,

II. first and second electrically conductive means movably supported respectively in said first and second housings, and

III. joinder means for interconnection of said first and second housings, said joinder means being comprised of electrically insulative material and defining a passage permitting movement of said first and second electrically conductive means between said first and second housings responsively to orientation of said tag,

said joinder means, said first and second housings and said first and second electrically conductive means being collectively dimensioned to provide for electrical conductivity between said first and second housings upon reorientation of said tag from disposition wherein neither of said first and second electrically conductive means are in registry with said joinder means.



5,025,247

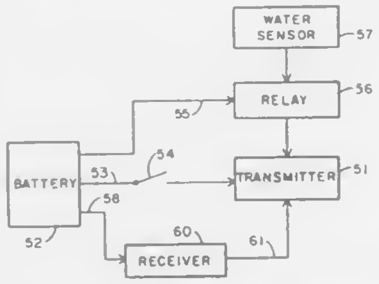
PORTABLE EMERGENCY ALERT SYSTEM

James C. Banks, 30924 Mission Avenue, Tavares, Fla. 32778

Filed Apr. 9, 1990, Ser. No. 506,293

Int. Cl.^{5} G08B *13/00, 21/00*

U.S. Cl. 340—574 **5 Claims**



1. A portable emergency alarm system comprising:

a power source;

a digital receiver having a latch relay connected in circuit with said power source;

at least one of a sound alarm and light means connected in circuit with said latch relay;

a portable digital transmitter having a failsafe activating means for triggering said receiver means latch relay and thereby energizing said sound alarm and light means; and

a water sensor attached to said portable digital transmitter to energize an alarm system whenever the transmitter is immersed in a body of water, said water sensor having a pair of dissimilar metal electrodes spaced by an insulator for generating a galvanic current for actuating said transmitter.

5,025,248

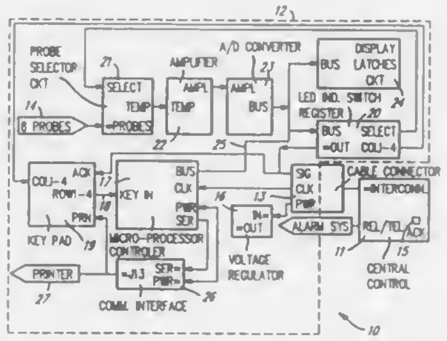
AUTOMATIC TEMPERATURE MONITORING SYSTEM

Réal Bergeron, Ste-Marthe-sur-le-Lac, Canada, assignor to Microthermo, Laval, Canada

Filed Sep. 1, 1989, Ser. No. 402,885

Int. Cl.^{5} G08B *17/06;* **G01K** *13/00;* **H02J** *7/00*

U.S. Cl. 340—596 **16 Claims**



1. An automatic temperature monitoring system comprising a central control circuit and one or more processing circuits connected in parallel to said central control circuit, each said processing circuit having one or more remote temperature sensing probes connected thereto, each said processing circuit having switch means operable by a user for programming microcontroller circuit of said processing circuit and for setting high and low temperature limit parameters as well as alarm time delay parameters for analyzing current signals generated by each said remote temperature sensing probe, display means for displaying numerical values of said temperature and limit parameters, access output means for accessing stored information signals in said microcontroller and representative of accumulated monitored signals received from said sensing probes on a predetermined periodic basis, alarm means for generating an alarm upon detection of an alarm condition by said microcontroller, said probes having current generating means for generating said current signals which are proportional to an ambient temperature sensed by said probes, and control means having memory means for controlling the operation of said processing circuit, said probes being connected to selection means of said processing circuit, converting means from converting said current signals of said probes to digital signals, said control means storing said digital signals in said memory means and being responsive to a program stored in said memory means, said switch means is a keypad having a plurality of switches for accessing programmed functions in said stored program, and said programmed functions being accessible through a source code.

5,025,249

PIXEL LOOKUP IN MULTIPLE VARIABLY-SIZED HARDWARE VIRTUAL COLORMAPS IN A COMPUTER VIDEO GRAPHICS SYSTEM

Larry D. Seiler, Boylston; James L. Pappas, Leominster, and Robert C. Rose, Hudson, all of Mass., assignors to Digital Equipment Corporation, Hudson, Mass.

Filed Jun. 13, 1988, Ser. No. 206,026

Int. Cl.^{5} G09G *1/00*

U.S. Cl. 340—721 **11 Claims**

1. A computer video graphics system for displaying pixel values in one or more windows on a monitor, comprising:

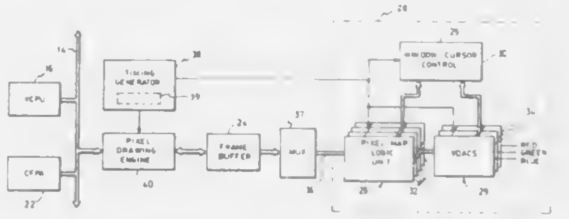
a. a physical color lookup table for storing one or more virtual color lookup tables for producing digital color values to be displayed on the monitor;

b. a pixel value memory containing pixel values for indexing into one or more virtual color lookup tables;

c. means for providing a window number corresponding to each pixel value in the pixel value memory;

d. a base value lookup table having a base value for each window, said base value lookup table having means for allowing access to said base value lookup table by using said window numbers as indices into said base value lookup table; and

e. adders for adding pixel values to the base value from the base value lookup table thereby to produce indices into the physical color lookup table.



5,025,250

MATRIX DISPLAY DEVICE

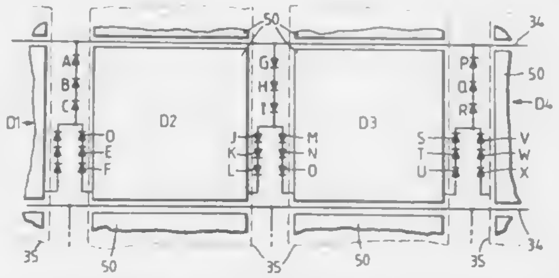
Ralph N. Hains, Cardiff, United Kingdom, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 22, 1989, Ser. No. 327,224

Claims priority, application United Kingdom, Jun. 10, 1988, 8813778

Int. Cl.^{5} G09G *3/00, 3/36*

U.S. Cl. 340—811 **20 Claims**



1. A matrix display device comprising a plurality of row and column address conductors, a plurality of electro-optical display elements each of which is connected between a single row conductor and column conductor in series with a two terminal non-linear resistance device which comprises first and second parallel conduction branches capable of allowing current flow in respective opposite directions with each branch exhibiting a threshold characteristic and comprising a plurality of series-connected diode elements, characterized in that for each of a plurality of groups of display elements a part comprising at least one diode element of a second branch of a non-linear resistance device associated with a first display element is common to, and forms part of, a first branch of a non-linear device associated with a second display element, said second and first branches of said first and second display elements respectively each containing at least one further diode element between its associated display element and the common part.

5,025,251

SELF-TUNING DIRECT COUPLED DATA LIMITER OF A BATTERY SAVER TYPE PAGING RECEIVER

James G. Mittel, Boynton Beach, and Walter L. Davis, Coral Springs, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 29, 1989, Ser. No. 373,299

Int. Cl.^{5} H04Q *7/00;* **H04L** *25/06;* **H04B** *1/16*

U.S. Cl. 340—825.44 **9 Claims**

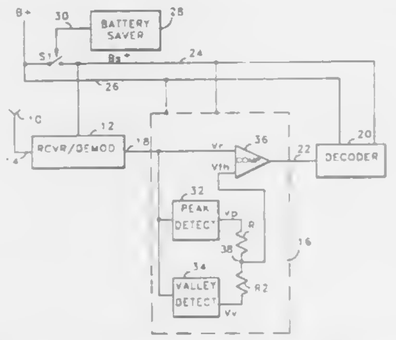
1. A battery saver type paging receiver including: an input section for receiving a paging signal transmitted from an external source, said paging signal including modulated digitally coded data words, and for demodulating said received paging signal to recover an analog signal representing the digitally

VOL 1127 ISS 3 JE 18 1991 UMI

coded data words; a data limiter section for converting the recovered analog signal into a corresponding binary bit stream representing the coded data words of said paging signal; and a battery saver section coupled to said input section and said data limiter section and to a battery powered source for cyclically energizing and de-energizing said input and data limiter sections from said battery powered source during awake and sleep periods, respectively, said data limiter section comprising:

first means operative in a first mode to acquire a peak amplitude from the recovered analog signal and to generate a first digital word representative thereof, said first means including a first storage means for storing the first digital word, said first means operative in a second mode to cause said first storage means to hold the first digital word;

second means operative in said first mode to acquire a valley amplitude from the recovered analog signal and to generate a second digital word representative thereof, said



second means including a second storage means for storing the second digital word, said second means operative in said second mode to cause said second storage means to hold the second digital word;

said first and second means being each further operative in a third mode to alter the respective first and second word thereof a predetermined count;

control means responsive to at least one command signal to control the transfer of operation of said first and second means among the first, second and third modes;

third means for converting the recovered analog signal into its corresponding binary bit stream based on said first and second digital words; and

means for generating a reference signal wherein the control means is governed by the reference clock signal in controlling the transfer among the modes of the first and second means.

5,025,252

PAGING RECEIVER WITH OVER-THE-AIR CHARACTERIZATION OF CALL SIGNAL PROCESSING

Michael J. DeLuca; Gregory O. Snowden, both of Boca Raton, and Robert D. Fennell, Coral Springs, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 3, 1989, Ser. No. 431,112

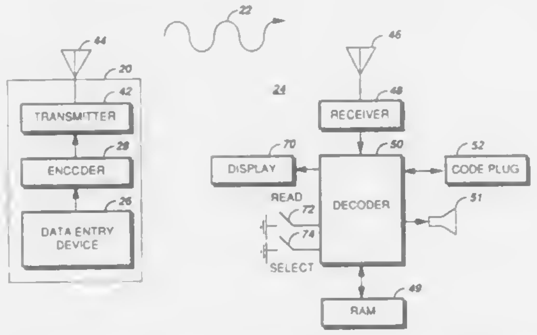
Int. Cl.^{5} H04B *7/00*

U.S. Cl. 340—825.44 **23 Claims**

1. A paging receiver being assigned at least one call address code for receiving and accepting a call signal, transmitted from an external source and including a call address code substantially consistent with said at least one assigned call address code of said receiver, said accepted call signal having a protocol capable of including message information associated with said at least one assigned call address code and a characterization code corresponding to said at least one assigned call address code, said paging receiver including a display; means responsive to a display command to display selected message information on said display; and means governed by the characterization code of said accepted call signal to disable said at least one assigned call address code such that received message information of said disabled at least one assigned call address code is prevented from being displayed on said display by said display means; said paging receiver comprising:

first means for decoding and examining said accepted call signal to identify the presence of and obtain message information associated with the call address code thereof;

means for storing said obtained message information of said accepted call signal;



second means for decoding and examining said accepted call signal to identify the presence of and obtain the characterization code thereof corresponding to said at least one assigned call address code; and

means governed by said obtained characterization code to selectively enable and disable the storage of obtained message information corresponding to said disabled at least one assigned call address code by said storing means.

5,025,253

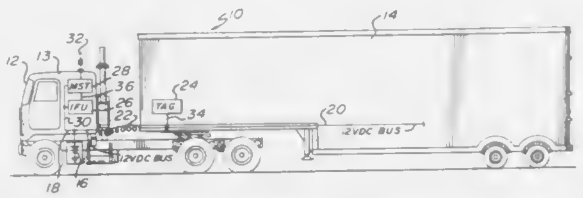
SYSTEM AND METHOD FOR REMOTELY MONITORING THE CONNECT/DISCONNECT STATUS OF A MULTIPLE PART VEHICLE

Joseph V. DiLullo, Rydal; Stephan C. Schifter, Philadelphia, both of Pa.; Michael Negin, Pennsauken, N.J., and Kenneth W. Paist, Philadelphia, Pa., assignors to Secura Corporation, Philadelphia, Pa.

Continuation of Ser. No. 258,162, Oct. 14, 1988, Pat. No. 4,897,642. This application Oct. 3, 1989, Ser. No. 416,387

Int. Cl.^{5} H04B *1/00;* **G08B** *5/22*

U.S. Cl. 340—825.06 **43 Claims**



1. Status monitoring apparatus for a vehicle having a first part and at least one second part comprising:

(a) tag means for placement on the second part of the vehicle, the tag providing a unique ID code;

(b) processing means for placement on the first part of the vehicle for detecting the presence of a valid ID code from the tag means and or providing a status indication that the second part has been connected to the first part when a valid ID code is detected and that the second part has been disconnected from the first part when a valid ID code has not been detected; and,

(c) transmitting means for placement on the first part of the vehicle for transmitting at least the status indication to a remote location.

5,025,254

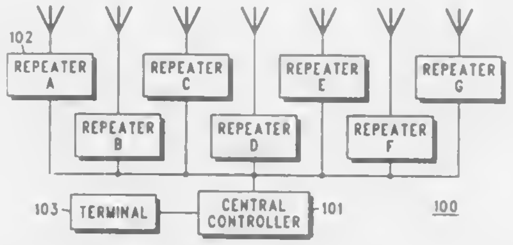
COMMUNICATION SYSTEM WITH IMPROVED RESOURCE ASSIGNMENT

David W. Hess, Hoffman Estates, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 23, 1989, Ser. No. 370,497

Int. Cl.^{5} H04Q *7/00*

U.S. Cl. 340—826 **4 Claims**



1. In a communication system having a resource controller for controlling allocation of a plurality of communication resources amongst a plurality of communication units, an improvement wherein:

(A) some, but not all, of the communication units are combined to form a first group;

(B) some, but not all, of the communication resources are continually dedicated for use only by the first group;

such that the resource controller can select from any available communication resource to support a communication between communication units belonging to the first group, but can only select from available non-dedicated communication resources to support a communication between communication units that do not belong to the first group.

5,025,255

SECURE KEYBOARD WITH RANDOM ORDER OF KEY INTERROGATION

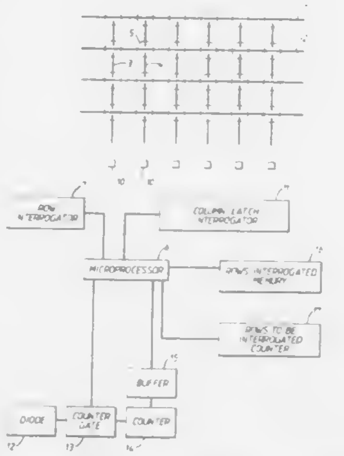
David Mould, Turners Hill, United Kingdom, assignor to H. Bollmann Manufacturers Limited, West Sussex, England

Filed Sep. 14, 1989, Ser. No. 407,315

Claims priority, application United Kingdom, Sep. 22, 1988, 8822296

Int. Cl.^{5} H03K *17/94;* **H03M** *11/20*

U.S. Cl. 341—26 **15 Claims**



1. A keyboard arrangement comprising a plurality of keys arranged in rows and columns, said rows of keys being associated with a respective first set of conductors and said columns of keys being associated with a respective second set of conductors, each key acting, on depression thereof, to interconnect respective ones of said first and second sets of conductors associated with the row and column in which the key is located; means for interrogating said rows during each of a plurality of cycles of operation by transmitting pulses to said rows to determine the presence of a transmitted pulses on any one of said columns, the interrogating means being adapted to interrogate said rows and columns in a random or quasi-random order during successive cycles of operation.

5,025,256

DATA TRANSMISSION CODE

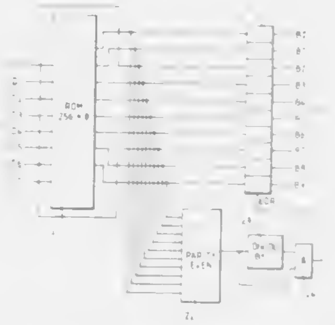
Reginald W. Stevens, Stockport, Great Britain, assignor to International Computers Limited, London, England

Filed Apr. 17, 1990, Ser. No. 510,051

Claims priority, application United Kingdom, May 31, 1989, 8912471

Int. Cl.^{5} H03M *7/00*

U.S. Cl. 341—59 **9 Claims**



1. A method of encoding data comprising:

(I) forming a set of 10-bit code blocks satisfying the following rules:

(a) each code block in the set contains either 5 bits of a first prdetermined binary value and 5 bits of a second predetermined binary value, or 4 bits of the first binary value, and 6 bits of the second binary value,

(b) no code block in the set has more than 4 contiguous bits of the first binary value of more than 4 contiguous bits of the second binary value,

(c) each code block in the set has at least one transition in the first three bits of the code block and at least one transition in the last three bits of the code block,

(d) each code block in the set contains at least four transitions, and

(e) each code block in the set contains at least two transitions in the first six bits of the code block and at least two transitions in the last six bits of the code block,

(II) receiving input 8-bit data bytes; and

(III) encoding each 8-bit data byte as one of said set of 10-bit code blocks.

5,025,257

INCREASED PERFORMANCE OF DIGITAL INTEGRATED CIRCUITS BY PROCESSING WITH MULTIPLE-BIT-WIDTH DIGITS

Richard I. Hartley, Schenectady, N.Y.; Peter F. Corbett, Princeton, N.J.; Fathy F. Yassa, and Sharbel E. Noujaim, both of Clifton Park, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 347,860, May 4, 1989, Pat. No. 4,942,396, which is a continuation-in-part of Ser. No. 204,792, Jun. 10, 1988, as ordered. This application Feb. 20, 1990, Ser. No. 482,122

Int. Cl.^{5} H03M *9/00*

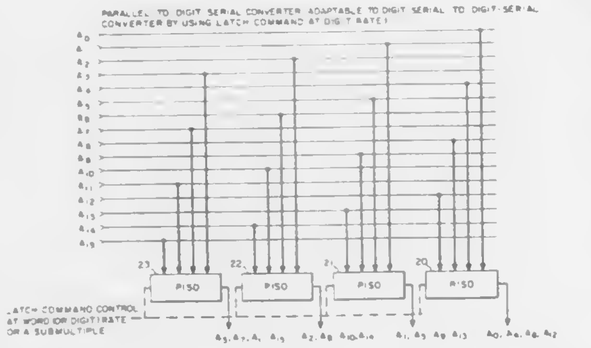
U.S. Cl. 341—101 **46 Claims**

1. A system for processing digital data, said system comprising:

first to-digit-serial converter means for converting to an m-bit-digit digit-serial format first input digital data re-

VOL
1127
ISS
3
JE
18
1991
UMI

ceived in another digital format, m being a positive plural integer at least three; and


PARALLEL TO DIGIT SERIAL CONVERTER ADAPTABLE TO DIGIT SERIAL TO DIGIT-SERIAL CONVERTER BY USING LATCH COMMAND AT DIGIT RATE)
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PISO
LATCH COMMAND CONTROL AT WORD (OR DIGIT) RATE OR A SUBMULTIPLE

first digit-serial processing means for processing said first input digital data, as supplied in m-bit-digit digit-serial format from said first to-digit-serial converter, to generate first output digital data in m-bit-digit-serial format.

5,025,258

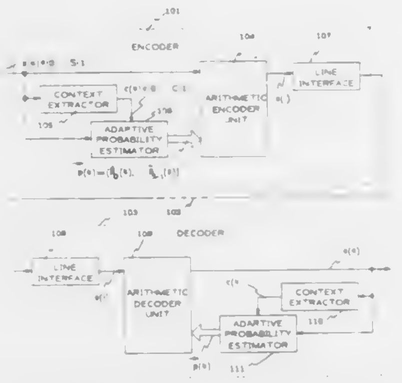
ADAPTIVE PROBABILITY ESTIMATOR FOR ENTROPY ENCODING/DECODING

Donald L. Duttweiler, Rumson, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 1, 1989, Ser. No. 359,559

Int. Cl.⁵ H03M *7/00*

U.S. Cl. 341—107 **27 Claims**



1. An adaptive probability estimator for generating probability estimates of a supplied signal having a plurality of symbol values in a supplied context to be used in entropy encoding/decoding, comprising:

a source of the supplied signal;

means for obtaining representations of accumulated occurrences of individual symbol values of said supplied signal in said supplied context; and

means responsive to said representations of accumulated occurrences for adjusting a rate of adaptation of the adaptive probability estimator in accordance with a prescribed criterion, said means for adjusting including means for obtaining at least a first prescribed characteristic of said representations of accumulated occurrences and means responsive to said first prescribed characteristic for proportionately adjusting said representations of accumulated occurrences when said first prescribed characteristic meets said prescribed criterion.

5,025,259

ANALOG-TO-DIGITAL CONVERSION SYSTEM FOR AN ELECTRONIC CONTROL SYSTEM OF A MOTOR VEHICLE

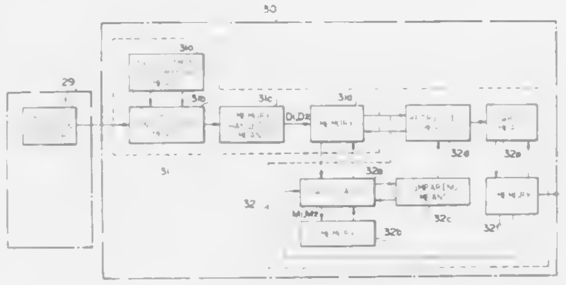
Kunihiro Abe, Higashimurayama, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 9, 1990, Ser. No. 462,585

Claims priority, application Japan, Jan. 19, 1989, 1-010679

Int. Cl.⁵ H03M *1/06*

U.S. Cl. 341—118 **5 Claims**



1 An analog-to-digital conversion system for obtaining digital values for an electronic control system of a motor vehicle having various sensors to detect operating conditions of said motor vehicle and to produce analog signals comprising:

input determining means for generating a select signal to select one of a plurality of channels corresponding to one of said sensors and operating conditions;

converting means responsive to said analog signals and said select signal for converting the analog signal corresponding to said one sensor and operating condition into digital signals at a predetermined timing;

changeover means responsive to said digital signals for storing said digital signals as digital values art respective addresses;

calculating means responsive to said digital values for calculating a difference between a present said digital value at a present time and an old digital value obtained at a previous time and for producing a difference signal;

comparing means responsive to said difference signal for effectively comparing said present digital value with said old digital value in order to select a smallest difference value and for producing a corresponding signal; and

retrieving means responsive to said corresponding signal for retrieving as a newly obtained digital value the digital value corresponding to said smallest difference value stored in said respective address, whereby influence of noise in said newly obtained digital value have been eliminated without delay.

5,025,260

MEASURING SYSTEM

Alexander Colquhoun, Heilbronn-Frankenbach, and Klaus Berchtold, Heilbronn, both of Fed. Rep. of Germany, assignors to Telefunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Jun. 20, 1989, Ser. No. 368,544

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1988, 3821216

Int. Cl.⁵ G01S *13/08*

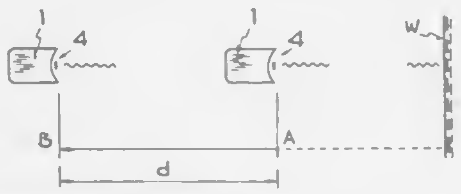
U.S. Cl. 342—127 **23 Claims**

1. A measuring system for measuring a distance between first and second points, comprising:

a transmission and reception section having transmitting, receiving and detecting means for transmitting a first signal with a predetermined transmission frequency so as to be reflected off of a fixed object during a movement of the transmission and reception section from a first point to a second point, and concurrently with the transmission of

the first signal, receiving and detecting a frequency of the reflected signal;

means, responsive to the reflected signal received by said transmitting, receiving and detecting means, for producing a second signal having a frequency which is based on a difference between the predetermined frequency and the detected frequency of the reflected signal, the difference resulting from a Doppler effect on the detected frequency of the reflected signal caused by the movement of the transmission and reception section; and



an evaluation unit including

means for counting a total number of periods of the second signal from a time when the transmission and reception section leaves the first point until a time when the transmission and reception section arrives at the second point, and

means for calculating the distance based on the counted total number.

5,025,261

MOBILE OBJECT NAVIGATION SYSTEM

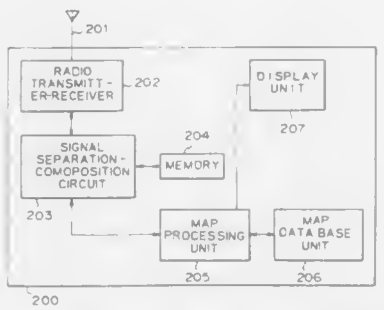
Tomozo Ohta, Ikoma; Hiroshi Nakano, and Masao Miyazaki, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 16, 1990, Ser. No. 464,141

Claims priority, application Japan, Jan. 18, 1989, 1-10837; Feb. 6, 1989, 1-26875

Int. Cl.⁵ H04B *7/185;* **G01S** *5/02*

U.S. Cl. 342—357 **8 Claims**



1. A mobile navigation system using a communication system between at least one mobile object and a key station, comprising:

means, mounted on the mobile object, for determining the position of the mobile object;

means, mounted on the mobile object, for transmitting data representative of the determined position to the key station via the communication system;

a data base unit, mounted in the key station, for storing map data;

means, mounted in the key station, responsive to the transmitted position data for deriving from the data base unit map data of an area that includes the position of the mobile object;

means, mounted in the key station, for transmitting data including the derived map data to the mobile object via the communication system; and

means, mounted on the mobile object, for displaying a composite image composed of the position data of the mobile object and the map data, in response to the transmitted data from the key station.

5,025,262

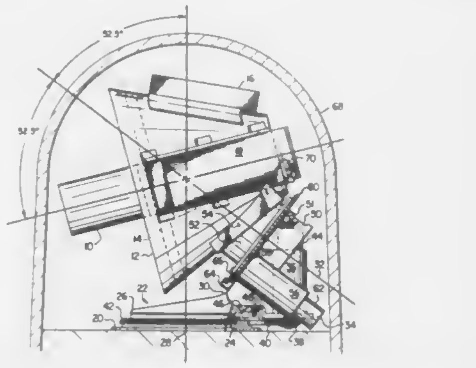
AIRBORNE ANTENNA AND A SYSTEM FOR MECHANICALLY STEERING AN AIRBORNE ANTENNA

Mohamed A. Abdelrazik, Rockwall; John D. Martin, and Boyd L. Corcoran, both of Greenville, all of Tex., assignors to E-Systems, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 927,387, Nov. 6, 1986, abandoned. This application Jun. 15, 1987, Ser. No. 61,494

Int. Cl.⁵ H01Q *3/08*

U.S. Cl. 343—705 **17 Claims**



1. An antenna/pedestal assembly for an airborne communication system, comprising:

an antenna having a longitudinal axis and including a radiating element positionable with reference to an azimuth axis and an elevation axis;

a pedestal including a pedestal base, an azimuth member having a longitudinal axis coinciding with the azimuth axis of the system, means to couple the azimuth member to the pedestal base to permit rotation of said azimuth member, azimuth steering unit to rotate the azimuth member with reference to the pedestal base, elevation member integral with the azimuth member and having longitudinal axis non-orthogonal to and intersecting the azimuth axis, interface means to couple said antenna to the elevation member of said pedestal with the longitudinal axis of the antenna non-orthogonal to and intersecting the longitudinal axis of the elevation member to permit rotation of said antenna with reference to the elevation member such that in at least one position of the antenna the longitudinal axis thereof coincides with the azimuth axis, elevation steering unit to rotate the interface means and the antenna with reference to the elevation member; and

antenna control unit, coupled to the azimuth steering unit and the elevation steering unit, to generate steering control signals in response to antenna position signals, RF signals received by said antenna and navigational and altitude information signals.

5,025,263

MULTI-FREQUENCY ANTENNA

Kengo Okamoto; Takaaki Habu, and Shoji Muroi, all of Saitama, Japan, assignors to Nippon Antenna Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 285,852, Dec. 16, 1988, abandoned. This application Dec. 19, 1989, Ser. No. 453,399

Claims priority, application Japan, Dec. 25, 1987, 62-329369

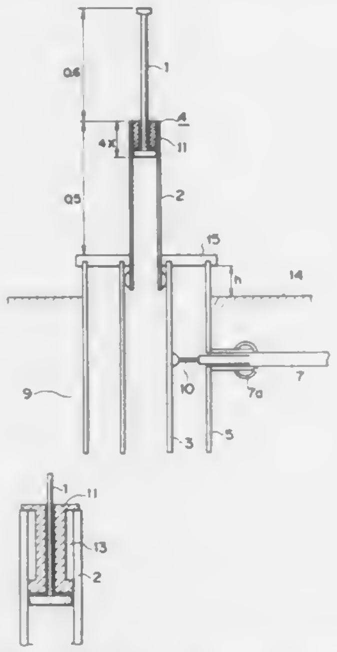
Int. Cl.⁵ H01Q *1/100, 1/320, 9/000*

U.S. Cl. 343—715 **4 Claims**

1. In a multi-frequency antenna which includes: a first rod; a second rod movably supported on said first rod by a phase shifter for extending and contracting movements relative to said first rod; a hollow third rod on which said first rod is

VOL
1127
ISS
3
JE
18
1991
UMI

movably supported and which is capable of accepting and storing said first and second rods therein; and outer pipe disposed around and immovably supporting said third rod, said outer pipe being supported by a car body so that a predetermined lengthwise portion of said outer pipe is disposed under the car body and is grounded at a predetermined position; a power feeding coaxial cable having a core connected to said third rod and having an outer skin ground connected to said outer pipe; antenna driving means for extending and contracting said second rod relative to said first rod and said first rod relative to said third rod and outer pipe; and impedance matching means which includes said third rod, said coaxial cable and said outer pipe being configured to form a coaxial line arrangement of an open trap type so that an input impedance of the outer pipe is continuous; the improvement comprising wherein said phase shifter is a dielectric element which is approximately λ/4 long electrically, is inserted in a portion of said first rod, and has second rod extending through an opening therein, and means defining between said first rod and said dielectric element an air gap having a selected size which effects a predetermined dielectric constant in the phase shifter, wherein the antenna gain and phase are dependent on said dielectric constant.



5,025,264

CIRCULARLY POLARIZED ANTENNA WITH RESONANT APERTURE IN GROUND PLANE AND PROBE FEED

Gary P. Stafford, St. Albans, England, assignor to The Marconi Company Limited, England

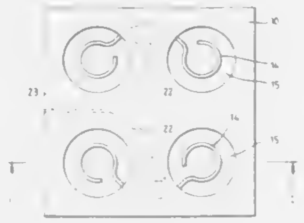
Filed Feb. 21, 1990, Ser. No. 482,525

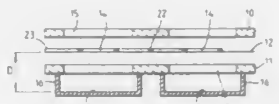
Claims priority, application United Kingdom, Feb. 24, 1989, 8904303

Int. Cl.⁵ H01Q *1/38, 13/08, 13/18*

U.S. Cl. 343—767 **14 Claims**

10. An antenna element for circularly polarized signals, comprising:
(a) a probe lying in a probe plane;
(b) an axis normal to said probe plane;
(c) a feed conductor lying in said probe plane and connected to said probe;
and (d) a ground plane spaced from, but parallel to, said probe plane;
(e) said ground plane having a resonant aperture;





(f) said probe substantially surrounding said axis and lying within a boundary formed by a projection of said resonant aperture.

5,025,265

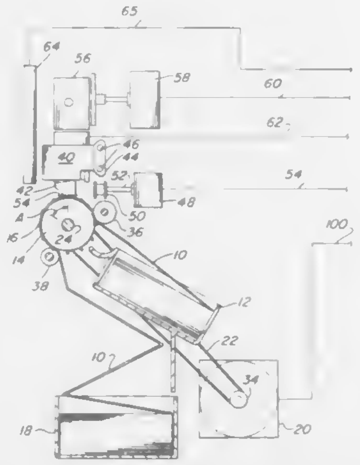
METHOD AND APPARATUS FOR INCREASING VISIBILITY OF TREND LINES ON STRIP CHART RECORDERS

Daniel J. Carr, Harleysville, and Charles R. Scally, Warminster, both of Pa., assignors to General Signal Corporation, Stamford, Conn.

Filed Dec. 21, 1988, Ser. No. 288,322

Int. Cl.⁵ G01D *9/00*

U.S. Cl. 346—1.1 9 Claims



5. A method for providing good visibility for the most recent record on a multipoint strip chart recorder of the type which periodically scans measured variables to be recorded and causes a printing mechanism to record the values of those variables as it traverses a chart being fed over a paper drive roll from a paper supply system to a paper collection system in a manner such that the lengthwise dimension of the chart represents time, comprising the steps of:
operating said printing mechanism so it traverses the chart on the top portion of the feed drive roll to record on the chart the values of measured variables which have been scanned since the previous printing of the values, said printing being such that the position of the record along the chart width is indicative of the value of the variable being recorded;
dividing the operating time of the recorder into cycles of duration depending on the time scale desired along the length of the chart so that each cycle has a fixed printing period sufficient for operation of the printing mechanism to print a record of the variables and a rest period of duration sufficient for viewing of the record;
advancing the feed drive roll at the end of each printing period to advance the chart to a rest position which is forward of the printing position, the advance of the drive roll being by an angle sufficient to make the most recent record on the chart more easily visible from a normal viewing position; and
retracting said chart from said rest position at the end of said rest period by driving the feed roll in reverse to a position which is forward of the previous printing position on the chart by an amount corresponding to that required to maintain the selected time scale for the chart so that the position of a record along the length of the chart is always indicative of the time the corresponding variable was scanned.

5,025,266

PHOTOSENSITIVE AND HEAT-SENSITIVE POLYMERS, PROCESS FOR PRODUCING THE SAME AND PROCESS FOR RECORDING INFORMATION USING THE SAME

Yasuki Shimamura, Fuji, and Jyoji Ihata, Mishima, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

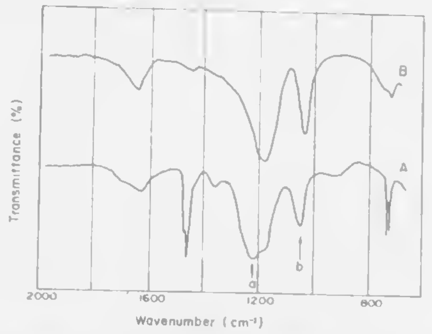
Division of Ser. No. 171,590, Mar. 22, 1988, Pat. No. 4,965,322.

This application Jul. 20, 1990, Ser. No. 554,751

Claims priority, application Japan, Apr. 6, 1987, 62-83071; Apr. 16, 1987, 62-91964; Apr. 20, 1987, 62-95055; May 18, 1987, 62-118865; Jun. 1, 1987, 62-134934; Jun. 12, 1987, 62-145235; Jul. 10, 1987, 62-171074; Jul. 15, 1987, 62-174899

Int. Cl.⁵ G01D *9/00, 15/10;* **B41M** *5/00*

U.S. Cl. 346—1.1 7 Claims



1. A process for recording information which comprises contacting a thermal head with a photosensitive and heat-sensitive polymer having conjugated polyenes and sulfonic acid groups and an absorbance ratio of a strong band in a region of 1200 cm^{-1} to 1300 cm^{-1} assignable to sulfonic acid groups adjacent to conjugated polyenes of at least 3 sequence lengths to a strong band near 1050 cm^{-1} assignable to sulfonic acid groups in a IR spectrum of at least 0.6.

5,025,267

THERMAL PRINT HEAD TERMPERATURE CONTROL

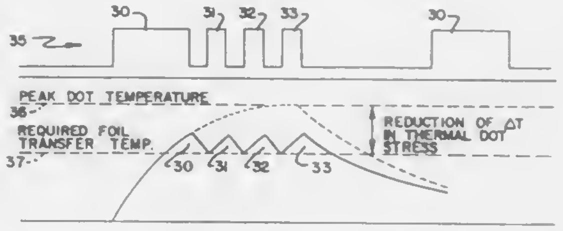
Harold D. Schofield, Naragansett, and Paul R. Caron, Tiverton, both of R.I., assignors to DataCard Corporation, Minnetonka, Minn.

Filed Sep. 23, 1988, Ser. No. 248,829

Int. Cl.⁵ G01D *9/00, 15/10*

U.S. Cl. 346—1.1 12 Claims

1. Apparatus for thermal printing of graphics images, comprising:
a thermal printhead comprised of a plurality of dot elements;
means for controlling the temperature of said dot elements and said thermal printhead, thereby optimizing print quality and reducing the thermal and electrical stress on said thermal printhead; and
wherein the temperature controlling means further includes:
hysteresis control means for determining an amount of electrical pulses supplied to said each of said dot elements in said thermal printhead;
peak temperature control means for determining the width of said pulses supplied to said dot elements in said thermal printhead;



pre-heating control means for raising the temperature of said dot elements when said dot elements have been idle for a predetermined period; and
substrate temperature control means for maintaining the temperature of said thermal printhead at a predetermined value.

5,025,268

OPTICAL SCANNING APPARATUS AND ASYMMETRICAL ASPHERIC SCANNING LENS

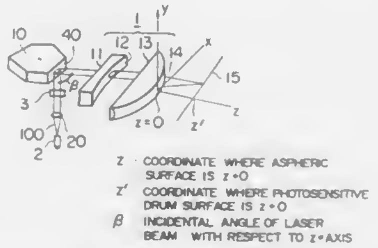
Akira Arimoto, Kodaira; Susumu Saito, Hachioji; Yoshito Tsunoda, Tokyo; Shigeo Moriyama, Tama, and Takeshi Mochizuki, Mito, all of Japan, assignors to Hitachi, Ltd. and Hitachi Koki Co., Ltd., both of Tokyo, Japan

Filed Jul. 10, 1989, Ser. No. 377,325

Claims priority, application Japan, Jul. 13, 1988, 63-172724

Int. Cl.⁵ H04N *1/21*

U.S. Cl. 346—108 **14 Claims**


1
y
10
40
12
13
11
14
x
15
β
3
z
z=0
z'
100
20
2
z COORDINATE WHERE ASPHERIC SURFACE IS z=0
z' COORDINATE WHERE PHOTOSENSITIVE DRUM SURFACE IS z=0
β INCIDENTAL ANGLE OF LASER BEAM WITH RESPECT TO z=AXIS

1. An optical scanning apparatus comprising:
a light source for emitting optical beams;
a rotating polygonal mirror for deflecting said optical beams so that the beams scan a scanning surface;
a scanning lens with an optical axis disposed between said rotating polygonal mirror and said scanning surface for imaging said rotating polygonal mirror and said scanning surface in a conjugate relationship with respect to a sub-scanning direction (y) which is perpendicular to a main scanning direction (x) to be scanned by said rotating polygonal mirror and for imaging said optical beams which have been deflected at the reflective surface of said rotating polygonal mirror at a position on said scanning surface in proportion to its scanning angle, said scanning lens having an aspheric surface having individual curvature radii in the main scanning direction and the sub-scanning direction, wherein the curvature radius in the sub-scanning direction is increased asymmetrically with respect to the optical axis with the distance between the curvature radius in the sub-scanning direction and the optical axis; and
an optical system disposed between said light source and

VOL
1127
ISS
3
JE
18
1991
UMI

said rotating polygonal mirror for converging said optical beams emitted from said light source with respect to said sub-scanning direction and making said optical beams diagonally incident upon, with respect to said optical axis of said scanning lens, said reflective surface of said rotating polygonal mirror to form an elongated shape in said main scanning direction, said optical scanning making said optical beams obliquely incident upon, with respect to said optical axis of said scanning lens.

5,025,269
COLOR ELECTROSTATIC RECORDING APPARATUS

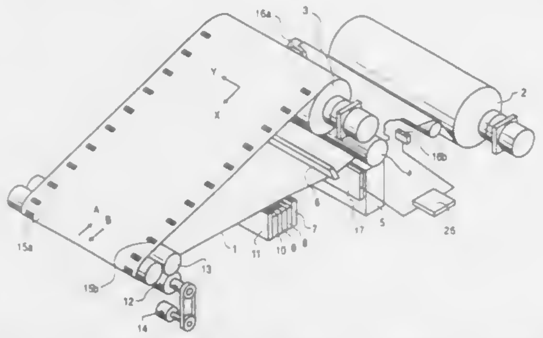
Kiyoshi Saeki, Toyonaka; Toshinori Ohtsuki, Yawata, and Kazuo Ueno, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 8, 1989, Ser. No. 433,212

Claims priority, application Japan, Nov. 10, 1988, 63-284520

Int. Cl.⁵ G01D *15/06*

U.S. Cl. 346—108 **1 Claim**



1. A color electrostatic recording apparatus comprising: transfer means for feeding a recording medium; recording means including a multi-pin electrode recording head and a plurality of developing devices provided along a transfer path of the recording medium for overlapping recording different color images in sequence onto the recording medium transferred by said transfer means; mark detecting means for provided adjacent to said multi-pin electrode recording head for detection of series of register marks arranged along at least one side edge of the recording medium; and compensation means responsive to the information given by said mark detecting means for estimating the amount of expansion/contraction and meandering of the recording medium, the former being measured at right angles to its transfer direction, and for actuating said multi-pin electrode recording head to expand or contract and shifting the recording start position of an image signal in accordance with the estimation.

5,025,270
RECORDING APPARATUS COUPLED INK SUPPLY TUBES

Kazuhisa Umezawa, Tokyo, Japan, assignor to Seiko Instruments, Inc., Chiba, Japan

Filed Jun. 22, 1989, Ser. No. 369,708

Claims priority, application Japan, Jun. 27, 1988, 63-85404[U]; Jul. 1, 1988, 63-88335[U]; Jul. 1, 1988, 63-88336[U]

Int. Cl.⁵ G01D *15/18*

U.S. Cl. 346—140 R **9 Claims**

1. An ink jet recording apparatus comprising:

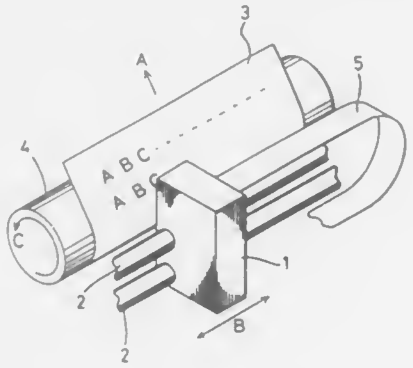
a recording head block having a plurality of ink jet heads for spraying ink drops;

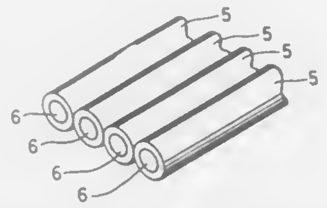
head moving means for moving said recording head block reciprocally;

paper feeding means for feeding paper sheet in a direction perpendicular to the moving direction of said head block;

an ink supplying source for storing an ink, said source being stationary relative to said recording head block; and

a plurality of flexible ink supplying tubes connected between said ink jet heads and said ink supplying source for causing said ink to flow in parallel through said ink supplying tubes in a given direction from said ink supplying source to said ink jet heads, said tubes being bound together in a plane and arranged to be parallel to the movement direction of said recording head block.





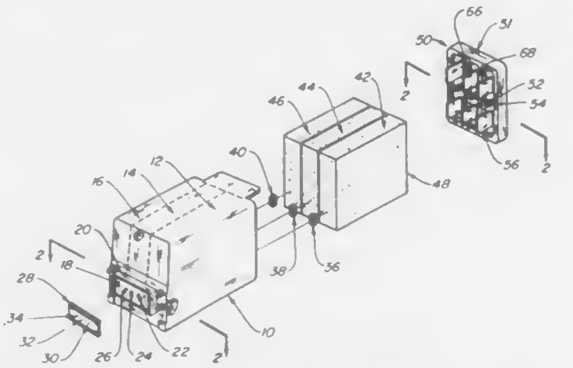
5,025,271
THIN FILM RESISTOR TYPE THERMAL INK PEN USING A FORM STORAGE INK SUPPLY

Jeffrey P. Baker; Duong T. La, both of San Diego, and Randy A. Coverstone, Newark, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 191,292, May 6, 1988, abandoned, which is a division of Ser. No. 880,774, Jul. 1, 1986, Pat. No. 4,771,295. This application Sep. 18, 1989, Ser. No. 409,486

Int. Cl.⁵ B41J *2/05, 2/21*

U.S. Cl. 346—140 R **3 Claims**



1. An ink jet pen including, in combination:

a. a housing and support member having a support surface at one end thereof with openings for passing ink therethrough,

b. a thin film resistor type thermal ink jet printhead mounted on said support surface and having a plurality of ink ejection orifices communicating with said openings in said support surface,

c. a porous foam material mounted within said housing and said support member and operative to receive and retain a supply of ink for feeding ink through said openings in said support surface and to said ink jet printhead, with said printhead receiving ink directly from said openings in said support surface and operative to eject ink in a direction normal to said support surface, said foam material being compressible to reduce its thickness and pore size while increasing its density, and the desired capillarity of said foam may be controlled and the capillary force of the foam increased to thereby render said foam material especially well suited for feeding ink to a thin film resistor type of thermal ink jet printhead, and

d. tab means extending into contact with said foam material for providing a desired amount of compressive force to said foam.

5,025,272
DOT EXPOSURE TYPE IMAGE FORMING APPARATUS

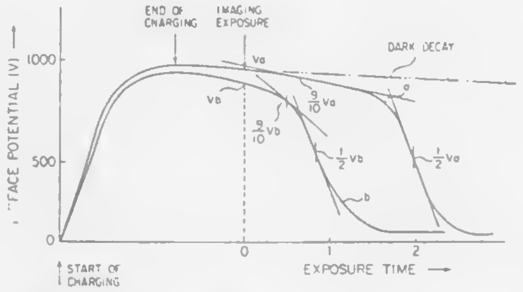
Satoshi Haneda, and Hiroyuki Nomori, both of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Dec. 26, 1989, Ser. No. 456,364

Claims priority, application Japan, Dec. 28, 1988, 63-330865

Int. Cl.⁵ G01D *15/06*

U.S. Cl. 346—153.1 **20 Claims**



1. An apparatus for forming a toner image by reversal development, comprising:

a charging means for uniformly charging a photoreceptor to a given electrostatic potential;

said photoreceptor discharging in response to an exposure light to form an electrostatic latent image, said photoreceptor having a predetermined light decay curve indicating a relation between an amount of the exposure light and a discharged potential on the exposed portion wherein an absolute value of the differential coefficient of the light decay curve is small when the amount of the exposure light is small and said value sharply becomes large when the amount of the exposure light increases;

an exposure means for exposing said photoreceptor with a dot-shaped light; and

a developing means for providing toner onto said exposed portion of said latent image, thereby forming a toner image,

wherein said light decay curve satisfies the relationship

$$1<E_{\frac{1}{2}}/E_{9/10}$$

E 9/10 being a light sensitivity of said photoreceptor when said electrostatic potential has decayed to 9/10 of that at the start of said exposure and E ½ is a light sensitivity of said photoreceptor when said electrostatic potential has decayed to ½ of that at the start of said exposure.

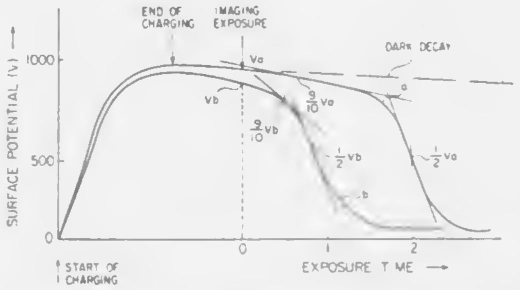
5,025,273
RF DRIVE CIRCUIT FOR AN ION PROJECTION PRINTING HEAD

John H. Bowers, Clarksburg, N.J., assignor to Armstrong World Industries Inc., Lancaster, Pa.

Filed Apr. 30, 1990, Ser. No. 516,647

Int. Cl.⁵ G01D *15/06*

U.S. Cl. 346—159 **18 Claims**



1. A circuit for generating a radio frequency (RF) AC voltage of sufficient peak-to-peak amplitude to produce a plasma when applied to RF lines, which present an effective capacitance, of an ion projection printing head, said circuit comprising means including an active switching device for providing current pulses through said device at a repetition rate related to said radio frequency, an inductor connected in series with said device and said effective capacitance, said inductor and effective capacitance defining a series resonance circuit resonant at said RF frequency. and said current pulse producing means including means for providing said current pulses at sufficient amplitudes to develop said sufficient peak-to-peak amplitude across said effective capacitance.

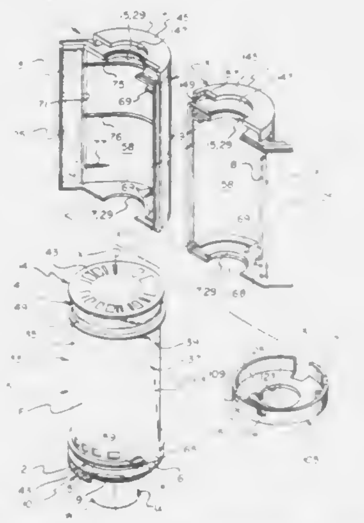
5,025,274
FILM CASSETTE WITH BUILT-IN SUPPORT FOR OPTICAL SENSOR TO READ FILM INFORMATION

Daniel M. Pagano, Henrietta, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 2, 1990, Ser. No. 562,501

Int. Cl.⁵ G03B *7/00*

U.S. Cl. 354—21 **8 Claims**



1. A film cassette comprising a lighttight cassette shell for containing a filmstrip, and a film information disk supported for rotation relative to said shell, is characterized in that:

said film information disk includes optically readable information; and

VOL
1127
ISS
3
JE
18
1991
UMI

sensor positioning means fixed to said shell includes a viewing aperture located a predetermined distance from the optically readable information of said film information disk to position an optoelectronic sensor at said viewing aperture to substantially optimally read the optically readable information as the disk is rotated.

5,025,275

PHOTOGRAPHIC CAMERA

Nobuyuki Taniguchi; Yoshiaki Hata, both of Nishinomiya; Yoshinobu Kudo, Sakai; Manabu Inoue, Kube; Takeo Hoda, Kawachinagano, and Hiroshi Ueda, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

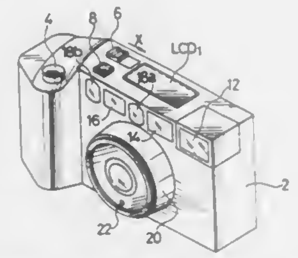
Cootinuation of Ser. No. 207,330, Jun. 16, 1988, Pat. No. 4,943,825, which is a division of Ser. No. 895,826, Aug. 12, 1986, Pat. No. 4,780,735. This applicatioo Jun. 13, 1990, Ser. No. 537,116

Claims priority, application Japan, Aug. 29, 1985, 60-190520; Aug. 29, 1985, 60-190521; Aug. 29, 1985, 60-190522; Aug. 29, 1985, 60-190523; Aug. 30, 1985, 60-192621; Sep. 10, 1985, 60-201095; Sep. 10, 1985, 60-201096; Nov. 14, 1985, 60-255550; Dec. 19, 1985, 60-286732

The portion of the term of this patent subsequent to Oct. 25, 2005, has been disclaimed.

Int. Cl.^{5} G03B *17/24*

U.S. Cl. 354—106 **2 Claims**



1. A photographic camera having a photographic lens, comprising:
- means for selecting a real focal length photographing mode in which a normal range in a frame of a film will be printed on a photographic paper and a pseudo focal length photographing mode in which a range smaller than the normal range in a frame of the film will be printed on a photographic paper;
- means for specifying a magnification corresponding to a range to be printed on the photographic paper in printing when the pseudo focal length photographing mode is selected;
- means for producing a signal indicative of a characteristic of a film loaded in the camera; and
- means for limiting the magnification capable of being specified by the magnification specifying means below a predetermined value depending upon the signal from said producing means.

5,025,276

CONTROL APPARATUS OF SINGLE-LENS REFLEX CAMERA

Tosbiyuki Kitazawa, Tukyo; Masahiko Kurosaki, Kanagawa, and Yutaka Ohsawa, Tokyo, all of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

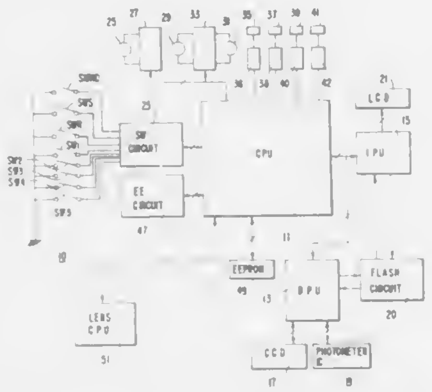
Filed Aug. 10, 1990, Ser. No. 565,153

Claims priority, application Japan, Aug. 22, 1989, 1-215466

Int. Cl.^{5} G03B *19/12*

U.S. Cl. 354—152 **23 Claims**

1. A control apparatus of a single-lens reflex camera, comprising:
- a mirror which moves between a charge completion position and a photographing position;
- a mirror driving means for moving the mirror between the charge completion position and the photographing position;
- a mirror holding means for maintaining the mirror at the charge completion position;
- a mirror charge detecting means for detecting the completion of the mirror charge;



- a mode setting means for setting a continuous photographing mode; and,
- a control means for releasing the hold of the mirror by the mirror holding means when the mirror charge detecting means detects the charge completion position of the mirror, at the continuous photographing mode.

5,025,277

CAMERA WITH FOCAL POINT SWITCHING MECHANISM

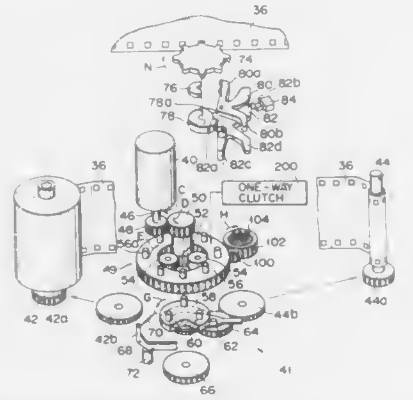
Takashi Inoue, Hachioji; Tatsuya Suzuki, Tokyo; Akiteru Kimura, Hachioji; Hiroaki Miyazaki, Tsukui, and Moriya Katagiri, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 15, 1990, Ser. No. 494,128

Claims priority, application Japan, Mar. 28, 1989, 1-76048

Int. Cl.^{5} G03B *1/18*

U.S. Cl. 354—173.1 **7 Claims**



1. A camera comprising:
- a motor;
- a planet gear mechanism having a planet gear to be revolved or rotated by said motor;
- a film wind mechanism provided on a revolution orbit of said planet gear and meshed with and driven by said planet gear upon forward rotation of said motor to perform a film winding operation;
- a film rewind mechanism provided on the revolution orbit of said planet gear and meshed with and driven by said planet gear upon reverse rotation of said motor to perform a film rewinding operation;
- a focal point switching mechanism provide on the revolution orbit of said planet gear from said film wind mechanism to said film rewind mechanism, and meshed with and driven by said planet gear upon reverse rotation of said motor to switch a focal length of a photographic lens of the camera; and
- selecting means for selectively causing said planet gear to mesh with said film rewind mechanism or said focal point switching mechanism upon making said planet gear engage with or disengage from said focal point switching mechanism at the position in which said planet gear can mesh with said focal point switching mechanism when said planet gear is revolved toward said focal point switching mechanism and said film rewind mechanism by reverse rotation of said motor.

5,025,278

PLATE FOR LIGHT SHIELDING BLADE

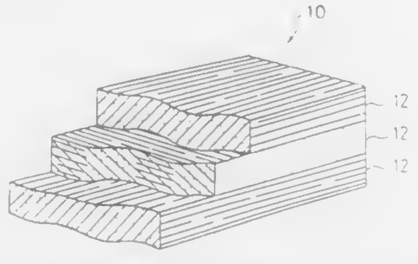
Takashi Matsubara, Tokyo, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Mar. 27, 1990, Ser. No. 501,371

Claims priority, application Japan, Jun. 17, 1988, 63-148262

Int. Cl.^{5} G03B *9/40*

U.S. Cl. 354—246 **12 Claims**



1. A thin plate having a thickness of 60 to 120 μm and comprising a laminate of plural carbon fiber reinforced resin sheets each having continuous carbon fibers oriented in a predetermined direction and epoxy resin enveloping said continuous fibers, said epoxy resin having a glass transition temperature which is equal to or more than 120° C.

5,025,279

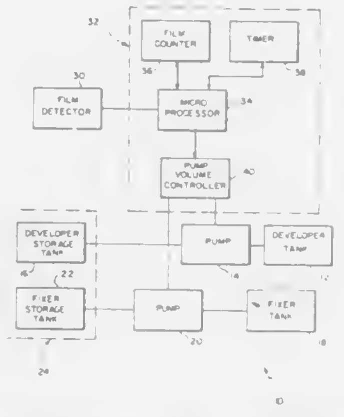
PROCESS FOR REPLENISHING SOLUTIONS IN A FILM PROCESSOR

Roger D. Ellsworth, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 21, 1990, Ser. No. 496,753

Int. Cl.^{5} G03D *3/06, 3/08*

U.S. Cl. 354—298 **7 Claims**



1. A process for replenishing a solution in a film processor wherein a series of film sheets are fed seriatim through a tank containing the solution, the process comprising:
- detecting each film sheet fed through the solution.
- incrementing a counter each time a film sheet is detected during a predetermined time period. and
- replenishing the solution in the tank as a function of the number of sheets detected during the time period with the volume of replenishment solution varying from (1) a first volume when the counter indicates a low number of sheets to (2) a second volume different than the first volume when the counter indicates a higher number of sheets.

5,025,280

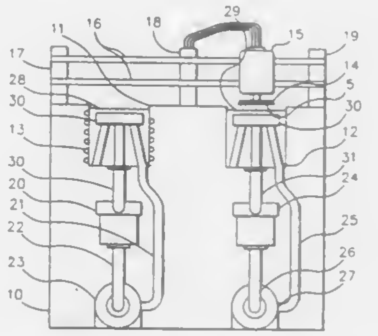
IMMERSION DEVELOPMENT AND RINSE MACHINE AND PROCESS

William E. Lamb, Bellaire; Jerome L. Kowaleski, Meadows; Vojtech Haikl, Houston; Alan R. Bittancourt, Rosenberg, and Harvey S. Daugherty, Richmond, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 134,284, Dec. 17, 1987, Pat. No. 4,902,608. This application Nov. 13, 1989, Ser. No. 436,160

Int. Cl.^{5} G03D *3/06, 3/08*

U.S. Cl. 354—299 **10 Claims**



1. A semiconductor wafer processing apparatus wherein semiconductor wafers are spun developed and rinsed in developer fluid and a rinse fluid, comprising; first and second fluid tanks for holding the developer fluid and rinse fluid, each tank interconnected with a fluid circulation system, a vacuum chuck for holding a semiconductor wafer in an upside-down position, a track and actuation mechanism for moving the vacuum chuck in vertical and horizontal directions, and a spin motor for rotating said vacuum chuck and the semiconductor wafer in said developer and rinse fluids.

5,025,281

IMAGE RECORDING APPARATUS USING PHOTOSENSITIVE PRESSURE-SENSITIVE RECORDING MEDIUM

Takashi Nakata, Nagoya; Takashi Tomizawa, Aichi; Shigeyuki Hayashi, Nagoya; Motoshi Ohno, Nagoya, and Yoichi Horaguchi, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Dec. 13, 1988, Ser. No. 283,845

Claims priority, application Japan, Dec. 15, 1987, 62-317849

Int. Cl.^{5} G03B *27/32, 27/52*

U.S. Cl. 355—27 **8 Claims**

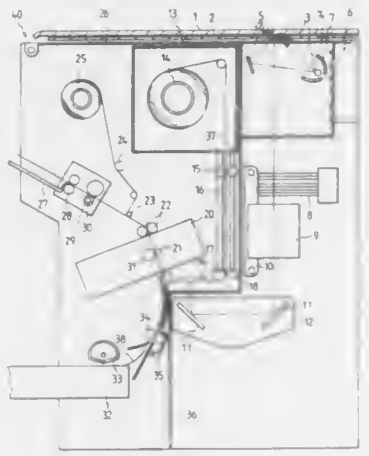
1. An image recording apparatus for recording an image of an original on an elongated web-like image recording medium, said image recording medium having an imaging surface capable of forming a latent image thereon when exposed to light, said apparatus comprising:
- a pair of main frames defining an internal space therebetween;
- a light source for irradiating light;
- an original support unit for supporting said original to receive the light irradiated from said light source, said unit and said light source being movable at a first speed relative to each other so that said image on said original is sequentially scanned by said light;

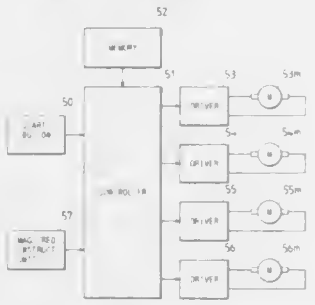
VOL
1127
ISS
3
JE
18
1991
UMI

an optical system secured to said main frames for receiving light reflected from said original and providing an image bearing light;

an exposure unit disposed within said internal space and defining an exposure zone through which said image recording medium is travelled wherein said image bearing light is controlled to form a latent image on said image recording medium;

a first driving unit for moving said recording medium at a feeding speed related to the first speed when said recording medium travels along the exposure zone;





a developing unit disposed downstream of said exposure unit and provided with a developing zone through which said recording medium passes for developing said latent image;

a second driving unit for moving said recording medium at a speed substantially equal to said feeding speed when said recording medium is developed by said developing unit; and

magnification/reduction means for setting a magnification/reduction factor that applied to said first speed determines said feeding speed, wherein said first and said second driving units control said feeding speed of the recording medium corresponding to the magnification/reduction factor adjustment of said first speed.

5,025,282

COLOR IMAGE FORMING APPARATUS

Hiroaki Nakamura, and Atsushi Takagi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 29, 1990, Ser. No. 604,850

Claims priority, application Japan, Oct. 30, 1989, 1-282595

Int. Cl.^{5} G03B *27/80*

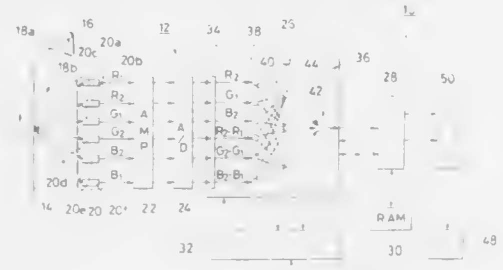
U.S. Cl. 355—38 **13 Claims**

1. A color image forming apparatus that comprises:

an image information detecting means for detecting a original image information carried on a document to be duplicated;

a computing means that has a learning capability and which computes image forming conditions as appropriate for a specified light-sensitive material for reproducing a desired image on the basis of said original image information;

a color image forming means that allows said light-sensitive material to be exposed under the computed image forming conditions and which processes the exposed light-sensitive material to reproduce a visible image; and



input means which, when said visible image does not reproduce appropriate colors and densities, supplies said computing means with correcting conditions for obtaining the appropriate colors and densities,

said computing means being so adapted as to learn the appropriate image forming conditions for the original image information in response to the inputting of said correcting conditions.

5,025,283

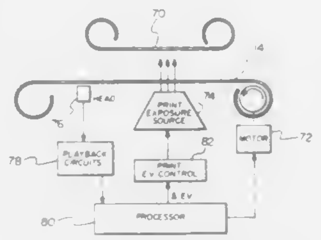
MAGNETIC RECORDING ON FILM OF SCENE PARAMETERS AND PHOTOFINISHING PROCESS FOR USE THEREWITH

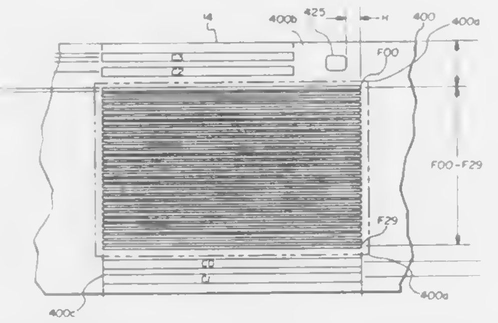
Gary L. Robison, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 407,994, Sep. 14, 1989, abandoned. This application Aug. 23, 1990, Ser. No. 571,008

Int. Cl.^{5} G03B *27/52*

U.S. Cl. 355—40 **6 Claims**





6. In a photofinishing apparatus wherein previously developed film having a virtually transparent magnetic layer therein is exposed onto photosensitive print paper with a print exposure source, the improvement comprising:

magnetic head means for playing back data previously recorded in magnetic tracks on said film in registration with individual frames thereof;

print exposure value control means for varying the exposure value employed by said print exposure source in exposing a frame on said print paper to said frame on said film; and

a processor, including means for:

a. reading through said magnetic head means data previously recorded on said magnetic tracks representing a difference between an ideal exposure value and an actual exposure value characteristic of said film frame, and

b. transmitting said difference to said print exposure value controller, whereby said controller changes the exposure value employed by said print exposure source so as to compensate for said difference in making a print from said film frame.

5,025,284

EXPOSURE METHOD AND EXPOSURE APPARATUS

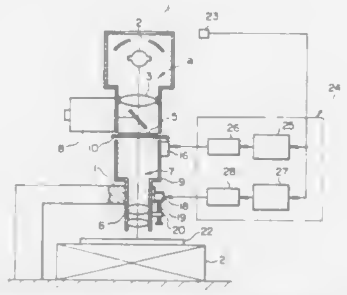
Susumu Komoriya, Tokorozawa; Hiroshi Nishizuka, Higashikurume; Shinya Nakagawa, Kodaira, and Hisashi Maejima, Higashiyamato, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 288,971, Dec. 23, 1988, which is a continuation of Ser. No. 70,388, Jul. 7, 1987, which is a division of Ser. No. 742,786, Jun. 10, 1985, Pat. No. 4,699,505. This application Sep. 5, 1990, Ser. No. 577,632

Claims priority, application Japan, Jun. 11, 1984, 59-118315

Int. Cl.^{5} G03B *27/42, 27/52*

U.S. Cl. 355—53 **20 Claims**



1. An exposure apparatus for fabricating an integrated circuit device comprising:

(a) an XY table for holding and displacing a wafer for fabricating the integrated circuit device in a first plane;

(b) a mask holder for holding one of a mask and a reticle having a mask pattern on a first major surface thereof;

(c) a light source for generating an exposure light to expose the one of the mask and reticle;

(d) a projection lens system, for reducing and projecting the transmitted light from the one of the mask and reticle onto a photoresist film on a first major surface of the wafer, having a first set of at least one lens adjacent to the wafer and a second set of at least one lens adjacent to the one of the mask and reticle, the projection lens system being telecentric at least on the one of the mask and reticle side;

(e) atmospheric pressure detecting means for detecting the atmospheric pressure corresponding to an environment where the exposure apparatus is placed; and

(f) control means for controlling an optical distance between the first and second sets of at least one lens in accordance with the atmospheric pressure detected by the detecting means to adjust the demagnification of the projection lens system to a predetermined value.

5,025,285

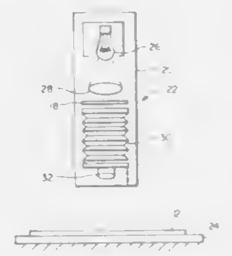
APPARATUS AND METHOD FOR SHADOW MOIRE MAPPING

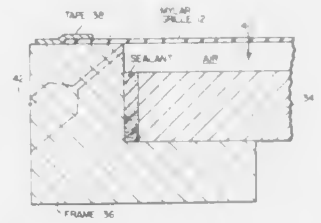
Robert C. Schwarz, Dix Hills, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed May 10, 1989, Ser. No. 349,722

Int. Cl.^{5} G03B *27/32*

U.S. Cl. 355—77 **5 Claims**





1. In a shadow Moire method for mapping plane displacement of an investigated structural surface, wherein a back lit grille is employed for casting a grille shadow on the surface which is viewed from behind the grille whereat fringes appear in relation to the out-of-plane displacement, the method for creating the grille comprising the steps:

positioning a flexible strip of photoreproduction material against a flat surface;

directing light through a master grille in optical alignment with the photoreproduction strip;

focusing an enlarged master grille image on the photoreproduction strip, the enlarged image having a lesser line density than the master grille by a ratio corresponding to the ratio of enlargement;

developing the enlarged grille image on the photoreproduction strip for utilization as a shadow Moire grille.

5,025,286

LASER BEAM IMAGE FORMING APPARATUS WITH SOS DETECTION

Hirofumi Hasegawa; Naoto Ohmori; Yukio Yamada, and Narutaka Yoshida, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 29, 1989, Ser. No. 373,989

Claims priority, application Japan, Jun. 29, 1988, 63-162210; Jun. 29, 1988, 63-162211

Int. Cl.^{5} G03G *15/04*

U.S. Cl. 355—244 **10 Claims**

1. An image forming apparatus, comprising:

supporting means for supporting an original;

a rotatable photosensitive member;

a laser beam radiating unit including a radiant element and a scanning device;

optical means for guiding the laser beam radiated from said laser beam radiating unit to said supporting means and for projecting a reflected image of the original onto said photosensitive member;

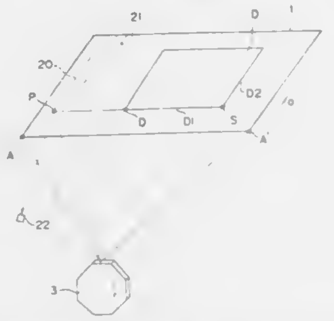
scanning means for relatively scanning the reflected image in the direction perpendicular to the direction in which said scanning device spreads the laser beams on the original;

reflecting means for reflecting the laser beam radiated from said laser beam radiating unit, said reflecting means being

VOL
1127
ISS
3
JE
18
1991
UMI

provided on said supporting means outside of the area where said original is placed and extending in the scanning direction by said scanning means;

a sensor for producing a signal which determines the timing of starting outputting image data in the scanning direction



by said scanning device on detecting the laser beam reflected from said reflecting means; and

control means for turning on and off said radiant element in response to the signal produced by said sensor so that the laser beam is modulated in accordance with image data.

5,025,287

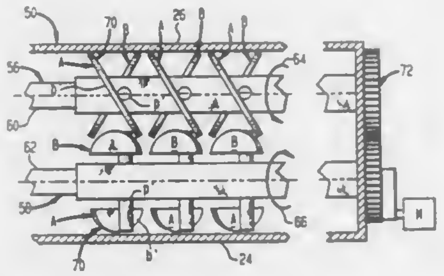
DEVELOPMENT APPARATUS HAVING DUAL INTERLEAVING PADDLE MIXERS

Thomas K. Hilbert, Spencerport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 18, 1989, Ser. No. 451,853

Int. Cl.^{5} G03G *15/06;* B01F *7/00*

U.S. Cl. 355—245 17 Claims



1. In an electrostatographic copier or printer a development apparatus for developing latent images on an image-bearing member of the copier or printer using developer material consisting of charged toner particles and charged magnetic carrier particles, the development apparatus including:

(a) an elongate housing having a sump portion for holding, mixing and charging developer material, said sump portion consisting of first and second parallel, side-by-side cylindrical recessed sections within the bottom of said housing, said first and second recessed sections partially forming an overlapping segment therebetween;

(b) a development roller located in a top portion of the housing to be adjacent the image-bearing member of the copier or printer for moving charged developer material into applying relationship with electrostatic latent images thereon, thereby developing such images with toner particles;

(c) feed means between said sump portion and said development roller for feeding charged developer material from said sump portion to said development roller; and

(d) first and second mixers for producing developer material mixing and charging movement including a chopping action, a folding action, end-to-end flow, and side-to-side flow, thereby assuring high and reliable charge and toner concentration levels, as well as, even cr uniform end-to-end accumulation and depletion of toner particles in the developer material, said first and second mixers each including:

(i) a rotatable shaft; and

(ii) first and second radially extending paddles connected to said shaft and forming an axially repeated set on said shaft, said first and second paddles being each attached to a short post member and connected to said shaft at a developer material moving attack angle X° less than normal, as measured relative to the axis of rotation of said shaft, and said first and second paddles being spaced circumferentially on said shaft an angle Y°; and

said first and second mixers being mounted side-by-side within said first and second recessed sections, respectively, of said sump portion such that said first and second paddles of said first mixer interleave within said overlapping segment of said recessed sections with said first and second paddles of said second mixer.

5,025,288

IMAGE FORMING APPARATUS CAPABLE OF PREVENTING SIMULTANEOUS ROTATION OF THE MAGNET ROLL AND THE DEVELOPING SLEEVE

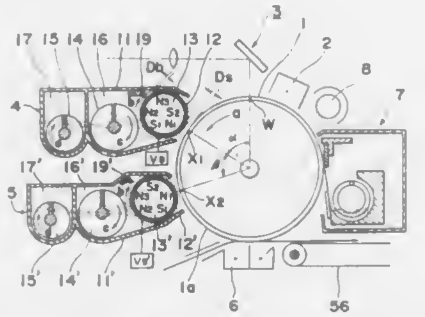
Yasuhiro Kusuda, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 31, 1989, Ser. No. 429,650

Claims priority, application Japan, Nov. 1, 1988, 63-278352; Nov. 21, 1988, 63-294216; Nov. 21, 1988, 63-294217

Int. Cl.^{5} G03G *15/09*

U.S. Cl. 355—251 9 Claims



1. An image forming apparatus arranged to develop an electrostatic latent image formed on an electrostatic latent image holding member by use of toner, said image forming apparatus comprising:

a developing sleeve rotatably provided to confront the electrostatic latent image holding member,

a sleeve driving means for rotating said developing sleeve,

a magnet roller provided within said developing sleeve and having a plurality of magnetic poles,

a magnet roller driving means for rotating said magnet roller through a predetermined angle, said magnet roller driving means being arranged to rotate said magnet roller between a first state where a magnetic pole thereof confronts the electrostatic latent image holding member and a second state where an intermediate portion between neighboring magnetic poles confronts said electrostatic latent image holding member, and

a control means for controlling said sleeve driving means and said magnet roller driving means in such a manner as to rotate the magnetic poles of said magnet roller from the first state to the second state after stopping rotation of said developing sleeve when the developing function is to be completed.

5,025,289

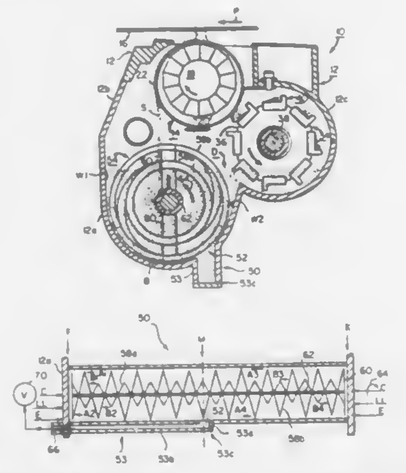
DEVELOPMENT APPARATUS HAVING SELF-CLOSING PURGING MECHANISM

Vladimir S. Guslits, Rochester, and John P. Swapceinski, Bergen, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 13, 1989, Ser. No. 434,198

Int. Cl.^{5} G03G *15/09*

U.S. Cl. 355—253 7 Claims



1. A development apparatus in an electrostatographic copier or printer, the apparatus including:

(a) a housing having a bottom portion for holding developer material; and

(b) a mechanism, associated with said bottom portion of said housing for purging developer material from said housing, said purging mechanism including:

(i) an aperture in said bottom portion of said housing, for discharging developer material from said housing;

(ii) means, within said bottom portion of said housing, for moving developer material across said aperture; and

(iii) a developer material holding and transport conduit connected to the outside of said housing over said aperture, said conduit forming automatic self-closing means for blocking the flow of developer material out of said housing through said aperture, said automatic self-closing means including a developer material trapping elbow just below said aperture for trapping a small amount of developer material thereby causing developer material to block and close said aperture, said trapping elbow being formed by a short downward conduit section, and a long substantially horizontal conduit section, said horizontal conduit section having an open end from the outside into said elbow requiring no closing means thereto; and

(iv) transport means associated with said open end of said horizontal conduit section for selectively causing said developer material trapped in said elbow, and developer material discharging into said elbow, to flow through said horizontal conduit section and out of said open end thereof.

5,025,290

PULSED VOLTAGE DEVELOPMENT ELECTRODE CLEANER

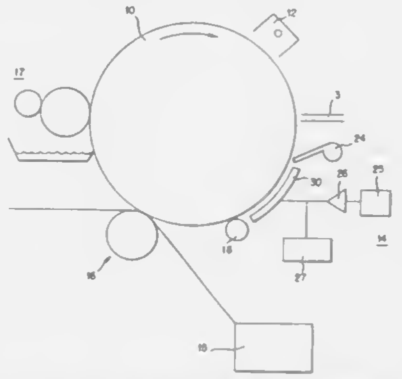
Benzion Landa, Edmonton, Canada; Yakov Krumberg, and Yossef Adam, both of Rehovot, Israel, assignors to Savin Corporation, Stamford, Conn.

Continuation of Ser. No. 22,245, Mar. 5, 1987, abandoned. This application May 8, 1989, Ser. No. 349,961

Int. Cl.^{5} G03G *15/06*

U.S. Cl. 355—265 17 Claims

1. In an electrophotographic apparatus having a photoconductor capable of carrying a latent electrostatic image and a development station with a development electrode spaced from said photoconductor, wherein charged toner particles are supplied to said photoconductor by said development electrode the improvement comprising:



means for supplying an electrical pulse to said development electrode during the development of said latent electrostatic image wherein said pulse is sufficient to dislodge said charged toner particles from the surface of said development electrode and said pulse being insufficient to coat said charged particles onto said photoconductor.

5,025,291

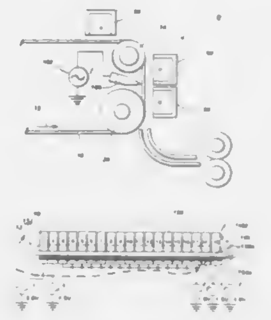
EDGE EFFECT COMPENSATION IN HIGH FREQUENCY VIBRATORY ENERGY PRODUCING DEVICES FOR ELECTROPHOTOGRAPHIC IMAGING

William J. Nowak, Webster; Anthony A. Attardi, Rochester, and Daniel W. Costanza, Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 2, 1990, Ser. No. 548,318

Int. Cl.^{5} G03G *15/14*

U.S. Cl. 355—273 11 Claims



1. In an imaging device having a non-rigid member with a charge retentive surface moving along an endless path, means for creating a latent image on the charge retentive surface, means, for imagewise developing the latent image with toner, means for electrostatically transferring the developed toner image to a copy sheet, and a resonator for enhancing toner release from the charge retentive surface producing relatively high frequency vibratory energy and having a portion thereof adapted for contact across the non-rigid member, generally transverse to the direction of movement thereof, the resonator comprising:

a horn member for applying the high frequency vibratory energy to the non-rigid member, having a platform portion, a horn portion, and a contacting portion;

said horn member divided into a linear array of horn segments across said belt member, each horn segment including horn portion and contacting portion;

a linear array of vibratory energy producing elements, each

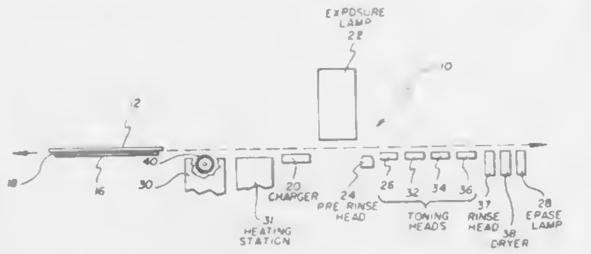
VOL
1127
ISS
3
JE
18
1991
UMI

element coupled to said horn platform at a position corresponding to at least one of said horn segments, for generating the high frequency vibratory energy;
support means for supporting the combination of said vibratory energy producing means and said horn member;
differential driving voltage means for differentially driving said linear array of vibratory energy producing elements with different driving voltage magnitudes, to produce different responses from said horn segments across the array.

5,025,292

METHOD AND APPARATUS FOR IMPROVING A MULTI-COLOR ELECTROPHOTOGRAPHIC IMAGE USING HEAT FUSING

Lawrence C. Steele, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Mar. 28, 1990, Ser. No. 500,431
Int. Cl.⁵ G03G *15/01*
U.S. Cl. 355—326 16 Claims



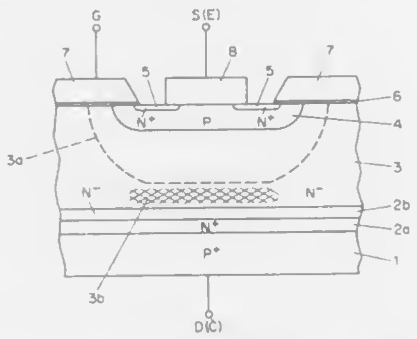
1. In an apparatus for producing a multi-stage electrophotographic image comprising means for providing an electrophotographic medium on a carrier therefor, means for translating the carrier and medium together over a predetermined path, means for charging the medium, means for exposing the medium to a first light-borne image, means for toning the image bearing charged region of the medium to produce a first color visible image, means for drying said image, and means for returning the carrier to the starting position to repeat the foregoing steps of charging said medium, exposing it to a second light-borne image, toning said medium to produce a second visible image, and drying said image, the improvement comprising means for heating the surface of the first toned image after said first toning and drying steps and prior to said second charging step to smooth the toned image and prevent unwanted toner particles from adhering to the first toned image.

5,025,293

CONDUCTIVITY MODULATION TYPE MOSFET

Yasukazu Seki, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan
Filed Jan. 22, 1990, Ser. No. 467,848
Claims priority, application Japan, Jan. 25, 1989, 1-15901
Int. Cl.⁵ H01L *29/78*
U.S. Cl. 357—23.4 8 Claims

1. In a conductivity modulation MOSFET having a semiconductor substrate of a first conductive type, a first buffer layer of a second conductive type formed on said substrate, a conductivity modulation layer of a second conductive type, and characterized by a low on resistance and a turn off time, the improvement comprising:
a second buffer layer of the second conductive type disposed between said first buffer layer and said conductivity modulation layer, thinner than and having a higher impurity concentration than said first buffer layer, and interspersed with a plurality of heavy metal atoms;

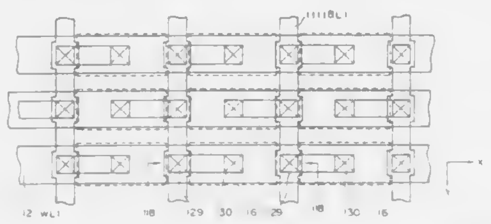


whereby the concentration of heavy metal atoms within said second buffer layer is effective in shortening said turn off time while maintaining a low on resistance.

5,025,294

METAL INSULATOR SEMICONDUCTOR TYPE DYNAMIC RANDOM ACCESS MEMORY DEVICE

Taiji Ema, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan
Filed Jun. 7, 1989, Ser. No. 362,222
Claims priority, application Japan, Jun. 29, 1988, 63-162189
Int. Cl.⁵ H01L *29/78, 27/02, 29/34*
U.S. Cl. 357—23.6 23 Claims

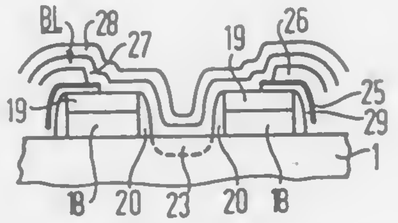


1. A dynamic random access memory device comprising:
a substrate having a main surface;
a field oxide film formed on the main surface of the substrate and patterned to define a matrix array of plural exposed areas of the substrate main surface;
a matrix array of plural transistors respectively formed in said exposed areas of said substrate, said plural transistors and respective, plural exposed areas being aligned in corresponding, parallel sets in each of mutually traverse, first and second directions parallel to the main surface of the substrate, and each transistor comprising a pair of associated source and drain regions, spaced apart within said respective area and defining a channel therebetween extending in the first direction;
plural bit lines formed in said substrate and extending in parallel relationship in the second direction, each said bit line being associated with a respective set of transistors aligned in said second direction and said source regions thereof comprising portions of said associated bit line;
gate oxidation films formed on said exposed areas of said main surface of said substrate and covering the respective, said associated source and drain regions;
plural word lines formed on said field oxidation and gate oxidation films and extending in parallel relationship in the first direction, each said word line being associated with a respective set of transistors aligned in the first direction and being disposed above and separated by the corresponding gate oxidation films from the respective, associated sources and drains of the associated, aligned set of transistors and serving in common as the respective gate electrodes thereof;
plural contact holes respectively associated with said plural drain regions and extending through the respective said word lines and gate oxidation films in a third direction, transverse to the main surface of the substrate, each contact hole having corresponding sidewalls and being aligned with and exposing at least a portion of a respectively associated drain region;
an insulating film formed on and covering said word lines and said transverse sidewalls of each of said contact holes and partially covering the surfaces of said drain regions exposed through said respective contact holes; and
plural storage capacitors respectively associated with said plural transistors, each storage capacitor comprising a storage electrode, formed on said insulating film and spaced thereby from the associated word line, extending in correspondence with, and above, the associated transistor and adjacent field oxide film, each said storage capacitor extending through the corresponding contact hole and contacting the drain region of the respectively associated transistor, a dielectric film formed on said storage electrode, a dielectric film formed on said storage electrode, and an opposed electrode formed on said dielectric film.

5,025,295

THREE-DIMENSIONAL ONE-DIMENSIONAL CELL ARRANGEMENT FOR DYNAMIC SEMICONDUCTOR MEMORIES AND METHOD FOR THE MANUFACTURE OF A BIT LINE CONTACT

Karl-Heinz Kuesters, Munich; Wolfgang Mueller, Putzbrunn, and Gerd Enders, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany
Continuation of Ser. No. 312,303, Feb. 17, 1989, abandoned, which is a continuation of Ser. No. 64,613, Jun. 22, 1987, abandoned. This application Jan. 16, 1990, Ser. No. 464,685
Claims priority, application Fed. Rep. of Germany, Mar. 6, 1987, 3707241
Int. Cl.⁵ H01L *29/68, 29/34, 29/06*
U.S. Cl. 357—23.6 10 Claims

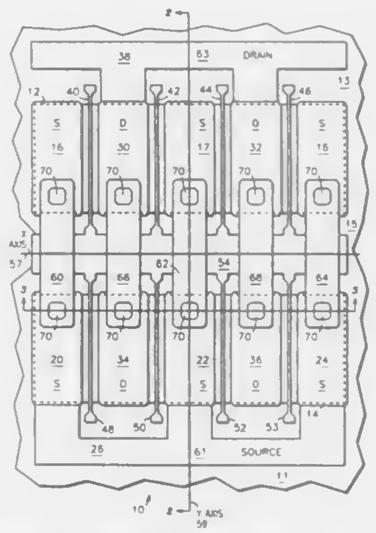


1. A semiconductor device comprising:
a doped semiconductor substrate;
a switching field effect transistor having an insulated gate electrode at the surface of said substrate and source and drain zones in said substrate;
a first insulating layer covering said insulated gate electrode at the surface of said substrate;
a trench capacitor formed in a trench in said substrate under said field effect transistor and electrically connected to a source or drain zone thereof;
a bit line spaced above the level of the insulated gate electrode by both an intermediate insulating layer and said first insulating layer, said intermediate insulating layer comprising a triple layer of silicon oxide/silicon nitride/-silicon oxide, whereby the silicon nitride layer is significantly thinner than the silicon oxide layer lying thereon but is at least 10 nm thick, the layer adjacent to said bit line being a silicon oxide layer, a bit line contacting recess formed in said intermediate insulating layer for the electrical connection of said bit line to said drain zone, said bit line overlapping said insulated gate electrode, said bit lien also overlapping a neighboring field oxide region.

5,025,296

CENTER TAPPED FET

Craig L. Fullerton, Scottsdale, and Warren L. Seely, Chandler, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.
Continuation of Ser. No. 161,826, Feb. 29, 1988, abandoned. This application Sep. 4, 1990, Ser. No. 577,840
Int. Cl.⁵ H01L *29/80, 29/78, 27/10*
U.S. Cl. 357—23.8 25 Claims



1. A field effect transistor including in combination:
a first active semiconductor area;
a first source conductor and a first drain conductor located on said first active semiconductor area;
a second active semiconductor area located adjacent to but separated from said first active semiconductor area;
a second source conductor and a second drain conductor located on said second active semiconductor area;
an inactive area located between said first active semiconductor area and said second active semiconductor area;
gate bus means located on said inactive area;
first gate finger contact means extending from said gate bus means in a first direction across a portion of said inactive area and across a portion of said first active semiconductor area between said first source conductor and said first drain conductor;
second gate finger contact means extending from said gate bus means in a direction opposite to said first direction across a portion of said inactive area and across a portion of said second active semiconductor area between said second source area and said second drain area; and
said gate finger contact means and said source and drain conductors all being located in the same plane.

5,025,297

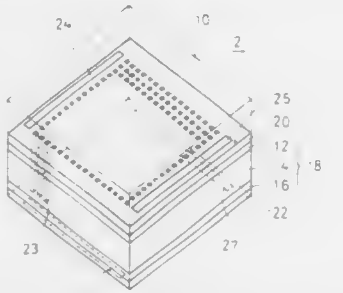
SEMICONDUCTOR LIGHT BEAM POSITION SENSOR ELEMENT AND A POSITION SENSOR AND A PICTURE IMAGE INPUT DEVICE EACH USING THE SAME

Satoru Murakami, Kobe; Minori Yamaguchi, Akashi; Akimine Hayashi, Kobe; Masataka Kondo, Kobe, and Yoshihisa Tawada, Kobe, all of Japan, assignors to Kanegafuchi Chemical Industry Co., Ltd., Osaka, Japan
Filed Mar. 7, 1989, Ser. No. 320,149
Claims priority, application Japan, Mar. 7, 1988, 63-53032
Int. Cl.⁵ H01L *27/14*
U.S. Cl. 357—30 8 Claims

1. A semiconductor light beam position sensor element comprising a semiconductor layer composed of p-type, i-type and n-type semiconductors successively formed and two electrically conductive layers one of which is disposed on one side of said semiconductor layer with the other of which on the other side, at least one of said electrically conductive layers

VOL
1127
ISS
3
JE
18
1991
UMI

being made of a transparent material, at least the other electrically conductive layer and said semiconductor layer having a multiplicity of common apertures running in the thickness direction of the element, the apertures being filled with one of translucent and transparent material and at least one of said electrically conductive layers being provided with at least one pair of electrodes of opposite polarities in marginal regions thereof.



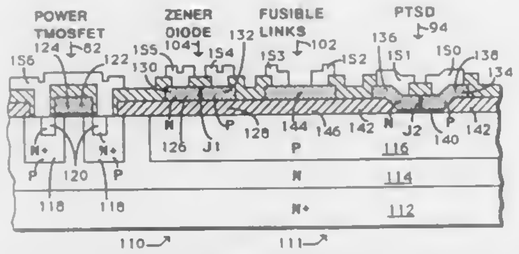
5,025,298
SEMICONDUCTOR STRUCTURE WITH CLOSELY COUPLED SUBSTRATE TEMPERATURE SENSE ELEMENT

Gary V. Fay, Scottsdale; Stephen P. Robb, Tempe; Judith L. Sutor, Chandler, and Lewis E. Terry, Phoenix, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 22, 1989, Ser. No. 397,052

Int. Cl.⁵ H01L *27/02, 29/78, 29/04*

U.S. Cl. 357—41 **9 Claims**



1. A semiconductor apparatus having thereon semiconductor elements with thin and thick dielectric regions and a substrate temperature sensing means, comprising:
- a semiconductor substrate;
- a dielectric located on the substrate and having at least one thin region of about 0.1 micrometers or less in thickness, and having a thicker region; and
- a semiconductor layer having a forward biased PN junction located on the at least one thin region for sensing substrate temperature through the thin region of the dielectric.

5,025,299
CELLULAR POWER SEMICONDUCTOR DEVICE

Jacques Arnould, Aix En Provence, France, assignor to Telemecanique, France

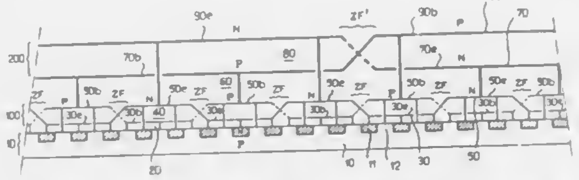
Filed Feb. 2, 1990, Ser. No. 473,766

Claims priority, application France, Feb. 3, 1989, 89 01409

Int. Cl.⁵ H01L *27/10, 27/02, 29/72*

U.S. Cl. 357—45 **14 Claims**

1. A cellular power semiconductor device of the type comprising a plurality of n-type or p-type zones (**11**) diffused on the surface of a p-type or n-type substrate (**10**) respectively so as to present on the surface of the substrate a plurality of diffused zones (**11**) and zones of emergence (**12**) of the substrate so arranged in relation to one another as to form a network of cells alternately of n-type and p-type, and means for connecting all the cells of each type to one another and to a connection area (**90***e*, **90***b*) of the device, characterized in that said means comprise:
- a first conductive sheet (**30**) which extents above the surface of the substrate and is insulated therefrom and is divided in first frontier zones (ZF), in accordance with first predetermined patterns (**33**), into first and second alternate zones (**30***e*, **30***b*) disposed in a network and insulated from one another, said first conductive sheet being connected to each of the subjacent n-type cells in its first zones and to each of the subjacent p-type cells in its second zones via first conductive pins;
- a second conductive sheet (**50**) which extends above the first sheet and is insulated therefrom and is also divided in the first frontier zones (ZF), in accordance with second predetermined patterns (**53**), into first and second alternate zones (**50***b*, **50***e*) disposed in a network, insulated from one another and respectively superimposed on the first and second zones (**30***e*, **30***b*) of the first conductive sheet, said second conductive sheet being connected to each of the subjacent p-type cells in its first zones and to each of the subjacent n-type cells in its second zones via second conductive pins (**31**) which extend, in line with each of the cells, through the first sheet (**30**) while remaining insulated therefrom and without breaking the electrical continuity thereof;
- the first and second sheets being so connected to one another in said first frontier zones (ZF) that each of the first and second zones (**30***e*, **30***b*) of the first sheet (**30**) are connected, inside said frontier zones, to the adjacent second and first zones (**50***e*, **50***b*) respectively of the second sheet (**50**);
- a third conductive sheet (**70**) which extends above the second sheet and is insulated therefrom and is divided in a second frontier zone (ZF'), in accordance with a third predetermined pattern (**73**), into a first zone and a second zone (**70***e*, **70***b*) which are insulated from one another, said third conductive sheet being connected to each of the second subjacent zones (**50***e*) of the second sheet (**50**) in its first zone (**70***e*) and to each of the first subjacent zones (**50***b*) of the second sheet (**50**) in its second zone (**70***b*) via third conductive pins;
- a fourth conductive sheet (**90**) which extends above the third sheet (**70**) and is insulated therefrom and is also divided in the second frontier zone (ZF'), in accordance with a fourth predetermined pattern (**93**), into a first zone and a second zone (**90***b*, **90***e*) which are insulated from one another and are superimposed on the first zone and the second zone (**70***e*, **70***b*) of the third conductive sheet respectively, said fourth conductive sheet being connected to each of the first subjacent zones (**50***b*) on the second sheet (**50**) in its first zone (**90***b*) and to each of the second subjacent zones (**50***e*) of the second sheet (**50**) in its second zone (**90***e*) via fourth conductive pins (**71**) which extend, in line with each of the cells, through the second sheet (**70**) while remaining insulated therefrom and without breaking its electric continuity;
- the third and fourth sheets (**70, 90**) being connected to one another in said second frontier zone (ZF') so that the first and second zones (**70***e*, **70***b*) of the third sheet (**70**) are connected, inside said frontier zone, to the second and first zone (**90***e*, **90***b*) of the fourth sheet respectively, said second and first zones (**90***e*, **90***b*) each defining a connection area of the device, and
- the thickness of the third and fourth sheets (**70, 90**) is greater than that of the first and second sheets (**30, 50**), and the third and fourth pins are larger than the first and second pins.



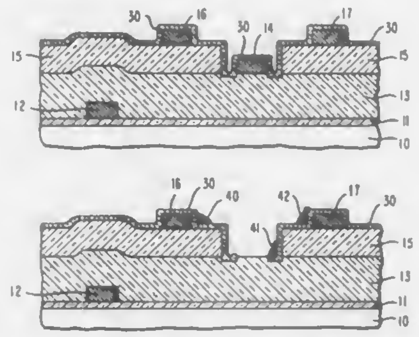
5,025,300
INTEGRATED CIRCUITS HAVING IMPROVED FUSIBLE LINKS

James N. Billig, Slatington; James D. Chlipala; Kuo H. Lee, both of Lower Macungie Township, Lehigh County, and William J. Nagy, Bethlehem, all of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 373,763, Jun. 30, 1989, abandoned. This application Jul. 25, 1990, Ser. No. 560,462

Int. Cl.⁵ H01L *29/34, 27/02, 23/48*

U.S. Cl. 357—51 **13 Claims**



1. An integrated circuit comprising a patterned metal level formed on a first layer of dielectric material (e.g., **13**), and a second layer of dielectric material (e.g., **15**) of a given thickness covering portions of said patterned metal level, wherein said patterned metal level includes at least one conductive fusible link portion (e.g., **14**) that is not covered by said second layer of dielectric material,
- Characterized in that said fusible link portion and said second layer of dielectric material are covered by a protective dielectric layer (e.g., **30**) having a thickness less than said given thickness, wherein said second layer and said protective dielectric layer each essentially comprise silicon dioxide.

5,025,301
DRAM WHICH USES MISFETS IN THE PERIPHERAL CIRCUIT

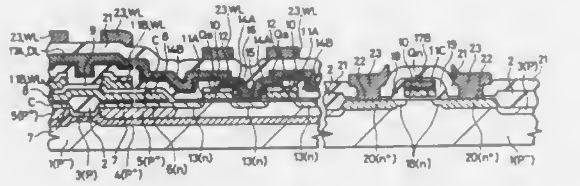
Shinji Shimizu, Hoya, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 35,010, Mar. 26, 1987, Pat. No. 4,845,544. This application Apr. 25, 1989, Ser. No. 343,879

Claims priority, application Japan, Mar. 26, 1986, 61-65695

Int. Cl.⁵ H01L *29/34, 27/01, 29/00, 29/78*

U.S. Cl. 357—54 **15 Claims**



1. A semiconductor integrated circuit device having a plurality of data lines extending in a row direction, a plurality of word lines extending in a column direcction and a plurality of memory cells connected to the data lines and the word lines, each memory cell comprising a switching transistor element and a capacitor element connected in series;
- wherein the switching transistor element includes a gate electrode, over a semiconductor substrate, the gate electrode having sides, the transistor element including first and second semiconductor regions arranged at the sides of the gate electrode and extending to a surface of the semiconductor substrate, the first semiconductor region being connected to a data line, and the second semiconductor region connected to said capacitor element;
- and wherein the device further comprises a first insulating film on said gate electrode in order to isolate said gate electrode from said data lines, wherein said first insulating film has a first insulating film opening, for exposing said first semiconductor region through the first insulating film; a second insulating film on one of the sides of said gate electrode in order to isolate said gate electrode from said data lines, the second insulating film being an insulating film formed by anisotropic etching, the data lines being provided directly in contact with the second insulating film; and a third insulating film, provided on said first insulating film, and having an opening at said first insulating film opening so as to expose the first semiconductor region through the third insulating film.

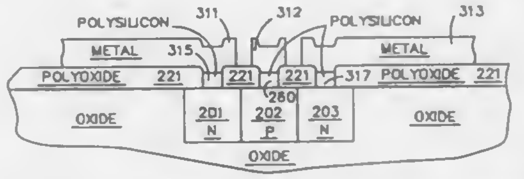
5,025,302
PNP TYPE LATERAL TRANSISTOR WITH MINIMAL SUBSTRATE OPERATION INTERFERENCE

Sidney I. Soclof, San Gabriel, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 279,482, Jul. 1, 1981, abandoned. This application Jun. 16, 1987, Ser. No. 62,754

Int. Cl.⁵ H01L *29/72, 29/06*

U.S. Cl. 357—55 **5 Claims**



1. An array of sub-micron dimensioned PNP-type lateral transistors formed in a substrate doped N-type, each comprising in combination:
- spaced apart slots in the substrate through selected sides of which N+-type doping is received into the adjacent substrate and driven in followed by P or P+ doping driven in through opposed sides;
- said spaced apart slots comprising spaced apart pairs of slots orthogonally related to further pairs of slots with each pair of slots and each further pair of slots bounding a portion of the substrate comprising a region between said opposed sides;
- said slots filled with field oxide and surrounding each said region where a transistor will be formed;
- said P+ doping on the inner sides of said spaced apart slots within said regions comprising an emitter and a collector electrode area;
- said N+ doping and the N substrate in said region between the P+ doping comprising a graded base electrode area;
- electrical contacts on each P+ electrode area and on the graded N+N electrode area; and,
- each contact measuring down to 0.1 micron across.

5,025,303
PRODUCT OF PILLAR ALIGNMENT AND FORMATION PROCESS

Jeffrey E. Brighton, Katy, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 26, 1988, Ser. No. 161,573

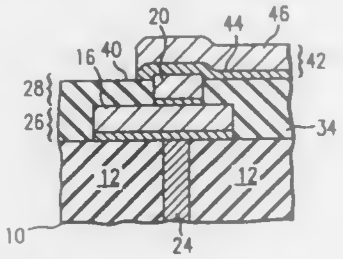
Int. Cl.⁵ H01L *23/48*

U.S. Cl. 357—68 **3 Claims**

1. A product formed by a method of interconnecting metal

VOL
1127
ISS
3
JE
18
1991
UMI

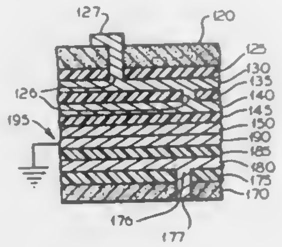
layers through an intermediate insulating layer, said method comprising the steps of:
(a) providing a substrate having an aligning structure;
(b) forming first and overlying pillar layers of electrically conducting material on said substrate;
(c) forming a first layer pattern aligned with said aligning structure in said first layer and a pillar pattern aligned with said first layer pattern in said pillar layer;



(d) depositing an insulating layer over said first and pillar layers;
(e) removing portions of said insulating layer to expose a portion of said pillar layer; and
(f) depositing a second layer of electrically conducting material over said pillar and insulating layers to form a second layer pattern so that said pillar layer connects said first layer to said second layer.

5,025,304
HIGH DENSITY SEMICONDUCTOR STRUCTURE AND METHOD OF MAKING THE SAME

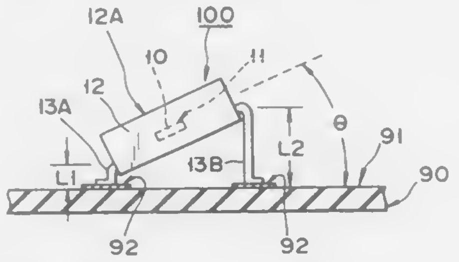
Arnold Reisman, and Iwona Turlik, both of Raleigh, N.C., assignors to MCNC, Research Triangle Park, N.C. and Northern Telecom Limited, Montreal, Canada
Filed Nov. 29, 1988, Ser. No. 277,607
Int. Cl.^{5} H01L *23/48*
U.S. Cl. 357—71 3 Claims



1. A buried metal layer semiconductor device comprising:
a substrate;
first and second buried metal layers on said substrate, said first and second buried metal layers having an oxide bond therebetween, said oxide bond being sufficiently thick to form a first buried insulating layer between said first and second buried metal layers, said first buried insulating layer being an oxide of said first buried metal layer;
a second buried insulating layer on said second buried metal layer; and,
a semiconductor layer on said second buried insulating layer.

5,025,305
SEMICONDUCTOR DEVICE FOR DETECTING OR EMITTING A MAGNETIC LINE OF FORCE OR LIGHT

Yutaka Tomisawa, Yokohama; Toshikazu Fukuda, Kawasaki, and Kazuhiko Inoue, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed May 1, 1990, Ser. No. 517,294
Claims priority, application Japan, May 18, 1989, 1-125311
Int. Cl.^{5} H01L *23/28, 23/02, 23/12, 27/14*
U.S. Cl. 357—72 10 Claims



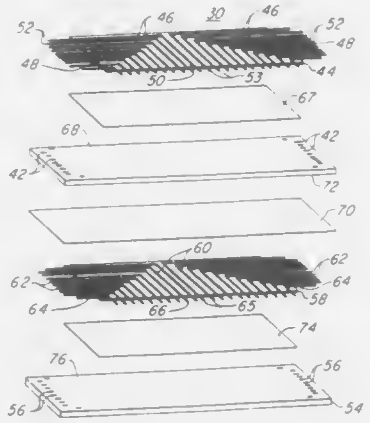
1. A semiconductor device comprising:
a semiconductor chip having a major surface;
an active element formed on the major surface of said semiconductor chip, for detecting at least one of a magnetic line of force and light;
a package for housing said semiconductor chip, said package having an upper surface facing the major surface of said semiconductor chip, a lower surface opposing the upper surface, and a plurality of sides connecting the upper and lower surfaces;
a first lead having first and second portions terminating respectfully at first and second ends, the first portion of said first lead being guided from a first side of said plurality of sides into said package, the first end of said first lead being electrically connected to said semiconductor chip, and the second portion of said first lead extending along the first side and being bent toward the lower surface of said package;
a second lead having first and second portions terminating respectfully at first and second ends, the first portion of said second lead being guided from a second side of said plurality of sides opposing the first side into said package, the first end of said second lead being electrically connected to said semiconductor chip, and the second portion of said second lead extending along the second side and being bent toward the lower surface of said package; and
wherein the length of said second lead between the position at which said second lead is bent and the second end of said second lead is different from the length of said first lead between the position at which said first lead is bent and the second end of said first lead, and wherein the active element is inclined with respect to a line defined by the second ends of said first and second leads.

5,025,306
ASSEMBLY OF SEMICONDUCTOR CHIPS

Randall E. Johnson, Carrollton, and James M. Drumm, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed Aug. 9, 1988, Ser. No. 230,203
Int. Cl.^{5} H01L *25/10*
U.S. Cl. 357—75 10 Claims

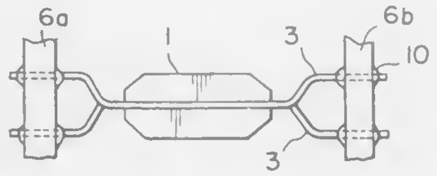
3. A three dimensional circuit package comprising:
a first semiconductor circuit chip having pads on its periphery;
a first dielectric carrier over at least a portion of said first chip;
a first plurality of conductors positioned on the carrier between said first chip and said first carrier, substantially within the periphery of said first chip, one end of each

conductor connected to a chip pad, and the other end of each connector extending beyond a single edge of said first chip;
a second semiconductor circuit chip having second pads on its periphery;
a second dielectric carrier over at least a portion of said second chip;
a second plurality of conductors mounted on the second carrier between said second chip and said second carrier, substantially within the periphery of said second chip, one end of each of said second conductors connected to said second pads, and the other end of each of said second conductors extending beyond the same edge of said second chip as the corresponding edge of said first chip; and
an interconnect substrate having a plurality of conductive means thereon electrically interconnected with said first and second plurality of conductor ends that extend beyond the end of said first and second chips, respectively.



5,025,307
MODULAR SEMICONDUCTOR DEVICE

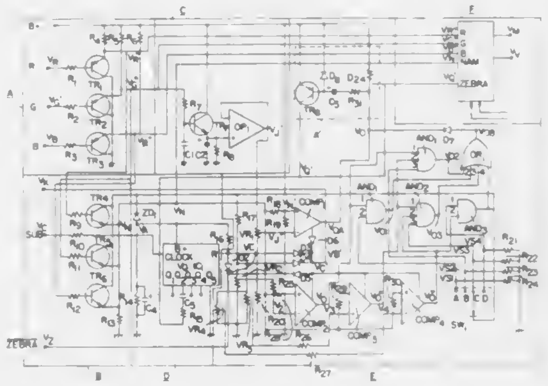
Tetsuya Ueda; Toru Tachikawa, and Masataka Takehara, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan
Filed Mar. 29, 1990, Ser. No. 501,276
Claims priority, application Japan, Mar. 30, 1989, 1-80486
Int. Cl.^{5} H01L *39/02, 23/02, 23/12, 23/16*
U.S. Cl. 357—80 12 Claims



1. A modular semiconductor device comprising:
a first pair of generally parallel first electronic circuit boards, each having first and second edges;
at least one integrated circuit disposed generally perpendicular to and mechanically and electrically connected to each of said first pair of first electronic circuit boards; and
first electrical connection means disposed along the first edge of each of said first pair of first electronic circuit boards for establishing electrical connections with external equipment and for supporting said first pair of first electronic circuit boards when connected to external equipment wherein said first electrical connection means comprises a plurality of external electrodes disposed on each of said first electronic circuit boards and a plurality of clip leads, each clip lead including a clip portion contacting one of said external electrodes and engaging one of said electronic circuit boards and a lead portion extending from said clip portion for connection to external equipment, alternating lead portions disposed on each of said first electronic circuit boards being offset from each other.

5,025,308
ZEBRA SIGNAL GENERATING CIRCUIT OF A VIDEO CAMERA

Hyo-Sam Lee, Seoul, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Suwon, Rep. of Korea
Filed Apr. 6, 1990, Ser. No. 505,264
Int. Cl.^{5} H04N *17/02*
U.S. Cl. 358—10 5 Claims



1. A zebra signal generating circuit of a video camera, comprising:
video signal amplifying means for generating amplified red, green, and blue video signals;
non-additive mixing video signal means for outputting a non-additive mixing video signal proportional to an average value of the red, green, and blue video signals utilizing the amplified red, green, and blue video signals from said video signal amplifying means;
video signal integrating means for amplifying and successively integrating the green video amplified signal of the red, green, and blue amplified signals from said video signal amplifying means;
zebra signal generating means for generating comb teeth pattern signals in response to reception of a control signal from a control terminal; and
zebra signal control means for comparing the zebra signal with a reference voltage and generating the zebra signal in stages by controlling and switching through a logic circuit.

5,025,309
EXTENDED DEFINITION WIDESCREEN TELEVISION SIGNAL PROCESSING SYSTEM

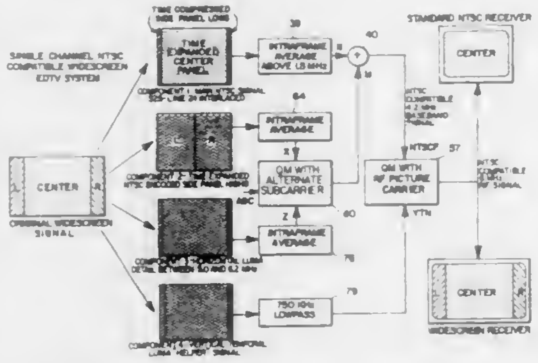
Michael A. Isnardi, Plainsboro, N.J., assignor to RCA Licensing Corporation, Princeton, N.J.
Filed Dec. 29, 1987, Ser. No. 139,340
Claims priority, application United Kingdom, Sep. 14, 1987, 8721565
Int. Cl.^{5} H04N *7/04, 11/00, 11/12*
U.S. Cl. 358—12 62 Claims

1. A system for processing a television-type signal, comprising:
means for providing a television-type signal representative of a widescreen image having an associated primary image information portion with an image aspect ratio greater than that of an associated secondary image information portion, an overall image aspect ratio greater than that of a standard television image, and enhanced image resolution relative to a standard television signal image;

VOL
1127
ISS
3
JE
18
1991
UMI

means responsive to said television signal for developing a baseband first component comprising information representative of a standard aspect ratio image;

means responsive to said television signal for developing a baseband second component comprising secondary image portion information having an aspect ratio less than that of standard television image;


SINGLE CHANNEL NTSC COMPATIBLE WIDESCREEN EDTV SYSTEM
TIME COMPRESSED SIDE PANEL LOWS
TIME EXPANDED CENTER PANEL
INTRAFRAME AVERAGE ABOVE 1.5 MHz
INTRAFRAME AVERAGE
QM WITH ALTERNATE SUBCARRIER
QM WITH RF PICTURE CARRIER
INTRAFRAME AVERAGE
750 KHz LOWPASS
STANDARD NTSC RECEIVER
CENTER
CENTER
WIDESCREEN RECEIVER
CENTER
ORIGINAL WIDESCREEN SIGNAL
NTSCF
YTN
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means responsive to said television signal for developing a baseband third component comprising high frequency image detail information; and

means for combining said first, second and third components into a common baseband signal for transmission via a single channel.

5,025,310
CLOCK PULSE GENERATOR CAPABLE OF BEING SWITCHED TO PROCESS BOTH STANDARD AND NON-STANDARD TELEVISION SIGNALS

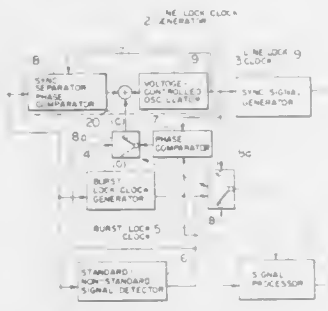
Hiroshi Sekiya; Toshiyuki Kurita, both of Yokohama; Nobufumi Nakagaki, Tokyo, and Toshinori Murata, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Video Engineering, Inc., Yokohama, both of Japan

Filed Mar. 23, 1990, Ser. No. 497,973

Claims priority, application Japan, Mar. 23, 1989, 1-69382; Jul. 19, 1989, 1-184686

Int. Cl.^{5} H04N *9/45, 9/455, 9/64, 5/04*

U.S. Cl. 358—19 **12 Claims**


SYNC SEPARATOR PHASE COMPARATOR
VOLTAGE-CONTROLLED OSCILLATOR
SYNC SIGNAL GENERATOR
PHASE COMPARATOR
BURST LOCK CLOCK GENERATOR
BURST LOCK CLOCK
STANDARD/NON-STANDARD SIGNAL DETECTOR
SIGNAL PROCESSOR
2
3
4
5
6
7
8
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1. A clock pulse generator comprising:

a first clock pulse generating means for generating a first clock pulse signal synchronized with a color burst signal contained in a video signal;

a second clock pulse generating means for generating a second clock pulse signal synchronized with a horizontal synchronizing signal contained in said video signal;

a detection means for detecting whether said video signal accords with a predetermined standard or not;

a phase control means for synchronizing the phase of said second clock pulse signal with the phase of said first clock pulse signal when said detection means makes a decision that said video signal accords with said standard;

a selection means supplied with said first and second clock pulse signals and for selecting one of said first and second clock pulse signals in accordance with the result of the detection through said detection means; and

said second clock pulse signal being supplied to a synchronizing signal generating means to make said synchronizing signal generating means generate a synchronizing signal based on said second clock pulse signal, the selected clock pulse signal being supplied from said selection means to a signal processing circuit to make said signal processing circuit perform signal processing upon said video signal based on said selected clock pulse signal.

5,025,311
VIDEO SIGNAL SEPARATING APPARATUS

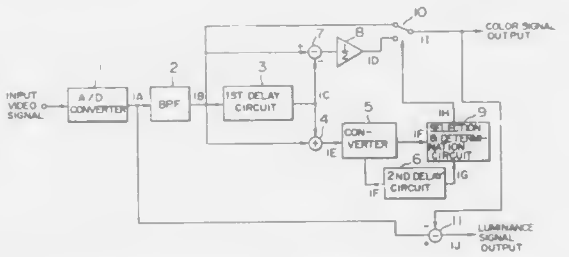
Osamu Hosoi, Neyagawa, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 22, 1988, Ser. No. 288,479

Claims priority, application Japan, Dec. 28, 1987, 62-331957; Feb. 5, 1988, 63-26102

Int. Cl.^{5} H04N *9/78*

U.S. Cl. 358—31 **7 Claims**



1. A video signal separating apparatus comprising:

an analog-to-digital converter for converting a video signal to a digital video signal;

a band-pass filter for passing a color signal band of the digital video signal;

a first delay circuit for delaying a first color signal passed from the filter by n horizontal periods where n is an integer;

a first-calculating circuit for calculating out the sum of the first color signal and a delayed version of the first color signal outputted from the first delay circuit to thereby calculate out the difference between these signals;

a converter for converting the output from the first calculating circuit to a correlation value;

a second delay circuit for delaying the correlation value outputted from the converter by m horizontal periods where m is an integer;

a second calculating circuit for calculating to halve the difference between the first color signal and a delayed version of the first color signal from the first delay circuit;

a switching circuit for outputting either one of a second color signal output from the second calculating circuit and the first color signal; and

a selection and determination circuit for determining which of the first and second color signals should be selected as the output from the switching circuit in accordance with the correlation values output from the converter and the second delay circuit, whereby the signal from the switching circuit is used as a third color signal to be outputted as an output color signal, and the third color signal is then subtracted from the video signal to produce an output luminance signal.

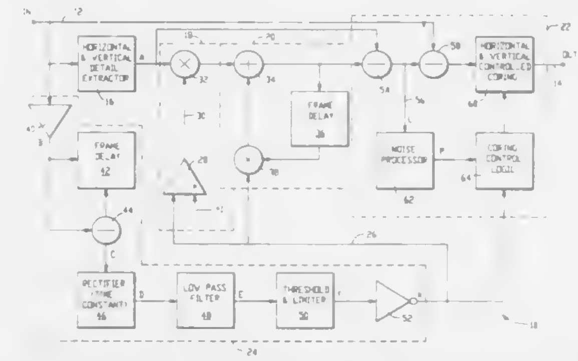
5,025,312
MOTION-ADAPTIVE VIDEO NOISE REDUCTION SYSTEM USING RECIRCULATION AND CORING

Yves C. Faroudja, 26595 Anacapa Dr., Los Altos, Calif. 94022

Filed Mar. 30, 1990, Ser. No. 503,313

Int. Cl.^{5} H04N *9/64, 5/713*

U.S. Cl. 358—36 31 Claims



1. A noise reduction system for reducing random noise within a video signal for providing a picture image upon a television display, the system comprising:

an input for receiving the video signal including transmission path noise and an output for putting out the video signal after removal of the transmission path noise,

detail separation means connected to the input for separating low amplitude level picture detail components and the transmission path noise from the video signal,

recirculation loop means connected for recirculating a fractional amount of the separated low amplitude level picture detail components and the transmission path noise, the fractional amount being controlled by a motion control signal in order to be higher when motion is lower and lower when motion is higher, so as to separate the transmission path noise from the low amplitude level picture detail components for non-motion portions of the picture image,

combiner means for subtracting the separated transmission path noise from non-motion portions of the picture image of the video signal thereby to provide a first noise reduction mode, and

coring means connected for coring in function of motion portions of the picture image of the video signal in accordance with the motion control signal; and,

motion detection and control signal generation means connected to the input for generating the motion control signal as a function of detected motion in the picture image of the video signal.

5,025,313
SYSTEM FOR MINIMIZING OPTICAL DISTORTIONS AND CHROMATIC ABERRATIONS IN A LINEAR COLOR SCANNER

Kenneth A. Parulski, and David Kessler, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

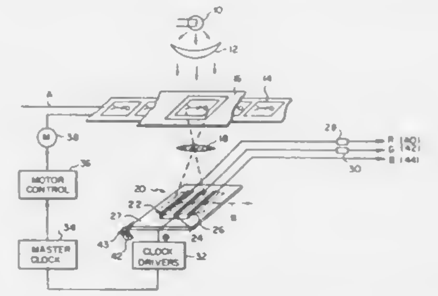
Filed Oct. 16, 1989, Ser. No. 422,331

Int. Cl.^{5} H04N *9/11, 5/253*

U.S. Cl. 358—54 **7 Claims**

1. In a color image scanning apparatus of the type having means including image forming optics for projecting a two-dimensional color image, a color image sensor means having a plurality of linear array sensors mounted in a flat plane with each linear array being responsive to a particular color for providing an output indicative of the intensity of the light impinging thereon, means for scanning the projected image at a predetermined line scan rate, and means for continuously displacing the projected image in a direction perpendicular to the line scan to effect an image raster scan composed of a number of spaced lines, the improvement comprising:

a transparent layer of material having an index of refraction for correcting the focus of the projected image from said forming optics positioned over at least one of said linear arrays.



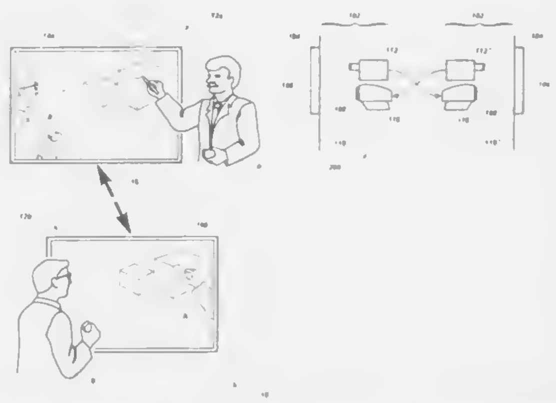
5,025,314
APPARATUS ALLOWING REMOTE INTERACTIVE USE OF A PLURALITY OF WRITING SURFACES

John C. Tang, Palo Alto, and Scott L. Minneman, San Francisco, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 30, 1990, Ser. No. 559,486

Int. Cl.^{5} H04N *7/18*

U.S. Cl. 358—93 **12 Claims**



1. An apparatus for remote interactive communication, comprising:

first and second writing/display screens, each writing/display screen having a first surface for receiving indicia imparted by a user thereupon and a second surface opposite said first surface for diffusing light incident thereupon;

a first video camera positioned to capture substantially only those images imparted on the first surface of the first writing/display screen by imaging the second surface of the first writing/display screen;

a second video camera positioned to capture substantially

VOL
1127
ISS
3
JE
18
1991
UMI

only those images imparted on the first surface of the second writing/display screen by imaging the second surface of the second writing/display screen;

a first video projector positioned to project an image onto the second surface of the first writing/display screen;

a second video projector positioned to project an image onto the second surface of the second writing/display screen; and

means for interconnecting the first and second video cameras and video projectors such that an image of indicia imparted by a user upon the first surface of the first writing/display screen is detected by the first video camera and transmitted to the second video projector which projects the image from the first writing/display screen onto the second surface of the second writing/display screen and an image of indicia imparted by a user upon the first surface of the second writing/display screen is detected by the second video camera and transmitted to the first video projector which projects the image from the second writing/display screen onto the second surface of the first writing/display screen to thereby form an optical composite of the images on the first surfaces of the first and second writing/display screens.

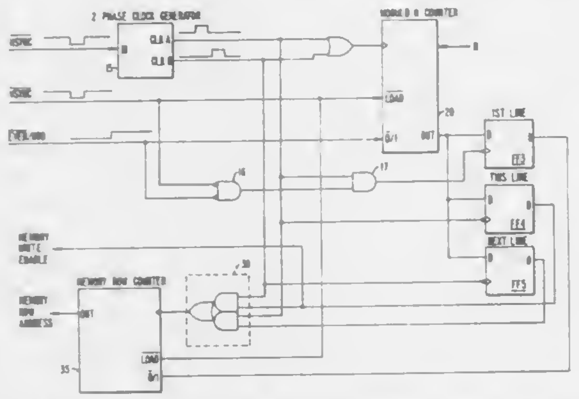
5,025,315
METHOD AND APPARATUS FOR SCALING INTERLACED IMAGES

Arun Johary, and Mark A. Rosenau, both of San Jose, Calif., assignors to Chips and Technologies, Inc., San Jose, Calif.

Filed Sep. 6, 1990, Ser. No. 578,704

Int. Cl.^{5} H04N *5/14*

U.S. Cl. 358—140 4 Claims



1. A scaling method for use with interlaced video data, the video data having two fields, each field having a predetermined number of input lines, the method comprising the steps of:

receiving as input a scaling factor, expressible as a fraction having a numerator and a denominator, the numerator indicating the number of output lines for a predetermined number of input lines, the predetermined number of input lines equalling the denominator;

sequentially processing each successive input line;

counting from 1 to the denominator in steps of 1, the count resetting to 1 whenever the count is equal to the denominator, the count being incremented N times for each input line;

storing the input line in an output frame buffer and leaving one blank space in the output frame buffer if each of the two counts for the input line is less than or equal to the numerator;

storing the input line in a frame buffer and leaving no blank spaces in the frame buffer if the first count is equal to the numerator and the successive count is greater than the numerator and less than or equal to the denominator;

deleting the input line and leaving one blank space in the frame buffer if the first count is greater than the numerator and less than or equal to the denominator and the successive count is less than or equal to the numerator;

deleting the input line and leaving no blank spaces if the first and second count for the input line are both greater than the numerator and less than or equal to the denominator; and

resetting the count to 2 when the second field is encountered, if the first input line in the first field was stored in the output frame buffer and, if the first input line in the first field was not put into the frame buffer, resetting the count to 1.

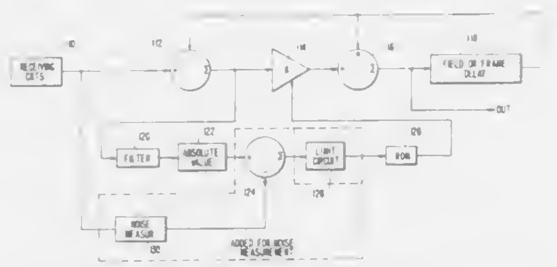
5,025,316
VIDEO NOISE REDUCTION SYSTEM WITH MEASURED NOISE INPUT

Ted A. Darby, Knoxville, Tenn., assignor to North American Philips Corporation, New York, N.Y.

Filed Nov. 6, 1989, Ser. No. 433,059

Int. Cl.^{5} H04N *5/213*

U.S. Cl. 358—167 3 Claims



1. Television receiver apparatus, comprising:

receiving means for receiving a television signal having noise superimposed thereon and for furnishing a received television signal in response thereto;

first means connected to said receiving means for generating a noise signal varying, at least in part, in accordance with the amplitude of said superimposed noise;

second means connected to said receiving means for generating movement signals indicative, at least in part, of desired changes in said television signal resulting from actual changes in the television image; and

processing means, connected to said first means and said second means, for forming, in response to said noise signal and said movement signals, an output television signal having a noise content adjustably reduced from that in said received television signal, said processing means comprising a noise reduction circuit coupled to said second means for forming said output television signal with said noise content being adjusted in response to a control signal applied to a control input of said noise reduction circuit, and control signal generating means comprising subtraction means connected to said first means and said second means for subtracting said noise signal form said movement signals, an output of said subtraction means being coupled to said control input of said noise reduction circuit.

5,025,317
GHOST CANCELER USING REFERENCE SIGNALS TO GENERATE UPDATED CRITERION FUNCTIONS ON WHICH TAP GAINS ARE DETERMINED

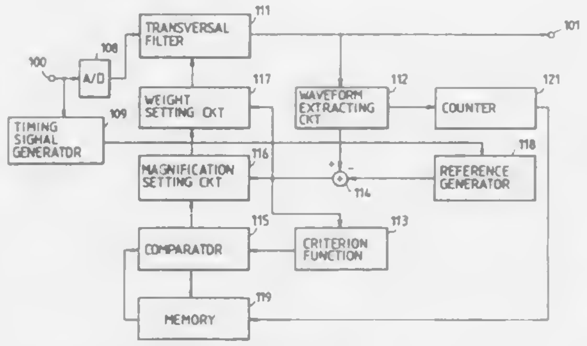
Tatsushi Koguchi, Iwai; Shigehiro Ito; Kazyuki Ebihara, both of Toride, and Yuji Nishi, Iwai, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Apr. 10, 1990, Ser. No. 506,834

Claims priority, application Japan, Apr. 13, 1989, 1-94227; Apr. 27, 1989, 1-49948[U]

Int. Cl.^{5} H04N *5/21*

U.S. Cl. 358—167 1 Claim



1. A ghost canceler comprising:

a transversal filter filtering an input video signal with a filtering characteristic determined by tap gains;

a waveform extracting circuit extracting a waveform of a first ghost cancel reference signal contained in the input video signal;

a reference signal generator generating a second ghost cancel reference signal synchronous with the first reference signal;

a subtracter deriving a difference between the waveform of the first reference signal and a waveform of the second reference signal and generating a row of error signals representing the derived difference;

a criterion function setting circuit calculating a criterion function on the basis of the row of the error signals;

a memory storing a minimal value;

a comparator determining whether or not the criterion function currently calculated by the criterion function setting circuit is smaller than the minimal value stored in the minimal value;

means responsive to an output signal from the comparator for replacing the minimal value with the currently-calculated criterion function as a new minimal value when the currently-calculated criterion function is smaller than the minimal value, and for keeping the minimal value stored in the memory when the currently-calculated criterion function is not smaller than the minimal value;

a magnification setting circuit determining a magnification on the basis of the row of the error signals and the output signal from the comparator;

a weight setting means for calculating the tap gains on the basis of the magnification determined by the magnification setting circuit and the row of the error signals;

means for counting a number of times of execution of the extracting of the waveform by the waveform extracting circuit; and

means resetting the minimal value in the memory to a predetermined initial value when the number of times which is counted by the counting means reaches a predetermined number.

5,025,318
IMAGING APPARATUS WITH MEANS FOR CANCELLING DIFFERENTIAL OFFSET VOLTAGE

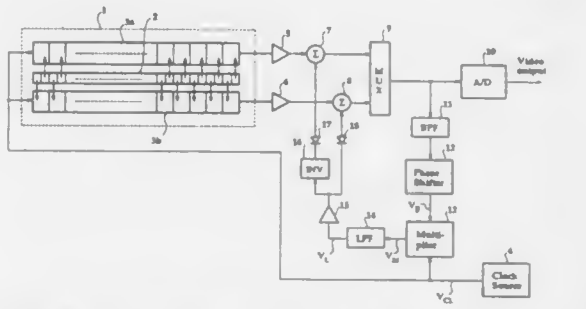
Riichi Nagura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 27, 1989, Ser. No. 457,901

Claims priority, application Japan, Dec. 27, 1988, 63-334826

Int. Cl.^{5} H04N *3/14, 5/335, 5/213*

U.S. Cl. 358—213.15 18 Claims



1. A difference voltage canceller for a charge transfer device having a photosensor divided into odd- and even-numbered photosensitive elements, a first shift register connected to the odd-numbered photosensitive elements, and a second shift register connected to the even-numbered photosensitive elements, comprising:

means for generating bipolar clock pulses for driving said first and second shift registers;

detector means for generating a difference voltage representative of a difference between first and second offset voltages generated respectively by said first and second shift registers;

multiplier means for multiplying said difference voltage with said bipolar clock pulses;

filter means for smoothing a voltage output of said multiplier means; and

means for combining a voltage output of said filter means with one of the output signals of said first and second shift registers depending on the polarity of the voltage output of said filter means so that the difference between said offset voltages substantially reduces to zero.

5,025,319
SOLID STATE IMAGE PICKUP DEVICE DRIVING METHOD UTILIZING AN ELECTRONIC SHUTTER OPERATION

Hideki Mutoh, Kanagawa; Kazuya Oda, Tokyo, and Kazuhiro Kawajiri, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 27, 1989, Ser. No. 371,783

Claims priority, application Japan, Jul. 12, 1988, 63-171879; Sep. 27, 1988, 63-239596

Int. Cl.^{5} H04N *3/14*

U.S. Cl. 358—213.29 10 Claims

1. A method for driving a solid image pickup device comprising light receiving elements arranged in first and second fields, the elements being operatively connected to charge transfer paths in a light receiving section and a storage section, the storage section being operative to output its contents to a charge coupled device (CCD), comprising:

(a) transferring first signal charges produced by light receiving elements in said first field to charge transfer paths in said light receiving section and then to said storage section;

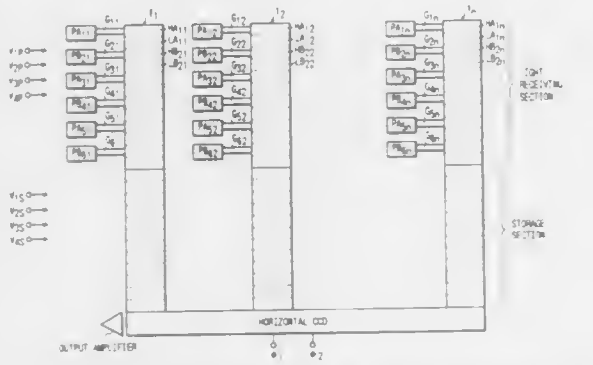
(b) transferring, while said first signal charges are held in said storage section, second signal charges produced by light receiving elements in said second field to said charge transfer paths in said light receiving section;

(c) outputting, while said second signal charges are held in said charge transfer paths of said light receiving section,

VOL
1127
ISS
3
JE
18
1991
UMI

said first signal charges in said storage section through said CCD;

(d) utilizing a first time interval, which spans from the reception of light in said light receiving elements in said first field until the transferring of said first signal charges to said charge transfer paths, as a shutter period for said first field, and

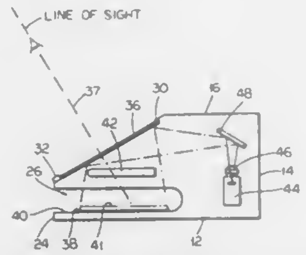


(e) utilizing a second time interval, which spans from the reception of light in said light receiving elements in said second field until the transferring of said second signal charges to said charge transfer paths, as a shutter period for said second field.

5,025,320
VIDEO IMAGING PODIUM

Henry Kyhl, Englewood, N.J., assignor to Buhl Industries, Inc., Fair Lawn, N.J.

Filed Sep. 7, 1989, Ser. No. 404,077
Int. Cl.^{5} H04N *5/30, 7/18*
U.S. Cl. 358—229 **12 Claims**



1. A speaker's podium for use in boardrooms, meetings, training classes, auditoriums, and the like in conjunction with display of the speaker's illustrative materials, comprising:

an enclosure having a height that is lower than the speaker to permit an audience to view the speaker and being defined by a plurality of surfaces including a top surface, said top surface having a first opening therethrough and being spaced below eye level of the speaker;

at two-way mirror positioned in said first opening, a first side of said mirror being reflective, said first mirror side facing the interior of said enclosure, the second side of said mirror being at ieast partially transparent and facing outwardly of said enclosure;

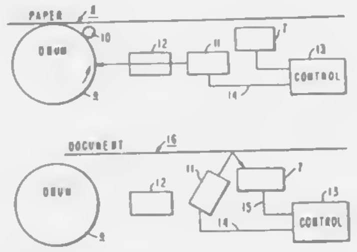
support means being at least partially within said enclosure for supporting illustrative materials, said materials being visible to the speaker from outside of said enclosure by viewing directly through said two-way mirror when the speaker looks downwardly at the podium;

and camera means within said enclosure and positioned to receive light reflected from said illustrative materials by way of said reflective first mirror side when said illustrative materials are supported by said support means, all of the surfaces of the enclosure being spaced below eye level of a speaker to enable the speaker to have both an unobstructed view in a horizontal direction over said enclosure and an unobstructed view downwardly through said mirror when viewing from any position which is above the mirror.

5,025,321
FACSIMILE MACHINE USING THIN FILM ELECTROLUMINESCENT DEVICE

David Leksell, Oakmont; Zoltan K. Kun, Churchill Boro, and Juris A. Asars, Murrysville Borough, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 22, 1990, Ser. No. 527,213
Int. Cl.^{5} H04N *1/028, 1/036, 1/29;* **G01D** *15/14*
U.S. Cl. 358—296 **24 Claims**



1. A facsimile machine having a read mode for producing electrical signals representative of a document and having a write mode for producing a fixed copy of a document from a representative electrical signal comprising:

sensor means for scanning a document and converting light images received into an electrical signal representative of such document;

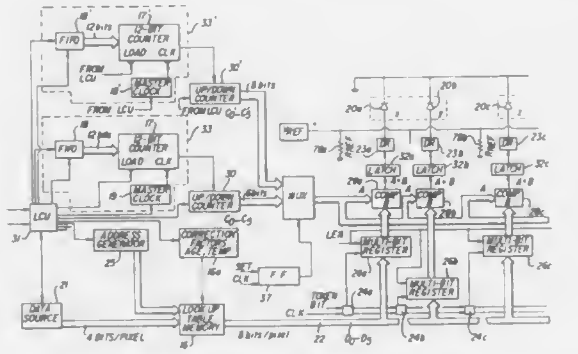
photoreceptor means for forming a fixed copy from light images received; and

an edge emitting thin film electroluminescent line array containing a plurality of pixels for selectively directing at least a portion of light emitted from said pixels to said photoreceptor means when such facsimile machine is in a write mode thereby transmitting light images to said photoreceptor means and for selectively directing at least a portion of light emitted from said pixels to illuminate a document thereby providing light images to said sensor means when said facsimile machine is in a read mode.

5,025,322
METHOD AND APPARATUS FOR GREY LEVEL RECORDING USING MULTIPLE ADDRESSABILITY

Yee S. Ng, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 18, 1989, Ser. No. 453,421
Int. Cl.^{5} H04N *1/21;* **G01D** *15/14*
U.S. Cl. 358—298 **27 Claims**



1. An apparatus for recording images upon an image receptor, the apparatus comprising:

a recording head having a plural number N of point-like recording elements per inch extending so as to record along a line, the recording head emitting a line of dot recording emissions in response to data signals;

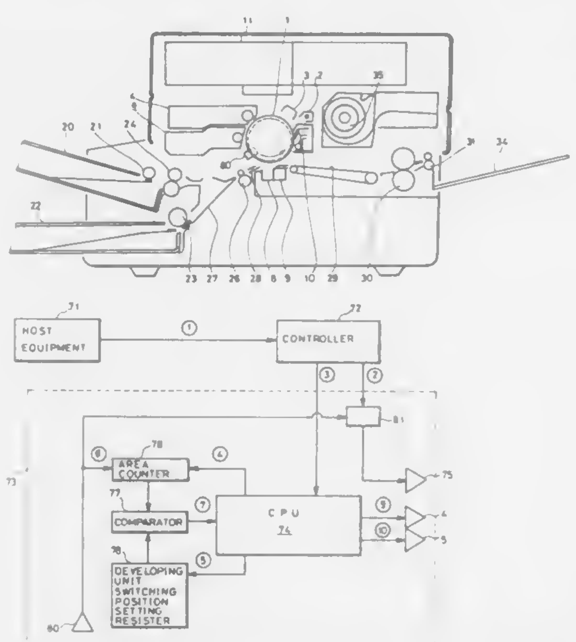
control means including means for providing data signals to the recording head for exposing M sub-lines per inch on the image receptor to record an image with a resolution of N×M dots per square inch, N and M being numbers greater than one and M being greater than N; and

wherein the control means further includes master clock means emitting pulses of first and second frequencies and means for controlling the duration of the emissions from the recording elements by controlling a recording element during one sub-line of recording in response to a plurality of pulses of the first frequency from the master clock means and controlling the same recording element during a next sub-line of recording in response to a plurality of pulses of the second frequency from the master clock means.

5,025,323
DEVELOPING UNIT SWITCHING DEVICE FOR A PRINTER

Kiyoshi Emori, and Hiroshi Maekawa, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 23, 1989, Ser. No. 299,648
Claims priority, application Japan, Jan. 22, 1988, 63-13396
Int. Cl.^{5} H04N *1/29;* **G03G** *15/01, 15/06*
U.S. Cl. 358—300 **11 Claims**



1. A printer for forming a printed image on a recording medium on the basis of data received from a host control unit, said printer comprising:

a photoreceptor member;

latent electrostatic image forming means provided opposed to said photoreceptor member for forming a latent electrostatic image on an outer periphery of said photoreceptor member;

first developing means provided opposed to said photoreceptor member in the downstream side of said latent electrostatic image forming means for developing a portion of said latent electrostatic image with toner of a first color;

second developing means provided in the downstream side of said first developing means for developing another portion of said latent electrostatic image with toner of a second color which is different from said first color;

pulse generating means associated with said photoreceptor member for generating pulses corresponding to an amount of rotation of said photoreceptor member;

counting means for counting said pulses, said counting means being adapted to start counting after start of formation of said latent electrostatic image;

setting means for setting a prescribed value based on the data received from the host control unit, said data representing a border line between the portions developed by the first developing means and developed by the second developing means;

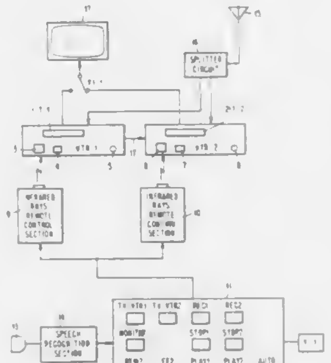
switching signal generating means for generating a signal to switch operation of said first and second developing means, said switching signal generating means being adapted to output said switching signal when a value counted by said counting means reaches said prescribed value set by setting means; and

control means responsive to said switching signal for controlling the operation of said first and second developing means.

5,025,324
METHOD OF AND APPARATUS FOR RECORDING INFORMATION ON BOTH A MAIN RECORDING MEDIUM AND AN ENDLESS RECORDING MEDIUM FOR REPEATED EVENT MONITORING

Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 773,191, Sep. 6, 1985, abandoned. This application Jan. 9, 1989, Ser. No. 295,073
Int. Cl.^{5} H04N *5/782*
U.S. Cl. 358—335 **6 Claims**



1. An audio/video information recording/playback apparatus with repeating monitor function and having an input means for receiving broadcast information, comprising:

means for performing a repeating recording operation of an endless type recording medium (T-1) which is composed of at least several seconds per cycle, and for performing a repeating playback operation thereof selectively in response to a control signal;

means for performing a recording or playback operation of a main recording medium (T-2);

means responsive to a first control signal generated by a remote control box for driving both said recording media (T-1 and T-2) simultaneously in a recording mode; and

control circuit means including

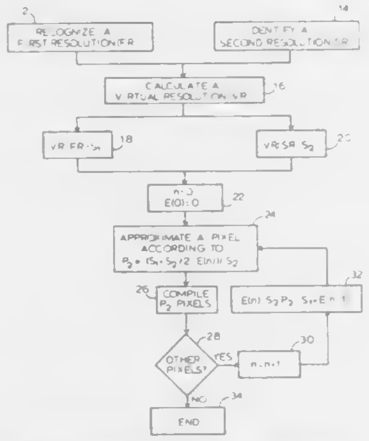
(a) first means operative in a first mode that is responsive to a second control signal generated by said remote control box for recording on said main recording medium (T-2) broadcast information received at said input means while causing a repeating playback of said endless type recording medium (T-1) so as to keep record-

VOL
1127
ISS
3
JE
18
1991
UMI

ing said broadcast information on said main recording medium (T-2) without interruption; and
(b) second means operative in a second mode that is
  (i) responsive to a third control signal generated by said remote control box for starting playback of said main recording medium (T-2) and, at the same time, setting said endless type recording medium (T-1) in the recording mode while said main recording medium (T-2) is used for playback so that information previously recorded by said main recording medium (T-2) can be recorded by said endless type recording medium (T-1),
  (ii) responsive to a fourth control signal generated by said control box for causing temporary stopping of a driving operation of said main recording medium (T-2) at a temporary stopping position thereof while causing a repeating playback of said endless type recording medium (T-1), and
  (iii) responsive to a fifth control signal generated by said remote control box for performing a playback operation of said main recording medium (T-2) from said temporary stopping position and at the same time switching said endless type recording medium (T-1) to the recording mode to record information previously recorded on said main recording medium (T-2).

5,025,325
GRAPHICS SCALING METHOD FOR HIGH RESOLUTION PRINTERS

Kevin R. Hudson, Vancouver, Wash., assignor to Hewlett-Packard Company, Palo Alto, Calif.
Filed Oct. 13, 1989, Ser. No. 421,040
Int. Cl.^{5} H04N *1/40*
U.S. Cl. 358—447 **12 Claims**


2
RECOGNIZE A FIRST RESOLUTION FR
14
IDENTIFY A SECOND RESOLUTION SR
CALCULATE A VIRTUAL RESOLUTION VR
16
18
20
22
E(0)=0
24
APPROXIMATE A PIXEL ACCORDING TO
26
COMPILE P2 PIXELS
32
28
OTHER PIXELS?
YES
NO
30
n=n+1
34
END

1. A method of scaling an image comprising:
recognizing such image as an arrangement of pixels at a first resolution of pixel positions;
identifying a second resolution of pixel positions, greater than the first resolution;
calculating a virtual resolution that is a multiple of the first and second resolutions and that may be expressed in arbitrary units;
approximating each pixel of such image at the first resolution as multiple pixels at the second resolution according to:

$$P_2=(S_1+S_2/2-E(n))/S_2$$

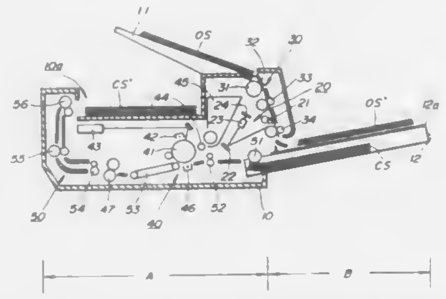
$$E(0)=0$$

$$E(n+1)=S_2P_2-S_1+E(n)$$

where P_2 is the number of pixels at the second resolution needed to approximate each pixel at the first resolution, S_1 is the number of virtual resolution units per first resolution position, S_2 is the number of virtual resolution units per second resolution position, and E(n) is a cumulative scaling error; and
compiling the P_2 pixels at the second resolution to create a scaled image.

5,025,326
FACSIMILE MACHINE USING CUT SHEETS AS RECEIVED-SIGNAL RECORDING PAPER AND METHOD OF FEEDING THE CUT-SHEETS

Takashi Shimmyo, Musashino, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Sep. 22, 1989, Ser. No. 411,002
Claims priority, application Japan, Sep. 30, 1988, 63-127102[U]
Int. Cl.^{5} H04M *1/04*
U.S. Cl. 358—498 **10 Claims**

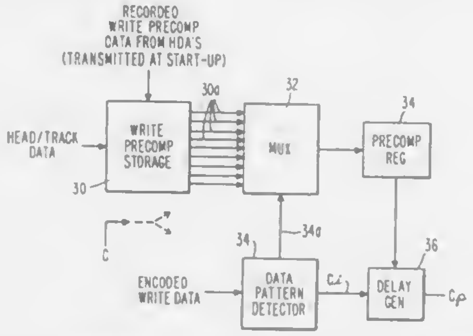


1. A sheet feeding method in a facsimile machine using cut sheets as received-signal recording paper and including a machine casing as a main frame of said facsimile machine and a recording paper cassette removably attached onto one side of said machine casing for containing the cut sheets, said method comprising the steps of:
sequentially introducing original document sheets from a casing installation zone where the machine casing is installed into interior of the casing;
reading a picture image written on one of the original sheets to be transmitted within the casing; and
discharging the original sheet having the image already read therefrom into a recording-cassette installation zone where said recording paper cassette is installed.

5,025,327
MAGNETIC DISK WRITE PRECOMPENSATION METHOD AND APPARATUS WHICH TAKES INTO ACCOUNT VARIATIONS IN HEAD/DISK CHARACTERISTICS

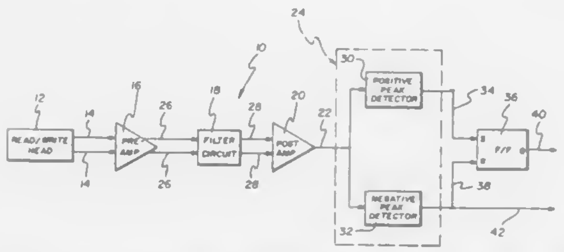
Jesse I. Stamness, Los Altos Hills; Raymond W. Morrow, San Jose, and Edward E. Asato, Sunnyvale, all of Calif., assignors to Unisys Corp., Detroit, Mich.
Filed Oct. 17, 1986, Ser. No. 920,004
Int. Cl.^{5} G11B *5/09*
U.S. Cl. 360—45 **21 Claims**

1. A magnetic media storage system comprising:
controller means for providing control for said system;
a head/media assembly including a plurality of head/media combinations cooperating with said controller means for writing and reading digital data;
said assembly having media on which write precompensation data is recorded, said write precompensation data defining write precompensation characteristics for said head/media combinations taking into account performance differences among said head/media combinations;
said controller means including read/write means for performing a writing operation on said media;
said controller means also including write precompensation means for providing write precompensation for said writing operation, said precompensation means having write precompensation storage means for storing write precompensation data;
means for transferring the write precompensation data recorded on said media to said write precompensation storage means for storage therein prior to the performance of writing operations;
said write precompensation means being operative prior to the performance of a writing operation by a selected head/media combination for accessing from said write precompensation storage means selected bit-shift write precompensation data corresponding to the selected head/media combination and also to the pattern of data to be written;
said read/write means being responsive to said selected bit-shift write compensation data to perform said writing operation in a manner which takes into account the selected head/media combination as well as the data pattern of the data to be written.



5,025,328
CIRCUIT FOR DECODING BINARY INFORMATION

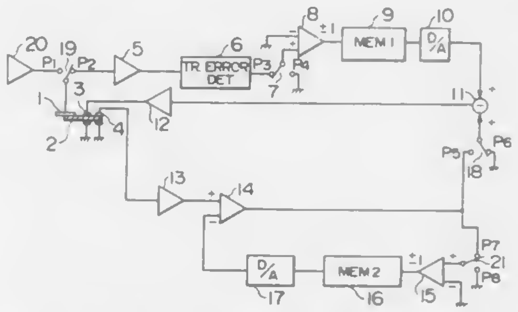
Fernando G. Silva, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Mar. 22, 1989, Ser. No. 327,068
Int. Cl.^{5} G11B *5/09*
U.S. Cl. 360—46 **6 Claims**



1. An electrical circuit suitable for decoding binary data comprising first and second information; which data has been encoded into an encoded signal, the encoded signal comprising:
(i) a succession of event-cells, each of which event-cells is demarcated by a pair of unique clock transitions; and wherein
(ii) each event-cell is dedicated to encoding either a first information or a second information; the electrical circuit comprising:
  (1) a reading means for reading the encoded signal and producing a read signal which corresponds to a mathematical derivative of the encoded signal, so that the read signal comprises
    a succession of event-cells, each of which event-cells comprises a unique pair of clock transition components, and each of which event-cells contains either a first information component represented by the substantial absence of a read signal in the event-cell or a second information component represented by the presence of a read signal in the event-cell;
  (2) a detector means for interrogating the read signal and producing separate first and second output signals, wherein
    (i) the first output signal comprises the succession of unique clock transition components, and
    (ii) the second output signal comprises the first and second information components; and
  (3) bi-state means responsive to said first and second output signals for assuming during each event-cell either a first state in the absence of a read signal in the event-cell or a second state in the presence of a read signal in the event-cell, thereby mapping, in a one-to-one relationship, the succession of event-cells with the corresponding first or second information component dedicated in the encoding to each event-cell.

5,025,329
ELECTRONICALLY CONTROLLED MAGNETIC TAPE EDITING DEVICE

Hiroshi Taniguchi; Kanji Kubo, both of Hirakata, and Hiromi Nakase, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jun. 26, 1989, Ser. No. 371,287
Claims priority, application Japan, Jun. 28, 1988, 63-160057
Int. Cl.^{5} G11B *5/592*
U.S. Cl. 360—77.16 **3 Claims**

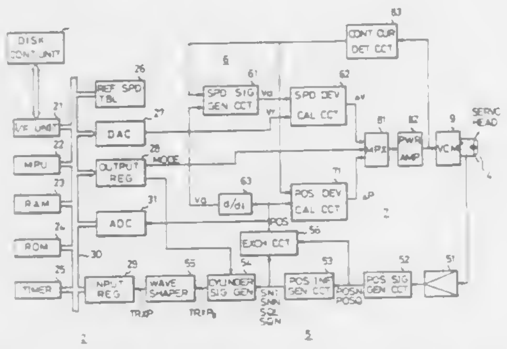


1. An electronically controlled magnetic tape editing device for a magnetic tape recorder/reproducer of helical scan type, comprising:
at least one magnetic head;
a first memory to store curvature information of a reproduced track derived from said magnetic head;
an electro-mechanical converting element which has said magnetic head mounted thereon and which is actuated in response to an output of said first memory;
a strain sensor for detecting mechanical strain in said electro-mechanical converting element;
a second memory for storing an output of said strain sensor for at least one reproduced track; and
an auxiliary circuit for actuating said electro-mechanical converting element to cause the output of said strain sensor in an editing recording operation to be coincident with the output of said strain sensor stored in the second memory while reproducing the track before an editing point in the tape,
wherein when said magnetic head is set for reproducing recorded tracks, both curvature information a nd the output of said strain sensor relating to the track before said editing point for a predetermined time period prior to the editing operation are stored respectively into said first memory and said second memory and when said magnetic head reaches said editing point, said magnetic head is set for recording new records to be edited onto the track.

VOL 1127
ISS 3
JE 18 1991
UMI

5,025,330
HEAD POSITIONING CONTROL SYSTEM AND METHOD FOR A MEMORY DEVICE USING EVEN AND ODD TRACK CROSS PULSES

Takeshi Nishimiya, Cupertino, Calif., assignor to Fujitsu Limited, Kawasaki, Japan
PCT No. PCT/JP88/00061, § 371 Date Sep. 27, 1988, § 102(e) Date Sep. 27, 1988, PCT Pub. No. WO88/05594, **PCT Pub. Date Jul. 28, 1988**
PCT Filed Jan. 27, 1988, Ser. No. 254,773
Claims priority, application Japan, Jan. 27, 1987, 62-16720
Int. Cl.⁵ G11B *5/55, 21/08*
U.S. Cl. 360—78.04 **19 Claims**

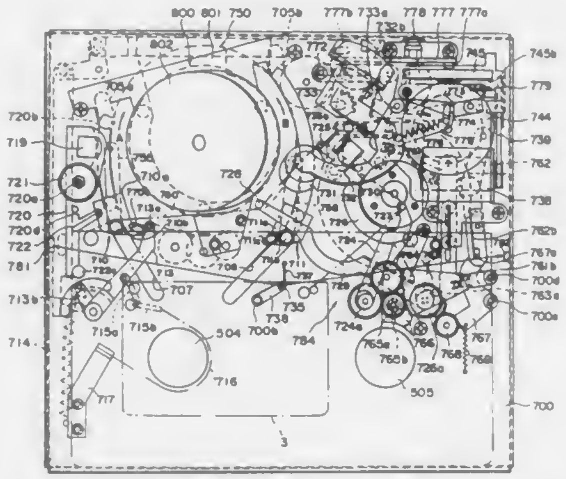


18. A method for positioning a servo head from a current cylinder to a target cylinder of a memory storage device, comprising the steps of:
- (a) calculating a cylinder movement difference by subtracting the current cylinder from the target cylinder;
- (b) moving the servo head towards the target cylinder in dependence upon a predetermined reference speed and the cylinder movement difference;
- (c) detecting an odd cylinder crossing by the servo head if the target cylinder is odd and an even cylinder crossing if the target cylinder is even;
- (d) updating the cylinder movement difference after said detecting of step (c) by reducing the cylinder movement difference by 2 if the current cylinder and the target cylinder are both odd and if both are even; and
- (e) repeating steps (b), (c) and (d) until the cylinder movement difference is equal to zero.

5,025,331
TAPE CASETTE LOADING SYSTEM COMPATIBLE WITH TWO DIFFERENT SIZED CASSETTES

Hiromichi Hirayama, Yokosuka; Mitsuhiko Hara, Kawasaki; Masato Mihara, Hiratsuka, and Mitsuo Harumatsu, Tokyo, all of Japan, assignors to Victor Company of **Japan**, Ltd., **Kanagawa, Japan**
Filed Nov. 9, 1988, Ser. No. 269,775
Claims priority, application Japan, Nov. 10, 1987, 62-282248
Int. Cl.⁵ G11B *5/027*
U.S. Cl. 360—85 **14 Claims**

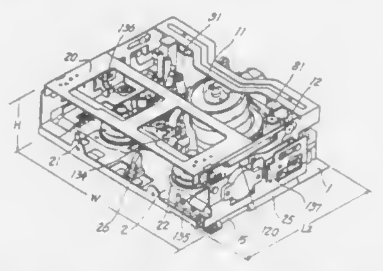
1. A tape loading mechanism of a magnetic recording/reproducing apparatus for recording and/or reproducing an information signal on and from a magnetic tape contained in one of first and second tape cassettes which is held at a respective one of first and second predetermined positions in a body of the magnetic recording/reproducing apparatus, for loading and unloading the magnetic tape on a rotary drum means of the magnetic recording and reproducing apparatus on which magnetic heads for recording and reproduction of the infraction are carried, comprising:
- a chassis fixed on the body of the magnetic recording/reproducing apparatus such that said first tape cassette having a first size and held at said first predetermined position in the body of the magnetic recording/reproducing apparatus is positioned above a first predetermined area defined on the chassis and that said second tape cassette having a second size substantially smaller than said first size and held at said second predetermined position in the body of the magnetic recording/reproducing apparatus is positioned above a second predetermined area of the chassis included in said first predetermined area, said chassis further carrying said rotary drum means at a position outside said first predetermined area;
- first and second arcuate guide grooves respectively provided on said chassis with the rotary drum means being located therebetween, each of said arcuate guide grooves comprising a first part located outside said first predetermined area first predetermined area and said, a second part located inside said first predetermined area but outside said second predetermined area, and a third part located inside said first predetermined area and said second predetermined area;
- first and second loading members respectively held on said chassis in a manner movable along said first and second arcuate guide grooves, each of said loading members carrying an oblique pole adapted to carry the magnetic tape and to wrap it around the rotary drum means when the loading members are located at respective first positions in said first parts of said first and second guide grooves, respectively said oblique poles on the loading members being accepted in a depressed part at a front side of the first tape cassette which faces the rotary drum means when the first tape cassette is held at the first predetermined position in the body of a magnetic recording/reproducing apparatus and said first and second loading members are respectively located at second positions in said second parts of said first and second guide grooves, and said oblique poles on the loading members being accepted in a depressed part at a front side of the second tape cassette which faces the rotary drum means when the second tape cassette is held at the second predetermined position in the body of the magnetic recording/reproducing apparatus and said first and second loading members are respectively located at third positions in siad third parts of said first and second guide grooves; and



- a motor driving means comprising a motor for moving said first and second loading members along said first and second guide grooves respectively between said first, second and third positions.

5,025,332
RECORDING-REPRODUCING SYSTEM HAVING MOVABLE REEL CHASSIS

Takefumi Tsuchida, Kadoma; Minoru Yoshida, Neyagawa; Yoshimi Kodama, Kobe, and Masahiro Moriyama, Daito, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan
Filed Aug. 29, 1989, Ser. No. 400,221
Claims priority, application Japan, Aug. 30, 1988, 63-215494; Aug. 30, 1988, 63-215495; Aug. 30, 1988, 63-215496; Aug. 30, 1988, 63-215497; Aug. 30, 1988, 63-215498; Aug. 30, 1988, 63-215499
Int. Cl.⁵ G11B *5/027, 5/008*
U.S. Cl. 360—85 11 Claims

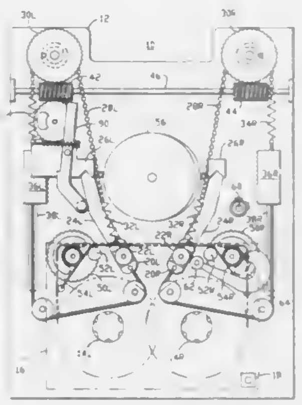


1. A recording-reproduction system settable in a standby mode and in a play mode, comprising:
- a main chassis;
- a head cylinder and a capstan disposed on said main chassis;
- a movable reel chassis having a pair of reel supports, the reel chassis being movably supported on the main chassis having a head cylinder such that the reel chassis is movable toward or away from the head cylinder;
- a rack supported by the movable reel chassis;
- in the standby mode, a tape cassette supported on the reel chassis is disposed at a maximum distance away from the head cylinder, and in a play mode, signals are recorded or reproduced with the reel chassis positioned at a minimum distance from the head cylinder;
- a loading motor supported on the main chassis;
- a power shaft drivingly rotatable by the loading motor, the power shaft being rotatably supported on the main chassis and being axially movably supported on the main chassis;
- a mode lever mounted on the main chassis and connected to an end of the power shaft such that the mode lever is pivotally movable in response to axial movement of the power shaft;
- a worm gear fixed to the power shaft for rotation therewith, the worm gear being constantly in mesh with the rack mounted on the movable reel chassis;
- a restraining mechanism disposed between the mode lever and the movable reel chassis for restraining the mode lever from pivotal movement during the movement of the movable reel chassis; and
- a pinch roller pressing mechanism mounted on the movable reel chassis for pressing a magnetic tape against the capstan on the main chassis in response to pivotal movement of the mode lever.

5,025,333
TAPE ENGAGEMENT MECHANISM FOR MAGNETIC CASSETTE TAPE

Howard A. Feinberg, San Jose, and Theodore D. Rees, Mountain View, both of Calif., assignors to R-Byte, Inc., San Jose, Calif.
Filed Apr. 12, 1990, Ser. No. 508,344
Int. Cl.⁵ G11B *15/665*
U.S. Cl. 360—85 25 Claims

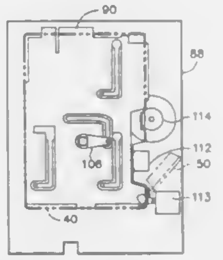
1. Apparatus for extracting a magnetic tape from a cassette and positioning it proximately to a tape head for playback or recording, including:
- symmetrical first and second tape engagement means for extracting said tape from said cassette and moving it along first and second tape engagement paths in a direction towards said tape head, said first and second tape engagement means including first and second end of travel stop means at either end of said first and second tape engagement paths for halting said first and second tape engagement means at predetermined stop positions, and



- drive means for imparting motion to said tape engagement means, said drive means including anti-jamming means to prevent jamming said drive means in the event that one of said first and second tape engagement means arrives at its predetermined stop position before the other.

5,025,334
AUTO-LOADING TRANSPORT FOR TAPE CARTRIDGE WITH TAPE ACCESS DOOR AND BELT CAPSTAN ROLLER

Mark Perona; Tom C. Woller, both of San Diego, and Jon S. Guy, Carlsbad, all of Calif., assignors to Cipher Data Products, Inc., San Diego, Calif.
Filed Sep. 12, 1989, Ser. No. 405,932
Int. Cl.⁵ G11B *5/008*
U.S. Cl. 360—96.5 37 Claims



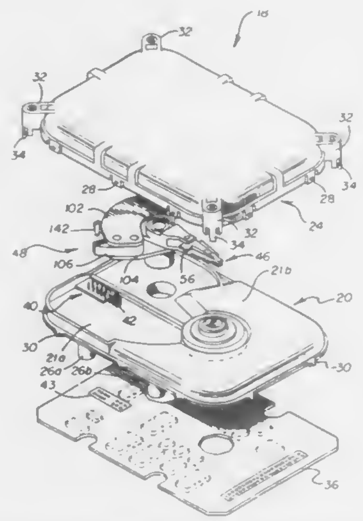
1. A transport for a rectangular tape cartridge having a length of six inches and a width of four inches, the cartridge further having a metal base plate, a plastic cover attached to the base plate and enclosing a pair of reels, a tape access door hingedly mounted between the base plate and the cover along a side edge of the cartridge, the access door being pivotable about and axis perpendicular to the base plate to open a cut-out region in the cover and thereby permit access to a length of tape which is windable between the reels by driving a belt capstan roller rotatably mounted along the side edge of the cartridge between the base plate and the cover, the transport comprising:
- a frame dimensioned to fit within a rectangular enclosure measuring five and three-quarter inches in width and eight inches in length and to receive the cartridge therein;
- a tray located inside the frame for receiving the cartridge endwise thereon so that the base plate of the cartridge is substantially parallel with a plane of the tray and the side edge of the cartridge is generally parallel to a longitudinal axis of the frame which coincides with the eight inch length dimension of the rectangular enclosure;

VOL
1127
ISS
3
JE
18
1991
UMI

- means connected to the frame adjacent the tray for opening the access door of the cartridge;
- a read/write head;
- means mounted to the frame adjacent the tray for supporting the read/write head for movement along a head reciprocation axis generally perpendicular to the base plate of the cartridge;
- first electric motor means for selectively moving the read/-write head along the head reciprocation axis;
- a capstan drive roller;
- means for rotatably mounting the capstan drive roller adjacent the tray;
- second electric motor means for driving the capstan drive roller;
- means for mounting the tray to the frame for movement in a direction generally transverse to the longitudinal axis of the frame to thereby transversely move the cartridge to engage the tape exposed by opening the access door with the read/write head and to engage the capstan drive roller with the belt capstan roller; and
- third electric motor means for transversely moving the tray.

5,025,335
ARCHITECTURE FOR 2½ INCH DIAMETER SINGLE DISK DRIVE

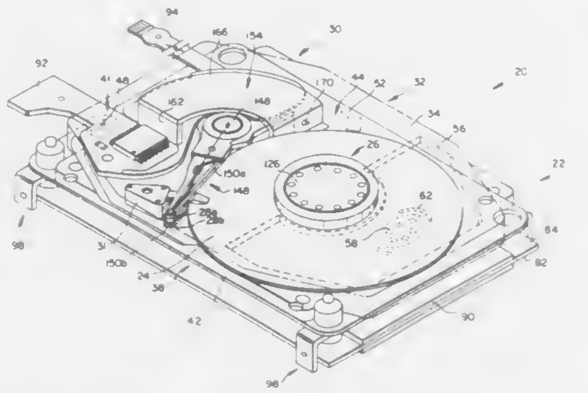
Frederick M. Stefansky, Longmont, Colo., assignor to Conner Peripherals, Inc., San Jose, Calif.
Filed Jul. 31, 1989, Ser. No. 387,944
Int. Cl.⁵ G11B *5/012*
U.S. Cl. 360—97.01 19 Claims



1. A two and one-half inch (2.5") form factor disk drive, comprising:
- a base having a length approximately equal to the width of a three and one-half inch (3.5") form factor disk drive and a width approximately equal to one-half of the length of a 3.5" form factor disk drive;
- a cover having the same dimensions as said base and engaged with said base to provide a controlled environment between said base and Baid cover;
- control means for providing control signals;
- storage means for storing data;
- means provided on said base for rotating said storage means in response to the control signals; and
- means for reading information from and writing information on said storage means in response to the control signals.

5,025,336
DISK DRIVE APPARATUS

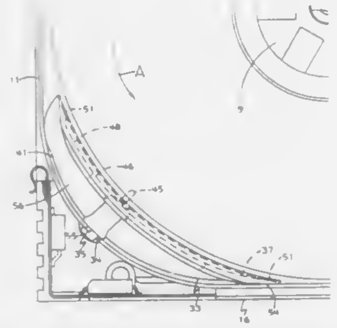
James H. Morehouse, Jamestown; David M. Furay; John Blagaila, both of Boulder; F. Eugene Dion; Scott A. Shelstad, both of Longmont, and Jimmy L. Woods, Arvada, all of Colo., assignors to Prairietek Corporation, Longmont, Colo.
Filed Nov. 6, 1989, Ser. No. 432,664
Int. Cl.⁵ G11B *33/14*
U.S. Cl. 360—97.02 4 Claims



1. An information storage apparatus, comprising:
- a hard disk;
- a spin motor for rotating said hard disk;
- a transducer for communicating information with said hard disk;
- a rotary actuator including arm means and motor means;
- circuit means connected to said rotary actuator communicating with said transducer means;
- housing means for housing said hard disk, said spin motor means, said transducer and said rotary actuator;
- a printed circuit board;
- electronic means located on said circuit board for controlling at least one of the following: said spin motor, said transducer and said rotary actuator;
- means for connecting said housing to said printed circuit board in a stacked relationship wherein said information storage apparatus has a height no greater than approximately 0.630 inches.

5,025,337
RECIRCULATING AIR FILTER SYSTEM FOR ROTATING DISK DRIVES

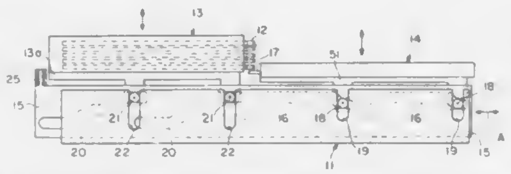
Peter E. Brooks, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 6, 1989, Ser. No. 334,669
Int. Cl.⁵ G11B *33/19*
U.S. Cl. 360—97.03 5 Claims



1. A magnetic disk drive having a plurality of disk media mounted as a disk stack for rotation in unison about a common axis and a head-disk enclosure closely surrounding at least a portion of the periphery of said disk stack comprising
- a baffle presenting a surface substantially concentric with and adjoining the periphery of said disk stack said baffle having a leading edge proximate to the periphery of said disk stack where said disks rotate toward said baffle;
- an inlet opening between said baffle and said enclosure near said leading edge;
- an outlet opening in said concentric baffle surface; and
- a filter medium mounted across said outlet opening, whereby a recirculating air filter path is established from said inlet opening to said outlet opening and through said filter medium.

5,025,338
AUTOMATIC DISC CARRYING AND PLAYING DEVICE

Toshiyuki Sone, Kanagawa; Takehiko Matsumoto, Ibaragai; Nobuya Omotezako, Kanagawa, and Keiji Kawasuji, Ibaragi, all of Japan, assignors to Car Mate Mfg. Co., Ltd., Tokyo, Japan
Filed Apr. 27, 1990, Ser. No. 515,118
Int. Cl.⁵ G11B *15/68, 17/04*
U.S. Cl. 360—99.06 6 Claims

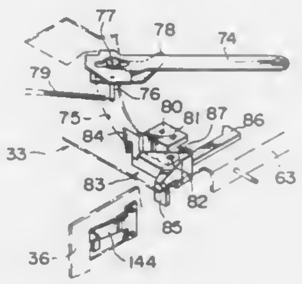


1. An automatic disk carrying and playing device in which individual disk trays are stored in stratified storage sections of a disk magazine, indentations formed in corners of each one of the disk trays adapted to engage with hooks on a disk carrier provided in a housing, a selected disk tray is carried to a disk read-out unit installed on a base frame by moving said hooks, and a disk tray of which a disk has been played is returned and stored in one of the storage sections of said disk magazine, wherein a pair of slide plates, which move back and forth in parallel with a direction in which said disk tray is drawn out and returned, are provided on said base frame, and each of said slide plates is provided with long lateral guide holes which support and guide said housing and stepped guide holes which support and guide said disk magazine so that:

- said long lateral guide hole consists of:
  - an ascending guide part by which said housing is raised from a starting position to a position where said hooks are engaged with indentions on each one of said disk trays;
  - a horizontal guide part having a length corresponding to the number of disk trays housed in said disk magazine; and
  - a descending guide part along which a drawn out disk tray is lowered to a specified read-out position in said read-out unit; and
  - each of said stepped guides hole has a stepped guide part having steps which correspond in number to the number of disk trays in said disk magazine and a guide part which corresponds to said descending guide part along with one of said disk trays which is lowered to said read-out position of said read-out unit.

5,025,339
DISK DRIVE APPARATUS WITH OIL DAMPER ON EJECT LEVER

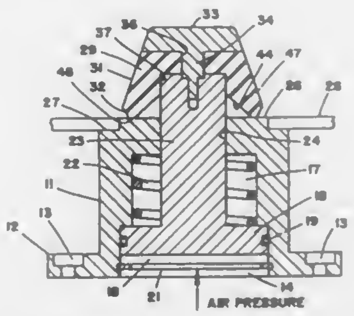
Tetsuo Kanno, Ebina; Yasushi Kotake, Machida, and Hitoshi Inada, Atsugi, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan
Division of Ser. No. 310,476, Feb. 13, 1989, abandoned, which is a division of Ser. No. 47,853, May 8, 1987, abandoned. This application Apr. 13, 1990, Ser. No. 511,987
Claims priority, application Japan, May 9, 1986, 61-105887
Int. Cl.⁵ G11B *17/04*
U.S. Cl. 360—99.06 4 Claims



1. A disk drive apparatus comprising a tray (33) for receiving a disk device (130) loaded at a predetermined position therein, a movable eject arm (74) which is secured to said tray (33) and engages said disk device (130) loaded at said predetermined position in said tray (33), said disk device (130) having a movable shutter (133), said eject arm (74) being biased to exert an ejecting force on said disk device (130) loaded at said predetermined position in said tray (33), discharging means selectively permitting said disk device to be movable from said predetermined position in said tray under the biasing force exerted by said eject arm, a shutter opening and closing member (78) engaging and opening said movable shutter (133) of the disk device (130) as the disk device is being loaded at said predetermined position in said tray, and a damping mechanism (77) through which said shutter opening and closing member (78) is coupled to said movable eject arm (74).

5,025,340
ROTARY CHUCK FOR CENTERING AND RETAINING DATA DISCS

Roger Peters, 2260 American Ave., Hayward, Calif. 94545
Filed Oct. 16, 1989, Ser. No. 421,754
Int. Cl.⁵ G11B *17/08*
U.S. Cl. 360—99.120 9 Claims



1. A chuck for releasably retaining a disc having first and second opposite surfaces and a central aperture extending therebetween, said chuck being comprised of:
- an arbor extending along an axis of rotation and having a proximal end and a distal end, said arbor including at its distal end a coaxial neck portion dimensioned to be received through the central aperture of the disc, an annular land surface extending about said neck portion and dis-

VOL 1127 ISS 3 JE 18 1991 UMI

posed to receive and seat a portion of said first surface of a disc which is to be retained by said chuck;

a deformable annular bushing disposed adjacent to said neck portion and being secured to said arbor in coaxial relationship therewith, said bushing having an annular sidewall portion formed of resilient material which expands radially in response to axial compression of said bushing, said bushing further having an annular edge at the periphery of said sidewall portion that contacts said neck portion of said arbor when said bushing is in an uncompressed condition and which edge increases in diameter to overlay and bear against an adjacent annular region of said second disc surface when said bushing is compressed, and

means for compressing said bushing in the axial direction to expand said annular edge of said bushing radially outward and onto said second surface of said disc thereby clamping said disc against said land surface.

5,025,341
THERMO-MAGNETIC RECORDING HEAD

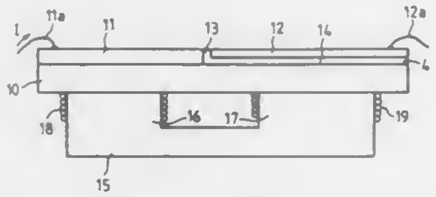
Philippe Bousquet, Chatillon, and Jean-Claude Lehureau, Ste-Genevieve-des-Bois, both of France, assignors to Thomson-Csf, Puteaux, France

Filed Apr. 25, 1989, Ser. No. 342,879

Claims priority, application France, Apr. 27, 1988, 88 05593

Int. Cl.^{5} G11B *5/235*

U.S. Cl. 360—120 **23 Claims**



1. A magnetic head comprising:

a gap of a first material with magnetic properties at ambient temperature;

heating means to heat the material of the gap beyond the Curie temperature in order to make said gap material lose its magnetic properties; and

magnetic pole pieces of a second material on each side of the gap said pieces forming electrical conductors for conveying heating current to heat the gap material.

5,025,342
THIN-FILM MAGNETIC HEAD DEVICE FOR RECORDING AND REPRODUCING

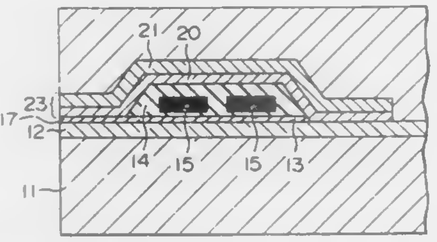
Yuji Nagata, Yao, and Toshio Fukazawa, Kyoto, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Aug. 15, 1990, Ser. No. 567,812

Claims priority, application Japan, Aug. 24, 1989, 1-218001

Int. Cl.^{5} G11B *5/147*

U.S. Cl. 360—126 **6 Claims**



1. A magnetic head device comprising, at least, a substrate, a lower magnetic layer formed on said substrate, an upper magnetic layer which forms a magnetic gap at its one end adjacent to the surface of said lower magnetic layer for making sliding contact with a recording medium and a magnetic coupling at its other end, and a conductive coil which winds around the magnetic circuit formed by said lower and upper magnetic layers, wherein at least one of said lower and upper magnetic layers has a double-layered soft magnetic structure composed of two soft magnetic layers having different levels of coercive force, such that one of the soft magnetic layers which is located on the inner side of said magnetic circuit has a coercive force which is smaller than that of the other soft magnetic layer.

5,025,343
MAGNETIC HEAD CORE UTILIZING A NON-MAGNETIC LAYER

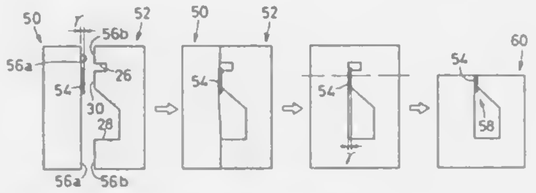
Shinzi Iida, Haguri; Fuminori Takeya, and Shinya Aoki, both of Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Japan

Division of Ser. No. 330,894, Mar. 31, 1989, Pat. No. 4,967,466. This application Aug. 8, 1990, Ser. No. 564,186

Claims priority, application Japan, Mar. 31, 1988, 63-80135

Int. Cl.^{5} G11B *5/133*

U.S. Cl. 360—127 **10 Claims**



1. A magnetic head core comprising:

a plurality of ferrite core elements bonded together through solid-solid reaction to form a substantially annular structure, wherein said structure has a magnetic gap of a predetermined width formed therein which is defined by two opposed portions of the ferrite core elements, said magnetic gap extending in a direction across the annulus of said structure; and p1 a non-magnetic layer consisting essentially of SiO or SiO_2 interposed between the opposed portions so as to define the predetermined width of said magnetic gap and for preventing an oxidation reduction reaction during the solid-solid reaction bonding of the ferrite core elements.

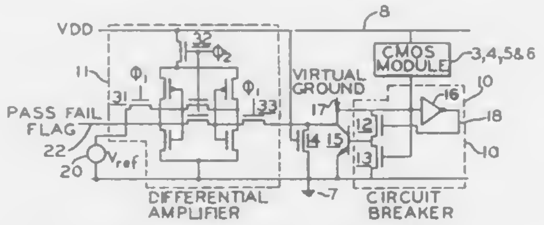
5,025,344
BUILT-IN CURRENT TESTING OF INTEGRATED CIRCUITS

Wojciech P. Maly, Pittsburgh, Pa., and Phillip J. Nigh, Peekskill, N.Y., assignors to Carnegie Mellon University, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 277,352, Nov. 30, 1988, abandoned. This application Feb. 22, 1990, Ser. No. 483,569

Int. Cl.^{5} H02H *3/16*

U.S. Cl. 361—88 **17 Claims**



1. A semiconductor integrated circuit comprising:

a main circuit assembly and a built-in current testing fault-detecting assembly on a unitary substrate;

said fault-detecting assembly being connected in circuit with at least a portion of said main circuit assembly to detect the quiescent current flow through said integrated circuit portion a predetermined period after the application of timing signals to said built-in current testing fault-detecting assembly;

said fault-detecting assembly and integrated circuit portion being connected in series between local ground and the global ground of said integrated portion; and

said fault-detecting assembly being responsive to abnormal quiescent current flow through said integrated circuit portion while ignoring normal high operational currents in said integration circuit during the timing period as an indication of defects within said integrated circuit portion;

whereby the speed of said fault detecting assembly matches the circuit under test.

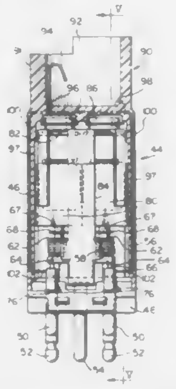
5,025,345
OVERLOAD PROTECTOR MODULE AND BUILDING ENTRY PROTECTOR WITH INTEGRALLY MOLDED MODULAR JACK

Robert J. Marks, Carpentersville, Ill., assignor to Northern Telecom Limited, Montreal, Canada

Filed Feb. 24, 1987, Ser. No. 18,290

Int. Cl.^{5} H02H *3/22*

U.S. Cl. 361—119 **12 Claims**



1. An overvoltage protector module comprising a housing having a base; a first pair of line terminals and a ground terminal in the base; a modular jack provided upon the housing in a position remote from and on the opposite side of the housing from the base, a second pair of line terminals provided by the modular jack with the terminals of the second pair connected, one in circuit with each of the terminals of the first pair; a third pair of line terminals connected one in circuit with each of the terminals of the first pair, the terminals of the third pair extending from the base; a current overload protection unit located in series between each terminal of the first pair and the corresponding in-circuit terminal of the second pair and in series between each terminal of the first pair and the corresponding in-circuit terminal of the third pair; and an overvoltage protection unit means inside the housing, the overvoltage protection unit means having two first electrode means, electrically connected one to each terminal of the first pair, the overvoltage protection unit means also having second electrode means spaced apart from each of the first electrode means to define a gap with each of said first electrode means, the second electrode means electrically connected to the ground terminal.

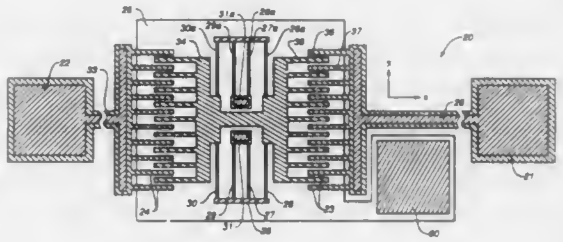
5,025,346
LATERALLY DRIVEN RESONANT MICROSTRUCTURES

William C. Tang, Emeryville, and Roger T. Howe, Lafayette, both of Calif., assignors to Regents of the University of California, Oakland, Calif.

Filed Feb. 17, 1989, Ser. No. 312,642

Int. Cl.^{5} H01G *7/00;* G01P *15/08*

U.S. Cl. 361—283 **20 Claims**



10. A resonant microstructure for use as a sensor or an actuator, including in combination:

a silicon substrate,

a movable plate, suspended above and anchored to such substrate, and

lateral-drive means for driving said plate electrostatically in a plane parallel to and above said substrate.

5,025,347
SEMICONDUCTOR DEVICE

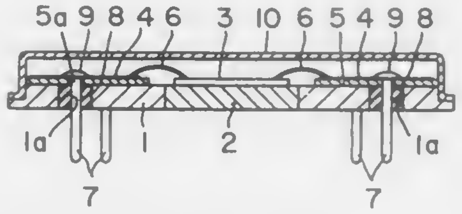
Masamichi Shindo; Toshiharu Sakurai; Hideo Taguchi, and Nobu Izawa, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 11, 1989, Ser. No. 336,429

Claims priority, application Japan, Apr. 13, 1988, 63-90855

Int. Cl.^{5} H05K *7/20*

U.S. Cl. 361—386 **3 Claims**



1 A semiconductor device comprising:

a metal stem having a planar shape and a plurality of through holes, and being made of metal having a coefficient of thermal expansion αs;

a printed circuit board having wiring patterns on its upper surface and a plurality of through holes, being made of a material having a maximum coefficient αp in the widthwise direction, and being superposed over the upper surface of said metal stem to form a lamination, said lamination having a maximum width (L);

a plurality of lead pins having upper portions inserted into said through holes of said stem and board which are in alignment with each other when said board and said stem are superposed one upon another; and

connecting members for connecting said upper portions of said lead pins with corresponding wiring pattern;

wherein an absolute value $\Delta\alpha$ of the difference between said maximum coefficient αp of said board and said coefficient αs of said stem ($\Delta\alpha = \alpha p - \alpha s$) is less than or equal to about "$1.52 \times 10^{-4}/L$" ($\Delta\alpha \leqq 1.52 \times 10^{-4}/L$).

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,348
BONDING STRUCTURE OF AN ELECTRONIC DEVICE AND A METHOD FOR MANUFACTURING THE SAME

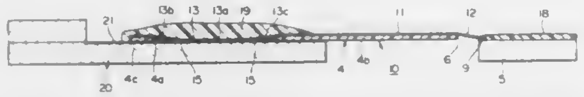
Satoshi Suzuki; Osamu Kuwabara; Jiro Muto, and Eiichi Shinozaki, all of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 272,136

Claims priority, application Japan, Nov. 20, 1987, 62-292151; **Apr. 20, 1988, 63-95448**

Int. Cl.^{5} **H05K** *1/00*

U.S. Cl. 361—398 18 Claims



1. A bonding structure of an electronic device, comprising:
- an insulating sheet having a central portion, a side portion and a connecting opening defined by said central portion and side portion;
- an electronic device having a plurality of electrodes arranged at a side edge thereof;
- a plurality of electrically conductive metal leads carried on at least one surface of said insulating sheet, said electrically conductive metal leads having ends electrically connected to said electrodes of said electronic device at said central portion of said insulating sheet and having in the vicinity of other ends thereof connecting portions which are received in said connecting opening, said other ends being carried by said side portion of said insulating sheet, said connecting portions being deformed so as to have a level part facing to the other surface of said insulating sheet and two inclined parts adjacent to said level part, said inclined parts rising up towards the upper edge of a wall of said central portion and side portion of said insulating sheet;
- a plurality of connecting terminals facing said connecting portions of said metal leads, respectively; and
- soldering layers for bonding said connecting portions of said metal leads and said connecting terminals to each other, each of said soldering layers including two pools which increase a thickness of a layer along said inclined parts of said metal leads.

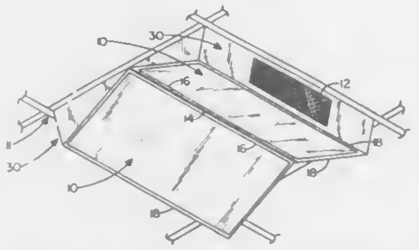
5,025,349
EMERGENCY LIGHTING FIXTURE

Thomas W. Gow, 1039 109th Ave. N.W., Coon Rapids, Minn.

Continuation of Ser. No. 241,353, Sep. 8, 1988, abandoned, which is a continuation of Ser. No. 159,274, Feb. 23, 1988, abandoned, which is a continuation of Ser. No. 75,512, Jul. 20, 1987, abandoned. This application Aug. 4, 1989, Ser. No. 389,629

Int. Cl.^{5} **F21V** *19/04*

U.S. Cl. 362—20 5 Claims



1. An emergency lighting fixture for actuation when power to a primary lighting system in a room is lost, comprising:
- (a) a panel mounted in a ceiling of the room for movement between a normal, retracted position, and an extended position, said panel having a first edge defining an axis with respect to which said panel is disposed for pivoting, and wherein, when said panel is in said retracted position, said panel is flush with the ceiling, and wherein, when said panel is in said extended position, said panel is pivoted downwardly about said axis, and wherein said panel has a second edge opposite said first edge and a platen intersecting said panel generally perpendicularly along said second edge, said platen having a generally horizontally extending slot formed therein;
- (b) means, when power to the primary lighting system is uninterrupted, for maintaining said panel in said retracted position, and, when power to the primary lighting system becomes interrupted, for moving said panel to said extended position, said means for maintaining and moving comprising;
  - (i) a shaft having a main portion defining an axis of elongation, and a distal portion, spaced radially from said axis of elongation, said shaft being disposed for movement wherein said main portion thereof rotates about said axis of elongation between a first position, wherein said distal portion is angled away from a directly downwardly extending orientation, and a second position, wherein said distal portion is rotated downwardly from said first position, said distal portion being received in said slot formed in said platen; and
  - (ii) means for orienting said main portion of said shaft in said first position thereof when power to the primary lighting system is uninterrupted, and for rotating said main portion of said shaft to said second position thereof when power to the primary lighting system becomes interrupted;
- (c) a lamp mounted on said panel, said lamp projecting generally perpendicularly to said platen; and
- (d) means, when said panel is in said extended position, for energizing said lamp.

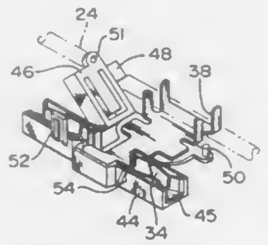
5,025,350
VEHICLE CLEARANCE LAMP ASSEMBLY

Alfred G. Tienken, Syracuse, N.Y., assignor to Federal-Mogul Corporation, Southfield, Mich.

Filed Apr. 25, 1990, Ser. No. 514,480

Int. Cl.^{5} **H01R** *4/24*

U.S. Cl. 362—61 14 Claims



1. A bulb lamp assembly of the type adapted to be fixed on a pair of conductors and releasably snapped into a housing which comprises:
- a first conductive connector plate having at least one bulb receptacle member and at least one conductor receptacle member arranged at opposite ends thereof;
- a non conductive housing for said plate adapted to hold and insulate said plate, said housing having a hinged clamping tab and a locking stud adapted to capture a conductor within said conductor receptacle when said tab and stud are engaged to secure said conductor mechanically and electrically in said conductor receptacle,
- said non-conductive housing having an alignment stud and a latch bail and striker adapted to mate with a corresponding latch bail and striker of another identical housing when a pair of said housings are engaged in face to face mating relationship so that a pair of plates are connected to a pair of conductors to form at least one receptacle for a lamp.

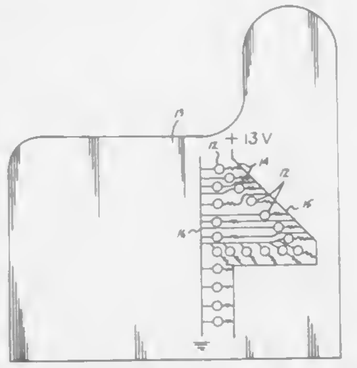
5,025,351
ILLUMINATED SPLASH GUARD

Greg L. Martin, 2125 Glouchester Ave., Columbus, Ohio 43229-1514

Filed Mar. 15, 1990, Ser. No. 493,633

Int. Cl.^{5} **B60Q** *1/00*

U.S. Cl. 362—83 3 Claims



1. An illumination member comprising, in combination,
- a flexible splash guard including a forward surface spaced from a rear surface, and
- the forward surface including a matrix of light emitting diodes mounted thereon for creating a message on the forward surface, and
- a negative transmission line, and a positive transmission line directed interiorly of the splash guard between the forward surface and the rear surface to effect illumination of the light emitting diodes, and
- wherein a rectangular matrix of apertures are directed through the forward and the rear surface of the splash guard in electrical communication with the electrical transmission lines, and a snap-on illumination member selectively mounted in selective ones of the matrix of apertures for securement of the illumination member thereon, and for electrical communication therewith and the illumination member including the light emitting diodes mounted thereon.

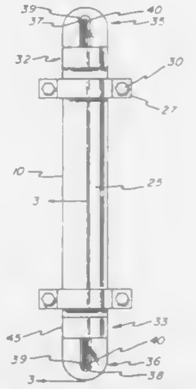
5,025,352
LIGHTED GRAB HANDLES FOR TRUCKS

Thomas H. Brown, 716 W. Bogart Rd., Sandusky, Ohio 44870

Filed Jun. 11, 1990, Ser. No. 536,361

Int. Cl.^{5} **B60Q** *1/32*

U.S. Cl. 362—83.3 17 Claims



1. A grab handle for use on motor vehicles comprising
- a generally vertically extending gripping portion,
- means for attaching said gripping portion to the side of a motor vehicle, and
- lamp means in at least one end of said handle for indicating the position of said vehicle, said lamp means including first and second lamp filaments, said first lamp filament connected to the electrical circuitry of the vehicle responsible for supplying power to the running lamps of the vehicle, said second lamp filament connected to the electrical circuitry of the vehicle responsible for supplying power to the turn signals of the vehicle.

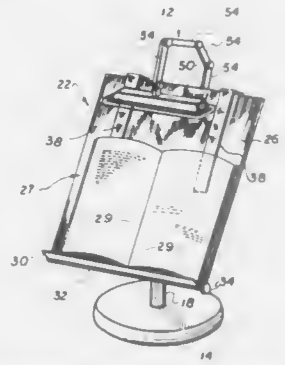
5,025,353
ADJUSTABLE READING STAND AND LIGHT ASSEMBLY

David L. Menaged, 12260 SW. 40th St., Miami, Fla. 33175

Filed Mar. 12, 1990, Ser. No. 492,074

Int. Cl.^{5} **A47B** *19/00*

U.S. Cl. 362—98 17 Claims



1. A light assembly for use in combination with a reading stand comprising:
- said reading stand including a support platform configured for mounting on a supporting surface and a support arm secured thereto and extending upwardly therefrom,
- said reading stand further including a copy holder having a substantially planar configuration and attached to and adjustably positionable on an outer end of said supporting arm,
- said copy holder including a support plate mounted on lower end thereof and extending outwardly therefrom into supporting relation to a copy positioned on an outer exposed surface of said copy holder,
- a stop plate pivotally mounted to said lower end of said copy holder and angularly adjustable relative thereto in retaining position relative to lower ends of the copy disposed on said outer exposed surface,
- adjustment ;means mounted on said copy holder and movably interconnecting said stop plate to said lower end of said copy holder for adjustable, angular retaining orientation of said stop plate relative to the lower ends of the copy disposed on said outer exposed surface,
- said light assembly including a base assembly mountable adjacent to said copy holder and structured to house a control means for activating and powering a light associated with said light assembly,
- mounting means secured at least in part to an under surface of said copy holder and structured to removably support said base of said light assembly thereon,
- a support member having an end connected to said base and extending outwardly therefrom into supporting attachment with a light housing at an opposite end thereof relative to said base,
- said support member and said light housing adjustably connected and selectively positionable relative to said outer exposed surface and copy thereon, and
- a conductor means movably attachable to said base and said control means therein for connection from said control means to a source of electrical power.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,354

COMPACT HAVING AN ILLUMINATOR

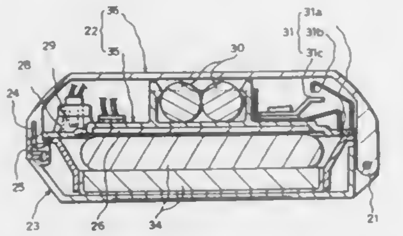
Yoshio Kondo, Paradion Sugaguchi 501, 1-26 Sugaguchi Ekimae, Shinkawacho, Nishikasugai District, Aichi Prefecture, Japan

Filed Jun. 1, 1990, Ser. No. 531,875

Claims priority, application Japan, Dec. 26, 1989, 1-149956[U]; Mar. 9, 1990, 2-23918[U]

Int. Cl.^{5} F21V *33/00*

U.S. Cl. 362—135 **2 Claims**



1. An illuminated compact for use in applying cosmetics to a user's face, operable automatically on opening and closing the compact, said compact comprising a body formed of an upper case and a lower case, said upper case having an illuminating lamp, a reflecting means for collecting light emitted from said lamp, and a light transmittable element diffusing the collected light, said light transmittable element irradiating said light onto the face of the user, and said lower case having a place for accommodating one or more of a variety of cosmetics, said upper case having a removable cover and an automatic switch, a battery, and a manual switch placed therein, said manual switch comprising a cylinder rotatable by manually rotating a knob and having an insulating portion for interrupting an electrical current, and an electrode plate, one end of which is coupled to the battery and the other end of which is coupled to said rotatable cylinder.

5,025,355

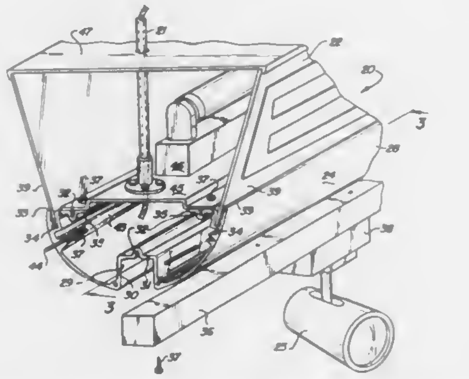
COMBINATION LIGHTING FIXTURE AND GRAPHIC DISPLAY MEANS

Ronald P. Harwood, 31110 Applewood, Farmington Hills, Mich. 48018

Filed Nov. 3, 1989, Ser. No. 431,292

Int. Cl.^{5} F21S *1/02*

U.S. Cl. 362—147 **25 Claims**



1. A lighting fixture and graphic display means including, in combination:

(a) a fixture body of a desired shape and cross-section,
(b) a pair of slots formed in said fixture body proximate the upper longitudinal edges thereof,
(c) a pair of support shelves formed in said fixture body adjacent said slots,
(d) a raceway cover extending between and connected to said support shelves to form a hollow raceway within said fixture body,
(e) a light source mounted to said raceway cover, and
(f) upwardly extending graphic display means mounted in said slots in a position to receive light directly from said light source.

5,025,356

SMALL PROFILE HIGH WATTAGE HORITCULTURAL LUMINAIRE

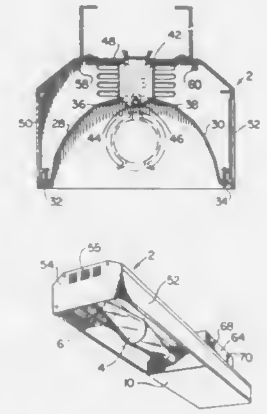
Mahmoud A. Gawad, Montreal, Canada, assignor to GET Sylvania Canada Ltd, Montreal, Canada

Filed Jul. 31, 1989, Ser. No. 388,179

Claims priority, application Canada, Oct. 7, 1988, 579557

Int. Cl.^{5} F21V *7/12, 7/16*

U.S. Cl. 362—221 **5 Claims**



1. A luminaire having an adjustable photometric distribution comprising:

a housing including a first compartment for containing a lamp, said first compartment having an open underside;
a first plate member mounted on said housing, said first plate member having first and second sides, said first side defining one end of said first compartment, a socket for said lamp being mounted on said first side of said first plate member;
a second plate member mounted on said housing spaced from said first plate member, said second plate member having first and second sides, there being a second compartment extending from said second side of said first plate member to said first side of said second plate member;
a ballast unit for said lamp mounted in said second compartment and making heat-conductive contact with said housing;
a third plate member covering the open underside portion of said second compartment, said third plate member making heat-conductive contact with said ballast unit;
a reflector for reflecting light from said lamp with an adjustable photometric distribution, said reflector being mounted within said first compartment above the position for said lamp, said reflector comprising two flexible sections, each section having a lower longitudinal edge and an upper longitudinal edge;
a reflector support member mounted within said first compartment above the position for said lamp, said support member including first support means for supporting the upper longitudinal edge of said first reflector section in a plurality of mounting positions and second reflector support means for supporting the upper longitudinal edge of said second reflector section in a plurality of mounting positions;
said first reflector section being mounted with its upper longitudinal edge supported in a selected upper mounting position by said first support means and said second reflector section being mounted with its upper longitudinal edge supported in a selected upper mounting position by said second reflector support means such that the shape of said first flexible reflector section is adjusted by its selected upper mounting position, the shape of said second flexible reflector section is adjusted by its selected upper mounting position, and the photometric distribution of said luminaire is adjusted by said upper mounting positions of said first and second reflector sections.

5,025,357

SUSPENDED ELECTRIC LAMP

Ingo Maurer, Kaiserstrasse 47, 8000 Muenchen 40, Fed. Rep. of Germany

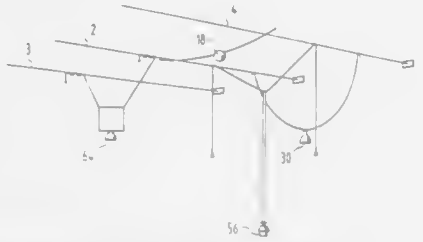
PCT No. PCT/EP85/00485, § 371 Date May 19, 1986, § 102(e) Date May 19, 1986, PCT Pub. No. WO86/01872, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 18, 1985, Ser. No. 876,853

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1984, 3434410

Int. Cl.^{5} F21V *21/00*

U.S. Cl. 362—249 **6 Claims**



1. A suspended electric lamp comprising:

a light source;
two tensioned lead-in wires fed with low voltage;
two conducting wires, each having a first and second end, said conducting wires, supporting and serving as a power supply for said light source, said conducting wires being substantially flexible at least at said first ends thereof, said first ends of said conducting wires being each releasably connected to one of said two tensioned lead-in wires; and
said first ends of said flexible conducting wires are wound around said lead-in wires.

5,025,358

DUST RESISTANT ELECTRIC LIGHT FIXTURE

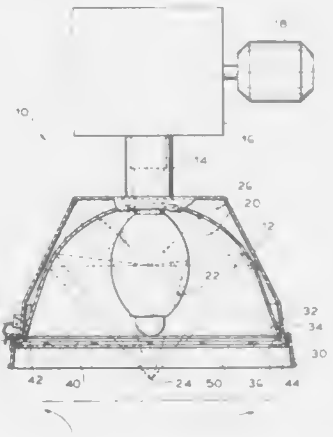
Timothy A. Canneli, Kirkwood, Mo., assignor to Guth Lighting Inc., St. Louis, Mo.

Filed May 18, 1990, Ser. No. 525,916

Int. Cl.^{5} F21V *29/00*

U.S. Cl. 362—267 **6 Claims**

1. An electric light fixture comprising a lamp head having an open end, a bulb in said head, an elliptically shaped reflector in said head, said bulb being located at one focus of the elliptical shape of the reflector for focusing light from said bulb at the other focus of the elliptical shape, a transparent lens positioned across said open end of said head between said foci of the elliptical shape closer to the focus at which said light is focused, whereby heat from the lamp is focused and concentrated beneath and near said lens to heat the air adjacent the lens to temperatures sufficient to create a substantial static-air barrier layer adjacent the lens, and an extension ring removably mounted on said open end of said head and extending away from said head and lens thereby to trap the air heated by the focused light adjacent said lens and within the space defined by said ring below said lens whereby dust particles are deflected away from said lens by convection air flow and fall away from said lens when they do manage to get into the layer.



5,025,359

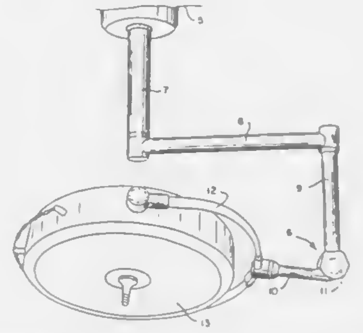
COUNTERBALANCED ARM FOR A LIGHTHEAD

Raja Saluja, and Arthur T. Nagare, both of Erie, Pa., assignors to American Sterilizer Company, Erie, Pa.

Filed Mar. 16, 1990, Ser. No. 495,248

Int. Cl.^{5} F21V *21/15*

U.S. Cl. 362—402 **7 Claims**



2. A counterbalanced arm for a lighthead, comprising:

an upper arm portion;
a lower arm portion adapted at one end to be connected to the lighthead and at the other end for articulation about said upper arm portion;
pivot means connecting said upper arm and said lower arm portion, said pivot means defining a pivot axis about which said lower arm portion pivots with respect to said upper arm portion;
lever means having a first end positioned on one side of said pivot axis and a second end positioned on said other side of said pivot axis, said lever means having an arcuate shaped link, said lever means additionally having an auxiliary link having a first end pivotally connected to one of said upper and lower arm portions and a second end pivotally connected to one end of said arcuate shaped link, said auxiliary link operative to extend the moment arm of said lever means to enable the counterbalanced arm to counteract the weight of the lighthead when said lower arm portion forms an acute angle with said upper arm portion, said arcuate shaped link having a sufficient arc to enable said lower arm portion to pivot about said pivot axis from a position forming an acute angle with respect to said upper arm portion to a position forming a 180 degree angle with said upper arm portion;

VOL
1127
ISS
3
JE
18
1991
UMI

pull rod means positioned within the one of said upper and lower arm portions which is not connected to said first end of said auxiliary link and pivotally attached to said second end of said lever means;

spring means operatively connected to said pull rod means such that said spring means provides a force to counterbalance the lighthead.

5,025,360

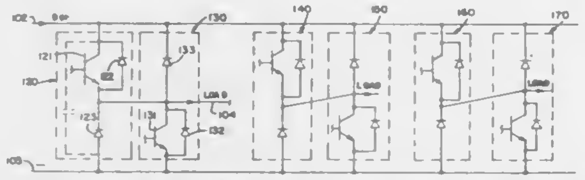
INVERTER SWITCH WITH PARALLEL FREE-WHEEL DIODES

Thomas S. Latos, Huntley, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 20, 1989, Ser. No. 453,751

Int. Cl.^{5} H02M *3/335*

U.S. Cl. 363—16 7 Claims



1. A module of components grouped physically close to each other, comprising a transistor, an antiparallel diode connected across said transistor, and a series diode connected in series with said transistor, the primary directions of conductance of said transistor and said series diode being in opposition.

5,025,361

WATERING CONTROL SYSTEM

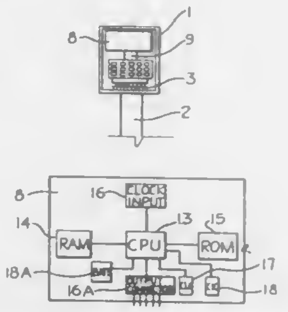
John L. Pitman, 4 Sixth Avenue, Glenelg East Adelaide 5000, and Kyn A. McCauley, 15 Ferry Avenue, Plympton Park Adelaide 5000, both of Australia

Continuation of Ser. No. 6,677, Dec. 15, 1986, abandoned. This application Aug. 3, 1989, Ser. No. 390,475

Claims priority, application Australia, Apr. 15, 1985, PH00142

Int. Cl.^{5} G06F *15/46;* **G05D** *7/06*

U.S. Cl. 364—143 15 Claims



15. An apparatus for controlling a plurality of outputs for an irrigation system comprising,

a basic unit including a plurality of off/on controllers, and prompting module to control said off/on controllers,

said off/on controllers being connected to selectively operable output control devices used to supply an irrigation fluid,

said prompting module comprising a central processing unit, clock means interfacing with said central processing unit for providing timing information for controlling the operation of said central processing unit, and memory means interfacing with said central processing unit to provide program information to said central processing unit to operate said off/on controllers,

said prompting module being separable from said basic units and coupled thereto by output connecting means which enables communication between said prompting module and said basic unit for control of said off/on controllers,

said separable prompting module being removable from said basic unit and able to be coupled to an interfacing port of a computer by means of said output connecting means so as to communicate with an interface adapter within said computer, wherein said interface adapter may be configured for two-way communication such that said memory means in said prompting module may be reprogrammed by means of said computer.

5,025,362

COORDINATE POSITIONING SYSTEM

Alan D. Darlington, Dursley, United Kingdom, and Kevin P. Waggitt, Etobicoke, Canada, assignors to Renishaw plc, Gloucestershire, United Kingdom

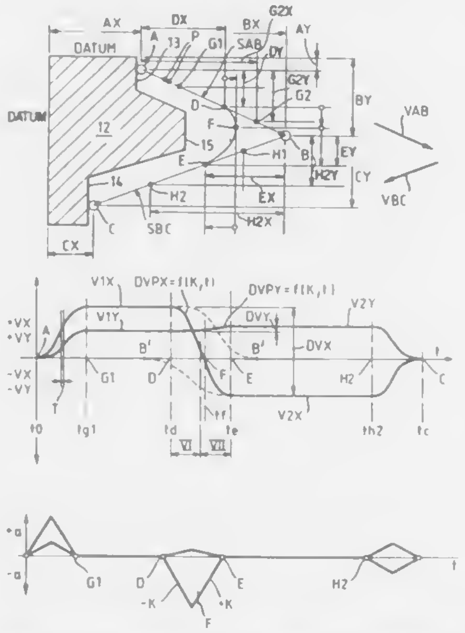
PCT No. PCT/GB87/00787, § 371 Date Aug. 10, 1988, § 102(e) Date Aug. 10, 1988, PCT Pub. No. WO88/03672, PCT Pub. Date May 19, 1988

PCT Filed Nov. 6, 1987, Ser. No. 216,541

Claims priority, application United Kingdom, Nov. 8, 1986, 8626734

Int. Cl.^{5} G05B *19/41*

U.S. Cl. 364—167.01 20 Claims



5. A method of operating a coordinate positioning machine to accelerate a head of the machine, the method comprising the steps of:

determining, on the basis of first and second velocities and a predetermined acceleration function, a time interval required to accelerate the head from the first to the second velocity;

determining on the basis of the time interval a curved velocity profile for accelerating the head from the first to the second velocity; and

driving the head according to the curved velocity profile.

5,025,363

AUTOMATIC PROGRAMMING METHOD

Masaki Seki; Takashi Takegahara, both of Tokyo, and Masatoshi Nakajima, Yamanashi, all of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

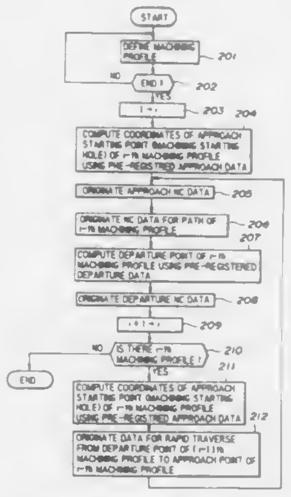
PCT No. PCT/JP88/00704, § 371 Date Mar. 7, 1989, § 102(e) Date Mar. 7, 1989, PCT Pub. No. WO89/00475, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 15, 1988, Ser. No. 320,091

Claims priority, application Japan, Jul. 16, 1987, 62-178091

Int. Cl.^{5} G05B *19/403*

U.S. Cl. 364—191 8 Claims


START
DEFINE MACHINING PROFILE
201
NO
END ?
202
YES
203
204
COMPUTE COORDINATES OF APPROACH STARTING POINT (MACHINING STARTING HOLE) OF i-th MACHINING PROFILE USING PRE-REGISTRED APPROACH DATA
ORIGINATE APPROACH NC DATA
205
ORIGINATE NC DATA FOR PATH OF i-th MACHINING PROFILE
206
207
COMPUTE DEPARTURE POINT OF i-th MACHINING PROFILE USING PRE-REGISTERED DEPARTURE DATA
ORIGINATE DEPARTURE NC DATA
208
209
NO
IS THERE i-th MACHINING PROFILE ?
210
211
YES
END
COMPUTE COORDINATES OF APPROACH STARTING POINT (MACHINING STARTING HOLE) OF i-th MACHINING PROFILE USING PRE-REGISTRED APPROACH DATA
212
ORIGINATE DATA FOR RAPID TRAVERSE FROM DEPARTURE POINT OF (i-1)th MACHINING PROFILE TO APPROACH POINT OF i-th MACHINING PROFILE

1. An automatic programming method involving NC program data for wirecut electric discharge machining, comprising the steps of:

(a) presetting data for specifying an approach path, a departure path and wire-cut electric discharge machining conditions;

(b) successively setting two or more machining profiles; and

(c) creating, for each of said machining profiles and after step (b), approach NC data, NC data for moving a wire electrode along the machining profile, and departure NC data using the machining profile and said preset data.

5,025,364

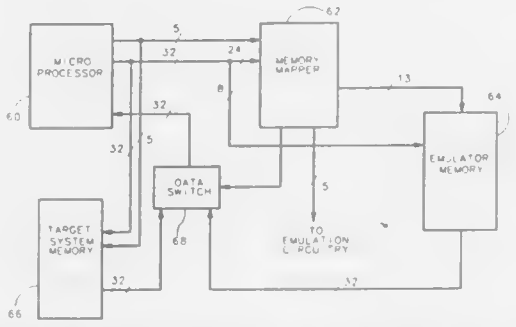
MICROPROCESSOR EMULATION SYSTEM WITH MEMORY MAPPING USING VARIABLE DEFINITION AND ADDRESSING OF MEMORY SPACE

Joel A. Zellmer, Colorado Springs, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jun. 29, 1987, Ser. No. 67,987

Int. Cl.^{5} G06F *9/355, 9/455, 12/02, 7/02*

U.S. Cl. 364—200 3 Claims



3. An emulation system for emulating a user-defined microprocessor-based target system having a target microprocessor for executing the target system, a target memory wherein target system information is stored in relation to target memory address information, and a target input/output port, the system comprising:

emulation support means for receiving user compounds, for accessing the target system to determine internal target system values, and for emulating a user-defined microprocessor-based target system;

microprocessor means connected to the emulsion support means for controlling the emulation support means in response to received user commands;

emulation memory means connected to the microprocessor means for emulating a target memory defined in the target system; and

memory mapper means connected to the emulation support means, the microprocessor means, and the emulation memory means, for receiving the target memory address information, for defining and mapping memory blocks in the emulation memory means in relation to the target memory address information and for storing information in the emulation memory means in relation to the defining and mapping of memory blocks, wherein said memory mapper means comprises:

a plurality of definition means, each having a plurality of address inputs, a plurality of definition inputs, a plurality of address outputs, and a control output, for defining individual blocks of memory, wherein each definition means operates in parallel to all other definition means in the system,

wherein the address inputs for each definition means are identical, the address outputs for each definition means are ORed together, the control outputs for each definition means are ORed together, and wherein each definition means comprises:

range comparator means connected to the address inputs, the definition inputs, and the control output, for determining whether the address on the address inputs is outside a range defined by an upper and lower user-defined limit whereby a comparator means result is produced and for signaling the comparator means result on the control output, said range comparator means comprising definition comparator means for determining whether the definition inputs are identical to a user defined definition,

translator means connected to the address inputs and the definition inputs, for adding a user-defined offset to the address on the address inputs whereby a translator means result is produced, and

buffer means connected to the range comparator means and the translator means and the address output, for placing the translator means result on the address output only when both the range comparator means determines the address is not outside the defined range and the definition comparator means determines the definition inputs are identical to the user-defined definition.

5,025,365

HARDWARE IMPLEMENTED CACHE COHERENCY PROTOCOL WITH DUPLICATED DISTRIBUTED DIRECTORIES FOR HIGH-PERFORMANCE MULTIPROCESSORS

Sanjay S. Mathur, Mission Viejo, and John S. Fernando, Los Angeles, both of Calif., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Nov. 14, 1988, Ser. No. 270,324

Int. Cl.^{5} G06F *12/12, 13/00*

U.S. Cl. 364—200 11 Claims

1. Twice Amended In a multiple processor network where each processor has its own private cache means and private interface means connected to a main memory means via a common system bus, which carries commands from said processors, a method for ensuring minimal processor-cache access time and guaranteeing that any data accessed from main memory and/or a private cache means by any processor, is up-to-

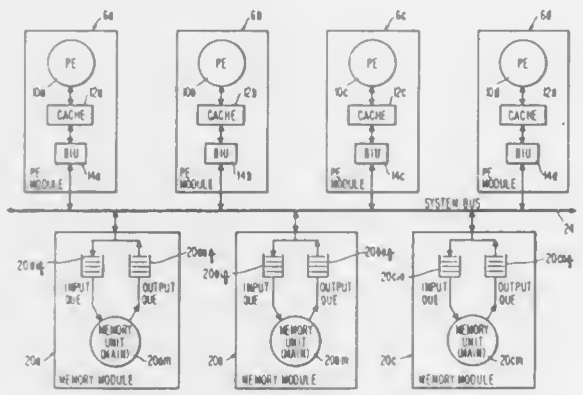
VOL
1127
ISS
3
JE
18
1991
UMI

date and currently coherent, said method comprising the steps of:

(a) maintaining a cache directory in said cache means to indicate the presence of an addressed block of data in said cache means and its status condition as to whether the said block of data is currently valid and unable or invalid and not usable;

(b) enabling any one of said processors to access blocks of data from said main memory means or from the said cache means of its own private cache means of from the private cache means of another processor;

(c) establishing a private image directory for each processor which non-atomically updates validity status information in said cache directory;



(d) monitoring said common system bus to sense any updated changes in data blocks in said cache means or said main memory means which were written into by any processor;

(d1) evaluating the collective response of receivers to a command on said system bus to determine which receiver should accept the command;

(d2) updating the image directories of each said cache means;

(d3) updating the validity status information in each cache directory;

(e) comparing and checking the status in the said cache directory and image directory of a data block, requested by a processor, via said system bus, to verify its current validity before enabling said data cache means for data access by a requesting processor.

5,025,366
ORGANIZATION OF AN INTEGRATED CACHE UNIT FOR FLEXIBLE USAGE IN CACHE SYSTEM DESIGN

Gigy Baror, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

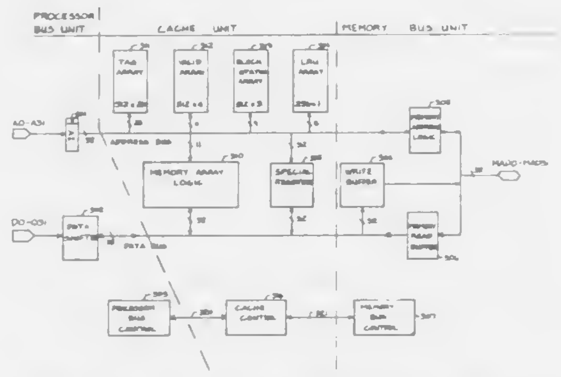
Filed Jan. 20, 1988, Ser. No. 146,009

Int. Cl.^{5} G06F *12/08*

U.S. Cl. 364—200 **38 Claims**

1. A computer system comprising a programmable cache unit on a single integrated circuit chip, at least one central processing unit (CPU), a memory separate from the cache unit, a memory bus for coupling addresses and data between the CPU and said memory, a memory bus interface unit connected between the memory bus and the cache unit for controlling coupling of addresses and data between the cache unit and the memory bus, an address bus coupled to the CPU, a data bus coupled to the CPU, a processor bus interface unit connected between the address and data buses and the cache unit for controlling coupling of data between the data bus and the cache unit, said cache unit including:

(a) memory array means, tag array means and valid array means, said programmable cache unit being coupled to said processor bus interface unit and said memory bus interface unit performing cache functions, an address bus in the cache unit connected to the processor bus interface unit connecting the memory array means of the programmable cache unit with said tag array means and valid array means so that said tag array means and valid array means control coupling of signals between the processor and the memory array means of the programmable cache unit via the processor bus interface unit; said tag array means, said valid array means and said memory array means being organized as a 2^n way set associative cache, where n is an integer greater than or equal to zero; and



(b) means for controlling said programmable cache unit so said memory means separate from said programmable cache unit is coupled with said tag array means and valid array means to be responsive to signals derived from said tag array means and valid array means so that said tag array means and valid array means control coupling of signals between the CPU and the memory means separate from said programmable cache unit.

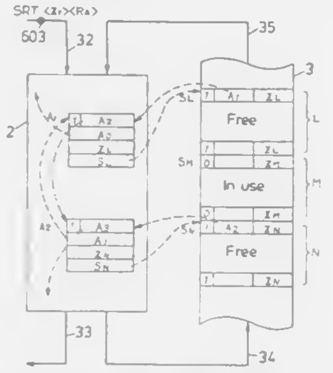
5,025,367
STORAGE ALLOCATION AND GARBAGE COLLECTION USING LIBERATE SPACE TOKENS

John R. Gurd, Manchester, United Kingdom, and Katsura Kawakami, Kanagawaken, Japan, assignors to Victoria University of Manchester, Manchester, United Kingdom and Matsushita Electrical Industrial Co., Ltd., Osaka, Japan

Filed May 28, 1987, Ser. No. 55,716

Int. Cl.^{5} G06F *9/312, 12/02, 12/12*

U.S. Cl. 364—200 **5 Claims**



1. A method for controlling the use of space in a data storage system in which a processing device communicates with a distribution section and the distribution section manages the allocation of space in a memory section in response to communications with the processing device, comprising:

a. storing available allocator addresses in the memory section, each available allocator address identifying a respective portion of a memory of the distribution section which is available to store allocator data,

b. storing in the memory section, for each free space within the memory, data identifying the length of the free space

selecting an allocator address from the available allocator addresses stored in the memory section,

c. storing the allocator address selected from the available allocator addresses in the memory section for each free space,

d. storing allocator data in the portions of the distribution section identified by the selected allocator addresses, each portion storing a pointer to the free space for which the allocator address of that portion is stored and each portion storing length data identifying the length of the free space for which the allocator address of the portion is stored,

e. identifying any space within the memory section which becomes available for use.

f. identifying any space within the memory section which can be combined with the space which becomes available,

g. transmitting a liberate space token from the memory section to the distribution section for each space which becomes available, the liberate space token including as a first allocator address an address selected from the available allocator addresses stored in the memory section, and as a second allocator address the address stored in the memory section for any one of the space which can be combined.

h storing a first allocator at the first address in the event that no such second address is included in the liberate space token, the stored allocator pointing to the space which becomes available to indicate that that space is free,

i. combining the space which becomes available and the space which can be combined therewith in the event that the second address is included in the liberate space token, and the second allocator address points to a free space in the memory section, the spaces being combined to form a single free space, and storing a second allocator at the first address which allocator points to the single free space and includes length data identifying the length of the combined space, and

j. storing a third allocator at the first address in the event that the second address is included in the liberate space token, and the second allocator address does not point to a free space in the memory section, the allocator being stored at the first address and pointing to the space within the memory section which becomes available to indicate that that space is free,

whereby the liberate space token carries with it sufficient information to be able to recognize, from the status of the allocators, whether or not it is appropriate to combine free spaces.

5,025,368
MICROPROCESSOR WITH OPTION AREA ADJACENT CPU CORE FACILITATING INTERFACING WITH PERIPHERAL DEVICES

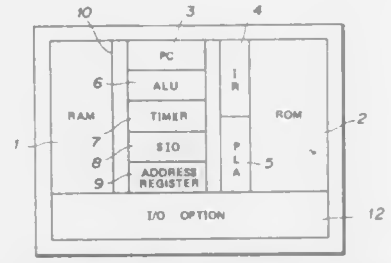
Nobuhisa Watanabe, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 18, 1985, Ser. No. 810,192

Claims priority, application Japan, Dec. 27, 1984, 59-281592; Dec. 27, 1984, 59-281593; Dec. 27, 1984, 59-281594

Int. Cl.^{5} G06F *15/76*

U.S. Cl. 364—200 **18 Claims**



1. A microprocessor having architecture comprising:

a CPU core having a first, second and third peripheral edges, which first and second peripheral edges are located on opposite sides of said CPU core and connected by said third peripheral edge;

a RAM adjoining said first peripheral edge of said CPU core;

a ROM adjoining said second peripheral edge of said CPU core; and

an input/output option structurally adapted for interfacing with various peripheral devices and adjoining said third peripheral edge of said CPU core and parallel peripheral edges of said RAM and ROM.

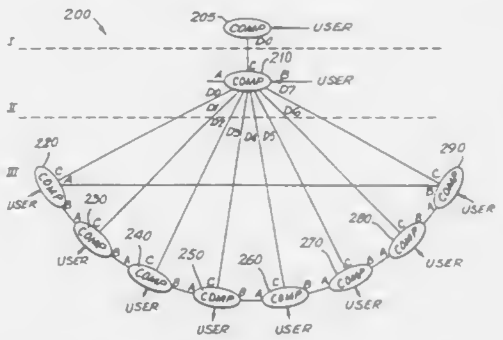
5,025,369
COMPUTER SYSTEM

David J. Schwartz, Woodmere, N.Y., assignor to David Schwartz Enterprises, Inc., New York, N.Y.

Filed Aug. 25, 1988, Ser. No. 236,493

Int. Cl.^{5} G06F *15/16*

U.S. Cl. 364—200 **70 Claims**



1. A multilevel computer system including high level computing means and low level computing means, comprising:

said high level computer means including at least one computer and operable for receiving a task, for distributing one or more portions of the task to said low level computer means for processing based on the availability, as determined by said high level computer means, of the low level computer means to process said one or more portions of the task, and for processing, if currently available, all undistributed portions of the task;

said low level computer means including at least two computers and operable for receiving an additional task, for processing, if currently available, portions of the additional task, for distributing for processing those portions of the unprocessed additional task to high level computer means based on the availability, as determined by said low level computer means, of the high level computer means to process one or more portions of the unprocessed additional task, and for processing portions of the task received from said high level computer means; and

communications link means for transferring portions of the task within the computer system, said communications link means including first link means and second link means, said first link means coupling said at least one computer of said high level computer means to said at least two computers of said low level computer means, each of said second link means coupling said at least two computers of said low level computer means together;

wherein the availability of said low level computer means is communicated to said high level computer means and the availability of said high level computer means is communicated to said low level computer means along said first link means; and

wherein the number of first and second link means associated with at least one of the at least two computers of said low level computer means are unequal.

VOL
1127

ISS
3

JE
18

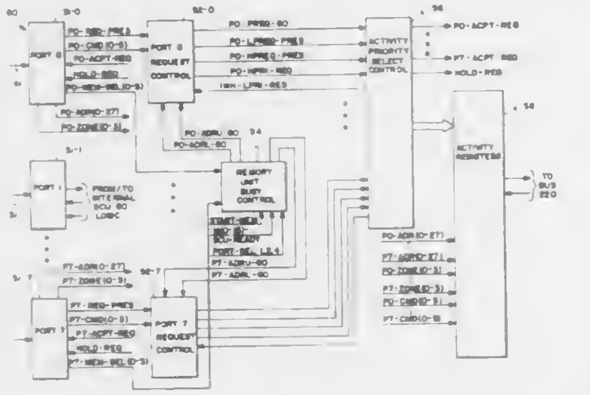
1991

UMI

5,025,370

CIRCUIT FOR PREVENTING LOCK-OUT OF HIGH PRIORITY REQUESTS TO A SYSTEM CONTROLLER

Robert J. Koegel, 4621 Orchid La., Glendale, Ariz. 85302, and Leonard Rabins, 8625 E. Monterosa, Scottsdale, Ariz. 85251
Filed Sep. 2, 1986, Ser. No. 902,544
Int. Cl.^{5} G06F *11/00*
U.S. Cl. 364—200 3 Claims



1. In a data processing system having a plurality of subsystems including a system controller having a plurality of ports for controlling access to at least one subsystem of the data processing system in response to access request commands from a plurality of equipment operatively connected to the ports of said system controller, each request for access applied to a port by an equipment has one of a plurality of command priority levels, one of said priority levels being the highest, each of the ports of the system controller having a different port priority relative to the ports for each given command priority level, the port priority levels of ports for a given command priority level being conditionally rotated when a request for access for equipment connected to a given port having the highest port priority is granted access by the system controller, said system controller including a circuit for preventing lock-out of access requests having a higher command priority level or a higher port priority, said circuit comprising:

a) counter means for counting the number of times access request commands having a lower command priority level or a lower port priority are granted access by the system controller while access request commands having a higher command priority or higher port priority are pending, the counter means producing a count value which is temporarily stored in said counter means; and

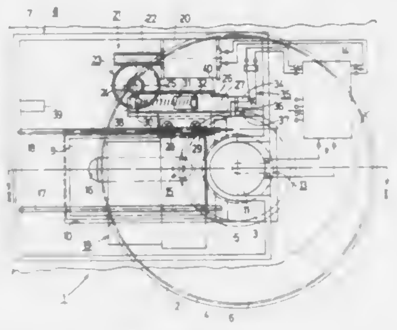
b) compare means, operatively connected to said counter means, for comparing said count value of said counter means to a predetermined value, and for generating a control signal when said count value is equal to said predetermined value, said control signal being coupled to each of ports of the the system controller to inhibit the ports from accepting any further access request commands from the equipments connected to said ports.

5,025,371

OVERLOAD PROTECTED RACK AND PINION DRIVE FOR AN OPTICAL SCANNING DEVICE

Norbert Heinrich, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Oct. 13, 1988, Ser. No. 257,259
Claims priority, application Austria, Oct. 16, 1987, 2742/87
Int. Cl.^{5} G11B *17/30*
U.S. Cl. 369—219 1 Claim

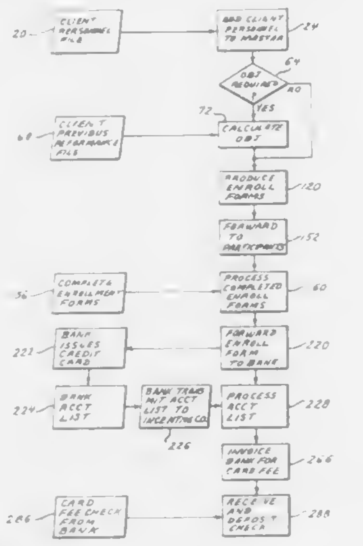
1. A reproducing apparatus for a rotatable disc-shaped record carrier on which information signals are stored in spiral tracks, comprising a scanning device for scanning the tracks, which scanning device is arranged on a slide which is movable in a radial direction relative to the record carrier, which slide is movable by a motor via a gear mechanism to position the scanning device between an innermost position and an outermost position, which gear mechanism comprises a pinion which can be driven by the motor and two juxtaposed gear racks which can be driven by the pinion, which are slidably guided parallel to one another, and which are tensioned relative to each other by means of a spring, one of said gear racks being fixedly connected to the slide and a stop which is fixedly connected to said gear rack abutting, against a fixed stop on the apparatus when the scanning device is set to one of said positions, characterized in that when the slide abuts against the fixed stop on the apparatus the gear rack, which is rigidly connected to the slide, is not in mesh with the pinion and at least one end tooth the other gear rack is situated within the range of meshing with the pinion and the spring which tensions the two gear racks relative to one another holds the slide positioned against the fixed stop on the apparatus and urges the other gear rack towards the pinion.



5,025,372

SYSTEM AND METHOD FOR ADMINISTRATION OF INCENTIVE AWARD PROGRAM THROUGH USE OF CREDIT

James F. Burton, Ladue, and Daniel L. Henke, St. Louis, both of Mo., assignors to Meridian Enterprises, Inc., St. Louis, Mo.
Continuation of Ser. No. 98,008, Sep. 17, 1987, abandoned. This application Sep. 25, 1989, Ser. No. 412,570
Int. Cl.^{5} G06F *15/21*
U.S. Cl. 364—406 32 Claims


CLIENT PERSONNEL FILE
ADD CLIENT PERSONNEL TO MASTER
OBJ REQUIRED?
CLIENT PREVIOUS PERFORMANCE FILE
CALCULATE OBJ
PRODUCE ENROLL FORMS
FORWARD TO PARTICIPANTS
COMPLETE ENROLLMENT FORMS
PROCESS COMPLETED ENROLL FORMS
BANK ISSUES CREDIT CARD
FORWARD ENROLL FORM TO BANK
BANK ACCT LIST
BANK TRANSMIT ACCT LIST TO INCENTIVE CO
PROCESS ACCT LIST
INVOICE BANK FOR CARD FEE
CARD FEE CHECK FROM BANK
RECEIVE AND DEPOSIT CHECK

1. In a system for an incentive award program for a company having individual program participants and having levels of performance set as goals to be achieved by participants for the company, improvements comprising:

(a) computer memory means for data storing of information identifying the participants;

(b) credit instruments for the participants, and computer data processing means for assigning individual credit instrument account numbers and corresponding accounts to the individual participants;

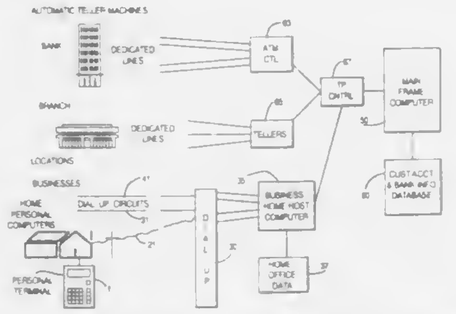
(c) computer memory means for storing levels of performance to be achieved by the participants under the incentive program in order for the individual participants to have money credited for available use to the individual participants' credit instrument account; and

(d) computer data processing means for allocating monetary amounts to be credited for available use through the individual participant's credit instruments based on the participant's meeting of a designated level of performance under the incentive program.

5,025,373

PORTABLE PERSONAL-BANKING SYSTEM

George T. Keyser, Jr., Potomac; Carl R. Fosler, Gaithersburg, and Jeffrey D. Johnson, Rockville, all of Md., assignors to JML Communications, Inc., Washington, D.C.
Filed Jun. 30, 1988, Ser. No. 214,263
Int. Cl.^{5} G06C *13/30*
U.S. Cl. 364—408 28 Claims



1. A portable personal banking terminal for use in a banking terminal system comprising:

an m line by n character display where m is between one and four and n is between 12 and 32,

a data modulator and demodulator for transmitting data over a telephone line,

an automatic telephone dialer for supervising and actuating a switched telephone connection over a public switched telephone network to a host computer, a data entry means for providing ten plus i selectable choices, the choices comprising ten numerical choices and i functional elements wherein i is between two and ten and

a controller, coupled to the display, the data modulator and demodulator, the automatic telephone dialer and the data entry means, for encrypting and formatting data in packets for transmission to the host computer, for validating and controlling the display of data entered via the data entry means during any of a local, an initialization or a banking mode of operation, and for controlling actuation of the switched telephone connection to the host computer during the initialization mode of operation, the controller being further responsive to the host computer during the baking mode of operation for controlling the display and storage of text messages, prompts and data transmitted from the host computer,

the terminal adapted to be handheld and having a front and a rear surface, the front surface providing a location for the data entry means and display and the rear surface providing a pocket for banking forms and a writing table.

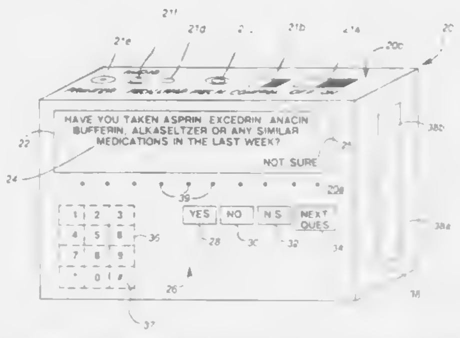
18. A portable personal banking terminal for use in an initialization and a banking mode of operation in a banking terminal system comprising a host computer and for use in a local mode of operation without the banking terminal system, the portable personal banking terminal during the local mode of operation serving as a personal banking manager and during a banking mode of operation under host computer control as a bank information retrieval terminal,

the terminal adapted to be handheld and having a front and a rear surface, the front surface providing means for data entry and display and the rear surface providing a pocket for banking forms and a writing table.

5,025,374

PORTABLE SYSTEM FOR CHOOSING PRE-OPERATIVE PATIENT TEST

Michael Roizen, Chicago; William E. Turcotte, II, Oak Park, and Richard E. Pfisterer, Arlington Heights, all of Ill., assignors to ARCH Development Corp., Chicago, Ill.
Filed Dec. 9, 1987, Ser. No. 130,934
Int. Cl.^{5} G06F *15/42*
U.S. Cl. 364—413.02 8 Claims


HAVE YOU TAKEN ASPRIN EXCEDRIN ANACIN BUFFERIN, ALKASELTZER OR ANY SIMILAR MEDICATIONS IN THE LAST WEEK?
NOT SURE
YES
NO
N S
NEXT QUES
1 2 3
4 5 6
7 8 9
0

1. A portable patient-operable pre-operative test selector especially for use by bed-ridden pre-operative patients, said selector comprising:

power supply means for accepting a battery, electronic circuitry connected to derive operating power exclusively from a battery when installed in said power supply means, said electronic circuitry including data-storage means for storing a series of pre-operative questions directed to the determination of which pre-operative diagnostic tests should be undergone by a patient before surgery, reflective display means, programmable data-processing means, control program storage means for storing a program for controlling said data-processing means, a special-purpose control program stored therein, said control program being arranged for displaying said pre-operative questions serially on said display means, means operable by an unskilled patient to answer "yes" and "no" to each such question in turn, means for storing such answers, said control program being further arranged for analyzing said answers and determining therefrom which pre-operative diagnostic tests are indicated, and output means for revealing the results of such determination.

2. A portable test selector for use by an untrained patient to complete a medical questionnaire, comprising:

read-only memory means for storing (i) a series of preselected medical questions related to determining which tests among a set of preselected tests the patient should undergo, and (ii) a decision table indicating for each of the tests which answers to which questions should cause that test to be determined as one the patient should undergo;

scratchpad memory means for storing data; means for reading said data from said scratchpad memory means

display means for displaying information to the patient;

interrogation means for causing the medical questions stored in said read-only memory means to be displayed to the patient by the display means;

manual input means for enabling the patient to indicate an answer to a displayed question; and

tabulating means for enabling the patient to indicate an answer to a displayed question; and

tabulating means for causing the corresponding answer

VOL
1127
ISS
3
JE
18
1991
UMI

indicated by the patient via the manual input means to be stored as data in the scratchpad memory means;

wherein the read-only memory means is easily removable from the test selector and replaceable to enable updating of the medical questions and decision table.

5,025,375
VOLUME DATA TRANSMISSION SYSTEM

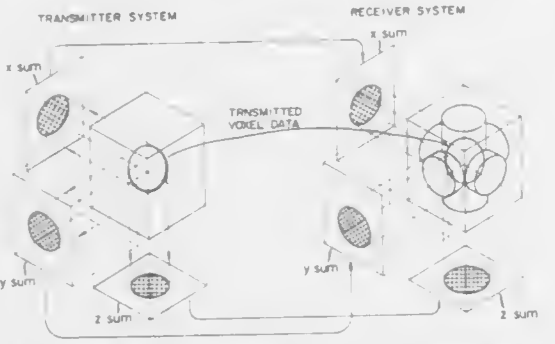
Michitaka Sugawara, Utsunomiya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 4, 1988, Ser. No. 228,148

Claims priority, application Japan, Aug. 10, 1987, 62-198105

Int. Cl.⁵ G06G *7/60;* **G06K** *9/36*

U.S. Cl. 364—413.22 **11 Claims**



1. A volume data transmission system for transmitting volume data consisting of voxel data through a communication line, comprising:

projection data generating means for generating binary projection data from the volume data in accordance with whether predetermined significant data is included in any of the voxel data along a plurality of predetermined directions in a 3-dimensional space,

data selecting means for sequentially selecting only voxel data having significant data corresponding to any of the binary projection data on the basis of the binary projection data; and

data transmitting means for transmitting the binary projection data and the sequentially-selected voxel data.

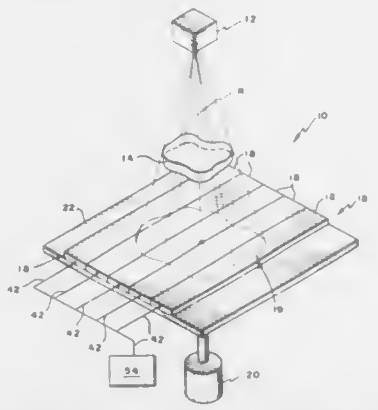
5,025,376
RADIATION TELETHERAPY IMAGING SYSTEM HAVING PLURAL IONIZATION CHAMBERS

Frank J. Bova; Lawrence T. Fitzgerald, and Walter Mauderli, all of Gainesville, Fla., assignors to University of Florida, Gainesville, Fla.

Filed Sep. 30, 1988, Ser. No. 251,529

Int. Cl.⁵ G01T *1/185;* **H01J** *47/04*

U.S. Cl. 364—413.26 **29 Claims**



1. Apparatus for imaging a high energy beam of radiation emanated from a radiation source and transmitted through an object comprising:

detector means for quantitatively measuring and detecting said transmitted radiation, said detector means comprising a plurality of ion chambers each of said ion chambers having a longitudinal extent, said ion chambers being disposed in a parallel, side-by-side manner whereby said detector means comprises a parallel array of said longitudinally extending ion chambers;

said plurality of ion chambers comprising at least a first front surface electrode and a plurality of substantially parallel, longitudinally extending collecting electrodes disposed to be facing said front surface electrode and spaced apart at a predetermined distance, wherein said plurality of ion chambers has a predetermined total width at least as great as a maximum width dimension of a target area to be imaged, and wherein said longitudinal extent of each of said plurality of ion chambers has a predetermined length at least as great as a maximum length dimension of said target area,

said detector means being disposed on a side of said object opposite that of said radiation source;

means for converting an ionization current measured by each of said ion chambers into projection data representative of an amount of radiation absorbed by each of said ion chambers;

means for converting said projection data obtained from each of said ion chambers into a single projection containing data measured from each of said ion chambers; and

means for displaying said single projection.

5,025,377
POSITION DETECTOR FOR MOVING VEHICLE

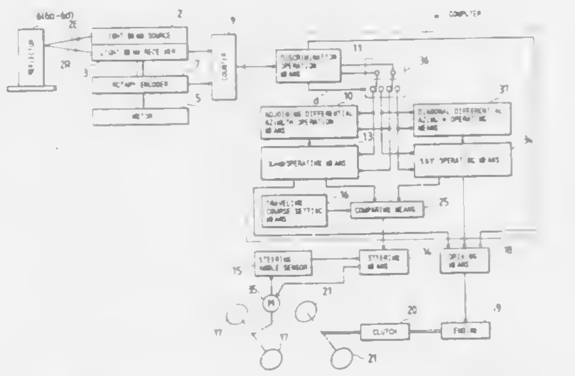
Kenji Kamimura, and Sadachika Tsuzuki, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 28, 1989, Ser. No. 442,371

Claims priority, application Japan, Dec. 12, 1988, 63-313539

Int. Cl.⁵ G06F *15/50*

U.S. Cl. 364—424.02 **5 Claims**



1. A position-detecting system for a moving vehicle that is adapted to travel through a working area whose boundaries are defined by light reflectors disposed at four spaced reference points none of which reflectors carries any identification information regarding the position of said reflector, said vehicle including a light source that scans a light beam horizontally around a fixed axis on said vehicle, said vehicle including light-receiving means disposed at said fixed axis for receiving light reflected by said light reflectors, and said vehicle also including control means for detecting the position of said moving vehicle on the basis of signals derived from reflected light received by said light receiving means, said control means comprising:

means for detecting the azimuths of said reference points with respect to the advance direction of the moving vehicle based on light-receiving intervals of the light-receiving means;

first operating means for operating the position of the moving vehicle on the basis of preset positional information as well as the azimuths of the reference points;

second operating means for operating the position of the moving vehicle on the basis of preset positional information and the azimuths of any three reference points out of said four reference points;

discrimination processing means having means for outputting a reference point-missing signal when a light beam signal is not detected from one of the four reference points; and

a switching means responsive to occurrence of said reference-point missing signal for transferring control from said first operating means to said second operating means to allow the second operating means to operate the position of the moving vehicle on the basis of the positional information as well as the azimuths of the three reference points other than the reference point that was missed.

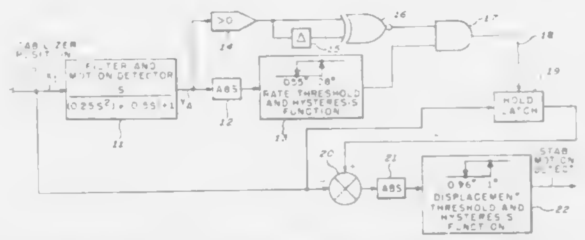
5,025,378
HORIZONTAL STABILIZER MOTION DETECTOR

Jeffrey A. Kahler, Phoenix, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 3, 1989, Ser. No. 332,852

Int. Cl.⁵ G05D *1/00;* **G06F** *15/20*

U.S. Cl. 364—424.06 **12 Claims**


STABILIZER POSITION
FILTER AND MOTION DETECTOR
ABS
RATE THRESHOLD AND HYSTERESIS FUNCTION
HOLD LATCH
ABS
DISPLACEMENT THRESHOLD AND HYSTERESIS FUNCTION
STAB MOTION DETECT
>0
Δ
14
15
16
17
18
19
20
21
22

8. Programmed computer apparatus for generating a warning signal in response to a position signal of a control surface of a maneuverable craft when said control surface exceeds a predetermined rate of displacement over a predetermined displacement, said position signal being proportional to the displacement of said control surface, said apparatus comprising

motion filter means responsive to said position signal for providing an output signal in accordance with the rate of change of said position signal, said motion filter means comprising a Chebychev filter,

first threshold means for detecting when said output signal of said motion filter means exceeds said predetermined rate and providing a logic signal in accordance therewith, and

second threshold means responsive to said logic signal and said position signal for providing said warning signal when said position signal indicates that said control surface has traversed a displacement greater than said predetermined displacement while said logic signal has indicated that said output signal of said motion filter means was exceeding said predetermined rate.

5,025,379
SYSTEM AND METHOD FOR AUTOMATICALLY CONTROLLING VEHICLE SPEED TO DESIRED CRUISE SPEED USING MICROCOMPUTER

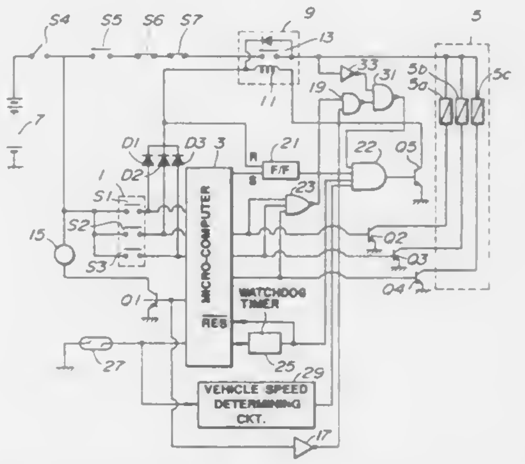
Yoshiyuki Etoh; Hiroshi Inoue; Kazuyuki Mori; Koichi Suzuki; Kinichiro Nakano; Hiroyuki Nomura; Isao Yamamoto, and Kiyoshi Yoshida, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Oct. 28, 1988, Ser. No. 263,758

Claims priority, application Japan, Oct. 29, 1987, 62-273935

Int. Cl.⁵ B60K *31/00*

U.S. Cl. 364—426.04 **16 Claims**



1. A method for automatically controlling a vehicle speed to a desired cruise speed, comprising the steps of:

(a) detecting the current vehicle speed;

(b) operatively outputting command signals on a cruise speed run of the vehicle, respectively;

(c) providing a microcomputer, responsive to any one of the command signals, for outputting a control command signal through each of a plurality of output ports thereof according to the corresponding one of the contents of the command signals, the microcomputer outputting a cruise signal through another output port together with the control command signals and outputting a receipt signal through still another output port upon receipt of any one of the command signals;

(d) providing a plurality of control valves for, with a power supply therefor being received, adjusting an operating variable of a vehicular engine driving force adjusting mechanism according to the contents of the control command signals outputted from the microcomputer via the respective output ports so that the current vehicle speed is controlled in accordance with the corresponding one of the contents of the command signals;

(e) determining whether any one of the command signals is outputted and thereafter the microcomputer outputs the receipt signal through the still other output port;

(f) determining whether the microcomputer falls in a cruise speed control enable state on the basis of a plurality of determining factors, the factors determining that the microcomputer enables the cruise speed control and the factors including the determination result in the step (e) that any one of the command signals is outputted and thereafter the microcomputer outputs the receipt signal through the still other output port; and

(g) enabling the power to be supplied to the control valves only when all of the determining factors satisfy a condition of enabling the power to be supplied to the control valves to execute a cruise speed control via the control valves.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,380
METHOD AND DEVICE FOR CONTROLLING THE OPERATION OF AN ENGINE FOR A VEHICLE

Seiji Wataya, Himeji, and Shoichi Washino, Amagasaki, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

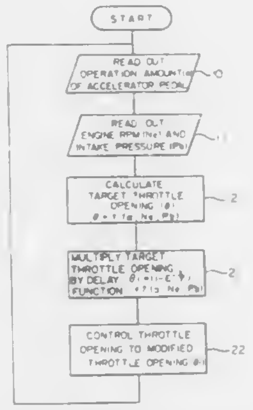
PCT No. PCT/JP88/00132, § 371 Date Oct. 11, 1988, § 102(e) Date Oct. 11, 1988, PCT Pub. No. WO88/06234, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 10, 1988, Ser. No. 265,809

Claims priority, application Japan, Feb. 12, 1987, 62-30018

Int. Cl.^{5} F02D *41/30*

U.S. Cl. 364—431.05 23 Claims


START
READ OUT OPERATION AMOUNT (α) OF ACCELERATOR PEDAL
READ OUT ENGINE RPM (Ne) AND INTAKE PRESSURE (Pb)
CALCULATE TARGET THROTTLE OPENING (θ)
MULTIPLY TARGET THROTTLE OPENING BY DELAY FUNCTION
CONTROL THROTTLE OPENING TO MODIFIED THROTTLE OPENING
2
22

1. An engine control method for a vehicle in which a valve means in an engine intake passage is operatively associated with an accelerator pedal such that the opening degree of said valve means is changed by operation of said accelerator pedal so as to control at least one of the amount of intake air and the amount of fuel supplied to an engine, the method comprising the steps of:

sensing the amount of operation of said accelerator pedal imparted by an operator;

sensing the load condition of an engine;

sensing the number of revolutions per minute of said engine; and

gradually opening said valve means according to a non step-wise function when said accelerator pedal is operated rapidly to open said valve means to a target degree of opening which is set based on at least one of the sensed amount of accelerator pedal operation, the sensed engine load condition, and the sensed number of revolutions per minute of said engine.

5,025,381
ATTITUDE CONTROL COMPENSATOR FOR FLEXIBLE SPACECRAFT

Neil E. Goodzeit, East Windsor, Township, Mercer County, N.J., and David M. Linder, Buckingham Township, Bucks County, Penn., assignors to General Electric Company, East Windsor, N.J.

Filed Jan. 2, 1990, Ser. No. 459,627

Int. Cl.^{5} G06F *15/50;* B64G *1/36*

U.S. Cl. 364—434 9 Claims

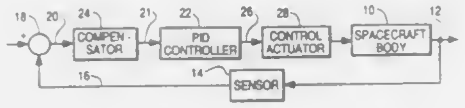
1. An attitude controller for a spacecraft having a body defining at least a primary self-resonant frequency, comprising:

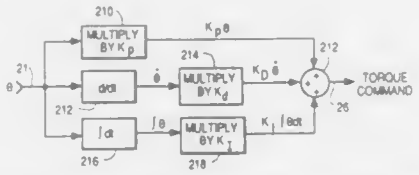
torquing means coupled to the spacecraft body for generating torques for changing the attitude of said spacecraft;

sensing means coupled to said body for sensing the attitude thereof and for generating deviation signals indicative of the deviation of the attitude away from a desired attitude;

PID control means for operating on attitude error signals for summing first, second and third products, said first product being formed by multiplying a first constant by said attitude error signals, said second product being formed by multiplying a second constant by the time derivative of said attitude error signals, and said third product being formed by multiplying a third constant by the time integral of said attitude error signals;

coupling means coupled to said torquing means, said sensing means and said PID control means for coupling said PID control means in a control path responsive to said attitude error signals, and extending from said sensing means to said torquing means, for stabilizing said attitude, said coupling means further including compensation means cascaded with said PID control means, said compensation means having a transfer characteristic including a gain function which is substantially constant below a frequency of about ω/7, which gain function includes (a) a component representing a monotonic decrease in gain with increasing frequency from said frequency ω/7, superimposed upon (b) a notch component at a frequency of ω, where ω is selected to be slightly below the self-resonant frequency of said spacecraft, said transfer function including a phase response which tends toward zero degrees as frequency decreases from said frequency of ω/7, and which progressively lags toward −180 degrees with frequency increasing from ω/7 toward ω, and which from a value of +180 degrees at ω becomes monotonically more negative and tends toward −90 degrees at frequencies far above ω, whereby said compensation means cascaded with said PID control means responds to said deviation signals for driving said torquing means.





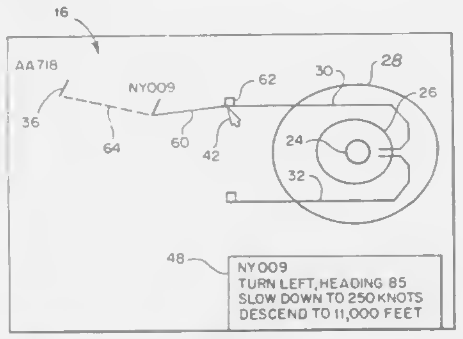
5,025,382
DATALINK CONTROLLER INTERFACE

John M. Artz, Rockville, Md., assignor to The Mitre Corporation, Bedford, Mass.

Filed Dec. 12, 1989, Ser. No. 448,965

Int. Cl.^{5} G06F *15/48;* G09G *1/00;* G08B *21/00;* G08G *1/123*

U.S. Cl. 364—439 16 Claims



1. A method for providing a digital data link between an air traffic controller at a ground station and the pilot of an aircraft through digital communication between a ground-based computer located at the ground station and including an associated display screen containing a spatial representation of the airspace around the aircraft as well as representation of the location of the aircraft in that airspace, and a computer on that aircraft, said method comprising:

moving a pointing device to cause movement of a cursor on said display screen, beginning at the representation of the aircraft, to generate a continuous line on the screen between the representation of the aircraft and the cursor corresponding to a potential flight path of the aircraft,

generating on said screen, in response to the production of a said continuous line corresponding to the flight path of the aircraft that the controller intends, a static cursorline representative of the intended flight path of aircraft;

using the ground-base computer to calculate, from beginning and the end points of the cursorline, the intended heading of the aircraft; and

transmitting digital data related to calculated intended heading to the aircraft computer.

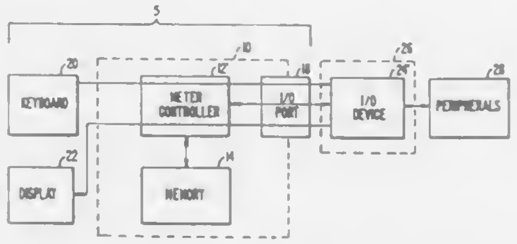
5,025,383
POSTAGE METER TRANSPARENT I/O INTERFACE

John G. Haines, Oakland; Nolan G. Rosenbaum, Hayward; Albert L. Pion, Berkeley, all of Calif.; Marc Lecarpentier, Antony; Christophe Henriot, Crepy en Valois, both of France, and Cyrus Abumehdi, Harlow, England, assignors to FME Corporation, Hayward, Calif.

Continuation of Ser. No. 146,919, Jan. 22, 1988, abandoned. This application Jun. 5, 1990, Ser. No. 534,013

Int. Cl.^{5} G06F *15/20*

U.S. Cl. 364—464.03 9 Claims



1. In a postage meter having first input means for entering data, first output means for displaying data, means for printing postage, means for storing data, second input means for entering data from external devices, second output means for writing data to external devices, and a meter controller electrically connected to each of the aforesaid means and programmed for processing data and for controlling the operation of the postage meter, the improvement wherein the meter controller comprises:

mode means, having two states, for defining two modes for the meter, designated a normal mode and a transparent mode;

first means, responsive to the mode means and responsive to data entered on the first input means for (a) directing meter operation in response to data representing a valid meter function when the meter is in the normal mode, (b) transferring data not representing a valid meter function to the second output means without directing meter operation when the meter is in the normal mode, and (c) transferring all data entered on the first input means to the second output means without directing meter operation when the meter is in the transparent mode; and

second means, responsive to the mode means and responsive to data entered on the second input means for transferring at least some data entered on the second input means to the first output means without directing meter operation when the meter is in the transparent mode.

5,025,384
PRODUCTION PROCESS CONTROL SYSTEM

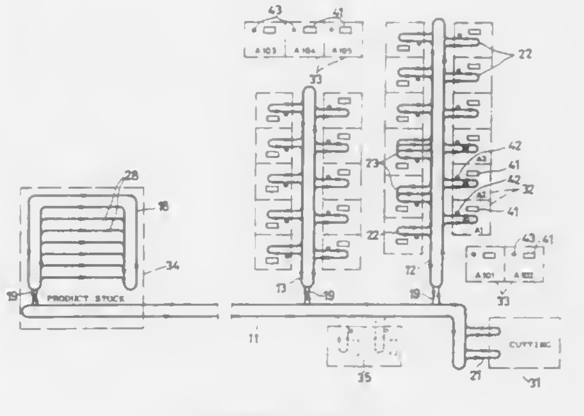
Mitsuji Teranishi; Yasuo Watanabe, and Akira Takenchi, all of Osaka, Japan, assignors to Aslcs Corporation, Kobe, Japan

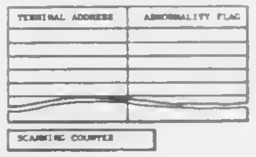
Continuation of Ser. No. 292,457, Dec. 30, 1988, abandoned, which is a division of Ser. No. 171,226, Mar. 22, 1988, Pat. No. 4,878,176, which is a continuation of Ser. No. 730,185, May 3, 1985, abandoned. This application Oct. 26, 1989, Ser. No. 428,023

Claims priority, application Japan, May 4, 1984, 59-65803[U]; May 4, 1984, 59-65804[U]; May 4, 1984, 59-65805[U]; May 4, 1984, 59-89831; May 4, 1984, 59-89832; May 4, 1984, 59-89833; May 4, 1984, 59-89834; May 4, 1984, 59-89835; May 4, 1984, 59-89836; May 4, 1984, 59-89837

Int. Cl.^{5} G06F *15/00*

U.S. Cl. 364—468 8 Claims





1. A system for communicating between a plurality of terminal devices and a central device connected to said plurality of terminal devices, wherein the central device comprises:

communicating means for taking the initiative and performing communication with the plurality of terminal devices in a predetermined order by scanning the terminal devices and for detecting an abnormality of a terminal device in communication therewith;

an abnormal terminal table in which the abnormality of said terminal devices is registered;

means for checking whether an abnormality is registered for a particular one of the terminal devices with reference to the table before communicating with said particular terminal device and generating a corresponding output;

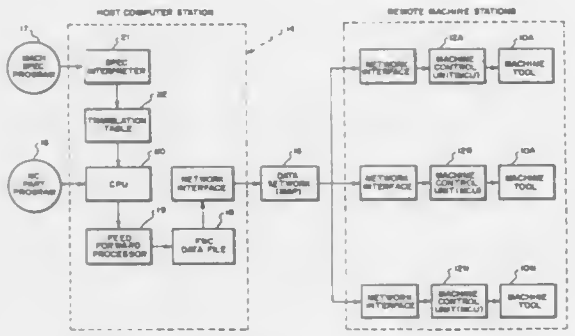
control means responsive to the output of the checking means, for causing the communicating means to proceed to communication processing with said particular terminal device when no abnormality is registered and for causing the checking means to check the next terminal device for abnormality registration when an abnormality is registered; and

means for registering in said abnormal terminal table any terminal device that is found abnormal by the communicating means.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,385
MULTIPLE AXIS MOTION CONTROL SYSTEM

Stanley G. Froyd, 5537 Calle Arena, Carpenteria, Calif. 93013
Division of Ser. No. 181,820, Apr. 15, 1988, Pat. No. 4,947,336. This application May 25, 1990, Ser. No. 529,132
Int. Cl.⁵ G06F *15/46*
U.S. Cl. 364—474.11 **3 Claims**



1. A system for controlling a plurality of machines, each machine including multiple independent actuators for moving a member along a path with respect to multiple axes, said system comprising:

input means for supplying a part program for each of said machines, each part program defining the terminal coordinates of successive path portions;

host computer means;

program means for operating said host computer means to generate with respect to each machine, a feedforward data file based on said part program input means comprised of a series of data blocks, each data block defining a profile of position and velocity versus time with respect to a linear path segment, said program means including means for looking ahead at the direction and magnitude of subsequent path portions to generate the data block defining each path segment;

a plurality of machine control units, each connected to a different machine;

means for distributing each data file generated by said host computer means to one of said machine control units;

each of said machine control units including:

position commander means responsive to each data block for generating a plurality of command position signals each associated with a different actuator;

velocity profiler means responsive to each data block for generating a plurality of feedforward velocity signals, each associated with a different actuator;

each actuator having associated therewith;

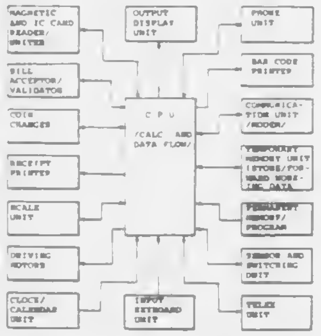
position sensor means for generating an actual position signal with respect to the associated actuator;

means for summing the command position and actual position signals generated with respect to the associated actuator for producing a position error signal for that actuator; and

means for summing said command position error and feedforward velocity signals generated with respect to each actuator for producing a command velocity signal with respect to that actuator.

5,025,386
AUTOMATED MAIL COLLECTING AND TELECOMMUNICATION MACHINE II

Pavo Pusic, Moluntska 6, Dubrovnik, Yugoslavia 500000
Continuation-in-part of Ser. No. 226,778, Aug. 1, 1988, Pat. No. 4,900,905. This application Oct. 25, 1988, Ser. No. 262,029
The portion of the term of this patent subsequent to Feb. 13, 2007, has been disclaimed.
Int. Cl.⁵ G06F *15/20*
U.S. Cl. 364—478 **19 Claims**



1. Self-contained apparatus for processing and collecting an item to be mailed comprising:

computer means;

display means coupled to said computer means, said display means displaying information associated with the use of the apparatus such as the instructions for using said apparatus;

receiving means coupled to said computer means for receiving the item to be mailed;

data entry means coupled to said computer means and to said display means for entering data relating to the item to be mailed, such as the address to which said item is to be mailed;

weighing means coupled to said computer means and to said receiving means for securely weighing said item to be mailed;

determining means including said computer means and coupled to said data entry means and to said weighing means for determining the required postage for said item to be mailed;

payment means for accepting and verifying payment for said postage including said computer means and coupled to said display means, to said data entry means, and to said determining means;

means coupled to said computer means for providing machine readable information concerning the item to be mailed on the item to be mailed, such as the zip code to which said item is to be mailed;

transport means coupled to said computer means for transporting the item to be mailed from said receiving means to a storage area for subsequent pick up; and

means coupled to said transport means for moving said transport means to drop said item in said storage area and moving said transport means to its original position after said item has been dropped in said storage area.

5,025,387
POWER SAVING ARRANGEMENT FOR A CLOCKED DIGITAL CIRCUIT

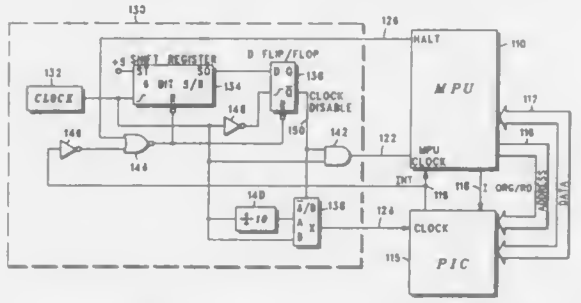
Terrie L. Frane, Bloomingdale, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Continuation of Ser. No. 240,320, Sep. 6, 1988, abandoned. This application Jun. 1, 1990, Ser. No. 532,157
Int. Cl.⁵ G06F *1/04;* **H03K** *5/04*
U.S. Cl. 364—493 **16 Claims**

12. An electronic circuit having a plurality of electronic components, processing means for generating a disable signal, a peripheral circuit for generating an interrupt signal, clocking means for generating a first clock signal at a first predetermined frequency, and a power control apparatus, the power control apparatus comprising:

a) disabling means, generating a second clock signal at the first predetermined frequency, coupled to the processing means and the first clock signal, for disabling the second clock signal clocking in response to the disable signal, and enabling the second clock signal in response to the interrupt signal; and

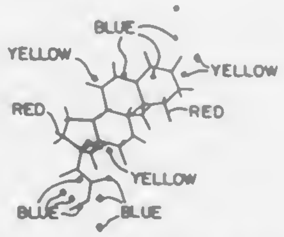
b) means, generating a third clock signal at the first predetermined frequency, coupled to the first clock signal and the peripheral circuit, for reducing, in response to the disable signal, the first predetermined frequency of the third clock signal to a second predetermined frequency, and increasing, in response to the interrupt signal, the second predetermined frequency to the first predetermined frequency;

wherein the processing means consumes substantially no power when the second clock signal is disabled and the control means consumes less power when the first predetermined frequency of the third clock signal is reduced to the second predetermined frequency.



5,025,388
COMPARATIVE MOLECULAR FIELD ANALYSIS (COMFA)

Richard D. Cramer, III, 4100 Laclede Avenue, #314, St. Louis, Mo. 63108, and Svante B. Wold, 3326A Gullsjó, S-9110, Vännás, Sweden
Filed Aug. 26, 1988, Ser. No. 237,491
Int. Cl.⁵ G06F *13/46*
U.S. Cl. 364—496 **93 Claims**



1. A computer-based method of generating and visualizing a three-dimensional quantitative structure activity relationship of a series of molecules comprising the steps of:

(a) defining molecular shape descriptors for each molecule in said series of molecules wherein each molecule is associated with a unique parameter value;

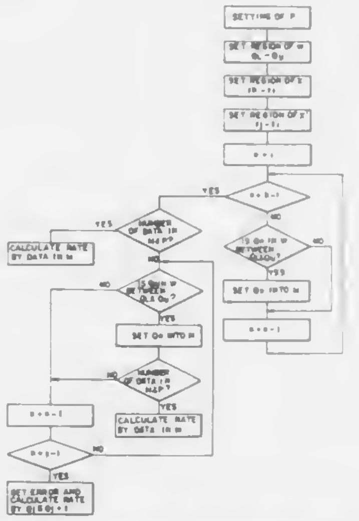
(b) aligning each molecule in said series with the common shape elements of all the molecules in said series;

(c) correlating the molecular shape descriptors and unique parameter value of each molecule with all the other molecules in said series;

(d) visually displaying using computer graphics the correlation among the molecules in said series.

5,025,389
METHOD OF ANALYZING REACTION RATE IN CHEMICAL ANALYSIS

Toshiaki Imai, Otawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jan. 13, 1989, Ser. No. 296,823
Claims priority, application Japan, Jan. 16, 1988, 63-7960
Int. Cl.⁵ G06F *15/42*
U.S. Cl. 364—497 **4 Claims**


SETTING OF P
YES
NO
CALCULATE RATE BY DATA IN M
SET Gn INTO M
CALCULATE RATE BY DATA IN M
SET ERROR AND CALCULATE RATE

1. A method of analyzing a reaction rate in chemical analysis, comprising the steps of:

reacting at least one sample and at least one reagent;

first measuring at various time points the level of reaction of a sample and the reagent so as to provide a plurality of measurement region bands;

dividing each of the plurality of said measurement region bands different which have time series n which the said reaction rate is measured and stored;

finding within said measurements one of said samples high in active value by using data included in the region band in a forward position in said time series;

second measuring a sample which will have a normal or low active value; and

finding an active value by using a data look up of data which was part of the measurement indicated in the region band in a backward position in said time series in relation to said forward position.

5,025,390
ROBOTIC WORKCELL CONTROL SYSTEM WITH A BINARY ACCELERATOR PROVIDING ENHANCED BINARY CALCULATIONS

Kenneth E. Daggett, Murrysville, Pa., assignor to Staubli International AG, Switzerland
Filed Jan. 31, 1989, Ser. No. 304,971
Int. Cl.⁵ G06F *15/46, 15/16*
U.S. Cl. 364—513 **5 Claims**

1. A control system for a robotic workcell having at least one electric robot and a plurality of workcell equipment items in turn having a plurality of control and sensor devices associated therewith, said system comprising:

an electronic robot controller disposed at a first workcell location to operate said robot as a part of the workcell process;

means for loading program data into said robot controller;

at least one input/output control module disposed at a second workcell location and having connected thereto as inputs a first group of sensor devices and as outputs a first group of said control devices; and

means for linking said robot controller and said input/output

VOL
1127

ISS
3

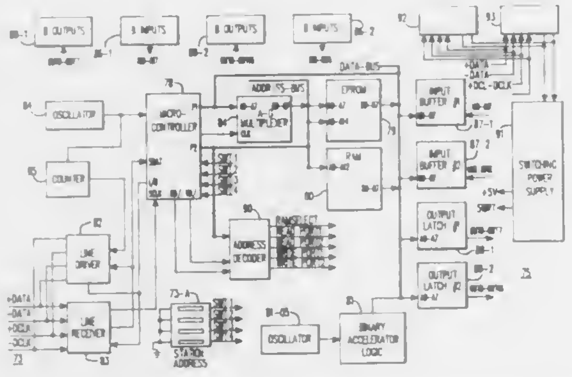
JE
18

1991

UMI

module to provide for program and process data communication;

said input/output module having computing means including a microprocessor for operating the module in accordance with a system operating program downloadable from said robot controller to said module and for processing inputs and outputs in accordance with a user process program downloadable from said robot controller to the module;



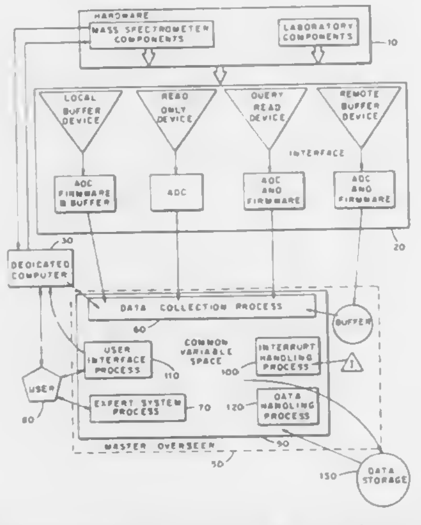
said input/output module further having coprocessor means for executing binary equation solutions and storing the results thereof for processing by said microprocessor and thereby accelerating the solution of said binary equations; wherein said coprocessor means includes circuit means for fetching binary instructions from memory and for sequentially executing the binary instructions to produce binary equation solutions in accordance with a reverse polish notation calculation system.

5,025,391
EXPERT OVERSEER FOR MASS SPECTROMETER SYSTEM

Evan E. Filby, Idaho Falls, and Richard A. Rankin, Ammon, both of Id., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 4, 1989, Ser. No. 333,075
Int. Cl.⁵ G06F *15/18*

U.S. Cl. 364—513 23 Claims



1. An expert overseer system for the operation and real-time evaluation of a complex instrument system that includes key instrument components,

a computer means capable of controlling the key instrument components and producing results from the complex instrument system, and

a laboratory support system,

said expert overseer system comprising:

an interface coupling the key instrument components of the complex instrument system, the laboratory support system, and the computer means,

a master overseer system comprising the computer means and a master overseer program implemented on the computer means,

said master overseer system including a means for polling and collecting data from the key components of the complex instrument system, and the laboratory support system comprising automatically and manually specified time sequencing of said means for polling and collecting data,

a knowledge base including data obtained from said means for polling and collecting data,

heuristic rules and parametric rules responsive to the data obtained from said means for polling and collecting data, and set parameters,

an expert means responsive to said means for polling and collecting data and said knowledge base, said expert means capable of using a rule base and an inference engine to automatically analyze the status of the complex instrument system, to employ a set parameter damage prevention system, and to potentially alter a specified sampling routine,

an interrupt handling means responsive to the key instrument components of the complex instrument system and the laboratory support system, said interrupt handling means capable of initiating varying degrees of data collection by said means for polling and collecting data, and

a user interface responsive to said expert means, said user interface capable of relating the output of said expert means to a human operator.

5,025,392
APPARATUS AND METHOD FOR EXPERT ANALYSIS OF METAL FAILURE WITH AUTOMATED VISUAL AIDS

Guryinder P. Singh, 9303 Lockridge, San Antonio, Tex. 78250

Continuation of Ser. No. 268,846, Nov. 9, 1988, Pat. No. 4,954,964. This application May 29, 1990, Ser. No. 529,879

The portion of the term of this patent subsequent to Sep. 4, 2007, has been disclaimed.

Int. Cl.⁵ G06F *15/18*

U.S. Cl. 364—513 13 Claims

1. A digital processing system with expert system part failure analysis, said system comprising

a digital data processing device;

data storage means in electrical communication with said digital data processing device;

knowledge base means carried on said data storage means for identifying a possible mode of failure;

input means in electrical communication with said digital data processing device;

output means in electrical communication with said digital data processing device;

visual display means for displaying macroscopic or microscopic views of selected part failures, said visual display means being in electrical communication with said digital data processing device;

expert system means controlling the digital data processing device for requesting and receiving, through the output device, information from a user while displaying at least one of said selected views on the visual display means, said view being associated with at least some of the requests for information;

program means for receiving responses from the user through the input device;

inference engine means for logically correlating said received information with said knowledge base to isolate possible failure modes; and

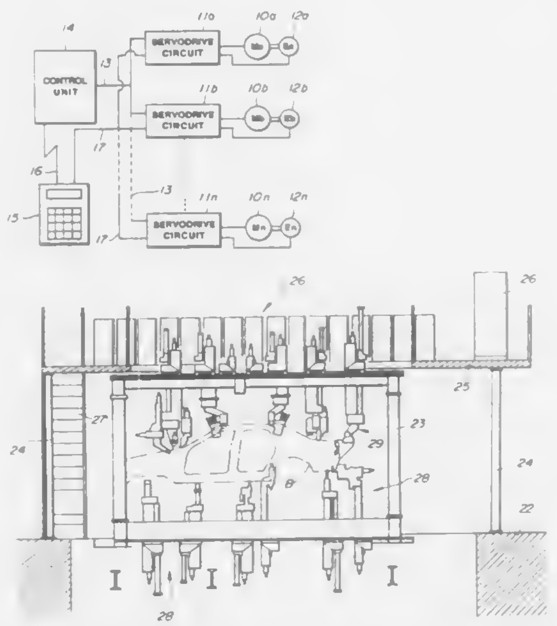
incident file means carried on said storage means for retaining a record of the information requested and received from the user.

5,025,393
TEACHING APPARATUS

Tatsuo Naito, Atsugi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jun. 16, 1989, Ser. No. 366,926
Claims priority, application Japan, Jun. 20, 1988, 63-150061
Int. Cl.⁵ G06F *15/00*

U.S. Cl. 364—513 1 Claim



1. A teaching apparatus for use with at least one manipulator arm for carrying out a plurality of distinct motions to carry and position a work tool for performing a work function, comprising:

a power unit including actuators for powering the respective motions of the manipulator arm;

a control unit, coupled through a first data line to the actuators, for controlling the actuators;

a teach pendant connected through a second data line to the control unit and through a third data line to the actuators, the teach pendant including means for producing a motion command on the second and third data lines, the motion command having digit information specifying a selected one of the distinct motions of the manipulator arm, and means for producing a teach command on the second data line;

the power unit including means, responsive to the motion command fed thereto through the third data line from the teach pendant, for selecting one of the actuators to power the selected motion of the manipulator arm, and means for measuring a value of displacement of the selected actuator;

the control unit including

means, responsive to the motion command fed thereto through the second at a line from the teach pendant, for specifying a memory location accommodated to the digit information of the motion command,

means, responsive to the teach command fed thereto through the second data line from the teach pendant, for transferring the measured displacement value through the first data line from the power unit, and

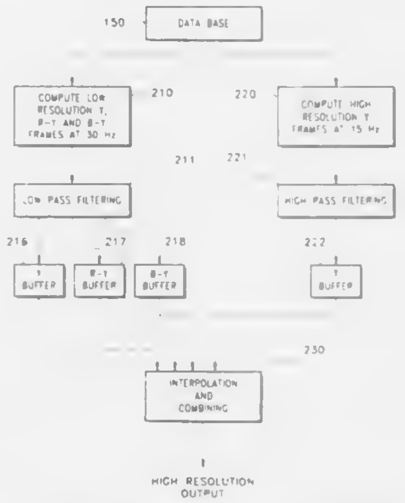
means for storing the transferred displacement value at the specified memory location.

5,025,394
METHOD AND APPARATUS FOR GENERATING ANIMATED IMAGES

Frederic I. Parke, Glen Cove, N.Y., assignor to New York Institute of Technology, Old Westbury, N.Y.

Filed Sep. 9, 1988, Ser. No. 242,434
Int. Cl.⁵ G06F *15/66*

U.S. Cl. 364—518 16 Claims



1. A method for generating electronic representations of animated images from stored image data elements, comprising the steps of:

computing, from said stored image data elements, a first sequence of relatively low resolution frames representing animated images over a given time period and low pass filtering the information in said relatively low resolution frames;

computing, from said stored image data elements, a second sequence of relatively high resolution frames representing said animated images over the given time period and high pass filtering the information in said relatively high resolution frames, the number of frames in said second sequence being less than the number of frames in said first sequence; and

combining corresponding frames of said first and second sequences to obtain output high resolution frames representative of said animated images over said given time period.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,395
DATA PROCESSING SYSTEM CAPABLE OF EXECUTING DATA PROCESSING USING RESOURCES BY DESIGNATING DISPLAYED GRAPHIC PATTERNS REPRESENTING SELECTED RESOURCES

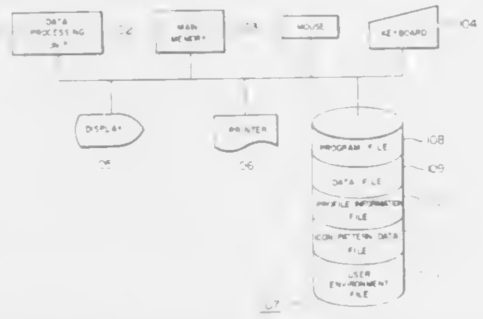
Toshiro Nose, Tokyo; Hisashi Hashimoto, Yokohama, both of Japan, and Masato Manda, West Lebanon, N.H., assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 17, 1987, Ser. No. 15,026

Claims priority, application Japan, Feb. 21, 1986, 61-35152

Int. Cl.^{5} G06F *9/44*

U.S. Cl. 364—518 **13 Claims**



1. In a multi-user data processing system, means for designating resources, which are available for use in data processing, by displaying said resources in the form of graphic patterns and identifying names thereof, comprising:

first file means for storing respective resource identifying information to identify resources in correspondence with respective user identifying information assigned to individual users;

second file means for storing graphic patterns of said resources and identifying names thereof in correspondence with respective resource identifying information for each individual user;

display means including a display screen capable of displaying a plurality of graphic patterns and identifying names thereof:

input means for inputting user identifying information in precedence to execution of data processing;

control means responsive to the inputting of said user identifying information for reading out the resource identifying information corresponding to said inputted user identifying information from said first file means and for reading out specified ones of the graphic patterns and the identifying means thereof from said second file means on the basis of said resource identifying information read out from said first file means to output said read out graphic patterns and identifying names to said display means for display on said display screen; and

designating means for designating selectively one of the plural graphic patterns or identifying names thereof displayed by said display means to identify resources for use in performing data processing.

5,025,396
METHOD AND APPARATUS FOR MERGING A DIGITIZED IMAGE WITH AN ALPHANUMERIC CHARACTER STRING

Carol A. Parks, Monrovia, Md.; Robert E. Probst, Reston, Va.; Doraiswamy Rajagopal, Rockville, and Gary L. Youngs, Gaithersburg, both of Md., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 21, 1989, Ser. No. 326,338

Int. Cl.^{5} G06F *11/10*

U.S. Cl. 364—518 **8 Claims**

7. In a data processing system, an apparatus for storing and retrieving a digitized image of a document having fixed and variable fields, comprising:

first means for inputting to said data processing system, a bit-mapped image of a document which includes a first variable field for first type information;

second means coupled to said first means, for compressing said bit-mapped image in said system and storing the compressed image in said system, accessible using an image file name;

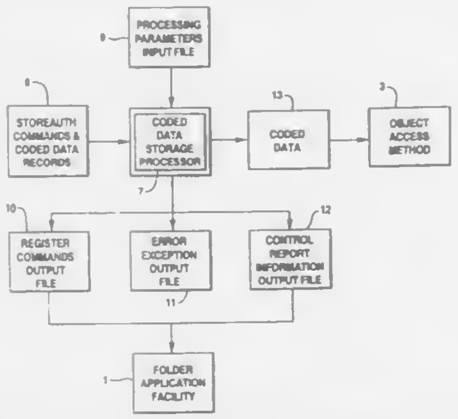
third means for inputting first field location information to said system, identifying a location of said first variable field in said bit-mapped image;

fourth means for inputting to said system a first alphanumeric character string expressing the first type information;

fifth means coupled to said third and fourth means, for assembling in said system a first data set including said first character string, said image file name, and said first field location information and storing the first data set in said system, accessible using a first object file name;

said fourth means inputting to said system a second alphanumeric character string expressing the first type information;

said fifth means assembling in said system a second data set including said second character string, said image file name, and said first field location information and storing the second data set in said system, accessible using a second object file means;


PROCESSING PARAMETERS INPUT FILE
9
6
STOREAUTH COMMANDS & CODED DATA RECORDS
CODED DATA STORAGE PROCESSOR
13
CODED DATA
3
OBJECT ACCESS METHOD
7
10
REGISTER COMMANDS OUTPUT FILE
ERROR EXCEPTION OUTPUT FILE
12
CONTROL REPORT INFORMATION OUTPUT FILE
11
1
FOLDER APPLICATION FACILITY

sixth means for selectively initiating the display of the document with the second character string in said first field by inputting to said system said second object file name to access said second data set;

seventh means coupled to said sixth means, for extracting in said system said image file name from said second data set;

eighth means coupled to said seventh means, for accessing in said system said compressed image using said image file name;

ninth means coupled to said eighth means, for decompressing said compressed image and storing said bit-mapped image in an image buffer in said system;

said seventh means extracting in said system said second alphanumeric character string from said second data set;

tenth means coupled to said seventh means, for converting in said system said second alphanumeric character string to corresponding pel bit shapes of the characters in the second string;

said seventh means extracting in said system said first field location information from said second data set;

eleventh means coupled to said ninth and tenth means, for merging in said system said pel bit shapes with said bit-mapped image in the image buffer, at said first field location, forming a merged image;

twelfth means coupled to said eleventh means, for displaying said merged image from said image buffer on a display device in said system.

5,025,397
LABEL PRINTER

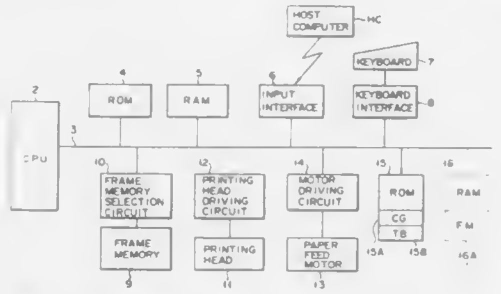
Michio Suzuki, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Aug. 21, 1989, Ser. No. 396,537

Claims priority, application Japan, Aug. 24, 1988, 63-210010; Mar. 6, 1989, 1-53193

Int. Cl.^{5} G06K *15/00*

U.S. Cl. 364—519 **8 Claims**



1. A label printer comprising:

input means for inputting printing data;

memory means for storing items of image data;

printing means for printing labels according to an item of said image data; and

processing means for processing printing data input by said input means, said processing means including means for checking whether said memory means already contains image data corresponding to the input printing data; means for, when it is detected that the memory means does not contain the corresponding image data, creating in said memory means new image data from the input printing data as the corresponding image data and transferring the corresponding image data from said memory means to said printing means; and means for, when it is detected that the memory means contains the corresponding image data, transferring the detected corresponding image data from said memory means to said printing means.

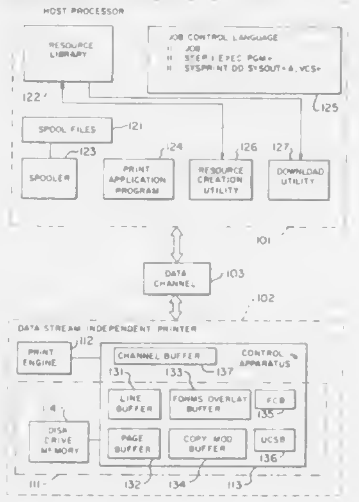
5,025,398
DATA STREAM INDEPENDENT PRINTER

Thomas C. Nelson, Melbourne, Fla., assignor to Storage Technology Corporation, Louisville, Colo.

Filed May 21, 1990, Ser. No. 526,505

Int. Cl.^{5} G60K *15/00*

U.S. Cl. 364—519 **17 Claims**



1. In a nonimpact printer system, an interface for interconnecting said nonimpact printer with a host processor line printer print driver that transmits lien printer setup data and line printer character definition data prior to transmitting line printer print character data comprising:

means for storing said line printer setup and line printer character definition data received from said print driver;

memory means for storing a plurality of character set definitions, forms overlays and copy modifications, each of said character set definitions including a plurality of print character definitions;

means, responsive to said stored line printer character definition data received from said print driver, for translating independent of operator intervention, said line printer character definition data into character set selection data;

means, responsive to said character set selection data, for selecting the one of said character set definitions stored in said memory means corresponding to said stored line printer character definition data;

means for converting said stored line printer setup data into corresponding nonimpact printer control signals; and

means for activating said nonimpact printer to print a print character corresponding to each received print character data along with forms overlays and copy modifications as designated by said line printer setup data.

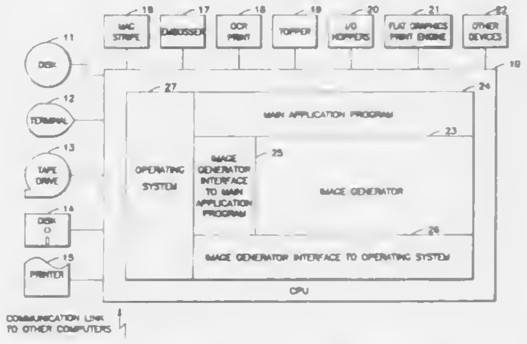
5,025,399
METHOD AND APPARATUS FOR PERSONALIZING PLASTIC CARDS

Richard W. Wendt, Shakopee, and Brian Johnson, St. Louis Park, both of Minn., assignors to DataCard Corporation, Minnetonka, Minn.

Filed Sep. 23, 1988, Ser. No. 248,811

Int. Cl.^{5} G06K *19/06;* **G06F** *15/626*

U.S. Cl. 354—519 **13 Claims**



1. A plastic card personalization system comprised of a computer and a graphics printer connected to the computer for printing a plurality of different types of images on the plastic cards, the card personalization system comprising:

(a) memory storage means for storing a control data stream comprising at least one graphics command;

(b) first control means executing on the computer for reading said graphics commands from the memory storage means;

(c) second control means executing on the computer for interpreting said graphics commands read from said memory storage means, and in response thereto, deciding what graphics images to use and where on the plastic cart the graphics images should be placed;

(d) said graphics commands identified in said control data stream by a command language version code;

(e) said command language version code comprised of a command delimiter code and a single character code which is used throughout the remainder of said graphics commands as a delimiter wherein said delimiter precedes every said graphics command, and further, wherein two

VOL
1127
ISS
3
JE
18
1991
UMI

sequential occurrences of said delimiter signifies an end to said control data stream;

(f) said delimiter followed by at least one graphics command field comprised of a command mnemonic, an operator subfield, and a command value;

(g) said command mnemonic comprising one of a plurality of commands which supply data and commands which specify how and where the graphics images should be placed on the plastic card;

(h) said operator subfield indicating whether said command value is a transient or persistent command value, wherein said transient command value is active only during the interpretation of said command mnemonics for the particular graphics command field in which it appears, and further, wherein said persistent command value is active for all occurrences of said command mnemonics in the present and subsequent graphics command fields until a new command value is assigned to said command mnemonic; and

(i) said command value supplying data for the interpretation and operation of said command mnemonic by said second control means.

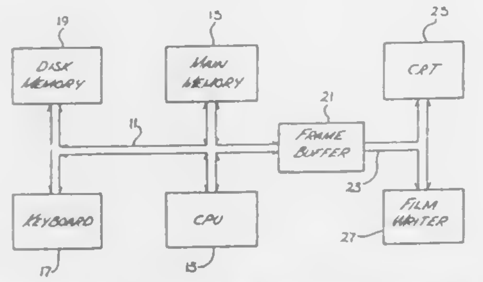
5,025,400
PSEUDO-RANDOM POINT SAMPLING TECHNIQUES IN COMPUTER GRAPHICS

Robert L. Cook, San Anselmo; Thomas K. Porter, Fairfax, and Loren C. Carpenter, Novato, all of Calif., assignors to Pixar, Richmond, Calif.

Continuation of Ser. No. 746,626, Jun. 19, 1985. This application Jun. 21, 1989, Ser. No. 379,503

Int. Cl.^{5} G09G *1/06, 1/16*

U.S. Cl. 364—522 **62 Claims**



1. In a method of forming an electronic signal of a video image frame that individually specifies characteristic information of each pixel of an array of pixels that forms said frame, wherein the characteristic information of each pixel is determined by point sampling, at at least one point within a boundary of each of said pixels, data stored in a computer data base that specifies various parameters relating to an object scene, wherein the improvement comprises:

providing electronic point sampling of at least one of said stored parameters with a pseudo-random distribution of sample points; and

constraining said distribution such that a Fourier transform of said distribution over an infinite extent contains substantially continuous regions.

5,025,401
AUTOMOTIVE MILEAGE CALCULATING APPARATUS

Takahiro Kato, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 28, 1990, Ser. No. 486,703

Claims priority, application Japan, Oct. 17, 1989, 1-268052

Int. Cl.^{5} G01C *21/00;* **G06F** *7/70*

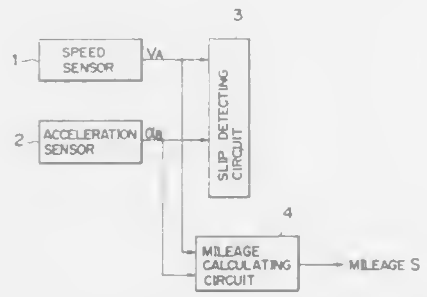
U.S. Cl. 364—561 **6 Claims**

1. An automotive mileage calculating apparatus for calculating the amount of miles travelled by an automobile during a plurality of time intervals comprising:

a vehicle speed sensor for generating a vehicle speed signal according to the running speed of the vehicle;

an acceleration sensor for detecting the acceleration of the vehicle in the direction of travel;

a slip detecting circuit for detecting a wheel slip according to the speed signal from the vehicle speed sensor and the acceleration signal from the acceleration sensor; and



a mileage calculating circuit for calculating the mileage, the mileage calculating circuit computing the mileage by using the speed signal from the vehicle speed sensor during time intervals when no wheel slip has been detected by said slip detecting circuit and, by using the acceleration signal from the acceleration sensor during time intervals when a wheel slip has been detected by said slip detecting means.

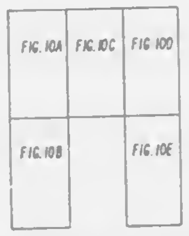
5,025,402
METHOD OF TRANSIENT SIMULATION OF TRANSMISSION LINE NETWORKS USING A CIRCUIT SIMULATOR

Dan Winkelstein, Raleigh, N.C., assignor to Northern Telecom Limited, Montreal, Canada

Filed Apr. 7, 1989, Ser. No. 334,325

Int. Cl.^{5} G06F *15/31*

U.S. Cl. 364—578 **12 Claims**



1. A method of determining expected performance of a transmission line system comprising the steps of:

simulating the transmission line system and termination characteristics with a general purpose circuit simulator, the simulator allowing elements represented by a branch statement to be defined by a subroutine;

determining frequency domain S-parameters of the transmission line system;

calling from the general purpose circuit simulator a subroutine finding a time domain Green's function from the S-parameter;

calling from the general purpose circuit simulator a subroutine performing a circular convolution of voltages and currents at sources in the transmission line system with the Green's function providing a steady state voltage value at each port; and

calling from the general purpose simulator a subroutine convolving the Green's function with present and past port voltages and currents at discrete times to find voltage and current at each port at each discrete time.

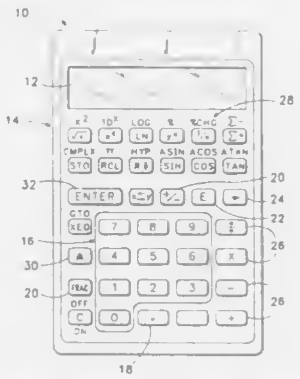
5,025,403
FRACTION ENTRY AND DISPLAY

Bruce A. Stephens, Corvallis, Oreg., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 30, 1989, Ser. No. 429,437

Int. Cl.^{5} G06F *3/02*

U.S. Cl. 364—709.07 **10 Claims**



1. A calculator for operation by a user, the calculator comprising:

a plurality of digit entry keys for activation by the user to input a numeric value, one of said digit entry keys being a primary key;

a display;

means for presenting characters on said display corresponding to user activation of said digit entry keys whereby upon a first activation of said primary key a character corresponding to a decimal point is presented on said display, and upon a second activation of said primary key said character corresponding to a decimal point is removed from said display and a numerator-denominator separation character is presented on said display;

register means for storing a numeric value;

means for receiving a user selected denominator;

calculation means for deriving a whole value and a numerator value using said selected denominator value and said numeric value to represent said numeric value as a fraction value; and

means for presenting said whole value, numerator value, and denominator value as said fraction value on said display.

5,025,404
METHOD OF CORRECTING ERRONEOUS VALUES OF SAMPLES OF AN EQUIDISTANTLY SAMPLED SIGNAL AND DEVICE FOR CARRYING OUT THE METHOD

Augustus J. E. M. Janssen; Raymond N. J. Veldhuis; Hendrik J. Prins, and Lodewijk B. Vries, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 317,115, Feb. 28, 1989, abandoned, which is a continuation of Ser. No. 180,665, Mar. 30, 1988, abandoned, which is a continuation of Ser. No. 20,140, Feb. 25, 1987, abandoned, which is a continuation of Ser. No. 601,817, Apr. 19, 1984, abandoned. This application Nov. 27, 1989, Ser. No. 442,495

Claims priority, application Netherlands, Dec. 7, 1983, 8304214

Int. Cl.^{5} G06F *15/353*

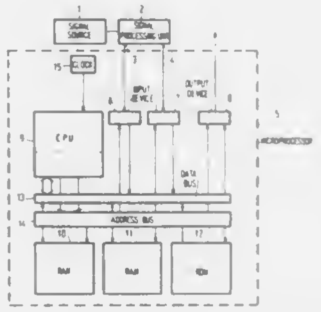
U.S. Cl. 364—723 **33 Claims**

24. An apparatus for correcting by interpolation erroneous values of signal samples of a uniformly sampled signal comprising:

input means for receiving sample values of said sampled signal;

detection means for identifying samples having erroneous values;

computing means for selecting a sampling interval which includes said samples having erroneous values, and for determining from said interval containing said samples having erroneous values a best fitting recursion formula and, for estimating from said recursion formula the correct value for said erroneous values of samples by determining the value of a sample as a weighted sum of the values of a number of preceding samples and their respective coefficients, and an error term.



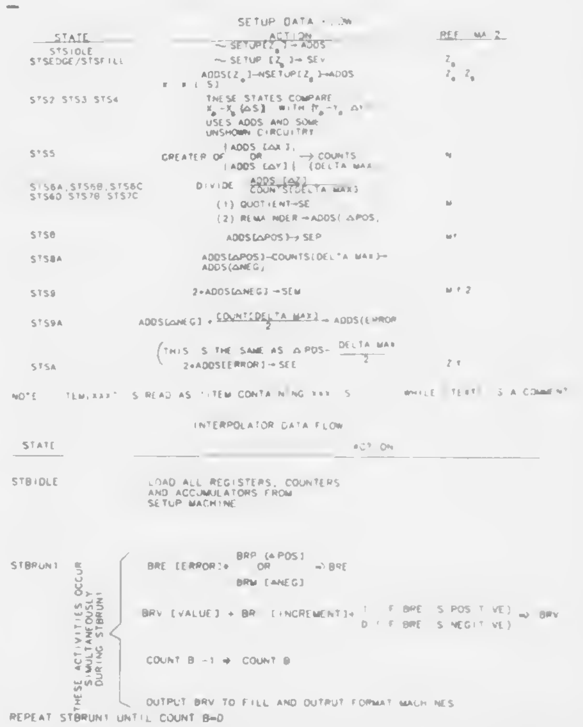
5,025,405
METHOD OF INTERPOLATING PIXEL VALUES

Roger W. Swanson, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 316,568, Feb. 27, 1989, abandoned, which is a continuation of Ser. No. 897,182, Aug. 15, 1986, abandoned. This application Oct. 11, 1989, Ser. No. 421,298

Int. Cl.^{5} G06F *7/38, 15/00;* **G09G** *1/06*

U.S. Cl. 364—723 **7 Claims**


SETUP DATA FLOW
STATE
ACTION
STSIDLE
INTERPOLATOR DATA FLOW
STBIDLE
LOAD ALL REGISTERS, COUNTERS AND ACCUMULATORS FROM SETUP MACHINE
STBRUN
THESE ACTIVITIES OCCUR SIMULTANEOUSLY DURING STBRUN
COUNT B -1 → COUNT B
OUTPUT BRV TO FILL AND OUTPUT FORMAT MACHINES
REPEAT STBRUN UNTIL COUNT B=0

1. A method of producing, from input data, pixels having depth components determined by linearly interpolating the integer values of a dependent variable Z representing pixel ordinal position along a depth axis, Z ranging from a given starting ordinal position of value Zs to a given ending ordinal position of value Ze, the interpolating of Z done as an independent variable Z representing pixel ordinal position along a scan line traverses an ordered sequence of integers starting with a value Xs representing a starting ordinal position along the scan

VOL
1127
ISS
3
JE
18
1991
UMI

line and ending with a value Xe representing an ending ordinal position along the scan line, thus producing a sequence of (X, Z) pairs describing as ordinal positions the physical locations of pixels along the scan line and their associated depths, the method comprising the steps of:

a. finding the ordinal position differences ($Z=Ze-Zs$ and $X=Xe-Xs$;
b. finding an integer quotient Mi and a remainder R by dividing Z by X;
c. multiplying the value of R by two to obtain a scaled fractional part Mf;
d. assigning the initial values Mf− X to a term Zf and Zs to a term Zi;
e. assigning the value Xs to a term X;
f. taking (Xs, Zs) as the first pair in a sequence of (X, Z) pairs, each of which pairs describes the ordinal position along a scan line of a pixel whose ordinal position along a depth axis is Z;
g. replacing the value of X with the next value in the ordered sequence of integers;
h. determining if Zf is greater than or equal to zero;
i. if the outcome in step h is that Zf is greater than or equal to zero then:
  j. adding Mi+1 to Zi; and also
  k. adding Mf−2 X to Zf;
l. if the outcome in step h is that Zf is less than zero, then:
  m. adding Mi to Zi; and also
n. adding Mf to Zf;
o. taking (X, Zi) as the next pair in the sequence of (X, Z) pairs;
p. repeating steps g through o until they have been performed with X equal to Xe;
q. generating a scan line composed of pixels whose ordinal positions thereon and on the depth axis are determined by the sequence of (X, Z) pairs; and
r. illuminating each pixel in the scan line of step q, by an amount ranging from fully on to fully off, the amount determined in accordance with the Z component of that pixel's (X, Z) pair.

5,025,406

ADAPTIVE DIGITAL FILTER FOR MULTI PATH DISTORTION CANCELLATION

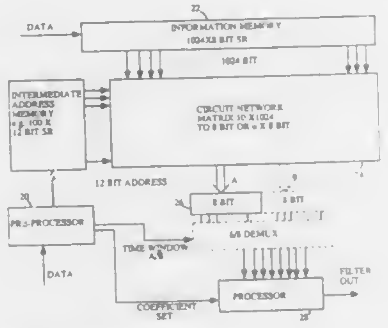
Otto Klank, Lehrte-Arpke, and Dieter Rottmann, Hanover, both of Fed. Rep. of Germany, assignors to Deutsche Thomson-Braudt GmbH, Ullingen-Schweinningen, Fed. Rep. of Germany

Filed Dec. 7, 1989, Ser. No. 447,279

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1988, 3841268

Int. Cl.^{5} G06F *15/31*

U.S. Cl. 364—724.19 10 Claims



1. An adaptive filter comprising:
a source of signal to be filtered;
shift register means for serially loading said signal and providing parallel output samples at parallel output terminals;
matrix means coupled to said parallel output terminals, and responsive to control signals, for providing groups of predetermined ones of said output samples to respective matrix output terminals;
processing means, coupled to said matrix means, for generating as an output signal, sums of products of said ones of said output samples and predetermined coefficients;
preprocessor means, responsive to said source of signal, for generating filter coefficients for each samples provided by said shift register means and providing as said predetermined coefficients only coefficients having values which exceed a predetermined value, and providing control signals corresponding to samples for which coefficients exceed said predetermined value.

5,025,407

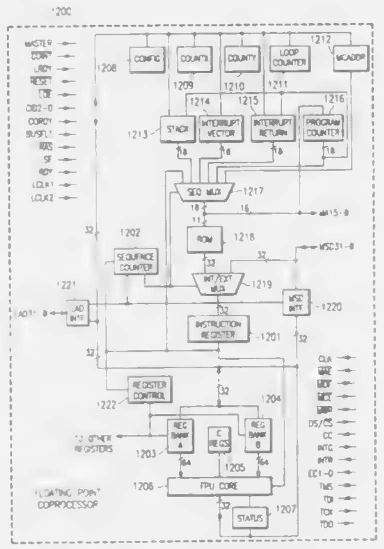
GRAPHICS FLOATING POINT COPROCESSOR HAVING MATRIX CAPABILITIES

David W. Gulley, and Jerry R. Van Aken, both of Sugar Land, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 28, 1989, Ser. No. 387,459

Int. Cl.^{5} G06F *7/52*

U.S. Cl. 364—754 14 Claims



1. A coprocessor comprising:
a bus for communicating data to and from an external source;
a plurality of registers for the acceptance of data from either an internal or an external source via said bus;
a processing unit;
a memory containing coded instructions for controlling said processing unit, said coded instructions operable for moving data in and out of said registers and to and from said bus during the performance of any of said coded instructions; and
a circuit operable in response to institution of a particular set of said coded instructions upon receipt of a single instruction via said bus for providing matrix calculations on data stored in said plurality of registers where certain intermediate results are stored in said registers while other intermediate results remain within said circuit available for subsequent use, thereby reducing the number of storage registers required during any matrix arithmetic operation.

5,025,408

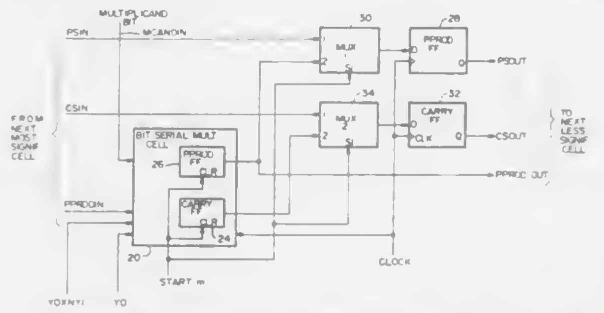
BIT SERIAL MULTIPLIER WITH PARALLEL-IN-SERIAL-OUT CARRY AND PARTIAL PRODUCT SHIFT REGISTERS

David L. Sherman, Fremont, Calif., assignor to Shographics, Inc., Mountain View, Calif.

Filed Jul. 31, 1989, Ser. No. 387,601

Int. Cl.^{5} G06F *7/52*

U.S. Cl. 364—759 8 Claims



1. A bit serial multiplier for pipelined operation comprising:
first means including a plurality of cells and including a plurality of partial product and carry latches for multiplying an N bit multiplier times an M bit multiplicand, where N and M are each any integer, by shifting in the multiplier bits one at a time and multiplying each multiplier bit as said multiplier bit arrives times the multiplicand each bit of which is operated upon in a corresponding cell where each cell generates a partial product bit and a carry bit and stores said partial product and carry bits in corresponding partial product and carry latches for use in the operations on the next multiplier bit to arrive and each cell is coupled to an adjacent cell for shifting out final result bits in serial fashion; and
second means for storing all the partial product bits from said partial product latches in a first shift register, and for storing all the carry bits from said carry latches in a second shift register, said partial product and carry bits being so stored after all N bits of the multiplier have been shifted in, and said second means also for clearing said latches storing said partial product bits and said carry bits after all N of the multiplier bits have been shifted in so as to ready said first means to begin another multiplication with a different multiplier and a different multiplicand, and for combining the stored partial product and carry bits to generate the most significant bits of the final product during the clock cycles used to shift the next multiplier into said first means.

5,025,409

CARRY PROPAGATION CIRCUIT OF PARALLEL-TYPE FULL ADDER

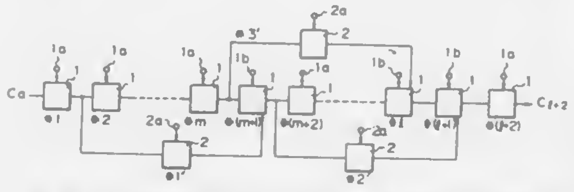
Gensuke Goto, Ebina, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 15, 1989, Ser. No. 366,541

Claims priority, application Japan, Jun. 15, 1988, 63-147821

Int. Cl.^{5} G06F *7/50*

U.S. Cl. 364—786 9 Claims



1. A carry propagation circuit of a parallel-type full adder having a plurality of bits, said carry propagate circuit comprising:
control means for controlling a carry propagation;
a main path including a plurality of transfer circuits having input and output ends and serially connected at corresponding nodes, each said main path transfer circuit being provided for a respective bit of said plurality of bits and transferring a carry signal from a lower bit to a higher bit when said control means brings said main path transfer circuit to an ON state; and
at least one bypass arranged to bypass a predetermined number of said transfer circuits of said main path and each said bypass comprising a transfer circuit having input and output ends, said control means selectively bringing said bypass transfer circuit to an ON state or an OFF state, said output end of said bypass transfer circuit and an output end of a main path transfer circuit corresponding to the highest bit among bits to be bypassed in the main path are coupled to an identical said node and, when said control means brings said bypass transfer circuit to the ON state and propagates a carry signal thereby to the higher bit side, it brings said main path transfer circuit provided immediately in the lower bit side of said main path, as seen from the identical node, to the OFF state and prevents a carry signal from being generated from said OFF state transfer circuit.

5,025,410

COORDINATE READING APPARATUS

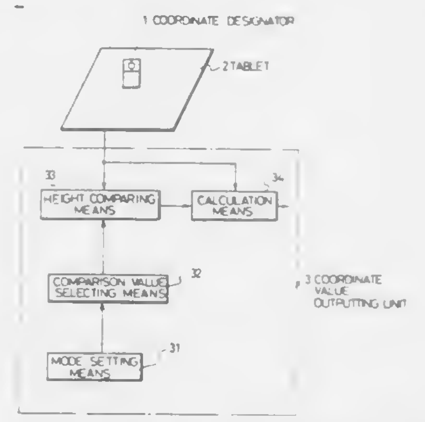
Yoshiyuki Morita, Tokyo, Japan, assignor to Seiko Instruments, Inc., Tokyo, Japan

Filed Aug. 11, 1988, Ser. No. 233,263

Claims priority, application Japan, Aug. 12, 1987, 62-201487

Int. Cl.^{5} G02B *7/14;* G08C *21/00;* G09G *3/00*

U.S. Cl. 364—900 6 Claims



1. A coordinate reading apparatus for inputting coordinate data to a computer and operable in a selected one of a relative coordinate mode and a second mode, said apparatus comprising: a first member constituting a tablet defining a coordinate surface; a second member in the form of a coordinate designator movable across said surface so that a distance exists between said designator and said surface; position signal producing means associated with said members for producing a plurality of induced signals each inversely proportional to the distance between said designator and said surface so that one of the induced signals will have a value greater than the value of each other induced signal so that the value of the one of the induced signals will be a maximum induced signal value relative to the values of all of the induced signals; and coordinate value outputting means connected to said position signal producing means for producing coordinate value output signals representative of the coordinate value of the point designated by said designator, wherein said outputting means comprise:

mode setting means responsive to a setting operation for

VOL
1127
ISS
3
JE
18
1991
UMI

generating a control signal indicative of the relative coordinate mode;

selecting means for producing a first signal representing a predetermined value in the absence of the control signal, and responsive to the control signal for selectively producing, in place of the first signal, a second signal representing a value greater than the predetermined value;

comparator means connected to said position signal producing means and to said selecting means for comparing the maximum induced signal value produced by said position signal producing means with the signal being produced by said selecting means and producing a comparison signal when the maximum induced signal value exceeds the value represented by the signal being produced by said selecting means; and

coordinate value calculating means connected to said position signal producing means and to said comparator means for producing a coordinate value output signal from the induced signal value occurring in the time coincidence with the comparison signal.

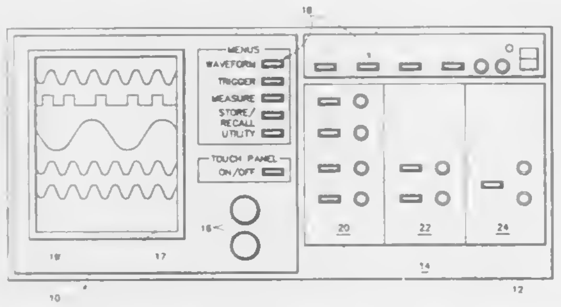
5,025,411
METHOD WHICH PROVIDES DEBOUNCED INPUTS FROM A TOUCH SCREEN PANEL BY WAITING UNTIL EACH X AND Y COORDINATES STOP ALTERING

James L. Tallman, Hillsboro, and Terry G. Sherbeck, Aloha, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Dec. 8, 1986, Ser. No. 939,645

Int. Cl.⁵ G06F *3/037, 3/033;* **G09G** *1/16;* **G06K** *11/06*

U.S. Cl. 364—900 2 Claims



1. For an instrument comprising a computer, means for producing a plurality of output signals, and interface means for storing data indicating the states of said output signals, for transmitting and interrupt signal to said computer whenever the state of any one of said output signals changes, and for transferring said data to said computer, a method for said computer for acquiring and responding to said data, the method comprising the steps of:

a. acquiring said data stored by said interface means upon each receipt of said interrupt signal, and setting the value of a first parameter to represent the state of at least one of said plurality of output signals as indicated by said data;

b. concurrently with performing step a, periodically determining whether the value of said first parameter has remained constant for a predetermined period; and

c. initiating a selected action after the first parameter is determined in step b to have remained constant for said predetermined period, said action being selected according to the value of said first parameter.

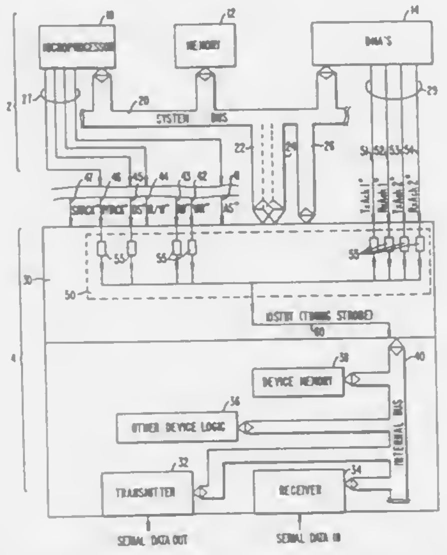
5,025,412
UNIVERSAL BUS INTERFACE

Monte J. Dalrymple, Fremont; Phillip D. Verinsky, San Jose, and Don Smith, Los Gatos, all of Calif., assignors to Zilog, Inc., Campbell, Calif.

Filed Feb. 17, 1988, Ser. No. 157,294

Int. Cl.⁵ G06F *13/36*

U.S. Cl. 364—900 6 Claims



1. A universal bus interface for interfacing a peripheral device via a bus with a current microprocessor system, the current microprocessor system being any one from a predetermined group of microprocessor systems, each microprocessor system in the predetermined group having a set of strobe signals for timing bus transactions, each strobe signal being in either an asserted state or an unasserted state and at any one time at most one strobe signal among the set of strobe signals of the current microprocessor system is being asserted, said bus interface comprising:

a plurality of input means, each corresponding to and responsive to a possible strobe signal among the predetermined group of microprocessor systems, such that those input means not corresponding to and not connecting to the current microprocessor are at the unasserted state, and those input means corresponding to and connecting to receive the strobe signals of the current microprocessor system are driven by the strobe signals according to the states thereof;

a plurality of driver modules, each having an input end adjacent and connected to a corresponding input means, and an output end, each of said driver modules responsive to the state at its input end and the state at its output end for driving the output end (1) to the asserted state when the input end is at the asserted state and the output end is at the unasserted state, (2) to the unasserted state when the input end is at the unasserted state and the output end is at the asserted state, and (3) to an electrically floating state when the input end is at the unasserted state and the output end is at the unasserted state; and

an output means connected to the output ends of the plurality of driver modules for deriving a strobe signal therefrom such that when an asserted state appears at one of the plurality of driver modules, the output means is pulled to the asserted state, whereby the strobe signals of the current microprocessor system received at the input means producing a universal strobe signal at the output means suitable for timing bus transactions or strobing data in a peripheral device without a system clock.

5,025,413
DATA PROCESSING APPARATUS INCLUDING A DELETE FUNCTION

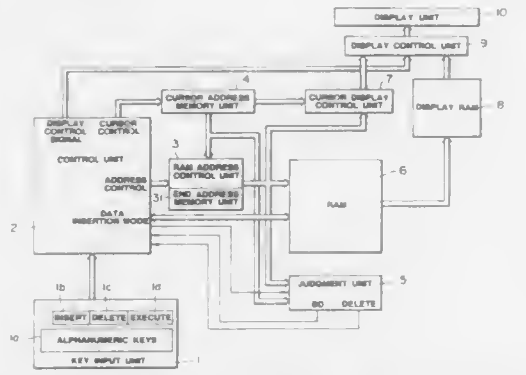
Kohei Genda, and Kazuaki Murai, both of Fussa, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Mar. 3, 1989, Ser. No. 319,142

Claims priority, application Japan, Mar. 8, 1988, 63-29853[U]

Int. Cl.⁵ G06F *3/153*

U.S. Cl. 364—900 6 Claims



1. A data processing apparatus comprising:

data input means for inputting data items to be displayed;

memory means having a plurality of storage areas for storing data items entered by said data input means;

display means having a plurality of display areas for displaying said data items stored in said memory means, each of said display areas displaying a data item stored in a storage area of said memory means;

cursor means including designating means for designating said storage areas of said memory means, and means for displaying a cursor on a display area of said display means which corresponds to said designated storage area;

cursor detecting means for determining which of said storage areas is designated by said cursor means to thereby determine at which display area of said display means said cursor is displayed;

delete-command input means for inputting a delete-command for commanding deletion of a data item displayed on said display means and stored in said memory means; and

deleting means, responsive to the delete-command input from said delete command input means, for deleting one of a data item stored in said storage area designated by said cursor means and a data item stored in said storage area located before said storage area designated by said cursor means, in response to a detecting result obtained by said cursor detecting means indicating the location of said cursor on said display means.

5,025,414
SERIAL BUS INTERFACE CAPABLE OF TRANSFERRING DATA IN DIFFERENT FORMATS

Shinichi Iwamoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 6, 1987, Ser. No. 117,738

Claims priority, application Japan, Nov. 6, 1986, 61-265153

Int. Cl.⁵ G06F *1/00*

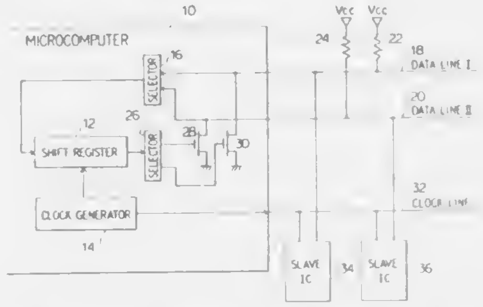
U.S. Cl. 364—900 9 Claims

1. A master processor for use in a serial data transfer system, the master processor being interconnected to at least first and second slave devices through the same single serial clock line, the master processor being interconnected to the first slave device through a first serial data line and the master processor being interconnected to the second slave device through a second serial data line, the master processor comprising:

a shift register commonly receiving and transmitting serial data transferred from and to be transferred through the first and second serial data lines,

a first selector, coupled to a serial input of the shift register, capable of selectively coupling the serial input of the shift register to either one of the first and second serial data lines,

a second selector, coupled to a serial output of the shift register, capable of selectively coupling the serial output of the shift register to either one of the first and second serial data lines, and



a clock generator, coupled to the single serial clock line, capable of generating a clock pulse in at least two different transfer formats which are different from each other in the number of clock pulses to be supplied to the shift register, the clock generator operating to output to the single serial clock line a clock pulse in accordance with a format utilized by one of the first and second serial data lines selected by either the first selector or the second selector.

5,025,415
MEMORY CARD

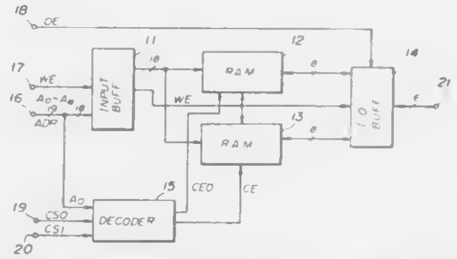
Masaru Masuyama, Sagamihara; Yoshihiro Takemae, Tokyo; Tetsuhiko Endoh, Inagi; Hirosuke Komyoji, Minokamo; Ryuji Tanaka, Kawasaki, and Katsuhiko Itakura, Minokamo, all of Japan, assignors to Fujitsu Limited, Kawasaki and Fujitsu Vlsi Limited, Kasugai, both of Japan

Filed Sep. 25, 1989, Ser. No. 412,077

Claims priority, application Japan, Sep. 28, 1988, 63-242950

Int. Cl.⁵ G11C *5/06*

U.S. Cl. 365—52 11 Claims



1. A memory card for use on a card write and/or read apparatus which has a data bus with an arbitrary bit width and writes and/or reads a datum to and/or from said memory card, said memory card comprising:

data input/output terminal means including data terminal of at least n×N bits;

memory means including a data bus, first memory means for storing data having a bit width n and second memory means for storing data having a bit width n, said data bus of said memory means including n×N bus lines and being connected to said data terminals, said first memory means having n data terminals which are connected to n bus lines out of the n×N bus lines, said second memory means having n data terminals which are connected to other n bus lines out of the n×N bus lines;

address input terminal means for receiving an address signal having a plurality of bits;

first input terminal means for receiving a first chip select

VOL
1127
ISS
3
JE
18
1991
UMI

signal for selecting one of said first and second memory means;

second input terminal means for receiving a second chip select signal for selecting one of said first and second memory means; and

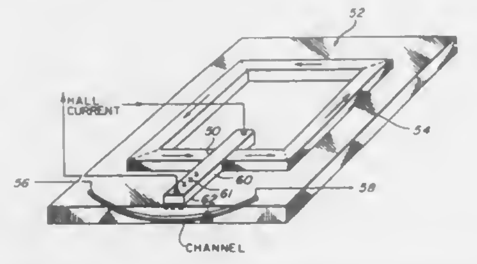
decoder means for determining a bit width of the data bus of said memory means to be used for data communication between the card write and/or read apparatus to one of n bits and n/N bits based on the first and second chip select signals and at least one bit of the address signal by supplying a first control signal to said first memory means and a second control signal to said second memory means, where n, N and n/N are positive integers,

said first and second memory means being disabled and having a high impedance output when said first and second chip select signals have a first bit pattern, without regard to a logic value of said one bit of said address signal,

said first and second memory means being enabled to output (n×N)-bit data to the data bus of said memory means when said first and second chip select signals have a second bit pattern, without regard to said logic value of said one bit of said address signal,

one of said first and second memory means, corresponding to said logic value of said one bit of said address signal, being enabled to output an n-bit data to the data bus of said memory means and the other being disabled and having a high impedance output when said first and second chip select signals have a third bit pattern.

5,025,416
THIN FILM MAGNETIC MEMORY ELEMENTS
Gary A. Prinz, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Jun. 1, 1989, Ser. No. 360,173
Int. Cl.^{5} G11C *11/14*
U.S. Cl. 365—170 16 Claims

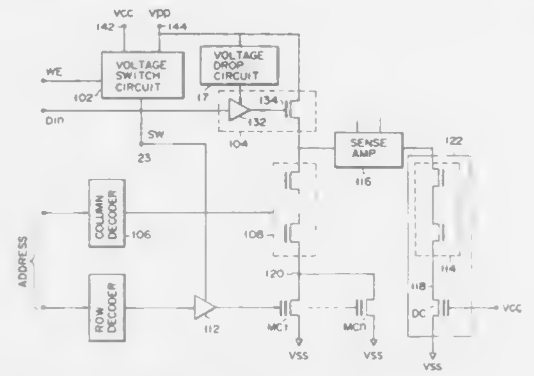


1. A thin film magnetic memory element, comprising:

a single crystal substrate; and

a closure domain on top of said substrate, wherein said closure domain is a single crystal magnetic film which is lattice-matched to said substrate, said closure domain includes a plurality of legs, with each of said legs being oriented along an easy axis of said single crystal magnetic film with said legs joining at domain walls.

5,025,417
SEMICONDUCTOR MEMORY DEVICE CAPABLE OF PREVENTING DATA OF NON-SELECTED MEMORY CELL FROM BEING DEGRADED
Junichi Miyamoto; Nobuaki Ohtsuka, both of Yokohama; Kuniyoshi Yoshikawa, and Seiichi Mori, both of Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Dec. 4, 1989, Ser. No. 444,998
Claims priority, application Japan, Jan. 13, 1989, 1-6213
Int. Cl.^{5} G11C *11/40, 13/00*
U.S. Cl. 365—189.09 13 Claims



1. A semiconductor memory device comprising:

a memory cell constructed by a MOS transistor having a floating gate, a control gate and a drain, for storing data;

power source switching means for selectively supplying as a power source potential one of first and second power source potentials in accordance with an input write-in control signal;

a gate potential control circuit for generating a first output in accordance with the power source potential from said power source switching means and supplying a first output to said control gate of said memory cell;

drain potential control means for generating a second output in accordance with a lowered potential supplied thereto and outputting the second output to said drain of said memory cell; and

power source potential lowering means for lowering the second power source potential by a preset value to obtain the lowered potential and supplying the lowered potential to said drain potential control means.

5,025,418
SEMICONDUCTOR DEVICE FOR PERFORMING AUTOMATIC REPLACEMENT OF DEFECTIVE CELLS
Syoichi Asoh, Oita, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jan. 23, 1990, Ser. No. 468,880
Claims priority, application Japan, Feb. 2, 1989, 1-24548
Int. Cl.^{5} G11C *8/00*
U.S. Cl. 365—200 8 Claims

1. A semiconductor device comprising:

main storage means for storing data;

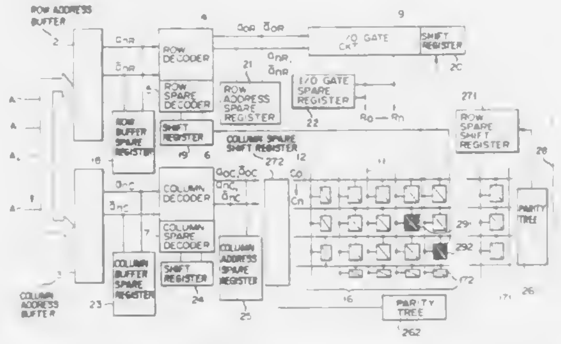
spare storage means disposed in association with said main storage means so as to serve as a redundancy circuit for replacing a defective element of said main storage means;

temporary storage means disposed in association with said main storage means to store said data temporarily;

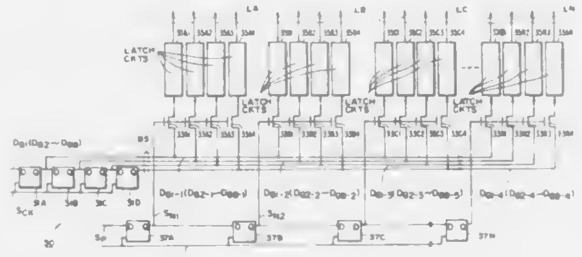
comparing means for comparing the data stored in said main storage means with the data stored in said temporary storage means to output a comparison result; and

switching means coupled to said main storage means and

said spare storage means and responsive to the comparison result output from said comparing means for replacing the defective element of said main storage means with said spare storage means.



5,025,419
INPUT/OUTPUT CIRCUIT
Yoichi Nishino, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Mar. 30, 1989, Ser. No. 331,275
Claims priority, application Japan, Mar. 31, 1988, 63-079558; Jul. 25, 1988, 63-185995
Int. Cl.^{5} G11C *19/00;* H03K *17/56;* G06M *1/22;* H02H *3/20*
U.S. Cl. 365—221 7 Claims



1. An input/output circuit comprising:

a first data line including a plural number of first unit data lines;

a second data line including plural sets of second unit data lines, each set of second unit data lines being formed of an equal number of lines as the number of first unit data lines forming the first data line;

switch means for selectively coupling the first unit data lines with corresponding ones of the second unit data lines;

latch circuits provided between the switch means and the second data line; and

control means for controlling the switch means to turn on, such that at least one set of the second unit data lines of the second data line is sequentially coupled with the first data line.

5,025,420
PORTABLE SEMICONDUCTOR MEMORY DEVICE
Masatoshi Kimura, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan
Filed Jan. 16, 1990, Ser. No. 465,497
Claims priority, application Japan, Nov. 2, 1989, 1-284855
Int. Cl.^{5} G11C *11/40*
U.S. Cl. 365—230.01 4 Claims

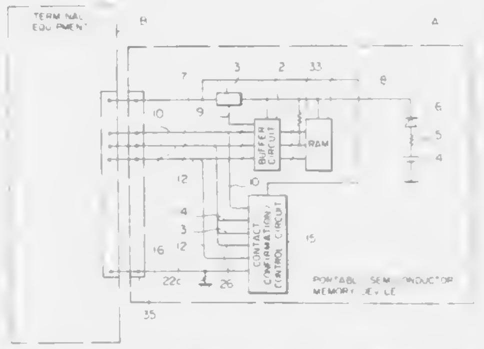
1. A portable semiconductor memory device comprising:

an internal memory for storing data;

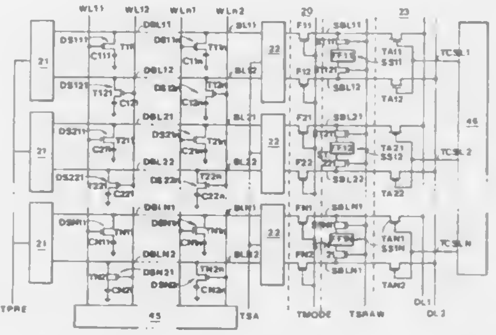
an address bus, a control bus, and a data bus which are connected to said internal memory;

a connector for electrically connecting said address bus, said control bus, and said data bus to terminal equipment; and

a contact confirmation/control circuit connected to said address bus, said control bus, and said data bus and storing at least one known digital data word for outputting the known digital data word to said data bus when a read control signal input to said contact confirmation/control circuit from the terminal equipment over said control bus with a given address specified on said address bus is received, thereby indicating proper connection of said connector to the terminal equipment and for not outputting the known data word to said data bus when a read control signal is input from the terminal equipment over said control bus with a given address is specified on said address bus but is not received, thereby indicating trouble in the connection of said connector to the terminal equipment.


TERMINAL EQUIPMENT
BUFFER CIRCUIT
RAM
CONTACT CONFIRMATION CONTROL CIRCUIT
PORTABLE SEMICONDUCTOR MEMORY DEVICE

5,025,421
SINGLE PORT DUAL RAM
Gyung Y. Cho, Dong-A Apt. 25-1403, Bupyung 1-Dong, Buk-Ku, Inchon, Rep. of Korea
Filed Jan. 2, 1990, Ser. No. 459,887
Claims priority, application Rep. of Korea, Jan. 9, 1989, 89175
Int. Cl.^{5} G11C *13/00*
U.S. Cl. 365—230.05 9 Claims



1. In a semiconductor memory device comprising one or more than one storage array, each of said storage array(s) including a plurality of bit lines, and an input/output port connected to said plurality of bit lines by gate means for access to said storage array, wherein each of said bit lines comprising:

one or more than one DRAM bit line, each of said DRAM bit line(s), including a plurality of dynamic type storage elements, each of said dynamic type storage elements having a storage capacitor means for storing data in a binary state;

a SRAM bit line including one or more than one static type storage element, each of said static type storage element(s) having a storage flip flop means for storing data in a binary state; and

an interface means for electrically interconnecting one of

VOL
1127
ISS
3
JE
18
1991
UMI

said DRAM bit line(s) to said SRAM bit line or isolating said DRAM bit line(s) from said SRAM bit line.

5,025,422
SEMICONDUCTOR MEMORY DEVICE

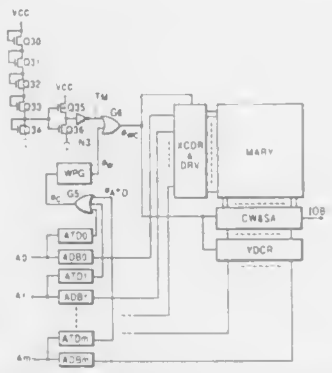
Nobuyuki Moriwaki, Kodaira; Mitsuhiro Higuchi, Koganei, and Mitsuhiro Toshita, Kodaira, all of Japan, assignors to Hitachi, Ltd. and Hitachi VLSI Engineering Corp., both of Tokyo, Japan

Filed Oct. 10, 1989, Ser. No. 419,311

Claims priority, application Japan, Oct. 7, 1988, 63-253147

Int. Cl.^{5} G11C *7/00*

U.S. Cl. 365—233.5 24 Claims



1. A semiconductor memory device comprising:
a plurality of memory cells each respectively coupled to a word line and to a pair of data lines;
read means selectively coupled to said pair of data lines through a switching means for amplifying data from said memory cells;
address transition detecting means for outputting a pulse signal in response to changes in an address signal applied to said semiconductor memory device;
pulse generating means for outputting a first control signal having a predetermined pulse width in response to said pulse signal;
operation mode detection means for detecting a predetermined operation mode in accordance with a voltage level of a predetermined external terminal and for outputting a second control signal when said predetermined operation mode is detected;
control means for receiving said first control signal and said second control signal, wherein said control means includes means for outputting a third control signal; and
first selection means coupled to receive said third control signal and said address signal for selecting a predetermined word line in accordance with said address signal and for activating the selected word line in response to said third control signal,
wherein said outputting means of said control means outputs said third control signal having a predetermined pulse width in response to said first control signal when said operation mode detection means does not detect said predetermined operation mode, and outputs the third control signal in response to said second control signal so that the third control signal is outputted for a period of time longer than said predetermined pulse width when said operation mode detection means detects said predetermined operation mode.

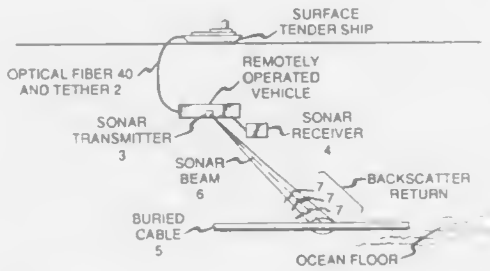
5,025,423
ENHANCED BOTTOM SONAR SYSTEM

Ronald L. Earp, Burlington, N.C., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 21, 1989, Ser. No. 454,081

Int. Cl.^{5} G01S *15/00*

U.S. Cl. 367—137 26 Claims



1. A system for identifying objects, comprising:
means for transmitting toward a target a first signal comprising a succession of bursts of selected different frequencies;
means for receiving the target backscatter energy created by each successive individual frequency burst of said first signal;
means for collecting as data points over the range of frequencies used, each backscatter signal amplitude value and the associated burst frequency;
a reference library of data point sets, each set predetermined to be representative of the backscatter energy of a particular object when impinged by said first signal; and
means for determining which set of predetermined reference data points is most closely matched to said collected data points.

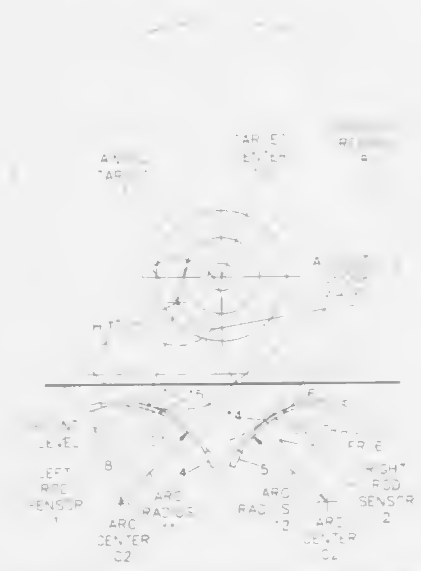
5,025,424
SHOCK WAVE SCORING APPARATUS EMPLOYING CURVED ROD SENSORS

George W. Rohrbaugh, Rte. 1, Box 454, Alexandria, Pa. 16611

Filed May 21, 1990, Ser. No. 527,057

Int. Cl.^{5} G01S *3/80*

U.S. Cl. 367—127 6 Claims



1. An automatic target scoring apparatus for use with moving targets responsive to the airborne first acoustic shock wave of a supersonic projectile for determining the "hit" location at which the projectile passed through the predetermined target area of the moving target, comprising in combination:

an array comprised of two acoustical projectile detection devices, each comprising a first and a second curved acoustic energy translation rod, each translation rod positioned adjacent to the path of said moving target and adapted to intercept said first acoustic shock wave of said supersonic projectile and to transmit through said translation rod a secondary acoustic shock wave, each first and second curved acoustical energy translation device being responsive to an acoustical scoring region in the path of said moving target;
acoustic transducers mounted one on each end portion of each of said curved acoustic energy translation rods in said array, each transducer being respectively responsive to the said secondary acoustic shock waves in said translation rods to produce an electrical output signal, said electrical output signal of each pair of said acoustic transducers having a timed relationship of the difference in arrival times of the said secondary acoustic shock wave at the respective acoustic transducers;
independent electrical circuit means coupled to each pair of said transducers positioned upon said first and said second curved acoustic energy translation rods said circuit being responsive to the electrical signals of the said transducers and providing an output signal which is the measure of the difference in arrival times of said secondary acoustic shock wave through each energy translation rod;
computer means coupled to each electrical circuit means to receive the said time difference of arrival signals produced by each of said acoustic energy translation rods whereby the position of the said supersonic projectile passing through said target area is calculated as the intercept of two straight lines where the first straight line is defined as passing through two points where the first point is the tangent point of contact between said airborne first acoustic shock wave and the first energy translation rod and the second point is the center of curvature point for said first energy translation rod, and the second straight line is defined as passing through two additional points where the first point is the tangent point of contact between said airborne first acoustic shock wave and the second energy translation rod and the second point is the center of curvature point for said second energy translation rod, both rods being in a row to be struck by said airborne acoustic shock wave;
a display means connected to said computer means adapted to represent the "hit" position determined by said computer.

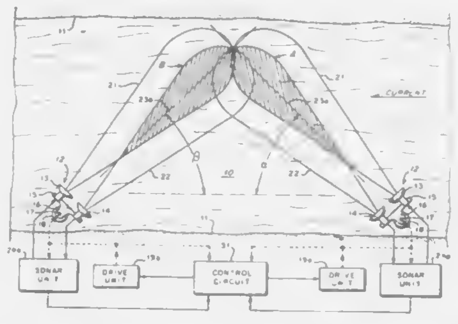
5,025,425
SONIC DETECTION AND TRACKING SYSTEM

Henry Suter, Hatboro, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 30, 1970, Ser. No. 43,616

Int. Cl.^{5} G01S *15/00*

U.S. Cl. 367—96 5 Claims



1. An object detection system for a desired surveillance region, comprising:
first and second scanning arrays spatially disposed along a first boundary and pivotal in a plane within the surveillance region, each array including a transmitter for generating respective first and second finite beams defining second and third boundaries of the surveillance region and a receiver for accepting the respective reflected signals, said arrays being positioned such that the beams can overlap intermediate said arrays and laterally displaced from the first boundary;
first and second threshold means connected respectively to said first and second arrays receiving the outputs of said receivers for providing first and second alarm output signals when an object is present within said first or second beam respectively;
first and second control means respectively connected to said first and second threshold means for producing a first control signal output when an object is present within said second beam and absent within said first beam, and a second control signal output when an object is present within said first beam and absent within said second beam; and
first and second drive means operatively connected between said first and second control means and said first and second arrays respectively for rotating said first array in the presence of the first control signal and said second array in the presence of the second control signal.

5,025,426
REMINDER APPARATUS

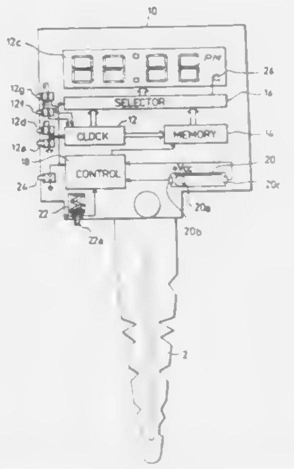
Shlomo Blumberg, and Avraham Olti, both of Carmiel, Israel, assignors to Y. M. Shoval Ltd., Haifa, Israel

Filed Jun. 29, 1990, Ser. No. 545,804

Claims priority, application Israel, Nov. 18, 1987, 84520

Int. Cl.^{5} G04B *47/00;* **E05B** *39/04*

U.S. Cl. 368—10 17 Claims



1. Reminder apparatus to be carried by a user with a key to remind the user as to the last operation in which the key was used with respect to a lock, comprising:
a real time clock for measuring time;
an operation sensor for sensing the time of the last key operation in which the key was used with respect to the lock;
a memory for storing the time of the last key operation as sensed by the sensor;
a display;
a manually-operable member; and
a control circuit effective, upon manual operation of said latter member, to display in said display the time of the last key operation as stored in said memory.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,427

ELECTRONIC DISPLAY DEVICE FOR DISPLAYING CALENDAR INFORMATION

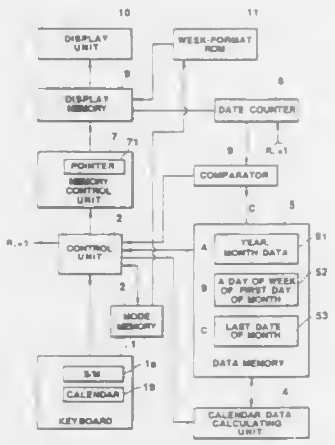
Yuji Kuriyama, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 24, 1990, Ser. No. 513,567

Claims priority, application Japan, Apr. 28, 1989, 1-49707[U]

Int. Cl.^{5} G04B *19/24*

U.S. Cl. 368—29 **13 Claims**



1. An electronic device comprising:

display means, having a display screen, for displaying calendar information about at least one month, said display screen including a first display section arranged to display days-of-week information and a second display section, arranged to display date information about a month, having a plurality of display lines, each line having seven display areas;

input means for inputting "year" and "month" data;

calculating means for calculating calendar information base on "year" and "month" data inputted from said input means;

designating means for variably designating a calendar display format defining an arrangement of days of the week; and

control means for controlling said display means to display the calendar information according to the display format designated by said designating means, including means for displaying the days-of-week information on said first display section and means for entering date information into said display areas of said second display section in a manner corresponding to the displayed day-of-week information.

5,025,428

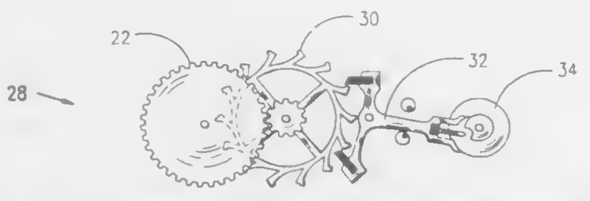
ELECTROMAGNETIC ESCAPEMENT FOR MECHANICALLY DRIVEN WATCH OR CLOCK

Wit Jarochowski, 14603 S. Xenophon Ave., Glenpool, Okla. 74033

Filed Dec. 17, 1990, Ser. No. 628,102

Int. Cl.^{5} G04B *15/00;* G04F *1/00*

U.S. Cl. 368—126 **4 Claims**



1. A clock, watch or other timing device which comprises: mechanical energy generator means supplying a driving force; rotatable rotor means engaged with said driving force resulting in rotational force in a radial direction on said rotor;

magnetically permeable stator surrounding said rotor means;

a permanent magnet within said rotor means, said permanent magnet supplying an attractive force on said stator at least as strong as said rotational force to retain or lock said rotor in said position; and

electromagnetic means to periodically induce a magnetic field in said stator to provide a rotational force in said rotor means in the direction of said mechanical generator driving force sufficient to overcome said permanent magnetic force and allow said rotor means to rotate, whereby rotation of said rotor means will be regulated.

5,025,429

ELECTRIC POWER SUPPLY DEVICE FOR HAND WITH LOAD

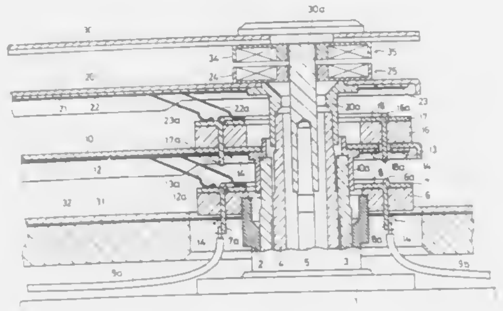
Isato Watanabe, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Dec. 29, 1989, Ser. No. 458,917

Claims priority, application Japan, Dec. 29, 1988, 63-331196

Int. Cl.^{5} G04B *19/02*

U.S. Cl. 368—238 **15 Claims**



1. In a timepiece having hour, minute and second hands each having a drivable load, an electric power supply device comprising:

a fixed contact receiver disposed below the hour hand and having two fixed annular conductors on the upper side of the fixed contact receiver concentrically with the center of rotation of the hands,

a contact receiver secured on the upper side of the hour hand and having two other annular conductors on the upper side of the contact receiver concentrically with the center of rotation of the hands,

a pair of first contact members for supplying electric drive power to the load mounted on the hour hand, the first contact members being disposed on the under side of the hour hand and having respective contact segments slidable on each of the fixed annular conductors,

a pair of second contact members for supplying electric drive power to the load mounted on the under side of the minute hand and having respective contact segments slidable on each of the other annular conductors,

a first coil mounted on the under side of the second hand concentrically with the center of rotation of the hands, and

a second coil mounted on the upper side of the minute hand opposite and close to the first coil,

wherein the fixed annular conductors are supplied with electric power from an external power supply, the other annular conductors are connected electrically with the pair of first contact members, the second coil is connected electrically with the pair of second contact members and the first coil is connected electrically with the load on the second hand.

5,025,430

MAGNETO-OPTIC RECORDING AND REPRODUCING APPARATUS INCLUDING A MULTIPLE LAYER RECORDING MEDIUM HAVING A PREMAGNETIZED BIAS LAYER REPLACING AN EXTERNAL BIAS MAGNETIC

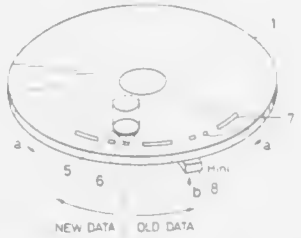
Michihiro Takokoro; Kazuo Okada, and Hitoshi Imai, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 31, 1988, Ser. No. 176,152

Claims priority, application Japan, Apr. 3, 1987, 62-83392

Int. Cl.^{5} G11B *13/04*

U.S. Cl. 369—13 **10 Claims**



1. A magneto-optic recording and reproducing apparatus comprising:

a magneto-optic information carrying medium comprising:

a substrate layer for facing a laser beam to be incident thereon for recording or reproducing information on said medium;

a first magnetic layer adjacent said substrate layer;

a second magnetic layer adjacent said first layer;

a third magnetic layer adjacent said second layer, said third magnetic layer being premagnetized in a predetermined uniform direction substantially parallel to said incident laser beam;

said first, second, and third magnetic layers having Curie temperatures designated Tc1, Tc2 and Tc3, respectively, and coercive forces Hc1, Hc2 and Hc3, respectively;

the Curie temperatures of said layers satisfying the relationship $Tc1 < Tc2 < Tc3$;

the coercive forces of said layers satisfying at least one of the relationships

$Hc1 > Hc3 > Hc2$, or

$Hc1 > Hc2$ and $Hc3 > Hc2$;

magnetizing means for generating a magnetic field designated Hini in a direction opposite to said predetermined uniform direction of said third magnetic layer, for controlling the magnetization of the second magnetic layer at room temperature and wherein the intensity Hini of said magnetizing means is related to the coercive forces of said magnetic layers by the expressions:

$Hini < Hc1$, $Hini > Hc2$, and $Hini < Hc3$;

controlling means for controlling said laser beam so that said laser beam can be at one of first, second and third intensities, said first intensity for causing the magnetization on said first, second, and third magnetic layers to remain in previous states and not be affected by rises in temperature in said layers caused by said laser beam, said second intensity for causing the magnetization of the first magnetic layer to be erased by causing the temperature in said first magnetic layer to exceed the Curie temperature Tc1 of the first magnetic layer, but not causing the temperature in said second and third magnetic layers to exceed their respective Curie temperatures, Tc2 and Tc3, so as not to affect the magnetizations of said second and third magnetic layers, and said third intensity for causing the magnetizations of said first and second layers to be erased by causing the temperatures in said first and second magnetic layers to exceed their respective Curie temperatures, Tc1 and Tc2, but not to exceed the Curie temperature Tc3 of said third layer so as not to affect the magnetization of said third layer.

5,025,431

AUTOCHANGER OF WRITABLE DISCS

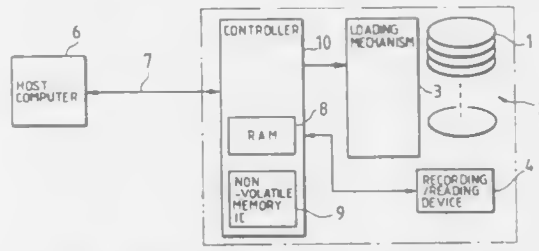
Ryuichi Naito, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sep. 14, 1988, Ser. No. 243,960

Claims priority, application Japan, Sep. 14, 1987, 62-230196

Int. Cl.^{5} G06F *9/46;* G11B *7/00*

U.S. Cl. 369—36 **7 Claims**



1. An autochanger of writable discs, comprising:

a plurality of writable discs for storing data, wherein each of said writable discs has user areas for storing said data, replacement areas for storing said data upon the occurrence of a defective sector in said user area, and map areas for storing defect management information;

a disc accommodation unit for accommodating, in order, said plurality of discs;

recording/reading device for recording said data into said writable disc and reading recorded data from said writable disc by accessing prescribed addresses of said writable disc while avoiding defective areas of said writable disc by referencing latest defect management information;

a loading mechanism for automatically transferring said writable disc between said disc accommodation unit and said recording/reading device;

a controller for controlling said loading mechanism, said recording/reading device, and erasable non-volatile memory means; and

said erasable non-volatile memory means for storing address information of sectors storing said latest defect management information, said stored address information being renewed when a new defective sector is found.

5,025,432

AUTOCHANGER OF WRITABLE DISCS INCLUDING A NON-VOLATILE MEMORY FOR STORING MOST RECENT DEFECT MANAGEMENT INFORMATION RELATING TO THE WRITABLE DISCS

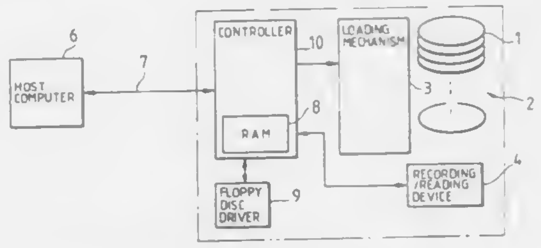
Ryuichi Naito, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sep. 14, 1988, Ser. No. 243,961

Claims priority, application Japan, Sep. 14, 1987, 62-230195

Int. Cl.^{5} G11B *17/22*

U.S. Cl. 369—36 **8 Claims**



1. An autochanger of writable discs, comprising:

a plurality of writable discs for storing data, wherein each of

VOL
1127
ISS.
3
JE
18
1991
UMI

said writable discs has user areas for storing said data, replacement areas for storing said data in place of a defective sector in said user area, and map areas for storing defect management information, said defect management information including addresses of defective sectors in said writable disc and addresses of replacement sectors corresponding to said defective sectors;

a disc accommodation unit for accommodating, in order, said plurality of discs;

a recording/reading device for recording said data into one of said writable discs which is currently in said recording/reading device and reading recorded data from said writable disc by accessing prescribed addresses of said writable disc while referring to latest defect management information stored in a memory;

a loading mechanism for automatically transferring said writing discs between said disc accommodation unit and said recording/reading device;

erasable non-volatile memory means, different from said writable discs and said memory, for non-volatile storage of said latest defect management information of each of said plurality of writable discs, said stored latest defect management information being renewed when a new defective sector is found; and

a controller for controlling said loading mechanism, said recording/reading device, and said erasable non-volatile memory means, said controller including said memory in which said latest defect management information referred to by said recording/reading device is stored;

wherein latest defect management information stored in said erasable non-volatile memory means corresponding to said writable disc currently in said recording/reading device is stored in said memory of said controller while said corresponding writable disc is in said recording/reading device.

5,025,433
ELECTRO-OPTICAL DEVICE

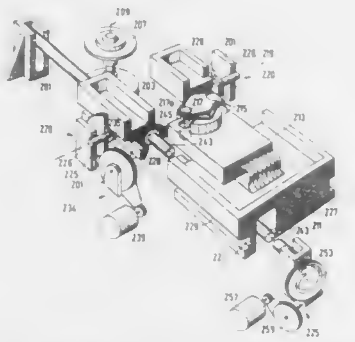
Omar P. L. P. Van Heusden, and Jozef H. M. R. Verheyen, both of Hasselt, Belgium, assignors to U. S. Philips Corporation, New York, N.Y.

Filed Jan. 27, 1989, Ser. No. 303,601

Claims priority, application Netherlands, Feb. 16, 1988, 8800373

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—44.14 **10 Claims**



1. An electro-optical device for recording and/or reading information in an information plane in an optical record carrier by means of a radiation beam, comprising

a frame carrying a turntable which is rotatable about an axis of rotation,

an optical unit which comprises an objective having an optical axis and which is arranged on a slide which is pivotable about a pivotal axis which is stationary relative to the frame to focus the radiation beam so as to form a radiation spot in the information plane, the pivotal axis extending at least substantially transversely of the plane defined by the optical axis and the axis of rotation,

a slide supporting arrangement and a slide-drive arrangement for moving the objective radially of the turntable between a first position situated near the turntable and a second position which is more remote thereof, and

means for tilting the slide, characterized in that the slide is supported directly in the frame, the slide-supporting arrangement enabling the slide to be moved in a radial direction and to be tilted about said pivotal axis.

5,025,434
TRACKING SERVO APPARATUS OF DISK PLAYER

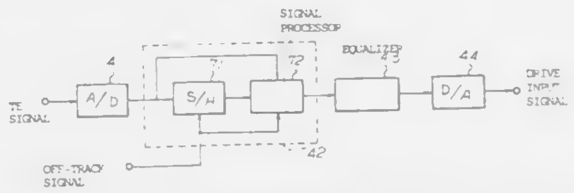
Kiyoshi Tateishi; Haruyasu Sakata; Yuji Tawaragi; Masanori Suzuki, and Takayuki Ohie, all of Tokorozawa, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 8, 1989, Ser. No. 363,134

Claims priority, application Japan, Jun. 17, 1988, 63-149785; Oct. 20, 1988, 63-264961

Int. Cl.^{5} G11B *7/09*

U.S. Cl. 369—44.36 **6 Claims**



1. A tracking servo apparatus having tracking error signal generating means for generating a tracking error signal according to a deviation amount of an information reading spot of a pickup from a recording track in a radial direction of an information recording disk and driving means for driving said information reading spot in the disk radial direction so as to suppress the deviation between the information reading spot and the recording track on the basis of said tracking error signal, the tracking servo apparatus further comprising:

off-track detecting means for detecting whether the information reading spot impinges on the recording track and for generating an off-track signal indicative of a state in which the information reading spot is not on the recording track; and

level control means for increasing an amplitude of the tracking error signal in response to the off-track signal wherein said level control means has holding means for holding a level of said tracking error signal at the instant of time that the off-track signal is generated and outputs the level held in said holding means in response to the off-track signal.

5,025,435
APPARATUS FOR READING OR WRITING CONTRAST ENHANCED INFORMATION OPTICAL RECORD CARRIER

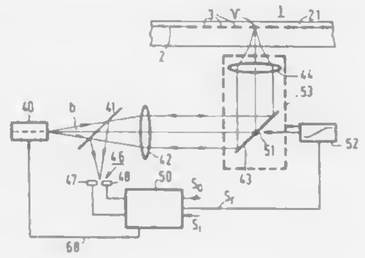
Aartje W. Veenis, and Winslow M. Mimnagh, both of Eindhoven, Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.

Division of Ser. No. 191,505, May 9, 1988, Pat. No. 4,949,332. This application Jul. 18, 1990, Ser. No. 554,604

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—48 **4 Claims**

1. Apparatus for reading and/or writing information in a pattern of optically detectable information areas in a record carrier, the apparatus comprising scanning means for scanning a track using a radiation beam, opto-electrical conversion means for converting radiation from the track into an electrical signal, a signal processing circuit for deriving an information signal from the electric signal indicative of the information recorded in the scanned track, means for deriving a track-width signal from the electric signal, and means for setting the signal processing circuit in response to the derived track-width indication signal.



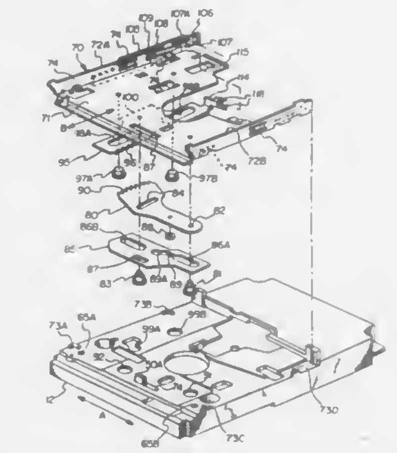
5,025,436
DISK CARTRIDGE POSITIONING MECHANISM FOR AN INFORMATION STORAGE DISK DRIVE SYSTEM

Ronald A. Crain, San Jose; James D. Harney, Mountainview, both of Calif., and James R. Carey, Rochester, N.Y., assignors to Literal Corporation, Colorado Springs, Colo.

Filed Dec. 20, 1988, Ser. No. 287,806

Int. Cl.^{5} G11B *33/02, 17/04*

U.S. Cl. 369—77.2 **6 Claims**



1. Apparatus for positioning a disk cartridge, under power, in an information storage disk drive system comprising:

a mount plate;

cartridge receiving means for receiving and holding a disk cartridge in its own plane, the cartridge having been at least partially manually inserted in a longitudinal direction, said receiving means being mounted above said mount plate to form a planar interstitial space therebetween;

motor actuated linear drive means mounted beneath said mount plate and having a drive tab extending through the mount plate into said interstitial space for providing linear driving motion in a lateral direction normal to said longitudinal direction;

means including a pivoted sector gear mounted in said interstitial space and pivotally responsive to movement of said tab to convert said driving motion from said lateral direction to said longitudinal direction;

and longitudinal linear drive means at least partially mounted within said interstitial space in engagement with said sector gear and having at least one cartridge contacting member for contacting and moving said cartridge in said longitudinal direction in response to movement of said drive tab in the lateral direction.

5,025,437
INTERLOCKING BRAKING AND LOCK MECHANISMS FOR SCANNING APPARATUS OF AN INFORMATION PROCESSING SYSTEM

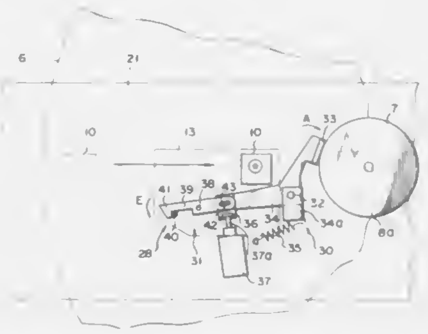
Hiroshi Yamashita, Kawasaki; Yoshiaki Tago, and Tomohisa Yoshimaru, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 6, 1989, Ser. No. 306,715

Claims priority, application Japan, Feb. 8, 1988, 63-26792

Int. Cl.^{5} G11B *5/54*

U.S. Cl. 369—79 **10 Claims**



1. An apparatus for following a track on an optical information memory disk, comprising:

first drive means, having a spindle motor, for rotating the memory disk;

optical head means, adapted to be adjacent the memory disk when the rotating means is rotating the memory disk, for scanning the information on the memory disk;

means for moving the optical head means in the radial direction of the memory disk, the moving means including a movable member movable in the radial direction of the memory disk, and the moving means supporting the optical head means, the movable member having an engagement portion;

means for electrically braking the first device means to reduce the rotational speed of the spindle motor when the spindle motor power is cut off;

means for mechanically braking the first drive means when the rotational speed is reduced;

lock means for engaging the engagement portion to lock the movable member at a predetermined position when the mechanical braking means is operative to brake the first drive means; and

second drive means for simultaneously driving both the mechanical braking means and the lock means.

5,025,438
RECORDING AND REPRODUCING OPTICAL INFORMATION DEVICE WHICH CONVERTS THE FIRST BEAM INTO A SECOND BEAM HAVING DIFFERENT LIGHT INTENSITY DISTRIBUTION

Masami Emoto, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 9, 1990, Ser. No. 491,176

Claims priority, application Japan, Mar. 17, 1989, 1-64982

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—112 **6 Claims**

1. An apparatus for recording and reproducing optical information, comprising:

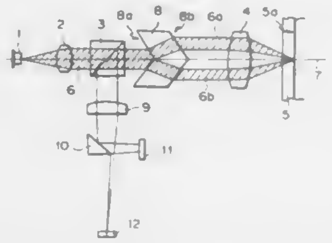
a laser beam source for emitting a laser beam;

a collimator lens in an optical path of said laser beam for collimating said beam to form a first parallel light beam;

a prism arranged symmetrically with respect to an optical axis in an optical path of said first parallel light beam for changing said first parallel light beam to a second parallel light beam having a light intensity distribution in which a light intensity at a peripheral portion of said optical axis is greater than that at said optical axis; and

VOL
1127
ISS
3
JE
18
1991
UMI

an objective lens arranged in an optical path of said second parallel light beam for converging said second parallel light beam in the shape of a spot at a recording face of an optical information recording medium.



5,025,439

METHOD FOR RECORDING AND REPRODUCING OF INFORMATION ON AN OPTICAL DISK OF A PHASE-CHANGE TYPE

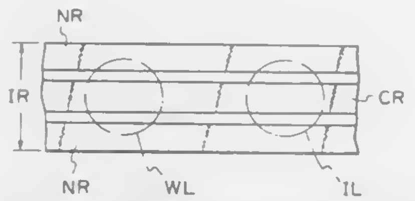
Toshihiro Komaki; Hideo Kudo; Tomonori Ishizukl, and Shinichi Yokozeki, all of Tokorozawa, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Aug. 26, 1988, Ser. No. 236,913

Claims priority, application Japan, Nov. 24, 1987, 62-295679

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—100 **4 Claims**



1. A method for recording and reproducing data on an optical disk of a phase-change type which disk is capable of being over-written while rotating at a speed and being irradiated by a focused light beam as a spot on the disk, which comprises the steps of:

initializing an optical disk through the whole by irradiating an initializing spot to make, in advance of writing, an initialized region on which data is to be written and read;

writing the data in said initialized region by irradiating a writing spot;

over-writing the data by irradiating the writing spot after erasing the written data by irradiating an erasing spot; and

reading the written data by irradiating a reading spot;

wherein an amount of optical energy supplied to a unitary area of said optical disk by said initializing spot is larger than that by said writing spot so that a width of said initialized region is wider than that of an area produced by the irradiation of said writing spot.

5,025,440

DUAL SIDE DISC PLAYER HAVING A PICKUP REVERSING MECHANISM

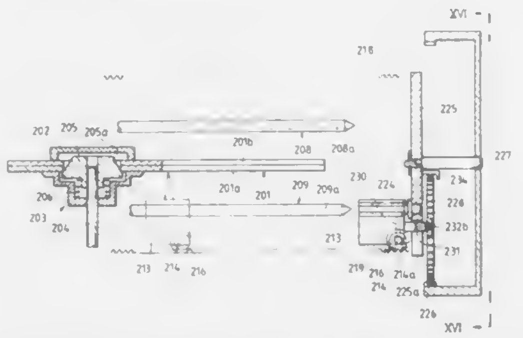
Tadashi Funabashi, and Isami Kenmotsu, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Division of Ser. No. 278,303, Nov. 30, 1988. This application Apr. 20, 1990, Ser. No. 511,884

Claims priority, application Japan, Nov. 30, 1987, 62-303506; Dec. 26, 1987, 62-198782[U]; Jan. 14, 1988, 63-3165[U]

Int. Cl.^{5} G11B *17/04, 17/08*

U.S. Cl. 369—199 **4 Claims**



1. A disc player wherein a carriage carrying pickup means is guided and driven by guide and drive means so as to move along both recording surfaces of a disc so as to play either side of said disc, said guide and drive means comprising: first and second guide members disposed in such a manner that said disc is interposed therebetween, and disposed to detachably support said carriage at predetermined attachment/detachment positions; a holder member for holding said carriage at said predetermined attachment/detachment positions; an inverting mechanism for rotating said holder member from one of the attachment/detachment positions of said first and second guide members to the other along a plane intersecting the directions of guiding by said guide members; and drive means for moving said carriage on said first and second guide members and for driving said inverting mechanism so as to move said holder member.

5,025,441

KEY TELEPHONE SYSTEM

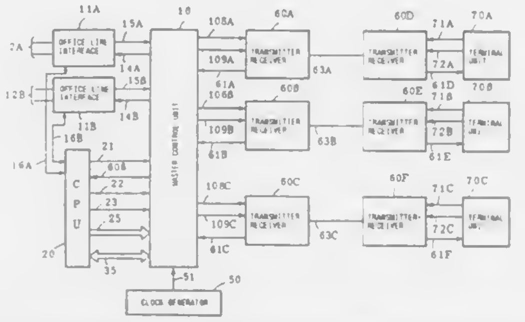
Masaharu Kamigaki; Hironobu Oshikata, both of Tokyo; Yoshihiro Kawata, Saitama; Nobuyasu Shiga, Tokyo; Hideharu Omori, Tokyo; Masayuki Kawashima, Tokyo, and Toshimichi Sbimatani, Tokyo, all of Japan, assignors to Iwatsu Electric Company, Ltd., Tokyo, Japan

Filed Dec. 28, 1988, Ser. No. 291,442

Claims priority, application Japan, Dec. 28, 1987, 62-332162; Dec. 28, 1987, 62-332163; Dec. 29, 1987, 62-336654; Dec. 29, 1987, 62-336655; Dec. 30, 1987, 62-336559

Int. Cl.^{5} H04J *3/00*

U.S. Cl. 370—77 7 Claims



1. A key telephone system including a master control unit, a plurality of terminal units connected to said master control unit, a central office line interface for connecting a central office line to said master control unit, and a CPU connected to said master control unit for controlling transmission and exchange for signals in which down-information to be transmitted from said central office line to said terminal units and up-information to be transmitted from said terminal units to said central office line are subjected to PCM communication, wherein:

said master control unit is provided with a central office line communication trunk; and

said central office line communication trunk comprises:

first register for receiving down-information from said central office line interface at a first time to temporarily store said down-information, and for sending out said down-information stored at a second time;

a demultiplexer for sending out said down-information sent out from said first register to said terminal units designated by said CPU;

a multiplexer for receiving up-information from said terminal units designated by said CPU;

a second register for receiving said up-information from said multiplexer at said first time to temporarily store said up-information, and for sending out said up-information stored to said central office line interface at said second time; and

timing generation means for preparing said first time and said second time, in which one frame is constructed by said up-information and said down-information, and a guard time is provided between said up-information and said down-information according to time-delay in transmission of said up-information and said down-information.

5,025,442

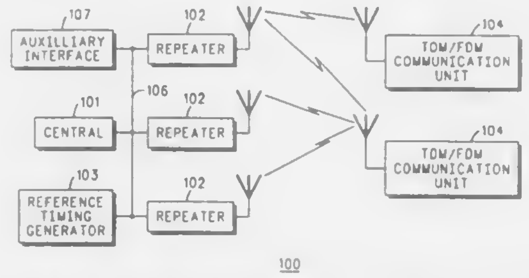
TDM/FDM COMMUNICATION SYSTEM WITH PSEUDO-DUPLEX CAPABILITY

Charles N. Lynk, and Eric R. Schorman, both of Bedford, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 23, 1989, Ser. No. 300,520

Int. Cl.^{5} H04L *5/14;* **H04J** *4/00*

U.S. Cl. 370—29 4 Claims



1. In a time division multiplexed communication system wherein at least one time slot per TDM frame on at least one communication channel is a system control time slot that is used to substantially support communication control information, a method of providing pseudo-duplex communication between at least a first and second communication unit, comprising the steps of:

(A) transmitting information from said first communication unit in a first time slot wherein the first time slot is assigned to said first communication unit via said system control time slot;

(B) receiving said information by said second communication unit in said first time slot, wherein the reception is terminated by each one of the following conditions:

(i) said first communication unit concludes transmitting, thereby allowing said second communication unit to begin transmitting;

(ii) said first communication unit concludes transmitting, thereby concluding said communication;

(iii) while said first communication unit is transmitting, said second communication unit transmits a talk request signal via said system control time slot, thereby causing said first communication unit to receive a transmit-abort instruction via said system control time slot, thereby allowing said second communication unit to transmit a message to said first communication unit, and said first communication unit to receive said message.

5,025,443

DIGITAL DATA OVER VOICE COMMUNICATION

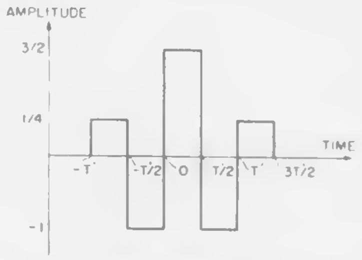
Dev V. Gupta, Flemington, N.J., assignor to Integrated Network Corporation, Bridgewater, N.J.

Continuation of Ser. No. 159,887, Feb. 24, 1988. This application Apr. 28, 1989, Ser. No. 345,472

The portion of the term of this patent subsequent to Aug. 28, 2007, has been disclaimed.

Int. Cl.^{5} H04J *1/14*

U.S. Cl. 370—76 10 Claims



1. Apparatus for encoding data signals for transmission at a predetermined rate over telephone lines in the presence of voice band telephone signals such that the frequency spectrum of the data signals is substantially removed from the voice band and is shifted to a higher frequency spectrum comprising:

(a) generator means for generating pulsed data signals in bit intervals of duration T;

(b) coding means for forming linear combinations of said pulsed data signals with delayed and advanced version thereof to sinusoidally encode the pulses in the frequency domain by converting each data bit into a corresponding data symbol having a duration 5T/2, the data symbol being composed of five pulses spaced T/2 apart having alternately opposite polarities and equal durations of not more than T/2, the amplitudes of a first pair of pulses on either side of a central pulse being equal and being "a" times an amplitude of the central pulse, where "a" is a factor $\leqq 1$, and the amplitudes of a second pair of pulses on either side of the first pair of pulses being equal and being "b" times the amplitude of the central pulse where "b" is a factor $\leqq 1$.

5,025,444

COMMUNICATIONS ERROR DETECTION SYSTEM

James L. Clayton, and Robert E. Gewin, both of Huntsville, Ala., assignors to Phoenix Microsystems, Inc., Huntsville, Ala.

Filed Apr. 5, 1989, Ser. No. 334,587

Int. Cl.^{5} G06F *11/00*

U.S. Cl. 371—34 3 Claims

1. A communications error detection system comprising:

a first data transmitter, at point A, and a second data transmitter, at point B, said first transmitter transmitting a data stream from said first data transmitter to said second data transmitter, and said second data transmitter transmitting a data stream to said first data transmitter;

a first data receiver at point A being coupled to receive a data stream from said second data transmitter, and a second data receiver at point B being coupled to receive a data stream from said first data transmitter;

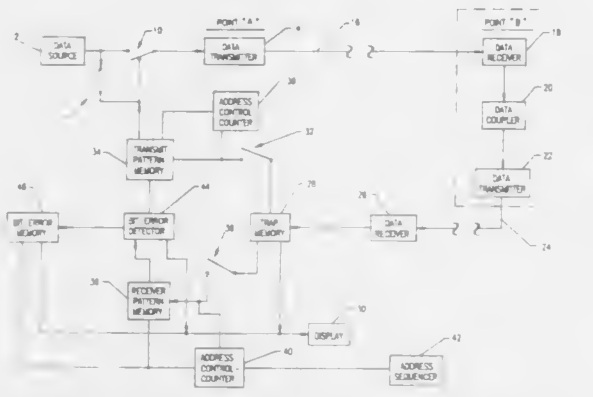
retransmit coupling means for coupling the output of said second receiver to said second transmitter, whereby an

VOL
1127
ISS
3
JE
18
1991
UMI

output of said first transmitter is receiver by said second receiver and transmitted back to said first receiver;

sampling means coupled to said first receiver for sampling a selected sample data stream received by said first receiver;

transmitter coupling means including first memory means for storing a said selected sample data stream from said sampling means and selectively applying, as an output, the contents of said first memory means to said first data transmitter, whereby said sample data stream is repeatedly transmitted by said first transmitter;



second memory means responsive to the reception by said first receiver of sample data streams responsive to transmissions of said sample data stream to and from said second transmitter for providing as an output repeated sequences of data in the same sequence format as provided by the output of said first memory means; and

comparator means coupled to said first and second memory means for providing bit-by-bit differences with respect to bit accuracy in the contents of said first and second memories and thereby providing transmission system influenced errors.

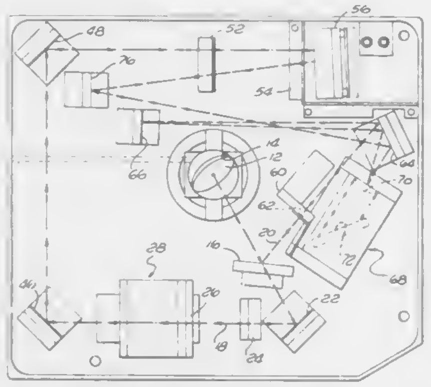
5,025,445
SYSTEM FOR, AND METHOD OF, REGULATING THE WAVELENGTH OF A LIGHT BEAM

Stuart L. Anderson, San Diego, and Richard L. Sandstrom, Encinitas, both of Calif., assignors to Cymer Laser Technologies, San Diego, Calif.

Filed Nov. 22, 1989, Ser. No. 440,605

Int. Cl.^{5} H01S *3/10*

U.S. Cl. 372—20 **25 Claims**



1. In combination for regulating the output of light from a laser at a particular wavelength,

first means for providing a first optical path

second means responsive to the light in the first optical path for producing first signals representing the wavelength of the light from the laser in a plurality of free spectral ranges,

third means for providing a second optical path from the laser,

fourth means responsive to the light in the second optical path for producing second signals representing the particular one of the free spectral ranges in which the wavelength of the light from the laser occurs, and

fifth means responsive to the first and second signals for producing third signals to identify the wavelength of the light from the laser.

5,025,446
INTRA-CAVITY BEAM RELAY FOR OPTICAL HARMONIC GENERATION

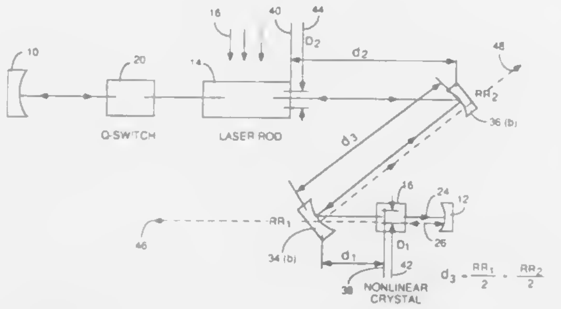
Dirk J. Kuizenga, Sunnyvale, Calif., assignor to Laserscope, San Jose, Calif.

Continuation-in-part of Ser. No. 176,810, Apr. 1, 1988, abandoned. This application Jan. 23, 1989, Ser. No. 300,389

The portion of the term of this patent subsequent to Mar. 6, 2007, has been disclaimed.

Int. Cl.^{5} H01S *3/10*

U.S. Cl. 372—21 **24 Claims**



1. A laser resonator system that comprises: a first and second mirror forming an optical resonator, where said first and second mirrors have radii of curvature **R1** and **R2** respectively; a laser medium positioned within said optical resonator wherein said laser medium provides gain to a beam of electromagnetic radiation at a certain wavelength, referred to as the fundamental wavelength, said beam at the fundamental wavelength having a diameter D_2 after it passes through said laser medium; an optical element positioned within said optical resonator said optical element being substantially transparent to said beam of electromagnetic radiation at the fundamental wavelength; a means for imaging, positioned between said laser medium and said optical element within said optical resonator, that accepts said beam of radiation with diameter D_2 from said laser medium and images said beam with diameter D_2 to a beam of radiation with diameter d_1 in said optical element such that the ratio of diameters d_2/D_1 depends only on the properties of said means of imaging and said ratio of diameters D_2/D_1 is independent of the position and radii of curvature of said first and second mirrors and is independent of any focusing properties of said laser medium or said optical element.

5,025,447
DRIVE CIRCUIT AND METHOD FOR SETTING A CONTROL SIGNAL OF A SEMICONDUCTOR LASER

Tsuyoshi Ohashi, Hashima, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Sep. 4, 1990, Ser. No. 577,016

Claims priority, application Japan, Sep. 12, 1989, 1-237584

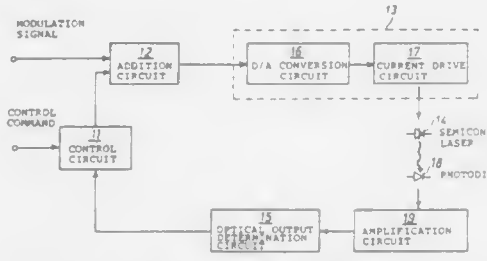
Int. Cl.^{5} H01S *3/10*

U.S. Cl. 372—31 **17 Claims**

1. A semiconductor laser drive circuit comprising:

control means for generating a control signal, where the control signal determines a range of output of the semiconductor laser; and

determination means for determining whether an output of the semiconductor laser is greater than or less than a predetermined value and sending to the control means a determination result indicating whether the output of the semiconductor laser is greater than or less than the predetermined value; wherein



upon receiving an externally provided control command, the control means generates a new control signal based on the determination result by generating a predetermined number of search control signals in a binary-tree search, the new control signal corresponding to the final search control signal.

5,025,448
METHOD AND APPARATUS FOR STABILIZING FREQUENCY OF SEMICONDUCTOR LASER

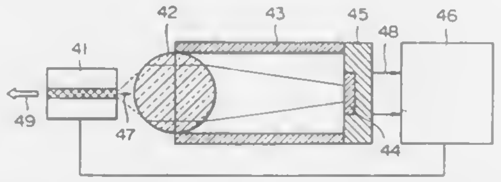
Shoichi Sudo, Atsugi; Yoshihisa Sakai, Yokohama; Hiroshi Yasaka, Zama; Tetsuhiko Ikegami, Tokyo; Yuzo Yoshikuni, Kawasaki; Itaru Yokohama, Zama, and Kenichi Kubodera, Isehara, all of Japan, assignors to Nippon Telegraph & Telephone Corporation, Tokyo, Japan

Filed Mar. 13, 1990, Ser. No. 492,716

Claims priority, application Japan, May 12, 1989, 1-117594; Sep. 27, 1989, 1-0249065

Int. Cl.^{5} H01S *3/13*

U.S. Cl. 372—32 **20 Claims**



1. A semiconductor laser apparatus including means for stabilizing the frequency thereof, said apparatus comprising:

a semiconductor laser means for emitting light;

a frequency modulating means for frequency modulating a light output from said semiconductor laser means;

an optical energy absorbing medium for absorbing optical energy, said optical energy absorbing medium being enclosed within a space such that frequency modulated light output from said frequency modulating means is incident on said optical energy absorbing medium;

photodetector means for converting said frequency modulated light transmitted through said optical energy absorbing medium to an electrical signal; and

control circuit means for stabilizing the frequency of light output from said semiconductor laser means in response to said electrical signal output from said photodetector means;

wherein said optical energy absorbing medium comprises acetylene gas enclosed within said space, and wherein among carbon and hydrogen atoms of which molecules of said acetylene as are comprised, at least one atom is of a selected isotope.

5,025,449
OPTICAL PUMPING-TYPE SOLID-STATE LASER APPARATUS WITH A SEMICONDUCTOR LASER DEVICE

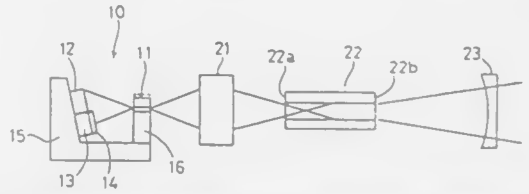
Osamu Yamamoto, and Toshihiko Yoshida, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Japan

Filed Mar. 27, 1990, Ser. No. 500,039

Claims priority, application Japan, Mar. 28, 1989, 1-77824

Int. Cl.^{5} H01S *3/133*

U.S. Cl. 372—32 **12 Claims**



1. An optical pumping-type solid-state laser apparatus comprising:

a semiconductor laser device for emitting light from two opposite sides;

a solid-state laser which is optically pumped by laser light with a predetermined pumping wavelength emitted from a first side of said semiconductor laser device and absorbed by the solid-state laser to as to generate laser light with a target wavelength;

a first optical detection means for detecting the amount of laser light emitted from a second side of said semiconductor laser device;

a second optical detection means for detecting the amount of laser light which has been emitted from said second side of said semiconductor laser device and transmitted through a filter means, said filter means selectively absorbing light with the same said pumping wavelength as that of light to be absorbed by said solid-state laser; and

a means for modifying the wavelength of the laser light to be emitted from said first side of the semiconductor laser device in accordance with difference between the amounts of laser light detected by said first and second optical detection means.

5,025,450
SEMICONDUCTOR LASER DEVICE

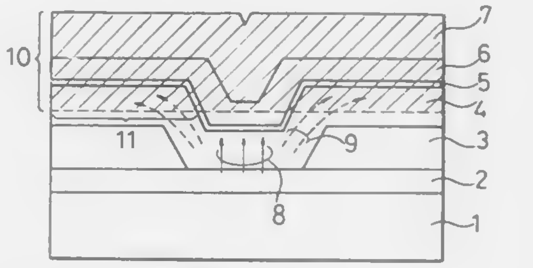
Toshitaka Aoyagi, and Takashi Motoda, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Feb. 21, 1990, Ser. No. 482,507

Claims priority, application Japan, Mar. 27, 1989, 1-75706

Int. Cl.^{5} H01S *3/19*

U.S. Cl. 372—46 **14 Claims**



1. In a semiconductor laser structure:

a substrate;

an active layer including a non-planar light-emitting portion supported by said substrate;

lower and upper cladding layers respectively disposed on opposite sides of said active layer; and

a diffusion region produced by diffusion impurities from the side of the device opposite the substrate to a position

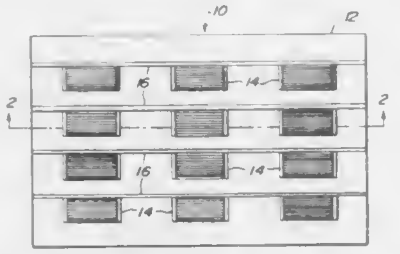
VOL
1127
ISS
3
JE
18
1991
UMI

within said lower cladding layer, the impurities forming a pn junction within said lower cladding layer spaced from the light-emitting portion of the non-planar active layer.

5,025,451
TWO-DIMENSIONAL INTEGRATED LASER ARRAY

Michael Jansen, Los Angeles; Moshe Sergant, Culver City; Szutsun S. Ou, Manhattan Beach; Jaroslava Z. Wilcox; Jane J. Yang, both of Los Angeles, and Larry R. Eaton, Huntington Beach, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Oct. 20, 1989, Ser. No. 424,424
Int. Cl.^{5} H01S *3/19*
U.S. Cl. 372—50 **16 Claims**

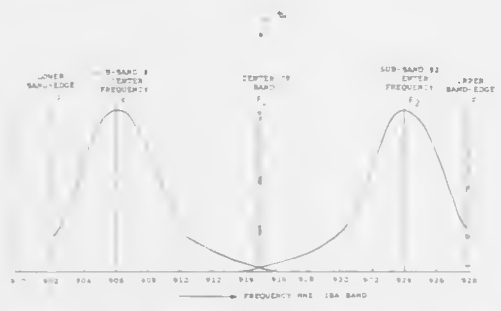


1. A two-dimensional integrated laser array, comprising:
a plurality of surface-emitting laser arrays; and
means for optically coupling the individual laser arrays together such that the laser arrays operate in phase and at the same wavelength to emit coherent beams of light.

5,025,452
FULL-DUPLEX, SUB-BAND SPREAD SPECTRUM COMMUNICATIONS SYSTEM

Harold K. Sohner, Richardson; Joel N. Hoyloak, Lucas; Richard J. Girvin, Plano, all of Tex., and Surinder Kumar, Saskatoon, Canada, assignors to Andrew Corporation, Orland Park, Ill.

Filed Mar. 20, 1990, Ser. No. 496,332
Int. Cl.^{5} H04K *1/00*
U.S. Cl. 375—1 **18 Claims**

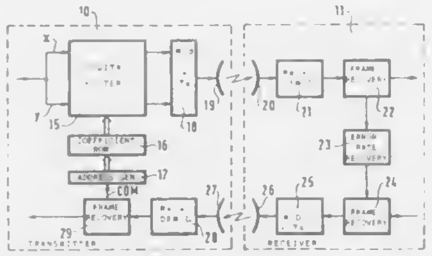


1. A full-duplex, sub-band spread spectrum communications system adapted for radio communications within a prescribed restricted frequency band, said system comprising:
at least one master station for providing RF coverage within a prescribed area;
a plurality of radio units disposed within the prescribed RF coverage area; and
means for relaying RF signals between said master station and said radio units;
said master station and each of said radio units including transmitter means for processing input data and generating spread spectrum signals for being transmitted over said RF signal relaying means; and
receiver means for receiving said transmitted spread spectrum signals from said relaying means and de-spreading said received signals to extract the original data therefrom;
said spread spectrum signals transmitted from said master station to said radio units (the "transmit" signals) being confined to a first frequency sub-band defined within said restricted frequency band, and spread spectrum signals transmitted from said radio units to said master station (the "receive" signals) being confined to a second frequency sub-band which is also defined within said specified frequency band, said first and second frequency sub-bands being defined about different band-edges of said restricted frequency band.

5,025,453
METHOD OF MEASURING THE SIGNATURE OF DIGITAL TRANSMISSION EQUIPMENT, AND APPARATUS FOR IMPLEMENTING SUCH A METHOD

Bertrand Hurinville, Levallois-Perret, France, assignor to Alcatel Transmission par Faisceaux Hertziens, Cedex, France

Filed Dec. 13, 1989, Ser. No. 450,191
Claims priority, application France, Dec. 15, 1988, 88 16558
Int. Cl.^{5} H04B *17/00*
U.S. Cl. 375—10 **3 Claims**



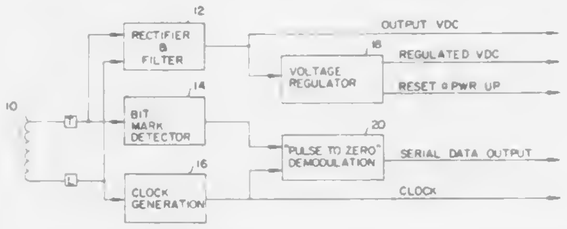
1. A method for measuring the signature of digital transmission equipment in a communication link having the digital transmission equipment at a transmission station and receiving equipment at a receiving station, wherein the receiving the equipment continuously provides the digital transmission equipment with an error rate signal, and wherein the measurement is performed during operation without the addition of special equipment, said method comprising the steps of:
(a) transmitting an output signal of a digital filter, said digital filter providing a transfer function responsive to a plurality of coefficients stored in a memory unit coupled to said digital filter, at one of a plurality of frequencies;
(b) varying the depth of fade at said one of said frequencies so as to vary said transfer function of said digital filter under the control of an address generation circuit responsive to the error rate signal, said address circuit being coupled to said memory unit so as to select a group of said coefficients, until an error rate signal equal to a predetermined value is obtained and recording said depth of fade;
(c) selecting another one of said frequencies; and
(d) repeating steps (a) through (c) until said signature is obtained.

5,025,454
PULSE TO ZERO DIGITAL (PZ) MODULATION

Arthur F. Hogrefe, Laurel, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Filed Jul. 17, 1989, Ser. No. 380,576
Int. Cl.^{5} H04L *27/02*
U.S. Cl. 375—41 **10 Claims**

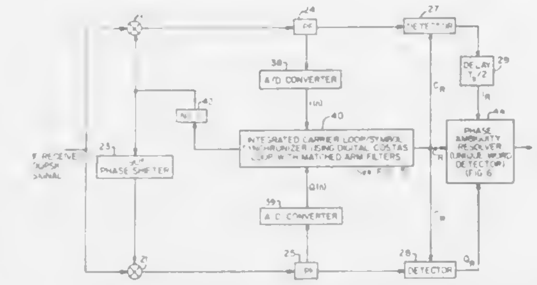
9. A modulation and demodulation method comprising:
modulating a bit mark onto a carrier signal at the start of each "0" in a bit stream to be transmitted;
receiving the modulated carrier and detecting each bit mark;
regenerating the carrier as a logical compatible train of clock counts; and,
decoding the bit mark sequence by outputting a "0" at the occurrence of each detected bit mark and resetting the output to "1" if a second bit mark has not occurred within a preset number of said clock counts from the previously detected bit mark.



5,025,455
PHASE AMBIGUITY RESOLUTION FOR OFFSET QPSK MODULATION SYSTEMS

Tien M. Nguyen, Fullerton, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed Nov. 30, 1989, Ser. No. 443,539
Int. Cl.^{5} H04L *27/18*
U.S. Cl. 375—53 **4 Claims**

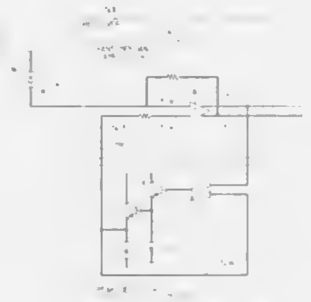

24
27
29
DELAY $T_s/2$
38
A/D CONVERTER
I(n)
42
40
INTEGRATED CARRIER LOOP/SYMBOL SYNCHRONIZER USING DIGITAL COSTAS LOOP WITH MATCHED ARM FILTERS
44
PHASE AMBIGUITY RESOLVER (UNIQUE WORD DETECTOR) (FIG 6)
DATA OUTPUT
23
90° PHASE SHIFTER
RECEIVE OQPSK SIGNAL
Q(n)
39
A/D CONVERTER
21
25
28
DETECTOR
C_R
I_R
Q_R

1. In an offset quaternary phase-shift-keyed modulation system for digital communications, wherein unique inphase and quadrature words are separately modulated onto respective inphase and quadrature channels of a preamble before combining the channels to form a quadraphase modulated carrier for transmission of data bits of a quaternary phase-shift-keyed modulated message, and in which a receiver includes means for detecting said inphase and quadrature data channels of the received data from said quadraphase modulated carrier, an improvement in said receiver comprising
means for tracking the phase of said modulated carrier and deriving a synchronization signal, said tracking means comprising a digital Costas loop and an integrated symbol synchronizer, said Costas loop comprising inphase and quadrature accumulators connected to receive data from said means of said receiver for detecting said inphase and quadrature data channels, respectively, said integrated symbol synchronizer being connected to receive the output of said inphase accumulator and produce said synchronizing signal, said integrated symbol synchronizer being connected to provide said synchronizing signal as a feedback to said inphase accumulator and with a delay of one half a bit symbol duration time Ts to a quadrature accumulator for correcting synchronization timing, thereby resolving four-phase ambiguity conditions using the inphase and quadrature channel reversal correcting property of said Costas loop with said integrated symbol synchronizer to correct errors associated with 90° and 270° carrier phase errors, and
a phase ambiguity resolver connected to receive said inphase and quadrature data channels of said tracking means in which 90° and 270° carrier phase errors have been corrected, said phase ambiguity resolver including
unique inphase word detector means and unique quadrature word detector means for separately determining when said unique inphase and quadrature words are received with bits 180° out of phase,
means connected to said unique inphase word detector means and said unique quadrature word detector means for resolving phase ambiguity by separately inverting inphase and quadrature data bits thereby to so complement said bits as to correspond to bits of said unique words, whereby remaining phase ambiguity conditions associated with 0° and 180° carrier phase error are resolved, wherein each of said unique word detector means is comprised of
means for separately correlating said unique inphase and quadrature words received with corresponding unique inphase and quadrature words transmitted, and
means responsive to said means for correlating said unique inphase and quadrature words received for inverting data bits of a corresponding one of said inphase and quadrature data channels received thereafter, and
means responsive to said means for separately correlating said inphase and said quadrature phase unique words for generating synchronizing pulses for demodulated data bits received thereafter.

5,025,456
BURST MODE DIGITAL DATA RECEIVER

Yusuke Ota, Mountain Lakes, and Robert G. Swartz, Tinton Falls, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 2, 1989, Ser. No. 305,035
Int. Cl.^{5} H04L *25/06*
U.S. Cl. 375—76 **14 Claims**



1. A digital data receiver comprising a DC-coupled differential amplifier circuit having a first input for receiving a digital data input signal, a second input for receiving a reference signal, and a data output;
means responsive to said data output for detecting a peak amplitude of said digital data input signal and for generating said reference signal in such a way that said amplifier circuit has a first gain value during the absence of said data input signal and while the data input signal is less than its peak amplitude, and has a second gain value approximately equal to twice the first gain value for a predetermined time after the peak amplitude of the data input signal is reached.

VOL
1127
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1991
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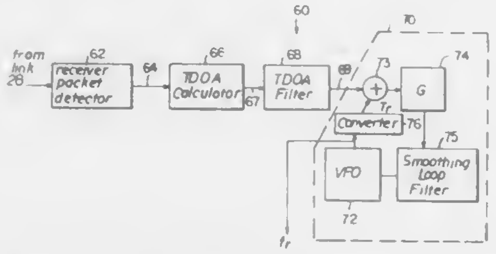
5,025,457

SYNCHRONIZING CONTINUOUS BIT STREAM ORIENTED TERMINALS IN A COMMUNICATIONS NETWORK

Hassan M. Ahmed, Wrentham, Mass., assignor to Codex Corporation, Mansfield, Mass.
Filed Apr. 21, 1989, Ser. No. 341,647
Int. Cl.^{5} H04L *7/00*
U.S. Cl. 375—106 **36 Claims**



1. A method for controlling the frequency of a clock for a receiving terminal based on a predetermined clock frequency of a terminal that produces a continuous stream of data at a predetermined frequency for transmission to the receiving terminal over a communications network of the kind in which data is transmitted between the terminals in discrete packets that are delayed on the network by possibly different amounts, comprising:

detecting arrivals of packets that are sent to the receiving terminal,

determining time intervals between the arrivals of successive said packets,

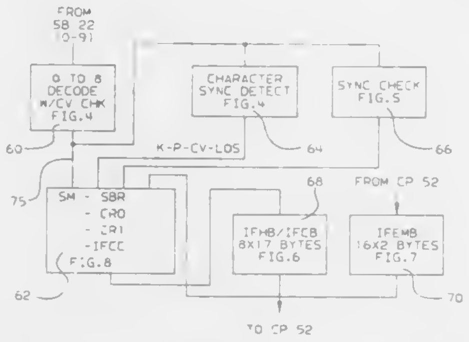
processing said time intervals to generate an estimate that is related to said predetermined frequency, and

controlling said frequency of said receiving terminal clock in response to said estimate.

5,025,458

APPARATUS FOR DECODING FRAMES FROM A DATA LINK

Daniel F. Casper, Poughkeepsie; John R. Flanagan, Staatsburg; Thomas A. Gregg, Highland; Catherine C. Huang, Poughkeepsie, all of N.Y., and Matthew J. Kalos, Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Oct. 30, 1989, Ser. No. 429,257
Int. Cl.^{5} H04L *7/02;* **H04J** *3/06*
U.S. Cl. 375—114 **13 Claims**


FROM 58 22 10-91
0 TO 8 DECODE W/CV CHK FIG.4
CHARACTER SYNC DETECT FIG.4
SYNC CHECK FIG.5
60
K-P-CV-LOS
64
66
75
SM - SBR - CR0 - CR1 - IFCC FIG.8
68
IFHB/IFCB 8X17 BYTES FIG.6
FROM CP 52
IFEMB 16X2 BYTES FIG.7
62
70
TO CP 52

1. Apparatus for decoding frames from a data link, each frame having multiple data characters, said apparatus comprising:

a frame input connected to said data link for the receipt thereon of a received frame from the data link;

an expect/mask buffer, having a first portion for storing a reproduction of expected characters expected to be in said received frame, and a second portion for storing a mask indicating which bits of the characters of said received frame are to be compared to corresponding bits of said expected characters in the first portion;

compare means for comparing characters of said received frame to corresponding expected characters in the first portion of said expect/mask buffer as masked by said second portion;

a compare register connected to said compare means for storing the results of the comparison of said compare means;

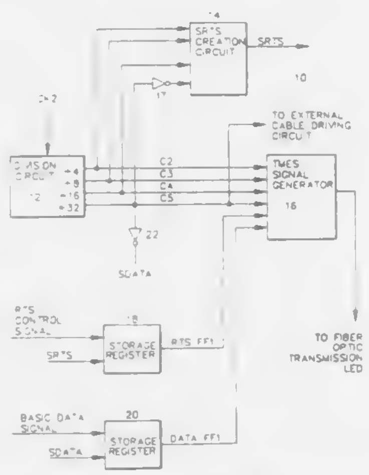
a header buffer having multiple entries and being connected to said frame input, each entry thereof for storing characters of one of the frames received by said frame input; and

a compare buffer having multiple entries and being connected to said compare register, each entry thereof for storing the contents of said compare register resulting from the comparison by said compare means for the corresponding frame entry in said header buffer.

5,025,459

OPTICAL COMMUNICATIONS TRANSMITTER AND RECEIVER

Thomas M. Lill, Port Huron, Mich., assignor to Optical Communications Corp., Silver Spring, Md.
Continuation of Ser. No. 888,203, Jul. 23, 1986, Pat. No. 4,852,128. This application Jul. 24, 1989, Ser. No. 383,537
The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.
Int. Cl.^{5} H04L *25/38, 7/06*
U.S. Cl. 375—117 **6 Claims**



1. A receiver for receiving a transmitted data signal comprised of one or more frames of binary data which occur at a frame rate with each frame having a start pulse of a first time duration which marks the beginning of the frame, a midpoint pulse which marks the midpoint of the frame, and a plurality of bit positions within the frame for transmitting digital data, the midpoint pulse and each bit having a second time duration different than the first time duration comprising:

means for receiving the transmitted frames of the data signal;

means, coupled to the means for receiving the transmitted frames of data for detecting the start pulse within the frames of the transmitted data signal having an output on which the start pulse is produced;

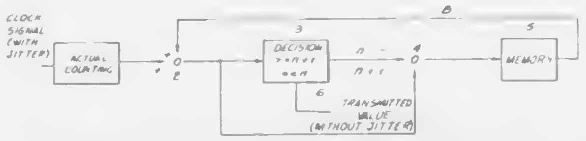
means, coupled to the means for receiving the transmitted frame of data, for detecting the midpoint pulse within the frames of the transmitted data signal and having an output on which the midpoint pulse is produced; and

means for sampling the bit positions, coupled to the start pulse and the means for detecting the midpoint pulse, which samples the bit position at fixed time intervals keyed to the start pulse and the midpoint pulse.

5,025,460

SYSTEM AND CIRCUITS FOR THE PROCESSING AND TRANSMISSION OF A CLOCK SIGNAL, IN PARTICULAR OF THE VIDEO SYNCHRONIZATION FREQUENCY

Silvio Cucchi, Gaggiano, and Stefano Carbone, Milan, both of Italy, assignors to Telettra-Telefonia Elettronica e Radio S.p.A., Milan, Italy
Filed Jun. 14, 1989, Ser. No. 365,846
Claims priority, application Italy, Jun. 14, 1988, 20952 A/88
Int. Cl.^{5} H04B *1/10*
U.S. Cl. 375—118 **9 Claims**


CLOCK SIGNAL (WITH JITTER)
ACTUAL COUNTING
1
2
DECISION
3
4
5
MEMORY
6
8
n
n+1
TRANSMITTED VALUE (WITHOUT JITTER)

1. A method for the processing and transmission of a clock signal affected by jitter, said clock signal having a period 1Fsr, where Fsr is the frequency of the clock signal, by measuring said period with a sample signal having a frequency Fc, said method comprising the steps of:

taking a discrete binary measurement of the ratio Fc/Fsr;

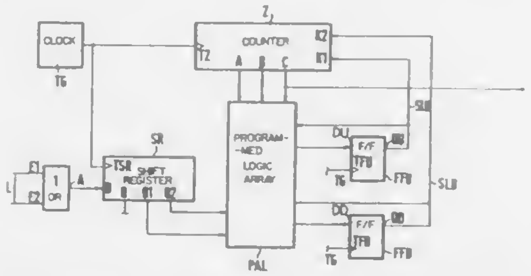
processing said discrete binary measurement of the ratio Fc/Fsr to compress and discharge the jitter in the signal by using a circuit with a feedback loop to feed back error introduced by the jitter and thereby accumulate and integrate said error introduced by the jitter; and

generating a single binary digit 0 or 1 based upon the sum of the discrete binary measurement of the ratio Fc/Fsr and the error fed back by said feedback loop, said single binary digit 0 to 1 adequately representing each period of the clock signal.

5,025,461

METHOD OF AND CIRCUIT ARRANGEMENT FOR RECOVERING A BIT CLOCK FROM A RECEIVED DIGITAL COMMUNICATION SIGNAL

Dieter Pauer, Frieberg, Fed. Rep. of Germany, assignor to Alcatel N.V., Amsterdam, Netherlands
Filed Jun. 5, 1989, Ser. No. 362,802
Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3818843
Int. Cl.^{5} H04L *7/033*
U.S. Cl. 375—119 **5 Claims**



1. Method of recovering a bit clock signal from pulses of a digital communication signal received at a receiving end of a transmission path, said method comprising the steps:

generating a reference clock at the receiving end whose frequency is N times a nominal frequency of the bit clock,

using the reference clock to cyclically increment a counter having at least N count states so as to divide the reference clock down to the frequency of the bit clock, such that an output of the counter provides an effective pulse edge of the bit clock signal at count state N/2,

using a phase evaluation logic circuit to determine a first count state of said counter at which a leading edge and a s second count state of said counter at which a trailing edge of each received pulse of the communication signal respectively occur,

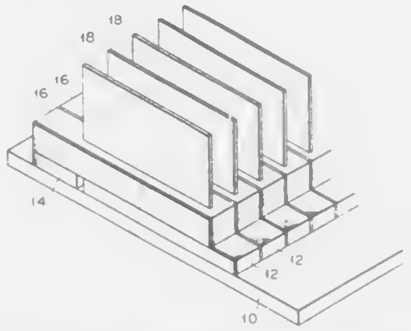
determining a respective center count state of said counter corresponding to said each received pulse, said center count state being equal to the average of said first and second count states, and

for said each received pulse, delivering a phase correction signal to the counter only if the thus determined center count state is not equal to said count state N/2.

5,025,462

X-RAY DETECTOR HAVING FUNCTION OF COMPENSATING FOR SENSITIVITY OF SCINTILLATOR

Yasuo Saito, Nishinasunomachi; Seiji Fujimoto, Ootawara; Yasuo Nobuta, Nishinasunomachi, and Masahiko Yamazaki, Ootawara, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jun. 19, 1990, Ser. No. 540,328
Claims priority, application Japan, Jun. 21, 1989, 1-158801
Int. Cl.^{5} G01N *23/00*
U.S. Cl. 378—19 **18 Claims**



1. An X-ray CT scanner device comprising:

means for irradiating X-rays to an object;

scintillator means for receiving X-rays passing through the object and generating scintillation light corresponding to the received X-rays;

photoelectric converting means for receiving the scintillation light and generating an electric signal corresponding to the received scintillation light;

means for processing an output of said photoelectric converting means to produce a tomographic image; and

means, operated in connection with the operation of said X-ray irradiating means, for projecting light to said scintillator means when X-rays are not irradiated on said scintillator means.

5,025,463

X-RAY CT SCANNER DEVICE

Yasuo Saito, Tochigi; Mitsuru Yahata, Ootawara; Kouji Honjo, Fuoabashi, and Takayuki Matsubayashi, Tochigi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jun. 20, 1990, Ser. No. 540,601
Claims priority, application Japan, Jun. 21, 1989, 1-158803
Int. Cl.^{5} G01N *23/00*
U.S. Cl. 378—19 **14 Claims**

1. An X-ray CT scanner device comprising:

means for irradiating X-rays in a sector form to an object;

X-ray detection means including a plurality of detector modules each having a preset number of detectors and disposed to completely surround the object, for detecting the X-rays which have passed through the object;

first reconstruction means for subjecting outputs of all of said detector modules of said X-ray detection means to a

VOL
1127
ISS
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1991
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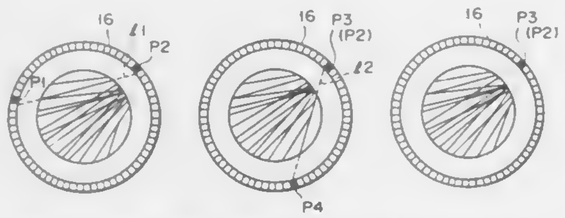
reconstruction process to create a first tomographic image;

means for detecting a defective detector module based on the first tomographic image created by said first reconstruction means; and



means for subjecting outputs of those of said detector modules which are not a defective detector module to a reconstruction process to create a second tomographic image when the at least one defective detector module is detected.

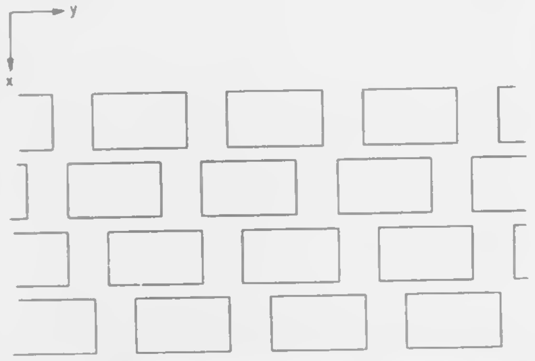
5,025,464
PSEUDO-RANDOM SUPPORT STRUCTURE FOR TRANSMISSION GRATINGS

John F. Meekins, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 15, 1990, Ser. No. 498,249

Int. Cl.^{5} G21K *1/06*

U.S. Cl. 378—84 5 Claims



3. A method of substantially eliminating the artifacts generated by the support structure matrix in a transmission grating diffraction plane comprising the steps of:

preparing a grating of equidistantly spaced wires;

structurally supporting said wires with a matrix of horizontal bars and vertical supports arranged so as to form a plurality of horizontal rows;

spacing the horizontal supports at regular intervals relative to each other;

spacing the vertical bars in a regular pattern relative to each other in each row and in a pseudo-random pattern relative to vertical bars in each of the other rows;

and attaching each of said vertical supports at the ends thereof to adjacent ones of said horizontal bars.

5,025,465
X-RAY CASSETTE FOR FOILS WITH PHOSPHOR LAYER

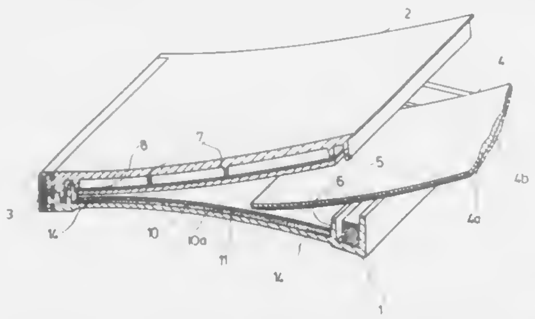
Walter Bauer, and Roland Müller, both of Muenchen, Fed. Rep. of Germany, assignors to Agfa-Gevaert Ag, Leverkusen, Fed. Rep. of Germany

Filed Oct. 31, 1989, Ser. No. 429,354

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1988, 8814270

Int. Cl.^{5} G03B *42/02, 42/04, 5/16*

U.S. Cl. 378—169 17 Claims



1. An X-ray cassette for foils provided with a stimulable phosphor layer, comprising two cassette parts turnable relative to one another between open and closed positions, one of said cassette parts being permeable for X-rays; means for turnably connecting said cassette parts with one another; means for holding a foil on said X-ray permeable cassette part, said holding means including an X-ray permeable elastic pad arranged on said X-ray permeable cassette part and having a surface facing toward a phosphor layer of a foil inserted into the cassette; and means for protecting the phosphor layer of the foil from mechanical loads and scrapping and including an elastic protective foil applied on said surface of said elastic pad, facing toward the phosphor layer, and having a smooth, wear-resistant outer surface.

5,025,466
TELEPHONE TEST INSTRUMENT

William R. Hilligoss; Lawrence D. Hillogoss, both of Ashland, Oreg.; David Van Winkle, Simi Valley, Calif., and Myron C. Butler, Edmond, Okla., assignors to Communications Manufacturing Company, Los Angeles, Calif.

Filed Mar. 13, 1990, Ser. No. 493,101

Int. Cl.^{5} H04M *1/02, 1/24, 19/00*

U.S. Cl. 379—1 44 Claims

23. A telephone test instrument, comprising: means for connecting said test instrument to a telephone circuit;

an internal energy supply;

means, connected to said means for connecting, for energizing said instrument from the telephone circuit with a current up to a predetermined current load; and

means, connected to said energy supply, for connecting said energy supply to energize said instrument with additional

current in response to said instrument requiring current above the predetermined current load.

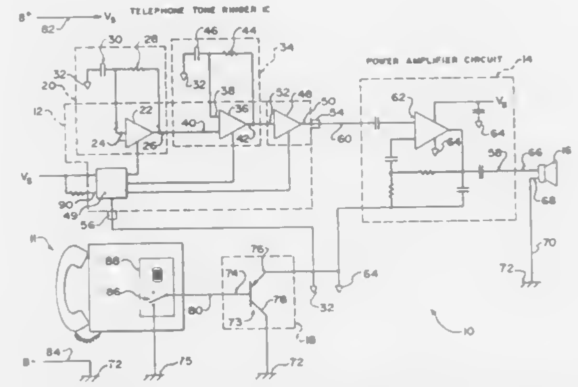
5,025,467
CELLULAR TELEPHONE RING ANNUNCIATOR

Wayne D. Wheller, Surrey, Canada, assignor to Hescor Canada Ltd., New Westminster, Canada

Filed Feb. 3, 1988, Ser. No. 151,977

Int. Cl.^{5} H04M *1/00*

U.S. Cl. 379—60 13 Claims



1. An apparatus for producing an audible sound to indicate the occurrence of an incoming telephone call on a cellular telephone, the apparatus comprising:

(a) first means for producing a first waveform having a first voltage and a first frequency;

(b) second means for producing a second waveform, the second means including a voltage to frequency converter, the voltage to frequency converter including a first operational amplifier having a fist inverting input, a first non-inverting input and a first operational amplifier output, a second resistor, means for connecting said second resistor between said first operational amplifier output and said first non-inverting input, a second capacitor, means for connecting said second capacitor between said first non-inverting input and a first signal ground, and wherein said second resistor and said second capacitor have parameters selected so that said second frequency has a nominal value in the range including 508 to 635 Hz;

(c) amplifying means for amplifying said second waveform to produce an amplified waveform, said amplifying means being operably connected to receive said second waveform;

(d) third means for producing an audible sound from said amplified waveform, said third means being operably connected to receive said amplified waveform;

(e) an enable circuit interconnecting the cellular telephone and at least one of the following: said first means, said second means and said amplifying means, said enable circuit being operable to render the apparatus operative to produce said audible sound.

5,025,468
COMPUTERIZED SYSTEM FOR INCOMING CALLS

Parminder S. Sikand, Richmond; Mary J. McAllister, San Anselmo; John Henel, Richmond; Allen L. Jackson, Penngrove, and Karen Bell, Rohnert Park, all of Calif., assignors to Harris Corporation, Melbourne, Fla.

Filed May 4, 1989, Ser. No. 347,531

Int. Cl.^{5} H04Q *3/64*

U.S. Cl. 379—67 39 Claims

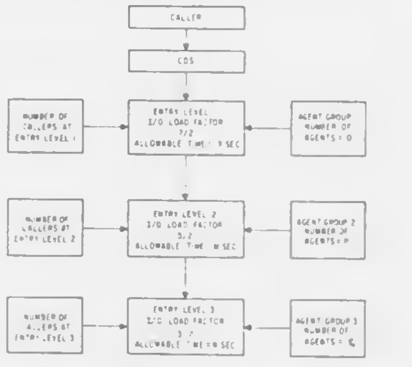
1. A method of queuing callers connected to an automatic call distribution system (ACD). comprising the steps of:

a. establishing a queue for the callers;

b. establishing groups of agents, each of said groups having one or more agents for responding to the said callers;

c. establishing a series of entry levels;

d. establishing a load factor for each of said entry levels related to the respective number of callers, with each of said entry levels arranged in a hierarchy of increasing priority levels, and with said increasing priority levels being indicative of an increased probability an agent will respond to the caller in said queue; and


CALLER
CDS
NUMBER OF CALLERS AT ENTRY LEVEL 1
ENTRY LEVEL 1 S/O LOAD FACTOR 1/2 ALLOWABLE TIME = SEC
AGENT GROUP 1 NUMBER OF AGENTS = 10
NUMBER OF CALLERS AT ENTRY LEVEL 2
ENTRY LEVEL 2 S/O LOAD FACTOR 3/4 ALLOWABLE TIME = SEC
AGENT GROUP 2 NUMBER OF AGENTS = 8
NUMBER OF CALLERS AT ENTRY LEVEL 3
ENTRY LEVEL 3 S/O LOAD FACTOR 3/4 ALLOWABLE TIME = SEC
AGENT GROUP 3 NUMBER OF AGENTS = 6

e. determining whether the said load factor has been exceeded at any of said entry points;

f. moving at least one caller from said entry level where said load factor has been exceeded to the next in said series of entry levels.

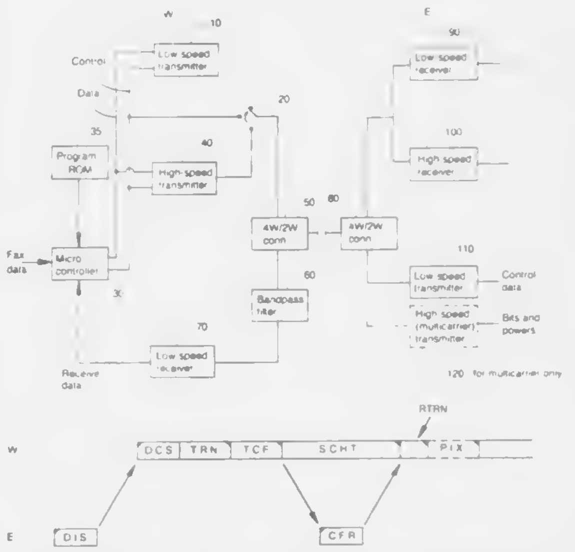
5,025,469
METHOD AND APPARATUS FOR REDUCING THE TURN-AROUND TIME IN FACSIMILE TRANSMISSION

John A. C. Bingham, 2353 Webster St., Palo Alto, Calif. 94301

Filed Feb. 6, 1990, Ser. No. 475,455

Int. Cl.^{5} H04M *11/00*

U.S. Cl. 379—98 7 Claims



5. An apparatus in a device for sending facsimile data via a communication link from a source modem to a destination modem, each having a receiver and a transmitter, using a half-duplex protocol whereby, in sequence, said source modem sends a signal to said destination modem to synchronize and train its receiver, said destination modem sends a command signal back to said source modem, and said source modem sends a resynchronizing and retraining signal followed by data, an apparatus for preventing the re-routing of some sections of said communication link and speeding the resynchronization

VOL
1127
ISS
3
JE
18
1991
UMI

and retraining of the receiver of said destination modem, said apparatus comprising:
- means for recognizing the beginning and end of the time periods when said source modem is awaiting a response from said destination modem or is receiving and decoding said response; and
- means for transmitting, during said periods, a holding signal that occupies a band or bands of frequencies separate from that occupied by said command signal.

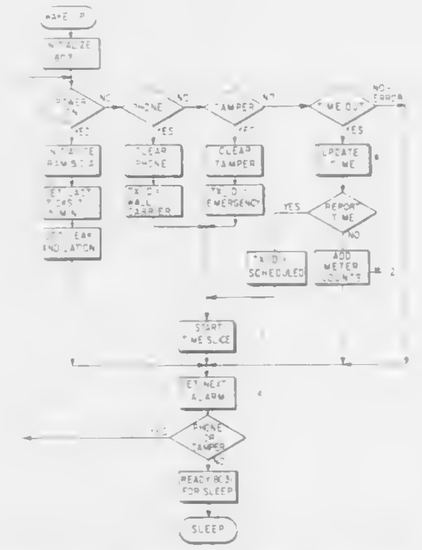
5,025,470
AUTOMATIC METER READING SYSTEM WITH MALFUNCTION PROTECTION

Raymond J. Thornborough, Menomonee Falls, and Donald H. Strobel, Cedarburg, both of Wis., assignors to Badger Meter, Inc., Milwaukee, Wis.

Division of Ser. No. 109,446, Jun. 19, 1987, Pat. No. 4,866,761, which is a continuation-in-part of Ser. No. 876,896, Jun. 20, 1986, Pat. No. 4,817,131. This application Sep. 8, 1989, Ser. No. 404,686

Int. Cl.^{5} H04M *11/00*

U.S. Cl. 379—107 **11 Claims**



1. A malfunction protection system, comprising: malfunction detecting means having input terminals, and metering means having output terminals arranged to be coupled through connecting lead wire means to said input terminals of said malfunction detecting means for transmission of metering pulses to said malfunction detecting means, said metering means in developing metering pulses being arranged to shift between a first state in which a predetermined low impedance is presented between said output terminals thereof and a second state in which a predetermined higher impedance is presented between said output terminals of said metering means, and said malfunction detecting means including voltage supply means, impedance means coupling said voltage supply means to said input terminals of said malfunction detecting means, and voltage comparator means coupled to said input terminals of said malfunction detecting means to respond to changes in the impedance presented by said metering means and connecting lead wires, said comparator means being arragned to develop metering signals in response to shifts between voltages at said input terminals of said malfunction detecting means which correspond to said predetermined low impedance and high impedance states of said metering means, and said comparator means being arranged to develop a malfunction signal in response to a voltage at said input terminals of said malfunction detecting means which is substantially outside a range of voltages at said input terminals of said malfunction detecting means which correspond to said predetermined low impedance and higher impedance states of said metering means.

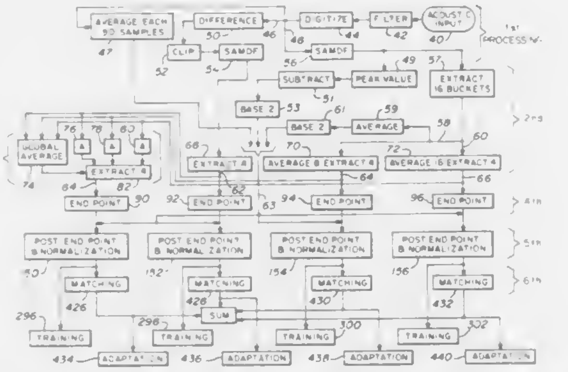
5,025,471
METHOD AND APPARATUS FOR EXTRACTING INFORMATION-BEARING PORTIONS OF A SIGNAL FOR RECOGNIZING VARYING INSTANCES OF SIMILAR PATTERNS

Brian L. Scott; Lloyd A. Smith; J. Mark Newell; Bruce E. Balentine, and Lisan S. Lin, all of Denton, Tex., assignors to Scott Instruments Corporation, Denton, Tex.

Filed Aug. 4, 1989, Ser. No. 389,682

Int. Cl.^{5} G10L *5/00*

U.S. Cl. 381—43 **38 Claims**



1. A method for processing an acoustic input speech signal for extraction of individual utterances comprising the steps of:
- (a) converting said speech signal into a first and second sequence of speech related samples;
- (b) correlating the first sequence of speech related samples to derive a first histogram representing the input speech signal;
- (c) correlating the second sequence of speech related samples to derive a second histogram representing the input speech signal;
- (d) compressing the first and second histograms to derive a plurality of spaced channels;
- (e) generating a compression histogram representing at least a part of the input speech signal from the spaced channels;
- (f) repeating steps (a)–(e) to generate a sequence of compression histograms said sequence of compression histogram representing a transformation of the input speech signal;
- (g) identifying end points for each utterance in the sequence of compression histograms; and
- (h) extracting individual utterances from the sequence of compression histograms between the identified utterance end points.

5,025,472
REVERBERATION IMPARTING DEVICE

Yasushi Shimizu, and Fukushi Kawakami, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed May 25, 1988, Ser. No. 198,473

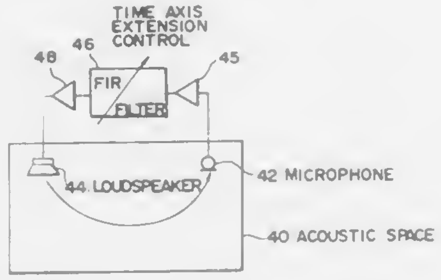
Claims priority, application Japan, May 27, 1987, 62-130343

Int. Cl.^{5} H03G *3/00*

U.S. Cl. 381—63 **11 Claims**

1. A reverberation imparting device comprising:
- a microphone means disposed in an acoustic space for picking up sound in the acoustic space;
- loudspeaker means disposed in the acoustic space for diffusing the sound picked up by said microphone means; and
- feedback means comprising a signal processing circuit for electrically processing an electric signal corresponding to the sound picked up by said microphone means, an output of said signal processing circuit being supplied to said loudspeaker means,

- said microphone means, feedback means and loudspeaker means forming a feedback loop, and
- said signal processing circuit in said feedback means comprising means for subjecting a composite impulse response to a convolution operation to provide an output representative of the convolved impulse response to said loudspeaker means and means for increasing all delay times of impulse responses to increase reverberation time and decreasing all delay times of impulse responses to decrease reverberation time.



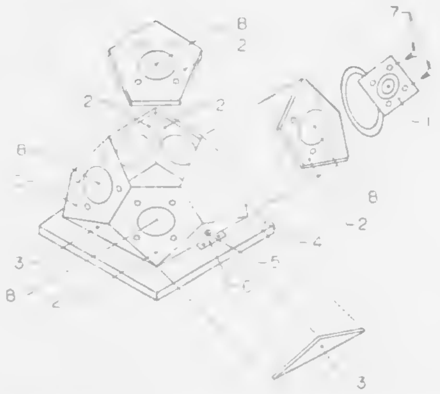
5,025,473
HEMISPHERICAL SPEAKER SYSTEM

George D. Carlseo, II, 1145, Sea Village Dr., Cardiff, Calif. 92007, and Ronald W. Vale, 416 W. San Ysidro Blvd., Suite L612, San Ysidro, Calif. 92073

Filed Aug. 24, 1989, Ser. No. 399,236

Int. Cl.^{5} H04R *1/02, 25/00;* **H05K** *5/00*

U.S. Cl. 381—88 **4 Claims**



1. An arrangement of divergently mounted acoustic transducers comprising:
- a substantially air tight frame with the general shape of a polyhedron having six sides plus a base, said polyhedron being formed by bisecting a dodecahedron twelve sided polyhedron at its equitorial plane, a base plate closing the bottom of said frame, said base plate having a top surface and a bottom surface;
- the six sides of said frame each having substantially identical equal-sided pentagonal shaped plates, said pentagonal shaped plates having their sides beveled at an angle of 33 degrees;
- five substantially identical triangularly shaped gussets, each gusset having a 108 degree angle and two base angles of 36 degrees each, the two equal length sides of said gussets being beveled at an angle of 33 degrees to mate with their corresponding equal-sided pentagonal shaped plates, the remaining side of said triangularly shaped gussets being beveled at an angle of 123 degrees to mate with the top surface of said base plate; and
- an acoustic transducer mounted in each of said pentagonal shaped plates, said acoustic transducers being substantially identical and being electrically connected to operate in phase.

5,025,474
SPEAKER SYSTEM WITH IMAGE PROJECTION SCREEN

Tsuneo Tanaka, Nishinomiya; Kazue Sato, Neyagawa; Hiroyuki Takewa, Kaizuka; Akira Kurozuka, Neyagawa; Tadashi Tamura, Kadoma; Katsuji Hattori, Takarazuka; Satoshi Takayama, Hirakata; Kosaku Murata, Kobe; Katsuaki Satoh, Osaka; Mitubiko Serikawa, Hirakata; Youichi Kimura, Ashiya, and Shuichi Ohata, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

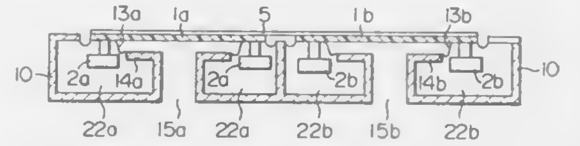
Filed Sep. 27, 1988, Ser. No. 249,954

Claims priority, application Japan, Sep. 29, 1987, 62-245101; Nov. 20, 1987, 62-294418; Dec. 1, 1987, 62-305016

The portion of the term of this patent subsequent to Feb. 6, 2007, has been disclaimed.

Int. Cl.^{5} H04R *1/02*

U.S. Cl. 381—90 **18 Claims**



1. A speaker system comprising:
- an acoustic diaphragm having a front surface and a rear surface, said front surface carrying an image projection screen thereon;
- a driving unit provided on said rear surface of said diaphragm, for driving said diaphragm; and
- a cabinet provided on said rear surface of said diaphragm and defining an open space and a closed space therein so as to expose a part of said rear surface of said diaphragm to said open space and to enclose the other part of said rear surface of said diaphragm within said closed space.

5,025,475
PROCESSING MACHINE

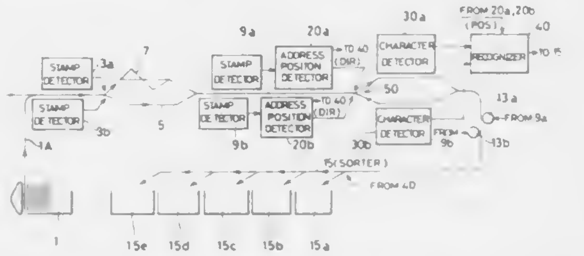
Yoshie Okabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Feb. 24, 1988, Ser. No. 159,927

Claims priority, application Japan, Feb. 24, 1987, 62-39207

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—1 **6 Claims**



1. A mail processing machine, comprising:
- (a) means for feeding a piece of mail having first and second surfaces;
- (b) first detecting means for detecting the presence of a destination mail address on the first surface of the piece of mail, wherein the first detecting means comprises:
  - first light emitting means for emitting light onto the first surface of the piece of mail for coarse scanning; and
  - first photosensitive means, coupled to the first light emitting means, for detecting light emitted from the first

VOL
1127
ISS
3
JE
18
1991
UMI

light emitting means and reflected from the piece of mail to obtain destination mail address information;

(c) second detecting means for detecting the presence of a destination mail address on the second surface of the piece of mail, wherein the second detecting means comprises:
second light emitting means for emitting light onto the second surface of the piece of mail for coarse scanning; and
second photosensitive means, coupled to the second light emitting means, for detecting light emitted from the second light emitting means and reflected from the piece of mail to obtain destination mail address information;

(d) means for determining a front side of the mail on which the destination mail address is detected to be present according to the presence of one of a destination mail address window, a destination mail address label, and a predetermined number of letters in the destination mail address, wherein the means for determining comprises:
first quantizing means, coupled to the first and second photosensitive means, for quantizing detected destination mail address information in accordance with a first slice level to generate a first destination address position signal indicative of any one of a destination address window and a destination address label;
second quantizing means, coupled to the first and second photosensitive means, for quantizing detected destination mail address information in accordance with a second slice level, lower than the first slice level, to generate a second destination address position signal indicative of destination address character;
third quantizing means coupled to the second detecting means;
first integrating means, coupled to the second quantizing means, for integrating the second destination mail address signal;
second integrating means, coupled to the third quantizing means, for integrating the signal output therefrom; and
comparing means, coupled to the second and third integrating means, for comparing the destination signal from the first integrating means with the signal from the second integrating means to determine mail front surface;

(e) third detecting means for detecting the destination mail address on the first surface of the piece of mail, when the first surface is determined as the front side of the mail;

(f) fourth detecting means for detecting the destination mail address on the second surface of the piece of mail, when the second surface is determined as the front side of the mail; and

(g) means for recognizing two types of an address including a handwritten address and a printed address and for deciding to which of the two types the destination mail address, detected by one of the third and fourth detecting means, belongs.

5,025,476

REDOTOPOGRAPHY APPARATUS AND METHOD USING MOIRé FRINGE ANALYSIS TO MEASURE FOOT SHAPES

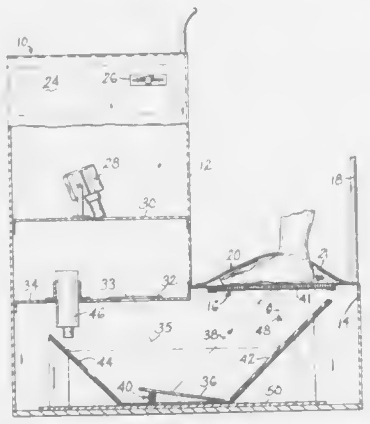
Nathaniel Gould, Boca Raton, Fla.; Michael Footes, Hinesburg, and Tyler R. Thessin, South Burlington, both of Vt., assignors to Nathaniel Gould Diagnostics, Inc., Wallingford, Conn.

Filed Oct. 31, 1988, Ser. No. 264,908

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—2 28 Claims

1. A pedotopography apparatus comprising:
means for producing a moiré fringe pattern representative of the topography of the underside of a foot to be analyzed;
said fringe pattern being formed between the line grading and the line grating shadow on the underside of the foot;
image capture means for capturing and storing an image of the moiré fringe pattern in an image storage buffer;
image processing means for enhancing edges in the captured image;
image analyzing means operatively connected to the image capture means for analyzing the image of the moiré fringe pattern to locate at least two points of interest on the foot; and
computing means for calculating information corresponding to the distance between the two points.



5,025,477

METHOD FOR OPTICALLY SENSING MARKS ON OBJECTS AND APPARATUS FOR CARRYING OUT THE METHOD

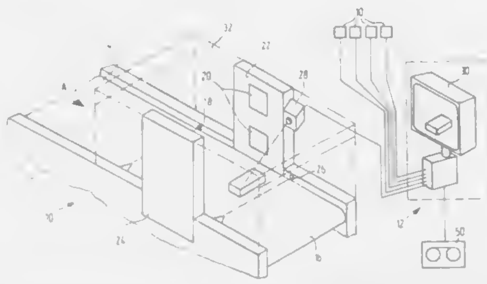
Guenter Baitz, Berlin, and Rudolf Behling, Moelin, both of Fed. Rep. of Germany, assignors to Siemens Nixdorf Informationssysteme AG, Paderborn, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 339,054

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813725

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—8 13 Claims



1. An apparatus for optically sensing markings on objects at a plurality of separate detection stations at each of which objects are transported by a transport apparatus through the sensing area of an optical sensing apparatus and whereby an object upon unsuccessful sensing of its markings is viewed by a camera means and a pictorial representation of the object produced by the camera means is transmitted to a central station, each of said detecting stations having a transport apparatus for moving the objects to be identified along a given path, means providing a tunnel at least partially covering a portion of said path, an optical sensing apparatus associated with said tunnel for identifying markings on the objects transported along said path by said transport apparatus, said transport apparatus being divided into at least first and second conveyor areas located successively along said path with each of said first and second areas having associated with it an individually controllable conveyor arrangement, said optical sensing apparatus being associated with said second conveyor area, two sensing arrangements located respectively in front of and following said sensing apparatus with respect to the general direction of movement of objects along said path for registering the passage of an object into and out of association with said optical sensing apparatus, and at least one camera provided in said second conveyor area for forming a pictorial representation of an object located within said second conveyor area which pictorial representation may be transmitted to said central station and/or stored in a memory.

5,025,478

METHOD AND APPARATUS FOR DETECTING FALSE EDGES IN AN IMAGE

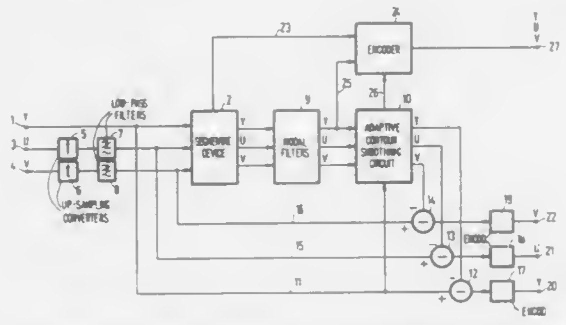
Octavius J. Morris, Redhill, and David Moran, Crawley, both of England, assignors to U.S. Philips Corp., New York, N.Y.

Filed Mar. 19, 1990, Ser. No. 496,375

Claims priority, application United Kingdom, Mar. 22, 1989, 8906587

Int. Cl.^{5} G06K *9/46*

U.S. Cl. 382—22 8 Claims



1. A method of processing a picture signal for conveyance by means of a transmission path or storage medium, said method comprising the steps of:
i) producing a picture signal which corresponds to a picture,
ii) subjecting said picture signal to a segmentation algorithm to produce a region signal which identifies edges and closed regions in said picture,
iii) producing a texture signal which corresponds to the difference between said picture signal and said region signal,
characterised in that said method comprises the further steps of
iv) selecting, at least a portion of a boundary between two adjacent regions in said region signal,
v) determining the mean values of the region signal in areas immediately adjacent to and on either side of said boundary portion and forming the difference between these mean values,
vi) determining the mean values of the picture signal in corresponding areas immediately adjacent to and on either side of the boundary portion identified in said region signal and forming the difference between these means values,
vii) comparing the said difference obtained in step (v) with that obtained in step (vi), and
viii) using the result of the comparison performed in step vii) to determine whether the said boundary represents a true or false edge.

5,025,479

RECOGNITION METHOD FOR CHARACTER SET

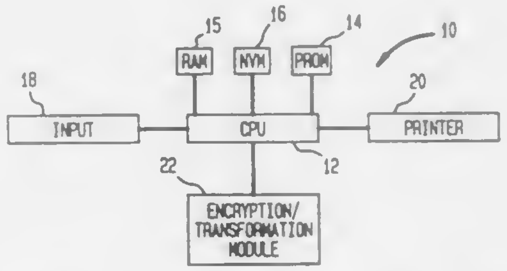
Jose Pastor, 191 Wilton Rd., Westport, Conn. 06880

Filed Sep. 19, 1988, Ser. No. 245,610

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—38 13 Claims

1. A method for recognizing characters selected from a character set having N characters having the form of connected graphs, the nodes of said graphs being positioned on a predetermined grid; comprising the steps of:
a) scanning one of said characters to determine features of said scanned character said features including the number of type 1 and type 3 points in said graph, wherein said type 1 points are nodes of said graph where one branch is connected and said type 3 points are nodes of said graph where three branches are connected;
b) making a first level classification of said scanned character based upon said determined numbers of type 1 and type 3 points; and



c) making a further classification of said scanned character based on the spatial relationships between said type 1 and type 3 points and recognition rules selected in accordance with said first level classification.

5,025,480

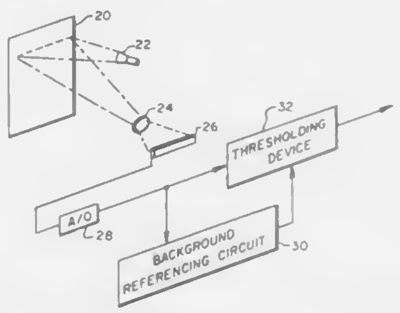
BACKGROUND REFERENCING

Roger A. Morton, Penfield, and Thomas J. Wetzel, Greece, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 23, 1987, Ser. No. 29,121

Int. Cl.^{5} G06K *9/38*

U.S. Cl. 382—50 14 Claims



1. Background referencing apparatus for use with apparatus for scanning documents having images with object and background regions, wherein said background referencing apparatus (1) receives, from the scanning apparatus, a video signal having a value representing the document image, (2) generates a signal having a value representative of an estimate of a background density level of a document being scanned, and (3) further comprises:
means for storing a generated estimated background level signal; and
means responsive to a generated estimated background level signal and a received video signal for producing an estimate-updating signal (1) when a received video signal changes in value in a direction associated with a transition from object to background, and (2) when a received video signal makes only a small change in value in a direction associated with transition from background to object, whereby large transitions from background to object result in substantially no change in a stored estimated background level signal.

VOL
1127
ISS
3
JE
18
1991
UMI

5,025,481

DOT REGION DISCRIMINATING METHOD

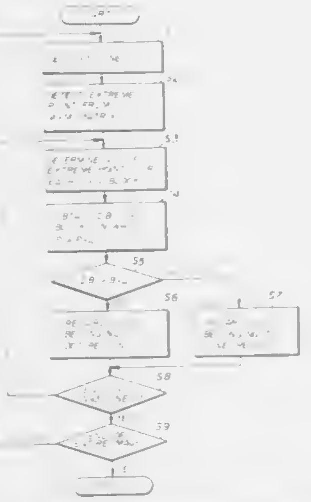
Satoshi Obuchi, Tokyo, Japan, assignor to Ricob Company, Ltd., Japan

Filed Oct. 4, 1989, Ser. No. 417,074

Claims priority, application Japan, Oct. 21, 1988, 63-263884; Oct. 24, 1988, 63-266212; Oct. 26, 1988, 63-268311; Oct. 26, 1988, 63-268312; Nov. 2, 1988, 63-275999

Int. Cl.^{5} G06K *9/38*

U.S. Cl. 382—53 **70 Claims**



1. A dot region discriminating method for discriminating a dot region of an image which is described by a digital multilevel input image signal, said dot region discriminating method comprising:

(a) an extreme point detecting step for detecting one or a plurality of extreme points from a first local region within the image, each of said extreme points corresponding to a peak or a valley of a density change of a picture element within said first local region, said first local region corresponding to a matrix which comprises M×M picture elements;

(b) a dot region detecting step for detecting whether or not

(1) one of a center picture element within one of said second local regions of the image or

(2) one of said second local regions, belongs to a dot region;

wherein the dot region detecting step is based on a distribution of the extreme points detected within said first local region by said extreme point detecting step, and wherein each of said second local regions corresponds to a block which comprises N×N picture elements; and

(c) a discriminating step for discriminating the dot region of the image based on the detection made by said dot region detecting step.

5,025,482

IMAGE TRANSFORMATION CODING DEVICE WITH ADAPTIVE QUANTIZATION CHARACTERISTIC SELECTION

Tokumichi Murakami; Kohtaro Asai, and Kazuhiro Matsuzaki, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 21, 1990, Ser. No. 525,588

Claims priority, application Japan, May 24, 1989, 1-128867

Int. Cl.^{5} G06K *9/36*

U.S. Cl. 382—56 **4 Claims**

1. A transformation coding device comprising:

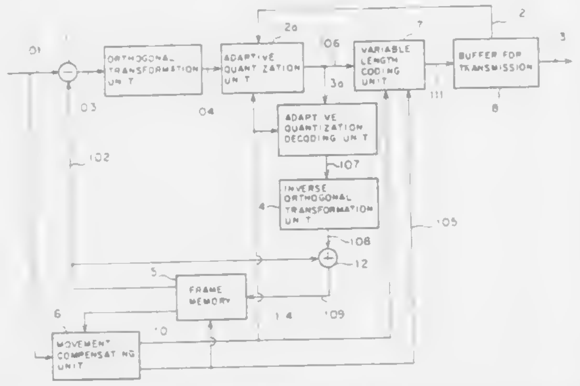
a movement compensating unit which divides a digital image input signal series into a plurality of blocks, and thereafter compares respective blocks with corresponding preceding frame image signals located at the same spatial positions or in the vicinity of said position, detects the most similar portions of said blocks from among said preceding frame image signals, and outputs a spatial amount of displacement between said blocks and the similar portions of said preceding frame image signals as a motion vector;

a subtractor which subtracts a prediction signal between movement compensating frames produced in accordance with said motion vector from said digital image input signal and a generates difference signal corresponding to the result of said subtraction;

an orthogonal transformation unit which applies orthogonal transformation to said difference signal and outputs a transformation coefficient;

an adaptive quantization unit which selects one quantization characteristic from among a plurality of predetermined quantization characteristics in accordance with both the degree of similarity of the prediction signal between movement compensating frames for said block digital image signal series and a sequence of said transformation coefficient and applies quantization to said transformation coefficient according to the selected quantization characteristic;

an adaptive quantization decoding unit which selects one quantization characteristic from among a plurality of predetermined quantization characteristics corresponding to both the degree of similarity of the prediction signal between movement compensating frames and the sequence of said transformation coefficient, and applies quantization decoding to the quantized transformation coefficient from said adaptive quantization unit;


01
ORTHOGONAL TRANSFORMATION UNIT
ADAPTIVE QUANTIZATION UNIT
VARIABLE LENGTH CODING UNIT
BUFFER FOR TRANSMISSION
2a
06
7
2
3
03
04
3a
111
8
ADAPTIVE QUANTIZATION DECODING UNIT
102
107
INVERSE ORTHOGONAL TRANSFORMATION UNIT
4
105
108
12
5
FRAME MEMORY
6
14
109
10
MOVEMENT COMPENSATING UNIT

an inverse orthogonal transformation unit which applies inverse orthogonal transformation to the quantization decoded transformation coefficient to produce a difference signal between decoded frames;

an adder which adds said difference signal between decoded frames and said prediction signal between movement compensating frames to produce a decoded image signal;

a frame memory which stores said decoded image signal temporarily to output said prediction signal between movement compensating frames in accordance with said motion vector;

a variable length coding unit which applies variable length coding to said quantized transformation coefficient and outputs the result as coded data; and

a transmitting buffer which stores said coded data temporarily, outputs them with a fixed bit rate, and at the same time, outputs an amount of buffer data storage as a feedback signal to said adaptive quantization unit in order to prevent buffer overflow

5,025,483

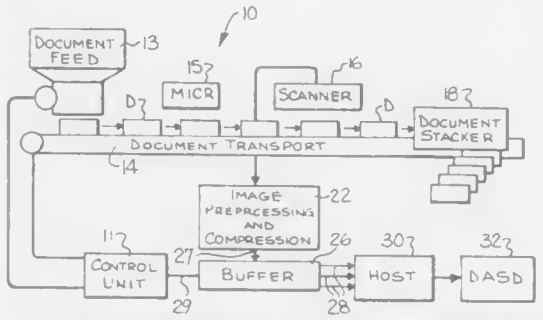
SYSTEM FOR SCANNING DOCUMENTS WITHOUT LOSS OF IMAGE DATA

Raymond F. Dinan, Mint Hill; Hugh C. Fallon; Jerald R. Malin, both of Charlotte; Robert R. Rodite, Matthews; Clair F. Rohe, Charlotte, and Gene D. Rohrer, Concord, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 134,493, Dec. 18, 1987, abandoned. This application Jan. 25, 1990, Ser. No. 469,967

Int. Cl.^{5} G06K *9/20*

U.S. Cl. 382—58 **10 Claims**



1. A system for capturing video image data from documents comprising

document feed means for feeding successive documents from a hopper to a document transport,

document transport means for receiving each successively fed document and advancing the respective documents past a document scanner,

document scanner means for scanning the successively transported documents and for generating therefrom video image data, the quantity of which may vary widely depending upon the amount of information present on the document,

a buffer for receiving and temporarily storing video image data,

data input means for directing video image data obtained from said document scanner means into said buffer,

data output means cooperating with said buffer for extracting video image data from the buffer, and

control means cooperating with said buffer and operable to perform a hierarchy of control actions over the flow of video image data into said buffer to assure data integrity and prevent loss of data, said control means including

a first control action means operable in response to the level of stored data in said buffer reaching a first threshold for effecting stopping of the feed of additional documents by said document feed means while allowing documents already in the document transport to continue in process, and

a second control action means for sensing the rate at which said buffer is filling with data, and in response to said rate exceeding a predetermined limit, said second control action means being operable for effecting stopping of the feed of additional documents by said document feed means even though said first threshold may not have been met.

5,025,484

CHARACTER READER DEVICE

Masaya Yamanari, and Masami Ikeda, both of Ohme, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 15, 1988, Ser. No.-232,189

Claims priority, application Japan, Dec. 11, 1987, 62-314349

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—61 **6 Claims**

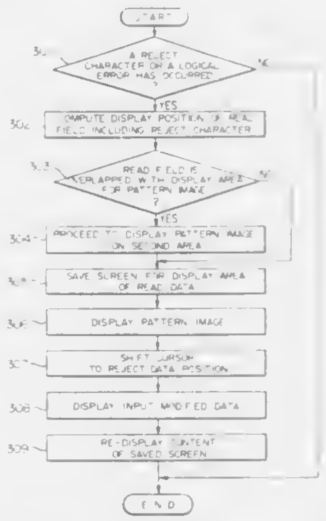
1. A character reading apparatus for processing an input data sheet including character data, the character reading apparatus for use with a computer system including a display apparatus having a plurality of display areas including at least first and second display areas, the character reading apparatus comprising:

scanner means for scanning the input data sheet and for producing an output image data corresponding to the input data sheet;

character recognizing means for recognizing a character having a clarity of at least a predetermined level in the output image data;

reject character detecting means for detecting a reject character having a level of clarity below the predetermined level in the output image data;

pattern image generating means for reproducing a reject character image corresponding to the reject character;


START
A REJECT CHARACTER OR A LOGICAL ERROR HAS OCCURRED ?
NO
YES
COMPUTE DISPLAY POSITION OF READ FIELD INCLUDING REJECT CHARACTER
READ FIELD IS OVERLAPPED WITH DISPLAY AREA FOR PATTERN IMAGE ?
NO
YES
PROCEED TO DISPLAY PATTERN IMAGE ON SECOND AREA
304
SAVE SCREEN FOR DISPLAY AREA OF READ DATA
DISPLAY PATTERN IMAGE
SHIFT CURSOR TO REJECT DATA POSITION
DISPLAY INPUT MODIFIED DATA
308
RE-DISPLAY CONTENT OF SAVED SCREEN
309
END

position computing means for computer a display position on the display apparatus in accordance with the recognized character and the reject character;

display control means for displaying an image of each of the recognized character and the reject character in accordance with the display position from the position computer means, and for selectively displaying the reject character image in the first display area or the second display area;

decision means for determining whether the displayed reject character overlaps the first display area; and

shifting means for shifting the displayed reject character image to the second display area when the decision means determines that the displayed reject character overlaps the first display area.

5,025,485

MULTI-FEED, MULTI-CHANNEL COMMUNICATION SYSTEM

Rezso J. Csongor, King of Prussia, Pa., and Leroy J. Tangradi, Bellmawr, N.J., assignors to General Electric Company, East Windsor, N.J.

Filed Jan. 12, 1989, Ser. No. 296,456

Int. Cl.^{5} H04B *7/19*

U.S. Cl. 455—12 **12 Claims**

1. A multifeed, multichannel communications system, comprising:

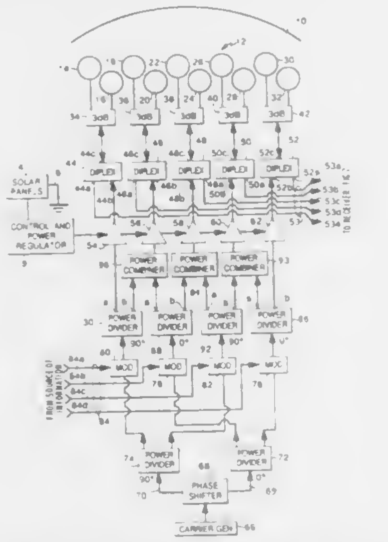
first, second and third signal sources, each generating a signal at the same carrier frequency, and each being adapted to be modulated with independent information, said first and third sources being at the same reference phase of said carrier, and said second signal source being in phase quadrature with said reference phase;

first, second, third and fourth radiating means, said first and second radiating means being physically contiguous, said second and third radiating means being physically contig-

VOL
1127
ISS
3
JE
18
1991
UMI

uous, and said third and fourth radiating means being physically contiguous; and

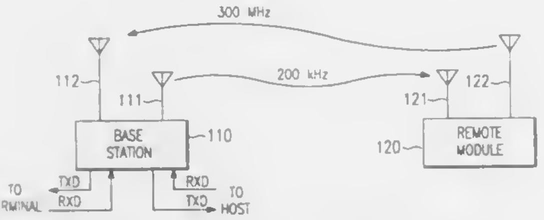
coupling means coupled to said first, second and third signal sources and to said first, second, third and fourth radiating means, for dividing the signal power of each of said first, second and third signal sources into first and second equal portions, and for coupling said second portion of said signal power of said first signal source to said first radiating means, said first portion of said signal power of said second signal source together with said first portion of said signal power of said first signal source to said second radiating means, said first portion of said signal power of said third signal source together with said second portion of said signal power of said second signal source to said third radiating means, and said second portion of said signal power of said third signal source to said fourth radiating means.



5,025,486

WIRELESS COMMUNICATION SYSTEM WITH PARALLEL POLLING

Kevin M. Klughart, Addison, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.
Filed Dec. 9, 1988, Ser. No. 282,406
Int. Cl.^{5} H04J *3/16*
U.S. Cl. 455—54 **20 Claims**



1. A wireless communication system, comprising:

at least one base station, and a set of remote modules;

wherein said base station includes a first RF transmitter capable of operation at a first frequency, and a second RF receiver capable of operation at a second frequency;

and wherein each of said remote modules includes a first RF receiver capable of operation at said first frequency, and a second RF transmitter capable of operation at said second frequency;

and said first transmitter and said second receiver of said base station, and said second transmitter and said first receiver of said remote module, are connected so that said base station and said remote module can carry on data communications on said first and second frequencies, but only while in mutual proximity;

wherein said base station can broadcast a polling command, over said first frequency, to ascertain what remote modules are in proximity at a given moment;

whereupon, if a respective one of said modules happens to be in proximity to said base station and respective module will receive said poling command through said respective first receiver, and will respond to said polling command, throuyh said respective second transmitter thereof, with a response which includes an identification field;

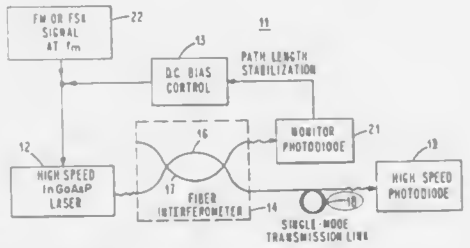
and wherein at least a portion of said identification field contains bit positions which are individually, and not combinatorially or numerically, assigned to correspond to respective subsets of said set of remote modules;

and wherein said base station contains logic to decode response to said polling command, and to determine the presence of multiple ones of said subsets of said modules, if ones of said subsets simultaneously respond to said polling command.

5,025,487

SYSTEM FOR TRANSMITTING INFORMATION ON INTERFEROMETRICALLY GENERATED OPTICAL CARRIERS

Elliot G. Eichen, Arlington, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.
Continuation-in-part of Ser. No. 4,504, Jan. 20, 1987, Pat. No. 4,749,277. This application Jun. 7, 1988, Ser. No. 203,661
Int. Cl.^{5} H04B *10/04*
U.S. Cl. 455—618 **5 Claims**



1. An optical transmitter, comprising:

means for generating a sinusoidal drive signal;

means for modulating said drive signal with an information signal;

a semiconductor laser;

means for applying said modulated drive signal and a DC bias signal to said laser for modulating said laser, wherein the modulated output spectrum from said laser has both frequency modulated components and amplitude modulated components;

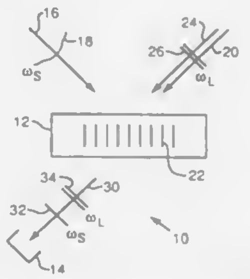
interferometric means for splitting said laser output signal into two separate light beams which subsequently travel over respective path lengths having an optical path difference therebetween before being combined into an output signal; and

means for adjusting said optical path difference to a selected value such that the output signal from said interferometric means is due solely to frequency modulated components at either even harmonics or odd harmonics of said modulated drive signal in accordance with said selected path difference, said harmonics being at frequencies which are much greater than the bandwidth of said laser.

5,025,488

OPTICAL HETERODYNE DETECTOR

Pochi A. Yeh, Thousand Oaks, and John H. Hong, Moorpark, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.
Filed Nov. 16, 1989, Ser. No. 437,968
Int. Cl.^{5} G02F *1/00*
U.S. Cl. 455—619 **10 Claims**



1. An optical heterodyne detector comprising:

a received optical signal beam, said signal beam having a first frequency and a first wave front carrying spatial information;

an optical reference beam having said first frequency and a second wave front;

a local oscillator beam alternated in time with said reference beam, said local oscillator beam having a second frequency and said second wave front;

a nonlinear optical medium for receiving and mixing said signal beam and said reference beam to produce a hologram in said nonlinear medium, said hologram containing said spatial information of said received optical signal beam;

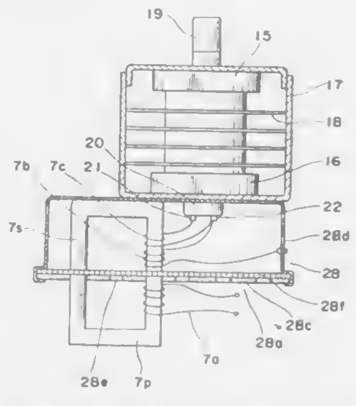
an output beam comprising diffracted and undiffracted components of said signal beam and said local oscillator beam passing through said hologram; and

a photodetector for detecting an optical heterodyne signal produced by said components of said output beam.

5,025,489

TRANSFORMER HAVING SHIELDING WALL FOR DRIVING A MAGNETRON

Kimiaki Yamaguchi, Nara, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Continuation of Ser. No. 194,281, May 16, 1988, abandoned. This application Jun. 19, 1990, Ser. No. 540,870
Claims priority, application Japan, May 14, 1987, 62-117337; May 14, 1987, 62-117342
Int. Cl.^{5} H05B *6/76;* H01F *15/04*
U.S. Cl. 219—10.55 B **16 Claims**

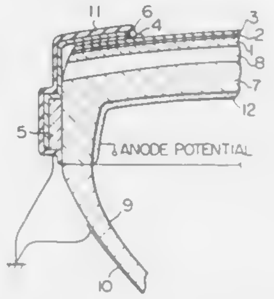


1. A transformer comprising a primary coil winding, a secondary coil winding, and a wave shielding wall provided between the primary coil winding and secondary coil winding and having an external shape constructed by plates of metal, the plates being provided with numerous through holes each disposed vertically relative to a plane of one of the plates and having a cross-section defining a polygon, each through hole being arranged at a position adjacent to at least one other in an arrangement of a common wall plate being formed at a front and rear sides as wall planes, the thickness of the plates constructing the wall planes of each of the through holes being provided in a dimension of less than about one tenth a depth of penetration of an electromagnetic wave with respect to an employed frequency of the transformer to be determined in relationship with the material of the plates.

5,025,490

CATHODE-RAY TUBE WITH ITS DISPLAY FRONT PROTECTED FROM UNDESIRABLE ELECTRIFICATION

Katsuyoshi Tamura, Mobara, Japan, assignor to Hitachi, Ltd., Tokyo, Japan
Filed Aug. 29, 1989, Ser. No. 400,000
Claims priority, application Japan, Sep. 19, 1988, 63-232301
Int. Cl.^{5} H01J *29/87;* H04N *5/65*
U.S. Cl. 313—479 **23 Claims**



1. A cathode-ray tube including an anode to be supplied with a high voltage in operation, comprising:

a glass bulb having a panel portion;

a transparent, electrical conductive film fixed with respect to an outer surface of said panel portion;

a transparent, electrical insulating layer provided on said conductive film; and

an electrode unit provided on said insulating layer and electrical connected with a common potential line, said high voltage being established with respect to said common potential, said electrode unit, said electrical insulating layer and said electrical conductive film forming a capacitor.

5,025,491

DYNAMIC ADDRESS BINDING IN COMMUNICATION NETWORKS

Paul F. Tsuchiya, Washington, D.C., and Robert H. Stine, Arlington, Va., assignors to The Mitre Corporation, Bedford, Mass.
Continuation of Ser. No. 210,226, Jun. 23, 1988, abandoned. This application Oct. 26, 1989, Ser. No. 427,976
Int. Cl.^{5} H04B *1/00*
U.S. Cl. 340—825.52 **45 Claims**

1. A communication network comprising

a plurality of destination stations and associated server stations,

each destination station having a unique destination address,

each server station having a unique server address,

each destination station having a unique destination name containing no predetermined indication of the address of an associated server station and no predetermined indication of a name of an associated server station,

each server station comprising means for storing the destination address of each destination station in which it is associated,

VOL
1127
ISS
3
JE
18
1991
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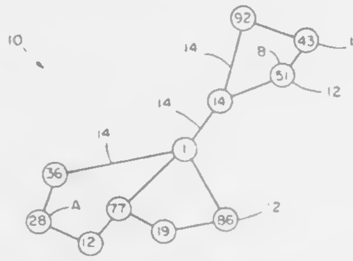
the server address being found by an algorithmic manipulation of the destination name of any destination station that is associated with the server station, the algorithmic manipulation producing an output that changes in accor-



dance with changes in a routing table containing addresses of operational server stations, so that the server address found by the algorithmic manipulation is always a server address listed on the routing table.

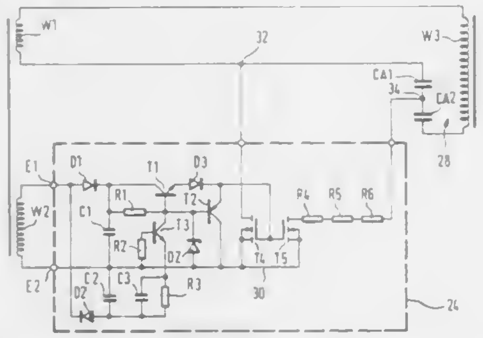
5,025,492
DAMPING CIRCUIT FOR THE ANTENNA RESONANCE CIRCUIT OF A RADIO TRANSMITTER-RECEIVER

Bruno Viereck, Marzling, Fed. Rep. of Germany, assignor to Texas Instruments Deutschland GmbH, Dallas, Tex.

Filed Apr. 11, 1990, Ser. No. 507,683

Int. Cl.⁵ G01S *13/74;* **G08B** *13/184*

U.S. Cl. 342—144 **4 Claims**



1. Damping circuit for the antenna resonance circuit of a radio transmitter-receiver which in a transmitting phase transmits a time-limited energy-rich HF interrogation pulse and in a receiving phase following the transmitting phase is ready to receive high-frequency response signals coming from a responder which transmits said response signals as a reaction to the reception of the interrogation pulse, including a damping member adapted to be connected to the antenna resonance circuit and separated therefrom, a switching means which on reception of a switching voltage connects the damping member to the antenna resonance circuit, a first energy-storage element chargeable by the HF interrogation pulse for furnishing the switching voltage and a second energy-storage element which is chargeable by the HF interrogation pulse and which in dependence upon the time profile of the HF interrogation pulse enables the application of the switching voltage present at the first energy-storage element to the switching means.

5,025,493
MULTI-ELEMENT ANTENNA SYSTEM AND ARRAY SIGNAL PROCESSING METHOD

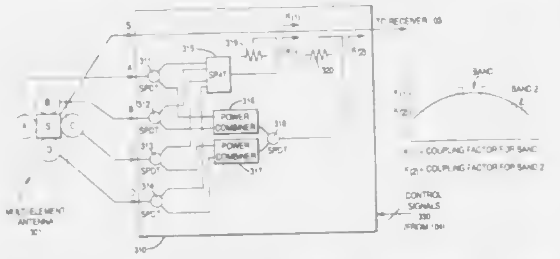
James Cook, Jr., Tucker, Ga., assignor to Scientific-Atlanta, Inc., Atlanta, Ga.

Filed Jun. 2, 1989, Ser. No. 360,823

Int. Cl.⁵ H01Q *3/02, 3/12*

U.S. Cl. 342—374 **50 Claims**

1. Antenna array processor apparatus for automatically tracking a target comprising multiple antenna elements of a multi-element antenna feed, the elements having parallel-planar apertures, a signal switching means coupled to the multiple antenna elements for selecting from a plurality of signals of the



multiple antenna elements and a signal coupler for coupling a selected signal of one of the plurality of antenna element signals with another signal of the multi-element antenna feed to produce an antenna beam steering signal.

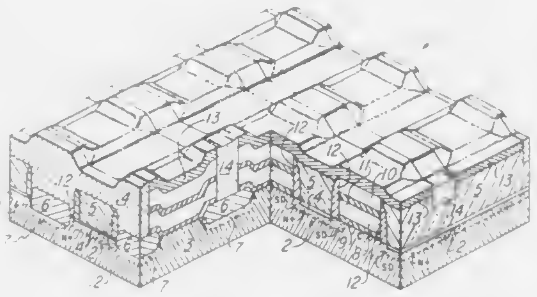
5,025,494
CROSS-POINT CONTACT-FREE FLOATING-GATE MEMORY ARRAY WITH SILICIDED BURIED BITLINES

Manzur Gill, Rosharon, and David J. McElroy, Rosenberg, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 10, 1988, Ser. No. 269,838

Int. Cl.⁵ H01L *29/68, 23/48, 27/10*

U.S. Cl. 357—23.5 **22 Claims**



1. A non-volatile memory cell array, comprising:

a plurality of parallel conductors including source-drain regions formed in a face of a semiconductor substrate, each of said conductors being a heavily-doped region of second conductivity-type opposite that of a first conductivity type of the underlying material of said semiconductor substrate, each of said source-drain regions being spaced from at least one other said source-drain region on said face by a channel area;

thick field oxide regions located at the face of said semiconductor substrate between adjacent ones of said conductors and between adjacent ones of said channel areas;

a floating gate over each said channel area, the floating gate being separated from said channel area of said face by a gate insulator layer, wherein said floating gate extends over a part of each adjacent thick field oxide region, the extensions being in directions substantially at right angles to the direction of said parallel conductors;

a control gate extending along said face over said floating gate, the control gate being separated from said floating gate by an inter-level dielectric layer; and

a plurality of separately formed wordlines contacting said control gates and extending over said control gates in a direction substantially at right angle to the direction of said parallel conductors;

wherein each of said conductors including said source-drain regions also includes a silicided region.

5,025,495
MOTION DEPENDENT VIDEO SIGNAL PROCESSING

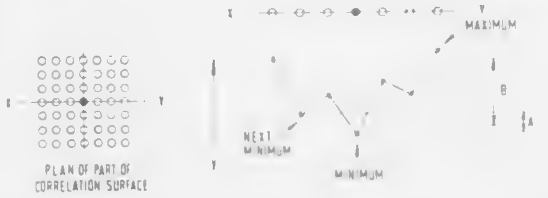
Richard J. A. Avis, Basingstoke, United Kingdom, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 20, 1990, Ser. No. 512,813

Claims priority, application United Kingdom, Apr. 27, 1989, 8909648

Int. Cl.⁵ H04N *7/01*

U.S. Cl. 358—140 **10 Claims**



1. A motion compensated video standards converter for converting a video signal conforming with a first video standard to a converted video signal conforming with a second video standard, said video signal being provided as a sequence of intervals selected from fields and frames, each of said intervals being arranged in a plurality of blocks each representing a portion of an image represented by said video signal, comprising:

comparing means for comparing each of a plurality of blocks in a first interval of said video signal with a plurality of blocks in an adjacent interval of said video signal by generating a respective correlation surface representing respective differences between the image portion represented by said each of said plurality of blocks in said first interval and the respective image portions represented by each of said plurality of blocks in said adjacent interval;

motion vector deriving means for deriving a motion vector representing motion of said image portion represented by said each of said plurality of blocks in said first interval based upon a detection of a clear minimum value of said respective correlation surface by determining whether a minimum of said respective differences represented by said respective correlation surface differs from a next smallest difference selected from at least some of said respective differences represented by said respective correlation surface by more than a predetermined amount; and

interpolator means for producing said converted video signal, said interpolator means being controlled at least in dependence on said motion vector derived by said motion vector deriving means.

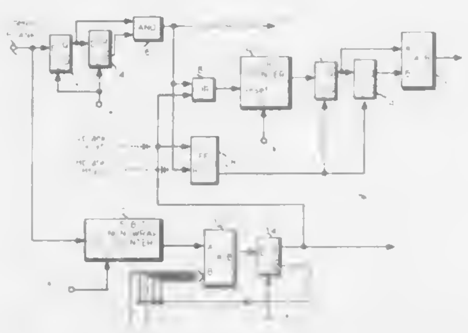
5,025,496
ODD/EVEN FIELD DETECTOR FOR VIDEO SIGNALS

Barth A. Canfield, Indianapolis, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed May 7, 1990, Ser. No. 520,205

Int. Cl.⁵ H04N *5/04*

U.S. Cl. 358—153 **7 Claims**



1. In a video signal processing system for processing video signal having first and second alternating field types, said first and second field types including horizontal and vertical signal components and differing with respect to a timing relationship of their respective horizontal and vertical signal components, apparatus for generating a field type indicating signal comprising:

means for providing a vertical signal corresponding to said vertical component;

means for providing a horizontal signal corresponding to said horizontal component;

means responsive to said vertical and horizontal signals for measuring an interval between a transition of said vertical signal and a predetermined transition of said horizontal signal, and providing a measurement value for each field; and

means for comparing the measurement value from a field with the measurement value of the immediately preceding field of video signal to provide a field type indicating signal.

5,025,497
FACSIMILE APPARATUS CONNECTED TO DATA COMMUNICATION NETWORK HAVING TIME-SAVING CAPABILITY

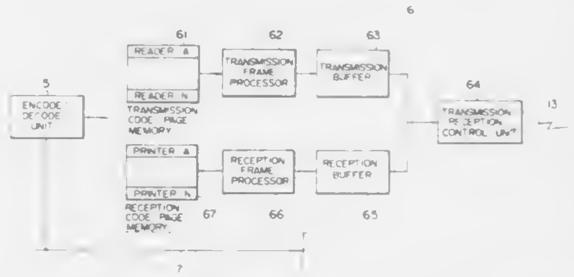
Yoshio Yoshiura, Ninomiya, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 940,497, Dec. 10, 1986, abandoned. This application Mar. 22, 1989, Ser. No. 326,447

Claims priority, application Japan, Dec. 17, 1985, 60-283992

Int. Cl.⁵ H04N *1/32*

U.S. Cl. 358—425 **15 Claims**


6
61
62
63
5
READER A
READER N
TRANSMISSION CODE PAGE MEMORY
TRANSMISSION FRAME PROCESSOR
TRANSMISSION BUFFER
64
ENCODE DECODE UNIT
TRANSMISSION RECEPTION CONTROL UNIT
13
PRINTER A
PRINTER N
RECEPTION CODE PAGE MEMORY
RECEPTION FRAME PROCESSOR
RECEPTION BUFFER
67
66
65
7

1. A facsimile apparatus connected to a line of a packet switch network comprising:

a plurality of generating means each for generating image data representing an original image;

memory means for storing the image data from said plurality of generating means;

transmitting means for converting said image data stored in said memory means into a plurality of packet data and for transmitting said packet data to said line; and

control means for controlling said transmitting means such that a plurality of packet data of a first original image and a plurality of packet data of a second original image are transmitted to said line time-divisionally.

5,025,498
APPARATUS FOR CONTROLLING THE TRIGGER SEQUENCE IN IGNITION SYSTEMS

Nils A. Agren, Åmål, Sweden, assignor to SEM AB, Åmål, Sweden

Continuation of Ser. No. 25,402, Mar. 13, 1987, abandoned. This application Jul. 27, 1989, Ser. No. 388,299

Claims priority, application Sweden, Mar. 14, 1986, 8601219

Int. Cl.⁵ H01H *47/00*

U.S. Cl. 361—156 **1 Claim**

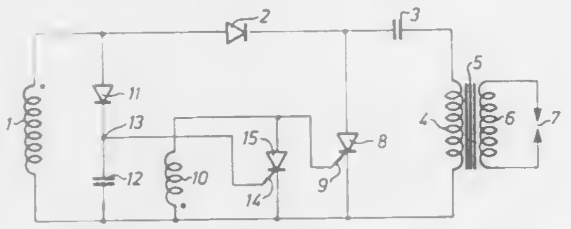
1. In a high reliability ignition system utilizing a minimum number of electrical components for controlling the triggering

VOL
1127
ISS
3
JE
18
1991
UMI

sequence in response to a rotating permanent magnet for internal combustion engines having a spark coil, and a core of magnetic conducting material carrying a capacitor charging coil, and an electrically separate triggering coil wired in reverse polarity to said charging coil and cooperating with the rotating permanent magnet for producing three generated halfwaves in sequence in said coils, the charging coil being connected in series with a rectifier, a charging capacitor, and the primary winding of said spark coil, and a discharge thyristor connected in series with the charging coil and the primary winding of the spark coil and having its input gate coupled across the triggering coil, the improvement comprising

an actuating timing circuit having a series combination of a diode and timing capacitor connected across the charging coil;

a switching thyristor having its anode connected to one terminal of the triggering coil and having its input gate connected to the intersection of said diode and said timing capacitor, the cathodes of said switching and discharge thyristor being connected together to the opposite terminal of the triggering coil, so that the charging capacitor discharges its stored charge upon the conduction of the discharge thyristor, the second halfwave being used for charging the charging capacitor and actuating said timing circuit, so as to maintain the discharge thyristor inactive during the presence of the third halfwave, whereupon triggering occurs during the first generated voltage halfwave in the next voltage sequence, said diode of said actuating timing circuit, permitting the second halfwave to pass and charge said timing capacitor during the charging phase of the charging capacitor wherein the total number of electrical components of the ignition system is no more than seven components including two diodes, two capacitors and two thyristors or triacs, and wherein said electrical circuit utilizes no resistors for high efficiency.



5,025,499
PROCESS CONTROL METHOD AND CONTROL SYSTEM

Haruki Inoue, Katsuta; Motohisa Funabashi, Sagamihara; Masakazu Yahiro, Hitachi, and Fumiki Tanaka, Ebetsu, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Engineering Co., Ltd., Ibaraki, both of Japan

Filed Apr. 12, 1989, Ser. No. 336,797

Claims priority, application Japan, Apr. 13, 1988, 63-89077

Int. Cl.^{5} G05B *13/02*

U.S. Cl. 364—165 **7 Claims**

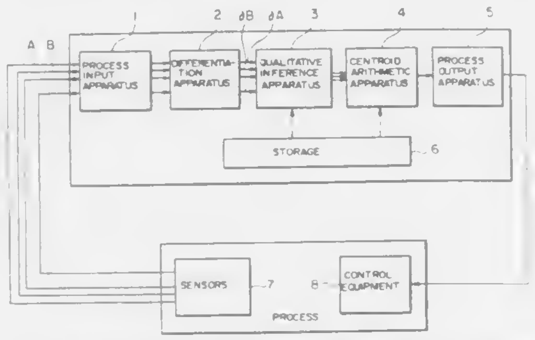
1. A process control system for controlling a process, comprising:

differentiation means for receiving different kinds of process information from process sensors which measure different variables of a process and calculating amounts of change of said process information with respect to time;

qualitative evaluation means, connected to said differentiation means, for evaluating in evaluation stages said process information or said amounts of change of said process information with respect to time by a membership function previously determined as having fuzzy amounts;

qualitative inference means, connected to said qualitative evaluation means, for inferring a qualitative evaluation value set of control target process information after a unit of time by experiential rules on the basis of combinations of values in each of said evaluation stages;

centroid arithmetic means, connected to said qualitative inference means, for receiving said qualitative evaluation value set inferred by said qualitative inference means and determining an amount of control of said control target process information by centroid arithmetic processing of said membership function; and



output means, connected to said centroid arithmetic means, for supplying said amount of control determined by said centroid arithmetic means to said process, thereby causing a change in operation of said process according to said amount of control.

5,025,500
APPARATUS FOR PROVIDING MULTIPLE CONTROLLER INTERFACES TO A STANDARD DIGITAL MODEM AND INCLUDING INTEGRAL CONFLICT RESOLUTION

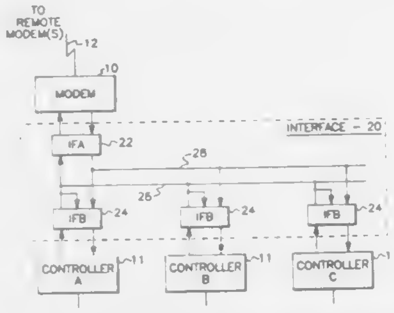
Thomas L. Phinney, Boulder City, Nev., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 9, 1989, Ser. No. 363,843

The portion of the term of this patent subsequent to Feb. 12, 2008, has been disclaimed.

Int. Cl.^{5} H04J *03/04;* **H04B** *01/38*

U.S. Cl. 370—85.13 **29 Claims**



1. In a combination system, having a modem for providing an interface to a communication link, said communication system further having a plurality of controllers whereby each of said controllers is connected to said modem via an interface apparatus, and further wherein said modem and said controllers comply with a predetermined protocol, said interface apparatus comprising:

a) bus means, for providing a medium to transfer signals between said controllers and said modem;

b) first interface means, having a decoder, connected to said bus means, for interfacing said modem to said bus means, said first interface means implementing a modem-associated multi-state state machine which responds to signals on said bus to maintain the predetermined protocol between said modem and said first interface means, the predetermined protocol being maintained by decoding

signals from said bus means based on a current state of the multi-state state machine; and

c) a plurality of second interface means, each having an encoder, each of said second interface means being connected to said bus means and to a corresponding controllers, for interfacing each of said plurality of controllers to said bus means, each of said second interface means implementing a controller-associated multi-state state machine which responds to signals on said bus means and further responds to signals from the corresponding controller, each of said second interface means maintaining the predetermined protocol between the second interface means and the corresponding controller, and wherein each of said second interface means transmits onto said bus means in a predetermined cycle to resolve conflicts between controllers for access to said bus means.

VOL
1127
ISS
3
JE
18
1991
UMI

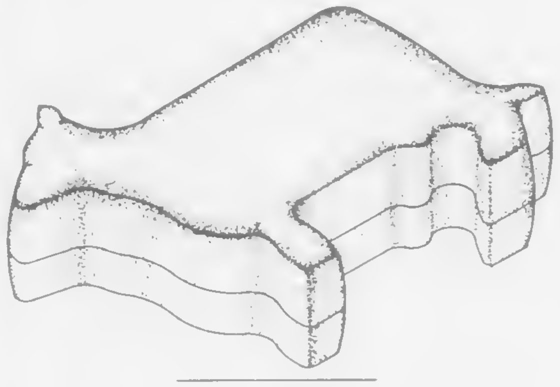
DESIGNS

JUNE 18, 1991

317,522

HAMBURGER BUN OR SIMILAR ARTICLE

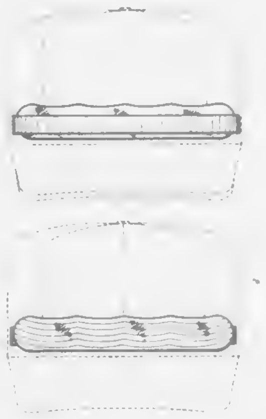
Robert H. Hicks, Sr., and Linda M. Hicks, both of 5114 Northridge, Houston, Tex. 77033
Filed May 19, 1988, Ser. No. 196,108
Term of patent 14 years
U.S. Cl. D1—107



317,523

REMOVABLE SWEAT BAND FOR HATS

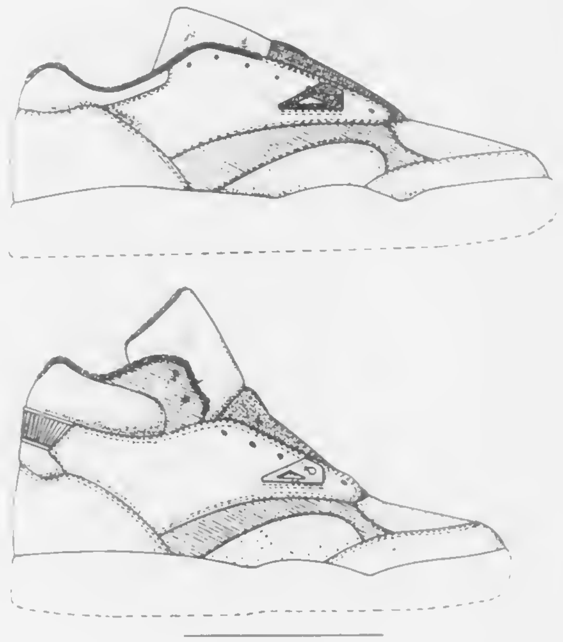
LeRoy E. Smith, 4832-E SW. 152nd Ct., Miami, Fla. 33185-4226
Filed May 18, 1988, Ser. No. 195,181
Term of patent 14 years
U.S. Cl. D2—261



317,524

SHOE UPPER

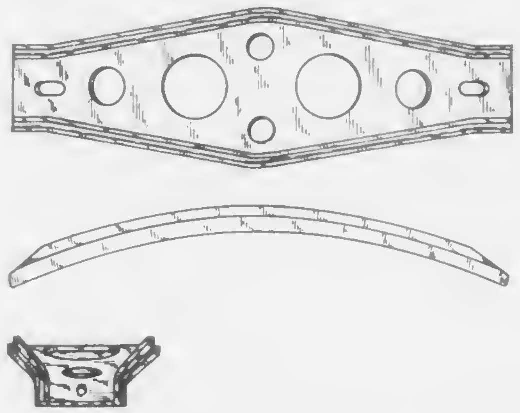
John Earle, Tigard, Oreg., assignor to Avia Group International, Inc., Portland, Oreg.
Filed Jun. 25, 1990, Ser. No. 543,194
Term of patent 14 years
U.S. Cl. D2—314



317,525

BAND FOR HEADSET

Christopher D. Wiegel, Minneapolis, Minn., assignor to Telex Communications, Inc., Minneapolis, Minn.
Filed Nov. 24, 1986, Ser. No. 934,128
Term of patent 14 years
U.S. Cl. D2—512

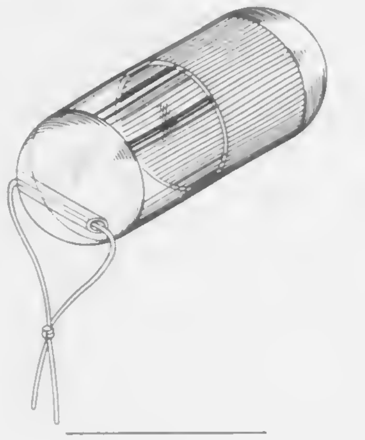


VOL
1127
ISS
3
JE
18
1991
UMI

317,526

EYEGLASS CARRYING CASE

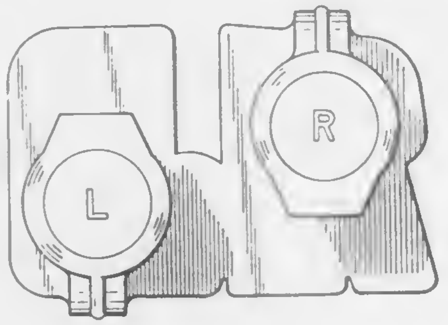
Ralph R. Lapham, New London, N.H., assignor to Uvex Winter Optical, Inc., North Smithfield, R.I.
Filed Feb. 20, 1987, Ser. No. 27,260
Term of patent 14 years
U.S. Cl. D3—34



317,527

CONTACT LENS CASE

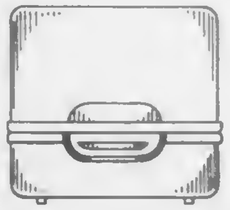
Carol Bonelli, West Hartford, Conn., assignor to Creative Link Limited, West Hartford, Conn.
Filed Oct. 1, 1987, Ser. No. 103,587
Term of patent 14 years
U.S. Cl. D3—34



317,528

BOX FOR JEWELRY ITEMS

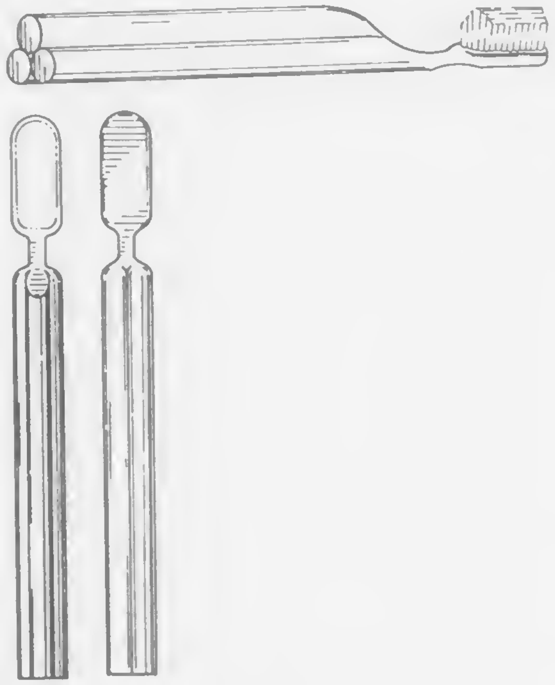
Thomas J. Harvey, Pawtucket, R.I., assignor to International Packaging Corporation, Pawtucket, R.I.
Filed Jan. 11, 1988, Ser. No. 143,172
Term of patent 14 years
U.S. Cl. D3—75



317,529

TOOTHBRUSH HANDLE

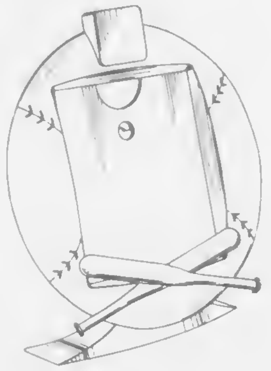
Lucia Smigel, and Irwin E. Smigel, both of 150 E. 69th St., New York, N.Y. 10021
Filed Nov. 10, 1988, Ser. No. 269,656
Term of patent 14 years
U.S. Cl. D4—104



317,530

BASEBALL MOTIF PICTURE FRAME

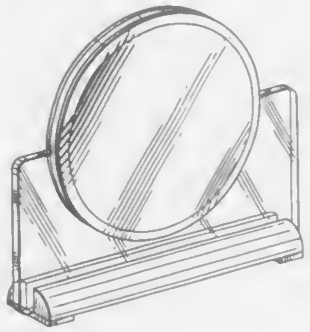
Susan M. Masterson, 8707 W. 102nd St., Apt. #3, Overland Park, Kans. 66212
Filed Apr. 18, 1989, Ser. No. 340,162
Term of patent 14 years
U.S. Cl. D6—303



317,531

VANITY MIRROR

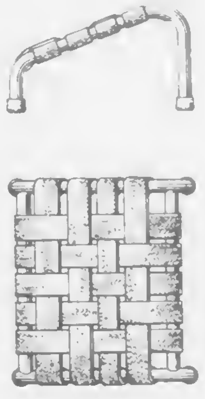
Keith Evans, Montpelier, Ohio, assignor to Design Institute America, Inc., Jasper, Ind.
Filed Feb. 28, 1989, Ser. No. 316,688
Term of patent 14 years
U.S. Cl. D6—309



317,532

HUNTING CHAIR

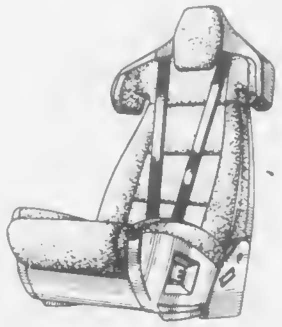
R. Chapman Meadows, 304 Cahaba Rd., Selma, Ala. 36701
Filed Apr. 27, 1988, Ser. No. 187,062
Term of patent 14 years
U.S. Cl. D6—355



317,533

VEHICLE SEAT OR SIMILAR ARTICLE

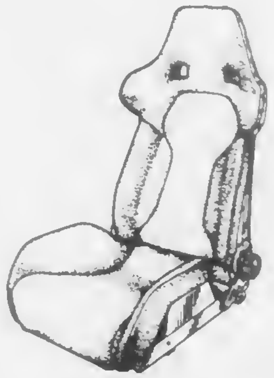
Frank Beermann, Kirchheim, Fed. Rep. of Germany, assignor to Keiper Recaro GmbH & Co., Fed. Rep. of Germany
Filed Mar. 2, 1988, Ser. No. 163,404
Claims priority, application Fed. Rep. of Germany, Sep. 8, 1987, 2MR922
Term of patent 14 years
U.S. Cl. D6—356



317,534

VEHICLE SEAT OR SIMILAR ARTICLE

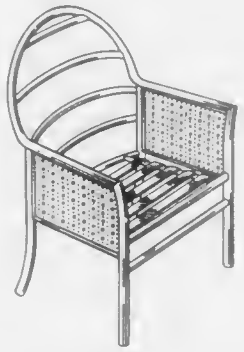
Dietger Hänsel, Umkirch, Fed. Rep. of Germany, assignor to Keiper Recaro GmbH & Co., Fed. Rep. of Germany
Filed Nov. 12, 1987, Ser. No. 119,421
Claims priority, application Fed. Rep. of Germany, May 27, 1987, 2MR917
Term of patent 14 years
U.S. Cl. D6—356



317,535

CHAIR FRAME

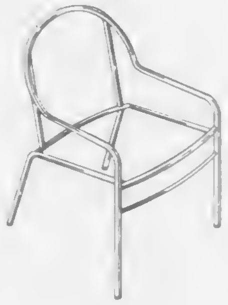
Stephen C. Hess, Birmingham, Ala., assignor to Winston Furniture Company of Alabama, Inc., Birmingham, Ala.
Filed Jun. 1, 1988, Ser. No. 201,103
Term of patent 14 years
U.S. Cl. D6—380



317,536

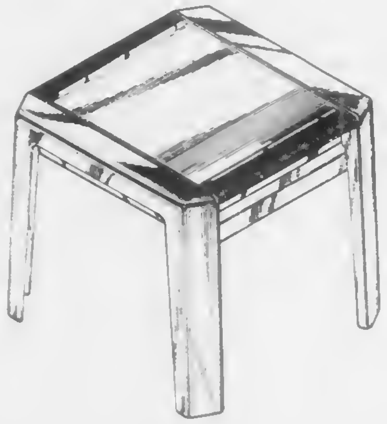
CHAIR FRAME

Stephen C. Hess, Birmingham, Ala., assignor to Winston Furniture Company of Alabama, Inc., Birmingham, Ala.
Filed Jun. 1, 1988, Ser. No. 201,102
Term of patent 14 years
U.S. Cl. D6—380

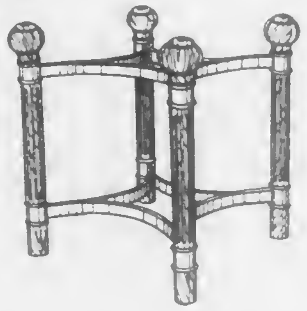


VOL
1127
ISS
3
JE
18
1991
UMI

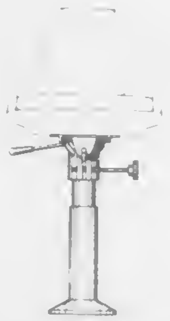
317,537
TABLE
Giovanni Pioo, Wooster, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed May 16, 1988, Ser. No. 194,117
Term of patent 14 years
U.S. Cl. D6—484



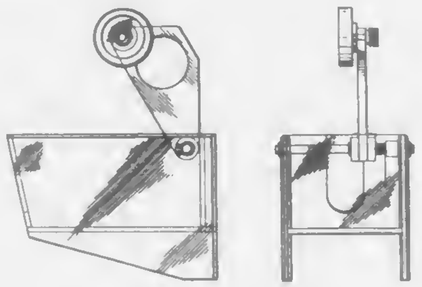
317,538
TABLE BASE
Robert L. Wilson, Memphis, Tenn., assignor to Chromcraft Furniture Corp., Senatobia, Miss.
Filed May 29, 1990, Ser. No. 529,526
Term of patent 14 years
U.S. Cl. D6—495



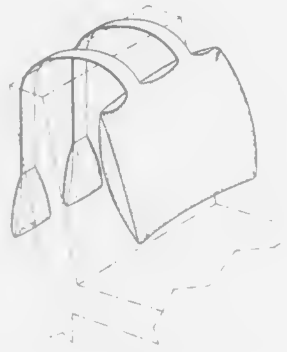
317,539
ADJUSTABLE BOATING CHAIR PEDESTAL
Howard G. Goldsmith, Cranston, R.I., assignor to Todd Enterprises, Inc., Cranston, R.I.
Filed Dec. 23, 1986, Ser. No. 947,765
Term of patent 14 years
U.S. Cl. D6—495



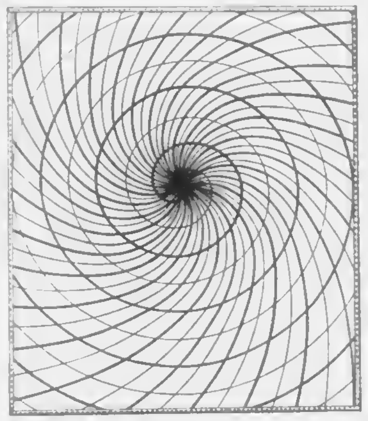
317,540
PERMANENT WAVE TISSUE DISPENSER
Marvin T. Reid, 3913 Douglas, and August J. Wesell, 3914 Douglas, both of Garland, Tex. 75041
Filed Jun. 10, 1988, Ser. No. 204,789
Term of patent 14 years
U.S. Cl. D6—518



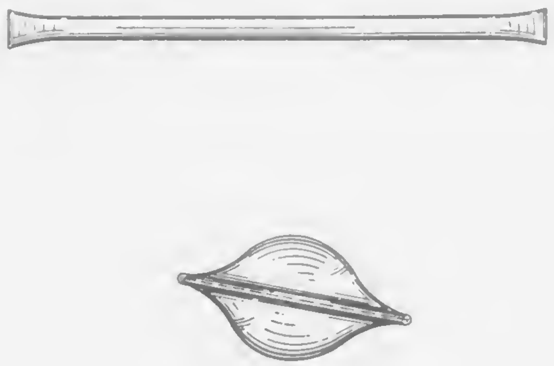
317,541
CUSHION FOR THE BACK OF A CHAIR OR THE LIKE
Elizabeth H. Carwile, 113 Hickory Creek Dr., Brandon, Fla. 33511
Filed Sep. 25, 1989, Ser. No. 411,626
Term of patent 14 years
U.S. Cl. D6—601



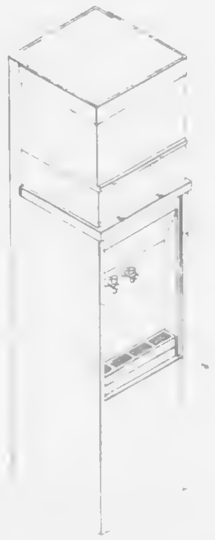
317,542
BED LINEN
Terrance W. Sachetti, 5930 W. Broadway #9, Crystal, Minn. 55428
Filed Nov. 28, 1989, Ser. No. 442,182
Term of patent 14 years
U.S. Cl. D6—603



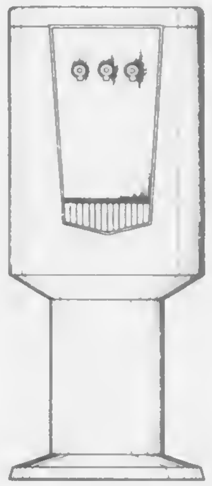
317,543
COMBINED CONTAINER, STIRRER AND DRINKING STRAW
Robert A. Small, 1220 Manhattan Ave., Ste. A, Manhattan Beach, Calif. 90266
Filed Nov. 24, 1986, Ser. No. 934,616
Term of patent 14 years
U.S. Cl. D7—300.2



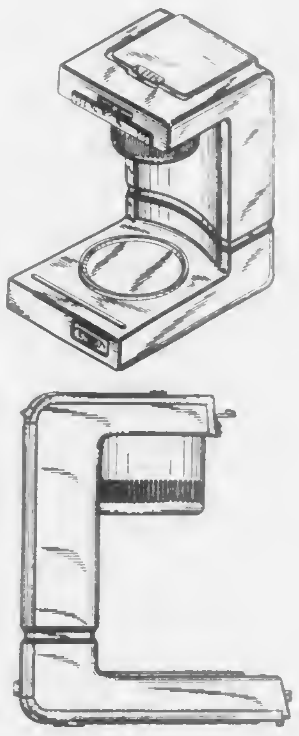
317,544
WATER DISPENSER
Rutledge Bermingham, Rye, N.Y., assignor to Back Bone Water Company, Rye, N.Y.
Filed Oct. 28, 1988, Ser. No. 264,161
Term of patent 14 years
U.S. Cl. D7—307



317,545
WATER DISPENSER
Lloyd W. Lambert, 201 Vanderpool La.#604, Houston, Tex. 77024; Joe A. Brown, 9715 Burdine, Houston, Tex. 77096, and John L. Morgan, 8817 Merlin Dr., Houston, Tex. 77055
Filed Oct. 31, 1988, Ser. No. 264,679
Term of patent 14 years
U.S. Cl. D7—307

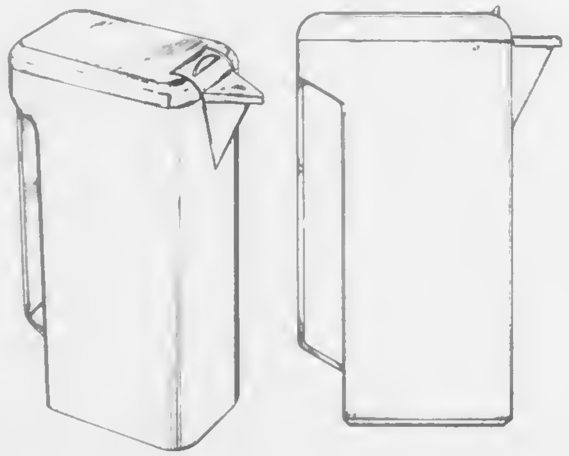


317,546
COFFEE MAKER
William J. Rakocy, Madison; Ronald L. Muller, Old Saybrook, and Masao Tsuji, Old Lyme, all of Conn., assignors to North American Philips Corporation, New York, N.Y.
Filed Jul. 11, 1988, Ser. No. 217,571
Term of patent 14 years
U.S. Cl. D7—309

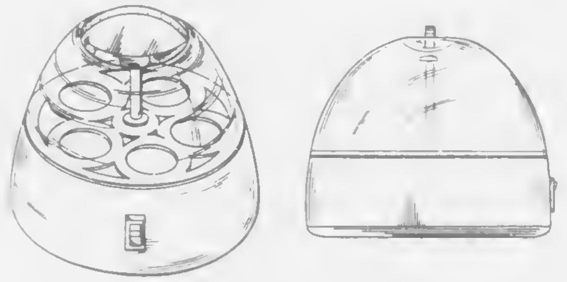


VOL
1127
ISS
3
JE
18
1991
UMI

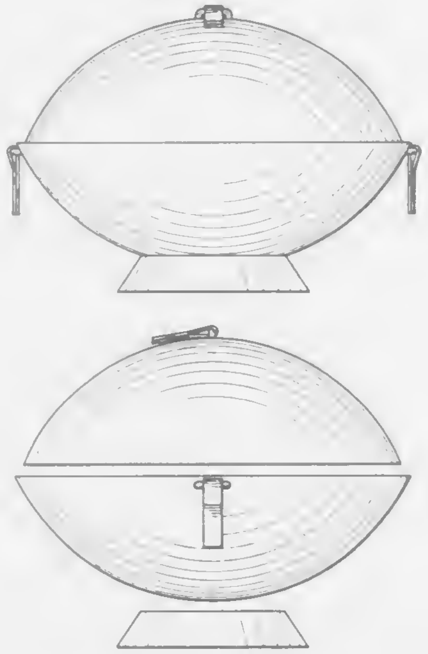
317,547
CARAFE
Bruno Gecchelin, Milan, Italy, assignor to Fratelli Guzzini, S.p.A., Recanati, Italy
Filed Apr. 13, 1988, Ser. No. 181,258
Term of patent 14 years
U.S. Cl. D7—317



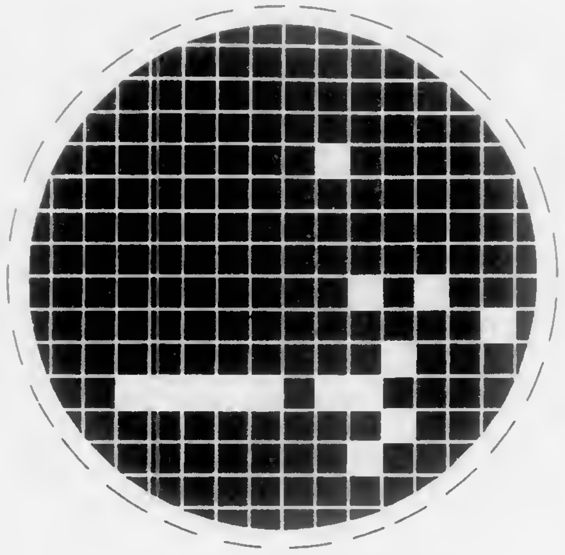
317,548
ELECTRIC EGG COOKER
Stanley Yeh, Taipei, Taiwan, assignor to 501 Giant Up Co., Ltd., Taipei, Taiwan
Filed Jul. 18, 1988, Ser. No. 232,633
Term of patent 14 years
U.S. Cl. D7—357



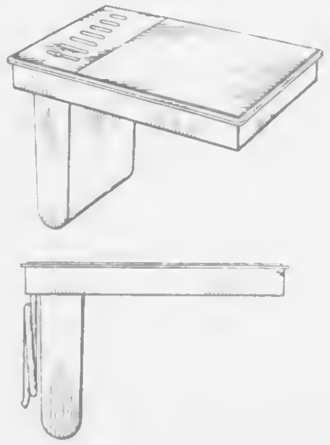
317,549
CAMPER'S WOK
C. Richard Stadelmaier, 505 E. 41st St., Baltimore, Md. 21218
Filed Sep. 2, 1988, Ser. No. 240,119
Term of patent 14 years
U.S. Cl. D7—360



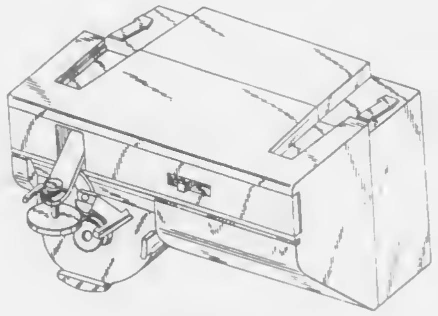
317,550
SURFACE DECORATION FOR THE BOTTOM EXTERIOR OF A COOKING PAN
Francois Elie, Paris, France, assignor to Terraillon, Annemasse, France
Filed Feb. 2, 1988, Ser. No. 151,645
Claims priority, application France, Aug. 6, 1987, 87 4669
Term of patent 14 years
U.S. Cl. D7—402



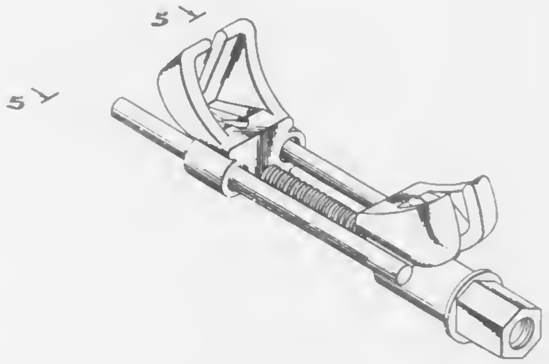
317,551
COMBINATION KNIFERACK, CUTTING BOARD AND DRAIN
Donald G. King, 3140 Wharton Way, Mississauga, Ontario, Canada L4X 2C1
Filed Jun. 7, 1989, Ser. No. 362,593
Claims priority, application Canada, Mar. 9, 1989, 49-03-89-10
Term of patent 14 years
U.S. Cl. D7—638



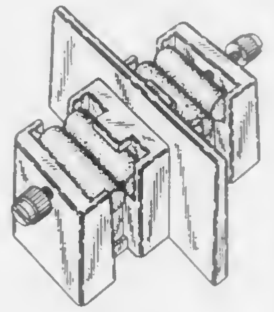
317,552
ELECTRICALLY POWERED CAN OPENER
Don R. McCloskey, Stratford, Conn.; Gary van Deursen, Upper Saddle River, N.J., and Sally A. Hattle, Wilmington, Del., assignors to Black & Decker Inc., Newark, Del.
Filed Apr. 26, 1989, Ser. No. 344,147
Term of patent 14 years
U.S. Cl. D8—36



317,553
CHAIN SHORTENER
Shigemi J. Nakagiri, 11408 Barman St., Culver City, Calif. 90230
Filed Nov. 4, 1988, Ser. No. 266,993
Term of patent 14 years
U.S. Cl. D8—44



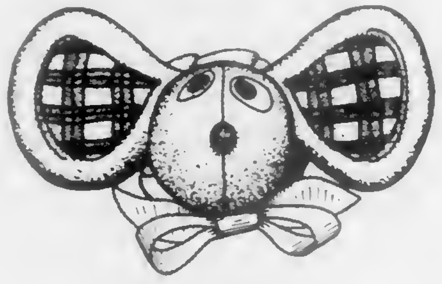
317,554
KNIFE SHARPENER
Raymond A. Young, 2615 SE. Courtney, Sp. 8, Milwaukie, Oreg. 97222
Filed Jun. 6, 1988, Ser. No. 202,992
Term of patent 14 years
U.S. Cl. D8—93



VOL
1127
ISS
3
JE
18
1991
UMI

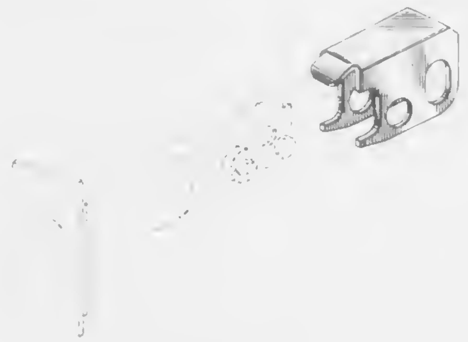
317,555
MOUSE DOOR KNOB COVER

Mary C. Guberman, c/o Kensington Designs, Inc., 11508 Applejack Ct., Cincinnati, Ohio 45241
Filed May 20, 1988, Ser. No. 196,919
Term of patent 14 years
U.S. Cl. D8—322



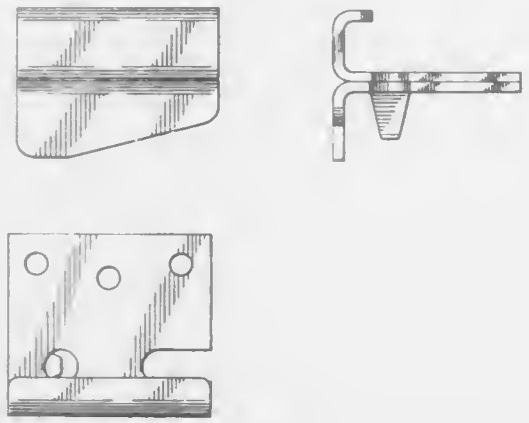
317,556
PROTECTIVE SHIELD FOR A DEADBOLT ASSEMBLY

John L. McKernan, 32 Province St., Boston, Mass. 02108
Filed Oct. 19, 1988, Ser. No. 259,695
Term of patent 14 years
U.S. Cl. D8—346



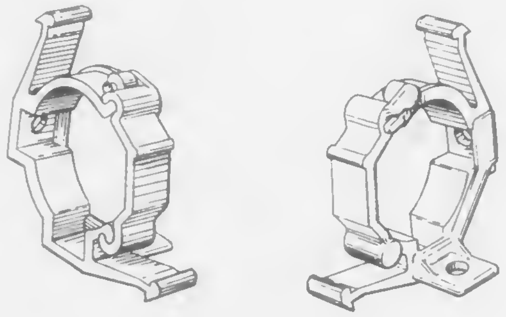
317,557
PADLOCK HASP GUARD

Lloyd R. Poe, 28122 Haria St., Mission Viejo, Calif. 92692
Division of Ser. No. 275,540, Nov. 25, 1988. This application Nov. 5, 1990, Ser. No. 609,217
Term of patent 14 years
U.S. Cl. D8—346



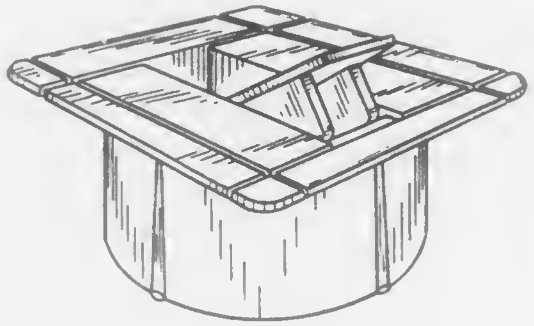
317,558
MODULAR CONDUIT SUPPORT

Robert V. Daigle, Deerfield Beach, Fla., and Gordon J. Grice, Janesville, Wis., assignors to Creative Engineering Systems, Janesville, Wis.
Filed Nov. 27, 1989, Ser. No. 441,405
Term of patent 14 years
U.S. Cl. D8—354



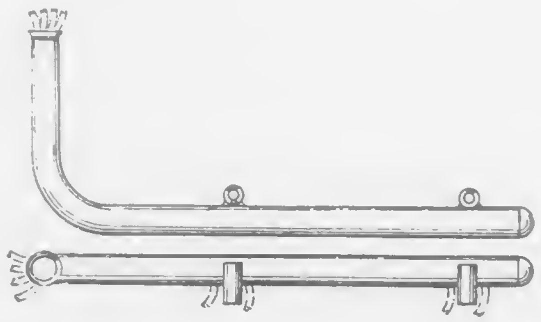
317,559
GROMMET

Ronald Simonton, Stonington, Conn., assignor to Herman Miller, Inc., Zeeland, Mich.
Filed Jan. 8, 1990, Ser. No. 461,799
Term of patent 14 years
U.S. Cl. D8—356



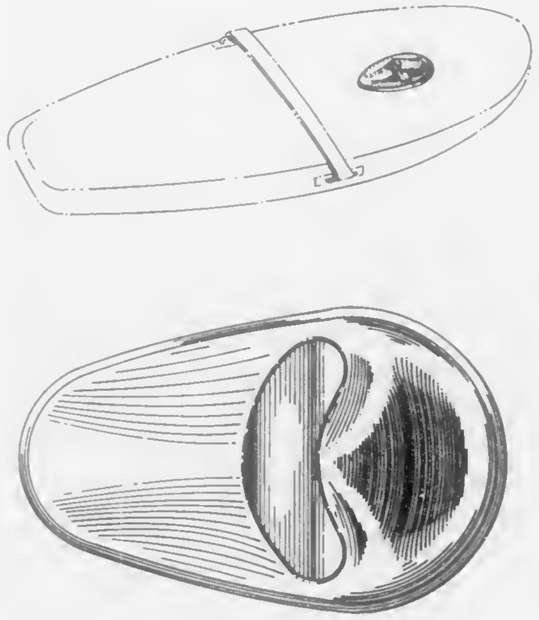
317,560
AUTO WIRING MANIFOLD

Kenneth Skaggs, 1335 Jefferson Rd., Hoffman Estates, Ill. 60195
Filed Apr. 25, 1986, Ser. No. 857,580
Term of patent 14 years
U.S. Cl. D8—357



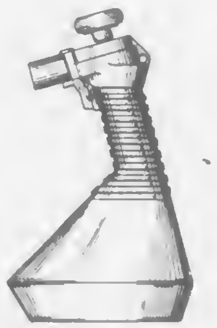
317,561
TETHER RETAINER FOR SURF BOARDS OR THE LIKE

Alan W. Stubbings, Mojave, Calif., assignor to John G. Tamborrino, Lancaster, Calif.
Filed Nov. 21, 1988, Ser. No. 274,124
Term of patent 14 years
U.S. Cl. D8—367



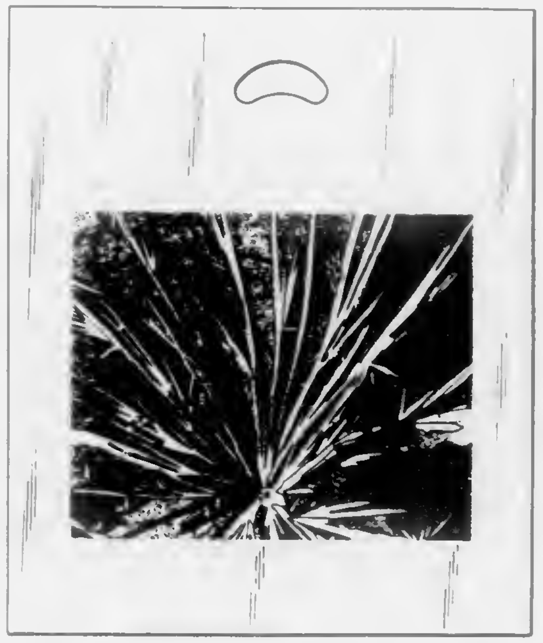
317,562
SPRAYER BOTTLE

Daniel Lami, Briodas, France, assignor to Etablissements Perras, Villefranche, France
Filed Dec. 7, 1988, Ser. No. 281,007
Term of patent 14 years
U.S. Cl. D9—300



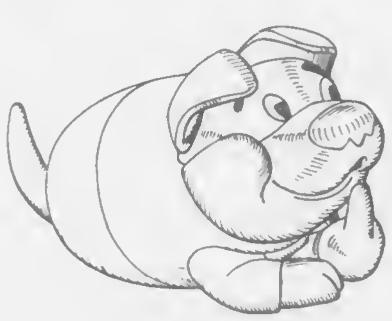
317,563
BAG

Harriett M. Spry, Worcester Park, England, assignor to Beecham Group p.l.c., Brentford, England
Filed Nov. 18, 1988, Ser. No. 273,869
Claims priority, application United Kingdom, May 20, 1988, 1050885
Term of patent 14 years
U.S. Cl. D9—305



317,564
CONTAINER FOR CONFECTIONERY PRODUCTS

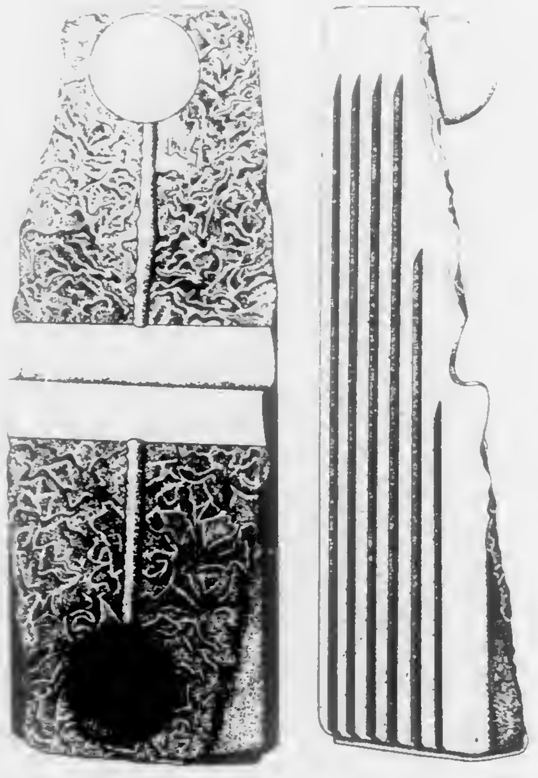
Pietro Ferrero, Avenue Lequim 62, 1640 Rhode St., Genese, Bruxelles, Belgium
Filed Sep. 23, 1988, Ser. No. 249,074
Claims priority, application Italy, Mar. 24, 1988, 53009-B/88
Term of patent 14 years
U.S. Cl. D9—318



VOL
1127
ISS
3
JE
18
1991
UMI

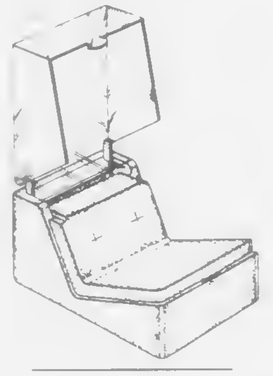
317,565
BOTTLE

Gaetano Pesce, Canaregio, Italy, assignor to Societe Generale Des Eaux Minerales De Vittel, Vittel, France
Filed Jan. 20, 1987, Ser. No. 4,686
Claims priority, application France, Jul. 18, 1986, 151
Term of patent 14 years
U.S. Cl. D9—367



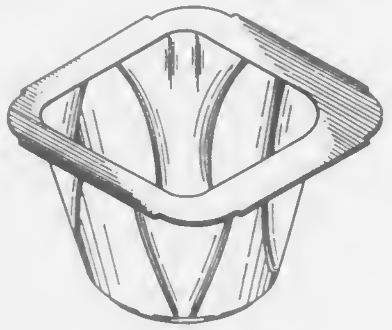
317,566
ARTICLE DISPLAY BOX

Dino L. Garganese, 40 Celestia Ct., N. Kingston, R.I. 02852
Filed Apr. 5, 1988, Ser. No. 177,597
Term of patent 14 years
U.S. Cl. D9—420



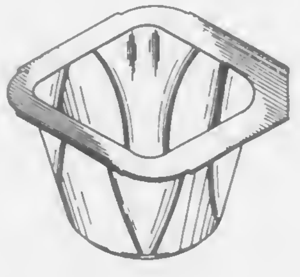
317,567
PACKAGING CONTAINER

William A. Lane, Sr., Redlands, Calif., assignor to W. A. Lane, Inc., San Bernardino, Calif.
Filed Nov. 2, 1988, Ser. No. 266,359
The portion of the term of this patent subsequent to Jun. 18, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—425



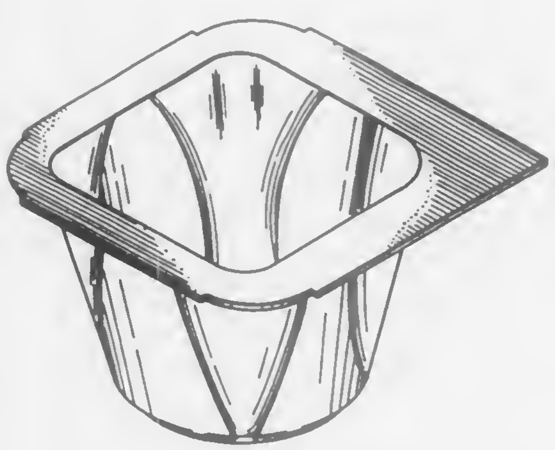
317,568
PACKAGING CONTAINER

William A. Lane, Sr., Redlands, Calif., assignor to W.A. Lane, Inc., San Bernardino, Calif.
Filed Nov. 2, 1988, Ser. No. 266,358
The portion of the term of this patent subsequent to Jun. 18, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—425



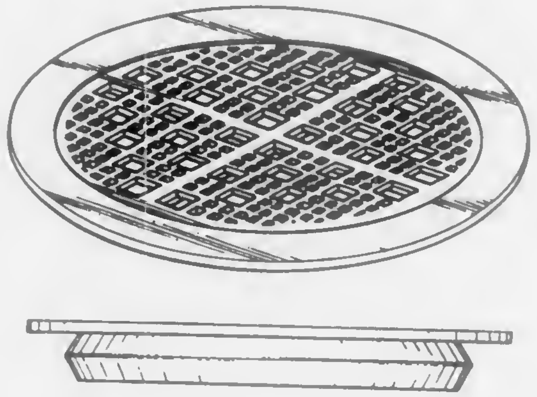
317,569
PACKAGING CONTAINER

William A. Lane, Sr., Redlands, Calif., assignor to W. A. Lane, Inc., San Bernardino, Calif.
Filed Nov. 2, 1988, Ser. No. 266,357
The portion of the term of this patent subsequent to Jun. 18, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—425



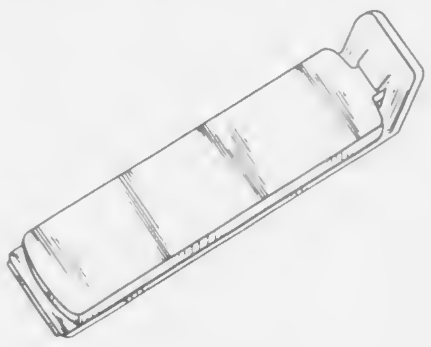
317,570
CONTAINER FILTER

Lewis Kryk, Windsor, Canada, assignor to Diversey Corporation, Mississauga, Canada
Filed Sep. 23, 1988, Ser. No. 248,036
Term of patent 14 years
U.S. Cl. D9—434



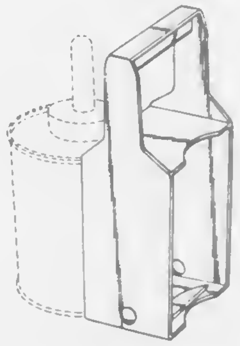
317,571
BAG CLIP

Kjell Henriksson, Bredaryd, Sweden, assignor to Linden International AB, Varnamo, Sweden
Filed May 9, 1989, Ser. No. 349,150
Claims priority, application Sweden, Nov. 9, 1988, 88-2557
Term of patent 14 years
U.S. Cl. D9—443



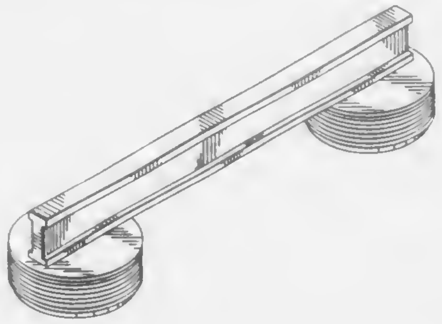
317,572
CONTAINER HOLDER

Hartley Logsdon, 900 S. Dixie Hwy., West Palm Beach, Fla. 33401
Filed Jul. 12, 1988, Ser. No. 218,387
Term of patent 14 years
U.S. Cl. D9—455



317,573
ALIGNMENT BAG

Paul Step, Toronto, Canada, assignor to 501 Romet Limited, Canada
Filed Apr. 5, 1989, Ser. No. 333,494
Claims priority, application Canada, Oct. 5, 1988, 05-10-88-6
Term of patent 14 years
U.S. Cl. D10—64



VOL
1127
ISS
3
JE
18
1991
UMI

317,574
THEODOLITE OR SIMILAR ARTICLE

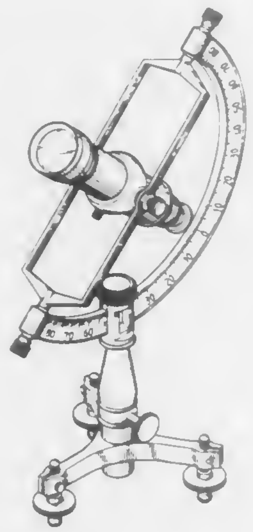
Roger Chen, Rm. 1002, No. 346, Nanking E. Road Sec. 3, Taipei, China

Filed Apr. 18, 1988, Ser. No. 182,565

Claims priority, application China, Aug. 5, 1987, 76304665

Term of patent 14 years

U.S. Cl. D10—66



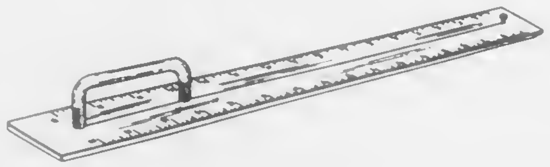
317,575
DEVICE FOR HANGING SUSPENDED OBJECTS ON A WALL

David L. Ramsey, 6051 Scenic Ave., Hollywood, Calif. 90068

Filed Oct. 17, 1988, Ser. No. 258,455

Term of patent 14 years

U.S. Cl. D10—71



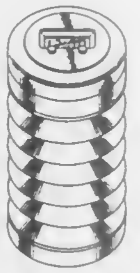
317,576
DIGITAL CLOCK

Sanae Aoki, and Tsunataka Konoike, both of Tokyo, Japan, assignors to Tanaka Manufacturing Company Limited, Tokyo, Japan

Filed Aug. 21, 1987, Ser. No. 88,104

Term of patent 14 years

U.S. Cl. D10—15



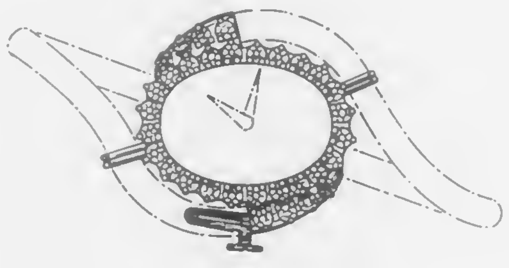
317,577
WATCH CASE

Martin Eiss, Freeport, N.Y., assignor to Ajco Jewelry Co. Inc., New York, N.Y.

Filed Jul. 18, 1988, Ser. No. 220,817

Term of patent 14 years

U.S. Cl. D10—30



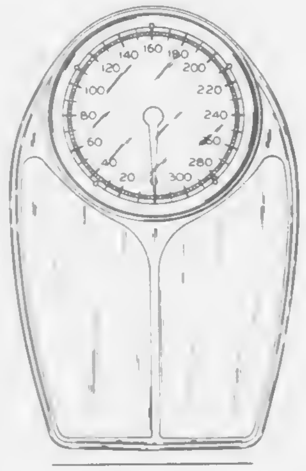
317,578
DIAL SCALE

Michael Joss; Stanley Gresens, both of Chicago, Ill., and Richard Fraker, Seattle, Wash., assignors to Continental Scale Corporation, Bridgeview, Ill.

Filed Apr. 12, 1989, Ser. No. 336,668

Term of patent 14 years

U.S. Cl. D10—92



317,579
COMBINED FLUID ALERT AND THERMOMETER

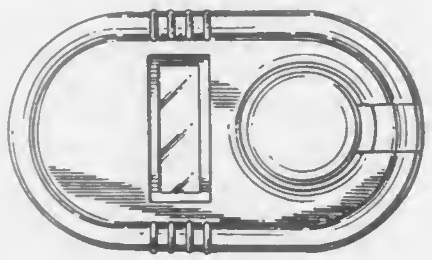
Ram Shalvi, Hong Kong, Hong Kong, assignor to Solar Wide Industrial Limited, Kowloon, Hong Kong

Filed Jun. 15, 1989, Ser. No. 367,099

Claims priority, application United Kingdom, May 25, 1989, 1059723

Term of patent 14 years

U.S. Cl. D10—101



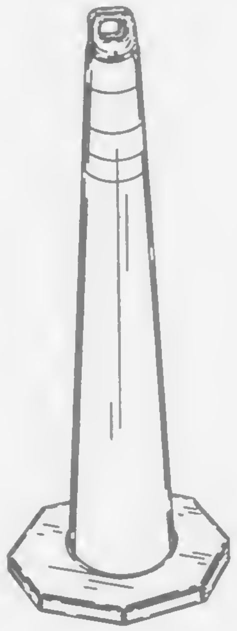
317,580
SAFETY ROAD CHANNELIZER

Kurt W. Thurston, 475 Hill St., Reno, Nev. 89501

Filed Apr. 21, 1987, Ser. No. 40,627

Term of patent 14 years

U.S. Cl. D10—109



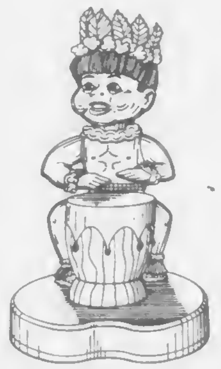
317,581
DRUM BOY FIGURINE OR SIMILAR ARTICLE

Nam J. Yeu, Seoul, Rep. of Korea, assignor to Michael & Park's Trading and Sales, Inc., Honolulu, Hi.

Continuation-in-part of Ser. No. 947,487, Dec. 29, 1986, abandoned. This application Apr. 6, 1989, Ser. No. 334,126

Term of patent 14 years

U.S. Cl. D11—160



317,582
FLOWER POT COVER

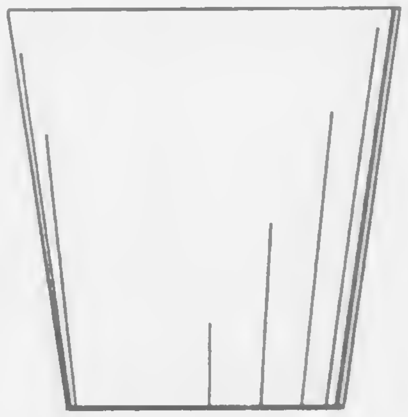
Donald E. Weder, Highland, Ill., assignor to Highland Supply Corporation, Highland, Ill.

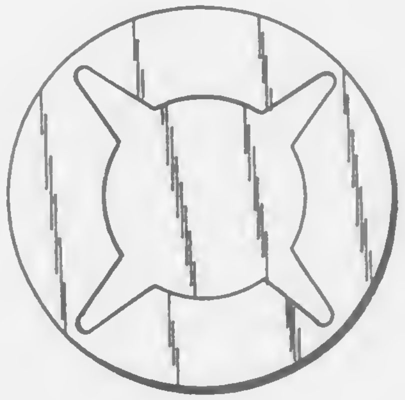
Filed Apr. 13, 1989, Ser. No. 337,447

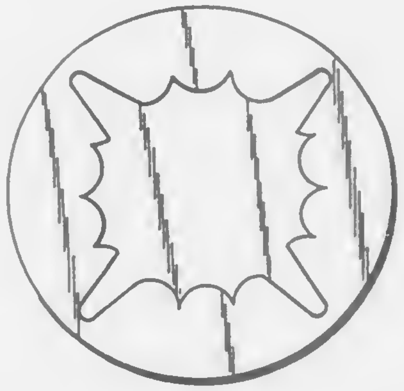
The portion of the term of this patent subsequent to May 21, 2005, has been disclaimed.

Term of patent 14 years

U.S. Cl. D11—164







VOL
1127
ISS
3
JE
18
1991
UMI

317,583

FLOWER POT COVER

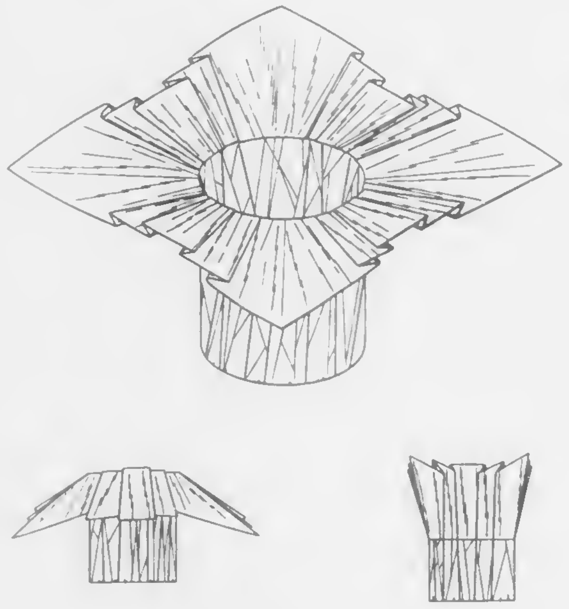
Donald E. Weder; Erwin H. Weder, both of Highland, Ill.; Wanda M. Weder, Highland, Calif.; Franklin J. Craig, Valley Park, Mo.; Wilma M. Donnelly, Highland, Ill.; Phyllis J. Bolk, Highland, Ill.; John W. Bergstrand, Highland, Ill., and Robert C. Abrams, Edwardsville, Ill., assignors to Highland Supply Corporation, Highland, Ill.

Continuation-in-part of Ser. No. 613,053, May 22, 1984, Pat. No. Des. 293,224. This application Oct. 13, 1987, Ser. No. 108,023

The portion of the term of this patent subsequent to Apr. 2, 2005, has been disclaimed.

Term of patent 14 years

U.S. Cl. D11—164



317,584

VEHICLE TIRE

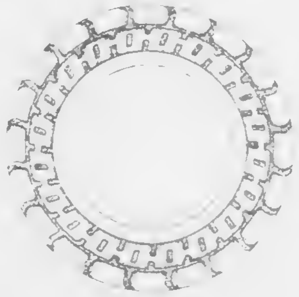
Kotaro Tsutsumi, Tokyo, Japan, assignor to The Ohtsu Tire & Rubber Co., Ltd., Izumi-Ohtsu, Japan

Filed Apr. 12, 1988, Ser. No. 180,863

Claims priority, application Japan, Dec. 10, 1987, 62-50712

Term of patent 14 years

U.S. Cl. D12—151



317,585

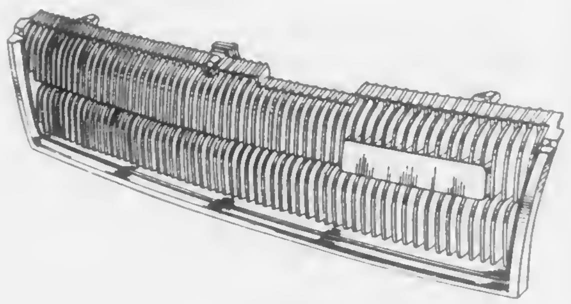
GRILL FOR AUTOMOBILE RADIATOR

Akira Uchida, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 28, 1988, Ser. No. 187,631

Term of patent 14 years

U.S. Cl. D12—163



317,586

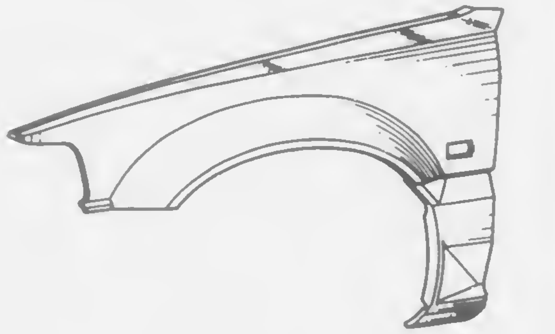
AUTOMOBILE FRONT FENDER EXTERIOR SURFACE

Fujimura Yoshinao, and Yusuke Saitoh, both of Tokyo, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 9, 1987, Ser. No. 94,538

Term of patent 14 years

U.S. Cl. D12—184



317,587

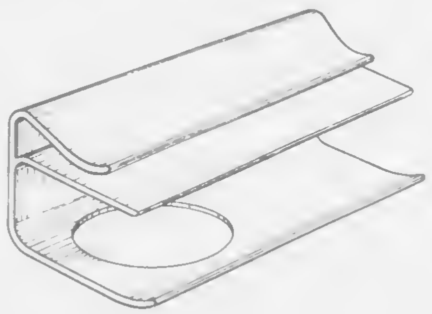
VISOR ATTACHABLE HOLDER FOR A MICROCASSETTE RECORDER

Guy A. Chembars, P.O. Box 229, Broadway, N.J. 08808

Filed May 2, 1988, Ser. No. 189,680

Term of patent 14 years

U.S. Cl. D12—191



317,588

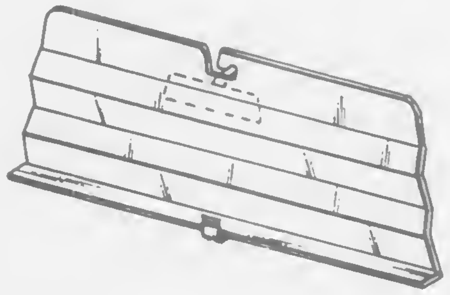
VEHICLE WINDSHIELD SHADE OR SIMILAR ARTICLE

Michael R. Pluta, 16748 Algonquin, Huntington Beach, Calif. 92649

Filed Jan. 23, 1989, Ser. No. 299,814

Term of patent 14 years

U.S. Cl. D12—191



317,589

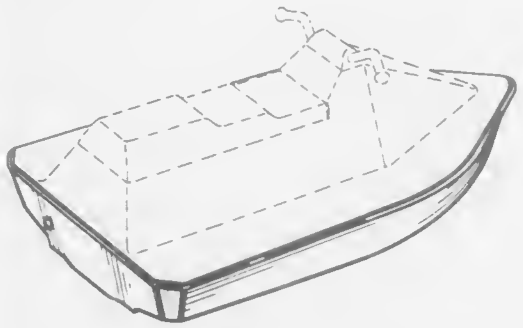
WATERCRAFT

Jack Sutherland, Springfield, Mo., assignor to Dynamic Products, Inc., Springfield, Mo.

Filed Oct. 31, 1989, Ser. No. 429,352

Term of patent 14 years

U.S. Cl. D12—318



317,590

AUTOMOBILE BULB SOCKET

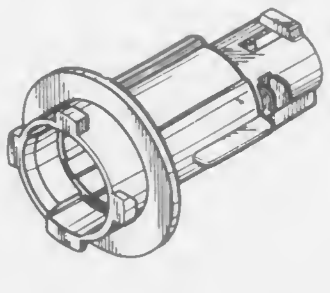
Ken Matsuoka; Kihachiro Uchida, both of Shizuoka; Kazuya Horiuchi, and Hiroyuki Hayashi, both of Mie, all of Japan, assignors to Koito Manufacturing Co., Ltd., Mie, Japan

Filed Aug. 21, 1987, Ser. No. 87,949

Claims priority, application Japan, Feb. 26, 1987, 62-7260

Term of patent 14 years

U.S. Cl. D13—134



317,591

ELECTRICAL CONNECTOR PLUG

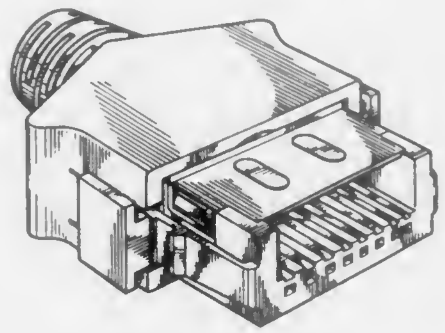
Shuichi Matsuzaki, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan

Filed Aug. 26, 1988, Ser. No. 237,006

Claims priority, application Japan, Mar. 7, 1988, 63-9203

Term of patent 14 years

U.S. Cl. D13—147



317,592

SEMICONDUCTOR ELEMENT

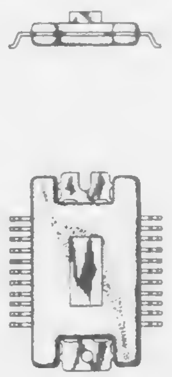
Tetsuo Yoshizawa, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 2, 1987, Ser. No. 69,579

Claims priority, application Japan, Jan. 19, 1987, 62-1597

Term of patent 14 years

U.S. Cl. D13—182



317,593

TRANSMITTER FOR WIRELESS SWITCH

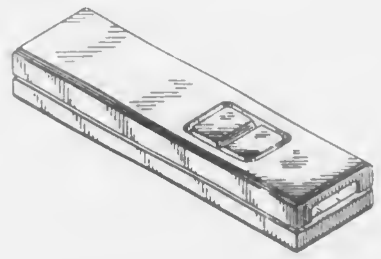
Michael J. Rowen, Center Valley, Pa., assignor to Lutron Electronics Co., Inc., Coopersburg, Pa.

Filed Sep. 26, 1988, Ser. No. 249,463

The portion of the term of this patent subsequent to Sep. 26, 2003, has been disclaimed.

Term of patent 14 years

U.S. Cl. D13—168



VOL
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ISS
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JE
18
1991
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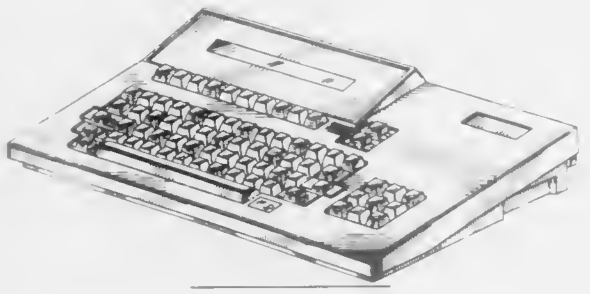
KEYBOARD

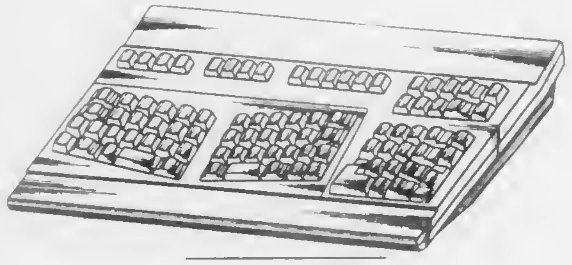
Michael M. Richardson, Eden Prairie, Minn., and Geoff Ringle, Trenton, N.J., assignors to Kroy Inc., Scottsdale, Ariz.
Filed Jan. 31, 1989, Ser. No. 304,416
Term of patent 14 years
U.S. Cl. D14—100



317,595

KEYBOARD FOR DATA PROCESSING SYSTEM

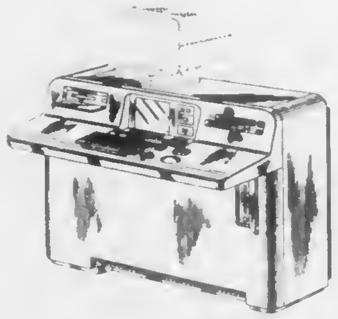
Isamu Yoshitake, Fuchu, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Feb. 27, 1989, Ser. No. 316,448
Claims priority, application Japan, Apr. 28, 1988, 63-17391
Term of patent 14 years
U.S. Cl. D14—100



317,596

OPERATOR CONSOLE FOR MAGNETIC RESONANCE IMAGING SYSTEM

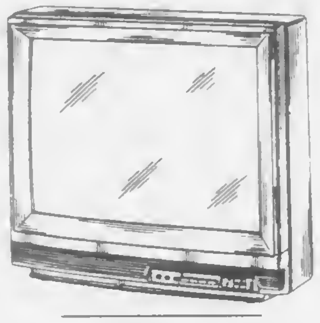
Isamu Takekoshi; Mitsuru Onuma, both of Tokyo; Kazuki Torai, Kokubunji; Kazunori Hashimoto, Tachikawa, and Toshiaki Aritomi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Aug. 4, 1989, Ser. No. 389,566
Claims priority, application Japan, Mar. 20, 1989, 1-9800
Term of patent 14 years
U.S. Cl. D14—103



317,597

TELEVISION RECEIVER

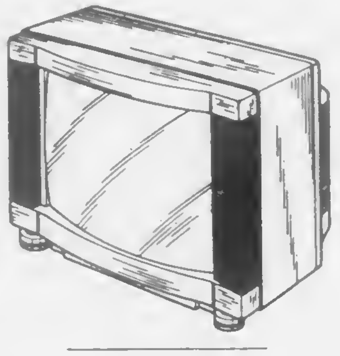
Masahiro Kawanabe, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Feb. 22, 1989, Ser. No. 313,805
Claims priority, application Japan, Aug. 23, 1988, 63-33030
Term of patent 14 years
U.S. Cl. D14—126



317,598

TELEVISION SET

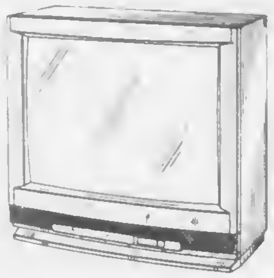
Jong M. Park, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea
Filed Aug. 24, 1989, Ser. No. 400,024
Claims priority, application Rep. of Korea, Mar. 22, 1989, 89-3486
Term of patent 14 years
U.S. Cl. D14—126



317,599

TELEVISION RECEIVER

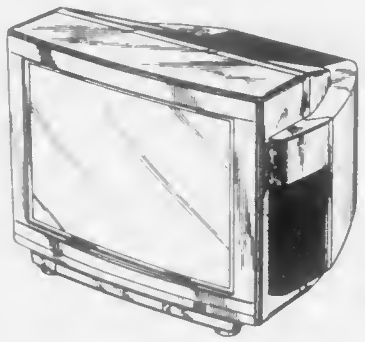
Masahiro Kawanabe, Tokyo, and Kanta Takechi, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jul. 19, 1989, Ser. No. 381,936
Claims priority, application Japan, Feb. 23, 1989, 1-6450
Term of patent 14 years
U.S. Cl. D14—126

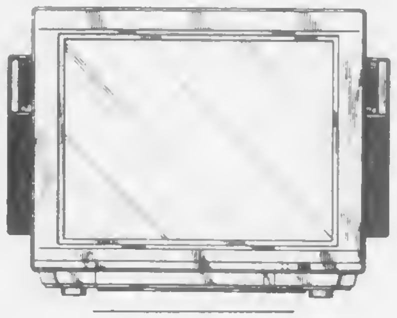


317,600

TELEVISION RECEIVER

Yoshiaki Amano; Kenta Kumagai, both of Tokyo; Fumihito Katou, Ichikawa; Kouichi Kasama, and Tooru Kiyota, both of Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Aug. 10, 1989, Ser. No. 392,151
Term of patent 14 years
U.S. Cl. D14—126

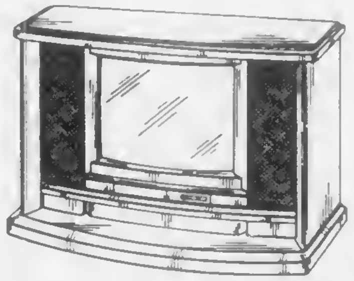




317,601

TELEVISION RECEIVER

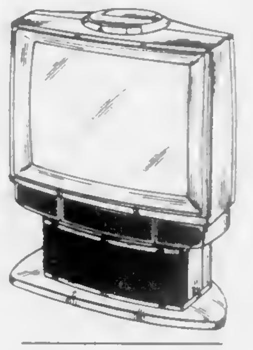
Masahiro Kawanabe, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Sep. 14, 1989, Ser. No. 407,133
Claims priority, application Japan, Mar. 23, 1989, 1-10159
Term of patent 14 years
U.S. Cl. D14—133



317,602

TELEVISION RECEIVER

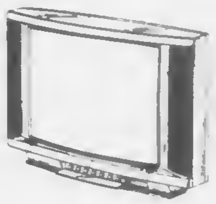
Tatsuyuki Mikami, Ichikawa, and Kaoru Tanaka, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Sep. 14, 1989, Ser. No. 407,025
Claims priority, application Japan, Mar. 23, 1989, 1-10160
Term of patent 14 years
U.S. Cl. D14—133

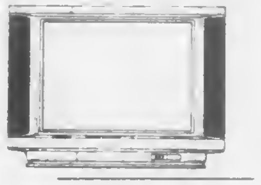


317,603

TELEVISION RECEIVER

Masahiro Kawanabe, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Nov. 15, 1989, Ser. No. 436,677
Claims priority, application Japan, May 16, 1989, 1-17542
Term of patent 14 years
U.S. Cl. D14—133

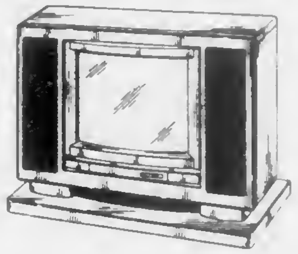




317,604

TELEVISION RECEIVER

Takashi Abe, Chiba; Michihiro Nakahara, Koshigaya, and Kaoru Tanaka, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Sep. 14, 1989, Ser. No. 407,134
Claims priority, application Japan, Mar. 23, 1989, 1-10158
Term of patent 14 years
U.S. Cl. D14—133



VOL
1127

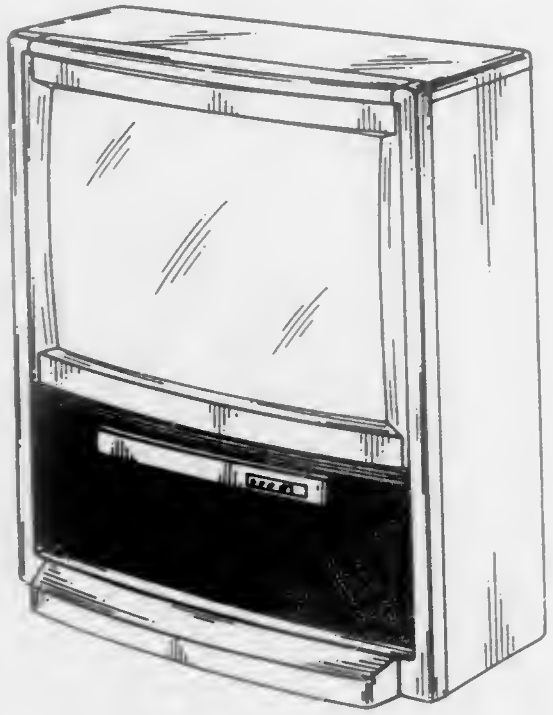
ISS
3

JE
18

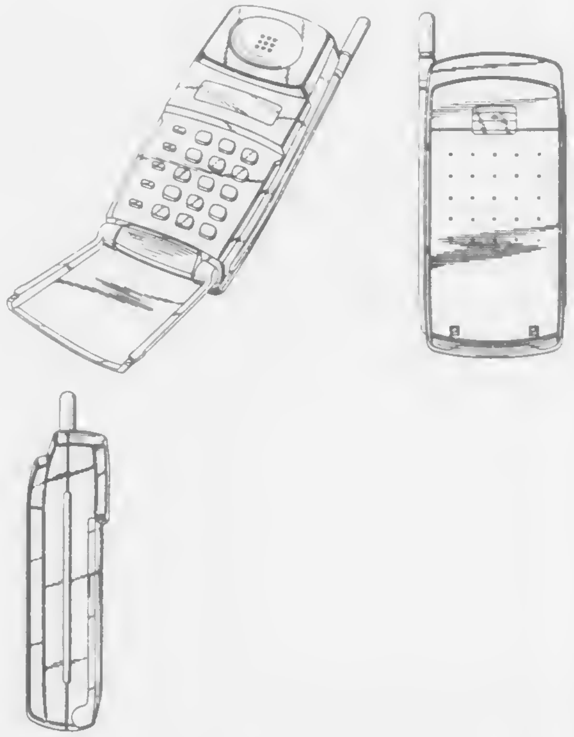
1991

UMI

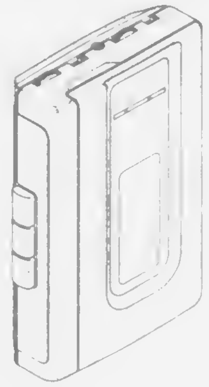
317,605
TELEVISION RECEIVER
Kimiyoshi Ban, Kasukabe, and Takashi Abe, Chiba, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Sep. 5, 1989, Ser. No. 402,430
Claims priority, application Japan, Mar. 7, 1989, 1-8042
Term of patent 14 years
U.S. Cl. D14—133



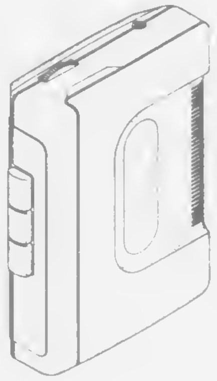
317,606
PORTABLE TELEPHONE
Toru Irie; Isamu Fukuda, both of Yokohama, and Hisamitsu Takagi, Inagi, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan
Filed Oct. 11, 1990, Ser. No. 595,494
Term of patent 14 years
U.S. Cl. D14—138



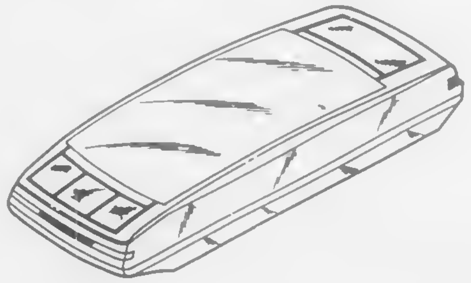
317,607
COMBINED STEREO RADIO AND CASSETTE PLAYER
Ronald Emmerling, Bay Head, N.J., assignor to Gemini Industries Inc., Clifton, N.J.
Filed May 15, 1989, Ser. No. 351,913
Term of patent 14 years
U.S. Cl. D14—163



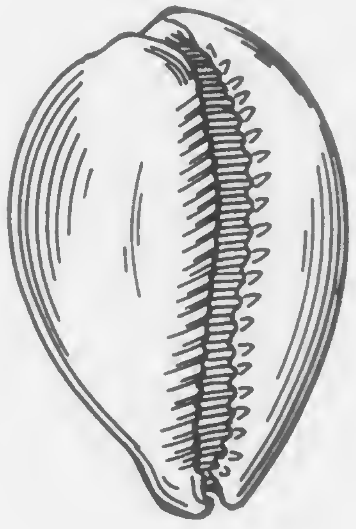
317,608
STEREO CASSETTE PLAYER
Ronald Emmerling, Bay Head, N.J., assignor to Gemini Industries Inc., Clifton, N.J.
Filed May 15, 1989, Ser. No. 352,031
Term of patent 14 years
U.S. Cl. D14—165



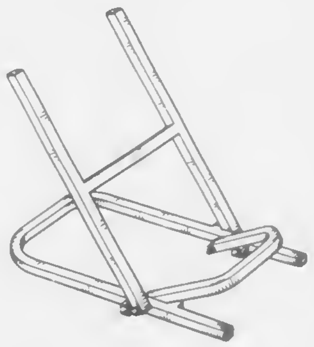
317,609
TAPE REWINDER
Joe Wei, No. 125, Wan Shou Road, Sec. 3, Taoyuan Hsien, Taiwan
Filed Feb. 10, 1989, Ser. No. 308,694
Term of patent 14 years
U.S. Cl. D14—217



317,610
HEADPHONE EARPIECE
Nicolette A. Jahnke, 4489 Murietta Ave., #8, Sherman Oaks, Calif. 91423
Filed Oct. 7, 1988, Ser. No. 255,538
Term of patent 14 years
U.S. Cl. D14—223



317,611
SPEAKER STAND
Kenneth A. Poe, 4956 Champlain, San Antonio, Tex. 78217
Filed Nov. 10, 1988, Ser. No. 269,166
Term of patent 14 years
U.S. Cl. D14—224



VOL
1127
ISS
3
JE
18
1991
UMI

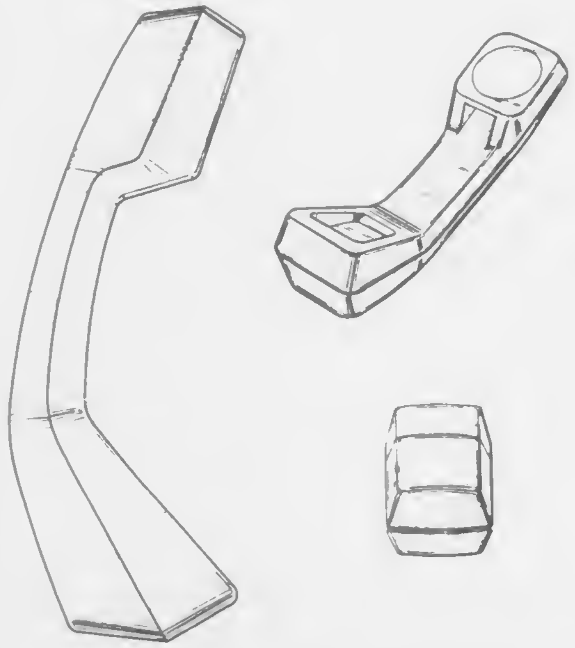
317,612
TELEPHONE HANDSET

Gary K. Dalton, Woodbridge, England, assignor to British Telecommuoications public limited company, London, England
Filed Aug. 16, 1989, Ser. No. 394,332

Claims priority, application United Kingdom, Feb. 16, 1989, 1057179

Term of patent 14 years

U.S. Cl. D14—248

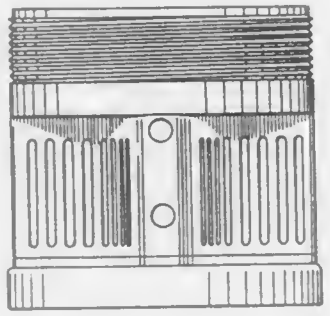


317,613
SUCTION INLET BOWL FOR A SUBMERSIBLE PUMP

Alan B. Channell, Ashland, Ohio, assignor to McNeil (Ohio) Corporation, St. Paul, Minn.
Filed Nov. 18, 1988, Ser. No. 273,001

Term of patent 14 years

U.S. Cl. D15—7



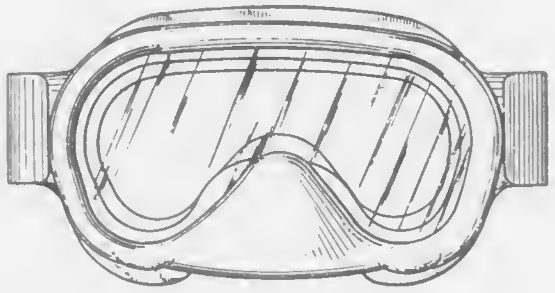
317,614
GOGGLES

Franz Dianitsch, Lerchenau 3, 4020 Leonding, Austria
Filed Jun. 15, 1987, Ser. No. 62,827

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1987, 17040

Term of patent 14 years

U.S. Cl. D16—102



317,615
ELECTRONIC STILL VIDEO CAMERA

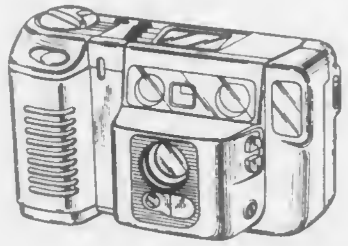
Nobuo Kikuchi, Tokyo, and Hiroshi Sano, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jun. 2, 1988, Ser. No. 201,162

Claims priority, application Japan, Dec. 2, 1987, 62-49498

The portion of the term of this patent subsequent to May 7, 2005, has been disclaimed.

Term of patent 14 years

U.S. Cl. D16—202



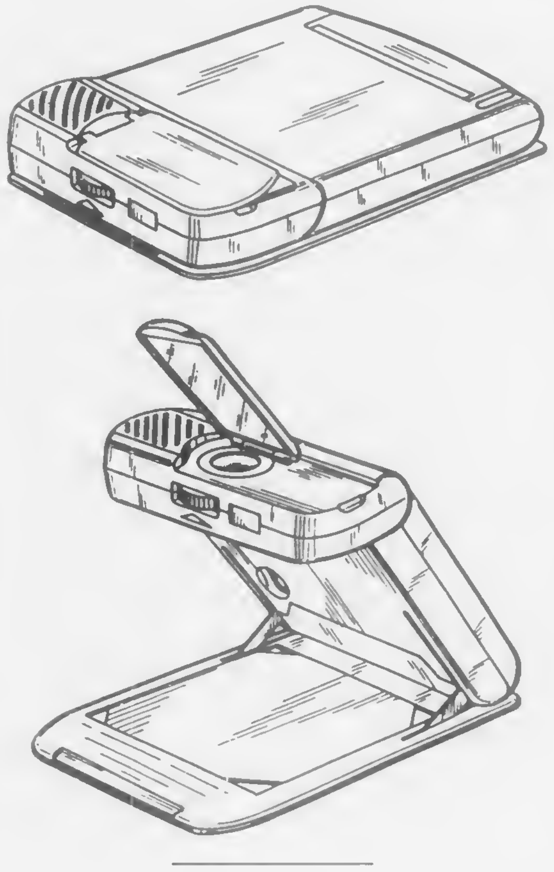
317,616
OVERHEAD PROJECTOR

Minoru Shiiba, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Sep. 30, 1988, Ser. No. 251,574

Claims priority, application Japan, Apr. 13, 1988, 63-14920

Term of patent 14 years

U.S. Cl. D16—232

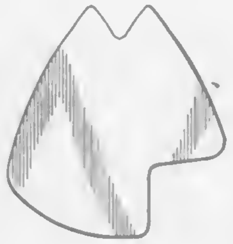


317,617
DOUBLE POINTED GUITAR PICK

Glenn W. Mutti, 1455 Madison Ave., Bridgeport, Conn. 06606
Filed Sep. 2, 1988, Ser. No. 239,848

Term of patent 14 years

U.S. Cl. D17—20



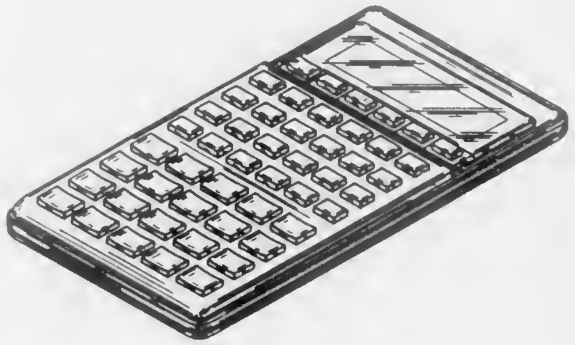
317,618
ELECTRONIC CALCULATOR

Masaji Sawada, and Kouji Nishida, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Oct. 16, 1989, Ser. No. 421,693

Claims priority, applicatioo Japan, Apr. 19, 1989, 1-14485

Term of patent 14 years

U.S. Cl. D18—7



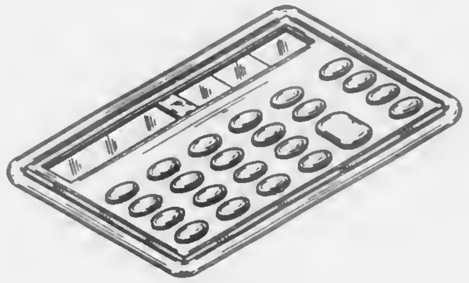
317,619
ELECTRONIC CALCULATOR WITH SOLAR CELL

Masaji Sawada, and Youko Yoshimura, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Oct. 27, 1989, Ser. No. 428,754

Claims priority, application Japan, Apr. 27, 1989, 1-16293

Term of patent 14 years

U.S. Cl. D18—7

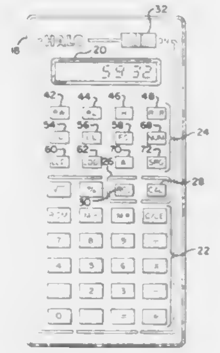


317,620
LIGHTING CALCULATOR

Raymond J. Kusmer, La Habra, Calif., assignor to Cooper Industries, Inc., Houston, Tex.
Filed Mar. 31, 1988, Ser. No. 176,813

Term of patent 14 years

U.S. Cl. D18—7

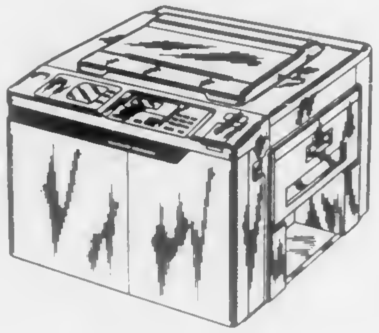


VOL
1127
ISS
3
JE
18
1991
UMI

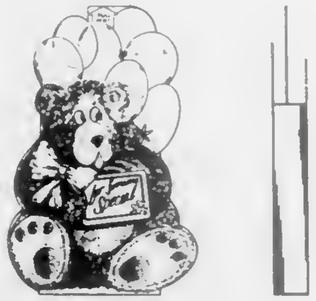
317,621
TYPE FONT
Sumner R. Stone, Palo Alto, Calif., assignor to Adobe Systems Incorporated, Mountain View, Calif.
Filed May 11, 1988, Ser. No. 193,316
Term of patent 14 years
U.S. Cl. D18—24

ABCDEFJ
KLNOPQR
STUVWXYZ
abcdefgij
klmnopqr
stuvwxyzªº

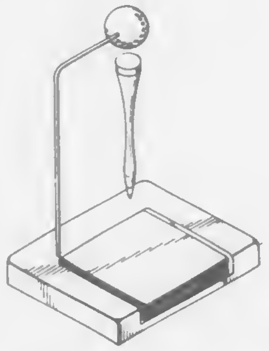
317,622
COPYING MACHINE
Masataka Isomoto, Kawasaki; Minoru Aoyama, Tokyo, and Mitsuru Sakurai, Musashino, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 18, 1989, Ser. No. 381,172
Claims priority, application Japan, Jan. 19, 1989, 1-1657
Term of patent 14 years
U.S. Cl. D18—38



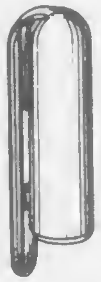
317,623
GREETING CARD
Edward Piechocki, R.D. 1, P.O. Box 4078, Upper Black Eddy, Pa. 18972
Filed Dec. 14, 1989, Ser. No. 450,730
Term of patent 14 years
U.S. Cl. D19—1



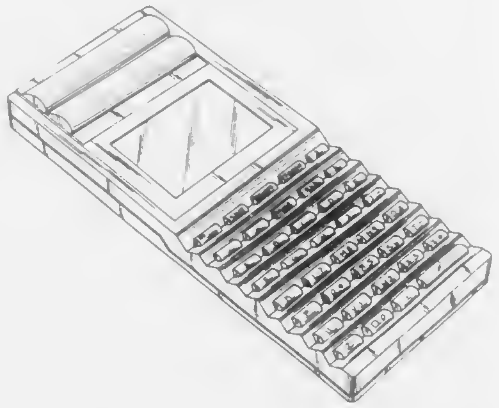
317,624
COMBINED PEN AND MAGNETIC HOLDER THEREFOR
William R. Jurinjak, 728 W. 1720 N.#216, Provo, Utah
Filed Aug. 24, 1988, Ser. No. 235,632
Term of patent 14 years
U.S. Cl. D19—42



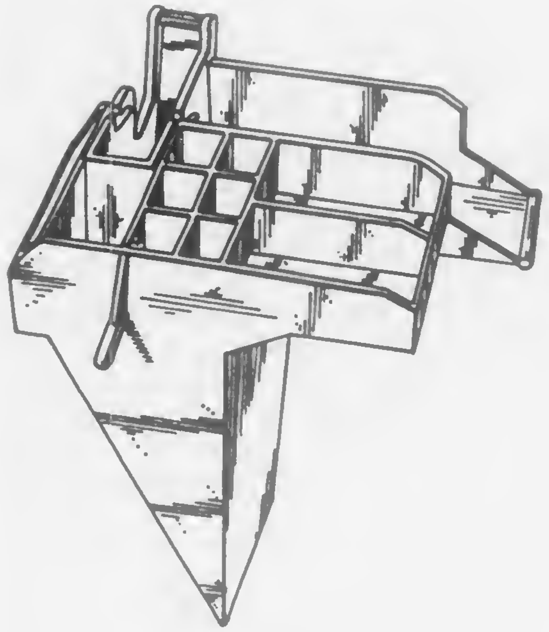
317,625
PEN CAP OR SIMILAR ARTICLE
Kunio Itoh, Funabashi, Japan, assignor to Pentel Kabushiki Kaisha, Japan
Division of Ser. No. 935,558, Nov. 26, 1986, Pat. No. Des. 310,684. This application Aug. 13, 1990, Ser. No. 567,901
Term of patent 14 years
U.S. Cl. D19—57



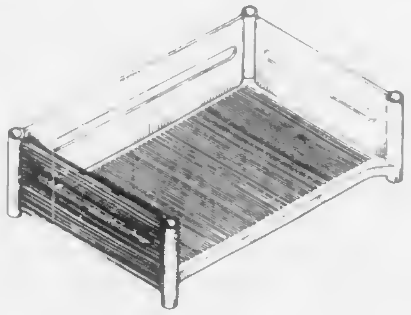
317,626
PORTABLE ELECTRONIC DICTIONARY
Peter H. Muller, Los Gatos, Calif., assignor to Alexander H. Hwang, Moraga, Calif.
Filed Mar. 7, 1990, Ser. No. 489,520
Term of patent 14 years
U.S. Cl. D19—60



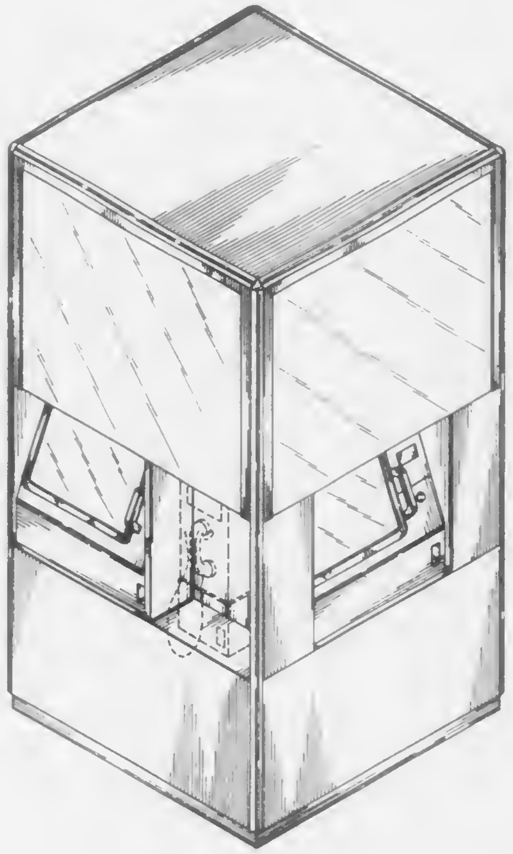
317,627
HOLDER FOR ASSORTED DESK ARTICLES
Theodore P. Lapadakis, 9827 Mason Ave., Chatsworth, Calif. 91311
Filed Mar. 7, 1988, Ser. No. 164,993
Term of patent 14 years
U.S. Cl. D19—75



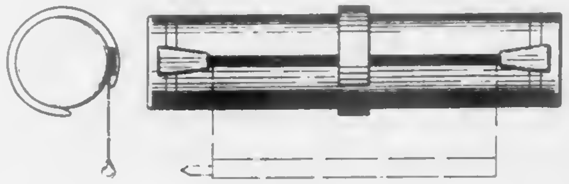
317,628
DESK TRAY
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Sep. 28, 1987, Ser. No. 101,770
Term of patent 14 years
U.S. Cl. D19—92



317,629
NEWSPAPER VENDING KIOSK
Jack S. Chalabian, Huntington Beach, Calif., assignor to K-Jack Engineering Company, Inc., Gardena, Calif.
Filed Jul. 13, 1988, Ser. No. 218,024
Term of patent 14 years
U.S. Cl. D20—6

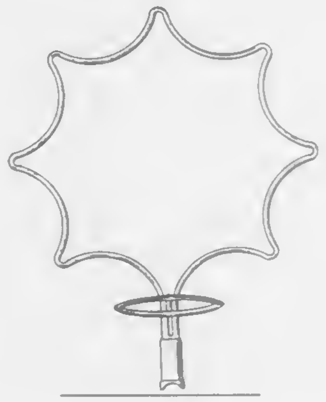


317,630
RETRACTABLE ROLLER DIRECTORY
Gaudet Allen, and Gaudet E. Allen, both of 1217 Blue Hills Ave., Bloomfield, Conn. 06002
Filed Mar. 23, 1988, Ser. No. 172,134
Term of patent 14 years
U.S. Cl. D20—42

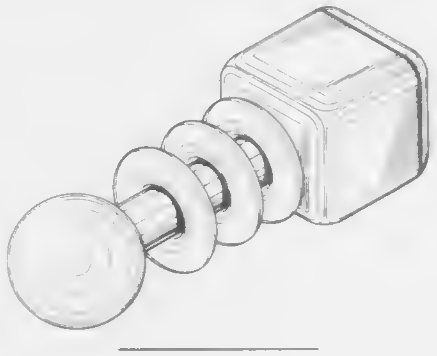


VOL
1127
ISS
3
JE
18
1991
UMI

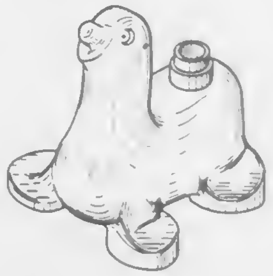
317,631
BUBBLE WAND
Richard L. Neuroth; Margerate A. B. Neuroth, both of R.R. Box 178-A, Epworth, Iowa 52045; Richard A. Robertson, and Elizabeth A. Robertson, both of 3065 Hales Mill Rd., Dubuque, Iowa 52001
Filed Jun. 13, 1989, Ser. No. 365,502
Term of patent 14 years
U.S. Cl. D21—61



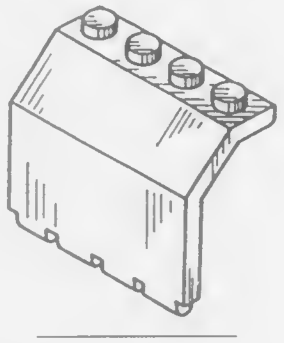
317,632
TOY RATTLE
James F. Mariol, Cincinnati, Ohio, assignor to The Little Tikes Company, Hudson, Ohio
Filed Jun. 26, 1989, Ser. No. 371,012
Term of patent 14 years
U.S. Cl. D21—65



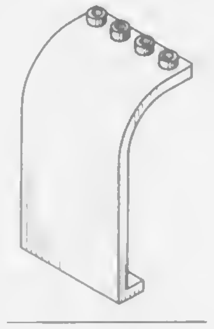
317,633
TOY SEA LION
Christian Stephensen, Marstal, and Jacob Nielsen, Copenhagen, both of Denmark, assignors to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 443,223
Term of patent 14 years
U.S. Cl. D21—108



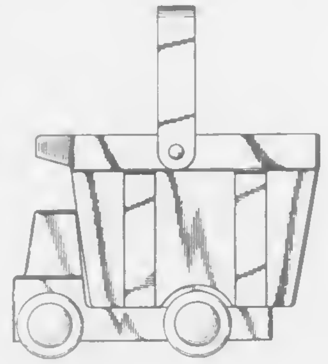
317,634
TOY BUILDING ELEMENT
Kim P. Larsen, Vandel, and Erling T. Dideriksen, Billund, both of Denmark, assignors to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 443,234
Term of patent 14 years
U.S. Cl. D21—108



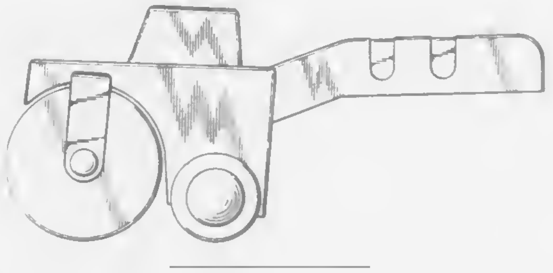
317,635
TOY BUILDING ELEMENT
Bo Eggert, Kolding, and Erling T. Dideriksen, Billund, both of Denmark, assignors to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 443,275
Term of patent 14 years
U.S. Cl. D21—108



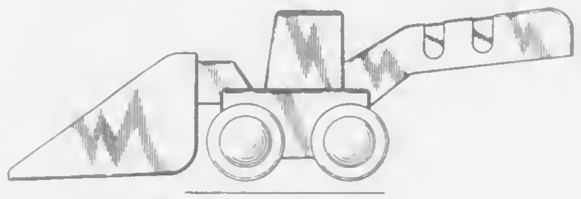
317,636
TOOL FOR PLAYING IN SAND
Masaki Mayuzumi, Tokyo, Japan, assignor to Tomy Company, Ltd., Tokyo, Japan
Filed Jul. 13, 1989, Ser. No. 379,143
Claims priority, application Japan, Jan. 18, 1989, 1-1354
Term of patent 14 years
U.S. Cl. D21—120



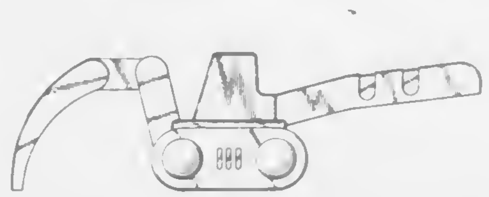
317,637
TOOL FOR PLAYING IN SAND
Masaki Masuzumi, Tokyo, Japan, assignor to Tomy Company, Ltd., Tokyo, Japan
Filed Jul. 13, 1989, Ser. No. 379,167
Claims priority, application Japan, Jan. 18, 1989, 1-1352
Term of patent 14 years
U.S. Cl. D21—120



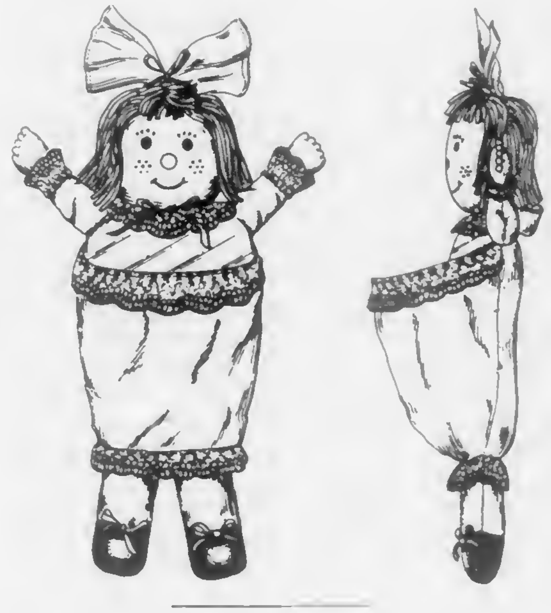
317,638
TOOL FOR PLAYING IN SAND
Masaki Mayuzumi, Tokyo, Japan, assignor to Tomy Company, Ltd., Tokyo, Japan
Filed Jul. 13, 1989, Ser. No. 379,145
Claims priority, application Japan, Jan. 18, 1989, 1-1353
Term of patent 14 years
U.S. Cl. D21—120



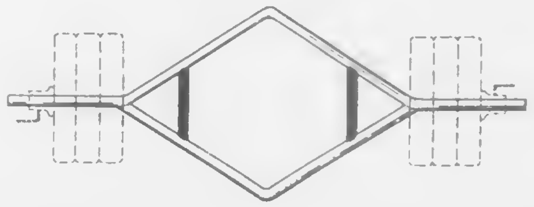
317,639
TOOL FOR PLAYING IN SAND
Masaki Mayuzumi, Tokyo, Japan, assignor to Tomy Company, Ltd., Tokyo, Japan
Filed Jul. 13, 1989, Ser. No. 379,144
Claims priority, application Japan, Jan. 18, 1989, 1-1352
Term of patent 14 years
U.S. Cl. D21—120



317,640
STUFFED DOLL FIGURE WITH FRONTAL POUCH
Edith A. Verone, 515 Helen St., Syracuse, N.Y. 13203
Filed May 12, 1989, Ser. No. 351,097
Term of patent 14 years
U.S. Cl. D21—167



317,641
WEIGHT LIFTING BAR
Al P. Gerard, 207 Holyoke Dr., Washington, N.C. 27889
Filed Mar. 23, 1987, Ser. No. 29,419
Term of patent 14 years
U.S. Cl. D21—197



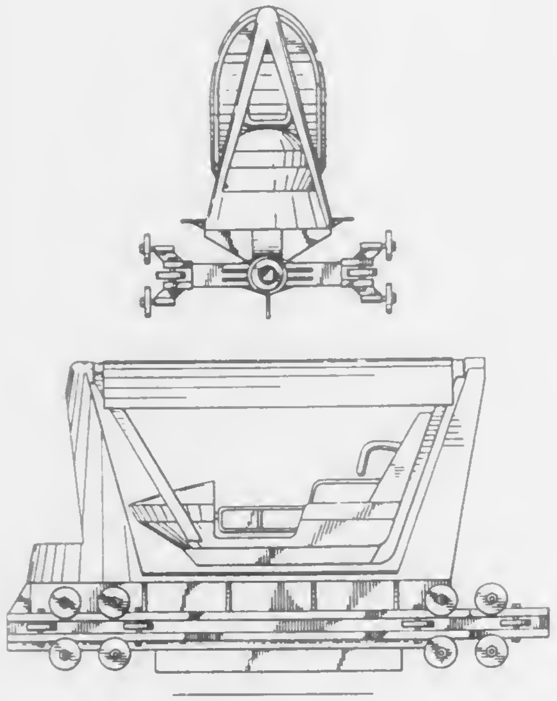
VOL
1127
ISS
3
JE
18
1991
UMI

317,642
CAR FOR A ROLLER COASTER
Keizo Hashimoto, Kodaira, Japan, assignor to Midgety Engineering Co., Ltd., Tokyo, Japan

Filed Jan. 25, 1988, Ser. No. 148,397

Term of patent 14 years

U.S. Cl. D21—247

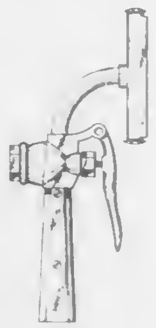


317,643
COMBINED SPRAYER AND HANDLE FOR DISHWASHING EQUIPMENT
Robert L. Duke, 4154 Arden St., Clemmons, N.C. 27012

Division of Ser. No. 111,565, Oct. 22, 1987, Pat. No. Des. 306,896. This application Dec. 4, 1989, Ser. No. 445,477

Term of patent 14 years

U.S. Cl. D23—226



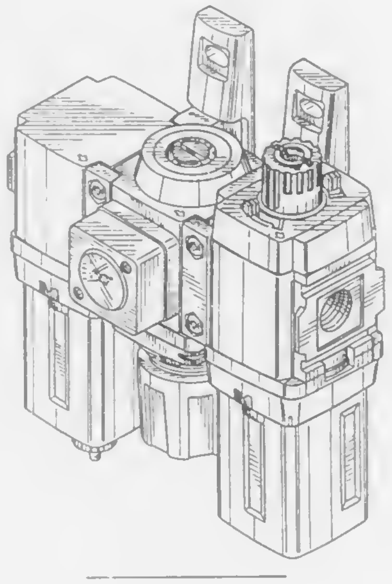
317,644
COMBINED PRESSURE REGULATOR FILTER AND LUBRICATOR
Yasuyuki Ito; Tatsuaki Aoyama, both of Ichinomiya, and Hisanobu Niwa, Komaki, all of Japan, assignors to CKD Kabushiki Kaisha, Komaki, Japan

Filed Mar. 30, 1989, Ser. No. 330,739

Claims priority, application Japan, Sep. 30, 1988, 63-38442

Term of patent 14 years

U.S. Cl. D23—235

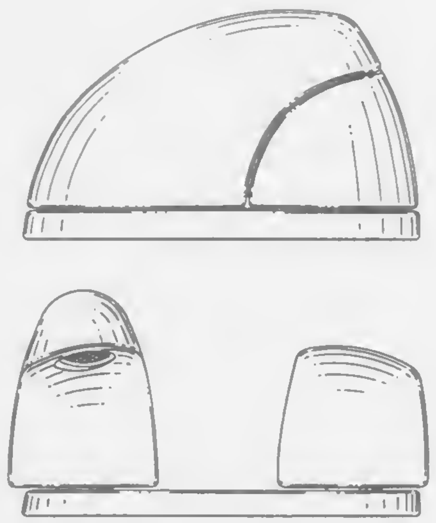


317,645
FAUCET
Kevin W. Rosenbaum, Parma, Ohio, assignor to Moen Incorporated, Windsor, Conn.

Filed Jan. 11, 1988, Ser. No. 142,221

Term of patent 14 years

U.S. Cl. D23—238

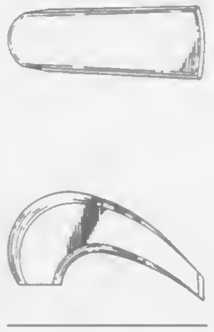


317,646
DRAIN CONTROL KNOB
Holly K. Yost, Santa Monica, Calif., assignor to Price Pfister, Inc., Pacoima, Calif.

Filed Jan. 14, 1988, Ser. No. 144,392

Term of patent 14 years

U.S. Cl. D23—252



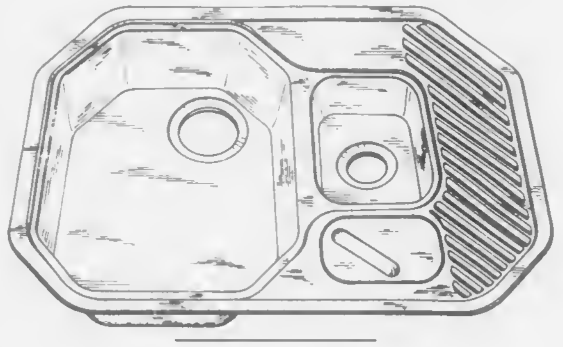
317,647
SINK
Karl-Heinz Jung, Münsingen-Dottingen, and Manfred Mück, Kürnbach, both of Fed. Rep. of Germany, assignors to Blanco GmbH & Co. KG, Oberderdingen, Fed. Rep. of Germany

Filed Mar. 17, 1988, Ser. No. 169,348

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1987, 10 AR 157/87

Term of patent 14 years

U.S. Cl. D23—290



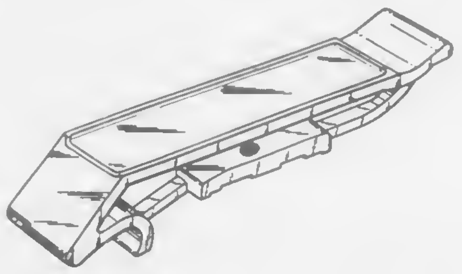
317,648
ELEMENT OF A MOVEABLE GRATE SURFACE FOR INCINERATORS
Hans B. Andersen, Muodelstrup; Allan Sorensen, Åbyhoj, and Per Jespersen, Rude, all of Denmark, assignors to B & S Miljoteknik, Arhus, Denmark

Filed Mar. 31, 1988, Ser. No. 176,342

Claims priority, application Sweden, Oct. 2, 1987, 87-2182

Term of patent 14 years

U.S. Cl. D23—397

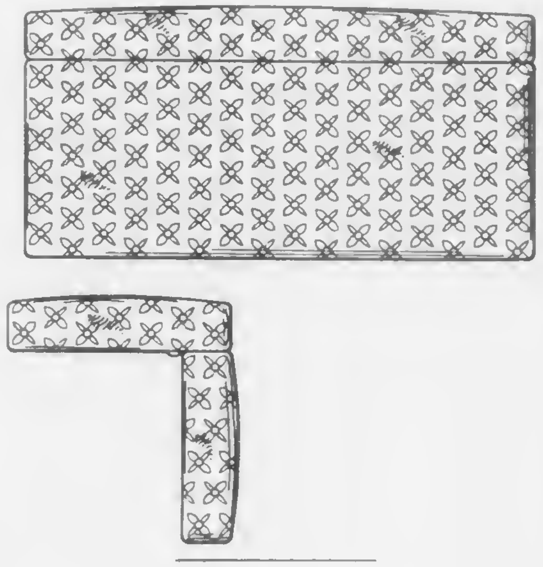


317,649
CHILD PROTECTIVE PADDED HEARTH COVER
Karen R. Alford, 407 Holly Springs Rd., Woodstock, Ga. 30188

Filed Sep. 5, 1989, Ser. No. 402,427

Term of patent 14 years

U.S. Cl. D23—403



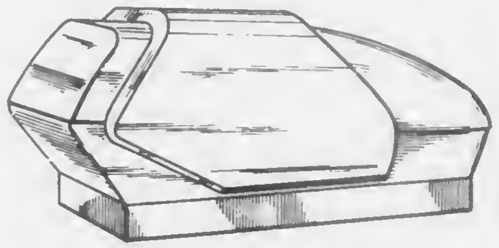
317,650
COMBINED RELAXATION AND PSYCHOSENSORIAL STIMULATION CHAMBER
Hugo Soder, Montreux, Switzerland, assignor to New Space S.A., Switzerland

Filed Mar. 31, 1988, Ser. No. 175,727

Claims priority, application Switzerland, Oct. 8, 1987, DM/009434

Term of patent 14 years

U.S. Cl. D24—202



VOL
1127
ISS
3
JE
18
1991
UMI

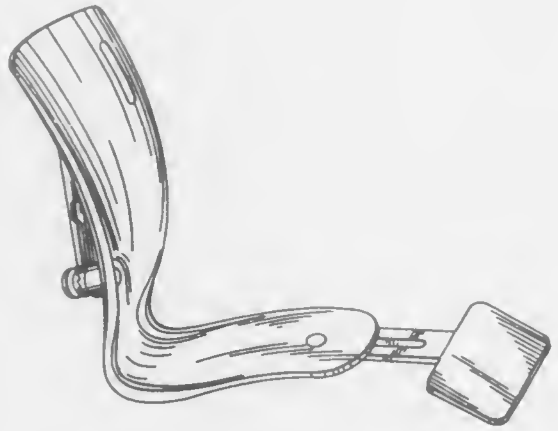
317,651
FOOT SPLINT OR THE LIKE

Harold J. Farris, 10398 104th Ave. North, Seminole; J. Marvin Winn, 1072 Fay Ave. North, Largo, both of Fla. 34641, and Joseph P. Morrissey, 13593 91st Ave. North, Seminole, Fla. 34646

Filed Sep. 20, 1988, Ser. No. 247,104

Term of patent 14 years

U.S. Cl. D24—192



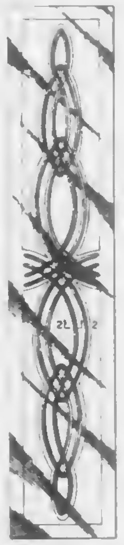
317,652
DECORATIVE GLASS PANEL

Norbert J. Guetle, Jr., Cincinnati, Ohio, and Marlin Greene, Redmond, Wash., assignors to Pease Industries, Inc., Fairfield, Ohio

Filed Jan. 30, 1989, Ser. No. 302,855

Term of patent 14 years

U.S. Cl. D25—103



317,653
DECORATIVE GLASS PANEL

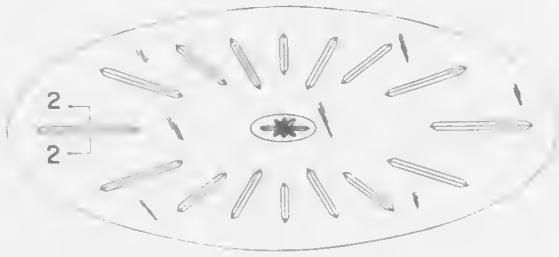
Norbert J. Guetle, Jr., Cincinnati, and B. Jeremiah Shaffer, Worthington, both of Ohio, assignors to Pease Industries, Inc., Fairfield, Ohio

Division of Ser. No. 302,867, Jan. 30, 1989, Pat. No. Des. 315,603. This application Aug. 13, 1990, Ser. No. 565,917

The portion of the term of this patent subsequent to Jun. 18, 2005, has been disclaimed.

Term of patent 14 years

U.S. Cl. D25—103



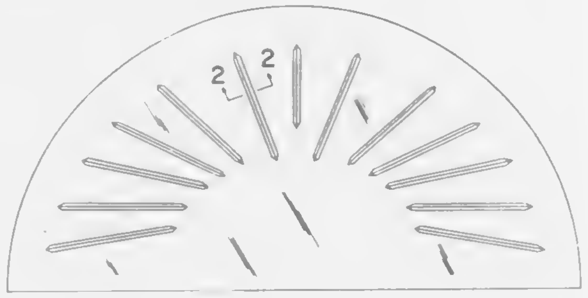
317,654
DECORATIVE GLASS PANEL

Norbert J. Guetle, Jr., Cincinnati, and B. Jeremiah Shaffer, Worthington, both of Ohio, assignors to Pease Industries, Inc., Fairfield, Ohio

Division of Ser. No. 302,865, Jan. 30, 1989, abandoned. This application Aug. 13, 1990, Ser. No. 565,916

Term of patent 14 years

U.S. Cl. D25—103



317,655
DECORATIVE GLASS PANEL

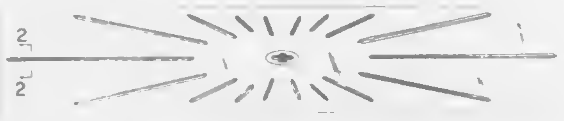
Norbert J. Guetle, Jr., Cincinnati, and B. Jeremiah Shaffer, Worthington, both of Ohio, assignors to Pease Industries, Inc., Fairfield, Ohio

Division of Ser. No. 302,860, Jan. 30, 1989, Pat. No. Des. 314,239. This application Jul. 30, 1990, Ser. No. 560,306

The portion of the term of this patent subsequent to Jun. 18, 2005, has been disclaimed.

Term of patent 14 years

U.S. Cl. D25—103



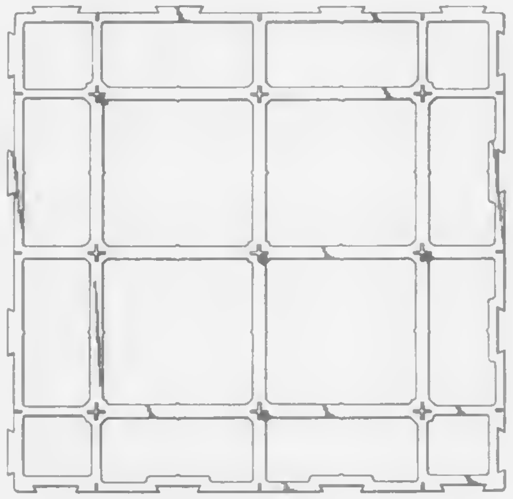
317,656
TILE MOUNTING AID

Philip L. Rea, "Melleray", 7a, Hillcrest Road, Ealing, London W5 2JL, and Stanley R. Bagshaw, 19, Georgewood Road, Hemel Hempstead, Hertfordshire HP3 8AL, both of United Kingdom

Continuation-in-part of Ser. No. 873,346, Jun. 12, 1986. This application Oct. 19, 1987, Ser. No. 109,699

Term of patent 14 years

U.S. Cl. D25—138



317,657
FLUORESCENT DISPLAY TUBE FOR LARGE SCREEN VIDEO MATRIX ARRAY

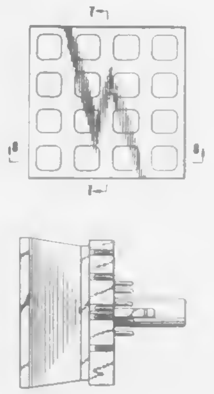
Shuji Iwata; Tsutomu Suyama, both of Amagasaki; Nobuo Terazaki, Nagasaki; Shunichi Futatsuishi, Nagasaki; Zenichiro Hara, Nagasaki, and Noriyuki Tomimatsu, Nagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 917,366, Oct. 9, 1986, abandoned, and a continuation-in-part of Ser. No. 917,367, Oct. 9, 1986, abandoned. This application Oct. 27, 1989, Ser. No. 428,046

Claims priority, application Japan, Apr. 18, 1986, 61-14571; Apr. 18, 1986, 61-14575

Term of patent 14 years

U.S. Cl. D26—1



317,658
TAILLAMP FOR AUTOMOBILE

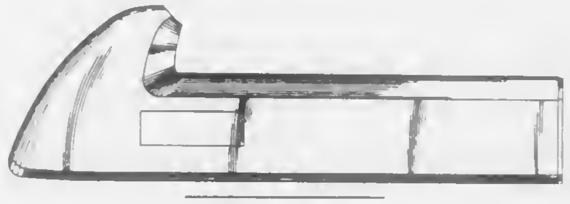
Harumi Okano, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 8, 1989, Ser. No. 391,369

Claims priority, application Japan, Feb. 8, 1989, 1-14416

Term of patent 14 years

U.S. Cl. D26—28



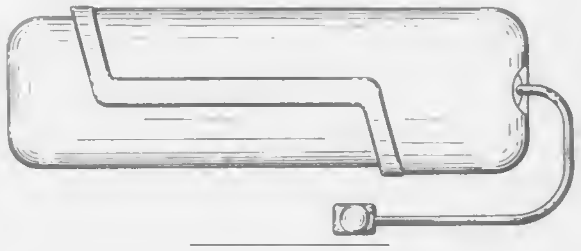
317,659
COMBINED BATTERY OPERATED LANTERN AND WATERPROOF CAP

Kenneth L. W. Hau, c/o Room 902, Chevalier House, 45-51 Chatham Rd., South, Tsimshatsui, Kowloon, Hong Kong

Filed Nov. 10, 1988, Ser. No. 269,654

Term of patent 14 years

U.S. Cl. D26—38



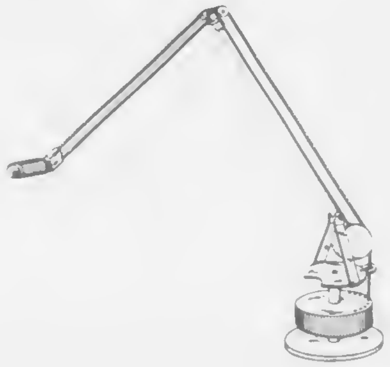
317,660
ADJUSTABLE LAMP

Sacha Ketoff, Ivry, France, assignor to PAF S.R.L., Italy

Filed Mar. 13, 1989, Ser. No. 322,237

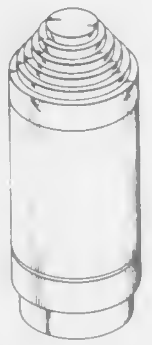
Term of patent 14 years

U.S. Cl. D26—65

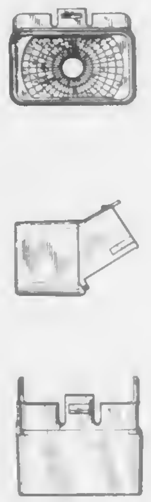


VOL
1127
ISS
3
JE
18
1991
UMI

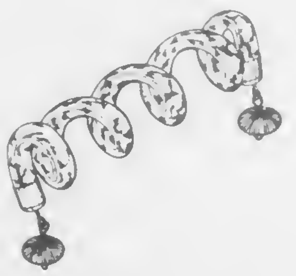
317,661
OUTDOOR BOLLARD LIGHTING FIXTURE
Hiroshi Kira, Westlake Village, Calif., assignor to Lumiere Design and Manufacturing, Inc., Westlake, Calif.
Filed Oct. 13, 1989, Ser. No. 421,393
Term of patent 14 years
U.S. Cl. D26—68



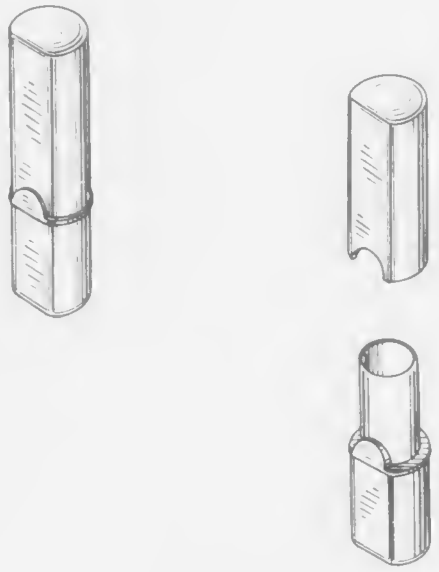
317,662
COMBINED FLASHLIGHT CASING HEAD AND REFLECTOR
Paul R. Bliss, Delta, Ohio, assignor to Fulton Industries, Inc., Wauseon, Ohio
Filed Oct. 4, 1989, Ser. No. 400,269
Term of patent 14 years
U.S. Cl. D26—113



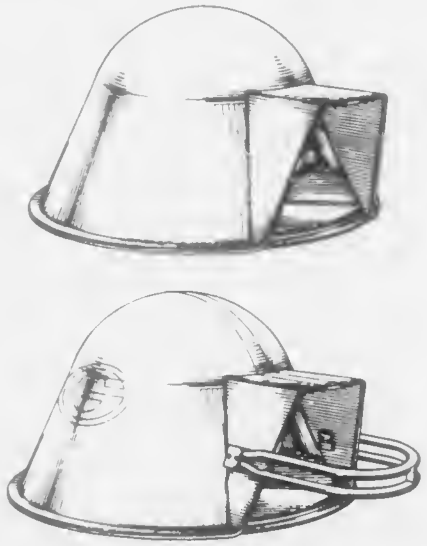
317,663
HAIR ORNAMENT
Julianne B. Calderon, 418 7th Ave., Salt Lake City, Utah 84103
Filed Aug. 17, 1989, Ser. No. 395,419
Term of patent 14 years
U.S. Cl. D28—41



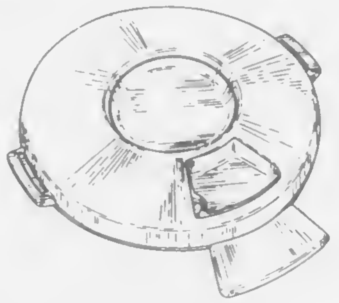
317,664
LIPSTICK CASE
Karena Bakic, Varese, Italy, assignor to Cosmede Anstalt, Vaduz, Liechtenstein
Filed Sep. 8, 1989, Ser. No. 404,435
Claims priority, application Int'l Pat. Institute, Apr. 5, 1989, DM/013279
Term of patent 14 years
U.S. Cl. D28—85



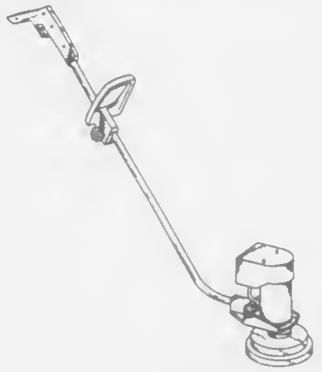
317,665
DOG HOUSE
Randolph L. Marshall, Columbus, Ga., assignor to Domation Inc., Columbus, Ga.
Filed Aug. 21, 1989, Ser. No. 396,612
Term of patent 14 years
U.S. Cl. D30—108



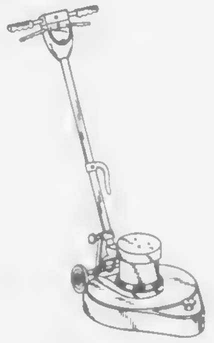
317,666
ANIMAL ACTIVATED FEEDER
Graham J. Haynes, P.O. Box 413, Plympton, Australia 5038
Filed Aug. 1, 1989, Ser. No. 388,705
Claims priority, application Australia, Feb. 2, 1989, 0282/89
Term of patent 14 years
U.S. Cl. D30—131



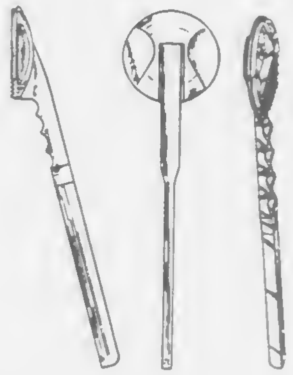
317,667
FLOOR TREATING MACHINE
Chester W. Bolser, Fremont, and Lyle H. Wierenga, Muskegon, both of Mich., assignors to Pacific Floor Machine Company, Inc., Grand Haven, Mich.
Filed May 17, 1988, Ser. No. 194,723
Term of patent 14 years
U.S. Cl. D32—19



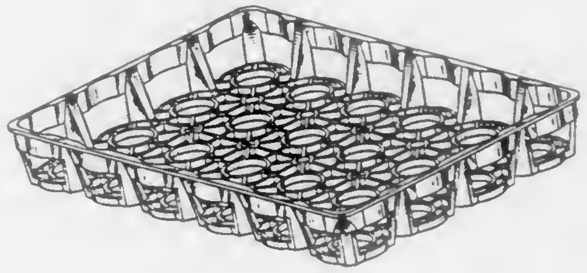
317,668
FLOOR POLISHER MACHINE
Chester W. Bolser, Fremont, and Lyle H. Wierenga, Muskegon, both of Mich., assignors to Pacific Floor Machine Company, Inc., Grand Haven, Mich.
Filed May 17, 1988, Ser. No. 194,956
Term of patent 14 years
U.S. Cl. D32—19



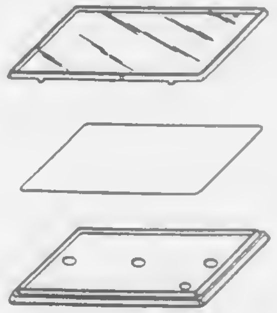
317,669
WINDSHIELD ICE SCRAPER
Michael J. Farmer, Sioux Falls, S. Dak., assignor to Luverne Truck Equipment Inc., Brandon, S. Dak.
Filed Sep. 18, 1989, Ser. No. 409,032
Term of patent 14 years
U.S. Cl. D32—49



317,670
NESTABLE CAN TRAY
William P. Apps, Anaheim, Calif., assignor to Rehrig-Pacific Company, Inc., Los Angeles, Calif.
Filed May 23, 1989, Ser. No. 357,068
Term of patent 14 years
U.S. Cl. D34—40



317,671
COIN TRAY AND THE LIKE
Charles L. Skaggs, Great Falls; Charles A. Thomas, Fairfax, and Sara L. Danis, McLean, all of Va., assignors to Mobil Oil Corporation, Fairfax, Va.
Filed Apr. 14, 1988, Ser. No. 183,026
Term of patent 14 years
U.S. Cl. D99—34



VOL
1127
ISS
3
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1991
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LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF JUNE, 1991

NOTE —Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- A.G.P. Systems, Inc.: *See—*
  - Leys, Cassius W., 5,024,780, Cl. 252-162.000.
- A H. Robins Co., Inc.: *See—*
  - Lo, Young S.; Walsh, David A.; and Uwaydah, Ibrahim M., 5,025,031, Cl. 514-399.000.
- Abbott, Kenneth E.; and Lyons, Patrick J., to Stripping Technologies Inc. Abrasive media valve system. 5,024,029, Cl. 51-438.000.
- Abdelrazik, Mohamed A.; Martin, John D.; and Corcoran, Boyd L., to E-Systems, Inc. Airborne antenna and a system for mechanically steering an airborne antenna. 5,025,262, Cl. 343-705.000.
- Abe, Kunihiro, to Fuji Jukogyo Kabushiki Kaisha. Air-fuel ratio control system for automotive engine. 5,024,199, Cl. 123-489.000.
- Abe, Kunihiro, to Fuji Jukogyo Kabushiki Kaisha. Analog-to-digital conversion system for an electronic control system of a motor vehicle. 5,025,259, Cl. 341-118.000.
- Abe, Masaki: *See—*
  - Kuruma, Kiyoshi; Abe, Masaki; Kagechika, Hiroshi; and Kagaya, Shinichi, 5,024,900, Cl. 428-626.000.
- Abe, Tsutomu; and Fukumoto, Masayuki, to Asahi Kasei Kabushiki Kaisha. Human monoclonal antibody to antigen of gastric cancer and B-cell line for producing this antibody, method for preparing this B-cell line and antibody, antigen and method of preparation of this antigen. 5,024,946, Cl. 435-240.270.
- Abplanalp, Robert H.; and Naku, Virgil. Apparatus for forming an aerosol container closure. 5,024,592, Cl. 425-112.000.
- Abumehdi, Cyrus: *See—*
  - Haines, John G.; Rosenbaum, Nolan G.; Pion, Albert L.; Lecarpentier, Marc; Henriot, Christophe; and Abumehdi, Cyrus, 5,025,383, Cl. 364-464.030.
- Aburaya, Toshio: *See—*
  - Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.
- Abys, Joseph A.; and Straschil, Heinrich K., to AT&T Bell Laboratories. Palladium alloy electroplating process. 5,024,733, Cl. 204-3.000.
- Academy of Applied Science: *See—*
  - Chien, James C. W., 5,024,894, Cl. 428-433.000.
  - Ramsay, Ronald. 5,024,428, Cl. 269-274.000.
- Acker, William E.: *See—*
  - DePellegrini, Donald D.; Acker, William E.; and Hoff, Richard, 5,024,038, Cl. 52-700.000.
- AcroMed Corporation: *See—*
  - Asher, Marc A.; Strippgen, Walter E.; Heinig, Charles F.; and Carson, William, 5,024,213, Cl. 128-69.000.
- Adam, Yossef: *See—*
  - Landa, Benzion; Krumberg, Yakov; and Adam, Yossef, 5,025,290, Cl. 355-265.000.
- Adams, Chip: *See—*
  - Pape, Robert; Rose, William; Burgel, Frank; and Adams, Chip, 5,023,996, Cl. 30-144.000.
- Adams, Graham R.: *See—*
  - Pfaffmann, George D.; Kubis, Charles S.; Currie, John P.; Balzer, Norbert R.; Walter, John; and Adams, Graham R., 5,025,123, Cl. 219-10.750.
- Adams, Thomas R.: *See—*
  - Collins, Glenn B.; Hildebrand, David F.; Lazzeri, Paul A.; Adams, Thomas R.; Parrott, Wayne A.; and Hartweck, Lynn M., 5,024,944, Cl. 435-172.300.
- Adickes, Eric: *See—*
  - Winter, Steven D.; Botich, Michael J.; and Adickes, Eric, 5,024,177, Cl. 114-61.000.
- Adiwinata, Sofyan. Rotary engine of the type having a planetary rotor with rotor and shaft equal rotation. 5,024,590, Cl. 418-61.200.
- Advanced Medical Technology, Inc.: *See—*
  - Shapiro, Ronald S., 5,024,236, Cl. 128-735.000.
- Advanced Micro Devices, Inc.: *See—*
  - Baror, Gigor, 5,025,366, Cl. 364-200.000.
  - Farmer, Charles, 5,025,181, Cl. 307-571.000.
  - Farmer, Charles, 5,025,182, Cl. 307-571.000.
- Advanced Nuclear Fuels Corporation: *See—*
  - Busch, Raymond A.; and Patterson, John F., 5,024,426, Cl. 267-158.000.
- Advanced Products International, Inc.: *See—*
  - Masciarella, Andrew M.; and Whistler, George R., 5,023,998, Cl. 30-276.000.
- AEC-Able Engineering Co., Inc.: *See—*
  - Harvey, Thomas J., 5,024,111, Cl. 73-865.600.
- Aerospace Corporation, The: *See—*
  - Sheaffer, Patrick M.; and Noblet, James A., 5,024,710, Cl. 156-89.000.
- Aerospatiale Societe Nationale Industrielle: *See—*
  - Debaig-Valade, Caroline; Filliatre, Claude; and Servens, Christian, 5,024,979, Cl. 501-95.000.
  - Lecourt, Guy; and Riou, Jacques, 5,024,712, Cl. 156-184.000.
- Affa, Stephen N.: *See—*
  - McGilp, Kenneth J.; Affa, Stephen N.; and Newman, Ira R., 5,024,454, Cl. 277-207.00A.
- Agfa-Gevaert AG: *See—*
  - Bauer, Walter; and Muller, Roland, 5,025,465, Cl. 378-169.000.
- Agisim, Gary R.: *See—*
  - Motola, Solomon; Agisim, Gary R.; and Mogavero, Annabelle, 5,024,997, Cl. 514-58.000.
- Agren, Nils A., to SEM AB. Apparatus for controlling the trigger sequence in ignition systems. 5,025,498, Cl. 361-156.000.
- Agro Forest Technik North America, Inc.: *See—*
  - Huber, Ernst, 5,024,172, Cl. 111-104.000.
- Ahlborn, Gunter; Budenbender, Herbert; and Lohmann, Alfred, to Waggon Union GmbH. Bogie for rail vehicles. 5,024,166, Cl. 105-453.000.
- Ahmad, Aftab A.: *See—*
  - Lee, Ruojia; and Ahmad, Aftab A., 5,024,961, Cl. 437-34.000.
- Ahmed, Hassan M., to Codex Corporation. Synchronizing continuous bit stream oriented terminals in a communications network. 5,025,457, Cl. 375-106.000.
- Ahrens, Kurt H.; Schickaneder, Helmut; Engler, Heidrun; and Szeleny, Istvan, to Ludwig Heumann & Co. GmbH. Pyrimidine-thioalkyl pyridine derivatives, medicaments containing these compounds, and method of treatment. 5,025,016, Cl. 514-274.000.
- Air Preheater Company, Inc., The: *See—*
  - Mattison, Glenn D., 5,024,817, Cl. 422-111.000.
- Air Products and Chemicals, Inc.: *See—*
  - Garg, Diwakar; Dyer, Paul N.; Schaffer, Leslie E.; Wrecsics, Ernest L.; Dimos, Duane; and Mueller, Carl F., 5,024,901, Cl. 428-627.000.
  - Lucas, Peter A.; and Casey, Jeremiah P., 5,025,078, Cl. 528-120.000.
- Aisin AW Co., Ltd.: *See—*
  - Sakakibara, Shiro; Hasebe, Masahiro; and Hattori, Masashi, 5,024,638, Cl. 475-210.000.
- Aisin Kako Kabushiki Kaisha: *See—*
  - Yamaguchi, Shigeru; and Mizutani, Ken-ichiro, 5,024,267, Cl. 165-122.000.
- Aisin Seiki Kabushiki Kaisha: *See—*
  - Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; and Okada, Shoji, 5,025,187, Cl. 310-323.000.
  - Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.
  - Nishii, Michiharu; Mizuno, Genji; Nomura, Yoshihisa; and Kato, Masahiko, 5,024,492, Cl. 303-114.000.
  - Nishikawa, Masumi, 5,024,157, Cl. 102-252.000.
  - Wakabayashi, Hideaki, 5,024,307, Cl. 192-40.000.
  - Yamaguchi, Shigeru; and Mizutani, Ken-ichiro, 5,024,267, Cl. 165-122.000.
- Aitken, W. Sidney; and Gonzales, Ralph. Adjustable length piping union. 5,024,469, Cl. 285-302.000.
- Ajax Magnethermic Corporation: *See—*
  - Howell, Charles N., 5,025,122, Cl. 219-10.710.
- Akamine, Hiroshi: *See—*
  - Sato, Yoshinori; and Akamine, Hiroshi, 5,025,051, Cl. 524-99.000.
- Akasaki, Yutaka; Aonuma, Hidekazu; Nukada, Katsumi; Tokita, Akihiko; Suto, Hidemi; Sato, Katsuhiro; and Tanaka, Hiroyuki, to Fuji Xerox Co., Ltd. Electrophotographic photoreceptor having an electric charge generating layer comprising a pyrylium compound. 5,024,911, Cl. 430-58.000.
- Akiyama, Koichi, to Kowa Company Ltd. Ophthalmic measurement apparatus. 5,024,520, Cl. 351-221.000.
- Aklonis, Carol A.; Ax, Helen A.; Kirsch, Donald R.; O'Sullivan, Joseph; Tymiak, Adrienne; and Wells, J. Scott, to E. R. Squibb & Sons, Inc. Dactylocycline A and dactylocycline B. 5,024,839, Cl. 424-115.000.
- Ako, Hidenobu, to Teijin Seiki Company Limited. Servo control apparatus. 5,025,199, Cl. 318-561.000.
- Aktiebolaget Electrolux: *See—*
  - Peterson, Christer C. I., 5,025,125, Cl. 219-85.110.
- Aktiebolaget Hassle: *See—*
  - Brandstrom, Arne E.; Lindberg, Fer L.; and Sunden, Gunnel E., 5,025,024, Cl. 514-338.000.
- AKZO NV: *See—*
  - Barda, Henry J., 5,025,090, Cl. 568-33.000.

VOL
1127
ISS
3
JE
18
1991
UMI

- Alandale Industries, Inc.: *See—*
  - Gutschmit, Alan, 5,024,393, Cl. 242-131.000.
- Alberghini, Alfred C.; Brunson, David A.; and Lynn, Stephen R., to Sewell Plastics, Inc. Wide stance footed bottle. 5,024,340, Cl. 215-1.00C.
- Alcan Aluminum Corporation: *See—*
  - Gailey, J. Lynn, 5,024,034, Cl. 52-484.000.
- Alcatel N.V.: *See—*
  - De Luca, Olivier, 5,025,234, Cl. 333-166.000.
  - Pauer, Dieter, 5,025,461, Cl. 375-119.000.
- Alcatel Transmission par Faisceaux Hertziens: *See—*
  - Hurinville, Bertrand, 5,025,453, Cl. 375-10.000.
- Alcon Surgical, Inc.: *See—*
  - Tyler, Hugh J., 5,024,654, Cl. 604-43.000.
- Aldwin, Lois: *See—*
  - Houston, L. L.; Aldwin, Lois; and Nitecki, Danute E., 5,024,834, Cl. 424-85.910.
- Alfa Lancia Industriale S.p.A.: *See—*
  - Petrelli, Luigi, 5,024,480, Cl. 296-146.000.
- Alfa-Laval Separation AB: *See—*
  - Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nåbo, Olle, 5,024,648, Cl. 494-56.000.
- Alfred Teves GmbH: *See—*
  - Booten, Sigmund; Kley, Uwe; and Hoffmann, Cristiano, 5,024,304, Cl. 188-356.000.
- Alfredeen, Lennart A. Electromagnetic device for heating metal elements. 5,025,124, Cl. 219-10.750.
- Aligena AG: *See—*
  - Linder, Charles; Perry, Mordechai; Nemas, Mara; and Katraro, Reuven, 5,024,765, Cl. 210-651.000.
- Allaire, Roger A.; Friske, Mark S.; Hagg, Sandra L.; and Janas, Victor F., to Corning Incorporated. Compositions and methods for making ceramic matrix composites. 5,024,978, Cl. 501-95.000.
- Allen, Frankie H.; and Leone, David A., to Siemens Energy & Automation, Inc. Circuit breaker contact assembly. 5,025,121, Cl. 200-275.000.
- Allied-Signal Inc.: *See—*
  - Henk, Michael G.; and Summers, Jack C., II, 5,024,824, Cl. 423-213.500.
  - Logsdon, Peter B.; Stachura, Leonard M.; Swan, Ellen L.; and Basu, Bajat S., 5,024,781, Cl. 252-171.000.
  - Mason, Charles D.; Sacks, William; Engelmann, Theodore R.; and Verma, Satyajit, 5,024,897, Cl. 428-474.400.
  - Thomas, Rudy V., 5,023,980, Cl. 24-196.000.
  - Zupancic, Joseph J.; Swedo, Raymond J.; Jamieson, Donald R.; Schumacher, Elaine F.; and Buehler, Allyson J., 5,025,079, Cl. 528-170.000.
- Alonso, Nelson A. Bidet accessory. 5,023,961, Cl. 4-448.000.
- Alpha Industries: *See—*
  - Negas, Taki; and Dominques, Louis P., 5,024,980, Cl. 501-134.000.
- Alsop, George M., to Union Carbide Chemicals and Plastics Technology Corporation. Method for obtaining analytes from liquid menstrua for analysis. 5,024,952, Cl. 436-177.000.
- Altman, Leonard F.; Flaugher, Jill L.; Suppelsa, Anthony B.; and Mullen, William B., III, to Motorola, Inc. Method of making high density solder bumps and a substrate socket for high density solder bumps. 5,024,372, Cl. 228-248.000.
- Aluminum Company of America: *See—*
  - Hittner, Herman J.; and Nguyen, Quyen C., 5,024,822, Cl. 423-111.000.
- Alusuisse-Lonza Services Ltd.: *See—*
  - Ryan, Thomas J., 5,024,696, Cl. 75-708.000.
- Alvarado-Swaisgood, Aileen E.: *See—*
  - Kaminsky, Mark P.; Kleefisch, Mark S.; Huff, George A.; Washecheck, Don M.; Alvarado-Swaisgood, Aileen E.; and Barr, Mark K., 5,024,984, Cl. 502-303.000.
- ALZA Corporation: *See—*
  - Edgren, David E.; and Theeuwes, Felix, 5,024,842, Cl. 424-473.000.
  - Kuczynski, Anthony L.; Ayer, Atul D.; and Wong, Patrick S.-L., 5,024,843, Cl. 424-499.000.
  - Yum, Su Il, 5,024,663, Cl. 604-131.000.
- Ambridge Limited: *See—*
  - Jerie, Hans G., 5,024,523, Cl. 353-11.000.
- American Cyanamid Company: *See—*
  - Rothstein, David M.; Love, Susan F.; and Baum, Ellen Z., 5,024,948, Cl. 435-252.100.
  - Trybulski, Eugene J.; and Brabander, Herbert J., 5,025,099, Cl. 548-527.000
- American Home Products Corporation: *See—*
  - Motola, Sciomon; Agisim, Gary R.; and Mogavero, Annabelle, 5,024,997, Cl. 514-58.000.
- American Life Support Technology: *See—*
  - Ferrand, Robert, 5,023,967, Cl. 5-62.000.
- American Materials Recycling Inc.: *See—*
  - Boyd, John A.; and Staples, George M., III, 5,024,770, Cl. 210-747.000.
- American Photo Systems, Inc.: *See—*
  - Greene, Arnold H.; and Holden, Harold E., 5,024,512, Cl. 350-514.000.
- American Saw & Mfg. Company: *See—*
  - Korb, William B., 5,024,026, Cl. 51-206.400.
- American Standard Inc.: *See—*
  - Bergmann, Konrad; Ems, Josef; and Nikolayczik, Hans, 5,024,378, Cl. 236-93.00B.
- American Sterilizer Company: *See—*
  - Saluja, Raja; and Nagare, Arthur T., 5,025,359, Cl. 362-402.000.
- Ametek, Inc.: *See—*
  - Holler, Thomas D., 5,024,764, Cl. 210-484.000.
- Amoco Corporation: *See—*
  - Kaminsky, Mark P.; Kleefisch, Mark S.; Huff, George A.; Washecheck, Don M.; Alvarado-Swaisgood, Aileen E.; and Barr, Mark K., 5,024,984, Cl. 502-303.000.
- Amonett, Daniel K.: *See—*
  - Cole, Ronald E.; and Amonett, Daniel K., 5,025,117, Cl. 200-38.00R.
- AMP Incorporated: *See—*
  - Bennett, Glenn E.; Lucius, John E.; Polk, Roger N.; Rider, Frederick H.; and Szczesny, David S., 5,024,627, Cl. 439-631.000.
  - Dola, Frank P.; Feldman, Steven; Lauterbach, John H.; and Mengelson, William G., 5,024,614, Cl. 439-114.000.
  - French, Jay L.; Himes, John L., Jr.; Weber, Ronald M.; and Wise, James H., 5,024,610, Cl. 439-857.000.
  - Hettinger, Arthur C., 5,024,106, Cl. 73-862.540.
- Anahara, Meiji: *See—*
  - Yasui, Yoshiharu; Anahara, Meiji; Asahi, Goro; and Miyake, Shiro, 5,024,874, Cl. 428-257.000.
- Analgesic Associates: *See—*
  - Sunshine, Abraham; Laska, Eugene M.; and Siegel, Carole E., 5,025,019, Cl. 514-277.000.
- Anderheggen, Wolfgang; Kraemer, Michael; Vogelsgesang, Roland; Wagner, Wolfram; Olges, Wolfgang; and Dragovic, Thomas, to Bayer Aktiengesellschaft. Processes for the production of mono- and multifilaments and staple fibers based on polyarylene sulfides. 5,024,797, Cl. 264-143.000.
- Andersen, Peter H.: *See—*
  - Gronwald, Frederik; Andersen, Peter H.; Faarup, Peter; Guddal, Erling; Hansen, Kristian T.; Hansen, Louis B.; and Nielsen, Erik B., 5,025,009, Cl. 514-213.000.
- Anderson, David B. Computer software protection, by optical effects. 5,024,495, Cl. 350-3.700.
- Anderson, Donald A., to Gear Fit Golf, Inc. Golf club head. 5,024,437, Cl. 273-78.000.
- Anderson, Donald J.; Duerksen, John H.; McCallum, Doug J.; and Petrick, Mark, to Chevron Research Company. Method of recovering hydrocarbons using single well injection/production system. 5,024,275, Cl. 166-303.000.
- Anderson, Eric W.: *See—*
  - Ford, Douglas L.; Anderson, Eric W.; and Kopp, Clinton V., 5,024,762, Cl. 210-321.690.
- Anderson, Ray L. Prefabricated construction unit with insulation. 5,024,033, Cl. 52-407.000.
- Anderson, Robert: *See—*
  - Romero, Hugo; and Anderson, Robert, 5,024,109, Cl. 73-864.160.
- Anderson, Roger, to Robotic Originals, Inc. Lightweight gripper for robotic transfer operations. 5,024,575, Cl. 414-627.000.
- Anderson, Stuart L.; and Sandstrom, Richard L., to Cymer Laser Technologies. System for, and method of, regulating the wavelength of a light beam. 5,025,445, Cl. 372-20.000.
- Anderson, Thomas F. Latch hook frame. 5,024,357, Cl. 223-106.000.
- Andra, Rainer H., to Carl Freudenberg, Firma. Torsional vibration damper with an undulating damping ring. 5,024,120, Cl. 74-574.000.
- Andrew Corporation: *See—*
  - Sohner, Harold K.; Hoyloak, Joel N.; Girvin, Richard J.; and Kumar, Surinder, 5,025,452, Cl. 375-1.000.
- Andrews, Mena G.: *See—*
  - Hatfield, Stephen C.; Andrews, Mena G.; and Broders, Richard P., 5,024,807, Cl. 376-352.000.
- Ankrom, Michael J.: *See—*
  - Downs, Walter M.; and Ankrom, Michael J., 5,024,734, Cl. 204-15.000.
- Anritsu Corporation: *See—*
  - Yamazaki, Syoji; Oda, Toshikazu; Iwanaga, Kenji; and Gono, Yoshitaka, 5,025,237, Cl. 335-83.000.
- Anthony, Ella L.: *See—*
  - Harbarger, Josephine A.; Oliver, David; and Anthony, Ella L., 5,024,207, Cl. 125-35.000.
- Anthony, James R.; Wiseman, Michael A.; and Lortz, Allan R., to Indiana Mills & Manufacturing, Inc. Belt buckle with interlocking dual tongue. 5,023,981, Cl. 24-573.500.
- Anthony, Michael; Ohler, Craig A.; and Christensen, Arnold, to Anthony, Michael. Electronic tuner for a musical instrument. 5,024,132, Cl. 84-312.00R.
- Aoike, Tatsuyuki: *See—*
  - Kanai, Masahiro; Aoike, Tatsuyuki; Matsuda, Koichi; and Kawakami, Soichiro, 5,024,706, Cl. 136-258.000.
- Aoki, Shinichiro; Sato, Takeo; Yamaguchi, Katsumasa; and Yamamoto, Masaki, to Matsushita Electric Industrial Co., Ltd. Alignment apparatus including three beams and three gratings. 5,025,168, Cl. 250-548.000.
- Aoki, Shinya: *See—*
  - Iida, Shinzi; Takeya, Fuminori; and Aoki, Shinya, 5,025,343, Cl. 360-127.000.
- Aonuma, Hidekazu: *See—*
  - Akasaki, Yutaka; Aonuma, Hidekazu; Nukada, Katsumi; Tokita, Akihiko; Suto, Hidemi; Sato, Katsuhiro; and Tanaka, Hiroyuki, 5,024,911, Cl. 430-58.000.
- Aoshima, Shinichiro; Urakami, Tsuneyuki; and Tsuchiya, Yutaka, to Hamamatsu Photonics Kabushiki Kaisha. Light waveform changing apparatus using an optical amplifier. 5,025,142, Cl. 250-201.900.

- Aoyagi, Toshitaka; and Motoda, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser device. 5,025,450, Cl. 372-46.000.
- Appelt, Kathleen A.: *See—*
  - Hartke, David J.; and Appelt, Kathleen A., 5,024,188, Cl. 123-195.00A.
- Appleton Specialty Products, Inc.. *See—*
  - Frawley, Thomas E., Jr., 5,024,084, Cl. 73-215.000.
- Appleyard, Ian P.: *See—*
  - Jones, William J.; and Appleyard, Ian P., 5,024,827, Cl. 423-610.000.
- Aquaria, Inc.: *See—*
  - Reinoehl, Robert F., 5,025,185, Cl. 310-87.000.
- Arai, Kei; Ohashi, Minoru; Utsugi, Yoshio; Oka, Osamu; Numazawa, Kenichi; Miwa, Kenji; and Sugawara, Kenzo, to Zaidanhojin Shokuhin Sangyo Senta; and Oriental Electric Company, Ltd. Apparatus for determining the degree of freshness of raw, frozen and processed fish, poultry and meat. 5,024,816, Cl. 422-68.100.
- Arai, Kunio, to Hitachi Seiko Ltd. Pressure foot for printed circuit board drilling machine. 5,024,562, Cl. 408-1.00R.
- Arai, Osamu: *See—*
  - Sato, Isao; Kirikami, Seiichi; Shimura, Akira; Hirose, Fumiyuki; Inose, Hiroshi; Urushidani, Haruo; and Arai, Osamu, 5,024,055, Cl. 60-39.270.
- Arakawa, Ikuo, to Mitsuba Electric Manufacturing Co., Ltd. Method for coating the armature of a rotary electric apparatus. 5,024,857, Cl. 427-104.000.
- Arakawa, Masao; Terasawa, Tomizo; Ogawa, Masanobu; and Kami, Hironori, to Matsushita Electric Works, Ltd. Sensor in IC formation. 5,025,169, Cl. 250-574.000.
- Araki, Kazunori: *See—*
  - Hagiwara, Hiroshi; Araki, Kazunori; and Michimori, Akihiro, 5,024,650, Cl. 600-26.000.
- Araki, Shinji: *See—*
  - Oohashi, Keiji; Araki, Shinji; Suzuki, Hideo; and Shimomichi, Tsuyoshi, 5,024,688, Cl. 65-3.120.
- Araki, Shunji: *See—*
  - Mouri, Hiroshi; and Araki, Shunji, 5,025,059, Cl. 524-495.000.
- ARBO Medizin-Technologie GmbH: *See—*
  - Schmid, Walter, 5,024,227, Cl. 128-640.000.
- ARCH Development Corp.: *See—*
  - Roizen, Michael; Turcotte, William E., II; and Pfisterer, Richard E., 5,025,374, Cl. 364-413.020.
- Ardco, Inc.: *See—*
  - Kostos, Jeffery; Kaspar, Melvin, and Artwohl, Paul, 5,024,023, Cl. 49-501.000.
- Argy, Gilles: *See—*
  - Busnel, Rene-Guy; and Argy, Gilles, 5,024,852, Cl. 427-2.000.
- Arimoto, Akira; Saito, Susumu; Tsunoda, Yoshito; Moriyama, Shigeo; and Mochizuki, Takeshi, to Hitachi, Ltd.; and Hitachi Koki Co., Ltd. Optical scanning apparatus and asymmetrical aspheric scanning lens. 5,025,268, Cl. 346-108.000.
- Armstrong, Gordon P.: *See—*
  - Pollet, Jean C.; Williams, Gary L.; Armstrong, Gordon P.; and Flautt, Martin C., 5,024,890, Cl. 428-372.000.
- Armstrong, Mark L.: *See—*
  - Smothers, William K.; Doraiswamy, Krishna C.; and Armstrong, Mark L., 5,024,909, Cl. 430-1.000.
- Armstrong World Industries Inc.: *See—*
  - Bowers, John H., 5,025,273, Cl. 346-159.000.
- Arnould, Jacques, to Telemecanique. Cellular power semiconductor device. 5,025,299, Cl. 357-45.000.
- Aron, M Jerome, to Kuhn S.A. Agricultural machine having at least one rotor for moving products located on the ground. 5,024,053, Cl. 56-367.000.
- Arthur, David J.; and Swei, Gwo S., to Rogers Corporation. Ceramic filled fluoropolymetric composite material. 5,024,871, Cl. 428-209.000.
- Arthur Schlaginhaufen Ing.: *See—*
  - Schlaginhaufen, Arthur, 5,024,763, Cl. 210-333.010.
- Artwohl, Paul: *See—*
  - Kostos, Jeffery; Kaspar, Melvin; and Artwohl, Paul, 5,024,023, Cl. 49-501.000.
- Artz, John M., to Mitre Corporation, The. Datalink controller interface. 5,025,382, Cl. 364-439.000.
- Asahi Glass Company, Ltd.: *See—*
  - Nakamura, Arao; Manabe, Tsuneo; Sugimoto, Naoki; and Usui, Hiroshi, 5,024,974, Cl. 501-57.000.
- Asahi, Goro: *See—*
  - Yasui, Yoshiharu; Anahara, Meiji; Asahi, Goro; and Miyake, Shiro, 5,024,874, Cl. 428-257.000.
- Asahi Kasei Kabushiki Kaisha: *See—*
  - Abe, Tsutomu; and Fukumoto, Masayuki, 5,024,946, Cl 435-240.270.
- Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
  - Shimamura, Yasuki; and Ihata, Jyoji, 5,025,266, Cl. 346-1.100.
- Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
  - Kitazawa, Toshiyuki; Kurosaki, Masahiko; and Ohsawa, Yutaka, 5,025,276, Cl. 354-152.000.
- Asai, Kohtaro: *See—*
  - Murakami, Tokumichi; Asai, Kohtaro; and Matsuzaki, Kazuhiro, 5,025,482, Cl. 382-56.000.
- Asakawa, Kouji: *See—*
  - Miura, Masao; Uchida, Naoshi; Takahashi, Tatsunori; Asakawa, Kouji; and Nozawa, Eiji, 5,025,236, Cl. 335-46.000.
- Asakura, Tsutou: *See—*
  - Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Tai, Hiromichi, 5,025,209, Cl. 324-96.000.
- Asars, Juris A.: *See—*
  - Leksell, David; Kun, Zoltan K.; and Asars, Juris A., 5,025,321, Cl. 358-296.000.
- Asato, Edward E.: *See—*
  - Stamness, Jesse I.; Morrow, Raymond W ; and Asato, Edward E., 5,025,327, Cl. 360-45.000.
- Asea Brown Boveri Aktiengesellschaft: *See—*
  - Hahn, Walter; Lutz, Ferdinand; and Jahn, Manfred, 5,024,115, Cl. 74-89.150.
- Asea Brown Boveri Ltd.: *See—*
  - Jetzer, Gregor; Kolb, Roland; and Spinnler, Fritz, 5,024,589, Cl 418-55.300.
- Ashby, Robert E., to Moore Business Forms, Inc. Flyless mailer having top sheet with cutout. 5,024,374, Cl. 229-71.000.
- Ashdown, Charles P.; Bewley, James G.; and Kenney, George B., to UltraFine Powder Technology, Inc. Fine hollow particles of metals and metal alloys and their production. 5,024,695, Cl. 75-338.000.
- Asher, Marc A.; Strippgen, Walter E.; Heinig, Charles F.; and Carson, William, to AcroMed Corporation. Connector for a corrective device. 5,024,213, Cl. 128-69.000.
- Ashland Oil, Inc.: *See—*
  - Landers, Perry E.; and Felton, George F., 5,024,697, Cl. 106-14.130.
- Asics Corporation: *See—*
  - Kiyosawa, Junichi, 5,024,006, Cl. 36-83.000.
  - Teranishi, Mitsuji; Watanabe, Yasuo; and Takeuchi, Akira, 5,025,384, Cl. 364-468.000.
- Asoh, Syoichi, to Kabushiki Kaisha Toshiba. Semiconductor device for performing automatic replacement of defective cells. 5,025,418, Cl. 365-200.000.
- Assh, Daniel. Combined air and leaf spring suspension for heavy weight vehicle. 5,024,462, Cl. 280-712.000.
- Astra Meditec Aktiebocag: *See—*
  - Buchel, Udo P., 5,024,615, Cl. 604-119.000.
- Astra-Vent AB: *See—*
  - Torok, Vilmos; and Loreth, Andrzej, 5,024,685, Cl. 55-117.000.
- AT&T Bell Laboratories: *See—*
  - Abys, Joseph A.; and Straschil, Heinrich K., 5,024,733, Cl. 204-3.000.
  - Billig, James N.; Chlipala, James D.; Lee, Kuo H.; and Nagy, William J., 5,025,300, Cl. 357-51.000.
  - Bleich, Larry L.; Roberts, Joni A.; and Zerbs, Stephen T., 5,024,864, Cl. 427-424.000.
  - Burack, John J.; LeGrange, Jane D.; and Townsend, Wesley P., 5,024,873, Cl. 428-220.000.
  - Chen, Chin-Chen; Feldman, Martin, and Waggener, Herbert A., 5,025,165, Cl. 250-491.100.
  - Craft, Adam B.; and Torok, Gabor P., 5,025,211, Cl. 324-158.00R.
  - Dietrich, Norman R.; Moyer, Ralph S.; and Wong, Yiu-Huen, 5,024,966, Cl. 437-60.000.
  - Duttweiler, Donald L., 5,025,258, Cl. 341-107.000.
  - Earp, Ronald L., 5,025,423, Cl. 367-137.000.
  - Hardin, Tommy G., and Khorramian, Behrooz A., 5,024,506, Cl 350-96.230.
  - Jebens, Robert W., 5,024,497, Cl. 350-96.200.
  - Kopf, Rose F.; Kuo, J. M.; Luftman, Henry S.; and Schubert, Erdmann F., 5,024,967, Cl. 437-95.000.
  - Ota, Yusuke; and Swartz, Robert G., 5,025,456, Cl. 375-76.000.
  - Purens, Alfred, 5,024,415, Cl. 248-923.000.
  - Sutton, Owen W., 5,025,170, Cl. 307-116.000.
- Athayde, Amulya L.; and Baker, Richard W., to Membrane Technology & Research, Inc. Protective clothing material. 5,024,594, Cl. 428-246.000.
- Atochem North America, Inc.: *See—*
  - Sandler, Stanley R., 5,025,104, Cl. 562-109.000.
- Atsumi, Senji: *See—*
  - Ohshima, Masaaki; Kobayashi, Akira; Atsumi, Senji; and Shimada, Hiromi, 5,024,907, Cl. 429-191.000.
- Attardi, Anthony A.: *See—*
  - Nowak, William J.; Attardi, Anthony A.; and Costanza, Daniel W , 5,025,291, Cl. 355-273.000.
- Au, Andrew: *See—*
  - van Konyenburg, Peter H.; and Au, Andrew, 5,025,131, Cl. 392-451.000.
- Auel, Carl C. All-purpose rocking, swiveling, reclining, and lifting chair. 5,024,486, Cl. 297-330.000.
- AUSIMONT S.r.l.: *See—*
  - Modena, Silvana; and Strepparola, Ezio, 5,025,105, Cl. 562-851.000.
- Ausimont S.p.A.: *See—*
  - Massa, Vincenzo; Cicuta, Aldo; and Cavigiolo, Walter, 5,024,879, Cl. 428-304.400.
- Aussieker, Dwight E.: *See—*
  - Blunier, Dennis L.; Shankwitz, Phillip J.; Caudill, Maurice L.; Bowar, Ronald C.; and Aussieker, Dwight E., 5,024,074, Cl. 72-16.000.
- Austin, Griffith D. Drape rod assembly. 5,024,338, Cl. 211-105.100.
- Autin, Jean-Marie: *See—*
  - Patoiseau, Jean F.; Autin, Jean-Marie; Cousse, Henri; Sales, Veronique; Tisne-Versailles, Jacky; and Bali, Jean-Pierre, 5,025,015, Cl. 514-274.000.
- Automated Machinery Systems, Inc.: *See—*
  - Ferguson, Vivian, 5,024,174, Cl. 112-121.240.

VOL
1127
ISS
3
JE
18
1991
UMI

- Avco Corporation: *See—*
  - Loszewski, Raymond C., 5,024,889, Cl. 428-368.000.
- Avedon, Raymond B.: *See—*
  - Hayes, Norman J.; and Avedon, Raymond B., 5,024,013, Cl. 40-301.000.
- Avila, Augusto F.: *See—*
  - Wender, Harry; and Avila, Augusto F., 5,024,661, Cl. 604-110.000.
- Avis, Richard J. A., to Sony Corporation. Motion dependent video signal processing. 5,025,495, Cl. 358-140.000.
- Awano, Yuji, to 501 Fujitsu Limited. Compound semiconductor device and a manufacturing method thereof. 5,024,958, Cl. 437-31.000.
- Ax, Helen A.: *See—*
  - Aklonis, Carol A.; Ax, Helen A.; Kirsch, Donald R.; O'Sullivan, Joseph; Tymiak, Adrienne; and Wells, J. Scott, 5,024,839, Cl. 424-115.000.
- Ayer, Atul D.: *See—*
  - Kuczynski, Anthony L.; Ayer, Atul D.; and Wong, Patrick S.-L., 5,024,843, Cl. 424-499.000.
- Ayers, Margaret A. Electroencephalic neurofeedback apparatus and method for bioelectrical frequency inhibition and facilitation. 5,024,235, Cl. 128-732.000.
- Ayrest, Robert B. Thermoplastic heating apparatus. 5,025,137, Cl 219-521.000.
- Azekura, Ko: *See—*
  - Tanaka, Nobuhiro; Hirata, Eiji; Moriguchi, Hideyuki; Azekura, Ko; Tsubone, Akira; and Ryu, Yasunori, 5,024,572, Cl. 414-276.000.
- B. Bunch Company, Inc.: *See—*
  - Bunch, Earnest B., III, 5,024,644, Cl. 493-357.000.
- B. F. Goodrich Company, The: *See—*
  - Russell, Donald L., 5,024,297, Cl. 188-18.00A.
- Baba, Fumiaki, to Mazda Motor Corporation. Shift control system for an automatic transmission. 5,024,125, Cl. 74-866.000.
- Bachman, William H., to Combustion Engineering, Inc. Support grid with integral inclined waves. 5,024,810, Cl. 376-438.000.
- Backes, Peter G., to Hughes Aircraft Company. Paint viscosity monitoring system and method. 5,024,080, Cl. 73-54.000.
- Backeze Limited: *See—*
  - Hayes, Leon, 5,024,214, Cl. 128-75.000.
- Badger Meter, Inc.: *See—*
  - Thornborough, Raymond J.; and Strobel, Donald H., 5,025,470, Cl. 379-107.000.
- Baer, William G. Animal training device. 5,024,183, Cl. 119-29.000.
- Baiker, Walter. Axle suspension for vehicles, particularly heavy vehicles with two or more axles. 5,024,465, Cl. 280-840.000.
- Bailey, Larry D. Band and label carrier. 5,024,337, Cl. 211-88.000.
- Bailey, Richard G., to Flakee Mills, Inc. Vibratory bulk material processor and method. 5,024,145, Cl. 99-451.000.
- Baillemont, Ghislaine; and Beauverd, Jean, to Colas S.A. Method of obtaining a composite sealing structure for permanent roadways. 5,024,552, Cl. 404-31.000.
- Bain, G. William. Apparatus for protecting ceiling work area from dispersal of asbestos fibers. 5,024,246, Cl. 134-200.000.
- Baitz, Guenter; and Behling, Rudolf, to Siemens Nixdorf Informationssysteme AG. Method for optically sensing marks on objects and apparatus for carrying out the method. 5,025,477, Cl. 382-8.000.
- Bak, Johannes J.: *See—*
  - Van Der Hoorn, Rudolf J.; Jaspers, Martinus J.; and Bak, Johannes J., 5,023,975, Cl. 17-46.000.
- Baker, Frank K.; and Hayden, James D., to Motorola, Inc. Method for patterning submicron openings using an image reversal layer of material. 5,024,971, Cl. 437-228.000.
- Baker, Jeffrey P.; La, Duong T.; and Coverstone, Randy A., to Hewlett-Packard Company. Thin film resistor type thermal ink pen using a form storage ink supply. 5,025,271, Cl. 346-140.00R.
- Baker, Richard J.: *See—*
  - Benneyworth, Douglas F.; and Baker, Richard J., 5,024,554, Cl. 404-74.000.
- Baker, Richard W.: *See—*
  - Athayde, Amulya L.; and Baker, Richard W., 5,024,594, Cl. 428-246.000.
- Bakker, Emile A. M., to Chrysler Corporation. System for axially locating a camshaft. 5,024,187, Cl. 123-193.00H.
- Bakowski, Steven J.: *See—*
  - Schumacher, David B.; and Bakowski, Steven J., 5,024,595, Cl. 431-18.000.
- Balco, Incorporated: *See—*
  - Borner, Willy and McQueeney, Kenneth A., 5,024,001, Cl. 33-203.180.
- Baldwin, Brian E. Adjustably controllable accuracy-enhancing pump arrangement and method. 5,024,347, Cl. 222-1.000.
- Balentine, Bruce E.: *See—*
  - Scott, Brian L.; Smith, Lloyd A.; Newell, J. Mark; Balentine, Bruce E.; and Lin, Lisan S., 5,025,471, Cl. 381-43.000.
- Bali, Jean-Pierre: *See—*
  - Patoiseau, Jean F.; Autin, Jean-Marie; Cousse, Henri; Sales, Veronique; Tisne-Versailles, Jacky; and Bali, Jean-Pierre, 5,025,015, Cl. 514-274.000.
- Ballard, Estus E. Pipe clamp for overhead sprinkler heads and the like. 5,024,404, Cl. 248-62.000.
- Balser, Richard L.: *See—*
  - Sutton, Allen R.; and Balser, Richard L., 5,024,689, Cl. 71-29.000.
- Balzer, Norbert R.: *See—*
  - Pfaffmann, George D.; Kubis, Charles S.; Currie, John P.; Balzer, Norbert R.; Walter, John; and Adams, Graham R., 5,025,123, Cl. 219-10.750.
- Banks, James C. Portable emergency alert system. 5,025,247, Cl. 340-574.000.
- Bannister, Raymond L.; Close, Frederick C.; and Loeber, Peter J., to Pitney Bowes Inc. Print drum for a postage meter. 5,024,153, Cl 101-91.000.
- Baotou Institute of Applied Design of New Materials: *See—*
  - Meihua, Wang, 5,024,271, Cl. 166-66.500.
- Bar Ilan University: *See—*
  - Freund, Isaac; and Rosenbluh, Michael, 5,024,528, Cl. 356-356.000.
- Barda, Henry J., to AKZO NV. Decolorization of dihydroxydiphenyl sulfone. 5,025,090, Cl. 568-33.000.
- Bardey, Philippe R.: *See—*
  - Guevel, Pierre M.; and Bardey, Philippe R., 5,024,396, Cl. 244-35.00R.
- Barke, Otto. Pedestrian signal system for automobiles. 5,025,245, Cl. 340-471.000.
- Barker, Henry E. Support device for supporting a skater. 5,024,601, Cl 434-255.000.
- Baror, Gigor, to Advanced Micro Devices, Inc. Organization of an integrated cache unit for flexible usage in cache system design. 5,025,366, Cl. 364-200.000.
- Barquet, Henri; Negroni, Pierre-Paul; and Plissonneau, Bernard, to Societe Nationale Industrielle et Aetospatiale. Frame made of a composite material, especially for the fuselage of an aircraft, and its method of production. 5,024,399, Cl. 244-119.000.
- Barr, Mark K.: *See—*
  - Kaminsky, Mark P.; Kleefisch, Mark S.; Huff, George A., Washecheck, Don M.; Alvarado-Swaisgood, Aileen E.; and Barr, Mark K., 5,024,984, Cl. 502-303.000.
- Barreau, Michel; Hardy, Jean-Claude; Martin, Jean-Paul; and Renault, Christian, to Rhone-Poulenc Sante. New benzopyran derivatives, their preparation and pharmaceutical compositions containing them. 5,025,013, Cl. 514-253.000.
- Barrett, David D. Air conditioning system for confined spaces 5,024,065, Cl. 62-285.000.
- Barrie, Robert L. Flexible vane for arrows. 5,024,448, Cl. 273-423.000.
- Barris, Marty A.; and Wagner, Wayne M., to Donaldson Company, Inc. Engine exhaust system with sequential loading of multiple filters. 5,024,054, Cl. 60-274.000.
- Bartley, John E., to Waukesha Specialties & Fabricators. Adjustable support for loudspeaker. 5,024,407, Cl. 248-164.000.
- Bartlow, David H.: *See—*
  - Dallum, Barry J.; and Bartlow, David H., 5,024,342, Cl. 220-468.000.
- BASF: *See—*
  - Crema, Stefano C.; Kucera, Clare H.; Konrad, Gerd, and Hartmann, Heinrich, 5,025,040, Cl 523-130.000.
- BASF Aktiengesellschaft: *See—*
  - Ley, Gregor; Schultze, Wolfgang; Vinke, Johannes; and Wistuba, Eckehardt, 5,025,062, Cl. 524-556.000.
  - Oftring, Alfred, Birnbach, Stefan; Fikentscher, Rolf; Baur, Richard; Kud, Alexander; Goeckel, Ulrich; and Perner, Johannes, 5,025,103, Cl. 560-170.000.
- BASF Corporation: *See—*
  - Thurman, Laurance R.; Dowd, Joseph P.; and Fischer, Kathy J., 5,024,772, Cl. 252-1.000.
  - Yeh, Ling; and Harrelson, Hugh G., Jr., 5,024,869, Cl. 428-97.000.
- BASF K&F Corporation: *See—*
  - Christenson, Philip A.; Eilerman, Robert G.; Riker, Paul J.; and Drake, Brian J., 5,024,847, Cl. 426-535.000.
- Basu, Bajat S.: *See—*
  - Logsdon, Peter B.; Stachura, Leonard M.; Swan, Ellen L., and Basu, Bajat S., 5,024,781, Cl. 252-171.000.
- Battelle Memorial Institute: *See—*
  - Miller, Steven D.; McDonald, Joseph C.; Eichner, Fred N.; and Tomeraasen, Paul L., 5,025,159, Cl. 250-337.000.
  - Timmerman, Craig L., 5,024,556, Cl. 405-128.000.
- Bauer, Kurt; and Schmid, Eckhardt, to SWF-Auto-Electric GmbH Spare wiper element. 5,023,972, Cl. 15-250.420.
- Bauer, Walter; and Muller, Roland, to Agfa-Gevaert AG. X-ray cassette for foils with phosphor layer. 5,025,465, Cl. 378-169.000.
- Baum, Ellen Z.: *See—*
  - Rothstein, David M.; Love, Susan F.; and Baum, Ellen Z., 5,024,948, Cl. 435-252.100.
- Bauman, Ralph E.; and Seymour, Horace W., III, to Sanders Associates, Inc. Electrical circuit board mounting method. 5,024,623, Cl. 439-876.000.
- Baur, Richard: *See—*
  - Oftring, Alfred; Birnbach, Stefan; Fikentscher, Rolf; Baur, Richard; Kud, Alexander; Goeckel, Ulrich; and Perner, Johannes, 5,025,103, Cl. 560-170.000.
- Baureis, Hans-Paul: *See—*
  - Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul, Bickle, Wolfgang; and Braus, Jurgen, 5,024,881, Cl. 428-323.000.
  - Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul; Bickle, Wolfgang; and Braus, Jurgen, 5,024,882, Cl. 428-323.000.
- Baxter International Inc.: *See—*
  - Mitchell, Richard J., 5,024,664, Cl. 604-143.000.
  - Needham, Thomas E.; Wright, Jeremy C.; Pearson, Steve; Chilamkurti, Rao; and Kopp, Clinton V., 5,024,657, Cl. 604-85.000.
  - Peterson, Robert H.; and McGurk-Burleson, Erin, 5,024,669, Cl. 623-13.000.
  - Soubrier, Pierre; and Denis, Xavier, 5,024,645, Cl. 493-380.000.
  - Tu, Roger; Chen, David; and Mathewson, Wilfred F., 5,024,671, Cl. 623-1.000.

- Bayer Aktiengesellschaft: *See—*
  - Anderheggen, Wolfgang; Kraemer, Michael; Vogelsgesang, Roland; Wagner, Wolfram; Olges, Wolfgang; and Dragovic, Thomas, 5,024,797, Cl. 264-143.000.
  - Klug, Gunter; Jabs, Gert; Berneth, Horst; and Botta, Artur, 5,024,987, Cl. 503-211.000
  - Lantzsch, Reinhard; Kysela, Ernst, Buchel, Karl H.; Dutzmann, Stefan; Brandes, Wilhelm; and Hanssler, Gerd, 5,025,030, Cl. 514-383.000.
  - Neuhaus, Alfred; Ganster, Otto; and Kopp, Richard, 5,025,039, Cl. 521-51.000.
  - Reiff, Helmut; and Lorenz, Otto, 5,025,064, Cl. 524-591.000.
  - Schallner, Otto; Negele, Michael; Santel, Hans-Joachim; Lurssen, Klaus; Schmidt, Robert R.; and Krauskopf, Birgit, 5,024,694, Cl. 71-95.000.
  - Tacke, Peter; Grigo, Ulrich; Nouvertne, Werner; Freitag, Dieter; Idel, Karsten-Josef; and Westeppe, Uwe, 5,025,065, Cl 524-611.000.
- Bayer, George: *See—*
  - Smith, Tempel, Jr.; Miletic, Veselko; Bayer, George; Coutre, Christopher A.; Reichel, William L.; and Chronowski, Mirek J., 5,025,223, Cl. 324-662.000.
- Beauverd, Jean: *See—*
  - Baillemont, Ghislaine; and Beauverd, Jean, 5,024,552, Cl. 404-31.000.
- Beaver, Phillip R., to Ethyl Corporation. Alcohol reaction media for production of hexabromocyclododecane. 5,025,110, Cl 570-206.000.
- Beckemeyer, Lynn M.: *See—*
  - Beckemeyer, Steven D.; and Beckemeyer, Lynn M., 5,024,515, Cl. 351-52.000.
- Beckemeyer, Steven D., and Beckemeyer, Lynn M. Ornaments for eye glasses. 5,024,515, Cl. 351-52.000.
- Becker, Johann A.; Deusser, Peter G.; and Holzmann, Olar W. R., to U.S. Philips Corp. Switch box for producing freely selectable optical plug connections. 5,024.498, Cl. 350-96.100.
- Beckman Instruments, Inc.: *See—*
  - Dodson, Charles L., 5,025,161, Cl. 250-364.000.
  - Lewis, Mark L.; Sharples, Thomas D.; and Little, Stephen E., 5,024,646, Cl. 494-16.000.
- Begley, Carl L.: *See—*
  - Oldham, James G.; Spencer, Charles R.; Begley, Carl L.; and Meyer, H. Robert, 5,025,150, Cl. 250-253.000.
- Behling, Rudolf: *See—*
  - Baitz, Guenter; and Behling, Rudolf, 5,025,477, Cl. 382-8.000.
- Beiling Stone Group Co.: *See—*
  - Wang, Tingyi, 5,024,490, Cl. 303-9.000.
- Bell, Joseph. Battery terminal post clamp. 5,024,620, Cl. 439-759.000.
- Bell, Karen: *See—*
  - Sikand, Parminder S.; McAllister, Mary J.; Henel, John; Jackson, Allen L.; and Bell, Karen, 5,025,468, Cl. 379-67.000.
- Bellagamba, Miro D. Athletic swing practice apparatus. 5,024,443, Cl. 273-188.00R.
- Bellows, James C.; and Koubek, Rudolph, III, to Westinghouse Electric Corp. Steam turbine rotor having graded weldments. 5,024,582, Cl. 416-213.00R.
- Beloit Corporation: *See—*
  - Gero, William; and Paskowski, Frank, 5,023,986, Cl. 29-163.600.
- Bender, Walter W., to Blount, Inc. Multi-station cartridge reloading press with controlled powder dispensing. 5,024,135, Cl. 86-31.000.
- Bennett, Glenn E.; Lucius, John E.; Polk, Roger N.; Rider, Frederick H.; and Szczesny David S., to AMP Incorporated. Float mounted receptacle contact assembly for card cage. 5,024,627, Cl. 439-631.000.
- Bennett, Robert B.; Hung, Vincent; and Sassoon, Ezra. Fastener for garments. 5,023,979, Cl. 24-68.00R.
- Benneyworth, Douglas F.; and Baker, Richard J., to Koch Materials Company. Bridge joint construction. 5,024,554, Cl. 404-74.000.
- Bensoussan, David; and Tardio, Don. Means for refreshing a triac control circuit power supply. 5,025,134, Cl. 219-494.000.
- Berchtold, Klaus: *See—*
  - Colquhoun, Alexander; and Berchtold, Klaus, 5,025,260, Cl. 342-127.000.
- Berg, Joseph A.; and Eames, Loren W. Front and back adjustable rocking seat support arrangement for seat having relatively adjustable sections. 5,024,485, Cl. 297-312.000.
- Berger, Alexander, to Vernitron Corporation. Segmented resolver. 5,025,201, Cl. 318-605.000.
- Berger, Harvey J.; Maddahi, Jamshid; and Berman, Daniel, to Centocor, Inc., by said Harvey J. Berger. Method of imaging coronary thrombi. 5,024,829, Cl. 424-1.100.
- Bergeron, Real, to Microthermo. Automatic temperature monitoring system. 5,025,248, Cl. 340-596.000.
- Bergmann, Konrad; Ems, Josef; and Nikolayczik, Hans, to American Standard Inc. Shut-off valve for scald prevention. 5,024,378, Cl. 236-93.00B.
- Berman, Daniel: *See—*
  - Berger, Harvey J.; Maddahi, Jamshid; and Berman, Daniel, 5,024,829, Cl. 424-1.100.
- Berneth, Horst: *See—*
  - Klug, Gunter; Jabs, Gert; Berneth, Horst; and Botta, Artur, 5,024,987, Cl. 503-211.000.
- Berntsson, Leif: *See—*
  - Gustafsson, Gert-Ove; Berntsson, Leif; and Larsson, Kåre, 5,024,703, Cl. 106-649.000.
- Berry, John P., to Ethicon, Inc.; and University of Liverpool, The. Method and apparatus for manufacturing electrostatically spun structure. 5,024,789, Cl. 264-6.000.
- Bertus, Brent J.: *See—*
  - Sughrue, Edward L., II; Tooley, Patricia A., Bertus, Brent J.; and Grayson, Bille S., 5,024,750, Cl. 208-57.000.
- Bethe, Klaus W. B., to U.S. Philips Corporation. Pressure or force sensor having an axially symmetrical pressure or force-receiving circular plate spring. 5,024,107, Cl. 73-862.650.
- Bethlehem Steel Corporation: *See—*
  - Newman, H. Anthony, 5,024,380, Cl. 238-218.000.
- Bettcher Industries, Inc.: *See—*
  - Bettcher, Laurence A., 5,023,953, Cl. 2-126.000.
- Bettcher, Laurence A., to Bettcher Industries, Inc. Garment and protective sleeve. 5,023,953, Cl. 2-126.000.
- Betz Laboratories, Inc.: *See—*
  - Merrell, Gene A., 5,024,768, Cl. 210-712.000.
- Beuchel, Peter H., to Westinghouse Electric Corp. Punch for use in a pellet press. 5,024,559, Cl. 425-406.000.
- Bewley, James G.: *See—*
  - Ashdown, Charles P.; Bewley, James G.; and Kenney, George B., 5,024,695, Cl. 75-338.000.
- Bhagwat, Shripad S.; Main, Alan J.; and Rodriguez, Herman R., to Ciba-Geigy Corporation. (Arylsulfonamido- and pyridyl-)-substituted carboxylic acids and derivatives thereof and use for suppressing thromboxane activity. 5,025,025, Cl. 514-340.000.
- Bice, Charles D., to Westinghouse Electric Corp. Reactor coolant pump having thermally stabilized hydrostatic sealing assembly. 5,024,452, Cl. 277-81.00R.
- Bickle, Wolfgang: *See—*
  - Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul; Bickle, Wolfgang; and Braus, Jurgen, 5,024,881, Cl. 428-323.000.
  - Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul; Bickle, Wolfgang; and Braus, Jurgen, 5,024,882, Cl. 428-323.000.
- Bierschenk, Thomas R.: *See—*
  - Lagow, Richard J.; Bierschenk, Thomas R.; Juhlke, Timothy J.; and Kawa, Hajimu M., 5,025,093, Cl. 568-601.000.
- Biller, Scott A., to E. R. Squibbs & Sons, Inc. Isoprenoid phosphinylformic acid squalene synthetase inhibitors. 5,025,003, Cl. 514-120.000.
- Billeter, Lynn S.: *See—*
  - Carlston, Jerry B., 5,024,403, Cl. 248-57.000.
- Billig, James N.; Chlipala, James D.; Lee, Kuo H.; and Nagy, William J., to AT&T Bell Laboratories. Integrated circuits having improved fusible links. 5,025,300, Cl. 357-51.000.
- Billman, Elizabeth R.: *See—*
  - Mehrotra, Pankaj K.; and Billman, Elizabeth R., 5,024,976, Cl. 501-89.000.
- Bingham, John A. C. Method and apparatus for reducing the turnaround time in facsimile transmission. 5,025,469, Cl. 379-98.000.
- Bio Medic Data Systems, Inc.: *See—*
  - Campbell, Neil E.; and Park, Chinsoo, 5,024,727, Cl. 156-663.000.
- Biolandes: *See—*
  - Coutiere, Dominique, 5,024,820, Cl. 422-261.000.
- Biospace Instruments: *See—*
  - Charpak, Georges, 5,025,162, Cl. 250-385.200.
- BioTechnica International, Inc.: *See—*
  - Maine, Gregory T.; Daves, Robert S.; and Yocum, Robert R., 5,024,941, Cl. 435-69.900.
- BioTrol, Inc.: *See—*
  - Hegeman, George D.; and Nickens, David G., 5,024,949, Cl. 435-262.000.
- Bird Escher Wyss: *See—*
  - Livsey, James D., 5,024,755, Cl. 209-211.000.
- Bird Machine Company: *See—*
  - Smith, Clement V., 5,024,649, Cl. 494-85.000.
- Birken, Karl: *See—*
  - Birken, Stephen M.; and Birken, Karl, 5,024,740, Cl. 204-157.150.
- Birken, Stephen M.; and Birken, Karl. Mineral refinement by high RF energy application. 5,024,740, Cl. 204-157.150.
- Birker, Otto, to Lignoform Benken AG. Sound absorbing panel for interior walls. 5,024,290, Cl. 181-293.000.
- Birnbach, Stefan: *See—*
  - Oftring, Alfred; Birnbach, Stefan; Fikentscher, Rolf; Baur, Richard; Kud, Alexander; Goeckel, Ulrich; and Perner, Johannes, 5,025,103, Cl. 560-170.000.
- Bishop, John F.: *See—*
  - McClune, Gregory J.; and Bishop, John F., 5,024,935, Cl. 435-7.100.
- Bittancourt, Alan R.: *See—*
  - Lamb, William E.; Kowaleski, Jerome L.; Haikl, Vojtech; Bittancourt, Alan R.; and Daugherty, Harvey S., 5,025,280, Cl. 354-299.000.
- Bitton, Max D.; and Wahlquist, Randall W., to Westinghouse Electric Corp. Deburring method and machine. 5,023,984, Cl. 29-81.050.
- Blaess, Gerhard, to Siemens Aktiengesellschaft. Method for measurement of attenuation and distortion by a test object. 5,025,221, Cl. 324-603.000.
- Blagaila, John: *See—*
  - Morehouse, James H.; Furay, David M.; Blagaila, John; Dion, F. Eugene; Shelstad, Scott A.; and Woods, Jimmy L., 5,025,336, Cl. 360-97.020.
- Blakely, Lawrence W.; Howe, Michael A.; Pinholster, Daniel F., Jr.; Terry, Claude E.; and McIntosh, Robert H., Sr., to Interface, Inc. Antimicrobial carpet and carpet tile. 5,024,840, Cl. 424-404.000.
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VOL
1127
ISS
3
JE
18
1991
UMI

Blaushild, Ronald M., to Westinghouse Electric Corp. Swinging support for nuclear power plant pressurizer valves. 5,024,804, Cl. 376-285.000.

Blaushild, Ronald M.: *See—*
  Miller, Phillip E.; Katz, Leonoard R.; Nath, Raymond J.; Blaushild, Ronald M.; Tatch, Michael D.; Kordalski, Frank J.; Wykstra, Donald T.; and Kavalkovich, William M., 5,025,129, Cl. 219-201.000.

Bleich, Larry L.; Roberts, Joni A.; and Zerbs, Stephen T., to AT&T Bell Laboratories. Methods of and apparatus for making an insulated transmission medium. 5,024,864, Cl. 427-424.000.

Bleier, Zvi; and Lipkins, Morton S., to Precision Lapping & Optical Co., Inc. Lateral transfer retroreflector and roof mirror for same. 5,024,514, Cl. 350-618.000.

Blessing, Martin G., to Dana Corporation. Hydraulic variable lock differential with oil return in floating manifold. 5,024,634, Cl. 475-86.000.

Bloom, Iris B. K.: *See—*
  Minns, Richard A.; Bloom, Iris B. K., and Ramharack, Roopram, 5,024,507, Cl. 350-96.340.

Blount, Inc.: *See—*
  Bender, Walter W., 5,024,135, Cl. 86-31.000.

Blount, William W., Jr.; and Zoeller, Joseph R., to Eastman Kodak Company. Novel trifunctional monomer compounds, polyesters derived therefrom and thermosetting coating compositions containing the polyesters. 5,025,086, Cl. 528-272.000.

Blumberg, Shlomo; and Olti, Avraham, to Y. M. Shoval Ltd Reminder apparatus. 5,025,426, Cl. 368-10.000.

Blunier, Dennis L.; Shankwitz, Phillip J.; Caudill, Maurice L.; Bowar, Ronald C.; and Aussieker, Dwight E., to Caterpillar Inc. Apparatus and method for selectively forming a thickened edge on a plate of formable material. 5,024,074, Cl. 72-16.000.

Blyakhman, Yefim; and Lee, Byung H., to Ciba-Geigy Corporation. Substituted diallylphenol derivatives as reactive diluents for bismaleimides. 5,025,095, Cl. 568-652.000.

Board of Regents, The University of Texas, The: *See—*
  Linner, John G., 5,024,830, Cl. 424-3.000.

Board of Regents, The University of Texas System: *See—*
  Holmgreen, W. Corbett; and Bunegin, Leonid, 5,024,220, Cl. 128-207.180.
  Lee, Ming-Sheng, 5,024,934, Cl. 435-6.000.

Bobbie Scope, Inc.: *See—*
  Gilbreath, John R.; and Gilbreath, Bobbie L., 5,024,292, Cl. 182-90.000.

Bobsein, Rex L.; Stone, Mark L.; and Geibel, Jon F., to Phillips Petroleum Company. Reinforced plastic comprising poly(arylene sulfide sulfone) polymer containing ether groups matrix. 5,024,876, Cl. 428-272.000.

Bock, Erich, to DIEHL GmbH & Co. Equipment for gun loader. 5,024,136, Cl. 89-6.000.

Bodor, Nicholas S., to University of Florida. Pharmaceutical formulations for parenteral use. 5,024,998, Cl. 514-58.000.

Boehringer Mannheim GmbH: *See—*
  Mayr, Ulrich; Gauhl, Helmgard, and Seidel, Hans, 5,024,945, Cl. 435-191.000.
  Reinholz. Erhard; Friebe, Walter-Gunar; Kampe, Wolfgang; Mertin, Jurgen; and Wilhelms, Otto-Henning, 5,025,028, Cl. 514-381.000.

Boeing Company, The: *See—*
  Falk, R. A., 5,024,499, Cl. 350-96.110.
  Frank, Ed, 5,024,862, Cl. 427-264.000.
  Pease, George E., Jr.; Romero, Ervin G ; and Glasenapp, Rudi K. H., 5,024,491, Cl. 303-93.000.
  Riedinger, Thomas R.; and White, Thomas H., 5,024,398, Cl. 244-118.500.
  Wuepper, Karl J.; Swanson, Jerald L.; and Hartz, Dale E., 5,023,987, Cl. 29-402.110.

Boelter, John D., Jr. Method of playing a board game. 5,024,445, Cl. 273-256.000.

Bogner, Martin, to GEZE Sport International GmbH. Safety ski binding. 5,024,457, Cl. 280-632.000.

Bohnen, David J. Slidably lockable bracket. 5,024,409, Cl. 248-222.400.

Boisseau, Jean-Louis, to Vega Automation. Programmable dynamically adjustable plunger and tray former apparatus. 5,024,641, Cl. 493-171.000.

Bolan, Michael L., to Dallas Semiconductor Corporation. Hand-held wand for reading electronic tokens. 5,025,141, Cl. 235-472.000.

Bolton, Bernard. Suture extender and needle guard. 5,024,323, Cl. 206-63.300.

Bolz, Hans-Peter. *See—*
  Haenni, Edwin W.; and Bolz, Hans-Peter, 5,024,349, Cl. 221-46.000.

Bonnaudet, Serge: *See—*
  Cameron, Charles; Mimoun, Hubert; Robine, Alain; Bonnaudet, Serge; Chaumette, Patrick; and Dang Vu, Quang, 5,025,108, Cl 585-500.000.

Bonnet, Ludwig; and Wetterauer, Ulrich, to Richard Wolf GmbH Endoscope/resectoscope and shield therefor. 5,024,212, Cl. 128-4.000.

Bontrager, Rick L., to Great Western Foam Products Corporation. Foam packing frame and blank for forming the same. 5,024,328, Cl. 206-453.000.

Booten, Sigmund; Kley, Uwe; and Hoffmann, Cristiano, to Alfred Teves GmbH. Vacuum brake force booster with acoustic insulation. 5,024,304, Cl. 188-356.000.

Borchardt, John K., to Shell Oil Company. Hydraulic fracturing in subterranean formations. 5,024,276, Cl 166-308.000.

Bordini, Giorgio; and Vincenzi, Maurizio, to Tetra Dev-Co. Pump unit with adjustable piston stroke length. 5,024,584, Cl. 417-342.000.

Borgstrom, Leonard: *See—*
  Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nåbo, Olle, 5,024,648, Cl. 494-56.000.

Borland, James E.: *See—*
  Smith, Kim R.; and Borland, James E., 5,024,777, Cl. 252-117.000.

Borner, Willy; and McQueeney, Kenneth A., to Balco, Incorporated Wheel alignment rim clamp claw. 5,024,001, Cl. 33-203.180.

Borowski, Richard, to Garlock Inc. Multi-position labyrinth seal ring. 5,024,451, Cl. 277-53.000.

Borowy, William J. Process to refine flyash captured from pulverized coal fired boilers and auxiliary equipment. 5,024,169, Cl. 110-165.00A

Boss, Ernst; Dill, Andreas R.; and Zimmermann, Heinz, to Zevatech AG. Feeding apparatus for feeding belted components to an automatic assembly apparatus. 5,024,720, Cl. 156-584.000.

Bostick, John. Well sealing device. 5,024,270, Cl. 166-63.000.

Botich, Michael J.: *See—*
  Winter, Steven D.; Botich, Michael J.; and Adickes, Eric. 5,024,177, Cl. 114-61.000.

Botsolas, Carol: *See—*
  Botsolas, Christos J., 5,024,249, Cl. 138-110.000.

Botsolas, Christos J., to Botsolas, Carol. Specialized one-piece pipefitting cover for insulated strainer and lateral 45 degree -Y. 5,024,249, Cl. 138-110.000.

Botta, Artur: *See—*
  Klug, Gunter; Jabs, Gert; Berneth, Horst; and Botta, Artur, 5,024,987, Cl. 503-211.000.

Bottomley, Ian E.; and Cooper, Graham A., to British Aerospace Stopping-off method for use with diffusion bonding. 5,024,368, Cl. 228-118.000.

Bouchard, Andre C.; Thibault, Paul A.; Lagushenko Radomir; Maya, Jakob; and Maya, Jakob, to GTE Products Corporation. Glow discharge lamp. 5,025,190, Cl. 313-619.000.

Boudreau, Robert A.; and Rideout, William C., to GTE Laboratories Incorporated. Method of aligning and packaging an optoelectronic component with a single-mode optical fiber array. 5,024,504, Cl 350-96.180.

Bouillot, Jean-Michel; Coutureau, Thierry; and Decuyper, Patrick G., to Orega Electronique et Mecanique. Transformer of ferrite closed magnetic circuit type. 5,025,241, Cl. 336-100.000.

Bourque, Donald L., to Dennison Manufacturing Company. Apparatus for dispensing fasteners. 5,024,365, Cl. 227-67.000.

Bousquet, Philippe; and Lehureau, Jean-Claude, to Thomson-Csf. Thermo-magnetic recording head. 5,025,341, Cl. 360-120.000.

Bova, Frank J.; Fitzgerald, Lawrence T.; and Mauderli, Walter, to University of Florida. Radiation teletherapy imaging system having plural ionization chambers. 5,025,376, Cl. 364-413.260.

Bowar, Ronald C.: *See—*
  Blunier, Dennis L.; Shankwitz, Phillip J.; Caudill, Maurice L.; Bowar, Ronald C.; and Aussieker, Dwight E., 5,024,074, Cl. 72-16.000.

Bowers, John H., to Armstrong World Industries Inc. RF drive circuit for an ion projection printing head. 5,025,273, Cl. 346-159.000.

Boyd, John A.; and Staples, George M., III, to American Materials Recycling Inc. Waste separating, processing and recycling system. 5,024,770, Cl. 210-747.000.

BP Chemicals Limited: *See—*
  Bullen, David J., 5,025,071, Cl. 525-326.500.
  Hazel, Nicholas J., 5,025,111, Cl. 585-601.000.

Brabander, Herbert J.: *See—*
  Trybulski, Eugene J.; and Brabander, Herbert J., 5,025,099, Cl. 548-527.000.

Braden, Jeffrey S., to Olin Corporation. Multi-layer lead frames for integrated circuit packages. 5,025,114, Cl. 174-52.400.

Bragg, R. D.; and Weatherbee, H Lloyd, to Doug Bragg Enterprises Ltd. Apparatus for harvesting berries on low plants. 5,024,052, Cl. 56-330.000.

Brandes, Wilhelm: *See—*
  Lantzsch, Reinhard; Kysela, Ernst; Buchel, Karl H.; Dutzmann, Stefan; Brandes, Wilhelm; and Hanssler, Gerd, 5,025,030, Cl. 514-383.000.

Brandstrom, Arne E.; Lindberg, Fer L.; and Sunden, Gunnel E., to Aktiebolaget Hassle. Therapeutically active fluoro-substituted compound. 5,025,024, Cl. 514-338.000.

Brassey, J. Michael: *See—*
  Turk, Amos, 5,024,682, Cl. 55-73.000.

Brattan, Keith, to Imperial Chemical Industries PLC. Structure for effecting gas-liquid and part thereof. 5,024,788, Cl. 261-114.100.

Braus, Jurgen: *See—*
  Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul; Bickle, Wolfgang; and Braus, Jurgen, 5,024,881, Cl. 428-323.000.
  Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul; Bickle, Wolfgang; and Braus, Jurgen, 5,024,882, Cl. 428-323.000

Breed, Anthonius J. M.: *See—*
  Drent, Eit; and Breed, Anthonius J. M., 5,025,092, Cl. 528-392.000.

Brelan, S.A.: *See—*
  Leurent, Henri G., 5,024,040, Cl. 52-738.000.

Brendel, Berhard; and Schrors, Gunter. Process for reducing vibrations of successive sets of rolls and a roll arrangement having reduced vibratory tendencies. 5,024,150, Cl. 100-35.000.

Brenner, Michael B.; Strominger, Jack L.; Seidman, Jonathan; Ip, Stephen H.; and Krangel, Micahel S., to T Cell Sciences, Inc.; Dana-Farber Cancer Institute; and President & Fellows of Harvard College. Nucleic acids encoding the delta chain of the T cell antigen receptor. 5,024,940, Cl 435-69.100.

Brewer, Terry: *See—*
  Moss, Mary G.; Brewer, Terry; Cuzmar, Ruth M.; Hawley, Dan W.; and Flaim, Tony D., 5,024,922, Cl. 430-330.000.

Breyer, Karl-Hermann, to Carl-Zeiss-Stiftung, Heidenheim/Brenz. Work-contacting probe system for a coordinate-measuring instrument. 5,024,003, Cl. 33-561.000.

Bridgestone Corporation: *See—*
  Mouri, Hiroshi; and Araki, Shunji, 5,025,059, Cl. 524-495.000
  Yamagishi, Hisashi; Kakiuchi, Shinichi, and Tomita, Seisuke, 5,024,444, Cl. 273-232.000.

Briggs & Stratton Corporation: *See—*
  Dykstra, Richard A., 5,024,204, Cl. 123-602.000.

Brigham and Women's Hospital: *See—*
  Loscalzo, Joseph; and Cooke, John, 5,025,001, Cl 514-91.000.

Brighton, Jeffrey E., to Texas Instruments Incorporated. Product of pillar alignment and formation process. 5,025,303, Cl. 357-68.000.

Brink, Andre; Cahill, Michael J.; Dawson, John; Gardner, Juilian W.; and Thierry, Alan A., to Molins PLC. Cigarette segregating apparatus 5,024,333, Cl. 209-535.000.

Brinkman, Kerry C.: *See—*
  Wang, Sophia L.; Meyer, George R.; and Brinkman, Kerry C., 5,024,677, Cl. 44-335.000.

Bristol-Myers Company: *See—*
  Konishi, Masataka; Tomita, Koji; Oka, Masahisa; and Numata, Ken-icni, 5,025,023, Cl. 514-183.000.

British Aerospace: *See—*
  Bottomley, Ian E.; and Cooper, Graham A., 5,024,368, Cl 228-118.000.

British Aerospace Public Limited Company: *See—*
  Harrison, Andrew B., 5,024,527, Cl. 356-124.000.

British Telecommunications public limited company: *See—*
  Stanley, Ian W.; Shepherd, John N.; and Dobson. Peter S., 5,024,500, Cl. 350-96.150.

Britton, William E., Jr., to Ink Company, The. Thixotropic printing ink compositions and methods of preparing same. 5,024,700, Cl. 106-32.000.

Broders, Richard P.: *See—*
  Hatfield, Stephen C.; Andrews, Mena G.; and Broders, Richard P., 5,024,807, Cl. 376-352.000.

Broer, Dirk J.; and Van Der Veen, Jan, to U.S. Philips Corporation. Method of manufacturing a polarization filter and a polarization filter so obtained. 5,024,850, Cl. 428-1.000

Bromine Compounds Ltd.: *See—*
  Effenberger, Reinhard; and Direktor, David, 5,025,002, Cl. 514-112.000.

Brooks, Peter E., to International Business Machines Corporation. Recirculating air filter system for rotating disk drives. 5,025,337, Cl. 360-97.030.

Brother Kogyo Kabushiki Kaisha: *See—*
  Nakata, Takashi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Horaguchi, Yoichi, 5,025,281, Cl. 355-27.000.
  Ohashi, Tsuyoshi, 5,025,447, Cl. 372-31.000.
  Yamane, Mitsuo, 5,024,887, Cl. 428-335.000.
  Yoshimoto, Satoshi; and Funamoto, Masaya, 5,024,545, Cl. 400-696.000.

Brotz, Gregory R. Wear-prevention structure for pneumatic conveying pipe elbow. 5,024,466, Cl. 285-16.000.

Brown, Kathleen L. Adjustahle scalp protection for hair discoloration. 5,024,244, Cl. 132-270.000.

Brown, Thomas H. Lighted grab handles for trucks. 5,025,352, Cl. 362-83.300.

Brown & Williamson Tobacco Corporation: *See—*
  Lowe, Byron L.; Lewis, Robert T.; Milliner, Kenneth M.; and Finn, Everett N., 5,024,351, Cl. 221-277.000.

Bruce, Martin G. Underwater propulsion device. 5,024,178, Cl. 114-315.000.

Brunelle, Louise: *See—*
  Girardin, Guy; Morin, Pierre; Nguyen, Duy; Nguyen, Duc; and Brunelle, Louise, 5,024,151, Cl. 100-53.000.

Brunet, Michel: *See—*
  Jouillat, Claude; and Brunet, Michel, 5,024,355, Cl. 222-162.000.

Brunson, David A.: *See—*
  Alberghini, Alfred C.; Brunson, David A.; and Lynn, Stephen R., 5,024,340, Cl. 215-1.00C.

Bryant, Robert G.; Hornak, Joseph P.; and Marshall, Eric A., to University of Rochester, The. Resonators for magnetic resonance imaging. 5,024,229, Cl. 128-653.0SC.

Bryngelson, Gaylord D. Automotive sun screen. 5,024,479, Cl. 296-97.700.

Bubel, Rainer: *See—*
  Holland-Letz, Horst; and Bubel, Rainer, 5,024,126, Cl. 81-489.000.

Buchacz, Jurek. Adjustable sitting device. 5,024,484, Cl. 297-300.000.

Buchbauer, Burkhart, to D. Swarovski & Co. Method of applying ornamental element with a shaft of melt adhesive. 5,024,713, Cl. 156-221.000.

Buchel, Karl H.: *See—*
  Lantzsch, Reinhard; Kysela, Ernst; Buchel, Karl H.; Dutzmann, Stefan; Brandes, Wilhelm; and Hanssler, Gerd, 5,025,030, Cl. 514-383.000.

Buchel, Udo P., to Astra Meditec Aktiebocag. Surgical aspiration device. 5,024,615, Cl. 604-119.000.

Bucher, George D.: *See—*
  Wilson, John F.; Rosal, Enrique R.; and Bucher, George D., 5,024,574, Cl. 414-416.000.

Buchholz, Robert L., Grald, Eric W.; Nelson, Lorne W.; and Shah, Dipak J., to Honeywell Inc. Zone control system providing synchronization of system operation with the zone of greatest demand. 5,024,265, Cl. 165-22.000.

Buchman, James E.; and Jahnke, Kenneth C., to Presto Products, Incorporated. Rotary draw tape bag making apparatus and method 5,024,642, Cl. 493-193.000.

Buckley, Paul W.: *See—*
  Fontana, Luca P.; and Buckley, Paul W , 5,025,081, Cl. 528-176.000.

Budenbender, Herbert: *See—*
  Ahlborn, Gunter; Budenbender, Herbert; and Lohmann, Alfred. 5,024,166, Cl. 105-453.000.

Buehler, Allyson J.: *See—*
  Zupancic, Joseph J.; Swedo, Raymond J., Jamieson, Donald R.; Schumacher, Elaine F.; and Buehler, Allyson J., 5,025,079, Cl. 528-170.000.

Bugrov, Vladimir P.: *See—*
  Kozlov, Vladimir S.; Markov, Gennady I ; and Bugrov, Vladimir P., 5,024,658, Cl. 604-96.000.

Buhl, Horst; Holz, Josef; and Dany, Franz-Josef, to Hoechst Aktiegesellschaft. Process for the preparation of dicalcium phosphate. 5,024,825, Cl. 423-309.000.

Buhl Industries, Inc.: *See—*
  Kyhl, Henry, 5,025,320, Cl. 358-229.000.

Bujatti, Marina; and Sechi, Franco N., to Microwave Power, Inc. Method of manufacturing a microwave intergrated circuit substrate including metal lined via holes. 5,023,994, Cl. 29-852.000.

Bullen, David J., to BP Chemicals Limited. Crosslinkable silyl polymer composition. 5,025,071, Cl. 525-326.500.

Bulso, Joseph D., Jr.; and McClung, James A., to Redicon Corporation. Method for forming container with profiled bottom. 5,024,077, Cl. 72-336.000.

Buma, Shuuichi: *See—*
  Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio, Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.

Bunch, Earnest B., III, to B. Bunch Company, Inc. Continuous form stationery folding and cutting machine. 5,024,644, Cl. 493-357.000.

Bunegin, Leonid: *See—*
  Holmgreen, W. Corbett; and Bunegin, Leonid, 5,024,220, Cl. 128-207.180.

Bunnelle, William L.: *See—*
  Malcolm, David B.; and Bunnelle, William L., 5,024,667, Cl. 604-382.000.

Burack, John J.; LeGrange, Jane D.; and Townsend, Wesley P., to AT&T Bell Laboratories. Composite films with Langmuir-Blodgett component. 5,024,873, Cl. 428-220.000.

Burch, Robert R., to Du Pont de Nemours, E. I., and Company. Metallized polymers and method. 5,024,858, Cl. 427-123.000.

Burge, Donald G., to Parker Hannifin Corporation. Push-in tube fitting and release tool. 5,024,468, Cl. 285-39.000.

Burgel, Frank: *See—*
  Pape, Robert, Rose, William; Burgel, Frank; and Adams, Chip, 5,023,996, Cl. 30-144.000.

Burger, Bernd: *See—*
  Gasser, Oswald; Guggenberger, Rainer; and Burger, Bernd, 5,024,711, Cl. 156-153.000.

Burlington Industries, Inc.: *See—*
  Hill, Berlie R.; Watson, Thomas F., Sr., and Triplett, Benny L., 5,024,875, Cl. 428-267.000.

Burndy Corporation: *See—*
  Piorunneck, Heinz, 5,024,609, Cl. 439-637.000.

Burnier, Julia S., to Hercules Incorporated. Organosilicon composition comprising stabilizer. 5,025,048, Cl. 524-99 000.

Burns, Gary T., to Dow Corning Corporation. Methylpolysilanes and method for their preparation. 5,025,075, Cl. 528-33.000.

Burton, James F.; and Henke, Daniel L., to Meridian Enterprises. Inc. System and method for administration of incentive award program through use of credit. 5,025,372, Cl. 364-406.000.

Burton, Russell J.: *See—*
  Vinden, Peter; Burton, Russell J.; and Vaioleti, Timote M., 5,024,861, Cl. 427-254.000.

Busch, Bruce D.; and Nicholls, Jeffrey R., to Fremont Industries, Inc. Boiler and boiler water treatment system. 5,024,783, Cl. 252-180.000.

Busch, Raymond A.; and Patterson, John F., to Advanced Nuclear Fuels Corporation. Bimetallic spring member for radiation environment. 5,024,426, Cl. 267-158.000.

Busnel, Rene-Guy; and Argy, Gilles, to Hutchinson. Process for preparing a prophylactic device made of rupturable microcapsules and layers of elastomeric material. 5,024,852, Cl. 427-2.000.

Butler, Myron C.: *See—*
  Hilligoss, William R.; Hillogoss, Lawrence D.; Van Winkle, David; and Butler, Myron C., 5,025,466, Cl. 379-1.000.

Butt, Sheldon H.: *See—*
  SinghDeo, Narendra N.; Mahulikar, Deepak; and Butt, Sheldon H., 5,024,883, Cl. 428-323.000.

Buttermore, William H.: *See—*
  Chriswell, Colin D.; Markuszewski, Richard; and Buttermore, William H., 5,024,753, Cl. 209-1.000.

Byrne, John W.: *See—*
  Speronello, Barry K.; Byrne, John W.; and Chen, James M., 5,024,981, Cl. 502-67.000.

VOL
1127
ISS
3
JE
18
1991
UMI

Cabasso, Israel: *See—*
Smid, Johannes; Cabasso, Israel; Obligin, Alan; and Rawls, H. Ralph, 5,024,232, Cl. 128-654.000.
Cahill, Claire M. Paint brush cleaning system. 5,024,705, Cl. 134-38.000.
Cahill, Michael J.: *See—*
Brink, Andre; Cahill, Michael J.; Dawson, John; Gardner, Juilian W.; and Thierry, Alan A., 5,024,333, Cl. 209-535.000.
Cama, Lovji D.: *See—*
Greenlee, Mark L.; DiNinno, Frank P.; Cama, Lovji D.; and Heck, James V., 5,025,007, Cl. 514-210.000.
Cambridge Research Laboratories, Inc.: *See—*
Gershon, Sol; Fox, Charles; and Garfinkle, Norton, 5,024,855, Cl 424-52.000.
Cameron, Charles; Mimoun, Hubert; Robine, Alain, Bonnaudet, Serge; Chaumette, Patrick; and Dang Vu, Quang, to Institut Francais du Petrole. Process for producing olefins from natural gas. 5,025,108, Cl. 585-500.000.
Campbell, Edward N.: *See—*
Lindhuber, Thomas C.; and Campbell, Edward N., 5,024,488, Cl. 301-108.00S.
Campbell, Gaines P., Jr Sheeter for web fed printing press. 5,024,128, Cl. 83-26.000.
Campbell, Neil E.; and Park, Chinsoo, to Bio Medic Data Systems, Inc. Method of forming an animal marker implanting system. 5,024,727, Cl. 156-663.000.
Cancer Biologics of America, Inc.: *See—*
Van Dyke, Knox, 5,025,020, Cl. 514-280.000.
Cancer Diagnostics, Inc.: *See—*
Guirguis, Raouf A., 5,024,238, Cl. 128-771.000.
Candow, A. J. Detachable golf putter extension. 5,024,438, Cl. 273-81.00R.
Canfield, Barth A., to RCA Licensing Corporation. Odd/even field detector for video signals. 5,025,496, Cl. 358-153.000.
Canivenc, Edith; Forestier, Serge; Gay, Michel; Lang, Gerard, and Richard, Herve, to Rhone-Poulenc Chimie. Diorganopolysiloxanes containing dibenzoylmethane functional groups. 5,025,053, Cl. 524-265.000.
Cannell, Timothy A., to Guth Lighting Inc. Dust resistant electric light fixture. 5,025,358, Cl. 362-267.000.
Canon Kabushiki Kaisha: *See—*
Kanai, Masahiro; Aoike, Tatsuyuki, Matsuda, Koichi; and Kawakami, Soichiro, 5,024,706, Cl. 136-258.000.
Mihara, Chieko; Santoh, Tsuyoshi; and Sugata, Hiroyuki, 5,024,917, Cl. 430-271.000.
Neishi, Toshie; Kikuchi, Toshihiro; Takiguchi, Takao; Suzuki, Koichi; and Matsumoto, Masakazu, 5,024,912, Cl. 430-59.000
Sato, Yasue, 5,024,716, Cl. 156-345.000.
Sato, Yukou; and Kukimoto, Tsutomu, 5,024,915, Cl 430-110.000.
Suzuki, Hidetoshi; Nomura, Ichiro; Majima, Toshiaki; and Yamamoto, Mitsuru, 5,025,196, Cl. 315-168.000.
Yoshiura, Yoshio, 5,025,497, Cl. 358-425.000.
Canterberry, J. B.; and Flanigan, David A., to Thiokol Corporation. Rapid burning propellant charge for automobile air bag inflators, rocket motors, and igniters therefor. 5,024,160, Cl. 102-323.000.
Car Mate Mfg. Co., Ltd.: *See—*
Sone, Toshiyuki, Matsumoto, Takehiko; Omotezako, Nobuya, and Kawasuji, Keiji, 5,025,338, Cl. 360-99.060.
Caraballo, Damian F. Terminal connector assembly. 5,024,619, Cl. 439-755.000.
Carbone, Stefano: *See—*
Cucchi, Silvio; and Carbone, Stefano, 5,025,460, Cl. 375-118.000.
Carborundum Company, The: *See—*
Mordue, George S.; and Ritchie, Herbert L., Jr., 5,025,198, Cl 318-434.000.
Cardiovascular Imaging Systems, Inc.: *See—*
Leary, James J.; and McKenzie, John R., 5,024,234, Cl. 128-663.010.
Carey, James R.: *See—*
Crain, Ronald A.; Harney James D., and Carey, James R., 5,025,436, Cl. 369-77.200.
Carl Freudenberg, Firma: *See—*
Andra, Rainer H., 5,024,120, Cl. 74-574.000.
Schwerdt, Hans-Werner, 5,024,425, Cl 267-140.100.
Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co.: *See—*
Parzl, Franz; and Eichinger, Johann, 5,024,122, Cl. 74-606.00R.
Carl-Zeiss-Stiftung, Heidenheim/Brenz: *See—*
Breyer, Karl-Hermann, 5,024,003, Cl. 33-561.000.
Carlsen, George D., II; and Vale, Ronald W Hemispherical speaker system. 5,025,473, Cl. 381-88.000.
Carlsson, Claes-Goran: *See—*
Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nåbo, Olle, 5,024,648, Cl. 494-56.000.
Carlston, Jerry B., to Billeter, Lynn S Pipe hanger. 5,024,403, Cl. 248-57.000.
Carnegie Mellon University: *See—*
Maly, Wojciech P.; and Nigh, Phillip J., 5,025,344, Cl. 361-88.000
Carney, John M.; and Floyd, Robert A., to Oklahoma Medical Research Foundation; and University of Kentucky Research Foundation. Phenyl butyl nitrone compositions and methods for treatment of oxidative tissue damage. 5,025,032, Cl. 514-400.000.
Caron, Paul R.: *See—*
Schofield, Harold D.; and Caron, Paul R., 5,025,267, Cl. 346-1.100.
Carondelet Foundry Company: *See—*
Culling, John H., 5,024,812, Cl. 420-49.000.
Carpenter, Loren C.: *See—*
Cook, Robert L.; Porter, Thomas K., and Carpenter, Loren C., 5,025,400, Cl. 364-522.000.
Carr, Daniel J.; and Scally, Charles R., to General Signal Corporation Method and apparatus for increasing visibility of trend lines on strip chart recorders. 5,025,265, Cl. 346-1.100.
Carrier Corporation: *See—*
Dempsey, Daniel J., 5,024,379, Cl. 237-16.000.
Carrier Kheops Bac.: *See—*
Savin, Antoine; and Salaun, Jacques, 5,024,604, Cl. 439-345.000.
Carroll, Kenneth J.; and Pless, Benjamin D., to Ventritex, Inc. Clock generator generating trapezoidal waveform. 5,025,172, Cl. 307-261.000.
Carroll, Noel: *See—*
Kidd, ALexander D., 5,024,112, Cl. 74-5.370.
Carson, Matthew; Han, Ru-Jen L.; and LeMahieu, Ronald A., to Hoffmann-La Roche Inc. Catechol carboxylic acids. 5,025,036, Cl 514-568.000.
Carson, William: *See—*
Asher, Marc A.; Strippgen, Walter E.; Heinig, Charles F., and Carson, William, 5,024,213, Cl 128-69.000.
Carter-Hoffman Corporation: *See—*
Fortmann, Robert C.; Pinnow, Curtis C.; Kuschewski, Gustav, and Joseph, William A., Jr., 5,025,132, Cl. 219-401.000.
Casagrande, Cesare; Montanari, Stefania; and Santangelo, Francesco, to SIMES, Societa Italiana Medicinali e Sintetici S.p.A. Fused pyridines active on the cardiovascular system. 5,025,011, Cl. 514-234 200.
Casal, Andre . Material-removal woodworking tool 5,024,000, Cl. 30-475.000.
Casey, Jeremiah P.: *See—*
Lucas, Peter A.; and Casey, Jeremiah P., 5,025,078, Cl 528-120.000.
Casio Computer Co., Ltd.: *See—*
Genda, Kohei; and Murai, Kazuaki, 5,025,413, Cl. 364-900.000
Kuriyama, Yuji, 5,025,427, Cl. 368-29.000.
Suzuki, Satoshi; Kuwabara, Osamu; Muto, Jiro; and Shinozaki, Eiichi, 5,025,348, Cl. 361-398.000.
Tsukada, Shuya; Mochinaga, Nobuyuki; and Kanoe, Yasuo, 5,024,541, Cl. 400-88.000.
Uchiyama, Shigeru, 5,024,134, Cl. 84-654.000.
Casper, Daniel F.; Flanagan, John R.; Gregg, Thomas A.; Huang, Catherine C.; and Kalos, Matthew J., to International Business Machines Corporation. Apparatus for decoding frames from a data link. 5,025,458, Cl. 375-114.000.
Cassatta, Joseph C.: *See—*
Colvin, Alex D.; Graham, Daniel J. and Cassatta, Joseph C., 5,025,220, Cl. 324-449.000.
Catchpole, Owen J.: *See—*
McLachlan, Corran N. S.; Catchpole, Owen J. and Hamilton, Bruce H., 5,024,846, Cl 426-312.000.
Caterpillar Inc.: *See—*
Blunier, Dennis L.; Shankwitz, Phillip J.; Caudill, Maurice L., Bowar, Ronald C.; and Aussieker, Dwight E., 5,024,074, Cl 72-16.000.
Graze, Russell R, Jr., 5,024,193, Cl. 123-259.000.
Cathey, David A., Jr., to Micron Technology, Inc. Process for fabricating conductors used for integrated circuit connections and the like. 5,024,722, Cl. 156-643.000.
Caudill, Maurice L.: *See—*
Blunier, Dennis L.; Shankwitz. Phillip J., Caudill, Maurice L., Bowar, Ronald C; and Aussieker, Dwight E., 5,024,074. Cl. 72-16.000.
Cavigiolo, Walter: *See—*
Massa, Vincenzo; Cicuta. Aldo; and Cavigiolo, Walter, 5,024,879, Cl. 428-304.400.
Cedars-Sinai Medical Center: *See—*
Nesburn, Anthony B.; Gorin, Michael; Martinez, Marvin; Kenney, M Cristina; and Maguen, Ezra, 5,024,742. Cl. 204-157.680.
Center for Innovative Technology: *See—*
Richards, David W.; and Murphy, Kent A. 5,024,518, Cl 351-219.000.
Centocor, Inc.: *See—*
Berger, Harvey J.; Maddalu, Jamshid; and Berman, Daniel (said Harvey J. Berger assors. to), 5,024,829, Cl. 424-1.100.
Centre National de la Recherche Scientifique: *See—*
Menet, Jacques; and de Gabrielli, Olivier, 5,025,194. Cl 315-111.810.
CertainTeed Corporation: *See—*
Fluent, Stewart L.; Hart, Colin; McCree, Charles D. and Lotsch, Charles F., 5,024,045, Cl. 53-443.000.
Cetus Corporation: *See—*
Houston, L. L.; Aldwin, Lois; and Nitecki, Danute E., 5,024,834, Cl 424-85.910.
Inlow, Duane; and Maiorella, Brian, 5,024,947, Cl. 435-240.310.
Chabala, Leonard V.: *See—*
Fanta, Thomas O.; and Chabala, Leonard V., 5,025,171, Cl 307-150.000
Chamberlin, Kim S, to Eastman Kodak Company. Process for coproduction of arylene diamine dihalides and alkyl halides. 5,025,107, Cl 564-414.000.
Chang, Chen-Chi P.; and Li, Mei. Manufacturing high speed low leakage radiation hardened CMOS/SOI devices. 5,024,965, Cl 437-57.000.
Chang, Ramsay, to Electric Power Research Institute Compact hybrid particulate collector. 5,024,681, Cl. 55-6.000.

Chang, Suae-Chen, to Ethyl Corporation. Rocket motor insulation using phosphonitrilic elastomeric compositions. 5,024,860, Cl. 427-230.000.
Chapman, Derek D.; and Evans, Steven, to Eastman Kodak Company. Mixture of dyes for cyan dye donor for thermal color proofing. 5,024,990, Cl. 503-227.000.
Chapman, Donald L., to Square D Company. Lay-in wireway assembly. 5,024,251, Cl. 138-92.000.
Chapp, James, Jr.: *See—*
Khalifa, Mustafa A.; and Chapp, James, Jr., 5,024,118, Cl 74-492.000.
Charpak, Georges, to Biospace Instruments. Method and device for determining the distribution of βrays emerging from a surface. 5,025,162, Cl. 250-385.200.
Chasteen, Ronald E.: *See—*
Gatza, Ward K., and Chasteen, Ronald E., 5,024,205, Cl. 123-632.000.
Chaumette, Patrick: *See—*
Cameron, Charles; Mimoun, Hubert; Robine, Alain; Bonnaudet, Serge; Chaumette, Patrick; and Dang Vu, Quang. 5,025,108, Cl. 585-500.000.
Cheadle, Brian E.; and Rusiniak, Richard J., to Long Manufacturing Ltd. Corrosion inhibiting coolant inhibitor container. 5,024,268, Cl. 165-134.100.
Chem-Nuclear Systems Inc.: *See—*
Oldham, James G.; Spencer, Charles R.; Begley, Carl L.; and Meyer, H Robert, 5,025,150, Cl. 250-253.000.
Chen, Chengjun J., to International Business Machines Corp. Method for self-inducted repair of circuit shorts and near-shorts. 5,024,725, Cl. 156-643.000.
Chen, Chin-Chen; Feldman, Martin; and Waggener, Herbert A., to AT&T Bell Laboratories. Method for producing a semiconductor device using an electron beam exposure tool and apparatus for producing the device. 5,025,165, Cl. 250-491.100.
Chen, David: *See—*
Tu, Roger; Chen. David, and Mathewson, Wilfred F, 5,024,671, Cl. 623-1.000.
Chen, James M.: *See—*
Speronello, Barry K.; Byrne, John W., and Chen, James M., 5,024,981, Cl. 502-67.000.
Chen, Mao-Chieh; Tsui, Bing-Yue; and Tsai. Jiunn-Yann, to National Science Council. Method of improving high temperature stability of PTSI/SI structure. 5,024,954, Cl. 437-24.000
Chen, Paul N., Sr.: *See—*
Vora, Rohitkumar H.; and Chen, Paul N., Sr., 5,025,089, Cl. 528-353.000.
Chen, Stephen P.: *See—*
Lougheed, Edgar P.; Richenberg, Carl B.; and Chen, Stephen P., 5,024,929, Cl. 430-546.000.
Chen, Sy-Hwa; and Sung, Chien-Min, to Norton Company. Multiple metal coated superabrasive grit and methods for their manufacture. 5,024,680, Cl. 51-295.000.
Cherniawski, Michael R.: *See—*
DePinto, Gary A.; Steinberg, Joe; Franka, John G.; and Cherniawski, Michael R., 5,024,972, Cl. 437-233.000.
Cheung, Tin-Tack P.: *See—*
Tooley, Patricia A.; Cheung, Tin-Tack P.; Cymbaluk, Ted H.; Nowack, Gerhard P.; and Johnson, Marvin M., 5,024,683, Cl. 55-74.000.
Chevron Research Company: *See—*
Anderson, Donald J.; Duerksen, John H.; McCallum, Doug J.; and Petrick, Mark, 5,024,275, Cl. 166-303.000.
Liston, Thomas V., 5,024,773, Cl. 252-42.700.
Chhabra, Navjot, to Micron Technology, Inc. Semiconductor processing apparatus for creating back pressure within a quartz furnace tube. 5,024,599, Cl. 432-226.000.
Chiang, Yunn H.; and Gaudiana, Russell A., to Polaroid Corporation. Process and materials for thermal imaging. 5,024,989, Cl. 503-227.000.
Chiarito, Richard J., to Everfilt Corporation. Liquid filter and methods of filtration and cleaning of filter. 5,024,771, Cl. 210-791.000.
Chiba, Shunich: *See—*
Futatasuka, Rensei; Koshiba, Yutaka; Chiba, Shunich; Orikasa, Toyoaki; Noguchi, Seiji; and Idoshita, Takuya, 5,024,814, Cl. 420-473.000.
Chien, James C. W., to Academy of Applied Science, a part interest. Method of producing silicon and similar wafers buffered for the deposition of metal oxide superconducting (MOS) polymer composites and the like by insulating metal oxides (IMO) suitable as substrates for MOS, and novel buffered wafers provided thereby. 5,024,894, Cl. 428-433.000.
Chiesi Farmaceutici S.p.A.: *See—*
Robertson, Bengt; and Curstedt, Tore, 5,024,995, Cl. 514-21.000.
Chilamkurti, Rao: *See—*
Needham, Thomas E.; Wright, Jeremy C.; Pearson, Steve; Chilamkurti, Rao; and Kopp, Clinton V., 5,024,657, Cl. 604-85.000.
Children's Hospital Medical Center of Northern California: *See—*
Perrine, Susan, 5,025,029, Cl. 514-381.000.
Chips and Technologies, Inc.: *See—*
Johary, Arun; and Rosenau, Mark A., 5,025,315, Cl. 358-140.000.
Chiron-Werke GmbH & Co. KG: *See—*
Winkler, Hans-Henning; and Rutschle, Eugen, 5,023,983, Cl. 29-27.00R.
Chisso Corporation: *See—*
Kurisaki, Hideo; and Nishikawa, Masahiko, 5,024,831, Cl 424-69.000.
Maeda, Hirotoshi; and Kunimune, Kouichi, 5,025,088, Cl. 528-353.000.
Nagato, Shoin; Taguchi, Ryusuke; Hirai, Kenji; Hirose, Hiroaki; and Yokota, Masahiro, 5,024,692, Cl. 71-86.000.
Chiu, Kuen-Wai; Yu, Lin-Chen; and Strickler, John R., to Mine Safety Appliances Company. Preparation of indole and indole derivatives. 5,025,096, Cl. 544-234.000.
Chlipala, James D.: *See—*
Billig, James N.; Chlipala, James D; Lee, Kuo H., and Nagy, William J., 5,025,300, Cl. 357-51.000.
Chloride Silent Power Limited: *See—*
Stackpool, Michael; and Riley, David 5,024,675, Cl 29-623.100.
Cho, Gyung Y. Single port dual RAM. 5,025,421, Cl. 365-230.050.
Chollet, Charles C., to Snake River Chemicals, Inc. Seed treatment compositions. 5,024,690, Cl. 71-77.000.
Chow, Alan Y. Artificial retina device. 5,024,223, Cl. 128-419.00R
Christell, Lance A.; and Kafka, Fred Y., to Du Pont de Nemours, E. I., and Company. Extrusion isolation of blends of rubber and asphalt 5,025,044, Cl. 523-334.000.
Christensen, Arnold: *See—*
Anthony, Michael; Ohler, Craig A., and Christensen, Arnold, 5,024,132, Cl 84-312.00R
Christenson, Philip A.; Eilerman, Robert G.; Riker, Paul J.; and Drake, Brian J., to BASF K&F Corporation. Sulfur containing acyclic terpenes. 5,024,847, Cl. 426-535.000.
Chriswell, Colin D.; Markuszewski, Richard, and Buttermore, William H., to Iowa State University Research Foundation, Inc. Material separation efficiency determination employing fluorescing control particles. 5,024,753, Cl. 209-1.000.
Chronowski, Mirek J.: *See—*
Smith, Tempel, Jr.; Miletic, Veselko; Bayer, George; Coutre, Christopher A.; Reichel, William L.; and Chronowski, Mirek J., 5,025,223, Cl. 324-662.000.
Chrysler Corporation: *See—*
Bakker, Emile A. M., 5,024,187, Cl 123-193.00H
Deweerdt, Kevin R., 5,024,345, Cl. 220-366.000.
Elwell, John R., 5,024,411, Cl. 248-311.200.
Khalifa. Mustafa A.; and Chapp, James, Jr, 5,024,118, Cl 74-492.000.
Waller, Roger A., 5,024,687, Cl. 55-316.000.
Chu, George H.; Ogawa, Yasushi, McPherson, John M.; Ksander, George; Pratt, Bruce; Hendricks, Diana; and McMullin, Hugh, to Collagen Corporation. Collagen wound healing matrices and process for their production. 5,024,841, Cl. 424-422.000
Ciba-Geigy Corporation: *See—*
Bhagwat, Shripad S.; Main, Alan J.; and Rodriguez, Herman R., 5,025,025, Cl. 514-340.000.
Blyakhman, Yefim; and Lee, Byung H., 5,025,095, Cl 568-652.000.
Dobinson, Bryan; and Southcott, Mark R., 5,025,084, Cl 528-229.000.
Pfenninger, Johannes, 5,025,041, Cl. 523-171.000.
Steinmann, Alfred. 5,024,916, Cl 430-270.000.
Zink, Rudolf; and Phaff, Rox, 5,024,988, Cl. 503-212.000.
Cicuta, Aldo: *See—*
Massa. Vincenzo; Cicuta, Aldo; and Cavigiolo, Walter, 5,024,879, Cl. 428-304.400.
Cioffi, Joseph V.; and Kerrey, John S., to Westinghouse Electric Corp. Enhanced debris filter bottom nozzle for a nuclear fuel assembly. 5,024,806, Cl. 376-352.000.
Cipher Data Products, Inc.: *See—*
Perona, Mark; Woller, Tom C.; and Guy, Jon S., 5,025,334, Cl. 360-96.500.
Citizen Watch Co., Ltd.: *See—*
Egawa, Shunji; and Yamada, Masato, 5,024,533, Cl. 374-126.000.
CLAAS OHG: *See—*
Harig, Horst; and Kersting, Hermann, 5,024,630, Cl. 460-21.000.
Heidjann, Franz; and Kleingraeber, Karl-Josef, 5,024,631, Cl. 460-75.000.
Clairol Incorporated: *See—*
Pan, Yuh-Guo; and Hochman, Lana, 5,024,673, Cl. 8-414.000.
Claus, Kenneth G.; Schoppe, Dwaine W.; and Earlam, Matthew R., to Dow Chemical Company, The. Process for producing a reactive metal-magnesium alloy. 5,024,737, Cl. 204-71.000.
Clauss, Wolfgang; Kurze, Werner; Leifeld, Ferdinand; and Wassenberg, Willy, to Raschig AG. Process for electroplating utilizing disubstituted ethane sulfonic compounds as electroplating auxiliaries and electroplating auxiliaries containing same. 5,024,736, Cl. 204-49.000.
Clayton, James L.; and Gewin, Robert E., to Phoenix Microsystems, Inc. Communications error detection system. 5,025,444, Cl. 371-34.000.
Clorox Company, The: *See—*
Finn, Leslie E.; Swatling, Donald K., and Mankin, Erle D., 5,024,782, Cl. 252-174.130.
Close, Frederick C.: *See—*
Bannister, Raymond L.; Close, Frederick C; and Loeber, Peter J., 5,024,153, Cl. 101-91.000.
Cloth, Helmut. Releasing device for a parachute. 5,024,400, Cl. 244-147.000.
Cloud, Randy G.; and Pretchel, David A., to Minnesota Mining & Manufacturing Company. Method and apparatus for making a jumper connector. 5,024,798, Cl. 264-272.150.
CMB Foodcan plc: *See—*
Hemus, David S., 5,024,317, Cl 198-415.000.
Coble, James R.: *See—*
Diehl, Phillip C.; and Coble, James R., 5,023,968, Cl. 5-82.00R.

VOL
1127
ISS
3
JE
18
1991
UMI

Codex Corporation: *See—*
Ahmed, Hassan M., 5,025,457, Cl. 375-106.000
Coe, Everett L., Jr.: *See—*
Krigmont, Henry V.; Coe, Everett L., Jr., and Southam, Barry J., 5,024,171, Cl. 110-345.000.
Coflexip: *See—*
Ochsner, Richard, 5,024,252, Cl 138-130.000.
Cohen, Mordechai, to Sundstrand Corporation. Valve actuator 5,024,416, Cl. 251-78.000.
Cohrs, Richard B., to Von Duprin, Inc. Flushbolt actuator assembly 5,024,472, Cl. 292-182.000.
Colas S.A.: *See—*
Baillemont, Ghislaine; and Beauverd, Jean, 5,024,552, Cl 404-31.000.
Cole, Frank: *See—*
Coone, Malcolm G.; Ehlinger, Jeffry C., and Cole, Frank, 5,024,273, Cl. 166-289.000.
Cole, Ronald E.; and Amonett, Daniel K., to Emhart Industries Inc. Can operated timer with improved housing 5,025,117, Cl 200-38.00R
Coles, Kenneth G., to Conveyor Co. of Australia Pty. Ltd Rotation method and apparatus. 5,023,974, Cl. 452-177.000.
Colgate-Palmolive Company: *See—*
Grecsek, John J., 5,024,778, Cl. 252-140.000.
Collagen Corporation: *See—*
Chu, George H.; Ogawa, Yasushi; McPherson, John M., Ksander, George; Pratt, Bruce; Hendricks, Diana; and McMullin, Hugh, 5,024,841, Cl. 424-422.000.
Collard, Marie-Paule: *See—*
Rao, KSP Siva Bhushana; Dejonghe, Jean-Paul; Collard, Marie-Paule; and Trouet, Andre, 5,024,835, Cl. 424-85.910.
Collins, Dane H. Decorative message display. 5,024,011, Cl. 40-124.100.
Collins, Glenn B.; Hildebrand, David F.; Lazzeri, Paul A.; Adams, Thomas R., Parrott, Wayne A.; and Hartweck, Lynn M., to Lubrizol Genetics, Inc.; and University of Kentucky Research Foundation, Inc., The. Transformation, somatic embryogenesis and whole plant regeneration method for Glycine species. 5,024,944, Cl. 435-172.300.
Colquhoun, Alexander; and Berchtold, Klaus, to Telefunken electronic GmbH. Measuring system. 5,025,260, Cl 342-127.000.
Colton, Douglas E.: *See—*
Faulkner, W Harrison, III; and Colton, Douglas E., 5,024,709, Cl. 156-69.000.
Colvert, James H., to Texaco Inc Control system for delayed coker. 5,024,730, Cl. 196-132.000.
Colvin, Alex D.; Graham, Daniel J.; and Cassatta, Joseph C., to Ford Motor Company. Continuous measurement of the absolute conductivity of a liquid. 5,025,220, Cl. 324-449.000.
Com Dev Ltd. *See—*
Pramanick, Protap, 5,025,235, Cl. 333-204.000.
Combustion Engineering, Inc.: *See—*
Bachman, William H., 5,024,810, Cl. 376-438.000.
Hatfield, Stephen C.; Andrews, Mena G.; and Broders, Richard P., 5,024,807, Cl. 376-352.000.
Commonwealth Scientific and Industrial Research Organisation: *See—*
Watt, John S., 5,025,160, Cl. 250-356.100.
Communications Manufacturing Company: *See—*
Hilligoss, William R.; Hillogoss, Lawrence D.; Van Winkle, David, and Butler, Myron C., 5,025,466, Cl. 379-1.000.
Compagnie d'Electronique et de Piezo-Electricite D.E.P.E.: *See—*
Gerard, Evelyne; Molle, Roger; and Debaisieux, Andre, 5,025,228, Cl. 331-69.000.
Conner Peripherals, Inc.: *See—*
Stefansky, Frederick M., 5,025,335, Cl. 360-97.010.
Contec Chemieanlagen GmbH: *See—*
Gast, Eduard; and Semmler, Peter, 5,024,708, Cl. 149-19.100.
Continental Can Company, Inc.: *See—*
Pfaffmann, George D.; Kubis, Charles S.; Currie, John P.; Balzer, Norbert R.; Walter, John; and Adams, Graham R., 5,025,123, Cl 219-10.750.
Conveyor Co. of Australia Pty. Ltd.: *See—*
Coles, Kenneth G., 5,023,974, Cl 452-177.000.
Cook, James, Jr., to Scientific-Atlanta, Inc. Multi-element antenna system and array signal processing method. 5,025,493, Cl. 342-374.000.
Cook, Robert H., to Ford Motor Company. Hydraulic rebound stop assembly for a shock absorber. 5,024,301, Cl. 188-284.000.
Cook, Robert L.; Porter, Thomas K.; and Carpenter, Loren C., to Pixar. Pseudo-random point sampling techniques in computer graphics. 5,025,400, Cl. 364-522.000.
Cook, Steven L., to Eastman Kodak Company. Preparation of aqueous solutions of acetoacetamide. 5,025,106, Cl. 564-199.000.
Cooke, John: *See—*
Loscalzo, Joseph; and Cooke, John, 5,025,001, Cl. 514-91.000.
Cooley, William G., to USX Corporation. Interlocking snorkel refractory. 5,024,421, Cl. 266-210.000.
Coone, Malcolm G.; Ehlinger, Jeffry C.; and Cole, Frank, to Davis-Lynch, Inc. Cementing apparatus and method. 5,024,273, Cl. 166-289.000.
Cooper, Graham A.: *See—*
Bottomley, Ian E.; and Cooper, Graham A., 5,024,368, Cl. 228-118.000.
Corbett, Peter F.: *See—*
Hartley, Richard I.; Corbett, Peter F.; Yassa, Fathy F.; and Noujaim, Sharbel E., 5,025,257, Cl. 341-101.000.
Corcoran, Boyd L. *See—*
Abdelrazik, Mohamed A., Martin, John D and Corcoran, Boyd L., 5,025,262, Cl 343-705.000.
Cordfunke, Erik H P; and Tool, Cornelis J J, to Ultra-Centrifuge Nederland N.V. Apparatus for separating isotopes of uranium 5,025,152, Cl. 250-281.000
Corning Incorporated: *See—*
Allaire, Roger A.; Friske, Mark S.; Hagg, Sandra L., and Janas, Victor F., 5,024,978, Cl 501-95.000.
Grossman, David G; Karnas, Michael A; and Johnson, Ronald E, 5,024,790, Cl. 264-16.000.
Coryea, Peter F.: *See—*
Germer, Warren R.; Coryea, Peter F., Keturakis, Andrius A, Masury, David H., and Stevens, Thomas H., 5,025,206, Cl. 324-74.000.
Costanza, Daniel W.: *See—*
Nowak, William J.; Attardi, Anthony A.; and Costanza, Daniel W., 5,025,291, Cl. 355-273.000.
Cousse, Henri: *See—*
Patoiseau, Jean F.; Autin, Jean-Marie; Cousse, Henri; Sales, Veronique; Tisne-Versailles, Jacky; and Bali, Jean-Pierre, 5,025,015, Cl. 514-274.000.
Coutiere, Dominique, to Biolandes. Mechanism for charging and discharging a closed chamber utilizable as an extraction tank of a continuous vegetable material extraction unit and extraction process comprising an application thereof. 5,024,820, Cl. 422-261.000.
Coutre, Christopher A.: *See—*
Smith, Tempel, Jr.; Miletic, Veselko; Bayer, George, Coutre, Christopher A.; Reichel, William L., and Chronowski, Mirek J, 5,025,223, Cl. 324-662.000.
Coutureau, Thierry: *See—*
Bouillot, Jean-Michel; Coutureau, Thierry; and Decuyper, Patrick G., 5,025,241, Cl. 336-100.000.
Coverstone, Randy A.: *See—*
Baker, Jeffrey P.; La, Duong T.; and Coverstone, Randy A. 5,025,271, Cl. 346-140.00R.
Cox, Vernon F.; and Hyde, Phillip M., to Westland Helicopters Limited. Transmission shaft with shear section and debris retainer 5,024,632, Cl. 464-33.000.
Craft, Adam B.; and Torok, Gabor P., to AT&T Bell Laboratories. Technique for reducing electromagnetic interference. 5,025,211, Cl. 324-158.00R.
Crain, Ronald A.; Harney James D.; and Carey, James R., to Literal Corporation. Disk cartridge positioning mechanism for an information storage disk drive system. 5,025,436, Cl. 369-77.200.
Cramer, Richard D., III; and Wold, Svante B. Comparative molecular field analysis (CoMFA). 5,025,388, Cl. 364-496.000.
Crater, Davis H.; Howells, Richard D.; Stern, Richard M.; and Temperante, John A., to Minnesota Mining and Manufacturing Company Fluorochemical oxazolidinones. 5,025,052, Cl. 524-104.000.
Craun, Gary P.; and Kunz, Barbara L., to Glidden Company, The Ionomeric coatings 5,025,063, Cl. 524-560.000.
Crema, Stefano C.; Kucera, Clare H.; Konrad, Gerd; and Hartmann, Heinrich, to BASF. Fluid loss control additives for oil well cementing compositions. 5,025,040, Cl. 523-130.000.
Crispo, Cesare. "Z" type steerable balanced power transmission. 5,024,639, Cl. 475-221.000.
Critchlow, Graham, to Simon Container Machinery Limited Heated roll. 5,024,266, Cl. 165-89.000.
Critikon, Inc.: *See—*
Tan, Josef N. S., 5,024,226, Cl. 128-633.000.
Crown Iron Works Company: *See—*
Moses, Darcy, 5,024,148, Cl. 99-618.000.
Crystals International: *See—*
Little, Cindy E., 5,024,848, Cl. 426-587.000.
CSL Group Inc., The: *See—*
Johnston, William H., 5,024,568, Cl. 414-142.200.
Csongor, Rezso J; and Tangradi, Leroy J., to General Electric Company. Multi-feed, multi-channel communication system. 5,025,485, Cl. 455-12.000.
Cucchi, Silvio; and Carbone, Stefano, to Telettra-Telefonia Elettronica e Radio S.p.A. System and circuits for the processing and transmission of a clock signal, in particular of the video synchronization frequency. 5,025,460, Cl. 375-118.000.
Cuervo, Vincent. Method and system for providing verifiable line of credit information. 5,025,138, Cl. 235-379.000.
Culley, Scott A.: *See—*
Hanlon, J. Vincent; and Culley, Scott A., 5,024,775, Cl. 252-52.00R
Culling, John H., to Carondelet Foundry Company. Hydrochloric acid resistant stainless steel. 5,024,812, Cl. 420-49.000.
Cummins Engine Company, Inc.: *See—*
Free, Paul D.; Doszpoly, B.; Villanyi, Tibor J.; and Olson, David A., 5,024,200, Cl. 123-501.000.
Curiel, Ray, to Envirolite Products, Inc. Direct current salt water activated generator 5,024,904, Cl. 429-27.000.
Currie, John P.: *See—*
Pfaffmann, George D.; Kubis, Charles S.; Currie, John P.; Balzer, Norbert R.; Walter, John; and Adams, Graham R., 5,025,123, Cl 219-10.750.
Curstedt, Tore: *See—*
Robertson, Bengt; and Curstedt, Tore, 5,024,995, Cl. 514-21.000.
Cusano, Dominic A.; and Yeager, Gary W., to General Electric Company. Method of producing a photostimulable x-ray image convertor. 5,024,791, Cl. 264-21.000.

Cuzmar, Ruth M.: *See—*
Moss, Mary G.; Brewer, Terry; Cuzmar, Ruth M.; Hawley, Dan W.; and Flaim, Tony D., 5,024,922, Cl. 430-330.000.
Cymbaluk, Ted H.: *See—*
Tooley, Patricia A.; Cheung, Tin-Tack P.; Cymbaluk, Ted H.; Nowack, Gerhard P.; and Johnson, Marvin M., 5,024,683, Cl. 55-74.000.
Cymer Laser Technologies: *See—*
Anderson, Stuart L.; and Sandstrom, Richard L., 5,025,445, Cl. 372-20.000.
D. Swarovski & Co.: *See—*
Buchbauer, Burkhart, 5,024,713, Cl. 156-221.000.
Daggett, Kenneth E., to Staubli International AG. Robotic workcell control system with a binary accelerator providing enhanced binary calculations. 5,025,390, Cl. 364-513.000.
Daicel Chemical Industries Co., Ltd.: *See—*
Suzuki, Hajime, 5,025,070, Cl. 525-184.000.
Daicel Chemical Industries, Ltd.: *See—*
Okabayashi, Norio, 5,024,744, Cl. 204-194.000.
Ueda, Mitsuru; Kanno, Tatsuya; Iguchi, Yoshihiro; and Oshino, Yasuhiro, 5,025,083, Cl. 528-199.000.
Daimler-Benz: *See—*
Zivkovic, Milorad, 5,024,056, Cl. 60-550.000.
Dainichiseika Color & Chemicals Mfg. Co., Ltd.: *See—*
Hanada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, 5,024,893, Cl. 428-423.100.
Dainippon Ink and Chemicals, Inc.: *See—*
Morita, Tsuyoshi; Shimazu, Kyotaro; and Furukawa, Masataka, 5,024,728, Cl. 159-27.400.
Dalby, James F., to MRJ Group, Inc. Method and apparatus for joining structural members. 5,024,549, Cl. 403-404.000.
Dallas Semiconductor Corporation: *See—*
Bolan, Michael L., 5,025,141, Cl. 235-472.000.
Klughart, Kevin M., 5,025,486, Cl. 455-54.000.
Mounger, Robert W., 5,025,177, Cl. 307-355.000.
Dallum, Barry J.; and Bartlow, David H. Corrosion resistant containers. 5,024,342, Cl. 220-468.000.
Dalrymple, Monte J.; Verinsky, Phillip D.; and Smith, Don, to Zilog, Inc. Universal bus interface. 5,025,412, Cl. 364-900.000.
Dames, Andrew N., to Schlumberger Industries Limited. Combined output and drive circuit for a mass flow transducer. 5,024,104, Cl. 73-861.370.
Dana Corporation: *See—*
Blessing, Martin G., 5,024,634, Cl. 475-86.000.
Lindhuber, Thomas C.; and Campbell, Edward N., 5,024,488, Cl. 301-108.00S.
Dana-Farber Cancer Institute: *See—*
Brenner, Michael B.; Strominger, Jack L.; Seidman, Jonathan; Ip, Stephen H.; and Krangel, Micahel S., 5,024,940, Cl. 435-69.100.
Dang Vu, Quang: *See—*
Cameron, Charles; Mimoun, Hubert; Robine, Alain; Bonnaudet, Serge; Chaumette, Patrick; and Dang Vu, Quang, 5,025,108, Cl. 585-500.000.
Dany, Franz-Josef: *See—*
Buhl, Horst; Holz, Josef; and Dany, Franz-Josef, 5,024,825, Cl. 423-309.000.
Danzeisen, Klaus, to Rohde & Schwarz GmbH & Co KG. Method of measuring radio-frequency interfering voltages. 5,025,208, Cl. 324-77.00R.
Dao-Xuan, Phon: *See—*
Hofsess, Alexander; and Dao-Xuan, Phon, 5,024,027, Cl. 51-34.00H.
Darby, Ted A., to North American Philips Corporation. Video noise reduction system with measured noise input. 5,025,316, Cl. 358-167.000.
Darlington, Alan D.; and Waggitt, Kevin P., to Renishaw plc. Coordinate positioning system. 5,025,362, Cl. 364-167.010.
DataCard Corporation: *See—*
Schofield, Harold D.; and Caron, Paul R., 5,025,267, Cl. 346-1.100.
Wendt, Richard W.; and Johnson, Brian, 5,025,399, Cl. 364-519.000.
Daugherty, Harvey S.: *See—*
Lamb, William E.; Kowaleski, Jerome L.; Haikl, Vojtech; Bittancourt, Alan R.; and Daugherty, Harvey S., 5,025,280, Cl. 354-299.000.
Daves, Robert S.: *See—*
Maine, Gregory T.; Daves, Robert S.; and Yocum, Robert R., 5,024,941, Cl 435-69.900.
David Schwartz Enterprises, Inc.: *See—*
Schwartz, David J., 5,025,369, Cl. 364-200.000.
Davis, Gary C.; McGrath, Barbara E.; and Snow, Kevin M., to General Electric Company. Flame retardant organopolysiloxane-polycarbonate triblock copolymers. 5,025,074, Cl. 528-15.000.
Davis, Kent A.: *See—*
Friedrich, Steven G.; and Davis, Kent A., 5,024,044, Cl. 53-433.000.
Davis-Lynch, Inc.: *See—*
Coone, Malcolm G.; Ehlinger, Jeffry C.; and Cole, Frank, 5,024,273, Cl. 166-289.000.
Davis, Walter L.: *See—*
Mittel, James G.; and Davis, Walter L., 5,025,251, Cl. 340-825.440.
Dawson, John: *See—*
Brink, Andre; Cahill, Michael J.; Dawson, John; Gardner, Juilian W.; and Thierry, Alan A., 5,024,333, Cl. 209-535.000.
Daxor Corporation: *See—*
Feldschuh, Joseph; and Feldschuh, Jonathan A., 5,024,231, Cl. 128-654.000.
Dayhoff, Edward S., to United States of America, Navy. Enhanced clutter suppression apparatus for use with an infrared search and surveillance system. 5,025,143, Cl. 250-203.300.
DEA Mineralol Aktiengesellschaft: *See—*
Mertens-Gottselig, Dagmar; Hammer, Hartmut; Muller, Heinrich; and Wildersohn, Manfred, 5,024,678, Cl. 44-348.000.
Debaig-Valade, Caroline; Filliatre, Claude; and Servens, Christian, to Aerospatiale Societe Nationale Industrielle. Method of forming a fibrous structure composite ceramic material and material thus obtained. 5,024,979, Cl. 501-95.000.
Debaisieux, Andre: *See—*
Gerard, Evelyne; Molle, Roger; and Debaisieux, Andre, 5,025,228, Cl. 331-69.000.
DeCaul, Lorenzo C.; Han, Scott; Palermo, Robert E.; and Walsh, Dennis E., to Mobil Oil Corporation. Process for upgrading methane to higher hydrocarbons. 5,025,109, Cl. 585-500.000.
Deckler, Harry C., to Kinze Manufacturing, Inc. Clutch for chemical dispenser for planter. 5,024,173, Cl. 111-178.000.
DeCrescenzo, Gary A.: *See—*
Getman, Daniel P.; and DeCrescenzo, Gary A., 5,025,021, Cl. 514-302.000.
Decuyper, Patrick G.: *See—*
Bouillot, Jean-Michel; Coutureau, Thierry; and Decuyper, Patrick G., 5,025,241, Cl. 336-100.000.
Deere & Company: *See—*
Gage, Douglas M., 5,024,140, Cl. 91-28.000.
Hadley, Howard C.; and Myers, John R., 5,024,456, Cl. 280-412.000.
de Gabrielli, Olivier: *See—*
Menet, Jacques; and de Gabrielli, Olivier, 5,025,194, Cl. 315-111.810.
Deguchi, Katsuhiko; Saito, Kozo; Saijo, Hiroyuki; and Tosaka, Masaki, to Kao Corporation. Mild alkyl glycoside-based detergent compositions, further comprising terpene and isothiazolone derivatives. 5,025,069, Cl. 252-174.170.
Deguchi, Naoyasu, to Fuji Photo Film Co., Ltd. Method of forming color image from a color reversal photographic material comprising a specified iodide content and spectral distribution. 5,024,925, Cl. 430-379.000.
Degussa Aktiengesellschaft: *See—*
Koberstein, Edgar; Engler, Bernd; Domesle, Rainer; and Schubert, Peter, 5,024,985, Cl. 502-304.000.
Wolff, Siegfried; and Goerl, Udo, 5,025,047, Cl. 524-99.000.
DeHoff, Edward J.: *See—*
Schenk, Donald E.; DeHoff, Edward J.; and Shaw, Schuyler S., 5,024,298, Cl. 188-72.200.
Shaw, Schuyler S.; Hallinan, Linda L.; Hammersmith, Robert J.; Schenk, Donald E.; DeHoff, Edward J.; and Kade, Alexander, 5,024,299, Cl. 188-156.000.
Deibel, Richard J. High-strength quick-disconnect tube filter. 5,024,761, Cl. 210-232.000.
Dejonghe, Jean-Paul: *See—*
Rao, KSP Siva Bhushana; Dejonghe, Jean-Paul, Collard, Marie-Paule; and Trouet, Andre, 5,024,835, Cl. 424-85.910.
DeJulio, Emil R.: *See—*
Santanam, Chandran B.; Thomas, William H.; and DeJulio, Emil R., 5,024,170, Cl. 110-264.000.
Dekerle, Benoit, to Societe Anonyme des Eaux Minerales d'Evian. Nipple adapter for a bottle comprising a screw ring. 5,024,341, Cl. 215-11.100.
Del Bianco, Sergio; and Sica, Gigliola, to Industrial Farmaceutica Serono SpA. Combined interferon/antiestrogen therapy for treatment of breast cancer. 5,024,833, Cl. 424-85.400.
Deli, Jack M., to Komatsu Dresser Company. Pivotable, resilient mounting. 5,024,283, Cl. 180-89.140.
DeLuca, Michael J.; Snowden, Gregory O.; and Fennell, Robert D., to Motorola, Inc. Paging receiver with over-the-air characterization of call signal processing. 5,025,252, Cl. 340-825.440.
De Luca, Olivier, to Alcatel N.V. Transversal filter with wide band phase shifters in series with the delay cells. 5,025,234, Cl. 333-166.000.
Demoute, Jean-Pierre; Touyer, Gaetan; and Mouren, Michel, to Roussel Uclaf. Novel radioactive pyrethrinoids and use thereof. 5,024,828, Cl. 424-1.100.
Dempsey, Daniel J., to Carrier Corporation. Variable capacity heating appliance. 5,024,379, Cl. 237-16.000.
Denis, Xavier: *See—*
Soubrier, Pierre; and Denis, Xavier, 5,024,645, Cl. 493-380.000.
Dennis, Anthony H. K.: *See—*
Lean, Gordon D.; and Dennis, Anthony H. K., 5,024,286, Cl. 180-206.000.
Dennison Manufacturing Company: *See—*
Bourque, Donald L., 5,024,365, Cl. 227-67.000.
Pitts, Warren R.; Estrada, hayden F.; and West, Peter, 5,024,898, Cl. 428-511.000.
DePellegrini, Donald D.; Acker, William E.; and Hoff, Richard, to University of Pittsburgh. Apparatus and method for proving an anchor in walls and ceilings composed of friable asbestos containing material. 5,024,038, Cl. 52-700.000.
DePinto, Gary A.; Steinberg, Joe; Franka, John G.; and Cherniawski, Michael R., to Motorola, Inc. Deposition of a conductive layer for contacts. 5,024,972, Cl. 437-233.000.
DePuy, Division of Boehringer Mannheim Corporation: *See—*
Smith, Todd S.; and Kelman, David C., 5,024,670, Cl. 623-18.000.
Derbyshire, Rodney L., to Metcal, Inc. Rivet with integral heater. 5,025,128, Cl. 219-200.000.

VOL 1127 ISS 3 JE 18 1991 UMI

- Derudder, James L.; and Wang, I-Chung W., to General Electric Company. Polycarbonate and polyester blends modified with polyorganosiloxane graft polymers combined with diene rubber-based graft polymers. 5,025,066, Cl. 525-66.000.
- Design Tech International, Inc.: *See—*
  - Long, Robert; and Gottlieb, Mark, 5,024,186, Cl. 123-179.00B.
- Desmarais, Armand J., to Hercules Incorporated Denture adhesive composition. 5,024,701, Cl. 106-35.000.
- Deusser, Peter G.: *See—*
  - Becker, Johann A.; Deusser, Peter G.; and Holzmann, Olar W. R., 5,024,498, Cl. 350-96.100.
- Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V.: *See—*
  - von Redwitz, Heribert, 5,024,526, Cl. 356-73.000
- Deutsche Solvay-Werke GmbH: *See—*
  - Jakobson, Gerald; Siemanowski, Werner; and Uhlig, Karl-Heinz, 5,024,787, Cl. 260-410.600.
- Deutsche Thomson-Braudt GmbH: *See—*
  - Klank, Otto; and Rottmann, Dieter, 5,025,406, Cl. 364-724.190.
- Devon Industries, Inc.: *See—*
  - Sandel, Dan; Horan, Robert T.; Gaba, Rodolfo; and Ramirez, Bruno J., 5,024,326, Cl. 206-366.000.
- Deweerdt, Kevin R., to Chrysler Corporation. Vehicle air venting cap. 5,024,345, Cl. 220-366.000.
- DeWitt, Donald E.: *See—*
  - Van Fossen, Robert A.; Spence, Scott L.; and DeWitt, Donald E., 5,024,294, Cl. 184-108.000.
- Dickson, Thomas D., Jr.: *See—*
  - Schwarze, Ralph W.; and Dickson, Thomas D., Jr., 5,024,318, Cl. 198-465.200.
- DIEHL GmbH & Co.: *See—*
  - Bock, Erich, 5,024,136, Cl. 89-6.000.
- Diehl, Phillip C.; and Coble, James R. Removable litter chair insert. 5,023,968, Cl. 5-82.00R.
- Diesel Kiki Co., Ltd.: *See—*
  - Nagasaki, Wataru; Endo, Takuro; Taira, Susumu; and Muramatsu, Hajime, 5,024,087, Cl. 73-516.00R.
  - Nakajima, Nobuyuki, 5,024,591, Cl. 418-178.000.
- Dietrich, Norman R.; Moyer, Ralph S.; and Wong, Yiu-Huen, to AT&T Bell Laboratories. Method of forming a silicon-based semiconductor optical device mount. 5,024,966, Cl. 437-60.000.
- Dietz, Henry G. Apparatus for inhalation therapy using triggered dose oxygenator employing an optoelectronic inhalation sensor. 5,024,219, Cl. 128-204.210.
- Digital Equipment Corporation: *See—*
  - Seiler, Larry D.; Pappas, James L.; and Rose, Robert C., 5,025,249, Cl. 340-721.000.
  - Smith, Alan B., 5,023,991, Cl. 29-603.000.
- Dill, Andreas R.: *See—*
  - Boss, Ernst; Dill, Andreas R.; and Zimmermann, Heinz, 5,024,720, Cl. 156-584.000.
- DiLullo, Joseph V.; Schifter, Stephan C.; Negin, Michael; and Paist, Kenneth W., to Secura Corporation. System and method for remotely monitoring the connect/disconnect status of a multiple part vehicle. 5,025,253, Cl. 340-825.060.
- Dimos, Duane: *See—*
  - Garg, Diwakar; Dyer, Paul N.; Schaffer, Leslie E.; Wrecsics, Ernest L.; Dimos, Duane; and Mueller, Carl F., 5,024,901, Cl. 428-627.000.
- Dinan, Raymond F.; Fallon, Hugh C.; Malin, Jerald R.; Rodite, Robert R.; Rohe, Clair F.; and Rohrer, Gene D., to International Business Machines Corporation. System for scanning documents without loss of image data. 5,025,483, Cl. 382-58.000.
- Dinewitz, Isaac: *See—*
  - Lindstrom, Walter W.; and Dinewitz, Isaac, 5,024,230, Cl. 128-654.000.
- Dingus, George W.: *See—*
  - Garthaffner, Martin T.; Keen, Billy J., Jr.; Gillespie, Andrew J.; Wheless, Jack C.; and Dingus, George W., 5,024,242, Cl. 131-94.000.
- Dininno, Frank P.; and Salzmann, Thomas N., to Merck & Co., Inc. 2-biphenyl-carbapenem antibacterial agents. 5,025,006, Cl. 514-210.000.
- DiNinno, Frank P.; Salzmann, Thomas N.; and Greenlee, Mark L., to Merck & Co., Inc. 2-(substituted-dibenzofuranyl and dibenzothienyl) carbapenem antibacterial agents. 5,025,008, Cl. 514-210.000.
- DiNinno, Frank P.: *See—*
  - Greenlee, Mark L.; DiNinno, Frank P.; Cama, Lovji D.; and Heck, James V., 5,025,007, Cl. 514-210.000.
- Dinter, Peter; Funke, Hermann; and Matschke, Klaus, to Hoechst Aktiengesellschaft. Apparatus for the surface treatment of sheet-like structures by electric corona discharge. 5,024,819, Cl. 422-186.060.
- Dion, F. Eugene: *See—*
  - Morehouse, James H.; Furay, David M.; Blagaila, John; Dion, F. Eugene; Shelstad, Scott A.; and Woods, Jimmy L., 5,025,336, Cl. 360-97.020.
- Direktor, David: *See—*
  - Effenberger, Reinhard; and Direktor, David, 5,025,002, Cl. 514-112.000.
- Diskus Werke Frankfurt ammain Aktiengesellschaft: *See—*
  - Hofsess, Alexander; and Dao-Xuan, Phon, 5,024,027, Cl. 51-34.00H.
- Dixon, James W.: *See—*
  - Dixon, Steven C.; and Dixon, James W., 5,024,319, Cl. 198-494.000.
- Dixon, Steven C.; and Dixon, James W. Belt heater for conveyors. 5,024,319, Cl. 198-494.000.
- Dobinson, Bryan; and Southcott, Mark R., to Ciba-Geigy Corporation Polyimide-forming compositions. 5,025,084, Cl. 528-229.000.
- Dohler, Klaus; and Hachtel, Hansjorg, to Robert Bosch GmbH Device for determining a length of linear movement or an angle of rotation of a machine part. 5,025,213, Cl. 324-207.120.
- Dobson, Peter S.: *See—*
  - Stanley, Ian W.; Shepherd, John N.; and Dobson, Peter S., 5,024,500, Cl. 350-96.150.
- Dodson, Charles L., to Beckman Instruments, Inc. Detecting multiple phases in liquid scintillation samples. 5,025,161, Cl. 250-364.000.
- Doege, Mathias; and Frey, Wunibald, to Robert Bosch GmbH. Device for and method of applying voltage to a heating resistor in a motor vehicle in dependency on operating conditions of the vehicle. 5,025,136, Cl. 219-508.000.
- Doherty, Annette M.; Hudspeth, James P.; Kaltenbronn, James S., Repine, Joseph T.; Roark, William H.; Sircar, Ila; and Tinney, Francis J., to Warner-Lambert Company. Renin inhibitors IV. 5,024,994, Cl. 514-18.000.
- Dola, Frank P.; Feldman, Steven, Lauterbach, John H.; and Mengelson, William G., to AMP Incorporated. Surface accessible wiring system and assembly. 5,024,614, Cl. 439-114.000.
- Domergue, Jean-Paul: *See—*
  - Maisonneuve, Jean-Michel; Domergue, Jean-Paul; Parize, Gabrielle; Palandjian, Philippe; and Isbert, Jacques, 5,024,502, Cl 350-96.160.
- Domesle, Rainer: *See—*
  - Koberstein, Edgar; Engler, Bernd; Domesle, Rainer; and Schubert, Peter, 5,024,985, Cl. 502-304.000.
- Dominguez, Danilo A.; and Flores, James F. Center beam/center partition flat car and retention assembly. 5,024,567, Cl. 410-100.000.
- Dominques, Louis P.: *See—*
  - Negas, Taki; and Dominques, Louis P., 5,024,980, Cl. 501-134.000.
- Domnikov, Larissa: *See—*
  - Garcia, Gilbert; and Domnikov, Larissa, 5,025,068, Cl 525-119.000
- Donaldson Company, Inc.: *See—*
  - Barris, Marty A.; and Wagner, Wayne M., 5,024,054, Cl. 60-274.000.
  - Jackson, William E., 5,024,870, Cl. 428-181.000.
- Donovan, William P.; Gonzalez, Jose M., Jr.; Levinson, Barry L.; and Macaluso, Anthony. Coleopteran active microorganisms, related insecticide compositions and methods for their production and use 5,024,837, Cl. 424-93.000.
- Doraiswamy, Krishna C.: *See—*
  - Smothers, William K.; Doraiswamy, Krishna C.; and Armstrong, Mark L., 5,024,909, Cl. 430-1.000.
- Doss, Brian L.: *See—*
  - Svetkoff, Donald J.; and Doss, Brian L., 5,024,529, Cl. 356-376.000.
- Doszpoly, B.: *See—*
  - Free, Paul D.; Doszpoly, B.; Villanyi, Tibor J.; and Olson, David A., 5,024,200, Cl. 123-501.000.
- Doty, Gerald A.: *See—*
  - Zygutis, James L.; and Doty, Gerald A., 5,024,391, Cl. 242-107.200.
- Doug Bragg Enterprises Ltd.: *See—*
  - Bragg, R. D.; and Weatherbee, H. Lloyd, 5,024,052, Cl. 56-330.000.
- Doussiet, Roger; and Labadie, Louis, to Societe Nationale Elf Aquitaine (Production). Cell for sampling and storing fluid deposits. 5,024,110, Cl. 73-864.620.
- Dow Chemical Company, The: *See—*
  - Claus, Kenneth G.; Schoppe, Dwaine W.; and Earlam, Matthew R., 5,024,737, Cl. 204-71.000.
  - Hefner, Robert E., Jr.; and Haynes, Deborah I., 5,024,785, Cl. 252-299.010.
  - McCullough, Francis P., Jr.; Snelgrove, R. Vernon; and Hall, David M., 5,024,877, Cl. 428-282.000.
  - Relenyi, Attila G.; and Gartner, Charles D., 5,025,038, Cl. 514-665.000.
- Dow Corning Corporation: *See—*
  - Burns, Gary T., 5,025,075, Cl. 528-33.000.
  - Penticoff, Amy M.; and Lyon, John D., 5,024,937, Cl. 435-41.000.
- DowBrands Inc.: *See—*
  - Gundlach, Douglas P., 5,024,325, Cl. 206-229.000.
- Dowd, Joseph P.: *See—*
  - Thurman, Laurance R.; Dowd, Joseph P.; and Fischer, Kathy J., 5,024,772, Cl. 252-1.000.
- Downing, Gerald W. Foldable handrail assembly. 5,024,420, Cl. 256-67.000.
- Downs, Walter M.; and Ankrom, Michael J., to Westinghouse Electric Corp. Solder pad/circuit trace interface and a method for generating the same. 5,024,734, Cl. 204-15.000.
- Dragerwerk Aktiengesellschaft: *See—*
  - Maurer, Christoph, 5,024,587, Cl. 417-488.000.
- Draghetti, Fiorenzo; and Gamberini, Antonio, to G.D. Societa Per Azioni. Machine for wrapping substantially parallelepiped commodities. 5,024,043, Cl. 53-234.000.
- Dragovic, Thomas: *See—*
  - Anderheggen, Wolfgang; Kraemer, Michael; Vogelsgesang, Roland; Wagner, Wolfram; Olges, Wolfgang; and Dragovic, Thomas, 5,024,797, Cl. 264-143.000.
- Drain, Dennis R. Stabilizing device for hand-held/portable electronic device. 5,024,414, Cl. 248-688.000.
- Drake, Brian J.: *See—*
  - Christenson, Philip A.; Eilerman, Robert G.; Riker, Paul J.; and Drake, Brian J., 5,024,847, Cl. 426-535.000.
- Draxler, Richard: *See—*
  - Fantozzi, Louis R.; Kessler, Lawrence; and Draxler, Richard, 5,024,493, Cl 350-1.300.

- Dreier, Friedrich; and Fischer, Ernst, to Robert Bosch GmbH. Shaft bearing with a ball socket in a frame-mounted housing. 5,024,540, Cl. 384-203.000.
- Drent, Eit; and Breed, Anthonius J. M., to Shell Oil Company. Polymerization of carbon monoxide with ethylenically unsaturated alcohol. 5,025,092, Cl. 528-392.000.
- Dresser Industries, Inc.: *See—*
  - Ricles, Thomas D., 5,024,277, Cl. 166-381.000.
- Drumm, James M.: *See—*
  - Johnson, Randall E.; and Drumm, James M., 5,025,306, Cl. 357-75.000.
- Dubois, Gerald N., III, to Townsend Engineering Company. Safety means for powered machinery. 5,025,175, Cl. 307-326.000.
- Dubois, Pascal: *See—*
  - Fishler, Mark K.; Koten, Jean-Marie; and Dubois, Pascal, 5,024,422, Cl. 266-272.000.
- Duerksen, John H.: *See—*
  - Anderson, Donald J.; Duerksen, John H.; McCallum, Doug J.; and Petrick, Mark, 5,024,275, Cl. 166-303.000.
- Dufort, Mario C. Test plug for flanged pipes. 5,024,079, Cl. 73-49.800.
- DuFour, Pierre, to Salomon S. A. Sole for a sport shoe. 5,024,007, Cl. 36-127.000.
- Dull, Gordon L., to Wisconsin Dairies Cooperative. Cheese drainer pan assembly. 5,024,146, Cl. 99-458.000.
- Dumenek, Vladimir A.; Stolyarenko, Georgy E.; and Kossovsky, Leopold V. Ophthalmological device. 5,024,652, Cl. 604-22.000.
- Duncan, Marlie A.: *See—*
  - Razauskas, Anthony F.; and Duncan, Marlie A., 5,024,081, Cl. 73-104.000.
- Du Pont de Nemours, E. I., and Company: *See—*
  - Burch, Robert R., 5,024,858, Cl. 427-123.000.
  - Christell, Lance A.; and Kafka, Fred Y., 5,025,044, Cl. 523-334.000.
  - Gerling, Joseph F.; and Kaczmarczyk, Raymond A., Jr., 5,024,356, Cl. 222-312.000.
  - Hartmann, Hans S., 5,024,975, Cl. 501-65.000.
  - Linton, Howard R., 5,024,826, Cl. 423-335.000.
  - Sidwell, Lloyd G.; and Miller, Conrad E., 5,025,164, Cl. 250-483.100.
  - Smothers, William K.; Doraiswamy, Krishna C.; and Armstrong, Mark L., 5,024,909, Cl. 430-1.000.
  - Williams, Franklin P., III, 5,025,087, Cl. 528-339.000.
  - Yeh, An-Gong, 5,024,387, Cl. 241-21.000.
- Durand, John E. Signal pickup mechanism. 5,024,085, Cl 73-256.000.
- Durand-Wayland, Inc.: *See—*
  - Leverett, William H., 5,024,047, Cl. 53-502.000.
- Durig, Urs T.; Fischer, Ulrich C.; and Pohl, Wolfgang D., to Ernst Leitz Wetzlar, GmbH; and International Business Machines Company. Sensor for converting a distance to optical and further to electrical energy, and surface scanning apparatus using same. 5,025,147, Cl. 250-216.000.
- Duryea, John L.: *See—*
  - Impink, Albert J., Jr.; Grobmyer, Louis R.; Sariscak, Robert E.; Morita, Toshio; and Duryea, John L., 5,024,801, Cl. 376-217.000.
- Duttweiler, Donald L., to AT&T Bell Laboratories. Adaptive probability estimator for entropy encoding/decoding. 5,025,258, Cl. 341-107.000.
- Dutzmann, Stefan: *See—*
  - Lantzsch, Reinhard; Kysela, Ernst; Buchel, Karl H.; Dutzmann, Stefan; Brandes, Wilhelm; and Hanssler, Gerd, 5,025,030, Cl. 514-383.000.
- Dye, John F.: *See—*
  - Ovassapian, Andranik; and Dye, John F., 5,024,218, Cl. 128-200.260.
- Dyer, Paul N.: *See—*
  - Garg, Diwakar; Dyer, Paul N.; Schaffer, Leslie E.; Wrecsics, Ernest L.; Dimos, Duane; and Mueller, Carl F., 5,024,901, Cl. 428-627.000.
- Dykstra, Richard A., to Briggs & Stratton Corporation. Capacitive discharge ignition system with continuous timing advance. 5,024,204, Cl. 123-602.000.
- Dynamic Engineering, Inc.: *See—*
  - Weinstein, Leonard M., 5,024,100, Cl. 73-756.000.
- E. R. Squibb & Sons, Inc.: *See—*
  - Aklonis, Carol A.; Ax, Helen A.; Kirsch, Donald R.; O'Sullivan, Joseph; Tymiak, Adrienne; and Wells, J. Scott, 5,024,839, Cl. 424-115.000.
  - Karanewsky, Donald S., 5,025,000, Cl. 514-80.000.
  - Karanewsky, Donald S., 5,025,017, Cl. 514-277.000.
- E. R. Squibbs & Sons, Inc.: *See—*
  - Biller, Scott A., 5,025,003, Cl. 514-120.000.
- E-Systems, Inc.: *See—*
  - Abdelrazik, Mohamed A.; Martin, John D.; and Corcoran, Boyd L., 5,025,262, Cl. 343-705.000.
- Eames, Loren W.: *See—*
  - Berg, Joseph A.; and Eames, Loren W., 5,024,485, Cl. 297-312.000.
- Earlam, Matthew R.: *See—*
  - Claus, Kenneth G.; Schoppe, Dwaine W.; and Earlam, Matthew R., 5,024,737, Cl. 204-71.000.
- Earp, Ronald L., to AT&T Bell Laboratories. Enhanced bottom sonar system. 5,025,423, Cl. 367-137.000.
- Eastman Kodak Company: *See—*
  - Blount, William W., Jr.; and Zoeller, Joseph R., 5,025,086, Cl. 528-272.000.
  - Chamberlin, Kim S., 5,025,107, Cl 564-414.000.
  - Chapman, Derek D.; and Evans, Steven, 5,024,990, Cl. 503-227.000.
  - Cook, Steven L., 5,025,106, Cl. 564-199.000.
  - Ellsworth, Roger D., 5,025,279, Cl. 354-298.000.
  - Evans, Francis J.; Jones, Ralph W., Jr.; and Wilson, Robert D., 5,024,931, Cl. 430-567.000.
  - Guslits, Vladimir S.; and Swapceinski, John P., 5,025,289, Cl. 355-253.000.
  - Hilbert, Thomas K., 5,025,287, Cl. 355-245.000.
  - Jeffers, Frederick J., 5,025,163, Cl. 250-483.100.
  - Lougheed, Edgar P.; Richenberg, Carl B., and Chen, Stephen P., 5,024,929, Cl. 430-546.000.
  - McClune, Gregory J.; and Bishop, John F., 5,024,935, Cl. 435-7.100.
  - Morton, Roger A.; and Wetzel, Thomas J., 5,025,480, Cl 382-50.000.
  - Ng, Yee S., 5,025,322, Cl. 358-298.000.
  - Pagano, Daniel M., 5,025,274, Cl. 354-21.000.
  - Parulski, Kenneth A.; and Kessler, David, 5,025,313, Cl. 358-54.000.
  - Robison, Gary L., 5,025,283, Cl. 355-40.000.
  - Silva, Fernando G., 5,025,328, Cl. 360-46.000.
  - Steele, Lawrence C., 5,025,292, Cl. 355-326.000.
  - Wu, Stephen H. W.; Greene, Carol J.; and Sharma, Mahendra K., 5,025,004, Cl. 514-165.000.
- Eaton Corporation: *See—*
  - Oliver, James L.; Juriga, James A.; Walton, Erlen B.; and Preston, David M., 5,024,463, Cl. 280-718.000.
  - Reinicke, Robert H.; Mohtar, Rafic; and Nelson, Richard O., 5,024,418, Cl. 251-129.110.
- Eaton, Larry R.: *See—*
  - Jansen, Michael; Sergant, Moshe; Ou, Szutsun S.; Wilcox, Jaroslava Z.; Yang, Jane J.; and Eaton, Larry R., 5,025,451, Cl. 372-50.000.
- Ebihara, Kazyuki: *See—*
  - Koguchi, Tatsushi; Ito, Shigehiro; Ebihara, Kazyuki; and Nishi, Yuji, 5,025,317, Cl. 358-167.000.
- Eckerle, Douglas W.; and Sainburg, Frank P. Poseable doll magnetically secured to its stand. 5,024,611, Cl. 446-268.000.
- Edgren, David E.; and Theeuwes, Felix, to ALZA Corporation. Annealed coats. 5,024,842, Cl. 424-473.000.
- EDS Technologies, Inc.: *See—*
  - Watts, Leonard A.; and Espinosa, Medardo, 5,024,569, Cl. 414-790.300.
- Edwards, Arthur J., to Motorola, Inc. Circuit for use with a voltage regulator. 5,025,203, Cl. 323-268.000.
- Edwards, James C.; and Pritchard, Edward E., to International Paper Clamshell attachment for log grapple. 5,024,397, Cl. 294-68.230.
- Effenberger, Reinhard; and Direktor, David, to Bromine Compounds Ltd. Process for control of microorganisms with phosphorus-based compositions. 5,025,002, Cl. 514-112.000.
- Egawa, Shunji; and Yamada, Masato, to Citizen Watch Co., Ltd. Radiation clinical thermometer. 5,024,533, Cl. 374-126.000.
- Ehlinger, Jeffry C.: *See—*
  - Coone, Malcolm G.; Ehlinger, Jeffry C.; and Cole, Frank, 5,024,273, Cl. 166-289.000.
- Eich, Manfred; and Wendorff, Joachim, to Rohm GmbH Chemische Fabrik. Device for reversible optical data storage using polymeric liquid crystals. 5,024,784, Cl. 252-299.010.
- Eichen, Elliot G., to GTE Laboratories Incorporated. System for transmitting information on interferometrically generated optical carriers. 5,025,487, Cl. 455-618.000.
- Eichinger, Johann: *See—*
  - Parzl, Franz; and Eichinger, Johann, 5,024,122, Cl. 74-606.00R.
- Eichner, Fred N.: *See—*
  - Miller, Steven D.; McDonald, Joseph C.; Eichner, Fred N.; and Tomeraasen, Paul L., 5,025,159, Cl. 250-337.000.
- Eilerman, Robert G.: *See—*
  - Christenson, Philip A.; Eilerman, Robert G.; Riker, Paul J.; and Drake, Brian J., 5,024,847, Cl. 426-535.000.
- Eilersen, Jens J. Piece of furniture. 5,023,966, Cl. 5-17.000.
- Eimei Company, Ltd.: *See—*
  - Ishii, Yoichi; and Mihara, Hisashi, 5,024,844, Cl. 424-520.000.
- Eisenberg, Morris, to Electrochimica Corporation Rechargeable electrochemical cell. 5,024,906, Cl. 429-101.000.
- Eishin Technology Company, Limited: *See—*
  - Kubo, Chikanari, 5,024,248, Cl. 137-596.160.
- Ekeroth, Douglas E.: *See—*
  - Veronesi, Luciano; and Ekeroth, Douglas E., 5,025,158, Cl. 250-328.000.
- Electric Power Research Institute: *See—*
  - Chang, Ramsay, 5,024,681, Cl. 55-6.000.
- Electrochimica Corporation: *See—*
  - Eisenberg, Morris, 5,024,906, Cl. 429-101.000.
- Elitex Koncern Textiln: *See—*
  - Fucik, Borivoj; Petranek, Milan; and Smital, Frantisek, 5,024,068, Cl. 66-53.000.
- Ellsworth, Roger D., to Eastman Kodak Company Process for replenishing solutions in a film processor. 5,025,279, Cl. 354-298.000.
- Elwell, John R., to Chrysler Corporation. Beverage container holder 5,024,411, Cl. 248-311.200.
- Ema, Taiji, to Fujitsu Limited. Metal insulator semiconductor type dynamic random access memory device. 5,025,294, Cl. 357-23.600.
- Emhart Industries Inc.: *See—*
  - Cole, Ronald E.; and Amonett, Daniel K., 5,025,117, Cl. 200-38.00R.
- Emori, Kiyoshi; and Maekawa, Hiroshi, to Minolta Camera Kabushiki Kaisha. Deveoloping unit switching device for a printer. 5,025,323, Cl. 358-300.000.

VOL
1127
ISS 3
JE 18
1991
UMI

- Emoto, Masami, to Ricoh Company, Ltd. Recording and reproducing optical information device which converts the first beam into a second beam having different light intensity distribution. 5,025,438, Cl. 369-112.000.
- Empire Research Corporation: *See—*
  - Wender, Harry; and Avila, Augusto F., 5,024,661, Cl. 604-110.000.
- Ems, Josef: *See—*
  - Bergmann, Konrad; Ems, Josef; and Nikolayczik, Hans, 5,024,378, Cl. 236-93.00B.
- Enderlin, Robert, to Superba S.A. Apparatus with endless screws for forming flat loops of textile yarn. 5,024,390, Cl. 242-47.000.
- Enders, Gerd. *See—*
  - Kuesters, Karl-Heinz; Mueller, Wolfgang; and Enders, Gerd, 5,025,295, Cl. 357-23.600.
- Endo, Takuro: *See—*
  - Nagasaki, Wataru; Endo, Takuro; Taira, Susumu; and Muramatsu, Hajime, 5,024,087, Cl. 73-516.00R.
- Endo, Yasushi; Kato, Mikihiko; Kawamata, Toshio; and Masaki, Kouichi, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 5,024,885, Cl. 428-329.000.
- Endoh. Tetsuhiko: *See—*
  - Masuyama, Masaru; Takemae, Yoshihiro; Endoh, Tetsuhiko; Komyoji, Hirosuke; Tanaka, Ryuji; and Itakura, Katsuhiko, 5,025,415, Cl. 365-52.000.
- Engebretson, A. Maynard, to Storz Instrument Company. Method of readout of implanted hearing aid device and apparatus therefor. 5,024,224, Cl. 128-420.600.
- Engelhard Corporation: *See—*
  - Speronello, Barry K.; Byrne, John W.; and Chen, James M., 5,024,981, Cl. 502-67.000.
- Engelhardt, Dietmar: *See—*
  - Grecksch, Hans; and Engelhardt, Dietmar, 5,024,389, Cl. 242-35.50A.
- Engelmann, Theodore R.: *See—*
  - Mason, Charles D.; Sacks, William; Engelmann, Theodore R.; and Verma, Satyajit, 5,024,897, Cl. 428-474.400.
- Engelsberg, Audrey C. Removal of surface contaminants by irradiation from a high-energy source. 5,024,968, Cl. 437-173.000.
- Engler, Bernd: *See—*
  - Koberstein, Edgar; Engler, Bernd; Domesle, Rainer; and Schubert, Peter, 5,024,985, Cl. 502-304.000.
- Engler, Heidrun: *See—*
  - Ahrens, Kurt H.; Schickaneder, Helmut, Engler, Heidrun; and Szeleny, Istvan, 5,025,016, Cl. 514-274.000.
- Enomoto, Katashi: *See—*
  - Itoh, Hisato; Enomoto, Katashi; Oguchi, Takahisa. and Nishizawa, Tsutomu, 5,024,926, Cl. 430-495.000.
- Envirolite Products, Inc.: *See—*
  - Curiel, Ray, 5,024,904, Cl 429-27.000.
- Enya, Takeshi: *See—*
  - Tanaka, Hiroaki; Enya, Takeshi; and Nakamura, Katsumi, 5,024,101, Cl. 73-766.000.
- Enzo Biochem, Inc.: *See—*
  - Yang, Huey-Lang; Todd, John; and Jou, Huey-Ling L., 5,024,933, Cl. 435-6.000.
- Epstein, William E. Flexibility enhancement multi-machine carousel. 5,024,175, Cl. 112-217.200.
- Erickson, Donald C. Branched gax absorption vapor compressor. 5,024,063, Cl. 62-101.000.
- Ernst Leitz Wetzlar, GmbH: *See—*
  - Durig, Urs T.; Fischer, Ulrich C.; and Pohl, Wolfgang D., 5,025,147, Cl. 250-216.000.
- Espaillac, Marcellin: *See—*
  - Giuliani, Pierre; Le Page, Jean-Francois; Plumail, Jean-Claude; and Espaillac, Marcellin, 5,024,751, Cl. 208-108.000.
- Espinosa, Medardo: *See—*
  - Watts, Leonard A.; and Espinosa, Medardo. 5,024,569, Cl. 414-790.300.
- Estrada, hayden F.: *See—*
  - Pitts, Warren R.; Estrada, hayden F.; and West, Peter, 5,024,898, Cl. 428-511.000.
- Etat Francais represente par le Ministre: *See—*
  - Landreau, Jean; and Nakajima, Hisao, 5,024,853, Cl. 427-10.000.
- Etcheparre, Jean; and Etchparre, Bernard, to Lectra Systemes S.A. Method and apparatus for piling plural sheets of material having a repetitive pattern thereon, while ensuring the vertical alignment of the patterns from one sheet to the next. 5,024,429, Cl. 270-30.000.
- Etchparre, Bernard: *See—*
  - Etcheparre, Jean; and Etchparre, Bernard, 5,024,429, Cl. 270-30.000.
- Ethicon, Inc.: *See—*
  - Berry, John P., 5,024,789, Cl. 264-6.000.
- Ethyl Corporation: *See—*
  - Beaver, Phillip R., 5,025,110, Cl. 570-206.000.
  - Chang, Suae-Chen, 5,024,860, Cl. 427-230.000.
  - Hanlon, J. Vincent; and Culley, Scott A., 5,024,775, Cl. 252-52.00R.
  - Smith, Kim R.; and Borland, James E., 5,024,777, Cl. 252-117.000.
  - Torres, James E., 5,025,050, Cl. 524-91.000.
- Etoh, Yoshiyuki; Inoue, Hiroshi; Mori, Kazuyuki; Suzuki, Koichi; Nakano, Kinichiro; Nomura, Hiroyuki; Yamamoto, Isao; and Yoshida, Kiyoshi, to Nissan Motor Company, Limited. System and method for automatically controlling vehicle speed to desired cruise speed using microcomputer. 5,025,379, Cl. 364-426.040.
- Euroflex, S.A.: *See—*
  - Mulvey, Philip, 5,024,419, Cl. 251-148.000.
- Evans, Francis J.; Jones, Ralph W., Jr., and Wilson, Robert D., to Eastman Kodak Company. Photographic emulsions sensitized by the introduction of oligomers. 5,024,931, Cl. 430-567.000.
- Evans, Steven: *See—*
  - Chapman, Derek D.; and Evans, Steven, 5,024,990, Cl 503-227.000
- Everfilt Corporation: *See—*
  - Chiarito, Richard J., 5,024,771, Cl. 210-791.000.
- Exfluor Research Corporation: *See—*
  - Lagow, Richard J.; Bierschenk, Thomas R.; Juhlke, Timothy J., and Kawa, Hajimu M., 5,025,093, Cl 568-601.000.
- Extrusion Services, Inc.: *See—*
  - Hays, Donald F., Jr., 5,024,130, Cl. 83-444.000.
- Exxon Research & Engineering Company: *See—*
  - Gorun, Sergiu M.; and Stibrany, Robert T., 5,025,101, Cl. 556-50.000.
- Eylon, Daniel: *See—*
  - Froes, Francis H., and Eylon, Daniel, 5,024,369, Cl. 228-157.000
- Faarup, Peter: *See—*
  - Gronwald, Frederik; Andersen, Peter H.; Faarup, Peter; Guddal, Erling; Hansen, Kristian T.; Hansen, Louis B., and Nielsen, Erik B., 5,025,009, Cl. 514-213.000.
- Faden, Alan I., to Medicis Corporation. Central nervous system injury treatment with opiate-receptor antagonist. 5,025,018, Cl. 514-277.000.
- Fairfield Manufacturing Company, Inc.: *See—*
  - Phebus, Dan E.; Schrader, William A.; and Summers, Russell E., Jr., 5,024,636, Cl. 475-141.000.
- Falk, R. A., to Boeing Company, The. Optical and gate for use in a cross-bar arithmetic/logic unit. 5,024,499, Cl. 350-96.110.
- Fallon, Hugh C.: *See—*
  - Dinan, Raymond F.; Fallon, Hugh C.; Malin, Jerald R.; Rodite, Robert R.; Rohe, Clair F.; and Rohrer, Gene D., 5,025,483, Cl. 382-58.000.
- Fang, William. Personal health monitor enclosure. 5,024,225, Cl 128-630.000.
- Fanta, Thomas O.; and Chabala, Leonard V., to S&C Electric Company. Method and arrangement for providing power operation of switchgear apparatus. 5,025,171, Cl. 307-150.000.
- Fantozzi, Louis R.; Kessler, Lawrence; and Draxler, Richard, to Fantozzi, Louis R.; and Kessler, Lawrence. Compact infrared lens arrangement including at least three reflections. 5,024,493, Cl 350-1.300.
- Fanuc Ltd.: *See—*
  - Seki, Masaki; Takegahara, Takashi. and Nakajima, Masatoshi, 5,025,363, Cl. 364-191.000.
- Fanuc Ltd: *See—*
  - Kurakake, Mitsuo; and Kinoshita, Jiro, 5,025,200, Cl. 318-569.000.
- Farkas, Otto : *See—*
  - Fejerdy, Istvan, Farkas, Otto ; and Havasi, Gabor, 5,024,424, Cl 267-64.270.
- Farmer, Charles, to Advanced Micro Devices, Inc. Apparatus for generating digital gating signals in response to a digital data signal. 5,025,181, Cl. 307-571.000.
- Farmer, Charles, to Advanced Micro Devices, Inc. Digital apparatus for generating gating signals in response to a data signal. 5,025,182, Cl. 307-571.000.
- Faroudja, Yves C. Motion-adaptive video noise reduction system using recirculation and coring. 5,025,312, Cl. 358-36.000.
- Farrar, John M.; and Graham, Mark D., to Sandoz Ltd. Detergent compositions containing an anionic surfactant and a 4,4'-bis(-triazinylamino)-stilbene disulphonic acid optical brightener 5,024,786, Cl. 252-543.000.
- Faulkner, W. Harrison, III; and Colton, Douglas E., to Slautterback Corporation. Contact-free method of forming sift-proof seals. 5,024,709, Cl. 156-69.000.
- Fay, Gary V.; Robb, Stephen P.; Sutor, Judith L.; and Terry, Lewis E., to Motorola, Inc. Semiconductor structure with closely coupled substrate temperature sense element. 5,025,298, Cl. 357-41.000.
- Fazio, Luigi: *See—*
  - Vaschetto, Lorenzo; and Fazio, Luigi, 5,024,383, Cl. 239-284.100.
- Federal-Mogul Corporation: *See—*
  - Nash, Stephen E., 5,024,364, Cl. 277-35.000.
  - Tienken, Alfred G., 5,025,350, Cl. 362-61.000.
- Feinberg, Howard A.; and Rees, Theodore D., to R-Byte, Inc. Tape engagement mechanism for magnetic cassette tape. 5,025,333, Cl 360-85.000.
- Fejerdy, Istvan; Farkas, Otto ; and Havasi, Gabor, to TAURUS Gumiipari Vallalat. Air-spring, in particular for the use under extreme conditions. 5,024,424, Cl. 267-64.270.
- Feldman, Martin: *See—*
  - Chen, Chin-Chen; Feldman, Martin; and Waggener, Herbert A., 5,025,165, Cl. 250-491.100.
- Feldman, Steven: *See—*
  - Dola, Frank P.; Feldman, Steven; Lauterbach, John H.; and Mengelson, William G., 5,024,614, Cl. 439-114.000.
- Feldmuehle Aktiengesellschaft: *See—*
  - Friederich, Kilian; and Rogowski, Dirk, 5,024,977, Cl 501-91.000.
- Feldschuh, Jonathan A.: *See—*
  - Feldschuh, Joseph; and Feldschuh, Jonathan A., 5,024,231, Cl 128-654.000.
- Feldschuh, Joseph; and Feldschuh, Jonathan A., to Daxor Corporation. Automated multi-point blood volume analyzer. 5,024,231, Cl. 128-654.000.
- Felo-Werkzeugfabrik: *See—*
  - Holland-Letz, Horst; and Bubel, Rainer, 5,024,126, Cl. 81-489.000.

- Felton, George F.: *See—*
  - Landers, Perry E.; and Felton, George F., 5,024,697, Cl. 106-14.130.
- Fendley, James R., to Zenith Electronics Corporation. Adjustable-height shadow mask support for a flat tension mask color cathode ray tube. 5,025,191, Cl. 313-407.000.
- Fengelly, Raymond S., to Grumman Aerospace Corporation. Method for manufacturing a high-performance package for monolithic microwave integrated circuits. 5,023,993, Cl. 29-843.000.
- Fennell, Robert D.: *See—*
  - DeLuca, Michael J.; Snowden, Gregory O.; and Fennell, Robert D., 5,025,252, Cl. 340-825.440.
- Fenwick, Lawrence M. Magnetic key chain. 5,024,078, Cl. 70-456.00R.
- Ferguson, Vivian, to Automated Machinery Systems, Inc. Airbag stitching device. 5,024,174, Cl. 112-121.240.
- Fernando, John S.: *See—*
  - Mathur, Sanjay S.; and Fernando, John S., 5,025,365, Cl. 364-200.000.
- Ferrand, Robert, to American Life Support Technology. Patient support system. 5,023,967, Cl. 5-62.000.
- Ferrari, Harry M.: *See—*
  - Snyder, Thomas S.; Jackovitz, John F.; and Ferrari, Harry M., 5,024,749, Cl. 204-299.00R.
- Ferrigno, Michael R. Adjustable belt-attached fishing rod holder. 5,024,018, Cl. 43-21.200.
- Ferro Corporation: *See—*
  - Sato, Yoshinori; and Akamine, Hiroshi, 5,025,051, Cl. 524-99.000.
- Fiat Ferroviaria S.p.A.: *See—*
  - Panagin, Romano, 5,024,165, Cl. 105-168.000.
- Fikentscher, Rolf: *See—*
  - Oftring, Alfred; Birnbach, Stefan; Fikentscher, Rolf; Baur, Richard; Kud, Alexander; Goeckel, Ulrich; and Perner, Johannes, 5,025,103, Cl. 560-170.000.
- Filby, Evan E.; and Rankin, Richard A., to United States of America, Energy. Expert overseer for mass spectrometer system. 5,025,391, Cl. 364-513.000.
- Filliatre, Claude: *See—*
  - Debaig-Valade, Caroline; Filliatre, Claude; and Servens, Christian, 5,024,979, Cl. 501-95.000.
- Finn, Everett N.: *See—*
  - Lowe, Byron L.; Lewis, Robert T.; Milliner, Kenneth M.; and Finn, Everett N., 5,024,351, Cl. 221-277.000.
- Finn, Leslie E.; Swatling, Donald K.; and Mankin, Erle D., to Clorox Company, The. Zeolite agglomeration process and product. 5,024,782, Cl. 252-174.130.
- Fischer, Ernst: *See—*
  - Dreier, Friedrich; and Fischer, Ernst, 5,024,540, Cl. 384-203.000.
- Fischer, Gerhard: *See—*
  - Klock, Jurgen; Fischer, Gerhard; and Grubisic, Vatroslav, 5,024,102, Cl. 73-798.000.
- Fischer, Kathy J.: *See—*
  - Thurman, Laurance R.; Dowd, Joseph P.; and Fischer, Kathy J., 5,024,772, Cl. 252-1.000.
- Fischer, Kurt; and Louys, Georges, to Georg Fischer AG. Molding apparatus. 5,024,161, Cl. 164-149.000.
- Fischer, Roland: *See—*
  - Meyer, Urs; Gartenmann, Niklaus; and Fischer, Roland, 5,023,976, Cl. 19-0.250.
- Fischer, Ulrich C.: *See—*
  - Durig, Urs T.; Fischer, Ulrich C.; and Pohl, Wolfgang D., 5,025,147, Cl. 250-216.000.
- Fishler, Mark K.; Koten, Jean-Marie; and Dubois, Pascal, to Vesuvius Crucible Company. One-piece stopper rod. 5,024,422, Cl. 266-272.000.
- Fitzgerald, Lawrence T.: *See—*
  - Bova, Frank J.; Fitzgerald, Lawrence T.; and Mauderli, Walter, 5,025,376, Cl. 364-413.260.
- Flaim, Tony D.: *See—*
  - Moss, Mary G.; Brewer, Terry; Cuzmar, Ruth M.; Hawley, Dan W.; and Flaim, Tony D., 5,024,922, Cl. 430-330.000.
- Flakee Mills, Inc.: *See—*
  - Bailey, Richard G., 5,024,145, Cl. 99-451.000.
- Flanagan, John R.: *See—*
  - Casper, Daniel F.; Flanagan, John R.; Gregg, Thomas A.; Huang, Catherine C.; and Kalos, Matthew J., 5,025,458, Cl. 375-114.000.
- Flanigan, David A.: *See—*
  - Canterberry, J. B.; and Flanigan, David A., 5,024,160, Cl. 102-323.000.
- Flasck, Richard A., to RAF Electronics Corp. Reflective image plane module. 5,024,524, Cl. 353-31.000.
- Flaugher, Jill L.: *See—*
  - Altman, Leonard F.; Flaugher, Jill L.; Suppelsa, Anthony B.; and Mullen, William B., III, 5,024,372, Cl. 228-248.000.
- Flautt, Martin C.: *See—*
  - Pollet, Jean C.; Williams, Gary L.; Armstrong, Gordon P.; and Flautt, Martin C., 5,024,890, Cl. 428-372.000.
- Fleet, George W. J., to Monsanto Company. Method of preparing bicyclic tetrahydroxylated pyrrolizidines. 5,025,098, Cl. 548-453.000.
- Flores, James F.: *See—*
  - Dominguez, Danilo A.; and Flores, James F., 5,024,567, Cl. 410-100.000.
- Flowers, Joyce D. Supply caddy. 5,024,361, Cl. 224-223.000.
- Floyd, Robert A.: *See—*
  - Carney, John M.; and Floyd, Robert A., 5,025,032, Cl. 514-400.000.
- Fluent, Stewart L.; Hart, Colin; McCree, Charles D.; and Lotsch, Charles F., to CertainTeed Corporation. Panel packaging system. 5,024,045, Cl. 53-443.000.
- FME Corporation: *See—*
  - Haines, John G.; Rosenbaum, Nolan G.; Pion, Albert L.; Lecarpentier, Marc; Henriot, Christophe; and Abumehdi, Cyrus, 5,025,383, Cl. 364-464.030.
- Focke & Co., GmbH: *See—*
  - Focke, Heinz, 5,024,376, Cl. 229-160.100.
- Focke, Heinz, to Focke & Co., GmbH. Web of material consisting of (pack) blanks connected to one another. 5,024,376, Cl. 229-160.100.
- Fontana, Luca P.; and Buckley, Paul W., to General Electric Company. Preparation of polyestercarbonate from aliphatic dicarboxylic acid. 5,025,081, Cl. 528-176.000.
- Fontes, Michael: *See—*
  - Gould, Nathaniel; Fontes, Michael; and Thessin, Tyler R., 5,025,476, Cl. 382-2.000.
- Ford, Douglas L.; Anderson, Eric W.; and Kopp, Clinton V., to Memtec Limited. Concentration of solids in a suspension. 5,024,762, Cl. 210-321.690.
- Ford Motor Company: *See—*
  - Colvin, Alex D.; Graham, Daniel J.; and Cassatta, Joseph C., 5,025,220, Cl. 324-449.000.
  - Cook, Robert H., 5,024,301, Cl. 188-284.000.
- Ford New Holland, Inc.: *See—*
  - Glass, Emmett F.; Schoeneberger, Ernest A.; and Makofka, Stanley J., 5,024,051, Cl. 56-297.000.
- Forestier, Serge: *See—*
  - Canivenc, Edith; Forestier, Serge; Gay, Michel; Lang, Gerard; and Richard, Herve, 5,025,053, Cl. 524-265.000.
- Fortmann, Robert C.; Pinnow, Curtis C.; Kuschewski, Gustav; and Joseph, William A., Jr., to Carter-Hoffman Corporation. Microprocessor controlled food treatment cabinet with flash steamer and compensating humidity control routines. 5,025,132, Cl. 219-401.000.
- Fosler, Carl R.: *See—*
  - Keyser, George T., Jr.; Fosler, Carl R.; and Johnson, Jeffrey D., 5,025,373, Cl. 364-408.000.
- Foucher, Gerard, to GEC Alsthom SA. Devices for reducing deflection and stress in turbine diaphragms. 5,024,581, Cl. 415-191.000.
- Fox, Charles: *See—*
  - Gershon, Sol; Fox, Charles; and Garfinkle, Norton, 5,024,855, Cl. 424-52.000.
- Fox, Flo, to Weiss, Peter. Elongated article of apparel. 5,023,956, Cl. 2-338.000.
- Francis, Charles E., to Gassett, John D., a part interest. Strengthening door jamb. 5,024,475, Cl. 292-340.000.
- Frane, Terrie L., to Motorola, Inc. Power saving arrangement for a clocked digital circuit. 5,025,387, Cl. 364-493.000.
- Frank, Ed, to Boeing Company, The. Automated cutting and kitting system of composite material and method. 5,024,862, Cl. 427-264.000.
- Franka, John G.: *See—*
  - DePinto, Gary A.; Steinberg, Joe; Franka, John G.; and Cherniawski, Michael R., 5,024,972, Cl. 437-233.000.
- Franzen, Peter: *See—*
  - Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nåbo, Olle, 5,024,648, Cl. 494-56.000.
- Fraunhofer-Gesellschaft: *See—*
  - Klock, Jurgen; Fischer, Gerhard; and Grubisic, Vatroslav, 5,024,102, Cl. 73-798.000.
- Frawley, Thomas E., Jr., to Appleton Specialty Products, Inc. Flow meter for liquid doctored through Fourdrinier fabric at wet end of Fourdrinier paper machine. 5,024,084, Cl. 73-215.000.
- Free, Paul D.; Doszpoly, B.; Villanyi, Tibor J.; and Olson, David A., to Cummins Engine Company, Inc. Viscosity responsive pressure regulator and timing control tappet system incorporating the same. 5,024,200, Cl. 123-501.000.
- Freeman, Andrew B.; and Hein, H. A. Tillmann. Epidural catheter apparatus and associated method. 5,024,655, Cl. 604-53.000.
- Freeport McMoRan Resource Partners: *See—*
  - Sutton, Allen R.; and Balser, Richard L., 5,024,689, Cl. 71-29.000.
- Freitag, Dieter: *See—*
  - Tacke, Peter; Grigo, Ulrich; Nouvertne, Werner; Freitag, Dieter; Idel, Karsten-Josef; and Westeppe, Uwe, 5,025,065, Cl. 524-611.000.
- Freitas, Oscar W., to National Semiconductor Corporation. ECL clamped cutoff driver circuit. 5,025,179, Cl. 307-455.000.
- Fremont Industries, Inc.: *See—*
  - Busch, Bruce D.; and Nicholls, Jeffrey R., 5,024,783, Cl. 252-180.000.
- French, Jay L.; Himes, John L., Jr.; Weber, Ronald M.; and Wise, James H., to AMP Incorporated. Low profile spring contact with protective guard means. 5,024,610, Cl. 439-857.000.
- Freund, Isaac; and Rosenbluh, Michael, to Bar Ilan University. Alignment apparatus employing a laser light scatterer. 5,024,528, Cl. 356-356.000.
- Frey, Wunibald: *See—*
  - Doege, Mathias; and Frey, Wunibald, 5,025,136, Cl. 219-508.000.
- Friebe, Walter-Gunar: *See—*
  - Reinholz, Erhard; Friebe, Walter-Gunar; Kampe, Wolfgang; Mertin, Jurgen; and Wilhelms, Otto-Henning, 5,025,028, Cl. 514-381.000.
- Friederich, Kilian; and Rogowski, Dirk, to Feldmuehle Aktiengesellschaft. Combination of two sliding or sealing elements and a method for producing the same. 5,024,977, Cl. 501-91.000.

VOL 1127
ISS 3
JE 18
1991
UMI

Friedrich, Steven G.; and Davis, Kent A., to W. R. Grace & Co.-Conn. Process for producing an easily opened package. 5,024,044, Cl. 53-433.000.
Friske, Mark S.: *See—*
Allaire, Roger A.; Friske, Mark S.; Hagg, Sandra L.; and Janas, Victor F., 5,024,978, Cl. 501-95.000.
Fritsch, Josef: *See—*
Urban, Rudolf; Fritsch, Josef; and Schoen, Klaus-Peter, 5,024,041, Cl. 53-449.000.
Froes, Francis H.; and Eylon, Daniel, to United States of America, Air Force. Method to produce superplastically formed titanium alloy components. 5,024,369, Cl. 228-157.000.
Fromageries Bel: *See—*
Litzler, Jean, 5,024,331, Cl. 206-551.000.
Froyd, Stanley G. Multiple axis motion control system. 5,025,385, Cl. 364-474.110.
Fuchs, Elmar B.: *See—*
Nigg, Ernst; and Fuchs, Elmar B., 5,024,162, Cl. 104-178.000.
Fucik, Borivoj; Petranek, Milan; and Smital, Frantisek, to Elitex Koncern Textiln. Needle picker releasing device. 5,024,068, Cl. 66-53.000.
Fuji Electric Co., Ltd.: *See—*
Miura, Masao; Uchida, Naoshi; Takahashi, Tatsunori; Asakawa, Kouji; and Nozawa, Eiji, 5,025,236, Cl. 335-46.000.
Seki, Yasukazu, 5,025,293, Cl. 357-23.400.
Fuji Film Co., Ltd.: *See—*
Katsuaki, Muraishi, 5,025,157, Cl. 250-327.200.
Fuji Jukogyo Kabshiki Kaisha. *See—*
Nakamura, Akihisa, 5,024,197, Cl. 123-339 000.
Fuji Jukogyo Kabushiki Kaisha: *See—*
Abe, Kunihiro, 5,024,199, Cl. 123-489 000.
Abe, Kunihiro, 5,025,259, Cl. 341-118.000.
Fuji Photo Film Co., Ltd.: *See—*
Deguchi, Naoyasu, 5,024,925, Cl. 430-379.000.
Endo, Yasushi; Kato, Mikihiko; Kawamata, Toshio; and Masaki, Kouichi, 5,024,885, Cl. 428-329.000.
Mutoh, Hideki; Oda, Kazuya; and Kawajiri, Kazuhiro, 5,025,319, Cl. 358-213.290.
Nakamura, Hiroaki; and Takagi, Atsushi, 5,025,282, Cl. 355-38.000.
Naruse, Hideaki; Takahashi, Osamu; Ohki, Nobutaka; and Ono, Michio, 5,024,924, Cl. 430-376.000.
Ohgoda, Makoto, 5,025,156, Cl. 250-327.200.
Suzuki, Yoshiaki; and Hayashi, Gouichi, 5,024,923, Cl. 430-372.000.
Watanabe, Hideomi; and Okita, Tsutomu, 5,024,892, Cl. 428-423.100.
Fuji Xerox Co., Ltd.: *See—*
Akasaki, Yutaka, Aonuma, Hidekazu; Nukada, Katsumi; Tokita, Akihiko; Suto, Hidemi; Sato, Katsuhiro; and Tanaka, Hiroyuki, 5,024,911, Cl. 430-58.000.
Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; and Okada, Shoji, to Aisin Seiki Kabushiki Kaisha. Actuator and control system for cleaning of mirror-like objects. 5,025,187, Cl. 310-323.000.
Fujii, Hiroyuki: *See—*
Suganuma, Katsuaki; Fujii, Hiroyuki; Minakuchi, Hiroyoshi; Kada, Katsuhiko; Osafune, Haruo; and Kanamaru, Kuniaki, 5,024,902, Cl. 428-633.000.
Fujii, Katsuyoshi: *See—*
Nakanishi, Masahiro; Mori, Daisuke; Fujii, Katsuyoshi; Hatanaka, Masahiko; and Shinada, Hiroko, 5,024,133, Cl. 84-615.000.
Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kirahara, Masaki, to Nissan Chemical Industries Ltd. Pyrazolopyridine type mevalonolactones useful as pharmaceuticals. 5,024,999, Cl. 514-63.000.
Fujikura Ltd.: *See—*
Oohashi, Keiji; Araki, Shinji; Suzuki, Hideo; and Shimomichi, Tsuyoshi, 5,024,688, Cl. 65-3.120.
Suda, Hirohisa; Sasaki, Katsumi; and Osato, Yasukuni, 5,024,363, Cl. 225-96.005.
Taya, Hiroyuki; Yoshinuma, Mikio; Yamada, Takeshi; Nishide, Kenji; Suzuki, Fumio; Fujimoto, Hirohisa; and Yamauchi, Ryozo, 5,024,501, Cl. 350-96.150.
Fujimoto, Hirohisa: *See—*
Taya, Hiroyuki; Yoshinuma, Mikio; Yamada, Takeshi; Nishide, Kenji; Suzuki, Fumio; Fujimoto, Hirohisa; and Yamauchi, Ryozo, 5,024,501, Cl. 350-96.150.
Fujimoto, Seiji: *See—*
Saito, Yasuo; Fujimoto, Seiji; Nobuta, Yasuo; and Yamazaki, Masahiko, 5,025,462, Cl. 378-19.000.
Fujimura, Shuzo, to Fujitsu Limited. Microwave plasma processing apparatus. 5,024,748, Cl. 204-298.380.
Fujino, Toshihiro: *See—*
Ohashi, Yasusuke; Fujino, Toshihiro; Taki, Yasuhito; and Nishijima, Tamotsu, 5,024,815, Cl. 420-487.000.
Fujisawa Pharmaceutical Co., Ltd.: *See—*
Osamu, Nakaguchi, 5,025,026, Cl. 514-356.000.
Fujita, Nagahisa, to Mazda Motor Corporation. Slippage preventing apparatus for a vehicle. 5,024,285, Cl. 180-197.000.
Fujita, Yoshikuni; and Matsuo, Haruyuki, to Mitsubishi Denki Kabushiki Kaisha. Ignition distributor of internal combustion engine. 5,024,185, Cl. 123-146.50A.
Fujitsu Limited: *See—*
Ema, Taiji, 5,025,294, Cl. 357-23.600.
Fujimura, Shuzo, 5,024,748, Cl. 204-298.380.
Goto, Gensuke, 5,025,409, Cl. 364-786.000.
Kiriseko, Tadashi; Tani, Hiromichi; Soma, Noriko; Shigemi, Nobuhisa; and Toyoda, Takayuki, 5,024,570, Cl. 414-222.000.
Masuyama, Masaru; Takemae, Yoshihiro; Endoh, Tetsuhiko; Komyoji, Hirosuke; Tanaka, Ryuji; and Itakura, Katsuhiko, 5,025,415, Cl. 365-52.000.
Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Karuhiko; and Nagai, Takeshi, 5,024,264, Cl. 165-1.000.
Nishimiya, Takeshi, 5,025,330, Cl. 360-78.040.
Takeno, Minoru, 5,025,176, Cl. 307-351.000.
Fujitsu Vlsi Limited: *See—*
Masuyama, Masaru; Takemae, Yoshihiro; Endoh, Tetsuhiko; Komyoji, Hirosuke; Tanaka, Ryuji; and Itakura, Katsuhiko, 5,025,415, Cl. 365-52.000.
Fujiwara, Masatoshi, to Mitsubishi Denki Kabushiki Kaisha. Method for producing a λ/4 shift type diffraction grating. 5,024,726, Cl. 156-653.000.
Fukami, Toshiyuki: *See—*
Yoshida, Takeshi; Nakatani, Kaname; Fukami, Toshiyuki; and Tanaka, Nariaki, 5,024,913, Cl. 430-67.000.
Fukazawa, Toshio: *See—*
Nagata, Yuji; and Fukazawa, Toshio, 5,025,342, Cl. 360-126.000.
Fukuda, Mitsuhiro: *See—*
Yabuta, Motoshi; Nakao, Yasushi; Sugiura, Shinji; Fukuda, Mitsuhiro; and Miyamoto, Yuzo, 5,025,060, Cl. 524-533.000.
Fukuda, Toshikazu: *See—*
Tomisawa, Yutaka; Fukuda, Toshikazu; and Inoue, Kazuhiko, 5,025,305, Cl. 357-72.000.
Fukui, Tetsu; Yoshii, Takashi; Takemura, Toshihiko; and Hattori, Akio, to Kubota, Ltd. Propelling drive control apparatus for working vehicle. 5,024,306, Cl. 192-3.570.
Fukumoto, Masayuki: *See—*
Abe, Tsutomu; and Fukumoto, Masayuki, 5,024,946, Cl. 435-240.270.
Fullerton, Craig L.; and Seely, Warren L., to Motorola, Inc. Center tapped FET. 5,025,296, Cl 357-23.800.
Fuma, Hiroshi: *See—*
Shoji, Hisashi; Tamura, Akihiko; Itaya, Masahiko; Fuma, Hiroshi, and Soma, Shinobu, 5,024,181, Cl. 118-658.000.
Funabashi, Motohisa. *See—*
Inoue, Haruki; Funabashi, Motohisa; Yahiro, Masakazu; and Tanaka, Fumiki, 5,025,499, Cl. 364-165.000.
Funabashi, Tadashi; and Kenmotsu, Isami, to Pioneer Electronic Corporation. Dual side disc player having a pickup reversing mechanism. 5,025,440, Cl. 369-199.000.
Funamoto, Masaya: *See—*
Yoshimoto, Satoshi, and Funamoto, Masaya, 5,024,545, Cl 400-696.000.
Funato, Ryo; Takahiro, Syuji; Yoshida, Keiji; Kubo, Shinji; and Inagaki, Motoshi, to Mitsubishi Rayon Company Limited Resin for toner particle. 5,024,914, Cl. 430-109.000.
Funke, Hermann: *See—*
Dinter, Peter; Funke, Hermann; and Matschke, Klaus, 5,024,819, Cl. 422-186.060.
Furay, David M.: *See—*
Morehouse, James H., Furay, David M.; Blagaila, John; Dion, F. Eugene; Shelstad, Scott A.; and Woods, Jimmy L., 5,025,336, Cl. 360-97.020.
Furlough, Thomas D., to Long Manufacturing N.C., Inc. Reversible moldboard plow. 5,024,281, Cl. 172-219.000.
Furukawa Electric Co., Ltd., The: *See—*
Senoo, Atsuyoshi, 5,025,058, Cl. 524-436.000.
Furukawa, Masataka: *See—*
Morita, Tsuyoshi; Shimazu, Kyotaro; and Furukawa, Masataka, 5,024,728, Cl. 159-27.400.
Furuya, Masato: *See—*
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Tai, Hiromichi, 5,025,209, Cl. 324-96.000.
Fuschetto, Anthony N., to United States of America, Air Force. Electromagnetic actuator driver apparatus with pivot axis. 5,025,183, Cl. 310-20.000.
Futatasuka, Rensei; Koshiba, Yutaka; Chiba, Shunich; Orikasa, Toyoaki; Noguchi, Seiji; and Idoshita, Takuya, to Mitsubishi Shindoh Co., Ltd. Copper alloy having excellent hot rollability and excellent adhesion strength of plated surface thereof when heated. 5,024,814, Cl. 420-473.000.
G.D. Societa Per Azioni: *See—*
Draghetti, Fiorenzo; and Gamberini, Antonio, 5,024,043, Cl. 53-234.000.
Spatafora, Mario; and Gamberini, Antonio, 5,024,046, Cl. 53-466.000.
Gaba, Rodolfo: *See—*
Sandel, Dan, Horan, Robert T.; Gaba, Rodolfo; and Ramirez, Bruno J., 5,024,326, Cl. 206-366.000.
GAF Chemicals Corporation: *See—*
Helioff, Michael W.; Tazi, Mohammed; Kwak, Yoon T.; and Login, Robert B., 5,024,779, Cl. 252-162.000.
Gage, Douglas M., to Deere & Company. Hydraulic control mechanism for a hydraulic actuator. 5,024,140, Cl. 91-28.000.
Gailey, J. Lynn, to Alcan Aluminum Corporation. Non-directional suspended ceiling panels. 5,024,034, Cl. 52-484.000.
Gallup, Darrell L., to Union Oil Company of California. Method of treating an arsenic-containing solution. 5,024,769, Cl. 210-721.000.
Gamberini, Antonio: *See—*
Draghetti, Fiorenzo; and Gamberini, Antonio, 5,024,043, Cl. 53-234.000.

Spatafora, Mario; and Gamberini, Antonio, 5,024,046, Cl. 53-466.000.
Gambini, Tiziana: *See—*
Prelini, Cesare; Trovati, Aldo; Gambini, Tiziana; and Stefanoli, Vittorio, 5,024,674, Cl. 8-554.000.
Gambro AB: *See—*
Sternby, Jan P., 5,024,756, Cl. 210-93.000.
Ganser, Hans G.; Schafer, Ralf; and Stormberg, Hans P., to U.S. Philips Corporation. Circuit arrangement for A.C. operation of high-pressure gas discharge lamps. 5,025,197, Cl. 315-172.000.
Ganster, Otto: *See—*
Neuhaus, Alfred; Ganster, Otto; and Kopp, Richard, 5,025,039, Cl 521-51.000.
Garcia, Felix: *See—*
Williams, Rodney D.; and Garcia, Felix, 5,024,494, Cl. 350-3.600.
Garcia, Gilbert; and Domnikov, Larissa, to Hughes Aircraft Company. Reacting novolac and bisphenol F epoxy resins with carboxy-terminated butadiene-acrylonitrile. 5,025,068, Cl. 525-119.000.
Gardner, Juilian W.: *See—*
Brink, Andre; Cahill, Michael J ; Dawson, John; Gardner, Juilian W.; and Thierry, Alan A., 5,024,333, Cl. 209-535.000.
Garfinkle, Norton: *See—*
Gershon, Sol; Fox, Charles; and Garfinkle, Norton, 5,024,855, Cl. 424-52.000.
Garg, Diwakar; Dyer, Paul N.; Schaffer, Leslie E.; Wrecsics, Ernest L.; Dimos, Duane; and Mueller, Carl F., to Air Products and Chemicals, Inc. Method for depositing highly erosive and abrasive wear resistant composite coating system on a substrate. 5,024,901, Cl. 428-627.000.
Garlock Inc.: *See—*
Borowski, Richard, 5,024,451, Cl. 277-53.000.
Gartenmann, Niklaus: *See—*
Meyer, Urs; Gartenmann, Niklaus; and Fischer, Roland, 5,023,976, Cl. 19-0.250.
Garthaffner, Martin T.; Keen, Billy J., Jr.; Gillespie, Andrew J.; Wheless, Jack C.; and Dingus, George W., to Philip Morris Incorporated. Methods and apparatus for making multiple component smoking articles. 5,024,242, Cl. 131-94.000.
Gartner, Charles D.: *See—*
Relenyi, Attila G.; and Gartner, Charles D., 5,025,038, Cl. 514-665.000.
Gasaway, Jack S.; Parsons, J. Stuart; and Harshman, Robert L., to Injet Medical Products, Inc. Gas-pressure-regulated needleless injection system. 5,024,656, Cl. 604-70.000.
Gaspard, Jean R., to Pechiney Recherche. Apparatus and method continuous measurement of the electrical conductivity of liquid media in a dynamic cell. 5,025,219, Cl. 324-447.000.
Gasser, Oswald; Guggenberger, Rainer; and Burger, Bernd, to Thera. Method for preparing a substrate surface for bonding with a synthetic resin by applying a layer by sand blasting. 5,024,711, Cl. 156-153.000.
Gassett, John D.: *See—*
Francis, Charles E., 5,024,475, Cl. 292-340.000.
Gast, Eduard; and Semmler, Peter, to Contec Chemieanlagen GmbH. Castable and/or pressable gas generating propellants. 5,024,708, Cl. 149-19.100.
Gates, Peter S.; and Jones, Graham P., to Schering Agrochemicals Ltd. Herbicides. 5,024,693, Cl. 71-92.000
Gatza, Ward K.; and Chasteen, Ronald E., to Injection Research Specialists, Inc. Method and apparatus for conserving battery power in a snowmobile electrical system. 5,024,205, Cl. 123-632.000.
Gaudiana, Russell A.: *See—*
Chiang, Yunn H.; and Gaudiana, Russell A., 5,024,989, Cl. 503-227.000.
Gauhl, Helmgard: *See—*
Mayr, Ulrich; Gauhl, Helmgard; and Seidel, Hans, 5,024,945, Cl. 435-191.000.
Gauthier, Dominique, to Thomson-LGT Laboratoire General des Telecommunications. Method for the measurement of a steady level in a noise-infested signal and automatic measuring device for the application of this method. 5,025,207, Cl. 324-77.00A.
Gawad, Mahmoud A., to GET Sylvania Canada Ltd. Small profile high wattage horitcultural luminaire. 5,025,356, Cl. 362-221.000.
Gawin, Irena; and Swetlin, Brian J., to Hercules Incorporated. Damage tolerant composites containing infusible particles. 5,025,045, Cl. 523-440.000.
Gay, Michel: *See—*
Canivenc, Edith; Forestier, Serge; Gay, Michel; Lang, Gerard; and Richard, Herve, 5,025,053, Cl. 524-265.000.
Gear Fit Golf, Inc.: *See—*
Anderson, Donald A., 5,024,437, Cl. 273-78.000.
Gebrueder Buehler AG: *See—*
Gmur, Bruno; and Kuhnemund, Bernd, 5,024,352, Cl. 222-1.000.
GEC Alsthom SA: *See—*
Foucher, Gerard, 5,024,581, Cl. 415-191.000.
Geibel, Jon F.: *See—*
Bobsein, Rex L.; Stone, Mark L.; and Geibel, Jon F., 5,024,876, Cl. 428-272.000.
Geisen, Pierre; and Reillaudoux, Jean-Claude, to Soprema S.A. Sealing sheets for roofs. 5,024,886, Cl. 428-332.000.
Gels, Robert G.: *See—*
Tajima, Yusuke; and Gels, Robert G., 5,025,225, Cl. 330-124.00D.
Genda, Kohei; and Murai, Kazuaki, to Casio Computer Co., Ltd. Data processing apparatus including a delete function. 5,025,413, Cl. 364-900.000.
Genentech, Inc.: *See—*
Gorman, Cornelia M., 5,024,939, Cl. 435-69.100.
General Dynamics Corp., Pomona Div.: *See—*
Nunally, Patrick O., 5,025,178, Cl. 307-442.000.
General Electric Company: *See—*
Csongor, Rezso J.; and Tangradi, Leroy J., 5,025,485, Cl. 455-12.000.
Cusano, Dominic A.; and Yeager, Gary W., 5,024,791, Cl. 264-21.000.
Davis, Gary C.; McGrath, Barbara E.; and Snow, Kevin M., 5,025,074, Cl. 528-15.000.
Derudder, James L.; and Wang, I-Chung W., 5,025,066, Cl. 525-66.000.
Fontana, Luca P.; and Buckley, Paul W., 5,025,081, Cl. 528-176.000.
Germer, Warren R.; Coryea, Peter F.; Keturakis, Andrius A., Masury, David H.; and Stevens, Thomas H., 5,025,206, Cl. 324-74.000.
Goodzeit, Neil E.; and Linder, David M., 5,025,381, Cl 364-434.000.
Hamersma, Wilhelmus J. L. A.; Kempers, Torben P.; and Roovers, Wilhemus M. M., 5,025,055, Cl. 524-269.000.
Hartley, Richard I.; Corbett, Peter F.; Yassa, Fathy F.; and Noujaim, Sharbel E., 5,025,257, Cl. 341-101.000.
Lewis, Larry N.; and Sumpter, Chris A., 5,025,073, Cl. 528-15.000.
Millard, Michael L.; Harrison, Michael G.; and Szweda, Andrew, 5,024,859, Cl. 427-226.000.
Taylor, Dale F., 5,024,809, Cl. 376-417.000.
General Kinematics Corporation: *See—*
Musschoot, Albert, 5,024,320, Cl. 198-756.000.
General Mills, Inc.: *See—*
Ringe, Mitchell L., 5,024,996, Cl. 514-54.000.
General Motors Corporation. *See—*
Hanson, Reed D.; and Radcliffe, Scott T., 5,024,460, Cl 280-707.000.
Miller, Jon E.; and Schenk, Donald E., 5,024,300, Cl. 188-264.0CC.
Santanam, Chandran B.; Thomas, William H.; and DeJulio, Emil R., 5,024,170, Cl. 110-264.000.
Schenk, Donald E.; DeHoff, Edward J.; and Shaw, Schuyler S., 5,024,298, Cl. 188-72.200.
Schmidt, Michael R., 5,024,633, Cl. 475-72.000.
Shaw, Schuyler S.; Hallinan, Linda L.; Hammersmith, Robert J., Schenk, Donald E.; DeHoff, Edward J.; and Kade, Alexander, 5,024,299, Cl. 188-156.000.
Tibbetts, Gary G.; Gorkiewicz, Daniel W ; and Hammond, Dean C., Jr., 5,024,818, Cl. 422-158.000.
Vansadia, Ghanshyamsinh D., 5,024,578, Cl. 415-55.100.
General Signal Corporation: *See—*
Carr, Daniel J.; and Scally, Charles R., 5,025,265, Cl. 346-1.100.
Gentex Corporation: *See—*
Murphy, John A., II; and Westgate, Charles A., 5,023,955, Cl. 2-209.000.
Georg Fischer AG: *See—*
Fischer, Kurt; and Louys, Georges, 5,024,161, Cl. 164-149.000.
George, William A.: *See—*
Grossman, Mark W.; and George, William A., 5,024,738, Cl. 204-105.00R.
Gerard, Evelyne; Molle, Roger; and Debaisieux, Andre, to Compagnie d'Electronique et de Piezo-Electricite D.E.P.E. Ultrastable oscillator functioning at atmospheric pressure and under vacuum. 5,025,228, Cl. 331-69.000.
Gerling, Joseph F.; and Kaczmarczyk, Raymond A., Jr., to Du Pont de Nemours, E. I., and Company. Methods, systems, apparatus and rotor for applying granular material. 5,024,356, Cl. 222-312.000.
Germer, Warren R.; Coryea, Peter F.; Keturakis, Andrius A.; Masury, David H.; and Stevens, Thomas H., to General Electric Company. Test mode actuator and indicator for electronic energy meter 5,025,206, Cl. 324-74.000.
Gero, William; and Paskowski, Frank, to Beloit Corporation. Method of manufacturing a wave screen plate. 5,023,986, Cl. 29-163.600.
Gershon, Sol; Fox, Charles; and Garfinkle, Norton, to Cambridge Research Laboratories, Inc. Oral rinse and method for plaque removal. 5,024,855, Cl. 424-52.000.
Gesche, Roland; and Vey, Norbert, to Leybold Aktiengesellschaft. Circuit configuration for the recognition of a plasma. 5,025,135, Cl. 219-506.000.
GET Sylvania Canada Ltd: *See—*
Gawad, Mahmoud A., 5,025,356, Cl. 362-221.000.
Getman, Daniel P.; and DeCrescenzo, Gary A., to Monsanto Company. 1,2-dideoxy-2-fluoronojirimycin as glycosidase inhibitors. 5,025,021, Cl. 514-302.000.
Gewin, Robert E.: *See—*
Clayton, James L.; and Gewin, Robert E., 5,025,444, Cl. 371-34.000.
Gewirtz, Jonah: *See—*
Skolnik, Howard; and Gewirtz, Jonah, 5,024,597, Cl. 432-2.000.
GEZE Sport International GmbH: *See—*
Bogner, Martin, 5,024,457, Cl. 280-632.000.
Ghafoerkhan, Shafiq M.: *See—*
Riel, Leslie L., 5,024,373, Cl. 229-68.00R.
Ghoshal, Uttam S.: *See—*
Kroger, Harry; and Ghoshal, Uttam S., 5,024,993, Cl. 505-1.000.
Gibbon, Robert M., to JMK International, Inc. Engine gasket with oil impermeable surface. 5,024,863, Cl. 427-387.000.
Gilbreath, Bobbie L.: *See—*
Gilbreath, John R.; and Gilbreath, Bobbie L., 5,024,292, Cl 182-90.000.

VOL
1127
ISS
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Gilbreath, John R.; and Gilbreath, Bobbie L., to Bobbie Scope, Inc. Portable ladder assembly for truck trailers. 5,024,292, Cl. 182-90.000.

Gill, Manzur; and McElroy, David J., to Texas Instruments Incorporated. Cross-point contact-free floating-gate memory array with silicided buried bitlines. 5,025,494, Cl. 357-23.500.

Gillespie, Andrew J.: *See—*
Garthaffner, Martin T.; Keen, Billy J., Jr.; Gillespie, Andrew J.; Wheless, Jack C.; and Dingus, George W., 5,024,242, Cl. 131-94.000.

Gilliland, Malcolm T. Electronic welding station with AC and reversible polarity DC outputs. 5,025,127, Cl. 219-130.100.

Gilmozzi, Gunther: *See—*
Meinherz, Manfred; Veuhoff, Freidrich-Wilh; Gilmozzi, Gunther; and Kelch, Thomas, 5,025,118, Cl. 200-148.00R.

Ginsburgh, Irwin: *See—*
Zuchowski, Larry; Tichenor, Clyde I.; and Ginsburgh, Irwin, 5,024,521, Cl. 352-86.000.

Girard, David E., to Hay & Forage Industries. Quarter turn bale discharge apparatus. 5,024,152, Cl. 100-188.00R.

Girardin, Guy; Morin, Pierre; Nguyen, Duy; Nguyen, Duc; and Brunelle, Louise, to Les Enterprises Julien Inc. Refuse compactor. 5,024,151, Cl. 100-53.000.

Girvin, Richard J.: *See—*
Sohner, Harold K.; Hoyloak, Joel N.; Girvin, Richard J.; and Kumar, Surinder, 5,025,452, Cl. 375-1.000.

Gist-brocades: *See—*
Van Ee, Jan H., 5,024,943, Cl. 435-172.300.

Giuliani, Pierre; Le Page, Jean-Francois; Plumail, Jean-Claude; and Espaillac, Marcellin, to Institut Francais du Petrole. Catalytic composition comprising a metal sulfide suspended in a liquid containing asphaltenes and hydrovisbreaking process of a hydrocarbon charge. 5,024,751, Cl. 208-108.000.

Glasenapp, Rudi K. H.: *See—*
Pease, George E., Jr.; Romero, Ervin G.; and Glasenapp, Rudi K. H., 5,024,491, Cl. 303-93.000.

Glass, Emmett F.; Schoeneberger, Ernest A.; and Makofka, Stanley J., to Ford New Holland, Inc. Bolted double sickle cutterbar. 5,024,051, Cl. 56-297.000.

Glidden Company, The: *See—*
Craun, Gary P.; and Kunz, Barbara L., 5,025,063, Cl. 524-560.000.

Gloanec, Maurice; Jarry, Jacques; and Lailler, Jean L., to Thomson Hybrides et Microondes. Circuit for measuring the dynamic characteristics of a package for high-speed integrated circuits and a method for measuring said dynamic characteristics. 5,025,212, Cl. 324-158.00R.

Gmur, Bruno; and Kuhnemund, Bernd, to Gebrueder Buehler AG. Apparatus for the automatic determination of a continuous bulk material throughput by a continuous balance. 5,024,352, Cl. 222-1.000.

Goad, Conrad D.; and Taylor, Jeffrey L., to Precision Fabrics Group Inc.; and Standard Textile Co., Inc. Process for preparing a woven medical fabric. 5,024,851, Cl. 427-2.000.

Goavec, Jean-Jacques, to Goavec S.A. Installation for the making of food products, in particular expanded food products, such as ice cream. 5,024,066, Cl. 62-306.000.

Goavec S.A.: *See—*
Goavec, Jean-Jacques, 5,024,066, Cl. 62-306.000.

Godbersen, Byron L. Boat support roller assembly. 5,024,312, Cl. 193-37.000.

Godhwani, Nevand: *See—*
Murray, Roger W.; and Godhwani, Nevand, 5,024,962, Cl. 437-40.000.

Goeckel, Ulrich: *See—*
Oftring, Alfred; Birnbach, Stefan, Fikentscher, Rolf; Baur, Richard; Kud, Alexander; Goeckel, Ulrich; and Perner, Johannes, 5,025,103, Cl. 560-170.000.

Goerl, Udo: *See—*
Wolff, Siegfried; and Goerl, Udo, 5,025,047, Cl. 524-99.000.

Goesele, Ulrich M.; and Lehmann, Volker E. Method of producing a thin silicon on insulator layer by wafer bonding and chemical thinning. 5,024,723, Cl. 156-628.000.

Goglio, Luigi. Packaging bag, especially for cooked ham, provided with drain valve. 5,024,538, Cl. 383-103.000.

Gokcek, Cetin, to Messer Griesheim GmbH. Copper sulfate absorption mass to remove AsH_3, PH_3, B_2H_6, GeH_4 and SiH_4 5,024,823, Cl 423-210.000.

Goldstar Electron Co.: *See—*
Park, Yong; and Lee, Seo K., 5,024,963, Cl. 437-41.000.

Goldstone, Andrew C.; and Schettino, Raymond L. Electrode endotracheal tube. 5,024,228, Cl. 128-642.000.

Gono, Yoshitaka: *See—*
Yamazaki, Syoji; Oda, Toshikazu; Iwanaga, Kenji; and Gono, Yoshitaka, 5,025,237, Cl. 335-83.000.

Gonzales, Ralph: *See—*
Aitken, W. Sidney; and Gonzales, Ralph, 5,024,469, Cl. 285-302.000.

Gonzalez, Jose M., Jr.: *See—*
Donovan, William P.; Gonzalez, Jose M., Jr.; Levinson, Barry L.; and Macaluso, Anthony, 5,024,837, Cl. 424-93.000.

Goode, David P., to SKI Accessories, Inc. Composite ski pole and method of making same. 5,024,866, Cl. 428-36.400.

Goodzeit, Neil E.; and Linder, David M., to General Electric Company. Attitude control compensator for flexible spacecraft. 5,025,381, Cl. 364-434.000.

Gorin, Michael: *See—*
Nesburn, Anthony B.; Gorin, Michael; Martinez, Marvin; Kenney, M. Cristina; and Maguen, Ezra, 5,024,742, Cl. 204-157.680.

Gorkiewicz, Daniel W.: *See—*
Tibbetts, Gary G.; Gorkiewicz, Daniel W.; and Hammond, Dean C., Jr., 5,024,818, Cl. 422-158.000.

Gorler, Klaus; Krumbiegel, Gunter; Hanack, Michael; and Subramanian, Lakshmina R., to Madaus GmbH & Co. Methylendioxyphenathrene and stilben derivatives, process for the preparation thereof, pharmaceutical compositions using these, and therapeutic applications. 5,024,743, Cl. 204-157.690.

Gorman, Cornelia M., to Genentech, Inc. Transient expression system for producing recombinant protein. 5,024,939, Cl. 435-69.100.

Gorun, Sergiu M.; and Stibrany, Robert T., to Exxon Research & Engineering Company. Novel tetranuclear manganese complexes. 5,025,101, Cl. 556-50.000.

Goto, Gensuke, to Fujitsu Limited. Carry propagation circuit of parallel-type full adder. 5,025,409, Cl. 364-786.000.

Goto, Giichi; and Nagaoka, Akinobu, to Takeda Chemical Industries, Ltd. Alkylene diamines. 5,025,033, Cl. 514-417.000.

Goto, Tomoko: *See—*
Hanada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, 5,024,893, Cl. 428-423.100.

Gottlebe, Jurgen: *See—*
Hank Dietrich; and Gottlebe, Jurgen, 5,024,156, Cl. 101-216.000.

Gottlieb, Mark: *See—*
Long, Robert; and Gottlieb, Mark, 5,024,186, Cl. 123-179.00B.

Gould, Nathaniel; Fontes, Michael; and Thessin, Tyler R., to Nathaniel Gould Diagnostics, Inc. Redotopography apparatus and method using moire fringe analysis to measure foot shapes. 5,025,476, Cl. 382-2.000.

Gow, Thomas W. Emergency lighting fixture. 5,025,349, Cl. 362-20.000.

Graeger, Volker; and Kobs, Rolf U. D., to U.S. Philips Corporation. Pressure sensor comprising a silicon body. 5,024,097, Cl. 73-727.000.

Graham, Daniel J.: *See—*
Colvin, Alex D.; Graham, Daniel J.; and Cassatta, Joseph C., 5,025,220, Cl. 324-449 000.

Graham, Mark D.: *See—*
Farrar, John M.; and Graham, Mark D., 5,024,786, Cl. 252-543.000.

Grald, Eric W.: *See—*
Buchholz, Robert L.; Grald, Eric W.; Nelson, Lorne W.; and Shah, Dipak J., 5,024,265, Cl. 165-22.000.

Grayson, Bille S.: *See—*
Sughrue, Edward L., II; Tooley, Patricia A.; Bertus, Brent J.; and Grayson, Bille S., 5,024,750, Cl. 208-57.000.

Graze, Russell R., Jr., to Caterpillar Inc. Fuel combustion system, method, and nozzle member therefor. 5,024,193, Cl. 123-259.000.

Great Western Foam Products Corporation: *See—*
Bontrager, Rick L., 5,024,328, Cl. 206-453.000.

Grecksch, Hans; and Engelhardt, Dietmar, to W. Schlafhorst & Co. Conveying apparatus for a textile winding machine. 5,024,389, Cl. 242-35.50A.

Grecsek, John J., to Colgate-Palmolive Company. Spray dried base beads for detergent compositions containing zeolite, bentonite and polyphosphate. 5,024,778, Cl. 252-140.000.

Greene, Arnold H.; and Holden, Harold E., to American Photo Systems, Inc. Microfilm reader with microfilm and reticle images provided to each of two binocular eyepieces. 5,024,512, Cl. 350-514.000.

Greene, Carol J.: *See—*
Wu, Stephen H. W.; Greene, Carol J.; and Sharma, Mahendra K., 5,025,004, Cl. 514-165.000.

Greenlee, Mark L.; DiNinno, Frank P.; Cama, Lovji D.; and Heck, James V., to Merck & Co., Inc. 2-(9-fluorenonyl)-carbapenem antibacterial agents. 5,025,007, Cl. 514-210.000.

Greenlee, Mark L.: *See—*
DiNinno, Frank P.; Salzmann, Thomas N.; and Greenlee, Mark L., 5,025,008, Cl. 514-210.000.

Greenshields, James N.; and Tetlow, Peter E., to ICI Americas Inc. Solvent extraction process. 5,024,821, Cl. 423-23.000.

Gregg, Thomas A.: *See—*
Casper, Daniel F.; Flanagan, John R.; Gregg, Thomas A.; Huang, Catherine C.; and Kalos, Matthew J., 5,025,458, Cl. 375-114.000.

Gregorio, Manuel Z.: *See—*
Schwartz, Russell J.; and Gregorio, Manuel Z., 5,024,698, Cl 106-20.000.

Gregory, Danny L.; Priddy, Tommy G.; Smallwood, David O.; and Woodall, Tommy D., to United States of America, Energy. Composite slip table of dissimilar materials for damping longitudinal modes 5,024,096, Cl. 73-663.000.

Griffin-Woodhouse Limited: *See—*
Timmington, David A., 5,024,548, Cl. 403-78.000.

Grigo, Ulrich: *See—*
Tacke, Peter; Grigo, Ulrich; Nouvertne, Werner; Freitag, Dieter; Idel, Karsten-Josef; and Westeppe, Uwe, 5,025,065, Cl 524-611.000.

Grobmyer, Louis R.: *See—*
Impink, Albert J., Jr.; Grobmyer, Louis R.; Sariscak, Robert E.; Morita, Toshio; and Duryea, John L., 5,024,801, Cl. 376-217.000.

Groenendaal, John C., Jr.; and Rudy, Randy T., to Westinghouse Electric Corp. Fully floating inlet flow guide for double-flow low pressure steam turbines. 5,024,579, Cl. 415-108.000.

Grohrock, Peter, to Siemens Aktiengesellschaft. Lockable container for transporting and for storing semiconductor wafers. 5,024,329, Cl. 206-454.000.

Gronwald, Frederik, Andersen, Peter H., Faarup, Peter; Guddal, Erling; Hansen, Kristian T.; Hansen, Louis B.; and Nielsen, Erik B., to Novo Nordisk A/S. Novel benzazepine derivatives. 5,025,009, Cl. 514-213.000.

Grossman, David G.; Karnas, Michael A.; and Johnson, Ronald E., to Corning Incorporated. Glazing dental constructs. 5,024,790, Cl. 264-16.000.

Grossman, Mark W.; and George, William A., to GTE Products Corporation. Recovery of mercury from mercury compounds via electrolytic methods. 5,024,738, Cl. 204-105.00R.

Grosveld, Ferdinand M. W. A.: *See—*
Shepherd, Kevin P.; and Grosveld, Ferdinand M. W. A., 5,024,288, Cl. 181-206.000.

Grubisic, Vatroslav: *See—*
Klock, Jurgen; Fischer, Gerhard; and Grubisic, Vatroslav, 5,024,102, Cl. 73-798.000.

Grumman Aerospace Corporation: *See—*
Fengelly, Raymond S., 5,023,993, Cl. 29-843.000.
Schwarz, Robert C., 5,025,285, Cl. 355-77.000.

Grunner, Erich: *See—*
Schmidt, Oskar; and Grunner, Erich, 5,024,800, Cl. 264-502.000.

GTE Laboratories Incorporated: *See—*
Boudreau, Robert A.; and Rideout, William C., 5,024,504, Cl. 350-96.180.
Eichen, Elliot G., 5,025,487, Cl. 455-618.000.

GTE Products Corporation: *See—*
Bouchard, Andre C.; Thibault, Paul A.; Lagushenko Radomir; Maya, Jakob; and Maya, Jakob, 5,025,190, Cl. 313-619.000.
Grossman, Mark W.; and George, William A., 5,024,738, Cl. 204-105.00R.
Maya, Jakob, 5,024,739, Cl. 204-157.200.
Maya, Jakob, 5,024,741, Cl. 204-157.220.

Guddal, Erling: *See—*
Gronwald, Frederik; Andersen, Peter H., Faarup, Peter; Guddal, Erling; Hansen, Kristian T.; Hansen, Louis B.; and Nielsen, Erik B., 5,025,009, Cl. 514-213.000.

Guenther, Dieter: *See—*
Wingen, Rainer; Guenther, Dieter; and Lingnau, Juergen, 5,025,097, Cl. 548-235.000.

Guevel, Pierre M.; and Bardey, Philippe R., to Principia Recherche Developpement SA. Air or submarine engine with improved contour. 5,024,396, Cl. 244-35.00R.

Guggenberger, Rainer: *See—*
Gasser, Oswald; Guggenberger, Rainer; and Burger, Bernd, 5,024,711, Cl. 156-153.000.

Guichard, Louis. Automatic mechanical transmission apparatus with continuous variation of the transmission ratio from an infinite ratio up to a ratio less then 1/1. 5,024,637, Cl. 475-166.000.

Guirguis, Raouf A., to La Mina Ltd. Modular fluid sample preparation assembly. 5,024,237, Cl. 128-760.000.

Guirguis, Raouf A., to Cancer Diagnostics, Inc. Blood withdrawing apparatus and antigen testing method. 5,024,238, Cl. 128-771.000.

Gulley, David W.; and Van Aken, Jerry R., to Texas Instruments Incorporated. Graphics floating point coprocessor having matrix capabilities. 5,025,407, Cl. 364-754.000.

Gundlach, Douglas P., to DowBrands Inc. Prewetted absorbent pads and dispensing package therefor. 5,024,325, Cl. 206-229.000.

Gunn, Duncan A.; and McManus, Stephen J., to STC PLC. Hermetic gland for optical fibres. 5,024,503, Cl. 350-96.200.

Gupta, Dev V., to Integrated Network Corporation. Digital data over voice communication. 5,025,443, Cl. 370-76.000.

Gurd, John R.; and Kawakami, Katsura, to Victoria University of Manchester; and Matsushita Electrical Industrial Co., Ltd. Storage allocation and garbage collection using liberate space tokens. 5,025,367, Cl. 364-200.000.

Guslits, Vladimir S.; and Swapceinski, John P., to Eastman Kodak Company. Development apparatus having self-closing purging mechanism. 5,025,289, Cl. 355-253.000.

Gustafsson, Gert-Ove; Berntsson, Leif; and Larsson, Kåre, to Multistructure Sweden AB. Method for the production of a compound for increasing of frost-resistance of hardened concrete and the compound thus produced. 5,024,703, Cl. 106-649.000.

Gutag Innovations AG: *See—*
Guttinger, Kurt, 5,024,114, Cl. 74-86.000.

Guth Lighting Inc.: *See—*
Cannell, Timothy A., 5,025,358, Cl. 362-267.000.

Gutschmit, Alan, to Alandale Industries, Inc. Yarn threading apparatus for tube-type textile yarn creels. 5,024,393, Cl. 242-131.000.

Guttinger, Kurt, to Gutag Innovations AG. Wobble drive for a translationally moving structural part. 5,024,114, Cl. 74-86.000.

Guy, Jon S.: *See—*
Perona, Mark; Woller, Tom C.; and Guy, Jon S., 5,025,334, Cl. 360-96.500.

Guzman, Julio; and Spector, George. Compressible three chamber device for dispersing pomade. 5,024,546, Cl. 401-16.000.

H. B. Fuller Licensing & Financing, Inc.: *See—*
Malcolm, David B.; and Bunnelle, William L., 5,024,667, Cl. 604-382.000.

H. Bollmann Manufacturers Limited: *See—*
Mould, David, 5,025,255, Cl. 341-26.000.

Habu, Takaaki: *See—*
Okamoto, Kengo; Habu, Takaaki; and Muroi, Shoji, 5,025,263, Cl. 343-715.000.

Hachtel, Hansjorg: *See—*
Dobler, Klaus; and Hachtel, Hansjorg, 5,025,213, Cl. 324-207.120.

Hadley, Howard C.; and Myers, John R., to Deere & Company. Two unit folding hitch structures. 5,024,456, Cl. 280-412.000.

Haenni, Edwin W.; and Bolz, Hans-Peter, to Sonoco Products Company. Tube dispenser for flexible sheet material. 5,024,349, Cl. 221-46.000.

Hagg, Sandra L.: *See—*
Allaire, Roger A.; Friske, Mark S.; Hagg, Sandra L.; and Janas, Victor F., 5,024,978, Cl. 501-95.000.

Hagiwara, Hiroshi; Araki, Kazunori; and Michimori, Akihiro, to Matsushita Electric Works, Ltd. Stress dissolving refreshment system. 5,024,650, Cl. 600-26.000.

Hahn, Walter; Lutz, Ferdinand; and Jahn, Manfred, to Asea Brown Boveri Aktiengesellschaft. Spindle drive. 5,024,115, Cl. 74-89.150.

Haikl, Vojtech: *See—*
Lamb, William E.; Kowaleski, Jerome L.; Haikl, Vojtech; Bittancourt, Alan R.; and Daugherty, Harvey S., 5,025,280, Cl 354-299.000.

Haines, John G.; Rosenbaum, Nolan G.; Pion, Albert L.; Lecarpentier, Marc; Henriot, Christophe; and Abumehdi, Cyrus, to FME Corporation. Postage meter transparent I/O interface. 5,025,383, Cl 364-464.030.

Hains, Ralph N., to U.S. Philips Corporation. Matrix display device. 5,025,250, Cl. 340-811.000.

Hajime Industries Ltd.: *See—*
Yoshida, Hajime, 5,024,525, Cl. 354-126.000.

Haken, Roger A., to Texas Instruments Incorporated. Dual LDD submicron CMOS process for making low and high voltage transistors with common gate. 5,024,960, Cl. 437-34 000.

Hall, David M.: *See—*
McCullough, Francis P., Jr.; Snelgrove, R. Vernon; and Hall, David M., 5,024,877, Cl. 428-282.000.

Halliburton Logging Services, Inc.: *See—*
Roessler, Dennis E., 5,024,272, Cl. 166-117.700.

Halliburton, W. Ken, Jr. Redeemable coupon disbursement control and reporting system. 5,025,139, Cl. 235-379.000.

Hallinan, Linda L.: *See—*
Shaw, Schuyler S.; Hallinan, Linda L.; Hammersmith, Robert J.; Schenk, Donald E.; DeHoff, Edward J.; and Kade, Alexander, 5,024,299, Cl. 188-156.000.

Hamada, Fukusaburo: *See—*
Nozaki, Chikateru; Miyanohara, Atsushi; Hamada, Fukusaburo; Ohtomo, Nobuya; and Matsubara, Kenichi, 5,024,938, Cl. 435-68.100.

Hamada, Mitsuo: *See—*
Yoshida, Keiji; and Hamada, Mitsuo, 5,025,054, Cl. 524-267.000.

Hamada, Toshiaki: *See—*
Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.

Hamamatsu Photonics Kabushiki Kaisha: *See—*
Aoshima, Shinichiro; Urakami, Tsuneyuki; and Tsuchiya, Yutaka, 5,025,142, Cl. 250-201.900.

Hamel, Leo F. Cord restraint. 5,024,402, Cl. 248-52.000.

Hamersma, Wilhelmus J. L. A.; Kempers, Torben P.; and Roovers, Wilhemus M. M., to General Electric Company. Polymer mixture comprising aromatic polycarbonate and two agents to improve the impact strength; articles formed therefrom. 5,025,055, Cl. 524-269.000.

Hamilton, Bruce H.: *See—*
McLachlan, Corran N. S.; Catchpole, Owen J.; and Hamilton, Bruce H., 5,024,846, Cl. 426-312.000.

Hammer, Hartmut: *See—*
Mertens-Gottselig, Dagmar; Hammer, Hartmut; Muller, Heinrich; and Wildersohn, Manfred, 5,024,678, Cl. 44-348.000.

Hammersmith, Robert J.: *See—*
Shaw, Schuyler S.; Hallinan, Linda L.; Hammersmith, Robert J.; Schenk, Donald E.; DeHoff, Edward J.; and Kade, Alexander, 5,024,299, Cl. 188-156.000.

Hammond, Dean C., Jr.: *See—*
Tibbetts, Gary G.; Gorkiewicz, Daniel W.; and Hammond, Dean C., Jr., 5,024,818, Cl. 422-158.000.

Han, Ru-Jen L.: *See—*
Carson, Matthew; Han, Ru-Jen L.; and LeMahieu, Ronald A., 5,025,036, Cl. 514-568.000.

Han, Scott: *See—*
DeCaul, Lorenzo C.; Han, Scott; Palermo, Robert E.; and Walsh, Dennis E., 5,025,109, Cl. 585-500.000.

Hanack, Michael: *See—*
Gorler, Klaus; Krumbiegel, Gunter; Hanack, Michael; and Subramanian, Lakshmina R., 5,024,743, Cl. 204-157.690.

Hanada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, to Dainichiseika Color & Chemicals Mfg. Co., Ltd.; and Ukima Colour & Chemicals Mfg. Co. Ltd. Heat-sensitive recording medium. 5,024,893, Cl. 428-423.100.

Haneda, Satoshi; and Nomori, Hiroyuki, to Konica Corporation. Dot exposure type image forming apparatus. 5,025,272, Cl. 346-153.100.

Hank Dietrich; and Gottlebe, Jurgen, to Veb Kombinat Polygraph "Werner Lamberz" Leipzig. Safety device for the control of web-fed rotary printing machines. 5,024,156, Cl. 101-216.000.

Hanlon, J. Vincent; and Culley, Scott A., to Ethyl Corporation. Alkyl phenol stabilizer compositions for fuels and lubricants. 5,024,775, Cl. 252-52.00R.

VOL
1127
ISS
3
JE
18
1991
UMI

Hannen, Jakob, to Kleinewefers GmbH. Label applying apparatus. 5,024,718, Cl. 156-475.000.

Hansen, Henning. Articulated support arm 5,025,126, Cl. 219-125.100.

Hansen, Kristian T.: *See—*
- Gronwald, Frederik; Andersen, Peter H.; Faarup, Peter; Guddal, Erling; Hansen, Kristian T.; Hansen, Louis B.; and Nielsen, Erik B., 5,025,009, Cl. 514-213.000.

Hansen, Louis B.: *See—*
- Gronwald, Frederik; Andersen, Peter H.; Faarup, Peter; Guddal, Erling; Hansen, Kristian T.; Hansen, Louis B.; and Nielsen, Erik B., 5,025,009, Cl. 514-213.000.

Hanson, Gary N.; and Inness, Keith W., to Insulock Corporation. Building block and structures formed therefrom. 5,024,035, Cl. 52-591.000.

Hanson, Reed D.; and Radcliffe, Scott T., to General Motors Corporation. Output filter and method for on/off semi-active suspension control. 5,024,460, Cl. 280-707.000.

Hanssler, Gerd: *See—*
- Lantzsch, Reinhard; Kysela, Ernst; Buchel, Karl H.; Dutzmann, Stefan; Brandes, Wilhelm; and Hanssler, Gerd, 5,025,030, Cl. 514-383.000.

Hara, Mitsuhiko: *See—*
- Hirayama, Hiromichi; Hara, Mitsuhiko; Mihara, Masato; and Harumatsu, Mitsuo, 5,025,331, Cl. 360-85.000.

Harada, Naoto: *See—*
- Sekine, Shuji; and Harada, Naoto, 5,025,184, Cl. 310-71.000.

Harame, David L.; and Stork, Johannes M. C., to International Business Machines Corporation. Method of fabricating a bipolar transistor with ultra-thin epitaxial base. 5,024,957, Cl. 437-31.000.

Harandi, Mohsen N.; and Owen, Hartley, to Mobil Oil Corporation. Olefins etherification and conversion to liquid fuels with paraffins dehydrogenation. 5,024,679, Cl. 44-449.000.

Harbarger, Josephine A.; Oliver, David; and Anthony, Ella L., to Motorola, Inc. Heating apparatus and method for semiconductor material slicing process. 5,024,207, Cl. 125-35.000.

Hardin, Tommy G.; and Khorramian, Behrooz A , to AT&T Bell Laboratories. Plenum cables which include non-halogenated plastic materials. 5,024,506, Cl. 350-96.230.

Hardy, Jean-Claude: *See—*
- Barreau, Michel; Hardy, Jean-Claude; Martin, Jean-Paul; and Renault, Christian, 5,025,013, Cl. 514-253.000.

Hargrave, David L. Tool for repairing pop-up sprinklers. 5,023,989, Cl. 29-426.500.

Harig, Horst; and Kersting, Hermann, to CLAAS OHG. Harvester thresher. 5,024,630, Cl. 460-21.000.

Harigaya, Makoto: *See—*
- Yamada, Katsuyuki; Ide, Yukio; Harigaya, Makoto; and Iwasaki, Hiroko, 5,024,927, Cl. 430-495.000.

Harney James D.: *See—*
- Crain, Ronald A.; Harney James D.; and Carey, James R., 5,025,436, Cl. 369-77.200.

Harp, Raymond S.; and Smith, Donald L., to Tredegar Industries, Inc. Method for producing an embossed oriented film. 5,024,799, Cl. 264-284.000.

Harrelson, Hugh G., Jr.: *See—*
- Yeh, Ling; and Harrelson, Hugh G., Jr., 5,024,869, Cl. 428-97.000.

Harris Corporation: *See—*
- Sikand, Parminder S.; McAllister, Mary J.; Henel, John; Jackson, Allen L.; and Bell, Karen, 5,025,468, Cl. 379-67.000.

Harrison, Andrew B., to British Aerospace Public Limited Company. Method and apparatus for remote position sensing using edge diffraction. 5,024,527, Cl. 356-124.000.

Harrison, Frank. Vehicle heating system. 5,024,377, Cl. 237-2.00A.

Harrison, Michael G.: *See—*
- Millard, Michael L.; Harrison, Michael G.; and Szweda, Andrew, 5,024,859, Cl. 427-226.000.

Harrold, Ronald T.; and Sanjana, Zal N., to Westinghouse Electric Corp. Method and apparatus for selective transmission and reflection of sound through a solid. 5,024,092, Cl. 73-602.000.

Harshman, Robert L.: *See—*
- Gasaway, Jack S.; Parsons, J. Stuart; and Harshman, Robert L., 5,024,656, Cl. 604-70.000.

Hart, Colin: *See—*
- Fluent, Stewart L.; Hart, Colin; McCree, Charles D.; and Lotsch, Charles F., 5,024,045, Cl. 53-443.000.

Hartke, David J.; and Appelt, Kathleen A., to Outboard Marine Corporation. Fuel supply system component assembly. 5,024,188, Cl. 123-195.00A.

Hartley, Richard I.; Corbett, Peter F.; Yassa, Fathy F.; and Noujaim, Sharbel E., to General Electric Company. Increased performance of digital integrated circuits by processing with multiple-bit-width digits. 5,025,257, Cl. 341-101.000.

Hartmann, Hans S., to Du Pont de Nemours, E. I., and Company. Crystallizable, low dielectric constant, low dielectric loss composition. 5,024,975, Cl. 501-65.000.

Hartmann, Heinrich: *See—*
- Crema, Stefano C.; Kucera, Clare H.; Konrad, Gerd; and Hartmann, Heinrich, 5,025,040, Cl. 523-130.000.

Hartweck, Lynn M.: *See—*
- Collins, Glenn B.; Hildebrand, David F.; Lazzeri, Paul A.; Adams, Thomas R.; Parrott, Wayne A.; and Hartweck, Lynn M., 5,024,944, Cl. 435-172.300.

Hartz, Dale E.: *See—*
- Wuepper, Karl J.; Swanson, Jerald L.; and Hartz, Dale E., 5,023,987, Cl. 29-402.110.

Harumatsu, Mitsuo: *See—*
- Hirayama, Hiromichi; Hara, Mitsuhiko; Mihara, Masato; and Harumatsu, Mitsuo, 5,025,331, Cl. 360-85.000.

Harvey, Mary A. Panty hose for wearing under an abbreviated outer garment. 5,023,957, Cl. 2-409.000.

Harvey, Thomas J., to AEC-Able Engineering Co., Inc. Adjustment of zero spring rate suspensions. 5,024,111, Cl. 73-865.600.

Harwood, Ronald P. Combination lighting fixture and graphic display means. 5,025,355, Cl. 362-147.000.

Hasebe, Masahiro: *See—*
- Sakakibara, Shiro; Hasebe, Masahiro; and Hattori, Masashi, 5,024,638, Cl. 475-210.000.

Hasegawa, Hirofumi; Ohmori, Naoto; Yamada, Yukio; and Yoshida, Narutaka, to Minolta Camera Kabushiki Kaisha. Laser beam image forming apparatus with SOS Detection. 5,025,286, Cl. 355-244.000.

Hasegawa, Makoto; Takahashi, Kazuaki; Makimoto, Mitsuo; Takahashi, Masao; and Shimazu, Takayuki, to Matsushita Electric Industrial Co., Ltd. Voltage-controlled oscillator using a surface elastic wave resonator. 5,025,229, Cl. 331-107.00A.

Hashimoto Corporation: *See—*
- Hashimoto, Kazuo, 5,025,324, Cl. 358-335.000.

Hashimoto, Hisashi: *See—*
- Nose, Toshiro; Hashimoto, Hisashi; and Manda, Masato, 5,025,395, Cl. 364-518.000.

Hashimoto, Kazuo, to Hashimoto Corporation. Method of and apparatus for recording information on both a main recording medium and an endless recording medium for repeated event monitoring. 5,025,324, Cl. 358-335.000.

Hashimoto, Michiaki: *See—*
- Morishita, Hajime; Hayashi, Nobuaki; Nonogaki, Saburo; Hashimoto, Michiaki; Ito, Masato; Nishizawa, Masahiro; Miura, Kiyoshi; and Odaka, Yoshiyuki, 5,024,920, Cl. 430-325.000.

Hashimoto, Satoshi: *See—*
- Yoshida, Mamoru; Suya, Hachiro; Hayashi, Shoji; Koshiyama, Takao; Hashimoto, Satoshi; and Horita, Katsuhiro, 5,025,042, Cl. 523-216.000.

Hata, Yoshiaki: *See—*
- Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, 5,025,275, Cl. 354-106.000.

Hatanaka, Masahiko: *See—*
- Nakanishi, Masahiro; Mori, Daisuke; Fujii, Katsuyoshi; Hatanaka, Masahiko; and Shinada, Hiroko, 5,024,133, Cl. 84-615.000.

Hatfield, Dean C., Jr., to Hughes Aircraft Company. Integrated multispectral boresight target generator. 5,025,149, Cl. 250-342.000.

Hatfield, Stephen C.; Andrews, Mena G.; and Broders, Richard P., to Combustion Engineering, Inc. Debris catching spring detent spacer grid. 5,024,807, Cl. 376-352.000.

Hattori, Akio: *See—*
- Fukui, Tetsu; Yoshii, Takashi; Takemura, Toshihiko; and Hattori, Akio, 5,024,306, Cl. 192-3.570.

Hattori, Katsuji: *See—*
- Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.

Hattori, Masashi: *See—*
- Sakakibara, Shiro; Hasebe, Masahiro; and Hattori, Masashi, 5,024,638, Cl. 475-210.000.

Hattori, Yoshihiro, to Minolta Camera Kabushiki Kaisha. Charging device for electrophotographic systems. 5,025,155, Cl. 250-326.000.

Haughton, David R.: *See—*
- Mazuch, Ludvik; and Haughton, David R., 5,024,702, Cl. 106-277.000.

Havasi, Gabor: *See—*
- Fejerdy, Istvan; Farkas, Otto ; and Havasi, Gabor, 5,024,424, Cl. 267-64.270.

Havens, Marvin R., to W. R. Grace & Co.-Conn. Antistatic thermoplastic/polyamide-polyether compositions and antistatic polymeric films made therefrom. 5,024,792, Cl. 264-22.000.

Hawley, Dan W.: *See—*
- Moss, Mary G.; Brewer, Terry; Cuzmar, Ruth M.; Hawley, Dan W.; and Flaim, Tony D., 5,024,922, Cl. 430-330.000.

Hawley, Erwin T.; and Kladden, Gregory S., to Rexnord Corporation. Seal cartridge assembly. 5,024,450, Cl. 277-37.000.

Hawley, Gil P.; and McDaniel, Max P., to Phillips Petroleum Company. Silica-containing olefin polymerization catalysts and process. 5,024,982, Cl. 502-110.000.

Hay & Forage Industries: *See—*
- Girard, David E., 5,024,152, Cl. 100-188.00R.

Hayakawa, Kunio: *See—*
- Ilyama, Kiyotaka; Hayakawa, Kunio; Nakata, Masahiro; Kodera, Kaoru; and Miyazaki, Osamu, 5,024,699, Cl. 106-21.000.

Hayashi, Akimine: *See—*
- Murakami, Satoru; Yamaguchi, Minori; Hayashi, Akimine; Kondo, Masataka; and Tawada, Yoshihisa, 5,025,297, Cl. 357-30.000.

Hayashi, George, to Swift Instruments, Inc. Microscope. 5,024,513, Cl. 350-518.000.

Hayashi, Gouichi: *See—*
- Suzuki, Yoshiaki; and Hayashi, Gouichi, 5,024,923, Cl. 430-372.000.

Hayashi, Michio: *See—*
- Matsumoto, Fukuji; Tawara, Yoshio; Hayashi, Michio; and Yamada, Osamu, 5,024,423, Cl. 266-283.000.

Hayashi, Nobuaki: *See—*
- Morishita, Hajime; Hayashi, Nobuaki; Nonogaki, Saburo; Hashimoto, Michiaki; Ito, Masato; Nishizawa, Masahiro; Miura, Kiyoshi; and Odaka, Yoshiyuki, 5,024,920, Cl. 430-325.000.

Hayashi, Shigeyuki: *See—*
- Nakata, Takashi: Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Horaguchi, Yoichi, 5,025,281, Cl. 355-27.000.

Hayashi, Shoji: *See—*
- Yoshida, Mamoru; Suya, Hachiro; Hayashi, Shoji, Koshiyama, Takao; Hashimoto, Satoshi; and Horita, Katsuhiro, 5,025,042, Cl. 523-216.000.

Hayden, James D.: *See—*
- Baker, Frank K.; and Hayden, James D., 5,024,971, Cl. 437-228.000.

Hayes, Leon, to Backeze Limited. Apparatus for use in relieving neck and/or back pain. 5,024,214, Cl. 128-75.000.

Hayes, Norman J.; and Avedon, Raymond B., to Identification Technology Corporation. Identification tag assembly. 5,024,013, Cl. 40-301.000.

Haynes, Deborah I.: *See—*
- Hefner, Robert E., Jr.; and Haynes, Deborah I., 5,024,785, Cl. 252-299.010.

Hays, Donald F., Jr., to Extrusion Services, Inc. Flyknife cutter for extruded materials. 5,024,130, Cl. 83-444.000.

Hayward, James E., to Innovative Metal Inc. Desk system. 5,024,167, Cl. 108-50.000.

Hazel, Nicholas J., to BP Chemicals Limited. Production of non-conjugated diolefins. 5,025,111, Cl. 585-601.000.

HDRK Mining Research Limited: *See—*
- Pettigrew, Michel J.; Rhodes, David B.; Lux, Eric G.; and Mason, Victor A., 5,024,090, Cl. 73-572.000.

Heck, Ernst; and Horisberger, Jean, to Nestec S. A. Continuous stamping machine. 5,024,719, Cl 156-522.000.

Heck, James V.: *See—*
- Greenlee, Mark L.; DiNinno, Frank P.; Cama, Lovji D.; and Heck, James V., 5,025,007, Cl. 514-210.000.

Hefner, Robert E., Jr.; and Haynes, Deborah I., to Dow Chemical Company, The. Liquid crystal/rigid rodlike polymer modified epoxy/vinyl ester resins. 5,024,785, Cl. 252-299.010.

Hegeman, George D.; and Nickens, David G., to BioTrol, Inc. Aerobic bacterial remediation of aliphatic chlorinated hydrocarbon contamination. 5,024,949, Cl. 435-262.000.

Hehl, Karl. Apparatus for transporting moldings from an injection molding machine. 5,024,593, Cl. 425-556.000.

Heidelberger Druckmaschinen AG: *See—*
- Jahn, Hans-Georg, 5,024,155, Cl. 101-216.000.
- Thunker, Norbert; Pollich, Gerhard, and Luxem, Heiner, 5,024,432, Cl. 271-268.000.

Heidjann, Franz; and Kleingraeber, Karl-Josef, to Claas OHG. Combine harvester. 5,024,631, Cl. 460-75.000.

Heijne, Wilhelmus, to Hoogovens Groep B.V Method of measurement of the level of the surface of a metal bath. 5,024,086, Cl. 73-292.000.

Hein, H. A. Tillmann: *See—*
- Freeman, Andrew B.; and Hein, H. A. Tillmann, 5,024,655, Cl. 604-53.000.

Heinig, Charles F.: *See—*
- Asher, Marc A.; Strippgen, Walter E.; Heinig, Charles F.; and Carson, William, 5,024,213, Cl. 128-69.000.

Heinrich, Norbert, to U.S. Philips Corporation. Overload protected rack and pinion drive for an optical scanning device. 5,025,371, Cl 369-219.000.

Helioff, Michael W.; Tazi, Mohammed; Kwak, Yoon T.; and Login, Robert B., to GAF Chemicals Corporation. Creamy nail polish remover containing hydrolyzed and neutralized maleic anhydride C_1–C_4 alkyl vinyl ether copolymer. 5,024,779, Cl. 252-162.000.

Hellman, Lars G. Multistage isothermal air dehumidification. 5,024,062, Cl. 62-92.000.

Hemedix International, Inc.: *See—*
- Kaufman, Jerry M., 5,024,665, Cl. 604-179.000.

Hemus, David S., to CMB Foodcan plc. Method and apparatus for closing cartons. 5,024,317, Cl. 198-415.000.

Hendricks, Diana: *See—*
- Chu, George H.; Ogawa, Yasushi; McPherson, John M.; Ksander, George; Pratt, Bruce; Hendricks, Diana; and McMullin, Hugh, 5,024,841, Cl. 424-422.000.

Henel, John: *See—*
- Sikand, Parminder S.; McAllister, Mary J.; Henel, John; Jackson, Allen L.; and Bell, Karen, 5,025,468, Cl. 379-67.000.

Heng, Jean-Paul; and Marmonier, Andre , to Societe Anonyme dite: CEGELEC. Connection device for a coaxial cable and a corresponding connection module, in particular a junction block. 5,024,608, Cl. 439-578.000.

Henk, Michael G.; and Summers, Jack C., II, to Allied-Signal Inc. Layered automotive catalytic composite. 5,024,824, Cl. 423-213.500.

Henke, Daniel L.: *See—*
- Burton, James F.; and Henke, Daniel L., 5,025,372, Cl. 364-406.000.

Henning, Rainer: *See—*
- Oekonomopulos, Raymond; Henning, Rainer; Lerch, Ulrich; Scholkens, Bernward; and Linz, Wolfgang, 5,025,010, Cl. 514-224.200.

Henriot, Christophe: *See—*
- Haines, John G.; Rosenbaum, Nolan G.; Pion, Albert L.; Lecarpentier, Marc; Henriot, Christophe; and Abumehdi, Cyrus, 5,025,383, Cl. 364-464.030.

Hens, Jozef F.: *See—*
- Janssens, Frans E.; Torremans, Joseph L. G.; and Hens, Jozef F., 5,025,014, Cl. 514-258.000.

Henshaw, Terry L.: *See—*
- Shook, Forrest A.; and Henshaw, Terry L., 5,024,382, Cl 239-11.000.

Her Majesty the Queen In Right of New Zealand Acting by and Through the Minister of Forestry for New Zealand: *See—*
- Vinden, Peter; Burton, Russell J.; and Vaioleti, Timote M., 5,024,861, Cl. 427-254.000.

Hercules Incorporated: *See—*
- Burnier, Julia S., 5,025,048, Cl. 524-99.000.
- Desmarais, Armand J., 5,024,701, Cl. 106-35.000.
- Gawin, Irena; and Swetlin, Brian J., 5,025,045, Cl. 523-440.000.

Herrin, Jerry J.: *See—*
- Rogers, Howard H.; and Herrin, Jerry J., 5,025,119, Cl. 200-262.000.

Hescor Canada Ltd.: *See—*
- Wheller, Wayne D., 5,025,467, Cl. 379-60.000.

Hess, David W., to Motorola, Inc. Communication system with improved resource assignment. 5,025,254, Cl. 340-826.000.

Hetrick, George L.: *See—*
- Holtkamp, Calvin J.; Hetrick, George L.; and Warren, Richard, 5,025,242, Cl. 337-309.000

Hettinger, Arthur C., to AMP Incorporated. Contact system normal force gage. 5,024,106, Cl. 73-862.540.

Hewlett-Packard Company: *See—*
- Baker, Jeffrey P.; La, Duong T.; and Coverstone, Randy A., 5,025,271, Cl. 346-140.00R.
- Hudson, Kevin R., 5,025,325, Cl. 358-447.000.
- Stephens, Bruce A., 5,025,403, Cl. 364-709.070.
- Su, David K., 5,025,204, Cl. 323-274.000.
- Swanson, Roger W., 5,025,405, Cl. 364-723.000.
- Zellmer, Joel A., 5,025,364, Cl. 364-200.000.

Hi-Sonic Co., Ltd.: *See—*
- Yamagiwa, Tamio, 5,024,254, Cl. 137-219.000.

Higashi, Hirofumi: *See—*
- Ushio, Sadakatsu; Nakamura, Noboru; Higashi, Hirofumi; Iwata, Masataka; and Niwa, Fumiyasu, 5,024,189, Cl. 123-195.00R.

Higuchi, Mitsuhiro: *See—*
- Moriwaki, Nobuyuki; Higuchi, Mitsuhiro; and Toshita, Mitsuhiro, 5,025,422, Cl. 365-233.500.

Hilbert, Thomas K., to Eastman Kodak Company. Development apparatus having dual interleaving paddle mixers. 5,025,287, Cl. 355-245.000.

Hildebrand, David F.: *See—*
- Collins, Glenn B.; Hildebrand, David F.; Lazzeri, Paul A.; Adams, Thomas R.; Parrott, Wayne A.; and Hartweck, Lynn M , 5,024,944, Cl. 435-172.300.

Hill, Berlie R.; Watson, Thomas F., Sr.; and Triplett, Benny L., to Burlington Industries, Inc. Antimicrobial microporous coating. 5,024,875, Cl. 428-267.000.

Hill, Diane E. Resealable compartmented bags. 5,024,536, Cl. 383-38.000.

Hill, Stephen H., to Sealed Power Technologies, L.P. PCV oil separator system. 5,024,203, Cl. 123-573.000.

Hilligoss, William R.; Hillogoss, Lawrence D.; Van Winkle, David; and Butler, Myron C., to Communications Manufacturing Company. Telephone test instrument. 5,025,466, Cl. 379-1.000.

Hillogoss, Lawrence D.: *See—*
- Hilligoss, William R.; Hillogoss, Lawrence D.; Van Winkie, David; and Butler, Myron C., 5,025,466, Cl. 379-1.000.

Himes, John L., Jr.: *See—*
- French, Jay L.; Himes, John L., Jr.; Weber, Ronald M.; and Wise, James H., 5,024,610, Cl. 439-857.000.

Hinterholzer, Hans. Resilient slalom gate. 5,024,551, Cl. 404-10.000.

Hinzmann, Gerd; Nies, Norbert; and Radewahn, Siegfried, to Mannesmann Aktiengesllschaft. Method for manufacturing dimensionally correct compacts. 5,024,811, Cl. 419-66.000.

Hirai, Kenji: *See—*
- Nagato, Shoin; Taguchi, Ryusuke; Hirai, Kenji; Hirose, Hiroaki; and Yokota, Masahiro, 5,024,692, Cl 71-86.000.

Hiraki, Akio: *See—*
- Moriyama, Noboru; Ogura, Tsugitoshi; and Hiraki, Akio, 5,024,676, Cl. 44-301.000.

Hirano, Akihiro: *See—*
- Nishioka, Yasuyuki; and Hirano, Akihiro, 5,024,108, Cl. 73-863.110.

Hirano, Sadayuki: *See—*
- Murano, Katsuaki; Yamashita, Yoshinori; Hirano, Sadayuki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,024,310, Cl. 192-0.076.

Hirata, Eiji: *See—*
- Tanaka, Nobuhiro; Hirata, Eiji; Moriguchi, Hideyuki; Azekura, Ko; Tsubone, Akira; and Ryu, Yasunori, 5,024,572, Cl. 414-276.000.

Hirayama, Hiromichi; Hara, Mitsuhiko; Mihara, Masato; and Harumatsu, Mitsuo, to Victor Company of Japan, Ltd. Tape casette loading system compatible with two different sized cassettes. 5,025,331, Cl. 360-85.000.

Hiroaki Yanagida: *See—*
- Ichikawa, Hiroshi, 5,025,243, Cl. 338-18.000.

Hirono, Yutaka; Kiyama, Seiichi; and Osumi, Masato, to Sanyo Electric Co., Ltd. Dry-etching method. 5,024,724, Cl. 156-643.000.

Hirose Electric Co., Ltd.: *See—*
- Masaki, Takashi, 5,023,992, Cl. 29-705.000.

Hirose, Fumiyuki: *See—*
- Sato, Isao; Kirikami, Seiichi; Shimura, Akira; Hirose, Fumiyuki; Inose, Hiroshi; Urushidani, Haruo; and Arai, Osamu, 5,024,055, Cl. 60-39.270.

VOL
1127
ISS
3
JE
18
1991
UMI

- Hirose, Hiroaki: *See—*
  - Nagato, Shoin; Taguchi, Ryusuke; Hirai, Kenji: Hirose, Hiroaki; and Yokota, Masahiro, 5,024,692, Cl. 71-86.000.
- Hitachi Engineering Co., Ltd.: *See—*
  - Inoue, Haruki; Funabashi, Motohisa; Yahiro, Masakazu; and Tanaka, Fumiki, 5,025,499, Cl 364-165.000.
- Hitachi Koki Co., Ltd.: *See—*
  - Arimoto, Akira; Saito, Susumu; Tsunoda, Yoshito; Moriyama, Shigeo; and Mochizuki, Takeshi, 5,025,268, Cl. 346-108.000.
- Hitachi, Ltd.: *See—*
  - Arimoto, Akira; Saito, Susumu; Tsunoda, Yoshito; Moriyama, Shigeo; and Mochizuki, Takeshi, 5,025,268, Cl. 346-108.000.
  - Inoue, Haruki; Funabashi, Motohisa; Yahiro, Masakazu; and Tanaka, Fumiki, 5,025,499, Cl. 364-165.000.
  - Komoriya, Susumu; Nishizuka, Hiroshi; Nakagawa, Shinya; and Maejima, Hisashi, 5,025,284, Cl. 355-53.000.
  - Morishita, Hajime; Hayashi, Nobuaki; Nonogaki, Saburo; Hashimoto, Michiaki; Ito, Masato; Nishizawa, Masahiro; Miura, Kiyoshi; and Odaka, Yoshiyuki, 5,024,920, Cl. 430-325.000.
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  - Nose, Toshiro; Hashimoto, Hisashi; and Manda, Masato, 5,025,395, Cl. 364-518.000.
  - Sasaki, Souji; Kino, Hirotoshi; Musha, Yoshinori; Kubota, Jun; and Okada, Hisao, 5,024,093, Cl. 73-633.000.
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  - Sekiya, Hiroshi; Kurita, Toshiyuki; Nakagaki, Nobufumi; and Murata, Toshinori, 5,025,310, Cl. 358-19.000.
  - Shimizu, Shinji, 5,025,301, Cl. 357-54.000.
  - Tamura, Katsuyoshi, 5,025,490, Cl. 313-479.000
  - Uematsu, Tsuyoshi; and Saitoh, Tadashi, 5,024,953, Cl. 437-2.000.
- Hitachi Seiko Ltd.: *See—*
  - Arai, Kumio, 5,024,562, Cl. 408-1.00R.
- Hitachi Video Engineering, Inc.. *See—*
  - Sekiya, Hiroshi; Kurita, Toshiyuki; Nakagaki, Nobufumi; and Murata, Toshinori, 5,025,310, Cl. 358-19.000.
- Hitachi VLSI Engineering Corp.: *See—*
  - Moriwaki, Nobuyuki; Higuchi, Mitsuhiro; and Toshita, Mitsuhiro, 5,025,422, Cl. 365-233.500.
- Hitaci, Ltd.: *See—*
  - Kubota, Jun; Kino, Hirotoshi; Musha, Yosinori; and Okada, Hisao, 5,024,094, Cl. 73-634.000.
- Hittner, Herman J.; and Nguyen, Quyen C., to Aluminum Company of America. Stabilization of fluorides of spent potlining by chemical dispersion. 5,024,822, Cl. 423-111.000.
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- Hochman, Lana: *See—*
  - Pan, Yuh-Guo; and Hochman, Lana, 5,024,673, Cl. 8-414.000.
- Hoda, Takeo: *See—*
  - Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, 5,025,275, Cl. 354-106.000.
- Hoechst Aktuegesellschaft: *See—*
  - Buhl, Horst; Holz, Josef, and Dany, Franz-Josef, 5,024,825, Cl 423-309.000.
- Hoechst Aktiengesellschaft: *See—*
  - Dinter, Peter; Funke, Hermann; and Matschke, Klaus, 5,024,819, Cl. 422-186.060.
  - Oekonomopulos, Raymond; Henning, Rainer; Lerch, Ulrich; Scholkens, Bernward; and Linz, Wolfgang, 5,025,010, Cl. 514-224.200.
  - Urban, Rudolf; Fritsch, Josef, and Schoen, Klaus-Peter, 5,024,041, Cl. 53-449.000.
  - Wingen, Rainer; Guenther, Dieter; and Lingnau, Juergen, 5,025,097, Cl. 548-235.000.
- Hoechst Celanese Corp.: *See—*
  - Vora, Rohitkumar H; and Chen, Paul N., Sr., 5,025,089, Cl. 528-353.000.
- Hoff, Richard: *See—*
  - DePellegrini, Donald D.; Acker, William E.; and Hoff, Richard, 5,024,038, Cl. 52-700.000.
- Hoffmann, Cristiano: *See—*
  - Booten, Sigmund; Kley, Uwe; and Hoffmann, Cristiano, 5,024,304, Cl. 188-356.000.
- Hoffmann-La Roche Inc.: *See—*
  - Carson, Matthew; Han, Ru-Jen L., and LeMahieu, Ronald A., 5,025,026, Cl. 514-568.000.
- Hofsess, Alexander, and Dao-Xuan, Phon, to Diskus Werke Frankfurt ammain Aktiengesellschaft. Tool mounting mechanism for a machine tool. 5,024,027, Cl. 51-34.00H.
- Hogan, Scott A.: *See—*
  - Holcomb, Gregory W.; Hogan, Scott A.; and Holcomb, Samuel R., 5,024,129, Cl. 83-107.000.
- Hogrefe, Arthur F., to Johns Hopkins University, The. Pulse to zero digital (PZ) modulation. 5,025,454, Cl. 375-41.000.
- Hohnerlein, Ernst. Method and apparatus for applying a flux. 5,024,856, Cl. 427-57.000.
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- Holcomb, Samuel R.: *See—*
  - Holcomb, Gregory W.; Hogan, Scott A.; and Holcomb, Samuel R., 5,024,129, Cl. 83-107.000.
- Holden, Harold E.: *See—*
  - Greene, Arnold H.; and Holden, Harold E., 5,024,512, Cl. 350-514.000.
- Holifield, William R., III *See—*
  - Jay, Jerry L., Sr.; and Holifield, William R., III, 5,024,245, Cl 134-108.000.
- Holland-Letz, Horst; and Bubel, Rainer, to Felo-Werkzeugfabrik Slip-resistant plastic surface and process for producing such. 5,024,126, Cl. 81-489.000.
- Hoiler, Thomas D., to Ametek, Inc. Method of making a composite filter. 5,024,764, Cl. 210-484.000.
- Holmgreen, W. Corbett; and Bunegin, Leonid, to Board of Regents, The University of Texas System. Nasotracheal tube insertion connector. 5,024,220, Cl. 128-207.180.
- Holtkamp, Calvin J., Hetrick, George L.; and Warren, Richard, to Robertshaw Controls Company, Inc. Oven thermostat. 5,025,242, Cl 337-309.000.
- Holz, Josef: *See—*
  - Buhl, Horst; Holz, Josef; and Dany. Franz-Josef, 5,024,825, Cl. 423-309.000.
- Holzmann, Olar W. R.: *See—*
  - Becker, Johann A.; Deusser, Peter G.; and Holzmann, Olar W R., 5,024,498, Cl. 350-96.100.
- Holzwarth, Henry A, to United States Surgical Corporation. Armed suture package. 5,024,322, Cl. 206-63.300.
- Honda Giken Kogyo Kabushiki Kaisha: *See—*
  - Ito, Toshifumi, Ohta, Atsuo; and Yamashita, Shoji, 5,024,113, Cl. 74-6.000.
  - Kamimura, Kenji; and Tsuzuki, Sadachika, 5,025,377, Cl 364-424.020.
  - Kawaguchi, Masaaki; Okamuro, Tomio; and Shirose, Keiichi, 5,024,464, Cl. 280-731.000.
  - Nagahiro, Kenichi; and Moriya, Takashi, 5,024,191, Cl. 123-198.00D.
- Honda, Yukihiro: *See—*
  - Ishii, Akihiko, Honda, Yukihiro; and Matsui, Toshio, 5,025,202, Cl 320-32.000.
- Honeywell Inc.: *See—*
  - Buchholz, Robert L.; Grald, Eric W.; Nelson, Lorne W.; and Shah, Dipak J., 5,024,265, Cl. 165-22.000.
  - Kahler, Jeffrey A., 5,025,378, Cl. 364-424 060.
  - Phinney, Thomas L., 5,025,500, Cl. 370-85.130.
- Hong, John H.: *See—*
  - Yeh, Pochi A; and Hong, John H., 5,025,488, Cl 455-619.000.
- Honjo, Kouji: *See—*
  - Saito, Yasuo; Yahata, Mitsuru; Honjo, Kouji; and Matsubayashi, Takayuki, 5,025,463, Cl. 378-19.000.
- Hoogovens Groep B.V.: *See—*
  - Heijne, Wilhelmus, 5,024,086, Cl. 73-292.000.
- Hopkins, Ronald J: *See—*
  - Land, John T.; and Hopkins, Ronald J., 5,024,808, Cl. 376-353.000.
- Horaguchi, Yoichi: *See—*
  - Nakata, Takashi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Horaguchi, Yoichi, 5,025,281, Cl. 355-27.000.
- Horan, Ann C, to Schering Corporation. Actinomadura fulva subsp indica. 5,024,950, Cl 435-825.000.
- Horan, Robert T.: *See—*
  - Sandel, Dan; Horan, Robert T.; Gaba, Rodolfo; and Ramirez, Bruno J., 5,024,326, Cl 206-366.000.
- Hori, Mitukazu: *See—*
  - Matuo, Ken-iti; Nakata, Muneo; Hori, Mitukazu; and Tanihara, Isaji, 5,025,238, Cl. 335-128.000.
- Horiba, Ltd.: *See—*
  - Kotani, Haruo; and Tomita, Katsuhiko, 5,024,951, Cl. 436-8.000.
  - Nishioka, Yasuyuki; and Hirano, Akihiro, 5,024,108, Cl 73-863.110.
- Horisberger, Jean: *See—*
  - Heck, Ernst; and Horisberger, Jean, 5,024,719, Cl. 156-522.000.
- Horita, Katsuhiro: *See—*
  - Yoshida, Mamoru; Suya, Hachiro· Hayashi, Shoji; Koshiyama, Takao; Hashimoto, Satoshi; and Horita, Katsuhiro, 5,025,042, Cl. 523-216.000.
- Hornak, Joseph P.: *See—*
  - Bryant, Robert G.; Hornak, Joseph P.; and Marshall, Eric A., 5,024,229, Cl. 128-653.0SC.
- Horne, David M Dispenser for refrigerated liquids. 5,024,353, Cl 222-185.000.
- Horner, Joseph L., to United States of America, Air Force. Amplitude encoded phase-only filters for optical correlators. 5,024,508, Cl. 350-162.130.
- Hosoi, Masatoshi: *See—*
  - Seki, Nobuyoshi; Morii, Nobuyuki; Sugiyama, Yoshihide; Komada, Takashi; Hosoi, Masatoshi; Hujiwara, Atuhisa; Ichinose, Tsutomu; Mori, Goro; Kikuchi, Toshiyuki; and Minato, Masahiro, 5,024,430, Cl. 270-53.000.
- Hosoi, Osamu, to Matsushita Electric Industrial Co., Ltd. Video signal separating apparatus. 5,025,311, Cl. 358-31.000.
- Hottenroth, Fred W.; and Hottenroth, Fred W., III, to ZZ Corp. Portable stove. 5,024,208, Cl. 126-25.00R.
- Hottenroth, Fred W., III: *See—*
  - Hottenroth, Fred W.; and Hottenroth, Fred W., III, 5,024,208, Cl. 126-25.00R.
- Houston, L. L.; Aldwin, Lois; and Nitecki, Danute E., to Cetus Corporation. Thioether linked immunotoxin conjugates. 5,024,834, Cl. 424-85.910.

- Howard, Dwight L.; and Johnson, Chris A., to University of California, Regents of the. Apparatus and method for visual-field testing. 5,024,519, Cl. 351-226.000.
- Howard, John B.: *See—*
  - Raikes, Terry E.; Kramer, William L.; Howard, John B.; Moore, Wayne D.; Jackson, Louis; and Kotecki, Jeffrey D., 5,024,282, Cl. 177-25.150.
- Howe, Michael A.: *See—*
  - Blakely, Lawrence W.; Howe, Michael A.; Pinholster, Daniel F.. Jr.; Terry, Claude E.; and McIntosh, Robert H., Sr, 5,024,840, Cl. 424-404.000.
- Howe, Roger T.: *See—*
  - Tang, William C.; and Howe, Roger T., 5,025,346, Cl. 361-283.000.
- Howell, Charles N., to Ajax Magnethermic Corporation. Induction heater with axially-aligned coils. 5,025,122, Cl. 219-10.710.
- Howells, Richard D.: *See—*
  - Crater, Davis H.; Howells, Richard D.; Stern, Richard M.; and Temperante, John A., 5,025,052, Cl. 524-104.000.
- Hoyloak, Joel N.: *See—*
  - Sohner, Harold K.; Hoyloak, Joel N.; Girvin, Richard J.; and Kumar, Surinder, 5,025,452, Cl. 375-1.000.
- Hsieh, Kin H. Hub assembly of a bicycle and the like. 5,024,121, Cl. 74-594.100.
- Hsieh, Shi-Nan. Protection device for use on electricity socket. 5,024,603, Cl. 439-148.000.
- Hsu, Tsui-Chen: *See—*
  - Hung, Shih-Ho; and Hsu, Tsui-Chen, 5,024,412, Cl 248-343.000.
- Huang, Catherine C.: *See—*
  - Casper, Daniel F.; Flanagan, John R.; Gregg, Thomas A.; Huang, Catherine C.; and Kalos, Matthew J., 5,025,458, Cl. 375-114.000.
- Huang, En L. Compactly foldable automobile sunshade. 5,024,262, Cl 160-370.200.
- Huang, Tien-Tsai. Tire pressure indicator. 5,025,244, Cl. 340-442.000.
- Hubel, Egon, to Schering Aktiengesellschaft. Method of and device for compensating variations of branch currents in electroplating baths. 5,024,732, Cl. 204-1.110.
- Huber, Ernst, to J.E. Love Company; and Agro Forest Technik North America, Inc., a part interest. Plant seedling holding and dispensing mechanism. 5,024,172, Cl. 111-104.000.
- Hudson, Kevin R., to Hewlett-Packard Company. Graphics scaling method for high resolution printers. 5,025,325, Cl. 358-447.000.
- Hudspeth, James P.. *See—*
  - Doherty, Annette M.; Hudspeth, James P.; Kaltenbronn, James S.; Repine, Joseph T.; Roark, William H.; Sircar, Ila; and Tinney, Francis J., 5,024,994, Cl. 514-18.000.
- Huff, George A.: *See—*
  - Kaminsky, Mark P.; Kleefisch, Mark S.; Huff, George A.; Washecheck, Don M.; Alvarado-Swaisgood, Aileen E.; and Barr, Mark K., 5,024,984, Cl. 502-303.000.
- Hughes Aircraft Company: *See—*
  - Backes, Peter G., 5,024,080, Cl. 73-54.000.
  - Garcia, Gilbert; and Domnikov, Larissa, 5,025,068, Cl. 525-119.000.
  - Hatfield, Dean C., Jr., 5,025,149, Cl. 250-342.000.
  - Leonakis, George L., 5,025,233, Cl. 333-128.000.
  - Rogers, Howard H.; and Herrin, Jerry J., 5,025,119, Cl 200-262.000.
- Hujiwara, Atuhisa: *See—*
  - Seki, Nobuyoshi; Morii, Nobuyuki; Sugiyama, Yoshihide; Komada, Takashi; Hosoi, Masatoshi; Hujiwara, Atuhisa; Ichinose, Tsutomu; Mori, Goro; Kikuchi, Toshiyuki; and Minato, Masahiro, 5,024,430, Cl. 270-53.000.
- Hulden, Fritiof, to Svets- & Maskinprodukter i Lidkoping AB. Device in a quick coupling. 5,024,010, Cl. 37-118.00R.
- Hull, Edwin J., Jr.; and Johnson, Charles R. Anti-theft locking apparatus for steering wheels. 5,024,069, Cl. 70-209.000.
- Hulsman, Severien; and Salemink, Johannes H. A. G., to Turmac Tobacco Company B.V. Method and apparatus for manufacturing a rod of tobacco or the like enclosed by a paper strip, and cigarette manufactured by said method. 5,024,241, Cl. 131-84.200.
- Hung, Shih-Ho; and Hsu, Tsui-Chen, to Llama Precision Inc. Hanger assembly. 5,024,412, Cl. 248-343.000.
- Hung, Vincent: *See—*
  - Bennett, Robert B.; Hung, Vincent; and Sassoon, Ezra, 5,023,979, Cl. 24-68.00R.
- Hurinville, Bertrand, to Alcatel Transmission par Faisceaux Hertziens. Method of measuring the signature of digital transmission equipment, and apparatus for implementing such a method. 5,025,453, Cl. 375-10.000.
- Hutchinson: *See—*
  - Busnel, Rene-Guy; and Argy, Gilles, 5,024,852, Cl. 427-2.000.
- Hutchinson, Martin A.: *See—*
  - Turner, Frederick T.; Hutchinson, Martin A.; Shaw, R. H.; and Lamont, Lawrence T., Jr., 5,024,747, Cl. 204-298.090.
- Huvenaars, Peter J. M.: *See—*
  - Rischke, Jorg W.; Loermans, Peter J. G.; and Huvenaars, Peter J. M., 5,024,745, Cl. 204-198.000.
- Hwo, Charles C.; and Mostert, Simone, to Shell Oil Company. Modified polybutylene-base hot melt compositions. 5,024,888, Cl. 428-355.000.
- Hyde, Phillip M.: *See—*
  - Cox, Vernon F.; and Hyde, Phillip M., 5,024,632, Cl. 464-33.000.
- Hydromatik GmbH. *See—*
  - Schniederjan, Reinhold, 5,024,143, Cl. 92-12.200.
- Hydroquip Technologies, Inc.: *See—*
  - McGrath, Thomas M.; and Tilles, Arno W., 5,024,759, Cl. 210-222.000.
- Hyodo, Kenji: *See—*
  - Katsura, Toru; Kaji, Hiroo; Hyodo, Kenji; and Ohkura, Hirokazu, 5,024,986, Cl. 503-200.000.
- Ichikawa, Hiroshi, to Nippon Carbon Co., Ltd.; Sogo Security Services Co.; and Hiroaki Yanagida. Infrared detective element. 5,025,243, Cl. 338-18.000.
- Ichikawa, Junichi: *See—*
  - Kawakami, Shin; Nikaido, Katsutomo; and Ichikawa, Junichi, 5,025,116, Cl. 174-250.000.
- Ichinose, Tsutomu: *See—*
  - Seki, Nobuyoshi; Morii, Nobuyuki; Sugiyama, Yoshihide; Komada, Takashi; Hosoi, Masatoshi; Hujiwara, Atuhisa; Ichinose, Tsutomu; Mori, Goro; Kikuchi, Toshiyuki; and Minato, Masahiro, 5,024,430, Cl. 270-53.000.
- ICI Americas Inc.: *See—*
  - Greenshields, James N.; and Tetlow, Peter E., 5,024,821, Cl. 423-23.000.
  - Nagubandi, Sreeramulu, 5,024,691, Cl. 71-86.000.
- Ide, Tetsuya, to Terumo Kabushiki Kaisha. Detachable probe-type electronic clinical thermometer. 5,024,622, Cl. 439-829.000.
- Ide, Yukio: *See—*
  - Yamada, Katsuyuki; Ide, Yukio; Harigaya, Makoto; and Iwasaki, Hiroko, 5,024,927, Cl. 430-495.000.
- Idel, Karsten-Josef: *See—*
  - Tacke, Peter; Grigo, Ulrich; Nouvertne, Werner; Freitag, Dieter: Idel, Karsten-Josef; and Westeppe, Uwe, 5,025,065, Cl. 524-611.000.
- Identification Technology Corporation: *See—*
  - Hayes, Norman J.; and Avedon, Raymond B., 5,024,013, Cl. 40-301.000.
- Idoshita, Takuya: *See—*
  - Futatasuka, Rensei; Koshiba, Yutaka; Chiba, Shunich; Orikasa, Toyoaki; Noguchi, Seiji; and Idoshita, Takuya, 5,024,814, Cl. 420-473.000.
- Igarashi, Eiji; Imamiya, Susumu; and Suzuki, Yasuo, to Yokohama Rubber Co., Ltd., The. Heavy duty pneumatic radial tire with improved steel cord belt. 5,024,261, Cl. 152-527.000.
- Iguchi, Yoshihiro: *See—*
  - Ueda, Mitsuru; Kanno, Tatsuya; Iguchi, Yoshihiro; and Oshino, Yasuhiro, 5,025,083, Cl. 528-199.000.
- Ihata, Jyoji: *See—*
  - Shimamura, Yasuki; and Ihata, Jyoji, 5,025,266, Cl. 346-1.100.
- Iida, Shinzi; Takeya, Fuminori; and Aoki, Shinya, to NGK Insulators, Ltd. Magnetic head core utilizing a non-magnetic layer. 5,025,343, Cl. 360-127.000.
- Iiyama, Kiyotaka; Hayakawa, Kunio; Nakata, Masahiro; Kodera, Kaoru; and Miyazaki, Osamu, to Ricoh Company, Ltd. Leuco dyes and recording materials using the same. 5,024,699, Cl. 106-21.000.
- Ikeda, Masami: *See—*
  - Yamanari, Masaya; and Ikeda, Masami, 5,025,484, Cl. 382-61.000.
- Ikegami, Tetsuhiko: *See—*
  - Sudo, Shoichi; Sakai, Yoshihisa; Yasaka, Hiroshi; Ikegami, Tetsuhiko; Yoshikuni, Yuzo; Yokohama, Itaru; and Kubodera, Kenichi, 5,025,448, Cl. 372-32.000.
- Ikemoto, Hiroyuki: *See—*
  - Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.
- Ilmatera OY: *See—*
  - Laine, Juhani; Nyman, Mikko; and Paananen, Tapio, 5,024,263, Cl. 165-1.000.
- Ilvespaa, Heikki: *See—*
  - Kuhasalo, Antti; Viitanen, Olavi; and Ilvespaa, Heikki, 5,024,729, Cl. 162-372.000.
- Imai, Hitoshi: *See—*
  - Takokoro, Michihiro; Okada, Kazuo; and Imai, Hitoshi, 5,025,430, Cl. 369-13.000.
- Imai, Toshiaki, to Kabushiki Kaisha Toshiba. Method of analyzing reaction rate in chemical analysis. 5,025,389, Cl. 364-497.000.
- Imaizumi, Tomoaki: *See—*
  - Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; and Okada, Shoji, 5,025,187, Cl. 310-323.000.
- Imamiya, Susumu: *See—*
  - Igarashi, Eiji; Imamiya, Susumu; and Suzuki, Yasuo, 5,024,261, Cl 152-527.000.
- Imperial Chemical Industries PLC: *See—*
  - Brattan, Keith, 5,024,788, Cl. 261-114.100.
  - Kennedy, David L.; True, Donald C; and Welsh, David M., 5,024,158, Cl. 102-275.110.
- Impink, Albert J., Jr.; Grobmyer, Louis R.; Sariscak, Robert E.; Morita. Toshio; and Duryea, John L., to Westinghouse Electric Corp. Reactor core model update system 5,024,801, Cl. 376-217.000.
- Inada, Hitoshi: *See—*
  - Kanno, Tetsuo; Kotake, Yasushi; and Inada, Hitoshi, 5,025,339, Cl. 360-99.060.
- Inada, Masanori; and Ohtani, Hichiro, to Mitsubishi Denki Kabushiki Kaisha. Terminal flow sensor. 5,024,083, Cl. 73-204 260
- Inagaki, Motoshi: *See—*
  - Funato, Ryo; Takahiro, Syuji; Yoshida, Keiji; Kubo, Shinji; and Inagaki, Motoshi, 5,024,914, Cl. 430-109.000.
- Indiana Mills & Manufacturing, Inc.: *See—*
  - Anthony, James R.; Wiseman, Michael A.; and Lortz, Allan R., 5,023,981, Cl. 24-573.500.

VOL
1127
ISS
3
JE
18
1991
UMI

- Industria Grafica Meschi S.r.l.: *See—*
  - Meschi, Luciano, 5,024,576, Cl. 414-786.000.
- Industrial Farmaceutica Serono SpA: *See—*
  - Del Bianco, Sergio; and Sica, Gigliola, 5,024,833, Cl. 424-85.400.
- Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nåbo, Olle, to Alfa-Laval Separation AB. Centrifugal separator with a discharge device. 5,024,648, Cl. 494-56.000.
- Injection Research Specialists, Inc.: *See—*
  - Gatza, Ward K.; and Chasteen, Ronald E., 5,024,205, Cl 123-632.000.
- Injet Medical Products, Inc.: *See—*
  - Gasaway, Jack S.; Parsons, J. Stuart; and Harshman, Robert L., 5,024,656, Cl. 604-70.000.
- Ink Company, The: *See—*
  - Britton, William E., Jr., 5,024,700, Cl. 106-32.000.
- Inlow, Duane; and Maiorella, Brian, to Cetus Corporation. Serum free media for the growth on insect cells and expression of products thereby. 5,024,947, Cl. 435-240.310.
- Inness, Keith W.: *See—*
  - Hanson, Gary N.; and Inness, Keith W., 5,024,035, Cl. 52-591.000.
- Innovative Metal Inc.: *See—*
  - Hayward, James E., 5,024,167, Cl 108-50.000.
- Inose, Hiroshi: *See—*
  - Sato, Isao; Kirikami, Seiichi; Shimura, Akira; Hirose, Fumiyuki; Inose, Hiroshi; Urushidani, Haruo; and Arai, Osamu, 5,024,055, Cl. 60-39.270.
- Inoue, Haruki; Funabashi, Motohisa; Yahiro, Masakazu; and Tanaka, Fumiki, to Hitachi, Ltd.; and Hitachi Engineering Co., Ltd. Process control method and control system. 5,025,499, Cl. 364-165.000.
- Inoue, Hiroshi: *See—*
  - Etoh, Yoshiyuki; Inoue, Hiroshi; Mori, Kazuyuki; Suzuki, Koichi; Nakano, Kinichiro; Nomura, Hiroyuki; Yamamoto, Isao; and Yoshida, Kiyoshi, 5,025,379, Cl. 364-426.040.
- Inoue, Kazuhiko: *See—*
  - Tomisawa, Yutaka; Fukuda, Toshikazu; and Inoue, Kazuhiko, 5,025,305, Cl. 357-72.000.
- Inoue, Manabu: *See—*
  - Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, 5,025,275, Cl. 354-106.000.
- Inoue, Takashi; Suzuki, Tatsuya; Kimura, Akiteru; Miyazaki, Hiroaki; and Katagiri, Moriya, to Olympus Optical Co., Ltd.; and Olympus Optical Co., Ltd. Camera with focal point switching mechanism. 5,025,277, Cl. 354-173.100.
- Insley, Thomas I., to Minnesota Mining and Manufacturing Company. Sorbent, impact resistant container. 5,024,865, Cl. 428-36.400.
- Institut Francais du Petrole: *See—*
  - Cameron, Charles; Mimoun, Hubert; Robine, Alain; Bonnaudet, Serge; Chaumette, Patrick; and Dang Vu, Quang, 5,025,108, Cl. 585-500.000.
  - Giuliani, Pierre; Le Page, Jean-Francois; Plumail, Jean-Claude; and Espailiac, Marcellin, 5,024,751, Cl. 208-108.000.
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  - Hanson, Gary N.; and Inness, Keith W., 5,024,035, Cl. 52-591.000.
- Integrated Network Corporation: *See—*
  - Gupta, Dev V., 5,025,443, Cl. 370-76.000.
- Interface, Inc.: *See—*
  - Blakely, Lawrence W.; Howe, Michael A.; Pinholster, Daniel F., Jr.; Terry, Claude E.; and McIntosh, Robert H., Sr., 5,024,840, Cl. 424-404.000.
- International Business Machines Company: *See—*
  - Durig, Urs T.; Fischer, Ulrich C.; and Pohl, Wolfgang D., 5,025,147, Cl. 250-216.000.
- International Business Machines Corporation: *See—*
  - Brooks, Peter E., 5,025,337, Cl. 360-97.030.
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  - Harame, David L.; and Stork, Johannes M. C., 5,024,957, Cl. 437-31.000.
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  - Mueller, Wolfgang F.; Popp, George; and Vandergheynst, George B., 5,024,127, Cl. 83-13.000.
  - Parks, Carol A.; Probst, Robert E.; Rajagopal, Doraiswamy; and Youngs, Gary L., 5,025,396, Cl. 364-518.000.
- International Computers Limited: *See—*
  - Stevens, Reginald W., 5,025,256, Cl. 341-59.000.
- International Medication Systems, Limited: *See—*
  - Ogle, George Braddock, II, 5,024,616, Cl. 604-192.000.
- International Paper: *See—*
  - Edwards, James C.; and Pritchard, Edward E., 5,024,397, Cl. 294-68.230.
- Inuzuka, Yutaka: *See—*
  - Yamada, Ichiji; Inuzuka, Yutaka; Murakami, Michiyuki; Suzuki, George; Tanahashi, Tyo; and Kondo, Takeshi, 5,024,117, Cl. 74-473.00P.
- Iorns, Martin E. Method and apparatus for constructing an offshore hollow column. 5,024,557, Cl. 405-223.000.
- Iowa State University Research Foundation, Inc.: *See—*
  - Chriswell, Colin D.; Markuszewski, Richard; and Buttermore, William H., 5,024,753, Cl. 209-1.000.
  - Misra, Manjit K.; and Shyy, Yuh-Yuan, 5,024,334, Cl. 209-557.000.
- Ip, Stephen H.: *See—*
  - Brenner, Michael B.; Strominger, Jack L.; Seidman, Jonathan; Ip, Stephen H.; and Krangel, Micahel S., 5,024,940, Cl. 435-69.100.
- Ippolito, Guy F.; and Spector, George. All in one drill bit. 5,024,566, Cl. 408-197.000.
- Ire-Celltarg S.A.: *See—*
  - Rao, KSP Siva Bhushana; Dejonghe, Jean-Paul; Collard, Marie-Paule; and Trouet, Andre, 5,024,835, Cl. 424-85.910.
- Isbert, Jacques: *See—*
  - Maisonneuve, Jean-Michel, Domergue, Jean-Paul; Parize, Gabrielle; Palandjian, Philippe; and Isbert, Jacques, 5,024,502, Cl. 350-96 160.
- Ishidoya, Masahiro; Soma, Toru; and Ogawa, Hisao, to Nippon Oil and Fats Co., Ltd. Aqueous dispersion coating material. 5,025,061, Cl 524-539.000.
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- Ishimura, Toshihiko; Okuno, Akira; Tanii, Junichi; and Seki, Reiji, to Minolta Camera Kabushiki Kaisha. Electromagnetic actuator for cameras and the like 5,025,239, Cl. 335-265.000.
- Ishizuki, Tomonori: *See—*
  - Komaki, Toshihiro; Kudo, Hideo; Ishizuki, Tomonori; and Yokozeki, Shinichi, 5,025,439, Cl. 369-100.000.
- Isnardi, Michael A., to RCA Licensing Corporation. Extended definition widescreen television signal processing system 5,025,309, Cl. 358-12.000.
- Isover Saint-Gobain: *See—*
  - Tetart, Serge; and Lericque, Bernard, 5,025,077, Cl. 528-86.000.
- Isukimi, Hayatsugu; and Kikuchi, Reiji, to Mazda Motor Corporation Front body structure of automotive vehicle. 5,024,482, Cl 296-194.000.
- Isuzu Motors Limited: *See—*
  - Kawamura, Hideo, 5,024,057, Cl. 60-597.000.
  - Tanaka, Koji; and Shima, Takashi, 5,024,489, Cl. 303-3.000.
- Itakura, Katsuhiko: *See—*
  - Masuyama, Masaru; Takemae, Yoshihiro; Endoh, Tetsuhiko; Komyoji, Hirosuke; Tanaka, Ryuji; and Itakura, Katsuhiko, 5,025,415, Cl. 365-52.000.
- Itaya, Masahiko: *See—*
  - Shoji, Hisashi; Tamura, Akihiko; Itaya, Masahiko; Fuma, Hiroshi, and Soma, Shinobu, 5,024,181, Cl. 118-658.000.
- Ito, Hideyoshi: *See—*
  - Iwabuchi, Masaburo; Ito, Hideyoshi; and Unetsubo, Kenji, 5,024,867, Cl. 428-40.000.
- Ito, Kazuo. Automobile window opening and closing device. 5,024,022, Cl. 49-139.000.
- Ito, Kiyoshi, to Komori Printing Machinery Co., Ltd. Transfer roller switching mechanisms of ink and water supply apparatus for use in printing presses 5,024,154, Cl. 101-148.000.
- Ito, Koji: *See—*
  - Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; and Okada, Shoji, 5,025,187, Cl. 310-323.000.
- Ito, Masato: *See—*
  - Morishita, Hajime; Hayashi, Nobuaki; Nonogaki, Saburo; Hashimoto, Michiaki; Ito, Masato; Nishizawa, Masahiro; Miura, Kiyoshi; and Odaka, Yoshiyuki, 5,024,920, Cl. 430-325.000.
- Ito, Michio: *See—*
  - Miyakawa, Shinji; and Ito, Michio, 5,024,461, Cl. 280-710.000.
- Ito, Shigehiro: *See—*
  - Koguchi, Tatsushi; Ito, Shigehiro; Ebihara, Kazyuki; and Nishi, Yuji, 5,025,317, Cl. 358-167.000.
- Ito, Toshifumi; Ohta, Atsuo; and Yamashita, Shoji, to Honda Giken Kogyo Kabushiki Kaisha. Reverse drive for vehicle. 5,024,113, Cl. 74-6.000.
- Ito, Yoichiro, to United States of America, Health and Human Services. Horizontal flow-through coil planet centrifuge with multilayer plural coils in eccentric synchronous rotation, suitable for counter-current chromatography. 5,024,758, Cl. 210-198.200.
- Itoh, Hisato; Enomoto, Katashi; Oguchi, Takahisa; and Nishizawa, Tsutomu, to Mitsui Toatsu Chemicals, Incorporated; and Yamamoto Chemicals, Incorporated. Alkylphthalocyanine near-infrared absorbers and recording/display materials using the same. 5,024,926, Cl. 430-495.000.
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- Iwabuchi, Masaburo; Ito, Hideyoshi; and Unetsubo, Kenji, to Kabushiki Kaisha Toshiba. Dopant film and methods of diffusing impurity into and manufacturing a semiconductor wafer. 5,024,867, Cl. 428-40.000.
- Iwamoto, Shinichi, to NEC Corporation. Serial bus interface capable of transferring data in different formats. 5,025,414, Cl. 364-900.000.
- Iwanaga, Kenji: *See—*
  - Yamazaki, Syoji; Oda, Toshikazu; Iwanaga, Kenji; and Gono, Yoshitaka, 5,025,237, Cl. 335-83.000.
- Iwasa, Nobuhiko. Wave dissipating caisson and method for producing thereof. 5,024,796, Cl. 264-69.000.
- Iwasaki, Hiroko: *See—*
  - Yamada, Katsuyuki; Ide, Yukio; Harigaya, Makoto; and Iwasaki. Hiroko, 5,024,927, Cl 430-495.000.

- Iwasaki, Hiroshi: *See—*
  - Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kirahara, Masaki, 5,024,999, Cl. 514-63.000.
- Iwata, Masataka: *See—*
  - Ushio, Sadakatsu; Nakamura, Noboru; Higashi, Hirofumi; Iwata, Masataka; and Niwa, Fumiyasu, 5,024,189, Cl. 123-195.00R.
- Iwatsu Electric Company, Ltd.: *See—*
  - Kamigaki, Masaharu; Oshikata, Hironobu; Kawata, Yoshihiro; Shiga, Nobuyasu; Omori, Hideharu; Kawashima, Masayuki; and Shimatani, Toshimichi, 5,025,441, Cl. 370-77.000.
- Izawa, Nobu: *See—*
  - Shindo, Masamichi; Sakurai, Toshiharu; Taguchi, Hideo; and Izawa, Nobu, 5,025,347, Cl. 361-386.000.
- J E. Love Company: *See—*
  - Huber, Ernst, 5,024,172, Cl. 111-104.000.
- Jabs, Gert: *See—*
  - Klug, Gunter; Jabs, Gert; Berneth, Horst; and Botta, Artur, 5,024,987, Cl. 503-211.000.
- Jackman, William E. Insert for a hydro pole switch. 5,025,120, Cl. 200-49.000.
- Jackovitz, John F.: *See—*
  - Snyder, Thomas S.; Jackovitz, John F.; and Ferrari, Harry M., 5,024,749, Cl. 204-299.00R.
- Jackson, Allen L.: *See—*
  - Sikand, Parminder S.; McAllister, Mary J.; Henel, John; Jackson, Allen L.; and Bell, Karen, 5,025,468, Cl. 379-67.000.
- Jackson, Louis: *See—*
  - Raikes, Terry E.; Kramer, William L.; Howard, John B.; Moore, Wayne D.; Jackson, Louis; and Kotecki, Jeffrey D., 5,024,282, Cl. 177-25.150.
- Jackson, William E., to Donaldson Company, Inc. Method for potting pleated filter media and filters made thereby. 5,024,870, Cl. 428-181.000.
- Jaeger, Hugh D., to W. R. Grace & Co.-Conn. Radio frequency air float bar. 5,024,004, Cl. 34-1.000.
- Jahn, Hans-Georg, to Heidelberger Druckmaschinen AG. Finger protecting element for cylinder nip. 5,024,155, Cl. 101-216.000.
- Jahn, Manfred: *See—*
  - Hahn, Walter, Lutz, Ferdinand; and Jahn, Manfred, 5,024,115, Cl. 74-89.150.
- Jahnke, Kenneth C.: *See—*
  - Buchman, James E.; and Jahnke, Kenneth C., 5,024,642, Cl. 493-193.000.
- Jakobson, Gerald, Siemanowski, Werner; and Uhlig, Karl-Heinz, to Deutsche Solvay-Werke GmbH. Process for the preparation of fatty acid or hydroxy fatty acid esters of isopropylidene derivatives of polyglycerols. 5,024,787, Cl. 260-410.600.
- James, Bertram G, to Varian Associates, Inc. Beam collector with low electrical leakage. 5,025,193, Cl. 315-5.380.
- Jamieson, Donald R.: *See—*
  - Zupancic, Joseph J.; Swedo, Raymond J.; Jamieson, Donald R.; Schumacher, Elaine F.; and Buehler, Allyson J., 5,025,079, Cl. 528-170.000.
- Janas, Victor F.: *See—*
  - Allaire, Roger A.; Friske, Mark S.; Hagg, Sandra L.; and Janas, Victor F., 5,024,978, Cl. 501-95.000.
- Jansen, Michael; Sergant, Moshe; Ou, Szutsun S.; Wilcox, Jaroslava Z.; Yang, Jane J.; and Eaton, Larry R., to TRW Inc. Two-dimensional integrated laser array. 5,025,451, Cl. 372-50.000.
- Janssen, Augustus J. E. M.; Veldhuis, Raymond N. J.; Prins, Hendrik J.; and Vries, Lodewijk B., to U.S. Philips Corporation. Method of correcting erroneous values of samples of an equidistantly sampled signal and device for carrying out the method. 5,025,404, Cl. 364-723.000.
- Janssen Pharmaceutica N.V.: *See—*
  - Janssens, Frans E.; Torremans, Joseph L. G.; and Hens, Jozef F., 5,025,014, Cl. 514-258.000.
- Janssens, Frans E.; Torremans, Joseph L. G.; and Hens, Jozef F., to Janssen Pharmaceutica N.V. Bicyclic heterocyclyl containing N-(bicyclic heterocyclyl)-4-piperidinamines as pharmaceuticals. 5,025,014, Cl. 514-258.000.
- Japan Defense Agency: *See—*
  - Yasui, Yoshiharu; Anahara, Meiji; Asahi, Goro; and Miyake, Shiro, 5,024,874, Cl. 428-257.000.
- Japan Electronic Control Systems Co., Ltd.: *See—*
  - Kobayashi, Kazumitsu; and Sunou, Hiroki, 5,024,201, Cl. 123-531.000.
- Jarochowski, Wit. Electromagnetic escapement for mechanically driven watch or clock. 5,025,428, Cl. 368-126.000.
- Jarry, Jacques: *See—*
  - Gloanec, Maurice; Jarry, Jacques; and Lailler, Jean L., 5,025,212, Cl. 324-158.00R.
- Jaspers, Martinus J.: *See—*
  - Van Der Hoorn, Rudolf J.; Jaspers, Martinus J.; and Bak, Johannes J., 5,023,975, Cl. 17-46.000.
- Jay, Jerry L., Sr.; and Holifield, William R., III. Pneumatic desedimentation machine improvement. 5,024,245, Cl. 134-108.000.
- Jebens, Robert W., to AT&T Bell Laboratories. Shape memory alloy optical fiber switch. 5,024,497, Cl. 350-96.200.
- Jeffers, Frederick J., to Eastman Kodak Company. Radiographic imaging screen. 5,025,163, Cl. 250-483.100.
- Jeffries, Alfred T., III: *See—*
  - Blakeney, Andrew J.; Jeffries, Alfred T., III; and Sarubbi, Thomas R., 5,024,921, Cl. 430-326.000.
- Jerie, Hans G., to Ambridge Limited. Map projection system. 5,024,523, Cl. 353-11.000.
- Jetzer, Gregor; Kolb, Roland; and Spinnler, Fritz, to Asea Brown Boveri Ltd. Spiral displacement machine having a lubricant system. 5,024,589, Cl. 418-55.300.
- JI. Case Corporation: *See—*
  - Warner, Steven D.; and Stufflebeam, John F., 5,024,279, Cl. 172-1.000.
- Jidoshi Denki Kogyo K.K.: *See—*
  - Sekine, Shuji; and Harada, Naoto, 5,025,184, Cl. 310-71.000.
- JMK International, Inc.: *See—*
  - Gibbon, Robert M., 5,024,863, Cl. 427-387.000.
- JML Communications, Inc.: *See—*
  - Keyser, George T., Jr.; Fosler, Carl R.; and Johnson, Jeffrey D., 5,025,373, Cl. 364-408.000.
- Johary, Arun; and Rosenau, Mark A., to Chips and Technologies, Inc. Method and apparatus for scaling interlaced images. 5,025,315, Cl. 358-140.000.
- Johns Hopkins University, The: *See—*
  - Hogrefe, Arthur F., 5,025,454, Cl. 375-41.000.
- Johnson, Brian: *See—*
  - Wendt, Richard W.; and Johnson, Brian, 5,025,399, Cl. 364-519.000.
- Johnson, Charles R.: *See—*
  - Hull, Edwin J., Jr.; and Johnson, Charles R., 5,024,069, Cl. 70-209.000.
- Johnson, Chris A.: *See—*
  - Howard, Dwight L.; and Johnson, Chris A., 5,024,519, Cl. 351-226.000.
- Johnson, David W. Interlocking support structures. 5,024,036, Cl. 52-600.000.
- Johnson, Jeffrey D.: *See—*
  - Keyser, George T., Jr.; Fosler, Carl R.; and Johnson, Jeffrey D., 5,025,373, Cl. 364-408.000.
- Johnson, Marvin M: *See—*
  - Tooley, Patricia A., Cheung, Tin-Tack P.; Cymbaluk, Ted H., Nowack, Gerhard P.; and Johnson, Marvin M., 5,024,683, Cl. 55-74.000.
- Johnson, Randall E.; and Drumm, James M., to Texas Instruments Incorporated. Assembly of semiconductor chips. 5,025,306, Cl. 357-75.000.
- Johnson, Ronald E.: *See—*
  - Grossman, David G.; Karnas, Michael A, and Johnson, Ronald E., 5,024,790, Cl. 264-16.000.
- Johnson Service Company: *See—*
  - Van Fossen, Robert A.; Spence, Scott L.; and DeWitt, Donald E., 5,024,294, Cl. 184-108.000
- Johnston, William H., to CSL Group Inc., The. Bulk material reclaiming apparatus. 5,024,568, Cl. 414-142.200.
- Jones, Graham P.: *See—*
  - Gates, Peter S.; and Jones, Graham P., 5,024,693, Cl. 71-92.000.
- Jones, Ralph W., Jr.: *See—*
  - Evans, Francis J.; Jones, Ralph W., Jr; and Wilson, Robert D, 5,024,931, Cl. 430-567.000.
- Jones, Robert L.; and Wilson, Norman H., to National Research Development Corporation. Prostaglandins. 5,025,034, Cl. 514-529.000.
- Jones, William J.; and Appleyard, Ian P., to Tioxide Group, PLC. Fine particulate material. 5,024,827, Cl. 423-610.000.
- Jorissen, Steven A.; Lundy, Charles E.; Krishnan, Sivaram; Mafoti, Robson; and Pyles, Robert A., to Mobay Corporation. Thermoplastic compositions having improved melt flow. 5,025,056, Cl. 524-310.000.
- Joseph, William A., Jr.: *See—*
  - Fortmann, Robert C.; Pinnow, Curtis C.; Kuschewski, Gustav; and Joseph, William A., Jr., 5,025,132, Cl. 219-401.000.
- Jou, Huey-Ling L.: *See—*
  - Yang, Huey-Lang; Todd, John; and Jou, Huey-Ling L., 5,024,933, Cl. 435-6.000.
- Jouillat, Claude; and Brunet, Michel, to Societe Technique de Pulverisation—STEP. Device for dispensing a liquid or a cream in small-volume drops, and an associated dispensing assembly. 5,024,355, Cl. 222-162.000.
- Jubin, Robert T.; and Randolph, John D., to United States of America, Energy. Centrifugal contactor with liquid mixing and flow control vanes and method of mixing liquids of different phases. 5,024,647, Cl. 494-37.000.
- Jude, Arthur D. Transmitter in arrow. 5,024,447, Cl. 273-416.000.
- Juhlke, Timothy J.: *See—*
  - Lagow, Richard J.; Bierschenk, Thomas R.; Juhlke, Timothy J.; and Kawa, Hajimu M., 5,025,093, Cl. 568-601.000.
- Junji; and Tamura, Fumiaki. Array splice for ribbon-like multi-core optical fibers. 5,024,505, Cl. 350-96.220.
- Juridical Foundation The Chemo-Sero-Therapeutic Research Institute: *See—*
  - Nozaki, Chikateru; Miyanohara, Atsushi; Hamada, Fukusaburo; Ohtomo, Nobuya; and Matsubara, Kenichi, 5,024,938, Cl. 435-68.100.
- Juriga, James A.: *See—*
  - Oliver, James L.; Juriga, James A.; Walton, Erlen B.; and Preston, David M., 5,024,463, Cl. 280-718.000.
- Kabushiki Kaisha Shinkawa: *See—*
  - Terakado, Yoshimitsu; and Yamazaki, Nobuto, 5,024,367, Cl. 228-111.000.
- Kabushiki Kaisha Toshiba: *See—*
  - Asoh, Syoichi, 5,025,418, Cl. 365-200.000.
  - Imai, Toshiaki, 5,025,389, Cl. 364-497.000.
  - Iwabuchi, Masaburo; Ito, Hideyoshi; and Unetsubo, Kenji, 5,024,867, Cl. 428-40.000.
  - Kondo, Hitoshi; Suwabe, Hiroyuki; and Kojima, Aiki, 5,025,230, Cl. 331-116.0FE.

VOL
1127
ISS
3
JE
18
1991
UMI

  - Miyamoto, Junichi; Ohtsuka, Nobuaki; Yoshikawa, Kuniyoshi; and Mori, Seiichi, 5,025,417, Cl. 365-189.090.
  - Miyata, Yukitaka; Wada, Hiroyuki; and Nishimura, Takashi, 5,025,166, Cl. 250-492.100.
  - Okabe, Yoshie, 5,025,475, Cl. 382-1.000.
  - Saito, Yasuo; Fujimoto, Seiji; Nobuta, Yasuo; and Yamazaki, Masahiko, 5,025,462, Cl. 378-19.000.
  - Saito, Yasuo; Yahata, Mitsuru; Honjo, Kouji; and Matsubayashi, Takayuki, 5,025,463, Cl. 378-19.000.
  - Shimmyo, Takashi, 5,025,326, Cl. 358-498.000.
  - Shindo, Masamichi; Sakurai, Toshiharu; Taguchi, Hideo; and Izawa, Nobu, 5,025,347, Cl. 361-386.000.
  - Sugawara, Michitaka, 5,025,375, Cl. 364-413.220.
  - Taketani, Mitsuhiro, 5,024,544, Cl. 400-692.000.
  - Tomisawa, Yutaka; Fukuda, Toshikazu; and Inoue, Kazuhiko, 5,025,305, Cl. 357-72.000.
  - Yaguchi, Toshiyuki, 5,025,210, Cl. 324-158.00R.
  - Yamanari, Masaya; and Ikeda, Masami, 5,025,484, Cl. 382-61.000.
  - Yamashita, Hiroshi; Tago, Yoshiaki; and Yoshimaru, Tomohisa, 5,025,437, Cl. 369-79.000.
- Kabushiki Kaisha Toyoda Jidoshokki: *See—*
  - Kawabata, Susumu; Yoshida, Kazunori; Kisanuki, Yoshikatsu; Suzuki, Hajime; and Shiraki, Masao, 5,024,253, Cl. 139-99.000.
- Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
  - Yasui, Yoshiharu; Anahara, Meiji; Asahi, Goro; and Miyake, Shiro, 5,024,874, Cl. 428-257.000.
- Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
  - Kawabata, Susumu; Yoshida, Kazunori; Kisanuki, Yoshikatsu; Suzuki, Hajime; and Shiraki, Masao, 5,024,253, Cl. 139-99.000.
  - Nagano, Susumu; Kawazoe, Hiromitsu; and Ohsawa, Katsuyuki, 5,024,184, Cl. 123-48.00R.
- Kabushiki Kaisha Universal: *See—*
  - Okada, Kazuo, 5,024,439, Cl. 273-143.00R.
- K.K. Sankto Seiki Seisakusho: *See—*
  - Komatsu, Fumito; Usuki, Hideo; and Oguchi, Yuzo, 5,024,088, Cl. 73-517.00B.
- Kachlic, Jerry D., to Molex Incorporated Grounding electrical connector. 5,024,607, Cl. 439-567.000.
- Kaczmarczyk, Raymond A., Jr.: *See—*
  - Gerling, Joseph F.; and Kaczmarczyk, Raymond A., Jr., 5,024,356, Cl. 222-312.000.
- Kada, Katsuhiko: *See—*
  - Suganuma, Katsuaki; Fujii, Hiroyuki; Minakuchi, Hiroyoshi; Kada, Katsuhiko; Osafune, Haruo; and Kanamaru, Kuniaki, 5,024,902, Cl. 428-633.000.
- Kade, Alexander: *See—*
  - Shaw, Schuyler S.; Hallinan, Linda L.; Hammersmith, Robert J.; Schenk, Donald E.; DeHoff, Edward J.; and Kade, Alexander, 5,024,299, Cl. 188-156.000.
- Kadija, Igor V. Method and apparatus for manufacturing interconnects with fine lines and spacing. 5,024,735, Cl. 204-15.000.
- Kafka, Fred Y.: *See—*
  - Christeil, Lance A.; and Kafka, Fred Y., 5,025,044, Cl. 523-334.000.
- Kagaani Elektroniikka OY: *See—*
  - Ritala, Risto; Laakso, Mikko; and Koponen, Jari, 5,025,154, Cl. 250-308.000.
- Kagaya, Shinichi: *See—*
  - Kuruma, Kiyoshi; Abe, Masaki; Kagechika, Hiroshi; and Kagaya, Shinichi, 5,024,900, Cl. 428-626.000.
- Kagechika, Hiroshi: *See—*
  - Kuruma, Kiyoshi; Abe, Masaki; Kagechika, Hiroshi; and Kagaya, Shinichi, 5,024,900, Cl. 428-626.000.
- Kahl, W. Henry; Price, David E.; and Tsao, Nai-Cheng, to Rubbermaid Incorporated. Safety release latch. 5,024,471, Cl. 292-97.000.
- Kahler, Jeffrey A., to Honeywell Inc. Horizontal stabilizer motion detector. 5,025,378, Cl. 364-424.060.
- Kaji, Hiroo: *See—*
  - Katsura, Toru; Kaji, Hiroo; Hyodo, Kenji; and Ohkura, Hirokazu, 5,024,986, Cl. 503-200.000.
- Kajimoto, Chikara: *See—*
  - Omata, Tetsuo; Senda, Shuji; Tanaka, Tamaki; Kumagai, Eriko; Kajimoto, Chikara; and Nakazono, Yutaka, 5,024,832, Cl. 424-84.000.
- Kaken Pharmaceutical Co., Ltd.: *See—*
  - Nagato, Shoir; Taguchi, Ryusuke; Hirai, Kenji, Hirose, Hiroaki; and Yokota, Masahiro, 5,024,692, Cl. 71-86.000.
- Kakiuchi, Shinichi: *See—*
  - Yamagishi, Hisashi; Kakiuchi, Shinichi; and Tomita, Seisuke, 5,024,444, Cl. 273-232.000.
- Kalos, Matthew J.: *See—*
  - Casper, Daniel F.; Flanagan, John R.; Gregg, Thomas A.; Huang, Catherine C.; and Kalos, Matthew J., 5,025,458, Cl. 375-114.000.
- Kaltenbronn, James S.: *See—*
  - Doherty, Annette M.; Hudspeth, James P., Kaltenbronn, James S.; Repine, Joseph T.; Roark, William H.; Sircar, Ila; and Tinney, Francis J., 5,024,994, Cl. 514-18.000.
- Kamata, Hiroshi: *See—*
  - Kishiro, Osamu; Kamata, Hiroshi; and Sakai, Hideko, 5,025,082, Cl. 528-190.000.
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- Kameyama, Takuma, to Sanshin Kogyo Kabushiki Kaisha. Oil supply device for two cycle engine. 5,024,190, Cl. 123-196.00R.
- Kami, Hironori: *See—*
  - Arakawa, Masao; Terasawa, Tomizo; Ogawa, Masanobu; and Kami, Hironori, 5,025,169, Cl. 250-574.000.
- Kamigaki, Masaharu; Oshikata, Hironobu; Kawata, Yoshihiro; Shiga, Nobuyasu; Omori, Hideharu; Kawashima, Masayuki; and Shimatani, Toshimichi, to Iwatsu Electric Company, Ltd. Key telephone system. 5,025,441, Cl. 370-77.000.
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- Kamman, Zora R. Swing rocker apparatus and furniture using same. 5,024,483, Cl. 297-273.000.
- Kampe, Wolfgang: *See—*
  - Reinholz, Erhard; Friebe, Walter-Gunar; Kampe, Wolfgang; Mertin, Jurgen; and Wilhelms, Otto-Henning, 5,025,028, Cl. 514-381.000.
- Kanai, Masahiro; Aoike, Tatsuyuki; Matsuda, Koichi; and Kawakami, Soichiro, to Canon Kabushiki Kaisha. Pin heterojunction photovoltaic elements with polycrystal AlP(H,F) semiconductor film. 5,024,706, Cl. 136-258.000.
- Kanamaru, Kuniaki: *See—*
  - Suganuma, Katsuaki; Fujii, Hiroyuki; Minakuchi, Hiroyoshi; Kada, Katsuhiko; Osafune, Haruo; and Kanamaru, Kuniaki, 5,024,902, Cl. 428-633.000.
- Kanegafuchi Chemical Industry Co., Ltd.: *See—*
  - Murakami, Satoru; Yamaguchi, Minori; Hayashi, Akimine; Kondo, Masataka; and Tawada, Yoshihisa, 5,025,297, Cl. 357-30.000.
- Kaneko, Katsuhiko; and Nishida, Minoru, to Nishimatsu Co., Ltd.; and Tokin Corporation. Stonework crusher. 5,024,388, Cl. 241-301.000.
- Kaneko, Yutaka: *See—*
  - Kita, Hiroshi; Wada, Hajime; and Kaneko, Yutaka, 5,024,930, Cl. 430-558.000.
- Kanno, Tatsuya: *See—*
  - Ueda, Mitsuru; Kanno, Tatsuya; Iguchi, Yoshihiro; and Oshino, Yasuhiro, 5,025,083, Cl. 528-199.000.
- Kanno, Tetsuo; Kotake, Yasushi; and Inada, Hitoshi, to Ricoh Company, Ltd. Disk drive apparatus with oil damper on eject lever. 5,025,339, Cl. 360-99.060.
- Kanoe, Yasuo: *See—*
  - Tsukada, Shuya; Mochinaga, Nobuyuki; and Kanoe, Yasuo, 5,024,541, Cl. 400-88.000.
- Kanouse, Richard C.: *See—*
  - Pierce, Kirby L.; and Kanouse, Richard C., 5,024,028, Cl. 51-432.000.
- Kansai Paint Co., Ltd.: *See—*
  - Yabuta, Motoshi; Nakao, Yasushi, Sugiura, Shinji; Fukuda, Mitsuhiro; and Miyamoto, Yuzo, 5,025,060, Cl. 524-533.000.
- Kao Corporation: *See—*
  - Deguchi, Katsuhiko; Saito, Kozo; Saijo, Hiroyuki; and Tosaka, Masaki, 5,025,069, Cl. 252-174.170.
  - Moriyama, Noboru; Ogura, Tsugitoshi; and Hiraki, Akio, 5,024,676, Cl. 44-301.000.
  - Tanaka, Nobuhiro; Hirata, Eiji; Moriguchi, Hideyuki; Azekura, Ko; Tsubone, Akira; and Ryu, Yasunori, 5,024,572, Cl. 414-276.000.
- Kaplan, Steve E., to Multilink, Inc. Cable stripping device. 5,023,995, Cl. 30-90.100.
- Karanewsky, Donald S., to E. R. Squibb & Sons, Inc. Phosphorus-containing HMG-CoA reductase inhibitor compounds. 5,025,000, Cl. 514-80.000.
- Karanewsky, Donald S., to E. R. Squibb & Sons, Inc. Seco-mevinic acid derivatives useful as antihypercholesterolemic agents and new intermediates. 5,025,017, Cl. 514-277.000.
- Karhumaki, Markku. Engagement profile or beam. 5,024,039, Cl. 52-735.000.
- Karlsson, Lars-Ake, to Metsa-Serla OY. Tear-edge guard. 5,024,362, Cl. 225-20.000.
- Karnas, Michael A.: *See—*
  - Grossman, David G.; Karnas, Michael A.; and Johnson, Ronald E., 5,024,790, Cl. 264-16.000.
- Karnopp, Dean, to Robert Bosch GmbH. Apparatus for damping courses of motion. 5,024,302, Cl. 188-299.000.
- Karpiel, John, to Wilson-Cook Medical, Inc. Sphincterotomy method and device having controlled bending and orientation. 5,024,617, Cl. 606-47.000.
- Kasahara, Takeshi, to Toko, Inc. Variable-capacitance diode element having wide capacitance variation range. 5,024,955, Cl. 437-27.000.
- Kasatani, Yasushi; and Tachikawa, Toru, to Mitsubishi Denki Kabushiki Kaisha. Connecting electrode. 5,024,605, Cl. 439-500.000.
- Kashimura, Masashi: *See—*
  - Hanada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, 5,024,893, Cl. 428-423.100.
- Kaspar, Melvin: *See—*
  - Kostos, Jeffery; Kaspar, Melvin; and Artwohl, Paul, 5,024,023, Cl. 49-501.000.
- Kastner, Arnold. Stapleless stapler. 5,024,643, Cl. 493-351.000.
- Katagiri, Moriya: *See—*
  - Inoue, Takashi; Suzuki, Tatsuya; Kimura, Akiteru; Miyazaki, Hiroaki; and Katagiri, Moriya, 5,025,277, Cl. 354-173.100.
- Kato, Kanami, to Signode Corporation. Binding strap operating apparatus. 5,024,149, Cl. 100-32.000.

- Kato, Masahiko: *See—*
  - Nishii, Michiharu; Mizuno, Genji; Nomura, Yoshihisa; and Kato, Masahiko, 5,024,492, Cl. 303-114.000.
- Kato, Mikihiko: *See—*
  - Endo, Yasushi; Kato, Mikihiko; Kawamata, Toshio; and Masaki, Kouichi, 5,024,885, Cl. 428-329.000.
- Kato, Takahiro, to Pioneer Electronic Corporation. Automotive mileage calculating apparatus. 5,025,401, Cl. 364-561.000.
- Katoh, Katsuaki: *See—*
  - Itoh, Takashi; and Katoh, Katsuaki, 5,024,905, Cl. 429-44.000.
- Katraro, Reuven: *See—*
  - Linder, Charles; Perry, Mordechai; Nemas, Mara; and Katraro, Reuven, 5,024,765, Cl 210-651.000.
- Katsuaki, Muraishi, to Fuji Film Co., Ltd. Light scanning system for a stimulable sheet including vacuum and roller sheet holding means. 5,025,157, Cl. 250-327.200.
- Katsura, Toru; Kaji, Hiroo; Hyodo, Kenji; and Ohkura, Hirokazu, to Mitsubishi Paper Mills Limited. Heat sensitive recording paper. 5,024,986, Cl. 503-200.000.
- Katsuragi, Kohei, to Nihon Chikasui Kaihatsu Kabushiki Kaisha. Non-water-sprinkling type snow melting method and system. 5,024,553, Cl. 404-71.000.
- Katsuyama, Koji: *See—*
  - Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Karuhiko; and Nagai, Takeshi, 5,024,264, Cl. 165-1.000.
- Katz, Leonoard R.: *See—*
  - Miller, Phillip E.; Katz, Leonoard R.; Nath, Raymond J.; Blaushild, Ronald M.; Tatch, Michael D.; Kordalski, Frank J.; Wykstra, Donald T.; and Kavalkovich, William M., 5,025,129, Cl. 219-201.000.
- Kaufman, Jerry M., to Hemedix International, Inc. Composite catheter assembly. 5,024,665, Cl. 604-179.000.
- Kavalkovich, William M.: *See—*
  - Miller, Phillip E.; Katz, Leonoard R.; Nath, Raymond J.; Blaushild, Ronald M.; Tatch, Michael D.; Kordalski, Frank J.; Wykstra, Donald T.; and Kavalkovich, William M., 5,025,129, Cl 219-201.000.
- Kavanagh, Dean L.; and Simon, Robert H M., to Monsanto Company. Laminate for a safety glazing. 5,024,895, Cl. 428-437.000.
- Kawa, Hajimu M.: *See—*
  - Lagow, Richard J.; Bierschenk, Thomas R.; Juhlke, Timothy J.; and Kawa, Hajimu M., 5,025,093, Cl. 568-601.000.
- Kawabata, Susumu; Yoshida, Kazunori; Kisanuki, Yoshikatsu; Suzuki, Hajime; and Shiraki, Masao, to Kabushiki Kaisha Toyota Chuo Kenkyusho; and Kabushiki Kaisha Toyoda Jidoshokki. System for controlling warp take up and let off rates. 5,024,253, Cl. 139-99.000.
- Kawada, Hiroyuki, to Sugiyasu Industries Co., Ltd. Method for the synchronous operation of juxtaposed cylinder devices. 5,024,141, Cl. 91-171.000.
- Kawaguchi, Masaaki; Okamuro, Tomio; and Shirose, Keiichi, to Honda Giken Kogyo Kabushiki Kaisha. Vibration suppression apparatus for steering wheel with air bag. 5,024,464, Cl. 280-731.000.
- Kawajiri, Kazuhiro: *See—*
  - Mutoh, Hideki; Oda, Kazuya; and Kawajiri, Kazuhiro, 5,025,319, Cl. 358-213.290.
- Kawakami, Fukushi: *See—*
  - Shimizu, Yasushi; and Kawakami, Fukushi, 5,025,472, Cl. 381-63.000.
- Kawakami, Katsura: *See—*
  - Gurd, John R.; and Kawakami, Katsura, 5,025,367, Cl. 364-200.000.
- Kawakami, Shin; Nikaido, Katsutomo; and Ichikawa, Junichi, to Nippon CMK Corp. Printed wiring board having electromagnetic wave shielding layer. 5,025,116, Cl. 174-250.000.
- Kawakami, Soichiro: *See—*
  - Kanai, Masahiro; Aoike, Tatsuyuki; Matsuda, Koichi; and Kawakami, Soichiro, 5,024,706, Cl. 136-258.000.
- Kawamata, Toshio *See—*
  - Endo, Yasushi; Kato, Mikihiko; Kawamata, Toshio; and Masaki, Kouichi, 5,024,885, Cl. 428-329.000.
- Kawamura, Hideo, to Isuzu Motors Limited. Exhaust-driven electric generator system for internal combustion engines. 5,024,057, Cl. 60-597.000.
- Kawamura, Isao: *See—*
  - Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Karuhiko; and Nagai, Takeshi, 5,024,264, Cl. 165-1.000.
- Kawamura, Masahiro: *See—*
  - Yoshiga, Norio; Kawamura, Masahiro; and Nonoyama, Hiroshi, 5,024,891, Cl. 428-414.000.
- Kawanishi, Masaki: *See—*
  - Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.
- Kawashima, Masayuki: *See—*
  - Kamigaki, Masaharu; Oshikata, Hironobu; Kawata, Yoshihiro; Shiga, Nobuyasu; Omori, Hideharu; Kawashima, Masayuki; and Shimatani, Toshimichi, 5,025,441, Cl. 370-77.000.
- Kawasuji, Keiji: *See—*
  - Sone, Toshiyuki; Matsumoto, Takehiko; Omotezako, Nobuya; and Kawasuji, Keiji, 5,025,338, Cl. 360-99.060.
- Kawata, Yoshihiro: *See—*
  - Kamigaki, Masaharu; Oshikata, Hironobu; Kawata, Yoshihiro, Shiga, Nobuyasu; Omori, Hideharu; Kawashima, Masayuki; and Shimatani, Toshimichi, 5,025,441, Cl. 370-77.000.
- Kawazoe, Hiromitsu: *See—*
  - Nagano, Susumu; Kawazoe, Hiromitsu; and Ohsawa, Katsuyuki, 5,024,184, Cl. 123-48.00R.
- Kazmark, Eugene A.; and Kazmark, Eugene A., Jr. Portable luggage carrier with pivotable wheels. 5,024,458, Cl. 280-645.000.
- Kazmark, Eugene A., Jr.: *See—*
  - Kazmark, Eugene A.; and Kazmark, Eugene A., Jr , 5,024,458, Cl. 280-645.000.
- Keeler, Preston J., III: *See—*
  - Vasconcellos, Alfred V.; and Keeler, Preston J., III, 5,024,613, Cl. 604-4.000.
- Keen, Billy J., Jr.: *See—*
  - Garthaffner, Martin T.; Keen, Billy J , Jr., Gillespie, Andrew J., Wheless, Jack C.; and Dingus, George W., 5,024,242, Cl. 131-94.000.
- Keenan, W. Russ: *See—*
  - Mydill, Marc R.; Pile, Sam R.; O'Keefe, Sheila, Okerblom, Neal F., and Keenan, W. Russ, 5,025,205, Cl. 324-73.100.
- Kelch, Thomas: *See—*
  - Meinherz, Manfred, Veuhoff, Freidrich-Wilh; Gilmozzi, Gunther; and Kelch, Thomas, 5,025,118, Cl. 200-148.00R.
- Kelman, David C.: *See—*
  - Smith, Todd S.; and Kelman, David C., 5,024,670, Cl. 623-18.000.
- Kemper, John J., to Kemper, John Joseph. Easily removable oil filter. 5,024,760, Cl. 210-232.000.
- Kemper, John Joseph: *See—*
  - Kemper, John J., 5,024,760, Cl. 210-232.000.
- Kempers, Torben P.: *See—*
  - Hamersma, Wilhelmus J. L. A.; Kempers, Torben P ; and Roovers, Wilhemus M. M., 5,025,055, Cl. 524-269.000.
- Kendall Company, The: *See—*
  - Ovassapian, Andranik; and Dye, John F., 5,024,218, Cl. 128-200.260.
- Kenmotsu, Isami: *See—*
  - Funabashi, Tadashi; and Kenmotsu, Isami, 5,025,440, Cl 369-199.000.
- Kennametal Inc.: *See—*
  - Mehrotra, Pankaj K.; and Billman, Elizabeth R., 5,024,976, Cl. 501-89.000.
- Kennedy, Christopher R.; and Newkirk, Marc S., to Lanxide Technology Company, LP. Method of making shaped ceramic composites. 5,024,795, Cl. 264-59.000.
- Kennedy, David L.; True, Donald C.; and Welsh, David M., to Imperial Chemical Industries PLC. Multi-directional initiator for explosives. 5,024,158, Cl. 102-275.110.
- Kenney, George B.: *See—*
  - Ashdown, Charles P.; Bewley, James G., and Kenney, George B., 5,024,695, Cl. 75-338.000.
- Kenney, M. Cristina: *See—*
  - Nesburn, Anthony B.; Gorin, Michael, Martinez, Marvin; Kenney, M. Cristina; and Maguen, Ezra, 5,024,742, Cl. 204-157.680.
- Kerrey, John S.: *See—*
  - Cioffi, Joseph V.; and Kerrey, John S., 5,024,806, Cl. 376-352.000.
- Kersting, Hermann: *See—*
  - Harig, Horst; and Kersting, Hermann, 5,024,630, Cl. 460-21.000.
- Kessler, David: *See—*
  - Parulski, Kenneth A.; and Kessler, David, 5,025,313, Cl 358-54.000.
- Kessler, Lawrence: *See—*
  - Fantozzi, Louis R.; Kessler, Lawrence; and Draxler, Richard, 5,024,493, Cl. 350-1.300.
- Ketcham, Raymond H. Device for hanging outdoor Christmas lights. 5,024,406, Cl. 248-149.000.
- Kettenbauer, Franz. Process and device suitable for thermally processing a material comprising thermally degradable and thermally-resistant substances. 5,024,598, Cl. 432-59.000.
- Keturakis, Andrius A.: *See—*
  - Germer, Warren R.; Coryea, Peter F.; Keturakis, Andrius A.; Masury, David H.; and Stevens, Thomas H., 5,025,206, Cl. 324-74.000.
- Keyser, George T., Jr.; Fosler, Carl R.; and Johnson, Jeffrey D., to JML Communications, Inc. Portable personal-banking system. 5,025,373, Cl. 364-408.000.
- Khalifa, Mustafa A.; and Chapp, James, Jr., to Chrysler Corporation. Steering column guide structure. 5,024,118, Cl. 74-492.000.
- Khorramian, Behrooz A.: *See—*
  - Hardin, Tommy G.; and Khorramian, Behrooz A., 5,024,506, Cl. 350-96.230.
- Kidd, ALexander D., to Carroll, Noel, a part interest. Gyroscopic apparatus. 5,024,112, Cl. 74-5.370.
- Kihara, Hiroyuki; and Omori, Hideki, to Seiko Seiki Kabushiki Kaisha. Control system of grinding machine. 5,024,025, Cl. 51-165.770.
- Kikuchi, Reiji: *See—*
  - Isukimi, Hayatsugu; and Kikuchi, Reiji, 5,024,482, Cl. 296-194.000.
- Kikuchi, Toshihiro: *See—*
  - Neishi, Toshie; Kikuchi, Toshihiro; Takiguchi, Takao; Suzuki, Koichi; and Matsumoto, Masakazu, 5,024,912, Cl. 430-59.000.
- Kikuchi, Toshiyuki: *See—*
  - Seki, Nobuyoshi; Morii, Nobuyuki; Sugiyama, Yoshihide; Komada, Takashi; Hosoi, Masatoshi; Hujiwara, Atuhisa; Ichinose, Tsutomu; Mori, Goro; Kikuchi, Toshiyuki; and Minato, Masahiro, 5,024,430, Cl. 270-53.000.

VOL
1127
ISS
3
JE
18
1991
UMI

- Kim, Henry I. Desoldering vat. 5,024,366, Cl. 228-56.100.
- Kim, Heung S.; and Myung, Chan K., to SamSung Semiconductor and Telecommunication Co. Ltd. TTL to ECL voltage level translator. 5,025,180, Cl. 307-475.000.
- Kimberly-Clark Corporation: *See—*
  - Soerens, Dave A., 5,025,046, Cl. 524-72.000.
- Kimura, Akiteru: *See—*
  - Inoue, Takashi; Suzuki, Tatsuya; Kimura, Akiteru; Miyazaki, Hiroaki; and Katagiri, Moriya, 5,025,277, Cl. 354-173.100.
- Kimura, Masatoshi, to Mitsubishi Denki Kabushiki Kaisha. Portable semiconductor memory device. 5,025,420, Cl. 365-230.010.
- Kimura, Youichi: *See—*
  - Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.
- King, Stephen W., to Union Carbide Chemicals and Plastics Technology Corporation. Heterogeneous alkoxylation using anion-bound metal oxides. 5,025,094, Cl. 568-623.000.
- Kino, Hirotoshi: *See—*
  - Kubota, Jun; Kino, Hirotoshi; Musha, Yosinori; and Okada, Hisao, 5,024,094, Cl. 73-634.000.
  - Sasaki, Souji; Kino, Hirotoshi; Musha, Yoshinori; Kubota, Jun; and Okada, Hisao, 5,024,093, Cl. 73-633.000.
- Kinoshita, Jiro: *See—*
  - Kurakake, Mitsuo; and Kinoshita, Jiro, 5,025,200, Cl. 318-569.000.
- Kinoshita, Yoshimi: *See—*
  - Kobayashi, Toshiyuki; Koshinaka, Masao; Kinoshita, Yoshimi; Oda, Masao; and Yoshizawa, Kenji, 5,024,182, Cl. 118-723.000.
- Kinoshita, Yoshio; and Nawa, Mitsuharu, to NSK Warner K.K. One-way clutch and holder for torque transmitting members thereof. 5,024,308, Cl. 192-41.00A.
- Kinze Manufacturing, Inc.: *See—*
  - Deckler, Harry C., 5,024,173, Cl. 111-178.000.
- Kirahara, Masaki: *See—*
  - Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kirahara, Masaki, 5,024,999, Cl. 514-63.000.
- Kirikami, Seiichi: *See—*
  - Sato, Isao; Kirikami, Seiichi; Shimura, Akira; Hirose, Fumiyuki; Inose, Hiroshi; Urushidani, Haruo; and Arai, Osamu, 5,024,055, Cl. 60-39.270.
- Kiriseko, Tadashi; Tani, Hiromichi; Soma, Noriko; Shigemi, Nobuhisa; and Toyoda, Takayuki, to Fujitsu Limited. Continuous semiconductor substrate processing system. 5,024,570, Cl. 414-222.000.
- Kirkman, Kenneth G. Apparatus and method for collecting shellfish and the like. 5,024,009, Cl. 37-55.000.
- Kirsch, Donald R.: *See—*
  - Aklonis, Carol A.; Ax, Helen A.; Kirsch, Donald R.; O'Sullivan, Joseph; Tymiak, Adrienne; and Wells, J. Scott, 5,024,839, Cl. 424-115.000.
- Kisanuki, Yoshikatsu: *See—*
  - Kawabata, Susumu; Yoshida, Kazunori; Kisanuki, Yoshikatsu; Suzuki, Hajime; and Shiraki, Masao, 5,024,253, Cl. 139-99.000.
- Kishiro, Osamu; Kamata, Hiroshi; and Sakai, Hideko, to Mitsubishi Kasei Corporation. Aromatic polyester, aromatic polyester-amide and processes for producing the same. 5,025,082, Cl. 528-190.000.
- Kita, Hiroshi; Wada, Hajime; and Kaneko, Yutaka, to Konica Corporation. Silver halide photographic light-sensitive material containing a Novel photographic coupler. 5,024,930, Cl. 430-558.000.
- Kitagawa, Isao. Bulk material feeder provided with internal cleaning mechanism. 5,024,561, Cl. 406-173.000.
- Kitamura, Shigeharu; Nakamura, Haruhiko; and Sanada, Masaru, to Mitsubishi Denki Kabushiki Kaisha. Escalator system with convertible steps for wheel chair. 5,024,314, Cl. 198-333.000.
- Kitano, Hirohisa: *See—*
  - Matsubara, Ken; Saito, Itaru; Kitano, Hirohisa; Shingaki, Kouichi; and Masuda, Tomohiko, 5,024,511, Cl. 350-356.000.
- Kitazawa, Toshiyuki; Kurosaki, Masahiko; and Ohsawa, Yutaka, to Asahi Kogaku Kogyo Kabushiki Kaisha. Control apparatus of single-lens reflex camera. 5,025,276, Cl. 354-152.000.
- Kiyama, Seiichi: *See—*
  - Hirono, Yutaka; Kiyama, Seiichi; and Osumi, Masato, 5,024,724, Cl. 156-643.000.
- Kiyosawa, Junichi, to Asics Corporation. Athletic shoe. 5,024,006, Cl. 36-83.000.
- Kladden, Gregory S.: *See—*
  - Hawley, Erwin T.; and Kladden, Gregory S., 5,024,450, Cl. 277-37.000.
- Klank, Otto; and Rottmann, Dieter, to Deutsche Thomson-Braudt GmbH. Adaptive digital filter for multi path distortion cancellation. 5,025,406, Cl. 364-724.190.
- Kleefisch, Mark S.: *See—*
  - Kaminsky, Mark P.; Kleefisch, Mark S.; Huff, George A.; Washecheck, Don M.; Alvarado-Swaisgood, Aileen E.; and Barr, Mark K., 5,024,984, Cl. 502-303.000.
- Kleinewefers GmbH: *See—*
  - Hannen, Jakob, 5,024,718, Cl. 156-475.000.
- Kleingraeber, Karl-Josef: *See—*
  - Heidjann, Franz; and Kleingraeber, Karl-Josef, 5,024,631, Cl. 460-75.000.
- Kleinschmidt, Peter; and Mader, Gerhard, to Siemens Aktiengesellschaft. Optical sensor line of amorphous or polycrystalline photoelectric material having a plurality of sensor elements. 5,025,146, Cl. 250-214.00L.
- Kley, Uwe: *See—*
  - Booten, Sigmund; Kley, Uwe; and Hoffmann, Cristiano, 5,024,304, Cl. 188-356.000.
- Kline, Joseph M. Periodontal scaler-like medicinal fluid applicator. 5,024,600, Cl. 433-82.000.
- Klingen, Jurgen: *See—*
  - Veasley, George F.; Klingen, Jurgen; and Landin, Donald T., 5,024,880, Cl. 428-317.500.
- Klock, Jurgen; Fischer, Gerhard; and Grubisic, Vatroslav, to Fraunhofer-Gesellschaft. Device for testing trailer couplings under loading conditions resembling those occurring in use, preferably with inclusion of the construction for fixing the trailer coupling. 5,024,102, Cl. 73-798.000.
- Klotsvog, Grigory N.: *See—*
  - Popov, Nikolai P.; Plotnikov, Andrei D.; and Klotsvog, Grigory N., 5,024,124, Cl. 74-625.000.
- Klug, Gunter; Jabs, Gert; Berneth, Horst; and Botta, Artur, to Bayer Aktiengesellschaft. Recording material. 5,024,987, Cl. 503-211.000.
- Klughart, Kevin M., to Dallas Semiconductor Corporation. Wireless communication system with parallel polling. 5,025,486, Cl. 455-54.000.
- Kniarmco Inc.: *See—*
  - Knight, C. Reed, Jr.; and Stoner, Eugene M., 5,024,139, Cl. 89-154.000.
- Knifton, John F.: *See—*
  - Sanderson, John R.; Marquis, Edward T.; and Knifton, John F., 5,025,112, Cl. 585-852.000.
  - Sanderson, John R.; and Knifton, John F., 5,025,113, Cl. 568-909.800.
- Knight, C. Reed, Jr.; and Stoner, Eugene M., to Kniarmco Inc. Firearm with movable barrel safety. 5,024,139, Cl. 89-154.000.
- Knoll International, Inc.: *See—*
  - Morrison, Andrew I., 5,024,030, Cl. 52-36.000.
- Kobayashi, Akira: *See—*
  - Ohshima, Masaaki; Kobayashi, Akira; Atsumi, Senji; and Shimada, Hiromi, 5,024,907, Cl. 429-191.000.
- Kobayashi, Kazumitsu; and Sunou, Hiroki, to Japan Electronic Control Systems Co., Ltd. Assist air supply system for internal combustion engine. 5,024,201, Cl. 123-531.000.
- Kobayashi, Manabu: *See—*
  - Okui, Kaoru; and Kobayashi, Manabu, 5,024,287, Cl. 180-297.000.
- Kobayashi, Toshiyuki; Koshinaka, Masao; Kinoshita, Yoshimi; Oda, Masao; and Yoshizawa, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Thin film forming apparatus having a gas flow settling device. 5,024,182, Cl. 118-723.000.
- Koberstein, Edgar; Engler, Bernd; Domesle, Rainer; and Schubert, Peter, to Degussa Aktiengesellschaft. Support material for three-way catalysts containing platinum group metal and having reduced tendency for H_2S emission. 5,024,985, Cl. 502-304.000.
- Kobs, Rolf U. D.: *See—*
  - Graeger, Volker; and Kobs, Rolf U. D., 5,024,097, Cl. 73-727.000.
- Koch Materials Company: *See—*
  - Benneyworth, Douglas F.; and Baker, Richard J., 5,024,554, Cl. 404-74.000.
- Kodama, Yoshimi: *See—*
  - Tsuchida, Takefumi; Yoshida, Minoru; Kodama, Yoshimi; and Moriyama, Masahiro, 5,025,332, Cl. 360-85.000.
- Kodera, Kaoru: *See—*
  - Iiyama, Kiyotaka; Hayakawa, Kunio; Nakata, Masahiro; Kodera, Kaoru; and Miyazaki, Osamu, 5,024,699, Cl. 106-21.000.
- Koegel, Robert J.; and Rabins, Leonard. Circuit for preventing lock-out of high priority requests to a system controller. 5,025,370, Cl. 364-200.000.
- Kogüchi, Tatsushi; Ito, Shigehiro; Ebihara, Kazyuki; and Nishi, Yuji, to Victor Company of Japan, Ltd. Ghost canceler using reference signals to generate updated criterion functions on which tap gains are determined. 5,025,317, Cl. 358-167.000.
- Kohnke, Ole B., to Testa-Laboratorium A/S. Aspirator. 5,024,653, Cl. 604-35.000.
- Kojima, Aiki: *See—*
  - Kondo, Hitoshi; Suwabe, Hiroyuki; and Kojima, Aiki, 5,025,230, Cl. 331-116.0FE.
- Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, to Toyota Jidosha Kabushiki Kaisha; and Aisin Seiki Kabushiki Kaisha. Pressure control system for suspension. 5,024,459, Cl. 280-707.000.
- Kolb, Roland: *See—*
  - Jetzer, Gregor; Kolb, Roland; and Spinnler, Fritz, 5,024,589, Cl. 418-55.300.
- Kolbenschmidt Aktiengesellschaft: *See—*
  - Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul, Bickle, Wolfgang; and Braus, Jurgen, 5,024,881, Cl. 428-323.000.
  - Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul; Bickle, Wolfgang; and Braus, Jurgen, 5,024,882, Cl. 428-323.000.
- Kolp, Robert J., Jr.: *See—*
  - Lee, Leighton, II; and Kolp, Robert J., Jr., 5,023,990, Cl. 29-525.100.
- Komada, Takashi: *See—*
  - Seki, Nobuyoshi; Morii, Nobuyuki; Sugiyama, Yoshihide; Komada, Takashi; Hosoi, Masatoshi; Hujiwara, Atuhisa; Ichinose, Tsutomu; Mori, Goro; Kikuchi, Toshiyuki; and Minato, Masahiro, 5,024,430, Cl. 270-53.000.
- Komaki, Toshihiro; Kudo, Hideo; Ishizuki, Tomonori; and Yokozeki, Shinichi, to Pioneer Electronic Corporation. Method for recording and reproducing of information on an optical disk of a phase-change type. 5,025,439, Cl. 369-100.000.

- Komatsu Dresser Company: *See—*
  - Deli, Jack M., 5,024,283, Cl. 180-89.140.
- Komatsu, Fumito; Usuki, Hideo; and Oguchi, Yuzo, to K.K. Sankto Seiki Seisakusho. Electromagnetic accelerometer. 5,024,088, Cl. 73-517.00B.
- Komori Printing Machinery Co., Ltd.: *See—*
  - Ito, Kiyoshi, 5,024,154, Cl. 101-148.000.
- Komoriya, Susumu, Nishizuka, Hiroshi; Nakagawa, Shinya; and Maejima, Hisashi, to Hitachi, Ltd. Exposure method and exposure apparatus. 5,025,284, Cl. 355-53.000.
- Komyoji, Hirosuke: *See—*
  - Masuyama, Masaru; Takemae, Yoshihiro; Endoh, Tetsuhiko; Komyoji, Hirosuke; Tanaka, Ryuji; and Itakura, Katsuhiko, 5,025,415, Cl. 365-52.000.
- Kondo, Hitoshi; Suwabe, Hiroyuki; and Kojima, Aiki, to Kabushiki Kaisha Toshiba. Oscillator circuit incorporated in a semiconductor circuit. 5,025,230, Cl. 331-116.0FE.
- Kondo, Kazuo; and Okuyama, Masahiko, to NGK Spark Plug Co., Ltd. Crystallized glass tooth crown material. 5,024,973, Cl. 501-10.000.
- Kondo, Masataka: *See—*
  - Murakami, Satoru; Yamaguchi, Minori; Hayashi, Akimine; Kondo, Masataka; and Tawada, Yoshihisa, 5,025,297, Cl. 357-30.000.
- Kondo, Takeshi: *See—*
  - Yamada, Ichiji; Inuzuka, Yutaka; Murakami, Michiyuki; Suzuki, George; Tanahashi, Tyo; and Kondo, Takeshi, 5,024,117, Cl. 74-473.00P.
- Kondo, Yoshio. Compact having an illuminator 5,025,354, Cl. 362-135.000.
- Kondou, Yasuhiro: *See—*
  - Nakano, Shigeru; and Kondou, Yasuhiro, 5,024,284, Cl. 180-179.000.
- Konica Corporation: *See—*
  - Haneda, Satoshi; and Nomori, Hiroyuki, 5,025,272, Cl. 346-153 100.
  - Kita, Hiroshi; Wada, Hajime; and Kaneko, Yutaka, 5,024,930, Cl. 430-558.000.
  - Kurihara, Etsuzou, 5,024,509, Cl. 350-254.000.
  - Shoji, Hisashi; Tamura, Akihiko; Itaya, Masahiko; Fuma, Hiroshi; and Soma, Shinobu, 5,024,181, Cl. 118-658.000.
  - Tanji, Masaki; and Nishijima, Toyoki, 5,024,932, Cl. 430-567.000.
- Konishi, Masataka; Tomita, Koji; Oka, Masahisa; and Numata, Kenichi, to Bristol-Myers Company. Peptide antibiotics. 5,025,023, Cl. 514-183.000.
- Konrad Doppelmayr & Sohn Maschinenfabrik Gesellschaft m.b.H. & Co. KG: *See—*
  - Nigg, Ernst; and Fuchs, Elmar B., 5,024,162, Cl. 104-178.000.
- Konrad, Gerd: *See—*
  - Crema, Stefano C.; Kucera, Clare H.; Konrad, Gerd; and Hartmann, Heinrich, 5,025,040, Cl. 523-130.000.
- Kopf, Rose F.; Kuo, J. M.; Luftman, Henry S.; and Schubert, Erdmann F., to AT&T Bell Laboratories. Doping procedures for semiconductor devices. 5,024,967, Cl. 437-95.000.
- Koponen, Jari: *See—*
  - Ritala, Risto; Laakso, Mikko; and Koponen, Jari, 5,025,154, Cl. 250-308.000.
- Kopp, Clinton V.: *See—*
  - Ford, Douglas L.; Anderson, Eric W.; and Kopp, Clinton V., 5,024,762, Cl. 210-321.690.
  - Needham, Thomas E.; Wright, Jeremy C.; Pearson, Steve; Chilamkurti, Rao; and Kopp, Clinton V., 5,024.657, Cl. 604-85.000.
- Kopp, Richard: *See—*
  - Neuhaus, Alfred; Ganster, Otto, and Kopp, Richard, 5,025,039, Cl. 521-51.000.
- Korb, William B., to American Saw & Mfg. Company. Segmental grinding wheel. 5,024,026, Cl. 51-206.400.
- Kordalski, Frank J.: *See—*
  - Miller, Phillip E.; Katz, Leonoard R.; Nath, Raymond J.; Blaushild, Ronald M.; Tatch, Michael D.; Kordalski, Frank J.; Wykstra, Donald T.; and Kavalkovich, William M., 5,025,129, Cl 219-201.000.
- Koshiba, Yutaka: *See—*
  - Futatasuka, Rensei; Koshiba, Yutaka; Chiba, Shunich; Orikasa, Toyoaki; Noguchi, Seiji; and Idoshita, Takuya, 5,024,814, Cl. 420-473.000.
- Koshiishi, Osamu: *See—*
  - Mitsuishi, Akio; Takeuchi, Takashi; and Koshiishi, Osamu, 5,024,543, Cl. 400-124.000.
- Koshinaka, Masao: *See—*
  - Kobayashi, Toshiyuki; Koshinaka, Masao; Kinoshita, Yoshimi; Oda, Masao; and Yoshizawa, Kenji, 5,024,182, Cl. 118-723.000.
- Koshiyama, Takao: *See—*
  - Yoshida, Mamoru; Suya, Hachiro; Hayashi, Shoji; Koshiyama, Takao; Hashimoto, Satoshi; and Horita, Katsuhiro, 5,025,042, Cl. 523-216.000.
- Kosloff, Ronald S. Hatchback locking device. 5,024,303, Cl. 188-300.000.
- Kossovsky, Leopold V.: *See—*
  - Dumenek, Vladimir A.; Stolyarenko, Georgy E.; and Kossovsky, Leopold V., 5,024,652, Cl. 604-22.000.
- Kostos, Jeffery; Kaspar, Melvin; and Artwohl, Paul, to Ardco, Inc. Insulated refrigerator door assembly with substantially all glass front doors. 5,024,023, Cl. 49-501.000.
- Kotake, Yasushi: *See—*
  - Kanno, Tetsuo; Kotake, Yasushi; and Inada, Hitoshi, 5,025,339, Cl. 360-99.060.
- Kotani, Haruo; and Tomita, Katsuhiko, to Horiba, Ltd. Method of calibrating a sheet type electrode. 5,024,951, Cl 436-8.000.
- Kotecki, Jeffrey D.: *See—*
  - Raikes, Terry E.; Kramer, William L.; Howard, John B.; Moore, Wayne D.; Jackson, Louis; and Kotecki, Jeffrey D., 5,024,282, Cl. 177-25.150.
- Koten, Jean-Marie: *See—*
  - Fishler, Mark K.; Koten, Jean-Marie; and Dubois, Pascal, 5,024,422, Cl. 266-272.000.
- Kotera, Koichi: *See—*
  - Ohta, Takeo; Uchida, Masami; Kotera, Koichi; and Matsubara, Kunihiro, 5,024,910, Cl. 430-19.000.
- Koubek, Rudolph, III: *See—*
  - Bellows, James C.; and Koubek, Rudolph, III, 5,024,582, Cl. 416-213.00R.
- Kowa Company Ltd.: *See—*
  - Akiyama, Koichi, 5,024,520, Cl. 351-221.000.
- Kowaleski, Jerome L.: *See—*
  - Lamb, William E.; Kowaleski, Jerome L., Haikl, Vojtech; Bittancourt, Alan R.; and Daugherty, Harvev S., 5,025,280, Cl 354-299.000.
- Koyama, Hiroyasu: *See—*
  - Miura, Katsutoshi; Koyama, Hiroyasu; Sugai, Toshiji; Yamada, Hiroaki; and Sakurai, Einosuke, 5,025,012, Cl. 514-252.000.
- Kozai, Yoshio: *See—*
  - Nomura, Hiroaki; Nishikawa, Kohei, Tsushima, Susumu, and Kozai, Yoshio, 5,025,005, Cl. 514-183.000.
- Kozlov, Vladimir S.; Markov, Gennady I.; and Bugrov, Vladimir P. Method and device for the diagnosis and treatment of nasal diseases. 5,024,658, Cl. 604-96.000.
- Kraemer, Michael: *See—*
  - Anderheggen, Wolfgang; Kraemer, Michael, Vogelsgesang, Roland; Wagner, Wolfram; Olges, Wolfgang; and Dragovic, Thomas, 5,024,797, Cl. 264-143.000.
- Kraft, Brett W. Modular rotary actuator. 5,024,116, Cl. 74-109.000.
- Kralovec, William M., to Sta-Rite Industries, Inc. Housing coupling mechanism. 5,024,585, Cl. 417-360.000.
- Kramer, Brian J.: *See—*
  - Rust, Mark H.; and Kramer, Brian J., 5,024,019, Cl. 43-42.310.
- Kramer, William L.: *See—*
  - Raikes, Terry E.; Kramer, William L.; Howard, John B.; Moore, Wayne D.; Jackson, Louis; and Kotecki, Jeffrey D., 5,024,282, Cl. 177-25.150.
- Krangel, Micahel S.: *See—*
  - Brenner, Michael B.; Strominger, Jack L., Seidman, Jonathan; Ip, Stephen H.; and Krangel, Micahel S., 5,024,940, Cl. 435-69.100.
- Kranz, Walter; and Tillmann, Heinz, to Messerschmitt Bolkow-Blohm GmbH. Stepping mechanism for rotary motions. 5,024,395, Cl. 244-3.220.
- Krauskopf, Birgit: *See—*
  - Schallner, Otto; Negele, Michael; Santel, Hans-Joachim; Lurssen, Klaus; Schmidt, Robert R.; and Krauskopf, Birgit, 5,024,694, Cl. 71-95.000.
- Kreischer, Pieter H., to Lever Brothers Company, Division of Conopco, Inc. Machine dishwashing compositions. 5,024,776, Cl 252-97.000.
- Krigmont, Henry V.; Coe, Everett L., Jr.; and Southam, Barry J., to Wahlco, Inc. Reduction of acidic emissions from combustion of sulfur-laden fuels. 5,024,171, Cl. 110-345.000.
- Krishnan, Sivaram: *See—*
  - Jorissen, Steven A.; Lundy, Charles E.; Krishnan, Sivaram; Mafoti, Robson; and Pyles, Robert A., 5,025,056, Cl. 524-310.000.
- Kroger, Harry; and Ghoshal, Uttam S., to Microelectronics & Computer Technology Corporation. Superconducting-semiconducting circuits, devices and systems. 5,024,993, Cl. 505-1.000.
- Krones AG Hermann Kronseder Maschinenfabrik: *See—*
  - Winter, Horst, 5,024,717, Cl. 156-354.000.
- Kronseder, Hermann. Magazine assembly for labels or the like in a labeling machine. 5,024,348, Cl. 221-11.000.
- Krumberg, Yakov: *See—*
  - Landa, Benzion; Krumberg, Yakov; and Adam, Yossef, 5,025,290, Cl. 355-265.000.
- Krumbiegel, Gunter: *See—*
  - Gorler, Klaus; Krumbiegel, Gunter; Hanack, Michael; and Subramanian, Lakshmina R., 5,024,743, Cl. 204-157.690.
- Krupp Polysius AG: *See—*
  - Patzelt, Norbert; and von Seebach, Michael, 5,024,754, Cl. 209-135.000.
- Ksander, George: *See—*
  - Chu, George H.; Ogawa, Yasushi; McPherson, John M., Ksander, George; Pratt, Bruce; Hendricks, Diana; and McMullin, Hugh, 5,024,841, Cl. 424-422.000.
- Kubis, Charles S.: *See—*
  - Pfaffmann, George D.; Kubis, Charles S.; Currie, John P.; Balzer, Norbert R.; Walter, John; and Adams, Graham R., 5,025,123, Cl 219-10.750.
- Kubo, Chikanari, to Eishin Technology Company, Limited. Two-position and three-way valve. 5,024,248, Cl. 137-596.160.
- Kubo, Kanji: *See—*
  - Taniguchi, Hiroshi; Kubo, Kanji; and Nakase, Hiromi, 5,025,329, Cl. 360-77.160.
- Kubo, Nami; Yoshioka, Toshio; Saito, Kouichi; and Tohyama, Syunroku, to Toray Industries, Inc. Method for purifying liquids. 5,024,767, Cl. 210-682.000.

VOL 1127
ISS 3
JE 18
1991
UMI

Kubo, Shinji: *See—*

Funato, Ryo; Takahiro, Syuji; Yoshida, Keiji; Kubo, Shinji: and Inagaki, Motoshi, 5,024,914, Cl. 430-109.000.

Kubodera, Kenichi: *See—*

Sudo, Shoichi; Sakai, Yoshihisa; Yasaka, Hiroshi; Ikegami, Tetsuhiko; Yoshikuni, Yuzo; Yokohama, Itaru, and Kubodera, Kenichi, 5,025,448, Cl. 372-32.000.

Kubota, Jun; Kino, Hirotoshi, Musha, Yosinori; and Okada, Hisao, to Hitaci, Ltd Ultrasonic imaging system of bonding zone. 5,024,094, Cl 73-634.000.

Kubota, Jun: *See—*

Sasaki, Souji; Kino, Hirotoshi; Musha, Yoshinori; Kubota, Jun, and Okada, Hisao, 5,024,093, Cl. 73-633.000.

Kubota, Ltd.: *See—*

Fukui, Tetsu; Yoshii, Takashi; Takemura, Toshihiko; and Hattori, Akio, 5,024,306, Cl. 192-3.570

Kubota, Norio: *See—*

Uchida, Hiroshi; and Kubota, Norio, 5,024,392, Cl. 242-128.000.

Kucera, Clare H.: *See—*

Crema, Stefano C.; Kucera, Clare H.; Konrad, Gerd; and Hartmann, Heinrich, 5,025,040, Cl. 523-130.000.

Kuczynski, Anthony L.; Ayer, Atul D.; and Wong, Patrick S.-L., to ALZA Corporation. Oral hypoglycemic glipizide granulation. 5,024,843, Cl 424-499.000.

Kud, Alexander: *See—*

Oftring, Alfred, Birnbach, Stefan; Fikentscher, Rolf; Baur, Richard, Kud, Alexander; Goeckel, Ulrich; and Perner, Johannes, 5,025,103, Cl. 560-170.000.

Kudo, Hideo: *See—*

Komaki, Toshihiro; Kudo, Hideo; Ishizuki, Tomonori; and Yokozeki, Shinichi, 5,025,439, Cl. 369-100.000.

Kudo, Yoshinobu: *See—*

Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, 5,025,275, Cl 354-106.000.

Kuesters, Karl-Heinz; Mueller, Wolfgang, and Enders, Gerd, to Siemens Aktiengesellschaft. Three-dimensional one-dimensional cell arrangement for dynamic semiconductor memories and method for the manufacture of a bit line contact. 5,025,295, Cl. 357-23.600.

Kuhasalo, Antti; Viitanen, Olavi; and Ilvespaa, Heikki, to Valmet Paper Machinery Inc. Suction roll with turbulence suppression element. 5,024,729, Cl. 162-372.000.

Kuhn S.A.: *See—*

Aron, M Jerome, 5,024,053, Cl 56-367.000.

Kuhnemund, Bernd: *See—*

Gmur, Bruno; and Kuhnemund, Bernd, 5,024,352, Cl. 222-1.000.

Kuizenga, Dirk J., to Laserscope. Intra-cavity beam relay for optical harmonic generation. 5,025,446, Cl. 372-21.000.

Kukimoto, Tsutomu: *See—*

Sato, Yukou; and Kukimoto, Tsutomu, 5,024,915, Cl. 430-110.000.

Kumagai, Eriko: *See—*

Omata, Tetsuo; Senda, Shuji; Tanaka, Tamaki; Kumagai, Eriko; Kajimoto, Chikara; and Nakazono, Yutaka, 5,024,832, Cl. 424-84.000.

Kumar, Surinder: *See—*

Sohner, Harold K., Hoyloak, Joel N; Girvin, Richard J.; and Kumar, Surinder, 5,025,452, Cl. 375-1.000.

Kun, Zoltan K.: *See—*

Leksell, David; Kun, Zoltan K.; and Asars, Juris A., 5,025,321, Cl. 358-296.000.

Kunimune, Kouichi: *See—*

Maeda, Hirotoshi; and Kunimune, Kouichi, 5,025,088, Cl. 528-353.000.

Kunz, Barbara L.: *See—*

Craun, Gary P.; and Kunz, Barbara L., 5,025,063, Cl. 524-560.000.

Kuo, J. M.: *See—*

Kopf, Rose F.: Kuo, J M.; Luftman, Henry S.; and Schubert, Erdmann F., 5,024,967, Cl. 437-95.000.

Kurakake, Mitsuo; and Kinoshita, Jiro, to Fanuc Ltd. Synchronous control system. 5,025,200, Cl. 318-569.000.

Kurihara, Etsuzou, to Konica Corporation. Structural combination of plastic lenses. 5,024,509, Cl. 350-254.000.

Kurihara, Kazumasa; and Takahashi, Tsutomu, to Zexel Corporation Method for controlling vehicle transmission systems. 5,024,305, Cl. 192-0.055.

Kurisaki, Hideo; and Nishikawa, Masahiko, to Chisso Corporation Powdery cosmetic containing cellulose powder impregnated with moisturizing polymer. 5,024,831, Cl. 424-69.000.

Kurita, Toshiyuki: *See—*

Sekiya, Hiroshi; Kurita, Toshiyuki; Nakagaki, Nobufumi; and Murata, Toshinori, 5,025,310, Cl. 358-19.000.

Kuriyama, Katsumi: *See—*

Hanada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, 5,024,893, Cl. 428-423.100

Kuriyama, Yuji, to Casio Computer Co., Ltd. Electronic display device for displaying calendar information. 5,025,427, Cl. 368-29.000.

Kuroda, Kohichi: *See—*

Hanada, Kazuyuki; Kuroda, Kohichi, Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, 5,024,893, Cl. 428-423.100.

Kurosaki, Masahiko: *See—*

Kitazawa, Toshiyuki; Kurosaki, Masahiko; and Ohsawa, Yutaka, 5,025,276, Cl. 354-152.000.

Kurozuka, Akira: *See—*

Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.

Kuruma, Kiyoshi; Abe, Masaki; Kagechika, Hiroshi; and Kagaya, Shinichi, to NKK Corporation. Composite nickel-phosphorus alloy plated metal sheet excellent in strippability and having high hardness and method for manufacturing same. 5,024,900, Cl. 428-626.000.

Kurze, Werner: *See—*

Clauss, Wolfgang; Kurze, Werner, Leifeld, Ferdinand, and Wassenberg, Willy, 5,024,736, Cl. 204-49.000.

Kuschewski, Gustav: *See—*

Fortmann, Robert C.; Pinnow, Curtis C.; Kuschewski, Gustav; and Joseph, William A., Jr., 5,025,132, Cl. 219-401.000.

Kusuda, Yasuhiro, to Minolta Camera Kabushiki Kaisha. Image forming apparatus capable of preventing simultaneous rotation of the magnet roll and the developing sleeve. 5,025,288, Cl 355-251 000.

Kuwabara, Osamu: *See—*

Suzuki, Satoshi; Kuwabara, Osamu; Muto, Jiro, and Shinozaki, Eiichi, 5,025,348, Cl. 361-398.000.

Kwak, Yoon T.: *See—*

Helioff, Michael W.; Tazi, Mohammed; Kwak, Yoon T; and Login, Robert B., 5,024,779, Cl. 252-162.000.

KWM-Kunststoffmaschinen GmbH. *See—*

Will, Manfred O., 5,024,531, Cl. 366-75.000.

Kyhl, Henry, to Buhl Industries, Inc. Video imaging podium 5,025,320, Cl. 358-229.000.

Kysela, Ernst. *See—*

Lantzsch, Reinhard, Kysela, Ernst, Buchel, Karl H.; Dutzmann, Stefan; Brandes, Wilhelm, and Hanssler, Gerd, 5,025,030, Cl 514-383.000.

La, Duong T.: *See—*

Baker, Jeffrey P., La, Duong T.; and Coverstone, Randy A., 5,025,271, Cl. 346-140.00R

La Mina Ltd.: *See—*

Guirguis, Raouf A., 5,024,237, Cl. 128-760.000.

Laakso, Mikko: *See—*

Ritala, Risto; Laakso, Mikko; and Koponen, Jari, 5,025,154, Cl 250-308.000.

Labadie, Louis: *See—*

Doussiet, Roger; and Labadie, Louis, 5,024,110, Cl 73-864.620.

Labuz, Joseph F: *See—*

Vardoulakis, Ioannis; Labuz, Joseph F.; and Papamichos, Euripides, 5,024,103, Cl. 73-819.000.

La Croix, Mark E., to Torrington Company, The. Method and apparatus for forming magnetized zones on a magnetizable body. 5,025,240, Cl 335-284.000.

Lagerstedt, Torgny: *See—*

Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nåbo, Olle, 5,024,648, Cl. 494-56.000.

Lagow, Richard J.; Bierschenk, Thomas R.; Juhlke, Timothy J., and Kawa, Hajimu M., to Exfluor Research Corporation. Pyrolysis of perfluoropolyethers. 5,025,093, Cl. 568-601.000.

Lagowski, Jacek J. Method and apparatus for determining the minority carrier diffusion length from linear constant photon flux photovoltage measurements. 5,025,145, Cl. 250-211.00J.

Lagushenko Radomir: *See—*

Bouchard, Andre C.; Thibault, Paul A.; Lagushenko Radomir; Maya, Jakob; and Maya, Jakob, 5,025,190. Cl. 313-619.000.

Lailler, Jean L.: *See—*

Gloanec, Maurice; Jarry, Jacques; and Lailler, Jean L., 5,025,212, Cl. 324-158.00R.

Laine, Juhani; Nyman, Mikko; and Paananen, Tapio, to Ilmatera OY Method and apparatus for the control of air flows and pressures in air-conditioning. 5,024,263, Cl. 165-1.000.

Laitram Corporation: *See—*

Lapeyre, James M., 5,024,321, Cl. 198-853.000.

Lamb, William E.; Kowaleski, Jerome L., Haikl, Vojtech; Bittancourt, Alan R.; and Daugherty, Harvey S., to Texas Instruments Incorporated. Immersion development and rinse machine and process. 5,025,280, Cl. 354-299.000.

Lamond, Thomas W. Method for removing a bowling ball fingertip insert from a bowling ball finger hole. 5,023,988, Cl. 29-426.100.

Lamont, Lawrence T., Jr.: *See—*

Turner, Frederick T.; Hutchinson, Martin A.; Shaw, R. H, and Lamont, Lawrence T., Jr., 5,024,747, Cl 204-298.090.

Land, John T.; and Hopkins, Ronald J., to Westinghouse Electric Corp. Combined support column and guide tube for use in a nuclear reactor 5,024,808, Cl. 376-353.000.

Landa, Benzion; Krumberg, Yakov; and Adam, Yossef, to Savin Corporation. Pulsed voltage development electrode cleaner. 5,025,290, Cl. 355-265.000.

Landers, Perry E.; and Felton, George F., to Ashland Oil, Inc. Coating composition and method for forming a self-heating corrosion preventative film. 5,024,697, Cl. 106-14.130.

Landin, Donald T.: *See—*

Veasley, George F.; Klingen, Jurgen; and Landin, Donald T., 5,024,880, Cl. 428-317.500.

Landreau, Jean; and Nakajima, Hisao, to Etat Francais represente par le Ministre. Method to control the thickness of an antireflection coating and implementation installation. 5,024,853, Cl. 427-10.000.

Lang, Gerard: *See—*

Canivenc, Edith; Forestier, Serge; Gay, Michel; Lang, Gerard; and Richard, Herve, 5,025,053, Cl. 524-265.000.

Lang, Helfried, to Riter Machine Works, Ltd. Sliver guide for a textile machine. 5,023,977, Cl. 19-115.00R.

Lang, Richard D. Resilient metallic friction facing material. 5,024,899, Cl. 428-550.000.

Langlais, Francis: *See—*

Robinbrosse, Christian; Naslain, Roger; Minet, Jacky; and Langlais, Francis, 5,024,878, Cl. 428-297.000.

Langlois, Michel: *See—*

Naylor, Robert J.; Naylor, Brenda; Renaud, Alain; and Langlois, Michel, 5,025,022, Cl. 514-305.000.

Lantzsch, Reinhard; Kysela, Ernst; Buchel, Karl H.; Dutzmann, Stefan; Brandes, Wilhelm; and Hanssler, Gerd, to Bayer Aktiengesellschaft. Hydroxyalkinyl-azolyl derivatives. 5,025,030, Cl. 514-383.000.

Lanxide Technology Company, LP: *See—*

Kennedy, Christopher R.; and Newkirk, Marc S., 5,024,795, Cl. 264-59.000.

Newkirk, Marc S; and Weinstein, Jerry G., 5,024,794, Cl. 264-57.000.

Lapeyre, James M., to Laitram Corporation. Modular center drive conveyor belt. 5,024,321, Cl. 198-853.000.

Larsson, Kåre: *See—*

Gustafsson, Gert-Ove; Berntsson, Leif, and Larsson, Kåre, 5,024,703, Cl. 106-649.000.

Laserscope: *See—*

Kuizenga, Dirk J., 5,025,446, Cl 372-21.000.

Laska, Eugene M.: *See—*

Sunshine, Abraham; Laska, Eugene M., and Siegel, Carole E., 5,025,019, Cl. 514-277.000.

Lassota, Marek J., to Unotech Corporation. Rotary compressor and process of compressing compressible fluids with intake and discharge through piston shaft and piston. 5,024,588, Cl. 418-1.000.

Latos, Thomas S., to Sundstrand Corporation. Inverter switch with parallel free-wheel diodes. 5,025,360, Cl. 363-16.000.

Lauterbach, John H.: *See—*

Dola, Frank P.; Feldman, Steven; Lauterbach, John H.; and Mengelson, William G., 5,024,614, Cl. 439-114.000.

Lazzeri, Paul A.: *See—*

Collins, Glenn B., Hildebrand, David F., Lazzeri, Paul A., Adams, Thomas R.; Parrott, Wayne A.; and Hartweck, Lynn M., 5,024,944, Cl. 435-172.300.

Lean, Gordon D.; and Dennis, Anthony H. K Motor assisted pedal cycle. 5,024,286, Cl. 180-206.000.

Leary, James J.; and McKenzie, John R., to Cardiovascular Imaging Systems, Inc. Ultrasonic imaging catheter with guidewire channel. 5,024,234, Cl. 128-663.010.

Lecarpentier, Marc: *See—*

Haines, John G.; Rosenbaum, Nolan G.; Pion, Albert L.; Lecarpentier, Marc; Henriot, Christophe; and Abumehdi, Cyrus, 5,025,383, Cl. 364-464.030.

Lecourt, Guy; and Riou, Jacques, to Aerospatiale Societe Nationale Industrielle. Process and machine for manufacturing tubular pieces from at least one web of supple material and tubular pieces thus obtained. 5,024,712, Cl. 156-184.000.

Lectra Systemes S.A.: *See—*

Etcheparre, Jean; and Etchparre, Bernard, 5,024,429, Cl 270-30.000.

Ledewitz, William. Collapsible dispensing container. 5,024,354, Cl. 222-94 000.

Lee, Byung H.: *See—*

Blyakhman, Yefim; and Lee, Byung H., 5,025,095, Cl. 568-652.000.

Lee Company, The: *See—*

Lee, Leighton, II; and Kolp, Robert J., Jr., 5,023,990, Cl. 29-525.100

Lee, Hyo-Sam, to SamSung Electronics Co., Ltd. Zebra signal generating circuit of a video camera. 5,025,308, Cl. 358-10.000.

Lee, Kuo H.: *See—*

Billig, James N.; Chlipala, James D.; Lee, Kuo H.; and Nagy, William J., 5,025,300, Cl. 357-51.000.

Lee, Leighton, II; and Kolp, Robert J., Jr., to Lee Company, The. Device and method for removably retaining components in a smooth bore. 5,023,990, Cl. 29-525.100.

Lee, Miko. Tumbler pin lock system. 5,024,072, Cl. 70-491.000.

Lee, Ming-Sheng, to Board of Regents, The University of Texas System, The. Detection of minimal numbers of neoplastic cells carrying DNA translocations by DNA sequence amplification. 5,024,934, Cl. 435-6.000.

Lee, Ruojia; and Ahmad, Aftab A., to Micron Technology, Inc. Blanket punchthrough and field-isolation implant for sub-micron N-channel CMOS devices. 5,024,961, Cl. 437-34.000.

Lee, Seo K.: *See—*

Park, Yong; and Lee, Seo K., 5,024,963, Cl. 437-41.000.

Lee, Shih-Ying, to Setra Systems, Inc. Pressure transducer with flow-through measurement capability. 5,024,099, Cl. 73-730.000.

Lee Shuknecht & Sons, Inc.: *See—*

Shuknecht, Lee N, 5,024,278, Cl. 171-17.000.

Leffel, Harold P. Foldable signal flag and standard assembly. 5,024,179, Cl. 116-173.000.

LeGrange, Jane D.: *See—*

Burack, John J., LeGrange, Jane D.; and Townsend, Wesley P, 5,024,873, Cl. 428-220.000.

Lehmann, Volker E.: *See—*

Goesele, Ulrich M.; and Lehmann, Volker E., 5,024,723, Cl. 156-628 000.

Lehtonen, Pentti: *See—*

Salo, Jukka; and Lehtonen, Pentti, 5,023,985, Cl. 29-132.000.

Lehureau, Jean-Claude: *See—*

Bousquet, Philippe; and Lehureau, Jean-Claude, 5,025,341, Cl. 360-120.000.

Leidenix, Monte. Reel bat. 5,024,050, Cl. 56-220.000.

Leifeld, Ferdinand: *See—*

Clauss, Wolfgang; Kurze, Werner; Leifeld, Ferdinand; and Wassenberg, Willy, 5,024,736, Cl. 204-49.000.

Leist, Alan R., to Pipp Mobile Systems, Inc. Mobile storage system with improved driving assemblies. 5,024,164, Cl. 105-101.000.

Leksell, David; Kun, Zoltan K.; and Asars, Juris A., to Westinghouse Electric Corp. Facsimile machine using thin film electroluminescent device. 5,025,321, Cl. 358-296.000.

Leland Stanford Junior University, The Board of Trustees of the: *See—*

Pauly, John M.; and Nishimura, Dwight G., 5,025,216, Cl. 324-309.000.

LeMahieu, Ronald A.: *See—*

Carson, Matthew; Han, Ru-Jen L.; and LeMahieu, Ronald A., 5,025,036, Cl. 514-568.000.

Lembke, Herbert, to Mannesmann Rexroth GmbH. Control motor for a servo valve. 5,024,247, Cl. 137-82.000.

Lemelson, Jerome H. Container assembly and method. 5,024,343, Cl. 220-326.000.

Lemelson, Jerome H. Method and apparatus for forming a composite material. 5,024,714, Cl. 156-243.000.

Lenz, Erwin. Derailment resisting, tractive power railway system. 5,024,163, Cl. 105-73.000.

Leonakis, George L., to Hughes Aircraft Company Broadband power divider. 5,025,233, Cl. 333-128.000.

Leone, David A.: *See—*

Allen, Frankie H.; and Leone, David A., 5,025,121, Cl. 200-275.000.

Leong, Robert, to United States of America, Energy Electrical grounding prong socket. 5,024,602, Cl. 439-107.000.

Le Page, Jean-Francois: *See—*

Giuliani, Pierre; Le Page, Jean-Francois; Plumail, Jean-Claude; and Espaillac, Marcellin, 5,024,751, Cl. 208-108.000.

Lerch, Ulrich: *See—*

Oekonomopulos, Raymond; Henning, Rainer; Lerch, Ulrich; Scholkens, Bernward; and Linz, Wolfgang, 5,025,010, Cl 514-224.200.

Lericque, Bernard: *See—*

Tetart, Serge; and Lericque, Bernard, 5,025,077, Cl. 528-86.000.

Lerio Corporation, The: *See—*

Moore, Richard L., 5,024,048, Cl. 53-534.000.

Lerner, Bernard J. Recycle spray gas-liquid contactor 5,024,686, Cl. 55-259.000.

Les Enterprises Julien Inc.: *See—*

Girardin, Guy; Morin, Pierre; Nguyen, Duy; Nguyen, Duc; and Brunelle, Louise, 5,024,151, Cl. 100-53.000.

Lessard, Robert J.: *See—*

Stierman, Roger J.; and Lessard, Robert J., 5,024,746, Cl. 204-297.00W.

Lester, Wayne L. Compound archery bow. 5,024,206, Cl. 124-23.100.

Leurent, Henri G., to Brelan, S.A. Curved tubular profile. 5,024,040, Cl. 52-738.000.

Lever Brothers Company, Division of Conopco, Inc.: *See—*

Kreischer, Pieter H., 5,024,776, Cl. 252-97.000.

Leverett, William H., to Durand-Wayland, Inc. Weighing and sorting machine and method. 5,024,047, Cl. 53-502.000.

Levinson, Barry L.: *See—*

Donovan, William P.; Gonzalez, Jose M., Jr.; Levinson, Barry L.; and Macaluso, Anthony, 5,024,837, Cl. 424-93.000.

Lewis, Larry N.; and Sumpter, Chris A., to General Electric Company. One part heat curable organopolysiloxane compositions. 5,025,073, Cl. 528-15.000.

Lewis, Mark L.; Sharples, Thomas D.; and Little, Stephen E., to Beckman Instruments, Inc. Optimum fixed angle centrifuge rotor. 5,024,646, Cl. 494-16.000.

Lewis, Robert T.: *See—*

Lowe, Byron L.; Lewis, Robert T.; Milliner, Kenneth M.; and Finn, Everett N., 5,024,351, Cl. 221-277.000.

Ley, Gregor; Schultze, Wolfgang; Vinke, Johannes, and Wistuba, Eckehardt, to BASF Aktiengesellschaft. Coating materials based on synthetic resin. 5,025,062, Cl. 524-556.000.

Leybold Aktiengesellschaft: *See—*

Gesche, Roland; and Vey, Norbert, 5,025,135, Cl. 219-506.000.

Leys, Cassius W., to A.G.P. Systems, Inc. Cleaner for treating a surface. 5,024,780, Cl. 252-162.000.

Li, Mei: *See—*

Chang Chen-Chi P.; and Li, Mei, 5,024,965, Ci 437-57.000.

Lignoform Benken AG: *See—*

Birker, Otto, 5,024,290, Cl. 181-293.000.

Lill, Thomas M., to Optical Communications Corp. Optical communications transmitter and receiver. 5,025,459, Cl. 375-117.000.

Lim Kunststoff Technologie Gesellschaft m.b.H.: *See—*

Schmidt, Oskar; and Grunner, Erich, 5,024,800, Cl. 264-502.000.

Lin, Jiang-Jen; and Speranza, George P., to Texaco Chemical Company. Liquid amine terminated derivatives of diglycidyl ethers. 5,025,100, Cl. 549-551.000.

Lin, Lisan S.: *See—*

Scott, Brian L.; Smith, Lloyd A.; Newell, J. Mark; Balentine, Bruce E.; and Lin, Lisan S., 5,025,471, Cl. 381-43.000.

Lindberg, Fer L.: *See—*

Brandstrom, Arne E.; Lindberg, Fer L.; and Sunden, Gunnel E., 5,025,024, Cl. 514-338.000.

Linden, Paul R. Bicycle handlebars. 5,024,119, Cl. 74-551.100.

Linder, Charles; Perry, Mordechai; Nemas, Mara; and Katraro, Reuven, to Aligena AG. Composite membranes and processes using them. 5,024,765, Cl. 210-651.000.

VOL 1127
ISS 3
JE 18
1991
UMI

- Linder, David M.: *See—*
  - Goodzeit, Neil E.; and Linder, David M., 5,025,381, Cl. 364-434.000.
- Lindhuber, Thomas C.; and Campbell, Edward N., to Dana Corporation. Hub cover assembly. 5,024,488, Cl. 301-108.00S.
- Lindstrom, Walter W.; and Dinewitz, Isaac, to Picker International, Inc. Dual flow/lambda display for xenon enhanced tomography. 5,024,230, Cl. 128-654.000.
- Lingnau, Juergen: *See—*
  - Wingen, Rainer; Guenther, Dieter; and Lingnau, Juergen, 5,025,097, Cl. 548-235.000.
- Linner, John G., to Board of Regents, The University of Texas, The. Method for cryopreparing biological tissue for ultrastructural analysis. 5,024,830, Cl. 424-3.000.
- Linton, Howard R., to Du Pont de Nemours, E. I., and Company. Silica particulate composition. 5,024,826, Cl. 423-335.000.
- Linz, Wolfgang: *See—*
  - Oekonomopulos, Raymond; Henning, Rainer; Lerch, Ulrich, Scholkens, Bernward; and Linz, Wolfgang, 5,025,010, Cl. 514-224.200.
- Lipkins, Morton S.: *See—*
  - Bleier, Zvi; and Lipkins, Morton S., 5,024,514, Cl. 350-618.000.
- Liston, Thomas V., to Chevron Research Company. Methods for preparing, group II metal overbased sulfurized alkylphenols 5,024,773, Cl. 252-42.700.
- Literal Corporation: *See—*
  - Crain, Ronald A.; Harney James D.; and Carey, James R., 5,025,436, Cl. 369-77.200.
- Little, Cindy E., to Crystals International. Freeze dried sweetened condensed milk crystals and process of making. 5,024,848, Cl. 426-587.000.
- Little, Stephen E.: *See—*
  - Lewis, Mark L.; Sharples, Thomas D.; and Little, Stephen E., 5,024,646, Cl. 494-16.000.
- Litzler, Jean, to Fromageries Bel. Packing wrapper for packaging pasty products and pasty product packaged therewith. 5,024,331, Cl. 206-551.000.
- Livingston, William H. Uses for the oral use of oak poison preventative in the treatment of: feline leukemia, increased wool production in sheep, and reduction of shipping fever in stressed animals. 5,025,037, Cl. 514-574.000.
- Livsey, James D., to Bird Escher Wyss. Cone wear detection. 5,024,755, Cl. 209-211.000.
- Llama Precision Inc.: *See—*
  - Hung, Shih-Ho; and Hsu, Tsui-Chen, 5,024,412, Cl. 248-343.000.
- Lloyd, James E. Woodworking machine. 5,024,257, Cl. 144-1.00R.
- Lloyd, Larry K. Dowel drilling jig. 5,024,564, Cl. 408-115.00R.
- Lloyd, Russell M., to Rusken Machine & Tool Service. Bezel lock, key and receiver assembly. 5,024,073, Cl. 70-491.000.
- Lo, Young S.; Walsh, David A.; and Uwaydah, Ibrahim M., to A. H Robins Co., Inc. Aryl and aryloxyalkyl sulfamate esters useful as anticonvulsants. 5,025,031, Cl. 514-399.000.
- Lockheed Missiles & Space Company, Inc.: *See—*
  - Mende, Stephen B., 5,024,530, Cl. 356-402.000.
- Loeber, Peter J.: *See—*
  - Bannister, Raymond L.; Close, Frederick C.; and Loeber, Peter J., 5,024,153, Cl. 101-91.000.
- Loermans, Peter J. G.: *See—*
  - Rischke, Jorg W.; Loermans, Peter J. G.; and Huvenaars, Peter J. M., 5,024,745, Cl. 204-198.000.
- Login, Robert B.: *See—*
  - Helioff, Michael W.; Tazi, Mohammed; Kwak, Yoon T.; and Login, Robert B., 5,024,779, Cl. 252-162.000.
- Logsdon, Peter B.; Stachura, Leonard M.; Swan, Ellen L.; and Basu. Bajat S., to Allied-Signal Inc. Azeotrope-like compositions of 1,1-dichloro-1-fluoroethane, dichlorotrifluoroethane, methanol and a mono- or di-chlorinated C_2 or C_3 alkane. 5,024,781, Cl. 252-171.000.
- Lohmann, Alfred: *See—*
  - Ahlborn, Gunter; Budenbender, Herbert; and Lohmann, Alfred, 5,024,166, Cl. 105-453.000.
- Loiacono, Marco; and Loviglio, Giuseppe, to Minnesota Mining and Manufacturing Company. Silver halide multilayer color reversal photographic material having improved color reproducibility. 5,024,928, Cl. 430-504.000.
- Long Manufacturing Ltd.: *See—*
  - Cheadle, Brian E.; and Rusiniak, Richard J., 5,024,268, Cl. 165-134.100.
- Long Manufacturing N.C., Inc.: *See—*
  - Furlough, Thomas D., 5,024,281, Cl. 172-219.000.
- Long, Robert; and Gottlieb, Mark, to Design Tech International, Inc. Remote automobile starter. 5,024,186, Cl. 123-179.00B.
- Looper, Timothy J.; and Sistare, James R., to Ryobi Motor Products Corp. Unitized tool construction. 5,023,999, Cl. 30-390.000.
- Lorenz, Otto: *See—*
  - Reiff, Helmut; and Lorenz, Otto, 5,025,064, Cl. 524-591.000.
- Loreth, Andrzej: *See—*
  - Torok, Vilmos; and Loreth, Andrzej, 5,024,685, Cl. 55-117.000.
- Lortz, Allan R.: *See—*
  - Anthony, James R.; Wiseman, Michael A.; and Lortz, Allan R., 5,023,981, Cl. 24-573.500.
- Loscalzo, Joseph; and Cooke, John, to Brigham and Women's Hospital. S-nitroso derivatives of ACE inhibitors and the use thereof. 5,025,001, Cl. 514-91.000.
- Loszewski, Raymond C., to Avco Corporation. Surface treatment for silicon carbide filaments and product. 5,024,889, Cl. 428-368.000.
- Lotsch, Charles F.: *See—*
  - Fluent, Stewart L.; Hart, Colin; McCree, Charles D.; and Lotsch, Charles F., 5,024,045, Cl. 53-443.000.
- Lougheed, Edgar P.; Richenberg, Carl B.; and Chen, Stephen P., to Eastman Kodak Company. Method of preparing coupler dispersions for photographic use. 5,024,929, Cl. 430-546.000.
- Louys, Georges: *See—*
  - Fischer, Kurt; and Louys, Georges, 5,024,161, Cl. 164-149.000.
- Love, Susan F.: *See—*
  - Rothstein, David M., Love, Susan F.; and Baum, Ellen Z., 5,024,948, Cl. 435-252.100.
- Loviglio, Giuseppe: *See—*
  - Loiacono, Marco; and Loviglio, Giuseppe, 5,024,928, Cl. 430-504.000.
- Lovik, Craig J. Expandable balloon wrapped media display system 5,024,012, Cl. 40-212.000.
- Lowe, Byron L.; Lewis, Robert T.; Milliner, Kenneth M., and Finn, Everett N., to Brown & Williamson Tobacco Corporation. Dispenser device for removing planar panels from a hopper 5,024,351, Cl 221-277.000.
- Lubins, Paula M.; and Mroszak, John C. Cartridge holder system 5,024,510, Cl. 350-321.000.
- Lubrizol Corporation, The: *See—*
  - Piedrahita, Carlos A.; Quinn, Robert E.; and Perz, John S., 5,025,085, Cl. 528-230.000.
  - Salomon, Mary F., 5,024,774, Cl. 252-47.000
- Lubrizol Genetics, Inc.. *See—*
  - Collins, Glenn B.; Hildebrand, David F.; Lazzeri, Paul A.; Adams, Thomas R.; Parrott, Wayne A.; and Hartweck, Lynn M., 5,024,944, Cl. 435-172.300.
- Lucas, Peter A.; and Casey, Jeremiah P., to Air Products and Chemicals, Inc. Epoxy resin systems containing methyl-2,6,-cyclohexanediamine. 5,025,078, Cl. 528-120.000.
- Lucius, John E.: *See—*
  - Bennett, Glenn E.; Lucius, John E.; Polk, Roger N.; Rider, Frederick H.; and Szczesny, David S., 5,024,627, Cl. 439-631.000.
- Ludwig Heumann & Co. GmbH. *See—*
  - Ahrens, Kurt H.; Schickaneder, Helmut; Engler, Heidrun, and Szeleny, Istvan, 5,025,016, Cl. 514-274.000.
- Luftman, Henry S.: *See—*
  - Kopf, Rose F.; Kuo, J. M.; Luftman, Henry S.; and Schubert, Erdmann F., 5,024,967, Cl. 437-95.000.
- Lundell, Vernon J. Automatic sorter. 5,024,335, Cl. 209-618.000.
- Lundy, Charles E.: *See—*
  - Jorissen, Steven A.; Lundy, Charles E.; Krishnan, Sivaram, Mafoti, Robson; and Pyles, Robert A., 5,025,056, Cl. 524-310.000.
- Lurssen, Klaus: *See—*
  - Schallner, Otto; Negele, Michael; Santel, Hans-Joachim; Lurssen, Klaus; Schmidt, Robert R.; and Krauskopf, Birgit, 5,024,694, Cl. 71-95.000.
- Lutz, Ferdinand: *See—*
  - Hahn, Walter; Lutz, Ferdinand; and Jahn, Manfred, 5,024,115, Cl. 74-89.150.
- Lux, Eric G.: *See—*
  - Pettigrew, Michel J.; Rhodes, David B.; Lux, Eric G.; and Mason, Victor A., 5,024,090, Cl. 73-572.000.
- Luxem, Heiner: *See—*
  - Thunker, Norbert, Pollich, Gerhard; and Luxem, Heiner, 5,024,432, Cl. 271-268.000.
- Luxtron Corporation: *See—*
  - Rall, Dieter, 5,024,532, Cl. 374-28.000.
- Lynk, Charles N.; and Schorman, Eric R., to Motorola, Inc. TDM/FDM communication system with pseudo-duplex capability 5,025,442, Cl. 370-29.000.
- Lynn, Stephen R.: *See—*
  - Alberghini, Alfred C.; Brunson, David A., and Lynn, Stephen R., 5,024,340, Cl. 215-1.00C.
- Lyon, John D.: *See—*
  - Penticoff, Amy M., and Lyon, John D., 5,024,937, Cl. 435-41.000.
- Lyons, Calvin R. Forehead, temple, ear, and neck protector. 5,023,954, Cl. 2-174.000.
- Lyons, Patrick J.: *See—*
  - Abbott, Kenneth E.; and Lyons, Patrick J., 5,024,029, Cl 51-438.000.
- Maas, Henricus G. R.: *See—*
  - Van Der Velden, Johannes W. A.; Maas, Henricus G. R.; and Van Iersel-Schiffmacher, Marguerite M. C., 5,024,956, Cl. 437-31.000.
- Macaluso, Anthony: *See—*
  - Donovan, William P.; Gonzalez, Jose M., Jr.; Levinson, Barry L.; and Macaluso, Anthony, 5,024,837, Cl. 424-93.000.
- MacCarthy, Patrick. Top and propelling element. 5,024,625, Cl 446-259.000.
- Mackal, Glenn H. Apparatus for making inflator parts. 5,024,558, Cl. 425-121.000.
- Macri, James. Assessing fetal lung maturity. 5,024,936, Cl. 435-28.000.
- Madaus GmbH & Co.: *See—*
  - Gorler, Klaus; Krumhiegel, Gunter; Hanack, Michael; and Subramanian, Lakshmina R., 5,024,743, Cl. 204-157.690.
- Maddahi, Jamshid: *See—*
  - Berger, Harvey J.; Maddahi, Jamshid; and Berman, Daniel, 5,024,829, Cl. 424-1.100.
- Mader, Gerhard: *See—*
  - Kleinschmidt, Peter; and Mader, Gerhard, 5,025,146, Cl. 250-214.00L.

- Maeda, Hirotoshi; and Kunimune, Kouichi, to Chisso Corporation. Photosensitive poly(amide)imide heat-resistant polymer. 5,025,088, Cl. 528-353.000.
- Maejima, Hisashi: *See—*
  - Komoriya, Susumu; Nishizuka, Hiroshi, Nakagawa, Shinya; and Maejima, Hisashi, 5,025,284, Cl. 355-53.000.
- Maekawa, Hiroshi: *See—*
  - Emori, Kiyoshi; and Maekawa, Hiroshi, 5,025,323, Cl. 358-300.000.
- Mafoti, Robson: *See—*
  - Jorissen, Steven A.; Lundy, Charles E.; Krishnan, Sivaram; Mafoti, Robson; and Pyles, Robert A., 5,025,056, Cl. 524-310.000.
- Magee, Maynard. Athletic shoe holder. 5,024,408, Cl. 248-206.500.
- Maguen, Ezra: *See—*
  - Nesburn, Anthony B.; Gorin, Michael; Martinez, Marvin; Kenney, M. Cristina; and Maguen, Ezra, 5,024,742, Cl. 204-157.680.
- Mahmud, Shahzad. Point of use deionized water purification unit. 5,024,766, Cl. 210-668.000.
- Mahulikar, Deepak: *See—*
  - SinghDeo, Narendra N.; Mahulikar, Deepak; and Butt, Sheldon H., 5,024,883, Cl. 428-323.000.
- Maier, Simeon E., II. Fit and cool beverage container. 5,024,067, Cl. 62-457.400.
- Maigetter, Robert Z.: *See—*
  - McAleer, William J.; Maigetter, Robert Z.; and Markus, Henry Z., 5,024,836, Cl. 424-89.000.
- Main, Alan J.: *See—*
  - Bhagwat, Shripad S.; Main, Alan J., and Rodriguez, Herman R., 5,025,025, Cl. 514-340.000.
- Maine, Gregory T.; Daves, Robert S.; and Yocum, Robert R., to BioTechnica International, Inc. Expression and secretion vector for yeast containing a glucoamylase signal sequence. 5,024,941, Cl. 435-69.900.
- Mainville, Jack Trench grate. 5,024,550, Cl. 404-4.000.
- Maiorella, Brian: *See—*
  - Inlow, Duane; and Maiorella, Brian, 5,024,947, Cl. 435-240.310.
- Maisonneuve, Jean-Michel; Domergue, Jean-Paul; Parize, Gabrielle; Palandjian, Philippe; and Isbert, Jacques, to Office National d'Etudes et de Recherche Aerospatiales (ONERA); and Societe Nationale Industrielle et Aerospatiale. System to transmit optical information and comprising a plurality of transmitters and receivers connected by optical fibers. 5,024,502, Cl. 350-96.160.
- Majima, Toshiaki: *See—*
  - Suzuki, Hidetoshi; Nomura, Ichiro; Majima, Toshiaki; and Yamamoto, Mitsuru, 5,025,196, Cl. 315-168.000.
- Makimoto, Mitsuo: *See—*
  - Hasegawa, Makoto; Takahashi, Kazuaki; Makimoto, Mitsuo; Takahashi, Masao; and Shimazu, Takayuki, 5,025,229, Cl. 331-107.00A
- Makofka, Stanley J *See—*
  - Glass, Emmett F.; Schoeneberger, Ernest A.; and Makofka, Stanley J., 5,024,051, Cl. 56-297.000.
- Malak, Francis R. Apparatus for removing ice from a chopped or cut hole. 5,024,757, Cl. 210-136.000.
- Malcolm, David B.; and Bunnelle, William L., to H. B. Fuller Licensing & Financing, Inc. Disposable article construction. 5,024,667, Cl. 604-382.000.
- Malin, Jerald R.: *See—*
  - Dinan, Raymond F.; Fallon, Hugh C.; Malin, Jerald R.; Rodite, Robert R.; Rohe, Clair F.; and Rohrer, Gene D., 5,025,483, Cl. 382-58.000.
- Maly, Wojciech P.; and Nigh, Phillip J., to Carnegie Mellon University. Built-in current testing of integrated circuits. 5,025,344, Cl. 361-88.000.
- Manabe, Tsuneo: *See—*
  - Nakamura, Arao; Manabe, Tsuneo; Sugimoto, Naoki; and Usui, Hiroshi, 5,024,974, Cl. 501-57.000.
- Manda, Masato: *See—*
  - Nose, Toshiro; Hashimoto, Hisashi; and Manda, Masato, 5,025,395, Cl. 364-518.000.
- Mankin, Erle D.: *See—*
  - Finn, Leslie E.; Swatling, Donald K.; and Mankin, Erle D., 5,024,782, Cl. 252-174.130.
- Mannesmann Aktiengesllschaft: *See—*
  - Hinzmann, Gerd; Nies, Norbert; and Radewahn, Siegfried, 5,024,811, Cl. 419-66.000.
- Mannesmann Rexroth GmbH: *See—*
  - Lembke, Herbert, 5,024,247, Cl. 137-82.000.
  - Voxbrunner, Walter, 5,024,417, Cl. 251-129.040.
- Maples, D. Ray. Footwear device for hunters. 5,024,008, Cl. 36-136.000.
- Marconi Company Limited, The: *See—*
  - Stafford, Gary P., 5,025,264, Cl. 343-767.000.
- Markov, Gennady I.: *See—*
  - Kozlov, Vladimir S.; Markov, Gennady I.; and Bugrov, Vladimir P., 5,024,658, Cl. 604-96.000.
- Marks, Robert J., to Northern Telecom Limited. Overload protector module and building entry protector with integrally molded modular jack. 5,025,345, Cl. 361-119.000.
- Markus, Henry Z.: *See—*
  - McAleer, William J.; Maigetter, Robert Z., and Markus, Henry Z., 5,024,836, Cl. 424-89.000.
- Markuszewski, Richard: *See—*
  - Chriswell, Colin D.; Markuszewski, Richard; and Buttermore, William H., 5,024,753, Cl. 209-1.000.
- Marmonier, Andre : *See—*
  - Heng, Jean-Paul; and Marmonier, Andre , 5,024,608, Cl. 439-578.000.
- Maron, Stanislav. Reticle masking apparatus for a camera and method. 5,024,522, Cl. 352-89.000.
- MARPOSS Societa' per Azioni: *See—*
  - Possati, Mario, 5,024,002, Cl. 33-549.000.
- Marquis, Edward T.: *See—*
  - Sanderson, John R.; Marquis, Edward T.; and Knifton, John F., 5,025,112, Cl. 585-852.000.
- Marshall, Eric A.: *See—*
  - Bryant, Robert G.; Hornak, Joseph P.; and Marshall, Eric A., 5,024,229, Cl. 128-653.0SC.
- Martin, Greg L. Illuminated splash guard. 5,025,351, Cl. 362-83.000.
- Martin, Jean-Paul: *See—*
  - Barreau, Michel; Hardy, Jean-Claude; Martin, Jean-Paul; and Renault, Christian, 5,025,013, Cl. 514-253.000.
- Martin, John D.: *See—*
  - Abdelrazik, Mohamed A.; Martin, John D., and Corcoran, Boyd L., 5,025,262, Cl 343-705.000.
- Martinez, Marvin: *See—*
  - Nesburn, Anthony B.; Gorin, Michael; Martinez, Marvin; Kenney, M. Cristina; and Maguen, Ezra, 5,024,742, Cl. 204-157.680.
- Masaki, Kouichi: *See—*
  - Endo, Yasushi; Kato, Mikihiko; Kawamata, Toshio; and Masaki, Kouichi, 5,024,885, Cl. 428-329.000.
- Masaki, Takashi, to Hirose Electric Co., Ltd Cable loading machine. 5,023,992, Cl. 29-705.000.
- Maschinenfabrik Rieter AG: *See—*
  - Meyer, Urs; Gartenmann, Niklaus; and Fischer, Roland, 5,023,976, Cl. 19-0.250.
- Masciarella, Andrew M.; and Whistler, George R., to Advanced Products International, Inc. Filament holder for a rotating filament vegetation cutter. 5,023,998, Cl. 30-276.000.
- Mase, Akira: *See—*
  - Watanabe, Toshio; Sato, Masahiko; Osabe, Akio; Sakayori, Hiroyuki; and Mase, Akira, 5,024,255, Cl. 141-11.000.
- Mason, Charles D.; Sacks, William; Engelmann, Theodore R.; and Verma, Satyajit, to Allied-Signal Inc. Blends of polyamide, polyolefin, and ethylene vinyl alcohol copolymer. 5,024,897, Cl. 428-474.400.
- Mason, Victor A.: *See—*
  - Pettigrew, Michel J.; Rhodes, David B.; Lux, Eric G.; and Mason, Victor A., 5,024,090, Cl. 73-572.000.
- Massa, Vincenzo; Cicuta, Aldo; and Cavigiolo, Walter, to Ausimont S.p.A. Process for consolidating discontinuous-structured materials. 5,024,879, Cl. 428-304.400.
- Massey, Charles E. Tool for handling a heavy elongate article. 5,024,476, Cl. 294-16.000.
- Massey University: *See—*
  - Thornton, Roy J.; and Rodriguez, Susan B., 5,024,845, Cl 426-15.000.
- Masuda, Tomohiko: *See—*
  - Matsubara, Ken; Saito, Itaru; Kitano, Hirohisa; Shingaki, Kouichi; and Masuda, Tomohiko, 5,024,511, Cl. 350-356.000.
- Masury, David H.: *See—*
  - Germer, Warren R.; Coryea, Peter F.; Keturakis, Andrius A.; Masury, David H.; and Stevens, Thomas H., 5,025,206, Cl. 324-74.000.
- Masuyama, Masaru; Takemae, Yoshihiro; Endoh, Tetsuhiko; Komyoji, Hirosuke; Tanaka, Ryuji; and Itakura, Katsuhiko, to Fujitsu Limited; and Fujitsu Vlsi Limited. Memory card. 5,025,415, Cl. 365-52.000.
- Mata, Francisco R. E. Single block for fixing electroconductor cables to vehicle battery terminals. 5,024,621, Cl. 439-771.000.
- Mathad, Gangadhara S.; Stanasolovich, David; and Via, Giorgio G., to International Business Machines Corporation. Collimated metal deposition. 5,024,896, Cl. 428-473.500.
- Mathewson, Wilfred F.: *See—*
  - Tu, Roger; Chen, David; and Mathewson, Wilfred F., 5,024,671, Cl. 623-1.000.
- Mathur, Sanjay S.; and Fernando, John S., to Unisys Corporation. Hardware implemented cache coherency protocol with duplicated distributed directories for high-performance multiprocessors. 5,025,365, Cl. 364-200.000.
- Matschke, Klaus: *See—*
  - Dinter, Peter; Funke, Hermann; and Matschke, Klaus, 5,024,819, Cl. 422-186.060.
- Matsubara, Ken; Saito, Itaru; Kitano, Hirohisa; Shingaki, Kouichi; and Masuda, Tomohiko, to Minolta Camera Kabushiki Kaisha. Display apparatus. 5,024,511, Cl. 350-356.000.
- Matsubara, Kenichi: *See—*
  - Nozaki, Chikateru; Miyanohara, Atsushi; Hamada, Fukusaburo; Ohtomo, Nobuya; and Matsubara, Kenichi, 5,024,938, Cl. 435-68.100.
- Matsubara, Kunihiro: *See—*
  - Ohta, Takeo; Uchida, Masami; Kotera, Koichi; and Matsubara, Kunihiro, 5,024,910, Cl. 430-19.000.
- Matsubara, Takashi, to Nikon Corporation. Plate for light shielding blade. 5,025,278, Cl. 354-246.000.
- Matsubara, Yoshihiro; and Matsumura, Shuzo, to NGK Spark Plug Co., Ltd. Temperature sensor for use in a spark plug of an internal combustion engine. 5,024,534, Cl. 374-144.000.
- Matsubayashi, Takayuki: *See—*
  - Saito, Yasuo; Yahata, Mitsuru; Honjo, Kouji; and Matsubayashi, Takayuki, 5,025,463, Cl. 378-19.000.
- Matsuda, Koichi: *See—*
  - Kanai, Masahiro; Aoike, Tatsuyuki; Matsuda, Koichi; and Kawakami, Soichiro, 5,024,706, Cl. 136-258.000.

VOL
1127
ISS
3
JE
18
1991
UMI

- Matsui, Toshio: *See—*
  - Ishii, Akihiko; Honda, Yukihiro; and Matsui, Toshio, 5,025,202, Cl. 320-32.000.
- Matsumoto, Fukuji; Tawara, Yoshio; Hayashi, Michio; and Yamada, Osamu, to Shin-Etsu Chemical Co., Ltd Semiconductor diffusion furnace inner tube. 5,024,423, Cl. 266-283.000.
- Matsumoto, Masakazu: *See—*
  - Neishi, Toshie; Kikuchi, Toshihiro; Takiguchi, Takao; Suzuki, Koichi; and Matsumoto, Masakazu, 5,024,912, Cl. 430-59.000.
- Matsumoto, Takehiko: *See—*
  - Sone, Toshiyuki; Matsumoto, Takehiko; Omotezako, Nobuya; and Kawasuji, Keiji, 5,025,338, Cl. 360-99.060.
- Matsumura, Shuzo: *See—*
  - Matsubara, Yoshihiro; and Matsumura, Shuzo, 5,024,534, Cl. 374-144.000.
- Matsuo, Haruyuki: *See—*
  - Fujita, Yoshikuni; and Matsuo, Haruyuki, 5,024,185, Cl. 123-146.50A.
- Matsushita Electric Industrial Co., Ltd.: *See—*
  - Aoki, Shinichiro; Sato, Takeo; Yamaguchi, Katsumasa; and Yamamoto, Masaki, 5,025,168, Cl. 250-548.000.
  - Hasegawa, Makoto; Takahashi, Kazuaki; Makimoto, Mitsuo; Takahashi, Masao; and Shimazu, Takayuki, 5,025,229, Cl. 331-107.00A.
  - Hosoi, Osamu, 5,025,311, Cl. 358-31.000.
  - Nagata, Yuji; and Fukazawa, Toshio, 5,025,342, Cl. 360-126.000.
  - Nakanishi, Masahiro; Mori, Daisuke; Fujii, Katsuyoshi; Hatanaka, Masahiko; and Shinada, Hiroko, 5,024,133, Cl. 84-615.000.
  - Nakano, Shigeru; and Kondou, Yasuhiro, 5,024,284, Cl. 180-179.000.
  - Ohta, Takeo; Uchida, Masami; Kotera, Koichi; and Matsubara, Kunihiro, 5,024,910, Cl. 430-19 000.
  - Saeki, Kiyoshi; Ohtsuki, Toshinori; and Ueno, Kazuo, 5,025,269, Cl. 346-108.000.
  - Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.
  - Taniguchi, Hiroshi; Kubo, Kanji; and Nakase, Hiromi, 5,025,329, Cl. 360-77.160.
  - Yamaguchi, Kimiaki, 5,025,489, Cl. 219-10.55B
- Matsushita Electric Works, Ltd.: *See—*
  - Arakawa, Masao; Terasawa, Tomizo; Ogawa, Masanobu; and Kami, Hironori, 5,025,169, Cl. 250-574.000
  - Hagiwara, Hiroshi; Araki, Kazunori; and Michimori, Akihiro, 5,024,650, Cl. 600-26.000.
- Matsushita Electrical Industrial Co., Ltd.: *See—*
  - Gurd, John R.; and Kawakami, Katsura, 5,025,367, Cl. 364-200 000.
- Matsushita, Masao: *See—*
  - Yonezawa, Yasuo; Ohnishi, Toshiya, Okumura, Shin-ichi; Sakai, Akiyoshi; Nakano, Hiroki; Matsushita, Masao; Morikawa, Atsushi; and Yoshihara, Motoshi, 5,024,064, Cl. 62-106.000.
- Matsuzaki, Kazuhiro: *See—*
  - Murakami, Tokumichi; Asai, Kohtaro; and Matsuzaki, Kazuhiro, 5,025,482, Cl. 382-56.000.
- Mattison, Glenn D., to Air Preheater Company, Inc., The. Twin bed regenerative incinerator system. 5,024,817, Cl. 422-111.000.
- Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul; Bickle, Wolfgang; and Braus, Jurgen, to Kolbenschmidt Aktiengesellschaft. Material for use in composite sliding surface bearings and process of manufacturing the material. 5,024,881, Cl. 428-323.000.
- Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul; Bickle, Wolfgang; and Braus, Jurgen, to Kolbenschmidt Aktiengesellschaft. Material for use in composite sliding surface bearings and process of manufacturing the material. 5,024,882, Cl. 428-323.000.
- Matuo, Ken-iti; Nakata, Muneo; Hori, Mitukazu; and Tanihara, Isaji, to Omron Tateisi Electronics Co. Electromagnetic relay. 5,025,238, Cl 335-128.000.
- Mauderli, Walter. *See—*
  - Bova, Frank J.; Fitzgerald, Lawrence T.; and Mauderli, Walter, 5,025.376, Cl. 364-413.260.
- Maurer, Christoph, to Dragerwerk Aktiengesellschaft Valveless pump. 5,024,587, Cl. 417-488.000.
- Maurer, Ingo. Suspended electric lamp. 5,025,357, Cl. 362-249.000.
- Maya, Jakob, to GTE Products Corporation Novel hybrid isotope separation scheme and apparatus. 5,024,739, Cl. 204-157.200.
- Maya, Jakob, to GTE Products Corporation. Hybrid isotope separation scheme. 5,024,741, Cl. 204-157.220.
- Maya, Jakob: *See—*
  - Bouchard, Andre C.; Thibault, Paul A.; Lagushenko Radomir; Maya, Jakob; and Maya, Jakob, 5,025,190, Cl. 313-619.000.
  - Bouchard. Andre C.; Thibault, Paul A.; Lagushenko Radomir; Maya, Jakob; and Maya, Jakob, 5,025,190, Cl. 313-619.000.
- Mayr, Ulrich, Gauhl, Helmgard; and Seidel, Hans, to Boehringer Mannheim GmbH. Process for obtaining sarcosine oxidase from microorganisms. 5,024,945, Cl. 435-191.000.
- Mazda Motor Corporation: *See—*
  - Baba, Fumiaki, 5,024,125, Cl. 74-866.000.
  - Fujita, Nagahisa, 5,024,285, Cl. 180-197.000.
  - Isukimi, Hayatsugu; and Kikuchi, Reiji, 5,024,482, Cl. 296-194.000.
- Mazuch, Ludvik; and Haughton, David R. Soil or aggregate stabilizing agent and matrixes stabilized by same. 5,024,702, Cl. 106-277.000.
- McAleer, William J.; Maigetter, Robert Z.; and Markus, Henry Z., to Merck & Co., Inc. Stable lyophilized live herpes virus vaccine. 5,024,836, Cl. 424-89.000.
- McAllister, Mary J.: *See—*
  - Sikand, Parminder S.; McAllister, Mary J. Henel, John; Jackson, Allen L.; and Bell, Karen, 5,025,468, Cl. 379-67.000.
- McCallum, Doug J.: *See—*
  - Anderson, Donald J.; Duerksen, John H.; McCallum, Doug J. and Petrick, Mark, 5,024,275, Cl. 166-303.000.
- McCauley, Kyn A.: *See—*
  - Pitman, John L.; and McCauley, Kyn A., 5,025,361, Cl. 364-143.000.
- McClune, Gregory J.; and Bishop, John F., to Eastman Kodak Company. Dye-providing composition, diagnostic test kit and their use in method for ligand determination using peroxidase labeled-receptor. 5,024,935, Cl. 435-7.100.
- McClung, James A.: *See—*
  - Bulso, Joseph D., Jr.; and McClung, James A., 5,024,077, Cl. 72-336.000.
- McConnel, Fred M S. Manofluorography system, method for forming a manofluorogram and method for preparing a swallowing profile 5,024,240, Cl. 128-780.000.
- McCree, Charles D.: *See—*
  - Fluent, Stewart L.; Hart, Colin; McCree, Charles D; and Lotsch, Charles F., 5,024,045, Cl. 53-443.000.
- McCullough, Francis P., Jr.; Snelgrove, R. Vernon; and Hall, David M., to Dow Chemical Company, The. Fire resistant materials. 5,024,877, Cl. 428-282.000.
- McDaniel, Max P.: *See—*
  - Hawley, Gil P.; and McDaniel, Max P., 5,024,982, Cl 502-110.000.
- McDonald, Joseph C.: *See—*
  - Miller, Steven D.; McDonald, Joseph C.; Eichner, Fred N; and Tomeraasen, Paul L., 5,025,159, Cl. 250-337.000.
- McElroy, David J.: *See—*
  - Gill, Manzur; and McElroy, David J., 5,025,494, Cl. 357-23.500.
- McGilp, Kenneth J.; Affa, Stephen N; and Newman, Ira R Compensating seal. 5,024,454, Cl. 277-207.00A.
- McGrath, Barbara E.: *See—*
  - Davis, Gary C.; McGrath, Barbara E.; and Snow, Kevin M., 5,025,074, Cl. 528-15.000.
- McGrath, Thomas M.; and Tilles, Arno W., to Hydroquip Technologies, Inc. Magnetic treatment of fluids. 5,024,759, Cl. 210-222.000.
- McGuire, Robert H. Pipe clamp. 5,024,405, Cl. 248-73.000.
- McGurk-Burleson, Erin: *See—*
  - Peterson, Robert H.; and McGurk-Burleson, Erin, 5,024,669. Cl. 623-13.000.
- McIntosh, Robert H., Sr.: *See—*
  - Blakely, Lawrence W., Howe, Michael A.; Pinholster, Daniel F., Jr.; Terry, Claude E.; and McIntosh, Robert H., Sr., 5.024.840, Cl. 424-404.000.
- McKay, Michael L., to Orbital Engine Company Proprietary Limited. Metering of fuel. 5,024,202, Cl. 123-533.000.
- McKenzie, John R.: *See—*
  - Leary, James J., and McKenzie, John R., 5,024,234, Cl. 128-663.010.
- McLachlan, Carran Norman Stuart: *See—*
  - McLachlan, Corran N. S; Catchpole, Owen J.; and Hamilton, Bruce H., 5,024,846, Cl. 426-312.000.
- McLachlan, Corran N. S.; Catchpole, Owen J.; and Hamilton, Bruce H., to McLachlan, Carran Norman Stuart. Separation of sterols from lipids. 5,024,846, Cl. 426-312.000.
- McManus, Stephen J.: *See—*
  - Gunn, Duncan A.; and McManus, Stephen J, 5,024.503, Cl. 350-96.200.
- McMillin, Larry D.: *See—*
  - Rohrer, George A.; and McMillin, Larry D., 5,024,964, Cl. 437-47.000.
- McMullin, Hugh: *See—*
  - Chu, George H.; Ogawa, Yasushi; McPherson, John M.; Ksander, George; Pratt, Bruce; Hendricks, Diana; and McMullin, Hugh. 5,024,841, Cl. 424-422.000.
- McNaughton, R. David. Syringe shield. 5,024,660, Cl. 604-110.000.
- MCNC: *See—*
  - Reisman, Arnold; and Turlik, Iwona, 5,025,304, Cl. 357-71.000
- McPherson, John M.. *See—*
  - Chu, George H.; Ogawa, Yasushi; McPherson, John M.; Ksander, George; Pratt, Bruce; Hendricks, Diana; and McMullin, Hugh, 5,024,841, Cl. 424-422.000.
- McQuade, Donald E. Gate locking device featuring dead bolt means. 5,024,473, Cl. 292-120.000.
- McQueeney, Kenneth A.: *See—*
  - Borner, Willy; and McQueeney, Kenneth A. 5,024,001, Cl. 33-203.180.
- Mead Corporation, The: *See—*
  - Spamer, William S., 5,024,336, Cl. 211-59.200.
- Meccanizzazione Postale E Automazione SpA: *See—*
  - Scata, Mario; and Passero, Adolfo, 5,024,316, Cl. 198-369.000.
- MECO Equipment Engineers B.V.: *See—*
  - Rischke, Jorg W.; Loermans, Peter J G., and Huvenaars, Peter J. M., 5,024,745, Cl. 204-198.000.
- Med-Safe Systems, Inc.: *See—*
  - Shillington, Richard A., 5,024,327, Cl. 206-366.000.
- Medical Laboratory Automation, Inc.: *See—*
  - Romero, Hugo; and Anderson, Robert, 5,024.109, Cl. 73-864.160.
- Medicis Corporation: *See—*
  - Faden, Alan I., 5,025,018, Cl. 514-277.000.
- Meekins, John F., to United States of America, Navy. Pseudo-random support structure for transmission gratings. 5,025,464, Cl. 378-84.000.

- Mehan, Charles T Shoe lace for athletic shoes. 5,023,982, Cl. 24-715.300.
- Mehrotra, Pankaj K.; and Billman, Elizabeth R., to Kennametal Inc Alumina-zirconia-silicon carbide-magnesia ceramic cutting tools. 5,024,976, Cl. 501-89.000.
- Meihua, Wang, to Baotou Institute of Applied Design of New Materials. Permanent-magnet wax-proof device. 5,024,271, Cl. 166-66.500.
- Meinherz, Manfred; Veuhoff, Freidrich-Wilh; Gilmozzi, Gunther; and Kelch, Thomas, to Siemens Aktiengesellschaft. Metal-clad, compressed gas-blast circuit-breaker with a shifting linkage. 5,025,118, Cl. 200-148.00R.
- Meiri, Samuel. Accurate peristaltic pump for non elastic tubing. 5,024,586, Cl. 417-477.000.
- Melcher, Charles L., to Schlumberger Technology Corporation. Lutetium orthosilicate single crystal scintillator detector. 5,025,151, Cl. 250-269.000.
- Membrane Technology & Research, Inc.: *See—*
  - Athayde, Amulya L.; and Baker, Richard W., 5,024,594, Cl. 428-246.000.
- Memtec Limited. *See—*
  - Ford, Douglas L.; Anderson, Eric W.; and Kopp, Clinton V., 5,024,762, Cl. 210-321.690.
- Menaged, David L. Adjustable reading stand and light assembly. 5,025,353, Cl. 362-98.000.
- Mende, Stephen B., to Lockheed Missiles & Space Company, Inc. Multichannel telecentric filtered imager. 5,024,530, Cl. 356-402.000.
- Mendle Limited: *See—*
  - Riemer, Horst H., 5,024,339, Cl. 215-1.00C.
- Menes, Cenon M.: *See—*
  - Menes, Cesar M; and Menes, Cenon M., 5,024,662, Cl. 604-131.000.
- Menes, Cesar M.; and Menes, Cenon M Resistance syringe for epidural anesthesia. 5,024,662, Cl. 604-131.000.
- Menet, Jacques; and de Gabrielli, Olivier, to Centre National de la Recherche Scientifique. Vapor and ion source. 5,025,194, Cl. 315-111.810.
- Mengelson, William G.: *See—*
  - Dola, Frank P.; Feldman, Steven; Lauterbach, John H.; and Mengelson, William G., 5,024,614, Cl. 439-114.000.
- Mercer, Albert E., to Thetford Corporation. Extendable waste hose system. 5,023,959, Cl. 4-321.000.
- Merck & Co., Inc.: *See—*
  - Dininno, Frank P.; and Salzmann, Thomas N., 5,025,006, Cl. 514-210.000.
  - DiNinno, Frank P.; Salzmann, Thomas N.; and Greenlee, Mark L., 5,025,008, Cl. 514-210.000.
  - Greenlee, Mark L.; DiNinno, Frank P.; Cama, Lovji D.; and Heck, James V., 5,025,007, Cl. 514-210.000.
  - McAleer, William J.; Maigetter, Robert Z.; and Markus, Henry Z., 5,024,836, Cl. 424-89.000.
- Meridian Enterprises, Inc.: *See—*
  - Burton, James F.; and Henke, Daniel L., 5,025,372, Cl. 364-406.000.
- Merrell, Gene A., to Betz Laboratories, Inc. Organic polymer activator for detackification. 5,024,768, Cl. 210-712.000.
- Merry, Richard P., to Minnesota Mining and Manufacturing Company. Insulated double-walled exhaust pipe. 5,024,289, Cl. 181-231.000.
- Mertens-Gottselig, Dagmar; Hammer, Hartmut; Muller, Heinrich, and Wildersohn, Manfred, to DEA Mineralol Aktiengesellschaft. Process for the prevention or reduction of deposits in carburetors, injection devices and similar devices of engines. 5,024,678, Cl. 44-348.000.
- Mertin, Jurgen: *See—*
  - Reinholz, Erhard; Friebe, Walter-Gunar; Kampe, Wolfgang; Mertin, Jurgen; and Wilhelms, Otto-Henning, 5,025,028, Cl. 514-381.000.
- Meschi, Luciano, to Industria Grafica Meschi S.r.l. Working method of an automatic service truck for moving sheet packages. 5,024,576, Cl. 414-786.000.
- Messer Griesheim GmbH: *See—*
  - Gokcek, Cetin, 5,024,823, Cl. 423-210.000.
- Messerschmitt-Boelkow-Blohm GmbH: *See—*
  - Poisel, Hans; and Trommer, Gert, 5,025,148, Cl. 250-227.120.
- Messerschmitt Bolkow-Blohm GmbH: *See—*
  - Kranz, Walter; and Tillmann, Heinz, 5,024,395, Cl. 244-3.220.
- Metallgesellschaft Aktiengesellschaft: *See—*
  - Rausch, Werner, 5,024,707, Cl. 148-253.000
- Metcal, Inc.: *See—*
  - Derbyshire, Rodney L., 5,025,128, Cl. 219-200.000.
- Metsa-Serla OY: *See—*
  - Karlsson, Lars-Ake, 5,024,362, Cl. 225-20.000.
- Meyer, George R.: *See—*
  - Wang, Sophia L.; Meyer, George R.; and Brinkman, Kerry C., 5,024,677, Cl. 44-335.000.
- Meyer, H. Robert: *See—*
  - Oldham, James G.; Spencer, Charles R.; Begley, Carl L.; and Meyer, H Robert, 5,025,150, Cl. 250-253.000.
- Meyer, Hans-H. Bag filling and closing apparatus. 5,024,042, Cl. 53-168.000.
- Meyer, Urs; Gartenmann, Niklaus; and Fischer, Roland, to Maschinenfabrik Rieter AG. Feed table of a drawframe arrangement. 5,023,976, Cl. 19-0.250.
- Michimori, Akihiro: *See—*
  - Hagiwara, Hiroshi; Araki, Kazunori; and Michimori, Akihiro, 5,024,650, Cl. 600-26.000.
- Microelectronics & Computer Technology Corporation: *See—*
  - Kroger, Harry; and Ghoshal, Uttam S., 5,024,993, Cl. 505-1.000.
- Micron Technology, Inc.: *See—*
  - Cathey, David A., Jr., 5,024,722, Cl. 156-643.000.
  - Chhabra, Navjot, 5,024,599, Cl. 432-226.000.
  - Lee, Ruojia; and Ahmad, Aftab A., 5,024,961, Cl. 437-34 000.
- Microthermo: *See—*
  - Bergeron, Real, 5,025,248, Cl. 340-596.000.
- Microwave Power, Inc.: *See—*
  - Bujatti, Marina; and Sechi, Franco N., 5,023,994, Cl. 29-852.000.
- Midwest Blast Products, Inc.: *See—*
  - Pierce, Kirby L.; and Kanouse, Richard C., 5,024,028, Cl. 51-432.000.
- Mihara, Chieko; Santoh, Tsuyoshi; and Sugata, Hiroyuki, to Canon Kabushiki Kaisha. Optical recording medium containing meta-position aluminium-type IR-ray absorptive compound. 5,024,917, Cl 430-271.000.
- Mihara, Hisashi: *See—*
  - Ishii, Yoichi; and Mihara, Hisashi, 5,024,844, Cl. 424-520.000.
- Mihara, Masato: *See—*
  - Hirayama, Hiromichi; Hara, Mitsuhiko; Mihara, Masato; and Harumatsu, Mitsuo, 5,025,331, Cl. 360-85 000.
- Mikoshiba, Nobuo: *See—*
  - Okada, Takao; Yagi, Akira; Morita, Seizo; and Mikoshiba, Nobuo, 5,025,153, Cl. 250-306.000.
- Miletic, Veselko: *See—*
  - Smith, Tempel, Jr.; Miletic, Veselko; Bayer, George; Coutre, Christopher A.; Reichel, William L.; and Chronowski, Mirek J., 5,025,223, Cl. 324-662.000.
- Millard, Michael L.; Harrison, Michael G.; and Szweda, Andrew, to General Electric Company. Method for applying an oxide barrier coating to a reinforcing fiber. 5,024,859, Cl. 427-226.000
- Miller, Conrad E.: *See—*
  - Sidwell, Lloyd G.; and Miller, Conrad E., 5,025,164, Cl. 250-483.100.
- Miller, Jon E.; and Schenk, Donald E., to General Motors Corporation. Disc brake rotor and wheel assembly. 5,024,300, Cl. 188-264.0CC.
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- Milliken Denmark A/S: *See—*
  - Petersen, Helle B., 5,024,868, Cl. 428-88.000.
- Milliner, Kenneth M.: *See—*
  - Lowe, Byron L.; Lewis, Robert T.; Milliner, Kenneth M, and Finn, Everett N., 5,024,351, Cl. 221-277.000.
- Mininagh, Winslow M.: *See—*
  - Veenis, Aartje W.; and Mimnagh, Winslow M., 5,025,435, Cl. 369-48.000.
- Mimoun, Hubert: *See—*
  - Cameron, Charles; Mimoun, Hubert; Robine, Alain; Bonnaudet, Serge; Chaumette, Patrick; and Dang Vu, Quang, 5,025,108, Cl. 585-500.000.
- Minakuchi, Hiroyoshi: *See—*
  - Suganuma, Katsuaki; Fujii, Hiroyuki; Minakuchi, Hiroyoshi; Kada, Katsuhiko; Osafune, Haruo; and Kanamaru, Kuniaki, 5,024,902, Cl. 428-633.000.
- Minato, Masahiro: *See—*
  - Seki, Nobuyoshi; Morii, Nobuyuki, Sugiyama, Yoshihide, Komada, Takashi; Hosoi, Masatoshi; Hujiwara, Atuhisa; Ichinose, Tsutomu; Mori, Goro; Kikuchi, Toshiyuki; and Minato, Masahiro, 5,024,430, Cl. 270-53.000.
- Mine Safety Appliances Company: *See—*
  - Chiu, Kuen-Wai; Yu, Lin-Chen; and Strickler, John R., 5,025.096, Cl. 544-234.000.
- Minet, Jacky: *See—*
  - Robinbrosse, Christian; Naslain, Roger; Minet, Jacky; and Larglais, Francis, 5,024,878, Cl. 428-297.000.
- Ming-Hwa, Yeh. Coaxial cable connector. 5,024,606, Cl. 439-578.000.
- Minneman, Scott L.: *See—*
  - Tang, John C.; and Minneman, Scott L., 5,025,314, Cl. 358-93.000.
- Minnesota Mining & Manufacturing Company: *See—*
  - Cloud, Randy G.; and Pretchel, David A., 5,024,798, Cl. 264-272.150.
  - Crater, Davis H.; Howells, Richard D.; Stern, Richard M., and Temperante, John A., 5,025,052, Cl. 524-104.000.
  - Insley, Thomas I., 5,024,865, Cl. 428-36.400.
  - Loiacono, Marco; and Loviglio, Giuseppe, 5,024,928, Cl 430-504.000.
  - Merry, Richard P., 5,024,289, Cl. 181-231.000.
  - van den Honert, Christopher; and Stypulkowski, Paul H., 5,024,612, Cl. 604-36.000.
  - Veasley, George F.; Klingen, Jurgen; and Landin, Donald T., 5,024,880, Cl. 428-317.500.
- Minns, Richard A.; Bloom, Iris B. K.; and Ramharack, Roopram, to Polaroid Corporation. Photopolymerizable composition for cladding optical fibers. 5,024,507, Cl. 350-96.340.
- Minolta Camera Kabushiki Kaisha: *See—*
  - Emori, Kiyoshi; and Maekawa, Hiroshi, 5,025,323, Cl. 358-300.000.
  - Hasegawa, Hirofumi; Ohmori, Naoto; Yamada, Yukio; and Yoshida, Narutaka, 5,025,286, Cl. 355-244.000.
  - Hattori, Yoshihiro, 5,025,155, Cl. 250-326.000.
  - Ishimura, Toshihiko; Okuno, Akira; Tanii, Junichi; and Seki, Reiji, 5,025,239, Cl. 335-265.000.
  - Kusuda, Yasuhiro, 5,025,288, Cl. 355-251.000.

VOL
1127
ISS
3
JE
18
1991
UMI

  Matsubara, Ken; Saito, Itaru; Kitano, Hirohisa; Shingaki, Kouichi; and Masuda, Tomohiko, 5,024,511, Cl. 350-356.000.
  Shimizu, Tadafumi; and Ohira, Tadashi, 5,024,431, Cl. 271-263.000.
  Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, 5,025,275, Cl. 354-106.000.
Misaizu, Iwao: *See—*
  Hanada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, 5,024,893, Cl. 428-423.100.
Misra, Manjit K.; and Shyy, Yuh-Yuan, to Iowa State University Research Foundation, Inc. Method and means for gravity table automation. 5,024,334, Cl. 209-557.000.
Mita Industrial Co., Ltd.: *See—*
  Yoshida, Takeshi; Nakatani, Kaname; Fukami, Toshiyuki; and Tanaka, Nariaki, 5,024,913, Cl. 430-67.000.
Mitchell, Richard J., to Baxter International Inc. Vacuum infusion device. 5,024,664, Cl. 604-143.000.
Mitre Corporation, The: *See—*
  Artz, John M., 5,025,382, Cl. 364-439.000.
  Tsuchiya, Paul F.; and Stine, Robert H., 5,025,491, Cl. 340-825.520.
Mitsuba Electric Manufacturing Co., Ltd.: *See—*
  Arakawa, Ikuo, 5,024,857, Cl. 427-104.000.
Mitsubishi Denki Kabushiki Kaisha: *See—*
  Aoyagi, Toshitaka; and Motoda, Takashi, 5,025,450, Cl. 372-46.000.
  Fujita, Yoshikuni; and Matsuo, Haruyuki, 5,024,185, Cl. 123-146.50A.
  Fujiwara, Masatoshi, 5,024,726, Cl. 156-653.000.
  Inada, Masanori; and Ohtani, Hichiro, 5,024,083, Cl. 73-204.260.
  Ishii, Akihiko; Honda, Yukihiro; and Matsui, Toshio, 5,025,202, Cl. 320-32.000.
  Kasatani, Yasushi; and Tachikawa, Toru, 5,024,605, Cl. 439-500.000.
  Kimura, Masatoshi, 5,025,420, Cl. 365-230.010.
  Kitamura, Shigeharu; Nakamura, Haruhiko; and Sanada, Masaru, 5,024,314, Cl. 198-333.000.
  Kobayashi, Toshiyuki; Koshinaka, Masao; Kinoshita, Yoshimi; Oda, Masao; and Yoshizawa, Kenji, 5,024,182, Cl. 118-723.000.
  Mori, Masataka, 5,024,970, Cl. 437-226.000.
  Murakami, Tokumichi; Asai, Kohtaro; and Matsuzaki, Kazuhiro, 5,025,482, Cl. 382-56.000.
  Murano, Katsuaki; Yamashita, Yoshinori; Hirano, Sadayuki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,024,310, Cl. 192-0.076.
  Ohkubo, Satoru; and Washino, Shoichi, 5,024,082, Cl. 73-117.300.
  Ohuchi, Hirofumi, 5,024,196, Cl. 123-339.000.
  Okuda, Soichiro; Nakanishi, Tetsuya; Sasaki, Shigeo; and Noguchi, Kazuhiko, 5,025,167, Cl. 250-492.200.
  Takokoro, Michihiro; Okada, Kazuo; and Imai, Hitoshi, 5,025,430, Cl. 369-13.000.
  Tsutahara, Kouichirou; and Tanaka, Hiroshi, 5,025,133, Cl. 219-462.000.
  Ueda, Tetsuya; Tachikawa, Toru; and Takehara, Masataka, 5,025,307, Cl. 357-80.000.
  Wataya, Seiji; and Washino, Shoichi, 5,025,380, Cl. 364-431.050.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
  Ushio, Sadakatsu; Nakamura, Noboru; Higashi, Hirofumi; Iwata, Masataka; and Niwa, Fumiyasu, 5,024,189, Cl. 123-195.00R.
Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
  Moriyama, Noboru; Ogura, Tsugitoshi; and Hiraki, Akio, 5,024,676, Cl. 44-301.000.
Mitsubishi Kasei Corporation: *See—*
  Kishiro, Osamu; Kamata, Hiroshi; and Sakai, Hideko, 5,025,082, Cl. 528-190.000.
Mitsubishi Kinzoku Kabushiki Kaisha: *See—*
  Tsunashima, Makoto; Uchida, Hiroto; Sakai, Kazuhiro; and Miyauchi, Masato, 5,024,991, Cl. 505-1.000
Mitsubishi Paper Mills Limited: *See—*
  Katsura, Toru; Kaji, Hiroo; Hyodo, Kenji; and Ohkura, Hirokazu, 5,024,986, Cl. 503-200.000.
Mitsubishi Plastics Industries limited: *See—*
  Yoshiga, Norio; Kawamura, Masahiro; and Nonoyama, Hiroshi, 5,024,891, Cl. 428-414.000.
Mitsubishi Rayon Company Limited: *See—*
  Funato, Ryo; Takahiro, Syuji; Yoshida, Keiji; Kubo, Shinji; and Inagaki, Motoshi, 5,024,914, Cl. 430-109.000.
Mitsubishi Shindoh Co., Ltd.: *See—*
  Futatasuka, Rensei; Koshiba, Yutaka; Chiba, Shunich; Orikasa, Toyoaki; Noguchi, Seiji; and Idoshita, Takuya, 5,024,814, Cl. 420-473.000.
Mitsui Petrochemical Industries, Ltd.: *See—*
  Shigemori, Hiromi, 5,025,057, Cl. 524-423.000.
  Yamamoto, Yohzoh; Suzuki, Goro; Nakamura, Hideo; and Yasuda, Kiyomi 5,025,067, Cl. 525-109.000.
Mitsui Toatsu Chemicals, Incorporated: *See—*
  Itoh, Hisato; Enomoto, Katashi; Oguchi, Takahisa; and Nishizawa, Tsutomu, 5,024,926, Cl. 430-495.000.
Mitsuishi, Akio; Takeuchi, Takashi; and Koshiishi, Osamu, to Seiko Epson Corporation. Impact dot print head. 5,024,543, Cl. 400-124.000.
Mittel, James G.; and Davis, Walter L., to Motorola, Inc. Self-tuning direct coupled data limiter of a battery saver type paging receiver. 5,025,251, Cl. 340-825.440.
Miura, Asahiko: *See—*
  Terada, Masayuki; Saito, Shinji; and Miura, Asahiko, 5,024,908, Cl. 429-245.000.
Miura, Isamu. Paper arranging system. 5,024,577, Cl. 414-788.400.
Miura, Katsutoshi, Koyama, Hiroyasu; Sugai, Toshiji; Yamada, Hiroaki; and Sakurai, Einosuke, to Nisshin Flour Milling Co., Ltd. Nicotinic acid derivatives and pharmaceutical compositions comprising same. 5,025,012, Cl. 514-252.000.
Miura, Kiyoshi: *See—*
  Morishita, Hajime; Hayashi, Nobuaki; Nonogaki, Saburo; Hashimoto, Michiaki; Ito, Masato; Nishizawa, Masahiro; Miura, Kiyoshi; and Odaka, Yoshiyuki, 5,024,920, Cl. 430-325.000.
Miura, Masao; Uchida, Naoshi; Takahashi, Tatsunori; Asakawa, Kouji; and Nozawa, Eiji, to Fuji Electric Co., Ltd. Circuit breaker. 5,025,236, Cl. 335-46.000.
Miwa, Kenji: *See—*
  Arai, Kei; Ohashi, Minoru; Utsugi, Yoshio; Oka, Osamu; Numazawa, Kenichi; Miwa, Kenji; and Sugawara, Kenzo, 5,024,816, Cl. 422-68.100.
Miyakawa, Shinji; and Ito, Michio, to Tokai Rubber Industries, Ltd. Upper support for shock absorber in suspension system, having elastically supported resonance member. 5,024,461, Cl. 280-710.000.
Miyake, Shiro: *See—*
  Yasui, Yoshiharu; Anahara, Meiji; Asahi, Goro; and Miyake, Shiro, 5,024,874, Cl. 428-257.000.
Miyamoto, Junichi; Ohtsuka, Nobuaki; Yoshikawa, Kuniyoshi; and Mori, Seiichi, to Kabushiki Kaisha Toshiba. Semiconductor memory device capable of preventing data of non-selected memory cell from being degraded. 5,025,417, Cl. 365-189.090.
Miyamoto, Yuzo: *See—*
  Yabuta, Motoshi; Nakao, Yasushi; Sugiura, Shinji; Fukuda, Mitsuhiro; and Miyamoto, Yuzo, 5,025,060, Cl. 524-533.000.
Miyanohara, Atsushi: *See—*
  Nozaki, Chikateru; Miyanohara, Atsushi; Hamada, Fukusaburo; Ohtomo, Nobuya; and Matsubara, Kenichi, 5,024,938, Cl. 435-68.100.
Miyata, Yukitaka; Wada, Hiroyuki; and Nishimura, Takashi, to Kabushiki Kaisha Toshiba. Exposure apparatus for color cathode ray tubes. 5,025,166, Cl. 250-492.100.
Miyauchi, Masato: *See—*
  Tsunashima, Makoto; Uchida, Hiroto; Sakai, Kazuhiro; and Miyauchi, Masato, 5,024,991, Cl. 505-1.000.
Miyazaki, Hiroaki: *See—*
  Inoue, Takashi; Suzuki, Tatsuya; Kimura, Akiteru; Miyazaki, Hiroaki; and Katagiri, Moriya, 5,025,277, Cl. 354-173.100.
Miyazaki, Masao: *See—*
  Ohta, Tomozo; Nakano, Hiroshi; and Miyazaki, Masao, 5,025,261, Cl. 342-357.000.
Miyazaki, Osamu: *See—*
  Iiyama, Kiyotaka; Hayakawa, Kunio; Nakata, Masahiro; Kodera, Kaoru; and Miyazaki, Osamu, 5,024,699, Cl. 106-21.000.
Miyazawa, Tadashi, to Sanden Coporation. Coin return control system for vending machines 5,024,313, Cl. 194-217.000.
Mizukami, Makoto, to Victor Company of Japan, Ltd. Magnetic recording medium having a magnetic layer of a quaternary alloy. 5,024,903, Cl. 428-694.000.
Mizuno, Genji: *See—*
  Nishii, Michiharu; Mizuno, Genji; Nomura, Yoshihisa; and Kato, Masahiko, 5,024,492, Cl. 303-114.000.
Mizutani, Ken-ichiro: *See—*
  Yamaguchi, Shigeru; and Mizutani, Ken-ichiro, 5,024,267, Cl. 165-122.000.
MK-Ferguson Company: *See—*
  Oldham, James G.; Spencer, Charles R., Begley, Carl L.; and Meyer, H. Robert, 5,025,150, Cl. 250-253.000.
Mobay Corporation: *See—*
  Jorissen, Steven A.; Lundy, Charles E.; Krishnan, Sivaram; Mafoti, Robson; and Pyles, Robert A., 5,025,056, Cl. 524-310.000.
Moberg, Hans: *See—*
  Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nåbo, Olle, 5,024,648, Cl. 494-56.000.
Mobil Oil Corporation: *See—*
  DeCaul, Lorenzo C.; Han, Scott; Palermo, Robert E.; and Walsh, Dennis E., 5,025,109, Cl. 585-500.000.
  Harandi, Mohsen N.; and Owen, Hartley, 5,024,679, Cl. 44-449.000.
  Nowlin, Thomas E.; and Wagner, Klaus P., 5,025,072, Cl. 526-129.000.
  Yan, Tsoung Y., 5,024,752, Cl. 208-131.000.
Mochinaga, Nobuyuki: *See—*
  Tsukada, Shuya; Mochinaga, Nobuyuki; and Kanoe, Yasuo, 5,024,541, Cl. 400-88.000.
Mochizuki, Takeshi: *See—*
  Arimoto, Akira; Saito, Susumu; Tsunoda, Yoshito; Moriyama, Shigeo; and Mochizuki, Takeshi, 5,025,268, Cl. 346-108.000.
Modena, Silvana; and Strepparola, Ezio, to AUSIMONT S.r.l. Process for preparing bromodifluoroacetylfluoride. 5,025,105, Cl. 562-851.000.
Mogavero, Annabelle: *See—*
  Motola, Solomon; Agisim, Gary R.; and Mogavero, Annabelle, 5,024,997, Cl. 514-58.000.
Mohtar, Rafic: *See—*
  Reinicke, Robert H.; Mohtar, Rafic; and Nelson, Richard O., 5,024,418, Cl. 251-129.110.
Molex Incorporated: *See—*
  Kachlic, Jerry D., 5,024,607, Cl. 439-567.000.
Molins PLC: *See—*
  Brink, Andre; Cahill, Michael J.; Dawson, John; Gardner, Juilian W.; and Thierry, Alan A., 5,024,333, Cl. 209-535.000.

Molle, Roger: *See—*
  Gerard, Evelyne; Molle, Roger; and Debaisieux, Andre, 5,025,228, Cl. 331-69.000.
Monsanto Company: *See—*
  Fleet, George W. J., 5,025,098, Cl. 548-453.000.
  Getman, Daniel P.; and DeCrescenzo, Gary A., 5,025,021, Cl. 514-302.000.
  Kavanagh, Dean L.; and Simon, Robert H. M., 5,024,895, Cl. 428-437.000.
Montanari, Stefania: *See—*
  Casagrande, Cesare; Montanari, Stefania; and Santangelo, Francesco, 5,025,011, Cl. 514-234.200.
Monteiro, Daniel: *See—*
  Petit, Gaston; and Monteiro, Daniel, 5,024,147, Cl. 99-549.000.
Moore Business Forms, Inc.: *See—*
  Ashby, Robert E., 5,024,374, Cl. 229-71.000.
Moore, Richard L., to Lerio Corporation, The. Apparatus for dispensing containers. 5,024,048, Cl. 53-534.000.
Moore, Wayne D.: *See—*
  Raikes, Terry E.; Kramer, William L.; Howard, John B.; Moore, Wayne D.; Jackson, Louis; and Kotecki, Jeffrey D., 5,024,282, Cl. 177-25.150.
Moran, David: *See—*
  Morris, Octavius J.; and Moran, David, 5,025,478, Cl. 382-22.000.
Mordue, George S.; and Ritchie, Herbert L., Jr., to Carborundum Company, The. Torque coupling system for graphite impeller shafts. 5,025,198, Cl. 318-434.000.
Morehead, William C. Wallet. 5,024,258, Cl. 150-140.000.
Morehouse, James H.; Furay, David M.; Blagaila, John; Dion, F. Eugene; Shelstad, Scott A.; and Woods, Jimmy L., to Prairietek Corporation. Disk drive apparatus. 5,025,336, Cl. 360-97.020.
Morgan, Wayne A., to Siemens-Pacesetter, Inc. Programmable bandpass amplifier for use with implantable medical device. 5,024,221, Cl. 128-419.0PG.
Mori, Daisuke: *See—*
  Nakanishi, Masahiro; Mori, Daisuke; Fujii, Katsuyoshi; Hatanaka, Masahiko; and Shinada, Hiroko, 5,024,133, Cl. 84-615.000.
Mori, Goro: *See—*
  Seki, Nobuyoshi; Morii, Nobuyuki; Sugiyama, Yoshihide; Komada, Takashi; Hosoi, Masatoshi; Hujiwara, Atuhisa; Ichinose, Tsutomu; Mori, Goro; Kikuchi, Toshiyuki; and Minato, Masahiro, 5,024,430, Cl. 270-53.000.
Mori, Kazuyuki: *See—*
  Etoh, Yoshiyuki; Inoue, Hiroshi; Mori, Kazuyuki; Suzuki, Koichi; Nakano, Kinichiro; Nomura, Hiroyuki; Yamamoto, Isao; and Yoshida, Kiyoshi, 5,025,379, Cl. 364-426.040.
Mori, Masataka, to Mitsubishi Denki Kabushiki Kaisha. Method of obtaining semiconductor chips. 5,024,970, Cl. 437-226.000.
Mori, Seiichi: *See—*
  Miyamoto, Junichi; Ohtsuka, Nobuaki; Yoshikawa, Kuniyoshi; and Mori, Seiichi, 5,025,417, Cl. 365-189.090.
Moriguchi, Hideyuki: *See—*
  Tanaka, Nobuhiro; Hirata, Eiji; Moriguchi, Hideyuki; Azekura, Ko; Tsubone, Akira; and Ryu, Yasunori, 5,024,572, Cl. 414-276.000.
Morii, Nobuyuki: *See—*
  Seki, Nobuyoshi; Morii, Nobuyuki; Sugiyama, Yoshihide; Komada, Takashi; Hosoi, Masatoshi; Hujiwara, Atuhisa; Ichinose, Tsutomu; Mori, Goro; Kikuchi, Toshiyuki; and Minato, Masahiro, 5,024,430, Cl. 270-53.000.
Morikawa, Atsushi: *See—*
  Yonezawa, Yasuo; Ohnishi, Toshiya; Okumura, Shin-ichi; Sakai, Akiyoshi; Nakano, Hiroki; Matsushita, Masao; Morikawa, Atsushi; and Yoshihara, Motoshi, 5,024,064, Cl. 62-106.000.
Morin, Pierre: *See—*
  Girardin, Guy; Morin, Pierre; Nguyen, Duy; Nguyen, Duc; and Brunelle, Louise, 5,024,151, Cl. 100-53.000.
Morishima, Morito: *See—*
  Ubayama, Takashi; Suzuki, Eiichi; and Morishima, Morito, 5,025,173, Cl. 307-265.000.
Morishita, Hajime; Hayashi, Nobuaki; Nonogaki, Saburo; Hashimoto, Michiaki; Ito, Masato; Nishizawa, Masahiro; Miura, Kiyoshi; and Odaka, Yoshiyuki, to Hitachi, Ltd. Process for forming a pattern using a photosensitive azide and a high-molecular weight copolymer or polymer. 5,024,920, Cl. 430-325.000.
Morita, Seizo: *See—*
  Okada, Takao; Yagi, Akira; Morita, Seizo; and Mikoshiba, Nobuo, 5,025,153, Cl. 250-306.000.
Morita, Toshio: *See—*
  Impink, Albert J., Jr.; Grobmyer, Louis R.; Sariscak, Robert E.; Morita, Toshio; and Duryea, John L., 5,024,801, Cl. 376-217.000.
Morita, Tsuyoshi; Shimazu, Kyotaro; and Furukawa, Masataka, to Dainippon Ink and Chemicals, Inc. Devolatilization of liquid composition containing polymer and volatile constituents. 5,024,728, Cl. 159-27.400.
Morita, Yoshiyuki, to Seiko Instruments, Inc. Coordinate reading apparatus. 5,025,410, Cl. 364-900.000.
Moriwaki, Nobuyuki; Higuchi, Mitsuhiro; and Toshita, Mitsuhiro, to Hitachi, Ltd.; and Hitachi VLSI Engineering Corp. Semiconductor memory device. 5,025,422, Cl. 365-233.500.
Moriya, Takashi: *See—*
  Nagahiro, Kenichi; and Moriya, Takashi, 5,024,191, Cl. 123-198.00D.
Moriyama, Masahiro: *See—*
  Tsuchida, Takefumi; Yoshida, Minoru; Kodama, Yoshimi; and Moriyama, Masahiro, 5,025,332, Cl. 360-85.000.
Moriyama, Noboru; Ogura, Tsugitoshi; and Hiraki, Akio, to Kao Corporation; and Mitsubishi Jukogyo Kabushiki Kaisha. Super-heavy oil emulsion fuel. 5,024,676, Cl. 44-301.000.
Moriyama, Shigeo: *See—*
  Arimoto, Akira, Saito, Susumu; Tsunoda, Yoshito; Moriyama, Shigeo; and Mochizuki, Takeshi, 5,025,268, Cl. 346-108.000.
Mork, Orlan H. Soil leveling apparatus with improved frame and hitch. 5,024,280, Cl. 172-197.000.
Morris, Alvin L., to PFM, Inc. Tire converting apparatus and method. 5,024,386, Cl. 241-3.000.
Morris, Donald E., to University of California, The Regents of the. Preparation of highly oxidized $RBa_2Cu_4O_8$ superconductors. 5,024,992, Cl. 505-1.000.
Morris, Octavius J.; and Moran, David, to U.S. Philips Corp. Method and apparatus for detecting false edges in an image. 5,025,478, Cl. 382-22.000.
Morrison, Andrew I., to Knoll International, Inc. Space divider system. 5,024,030, Cl. 52-36.000.
Morrow, Raymond W.: *See—*
  Stamness, Jesse I.; Morrow, Raymond W.; and Asato, Edward E., 5,025,327, Cl. 360-45.000.
Morton, Roger A.; and Wetzel, Thomas J., to Eastman Kodak Company. Background referencing. 5,025,480, Cl. 382-50.000.
Mortreux, Andre: *See—*
  Paumard, Eric; Mutez, Sylvain; Mortreux, Andre; and Petit, Francis, 5,024,983, Cl. 502-167.000.
Mosberg, Kaare. Manually adjustable ropes suspended therefrom. 5,024,433, Cl. 272-120.000.
Moses, Darcy, to Crown Iron Works Company. Coating removal device for granular materials. 5,024,148, Cl. 99-618.000.
Moss, Mary G.; Brewer, Terry; Cuzmar, Ruth M.; Hawley, Dan W.; and Flaim, Tony D. Positive working polyamic acid/imide and diazoquinone photoresist with high temperature pre-bake. 5,024,922, Cl. 430-330.000.
Mostert, Simone: *See—*
  Hwo, Charles C.; and Mostert, Simone, 5,024,888, Cl. 428-355.000.
Motoda, Takashi: *See—*
  Aoyagi, Toshitaka; and Motoda, Takashi, 5,025,450, Cl. 372-46.000.
Motola, Solomon; Agisim, Gary R.; and Mogavero, Annabelle, to American Home Products Corporation. Palatable ibuprofen solutions. 5,024,997, Cl. 514-58.000.
Motorola, Inc.: *See—*
  Altman, Leonard F.; Flaugher, Jill L.; Suppelsa, Anthony B.; and Mullen, William B., III, 5,024,372, Cl. 228-248.000.
  Baker, Frank K.; and Hayden, James D., 5,024,971, Cl. 437-228.000.
  DeLuca, Michael J.; Snowden, Gregory O.; and Fennell, Robert D., 5,025,252, Cl. 340-825.440.
  DePinto, Gary A.; Steinberg, Joe; Franka, John G.; and Cherniawski, Michael R., 5,024,972, Cl. 437-233.000.
  Edwards, Arthur J., 5,025,203, Cl. 323-268.000.
  Fay, Gary V.; Robb, Stephen P.; Sutor, Judith L.; and Terry, Lewis E., 5,025,298, Cl. 357-41.000.
  Frane, Terrie L., 5,025,387, Cl. 364-493.000.
  Fullerton, Craig L.; and Seely, Warren L., 5,025,296, Cl. 357-23.800.
  Harbarger, Josephine A.; Oliver, David; and Anthony, Ella L., 5,024,207, Cl. 125-35.000.
  Hess, David W., 5,025,254, Cl. 340-826.000.
  Lynk, Charles N.; and Schorman, Eric R., 5,025,442, Cl. 370-29.000.
  Mittel, James G.; and Davis, Walter L., 5,025,251, Cl. 340-825.440.
  Pfiester, James R., 5,024,959, Cl. 437-34.000.
Mould, David, to H. Bollmann Manufacturers Limited. Secure keyboard with random order of key interrogation. 5,025,255, Cl. 341-26.000.
Mounger, Robert W., to Dallas Semiconductor Corporation. Sensitive low power comparator. 5,025,177, Cl. 307-355.000.
Mouren, Michel: *See—*
  Demoute, Jean-Pierre; Touyer, Gaetan; and Mouren, Michel, 5,024,828, Cl. 424-1.100.
Mouri, Hiroshi; and Araki, Shunji, to Bridgestone Corporation. Pneumatic tires with tread comprising a blend of isoprene rubber, high-transpolybutadiene rubber and carbon black. 5,025,059, Cl. 524-495.000.
Moyer, Ralph S.: *See—*
  Dietrich, Norman R.; Moyer, Ralph S.; and Wong, Yiu-Huen, 5,024,966, Cl. 437-60.000.
MRJ Group, Inc.: *See—*
  Dalby, James F., 5,024,549, Cl. 403-404.000.
Mroszak, John C.: *See—*
  Lubins, Paula M.; and Mroszak, John C., 5,024,510, Cl. 350-321.000.
Mueller, Carl F.: *See—*
  Garg, Diwakar; Dyer, Paul N.; Schaffer, Leslie E.; Wrecsics, Ernest L.; Dimos, Duane; and Mueller, Carl F., 5,024,901, Cl. 428-627.000.
Mueller, Wolfgang: *See—*
  Kuesters, Karl-Heinz; Mueller, Wolfgang; and Enders, Gerd, 5,025,295, Cl. 357-23.600.
Mueller, Wolfgang F.; Popp, George; and Vandergheynst, George B., to International Business Machines Corporation. Punching mechanism. 5,024,127, Cl. 83-13.000.
Mui, Paul Y. H.; and Tso, Rosa Y. M. Writing utensil with notepaper. 5,024,547, Cl. 401-195.000.
Mullen, William B., III: *See—*
  Altman, Leonard F.; Flaugher, Jill L.; Suppelsa, Anthony B.; and Mullen, William B., III, 5,024,372, Cl. 228-248.000.

VOL 1127 ISS 3 JE 18 1991 UMI

- Muller, Fritz. Piston drive. 5,024,144, Cl. 92-13.500.
- Muller, Heinrich: *See—*
  - Mertens-Gottselig, Dagmar; Hammer, Hartmut; Muller, Heinrich; and Wildersohn, Manfred, 5,024,678, Cl. 44-348.000.
- Muller, Roland: *See—*
  - Bauer, Walter; and Muller, Roland, 5,025,465, Cl. 378-169.000.
- Multilink, Inc.: *See—*
  - Kaplan, Steve E., 5,023,995, Cl. 30-90.100.
- Multistructure Sweden AB: *See—*
  - Gustafsson, Gert-Ove; Berntsson, Leif; and Larsson, Kåre, 5,024,703, Cl. 106-649.000.
- Mulvey, Philip, to Euroflex, S.A. Faucet connector assembly. 5,024,419, Cl. 251-148.000.
- Murai, Kazuaki: *See—*
  - Genda, Kohei; and Murai, Kazuaki, 5,025,413, Cl. 364-900.000.
- Murakami, Michiyuki: *See—*
  - Yamada, Ichiji; Inuzuka, Yutaka; Murakami, Michiyuki; Suzuki, George; Tanahashi, Tyo; and Kondo, Takeshi, 5,024,117, Cl. 74-473.00P.
- Murakami, Satoru; Yamaguchi, Minori; Hayashi, Akimine; Kondo, Masataka; and Tawada, Yoshihisa, to Kanegafuchi Chemical Industry Co., Ltd. Semiconductor light beam position sensor element and a position sensor and a picture image input device each using the same. 5,025,297, Cl. 357-30.000.
- Murakami, Tokumichi; Asai, Kohtaro; and Matsuzaki, Kazuhiro, to Mitsubishi Denki Kabushiki Kaisha. Image transformation coding device with adaptive quantization characteristic selection. 5,025,482, Cl. 382-56.000.
- Muramatsu, Hajime: *See—*
  - Nagasaki, Wataru; Endo, Takuro; Taira, Susumu; and Muramatsu, Hajime, 5,024,087, Cl. 73-516.00R
- Murano, Katsuaki; Yamashita, Yoshinori; Hirano, Sadayuki; Tatsumi, Takumi; and Yamamoto, Hiroaki, to Suzuki Jidosha Kogyo Kabushiki Kaisha; and Mitsubishi Denki Kabushiki Kaisha. Clutch pressure control device for continuously variable transmission. 5,024,310, Cl. 192-0.076.
- Murata Kikai Kabushiki Kaisha: *See—*
  - Uchida, Hiroshi; and Kubota, Norio, 5,024,392, Cl. 242-128.000.
- Murata, Kosaku: *See—*
  - Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.
- Murata, Toshinori: *See—*
  - Sekiya, Hiroshi; Kurita, Toshiyuki; Nakagaki, Nobufumi; and Murata, Toshinori, 5,025,310, Cl. 358-19.000.
- Muroi, Shoji: *See—*
  - Okamoto, Kengo; Habu, Takaaki; and Muroi, Shoji, 5,025,263, Cl. 343-715.000.
- Murphy, John A., II, and Westgate, Charles A., to Gentex Corporation. Impact-absorbing sound-attenuating earcup. 5,023,955, Cl. 2-209 000.
- Murphy, Kent A.: *See—*
  - Richards, David W.; and Murphy, Kent A., 5,024,518, Cl. 351-219.000.
- Murray, Alexander P., to Westinghouse Electric Corp. Method for decontaminating a pressurized water nuclear reactor system. 5,024,805, Cl. 376-305.000.
- Murray, Darlene G. Coin holder/dispenser. 5,024,629, Cl. 453-54.000.
- Murray, Roger W.; and Godhwani, Nevand, to Teledyne Industries, Inc. Method for preventing auto-doping in the fabrication of metal gate CMOS devices. 5,024,962, Cl. 437-40.000.
- Musante, Louis P., to Musante, Louis P.; and Musante, Lynda S. Needlepoint sheet having octagonal openings and method of use thereof 5,024,176, Cl. 112-266.100.
- Musante, Lynda S.: *See—*
  - Musante, Louis P., 5,024,176, Cl. 112-266.100.
- Musha, Yoshinori: *See—*
  - Sasaki, Souji; Kino, Hirotoshi; Musha, Yoshinori; Kubota, Jun; and Okada, Hisao, 5,024,093, Cl. 73-633.000.
- Musha, Yosinori: *See—*
  - Kubota, Jun; Kino, Hirotoshi; Musha, Yosinori; and Okada, Hisao, 5,024,094, Cl. 73-634.000.
- Musschoot, Albert, to General Kinematics Corporation. Vibratory spiral elevator. 5,024,320, Cl. 198-756.000.
- Mutez, Sylvain: *See—*
  - Paumard, Eric; Mutez, Sylvain; Mortreux, Andre; and Petit, Francis, 5,024,983, Cl. 502-167.000.
- Muto, Jiro: *See—*
  - Suzuki, Satoshi; Kuwabara, Osamu, Muto, Jiro; and Shinozaki, Eiichi, 5,025,348, Cl. 361-398.000.
- Mutoh, Hideki; Oda, Kazuya; and Kawajiri, Kazuhiro, to Fuji Photo Film Co., Ltd. Solid state image pickup device driving method utilizing an electronic shutter operation. 5,025,319, Cl. 358-213.290.
- Mydill, Marc R.; Pile, Sam R.; O'Keefe, Sheila; Okerblom, Neal F.; and Keenan, W. Russ, to Texas Instruments Incorporated. Reconfigurable architecture for logic test system. 5,025,205, Cl. 324-73.100.
- Myers, John R.: *See—*
  - Hadley, Howard C.; and Myers, John R., 5,024,456, Cl 280-412.000.
- Myung, Chan K.: *See—*
  - Kim, Heung S.; and Myung, Chan K., 5,025,180, Cl. 307-475.000.
- N. E. Chemcat Corporation: *See—*
  - Itoh, Takashi; and Katoh, Katsuaki, 5,024,905, Cl. 429-44.000.
- Nagahiro, Kenichi; and Moriya, Takashi, to Honda Giken Kogyo Kabushiki Kaisha. Control system for a variable valve actuating mechanism of an internal combustion engine. 5,024,191, Cl. 123-198.00D.
- Nagai, Takeshi: *See—*
  - Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Karuhiko; and Nagai, Takeshi, 5,024,264, Cl. 165-1.000.
- Nagano, Susumu; Kawazoe, Hiromitsu; and Ohsawa, Katsuyuki, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Direct fuel injection internal combustion engine. 5,024,184, Cl. 123-48.00R.
- Nagano Technical Service Co., Ltd.: *See—*
  - Saitoh, Takashi, 5,024,640, Cl. 493-127.000.
- Nagaoka, Akinobu: *See—*
  - Goto, Giichi; and Nagaoka, Akinobu, 5,025,033, Cl. 514-417.000.
- Nagare, Arthur T.: *See—*
  - Saluja, Raja; and Nagare, Arthur T., 5,025,359, Cl. 362-402.000.
- Nagasaki, Wataru; Endo, Takuro; Taira, Susumu; and Muramatsu, Hajime, to Diesel Kiki Co., Ltd. Acceleration sensor. 5,024,087, Cl 73-516.00R.
- Nagata, Hisako: *See—*
  - Nagata, Katsumi; and Nagata, Hisako, 5,024,731, Cl. 203-99.000.
- Nagata, Katsumi; and Nagata, Hisako. Method of manufacturing material for medical and pharmaceutical products from pyroligneous acid 5,024,731, Cl. 203-99.000.
- Nagata, Yuji; and Fukazawa, Toshio, to Matsushita Electric Industrial Co., Ltd. Thin-film magnetic head device for recording and reproducing. 5,025,342, Cl. 360-126.000.
- Nagato, Shoin; Taguchi, Ryusuke; Hirai, Kenji; Hirose, Hiroaki; and Yokota, Masahiro, to Kaken Pharmaceutical Co., Ltd.; Sagami Chemical Research Center; and Chisso Corporation. Herbicidal composition and herbicidal method 5,024,692, Cl. 71-86.000.
- Nagel, Dietmar: *See—*
  - Robbins, Jack; and Nagel, Dietmar, 5,024,626, Cl. 446-409.000.
- Nagubandi, Sreeramulu, to ICI Americas Inc. Substituted phenoxy benzamide herbicides and methods of use. 5,024,691, Cl. 71-86.000.
- Nagura, Riichi, to NEC Corporation. Imaging apparatus with means for cancelling differential offset voltage. 5,025,318, Cl. 358-213.150.
- Nagy, William J.: *See—*
  - Billig, James N.; Chlipala, James D.; Lee, Kuo H.; and Nagy, William J., 5,025,300, Cl. 357-51.000.
- Naito, Ryuichi, to Pioneer Electronic Corporation. Autochanger of writable discs. 5,025,431, Cl. 369-36.000.
- Naito, Ryuichi, to Pioneer Electronic Corporation. Autochanger of writable discs including a non-volatile memory for storing most recent defect management information relating to the writable discs. 5,025,432, Cl. 369-36.000.
- Naito, Tatsuo, to Nissan Motor Co., Ltd. Teaching apparatus 5,025,393, Cl. 364-513.000.
- Nakagaki, Nobufumi: *See—*
  - Sekiya, Hiroshi; Kurita, Toshiyuki, Nakagaki, Nobufumi; and Murata, Toshinori, 5,025,310, Cl. 358-19.000.
- Nakagaki, Shintaro: *See—*
  - Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Tai, Hiromichi, 5,025,209, Cl. 324-96.000.
- Nakagawa, Shinya: *See—*
  - Komoriya, Susumu; Nishizuka, Hiroshi; Nakagawa, Shinya; and Maejima, Hisashi, 5,025,284, Cl. 355-53.000.
- Nakajima, Hisao: *See—*
  - Landreau, Jean; and Nakajima, Hisao, 5,024,853, Cl. 427-10.000.
- Nakajima, Masatoshi: *See—*
  - Seki, Masaki; Takegahara, Takashi; and Nakajima, Masatoshi, 5,025,363, Cl. 364-191.000.
- Nakajima, Nobuyuki, to Diesel Kiki Co., Ltd. Vane compressor having reduced weight as well as excellent anti-seizure and wear resistance 5,024,591, Cl. 418-178.000.
- Nakamura, Akihisa, to Fuji Jukogyo Kabshiki Kaisha. Engine idling control apparatus. 5,024,197, Cl. 123-339.000.
- Nakamura, Arao; Manabe, Tsuneo; Sugimoto, Naoki; and Usui, Hiroshi, to Asahi Glass Company, Ltd. Glass having ultrafine particles of CuCl and/or CuBr precipitated therein and process for its production. 5,024,974, Cl. 501-57.000.
- Nakamura, Haruhiko: *See—*
  - Kitamura, Shigeharu; Nakamura, Haruhiko; and Sanada, Masaru, 5,024,314, Cl. 198-333.000.
- Nakamura, Hideo: *See—*
  - Yamamoto, Yohzoh; Suzuki, Goro; Nakamura, Hideo; and Yasuda, Kiyomi, 5,025,067, Cl. 525-109.000.
- Nakamura, Hiroaki; and Takagi, Atsushi, to Fuji Photo Film Co., Ltd Color image forming apparatus. 5,025,282, Cl. 355-38.000.
- Nakamura, Katsumi: *See—*
  - Tanaka, Hiroaki; Enya, Takeshi; and Nakamura, Katsumi, 5,024,101, Cl. 73-766.000.
- Nakamura Koki Co., Ltd.: *See—*
  - Nakamura, Masao, 5,024,250, Cl. 138-31.000.
- Nakamura, Kyuzo; Ota, Yoshifumi; and Yamada, Taiki, to Nihon Shinku Gijutsu Kabushiki Kaisha. Method of manufacturing perpendicular type magnetic recording member. 5,024,854, Cl. 427-38.000.
- Nakamura, Masao, to Nakamura Koki Co., Ltd. Piston type accumulator for hydraulic system. 5,024,250, Cl. 138-31.000.
- Nakamura, Noboru: *See—*
  - Ushio, Sadakatsu; Nakamura, Noboru; Higashi, Hirofumi; Iwata, Masataka; and Niwa, Fumiyasu, 5,024,189, Cl 123-195.00R.
- Nakanishi, Masahiro; Mori, Daisuke; Fujii, Katsuyoshi; Hatanaka, Masahiko; and Shinada, Hiroko, to Matsushita Electric Industrial Co., Ltd. Electronic musical instrument with improved generation of wind instruments. 5,024,133, Cl. 84-615.000.

- Nakanishi, Tetsuya: *See—*
  - Okuda, Soichiro; Nakanishi, Tetsuya; Sasaki, Shigeo; and Noguchi, Kazuhiko, 5,025,167, Cl. 250-492.200.
- Nakanishi, Yuki: *See—*
  - Tsuchida, Yasuyuki; and Nakanishi, Yuki, 5,023,973, Cl. 15-319.000.
- Nakano, Hiroki: *See—*
  - Yonezawa, Yasuo; Ohnishi, Toshiya; Okumura, Shin-ichi; Sakai, Akiyoshi; Nakano, Hiroki; Matsushita, Masao; Morikawa, Atsushi; and Yoshihara, Motoshi, 5,024,064, Cl. 62-106.000.
- Nakano, Hiroshi: *See—*
  - Ohta, Tomozo; Nakano, Hiroshi; and Miyazaki, Masao, 5,025,261, Cl. 342-357.000.
- Nakano, Kinichiro: *See—*
  - Etoh, Yoshiyuki; Inoue, Hiroshi; Mori, Kazuyuki; Suzuki, Koichi; Nakano, Kinichiro; Nomura, Hiroyuki; Yamamoto, Isao; and Yoshida, Kiyoshi, 5,025,379, Cl. 364-426.040.
- Nakano, Shigeru; and Kondou, Yasuhiro, to Matsushita Electric Industrial Co. Ltd. Apparatus for running a car at constant speed. 5,024,284, Cl. 180-179.000.
- Nakao, Yasushi: *See—*
  - Yabuta, Motoshi; Nakao, Yasushi; Sugiura, Shinji; Fukuda, Mitsuhiro; and Miyamoto, Yuzo, 5,025,060, Cl. 524-533.000.
- Nakase, Hiromi: *See—*
  - Taniguchi, Hiroshi; Kubo, Kanji; and Nakase, Hiromi, 5,025,329, Cl. 360-77.160.
- Nakashima, Hiroshi. Control apparatus for quad-line stunt kites. 5,024,401, Cl. 244-155.00A.
- Nakata, Futoshi: *See—*
  - Noguchi, Ichiro; and Nakata, Futoshi, 5,024,269, Cl. 165-153.000.
- Nakata, Masahiro: *See—*
  - Iiyama, Kiyotaka; Hayakawa, Kunio; Nakata, Masahiro; Kodera, Kaoru; and Miyazaki, Osamu, 5,024,699, Cl. 106-21.000.
- Nakata, Muneo: *See—*
  - Matuo, Ken-iti; Nakata, Muneo; Hori, Mitukazu; and Tanihara, Isaji, 5,025,238, Cl. 335-128.000.
- Nakata, Takashi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Horaguchi, Yoichi, to Brother Kogyo Kabushiki Kaisha. Image recording apparatus using photosensitive pressure-sensitive recording medium. 5,025,281, Cl. 355-27.000.
- Nakatani, Kaname: *See—*
  - Yoshida, Takeshi; Nakatani, Kaname; Fukami, Toshiyuki; and Tanaka, Nariaki, 5,024,913, Cl. 430-67.000.
- Nakazono, Yutaka: *See—*
  - Omata, Tetsuo; Senda, Shuji; Tanaka, Tamaki; Kumagai, Eriko; Kajimoto, Chikara; and Nakazono, Yutaka, 5,024,832, Cl. 424-84.000.
- Naku, Virgil: *See—*
  - Abplanalp, Robert H.; and Naku, Virgil, 5,024,592, Cl. 425-112.000.
- Nalco Chemical Company: *See—*
  - Wang, Sophia L.; Meyer, George R.; and Brinkman, Kerry C., 5,024,677, Cl. 44-335.000.
- Naruse, Hideaki; Takahashi, Osamu; Ohki, Nobutaka; and Ono, Michio, to Fuji Photo Film Co., Ltd. Method for processing silver halide color photographic materials. 5,024,924, Cl. 430-376.000.
- Nash, Stephen E., to Federal-Mogul Corporation. Unitized oil seal and method of making a unitized oil seal. 5,024.364, Cl. 277-35.000.
- Naslain, Roger: *See—*
  - Robinbrosse, Christian; Naslain, Roger; Minet, Jacky; and Langlais, Francis, 5,024,878, Cl. 428-297.000.
- Nath, Raymond J.: *See—*
  - Miller, Phillip E.; Katz, Leonoard R.; Nath, Raymond J.; Blaushild, Ronald M.; Tatch, Michael D.; Kordalski, Frank J.; Wykstra, Donald T.; and Kavalkovich, William M., 5,025,129, Cl. 219-201.000.
- Nathaniel Gould Diagnostics, Inc.: *See—*
  - Gould, Nathaniel; Fontes, Michael, and Thessin, Tyler R., 5,025,476, Cl. 382-2.000.
- National Research Development Corporation: *See—*
  - Jones, Robert L.; and Wilson, Norman H., 5,025,034, Cl. 514-529.000.
- National Science Council: *See—*
  - Chen, Mao-Chieh; Tsui, Bing-Yue; and Tsai, Jiunn-Yann, 5,024,954, Cl. 437-24.000.
- National Semiconductor Corporation: *See—*
  - Freitas, Oscar W., 5,025,179, Cl. 307-455.000.
- Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Karuhiko; and Nagai, Takeshi, to Fujitsu Limited. Method of cooling a semiconductor device with a cooling unit, using metal sherbet between the device and the cooling unit. 5,024.264, Cl. 165-1.000.
- Nattrass, Douglas J. Novel blanket/sheet for a double bed. 5,023,969, Cl. 5-486.000.
- Nawa, Mitsuharu: *See—*
  - Kinoshita, Yoshio; and Nawa, Mitsuharu, 5,024,308, Cl. 192-41.00A.
- Naylor, Brenda: *See—*
  - Naylor, Robert J.; Naylor, Brenda; Renaud, Alain; and Langlois, Michel, 5,025,022, Cl. 514-305.000.
- Naylor, Robert J.; Naylor, Brenda; Renaud, Alain; and Langlois, Michel. Method of treating or preventing schizophrenia and/or psychosis using S-N-(1-azabicyclo[2.2.2]oct-3-yl)benzamides and thiobenzamides. 5,025,022, Cl. 514-305.000.
- Nåbo, Olle: *See—*
  - Inge, Claes; Franzen, Peter; Lagerstedt, Torgny; Borgstrom, Leonard; Carlsson, Claes-Goran; Moberg, Hans; and Nåbo, Olle, 5,024,648, Cl. 494-56.000.
- NEC Corporation: *See—*
  - Iwamoto, Shinichi, 5,025,414, Cl. 364-900.000.
  - Nagura, Riichi, 5,025,318, Cl. 358-213.150.
- Needham, Thomas E.; Wright, Jeremy C.; Pearson, Steve; Chilamkurti, Rao; and Kopp, Clinton V., to Baxter International Inc. Drug delivery apparatus and method preventing local and systemic toxicity. 5,024,657, Cl. 604-85.000.
- Negas, Taki; and Dominques, Louis P., to Alpha Industries. Ceramic dielectric alloy. 5,024,980, Cl. 501-134.000.
- Negele, Michael: *See—*
  - Schallner, Otto; Negele, Michael; Santel, Hans-Joachim; Lurssen, Klaus; Schmidt, Robert R.; and Krauskopf, Birgit, 5,024,694, Cl. 71-95.000.
- Negin, Michael: *See—*
  - DiLullo, Joseph V.; Schifter, Stephan C.; Negin, Michael; and Paist, Kenneth W., 5,025,253, Cl. 340-825.060.
- Negroni, Pierre-Paul: *See—*
  - Barquet, Henri; Negroni, Pierre-Paul; and Plissonneau, Bernard, 5,024,399, Cl. 244-119.000.
- Neishi, Toshie; Kikuchi, Toshihiro; Takiguchi, Takao; Suzuki, Koichi; and Matsumoto, Masakazu, to Canon Kabushiki Kaisha. 5H-dibenzo(A,D) cycloheptanylidene derivative and 5H-dibenzo (A,D) cycloheptenylidene derivative, and electrophotographic photosensitive member using the same. 5,024,912, Cl. 430-59.000.
- Nelson, Lorne W.: *See—*
  - Buchholz, Robert L.; Grald, Eric W.; Nelson, Lorne W.; and Shah, Dipak J., 5,024,265, Cl. 165-22.000.
- Nelson, Richard O.: *See—*
  - Reinicke, Robert H.; Mohtar, Rafic; and Nelson, Richard O., 5,024,418, Cl. 251-129.110.
- Nelson, Thomas C., to Storage Technology Corporation. Data stream independent printer. 5,025,398, Cl. 364-519.000.
- Nelson, Thomas E., to Soltech, Inc. Water heater construction. 5,024,210, Cl. 126-344.000.
- Nemas, Mara: *See—*
  - Linder, Charles; Perry, Mordechai; Nemas, Mara; and Katraro, Reuven, 5,024,765, Cl. 210-651.000.
- Nesburn, Anthony B.; Gorin, Michael; Martinez, Marvin; Kenney, M. Cristina; and Maguen, Ezra, to Cedars-Sinai Medical Center. Method of crosslinking amino acid containing polymers using photoactivatable chemical crosslinkers. 5,024,742, Cl. 204-157.680.
- Nestec S. A.: *See—*
  - Heck, Ernst; and Horisberger, Jean, 5,024,719, Cl. 156-522.000.
- Nestec S.A.: *See—*
  - Rasilewicz, Casimir E., 5,024,849, Cl. 426-656.000.
- Neuhaus, Alfred; Ganster, Otto; and Kopp, Richard, to Bayer Aktiengesellschaft. Process for the production of molded polyurethane foams and the molded foams obtained by this process. 5,025,039, Cl. 521-51.000.
- New York Institute of Technology: *See—*
  - Parke, Frederic I., 5,025,394, Cl. 364-518.000.
- Newell, J. Mark: *See—*
  - Scott, Brian L.; Smith, Lloyd A.; Newell, J. Mark; Balentine, Bruce E.; and Lin, Lisan S., 5,025,471, Cl. 381-43.000.
- Newkirk, Marc S.; and Weinstein, Jerry G., to Lanxide Technology Company, LP. Self-supporting ceramic structures and methods of making the same. 5,024,794, Cl. 264-57.000.
- Newkirk, Marc S.: *See—*
  - Kennedy, Christopher R.; and Newkirk, Marc S., 5,024,795, Cl 264-59.000.
- Newman, H. Anthony, to Bethlehem Steel Corporation. Method and apparatus for continuous welded rail. 5,024,380, Cl. 238-218.000.
- Newman, Ira R.: *See—*
  - McGilp, Kenneth J.; Affa, Stephen N.; and Newman, Ira R., 5,024,454, Cl. 277-207.00A.
- Ng, Yee S., to Eastman Kodak Company. Method and apparatus for grey level recording using multiple addressability. 5,025,322, Cl. 358-298.000.
- NGK Insulators, Ltd.: *See—*
  - Iida, Shinzi; Takeya, Fuminori; and Aoki, Shinya, 5,025,343, Cl. 360-127.000.
  - Ohshima, Masaaki; Kobayashi, Akira, Atsumi, Senji; and Shimada, Hiromi, 5,024,907, Cl. 429-191.000.
- NGK Spark Plug Co., Ltd.: *See—*
  - Kondo, Kazuo; and Okuyama, Masahiko, 5,024,973, Cl. 501-10.000.
  - Matsubara, Yoshihiro; and Matsumura, Shuzo, 5,024,534, Cl. 374-144.000.
- Nguyen, Duc: *See—*
  - Girardin, Guy; Morin, Pierre; Nguyen, Duy; Nguyen, Duc; and Brunelle, Louise, 5,024,151, Cl. 100-53.000.
- Nguyen, Duy: *See—*
  - Girardin, Guy; Morin, Pierre; Nguyen, Duy, Nguyen, Duc; and Brunelle, Louise, 5,024,151, Cl. 100-53.000.
- Nguyen, Quyen C.: *See—*
  - Hittner, Herman J.; and Nguyen, Quyen C., 5,024,822, Cl. 423-111.000.
- Nguyen, Tien M., to United States of America, Administer, National Aeronautics and Space Administration, The United States of America as represented by the Administrator of the National Aeronautics and Space Administration. Phase ambiguity resolution for offset QPSK modulation systems. 5,025,455, Cl. 375-53.000.
- Nicholls, Jeffrey R.: *See—*
  - Busch, Bruce D.; and Nicholls, Jeffrey R., 5,024,783, Cl 252-180.000.

VOL
1127
ISS
3
JE
18
1991
UMI

- Nickens, David G.: *See—*
  - Hegeman, George D.; and Nickens, David G., 5,024,949, Cl. 435-262.000.
- Nielsen, Erik B.: *See—*
  - Gronwald, Frederik, Andersen, Peter H., Faarup, Peter; Guddal, Erling; Hansen, Kristian T.; Hansen, Louis B.; and Nielsen, Erik B., 5,025,009, Cl. 514-213.000.
- Nies, Norbert: *See—*
  - Hinzmann, Gerd; Nies, Norbert, and Radewahn, Siegfried, 5,024,811, Cl. 419-66.000.
- Nigg, Ernst; and Fuchs, Elmar B., to Konrad Doppelmayr & Sohn Maschinenfabrik Gesellschaft m.b.H & Co. KG Cable transport apparatus. 5,024,162, Cl. 104-178.000.
- Nigh, Phillip J.: *See—*
  - Maly, Wojciech P.; and Nigh, Phillip J., 5,025,344, Cl. 361-88.000.
- Nihon Chikasui Kaihatsu Kabushiki Kaisha: *See—*
  - Katsuragi, Kohei, 5,024,553, Cl. 404-71.000.
- Nihon Shinku Gijutsu Kabushiki Kaisha: *See—*
  - Nakamura, Kyuzo; Ota, Yoshifumi; and Yamada, Taiki, 5,024,854, Cl. 427-38.000.
- Nikaido, Katsutomo: *See—*
  - Kawakami, Shin; Nikaido, Katsutomo; and Ichikawa, Junichi, 5,025,116, Cl. 174-250.000.
- Nikolayczik, Hans: *See—*
  - Bergmann, Konrad; Ems, Josef, and Nikolayczik, Hans, 5,024,378, Cl. 236-93.00B.
- Nikon Corporation: *See—*
  - Matsubara, Takashi, 5,025,278, Cl. 354-246.000.
- Nippon Antenna Co., Ltd.: *See—*
  - Okamoto, Kengo; Habu, Takaaki; and Muroi, Shoji, 5,025,263, Cl. 343-715.000.
- Nippon Carbon Co., Ltd.: *See—*
  - Ichikawa, Hiroshi, 5,025,243, Cl. 338-18.000.
- Nippon CMK Corp.: *See—*
  - Kawakami, Shin; Nikaido, Katsutomo; and Ichikawa, Junichi, 5,025,116, Cl. 174-250.000.
- Nippon Oil and Fats Co., Ltd.: *See—*
  - Ishidoya, Masahiro; Soma, Toru; and Ogawa, Hisao, 5,025,061, Cl. 524-539.000.
  - Shimizu, Shoichi; and Yamane, Tsuneo, 5,024,942, Cl. 435-134.000.
- Nippon Soken, Inc.: *See—*
  - Tanaka, Hiroaki; Enya, Takeshi; and Nakamura, Katsumi, 5,024,101, Cl. 73-766.000.
- Nippon Telegraph & Telephone Corporation: *See—*
  - Sudo, Shoichi; Sakai, Yoshihisa; Yasaka, Hiroshi; Ikegami, Tetsuhiko; Yoshikuni, Yuzo; Yokohama, Itaru; and Kubodera, Kenichi, 5,025,448, Cl. 372-32.000.
- Nippon Unicar Company Limited: *See—*
  - Yoshida, Mamoru; Suya, Hachiro; Hayashi, Shoji; Koshiyama, Takao; Hashimoto, Satoshi; and Horita, Katsuhiro, 5,025,042, Cl. 523-216.000.
- Nippondenso Co., Ltd.: *See—*
  - Tanaka, Hiroaki; Enya, Takeshi; and Nakamura, Katsumi, 5,024,101, Cl. 73-766.000.
- Nishi, Yuji: *See—*
  - Koguchi, Tatsushi; Ito, Shigehiro; Ebihara, Kazyuki; and Nishi, Yuji, 5,025,317, Cl. 358-167.000.
- Nishida, Minoru: *See—*
  - Kaneko, Katsuhiko; and Nishida, Minoru, 5,024,388, Cl. 241-301.000.
- Nishide, Kenji: *See—*
  - Taya, Hiroyuki; Yoshinuma, Mikio; Yamada, Takeshi; Nishide, Kenji; Suzuki, Fumio; Fujimoto, Hirohisa; and Yamauchi, Ryozo, 5,024,501, Cl. 350-96.150.
- Nishii, Michiharu; Mizuno, Genji; Nomura, Yoshihisa; and Kato, Masahiko, to Aisin Seiki Kabushiki Kaisha; and Toyota Jidosha Kabushiki Kaisha. Hydraulic braking system for an automotive vehicle. 5,024,492, Cl. 303-114.000.
- Nishijima, Tamotsu: *See—*
  - Ohashi, Yasusuke; Fujino, Toshihiro; Taki, Yasuhito; and Nishijima, Tamotsu, 5,024,815, Cl. 420-487.000.
- Nishijima, Toyoki: *See—*
  - Tanji, Masaki; and Nishijima, Toyoki, 5,024,932, Cl. 430-567.000.
- Nishikawa, Kohei: *See—*
  - Nomura, Hiroaki; Nishikawa, Kohei; Tsushima, Susumu; and Kozai, Yoshio, 5,025,005, Cl. 514-183.000.
- Nishikawa, Masahiko: *See—*
  - Kurisaki, Hideo; and Nishikawa, Masahiko, 5,024,831, Cl. 424-69.000.
- Nishikawa, Masumi, to Aisin Seiki Kabushiki Kaisha. Shock detecting device. 5,024,157, Cl. 102-252.000.
- Nishimatsu Co., Ltd.: *See—*
  - Kaneko, Katsuhiko; and Nishida, Minoru, 5,024,388, Cl. 241-301.000.
- Nishimiya, Takeshi, to Fujitsu Limited. Head positioning control system and method for a memory device using even and odd track cross pulses. 5,025,330, Cl. 360-78.040.
- Nishimura, Dwight G.: *See—*
  - Pauly, John M.; and Nishimura, Dwight G., 5,025,216, Cl. 324-309.000.
- Nishimura, Takashi: *See—*
  - Miyata, Yukitaka; Wada, Hiroyuki, and Nishimura, Takashi, 5,025,166, Cl. 250-492.100.
- Nishino, Yoichi, to Sony Corporation. Input/output circuit. 5,025,419, Cl. 365-221.000.
- Nishioka, Jim Z. Trigger cover. 5,024,017, Cl. 42-70.070.
- Nishioka, Yasuyuki; and Hirano, Akihiro, to Horiba, Ltd Sample analyzer. 5,024,108, Cl. 73-863.110.
- Nishiyama, Katsuhiro. Magnesium-titanium type alloy and method for producing the same. 5,024,813, Cl. 420-402.000.
- Nishiyodo Air Conditioner Co., Ltd.: *See—*
  - Yonezawa, Yasuo; Ohnishi, Toshiya, Okumura, Shin-ichi; Sakai, Akiyoshi; Nakano, Hiroki; Matsushita, Masao; Morikawa, Atsushi; and Yoshihara, Motoshi, 5,024,064, Cl. 62-106.000.
- Nishizawa, Masahiro: *See—*
  - Morishita, Hajime; Hayashi, Nobuaki; Nonogaki, Saburo; Hashimoto, Michiaki; Ito, Masato; Nishizawa, Masahiro; Miura, Kiyoshi; and Odaka, Yoshiyuki, 5,024,920, Cl. 430-325.000.
- Nishizawa, Tsutomu: *See—*
  - Itoh, Hisato; Enomoto, Katashi; Oguchi, Takahisa; and Nishizawa, Tsutomu, 5,024,926, Cl. 430-495.000.
- Nishizuka, Hiroshi: *See—*
  - Komoriya, Susumu; Nishizuka, Hiroshi; Nakagawa, Shinya; and Maejima, Hisashi, 5,025,284, Cl. 355-53.000.
- Nissan Chemical Industries Ltd.: *See—*
  - Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kirahara, Masaki, 5,024,999, Cl. 514-63.000.
- Nissan Motor Company, Limited: *See—*
  - Etoh, Yoshiyuki; Inoue, Hiroshi; Mori, Kazuyuki, Suzuki, Koichi; Nakano, Kinichiro; Nomura, Hiroyuki; Yamamoto, Isao; and Yoshida, Kiyoshi, 5,025,379, Cl. 364-426.040.
  - Naito, Tatsuo, 5,025,393, Cl. 364-513.000.
  - Sasaki, Michiaki; and Yuki, Kazuya, 5,024,583, Cl. 417-198.000.
  - Takemura, Toji, and Okubo, Takashi, 5,024,309, Cl. 192-60.000.
- Nissan Motor Company, Ltd. of No. 2: *See—*
  - Shinzawa, Motohiro; and Sekiya, Yoshiki, 5,024,194, Cl. 123-269.000.
- Nisshin Flour Milling Co., Ltd.: *See—*
  - Miura, Katsutoshi; Koyama, Hiroyasu; Sugai, Toshiji; Yamada, Hiroaki; and Sakurai, Einosuke, 5,025,012, Cl. 514-252.000.
- Nitecki, Danute E.: *See—*
  - Houston, L. L.; Aldwin, Lois; and Nitecki, Danute E., 5,024,834, Cl. 424-85.910.
- Nitto Denko Co. Ltd.: *See—*
  - Omata, Tetsuo; Senda, Shuji; Tanaka, Tamaki; Kumagai, Eriko; Kajimoto, Chikara; and Nakazono, Yutaka, 5,024,832, Cl. 424-84.000.
- Niwa, Fumiyasu: *See—*
  - Ushio, Sadakatsu; Nakamura, Noboru; Higashi, Hirofumi; Iwata, Masataka; and Niwa, Fumiyasu, 5,024,189, Cl. 123-195.00R.
- NKK Corporation: *See—*
  - Kuruma, Kiyoshi; Abe, Masaki; Kagechika, Hiroshi; and Kagaya, Shinichi, 5,024,900, Cl. 428-626.000.
- NLB Corp.: *See—*
  - Shook, Forrest A.; and Henshaw, Terry L., 5,024,382, Cl. 239-11.000.
- Noble, Jerry D. Electronic force ionized gas air conditioning system compressor. 5,024,059, Cl. 62-3.100.
- Noblet, James A.: *See—*
  - Sheaffer, Patrick M.; and Noblet, James A., 5,024,710, Cl. 156-89.000.
- Nobuta, Yasuo: *See—*
  - Saito, Yasuo; Fujimoto, Seiji; Nobuta, Yasuo; and Yamazaki, Masahiko, 5,025,462, Cl. 378-19.000.
- Noguchi, Ichiro; and Nakata, Futoshi, to Zexel Corporation. Laminated heat exchanger. 5,024,269, Cl. 165-153.000.
- Noguchi, Kazuhiko: *See—*
  - Okuda, Soichiro; Nakanishi, Tetsuya; Sasaki, Shigeo; and Noguchi, Kazuhiko, 5,025,167, Cl. 250-492.200.
- Noguchi, Seiji: *See—*
  - Futatasuka, Rensei; Koshiba, Yutaka; Chiba, Shunich; Orikasa, Toyoaki; Noguchi, Seiji; and Idoshita, Takuya, 5,024,814, Cl 420-473.000.
- Nomori, Hiroyuki: *See—*
  - Haneda, Satoshi; and Nomori, Hiroyuki, 5,025,272, Cl. 346-153.100.
- Nomura, Hiroaki; Nishikawa, Kohei; Tsushima, Susumu; and Kozai, Yoshio, to Takeda Chemical Industries, Ltd. Lipid derivatives, their production and use. 5,025,005, Cl. 514-183.000.
- Nomura, Hiroyuki: *See—*
  - Etoh, Yoshiyuki; Inoue, Hiroshi; Mori, Kazuyuki; Suzuki, Koichi, Nakano, Kinichiro; Nomura, Hiroyuki; Yamamoto, Isao; and Yoshida, Kiyoshi, 5,025,379, Cl. 364-426.040.
- Nomura, Ichiro: *See—*
  - Suzuki, Hidetoshi; Nomura, Ichiro; Majima, Toshiaki; and Yamamoto, Mitsuru, 5,025,196, Cl. 315-168.000.
- Nomura, Yoshihisa: *See—*
  - Nishii, Michiharu; Mizuno, Genji; Nomura, Yoshihisa; and Kato, Masahiko, 5,024,492, Cl. 303-114.000.
- Nonogaki, Saburo: *See—*
  - Morishita, Hajime; Hayashi, Nobuaki; Nonogaki, Saburo; Hashimoto, Michiaki; Ito, Masato; Nishizawa, Masahiro; Miura, Kiyoshi; and Odaka, Yoshiyuki, 5,024,920, Cl. 430-325.000.
- Nonoyama, Hiroshi: *See—*
  - Yoshiga, Norio; Kawamura, Masahiro; and Nonoyama, Hiroshi, 5,024,891, Cl. 428-414.000.
- Norling, Brian L., to Sundstrand Data Control, Inc. Stress compensated transducer. 5,024,089, Cl. 73-517.00B.
- Norman, Neville M. Indicating means for tetherball game. 5,024,446, Cl. 273-413.000.
- Norsolor: *See—*
  - Paumard, Eric; Mutez, Sylvain; Mortreux, Andre; and Petit, Francis, 5,024,983, Cl. 502-167.000.

- North American Philips Corporation: *See—*
  - Darby, Ted A., 5,025,316, Cl. 358-167.000.
- North East Form Engineering, Inc.: *See—*
  - Randall, Joseph G., 5,024,563, Cl. 408-1.00R.
- Northern Telecom Limited: *See—*
  - Marks, Robert J., 5,025,345, Cl. 361-119.000.
  - Reisman, Arnold; and Turlik, Iwona, 5,025,304, Cl. 357-71.000.
  - Winkelstein, Dan, 5,025,402, Cl. 364-578.000.
- Norton Company: *See—*
  - Chen, Sy-Hwa; and Sung, Chien-Min, 5,024,680, Cl. 51-295.000.
- Nose, Toshiro; Hashimoto, Hisashi; and Manda, Masato, to Hitachi, Ltd. Data processing system capable of executing data processing using resources by designating displayed graphic patterns representing selected resources. 5,025,395, Cl. 364-518.000.
- Noujaim, Sharbel E.: *See—*
  - Hartley, Richard I.; Corbett, Peter F.; Yassa, Fathy F.; and Noujaim, Sharbel E., 5,025,257, Cl. 341-101.000.
- Nouvertne, Werner: *See—*
  - Tacke, Peter; Grigo, Ulrich; Nouvertne, Werner; Freitag, Dieter; Idel, Karsten-Josef; and Westeppe, Uwe, 5,025,065, Cl. 524-611.000.
- Novo Nordisk A/S: *See—*
  - Gronwald, Frederik; Andersen, Peter H.; Faarup, Peter; Guddal, Erling; Hansen, Kristian T.; Hansen, Louis B.; and Nielsen, Erik B., 5,025,009, Cl. 514-213.000.
- Nowack, Gerhard P.: *See—*
  - Tooley, Patricia A.; Cheung, Tin-Tack P.; Cymbaluk, Ted H.; Nowack, Gerhard P.; and Johnson, Marvin M., 5,024,683, Cl. 55-74.000.
- Nowak, William J.; Attardi, Anthony A.; and Costanza, Daniel W., to Zerox Corporation. Edge effect compensation in high frequency vibratory energy producing devices for electrophotographic imaging. 5,025,291, Cl. 355-273.000.
- Nowlin, Thomas E.; and Wagner, Klaus P., to Mobil Oil Corporation. Highly active catalyst composition for polymerizing alpha-olefins. 5,025,072, Cl. 526-129.000.
- Nozaki, Chikateru; Miyanohara, Atsushi; Hamada, Fukusaburo; Ohtomo, Nobuya; and Matsubara, Kenichi, to Juridical Foundation The Chemo-Sero-Therapeutic Research Institute. Recombinant DNA inserted with hepatitis B virus gene, mammalian cells transformed with cloned viral DNA, and production of hepatitis B virus proteins. 5,024,938, Cl. 435-68.100.
- Nozawa, Eiji: *See—*
  - Miura, Masao; Uchida, Naoshi; Takahashi, Tatsunori; Asakawa, Kouji; and Nozawa, Eiji, 5,025,236, Cl. 335-46.000.
- NSK Warner K.K.: *See—*
  - Kinoshita, Yoshio; and Nawa, Mitsuharu, 5,024,308, Cl. 192-41.00A.
- Nukada, Katsumi: *See—*
  - Akasaki, Yutaka; Aonuma, Hidekazu; Nukada, Katsumi; Tokita, Akihiko; Suto, Hidemi; Sato, Katsuhiro; and Tanaka, Hiroyuki, 5,024,911, Cl. 430-58.000.
- Numata, Ken-ichi: *See—*
  - Konishi, Masataka; Tomita, Koji; Oka, Masahisa; and Numata, Ken-ichi, 5,025,023, Cl. 514-183.000.
- Numazawa, Kenichi: *See—*
  - Arai, Kei; Ohashi, Minoru; Utsugi, Yoshio; Oka, Osamu; Numazawa, Kenichi; Miwa, Kenji; and Sugawara, Kenzo, 5,024,816, Cl. 422-68.100.
- Nunally, Patrick O., to General Dynamics Corp., Pomona Div. Fault-resistant solid-state line driver. 5,025,178, Cl. 307-442.000.
- Nyman, Mikko: *See—*
  - Laine, Juhani; Nyman, Mikko; and Paananen, Tapio, 5,024,263, Cl. 165-1.000.
- O-I Neg TV Products, Inc.: *See—*
  - Ward, William R., 5,024,315, Cl. 198-341.000.
- Obata, Shuichi: *See—*
  - Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.
- Obligin, Alan: *See—*
  - Smid, Johannes; Cabasso, Israel; Obligin, Alan; and Rawls, H. Ralph, 5,024,232, Cl. 128-654.000.
- Occupant Safety Systems, Inc.: *See—*
  - Zygutis, James L.; and Doty, Gerald A., 5,024,391, Cl. 242-107.200.
- OCG Microelectronic Materials, Inc.: *See—*
  - Blakeney, Andrew J.; Jeffries, Alfred T., III; and Sarubbi, Thomas R., 5,024,921, Cl. 430-326.000.
- Ochiai, Kiyoshi, to Sumitomo Rubber Industries, Ltd. Radial tire for heavy duty vehicles. 5,024,260, Cl. 152-209.00R.
- Ochsner, Richard, to Coflexip. Hoses stable in length under the effect of an internal pressure. 5,024,252, Cl. 138-130.000.
- Oda, Kazuya: *See—*
  - Mutoh, Hideki; Oda, Kazuya; and Kawajiri, Kazuhiro, 5,025,319, Cl. 358-213.290.
- Oda, Masao: *See—*
  - Kobayashi, Toshiyuki; Koshinaka, Masao; Kinoshita, Yoshimi; Oda, Masao; and Yoshizawa, Kenji, 5,024,182, Cl. 118-723.000.
- Oda, Toshikazu: *See—*
  - Yamazaki, Syoji; Oda, Toshikazu; Iwanaga, Kenji; and Gono, Yoshitaka, 5,025,237, Cl. 335-83.000.
- Odagaki, Toru, to Ushio Denki Kabushiki Kaisha. Elongate tubular incandescent lamp with filament shorting bars. 5,025,188, Cl. 313-273.000.
- Odaka, Yoshiyuki: *See—*
  - Morishita, Hajime; Hayashi, Nobuaki; Nonogaki, Saburo; Hashimoto, Michiaki; Ito, Masato; Nishizawa, Masahiro; Miura, Kiyoshi; and Odaka, Yoshiyuki, 5,024,920, Cl. 430-325.000.
- Odom, Robert W.; and Strathman, Michael D. Resistive anode encoder target and method producing baths charged and visual images. 5,025,144, Cl. 250-207.000.
- Oekonomopulos, Raymond; Henning, Rainer; Lerch, Ulrich; Scholkens, Bernward; and Linz, Wolfgang, to Hoechst Aktiengesellschaft. Benzothiazinone derivatives, and pharmaceuticals containing them. 5,025,010, Cl. 514-224.200.
- Office National d'Etudes et de Recherche Aerospatiales (ONERA): *See—*
  - Maisonneuve, Jean-Michel; Domergue, Jean-Paul; Parize, Gabrielle; Palandjian, Philippe; and Isbert, Jacques, 5,024,502, Cl. 350-96.160.
- Oftring, Alfred; Birnbach, Stefan; Fikentscher, Rolf; Baur, Richard; Kud, Alexander; Goeckel, Ulrich; and Perner, Johannes, to BASF Aktiengesellschaft. Glycerol aminocarboxylates and preparation and use thereof. 5,025,103, Cl. 560-170.000.
- Ogawa, Hisao: *See—*
  - Ishidoya, Masahiro; Soma, Toru; and Ogawa, Hisao, 5,025,061, Cl 524-539.000.
- Ogawa, Masanobu: *See—*
  - Arakawa, Masao; Terasawa, Tomizo; Ogawa, Masanobu; and Kami, Hironori, 5,025,169, Cl. 250-574.000.
- Ogawa, Yasushi: *See—*
  - Chu, George H.; Ogawa, Yasushi; McPherson, John M.; Ksander, George; Pratt, Bruce; Hendricks, Diana; and McMullin, Hugh, 5,024,841, Cl. 424-422.000.
- Ogle, George Braddock, II, to International Medication Systems, Limited. Disposable sheath for hypodermic cannula used with a syringe. 5,024,616, Cl. 604-192.000.
- Oguchi, Takahisa: *See—*
  - Itoh, Hisato; Enomoto, Katashi; Oguchi, Takahisa; and Nishizawa, Tsutomu, 5,024,926, Cl. 430-495.000.
- Oguchi, Yuzo: *See—*
  - Komatsu, Fumito; Usuki, Hideo; and Oguchi, Yuzo, 5,024,088, Cl. 73-517.00B.
- Ogura, Tsugitoshi: *See—*
  - Moriyama, Noboru; Ogura, Tsugitoshi; and Hiraki, Akio, 5,024,676, Cl. 44-301.000.
- Ohashi, Hiroshi: *See—*
  - Tanaka, Masaki; Ohashi, Hiroshi; and Takahashi, Yoshinobu, 5,025,076, Cl. 528-33.000.
- Ohashi, Kaoru: *See—*
  - Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.
- Ohashi, Minoru: *See—*
  - Arai, Kei; Ohashi, Minoru; Utsugi, Yoshio; Oka, Osamu; Numazawa, Kenichi; Miwa, Kenji; and Sugawara, Kenzo, 5,024,816, Cl. 422-68.100.
- Ohashi, Tsuyoshi, to Brother Kogyo Kabushiki Kaisha. Drive circuit and method for setting a control signal of a semiconductor laser. 5,025,447, Cl. 372-31.000.
- Ohashi, Yasusuke; Fujino, Toshihiro; Taki, Yasuhito; and Nishijima, Tamotsu, to Yazaki Corporation. Copper alloy with phosphorus and iron. 5,024,815, Cl. 420-487.000.
- Ohgoda, Makoto, to Fuji Photo Film Co., Ltd. Radiation image readout apparatus. 5,025,156, Cl. 250-327.200.
- Ohie, Takayuki: *See—*
  - Tateishi, Kiyoshi; Sakata, Haruyasu; Tawaragi, Yuji; Suzuki, Masanori; and Ohie, Takayuki, 5,025,434, Cl. 369-44.360.
- Ohira, Tadashi: *See—*
  - Shimizu, Tadafumi; and Ohira, Tadashi, 5,024,431, Cl. 271-263.000.
- Ohki, Nobutaka: *See—*
  - Naruse, Hideaki; Takahashi, Osamu, Ohki, Nobutaka; and Ono, Michio, 5,024,924, Cl. 430-376.000.
- Ohkubo, Satoru; and Washino, Shoichi, to Mitsubishi Denki Kabushiki Kaisha. Engine-start discriminating apparatus for an internal combustion engine. 5,024,082, Cl. 73-117.300.
- Ohkura, Hirokazu: *See—*
  - Katsura, Toru; Kaji, Hiroo; Hyodo, Kenji; and Ohkura, Hirokazu, 5,024,986, Cl. 503-200.000.
- Ohler, Craig A.: *See—*
  - Anthony, Michael; Ohler, Craig A.; and Christensen, Arnold, 5,024,132, Cl. 84-312.00R.
- Ohmori, Naoto: *See—*
  - Hasegawa, Hirofumi; Ohmori, Naoto; Yamada, Yukio; and Yoshida, Narutaka, 5,025,286, Cl. 355-244.000.
- Ohnishi, Toshiya: *See—*
  - Yonezawa, Yasuo; Ohnishi, Toshiya; Okumura, Shin-ichi; Sakai, Akiyoshi; Nakano, Hiroki; Matsushita, Masao; Morikawa, Atsushi; and Yoshihara, Motoshi, 5,024,064, Cl. 62-106.000.
- Ohno, Motoshi: *See—*
  - Nakata, Takashi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Horaguchi, Yoichi, 5,025,281, Cl. 355-27.000.
- Ohsawa, Katsuyuki: *See—*
  - Nagano, Susumu; Kawazoe, Hiromitsu; and Ohsawa, Katsuyuki, 5,024,184, Cl. 123-48.00R.
- Ohsawa, Yutaka: *See—*
  - Kitazawa, Toshiyuki; Kurosaki, Masahiko; and Ohsawa, Yutaka, 5,025,276, Cl. 354-152.000.

VOL
1127
ISS
3
JE
18
1991
UMI

Ohshima, Masaaki; Kobayashi, Akira; Atsumi, Senji; and Shimada, Hiromi, to Tokyo Electric Co., The; and NGK Insulators, Ltd. Solid electrolyte tube for sodium sulfur cells and surface finishing process thereof. 5,024,907, Cl. 429-191.000.
Ohta, Atsuo: *See—*
  Ito, Toshifumi; Ohta, Atsuo; and Yamashita, Shoji, 5,024,113, Cl. 74-6.000.
Ohta, Takeo; Uchida, Masami; Kotera, Koichi; and Matsubara, Kunihiro, to Matsushita Electric Industrial Co., Ltd. Optical information recording medium. 5,024,910, Cl. 430-19.000.
Ohta, Tomozo; Nakano, Hiroshi; and Miyazaki, Masao, to Sharp Kabushiki Kaisha Mobile object navigation system. 5,025,261, Cl. 342-357.000.
Ohtani, Hichiro: *See—*
  Inada, Masanori; and Ohtani, Hichiro, 5,024,083, Cl. 73-204.260.
Ohtomo, Nobuya: *See—*
  Nozaki, Chikateru; Miyanohara, Atsushi; Hamada, Fukusaburo; Ohtomo, Nobuya; and Matsubara, Kenichi, 5,024,938, Cl. 435-68.100.
Ohtsuka, Nobuaki: *See—*
  Miyamoto, Junichi; Ohtsuka, Nobuaki; Yoshikawa, Kuniyoshi; and Mori, Seiichi, 5,025,417, Cl. 365-189.090.
Ohtsuki, Toshinori: *See—*
  Saeki, Kiyoshi; Ohtsuki, Toshinori; and Ueno, Kazuo, 5,025,269, Cl. 346-108.000.
Ohuchi, Hirofumi, to Mitsubishi Denki Kabushiki Kaisha Idle speed adjusting system for internal combustion engine. 5,024,196, Cl. 123-339.000.
Ohuchi, Satoshi, to Ricoh Company, Ltd. Dot region discriminating method. 5,025,481, Cl. 382-53.000.
Oikawa, Tomohiro, to Ricoh Company, Ltd. Polygonal mirror for scanning light beam. 5,024,496, Cl. 350-6.800.
Oka, Masahisa: *See—*
  Konishi, Masataka; Tomita, Koji; Oka, Masahisa; and Numata, Ken-ichi, 5,025,023, Cl. 514-183.000.
Oka, Osamu: *See—*
  Arai, Kei; Ohashi, Minoru; Utsugi, Yoshio; Oka, Osamu; Numazawa, Kenichi; Miwa, Kenji; and Sugawara, Kenzo, 5,024,816, Cl. 422-68.100.
Okabayashi, Norio, to Daicel Chemical Industries, Ltd. Stamper cleaning apparatus. 5,024,744, Cl. 204-194.000.
Okabe, Yoshie, to Kabushiki Kaisha Toshiba. Processing machine. 5,025,475, Cl. 382-1.000.
Okada, Hisao: *See—*
  Kubota, Jun; Kino, Hirotoshi; Musha, Yosinori; and Okada, Hisao, 5,024,094, Cl. 73-634.000.
  Sasaki, Souji; Kino, Hirotoshi; Musha, Yoshinori; Kubota, Jun; and Okada, Hisao, 5,024,093, Cl. 73-633.000.
Okada, Kazuo, to Kabushiki Kaisha Universal. Slot machine. 5,024,439, Cl. 273-143.00R.
Okada, Kazuo: *See—*
  Takokoro, Michihiro; Okada, Kazuo; and Imai, Hitoshi, 5,025,430, Cl. 369-13.000.
Okada, Shoji: *See—*
  Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; and Okada, Shoji, 5,025,187, Cl. 310-323.000.
Okada, Takao; Yagi, Akira; Morita, Seizo; and Mikoshiba, Nobuo, to Olympus Optical Co., Ltd. Scanning tunneling spectroscope and a spectroscopic information detection method. 5,025,153, Cl 250-306.000.
Okamoto, Kengo; Habu, Takaaki; and Muroi, Shoji, to Nippon Antenna Co., Ltd. Multi-frequency antenna. 5,025,263, Cl. 343-715.000.
Okamoto, Manabu, to Ushio denki Kabushiki Kaisha. End base construction for a discharge lamp. 5,025,192, Cl 313-623.000.
Okamuro, Tomio: *See—*
  Kawaguchi, Masaaki; Okamuro, Tomio; and Shirose, Keiichi, 5,024,464, Cl. 280-731.000.
O'Keefe, Sheila: *See—*
  Mydill, Marc R.; Pile, Sam R.; O'Keefe, Sheila; Okerblom, Neal F.; and Keenan, W. Russ, 5,025,205, Cl. 324-73.100.
Okerblom, Neal F.: *See—*
  Mydill, Marc R.; Pile, Sam R.; O'Keefe, Sheila; Okerblom, Neal F., and Keenan, W. Russ, 5,025,205, Cl. 324-73.100.
Oki Electric Industry Co., Ltd.: *See—*
  Shikata, Makoto, 5,025,174, Cl. 307-272.200.
  Yamauchi, Takahiro, 5,024,919, Cl. 430-312.000.
Okita, Tsutomu: *See—*
  Watanabe, Hideomi; and Okita, Tsutomu, 5,024,892, Cl. 428-423.100.
Oklahoma Medical Research Foundation: *See—*
  Carney, John M , and Floyd, Robert A., 5,025,032, Cl. 514-400.000.
Oksuz, Martha: *See—*
  Woestemeyer, Henry J.; and Oksuz, Martha, 5,024,487, Cl. 299-2.000.
Okubo, Takashi: *See—*
  Takemura, Toji; and Okubo, Takashi, 5,024,309, Cl. 192-60.000.
Okuda, Soichiro; Nakanishi, Tetsuya; Sasaki, Shigeo; and Noguchi, Kazuhiko, to Mitsubishi Denki Kabushiki Kaisha. Ion implantation apparatus. 5,025,167, Cl. 250-492.200.
Okui, Kaoru; and Kobayashi, Manabu, to Yamaha Hatsudiki Kabushiki Kaisha. Engine unit for vehicle. 5,024,287, Cl. 180-297.000.
Okumura, Shin-ichi: *See—*
  Yonezawa, Yasuo; Ohnishi, Toshiya; Okumura, Shin-ichi; Sakai, Akiyoshi; Nakano, Hiroki; Matsushita, Masao; Morikawa, Atsushi; and Yoshihara, Motoshi, 5,024,064, Cl. 62-106.000.
Okuno, Akira: *See—*
  Ishimura, Toshihiko; Okuno, Akira; Tanii, Junichi; and Seki, Reiji, 5,025,239, Cl. 335-265.000.
Okuyama, Masahiko: *See—*
  Kondo, Kazuo; and Okuyama, Masahiko, 5,024,973, Cl. 501-10.000.
Oldham, James G.; Spencer, Charles R.; Begley, Carl L.; and Meyer, H Robert, to MK-Ferguson Company; and Chem-Nuclear Systems Inc Site survey method and apparatus. 5,025,150, Cl. 250-253.000.
Olemunda Pty. Ltd.: *See—*
  Spencer, Dennis S., 5,024,217, Cl. 128-82.000.
Olges, Wolfgang: *See—*
  Anderheggen, Wolfgang; Kraemer, Michael; Vogelsgesang, Roland; Wagner, Wolfram; Olges, Wolfgang; and Dragovic, Thomas, 5,024,797, Cl. 264-143.000.
Olin Corporation: *See—*
  Braden, Jeffrey S., 5,025,114, Cl. 174-52.400.
  SinghDeo, Narendra N.; Mahulikar, Deepak; and Butt, Sheldon H . 5,024,883, Cl. 428-323.000.
Olive, Clive E., to Rolls-Royce plc. Control of variable stator vanes. 5,024,580, Cl. 415-150.000.
Oliver, David: *See—*
  Harbarger, Josephine A.; Oliver, David; and Anthony, Ella L., 5,024,207, Cl. 125-35.000.
Oliver, James L.; Juriga, James A.; Walton, Erlen B.; and Preston, David M., to Eaton Corporation. Manually power mechanical actuator for parallel auxiliary spring. 5,024,463, Cl. 280-718.000.
Olson, David A.: *See—*
  Free, Paul D.; Doszpoly, B.; Villanyi, Tibor J.; and Olson, David A., 5,024,200, Cl. 123-501.000.
Olson, Jeffrey A., to Outboard Marine Corporation. Internal combustion engine fuel supply system. 5,024,385, Cl. 239-410.000.
Olti, Avraham: *See—*
  Blumberg, Shlomo; and Olti, Avraham, 5,025,426, Cl. 368-10.000
Olympus Optical Co., Ltd.: *See—*
  Inoue, Takashi; Suzuki, Tatsuya; Kimura, Akiteru, Miyazaki, Hiroaki; and Katagiri, Moriya, 5,025,277, Cl. 354-173.100.
  Inoue, Takashi; Suzuki, Tatsuya; Kimura, Akiteru; Miyazaki, Hiroaki; and Katagiri, Moriya, 5,025,277, Cl. 354-173.100.
  Okada, Takao; Yagi, Akira; Morita, Seizo; and Mikoshiba, Nobuo, 5,025,153, Cl. 250-306.000.
  Watanabe, Masaki, 5,024,024, Cl. 51-124.00L.
Omata, Tetsuo; Senda, Shuji; Tanaka, Tamaki; Kumagai, Eriko; Kajimoto, Chikara; and Nakazono, Yutaka, to Nitto Denko Co. Ltd. Termites trail-following pheromone and a same composition and method of detecting captured termites by using this composition 5,024,832, Cl. 424-84.000.
Omori, Hideharu: *See—*
  Kamigaki, Masaharu; Oshikata, Hironobu; Kawata, Yoshihiro; Shiga, Nobuyasu; Omori, Hideharu; Kawashima, Masayuki; and Shimatani, Toshimichi, 5,025,441, Cl. 370-77.000.
Omori, Hideki: *See—*
  Kihara, Hiroyuki, and Omori, Hideki, 5,024,025, Cl. 51-165.770.
Omotezako, Nobuya: *See—*
  Sone, Toshiyuki; Matsumoto, Takehiko; Omotezako, Nobuya; and Kawasuji, Keiji, 5,025,338, Cl. 360-99.060.
Omron Tateisi Electronics Co : *See—*
  Matuo, Ken-iti; Nakata, Muneo; Hori, Mitukazu, and Tanihara, Isaji, 5,025,238, Cl. 335-128.000.
Ono, Michio: *See—*
  Naruse, Hideaki; Takahashi, Osamu; Ohki, Nobutaka; and Ono, Michio, 5,024,924, Cl. 430-376.000.
Ono, Tatsuo. Process for connection of supports, and support system. 5,024,037, Cl. 52-646.000.
Onuma, Toshio: *See—*
  Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.
Oohashi, Keiji; Araki, Shinji; Suzuki, Hideo; and Shimomichi, Tsuyoshi, to Fujikura Ltd. Method for producing carbon-coated optical fiber. 5,024,688, Cl. 65-3.120.
Optical Communications Corp.: *See—*
  Lill, Thomas M., 5,025,459, Cl. 375-117.000.
Orbital Engine Company Proprietary Limited: *See—*
  McKay, Michael L., 5,024,202, Cl. 123-533.000.
Orega Electronique et Mecanique: *See—*
  Bouillot, Jean-Michel; Coutureau, Thierry; and Decuyper, Patrick G., 5,025,241, Cl. 336-100.000.
Oriental Electric Company, Ltd.: *See—*
  Arai, Kei; Ohashi, Minoru; Utsugi, Yoshio; Oka, Osamu, Numazawa, Kenichi; Miwa, Kenji; and Sugawara, Kenzo, 5,024,816, Cl. 422-68.100.
Orikasa, Toyoaki: *See—*
  Futatasuka, Rensei; Koshiba, Yutaka; Chiba, Shunich; Orikasa, Toyoaki; Noguchi, Seiji, and Idoshita, Takuya, 5,024,814, Cl. 420-473.000.
Orth, Jeffrey L.: *See—*
  Peters, Jeffrey L.; and Orth, Jeffrey L., 5,024,668, Cl 606-194.000.
Osabe, Akio: *See—*
  Watanabe, Toshio; Sato, Masahiko; Osabe, Akio; Sakayori, Hiroyuki; and Mase, Akira, 5,024,255, Cl. 141-11.000.
Osafune, Haruo: *See—*
  Suganuma, Katsuaki; Fujii, Hiroyuki; Minakuchi, Hiroyoshi; Kada, Katsuhiko; Osafune, Haruo; and Kanamaru, Kuniaki, 5,024,902, Cl. 428-633.000.

Osamu, Nakaguchi, to Fujisawa Pharmaceutical Co., Ltd. Hair restorer. 5,025,026, Cl. 514-356.000.
Osato, Yasukuni: *See—*
  Suda, Hirohisa; Sasaki, Katsumi; and Osato, Yasukuni, 5,024,363, Cl. 225-96.005.
Osawa, Masanori, to Tenryu Marusawa Kabushiki Kaisha. Electromagnetic spring clutch. 5,024,311, Cl. 192-84.00T.
Oshikata, Hironobu: *See—*
  Kamigaki, Masaharu; Oshikata, Hironobu; Kawata, Yoshihiro; Shiga, Nobuyasu; Omori, Hideharu; Kawashima, Masayuki; and Shimatani, Toshimichi, 5,025,441, Cl. 370-77.000.
Oshino, Yasuhiro: *See—*
  Ueda, Mitsuru; Kanno, Tatsuya; Iguchi, Yoshihiro; and Oshino, Yasuhiro, 5,025,083, Cl. 528-199.000.
O'Sullivan, Joseph: *See—*
  Aklonis, Carol A.; Ax, Helen A.; Kirsch, Donald R.; O'Sullivan, Joseph; Tymiak, Adrienne; and Wells, J Scott, 5,024,839, Cl. 424-115.000.
Osumi, Masato: *See—*
  Hirono, Yutaka; Kiyama, Seiichi; and Osumi, Masato, 5,024,724. Cl. 156-643.000.
Ota, Yoshifumi: *See—*
  Nakamura, Kyuzo; Ota, Yoshifumi; and Yamada, Taiki, 5,024,854. Cl. 427-38.000.
Ota, Yusuke; and Swartz, Robert G., to AT&T Bell Laboratories. Burst mode digital data receiver. 5,025,456, Cl. 375-76.000.
Otfinoski, William F., to United Technologies Corporation. Abradable seal having particulate erosion resistance. 5,024,884, Cl. 428-328.000.
Otis Elevator Company: *See—*
  Kameli, Nader, 5,024,296, Cl. 187-132.000.
  Thangavelu, Kandasamy, 5,024,295, Cl. 187-125.000.
Otis Engineering Corp.: *See—*
  Schwab, Carl M., Jr., 5,024,274, Cl. 166-303.000.
Otto, Dennis L., to Timken Company, The. Seal assembly for use with an overhang. 5,024,449, Cl. 277-37.000.
Ou, Szutsun S.: *See—*
  Jansen, Michael; Sergant, Moshe; Ou, Szutsun S.; Wilcox, Jaroslava Z.; Yang, Jane J.; and Eaton, Larry R., 5,025,451, Cl. 372-50.000.
Outboard Marine Corporation: *See—*
  Hartke, David J.; and Appelt, Kathleen A., 5,024,188, Cl. 123-195.00A.
  Olson, Jeffrey A., 5,024,385, Cl. 239-410.000.
Ovassapian, Andranik; and Dye, John F., to Kendall Company, The Intubating airway. 5,024,218, Cl. 128-200.260.
Owen, Hartley: *See—*
  Harandi, Mohsen N.; and Owen, Hartley, 5,024,679, Cl. 44-449.000.
Owens-Corning Fiberglass Corporation: *See—*
  Pollet, Jean C.; Williams, Gary L.; Armstrong, Gordon P.; and Flautt, Martin C., 5,024,890, Cl. 428-372.000.
Ozawa, Kazuo; and Sato, Masanori, to Sony Corporation. Tape cassette. 5,024,394, Cl. 242-198.000.
Paananen, Tapio: *See—*
  Laine, Juhani; Nyman, Mikko; and Paananen, Tapio, 5,024,263, Cl 165-1.000.
Pagano, Daniel M., to Eastman Kodak Company. Film cassette with built-in support for optical sensor to read film information. 5,025,274, Cl. 354-21.000.
Paist, Kenneth W.: *See—*
  DiLullo, Joseph V.; Schifter, Stephan C.; Negin, Michael; and Paist, Kenneth W., 5,025,253, Cl. 340-825.060.
Palandjian, Philippe: *See—*
  Maisonneuve, Jean-Michel; Domergue, Jean-Paul; Parize, Gabrielle; Palandjian, Philippe; and Isbert, Jacques, 5,024,502, Cl. 350-96.160.
Palermo, Robert E.: *See—*
  DeCaul, Lorenzo C.; Han, Scott; Palermo, Robert E.; and Walsh, Dennis E., 5,025,109, Cl. 585-500.000.
Palmer, Marcia R. Clothing item. 5,023,952, Cl. 2-69.000.
Pan, Yuh-Guo; and Hochman, Lana, to Clairol Incorporated Nitroaniline dyes with a cyano substituent group. 5,024,673, Cl. 8-414.000.
Panagin, Romano, to Fiat Ferroviaria S.p.A. Self-steering bogie for a railway vehicle. 5,024,165, Cl. 105-168.000.
Papamichos, Euripides: *See—*
  Vardoulakis, Ioannis; Labuz, Joseph F.; and Papamichos, Euripides, 5,024,103, Cl. 73-819.000.
Pape, Robert; Rose, William; Burgel, Frank; and Adams, Chip, to Sonin, Inc. Multiple blade handsaw 5,023,996, Cl. 30-144.000.
Papp, Karel. Sprung bicycle seat post. 5,024,413, Cl. 248-623.000.
Pappas, James L.: *See—*
  Seiler, Larry D.; Pappas, James L., and Rose, Robert C., 5,025,249, Cl. 340-721.000.
Parize, Gabrielle: *See—*
  Maisonneuve, Jean-Michel; Domergue, Jean-Paul; Parize, Gabrielle; Palandjian, Philippe; and Isbert, Jacques, 5,024,502, Cl. 350-96.160.
Park, Chinsoo: *See—*
  Campbell, Neil E.; and Park, Chinsoo, 5,024,727, Cl. 156-663.000.
Park, Yong; and Lee, Seo K., to Goldstar Electron Co. Method of fabricating a BCCD channel with stair-case doping by self-alignment. 5,024,963, Cl. 437-41.000.
Parke, Frederic I., to New York Institute of Technology. Method and apparatus for generating animated images. 5,025,394, Cl. 364-518.000.
Parker Hannifin Corporation: *See—*
  Burge, Donald G., 5,024,468, Cl. 285-39.000.
Parks, Carol A.; Probst, Robert E., Rajagopal, Doraiswamy; and Youngs, Gary L., to International Business Machines Corporation. Method and apparatus for merging a digitized image with an alphanumeric character string. 5,025,396, Cl. 364-518.000.
Parrilla, Vicente. Compositions for the treatment of skin injuries. 5,024,838, Cl. 424-94.650.
Parrott, Wayne A.: *See—*
  Collins, Glenn B.; Hildebrand, David F.; Lazzeri, Paul A.; Adams, Thomas R.; Parrott, Wayne A.; and Hartweck, Lynn M., 5,024,944, Cl. 435-172.300.
Parsons, J. Stuart: *See—*
  Gasaway, Jack S.; Parsons, J. Stuart; and Harshman, Robert L., 5,024,656, Cl. 604-70.000.
Parulski, Kenneth A.; and Kessler, David, to Eastman Kodak Company. System for minimizing optical distortions and chromatic aberrations in a linear color scanner. 5,025,313, Cl. 358-54.000.
Parzl, Franz; and Eichinger, Johann, to Carl Hurth Maschinen- und Zahnradfabrik GmbH & Co. Transmission housing with a support for a shaft carrying at least one gear. 5,024,122, Cl. 74-606.00R.
Paskowski, Frank: *See—*
  Gero, William; and Paskowski, Frank, 5,023,986, Cl. 29-163.600.
Passero, Adolfo: *See—*
  Scata, Mario; and Passero, Adolfo, 5,024,316, Cl. 198-369.000.
Pastor, Jose. Recognition method for character set. 5,025,479, Cl 382-38.000.
Patoiseau, Jean F.; Autin, Jean-Marie, Cousse, Henri; Sales, Veronique; Tisne-Versailles, Jacky; and Bali, Jean-Pierre, to Pierre Fabre Medicament. Thioformamidines, and use as medicaments. 5,025,015, Cl. 514-274.000.
Patterson, John F.: *See—*
  Busch, Raymond A.; and Patterson, John F., 5,024,426, Cl. 267-158.000.
Patzelt, Norbert; and von Seebach, Michael, to Krupp Polysius AG. Separator. 5,024,754, Cl. 209-135.000.
Pauer, Dieter, to Alcatel N V. Method of and circuit arrangement for recovering a bit clock from a received digital communication signal. 5,025,461, Cl. 375-119.000.
Paula, Kyle S. Reusable, flexible bag with foldable support structure. 5,024,344, Cl. 220-9.300.
Pauly, John M.; and Nishimura, Dwight G., to Leland Stanford Junior University, The Board of Trustees of the. Magnetic resonance imaging of short T_2 species. 5,025,216, Cl. 324-309.000.
Paumard, Eric; Mutez, Sylvain; Mortreux, Andre; and Petit, Francis, to Norsolor. Catalyst system, process for its preparation and its application to the manufacture of aldehydes. 5,024,983, Cl. 502-167.000
Pavio, Anthony M., to Texas Instruments Incorporated. Monolithic multilayer planar transmission line. 5,025,232, Cl. 333-26.000.
Pearson, Steve: *See—*
  Needham, Thomas E.; Wright, Jeremy C.; Pearson, Steve; Chilamkurti, Rao; and Kopp, Clinton V., 5,024,657, Cl. 604-85.000.
Pease, George E., Jr.; Romero, Ervin G.; and Glasenapp, Rudi K. H., to Boeing Company, The. Automatic aircraft braking system including wheelspeed responsive control apparatus. 5,024,491, Cl. 303-93.000.
Pechiney Recherche: *See—*
  Gaspard, Jean R , 5,025,219, Cl. 324-447.000.
Pellerin, Roy F.; and Ross, Robert J., to Washington State University Research Foundation, Inc. Non-destructive evaluation of structural members. 5,024,091, Cl. 73-597.000.
Penn, Thomas C.: *See—*
  Porter, Vernon R.; and Penn, Thomas C., 5,024,918, Cl 430-269.000.
Penticoff, Amy M.; and Lyon, John D., to Dow Corning Corporation. Method for processing aqueous fermentation broths. 5,024,937, Cl. 435-41.000.
Perkins Manufacturing Company: *See—*
  Redding, John W.; and Zelinka, Robert F., 5,024,573, Cl 414-408.000.
Perner, Johannes: *See—*
  Oftring, Alfred, Birnbach, Stefan; Fikentscher, Rolf; Baur, Richard; Kud, Alexander; Goeckel, Ulrich; and Perner, Johannes, 5,025,103, Cl. 560-170.000.
Perona, Mark; Woller, Tom C.; and Guy, Jon S., to Cipher Data Products, Inc. Auto-loading transport for tape cartridge with tape access door and belt capstan roller. 5,025,334, Cl. 360-96.500.
Perrine, Susan, to Children's Hospital Medical Center of Northern California. Method for augmenting fetal hemoglobin. 5,025,029, Cl. 514-381.000.
Perry, Mordechai: *See—*
  Linder, Charles; Perry, Mordechai; Nemas, Mara; and Katraro, Reuven, 5,024,765, Cl. 210-651.000.
Perz, John S.: *See—*
  Piedrahita, Carlos A.; Quinn, Robert E.; and Perz, John S., 5,025,085, Cl. 528-230.000.
Peters, Jeffrey L.; and Orth, Jeffrey L., to Rocky Mountain Research, Inc. Retrograde perfusion system, components and method. 5,024,668, Cl. 606-194.000.
Peters, Roger. Rotary chuck for centering and retaining data discs 5,025,340, Cl. 360-99.120.
Petersen, Helle B., to Milliken Denmark A/S. Dust control mat and method of manufacturing same. 5,024,868, Cl. 428-88.000.
Peterson, Christer C. I., to Aktiebolaget Electrolux. Brazing or soldering method and device including a laminar flow or gaseous flux. 5,025,125, Cl. 219-85.110.
Peterson, Robert H.; and McGurk-Burleson, Erin, to Baxter International Inc. Artificial ligament of differential weave structure. 5,024,669, Cl. 623-13.000.

VOL 1127
ISS 3
JE 18 1991
UMI

- Petit, Francis: *See—*
  - Paumard, Eric; Mutez, Sylvain; Mortreux, Andre; and Petit, Francis, 5,024,983, Cl. 502-167.000.
- Petit, Gaston; and Monteiro, Daniel. Device for pitting fruit, particularly prunes. 5,024,147, Cl. 99-549.000.
- Petitjean, Luc; and Valdois, Michel, to Schlumberger Technology Corporation. Pressure sensor useable in oil wells. 5,024,098, Cl. 73-729.000.
- Petranek, Milan: *See—*
  - Fucik, Borivoj; Petranek, Milan; and Smital, Frantisek, 5,024,068, Cl. 66-53.000.
- Petrelli, Luigi, to Alfa Lancia Industriale S.p.A. Bodywork for automobiles. 5,024,480, Cl. 296-146 000.
- Petrick, Mark: *See—*
  - Anderson, Donald J.; Duerksen, John H.; McCallum, Doug J.; and Petrick, Mark, 5,024,275, Cl. 166-303.000.
- Pettigrew, Michel J.; Rhodes, David B.; Lux, Eric G.: and Mason, Victor A., to HDRK Mining Research Limited. Loose rock detector. 5,024,090, Cl. 73-572.000.
- Pfaffmann, George D.; Kubis, Charles S.; Currie, John P.; Balzer, Norbert R.; Walter, John; and Adams, Graham R., to Continental Can Company, Inc. Apparatus and method for sealing a lid onto a container. 5,025,123, Cl. 219-10.750.
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- Pfisterer, Richard E.: *See—*
  - Roizen, Michael; Turcotte, William E., II; and Pfisterer, Richard E., 5,025,374, Cl. 364-413.020.
- Pfizer Hospital Products Group, Inc.: *See—*
  - Vasconcellos, Alfred V.; and Keeler, Preston J., III, 5,024,613, Cl. 604-4.000.
- PFM, Inc.: *See—*
  - Morris, Alvin L., 5,024,386, Cl. 241-3.000.
- Phaff, Rox *See—*
  - Zink, Rudolf; and Phaff, Rox, 5,024,988, Cl. 503-212.000.
- Phase Dynamics, Inc.: *See—*
  - Scott, Bentley N.; and Shortes, Samuel R., 5,025,222, Cl. 324-639.000.
- Phebus, Dan E.; Schrader, William A.; and Summers, Russell E., Jr., to Fairfield Manufacturing Company, Inc. Planetary wheel hub. 5,024,636, Cl. 475-141.000.
- Philip Morris Incorporated: *See—*
  - Garthaffner, Martin T.; Keen, Billy J., Jr.; Gillespie, Andrew J.; Wheless, Jack C.; and Dingus, George W., 5,024,242, Cl. 131-94.000.
- Phillips Petroleum Company: *See—*
  - Bobsein, Rex L.; Stone, Mark L.; and Geibel, Jon F., 5,024,876, Cl. 428-272.000.
  - Hawley, Gil P.; and McDaniel, Max P., 5,024,982, Cl. 502-110.000.
  - Sughrue, Edward L., II; Tooley, Patricia A.; Bertus, Brent J.; and Grayson, Bille S., 5,024,750, Cl. 208-57.000.
  - Tooley, Patricia A.; Cheung, Tin-Tack P.; Cymbaluk, Ted H.; Nowack, Gerhard P.; and Johnson, Marvin M., 5,024,683, Cl. 55-74.000.
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- Phoenix Microsystems, Inc.: *See—*
  - Clayton, James L.; and Gewin, Robert E., 5,025,444, Cl. 371-34.000.
- Picker International, Inc.: *See—*
  - Lindstrom, Walter W.; and Dinewitz, Isaac, 5,024,230, Cl. 128-654.000.
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- Pierce, Kirby L.; and Kanouse, Richard C., to Midwest Blast Products, Inc. Airless blast cleaning wheel and housing. 5,024,028, Cl. 51-432.000.
- Pierre Fabre Medicament: *See—*
  - Patoiseau, Jean F.: Autin, Jean-Marie; Cousse, Henri; Sales, Veronique; Tisne-Versailles, Jacky; and Bali, Jean-Pierre, 5,025,015, Cl. 514-274.000.
- Pile, Sam R.: *See—*
  - Mydill, Marc R.; Pile, Sam R.; O'Keefe, Sheila; Okerblom. Neal F.; and Keenan, W. Russ, 5,025,205, Cl. 324-73.100.
- Pinand, Henry. Hand tool. 5,024,565, Cl. 408-121.000.
- Pinholster, Daniel F., Jr.: *See—*
  - Blakely, Lawrence W.; Howe, Michael A.; Pinholster, Daniel F., Jr.; Terry, Claude E.; and McIntosh, Robert H., Sr., 5,024,840, Cl. 424-404.000.
- Pinnow, Curtis C.: *See—*
  - Fortmann, Robert C.; Pinnow, Curtis C.; Kuschewski, Gustav; and Joseph, William A., Jr., 5,025,132, Cl. 219-401.000.
- Pion, Albert L.: *See—*
  - Haines, John G.; Rosenbaum, Nolan G.; Pion, Albert L.; Lecarpentier, Marc; Henriot, Christophe; and Abumehdi, Cyrus, 5,025,383, Cl. 364-464.030.
- Pioneer Electronic Corporation: *See—*
  - Funabashi, Tadashi; and Kenmotsu, Isami, 5,025,440, Cl. 369-199.000.
  - Kato, Takahiro, 5,025,401, Cl. 364-561.000.
  - Komaki, Toshihiro; Kudo, Hideo; Ishizuki, Tomonori; and Yokozeki, Shinichi, 5,025,439, Cl. 369-100.000.
  - Naito, Ryuichi, 5,025,431, Cl. 369-36.000.
  - Naito, Ryuichi, 5,025,432, Cl. 369-36.000.
  - Tateishi, Kiyoshi; Sakata, Haruyasu; Tawaragi, Yuji, Suzuki, Masanori; and Ohie, Takayuki, 5,025,434, Cl. 369-44.360.
- Piorunneck, Heinz, to Burndy Corporation. High-density bi-level card edge connector and method of making the same. 5,024,609, Cl 439-637.000.
- Pipp Mobile Systems, Inc.: *See—*
  - Leist, Alan R., 5,024,164, Cl. 105-101.000.
- Pirl, William E., to Westinghouse Electric Corp. Support equipment for a combination eddy current and ultrasonic testing probe for inspection of steam generator tubing. 5,025,215, Cl. 324-220.000.
- Pirrera, Charles M.: *See—*
  - Pfeil, Richard A., Jr.; and Pirrera. Charles M., 5,024,061, Cl. 62-77.000.
- Pitman, John L.; and McCauley, Kyn A. Watering control system. 5,025,361, Cl. 364-143.000.
- Pitney Bowes Inc : *See—*
  - Bannister, Raymond L.; Close, Frederick C.; and Loeber, Peter J , 5,024,153, Cl. 101-91.000.
  - Raikes, Terry E.; Kramer, William L.; Howard, John B.; Moore, Wayne D.; Jackson, Louis; and Kotecki, Jeffrey D., 5,024,282, Cl. 177-25.150.
- Pitts, Warren R.; Estrada, hayden F.; and West, Peter, to Dennison Manufacturing Company. Erasably markable articles and methods of making such articles. 5,024,898, Cl. 428-511.000.
- Pituch, Daniel W. Medical needle sheath holding apparatus. 5,024,666, Cl. 604-263.000.
- Pixar: *See—*
  - Cook, Robert L.; Porter, Thomas K.; and Carpenter, Loren C., 5,025,400, Cl. 364-522.000.
- Pless, Benjamin D.: *See—*
  - Carroll, Kenneth J.; and Pless, Benjamin D., 5,025,172, Cl. 307-261.000.
- Plissonneau, Bernard: *See—*
  - Barquet, Henri; Negroni, Pierre-Paul; and Plissonneau, Bernard, 5,024,399, Cl. 244-119.000.
- Plotnikov, Andrei D.: *See—*
  - Popov, Nikolai P.; Plotnikov, Andrei D.; and Klotsvog, Grigory N., 5,024,124, Cl. 74-625.000.
- Plumail, Jean-Claude: *See—*
  - Giuliani, Pierre; Le Page, Jean-Francois; Plumail, Jean-Claude; and Espaillac, Marcellin, 5,024,751, Cl. 208-108.000.
- Pohl, Wolfgang D.: *See—*
  - Durig, Urs T.; Fischer, Ulrich C.; and Pohl, Wolfgang D., 5,025,147, Cl. 250-216.000.
- Poisel, Hans; and Trommer, Gert, to Messerschmitt-Boelkow-Blohm GmbH. Laser warning sensor with frequency-coded position information. 5,025,148, Cl. 250-227.120.
- Polaroid Corporation: *See—*
  - Chiang, Yunn H.; and Gaudiana, Russell A., 5,024,989, Cl 503-227.000.
  - Minns, Richard A., Bloom, Iris B. K ; and Ramharack, Roopram, 5,024,507, Cl. 350-96.340.
- Polk, Roger N.: *See—*
  - Bennett, Glenn E.; Lucius, John E.; Polk, Roger N ; Rider, Frederick H.; and Szczesny, David S., 5,024,627, Cl. 439-631.000.
- Pollet, Jean C.; Williams, Gary L.; Armstrong, Gordon P.; and Flautt, Martin C., to Owens-Corning Fiberglass Corporation. Size composition for impregnating filament strands and glass fibers coated therein 5,024,890, Cl. 428-372.000.
- Pollich, Gerhard: *See—*
  - Thunker, Norbert; Pollich, Gerhard; and Luxem, Heiner, 5,024 432, Cl. 271-268.000.
- Pomar, Eliodoro. Variable compression ratio internal combustion rotating engine. 5,024,192, Cl. 123-245.000.
- Pompe, Larry W. Contact lens surface treatment apparatus. 5,023,971. Cl. 15-97.100.
- Popov, Nikolai P.; Plotnikov, Andrei D.; and Klotsvog, Grigory N Electric drive with manual doubler. 5,024,124, Cl. 74-625.000.
- Popp, George: *See—*
  - Mueller, Wolfgang F.; Popp, George; and Vandergheynst, George B., 5,024,127, Cl. 83-13.000.
- Porter, Thomas K.: *See—*
  - Cook, Robert L.; Porter, Thomas K.; and Carpenter, Loren C., 5,025,400, Cl. 364-522.000.
- Porter, Vernon R.; and Penn, Thomas C., to Texas Instruments Incorporated. Heat activated dry development of photoresist by means of active oxygen atmosphere. 5,024,918, Cl. 430-269.000.
- Possati, Mario, to MARPOSS Societa' per Azioni. Apparatus with a supporting frame and process for manufacturing such a frame. 5,024,002, Cl. 33-549.000.
- Power Pack International B.V. i.o.: *See—*
  - Riel, Leslie L., 5,024,373, Cl. 229-68.00R.
- Prairietek Corporation: *See—*
  - Morehouse, James H.; Furay, David M.; Blagaila, John; Dion, F. Eugene; Shelstad, Scott A.; and Woods, Jimmy L., 5,025,336, Cl. 360-97.020.
- Pramanick, Protap, to Com Dev Ltd. Microstripline interdigital planar filter. 5,025,235, Cl. 333-204.000.

- Pratt, Bruce: *See—*
  - Chu, George H.; Ogawa, Yasushi; McPherson, John M.; Ksander, George; Pratt, Bruce; Hendricks, Diana; and McMullin, Hugh, 5,024,841, Cl. 424-422.000.
- Precision Fabrics Group Inc.: *See—*
  - Goad, Conrad D.; and Taylor, Jeffrey L., 5,024,851, Cl. 427-2.000.
- Precision Lapping & Optical Co., Inc.: *See—*
  - Bleier, Zvi; and Lipkins, Morton S., 5,024,514, Cl. 350-618.000.
- Prelini, Cesare; Trovati, Aldo; Gambini, Tiziana; and Stefanoli, Vittorio, to Raffineria Olii Lubrificanti "R.O.L" S.p.A. Process for improving the dyeability of woven or non-woven textiles: pre-treatment with aqueous dispersion of polyurethane containing random cationic groups. 5,024,674, Cl. 8-554.000.
- President & Fellows of Harvard College: *See—*
  - Brenner, Michael B.; Strominger, Jack L.; Seidman, Jonathan; Ip, Stephen H.; and Krangel, Micahel S., 5,024,940, Cl. 435-69.100.
- Pressure Services, Inc.: *See—*
  - Suggs, Steven M., 5,024,453, Cl. 277-106.000.
- Presto Products, Incorporated: *See—*
  - Buchman, James E.; and Jahnke, Kenneth C., 5,024,642, Cl. 493-193.000.
- Preston, David M.: *See—*
  - Oliver, James L.; Juriga, James A.; Walton, Erlen B.; and Preston, David M., 5,024,463, Cl. 280-718.000.
- Pretchel, David A.: *See—*
  - Cloud, Randy G.; and Pretchel, David A., 5,024,798, Cl. 264-272.150.
- Price, David E.: *See—*
  - Kahl, W. Henry; Price, David E.; and Tsao, Nai-Cheng, 5,024,471, Cl. 292-97.000.
- Price, Thomas W. Ladder assembly. 5,024,291, Cl. 182-85.000.
- Priddy, Tommy G.: *See—*
  - Gregory, Danny L.; Priddy, Tommy G.; Smallwood, David O.; and Woodall, Tommy D., 5,024,096, Cl. 73-663.000.
- Principia Recherche Developpement SA: *See—*
  - Guevel, Pierre M.; and Bardey, Philippe R., 5,024,396, Cl. 244-35.00R.
- Prins, Hendrik J.: *See—*
  - Janssen, Augustus J. E. M.; Veldhuis, Raymond N. J.; Prins, Hendrik J.; and Vries, Lodewijk B., 5,025,404, Cl. 364-723.000.
- Prinz, Gary A., to United States of America, Navy. Thin film magnetic memory elements. 5,025,416, Cl. 365-170.000.
- Pritchard, Edward E.: *See—*
  - Edwards, James C.; and Pritchard, Edward E., 5,024,397, Cl. 294-68.230.
- Probst, Robert E.. *See—*
  - Parks, Carol A.; Probst, Robert E.; Rajagopal, Doraiswamy; and Youngs, Gary L., 5,025,396, Cl. 364-518.000.
- Prouty, Lee J. Method and apparatus for cleaning can openers. 5,024,704, Cl. 134-6.000.
- Purens, Alfred, to AT&T Bell Laboratories. Tilt and swivel apparatus for a display monitor. 5,024,415, Cl. 248-923.000.
- Pusic, Pavo. Automated mail collecting and telecommunication machine II. 5,025,386, Cl. 364-478.000.
- Pyles, Robert A.: *See—*
  - Jorissen, Steven A.; Lundy, Charles E.; Krishnan, Sivaram; Mafoti, Robson; and Pyles, Robert A., 5,025,056, Cl. 524-310.000.
- Pyropower Corporation: *See—*
  - Tank, John T., 5,024,684, Cl. 55-92.000.
- Quarles, William B., Jr. Lightweight articulated advertising display. 5,024,015, Cl. 40-605.000.
- Quinn, Robert E.: *See—*
  - Piedrahita, Carlos A.; Quinn, Robert E.; and Perz, John S., 5,025,085, Cl. 528-230.000.
- R-Byte, Inc.: *See—*
  - Feinberg, Howard A.; and Rees, Theodore D., 5,025,333, Cl. 360-85.000.
- Rabins. Leonard: *See—*
  - Koegel, Robert J.; and Rabins, Leonard, 5,025,370, Cl. 364-200.000.
- Radcliffe, Scott T.: *See—*
  - Hanson, Reed D.; and Radcliffe, Scott T., 5,024,460, Cl. 280-707.000.
- Radewahn, Siegfried: *See—*
  - Hinzmann, Gerd; Nies, Norbert; and Radewahn, Siegfried, 5,024,811, Cl. 419-66.000.
- RAF Electronics Corp.: *See—*
  - Flasck, Richard A., 5,024,524, Cl. 353-31.000.
- Raffineria Olii Lubrificanti "R.O.L" S.p.A.: *See—*
  - Prelini, Cesare; Trovati, Aldo; Gambini, Tiziana; and Stefanoli, Vittorio, 5,024,674, Cl. 8-554.000.
- Raikes, Terry E.; Kramer, William L.; Howard, John B.; Moore, Wayne D.; Jackson, Louis; and Kotecki, Jeffrey D., to Pitney Bowes Inc. Electronic postal rating scale operable in metric and avoirdupois weight units. 5,024,282, Cl. 177-25.150.
- Rajagopal, Doraiswamy: *See—*
  - Parks, Carol A.; Probst, Robert E.; Rajagopal, Doraiswamy; and Youngs, Gary L., 5,025,396, Cl. 364-518.000.
- Rall, Dieter, to Luxtron Corporation. Dew point measuring apparatus installation system. 5,024,532, Cl. 374-28.000.
- Ramharack, Roopram: *See—*
  - Minns, Richard A.; Bloom, Iris B. K.; and Ramharack, Roopram, 5,024,507, Cl. 350-96.340.
- Ramirez, Bruno J.: *See—*
  - Sandel, Dan; Horan, Robert T.; Gaba, Rodolfo; and Ramirez, Bruno J., 5,024,326, Cl. 206-366.000.
- Ramsay, Ronald, to Academy of Applied Science, a part interest. Magnetic workpiece clamping blocks. 5,024,428, Cl. 269-274.000.
- Ramstedt, Clarence F., to United States of America, Navy. Pulsed field system for detecting the presence of a target in a subsurface environment. 5,025,218, Cl. 324-334.000.
- Ramtron Corporation: *See—*
  - Rohrer, George A.; and McMillin, Larry D., 5,024,964, Cl 437-47.000.
- Randall, Joseph G., to North East Form Engineering, Inc. Cutting apparatus. 5,024,563, Cl. 408-1.00R.
- Randolph, John D.: *See—*
  - Jubin, Robert T.; and Randolph, John D., 5,024,647, Cl. 494-37.000.
- Rankin, Richard A.: *See—*
  - Filby, Evan E.; and Rankin, Richard A., 5,025,391, Cl. 364-513.000.
- Rao, KSP Siva Bhushana; Dejonghe, Jean-Paul; Collard, Marie-Paule; and Trouet, Andre, to Ire-Celltarg S.A. Conjugates of a vinca derivative carrying a detergent chain in the C-3 position. 5,024,835, Cl. 424-85.910.
- Rapoport, Henry; and Sauerberg, Per, to University of California, Regents of the. Cyclic carbamate analogues of (+)-pilocarpine. 5,025,027, Cl. 514-376.000.
- Raschig AG: *See—*
  - Clauss, Wolfgang; Kurze, Werner; Leifeld, Ferdinand; and Wassenberg, Willy, 5,024,736, Cl. 204-49.000.
- Rasilewicz, Casimir E., to Nestec S.A. Liquid coffee whitener. 5,024,849, Cl. 426-656.000.
- Ratanagsu, Srinkarn. Toilet flapper valve control apparatus. 5,023,960, Cl. 4-393.000.
- Rausch, Werner, to Metallgesellschaft Aktiengesellschaft. Process of decreasing the incrustation in phosphating plants. 5,024,707, Cl. 148-253.000.
- Rawls, H. Ralph: *See—*
  - Smid, Johannes; Cabasso, Israel; Obligin, Alan; and Rawls, H. Ralph, 5,024,232, Cl. 128-654.000.
- Raychem Corporation: *See—*
  - van Konyenburg, Peter H.; and Au, Andrew, 5,025,131, Cl. 392-451.000.
- Raytheon Company: *See—*
  - Tajima, Yusuke; and Gels, Robert G., 5,025,225, Cl. 330-124.00D.
  - Wilson, David T.; and Tancrell, Roger H., 5,024,872, Cl. 428-212.000.
- Razauskas, Anthony F.; and Duncan, Marlie A., to Ward Machinery Company, The. Locating flat spots on rubber wipe rolls. 5,024,081, Cl. 73-104.000.
- RCA Licensing Corporation: *See—*
  - Canfield, Barth A., 5,025,496, Cl. 358-153.000.
  - Isnardi, Michael A., 5,025,309, Cl. 358-12.000.
- Reche, John J. Hybrid circuit structure fabrication methods using high energy electron beam curing. 5,024,969, Cl. 437-173.000.
- Redding, John W.; and Zelinka, Robert F., to Perkins Manufacturing Company. Lifting device. 5,024,573, Cl. 414-408.000.
- Redicon Corporation: *See—*
  - Bulso, Joseph D., Jr.; and McClung, James A., 5,024,077, Cl. 72-336.000.
- Redmon, Gerald W.; and Redmon, Tina L. Improved spray apparatus for concrete finishing machines. 5,024,384, Cl. 239-289.000.
- Redmon, Tina L.: *See—*
  - Redmon, Gerald W.; and Redmon, Tina L., 5,024,384, Cl. 239-289.000.
- Rees, Theodore D.: *See—*
  - Feinberg, Howard A.; and Rees, Theodore D., 5,025,333, Cl. 360-85.000.
- Reeves, Malcolm R., to Westinghouse Brake and Signal Holdings Limited. Current monitoring. 5,025,195, Cl. 315-136.000.
- Reichel, Gunter. Shower unit panel. 5,023,965, Cl. 4-607.000.
- Reichel, William L.: *See—*
  - Smith, Tempel, Jr.; Miletic, Veselko; Bayer, George; Coutre, Christopher A.; Reichel, William L.; and Chronowski, Mirek J., 5,025,223, Cl. 324-662.000.
- Reichert, Alberto J.: *See—*
  - Reichert, Ricardo H.; and Reichert, Alberto J., 5,024,358, Cl. 224-35.000.
- Reichert, Ricardo H.; and Reichert, Alberto J., to Schlumberger Industries Limited. Thermal-insulated fluid receptacle removably supported on bicycle frame. 5,024,358, Cl. 224-35.000.
- Reiff, Helmut; and Lorenz, Otto, to Bayer Aktiengesellschaft. Process for the production of aqueous polyurethane dispersions. 5,025,064, Cl. 524-591.000.
- Reillaudoux, Jean-Claude: *See—*
  - Geisen, Pierre; and Reillaudoux, Jean-Claude, 5,024,886, Cl. 428-332.000.
- Reilly, Joseph W. Method and apparatus for protection against coastal erosion. 5,024,560, Cl. 405-303.000.
- Reinholz, Erhard; Friebe, Walter-Gunar; Kampe, Wolfgang; Mertin, Jurgen; and Wilhelms, Otto-Henning, to Boehringer Mannheim GmbH. Tetrazolyl substituted thioethers, pharmaceutical compositions and anti-allergic use thereof. 5,025,028, Cl. 514-381.000.
- Reinicke, Robert H.; Mohtar, Rafic; and Nelson, Richard O., to Eaton Corporation. Fluid flow rate control device. 5,024,418, Cl. 251-129.110.
- Reinoehl, Robert F., to Aquaria, Inc. Bubble trap for epoxy sealant in a submersible electric motor. 5,025,185, Cl. 310-87.000.
- Reisman, Arnold; and Turlik, Iwona, to MCNC; and Northern Telecom Limited. High density semiconductor structure and method of making the same. 5,025,304, Cl. 357-71.000.

VOL 1127
ISS 3
JE 18
1991
UMI

- Relenyi, Attila G., and Gartner, Charles D., to Dow Chemical Company, The. Process for the preparation of antimicrobial formulations of 2-(alkylthio)ethanamine hydrohalides. 5,025,038, Cl 514-665.000.
- Renaud, Alain. *See—*
  - Naylor, Robert J; Naylor, Brenda; Renaud, Alain; and Langlois, Michel, 5,025,022, Cl. 514-305.000.
- Renaudin, Robert; and Tchatalian, Bruno. Emergency device for the control of the displacement for a carrier conveying a nuclear fuel assembly. 5,024,803, Cl. 376-270.000.
- Renault, Christian: *See—*
  - Barreau, Michel. Hardy, Jean-Claude; Martin, Jean-Paul, and Renault, Christian, 5,025,013, Cl. 514-253.000.
- Rene Tourolle et Fils (Societe A Responsabilite Limitee): *See—*
  - Simonetto, Charles M., 5,024,075, Cl 72-38.000.
- Renishaw plc: *See—*
  - Darlington, Alan D., and Waggitt, Kevin P., 5,025,362, Cl. 364-167.010.
- Repine, Joseph T.: *See—*
  - Doherty, Annette M.; Hudspeth, James P.; Kaltenbronn, James S.; Repine, Joseph T.; Roark, William H.; Sircar, Ila. and Tinney, Francis J., 5,024,994, Cl. 514-18.000.
- Research Foundation of State University of NY, The· *See—*
  - Smid, Johannes; Cabasso, Israel; Obligin, Alan; and Rawls, H Ralph, 5,024,232, Cl. 128-654.000.
- Rexnord Corporation: *See—*
  - Hawley, Erwin T.; and Kladden, Gregory S., 5,024,450, Cl 277-37.000.
- Rhodes, David B.: *See—*
  - Pettigrew, Michel J.; Rhodes, David B., Lux, Eric G; and Mason, Victor A., 5,024,090, Cl. 73-572.000.
- Rhodes, Melvin H., to United States of America, Air Force. Incremental integrator circuit. 5,025,224, Cl. 328-127.000.
- Rhone-Poulenc Chimie: *See—*
  - Canivenc, Edith; Forestier, Serge; Gay, Michel, Lang, Gerard, and Richard, Herve, 5,025,053, Cl. 524-265.000.
- Rhone-Poulenc Sante: *See—*
  - Barreau, Michel; Hardy, Jean-Claude; Martin, Jean-Paul; and Renault, Christian, 5,025,013, Cl 514-253.000.
- Richard, Herve: *See—*
  - Canivenc, Edith; Forestier, Serge; Gay, Michel; Lang, Gerard; and Richard, Herve, 5,025,053, Cl. 524-265.000.
- Richard Wolf GmbH. *See—*
  - Bonnet, Ludwig; and Wetterauer, Ulrich, 5,024,212, Cl. 128-4.000.
- Richards, David W.; and Murphy, Kent A., to Center for Innovative Technology; Virginia Commonwealth University; and Virginia Polytechnic Institute and State University. Ophthalmic contact lens with internal fixation light for examination of the optic nerve. 5,024,518, Cl. 351-219.000.
- Richenberg, Carl B.: *See—*
  - Lougheed, Edgar P.; Richenberg, Carl B.; and Chen, Stephen P., 5,024,929, Cl. 430-546.000.
- Ricles, Thomas D., to Dresser Industries, Inc. Running tool for use in well bores. 5,024,277, Cl. 166-381.000.
- Ricoh Company, Ltd.: *See—*
  - Emoto, Masami, 5,025,438, Cl. 369-112.000.
  - Ilyama, Kiyotaka; Hayakawa, Kunio; Nakata, Masahiro; Kodera, Kaoru; and Miyazaki, Osamu, 5,024,699, Cl. 106-21.000.
  - Kanno, Tetsuo; Kotake, Yasushi; and Inada, Hitoshi, 5,025,339, Cl. 360-99.060.
  - Ohuchi, Satoshi, 5,025,481, Cl. 382-53.000.
  - Oikawa, Tomohiro, 5,024,496, Cl. 350-6.800.
  - Seki, Nobuyoshi; Morii, Nobuyuki; Sugiyama, Yoshihide; Komada, Takashi; Hosoi, Masatoshi; Hujiwara, Atuhisa; Ichinose, Tsutomu; Mori, Goro; Kikuchi, Toshiyuki; and Minato, Masahiro, 5,024,430, Cl. 270-53.000.
  - Yamada, Katsuyuki; Ide, Yukio; Harigaya, Makoto; and Iwasaki, Hiroko, 5,024,927, Cl. 430-495.000.
- Rideout, William C.: *See—*
  - Boudreau, Robert A.; and Rideout, William C., 5,024,504, Cl. 350-96.180.
- Rider, Frederick H.: *See—*
  - Bennett, Glenn E.; Lucius, John E.; Polk, Roger N.; Rider, Frederick H.; and Szczesny, David S., 5,024,627, Cl. 439-631.000.
- Riedinger, Thomas R.; and White, Thomas H., to Boeing Company, The. Office module for passenger aircraft. 5,024,398, Cl 244-118.500.
- Riel, Leslie L., to Riel, Leslie L.; van der Tak, Hendrik; Ghafoerkhan, Shafiq M; and Power Pack International B.V i.o. Container for pulverized and granular products, such as medicines. 5,024,373, Cl. 229-68.00R.
- Riemer, Horst H., to Mendle Limited. Plastics bottle. 5,024,339, Cl. 215-1.00C.
- Riker, Paul J.: *See—*
  - Christenson, Philip A.; Eilerman, Robert G.; Riker, Paul J.; and Drake, Brian J., 5,024,847, Cl. 426-535.000.
- Riley, David: *See—*
  - Stackpool, Michael; and Riley, David, 5,024,675, Cl. 29-623.100.
- Ringe, Mitchell L., to General Mills, Inc. R-T-E cereal with soluble fibers. 5,024,996, Cl. 514-54.000.
- Riou, Jacques: *See—*
  - Lecourt, Guy; and Riou, Jacques, 5,024,712, Cl. 156-184.000.
- Ripley, Donald W. Real estate sign fastener. 5,024,410, Cl. 248-302.000.
- Rischke, Jorg W.; Loermans, Peter J. G.; and Huvenaars, Peter J. M., to MECO Equipment Engineers B.V. Apparatus for treating strip-shaped elements. 5,024,745, Cl. 204-198.000.
- Ritala, Risto, Laakso, Mikko; and Koponen, Jari, to Kagaani Elektroniikka OY. Procedure and means for measuring paper formation 5,025,154, Cl. 250-308.000.
- Ritchie, Herbert L., Jr.: *See—*
  - Mordue, George S., and Ritchie, Herbert L, Jr., 5,025,198, Cl. 318-434.000.
- Riter Machine Works, Ltd.· *See—*
  - Lang, Helfried, 5,023,977, Cl. 19-115.00R
- RJS Corporation: *See—*
  - Slezak, Raymond J., 5,024,477, Cl 294-81.200.
- Roark, William H.: *See—*
  - Doherty, Annette M., Hudspeth, James P.; Kaltenbronn, James S.; Repine, Joseph T.; Roark, William H, Sircar, Ila; and Tinney, Francis J., 5,024,994, Cl. 514-18.000.
- Robb, Stephen P.: *See—*
  - Fay, Gary V.; Robb, Stephen P.; Sutor, Judith L.; and Terry, Lewis E., 5,025,298, Cl. 357-41.000.
- Robbins, Jack; and Nagel, Dietmar. Sound producing remote control toy vehicle. 5,024,626, Cl. 446-409.000.
- Robbins, William D. Toy bat assembly. 5,024,435, Cl. 273-26.00B.
- Robert Bosch GmbH: *See—*
  - Dobler, Klaus; and Hachtel, Hansjorg, 5,025,213, Cl. 324-207.120.
  - Doege, Mathias; and Frey, Wunibald, 5,025,136, Cl. 219-508.000.
  - Dreier, Friedrich; and Fischer, Ernst, 5,024,540, Cl. 384-203.000.
  - Karnopp, Dean, 5,024,302, Cl 188-299.000.
- Roberts, Joni A.: *See—*
  - Bleich, Larry L.; Roberts, Joni A., and Zerbs, Stephen T., 5,024,864, Cl. 427-424.000.
- Robertshaw Controls Company, Inc.: *See—*
  - Holtkamp, Calvin J.; Hetrick, George L.; and Warren, Richard. 5,025,242, Cl. 337-309.000.
- Robertson, Bengt; and Curstedt, Tore, to Chiesi Farmaceutici S.p.A Natural pulmonary surfactant, method of preparation and pharamceutical compositions. 5,024,995, Cl. 514-21.000.
- Robinbrosse, Christian; Naslain, Roger; Minet, Jacky; and Langlais, Francis, to Societe Europeenne de Propulsion. Composite material with zirconia matrix. 5,024,878, Cl. 428-297.000.
- Robine, Alain: *See—*
  - Cameron, Charles; Mimoun, Hubert; Robine, Alain; Bonnaudet, Serge; Chaumette, Patrick; and Dang Vu, Quang, 5,025,108, Cl. 585-500.000.
- Robinson, Leslie K. Relating to ram units in transmissions of the toroidal race, rolling traction type. 5,024,635, Cl. 475-115.000.
- Robison, Gary L., to Eastman Kodak Company. Magnetic recording on film of scene parameters and photofinishing process for use therewith. 5,025,283, Cl. 355-40.000.
- Robotic Originals, Inc.: *See—*
  - Anderson, Roger, 5,024,575, Cl. 414-627.000.
- Rockwell International Corporation: *See—*
  - Soclof, Sidney I., 5,025,302, Cl. 357-55.000.
  - Yeh, Pochi A.; and Hong, John H., 5,025,488, Cl. 455-619.000.
- Rocky Mountain Research, Inc.: *See—*
  - Peters, Jeffrey L.; and Orth, Jeffrey L., 5,024,668, Cl. 606-194.000.
- Rodite, Robert R.: *See—*
  - Dinan, Raymond F.; Fallon, Hugh C.; Malin, Jerald R.; Rodite, Robert R.; Rohe, Clair F.; and Rohrer, Gene D., 5,025,483, Cl 382-58.000.
- Rodriguez, Alan. Post-tensioning anchor. 5,024,032, Cl. 52-223 00L.
- Rodriguez, Herman R.: *See—*
  - Bhagwat, Shripad S.; Main, Alan J.; and Rodriguez, Herman R., 5,025,025, Cl. 514-340.000.
- Rodriguez, Norton. Vest or like article of clothing for carrying rechargeable batteries. 5,024,360, Cl. 224-215.000.
- Rodriguez, Susan B.: *See—*
  - Thornton, Roy J.; and Rodriguez, Susan B., 5,024,845, Cl. 426-15.000.
- Roessler, Dennis E., to Halliburton Logging Services, Inc. Drill pipe downhole unthreading apparatus. 5,024,272, Cl. 166-117.700.
- Rogers Corporation: *See—*
  - Arthur, David J.; and Swei, Gwo S., 5,024,871, Cl. 428-209.000.
- Rogers, Howard H.; and Herrin, Jerry J., to Hughes Aircraft Company One-time-close relay useful in spacecraft power systems. 5,025,119, Cl. 200-262.000.
- Rogowski, Dirk: *See—*
  - Friederich, Kilian; and Rogowski, Dirk, 5,024,977, Cl. 501-91.000.
- Rohde & Schwarz GmbH & Co KG: *See—*
  - Danzeisen, Klaus, 5,025,208, Cl. 324-77.00R.
- Rohe, Clair F.: *See—*
  - Dinan, Raymond F.; Fallon, Hugh C.; Malin, Jerald R.; Rodite, Robert R.; Rohe, Clair F.; and Rohrer, Gene D., 5,025,483, Cl 382-58.000.
- Rohm GmbH Chemische Fabrik: *See—*
  - Eich, Manfred; and Wendorff, Joachim, 5,024,784, Cl. 252-299.010.
- Rohrbaugh, George W. Shock wave scoring apparatus employing curved rod sensors. 5,025,424, Cl. 367-127.000.
- Rohrer, Gene D.: *See—*
  - Dinan, Raymond F.; Fallon, Hugh C.; Malin, Jerald R.; Rodite, Robert R.; Rohe, Clair F.; and Rohrer, Gene D., 5,025,483, Cl. 382-58.000.
- Rohrer, George A.; and McMillin, Larry D., to Ramtron Corporation. Method of making ferroelectric memory devices. 5,024,964, Cl. 437-47.000.
- Roizen, Michael; Turcotte, William E., II; and Pfisterer, Richard E., to ARCH Development Corp. Portable system for choosing pre-operative patient test. 5,025,374, Cl. 364-413.020.

- Rolls-Royce plc: *See—*
  - Olive, Clive E., 5,024,580, Cl. 415-150.000.
- Roman, Lorand J. Stamp and envelope moistener. 5,024,180, Cl. 118-244.000.
- Romero, Ervin G.: *See—*
  - Pease, George E., Jr.; Romero, Ervin G.; and Glasenapp, Rudi K. H., 5,024,491, Cl. 303-93.000.
- Romero, Hugo; and Anderson, Robert, to Medical Laboratory Automation, Inc. Method and apparatus for performing hydrostatic correction in a pipette. 5,024,109, Cl. 73-864.160.
- Roobeek, Cornelis F.: *See—*
  - van Leeuwen, Petrus W. N. M.; and Roobeek, Cornelis F., 5,025,091, Cl. 528-392.000.
- Roovers, Wilhemus M. M.: *See—*
  - Hamersma, Wilhelmus J. L. A.; Kempers, Torben P.; and Roovers, Wilhemus M. M., 5,025,055, Cl. 524-269.000.
- Rosal, Enrique R.: *See—*
  - Wilson, John F.; Rosal, Enrique R.; and Bucher, George D., 5,024,574, Cl. 414-416.000.
- Rose, Robert C.: *See—*
  - Seiler, Larry D.; Pappas, James L.; and Rose, Robert C., 5,025,249, Cl. 340-721.000.
- Rose, William: *See—*
  - Pape, Robert; Rose, William; Burgel, Frank; and Adams, Chip, 5,023,996, Cl. 30-144.000.
- Rosenau, Mark A.: *See—*
  - Johary, Arun; and Rosenau, Mark A., 5,025,315, Cl. 358-140.000.
- Rosenbaum, Nolan G.: *See—*
  - Haines, John G.; Rosenbaum, Nolan G.; Pion, Albert L.; Lecarpentier, Marc; Henriot, Christophe; and Abumehdi, Cyrus, 5,025,383, Cl. 364-464.030.
- Rosenbluh, Michael: *See—*
  - Freund, Isaac; and Rosenbluh, Michael, 5,024,528, Cl. 356-356.000.
- Rosenstein, Alexander D. Method and apparatus for determining osseous implant fixation integrity. 5,024,239, Cl. 128-774.000.
- Roser, Georges, to Sotralentz S. A. Container for storing and transporting a liquid with a deformable liner which assists drainage. 5,024,346, Cl. 220-401.000.
- Ross, Jeffrey A., to Warner & Swasey Company, The. Circuit and process for converting a half bridge transducer output signal to an LVDT transducer output signal. 5,025,214, Cl. 324-207.190.
- Ross, Robert J.: *See—*
  - Pellerin, Roy F.; and Ross, Robert J., 5,024,091, Cl. 73-597.000.
- Rothstein, David M.; Love, Susan F.; and Baum, Ellen Z., to American Cyanamid Company. Genetic system for micromonospora. 5,024,948, Cl. 435-252.100.
- Rottmann, Dieter: *See—*
  - Klank, Otto; and Rottmann, Dieter, 5,025,406, Cl. 364-724.190.
- Rotzin, Stephen A. Aerodynamic bicycle helmet. 5,023,958, Cl. 2-411.000.
- Rousseau, Claude. Golfcourse simulator device. 5,024,441, Cl. 273-176.00R.
- Roussel Uclaf: *See—*
  - Demoute, Jean-Pierre; Touyer, Gaetan; and Mouren, Michel, 5,024,828, Cl. 424-1.100.
- Rubbermaid Incorporated: *See—*
  - Kahl, W. Henry; Price, David E.; and Tsao, Nai-Cheng, 5,024,471, Cl. 292-97.000.
- Rudy, Randy T.: *See—*
  - Groenendaal, John C., Jr.; and Rudy, Randy T., 5,024,579, Cl. 415-108.000.
- Rusiniak, Richard J.: *See—*
  - Cheadle, Brian E.; and Rusiniak, Richard J., 5,024,268, Cl. 165-134.100.
- Rusken Machine & Tool Service: *See—*
  - Lloyd, Russell M, 5,024,073, Cl. 70-491.000.
- Russell, Donald L., to B. F. Goodrich Company, The. Torque transmitting beam for wheel having brake torque drives. 5,024,297, Cl. 188-18.00A.
- Rust, Mark H.; and Kramer, Brian J. Spinner bait lure with rattle pod 5,024,019, Cl. 43-42.310.
- Rutschle, Eugen: *See—*
  - Winkler, Hans-Henning; and Rutschle, Eugen, 5,023,983, Cl. 29-27.00R.
- Ryan, Thomas J., to Alusuisse-Lonza Services Ltd. Apparatus and method for degassing molten metal. 5,024,696, Cl. 75-708.000.
- Ryba, Jiri: *See—*
  - Simecek, Cyril; and Ryba, Jiri, 5,024,233, Cl. 128-659.000.
- Ryobi Motor Products Corp.: *See—*
  - Looper, Timothy J.; and Sistare, James R., 5,023,999, Cl. 30-390.000.
- Ryu, Yasunori: *See—*
  - Tanaka, Nobuhiro; Hirata, Eiji; Moriguchi, Hideyuki; Azekura, Ko; Tsubone, Akira; and Ryu, Yasunori, 5,024,572, Cl 414-276.000.
- S&C Electric Company: *See—*
  - Fanta, Thomas O.; and Chabala Leonard V., 5,025,171, Cl 307-150.000.
- Sacks, William: *See—*
  - Mason, Charles D.; Sacks, William; Engelmann, Theodore R.; and Verma, Satyajit, 5,024,897, Cl. 428-474.400.
- Saeki, Kiyoshi; Ohtsuki, Toshinori; and Ueno, Kazuo, to Matsushita Electric Industrial Co., Ltd. Color electrostatic recording apparatus. 5,025,269, Cl. 346-108.000.
- Sagami Chemical Research Center: *See—*
  - Nagato, Shoin; Taguchi, Ryusuke; Hirai, Kenji; Hirose, Hiroaki; and Yokota, Masahiro, 5,024,692, Cl. 71-86.000.
- Saijo, Hiroyuki: *See—*
  - Deguchi, Katsuhiko; Saito, Kozo; Saijo, Hiroyuki; and Tosaka, Masaki, 5,025,069, Cl. 252-174.170.
- Sainburg, Frank P.: *See—*
  - Eckerle, Douglas W.; and Sainburg, Frank P., 5,024,611, Cl. 446-268.000.
- Saito, Itaru: *See—*
  - Matsubara, Ken; Saito, Itaru; Kitano, Hirohisa; Shingaki, Kouichi; and Masuda, Tomohiko, 5,024,511, Cl. 350-356.000.
- Saito, Kouichi: *See—*
  - Kubo, Nami; Yoshioka, Toshio; Saito, Kouichi; and Tohyama, Syunroku, 5,024,767, Cl. 210-682.000.
- Saito, Kozo: *See—*
  - Deguchi, Katsuhiko; Saito, Kozo; Saijo, Hiroyuki; and Tosaka, Masaki, 5,025,069, Cl. 252-174.170.
- Saito, Shinji: *See—*
  - Terada, Masayuki; Saito, Shinji; and Miura, Asahiko, 5,024,908, Cl. 429-245.000.
- Saito, Susumu: *See—*
  - Arimoto, Akira; Saito, Susumu; Tsunoda, Yoshito; Moriyama, Shigeo; and Mochizuki, Takeshi, 5,025,268, Cl. 346-108.000.
- Saito, Yasuo; Fujimoto, Seiji; Nobuta, Yasuo; and Yamazaki, Masahiko, to Kabushiki Kaisha Toshiba. X-ray detector having function of compensating for sensitivity of scintillator. 5,025,462, Cl. 378-19.000.
- Saito, Yasuo; Yahata, Mitsuru; Honjo, Kouji; and Matsubayashi, Takayuki, to Kabushiki Kaisha Toshiba. X-ray CT scanner device. 5,025,463, Cl. 378-19.000.
- Saitoh, Tadashi: *See—*
  - Uematsu, Tsuyoshi; and Saitoh, Tadashi, 5,024,953, Cl. 437-2.000.
- Saitoh, Takashi, to Nagano Technical Service Co., Ltd.; and Technical Products Co., Ltd. Method and apparatus for storing flat-folded cases in a pile, and for opening and sealing said cases. 5,024,640, Cl. 493-127.000.
- Sakai, Akiyoshi: *See—*
  - Yonezawa, Yasuo; Ohnishi, Toshiya; Okumura, Shin-ichi; Sakai, Akiyoshi; Nakano, Hiroki; Matsushita, Masao; Morikawa, Atsushi; and Yoshihara, Motoshi, 5,024,064, Cl. 62-106.000.
- Sakai, Hideko: *See—*
  - Kishiro, Osamu; Kamata, Hiroshi; and Sakai, Hideko, 5,025,082, Cl. 528-190.000.
- Sakai, Kazuhiro: *See—*
  - Tsunashima, Makoto; Uchida, Hiroto; Sakai, Kazuhiro; and Miyauchi, Masato, 5,024,991, Cl. 505-1.000.
- Sakai, Yoshihisa: *See—*
  - Sudo, Shoichi; Sakai, Yoshihisa; Yasaka, Hiroshi; Ikegami, Tetsuhiko; Yoshikuni, Yuzo; Yokohama, Itaru; and Kubodera, Kenichi, 5,025,448, Cl. 372-32.000.
- Sakakibara, Shiro; Hasebe, Masahiro; and Hattori, Masashi, to Aisin AW Co., Ltd. Actuator for a frictional engaging device. 5,024,638, Cl. 475-210.000.
- Sakashita, Mitsuaki: *See—*
  - Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kirahara, Masaki, 5,024,999, Cl. 514-63.000.
- Sakata, Haruyasu: *See—*
  - Tateishi, Kiyoshi; Sakata, Haruyasu; Tawaragi, Yuji; Suzuki, Masanori; and Ohie, Takayuki, 5,025,434, Cl 369-44.360.
- Sakayori, Hiroyuki: *See—*
  - Watanabe, Toshio; Sato, Masahiko; Osabe, Akio; Sakayori, Hiroyuki; and Mase, Akira, 5,024,255, Cl. 141-11.000.
- Sakurai, Einosuke: *See—*
  - Miura, Katsutoshi; Koyama, Hiroyasu; Sugai, Toshiji; Yamada, Hiroaki; and Sakurai, Einosuke, 5,025,012, Cl. 514-252.000.
- Sakurai, Toshiharu: *See—*
  - Shindo, Masamichi; Sakurai, Toshiharu; Taguchi, Hideo; and Izawa, Nobu, 5,025,347, Cl. 361-386.000.
- Salaun, Jacques: *See—*
  - Savin, Antoine; and Salaun, Jacques, 5,024,604, Cl. 439-345.000.
- Salemink, Johannes H. A. G.: *See—*
  - Hulsman, Severien; and Salemink, Johannes H A G., 5,024,241, Cl. 131-84.200.
- Sales, Veronique: *See—*
  - Patoiseau, Jean F.; Autin, Jean-Marie; Cousse, Henri; Sales, Veronique; Tisne-Versailles, Jacky; and Bali, Jean-Pierre, 5,025,015, Cl. 514-274.000.
- Salo, Jukka; and Lehtonen, Pentti, to Valmet Paper Machinery Inc. Coated roll for a paper making machine. 5,023,985, Cl. 29-132.000.
- Salomon, Mary F., to Lubrizol Corporation, The. Nitrogen containing anti-oxidant compositions. 5,024,774, Cl. 252-47.000.
- Salomon S. A.: *See—*
  - DuFour, Pierre, 5,024,007, Cl. 36-127.000.
- Saluja, Raja; and Nagare, Arthur T., to American Sterilizer Company Counterbalanced arm for a lighthead. 5,025,359, Cl. 362-402.000.
- Salvi, Jean-Francois, to Sipel Electronics S.A. Pair of nippers. 5,023,997, Cl. 30-175.000.
- Salzmann, Thomas N.: *See—*
  - Dininno, Frank P.; and Salzmann, Thomas N., 5,025,006, Cl. 514-210.000.
  - DiNinno, Frank P.; Salzmann, Thomas N., and Greenlee, Mark L., 5,025,008, Cl. 514-210.000.
- Samsung Electron Devices Co., Ltd.: *See—*
  - Son, Wan-jae, 5,025,189, Cl. 313-414.000.
- SamSung Electronics Co., Ltd.: *See—*
  - Lee, Hyo-Sam, 5,025,308, Cl. 358-10.000.

VOL
1127
ISS
3
JE
18
1991
UMI

SamSung Semiconductor and Telecommunication Co. Ltd.: *See—*
  Kim, Heung S.; and Myung, Chan K., 5,025,180, Cl. 307-475.000.
Sanada, Masaru: *See—*
  Kitamura, Shigeharu; Nakamura, Haruhiko; and Sanada, Masaru, 5,024,314, Cl. 198-333.000.
Sanchez, Mary M. Maternity and nursing brassiere with strap variations. 5,024,628, Cl. 450-36.000.
Sandel, Dan; Horan, Robert T.; Gaba, Rodolfo; and Ramirez, Bruno J., to Devon Industries, Inc. Medical instrument holder and sharps disposal container. 5,024,326, Cl. 206-366.000.
Sanden Coporation: *See—*
  Miyazawa, Tadashi, 5,024,313, Cl. 194-217.000.
Sanders Associates, Inc.: *See—*
  Bauman, Ralph E.; and Seymour, Horace W., III, 5,024,623, Cl. 439-876.000.
Sanderson, John R.; Marquis, Edward T.; and Knifton, John F., to Texaco Chemical Company. Purification of cumene recycle streams 5,025,112, Cl. 585-852.000.
Sanderson, John R.; and Knifton, John F., to Texaco Chemical Company. Catalytic preparation of tertiary butyl alcohol from tertiary butyl hydroperoxide. 5,025,113, Cl. 568-909.800.
Sanderson, Paul H.; and Serkland, Richard C. Aircraft armament apparatus. 5,024,138, Cl. 89-37.220.
Sandler, Stanley R., to Atochem North America, Inc. 2,4-pentanedione-1-sulfonic acid and method for preparing the same. 5,025,104, Cl. 562-109.000.
Sandoz Ltd.: *See—*
  Farrar, John M.; and Graham, Mark D., 5,024,786, Cl. 252-543.000.
Sandstrom, Richard L.: *See—*
  Anderson, Stuart L.; and Sandstrom, Richard L., 5,025,445, Cl. 372-20.000.
Sanjana, Zal N.: *See—*
  Harrold, Ronald T.; and Sanjana, Zal N., 5,024,092, Cl. 73-602.000.
Sanshin Kogyo Kabushiki Kaisha: *See—*
  Kameyama, Takuma, 5,024,190, Cl. 123-196.00R
Santanam, Chandran B.; Thomas, William H.; and DeJulio, Emil R., to General Motors Corporation. External combustor for gas turbine engine. 5,024,170, Cl. 110-264.000.
Santangelo, Francesco: *See—*
  Casagrande, Cesare; Montanari, Stefania; and Santangelo, Francesco, 5,025,011, Cl. 514-234.200.
Santel, Hans-Joachim: *See—*
  Schallner, Otto; Negele, Michael; Santel, Hans-Joachim; Lurssen, Klaus; Schmidt, Robert R.; and Krauskopf, Birgit, 5,024,694, Cl. 71-95.000.
Santoh, Tsuyoshi: *See—*
  Mihara, Chieko; Santoh, Tsuyoshi; and Sugata, Hiroyuki, 5,024,917, Cl. 430-271.000.
Sanyo Electric Co., Ltd.: *See—*
  Hirono, Yutaka; Kiyama, Seiichi; and Osumi, Masato, 5,024,724, Cl. 156-643.000.
  Tsuchida, Takefumi; Yoshida, Minoru; Kodama, Yoshimi; and Moriyama, Masahiro, 5,025,332, Cl. 360-85.000.
  Tsuchida, Yasuyuki; and Nakanishi, Yuki, 5,023,973, Cl. 15-319.000.
Sariscak, Robert E.: *See—*
  Impink, Albert J., Jr.; Grobmyer, Louis R., Sariscak, Robert E.; Morita, Toshio; and Duryea, John L., 5,024,801, Cl. 376-217.000.
Sarubbi, Thomas R.: *See—*
  Blakeney, Andrew J.; Jeffries, Alfred T., III, and Sarubbi, Thomas R., 5,024,921, Cl. 430-326.000.
Sasaki, Katsumi: *See—*
  Suda, Hirohisa; Sasaki, Katsumi; and Osato, Yasukuni, 5,024,363, Cl. 225-96.005.
Sasaki, Michiaki; and Yuki, Kazuya, to Nissan Motor Co., Ltd. Jet pump structure for a fuel tank. 5,024,583, Cl. 417-198.000.
Sasaki, Shigeo: *See—*
  Okuda, Soichiro; Nakanishi, Tetsuya; Sasaki, Shigeo; and Noguchi, Kazuhiko, 5,025,167, Cl. 250-492.200.
Sasaki, Souji; Kino, Hirotoshi; Musha, Yoshinori; Kubota, Jun; and Okada, Hisao, to Hitachi, Ltd. Fan-shape scanning ultrasonic flaw detecting apparatus. 5,024,093, Cl. 73-633.000.
Sassoon, Ezra: *See—*
  Bennett, Robert B.; Hung, Vincent; and Sassoon, Ezra, 5,023,979, Cl. 24-68.00R.
Sato, Isao; Kirikami, Seiichi; Shimura, Akira; Hirose, Fumiyuki; Inose, Hiroshi; Urushidani, Haruo; and Arai, Osamu, to Hitachi, Ltd. Device for detecting combustion conditions in combustors. 5,024,055, Cl. 60-39.270.
Sato, Katsuhiro: *See—*
  Akasaki, Yutaka, Aonuma, Hidekazu; Nukada, Katsumi; Tokita, Akihiko; Suto, Hidemi; Sato, Katsuhiro; and Tanaka, Hiroyuki, 5,024,911, Cl. 430-58.000.
Sato, Kazue: *See—*
  Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.
Sato, Kazuharu: *See—*
  Takarada, Mitsuhiro; and Sato, Kazuharu, 5,025,049, Cl. 524-91.000.
Sato, Kunihito: *See—*
  Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.
Sato, Masahiko: *See—*
  Watanabe, Toshio; Sato, Masahiko; Osabe, Akio; Sakayori, Hiroyuki; and Mase, Akira, 5,024,255, Cl. 141-11.000.
Sato, Masanori: *See—*
  Ozawa, Kazuo; and Sato, Masanori, 5,024,394, Cl. 242-198.000.
Sato, Takeo: *See—*
  Aoki, Shinichiro; Sato, Takeo; Yamaguchi, Katsumasa; and Yamamoto, Masaki, 5,025,168, Cl. 250-548.000.
Sato, Yasue, to Canon Kabushiki Kaisha. Plasma processing apparatus for etching, ashing and film-formation. 5,024,716, Cl. 156-345.000.
Sato, Yoshinori; and Akamine, Hiroshi, to Ferro Corporation. Synthetic resin composition. 5,025,051, Cl. 524-99.000.
Sato, Yukou; and Kukimoto, Tsutomu, to Canon Kabushiki Kaisha Positively chargeable developer. 5,024,915, Cl. 430-110.000.
Satoh, Katsuaki: *See—*
  Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.
Sauerberg, Per: *See—*
  Rapoport, Henry; and Sauerberg, Per, 5,025,027, Cl. 514-376.000.
Savin, Antoine; and Salaun, Jacques, to Carrier Kheops Bac. No-load breakable electrical contact especially for connected appliances or vehicles. 5,024,604, Cl. 439-345.000.
Savin Corporation: *See—*
  Landa, Benzion; Krumberg, Yakov; and Adam Yossef, 5,025,290, Cl. 355-265.000.
Sayegh, Emile G.; Vana, James G., Jr.; and Willey, Wendall D., to W. L. Gore & Associates, Inc. Insulated power cables. 5,025,115, Cl 174-117.00F.
Scally, Charles R.: *See—*
  Carr, Daniel J.; and Scally, Charles R., 5,025,265, Cl. 346-1.100.
Scata, Mario; and Passero, Adolfo, to Meccanizzazione Postale E Automazione SpA. Sorting unit for belt conveyor systems. 5,024,316, Cl. 198-369.000.
Schafer, Ralf: *See—*
  Ganser, Hans G.; Schafer, Ralf; and Stormberg, Hans P., 5,025,197, Cl. 315-172.000.
Schaffer, Leslie E.: *See—*
  Garg, Diwakar; Dyer, Paul N.; Schaffer, Leslie E.; Wrecsics, Ernest L.; Dimos, Duane; and Mueller, Carl F., 5,024,901, Cl. 428-627.000.
Schallner, Otto; Negele, Michael; Santel, Hans-Joachim; Lurssen, Klaus; Schmidt, Robert R.; and Krauskopf, Birgit, to Bayer Aktiengesellschaft. Herbicidal N-aryl nitrogen heterocycles having fluorine-containing substituents. 5,024,694, Cl. 71-95.000.
Schaupert, Kurt, to Schott Glaswerke. Gas cooking appliance with at least one radiant gas burner arranged underneath a glass ceramic plate, as well as process for reducing the heating-up time of such a gas cooking appliance. 5,024,209, Cl. 126-39.00H.
Schenk, Donald E.; DeHoff, Edward J.; and Shaw, Schuyler S., to General Motors Corporation. Apparatus and method of automotive brake with booster piston. 5,024,298, Cl. 188-72.200.
Schenk, Donald E.: *See—*
  Miller, Jon E.; and Schenk, Donald E., 5,024,300, Cl. 188-264.0CC.
  Shaw, Schuyler S.; Hallinan, Linda L.; Hammersmith, Robert J.; Schenk, Donald E.; DeHoff, Edward J.; and Kade, Alexander, 5,024,299, Cl. 188-156.000.
Schenkel, Howard M., to Sensormatic Electronics Corporation. EAS tag with motion detection facility. 5,025,246, Cl. 340-572.000.
Schering Agrochemicals Ltd.: *See—*
  Gates, Peter S.; and Jones, Graham P., 5,024,693, Cl. 71-92.000.
Schering Aktiengesellschaft: *See—*
  Hubel, Egon, 5,024,732, Cl. 204-1.110.
Schering Corporation: *See—*
  Horan, Ann C, 5,024,950, Cl. 435-825.000.
Schettino, Raymond L.: *See—*
  Goldstone, Andrew C.; and Schettino, Raymond L., 5,024,228, Cl. 128-642.000.
Schickaneder, Helmut. *See—*
  Ahrens, Kurt H.; Schickaneder, Helmut; Engler, Heidrun; and Szeleny, Istvan, 5,025,016, Cl. 514-274.000.
Schifter, Stephan C.: *See—*
  DiLullo, Joseph V.; Schifter, Stephan C.; Negin, Michael; and Paist, Kenneth W., 5,025,253, Cl. 340-825.060.
Schlaginhaufen, Arthur, to Arthur Schlaginhaufen Ing. Filtering apparatus. 5,024,763, Cl. 210-333.010.
Schlumberger Industries Limited: *See—*
  Dames, Andrew N., 5,024,104, Cl. 73-861.370.
  Reichert, Ricardo H.; and Reichert, Alberto J., 5,024,358, Cl. 224-35.000.
Schlumberger Technology Corporation: *See—*
  Melcher, Charles L., 5,025,151, Cl. 250-269.000.
  Petitjean, Luc; and Valdois, Michel, 5,024,098, Cl. 73-729.000.
Schmid, Eckhardt: *See—*
  Bauer, Kurt; and Schmid, Eckhardt, 5,023,972, Cl. 15-250.420.
Schmid, Walter, to ARBO Medizin-Technologie GmbH. Bioelectrical electrode. 5,024,227, Cl. 128-640.000.
Schmidt, Michael R., to General Motors Corporation. Hydromechanical transmission with adjunct flywheel. 5,024,633, Cl. 475-72.000.
Schmidt, Oskar; and Grunner, Erich, to Lim Kunststoff Technologic Gesellschaft m.b.H. Tire-making method. 5,024,800, Cl. 264-502.000.
Schmidt, Robert R.: *See—*
  Schallner, Otto; Negele, Michael; Santel, Hans-Joachim; Lurssen, Klaus; Schmidt, Robert R.; and Krauskopf, Birgit, 5,024,694, Cl. 71-95.000.

Schniederjan, Reinhold, to Hydromatik GmbH. Swashplate type hydraulic axial piston machine having a tracking device for the cage of the segmental rolling contact bearing of the swashplate. 5,024,143, Cl. 92-12.200.
Schoen, Klaus-Peter: *See—*
  Urban, Rudolf; Fritsch, Josef; and Schoen, Klaus-Peter, 5,024,041, Cl. 53-449.000.
Schoeneberger, Ernest A.: *See—*
  Glass, Emmett F.; Schoeneberger, Ernest A.; and Makofka, Stanley J., 5,024,051, Cl. 56-297.000.
Schofield, Harold D.; and Caron, Paul R., to DataCard Corporation. Thermal print head termperature control. 5,025,267, Cl. 346-1.100.
Scholkens, Bernward: *See—*
  Oekonomopulos, Raymond; Henning, Rainer; Lerch, Ulrich, Scholkens, Bernward; and Linz, Wolfgang, 5,025,010, Cl. 514-224.200.
Schoppe, Dwaine W.: *See—*
  Claus, Kenneth G.; Schoppe, Dwaine W.; and Earlam, Matthew R., 5,024,737, Cl. 204-71.000.
Schorman, Eric R.: *See—*
  Lynk, Charles N; and Schorman, Eric R., 5,025,442, Cl. 370-29.000.
Schott Glaswerke: *See—*
  Schaupert, Kurt, 5,024,209, Cl. 126-39.00H.
Schrader, William A.: *See—*
  Phebus, Dan E.; Schrader, William A.; and Summers, Russell E., Jr., 5,024,636, Cl. 475-141.000.
Schrecongost, Ray B. Luggage cart. 5,024,455, Cl. 280-37.000.
Schroeder, Jon M. Fuel assisted electromagnetic launcher. 5,024,137, Cl. 89-8.000.
Schrors, Gunter: *See—*
  Brendel, Berhard; and Schrors, Gunter, 5,024,150, Cl. 100-35.000.
Schubert, Erdmann F.: *See—*
  Kopf, Rose F.; Kuo, J. M.; Luftman, Henry S.; and Schubert, Erdmann F., 5,024,967, Cl. 437-95.000.
Schubert, Peter: *See—*
  Koberstein, Edgar; Engler, Bernd; Domesle, Rainer; and Schuhert, Peter, 5,024,985, Cl. 502-304.000.
Schultze, Wolfgang: *See—*
  Ley, Gregor; Schultze, Wolfgang; Vinke, Johannes; and Wistuba, Eckehardt, 5,025,062, Cl. 524-556.000.
Schumacher, David B.; and Bakowski, Steven J., to Snyder General Corporation. Furnace protective device. 5,024,595, Cl. 431-18.000.
Schumacher, Elaine F.: *See—*
  Zupancic, Joseph J.; Swedo, Raymond J.; Jamieson, Donald R.; Schumacher, Elaine F.; and Buehler, Allyson J., 5,025,079, Cl. 528-170.000.
Schwab, Carl M., Jr., to Otis Engineering Corp. Method and apparatus for enhanced oil recovery. 5,024,274, Cl. 166-303.000.
Schwartz, David J., to David Schwartz Enterprises, Inc. Computer system. 5,025,369, Cl. 364-200.000.
Schwartz, Russell J.; and Gregorio, Manuel Z., to Sun Chemical Corporation. Monoazo pigment compositions. 5,024,698, Cl. 106-20.000.
Schwartzbach, Bjarne, to U.S. Philips Corp. Temperature-controlled crystal oscillator circuit. 5,025,231, Cl. 331-116.00R.
Schwarz, Robert C., to Grumman Aerospace Corporation. Apparatus and method for shadow moire mapping. 5,025,285, Cl. 355-77.000.
Schwarze, Ralph W.; and Dickson, Thomas D., Jr. Conveyor storage apparatus. 5,024,318, Cl. 198-465.200.
Schwerdt, Hans-Werner, to Carl Freudenberg, Firma. Elastomeric sleeve spring. 5,024,425, Cl. 267-140.100.
Scientific-Atlanta, Inc.: *See—*
  Cook, James, Jr., 5,025,493, Cl. 342-374.000.
Scott, Bentley N.; and Shortes, Samuel R., to Phase Dynamics, Inc. System and method for monitoring substances and reactions. 5,025,222, Cl. 324-639.000.
Scott, Brian L.; Smith, Lloyd A.; Newell, J. Mark; Balentine, Bruce E.; and Lin, Lisan S., to Scott Instruments Corporation. Method and apparatus for extracting information-bearing portions of a signal for recognizing varying instances of similar patterns. 5,025,471, Cl. 381-43.000.
Scott Instruments Corporation: *See—*
  Scott, Brian L.; Smith, Lloyd A.; Newell, J. Mark; Balentine, Bruce E.; and Lin, Lisan S., 5,025,471, Cl. 381-43.000.
Seaford Nominees Pty. Ltd.: *See—*
  Stewart, Peter J., 5,024,005, Cl. 34-164.000.
Sealed Power Technologies, L.P.: *See—*
  Hill, Stephen H., 5,024,203, Cl. 123-573.000.
Sechi, Franco N.: *See—*
  Bujatti, Marina; and Sechi, Franco N., 5,023,994, Cl. 29-852.000.
Secura Corporation: *See—*
  DiLullo, Joseph V.; Schifter, Stephan C.; Negin, Michael; and Paist, Kenneth W., 5,025,253, Cl. 340-825.060.
Seely, Warren L.: *See—*
  Fullerton, Craig L.; and Seely, Warren L., 5,025,296, Cl. 357-23.800.
Seibu Electric & Machinery Co., Ltd.: *See—*
  Tanaka, Nobuhiro; Hirata, Eiji; Moriguchi, Hideyuki; Azekura, Ko; Tsubone, Akira; and Ryu, Yasunori, 5,024,572, Cl. 414-276.000.
Seidel, Hans: *See—*
  Mayr, Ulrich; Gauhl, Helmgard; and Seidel, Hans, 5,024,945, Cl. 435-191.000.
Seidman, Jonathan: *See—*
  Brenner, Michael B.; Strominger, Jack L.; Seidman, Jonathan; Ip, Stephen H.; and Krangel, Micahel S., 5,024,940, Cl. 435-69.100.
Seidner, Leonard. Monovision corneal contact lenses. 5,024,517, Cl. 351-161.000.
Seiko Epson Corporation: *See—*
  Mitsuishi, Akio; Takeuchi, Takashi; and Koshiishi, Osamu, 5,024,543, Cl. 400-124.000.
  Tanaka, Minoru, 5,024,542, Cl. 400-124.000.
Seiko Instruments, Inc.: *See—*
  Morita, Yoshiyuki, 5,025,410, Cl. 364-900.000.
  Tsukada, Nobuo, 5,025,186, Cl. 310-323.000.
  Umezawa, Kazuhisa, 5,025,270, Cl. 346-140.00R
Seiko Seiki Kabushiki Kaisha: *See—*
  Kihara, Hiroyuki; and Omori, Hideki, 5,024,025, Cl. 51-165.770.
Seikosha Co., Ltd.: *See—*
  Watanabe, Isato, 5,025,429, Cl. 368-238.000.
Seiler, Larry D.; Pappas, James L.; and Rose, Robert C., to Digital Equipment Corporation. Pixel lookup in multiple variably-sized hardware virtual colormaps in a computer video graphics system. 5,025,249, Cl. 340-721.000.
Seki, Masaki; Takegahara, Takashi; and Nakajima, Masatoshi, to Fanuc Ltd. Automatic programming method. 5,025,363, Cl. 364-191.000.
Seki, Nobuyoshi; Morii, Nobuyuki; Sugiyama, Yoshihide; Komada, Takashi; Hosoi, Masatoshi; Hujiwara, Atuhisa; Ichinose, Tsutomu, Mori, Goro; Kikuchi, Toshiyuki; and Minato, Masahiro, to Ricoh Company, Ltd. Paper handling apparatus. 5,024,430, Cl. 270-53.000.
Seki, Reiji: *See—*
  Ishimura, Toshihiko; Okuno, Akira; Tanii, Junichi; and Seki, Reiji, 5,025,239, Cl. 335-265.000.
Seki, Yasukazu, to Fuji Electric Co., Ltd. Conductivity modulation type MOSFET. 5,025,293, Cl. 357-23.400.
Sekine, Shuji; and Harada, Naoto, to Jidoshi Denki Kogyo K.K. Small-sized electric motor. 5,025,184, Cl. 310-71.000.
Sekiya, Hiroshi; Kurita, Toshiyuki; Nakagaki, Nobufumi; and Murata, Toshinori, to Hitachi, Ltd.; and Hitachi Video Engineering, Inc. Clock pulse generator capable of being switched to process both standard and non-standard television signals. 5,025,310, Cl. 358-19.000.
Sekiya, Yoshiki: *See—*
  Shinzawa, Motohiro; and Sekiya, Yoshiki, 5,024,194, Cl 123-269.000.
Selby, Howard W., III, to Selsys Corporation. Locking cam latch mechanism. 5,024,474, Cl. 292-252.000.
Selsys Corporation: *See—*
  Selby, Howard W., III, 5,024,474, Cl. 292-252.000.
SEM AB: *See—*
  Agren, Nils A., 5,025,498, Cl. 361-156.000.
Semiconductor Energy Laboratory Co., Ltd.: *See—*
  Watanabe, Toshio; Sato, Masahiko; Osabe, Akio; Sakayori, Hiroyuki; and Mase, Akira, 5,024,255, Cl. 141-11.000.
Semmler, Peter: *See—*
  Gast, Eduard; and Semmler, Peter, 5,024,708, Cl. 149-19.100.
Senda, Shuji: *See—*
  Omata, Tetsuo; Senda, Shuji; Tanaka, Tamaki; Kumagai, Eriko; Kajimoto, Chikara; and Nakazono, Yutaka, 5,024,832, Cl. 424-84.000.
Senoo, Atsuyoshi, to Furukawa Electric Co., Ltd., The. Flame-resistant non-drying putty composition. 5,025,058, Cl 524-436.000.
Sensormatic Electronics Corporation: *See—*
  Schenkel, Howard M., 5,025,246, Cl. 340-572.000.
Sergant, Moshe: *See—*
  Jansen, Michael; Sergant, Moshe; Ou, Szutsun S.; Wilcox, Jaroslava Z.; Yang, Jane J.; and Eaton, Larry R., 5,025,451, Cl. 372-50.000.
Serikawa, Mituhiko: *See—*
  Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira, Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.
Serkland, Richard C.: *See—*
  Sanderson, Paul H.; and Serkland, Richard C., 5,024,138, Cl 89-37.220.
Serve, Philippe, to Societe Industrielle de Plastiques en abrege "Sipla". Package for grouped articles. 5,024,330, Cl. 206-486.000.
Servens, Christian: *See—*
  Debaig-Valade, Caroline; Filliatre, Claude; and Servens, Christian, 5,024,979, Cl. 501-95.000.
Setra Systems, Inc.: *See—*
  Lee, Shih-Ying, 5,024,099, Cl. 73-730.000.
Sewell Plastics, Inc.: *See—*
  Alberghini, Alfred C.; Brunson, David A.; and Lynn, Stephen R., 5,024,340, Cl. 215-1.00C.
Seymour, Horace W., III: *See—*
  Bauman, Ralph E.; and Seymour, Horace W., III, 5,024,623, Cl. 439-876.000.
Shafirkin, David I. Coding assembly for locklike devices. 5,024,071, Cl. 70-387.000.
Shah, Dipak J.: *See—*
  Buchholz, Robert L.; Grald, Eric W.; Nelson, Lorne W.; and Shah, Dipak J., 5,024,265, Cl. 165-22.000.
Shahar, Gabriel: *See—*
  Shahar, Moshe; and Shahar, Gabriel, 5,024,571, Cl. 414-231.000.
Shahar, Moshe; and Shahar, Gabriel. Multi-level storage structure. 5,024,571, Cl. 414-231.000.
Shankwitz, Phillip J.: *See—*
  Blunier, Dennis L.; Shankwitz, Phillip J.; Caudill, Maurice L.; Bowar, Ronald C.; and Aussieker, Dwight E., 5,024,074, Cl. 72-16.000.

VOL 1127
ISS 3
JE 18
1991
UMI

- Shapiro, Ronald S., to Advanced Medical Technology, Inc. Photoprobe assembly. 5,024,236, Cl. 128-735.000.
- Sharma, Mahendra K.: *See—*
  - Wu, Stephen H. W.; Greene, Carol J.; and Sharma, Mahendra K., 5,025,004, Cl. 514-165.000.
- Sharp Kabushiki Kaisha: *See—*
  - Ohta, Tomozo; Nakano, Hiroshi; and Miyazaki, Masao, 5,025,261, Cl. 342-357.000.
  - Yamamoto, Osamu; and Yoshida, Toshihiko, 5,025,449, Cl. 372-32.000.
- Sharples, Thomas D.: *See—*
  - Lewis, Mark L.; Sharples, Thomas D.; and Little, Stephen E., 5,024,646, Cl. 494-16.000.
- Shaw, R. H.: *See—*
  - Turner, Frederick T.; Hutchinson, Martin A.; Shaw, R. H.; and Lamont, Lawrence T., Jr., 5,024,747, Cl. 204-298.090.
- Shaw, Schuyler S.; Hallinan, Linda L.; Hammersmith, Robert J.; Schenk, Donald E.; DeHoff, Edward J.; and Kade, Alexander, to General Motors Corporation. Electric drum brake. 5,024,299, Cl. 188-156.000.
- Shaw, Schuyler S.: *See—*
  - Schenk, Donald E.; DeHoff, Edward J.; and Shaw, Schuyler S., 5,024,298, Cl. 188-72.200.
- Sheaffer, Patrick M.; and Noblet, James A., to Aerospace Corporation, The. Process of applying a specular surface finish to a carbon-carbon substrate. 5,024,710, Cl. 156-89.000.
- Shekleton, Jack R.; and Smith, Robert W., to Sundstrand Corporation. Hot gas generator. 5,024,058, Cl. 60-752.000.
- Shell Oil Company: *See—*
  - Borchardt, John K., 5,024,276, Cl. 166-308.000.
  - Drent, Eit; and Breed, Anthonius J. M., 5,025,092, Cl. 528-392.000.
  - Hwo, Charles C.; and Mostert, Simone, 5,024,888, Cl. 428-355.000.
  - van Leeuwen, Petrus W. N. M.; and Roobeek, Cornelis F., 5,025,091, Cl. 528-392.000.
  - Wong, Puk K., 5,025,080, Cl. 528-170.000.
- Shelstad, Scott A.: *See—*
  - Morehouse, James H.; Furay, David M.; Blagaila, John; Dion, F. Eugene; Shelstad, Scott A.; and Woods, Jimmy L., 5,025,336, Cl. 360-97.020.
- Shepherd, John N.: *See—*
  - Stanley, Ian W.; Shepherd, John N.; and Dobson, Peter S., 5,024,500, Cl. 350-96.150.
- Shepherd, Kevin P.; and Grosveld, Ferdinand M. W. A., to United States of America, National Aeronautics and Space Administration. Sound attenuation apparatus. 5,024,288, Cl. 181-206.000.
- Sherbeck, Terry G.: *See—*
  - Tallman, James L.; and Sherbeck, Terry G., 5,025,411, Cl. 364-900.000.
- Sherman, David L., to Shographics, Inc. Bit serial multiplier with parallel-in-serial-out carry and partial product shift registers. 5,025,408, Cl. 364-759.000.
- Shiber, Samuel, to Surgical Systems & Instruments, Inc. Atherectomy system with a sleeve. 5,024,651, Cl. 604-22.000.
- Shiga, Nobuyasu: *See—*
  - Kamigaki, Masaharu; Oshikata, Hironobu; Kawata, Yoshihiro; Shiga, Nobuyasu; Omori, Hideharu; Kawashima, Masayuki; and Shimatani, Toshimichi, 5,025,441, Cl. 370-77.000.
- Shigemi, Nobuhisa: *See—*
  - Kiriseko, Tadashi; Tani, Hiromichi; Soma, Noriko; Shigemi, Nobuhisa; and Toyoda, Takayuki, 5,024,570, Cl. 414-222.000.
- Shigemori, Hiromi, to Mitsui Petrochemical Industries, Ltd. 4-methyl-1-pentene polymer compositions. 5,025,057, Cl. 524-423.000.
- Shikata, Makoto, to Oki Electric Industry Co., Ltd. Flip-flop circuit. 5,025,174, Cl. 307-272.200.
- Shillington, Richard A., to Med-Safe Systems, Inc. Restricted access opening for disposable sharps containers. 5,024,327, Cl. 206-366.000
- Shima, Takashi: *See—*
  - Tanaka, Koji; and Shima, Takashi, 5,024,489, Cl. 303-3.000.
- Shimada, Hiromi: *See—*
  - Ohshima, Masaaki; Kobayashi, Akira; Atsumi, Senji; and Shimada, Hiromi, 5,024,907, Cl. 429-191.000.
- Shimadzu Corporation: *See—*
  - Suganuma, Katsuaki; Fujii, Hiroyuki; Minakuchi, Hiroyoshi; Kada, Katsuhiko; Osafune, Haruo; and Kanamaru, Kuniaki, 5,024,902, Cl. 428-633.000.
- Shimamura, Yasuki; and Ihata, Jyoji, to Asahi Kasei Kogyo Kabushiki Kaisha. Photosensitive and heat-sensitive polymers, process for producing the same and process for recording information using the same. 5,025,266, Cl. 346-1.100.
- Shimatani, Toshimichi: *See—*
  - Kamigaki, Masaharu; Oshikata, Hironobu; Kawata, Yoshihiro; Shiga, Nobuyasu; Omori, Hideharu; Kawashima, Masayuki; and Shimatani, Toshimichi, 5,025,441, Cl. 370-77.000.
- Shimazu, Kyotaro: *See—*
  - Morita, Tsuyoshi; Shimazu, Kyotaro; and Furukawa, Masataka, 5,024,728, Cl. 159-27.400.
- Shimazu, Takayuki: *See—*
  - Hasegawa, Makoto; Takahashi, Kazuaki; Makimoto, Mitsuo; Takahashi, Masao; and Shimazu, Takayuki, 5,025,229, Cl. 331-107.00A.
- Shimizu, Shinji, to Hitachi, Ltd. DRAM which uses MISFETS in the peripheral circuit. 5,025,301, Cl. 357-54.000.
- Shimizu, Shoichi; and Yamane, Tsuneo, to Nippon Oil and Fats Co., Ltd. Biochemical process for reacting hydrophobic and hydrophilic substrates and apparatus therefor. 5,024,942, Cl. 435-134.000.
- Shimizu, Tadafumi; and Ohira, Tadashi, to Minolta Camera Kabushiki Kaisha. Sheet transport device with easy sheet jam handling. 5,024,431, Cl. 271-263.000.
- Shimizu, Yasushi; and Kawakami, Fukushi, to Yamaha Corporation. Reverberation imparting device. 5,025,472, Cl. 381-63.000.
- Shimmyo, Takashi, to Kabushiki Kaisha Toshiba. Facsimile machine using cut sheets as received-signal recording paper and method of feeding the cut-sheets. 5,025,326, Cl. 358-498.000.
- Shimomichi, Tsuyoshi: *See—*
  - Oohashi, Keiji; Araki, Shinji; Suzuki, Hideo; and Shimomichi, Tsuyoshi, 5,024,688, Cl. 65-3.120.
- Shimura, Akira: *See—*
  - Sato, Isao; Kirikami, Seiichi; Shimura, Akira; Hirose, Fumiyuki; Inose, Hiroshi; Urushidani, Haruo; and Arai, Osamu, 5,024,055, Cl. 60-39.270.
- Shin-Etsu Chemical Co., Ltd.: *See—*
  - Matsumoto, Fukuji; Tawara, Yoshio; Hayashi, Michio; and Yamada, Osamu, 5,024,423, Cl. 266-283.000.
  - Takarada, Mitsuhiro; and Sato, Kazuharu, 5,025,049, Cl. 524-91.000.
  - Tanaka, Masaki; Ohashi, Hiroshi; and Takahashi, Yoshinobu, 5,025,076, Cl. 528-33.000.
- Shin-Kobe Electric Machinery Co., Ltd.: *See—*
  - Terada, Masayuki; Saito, Shinji; and Miura, Asahiko, 5,024,908, Cl. 429-245.000.
- Shinada, Hiroko: *See—*
  - Nakanishi, Masahiro; Mori, Daisuke; Fujii, Katsuyoshi; Hatanaka, Masahiko; and Shinada, Hiroko, 5,024,133, Cl. 84-615.000.
- Shindo, Masamichi; Sakurai, Toshiharu; Taguchi, Hideo; and Izawa, Nobu, to Kabushiki Kaisha Toshiba. Semiconductor device. 5,025,347, Cl. 361-386.000.
- Shingaki, Kouichi: *See—*
  - Matsubara, Ken; Saito, Itaru; Kitano, Hirohisa; Shingaki, Kouichi; and Masuda, Tomohiko, 5,024,511, Cl. 350-356.000.
- Shinonaga, Hirohiko: *See—*
  - Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Tai, Hiromichi, 5,025,209, Cl. 324-96.000.
- Shinozaki, Eiichi: *See—*
  - Suzuki, Satoshi; Kuwabara, Osamu; Muto, Jiro; and Shinozaki, Eiichi, 5,025,348, Cl. 361-398.000.
- Shinzawa, Motohiro; and Sekiya, Yoshiki, to Nissan Motor Company, Ltd. of No. 2. Flame dispersion arrangement for swirl chamber type diesel engine piston crown. 5,024,194, Cl. 123-269.000.
- Shiono, Katuaki, to Tokyo Eizai Laboratory Co., Ltd. Knee support. 5,024,216, Cl. 128-80.00C.
- Shiraki, Masao: *See—*
  - Kawabata, Susumu; Yoshida, Kazunori; Kisanuki, Yoshikatsu; Suzuki, Hajime; and Shiraki, Masao, 5,024,253, Cl. 139-99.000.
- Shirose, Keiichi: *See—*
  - Kawaguchi, Masaaki; Okamuro, Tomio; and Shirose, Keiichi, 5,024,464, Cl. 280-731.000.
- Shoemaker, Stephen P., Jr. Dispensing apparatus. 5,024,350, Cl. 221-75.000.
- Shographics, Inc.: *See—*
  - Sherman, David L., 5,025,408, Cl. 364-759.000.
- Shoji, Hisashi; Tamura, Akihiko; Itaya, Masahiko; Fuma, Hiroshi; and Soma, Shinobu, to Konica Corporation. Method for the development of an electrostatic latent image. 5,024,181, Cl. 118-658.000.
- Shook, Forrest A.; and Henshaw, Terry L., to NLB Corp. Self-rotating nozzle and method of use. 5,024,382, Cl. 239-11.000.
- Shortes, Samuel R.: *See—*
  - Scott, Bentley N.; and Shortes, Samuel R., 5,025,222, Cl. 324-639.000.
- Shuknecht, Lee N., to Lee Shuknecht & Sons, Inc. Harvesting machine having blower damage prevention means. 5,024,278, Cl. 171-17.000.
- Shyy, Yuh-Yuan: *See—*
  - Misra, Manjit K.; and Shyy, Yuh-Yuan, 5,024,334, Cl. 209-557.000.
- Sica, Gigliola: *See—*
  - Del Bianco, Sergio; and Sica, Gigliola, 5,024,833, Cl. 424-85.400.
- Sidwell, Lloyd G.; and Miller, Conrad E., to Du Pont de Nemours, E. I., and Company. Antistatic lead screens for use with x-ray films. 5,025,164, Cl. 250-483.100.
- Siegel, Carole E.: *See—*
  - Sunshine, Abraham; Laska, Eugene M.; and Siegel, Carole E., 5,025,019, Cl. 514-277.000.
- Siemanowski, Werner: *See—*
  - Jakobson, Gerald; Siemanowski, Werner; and Uhlig, Karl-Heinz, 5,024,787, Cl. 260-410.600.
- Siemens Aktiengesellschaft: *See—*
  - Blaess, Gerhard, 5,025,221, Cl. 324-603.000.
  - Grohrock, Peter, 5,024,329, Cl. 206-454.000.
  - Kleinschmidt, Peter; and Mader, Gerhard, 5,025,146, Cl. 250-214.00L.
  - Kuesters, Karl-Heinz; Mueller, Wolfgang; and Enders, Gerd, 5,025,295, Cl. 357-23.600.
  - Meinherz, Manfred; Veuhoff, Freidrich-Wilh; Gilmozzi, Gunther; and Kelch, Thomas, 5,025,118, Cl. 200-148.00R.
- Siemens Energy & Automation, Inc.: *See—*
  - Allen, Frankie H.; and Leone, David A., 5,025,121, Cl. 200-275.000.
- Siemens Nixdorf Informationssysteme AG: *See—*
  - Baitz, Guenter; and Behling, Rudolf, 5,025,477, Cl. 382-8.000.
- Siemens-Pacesetter, Inc.: *See—*
  - Morgan, Wayne A., 5,024,221, Cl. 128-419.0PG.
  - Thacker, James R., 5,024,222, Cl. 128-419.0PG

- Signode Corporation: *See—*
  - Kato, Kanami, 5,024,149, Cl. 100-32.000.
- Sikand, Parminder S.; McAllister, Mary J.; Henel, John; Jackson, Allen L.; and Bell, Karen, to Harris Corporation. Computerized system for incoming calls. 5,025,468, Cl. 379-67.000.
- Silva, Fernando G., to Eastman Kodak Company. Circuit for decoding binary information. 5,025,328, Cl. 360-46.000.
- Simecek, Cyril; and Ryba, Jiri, to TESLA, koncernovy podnik. Apparatus for distribution evaluation of regional lung ventilation. 5,024,233, Cl. 128-659.000.
- SIMES, Societa Italiana Medicinali e Sintetici S.p.A.: *See—*
  - Casagrande, Cesare; Montanari, Stefania; and Santangelo, Francesco, 5,025,011, Cl. 514-234.200.
- Simon Container Machinery Limited: *See—*
  - Critchlow, Graham, 5,024,266, Cl. 165-89.000.
- Simon, Robert H. M.: *See—*
  - Kavanagh, Dean L.; and Simon, Robert H. M., 5,024,895, Cl. 428-437.000.
- Simonetto, Charles M., to Rene Tourolle et Fils (Societe A Responsabilite Limitee). Method of deforming two opposite edges of a single workpiece by machining, and apparatus for implementing the method. 5,024,075, Cl. 72-38.000.
- Sindelar, Joseph L., Sr Putting practice device. 5,024,442, Cl. 273-186.00C.
- Singh, Guryinder P. Apparatus and method for expert analysis of metal failure with automated visual aids. 5,025,392, Cl. 364-513.000.
- SinghDeo, Narendra N.; Mahulikar, Deepak; and Butt, Sheldon H., to Olin Corporation. Electronic packaging of components incorporating a ceramic-glass-metal composite. 5,024,883, Cl. 428-323.000.
- Sipel Electronics S.A.: *See—*
  - Salvi, Jean-Francois, 5,023,997, Cl 30-175.000.
- Sircar, Ila: *See—*
  - Doherty, Annette M.; Hudspeth, James P.; Kaltenbronn, James S.; Repine, Joseph T.; Roark, William H.; Sircar, Ila; and Tinney, Francis J., 5,024,994, Cl. 514-18.000.
- Sistare, James R.: *See—*
  - Looper, Timothy J.; and Sistare, James R., 5,023,999, Cl 30-390.000.
- Sitton, Gary L. Super setter plastic fishing hook. 5,024,020, Cl. 43-43.160.
- Sitzmann, Michael E., to United States of America, Navy. Bis(2-fluoro-2,2-dinitroethyl)carbonate pentafluorosulfanylimine. 5,025,102, Cl. 558-6.000.
- Sjostrom, Douglas D., to Smith & Nephew Dyonics Inc. Breakable needle and hinged needle guide. 5,024,659, Cl. 604-110.000.
- SKI Accessories, Inc.: *See—*
  - Goode, David P., 5,024,866, Cl. 428-36.400.
- Skolnik, Howard, and Gewirtz, Jonah, to Skolnik Industries Inc. Process and apparatus for koshering container lids. 5,024,597, Cl. 432-2.000.
- Skolnik Industries Inc.: *See—*
  - Skolnik, Howard, and Gewirtz, Jonah, 5,024,597, Cl. 432-2.000.
- Slautterback Corporation: *See—*
  - Faulkner, W. Harrison, III; and Colton, Douglas E., 5,024,709, Cl. 156-69.000.
- Slezak, Raymond J., to RJS Corporation. Creel loading apparatus. 5,024,477, Cl. 294-81.200.
- Slone, Michael D. Vehicle heating device. 5,025,130, Cl. 219-203.000.
- Smallwood, David O.: *See—*
  - Gregory, Danny L.; Priddy, Tommy G.; Smallwood, David O.; and Woodall, Tommy D., 5,024,096, Cl 73-663.000.
- Smid, Johannes; Cahasso, Israel; Obligin, Alan; and Rawls, H Ralph, to Research Foundation of State University of NY, The. Novel radiopaque heavy metal polymer complexes, compositions of matter and articles prepared therefrom. 5,024,232, Cl. 128-654.000.
- Smital, Frantisek: *See—*
  - Fucik, Borivoj; Petranek, Milan; and Smital, Frantisek, 5,024,068, Cl. 66-53.000.
- Smith, Alan B., to Digital Equipment Corporation. Electrical guide for tight tolerance machining. 5,023,991, Cl. 29-603.000.
- Smith, Clement V., to Bird Machine Company. Bowl head assembly. 5,024,649, Cl. 494-85.000.
- Smith, David E., to Victory Arms Co., Limited. Self-loading pistols. 5,024,016, Cl. 42-25.000.
- Smith, Don: *See—*
  - Dalrymple, Monte J.; Verinsky, Phillip D.; and Smith, Don, 5,025,412, Cl. 364-900.000.
- Smith, Donald L.: *See—*
  - Harp, Raymond S.; and Smith, Donald L., 5,024,799, Cl. 264-284.000.
- Smith, George A., to Union Camp Corporation. Polymerized fatty acid polyamide resin dispersions and method for the manufacture thereof. 5,025,043, Cl. 523-326.000.
- Smith, Kim R.; and Borland, James E., to Ethyl Corporation. Synergistic lime soap dispersing composition. 5,024,777, Cl. 252-117.000.
- Smith, Lloyd A.: *See—*
  - Scott, Brian L.; Smith, Lloyd A.; Newell, J. Mark; Balentine, Bruce E.; and Lin, Lisan S., 5,025,471, Cl. 381-43.000.
- Smith, Mark R. Multiflex exercise device. 5,024,434, Cl 272-123.000.
- Smith & Nephew Dyonics Inc.: *See—*
  - Sjostrom, Douglas D., 5,024,659, Cl. 604-110.000.
- Smith, Robert W.: *See—*
  - Shekleton, Jack R; and Smith, Robert W, 5,024,058, Cl 60-752.000.
- Smith, Tempel, Jr.; Miletic, Veselko; Bayer, George; Coutre, Christopher A.; Reichel, William L.; and Chronowski, Mirek J., to Tempel Steel Company. Flatness tester. 5,025,223, Cl. 324-662.000.
- Smith, Thomas M Infra-red equipment. 5,024,596, Cl. 431-328.000.
- Smith, Todd S.; and Kelman, David C., to DePuy, Division of Boehringer Mannheim Corporation. Polymeric bearing component. 5,024,670, Cl. 623-18.000.
- Smothers, William K.; Doraiswamy, Krishna C.; and Armstrong, Mark L., to Du Pont de Nemours, E. I., and Company. Dry film process for altering wavelength response of holograms. 5,024,909, Cl. 430-1.000.
- Snake River Chemicals, Inc.: *See—*
  - Chollet, Charles C., 5,024,690, Cl. 71-77.000.
- Snelgrove, R. Vernon: *See—*
  - McCullough, Francis P., Jr.; Snelgrove, R Vernon; and Hall, David M., 5,024,877, Cl. 428-282.000.
- Snow, Kevin M.: *See—*
  - Davis, Gary C.; McGrath, Barbara E.; and Snow, Kevin M., 5,025,074, Cl 528-15.000.
- Snowden, Gregory O.: *See—*
  - DeLuca, Michael J.; Snowden, Gregory O., and Fennell, Robert D., 5,025,252, Cl. 340-825.440.
- Snyder General Corporation: *See—*
  - Schumacher, David B.; and Bakowski, Steven J., 5,024,595, Cl. 431-18.000.
- Snyder, Susan L. Comb for practicing selective hair coloring. 5,024,243, Cl. 132-116.000.
- Snyder, Thomas S.; Jackovitz, John F.; and Ferrari, Harry M., to Westinghouse Electric Corp. System and method for continuous separation of isotopes. 5,024,749, Cl. 204-299.00R.
- Societe Anonyme des Eaux Minerales d'Evian: *See—*
  - Dekerle, Benoit, 5,024,341, Cl. 215-11.100.
- S.A. des Etablissements Staubli: *See—*
  - Truchet, Gaston, 5,024,467, Cl. 285-36.000.
- Societe Anonyme dite: CEGELEC: *See—*
  - Heng, Jean-Paul; and Marmonier, Andre , 5,024,608, Cl 439-578.000.
- Societe Europeenne de Propulsion: *See—*
  - Robinbrosse, Christian; Naslain, Roger; Minet, Jacky; and Langlais, Francis, 5,024,878, Cl. 428-297.000.
- Societe Industrielle de Plastiques en abrege "Sipla": *See—*
  - Serve, Philippe, 5,024,330, Cl. 206-486.000.
- Societe Nationale Elf Aquitaine (Production): *See—*
  - Doussiet, Roger; and Labadie, Louis, 5,024,110, Cl. 73-864.620.
- Societe Nationale Industrielle et Aerospatiale: *See—*
  - Maisonneuve, Jean-Michel; Domergue, Jean-Paul; Parize, Gabrielle; Palandjian, Philippe; and Isbert, Jacques, 5,024,502, Cl. 350-96.160.
- Societe Nationale Industrielle et Aetospatiale: *See—*
  - Barquet, Henri; Negroni, Pierre-Paul; and Plissonneau, Bernard, 5,024,399, Cl. 244-119.000.
- Societe Technique de Pulverisation—STEP: *See—*
  - Jouillat, Claude; and Brunet, Michel, 5,024,355, Cl. 222-162.000.
- Soclof, Sidney I., to Rockwell International Corporation. PNP type lateral transistor with minimal substrate operation interference. 5,025,302, Cl. 357-55.000.
- Soerens, Dave A., to Kimberly-Clark Corporation Creping adhesive composition. 5,025,046, Cl. 524-72.000.
- Sogo Security Services Co.: *See—*
  - Ichikawa, Hiroshi, 5,025,243, Cl. 338-18.000.
- Sohner, Harold K.; Hoyloak, Joel N.; Girvin, Richard J.; and Kumar, Surinder, to Andrew Corporation. Full-duplex, sub-band spread spectrum communications system. 5,025,452, Cl. 375-1.000.
- Soltech, Inc.: *See—*
  - Nelson, Thomas E., 5,024,210, Cl. 126-344.000.
- Soma, Noriko: *See—*
  - Kiriseko, Tadashi; Tani, Hiromichi; Soma, Noriko; Shigemi, Nobuhisa; and Toyoda, Takayuki, 5,024,570, Cl. 414-222.000.
- Soma, Shinobu: *See—*
  - Shoji, Hisashi; Tamura, Akihiko; Itaya, Masahiko; Fuma, Hiroshi; and Soma, Shinobu, 5,024,181, Cl. 118-658 000.
- Soma, Toru: *See—*
  - Ishidoya, Masahiro; Soma, Toru; and Ogawa, Hisao, 5,025,061, Cl. 524-539.000.
- Son, Wan-jae, to Samsung Electron Devices Co., Ltd. Dynamic focusing electron gun. 5,025,189, Cl. 313-414.000.
- Sone, Toshiyuki; Matsumoto, Takehiko; Omotezako, Nobuya, and Kawasuji, Keiji, to Car Mate Mfg. Co., Ltd. Automatic disc carrying and playing device. 5,025,338, Cl. 360-99.060.
- Sonin, Inc.: *See—*
  - Pape, Robert; Rose, William; Burgel, Frank, and Adams, Chip, 5,023,996, Cl. 30-144.000.
- Sonoco Products Company: *See—*
  - Haenni, Edwin W.; and Bolz, Hans-Peter, 5,024,349, Cl. 221-46.000
- Sony Corporation: *See—*
  - Avis, Richard J. A., 5,025,495, Cl. 358-140.000.
  - Nishino, Yoichi, 5,025,419, Cl. 365-221.000.
  - Ozawa, Kazuo; and Sato, Masanori, 5,024,394, Cl 242-198.000.
  - Watanabe, Nobuhisa, 5,025,368, Cl. 364-200.000.
- Soprema S.A.: *See—*
  - Geisen, Pierre; and Reillaudoux, Jean-Claude, 5,024,886, Cl. 428-332.000.
- Sotralentz S. A.: *See—*
  - Roser, Georges, 5,024,346, Cl 220-401.000.
- Soubrier, Pierre; and Denis, Xavier, to Baxter International Inc Apparatus for positioning a port in an aperture in a web of film. 5,024,645, Cl. 493-380.000.

VOL 1127
ISS 3
JE 18
1991
UMI

- Southam, Barry J.: *See—*
  - Krigmont, Henry V.; Coe, Everett L., Jr.; and Southam, Barry J., 5,024,171, Cl. 110-345.000.
- Southcott, Mark R.: *See—*
  - Dobinson, Bryan; and Southcott, Mark R., 5,025,084, Cl. 528-229.000.
- Spamer, William S., to Mead Corporation, The. Composite organizer. 5,024,336, Cl. 211-59.200.
- Spatafora, Mario; and Gamberini, Antonio, to G. D Societa per Azioni. Method and device for wrapping cylindrical products. 5,024,046, Cl. 53-466.000.
- Spector, George: *See—*
  - Guzman, Julio; and Spector, George, 5,024,546, Cl. 401-16.000.
  - Ippolito, Guy F.; and Spector, George, 5,024,566, Cl. 408-197.000.
  - Tidalgo, Max B.; and Spector, George, 5,024,440, Cl. 273-145.00A
- Spence, Scott L.: *See—*
  - Van Fossen, Robert A.; Spence, Scott L.; and DeWitt, Donald E., 5,024,294, Cl. 184-108.000.
- Spencer, Charles R.: *See—*
  - Oldham, James G.; Spencer, Charles R.; Begley, Carl L.; and Meyer, H. Robert, 5,025,150, Cl. 250-253.000.
- Spencer, Dennis S., to Olemunda Pty Ltd. Bandage applicator. 5,024,217, Cl. 128-82.000.
- Speranza, George P.: *See—*
  - Lin, Jiang-Jen; and Speranza, George P., 5,025,100, Cl. 549-551.000.
- Speronello, Barry K.; Byrne, John W.; and Chen, James M., to Engelhard Corporation. Staged metal-promoted zeolite catalysts and method for catalytic reduction of nitrogen oxides using the same. 5,024,981, Cl. 502-67.000.
- Spinnler, Fritz: *See—*
  - Jetzer, Gregor; Kolb, Roland; and Spinnler, Fritz, 5,024,589, Cl. 418-55.300.
- Square D Company: *See—*
  - Chapman, Donald L., 5,024,251, Cl. 138-92.000.
- Srinivasan, Jagannathan S., to Westinghouse Electric Corp. Method for steam generator water level measurement. 5,024,802, Cl. 376-258.000.
- Sta-Rite Industries, Inc.: *See—*
  - Kralovec, William M., 5,024,585, Cl. 417-360.000.
- Stachler, Richard J. Non-smear erasable label kit. 5,024,332, Cl. 206-575.000.
- Stachura, Leonard M.: *See—*
  - Logsdon, Peter B.; Stachura, Leonard M.; Swan, Ellen L.; and Basu, Bajat S., 5,024,781, Cl. 252-171.000.
- Stackpool, Michael; and Riley, David, to Chloride Silent Power Limited. Apparatus for filling and sealing alkali metal electrode containers for alkali metal energy conversion devices and method of filling alkali metal electrode containers for alkali metal energy conversion devices. 5,024,675, Cl. 29-623.100.
- Stafford, Gary P., to Marconi Company Limited, The. Circularly polarized antenna with resonant aperture in ground plane and probe feed. 5,025,264, Cl. 343-767.000.
- Stafford Rail Products, Inc.: *See—*
  - Stafford, Richard J., III, 5,024,381, Cl. 238-367.000.
- Stafford, Richard J., III, to Stafford Rail Products, Inc. Active railroad spike and tie plate interconnection therefor. 5,024,381, Cl. 238-367.000.
- Stamness, Jesse I.; Morrow, Raymond W.; and Asato, Edward E., to Unisys Corp. Magnetic disk write precompensation method and apparatus which takes into account variations in head/disk characteristics. 5,025,327, Cl. 360-45.000.
- Stanasolovich, David: *See—*
  - Mathad, Gangadhara S.; Stanasolovich, David, and Via, Giorgio G., 5,024,896, Cl. 428-473.500.
- Standard Textile Co., Inc.: *See—*
  - Goad, Conrad D.; and Taylor, Jeffrey L., 5,024,851, Cl. 427-2.000.
- Stanley, Ian W.; Shepherd, John N.; and Dobson, Peter S., to British Telecommunications public limited company. Cantilever beam radiation deflector assembly. 5,024,500, Cl. 350-96.150.
- Staples, George M., III: *See—*
  - Boyd, John A.; and Staples, George M., III, 5,024,770, Cl. 210-747.000.
- Staubli International AG: *See—*
  - Daggett, Kenneth E., 5,025,390, Cl. 364-513.000.
- STC PLC: *See—*
  - Gunn, Duncan A.; and McManus, Stephen J., 5,024,503, Cl. 350-96.200.
- Steele, Lawrence C., to Eastman Kodak Company. Method and apparatus for improving a multi-color electrophotographic image using heat fusing. 5,025,292, Cl. 355-326.000.
- Stefanoli, Vittorio: *See—*
  - Prelini, Cesare; Trovati, Aldo; Gambini, Tiziana; and Stefanoli, Vittorio, 5,024,674, Cl. 8-554.000.
- Stefansky, Frederick M., to Conner Peripherals, Inc. Architecture for 2½ inch diameter single disk drive. 5,025,335, Cl. 360-97.010.
- Steffens, Thomas: *See—*
  - Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul; Bickle, Wolfgang; and Braus, Jurgen, 5,024,881, Cl. 428-323.000.
  - Matucha, Karl-Heinz; Steffens, Thomas; Baureis, Hans-Paul; Bickle, Wolfgang; and Braus, Jurgen, 5,024,882, Cl. 428-323.000.
- Steinberg, Joe: *See—*
  - DePinto, Gary A.; Steinberg, Joe; Franka, John G.; and Cherniawski, Michael R., 5,024,972, Cl. 437-233.000.
- Steinmann, Alfred, to Ciba-Geigy Corporation. Organometal-containing polymers and use thereof in a photosensitive composition with photoacid generators. 5,024,916, Cl. 430-270.000.
- Steljes, Robert C. Bedside commode station for invalid patients. 5,023,962, Cl. 4-480.000.
- Stephens, Bruce A., to Hewlett-Packard Company. Fraction entry and display. 5,025,403, Cl. 364-709.070.
- Stern, Richard M.: *See—*
  - Crater, Davis H., Howells, Richard D.; Stern, Richard M.; and Temperante, John A., 5,025,052, Cl. 524-104 000.
- Sternby, Jan P., to Gambro AB. Dialysis system and method therefor 5,024,756, Cl. 210-93.000.
- Stevens, Reginald W., to International Computers Limited. Data transmission code. 5,025,256, Cl. 341-59.000.
- Stevens, Thomas H.: *See—*
  - Germer, Warren R.; Coryea, Peter F.; Keturakis, Andrius A.; Masury, David H.; and Stevens, Thomas H., 5,025,206, Cl 324-74.000.
- Stewart, Peter J., to Seaford Nominees Pty. Ltd Dewatering means. 5,024,005, Cl. 34-164.000.
- Stibrany, Robert T.: *See—*
  - Gorun, Sergiu M.; and Stibrany, Robert T., 5,025,101, Cl. 556-50.000.
- Stierman, Roger J.; and Lessard, Robert J., to Texas Instruments Incorporated. Fixture and a method for plating contact bumps for integrated circuits. 5,024,746, Cl. 204-297.00W.
- Stine, Robert H.: *See—*
  - Tsuchiya, Paul F.; and Stine, Robert H., 5,025,491, Cl. 340-825.520.
- Stolyarenko, Georgy E.: *See—*
  - Dumenek, Vladimir A.; Stolyarenko, Georgy E.; and Kossovsky, Leopold V., 5,024,652, Cl. 604-22.000.
- Stone, Mark L.: *See—*
  - Bobsein, Rex L.; Stone, Mark L.; and Geibel, Jon F., 5,024,876, Cl 428-272.000.
- Stoner, Eugene M.: *See—*
  - Knight, C. Reed, Jr.; and Stoner, Eugene M., 5,024,139, Cl 89-154.000.
- Storage Technology Corporation: *See—*
  - Nelson, Thomas C., 5,025,398, Cl. 364-519.000.
- Stork, Johannes M. C.: *See—*
  - Harame, David L.; and Stork, Johannes M. C., 5,024,957, Cl. 437-31.000.
- Stormberg, Hans P.: *See—*
  - Ganser, Hans G.; Schafer, Ralf, and Stormberg, Hans P., 5,025,197, Cl. 315-172.000.
- Storz Instrument Company: *See—*
  - Engebretson, A. Maynard, 5,024,224, Cl. 128-420.600.
- Straschil, Heinrich K.: *See—*
  - Abys, Joseph A.; and Straschil, Heinrich K., 5,024,733, Cl 204-3.000.
- Strathman, Michael D.: *See—*
  - Odom, Robert W.; and Strathman, Michael D., 5,025,144, Cl. 250-207.000.
- Stravitz, David M. Carousel storage device with rotating objects on top thereof. 5,024,168, Cl. 108-94.000.
- Strepparola, Ezio: *See—*
  - Modena, Silvana; and Strepparola, Ezio, 5,025,105, Cl. 562-851.000.
- Strickler, John R.: *See—*
  - Chiu, Kuen-Wai; Yu, Lin-Chen; and Strickler, John R., 5,025,096, Cl. 544-234.000.
- Strippgen, Walter E.: *See—*
  - Asher, Marc A.; Strippgen, Walter E.; Heinig, Charles F.; and Carson, William, 5,024,213, Cl. 128-69.000.
- Stripping Technologies Inc.: *See—*
  - Abbott, Kenneth E.; and Lyons, Patrick J., 5,024,029, Cl. 51-438.000.
- Strobel, Donald H.: *See—*
  - Thornborough, Raymond J.; and Strobel, Donald H., 5,025,470, Cl. 379-107.000.
- Strominger, Jack L.: *See—*
  - Brenner, Michael B.; Strominger, Jack L.; Seidman, Jonathan; Ip. Stephen H.; and Krangel, Micahel S., 5,024,940, Cl. 435-69.100.
- Strub, Eric W.; and Strub, Kenneth M. Band guiding and forming assembly for banding apparatus. 5,024,049, Cl. 53-585.000.
- Strub, Kenneth M.: *See—*
  - Strub, Eric W.; and Strub, Kenneth M., 5,024,049, Cl. 53-585.000.
- Stufflebeam, John F.: *See—*
  - Warner, Steven D.; and Stufflebeam, John F., 5,024,279, Cl 172-1.000.
- Stypulkowski, Paul H.: *See—*
  - van den Honert, Christopher; and Stypulkowski, Paul H., 5,024,612, Cl. 604-36.000.
- Su, David K., to Hewlett-Packard Company. Current mirror using resistor ratios in CMOS process. 5,025,204, Cl. 323-274.000.
- Subramanian, Lakshmina R.: *See—*
  - Gorler, Klaus; Krumbiegel, Gunter; Hanack, Michael; and Subramanian, Lakshmina R., 5,024,743, Cl. 204-157.690.
- Suda, Hirohisa; Sasaki, Katsumi; and Osato, Yasukuni, to Fujikura Ltd Method and apparatus for cutting an optical fiber. 5,024,363, Cl. 225-96.005.
- Sudo, Shoichi; Sakai, Yoshihisa; Yasaka, Hiroshi; Ikegami, Tetsuhiko; Yoshikuni, Yuzo; Yokohama, Itaru; and Kubodera, Kenichi, to Nippon Telegraph & Telephone Corporation. Method and apparatus for stabilizing frequency of semiconductor laser. 5,025,448, Cl. 372-32.000.
- Sugai, Toshiji: *See—*
  - Miura, Katsutoshi; Koyama, Hiroyasu; Sugai, Toshiji; Yamada, Hiroaki; and Sakurai, Einosuke, 5,025,012, Cl. 514-252.000.

- Suganuma, Katsuaki; Fujii, Hiroyuki; Minakuchi, Hiroyoshi; Kada, Katsuhiko; Osafune, Haruo; and Kanamaru, Kuniaki, to Shimadzu Corporation. Fiber-reinforced metal. 5,024,902, Cl. 428-633.000.
- Sugata, Hiroyuki: *See—*
  - Mihara, Chieko; Santoh, Tsuyoshi; and Sugata, Hiroyuki, 5,024,917, Cl. 430-271.000.
- Sugawara, Kenzo: *See—*
  - Arai, Kei; Ohashi, Minoru; Utsugi, Yoshio; Oka, Osamu; Numazawa, Kenichi; Miwa, Kenji; and Sugawara, Kenzo, 5,024,816, Cl. 422-68.100.
- Sugawara, Michitaka, to Kabushiki Kaisha Toshiba. Volume data transmission system. 5,025,375, Cl. 364-413.220.
- Suggs, Steven M., to Pressure Services, Inc. Liveload assembly for rotary or reciprocating shaft packing. 5,024,453, Cl. 277-106.000.
- Sughrue, Edward L., II; Tooley, Patricia A.; Bertus, Brent J.; and Grayson, Bille S., to Phillips Petroleum Company. Process for converting heavy hydrocarbon oil. 5,024,750, Cl. 208-57.000.
- Sugimoto, Naoki: *See—*
  - Nakamura, Arao; Manabe, Tsuneo; Sugimoto, Naoki; and Usui, Hiroshi, 5,024,974, Cl. 501-57.000.
- Sugiura, Shinji: *See—*
  - Yabuta, Motoshi; Nakao, Yasushi; Sugiura, Shinji; Fukuda, Mitsuhiro; and Miyamoto, Yuzo, 5,025,060, Cl. 524-533 000.
- Sugiyama, Yoshihide: *See—*
  - Seki, Nobuyoshi; Morii, Nobuyuki; Sugiyama, Yoshihide; Komada, Takashi; Hosoi, Masatoshi; Hujiwara, Atuhisa; Ichinose, Tsutomu; Mori, Goro; Kikuchi, Toshiyuki; and Minato, Masahiro, 5,024,430, Cl. 270-53.000.
- Sugiyasu Industries Co., Ltd.: *See—*
  - Kawada, Hiroyuki, 5,024,141, Cl. 91-171.000.
- Sumitomo Rubber Industries, Ltd.: *See—*
  - Ochiai, Kiyoshi, 5,024,260, Cl. 152-209.00R.
- Summers, Jack C., II: *See—*
  - Henk, Michael G.; and Summers, Jack C., II, 5,024,824, Cl. 423-213.500.
- Summers, Russell E., Jr.: *See—*
  - Phebus, Dan E.; Schrader, William A.; and Summers, Russell E., Jr., 5,024,636, Cl. 475-141.000.
- Sumpter, Chris A.: *See—*
  - Lewis, Larry N.; and Sumpter, Chris A., 5,025,073, Cl. 528-15.000.
- Sun Chemical Corporation: *See—*
  - Schwartz, Russell J.; and Gregorio, Manuel Z., 5,024,698, Cl 106-20.000.
- Sunden, Gunnel E.: *See—*
  - Brandstrom, Arne E.; Lindberg, Fer L.; and Sunden, Gunnel E., 5,025,024, Cl. 514-338.000.
- Sundstrand Corporation: *See—*
  - Cohen, Mordechai, 5,024,416, Cl. 251-78.000.
  - Latos, Thomas S., 5,025,360, Cl. 363-16.000.
  - Shekleton, Jack R.; and Smith, Robert W., 5,024,058, Cl. 60-752.000.
- Sundstrand Data Control, Inc.: *See—*
  - Norling, Brian L., 5,024,089, Cl. 73-517.00B.
- Sung, Chien-Min: *See—*
  - Chen, Sy-Hwa; and Sung, Chien-Min, 5,024,680, Cl. 51-295.000.
- Sunou, Hiroki: *See—*
  - Kobayashi, Kazumitsu; and Sunou, Hiroki, 5,024,201, Cl. 123-531.000.
- Sunshine, Abraham; Laska, Eugene M.; and Siegel, Carole E., to Analgesic Associates. Cough/cold mixtures comprising non-steroidal anti-inflammatory drugs. 5,025,019, Cl. 514-277.000.
- Superba S.A.: *See—*
  - Enderlin, Robert, 5,024,390, Cl. 242-47.000.
- Suppelsa, Anthony B.: *See—*
  - Altman, Leonard F.; Flaugher, Jill L.; Suppelsa, Anthony B.; and Mullen, William B., III, 5,024,372, Cl. 228-248.000.
- Surgical Systems & Instruments, Inc.: *See—*
  - Shiber, Samuel, 5,024,651, Cl. 604-22.000.
- Suter, Henry, to United States of America, Navy. Sonic detection and tracking system. 5,025,425, Cl. 367-96.000.
- Suto, Hidemi: *See—*
  - Akasaki, Yutaka; Aonuma, Hidekazu; Nukada, Katsumi; Tokita, Akihiko; Suto, Hidemi; Sato, Katsuhiro; and Tanaka, Hiroyuki, 5,024,911, Cl. 430-58.000.
- Sutor, Judith L.: *See—*
  - Fay, Gary V.; Robb, Stephen P.; Sutor, Judith L.; and Terry, Lewis E., 5,025,298, Cl. 357-41.000.
- Sutton, Allen R.; and Balser, Richard L., to Freeport McMoRan Resource Partners. Nitrogen fertilizer. 5,024,689, Cl. 71-29.000.
- Sutton, Owen W., to AT&T Bell Laboratories. Underwater magnetic switch for electrical cable transmitting A.C. electrical current. 5,025,170, Cl. 307-116.000.
- Suwabe, Hiroyuki: *See—*
  - Kondo, Hitoshi; Suwabe, Hiroyuki; and Kojima, Aiki, 5,025,230, Cl. 331-116.0FE.
- Suya, Hachiro: *See—*
  - Yoshida, Mamoru; Suya, Hachiro; Hayashi, Shoji; Koshiyama, Takao; Hashimoto, Satoshi; and Horita, Katsuhiro, 5,025,042, Cl. 523-216.000.
- Suzuki, Eiichi: *See—*
  - Ubayama, Takashi, Suzuki, Eiichi; and Morishima, Morito, 5,025,173, Cl. 307-265.000.
- Suzuki, Fumio: *See—*
  - Taya, Hiroyuki; Yoshinuma, Mikio; Yamada, Takeshi; Nishide, Kenji; Suzuki, Fumio; Fujimoto, Hirohisa; and Yamauchi, Ryozo, 5,024,501, Cl. 350-96.150.
- Suzuki, George: *See—*
  - Yamada, Ichiji; Inuzuka, Yutaka; Murakami, Michiyuki; Suzuki, George; Tanahashi, Tyo; and Kondo, Takeshi, 5,024,117, Cl. 74-473.00P.
- Suzuki, Goro: *See—*
  - Yamamoto, Yohzoh; Suzuki, Goro; Nakamura, Hideo; and Yasuda, Kiyomi, 5,025,067, Cl. 525-109.000.
- Suzuki, Hajime, to Daicel Chemical Industries Co., Ltd. Copolymer polyamide resin from hydrogenated polyolefin condensate. 5,025,070, Cl. 525-184.000.
- Suzuki, Hajime: *See—*
  - Kawabata, Susumu; Yoshida, Kazunori; Kisanuki, Yoshikatsu; Suzuki, Hajime; and Shiraki, Masao, 5,024,253, Cl. 139-99.000.
- Suzuki, Hideo: *See—*
  - Oohashi, Keiji; Araki, Shinji; Suzuki, Hideo; and Shimomichi, Tsuyoshi, 5,024,688, Cl. 65-3.120.
- Suzuki, Hidetoshi; Nomura, Ichiro; Majima, Toshiaki; and Yamamoto, Mitsuru, to Canon Kabushiki Kaisha. Image forming device with beam current control. 5,025,196, Cl. 315-168.000.
- Suzuki Jidosha Kogyo Kabushiki Kaisha: *See—*
  - Murano, Katsuaki; Yamashita, Yoshinori; Hirano, Sadayuki; Taisumi, Takumi; and Yamamoto, Hiroaki, 5,024,310, Cl. 192-0.076.
- Suzuki, Koichi: *See—*
  - Etoh, Yoshiyuki; Inoue, Hiroshi; Mori, Kazuyuki; Suzuki, Koichi; Nakano, Kinichiro; Nomura, Hiroyuki; Yamamoto, Isao; and Yoshida, Kiyoshi, 5,025,379, Cl. 364-426.040.
  - Neishi, Toshie; Kikuchi, Toshihiro; Takiguchi, Takao; Suzuki, Koichi; and Matsumoto, Masakazu, 5,024,912, Cl. 430-59.000.
- Suzuki, Masanori: *See—*
  - Tateishi, Kiyoshi; Sakata, Haruyasu; Tawaragi, Yuji; Suzuki, Masanori; and Ohie, Takayuki, 5,025,434, Cl. 369-44.360.
- Suzuki, Michio, to Tokyo Electric Co., Ltd. Label printer. 5,025,397, Cl. 364-519.000.
- Suzuki, Mikio: *See—*
  - Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kirahara, Masaki, 5,024,999, Cl. 514-63.000.
- Suzuki, Satoshi; Kuwabara, Osamu; Muto, Jiro; and Shinozaki, Eiichi, to Casio Computer Co., Ltd. Bonding structure of an electronic device and a method for manufacturing the same. 5,025,348, Cl. 361-398.000.
- Suzuki, Tatsuya: *See—*
  - Inoue, Takashi; Suzuki, Tatsuya; Kimura, Akiteru; Miyazaki, Hiroaki; and Katagiri, Moriya, 5,025,277, Cl. 354-173.100.
- Suzuki, Yasuo: *See—*
  - Igarashi, Eiji; Imamiya, Susumu; and Suzuki, Yasuo, 5,024,261, Cl. 152-527.000.
- Suzuki, Yoshiaki; and Hayashi, Gouichi, to Fuji Photo Film Co., Ltd. Infrared absorbent compositions. 5,024,923, Cl. 430-372.000.
- Suzumura, Nobuyasu: *See—*
  - Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.
- Svetkoff, Donald J.; and Doss, Brian L., to Synthetic Vision Systems, Inc. Method and system for high-speed, high-resolution, 3-D imaging of an object at a vision station. 5,024,529, Cl. 356-376.000.
- Svets- & Maskinprodukter i Lidkoping AB: *See—*
  - Hulden, Fritiof, 5,024,010, Cl. 37-118.00R.
- Swan, Ellen L.: *See—*
  - Logsdon, Peter B.; Stachura, Leonard M.; Swan, Ellen L.; and Basu, Bajat S., 5,024,781, Cl. 252-171.000.
- Swann, George H. Quick-change head for precision machine vise. 5,024,427, Cl. 269-136.000.
- Swanson, Jerald L.: *See—*
  - Wuepper, Karl J.; Swanson, Jerald L., and Hartz, Dale E., 5,023,987, Cl. 29-402.110.
- Swanson, Roger W., to Hewlett-Packard Company. Method of interpolating pixel values. 5,025,405, Cl. 364-723.000.
- Swapceinski, John P.: *See—*
  - Guslits, Vladimir S.; and Swapceinski, John P., 5,025,289, Cl 355-253.000.
- Swartz, Robert G.: *See—*
  - Ota, Yusuke; and Swartz, Robert G., 5,025,456, Cl. 375-76.000.
- Swatling, Donald K.: *See—*
  - Finn, Leslie E.; Swatling, Donald K.; and Mankin, Erle D., 5,024,782, Cl. 252-174.130.
- Swedo, Raymond J.: *See—*
  - Zupancic, Joseph J.; Swedo, Raymond J.; Jamieson, Donald R., Schumacher, Elaine F.; and Buehler, Allyson J., 5,025,079, Cl. 528-170.000.
- Swei, Gwo S.: *See—*
  - Arthur, David J.; and Swei, Gwo S., 5,024,871, Cl. 428-209.000.
- Swersky, Robert S. Wind baffle adjustable for different car widths. 5,024,481, Cl. 296-180.100.
- Swetlin, Brian J.: *See—*
  - Gawin, Irena; and Swetlin, Brian J., 5,025,045, Cl. 523-440.000.
- SWF-Auto-Electric GmbH: *See—*
  - Bauer, Kurt; and Schmid, Eckhardt, 5,023,972, Cl. 15-250.420.
- Swierczek, Remi D. Integral label and coaster 5,024,014, Cl. 40-310.000.
- Swift Instruments, Inc.: *See—*
  - Hayashi, George, 5,024,513, Cl. 350-518.000.
- Synthes U.S.A.: *See—*
  - Tepic, Slobodan, 5,024,618, Cl. 606-53.000.

VOL
1127
ISS
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Synthetic Vision Systems, Inc.: *See—*
Svetkoff, Donald J.; and Doss, Brian L., 5,024,529, Cl. 356-376.000.
Szczesny, David S.: *See—*
Bennett, Glenn E.; Lucius, John E.; Polk, Roger N.; Rider, Frederick H.; and Szczesny, David S., 5,024,627, Cl. 439-631.000.
Szeleny, Istvan: *See—*
Ahrens, Kurt H.; Schickaneder, Helmut; Engler, Heidrun, and Szeleny, Istvan, 5,025,016, Cl. 514-274.000.
Szweda, Andrew: *See—*
Millard, Michael L.; Harrison, Michael G.; and Szweda, Andrew, 5,024,859, Cl. 427-226.000.
T Cell Sciences, Inc.: *See—*
Brenner, Michael B.; Strominger, Jack L.; Seidman, Jonathan; Ip, Stephen H.; and Krangel, Micahel S., 5,024,940, Cl. 435-69.100.
Tachikawa, Toru: *See—*
Kasatani, Yasushi; and Tachikawa, Toru, 5,024,605, Cl. 439-500.000.
Ueda, Tetsuya; Tachikawa, Toru; and Takehara, Masataka, 5,025,307, Cl. 357-80.000.
Tacke, Peter; Grigo, Ulrich; Nouvertne, Werner; Freitag, Dieter; Idel, Karsten-Josef; and Westeppe, Uwe, to Bayer Aktiengesellschaft. Fire-retardant polycarbonates and polyesters. 5,025,065, Cl. 524-611.000.
Tagawa, Shinichi: *See—*
Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.
Tago, Yoshiaki: *See—*
Yamashita, Hiroshi; Tago, Yoshiaki, and Yoshimaru, Tomohisa, 5,025,437, Cl. 369-79.000.
Taguchi, Hideo: *See—*
Shindo, Masamichi; Sakurai, Toshiharu, Taguchi, Hideo; and Izawa, Nobu, 5,025,347, Cl. 361-386.000.
Taguchi, Ryusuke: *See—*
Nagato, Shoin; Taguchi, Ryusuke; Hirai, Kenji; Hirose, Hiroaki; and Yokota, Masahiro, 5,024,692, Cl. 71-86.000.
Tai, Hiromichi: *See—*
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Tai, Hiromichi, 5,025,209, Cl. 324-96.000.
Taira, Susumu: *See—*
Nagasaki, Wataru; Endo, Takuro; Taira, Susumu; and Muramatsu, Hajime, 5,024,087, Cl. 73-516.00R.
Tajima, Yusuke; and Gels, Robert G., to Raytheon Company. Amplifier having substantially constant D.C. to r.f. conversion efficiency. 5,025,225, Cl. 330-124.00D.
Takagi, Atsushi: *See—*
Nakamura, Hiroaki; and Takagi, Atsushi, 5,025,282, Cl. 355-38.000.
Takahashi, Kazuaki: *See—*
Hasegawa, Makoto; Takahashi, Kazuaki; Makimoto, Mitsuo; Takahashi, Masao; and Shimazu, Takayuki, 5,025,229, Cl. 331-107.00A.
Takahashi, Masao: *See—*
Hasegawa, Makoto; Takahashi, Kazuaki; Makimoto, Mitsuo; Takahashi, Masao; and Shimazu, Takayuki, 5,025,229, Cl. 331-107.00A.
Takahashi, Osamu: *See—*
Naruse, Hideaki; Takahashi, Osamu; Ohki, Nobutaka; and Ono, Michio, 5,024,924, Cl. 430-376.000.
Takahashi, Tatsunori: *See—*
Miura, Masao; Uchida, Naoshi; Takahashi, Tatsunori; Asakawa, Kouji; and Nozawa, Eiji, 5,025,236, Cl. 335-46.000.
Takahashi, Tsutomu: *See—*
Kurihara, Kazumasa; and Takahashi, Tsutomu, 5,024,305, Cl. 192-0.055.
Takahashi, Yoshinobu: *See—*
Tanaka, Masaki; Ohashi, Hiroshi; and Takahashi, Yoshinobu, 5,025,076, Cl. 528-33.000.
Takahiro, Syuji: *See—*
Funato, Ryo; Takahiro, Syuji; Yoshida, Keiji; Kubo, Shinji; and Inagaki, Motoshi, 5,024,914, Cl. 430-109.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Tai, Hiromichi, to Victor Company of Japan, Ltd. Apparatus for detecting surface potential distribution. 5,025,209, Cl. 324-96.000.
Takarada, Mitsuhiro; and Sato, Kazuharu, to Shin-Etsu Chemical Co., Ltd. Alkoxysilylated acrylic or vinylic resin containing primer compositions. 5,025,049, Cl. 524-91.000.
Takayama, Satoshi. *See—*
Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.
Takeda Chemical Industries, Ltd.: *See—*
Goto, Giichi; and Nagaoka, Akinobu, 5,025,033, Cl. 514-417.000.
Nomura, Hiroaki; Nishikawa, Kohei; Tsushima, Susumu; and Kozai, Yoshio, 5,025,005, Cl. 514-183.000.
Takegahara, Takashi: *See—*
Seki, Masaki; Takegahara, Takashi, and Nakajima, Masatoshi, 5,025,363, Cl. 364-191.000.
Takehara, Masataka: *See—*
Ueda, Tetsuya; Tachikawa, Toru; and Takehara, Masataka. 5,025,307, Cl. 357-80.000.
Takemae, Yoshihiro: *See—*
Masuyama, Masaru; Takemae, Yoshihiro; Endoh, Tetsuhiko, Komyoji, Hirosuke; Tanaka, Ryuji; and Itakura, Katsuhiko, 5,025,415, Cl. 365-52.000.
Takemura, Toji; and Okubo, Takashi, to Nissan Motor Co., Ltd. Rotational speed differential responsive type control coupling. 5,024,309, Cl. 192-60.000.
Takemura, Toshihiko: *See—*
Fukui, Tetsu; Yoshii, Takashi; Takemura, Toshihiko; and Hattori, Akio, 5,024,306, Cl. 192-3.570.
Takeno, Minoru, to Fujitsu Limited. Peak level detection circuit. 5,025,176, Cl. 307-351.000.
Taketani, Mitsuhiro, to Kabushiki Kaisha Toshiba. Method and system for controlling mechanism sections of printing apparatus. 5,024,544, Cl. 400-692.000.
Takeuchi, Akira: *See—*
Teranishi, Mitsuji; Watanabe, Yasuo; and Takeuchi, Akira, 5,025,384, Cl. 364-468.000.
Takeuchi, Takashi: *See—*
Mitsuishi, Akio; Takeuchi, Takashi; and Koshiishi, Osamu, 5,024,543, Cl. 400-124.000.
Takewa, Hiroyuki: *See—*
Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.
Takeya, Fuminori: *See—*
Iida, Shinzi; Takeya, Fuminori; and Aoki, Shinya, 5,025,343, Cl. 360-127.000.
Taki, Yasuhito: *See—*
Ohashi, Yasusuke; Fujino, Toshihiro; Taki, Yasuhito; and Nishijima, Tamotsu, 5,024,815, Cl. 420-487.000.
Takiguchi, Takao: *See—*
Neishi, Toshie; Kikuchi, Toshihiro; Takiguchi, Takao; Suzuki, Koichi; and Matsumoto, Masakazu, 5,024,912, Cl. 430-59.000.
Takokoro, Michihiro; Okada, Kazuo; and Imai, Hitoshi, to Mitsubishi Denki Kabushiki Kaisha. Magneto-optic recording and reproducing apparatus including a multiple layer recording medium having a premagnetized bias layer replacing an external bias magnetic. 5,025,430, Cl. 369-13.000.
Tallman, James L.; and Sherbeck, Terry G., to Tektronix, Inc. Method which provides debounced inputs from a touch screen panel by waiting until each x and y coordinates stop altering. 5,025,411, Cl. 364-900.000.
Tamura, Akihiko: *See—*
Shoji, Hisashi; Tamura, Akihiko; Itaya, Masahiko; Fuma, Hiroshi; and Soma, Shinobu, 5,024,181, Cl. 118-658.000.
Tamura, Fumiaki: *See—*
Junji; and Tamura, Fumiaki, 5,024,505, Cl. 350-96.220.
Tamura, Katsuyoshi, to Hitachi, Ltd. Cathode-ray tube with its display front protected from undesirable electrification. 5,025,490, Cl. 313-479.000.
Tamura, Tadashi: *See—*
Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, 5,025,474, Cl. 381-90.000.
Tan, Josef N. S., to Critikon, Inc. Epidural oxygen sensor. 5,024,226, Cl. 128-633.000.
Tanabe Machinery Co., Ltd.: *See—*
Toriyama, Daigoro, 5,024,478, Cl. 294-88.000.
Tanahashi, Tyo: *See—*
Yamada, Ichiji; Inuzuka, Yutaka; Murakami, Michiyuki; Suzuki, George; Tanahashi, Tyo; and Kondo, Takeshi, 5,024,117, Cl. 74-473.00P.
Tanaka, Fumiki: *See—*
Inoue, Haruki; Funabashi, Motohisa; Yahiro, Masakazu; and Tanaka, Fumiki, 5,025,499, Cl. 364-165.000.
Tanaka, Hiroaki; Enya, Takeshi; and Nakamura, Katsumi, to Nippondenso Co., Ltd.; and Nippon Soken, Inc. Power source circuit and bridge type measuring device with output compensating circuit utilizing the same. 5,024,101, Cl. 73-766.000.
Tanaka, Hiroshi: *See—*
Tsutahara, Kouichirou; and Tanaka, Hiroshi, 5,025,133, Cl 219-462.000.
Tanaka, Hiroyuki: *See—*
Akasaki, Yutaka; Aonuma, Hidekazu; Nukada, Katsumi; Tokita, Akihiko; Suto, Hidemi; Sato, Katsuhiro; and Tanaka, Hiroyuki, 5,024,911, Cl. 430-58.000.
Tanaka, Koji; and Shima, Takashi, to Isuzu Motors Limited. Regenerative braking system for car. 5,024,489, Cl. 303-3.000.
Tanaka, Masaki; Ohashi, Hiroshi; and Takahashi, Yoshinobu, to Shin-Etsu Chemical Co., Ltd. Silicone-based fabric finishing agent. 5,025,076, Cl. 528-33.000.
Tanaka, Minoru, to Seiko Epson Corporation. Magnetic actuator. 5,024,542, Cl. 400-124.000.
Tanaka, Nariaki: *See—*
Yoshida, Takeshi; Nakatani, Kaname; Fukami, Toshiyuki; and Tanaka, Nariaki, 5,024,913, Cl. 430-67.000.
Tanaka, Nobuhiro; Hirata, Eiji; Moriguchi, Hideyuki; Azekura, Ko; Tsubone, Akira; and Ryu, Yasunori, to Kao Corporation; and Seibu Electric & Machinery Co., Ltd Goods handling method and apparatus thereof. 5,024,572, Cl. 414-276.000.

Tanaka, Ryuji: *See—*
Masuyama, Masaru; Takemae, Yoshihiro; Endoh, Tetsuhiko; Komyoji, Hirosuke; Tanaka, Ryuji; and Itakura, Katsuhiko, 5,025,415, Cl. 365-52.000.
Tanaka, Tamaki: *See—*
Omata, Tetsuo; Senda, Shuji; Tanaka, Tamaki; Kumagai, Eriko; Kajimoto, Chikara; and Nakazono, Yutaka, 5,024,832, Cl. 424-84.000.
Tanaka, Tsuneo; Sato, Kazue; Takewa, Hiroyuki; Kurozuka, Akira; Tamura, Tadashi; Hattori, Katsuji; Takayama, Satoshi; Murata, Kosaku; Satoh, Katsuaki; Serikawa, Mituhiko; Kimura, Youichi; and Obata, Shuichi, to Matsushita Electric Industrial Co., Ltd. Speaker system with image projection screen. 5,025,474, Cl. 381-90.000.
Tancrell, Roger H.: *See—*
Wilson, David T.; and Tancrell, Roger H., 5,024,872, Cl. 428-212.000.
Tang, John C.; and Minneman, Scott L., to Xerox Corporation. Apparatus allowing remote interactive use of a plurality of writing surfaces. 5,025,314, Cl. 358-93.000.
Tang, William C.; and Howe, Roger T., to University of California, Regents of the. Laterally driven resonant microstructures. 5,025,346, Cl. 361-283.000.
Tangradi, Leroy J.: *See—*
Csongor, Rezso J.; and Tangradi, Leroy J., 5,025,485, Cl. 455-12.000.
Tani, Hiromichi: *See—*
Kiriseko, Tadashi; Tani, Hiromichi; Soma, Noriko; Shigemi, Nobuhisa; and Toyoda, Takayuki, 5,024,570, Cl. 414-222.000.
Taniguchi, Hiroshi; Kubo, Kanji; and Nakase, Hiromi, to Matsushita Electric Industrial Co., Ltd. Electronically controlled magnetic tape editing device. 5,025,329, Cl. 360-77.160.
Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Photographic camera. 5,025,275, Cl. 354-106.000.
Tanihara, Isaji: *See—*
Matuo, Ken-iti; Nakata, Muneo; Hori, Mitukazu; and Tanihara, Isaji, 5,025,238, Cl. 335-128.000.
Tanii, Junichi: *See—*
Ishimura, Toshihiko; Okuno, Akira; Tanii, Junichi; and Seki, Reiji, 5,025,239, Cl. 335-265.000.
Tanji, Masaki; and Nishijima, Toyoki, to Konica Corporation. Light-sensitive silver halide photographic material. 5,024,932, Cl. 430-567.000.
Tank, John T., to Pyropower Corporation. Multi-stage vortex reactor. 5,024,684, Cl. 55-92.000.
Tardio, Don: *See—*
Bensoussan, David; and Tardio, Don, 5,025,134, Cl. 219-494.000.
Tatch, Michael D.: *See—*
Miller, Phillip E.; Katz, Leonoard R.; Nath, Raymond J.; Blaushild, Ronald M.; Tatch, Michael D.; Kordalski, Frank J.; Wykstra, Donald T.; and Kavalkovich, William M., 5,025,129, Cl. 219-201.000.
Tateishi, Kiyoshi; Sakata, Haruyasu; Tawaragi, Yuji; Suzuki, Masanori; and Ohie, Takayuki, to Pioneer Electronic Corporation. Tracking servo apparatus of disk player. 5,025,434, Cl. 369-44.360.
Tatsumi, Takumi: *See—*
Murano, Katsuaki; Yamashita. Yoshinori; Hirano, Sadayuki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,024,310, Cl. 192-0.076.
TAURUS Gumiipari Vallalat: *See—*
Fejerdy, Istvan; Farkas, Otto ; and Havasi, Gabor, 5,024,424, Cl 267-64.270.
Tawada, Yoshihisa: *See—*
Murakami, Satoru; Yamaguchi, Minori; Hayashi, Akimine; Kondo, Masataka; and Tawada, Yoshihisa, 5,025,297, Cl. 357-30.000.
Tawara, Yoshio: *See—*
Matsumoto, Fukuji; Tawara, Yoshio; Hayashi, Michio; and Yamada, Osamu, 5,024,423, Cl. 266-283.000.
Tawaragi, Yuji: *See—*
Tateishi, Kiyoshi; Sakata, Haruyasu; Tawaragi, Yuji; Suzuki, Masanori; and Ohie, Takayuki, 5,025,434, Cl. 369-44.360.
Taya, Hiroyuki; Yoshinuma, Mikio; Yamada, Takeshi; Nishide, Kenji; Suzuki, Fumio; Fujimoto, Hirohisa; and Yamauchi, Ryozo, to Fujikura Ltd. Manufacturing method for polarization maintaining optical fiber couplers. 5,024,501, Cl. 350-96.150.
Taylor, Dale F., to General Electric Company. Corrosion resistant composite claddings for nuclear fuel rods. 5,024,809, Cl. 376-417.000.
Taylor, Jeffrey L.: *See—*
Goad, Conrad D.; and Taylor, Jeffrey L., 5,024,851, Cl. 427-2.000.
Taylor, Stewart S., to TriQuint Semiconductor, Inc. High-gain low-noise amplifier. 5,025,226, Cl. 330-277.000.
Tazi, Mohammed: *See—*
Helioff, Michael W.; Tazi, Mohammed; Kwak, Yoon T.; and Login, Robert B., 5,024,779, Cl. 252-162.000.
Tchatalian, Bruno: *See—*
Renaudin, Robert; and Tchatalian, Bruno, 5,024,863, Cl. 376-270.000.
Technical Products Co., Ltd.: *See—*
Saitoh, Takashi, 5,024,640, Cl. 493-127.000
Teijin Seiki Company Limited: *See—*
Ako, Hidenobu, 5,025,199, Cl. 318-561.000.
Tektronix, Inc.: *See—*
Tallman, James L.; and Sherbeck, Terry G., 5,025,411, Cl. 364-900.000.
Teledyne Industries, Inc.: *See—*
Murray, Roger W.; and Godhwani, Nevand, 5,024,962, Cl. 437-40.000.
Telefunken electronic GmbH: *See—*
Colquhoun, Alexander; and Berchtold, Klaus, 5,025,260, Cl. 342-127.000.
Telemecanique: *See—*
Arnould, Jacques, 5,025,299, Cl. 357-45.000.
Telettra-Telefonia Elettronica e Radio S.p.A.: *See—*
Cucchi, Silvio; and Carbone, Stefano, 5,025,460, Cl. 375-118.000.
Tempel Steel Company: *See—*
Smith, Tempel, Jr.; Miletic, Veselko; Bayer, George; Coutre, Christopher A.; Reichel, William L.; and Chronowski, Mirek J., 5,025,223, Cl. 324-662.000.
Temperante, John A.: *See—*
Crater, Davis H.; Howells, Richard D.; Stern, Richard M.; and Temperante, John A., 5,025,052, Cl. 524-104.000.
Tenryu Marusawa Kabushiki Kaisha: *See—*
Osawa, Masanori, 5,024,311, Cl. 192-84.00T.
Tentler, Michael L.; and Wheeler, Gerald L. Viscosity-insensitive variable-area flowmeter. 5,024,105, Cl. 73-861.580.
Tepic, Slobodan, to Synthes U.S.A. External fixation device. 5,024,618, Cl. 606-53.000.
Terada, Masayuki; Saito, Shinji; and Miura, Asahiko, to Shin-Kobe Electric Machinery Co., Ltd. Lead storage battery. 5,024,908, Cl. 429-245.000.
Terakado, Yoshimitsu; and Yamazaki, Nobuto, to Kabushiki Kaisha Shinkawa. Wire bonding method. 5,024,367, Cl. 228-111.000.
Teranishi, Mitsuji; Watanabe, Yasuo; and Takeuchi, Akira, to Asics Corporation. Production process control system 5,025,384, Cl. 364-468.000.
Terasawa, Tomizo: *See—*
Arakawa, Masao; Terasawa, Tomizo; Ogawa, Masanobu; and Kami, Hironori, 5,025,169, Cl. 250-574.000.
Terrestrial Engineering Corporation: *See—*
Pfeil, Richard A., Jr.; and Pirrera, Charles M., 5,024,061, Cl. 62-77.000.
Terry, Claude E.: *See—*
Blakely, Lawrence W.; Howe, Michael A.; Pinholster, Daniel F., Jr.; Terry, Claude E.; and McIntosh, Robert H., Sr., 5,024,840, Cl. 424-404.000.
Terry, Lewis E.: *See—*
Fay, Gary V.; Robb, Stephen P.; Sutor, Judith L.; and Terry, Lewis E., 5,025,298, Cl. 357-41.000.
Terumo Kabushiki Kaisha: *See—*
Ide, Tetsuya, 5,024,622, Cl. 439-829.000.
Tesch, Gunter. Bed cover. 5,023,970, Cl. 5-502.000.
TESLA, koncernovy podnik: *See—*
Simecek, Cyril; and Ryba, Jiri, 5,024,233, Cl. 128-659.000.
Testa-Laboratorium A/S: *See—*
Kohnke, Ole B., 5,024,653, Cl. 604-35.000.
Tetart, Serge; and Lericque, Bernard, to Isover Saint-Gobain. Composition for gluing discontinuous mineral fibers in order to obtain insulation products. 5,025,077, Cl. 528-86.000.
Tetlow, Peter E.: *See—*
Greenshields, James N.; and Tetlow, Peter E., 5,024,821, Cl. 423-23.000.
Tetra Dev-Co: *See—*
Bordini, Giorgio; and Vincenzi, Maurizio, 5,024,584, Cl. 417-342.000.
Texaco Chemical Company: *See—*
Lin, Jiang-Jen; and Speranza, George P., 5,025,100, Cl. 549-551.000.
Sanderson, John R.; Marquis, Edward T.; and Knifton, John F., 5,025,112, Cl. 585-852.000.
Sanderson, John R.; and Knifton, John F., 5,025,113, Cl. 568-909.800.
Texaco Inc.: *See—*
Colvert, James H., 5,024,730, Cl. 196-132.000.
Texas Instruments Deutschland GmbH: *See—*
Viereck, Bruno, 5,025,492, Cl. 342-144.000.
Texas Instruments Incorporated: *See—*
Brighton, Jeffrey E., 5,025,303, Cl. 357-68.000.
Gill, Manzur; and McElroy, David J., 5,025,494, Cl. 357-23.500.
Gulley, David W.; and Van Aken, Jerry R., 5,025,407, Cl. 364-754.000.
Haken, Roger A., 5,024,960, Cl. 437-34.000.
Johnson, Randall E.; and Drumm, James M., 5,025,306, Cl. 357-75.000.
Lamb, William E.; Kowaleski, Jerome L.; Haikl, Vojtech; Bittancourt, Alan R.; and Daugherty, Harvey S., 5,025,280, Cl. 354-299.000.
Mydill, Marc R.; Pile, Sam R.; O'Keefe, Sheila; Okerblom, Neal F.; and Keenan, W. Russ, 5,025,205, Cl. 324-73.100.
Pavio, Anthony M., 5,025,232, Cl. 333-26.000.
Porter, Vernon R.; and Penn, Thomas C., 5,024,918, Cl. 430-269.000.
Stierman, Roger J.; and Lessard, Robert J., 5,024,746, Cl. 204-297.00W.
Williams, Rodney D.; and Garcia, Felix, 5,024,494, Cl. 350-3.600.
Thacker, James R., to Siemens-Pacesetter, Inc. Hemodynamically rate responsive pacemaker and method of automatically adjusting the escape and A-V intervals. 5,024,222, Cl. 128-419.0PG.
Thangavelu, Kandasamy, to Otis Elevator Company. Relative system response elevator dispatcher system using artificial intelligence to vary bonuses and penalties. 5,024,295, Cl. 187-125.000.
Theeuwes, Felix: *See—*
Edgren, David E.; and Theeuwes, Felix, 5,024,842, Cl. 424-473.000.

VOL
1127
ISS
3
JE
18
1991
UMI

Thera: *See—*
  Gasser, Oswald; Guggenberger, Rainer; and Burger, Bernd, 5,024,711, Cl. 156-153.000.
Thessin, Tyler R.: *See—*
  Gould, Nathaniel; Fontes, Michael; and Thessin, Tyler R., 5,025,476, Cl. 382-2.000.
Thetford Corporation: *See—*
  Mercer, Albert E., 5,023,959, Cl. 4-321.000.
Thibault, Paul A.: *See—*
  Bouchard, Andre C.; Thibault, Paul A.; Lagushenko Radomir; Maya, Jakob; and Maya, Jakob, 5,025,190, Cl. 313-619.000.
Thierry, Alan A.: *See—*
  Brink, Andre; Cahill, Michael J.; Dawson, John; Gardner, Juilian W.; and Thierry, Alan A., 5,024,333, Cl. 209-535.000.
Thiokol Corporation: *See—*
  Canterberry, J B.; and Flanigan, David A., 5,024,160, Cl. 102-323.000
Thomas Industries, Inc.: *See—*
  Toledo, George F., 5,024,070, Cl. 70-370.000.
Thomas, Jan B. Bicycle cooler 5,024,359, Cl. 224-36.000.
Thomas, Rudy V., to Allied-Signal Inc. Free running cinching latch plate. 5,023,980, Cl. 24-196.000.
Thomas, William H.: *See—*
  Santanam, Chandran B.; Thomas, William H.; and DeJulio, Emil R., 5,024,170, Cl. 110-264.000.
Thompson, Bobbie J.; and Thompson, Tamela T., to Thompson, Tamela T. Scarf clip adapter for brooch or earring 5,023,978, Cl. 24-3.00L.
Thompson, Tamela T.: *See—*
  Thompson, Bobbie J., and Thompson, Tamela T., 5,023,978, Cl. 24-3.00L.
Thomson-Csf: *See—*
  Bousquet, Philippe; and Lehureau, Jean-Claude, 5,025,341, Cl. 360-120.000.
Thomson Hybrides et Microondes: *See—*
  Gloanec, Maurice; Jarry, Jacques, and Lailler, Jean L., 5,025,212, Cl. 324-158.00R.
Thomson-LGT Laboratoire General des Telecommunications: *See—*
  Gauthier, Dominique, 5,025,207, Cl. 324-77.00A.
Thornborough, Raymond J.; and Strobel, Donald H., to Badger Meter, Inc. Automatic meter reading system with malfunction protection. 5,025,470, Cl. 379-107.000.
Thornton, Roy J.; and Rodriguez, Susan B., to Massey University. Method of reducing L-malic acid in juice medium. 5,024,845, Cl. 426-15.000.
Thunker, Norbert; Pollich, Gerhard, and Luxem, Heiner, to Heidelberger Druckmaschinen AG. Sheet transfer device for a printing machine. 5,024,432, Cl. 271-268.000.
Thurman, Laurance R.; Dowd, Joseph P.; and Fischer, Kathy J., to BASF Corporation. Method of producing HPN and mixtures thereof. 5,024,772, Cl. 252-1.000.
Tibbetts, Gary G.; Gorkiewicz, Daniel W.; and Hammond, Dean C., Jr., to General Motors Corporation. Apparatus for forming carbon fibers 5,024,818, Cl. 422-158.000.
Tichenor, Clyde I.: *See—*
  Zuchowski, Larry; Tichenor, Clyde I.; and Ginsburgh, Irwin, 5,024,521, Cl. 352-86.000.
Tidalgo, Max B.; and Spector, George. Dice a word. 5,024,440, Cl. 273-145.00A.
Tienken, Alfred G., to Federal-Mogul Corporation. Vehicle clearance lamp assembly. 5,025,350, Cl. 362-61.000.
Tilles, Arno W.: *See—*
  McGrath, Thomas M.; and Tilles, Arno W., 5,024,759, Cl. 210-222.000.
Tillmann, Heinz. *See—*
  Kranz, Walter; and Tillmann, Heinz, 5,024,395, Cl. 244-3.220.
Tilman, Paul A., to Zip-Pak Incorporated. Tape carried pre-cut zipper. 5,024,537, Cl. 383-63.000.
Timken Company, The: *See—*
  Otto, Dennis L., 5,024,449, Cl. 277-37.000.
Timmerman, Craig L., to Battelle Memorial Institute. System for enhanced destruction of hazardous wastes by in situ vitrification of soil. 5,024,556. Cl. 405-128.000.
Timmington, David A., to Griffin-Woodhouse Limited. End fittings for wire rope. 5,024,548, Cl. 403-78.000.
Tinney, Francis J.: *See—*
  Doherty, Annette M.; Hudspeth, James P., Kaltenbronn, James S., Repine, Joseph T.; Roark, William H; Sircar, Ila; and Tinney, Francis J., 5,024,994, Cl. 514-18.000.
Tioxide Group, PLC: *See—*
  Jones, William J.; and Appleyard, Ian P., 5,024,827, Cl 423-610.000.
Tisne-Versailles, Jacky: *See—*
  Patoiseau, Jean F.; Autin, Jean-Marie; Cousse, Henri; Sales, Veronique; Tisne-Versailles, Jacky; and Bali, Jean-Pierre, 5,025,015, Cl 514-274.000.
Todd, John: *See—*
  Yang, Huey-Lang; Todd, John; and Jou, Huey-Ling L., 5,024,933, Cl. 435-6.000.
Tohyama, Syunroku: *See—*
  Kubo, Nami; Yoshioka, Toshio; Saito, Kouichi; and Tohyama, Syunroku, 5,024,767, Cl. 210-682.000.
Tokai Rubber Industries, Ltd.: *See—*
  Miyakawa, Shinji; and Ito, Michio, 5,024,461, Cl. 280-710.000.
Tokin Corporation: *See—*
  Kaneko, Katsuhiko; and Nishida, Minoru, 5,024,388, Cl. 241-301.000.
Tokita, Akihiko: *See—*
  Akasaki, Yutaka; Aonuma, Hidekazu; Nukada, Katsumi; Tokita, Akihiko; Suto, Hidemi; Sato, Katsuhiro; and Tanaka, Hiroyuki, 5,024,911, Cl. 430-58.000.
Toko, Inc.: *See—*
  Kasahara, Takeshi, 5,024,955, Cl. 437-27.000.
Tokyo Eizai Laboratory Co., Ltd.: *See—*
  Shiono, Katuaki, 5,024,216, Cl. 128-80.00C.
Tokyo Electric Co., The: *See—*
  Ohshima, Masaaki; Kobayashi, Akira; Atsumi, Senji; and Shimada, Hiromi, 5,024,907, Cl. 429-191.000.
Tokyo Electric Co., Ltd.: *See—*
  Suzuki, Michio, 5,025,397, Cl. 364-519.000.
Toledo, George F., to Thomas Industries, Inc. Lock mounting pad. 5,024,070, Cl. 70-370.000.
Tomeraasen, Paul L.: *See—*
  Miller, Steven D.; McDonald, Joseph C.; Eichner, Fred N.; and Tomeraasen, Paul L., 5,025,159, Cl. 250-337.000.
Tomisawa, Yutaka; Fukuda, Toshikazu; and Inoue, Kazuhiko, to Kabushiki Kaisha Tosniba. Semiconductor device for detecting or emitting a magnetic line of force or light. 5,025,305, Cl. 357-72.000.
Tomita, Katsuhiko: *See—*
  Kotani, Haruo; and Tomita, Katsuhiko, 5,024,951, Cl. 436-8.000.
Tomita, Koji: *See—*
  Konishi, Masataka; Tomita, Koji; Oka, Masahisa; and Numata, Ken-ichi, 5,025,023, Cl. 514-183.000.
Tomita, Seisuke: *See—*
  Yamagishi, Hisashi; Kakiuchi, Shinichi; and Tomita, Seisuke, 5,024,444, Cl. 273-232.000.
Tomizawa, Takashi: *See—*
  Nakata, Takashi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Horaguchi, Yoichi, 5,025,281, Cl. 355-27.000.
Tool, Cornelis J. J.: *See—*
  Cordfunke, Erik H P.; and Tool, Cornelis J. J., 5,025,152, Cl. 250-281.000.
Tooley, Patricia A.; Cheung, Tin-Tack P.; Cymbaluk, Ted H.; Nowack, Gerhard P.; and Johnson, Marvin M., to Phillips Petroleum Company. Sorption of trialkyl arsines. 5,024,683, Cl. 55-74.000.
Tooley, Patricia A.: *See—*
  Sughrue, Edward L., II; Tooley, Patricia A.; Bertus, Brent J.; and Grayson, Bille S., 5,024,750, Cl. 208-57.000.
Toray Industries, Inc.: *See—*
  Kubo, Nami; Yoshioka, Toshio; Saito, Kouichi; and Tohyama, Syunroku, 5,024,767, Cl. 210-682.000.
Toray Silicone Company, Limited: *See—*
  Yoshida, Keiji; and Hamada, Mitsuo, 5,025,054, Cl. 524-267.000.
Toriyama, Daigoro, to Tanabe Machinery Co., Ltd. Box hlank holding device in a box-making machine. 5,024,478, Cl. 294-88.000.
Torok, Gabor P.: *See—*
  Craft, Adam B.; and Torok, Gabor P., 5,025,211, Cl. 324-158.00R.
Torok, Vilmos; and Loreth, Andrzej, to Astra-Vent AB. Electrostatic air treatment and movement system. 5,024,685, Cl. 55-117.000.
Torremans, Joseph L. G.: *See—*
  Janssens, Frans E.; Torremans, Joseph L. G.; and Hens, Jozef F., 5,025,014, Cl. 514-258.000.
Torres, James E., to Ethyl Corporation. Ultraviolet-radiation stabilizer and flame retardant systems. 5,025,050, Cl. 524-91.000.
Torrington Company, The: *See—*
  La Croix, Mark E., 5,025,240, Cl. 335-284.000.
Tosaka, Masaki: *See—*
  Deguchi, Katsuhiko; Saito, Kozo; Saijo, Hiroyuki; and Tosaka, Masaki, 5,025,069, Cl. 252-174.170.
Toshita, Mitsuhiro: *See—*
  Moriwaki, Nobuyuki; Higuchi, Mitsuhiro; and Toshita, Mitsuhiro, 5,025,422, Cl. 365-233.500.
Touyer, Gaetan: *See—*
  Demoute, Jean-Pierre; Touyer, Gaetan; and Mouren, Michel, 5,024,828, Cl. 424-1.100.
Townsend Engineering Company: *See—*
  Dubois, Gerald N., III, 5,025,175, Cl. 307-326.000.
Townsend, Wesley P.: *See—*
  Burack, John J.; LeGrange, Jane D.; and Townsend, Wesley P., 5,024,873, Cl. 428-220.000.
Toyoda, Takayuki: *See—*
  Kiriseko, Tadashi; Tani, Hiromichi; Soma, Noriko; Shigemi, Nobuhisa; and Toyoda, Takayuki, 5,024,570, Cl. 414-222.000.
Toyota Jidosha Kabushiki Kaisha: *See—*
  Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki; Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.
  Nishii, Michiharu, Mizuno, Genji; Nomura, Yoshihisa; and Kato, Masahiko, 5,024,492, Cl. 303-114.000.
  Yamada, Ichiji; Inuzuka, Yutaka; Murakami, Michiyuki; Suzuki, George; Tanahashi, Tyo; and Kondo, Takeshi, 5,024,117, Cl. 74-473.00P.
Treadway, C. Arthur. Golf club rain sack. 5,024,259, Cl 150-159.000.
Tredegar Industries, Inc.: *See—*
  Harp, Raymond S.; and Smith, Donald L., 5,024,799, Cl 264-284.000.

Triplett, Benny L.: *See—*
  Hill, Berlie R.; Watson, Thomas F., Sr.; and Triplett, Benny L., 5,024,875, Cl. 428-267.000.
TriQuint Semiconductor, Inc.: *See—*
  Taylor, Stewart S., 5,025,226, Cl. 330-277.000.
Trommer, Gert: *See—*
  Poisel, Hans; and Trommer, Gert, 5,025,148, Cl. 250-227.120.
Trouet, Andre: *See—*
  Rao, KSP Siva Bhushana; Dejonghe, Jean-Paul; Collard, Marie-Paule; and Trouet, Andre, 5,024,835, Cl. 424-85.910.
Trovati, Aldo: *See—*
  Prelini, Cesare; Trovati, Aldo; Gambini, Tiziana; and Stefanoli, Vittorio, 5,024,674, Cl. 8-554.000.
Truchet, Gaston, to S.A. des Etablissements Staubli. Device for coupling element-holding plates of multiple connections. 5,024,467, Cl. 285-36.000.
True, Donald C.: *See—*
  Kennedy, David L.; True, Donald C.; and Welsh, David M., 5,024,158, Cl. 102-275.110.
Trusch, Raymond B., to United Technologies Corporation. Joule-Thomson refrigeration cycle employing a reversible drive electrochemical compressor. 5,024,060, Cl. 62-51.200.
Trusco Tank, Inc.: *See—*
  Trussler, Jared A., 5,024,715, Cl. 156-245.000.
Trussler, Jared A., to Trusco Tank, Inc. Method for fabricating secondary containment capsule for underground storage tank. 5,024,715, Cl. 156-245.000.
TRW Inc.: *See—*
  Jansen, Michael; Sergant, Moshe; Ou, Szutsun S.; Wilcox, Jaroslava Z.; Yang, Jane J.; and Eaton, Larry R., 5,025,451, Cl. 372-50.000.
Trybulski, Eugene J.; and Brabander, Herbert J., to American Cyanamid Company. (3-amino-1-propynyl)methylthiothiophene derivatives. 5,025,099, Cl. 548-527.000.
Tsai, Jiunn-Yann: *See—*
  Chen, Mao-Chieh; Tsui, Bing-Yue; and Tsai, Jiunn-Yann, 5,024,954, Cl. 437-24.000.
Tsao, Nai-Cheng: *See—*
  Kahl, W. Henry; Price, David E.; and Tsao, Nai-Cheng, 5,024,471, Cl. 292-97.000.
Tso, Rosa Y. M.: *See—*
  Mui, Paul Y. H.; and Tso, Rosa Y. M., 5,024,547, Cl. 401-195.000.
Tsubone, Akira: *See—*
  Tanaka, Nobuhiro; Hirata, Eiji; Moriguchi, Hideyuki; Azekura, Ko; Tsubone, Akira; and Ryu, Yasunori, 5,024,572, Cl. 414-276.000.
Tsuchida, Takefumi; Yoshida, Minoru; Kodama, Yoshimi; and Moriyama, Masahiro, to Sanyo Electric Co., Ltd. Recording-reproducing system having movable reel chassis. 5,025,332, Cl. 360-85.000.
Tsuchida, Yasuyuki; and Nakanishi, Yuki, to Sanyo Electric Co., Ltd. Vacuum cleaner. 5,023,973, Cl. 15-319.000.
Tsuchiya, Paul F.; and Stine, Robert H., to Mitre Corporation, The. Dynamic address binding in communication networks. 5,025,491, Cl. 340-825.520.
Tsuchiya, Yutaka: *See—*
  Aoshima, Shinichiro; Urakami, Tsuneyuki; and Tsuchiya, Yutaka, 5,025,142, Cl. 250-201.900.
Tsuda Industries Company, Ltd.: *See—*
  Yamada, Ichiji; Inuzuka, Yutaka; Murakami, Michiyuki; Suzuki, George; Tanahashi, Tyo; and Kondo, Takeshi, 5,024,117, Cl. 74-473.00P.
Tsui, Bing-Yue: *See—*
  Chen, Mao-Chieh; Tsui, Bing-Yue; and Tsai, Jiunn-Yann, 5,024,954, Cl. 437-24.000.
Tsukada, Nobuo, to Seiko Instruments Inc. Ultrasonic motor. 5,025,186, Cl. 310-323.000.
Tsukada, Shuya; Mochinaga, Nobuyuki; and Kanoe, Yasuo, to Casio Computer Co., Ltd. Manually operable sweeping-type printing apparatus. 5,024,541, Cl. 400-88.000.
Tsunashima, Makoto; Uchida, Hiroto; Sakai, Kazuhiro; and Miyauchi, Masato, to Mitsubishi Kinzoku Kabushiki Kaisha. Composition using Schiff base copper complex for preparing compound metal oxides. 5,024,991, Cl. 505-1.000.
Tsunoda, Yoshito: *See—*
  Arimoto, Akira; Saito, Susumu; Tsunoda, Yoshito; Moriyama, Shigeo; and Mochizuki, Takeshi, 5,025,268, Cl. 346-108.000.
Tsushima, Susumu: *See—*
  Nomura, Hiroaki; Nishikawa, Kohei; Tsushima, Susumu; and Kozai, Yoshio, 5,025,005, Cl. 514-183.000.
Tsutahara, Kouichirou; and Tanaka, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor wafer heating device. 5,025,133, Cl. 219-462.000.
Tsuzuki, Sadachika *See—*
  Kamimura, Kenji; and Tsuzuki, Sadachika, 5,025,377, Cl 364-424.020.
Tu, Roger; Chen, David; and Mathewson, Wilfred F., to Baxter International Inc. Microporous vascular graft. 5,024,671, Cl. 623-1.000.
Turcotte, William E., II: *See—*
  Roizen, Michael; Turcotte, William E., II; and Pfisterer, Richard E., 5,025,374, Cl. 364-413.020.
Turk, Amos, to Brassey, J. Michael. Caustic-impregnated activated carbons for removal of hydrogen sulfide. 5,024,682, Cl. 55-73.000.
Turlik, Iwona: *See—*
  Reisman, Arnold; and Turlik, Iwona, 5,025,304, Cl. 357-71.000.
Turmac Tobacco Company B.V.: *See—*
  Hulsman, Severien; and Salemink, Johannes H. A. G., 5,024,241, Cl. 131-84.200.
Turner, Frederick T.; Hutchinson, Martin A.; Shaw, R. H.; and Lamont, Lawrence T., Jr., to Varian Associates, Inc. Wafer coating system. 5,024,747, Cl. 204-298.090.
Tyler, Hugh J., to Alcon Surgical, Inc. Insulated infusion and aspiration probe. 5,024,654, Cl. 604-43.000.
Tymiak, Adrienne: *See—*
  Aklonis, Carol A.; Ax, Helen A.; Kirsch, Donald R.; O'Sullivan, Joseph; Tymiak, Adrienne; and Wells, J. Scott, 5,024,839, Cl. 424-115.000.
Ubayama, Takashi; Suzuki, Eiichi; and Morishima, Morito, to Yamaha Corporation. EFM-signal comparator. 5,025,173, Cl. 307-265.000.
Uchida, Hiroshi; and Kubota, Norio, to Murata Kikai Kabushiki Kaisha. Kink preventing device for winder. 5,024,392, Cl. 242-128.000.
Uchida, Hiroto: *See—*
  Tsunashima, Makoto; Uchida, Hiroto; Sakai, Kazuhiro; and Miyauchi, Masato, 5,024,991, Cl. 505-1.000.
Uchida, Masami: *See—*
  Ohta, Takeo; Uchida, Masami; Kotera, Koichi; and Matsubara, Kunihiro, 5,024,910, Cl. 430-19.000.
Uchida, Naoshi: *See—*
  Miura, Masao; Uchida, Naoshi; Takahashi, Tatsunori; Asakawa, Kouji; and Nozawa, Eiji, 5,025,236, Cl. 335-46.000.
Uchiyama, Shigeru, to Casio Computer Co., Ltd. Pitch control device for electronic stringed instrument. 5,024,134, Cl. 84-654.000.
Ueda, Hiroshi: *See—*
  Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, 5,025,275, Cl 354-106.000.
Ueda, Mitsuru; Kanno, Tatsuya; Iguchi, Yoshihiro; and Oshino, Yasuhiro, to Daicel Chemical Industries, Ltd. Process for preparation of polycarbonate. 5,025,083, Cl. 528-199.000.
Ueda, Tetsuya; Tachikawa, Toru; and Takehara, Masataka, to Mitsubishi Denki Kabushiki Kaisha. Modular semiconductor device. 5,025,307, Cl. 357-80.000.
Uematsu, Tsuyoshi; and Saitoh, Tadashi, to Hitachi, Ltd. Method for producing opto-electric transducing element. 5,024,953, Cl. 437-2.000.
Ueno, Kazuo: *See—*
  Saeki, Kiyoshi; Ohtsuki, Toshinori; and Ueno, Kazuo, 5,025,269, Cl. 346-108.000.
Uhlig, Karl-Heinz: *See—*
  Jakobson, Gerald; Siemanowski, Werner, and Uhlig, Karl-Heinz, 5,024,787, Cl. 260-410.600.
Ukima Colour & Chemicals Mfg. Co. Ltd.: *See—*
  Hanada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, 5,024,893, Cl. 428-423.100.
Ultra-Centrifuge Nederland N.V.: *See—*
  Cordfunke, Erik H. P.; and Tool, Cornelis J. J., 5,025,152, Cl. 250-281.000.
UltraFine Powder Technology, Inc.: *See—*
  Ashdown, Charles P.; Bewley, James G.; and Kenney, George B., 5,024,695, Cl. 75-338.000
Umezawa, Kazuhisa, to Seiko Instruments, Inc. Recording apparatus coupled ink supply tubes. 5,025,270, Cl. 346-140.00R.
Unde, Madhav A. Welding process. 5,024,371, Cl. 228-216.000.
Unetsubo, Kenji: *See—*
  Iwabuchi, Masaburo; Ito, Hideyoshi; and Unetsubo, Kenji, 5,024,867, Cl. 428-40.000.
Union Camp Corporation: *See—*
  Smith, George A., 5,025,043, Cl. 523-326.000.
Union Carbide Chemicals and Plastics Technology Corporation: *See—*
  Alsop, George M., 5,024,952, Cl. 436-177.000.
  King, Stephen W., 5,025,094, Cl. 568-623.000.
Union Oil Company of California: *See—*
  Gallup, Darrell L., 5,024,769, Cl. 210-721.000.
Unisys Corporation: *See—*
  Mathur, Sanjay S.; and Fernando, John S., 5,025,365, Cl. 364-200.000.
  Stamness, Jesse I.; Morrow, Raymond W., and Asato, Edward E., 5,025,327, Cl. 360-45.000.
United States of America
  Administer, National Aeronautics and Space Administration: *See—*
    Nguyen, Tien M., 5,025,455, Cl. 375-53.000.
  Air Force: *See—*
    Froes, Francis H.; and Eylon, Daniel, 5,024,369, Cl. 228-157.000.
    Fuschetto, Anthony N., 5,025,183, Cl. 310-20.000.
    Horner, Joseph L., 5,024,508, Cl. 350-162.130.
    Rhodes, Melvin H., 5,025,224, Cl. 328-127.000.
  Energy: *See—*
    Filby, Evan E.; and Rankin, Richard A., 5,025,391, Cl 364-513.000.
    Gregory, Danny L.; Priddy, Tommy G.; Smallwood, David O.; and Woodall, Tommy D., 5,024,096, Cl. 73-663.000.
    Jubin, Robert T.; and Randolph, John D., 5,024,647, Cl. 494-37.000.
    Leong, Robert, 5,024,602, Cl. 439-107.000.
    Miller, Phillip E.; Katz, Leonoard R.; Nath, Raymond J.; Blaushild, Ronald M.; Tatch, Michael D.; Kordalski, Frank J.; Wykstra, Donald T.; and Kavalkovich, William M., 5,025,129, Cl. 219-201.000.
  Health and Human Services: *See—*
    Ito, Yoichiro, 5,024,758, Cl. 210-198.200.
  National Aeronautics and Space Administration: *See—*
    Shepherd, Kevin P.; and Grosveld, Ferdinand M. W. A., 5,024,288, Cl. 181-206.000.

VOL
1127
ISS
3
JE
18
1991
UMI

- Navy: *See—*
  - Dayhoff, Edward S., 5,025,143, Cl. 250-203.300.
  - Meekins, John F., 5,025,464, Cl. 378-84.000.
  - Prinz, Gary A., 5,025,416, Cl. 365-170.000.
  - Ramstedt, Clarence F., 5,025,218, Cl. 324-334.000.
  - Sitzmann, Michael E., 5,025,102, Cl. 558-6.000.
  - Suter, Henry, 5,025,425, Cl. 367-96.000.
- U.S. Philips Corp.: *See—*
  - Becker, Johann A.; Deusser, Peter G.; and Holzmann, Olar W. R., 5,024,498, Cl. 350-96.100.
  - Bethe, Klaus W. B., 5,024,107, Cl. 73-862.650.
  - Broer, Dirk J.; and Van Der Veen, Jan, 5,024,850, Cl. 428-1.000.
  - Ganser, Hans G.; Schafer, Ralf; and Stormberg, Hans P., 5,025,197, Cl. 315-172.000.
  - Graeger, Volker; and Kobs, Rolf U. D., 5,024,097, Cl. 73-727.000.
  - Hains, Ralph N., 5,025,250, Cl. 340-811.000.
  - Heinrich, Norbert, 5,025,371, Cl. 369-219.000.
  - Janssen, Augustus J. E. M.; Veldhuis, Raymond N. J.; Prins, Hendrik J.; and Vries, Lodewijk B., 5,025,404, Cl. 364-723.000.
  - Morris, Octavius J.; and Moran, David, 5,025,478, Cl. 382-22.000.
  - Schwartzbach, Bjarne, 5,025,231, Cl. 331-116.00R.
  - Van Der Velden, Johannes W. A.; Maas, Henricus G. R.; and Van Iersel-Schiffmacher, Marguerite M. C., 5,024,956, Cl. 437-31.000.
  - Van Heusden, Omar P. L. P.; and Verheyen, Jozef H. M. R., 5,025,433, Cl. 369-44.140.
  - Van Vaals, Johannes J., 5,025,217, Cl. 324-322.000.
  - Veenis, Aartje W.; and Mimnagh, Winslow M., 5,025,435, Cl. 369-48.000.
- United States Surgical Corporation: *See—*
  - Holzwarth, Henry A., 5,024,322, Cl. 206-63.300.
- United Technologies Corporation: *See—*
  - Otfinoski, William F., 5,024,884, Cl. 428-328.000.
  - Trusch, Raymond B., 5,024,060, Cl. 62-51.200.
  - Winston, Charles R., Jr., 5,024,535, Cl. 374-178.000.
- University of California, Regents of the: *See—*
  - Howard, Dwight L.; and Johnson, Chris A., 5,024,519, Cl. 351-226.000.
  - Morris, Donald E., 5,024,992, Cl. 505-1.000.
  - Rapoport, Henry; and Sauerberg, Per, 5,025,027, Cl. 514-376.000.
  - Tang, William C.; and Howe, Roger T., 5,025,346, Cl. 361-283.000.
- University of Florida: *See—*
  - Bodor, Nicholas S., 5,024,998, Cl. 514-58.000.
  - Bova, Frank J.; Fitzgerald, Lawrence T.; and Mauderli, Walter, 5,025,376, Cl. 364-413.260.
- University of Kentucky Research Foundation: *See—*
  - Carney, John M.; and Floyd, Robert A., 5,025,032, Cl. 514-400.000.
- University of Kentucky Research Foundation, Inc., The: *See—*
  - Collins, Glenn B.; Hildebrand, David F.; Lazzeri, Paul A.; Adams, Thomas R.; Parrott, Wayne A.; and Hartweck, Lynn M., 5,024,944, Cl. 435-172.300.
- University of Liverpool, The: *See—*
  - Berry, John P., 5,024,789, Cl. 264-6.000.
- University of Minnesota, Regents of the: *See—*
  - Vardoulakis, Ioannis; Labuz, Joseph F.; and Papamichos, Euripides, 5,024,103, Cl. 73-819.000.
- University of Pittsburgh: *See—*
  - DePellegrini, Donald D.; Acker, William E.; and Hoff, Richard, 5,024,038, Cl. 52-700.000.
- University of Rochester, The: *See—*
  - Bryant, Robert G.; Hornak, Joseph P.; and Marshall, Eric A., 5,024,229, Cl. 128-653.0SC.
- Unotech Corporation: *See—*
  - Lassota, Marek J., 5,024,588, Cl. 418-1.000.
- Unsworth, John. Shower curtain retainer. 5,023,964, Cl. 4-558.000.
- Urakami, Tsuneyuki: *See—*
  - Aoshima, Shinichiro; Urakami, Tsuneyuki; and Tsuchiya, Yutaka, 5,025,142, Cl. 250-201.900.
- Urban, Rudolf; Fritsch, Josef; and Schoen, Klaus-Peter, to Hoechst Aktiengesellschaft. Process for filling tubular casings. 5,024,041, Cl. 53-449.000.
- Urushidani, Haruo: *See—*
  - Sato, Isao; Kirikami, Seiichi; Shimura, Akira; Hirose, Fumiyuki; Inose, Hiroshi; Urushidani, Haruo; and Arai, Osamu, 5,024,055, Cl. 60-39.270.
- Ushio Denki Kabushiki Kaisha: *See—*
  - Odagaki, Toru, 5,025,188, Cl. 313-273.000.
  - Okamoto, Manabu, 5,025,192, Cl. 313-623.000.
- Ushio, Sadakatsu; Nakamura, Noboru; Higashi, Hirofumi; Iwata, Masataka; and Niwa, Fumiyasu, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Engine unit. 5,024,189, Cl. 123-195.00R
- Usui, Hiroshi: *See—*
  - Nakamura, Arao; Manabe, Tsuneo; Sugimoto, Naoki, and Usui, Hiroshi, 5,024,974, Cl. 501-57.000
- Usui Kokusai Sangyo Kaisha Ltd.: *See—*
  - Usui, Masayoshi, 5,024,198, Cl. 123-468.000.
- Usui, Masayoshi, to Usui Kokusai Sangyo Kaisha Ltd. Fuel delivery rail assembly. 5,024,198, Cl. 123-468.000.
- Usuki, Hideo: *See—*
  - Komatsu, Fumito; Usuki, Hideo; and Oguchi, Yuzo, 5,024,088, Cl. 73-517.00B.
- USX Corporation: *See—*
  - Cooley, William G., 5,024,421, Cl. 266-210.000.
- Utsugi, Yoshio: *See—*
  - Arai, Kei; Ohashi, Minoru; Utsugi, Yoshio; Oka, Osamu, Numazawa, Kenichi; Miwa, Kenji; and Sugawara, Kenzo, 5,024,816, Cl. 422-68.100.
- Uwaydah, Ibrahim M.: *See—*
  - Lo, Young S.; Walsh, David A.; and Uwaydah, Ibrahim M., 5,025,031, Cl. 514-399.000.
- Vadher, Dinesh L. Vial construction and method. 5,024,256, Cl. 141-329.000.
- Vaioleti, Timote M.: *See—*
  - Vinden, Peter; Burton, Russell J.; and Vaioleti, Timote M., 5,024,861, Cl. 427-254.000.
- Valdois, Michel: *See—*
  - Petitjean, Luc; and Valdois, Michel, 5,024,098, Cl. 73-729.000.
- Vale, Ronald W.: *See—*
  - Carlsen, George D., II; and Vale, Ronald W., 5,025,473, Cl. 381-88.000.
- Valmet Paper Machinery Inc.: *See—*
  - Kuhasalo, Antti; Viitanen, Olavi; and Ilvespaa, Heikki, 5,024,729, Cl. 162-372.000.
  - Salo, Jukka; and Lehtonen, Pentti, 5,023,985, Cl. 29-132.000.
- Vana, James G., Jr.: *See—*
  - Sayegh, Emile G.; Vana, James G., Jr.; and Willey, Wendall D., 5,025,115, Cl. 174-117.00F.
- Van Aken, Jerry R.: *See—*
  - Gulley, David W.; and Van Aken, Jerry R., 5,025,407, Cl. 364-754.000.
- van den Honert, Christopher; and Stypulkowski, Paul H., to Minnesota Mining and Manufacturing Company. External ear canal pressure regulating device and tinnitus suppression device. 5,024,612, Cl. 604-36.000.
- Vandergheynst, George B.: *See—*
  - Mueller, Wolfgang F.; Popp, George; and Vandergheynst, George B., 5,024,127, Cl. 83-13.000.
- Van Der Hoorn, Rudolf J.; Jaspers, Martinus J.; and Bak, Johannes J. Boning apparatus for removing ribs from a belly. 5,023,975, Cl. 17-46.000.
- van der Tak, Hendrik: *See—*
  - Riel, Leslie L., 5,024,373, Cl. 229-68.00R.
- Van Der Veen, Jan: *See—*
  - Broer, Dirk J.; and Van Der Veen, Jan, 5,024,850, Cl. 428-1.000.
- Van Der Velden, Johannes W. A.; Maas, Henricus G. R.; and Van Iersel-Schiffmacher, Marguerite M. C., to U.S. Philips Corporation. Method of manufacturing a semiconductor device including mesa bipolar transistor with edge contacts. 5,024,956, Cl. 437-31.000.
- Van Dyke, Knox, to Cancer Biologics of America, Inc. Use of tetrandrine and its derivatives to treat malaria. 5,025,020, Cl. 514-280.000.
- Van Ee, Jan H., to Gist-brocades. Regulatory region cloning and analysis plasmid for bacillus. 5,024,943, Cl. 435-172.300.
- Van Fossen, Robert A.; Spence, Scott L.; and DeWitt, Donald E., to Johnson Service Company. Differential pressure transducer. 5,024,294, Cl. 184-108.000.
- Van Heusden, Omar P. L. P.; and Verheyen, Jozef H. M. R., to U.S. Philips Corporation. Electro-optical device. 5,025,433, Cl. 369-44.140.
- Van Iersel-Schiffmacher, Marguerite M. C.: *See—*
  - Van Der Velden, Johannes W. A.; Maas, Henricus G. R.; and Van Iersel-Schiffmacher, Marguerite M. C., 5,024,956, Cl. 437-31.000.
- van Konyenburg, Peter H.; and Au, Andrew, to Raychem Corporation. Method of heating diesel fuel utilizing conductive polymer heating elements. 5,025,131, Cl. 392-451.000.
- van Leeuwen, Petrus W. N. M.; and Roobeek, Cornelis F., to Shell Oil Company. Polymerization of CO/olefin with Hydrocarbyl-Pd halide/bidentate P ligand catalyst complex. 5,025,091, Cl. 528-392.000.
- Vansadia, Ghanshyamsinh D., to General Motors Corporation. Regenerative pump with two-stage stripper. 5,024,578, Cl. 415-55.100.
- Van Vaals, Johannes J., to U.S. Philips Corporation. Method of and device for eddy current compensation in MR apparatus. 5,025,217, Cl. 324-322.000.
- Van Winkle, David: *See—*
  - Hilligoss, William R.; Hillogoss, Lawrence D.; Van Winkle, David; and Butler, Myron C., 5,025,466, Cl. 379-1.000.
- Vardoulakis, Ioannis; Labuz, Joseph F.; and Papamichos, Euripides, to University of Minnesota, Regents of the. Surface instability detection apparatus. 5,024,103, Cl. 73-819.000.
- Varian Associates, Inc.: *See—*
  - James, Bertram G., 5,025,193, Cl. 315-5.380.
  - Turner, Frederick T.; Hutchinson, Martin A.; Shaw, R. H.; and Lamont, Lawrence T., Jr., 5,024,747, Cl. 204-298.090.
- Varley, Clement. Apparatus for receiving articles, storing them after processing and subsequently re-issuing them. 5,025,140, Cl 235-385.000.
- Vaschetto, Lorenzo; and Fazio, Luigi, to 501 Fiat Auto S.p.A. Vehicle with a reservoir incorporated in a structural element of the vehicle body. 5,024,383, Cl. 239-284.100.
- Vasconcellos, Alfred V.; and Keeler, Preston J., III, to Pfizer Hospital Products Group, Inc. Blood recovery system and method. 5,024,613, Cl. 604-4.000.
- Veasley, George F.; Klingen, Jurgen; and Landin, Donald T., to Minnesota Mining and Manufacturing Company. Cellular pressure-sensitive adhesive membrane. 5,024,880, Cl. 428-317.500.
- Veb Kombinat Polygraph "Werner Lamberz" Leipzig: *See—*
  - Hank Dietrich; and Gottlebe, Jurgen, 5,024,156, Cl. 101-216.000.
- Veenis, Aartje W.; and Mimnagh, Winslow M., to U.S. Philips Corporation. Apparatus for reading or writing contrast enhanced information optical record carrier. 5,025,435, Cl. 369-48.000.
- Vega Automation: *See—*
  - Boisseau, Jean-Louis, 5,024,641, Cl 493-171.000.

- Veldhuis, Raymond N. J.: *See—*
  - Janssen, Augustus J. E. M., Veldhuis, Raymond N. J., Prins, Hendrik J.; and Vries, Lodewijk B., 5,025,404, Cl. 364-723.000.
- Vento, Sammy J. Baseball bat exercising device. 5,024,436, Cl. 273-26.00R.
- Ventritex, Inc.: *See—*
  - Carroll, Kenneth J.; and Pless, Benjamin D., 5,025,172, Cl 307-261.000.
- Vereinigte Aluminum-Werke Aktiengesellschaft: *See—*
  - Wilkening, Siegfried, 5,024,793, Cl. 264-29.700.
- Verheyen, Jozef H. M. R.: *See—*
  - Van Heusden, Omar P. L. P.; and Verheyen, Jozef H. M. R., 5,025,433, Cl. 369-44.140.
- Verinsky, Phillip D.: *See—*
  - Dalrymple, Monte J.; Verinsky, Phillip D.; and Smith, Don, 5,025,412, Cl. 364-900.000.
- Verma, Satyajit: *See—*
  - Mason, Charles D.; Sacks, William; Engelmann, Theodore R., and Verma, Satyajit, 5,024,897, Cl 428-474.400.
- Vernitron Corporation: *See—*
  - Berger, Alexander, 5,025,201, Cl. 318-605.000.
- Veronesi, Luciano; and Ekeroth, Douglas E., to Westinghouse Electric Corp. Hydroball detector string stepping device. 5,025,158, Cl. 250-328.000.
- Vesuvius Crucible Company: *See—*
  - Fishler, Mark K.; Koten, Jean-Marie; and Dubois, Pascal, 5,024,422, Cl. 266-272.000.
- Veuhoff, Freidrich-Wilh: *See—*
  - Meinherz, Manfred, Veuhoff, Freidrich-Wilh; Gilmozzi, Gunther; and Kelch, Thomas, 5,025,118, Cl. 200-148.00R.
- Vey, Norbert: *See—*
  - Gesche, Roland; and Vey, Norbert, 5,025,135, Cl. 219-506.000.
- Vezirian, Edward. Friction bearing and cone retention thrust system for a rock bit. 5,024,539, Cl. 384-92.000.
- Via, Giorgio G.: *See—*
  - Mathad, Gangadhara S.; Stanasolovich, David; and Via, Giorgio G., 5,024,896, Cl. 428-473.500.
- Victor Company of Japan, Ltd.: *See—*
  - Hirayama, Hiromichi; Hara, Mitsuhiko; Mihara, Masato; and Harumatsu, Mitsuo, 5,025,331, Cl. 360-85.000.
  - Koguchi, Tatsushi; Ito, Shigehiro; Ebihara, Kazyuki; and Nishi, Yuji, 5,025,317, Cl. 358-167.000.
  - Mizukami, Makoto, 5,024,903, Cl. 428-694.000.
  - Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Tai, Hiromichi, 5,025,209, Cl. 324-96.000.
- Victoria University of Manchester: *See—*
  - Gurd, John R.; and Kawakami, Katsura, 5,025,367, Cl. 364-200.000.
- Victory Arms Co., Limited: *See—*
  - Smith, David E., 5,024,016, Cl. 42-25.000.
- Viereck, Bruno, to Texas Instruments Deutschland GmbH. Damping circuit for the antenna resonance circuit of a radio transmitter-receiver. 5,025,492, Cl. 342-144.000.
- Viitanen, Olavi: *See—*
  - Kuhasalo, Antti; Viitanen, Olavi; and Ilvespaa, Heikki, 5,024,729, Cl. 162-372.000.
- Villanyi, Tibor J.: *See—*
  - Free, Paul D.; Doszpoly, B.; Villanyi, Tibor J.; and Olson, David A., 5,024,200, Cl. 123-501.000.
- Vincenzi, Maurizio: *See—*
  - Bordini, Giorgio; and Vincenzi, Maurizio, 5,024,584, Cl. 417-342.000.
- Vinden, Peter; Burton, Russell J.; and Vaioleti, Timote M., to Her Majesty the Queen In Right of New Zealand Acting by and Through the Minister of Forestry for New Zealand. Gaseous or vapor phase treatment of wood with boron preservatives. 5,024,861, Cl. 427-254.000.
- Vinke, Johannes: *See—*
  - Ley, Gregor; Schultze, Wolfgang; Vinke, Johannes; and Wistuba, Eckehardt, 5,025,062, Cl. 524-556.000.
- Virginia Commonwealth University: *See—*
  - Richards, David W.; and Murphy, Kent A., 5,024,518, Cl 351-219.000.
- Virginia Polytechnic Institute and State University: *See—*
  - Richards, David W.; and Murphy, Kent A., 5,024,518, Cl 351-219.000.
- Vogel, Naomi R. Self adjusting and self securing shampoo tray 5,023,963, Cl. 4-521.000.
- Vogelsgesang, Roland: *See—*
  - Anderheggen, Wolfgang; Kraemer, Michael; Vogelsgesang, Roland; Wagner, Wolfram; Olges, Wolfgang; and Dragovic, Thomas, 5,024,797, Cl. 264-143.000.
- Von Duprin, Inc.: *See—*
  - Cohrs, Richard B., 5,024,472, Cl. 292-182.000.
- von Redwitz, Heribert, to Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V. Measuring instrument for determining the scattering and absorption coefficient of the atmosphere. 5,024,526, Cl. 356-73.000
- von Seebach, Michael. *See—*
  - Patzelt, Norbert; and von Seebach, Michael, 5,024,754, Cl 209-135.000.
- Vora, Rohitkumar H.; and Chen, Paul N., Sr., to Hoechst Celanese Corp. Copolyimides derived from 2,2-bis (amino phenyl) hexafluoropropane. 5,025,089, Cl. 528-353.000.
- Voxbrunner, Walter, to Mannesmann Rexroth GmbH. Control circuitry for a solenoid operated control valve. 5,024,417, Cl. 251-129.040.
- Vrhel, Thomas, Jr.: *See—*
  - Vrhel, Thomas, Sr.; and Vrhel, Thomas, Jr., 5,024,142, Cl. 91-271.000.
- Vrhel, Thomas, Sr.; and Vrhel, Thomas, Jr. Cyclically operating fluid drive motor with magnetically controlled diaphragm valves. 5,024,142, Cl. 91-271.000.
- Vries, Lodewijk B.: *See—*
  - Janssen, Augustus J. E. M.; Veldhuis, Raymond N. J.; Prins, Hendrik J.; and Vries, Lodewijk B., 5,025,404, Cl. 364-723.000.
- W. L. Gore & Associates, Inc.: *See—*
  - Sayegh, Emile G.; Vana, James G., Jr.; and Willey, Wendall D., 5,025,115, Cl. 174-117.00F.
- W. R. Grace & Co.-Conn.: *See—*
  - Friedrich, Steven G.; and Davis, Kent A., 5,024,044, Cl. 53-433.000.
  - Havens, Marvin R., 5,024,792, Cl. 264-22.000.
  - Jaeger, Hugh D., 5,024,004, Cl. 34-1.000
- W. Schlafhorst & Co.: *See—*
  - Grecksch, Hans; and Engelhardt, Dietmar, 5,024,389, Cl. 242-35.50A.
- Wada, Hajime: *See—*
  - Kita, Hiroshi; Wada, Hajime, and Kaneko, Yutaka, 5,024,930, Cl 430-558.000.
- Wada, Hiroyuki: *See—*
  - Miyata, Yukitaka; Wada, Hiroyuki; and Nishimura, Takashi, 5,025,166, Cl. 250-492.100.
- Waggener, Herbert A.: *See—*
  - Chen, Chin-Chen; Feldman, Martin; and Waggener, Herbert A., 5,025,165, Cl. 250-491.100.
- Waggitt, Kevin P.: *See—*
  - Darlington, Alan D.; and Waggitt, Kevin P., 5,025,362, Cl. 364-167.010.
- Waggon Union GmbH: *See—*
  - Ahlborn, Gunter; Budenbender, Herbert, and Lohmann, Alfred, 5,024,166, Cl. 105-453.000.
- Wagner, Klaus P.: *See—*
  - Nowlin, Thomas E.; and Wagner, Klaus P., 5,025,072, Cl. 526-129.000.
- Wagner, Wayne M.: *See—*
  - Barris, Marty A.; and Wagner, Wayne M., 5,024,054, Cl. 60-274.000.
- Wagner, Wolfram: *See—*
  - Anderheggen, Wolfgang; Kraemer, Michael; Vogelsgesang, Roland; Wagner, Wolfram; Olges, Wolfgang; and Dragovic, Thomas, 5,024,797, Cl. 264-143.000.
- Wahlco, Inc.: *See—*
  - Krigmont, Henry V.; Coe, Everett L., Jr., and Southam, Barry J., 5,024,171, Cl. 110-345.000.
- Wahlquist, Randall W.: *See—*
  - Bitton, Max D.; and Wahlquist, Randall W., 5,023,984, Cl. 29-81.050.
- Wakabayashi, Hideaki, to Aisin Seiki Kabushiki Kaisha. Free wheel hub system. 5,024,307, Cl. 192-40.000.
- Wallace, Jan D., to Warner-Lambert Company. Method of treating depression. 5,025,035, Cl. 514-530.000.
- Waller, Roger A., to Chrysler Corporation. Dry air purge system for vapor canister. 5,024,687, Cl. 55-316.000.
- Walley, David H. Plane-wave forming sheet explosive. 5,024,159, Cl 102-289.000.
- Walsh, David A.: *See—*
  - Lo, Young S.; Walsh, David A., and Uwaydah, Ibrahim M., 5,025,031, Cl. 514-399.000.
- Walsh, Dennis E.: *See—*
  - DeCaul, Lorenzo C.; Han, Scott; Palermo, Robert E., and Walsh, Dennis E., 5,025,109, Cl. 585-500.000.
- Walter, John: *See—*
  - Pfaffmann, George D.; Kubis, Charles S., Currie, John P., Balzer, Norbert R.; Walter, John; and Adams, Graham R., 5,025,123, Cl 219-10.750.
- Walton, Erlen B.: *See—*
  - Oliver, James L., Juriga, James A., Walton, Erlen B., and Preston, David M., 5,024,463, Cl. 280-718.000.
- Walton, Richard J., to Young, William. Metal detection circuit 5,025,227, Cl. 331-65.000.
- Wang, Chin-Teh. Lampshade-shaped animal trap. 5,024,021, Cl 43-62.000.
- Wang, I-Chung W.: *See—*
  - Derudder, James L.; and Wang, I-Chung W., 5,025,066, Cl 525-66.000.
- Wang, Jason. Back rack for alleviating musculo-skeletal tension 5,024,215, Cl. 128-75.000.
- Wang, Sophia L.; Meyer, George R.; and Brinkman, Kerry C., to Nalco Chemical Company. Corrosion inhibitor for alcohol and gasohol fuels. 5,024,677, Cl. 44-335.000.
- Wang, Tingyi, to Beiling Stone Group Co. Emergency compressed-air brake for automobiles. 5,024,490, Cl 303-9.000
- Ward Machinery Company, The: *See—*
  - Razauskas, Anthony F.; and Duncan, Marlie A., 5,024,081, Cl. 73-104.000.
- Ward, William R., to O-I Neg TV Products, Inc. Method of distributing workpieces between a conveyor and workstations. 5,024,315, Cl 198-341.000.
- Warner, Brian. Diagnostic locator for mechanically malfunctioning electronic circuitry. 5,024,095, Cl 73-661.000

VOL
1127
ISS
3
JE
18
1991
UMI

Warner-Lambert Company: *See—*
Doherty, Annette M.; Hudspeth, James P.; Kaltenhronn, James S.; Repine, Joseph T.; Roark, William H.; Sircar, Ila, and Tinney, Francis J., 5,024,994, Cl. 514-18.000.
Wallace, Jan D., 5,025,035, Cl. 514-530.000.
Warner, Richard L. Tool for forming sheet metal. 5,024,076, Cl. 72-211.000.
Warner, Steven D.; and Stufflebeam, John F., to JI. Case Corporation. Foldable implement carrier. 5,024,279, Cl. 172-1.000.
Warner & Swasey Company, The: *See—*
Ross, Jeffrey A., 5,025,214, Cl. 324-207.190.
Warren, Richard: *See—*
Holtkamp, Calvin J.; Hetrick, George L.; and Warren, Richard, 5,025,242, Cl. 337-309.000.
Washecheck, Don M.. *See—*
Kaminsky, Mark P.; Kleefisch, Mark S.; Huff, George A.; Washecheck, Don M.; Alvarado-Swaisgood, Aileen E.; and Barr, Mark K., 5,024,984, Cl. 502-303.000.
Washington State University Research Foundation, Inc.: *See—*
Pellerin, Roy F.; and Ross, Robert J., 5,024,091, Cl. 73-597.000.
Washino, Shoichi: *See—*
Ohkubo, Satoru; and Washino, Shoichi, 5,024,082, Cl. 73-117.300.
Wataya, Seiji; and Washino, Shoichi, 5,025,380, Cl. 364-431.050.
Wassenberg, Willy: *See—*
Clauss, Wolfgang; Kurze, Werner; Leifeld, Ferdinand; and Wassenberg, Willy, 5,024,736, Cl. 204-49.000.
Watanabe, Hideomi; and Okita, Tsutomu, to Fuji Photo Film Co., Ltd. Magnetic recording medium having a binder comprising a copolymer which includes a vinyl compound having a dialkylaminoalkyl group. 5,024,892, Cl. 428-423.100.
Watanabe, Isao: *See—*
Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Karuhiko; and Nagai, Takeshi, 5,024,264, Cl. 165-1.000.
Watanabe, Isato, to Seikosha Co., Ltd. Electric power supply device for hand with load. 5,025,429, Cl. 368-238.000.
Watanabe, Masaki, to Olympus Optical Company Limited. Grinding and finishing apparatus and method. 5,024,024, Cl. 51-124.00L.
Watanabe, Nobuhisa, to Sony Corporation. Microprocessor with option area adjacent CPU core facilitating interfacing with peripheral devices. 5,025,368, Cl. 364-200.000.
Watanabe. Toshio; Sato, Masahiko; Osabe, Akio; Sakayori, Hiroyuki; and Mase, Akira, to Semiconductor Energy Laboratory Co., Ltd. Method of filling a liquid crystal device with ferroelectric liquid crystal material. 5,024,255, Cl. 141-11.000.
Watanabe, Yasuo: *See—*
Teranishi, Mitsuji; Watanabe, Yasuo; and Takeuchi, Akira, 5,025,384, Cl. 364-468.000.
Wataya, Seiji; and Washino, Shoichi, to Mitsubishi Denki Kabushiki Kaisha. Method and device for controlling the operation of an engine for a vehicle. 5,025,380, Cl. 364-431.050.
Watson, Thomas F., Sr.: *See—*
Hill, Berlie R.; Watson, Thomas F., Sr.; and Triplett, Benny L., 5,024,875, Cl. 428-267.000.
Watt, John S. to Commonwealth Scientific and Industrial Research Organisation. Measurement of flow velocity and mass flowrate. 5,025,160, Cl. 250-356.100.
Watts, Leonard A.; and Espinosa, Medardo, to EDS Technologies, Inc. Stacking method and apparatus. 5,024,569, Cl. 414-790.300.
Waukesha Specialties & Fabricators: *See—*
Bartley, John E., 5,024,407, Cl. 248-164.000.
Weatherbee, H. Lloyd: *See—*
Bragg, R. D.; and Weatherbee, H. Lloyd, 5,024,052, Cl. 56-330.000.
Weber, Ronald M.: *See—*
French, Jay L.; Himes, John L., Jr.; Weber, Ronald M.; and Wise, James H., 5,024,610, Cl. 439-857.000.
Weidman, Roger F. Duct board cutter. 5,024,131, Cl 83-875.000.
Weinstein, Jerry G.: *See—*
Newkirk, Marc S.; and Weinstein, Jerry G., 5,024,794, Cl. 264-57.000.
Weinstein, Leonard M., to Dynamic Engineering, Inc. Automatic transducer selection system for pressure measurement. 5,024,100, Cl. 73-756.000.
Weiss, Peter: *See—*
Fox, Flo, 5,023,956, Cl. 2-338.000.
Wells, J. Scott: *See—*
Aklonis, Carol A.; Ax, Helen A.; Kirsch, Donald R.; O'Sullivan, Joseph; Tymiak, Adrienne; and Wells, J. Scott, 5,024,839, Cl. 424-115.000.
Welsh, David M.: *See—*
Kennedy, David L.; True, Donald C.; and Welsh, David M., 5,024,158, Cl. 102-275.110.
Wender, Harry, and Avila, Augusto F., to Empire Research Corporation. Non-reuseable hypodermic syringe. 5,024,661, Cl. 604-110.000.
Wendorff, Joachim: *See—*
Eich, Manfred; and Wendorff, Joachim, 5,024,784, Cl. 252-299.010.
Wendt, Richard W.; and Johnson, Brian, to DataCard Corporation. Method and apparatus for personalizing plastic cards 5,025,399, Cl. 364-519.000.
West, Peter: *See—*
Pitts, Warren R.; Estrada, hayden F.; and West, Peter, 5,024,898, Cl. 428-511.000.
Westeppe, Uwe: *See—*
Tacke, Peter; Grigo, Ulrich; Nouvertne, Werner; Freitag, Dieter; Idel, Karsten-Josef; and Westeppe, Uwe, 5,025,065, Cl. 524-611.000.
Westgate, Charles A.: *See—*
Murphy, John A., II; and Westgate, Charles A., 5,023,955, Cl. 2-209.000.
Westinghouse Brake and Signal Holdings Limited· *See—*
Reeves, Malcolm R., 5,025,195, Cl. 315-136.000.
Westinghouse Electric Corp.: *See—*
Bellows, James C.; and Koubek, Rudolph, III, 5,024,582, Cl. 416-213.00R.
Beuchel, Peter H., 5,024,559, Cl. 425-406.000.
Bice, Charles D., 5,024,452, Cl. 277-81.00R.
Bitton, Max D.; and Wahlquist, Randall W., 5,023,984, Cl. 29-81.050.
Blaushild, Ronald M., 5,024,804, Cl. 376-285.000.
Cioffi, Joseph V.; and Kerrey, John S., 5,024,806, Cl. 376-352.000.
Downs, Walter M.; and Ankrom, Michael J., 5,024,734, Cl 204-15.000.
Groenendaal, John C., Jr.; and Rudy, Randy T., 5,024,579, Cl 415-108.000.
Harrold, Ronald T.; and Sanjana, Zal N., 5,024,092, Cl. 73-602.000.
Impink, Albert J., Jr.; Grobmyer, Louis R.; Sariscak, Robert E.; Morita, Toshio; and Duryea, John L., 5,024,801, Cl. 376-217.000.
Land, John T.; and Hopkins, Ronald J., 5,024,808, Cl. 376-353.000.
Leksell, David; Kun, Zoltan K.; and Asars, Juris A., 5,025,321, Cl 358-296.000.
Murray, Alexander P., 5,024,805, Cl. 376-305.000.
Pirl, William E., 5,025,215, Cl. 324-220.000.
Snyder, Thomas S.; Jackovitz, John F.; and Ferrari, Harry M., 5,024,749, Cl. 204-299.00R.
Srinivasan, Jagannathan S., 5,024,802, Cl. 376-258.000.
Veronesi, Luciano; and Ekeroth, Douglas E., 5,025,158, Cl. 250-328.000.
Wilson, John F.; Rosal, Enrique R.; and Bucher, George D., 5,024,574, Cl. 414-416.000.
Westland Helicopters Limited: *See—*
Cox, Vernon F.; and Hyde, Phillip M., 5,024,632, Cl. 464-33.000.
Wetterauer, Ulrich: *See—*
Bonnet, Ludwig; and Wetterauer, Ulrich, 5,024,212, Cl. 128-4.000.
Wetzel, Thomas J.: *See—*
Morton, Roger A.; and Wetzel, Thomas J., 5,025,480, Cl 382-50.000.
Wheeler, Gerald L.: *See—*
Tentler, Michael L.; and Wheeler, Gerald L., 5,024,105, Cl. 73-861.580.
Wheless, Jack C.: *See—*
Garthaffner, Martin T., Keen, Billy J., Jr.; Gillespie, Andrew J., Wheless, Jack C.; and Dingus, George W., 5,024,242, Cl. 131-94.000.
Wheller, Wayne D., to Hescor Canada Ltd. Cellular telephone ring annunciator. 5,025,467, Cl. 379-60.000.
Whistler, George R.: *See—*
Masciarella, Andrew M.; and Whistler, George R., 5,023,998, Cl. 30-276.000.
White, Thomas H.: *See—*
Riedinger, Thomas R.; and White, Thomas H., 5,024,398, Cl. 244-118.500.
Whittaker, Dale Single use dental floss spindle and method. 5,024,324, Cl. 206-63.500.
Widlund, Leif U. R. Disposable diaper. 5,024,672, Cl. 604-390.000.
Wilcox, Jaroslava Z.: *See—*
Jansen, Michael; Sergant, Moshe; Ou, Szutsun S.; Wilcox, Jaroslava Z.; Yang, Jane J.; and Eaton, Larry R., 5,025,451, Cl. 372-50.000.
Wildersohn, Manfred: *See—*
Mertens-Gottselig, Dagmar; Hammer, Hartmut; Muller, Heinrich; and Wildersohn, Manfred, 5,024,678, Cl. 44-348.000.
Wilhelms, Otto-Henning: *See—*
Reinholz, Erhard; Friebe, Walter-Gunar; Kampe, Wolfgang; Mertin, Jurgen; and Wilhelms, Otto-Henning, 5,025,028, Cl. 514-381.000.
Wilkening, Siegfried, to Vereinigte Aluminum-Werke Aktiengesellschaft. Method for manufacturing refractory oxide-carbon bricks. 5,024,793, Cl. 264-29.700.
Will, Manfred O., to KWM-Kunststoffmaschinen GmbH Device for continuous degassing of mixes. 5,024,531, Cl. 366-75.000.
Willey, Wendall D.: *See—*
Sayegh, Emile G.; Vana, James G., Jr.; and Willey, Wendall D., 5,025,115, Cl. 174-117.00F.
Williams, Franklin P., III, to Du Pont de Nemours, E. I., and Company. 66 nylon filament with low content of dodecane dioic acid units. 5,025,087, Cl. 528-339.000.
Williams, Gary L.: *See—*
Pollet, Jean C.; Williams, Gary L.; Armstrong, Gordon P.; and Flautt, Martin C., 5,024,890, Cl. 428-372.000.
Williams, Rodney D.; and Garcia, Felix, to Texas Instruments Incorporated. Focussed light source pointer for three dimensional display. 5,024,494, Cl. 350-3.600.
Wilson-Cook Medical, Inc.: *See—*
Karpiel, John, 5,024,617, Cl. 606-47.000.
Wilson, David T.; and Tancrell, Roger H., to Raytheon Company. Sheets of stretched and polarized polymer materials and method of manufacturer. 5,024,872, Cl. 428-212.000.
Wilson, John F.; Rosal, Enrique R.; and Bucher, George D., to Westinghouse Electric Corp. Random fuel pellet vacuum transfer apparatus. 5,024,574, Cl. 414-416.000.
Wilson, Norman H : *See—*
Jones, Robert L.; and Wilson, Norman H., 5,025,034, Cl. 514-529.000.

Wilson, Robert D.. *See—*
Evans, Francis J.; Jones, Ralph W., Jr.; and Wilson, Robert D., 5,024,931, Cl. 430-567.000.
Wingen, Rainer; Guenther, Dieter; and Lingnau, Juergen, to Hoechst Aktiengesellschaft. 4-chlorooxazole derivatives and processes for their preparation and use. 5,025,097, Cl. 548-235.000
Winkelstein, Dan, to Northern Telecom Limited. Method of transient simulation of transmission line networks using a circuit simulator 5,025,402, Cl. 364-578.000.
Winkler, Hans-Henning; and Rutschle, Eugen, to Chiron-Werke GmbH & Co. KG Device for producing mounting bores or valve bores in a wheel disk. 5,023,983, Cl. 29-27.00R.
Winston, Charles R., Jr., to United Technologies Corporation. Semiconductor light source temperature measurement. 5,024,535, Cl 374-178.000.
Winter, Horst, to Krones AG Hermann Kronseder Maschinenfabrik. Labelling apparatus. 5,024,717, Cl. 156-354.000.
Winter, Steven D.; Botich, Michael J.; and Adickes, Eric. Wind sailing surf vessel with dual planar surfaces. 5,024,177, Cl. 114-61.000.
Winzen, Wilfried, to Witzenmann GmbH Metallschlauch-Fabrik Pforzheim. Heat exchange medium connector for movable solar heaters. 5,024,211, Cl 126-424.000.
Wisconsin Dairies Cooperative: *See—*
Dull, Gordon L., 5,024,146, Cl. 99-458.000.
Wise, James H.: *See—*
French, Jay L.; Himes, John L., Jr.; Weber, Ronald M.; and Wise, James H., 5,024,610, Cl. 439-857.000.
Wiseman, Michael A.: *See—*
Anthony, James R.; Wiseman, Michael A.; and Lortz, Allan R., 5,023,981, Cl. 24-573.500.
Wistuba, Eckehardt: *See—*
Ley, Gregor; Schultze, Wolfgang; Vinke, Johannes; and Wistuba, Eckehardt, 5,025,062, Cl. 524-556.000.
Witzenmann GmbH Metallschlauch-Fabrik Pforzheim: *See—*
Winzen, Wilfried, 5,024,211, Cl. 126-424.000.
Woesteineyer, Henry J.; and Oksuz, Martha. Method of creating an underground batch retort complex. 5,024,487, Cl. 299-2.000.
Wold, Svante B.: *See—*
Cramer, Richard D., III; and Wold, Svante B., 5,025,388, Cl. 364-496.000.
Wolff, Siegfried; and Goerl, Udo, to Degussa Aktiengesellschaft. Use of N,N'- and N,N',N'-substituted silyl ureas as antidegradation agents and polymer blends which contain them. 5,025,047, Cl. 524-99.000.
Woller, Tom C.: *See—*
Perona, Mark; Woller, Tom C.; and Guy, Jon S., 5,025,334, Cl. 360-96.500.
Wong, Patrick S.-L.: *See—*
Kuczynski, Anthony L.; Ayer, Atul D.; and Wong, Patrick S.-L., 5,024,843, Cl. 424-499.000.
Wong, Puk K., to Shell Oil Company. Resin composition from di(arylcyclobutenealkyl) ether of di(hydroxyphenyl) oligomer. 5,025,080, Cl. 528-170.000.
Wong, Yiu-Huen: *See—*
Dietrich, Norman R.; Moyer, Ralph S.; and Wong, Yiu-Huen, 5,024,966, Cl. 437-60.000.
Woodall, Tommy D.: *See—*
Gregory, Danny L.; Priddy, Tommy G.; Smallwood, David O.; and Woodall, Tommy D., 5,024,096, Cl. 73-663.000.
Woods, Jimmy L.: *See—*
Morehouse, James H.; Furay, David M.; Blagaila, John; Dion, F. Eugene; Shelstad, Scott A.; and Woods, Jimmy L., 5,025,336, Cl. 360-97.020.
Wrecsics, Ernest L.: *See—*
Garg, Diwakar; Dyer, Paul N.; Schaffer, Leslie E.; Wrecsics, Ernest L.; Dimos, Duane; and Mueller, Carl F., 5,024,901, Cl. 428-627.000.
Wright, Christopher B. Closure device for reclosing a gable-top container. 5,024,375, Cl. 229-125.390.
Wright, Jeremy C.: *See—*
Needham, Thomas E.; Wright, Jeremy C.; Pearson, Steve; Chilamkurti, Rao; and Kopp, Clinton V., 5,024,657, Cl. 604-85.000.
Wu, Stephen H. W.; Greene, Carol J.; and Sharma, Mahendra K., to Eastman Kodak Company. Water-dispersible polymeric compositions. 5,025,004, Cl. 514-165.000.
Wuepper, Karl J.; Swanson, Jerald L.; and Hartz, Dale E., to Boeing Company, The. Strato streak flush patch. 5,023,987, Cl. 29-402.110.
Wykstra, Donald T.: *See—*
Miller, Phillip E.; Katz, Leonoard R.; Nath, Raymond J.; Blaushild, Ronald M.; Tatch, Michael D.; Kordalski, Frank J.; Wykstra, Donald T.; and Kavalkovich, William M., 5,025,129, Cl. 219-201.000.
Xerox Corporation: *See—*
Tang, John C.; and Minneman, Scott L., 5,025,314, Cl. 358-93.000.
Y. M. Shoval Ltd.: *See—*
Blumberg, Shlomo; and Olti, Avraham, 5,025,426, Cl. 368-10.000.
Yabuta, Motoshi; Nakao, Yasushi; Sugiura, Shinji; Fukuda, Mitsuhiro; and Miyamoto, Yuzo, to Kansai Paint Co., Ltd. Dispersion of fine particles of a polymer. 5,025,060, Cl. 524-533.000.
Yagi, Akira: *See—*
Okada, Takao; Yagi, Akira; Morita, Seizo; and Mikoshiba, Nobuo, 5,025,153, Cl. 250-306.000.
Yaguchi, Toshiyuki, to Kabushiki Kaisha Toshiba. Evaluation facilitating circuit device. 5,025,210, Cl. 324-158.00R.
Yahata, Mitsuru: *See—*
Saito, Yasuo; Yahata, Mitsuru; Honjo, Kouji; and Matsubayashi, Takayuki, 5,025,463, Cl. 378-19.000.
Yahiro, Masakazu: *See—*
Inoue, Haruki; Funabashi, Motohisa; Yahiro, Masakazu; and Tanaka, Fumiki, 5,025,499, Cl. 364-165.000.
Yamada, Hiroaki: *See—*
Miura, Katsutoshi; Koyama, Hiroyasu; Sugai, Toshiji; Yamada, Hiroaki; and Sakurai, Einosuke, 5,025,012, Cl. 514-252.000.
Yamada, Ichiji; Inuzuka, Yutaka; Murakami, Michiyuki; Suzuki, George; Tanahashi, Tyo; and Kondo, Takeshi, to Toyota Jidosha Kabushiki Kaisha; and Tsuda Industries Company, Ltd. Apparatus for supporting shift lever for transmission. 5,024,117, Cl. 74-473.00P.
Yamada, Katsuyuki; Ide, Yukio; Harigaya, Makoto; and Iwasaki, Hiroko, to Ricoh Company, Ltd. Information recording medium. 5,024,927, Cl. 430-495.000.
Yamada, Masato: *See—*
Egawa, Shunji; and Yamada, Masato, 5,024,533, Cl 374-126.000.
Yamada, Osamu: *See—*
Matsumoto, Fukuji; Tawara, Yoshio; Hayashi, Michio; and Yamada, Osamu, 5,024,423, Cl. 266-283.000.
Yamada, Taiki: *See—*
Nakamura, Kyuzo; Ota, Yoshifumi; and Yamada, Taiki, 5,024,854, Cl. 427-38.000.
Yamada, Takeshi: *See—*
Taya, Hiroyuki; Yoshinuma, Mikio; Yamada, Takeshi; Nishide, Kenji; Suzuki, Fumio; Fujimoto, Hirohisa; and Yamauchi, Ryozo, 5,024,501, Cl. 350-96.150.
Yamada, Yukio: *See—*
Hasegawa, Hirofumi; Ohmori, Naoto; Yamada, Yukio; and Yoshida, Narutaka, 5,025,286, Cl. 355-244.000.
Yamagata, Hiroshi, to Yoshida Kogyo K.K. Method of forming metal surface thin film having high corrosion resistance and high adhesion. 5,024,721, Cl. 156-643.000.
Yamagishi, Hisashi; Kakiuchi, Shinichi; and Tomita, Seisuke, to Bridgestone Corporation. Golf ball. 5,024,444, Cl. 273-232.000.
Yamagiwa, Tamio, to Hi-Sonic Co., Ltd. Liquid shut-off valve. 5,024,254, Cl. 137-219.000.
Yamaguchi, Katsumasa: *See—*
Aoki, Shinichiro; Sato, Takeo; Yamaguchi, Katsumasa; and Yamamoto, Masaki, 5,025,168, Cl. 250-548.000.
Yamaguchi, Kimiaki, to Matsushita Electric Industrial Co., Ltd. Transformer having shielding wall for driving a magnetron. 5,025,489, Cl. 219-10.55B.
Yamaguchi, Minori: *See—*
Murakami, Satoru; Yamaguchi, Minori; Hayashi, Akimine; Kondo, Masataka; and Tawada, Yoshihisa, 5,025,297, Cl. 357-30.000.
Yamaguchi, Shigeru; and Mizutani, Ken-ichiro, to Aisin Kako Kabushiki Kaisha; and Aisin Seiki Kabushiki Kaisha. Cooling apparatus for heat exchanger. 5,024,267, Cl. 165-122.000.
Yamaha Corporation: *See—*
Shimizu, Yasushi; and Kawakami, Fukushi, 5,025,472, Cl. 381-63.000.
Ubayama, Takashi; Suzuki, Eiichi; and Morishima, Morito, 5,025,173, Cl. 307-265.000.
Yamaha Hatsudiki Kabushiki Kaisha: *See—*
Okui, Kaoru; and Kobayashi, Manabu, 5,024,287, Cl. 180-297.000.
Yamamoto Chemicals, Incorporated: *See—*
Itoh, Hisato; Enomoto, Katashi; Oguchi, Takahisa; and Nishizawa, Tsutomu, 5,024,926, Cl. 430-495.000.
Yamamoto, Hiroaki: *See—*
Murano, Katsuaki; Yamashita, Yoshinori; Hirano, Sadayuki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,024,310, Cl. 192-0.076.
Yamamoto, Isao: *See—*
Etoh, Yoshiyuki; Inoue, Hiroshi; Mori, Kazuyuki; Suzuki, Koichi; Nakano, Kinichiro; Nomura, Hiroyuki; Yamamoto. Isao; and Yoshida, Kiyoshi, 5,025,379, Cl. 364-426.040.
Yamamoto, Karuhiko: *See—*
Natori, Katsuhide; Watanabe, Isao; Katsuyama, Koji; Kawamura, Isao; Yamamoto, Karuhiko; and Nagai, Takeshi, 5,024,264, Cl. 165-1.000.
Yamamoto, Masaki: *See—*
Aoki, Shinichiro; Sato, Takeo; Yamaguchi, Katsumasa; and Yamamoto, Masaki, 5,025,168, Cl. 250-548.000.
Yamamoto, Mitsuru: *See—*
Suzuki, Hidetoshi; Nomura, Ichiro; Majima, Toshiaki; and Yamamoto, Mitsuru, 5,025,196, Cl. 315-168.000.
Yamamoto, Osamu; and Yoshida, Toshihiko, to Sharp Kabushiki Kaisha. Optical pumping-type solid-state laser apparatus with a semiconductor laser device. 5,025,449, Cl. 372-32.000.
Yamamoto, Yohzoh; Suzuki, Goro; Nakamura, Hideo; and Yasuda, Kiyomi, to Mitsui Petrochemical Industries, Ltd. Partially cured epoxy resins and electrostatographic toner containing the same as binder. 5,025,067, Cl. 525-109.000.
Yamanari, Masaya; and Ikeda, Masami, to Kabushiki Kaisha Toshiba. Character reader device. 5,025,484, Cl. 382-61.000.
Yamane, Mitsuo, to Brother Kogyo Kabushiki Kaisha. Thermo-sensitive transfer ink ribbon to be used for producing dry type transfer material. 5,024,887, Cl. 428-335.000.
Yamane, Tsuneo: *See—*
Shimizu, Shoichi; and Yamane, Tsuneo, 5,024,942, Cl. 435-134.000.
Yamashita, Hiroshi; Tago, Yoshiaki; and Yoshimaru, Tomohisa, to Kabushiki Kaisha Toshiba. Interlocking braking and lock mechanisms for scanning apparatus of an information processing system. 5,025,437, Cl. 369-79.000.
Yamashita, Shoji: *See—*
Ito, Toshifumi; Ohta, Atsuo; and Yamashita, Shoji, 5,024,113, Cl. 74-6.000.

VOL
1127
ISS
3
JE
18
1991
UMI

Yamashita, Yoshinori: *See—*
  Murano, Katsuaki; Yamashita, Yoshinori; Hirano, Sadayuki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 5,024,310, Cl. 192-0.076.

Yamauchi, Ryozo: *See—*
  Taya, Hiroyuki; Yoshinuma, Mikio; Yamada, Takeshi; Nishide, Kenji; Suzuki, Fumio; Fujimoto, Hirohisa; and Yamauchi, Ryozo, 5,024,501, Cl. 350-96.150.

Yamauchi, Takahiro, to Oki Electric Industry Co., Ltd. Process for forming fine pattern in semiconductor device. 5,024,919, Cl. 430-312.000.

Yamazaki, Masahiko: *See—*
  Saito, Yasuo; Fujimoto, Seiji; Nobuta, Yasuo; and Yamazaki, Masahiko, 5,025,462, Cl. 378-19.000.

Yamazaki, Nobuto: *See—*
  Terakado, Yoshimitsu; and Yamazaki, Nobuto, 5,024,367, Cl. 228-111.000.

Yamazaki, Syoji; Oda, Toshikazu; Iwanaga, Kenji; and Gono, Yoshitaka, to Anritsu Corporation. Relay device for switching radio frequency signal. 5,025,237, Cl. 335-83.000.

Yan, Tsoung Y., to Mobil Oil Corporation. Upgrading of resids by liquid phase mild coking. 5,024,752, Cl. 208-131.000.

Yang, Anthony; and Yang, Victor. Emergency ladder equipment. 5,024,293, Cl. 182-93.000.

Yang, Huey-Lang; Todd, John; and Jou, Huey-Ling L., to Enzo Biochem, Inc. Method and kit for sample adherence to test substrate. 5,024,933, Cl. 435-6.000.

Yang, Jane J.: *See—*
  Jansen, Michael; Sergant, Moshe; Ou, Szutsun S.; Wilcox, Jaroslava Z.; Yang, Jane J.; and Eaton, Larry R., 5,025,451, Cl. 372-50.000.

Yang, Victor: *See—*
  Yang, Anthony; and Yang, Victor, 5,024,293, Cl. 182-93.000.

Yasaka, Hiroshi: *See—*
  Sudo, Shoichi; Sakai, Yoshihisa; Yasaka, Hiroshi; Ikegami, Tetsuhiko; Yoshikuni, Yuzo; Yokohama, Itaru; and Kubodera, Kenichi, 5,025,448, Cl. 372-32.000.

Yassa, Fathy F.: *See—*
  Hartley, Richard I.; Corbett, Peter F.; Yassa, Fathy F.; and Noujaim, Sharbel E., 5,025,257, Cl. 341-101.000.

Yasuda, Kiyomi: *See—*
  Yamamoto, Yohzoh; Suzuki, Goro; Nakamura, Hideo; and Yasuda, Kiyomi, 5,025,067, Cl. 525-109.000.

Yasui, Yoshiharu; Anahara, Meiji; Asahi, Goro; and Miyake, Shiro, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho; and Japan Defense Agency. Three dimensional fabric with a linkage structure. 5,024,874, Cl. 428-257.000.

Yazaki Corporation: *See—*
  Ohashi, Yasusuke; Fujino, Toshihiro; Taki, Yasuhito; and Nishijima, Tamotsu, 5,024,815, Cl. 420-487.000.

Yeager, Gary W.: *See—*
  Cusano, Dominic A.; and Yeager, Gary W., 5,024,791, Cl. 264-21.000.

Yeh, An-Gong, to Du Pont de Nemours, E. I., and Company. On line control method to determine media fluidization in a media mill. 5,024,387, Cl. 241-21.000.

Yeh, Ling; and Harrelson, Hugh G., Jr., to BASF Corporation. Flame retardant fibers for textile use. 5,024,869, Cl. 428-97.000.

Yeh, Pochi A.; and Hong, John H., to Rockwell International Corporation. Optical heterodyne detector. 5,025,488, Cl. 455-619.000.

Yocum, Robert R.: *See—*
  Maine, Gregory T.; Daves, Robert S.; and Yocum, Robert R., 5,024,941, Cl. 435-69.900.

Yokohama, Itaru: *See—*
  Sudo, Shoichi; Sakai, Yoshihisa; Yasaka, Hiroshi; Ikegami, Tetsuhiko; Yoshikuni, Yuzo; Yokohama, Itaru; and Kubodera, Kenichi, 5,025,448, Cl. 372-32.000.

Yokohama Rubber Co., Ltd., The: *See—*
  Igarashi, Eiji; Imamiya, Susumu; and Suzuki, Yasuo, 5,024,261, Cl. 152-527.000.

Yokota Machinery Co., Ltd.: *See—*
  Yokota, Senichi, 5,024,370, Cl. 228-180.100.

Yokota, Masahiro: *See—*
  Nagato, Shoin; Taguchi, Ryusuke; Hirai, Kenji; Hirose, Hiroaki, and Yokota, Masahiro, 5,024,692, Cl. 71-86.000.

Yokota, Senichi, to Yokota Machinery Co., Ltd. Automatic soldering method and the apparatus thereof. 5,024,370, Cl. 228-180.100.

Yokozeki, Shinichi: *See—*
  Komaki, Toshihiro; Kudo, Hideo; Ishizuki, Tomonori; and Yokozeki, Shinichi, 5,025,439, Cl. 369-100.000.

Yonekawa, Takashi: *See—*
  Kokubo, Kouichi; Hamada, Toshiaki; Tagawa, Shinichi; Suzumura, Nobuyasu; Buma, Shuuichi; Aburaya, Toshio; Onuma, Toshio; Sato, Kunihito; Yonekawa, Takashi; Kawanishi, Masaki, Ikemoto, Hiroyuki; and Ohashi, Kaoru, 5,024,459, Cl. 280-707.000.

Yonezawa, Yasuo; Ohnishi, Toshiya; Okumura, Shin-ichi; Sakai, Akiyoshi; Nakano, Hiroki; Matsushita, Masao; Morikawa, Atsushi; and Yoshihara, Motoshi, to Nishiyodo Air Conditioner Co., Ltd. Method of operating adsorption refrigerator. 5,024,064, Cl. 62-106.000.

York, Richard D. Sub-surface irrigation system. 5,024,555, Cl. 405-48.000.

Yoshida, Hajime, to Hajime Industries Ltd. Photo sensing device. 5,024,525, Cl. 354-126.000.

Yoshida, Kazunori: *See—*
  Kawabata, Susumu; Yoshida, Kazunori; Kisanuki, Yoshikatsu; Suzuki, Hajime; and Shiraki, Masao, 5,024,253, Cl. 139-99.000.

Yoshida, Keiji; and Hamada, Mitsuo, to Toray Silicone Company, Limited. Polish containing a silicone rubber powder. 5,025,054, Cl 524-267.000.

Yoshida, Keiji: *See—*
  Funato, Ryo; Takahiro, Syuji; Yoshida, Keiji; Kubo, Shinji; and Inagaki, Motoshi, 5,024,914, Cl. 430-109.000.

Yoshida, Kiyoshi: *See—*
  Etoh, Yoshiyuki; Inoue, Hiroshi; Mori, Kazuyuki; Suzuki, Koichi; Nakano, Kinichiro; Nomura, Hiroyuki; Yamamoto, Isao; and Yoshida, Kiyoshi, 5,025,379, Cl. 364-426.040.

Yoshida Kogyo K.K.: *See—*
  Yamagata, Hiroshi, 5,024,721, Cl. 156-643.000.

Yoshida, Mamoru; Suya, Hachiro; Hayashi, Shoji; Koshiyama, Takao; Hashimoto, Satoshi; and Horita, Katsuhiro, to Nippon Unicar Company Limited. Flame retardant composition. 5,025,042, Cl. 523-216.000.

Yoshida, Minoru: *See—*
  Tsuchida, Takefumi; Yoshida, Minoru; Kodama, Yoshimi; and Moriyama, Masahiro, 5,025,332, Cl. 360-85.000.

Yoshida, Narutaka: *See—*
  Hasegawa, Hirofumi; Ohmori, Naoto; Yamada, Yukio; and Yoshida, Narutaka, 5,025,286, Cl. 355-244.000.

Yoshida, Takeshi; Nakatani, Kaname; Fukami, Toshiyuki; and Tanaka, Nariaki, to Mita Industrial Co., Ltd. Electrophotographic photosensitive material. 5,024,913, Cl. 430-67.000.

Yoshida, Toshihiko: *See—*
  Yamamoto, Osamu; and Yoshida, Toshihiko, 5,025,449, Cl. 372-32.000.

Yoshiga, Norio; Kawamura, Masahiro; and Nonoyama, Hiroshi, to Mitsubishi Plastics Industries limited. Polyamide resin-metal laminate. 5,024,891, Cl. 428-414.000.

Yoshihara, Motoshi: *See—*
  Yonezawa, Yasuo; Ohnishi, Toshiya; Okumura, Shin-ichi; Sakai, Akiyoshi; Nakano, Hiroki; Matsushita, Masao; Morikawa, Atsushi; and Yoshihara, Motoshi, 5,024,064, Cl. 62-106.000.

Yoshii, Takashi: *See—*
  Fukui, Tetsu; Yoshii, Takashi; Takemura, Toshihiko; and Hattori, Akio, 5,024,306, Cl. 192-3.570.

Yoshikawa, Kuniyoshi: *See—*
  Miyamoto, Junichi; Ohtsuka, Nobuaki; Yoshikawa, Kuniyoshi; and Mori, Seiichi, 5,025,417, Cl. 365-189.090.

Yoshikuni, Yuzo: *See—*
  Sudo, Shoichi; Sakai, Yoshihisa; Yasaka, Hiroshi; Ikegami, Tetsuhiko; Yoshikuni, Yuzo; Yokohama, Itaru; and Kubodera, Kenichi, 5,025,448, Cl. 372-32.000.

Yoshimaru, Tomohisa: *See—*
  Yamashita, Hiroshi; Tago, Yoshiaki; and Yoshimaru, Tomohisa, 5,025,437, Cl. 369-79.000.

Yoshimoto, Satoshi; and Funamoto, Masaya, to Brother Kogyo Kabushiki Kaisha. Multi-impact character erasing apparatus with control of correction ribbon feed. 5,024,545, Cl. 400-696.000.

Yoshinuma, Mikio: *See—*
  Taya, Hiroyuki; Yoshinuma, Mikio; Yamada, Takeshi; Nishide, Kenji; Suzuki, Fumio; Fujimoto, Hirohisa; and Yamauchi, Ryozo, 5,024,501, Cl. 350-96.150.

Yoshioka, Toshio: *See—*
  Kubo, Nami; Yoshioka, Toshio; Saito, Kouichi; and Tohyama, Syunroku, 5,024,767, Cl. 210-682.000.

Yoshiura, Yoshio, to Canon Kabushiki Kaisha. Facsimile apparatus connected to data communication network having time-saving capability. 5,025,497, Cl. 358-425.000.

Yoshizawa, Kenji: *See—*
  Kobayashi, Toshiyuki; Koshinaka, Masao; Kinoshita, Yoshimi; Oda, Masao; and Yoshizawa, Kenji, 5,024,182, Cl. 118-723.000.

Young, William: *See—*
  Walton, Richard J., 5,025,227, Cl. 331-65.000.

Youngs, Gary L.: *See—*
  Parks, Carol A.; Probst, Robert E.; Rajagopal, Doraiswamy; and Youngs, Gary L., 5,025,396, Cl. 364-518.000.

Yu, Lin-Chen: *See—*
  Chiu, Kuen-Wai; Yu, Lin-Chen; and Strickler, John R , 5,025,096, Cl. 544-234.000.

Yuki, Kazuya: *See—*
  Sasaki, Michiaki; and Yuki, Kazuya, 5,024,583, Cl. 417-198.000.

Yum, Su Il, to Alza Corporation. Self-contained suction pump. 5,024,663, Cl. 604-131.000.

Zaidanhojin Shokuhin Sangyo Senta: *See—*
  Arai, Kei; Ohashi, Minoru; Utsugi, Yoshio; Oka, Osamu; Numazawa, Kenichi; Miwa, Kenji; and Sugawara, Kenzo, 5,024,816, Cl. 422-68.100.

Zelinka, Robert F.: *See—*
  Redding, John W.; and Zelinka, Robert F., 5,024,573, Cl. 414-408.000.

Zellmer, Joel A., to Hewlett-Packard Company. Microprocessor emulation system with memory mapping using variable definition and addressing of memory space. 5,025,364, Cl. 364-200.000.

Zenith Electronics Corporation: *See—*
  Fendley, James R., 5,025,191, Cl. 313-407.000.

Zerbs, Stephen T.: *See—*
  Bleich, Larry L.; Roberts, Joni A.; and Zerbs, Stephen T., 5,024,864, Cl. 427-424.000.

Zerox Corporation: *See—*
  Nowak, William J.; Attardi, Anthony A.; and Costanza, Daniel W., 5,025,291, Cl. 355-273.000.

Zevatech AG: *See—*
  Boss, Ernst; Dill, Andreas R.; and Zimmermann, Heinz, 5,024,720, Cl. 156-584.000.

Zexel Corporation: *See—*
  Kurihara, Kazumasa; and Takahashi, Tsutomu, 5,024,305, Cl. 192-0.055.
  Noguchi, Ichiro; and Nakata, Futoshi, 5,024,269, Cl. 165-153.000.

Zilog, Inc.: *See—*
  Dalrymple, Monte J.; Verinsky, Phillip D.; and Smith, Don, 5,025,412, Cl. 364-900.000.

Zimmermann, Heinz: *See—*
  Boss, Ernst; Dill, Andreas R.; and Zimmermann, Heinz, 5,024,720, Cl. 156-584.000.

Zink, Rudolf; and Phaff, Rox, to Ciba-Geigy Corporation. Pressure-or heat-sensitive recording material. 5,024,988, Cl. 503-212.000.

Zip-Pak Incorporated: *See—*
  Tilman, Paul A., 5,024,537, Cl. 383-63.000.

Zivkovic, Milorad, to Daimler-Benz. Dual-circuit brake booster. 5,024,056, Cl. 60-550.000.

Zoeller, Joseph R.: *See—*
  Blount, William W., Jr.; and Zoeller, Joseph R., 5,025,086, Cl. 528-272.000.

Zoueki, Georges. Ophtalmic apparatus. 5,024,516, Cl. 351-57.000.

Zuchowski, Larry; Tichenor, Clyde I.; and Ginsburgh, Irwin. Autostereoscopic presentation system. 5,024,521, Cl. 352-86.000.

Zupancic, Joseph J.; Swedo, Raymond J.; Jamieson, Donald R.; Schumacher, Elaine F.; and Buehler, Allyson J., to Allied-Signal Inc. Ortho-ortho aramatic bis maleimide-diamine resin. 5,025,079, Cl. 528-170.000.

Zygutis, James L.; and Doty, Gerald A., to Occupant Safety Systems, Inc. Retractor with auxiliary braking mechanism. 5,024,391, Cl. 242-107.200.

ZZ Corp.: *See—*
  Hottenroth, Fred W.; and Hottenroth, Fred W., III, 5,024,208, Cl. 126-25.00R.

501 Fiat Auto S.p.A.: *See—*
  Vaschetto, Lorenzo; and Fazio, Luigi, 5,024,383, Cl. 239-284.100.

501 Fujitsu Limited: *See—*
  Awano, Yuji, 5,024,958, Cl. 437-31.000.

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LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF JUNE, 1991

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- Bodnar, Ernest R. Rotary apparatus. Re. 33,613, Cl. 72-190.000.
- Cole, Ronald E. Ice maker system. Re. 33,612, Cl. 62-233.000.
- International Medication Systems Limited: *See—*
  - Ogle, George B., II, Re. 33,617, Cl. 604-192.000.
- Ogle, George B., II, to International Medication Systems Limited. Protected cannula. Re. 33,617, Cl. 604-192.000.
- Otis Engineering Corp.: *See—*
  - Schwab, Carl M., Jr.; Robison, Clark E.; and Renfroe, James B., Jr., Re. 33,614, Cl. 166-303.000.
- Renfroe, James B., Jr.: *See—*
  - Schwab, Carl M., Jr.; Robison, Clark E.; and Renfroe, James B., Jr., Re. 33,614, Cl. 166-303.000.
- Robison, Clark E.: *See—*
  - Schwab, Carl M., Jr.; Robison, Clark E.; and Renfroe, James B., Jr., Re. 33,614, Cl. 166-303.000.
- Schwab, Carl M., Jr.; Robison, Clark E.; and Renfroe, James B., Jr., to Otis Engineering Corp. Apparatus and method for enhanced oil recovery. Re. 33,614, Cl. 166-303.000.
- Uarco Incorporated: *See—*
  - Welsch, Bernhard J., Re. 33,616, Cl. 428-41.000.
- Welsch, Bernhard J., to Uarco Incorporated. Label bearing continuous business form. Re. 33,616, Cl. 428-41.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

- BASF Corporation: *See—*
  - Hays, Byron G.; and Stanaback, Robert J., B1 4,648,907, Cl. 106-30.000.
- Hays, Byron G.; and Stanaback, Robert J., to BASF Corporation. High color strength diarylide yellow pigment compositions. B1 4,648,907, 6-18-91, Cl. 106-30.000.
- Silverman, Robert R., to Twenty First Century International Fire Equipment and Services, Corporation. Fire extinguishing system for cookstove and ranges. B1 4,773,485, 6-18-91, Cl. 169-65.000.
- Stanaback, Robert J.: *See—*
  - Hays, Byron G.; and Stanaback, Robert J., B1 4,648,907, Cl. 106-30.000.
- Twenty First Century International Fire Equipment and Services, Corporation: *See—*
  - Silverman, Robert R., B1 4,773,485, Cl 169-65.000.

LIST OF DESIGN PATENTEES

- Abe, Takashi; Nakahara, Michihiro; and Tanaka, Kaoru, to Kabushiki Kaisha Toshiba. Television receiver. 317,604, 6-18-91, Cl. D14-133 000.
- Abe, Takashi: *See—*
  - Ban, Kimiyoshi; and Abe, Takashi, 317,605, Cl. D14-133 000.
- Abrams, Robert C.: *See—*
  - Weder, Donald E.; Weder, Erwin H., Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 317,583, Cl. D11-164.000.
- Adobe Systems Incorporated *See—*
  - Stone, Sumner R., 317,621, Cl. D18-24.000.
- Ajco Jewelry Co. Inc.: *See—*
  - Eiss, Martin, 317,577, Cl. D10-30.000.
- Alford, Karen R. Child protective padded hearth cover. 317,649, 6-18-91, Cl. D23-403.000.
- Allen, Gaudet; and Allen, Gaudet E. Retractable roller directory. 317,630, 6-18-91, Cl. D20-42.000.
- Allen, Gaudet E.: *See—*
  - Allen, Gaudet; and Allen, Gaudet E., 317,630, Cl D20-42.000.
- Amano, Yoshiaki: Kumagai, Kenta; Katou, Fumihito; Kasama, Kouichi; and Kiyota, Tooru, to Hitachi, Ltd. Television receiver. 317,600, 6-18-91, Cl. D14-126.000.
- Andersen, Hans B.; Sorensen, Allan; and Jespersen, Per, to B & S Miljoteknik. Element of a moveable grate surface for incinerators. 317,648, 6-18-91, Cl. D23-397.000.
- Aoki, Sanae; and Konoike, Tsunataka, to Tanaka Manufacturing Company Limited. Digital clock. 317,576, 6-18-91, Cl. D10-15.000.
- Aoyama, Minoru: *See—*
  - Isomoto, Masataka; Aoyama, Minoru; and Sakurai, Mitsuru, 317,622, Cl. D18-38.000.
- Aoyama, Tatsuaki: *See—*
  - Ito, Yasuyuki; Aoyama, Tatsuaki; and Niwa. Hisanobu, 317,644, Cl. D23-235.000.
- Apps, William P., to Rehrig-Pacific Company, Inc. Nestable can tray. 317,670, 6-18-91, Cl. D34-40.000.
- Aritomi, Toshiaki: *See—*
  - Takekoshi, Isamu; Onuma, Mitsuru; Torai, Kazuki; Hashimoto, Kazunori; and Aritomi, Toshiaki, 317,596, Cl. D14-103.000.
- Avia Group International, Inc.: *See—*
  - Earle, John, 317,524, Cl. D2-314.000.
- B & S Miljoteknik: *See—*
  - Andersen, Hans B.; Sorensen, Allan; and Jespersen, Per, 317,648, Cl. D23-397.000.
- Back Bone Water Company: *See—*
  - Bermingham. Rutledge, 317,544, Cl. D7-307.000.
- Bagshaw, Stanley R.: *See—*
  - Rea, Philip L.: and Bagshaw, Stanley R., 317,656, Cl. D25-138.000.
- Bakic, Karena, to Cosmede Anstalt. Lipstick case. 317,664, 6-18-91, Cl. D28-85.000.
- Ban, Kimiyoshi; and Abe, Takashi, to Kabushiki Kaisha Toshiba. Television receiver. 317,605, 6-18-91, Cl. D14-133.000.
- Beecham Group p.l.c.: *See—*
  - Spry, Harriett M., 317,563, Cl. D9-305.000.
- Beermann, Frank, to Keiper Recaro GmbH & Co. Vehicle seat or similar article. 317,533, 6-18-91, Cl. D6-356.000.
- Bergstrand. John W.: *See—*
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 317,583, Cl. D11-164 000.
- Bermingham, Rutledge, to Back Bone Water Company. Water dispenser. 317,544, 6-18-91, Cl. D7-307.000.
- Black & Decker Inc.: *See—*
  - McCloskey, Don R.; van Deursen, Gary; and Hattle, Sally A., 317,552, Cl. D8-36.000.
- Blanco GmbH & Co. KG: *See—*
  - Jung, Karl-Heinz; and Muck, Manfred, 317,647, Cl. D23-290.000.
- Bliss, Paul R., to Fulton Industries, Inc. Combined flashlight casing head and reflector. 317,662, 6-18-91, Cl. D26-113.000.

- Bolk, Phyllis J.: *See—*
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J ; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 317,583, Cl. D11-164.000.
- Bolser, Chester W.; and Wierenga, Lyle H., to Pacific Floor Machine Company, Inc. Floor treating machine. 317,667, 6-18-91, Cl. D32-19.000.
- Bolser, Chester W.; and Wierenga, Lyle H., to Pacific Floor Machine Company, Inc. Floor polisher machine. 317,668, 6-18-91, Cl. D32-19.000.
- Bonelli, Carol, to Creative Link Limited. Contact lens case. 317,527, 6-18-91, Cl. D3-34.000.
- British Telecommunications public limited company: *See—*
  - Dalton, Gary K., 317,612, Cl. D14-248.000.
- Brown, Joe A.: *See—*
  - Lambert, Lloyd W.; Brown, Joe A.; and Morgan, John L., 317,545, Cl. D7-307.000.
- Calderon, Julianne B. Hair ornament. 317,663, 6-18-91, Cl. D28-41.000.
- Canon Kabushiki Kaisha: *See—*
  - Isomoto, Masataka; Aoyama, Minoru; and Sakurai, Mitsuru, 317,622, Cl. D18-38.000.
  - Kikuchi, Nobuo; and Sano, Hiroshi, 317,615, Cl D16-202.000.
  - Yoshizawa, Tetsuo, 317,592, Cl. D13-182.000.
- Carwile, Elizabeth H. Cushion for the back of a chair or the like. 317,541, 6-18-91, Cl. D6-601.000.
- Casio Computer Co., Ltd.: *See—*
  - Yoshitake, Isamu, 317,595, Cl. D14-100.000.
- Chalabian, Jack S., to K-Jack Engineering Company, Inc. Newspaper vending kiosk. 317,629, 6-18-91, Cl. D20-6.000.
- Channell, Alan B., to McNeil (Ohio) Corporation. Suction inlet bowl for a submersible pump. 317,613, 6-18-91, Cl. D15-7.000.
- Chembars, Guy A. Visor attachable holder for a microcassette recorder. 317,587, 6-18-91, Cl. D12-191.000.
- Chen, Roger. Theodolite or similar article. 317,574, 6-18-91, Cl. D10-66.000.
- Chromcraft Furniture Corp.: *See—*
  - Wilson, Robert L., 317,538, Cl. D6-495.000.
- CKD Kabushiki Kaisha: *See—*
  - Ito, Yasuyuki; Aoyama, Tatsuaki; and Niwa, Hisanobu, 317,644, Cl. D23-235.000.
- Continental Scale Corporation: *See—*
  - Joss, Michael; Gresens, Stanley; and Fraker, Richard, 317,578, Cl D10-92.000.
- Cooper Industries, Inc.: *See—*
  - Kusmer, Raymond J., 317,620, Cl. D18-7.000.
- Cosmede Anstalt: *See—*
  - Bakic, Karena, 317,664, Cl. D28-85.000.
- Craig, Franklin J.: *See—*
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 317,583, Cl. D11-164.000.
- Creative Engineering Systems: *See—*
  - Daigle, Robert V.; and Grice, Gordon J., 317,558, Cl. D8-354.000.
- Creative Link Limited: *See—*
  - Bonelli, Carol, 317,527, Cl. D3-34.000.
- Daigle, Robert V.; and Grice, Gordon J., to Creative Engineering Systems. Modular conduit support. 317,558, 6-18-91, Cl. D8-354.000.
- Dalton, Gary K., to British Telecommunications public limited company. Telephone handset. 317,612, 6-18-91, Cl. D14-248.000.
- Danis, Sara L.: *See—*
  - Skaggs, Charles L.; Thomas, Charles A., and Danis, Sara L., 317,671, Cl. D99-34.000.
- Design Institute America, Inc.: *See—*
  - Evans, Keith, 317,531, Cl. D6-309.000.
- Dianitsch, Franz. Goggles. 317,614, 6-18-91, Cl. D16-102.000.
- Dideriksen, Erling T.: *See—*
  - Eggert, Bo; and Dideriksen, Erling T., 317,635, Cl. D21-108.000.
  - Larsen, Kim P.; and Dideriksen, Erling T., 317,634, Cl. D21-108.000.
- Diversey Corporation *See—*
  - Kryk, Lewis, 317,570, Cl. D9-434.000.
- Domation Inc.: *See—*
  - Marshall, Randolph L., 317,665, Cl. D30-108.000.
- Donnelly, Wilma M.: *See—*
  - Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 317,583, Cl. D11-164.000.
- Duke, Robert L. Combined sprayer and handle for dishwashing equipment. 317,643, 6-18-91, Cl. D23-226.000.
- Dynamic Products, Inc.: *See—*
  - Sutherland, Jack, 317,589, Cl. D12-318.000.
- Earle, John, to Avia Group International, Inc. Shoe upper. 317,524, 6-18-91, Cl. D2-314.000.
- Eggert, Bo; and Dideriksen, Erling T., to Interlego A.G. Toy building element. 317,635, 6-18-91, Cl. D21-108.000.
- Eiss, Martin, to Ajco Jewelry Co. Inc. Watch case. 317,577, 6-18-91, Cl. D10-30.000.
- Eldon Industries, Inc.: *See—*
  - Evenson, Mel, 317,628, Cl. D19-92.000.
- Elie, Francois, to Terraillon. Surface decoration for the bottom exterior of a cooking pan. 317,550, 6-18-91, Cl. D7-402.000.
- Emmerling, Ronald, to Gemini Industries Inc. Combined stereo radio and cassette player. 317,607, 6-18-91, Cl. D14-163.000.
- Emmerling, Ronald, to Gemini Industries Inc. Stereo cassette player. 317,608, 6-18-91, Cl. D14-165.000.
- Etablissements Perras: *See—*
  - Lami, Daniel, 317,562, Cl. D9-300.000.
- Evans, Keith, to Design Institute America, Inc. Vanity mirror. 317,531, 6-18-91, Cl. D6-309.000.
- Evenson, Mel, to Eldon Industries, Inc. Desk tray. 317,628, 6-18-91, Cl. D19-92.000.
- Farmer, Michael J., to Luverne Truck Equipment Inc. Windshield ice scraper. 317,669, 6-18-91, Cl. D32-49.000.
- Farris, Harold J.; Winn, J. Marvin; and Morrissey, Joseph P. Foot splint or the like. 317,651, 6-18-91, Cl. D24-192.000.
- Ferrero, Pietro. Container for confectionery products. 317,564, 6-18-91, Cl. D9-318.000.
- Fraker, Richard: *See—*
  - Joss, Michael; Gresens. Stanley; and Fraker. Richard, 317,578, Cl. D10-92.000.
- Fratelli Guzzini, S.p.A.: *See—*
  - Gecchelin, Bruno, 317,547, Cl. D7-317.000.
- Fuji Photo Film Co., Ltd.: *See—*
  - Shiiba, Minoru, 317,616, Cl. D16-232.000.
- Fujitsu Limited: *See—*
  - Irie, Toru; Fukuda, Isamu; and Takagi, Hisamitsu, 317,606, Cl. D14-138.000.
- Fukuda, Isamu: *See—*
  - Irie, Toru; Fukuda, Isamu; and Takagi, Hisamitsu, 317,606, Cl. D14-138.000.
- Fulton Industries, Inc.: *See—*
  - Bliss, Paul R., 317,662, Cl. D26-113.000.
- Futatsuishi, Shunichi: *See—*
  - Iwata, Shuji; Suyama, Tsutomu; Terazaki, Nobuo; Futatsuishi, Shunichi; Hara, Zenichiro; and Tomimatsu, Noriyuki, 317,657, Cl. D26-1.000.
- Garganese, Dino L. Article display box. 317,566, 6-18-91, Cl. D9-420.000.
- Gecchelin, Bruno, to Fratelli Guzzini, S.p.A. Carafe. 317,547, 6-18-91, Cl. D7-317.000.
- Gemini Industries Inc.: *See—*
  - Emmerling, Ronald, 317,607, Cl. D14-163.000.
  - Emmerling, Ronald, 317,608, Cl. D14-165.000.
- Gerard, Al P. Weight lifting bar. 317,641, 6-18-91, Cl. D21-197.000.
- Gold Star Co., Ltd.: *See—*
  - Park, Jong M., 317,598, Cl. D14-126.000.
- Goldsmith, Howard G., to Todd Enterprises, Inc. Adjustable boating chair pedestal. 317,539, 6-18-91, Cl D6-495.000.
- Greene, Marlin: *See—*
  - Guetle, Norbert J., Jr.; and Greene, Marlin, 317,652, Cl. D25-103.000.
- Gresens, Stanley *See—*
  - Joss, Michael; Gresens, Stanley; and Fraker, Richard, 317,578, Cl. D10-92.000.
- Grice, Gordon J.: *See—*
  - Daigle, Robert V.; and Grice, Gordon J., 317,558, Cl. D8-354.000.
- Guberman, Mary C. Mouse door knob cover 317,555, 6-18-91, Cl. D8-322.000.
- Guetle, Norbert J., Jr.; and Greene, Marlin, to Pease Industries, Inc. Decorative glass panel. 317,652, 6-18-91, Cl. D25-103.000.
- Guetle, Norbert J., Jr.; and Shaffer, B Jeremiah, to Pease Industries, Inc. Decorative glass panel. 317,653, 6-18-91, Cl. D25-103.000.
- Guetle, Norbert J., Jr.; and Shaffer, B. Jeremiah, to Pease Industries, Inc. Decorative glass panel. 317,654, 6-18-91, Cl. D25-103.000.
- Guetle, Norbert J., Jr.; and Shaffer, B. Jeremiah, to Pease Industries, Inc. Decorative glass panel. 317,655, 6-18-91, Cl. D25-103.000.
- Hansel, Dietger, to Keiper Recaro GmbH & Co. Vehicle seat or similar article. 317,534, 6-18-91, Cl. D6-356.000.
- Hara, Zenichiro: *See—*
  - Iwata, Shuji; Suyama, Tsutomu; Terazaki, Nobuo; Futatsuishi, Shunichi; Hara, Zenichiro; and Tomimatsu, Noriyuki, 317,657, Cl. D26-1.000.
- Harvey, Thomas J., to International Packaging Corporation. Box for jewelry items. 317,528, 6-18-91, Cl. D3-75.000.
- Hashimoto, Kazunori: *See—*
  - Takekoshi, Isamu; Onuma, Mitsuru; Torai, Kazuki; Hashimoto, Kazunori; and Aritomi, Toshiaki, 317,596, Cl. D14-103.000.
- Hashimoto, Keizo, to Midgety Engineering Co., Ltd. Car for a roller coaster. 317,642, 6-18-91, Cl. D21-247.000.
- Hattle, Sally A.: *See—*
  - McCloskey, Don R.; van Deursen, Gary; and Hattle, Sally A., 317,552, Cl. D8-36.000.
- Hau, Kenneth L. W. Combined battery operated lantern and waterproof cap. 317,659, 6-18-91, Cl. D26-38.000.
- Hayashi, Hiroyuki: *See—*
  - Matsuoka, Ken; Uchida, Kihachiro; Horiuchi, Kazuya; and Hayashi, Hiroyuki, 317,590, Cl. D13-134.000.
- Haynes, Graham J. Animal activated feeder. 317,666, 6-18-91, Cl. D30-131.000.
- Henriksson, Kjell, to Linden International AB. Bag clip. 317,571, 6-18-91, Cl. D9-443.000.
- Herman Miller, Inc.: *See—*
  - Simonton, Ronald, 317,559, Cl. D8-356.000.
- Hess, Stephen C., to Winston Furniture Company of Alabama, Inc. Chair frame. 317,535, 6-18-91, Cl. D6-380.000.
- Hess, Stephen C., to Winston Furniture Company of Alabama, Inc. Chair frame. 317,536, 6-18-91, Cl. D6-380.000.
- Hicks, Linda M.: *See—*
  - Hicks, Robert H., Sr.; and Hicks, Linda M., 317,522, Cl. D1-107.000.

VOL 1127
ISS 3
JE 18
1991
UMI

Hicks, Robert H., Sr., and Hicks, Linda M. Hamburger bun or similar article. 317,522, 6-18-91, Cl. D1-107.000.
Highland Supply Corporation: *See—*
  Weder, Donald E., 317,582, Cl. D11-164.000.
  Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 317,583, Cl. D11-164.000.
Hirose Electric Co., Ltd.: *See—*
  Matsuzaki, Shuichi, 317,591, Cl. D13-147.000.
Hitachi, Ltd.: *See—*
  Amano, Yoshiaki; Kumagai, Kenta; Katou, Fumihito; Kasama, Kouichi; and Kiyota, Tooru, 317,600, Cl. D14-126.000.
  Takekoshi, Isamu; Onuma, Mitsuru; Torai, Kazuki; Hashimoto, Kazunori; and Aritomi, Toshiaki, 317,596, Cl. D14-103.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
  Okano, Harumi, 317,658, Cl. D26-28.000.
  Yoshinao, Fujimura; and Saitoh, Yusuke, 317,586, Cl. D12-184.000.
Horiuchi, Kazuya: *See—*
  Matsuoka, Ken; Uchida, Kihachiro; Horiuchi, Kazuya; and Hayashi, Hiroyuki, 317,590, Cl. D13-134.000.
Hwang, Alexander H.: *See—*
  Muller, Peter H., 317,626, Cl. D19-60.000.
Interlego A.G.: *See—*
  Eggert, Bo; and Dideriksen, Erling T., 317,635, Cl. D21-108.000.
  Larsen, Kim P.; and Dideriksen, Erling T., 317,634, Cl. D21-108.000.
  Stephensen, Christian; and Nielsen, Jacob, 317,633, Cl. D21-108.000.
International Packaging Corporation: *See—*
  Harvey, Thomas J., 317,528, Cl. D3-75.000.
Irie, Toru; Fukuda, Isamu; and Takagi, Hisamitsu, to Fujitsu Limited. Portable telephone. 317,606, 6-18-91, Cl. D14-138.000.
Isomoto, Masataka; Aoyama, Minoru; and Sakurai, Mitsuru, to Canon Kabushiki Kaisha. Copying machine. 317,622, 6-18-91, Cl. D18-38.000.
Ito, Yasuyuki; Aoyama, Tatsuaki; and Niwa, Hisanobu, to CKD Kabushiki Kaisha. Combined pressure regulator filter and lubricator. 317,644, 6-18-91, Cl. D23-235.000.
Itoh, Kunio, to Pentel Kabushiki Kaisha. Pen cap or similar article. 317,625, 6-18-91, Cl. D19-57.000.
Iwata, Shuji; Suyama, Tsutomu; Terazaki, Nobuo; Futatsuishi, Shunichi; Hara, Zenichiro; and Tomimatsu, Noriyuki, to Mitsubisni Denki Kabushiki Kaisha. Fluorescent display tube for large screen video matrix array. 317,657, 6-18-91, Cl. D26-1.000.
Jahnke, Nicolette A. Headphone earpiece. 317,610, 6-18-91, Cl. D14-223.000.
Jespersen, Per: *See—*
  Andersen, Hans B.; Sorensen, Allan; and Jespersen, Per, 317,648, Cl. D23-397.000.
Joss, Michael; Gresens, Stanley; and Fraker, Richard, to Continental Scale Corporation. Dial scale. 317,578, 6-18-91, Cl. D10-92.000.
Jung, Karl-Heinz; and Muck, Manfred, to Blanco GmbH & Co. KG. Sink. 317,647, 6-18-91, Cl. D23-290.000
Jurinjak, William R. Combined pen and magnetic holder therefor 317,624, 6-18-91, Cl. D19-42.000.
K-Jack Engineering Company, Inc.: *See—*
  Chalabian, Jack S., 317,629, Cl. D20-6.000.
Kabushiki Kaisha Toshiba: *See—*
  Abe, Takashi; Nakahara, Michihiro; and Tanaka, Kaoru, 317,604, Cl. D14-133.000.
  Ban, Kimiyoshi; and Abe, Takashi, 317,605, Cl. D14-133.000.
  Kawanabe, Masahiro, 317,597, Cl. D14-126.000.
  Kawanabe, Masahiro; and Takechi, Kanta, 317,599, Cl. D14-126.000.
  Kawanabe, Masahiro, 317,601, Cl. D14-133.000.
  Kawanabe, Masahiro, 317,603, Cl. D14-133.000.
  Mikami, Tatsuyuki; and Tanaka, Kaoru, 317,602, Cl. D14-133.000.
Kasama, Kouichi: *See—*
  Amano, Yoshiaki; Kumagai, Kenta; Katou, Fumihito; Kasama, Kouichi; and Kiyota, Tooru, 317,600, Cl. D14-126.000.
Katou, Fumihito: *See—*
  Amano, Yoshiaki; Kumagai, Kenta; Katou, Fumihito; Kasama, Kouichi; and Kiyota, Tooru, 317,600, Cl. D14-126.000.
Kawanabe, Masahiro, to Kabushiki Kaisha Toshiba. Television receiver. 317,597, 6-18-91, Cl. D14-126.000.
Kawanabe, Masahiro; and Takechi, Kanta, to Kabushiki Kaisha Toshiba. Television receiver. 317,599, 6-18-91, Cl. D14-126.000.
Kawanabe, Masahiro, to Kabushiki Kaisha Toshiba. Television receiver. 317,601, 6-18-91, Cl. D14-133.000.
Kawanabe, Masahiro, to Kabushiki Kaisha Toshiba. Television receiver. 317,603, 6-18-91, Cl. D14-133.000.
Keiper Recaro GmbH & Co.: *See—*
  Beermann, Frank, 317,533, Cl. D6-356.000.
  Hansel, Dietger, 317,534, Cl. D6-356.000.
Ketoff, Sacha, to PAF S.R.L. Adjustable lamp. 317,660, 6-18-91, Cl. D26-65.000.
Kikuchi, Nobuo; and Sano, Hiroshi, to Canon Kabushiki Kaisha. Electronic still video camera. 317,615, 6-18-91, Cl. D16-202.000.
King, Donald G. Combination kniferack, cutting board and drain. 317,551, 6-18-91, Cl. D7-638.000.
Kira, Hiroshi, to Lumiere Design and Manufacturing, Inc. Outdoor bollard lighting fixture. 317,661, 6-18-91, Cl. D26-68.000.
Kiyota, Tooru: *See—*
  Amano, Yoshiaki; Kumagai, Kenta; Katou, Fumihito; Kasama, Kouichi; and Kiyota, Tooru, 317,600, Cl. D14-126.000.
Koito Manufacturing Co., Ltd.: *See—*
  Matsuoka, Ken; Uchida, Kihachiro; Horiuchi, Kazuya; and Hayashi, Hiroyuki, 317,590, Cl. D13-134.000.
Konoike, Tsunataka: *See—*
  Aoki, Sanae; and Konoike, Tsunataka, 317,576, Cl. D10-15.000.
Kroy Inc.: *See—*
  Richardson, Michael M.; and Ringle, Geoff, 317,594, Cl. D14-100.000.
Kryk, Lewis, to Diversey Corporation. Container filter. 317,570, 6-18-91, Cl. D9-434.000.
Kumagai, Kenta: *See—*
  Amano, Yoshiaki; Kumagai, Kenta; Katou, Fumihito; Kasama, Kouichi; and Kiyota, Tooru, 317,600, Cl. D14-126.000.
Kusmer, Raymond J., to Cooper Industries, Inc. Lighting calculator. 317,620, 6-18-91, Cl. D18-7.000.
Lambert, Lloyd W.; Brown, Joe A.; and Morgan, John L. Water dispenser. 317,545, 6-18-91, Cl. D7-307.000.
Lami, Daniel, to Etablissements Perras. Sprayer bottle. 317,562, 6-18-91, Cl. D9-300.000.
Lane, William A., Sr., to W. A. Lane, Inc. Packaging container. 317,567, 6-18-91, Cl. D9-425.000.
Lane, William A., Sr., to W. A. Lane, Inc. Packaging container. 317,568, 6-18-91, Cl. D9-425.000.
Lane, William A., Sr., to W. A. Lane, Inc. Packaging container 317,569, 6-18-91, Cl. D9-425.000.
Lapadakis, Theodore P. Holder for assorted desk articles. 317,627, 6-18-91, Cl. D19-75.000.
Lapham, Ralph R., to Uvex Winter Optical, Inc. Eyeglass carrying case. 317,526, 6-18-91, Cl. D3-34.000.
Larsen, Kim P.; and Dideriksen, Erling T., to Interlego A.G. Toy building element. 317,634, 6-18-91, Cl. D21-108.000.
Linden International AB: *See—*
  Henriksson, Kjell, 317,571, Cl. D9-443.000.
Little Tikes Company, The: *See—*
  Mariol, James F., 317,632, Cl. D21-65.000.
Logsdon, Hartley. Container holder. 317,572, 6-18-91, Cl. D9-455.000.
Lumiere Design and Manufacturing, Inc.: *See—*
  Kira, Hiroshi, 317,661, Cl. D26-68.000.
Lutron Electronics Co., Inc.: *See—*
  Rowen, Michael J., 317,593, Cl. D13-168.000.
Luverne Truck Equipment Inc.: *See—*
  Farmer, Michael J., 317,669, Cl. D32-49.000.
Mariol, James F., to Little Tikes Company, The. Toy rattle. 317,632, 6-18-91, Cl. D21-65.000.
Marshall, Randolph L., to Domation Inc. Dog house. 317,665, 6-18-91, Cl. D30-108.000.
Masterson, Susan M. Baseball motif picture frame. 317,530, 6-18-91, Cl. D6-303.000.
Masuzumi, Masaki, to Tomy Company, Ltd. Tool for playing in sand. 317,637, 6-18-91, Cl. D21-120.000.
Matsuoka, Ken; Uchida, Kihachiro; Horiuchi, Kazuya; and Hayashi, Hiroyuki, to Koito Manufacturing Co., Ltd. Automobile bulb socket. 317,590, 6-18-91, Cl. D13-134.000.
Matsuzaki, Shuichi, to Hirose Electric Co., Ltd. Electrical connector plug. 317,591, 6-18-91, Cl. D13-147.000.
Mayuzumi, Masaki, to Tomy Company, Ltd. Tool for playing in sand. 317,636, 6-18-91, Cl. D21-120.000.
Mayuzumi, Masaki, to Tomy Company, Ltd. Tool for playing in sand. 317,638, 6-18-91, Cl. D21-120.000.
Mayuzumi, Masaki, to Tomy Company, Ltd. Tool for playing in sand. 317,639, 6-18-91, Cl. D21-120.000.
Mazda Motor Corporation: *See—*
  Uchida, Akira, 317,585, Cl. D12-163.000.
McCloskey, Don R.; van Deursen, Gary; and Hattle, Sally A., to Black & Decker Inc. Electrically powered can opener. 317,552, 6-18-91, Cl. D8-36.000.
McKernan, John L. Protective shield for a deadbolt assembly 317,556, 6-18-91, Cl. D8-346.000.
McNeil (Ohio) Corporation: *See—*
  Channell, Alan B., 317,613, Cl. D15-7.000.
Meadows, R. Chapman. Hunting chair. 317,532, 6-18-91, Cl. D6-355.000.
Michael & Park's Trading and Sales, Inc.: *See—*
  Yeu, Nam J., 317,581, Cl. D11-160.000.
Midgety Engineering Co., Ltd.: *See—*
  Hashimoto, Keizo, 317,642, Cl. D21-247.000.
Mikami, Tatsuyuki; and Tanaka, Kaoru, to Kabushiki Kaisha Toshiba. Television receiver. 317,602, 6-18-91, Cl. D14-133.000.
Mitsubishi Denki Kabushiki Kaisha: *See—*
  Iwata, Shuji; Suyama, Tsutomu; Terazaki, Nobuo; Futatsuishi, Shunichi; Hara, Zenichiro; and Tomimatsu, Noriyuki, 317,657, Cl. D26-1.000.
Mobil Oil Corporation: *See—*
  Skaggs, Charles L.; Thomas, Charles A.; and Danis, Sara L., 317,671, Cl. D99-34.000.
Moen Incorporated: *See—*
  Rosenbaum, Kevin W., 317,645, Cl. D23-238.000.
Morgan, John L.: *See—*
  Lambert, Lloyd W.; Brown, Joe A.; and Morgan, John L., 317,545, Cl. D7-307.000.
Morrissey, Joseph P.: *See—*
  Farris, Harold J.; Winn, J. Marvin; and Morrissey, Joseph P., 317,651, Cl. D24-192.000.
Muck, Manfred: *See—*
  Jung, Karl-Heinz; and Muck, Manfred, 317,647, Cl. D23-290.000.

Muller, Peter H., to Hwang, Alexander H. Portable electronic dictionary. 317,626, 6-18-91, Cl. D19-60.000.
Muller, Ronald L.: *See—*
  Rakocy, William J.; Muller, Ronald L.; and Tsuji, Masao, 317,546, Cl. D7-309.000.
Mutti, Glenn W. Double pointed guitar pick. 317,617, 6-18-91, Cl. D17-20.000.
Nakagiri, Shigemi J. Chain shortener. 317,553, 6-18-91, Cl. D8-44.000.
Nakahara, Michihiro: *See—*
  Abe, Takashi; Nakahara, Michihiro; and Tanaka, Kaoru, 317,604, Cl. D14-133.000.
Neuroth, Margerate A. B.: *See—*
  Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A., 317,631, Cl. D21-61.000.
Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A. Bubble wand. 317,631, 6-18-91, Cl. D21-61.000.
New Space S.A.: *See—*
  Soder, Hugo, 317,650, Cl. D24-202.000.
Nielsen, Jacob: *See—*
  Stephensen, Christian; and Nielsen, Jacob, 317,633, Cl. D21-108.000.
Nishida, Kouji: *See—*
  Sawada, Masaji; and Nishida, Kouji, 317,618, Cl. D18-7.000.
Niwa, Hisanobu: *See—*
  Ito, Yasuyuki; Aoyama, Tatsuaki; and Niwa, Hisanobu, 317,644, Cl. D23-235.000.
North American Philips Corporation: *See—*
  Rakocy, William J.; Muller, Ronald L.; and Tsuji, Masao, 317,546, Cl. D7-309.000.
Ohtsu Tire & Rubber Co., Ltd., The: *See—*
  Tsutsumi, Kotaro, 317,584, Cl. D12-151.000.
Okano, Harumi, to Honda Giken Kogyo Kabushiki Kaisha. Taillamp for automobile. 317,658, 6-18-91, Cl. D26-28.000.
Onuma, Mitsuru: *See—*
  Takekoshi, Isamu; Onuma, Mitsuru; Torai, Kazuki; Hashimoto, Kazunori; and Aritomi, Toshiaki, 317,596, Cl. D14-103.000.
Pacific Floor Machine Company, Inc.: *See—*
  Bolser, Chester W.; and Wierenga, Lyle H., 317,667, Cl. D32-19.000.
  Bolser, Chester W.; and Wierenga, Lyle H., 317,668, Cl. D32-19.000.
PAF S.R.L.: *See—*
  Ketoff, Sacha, 317,660, Cl. D26-65.000.
Park, Jong M., to Gold Star Co., Ltd. Television set. 317,598, 6-18-91, Cl. D14-126.000.
Pease Industries, Inc.: *See—*
  Guetle, Norbert J., Jr.; and Greene, Marlin, 317,652, Cl. D25-103.000.
  Guetle, Norbert J., Jr.; and Shaffer, B. Jeremiah, 317,653, Cl. D25-103.000.
  Guetle, Norbert J., Jr.; and Shaffer, B. Jeremiah, 317,654, Cl. D25-103.000.
  Guetle, Norbert J., Jr.; and Shaffer, B. Jeremiah, 317,655, Cl. D25-103.000.
Pentel Kabushiki Kaisha: *See—*
  Itoh, Kunio, 317,625, Cl. D19-57.000.
Pesce, Gaetano, to Societe Generale des Eaux Minerales de Vittel. Bottle. 317,565, 6-18-91, Cl. D9-367.000.
Piechocki, Edward. Greeting card. 317,623, 6-18-91, Cl. D19-1.000.
Pino, Giovanni, to Rubbermaid Incorporated. Table. 317,537, 6-18-91, Cl. D6-484.000.
Pluta, Michael R. Vehicle windshield shade or similar article. 317,588, 6-18-91, Cl. D12-191.000.
Poe, Kenneth A. Speaker stand. 317,611, 6-18-91, Cl. D14-224.000
Poe, Lloyd R. Padlock hasp guard. 317,557, 6-18-91, Cl. D8-346.000.
Price Pfister, Inc.: *See—*
  Yost, Holly K., 317,646, Cl. D23-252.000.
Rakocy, William J.; Muller, Ronald L.; and Tsuji, Masao, to North American Philips Corporation. Coffee maker. 317,546, 6-18-91, Cl. D7-309.000.
Ramsey, David L. Device for hanging suspended objects on a wall. 317,575, 6-18-91, Cl. D10-71.000.
Rea, Philip L.; and Bagshaw, Stanley R. Tile mounting aid. 317,656, 6-18-91, Cl. D23-138.000.
Rehrig-Pacific Company, Inc.: *See—*
  Apps, William P., 317,670, Cl. D34-40.000.
Reid, Marvin T.; and Wesell, August J. Permanent wave tissue dispenser 317,540, 6-18-91, Cl. D6-518.000.
Richardson, Michael M.; and Ringle, Geoff, to Kroy Inc. Keyboard. 317,594, 6-18-91, Cl. D14-100.000.
Ringle, Geoff: *See—*
  Richardson, Michael M.; and Ringle, Geoff, 317,594, Cl. D14-100.000.
Robertson, Elizabeth A.: *See—*
  Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A., 317,631, Cl. D21-61.000.
Robertson, Richard A.: *See—*
  Neuroth, Richard L.; Neuroth, Margerate A. B.; Robertson, Richard A.; and Robertson, Elizabeth A., 317,631, Cl. D21-61.000.
Rosenbaum, Kevin W., to Moen Incorporated. Faucet. 317,645, 6-18-91, Cl. D23-238.000.
Rowen, Michael J., to Lutron Electronics Co., Inc. Transmitter for wireless switch. 317,593, 6-18-91, Cl. D13-168.000.
Rubbermaid Incorporated: *See—*
  Pino, Giovanni, 317,537, Cl. D6-484.000.
Sachetti, Terrance W. Bed linen. 317,542, 6-18-91, Cl. D6-603.000.
Saitoh, Yusuke: *See—*
  Yoshinao, Fujimura; and Saitoh, Yusuke, 317,586, Cl. D12-184.000.
Sakurai, Mitsuru: *See—*
  Isomoto, Masataka; Aoyama, Minoru; and Sakurai, Mitsuru, 317,622, Cl. D18-38.000.
Sano, Hiroshi: *See—*
  Kikuchi, Nobuo; and Sano, Hiroshi, 317,615, Cl. D16-202.000.
Sawada, Masaji; and Nishida, Kouji, to Sharp Corporation. Electronic calculator. 317,618, 6-18-91, Cl. D18-7.000.
Sawada, Masaji; and Yoshimura, Youko, to Sharp Corporation. Electronic calculator with solar cell. 317,619, 6-18-91, Cl. D18-7.000.
Shaffer, B. Jeremiah: *See—*
  Guetle, Norbert J., Jr.; and Shaffer, B. Jeremiah, 317,653, Cl. D25-103.000.
  Guetle, Norbert J., Jr.; and Shaffer, B. Jeremiah, 317,654, Cl. D25-103.000.
  Guetle, Norbert J., Jr.; and Shaffer, B. Jeremiah, 317,655, Cl. D25-103.000.
Shalvi, Ram, to Solar Wide Industrial Limited. Combined fluid alert and thermometer. 317,579, 6-18-91, Cl. D10-101.000.
Sharp Corporation: *See—*
  Sawada, Masaji; and Nishida, Kouji, 317,618, Cl. D18-7.000.
  Sawada, Masaji; and Yoshimura, Youko, 317,619, Cl. D18-7.000.
Shiiba, Minoru, to Fuji Photo Film Co., Ltd. Overhead projector. 317,616, 6-18-91, Cl. D16-232.000.
Simonton, Ronald, to Herman Miller, Inc. Grommet. 317,559, 6-18-91, Cl. D8-356.000.
Skaggs, Charles L.; Thomas, Charles A.; and Danis, Sara L., to Mobil Oil Corporation. Coin tray and the like. 317,671, 6-18-91, Cl. D99-34.000.
Skaggs, Kenneth. Auto wiring manifold. 317,560, 6-18-91, Cl. D8-357.000.
Small, Robert A. Combined container, stirrer and drinking straw 317,543, 6-18-91, Cl. D7-300.200.
Smigel, Irwin E.: *See—*
  Smigel, Lucia; and Smigel, Irwin E., 317,529, Cl. D4-104.000.
Smigel, Lucia; and Smigel, Irwin E. Toothbrush handle. 317,529, 6-18-91, Cl. D4-104.000.
Smith, LeRoy E. Removable sweat band for hats. 317,523, 6-18-91, Cl. D2-261.000.
Societe Generale des Eaux Minerales de Vittel: *See—*
  Pesce, Gaetano, 317,565, Cl. D9-367.000.
Soder, Hugo, to New Space S.A. Combined relaxation and psychosensorial stimulation chamber. 317,650, 6-18-91, Cl. D24-202.000.
Solar Wide Industrial Limited: *See—*
  Shalvi, Ram, 317,579, Cl. D10-101.000.
Sorensen, Allan: *See—*
  Andersen, Hans B.; Sorensen, Allan; and Jespersen, Per, 317,648, Cl. D23-397.000.
Spry, Harriett M., to Beecham Group p.l.c. Bag. 317,563, 6-18-91, Cl. D9-305.000.
Stadelmaier, C. Richard. Camper's wok. 317,549, 6-18-91, Cl. D7-360.000.
Step, Paul, to 501 Romet Limited. Alignment bag. 317,573, 6-18-91, Cl. D10-64.000.
Stephensen, Christian; and Nielsen, Jacob, to Interlego A.G. Toy sea lion. 317,633, 6-18-91, Cl. D21-108.000.
Stone, Sumner R., to Adobe Systems Incorporated. Type font. 317,621, 6-18-91, Cl. D18-24.000.
Stubbings, Alan W., to Tamborrino, John G. Tether retainer for surf boards or the like. 317,561, 6-18-91, Cl. D8-367.000.
Sutherland, Jack, to Dynamic Products, Inc. Watercraft. 317,589, 6-18-91, Cl. D12-318.000.
Suyama, Tsutomu: *See—*
  Iwata, Shuji; Suyama, Tsutomu; Terazaki, Nobuo; Futatsuishi, Shunichi; Hara, Zenichiro; and Tomimatsu, Noriyuki, 317,657, Cl. D26-1.000.
Takagi, Hisamitsu: *See—*
  Irie, Toru; Fukuda, Isamu; and Takagi, Hisamitsu, 317,606, Cl. D14-138.000.
Takechi, Kanta: *See—*
  Kawanabe, Masahiro; and Takechi, Kanta, 317,599, Cl. D14-126.000.
Takekoshi, Isamu; Onuma, Mitsuru; Torai, Kazuki; Hashimoto, Kazunori; and Aritomi, Toshiaki, to Hitachi, Ltd. Operator console for magnetic resonance imaging system. 317,596, 6-18-91, Cl. D14-103.000.
Tamborrino, John G.: *See—*
  Stubbings, Alan W., 317,561, Cl. D8-367.000.
Tanaka, Kaoru: *See—*
  Abe, Takashi; Nakahara, Michihiro; and Tanaka, Kaoru, 317,604, Cl. D14-133.000.
  Mikami, Tatsuyuki; and Tanaka, Kaoru, 317,602, Cl. D14-133.000.
Tanaka Manufacturing Company Limited: *See—*
  Aoki, Sanae; and Konoike, Tsunataka, 317,576, Cl. D10-15.000.
Telex Communications, Inc.: *See—*
  Wiegel, Christopher D., 317,525, Cl. D2-512.000.
Terazaki, Nobuo: *See—*
  Iwata, Shuji; Suyama, Tsutomu; Terazaki, Nobuo; Futatsuishi, Shunichi; Hara, Zenichiro; and Tomimatsu, Noriyuki, 317,657, Cl. D26-1.000.
Terraillon: *See—*
  Elie, Francois, 317,550, Cl. D7-402.000.

VOL
1127
ISS
3
JE
18
1991
UMI

Thomas, Charles A.: *See—*
  Skaggs, Charles L.; Thomas, Charles A., and Danis, Sara L., 317,671, Cl. D99-34.000.
Thurston, Kurt W. Safety road channelizer. 317,580, 6-18-91, Cl. D10-109.000.
Todd Enterprises, Inc.: *See—*
  Goldsmith, Howard G., 317,539, Cl. D6-495.000.
Tomimatsu, Noriyuki: *See—*
  Iwata, Shuji; Suyama, Tsutomu; Terazaki, Nobuo; Futatsuishi, Shunichi; Hara, Zenichiro; and Tomimatsu, Noriyuki, 317,657, Cl. D26-1.000.
Tomy Company, Ltd.: *See—*
  Masuzumi, Masaki, 317,637, Cl. D21-120.000.
  Mayuzumi, Masaki, 317,636, Cl. D21-120.000.
  Mayuzumi, Masaki, 317,638, Cl. D21-120.000.
  Mayuzumi, Masaki, 317,639, Cl. D21-120.000.
Torai, Kazuki: *See—*
  Takekoshi, Isamu; Onuma, Mitsuru; Torai, Kazuki; Hashimoto, Kazunori; and Aritomi, Toshiaki, 317,596, Cl. D14-103.000.
Tsuji, Masao: *See—*
  Rakocy, William J.; Muller, Ronald L.; and Tsuji, Masao, 317,546, Cl. D7-309.000.
Tsutsumi, Kotaro, to Ohtsu Tire & Rubber Co., Ltd., The. Vehicle tire. 317,584, 6-18-91, Cl. D12-151.000.
Uchida, Akira, to Mazda Motor Corporation. Grill for automobile radiator. 317,585, 6-18-91, Cl. D12-163.000.
Uchida, Kihachiro: *See—*
  Matsuoka, Ken; Uchida, Kihachiro; Horiuchi, Kazuya; and Hayashi, Hiroyuki, 317,590, Cl. D13-134.000.
Uvex Winter Optical, Inc.: *See—*
  Lapham, Ralph R., 317,526, Cl. D3-34.000.
van Deursen, Gary: *See—*
  McCloskey, Don R.; van Deursen, Gary; and Hattle, Sally A., 317,552, Cl. D8-36.000.
Verone, Edith A. Stuffed doll figure with frontal pouch. 317,640, 6-18-91, Cl. D21-167.000.
W. A. Lane, Inc.: *See—*
  Lane, William A., Sr., 317,567, Cl. D9-425.000.
  Lane, William A., Sr., 317,568, Cl. D9-425.000.
  Lane, William A., Sr., 317,569, Cl. D9-425.000.
Weder, Donald E., to Highland Supply Corporation. Flower pot cover. 317,582, 6-18-91, Cl. D11-164.000.
Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., to Highland Supply Corporation. Flower pot cover. 317,583, 6-18-91, Cl. D11-164.000.
Weder, Erwin H.: *See—*
  Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 317,583, Cl. D11-164.000
Weder, Wanda M.: *See—*
  Weder, Donald E.; Weder, Erwin H.; Weder, Wanda M.; Craig, Franklin J.; Donnelly, Wilma M.; Bolk, Phyllis J.; Bergstrand, John W.; and Abrams, Robert C., 317,583, Cl. D11-164.000.
Wei, Joe. Tape rewinder. 317,609, 6-18-91, Cl. D14-217.000.
Wesell, August J.: *See—*
  Reid, Marvin T.; and Wesell, August J., 317,540, Cl. D6-518.000
Wiegel, Christopher D., to Telex Communications, Inc. Band for headset. 317,525, 6-18-91, Cl. D2-512.000.
Wierenga, Lyle H.: *See—*
  Bolser, Chester W.; and Wierenga, Lyle H., 317,667, Cl. D32-19.000.
  Bolser, Chester W.; and Wierenga, Lyle H., 317,668, Cl. D32-19.000.
Wilson, Robert L., to Chromcraft Furniture Corp. Table base. 317,538, 6-18-91, Cl. D6-495.000.
Winn, J. Marvin: *See—*
  Farris, Harold J.; Winn, J. Marvin; and Morrissey, Joseph P., 317,651, Cl. D24-192.000.
Winston Furniture Company of Alabama, Inc.: *See—*
  Hess, Stephen C., 317,535, Cl. D6-380.000.
  Hess, Stephen C., 317,536, Cl. D6-380.000.
Yeh, Stanley, to 501 Giant Up Co., Ltd. Electric egg cooker. 317,548, 6-18-91, Cl. D7-357.000.
Yeu, Nam J., to Michael & Park's Trading and Sales, Inc. Drum boy figurine or similar article. 317,581, 6-18-91, Cl. D11-160.000.
Yoshimura, Youko: *See—*
  Sawada, Masaji; and Yoshimura, Youko, 317,619, Cl. D18-7.000.
Yoshinao, Fujimura; and Saitoh, Yusuke, to Honda Giken Kogyo Kabushiki Kaisha. Automobile front fender exterior surface. 317,586, 6-18-91, Cl. D12-184.000.
Yoshitake, Isamu, to Casio Computer Co., Ltd. Keyboard for data processing system. 317,595, 6-18-91, Cl. D14-100.000.
Yoshizawa, Tetsuo, to Canon Kabushiki Kaisha. Semiconductor element. 317,592, 6-18-91, Cl. D13-182.000.
Yost, Holly K., to Price Pfister, Inc. Drain control knob. 317,646, 6-18-91, Cl. D23-252.000.
Young, Raymond A. Knife sharpener. 317,554, 6-18-91, Cl. D8-93.000.
501 Giant Up Co., Ltd.: *See—*
  Yeh, Stanley, 317,548, Cl. D7-357.000.
501 Romet Limited: *See—*
  Step, Paul, 317,573, Cl. D10-64.000.

LIST OF PLANT PATENTEES

Austin, David C. H., to David Austin Roses. Rose plant — Ausman. 7,556, 6-18-91, Cl. 1.000.
Austin, David C. H., to David Austin Roses. Rose plant—Ausleaf. 7,557, 6-18-91, Cl. 1.000.
David Austin Roses: *See—*
  Austin, David C. H., 7,556, Cl. 1.000.
  Austin, David C. H., 7,557, Cl. 1.000.
DeVor Nurseries, Inc.: *See—*
  Marciel, Stanley G., 7,558, Cl. 7.000.
  Marciel, Stanley G., 7,559, Cl. 10.000.
  Marciel, Stanley G., 7,560, Cl. 10.000.
  Marciel, Stanley G., 7,562, Cl. 20.000.
  Twomey, Jerry, 7,561, Cl. 18.000.
Hureau, Robert C., to Societe Civile Darbonne. Strawberry plant named Darlibelle. 7,563, 6-18-91, Cl. 49.000.
Marciel, Stanley G., to DeVor Nurseries, Inc. Miniature pot rose named Devpresa. 7,558, 6-18-91, Cl. 7.000.
Marciel, Stanley G., to DeVor Nurseries, Inc. Miniature rose named Devrico. 7,559, 6-18-91, Cl. 10.000.
Marciel, Stanley G., to DeVor Nurseries, Inc. Miniature rose named Devclavel. 7,560, 6-18-91, Cl. 10.000.
Marciel, Stanley G., to DeVor Nurseries, Inc. Rose plant named Devcali. 7,562, 6-18-91, Cl. 20.000.
Societe Civile Darbonne: *See—*
  Hureau, Robert C., 7,563, Cl. 49.000.
Twomey, Jerry, to DeVor Nurseries, Inc. Rose plant named Twodream. 7,561, 6-18-91, Cl. 18.000.

CLASSIFICATION OF PATENTS

ISSUED JUNE 18, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2	
69	5,023,952
126	5,023,953
174	5,023,954
209	5,023,955
338	5,023,956
409	5,023,957
411	5,023,958
CLASS 4	
321	5,023,959
393	5,023,960
448	5,023,961
480	5,023,962
521	5,023,963
558	5,023,964
607	5,023,965
CLASS 5	
17	5,023,966
62	5,023,967
82 R	5,023,968
486	5,023,969
502	5,023,970
CLASS 8	
414	5,024,673
554	5,024,674
CLASS 15	
97.1	5,023,971
250.42	5,023,972
319	5,023,973
CLASS 17	
46	5,023,975
CLASS 19	
0.25	5,023,976
115 R	5,023,977
CLASS 24	
3 L	5,023,978
68 R	5,023,979
196	5,023,980
573.5	5,023,981
715.3	5,023,982
CLASS 29	
27 R	5,023,983
81.05	5,023,984
132	5,023,985
163.6	5,023,986
402.11	5,023,987
426.1	5,023,988
426.5	5,023,989
525.1	5,023,990
603	5,023,991
623.1	5,024,675
705	5,023,992
843	5,023,993
852	5,023,994
CLASS 30	
90.1	5,023,995
144	5,023,996
175	5,023,997
276	5,023,998
390	5,023,999
475	5,024,000
CLASS 33	
203.18	5,024,001
549	5,024,002
561	5,024,003
CLASS 34	
1	5,024,004
164	5,024,005
CLASS 36	
83	5,024,006
127	5,024,007
136	5,024,008
CLASS 37	
55	5,024,009
118 R	5,024,010
CLASS 40	
124.1	5,024,011
212	5,024,012
301	5,024,013
310	5,024,014
605	5,024,015
CLASS 42	
25	5,024,016
70.07	5,024,017
CLASS 43	
21 2	5,024,018
42.31	5,024,019
43.16	5,024,020
62	5,024,021
CLASS 44	
301	5,024,676
335	5,024,677
348	5,024,678
449	5,024,679
CLASS 49	
139	5,024,022
501	5,024,023
CLASS 51	
34 H	5,024,027
124 L	5,024,024
165.77	5,024,025
206.4	5,024,026
295	5,024,680
432	5,024,028
438	5,024,029
CLASS 52	
36	5,024,030
81	5,024,031
223 L	5,024,032
407	5,024,033
484	5,024,034
591	5,024,035
600	5,024,036
646	5,024,037
700	5,024,038
735	5,024,039
738	5,024,040
CLASS 53	
168	5,024,042
234	5,024,043
433	5,024,044
443	5,024,045
449	5,024,041
466	5,024,046
502	5,024,047
534	5,024,048
585	5,024,049
CLASS 55	
6	5,024,681
73	5,024,682
74	5,024,683
92	5,024,684
117	5,024,685
259	5,024,686
316	5,024,687
CLASS 56	
220	5,024,050
297	5,024,051
330	5,024,052
367	5,024,053
CLASS 60	
39.27	5,024,055
274	5,024,054
550	5,024,056
597	5,024,057
752	5,024,058
CLASS 62	
3.1	5,024,059
51.2	5,024,060
77	5,024,061
92	5,024,062
101	5,024,063
106	5,024,064
233	Re.33,612
285	5,024,065
306	5,024,066
457.4	5,024,067
CLASS 65	
3.12	5,024,688
CLASS 66	
53	5,024,068
CLASS 70	
209	5,024,069
370	5,024,070
387	5,024,071
456 R	5,024,078
491	5,024,072
	5,024,073
CLASS 71	
29	5,024,689
77	5,024,690
86	5,024,691
	5,024,692
92	5,024,693
95	5,024,694
CLASS 72	
16	5,024,074
38	5,024,075
190	Re.33,613
211	5,024,076
336	5,024,077
CLASS 73	
49.8	5,024,079
54	5,024,080
104	5,024,081
117.3	5,024,082
204.26	5,024,083
215	5,024,084
256	5,024,085
292	5,024,086
516 R	5,024,087
517 B	5,024,088
	5,024,089
572	5,024,090
597	5,024,091
602	5,024,092
633	5,024,093
634	5,024,094
661	5,024,095
663	5,024,096
727	5,024,097
729	5,024,098
730	5,024,099
756	5,024,100
766	5,024,101
798	5,024,102
819	5,024,103
861.37	5,024,104
861.58	5,024,105
862.54	5,024,106
862.65	5,024,107
863.11	5,024,108
864.16	5,024,109
864.62	5,024,110
865.6	5,024,111
CLASS 74	
5.37	5,024,112
6	5,024,113
86	5,024,114
89.15	5,024,115
109	5,024,116
473 P	5,024,117
492	5,024,118
551.1	5,024,119
574	5,024,120
594.1	5,024,121
606 R	5,024,122
625	5,024,124
866	5,024,125
CLASS 75	
338	5,024,695
708	5,024,696
CLASS 81	
489	5,024,126
CLASS 83	
13	5,024,127
26	5,024,128
107	5,024,129
444	5,024,130
875	5,024,131
CLASS 84	
312 R	5,024,132
615	5,024,133
654	5,024,134
CLASS 86	
31	5,024,135
CLASS 89	
6	5,024,136
8	5,024,137
37 22	5,024,138
154	5,024,139
CLASS 91	
28	5,024,140
171	5,024,141
271	5,024,142
CLASS 92	
12.2	5,024,143
13.5	5,024,144
CLASS 99	
451	5,024,145
458	5,024,146
549	5,024,147
618	5,024,148
CLASS 100	
32	5,024,149
35	5,024,150
53	5,024,151
188 R	5,024,152
CLASS 101	
91	5,024,153
148	5,024,154
216	5,024,155
	5,024,156
CLASS 102	
252	5,024,157
275.11	5,024,158
289	5,024,159
323	5,024,160
CLASS 104	
178	5,024,162
CLASS 105	
73	5,024,163
101	5,024,164
168	5,024,165
453	5,024,166
CLASS 106	
14 13	5,024,697
20	5,024,698
21	5,024,699
30	B1 4,648,907
32	5,024,700
35	5,024,701
277	5,024,702
649	5,024,703
CLASS 108	
50	5,024,167
94	5,024,168
CLASS 110	
165 A	5,024,169
264	5,024,170
345	5,024,171
CLASS 111	
104	5,024,172
178	5,024,173
CLASS 112	
121.24	5,024,174
217.2	5,024,175
266.1	5,024,176
CLASS 114	
61	5,024,177
315	5,024,178
CLASS 116	
173	5,024,179
CLASS 118	
244	5,024,180
658	5,024,181
723	5,024,182
CLASS 119	
29	5,024,183
CLASS 123	
48 R	5,024,184
146.5 A	5,024,185
179 B	5,024,186
193 H	5,024,187
195 A	5,024,188
195 R	5,024,189
196 R	5,024,190
198 D	5,024,191
245	5,024,192
259	5,024,193
269	5,024,194
304	5,024,195
339	5,024,196
	5,024,197
468	5,024,198
489	5,024,199
501	5,024,200
531	5,024,201
533	5,024,202
573	5,024,203
602	5,024,204
632	5,024,205
CLASS 124	
23.1	5,024,206
CLASS 125	
35	5,024,207
CLASS 126	
25 R	5,024,208
39 H	5,024,209
344	5,024,210
424	5,024,211
CLASS 128	
4	5,024,212
69	5,024,213
75	5,024,214
	5,024,215
80 C	5,024,216
82	5,024,217
200.26	5,024,218
204 21	5,024,219
207.18	5,024,220
419 PG	5,024,221
	5,024,222
419 R	5,024,223
420.6	5,024,224
630	5,024,225
633	5,024,226
640	5,024,227
642	5,024,228
653 SC	5,024,229
654	5,024,230
	5,024,231
	5,024,232
659	5,024,233
663.01	5,024,234
732	5,024,235
735	5,024,236
760	5,024,237
771	5,024,238
774	5,024,239
780	5,024,240
CLASS 131	
84 2	5,024,241
94	5,024,242
CLASS 132	
116	5,024,243
270	5,024,244
CLASS 134	
6	5,024,704
38	5,024,705
108	5,024,245
200	5,024,246
CLASS 136	
258	5,024,706
CLASS 137	
82	5,024,247
219	5,024,254
596.16	5,024,248
CLASS 138	
31	5,024,250
92	5,024,251
110	5,024,249
130	5,024,252
CLASS 139	
99	5,024,253
CLASS 141	
11	5,024,255
329	5,024,256
CLASS 144	
1 R	5,024,257
CLASS 148	
253	5,024,707
CLASS 149	
19 1	5,024,708
CLASS 150	
140	5,024,258
159	5,024,259
CLASS 152	
209 R	5,024,260
527	5,024,261
CLASS 156	
69	5,024,709
89	5,024,710
153	5,024,711
184	5,024,712
221	5,024,713
243	5,024,714
245	5,024,715
345	5,024,716
354	5,024,717
475	5,024,718
522	5,024,719
584	5,024,720
628	5,024,723
643	5,024,721
	5,024,722
	5,024,724
	5,024,725
653	5,024,726
663	5,024,727
CLASS 159	
27 4	5,024,728
CLASS 160	
370.2	5,024,262
CLASS 162	
372	5,024,729
CLASS 164	
149	5,024,161
CLASS 165	
1	5,024,263
	5,024,264
22	5,024,265
89	5,024,266
122	5,024,267
134.1	5,024,268
153	5,024,269
CLASS 166	
63	5,024,270
66.5	5,024,271
117.7	5,024,272
289	5,024,273
303	Re.33,614
	5,024,274
	5,024,275
308	5,024,276
381	5,024,277
CLASS 169	
65	B1 4,773,485
CLASS 171	
17	5,024,278
CLASS 172	
1	5,024,279
197	5,024,280
219	5,024,281
CLASS 174	
52.4	5,025,114
117 F	5,025,115
250	5,025,116

VOL
1127
ISS
3
JE
18
1991
UMI

CLASS 177	
25.15	5,024,282
CLASS 180	
89 14	5,024,283
179	5,024,284
197	5,024,285
206	5,024,286
297	5,024,287
CLASS 181	
206	5,024,288
231	5,024,289
293	5,024,290
CLASS 182	
85	5,024,291
90	5,024,292
93	5,024,293
CLASS 184	
108	5,024,294
CLASS 187	
125	5,024,295
132	5,024,296
CLASS 188	
18 A	5,024,297
72.2	5,024,298
156	5,024,299
264 CC	5,024,300
284	5,024,301
299	5,024,302
300	5,024,303
356	5,024,304
CLASS 192	
0 055	5,024,305
0.076	5,024,310
3.57	5,024,306
40	5,024,307
41 A	5,024,308
60	5,024,309
84 T	5,024,311
CLASS 193	
37	5,024,312
CLASS 194	
217	5,024,313
CLASS 196	
132	5,024,730
CLASS 198	
333	5,024,314
341	5,024,315
369	5,024,316
415	5,024,317
465 2	5,024,318
494	5,024,319
756	5,024,320
853	5,024,321
CLASS 200	
38 R	5,025,117
49	5,025,120
148 R	5,025,118
262	5,025,119
275	5,025,121
CLASS 203	
99	5,024,731
CLASS 204	
1.11	5,024,732
3	5,024,733
15	5,024,734
	5,024,735
49	5,024,736
71	5,024,737
105 R	5,024,738
157.15	5,024,740
157.2	5,024,739
157 22	5,024,741
157.68	5,024,742
157 69	5,024,743
194	5,024,744
198	5,024,745
297 W	5,024,746
298 09	5,024,747
298.38	5,024,748
299 R	5,024,749
CLASS 206	
63.3	5,024,322
	5,024,323
63.5	5,024,324
229	5,024,325
366	5,024,326
	5,024,327
453	5,024,328
454	5,024,329
486	5,024,330
551	5,024,331
575	5,024,332
CLASS 208	
57	5,024,750
108	5,024,751
131	5,024,752
CLASS 209	
1	5,024,753
135	5,024,754
211	5,024,755
535	5,024,333
557	5,024,334
618	5,024,335
CLASS 210	
93	5,024,756
136	5,024,757
198 2	5,024,758
222	5,024,759
232	5,024,760
	5,024,761
321 69	5,024,762
333.01	5,024,763
484	5,024,764
651	5,024,765
668	5,024,766
682	5,024,767
712	5,024,768
721	5,024,769
747	5,024,770
791	5,024,771
CLASS 211	
59 2	5,024,336
88	5,024,337
105.1	5,024,338
CLASS 215	
1 C	5,024,339
	5,024,340
11 1	5,024,341
CLASS 219	
10.55 B	5,025,489
10.71	5,025,122
10.75	5,025,123
	5,025,124
85 11	5,025,125
125.1	5,025,126
130.1	5,025,127
200	5,025,128
201	5,025,129
203	5,025,130
401	5,025,132
462	5,025,133
494	5,025,134
506	5,025,135
508	5,025,136
521	5,025,137
CLASS 220	
9 3	5,024,344
326	5,024,343
366	5,024,345
401	5,024,346
468	5,024,342
CLASS 221	
11	5,024,348
46	5,024,349
75	5,024,350
277	5,024,351
CLASS 222	
1	5,024,347
	5,024,352
94	5,024,354
162	5,024,355
185	5,024,353
312	5,024,356
CLASS 223	
106	5,024,357
CLASS 224	
35	5,024,358
36	5,024,359
215	5,024,360
223	5,024,361
CLASS 225	
20	5,024,362
96.005	5,024,363
CLASS 227	
67	5,024,365
CLASS 228	
56.1	5,024,366
111	5,024,367
118	5,024,368
157	5,024,369
180.1	5,024,370
216	5,024,371
248	5,024,372
CLASS 229	
68 R	5,024,373
71	5,024,374
125.39	5,024,375
160 1	5,024,376
CLASS 235	
379	5,025,138
	5,025,139
385	5,025,140
472	5,025,141
CLASS 236	
93 B	5,024,378
CLASS 237	
2 A	5,024,377
16	5,024,379
CLASS 238	
218	5,024,380
367	5,024,381
CLASS 239	
11	5,024,382
284 1	5,024,383
289	5,024,384
410	5,024,385
CLASS 241	
3	5,024,386
21	5,024,387
301	5,024,388
CLASS 242	
35.50 A	5,024,389
47	5,024,390
107.200	5,024,391
128	5,024,392
131	5,024,393
198	5,024,394
CLASS 244	
3.22	5,024,395
35 R	5,024,396
118 5	5,024,398
119	5,024,399
147	5,024,400
155 A	5,024,401
CLASS 248	
52	5,024,402
57	5,024,403
62	5,024,404
73	5,024,405
149	5,024,406
164	5,024,407
206.5	5,024,408
222 4	5,024,409
302	5,024,410
311.2	5,024,411
343	5,024,412
623	5,024,413
688	5,024,414
923	5,024,415
CLASS 250	
201 9	5,025,142
203.3	5,025,143
207	5,025,144
211 J	5,025,145
214 L	5,025,146
216	5,025,147
227 12	5,025,148
253	5,025,150
269	5,025,151
281	5,025,152
306	5,025,153
308	5,025,154
326	5,025,155
327 2	5,025,156
	5,025,157
328	5,025,158
337	5,025,159
342	5,025,149
356.1	5,025,160
364	5,025,161
385 2	5,025,162
483 1	5,025,163
	5,025,164
491.1	5,025,165
492.1	5,025,166
492 2	5,025,167
548	5,025,168
574	5,025,169
CLASS 251	
78	5,024,416
129.04	5,024,417
129.11	5,024,418
148	5,024,419
CLASS 252	
1	5,024,772
42.7	5,024,773
47	5,024,774
52 R	5,024,775
97	5,024,776
117	5,024,777
140	5,024,778
162	5,024,779
	5,024,780
171	5,024,781
174 13	5,024,782
174 17	5,025,069
180	5,024,783
299 01	5,024,784
	5,024,785
543	5,024,786
CLASS 256	
67	5,024,420
CLASS 260	
410.6	5,024,787
CLASS 261	
114 1	5,024,788
CLASS 264	
6	5,024,789
16	5,024,790
21	5,024,791
22	5,024,792
29.7	5,024,793
57	5,024,794
59	5,024,795
69	5,024,796
143	5,024,797
272.15	5,024,798
284	5,024,799
502	5,024,800
CLASS 266	
210	5,024,421
272	5,024,422
283	5,024,423
CLASS 267	
64 27	5,024,424
140.1	5,024,425
158	5,024,426
CLASS 269	
136	5,024,427
274	5,024,428
CLASS 270	
30	5,024,429
53	5,024,430
CLASS 271	
263	5,024,431
268	5,024,432
CLASS 272	
120	5,024,433
123	5,024,434
CLASS 273	
26 B	5,024,435
26 R	5,024,436
78	5,024,437
81 R	5,024,438
143 R	5,024,439
145 A	5,024,440
176 R	5,024,441
186 C	5,024,442
188 R	5,024,443
232	5,024,444
256	5,024,445
413	5,024,446
416	5,024,447
423	5,024,448
CLASS 277	
35	5,024,364
37	5,024,449
	5,024,450
53	5,024,451
81 R	5,024,452
106	5,024,453
207 A	5,024,454
CLASS 280	
37	5,024,455
412	5,024,456
632	5,024,457
645	5,024,458
707	5,024,459
	5,024,460
710	5,024,461
712	5,024,462
718	5,024,463
731	5,024,464
840	5,024,465
CLASS 285	
16	5,024,466
36	5,024,467
39	5,024,468
302	5,024,469
CLASS 292	
97	5,024,471
120	5,024,473
182	5,024,472
252	5,024,474
340	5,024,475
CLASS 294	
16	5,024,476
68 23	5,024,397
81 2	5,024,477
88	5,024,478
CLASS 296	
97.7	5,024,479
146	5,024,480
180.1	5,024,481
194	5,024,482
CLASS 297	
273	5,024,483
300	5,024,484
312	5,024,485
330	5,024,486
CLASS 299	
2	5,024,487
CLASS 301	
108 S	5,024,488
CLASS 303	
3	5,024,489
9	5,024,490
93	5,024,491
114	5,024,492
CLASS 307	
116	5,025,170
150	5,025,171
261	5,025,172
265	5,025,173
272.2	5,025,174
326	5,025,175
351	5,025,176
355	5,025,177
442	5,025,178
455	5,025,179
475	5,025,180
571	5,025,181
	5,025,182
CLASS 310	
20	5,025,183
71	5,025,184
87	5,025,185
323	5,025,186
	5,025,187
CLASS 313	
273	5,025,188
407	5,025,191
414	5,025,189
479	5,025,490
619	5,025,190
623	5,025,192
CLASS 315	
5.38	5,025,193
111 81	5,025,194
136	5,025,195
168	5,025,196
172	5,025,197
CLASS 318	
434	5,025,198
561	5,025,199
569	5,025,200
605	5,025,201
CLASS 320	
32	5,025,202
CLASS 323	
268	5,025,203
274	5,025,204
CLASS 324	
73.1	5,025,205
74	5,025,206
77 A	5,025,207
77 R	5,025,208
96	5,025,209
158 R	5,025,210
	5,025,211
	5,025,212
207 12	5,025,213
207 19	5,025,214
220	5,025,215
309	5,025,216
322	5,025,217
334	5,025,218
447	5,025,219
449	5,025,220
603	5,025,221
639	5,025,222
662	5,025,223
CLASS 328	
127	5,025,224
CLASS 330	
124 D	5,025,225
277	5,025,226
CLASS 331	
65	5,025,227
69	5,025,228
107 A	5,025,229
116 FE	5,025,230
116 R	5,025,231
CLASS 333	
26	5,025,232
128	5,025,233
166	5,025,234
204	5,025,235
CLASS 335	
46	5,025,236
83	5,025,237
128	5,025,238
265	5,025,239
284	5,025,240
CLASS 336	
100	5,025,241
CLASS 337	
309	5,025,242
CLASS 338	
18	5,025,243
CLASS 340	
442	5,025,244
471	5,025,245
572	5,025,246
574	5,025,247
596	5,025,248
721	5,025,249
811	5,025,250
825.06	5,025,253
825.44	5,025,251
	5,025,252
825 52	5,025,491
826	5,025,254
CLASS 341	
26	5,025,255
59	5,025,256
101	5,025,257
107	5,025,258
118	5,025,259
CLASS 342	
127	5,025,260
144	5,025,492
357	5,025,261
374	5,025,493
CLASS 343	
705	5,025,262
715	5,025,263
767	5,025,264
CLASS 346	
1 1	5,025,265
	5,025,266
	5,025,267
108	5,025,268
	5,025,269
140 R	5,025,270
	5,025,271
153.1	5,025,272
159	5,025,273
CLASS 350	
1 3	5,024,493
3.6	5,024,494
3.7	5,024,495
6.8	5,024,496
96.10	5,024,498
96.11	5,024,499
96.15	5,024,500
	5,024,501
96.16	5,024,502
96.18	5,024,504
96.2	5,024,497
96.20	5,024,503
96.22	5,024,505
96.23	5,024,506
96.34	5,024,507
162.13	5,024,508
254	5,024,509
321	5,024,510
356	5,024,511
514	5,024,512
518	5,024,513
618	5,024,514
CLASS 351	
52	5,024,515
57	5,024,516
161	5,024,517
219	5,024,518
221	5,024,520
226	5,024,519
CLASS 352	
86	5,024,521
89	5,024,522

CLASS 353	
11	5,024,523
31	5,024,524
CLASS 354	
21	5,025,274
106	5,025,275
126	5,024,525
152	5,025,276
173.1	5,025,277
246	5,025,278
298	5,025,279
299	5,025,280
CLASS 355	
27	5,025,281
38	5,025,282
40	5,025,283
53	5,025,284
77	5,025,285
244	5,025,286
245	5,025,287
251	5,025,288
253	5,025,289
265	5,025,290
273	5,025,291
326	5,025,292
CLASS 356	
73	5,024,526
124	5,024,527
356	5,024,528
376	5,024,529
402	5,024,530
CLASS 357	
23 4	5,025,293
23.5	5,025,494
23.6	5,025,294
	5,025,295
23.8	5,025,296
30	5,025,297
41	5,025,298
45	5,025,299
51	5,025,300
54	5,025,301
55	5,025,302
68	5,025,303
71	5,025,304
72	5,025,305
75	5,025,306
80	5,025,307
CLASS 358	
10	5,025,308
12	5,025,309
19	5,025,310
31	5,025,311
36	5,025,312
54	5,025,313
93	5,025,314
140	5,025,315
	5,025,495
153	5,025,496
167	5,025,316
	5,025,317
213.15	5,025,318
213.29	5,025,319
229	5,025,320
296	5,025,321
298	5,025,322
300	5,025,323
335	5,025,324
425	5,025,497
447	5,025,325
498	5,025,326
CLASS 360	
45	5,025,327
46	5,025,328
77.16	5,025,329
78.04	5,025,330
85	5,025,331
	5,025,332
	5,025,333
96.5	5,025,334
97.01	5,025,335
97.02	5,025,336
97.03	5,025,337
99.06	5,025,338
	5,025,339
99.120	5,025,340
120	5,025,341
126	5,025,342
127	5,025,343
CLASS 361	
88	5,025,344
119	5,025,345
156	5,025,498
283	5,025,346
386	5,025,347
398	5,025,348
CLASS 362	
20	5,025,349
61	5,025,350
83	5,025,351
83.3	5,025,352
98	5,025,353
135	5,025,354
147	5,025,355
221	5,025,356
249	5,025,357
267	5,025,358
402	5,025,359
CLASS 363	
16	5,025,360
CLASS 364	
143	5,025,361
165	5,025,499
167.01	5,025,362
191	5,025,363
200	5,025,364
	5,025,365
	5,025,366
	5,025,367
	5,025,368
	5,025,369
	5,025,370
406	5,025,372
408	5,025,373
413.02	5,025,374
413.22	5,025,375
413.26	5,025,376
424.02	5,025,377
424.06	5,025,378
426.04	5,025,379
431.05	5,025,380
434	5,025,381
439	5,025,382
464.03	5,025,383
468	5,025,384
474.11	5,025,385
478	5,025,386
493	5,025,387
496	5,025,388
497	5,025,389
513	5,025,390
	5,025,391
	5,025,392
	5,025,393
518	5,025,394
	5,025,395
	5,025,396
519	5,025,397
	5,025,398
	5,025,399
522	5,025,400
561	5,025,401
578	5,025,402
709.07	5,025,403
723	5,025,404
	5,025,405
724 19	5,025,406
754	5,025,407
759	5,025,408
786	5,025,409
900	5,025,410
	5,025,411
	5,025,412
	5,025,413
	5,025,414
CLASS 365	
52	5,025,415
170	5,025,416
189.09	5,025,417
200	5,025,418
221	5,025,419
230.01	5,025,420
230.05	5,025,421
233.5	5,025,422
CLASS 366	
75	5,024,531
CLASS 367	
96	5,025,425
127	5,025,424
137	5,025,423
CLASS 368	
10	5,025,426
29	5,025,427
126	5,025,428
238	5,025,429
CLASS 369	
13	5,025,430
36	5,025,431
	5,025,432
44.14	5,025,433
44.36	5,025,434
48	5,025,435
77.2	5,025,436
79	5,025,437
100	5,025,439
112	5,025,438
199	5,025,440
219	5,025,371
CLASS 370	
29	5,025,442
76	5,025,443
77	5,025,441
85.13	5,025,500
CLASS 371	
34	5,025,444
CLASS 372	
20	5,025,445
21	5,025,446
31	5,025,447
32	5,025,448
	5,025,449
46	5,025,450
50	5,025,451
CLASS 374	
28	5,024,532
126	5,024,533
144	5,024,534
178	5,024,535
CLASS 375	
1	5,025,452
10	5,025,453
41	5,025,454
53	5,025,455
76	5,025,456
106	5,025,457
114	5,025,458
117	5,025,459
118	5,025,460
119	5,025,461
CLASS 376	
217	5,024,801
258	5,024,802
270	5,024,803
285	5,024,804
305	5,024,805
352	5,024,806
	5,024,807
353	5,024,808
417	5,024,809
438	5,024,810
CLASS 378	
19	5,025,462
	5,025,463
84	5,025,464
169	5,025,465
CLASS 379	
1	5,025,466
60	5,025,467
67	5,025,468
98	5,025,469
107	5,025,470
CLASS 381	
43	5,025,471
63	5,025,472
88	5,025,473
90	5,025,474
CLASS 382	
1	5,025,475
2	5,025,476
8	5,025,477
22	5,025,478
38	5,025,479
50	5,025,480
53	5,025,481
56	5,025,482
58	5,025,483
61	5,025,484
CLASS 383	
38	5,024,536
63	5,024,537
103	5,024,538
CLASS 384	
92	5,024,539
203	5,024,540
CLASS 392	
451	5,025,131
CLASS 400	
88	5,024,541
124	5,024,542
	5,024,543
692	5,024,544
696	5,024,545
CLASS 401	
16	5,024,546
195	5,024,547
CLASS 403	
78	5,024,548
404	5,024,549
CLASS 404	
4	5,024,550
10	5,024,551
31	5,024,552
71	5,024,553
74	5,024,554
CLASS 405	
48	5,024,555
128	5,024,556
223	5,024,557
303	5,024,560
CLASS 406	
173	5,024,561
CLASS 408	
1 R	5,024,562
	5,024,563
115 R	5,024,564
121	5,024,565
197	5,024,566
CLASS 410	
100	5,024,567
CLASS 414	
142.2	5,024,568
222	5,024,570
231	5,024,571
276	5,024,572
408	5,024,573
416	5,024,574
627	5,024,575
786	5,024,576
788.4	5,024,577
790.3	5,024,569
CLASS 415	
55.1	5,024,578
108	5,024,579
150	5,024,580
191	5,024,581
CLASS 416	
213 R	5,024,582
CLASS 417	
198	5,024,583
342	5,024,584
360	5,024,585
477	5,024,586
488	5,024,587
CLASS 418	
1	5,024,588
55.3	5,024,589
61.2	5,024,590
178	5,024,591
CLASS 419	
66	5,024,811
CLASS 420	
49	5,024,812
402	5,024,813
473	5,024,814
487	5,024,815
CLASS 422	
68.1	5,024,816
111	5,024,817
158	5,024,818
186.06	5,024,819
261	5,024,820
CLASS 423	
23	5,024,821
111	5,024,822
210	5,024,823
213.5	5,024,824
309	5,024,825
335	5,024,826
610	5,024,827
CLASS 424	
1.1	5,024,828
	5,024,829
3	5,024,830
52	5,024,855
69	5,024,831
84	5,024,832
85.4	5,024,833
85.91	5,024,834
	5,024,835
89	5,024,836
93	5,024,837
94.65	5,024,838
115	5,024,839
404	5,024,840
422	5,024,841
473	5,024,842
499	5,024,843
520	5,024,844
CLASS 425	
112	5,024,592
121	5,024,558
406	5,024,559
556	5,024,593
CLASS 426	
15	5,024,845
312	5,024,846
535	5,024,847
587	5,024,848
656	5,024,849
CLASS 427	
2	5,024,851
	5,024,852
10	5,024,853
38	5,024,854
57	5,024,856
104	5,024,857
123	5,024,858
226	5,024,859
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424	5,024,864
CLASS 428	
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36.4	5,024,865
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41	Re.33,616
88	5,024,868
97	5,024,869
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329	5,024,885
332	5,024,886
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368	5,024,889
372	5,024,890
414	5,024,891
423.1	5,024,892
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433	5,024,894
437	5,024,895
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474.4	5,024,897
511	5,024,898
550	5,024,899
626	5,024,900
627	5,024,901
633	5,024,902
694	5,024,903
CLASS 429	
27	5,024,904
44	5,024,905
101	5,024,906
191	5,024,907
245	5,024,908
CLASS 430	
1	5,024,909
19	5,024,910
58	5,024,911
59	5,024,912
67	5,024,913
109	5,024,914
110	5,024,915
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270	5,024,916
271	5,024,917
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326	5,024,921
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372	5,024,923
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546	5,024,929
558	5,024,930
567	5,024,931
	5,024,932
CLASS 431	
18	5,024,595
328	5,024,596
CLASS 432	
2	5,024,597
59	5,024,598
226	5,024,599
CLASS 433	
82	5,024,600
CLASS 434	
255	5,024,601
CLASS 435	
6	5,024,933
	5,024,934
7.1	5,024,935
28	5,024,936
41	5,024,937
68.1	5,024,938
69.1	5,024,939
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134	5,024,942
172.3	5,024,943
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191	5,024,945
240.27	5,024,946
240.31	5,024,947
252.1	5,024,948
262	5,024,949
825	5,024,950
CLASS 436	
8	5,024,951
177	5,024,952
CLASS 437	
2	5,024,953
24	5,024,954
27	5,024,955
31	5,024,956
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	5,024,958
34	5,024,959
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57	5,024,965
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226	5,024,970
228	5,024,971
233	5,024,972
CLASS 439	
107	5,024,602
114	5,024,614
148	5,024,603
345	5,024,604
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829	5,024,622
857	5,024,610
876	5,024,623
CLASS 446	
259	5,024,625
268	5,024,611
409	5,024,626
CLASS 450	
36	5,024,628
CLASS 452	
177	5,023,974
CLASS 453	
54	5,024,629
CLASS 455	
12	5,025,485
54	5,025,486
618	5,025,487
619	5,025,488
CLASS 460	
21	5,024,630
75	5,024,631
CLASS 464	
33	5,024,632
CLASS 475	
72	5,024,633
86	5,024,634
115	5,024,635
141	5,024,636
166	5,024,637
210	5,024,638
221	5,024,639

VOL
1127
ISS
3
JE
18
1991
UMI

CLASSIFICATION OF PATENTS

CLASS 493	
127	5,024,640
171	5,024,641
193	5,024,642
351	5,024,643
357	5,024,644
380	5,024,645
CLASS 494	
16	5,024,646
37	5,024,647
56	5,024,648
85	5,024,649
CLASS 501	
10	5,024,973
57	5,024,974
65	5,024,975
89	5,024,976
91	5,024,977
95	5,024,978
	5,024,979
134	5,024,980
CLASS 502	
67	5,024,981
110	5,024,982
167	5,024,983
303	5,024,984
304	5,024,985
CLASS 503	
200	5,024,986
211	5,024,987
212	5,024,988
227	5,024,989
	5,024,990
CLASS 505	
1	5,024,991
	5,024,992
	5,024,993
CLASS 514	
18	5,024,994
21	5,024,995
54	5,024,996
58	5,024,997
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213	5,025,009
224.2	5,025,010
234.2	5,025,011
252	5,025,012
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258	5,025,014
274	5,025,015
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277	5,025,017
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280	5,025,020
302	5,025,021
305	5,025,022
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381	5,025,028
	5,025,029
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399	5,025,031
400	5,025,032
417	5,025,033
529	5,025,034
530	5,025,035
568	5,025,036
574	5,025,037
665	5,025,038
CLASS 521	
51	5,025,039
CLASS 523	
130	5,025,040
171	5,025,041
216	5,025,042
326	5,025,043
334	5,025,044
440	5,025,045
CLASS 524	
72	5,025,046
91	5,025,049
	5,025,050
99	5,025,047
	5,025,048
	5,025,051
104	5,025,052
265	5,025,053
267	5,025,054
269	5,025,055
310	5,025,056
423	5,025,057
436	5,025,058
495	5,025,059
533	5,025,060
539	5,025,061
556	5,025,062
560	5,025,063
591	5,025,064
611	5,025,065
CLASS 525	
66	5,025,066
109	5,025,067
119	5,025,068
184	5,025,070
326.5	5,025,071
CLASS 526	
129	5,025,072
CLASS 528	
15	5,025,073
	5,025,074
33	5,025,075
	5,025,076
86	5,025,077
120	5,025,078
170	5,025,079
	5,025,080
176	5,025,081
190	5,025,082
199	5,025,083
229	5,025,084
230	5,025,085
272	5,025,086
339	5,025,087
353	5,025,088
	5,025,089
392	5,025,091
	5,025,092
CLASS 544	
234	5,025,096
CLASS 548	
235	5,025,097
453	5,025,098
527	5,025,099
CLASS 549	
551	5,025,100
CLASS 556	
50	5,025,101
CLASS 558	
6	5,025,102
CLASS 560	
170	5,025,103
CLASS 562	
109	5,025,104
851	5,025,105
CLASS 564	
199	5,025,106
414	5,025,107
CLASS 568	
33	5,025,090
601	5,025,093
623	5,025,094
652	5,025,095
909 8	5,025,113
CLASS 570	
206	5,025,110
CLASS 585	
500	5,025,108
	5,025,109
601	5,025,111
852	5,025,112
CLASS 600	
26	5,024,650
CLASS 604	
4	5,024,613
22	5,024,651
	5,024,652
35	5,024,653
36	5,024,612
43	5,024,654
53	5,024,655
70	5,024,656
85	5,024,657
96	5,024,658
110	5,024,659
	5,024,660
	5,024,661
119	5,024,615
131	5,024,662
	5,024,663
143	5,024,664
179	5,024,665
192	Re.33,617
	5,024,616
263	5,024,666
382	5,024,667
390	5,024,672
CLASS 606	
47	5,024,617
53	5,024,618
194	5,024,668
CLASS 623	
1	5,024,671
13	5,024,669
18	5,024,670

CLASSIFICATION OF DESIGNS

D1—	107	317,522
D2—	261	317,523
	314	317,524
	512	317,525
D3—	34	317,526
		317,527
	75	317,528
D4—	104	317,529
D6—	303	317,530
	309	317,531
	355	317,532
	356	317,533
		317,534
	380	317,535
		317,536
	484	317,537
	495	317,538
		317,539
	518	317,540
	601	317,541
	603	317,542
D7—	300 2	317,543
	307	317,544
		317,545
	309	317,546
	317	317,547
	357	317,548
	360	317,549
	402	317,550
	638	317,551
D8—	36	317,552
	44	317,553
	93	317,554
	322	317,555
	346	317,556
		317,557
	354	317,558
	356	317,559
	357	317,560
	367	317,561
D9—	300	317,562
	305	317,563
	318	317,564
	367	317,565
	420	317,566
	425	317,567
		317,568
		317,569
	434	317,570
	443	317,571
	455	317,572
D10—	15	317,576
	30	317,577
	64	317,573
	66	317,574
	71	317,575
	92	317,578
	101	317,579
	109	317,580
D11—	160	317,581
	164	317,582
		317,583
D12—	151	317,584
	163	317,585
	184	317,586
	191	317,587
		317,588
	318	317,589
D13—	134	317,590
	147	317,591
	168	317,593
	182	317,592
D14—	100	317,594
		317,595
	103	317,596
	126	317,597
		317,598
		317,599
		317,600
	133	317,601
		317,602
		317,603
		317,604
		317,605
	138	317,606
	163	317,607
	165	317,608
	217	317,609
	223	317,610
	224	317,611
	248	317,612
D15—	7	317,613
D16—	102	317,614
	202	317,615
	232	317,616
D17—	20	317,617
D18—	7	317,618
		317,619
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	24	317,621
	38	317,622
D19—	1	317,623
	42	317,624
	57	317,625
	60	317,626
	75	317,627
	92	317,628
D20—	6	317,629
	42	317,630
D21—	61	317,631
	65	317,632
	108	317,633
		317,634
		317,635
	120	317,636
		317,637
		317,638
		317,639
	167	317,640
	197	317,641
	247	317,642
D23—	226	317,643
	235	317,644
	238	317,645
	252	317,646
	290	317,647
	397	317,648
	403	317,649
D24—	192	317,651
	202	317,650
D25—	103	317,652
		317,653
		317,654
		317,655
	138	317,656
D26—	1	317,657
	28	317,658
	38	317,659
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	68	317,661
	113	317,662
D28—	41	317,663
	85	317,664
D30—	108	317,665
	131	317,666
D32—	19	317,667
		317,668
	49	317,669
D34—	40	317,670
D99—	34	317,671

CLASSIFICATION OF PLANTS

P.—	1	7,556
		7,557
	7	7,558
	10	7,559
		7,560
	18	7,561
	20	7,562
	49	7,563

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1
Alaska	2
American Samoa	3
Arizona	4
Arkansas	5
California	6
Canal Zone	7
Colorado	8
Connecticut	9
Delaware	10
District of Columbia	11
Florida	12
Georgia	13
Guam	14
Hawaii	15
Idaho	16
Illinois	17
Indiana	18
Iowa	19
Kansas	20
Kentucky	21
Louisiana	22
Maine	23
Maryland	24
Massachusetts	25
Michigan	26
Minnesota	27
Mississippi	28
Missouri	29
Montana	30
Nebraska	31
Nevada	32
New Hampshire	33
New Jersey	34
New Mexico	35
New York	36
North Carolina	37
North Dakota	38
Ohio	39
Oklahoma	40
Oregon	41
Pennsylvania	42
Puerto Rico	43
Rhode Island	44
South Carolina	45
South Dakota	46
Tennessee	47
Texas	48
Utah	49
Vermont	50
Virginia	51
Virgin Islands	52
Washington	53
West Virginia	54
Wisconsin	55
Wyoming	56
U.S. Air Force	57
U.S. Army	58
U.S. Navy	59

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01	5,024,015
	5,024,048
	5,024,291
	5,024,337
	5,024,488
	5,025,444
02	5,024,009
04	5,024,011
	5,024,029
	5,024,207
	5,024,410
	5,024,522
	5,024,627
	5,024,628
	5,024,644
	5,024,904
	5,025,296
	5,025,298
	5,025,370
	5,025,378
05	5,024,324
06	Re.33,614
	Re.33,617
	5,023,958
	5,023,959
	5,023,960
	5,023,967
	5,023,989
	5,023,994
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	5,024,070
	5,024,080
	5,024,085
	5,024,105
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	5,024,129
	5,024,132
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	5,024,142
	5,024,171
	5,024,177
	5,024,208
	5,024,221
	5,024,222
	5,024,234
	5,024,235
	5,024,239
	5,024,246
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	5,024,275
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	5,024,769
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	5,024,842
	5,024,843
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	5,024,906
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	5,025,114
	5,025,119
	5,025,128
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	5,025,137
	5,025,144
	5,025,149
	5,025,161
	5,025,163
	5,025,170
	5,025,172
	5,025,178
	5,025,185
	5,025,193
	5,025,201
	5,025,204
	5,025,216
	5,025,218
	5,025,233
	5,025,271
	5,025,302
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	5,025,314
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	5,025,327
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	5,025,383
	5,025,385
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	5,025,408
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	5,025,445
	5,025,446
	5,025,451
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	5,025,468
	5,025,469
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	5,025,488
08	5,024,183
	5,024,205
	5,024,347
	5,024,420
	5,024,474
	5,024,487
	5,024,625
	5,025,335
	5,025,336
	5,025,364
	5,025,405
09	Re.33,616
	5,023,990
	5,023,996
	5,024,026
	5,024,060
	5,024,295
	5,024,296
	5,024,322
	5,024,354
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	5,024,884
	5,025,151
	5,025,183
	5,025,240
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10	5,024,701
	5,024,794
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	5,024,821
	5,024,826
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11	5,025,491
12	5,023,961
	5,023,998
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	5,024,438
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	5,024,579
	5,024,582
	5,024,614
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	5,024,759
	5,024,808
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	5,024,998
	5,025,138
	5,025,246
	5,025,247
	5,025,251
	5,025,252
	5,025,353
	5,025,376
	5,025,398
	5,025,476
	4,773,485
13	5,024,047
	5,024,240
	5,024,336
	5,024,340
	5,024,351
	5,024,453
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	5,024,840
	5,025,121
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15	5,024,409
16	5,024,179
	5,024,599
	5,024,690
	5,024,722
	5,024,961
	5,025,391
17	5,023,963
	5,024,023
	5,024,074
	5,024,078
	5,024,188
	5,024,193
	5,024,218
	5,024,223
	5,024,225
	5,024,257
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	5,024,283
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	5,024,385
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	5,024,415
	5,024,419
	5,024,455
	5,024,458
	5,024,573
	5,024,586
	5,024,588
	5,024,597
	5,024,657
	5,024,664
	5,024,984
	5,025,079
	5,025,132
	5,025,171
	5,025,191
	5,025,203
	5,025,223
	5,025,254
	5,025,345
	5,025,360
	5,025,374
	5,025,387
18	Re.33,612
	5,023,981
	5,024,170
	5,024,200
	5,024,251
	5,024,294
	5,024,380
	5,024,421
	5,024,450
	5,024,472

VOL
1127
ISS
3
JE
18
1991
UMI

	5,024,633		5,024,164		5,024,778		5,025,291		5,024,610		5,024,830
	5,024,634		5,024,203		5,024,779		5,025,292		5,024,623		5,024,863
	5,024,636		5,024,301		5,024,836		5,025,313		5,024,666		5,024,877
	5,024,670		5,024,303		5,024,839		5,025,322		5,024,686		5,024,888
	5,024,799		5,024,323		5,024,847		5,025,328		5,024,749		5,024,918
	5,024,899		5,024,325		5,024,855		5,025,350		5,024,752		5,024,934
	5,024,949		5,024,345		5,024,873		5,025,369		5,024,768		5,024,959
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	5,025,081		5,024,382		5,024,933		5,025,458		5,024,802		5,024,971
	5,025,117		5,024,386		5,024,950		5,025,480		5,024,804		5,024,972
	5,025,496		5,024,411		5,024,967	37	5,023,962		5,024,805		5,024,993
19	5,024,045		5,024,463		5,024,981		5,024,281		5,024,822		5,025,080
	5,024,140		5,024,468		5,024,997		5,024,338		5,024,829		5,025,093
	5,024,173		5,024,495		5,025,000		5,024,381		5,024,837		5,025,100
	5,024,312		5,024,529		5,025,003		5,024,393		5,024,858		5,025,112
	5,024,334		5,024,578		5,025,006		5,024,617		5,024,862		5,025,113
	5,024,335		5,024,687		5,025,007		5,024,723		5,024,901		5,025,115
	5,024,456		5,024,818		5,025,008		5,024,851		5,024,966		5,025,141
	5,024,753		5,024,866		5,025,017		5,025,164		5,024,976		5,025,177
	5,025,124		5,024,937		5,025,025		5,025,304		5,025,043		5,025,181
	5,025,175		5,024,964		5,025,036		5,025,402		5,025,056		5,025,182
	5,025,224		5,024,994		5,025,071		5,025,423		5,025,078		5,025,205
20	5,024,116		5,025,035		5,025,072		5,025,483		5,025,096		5,025,222
	5,024,131		5,025,038		5,025,089	38	5,024,050		5,025,104		5,025,232
	5,024,145		5,025,040		5,025,090	39	5,023,953		5,025,109		5,025,262
	5,024,152		5,025,075		5,025,099		5,023,995		5,025,129		5,025,280
	5,024,213		5,025,123		5,025,101		5,024,014		5,025,158		5,025,303
21	5,024,210		5,025,220		5,025,165		5,024,069		5,025,215		5,025,306
	5,024,689		5,025,355		5,025,211		5,024,077		5,025,253		5,025,366
	5,024,697		5,025,459		5,025,258		5,024,119		5,025,265		5,025,392
	5,024,944	27	5,023,971		5,025,273		5,024,130		5,025,300		5,025,407
	5,025,032		5,024,004		5,025,309		5,024,230		5,025,321		5,025,442
	5,025,044		5,024,054		5,025,320		5,024,236		5,025,344		5,025,452
22	5,024,019		5,024,076		5,025,381		5,024,258		5,025,359		5,025,471
	5,024,321		5,024,103		5,025,443		5,024,297		5,025,390		5,025,486
	5,024,560		5,024,148		5,025,456		5,024,298		5,025,424		5,025,494
	5,024,777		5,024,265		4,648,907		5,024,299		5,025,425	49	5,023,984
	5,024,860		5,024,280	35	5,024,096		5,024,300		5,025,485		5,024,403
	5,025,050		5,024,289		5,025,037		5,024,315	44	5,024,705		5,024,668
	5,025,110		5,024,445		5,025,150		5,024,369		5,025,267		5,024,680
23	5,025,179		5,024,448	36	5,023,956		5,024,447	45	5,023,999		5,025,045
24	5,024,063		5,024,479		5,024,030		5,024,449		5,024,034	51	5,023,954
	5,024,081		5,024,510		5,024,031		5,024,460		5,024,044		5,023,978
	5,024,186		5,024,612		5,024,109		5,024,471		5,024,175		5,024,061
	5,024,228		5,024,667		5,024,127		5,024,477		5,024,259		5,024,100
	5,024,237		5,024,783		5,024,163		5,024,696		5,024,349		5,024,169
	5,024,238		5,024,865		5,024,168		5,024,698		5,024,353		5,024,174
	5,024,319		5,024,870		5,024,219		5,024,774		5,024,359		5,024,242
	5,024,357		5,024,996		5,024,229		5,024,798		5,024,559		5,024,243
	5,024,734		5,025,052		5,024,231		5,024,859		5,024,574		5,024,288
	5,024,758		5,025,337		5,024,232		5,024,890		5,024,761		5,024,549
	5,024,980		5,025,349		5,024,256		5,025,063		5,024,792		5,024,600
	5,025,102		5,025,399		5,024,278		5,025,085		5,024,806		5,024,770
	5,025,143	29	5,024,224		5,024,406		5,025,122		5,024,869		5,024,875
	5,025,373		5,024,377		5,024,442		5,025,198		5,025,087		5,025,031
	5,025,396		5,024,436		5,024,451		5,025,214	47	5,024,008		5,025,382
	5,025,454		5,024,515		5,024,481		5,025,242		5,024,128		5,025,416
25	5,023,986		5,024,595		5,024,514		5,025,351		5,024,160		5,025,464
	5,023,991		5,024,775		5,024,517		5,025,352		5,024,245	53	5,023,987
	5,024,099		5,024,812		5,024,537	40	5,023,952		5,024,647		5,024,012
	5,024,365		5,024,922		5,024,546		5,024,159		5,024,683		5,024,035
	5,024,507		5,025,021		5,024,592		5,024,414		5,025,004		5,024,089
	5,024,508		5,025,358		5,024,661		5,024,475		5,025,086		5,024,091
	5,024,512		5,025,372		5,024,691		5,024,750		5,025,106		5,024,398
	5,024,563		5,025,388		5,024,725		5,024,824		5,025,107		5,024,426
	5,024,649	31	5,024,864		5,024,740		5,024,876		5,025,130		5,024,491
	5,024,651	32	5,024,215		5,024,780		5,024,982		5,025,139		5,024,499
	5,024,659		5,024 293		5,024,781		5,025,428		5,025,316		5,024,556
	5,024,695		5,025,500		5,024,790	41	5,024,017	48	5,024,020		5,024,564
	5,024,738	33	5,024,428		5,024,791		5,024,397		5,024,032		5,025,159
	5,024,739		5,024,483		5,024,809		5,024,401		5,024,059		5,025,325
	5,024,741		5,024,493		5,024,817		5,024,408		5,024,137	54	5,024,434
	5,024,755		5,024,504		5,024,896		5,025,226		5,024,138		5,024,952
	5,024,871		5,024,889		5,024,929		5,025,403		5,024,180		5,025,020
	5,024,872		5,025,206		5,024,931		5,025,411		5,024,206		5,025,094
	5,024,894	34	5,023,979		5,024,935		5,025,466		5,024,220	55	5,023,982
	5,024,895		5,023,993		5,024,936	42	5,023,955		5,024,270		5,024,028
	5,024,898		5,024,018		5,024,948		5,023,968		5,024,272		5,024,084
	5,024,921		5,024,095		5,024,957		5,023,969		5,024,273		5,024,146
	5,024,940		5,024,343		5,024,968		5,023,988		5,024,276		5,024,204
	5,024,941		5,024,435		5,024,978		5,024,038		5,024,277		5,024,244
	5,024,989		5,024,473		5,024,990		5,024,051		5,024,292		5,024,407
	5,025,001		5,024,497		5,025,019		5,024,073		5,024,342		5,024,466
	5,025,145		5,024,565		5,025,073		5,024,092		5,024,384		5,024,585
	5,025,190		5,024,596		5,025,074		5,024,106		5,024,404		5,024,601
	5,025,225		5,024,613		5,025,095		5,024,176		5,024,494		5,024,642
	5,025,249		5,024,626		5,025,257		5,024,356		5,024,655		5,024,757
	5,025,457		5,024,665		5,025,274		5,024,361		5,024,677		5,024,764
	5,025,487		5,024,679		5,025,279		5,024,374		5,024,730		5,024,880
26	5,023,957		5,024,714		5,025,283		5,024,387		5,024,737		5,025,046
	5,023,980		5,024,727		5,025,285		5,024,427		5,024,746		5,025,470
	5,024,067		5,024,733		5,025,287		5,024,452		5,024,772	56	5,024,013
	5,024 118		5,024,735		5,025,289		5,024,486		5,024,785		

DESIGN PATENTS

01	317,532		317,626		317,558	27	317,525		317,643	42	317,593
	317,535		317,627		317,572		317,542	39	317,531		317,623
	317,536		317,628		317,651		317,594		317,537	44	317,528
06	317,543		317,629	13	317,649	29	317,589		317,555		317,539
	317,553		317,646		317,665	32	317,580		317,613		317,566
	317,557		317,661	17	317,560	33	317,526		317,632	46	317,669
	317,561		317,670		317,578	34	317,587		317,645	47	317,538
	317,567	09	317,527		317,582		317,607		317,652	48	317,522
	317,568		317,541		317,583		317,608		317,653		317,540
	317,569		317,546	19	317,631	36	317,529		317,654		317,545
	317,575		317,552	20	317,530		317,544		317,655		317,611
	317,588		317,559	24	317,549		317,577		317,662	49	317,624
	317,610		317,617	25	317,556		317,640	41	317,524		317,663
	317,620		317,630	26	317,667	37	317,641		317,554	51	317,671
	317,621	12	317,523		317,668						

PLANT PATENTS

06	7,558		7,559		7,560		7,561		7,562		

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VOL
1127
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JE
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Harry F. Manbeck, Jr., *Commissioner*

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VOL
1127

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JE
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1991

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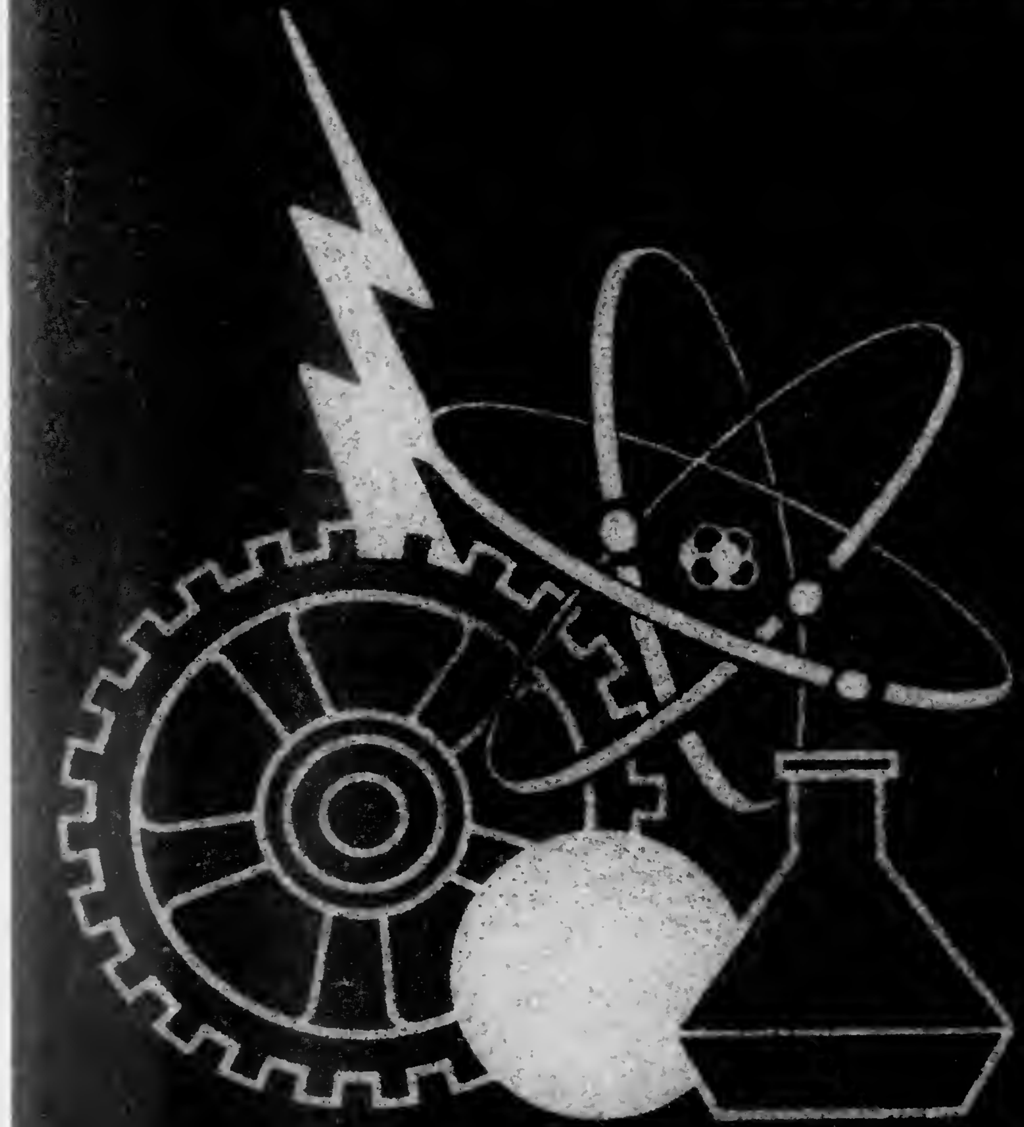

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VOL
1127

ISS
4

JE
25

1991

UMI

OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE
June 25, 1991 Volume 1127 Number 4

CONTENTS

Page

Patent and Trademark Office Notices

Patent Cooperation Treaty (PCT) Information ..... 1127 OG 56
Notice of Maintenance Fees Payable ..... 1127 OG 56
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees ..... 1127 OG 57
Reissue Applications Filed ..... 1127 OG 59
Requests for Reexaminations Filed ..... 1127 OG 60
Reinstatement to Register ..... 1127 OG 60
Removal from Register ..... 1127 OG 62
Status of PTO Services ..... 1127 OG 65
Patent Certificates of Correction ..... 1127 OG 67
Special Boxes for Mail ..... 1127 OG 68
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries ..... 1127 OG 69
Patent Examining Corps ..... 1127 OG 71
Reexaminations 1903
Reissue Patents Granted (33,618) 1905
Plant Patents Granted (7,564) 1907

Patents Granted

General and Mechanical (5,025,501) 1909
Chemical (5,026,400) 2217
Electrical (5,026,753) 2371
Design Patents Granted (317,522) 2541
Index of Patentees ..... PI 1
Indices of Reissue, Reexamination, Design and Plant Patents ..... PI 79

Classification of

Patents (Including Reissues and Reexaminations) ..... PI 85
Designs, and Plants Applications ..... PI 89

Geographical Index of Residence of Inventors

Patents (Including Reissues and Reexaminations) ..... PI 90
Designs and Plant Applications ..... PI 92
Change of Address Form and Subscription Order Form ..... PI 93

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VOL
1127
ISS
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1991
UMI

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1126 O.G. 2 on May 7, 1991.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the amount of the fee in German marks and the exchange rate of the U.S. dollar in relation to the German mark as of Jan. 3, 1991, and was announced in the *Official Gazette* at 1122 O.G. 564 on Jan. 1, 1991.

International fees were changed on March 1, 1991 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss franc and were announced in the *Official Gazette* at 1122 O.G. 629 on Jan. 22, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1492.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	400.00
—Additional examination fee, per additional invention	130.00
— ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	559.00
Basic Supplemental fee (for each page over 30)	11.00
Designation fee per country or region for the first 10 national or regional offices	135.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	171.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

April 11, 1991

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on June 21, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,751,746 through 4,752,969
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on June 19, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,454,611 through 4,455,682
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant..........$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant..........$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))..........$415.00
By other than a small entity..........$830.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f))..........$835.00
By other than a small enttity..........$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982..........$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f))..........$60.00
By other than a small entity..........$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable..........$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED APRIL 14, 1991
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,379,350	06/268,719	4/12/83
4,379,351	06/249,233	4/12/83
4,379,355	06/270,831	4/12/83
4,379,358	06/288,701	4/12/83
4,379,359	06/230,454	4/12/83
4,379,366	06/257,137	4/12/83
4,379,367	06/221,637	4/12/83
4,379,373	06/265,106	4/12/83
4,379,375	06/245,557	4/12/83
4,379,380	06/230,318	4/12/83
4,379,386	06/242,645	4/12/83
4,379,388	06/248,514	4/12/83
4,379,397	06/299,586	4/12/83
4,379,405	06/270,842	4/12/83
4,379,408	06/232,247	4/12/83
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4,379,488	06/230,879	4/12/83
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4,379,703	06/260,488	4/12/83
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4,379,747	06/299,752	4/12/83
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4,379,844	06/240,329	4/12/83
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4,379,886	06/280,132	4/12/83
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VOL
1127
ISS
4
JE
25
1991
UMI

Patent Number	Serial Number	Issue Date
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4,380,042	06/235,341	4/12/83
4,380,068	06/226,025	4/12/83
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4,656,696	06/810,922	4/14/87
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4,656,710	06/766,515	4/14/87
4,656,714	06/822,764	4/14/87
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4,656,782	06/795,893	4/14/87
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4,656,786	06/718,961	4/14/87
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4,656,821	06/839,149	4/14/87
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4,657,283	06/853,429	4/14/87

Patent Number	Serial Number	Issue Date
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4,658,222	06/721,352	4/14/87
4,558,235	06/777,165	4/14/87
4,658,237	06/373,636	4/14/87
4,658,239	06/766,503	4/14/87
4,658,247	06/635,806	4/14/87
4,658,251	06/756,773	4/14/87
4,658,266	06/541,587	4/14/87
4,658,279	06/530,401	4/14/87
4,658,298	06/739,017	4/14/87
4,658,316	06/595,672	4/14/87
4,658,321	06/764,853	4/14/87
4,658,334	06/841,453	4/14/87
4,658,335	06/482,841	4/14/87
4,658,337	06/803,014	4/14/87
4,658,371	06/631,475	4/14/87
4,658,399	06/684,007	4/14/87
4,658,408	06/707,732	4/14/87
4,658,409	06/666,246	4/14/87
4,658,411	06/746,548	4/14/87
4,658,412	06/720,320	4/14/87
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4,658,432	06/833,648	4/14/87
4,658,438	06/775,599	4/14/87
4,658,439	06/734,612	4/14/87

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,237,625 Re. S. N. 07/699,757, Filed May 14, 1991, Cl. 36/28, THRUST PRODUCING SHOE SOLE AND HEEL, George S. Cole, et al., Owner of Record: *Energaire Corp., Pebble Beach, Calif.*, Attorney or Agent: Jerry Stratman, Ex. Gp.: 247

VOL
1127
ISS
4
JE
25
1991
UMI

4,525,184, Re. S. N. 07/701,474, Filed May 16, 1991, Cl. 55/302, VERTICALLY TIERED PARTICLE FILTERING APPARATUS, Owen J. Tassicker, Owner of Record: *Electric Power Research Institute, Inc., Palo Alto, Calif.*, Attorney or Agent: William S. Galliani, Ex. Gp.: 135

4,576,837, Re. S. N. 07/684,581, Filed Apr. 12, 1991, Cl. 427/255, METHOD OF TREATING SURFACES, Gregorio Tarancon, Owner of Record: *Union Carbide Industrial Gases Technology Corp., Danbury, Conn.*, Attorney or Agent: Clyde V. Erwin, Jr., Ex. Gp.: 139

4,699,154, Re. S. N. 07/695,451, Filed May 5, 1991, Cl. 128/754, TISSUE SAMPLING DEVICE, Pergunnar Lindgren, Owner of Record: *Radiplast AB, Upsala, Sweden*, Attorney or Agent: Larry A. Roberts, Ex. Gp.: 339

4,763,550, Re. S. N. 07/664,493, Filed Mar. 5, 1991, Cl. 083, SELF EQUALIZING PIERCING MACHINE, Edward J. Waltonen, et al., Owner of Record: *Lamb Robo Inc., Bloomfield Hills, Mich.*, Attorney or Agent: Donald L. Wood, Ex. Gp.: 321

4,807,026, Re. S. N. 07/658,854, Filed Feb. 21, 1991, Cl. 358/098, ELECTRONIC IMAGE PICKUP DEVICE FOR ENDOSCOPES, Kimihiko Nishioka, et al., Owner of Record: *Olympus Optical Co., Ltd., Tokyo, Japan*, Attorney or Agent: G. Lloyd Knight, Ex. Gp.: 262

4,820,180, Re. S. N. 07/684,523, Filed April 10, 1991, Cl. 439/248, FLOATING PANEL MOUNT FOR ELECTRICAL CONNECTOR, Rene A. Mosquera, et al., Owner of Record: *Molex Co., Lisle, Ill* , Attorney or Agent: Charles S. Cohen, Ex. Gp.: 322

4,829,881, Re. S. N. 07/699,089, Filed May 13, 1991, Cl. 92/88, ROD-LESS CYLINDER, Teluomi Taki, et al., Owner of Record: *CKD Corp., Komaki, Japan*, Attorney or Agent: Bruce Hamburg, Ex. Gp.: 341

4,831,662, Re. S. N. 07/701,074, Filed May 16, 1991, Cl. 455/608, FIBER OPTIC DIGITAL DATA TRANSMITTING SYSTEM, Loughrey R. Kuhn, Owner of Record: *Optical Communications Corp., Silver Spring, Md.*, Attorney or Agent: Donald E. Stout, Ex. Gp.: 268

4,832,960, Re. S. N. 07/699,447, Filed May 13, 1991, Cl. 425/131.1, DEVICE FOR FEEDING AN EXTRUSION HEAD FOR PLASTIC MATERIAL, Michael F. Compagnon, Owner of Record: *Maillefer Sa, Ecublens, Switzerland*, Attorney or Agent: James A. Oliff, Ex. Gp.: 135

4,838,708, Re. S. N. 07/698,711, Filed May 10, 1991, Cl. 383/005, SECURITY DEPOSIT BAG, Bruce A. Holcomb, et al., Owner of Record: *Minnesota Mining and Manufacturing Co., St. Paul, Minn.*, Attorney or Agent: Mark W. Binder, Ex. Gp.: 241

4,851,963, Re. S. N. 07/679,383, Filed Apr. 2, 1991,, Cl. 361/356, WEATHERPROOF AIR CONDITIONING DISCONNECT SWITCH, Greg A. Miller, Owner of Record: *General Electric Co , New York, N. Y.*, Attorney or Agent: Richard A. Menelly, Ex. Gp.: 214

4,937,040, Re. S. N. 07/699,462, Filed May 13 1991, Cl. 383/5, SECURITY DEPOSIT BAG, Bruce A. Holcomb, et al., Owner of Record: *Minnesota Mining and Manufacturing Co., St. Paul, Minn.*, Attorney or Agent: Mark W. Binder, Ex. Gp.: 241

4,953,364, Re. S. N. 07/701,034, Filed May 16, 1991, Cl. 62/285, SUCTION DEVICE FOR DEHUMIDIFIER, Shin H. Lee, Owner of Record: *Samsung Electronics Co., Ltd., Republic of Korea*, Attorney or Agent: Scott A. Horstemeyer, Ex. Gp.: 344

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,230,793, Reexam. No. 90/002,352, Requested May 24, 1991, Cl. 430/315, PROCESS FOR THE PRODUCTION OF SOLDIER MASKS FOR PRINTED CIRCUITS, Ewald Losert, et al., Owner of Record: *Ciba-Geigy Corp., Hawthorne, N.Y.*, Attorney or Agent: Karl F. Jorda, Concord, N. H., Ex. Gp.: 156, Requester: Owner

4,715,980, Reexam. No. 90/002,349, Requested Feb. 20, 1991, Cl. 252/106, ANTIMICROBIAL SANITIZING COMPOSITION CONTAINING N-ALKYL AND N-ALKENYL SUCCINC ACID AND METHODS FOR USE, John A. Lopes, et al., Owner of Record: *Diversey Wyandotte Corp., Wyandotte, Mich.*, Attorney or Agent: Arnold S. Weintraub, Basile, Weintraub & Hanlon, Troy, Mich., Ex. Gp.: 119B, Requester: Ecolab, Inc., Minn.

4,743,239, Reexam. No. 90/002,351, Requested May 23, 1991, Cl. 604/385.1, DISPOSABLE BRIEF HAVING AN AREA OF RELATIVE THIN ABSORBENT MATERIAL AND AN AREA OF RELATIVELY THICK ABSORBENT MATERIAL, Shelley K. Cole, Owner of Record: *Inventor, Glendale, Ariz.*, Attorney or Agent: H. Gordon Shields, Phoenix, Ariz., Ex. Gp.: 338, Requester: Owner

4,842,666, Reexam. No. 90/002,348, Requested May 16, 1991, Cl. 156/161, PROCESS FOR THE PERMANENT JOINING OF STRETCHABLE THREADLIKE OR SMALL RIBBONLIKE ELASTIC ELEMENTS TO A FLAT SUBSTRATE AS WELL AS USE THEREOF FOR PRODUCING FRILLED SECTIONS OF FILM OR FOIL STRIP, Harald Werenicz, Owner of Record: *H B Fuller Co., St. Paul, Minn.*, Attorney or Agent: Merchant, Gould, Smith, Edell, Welter & Schmidt, St. Paul, Minn., Ex. Gp.: 131, Requester: Century Adhesives, Inc., Columbus, Ohio

4,874,365, Reexam. No. 90/002,345, Requested May 13, 1991, Cl. 604/054, FEEDING TUBE FACILITATING IMPROVED PLACEMENT AND PERMITTING SUBSEQUENT DELIVERY OF A SECOND PRESCRIBED PRODUCT AND METHOD THEREFOR, Warren P. Frederick, et al., Owner of Record: *Baxter International, Inc., Deerfield, Ill.*, Attorney or Agent: Kay H. Pierce, Baxter Int'l., Deerfield, Ill., Ex. Gp.: 336, Requester: Owner

4,880,802, Reexam. No. 90/002,346, Requested May 10, 1991, Cl. 514/222.200, SUBSTITUTED BASIC 2-AMINOTETRALIN PHARMECEUTICALS, Rudolph Schohe, et al., Owner of Record: *Bayer Aktiengesellschaft, Leverkusen, Germany*, Attorney or Agent: Sprung, Horn, Kramer & Woods, New York, N. Y., Ex. Gp.: 121, Requester: Owner

4,917,354, Reexam. No. 90/002,347, Requested May 16, 1991, Cl. 251/163, DUAL ACTION BALL VALVE, James F. Chambers, Owner of Record: *Grove Valve and Regulation Co., Oakland, Calif.*, Attorney or Agent: James G. O'Boyle, Brady, O'Boyle & Gates, Ex. Gp.: 347, Requester: Orbit Valve International, Inc., Little Rock, Ark.

4,980,964, Reexam. No. 90/002,350, Requested May 22, 1991, Cl. 029/599, SUPERCONDUCTING WIRE, Jan Boeke, Owner of Record: *Inventor, Chapel Hill, N. C.*, Attorney or Agent: Richard T. Foster, Connolly & Hutz, Wilmington, Del., Ex. Gp.: 326, Requester: Eugen E. Packer, American Telephone & Telegraph Co., Murray Hill, N. J.

Reinstatement to Register

The following list of persons, whose names have been previously removed from the Register of Attorneys and Agents pursuant to the provisions of 37 CFR 10.11(b), have been reinstated in view of the required fee and information they furnished to the Office of Enrollment and Discipline.

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May 23, 1991

CAMERON WEIFFENBACH, *Director*
Office of Enrollment and Discipline

Removal from Register

Pursuant to 37 CFR § 10.11(b), a survey letter was directed on November 30, 1990 to the last post office address furnished to the Office of Enrollment and Discipline by each of the persons whose name and address appear on the following list. With respect to some of the letters, no reply was received within the period of forty-five (45) days therein set. Other letters were returned by the Post Office with notations to the effect that the addressee was deceased, unknown, or had moved and left no forwarding address or the forwarding had expired.

Accordingly, the names of the following persons have been removed from the Register of Patent Attorneys and Agents.

May 24, 1991

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VOL
1127
ISS
4
JE
25
1991
UMI

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Status of PTO Services

The following is an update of the status of PTO services for May 1991:

Service Item	FY 1991 Goal (Calendar Days)*	Monthly Average (Calendar Days)*
Filing Receipts:		
Patents	22	18
Trademarks	30	33
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	14 Hours
Window Coupons	5	2
Mail Coupons	12	5
Letter Orders	16	13
Electronic Ordering Service (EOS)	11	4
Certified Copies:		
Trademark Registrations	21	25
Applications-As-Filed	17	11
File-Wrapper/Contents	N/A	26
Walk-up Certification	1	1
Patent Application Expedited	5	5
Trademark Search Library:		
Filing Pending Marks	23	28
Filing Reg. Certificates	Issue Date+2 days	On Goal
Filing Temp. Drawings	8	14
Assignments:		
Recording Patent-New Applications	20**	16
Recording Patent-Mail Room Recpts.	20	18
Return Patents-New Applications	34**	34
Return Patents-Mail Room Recpts.	34	31
Recording Trademarks	20	17
Returning Trademark Documents	34	31
Avg. Days from Issue Fee Payment to Issue Date	90-100	109
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	On Time
Patent Copies Available	95% on Issue Date	82% on Issue Date + 7
Trademark Copies Available	95% on Issue Date	99% on Issue Date

* Unless otherwise noted.
** Goal reflects the number of days from the date the filing receipt is mailed.

Service Statistics —Patent copies available on issue day was less than goal due to start-up problems at the Government Printing Office's new patent printer's plant.

Relocation of Assignment and Certification Services Division

During the weekend of May 25, 1991, the Assignment and Certification Services Division moved to new facilities in the North Tower Buliding located at 2800 Crystal Drive. This move consolidates the assignment processing and certification processing functions in a single location. In addition, this modern facility better supports new automated data entry systems and high speed/high volume copiers used to fill public orders.

The new location offers a public service for direct access to knowledgeable staff who can assist members of the public with inquiries and service delivery problems. The counter is located in the 10th floor lobby of the North Tower Building and is open from 8:30 a.m. until 5:00 p.m. on PTO business days.

The Division can now accept correspondence relating to certification and assignment processing services and requests for certified copies of office records (with the exception of certified copies of assignments and trademark registrations) via fax. All fax requests for fee related services must be placed using a PTO deposit account. The fax telephone number for this Division is (703) 308-9759.

The new telephone and room numbers for this Division are as follows:

Division Manager— NT-10C12	Cathy Kern	—(703) 308-9700
Assignment Branch— NT-10C08	Matt Lorelli	—(703)308-9706
Assignment Status Unit NT-10th FLOOR LOBBY		—(703) 308-9723
Certification Branch— NT 10C16	Cathy Kern, Acting	—(703) 308-9726

VOL
1127
ISS
4
JE
25
1991
UMI

Certification Status Unit
NT-10th FLOOR LOBBY
—(703) 308-9723

May 30, 1991

THERESA A. BRELSFORD
Assistant Commissioner for Administration

PATENT NOTICES

Certificates of Correction For Week of June 25, 1991

4,144,987
4,256,104
4,496,886
4,540,700
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VOL
1127
ISS
4
JE
25
1991
UMI

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

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Box 3	Mail for the Office of personel for NFC
Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and Internal Affairs.
Box 5	"No Fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement
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Box 15	Mail for the Advisory Commission on Patent Law Reform.
Box 16	Deposit Account Replenishment Checks
Box 171	Vacancy Announcement Applications.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
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Box EEO	Mail for the Office of Equal Employment Programs.
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Box Issue Fee	All Communications following the receipt of a PTOL-85. "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments should be submitted in a separate envelope and not be sent to Box Issue Fee.
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Box PATENT APPLICATION	New patent application and associated papers and fees.
Box TRADEMARK	New trademark application and associated papers and APPLICATION fees.
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	Sacramento: California State Library	(916) 322-4572
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	Toledo/Lucas County Public Library	(419) 259-5212
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VOL
1127
ISS
4
JE
25
1991
UMI

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	Nashville: Stevenson Science Library, Vanderbilt University	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext.2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: James Branch Cabell Library, Virginia Commonwealth University	(804) 367-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

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MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Director	308-1148
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	308-0858
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—JOHN KITTLE, Director	308-0861
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	308-0651

Expiration of patents: The patents within the range of numbers indicated below expire during May 1991 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,808,604 to 3,813,693 inclusive
Plant Patents	3,541 to 3,560 inclusive

VOL 1127
ISS 4
JE 25
1991
UMI

REEXAMINATIONS

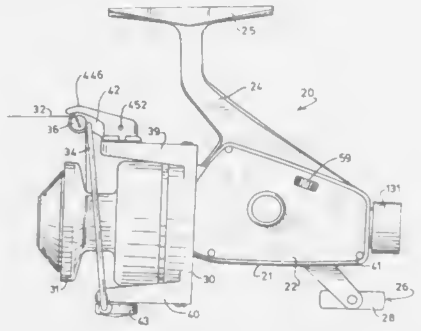
JUNE 25, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,676,450 (1494th)
QUICK BAIL OPENING SYSTEM FOR FISHING REEL

Robert L. Carpenter, and Steven L. Swisher, both of Tulsa, Okla., assignors to Brunswick Corporation, Skokie, Ill.
Reexamination Request No. 90/001,603, Sep. 16, 1988.
Reexamination Certificate for Patent No. 4,676,450, issued Jun. 30, 1987, Ser. No. 820,579, Jan. 16, 1986.
Int. Cl.^{5} A01K *89/01*

U.S. Cl. 242—233



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1** and **6–11** are cancelled.

Claims **2**, **4**, **5**, and **12** are determined to be patentable as amended.

Claim **3**, dependent on an amended claim, is determined to be patentable.

2. In [the] *a* spinning reel [of claim 1] *having a housing with a stem and mounting shoe, a center shaft mounted in the housing, a spool mounted on the center shaft for holding a fishing line, a handle and gear train assembly mounted in the housing, a rotor mounted for rotation by cooperative movement of the handle and gear train assembly, first and second bail ears carried by the rotor, first and second bail arms carried by the first and second bail ears respectively, and a movable bail mounted on the bail arms and having a closed retrieving position and an open casting position, the improvement comprising a bail actuating mechanism for moving the bail from the retrieving position to the casting position comprising:*

(a) means for mounting the bail to the bail arms so that the bail and bail arms comprise a unitary bail assembly that is movable as a unit upon the bail moving between the closed retrieving position and open casting position;

(b) pivot means for mounting the unitary bail assembly for pivoting mavement abaut a single axis relative to the bail ears;

(c) means fror biasably holding the bail in each of the retrieving position and the casting position;

(d) a one-piece trigger, said trigger having a first portion for engagement by an operator's finger and a second portion having a cam surface for acting directly against one of the bail arms; and

(e) means for mounting the one-piece trigger for pivoting movement about a second axis that is transverse to the single axis relative to one of the bail arms between first and second positions,

whereby upon an operator grasping the first portion of the trigger and pivoting the trigger about the second axis from the first position to the second position with the bail in the retrieving position, the cam surface on the second trigger portion acts directly against the one bail arm and thereby moves the bail to the casting position so that movement of the trigger is positively transmitted to the unitary bail assembly,

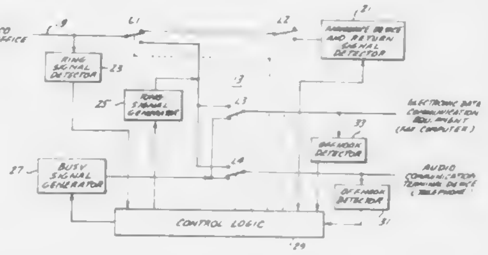
wherein the trigger is pivoted on the pivot means for mounting the unitary bail assembly, and said second trigger portion has an actuating lug *defining said cam surface* for movement into direct engagement with an abutment on the [first] *one* bail arm, whereby lifting an end of the triggerpivots the bail arm about the single axis to a point that the means biasably holding the bail drives the bail arms and bail to the open casting position,

said trigger being movable from said second position back to said first position without moving the bail from said casting position.

B1 4,821,312 (1495th)
VOICE/DATA SWITCH

Stephen W. Horton, Kirkland, and Dan M. Percival, Maple Valley, both of Wash., assignors to Rainier Technologies Corporation, Kirkland, Wash.
Reexamination Request No. 90/002,011, Apr. 30, 1990.
Reexamination Certificate for Patent No. 4,821,312, issued Apr. 11, 1989, Ser. No. 109,260, Oct. 14, 1987.
Int. Cl.^{5} H04M *11/00*

U.S. Cl. 379—102



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1**, **11** and **21** are determined to be patentable as amended.

Claims **2–10**, **11–20** and **22–24**, dependent on an amended claim, are determined to be patentable.

1. A voice/data switch for selectively connecting a Telco line to either a piece of electronic data communication equipment, such as a FAX machine or a computer, or an audio communication device, such as a telephone, said voice/data switch comprising:

announcement and return signal means for producing [an] *a human understandable* audible message requesting a return signal and detecting the receipt of said requested return signal; and,

switch means connected to said announcement and return signal means for receiving a signal when said announcement and return signal means receives said return signal and [selectively controlling the connection of], *subsequent to the receipt of said return signal or after a time-out period has expired, connecting* either a piece of electronic data communication equipment or an audio communication terminal device to a Telco line such that said piece of electronic data communication equipment is connected to said Telco line [if a return signal is not] *after said time-*

VOL
1127
ISS
4
JE
25
1991
UMI

out period has expired, provided said return signal has not been detected by said announcement and return signal means, and said audio communication terminal device is connected to said Telco line if a return signal is detected by said announcement and return signal means.

B1 4,906,432 (1496th)
LIQUID HANDLING

Theodore S. Geiselman, Groveland, Mass., assignor to Fisher Scientific Company, Pittsburgh, Pa.

Reexamination Request No. 90/002,189, Nov. 1, 1990.

Reexamination Certificate for Patent No. 4,906,432, issued Mar. 6, 1990, Ser. No. 74,942, Jul. 17, 1987.

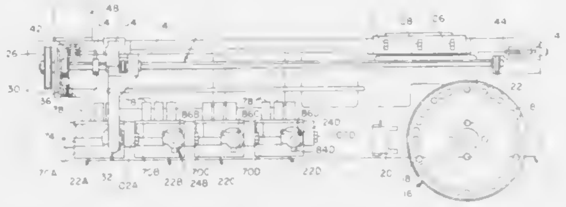
Int. Cl.^{5} G01N *35/06*

U.S. Cl. 422—63

AS A RESULT OF REEXAMINATION, IS HAS BEEN DETERMINED THAT:

The patentability of claims 1-18 is confirmed.

1. An analysis system comprising
analysis station structure,
sample station structure spaced from said analysis station structure along a straight line path,
support shaft structure disposed along an axis parallel to said straight line path,
a transport carriage, probe structure mounted on said transport carriage, said transport carriage being mounted on said support shaft structure for movement along said support shaft structure and keyed thereto for pivoting movement in response to rotation of said support shaft structure,
first drive means including a drive motor and flexible cable structure coupled between said carriage and said drive motor for moving said transport carriage along said shaft structure to selectively position said probe structure at said sample and analysis stations,



second drive means for rotating said shaft structure for inserting said probe structure into and withdrawing said probe structure from chamber structure at said sample and analysis station structures, and
metering means coupled to said probe structure for flowing liquid into and discharging liquid from said probe structure.

REISSUES

JUNE 25, 1991

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

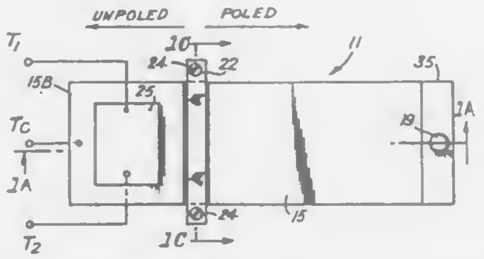
Re. 33,618
METHOD FOR INITIALLY POLARIZING AND CENTERING A PIEZOELECTRIC CERAMIC SWITCHING DEVICE

John D. Harnden, Jr., Schenectady, and William P. Kornrumpf, Albany, both of N.Y., assignors to General Electric Company, Fort Wayne, Ind.

Original No. 4,669,160, dated Jun. 2, 1987, Ser. No. 835,830, Mar. 3, 1986. Division of Ser. No. 685,109, Dec. 21, 1984, Pat. No. 4,670,682. Application for reissue Jun. 1, 1989, Ser. No. 360,225

Int. Cl.^{5} H01L *41/22*

U.S. Cl. 29—25.35 10 Claims



6. A method of initially polarizing and centering the movable piezoceramic bender member of a piezoceramic bender-type switching device, comprising:
substantially completing the assembly of all of the major components of the piezoceramic switching device into a unitary structure;
applying a relatively high value initial polarization potential to the respective piezoceramic plate elements of the bender member to achieve dipole alignment of the piezoceramic material; and
simultaneously adjusting the relative magnitudes of the initial polarizing potential applied to the respective piezoceramic plate elements of the bender member to cause it to be precisely positioned relative to the load current fixed switch contacts of the switching device.

Re. 33,620
CONTINUOUSLY VARIABLE CAPACITY REFRIGERATION SYSTEM

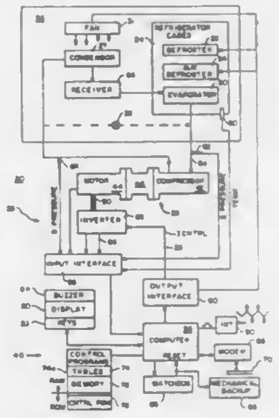
Jacob P. Persem, Conyers, Ga., assignor to Margaux, Inc., Fremont, Calif.

Original No. 4,765,150, dated Aug. 23, 1988, Ser. No. 12,578, Feb. 9, 1987. Application for reissue May 23, 1989, Ser. No. 356,380

Int. Cl.^{5} F25B *1/00*

U.S. Cl. 62—215 38 Claims

12. A single stage compressor system for use in a commercial product refrigeration system having one or more refrigerator cases wherein goods are stored said refrigeration system including condensing means for condensing compressed refrigerant from said compressor system, evaporating means for expanding the refrigerant in said condensing means and thereby removing heat from said refrigerator cases, and compressor suction line means for directing expanded refrigerant fram said evaporating means to said compressor system, said compressor system comprising:
a reciprocating compressor coupled to a three phase drive motor, said motor having a capacity of at least five horsepower;
inverter means for driving said motor at a speed specified by a motor speed signal, wherein said speed can be varied substantially continuously over a predefined range of speeds;
load sensing means for detecting at least one physical parameter indicative of the load on the refrigeration system, including means for sensing the temperature in at least one of said refrigeration cases, and for generating a load differential signal corresponding to the difference between said detected physical parameter and a specified target value; and
control means, responsive to said load differential signal, for adjusting the capacity of the refrigeration system by adjusting the speed of said motor within said predefined range of speeds, including software means for establishing an initial speed value and for periodically adjusting said speed value so as to minimize said load differential signal, and means for generating and adjusting said motor speed to correspond to said speed value;
said software means including temperature strategy means for adjusting said speed value by an amount corresponding to



$$(Kd{*}d\Delta T/dt)+(Ki\textstyle\int \Delta T\, dt)+\Delta T$$

where ΔT is the difference between the temperature in said preselected area and a specified target temperature, Kd and Ki are constant parameters, $d\Delta T/dt$ is the rate of change in ΔT and "$\int \Delta T\, dt$" is the integral of ΔT over a specified period of time;
wherein said control means adjusts the capacity of said refrigeration system within a substantially continuous range sa as to maintain a substantially constant temperature in said refrigeration cases.

Re. 33,621
ANATOMIC BRACE FRACTURE FOR THE KNEE

Steve R. Lamb, 6724 Corte Del Vista, Pleasanton, Calif. 94566, and Robert R. Moore, 1897 National Ave., Hayward, Calif. 94577

Original No. 4,523,585, dated Jun. 18, 1985, Ser. No. 538,120, Oct. 3, 1983. Continuation of Ser. No. 828,453, Feb. 11, 1986, abandoned, which is a continuation-in-part of Ser. No. 315,424, Oct. 27, 1981, abandoned. Application for reissue Sep. 19, 1988, Ser. No. 246,260

Int. Cl.^{5} A61F *5/04, 3/00*

U.S. Cl. 128—80 C 10 Claims

11. A brace mechanism having a four-bar linkage for use in a paired arrangement on each side of a user's leg in an anatomic knee brace comprising:
a. a first extension link with an upward extension portion adapted and constructed to align with a user's leg above the knee, and with a lower end portion, having first and second spaced pivots;
b. a second extension link with a downward extension portion adapted and constructed to align with a user's leg below the knee, and with an upper end portion having spaced third and

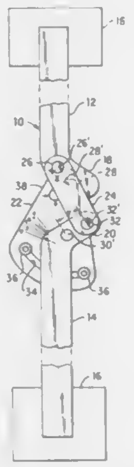
VOL
1127
ISS
4
JE
25
1991
UMI

fourth pivots, said distance between said third and fourth pivots being greater than said first and second pivots;

c. a third connecting link having a first end connected to said first pivot on said first link and a second end connected to said fourth pivot on said second link;

d. a fourth connecting link having a first end connected to said second pivot on said first link and a second end connected to said third pivot on said link wherein upon alignment of said extension portions, said first pivot is located on said end portion of said first link proximate said extension portion and said second pivot is spaced from said first pivot in a downward angled direction, said third pivot is located on said end portion of said second link proximate said extension portion and said fourth pivot is spaced from said third pivot in an upward angled direction toward said second pivot; and said fourth link crosses said third link;

e. a locating means for aligning the brace mechanism in a paired arrangement on each side of a user's leg, the locating means being positioned at the bone prominence of a user's femur at the side of a user's knee when the brace mechanism is installed on a user; and



f. a locking means for locking said brace mechanism with said extension links aligned, wherein said third connecting link includes a tab extension which aligns with said extension portion of said first extension link on alignment of said two extension links, said locking means comprising a slide collar slidable on said extension portion of said first extension link and engageable around said tab extension to lock said tab extension to said first extension link thereby locking said brace mechanism; whereby said four-bar linkage is constructed and arranged to generate a polycentric motion with dual centrodes progressing from a common centrode point when said extension portions are aligned against a user's straight leg and diverging with asymmetric trajectories when said extension portions are angled conforming to a user's bent leg, the asymmetric trajectories of a four-bar linkage approximating the asymmetric trajectories of the polycentric motion of a user's knee.

Re. 33,622
INTEGRATED CIRCUITS HAVING STEPPED DIELECTRIC REGIONS

Kuo-hua Lee, Wescosville, and Samuel E. Polanco, Macungie, both of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Original No. 4,676,869, dated Jun. 30, 1987, Ser. No. 903,920, Sep. 4, 1986. Application for reissue Jun. 23, 1989, Ser. No. 371,246

Int. Cl.^{5} B44C *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—643 **26 Claims**

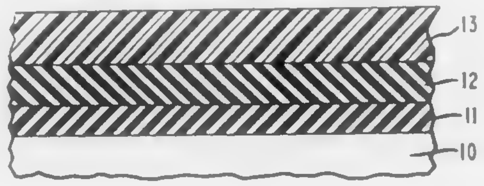
16. A method of making a solid state device characterized by steps comprising:

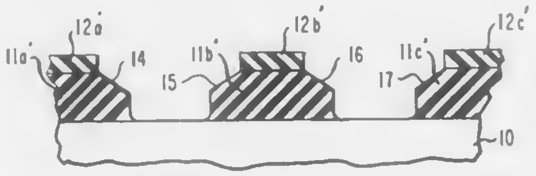
forming a first dielectric layer having a given etch rate on a surface of a semiconductor device precursor;

forming a second dielectric layer having an etch rate higher than said given etch rate on said first layer;

depositing a resist layer and lithographically defining a pattern in the resist;

anisotropically etching said pattern through said second dielectric layer and into said first dielectric layer





removing said resist layer;

and exposing the first and second dielectric layers to an isotropic etchant so that said second layer etches at a faster rate than said first layer, whereby a recessed edge of said second layer on said first layer is achieved.

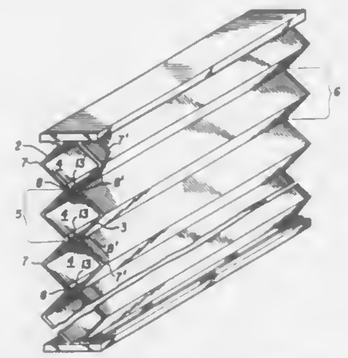
Re. 33,623
METHOD OF MAKING HONEYCOMB STRUCTURE WITH JOINED SINGLE PLEAT MATERIAL

Richard N. Anderson, 9885 Melba La., Whitesville, Ky. 42378

Original No. 4,685,986, dated Aug. 11, 1987, Ser. No. 869,865, Jun. 2, 1986. Division of Ser. No. 796,035, Nov. 7, 1985, Pat. No. 4,622,255. Application for reissue Aug. 11, 1989, Ser. No. 393,544

Int. Cl.^{5} B32B *3/12*

U.S. Cl. 156—197 **25 Claims**



13. A method of fabricating an expandable honeycomb structure for a window covering constructed of foldable material and defining a single row of longitudinally extending cells connected together in overlying expandable-collapsible relationship for collapsing each cell against the overlying cell in accordian pleated fashion, said method comprising the steps of

feeding a continuous length of a first material longitudinally of said length, said material having a first set of transverse creases spaced along the length thereof;

feeding a continuous length of a second material longitudinally of said length and toward said first material, said second material having a first set of transverse creases spaced along the length thereof; and

joining the two materials together intermediate said first set of creases.

PLANT PATENTS

GRANTED JUNE 25, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,564
ROSE PLANT— AUSWHITE

David C. H. Austin, Albrighton, England, assignor to David Austin Roses, Albrighton, England

Filed Nov. 9, 1989, Ser. No. 435,076

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—1 **1 Claim**

1. A new and distinct variety of rose plant of the shrub class characterised as to novelty by its fully double flowers of yellowish white with abundant continual blooming and the unusual blend of colouring and shaping of the flower being substantially as shown and described.

7,565
ROSE PLANT JACFED

William A. Warriner, Tustin, Calif., assignor to Bear Creek Gardens, Inc., Medford, Oreg.

Filed Mar. 8, 1990, Ser. No. 491,233

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—18 **1 Claim**

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by its upright vigorous growth, deep glossy green foliage, heavy petalled clear pink flower color, exceptionally large flower size, susceptibility to powdery moldew, abundance of small thorns and the exhibition quality of the blooms.

7,566
STRAWBERRY PLANT NAMED DARLINE

Robert C. Hureau, Le Vaudoue, France, assignor to Societe Civile Darbonne, Milly-La-Foret, France

Filed Sep. 14, 1989, Ser. No. 407,048

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—49 **1 Claim**

1. A new variety of strawberry plant named Darline, as illustrated and described.

7,567
GERANIUM PLANT NAMED FISROM

Ingeborg Schumann, Hoehr-Grenzhausen, Fed. Rep. of Germany, assignor to Florfis AG, Binningen, Switzerland

Filed Oct. 25, 1989, Ser. No. 427,464

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of Geranium plant named Fisrom, as illustrated and described.

7,568
BEGONIA PLANT NAMED SWEET DIANNE

Howard Siebold, Fort Bragg, Calif., assignor to Golden State Bulb Growers, Watsonville, Calif.

Filed Mar. 28, 1990, Ser. No. 500,256

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct Begonia plant named Sweet Dianne, as illustrated and described.

7,569
BEGONIA PLANT NAMED GOLDEN ANNIVERSARY

Howard Siebold, Fort Bragg, Calif., assignor to Golden State Bulb Growers, Watsonville, Calif.

Filed Mar. 28, 1990, Ser. No. 500,741

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct Begonia plant named Golden Anniversary, as illustrated and described.

7,570
IMPATIENS PLANT NAMED VULCAIN

Ludwig Kientzler, Gensingen, Fed. Rep. of Germany, assignor to Paul Ecke Ranch, Encinitas, Calif.

Filed Aug. 16, 1989, Ser. No. 501,862

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of Impatiens plant named Vulcain, as illustrated and described.

7,571
CACTACEAE PLANT NAMED 'SANIBEL'

Barnell L. Cobia, and Mark E. Cobia, both of P.O. Box 771369, Winter Garden, Fla. 34777-1369

Filed Apr. 13, 1990, Ser. No. 511,335

Int. Cl.^{5} A01H *5/00*

U.S. Cl. Plt.—88 **1 Claim**

1. A new and distinct plant variety of the Cactaceae family as shown and described and which is mainly distinguished from its antecedents and known related varieties by growth characteristics that are similar to those of the "Christmas Fantasy" variety but as modified by the combination of the following characteristics:

(1) A more erect posture at maturity than the "Christmas Fantasy" variety;

(2) Phylloclades which, in comparison to the "Christmas Fantasy" variety have (a) midribs with generally shorter length dimensions and generally greater thickness dimensions, (b) wings with generally greater thickness and width dimensions, and (c) teeth with generally greater thickness dimensions and in a larger number per phylloclade; and

(3) Flowers which, in comparison to the "Christmas Fantasy" variety, have (a) a sepaloid tepal series with generally longer length dimensions and generally greater width dimensions, (b) a tube laminating tepal series with generally longer length dimensions and generally greater width dimensions, (c) a tube forming tepal series with generally shorter length dimensions and generally greater width dimensions, (d) a perianth tube that at the throat has a generally longer major elliptical axis dimension and a generally longer minor elliptical axis dimension, and (e) ovaries with a generally longer major axis dimension at the distal end of the concavity and a generally longer minor axis dimension at the distal end of the concavity.

VOL
1127
ISS
4
JE
25
1991
UMI

PATENTS

GRANTED JUN. 25, 1991

ERRATA

For CLASS	See PATENT NO.
119-041	5,025,619
437-052	5,025,741
125-023	5,025,803
132-225	5,025,850
242-065	5,025,005
283-075	5,026,084
405-211	5,026,226
407-119	5,026,227
244-130	5,026,232
417-222	5,026,316
360-077	5,026,509
514-438	5,026,759
514-319	5,026,857
514-424	5,026,861
560-124	5,026,862
526-142	5,026,889
585-415	5,026,921
358-456	5,027,078
455-326	5,027,163
362-066	5,027,301
375-117	5,027,381
377-076	5,027,382

VOL
1127
ISS
4
JE
25
1991
UMI

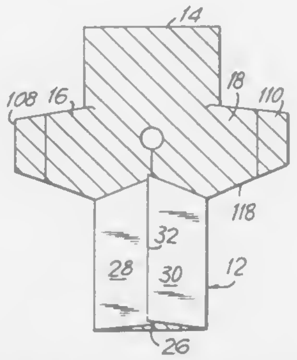
PATENTS

GRANTED JUNE 25, 1991

GENERAL AND MECHANICAL

5,025,501
MEDICAL GARMENT AND METHOD FOR MANUFACTURING THE SAME

John L. Dillon, 397 La Mirada, El Paso, Tex. 79923
Filed Dec. 22, 1989, Ser. No. 455,581
Int. Cl.^{5} A41D *13/00*
U.S. Cl. 2—51 **55 Claims**



23. A garment having a neck opening comprising:

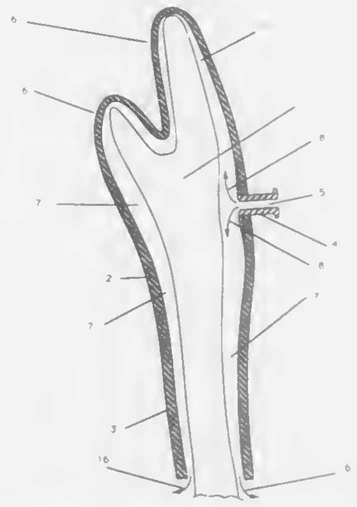
a first body portion having a first front panel extending continuously from the neck opening downwardly to a first bottom edge thereof and a rear panel extending from the neck opening to said first bottom edge, said first front panel being composed of first and second front folded sections which are joined by a first seam forming a front reinforcement, said first front folded section having a generally upwardly extending top surface and said second front folded section having a generally downwardly extending top surface, said top surfaces of said first and second reinforcements being joined at an apex along said first seam, said rear panel having an open slit along generally the mid-line thereof to allow easy access into the garment, said rear panel also having a sterile back placket joined thereto along a second seam adjacent to the neck opening; a second body portion having a second front panel overlying said first front panel to provide a double-layered front to the garment, said second front panel running continuously from the neck opening to a second bottom edge thereof which is substantially above said first bottom edge and is not attached to said first front panel to thereby form an open passageway between said first and second front panels said second body portion having first and second side reinforcements formed integrally with said second front panel which are joined to said rear panel along third and fourth seams, respectively, and said apex being secured to said second front panel adjacent to the neck opening;

a sleeve portion having first and second main sleeves extending continuously from the neck opening to an outer edge thereof, each said main sleeve having a front member formed integrally with said second front panel and a rear member formed integrally with said rear panel, said front and rear members of said first main sleeve are joined along a fifth seam and said front and rear members of said second main sleeve are joined along a sixth seam, said sleeve portion also including first and second sleeve bottoms which are joined to the outer ends of said respective main sleeves along a seventh and eight seams, respectively, thereof; and

first belt means and second belt means which when tied closes said open slit and closely confine the garment to the body of the wearer.

5,025,502
PUFF-OFF GLOVE

Douglas W. Raymond, 23 Martha Rd., Orinda, Calif. 94563, and Thomas W. Smith, 60 Orinda Cir., Pittsburg, Calif. 94565
Filed Sep. 18, 1989, Ser. No. 408,805
Int. Cl.^{5} A41D *19/00*
U.S. Cl. 2—159 **8 Claims**



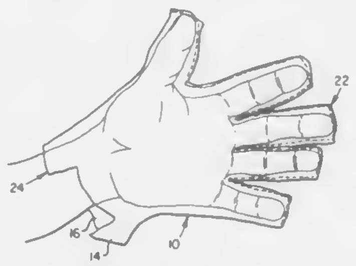
1. A protective glove, comprising

a glove portion formed of flexible and conformable material and having an inner surface normally engaged with a hand wearing said glove,

and inflating means on said glove portion providing a through passage extending from said inner surface to the outer surface of said glove portion for application of fluid under pressure through said inflating means to the interior of said glove between said inner surface of said glove portion and said hand for distending said glove portion away from said hand to facilitate doffing and donning of said glove.

5,025,503
GLOVE

Gwendolyn I. O'Brien, 6011 Mercedes, Dallas, Tex. 75206
Filed Jan. 5, 1987, Ser. No. 566
Int. Cl.^{5} A41D *19/00;* **B65D** *85/18*
U.S. Cl. 2—163 **4 Claims**



1. A glove, comprising:

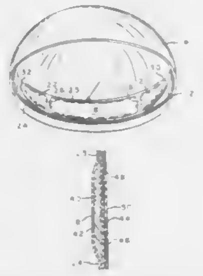
A first side and a second side joined along parallel edges and at a first end, the side separated at the opposite end to permit insertion of a hand, the glove being a portion of a roll of gloves with the first end of each glove being attached to the opposite end of the adjacent glove, the attached ends meeting perfectly to form a continuous roll of gloves with continuous sides and without waste to be removed prior to using the glove, the edges defining the

VOL
1127
ISS
4
JE
25
1991
UMI

size of the glove roll (The glove of claim 1), the glove further being split along a line parallel to and proximate a first edge from the first end with the first and second sides being joined on either side of the split for a sufficient distance to form a thumb portion.

5,025,504
LINER FOR A HELMET, HAT, CAP OR OTHER HEAD COVERING

Phyllis S. Benston, Auburn, and Michael E. Cotie, Tacoma, both of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.
Filed Dec. 16, 1988, Ser. No. 285,784
Int. Cl.^{5} A42C *5/02*
U.S. Cl. 2—181.4 **15 Claims**

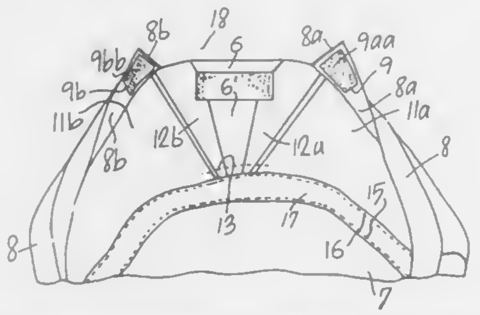


10. A liner for a helmet, hat, cap or other head covering to be worn by a user comprising:

an elongated body which includes a moisture absorbing material exposed along an external surface of the body for absorbing moisture from the head of the user, the body having plural segments defined by transversely extending densified regions, the body also including a core of thermoplastic and other fibers, a face sheet of a non-woven liquid permeable thermoplastic material, a backing sheet of a non-woven liquid permeable thermoplastic material, with the core, face and back sheets being heat fused together along the edges and along the transversely extending densified regions, and with the segments facilitating optional severing of the body in the transversely extending densified regions to adjust the length of the body.

5,025,505
ADJUSTABLE-FIT FLAT-TOP HAT

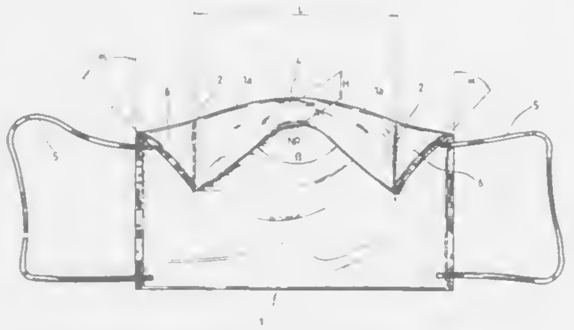
Joseph Fekete, Sr., c/o Virginia Garment Co., Inc., P.O. Box 2029, Richmond, Va. 23216
Continuation-in-part of Ser. No. 344,986, Apr. 28, 1989. This application Jul. 2, 1990, Ser. No. 548,503
Int. Cl.^{5} A42B *1/02*
U.S. Cl. 2—197 **12 Claims**



1. An adjustable-fit head covering having a crown and an elongated supporting band therefor having first and second band ends and having an upper band edge and the supporting band adapted to be turned inwardly as an inner supporting band, the crown including a top portion with top circumscribing edges and an elongated supporting circumscribing rim having upper and lower rim edges with the top circumscribing edges mounted on and along said upper rim edge, and said upper band edge being mounted on and along said lower rim edge with said first and second band ends forming a gap therebetween, said rim including a gap-positioned first rim portion in juxtaposition to said gap, and said rim including a remaining rim portion that is positioned away from said gap, said first rim portion including an intermediate rim portion and at-least two opposite direction-directed separate first and second spaced-apart reverse-direction means for obtaining equalized stresses on said rim and said top portion when adjusting crown wearing size, each of said reverse-direction means having first and second reverse-direction ends having first and second inwardly-directed surfaces thereof, with the first reverse-direction end mounted on said first rim portion and with the second reverse-direction end of each of said first and second spaced-apart reverse-direction means at spaced-apart locations at opposite sides of said gap adjoining said remaining rim portion, each of said first and second spaced-apart reverse-direction means being for hinge-like serially folding the annular rim structure upon itself in opposite directions at spaced-apart predetermined optionally alternate locations such that for each of said first and second spaced-apart reverse-direction means said first inwardly-directed surface is movable at-least partially to or from face-to-face juxtaposition to one-another when wearing size of the crown is optionally folded or unfolded to fit alternate sizes of heads, and a first and at-least two second mating means for detachably mating of the first mating means with the two second mating means for detachably mating with said first mating means, the first and second mating means being jointly for intermittently detachably securing said first and second band ends together after said supporting band has been turned-under said rim portion as said inner supporting band, the first mating means being positioned and mounted on said intermediate portion and one of said second mating means being mounted on said first band end and a remaining other second mating means being mounted on said second band end such that said first mating means is intermittently detachably matable with each of the two second mating means when said supporting band is inwardly turned to its rim-supporting position whereby the crown is securable at any of alternate head sizes when adjusted by either or both of said first and second spaced-apart reverse-direction means and whereby opposite sides of the crown may be evenly stretched and positioned to secure improved fitting and appearance when worn.

5,025,506
ONE PIECE MASK BODY HAVING VERTICALLY STITCHED NOSE ACCOMODATING PORTION

James R. C. Huang, 4th Fl. No. 18, Alley 3, Lane 94, Tai Chih Street, Taipei, Taiwan
Filed Sep. 28, 1989, Ser. No. 413,615
Int. Cl.^{5} A62B *18/02*
U.S. Cl. 2—206 **1 Claim**



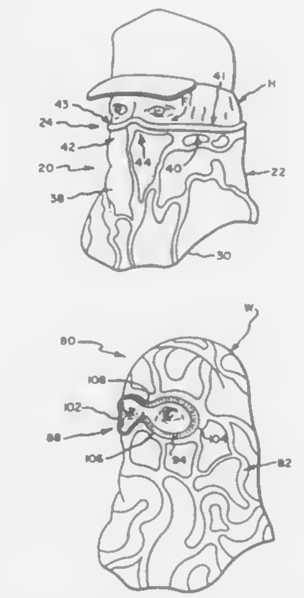
1. A face mask comprising in combination:

a rectangular body made of a flexible sheet material, said rectangular body having an upper portion which includes two opposing side portions, each of said side portions

being folded downwardly toward the center of said body and stitched onto said body to form a flange having an inverted, concave, V-shaped configuration which provides a space for accommodating the nose of the wearer of the mask.

5,025,507
FACE MASK

Richard C. Kirby, 6426 W. Quaker Rd., Orchard Park, N.Y. 14127
Continuation of Ser. No. 323,112, Mar. 13, 1989, abandoned, which is a continuation of Ser. No. 926,337, Nov. 3, 1986, abandoned. This application Jul. 27, 1990, Ser. No. 559,975
Int. Cl.^{5} A42B *1/18*
U.S. Cl. 2—206 **19 Claims**



1. A face mask comprising:

(a) sheet of flexible net material for partially concealing the wearer's face and positionable generally about the face of the wearer and depending generally downwardly from the bridge of the nose of the wearer when the mask is operatively worn so as to cover the end of the nose and the regions of the wearer's cheeks immediately beneath the eyes;

(b) elongate means associated with said sheet and including two side portions and a mid-portion extending between said side portions and possessing sufficient length so that when the mask is operatively worn, said elongate means generally spans the entire width of and overlies the wearer's face so that each of said side portions is positioned adjacent a corresponding side of the wearer's face and said mid-portion is positioned beneath the wearer's eyes and generally across the bridge of the wearer's nose, said elongate means being in the form of a loop for generally encircling both eyes of the wearer when the mask is operatively worn and for defining an unobstructed single open viewing space for both eyes;

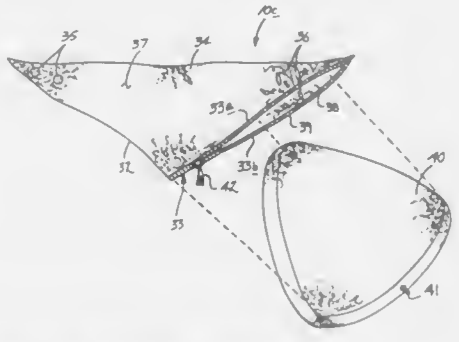
(c) elastomeric means joined to said elongate means for securing said elongate means in operative position across the face and encircling the eyes of the wearer;

(d) said elongate means being manually shapeable along the length thereof and in conformity with the contours of the wearer's face and capable of retaining its shape once bent in conformity to the face contours so that the contours of said elongate means can be altered to conform to the contour of the portions of the wearer's face across which the elongate means is positioned to overlie and each of said side portions can be bent rearwardly of the face at the corresponding side of the wearer's head so that any part of said sheet of material located outboard of the wearer's eyes is effectively held by said side portions out of the wearer's peripheral field of vision; and

(e) sleeve means associated with said sheet of material and positionable about the eyes of the wearer when the mask is operatively worn and forming a sleeve within which said elongate means is positioned, and said sleeve means and said sheet material being constructed of dissimilar materials.

5,025,508
SCARF CONSTRUCTION

Patty S. Duncan, 3575 Earhart Rd., Mt. Juliet, Tenn. 37122
Filed Dec. 18, 1989, Ser. No. 452,293
Int. Cl.^{5} A42B *5/00*
U.S. Cl. 2—207 **2 Claims**



1. A scarf construction comprising,

a triangular sheet member defined by a first edge, a second edge, and a third edge, and

a first apex corner defined by an intersection of the first and second edges, and

second apex corner defined by an intersection of the second and third edges, and

a third apex corner defined by an intersection of the first and third edges, and

a first fastener means integrally mounted on the sheet member adjacent the second apex corner at a first distance spaced therefrom, and a second fastener means integrally mounted on the sheet member adjacent the third apex corner spaced and a second distance therefrom wherein the first fastener means and the second fastener means are selectively securable together, and

wherein the first distance and the second distance are equal, and the first edge and the second edge are of equal length, wherein the triangular sheet member is defined as an isosceles triangular sheet member, and

wherein a first bisecting line bisecting an included angle defined by an intersection of the second and third edges, and a further bisecting line bisecting an included angle defined by an intersection of the first and third edges, and the first fastener means are defined as a plurality of buttons, and the second fastener means are defined as a plurality of button slots, and the buttons are arranged along the bisecting line, and the button slots are arranged at equal intervals along the further bisecting line, and

wherein the triangular sheet member includes an upper sheet and a lower sheet, and wherein the first edge defines a coextensive first seam between the upper and lower sheets, and the third edge defines a third coextensive seam between the upper and lower sheets, and the second edge includes an upper edge and a lower edge, the upper edge including a first zipper segment coextensive with the upper edge, and the lower edge including a second zipper segment coextensive with the lower zipper edge, the first and second zipper segments selectively securable together and wherein the upper and lower sheets define a pocket

VOL
1127
ISS
4
JE
25
1991
UMI

therebetween with an opening defined between the first and second zipper segments, and

further including a pneumatic bladder selectively positionable and receivable within the pocket, and the bladder further including a valve to enable selective inflation of the bladder.

5,025,509
OVERFLOW LEVEL CONTROLLER FOR A BATHTUB

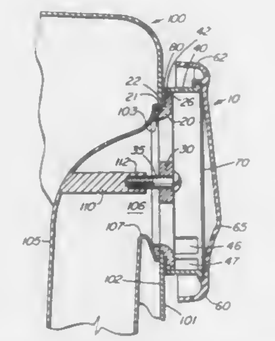
Peter K. Holt, 9682 129th Street, Surrey, British Columbia, Canada V3T 3G4 , and George M. Olorenshaw, 11810 Stephens Street, Maple Ridge, British Columbia, Canada V2X 6S3

Filed Apr. 25, 1990, Ser. No. 513,264

Claims priority, application Canada, Apr. 25, 1989, 596757

Int. Cl.^{5} E03C *1/24*

U.S. Cl. 4—206 7 Claims



1. A bathtub overflow level control device for a bathtub, said bathtub having

(i) an overflow drain pipe which provides a drain outlet from a side wall of the bathtub; and

(ii) a fixture base at said outlet for attaching a bathtub fixture, said device comprising:

(a) an adapter ring **20** sized to fit around said outlet;

(b) connecting means for tightly connecting said adapter ring to said base;

(c) a housing having a cylindrical perimeter and means for engaging said housing at one end with an outer perimeter of said adapter ring for rotary frictional sliding movement of said housing about said ring;

(d) a removable covering for sealingly covering the end of said housing opposed to said one end;

(e) an overflow port in the perimeter of said housing for permitting the flow of water from said bathtub, through said housing, and into said drain outlet;

(f) sealing means for preventing the flow of water from said bathtub into said pipe except through said port.

5,025,510
TOILET HAVING HYGIENIC CLEANING APPARATUS

Pauline R. Basile, 418 S. Valley Forge Rd., Devon, Pa. 19333

Continuation of Ser. No. 266,568, Nov. 3, 1988, Pat. No. 4,924,534. This application Jan. 30, 1990, Ser. No. 455,576

Int. Cl.^{5} A47K *7/08*

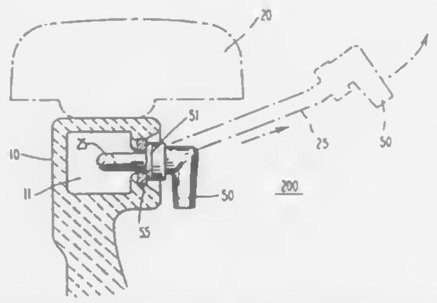
U.S. Cl. 4—447 5 Claims

1. A toilet having hygienic cleaning apparatus, comprising:

(a) a water source;

(b) valve means for connecting and regulating a flow of water from said water source; and

(c) flexible conduit means for transferring said flow of water from said valve means in a manually selected direction to a point of application, said flexible conduit means resiliently extendable by the direct grasp of a user from a position integral with said toilet to about said point of application, said toilet having a bowl portion having a rim with a substantially enclosed cavity therein disposed to contain a substantial portion of said flexible conduit means, said substantial portion comprising a length of resilient tubing having one end secured within said cavity, said rim having aperture means communicating with said cavity, said substantial portion of said flexible conduit means having an opposite end extending through said aperture means such that a selected amount of said portion is resiliently extendable therefrom only by being directly grasped and manipulated by the user.



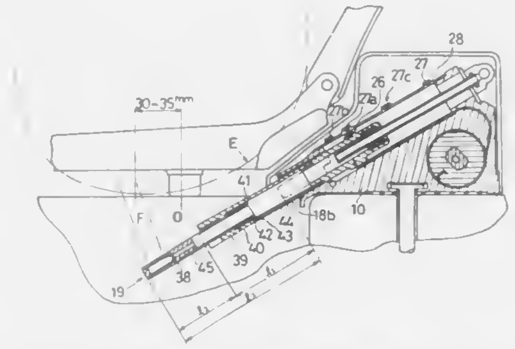
5,025,511
HUMAN PRIVATE PARTS WASHING APPARATUS

Hisanobu Takeda, Aichi, and Tomio Oguma, Anjo, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Continuation-in-part of Ser. No. 196,430, May 20, 1988. This application Oct. 30, 1989, Ser. No. 428,633

Int. Cl.^{5} A61H *35/00;* **A47K** *3/22*

U.S. Cl. 4—447 8 Claims



1. A human private parts washing apparatus adapted to be installed on the top of a toilet bowl at the rear, comprising:

a washing water splashing means for splashing washing water to human private parts, said washing water splashing means including a nozzle supporter, and a washing nozzle supported by said nozzle supporter, said washing nozzle being slidably held in an obliquely declining manner and being directed toward an inside of said toilet bowl, said washing nozzle including an outer nozzle, mechanical driving means for slidably operating said outer nozzle back and forth from a storage position to at least one washing standby position, and an inner nozzle having splashing openings and being slidably stored inside said outer nozzle at a front side thereof, said inner nozzle having an orifice communicating said splashing openings and the interior of said outer nozzle, and washing water hydraulic pressure means for slidably operating said inner nozzle back and forth from said at least one standby position to at least one operating position;

a washing water supplying means for supplying washing water from a washing water supply source; and

a control means for providing operation instructions to said washing water splashing means and said washing water supplying means so as to operate said outer nozzle back and forth from said storage position to said at least one standby position via said mechanical driving means, so as to supply washing water from said washing supply source into said washing nozzle via said washing water supplying means, so as to operate said inner nozzle back and forth from said at least one standby position to said at least one operating position via said hydraulic pressure means, and so as to wash human private parts.

5,025,512
FLOORING APPARATUS FOR POOL OR THE LIKE

Masateru Niimura, 4-4, Oomorinishi, 6-chome, Oota-ku, Tokyo 143, Japan

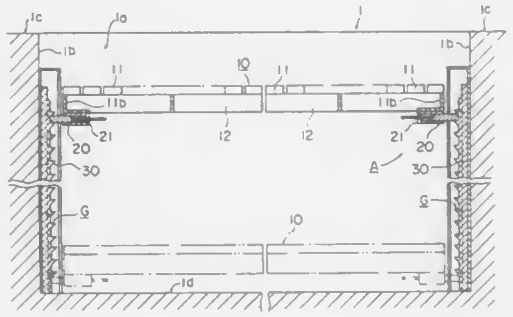
PCT No. PCT/JP87/00630, § 371 Date Apr. 20, 1988, § 102(e) Date Apr. 20, 1988, PCT Pub. No. WO88/01672, PCT Pub. Date Mar. 10, 1988

PCT Filed Aug. 26, 1987, Ser. No. 184,636

Claims priority, application Japan, Aug. 26, 1986, 61-198235; Aug. 26, 1986, 61-198236; Feb. 20, 1987, 62-35878; Mar. 23, 1987, 62-65790; May 20, 1987, 62-75782; May 20, 1987, 62-75783; May 20, 1987, 62-123127

Int. Cl.^{5} E04H *4/00*

U.S. Cl. 4—495 7 Claims



1. A floor-level adjusting device of a pool, said device comprising:

a movable floor disposed in the pool, vertically movable relative to the pool, and having a surface area that is substantially the same as the cross-sectional area of the pool,

said floor comprising a plurality of hollow floor members having hermetically sealed therein a volume of air that is sufficient to render the floor substantially weightless underwater, and a support frame to which said floor members are fixed;

an elevating means connected to said movable floor for moving said floor vertically up and down relative to the pool,

said elevating means comprising a rotatable take-up pulley, rope connected between said take-up pulley and the movable floor, and a plurality of rotatable direction-changing pulleys disposed between said take-up pulley and said movable floor, said rope extending over said direction-changing pulleys; and

holding means connected between said movable floor and the pool for supporting the movable floor and preventing said floor from moving downward relative to said pool from any one of a plurality of vertically spaced predetermined positions,

said holding means comprising a locking claw, locking claw support means for supporting said locking claw on said movable floor in a manner in which said locking claw is displaced as said floor is moved vertically by said elevating means, and a locking member secured to the pool and extending along an interior surface of the pool, said locking claw being engageable with said locking member in any of said predetermined positions in a manner in which said movable floor is prevented from being moved downward relative to the pool.

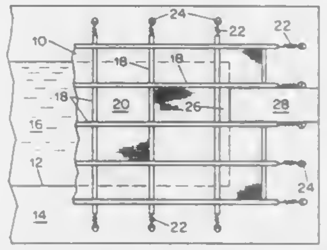
5,025,513
POOL COVER WITH COMPRESSIBLE SAFETY EDGE

David W. Weissner, Hicksville, N.Y., assignor to Meyco Products Inc., Hicksville, N.Y.

Filed Mar. 21, 1990, Ser. No. 496,606

Int. Cl.^{5} E04H *4/10*

U.S. Cl. 4—498 14 Claims



1. A pool cover, having a compressible safety edge for resiliently filling openings adjacent to vertical obstructions, comprising:

a flexible air and water permeable cover configured to cover a pool in secure overlapping relationship to pool edges except in the vicinity of an obstruction which prevents such overlapping along a portion of the edge of said cover;

resilient compressible means, conformable to an obstruction, for resiliently filling the interface between the edge of said cover and an obstruction of regular or irregular shape so as to leave only limited openings;

support means, configured for attachment to the edge of said cover, for supporting said resilient means at said non-overlapping portion of said edge; and

fastening means, attached to said cover, for holding the pool cover in place over a pool and holding said resilient means and support means in place adjoining said obstruction;

whereby, upon installation of the pool cover the safety edge is held in place adjacent to an obstruction so as to resiliently secure the interface between the pool cover and the obstruction during both static conditions and loading conditions tending to separate the cover from said obstruction.

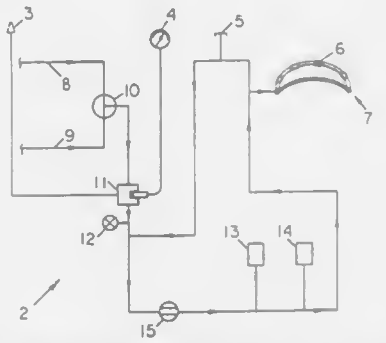
5,025,514
PRESSURE MEANS FOR AUTOMATIC HAIR AND SCALP TREATMENT APPARATUS

Archie M. Miller, Brentwood, Tenn., assignor to IHT, Inc., Nashville, Tenn.

Filed Apr. 5, 1990, Ser. No. 504,844

Int. Cl.^{5} A45D *19/14*

U.S. Cl. 4—518 1 Claim



1. In the apparatus for use in applying hair treating solutions to a person's head, which includes a bowl, a closure therefor adapted to enclose the head with the face outside the closure and the back of the nect on the bowl front, an arcuate header including spray manifolds adapted to oscillate in an arc from a

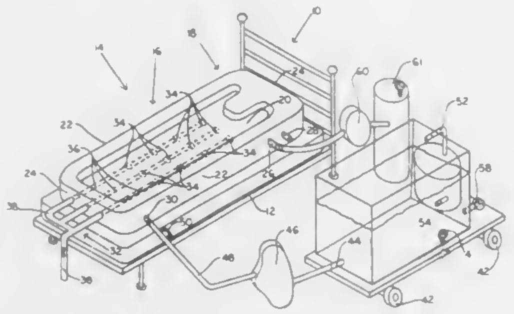
VOL
1127
ISS
4
JE
25
1991
UMI

top point opposite the forehead to a bottom point opposite the neck, means imparting partial rotation to the arcuate header to effect said oscillatory movement, a plurality of nozzles disposed on each manifold to dispense adjacent pressurized sprays, and means for supplying treating solutions to the nozzles at constant pressure, the improvement for supplying pressurized solutions of treating liquids to the spray nozzles at pressures which can be adjusted in the range of 80 psi to 120 psi comprising a closed hydraulic circuit including a fluid inlet line, a pump, an adjustable orifice pressure regulator, and a header in series with said pressure regulator, the pump being in the hydraulic circuit upstream from the header, in the direction of flow, to pump fluid to the header under pressure, the adjustable orifice pressure regulator being in the hydraulic circuit downstream from the header, in the direction of flow, the orifice cooperating with the pump to restrict flow thereto, permitting the attainment of a preselected pressure spray at the header by its back pressure.

5,025,515

PORTABLE BATH TUB APPARATUS

Michael Rhines, P.O. Box 1464, Orange, Tex. 77630
Filed Jun. 14, 1988, Ser. No. 207,108
Int. Cl.^{5} A47K *3/06, 3/02*
U.S. Cl. 4—585 4 Claims

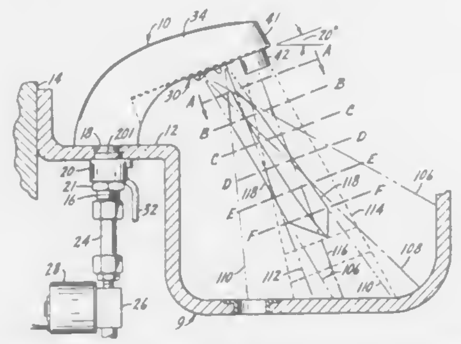


1. A portable bath tub apparatus including:
an inflatable bath tub having a plurality of drain openings formed therein, an air inlet nozzle for inflating the bath tub, and an air outlet nozzle for allowing the release of air from the bath tub;
an air pump for generating air to inflate the bath tub;
an air tank coupled between the air pump and the bath tub air inlet nozzle for storing and dispensing air from the air pump so that the bath tub can be inflated;
movable means for storing water therein adjacent the bath tub;
means for heating the water in the storing means to a predetermined temperature;
a hot water inlet nozzle coupled to the water heating means to allow water to flow from the water storing means into the water heating means;
a hot water outlet nozzle coupled to the water heating means to allow water to flow from the water heating means to the water storing means;
means coupled between the bath tub and the water storing means for pumping water from the water storing means into the bath tub to fill the bath tub to a desired level;
a water outlet nozzle coupled to the water storing means and couplable between the water storage means and the water pumping means; and
means coupled to the drain openings in the bath tub for selectively draining water from the bath tub.

5,025,516

AUTOMATIC FAUCET

John R. Wilson, Naperville, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.
Continuation of Ser. No. 173,883, Mar. 28, 1988, Pat. No. 4,894,874. This application Oct. 30, 1989, Ser. No. 428,905
Int. Cl.^{5} E03C *1/05*
U.S. Cl. 4—623 27 Claims

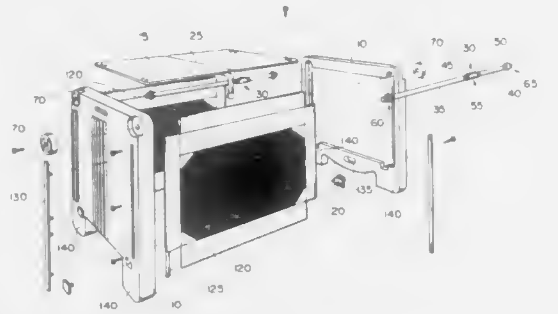


1. A faucet for automatic operation defining a base and an elongated spout body extending therefrom including a discharge outlet spaced from the base,
sensing means operative to automatically operate said faucet by detecting the presence of a user comprising a signal emitter and a signal detector disposed intermediate said base and said outlet, said emitter and detector each being disposed on the longitudinal centerline of the spout body, said detector having a field of view symmetrical about an axis, said axis being parallel to a centerline of said discharge outlet,
and said sensing means being able to communicate with a faucet control means adapted to automatically operate said faucet.

5,025,517

COLLAPSIBLE STRUCTURE SUITABLE FOR USE AS A PORTABLE PLAY YARD

Edward Johnson, Park Forest, Ill., assignor to Kolcraft Enterprises, Inc., Chicago, Ill.
Filed Dec. 12, 1989, Ser. No. 448,856
Int. Cl.^{5} A47D *7/00*
U.S. Cl. 5—99.1 2 Claims

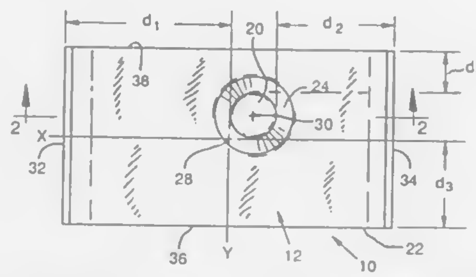


1. A collapsible structure including:
an enclosure comprising a pair of rigid opposing end members;
a foldable base positioned between said end members;
a pair of flexible opposite side walls positioned between said end members; and
a pair of cylindrical foldable support members, each being rotatable about a longitudinal axis between first and second positions and being disposed between the opposing end members and having two segments, each segment having a proximal end pivotally connected to a corresponding one of the pair of end members and a distal end pivotally coupled to the distal end of the other segment through a linkage, each said support member being rigid when rotated to the first position and foldable when rotated to the second position.

5,025,518

ORTHOPEDIC HEAD PILLOW

John D. Summer, 1427 NW. 23rd Ave., Portland, Oreg. 97210-2615
Continuation-in-part of Ser. No. 271,107, Nov. 4, 1988, Pat. No. 4,768,246. This application Sep. 6, 1989, Ser. No. 404,229
The portion of the term of this patent subsequent to Sep. 6, 2005, has been disclaimed.
Int. Cl.^{5} A47C *20/02*
U.S. Cl. 5—434 13 Claims



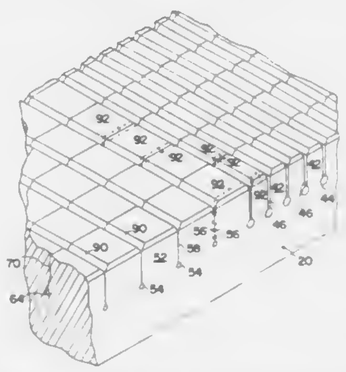
1. An orthopedic head pillow for supporting a user's head while the user is supported by a mattress or other support surface comprising:
a body of resilient material;
the body having a upper surface and a base surface for resting on the support surface;
the body having a peripheral edge or boundary and an interior wall surface defining a head receiving aperture spaced from the peripheral edge, the aperture permitting the back of the user's head to rest flush with or within no more than approximately one-fourth inch of the plane of the support surface with the wall surfaces supporting the sides of the user's head when the user is lying on the support surface and the user's head is positioned within the aperture;
the aperture being positioned at a location within the body so as to provide differing distances from plural locations in orthogonal directions along the peripheral edge to the aperture, whereby a user may orient the pillow to select the distance between the peripheral edge and aperture which conforms to the length of the user's neck; and
the body having a generally elongated rectangular periphery with a center; and
the aperture having a center which is displaced from the center of the body.

5,025,519

MULTI-SECTION MATTRESS OVERLAY FOR SYSTEMATIZED PRESSURE DISPERSION

Donald C. Spann; Daniel J. Schaefer, both of Greenville, S.C., and Thomas A. Krouskop, Stafford, Tex., assignors to Span-America Medical Systems, Inc., Greenville, S.C.
Continuation of Ser. No. 235,806, Aug. 23, 1988, which is a continuation of Ser. No. 921,968, Oct. 22, 1986, abandoned. This application Jun. 28, 1989, Ser. No. 372,860
The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.
Int. Cl.^{5} A47C *27/14*
U.S. Cl. 5—464 22 Claims

1. A mattress pad for providing systematized pressure dispersion for a person reclined thereon, comprising:
a main body of resilient material having a predetermined thickness and predetermined density;
an upper support surface, defined by said main body, for receipt of a person thereon;
a plurality of parallel longitudinal and parallel transverse cuts formed in said main body to a given depth thereof, and defining a plurality of rectangular-shaped elements;
a plurality of sections defined in said body, with each respective section including at least two adjacent transverse rows of said rectangular-shaped elements, and having predetermined support characteristics and element cross-sections which are generally constant over the respective section but which differ among said sections; wherein

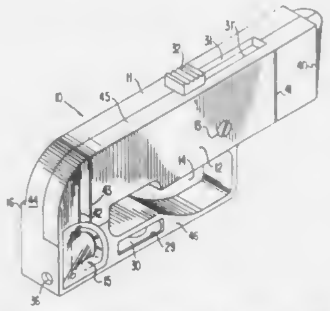


said support characteristics are selected with determined relationships therebetween, and having 25% ILD characteristics generally in a range from about 17 pounds to about 26 pounds, where 25% ILD stands for 25% identation load deflection as defined by the number of pounds of pressure required to push a 50 square inch circular plate into said main body so as to compress same by 25% of its predetermined thickness, so as to form a support system for dispersing pressure in a desired manner for all parts of a person reclined thereon for optimized prevention of decubitus ulcers.

5,025,520

COMBINED TOOL AND METHOD FOR USING SAME

William C. Watkins, 3910 Penrod Dr., Phenix City, Ala.
Filed Jul. 18, 1989, Ser. No. 381,363
Int. Cl.^{5} B26B *11/00*
U.S. Cl. 7—163 14 Claims



1. A tool, comprising a casing, a knife blade operatively associated with the casing and a pitch gage operatively associated with the casing and having means for directly reading vertical rise per standard horizontal distance wherein the pitch gage comprises a housing arranged in the casing, a pivot pin fixed in the housing, and a pendulum indicator freely rotatable about the pivot pin, and the direct reading means includes a scale graduated in amounts of vertical rise per horizontal distance and a pointer on the pendulum indicator to point to a discrete reading on the scale when the tool is positioned to take a pitch reading.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,521
SHOE LASTING MACHINE

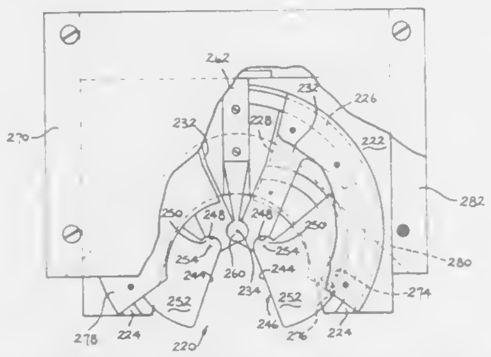
Frank C. Price, 15 Southland Road, Leicester LE2 3RJ, England, and Gerhard Giebel, Hubertusstrasse 12, 6232 Bad Soden 2, Fed. Rep. of Germany

Filed Apr. 18, 1989, Ser. No. 339,974

Claims priority, application United Kingdom, Apr. 22, 1988, 8809499

Int. Cl.⁵ A43D *23/02*

U.S. Cl. 12—12.4 **37 Claims**



1. Wiper assembly for a shoe lasting machine comprising two wiper plate arrangements providing a continuous wiping surface and leading edge and being mounted for pivotal movement relative to one another about a centrally disposed pivot, wherein said wiper plate arrangement comprises
- a first, toe wiper plate mounted for pivotal movement about said centrally disposed pivot,
- a second, forepart, wiper plate which is mounted for pivotal adjusting movement about a second pivot in relation to the toe wiper plate thus to vary the configuration of the continuous wiping surface and leading edge formed by the two wiper plates, and
- means whereby the forepart wiper plate is maintained in adjusted position in relation to the toe wiper plate, when the assembly is in use, during inwiping movement of the wiper plate arrangements to cause lasting marginal portions of the upper of a shoe to be wiped over and pressed against corresponding marginal portions of the insole of such shoe.

5,025,522
BRIDGE DECK PANEL SUPPORT SYSTEM AND METHOD

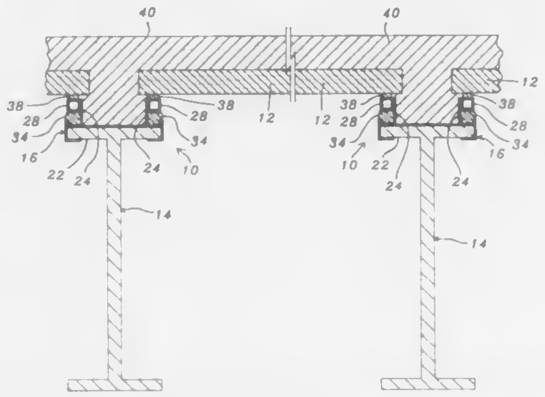
Larry R. Eskew, 214 Echodale La., Knoxville, Tenn. 37920, and Claude S. Simpson, 2001 Everheart Dr., NW., Cleveland, Tenn. 37311

Filed Jan. 25, 1990, Ser. No. 470,872

Int. Cl.⁵ E01D *19/12*

U.S. Cl. 14—73 **15 Claims**

1. A support system for supporting precast bridge deck panels on a bridge support, said system comprising:
- at least one grade bar support member secured to, and extending upwardly from, said bridge support, said grade bar support member defining an upper portion; and
- at least one grade bar for supporting at least one said deck panel, said grade bar defining an upper support surface for supporting said deck panel and a lower surface, said grade bar being secured to said upper portion of said grade bar support member such that a grout receiving space is defined between said lower surface of said grade bar and said bridge support for receiving non-shrink grout.



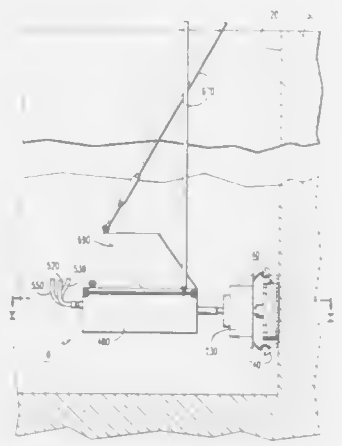
5,025,523
APPARATUS FOR REMOTELY DECONTAMINATING REACTOR CAVITY WALLS

Donald E. Zappa, North Hills, Pa.; Anthony J. Prisco, Jr., Cinnaminson, and Matthew A. Kirchner, Medford, both of N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 4, 1989, Ser. No. 293,401

Int. Cl.⁵ A46B *13/04*

U.S. Cl. 15—98 **37 Claims**



1. An apparatus for scrubbing an uneven surface, comprising:
- (a) brush means for scrubbing the surface;
- (b) a coiled spring contacting said brush means for biasing said brush means against the surface;
  means mounting said coil spring adjacent said brush means;
- (c) drive means connected to said brush means for rotating said brush means to scrub an area of the surface; and
- (d) drive means connected to said brush means for orbiting said brush means to scrub a larger area of the surface.

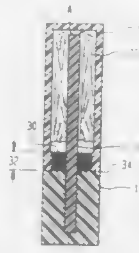
5,025,524
DISPOSABLE TOILET SEAT WIPE APPARATUS WITH SEPARATION ACTUATION

Philip A. Genovese, Jr., 550 Ocean Ave., Apt. 11H, Monmouth Beach, N.J. 07750

Filed May 7, 1990, Ser. No. 519,725

Int. Cl.⁵ A47L *13/17;* B65D *83/00*

U.S. Cl. 15—104.94 **7 Claims**



1. A disposable toilet seat wipe, comprising:
- a normally closed container having first and second separable sections;
- a handle secured to one end of said first section and of a length to extend into said second section;
- a cleaning pad, pre-moistened with any of a germicidal, sanitizing, disinfecting or similar like solution folded around said handle where said handle extends into said second section, and said cleaning pad, when opened, having a centralized section to which a tip of said extending handle is secured;
- and with said second section having an inner lip configured to grasp onto said folded cleaning pad as said firs and second sections are begun to be separated;
- with said lip configuration grasping said cleaning pad to continue to pull said pad from its folded position as said first and second sections continue to be separated; and
- with said lip configuration pulling said pad to an unfolded position about said handle when said first and second separable sections are fully separated.

5,025,525
TOOTH BRUSH WITH AN ANATOMICALLY COMPATIBLE STRUCTURE

Jose R. Munoz, and Maria O. Laporta, both of Francisco Alegre, 31, 08024 Barcelona, Spain

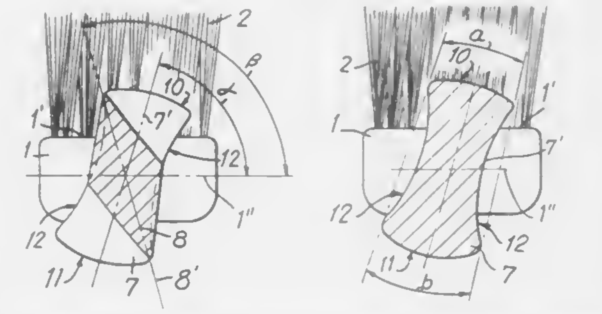
Filed Feb. 9, 1990, Ser. No. 478,270

Claims priority, application Spain, Feb. 23, 1989, 8900577; Dec. 5, 1989, 8903685

Int. Cl.⁵ A46B *9/04*

U.S. Cl. 15—167.1 **5 Claims**

1. An anatomically compatible tooth brush comprising a head having a plurality of bristles and a head plane, a neck and a handle connected to the head by the neck, said handle comprising an oblong concavo-convex section contiguous to said neck inclined with respect to said head plane and a substantially rhombus-like cross sectioned end part, said oblong concavo-convex section being designed to fit a thumb and forefinger of a hand of an individual, while said substantially rhombus-like cross sectioned end part is easily gripped by said hand in a comfortable position, when said bristles engage and remain upright on teeth of said individual.



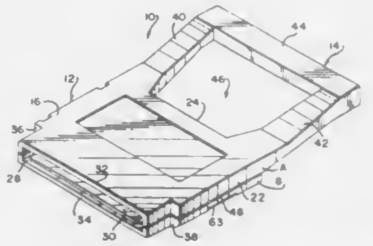
5,025,526
APPARATUS FOR CLEANING ELECTRONIC GAME CONSOLES AND CARTRIDGES

Norio Ichitsubo, Osaka, Japan; Hiroshi Kamada, and Lance Barr, both of Redmond, Wash., assignors to Nintendo of America, Inc., Redmond, Wash.

Filed Dec. 13, 1989, Ser. No. 450,079

Int. Cl.⁵ B08B *11/00*

U.S. Cl. 15—210 R **25 Claims**



1. A cleaning cartridge for an electronic game console comprising:
- a housing portion having a recess formed along one side thereof, said recess defined by extensions of top, bottom and side walls of the housing; a substantially stationary cleaner pad clamped within said recess and spaced from said top, bottom and two side walls and adapted for engagement with an edge connector in the game console;
- wherein said cleaner pad comprises a relatively thin, flat substrate covered over substantially its entire surface by a synthetic fabric.

VOL
1127
ISS
4
JE
25
1991
UMI

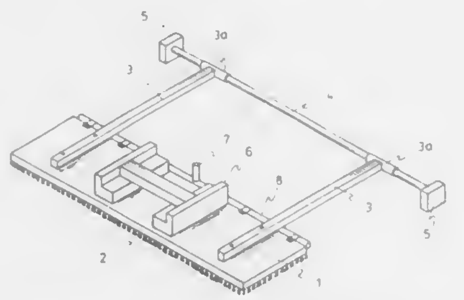
5,025,527
ESCALATOR CLEANING DEVICE

Graham A. W. Armstrong, Wagga Wagga, Australia, assignor to Advanced Escalator and Travelator Cleaner Pty. Ltd., New South Wales, Australia

Filed Apr. 13, 1989, Ser. No. 337,329

Int. Cl.⁵ A46B *15/00*

U.S. Cl. 15—256.5 5 Claims



1. An escalator cleaning device, comprising:

brush means adapted to cover a tread of an escalator:

frame means supporting said brush means;

engaging means on said frame means to engage side walls of said escalator for supporting in place said escalator cleaning device; and,

pipe means adapted to be connectable to a source of liquid for cleaning said escalator, said pipe means being arranged along an edge of said brush means which is first contacted by the tread of the escalator to distribute the liquid in use to the underside of said brush means.

5,025,528
MULTIPLE STATION MACHINE FOR BRUSHING OR CLEANING FOOTWEAR

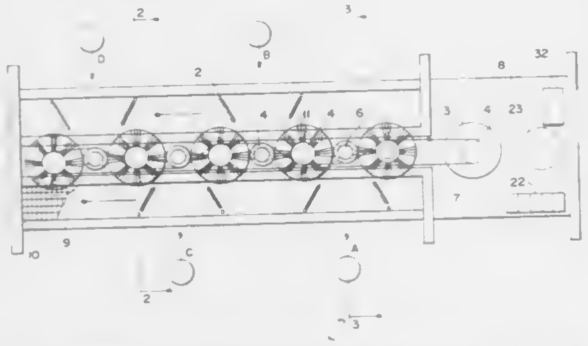
Bernard P. Burey, Route de Bonnetable, 72460 Savigne l'Eveque, and Jean-Paul Barcon, ABC Material, la Lande de Vihiers St. Jean de la Motte, 72510 Mansigne, both of France

Filed Sep. 26, 1988, Ser. No. 258,270

Claims priority, application France, Nov. 24, 1986, 86 16589

Int. Cl.⁵ A47L *23/02, 23/20*

U.S. Cl. 15—302 27 Claims



1. A machine for brushing footwear which includes a plurality of brushing stations, said machine comprising:

(a) a plurality of upstanding brushes mounted for rotation about respective generally vertical axes, said vertical axes being sequentially spaced apart, each of said brushing stations including a sequential pair of said upstanding brushes;

(b) a flat circular brush mounted between respective ones of said sequential pairs of said upstanding brushes at each of said brushing stations;

(c) a single motor;

(d) means operatively connected to said single motor for rotatably driving each of said plurality of upstanding brushes and said flat circular brushes; and

(e) a casing for housing said plurality of upstanding brushes and said flat circular brushes and at least a portion of said means for rotatably driving each of said plurality of upstanding brushes and said flat circular brushes, said casing having a lateral opening at each of said brushing stations for introducing an item of footwear into said respective brushing stations.

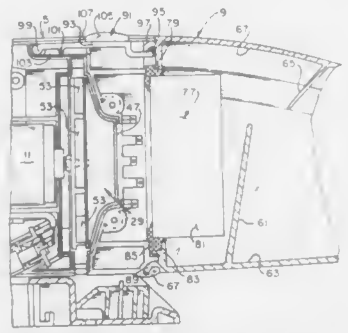
5,025,529
PORTABLE HAND HELD VACUUM CLEANER

David R. Hult, and Mark J. Tomasiak, both of St. Charles County, Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Division of Ser. No. 454,357, Dec. 21, 1989, which is a continuation of Ser. No. 229,494, Aug. 8, 1989, Pat. No. 4,920,608. This application Sep. 17, 1990, Ser. No. 583,471

Int. Cl.⁵ A47L *5/24*

U.S. Cl. 15—344 2 Claims



1. In a portable hand held vacuum cleaner having a housing with a handle permitting a user to lift and operate said vacuum cleaner and a nozzle/debris container releasably secured to said housing, said housing and container having lower complementary releasable interlocking fasteners and said housing having a push-button activated releasable lock positioned along an upper part of said housing for interengaging a complementary shaped locking shoulder along an upper part of said nozzle/debris container, the improvement comprising an integral one-piece push-button lever lock having an elongated body with hook shoulder at one end for engaging the locking shoulder on said nozzle/debris container, the other end of said elongated body having a ball portion for cooperative pivotal engagement with a corresponding pivot section provided on said housing, said elongated body further being provided with a depending finger adjacent said ball portion for engaging a supporting surface on said housing to spring bias a push button extending from said elongated body on an opposite side from said depending finger through and opening in said housing and for simultaneously engaging the hook shoulder thereof in resilient and releasable locking engagement with the locking shoulder of said nozzle/debris container.

5,025,530
QUICK COUPLING DOOR HINGE

Franco Ferrari, Frazione Deviscio, 1, 22053 Lecco (Como), and Carlo Migli, Lecco, both of Italy, assignors to Franco Ferrari, Lecco, Italy

Filed Nov. 13, 1989, Ser. No. 434,319

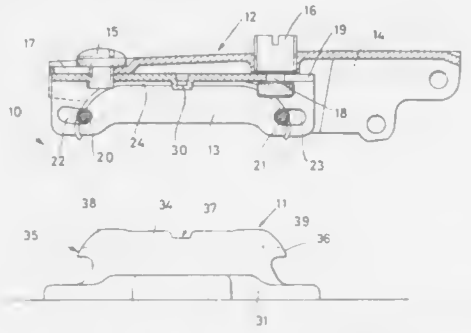
Claims priority, application Italy, Nov. 16, 1988, 22155 B/88; Jan. 4, 1989, 20408/89 [U]; Aug. 25, 1989, 21626/89[U]

Int. Cl.⁵ E05D *7/10*

U.S. Cl. 16—236 19 Claims

1. A furniture door hinge comprising a base plate having a raised portion to be secured to a piece of furniture, a hinge arm adapted to support a furniture door and an intermediate element or removably connecting the arm to the base, said arm

having a substantially U-shaped cross-sectional configuration forming two lateral side walls which laterally embrace the intermediate element and said intermediate element having a substantially U-shaped cross-sectional configuration forming two lateral side walls that embrace two lateral side surfaces on the raised portion of the base plate, means for fastening the arm to the intermediate element and readily releasable fastening means for coupling the intermediate element to the base, said releasable fastening means comprising a pair of members yieldably mounted in said intermediate element at spaced apart locations in the longitudinal direction of the side walls of the element for movement between a disengaged position and an engaged position where the element is coupled to the base, spring means biasing the members toward the engaged portion, a pair of opposed protrusions at opposite ends of the raised portion of said base plate, said protrusions forming housings for receiving said members in the engaged position and having a slanting upper surface that slants inwardly and upwardly from the ends of the protrusions, whereby as the intermediate element is pressed down onto the base plate in a direction substantially perpendicular to the base plate, with its side walls embracing the sides of the raised portion of the base plate, the slanted upper surfaces of the protrusions will push the yielding members against the action of the spring means toward the disengaged position until they pass the ends of the protrusions and come to rest in the housings, at least one of said yielding members having a portion that can be manually gripped to force it from its housing in the base plate toward its disengaged position to permit the intermediate element and attached arm to be removed from the base plate.



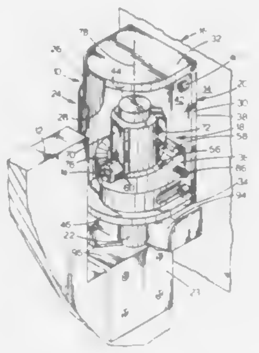
5,025,531
GRAVITY SWING DOOR HINGE

Lon H. McCarty, Estacada, Oreg., assignor to Econo Max Manufacturing, Gresham, Oreg.

Filed Jun. 30, 1989, Ser. No. 375,257

Int. Cl.⁵ E05F *1/02*

U.S. Cl. 16—313 14 Claims



1. A door hinge for mounting to a door jamb and for supporting a door within a door opening defined by the door jamb, the door hinge comprising:

a door pivot for mounting to a door;

a body including a jamb mounting portion for mounting to the door jamb;

first and second spaced apart hinge guards projecting outwardly from the jamb mounting portion so as to define a door pivot receiving space therebetween;

means on said body for pivotally receiving the door pivot for mounting the door to the body;

means carried by said body and said door pivot and positioned between the first and second hinge guards for biasing the door to a first position relative to the door opening;

a hinge body cover mountable to said body and cooperative with said first and second hinge guards to substantially enclose said means for pivotally receiving the door pivot; and

a slip cover adapted to be supported by said door slidably disposed with respect to said hinge body cover to telescope with respect thereto.

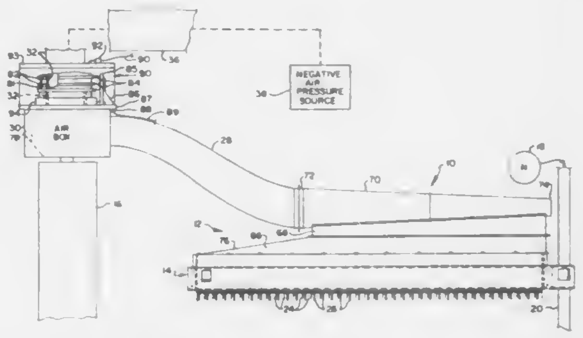
5,025,532
FIBER BALE OPENER HAVING TWO OPENING CHAMBERS

Kenneth G. Lytton, Gastonia, N.C.; Odell F. Bolin, Clover, S.C., and Robert J. Koehler, Gastonia, N.C., assignors to Fiber Controls Corporation, Gastonia, N.C.

Filed Mar. 20, 1990, Ser. No. 496,315

Int. Cl.⁵ D01G *7/12*

U.S. Cl. 19—80 R 19 Claims



1. In a textile fiber bale opener of the type which includes rotary beater means movable over fiber bales, the improvement comprising:

said rotary beater means including two spaced rotatable, horizontally-disposed plucker rolls extending parallel to each other and perpendicular to a direction of movement of said rotary beater means over fiber bales,

each of said plucker rolls having a multiplicity of circumferential sawtooth blades spaced along its length with each blade having a plurality of sawteeth disposed around its circumference,

a housing for said rotary beater means including an interior space having a longitudinally-extending divider disposed in between said rolls for centrally dividing the space into two chambers respectively containing said plucker rolls,

a multiplicity of grid bars respectively disposed between pairs of said sawtooth blades and extending below same for pressing down on fiber bales while said sawteeth pluck fibers from said bales, and

output means including common duct means for pulling plucked fibers from said chambers concurrently into said duct means when connected to a source of negative air pressure.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,533
METHOD OF BLENDING TEXTILE FIBERS

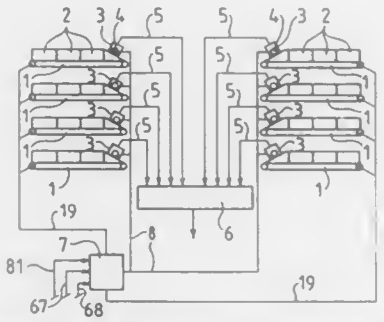
Jurg Faas, Dinhard; Eduard Nuessli, Wiesendangen; Christof Grundler, Winterthur; Paul Staheli, Wilen b. Wil; Daniel Hanselmann, Winterthur; Robert Demuth, Nuerensdorf; Rene Waeber, and Peter Fritzsche, both of Winterthur, all of Switzerland, assignors to Rieter Machine Works, Ltd, Winterthur, Switzerland

Filed Aug. 30, 1989, Ser. No. 400,693

Claims priority, application Switzerland, Sep. 6, 1988, 03355/88

Int. Cl.^{5} D01G *7/00, 13/00*

U.S. Cl. 19—145.5 **35 Claims**



1. A method of blending textile fibers comprising the steps of

extracting a fiber flock component from each of a plurality of fiber bales of varying origin in a predetermined variably controlled metered amount corresponding to a predetermined percentage of said fiber flock component in a predetermined blend of said components;

blending the fiber flock components from the fiber bales to form a uniform blend; and

automatically correcting the amount of a fiber flock component extracted from a respective bale in response to a deviation of the blend from a preset value of a characteristic thereof to eliminate said deviation.

5,025,534
DEVICE FOR THE POSITIONAL ORIENTATION OF THE CHEST STRAP OF A THREE-POINT SEAT BELT

Nils E. Meijer, Laholm, Sweden, assignor to Scafix AB, Halmstad, Sweden

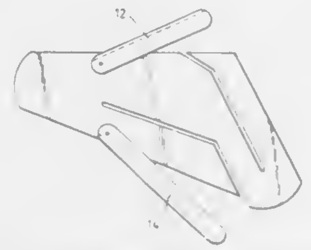
PCT No. PCT/SE87/00579, § 371 Date Aug. 8, 1989, § 102(e) Date Aug. 8, 1989, PCT Pub. No. WO88/04622, PCT Pub. Date Jun. 30, 1988

PCT Filed Dec. 4, 1987, Ser. No. 382,648

Claims priority, application Sweden, Dec. 16, 1986, 8605395

Int. Cl.^{5} A44B *11/00;* **A47D** *15/00*

U.S. Cl. 24—172 **12 Claims**



1. A device for positionally orienting the chest strap of a safety belt comprising:

a three-point safety belt having a chest strap extending across the chest of a wearer, and an abdomen strap extending over the abdomen of a wearer;

a plate shaped member having first and second elongated slots forming an angle with one another, said first slot having an open end directed substantially upwardly, said second slot having an open end directed substantially downwardly, said abdomen strap extending through said first slot, said chest strap extending through said second slot.

5,025,535
BOTTOM END STOP FOR SLIDE FASTENER

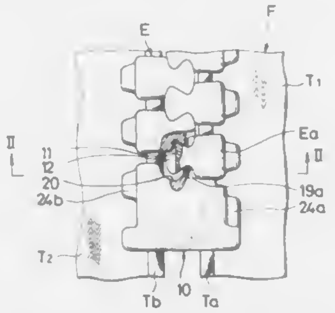
Masahiro Kusayama, Kurobe, Japan, assignor to Yoshida Kogyo, K. K., Tokyo, Japan

Filed Feb. 7, 1990, Ser. No. 476,613

Claims priority, application Japan, Feb. 16, 1989, 1-17069[U]

Int. Cl.^{5} A44B *19/38*

U.S. Cl. 24—433 **5 Claims**



1. In a slide fastener comprising a pair of stringer tapes, a row of discretely arranged coupling elements secured to and along a longitudinal inner edge of each of the tapes and a slider reciprocally movable along the rows of said coupling elements, each of said coupling elements having a bulged coupling head with an engaging recess formed in its front end, a reduced neck, a barrel with a slot formed therein for mounting said element astride said tape inner edge, shoulders formed between said neck and said barrel, a pair of engaging ribs projecting from said shoulders respectively, toward said head and a pair of heels extending from the rear end of said barrel, a bottom end stop secured to the bottom end portions of the respective tapes and adapted to restrict thereat the movement of said slider, said bottom end stop having forked portions defining therebetween a bay for receiving the coupling head of a terminal element and a recess formed in said forked portion for receiving the engaging rib of said terminal element, said forked portion forming a protuberance which extends between said neck and said head of said terminal element.

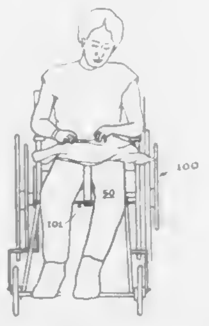
5,025,536
PANT'S CLIP APPARATUS

Elizabeth A. Vielhauer, 2841 "D" West Long Dr., Littleton, Colo. 80120

Filed May 11, 1990, Ser. No. 521,947

Int. Cl.^{5} A41F *1/00*

U.S. Cl. 24—563 **3 Claims**



1. A pant's clip apparatus in combination with a wheelchair having a seat and a seat cushion for retracting the front panel of a pair of pants worn by a patient sitting in the wheelchair during a catheterization procedure wherein the clip apparatus comprises:

a generally flat resilient, thin, one-piece clip member having a generally straight end, a curved end forming a hook element, and a curved intermediate portion which acts as a flexible hinge element relative to said ends; wherein said curved end is dimensioned to overlie and releasably engage said straight end; and, wherein said curved intermediate portion is engageable with the front of the seat of the wheelchair when said curved end of the clip member engages the front panel of the patient's pants in a retracted disposition; wherein, the clip member is dimensioned to be received between the seat cushion and said seat.

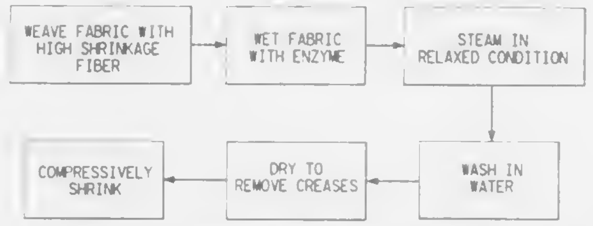
5,025,537
PROCESS FOR MAKING PRESHRUNK SIZE-FREE DENIM

James R. Green, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 24, 1990, Ser. No. 534,157

Int. Cl.^{5} D06B *19/00;* **D06M** *11/05;* **D03D** *15/00*

U.S. Cl. 26—18.5 **5 Claims**



1. A method for preparing denim fabric suitable for production of garments having the uniform appearance of new garments and the soft feel of worn garments, comprising

a) constructing a greige denim twill fabric with the warp yarn consisting essentially of from 20 to 90% cotton, from 10 to 80% of highly shrinkable synthetic staple fiber and optionally up to 70% of other staple fiber having low shrinkage and fill yarn consisting essentially of 20 to 100% cotton and from 0 to 80% of synthetic staple fiber, said warp and fill yarn having been sized,

b) wetting the fabric with a warm aqueous solution of an enzyme to assist in size digestion,

c) imparting a warp shrinkage of less than 12% by

  1. maintaining the wet fabric, open width, in a relaxed condition at a temperature of from 50° C. to 100° C. for at least 0.5 minute,
  2. rinsing the fabric in water to remove size, and
  3. drying the fabric, open width, at sufficient tension to remove creases, and

d) compressively shrinking the fabric up to 12% in the warp direction.

5,025,538
APPARATUS FOR CRIMPING TOW INCLUDING STUFFER BOX, CRIMPING ROLLERS AND MOLDING ROLLERS

Lotfy L. Saleh, Charlotte, N.C., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Mar. 30, 1990, Ser. No. 501,470

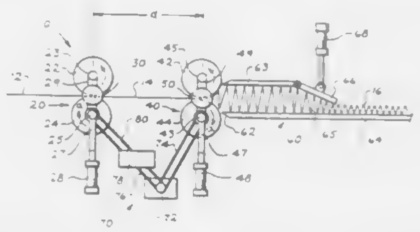
Int. Cl.^{5} D02G *1/12*

U.S. Cl. 28—263 **11 Claims**

1. An apparatus for crimping a continuous tow of textile fibrous materials comprising

a) a pair of parallel, rotatable molding rollers and a pair of side plates combined to define a molding space therebetween defining a nip and cooperating in exerting pressure on said tow at said nip passing through said molding space to mold said tow according to the molding space configuration;

b) a pair of parallel, rotatable crimping rollers and a pair of side plates combined to define a nip therebetween and located downstream of said molding rollers; and



c) a stuffer box chamber for producing a crimp in said tow and having an inlet positioned downstream and adjacent said crimping rollers and an outlet for conducting the crimped tow therethrough.

5,025,539
DRILLING AND MILLING MACHINE

Gerhard Stark, Notzingen, Fed. Rep. of Germany, assignor to Stama Maschinenfabrik GmbH, Fed. Rep. of Germany

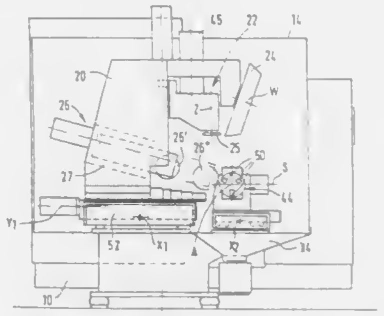
PCT No. PCT/EP89/00619, § 371 Date Jan. 11, 1990, § 102(e) Date Jan. 11, 1990, PCT Pub. No. WO89/11951, PCT Pub. Date Dec. 14, 1989

PCT Filed Jun. 2, 1989, Ser. No. 455,365

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3818903

Int. Cl.^{5} B23P *23/02*

U.S. Cl. 29—26 A **5 Claims**



1. Drilling and milling machine comprising

a workpiece carrier (**30**) which is formed for clamping a material bar (**18**) and is pivotal stepwise about a horizontal pivot axis (A) which coincides with the axis of the material bar (**18**) and

at least one tool spindle (**25**) which has a spindle axis (Z) arranged at right-angles to the pivot axis (A) and is adjustable along said spindle axis (Z), characterized by

a travelling pillar (**20**) which is displaceable in a direction (X axis) parallel to the pivot axis (A) and in a direction (Y axis) at right-angles to the pivot axis (A) and to the spindle axis (Z) and carries the tool spindle (**25**), and

a severing unit (**26**) which is also arranged on the travelling pillar (**20**) and is constructed for severing a portion (**18'**) of the material bar (**18**) which projects out of the workpiece carrier (**30**) into the working region of the tool spindle (**25**).

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,540

FLEXIBLE FILE HOLDER

Nicholas A. Asquith, Turret House, Youlgreave, Derby, United Kingdom DE4 1WL
PCT No. PCT/GB88/00169, § 371 Date Dec. 14, 1988, § 102(e) Date Dec. 14, 1988, PCT Pub. No. WO88/06502, PCT Pub. Date Sep. 7, 1988
PCT Filed Mar. 7, 1988, Ser. No. 269,533
Claims priority, application United Kingdom, Mar. 6, 1987, 8705324
Int. Cl.⁵ B23D *71/06*
U.S. Cl. 29—80 16 Claims

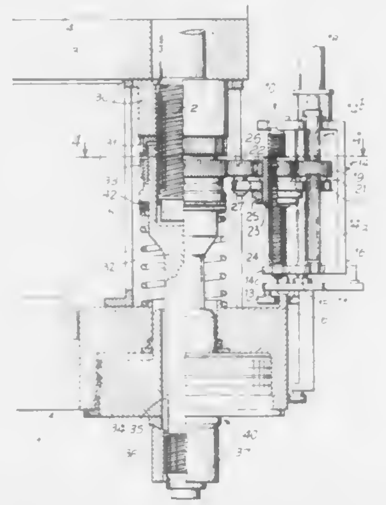
1. A file holder comprising first and second attachment means for attaching a flexible file blade to the holder in spaced-apart relation, a first member incorporating a cam surface and being so connected to the first attachment means as to be movable with respect thereto, a second member connected to the second attachment means and incorporating a cam follower bearing on the cam surface, the cam surface being so shaped as to vary the spaced-apart relation of the attachment means as the first member moves, said spaced-apart relation being variable by the cam surface between a first position in which the attachment means are relatively far apart and the said blade is relaxed and straight, and a second position in which the attachment means are relatively close together and the said blade is flexed, whereby a file attached to the holder may be variably flexed.

5,025,541

DEVICE AND A PROCESS FOR SCREWING AND UNSCREWING A NUT ON A COUPLING MEMBER

Alain Frizot, Montcenis, France, assignor to Framatome, Courbevoie, France
Filed May 24, 1989, Ser. No. 356,093
Claims priority, application France, May 25, 1988, 88 06953
Int. Cl.⁵ B23P *19/04*
U.S. Cl. 29—240 7 Claims

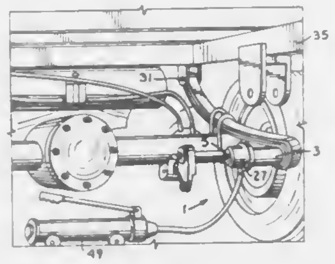
1. Device for selectively screwing and unscrewing a nut (30–32) on a coupling member (2) having a predetermined thread pitch, said device comprising a framework (14) pivoting around a shaft (15) parallel to said coupling member (2), means (17, 19, 22, 26) for driving in rotation said nut (30–32) to be selectively screwed and unscrewed and means (20, 24) for moving said driving means in a vertical direction, while said driving means rotates, along an axis parallel to a vertical axis of said coupling member (2) at a speed identical with that of said nut in motion while it is being screwed and unscrewed.



5,025,542

BUSHING EXTRACTOR/INSTALLER

Floyd B. Jacks, 219 NE. 82nd Terr., Kansas City, Mo. 64118
Filed Jun. 4, 1990, Ser. No. 532,874
Int. Cl.⁵ B23P *19/04*
U.S. Cl. 29—252 8 Claims



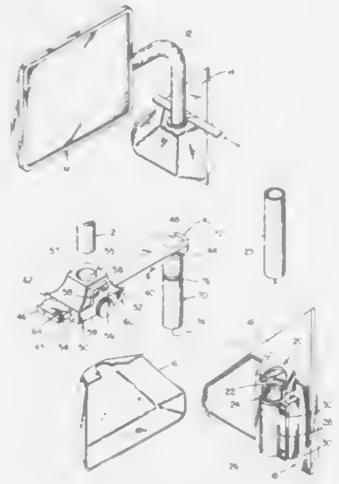
1. In extraction and installation apparatus for extraction of a first, existing bushing from a spring encirclement of a vehicle and for installation of a second, replacement bushing in said spring encirclement, the improvement comprising:
(a) portable on-vehicle extraction means in conjunction with a hydraulic ram for extracting said first bushing such that said extraction means is not thrust beyond said spring encirclement during said extraction of said first bushing; and
(b) portable on-vehicle installation means in conjunction with said hydraulic ram for installing said second bushing such that said installation means is not thrust beyond said spring encirclement during said installation of said second bushing.

5,025,543

METHOD OF PREPARING A SUPPORT MECHANISM FOR VEHICLE SIDE VIEW MIRROR

Timothy W. Byers, and Gary L. Byers, both of Whitefish, Mont., assignors to Creative Sales & Mfg. Co., Inc., Whitefish, Mont.
Continuation-in-part of Ser. No. 328,839, Mar. 27, 1989, abandoned. This application Jul. 2, 1990, Ser. No. 547,504
Int. Cl.⁵ B21K *21/16;* G02B *5/08*
U.S. Cl. 29—401.1 3 Claims

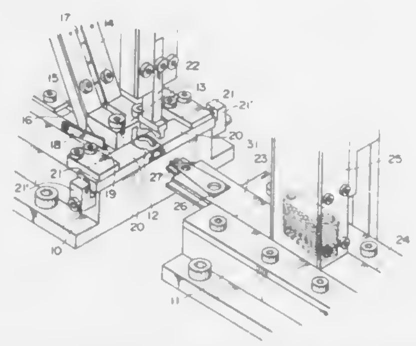
1. A method of preparing a support mechanism of a side mounted rear view mirror assembly for vehicles having a mirror, mirror neck and mirror neck support base, said support base having a retainer cradle assembly and releasable clamp means for holding said mirror neck in said retainer cradle assembly, said retainer cradle assembly also including an inwardly extending ridge means for engaging a coacting groove in said mirror neck, the improvement comprising the steps of:
(a) cutting said mirror neck at a predetermined location thereby creating a stub portion of predetermined length in said support base and a portion which is attached to said mirror,
(b) substituting for said stub portion in said support base a replacement sleeve of predetermined length having an annular groove therein to coact with said ridge means in said cradle assembly, said replacement sleeve having a predetermined portion thereof extending above the top surface of said support base, and
(c) securing a mirror support bar with movable support block means thereon to said replacement sleeve, and further securing that portion of said mirror neck attached to said mirror to said support block.



5,025,544

METHOD OF JOINING SLIDER BODY AND PULL TAB

Masataka Yoneda, Kurobe, and Shunichi Nakamura, Toyama, both of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan
Filed Jul. 30, 1990, Ser. No. 559,208
Claims priority, application Japan, Aug. 11, 1989, 1-208912
Int. Cl.⁵ B21D *53/54*
U.S. Cl. 29—409 4 Claims

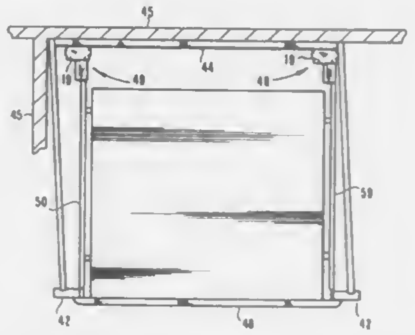


1. A method of joining a slider body having an attachment lug on an upper surface thereof and a pull tab having an attachment portion, the method comprising the steps of:
(a) continuously feeding a series of pull tabs on one end of a horizontal transport path;
(b) continuously feeding a series of slider bodies to another end of the horizontal transport path;
(c) placing a lowermost slider body and a lowermost pull tab into horizontal posture and into opposed relation to each other on the horizontal transport path;
(d) moving the lowermost slider body and the lowermost pull tab towards each other to thus bring the attachment lug of the former and the attachment portion of the latter into registry with each other, the slider body being burred during the moving step (d); and
(e) joining the attachment lug of the slider body and the attachment portion of the pull tab.

5,025,545

METHOD OF ATTACHING AND ADJUSTING A CABINET DRAWER GUIDE ASSEMBLY

James L. Brown, Sellersburg, Ind., assignor to Haas Cabinet Co., Inc., Sellersburg, Ind.
Continuation of Ser. No. 341,700, Apr. 17, 1990, abandoned, which is a division of Ser. No. 222,508, Jul. 21, 1988, abandoned. This application Aug. 21, 1990, Ser. No. 569,771
Int. Cl.⁵ B23P *11/00*
U.S. Cl. 29—434 12 Claims



1. A method for attaching a rear end of a first drawer slide to a mounting surface whereby lateral movement of the rear end of the slide is facilitated, said method comprising the following steps:
a. providing said drawer slide with an end bracket fixed at said rear end;
b. attaching a mounting bracket to the mounting surface, said mounting bracket having a front with means for receiving said end bracket;
c. inserting the end bracket into the receiving means on the front of the mounting bracket;
d. manually moving the first slide laterally at said rear end to align the slide so that a drawer supported by said first slide will move along a desired line of motion, said line of motion being parallel with another slide attached to and supporting the drawer; and
e. resiliently gripping the end bracket in the receiving means on the front of the mounting bracket to stabilize the rear end of the first slide against lateral movement during opening and closing of the drawer after the manually moving step.

5,025,546

METHOD OF JOINING PIPES

Taiji Gotoh; Hidetoshi Yamamoto, and Kiyoshi Yamada, all of Kuwana, Japan, assignors to Mie Hooro Co., Ltd., Mie, Japan
Continuation of Ser. No. 195,118, May 17, 1988, abandoned. This application Jan. 8, 1990, Ser. No. 462,997
Claims priority, application Japan, May 23, 1987, 62-126703; Jan. 26, 1988, 63-15681
Int. Cl.⁵ B21D *39/00*
U.S. Cl. 29—508 12 Claims

1. A method of joining piping materials which comprises: forming a socket at an end portion of one piping material to

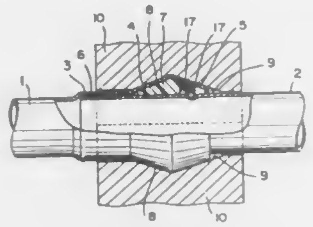
VOL
1127
ISS
4
JE
25
1991
UMI

be joined, said socket comprising a tapered portion which is diametrically enlarged gradually toward the pipe end of said one piping, and a maximum diameter portion extending from said tapered portion with the maximum diameter thereof;

then fitting an intermediary inserting member along an internal peripheral surface of said tapered portion in the socket so as to be in intimate contact therewith and thereafter inserting an end portion of another piping material thereinto;

said step of fitting said intermediary inserting member comprising arranging an annular gasket having a wedge-shaped cross-section so as to be in intimate contact with the internal peripheral surface of the tapered portion; and arranging a C ring in close contact with the internal peripheral surface of said maximum diameter portion of said socket of said one piping material and in close contact with a pipe end side face of said annular gasket, said C ring having a sharp internal rim or edge at a side thereof nearest said annular gasket and a sharp external edge at the pipe end side thereof; and

applying pressure in the radial direction at least to an external peripheral portion of said maximum diameter portion of said socket with two clamping members in a single step, said clamping members having a lateral cross-sectional shape extending in an axial direction of said one and said other piping material, with a center position of said clamping members being the deepest portion and having left and right side tapered, facing planes of clamping action on both sides thereof;



said step of applying pressure comprising first applying pressure to an external portion of said socket by said tapered plane of said clamping members located remote from the pipe end of said one piping, and then applying pressure to said external peripheral portion of said socket by both said left and right side tapered facing planes of said clamping members so as to simultaneously deform said external peripheral surface of said socket at said pipe end side thereof, and also at a portion spaced away from said pipe end thereof;

said step of applying pressure producing squeezing of said external peripheral portion of said socket in a diameter reducing direction to effect plastic deformation of said maximum diameter in the diameter reducing direction, and to compress said C ring to cause said sharp internal and external edges of said C ring to be pressed against an end portion of said another piping material and against said socket, respectively, to improve a pull-out resistance of said piping materials relative to each other.

5,025,547
METHOD OF PROVIDING TEXTURES ON MATERIAL BY ROLLING

Shen Sheu, Murrysville, and Louis G. Hector, Monroeville, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed May 7, 1990, Ser. No. 520,307

Int. Cl.^{5} B23P *25/00*

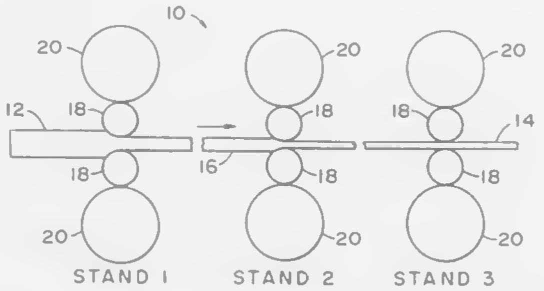
U.S. Cl. 29—527.4 10 Claims

1. A method of rolling metal material in a plurality of rolling stands, with each stand having two or more metal rolls including work rolls, comprising:

a pre-preparation step in which the surfaces of said rolls are polished to a mirror finish,

a direct processing step in which the mirror surfaces are textured with a plurality of non-random spaced apart minute micron size depressions, the spacing f said depressions being less than thirty percent of the length through which the work rolls contact the metal material in the direction of rolling,

a post-preparation step in which material deposited around the depression by the texturing step is removed such that any material remaining about the depressions has an outside slope angle no greater than 25° with respect to the nominal mirror surface of the roll,



coating the textured roll surfaces with a hard, dense material,

providing the roll surfaces with a lubricant,

directing metal material through the plurality of stands, said craters being capable of retaining and carrying lubricant into the bites of all of the rolls of the stands without substantial adherence of the metal material to the roll surfaces, and without substantial generation of wear debris on the surfaces of the rolls and rolled metal material, and

maintaining a compressive force on said metal material between the work rolls to reduce substantially the thickness of the metal material.

5,025,548
RIGHT-ANGLE DRIVE FOR VERTICAL MILLING MACHINE

Scott F. Justesen, 9710 223rd. St. North, Forest Lake, Minn. 55025

Filed Jun. 15, 1990, Ser. No. 538,746

Int. Cl.^{5} B23Q *37/00*

U.S. Cl. 29—560 6 Claims

1. A right-angle drive for a vertical milling machine to enable an operator to perform delicate horizontal boring operations comprising:

a housing for attachment to a vertical milling machine;

a vertical drive shaft located in said housing, said drive shaft including a bevel gear;

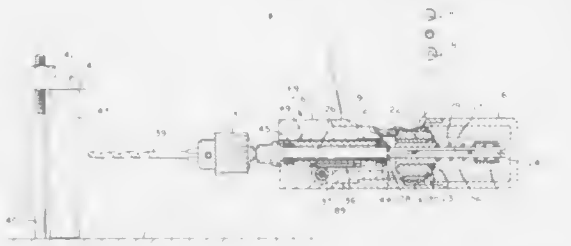
a first annular drive collar rotationally mounted along an horizontal axis in said housing, said first annular drive collar rotatably driven by said bevel gear, said first annular drive collar including an axial slot for engaging a drive key;

a horizontally rotatable drive shaft spindle having, a central axis, a first end, an intermediate portion and a second end, said horizontally rotatable drive shaft spindle including an axial slot;

a second annular drive collar, said second annular drive collar located in axially slideable relationship on said intermediate portion of said drive shaft spindle, said second annular drive collar including a first axial slot and a second axial slot;

a first drive key extending partially into said axial slot on said first annular drive collar and into said first axial slot on said second annular drive collar to thereby cause said first annular drive collar and said second annular drive collar to rotate together;

a non-rotatable horizontally displaceable housing located in said housing, said horizontally rotatable drive shaft spindle rotatably mounted in said non-rotatable horizontally displaceable housing;



a second drive key mounted on said horizontally rotatable drive shaft spindle, said second drive key extending partially into said second axial slot, said second drive key slideably mounted in said second axial slot to permit axial displacement of said horizontally rotatable drive shaft spindle in said second annular drive while rotating said horizontally rotatable drive shaft spindle;

a rack gear mounted on said non-rotatable horizontally displaceable housing;

a pinion gear rotatably mounted in said housing engagement with said rack gear to permit an operator to horizontally move said horizontally rotatable drive shaft spindle; and

a chuck for holding a work tool located on said first end of said horizontally rotatable drive shaft spindle so that an operator can horizontally move said chuck with a work tool to permit him or her to delicately control the horizontal displacement of the chuck with said work tool to prevent breaking of said work tool.

5,025,549
LEAD MAKING MACHINE HAVING IMPROVED WIRE FEEDING SYSTEM

Craig W. Hornung, Harrisburg, and Alden O. Long, Carlisle, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 31, 1990, Ser. No. 576,309

Int. Cl.^{5} H01R *43/052, 43/05*

U.S. Cl. 29—564.4 16 Claims

1. A lead making machine comprising wire feeding means for intermittently feeding wire, during a feeding interval, from an endless source along a horizontal wire feed path which extends through a wire transferring means and thence past a pair of open wire severing blades, the machine having a terminal applicator located beside the feed path proximate to the wire transferring means, the wire transferring means being shiftable between an aligned position and a terminating position, the transferring means extending parallel to the feed path when in its aligned position and being directed towards the terminal applicator when in its terminating position, the wire transferring means being in its aligned position at the beginning of an operating cycle with the leading end of the wire extending from the transferring means whereby upon shifting of the transferring means to its terminating position, a terminal can be attached to the leading end of the wire, and upon subsequent shifting of the transferring means to its aligned position, the wire can be fed during the feeding interval past the severing blades and along the feed path, and upon cutting the fed wire at the end of the feeding interval, an electrical lead is produced having a terminal on its leading end, the machine being characterized in that:

the wire feeding means commences to feed wire while the transferring means is being shifted from its terminating position to its aligned position so that the wire being fed extends beyond the severing blades when the transferring means arrives at its aligned position,

clearance is provided in the vicinity of the severing blades for the wire so that the wire being fed does not encounter the severing blades when the transferring means moves into its aligned position, and

control means are provided for controlling the feeding means, the transferring means, the terminal applicator, and the severing blades, the control means being effective to cause the feeding means to commence feeding wire while the transferring means is being shifted from its terminating position to its aligned position.

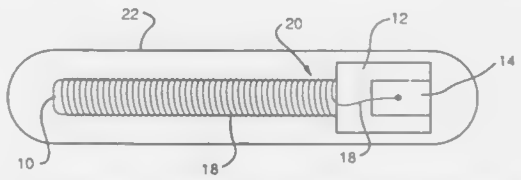
5,025,550
AUTOMATED METHOD FOR THE MANUFACTURE OF SMALL IMPLANTABLE TRANSPONDER DEVICES

Glen L. Zirbes, Silver Lake; Leonard D. Hadden, Minneapolis, both of Minn., and Philip R. Troyk, Morton Grove, Ill., assignors to Trovan Limited, Isle of Man, United Kingdom

Filed May 25, 1990, Ser. No. 530,047

Int. Cl.^{5} H01F *41/02*

U.S. Cl. 29—605 19 Claims



1. An automated method for manufacturing a passive transponder device, comprising the steps of:

attaching an individual identification device, including an individual identification integrated circuit means, to an individual site on a tape leadframe and electrically connecting said circuit means to the leads of said leadframe;

injection molding a protective cap around said device such that a plurality of leads of said leadframe protrude form said cap;

severing said plurality of leads to disassociate the encapsulated identification devices from said leadframe;

attaching one end of an elongated ferrite core to said cap;

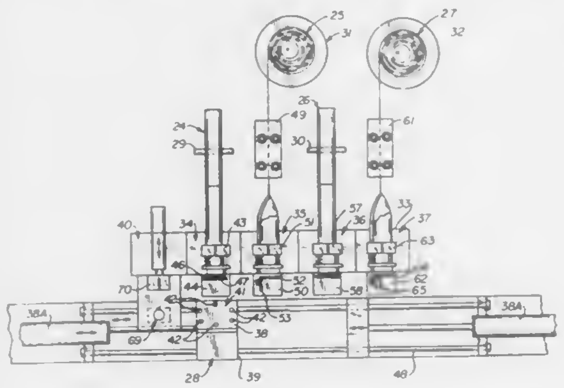
winding a length of wire at high speed around said core to form an inductor; and connecting a first end of said wire to a first of one said plurality of leads and a second end of said wire to a second one of said plurality of leads using a automated connecting means.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,551

METHOD FOR THE ASSEMBLY OF LEAD-ACID BATTERIES AND ASSOCIATED APPARATUS

Michael V. Rose, Pittsburgh, and Daniel E. Smith, Erie, both of Pa., assignors to Sealed Energy Systems, Inc., Pittsburgh, Pa.
Division of Ser. No. 464,104, Jan. 12, 1990, Pat. No. 4,973,335. This application Jul. 2, 1990, Ser. No. 546,927
Int. Cl.^{5} B23P *19/00*
U.S. Cl. 29—730 8 Claims

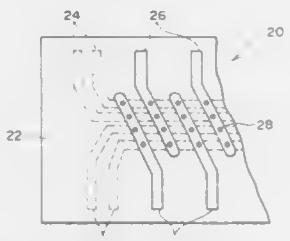


1. Apparatus for making a lead-acid battery comprising,
means for supplying a continuous length of positive plate stock,
means for supplying a continuous length of separate stock,
means for supplying a continuous length of negative plate stock,
means for severing individual separators and plates from said means for providing continuous lengths thereof,
assembly means for sequentially receiving individual separators and plates and establishing an assembly thereof, and
means for inserting the assembly of said separator and plates to a battery cell container.

5,025,552

METHOD OF MANUFACTURING ION CURRENT RECORDING HEAD

Toshihide Yamaoka, Akishima, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan
Filed Oct. 4, 1989, Ser. No. 417,025
Claims priority, application Japan, Oct. 11, 1988, 63-255225
Int. Cl.^{5} H01R *43/00*
U.S. Cl. 29—825 2 Claims

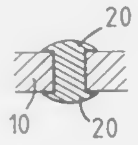


1. A method of manufacturing an ion current recording head having a plurality of small through holes for allowing passage of ions and adapted to control an ion current flowing through the respective small through holes by controlling an electric field in the respective small through holes, comprising the following steps in the sequence of:
forming first and second thin metal films on opposite surfaces of a solid insulating body;
forming a plurality of small holes in said first and second thin metal films so as to oppose each other through said solid insulating body;
radiating an excimer laser beam onto one of said first and second thin metal films to form the small through holes in the solid insulating body which each allow passage therethrough of the ion current; and
patterning said thin metal films.

5,025,553

CIRCUIT BOARD MANUFACTURE

Paul Telco, Hertfordsbire, United Kingdom, assignor to Telco International, Ltd., England
Filed Oct. 2, 1989, Ser. No. 415,718
Claims priority, application United Kingdom, Oct. 6, 1988, 8823537
Int. Cl.^{5} H01K *3/10*
U.S. Cl. 29—852 20 Claims

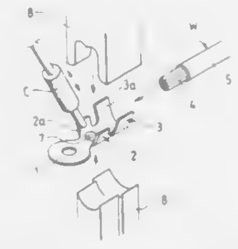


1. A method of interconnecting conductive patterns which are formed on opposite sides of a printed circuit board via a through hole or holes formed in said printed board, said method comprising:
locating in the or each hole a plug comprising a body of fusible material which is coated on its surface with an electrically conductive material thereby forming a layer and having a melting temperature higher than the melting temperature of the fusible material, and
applying solder material to opposite ends of the or each plug so that the solder bridges may gap between the conductive patterns and the conductive layer.

5,025,554

METHOD OF CONNECTING A CRIMP-STYLE TERMINAL TO ELECTRICAL CONDUCTORS OF AN ELECTRICAL WIRE

Hikoo Dohi, Shizuoka, Japan, assignor to Yazalci Corporation, Tokyo, Japan
Continuation of Ser. No. 376,737, Jul. 7, 1989, abandoned. This application Jul. 25, 1990, Ser. No. 559,454
Claims priority, application Japan, Jul. 8, 1988, 63-168963
Int. Cl.^{5} H01R *43/02*
U.S. Cl. 29—860 8 Claims

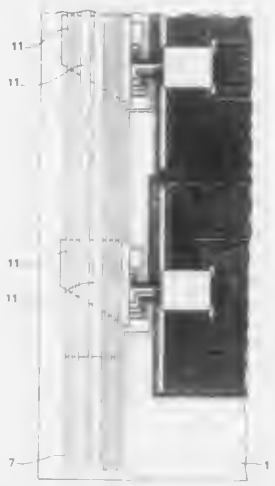


1. A method of connecting a crimp-style terminal to electrical conductors of an electrical wire, said crimp-style terminal being of the type having a conductor-holding portion, said conductor-holding portion comprising a base and a pair of clamp arms extending laterally respectively from opposite sides of said base, comprising the steps of:
applying a solder cream to one or both of the inner surfaces of said conductor-holding portion and the outer surfaces of said conductors;
subsequently deforming said conductor-holding portion by pressing and bending said pair of clamp arms upwardly and further curving said pair of clamp arms inwardly at end portions thereof so as to cause said conductor-holding portion to cover and grip said conductors such that gaps are formed between said conductors, said solder cream filling said gaps; and
subsequently melting and then solidifying said solder cream.

5,025,555

METHOD OF PRODUCING ELECTRIC CIRCUIT PATTERNS

Akira Mase, Atsugi, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan
Division of Ser. No. 303,241, Jan. 30, 1989, Pat. No. 4,934,045. This application Mar. 19, 1990, Ser. No. 495,757
Claims priority, application Japan, Feb. 5, 1988, 63-25911; Feb. 5, 1988, 63-25912; Feb. 5, 1988, 63-25913; Feb. 5, 1988, 63-25914; Feb. 5, 1988, 63-25915; Feb. 5, 1988, 63-25916
The portion of the term of this patent subseqnent to Jun. 19, 2007, has been disclaimed.
Int. Cl.^{5} H05K *3/34, 3/02*
U.S. Cl. 29—840 8 Claims



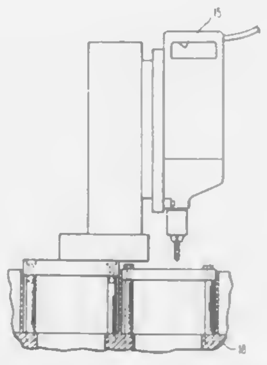
1. A method of producing electric circuit patterns consisting of a plurality of buslines and two or more sets of lead lines, the lead lines of each set being coupled to said buslines respectively, said method comprising;
forming two or more preceding patterns by wet etching, each consisting of the lead lines of one of said sets and fragments of said buslines which have been already coupled, wherein the fragments belonging to each preceding pattern are spaced from those of the adjacent preceding patterns;
coating an insulating film over portions of said preceding patterns of said sets that are located at sites on which said buslines are to be formed;
electrically coupling the fragmented buslines of adjacent preceding patterns by coating compensatory buslines in alignment with the fragmented buslines over said insulating films by screen printing.

5,025,556

ENGINE BLOCK CYLINDER HEAD BOLT HOLE REPAIR

James C. Stafford, Aston, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Jul. 19, 1990, Ser. No. 554,756
Int. Cl.^{5} B23P *6/00*
U.S. Cl. 29—888.011 19 Claims

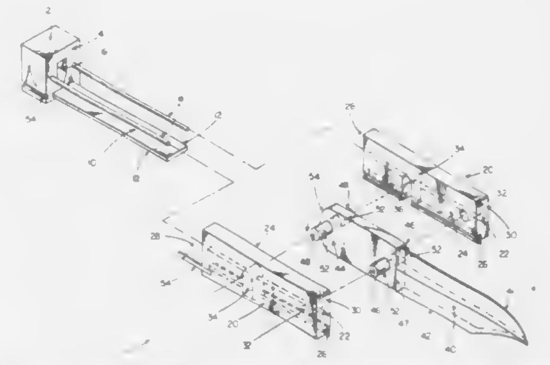
1. A method for repairing a damaged engine block cylinder head bolt and a damaged engine block cylinder head bolt hole in a large engine for powering a large vehicle of said engine requiring high precision tolerances and high precision alignment, said engine having a plurality of engine block cylinders, each cylinder having a plurality of engine block cylinders bolt holes, comprising the steps of:
(a) rigidly fixing drill support means to said engine,
(b) rigidly fixing drill means to said drill support means,
(c) rigidly coupling said drill support means to a further engine block cylinder head bolt hole in the vicinity of said damaged bolt hole, and
(d) drilling said damaged engine block cylinder head bolt hole with high precision tolerances and high precision alignment by means of said rigidly fixed drill while said engine is disposed in said vehicle.



5,025,557

LOCKING FOLDING KNIFE

Daniel C. Perreault, 1924 165th Ct. SE., Bellevue, Wash. 98008
Filed Jan. 18, 1990, Ser. No. 467,200
Int. Cl.^{5} B26B *1/04*
U.S. Cl. 30—151 20 Claims

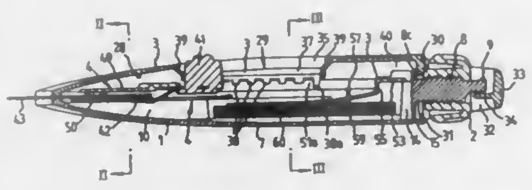


17. A folding knife having an open position and a closed position, the knife having:
a blade having a tang portion and a cutting portion, the tang having two spaced-apart points, a pivot point and a fixing point, said tang portion extending on the opposite side of said pivot point from said cutting portions; and
a handle having rotation means for rotatably engaging the blade at the pivot point, and having locking means for selectably fixing the blade at the fixing point, said handle being easily removable from said blade wherein the handle includes a pair of handle plates positioned on opposite sides of the blade.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,558
UTILITY KNIVES

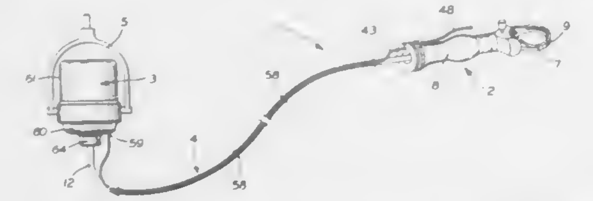
Richard Gilbert, Sheffield, Great Britain, assignor to The Stanley Works Limited, Bracknell, England
PCT No. PCT/GB88/00340, § 371 Date Jan. 8, 1990, § 102(e) Date Jan. 8, 1990, PCT Pub. No. WO88/08773, PCT Pub. Date Nov. 17, 1988
PCT Filed Apr. 29, 1988, Ser. No. 435,379
Claims priority, application United Kingdom, May 8, 1987, 8710982
Int. Cl.⁵ B26B *3/06, 1/00*
U.S. Cl. 30—162 **10 Claims**



1. A utility knife handle comprising:
a pair of elongated part shells which assemble about a longitudinal parting line;
wedge structure at said parting line and at a forward location of said handle;
means operable to cause one of said part shells to move longitudinally relative to the other part shell whereby component parts of said wedge structure move relatively and cause the said part shells to adopt relative transverse movement to grip or release a blade in a position protruding from a forward end of said handle;
an elongated holding frame extending along a rearward location within the handle and cooperating with one of said elongated part shells to define a storage compartment for reserve blade spaced from said forward location of said handle;
a resilient leaf extending from said elongated holding frame into said compartment toward said one elongated part shell to press against and firmly hold reserve blades in said compartment in restrained engagement with said one elongated part shell.

5,025,559
PNEUMATIC CONTROL SYSTEM FOR MEAT TRIMMING KNIFE

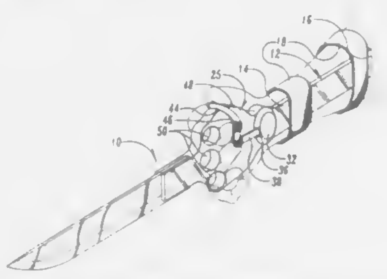
Timothy J. McCullough, Vermilion, Ohio, assignor to Food Industry Equipment International, Inc., Lorain, Ohio
Continuation-in-part of Ser. No. 354,618, May 19, 1989, which is a continuation-in-part of Ser. No. 102,322, Sep. 29, 1987, Pat. No. 4,850,111. This application May 7, 1990, Ser. No. 520,023
The portion of the term of this patent subsequent to Feb. 19, 2008, has been disclaimed.
Int. Cl.⁵ B26B *7/00, 13/26, 19/14*
U.S. Cl. 30—276 **9 Claims**



1. A combination control system and cutting blade including an electrically driven meat trimming knife having a handpiece with the cutting blade rotatably mounted on a front end of said handpiece, a flexible drive cable communicating with the handpiece for driving the cutting blade, and an electric motor located remote from the handpiece for driving said cable to rotate the cutting blade; and clutch means interposed between the electric motor and cutting blade for automatically limiting the amount of torque transmitted from the electric motor to the cutting blade, said clutch means containing a driving member and a driven member engageable therewith, with said driven member communicating with the cutting blade and the driving member communicating with the electric motor, wherein said clutch means automatically limits the torque transmitted between the driving member and the driven member upon a predetermined torque level being reached on the clutch means.

5,025,560
ERGONOMIC KNIFE

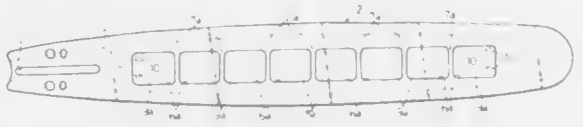
Ray T. Townsend, Des Moines, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa
Filed Oct. 24, 1989, Ser. No. 426,019
Int. Cl.⁵ B26B *3/00, 19/00, 13/00*
U.S. Cl. 30—298 **20 Claims**



1. A hand tool, comprising an elongated rigid support bar having forward and
rearward ends, means on said support bar for securing it to the forearm and
wrist of the wearer, a hand gripping member pivotally secured to the forward end of
said support bar,
locking means on said hand tool to selectively rigidly lock said hand gripping member in a predetermined pivotal position with respect to said support bar.

5,025,561
GUIDE BAR FOR A CHAIN SAW

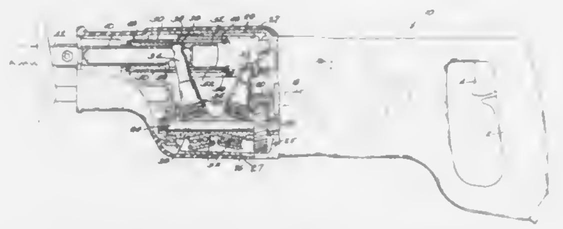
Hideo Sugihara, Takasu, and Kazubito Sugihara, Gifu, both of Japan, assignors to Sugihara Trading Co., Ltd., Gifu, Japan
Filed May 4, 1990, Ser. No. 519,108
Claims priority, application Japan, May 8, 1989, 1-52768[U]; Nov. 1, 1989, 1-128711[U]; Nov. 27, 1989, 1-137819[U]; Jan. 18, 1990, 2-3595[U]
Int. Cl.⁵ B23D *57/02, 59/00*
U.S. Cl. 30—387 **18 Claims**



1. A guide bar for a chain saw comprising:
an elongated main body having first and second sides;
a plurality of spaced apart first recesses formed in a central portion of the first side of the main body thereby forming a plurality of spaced apart first reinforcing supports in the central portion of said first side of the main body, each reinforcing support having a tapered hole extending therethrough;
a plurality of spaced apart second recesses formed in a central portion of the second side of the main body thereby forming a plurality of spaced apart second reinforcing supports in the central portion of said second side of the main body, each second reinforcing support having a tapered hole extending therethrough, said first and second reinforcing supports being staggered with respect to each other such that each reinforcing support is positioned opposite a recess formed in the opposing side of the main body and said first and second recesses overlap on opposing ends of said reinforcing supports to form a plurality of openings extending entirely through said main body;
an injection molded resin based filling material that fills said first and second recesses; and
securing means passing through each said tapered hole to secure the filling material in an opposing recess to the guide bar.

5,025,562
COUNTERBALANCED RECIPROCATING MECHANISM

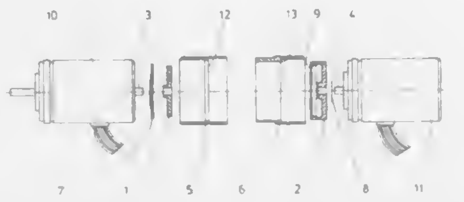
Bernhard Palm, Brookfield, Wis., assignor to Milwaukee Electric Tool Corporation, Brookfield, Wis.
Continuation-in-part of Ser. No. 487,219, Mar. 1, 1990, abandoned. This application Jun. 20, 1990, Ser. No. 541,093
Int. Cl.⁵ B23D *49/04, 49/02;* **F16H** *23/00*
U.S. Cl. 30—392 **19 Claims**



1. A reciprocating drive mechanism comprising,
a housing,
a jackshaft rotatably mounted in said housing,
means rotating said jackshaft,
a spindle mounted in said housing for reciprocating motion,
a counterweight mounted in said housing for reciprocating motion parallel to said spindle,
primary and secondary wobble plates mounted on said jackshaft and connected to said spindle and said counterweight respectively,
said wobble plates being at an angle with respect to each other to reciprocate said spindle and said counterweight in opposite directions.

5,025,563
MULTITURN ABSOLUTE ENCODER

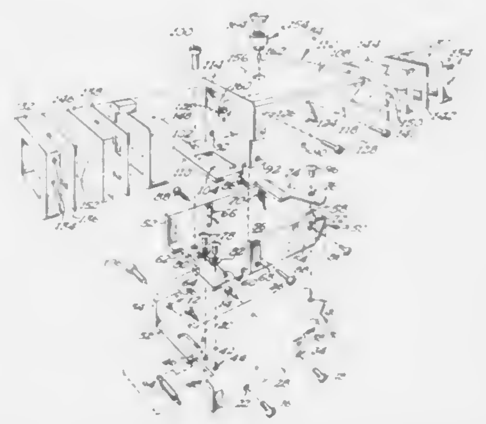
Gustav Rennerfelt, Nilstorpsvägen 53, Lidingö , Sweden S-181 47
PCT No. PCT/SE88/00153, § 371 Date Sep. 29, 1989, § 102(e) Date Sep. 29, 1989, PCT Pub. No. WO88/07655, PCT Pub. Date Oct. 6, 1988
PCT Filed Mar. 28, 1988, Ser. No. 411,514
Claims priority, application Sweden, Apr. 1, 1987, 8701362
Int. Cl.⁵ G01B *7/30*
U.S. Cl. 33—1 N **20 Claims**



1. Angle transducer unit of the multiturn type for absolute measurement of the angular position of a rotatable shaft, including a first angle transducer of the absolute angular measurement type, with a drive shaft, which is nonrotatably mounted on the rotatable shaft, said first angle transducer including a first housing, a second angle transducer of the absolute angular measurement type, with a driven shaft, said second angle transducer including a second housing, and gear wheels respectively mounted on the drive and driven shafts, said gear wheels being in mesh with each other to form a gear for up or down gearing of the drive shaft rotational rate, both angle transducers being intended for convention connection to an apparatus for measuring the differential angular position of the drive and driven shafts characterized in that said gear wheels are respectively an internally toothed gear wheel and an externally toothed gear wheel, the latter
- (a) rolling against the internally toothed gear wheel,
- (b) having a number of teeth which is only some few teeth less than the number of teeth on the internally toothed gear wheel, and
- (c) being mounted on one of said drive or driven shaft, the internally toothed gear wheel being mounted on the other of said drive or driven shaft, and in that eccentric means is provided in the form of a bore provided in said first housing and a corresponding cylindrical surface provided on said second housing, said first housing being attached to said second housing such that said cylindrical surface is fitted into said bore for permitting the assembly of the shafts eccentrically in relation to each other.

5,025,564
SIGHT VIEWING APPARATUS

Ronald J. Sanders, P.O. Box 658, Floodwood, Minn. 55736
Continuation-in-part of Ser. No. 176.617, Apr. 1, 1988, Pat. No. 4,920,654, which is a division of Ser. No. 917,799, Oct. 9, 1986, Pat. No. 4,734,989, which is a continuation-in-part of Ser. No. 855,959, Apr. 25, 1986, Pat. No. 4,734,990. This application May 16, 1989, Ser. No. 352,551
Int. Cl.⁵ F41G *1/32*
U.S. Cl. 33—241 **20 Claims**



1. Sighting device comprising, in combination: a front lens; a rear lens; means for securing the front lens and the rear lens in a spaced apart relation; a housing having a front opening and a rear opening, with the front lens positioned adjacent the front opening of the housing and with the rear lens positioned adjacent the rear opening of the housing; with the securing means comprising, in combination: a lens spacer for receipt in the housing intermediate the front and rear openings, with the front lens located within the housing and abutting with the lens spacer, with the front lens and the rear lens located on opposite sides of the lens spacer; and a first lens holder held in the housing adjacent the front opening for abutting with the front lens opposite to the lens spacer; a first design marked on the front lens; and a second design marked on the rear lens, with the first design appearing to be centered on the second design when viewing along a sighting line through the front lens and the rear lens on a level plane.

VOL
1127
ISS
4
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25
1991
UMI

5,025,565

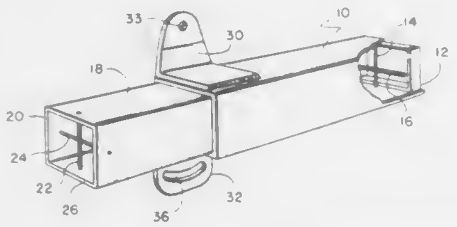
RANGE FINDING BOW SIGHT

C. Lee Stenerson, R.R. #1, Box 49, DeSota, Wis. 54624, and Michael L. Stenerson, both of R.R. #1, Box 257, Ontario, Wis. 54651

Filed Nov. 8, 1989, Ser. No. 433,126

Int. Cl.^{5} F41G *1/00*

U.S. Cl. 33—265 **9 Claims**



1. A sight for use with an archery bow to assist the user in properly aiming the bow at a target, said sight comprising: a first tubular sight member defining a first sight window through which the target is viewed, a first horizontal cross hair and a first vertical cross hair fixed relative to the first sight window, a second tubular sight member defining a second sight window through which the target is viewed, a second horizontal cross hair and a second vertical cross hair fixed relative to the second sight window, the first and second sight members being telescoped one into the other and slidable relative to each other, means for maintaining the sight members in a selected relative position, means for mounting the first and second sight members on the bow so that the first and second sight windows are in general alignment between the user's line of sight and the target, the first and second vertical cross hairs being aligned by the user when the bow is properly aimed at the target, and means for varying the distance between the first and second sight windows.

5,025,566

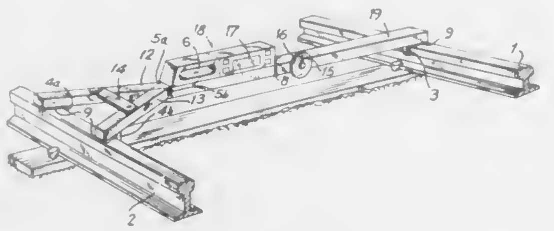
ELECTRONIC GAGE AND LEVELMETER

René A. Fiechter, 137 Hollywood Ave., Douglaston, N.Y. 11363

Filed Mar. 9, 1990, Ser. No. 491,278

Int. Cl.^{5} G01B *5/14;* **G01C** *9/06*

U.S. Cl. 33—338 **1 Claim**



1 A portable measuring device including in combination; four substantially equal arms, one comprising a central portion including a carrying handle, a second arm hinged to open coaxially with said central portion;

a third and fourth arms hinged to open oppositely to said second arm and to form a V with its apex at the central portion, and including an electronic level means mounted on one of said arms and a mechanically coupled gage indicator mounted on one of said arms, wherein when extended said arms are capable of spanning across a railroad track for indicating the level and gage of said track.

5,025,567

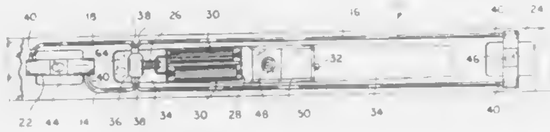
ILLUMINATED SPIRIT LEVEL USING FIBER OPTIC DEVICES

Robert E. McWilliams, 3421 Echo Dr., Springfield, Ohio 45502, and Robert L. Karg, 4190 Wolford Rd., Xenia, Ohio 45385

Filed Jun. 6, 1989, Ser. No. 364,090

Int. Cl.^{5} G01C *9/32*

U.S. Cl. 33—348.2 **6 Claims**



1. A spirit level containing at least one transparent level vial of approximate cylindrical shape and providing electrical illumination therefor,

said spirit level comprising an elongated frame,

said frame defined by two parallel working surfaces and providing at least one aperture passing through said frame, said aperture forming a storage enclosure in conjunction with two removable covers, one cover placed over each open side of said at least one aperture, said covers detachably engage with said aperture,

an electrical illumination means comprising one or more electrical batteries, a single light source having a radiating end and a contact end, and switching means,

fiber optic light transmission cables having light reception ends and light emission ends, and providing light transmission from said electrical illumination means to each end of each said transparent vial,

said light reception ends of said fiber optic cables and said radiating end of said light source contained within a chamber, said contact end of said light source being external to said chamber,

said chamber having a highly reflective interior surface, and

said light emission ends of said fiber optic cables formed to closely cooperate with and directly contact the surface of said at least one transparent level vial adjacent to each end of said at least one vial.

5,025,568

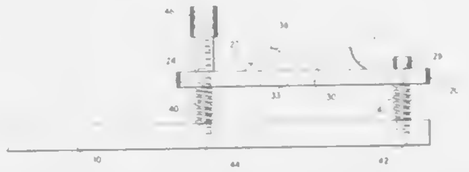
PHOTOGRAPHIC ENLARGER ALIGNMENT TOOL AND METHOD FOR ALIGNING A PHOTOGRAPHIC ENLARGER

Steven K. Grimes, Wrentham, Mass., assignor to E. Philip Levine, Inc., Boston, Mass.

Filed Jul. 17, 1989, Ser. No. 380,386

Int. Cl.^{5} G01C *9/28, 9/36*

U.S. Cl. 33—371 **17 Claims**



1. A tool adapted for use in aligning a photographic enlarger having a baseboard and a negative carrier comprising:

an essentially flat, elongated base plate formed from aluminum, steel or other suitable material said base plate being sufficiently lightweight and properly balanced to minimize alignment error between the baseboard and the negative carrier;

an approximately triangular level housing, also formed of aluminum, steel or other suitable material said level housing being sufficiently lightweight and properly balanced to minimize alignment error between the baseboard and the negative carrier;

two spring-loaded adjusting screws and a spring-loaded anchor screw movably joining the level housing to the base plate adjacent thereto at a point where the level housing is accessible to manipulation when the tool is in use and whereby the baseboard and the negative carrier of the photographic enlarger are able to be aligned in two axes simultaneously; and,

a circular level, situated within the level housing, including a vapor bubble sealed within a suitable liquid and visible through a slightly convex view window having an appropriately marked centering circle approximately the same size as, or slightly larger than, the vapor bubble.

5,025,569

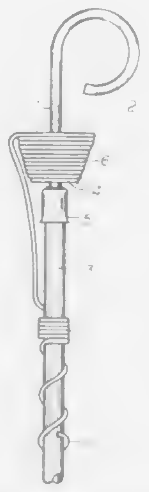
DIP STICK GUIDE, COMBINATION DIP STICK AND DIP STICK HOLDER

Russell R. Lalevee, Sr., P.O. Box 338, Chatham, Mass. 02633

Filed Jul. 24, 1990, Ser. No. 557,669

Int. Cl.^{5} G01F *23/04*

U.S. Cl. 33—726 **13 Claims**



1. A dip stick guide apparatus for use with a dip stick measuring device adapted to measure fluid levels in a fluid reservoir comprising:

a) a dip stick means to measure fluid levels in the fluid reservoir comprising a stick and having a one and other end and a handle attached to the one end;

b) an elongated hollow tube means for enclosing the dip stick means and for positioning the dip stick means in relation to the fluid reservoir, the tube means having a one and other end the one end connected to the fluid reservoir and the other end having an orifice;

c) a cap means to enclose the orifice and to prevent escape of vapor laden with droplets of fluid from the fluid reservoir;

d) a guide means for controlled entry of the dip stick into the tube means constructed of resilient wire comprising:

i) a continuous coil wire having a plurality of concentric coils of increasing diameter having a one end and an other end characterized by a narrow opening at the one end and an open layered funnel shaped opening having coils sequentially larger in diameter and forming a funnel to provide controlled entry of the dip stick;

ii) a center coil;

iii) a tilt wire connected to the upper funnel and to the center coil supporting the guide operations and maintaining the tilt wire in vertical alignment with the tube means;

iv) a bottom locking helix means to attach the guide means to the tube means adjacent the other end.

5,025,570

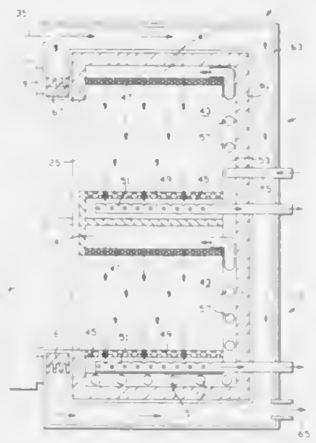
MODULAR CONVECTIVE OVEN WITH ANTI-CONTAMINATION FEATURES

William A. Moffat, 4436 Adragna Ct., San Jose, Calif. 95136

Filed Oct. 19, 1990, Ser. No. 600,530

Int. Cl.^{5} F26B *21/06*

U.S. Cl. 34—72 **2 Claims**



1. A convection oven with particle removal apparatus comprising,

a walled enclosure having a first plenum, a central cavity and a second plenum, the first plenum separated from the central cavity by a multi-orifice particle filter, the second plenum separated from the central cavity by a multi-orifice means for removing particles impinging on said means, said multi-orifice means for removing particles being a structure having a plurality of channels with open ends facing said central cavity, said channels having a diameter in the range of 50 to 150 microns,

a first gas conduit communicating heated gas from outside said walled enclosure into said first plenum at a first pressure,

a second gas conduit communicating heated gas from said second plenum to a region outside said walled enclosure at a second pressure, the second pressure lower than the first pressure, and

heat sink means in thermal transfer relation with said walled enclosure for removing heat therefrom.

5,025,571

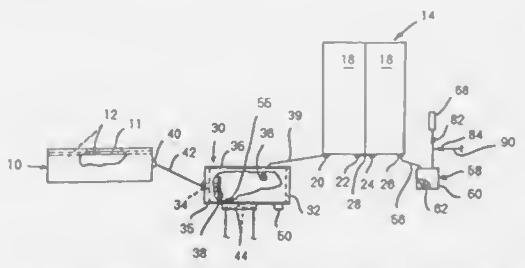
VACUUM PUMP WITH HEATED VAPOR PRE-TRAP

Yury Zlobinsky, Massapequa, and Donald A. Mattes, Huntington, both of N.Y., assignors to Savant Instruments, Inc., Farmingdale, N.Y.

Filed Apr. 25, 1990, Ser. No. 514,120

Int. Cl.^{5} F26B *21/06*

U.S. Cl. 34—72 **12 Claims**



1. Vacuum pump unit for use in evacuating a drying space wherein aqueous and like solvents-containing specimens are vacuum dried, there being removed from said drying space incident the vacuum drying operation, a gas products flow in

VOL
1127
ISS
4
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25
1991
UMI

which liquid and condensable vapor form solvent is entrained, said pump unit comprising

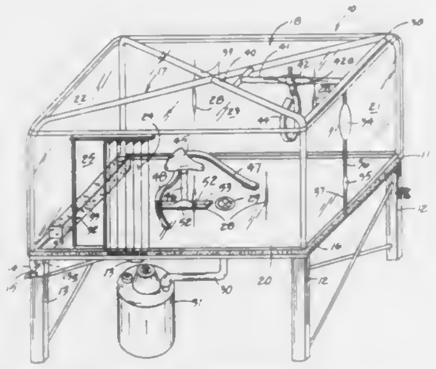
a diaphragm pump having an inlet thereto and an outlet therefrom,

means enclosing a space constituting a pre-trap chamber, said pre-trap chamber having an inlet thereto and an outlet therefrom, said pre-trap chamber inlet being communicatively connected with an outlet of said drying space, the outlet of said pre-trap chamber being communicatively connected with said pump inlet, the pre-trap chamber being positioned below said pump inlet to an extent that a height of predetermined distance exists between said pre-trap chamber outlet and said pump inlet, said pump drawing gas products including entrained liquid and vapor forms of solvent from said drying space at below atmospheric pressure and into said pre-trap chamber.

the outlet of said pre-trap chamber being sufficiently distant from the pre-trap chamber inlet that upon gas products flow entry to said pre-trap chamber and before such flow can access the pre-trap chamber outlet, liquid form solvent gravity separates from the gas products flow and collects at the bottom of said pre-trap chamber, the gas products flow and any solvent vapor therein thereafter being drawn outwardly from the pre-trap chamber through its outlet and into the pump, said pump increasing the pressure of said gas products flow so that upon discharge thereof the pump, pressure at the pump outlet is at or above atmospheric pressure value, and

heating means for maintaining said pre-trap chamber at a predetermined temperature sufficient to evaporate solvent collecting in said pre-trap chamber whereby it can pass from the pre-trap chamber into the pump in that form and thence be discharged by said pump to the outside atmosphere.

5,025,572
PET DRYER APPARATUS
Ann Cordier, 14A Parkwood Dr., South Amboy, N.J. 08879
Filed May 7, 1990, Ser. No. 519,814
Int. Cl.⁵ F26B *19/00*
U.S. Cl. 34—202 9 Claims



1. A pet dryer apparatus comprising,

a rigid planar platform, the platform including a plurality of front legs fixedly and orthogonally mounted to a bottom surface of the platform adjacent a forward end thereof,

and

a plurality of rear legs adjustably mounted to the platform at a rear end portion of the platform spaced from the front legs,

and

a rigid framework extending above the platform,

and

a transparent cover sheet surroundingly overlying the framework, the cover sheet including a continuous lower cover sheet edge, the lower cover sheet edge including a cover sheet hook and loop fastener surface coextensive with the lower cover sheet edge,

and

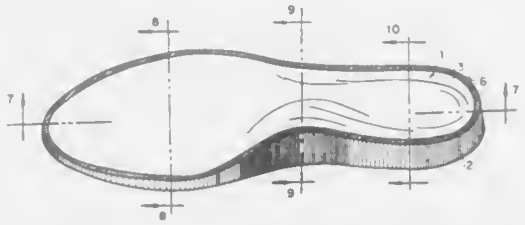
the platform including a surrounding end edge, the surrounding end edge including a surrounding hook and loop fastener surface cooperative with the lower terminal edge hook and loop fastener surface to secure the transparent sheet to the platform,

and

the transparent cover sheet including a front panel spaced from a rear panel, a right side panel, a left side panel, and a roof panel, the front panel including an upper opening defined by a first diameter directed through the front panel to receive an animal's head therethrough, and

wherein the upper opening is defined by a first diameter and the front panel includes a lower opening underlying and aligned with the upper opening wherein the the lower opening is defined by a second diameter less than that of the first diameter, and a medial slit is defined between the upper opening and lower opening through the front panel, the medial slit including opposed medial slit hook and loop fastener members to secure the medial slit selectively together, and a lower slit directed from the lower opening downwardly through the lower terminal edge of the transparent sheet wherein the lower slit includes a lower slit hook and loop fastener surface portion to permit selective securement of the lower slit together.

5,025,573
MULTI-DENSITY SHOE SOLE
Erik O. Giese, and Roger J. Brown, both of Aspen, Colo., assignors to Comfort Products, Inc., Aspen, Colo.
Filed Jun. 4, 1986, Ser. No. 871,017
Int. Cl.⁵ A43B *13/14, 13/12*
U.S. Cl. 36—30 R 40 Claims



1. A composite shoe bottom having a toe area, arch area and heel area comprising:

a) a lower shaped layer of predetermined hardness capable of maintaining its shape against the wearer's weight and having an increased height around the periphery of the heel area and in the arch area to form an irregular contoured upper stabilizing surface for the wearer's foot; and

b) an upper cushioning layer, softer than said lower layer, superposed in face-to-face relation upon said upper surface of the lower layer, said upper layer having a varying thickness to define an uppermost surface which is shaped to a contour complementary to the bottom surface of the wearer's foot; wherein the toe area is positioned beneath a wearer's toes and is provided with a transverse cross-section and further wherein the thickness of said lower layer decreases from a central portion to outer periphery thereof.

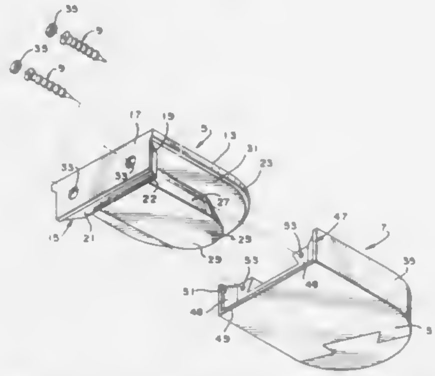
5,025,574
REPLACEABLE SHOE HEEL ASSEMBLY
William W. Lasher, III, 2097 Dogwood Dr., Westfield, N.J. 07090
Filed Oct. 24, 1989, Ser. No. 425,916
Int. Cl.⁵ A43B *21/36*
U.S. Cl. 36—42 9 Claims

1. A replaceable shoe heel assembly comprising:

a) a top portion for permanent attachment to a shoe and a tread portion detachably engageable with the top portion;

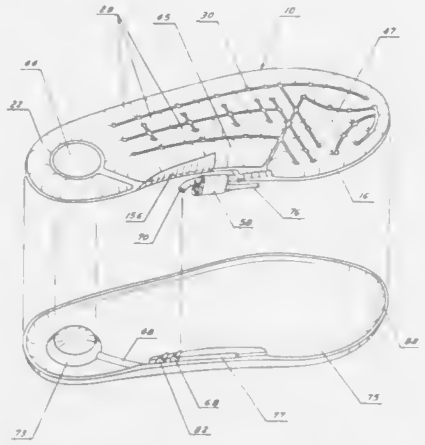
b) the top portion including a front and a rear, a mounting block extending transversely across the front defining a rear face, and a dovetail-shaped retaining tongue extending from the mounting block towards the rear, the width of the retaining tongue being less than that of the mounting block;

c) the tread portion including a front and a rear, a dovetail-shaped recess extending longitudinally from the front towards the rear for engagement by the retaining tongue, and a transverse recess extending transversely across the front for engagement by the block the recess having a front face; and



d) means for securing the top and tread portions together with the tongue is engaged within the dovetail recess and the mounting block is engaged within the transverse recess such that the rear face of the mounting block is adjacent to the front face of the recess.

5,025,575
INFLATABLE SOLE LINING FOR SHOES AND BOOTS
Nikola Lakic, 45-191 Elm St., Indio, Calif. 92201
Continuation-in-part of Ser. No. 323,340, Mar. 14, 1989, and a continuation-in-part of Ser. No. 262,749, Oct. 29, 1988. This application Oct. 27, 1989, Ser. No. 427,515
Int. Cl.⁵ A43B *13/41, 13/38*
U.S. Cl. 36—44 25 Claims



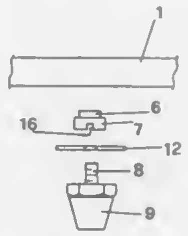
1. The combination of an inflatable sole lining having a sealed interior and a supporting underlayment for footwear which comprises:

a. a laminate of first and second sheets of plastic having the size and shape of the sole of said shoe and bonded together by a first peripheral seam about their peripheral edges to form said sealed interior and having a plurality of interconnected air flow passageways within said sealed interior and defined by tubular means extending across the surface of the sole lining and forming air channels on the top and under surfaces of said lining; and

b. inflation means comprising:
  (1) a flexible and resilient bulb;
  (2) an inlet port opening into said bulb;
  (3) a discharge port communicating from said bulb to said sealed interior of said sole lining;
  (4) a pair of check valves with one each of said check valves being positioned in a respective one of said inlet and discharge ports in opposite flow directions, whereby said bulb functions as a pump, to increase the pressure of air within said sealed interior; and
  (5) pressure control means having a manually adjustable valve to control and maintain a desired inflation pressure within said sealed interior; and

c. substantially flat support sheet beneath and coextensive with said laminate.

5,025,576
SOLE FOR SPORTS SHOES
Vittorio Biasiotto, and Leonildo Masiero, both of Vicenza, Italy, assignors to Biasiotto Contrafforti Di Biasiotto Vittorio & C.s.a.s., Vicenza, Italy
Filed Jul. 27, 1989, Ser. No. 387,015
Claims priority, application Italy, Jan. 10, 1989, 85502 A/89; Feb. 2, 1989, 85515 A/89
Int. Cl.⁵ A43B *5/00;* **A43C** *15/00*
U.S. Cl. 36—134 7 Claims



1. A sole assembly for sports shoes comprising at least one accessory element (9) releasably mountable on said sole, said accessory element (9) having a threaded portion, said sole has at least one cavity, at least one body (14) is inserted within said cavity, one recess (2) is formed in said body, said recess communicating towards the exterior by means of a slit (4) formed in said body, said slit having a first dimension greater than a second dimension, a tongue (6) insertable in said slit, said tongue having a dimension greater than the second dimension, said recess having interior walls (5) corresponding to the first greater dimension of the tongue in the shape of circular segments, the first greater dimension of said tongue being equal to the diameter of said circular segments, said tongue having an internal threaded bushing (7), said threaded portion of the accessory element engaging with said threaded bushing when said tongue is inserted in said slit and when said tongue is rotated to be in a position transversal with respect to the first greater dimension of the slit and means (15) located on said interior walls of said recess laterally with respect to said slit for blocking the tongue in said position.

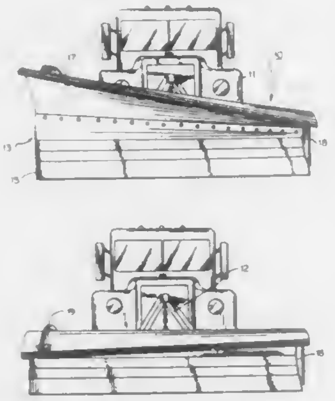
5,025,577
ADJUSTABLE ONE-WAY TRIP EDGE SNOW PLOW
Jan H. Verseef, Clayton, N.Y., assignor to Frink America, Inc., Clayton, N.Y.
Filed Aug. 3, 1989, Ser. No. 389,343
The portion of the term of this patent subsequent to Jun. 13, 2006, has been disclaimed.
Int. Cl.⁵ E01H *5/06*
U.S. Cl. 37—280 6 Claims

1. A moldboard assembly for a single discharge plow that includes,

a frame means attachable to a prime mover,

VOL
1127
ISS
4
JE
25
1991
UMI

- an elongated scraper blade unit attached to the frame means,
- a rectangular shaped plastic moldboard secured along its bottom edge to the scraper blade unit,
- means for securing one side edge of the moldboard in a fixed position to said frame means,
- an arcuate shaped adjusting arm connected at one end by a universal joint means to the top corner of the moldboard adjacent the other side edge thereof,



- bracket means movably mounted in the frame means for rotation about a vertical axis,
- hinge means for connecting the opposite end of the arm to the bracket means for rotation about a horizontal axis, and
- drive means for selectively rotating said arm about said horizontal axis to roll the moldboard into a desired scroll-like configuration to control the flow of material passing through the moldboard.

5,025,578

ROUGHENED SMOOTHING IRON SOLEPLATE HAVING AN ANTI-CORROSIVE, SCRATCH-RESISTANT AND EASILY SLIDABLE COATING THEREON

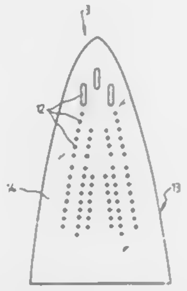
Ahmet Firatli, Wiesbaden, Fed. Rep. of Germany; Diethard Burger, Barcelona, Spain; Klaus Amsel, Oberursel, and Bernd Lindstaedt, Dietzenbach, both of Fed. Rep. of Germany, assignors to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany

Filed Aug. 18, 1989, Ser. No. 395,964

Claims priority, application Fed. Rep. of Germany, Aug. 25, 1988, 3828818; Jun. 9, 1989, 3918824

Int. Cl.^{5} D06F *75/38*

U.S. Cl. 38—93 6 Claims



1. A smoothing iron soleplate with a die-cast aluminum alloy soleplate body portion, the ironing side of said soleplate body portion having a surface with a roughness average value in the range of about two to ten micrometers and a thermally sprayed anticorrosive coating of metal, different from and harder than said aluminum alloy in direct and intimate contact with said roughened ironing side surface of said soleplate body portion, the surface of said coating being scratch resistant, capable of sliding easily and also easy to clean, said coating surface having an average roughness value in the range of 0.05 to two micrometers.

5,025,579

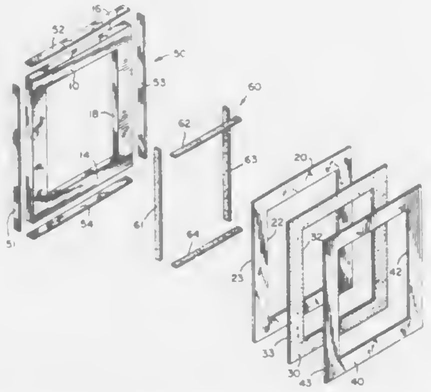
PICTURE FRAME

Barry D. Krueger, 240 E. Johnson St., Fond du Laca, Wis. 54935

Filed May 7, 1990, Ser. No. 520,045

Int. Cl.^{5} A47G *01/06*

U.S. Cl. 40—452 6 Claims



1. A picture frame comprising:
a. a base having a back surface, a front surface, an outer perimeter and an inner wall, the inner wall defining the boundary of the picture to be framed;
b. a first mat component of solid core plastic laminate material substantially conforming to the shape of the front surface of the base and mounted thereon;
c. at least one additional mat component of solid core plastic laminate material substantially conforming to the shape of the first mat member and mounted thereon;
d. an outer border component of solid core plastic laminate material, substantially conforming to the outer perimeter of the base and mounted thereon; and
e. an inner border component of solid core plastic laminate material, substantially conforming to the inner wall of the base and mounted thereon wherein all exposed edges of each of the various components are of the same material and color as the surface of the respective component.

5,025,580

THREE-DIMENSIONAL CARDS

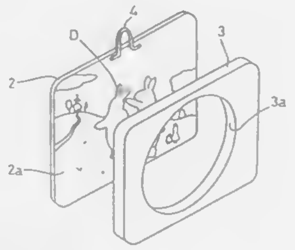
Haruo Asai, Minoo, Japan, assignor to Shobundo Insatsu Kabushiki Kaisha, Osaka, Japan

Filed Dec. 4, 1989, Ser. No. 444,910

Claims priority, application Japan, Mar. 29, 1989, 1-36982[U]

Int. Cl.^{5} G09F *1/12*

U.S. Cl. 40—152.1 14 Claims



1. A card comprising:
- a card body bearing a design on one side thereof, and a configured member attached to said one side of said card body, said configured member being configured in a motif pattern associated with said design, and said card body having another side bearing indicia;
- a frame composed of a plate having a thickness which is at least twice that of said card body and having a window-like opening in a central region of said frame, said window-like opening being larger than said design;
- a hanging cord having a loop portion and two ends extending outwardly from said loop portion, said hanging cord being arranged in a generally Ω-shaped configuration; and
- said frame having a first surface and a second surface which is opposite said first surface, said first surface being integrally bonded to said one side of said card body with said two ends of said hanging cord being sandwiched between said frame and said card body such that said loop portion of said hanging cord projects beyond said frame, and said configured member being recessed with respect to said second surface of said frame.

5,025,581

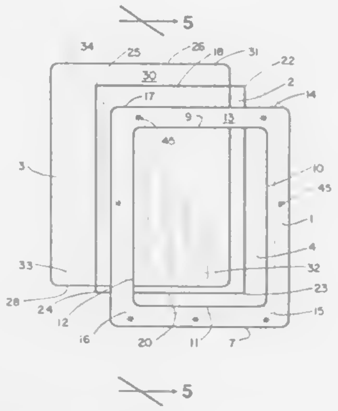
DISPLAY HOLDER

Ellen C. Polzin, 1216 N. Cross St., Wheaton, Ill. 60187

Filed Sep. 11, 1989, Ser. No. 405,729

Int. Cl.^{5} G09F *1/10*

U.S. Cl. 40—159 5 Claims



1. An item display holder which comprises:
- a base ply formed of a flexible paper-like material and having a top side and an underside;
- an upper ply formed of a flexible paper-like material and having a pair of opposed sides overlying the top side of said base ply;
- said upper ply comprising a frame defining a cut-out interior area for enabling viewing of the item to be displayed;
- means adhering said opposed sides of said upper ply to said top side of said base ply whereby a slot is formed between said opposed sides for insertion of the item to be displayed and for enabling said item to be located in said cut-out area overlying said base ply;
- a transparent ply interposed between said upper ply and said base ply and located within said cut-out interior area;
- means adhering said upper ply to said transparent ply enabling an item located in said cut-out area to underlie said transparent ply;
- an adhesive coating formed of an impermanent adhesive material affixed to the underside of said base ply for temporarily attaching said display holder to a surface and for removing and reattaching said holder to a surface; and
- a removable layer of material covering said adhesive coating.

5,025,582

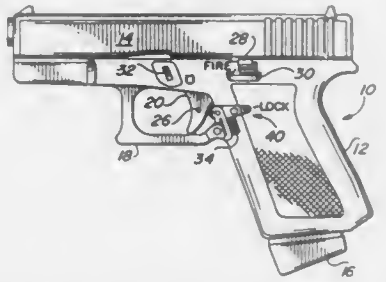
EXTERNAL SAFETY FOR HANDGUN

Charles R. Mote, Sr., 1751 N. Camino Altar, Tucson, Ariz. 85743

Filed Aug. 20, 1990, Ser. No. 569,299

Int. Cl.^{5} F41A *17/54*

U.S. Cl. 42—70.06 15 Claims



1. On a handgun having a frame, the frame consisting of a handle and trigger guard, the trigger guard attached at one point to the handle, the trigger guard defining in part a trigger opening, a trigger situated interiorly to the trigger opening, the trigger adapted to be moved rearward towards the rear portion of the trigger opening to fire the handgun, an external safety for the handgun comprising:
- a trigger block operably situated behind the trigger of the handgun:
- a pair of levers operably attached to said trigger block; and
- a pair of brackets operably attached to said pair of levers and to the handgun frame whereby either one of said pair of levers may be operated for operation of the external safety.

5,025,583

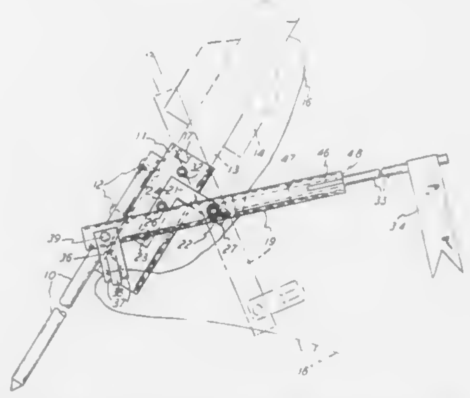
FISHING ROD HOLDER AND SIGNAL ASSEMBLY

Donald J. Langley, 30222 Sumac Dr., Burlington, Wis. 53105

Filed Aug. 17, 1990, Ser. No. 568,758

Int. Cl.^{5} A01K *85/01*

U.S. Cl. 43—17 23 Claims



1. The fishing rod holder and signal assembly, comprising a standard capable of being uprightly supported, a fishing rod holder attached to the upper end of said standard and being arranged for removably receiving and supporting a fishing rod, signal means pivotally included in said assembly and having a fixed pivot axis intermediate along said signal means for pivot of said signal means about said pivot axis in both directions of pivot, stop means included in said assembly and being in both paths of pivot of said signal means which pivots against said stop means for establishing a first limit pivot position of said signal means with one end of said signal means lower than the end opposite said one end and for also establishing a second limit pivot position of said signal means with said other end

VOL
1127
ISS
4
JE
25
1991
UMI

higher than said one end, a fish line releasable retainer on said one end of said signal means for retaining a fish line against the weight of the fish line and being arranged to respond to a fish-pull on the fish line to pivot said signal means to said second limit pivot position and to then subsequently release the fish line in response to said signal means pivoting against said stop means in said second limit pivot position, a signal included in said signal means at said other end thereof, the weight of said signal means with said signal being greater at said other end than the weight of said one end to thereby have said signal means with said signal overbalanced in both limit pivot positions to alternately retain said signal in said lower and said higher positions respectively before and after said signal means is pivoted to said limit pivot positions against stop means, said signal means includes a tube pivotally mounted on said rod holder, and with said tube presenting said signal means one end and said signal means opposite end, and said stop means being mounted on said rod holder and extending into the pivot path of said tube at said first limit pivot position and at said second limit pivot position of said tube.

5,025,584
FISHING ROD HOLDER

Gerry A. Butterwick, Sr., 200 W. Northrup, Lansing, Mich. 48911
Filed Jun. 11, 1990, Ser. No. 536,325
Int. Cl.⁵ A01K *97/10*

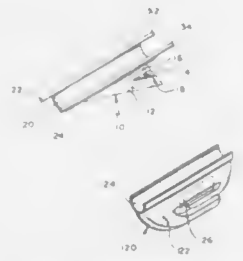
U.S. Cl. 43—21.2 15 Claims

1. A holder device adapted for use with a rod for ice fishing which comprises:
- (a) a base means having opposed ends adapted to be positioned along and in spaced relationship to a surface for supporting the holder device;
- (b) support means having opposed ends pivotably mounted on each of the ends of the base means and intermediate to the opposed ends of the support means, for arcuate movement between an upright position and a folded position adjacent to the base means and wherein the support means are provided with legs at one of the ends of each of the support means for supporting the holder device on the surface and wherein each of the support means are provided with holder means for holding the ice fishing rod in position on the support means at opposite the ends of the support means from the legs;
- (c) spring loaded hinge means mounted on each of the ends of the base means and on each of the support means so as to pivot and bias the support means to the upright position; and
- (d) retaining means provided between the base means and each of the support means which holds each of the support means in the folded position against the bias of the hinge means.

5,025,585
FISHING LINE CUTTER

Timothy R. Powell, 2621 40th Ave. N., Texas City, Tex. 77590, assignor to Timothy Powell
Filed Dec. 21, 1989, Ser. No. 453,823
Int. Cl.⁵ A01K *87/00*

U.S. Cl. 43—25 3 Claims

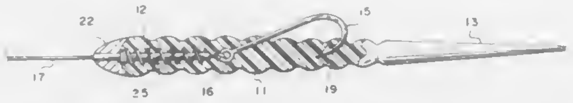


1. A fishing line cutter comprising
a body member mountable to a fishing rod,
a sharp member connected to the body member for cutting fishing line,
overlapping projecting fingers extending from the body member and providing a pathway between them along which a line must pass prior to contacting the sharp member.

5,025,586
FISHING LURE APPARATUS

Dennis N. Pixton, 604 SW. 80th Ter., North Lauderdale, Fla. 33068
Filed Jan. 10, 1990, Ser. No. 462,774
Int. Cl.⁵ A01K *85/00*

U.S. Cl. 43—42.24 8 Claims



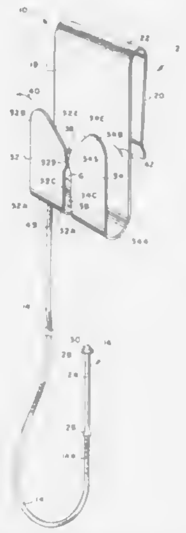
1. Weight apparatus of a type to be sued with a fishing lure comprising:
a convexly tapered weight member having one end pointed and an opposite end substantially flat, a boss member attached to said substantially flat end and an opening axially through said weight member;
a helical coil spring attached to said boss member and extending axially therefrom for screwing said weight member to said lure; and,
tube means axially aligned with said opening in said weight member and extending within said helical coil for preventing a fishing line and a hook from becoming entangled with said helical coil.

5,025,587
FISH STRINGER AND RETAINER

Ronald D. Creed, 5382 Taos, Abilene, Tex. 79605
Filed Nov. 27, 1989, Ser. No. 441,388
Int. Cl.⁵ A01K *65/00*

U.S. Cl. 43—55 10 Claims

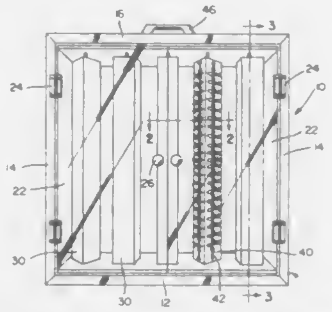
1. An improved fish stringer and retainer comprising, in combination:
a retainer bracket having a base plate and first and second resilient latch arms attached to said base plate, said first and second latch arms each having a connecting portion extending transversely with respect to each latch arm and said base plate, respectively, said latch arms and connecting portions being laterally spaced with respect to each other, respectively, thereby defining a guide slot therebetween and said latch arms being transversely offset with respect to said base plate, thereby defining an open space between each latch arm and said base plate for permitting travel of a spear head through said open space;
a flexible cord having a first end portion adapted for attachment to a spear and having a second end portion adapted for attachment to terminal means;
an elongated spear attached to the first ned portion of said cord, said elongated spear having a shaft and a spear head attached to said shaft, said shaft having a diameter which is less than the lateral dimension of said guide slot, and said spear head having a radially projecting head portion which exceeds the lateral dimension of said guide slot; and,
each latch arm having a shoulder portion projecting into said guide slot, said shoulder portions being laterally spaced with respect to each other, thereby defining a constricted entrance opening to said guide slot, the lateral dimension of said entrance opening being smaller than the diameter of said spear shaft, and said latch arms being outwardly deflectable with respect to each other to enlarge the entrance opening and permit said spear shaft to be inserted into and removed out of said guide slot.



5,025,588
JIG AND FLY BOX

John B. Echols, 403 Franklin St., Natchez, Miss. 39120
Filed Apr. 27, 1990, Ser. No. 515,588
Int. Cl.⁵ A01K *97/06*

U.S. Cl. 43—57.1 5 Claims

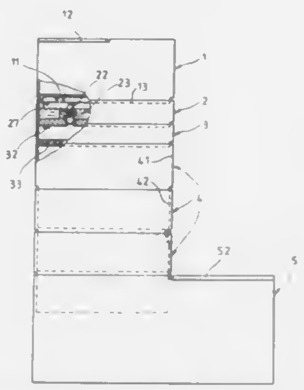


1. A jig and fly box comprising a bottom wall, upstanding parallel side walls and a top wall joined together to define a rigid peripheral wall, a rear wall connected to the peripheral wall and forming a closure for the rear of the box, access door means connected to the peripheral wall and providing access to the interior of the box, a plurality of vertically disposed posts mounted between the bottom and top walls of the box, each of the posts including a vertically disposed face, means on each face securing a plurality of jigs and flys releasably thereto in vertically spaced relation, said access door means and rear wall being transparent to enable observation and selection of a jig or fly, each of said posts having a square cross-sectional configuration defining four vertically disposed faces, each of said faces of each post including means supporting a plurality of jigs and flys, said means on each face of each post to support a plurality of jigs and flys including an elongated elastic cord, means securing the cord to the face of the posts at vertically spaced points thereby providing a plurality of elastic cord segments which can be stretched outwardly to enable insertion and removal of a jig or fly with the cord holding the jig or fly in place when released, and means interconnecting each of the posts and the top and bottom walls to enable rotational movement of the posts to enable all of the faces of the posts to be moved to an observable position, said access door means including a pair of pivotal, transparent panels having hinge means connecting the outer edges thereof to the upstanding side walls, knob means on the inner adjacent edges of the doors to enable manipulation thereof.

5,025,589
METHODS AND APPARATUS FOR GROWING THE BEAN SPROUTS

Young-keun Park, Soungsan Siyoung Apt., 17-1305, 450, Soungsan 2-dong, Mapo-ku, Seoul, Rep. of Korea
Filed Jun. 16, 1989, Ser. No. 367,044
Claims priority, application Rep. of Korea, Jun. 16, 1988, 88-7199
Int. Cl.⁵ A01G *31/00*

U.S. Cl. 47—61 18 Claims



1. An apparatus for growing bean sprouts comprising:
planting container means forming a plurality of bean sprouts beds in layers upward and downward;
a bottom water reservoir positioned under said planting container means;
a top water reservoir positioned at a top portion of the apparatus and having a timer hole in a bottom member for controlling the flow rate of water flowing therethrough;
a water spray container carried on said planting container means and having a large number of water spray holes in a bottom member; and
measuring container means for supplying water received through the timer hole to the water spray container at time intervals determined by the time hole.

VOL
1127
ISS
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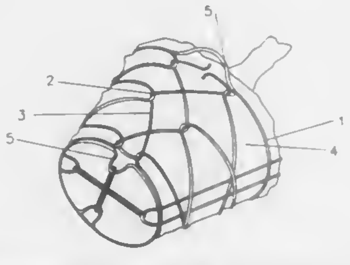
1991
UMI

5,025,590

ROOT BALL BASKET

Peter J. Smith, 157 Parkhurst Rd., Gansevoort, N.Y. 12831
Filed Jun. 16, 1989, Ser. No. 367,356
Int. Cl.^{5} A01G *23/04*
U.S. Cl. 47—76 **30 Claims**

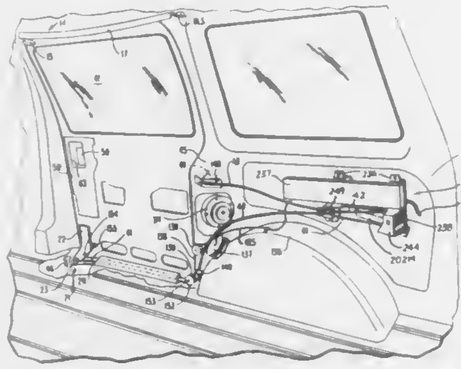


1. An apparatus for preserving the integrity of a tree root ball, said apparatus comprising:
a plurality of separate flexible wire panel sections sufficient to encompass the circumference of said tree root ball; and first adjusting means to tighten said panels circumferentially
a second adjusting means to tighten said panels radially across the bottom of said root ball
a third adjusting means to tighten said panels radially across the top of said root ball.

5,025,591

VARYING RADIUS HELICAL CABLE SPOOL FOR POWERED VEHICLE DOOR SYSTEMS

Daniel L. DeLand, Davison, and Douglas L. Semke, Durand, both of Mich., assignors to Masco Industries, Inc., Taylor, Mich.
Filed Mar. 22, 1990, Ser. No. 497,487
Int. Cl.^{5} E05F *11/00*
U.S. Cl. 49—360 **80 Claims**

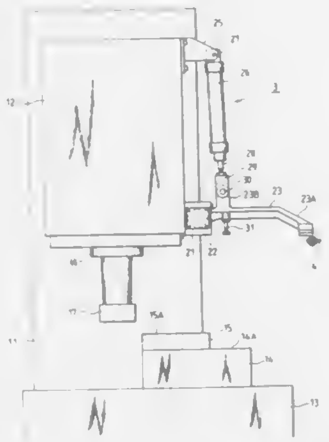


1. An improved cable spool for a cable-actuated device, said device having drive means for selectively rotating said cable spool about an axis in either of two directions and a cable with one end interconnected with a movable member, said cable spool including: cable attachment means for securing the opposite end of the cable to said cable spool; and a groove formed along a generally helical path on a circumferential portion of said cable spool for windingly receiving the cable therein as said cable spool is selectively rotated in one direction and for unwindingly paying out the cable therefrom as said cable spool is selectively rotated in an opposite direction, the radial depth of said helical groove varying along at least a portion of said helical path in order to cause the cable to be wound onto, and paid out from, said varying-depth portion of said helical groove at a varying rate with respect to the rotation of said cable spool, thereby causing the movable member to move at a correspondingly varying rate with respect to the rotation of said cable spool.

5,025,592

MACHINE TOOL HAVING WORKPIECE MACHINING DIMENSION AND TOOL LENGTH MEASURING FUNCTIONS

Masayoshi Yamamori, Kasugai, and Yoshihiko Nakashima, Nagoya, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan
Filed May 2, 1989, Ser. No. 346,547
Claims priority, application Japan, May 9, 1988, 63-112232; Jan. 24, 1989, 1-14917
Int. Cl.^{5} B24B *49/02*
U.S. Cl. 51—165.71 **5 Claims**

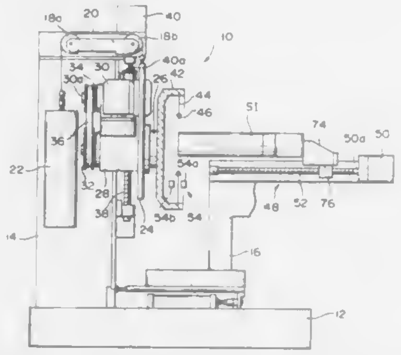


1. A grinding machine for grinding a workpiece with a grinding tool mounted on a main spindle, the main spindle being rotatably mounted on a main spindle head, comprising:
a numerical control apparatus having a function to determine a length of the grinding tool, said numerical control apparatus having a tool correcting program;
a correcting means having a working surface for dressing the grinding tool mounted on the main spindle head to correct the grinding tool and controlled by said dressing program;
a tool length measuring device for measuring the length of the grinding tool, said measuring device including a contact sensor for sensing a position and outputting a position signal representative of the sensed position;
a first storage means for storing a first position data representative of the position of the main spindle at the time when the dressing or truing by said correcting means is terminated;
a second storage means for storing a second position data representative of a second position outputted from said contact sensor when said contact sensor contacts the dressing or truing surface of said correcting means through a relative movement of said contact sensor with respect to said correcting means;
a third storage means for storing a third position data representative of a third position outputted from said contact sensor when said contact sensor contacts a reference plane through a relative movement of said contact sensor with respect to the reference plane;
a tool length calculating means for calculating the length of the grinding tool in accordance with the first position data, the second position data, and the third position data, said calculating means outputting a calculating data representative of the calculated length of the grinding tool; and
a tool length determining means for determining the length of the grinding tool in accordance with the calculated data and providing a tool length data, said tool length data being used to replace a previous tool length data value in said numerical control apparatus, whereby wear of said dressing or truing grinder is automatically corrected after a dressing or a truing operation on said grinding tool.

5,025,593

SLICING MACHINE AND CONTROL METHOD THEREOF

Keishi Kawaguchi, Higashihiroshima; Tatsumi Hamasaki, Hiroshima; Yoshihiro Tadera, Kure, and Sachio Yamazaki, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan
Filed Jan. 13, 1989, Ser. No. 297,473
Claims priority, application Japan, Jan. 18, 1988, 63-7056; Apr. 26, 1988, 63-103620
Int. Cl.^{5} B24B *49/16*
U.S. Cl. 51—165.77 **7 Claims**



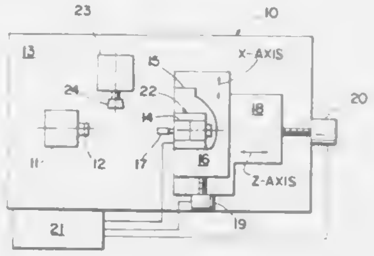
1. A slicing machine which slices a work to a predetermined thickness, comprising:
a rotary support means attached to a fixed position;
a disk-shaped blade rotatably supported on said rotary support means and having a cutting edge for slicing said work at an inner peripheral portion thereof;
a support base for supporting said work, said support base being movable in the rotational axis direction of said blade;
work moving means for moving said support base supporting said work in said rotational axis direction, said work fed by a predetermined amount with respect to said blade by said work moving means being sliced by said cutting edge of said blade;
flexure amount detection means, arranged near said blade, for detecting a flexure amount of said blade during a slicing operation; and
correction means for correcting the flexure amount of said blade based on a detection amount of said flexure amount detection means so as to uniformly slice said work to the predetermined thickness, said correction means correcting the flexure amount by changing the relative position between said support base and said blade in said rotational axis direction of said blade during the slicing operation.

5,025,594

METHOD AND APPARATUS FOR CONTROLLING GRINDING PROCESSES

Edward L. Lambert, Jr., Westboro; Charles B. Matson, Holden, and Bernard D. Vaillette, Leominster, all of Mass., assignors to Cincinnati Milacron-Heald Corp., Worcester, Mass.
Division of Ser. No. 400,733, Aug. 29, 1989, and a continuation-in-part of Ser. No. 240,021, Sep. 2, 1988, abandoned. This application Mar. 8, 1990, Ser. No. 490,416
Int. Cl.^{5} B24B *49/00*
U.S. Cl. 51—165.93 **13 Claims**

1. A grinding machine having a machine base, a wheelhead supported by said machine base for carrying a rotatable superabrasive grinding wheel means for relatively feeding said wheel and workpiece at a feed rate along a normal force vector therebetween, and an apparatus for automatically controlling grinding processes for individual workpieces, said apparatus further comprising:
means for relatively rotating said workpiece while said wheel and workpiece are in contact;
means for measuring the magnitude of the normal force vector occurring between said wheel and said workpiece through substantially at least one revolution of said workpiece, said measuring means including a force transducer mounted adjacent said wheelhead;
means for sampling said normal force vector at a plurality of intervals during said at least one revolution and determining workpiece runout therefrom; and

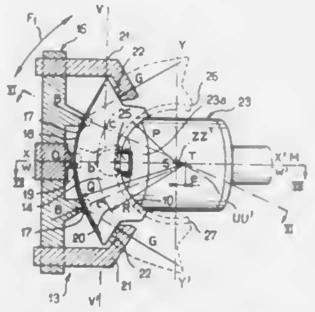


means for automatically varying said feed rate during a grinding process in response to the determined workpiece runout such that optimal normal force can be applied during each revolution of the workpiece to insure that the workpiece will be ground to desired roundness.

5,025,595

METHOD AND DEVICE FOR FINISHING A CONCAVE SPHERICAL BEARING SURFACE ON A ROLLER SEGMENT, PARTICULARLY FOR A HOMOKINETIC JOINT

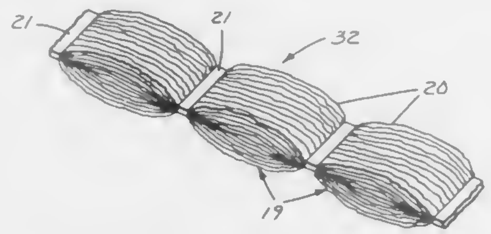
Michal Orain, Conflans Sainte Honorine, France, assignor to Glaenzer Spicer, Poissy, France
Filed Nov. 2, 1989, Ser. No. 430,602
Claims priority, application France, Nov. 11, 1988, 88 15008
Int. Cl.^{5} B24B *1/00*
U.S. Cl. 51—291 **18 Claims**



1. A method of finishing a concave spherical bearing surface having a desired center S and radius P on a roller segment having a toric external rolling surface, comprising:
providing a support means for supporting said roller segment;
immobilizing said rolier segment with said support means bearing said toric external rolling surface of said roller segment;
providing a tool means having an operative surface for generating a concave sphere;
rotating said tool means aobut an axis of rotation passing through said desired center S of the concave spherical bearing surface;
establishing a relative sweeping movement between said support means supporting said roller segment and said tool means about at least one axis intersecting said axis of rotation of said tool means at said desired center S for the spherical bearing surface; and
feeding said tool means along said axis of rotation of said tool means towards said roller segment until the distance between the spherical bearing surface and said desired center S equals said desired radius P.

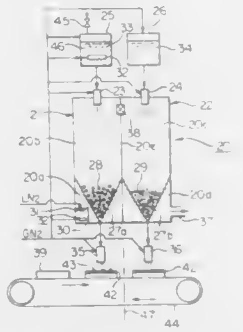
VOL
1127
ISS
4
JE
25
1991
UMI

5,025,596
HAND SCOURING PAD
Raymond F. Heyer, and Connie L. Hubbard, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Continuation of Ser. No. 244,055, Sep. 13, 1988. This application Sep. 28, 1990, Ser. No. 590,300
Int. Cl.⁵ B84D *11/00*
U.S. Cl. 51—400 15 Claims



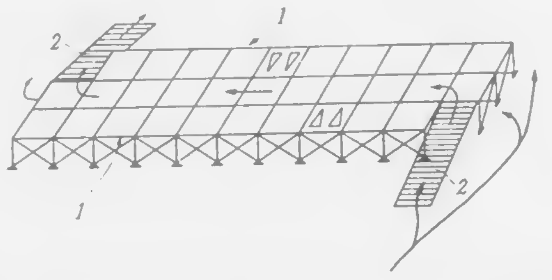
1. An open, lofty, nonwoven pad especially suited for use as a scouring article comprising a multiplicity of crimped or undulated, continuous, preformed thermoplastic organic filaments, each of said filaments having a first end and a second end with substantially all of said first ends bonded together in a first bond area and substantially all of said second ends bonded together in a second bond area so as to provide an open, lofty portion of said pad without said filaments being bonded together at points of contact within said open, lofty portion of said pad.

5,025,597
PROCESSING APPARATUS FOR SEMICONDUCTOR WAFERS
Masuo Tada, Yao; Takeki Hata, Kobe; Takaaki Fukumoto, and Toshiaki Ohmori, both of Itami, all of Japan, assignors to Taiyo Sanso Co., Ltd. and Mitsubishi Denki Kabushiki Kaisha, both of, Japan
Division of Ser. No. 177,784, Apr. 5, 1988, Pat. No. 4,932,168. This application Jan. 25, 1990, Ser. No. 470,226
Claims priority, application Japan, Jun. 23, 1987, 62-156061; Dec. 11, 1987, 62-313667
Int. Cl.⁵ B24C *3/00*
U.S. Cl. 51—410 6 Claims



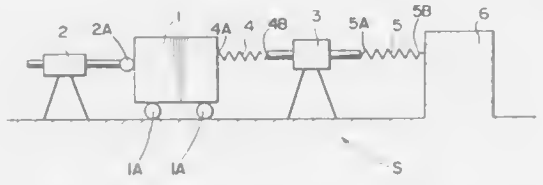
1. A processing apparatus for processing the surface of a semiconductor wafer comprising:
first freezing means for forming frozen particles for gettering comprising a frozen liquid and abrasive particles as nuclei;
second freezing means for forming frozen particles for cleaning comprising a frozen liquid;
first blasting means for blasting said frozen particles for gettering at the back side of a semiconductor wafer; and
second blasting means for blasting the frozen particles for cleaning at the back side of a semiconductor wafer after it has been blasted with the frozen particles for gettering.

5,025,598
MODULAR STRUCTURE FOR PARKING LOTS, PARTICULARLY SUITABLE FOR TEMPORARY PARKING LOTS
Biagio C. Manna, and Luciano Spellucci, both of Rome, Italy, assignors to Centro Progettazioni Coordinate S.r.l., Italy
Filed Feb. 26, 1990, Ser. No. 485,386
Claims priority, application Italy, Jul. 3, 1989, 35852/89[U]; Jul. 3, 1989, 35854/89[U]
Int. Cl.⁵ E04B *9/00*
U.S. Cl. 52—126.6 17 Claims



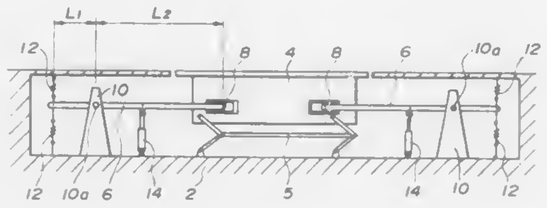
1. A modular structure for parking lots, particularly suitable for temporary parking lots, comprising a number of basic modular units, each of said units, comprising a rectangular or square composite floor slab, four edge beams along the sides of said slab, four node elements at the corners of said slab, four vertical supporting elements below each of said node elements, and four bases below each of said vertical supporting members, characterized in that each of said units also comprises a number of ties and/or struts for bracing the structure, connected at their ends to said node elements and said bases, and in that each of said bases incorporates means for adjusting the total length of said vertical supporting elements, said adjustment means comprising a flat base plate, a cylindrical collar rigidly fixed in the centre of said base plate, the axis thereof being perpendicular to the plane of said plate, one or more reinforcing elements for stiffening the connection between said base plate and said collar, a first hinge member in the shape of a spherical segment with its convex side upwards, resting on said base plate within said cylindrical collar a cylindrical pivot externally threaded, of a smaller diameter than said cylindrical collar and having, at its lower end, a second hinge member in the shape of a spherical segment complementary to the first one and with its concave side downwards, said lower end of said cylindrical pivot being inserted in said cylindrical collar, and an internally threaded sleeve fitting said cylindrical pivot and coupled externally with the lower end of said vertical supporting element.

5,025,599
COMPOUND SEISMIC RESPONSE AND WIND CONTROL SYSTEM
Koji Ishii; Kozo Toyama, and Jun Tagami, all of Tokyo, Japan, assignors to Kajima Corporation, Tokyo, Japan
Filed Jan. 16, 1990, Ser. No. 465,951
Claims priority, application Japan, Jan. 17, 1989, 1-8244
Int. Cl.⁵ E04B *1/98;* **E04H** *9/02*
U.S. Cl. 52—167 DF 16 Claims



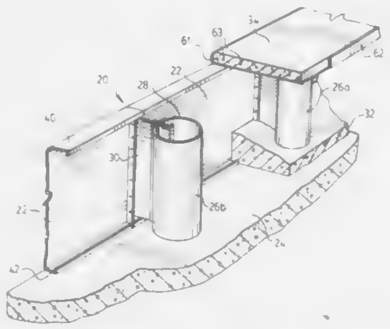
1. A mass damping device for attenuating vibrations in a structure caused by seismic and/or wind forces, comprising: a vibratable mass having opposite sides and supported by said structure; an actuator secured to one side of said vibratable mass and to said structure, adapted to actively vibrate said mass; passive energy means having a predetermined natural frequency secured to the opposite side of said mass and to said structure; a passive energy means frequency modifier adapted to modify the natural frequency of said passive energy means; power means to drive said actuator; and failsafe means to actuate said passive energy means frequency modifier responsive to a loss of said power means.

5,025,600
ISOLATION FLOOR SYSTEM FOR EARTHQUAKE
Hajime Sugimoto, and Yasuo Seko, both of Tokyo, Japan, assignors to Kaihatsu Architects & Engineers, Inc., Tokyo, Japan
Filed Jun. 21, 1989, Ser. No. 369,416
Claims priority, application Japan, Jun. 24, 1988, 63-156135
Int. Cl.⁵ E04B *1/98*
U.S. Cl. 52—167 44 Claims



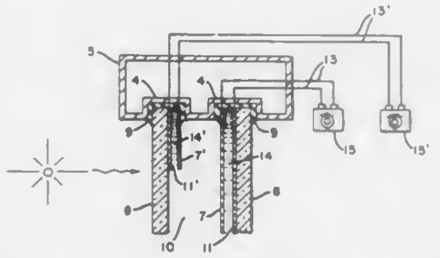
1. An isolation floor system for an earthquake comprising:
an supporting floor;
an isolation floor supported by said supporting floor to be movable in at least one of vertical and horizontal directions;
a damping means disposed along a moving direction of said isolation floor so as to connect said supporting floor and said isolation floor; and
means connected in series to said damping means for adjusting a relative displacement between said supporting floor and said isolation floor.

5,025,601
POOL WALL SUPPORT
Hugh R. Hand, 2310 Lakeshore Road East, Burlington, Ontario, Canada L7R 1B2
Filed Oct. 20, 1988, Ser. No. 260,339
Claims priority, application Canada, Oct. 22, 1987, 550011
Int. Cl.⁵ E04B *1/35*
U.S. Cl. 52—169.7 4 Claims



1. A swimming pool set in the ground essentially below ground level, the pool comprising:
means defining a lower part of the pool and extending downwardly from a peripheral step positioned below ground level and extending endlessly around the lower part;
a wall extending around the pool between the step and ground level, the wall comprising a plurality of panels attached one to another at vertical joints;
a plurality of wall supports extending vertically and supported on the step, each of the wall supports being positioned at one of said joints and including a hollow element extending vertically and filled with concrete, the hollow element being spaced from the pool wall and proportioned to provide a heavy mass of concrete for supporting the pool wall, and a continuous flat web connecting the hollow element to the wall to transmit loads from the wall to the element; and
pool edging means supported at least in part by the wall supports.

5,025,602
DUAL-PANE THERMAL WINDOW WITH LIQUID CRYSTAL SHADE
Ray H. Baughman, Morris Plains; Ernest D. Buff, Far Hills; Helmut Eckhardt, Madison, and Gerhard H. Fuchs, Far Hills, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.
Division of Ser. No. 515,034, Apr. 26, 1990, which is a division of Ser. No. 425,263, Oct. 23, 1989, which is a division of Ser. No. 398,599, Aug. 25, 1989, which is a division of Ser. No. 350,808, May 12, 1989, which is a division of Ser. No. 66,299, Jun. 25, 1987. This application Oct. 15, 1990, Ser. No. 597,216
Int. Cl.⁵ G02F *1/133*
U.S. Cl. 52—171 2 Claims

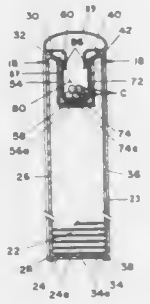


1. A thermal-pane window with an electro-optical shade for use in a window space of a building structure, comprising:
(a) window frame means for securing the mutual orientation of a plurality of transparent, substantially parallel, sequentially spaced panes and for sealingly isolating a space therebetween;
(b) a first transparent pane mounted in said window frame means in a position toward an exterior facing side of said frame means;
(c) a second transparent pane, substantially parallel to and spaced from said first pane, mounted in said frame means in a position toward an interior facing side of said frame means;
(d) a liquid crystal cell comprising a first wall composed of transparent, electrically conductive film, a second wall composed of transparent, electrically conductive film and a liquid crystal material disposed between opposing faces of said first and second walls, said liquid crystal material being electro-optically responsive and said first and second walls having sufficient supporting strength to maintain the integrity of said cells;
(e) said first wall of said cell being affixed to a fractional portion of one of the opposing faces of said first and second panes and said second wall of said cell delimiting with the other opposing face of said first and second panes a space providing a thermal break; and
(f) electrical means for applying an electric field between said conductive films and through said liquid crystal material of a selected field strength at least sufficient to change the optical transmission of said liquid crystal material.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,603
MODULAR SPACE DIVIDING PANELS HAVING WIRE MANAGEMENT CHANNELS

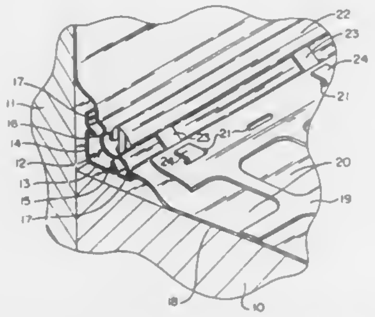
Gary C. Johnson, Grand Haven, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.
Filed Apr. 4, 1990, Ser. No. 504,588
Int. Cl.⁵ E04H *1/00*
U.S. Cl. 52—221 34 Claims



1. A modular space dividing panel comprising:
a pair of panlike frames having a side wall with inwardly directed flanges at the edges thereof forming a bottom wall, a pair of end edge walls, and a top wall, the frames being positioned in facing relationship wherein at least portions of the bottom walls, the end edge walls, and the top walls overlap in contacting relationship, and means in the respective top walls to define therebetween a substantially continuous channel extending along an upper edge of the panel, the channel being of a size to receive communication and/or electrical wiring therein;
means for securing the panlike frames together in facing relationship;
a top cap extending along the upper edge of the panel and overlying the channel; and
means for releasably securing the top cap to the top walls of the frames in overlying relationship to the channel.

5,025,604
PERIMETER SECUREMENT ASSEMBLY FOR ROOF DECK COVERING PROVIDED WITH APERTURED OVERLAY

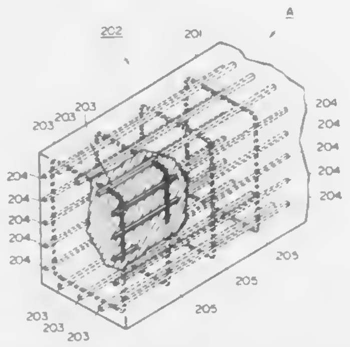
Robert C. Yeamans, 2777 Northwest Blvd., Columbus, Ohio 43221
Filed Jan. 9, 1990, Ser. No. 462,517
Int. Cl.⁵ E04B *7/00;* **E04D** *13/14, 13/15*
U.S. Cl. 52—273 9 Claims



1. In a roof deck covering comprising a waterproofing membrane positioned on the surface of said roof deck and an apertured overlay having one or more selvage edges positioned atop said waterproofing membrane and essentially coextensive therewith,
a perimeter securement assembly for a roof deck covering for securely fastening said waterproofing membrane and said apertured overlay to the periphery of said roof deck comprising,
a base member capable of being firmly attached to said roof deck and designed to extend along and adjacent to the edge of said roof deck and including a first portion designed to be substantially parallel to the surface of said roof deck and a second portion connected to said first portion and extending essentially at right angles to said first portion and adjacent the edge thereof, said first portion of said base member being provided with a first element extending in a direction toward said second portion of said base member, and said second portion of said base member being provided with a second element extending in a direction toward said first portion of said base member,
a connector provided with a first means attached securely to said first element and extending thereover and being provided with a second portion attached securely to said apertured overlay, and
a first resilient means of a shape conforming to that portion of said base member between said first and second elements and adapted to press said waterproofing membrane securely against said base member between said first and second elements and to press said first means on said connector securely against said first element.

5,025,605
MESHWORK REINFORCED AND PRE-STRESSED CONCRETE MEMBER, METHOD AND APPARATUS FOR MAKING SAME

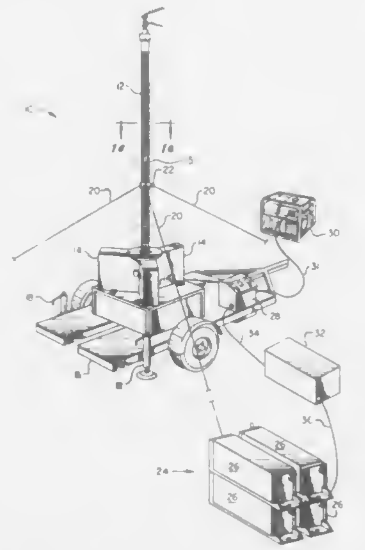
Kenzo Sekijima, and Seiho Kitagawa, both of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo and Dainihon Glass Industry Co., Ltd., Sagamihara, both of, Japan
Continuation of Ser. No. 212,962, Jun. 27, 1988, abandoned. This application Dec. 4, 1989, Ser. No. 445,144
Claims priority, application Japan, Jun. 26, 1987, 62-159365; Jun. 26, 1987, 62-159366; Mar. 28, 1988, 63-73937
Int. Cl.⁵ E04C *2/06*
U.S. Cl. 52—309.16 9 Claims



1. A pre-stressed reinforced concrete member comprising:
(a) a concrete body defining the reinforced concrete member;
(b) at least one reinforcing grid member embedded in the concrete body, each grid member having first elongated reinforcing members under tensile pre-stress and second elongated reinforcing members, both members intersecting each other at intersections, each of the first and second elongated reinforcing members including stacked rows of textiles laid on top of the other and resin impregnating and fuse-bonding the textiles and the rows to one another, the stacked rows of textiles included in the first and second elongated reinforcing members crossing and interleaving alternately at the intersections to fuse bond the first elongated reinforcing members and the second elongated reinforcing members to each other; and
(c) anchoring means for anchoring the first elongated reinforcing members to give tensile pre-stress to the first elongated reinforcing members, the anchoring means being disposed and embedding both end portions of the first elongated reinforcing members to be integrated to the first elongated reinforcing members,
(d) wherein the anchoring means is composed of a plurality of anchoring blocks with slits formed therebetween, the anchoring means being connected to both extremities of the first elongated reinforcing members, each slit having a concave portion at a mid-part of the surface opposing to each thereover, wherein the slit is used for giving tensile pre-stress to the first elongated members,
(e) whereby the grid member tightly grips the concrete body so as to firmly and uniformly transmit the pre-stress thereof to the concrete body, along a whole length thereof, both by bond between the grid member and the concrete member and by mechanical anchoring at the intersections between the grid member and the concrete body.

5,025,606
GUY CONTROL SYSTEM FOR EXTENSIBLE MAST

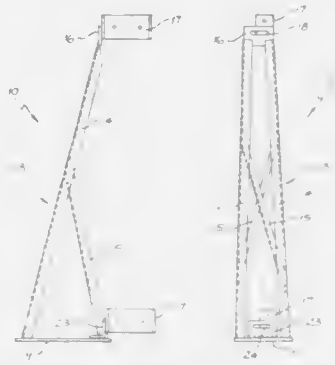
Henry J. McGinnis, Fort Worth; Fred R. Hickman, Flower Mound, and Wesley N. Ludwig, Arlington, all of Tex., assignors to Rapid Deployment Towers, Inc., Azle, Tex.
Filed Apr. 27, 1989, Ser. No. 344,255
Int. Cl.⁵ E04H *12/18*
U.S. Cl. 52—741 22 Claims



1. A system for erecting an extensible mast, comprising:
an extensible mast erectable at a controllable rate;
first means for determining the height of said extensible mast;
a plurality of guy cables coupled to said extensible mast and to anchor points spaced therefrom;
second means for determining the length of said guy cables; and
a controller for maintaining said guy cables at selected lengths, wherein said controller performs the functions of:
obtaining the height of said extensible mast from said first means;
obtaining the actual lengths of said guy cables from said second means;
calculating a selected length for each guy cable which is a function of the height of said extensible mast; and
controlling the actual lengths of said cables to match such actual lengths to the calculated selected lengths.

5,025,607
APPARATUS TO AID IN THE INSTALLATION OF DOORS

William A. D. Green, 93 Cary Street, Leichhardt, New South Wales 2040, Australia, and David N. Tregarthen, 6/37 Birriga Road, Bellevue Hill, New South Wales 2023, Australia
Filed Aug. 7, 1989, Ser. No. 390,160
Claims priority, application Australia, Aug. 5, 1988, P19722
Int. Cl.⁵ E04G *21/00;* **F16M** *13/00*
U.S. Cl. 52—749 4 Claims



1. A support to aid in the installation of door jambs, said support comprising:
a base to rest upon and to be secured to a floor surface;
a brace member attached to, and extending upwardly from said base, said brace member having an upper portion and a lower portion;
a first securing bracket to be fixed to a door jamb, and connected to a first mounting plate located on said upper portion of said brace member;
a second securing bracket also to be fixed to the door jamb, and connected to a second mounting plate located on said lower portion of said brace member, adjacent said base;
said first and second brackets cooperating to retain the door jamb in a generally vertical orientation, and being adjustably connected to said brace member for movement in a plurality of predetermined directions relative thereto, which predetermined directions are horizontal, parallel, co-planar and normal to the plane of the door jamb, and each bracket includes means enabling adjustment of the door jamb in the plane of the door.

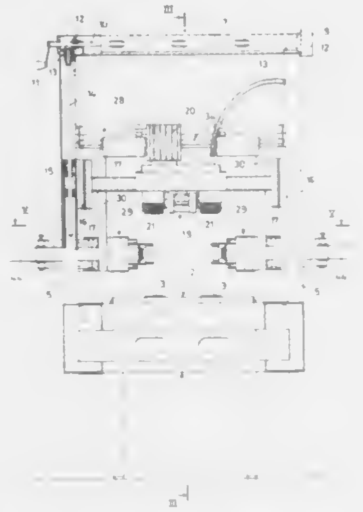
5,025,608
TAPING MACHINE FOR PARALLELEPIPED CARDBOARD BOXES TO BE SEALED ALONG THE SIDES

Augusto Marchetti, Piazza Sicilia, 7, 20146 Milano, Italy
Filed Mar. 14, 1990, Ser. No. 493,341
Claims priority, application Italy, Mar. 15, 1989, 19776 A/89
Int. Cl.⁵ B65B *61/00;* **B31B** *1/72*
U.S. Cl. 53—135.1 4 Claims

1. Taping machine comprising an operating and advancement plane for the boxes, first and second means for grasping the boxes which can engage the top and the bottom of the boxes, respectively, to cause the advancement of the boxes themselves along said operating plane, a vertically displaceable support for said first grasping means, first means for the adjustment of the vertical position of said vertically displaceable support, a pair of vertically and horizontally displaceable supports for taping units which can engage the sides of the boxes for the application of respective sections of adhesive tape along the junction slots between the folded sealing flaps of the boxes, second means for the adjustment of the vertical position of said pair of vertically and horizontally displaceable supports and third means for the adjustment of the horizontal position of said pair of supports, and further comprising means for the transmission of motion placed operationally between said first

VOL
1127
ISS
4
JE
25
1991
UMI

and second adjustment means so that every vertical displacement of said vertically displaceable support automatically



implies a similar halved vertical displacement of said pair of supports.

5,025,609

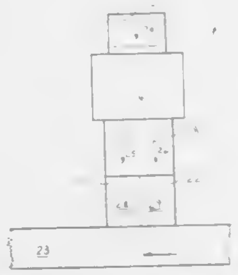
SHEET SEPARATOR DEVICE

James R. Moser, Easton; Gerald D. Warden, Bethlehem, and Thomas E. Bieber, Coplay, all of Pa., assignors to Bell & Howell Phillipsburg Co., Skokie, Ill.

Filed Sep. 1, 1989, Ser. No. 401,743

Int. Cl.^{5} B26F *3/02;* **B65B** *5/00*

U.S. Cl. 53—266.1 **8 Claims**



1. A sheet separator device for in-plane separation of at least two mutually unconnected sheet articles transported therethrough along laterally-adjacent, in-plane paths, each sheet article having a straight lateral edge along an entire side thereof which is oriented in a direction of overall transport motion and which faces toward the laterally-adjacent, in-plane path, said sheet separator device comprising:

first and second belt arrangements, each of said belt arrangements having an entry and an exit, said first and second belt arrangements being divergently disposed in relation to one another in said direction of overall transport motion, said first and second belt arrangements defining a first and a second in-plane path, respectively, between the respective ones of said entry and said exit, said first belt arrangement being operative to convey first unconnected sheet articles along said first in-plane path, said second belt arrangement being operative to convey second unconnected sheet articles along said second in-plane path, said first and second in-plane paths being disposed in one plane and having directions of transport motion that are divergent with respect to one another but wherein said first and second unconnected sheet articles are substantially irrotationally separated and spaced farther apart during passage though said first and second belt arrangements;

means for feeding said first and second unconnected sheet articles side-by-side substantially adjacently along substantially parallel paths toward said entries, respectively;

first and second collector means;

transport means for further transporting in side-by-side parallel relationship said first and second unconnected sheet articles from said exits to said first and second collector means, respectively, and means for delivering said sheet articles thereto;

further article handling means;

each of said collector means comprising at least one driven conveyor belt and selectively-releasable gate stop means for selectively stopping delivery motion of respective said unconnected sheet articles to said further article handling means, each of said collector means being operative to collect and temporarily hold said first and second unconnected sheet articles, respectively, for selective delivery to said further article handling means, said selectively releasable stop gate means being selectively actuatable so that said unconnected sheet articles that are temporarily collected and held in said collector means are released and are delivered to said further article handling means by the action of said at least one driven conveyor belts upon which said unconnected sheet articles are temporarily held.

5,025,610

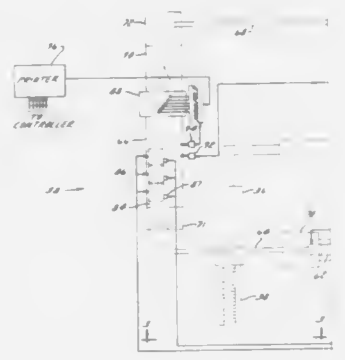
APPARATUS AND METHOD FOR SELECTIVELY PACKAGING MAGAZINES

William T. Graushar, Milwaukee, Wis., assignor to Quad/Tech, Inc., Pewaukee, Wis.

Filed Dec. 20, 1989, Ser. No. 454,041

Int. Cl.^{5} B65B *61/26;* **B65H** *39/02*

U.S. Cl. 53—411 **19 Claims**



1. A signature customizing system of the type including a conveyor line and a plurality of feeders for selectively delivering and processing signatures on said conveyor line in groups of completed books according to coded information, the system including:

packaging means, operatively connected with said conveyor line, for selectively wrapping said signatures of said completed books in accordance with said coded information.

5,025,611

THERMOPLASTIC SKIN PACKING MEANS

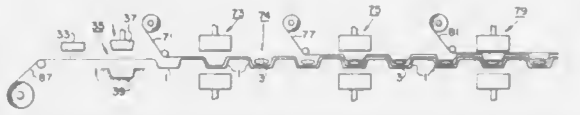
Anthony J. M. Garwood, Bayswater, Australia, assignor to Garwood Ltd., Knoxfield, Australia

Continuation of Ser. No. 239,283, Sep. 1, 1988, abandoned, which is a division of Ser. No. 86,046, Jun. 19, 1987, Pat. No. 4,840,271. This application Mar. 28, 1990, Ser. No. 500,217

Claims priority, application Australia, Nov. 14, 1985, PH3406; Feb. 24, 1986, PH4760

Int. Cl.^{5} B65B *11/52, 31/00, 31/02*

U.S. Cl. 53—509 **11 Claims**



1. An apparatus for packing perishable goods comprising:

means for carrying a base in which the perishable goods are placed;

means for applying a first flexible gas permeable plastic web over said goods;

means for establishing a reduced pressure below said first web relative to that above said first web for effecting at least partial skin packing of said first web over said goods relative to said base;

means for applying a second plastic web over said first web, said goods and said base;

means for sealing said second web to said base so as to provide a space between said first web and said second web, and

means for providing said space with a gas which can permeate through said first web toward said base to enhance preservation of said goods, said second web comprising a lid serving to retain the gas in said space.

5,025,612

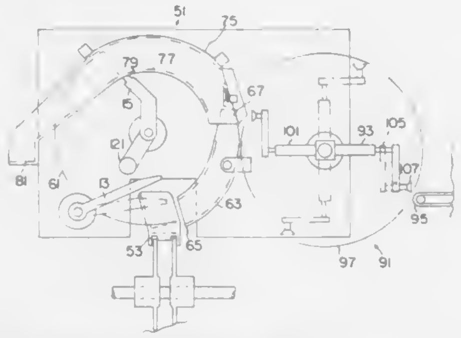
INVERTED TRAY CONTAINER LOADING APPARATUS

Claude E. Monsees, Fortmill, S.C., assignor to Roberts Systems, Inc., Charlotte, N.C.

Filed Nov. 29, 1989, Ser. No. 443,666

Int. Cl.^{5} B65B *5/06, 39/00, 63/00*

U.S. Cl. 53—530 **6 Claims**



1. A packaging apparatus comprising:

means for supplying a plurality of stacked products for packaging;

a rotary sweep arm, a portion of which is movable about a circle tangentially intersecting said plurality of stacked products;

an arcuate loading horn for receiving said plurality of stacked products as said rotary arm moves about said circle, said loading horn having an entrance end near said means for supplying a plurality of stacked products for packaging, and an exit end above said entrance end;

means for placing an inverted tray container over said exit end whereby said rotary sweep arm moves said plurality of stacked products from said means for supplying into said entrance end of said arcuate loading horn and out of said exit end and into said inverted tray container;

and arcuate chute, downstream, in the direction of movement of said rotary sweep arm, of said exit end of said arcuate loading horn, arched about said circle for receiving said inverted tray container having a plurality of stacked products therein as said rotary sweep arm continues about said circle, said arcuate chute permitting said inverted tray having product therein to assume an upright position as said tray traverses said chute and said rotary sweep arm continues about said circle.

5,025,613

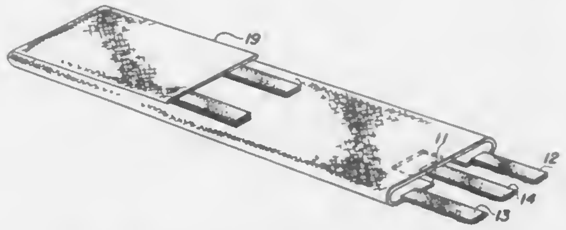
TAIL BAG AND METHOD FOR HORSE

Joseph C. Connors, Hurricane Hill Farm, R.D. 4, Auburn, N.Y. 13021

Filed Dec. 29, 1988, Ser. No. 290,380

Int. Cl.^{5} B68B *5/04*

U.S. Cl. 54—78 **10 Claims**



1. A tail protector for a horse comprising: an elongated bag open at one end and closed at the other end, the bag having a front surface, a rear surface, sides and upper and, lower portions, the bag dimensioned to completely enclose a horse's tail, the upper portion of the rear surface of the bag defining a slot for accommodating the base of the tail, means for attaching the top of the bag to the horse; and means for attaching the lower portions end of the bag to the upper portion of the bag to maintain the lower portion in a folded position, whereby in use of the horse's tail is substantially completely enclosed within the bag and a lower portion of the tail below the dock is folded up in the lower portion of the bag.

5,025,614

CONTROL SYSTEM FOR A COTTON HARVESTER

Jesse H. Orsborn; Timothy L. Chambers, both of Hinsdale, and John D. Watt, Naperville, all of Ill., assignors to J. I. Case Company, Racine, Wis.

Filed Mar. 22, 1990, Ser. No. 497,194

Int. Cl.^{5} A01D *46/08, 75/20*

U.S. Cl. 56—10.2 **8 Claims**

1. A control system for a cotton harvester, said cotton harvester having a mobile frame driven across a field by an engine which is operated from an operator station at a plurality of speeds, a harvesting unit connected to the frame and including a harvesting unit drive mechanism for operating the harvesting unit, and a control system comprising:

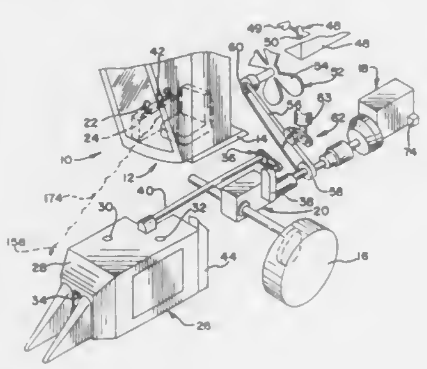
means for generating a speed signal indicative of engine speed;

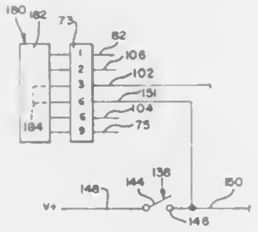
circuitry means for operating said harvesting unit drive mechanism and thereby said harvesting unit in a first operational mode from said operator station thereby reducing exposure to the harvesting mechanism while operating in said first operational mode; and

circuitry means connected to said speed signal generating means for enabling operation of said harvesting unit drive mechanism and thereby said harvesting unit in a second operational mode under the influence of switch means remote from said operator station as long as said engine is operated within a predetermined range of speeds and for inhibiting operation of said harvesting unit in said second

VOL
1127
ISS
4
JE
25
1991
UMI

operational mode under the influence of said switch means by effectively disabling said harvesting unit drive mechanism when said engine speeds are beyond said predetermined range.





5,025,615

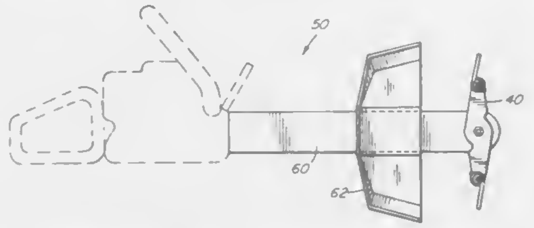
SCARIFIER ATTACHMENT FOR CHAIN SAW

Bruce R. Hawkenson, 1667 Rebman Crescent, Prince George, British Columbia, Canada V2L 4Z9

Filed Mar. 27, 1990, Ser. No. 500,396

Int. Cl.^{5} A01D *51/00;* B27B *23/00*

U.S. Cl. 56—12.7 **13 Claims**



1. A portable rotary debris remover which includes a power means and operator handle means, a hub rotatable about a rotation axis; a tine member pivotally connected to the hub at a location which follows a circular rotation path around the rotation axis of the hub when the hub is rotated; the tine member having at least one tine which projects from the hub and the tine member having a centre of gravity which is located so that the tine member, due to centrifugal forces acting thereon during rotation of the hub, is oriented with the tine being displaced from a direction which is radially oriented with respect to said circular rotation path in a direction corresponding with the direction of rotation of the hub.

5,025,616

HAYRAKE HITCH AND METHOD OF USE

Floyd Moss, 4339 Old Hillsboro Rd., Franklin, Tenn. 37064

Filed Nov. 1, 1989, Ser. No. 430,523

Int. Cl.^{5} A01D *7/00, 67/00*

U.S. Cl. 56—14.9 **17 Claims**

1. A hayrake hitch for use with a tractor of the type having a drawbar, a first hayrake hitched to the drawbar, and means for supplying hydraulic forces, comprising:

a main frame means pivotally connected to the tractor, the main frame means comprising an elevated main beam, the main beam having sufficient length and height to pivot laterally relative to the tractor without contacting the first hayrake;

rear support means pivotally connected to the main frame means,

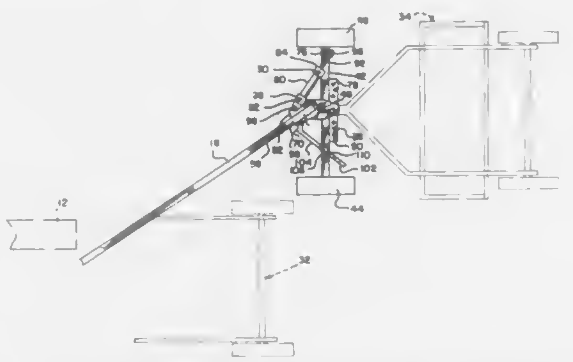
the rear support means comprising a rear support bar, left and right wheels rotatably carried by the rear support bar and a rear hitch secured to the rear support bar;

hydraulic steering means interconnected between a portion of the rear support bar and a portion of the main frame means to pivot the rear support means relative to the main frame means; and,

hydraulic line means interconnecting the hydraulic steering means and the means for supplying hydraulic forces to permit remote operating control of the hydraulic steering means;

whereby a second hayrake can be secured to the said rear hitch and whereby the rearward lateral position of the second hayrake relative to the position of the first hayrake can be controlled from the tractor.

16. The method of simultaneously raking two hay windrows comprising the steps of:



hitching a first hayrake to the drawbar of a tractor, the tractor comprising means for supplying hydraulic forces;

forming a main frame of generally U-shaped configuration having a main bar, front and rear depending frame legs and a wheeled rear support bar pivotally connected tot he main frame;

positioning the main frame over the first hayrake with the front frame leg forwardly of the first hayrake and the second frame leg rearwardly of the first hayrake and pivotally connecting the front frame leg to the tractor;

securing a second hayrake to the main frame rearwardly of the first hayrake and simultaneously pulling the first and second hayrakes with the tractor; and

interconnecting a hydraulic cylinder intermediate a portion of the rear support bar and a portion of the rear frame leg, interconnecting hydraulic lines between the hydraulic cylinder and the tractor means for supplying hydraulic forces, and energizing the hydraulic cylinder to rotatively move the rear support bar relative to the main frame while the tractor is moving.

17. The method according to claim **16** and the further step of adjustably interconnecting a locking bar intermediate spaced portions of the rear support bar and the main frame.

5,025,617

IMPLEMENT SUSPENSION MECHANISM

John B. Kuhn, Rubicon; Kenneth E. Hunt, Oconomowoc, and Christopher S. Thorman, Beaver Dam, all of Wis., assignors to Deere & Company, Moline, Ill.

Filed Mar. 5, 1990, Ser. No. 488,807

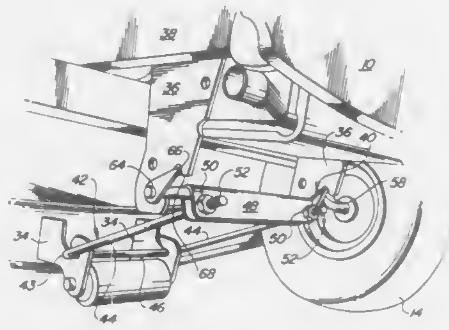
Int. Cl.^{5} A01D *34/64*

U.S. Cl. 56—15.6 **11 Claims**

3. Mechanism for releasably suspending one end of an implement from a vehicle having bracket means carried on the lower portion thereof, said bracket means including a first pair of transversely spaced apart and upwardly opening jaw means;

a second pair of transversely spaced apart and upwardly opening jaw means carried at the forward portion of the implement, said second jaw means adapted to be positioned fore and aft spaced from the first jaw means;

a pair of transversely spaced apart fore and aft extending draft links, said links having front and rear portions;



first and second fore and aft spaced and transversely extending pivot members extending between and connecting the respective front and rear portions of the links, said first and second pivot members being respectively receivable in the first and second jaw means; and

cam means operatively connected to one pivot member, shiftable between first and second positions and operable to shift said pivot member between fore and aft spaced positions as the cam means is shifted between its first and second positions.

5,025,618

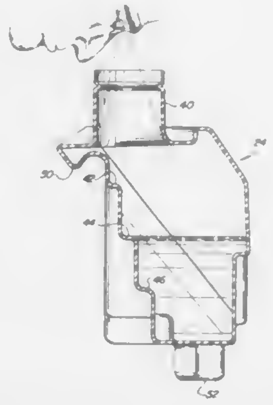
FUEL TANK WITH STEPPED INTERIOR GAUGE

Stephen A. Braun, Horicon, Wis., assignor to Deere & Company, Moline, Ill.

Filed Apr. 30, 1990, Ser. No. 516,625

Int. Cl.^{5} A01D *75/00*

U.S. Cl. 56—16.7 **4 Claims**



1. A fuel tank usable with a mobile vehicle having an engine thereon, said fuel tank having a wide mouthed and upwardly opening fuel inlet, the body of the tank being formed of opaque material and including inside thereof a plurality of stepped surfaces positioned beneath and visible through the wide mouthed fuel inlet, the stepped surfaces being vertically offset from the inlet and one another and positioned so as to indicate proportionate volumes of fuel in the tank when the surface of the fuel is generally even with a stepped surface.

5,025,619

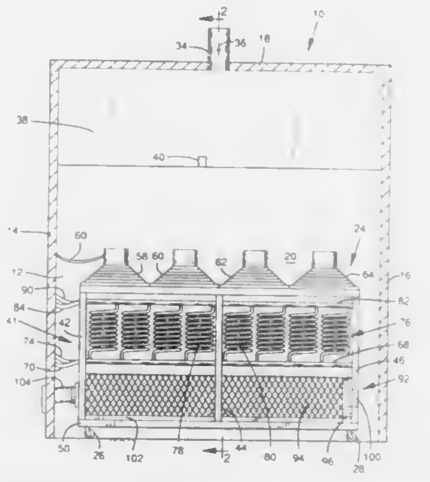
METHOD AND APPARATUS FOR INCUBATING AND HATCHING EGGS

Robert W. Cannon, 6565 Joseph St., SE., Salem, Oreg. 97301, assignor to Robert W. Cannon, Salem, Oreg.

Filed Mar. 16, 1989, Ser. No. 324,943

Int. Cl.^{5} A01K *41/02, 41/04*

U.S. Cl. 119—41 **21 Claims**



1. A method for incubating and hatching eggs comprising the steps of:

providing a first upright helical coil for conducting a relatively hot fluid and a second upright helical coil for conducting a relatively cold fluid;

placing the coils in an insulated chamber;

providing a humidifier in the chamber;

placing a plurality of eggs in the chamber;

selecting a chamber temperature and a minimum chamber relative humidity;

periodically monitoring the chamber temperature;

producing a relatively hot fluid flow in the first coil if the temperature is below the selected chamber temperature;

producing a relatively cold fluid flow in the second coil if the temperature is above the selected chamber temperature;

periodically monitoring the chamber relative humidity; and

actuating the humidifier if the relative humidity is below the selected minimum chamber relative humidity.

5,025,620

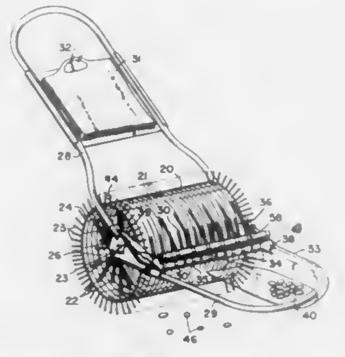
NUT HARVESTING APPARATUS

James M. Dudley, 11484 Pine St., Jacksonville, Fla. 32258

Filed Jul. 26, 1990, Ser. No. 558,234

Int. Cl.^{5} A01D *51/00*

U.S. Cl. 56—328.1 **20 Claims**

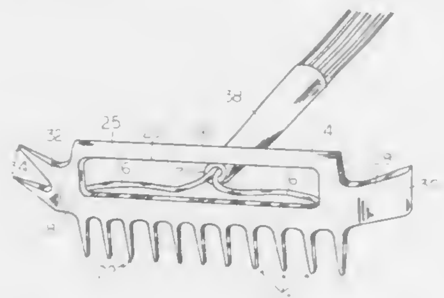


1. A nut harvesting apparatus comprising a frame having a

VOL
1127
ISS
4
JE
25
1991
UMI

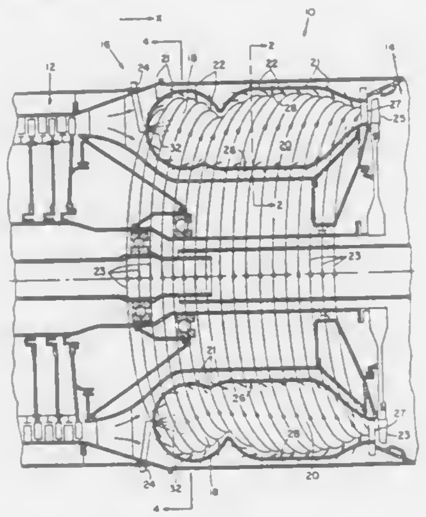
front, a back and two sides, a lateral axle extending from one to the other of said sides, a plurality of ground engaging nut collecting wheels individually rotatably mounted side-by-side on said axle, said frame including handle bar means at said back adapted to be pushed by a person walking behind said frame, a bag support at said front adapted to support an open collection bag thereon for receiving harvested nuts therein; and a nut stripping means to remove nuts from said wheels and direct them into said open bag; each said nut collecting wheel being a thin structure approximately the thickness of the smallest diametrical dimension of the nuts being collected and having a radially outwardly projecting wall member having a radial height outwardly of said rim being at least as large as said largest diametrical dimension of said nut and being adapted in combination with the wall member of the next adjacent wheel to clamp said nut therebetween, said stripping means being a comb-like member having a comb back extending across the front of said wheel adjacent said bag support and comb teeth projecting laterally outward from said comb back and extending into the spaces between said projecting wall members on adjacent wheels.

5,025,621
COMBINATION GARDEN IMPLEMENT
Vito A. DeMarco, P.O. Box 1091, Dennis, Mass. 02638
Filed Mar. 16, 1990, Ser. No. 495,456
Int. Cl.⁵ A01D *7/06*
U.S. Cl. 56—400.05 5 Claims



1. An improved combination garden implement apparatus comprising,
- (a) a handle of substantial length having a one end and an other end;
- (b) an implement head means of generally rectangular construction having a first and second longitudinal side, and a first and second end for mounting multi-purpose garden tool means attached to the one end of the handle mounted in perpendicular relationship with the handle;
- (c) the multi-purpose gardening tool means for performing multiple garden tasks comprising;
  - (i) a rake member extending along the first longitudinal side;
  - (ii) a sifter member extending along the second longitudinal side of the implement head means;
  - (iii) a hoe member extending outwardly from the one end of the implement head;
  - (iv) a cultivator extending outwardly from the other end of the implement head means;
- (d) pruning means mounted on the other end of the handle for detachment to use for pruning, the pruning means comprising;
  - (i) a handle element comprising a threaded sector in a longitudinal slot;
  - (ii) a shear blade fixedly fastened to the handle extendingly outward having a cultivating top;
  - (iii) a movable scissors blade having a blade end and a handle end.

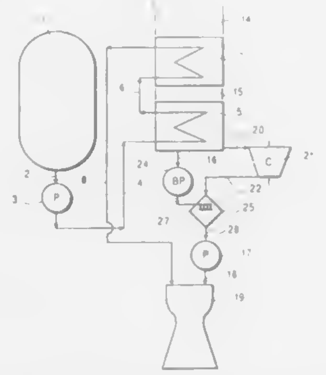
5,025,622
ANNULAR VORTEX COMBUSTOR
Jerry O. Melconian, Reading, Mass., assignor to SOL-3- Resources, Inc., Reading, Mass.
Continuation of Ser. No. 236,748, Aug. 26, 1988, abandoned. This application Jul. 10, 1990, Ser. No. 550,800
Int. Cl.⁵ F02C *3/14*
U.S. Cl. 60—39.464 21 Claims



1. a circumferentially stirred variable residence time vortex combustor comprising:
- a toroidal shaped primary annular combustion chamber disposed around a primary axis in the x-direction including an inner primary wall and an outer primary wall for containing an annular combustion vortex, at least one of said inner primary and said outer primary walls defining a first plurality of louvres peripherally disposed about said primary combustion chamber and longitudinally distributed along its primary axis, said louvres inclined to impel air circumferentially about the primary axis within said primary combustion chamber to cool its interior surfaces, to impel air inwardly to assist in driving the annular combustion vortex in a helical path and to feed combustion in said primary combustion chamber;
- a secondary annular combustion chamber including an inner secondary wall and an outer secondary wall; and
- a narrow annular waist region, interconnecting the output of said primary combustion chamber with said secondary annular combustion chamber and defined by said outer wall, for passing only lower density particles and trapping higher density particles in the annular combustion vortex in said primary annular combustion chamber for substantial combustion.

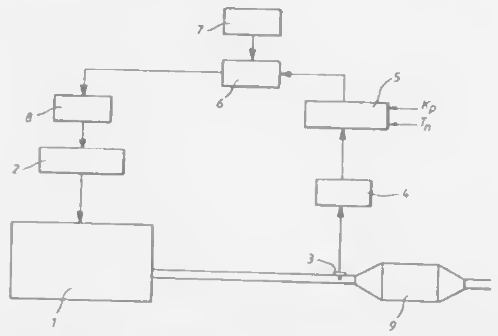
5,025,623
ROCKET ENGINE
Hiroyuki Hirakoso, and Teruyuki Aoki, both of Nagoya, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan
Filed Aug. 11, 1989 Ser. No. 392,283
Claims priority, application Japan, Sep. 13, 1988 63–227596
Int. Cl.⁵ F02K *9/42*
U.S. Cl. 60–257 20 Claims

1. a liquefied air cycle engine comprising:
- an air intake duct for receiving air;
- condensor means for condensing at least a portion of the air into liquefied air;
- coolant supply means for supplying coolant to said condensor means;
- a mixing chamber;
- spray means for spraying the liquefied air into said mixing chamber;
- pump means for pumping the liquefied air from said condensor means to said spray means;
- compressor means for compressing any unliquefied air remaining in said condensor;



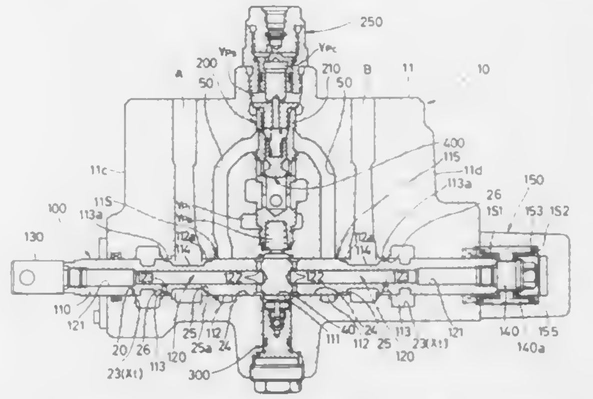
- means for feeding air from said compressor means to said mixing chamber to mix with the liquefied air sprayed into said mixing chamber such that the air from said compressor means becomes liquefied;
- means for feeding air from said mixing chamber; and
- combustor means for combusting liquefied air fed from said mixing chamber.

5,025,624
PROCESS FOR REGULATING THE FUEL/AIR RATIO IN INTERNAL COMBUSTION ENGINES
Wolfgang Strauss, Denkendorf, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Fed. Rep. of Germany
Filed Nov. 8, 1989, Ser. No. 433,121
Int. Cl.⁵ F0IN *3/20*
U.S. Cl. 60—274 5 Claims



1. Process for regulating a fuel/air ratio of internal combustion engines having an exhaust gas measuring probe and a catalyst in an exhaust gas path, a fuel/air mixture fed to the internal combustion engine via a proportioning device being regulated to a substantially stoichiometric value by a control unit with variable characteristics as a function of exhaust gas composition detected by the measuring probe, the process comprising the steps of:
- determining an operation time of the catalyst which reflects the catalyst aging and consequent decrease in conversion rate; and
- varying characteristics of the control unit in dependence on the operating time of the catalyst to thereby accommodate decreases in the catalyst conversion rate.

5,025,625
COMMONLY HOUSED DIRECTIONAL AND PRESSURE COMPENSATION VALVES FOR LOAD SENSING CONTROL SYSTEM
Rindo Morikawa, Higashimatsuyama, Japan, assignor to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan
Filed Nov. 7, 1989, Ser. No. 432,858
Claims priority, application Japan, Nov. 10, 1988, 63-284593
Int. Cl.⁵ F16K *11/00;* F15B *11/16*
U.S. Cl. 60—426 13 Claims



1. A hydraulic control system for driving a plurality of actuators, comprising:
- (a) a pump;
- (b) a plurality of directional control valves corresponding respectively to the plurality of actuators, each directional control valve comprising a pair of downstream throttle portions disposed between said pump and the corresponding actuator, and a spool for controlling the degree of opening of said pair of downstream throttle portions, and either of said two downstream throttle portions being opened in accordance with the movement of said spool to apply fluid to the corresponding actuator from said pump;
- (c) detection valve means comprising at least one detection valve for detecting the maximum load pressure among load pressures of the plurality of actuators;
- (d) a plurality of pressure compensation valves corresponding respectively to the plurality of actuators, each pressure compensation valve comprising an upstream throttle portion disposed between said pump and said pair of downstream throttle portions, and a balance piston for controlling the degree of opening of said upstream throttle portion, said balance piston having a first pressure receiving portion for receiving the load pressure of the corresponding actuator so as to move said balance piston in a direction to open said upstream throttle portion, said balance piston also having a second pressure receiving portion for receiving a supply pressure supplied from said upstream throttle portion to said downstream throttle portions so as to move said balance piston in a direction to close said upstream throttle portion, said balance piston including pressure receiving means for substantially receiving an operating pressure which decreases when the difference between the pressure of said pump and the maximum load pressure detected by said detection valve means decreases so that said balance piston can be moved in the direction to open said upstream throttle portion, and the position of said balance piston being so controlled that the force acting on said balance piston due to the difference between said supply pressure and said load pressure can be in equilibrium with the force acting on said balance piston due to said operating pressure received by said pressure receiving means; and
- (e) body means comprising a plurality of regions corresponding respectively to the plurality of actuators, said plurality of directional control valves as well as said plurality of pressure compensation valves being mounted

VOL
1127
ISS
4
JE
25
1991
UMI

respectively in said plurality of regions, each of said regions including a straight first hole and a straight second hole substantially perpendicularly intersecting a central portion of said first hole, said spool being slidably received in said first hole of the corresponding region of said body means, the intersection between said first and second holes forming a load pressure chamber for receiving the load pressure of the corresponding actuator, and said second hole having a first portion and a second portion between which said load pressure chamber is interposed, said balance piston of said pressure compensation valve being slidably received in said first portion of said second hole of the corresponding region of said body means, said first pressure receiving portion of said balance piston being directed toward said load pressure chamber, and said detection valve being received in said second portion of said second hole of one of said regions of said body means so as to receive the load pressure from said load pressure chamber.

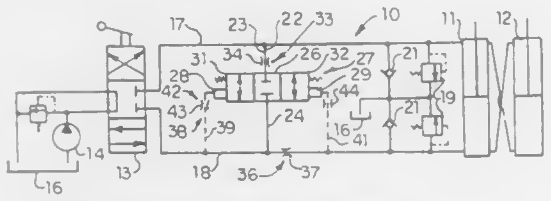
5,025,626
CUSHIONED SWING CIRCUIT

Jeffery A. Crosser, Joliet; Randall L. Mooberry, East Peoria; James D. Rinaldo, Joliet, and José M. Salazar-Vior, Washington, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Aug. 31, 1989, Ser. No. 401,392

Int. Cl.⁵ F16D *57/06*

U.S. Cl. 60—460 14 Claims



1. A cushioned swing circuit comprising:

a bi-directional hydraulic motor;

a directional control valve;

first and second conduits individually connected to the directional control valve and the hydraulic motor;

vent line means connected to at least one of the first and second motor conduits;

a cushion valve connected to the vent line means and moveable between a closed position blocking fluid flow through the vent line means and an open position establishing fluid flow through the vent line means, said cushion valve including spring means for resiliently biasing the cushion valve to the closed position;

means for restricting fluid flow through the vent line means when the cushion valve is in the open position;

flow restriction means disposed in one of the first and second motor conduits for generating a pressure differential therein when fluid is flowing therethrough;

means for moving the cushion valve to the open position position when the pressure differential exceeds a predetermined level; and

means for retaining the cushion valve in the open position for a predetermined limited time after the pressure differential drops below the predetermined level.

5,025,627
REMOTE CONTROLLED HIGH FORCE ACTUATOR

Edward T. Schneider, 8729 Hilltop, Mentor, Ohio 44060

Filed Sep. 5, 1989, Ser. No. 402,616

Int. Cl.⁵ F02G *7/06*

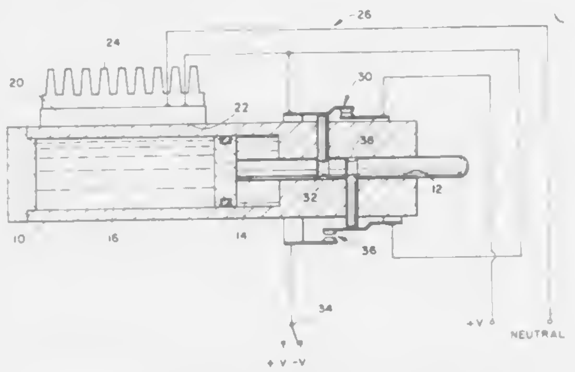
U.S. Cl. 60—527 21 Claims

1. A remotely controlled actuator comprising:

a chamber filled with a medium that expands as it undergoes a phase change from a solid phase to a liquid phase and contracts as it changes phase from the liquid phase to the solid phase;

a piston slidably received in the chamber for extending and retracting as the medium expands and contracts;

a means for selectively heating and cooling the medium to cause the medium to change phase, extending and retracting the piston;



a temperature control means for controlling the heating and cooling means to maintain the medium substantially at a melting point temperature at which the medium undergoes the phase change.

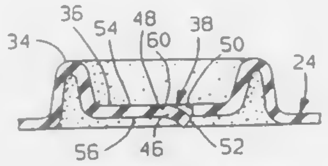
5,025,628
MASTER CYLINDER RESERVOIR DIAPHRAGM VENTING ARRANGEMENT

John C. Layman, Union, and Cecil C. Pugh, Kettering, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 27, 1989, Ser. No. 386,467

Int. Cl.⁵ B60T *11/26*

U.S. Cl. 60—585 11 Claims



8. A double acting vent valve in a diaphragm periodically subjected to differential pressures acting across the diaphragm in either direction, said diaphragm being made of a rubber-like resilient material, said valve comprising:

a tongue valve member having an edge surface and a base defined by one side of a curvilinear slit having spaced aligned ends separated by a curved slit section to form an omega slit, said base being that portion of said tongue valve member between said slit ends;

and a valve seat defined by the other side of said omega slit and cooperating with said tongue valve member when said valve is closed by edge surface contact of said tongue valve member and said valve seat;

said tongue valve member base forming a resilient hinge for said tongue valve member so that said tongue valve member acts as a cantilever flapper valve movable on either side of said diaphragm away from said valve seat to provide a valve opening through said omega slit, the side of said diaphragm to which said tongue valve member moves being the side having the lower pressure of the differential pressures impressed across said diaphragm.

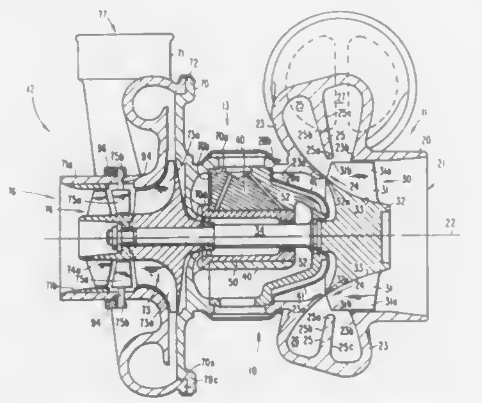
5,025,629
HIGH PRESSURE RATIO TURBOCHARGER

William E. Woollenweber, 3169 Camino del Arco, La Costa, Calif. 92009-7856

Filed Mar. 20, 1989, Ser. No. 325,916

Int. Cl.⁵ F02B *37/00*

U.S. Cl. 60—600 29 Claims



1. A turbocharger system for an internal combustion engine, comprising:

means forming a turbine adapted to be driven by exhaust gas from an internal combustion engine comprising:

a turbine wheel having a central core and a plurality of outwardly extending vanes, said turbine wheel being rotatable about a central axis;

a meridionally divided volute for exhaust gas surrounding said turbine wheel, said meridionally divided volute including a divider wall defining first and second volute passageways with openings at said turbine wheel;

means forming a high-pressure compressor driven by said turbine means, said high-pressure compressor comprising:

a plurality of rotating compressor blades, said compressor blades adapted to be driven in rotation about said central axis by said turbine means to deliver a flow of air at high pressures for an internal combustion engine, and a plurality of stator blades being moveable about longitudinal axes generally transverse to said central axis to impart positive or negative pre-whirl motion to the air leaving the stator blades prior to entering the rotating blades of the compressor stage;

closure means for providing a flow of engine exhaust gas from one of said first and second volute passageways into said turbine wheel; and

a control means for operating said closure means and said stator blades in synchronization.

5,025,630
METHOD AND DEVICE FOR PROTECTING AGAINST EROSION AND/OR CORROSION STEAM PIPES FROM THE HIGH-PRESSURE STAGE OF A TURBINE

Jacques Marjollet, and Boris Perras, both of Paris, France, assignors to Stein Industrie, France

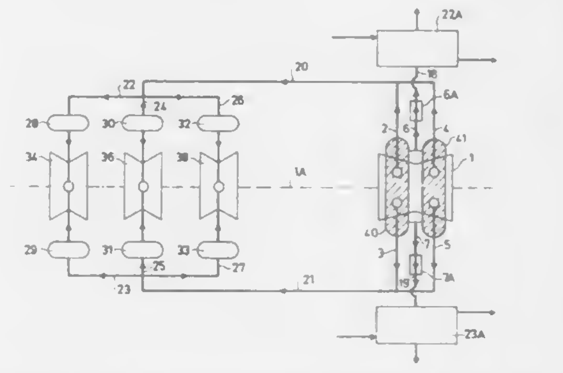
Filed Jan. 4, 1990, Ser. No. 460,793

Claims priority, application France, Jan. 6, 1989, 89 00110

Int. Cl.⁵ F01K *21/00*

U.S. Cl. 60—646 6 Claims

1. Method of protecting against erosion and/or corrosion steam pipes of the high-pressure stage of a power and/or steam generation plant saturated steam turbine, at portions of its low-pressure stage and at heaters of the heat exchanger installation of the power and/or steam generation plant, in which method the major part of the water contained in the offtakes and the wet steam outlets of the high-pressure stage is separated out by centrifugal means, a first fraction of the steam partly dried by said centrifugal means is at least final dried (28 30, 32, 29, 31, 33) and then fed into the portions of the low-pressure stage of the turbine and a complementary fraction of the partly dried steam is fed to the heaters (22A, 23A), the first fraction and the complementary fraction of the steam being partially dried together by centrifugal means (40, 41) after which the complementary fraction is final dried by centrifugal means.



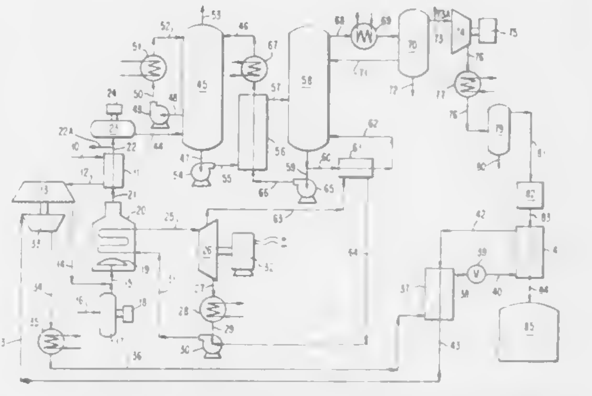
5,025,631
COGENERATION SYSTEM WITH LOW NO_x COMBUSTION OF FUEL GAS

Paul W. Garbo, 48 Lester Ave., Freeport, N.Y. 11520

Filed Jul. 16, 1990, Ser. No. 553,260

Int. Cl.⁵ F01K *23/10*

U.S. Cl. 60—655 12 Claims



1. A cogeneration system for the production of electricity and refrigeration with low NO_x combustion of fuel gas supplied at a high pressure, which comprises:

(1) a heat exchanger to heat said fuel gas at high pressure;

(2) a turbo-expander connected to receive and expand the heated fuel gas from said heat exchanger (1);

(3) a centrifugal compressor driven by said turbo-expander (2), said compressor being the refrigerant compressor of a refrigeration system;

(4) a porous fiber burner connected to receive the expanded fuel gas from said turbo-expander (2) together with the requisite combustion air;

(5) a high-pressure steam boiler heated by the combustion of said expanded fuel gas on the outer surface of said porous fiber burner (4), said boiler being connected to pass the resulting flue gas with low NO_x content through said heat exchanger (1) to heat said fuel gas at high pressure;

(6) a steam turbine connected to receive and expand high-pressure steam from said boiler (5) and to return expanded and condensed steam to said boiler (5); and

(7) an electric generator driven by said steam turbine (6).

VOL
1127
ISS
4
JE
25
1991
UMI

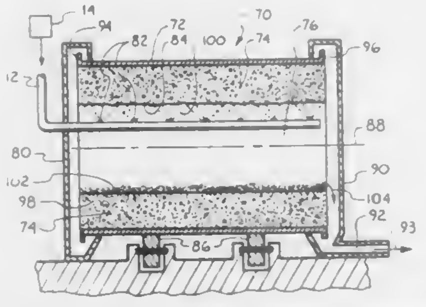
5,025,632
METHOD AND APPARATUS FOR CRYOGENIC REMOVAL OF SOLID MATERIALS

Michael H. Spritzer, San Diego, Calif., assignor to General Atomics, San Diego, Calif.

Filed Jun. 13, 1989, Ser. No. 365,667

Int. Cl.^{5} F25D *17/02*

U.S. Cl. 62—64 **27 Claims**



1. A device for removing exposed energetic material from a casing which comprises:
  - a container for holding a cryogen;
  - a wand connected in fluid communication with said container for directing said cryogen against a selected portion of said energetic material to embrittle said portion;
  - means operable with said wand for fracturing said embrittled portion into particles of said material; and
  - means operable with said fracturing means for removing said particles from said casing.

5,025,633
CFC RECYCLING SYSTEM

Daniel J. Furmanek, 5750 Newhouse Rd., E. Amherst, N.Y. 14051

Filed Jul. 31, 1990, Ser. No. 561,342

Int. Cl.^{5} T25B *45/00*

U.S. Cl. 62—77 **9 Claims**

1. A method for recycling Freon which comprises attaching a Freon removal valve to a Freon supply located in an appliance such as an air conditioner, refrigerator, freezer or the like, positioning a substantially empty Freon collecting vessel in gas flow relationship to said valve, drawing said Freon out of said Freon supply via said valve by providing said Freon removal valve with a puncture needle extending upwardly and adapted to puncture a Freon supply tubing in said appliance, below said puncture needle is positioned a spring means, and below said spring means is positioned a piercing means adapted to pierce a closure in said collecting vessel to thereby establish a gas passage means extending from said supply tube, through said needle, through said piercing means to said collecting vessel, collecting said Freon thereby in said collecting vessel, providing a substantially gas-free sealing means on said collecting vessel to insure substantial total containment of said Freon within said collecting vessel, and delivering said collecting vessel to a collection center for reuse and recycling of said Freon.

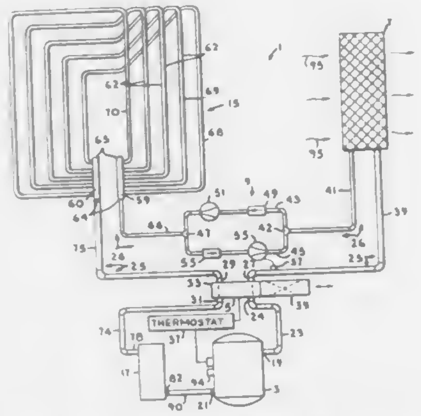
5,025,634
HEATING AND COOLING APPARATUS

William E. Dressler, 8385 Melrose, Lenexa, Kans. 66214

Continuation-in-part of Ser. No. 342,755, Apr. 25, 1989, abandoned. This application May 14, 1990, Ser. No. 523,118

Int. Cl.^{5} F25B *7/00*

U.S. Cl. 62—79 **22 Claims**



1. In a heating and cooling apparatus having a subterranean heat exchanger in thermal communication with the earth, a dynamic load heat exchanger in thermal communication with a dynamic load, a refrigerant for conveying thermal energy through said apparatus, said refrigerant alternately undergoing gas-to-liquid and liquid-to-gas phase changes while being directed through said apparatus, and a compressor for cycling said refrigerant through said apparatus, said compressor containing a lubricant, the improvement comprising:
  - (a) said subterranean heat exchanger being oriented substantially horizontally and including a pair of manifolds and a plurality of tubes fluidically interconnecting said manifolds;
  - (b) reversing valve means for selectively and reversibly interconnecting said compressor with said subterranean heat exchanger and said dynamic load heat exchanger for reversing the direction and sequence of refrigerant flow through said heat exchangers; and
  - (c) lubricant recovery means for recovering said lubricant from said subterranean exchanger and for restoring said recovered lubricant to said compressor.

19. A method for extracting thermal energy from the earth for heating purposes and diverting thermal energy to the earth for cooling purposes, comprising the steps of:
  - (a) providing a thermostatically controlled, single closed loop system containing a refrigerant, said loop having a gaseous portion whereat said refrigerant is substantially in a gaseous phase, and a liquid portion whereat said refrigerant is substantially in a liquid phase; a dynamic load heat exchanger disposed in said loop at a first juncture between said gaseous portion and said liquid portion; a subterranean heat exchanger similarly disposed in said loop at a second juncture between said gaseous portion and said liquid portion; said subterranean heat exchanger substantially horizontally oriented and disposed below the frost-line of the locality; a compressor for cycling said refrigerant through said loop and a reversing valve assembly having a heating mode configuration for extracting thermal energy from the earth and a cooling mode configuration for diverting thermal energy to the earth;
  - (b) placing said reversing valve assembly in said heating mode configuration; followed by
    - (1) compressing said refrigerant in said gaseous portion with said compressor such that said refrigerant acquires a temperature which is substantially warmer than a receiving medium which is in thermal communication with said dynamic load heat exchanger;
    - (2) removing thermal energy from said refrigerant by conveying said refrigerant through said dynamic load heat exchanger wherein said refrigerant substantially undergoes a gas-to-liquid phase transition while simultaneously transferring said thermal energy to said receiving medium for distribution elsewhere for heating purposes;
    - (3) simultaneously controllably regulating the flow rate and reducing the pressure of said liquid refrigerant such that the effective temperature of said refrigerant is substantially less than the temperature of the earth below the frost-line of the locality;
    - (4) extracting thermal energy from the earth with said refrigerant by passing said refrigerant at a relatively high velocity through said subterranean heat exchanger; said velocity of said refrigerant sufficient to sweep any lubricant oil, which may have escaped from said compressor along with said lubricant; said refrigerant substantially undergoing a liquid-to-gas phase transition by absorbing thermal energy from the earth while passing through said subterranean heat exchanger;
    - (5) returning said refrigerant with said escaped lubricant oil to said compressor completing the cycle of said refrigerant through said single closed loop system and restoring said escaped lubricant oil to said compressor;
  - (c) placing said reversing valve assembly in said cooling mode configuration; followed by:
    - (1) compressing said refrigerant in said gaseous portion with said compressor such that said refrigerant acquires a temperature which is substantially warmer than the earth which is in thermal communication with said subterranean heat exchanger;
    - (2) diverting thermal energy to the earth from said refrigerant by conveying said refrigerant through said subterranean heat exchanger wherein said refrigerant is conveyed therethrough with sufficient velocity to sweep any said escaped lubricant oil along with said refrigerant; said refrigerant substantially undergoing a gas-to-liquid phase transition while passing through said subterranean heat exchanger;
    - (3) simultaneously controllably regulating the flow rate and reducing the pressure of said liquid refrigerant such that the effective temperature of said refrigerant is substantially less than the temperature of said receiving medium in thermal communication with said dynamic load heat exchanger;
    - (4) absorbing thermal energy from and cooling said receiving medium by conveying said refrigerant through said dynamic load heat exchanger; said refrigerant substantially undergoing a liquid-to-gas phase transition while passing through said dynamic load heat exchanger;
    - (5) returning said refrigerant with said extracted lubricant oil to said compressor completing the cycle of said refrigerant through said single closed loop system and restoring said escaped lubricant oil to said compressor.

5,025,635
CONTINUOUS CONSTANT PRESSURE STAGING OF SOLID-VAPOR COMPOUND REACTORS

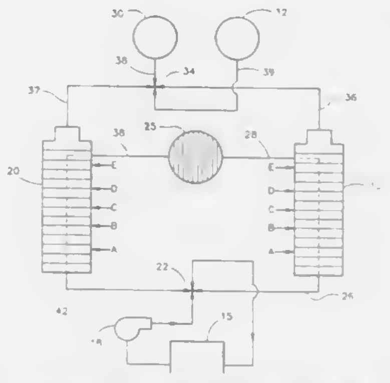
Uwe Rockenfeller, and Lance D. Kirol, both of Boulder City, Nev., assignors to Rocky Research, Boulder City, Nev.

Filed Nov. 14, 1989, Ser. No. 436,431

Int. Cl.^{5} F25B *17/00*

U.S. Cl. 62—106 **47 Claims**

1. A method of staging solid-vapor compound reactions comprising:
  - (a) selecting a plurality of two or more different compounds comprising a solid reactant adsorbent and a gaseous reactant adsorbed thereon, wherein each of said compounds has a different gaseous reactant vapor pressure, substantially independent of the concentration of the gaseous reactant,
  - (b) locating a first set of the said different compounds in a first reactor and a second set of the said different compounds in a second reactor,
  - (c) supplying a heat transfer fluid at a first temperature along said first reactor in thermal communication with said first set of compounds resulting in a first pressure, whereby said compounds desorb said gaseous reactant in endothermic reactions, and
  - (d) supplying a heat transfer fluid at a second temperature, lower than said first temperature, along said second reactor in thermal communication with said second set of compounds, and operating said second reactor at a second pressure whereby said compounds therein adsorb said gaseous reactant in exothermic reactions.



5,025,636
REFRIGERATING SYSTEM HAVING A COMPRESSOR WITH AN INTERNALLY AND EXTERNALLY CONTROLLED VARIABLE DISPLACEMENT MECHANISM

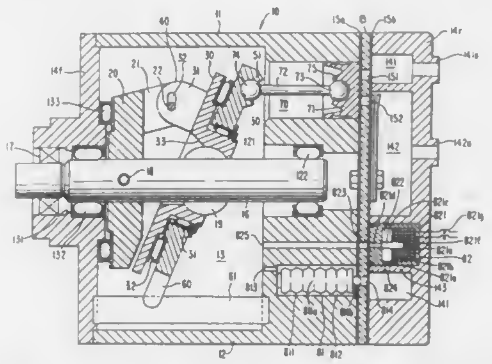
Kiyoshi Terauchi, Isesaki, Japan, assignor to Sanden Corporation, Gunma, Japan

Division of Ser. No. 247,605, Sep. 22, 1988, Pat. No. 4,882,909. This application Aug. 18, 1989, Ser. No. 395,510

Claims priority, application Japan, Sep. 22, 1987, 62-236315

Int. Cl.^{5} F04B *1/26*

U.S. Cl. 62—115 **4 Claims**



1. In a refrigerating system including a refrigerant circuit, comprising a condenser, evaporator and compressor, the compressor including a compressor housing having a central portion, a front end plate at one end and a rear end plate at its other end, said housing having a cylinder block, a piston slidably fitted within each of said cylinders, a drive mechanism coupled to said pistons to reciprocate said pistons within said cylinders, said drive mechanism including a drive shaft rotatably supported in said housing, a rotor coupled to said drive shaft and rotatable therewith, and coupling means for driv-

VOL
1127
ISS
4
JE
25
1991
UMI

ingly coupling said rotor to said pistons such that the rotary motion of said rotor is converted into reciprocating motion of said pistons, said coupling means including a member having a surface disposed at an incline angle relative to said drive shaft, said incline angle of said member being adjustable to vary the stroke length of said pistons and the capacity of said compressor, said rear end plate having a suction chamber and a discharge chamber, variable displacement control means for controlling angular displacement of said adjustable member, comprising first valve control means for controlling fluid communication between said crank chamber and said suction chamber in response to changes in refrigerant pressure in said compressor, said first valve control means comprising a first passageway providing fluid communication between said crank chamber and said suction chamber and first valve means for controlling the opening and closing of said first passageway to vary the capacity of the compressor by adjusting the incline angle, said first valve means comprising a first valve to directly open and close said first passageway, said variable displacement control means further comprising second valve control means for controlling fluid communication between said crank chamber and said suction chamber in response to a signal generated outside of the compressor, said second valve control means comprising a second passageway providing fluid communication between said crank chamber and said suction chamber and said second valve means for controlling the opening and closing of said second passageway to vary the capacity of said compressor by adjusting the incline angle, said second valve means comprising a second valve to directly open and close said second passageway and override the operation of said first valve, the improvement comprising:

means for controlling the generation of the control signal in response to the pressure at the outlet portion of the evaporator such that the control signal is generated when the pressure at the outlet portion of the evaporator indicates a value beyond a predetermined range of values.

5,025,637

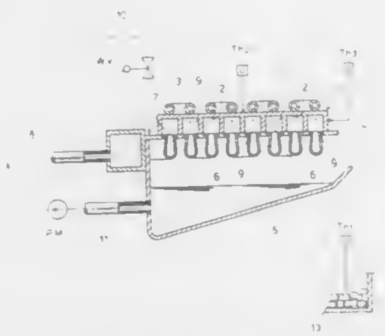
AUTOMATIC ICE MAKING MACHINE

Yasuo Hara, Toyoake, Japan, assignor to Hoshizaki Denki Kabushiki Kaisha, Aichi, Japan

Filed Apr. 16, 1990, Ser. No. 510,118

Int. Cl.^{5} F25C *1/12*

U.S. Cl. 62—138 **8 Claims**



1. An automatic ice making machine having an ice making section equipped with an evaporator connected to a freezing system, a water feed system for feeding a water to be frozen to said ice making section, an ice releasing unit for releasing the ice cakes formed in said ice making section, and an ice removal detector which detects completion of removal of ice cakes in said ice making section;

characterized in that said ice removal detector further comprises a protection unit which stops the ice making operation after a predetermined time counted from the starting point of the ice releasing operation, provided that the ice removal detector outputs no ice removal signal, and wherein:

the protection unit comprises a timer having a normally open contact which is closed when a preset time is counted up thereby, and a relay having a normally closed contact interposed within one of the power supply lines connected to the ice making machine and a normally open contact disposed in parallel to the normally open contact of the timer; and

the relay allows its normally closed contact to assume an open posture and also its normally open contact to assume a closed posture when it is energized between the two power supply lines upon closure of the normally open contact of the timer to retain continuity on its own.

5,025,638

DUCT TYPE AIR CONDITIONER AND METHOD OF CONTROLLING THE SAME

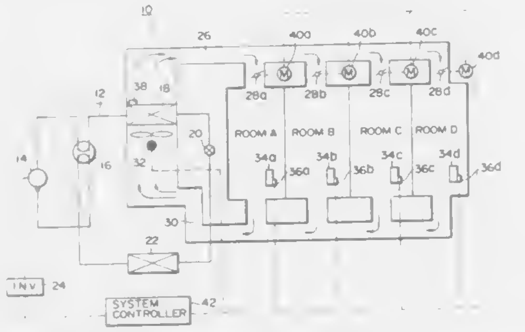
Katsuaki Yamagishi, Yokohama; Koichi Matsui, Tokyo; Toshimasa Tanaka, Ebina; Nobuo Matsui, Yokohama; Sei Suma, Fuji, and Yoshihito Mino, Shizuoka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 28, 1990, Ser. No. 500,599

Claims priority, application Japan, Mar. 30, 1989, 1-76516

Int. Cl.^{5} F25D *17/00*

U.S. Cl. 62—180 **12 Claims**



1. A duct type air conditioner comprising:

heat exchanging means for receiving one of a high-temperature high-pressure refrigerant gas and a low-temperature low-pressure liquid refrigerant and heat-exchanging one of the received refrigerant gas and the received liquid refrigerant with air, thereby extracting one of condensation heat and evaporation heat;

duct means for circulating air between a plurality of regions to be air-conditioned to be subjected to air conditioning and said heat exchanging means;

a plurality of air volume control means, independently provided in said plurality of regions to be air-conditioned, for controlling a flow amount of air supplied rom said heat exchanging means through said duct means, wherein each said air volume control means comprises:

means for controlling the flow amount of air in accordance with a difference between an intraregion temperature of a corresponding region to be air-conditioned and a set intraregion temperature and a holding time of the difference; and

means for changing the flow amount of air when the difference between the intraregion temperature of the corresponding region to be air-conditioned and the set intraregion temperature does not fall within a second predetermined rage and the holding time of the difference exceeds a second predetermined time;

temperature detecting means for detecting a temperature of the refrigerant obtained by heat exchange of one of the refrigerant gas and the liquid refrigerant with air performed by said heat exchanging means;

control means for controlling a flow amount of one of the refrigerant gas and the liquid refrigerant to be supplied to said heat exchanging means in accordance with a difference between the temperature of the refrigerant detected by said temperature detecting means and a first set temperature and a holding time of the difference; and

means for causing said control means to control the flow amount of one of the refrigerant gas and the liquid refrigerant before said plurality of air volume control means control the flow amounts of air.

5,025,639

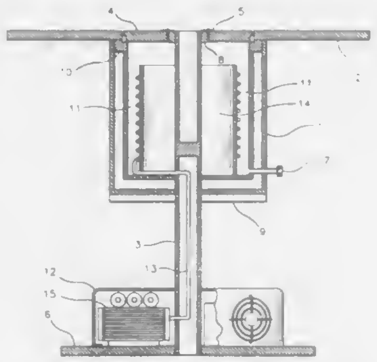
PATIO COOLER TABLE

Tammy D. Thomas, 1240 Riti La., Granite City, Ill. 62040

Filed Jun. 12, 1989, Ser. No. 365,002

Int. Cl.^{5} F25D *23/13*

U.S. Cl. 62—258 **1 Claim**



1. A patio table constructed of plastic or metal having a central refrigerated container accessible from the top wherein the improvement comprises:

(a) the table supported by a central vertical support tubular member;
(b) the top of the tubular member having means for supporting an umbrella post;
(c) the bottom of the tubular member attached to a base structure of extended area;
(d) the base structure including an enclosure for the alternate case of an electric refrigeration unit;
(e) support members extending radially from the tubular member supporting a circular, thermally insulated container;
(f) a second, container circumferential, ventilated, adjacent to and axially centered in the insulated container;
(g) the second container enclosing ice, chemical cooling materials or alternately refrigerating coils;
(h) two access doors on the top surface of the insulated container hinged to the radial support structure.

5,025,640

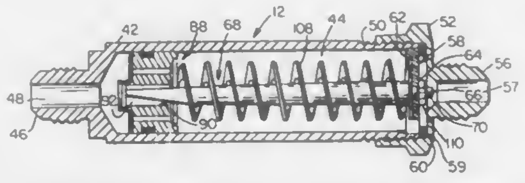
REFRIGERANT EXPANSION DEVICE FOR OPTIMIZING COOLING AND DEFROST OPERATION OF A HEAT PUMP

Alan S. Drucker, DeWitt, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Jun. 27, 1990, Ser. No. 544,576

Int. Cl.^{5} F25B *13/00*

U.S. Cl. 62—324.6 **2 Claims**



1. A refrigerant expansion device of the type including:

a housing having a flow passage extending therethrough, a piston, having a flow metering port therethrough, movably mounted within the flow passage, a flow metering rod supported within the housing and extending through the metering port, the flow metering rod and the flow metering port cooperating to define a flow metering passage therebetween, the flow metering rod having a varying cross-sectional area is configured so that the cross sectional area of the flow metering passage varies relative to an axial position of the piston with respect to the rod, the piston is spring biased to a closed position on the rod when no refrigerant is flowing through the device, and, the piston moves relative to the rod as a function of a pressure differential between a high and low pressure side of a refrigeration system in which the device is installed, wherein the improvement comprises;

configuring the cross sectional area of said flow metering rod to define a defrost zone which cooperates with said metering port to provide a flow metering passage, at pressure differentials lower than a normal pressure differential range for cooling operation of the system in which the device is to be installed, which is substantially larger than the flow metering passage required for cooling operation of the refrigeration system.

5,025,641

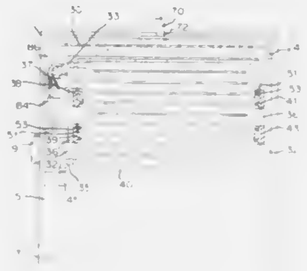
MODULAR ICE MACHINE

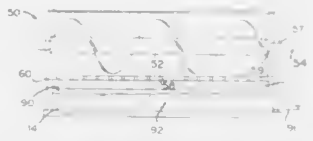
John A. Broadhurst, Route 1, Box 180, Argyle, Tex. 76226

Filed Feb. 24, 1989, Ser. No. 315,307

Int. Cl.^{5} F25C *1/12*

U.S. Cl. 62—347 **14 Claims**





1. An ice machine for manufacturing ice comprising:

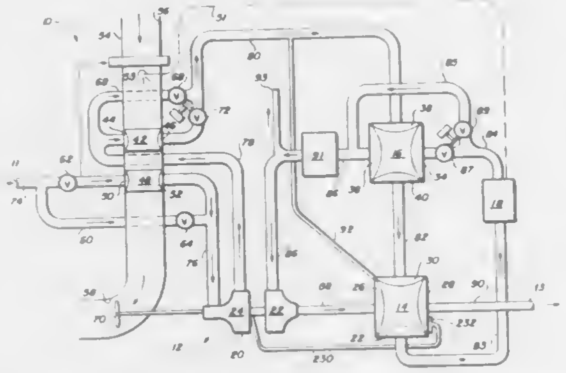
a. A frame manufactured completely of a thermal plastic material composed of four sides, a top and bottom;
b. a hydrostatic distributor supported by said frame and freely movable in relation thereto;
c. at least one freezing plate supported by and slidably mounted within said frame adjacent said hydrostatic distributor;
d. a refrigerant gas inlet means for said freezing plate;
e. a hot gas inlet means for said freezing plate;
f. a combination hot gas/refrigerant outlet means for said freezing plate;
g. an ice making water inlet means into said frame and in communication with said hydrostatic distributor;
h. ice slide means mounted within said frame below and at an oblique angle to said freezing plate; and
i. means for conveying ice from within said frame.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,642
FLUID CONDITIONING APPARATUS AND SYSTEM

Michael R. Brunskill, Rolling Hills Estates; George R. Manus, Redondo Beach, and Edgar A. Monegan, Chastworth, all of Calif., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Feb. 20, 1990, Ser. No. 482,382
Int. Cl.^{5} F25D *9/00*
U.S. Cl. 62—402 27 Claims



1. A system for conditioning a working fluid to be distributed from a source thereof to a point of use, comprising:

an air cycle machine including a compressor mechanically driven by a turbine, said compressor receiving working fluid from said source and operable to compress and heat the working fluid, said turbine operable to expand and cool the working fluid to subfreezing conditions prior to its delivery to the point of use;

first means for receiving and cooling the working fluid discharged from said compressor;

reheater means for receiving and further cooling the working fluid discharged from said first means;

condenser heat exchange means, receiving working fluid discharged from said reheater means, for condensing vapor entrained in the working fluid, said condenser means receiving the subfreezing working fluid discharged from said turbine to effect said condensing;

separator means, receiving the working fluid and condensed vapor discharged from said condenser means, for separating and removing the condensed vapor from the working fluid, at least a portion of the working fluid discharged from said separator means being directed through said reheater means to effect said further cooling of the working fluid discharged from said first means, and substantially all of the working fluid discharged from the separator means being delivered to said turbine;

a filter for removing contaminants from the working fluid discharged from said separator means prior to delivery to said turbine;

said condenser heat exchange means defining a core having first and second passageways arranged for heat exchange between the fluids therein, said first and second passageways being configured and sized to heat the subfreezing working fluid discharged from said turbine to a temperature desired for delivery to the point of use, whereby all working fluid delivered to the point of use passes through said filter, said condenser heat exchange means including:

first inlet and outlet plenum chambers at opposite inlet and outlet faces of said core, said first inlet and outlet plenum chambers communicating with said first passageway, said first inlet plenum chamber receiving the subfreezing working fluid discharged from said turbine and being sufficiently close-coupled to said turbine to produce a substantial stratification of flow velocity of the subfreezing working fluid impinging upon said inlet face of the core, said first outlet plenum chamber receiving and collecting the working fluid discharged from the first passageway for delivery thereof to the point of use;

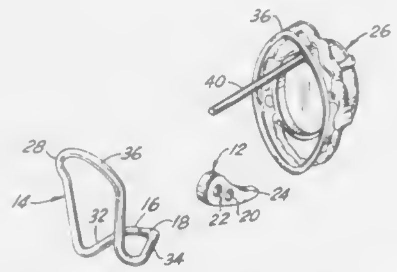
second inlet and outlet plenum chambers communicating with said second passageway, said second inlet plenum chamber receiving the working fluid discharged from said reheater means, and said second outlet plenum chamber receiving and collecting the working fluid discharged from said second passageway for delivery thereof to said separator means; and

flow redistributing means disposed in said first outlet plenum chamber for minimizing said stratification of flow velocities at said inlet face of the core.

5,025,643
HOLDING CLIP

David Chan, and Raymond Chan, both of Kowloon, Hong Kong, assignors to International Cultured Pearl Company, Inc., New York, N.Y.

Filed Feb. 27, 1990, Ser. No. 485,576
Int. Cl.^{5} A44C *7/00*
U.S. Cl. 63—12 8 Claims



1. An earring clip adapted to be mounted on the back surface of an earring comprising:

a base and a curved retaining wire,

said base having an attachment end adapted to be connected to the back surface of the earring,

said base having first and second openings therein, said openings being offset from one another, both of said openings spaced from said attachment end,

said retaining wire having first and second opposed end legs pivotally mounted respectively in said first and second openings of said base,

the mounting of said retaining wire to said base imparting a stress to said retaining wire causing said retaining wire to be movable between an open position and a holding position,

said retaining wire having a curved holding central portion connected to said first and second legs by first and second intermediate portions,

said curved central portion of said retaining wire being biased by the stress of said retaining wire toward the back surface of the earring to which the clip is mounted when said retaining wire is in said holding position,

said base and said intermediate portions of said retaining wire defining a space adjacent to the back surface of the earring to which the clip is mounted that is adapted to accommodate the earlobe of the wearer,

said retaining wire comprises in linear order, said first leg, said first intermediate portion, said curved central portion, said second intermediate portion and said second leg,

said first leg and said first intermediate portion forming a dogleg and defining a first plane,

said second leg and said second intermediate portion forming a dogleg and defining a second plane,

said first and second planes being approximately parallel to one another,

said curved central portion having a first end and a second end, said first end of said curved central portion and said first intermediate portion forming a dogleg and defining a third plane,

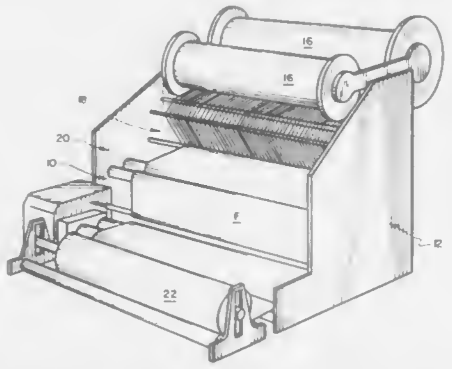
said second end of said curved central portion and said second intermediate portion forming a dogleg and defining a fourth plane,

said third and fourth planes forming an acute angle relative to one another.

5,025,644
SUEDING MEANS IN A TEXTILE FABRIC-PRODUCING MACHINE

Arne Nielsen, Oak Ridge, and Majid Moghaddassi, Greensboro, both of N.C., assignors to Guilford Mills, Inc., Greensboro, N.C.

Filed May 23, 1989, Ser. No. 355,917
Int. Cl.^{5} D04B *35/00;* **D06C** *11/00*
U.S. Cl. 66—147 23 Claims



1. In a textile fabric-producing machine of the type having means for manipulating yarn to form a fabric in flat open-width form and a location following the yarn manipulating means for take-up of the fabric, the improvement comprising means for sueding the fabric in full width form intermediate the yarn manipulating means and the take-up location, the sueding means comprising a sueding roll having an abrasive peripheral surface, means for directing the fabric to t ravel intermediate the yarn manipulating means and the take-up location in peripheral surface engagement with the sueding roll, the fabric directing means including dancer rolls means for monitoring tension and speed fluctuations in the fabric and adjusting the fabric directing means in relation thereto, and means for driving rotation of the sueding roll at a peripheral surface speed compatibly related to the traveling speed of the fabric.

5,025,645
WASHING MACHINE

Werner Eck, Herzogenaurach; Ernst Harrsch, Marbach, and Friedrich Geiger, Heilbronn, all of Fed. Rep. of Germany, assignors to Passat-Maschinenbau GmbH, Fed. Rep. of Germany

Filed May 25, 1989, Ser. No. 356,686
Claims priority, application Fed. Rep. of Germany, Jun. 6, 1988, 3819238
Int. Cl.^{5} D06F *31/00*
U.S. Cl. 68—27 16 Claims

1. Machine for washing material, comprising

a housing having a cylindrical bearing shell with a bearing surface which is coaxial with a substantially horizontal axis,

at least one drum with a circumferential wall extending about a drum axis, said circumferential wall surrounding at least partially a drum area for the material to be washed, said drum area having two end walls at least one of which has a drum opening for introduction and/or removal of said material,

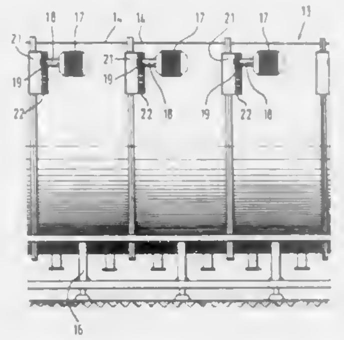
with a cylindrical drum connection piece surrounding said drum opening, said drum being mounted on said bearing surface for rotation about said substantially horizontal axis by means of said drum connection piece, and with a drive by means of which said drum is movable about said horizontal axis,

characterized in that

said drum connection piece is mounted on said bearing surface by means of a bearing ring surrounding said drum connection piece,

and in that

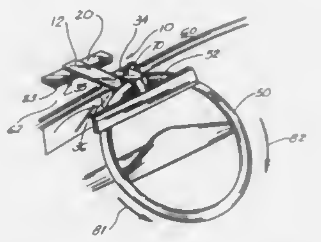
a housing opening is provided in said housing for exchanging said bearing ring.



5,025,646
STEERING WHEEL LOCK APPARATUS

Arthur A. Waguespack, Jr., 14 Sombrero La., St. Rose, La. 70087

Filed Nov. 19, 1990, Ser. No. 615,310
Int. Cl.^{5} B60R *25/02*
U.S. Cl. 70—209 5 Claims



1. An apparatus for preventing the turning of a steering wheel of a powered vehicle, comprising:

a) a principal body portion extending substantially between an upper portion of the steering wheel of the vehicle and an upper face of a dashboard of the vehicle;

b) a first transverse body member secured to a first end of the principal body portion and resting on the dashboard;

c) means for receiving a portion of the steering wheel in locked engagement with a second end of the principal body portion; and

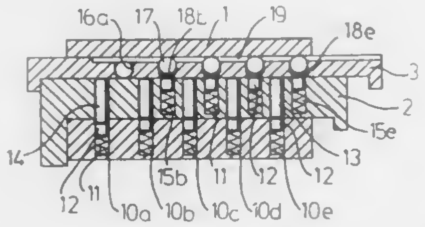
d) a second transverse body member secured to the second end of the principal body portion, making contact with a portion of the steering wheel so that any attempt to turn the steering wheel is resisted by the position of the first transverse body member, and any attempt to lift the apparatus out of position is resisted by the second transverse body member in relation to the steering wheel.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,647

LOCK ARRANGEMENT

Frank Muus, Moss, Norway, assignor to TrioVing a.s., Norway
PCT No. PCT/NO89/00026, § 371 Date Nov. 3, 1989, § 102(e) Date Nov. 3, 1989, PCT Pub. No. WO89/11576, PCT Pub. Date Nov. 30, 1989
PCT Filed Mar. 31, 1989, Ser. No. 435,417
Int. Cl.^{5} E05B *21/00*
U.S. Cl. 70—352 **7 Claims**

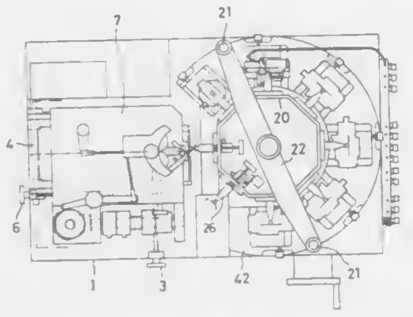


1. A lock arrangement having a housing (**1**), a locking member (**2**) which is movably arranged in the housing (**1**), a slot (**11**) for the introduction of a card-shaped key member (**4**), blocking pins, each having several parts and, by means of the card-shaped key member (**4**), being mechanically displaceable transversally of the plane of the key member in cylindrical chambers (**10**) between positions wherein they prevent and permit, respectively, relative movement between the locking member (**2**) and the housing (**1**), wherein said locking member (**2**) comprises coding chambers (**15**) having springs (**11**) and the coding disks (**18**), said coding chambers being arranged in a pattern corresponding to that of the chambers (**10**) of the blocking pins but being displaced with respect to these, and wherein the lock further comprises a recoding slide (**3**) which is slidably arranged in the housing (**1**) and is provided with chambers (**16**) in a pattern corresponding to that of the chambers (**10**) of the blocking pins, said slide (**3**) being positioned adjacent to the locking member (**2**) and being displaceable with respect to said member between a first and a second position, the chambers (**16**) of the slide (**3**) coinciding with the coding chambers (**15**) of the coding disks (**18**) in the first position and with the chambers (**10**) of the blocking pins in the second position.

5,025,648

COILED SPRING MAKING APPARATUS

Takeji Matsuoka, Tokyo, Japan, assignor to MEC Machinery Co., Ltd., Tokyo, Japan
Filed Apr. 27, 1990, Ser. No. 515,849
Claims priority, application Japan, May 8, 1989, 1-113777
Int. Cl.^{5} B21F *35/02*
U.S. Cl. 72—134 **4 Claims**

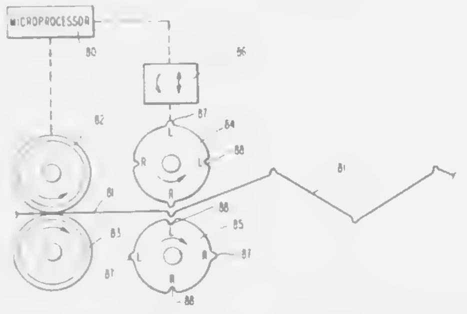


1. A coiled spring making apparatus comprising:
a coiling section for forming coiled springs; and
a progressive forming section for receiving the coiled springs formed at said coiling section and feeding the coiled springs to a plurality of stages on which said coiled springs are held and successively formed into a desired shape;
said coiling section being a bending die system in which said coiled springs are formed with their axes in a vertical position and said coiling section is mounted on a movable table, said movable table comprising means for moving said table horizontally or transversely with respect to said progressive forming section to a desired position and fixing said table in said desired position, wherein said coiling section is aligned with said progressive forming section in accordance with the desired shape of the coiled springs.

5,025,649

METAL HONEYCOMB CATALYST SUPPORT HAVING A DOUBLE TAPER

William B. Retallick, West Chester, Pa., assignor to W. R. Grace & Co.-Conn., New York, N.Y.
Division of Ser. No. 23,700, Mar. 9, 1989, Pat. No. 4,765,047, which is a division of Ser. No. 905,071, Sep. 8, 1986, Pat. No. 4,673,553. This application May 9, 1988, Ser. No. 191,612
Int. Cl.^{5} B21D *13/04*
U.S. Cl. 72—196 **8 Claims**



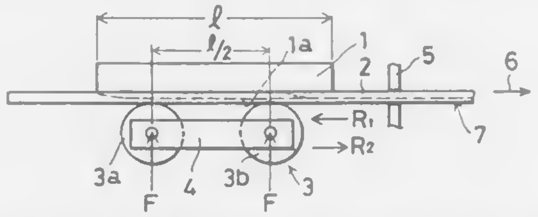
1. Apparatus for forming crease lines on a strip of metal, comprising:
- (a) a pair of creasing rollers positioned to form a gap between said rollers and disposed to be parted and closed together, while rotating at equal speeds, each creasing roller having on its surface an alternating sequence of ridges and grooves, the ridges and the grooves being disposed to mate when the creasing rollers are closed together, the creasing rollers being disposed on either side of the strip,
- (b) means for moving the strip through the gap, and
- (c) control means for opening and closing the creasing rollers around the strip by an amount sufficient that the rollers are alternately engaged with and fully disengaged from the strip, and said control means varying the rotational speed of the creasing rollers, when said pair of creasing rollers are disengaged from the strip, so that the crease lines can be formed in the strip at predetermined locations.

5,025,650

APPARATUS FOR FORMING PLATES OF IRREGULAR CROSS-SECTIONAL SHAPE

Hiroshi Fukuda, and Hideki Azuma, both of Matsumoto, Japan, assignors to Kabushiki Kaisha Kawai Gakki Seisakusho, Japan
Continuation of Ser. No. 41,826, Apr. 23, 1987, abandoned. This application Jul. 14, 1989, Ser. No. 379,724
Claims priority, application Japan, Apr. 23, 1986, 61-60179
Int. Cl.^{5} B21D *7/02*
U.S. Cl. 72—220 **3 Claims**

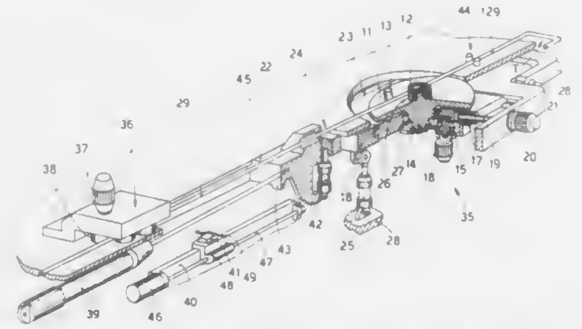
1. In an apparatus for forming a plate of irregular cross-sectional shape comprising a plateform die including a plate surface portion having a sharpened leading end portion, a pressure roller means, driving means for moving said pressure roller means reciprocably along a longitudinal axis for pressing a plate material against said plate surface portion of said die, and means for advancing said plate material a predetermined distance rearwardly from said leading end portion after each reciprocable movement of said pressure roller means, the improvement wherein said pressure roller means the comprises only first and second pressure rollers arranged for reciprocating movement, said first pressure roller having a first axis of rotation and said second pressure roller having a second axis of rotation, and wherein said first and second pressure rollers are respectively rotatably coupled to rigid support means by first and second pivot means whereby said first and second axes of rotation are substantially parallel to each other, are substantially perpendicular to said longitudinal axis, said axes of rotation being in a plane parallel to the plane of said plate surface portion of said die, and are separated by a predetermined distance substantially equal to one-half of the rolling distance of said pressure roller means in the course of one stroke, said rigid support means being driven to reciprocate by said driving means.



5,025,651

MOVABLE SHEARS UPSTREAM OF A BENDING ASSEMBLY AND METHOD TO BEND THE TRAILING END OF BARS

Marcello Del Fabro, Udine, and Giorgio Del Fabro, Cassacco-Fraz, both of Italy, assignors to M.E.P. Macchine Elettroniche Piegatrici SpA, Udine, Italy
Filed Jan. 10, 1990, Ser. No. 463,314
Claims priority, application Italy, Jan. 18, 1989, 15903 A/89
Int. Cl.^{5} B21D *7/024*
U.S. Cl. 72—294 **11 Claims**

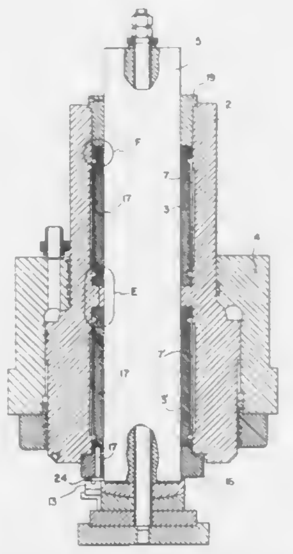


1. A method for bending of a trailing end of bars in a bending-shaping machine having a bar feeder unit for feeding bars in a longitudinally extending feed direction, movable shears provided on a slide block slidable along an axis of said longitudinally extending feed direction, and a bending assembly provided downstream of said shears and of said feeder unit with respect to said longitudinally extending feed direction, said method comprising:
feeding a bar in said longitudinally extending feed direction until a leading end is at said bending assembly;
bending said leading end of said bar with said bending assembly;
feeding said bar at least partly using said feeding unit in said longitudinally extending feed direction;
positioning said slide block and movable shears to a predetermined position along said axis of said longitudinally extending feed direction;
shearing said bar with said movable shears to form a trailing end of said bar, a length of said trailing end being determined by a distance between said bending assembly and said movable shears; and
laterally holding said bar by abuttment pins located downstream of said bending assembly and bending said trailing end of said bar while laterally holding said bar by said abuttment pins.

5,025,652

COLLET SURFACE STRUCTURE FOR A HYDRAULIC HIGH-SPEED PRESS

Friedrich B. Bielfeldt, Eppingen, Fed. Rep. of Germany, assignor to Maschinenfabrik J. Dieffenbacher GmbH & Co., Eppingen, Fed. Rep. of Germany
Filed Oct. 17, 1989, Ser. No. 422,554
Claims priority, application Fed. Rep. of Germany, Oct. 17, 1988, 3835298
Int. Cl.^{5} B21J *7/46*
U.S. Cl. 72—444 **10 Claims**



1. A collet surface structure for an hydraulic clamping system of an hydraulic highspeed press, said press comprising at least one collet disposed about a respective pressure rod of the press, a diaphragm pressing the collet against the respective pressure rod by means of pressurized fluid, and first sealing means for sealing an inner clamping region, located between said diaphragm and said pressure rod, from fluid acting on said diaphragm, said collet surface structure comprising:
a clamping face of said collet having a plurality of lubricating-fluid grooves defined therein, said grooves having a spacing of approximately 3.5 mm therebetween and a groove width of about 1 to 2 mm for a groove depth of approximately 0.5 mm, regardless of the clamping diameter of said collet;
second sealing means, provided for said collet, for preventing fluid from leaking onto said pressure rod from said collet; and
said collet having at least one leakage-fluid bore defined axially therein for collecting fluid which leaks past said first sealing means from said diaphragm and onto said collet.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,653
GAS DETECTION SYSTEM

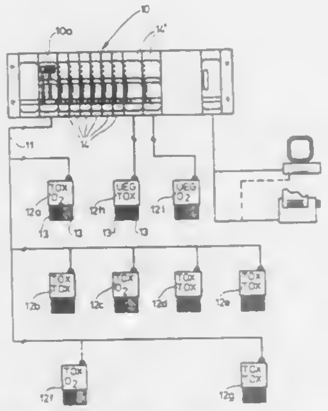
Hans P. Schuldt, Ditzingen, Fed. Rep. of Germany, assignor to Conducta Gesellschaft fur MeB- und Regeltechnik, Gerlingen, Fed. Rep. of Germany

Filed May 31, 1989, Ser. No. 359,479

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1988, 3819128

Int. Cl.^{5} G01N *27/00*

U.S. Cl. 73—1 G 20 Claims



1. A gas detection system for detecting the content of gases, comprising:

a plurality of measuring heads, each said head being positioned at a measuring point, each said measuring head being equipped for connection with a least one sensor, said sensors being one of the same and different types, sensors of the same type having one of the same and different measuring ranges;

a central electronic evaluation system, said evaluation system being connected to said plurality of measuring heads by means of a common two-wire line, said common two-wire line between said central electronic evaluation system and said measuring heads being adapted for bidirectional digital communication and, simultaneously, for supplying electrical operating current to said measuring heads;

each said measuring head having its own processing means for at least partially processing the signals supplied by each said sensor attached thereto, each said sensor having an identification indicative at least of its type, measuring component and measuring range, said identification being detected by the processing means of the associated measuring head upon connection of said sensor to said associated measuring head,

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5,025,654
PRESSURE STANDARD DEVICE

Hans W. Haefner, Aichach-Walchshofen, Fed. Rep. of Germany, assignor to Pfister GmbH, Augsburg, Fed. Rep. of Germany

PCT No. PCT/DE88/00276, § 371 Date Oct. 23, 1989, § 102(e) Date Oct. 23, 1989, PCT Pub. No. WO88/08966, PCT Pub. Date Nov. 17, 1988

PCT Filed May 7, 1988. Ser. No. 427,139

Claims priority, application Fed. Rep. of Germany, May 8, 1987, 3715450

Int. Cl.^{5} G01L *27/00*

U.S. Cl. 73—4 D 23 Claims

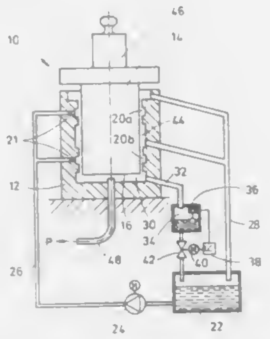
1. A pressure standard device, comprising:

a housing having a generally cylindrical recess with an upper opening and a bottom wall opposite thereto;

a piston guided with a minimum amount of friction in said cylindrical recess operating by way of at least one of a hydrostatic and aerostatic bearing means;

a pressure chamber formed between an inner end face of said piston and said bottom wall of said cylindrical recess;

a conduit means, connected to said pressure chamber, for transmitting an exact pressure prevailing therein, said pressure being precisely defined by loading said piston with calibration weights; and



a regulating device maintaining said piston in a precisely constant height position independent of varying loading of said piston by selectively feeding or discharging of fluid to and from said pressure chamber.

5,025,655
IMPACT TEST HAMMER

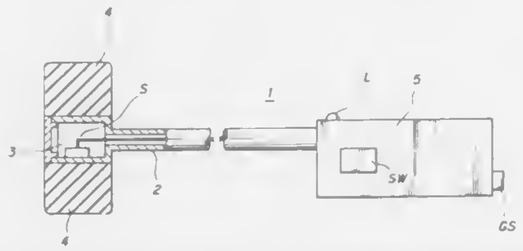
Kiyoshi Umemura, Kawasaki, and Teruo Irie, Tokyo, both of Japan, assignors to Yamaichi Electric Mfg. Co., Ltd., Tokyo, Japan

Filed Apr. 10, 1990, Ser. No. 507,116

Claims priority, application Japan, Apr. 12, 1989, 1-42800[U]

Int. Cl.^{5} G01N *3/30*

U.S. Cl. 73—11 1 Claim



1. An impact test hammer for impacting a test object, said impact test hammer comprising:

a cylindrical handle having opposite first and second end portions and a hollow interior;

a sensor storage portion fixed to said first end portion of said handle;

a grip portion fixed to said second end portion of said handle;

an elastic striking portion fixed to an outer periphery of said sensor storage portion;

an impact acceleration sensor housed within said sensor storage portion for sensing a striking power of said elastic striking portion applied to the test object and for outputting a first signal corresponding to said striking power;

a circuit housed within said grip portion and operatively connected to said sensor by wiring which passes through said hollow interior of said handle, said circuit comprising a range switch, a scale conversion amplifier and a wind comparator;

a knob provided on an outer peripheral portion of said grip portion for operating said range switch to set a degree of amplification of said amplifier;

said amplifier for receiving and amplifying said first signal at the degree of amplification set by said range switch and for outputting a thus amplified second signal;

said wind comparator for receiving said second signal and for outputting a third signal when said second signal is indicative of a striking power that falls within a striking power range which is suitable for the test object;

a battery housed within said grip portion for actuating said circuit;

a switch provided on the outer peripheral portion of said grip portion for turning on said battery; and

a light indicator provided on the outer peripheral portion of said grip portion for illuminating in response to said third signal being output by said wind comparator.

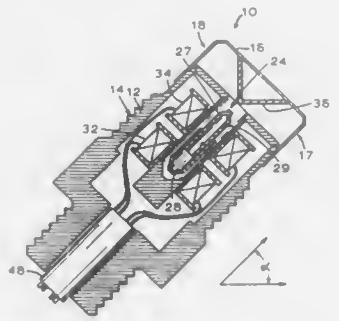
5,025,656
DENSITOMETER

Hubert A. Wright, Arlington, Mass., assignor to Cambridge Applied Systems, Inc., Cambridge, Mass.

Filed May 21, 1990, Ser. No. 526,128

Int. Cl.^{5} G01N *9/10, 11/10*

U.S. Cl. 73—32 A 13 Claims



1 A densitometer comprising:

A) a bob comprising ferromagnetic material:

B) guide means for guiding the bob along a bob path through a fluid whose density is to be measured;

C) bob-driving means for driving the bob alternately in opposite directions along the bob path, the bob-driving means including (i) first and second coils disposed adjacent the path for producing, when the coils conduct current, magnetic fields in the path that drive the bob in opposite directions and (ii) a current-driver circuit for alternately driving current through the first and second coils; and

D) sensing and measuring means for monitoring bob position, measuring the travel times required for the bob to travel known distances in both directions along the bob path, generating an indication of the difference between the measured times, and thereby indicating the relative density of the fluid whose density is to be measured.

5,025,657
PROCESS AND DEVICE FOR TESTING THE TIGHTNESS OF A FLEXIBLE PLASTIC CONTAINER

Bernd Schenk, Waldbronn, Fed. Rep. of Germany, assignor to Helga Schenk, Waldbronn, Fed. Rep. of Germany

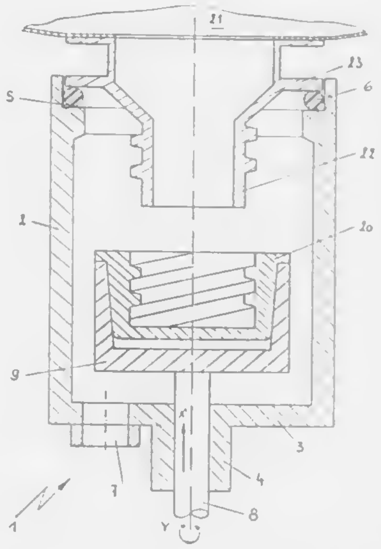
Filed Mar. 1, 1990, Ser. No. 487,210

Claims priority, application Fed. Rep. of Germany, Mar. 1, 1989, 3906361

Int. Cl.^{5} G01M *3/36*

U.S. Cl. 73—37 8 Claims

1. A process for testing the tightness of a flexible, collapsible plastic container which in use is sealed with a screw cap screwed on a spout of the container and for testing the tightness of the screw cap on the container, said process comprising: evacuating air from the container immediately after manufacture of the container thereby causing the container to collapse, sealing the evacuated and collapsed container at the



spout by means of a screw cap screwed thereon, and subjecting the sealed, collapsed container to atmospheric pressure.

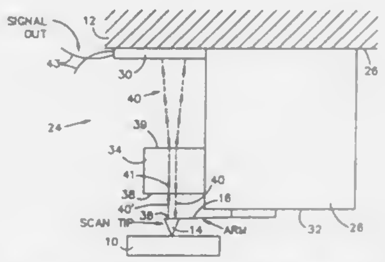
5,025,658
COMPACT ATOMIC FORCE MICROSCOPE

Virgil B. Elings; John A. Gurley, both of Santa Barbara, Calif., and Dror Sarid, Tucson, assignors to Digital Instruments, Inc., Santa Barbara, Calif.

Filed Nov. 28, 1989, Ser. No. 442,256

Int. Cl.^{5} G01B *5/28*

U.S. Cl. 73—105 32 Claims



1. In an atomic force microscope having a sensing tip mounted for vertical movement in response to relative horizontal movement of the sensing tip across a sample surface, apparatus for sensing vertical movement of the sensing tip and for outputting a signal reflecting characteristics of the sample surface related to vertical movement of the sensing tip comprising:

a) a reflective surface carried by the sensing tip;

b) a laser diode having a light-emitting face disposed close adjacent the sensing tip with said face facing said reflective surface to emit a laser light beam therefrom and receive a portion of said light beam reflected from said reflective surface thereon to thereby affect the power output of said laser diode from another face of said laser diode; and,

c) laser power detector means disposed for receiving laser light from said laser diode and for outputting an electrical signal directly related to the power of said laser light whereby said electrical signal is also directly related to movement of the sensing tip relative to said face of said laser diode and can be used to measure the profile and physical properties of the sample surface.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,659

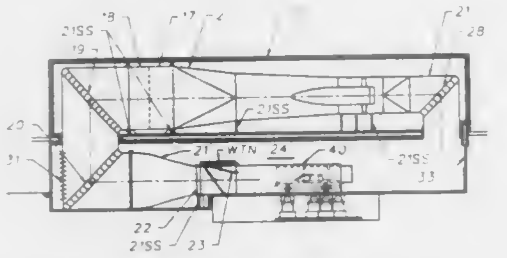
SLOTTED-WALL EXTENSION AND METHOD FOR ENVIRONMENTAL WIND TUNNELS

Rogers F. Starr, Jr., Manchester, and Lakhi N. Goenka, Tullahoma, both of Tenn., assignors to Sverdrup Technology, Inc., Tullahoma, Tenn.

Filed Sep. 13, 1989, Ser. No. 406,478

Int. Cl.^{5} G01M *9/00*

U.S. Cl. 73—147 **29 Claims**



1. In an environmental wind tunnel for air flow over an automotive vehicle simulating vehicle heating and cooling characteristics, said wind tunnel having a source of air under pressure and an elongated housing for receiving an automotive vehicle and having an upstream end coupled to the downstream end of said source of air under pressure and its downstream end connected to the upstream end of said source of air under pressure, air from said source of air under pressure flowing axially through the housing from its upstream end to its downstream end, the improvement comprising:

a slotted-wall extension disposed within said housing and having a plurality of rigid walls generally parallel to the direction of air flow through said housing positioned to surround an automotive vehicle within said housing, one or more of said walls being formed with elongated slots therein for correcting air flow over the exterior of the automotive vehicle, said walls being fixedly mounted with respect to each other, said walls enclosing a space within said walls in which an automotive vehicle can be placed, the cross sectional area of said space enclosed by said walls being 1.67 to 3.33 times the cross sectional area of the automotive vehicle.

5,025,660

APPARATUS AND METHOD FOR THE AUTOMATIC DETERMINATION OF THE COUNT OF A TEXTILE TEST SAMPLE

Eduard Heusser, Uster, Switzerland, assignor to Zellweger Uster AG, Uster, Switzerland

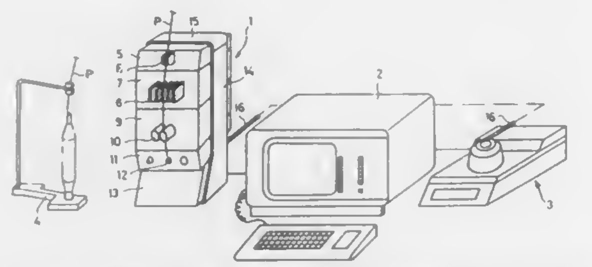
PCT No. PCT/CH88/00175, § 371 Date May 19, 1989, § 102(e) Date May 19, 1989, PCT Pub. No. WO89/03531, PCT Pub. Date Apr. 20, 1989

PCT Filed Sep. 28, 1988, Ser. No. 364,431

Claims priority, application Switzerland, Oct. 6, 1987, 03907/87

Int. Cl.^{5} G01N *33/36, 5/00*

U.S. Cl. 73—160 **18 Claims**



1. In apparatus for the automatic determination of the count of a textile test sample in the form of yarns, rovings or slivers, having a device for taking off definite lengths of a test sample from a supply, scales and an evaluation unit, the improvement which comprises means arranged in the path of the test sample upstream of the scales for forming the test sample taken off at any one time into a ball-like bundle and means for depositing the ball-like bundle on the scales for the making of a weight measurement.

18. In a method for determining the weight per unit length of a textile strand, the steps of disposing a portion of the textile strand in an air stream moving toward a chamber; allowing a predetermined length of said strand suitable for weighing to move with said air stream; forming said predetermined length into a ball-like bundle in said chamber depositing said ball-like bundle made up of said predetermined length of textile strand on a weighing scale; and determining the weight per unit length of said textile strand from the weight of said predetermined length of said strand as measured by said scale.

5,025,661

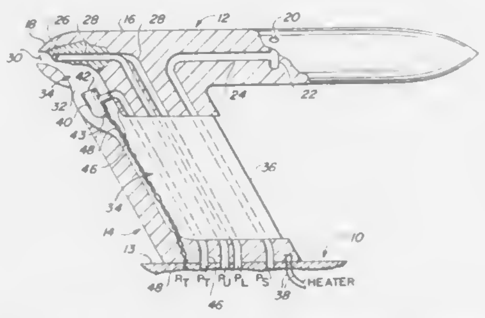
COMBINATION AIR DATA PROBE

William H. McCormack, Tucson, Ariz., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Dec. 11, 1989, Ser. No. 448,790

Int. Cl.^{5} G01C *21/00*

U.S. Cl. 73—180 **17 Claims**



1. A combination air data probe apparatus for installation on an aircraft comprising:

a housing configured to extend outwardly from an exterior surface of the aircraft;

means in said housing defining a relatively large forward-facing opening, and an interior cavity coupled to said opening;

a duct for air flow extending from said opening to an exit opening downstream and including said cavity, said duct being configured to direct the air flow along a curved path for developing centrifugal force to separate entrained particles from core air flow while maintaining laminar flow along the duct;

a stagnation chamber mounted within said cavity away from the sides of the duct in the region of core air flow, said chamber having upstream and downstream openings of different cross section, the upstream opening being substantially larger than the downstream opening, said chamber containing a resistor and attached circuit connections for providing air temperature measurements indicative of total temperature in said chamber; and

a pneumatic conduit leading from said chamber for providing a pressure corresponding to total pressure at said chamber.

5,025,662

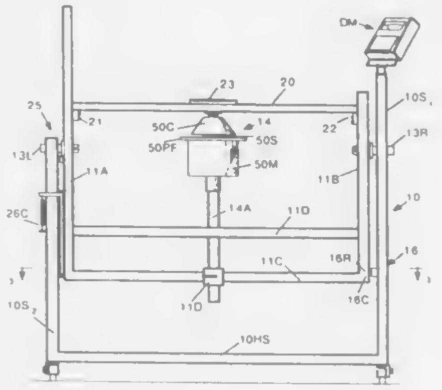
AUTOMOTIVE WHEEL BALANCING APPARATUS AND METHOD

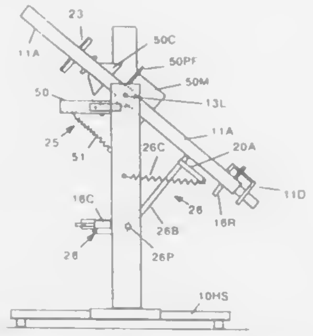
Richard M. Hultberg, 1802 Batten Hollow Rd., Vienna, Va. 22180

Continuation of Ser. No. 502,986, Jnn. 10, 1983, abandoned. This application Dec. 23, 1987, Ser. No. 139,124

Int. Cl.^{5} G01M *1/22*

U.S. Cl. 73—459 **9 Claims**





2. In an apparatus for dynamically balancing automotive wheels, including a support means, a frame, means pivotally mounting said frame on said support means for manual rotation about a first axis, freely rotatable spindle means for mounting an automotive wheel to be balanced on said frame for manual rotation about a second axis which is at an angle relative to said first axis, the improvement comprising:

transducer means for producing a first electrical signal proportional to movements of said frame about said first axis upon manual rotation of an automotive wheel in a speed range of about 1 to 3 RPS, when mounted on said frame, about said second axis,

first electric circuit means for detecting the maximum amplitude of said first electrical signals,

second electrical circuit means for deriving from said first signal the location on said rotating automotive wheel at which said maximum amplitude occurs, and

indication means connected to said first and second electrical circuit means for indicating the amplitude of any axial imbalance and the location thereof with respect to said automotive wheel mounted on said frame, and wherein said first axis is substantially horizontal, and including support means for supporting and stabilizing said second axis at a predetermined angle to a vertical axis whereby any unbalanced force of an automotive wheel is gravity operative to cause the wheel to rotate about said second axis to a point where this force and the point on the wheel rim corresponding thereto is lowermost indicating the diametrically opposite point on said wheel rim where a balance weight is to be secured so as to radially balance said wheel.

5,025,663

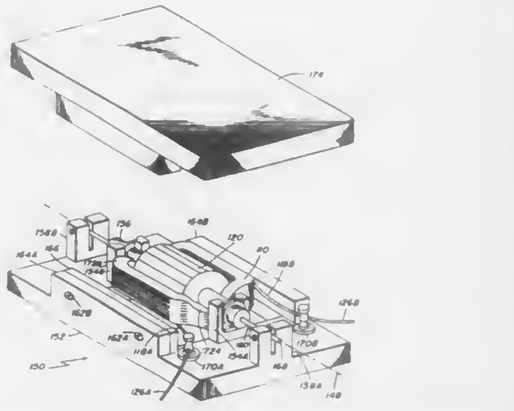
RATE OF ANGULAR ACCELERATION SENSOR

Charles P. Smith, Harvard, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Jun. 26, 1989, Ser. No. 371,342

Int. Cl.^{5} G01P *15/11*

U.S. Cl. 73—517 A **12 Claims**



1. A sensor for measuring the rate of angular acceleration around an axis, comprising:

a) a coil having an opening therein;

b) a magnet mounted along the axis and in the opening of the coil;

c) a torsion spring passing through the magnet along the axis and fixedly coupled to the magnet; and

d) two wires electrically coupled to the coil wherein the voltage across the wires indicates the rate of angular acceleration.

5,025,664

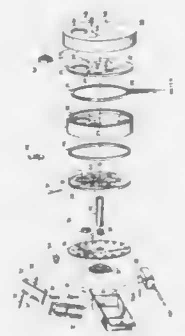
MULTIPLE CRYSTAL HEAD FOR DEPOSITION THICKNESS MONITOR

Mark F. Kendrick, Syracuse, and Carl A. Gogol, Manlius, both of N.Y., assignors to Leybold Inficon, Inc., East Syracuse, N.Y.

Filed Nov. 2, 1989, Ser. No. 430,428

Int. Cl.^{5} G01N *29/04*

U.S. Cl. 73—579 **17 Claims**



1. Apparatus for detecting the thickness of a vapor deposition in a chamber, comprising

a plurality of piezoelectric crystals each of which has at least one natural resonance which shifts as material is deposited on it;

a rotary carrier having a front surface and a central pivot and distributed circumferentially about said pivot a plurality of stations at which said plurality of piezoelectric crystals are respectively disposed;

a body in which said rotary carrier is pivotally mounted, said body and said carrier being formed of a high thermal conductivity material, including means holding the front

VOL
1127
ISS
4
JE
25
1991
UMI

surface of the carrier out of contact with said body to define an axial space adjacent said front surface;

means formed of a resilient thermally conductive material permitting heat flow between said rotary carrier and said body while permitting relative rotation therebetween,

a plate covering said rotary carrier and one side of said body, including a window therethrough which exposes a single one of said piezoelectric crystals disposed at a predetermined one of said stations aligned in registry with said window, said plate being formed of a low thermal conductivity material to shield said body and aid rotary carrier from heat of said vapor deposition;

means for selectively rotating said rotary carrier to position a desired one of said crystals into registry with said window; and

a waterline cooling coil pressed into thermal contact with said body to conduct heat away from said body to said rotary carrier.

5,025,665

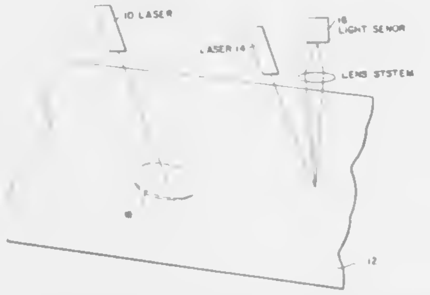
NON-CONTACTING ON-LINE PAPER STRENGTH MEASURING SYSTEM

Marion A. Keyes, IV, Chagrin Falls, and William L. Thompson, Montville, both of Ohio, assignors to Elsag International B.V., Amsterdam, Netherlands

Filed Jun. 1, 1989, Ser. No. 359,536

Int. Cl.^{5} G01N *29/18;* G01H *5/00*

U.S. Cl. 73—597 **8 Claims**



1. A system for measuring the strength of a material within a web without contacting same, comprising:

a first source of light beams positioned such that said light beams contact the material and induce an ultrasonic wave therein;

at least one second source of light beams directed so as to illuminate said ultrasonic wave as it traverses past;

light sensing means for detecting light reflected from the material as said ultrasonic wave traverses therethrough, said light sensing means being positioned at a predetermined distance from the point of inducement of said ultrasonic wave within the material, said at least one second source of light beams being positioned adjacent said light sensing means;

means for determining the velocity of said ultrasonic wave within the material, said determining means calculating velocity from elapsed time between transmission of the first light beam into the material and the detection of the at least one second light beam by said light sensing means;

means for determining the density of the material;

means for determining the strength of the material based on the velocity of said ultrasonic wave within the material and the density of the material; and

means for varying the output of said first source of light beams.

5,025,666

TRANSDUCER WITH BUILT-IN PRINTED CIRCUIT BOARD

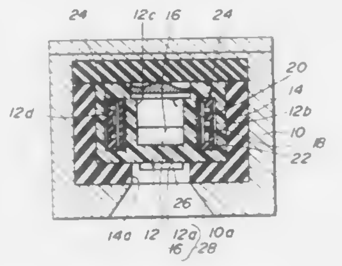
Hiroshi Kobayashi, Kanagawa, and Toshiharu Itoh, Aichi, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama and NGK Spark Plug Co., Ltd., Nagoya, both of, Japan

Continuation of Ser. No. 59,815, Jun. 9, 1987, abandoned. This application Jul. 5, 1990, Ser. No. 547,329

Claims priority, application Japan, Jun. 10, 1986, 61-87175[U]

Int. Cl.^{5} G01N *29/00*

U.S. Cl. 73—632 **40 Claims**



1. An ultrasonic transducer comprising:

a housing;

a vibrator positioned within said housing and drivable at ultrasonic frequency for generating an ultrasonic wave;

an electric transducer circuit positioned within said housing for converting an electric signal to an energy for driving said vibrator and/or detecting vibration of said vibrator and converting vibration energy of said vibrator into an electric signal; and

an elastic means supporting said vibrator for elastically damping oscillation of said vibrator so that oscillation of said vibrator can be stabilized within a given period of time which is shorter than a minimum interval between transmission of an ultrasonic wave toward an object and reception of an ultrasonic wave reflected by said object.

5,025,667

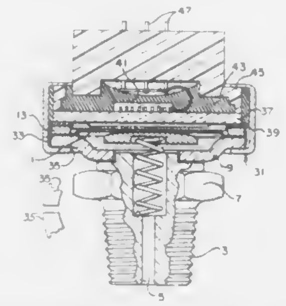
HERMETIC PRESSURE SENSOR

Werner Strasser, Versailles, Ky., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 15, 1989, Ser. No. 366,793

Int. Cl.^{5} G01L *7/08, 9/12*

U.S. Cl. 73—724 **9 Claims**



1. Pressure sensing apparatus comprising a metal housing having a cavity formed therein, the housing having a pressure port in communication with the cavity with an annular, radially extending flange circumscribing the cavity, a thin, flexible, metal membrane having an annular outer periphery disposed on the flange, the membrane having a central measuring section which is generally flat in its normal at rest position and in its normal at rest position having a single convolution between the annular outer periphery and the central measuring section so that the central measuring section lies in a plane offset from a plane in which the annular outer periphery lies, a metal member having a ring shaped portion received over the annular outer periphery of the membrane, the annular flange, the annular outer periphery of the membrane and the ring shaped portion being welded together to form an hermetic seal.

5,025,668

CELL FOR THE TRIAXIAL STRESS TESTING OF A ROCK SAMPLE AND A TESTING METHOD USING SUCH A CELL

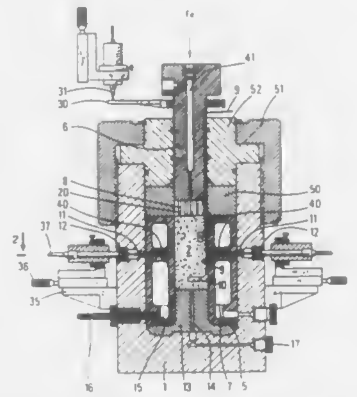
Jean-Paul Sarda, Rueil-Malmaison, and Guy Grard, Argenteuil, both of France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

Filed Jun. 30, 1989, Ser. No. 374,150

Claims priority, application France, Jun. 30, 1988, 88 08885

Int. Cl.^{5} G01N *3/00*

U.S. Cl. 73—795 **10 Claims**



1. A cell for the triaxial stress testing of a rock sample, comprising a central body including a means for exerting lateral stresses on said sample and a means for exerting a vertical pressure on a section of the sample, said means for exerting lateral stresses comprising a membrane enclosing said sample, said cell further comprising means for measuring the deformations of the sample related to the stresses which are applied thereto, wherein said membrane positioned within the central body has an external surface that comes into contact with said body and has a central longitudinal opening in which the sample is positioned, said sample being in contact with an inner surface of the membrane which defines the longitudinal opening and said membrane comprising a resilient member having a hollow internal volume forming a chamber for confinement of a fluid introduced into the chamber through an orifice connected to said membrane.

5,025,669

DEVICE FOR CARRYING OUT STRESS TESTS ON ROCK SAMPLE AND OTHER MATERIALS

Jean-Paul Sarda, Rueil-Malmaison; Guy Grard; Jean-Pierre Deflandre, both of Argenteuil, and Philippe Perreau, Nanterre, all of France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

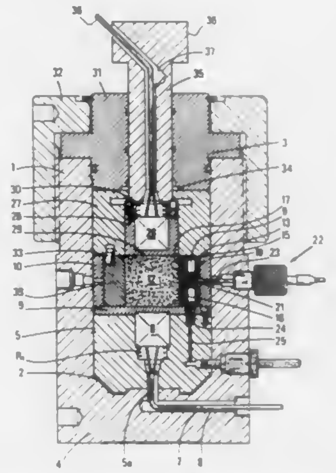
Filed Jun. 28, 1990, Ser. No. 544,883

Claims priority, application France, Jun. 28, 1989, 89 08759

Int. Cl.^{5} G01N *3/00*

U.S. Cl. 73—798 **7 Claims**

1. An improved testing device for examining rock samples or other materials subjected to stresses, comprising an extended rigid body (1) delimiting following its axis a cavity (2) open at a first end and closed at its opposite end, adapted for receiving a sample (12), means for exerting lateral stresses on the sample, elements (31,32) forming a cover to close the open end of the cavity, these elements being fitted with a central bore (34) for a piston (35) likely to rest against the sample following the axis of the body, means for exerting stresses on the piston and measuring means in contact with the sample for determining the stresses and the displacements undergone by the sample in several locations, characterized by at least one sonic sonde (6,28) arranged within the body allowing to obtain a representation of the inner structure of the sample and its development during the tests.



5,025,670

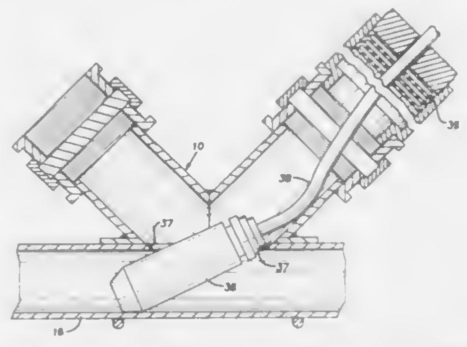
MEANS FOR INTRODUCING INSPECTION EQUIPMENT IN ACTIVE PIPELINES

George R. McNulty, 4709 Lake Rd., Sheffield Lake, Ohio 44054, and Charles E. Luff, 3909 Easton Rd., Norton, Ohio 44203

Filed May 30, 1990, Ser. No. 530,224

Int. Cl.^{5} G01B *5/12*

U.S. Cl. 73—865.8 **6 Claims**



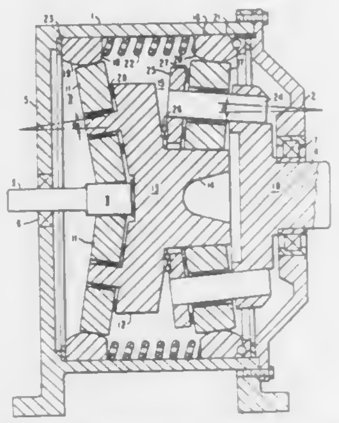
5. Apparatus for inspecting a pipeline in service comprising a housing adapted to be fixed on the exterior of the pipeline to isolate a portion of its wall from the environment, means for rotary cutting receivable in the housing, means on the housing for supporting said rotary cutting means for rotation and advance into the isolated wall portion on two separate cutting axii, each of said axii and the longitudinal axis of the pipe lying in substantially the same plane, the separate cutting axii each forming an oblique angle with the axis of the pipe and being arranged such that movement along each towards the pipeline includes a directional component opposite that of the other, means associated with each axis of the housing for valving the housing from the atmosphere, said rotary cutting supporting means including means for actuating carried by said housing outwardly of said valving means, the actuating means having a shaft for rotating and axially advancing said rotary cutting means successively along each of said cutting axii, said cutting axii and rotary cutting means being arranged to cut a hole in the side of the pipeline that is elongated in the axial direction of the pipeline and is greater in length in such direction that a hole which could be cut by said cutting means operating along only one of said axii whereby a relatively bulky elongated camera

VOL
1127
ISS
4
JE
25
1991
UMI

can be fully received in said pipeline through the elongated hole.

5,025,671
HIGH RATIO PLANETARY TYPE TRACTION ROLLER TRANSMISSION

Charles E. Kraus, Austin, Tex., assignor to Excelermatic Inc., Austin, Tex.
Filed Mar. 5, 1990, Ser. No. 488,990
Int. Cl.^5 F16H *13/02, 13/00*
U.S. Cl. 74—206 **7 Claims**



1. A traction roller transmission comprising a housing, two planetary type transmission structures arranged in tandem in said housing, each including a sun roller, a traction ring having a traction surface spaced from said sun roller and planetary traction rollers disposed in the space between, and in engagement with, said sun roller and traction ring, and a planetary traction roller support member rotatably supporting said traction rollers, the planetary traction roller support member of one of said planetary type transmission structures having the sun roller of the other planetary type transmission structure associated for rotation therewith, an input shaft connected to or forming the sun roller of said one planetary type transmission structure, and an output shaft associated with the planetary traction roller support structure of said other planetary type transmission structure, means for forcing said traction rings toward one another with a force which depends on a torque transmitted through the transmission, the traction surfaces of said traction rings being axially curved and said planetary type traction rollers being supported such that their axes are inclined and intersect the transmission axis at spaced points outside the traction roller transmission and at acute angles selected so as to provide radial engagement forces for the two planetary type traction rollers with the respective sun rollers and traction ring sufficient to accommodate the different relative torque values transmitted through the two planetary type transmission structures.

5,025,672
STEPLESS TRANSMISSION

Norimasa Takenaka, Takatsuki, Japan, assignor to Tsubakimoto Chain Co., Japan
Filed Sep. 6, 1989, Ser. No. 403,389
Claims priority, application Japan, Sep. 14, 1988, 63-122004[U]
Int. Cl.^5 F16H *15/08*
U.S. Cl. 74—208 **1 Claim**

1. A stepless transmission comprising:

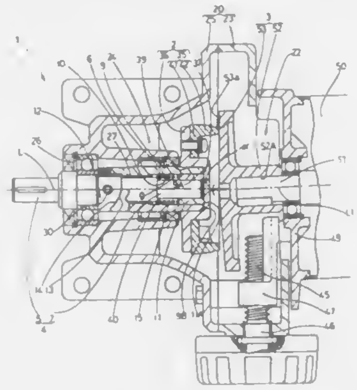
an output shaft rotatably supported by a case;

a cam having a tubular shape, mounted on the output shaft between the ends of the output shaft so as to partition the output shaft into an output shaft outward part and an inward part, said cam having an inward end facing in the same direction as the inward part of said output shaft and said cam having a continuous curved surface on the inward end of the cam;

a sleeve having a tubular shape with a driven face engaging with the inward end of the cam said sleeve being inserted on the inward part of the output shaft so as to be axially movable along the center line of rotation of the output shaft by relative rotation of the driven face and the cam inward end;

a friction disc which is fixed on the tubular sleeve; and

a rotary disc which is pressed to contact the friction disc and mounted for movement relative to the friction disc, wherein



the tubular sleeve has the same diameter as the diameter of the cam,

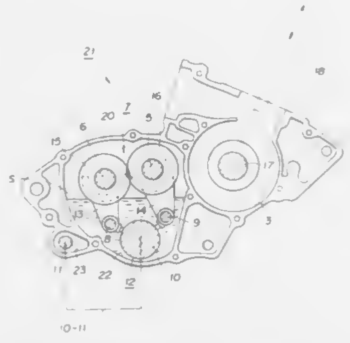
the driven face and the engaging inward end of the cam being complementarily curved along the cam face,

the cam and tubular sleeve being formed by division of one cylindrical body into two pieces by means of a laser process, and

each of the inward end and the driven face being formed by a cut section surface of each of the divided pieces.

5,025,673
CRANK CASE OF ENGINE FOR MOTOR-BICYCLE

Toshiyuki Yamada, Kosai, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Kamumura, Japan
Filed Jul. 25, 1989, Ser. No. 384,615
Claims priority, application Japan, Aug. 1, 1988, 63-192407
Int. Cl.^5 F16H *57/02;* **B62M** *11/06*
U.S. Cl. 74—337.5 **7 Claims**



1. A crank case for an engine of a motor-cycle, comprising.

a transmission chamber;

a transmission mechanism disposed within said transmission chamber;

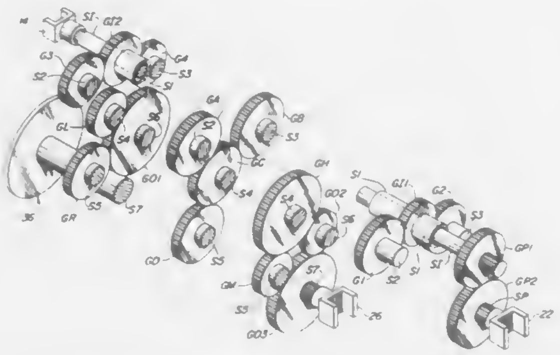
a gear change mechanism, comprising first and second shift fork shafts and a gear shift cam shaft interconnecting said first and second shift fork shafts, disposed within said transmission chamber and operatively connected to said transmission mechanism;

a gear shift shaft operatively connected to said gear shift cam shaft; and

a gear shift shaft chamber, integrally formed with said crank case so as to be external to and fluidically separated from said transmission chamber, for housing said gear shift shaft.

5,025,674
SIXTEEN SPEED POWERSHIFT TRANSMISSION

John P. McAskill, Coffeyville, Kans., assignor to Deere & Company, Moline, Ill.
Filed Feb. 28, 1990, Ser. No. 486,582
Int. Cl.^5 F16H *3/06*
U.S. Cl. 74—360 **12 Claims**



1. A transmission comprising:

a. a transmission housing;

b. a first shaft rotatably mounted in said housing and having first and second gears fixed for rotation therewith;

c. a second shaft rotatably mounted in said housing and having a third gear fixed for rotation therewith and fourth and fifth gears rotatably mounted thereto, said fourth and fifth gears meshing with said first and second gears, respectively;

d. first and second clutch means for selectively fixing said fourth and fifth gears, respectively, for rotation with said second shaft;

e. a third shaft rotatably mounted in said housing and having a sixth gear fixed for rotation therewith and seventh and eighth gears rotatably mounted thereto, said seventh and eighth gears meshing with said first and second gears, respectively;

f. third and fourth clutch means for selectively fixing said seventh and eighth gears, respectively, for rotation with said third shaft;

g. a fourth shaft rotatably mounted in said housing and having a ninth gear fixed for rotation therewith and tenth and eleventh gears rotatably mounted thereto, said ninth gear meshing with said third and sixth gears;

h. fifth and sixth clutch means for selectively fixing said tenth and eleventh gears, respectively, for rotation with said fourth shaft;

i. a fifth shaft rotatably mounted in said housing and having a twelfth gear fixed for rotation therewith and thirteenth and fourteenth gears rotatably mounted thereto, said twelfth gear meshing with said ninth gear and said fourteenth gear meshing with said eleventh gear;

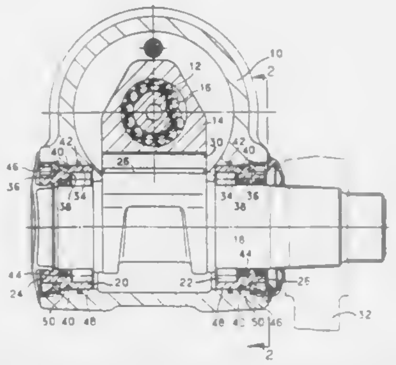
j. seventh and eighth clutch means for selectively fixing said thirteenth and fourteenth gears, respectively, for rotation with said fifth shaft;

k. a sixth shaft rotatably mounted in said housing and having fifteenth and sixteenth gears fixed for rotation therewith, said fifteenth gear meshing with said tenth and thirteenth gears and said sixteenth gear meshing with said eleventh gear; and

l. a seventh shaft rotatably mounted in said housing and having a seventeenth gear fixed for rotation therewith, said seventeenth gear meshing with said fourteenth and sixteenth gears.

5,025,675
GEAR ASSEMBLY

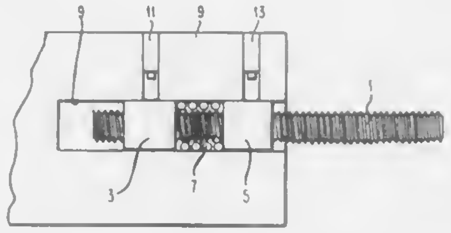
Esteve C. Guasch, Barcelona, Spain, assignor to Bendix Espana S.A., Barcelona, Spain
Filed Sep. 5, 1989, Ser. No. 402,950
Int. Cl.^5 F16H *1/94*
U.S. Cl. 74—422 **4 Claims**



1. A gear assembly comprising a housing in which is displaceably mounted a toothed input member, a toothed output member rotatably mounted in the housing, the teeth of the input and output members inter-engaging each other so that a displacement of the input member produces a rotation of the output member, the assembly further comprising at least one eccentric bushing mounted in the housing and rotatably receiving an end of the output member, rotation of the eccentric bushing relative to the housing causing a change in the position of the output member, and securing means for locking the bushing in position relative to the housing, the securing means comprising at least one projection on the bushing and adapted to engage and deform a corresponding surface when the bushing is mounted in position in the housing, the bushing comprising a cylindrical surface received within a corresponding cylindrical surface in the housing, the projection comprising a ball set into the cylindrical surface of the bushing.

5,025,676
SCREW ADJUSTMENT MECHANISM WITH PRE-SET BACKLASH

Frank Perretta, Marlboro, N.Y., assignor to Perretta Graphics Corporation, Poughkeepsie, N.Y.
Filed Jul. 3, 1989, Ser. No. 375,048
Int. Cl.^5 F16H *55/18*
U.S. Cl. 74—441 **7 Claims**



1. In a mechanism wherein a first part is adapted to be moved towards or away from a second part by the turning of a screw threadedly mating with one of the parts, means interacting between the one part and the screw to limit the amount of backlash in both directions inherent in the looseness of the threaded mating, the interacting means includes two bushings threadedly mated with the screw and each movable with respect to the one part and means for biasing the two bushings

VOL
1127
ISS
4
JE
25
1991
UMI

axially with respect to each other, and means for securing each of the two bushings to the one part after they have been threadedly mated with the screw.

5,025,677

GEAR SHIFT MECHANISM FOR A MOTOR VEHICLE TRANSMISSION

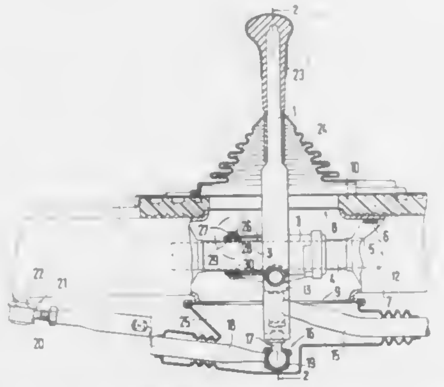
Robert Müller, Monsheim, and Bernd Wacker, Weissach, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany

Filed May 30, 1989, Ser. No. 357,814

Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3817990

Int. Cl.⁵ G05G *9/16*

U.S. Cl. 74—473 R 11 Claims



1. A gear shift mechanism for a motor vehicle transmission, having a manually operable gear shift lever means which is disposed in a stationary bearing means of a motor vehicle frame and to which a gear shift rod is pivotally connected which leads to the transmission, wherein the gear shift lever means is rotatably disposed at a two-part guide bush means, the guide bush means being twistably and slidably disposed at a stationary guide tube means with a first radial play which is bridged by elastic means for disconnecting vibration from the gear shift lever means, and wherein a lower end of the gear shift lever means is disposed in a ball joint means of a joint rod means, the other end of the joint rod means being disposed in a stationary ball joint means.

5,025,678

COLUMN SHIFT LEVER DEVICE

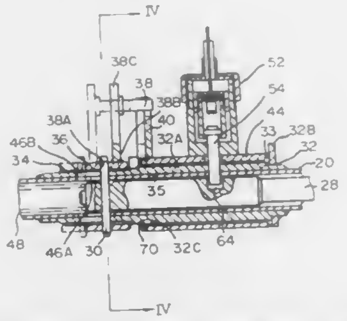
Yoshiharu Shinpo, Toyota, and Motoharu Akiyama, Chiryu, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Mannoh Kogyo Co., Ltd., Anjo, both of, Japan

Filed Aug. 29, 1989, Ser. No. 399,964

Claims priority, application Japan, Sep. 2, 1988, 63-115822[U]

Int. Cl.⁵ B60K *20/06*

U.S. Cl. 74—473 SW 7 Claims



1. A column shift lever device operatively connected to an automatic transmission of a motor vehicle and supported by a steering column which has a tiltable upper portion supporting a steering wheel, said column shift lever device comprising:

a shift lever which is manipulated by a vehicle driver so as to place the automatic transmission in one of a plurality of operating positions;

a tubular control shaft having an upper end to which said shift lever is connected, said tubular control shaft having at least one axially extending elongate hold formed therethrough;

an inner shaft accommodated within said tubular control shaft, said inner shaft having a fastener member protruding therefrom through said at least one elongate hole, so that said inner shaft is axially movable relative to and rotatable with said control shaft;

a stationary cylindrical outer casing disposed around said control shaft is coaxial relationship therewith, for rotatably supporting said control shaft at a portion thereof below said tiltable upper portion;

detent means having a detent pin for locking said shift lever in one of a plurality of shift positions corresponding to said operating positions of the automatic transmission, said detent means including a detent support sleeve which supports said detent pin and which is connected to said inner shaft through said fastener member;

splined engaging means provided between an outer circumference of said control shaft and an inner circumference of said detent support sleeve, for permitting a relative axial movement and a concurrent rotation of said control shaft and said detent support sleeve and

a bracket secured to said cylindrical outer casing and said steering column, for fixing said control shaft to the steering column.

5,025,679

STRUCTURE OF TILTABLE STEERING COLUMN FOR VEHICULAR STEERING SYSTEM

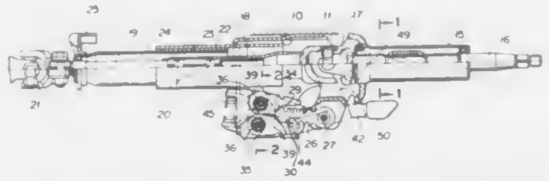
Yoshio Yamamoto, Shizuoka, Japan, assignor to Fuji Kiko Company, Limited, Tokyo, Japan

Filed Mar. 29, 1990, Ser. No. 501,607

Claims priority, application Japan, Mar. 31, 1989, 1-38038[U]

Int. Cl.⁵ B62D *1/18*

U.S. Cl. 74—493 13 Claims



1. A structure of a tiltable steering column, comprising:

a) a bracket member through which a steering shaft linked to a steering wheel is inserted, the bracket member being pivotally fixed to a predetermined position of a vehicle body;

b) a rod member having a flat surface, one end of which is fixed to the bracket member so as to tilt the bracket member with respect to the vehicle body;

c) a plurality of lock grooves, each lock groove having the same profile, aligned on at least one flat surface of the rod member, and being capable of receiving a lock pin so as to adjustably lock a tilt angle of the steering shaft through the bracket member with respect to the vehicle body;

d) a lever; and

e) first means, fixed to the vehicle body and linked to the lever, for slidably grasping a shoe portion formed on the other end of the rod member and for engaging and disengaging the lock pin with and from any one of the lock grooves when the lever is pivoted.

5,025,680

TORSIONAL DAMPER TYPE FLYWHEEL DEVICE

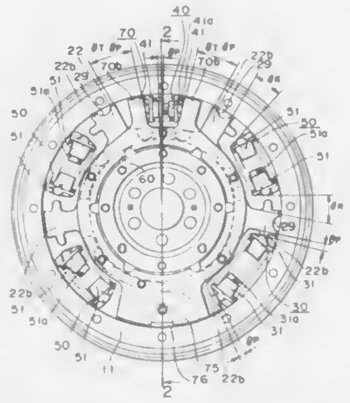
Mitsuhiro Umeyama; Masaki Inui, both of Toyota; Kenichi Yamamoto, Okazaki, and Kaoru Wakahara, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Aug. 21, 1989, Ser. No. 396,312

Claims priority, application Japan, Sep. 28, 1988, 63-125621; Sep. 30, 1988, 63-244615

Int. Cl.⁵ F16E *15/10;* **F16D** *3/14*

U.S. Cl. 74—574 11 Claims



2. A torsional damper type flywheel device comprising:

a drive side flywheel rotatable about an axis of rotation;

a driven side flywheel rotatable relative to the drive side flywheel about the axis of rotation;

a control plate rotatable relative to the drive side and driven side flywheels about the axis of rotation;

a plurality of springs, at least one of which is arranged between the drive side flywheel and the control plate and the remaining of which are arranged between the drive side and driven side flywheels, at least one of the plurality of springs being asymmetrically arranged with respect to the axis of rotation and at least one of the drive side, the drive side flywheels, and the control plate being asymmetrically configured to form a total, original imbalance of the flywheel device; and

means constructed of an added or removed mass for providing a compensating imbalance which is equal in magnitude of a force and opposite in direction of a force to the original imbalance as a centrifugal force vector and is equally divided into two portions each distributed respectively to the drive side and driven side flywheels, the means for providing a compensating imbalance being defined in the drive side and driven side flywheels before assembly of the flywheel device.

5,025,681

TORSIONAL VIBRATION DAMPER

Rainer H. Andrä, Limburg, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim, Fed. Rep. of Germany

Filed Jul. 24, 1989, Ser. No. 384,317

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1988, 3825062

Int. Cl.⁵ F16F *15/10*

U.S. Cl. 74—574 9 Claims

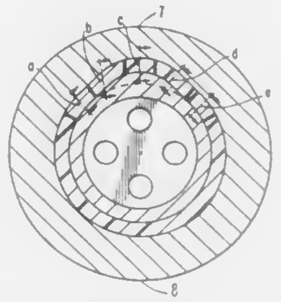
1. A torsional vibration damper having a longitudinal axis of rotation comprising:

(a) a central hub having means for connection to a part to be damped;

(b) an inertial damping mass spaced from the central hub to form a longitudinal extending gap surrounding the central hub;

(c) an elastic ring disposed in said gap in adherent contact between the central hub and the inertial damping mass for connecting the central hub to the inertial damping mass, said elastic ring having

(i) successive subsections along the circumferential direction of the elastic ring, each of said successive subsections having a shape that deviates from the shape of adjacent subsections, with at least one of said subsections uniformly merging into adjacent subsections and being spaced at a different distance from the longitudinal axis of rotation than the distance of other subsections from the longitudinal axis; and



(ii) a longitudinal profile that varies along the circumferential direction of the ring, said longitudinal profile having a bell curve shape outwardly projecting from at least one longitudinal plane of the torsional vibration damper, said bell curve shape having a peak height that varies in the circumferential direction of the elastic ring.

5,025,682

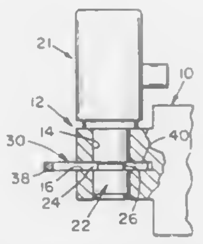
TRANSMISSION SOLENOID RETAINING CLIP

Ralph P. McCabe, Troy, and Lawrence McAuliffe, Jr., Ann Arbor, both of Mich., assignors to Coltec Industries Inc., New York, N.Y.

Filed Jun. 18, 1990, Ser. No. 539,489

Int. Cl.⁵ F16H *57/02;* **F16B** *21/18*

U.S. Cl. 74—606 R 14 Claims



1. In combination, a transmission housing having a wall and retaining means for positively retaining a generally cylindrical and slotted element in a generally cylindrical pocket in a protrusion of said housing wall, the combination comprising:

(a) said protrusion of said wall of said transmission housing having therein said generally cylindrical pocket for receiving said generally cylindrical element and also having therein a slot generally perpendicular to the cylindrical axis of and intersecting said pocket and

(b) said retaining means being a generally U-shaped retaining clip having a pair of broad bladed legs extending into and engaging said slot in said protrusion and adapted to engage simultaneously said slotted portion of said generally cylindrical element when said element is in a desired position in said pocket, each of said legs having an inwardly extending toe portion, said two portions being opposed to one another and separated by a distance less than the minimum diameter of said slotted portion of said generally cylindrical element to be retained and said legs being joined by a pair of resilient arms and a juncture between said arms.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,683

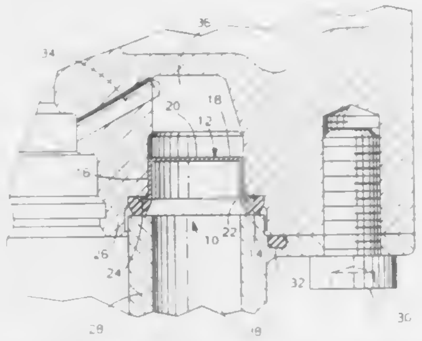
ORIFICE CUP PLUG AND SEAL ASSEMBLY

Charles W. Lewis, Wayne, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 19, 1990, Ser. No. 467,627

Int. Cl.^{5} F16H *57/04;* F16L *33/16*

U.S. Cl. 74—606 R **3 Claims**



3. A cup plug assembly for use at an interface of an automatic transmission case and an automatic transmission case extension, the plug assembly to be inserted into the transmission case prior to bolting the transmission case extension to the transmission case, comprising:

a cup plug element, with a distended cylindrical shape, open on a proximal end, closed on a distal end except for an orifice through the distal end for restricting fluid flow between the transmission end for restricting fluid flow between the transmission case and the transmission case extension, the distended shaped being sized to allow insertion of the distal end of the distended shape into an opening in the transmission case and tapering to the proximal end sized to require pressing the cup plug assembly to seat it in the opening in the transmission case;

the orifice sized to provide desired fluid flow;

a flange, integral with the plug element, extending radially outward from the proximal end of the plug element, forming a surface perpendicular to an axis of distention; and

a seal element for preventing the loss of fluid between the transmission case and transmission case extension, being bonded to the flange of the cup plug element, and providing a sealing force against both the transmission case and the transmission case extension.

5,025,684

METHOD AND APPARATUS FOR CONTROLLING AN AUTOMATIC SHIFT TRANSMISSION

Heinz Stehle, Weissach; Thomas Wehr, Ditzingen; Joseph Petersmann, Wimsbeim; Willi Seidel, Eberdingen-Hochdorf; Ludwig Hamm, Sindelfingen; Thomas Foeldi, Stuttgart; Gerhard Eschrich; Ronald Schwamm, both of Gerlingen; Wolfgang Runge, Ravensburg; Wolf-Dieter Gruble, Tettnang, and Peter Wendel. Kressbronn, all of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche AG, Stuttgart, Fed. Rep. of Germany

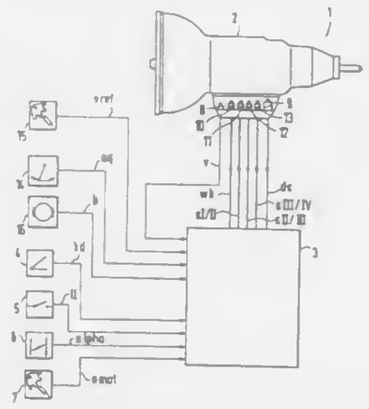
Filed Jul. 5, 1990, Ser. No. 548,254

Claims priority, application Fed. Rep. of Germany, Jul. 7, 1989, 3922040

Int. Cl.^{5} B60K *41/18*

U.S. Cl. 74—862 **13 Claims**

1. A method for controlling an automatically shifting transmission, comprising the steps of generating signals representative of the position of the throttle valve, the engine rotational speed, and of a lateral acceleration, automatically shifting gear steps of the transmission by way of shifting programs as a function of the signals for preventing upshifts, and delaying an upshifting during a coast operation by a first time period if a speed of change of the throttle valve signal value falls below a first limit value.



5,025,685

CONTROLLING DEVICE FOR NON-STAGE TRANSMISSION FOR VEHICLES

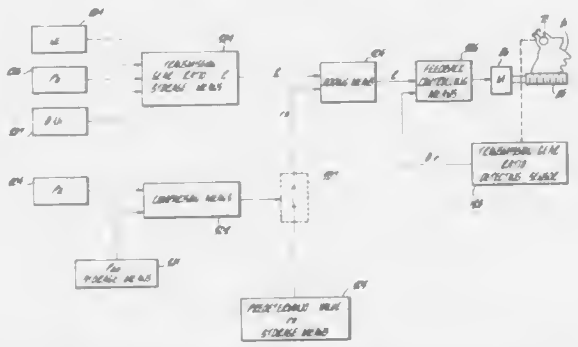
Akio Kobayashi; Hiroshi Tanaka; Shoji Yamashita, all of Saitama; Yasumasa Fujita; Koichi Hikichi, both of Tokyo, and Chiaki Kumagai, Saitama, all of Japan, assignors to Hooda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 31, 1989, Ser. No. 388,021

Claims priority, application Japan, Jul. 29, 1988, 63-19016; Aug. 12, 1988, 63-200031; Aug. 30, 1988, 63-213793; Oct. 25, 1988, 63-269226

Int. Cl.^{5} B60K *41/12*

U.S. Cl. 74—866 **4 Claims**



1. A controlling device for controlling the transmission ratio of a non-stage transmission in a vehicle, comprising,

engine output power forecasting means for forecasting an output power of an engine in said vehicle,

transmission ratio adjustment storage means for storing a transmission ratio adjustment value and outputting a transmission ratio adjustment according to said output power forecast,

vehicle condition sensing means for determining an actual running condition of said vehicle,

transmission gear ratio storage means for outputting an initial transmission ratio target value in response to said actual running condition,

adding means for determining a transmission ratio target value based on said initial transmission ratio target value and said transmission ratio adjustment, and

ratio control means for controlling said transmission ratio to correspond with said transmission ratio target value,

wherein said engine output power forecasting means comprises comparison means for comparing a detected atmospheric pressure with a predetermined atmospheric pressure, and wherein said engine output power forecasting means provides said transmission ratio adjustment to said adding means when said detected atmospheric pressure is less than said predetermined atmospheric pressure.

5,025,686

AUTOMATIC TRANSMISSION APPARATUS FOR VEHICLE

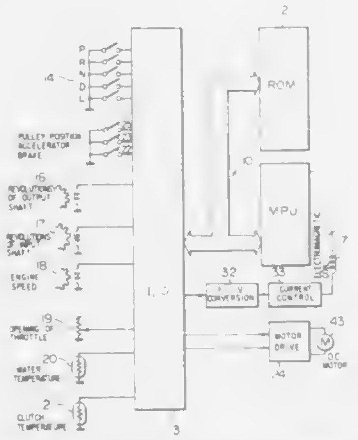
Kazuhiko Sato, and Shizuhisa Watanabe, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering Co., Ltd., Katsuta, both of, Japan

Filed Aug. 22, 1988, Ser. No. 234,758

Claims priority, application Japan, Aug. 28, 1987, 62-214777

Int. Cl.^{5} B60K *41/02*

U.S. Cl. 74—866 **2 Claims**



I. An automatic transmission method for vehicles in which a plurality of input data relating to a vehicle are inputted, and based on the input data, a pulley width of a continuously variable transmission of belt type is changed and concurrently therewith an effective diameter of the pulley is changed to control a transmission ratio substantially continuously, comprising:

a first step for deciding whether the vehicle is in a start state or a stop state, for selecting a first control loop when the vehicle is in the stop state, and for selecting a second control loop when the vehicle is in the start state,

a second step for deciding whether an accelerator is on or not when the first control loop is selected by the first step;

a third step for deciding whether an opening of the accelerator is larger than a first predetermined value when the second step decides that the accelerator is on;

a fourth step for setting a motor duty factor to a second predetermined value when the third step decides that the opening of the accelerator is larger than the first predetermined value; and

a fifth step for rotating the motor to a high gear side when the second predetermined value is set by the fourth step.

5,025,687

INTERLOCKING DIE-TYPE TOOLING FOR STRIPPING INSULATED ELECTRICAL CONDUCTORS

John D. Butler, Germantown, Wis., assignor to Mechtrix Corporation, Menomonee Falls, Wis.

Filed Mar. 20, 1989, Ser. No. 325,871

Int. Cl.^{5} H02G *1/12*

U.S. Cl. 81—9.51 **9 Claims**

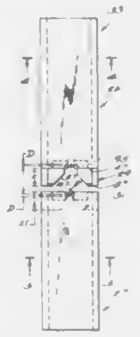
3. A tooling assembly useful for cutting and stripping insulation from an insulated electrical conductor comprising:

a. a stripping blade having first and second parallel longitudinal planar surfaces and a working end, the working end being formed with a depression having a surface that intersects a selected longitudinal planar surface in a cutting edge of predetermined size in the plane of the selected longitudinal planar surface, wherein the stripping blade has a generally U-shaped transverse cross section defining a longitudinal groove partially bounded by the second longitudinal planar surface; and

b. an insulation stop having a working end with a tab projecting from the working end, the tab terminating in a stop face, the stripping blade and insulation stop being relatively positionable to simultaneously enable the insulation stop stop face to be located a predetermined distance from the stripping blade cutting edge and the stripping blade working edge to extend beyond the insulation stop working end, wherein:

i. the insulation stop has a generally T-shaped transverse cross section comprised of a leg; and

ii. the stripping blade and the insulation stop are relatively positionable by interfitting the insulation stop leg within the stripping blade groove.



5,025,688

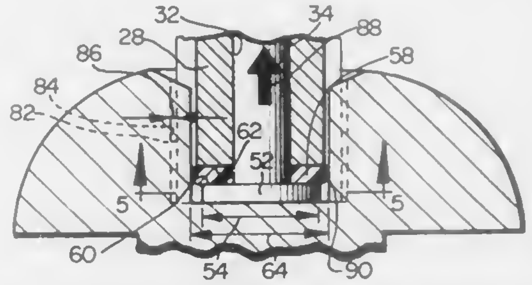
EXPANDABLE DRIVE TOOL TIP FOR SCREW RETENTION

Richard M. Davis, Arab, Ala., assignor to Ryder International Corp., Arab, Ala. and Textron Inc., Providence, R.I.

Filed May 22, 1990, Ser. No. 526,607

Int. Cl.^{5} B25B *23/10*

U.S. Cl. 81—448 **13 Claims**



1. A fastener drive tool for imparting rotational torque to a fastener, said drive tool comprising: an elongate shank member; a bit portion formed on an end of said shank member for cooperatively engaging a drive socket formed in said fastener; a bore axially extending through said shank member; a draw shaft axially movably positioned in said bore; fastener retaining expansion means formed on an end of said shank and said draw shaft, said fastener retaining expansion means including a resiliently compressible member operatively retained on an end of said bit portion and operatively engaged with said draw shaft, said resiliently compressible member radially outwardly expanding when compressed for engaging said socket formed in said fastener creating fastener retaining a wobble resisting forces between said drive tool and said fastener, said resiliently compressible member being selectively contractable for releasing said drive tool from said fastener.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,689
METHOD AND APPARATUS FOR MACHINING AXIALLY SYMMETRICAL PARTS

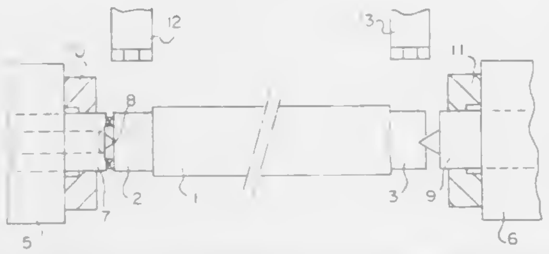
Theo Mayer, Boll, Fed. Rep. of Germany, assignor to Boehringer Werkzeugmaschinen GmbH, Goppingen, Fed. Rep. of Germany

Filed Mar. 22, 1989, Ser. No. 327,063

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1988, 3809619

Int. Cl.^{5} B23B *5/18*

U.S. Cl. 82—106 5 Claims



1. Apparatus for machining an axially symmetrical workpiece, comprising:

first and second means each for selectively supporting a respective end of a workpiece at its axis of rotation whereby end regions of said workpiece are exposed for unobstructed machining; and

first and second means each for selectively radially clamping a respective one of said end regions of said workpiece to assist said axial supporting means in the rotational support of the workpiece to permit accurate machining of central regions thereof;

said axial supporting means and said radial clamping means being movable relative to each other and cooperating to permit machining of the entire workpiece on a single apparatus in a single manufacturing sequence.

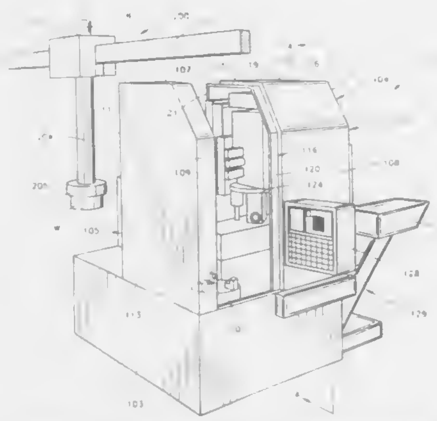
5,025,690
VERTICAL SPINDLE TURRET LATHE

Carl J. Myers, Mentor, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio

Continuation of Ser. No. 214,193, Jul. 1, 1988, abandoned, which is a continuation-in-part of Ser. No. 147,730, Jan. 25, 1988, Pat. No. 4,821,612, which is a division of Ser. No. 927,758, Nov. 6, 1986, Pat. No. 4,741,232. This application Nov. 9, 1989, Ser. No. 436,083

Int. Cl.^{5} B23B *3/20, 3/32, 15/00*

U.S. Cl. 82—121 5 Claims



1. A machine tool (**100**) for use in machining workpieces (W), said machine tool comprising a base (**134**) having a first spindle support section (**135**) and a first toolholder support section (**136**) extending upwardly from said base above the level of said spindle support section (**135**), first way means (**143**) connected with said first toolholder support section and having a vertical longitudinal axis, a first carriage (**144**) connected with said first way means (**143**) and movable along said first way means, first drive means (**145**) connected with said first carriage (**144**) for moving said first carriage up and down along said first way means, second way means (**146**) connected with said first carriage (**144**), said second way means having a horizontal longitudinal axis, a second carriage (**147**) connected with said second way means (**146**) and movable along said second way means, second drive means (**148**) connected with said second carriage (**147**) for moving said second carriage (**147**) along said second way means (**146**), a first toolholder (**124**) connected with said second carriage (**147**) for holding a cutting tool, first spindle means (**101**) connected with said first spindle support section (**135**) of said base for rotating a workpiece about a vertical axis (c), said machine tool being characterized by said first tool holder (**124**) comprising a tool turret (**124**) having a vertical rotatonal axis (d) spaced from the vertical longitudinal axis of said first way means and carrying a plurality of tools (T) extending vertically therefrom, and the vertical axis (c) about which said first spindle means (**101**) rotates a workpiece (W) being horizontally offset to be located to one side of said first carriage (**144**) and said first toolholder support section (**136**) of said base (**134**), said first toolholder support section (**136**) being located to said one side of said first spindle means (**101**) and said first spindle support section (**135**), said machine tool components configured and said second carriage and said tool turret movable so that the area above said first spindle support section (**135**) extending normally to said horizontal longitudinal axis from the front completely to the rear of said machine tool is able to be completely clear of said turret structure and the other components of said machine tool to enable overhead access to said first spindle support for loading of workpieces into said first spindle means (**101**) from the rear of said machine tool so as to allow movement of workpieces (W) to and from said first spindle means (**101**) along a linear path which extends between the rear of said machine tool (10) and said first spindle means (**101**).

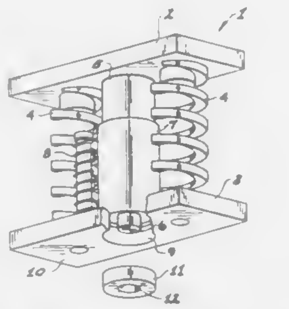
5,025,691
PUNCH GUIDE

Frank Deni, 20 Norris St., Buffalo, N.Y. 14207

Filed Jun. 16, 1989, Ser. No. 367,009

Int. Cl.^{5} B26F *1/14*

U.S. Cl. 83—140 9 Claims



1. A punch guide unit comprising in combination a punch plate, a stripper plate, a punch housing, a tubular punch guide with a hollow inner portion, and spring means to movably connect said stripper plate and said punch plate, said stripper plate having an aperture extending therethrough, said punch housing attached to an suspended from said punch plate, said punch housing having means to contain and hold in position a punch, said punch housing telescopically fitted into said tubular punch guide and freely movable in a vertical direction within the inner portion of said tubular punch guide, said tubular punch guide coextensive with said aperture and fixed to said stripper plate over said aperture, said tubular punch guide providing a vertical support to said punch housing and said punch to a point when said punch makes contact with a workpiece thereunder.

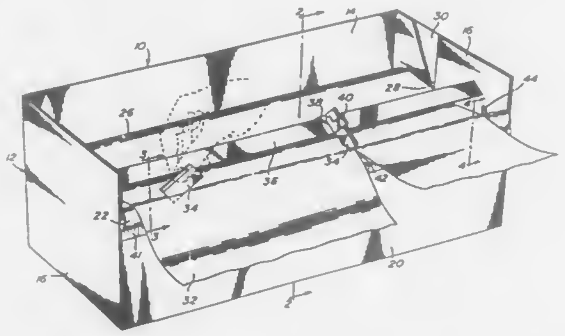
5,025,692
CUTTER FOR WALL COVERING SHEET ROLLS

Doug J. Reynolds, 17055 Valley Ave., Pierrefonds, Quebec, Canada H9J 1G4

Continuation-in-part of Ser. No. 173,150, Mar. 25, 1988, abandoned. This application Dec. 18, 1989, Ser. No. 451,941

Int. Cl.^{5} B26D *7/01*

U.S. Cl. 83—468 11 Claims



1. An apparatus for cutting wall covering sheet transversely and longitudinally from a roll, said apparatus comprising:

a container having a rod positioned in slots on opposing inside ends of the container, the rod constituting means to hold a roll of wall covering sheet and allow the sheet to be unwound;

a cutting blade;

a transverse member on an edge of one side of the container positioned substantially parallel with the roll, the sheet passing over the transverse member when unwound from the roll, the transverse member having a slot therein extending along a longitudinal axis thereof, said slot constituting a guide for said cutting blade to make a transverse cut in the sheet, said transverse member comprising a fixed tab adjacent one end thereof, said transverse member being integrally moveable laterally along the said edge of the container so that said fixed tab thereof acts as a guide for an edge of sheet unwound from the roll;

a longitudinal track member in the container supported on the opposing inside ends of the container, and extending transversely substantially parallel to the roll and the transverse member, and disposed therebetween, the longitudinal track member providing a guide to deflect the sheet downwards for the sheet to pass thereunder when unwound from the roll and passing over the transverse member; and

a cutting blade holder slidingly mounted on the longitudinal track member for positioning at any location thereon, said cutting blade being mounted in said cutting blade holder to cut the sheet longitudinally after passing under the longitudinal track member, and before passing over the transverse member, the said cutting blade being removable from said cutting blade holder and constituting means for making said transverse cut in said sheet by sliding engagement of said blade in the slot of said transverse member.

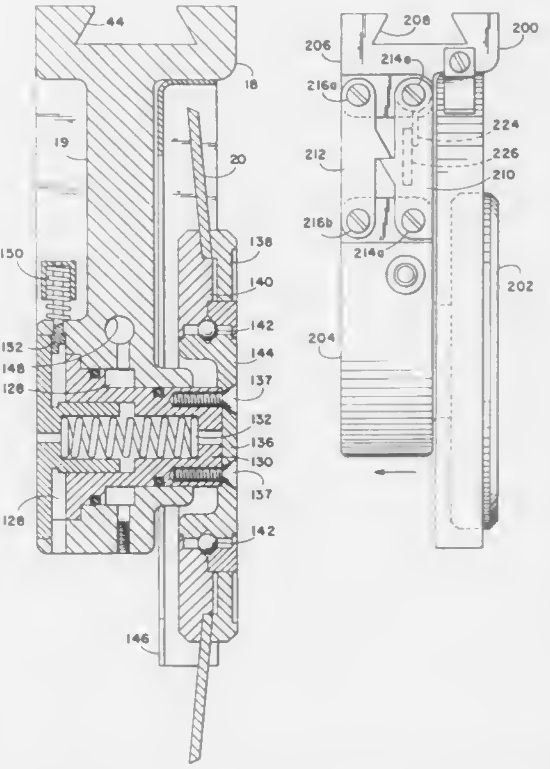
5,025,693
SIDE SHIFTING APPARATUS FOR CUTTING BLADE IN A WEB SLITTING MACHINE

John W. Tidland, Vancouver; Reinhold A. Schable, Washougal, both of Wash.; Casey M. Vander Bom, Hillsboro, Oreg.; Borendra K. Biswas, Vancouver, Wash., and William R. Miller, Portland, Oreg., assignors to Tidland Corporation, a Washington Corp., Camas, Wash.

Division of Ser. No. 293,298, Jan. 3, 1989. This application Sep. 29, 1989, Ser. No. 414,513

Int. Cl.^{5} B23D *19/02;* **B26D** *1/14*

U.S. Cl. 83—482 5 Claims



1. A web slitter for cutting a continuous web of material comprising:

(a) an upper carriage portion;

(b) a lower blade holder portion for holding a rotary blade, said blade holder portion having a laterally stationary support portion and a laterally movable hub portion;

(c) linkage means for coupling said laterally movable hub portion to the stationary support portion said linkage means comprising a pivotable parallelogram linkage for permitting lateral movement of the movable hub without tilting the blade; and

(d) shock absorbing means coupled to the linkage means for damping oscillations of the blade.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,694

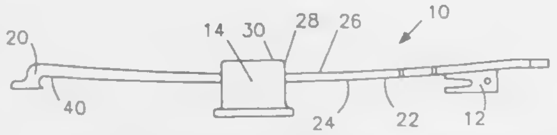
TUNING THE WOOD OF A MUSICAL INSTRUMENT BOW

John H. Hogue, 436 S. Saginaw St., Flint, Mich. 48501

Continuation-in-part of Ser. No. 264,352, Oct. 31, 1988, Pat. No. 4,941,383. This application Jul. 13, 1990, Ser. No. 553,103

Int. Cl.^{5} G10D *3/16*

U.S. Cl. 84—282 **7 Claims**



1. A method of manufacturing and tuning a bow for a stringed instrument, comprising the steps of:

a) forming the bow to a predetermined size and shape, having a frog disposed at one end and a tip disposed at the opposite end, with a thicker cross sectional bow configuration near the frog, and a thinner cross section bow configuration near the tip;

b) securing the frog in a suitable clamping means;

c) tapping the surface of the bow at a first location near the frog to determine the audible sound of the bow at the location tapped;

d) selectively removing the material from the bow in proximity to the tapping location to adjust the audible sound of the bow to the desired pitch;

e) progressively reclamping the bow at the previous tapping location, and selectively removing material in proximity to a newly selected tapping location to adjust the audible sound to the desired pitch until the substantial length of the bow has been progressively tapped and material selectively removed to achieve the desired audible sound along substantially the entire length of the bow.

5,025,695

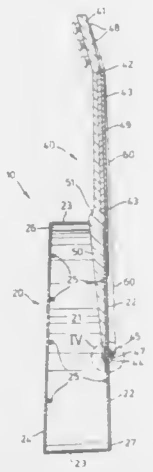
STRINGED INSTRUMENT WITH INWARDLY EXTENDING NECK

Gerald J. Viel, P. O. Box 144, St. Stephen, New Brunswick, Canada E3L 2X3

Filed Oct. 30, 1989, Ser. No. 428,716

Int. Cl.^{5} G10D *3/00*

U.S. Cl. 84—293 **15 Claims**



1. A musical instrument which produces sound by means of vibrating strings, comprising:

a hollow acoustic body having a top, and also having a tail portion apart from said top;

a bridge positioned above said top; and

a neck extending outwardly from said body opposite said tail portion, terminating at an upper end having upper string anchoring means, and also extending inwardly to a plane between said bridge and said tail portion, terminating at a lower end having lower string anchoring means,

the lower end of said neck being unattached to said tail portion and thus able to vibrate free from restraint thereby,

said neck contacting said top near said bridge, such that acoustic vibrations may be transmitted directly from said neck to said top near said bridge, thereby causing said top to resonate,

in use, the compressive forces of the strings being carried substantially by said neck, leaving said top substantially unstressed by such compressive forces.

5,025,696

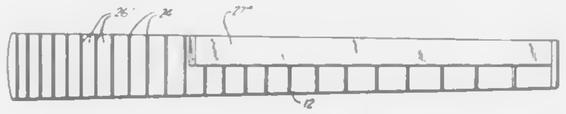
PARTIALLY FRETTED FINGERBOARD

John M. Brown, 7482 Concord Blvd., Inver Grove Heights, Minn. 55076

Filed Sep. 21, 1989, Ser. No. 410,259

Int. Cl.^{5} G10D *3/06*

U.S. Cl. 84—314 R **9 Claims**



1. A fingerboard of a stringed instrument having a longitudinal dimension along which a plurality of strings extend between a tension bridge and a nut on said instrument, said fingerboard comprising:

a fretted portion which extends transversely across said fingerboard beneath at least one but less than all of said strings, the frets of said fretted portion rising a selected height above said fingerboard and being spaced apart according to a selected tonal pattern; and

a fretless portion of said fingerboard extending transversely across said fingerboard beneath at least one but less than all of said strings, said fretless portion of said fingerboard having a relatively smooth surface and extending longitudinally along said fingerboard sufficiently to cover an area in which a plurality of consecutive frets would have otherwise occurred if said pattern of frets had been maintained in said fretless portion.

5,025,697

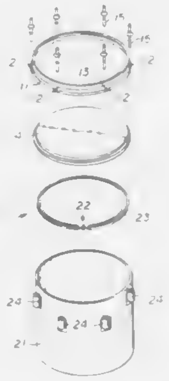
MUSICAL DRUM REINFORCEMENT

Randall L. May, 7712 Unit B Talbert Ave., Huntington Beach, Calif. 92648

Filed Oct. 9, 1990, Ser. No. 594,013

Int. Cl.^{5} G10D *13/02*

U.S. Cl. 84—411 R **10 Claims**



1. The combination with a musical drum comprising a drum shell, a drum head fitted on an open end of said drum shell, a rim, and adjusting screws for tightening said drum head on said drum shell, of

a stiffening ring removably positioned inside said drum shell against the wall thereof at the edge adjacent to the drum head, and

means for adjusting said stiffening ring to apply predetermined tension against said drum shell to prevent inward compression of said drum shell when said drum head is tightened thereon.

5,025,698

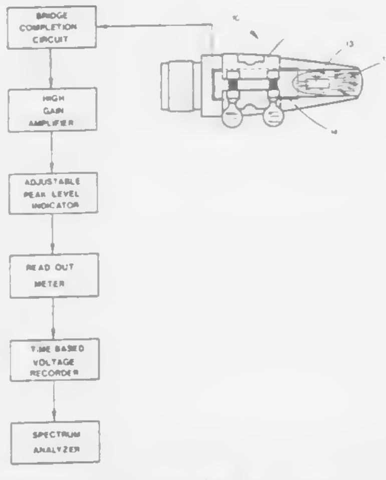
APPARATUS FOR MEASURING LIP PRESSURE ON REED OF WOODWIND INSTRUMENTS

David E. Feller, 209 E. 1400 South, Bountiful, Utah 84010, and Carl G. Wood, 780 Nancy Dr., South Ogden, Utah 84408

Filed Apr. 2, 1990, Ser. No. 504,916

Int. Cl.^{5} G10G *3/00;* **G01D** *21/00*

U.S. Cl. 84—453 **3 Claims**


BRIDGE COMPLETION CIRCUIT
HIGH GAIN AMPLIFIER
ADJUSTABLE PEAK LEVEL INDICATOR
READ OUT METER
TIME BASED VOLTAGE RECORDER
SPECTRUM ANALYZER
13
12

1. An apparatus for measuring lip pressure applied by a musician on a reed of a musical instrument comprising:

(a) a strain measuring transducer;

(b) attachment means for attaching said strain measuring transducer to said reed of said musical instrument; and

(c) signal means coupled to said strain measuring transducer for providing a signal corresponding to strain measured by said strain measuring transducer that is a function of said lip pressure applied by said musician on said reed.

5,025,699

FINGER REST FOR RECORDER

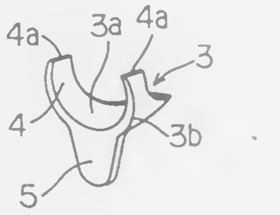
Toshiko Toyama, 2-39-1, Sakuragaoka, Tama-shi, Tokyo, Japan

Filed Nov. 14, 1989, Ser. No. 436,511

Claims priority, application Japan, Nov. 16, 1988, 63-149453[U]; Jan. 25, 1989, 1-15582; Jan. 27, 1989, 1-20924[U]

Int. Cl.^{5} G10D *9/00*

U.S. Cl. 84—453 **35 Claims**



1. A finger rest for a recorder having an elongated recorder body, the finger rest comprising:

a body holding section having a bottom portion extending a predetermined length in the longitudinal direction of the recorder body, and respective side portions extending from said bottom portion on both sides of said body holding section;

a thumb supporting section projecting from said body holding section downward in a direction substantially perpendicular to said longitudinal direction of said recorder body and of said body holding section;

said body holding section having a sectional shape in the form of an arc when viewed in the cross sectional direction of said recorder body so as to hold said recorder body firmly and tightly with a spring force;

at least a portion of said body holding section being resilient, and said body holding section having an inner diameter smaller than the outer diameter of said recorder body, an arc extending over the inner surfaces of said bottom portion and said side portions being a major arc which is larger than the length of a half circle;

said thumb supporting section comprising a plate-like member which has a plane substantially parallel to the cross section of said arc section of said body holding section; and

said plate-like member having a width W so as to extend the bottom portion of said body holding section and over to said two side portions of said body holding section which define said arc section.

5,025,700

ELECTRONIC MUSICAL INSTRUMENT WITH SIGNAL MODIFYING APPARATUS

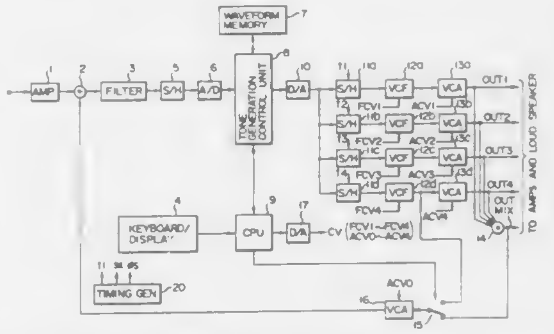
Shigenori Morikawa; Kohtaro Hanzawa, and Kazuhisa Nakamura, all of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 336,524, Apr. 10, 1989, abandoned, which is a continuation of Ser. No. 162,637, Mar. 1, 1988, abandoned, which is a division of Ser. No. 902,530, Sep. 2, 1986, Pat. No. 4,754,680. This application Dec. 22, 1989, Ser. No. 456,617

Claims priority, application Japan, Sep. 10, 1985, 60-200259; Sep. 11, 1985, 60-201301

Int. Cl.^{5} G10H *1/057, 1/08, 1/12, 7/04*

U.S. Cl. 84—603 **17 Claims**



9. An electronic musical instrument, comprising:

sampling means for receiving an input signal and for sampling said input signal at a predetermined sampling frequency for producing a digital waveform signal;

waveform memory means coupled to said sampling means for storing said digital waveform signal provided form said sampling means;

signal modifying means coupled to said waveform memory means, and including waveform reading means for reading out at least two digital waveform signals representing respective waveforms stored in said waveform memory means, and signal modifying means for modifying a timbre characteristic of said read-out digital waveform signals in a predetermined manner;

means for mixing at least two modified signals obtained by

VOL
1127
ISS
4
JE
25
1991
UMI

said signal modifying means and for generating a mixed digital waveform signal; and

means for supplying said mixed digital waveform signal to said waveform memory means for storing said mixed digital waveform signal in said waveform memory means.

5,025,701

SOUND SOURCE APPARATUS

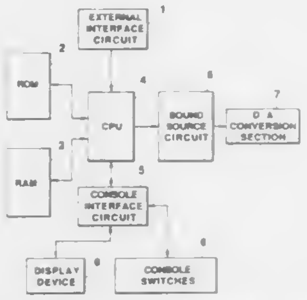
Naoaki Matsumoto, Tachikawa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Nov. 3, 1989, Ser. No. 431,738

Claims priority, application Japan, Nov. 8, 1988, 63-281642; Nov. 8, 1988, 63-281643

Int. Cl.^{5} G10H *1/18, 1/26*

U.S. Cl. 84—615 12 Claims



1. A sound source apparatus capable of receiving note data from an external unit and executing tone control based on said note data, said apparatus comprising:

polyphonic region designating means for specifying, in a first polyphonic region having a plurality of polyphonic channels, a second polyphonic region included in said first polyphonic region, by specifying upper and lower limit channels thereof;

note data memory means for storing note data for each polyphonic channel in said first polyphonic region, in an associated area;

polyphonic channel control means for, when receiving note data, updating note data of said polyphonic channels in said first polyphonic region, stored in said note data memory means, in accordance with a predetermined rule; and

tone control means having tone generation control means for controlling generation of a musical tone based on note data of each polyphonic channel stored in those areas of said note data memory means which are associated with said second polyphonic region.

5,025,702

ELECTRONIC MUSICAL INSTRUMENT EMPLOYING TIME-SHARING FREQUENCY MODULATION AND VARIABLE CONTROL OF HARMONICS

Akiyoshi Oya, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Division of Ser. No. 922,883, Jul. 7, 1978, Pat. No. 4,643,066, which is a continuation of Ser. No. 700,941, Jun. 29, 1976, abandoned, and a continuation of Ser. No. 109,084, Oct. 15, 1987, abandoned, which is a division of Ser. No. 748,732, Jun. 25, 1985, Pat. No. 4,748,888. This application Nov. 21, 1989, Ser. No. 439,006

Claims priority, application Japan, Jul. 3, 1975, 50-82208; Jul. 3, 1975, 50-82209

Int. Cl.^{5} G10H *1/14*

U.S. Cl. 84—659 11 Claims

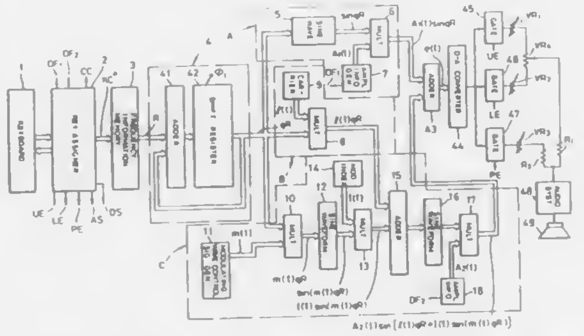
7. An electronic musical instrument comprising:

a first circuit for generating as a modulation index a function I(t) whose value varies with passage of time;

a second circuit for generating as a modulation wave a function waveform which contains a plurality of harmonic components;

a third circuit for generating a signal representing the frequency of a carrier wave the frequency of which varies with passage of time for a single note to be generated;

a fourth circuit for carrying out frequency modulation on said signal generated at said third circuit by using outputs of said first and second circuits and for outputting said frequency-modulated signal as a musical tone signal, wherein the modulating wave and carrier wave have relative frequencies such that the frequency modulation operation carried out by the fourth circuit causes the musical tone signal to be imparted with harmonic components.



5,025,703

ELECTRONIC STRINGED INSTRUMENT

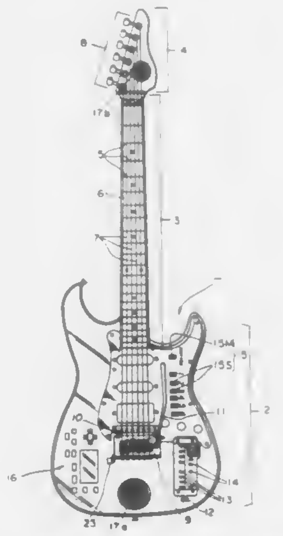
Akio Iba, Tokorozawa; Yoshiyuki Murata, Tachikawa, and Hajime Manabe, Higashiyamato, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Oct. 7, 1988, Ser. No. 256,398

Claims priority, application Japan, Oct. 7, 1987, 62-253230; Oct. 7, 1987, 62-253231; Oct. 7, 1987, 62-253235; Oct. 9, 1987, 62-256024; Oct. 14, 1987, 62-259243; Oct. 14, 1987, 62-259292; Oct. 16, 1987, 62-259786; Sep. 5, 1988, 63-220558

Int. Cl.^{5} G10H *1/32, 5/00, 1/02, 1/18*

U.S. Cl. 84—718 26 Claims



1. An electronic stringed instrument, comprising:

a fingerboard;

at least one extended string;

string-vibration detection means for detecting that said string is vibrated;

string-vibration strength measuring means for measuring a string-vibration strength of said string;

operation position detection means for detecting an operation position on said fingerboard;

sound source means for generating a musical tone for said string;

effect addition means connected with said sound source means for adding an effect to the musical tone supplied from said sound source means; and

tone control means including tone generation start instruction means for, when said string-vibration detection means detects that said string is vibrated, instructing said sound source means to start generation of a musical tone corresponding the vibrated string, and pitch instruction means for instructing said sound source means to cause a pitch of the musical tone generated by said sound source means to correspond to the operation position on said fingerboard detected by said operation position detection means,

wherein said instrument further comprises effect control means for controlling operation of said effect addition means in accordance with the string-vibration strength measured by said string-vibration strength measuring means.

5,025,704

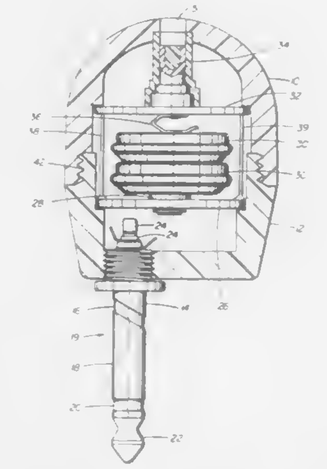
CORDLESS GUITAR TRANSMITTER

Richard L. Davis, Kentville, Canada, assignor to Airjack Wireless Systems Incorporated, Dartmouth, Canada

Filed Apr. 14, 1989, Ser. No. 337,907

Int. Cl.^{5} G10H *3/00;* **H05B** *1/034*

U.S. Cl. 84—723 20 Claims



1. A transmitter unit for use with a stringed musical instrument having a transducer electrically connected to an output jack said unit comprising a housing containing transmitter circuitry;

a coil of wire or other conductive means connected to said circuitry and adapted to induce a RF pattern within the strings of said stringed musical instrument, the combination of the said coil or said other conductive means and said strings acting as an antenna when the unit is in use;

a phono plug projecting from said housing for insertion into said output jack, to provide an electrical input to said circuitry from said transducer and to connect said strings to a ground for said circuitry, said housing being adapted to be held in place on said instrument by said plug.

5,025,705

METHOD AND APPARATUS FOR CONTROLLING A KEYBOARD OPERATED DEVICE

Jef Raskin, P.O. Box 1638, Pacifica, Calif. 94044

Continuation of Ser. No. 295,161, Jan. 6, 1989, abandoned. This application Nov. 22, 1989, Ser. No. 441,183

Int. Cl.^{5} G10H *3/00, 1/34*

U.S. Cl. 84—743 7 Claims

1. An apparatus for controlling a keyboard operated device having a plurality of keys which are digitally operated for producing an output signal when one or more of the keys are actuated, comprising:

a set of first sensors, each first sensor being associated with one or said keys, for detecting actuation of each of said first sensor's associated key;

means for producing a first response signal associated with each said key, connected to each said first sensor, which produces a first response signal when actuation of one of said keys is detected by its associated first sensor, said first response signal varying as a function of which key is actuated;

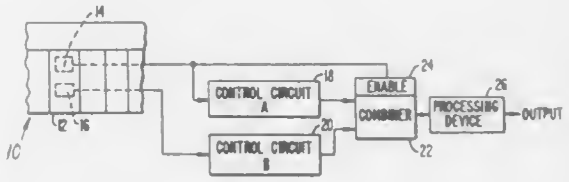
a set of second sensors, each second sensor being associated with one of said keys, for identification of which digit actuates said associated key when said associated key is actuated;

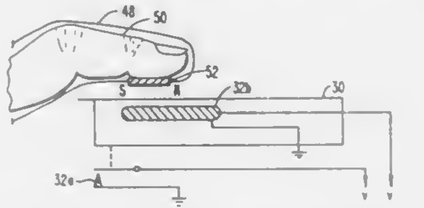
means for producing a second response signal associated with each said key, connected to each of said second sensors, which produces a second response signal which varies as a function of which digit actuates said associated key;

means for combining each said first and second response signals associated with each said key for producing an output signal associated with each key; and

means for outputting said output signal associated with each key when said associated key is actuated,

wherein said keyboard operated device is a musical synthesizer for producing a plurality of notes and further wherein said second response signal represent a predetermined timbre associated with each digit.





5,025,706

CONTROLLED DEPTH PRIMER SEATING TOOL

Kenneth E. Markle, 2525 Primrose Lane, York, Pa. 17404

Filed Jan. 9, 1990, Ser. No. 462,454

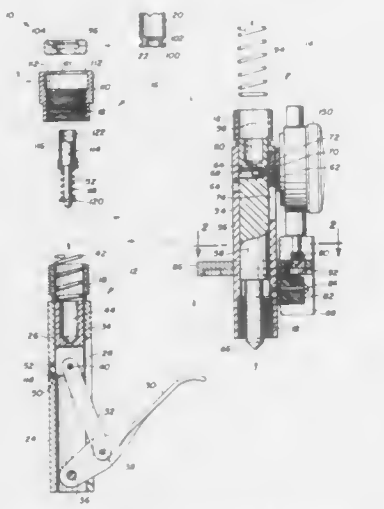
Int. Cl.^{5} F42B *33/04*

U.S. Cl. 86—37 17 Claims

1. A controlled depth primer seating tool, said tool comprising in combination a shell holder assembly adapted to receive and positionally retain a center fire cartridge case for priming, a primer seater having a primer retention cup and adapted by a mechanical linkage means of said tool to insertably probe a primer pocket of said positionally retained cartridge case and find and measure the depth thereof, a measurement assembly having a measuring means to differentially measure simultaneously between the primer pocket depth measurement and the height of a primer to be measurably seated within said primer pocket by means of said tool, a measurement assembly means to zero the simultaneous differential cartridge case primer pocket depth and primer height measurement difference thus taken, a seater assembly adapted to compressively seat said primer from receivable support within said primer

VOL 1127 ISS 4 JE 25 1991 UMI

retention cup of said primer seater to within said primer pocket to the measurement assembly zero differential setting, and by



means of said tool compressively effect a pre-load overseating of said primer by a measured amount.

5,025,707

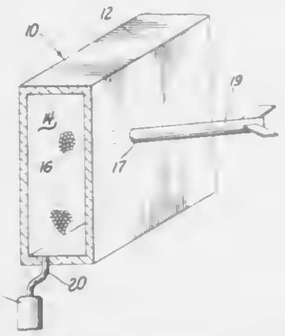
HIGH PRESSURE GAS ACTUATED REACTIVE ARMOR

Rene Gonzalez, Southfield, Mich., assignor to The United States of America as represeoted by the Secretary of the Army, Washingtoo, D.C.

Filed Mar. 19, 1990, Ser. No. 495,554

Int. Cl.^{5} F41H *5/007*

U.S. Cl. 89—36.17 3 Claims



1. A reactive armor structure adapted to resist the incursion of penetrators through the structure comprising: a shaped piece of armor plate material; a source of high pressure compressed gas, a plurality of penetrator resisting means contained within the armor structure said penetrator resisting means being disposed so that they are forced by the pressurized gas into the penetrator at the location of any lowered pressure in the armor structure caused by the intrusion of a penetrator so as to impinge on the penetrator to damage its integrity.

5,025,708

ACTUATOR WITH AUTOMATIC LOCK

Denzil B. Smith, and Melvyn F. Whitby, both of Houston, Tex., assignors to Baroid Technology, Inc., Houston, Tex.

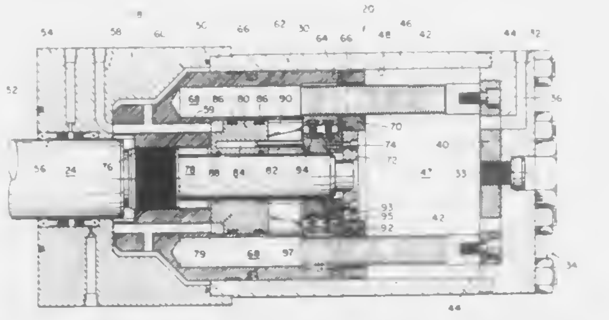
Filed Jan. 30, 1990, Ser. No. 472,644

Int. Cl.^{5} F15B *15/26*

U.S. Cl. 92—19 **26 Claims**

17. A fluid-powered blowout preventor actuator for reciprocating a ram block within a blowout preventor body in response to a pressurized fluid source to control flow of well fluids through the blowout preventor, the blowout preventor having a through passageway for receiving tubular members extending into a well bore, the blowout preventor actuator comprising:

- a cylinder having an inner bore defining an axis;
- a power piston axially movable within the cylinder bore from a ram open position to a ram closed position, the power piston having a plurality of axially extending locking rod cavities therein;
- a cylinder head for sealed engagement with an end of the cylinder;
- a ram shaft extending from the cylinder for mechanically interconnecting the power piston and the ram block;



- a plurality of locking rods each secured at a first end to the cylinder head and having an opposing second end movable within the corresponding axially extending cavity of the power piston, each locking rod having a multiplicity of axially spaced locking surface thereon;
- a plurality of locking segments each carried by the power piston and having a mating surface for locked engagement with a locking surface of a corresponding locking rod to prevent the power piston from moving within the cylinder bore to open the ram block; and
- an unlocking unit for selectively moving each of the locking segments out of engagement with the locking rods to unlock the power piston from the locking rods.

5,025,709

TANDEM TYPE VACUUM BOOSTER

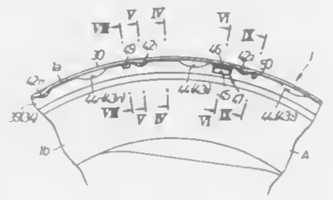
Yoshibisa Miyazaki, Nagano, Japan, assignor to Nissin Kogyo Kabushiki Kaisha, Ueda, Japan

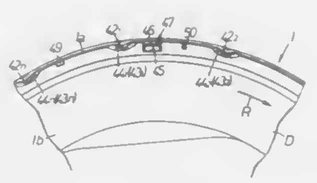
Filed May 24, 1990, Ser. No. 527,918

Claims priority, application Japan, Aug. 8, 1989, 1-93080[U]

Int. Cl.^{5} F01B *19/00*

U.S. Cl. 92—48 4 Claims





1. A tandem type vacuum booster comprising a booster shell which is comprised of a front shell half formed into a bottomed cylindrical shape with a rear end thereof opened, a rear shell half which closes the opened end of said front shell half, and a partition wall plate clamped between both said shell halves for dividing a chamber between both said shell halves into a front shell chamber and a rear shell chamber; a front diaphragm having an outer peripheral bead clamped between the front shell half and the partition wall plate; and a rear diaphragm having an outer peripheral bead clamped between the partition wall plate and the rear shell half; said front shell half being provided at its rear end with an annular radially outwardly extending step and a cylindrical portion extending rearwardly from an outer periphery of the step, said partition wall plate and said rear shell half having a first and a second flange provided thereon respectively, which flanges are superposed one on another within said cylindrical portion and rotatable between a disassembled position and an assembled position, each of the flanges having a number of notches circumferentially arranged along a peripheral edge thereof, said flanges being connected to each other through a positioning means so that their notches are aligned with each other, said cylindrical portion being provided with a number of locking claws which are aligned with the notches in the disassembled position of the flanges to enable engagement and disengagement of the flanges with and from the cylindrical portion and which clamp the flanges to the step in the assembled position,

wherein said second flange is formed with a first stop projection and a second stop projection, the first stop projection being adapted to abut against a predetermined one of the locking claws to stop the flanges at the assembled position before the locking claws interfere with the positioning means during rotation of the flanges to the assembled position, and said second stop projection permitting passing thereover of a locking claw other than said predetermined locking claw during rotation of the flanges toward the assembled position, but coming into abutment against such other locking claw to resist the rotation of the flanges back to the disassembled position when the flanges have reached the assembled position.

5,025,711

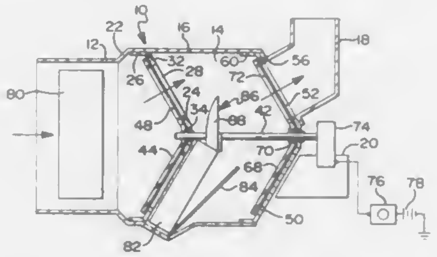
SIMULTANEOUS TEMPERATURE AND MODE SELECTOR FOR HEATING AND COOLING

Donald C. Cassidy, Bloomfield Hills, Mich., assignor to General Motors Corporation, Detorit, Mich.

Filed May 23, 1990, Ser. No. 527,605

Int. Cl.^{5} B60H *1/00*

U.S. Cl. 98—208 11 Claims



1. In an automotive heating and cooling system, means for simultaneously selecting temperature and mode comprising:

- an air passage having side walls and end walls,
- one end wall having inlet openings and the other end wall having outlet openings for air flow through the passage,
- a rotatable temperature control door adjacent the said one end wall for selectively controlling the air flow through the respective inlet openings, the proportion of air flow through each opening determining the temperature of the air flow through the outlet openings,
- a rotatable selector door adjacent the other end wall for selectively controlling the air flow through the outlet openings to determine mode, and
- a rotatable shaft extending through the passage and drivingly coupled to both doors for simultaneous rotation with the shaft such that for any given angle of shaft rotation a predetermined combination of inlet and outlet openings will be open to control the temperature of the outlet air and the mode.

5,025,712

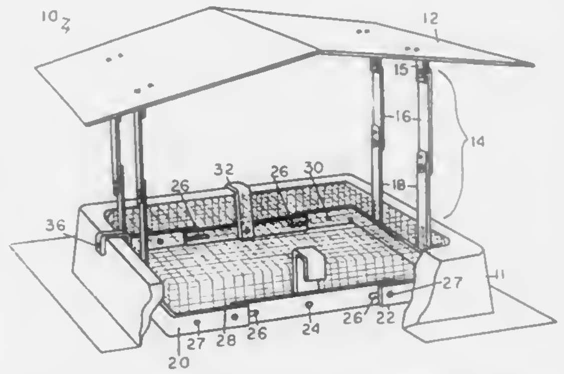
CHIMNEY COVER APPARATUS

Kevin D. Perry, #28 Lisa La., Mashpee, Mass. 02649

Filed Sep. 1, 1989, Ser. No. 401,819

Int. Cl.^{5} F23L *11/00*

U.S. Cl. 98—59 5 Claims



1. A chimney cover apparatus for installation in a chimney flue, which system comprises in combination;

a) a roof extending over the top of the chimney flue in adjustable spaced relationship thereto;

b) a barrier device for prevention of entry by animals comprising;

  i) a flexible mounting means for permitting manual insertion and installation of the chimney cover apparatus in the chimney flue comprising;

    1) an expandable band of general rectangular shape for telescopic insertion in the flue having a one end and other end comprising;

    a first arched section positioned at the one end;

    a second spaced apart arched section positioned at the other end of the flue opposite the first section;

    a plurality of slide bars having each a one end and an other end with a slot adjacent each end for connecting the first and second arched section for movement thereof between a compressed position and an open engaged position;

  ii) a spring means connected to the expandable band, constructed of resilient wire mesh for providing a barrier against entry by animals enclosed within the expandable band for constantly urging the first and second arched sections outwardly for providing clamping of the expandable band engagement against the inner surface of the flue;

  iii) connecting means for slideably connecting the first and second arched sections to the slide bars;

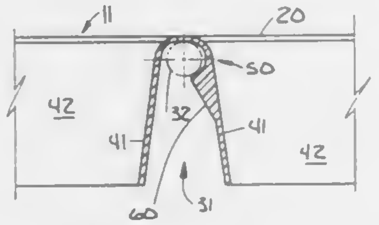
c) a plurality of prong means for engaging the top peripheral wall surface of the flue fastened securely to each arched segment and each slide bar;

d) a plurality of support arm members the one end secured to the roof and the other end hingeably attached to the flexible mounting band and provided with intermediate hinge means for adjustable mounting of the roof between an open position and a variable position to adjust the amount of draft in the flue; whereby the barrier device may be installed in the chimney by compressing the flexible mounting means inwardly, inserting the mounting means in the flue with the prongs engaging the top peripheral wall surface of the flue for positioning the barrier device relative to the chimney, next releasing the mounting means to be urged outwardly to securely engage the inner wall of the flue, with sufficient force to resist efforts by animals seeking to dislodge the chimney cover apparatus and gain entry into the chimney.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,713
TEMPORARY GRATE COVER ESPECIALLY ADAPTED FOR PAINT SPRAY BOOTH AREAS

Thomas C. Ouellette, Jr., Kalamazoo, Mich., assignor to Apollo Manufacturing Corporation, Kalamazoo, Mich.
Filed Oct. 16, 1990, Ser. No. 598,541
Int. Cl.⁵ B05B *15/12*
U.S. Cl. 98—115.2 9 Claims



1. An improved cover for paint spray area grates, including grates of the type having perimeter blades bounding the perimeter of the grate, plural grate blades running in spaced parallel direction along one dimension of the grate and plural grate cross members extending transversely to the grate blades, comprising:

means for shielding the grate blades and grate cross members from paint particles entrained in air drawn down through the grate and for facilitating installation of the cover on the grate without substantially inhibiting air flow down through the grate, such means comprising a lightweight plastic one piece member having:

a top wall comprising perimeter portions integral with plural length and width cross portions bounding a plurality of openings substantially coextensive with corresponding openings in the grate to be covered,

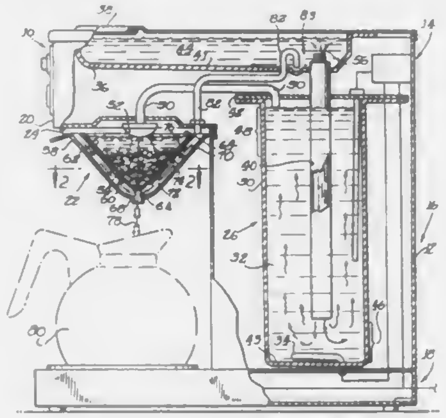
skirts depending into said openings from said perimeter portions, length cross portions and width cross portions, parts of said skirts adjacent said top wall being positioned close to the top of the grate blades and grate cross members, a pair of said skirts flanking each grate blade and cross member, each said pair of flanking skirts being downwardly divergent so that the space between the bottom edges of such pair of skirts is wider than the space between the top edges of said skirts, the skirts bounding each opening defining a steep funnel shape such that said opening has a somewhat larger area at the top than at the bottom thereof, the skirts in each opening being connected at the corners thereof so that said skirts form a continuous perimeter wall for such opening,

wherein width cross portions of the cover which extend downwardly below the bottom of the corresponding grate cross members are provided with built-in protuberances which are adapted to abut the bottom of the corresponding grate cross members, thereby to lock or clamp the corresponding skirts against a portion of the underside of the grate cross members and thereby positively to block lifting of the cover off of the grate by means of said built-in protuberances.

5,025,714
TEA MAKER

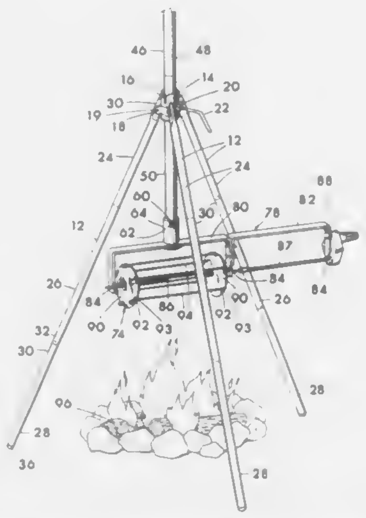
Alan W. Brewer, Divernon, Ill., assignor to Bunn-O-Matic Corporation, Springfield, Ill.
Filed Mar. 21, 1990, Ser. No. 496,887
Int. Cl.⁵ A47J *31/46;* **A23F** *3/16*
U.S. Cl. 99—300 7 Claims

1. An improved beverage apparatus for brewing beverage concentrates and diluting said beverage concentrates, said apparatus comprising: a reservoir for retaining a quantity of brewing water; a fill basin for receiving brewing and diluting water; a fill tube operatively attached to and extending from said basin to said reservoir for transporting water from said basin to said reservoir; a brewing water line extending from said reservoir for discharging brewing water into a brewing substance in a substance retainer for producing a brewed concentrate; a dilution water line in communication with and extending from said basin for discharging water for mixing with said concentrate; and flow regulating means for said brewing water and said dilution water, said flow regulation means comprising means for controlling the flow of dilution water from said basin, said flow regulating means preventing flow of dilution water prior to discharging water from said basin to said reservoir such that dilution water begins to flow at least not substantially before the discharge of brewing water from said brewing water line.



5,025,715
COOKING APPARATUS

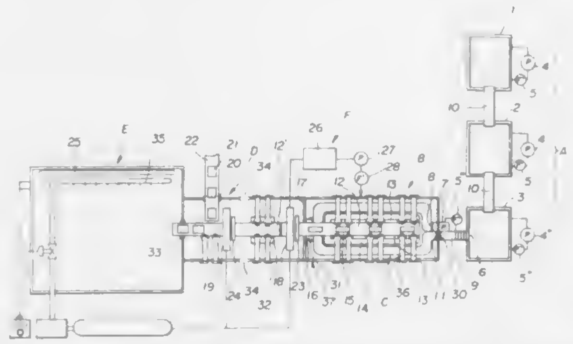
John Sir, 9261 Skyway, Paradise, Calif. 95969
Filed Nov. 30, 1990, Ser. No. 621,381
Int. Cl.⁵ A47J *33/00, 37/04;* **F16M** *11/00, 13/00*
U.S. Cl. 99—421 HV 13 Claims



1. In combination, a cooking apparatus for supporting food over a fire, comprising, at least three elongated support legs, one end of each of said support legs attached to a collar, each of said support legs extending angling outward from said collar with said angling providing widening spacing between each of said support legs, said collar further defining a main bore, said main bore containing a substantially rigid elongated shaft, said shaft vertically oriented and having an upper end and a lower end, said lower end of said shaft positioned generally centrally between said support legs, said shaft sized and shaped relative to said main bore to provide selectable vertical positioning of said shaft within said main bore, affixment means providing releasable stationary affixment of said shaft within said main bore, a food holding means attached to said lower end of said shaft, said food holding means vertically positionable by way of said selectable vertical positioning of said shaft within said main bore.

5,025,716
INSTALLATION FOR PROCESSING FOODS IN A STERILIZED CONDITION

Jitsuo Inagaki, 71, Aza Kamiyashiki, Oaza Itsusiki, Itsusikicho, Hazugun, Aichi, Japan
Continuation-in-part of Ser. No. 215,492, Jul. 6, 1988, abandoned. This application Oct. 4, 1989, Ser. No. 417,191
Int. Cl.⁵ A23L *3/00, 3/18, 3/34, 3/36*
U.S. Cl. 99—468 4 Claims

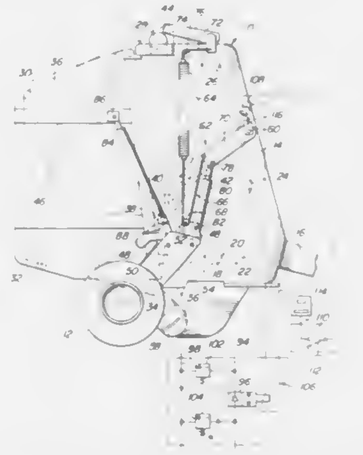


1. Installation for processing foods in a sterilized condition, wherein said installation comprises a tunnel shaped sterilized chamber made of transparent material and having an inlet and a plurality of openings on lateral sides of the sterilized chamber, each of said openings having a glove pair provided therein, a partition wall formed at the inlet of the sterilized chamber and a solution circulator channel for circulation of washing and sterilizing solution which conveys fresh foods such as fruits and sea foods into the sterilized chamber while washing and sterilizing them.

5,025,717
MACHINE FOR FORMING CYLINDRICAL BALES OF CROP

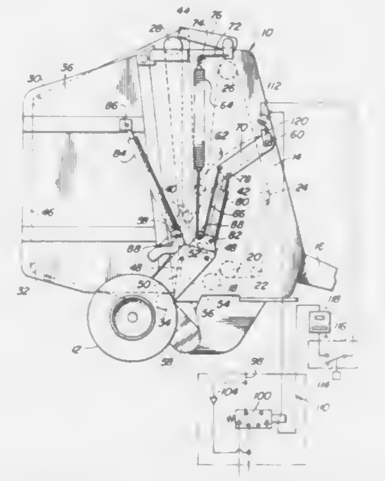
Jean Viaud, Sarrequemines; Arsène Roth, Walschbronn, both of France, and Henry D. Anstey, Ottumwa, Iowa, assignors to Deere & Company, Moline, Ill.
Filed May 17, 1990, Ser. No. 524,537
Claims priority, application United Kingdom, Jun. 8, 1989, 8913246
Int. Cl.⁵ B30B *5/06;* **A01D** *39/00*
U.S. Cl. 100—88 10 Claims

1. In a machine for forming cylindrical bales of crop having a variable volume baling chamber and a hydraulic system which includes a tension cylinder arranged so that a first end thereof can provide resistance to an increase in said volume and which is connected to a first supply/return line, said tension cylinder having a second end which is connected to a second supply/return line and a high pressure relief valve being connected in a first bypass line interconnecting the first and second supply/return lines, the improvement comprising: a low pressure relief valve being connected in a second bypass line interconnecting said first and second supply/return lines in parallel with said first bypass line; a mode select valve means being connected in the first supply/return line so as to be positioned between the low pressure relief valve and said first end of the tension cylinder; and said mode select valve means being shiftable between a dense bale position, preventing fluid flow from said first end of the tension cylinder to said low pressure relief valve means whereby fluid flows from the first to the second end of the tension cylinder only by way of the high pressure relief valve and a soft bale position, permitting fluid to flow from the first to the second end of the tension cylinder by way of the low pressure relief valve.



5,025,718
MACHINE FOR FORMING CYLINDRICAL BALES OF CROP

Jean Viaud, Sarrequemines; Arsène Roth, Walschbronn, both of France, and Henry D. Anstey, Ottumwa, Iowa, assignors to Deere & Company, Moline, Ill.
Filed May 17, 1990, Ser. No. 524,539
Claims priority, application United Kingdom, Jun. 8, 1989, 8913245
Int. Cl.⁵ B30B *5/06*
U.S. Cl. 100—88 15 Claims

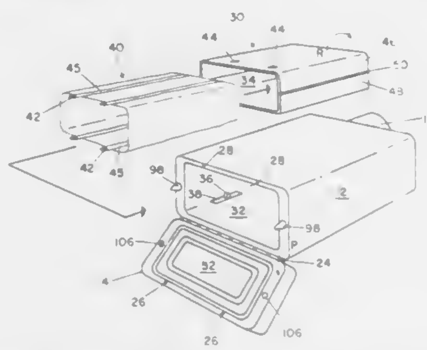


1. In a machine for forming cylindrical bales of crop having a variable volume baling chamber and a hydraulic system which includes a piston and cylinder unit which is arranged so that it can provide resistance to increase in the said volume and which is connectible to a source of pressurized hydraulic fluid, and a second piston and cylinder unit which is arranged so that it can move a component of the machine between two positions and which is connectible to the source, the improvement comprising: a first hydraulic line interconnecting rod and piston ends of the first unit; a second hydraulic line connected between the second unit and the first line; and valve means located in the first and second lines and being movable between a first position stopping flow between the opposite ends of the first unit and allowing free flow in the second line, and a second position allowing free flow between the ends of the

VOL
1127
ISS
4
JE
25
1991
UMI

first unit and stopping flow in the second line to the second unit.

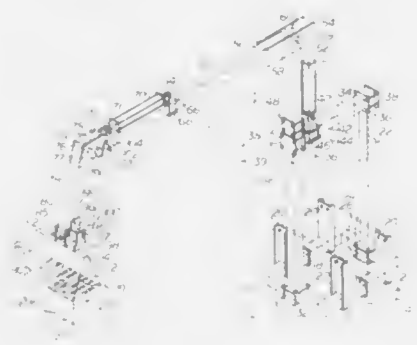
5,025,719
TRASH COMPACTOR APPARATUS AND METHOD
Kenneth D. Thomas, 892 Summit, #214, Round Rock, Tex. 78664
Filed Jul. 14, 1989, Ser. No. 380,112
Int. Cl.⁵ B30B *15/00, 1/00*
U.S. Cl. 100—99 **16 Claims**



1. A trash compactor comprising:
- A. a compactor housing including a front opening;
- B. a receptacle having a receptacle opening, the receptacle being adapted to be received within the compactor housing with the receptacle opening generally aligning with the front opening of the compactor housing;
- C. removable closure means for connecting to the compactor housing in a compacting position covering the receptacle opening and for releasing from the compacting position to expose the receptacle opening;
- D. collapsible compacting means connected to the closure means for extending a compacting head into the receptacle properly received within the compactor housing so as to compact litter contained in the receptacle and for retracting the compacting head to a retracted position out of the receptacle, when the closure means is connected to the front of the compactor housing in the compacting position;
- E. compactor drive motor means connected to the compactor housing in a position removed from the closure means for providing power to extend and retract the compacting head; and
- F. drive linkage means for mechanically linking the drive motor means and the compacting means when the compactor closure means is connected to the front of the housing in the compacting position so that the motor means may drive the compacting means to extend and retract the compacting head, and for enabling the closure means to release from the compacting position.

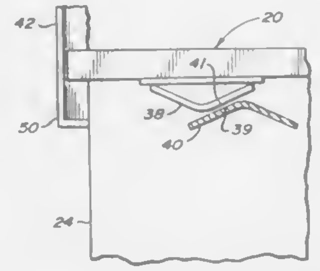
5,025,720
TRI-FOLD COTTON TROMPER
Chester Bates, **Rte. 3, P.O. Box 329-A, Halls, Ind. 38040**
Filed Jan. 4, 1990, Ser. No. 461,102
Int. Cl.⁵ B30B *1/00*
U.S. Cl. 100—226 **7 Claims**

1. In a cotton packing means mountable to a tractor and operable to pack cotton in a trailer after it has been dumped there by a cotton picker, the combination comprising:
- (A) a rectangular main support frame positioned between said tractor front and rear wheels in a horizontal plane underneath said tractor motor, said main support frame being extended beyond both sides of said tractor motor the length required to support a vertical mast and vertical support member,
- (B) a plurality of vertical mounting members connected at their lower ends to said main support frame and having mounting means at their upper ends for connection to a plurality of side mounting frames of said tractor, said side mounting frames being located adjacent to and on either side of said tractor motor,
- (C) a vertical mast with a connected flat support plate resting on, and adjustably connected to, one extended end of said main support frame,
- (D) a vertical support member with a connected flat support plate resting on, and adjustably connected to, an opposite extended end of said main support frame,
- (E) a horizontal bracing member positioned in a horizontal plane above said tractor motor, said bracing members being adjustably connected, one end to said vertical support member at a position near the top end of said vertical support member, and another end of said bracing member to said vertical mast at a point along the vertical length of said vertical mast sufficient to clear said tractor's hood,
- (F) a cantilevered horizontal boom with pivoting means, said boom being connected to the top end of said vertical mast, said pivoting means being located toward one end of said horizontal boom, whereby sufficient length is available beyond the pivot point for the connection and operation of a hydraulic cylinder, the other end of said cylinder being connected to a cylinder support located on said horizontal bracing member, said horizontal boom being positioned atop said vertical mast in a direction such that the extended length of said horizontal boom is perpendicular to the path of travel of said tractor,
- (G) a packer leg located at said extended end of said horizontal boom and being connected to said horizontal boom by a pivoting means, said packer leg being positioned with its top end connected to said pivoting means at an obtuse angle, said pivoting means being further connected to the movable end of a second hydraulic cylinder, said second hydraulic cylinder being connected at its other end to a cylinder mounting block located on top of said horizontal boom, whereby through the action of said second hydraulic cylinder, the lower end of said packer leg can be made to swing in an arc,



- (H) a packer foot located at the lower end of said packer leg, said packer foot being connected to said packer leg by a pivoting means, said packer foot being fashioned generally in the shape of a barn with said pivotal connecting means located at the center of the ridge line of said packer foot roof, said packer foot roof also being the location of a stabilizer arm bracket assembly, said bracket assembly being located along said ridge line and immediately adjacent to said packer foot and said packer leg pivotal connecting means,
- (I) an L-shaped stabilizing arm with bearing assemblies at each end, the horizontal end of said stablizing arm being connected to a pivot point on said stabilizer arm bracket assembly which in turn is located on said packer foot, and the vertical end of said stabilizing arm being connected to a shaft with pivoting means which extends in a horizontal plane from the side of said horizontal boom at a point which will cooperate with said pivot point between said horizontal boom and said packer leg, and said pivot point between said packer leg and said packer foot, whereby said packer foot is maintained in a vertical position as the lower end of said packer leg swings in an arc.

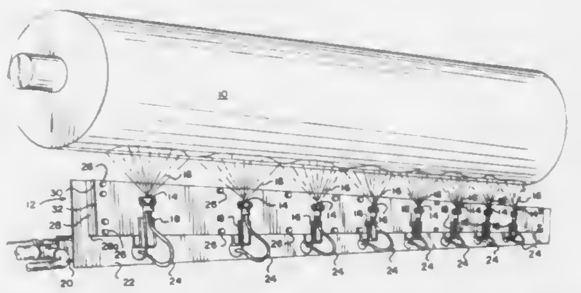
5,025,721
LOCK-IN DEVICE AND METHOD
Kent Spiers, Caledonia, Miss., assignor to Marathon Equipment Company, Vernon, Ala.
Filed Dec. 19, 1989, Ser. No. 452,411
Int. Cl.⁵ B30B *15/04*
U.S. Cl. 100—229 A **18 Claims**



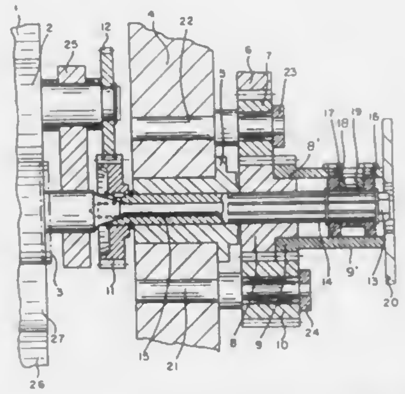
1. In a trash compactor assembly including compacting head means comprising a compactor head and a support for the compactor head; a removable container and lock-in means for the removable container; the container normally spaced and locked in position subjacent the compactor head for receiving trash for compaction; the container having lift receiving means for receiving fork lift loader arms carried by a loader to effect removal of the container to dump the contents thereof into the loader when said lock-in means is unlocked to permit the container to be removed from the compacting head means; said lock-in means comprising:
- a) first and second interlocking means,
- b) said first interlocking means fixedly secured to the compacting head means,
- c) said second interlocking means fixedly secured to the container,
- d) said first and second interlocking means being engageable with each other when the container is positioned for receiving trash for compaction, and disengageable from each other upon lifting of the container by the lifting forks and withdrawing of the container from the compactor head,
- e) the compacting head means having a front end and a rear end,
- f) said first interlocking means is located below the compacting head and between the front and rear ends,
- g) the container having a front end and a rear end and side walls between said front and rear ends, said second interlocking means is located between the front and rear ends of the container on a portion of at least one of said side walls and extends outwardly therefrom,
- h) whereby, the container is prevented from moving forwardly by said first and second interlocking means when a downward force is applied by the compactor head.

5,025,722
ADJUSTABLE SPRAY DAMPENING SYSTEM
Thomas G. Switall, Wheeling, and Robert O. Bloomquist, Mt. Prospect, both of Ill., assignors to Ryco Graphic Manufacturing, Inc., Wheeling, Ill.
Filed Jan. 22, 1990, Ser. No. 468,115
Int. Cl.⁵ B41L *25/06*
U.S. Cl. 101—147 **18 Claims**

1. In a spray dampening system, a plurality of spray nozzles arranged in laterally spaced relationship for spraying dampening fluid onto a dampening surface of a printing press in laterally adjacent individual spray patterns which merge on the dampening surface in a substantially continuous and laterally extending composite spray pattern, means for adjustably moving said spray nozzles simultaneously laterally toward and away from each other and for adjustably moving said spray nozzles together as a unit axially toward and away from the dampening surface, whereby the width of the composite spray patten may be adjusted while preventing excessive overlapping of the laterally adjacent individual spray patterns.



5,025,723
DRIVE FOR THE ROTATION AND LATERALLY RECIPROCATING DISTRIBUTING ROLLER IN INKING OR DAMPING UNITS
Paul Abendroth, Offenbach am Main, and Herbert Rebel, Rodgau, both of Fed. Rep. of Germany, assignors to MAN Roland Druckmaschinen AG, Fed. Rep. of Germany
Filed Jul. 13, 1990, Ser. No. 553,101
Claims priority, application Fed. Rep. of Germany, Jul. 14, 1989, 3923315
Int. Cl.⁵ B41F *7/26, 31/14*
U.S. Cl. 101—148 **1 Claim**



1. A drive for rotating and reciprocating a distributing roller in an inking or dampening unit of an offset printing press comprising:
- a plate cylinder;
- a distributing roller having a shaft;
- means for mounting said distributing roller for rotational and axial reciprocation;
- a gear connected to said plate cylinder for providing a drive input for rotating said distributing roller;
- a first gear and a second gear having different numbers of gear teeth thereon;
- means including said different numbers of gear teeth for rotating said first gear and second gear at different rotational speeds relative to one another;
- means including a hub on said first gear for mounting said first gear on the shaft of said distributing roller and for transmitting rotational movement thereto while allowing for axial sliding engagement thereon;
- said second gear being freely rotatably mounted on the hub of the first gear and disposed to transmit lateral reciprocation to said distributing roller;

VOL
1127
ISS
4
JE
25
1991
UMI

a circular cam groove mounted on the shaft of said distributing roller;
said first gear being in rigid driving engagement with said circular cam groove by way of said distributing roller shaft;
said second gear being in rigid driving engagement with a pin having a cam roller disposed for angular acceleration in said circular cam groove,
said first gear being driven by said gear connected to said plate cylinder,
an intermediate gear mounted for meshing engagement with both said first gear and said second gear;
and wherein only said first gear of said first and second gears rotating at different speeds from one another is driven directly by said gear connected to said plate cylinder and said second gear is driven only by said first gear by way of said intermediate gear meshing with both said first gear and said second gear.

5,025,724
CHANGE-OVER DEVICE FOR AN INTERMEDIATE DAMPING ROLLER IN AN OFFSET PRINTING PRESS

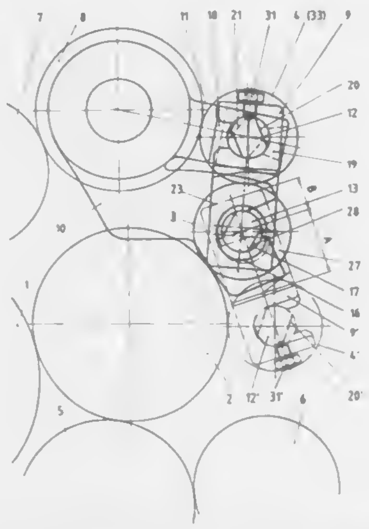
Roland Holl, Weiterstadt; Peter Hummel, Offenbach am Main, and Herbert Rebel, Rodgau, all of Fed. Rep. of Germany, assignors to MAN Roland Druckmaschinen AG, Fed. Rep. of Germany

Filed Mar. 12, 1990, Ser. No. 491,507

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1989, 3908043

Int. Cl.^{5} B41F *7/26, 7/36, 7/40;* **B41L** *25/16*

U.S. Cl. 101—148 **7 Claims**



1. A device for changing over the top intermediate roller of an intermediate roller pair connecting an inking unit to a damping unit in an offset printing press comprising:
a press frame,
a plate cylinder,
an inking unit including an ink spreader roller for inking said plate cylinder, a damping unit including a damping roller for damping said plate cylinder,
means for mounting said plate cylinder and said inking and damping units on said press frame,
a first intermediate roller having a spindle with opposed ends,
a second intermediate roller having a spindle with opposed ends,
a pair of first bearing levers pivotable around the center of said ink spreader roller and which bear axially against said press frame,
each end of said first intermediate roller spindle being received at an end of one of said bearing levers,
a pair of second bearing levers pivotable around the end of said ink spreader roller and which bear axially against said first bearing levers, pI each end of said second intermediate roller spindle being received in the end of one of said second bearing levers,
first lock means for securing each end of said second intermediate roller spindle to said second bearing levers,
means including a pair of swing levers each having one end pivotally connected at one end of said first intermediate roller spindle and having another end for receiving said second intermediate roller spindle,
second lock means for securing each end of said second intermediate roller spindle to said swing levers,
said swing levers having guide means for guiding said second intermediate roller between a first position, in which it is in engagement with said first intermediate roller and with said ink spreader roller, and a second position, in which said second intermediate roller is pivoted away from said first intermediate roller and together therewith engages, as a tandem rider roller, with said damping roller.

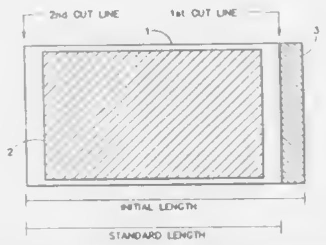
5,025,725
DOUBLE PAPER CUT SYSTEM FOR PRINTER MECHANISM

Hiroshi Fukino, Palos Verdes Estates, Calif., assignor to Seiko Instruments, Inc., Torrance, Calif.

Filed Jul. 21, 1989, Ser. No. 384,176

Int. Cl.^{5} B41F *13/56*

U.S. Cl. 101—227 **4 Claims**



1. A method for printing a full-size image in a standard length output sheet in a printer having a printing mechanism, an integral paper trimming mechanism, a paper transport mechanism, and electronic control means for controlling the movement and trimming of output sheets from a roll of paper, comprising the steps of:
a. advancing an initial length output sheet which is longer than the standard length output sheet from the paper roll so that the extra length of the initial length output sheet relative to the standard length output sheet constitutes a leading margin of the initial length output sheet and printing will begin in an image printing area on the initial length output sheet which is not part of the leading margin;
b. printing a full-size image in the image printing area;
c. trimming the leading margin with the paper trimmer;
d. trimming the remainder of the initial length output sheet from the roll of paper with the paper trimmer to provide the standard length output sheet.

5,025,726
MOVABLE INKER TYPE PRINTING MACHINE

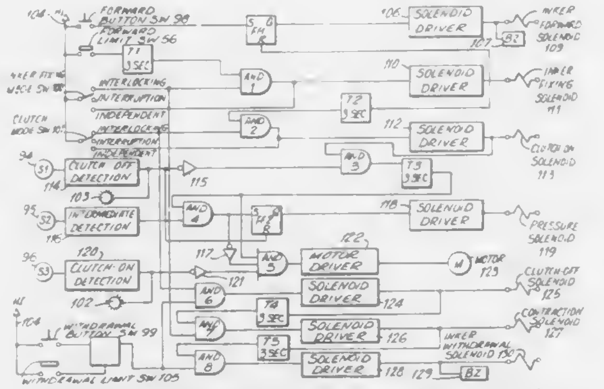
Isao Funabashi; Toshihiko Ebina, and Hiromitsu Numauchi, all of Toride, Japan, assignors to Komori Corporation, Tokyo, Japan

Filed Feb. 28, 1990, Ser. No. 486,214

Int. Cl.^{5} B41F *31/36;* **B41L** *27/38*

U.S. Cl. 101—352 **2 Claims**

1. A movable inker type printing machine comprising a printing machine main unit for a printing operation having a driving gear and a movable inker having a driven gear engaging with said driving gear, means for detaching said inker unit from said main unit,
a motor for rotating said driving gear,
a gear clutch device having, separate from said driving and driven gears, one movable gear disposed movably in the axial direction and a fixed gear disposed fixedly in the axial direction, said gear clutch device being responsive to a clutch-on instruction for moving said movable gear between a clutch-on position where said movable gear correctly engages with said fixed gear and a clutch-off position where said movable gear does not engage with said fixed gear,
a device having means for outputting to said gear clutch device a clutch-on instruction to move said movable gear from said clutch-off position to said clutch-on position,



a first detector having an output for detecting whether or not said movable gear is at said clutch-off position,
a second detector for detecting engagement of said movable gear with said fixed gear,
a timer having a time period commencing from an initial time-up position, means for operating said timer when the output of said first detector changes from detection of said clutch-off position to non-detection while said clutch-on instruction is being outputted, and
a motor control device having means for operating said motor to rotate said driving gear at a lower speed than a speed for printing operation for said time period from the time-up of said timer to engagement detection of said second detector and for stopping said motor after detection of the engagement.

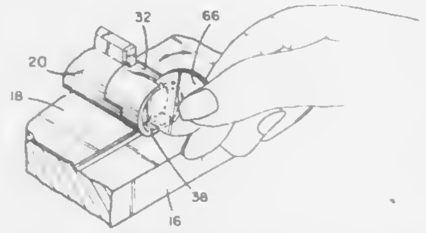
5,025,727
REPLACEABLE INK CARTRIDGE AND IMPRINTER

William P. Barbour, Laurel, Md., assignor to Datacard Corporatioo, Minneapolis, Minn.

Filed Jun. 21, 1990, Ser. No. 542,192

Int. Cl.^{5} B41J *3/04;* **B41F** *1/46*

U.S. Cl. 101—483 **18 Claims**



1. A method for replacing an ink roller on an imprinting device without soiling ones hands or clothing comprising:
(a) removing an exhausted replaceable ink cartridge, including ink roller containment means and an ink roller, by breaking the ink roller containment means; and
(b) replacing the exhausted replaceable ink cartridge with a new replaceable ink cartridge, wherein the new replaceable ink cartridge includes a nonexhausted ink roller, and further wherein an individual replacing the ink cartridge grasps the ink roller containment means during mounting.

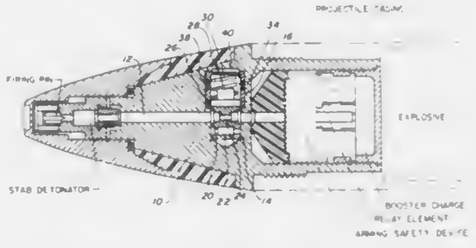
5,025,728
SELECTIVE POINT DETONATION/DELAY EXPLOSIVE TRAIN DEVICE

Richard Marion, Laurel, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 14, 1983, Ser. No. 465,972

Int. Cl.^{5} F42C *9/14*

U.S. Cl. 102—271 **7 Claims**



1. A fuze for use on a projectile, comprising:
a fuze body;
said fuze body having a single axial firing passage for communicating energy from its nose to an explosive in the projectile;
said fuze body further having a bore means intersecting said single axial firing passage;
an alignment assembly having disposed therein a PD detonator and a delay detonator;
said alignment assembly slidably disposed in said bore means with said delay detonator normally aligned in said single axial firing passage;
a selector assembly rotatably disposed in said bore means and peripherally engaging said alignment assembly for locking said alignment assembly in its normal position; and
said selector assembly being rotatably adjustable to allow centrifugal displacement of said alignment assembly upon spin being imparted to the projectile for aligning said PD detonator in said single axial firing passage.

5,025,729
AERIAL DISTRESS FLARE

Robert W. Cameron, 1321 King St., Bellingham, Wash. 98226

Filed Feb. 21, 1990, Ser. No. 482,877

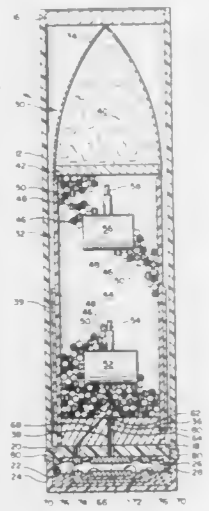
Int. Cl.^{5} F42B *4/26*

U.S. Cl. 102—336 **21 Claims**

1. An emergency signalling device, said device comprising:
a generally elongate shell;
a combustible propellant charge enclosed within said shell for propelling said shell aloft when ignited;
means for igniting said propellant charge;
means for generating a visible smoke trail from said shell as said shell is propelled aloft;
means for generating a visible spark trail from said shell as said shell is propelled aloft;
means for generating an audible report from said shell once said shell is propelled aloft beyond a predetermined altitude;

VOL
1127
ISS
4
JE
25
1991
UMI

a multiplicity of radar chaff particles enclosed within said shell; and

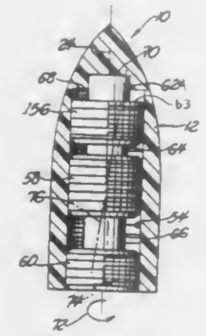


means for distributing said radar chaff particles from said shell once said shell is propelled aloft beyond a predetermined altitude.

5,025,730

JACKETED PROJECTILE FOR AMMUNITION

Paul A. Petrovich, 11269 Judd Rd., Fowlerville, Mich. 48836
Division of Ser. No. 539,959, Jun. 18, 1990. This application Oct. 2, 1990, Ser. No. 591,991
Int. Cl.⁵ F42B *12/00*
U.S. Cl. 102—516 **3 Claims**



1. A projectile for a round of ammunition, the projectile capable of being driven through a barrel of a gun wherein the barrel has an inner diametric surface whose radius is smaller than the radius of a largest diameter zone of the projectile, wherein the inner diametrical surface of the barrel defines a generally spiral shaped groove, the groove having a bed surface radially outward of the inner diametrical surface, the projectile comprising:

a core member removable from the projectile;

a jacket surrounding the core member and engaging the inner diametrical surface when the projectile is in the barrel, the jacket having a rearward end and a forward end;

the jacket defining a bore having an internal thread and a rearwardly facing abutment surface;

a core external thread on the core member, the core external thread being engaged to the internal thread of the jacket;

a forwardly facing abutment surface on the core member, the forwardly facing abutment surface being oriented toward the rearwardly facing abutment surface;

the bore defines a counterbore having a closed end and the rearwardly facing abutment surface is a shoulder between the bore and the counterbore;

a stem extends from the core member to the closed end of the counterbore;

the core member is axially spaced from the shoulder;

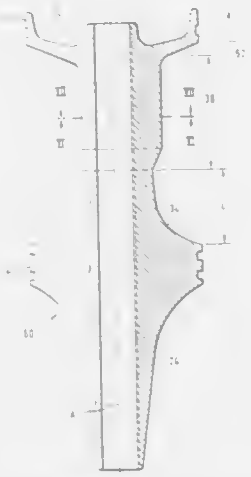
a portion of the jacket forming a groove engagement member when the jacket engages the inner diametrical surface of the barrel;

wherein the core external thread is threaded oppositely to the rifling groove.

5,025,731

SEGMENTED, DISCARDABLE SABOT HAVING POLYGONAL CROSS-SECTION FOR SUB-CALIBER PROJECTILE

Jürgen Meyer, Cologne; Achim Sippel, Ratingen; Monika Wildau, Korschenbroich; Heinz J. Kruse, Ratingen; Rainer Diel; Wilfried Becker, both of Düsseldorf; Gisbert Bartsch, Halle; Klaus-Dieter Pahnke, Solingen; Jürgen Huege, Düsseldorf, and Hans-Werner Luther, Kaarst, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Dusseldorf, Fed. Rep. of Germany
Filed Jun. 18, 1990, Ser. No. 539,826
Claims priority, application Fed. Rep. of Germany, Jun. 21, 1978, 3920254; Feb. 17, 1990, 4005127
Int. Cl.⁵ F42B *14/06*
U.S. Cl. 102—521 **21 Claims**



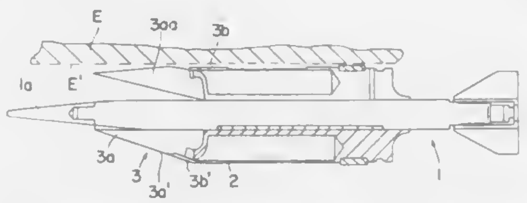
1. A segmented, discardable sabot for a slender sub-caliber kinetic energy projectile, comprising:

at least two sabot segments having adjacent plane parallel segment separating faces and presenting at least one caliber-sized gas sealing pressure flange member and a non-caliber sized partiat region along the longitudinal extent of said sabot, wherein the overall cross section of said sabot, at least in said partial region, has an essentially polygonal cross-sectional shape, and a tangent placed at any point of the periphery of said sabot does not pass through the cross-sectional area of said sabot, thereby providing increased bending stiffness in the non-caliber-sized region of said sabot.

5,025,732

AMMUNITION UNITS

Lennart Gustavsson; Ewa Karlsson, and Jan Reinholdsson, all of Karlskoga, Sweden, assignors to Aktiebolaget Bofors, Karlskoga, Sweden
Filed Oct. 5, 1989, Ser. No. 417,520
Claims priority, application Sweden, Oct. 6, 1988, 8803542
Int. Cl.⁵ F42B *14/06*
U.S. Cl. 102—521 **8 Claims**



1. An apparatus for facilitating loading of an ammunition unit without deterioration of the ballistics of the ammunition unit, in a weapon provided with a sabot having a leading portion with a forwardly projecting portion, the apparatus comprising:

a two-part guiding cup disposed at the leading portion of the sabot and including a unit made up of a plurality of separable prismatic elements forming a rotationally symmetrical unit in a unified state, and an enclosing member insertable over the first unit for holding the plurality of elements of the unit in the unified state during loading of the ammunition into a barrel of the weapon and for connecting the unit to the sabot;

the unit further defining an external surface which flares from a leading portion rearwardly towards its trailing portion and at the end of the trailing portion including a boss-shaped portion, and the enclosing member defining an external surface which also flares rearwardly at its leading portion and constitutes, when the enclosing member encloses the unit, continuation of the external surface of the unit;

the enclosing member further defining a trailing portion which is adapted to enclose the leading portion of the sabot and wherein a gap is formed between the boss-shaped portion and an inner surface of the enclosing member for receiving the forwardly projecting portion of the sabot which is designed with surfaces complimentary to those of the inner surface and the boss-shaped portion surface and is journalled therebetween;

wherein the enclosing member is provided with means for allowing its bursting due to the pressure arising during the movement of the ammunition unit in the barrel; and whereupon the elements of the unit are adapted to execute flip movements about their trailing portions, which are defined by the inner wall of the barrel, such that the rotationally symmetrical unit is forwardly splayed and separated in the barrel and on departure of the ammunition unit from the muzzle of the barrel, the rotationally symmetrical unit is subjected to the aerodynamic forces in the splayed, separated condition.

5,025,733

RAILROAD SUPPORT TIE REPLACEMENT DEVICE WITH TRACK LOCKING DEVICE

Elio Pierobon, 300 Queen Street North, Thorold, Ontario, Canada L2V 2P8
Filed Dec. 12, 1989, Ser. No. 449,714
Int. Cl.⁵ E01B *29/06*
U.S. Cl. 104—9 **14 Claims**

1. A device for inserting or removing a support member from beneath a plurality of rails, comprising:

a support frame specially configured to span the distance between a plurality of spaced rails, said rails having a width and configuration and being supported by a plurality of spaced support members, each of said support members spanning the distance between said rails;

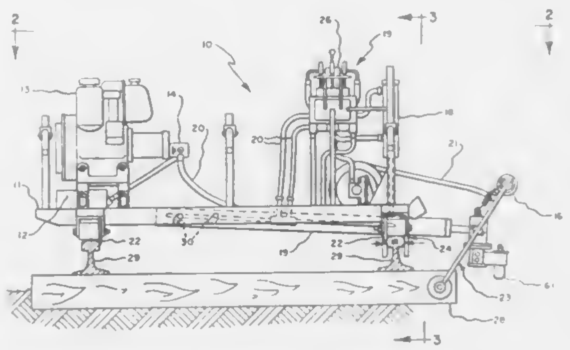
rollers, mounted on said support frame and arranged to freely rotate over said rails;

a main piston and cylinder, having a piston rod with a stroke said main cylinder operatively arranged on said support frame such that the direction of said stroke of said piston rod is horizontal, toward and away from said rails;

grippers, operatively connected to said piston rod, adapted to open and close and to be horizontally positioned by the stroke of said piston rod;

a gripper piston and cylinder, having one or more piston rods, adapted to open and close said gripper;

a lift piston and cylinder, having a piston rod, operatively connected to said main piston and cylinder and arranged to selectively vary said direction of said stroke of main cylinder piston rod;



a fluid reservoir for providing a source of fluid;

a motor and fluid pump adapted to provide said fluid from said fluid reservoir to said main piston and cylinder, said gripper piston and cylinder, and said lift piston and cylinder;

control means for regulating the fluid supplied to said main piston and cylinder, said gripper piston and cylinder and said lift piston and cylinder;

track locking means for securing said support frame to one of said rails, said track locking means being adapted to selectively secure said support frame to said rails independent of said rail width or configuration, wherein said track locking means is a plurality of U-shaped spacers adapted to fit over said width of said rail, said spacers being of variable width to accommodate rails of different widths and configurations.

5,025,734

LOCOMOTIVE EQUIPMENT CARRIAGE

Michael E. Romansky, North Huntingdon; Robert D. Dimsa, Elizabeth, both of Pa., and Howard R. Munday, Jacksonville, Fla., assignors to Westinghouse Air Brake Company, Wilmerding, Pa.
Filed May 3, 1990, Ser. No. 518,385
Int. Cl.⁵ B61C *17/00*
U.S. Cl. 105—26.05 **21 Claims**

1. An equipment carriage adapted for installation on a locomotive and having a unitized assembly including the locomotive air brake valve components with which the locomotive fluid pressure conduits are communicated, said equipment carriage comprising:

(a) a box-like frame having spaced-a sections, a front section, and a rear section;

(b) at least one primary pipe bracket affixed to said rear section of said frame and having fittings to which said fluid pressure conduits are connected, a face portion facing said front section of said frame, and passages interconnected between said fittings and said face portion; and

(c) at least one said unitized assembly removably mounted in said frame comprising:

VOL
1127

ISS
4

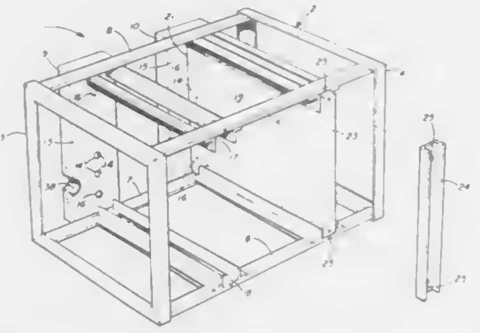
JE
25

1991

UMI

(i) said locomotive air brake valve components; and

(ii) a secondary pipe bracket in the form of a rectangular plate member having opposing sides on which said air brake valve components are mounted, an end face adjoining said face portion of said primary pipe bracket, and passages interconnected between said end face and said air brake valve components, said plate member having a vertical disposition in said frame with said opposing sides thereof being substantially parallel to said end sections of said frame, said passages in said primary pipe bracket and said plate member being aligned to provide flow paths via which said fluid pressure communication between said conduits and said air brake valve components is established when said face portion and said end face are in face-to-face engagement.

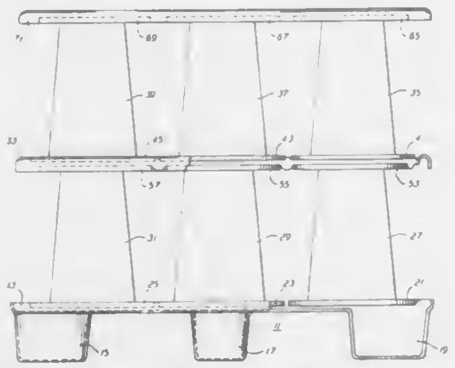


5,025,735

PALLET ASSEMBLY WHICH INTERLOCKS WITH WIRE REELS

Ronald E. Chan, Elk Grove Village, and Gerald F. Colby, Palatine, both of Ill., assignors to Chicago Magnet Wire Co., Elk Grove Village, Ill.

Filed May 28, 1987, Ser. No. 55,655
Int. Cl.^{5} B65D *19/44*
U.S. Cl. 108—55.3 **6 Claims**



1. A pallet assembly for transporting reels of electrical wire, said reels having flanges at each end, comprising

a bottom panel with a top surface, said top surface having a plurality of depressions formed therein, each said depression being dimensioned to receive one of the flanges of a reel of wire;

a top panel opposite said bottom panel with a bottom surface, said bottom surface having a plurality of depressions formed therein, said depressions being dimensioned to receive one of the flanges of a reel of wire;

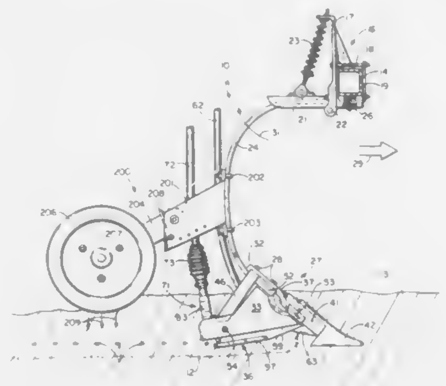
said depressions of said bottom panel and said top panel having centers, each of which is in substantial registry with a center of a depression of an opposite panel;

said top surface and said bottom surface having a plurality of tabs inwardly extending on the periphery of each depression to secure a reel flange in its associated depression once placed therein.

5,025,736

FURROW OPENER

Kevin M. Anderson, P.O. Box 32, Andover, S. Dak. 57422
Continuation-in-part of Ser. No. 251,862, Oct. 3, 1988, Pat. No. D. 313,804. This application Nov. 17, 1989, Ser. No. 437,643
Int. Cl.^{5} A01C *5/06, 5/08, 23/02*
U.S. Cl. 111—152 **34 Claims**



1. A furrow opener for an earth working tool comprising: a frame, a forwardly directed shoe secured to the frame for making a furrow in soil, a press plate of abrasive resistant and low friction plastic located behind and above said shoe for compressing soil above the bottom of the furrow made by the shoe, said press plate having opposite rearwardly diverging side edges and a transverse rear edge, a bottom surface, and side grooves along said side edges open to the bottom surface, abrasion resistant means located in said grooves having surfaces generally coextensive with said bottom surface, said abrasion resistant means comprise linear rectangular hard metal members having rear end portions projected rearwardly from said rear edge of the press plate, means securing the abrasion resistant means to said press plate, means releasably connecting the press plate to said frame whereby the press plate can be removed from the frame and replaced with a similar press plate, a first side plate of abrasive resistant and low friction plastic located above one side edge of the press plate adjacent one side of the frame, said first side plate having a rear portion extended rearwardly of the transverse edge of the press plate, means releasably connecting the first side plate to the frame whereby the first side plate can be removed and replaced with a similar side plate, a second side plate of abrasive resistant and low friction plastic located above the other side edge of the press plate adjacent the other side of the frame, said second side plate having a rear portion extended rearwardly of the transverse edge of the press plate, and means releasably connecting the second side plate to the frame whereby the second side plate can be removed and replaced with a similar side plate.

5,025,737

AUTOMATIC BOBBIN THREAD GUIDING APPARATUS

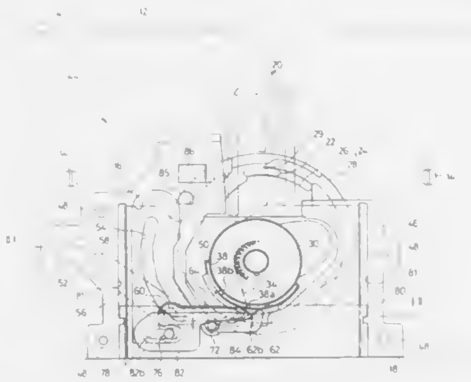
Osamu Kamiya, Chiryu, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Sep. 6, 1989, Ser. No. 403,442
Claims priority, application Japan, Sep. 12, 1988, 63-227975
Int. Cl.^{5} D05B *65/02, 57/14*
U.S. Cl. 112—296 **8 Claims**

1. A bobbin thread guiding apparatus in combination with a sewing machine comprising a work supporting bed; a throat plate fixed on the work supporting bed and having an opening; a shuttle race slide attached on the throat plate and slidable between a closed position and an opened position; and a horizontally rotating shuttle comprising a bobbin case for containing rotatably a bobbin having bobbin thread, a bobbin thread tension adjusting spring mechanism provided on the bobbin case and for exerting a tension on the bobbin thread drawn out from the bobbin, and a rotating looptaker for containing the bobbin case and the bobbin thread tension adjusting spring mechanism;

said bobbin thread guiding apparatus comprising:

bobbin thread holding means disposed between the shuttle race slide and the horizontally rotating shuttle, and comprising a bobbin thread catching portion for clamping an end of the bobbin thread, and connected with a rear end portion of the shuttle race slide so as to be driven forward and backward by the shuttle race slide;



bobbin thread engagement guiding means for guiding the bobbin thread holding means so that, when the shuttle race slide is driven from the opened position to the closed position, the bobbin thread catching portion moves from a predetermined upper front near position relative to the bobbin thread tension adjusting spring mechanism in a direction along the bobbin thread tension adjusting spring mechanism and then moves to a predetermined position outward of an outer circumference of the bobbin case.

5,025,738

NEEDLE THREAD DRAWING DEVICE OF A SEWING MACHINE

Shuichi Sato, and Shirou Ayusawa, both of Tochigi, Japan, assignors to SSMC Inc., Edison, N.J.

Filed Nov. 16, 1989, Ser. No. 437,230
Claims priority, application Japan, Dec. 5, 1988, 63-305952
Int. Cl.^{5} D05B *65/00*
U.S. Cl. 112—286 **2 Claims**

1. A needle thread drawing device for a sewing machine having an arm and comprising:

a needle mounted on the arm so as to move vertically, the needle having a needle hole through which a needle thread is threaded;

a thread end holding unit rotatably mounted on the arm, said unit having a needle thread gripping puller, the puller having a tip end with a hook portion thereat, said puller when turned is positioned either at a thread catch position or a return position, the hook portion catching the needle thread extended downward from the needle hole of the needle when the puller is positioned at the thread catch position, the needle thread is caught and held by the hook portion when the puller is positioned at the return position;

a needle thread drawing member mounted swingably on the side of the arm and having a tip end with another hook portion thereat; and

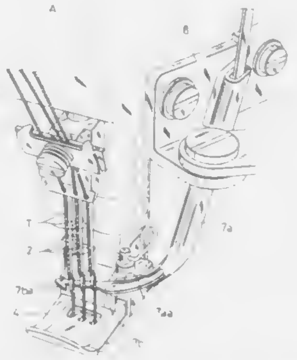
a cam member disposed at the side of the unit and rotatable in synchronism with the puller for rotatably swinging the needle thread drawing member so that said another hook can hold the needle thread when said another hook is positioned over the needle hole of the needle and can draw a thread end of the needle thread when said hook of the puller is positioned under the needle hole of the needle and when the puller is positioned in the thread catch position.

5,025,739

NEEDLE THREAD WIPER OF SEWING MACHINE

Tadashi Inoue, Amagasaki, Japan, assignor to Pegasus Sewing Machine Mfg., Co., Ltd., Osaka, Japan

Filed Jun. 27, 1990, Ser. No. 544,601
Claims priority, application Japan, Jul. 7, 1989, 1-80664[U]
Int. Cl.^{5} D05B *65/00*
U.S. Cl. 112—286 **8 Claims**



1. A needle thread wiper for a sewing machine having a main body and at least one needle, said needle thread wiper comprising:

a tube-shaped guide element fixed on the sewing machine main body, said guide element having spaced apart flat surfaces and a front end portion formed approximately in a J-form, said front end portion including a notch formed in each of the flat surfaces; and

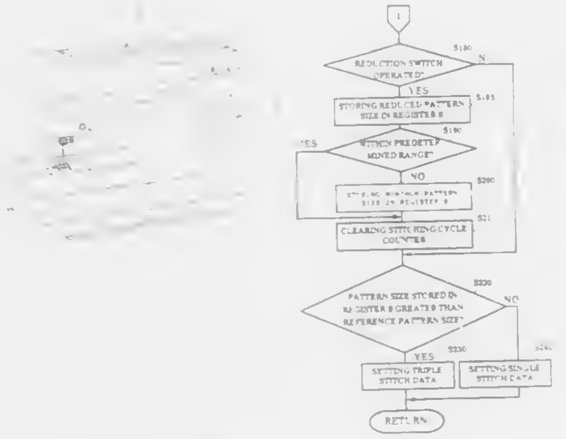
a leaf spring having flat surfaces and a front end having a hook formed therein, said leaf spring being slidable within the guide element, said hook serving to capture and pull the needle thread extending from each needle by sliding the leaf spring in the guide element, wherein

the notches are formed in each flat surface of the guide element extending along the guide element away from said front end portion so that the hook of the leaf spring can be seen through the notches.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,740
STITCH PATTERN SEWING MACHINE

Fujio Horie, and Tomo Inoue, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan
Filed May 22, 1990, Ser. No. 526,595
Claims priority, application Japan, Jul. 27, 1989, 1-195300
Int. Cl.⁵ D05B *3/02*
U.S. Cl. 112—456 7 Claims

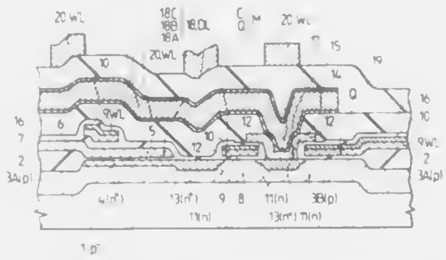

REDUCTION SWITCH OPERATED?
YES
NO
STORING REDUCED PATTERN SIZE IN REGISTER B
WITHIN PREDETERMINED RANGE?
CLEARING STITCHING CYCLE COUNTER
PATTERN SIZE STORED IN REGISTER B GREATER THAN REFERENCE PATTERN SIZE?
SETTING TRIPLE STITCH DATA
SETTING SINGLE STITCH DATA
RETURN

1. A stitch pattern sewing machine comprising:
pattern storage means for storing patterns to be formed on a workpiece;
pattern selecting means for selecting a pattern stored in said pattern storage means;
size setting means for setting a size of the pattern selected by said pattern selecting means;
multiple overlap stitch setting means for setting a number of overlap stitches for at least a portion of said pattern based on the size of the pattern set by said size setting means; and
stitch forming means for forming a stitch pattern corresponding to the pattern selected by said pattern selecting means based on the size of the pattern set by said size setting means and the number of overlap stitches set by said multiple overlap stitch setting means.

5,025,741
METHOD OF MAKING SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE WITH POLYSILICON CONTACTS

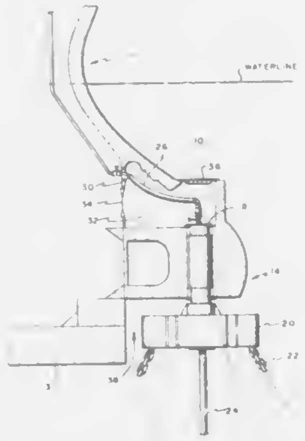
Naokatsu Suwanai, Koganei, and Osamu Tsuchiya, Ohme, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Apr. 28, 1989, Ser. No. 344,404
Claims priority, application Japan, May 2, 1988, 63-109781
Int. Cl.⁵ H01L *21/70*
U.S. Cl. 437—52 30 Claims

1. A method of manufacturing a semiconductor integrated circuit device, said method comprising: a step of forming a first semiconductor film in an amorphous state on one of source and drain regions of a MISFET in a semiconductor region on a semiconductor substrate; a step of performing heat-treatment on said first semiconductor film in the amorphous state, thereby changing the amorphous state into a polycrystalline state, crystal grains of the first semiconductor film in the polycrystalline state being sufficiently large so as to reduce a substitution reaction between semiconductor material of the first semiconductor film and aluminum, as compared to the substitution reaction where the crystal grains are smaller; and a step of forming a first wiring line, of an aluminum film, on the first semiconductor film in the polycrystalline state, wherein said first wiring line is connected to said first semiconductor film in the polycrystalline state on one of the source and drain regions of said MISFET of said semiconductor region.



5,025,742
TURRET MOORING FOR AN OIL TANKER

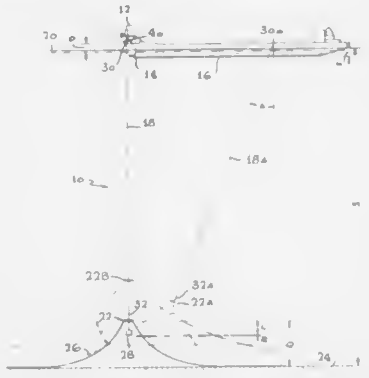
Karl A. B. Urdshals, Southpoint, Singapore, assignor to Nortrans Shipping and Trading Far East PTE Ltd., Singapore, Singapore
Filed Dec. 29, 1989, Ser. No. 456,655
Int. Cl.⁵ B63B *21/00*
U.S. Cl. 114—230 2 Claims



1. A mooring arrangement for a seagoing vessel, comprising:
(a) a vessel having a hull, a bow and a watertight compartment in said bow below a waterline of said vessel;
(b) a turret mooring disposed in said hull at said bow, said turret mooring including:
  (i) a fluid swivel disposed in said hull at said bow having a top exposed to said watertight compartment and a bottom exposed to an exterior of said hull; and
  (ii) a spider attached to said bottom of said fluid swivel and disposed external of said hull;
(c) a length of piping attached to said top of said fluid swivel and disposed in said watertight compartment; and,
(d) at least a first access door disposed in said compartment for gaining access to the compartment from within said vessel.

5,025,743
VERTICAL LINE MOORING SYSTEM

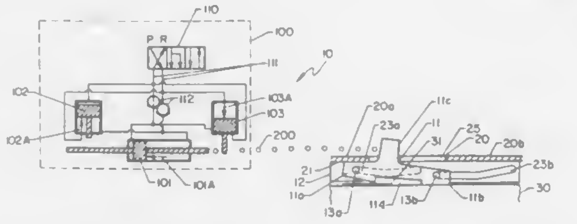
Jack Pollack, Reseda, Calif., assignor to Amtel, Inc., Calabasas, Calif.
Continuation of Ser. No. 802,860, Nov. 27, 1985, Pat. No. 4,727,819. This application Nov. 20, 1987, Ser. No. 123,577
Int. Cl.⁵ B63B *21/00*
U.S. Cl. 114—230 5 Claims



1. In a mooring system wherein a vessel-mooring transfer structure near the sea surface is connected through a primarily vertical anchor line to a chain table unit that is spaced above the sea floor by nearer the sea floor than the sea surface, the chain table unit being anchored by a plurality of chain devices extending in different directions in catenary curves to the sea floor, with a portion of each chain device lying a distance above the sea floor, and another portion of each chain device lying on the sea floor but liftable off the sea floor, the improvement wherein:
said chain table unit has a weight in water greater than the weight in water of the portions of all of said chain devices that lie above the sea floor in the quiescent condition of the system.

5,025,744
SUBMARINE TORPEDO TUBE AXIAL WEAPON RESTRAINER

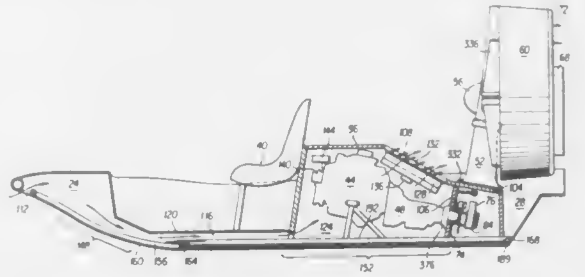
Paul E. Moody, Barrington, R.I., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Aug. 14, 1990, Ser. No. 566,920
Int. Cl.⁵ B63G *8/32*
U.S. Cl. 114—238 11 Claims



1. An axial weapon restraining system for a submarine torpedo tube, the torpedo tube having a breechward end and a muzzleward end, comprising:
an axial weapon restrainer for maintaining the axial position of a weapon in the torpedo tube; and
means mechanically connected to said restrainer for moving said restrainer to one of a load, lock or fire positions wherein said restrainer a) permits loading of a weapon into the torpedo tube when in said load position, b) restrains the weapon from axial movement in the torpedo tube when in said lock position, and c) permits movement of the weapon towards the muzzleward end of the torpedo tube when in said fire position, wherein the weapon is prevented from moving towards the breechward end of the torpedo tube in said lock position or during the initial restrainer movement stage of said fire position and prevented from moving towards a muzzleward end of the torpedo tube in either of said lock or load positions.

5,025,745
BOAT HULL

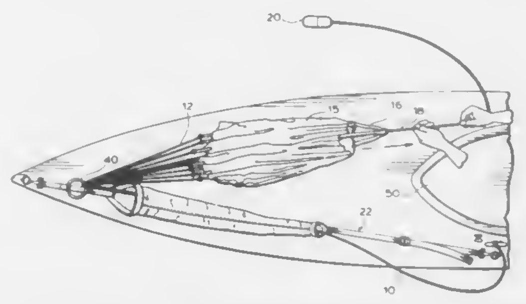
David E. Wine, The Penthouse South, 2200 North Atlantic Ave., Daytona Beach, Fla. 32018
Filed Jul. 10, 1989, Ser. No. 377,270
Int. Cl.⁵ B63B *1/38;* **B63H** *21/38*
U.S. Cl. 114—289 35 Claims



1. A boat comprising:
a hull;
an internal combustion engine mounted to said hull, said internal combustion engine having at least one exhaust manifold;
a propeller rotatably coupled to an upper and rearward portion of said hull and powered by said internal combustion engine, said propeller being rotatable in a generally vertical plane;
a propeller shroud coupled to said hull, said shroud generally encircling said propeller and having means for capturing slipstream air from said propeller;
means for expelling exhaust gases from said exhaust manifold and slipstream air from said shroud along the lower surface of said hull, and against the water beneath the hull.

5,025,746
SEA ANCHOR ASSEMBLY FOR KAYAK

Alan J. W. Boulter, 21 Dartmouth Cr., Toronto, Ontario, Canada M8V 1W9
Filed Feb. 26, 1990, Ser. No. 484,262
Claims priority, application Canada, Mar. 16, 1989, 593909
Int. Cl.⁵ B63B *21/48*
U.S. Cl. 114—311 18 Claims



1. An assembly for deployment and storage of a collapsible sea anchor comprising:
(a) elongate strap means having fastening means at each end;
(b) ring means secured to the strap means near a first end of the strap means;
(c) elongate tubular cover means open at both ends thereof and secured to the strap means to lie along the length of

VOL 1127 ISS 4 JE 25 1991 UMI

the strap means with a first of the open ends near a second end of the strap means and a second of the open ends between the first end of the cover means and the first end of the strap means; and

(d) a sea anchor assembly comprising joined end-to-end in sequence: anchoring rope means; collapsible sea anchor means; deployment rope means; and float means,

the sea anchor assembly extending longitudinally through the cover means and through the ring means,

in a storage configuration, the sea anchor means disposed within the cover means with the anchoring rope means extending out said first open end of the cover means and the deployment rope means extending out said second open end of the cover means and then through the ring means to the float,

the sea anchor means deployable from the cover means and through the ring means by drawing the deployment rope means,

the sea anchor means retractable from an expanded open position in use, by drawing the anchor rope means to draw the sea anchor means through the ring means and into the cover.

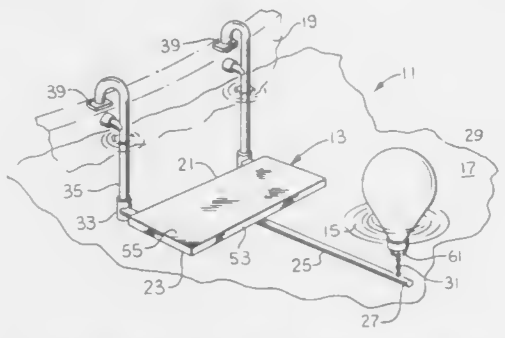
5,025,747
FLOTATION SUPPORTED SUBMERSIBLE SWIM PLATFORM

James L. Grayson, 1211 S. Washington Ave., Glendora, Calif. 91740

Filed Aug. 21, 1989, Ser. No. 396,230

Int. Cl.^{5} B63B *17/00*

U.S. Cl. 114—362 **12 Claims**



1. A swim platform to facilitate a swimmer's egress from a body of water onto a platform supporting structure, comprising:

a swim platform structure having an inner end and an outer end, and disposed horizontally in the body of water at a desired depth;

an elongated lever arm member having a first end and an opposite second end, and attached at said first end to said outer end of said platform structure;

pivotal means attached to said inner end of said platform structure and to the platform supporting structure for pivotal support of said platform structure in the body of water by the supporting structure; and

buoyancy means attached to said second end of said lever arm member for supporting said platform structure in a horizontal position in the body of water before and when said platform structure is supporting the weight of a swimmer.

5,025,748
PORTABLE SCORING DEVICE

Delmar D. Pettis, W4010, County-M, West Salem, Wis. 54669

Filed Feb. 27, 1990, Ser. No. 485,572

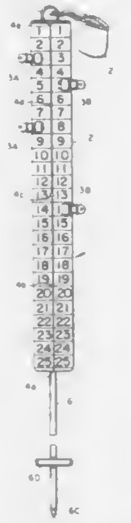
Int. Cl.^{5} A63F *1/18*

U.S. Cl. 116—222 **12 Claims**

1. A compact and portable scoring device which when anchored onto ground in an upright position serves as a temporary scoreboard, said device comprising:

(a) a mounting frame;

(b) a retractable and extendable post section mounted to said frame with said post section including a terminating ground penetrating tip and a radially protruding appendage which serves as a brace for forcing the penetrating tip of the post section into the ground and as a stabilizing brace for maintaining the anchored device in the upright position;



(c) a score display panel supported by said frame; and

(d) means cooperatively associated with said frame for retaining the post section in an extended ground penetrating position and means cooperatively associated with said frame for retaining the post section in a retracted position within said frame.

5,025,749
ASSEMBLY FOR FINISHING DOUGHNUTS WITH ICINGS AND CONDIMENTS

Jackie R. Sutherland, Independeoce, Kans., assignor to Daylight Corporation, Tulsa, Okla.

Filed Apr. 19, 1990, Ser. No. 513,100

Int. Cl.^{5} A23G *3/24*

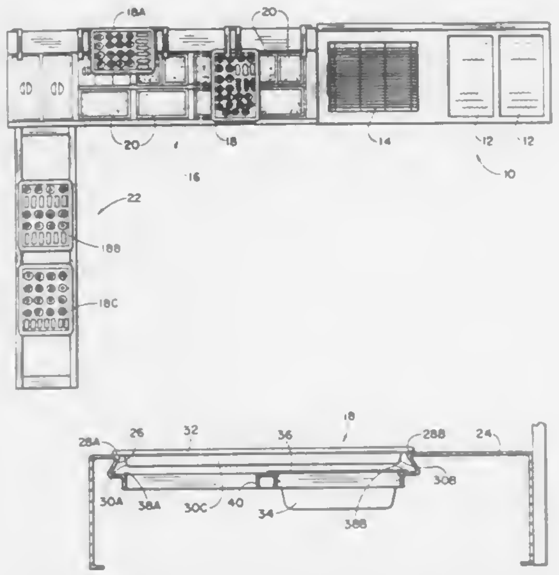
U.S. Cl. 118—28 **7 Claims**

1. An assembly to speed the process of finishing doughnuts with icings and condiments comprising:

a plurality of rectangular shallow depth doughnut holding trays each having a bottom, short height opposed end walls, side walls and an open top, the trays having a uniform length between end walls, and having a lip extending outwardly from at least said end walls;

a plurality of icing and/or condiment containing rectangular pans each having a bottom, an open top having a peripheral edge therearound, opposed end walls, and opposed side walls, each pan having an outwardly extending lip portion around at least a portion of the upper peripheral edge;

an elongated table having a horizontal upper surface and an elongated opening in the upper surface providing upper opposed, paralleled ledges lengthwise of the table and in a horizontal plane, the spacing between the upper ledges being slightly greater than the spacing between said end walls of said trays, the trays being receivable in said opening whereby the tray lips rest upon said table upper ledges and said trays may be individually slid along on said table upper surface, the table having, below said upper surface and within said elongated opening, means to removably receive, in a common horizontal plane, a plurality of said pans, the upper peripheral edges of said pans being below said table upper surface a distance greater than the depth of said trays whereby said trays may be slid upon said table within said opening with said icing and/or condiment containing pans therebelow.



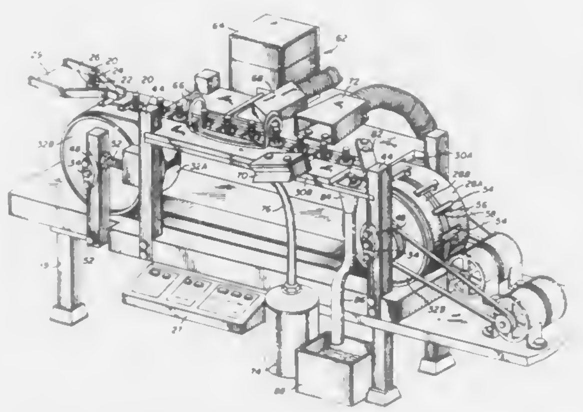
5,025,750
APPARATUS FOR COATING FASTENERS

Eugene D. Sessa, Mt. Clemens, and Richard Duffy, Utica, both of Mich., assignors to Nylok Fastener Corporation, Rochester, Mich.

Division of Ser. No. 70,416, Jul. 7, 1987, Pat. No. 4,842,890. This application May 11, 1989, Ser. No. 350,550

Int. Cl.^{5} B05C *11/00*

U.S. Cl. 118—69 22 Claims



1. An apparatus for coating a fastener having a shank portion and a head portion with an applied material comprising:

means for supporting the fastener on said head portion with said shank portion projecting upward;

means for conveying said fastener along a conveying path with said shank portion projecting upward therefrom, said means for conveying associated with said means for supporting said fastener;

means for heating the fastener positioned along said conveying path;

means for applying said material to the fastener after heating; and

means for controllably rotating the fastener during application of said material.

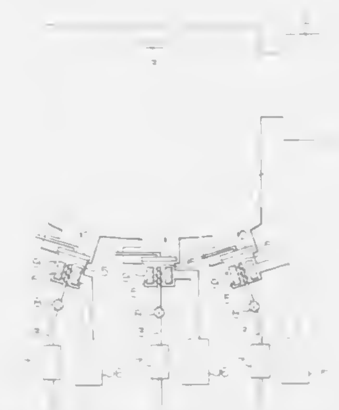
5,025,751
SOLID FILM GROWTH APPARATUS

Shinichiro Takatani; Shigeo Goto, both of Kokubunji; Masahiko Kawata, Hachioji, and Kenji Hiruma, Koganei, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 153,002, Feb. 8, 1988, abandoned. This application Jun. 14, 1989, Ser. No. 366,185

Int. Cl.^{5} C23C *16/00*

U.S. Cl. 118—733 26 Claims



23. A solid film forming apparatus for growth of a solid film using at least one raw material gas in a vacuum satisfying molecular flow conditions, comprising: a first container for growth of the solid film, at least one switching device for controlling introduction of the raw material gas, at least one second container isolated from the gas in said first container by said switching device, at least one raw material gas-introduction piping connected to said second container, and at least one evacuation facility for evacuation of and separately and directly connected to each of said first container and said at least one second container.

5,025,752
NON-ABSORBENT LITTER FOR USE WITH ABSORBENT PAD

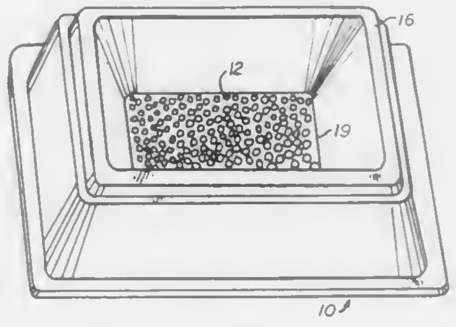
Patrick Yananton, 1518 Little Hill Rd., Point Pleasant, N.J. 08742

Continuation of Ser. No. 885,932, Jul. 15, 1986, abandoned, which is a continuation-in-part of Ser. No. 573,958, Jan. 26, 1984, Pat. No. 4,460,225, which is a continuation-in-part of Ser. No. 315,507, Oct. 27, 1981, Pat. No. 4,469,046. This application Jul. 27, 1988, Ser. No. 224,944

The portion of the term of this patent subsequent to Sep. 4, 2001, has been disclaimed.

Int. Cl.^{5} A01K *45/00*

U.S. Cl. 119—169 20 Claims



1. In the combination of a cat litter box, a dessicant/absorbent member and litter, the improvement wherein said litter is substantially non-absorbent particles having an average particle size of at least sufficiently large diameter to provide suffi-

VOL
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1991
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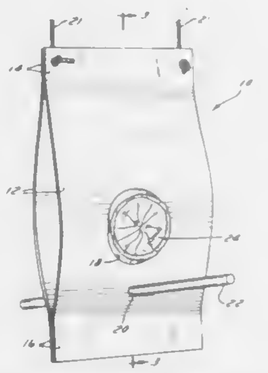
cient interparticle spacing to permit free flow of urine from the particles to said sorbtive-desiccant member and the free flow of water vapor from said sorbtive-desiccant member into the atmosphere and wherein said non-absorbent particles are substantially free of smaller particles having a size such that said smaller particles fill the spaces between adjacent non-absorbent particles and consequently inhibit air flow between adjacent litter particles.

5,025,753

FLEXIBLE BIRD FEEDER

Paul Schneider, 2604 N. Huebner, Oconomowoc, Wis. 53066
Filed Jun. 8, 1990, Ser. No. 535,463
Int. Cl.^{5} A01K *39/00*
U.S. Cl. 119—51.03 10 Claims



1. A bird feeder for supporting a whole fresh food product in an accessible position for feeding birds, said feeder comprising:

a pair of flexible sheets having upper and lower ends and sides,

a hole in each of said sheets intermediate the ends for supporting one end of a whole fresh food product,

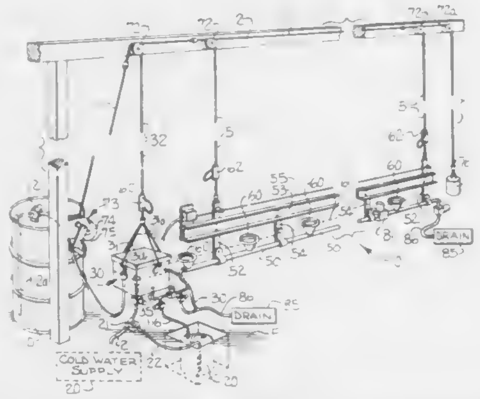
means for permanently connecting the ends of said sheets with the holes located in a coaxial relation, said sheets being spread apart to insert from the sides and maintain the position of the whole fresh food product in the holes between said sheets, and

means mounted on said sheets for supporting a bird in position to feed on the whole fresh food product.

5,025,754

APPARATUS AND METHOD FOR PROVIDING DRINKING WATER TO POULTRY

David Plyler, 6519 Prospect Rd., Monroe, N.C. 28110
Filed Feb. 1, 1990, Ser. No. 473,313
Int. Cl.^{5} A01K *7/00*
U.S. Cl. 119—73 33 Claims

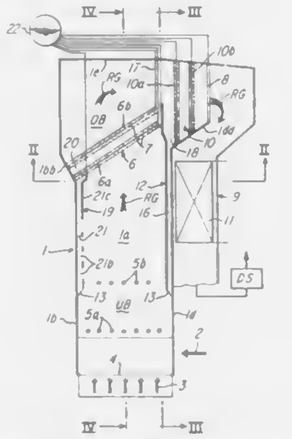


1. A relatively long poultry house of the conventional type having an earthen floor for the raising of fowl, such as turkeys, in combination with a gravity feed water distribution system for providing drinking water for the fowl in the poultry house and wherein the gravity feed water distribution system is characterized by leaving the floor of the poultry house substantially free of obstruction to movement of the fowl thereabout and wherein the water distribution system may readily be adjustably elevated as the fowl grow and increase in height and at times elevated to much higher levels to provide clearance for a tractor when it is desirable to till or clean the earthen floor of the poultry house, said gravity feed water distribution system comprising a reservoir for water including means for controlling the level of water in said reservoir, an elongate conduit connected in fluid communication to said reservoir and arranged to extend longitudinally throughout a substantial portion of said long poultry house, a plurality of drinking stations extending along said conduit and comprising spaced apart serially arranged water cups connected in open fluid communication to said conduit and extending upwardly therefrom, and means supported from upper portions of said poultry house for supportingly carrying said reservoir, conduit and drinking stations and for adjustably raising the same while maintaining the relative height relationship between said reservoir and said water cups, wherein as the fowl grow and increase in height, the drinking stations may be raised without impairment of the gravity feed of the water to the drinking stations.

5,025,755

APPARATUS FOR BURNING CARBONACEOUS MATERIAL IN A FLUIDIZED BED REACTOR

Wolfgang Eickvonder, Nümbrecht; Norbert Passmann, Alfter-Heidgen; Gerhard Thomas, Gummersbach; Peter Tummers, Gummersbach, and Hubert Steven, Gummersbach, all of Fed. Rep. of Germany, assignors to L. & C. Steinmüller GmbH, Gummersbaeb, Fed. Rep. of Germany
PCT No. PCT/EP87/00729, § 371 Date May 23, 1989, § 102(e) Date May 23, 1989, PCT Pub. No. WO88/04010, PCT Pub. Date Jun. 2, 1988
PCT Filed Nov. 25, 1987, Ser. No. 378,217
Claims priority, application Fed. Rep. of Germany, Nov. 26, 1986, 3640377
Int. Cl.^{5} B09B *3/00;* F22B *1/00*
U.S. Cl. 122—4 D 14 Claims



1. In an apparatus for burning carbonaceous material in a fluidized bed reactor that includes: a bottom portion; a top portion; wall cooling surfaces; a recirculation system that includes at least one labyrinth separator which serves for the return of separated-off solid material to said bottom portion and is provided with staggered beams that have an essentially U-shaped cross-sectional configuration and are open downwardly toward a rising flow of flue gas; and a fuel supply, a fluidizing air supply, and a secondary air supply in said bottom portion; the improvement wherein:

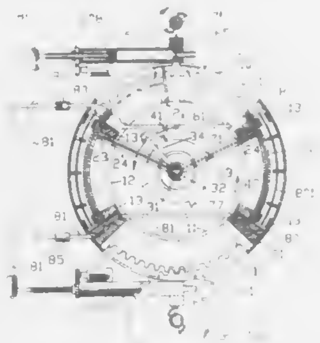
said staggered beams are disposed directly in said top portion of said fluidized bed reactor in a rising flow of flue gas, are inclined, and guide said separated-off solid material to at least one of said wall cooling surfaces, which define a rector interior and along which said solid material flows downwardly; and

said separator beams have free arms, on at least one of which is formed a guide chute that has an essentially U-shaped cross-sectional configuration and serves for the guidance of solid material, with said guide chute opening upwardly in a direction facing away from said rising flow of flue gas, and serving for the removal of solid material collected by associated separator beams.

5,025,756

INTERNAL COMBUSTION ENGINE

Wladimir Nyc, 1326 Mundy Dr., Jacksonville, Fla. 32207
Filed Aug. 20, 1990, Ser. No. 569,840
Int. Cl.^{5} F02B *53/00*
U.S. Cl. 123—18 R 12 Claims



1. An internal combustion engine comprising:
index having combustion ports

(A) a tubular, annular cylinder having combustion ports positioned 180 degrees apart;

(B) a first piston set comprising a pair of piston heads connected by a shaft and facing in opposite directions, said first piston set being contained within said annular cylinder between said combustion ports, where said first piston set is adapted to travel in a reciprocating motion within one half of said annular cylinder;

(C) a second piston set comprising a pair of piston heads connected by a shaft and facing in opposite directions, said second piston set being contained within said annular cylinder between said combustion ports on the opposite side from said first piston set, where said second piston set is adapted to travel in a reciprocating motion within the opposite half of said annular cylinder such that both said first piston set and said second piston set approach one of said combustion ports at the same time;

(D) a rotating pawl shaft centered on the central axis of said annular cylinder, said pawl shaft having two pawls directly attached and extending radially from said pawl shaft, where the pawls face in opposite directions;

(E) a rotating pawl sleeve encircling said rotating shaft, said pawl sleeve having two pawls directly attached and extending radially from said pawl sleeve, where the pawls face in opposite directions;

(F) a first arm connecting said shaft of said first piston set to said pawl shaft;

(G) a second arm connecting said shaft of said second piston set to said pawl sleeve;

(H) two double gear sets each having a first gear attached to a ratchet and centered on said central axis, and a second gear engaged with said first gear to transfer motion to a drive shaft, where one ratchet is operated by one of said pawls of said pawl shaft, and the other ratchet is operated by one of said pawls of said pawl sleeve;

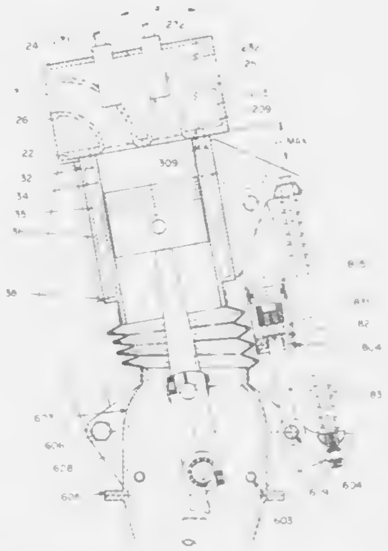
(I) two triple gear sets each having a first gear attached to a ratchet and centered on said central axis, a third gear to transfer motion to said drive shaft, and an intermediate gear engaging said third and first gear, where one ratchet is operated by the second of said pawls of said pawl shaft, and the other ratchet is operated by the second of said pawls of said pawl sleeve;

where said first piston set and said second piston set reciprocate between said combustion ports, this reciprocal motion being transferred to said pawl shaft and said pawl sleeve by said first and second connecting arms, which in turn translate the reciprocal motion through the engagement of said pawls and said ratchets into a rotational motion turning said gear sets.

5,025,757

RECIPROCATING PISTON ENGINE WITH A VARYING COMPRESSION RATIO

Gregory J. Larsen, 4501 Hallam Hill La., Lakeland, Fla. 33813
Filed Sep. 13, 1990, Ser. No. 582,410
Int. Cl.^{5} F02B *75/04*
U.S. Cl. 123—48 R 9 Claims



1. A reciprocating piston engine with a varying compression ratio comprising a block having at least one piston bore, a piston received in each bore, a head attached to the block and having a dome portion closing the top of each bore and defining with the piston a compression volume when the piston is at top dead center in the bore, a crankcase, a crank rotatably mounted in the crankcase, a connecting rod coupling each piston to the crank, means for mounting the block on the crankcase for pivotal movement about a pivot axis parallel to and spaced apart from the axis of the crank such that the size of the compression volume varies in accordance with the extent of the pivotal movement of the block about the pivot axis, and actuator means connected between the block and the crankcase for pivoting the block about the pivot axis relative to the crankcase in response to at least one signal indicative of at least one operating parameter of the engine.

5,025,758

GAS INJECTION SYSTEM

Joco Djurdjevic, 1050 Britiannia Road East, Suites 11-12, Mississauga, Ontario, Canada L4W 4N9
Filed Apr. 25, 1990, Ser. No. 514,312
Int. Cl.^{5} F02B *43/00*
U.S. Cl. 123—527 19 Claims

1. Apparatus for metering the supply of natural gas to an internal combustion engine having an air intake manifold and throttle valve mounted therein comprising:

VOL
1127
ISS
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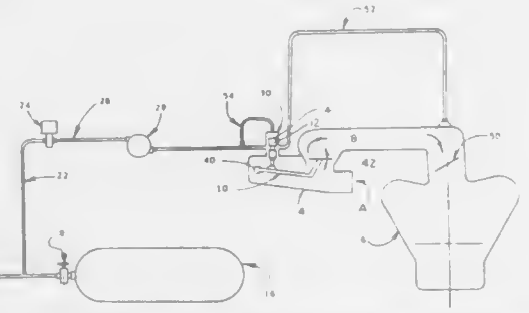
(a) pressure regulator means for regulating the pressure of said natural gas;
(b) sensor plate means associated with said air intake manifold and moveable in response to variations in said throttle valve;



(c) valve means being actuable by said moveable sensor plate means to vary the supply of natural gas to said air intake manifold in response to variations in said throttle valve so as to meter the supply of natural gas to said internal combustion engine.

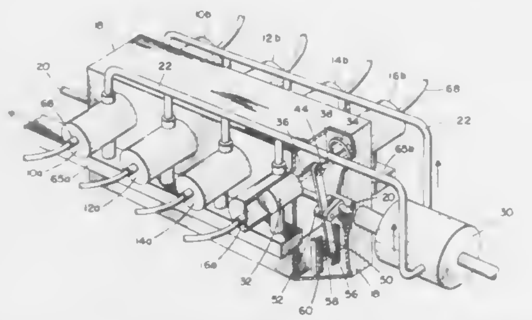
5,025,759
LEVER-TYPE TWO-CYCLE INTERNAL COMBUSTION ENGINE

Edward C. Wenzel, and Steven T. Wenzel, both of P.O. Box 213, Allamuchy, N.J. 07820

Filed Apr. 18, 1990, Ser. No. 510,428

Int. Cl.⁵ F01B *1/08*

U.S. Cl. 123—56 AC **9 Claims**



1. A lever type internal combustion engine comprising, in combination:

a plurality of power cylinders arranged in side-by-side opposed pairs and disposed in a first horizontal plane, each provided with a piston and a piston rod pivotally connected at an inner end with said piston,

a crankshaft supported for rotation about an axis lying in a second horizontal plane disposed in spaced parallel relationship with and below said first horizontal plane, and

a lever system whereby the power cylinder pistons drive said crankshaft, said lever system, one for each pair of opposed power cylinders, comprising

an elongate lever arm pivotally interconnected at a first end with the outer ends of said piston rods, means including guide members disposed below said crankshaft for constraining a second end of said lever arm for up and down movement in a direction perpendicular to said first and second horizontal planes, and means for operatively connecting said lever arm at a point intermediate its first and second ends to said crankshaft, whereby said lever arm functions as a lever of the second class between the piston rods and the crankshaft, the constrained second end thereof functioning as the fulcrum therefor.

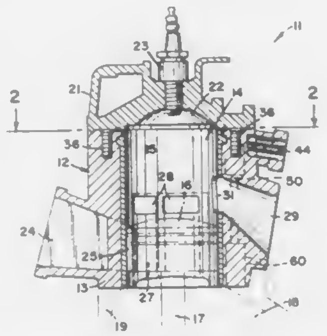
5,025,760
DIE-CAST LIQUID COOLED CYLINDER AND METHOD OF MAKING

Edward H. Webb, Paynesville, Minn., and Marley Duclo, Hotchkiss, Colo., assignors to Koronis Parts, Inc., Paynesville, Minn.

Filed Jun. 9, 1989, Ser. No. 364,009

Int. Cl.⁵ F02B *33/00*

U.S. Cl. 123—73 PP **3 Claims**



1. A die-cast liquid cooled cylinder, in an engine having a combustion chamber, comprising:

(a) a cylindrical bore member, said bore member including an intake port, an outtake port and a scavenge port;
(b) a cylinder block surrounding said bore member, said cylinder block including a plurality of coolant passages;
(c) a side cover connected to said cylinder block so as to form a cavity having two ends, a first end being proximate said scavenge port and a second end being in fluid communication with said combustion chamber,

wherein an inside surface of said side cover has a contoured central fin and a pair of contoured side fins.

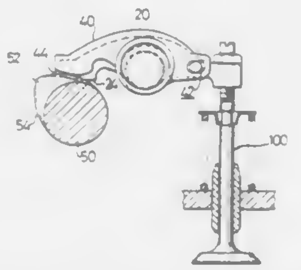
5,025,761
VARIABLE VALVE-TIMING DEVICE

Kuang-Tong Chen, No. 163, Chung Chen N. Rd., San Chung City, Taipei Hsien, Taiwan

Filed Jun. 13, 1990, Ser. No. 537,374

Int. Cl.⁵ F01L *1/34*

U.S. Cl. 123—90.16 **6 Claims**



1. A variable valve-timing device for an intake or exhaust valve in a cylinder head of an internal combustion engine operated directly from a camshaft comprising:

a low speed rocker arm mounted on a low speed rocker arm shaft;

a high speed rocker arm mounted on a high speed rocker arm shaft;

said low speed rocker arm and said high speed rocker arm being interconnected by a pin provided in a pin hole of said low speed rocker arm and a pin slot of said high speed rocker arm adjacent to said valve, a first portion of said pin being tightly received in said pin hole of said low speed rocker arm and a second portion of said pin being received in said pin slot of said high speed rocker arm, said pin slot of said high speed rocker arm extending in a direction perpendicular to a longitudinal axis of said pin so as to allow said high speed rocker arm to move relative to said low speed rocker arm;

a low speed cam being provided on said camshaft corresponding with said low speed rocker arm, said low speed cam having a first cam lobe which has a first cam face for contacting with a first rocker arm face of said low speed rocker arm;

a high speed cam being provided on said camshaft corresponding with said high speed rocker arm, said high speed cam having a second cam lobe which has a second cam face for contacting with a second rocker arm face of said high speed rocker arm;

said low speed rocker arm shaft and said high speed rocker arm shaft having a common fluted shaft, an outer circular hollow shaft being provided on said common fluted shaft and said low speed rocker arm being mounted on said outer circular hollow shaft which is fixedly mounted on an engine head by means of suitable fixing means, an outer hollow eccentric shaft having a slot with a cross section corresponding to said common fluted shaft being provided on said common fluted shaft and said high speed rocker arm being mounted on said eccentric shaft which is rotatably mounted on said engine head, an end of said fluted shaft being provided with a transmission means connected to an output shaft of a driving means, said driving means being controlled by means of a power controlling unit in response to engine operating factors to rotate said high speed rocker arm to move relative to said low speed rocker arm through said transmission means, said eccentric shaft and said fluted shaft to cause a change of relative phase angle of said high speed cam and said high speed rocker arm while a relative phase angle of said low speed cam and said low speed rocker arm remains unchanged.

5,025,762
TWO CYCLE ENGINE FOR SMALL BOAT

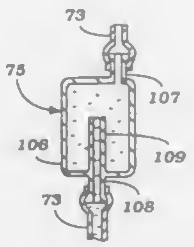
Yoshihiro Gohara, and Masaharu Miyazaki, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Aug. 1, 1990, Ser. No. 561,150

Claims priority, application Japan, Aug. 1, 1989, 1-197997

Int. Cl.⁵ F01M *1/00*

U.S. Cl. 123—196 S **16 Claims**



1. A lubricant system for a small watercraft powered by an internal combustion engine having a lubricant pump for pumping lubricant to said engine, a lubricant reservoir positioned at a higher vertical level than said lubricant pump when said watercraft is in a normal upright condition, conduit means extending between said lubricant reservoir and said lubricant pump and means for preventing air from passing through said conduit means to said pump when said watercraft is inverted and righted.

5,025,763
LATCHING MECHANISM FOR OUTBOARD MOTOR COWLING

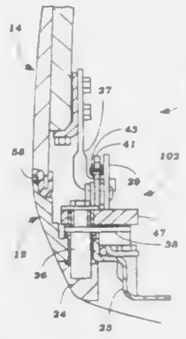
Eifu Watanabe, Hamamatsu, Japan, assignor to Sanshin Industries Co., Ltd., Hamamatsu, Japan

Filed Aug. 28, 1989, Ser. No. 400,159

Claims priority, application Japan, Aug. 29, 1988, 63-214568

Int. Cl.⁵ F02B *77/00*

U.S. Cl. 123—198 E **14 Claims**



1. A latching mechanism for connecting the top portion and tray of a cowling for a power head of an outboard motor comprising a shaft, an operating lever rotatably supported about said shaft, a connecting mechanism secured to said cowling and at least one keeper secured to said cowling, said connecting mechanism comprising a latch having a recessed portion engageable with said keeper and a fixed plate having a slot engageable with said keeper to connect the top portion and tray of said cowling with each other, said operating lever being operatively connected to said connecting mechanism such that rotation of said operating lever about said shaft releases said connecting mechanism from said keeper so that the top portion of said cowling can be detached from the tray of said cowling.

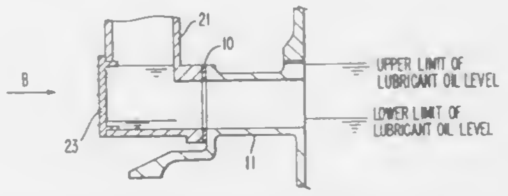
5,025,764
LUBRICANT OIL AMOUNT DETECTOR OF A VERTICAL SHAFT TYPE ENGINE

Kazuyuki Kobayashi, and Kouji Takahashi, both of Nagoya, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo and Churyo Engineering Kabushiki Kaisha, Aichi, both of, Japan

Filed Apr. 12, 1990, Ser. No. 507,853

Int. Cl.⁵ F02B *77/00*

U.S. Cl. 123—198 R **6 Claims**


21
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UPPER LIMIT OF LUBRICANT OIL LEVEL
LOWER LIMIT OF LUBRICANT OIL LEVEL

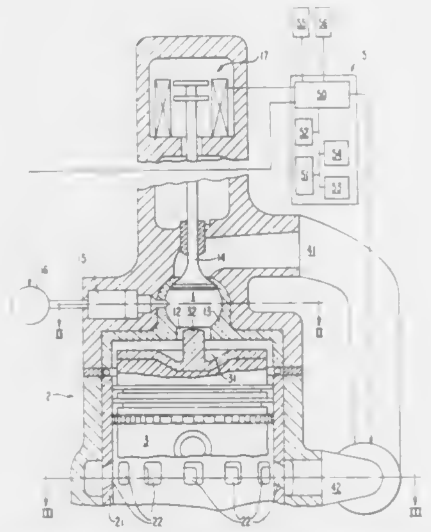
1. A lubricant oil amount detector in an oil accommodating section of a vertical shaft type engine to be mounted on a lawn mower or the like, comprising: an oil passageway provided in an oil pan side portion of a crank case cover, an oil pipe molded of transparent resin such as nylon or PBT and communicating with said oil passageway, and a cover bearing level marks corresponding to upper and lower limits of an engine lubricant oil amount, said cover disposed around the outer circumference of said oil pipe and having a small window extending therethrough over said level marks for facilitating inspection of the lubricant oil amount.

VOL
1127.
ISS
4
JE
25
1991
UMI

5,025,765

HEAT-INSULATED FOUR-CYCLE ENGINE WITH PRECHAMBER

Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Ceramics Research Institute Co. Ltd., Kanagawa, Japan
Filed Apr. 26, 1990, Ser. No. 514,842
Claims priority, application Japan, Apr. 26, 1989, 1-106582; May 24, 1989, 1-130325
Int. Cl.⁵ F02B *19/04. 25/04*
U.S. Cl. 123—254 **7 Claims**



1. A heat-insulated four-cycle engine comprising:

a main combustion chamber made of a heat insulating material;

a prechamber made of a heat insulating material, for holding, as swirls, swirling intake air introduced from said main combustion chamber, said prechamber having an exhaust port;

an exhaust valve for opening and closing said exhaust port;

an ejection port communicating between said prechamber and said main combustion chamber, for introducing the swirling intake air from said main combustion chamber into said prechamber;

a piston reciprocally disposed in said main combustion chamber and having a piston head surface;

a projection mounted on said piston head surface and movable into said ejection port to reduce the opening area of the ejection port when said piston reaches a position near the top dead center thereof, said piston head surface having a recess defined around said projection; and

an intake port defined in a circumferential surface of said main combustion chamber and positioned such that the intake port positionally corresponds to said piston head surface when said piston reaches a position near the bottom dead center thereof.

5,025,766

FUEL INJECTION VALVE AND FUEL SUPPLY SYSTEM EQUIPPED THEREWITH FOR INTERNAL COMBUSTION ENGINES

Teruo Yamauchi; Toshiharu Nogi, and Yoshishige Obyama, all of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Aug. 17, 1988, Ser. No. 233,038
Claims priority, application Japan, Aug. 24, 1987, 62-208312; Aug. 28, 1987, 62-212706; Oct. 30, 1987, 62-273289
Int. Cl.⁵ F02M *51/08;* **B05B** *17/06*
U.S. Cl. 123—472 **17 Claims**

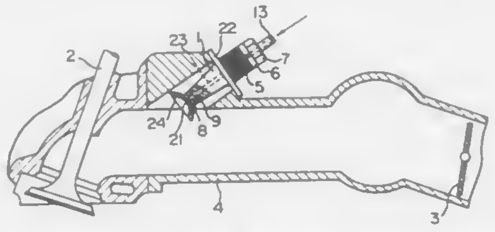
1. A fuel injection valve for internal combustion engines comprising:

an electrostrictive device for generating a mechanical vibration upon application thereto of an electrical oscillation at a set frequency;

a horn including an internal fuel path and a vibration enlarging section for enlarging a mechanical vibration at the outlet side of the fuel path;

a spring mounted at a part of the fuel path of the horn;

a fuel metering unit including a valve member biased in pressure contact with a valve seat under the force of the spring, said spring having such a characteristic as to generate a spring contraction force upon excitation through a vibration transmission system of the horn when the mechanical vibration reaches a predetermined level of amplitude, the spring contraction force causing the valve member to separate from the valve seat thereby to meter the fuel; and

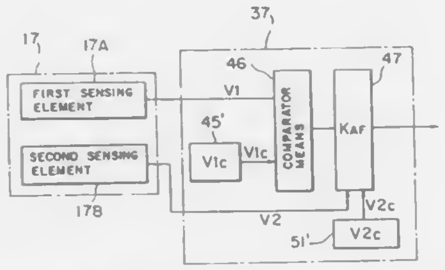


fuel guide means for guiding the fuel injected from the outlet of the fuel path to said vibration enlarging section of said horn after metering of the fuel by said fuel metering unit, the injected fuel being atomized at the vibration enlarging section, wherein said valve member is a ball valve built in a part of the internal fuel path of the horn, said vibration enlarging section is shaped like a semispherical cup, and said fuel guide means includes branch path branching from the outlet of the fuel path and extending along the tangentical direction of the inner peripheral part of the semi-peripherally cup-shaped vibration enlarging section.

5,025,767

AIR/FUEL RATIO CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE AND AIR/FUEL RATIO CONTROLLING OXYGEN DENSITY SENSOR

Tateo Kume, Kyoto; Reijiro Komagome, Joyo, and Kazuhiro Shiraishi, Kyoto, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 7, 1989, Ser. No. 335,212
Claims priority, application Japan, Apr. 9, 1988, 63-87600
Int. Cl.⁵ F02D *41/14*
U.S. Cl. 123—489 **6 Claims**



1. An air/fuel ratio control system for an internal combustion engine, comprising:

a first oxygen density sensor element for arrangement on the upstream side of a catalytic converter so as to detect the density of oxygen in exhaust gas, said catalytic converter being provided in an exhaust system of the internal combustion engine and adapted to clean the exhaust gas;

a second oxygen density sensor element for arrangment on the upstream side of the catalytic converter, said second oxygen density having a slower detection response speed in comparison with the first oxygen density sensor element;

an air/fuel ratio control means for controlling the air/fuel ratio of the internal combustion engine on the basis of results of a comparison between a detection value from the first oxygen density sensor element and a predetermined standard value; and

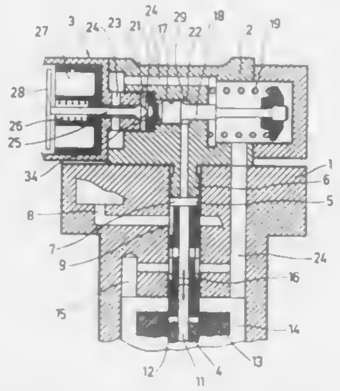
an air/fuel ratio control correction means for effecting a correction to the air/fuel ratio control by the air/fuel ratio control means on the basis of results of comparison between a detection value from the second oxygen density sensor element and a second standard value for the second oxygen density sensor element;

wherein the second standard value is set as a predetermined fixed value.

5,025,768

FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Konrad Eckert, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany
Filed Nov. 15, 1988, Ser. No. 271,263
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1987, 3743532
Int. Cl.⁵ F02M *37/04*
U.S. Cl. 123—506 **26 Claims**



1. A fuel injection system for internal combustion engines, which comprises,

a first housing;

an injection pump in said first housing for pumping fuel via at least one pressure line (8) to an injection nozzle from at least one pump work chamber (7) formed by a piston (4) in said first housing and an end of a fitting (6) of a second housing (2);

a metering device (13) for determining the injection quantity pumped from the pump work chamber to the injection nozzle;

a blocking piston (18) in said second housing which by means of a first face (29, 32) delimits a storage chamber (22) that is always connected to said pump work chamber (7) via a passage that extends from said pump work chamber (7) to said storage chamber (22) and fuel flow to and from said storage chamber (22) is permitted only through said passage, said blocking piston being displaceable within said second housing from a stop, counter to a restoring force (19) by fuel delivered from the pump work chamber into said storage chamber (22), said first face (29, 32) of said blocking piston being operative counter to said restoring force and a second face (34) of said blocking piston delimiting a control chamber (23) and being operative in a restoring direction of said restoring force;

a control line (24) of said control chamber (23) leads to a relief chamber (14) of lower pressure; and

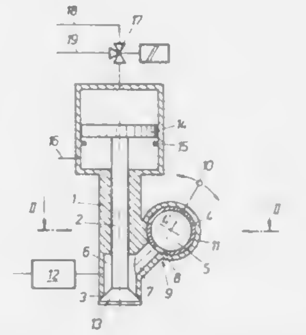
an electrically actuated control valve (3) in said control line (24);

said control valve (3) is an ON/OFF through valve; and said first face (29, 32) on said blocking piston (18, 31, 33) is smaller than said second face (34).

5,025,769

DEVICE FOR FEEDING FUEL INTO A COMBUSTION CHAMBER OF AN INTERNAL COMBUSTION ENGINE

Diethard Plohberger, Deutschlandsberg; Volker Pichl, and Leopold Mikulic, both of Graz, all of Austria
Filed Jul. 18, 1990, Ser. No. 553,660
Claims priority, application Austria, Jul. 31, 1989, 1847/89
Int. Cl.⁵ F02M *69/08*
U.S. Cl. 123—532 **11 Claims**

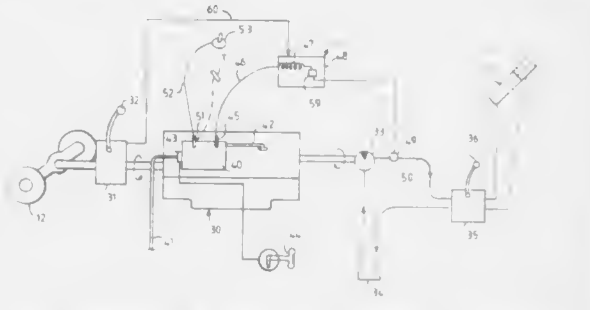


1. A device for feeding fuel into a combustion chamber of an internal combustion engine, comprising an injection valve with a valve seat, said injection valve opening into said combustion chamber and being used for taking compressed gas from said combustion chamber into a gas storage cell holding said compressed gas, and for injecting said compressed gas together with fuel supplied by a metering device, wherein a variable throttle is provided between said valve seat of said injection valve and said gas storage cell and wherein the flow cross-section of said variable throttle is controllable in accordance with load and speed parameters of said internal combustion engine.

5,025,770

APPARATUS AND ENGINE TO PROVIDE POWER TO THE APPARATUS

David A. Richardson, Alton, United Kingdom, assignor to J. C. Bamford Excavators Limited, United Kingdom
Filed Jul. 7, 1989, Ser. No. 377,436
Claims priority, application United Kingdom, Nov. 12, 1987, 8726520; Nov. 8, 1988, 8800959
Int. Cl.⁵ F02B *23/00*
U.S. Cl. 123—585 **17 Claims**



1. In combination, an apparatus, an engine to power the apparatus, a fuel delivery system for providing fuel to the engine, and a sensing means to sense operation of the apparatus, the fuel delivery system comprising an engine speed control by which an operator can set the engine speed control means responsive to the sensing means to allow a first quantity of fuel to be fed to the engine when the apparatus is being

VOL
1127
ISS
4
JE
25
1991
UMI

operated, the first quantity of fuel being that permitted by the setting of the engine speed control, and to operate a restrictor device which is separate from the settable engine speed control, to restrict the fuel supply to provide a second quantity of fuel to the engine which is reduced compared with the first quantity when the apparatus has not been operative for a predetermined time, the control means automatically returning the fuel supply to the first quantity when the sensing means senses that the apparatus is again operative, the control means changing the quantity of fuel in response to the sensing means, without altering the setting of the engine speed control.

5,025,771

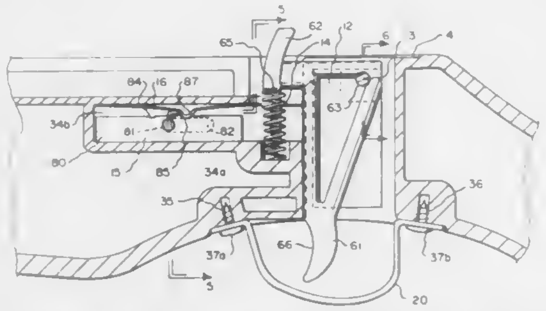
CROSSBOW

Brooks K. Hanson, 4075 S. Mt. Olympus Way, Salt Lake City, Utah 84124

Filed Sep. 19, 1989, Ser. No. 408,802

Int. Cl.^{5} F41B *5/12*

U.S. Cl. 124—25 **24 Claims**



1. A crossbow assembly, comprising an elongate stock having two opposing side surfaces, a relatively narrow upper surface, a relatively narrow lower surface, a front nose surface, and a rear butt surface; a unitary trigger and bow string release member pivotally mounted within the stock so that a trigger portion of said member extends from the relatively narrow lower surface of the stock to form a trigger and a bow string release portion extends from the relatively narrow upper surface of the stock to form a bow string holding and release means; pivot means mounting the trigger and bow string release member within the stock so that movement of the trigger portion about the pivot mounting from a cocked to released position causes movement of the bow string release portion from a bow string holding position wherein a bow string is held in a cocked position by resting against the bow string holding and release portion of the member to a bow string released position wherein the bow string holding and release portion of the member has pivoted to release the bow string; and retraction means for urging the trigger and bow string release member to a position wherein the trigger portion is in its cocked position and the bow string release portion is in its bow string holding position.

5,025,772

BOWSTRING RELEASE DEVICE

Mark W. Stevenson, 6518 Swigert Rd., Appleton, N.Y. 14008

Filed Nov. 13, 1989, Ser. No. 434,174

Int. Cl.^{5} F41B *5/00*

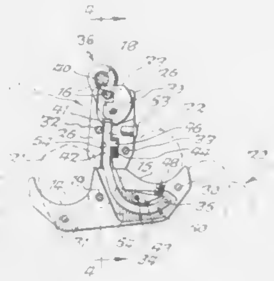
U.S. Cl. 124—35.2 **8 Claims**

1. A bowstring release device, comprising:

a housing having a first member and a second member, wherein said second member has an imaginary longitudinal centerline, and wherein said first member includes at least two finger grip recesses for gripping by fingers of an archer, wherein a first recess on one side of said centerline located closet to said centerline extends deeper into said first member than a corresponding closet second recess on the other side of said centerline, and wherein said first member is pivotally mounted to said second member;

release means secured to said second member and operatively arranged to hold and release a bowstring; and

linkage means within said housing operatively arranged to activate said release means to release said bowstring when said first member is pivoted relative to said second member, wherein said linkage means comprises a partially arcuate link pivotally mounted within said first member which functions to transform rotational motion caused by said pivoting of said first member relative to said second member into translational motion of said link which releasably engages said release means.



5,025,773

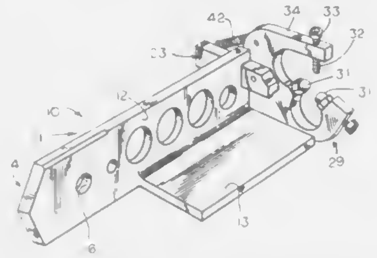
ARCHERY ARROW SUPPORT

Kurt Hintze, 220 Carmichael Dr., Woodstock, Ga. 30188, and Keith Hacker, 237 Lamplighter La., Marietta, Ga. 30067

Filed Sep. 26, 1988, Ser. No. 248,735

Int. Cl.^{5} F41B *5/00*

U.S. Cl. 124—445 **10 Claims**



10. An arrow rest for use with an archery bow for receiving an arrow, maintaining the arrow in a launch prone position and guiding the arrow from the bow upon launch, said arrow rest comprising:

a yoke formed to define a radially accessible opening having a central axis extending substantially along the direction of intended arrow flight;

pedestal means mounted to said yoke and extending into said opening on one side of said central axis with said pedestal means being configured and positioned to support and guide an arrow from the bow upon launch;

a resilient retaining member mounted to said yoke and extending into said opening on another side of said central axis substantially opposing said pedestal means;

said resilient retaining member being adapted to flex in response to radial movement of an arrow into said opening to allow the arrow to fall into place on said pedestal means and thence to return to its unflexed configuration extending toward the shaft of the arrow to constrain the arrow within the yoke.

5,025,774

COMPETITION BOW WITH IMPROVED VIBRATIONAL BEHAVIOR

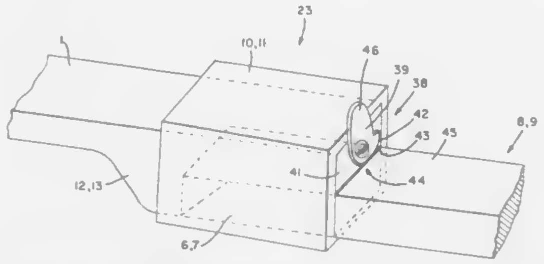
Jacques Martin, 1, rue Fort Louis, 67000 Strasbourg, France

Filed Jul. 25, 1989, Ser. No. 384,368

Claims priority, application France, Jul. 25, 1988, 88 10170

Int. Cl.^{5} F41B *5/00*

U.S. Cl. 124—89 **15 Claims**



1. An archery bow, comprising:

a longitudinally extending bow body having opposite end portions;

a pair of hollow sleeves respectively disposed upon said opposite end portions of said bow body;

a pair of bow branches having a configuration substantially corresponding to that of said pair of hollow sleeves such that said pair of bow branches can be accommodated within said pair of hollow sleeves;

spreader means mounted upon said bow body for permitting both horizontal and vertical adjustment of an arrow with respect to said bow body; and

cam type immobilizing means rotatably mounted upon said opposite end portions of said bow body so as to be movable between a first position at which said cam type immobilizing means engages said pair of bow branches disposed within said pair of hollow sleeves so as to force said pair of bow branches into contact with interior wall surfaces of said pair of hollow sleeves and thereby fix said pair of bow branches within said pair of hollow sleeves and upon said opposite end portions of said bow body, and a second position at which said cam type immobilizing means disengages said pair of bow branches disposed within said pair of hollow sleeves so as to permit said pair of bow branches to be removed from said pair of hollow sleeves.

5,025,775

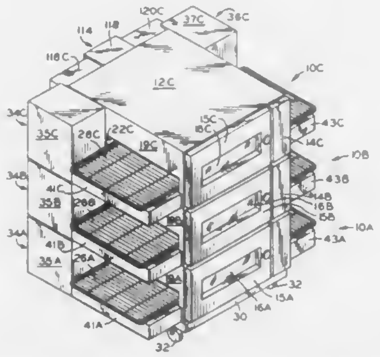
AIR DELIVERY SYSTEM AND OVEN CONTROL CIRCUITRY COOLING SYSTEM FOR A LOW PROFILE IMPINGEMENT OVEN

Duane L. Crisp, Freeland, Pa., assignor to Lincoln Foodservice Products, Inc., Fort Wayne, Ind.

Filed Jun. 4, 1990, Ser. No. 532,600

Int. Cl.^{5} F24C *15/32*

U.S. Cl. 126—21 A **13 Claims**



1. An impingement food preparation apparatus comprising:

an enclosure including a cooking chamber for cooking a food product therein;

supporting means in said cooking chamber for supporting the food product;

a plurality of finger duct members mounted in said cooking chamber and spaced from said supporting means, each of said duct members including a plurality of nozzles therein and pair of sidewalls, said nozzles being shaped and positioned to direct a plurality of discrete streams of impinging air toward said supporting means;

means forming a plenum in said enclosure connected to said duct members in fluid communication therewith to provide a flow of air thereto, said plenum means having a front wall with a plurality of openings connected to respective said duct members and an air intake opening therein;

means for heating the flow of air before it enters the plenum;

means for drawing air from said chamber into said plenum; and

adjacent said sidewalls of adjacent said ducts being tapered relative to each other to define an air return space outwardly tapered in a direction away from said plenum.

5,025,776

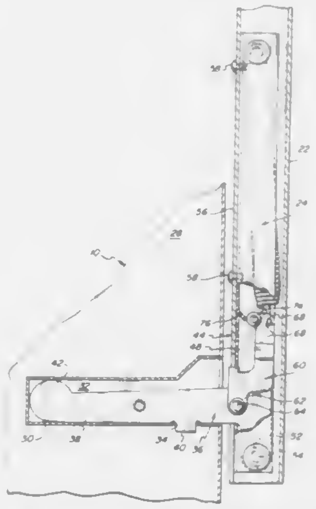
DOOR MOUNTED HINGE FOR OVEN DOORS AND THE LIKE

Roger T. Hanley, Newington, and Stephen D. Belanger, Coventry, both of Conn., assignors to The Stanley Works, New Britain, Conn.

Filed May 18, 1990, Ser. No. 525,902

Int. Cl.^{5} F23M *7/00*

U.S. Cl. 126—194 **17 Claims**



1. A hinge for mounting an oven door to close the oven cavity in a stove which has hinge mounting recesses adjacent the base of said cavity, said hinge comprising:

(a) an elongated support member for mounting in a fixed position in the associated door and having a sidewall and a base wall defining a channel, said support member being adapted to be mounted along the side of the associated door in a position extending perpendicularly to its bottom edge;

(b) a generally L-shaped hanger having an elongated arm portion for seating in a recess of the associated stove and further having a depending hinge portion extending within said channel of the lower end portion of said support member;

(c) pivot means pivotably mounting said hinge portion of said hanger in said support member adjacent the lower end thereof;

(d) a translation member having a generally L-shaped lower

VOL
1127
ISS
4
JE
25
1991
UMI

portion pivotably mounted on said hanger arm portion and an upper portion extending vertically within said support member;

(e) an elongated spring substantially contained within said channel of said support member and having one end connected to said upper portion of said translation member and having its other end secured to said support member at a point adjacent its upper end; and

(f) cooperating means on said support member and on said translation member adjacent the upper end of said upper portion for utilizing the biasing force of said spring, whereby pivoting of the associated door from a closed to an open position causes displacement of said translation member towards the lower end of said support member and said pivot means and concurrent elongation of said spring to produce tensioning thereof, said cooperating means on said support member and translation member in the closed position of the hinge cooperating to bias the associated door into its closed position under the biasing force of said spring and also cooperating to hold the translation member in an intermediate open position of the associated door under the biasing force of said spring, and said translation member abutting and cooperating with said pivot means in the open position of the hinge to limit further pivoting thereof.

5,025,777

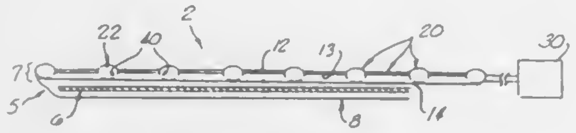
CHEMICALLY HEATED BLANKET

Eugene R. Hardwick, Encino, Calif., assignor to Karen Worchell, Studio City, Calif.

Continuation-in-part of Ser. No. 433,697, Nov. 9, 1989. This application Feb. 20, 1990, Ser. No. 482,333

Int. Cl.^{5} F24J *1/00*

U.S. Cl. 126—263 5 Claims



1. A chemical warmer, comprising:

an envelope having a first panel means and a second panel means peripherally connected to said first panel means to form said envelope,

an air introduction means for introducing air into said envelope,

a gas exhaust means for exhausting exhaust gas out of said envelope,

a powdered or granular thermogenic material or mixture, and

a thermogenic material mat disposed in said envelope for holding said thermogenic material therein in place, said mat including a first sheet of air-permeable material having a plurality of depressed small hollows, and a second sheet of material welded or cemented onto said first sheet of material to form a plurality of distributed cells therebetween for holding said thermogenic material in place.

5,025,778

ENDOSCOPE WITH POTENTIAL CHANNELS AND METHOD OF USING THE SAME

Fred E. Silverstein, Seattle, and Eric A. Opie, deceased, late of Brier, Wash. by Elizabeth Jeanne Opie Salamonsen, executrix , assignors to Opielab, Inc., Seattle, Wash.

Filed Mar. 26, 1990, Ser. No. 498,611

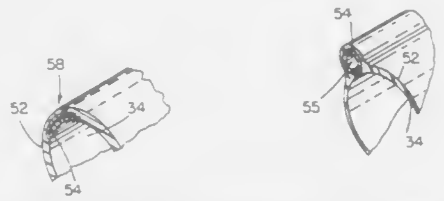
Int. Cl.^{5} A61B *1/00*

U.S. Cl. 128—4 28 Claims

1. An endoscope comprising:

an insertion tube having a distal end for inserting into a patient's body and a proximal end remaining outside said body;

a sheath covering said insertion tube, said sheath extending from said distal end of said insertion tube to said proximal end of said insertion tube; and



a resilient tubing within said sheath having a channel that is collapsed in its relaxed state and expandable to provide a lumen through said tubing.

5,025,779

DEVICE INTENDED TO BE USED FOR OPENING THE CHEST DURING SURGERY

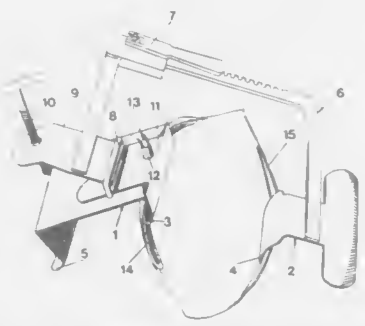
Mogens Bugge, Södeborgsgatan 64, 216 20 Malmö , Sweden

Filed Aug. 16, 1989, Ser. No. 395,029

Claims priority, application Sweden, Aug. 16, 1988, 8802904

Int. Cl.^{5} A61B *17/02*

U.S. Cl. 128—20 8 Claims



1. A refractor for opening the chest during surgery, said retractor comprising:

first and second substantially opposed retractor blades with first and second hooks, respectively, for gripping opposite incision edges of a chest incision, the first and second retractor blades being spaced and mounted to extend substantially parallel to each other in all positions thereof;

a frame structure, said retractor blades being interconnected by said frame structure;

a first adjusting means associated with the frame structure for adjusting the relative distance between the first and second blades; and

a second adjusting means arranged to act upon the first retractor blade to tilt the first retractor blade in a manner which enables lifting of the first hook and the incision edge gripped by it upwards while maintaining the first and second retractor blades oriented substantially parallel to each other.

5,025,780

TABLE MOUNTED SURGICAL RETRACTOR

Daniel K. Farley, 601 E. Lake Shore Dr., Barrington, Ill. 60010

Division of Ser. No. 343,807, Apr. 26, 1989, Pat. No. 4,971,038. This application Jan. 8, 1990, Ser. No. 461,816

Int. Cl.^{5} A61B *17/02*

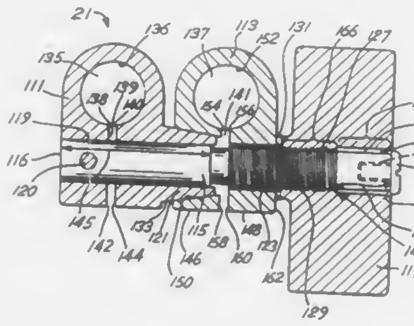
U.S. Cl. 128—20 16 Claims

1. A universal joint clamp for connecting members of a surgical retraction system relative to one another, said universal joint clamp comprising:

(i) a shaft member having a first set of threads disposed along a segment of the outer surface of said shaft member;

(ii) a first clamp member carried by said shaft member and having a first constrictable gripping surface for disposition relative to one of the members of a surgical retraction system for constricting against the one member for securing the one member in a fixed position relative to said first clamp member, and first clamp member including a first contact surface for receiving a force to cause said first constrictable gripping surface to constrict;

(iii) a second clamp member carried by said shaft member and having a second constrictable gripping surface for disposition relative to another of the members of the surgical retraction system for constricting against the other member for securing the other member in a fixed position relative to said second clamp member, said second clamp member including a second contact surface for receiving a force to cause said second constrictable gripping surface to constrict; said second clamp member rotable and slidable relative to said first clamp member and said second clamp member for applying a force to said first contact surface when said clamp members are forced together;



(iv) knob member having a second set of threads mateable with said first set of threads for causing movement of said knob member along said shaft member, said knob member located distally from said first and second jaw members and being manually rotatable for applying a force to said second contact surface and for forcing said clamp members together to constrict said first and second constrictable surfaces;

(v) first stop member for preventing removal of said first clamp member from one end of said shaft member, said first stop member cooperating with said knob member to fix said clamp members relative to said shaft; and

(vi) second stop means for preventing removal of said knob member from the other end of said shaft member, and second stop means being spaced a distance from said segment for permitting said knob member to move to a position which permits cleaning and lubrication of said first and second set of threads.

5,025,781

COMPRESSION DEVICE WITH A SAFETY PRESSURE RELEASE

Christopher Ferrari, Marlboro, Mass., assignor to Advanced Instruments, Inc., Needham Heights, Mass.

Filed May 8, 1989, Ser. No. 348,411

Int. Cl.^{5} A61H *15/00*

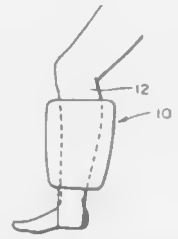
U.S. Cl. 128—64 4 Claims

1. A fluid pressure compression device comprising:

A. means for defining at least one fluid pressure inflatable/-deflatable fluid chamber, said chamber having a generally annular shape when placed around a human limb;

B. means fluidly coupled to said at least one fluid chamber for coupling the chamber to a source of fluid under cyclical relative positive and negative pressures whereby the at least one fluid chamber is cyclically inflated and deflated;

C. means for releasing fluid pressure from said at least one fluid chamber in the event that a negative pressure is not



applied to the fluid in the chamber to withdraw the fluid therefrom.

5,025,782

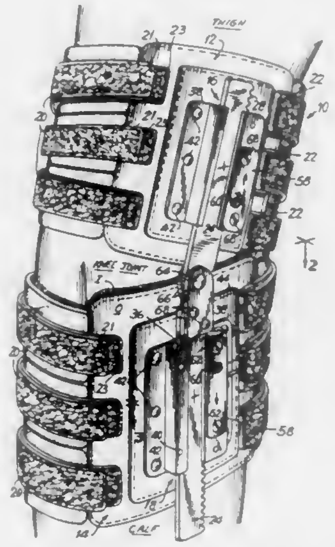
ADJUSTABLE RACK AND PINION KNEE BRACE

Laurie Salerno, Rahway, N.J., assignor to Ambulatory Traction Inc., Rahway, N.J.

Filed Feb. 12, 1990, Ser. No. 478,505

Int. Cl.^{5} A61F *5/00*

U.S. Cl. 128—80 C 18 Claims



1. Apparatus for bracing the knee joint of a wearer comprising:

a first support member securely fastened to the thigh of the wearer;

a second member securely fastened to the calf of the wearer;

a pair of first arms mounted on said first support member;

a pair of second arms mounted on said second member;

means connected between the free ends of said first arms and second arms for pivotally mounting said first arms to said second arms; and means on at least one of said supports member for spreading apart the support member longitudinally in relation to the arm members into a fixed position on the arm member (moveably connecting the support of said arms members for spreading apart said support members in relation to the respective arms), such that the load created by the weight of the wearer is transferred through said arms from the first support member to the second support member, and the knee joint is by-passed by a substantial portion of said load.

VOL
1127
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1991
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5,025,783
METHOD OF APPLYING A MEDICAL DRESSING DEVICE

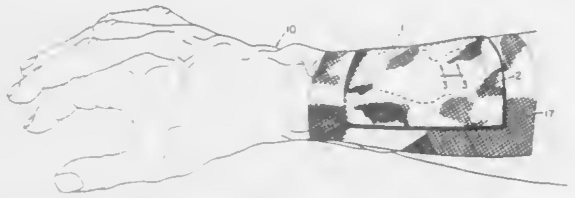
Patrick J. Lamb, Indian Mills, N.J., assignor to Sparta Surgical Corp., Hayward, Calif.

Continuation of Ser. No. 22,863, Mar. 6, 1987, which is a continuation of Ser. No. 902,667, Sep. 2, 1986, abandoned. This application Feb. 25, 1988, Ser. No. 160,202

The portion of the term of this patent subsequent to Mar. 15, 2005, has been disclaimed.

Int. Cl.^{5} A61F *13/00, 15/00*

U.S. Cl. 128—156 1 Claim



1. A method of treating wounds such as burns, abrasions, lacerations and surgical incision, comprising the steps of:

cleaning said wound; applying to said wound a foam pad consisting essentially of polyurethane having a thickness ranging from 0.50 to 15.0 mm and sized to cover said wound and extending at least two cm beyond the wound edge, said pad having a hydrophilic side in contact with said wound, and a porous, non-woven fibrous sheet having a permeability to water vapor, carbon dioxide and oxygen of at least 175 cc/hour and sized larger than said pad size and having an adhesive side in contact with the pad, said sheet then being pressed on to the non-wounded portion of the patient's skin to adhere the product to the patient; and maintaining said pad in contact with said wound for five to seven days.

5,025,784
APPARATUS AND METHOD FOR DETECTING AND PROCESSING IMPEDANCE RHEOGRAM

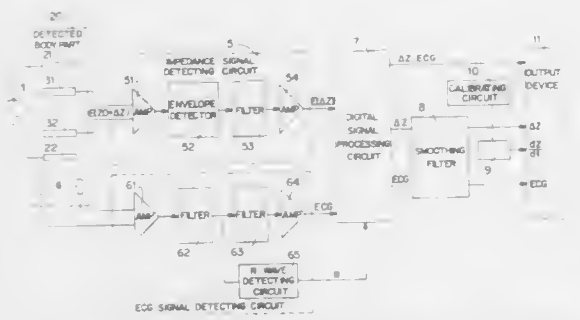
Shuyong Shao; Jianhua Feng, and Xinchao Zhang, all of Harbin, China, assignors to Harbin Polytechnic University, Harbin, China

Filed Sep. 6, 1988, Ser. No. 240,620

Claims priority, application China, Sep. 5, 1987, 87106212

Int. Cl.^{5} A61N *1/00*

U.S. Cl. 128—419 PG 9 Claims



1. An apparatus for detecting and processing an impedance rheogram, comprising:

a constant current source for generating a constant current having a frequency range of 20–100 KHz and an amplitude of less than 2 mA;

a pair of output electrodes connected to said constant current source for applying the constant current to a subject's body part;

a pair of voltage detecting electrodes for detecting from said body part of voltage signal which represents a change of impedance in response to the constant current applied to the said body part;

means for detecting an impedance signal from said voltage detecting electrodes and for further amplifying and filtering the impedance signal detected thereby;

ECG signal detecting electrodes adapted to be connected to the said body part for detecting an ECG signal generated by the said body part;

means for detecting the ECG signal generated by said ECG signal detecting electrodes, for amplifying and filtering the ECG signal detected, and for generating an R wave sequence from the ECG signal;

digital signal processing means connected to an output of each said means for detecting said impedance signal and said means for detecting said ECG signal wherein said impedance signal, ECG signal and R wave sequence are connected in parallel to said digital signal processing means; and

an output device connected to said digital signal processing means for displaying and recording the impedance signal and ECG signal;

wherein said digital signal processing means performs A/D converting and sampling of said impedance and ECG signals, divides said impedance signal into cycles according to said R wave sequence and performs linear interpolating processing within each cycle, said linear interpolation processing including selection of a predetermined number of interpolating points for each cycle, subsequently performs in-phase superposing-averaging processing of the impedance signal for a predetermined number of cycles and restores the impedance signal according to the interpolating points, and synchronously outputs the impedance and ECG signals to said output device.

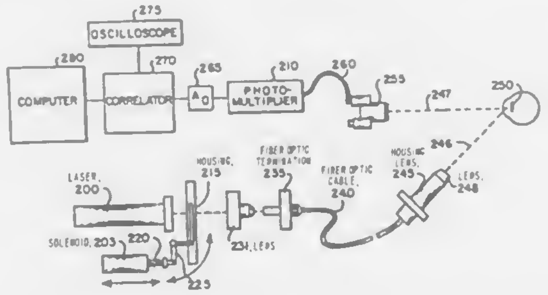
5,025,785
DIABETES DETECTION METHOD

Jeffrey N. Weiss, 2202 Lucaya Bend, E-4, Coconut Creek, Fla. 33066

Continuation-in-part of Ser. No. 672,717, Nov. 19, 1984, Pat. No. 4,895,159, which is a continuation-in-part of Ser. No. 416,654, Sep. 10, 1982, abandoned. This application Oct. 6, 1989, Ser. No. 418,109

Int. Cl.^{5} A61B *6/00*

U.S. Cl. 128—633 4 Claims



1. A noninvasive method of examining a patient for diabetes mellitus, comprising the steps of:

A. ascertaining the variations in the intensity of light back-scattered from the cornea of an in vivo eye of each of a plurality of normal persons and deriving measurements therefrom,

B. relating the derived measurements with the respective ages of the normal persons to obtain norms for persons of various ages,

C. ascertaining the variations in the intensity of the light back-scattered from the cornea a corresponding measurement therefrom, and

D. comparing the patient's measurement with the norm for persons of comparable age to the patient.

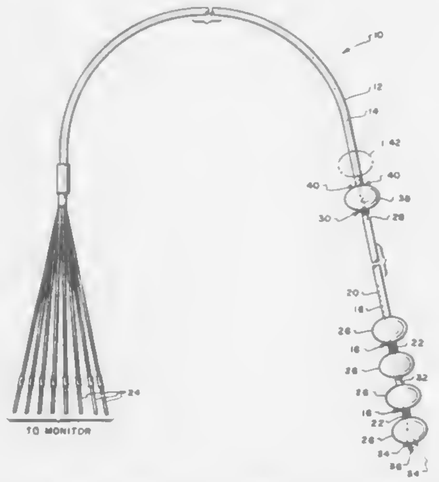
5,025,786
INTRACARDIAC CATHETER AND METHOD FOR DETECTING AND DIAGNOSING MYOCARDIAL ISCHEMIA

Sharon B. Siegel, 555 Laurel Ave., San Mateo, Calif. 94401

Filed Jul. 21, 1988, Ser. No. 222,217

Int. Cl.^{5} A61B *5/0402*

U.S. Cl. 128—642 21 Claims



1. An intracardiac catheter for sensing electrical activity and pressure within the heart of a living subject and for transmitting indications of this electrical activity and pressure to an external monitoring source, comprising:

a) a flexible elongated body having an outer wall defining a lumen formed therein extending the length of said elongated body, said body having a proximal end portion and a distal end portion;

b) electrical activity sensing means for measuring the electrical activity in a ventricle of the heart, including,

at least one distally extending electric conductor having a proximal end and a distal end, said electric conductor extending within said lumen from said proximal end portion to said distal end portion,

an electrically insulating sheath covering a substantial portion of said electric conductor,

sensing electrode means connected to the distal end of the conductor, said sensing electrode means being capable of detecting electric currents from the ventricle, and

means connected to the proximal end of the conductor to connect the electric conductor to said external monitoring source;

c) means secured to the elongated body for preventing the sensing electrode means from coming into direct contact with the endocardium of the heart plus preventing obscuration of the sensed electrical currents by interference patterns; and

d) pressure sensing means for sensing pressure in a body chamber adjacent said ventricle, said pressure sensing means extending within said lumen from an intermediate portion located between the distal portion and the proximal portion to said proximal portion, said pressure sensing means being connectable at a proximal end to said external monitoring source,

wherein during utilization of the catheter said intermediate portion is positioned within said body chamber adjacent said ventricle and said distal portion is positioned in a ventricle of the heart, the catheter therefore having the capability of providing simultaneous indications of electrical activity within the ventricle and pressure within the adjacent body chamber, thus permitting correlation between indications of pressure and electrical activity.

5,025,787
INTRAUTERINE PROBE

Ian A. Sutherland, Harpenden; Nigel J. Randall, London, and Philip J. Steer, Kingston upon Thames, all of England, assignors to The Imperial College of Science, Technology & Medicine, London, England

Continuation-in-part of Ser. No. 330,020, Mar. 29, 1989, abandoned, and Ser. No. 346,971, Jun. 6, 1989, abandoned. This application Feb. 26, 1990, Ser. No. 484,956

Claims priority, application United Kingdom, Mar. 29, 1988, 8807482; Oct. 8, 1989, 8624169

Int. Cl.^{5} A61B *5/04*

U.S. Cl. 128—642 17 Claims

1. An intrauterine probe for monitoring the condition of a fetus during labor, comprising:

an elongate flexible, flattened body member formed from electrically insulating material and having a rounded distal end, and having at least one sensor mounted in a flat face of the body member, said body member having a bending stiffness about an axis transverse to the plane of said body member of between 1 and 10 megaNewtons/m^2, whereby said body member is sufficiently directionally stable to be insertable into the vaginal tract and through the cervical OS and capable of being guided around the fetus without twisting.

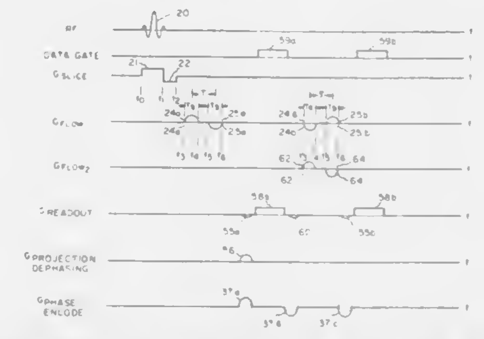
5,025,788
METHOD OF ACQUIRING NMR ANGIOGRAMS IN SELECTED FLOW COMPONENT DIRECTIONS

Charles L. Dumoulin, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 235,144, Aug. 23, 1988, abandoned, which is a division of Ser. No. 13,592, Feb. 11, 1987, Pat. No. 4,796,635. This application Mar. 22, 1990, Ser. No. 497,290

Int. Cl.^{5} A61B *5/055*

U.S. Cl. 128—653 AF 8 Claims



1. A method for acquiring at least one nuclear magnetic resonance (NMR) angiographic image of flowing material in at least a selected portion of a sample, comprising the steps of:

(a) immersing the sample in a main static magnetic field;

(b) nutating, in the initial part of each of a first sequence and a second sequence of a sequential pair of imaging sequences for each of a multiplicity S of regions of said selected sample portion, the spins of all nuclei of a selected species;

(c1) applying, prior to a first of a plurality N of response data acquisition time intervals in each sequence, a pair of alternating-polarity flow-encoding signal pulses in a first magnetic field gradient impressed upon the sample in a first one of a pair of flow-encoding directions;

(c2) applying, after the first response interval in each sequence and prior to a second response data acquisition time interval, another pair of alternating-polarity flow-encoding signal pulses which are the inverse of the pulse pair of step (c1) and are in the first magnetic field gradient in the same first one of the flow-encoding directions;

(c3) applying, prior to the second response interval in each sequence, a pair of alternating polarity flow-encoding signal pulses in the remaining one of the flow-encoding

VOL
1127
ISS
4
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1991
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directions in a second magnetic field gradient substantially orthogonal to the first magnetic field gradient; each of the flow-encoding pulses in the first sequence of each pair having a polarity opposite to the polarity of the like-positioned flow-encoding pulse in the second sequence of each pair; each flow-encoding direction being selective to establish one axis of an associated NMR angiographic projection image in which a resulting NMR response echo signal from the spin of a moving nucleus differs from the NMR response echo signal resulting from the spin of a substantially stationary nucleus;

(d) acquiring, responsive to a readout magnetic field gradient impressed upon the sample in a direction substantially independent of the flow-encoding directions, a set of data from the NMR response echo signal evoked, from at least the sample portion, in each different one of the plurality N of response data acquisition time intervals of each of the first and second sequences;

(e) subtracting the data in each first and second sets of data from the NMR response echo signal evoked in the first sequence, from the data in the like-numbered data set of the second sequence, to generate a respective first one I_A and a second one I_B of a pair of difference data sets from which response data obtained from stationary nuclei has been substantially removed; and

(f) processing the difference data I_A set in the first direction and the difference data I_B set in the second direction to obtain a final difference data set I_t having a value given to $I_t=((I_A)^2+(I_B)^2)^{\frac{1}{2}}$, to display a total-flow angiogram.

5,025,789

SHOCK WAVE SOURCE HAVING A CENTRAL ULTRASOUND LOCATING SYSTEM

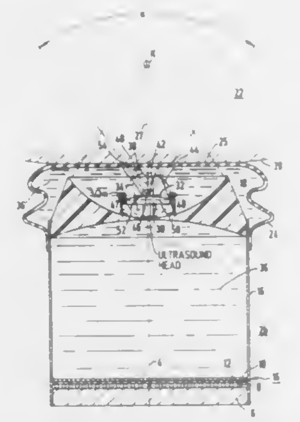
Dietrich Hassler, Uttenreuth, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 29, 1988, Ser. No. 250,522

Claims priority, application Fed. Rep. of Germany, Oct. 19, 1987, 3735346

Int. Cl.^{5} A61B *17/22*

U.S. Cl. 128—660.03 **16 Claims**



1. A shock wave source for disintegrating a calculus in a patient comprising:

a housing;

means in said housing for generating shock waves in a propagation direction;

means in said housing following said means for generating shock waves in said propagations direction and adapted for coupling said shock waves to a patient, said means for planar coupling having a coupling surface **8** adapted for pressing flush against a patient, said planar coupling surface **9** having a coupling surface normal substantially parallel to the shock wave propagation direction when pressed flush against said patient; and

ultrasound means for locating and observing a calculus in said patient, said ultrasound means including an ultrasound head centrally disposed in said means for generating shock waves and having an ultrasound exit face with an exit face surface normal always disposed obliquely relative to said coupling surface normal.

5,025,790

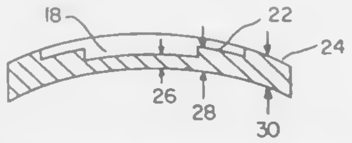
GRADED FREQUENCY SENSORS

J. Fleming Dias, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 16, 1989, Ser. No. 352,803

Int. Cl.^{5} A61B *8/00*

U.S. Cl. 128—662.03 **11 Claims**



1. An ultrasonic annular array sensor comprising:

an ultrasonic sensor [10] having a shape which approximates a right circular cylinder cut from a spherical shell of piezoelectric material; said shell having

(1) a center [12];

(2) a concave side [14];

(3) a convex side [16];

(4) a central portion [18], said central portion having a central thickness dimension [26]; and

(5) a peripheral portion [20], said peripheral portion having a peripheral thickness dimension, said central thickness dimension [26] being smaller than said peripheral thickness dimension.

5,025,791

PULSE OXIMETER WITH PHYSICAL MOTION SENSOR

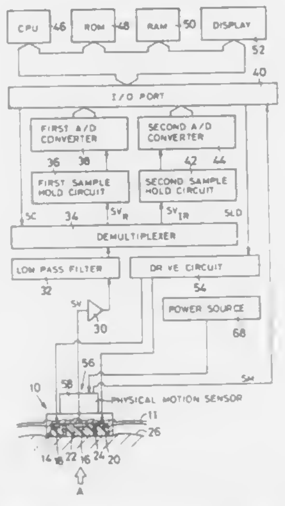
Minoru Niwa, Nagoya, Japan, assignor to Colin Electronics Co., Ltd., Japan

Filed Jun. 1, 1990, Ser. No. 531,768

Claims priority, application Japan, Jun. 28, 1989, 1-75700[U]

Int. Cl.^{5} A61B *5/14*

U.S. Cl. 128—670 **7 Claims**



1. A pulse oximeter of the reflection type, comprising:

first sensor means including means for emitting two lights having different wavelengths toward a body portion of said subject, and means for detecting the lights reflected from said body portion, said first sensor means producing first signals each of which is representative of a corresponding one of the detected lights;

second sensor means for detecting a physical motion of said subject, said second sensor means producing a second signal representative of the detected physical motion;

support means for supporting said first and second sensor means;

set means for setting said support means supporting said first and second sensor means, on said body portion of said subject; and

control means for discriminating the first signals produced by said first sensor means when said second signal is produced by said second sensor means, from the first signals produced when said second signal is not produced.

5,025,792

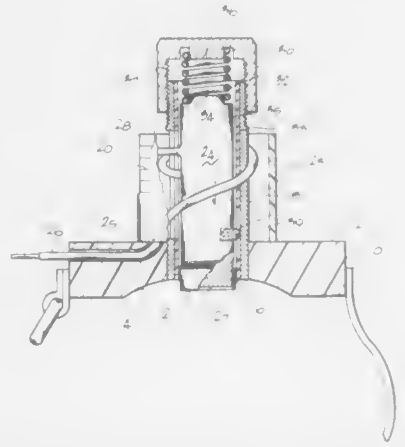
CONTINUOUS CUTANEOUS BLOOD PRESSURE MEASURING APPARATUS AND METHOD

Edward H. Hon, and Edward D. Hon, both of Bradbury, Calif., assignors to The Hon Group, Encino, Calif.

Filed Sep. 26, 1985, Ser. No. 780,398

Int. Cl.^{5} A61B *5/021*

U.S. Cl. 128—672 **15 Claims**



1. Apparatus for monitoring blood pressure of a body comprising isolating means for isolating a portion of cutaneous tissue and measuring means for measuring changes in said isolated cutaneous tissue, said isolating means comprising an annular ring.

5,025,793

FINGER BLOOD PRESSURE MEASUREMENT SYSTEM

Edward A. Richley, 1929 Crisanto, #226, Mountain View, Calif. 94040; Christopher E. Russell, 348 Central Dr., Mars, Penn. 16046

Continuation of Ser. No. 916,229, Oct. 7, 1986, abandoned. This application Sep. 29, 1988, Ser. No. 250,989

Int. Cl.^{5} A61B *5/022*

U.S. Cl. 128—677 **14 Claims**

5. An oscillimetric system for blood pressure measurement, comprising:

an inflatable air pressure bladder disposed for occlusion of user finger arteries in an inflated state.

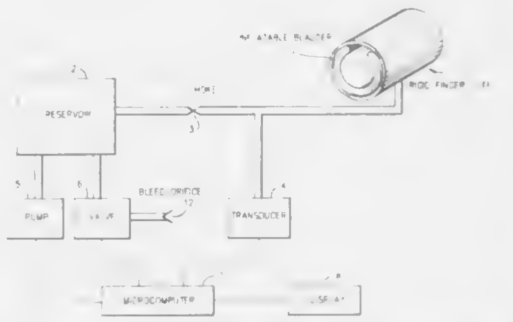
a transducer means, coupled to said bladder, for measuring pulse and cuff pressure components of air pressure variations in said bladder,

an air pressure reservoir, having a substantially larger air volume than said bladder in said inflated state,

a means for increasing the air pressure in said reservoir,

a means for decreasing the air pressure in said reservoir, and

an air communication means, coupling said bladder to said reservoir, for allowing communication therebetween, including a concentrating means, located at a point between its ends, for concentrating said pulse pressure components in said bladder.



5,025,794

METHOD FOR ANALYSIS OF ELECTROCARDIOGRAPHIC SIGNAL QRS COMPLEX

David E. Albert, and Edward J. Berbari, both of Edmond, Okla., assignors to Corazonix Corporation, Oklahoma City, Okla.

Filed Aug. 30, 1988, Ser. No. 238,503

Int. Cl.^{5} A61B *5/04*

U.S. Cl. 128—696 **10 Claims**

1. A method for determining anomalous late potentials in the QRS complex of an electrocardiographic beat signal, comprising:

deriving the QRS signal of the beat signal as a series of digital sample values at a selected sample rate;

filtering the QRS signal sample values through a digital filter of selected pass band;

filtering the QRS signal sample values in reversed time order through a digital filter of said selected pass band;

processing each of the filtered QRS signal in accordance with a predetermined window function and summing the resulting signal to produce a QRS summation signal; and

smoothing the QRS summation signal to produce a QRS signal replica accentuating the non-random late potential signal components within the QRS low amplitude signal sector.

5,025,795

NON-INVASIVE CARDIAC PERFORMANCE MONITORING DEVICE AND METHOD

Horst E. Kunig, R.D. #1, Box 577, Saltsburg, Pa. 15681

Filed Jun. 28, 1989, Ser. No. 373,229

The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.

Int. Cl.^{5} A61B *5/0452*

U.S. Cl. 128—713 **13 Claims**

1. A non-invasive cardiac monitoring device for determining cardiac pumping performance of an individual, comprising,

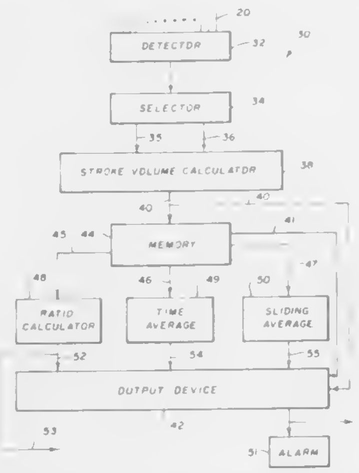
means for generating a plurality of electrocardiogram signals indicative of a plurality electrocardiogram waveforms;

means for detecting the amplitude of a R-wave electrocar-

VOL
1127
ISS
4
JE
25
1991
UMI

diogram component having the greatest amplitude from the plurality of the electrocardiogram signals;

means for detecting the amplitude of a T-wave electrocardiogram component having the greatest amplitude from the plurality of electrocardiogram signals;



means responsive to each of the means for detecting for producing a stroke volume signal which is a function of the ratio of the greatest amplitude of the R-wave component to the greatest amplitude of the T-wave component; and

means for displaying values of the stroke volume signal.

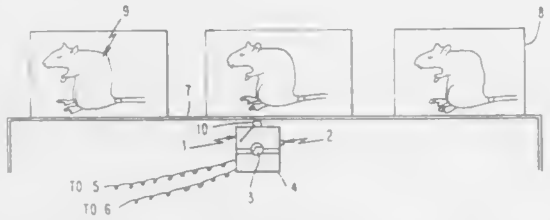
5,025,796
APPARATUS AND METHODS FOR DETERMINING IN VIVO RESPONSE TO THERMAL STIMULATION IN IN AN UNRESTRAINED SUBJECT

Kenneth M. Hargreaves, Bethesda, Md.; Ronald Dubner, Washington, D.C., and Fred Brown, Rockville, Md., assignors to The United States of America as represented by the Department of Health and Human Services, Wash.

Filed Dec. 1, 1988, Ser. No. 278,355

Int. Cl.^{5} A61B *5/00*

U.S. Cl. 128—742 **12 Claims**



1. A high sensitivity in vivo method of discerning a peripherally-mediated response to thermal stimulation caused by a drug in an unrestrained subject, comprising

(a) administering a drug to said subject for local delivery to a first situs thereof;

(b) exposing said situs to an amount of radiant heat effective to produce situs withdrawal after a latency time period in the absence of said drug;

(c) allowing said subject to spontaneously withdraw said situs from said radiant heat which is immediately discontinued;

(d) measuring the withdrawal latency time period elapsed between steps (b) and (c);

(e) administering a placebo to a second situs of said subject, said second situs being contralateral to said first situs and not being affected by said drug;

(f) repeating steps (b) through (d); and

(g) subtracting said drug withdrawal latency time period from said placebo withdrawal latency time period, whereby if the difference is less than about 1 second the drug is said to act substantially like the placebo, if the difference is about 1 second or greater the drug is said to produce peripherally mediated hyperalgesia, and if the difference is about −1 second or less the drug is said to produce peripherally-mediated hypoalgesia.

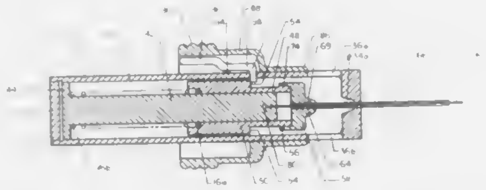
5,025,797
AUTOMATED BIOPSY INSTRUMENT

Gregory W. Baran, 18878 Greenwood Ct., Spring Lake, Mich. 49456

Filed Mar. 29, 1989, Ser. No. 330,230

Int. Cl.^{5} A61B *10/00*

U.S. Cl. 128—754 **11 Claims**



1. A biopsy instrument comprising an elongate hollow casing, a needle extending outwardly from the casing and having a cannula and a stylet received within the cannula, a stationary support mounted within the casing in fixed relation thereto and having means affixing the stylet thereto, a guide having means affixing the cannula thereto and being carried within the casing for reciprocating movement relative to the stationary support between a charged position, wherein the cannula is retracted in a direction away from the distal end of the stylet, and a discharged position, wherein the cannula is displaced from the charged position in the direction of the distal end of the stylet, relative to the charged position, a coil spring engaged between the stationary support and the guide to urge the guide toward the discharged position, a manually operable charging member surrounding the casing and being mounted thereon for reciprocal sliding movement relative thereto, the charging member having means engageable with the guide to move the guide to the charged position against the urging of the spring, and a release lever having means engageable with the guide for retaining the guide in the charged position, the release lever being manually actuable from without the casing to release the guide for movement to the discharged position.

5,025,798
METHODS AND APPARATUS FOR DIRECTLY SENSING AND MEASURING BLOOD RELATED PARAMETERS

Gary M. Schindele, Fairfield, Conn., assignor to Medical Systems Development Corporation, Fairfield, Conn.

Continuation of Ser. No. 264,614, Oct. 31, 1988, abandoned.

This application Jul. 30, 1990, Ser. No. 547,381

Int. Cl.^{5} A61B *5/00*

U.S. Cl. 128—771 **11 Claims**

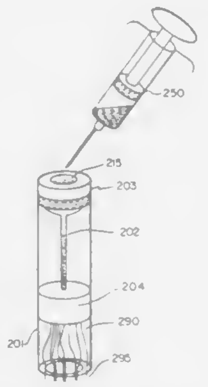
1. A method for directly sensing and measuring blood related parameters in a non-reusable disposable container, the method comprising the steps of:

(a) introducing an unadulterated blood sample into nonreuseable disposable encapsulating means for performing both the sensing and measuring of a preselected blood related parameter;

(b) directing said blood sample to means within said encapsulating means for performing both the sensing and measuring of said preselected blood related parameter, wherein said step of directing is performed utilizing a capillary tube located within said encapsulating means;

(c) sensing and measuring said preselected parameter entirely within said encapsulating means; and

(d) outputting, from said encapsulating means, the measured value of said parameter.



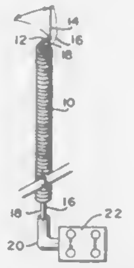
5,025,799
STEERABLE MEMORY ALLOY GUIDE WIRES

Bruce C. Wilson, 34 Twicwood La., Glens Falls, N.Y. 12801

Filed May 13, 1987, Ser. No. 49,152

Int. Cl.^{5} A61B *5/00*

U.S. Cl. 128—772 **17 Claims**



1. A steerable guide wire adapted to be inserted within the body, and including shape memory alloy means for effecting accurate steering or aiming of said within the body, said guide wire comprising at least a pair of solid elongated shape memory wire members held in substantial coaxial engagement with each other but so as to allow relative sliding movement therebetween, and wherein one of said wire members is annealed to undergo a shape change in one direction upon application of heat, and another of said wire members is annealed to undergo a shape change in another direction upon application of heat, said guide wire being rotatable about 360° to thereby enable reversibly omni-directional steering of said guide wire.

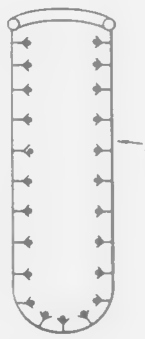
5,025,800
CONTRACEPTIVE DEVICE

Steve T. Zelson, 209 Mulberry La., Larchmont, N.Y. 10538

Filed Jan. 26, 1988, Ser. No. 148,568

Int. Cl.^{5} A61F *6/04, 6/06*

U.S. Cl. 128—844 **28 Claims**



1. A contraceptive device comprising a condom in association with an antibody to a sexually transmitted disease causing agent wherein said antibody is chemically bound to the condom.

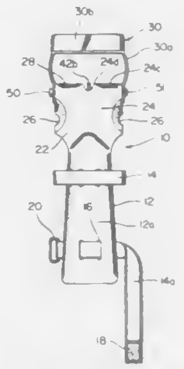
5,025,801
UNIVERSAL INTRAVENOUS ARM SUPPORT

James J. Callaway, 1577 Moran Rd., Franklin, Tenn. 37064

Filed Nov. 7, 1989, Ser. No. 432,494

Int. Cl.^{5} A61F *5/37*

U.S. Cl. 128—877 **9 Claims**



1. An arm support for intravenous therapy, comprising:

forearm support means contoured to conform with the ventral surface of a patient's forearm, for supporting the patient's forearm thereon;

means for securing the forearm of the patient to said forearm support means;

wrist support means adjoining said forearm support means and contoured to conform with the ventral surface of the patient's wrist, for supporting the patient's wrist thereon;

hand support means adjoining said wrist support means and contoured to conform generally to the palm and thumb of the patient, for supporting the palm and thumb of the patient thereon;

handgrip means adjoining said hand support means and contoured for accommodating gripping by the fingers of the patient's hand;

tubing support means pivotally mounted to said handgrip means for pivotal movement relative thereto, for providing a support surface for intravenous tubing adjacent and approximately level with the posterior of the patient's hand, wrist and forearm; and

locking means for locking said tubing support means to said handgrip for preventing movement therebetween.

VOL
1127
ISS
4
JE
25
1991
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5,025,802

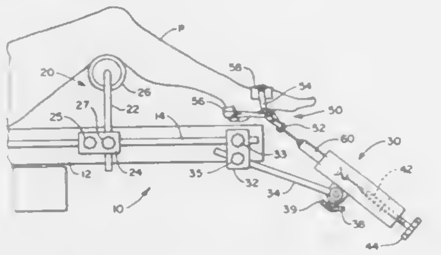
SURGICAL HOLDING APPARATUS FOR DISTRACTING ANKLE

Joseph P. Laico, New City, and Joseph L. Molino, Valley Cottage, both of N.Y., assignors to Lincoln Mills, Inc., New City, N.Y.

Filed Feb. 8, 1990, Ser. No. 477,319

Int. Cl.⁵ A61F *5/37, 5/04;* **A61H** *1/02*

U.S. Cl. 128—882 17 Claims



1. Apparatus for holding the leg and foot of a patient for surgery and the like comprising:

- operating table means comprising a table and a pair of transversely spaced, longitudinal rails extending at opposing sides of said table;
- leg support means clampable to said rails and engageable with the leg of the patient for supporting the leg of the patient above the operating table so that said foot is suspended at a first height; and
- foot assembly means for holding the foot of the patient comprising:
- harness means for attachment to the foot of the patient comprising first and second interconnected engagement means for engagement against the respective top and back portions of the foot;
- traction applicator means for applying a traction force to said harness means;
- mounting means for mounting said traction applicator means to a rail for positioning said traction applicator means generally below said first height; and
- direction selector means for adjustably positioning said traction applicator means for applying a traction force to said harness means at a selected direction,
- so that a patient may be positioned on said table means with the leg engaged by the leg support means for suspending the foot, and the harness means mounted to the foot, wherein a traction force applied by the applicator means exerts a force which is distributed through said first and second engagement means against the top and back portions of the foot to distract the angle joint.

5,025,803

DEVICE FOR BREAKING OFF PILES

Aart van der Toorn, Noordwijk, Netherlands, assignor to Persluchtcentrale B.V., Netherlands

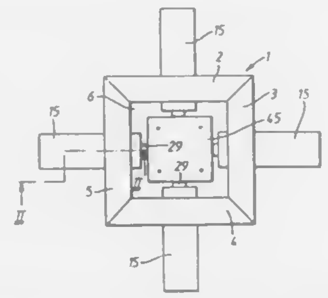
Filed Oct. 30, 1989, Ser. No. 429,113

Claims priority, application Netherlands, Oct. 31, 1988, 8802660

Int. Cl.⁵ B28D *1/32*

U.S. Cl. 125—23.01 8 Claims

1. A device for breaking off piles, said device being provided with a frame and at least one cutter having a square section and bevelled corners, said cutter being movable to and fro in its longitudinal direction by means of a setting cylinder supported by the frame, said cutter being guided in an elongated passage in said frame, a boundary wall of said passage being shaped such that recesses are formed between the boundary wall of the elongated passage and said bevelled portions on the corners of the cutter, said recesses extending in the longitudinal direction of the cutter and extending along the elongated passage.



5,025,804

ENDOSCOPE ANGLING MECHANISM

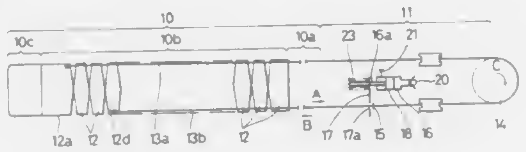
Mituo Kondo, Omiya, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Jul. 10, 1990, Ser. No. 550,640

Claims priority, application Japan, Jul. 12, 1989, 1-177945

Int. Cl.⁵ A61B *1/00*

U.S. Cl. 128—4 8 Claims



1. An endoscope angling mechanism, comprising:

- an angle operating means having a pair of first and second operating wires adapted to be pulled to and fro for bending an angle portion of a joint ring structure at the distal end of an insert section extending contiguously from the fore end of an operating section of an endoscope, said first operating wire having the fore end thereof securely stopped on one of an angle ring in the foremost position in said angle portion, and a rigid tip end portion of said angle portion, said second operating wire having the fore end thereof securely stopped on an angle ring in a position posterior to and spaced from the foremost angle ring by a predetermined number of angle rings; and
- a restraining means for restraining forward movement of said second operating wire in angling operation until operated with a predetermined increased force.

5,025,805

NASAL CANNULA ASSEMBLY

Betty Nutter, 23218 W. Ditner, Rockwood, Mich. 48173

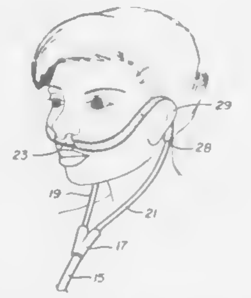
Filed Jul. 11, 1990, Ser. No. 550,894

Int. Cl.⁵ A61M *15/08*

U.S. Cl. 128—207.18 5 Claims

1. A nasal cannula assembly comprising a nasal cannula having a pair of apertured nostril outlet prongs and a pair of oxygen inlets;

- a pair of oxygen feed tubes, each tube having an inlet and an outlet;
- the tube outlets being connected to the cannula inlets respectively, and the feed tube inlets being adapted for connection to a source of pressurized oxygen;
- each of said feed tubes intermediate their ends adapted to be looped over the user's ears, respectively; and
- an elongated hollow cylindrical cuff of a soft resilient material mounted over and around each of said feed tubes and extending between said cannula and intermediate its ends, thereby protectively engaging the patient's nose, face, cheek and ears and preventing irritation thereof;
- said cuff having therein a partially cutaway portion intermediate its ends to cooperatively receive and support said cannula.



5,025,806

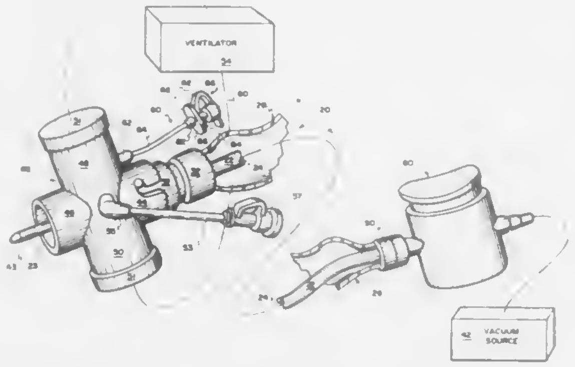
MEDICAL VENTILATING AND A SPIRATING APPARATUS AND METHODS

Darrel Palmer, Sandy, Utah, and Richard Radford, Auburn, Wash., assignors to Ballard Medical Products, Midvale, Utah

Filed Apr. 16, 1990, Ser. No. 509,665

Int. Cl.⁵ A61M *16/00*

U.S. Cl. 128—203.12 12 Claims



1. A method of placing respiratory medication into the lung/airway system of a medical patient comprising the steps of:

- interposing ventilating/aspirating apparatus between the lung/airway system of a patient and a ventilator;
- causing the ventilator and the ventilating apparatus to involuntarily cycle influent ventilating gas to the lungs of the patient and to remove effluent gas from the patient through a tracheal tube;
- selectively introducing an aspirating catheter into the respiratory system to remove secretions from the lungs of the patient without disconnection of the ventilating apparatus;
- selectively introducing at any time a selected quantity of respiratory medication across a selectively actuated one-way valve and along a central passage of a pressurized hand-held container into the ventilating apparatus through a centrally unobstructed passageway of a fitting in which the valve of the container is actuated immediately adjacent the tracheal tube of a patient without disconnection of the ventilating apparatus or interruption of either the aforesaid ventilating or aspirating steps.

5,025,807

NEUROCYBERNETIC PROSTHESIS

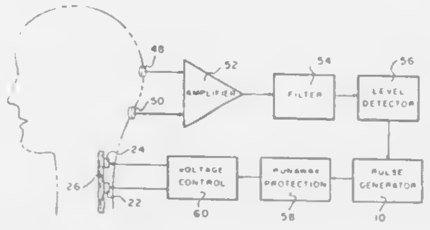
Jacob Zabara, Apartment 19F, 200 Locust St., Philadelphia, Pa. 19106

Division of Ser. No. 113,601, Oct. 26, 1987, Pat. No. 4,867,164, which is a continuation-in-part of Ser. No. 814,846, Dec. 30, 1985, Pat. No. 4,702,254, which is a continuation-in-part of Ser. No. 531,955, Sep. 14, 1983, abandoned. This application Jan. 25, 1989, Ser. No. 301,111

The portion of the term of this patent subsequent to Oct. 27, 2004, has been disclaimed.

Int. Cl.⁵ A61N *1/32*

U.S. Cl. 128—421 17 Claims



1. A method of controlling or preventing epileptic seizures comprising applying a pulsed electrical signal to the vagus nerve in such a way as to avoid any substantial slowing of the heart rate, said signal being applied repeatedly over a period of time to thereby prevent or control such seizures.

5,025,808

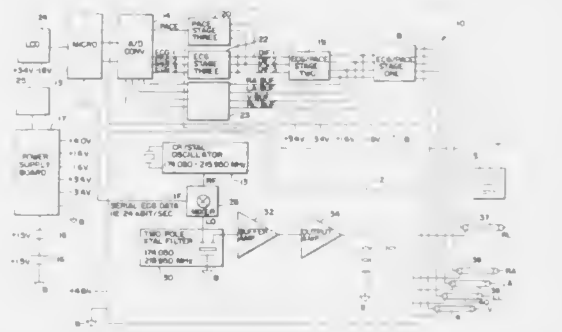
CARDIAC MONITORING METHOD AND APPARATUS

Curtis R. Hafner, Cedarburg, Wis., assignor to Marquette Electronics, Inc., Milwaukee, Wis.

Filed Jan. 31, 1990, Ser. No. 472,826

Int. Cl.⁵ A61B *5/04*

U.S. Cl. 128—696 38 Claims



1. A patient monitoring system for monitoring a patient at a first location and for transmitting patient data to a receiver at a second location remote from the first location, said receiver including a display, said system including a plurality of lead means adapted to be coupled to a patient at the first location for sensing individual ECG voltage signals, signal generating means coupled to said lead means for generating ECG signals functionally related to said ECG voltage signals, control means coupled to said signal generating means for receiving said ECG signals and being operative to sense the existence of a failed lead means and for generating a failed lead means signal, transmitting means coupled to the control means for receiving the ECG signals and the failed lead means signal and for transmitting the ECG signal and the failed lead means signal to the receiver for displaying the same, said patient monitoring system including display means coupled to said control means for receiving signals therefrom, said display means including a plurality of lead failure indicia defining means for generating a visual display to indicate the failure of

VOL
1127
ISS
4
JE
25
1991
UMI

any one or more of said lead means upon the receipt of an actuating signal, said control means being operative to provide an actuating signal to individually actuate said lead failure indicia defining means upon failure of any one of said lead means for displaying individual lead failures at the first location whereby the indication of lead failure may be displayed at both the first and second location.

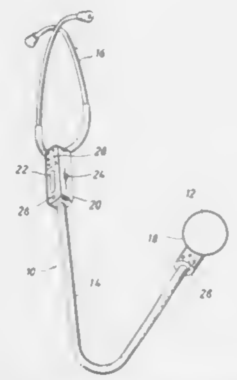
5,025,809
RECORDING, DIGITAL STETHOSCOPE FOR IDENTIFYING PCG SIGNATURES

Keith H. Johnson, and David A. Underwood, both of Houston, Tex., assignors to Cardionics, Inc., Houston, Tex.

Filed Nov. 28, 1989, Ser. No. 442,143

Int. Cl.^{5} A61B *7/02*

U.S. Cl. 128—715 **21 Claims**



1. A method for identifying characteristic phonocardiographic sounds, comprising:
- detecting the phonocardiographic (PCG) sounds of a patient during both the systolic and diastolic phases of the heart beat;
- detecting simultaneously at least a portion of the electrocardiographic (ECG) wave pattern of said patient;
- converting both the detected PCG sounds and ECG wave pattern for the patient to digital electrical signals;
- storing said digital electrical signals representing said PCG sounds and ECG wave pattern of said patient in a memory means;
- inputting the location of the stethoscope where said PCG sounds were recorded;
- transmitting said stored digital signals to a digital computer; and
- analyzing said stored digital PCG signals in said computer to produce a PCG signature for said patient, said PCG signature comprising a plurality of characteristics selected from the heart rate of said patient, said location, the type and timing of each short heart sound in said systolic phase, the pitch, type and timing of each long heart sound in said systolic phase, the type and timing of each short heart sound in said diastolic phase and the pitch, type and timing of each long heart sound in said diastolic phase.

5,025,810
HEATING APPARATUS FOR HYPERTHERMIA

Makoto Kikuchi, Mitaka; Shinsaku Mori, Tokyo; Yoshio Nikawa, Tokyo, and Takashige Terakawa, Tokyo, all of Japan, assignors to Tokyo Keiki Co., Ltd., Tokyo, Japan

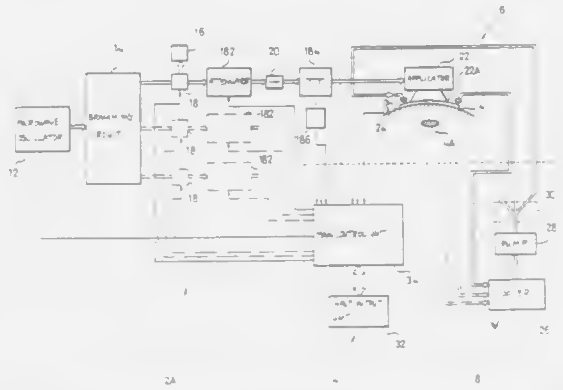
Division of Ser. No. 121,218, Nov. 16, 1987, Pat. No. 4,873,995, which is a division of Ser. No. 757,850, Jul. 22, 1985, Pat. No. 4,744,372. This application Apr. 14, 1989, Ser. No. 337,839

Claims priority, application Japan, Jul. 31, 1985, 60-162462; Jul. 31, 1985, 60-162465; Jul. 31, 1985, 60-162466; Jul. 31, 1985, 60-162467

Int. Cl.^{5} A61N *5/02*

U.S. Cl. 128—804 **10 Claims**

1. A method for treating a region of a patient with microwaves in a treatment branch, said method comprising the steps of:
- (a) periodically switching the microwaves between a dummy load and an attenuator in said branch;
- (b) measuring the temperature of the treatment region when the microwaves are switched into the dummy load;



- (c) reducing the level of attenuation of said attenuator if said temperature is less than a preselected value, and increasing the level of attentuation of said attenuator if said temperature is greater than said preselected value; and
- (d) repeating steps (a) to (c).

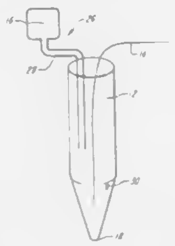
5,025,811
METHOD FOR FOCAL DESTRUCTION OF EYE TISSUE BY ELECTROABLATION

Michael J. Dobrogowski, #235, 2025 W. 42nd Ave., Vancouver, 2B5, and Mark A. Latina, 71 Paddock La., No. Andover, Mass. 01845

Filed Feb. 16, 1990, Ser. No. 480,742

Int. Cl.^{5} A61N *3/04*

U.S. Cl. 128—898 **15 Claims**



1. A non-invasive method for focal non-invasive transcleral destruction of living human eye tissue, comprising the steps of:
- (a) providing a hollow probe having a distal end and a proximal end;
- and, at said distal end a first aperture to receive a conductive electrode and means for filling said probe with a neutral solution;
- and, at said proximal end a second aperture of predetermined diameter;
- (b) connecting said conductive electrode to a constant current supply having a positive terminal and a negative terminal;
- (c) filling said probe with a neutral solution using said filling means;
- (d) adjusting said constant current supply to a current in the range of between about 1.5 milliamps to about 8.0 milliamps;
- (e) repeated placement of said proximal end of said probe onto a scleral surface of a human eye proximate to target eye tissue at a plurality of locations; and
- (f) each of said placement remains for a predetermined duration.

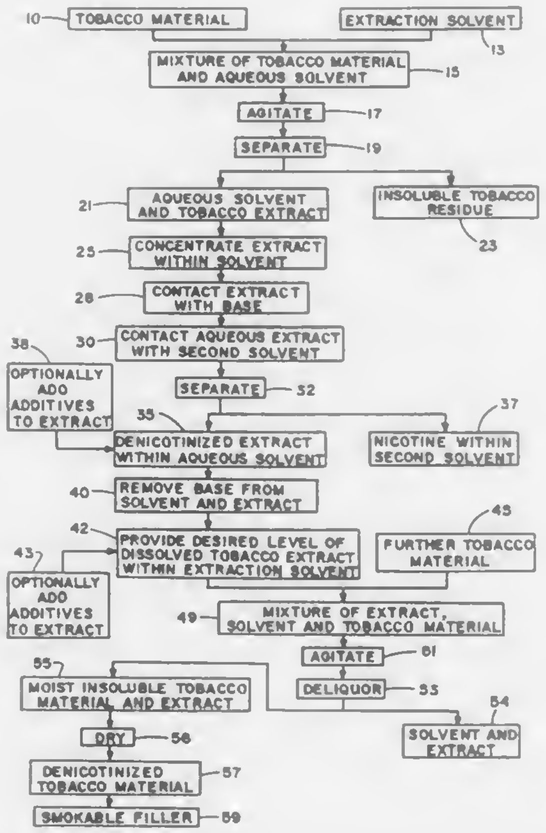
5,025,812
TOBACCO PROCESSING

Barry S. Fagg; Gary M. Dull, both of Winston-Salem; Richard G. Haberkern, King; Robert A. Merricks, and John E. Stewart, both of Winston-Salem, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Aug. 10, 1989, Ser. No. 392,519

Int. Cl.^{5} A24B *15/24, 15/26*

U.S. Cl. 131—297 **39 Claims**


10
TOBACCO MATERIAL
EXTRACTION SOLVENT
13
MIXTURE OF TOBACCO MATERIAL AND AQUEOUS SOLVENT
15
AGITATE
17
SEPARATE
19
21
AQUEOUS SOLVENT AND TOBACCO EXTRACT
INSOLUBLE TOBACCO RESIDUE
23
25
CONCENTRATE EXTRACT WITHIN SOLVENT
28
CONTACT EXTRACT WITH BASE
30
CONTACT AQUEOUS EXTRACT WITH SECOND SOLVENT
38
OPTIONALLY ADD ADDITIVES TO EXTRACT
SEPARATE
32
35
DENICOTINIZED EXTRACT WITHIN AQUEOUS SOLVENT
NICOTINE WITHIN SECOND SOLVENT
37
40
REMOVE BASE FROM SOLVENT AND EXTRACT
42
PROVIDE DESIRED LEVEL OF DISSOLVED TOBACCO EXTRACT WITHIN EXTRACTION SOLVENT
FURTHER TOBACCO MATERIAL
45
43
OPTIONALLY ADD ADDITIVES TO EXTRACT
49
MIXTURE OF EXTRACT, SOLVENT AND TOBACCO MATERIAL
AGITATE
51
DELIQUOR
53
55
MOIST INSOLUBLE TOBACCO MATERIAL AND EXTRACT
54
SOLVENT AND EXTRACT
DRY
56
DENICOTINIZED TOBACCO MATERIAL
57
SMOKABLE FILLER
59

1. A process for removing at least one selected substance from tobacco material to provide a processed tobacco material, the process comprising:
- (a) extracting tobacco material with extraction solvent to provide a tobacco extract within the extraction solvent;
- (b) removing at least one selected substance from the tobacco extract to provide a processed tobacco extract;
- (c) providing the processed tobacco extract within extraction solvent in an amount which ranges from about 10 to about 30 percent, based on the total weight of the extract and solvent;
- (d) contacting the processed tobacco extract within extraction solvent with a further amount of tobacco material under extraction conditions, thereby providing a mixture of solvent, tobacco extract and tobacco material insoluble in the solvent;
- (e) separating the tobacco material insoluble in the solvent from a portion of the solvent and tobacco extract; thereby providing a mixture of solvent, tobacco extract and tobacco material insoluble in the solvent in which a predetermined portion of the solvent and tobacco extract remains in contact with the tobacco material insoluble in the solvent; and
- (f) separating at least a portion of the solvent from the mixture provided in step (e) to provide a processed tobacco material.

5,025,813
METHOD AND APPARATUS FOR MAKING TOBACCO SHREDS

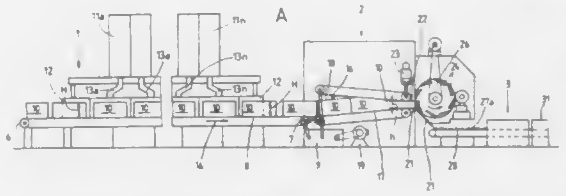
Reinhard Liebe, Hamburg, and Waldemar Wochnowski, Hamburg-Meiendorf, both of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

Division of Ser. No. 9,474, Feb. 2, 1987, Pat. No. 4,799,501. This application Dec. 19, 1988, Ser. No. 286,355

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1986, 3603193

Int. Cl.^{5} A24B *3/18*

U.S. Cl. 131—290 **37 Claims**



1. A method of transforming relatively dry tobacco into shreds, comprising the steps of heating relatively dry tobacco; and directly converting heated relatively dry tobacco into shreds.

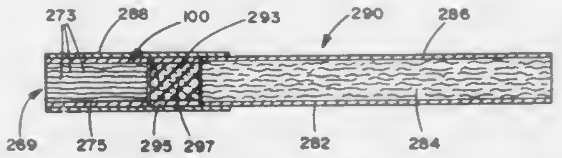
5,025,814
CIGARETTE FILTERS CONTAINING STRANDS OF TOBACCO-CONTAINING MATERIALS

Mark L. Raker, Clemmons, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed May 12, 1987, Ser. No. 49,200

Int. Cl.^{5} A24D *1/04, 3/06*

U.S. Cl. 131—331 **34 Claims**



1. A rod for the preparation of cigarette filter elements, the rod comprising a plurality of strands provided from tobacco-containing, nonwoven sheet-like material, wherein (i) the strands extend generally along the longitude of the rod, each have a width greater than the thickness thereof, and are contained in a circumscribing wrap; and (ii) the sheet-like material includes a sizing agent having a hydrophobic character.

5,025,815
POLYOLEFIN FILTER TOW AND METHOD OF MAKING IT

Michael Hill, Ascot, England, and Walter A. Nichols, Richmond, Va., assignors to Filter Materials Limited, New York, N.Y.

Filed Aug. 10, 1988, Ser. No. 231,147

Int. Cl.^{5} A24D *3/06*

U.S. Cl. 131—332 **24 Claims**

13. A polyolefin filter tow, comprising between about 70% and about 99% of at least one polypropylene homopolymer and between about 1% and about 30% of at least one low

VOL
1127
ISS
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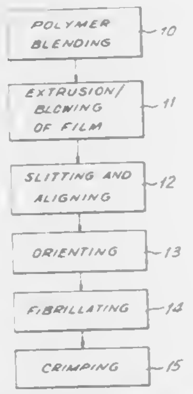
JE
25
1991
UMI

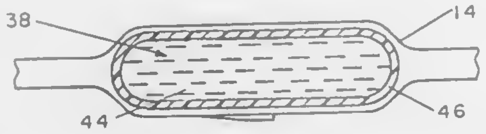
density polyethylene homopolymer, and having a yield of at least about 60%, said yield being defined as a dimensionless



ratio of filter pressure drop expressed in millimeters of water to filter weight expressed in milligrams.

5,025,816
HAIR ROLLER

Lois F. Jones, 222 Arnett Rd., Madison, Ala. 35758
Filed Dec. 27, 1989, Ser. No. 457,844
Int. Cl.^{5} A45D *2/20*
U.S. Cl. 132—247 **6 Claims**



1. A hair roller disposed for being wound in the hair adjacent the scalp of an individual comprising:

an elongated body having spaced first and second end portions, each end portions having a distal end, said elongated body provided with a non-rigid intermediate portion having a pocket therein and spaced substantially parallel continuous side edges;

a soft padding means insertable in said pocket of said intermediate portion, said padding means being a capsule having a liquid carried therein, said padding means forming a roller like element for receiving said hair of said individual in wrapped around relation, and,

fastening means disposed on said distal ends for secured relation therebetween for retention of said hair in said wrapped around relation around said intermediate portion, said fastening means including first and second fastening members, said first fastening member disposed at said distal end of said first end portion, said second fastening member disposed at said distal end of said second end portion.

5,025,817
STRUCTURE OF SPHERICAL VANITY CASE

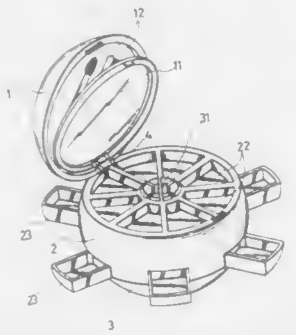
Steven Wen, 3 Fl., No. 73-5, Chi Nan Rd., Sec. 2, Taipei, Taiwan R.O.C.
Filed Jul. 10, 1990, Ser. No. 550,576
Int. Cl.^{5} A45D *33/22*
U.S. Cl. 132—296 **3 Claims**

1. A spherical vanity case, comprising:

an intermediate unit having a center hole through its central axis, a plurality of compartments on its top surface for holding dusting powder and rouge cake, and a plurality of powder make-up cases at the bottom and radially arranged around a circle, said powder make-up cases having each a bottom projection;

an upper cover pivotably covered on said intermediate unit, having a mirror pivoted thereto to define therewith a receiving space for keeping eyebrow brush, eyelash pencil and other small toiletries; and

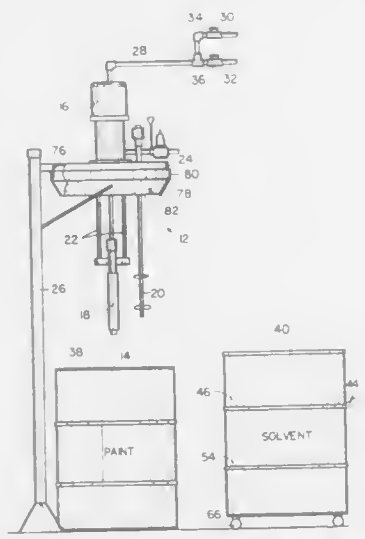
a bottom unit having a hollow shaft upstanding therefrom at the center and inserted in said center hole of said intermediate unit, and a plurality of grooves spirally radially made on the top surface thereof, said hollow shaft having a top flange retained at the topmost edge of said center hole, said top flange having a plurality of notches vertically made thereon;



wherein the bottom projections of said powder make-up cases are respectively movably fastened in said grooves on said bottom unit permitting said powder make-up cases to be moved inside or out of said intermediate unit during relative rotation of said intermediate unit against said bottom unit.

5,025,818
PAINT PUMP CLEANING SYSTEM

David L. Kalar, Geneseo Rd., Paso Robles, Calif. 93446
Filed Sep. 6, 1989, Ser. No. 403,567
Int. Cl.^{5} B08B *3/02*
U.S. Cl. 134—170 **5 Claims**



1. Apparatus for removing residual paint from both the interior portions and the exterior portions of a paint spraying outfit of the type having a cover that fits onto the top of a drum of paint, having portions that extend below the cover into the drum of paint, having a pump, and having an output line connected to the pump, said apparatus comprising in combination:

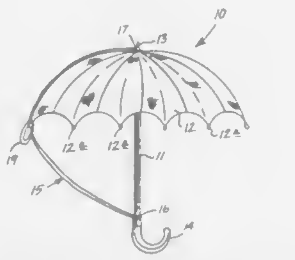
a solvent drum having a swedge extending circumferentially around it;

a spray manifold including a band coextensive with said swedge and sealed to the inside of said solvent drum on both sides of said swedge to define a duct between said band and said swedge, further including nozzles mounted on said band and communicating with said duct, and further including fitting means connected to said swedge and communicating with said duct; and,

means for connecting the output line of the paint spraying outfit to said fitting means of said spray manifold, whereby after the solvent drum has been partially filled with a solvent and the pump has been activated, solvent will be drawn into the pump and pumped through the output line, through said means for connecting, through said spray manifold, and sprayed by said nozzles onto the portions of the paint spraying outfit that extend below the cover, thereby removing residual paint from both the interior portions and the exterior portions of the paint spraying outfit.

5,025,819
UMBRELLA SLING APPARATUS

Adrienne H. Taylor, R.R.-5 Box 360, Montpelier, Vt. 05602
Filed Jul. 30, 1990, Ser. No. 560,351
Int. Cl.^{5} A45B *3/00*
U.S. Cl. 135—16 **1 Claim**



1. An umbrella sling apparatus comprising, in combination,

an umbrella, the umbrella includes an umbrella canopy, the umbrella canopy defined by a semi-spherical array of spine members; wherein the spine members project beyond the the umbrella canopy to define a spine tip, and

a support rod coaxially and medially mounted to the umbrella canopy at an upper terminal end of the support rod, including a support rod tip coaxially mounted to the support rod projecting coaxially beyond the umbrella canopy, and

a lower terminal end of the support rod including a handle mounted integrally thereto, and

a sling member, wherein the sling member includes a lower terminal end portion mounted to the support rod adjacent the handle, and

the sling member including an upper terminal end, wherein the upper terminal end includes a loop for securement about the support rod tip,

the sling member defined as an elongate flexible member, with an adjusting sleeve mounted medially of the sling member, with the adjusting sleeve including a through-extending bore receiving a medial portion of the sling member to define a loop, wherein the loop defines an adjustable length to effect adjustment of the sling member, and

wherein the lower terminal end of the sling member includes a housing, the housing including a support drum, the support drum including a spring-biased axle mounted to the housing to bias the drum to a retracted position, with the sling mounted about the drum to normally retract the sling within the housing when the upper terminal end portion is removed from the support rod tip, and

further including an elongate support strap web, the support strap web including an upper loop and a lower loop, the upper loop mounted to a spine tip, and the lower loop mounted about the support rod tip, and

wherein the support strap web includes an elongate web cavity contained interiorly of the support strap web, and an elongate zipper formed coextensively of the support strap web to permit access to the elongate web cavity, and

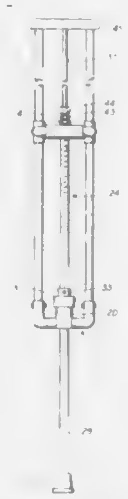
including a polymeric water-repellent jacket selectively securable within the elongate web cavity, the jacket including an elongate torso and sleeves for securement about an individual, and

wherein the elongate web cavity includes a series of equally spaced web securement loops mounted within the elongate web cavity, the web securement loops defined by split annular loop members to permit reception of the jacket in a furled configuration, and

wherein each of the securement loops include hook and loop fastener end surfaces at confronting ends of each of the securement loops for selective securement of each of the securement loops together to secure the jacket within the cavity.

5,025,820
SELF-ADJUSTING COLLAPSIBLE CRUTCH

William B. Gamper, 3064 Ramsgate Rd., Rancho Cordova, Calif. 95628
Filed Oct. 15, 1990, Ser. No. 597,838
Int. Cl.^{5} A61H *3/02*
U.S. Cl. 135—69 **14 Claims**



1. In an adjustable crutch having an arm piece, and a base boot, with a pair of spaced fixed lateral posts disposed on one end in the arm piece and on the other end in the base boot, the improvement comprising in combination:

(a) a base boot having a central arm having a vertical throughbore, in which throughbore is disposed,

(b) an annular cylindrical coupler, said coupler having a central opening therethrough and being of a diameter large enough for a central portion to pass therethrough, said coupler having an outside threaded area;

(c) a longitudinally adjustable central portion comprising a fixed central post disposed at one end in said arm piece and being nestable within a moveable central post, and the moveable central post being disposed through said coupler's central opening;

(d) a coupling collar having a central opening therein, said collar encircling said central portion and freely moveable therealong, said coupler having internal threads for threaded engagement with the outside threads of said cylindrical coupler;

(e) a height adjustment fastener selectively securable to said moveable central post, said adjustment fastener having movement limiting means thereon which means cooperates with said collar for preventing movement of said collar past said fastener and causing said collar to rest on said means;

(f) locking means on said moveable central post for releas-

VOL
1127
ISS
4
JE
25
1991
UMI

ably securing said moveable central post relative to said fixed central post;

whereby when said crutch is in a first closed position with the moveable central post secured by said locking means proximate the arm piece, and said fastener is selectively secured at a desired location on said moveable post, the coupling collar rests on said fastener, and when it is desired to use said crutch, the locking means is released causing the moveable central post to pass through said coupler until the fastener impacts said coupler such that the collar can be threadedly engaged to said coupler; and said locking means is relocked at a point distant from said arm piece.

5,025,821

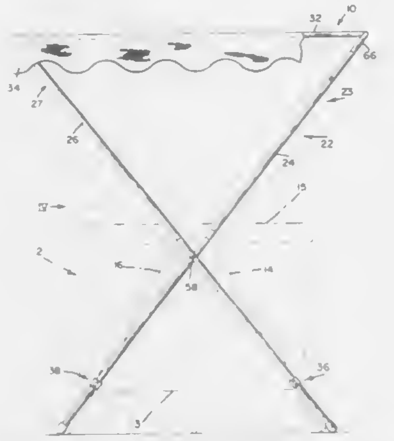
CANOPY FOR PLAYPEN

Dorothy R. Page, 435 Boston Rd., Sutton, Mass. 01527, and Gerald G. Berg, 162 Ash St., Spencer, Mass. 01562

Filed Dec. 8, 1989, Ser. No. 447,896

Int. Cl.^{5} E04H ***15/48***

U.S. Cl. 135—112 **16 Claims**



1. A playpen canopy for a playpen having a bottom and a top peripheral edge and a framework which includes first and second elongated supporting members which extend from said bottom to said top peripheral edge in a first vertical plane at one side of the playpen and a third and fourth elongated supporting members which extend from said bottom to first top peripheral edge in a second vertical plane at a side of said playpen opposite said one side, said playpen canopy comprising:

(a) a framework comprising first and second elongated rods which extend upwards and cross at an angle proximate said first vertical plane and which are adjacent said first and second elongated supporting members, respectively, third and fourth elongated rods which extend upwards and cross at an angle proximate said second vertical plane and which are adjacent to said third and fourth elongated supporting members, respectively, and a plurality of horizontal rods which are operatively connected to said first, second, third and fourth elongated rods to provide a playpen canopy roof framework,

(b) a sheet of flexible material attachable to said horizontal rods for forming a roof for said playpen canopy, and

(c) a plurality of connecting elements attached intermediate the ends of the respective elongated rods for releasably connecting said first, second, third and fourth elongated rods of said framework to the first, second, third and fourth elongated supporting members for removably connecting the playpen canopy framework to the outside of the playpen to provide a free-standing, removable playpen canopy.

5,025,822

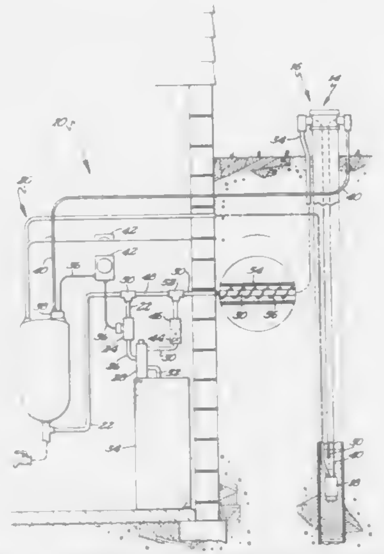
WATER DISINFECTING SYSTEM

Steven J. Guggisberg, Box 171, Glenwood, Minn. 56334

Filed Apr. 10, 1990, Ser. No. 506,794

Int. Cl.^{5} C02F ***1/68***

U.S. Cl. 137—1 **20 Claims**



15. Method for delivering disinfectant in a liquid form to a well of a water system, with the water system including a pressurized side, comprising the steps of:

(a) providing a source of liquid disinfectant;

(b) drawing water from the well and delivering the water to the pressurized side of the water system;

(c) providing a flow of water from the pressurized side of the water system to the well while water is being drawn and delivered to the pressurized side of the water system; and

(d) passing the flow of water intermediate the pressurized side and the well through a venturi, with the venturi withdrawing liquid disinfectant from the source of liquid disinfectant and mixing the liquid disinfectant with the flow of water before passage to the well.

5,025,823

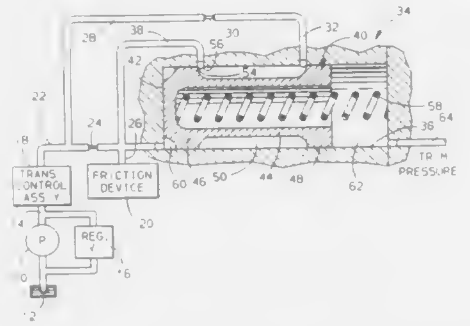
ACCUMULATOR AND VALVE STRUCTURE

Paul D. Stevenson, Ann Arbor, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 21, 1990, Ser. No. 586,164

Int. Cl.^{5} G05D ***16/10***

U.S. Cl. 137—110 **4 Claims**



1. A fluid flow control apparatus comprising: an inlet passage means for receiving fluid flow from a fluid source; an outlet passage means for delivering fluid to a device to be controlled; flow restriction means disposed between said inlet and outlet passage means for providing a controlled flow therebetween; and accumulator and valve means in fluid communication with said outlet passage means downstream of said flow restriction means and with said inlet passage means upstream of said flow restriction means including valve controlled passage means connected with said inlet passage means for directing fluid flow from said inlet passage means to said outlet passage means, control valve means movable between open and closed positions for connecting said valve controlled passage means with said outlet passage means in the open position and for disconnecting the valve controlled passage means from said outlet passage means in said closed position, pressure responsive area means responsive to fluid pressure in said outlet passage means to move said control valve means from the open position to the closed position when the pressure is above a predetermined value and accumulator means comprised of a portion of said control valve means, the pressure responsive area means and an expansible chamber cooperating with said restriction means for controlling the pressure increase time in said outlet passage means when the pressure is above said predetermined value.

5,025,824

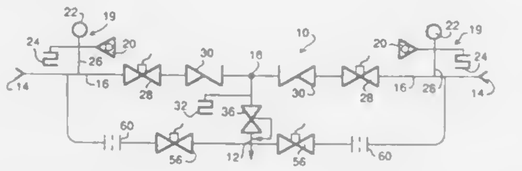
AUTOMATIC CHANGEOVER MANIFOLD

Radovan R. Maric, Willowdale, Canada, assignor to Union Carbide Canada Limited, Mississauga, Canada

Filed Sep. 27, 1990, Ser. No. 588,936

Int. Cl.^{5} F16K ***11/24***

U.S. Cl. 137—113 **15 Claims**



1. An apparatus for providing a continuous supply of fluid, which comprises:

first fluid supply conduit means for connecting a first source of said fluid to fluid delivery conduit means,

first pressure sensing means operatively connected to said first fluid supply conduit means for sensing fluid flow pressure in said first fluid supply conduit means,

first solenoid-operated on-off fluid flow control valve means operatively connected to said first fluid supply conduit means downstream of said first pressure sensing means for controlling fluid flow in said first fluid supply conduit means,

second fluid supply conduit means for connecting a second source of said fluid to said fluid delivery conduit means,

second pressure sensing means operatively connected to said second fluid conduit means for sensing fluid flow pressure in said second fluid supply conduit means,

second solenoid-operated on-off fluid flow control valve means operatively connected to said second fluid supply conduit means downstream of said second pressure sensing means for controlling fluid flow in said second fluid supply conduit means, and

electrical circuit means including:

first pressure switch means switchable between a first electrical flow path and a second electrical flow path parallel to said first electrical flow path in response to a predetermined pressure condition sensed by said first pressure sensing means,

first solenoid control relay means connected to said first solenoid-operated flow control valve means and in series with said first electrical flow path to be activated to change said first control valve means from a closed-condition to an open-condition when said first pressure switch means switches between said first and second electrical flow paths to cause an electric current to flow in said first flow path and to be deactivated to change said first control valve means from an open-condition to a closed-condition when said first pressure switch means switches between said first and second electrical flow paths to cause an electrical current to cease to flow in said first flow path,

second pressure switch means switchable between a third electrical flow path and a fourth electrical flow path parallel to said first, second and third electrical flow paths in response to a predetermined pressure condition sensed by said second pressure sensing means,

second solenoid control relay means connected to said second solenoid-operated flow control valve means and in series with said third electrical flow path to be activated to change said second control valve means from a closed-condition to an open-condition when said second pressure switch means switches between said third and fourth electrical flow paths to cause an electric current to flow in said third flow path and to be deactivated to change said second control valve means from an open-condition to a closed-condition when said second pressure switch means switches between said third and fourth electrical flow path to cause an electrical current to cease to flow in said these flow paths, and

anti-coincidence relay contact means activated by said first and second control relay means when current flows to said respective first and second control relay means and joined in series respectively with said first and second solenoid control relay means.

5,025,825

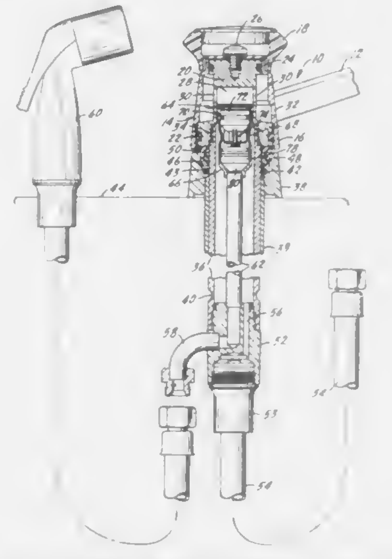
RISER SPOUT DIVERTER ASSEMBLY

David E. Gayton, Bay Village, Ohio, assignor to Moen Incorporated, Elyria, Ohio

Filed Jun. 15, 1990, Ser. No. 538,750

Int. Cl.^{5} E03C ***1/02***

U.S. Cl. 137—119 **5 Claims**



1. A rising type water faucet assembly including a support base adapted to be mounted on a sink deck, a spout housing and spout mounted on said support base, an elongated sleeve extending in said support base and attached to said spout housing, said sleeve including means cooperating with said support base for releasably positioning said sleeve and spout housing at a raised height above said support base,

a water inlet connected to a lower end of said sleeve,

an auxiliary water outlet connected to a lower end of said sleeve, a tube in said sleeve extending generally the length thereof, a diverter assembly positioned at the upper end of said sleeve and at the upper end of said tube, said sleeve

VOL
1127
ISS
4
JE
25
1991
UMI

and tube providing water passages between said diverter assembly and said inlet and auxiliary water outlet, said diverter assembly being movable with said sleeve and spout housing,

the lowermost position of said diverter assembly, when said spout housing is positioned directly on said support base, being above said sink deck.

5,025,826

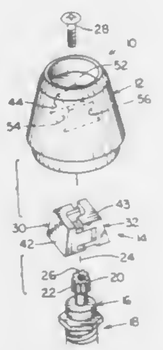
FAUCET HANDLE UNIVERSAL COUPLING

Adolf Schoepe, 1800 Via Burton, Anaheim, Calif. 92806, and Oscar Dufau, 2400 Wildwood Ct., Fullerton, Calif. 92635

Filed Sep. 4, 1990, Ser. No. 578,893

Int. Cl.^{5} F16K *31/60, 43/00*

U.S. Cl. 137—315 **13 Claims**



1. A faucet handle assembly for attachment to a faucet valve stem that has an upper end with a threaded hole and a peripheral surface which must be turned about an axis to operate the faucet valve, comprising:

a plurality of jaws having inner surfaces for engaging said valve stem peripheral surface, said jaws being movable together and apart from one another;

a screw having a head and a threaded shank;

a faucet handle for lying over said valve stem, said handle having a hole for passing the shank portion of said screw that threads into the stem hole while allowing the head of said screw to press down the handle;

said handle having pressing surfaces for receiving said jaws to press against jaw surfaces that lie outside of said jaw inner surfaces so as to press said jaws together to move said jaw inner surfaces against said stem periphery when said screw is tightened downwardly against said handle, to thereby couple said handle to said valve stem.

5,025,827

STRUCTURE OF FLUID LEVEL CONTROLLER OF PIPING TYPE

Evans Weng, No. 1, 4 Nong, 63 Lane, Fu Shing Rd., Taipei, Taiwan

Filed Apr. 12, 1990, Ser. No. 508,755

Int. Cl.^{5} F16K *31/08, 33/00;* **H01H** *35/18, 36/02*

U.S. Cl. 137—392 **10 Claims**

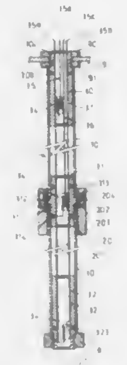
1. A pipe joint type fluid level controller for a tank, comprising:

a plurality of joint pipes connected in series to form a pipe assembly;

a plurality of reed elements disposed within a plurality of sleeve members and sealably arranged within said joint pipes and in direct abutting relationship with one another, each reed element having a single reed switch contained therein, a conductor connected to a common terminal of said reed switch and a conductor connected to an active terminal of said reed switch;

a single magnetic floating member sleeved on said pipe assembly and slidable from one end to the other end thereof;

a main control circuit connected to said reed elements and comprised of at least one latching relay and at least one fluid controller, said main control circuit comprising a plurality of conductors, latching relays in quantity one less than the quantity of said reed elements, and fluid controllers in quantity equal to said latching relays, said latching relays each comprising two coils, said coils respectively having a first terminal connected in series with said common terminal of said reed switches for further connection to a power supply and a second terminal connected with at least one active terminal of said reed switches, and each said latching relay is respectively connected to one fluid controller;



wherein said main control circuit performs fluid level control operation by alternatively turning its respective fluid controller on and off in response to said magnetic floating member following a fluid level by moving up and down along said pipe assembly and alternatively turning said reed switches on and off and wherein the number of said joint pipes and said reed elements are changed to control a different number of level steps with an equal number of controlling reed elements to accommodate different size tanks.

5,025,828

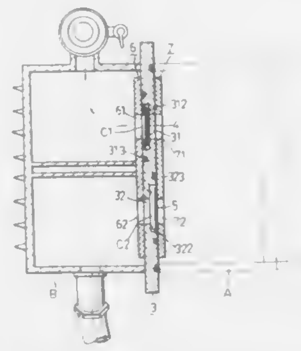
VALVE ASSEMBLY FOR A PISTON COMPRESSOR

Pi-Chu Lin, No. 157-8, Hu-Tzu Nei, Hu-Nei Li, Chia-Yi City, Taiwan

Filed Jul. 9, 1990, Ser. No. 550,153

Int. Cl.^{5} F04B *21/02*

U.S. Cl. 137—512 **2 Claims**



1. A valve assembly interposed between a cylinder body and a cylinder cover of a piston compressor in which a piston assembly is provided slidably in said cylinder body, said valve assembly having an inlet passage, an outlet passage, an inlet valve to open and close said inlet passage, and an outlet valve to open and close said outlet passage, said inlet passage having an increased-diameter inlet chamber formed in an intermediate portion thereof, said outlet passage having an increasing-diameter outlet chamber formed in an intermediate portion thereof, said inlet chamber including an outer end wall, an inner end wall positioned between said outer end wall of said inlet chamber and said piston assembly, and several inlet projections extending from said inner end wall of said inlet chamber, said outlet chamber including an outer end wall of said outlet chamber and said piston assembly, and several outlet projections extending from said outer end wall of said outlet chamber, said inlet valve being disposed slidably within said inlet chamber and having a diameter greater than that of said inlet passage, so as to rest on said outer end wall of said inlet chamber in a compression stroke, thereby closing said inlet passage, said outlet valve being disposed slidably within said outlet chamber and having a diameter greater than that of said outlet passage, so as to rest on said inner end wall of said outlet chamber in a suction stroke, thereby closing said outlet passage; whereby, said inlet valve rests on said inlet projections during the suction stroke so that gas can flow into said cylinder body through said inlet passage in the suction stroke; and whereby said outlet valve rests on said outlet projections in the compression stroke so that gas can flow from said cylinder body through said outlet passage;

a generally disc-shaped valve seat member including an outer end surface connected securely to said cylinder cover, an inner end surface connected securely to said cylinder body, an axially extending inlet hole formed through said valve seat member and having an increased-diameter end portion formed in said outer end surface of said valve seat member so as to form said inlet chamber, an annular inlet-surrounding groove formed in said outer end surface of said valve seat member around said inlet chamber, an axially extending outlet hole formed through said valve seat member and having an increased-diameter end portion formed in said inner end surface of said valve seat member so as to form said outlet chamber, and an annular outlet-surrounding groove formed in said inner end surface of said valve seat member around said outlet chamber;

an outer retaining plate, secured to said outer end surface of said valve seat member so as to retain said inlet valve within said inlet chamber, having an inlet hole formed through said outer retaining plate to communicate with said inlet hole of said valve seat member, and an outlet hole formed through said outer retaining plate to communicate with said outlet hole of said valve seat member;

an inner retaining plate, secured to said inner end surface of said valve seat member so as to retain said outlet valve within said outlet chamber, having an inlet hole formed through said inner retaining plate to communicate with said inlet hole of said valve seat member, and an outlet hole formed through said inner retaining plate to communicate with said outlet hole of said valve seat member, said inlet holes of said valve seat member, said outer retaining plate and said inner retaining plate constituting together said inlet passage, said outlet holes of said valve seat member, said outer retaining plate and said inner retaining plate constituting together said outlet passage;

a first O-ring receive within said inlet-surrounding groove of said valve seat member so as to establish an airtight seal between said valve seat member and said outer retaining plate around said inlet chamber; and

a second O-ring received within said outlet-surrounding groove of said valve seat member so as to establish an airtight seal between said valve seat member and said inner retaining plate around said outlet chamber.

5,025,829

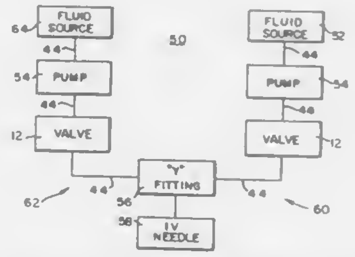
PARENTERAL CHECK VALVE

Floyd V. Edwards, Eggertsville, and Scott H. DeWitt, Lockport, both of N.Y., assignors to Harmac Medical Products, Inc., Buffalo, N.Y.

Filed Jan. 29, 1990, Ser. No. 471,876

Int. Cl.^{5} F16K *15/14*

U.S. Cl. 137—512 **17 Claims**



1. A check valve for use with apparatus to administer solutions, comprising:

a valve disk, wherein said valve disk comprises:

  a flat, circular piece of flexible material with a Shore A durometer hardness in the range of about 35–100 having at least three arcuately-shaped windows formed in said piece, each adjacent window being separated by a web of predetermined width;

  a sealing annulus at the outer periphery of said piece, said sealing annulus being defined by the formation of said windows; and

  a central closure for closing a valve seat of the check valve, said closure being defined by the formation of said windows concentrically inward from said windows and attached to said sealing annulus by said webs;

a first housing portion with an inlet adapted to receive a supply conduit, said first housing portion comprising first retaining means for retaining said valve disk;

a second housing portion with an outlet adapted to receive a discharge conduit, said second housing portion comprising second retaining means for retaining said valve disk, wherein said first and second retaining means each comprise an annular ridge in opposed surfaces of said first and second housing portions;

wherein said first and second retaining means together with said valve disk sealing said check valve when said first and second housing portions are coupled together; and

preloading means for preloading said valve disk, wherein said valve disk is adapted to open and close said inlet and wherein said preloading means comprises the valve seat being formed in said first housing portion to protrude therefrom a preselected distance from said surface of said first housing portion.

5,025,830

VALVE UNLOADER FINGER ASSEMBLY, A METHOD OF FORMING THE SAME, A KIT, AND A PLATE THEREFOR

James V. Kursar, Painted Post, N.Y., assignor to Dresser-Rand Company, Corning, N.Y.

Filed Aug. 16, 1990, Ser. No. 568,436

Int. Cl.^{5} F16K *15/18*

U.S. Cl. 137—522 **16 Claims**

1. A valve unloader finger assembly, comprising:

a body; and

a plurality of plates set upon said body; wherein each of said plates has a plurality of fingers projecting, angularly, therefrom;

one of said plates is superimposed upon another thereof; and

VOL
1127
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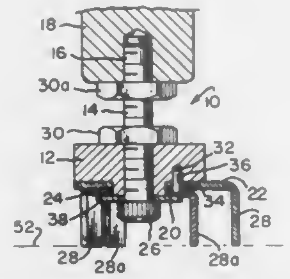
means holding said plates fast to said body; and further including



means engaged with said plates and said body for restraining said plates from rotation relative to said body.

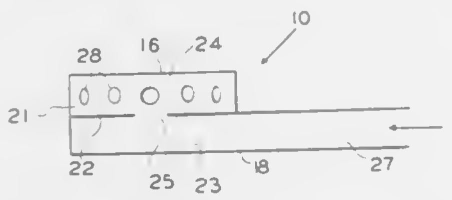
5,025,831
COMPACT RADIAL FLOW DISTRIBUTOR

Yiu Wah Wong, Succasunna; Jeffrey W. Frederick, Morris Plains, and Rutton D. Patel, Berkeley Heights, all of N.J., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Aug. 24, 1990, Ser. No. 571,691

Int. Cl.⁵ B05B *1/14*

U.S. Cl. 137—561 A 6 Claims



1. A radial flow distributor comprising:

a cylindrical body portion having vertical side walls, a top wall and a bottom wall;

a horizontal baffle disposed in the cylindrical body portion dividing the body portion into a first compartment and a second compartment, the horizontal baffle having a central opening therein providing fluid communication between the first compartment and the second compartment;

conduit means operably connected radially to the first compartment for introducing fluid therein; and,

a plurality of spaced-apart apertures in the side wall of the second compartment whereby, under conditions of use, fluid introduced into the first compartment is redirected by the horizontal baffle to flow into the second compartment and then through the apertures in the walls therein for radial distribution.

5,025,832
MULTIPLE ORIFICE ROTATABLE DISC IN-LINE RESTRICTOR VALVE

Julian S. Taylor, 8300 SW. 8th, Oklahoma City, Okla. 73128

Filed Sep. 14, 1990, Ser. No. 582,731

Int. Cl.⁵ F16K *3/08*

U.S. Cl. 137—625.31 12 Claims

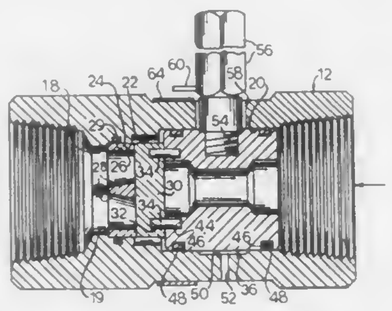
1. An in-line fluid flow restrictor valve, comprising:

an elongated valve body having a longitudinal flow passageway and having first and second counterbores in its upstream end portion;

pair of multiple orifice discs axially disposed in juxtaposed face-to-face contiguous contacting relation within the first counterbore;

a barrel axially disposed within the second counterbore, said barrel having a pair of axial diametrically offset mutually intersecting longitudinal bores for forming the upstream end portion of the flow passageway;

pin means for securing said barrel to the upstream disc; and,



means for angularly rotating the barrel relative to the body and mating and mismating the orifices in said discs.

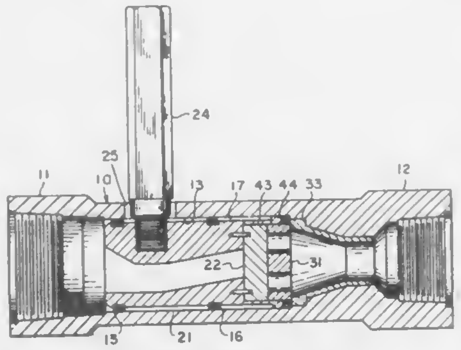
5,025,833
DISK VALVE

Fred W. Hendrick, Cerritos, Calif., assignor to Automatic Control Components, Inc., Denver, Colo.

Filed Oct. 31, 1988, Ser. No. 264,855

Int. Cl.⁵ F16K *3/00*

U.S. Cl. 137—625.31 10 Claims



1. A valve including the combination of:

a one-piece body having an internal cavity with an inlet and outlet for fluid;

a rotator spool seated for rotational movement in the cavity of said valve body at a spaced location upstream of the fluid outlet, said inlet being sized to allow introduction of said rotator spool through the inlet to the cavity in the valve body wherein the rotator spool is seated, said rotator spool having a fluid passageway;

an upstream disk locked to rotate with said rotator spool in the cavity of said valve body downstream of said rotator spool, said upstream disk having a fluid passageway for conducting fluid from the fluid passageway of said rotator spool;

a downstream disk arranged in a face to face and confronting relation with said upstream disk in the cavity of said valve body, said downstream disk having a fluid passageway for conducting fluid from the fluid passageway in said upstream disk;

means for interlocking said downstream disk member with said valve body; and

means for rotating said rotator spool while said rotator spool is seated in the cavity of the valve body to bring the passageway in the upstream disk and the passageway in the downstream disk into and out of fluid conducting relationship.

5,025,834
MOUNTING PLATE STORING CONDUCTOR FUNCTION

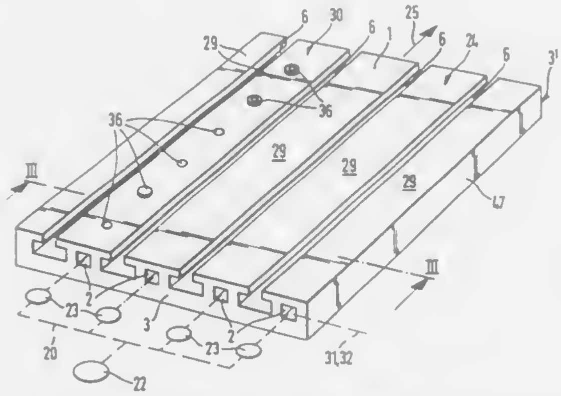
Kurt Stoll, Esslingen, Fed. Rep. of Germany, assignor to Festo KG, Esslingen, Fed. Rep. of Germany

Filed Jul. 17, 1989, Ser. No. 380,971

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1988, 3827749

Int. Cl.⁵ F16K *11/00*

U.S. Cl. 137—560 25 Claims



1. A mounting plate means with conduit structure comprising:

a mounting plate including means defining in an outer peripheral surface thereof a plurality of adjacent, laterally spaced, groove-like attachment recesses which extend linearly and parallel to each other, said mounting plate having a pair of generally opposite end surfaces which are contiguous with opposite ends of said outer peripheral surface, each said attachment recess extending continuously between and opening into both of said end surfaces, said outer peripheral surface of said mounting plate being divided by said attachment recesses into a plurality of surface sections respectively defined laterally between mutually adjacent pairs of said attachment recesses;

fastening means received within at least one said attachment recesses for detachably mounting objects on said outer peripheral surface of said mounting plate;

at least one object mounted on said outer peripheral surface of said mounting plate by said fastening means;

means defining in said mounting plate a plurality of separate internal supply conduits for receiving therein a physical medium and conducting the physical medium through said mounting plate, said supply conduits extending linearly and being parallel to and adjacent said attachment recesses, said supply conduits extending continuously between and opening into said opposite end surfaces of said mounting plate;

energizing means connected to at least one of said supply conduits on at least one of said end surfaces of said mounting plate for energizing the physical medium in said supply conduit; and

means defining in said mounting plate a connection passage for connecting said at least one supply conduit to said at least one object mounted on said outer peripheral surface, said connection passage extending transversely to said supply conduits and opening at one end thereof into said at least one supply conduit and at another end thereof into said outer peripheral surface, said at least one object being connected to said at least one supply conduit by said connection passage.

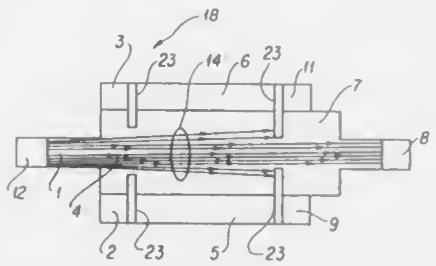
5,025,835
LAMINAR FLOW ACOUSTIC SENSOR-AMPLIFIER

George Mon, Potomac, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 13, 1990, Ser. No. 541,863

Int. Cl.⁵ F15C *1/06*

U.S. Cl. 137—833 10 Claims



1. A fluidic amplification device comprising:

input means having a fluid supply means;

a fluid supply nozzle for creating a laminar jet of said fluid;

control nozzle means to control fluid flow through said amplification device wherein said control nozzle means acts directly on said fluid to proportionally control said fluid output;

a pair of fluid output ports separated by a flow splitter means to proportionally divide the fluid flow flowing from said fluid supply nozzle to said pair of fluid output ports;

vent means disposed between said control nozzle means and said flow splitter means;

DC flow output means located within each of said fluid output ports;

a pressure signal output port within each of said fluid output ports.

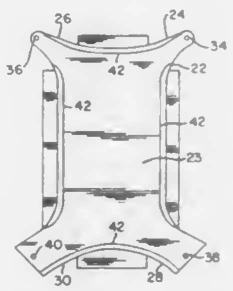
5,025,836
PIPE FITTING COVER FOR COVERING PIPE FITTING

Chris J. Botsolas, St. Petersburg, Fla., assignor to Carol Botsolas, St. Petersburg, Fla.

Continuation of Ser. No. 347,984, May 5, 1989, abandoned, which is a continuation of Ser. No. 141,696, Jan. 7, 1988, abandoned. This application Apr. 3, 1990, Ser. No. 506,567

Int. Cl.⁵ F16L *55/16, 59/16*

U.S. Cl. 138—110 12 Claims



1. A cover for a pipe fitting comprising a body made of semi-rigid watertight material and having opposed ends, said body adapted to fold to the shape of the pipe fitting from an initially substantially flat shape, at least one of said ends having a terminal portion and fastening means operatively connected thereto for securing said ends about the pipe fitting, said cover including at least one line of weakness constituting a means to trim said cover to correspond to the geometrical configuration of the pipe fitting and provide a secure fit of the cover about the pipe fitting on the job site.

VOL
1127
ISS
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1991
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5,025,837
APPARATUS FOR MEASURING LOOM WARP TENSION

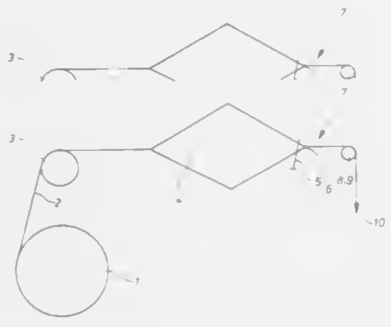
Markus Gielen, Sigmarszell, Fed. Rep. of Germany, assignor to Lindauer Dornier Gesellschaft mbH, Lindau, Fed. Rep. of Germany

Filed Feb. 26, 1990, Ser. No. 485,040

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1989, 3905881

Int. Cl.^{5} D03D *49/18;* **G01L** *5/04*

U.S. Cl. 139—35 **7 Claims**



1. An apparatus for measuring a warp thread tension on a weaving loom having a beat-up line, comprising means (9) for measuring a fabric tension which is proportional to said warp thread tension, and means for mounting said measuring means in a zone of a finished fabric (7) downstream of said beat-up line (6) as viewed in a travel direction of said finished fabric, whereby measuring takes place downstream of said beat-up line, and wherein said fabric measuring means (9) comprise an approximately cylinder-shaped member (11) having a jacket surface (12), an elongated groove (13) in said cylinder-shaped member (11), measuring beam means including a measuring beam and sensor means arranged in said groove (13) for sensing said fabric tension, said measuring beam having a surface approximately flush with said jacket surface (12) of said cylinder-shaped member (11), so that said measuring beam can contact said finished fabric.

5,025,838
SUPPORTING MECHANISM FOR THE BACK REST IN A WEAVING MACHINE

Michel Vandeweghe, Wijtschate-Heuvelland; Bart Lefever, Ypres, and Stefaan Vandersyppe, Wervik, all of Belgium, assignors to Picanol N.V., Ypres, Belgium

Filed Jul. 16, 1990, Ser. No. 552,895

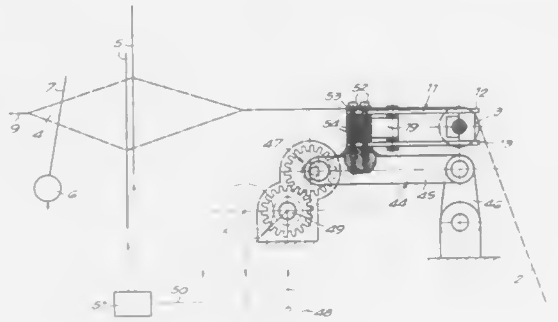
Claims priority, application Belgium, Jul. 17, 1989, 8900778; European Pat. Off., Jun. 21, 1990, 908700095.8

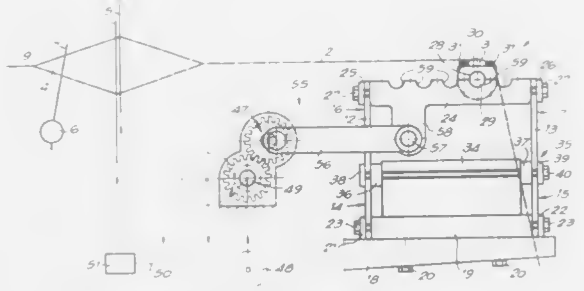
Int. Cl.^{5} D03D *49/22*

U.S. Cl. 139—114 **18 Claims**

1. A supporting mechanism for a back rest in a weaving machine, comprising:

means including at least two supports for supporting respective ends of the back rest, each support comprising at least two leaf springs mounted next to each other and each leaf spring having two ends, wherein a first of said ends of one of the leaf springs is attached to a corresponding first end of a second of said leaf springs and to the weaving machine, and a second of said ends of one of the leaf springs is connected to a second of said ends of the second leaf spring, said back rest being supported by said second ends of said leaf springs.





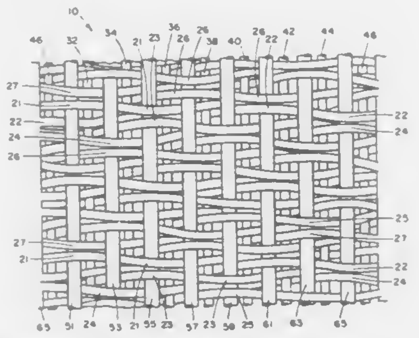
5,025,839
TWO-PLY PAPERMAKERS FORMING FABRIC WITH ZIG-ZAGGING MD YARNS

Walter P. Wright, Larsen, Wis., assignor to Asten Group, Inc., Charleston, S.C.

Filed Mar. 29, 1990, Ser. No. 501,237

Int. Cl.^{5} D03D *11/00*

U.S. Cl. 139—383 A **18 Claims**



1. A papermakers forming fabric comprising:

a lower CMD yarn layer having a selected number of yarns per inch;

an upper CMD yarn layer having twice said selected number of yarns per inch;

said upper layer CMD yarns being of a smaller diameter than said lower layer CMD yarns; and

a system of MD yarns interwoven with said CMD yarn layers in a repeat pattern such that:

(a) each MD yarn interweaves under at least a first individual lower layer CMD yarns, and

(b) the order of the repeat of the MD yarns is staggered such that alternate MD yarns are paired and weave under a common individual lower layer CMD yarn whereby the MD yarns zigzag on the underside of said fabric.

5,025,840
ICE CREAM DISPENSING MACHINE

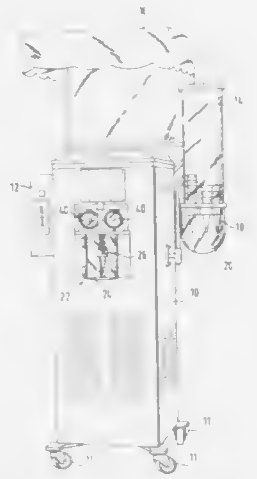
Rolf D. Tacke, Tubingen, Fed. Rep. of Germany, assignor to Umberto Carnisio, Galliate, Italy

Filed Dec. 28, 1988, Ser. No. 290,999

Claims priority, application Fed. Rep. of Germany, Dec. 29, 1987, 8717065[U]

Int. Cl.^{5} B67C *3/26*

U.S. Cl. 141—253 **4 Claims**



1. Machine for portioned dispensing of ice cream from at least one liquid stores of pre-prepared ice cream, said machine comprising: at least one storage container (44) for storing liquid ice cream, said storage container being arranged in a freely installable casing (10) and being connected to a freezing cylinder (40) in which by additional cooling and by a mixing spiral (42) an ice cream mass ready for use is made available, which ice cream mass can be filled into an ice cream cornet (18) by means of a dispensing device (22) in which the ice cream cornet (18) is vertically moveable so that a cone shaped ice cream for is created, a first timing clock (56) which limits the maximum dispensable amount of ice cream for each portion; a second timing clock (58) which determines the actually dispensed amount for each portion; a third timing clock (60) which controls the length of time for which the ice cream cornet (18) remains in its upper position and thus determines the width of the ice cream cone; and, a fourth timing clock (62) which determines the minimum time between the dispensing of two ice cream portions.

5,025,841
MULTI-PURPOSE SUPPORT TABLE FOR A ROUTER

John M. Totten, Orlando, Fla., assignor to Porta-Nails, Inc., Wilmington, N.C.

Filed Jul. 12, 1990, Ser. No. 551,878

Int. Cl.^{5} B27C *5/02;* **B25H** *1/00*

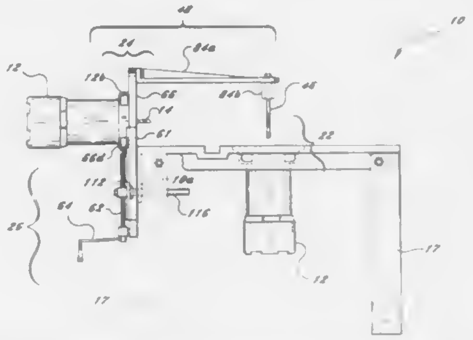
U.S. Cl. 144—134 R **17 Claims**

1. A multi-purpose support table for a router having a router bit, comprising:

a support member having a work surface with an opening extending through the support member and the work surface;

first means for mounting the router with the support member so that the router bit extends generally vertically through the opening and beyond the work surface;

second means for mounting the router with the support member so that the router bit extends generally parallel with the work surface; and



means for adjusting the dimension between the router bit and the work surface when the router is mounted with the second means.

5,025,842
FENCE RAIL AND METHOD AND APPARATUS OF MANUFACTURING THE SAME

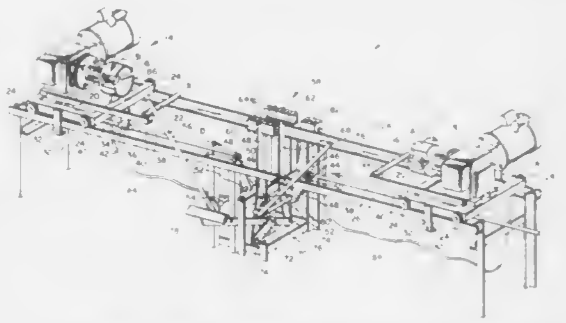
Frank E. Brimhall, 760 E. 300 South, Orem, Utah 84057

Filed Jan. 13, 1986, Ser. No. 818,229

The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.

Int. Cl.^{5} B27M *1/08*

U.S. Cl. 144—367 **5 Claims**



1. A horizontal milling machine for use in tapering opposite ends of logs comprising a pair of movable milling units each mounted on tracks that are parallel to material to be milled; means for mounting said milling units to said tracks for movement of each said milling unit independent of the other said unit; a cutter head carried by each said milling unit each of which cutter heads has a conical shaped inner surface that aligns and directs material being milled into the center thereof and with each conical surface containing at least one slot with a cutting knife mounted therein for milling the ends of the material to conform to the conical shaped inner surface; clamping means between the cutter heads to immobilize fence rail stock to be milled by the cutter heads; and means for driving each of said cutter heads independently of the other and oppositely to the direction of rotation of the other.

5. A method of forming a fence rail comprising

forming a tapered shoulder adjacent each end of a fence rail stock;

forming a tine projecting from the smallest portion of each tapered shoulder and extending outwardly from such tapered shoulder; and

forming a taper on the end of each tine.

VOL
1127
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1991
UMI

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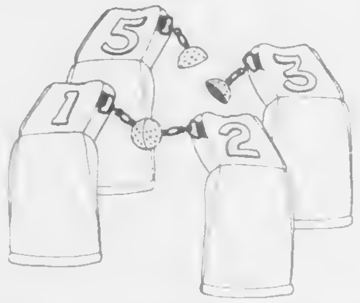
GOLF CLUB HEAD COVER KEEPER

Cavitt Caufield, 1010 W. 8th St., McGregor, Tex. 76657

Filed Jul. 6, 1989, Ser. No. 375,935

Int. Cl.^{5} A63B *57/00*

U.S. Cl. 150—160 **3 Claims**



1. A magnetized device for golf club heads comprising: A cover portion to be placed over said golf club head, loop means attached to an outside portion of said cover portion, magnetized means removably connected to said loop means by connecting means so that said magnetized means can be removed from said cover portion.

5,025,844

HEAVY DUTY PNEUMATIC RADIAL TIRE HAVING DEFINED TIRE ENLARGEMENT WITH INFLATION

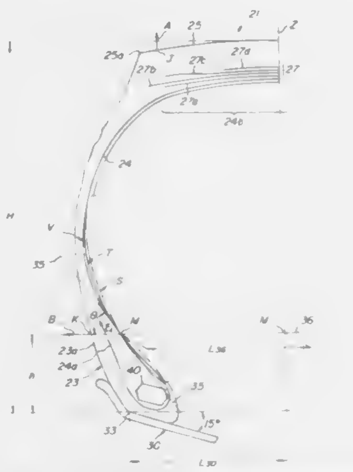
Hiroshi Ueda; Hisaaki Yoshigai, and Mikio Masunaga, all of Kodaira, Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Continuation of Ser. No. 294,974, Jan. 3, 1989, abandoned, which is a continuation of Ser. No. 16,822, Feb. 20, 1987, abandoned. This application Jan. 12, 1990, Ser. No. 517,446

Claims priority, application Japan, Feb. 20, 1986, 61-36454

Int. Cl.^{5} B60C *3/00, 3/04*

U.S. Cl. 152—454 **6 Claims**



1. A heavy duty pneumatic radial tire including a pair of bead portions, a carcass consisting of one steel cord layer and extending between said bead portions, and a tread portion arranged radially outward of a crown portion of said carcass when, said tire is mounted on a normal rim for said tire having a bead seat at an angle of approximately 15° relative to a rotating axis of said tire and engaging said bead portions of said tire, that, a tire enlargement ratio A/B lies within A/B=0.25–0.7, wherein A is an enlargement amount of a shoulder in radial and outward directions corresponding to a radial and outward displacement of a shoulder position J on the shoulder spaced by 10 mm from each end of said tread toward an equatorial plane of the tire during filling inner pressure from 7 to 100% of a determined maximum inner pressure of the tire and B is an enlargement amount of each bead portion in axial outward directions corresponding to an axial outward displacement of a bead position K on the bead portion at a height of 21% of a tire sectional height H from a bead heel during the filling of the inner pressure from 7 to 100% of the maximum inner pressure of said tire, and wherein a carcass tangential angle θ is within a range of 52°–59° at a height of 21% of the tire sectional height H from the bead heel when said tire is inflated to 7% of its maximum inner pressure.

5,025,845

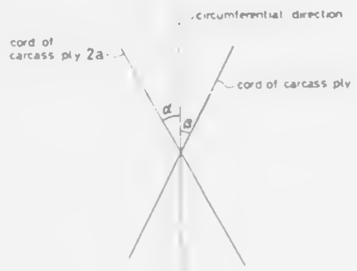
PNEUMATIC BIAS TIRE WITH CARCASS PLIES HAVING DIFFERENT CORD ANGLE

Hiroshi Iino, Minami-ashigara, and Shinichi Mori, Hiratsuka, both of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed Mar. 28, 1990, Ser. No. 501,820

Int. Cl.^{5} B60C *9/04, 9/06*

U.S. Cl. 152—559 **5 Claims**



1. A pneumatic bias tire including a two-ply carcass layer comprising an inner carcass ply and an outer carcass ply, in which the inner carcass ply comprises cords of an aromatic polyamide fiber, while the outer carcass ply comprises cords of nylon, the cords of the inner carcass ply crossing the cords of the outer carcass ply, the outer carcass ply having a cord angle β to the circumferential direction of the tire which is smaller than a cord angle α of the inner carcass ply to the tire circumferential direction.

5,025,846

HIGH SPEED FOLDING DOOR

Floyd D. West, Galena, Ill., assignor to Frommelt Industries, Inc., Dubuque, Iowa

Continuation-in-part of Ser. No. 216,325, Jul. 7, 1988, Pat. No. 4,887,659. This application May 12, 1989, Ser. No. 351,166

The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.

Int. Cl.^{5} E05D *15/26*

U.S. Cl. 160—199 **19 Claims**

1. A folding door comprising:

first and second side frames disposed adjacent to respective lateral edges of an opening in a wall;

a header assembly disposed adjacent to an upper edge of and extending across the opening and coupled to respective upper portions of said first and second side frames;

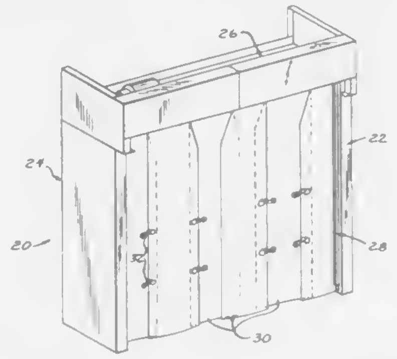
a support structure coupled to and disposed adjacent to said header assembly;

a plurality of trolleys coupled to and suspended from said support structure;

a plurality of support arms each coupled to and suspended from a respective trolley, wherein each of said support arms includes an elongated slot extending the length of said support arm along a lower portion thereof;

a plurality of flexible panels;

a plurality of flexible hanger means for attaching each of said flexible panels to a respective one of said support arms, wherein each of said flexible hanger means is disposed within a support arm and extends through the elongated slot therein and is securely coupled to an upper edge of a flexible panel, and wherein each of said hanger means includes a flexible loop coupled to opposed surfaces of a panel adjacent an upper edge thereof and extending into a support arm through the slot therein, said hanger means further including an elongated member disposed within said support arm and inserted through said flexible loop;



breakaway coupling means for coupling two panels in a sealed, continuous manner along adjacent edges thereof while allowing two coupled panels to be detached from one another when subjected to large forces incident thereon; and

drive means coupled to said trolleys for linearly displacing said trolleys along said support structure is opening and closing said folding door.

5,025,847

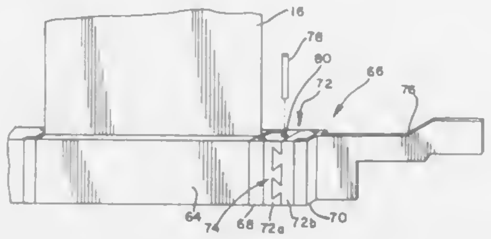
APPARATUS FOR ACCOMMODATING APPLICATION OF A FORCE IN EXCESS OF A PREDETERMINED MAGNITUDE AND CLOSURE EMPLOYING SUCH APPARATUS

Louis B. Mueller, Richfield, Wis., assignor to Rytec Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 520,980, May 9, 1990, abandoned, which is a continuation-in-part of Ser. No. 372,279, Jun. 27, 1989, abandoned. This application Sep. 21, 1990, Ser. No. 587,539

Int. Cl.^{5} E06B *9/17*

U.S. Cl. 160—270 **44 Claims**



1. An apparatus for controlling passage through an opening comprising a movable barrier means for selectively blocking said opening;

at least one guide means for guiding said movable barrier means;

and at least one guide follower means for effecting operative connection between said movable barrier means and said at least one guide means, said at least one guide follower means being attached to said movable barrier means and operatively interactive with said at least one guide means to control movement of said movable barrier means;

each of said at least one guide follower means comprising a first portion attached to said movable barrier means and a second portion, said first portion being slidingly separable from said second portion in a direction transverse to said movable barrier means in response to application of a predetermined force to said first portion transverse to said movable barrier means.

5,025,848

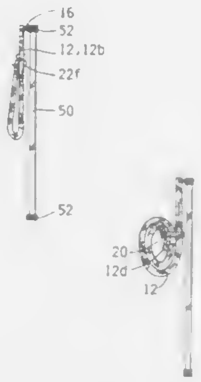
TEMPORARY WINDOW SHADE

Maria J. Prochaska, 10153 1/2 Riverside Dr., Suite 326, Toluca Lake, Calif. 91602

Filed Apr. 20, 1990, Ser. No. 512,256

Int. Cl.^{5} A47H *23/00*

U.S. Cl. 160—368.1 **3 Claims**



1. An improved temporary window shade for covering a window opening, said shade comprising:

(a) a disposable, non-woven and translucent material having a front surface, a back surface, an upper edge, a lower edge, a left side edge and a right side edge, where said material comprises, on at least one surface, an imprinted grid consisting of vertical and horizontal lines, where said grid facilitates the sizing, cutting and placement of said material on the window surface or to a surface surrounding the window such as to at least the upper section of a window sash or the wall surrounding a window frame,

(b) a material attachment means that allows said cut material to be attached to the window surface or to the surface surrounding the window, and

(c) a bendable strip attached near and across the lower edge of said material by an attachment means, where the outward ends of said strip extend across the left and right side edges of said material, where when said material is raised, folded over itself and the outward ends of said bendable strip are bent over and pressed against said material, the lower edge of said material is held in a raised position.

5,025,849

CENTRIFUGAL CASTING OF COMPOSITES

Subhash D. Karmarkar, Great Falls, and Amarnath P. Divecha, Falls Church, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 15, 1989, Ser. No. 436,847

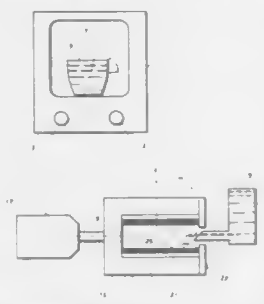
Int. Cl.^{5} B22D *19/14, 23/00*

U.S. Cl. 164—97 **13 Claims**

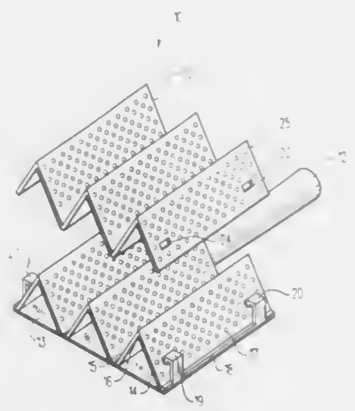
1. In a process for the manufacture of a tube or other symmetrical shape from a composite material, the improvement comprising melting a matrix metal selected from the group consisting of aluminum, aluminum alloy, magnesium, a magnesium alloy, copper, a copper alloy, nickel, or a nickel-based alloy containing particulate reinforcing material therein selected from the group consisting of silicon carbide, boron carbide, titanium carbide, graphite, alumina, silicon nitride, and combinations thereof, and introducing the resultant molten

VOL
1127
ISS
4
JE
25
1991
UMI

mixture into a rotating spin casting mold and cooling the mixture until it solidifies, said molten mixture being cast and solidified before any substantial reaction occurs between the reinforcing material and matrix metal.

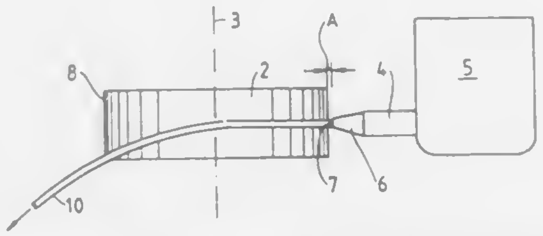


5,025,850
HAIR CRIMPING DEVICE
Theresa L. Simpson, P.O. Box 1357, Oak Park, Ill. 60304
Filed Oct. 12, 1989, Ser. No. 420,304
Int. Cl.⁵ A45D *2/40*
U.S. Cl. 132—225 1 Claim



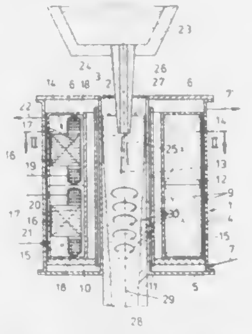
1. A hair crimping device, comprising:
- a pair of complementary formed triangular wave form members dimensioned for nesting engagement;
- a base plate secured to a first of said triangular wave form members;
- an elongated handle secured to said base plate;
- a plurality of holes formed through each of said triangular wave from members for fluid communication with hair clamped therebetween.
- a plurality of resilient tabs extending upwardly at opposite ends of said first triangular wave from member, said tabs attached to said first triangular wave form member at a position of substantially minimum vertical elevation adjacent said base plate;
- each of said tabs having an upper end with a rectangular channel construction forming a downwardly depending lug; and
- a plurality of rectangular aperture formed in inclined rectangular facets of a second of said triangular wave form members, said apertures dimensioned for engagement with said lugs, said tabs disposed so as to be deflected outwardly by downward movement of said second wave form member until engagement of said downwardly depending lugs in said apertures for securing said triangular wave form members in nesting relation.

5,025,851
APPARATUS FOR CASTING THIN TAPES
Hans Gloor, Umiken, Switzerland, assignor to Concast Standard AG, Zurich, Switzerland
PCT No. PCT/CH89/00128, § 371 Date Mar. 16, 1990, § 102(e) Date Mar. 16, 1990, PCT Pub. No. WO90/00946, PCT Pub. Date Feb. 8, 1990
PCT Filed Jul. 4, 1989, Ser. No. 490,560
Claims priority, application Switzerland, Jul. 20, 1988, 2776/88
Int. Cl.⁵ B22D *11/06*
U.S. Cl. 164—423 14 Claims



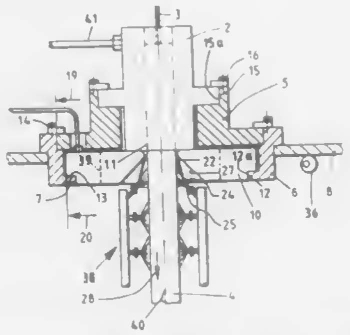
1. An apparatus for casting thin metal tapes comprising a casting wheel having a substantially vertical axis of rotation and a metal supply line comprising a casting nozzle which has a metal discharge opening directed towards a rotating cooling surface of said casting wheel, wherein said rotating cooling surface is substantially vertical and a gap of less than 1 mm is provided between said rotating cooling surface and said metal discharge opening of said casting nozzle, said rotating cooling surface comprising a substantially cylindrical outer surface of said casting wheel.

5,025,852
CONTINUOUS CASTING MOLD ARRANGEMENT FOR CASTING BILLETS AND BLOOMS
Karl Mayrhofer, Naarn, Austria, assignor to Voest-Alpine Industrieanlagenbau, Austria
Division of Ser. No. 361,123, Jun. 5, 1989, abandoned. This application Jun. 25, 1990, Ser. No. 538,137
Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819492
Int. Cl.⁵ B22D *11/00, 27/02*
U.S. Cl. 164—468 10 Claims



1. A method of continuously casting metal billets and blooms utilizing a free-stream casting technique and a stacked, plurality of electromagnetic stirring means arranged over the height of a continuous casting mold, said continuous casting mold being top fed, wherein:
- a) a casting stream of molten metal freely runs out of a tundish into said continuous casting mold in sufficient volume to form a casting level of said molten metal near the top of said continuous casting mold;
- b) activating only the electromagnetic stirring means arranged over a top half of said continuous casting mold to induce stirring; and
- c) cooling said continuous casting mold and said electromagnetic stirring means.

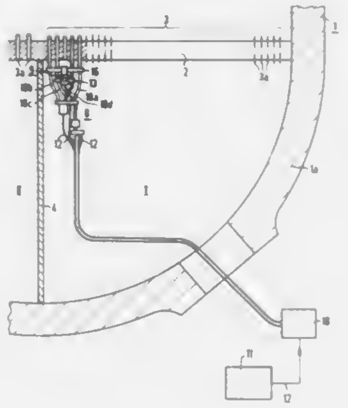
5,025,853
CONTINUOUS CASTING APPARATUS WITH ELECTROMAGNETIC STIRRER
Markus Schmid, Wadenswil, Switzerland, assignor to Concast Standard AG, Zurich, Switzerland
Filed Jan. 10, 1990, Ser. No. 462,807
Claims priority, application Switzerland, Jan. 19, 1989, 164/89
Int. Cl.⁵ B22D *27/02, 11/00*
U.S. Cl. 164—504 19 Claims



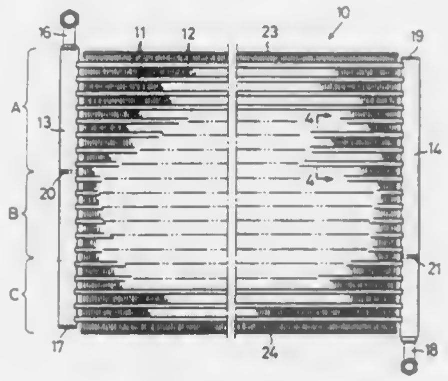
1. A continuous casting apparatus, comprising an open-ended mold having an inlet end for molten material and an outlet end for a continuously cast strand of the material; a support; means for oscillating said support; first mounting means for mounting said mold on said support independent of a stirrer; mold centering means on said support; a stirrer for the molten material; second mounting means, different from said mold molding means, for mounting said stirrer on said support downstream and adjacent of said outlet end; and stirrer centering means on said support separate from said mold centering means.

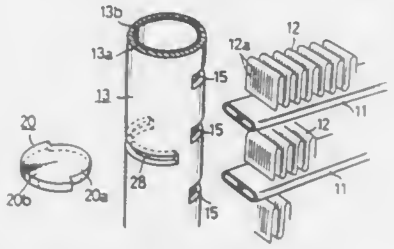
5,025,854
APPARATUS FOR INSPECTION AND/OR REPAIR OF TUBES DISCHARGING INTO A CHAMBER OF A HEAT EXCHANGER
Bernd Richter, Uelzen, and Helmar Adams, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany
Filed Sep. 20, 1988, Ser. No. 247,075
Claims priority, application Fed. Rep. of Germany, Sep. 22, 1987, 8712772[U]
Int. Cl.⁵ F28G *13/00, 15/00;* B25J *3/00, 15/04*
U.S. Cl. 165—11.2 6 Claims

1. Apparatus for at least one of the inspection and repair of tubes discharging into a chamber of a heat exchanger, comprising a tube sensor to be positioned in a tube, a manipulator for the remote-controlled positioning of said tube sensor, a plurality of mouthpieces disposed on said manipulator for introducing said sensor into tubes of a heat exchanger, tube connectors communicating with said mouthpieces and having two ends, one of said ends of said tube connectors being coaxially attachable to orifices of the tubes of the heat exchanger, an adaptor at which the other of said ends of said tube connectors are bundled into a circular group, a distributor plate having orifices into each of which a respective one of said tube connectors discharge, a parallel turntable supported on said distributor plate, a guide hose introduced into said turntable for guiding said tube sensor, means for incrementally rotating said turntable for selectively aligning the axis of said guide hose with the axis of one of said orifices in said distributor plate, and means for translationally moving said manipulator.



5,025,855
CONDENSER FOR USE IN A CAR COOLING SYSTEM
Ryoichi Hoshino; Hironaka Sasaki, and Takayuki Yasutake, all of Oyamashi, Japan, assignors to Showa Aluminum Kabushiki Kaisha, Osaka, Japan
Division of Ser. No. 328,896, Mar. 27, 1989, Pat. No. 4,936,379, which is a division of Ser. No. 77,815, Jul. 27, 1987, Pat. No. 4,825,941. This application Apr. 16, 1990, Ser. No. 509,901
Claims priority, application Japan, Jul. 29, 1986, 61-179763; Nov. 2, 1986, 61-263138
The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.
Int. Cl.⁵ F28D *1/00*
U.S. Cl. 165—150 1 Claim





1. A condensing apparatus comprising:
- a pair of headers provided in parallel with each other;
- a plurality of tubular elements whose opposite ends are connected to the headers;
- fins provided in air paths present between one tube and the next;
- wherein each header is made of an aluminum pipe having a circular cross-section;

VOL
1127
ISS
4
JE
25
1991
UMI

wherein each of the tubular elements is made of a flat hollow aluminum tube; and
wherein the opposite ends of the tubular elements are inserted in slits produced to the headers, and liquid-tightly secured therein;
wherein at least one of the headers is internally divided by a partition into at least two groups of coolant passageways, thereby enabling the flow of coolant to make at least one U-turn in the header; and
wherein the partition is inserted in the header through a slit produced in the header and secured therein.

5,025,856

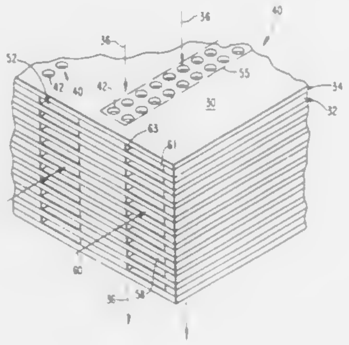
CROSSFLOW JET IMPINGEMENT HEAT EXCHANGER

John M. VanDyke, and Richard E. Niggemann, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Feb. 27, 1989, Ser. No. 315,829

Int. Cl.⁵ F28F *3/00*

U.S. Cl. 165—167 **31 Claims**



1. A heat exchanger for transferring heat between first and second fluids flowing transversely with respect to each other through a heat exchanger core comprising:
a polyhedron having a plurality of faces which define the heat exchanger core, a first pair of faces respectively being an inlet and an outlet for the first fluid and a second different pair of faces respectively being an inlet and an outlet for the second fluid;
at least one first channel extending through an interior section of the heat exchanger core between the first pair of faces for permitting the first fluid to flow between the first pair of faces with each first channel having a plurality of heat conductive walls for permitting heat exchange between the walls of each first channel and the first fluid;
at least one second channel extending through the interior section of the heat exchanger core between the second pair of faces for permitting the second fluid to flow between the second pair of faces with each second channel having a plurality of heat conductive walls for permitting heat exchange between the walls of each second channel and the second fluid, each second channel being thermally coupled to each first channel and offset from each first channel, each second channel having at least one jet impingement cooling means having at least one fluid orifice disposed within the second channel for forming a jet of the second fluid as fluid passes through the at least one second channel which impinges upon a heat conductive surface within the second channel;
a stack of a plurality of heat conductive first and second plates with at least one first plate partially defining at least one first channel and at least two second plates each having at least one fluid orifice within each second channel; and wherein
each first plate comprises first and second slots which each extend through the first plate to form a passage, each first slot extending across the first plate to opposed peripheral sides of the first plate and each second slot extending across the first plate and not to the opposed peripheral sides, each first slot being contained in a different first channel with the opposed peripheral sides respectively being disposed on different faces of the first pair of faces and each second slot being disposed within a different second channel.

25. A heat exchanger for transferring heat between first and second fluids flowing transversely with respect to each other through a heat exchanger core comprising:
a polyhedron having a plurality of faces which define the heat exchanger core, a first pair of faces each being an inlet and an outlet for the first fluid and a second different pair of faces respectively being an inlet and an outlet for the second fluid;
a plurality of first channels extending through an interior section of the heat exchanger core between the first pair of faces for permitting the first fluid to flow between the first pair of faces with each first channel having a plurality of heat conductive walls for permitting heat exchange between the walls of each first channel and the first fluid;
means for coupling the first fluid from a first fluid source to each of the first pair of faces to cause fluid to flow in opposite directions through the first channels of the interior section when the first fluid flows from the first fluid source;
means for collecting fluid flowing from the first faces; and
at least one second channel extending through the interior section of the heat exchanger core between the second pair of faces for permitting the second fluid to flow between the second pair of faces with each second channel having a plurality of heat conductive walls for permitting heat exchange between the walls of each second channel and the second fluid, each second channel being thermally coupled to each first channel and offset from each first channel.

5,025,857

WELLHEAD TUBING AND CASING PACKER AND INSTALLATION AND REMOVAL TOOL

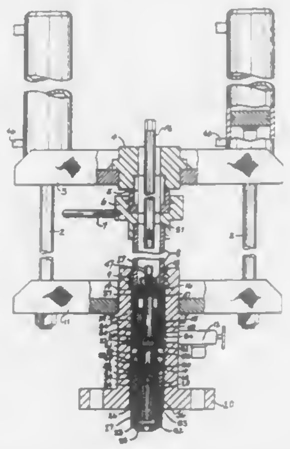
Roderick D. McLeod, 5104-125 St., Edmonton, Alberta, Canada T6H 3V5

Filed Oct. 20, 1988, Ser. No. 260,071

Int. Cl.⁵ F21B *19/00*

U.S. Cl. 166—77 **5 Claims**

1. Apparatus for removing a wellhead fitting while a well is under pressure, said apparatus comprising:
(a) a packer sized to fit tubing in said well; and
(b) tool means for installing and retrieving said packer in said tubing;
said tool means comprising (i) a lower tubular body adapted for mounting on said fitting; (ii) first lower beam means mounted on said lower body; (iii) second, upper beam means interconnected with said first beam means for reciprocal movement toward and away therefrom; (iv) an upper flanged body having a through bore mounted in said second, upper beam, said upper flanged body being in axial alignment with said lower tubular body and including thereon a threaded upper mandrel connecting means; (v) a rotatable joint connected to said upper mandrel and including means for suspending a lower mandrel, and means for rotating said rotatable joint; (vi) sealing means in said lower tubular body for circumferentially sealing said lower mandrel passing therethrough; (vii) said packer being removable attached to the lower end of said lower mandrel and (viii) means for insertion through said upper body in said first beam means and said mandrels for engaging, setting and locking said packer in said well tubing.



5,025,858

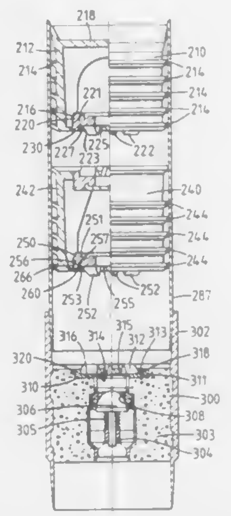
WELL APPARATUSES AND ANTI-ROTATION DEVICE FOR WELL APPARATUSES

Mark C. Glaser, Houston, Tex., assignor to Weatherford U.S., Inc., Houston, Tex.

Filed May 2, 1990, Ser. No. 517,925

Int. Cl.⁵ E21B *33/16*

U.S. Cl. 166—156 **22 Claims**



1. An anti-rotation device for an item used in wellbores for inhibiting relative rotation between the item and an adjacent apparatus having apparatus protrusions, the anti-rotation device comprising
a substantially cylindrical body member having two ends,
a recess in one of the ends of the body member, the recess having a bottom surface within the body member and a circular ring load member extending above the bottom surface and about the body member and encircling the recess,
a plurality of teeth extending from the bottom surface of the recess and beyond the circular ring load member, and
the teeth disposed for engaging the apparatus protrusions of the adjacent apparatus.

5,025,859

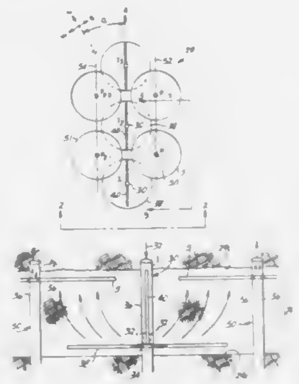
OVERLAPPING HORIZONTAL FRACTURE FORMATION AND FLOODING PROCESS

Merle E. Hanson, Livermore, and Lewis D. Thorson, Milpitas, both of Calif., assignors to Comdisco Resources, Inc., San Francisco, Calif.

Continuation of Ser. No. 331,455, Mar. 31, 1987, abandoned, which is a continuation-in-part of Ser. No. 186,046, Apr. 25, 1988, Pat. No. 4,889,186. This application Apr. 2, 1990, Ser. No. 504,090

Int. Cl.⁵ E21B *43/26, 43/30*

U.S. Cl. 166—252 **87 Claims**



8. In a fluid flood process for enhancing the secondary recovery of hydrocarbons from a reservoir using fluid injection wells and hydrocarbons recovery wells, each well having a well bore, including the steps of (i) establishing a horizontal injection fracture extending substantially horizontally from each of plural injection well bores in said reservoir and; (ii) (ii) establishing an individual horizontal recovery fracture, in said reservoir, extending substantially horizontally from each of plural recovery well bores and vertically displaced from and overlapping in said reservoir with at least one such injection fracture from an adjacent one of such injection well bores, the improvement comprising the steps of:
determining the azimuth of a vertical component of a fracture for said reservoir; and
disposing said recovery wells in at least one row which substantially parallel with said azimuth.

28. In a well system for enhancing the secondary recovery of hydrocarbons from a reservoir involving fluid injection wells and hydrocarbon recovery wells, each well having a well bore and wherein there is a horizontal injection fracture extending substantially horizontally from each of plural injection well bores in said reservoir and a horizontal recovery fracture in said reservoir extending substantially horizontally from each of plural recovery well bores vertically displaced from and overlapping with at least one injection fracture of an adjacent injection well bore, the improvement comprising:
disposing said recovery wells in at least one row which is substantially parallel with the azimuth of a vertical component of a fracture in said reservoir.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,860

METHOD AND APPARATUS OF OBTAINING NATURAL GAS FROM A MARITIME DEPOSIT

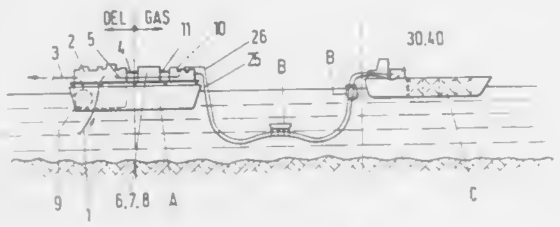
Charles Mandrin, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Mar. 28, 1990, Ser. No. 500,749

Claims priority, application Switzerland, Apr. 17, 1989, 1445/89

Int. Cl.⁵ E21B *43/01*

U.S. Cl. 166—267 **13 Claims**



1. A method of obtaining natural gas from a maritime deposit, said method comprising the steps of

obtaining a flow of natural gas from a maritime deposit on board one of a production platform and a production ship;

purifying the flow of natural gas of at least one of acid, carbon dioxide and water;

thereafter compressing and cooling the flow of natural gas to a compressed state on board the selected one of the platform and ship;

subsequently delivering the flow of compressed natural gas to a LNG tanker; and

expanding the flow of compressed natural gas on the tanker to form liquefied natural gas;

storing the liquefied natural gas on the tanker; and

returning non-liquefied natural gas from the flow of natural gas delivered to the tanker from the tanker to the selected one of the platform and ship.

5,025,861

TUBING AND WIRELINE CONVEYED PERFORATING METHOD AND APPARATUS

Klaus B. Huber, Missouri City; Joe C. Hromas, Sugar Land, and Arnold G. Edwards, Hockley, all of Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.

Filed Dec. 15, 1989, Ser. No. 451,279

Int. Cl.⁵ E21B *43/116*

U.S. Cl. 166—297 16 Claims

3. A method of perforating a formation in a borehole, comprising the steps of:

(a) attaching an apparatus to a perforating gun, the attaching step (a) including the steps of,

connecting said perforating gun to a tubing,

lowering said tubing, with attached perforating gun, to a first depth in said borehole, said first depth being less than said desired depth,

attaching said apparatus to said perforating gun, and disconnecting said perforating gun from said tubing;

(b) lowering said perforating gun to a desired depth in said borehole, said perforating gun suspending from said apparatus;

(c) anchoring said perforating gun to a wall of said borehole;

(d) disconnecting said apparatus from said perforating gun;

(e) withdrawing said apparatus from said borehole; and

(f) firing said perforating gun into said formation.

5,025,862

STEAM INJECTION PIPING

William E. Showalter, Long Beach, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Nov. 30, 1989, Ser. No. 443,931

Int. Cl.⁵ E21B *36/00*

U.S. Cl. 166—303 17 Claims

1. An apparatus for conducting a fluid mixture composed of a thermal fluid and a non-condensible barrier fluid, said apparatus comprising:

an outer duct;

an inner duct for conducting said fluid mixture, at least a portion of which is located within and spaced apart from said outer duct, said ducts forming an annular fluid passageway between portions of said inner duct and portions of said outer duct; and

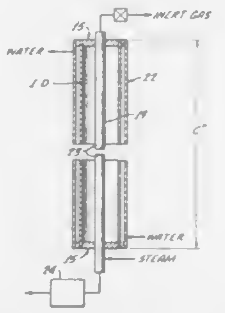
means for introducing said barrier fluid to said annular passageway from said fluid mixture within said inner duct.

7. A pipe apparatus for conducting a thermal transfer fluid within a wellbore having a wellbore axis extending generally downward from a ground surface, said apparatus comprising:

a substantially thermally conductive outer piping string attached to said wellbore and having a piping centerline generally concentric with said wellbore axis, said outer piping string forming a fluid-containing surface;

a plurality of adjoining pipe sections located generally within said outer piping string and having a generally open end distal from said ground surface, at least a portion of one of said pipe sections exhibiting an outwardly facing reduced emissivity surface having an emissivity less than an inwardly facing pipe section surface and said portion essentially lacking an intervening layer between said inwardly facing and outwardly facing surfaces, wherein said adjoining pipe sections form a thermal fluid passageway from near said ground surface to said open end, and wherein said passageway and outer piping also forms an annular space in fluid communication with said thermal fluid near said open end; and

means for introducing a barrier fluid to said annular space, wherein said means for introducing is capable of filling the majority of said annular space at a pressure of at least one atmosphere and sufficient to exclude said thermal fluid.



11. A process for conducting a thermal fluid within a conduit from near an aboveground location to an underground location when said conduit is inserted within a wellbore and a substantially thermally conductive casing wherein said conduit forms a structure essentially lacking an intervening layer from a radially inward facing surface to an outwardly facing outermost surface, said process comprising:

affixing a surface having an emissivity lower than said inwardly facing surface of said conduit to a portion of said outwardly facing outermost surface of said conduit;

inserting said low emissivity surface conduit into said wellbore to form a generally continuous ring-like space around at least a portion of said conduit; and

introducing a barrier fluid to said ring-like space at a pressure of at least one atmosphere within said ring-like space.

5,025,863

ENHANCED LIQUID HYDROCARBON RECOVERY PROCESS

Hiemi K. Haines, Englewood; Teresa G. Monger, Parker; Douglas E. Kenyon, Littleton, all of Colo., and Lance J. Galvin, Sugarland, Tex., assignors to Marathon Oil Company, Findlay, Ohio

Filed Jun. 11, 1990, Ser. No. 535,926

Int. Cl.⁵ E21B *43/18, 43/25*

U.S. Cl. 166—305.1 **10 Claims**

1. A process for the recovery of liquid hydrocarbons from a subterranean hydrocarbon-bearing formation consisting essentially of:

(a) injecting natural gas into the formation via a well in fluid communication with the formation, said natural gas being at a temperature which is insufficient to significantly mobilize light density oil in the formation and at a pressure such that said natural gas is immiscible with said light density oil in the formation, said natural gas being injected in a volume sufficient to contact light density oil in the formation within a radius from the well of about 50 meters;

(b) shutting in said well for a period of time of about 1 to about 100 days which is sufficient to render the contacted light density oil mobile; and

(c) producing the light density oil which has been mobilized by solution of said natural gas from the well.

5,025,864

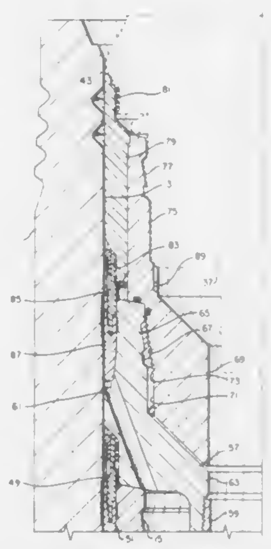
CASING HANGER WEAR BUSHING

Philippe C. Nobileau, Paris, France, assignor to Vetco Gray Inc., Houston, Tex.

Filed Mar. 27, 1990, Ser. No. 500,146

Int. Cl.⁵ E21B *23/04*

U.S. Cl. 166—348 **5 Claims**



1. In a subsea well of the type having a wellhead housing which supports a casing hanger secured to the upper end of a string of casing, the casing hanger having an axial bore and being surrounded by an annulus for receiving a seal between the casing hanger and the wellhead housing, the improvement comprising in combination:

a wear bushing;

an annular profile formed in the bore of the casing hanger;

means for securing the wear bushing to the annular profile for releasably mounting the wear bushing within the bore of the casing hanger;

means for releasably securing the wear bushing to a running tool for lowering the wear bushing and casing hanger into the wellhead housing;

a ring mounted to the exterior of the wear bushing for axial movement relative to the wear bushing, the ring having a lower end;

means for releasably securing the seal to the lower end of the ring; and

means for securing the running tool to the ring for moving the ring axially downward after the casing hanger lands in the wellhead, for setting the seal.

5. A method of mounting a casing hanger within a subsea well of the type having a wellhead housing, the casing hanger having an axial bore and being surrounded by an annulus for

VOL
1127
ISS
4
JE
25
1991
UMI

receiving a seal between the casing hanger and the wellhead housing, the method comprising in combination:
- securing the casing hanger to the upper end of a string of casing;
- providing an annular profile in the bore of the casing hanger;
- releasably mounting the wear bushing to the annular profile within the bore of the casing hanger;
- mounting a ring to the exterior of the wear bushing for axial movement relative to the wear bushing;
- releasably securing a seal to the lower end of the ring;
- releasably securing the wear bushing to a running tool;
- securing the running tool to the ring; then
- lowering the wear bushing and casing hanger into the wellhead housing; then
- cementing the casing string; then
- moving the ring axially downward and setting the seal between the casing hanger and wellhead housing; then
- removing the running tool; then
- continuing drilling operations through the casing string, with the wear bushing protecting the casing hanger; then
- removing the wear bushing from the casing hanger when the drilling operations have been completed.

5,025,865

SUBSEA OIL PRODUCTION SYSTEM

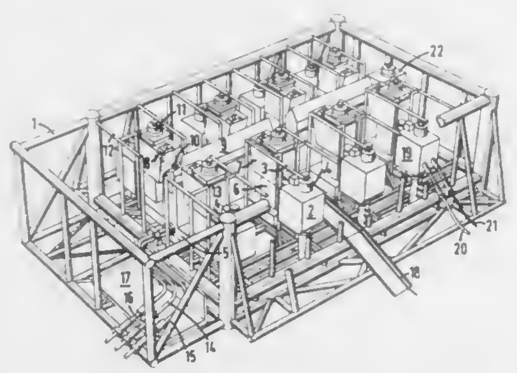
Trevor D. Caldwell, Woking, and Carlos Villanueva, Harpenden, both of England, assignors to The British Petroleum Company p.l.c., London, England

Filed Sep. 29, 1987, Ser. No. 102,366

Claims priority, application United Kingdom, Oct. 4, 1986, 8623900

Int. Cl.^{5} E21B *43/017*

U.S. Cl. 166—366 **12 Claims**



1. A subsea oil and/or gas production system comprising:
- (a) a template having a three-dimensional framework enclosing one or more production bays spaced apart, each bay having a well slot and a manifold slot, the space above the well slot being occupied by
- (b) a tree module fitted with
- (c) a high pressure cap, the space above the manifold slot being occupied by
- (d) a manifold header module positioned on the template and forming the base of the equipment in the area of the manifold slot(s),
- (e) isolation valve module(s) positioned adjacent to the manifold header module and connected thereto,
- (f) flow control module(s) positioned adjacent to the isolation valve module(s) and connected thereto,
- (g) production choke module(s) positioned adjacent to the flow control module(s) and connected thereto, and
- (h) production control pod(s) positioned adjacent to the flow control module(s) and connected thereto, the tree module(s) being connected to the flow control module(s).

5,025,866

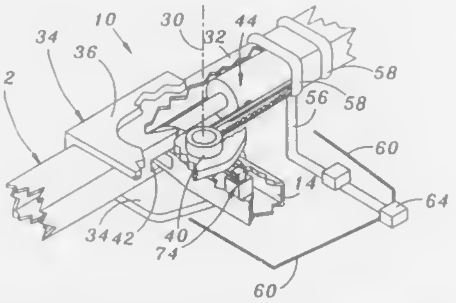
ROW FOLLOWING DRAWN IMPLEMENT WITH INTERNAL STEERING ARM

Eugene H. Schmidt, Lexington, and Lee F. Nikkel, Madrid, both of Nebr., assignors to New Tek Manufacturing, Inc., North Platte, Nebr.

Filed Jun. 4, 1990, Ser. No. 533,018

Int. Cl.^{5} A01B *63/00, 23/06*

U.S. Cl. 172—5 **18 Claims**



1. A row following drawn implement comprising, an implement frame,
- ground wheel support means on said frame,
- an elongated hitch arm having forward and rearward ends, said forward end having means for pivotal connection about a generally vertical axis to a drawbar of a towing vehicle,
- said hitch arm being pivotally connected to said frame for transverse pivotal movement of the hitch arm about a generally upright pivot axis adjacent said rearward end of said hitch arm,
- power means carried on said frame, said power means being actuatable to pivot said hitch arm about said pivot axis,
- said power means being housed substantially within the confines of said frame,
- row follower means carried on said implement and operative to sense transverse movement of the implement relative to a ground row, and
- said row follower means being operatively connected to said power means for actuating said power means to effect pivotal steering movement of said frame relative to said hitch arm in response to transverse movement of the implement relative to a ground row.

5,025,867

STAKE PULLER

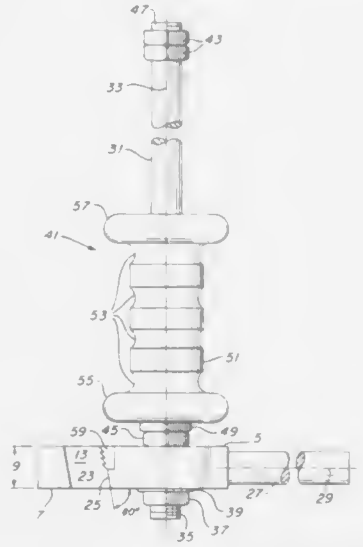
Laszlo Muller, 1126 Washington Ave., Allentown, Pa. 18013

Filed Jul. 16, 1990, Ser. No. 552,881

Int. Cl.^{5} B65D *9/00*

U.S. Cl. 173—90 **6 Claims**

1. A stake puller comprising:
- a. a horizontal planar base member having a thickness formed by a perimeter side portion;
- b. a slot through said thickness of said base member, extending linearly from an open end at a first perimeter side portion and terminating adjacent a second perimeter side portion;
- c. a horizontally extending elongated handle attached to said base member, said handle having a centerline passing substantially through the center of said base member and perpendicular to the linear direction of said slot, said centerline located on a horizontal plane substantially parallel to the plane of said base member;
- d. an elongated tubular slide bar affixed to said base member between said slot and said handle, said slide bar extending vertically upward from said base member, said slide bar having a vertical centerline at substantially a right angle to said base member, said centerlines of said handle and said slide bar being located in substantially the same vertical plane; and



- e. hammer means slidably telescoped on said slide bar for reciprocating back and forth between a pair of oppositely spaced stops on said slide bar.

5,025,868

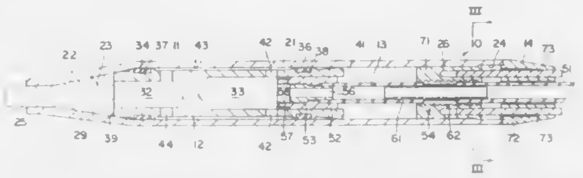
PNEUMATIC GROUND PIERCING TOOL

Steven W. Wentworth, Greenfield; Robert F. Crane, Mequon, and Jon A. Haas, Oconomowoc, all of Wis., assignors to Earth Tool Corporation, Oconomowoc, Wis.

Filed Nov. 13, 1989, Ser. No. 435,953

Int. Cl.^{5} B25D *9/00*

U.S. Cl. 173—91 **23 Claims**



1. A reversible, pneumatic ground-piercing tool, comprising:
- an elongated hollow body having a front nose and a rear opening;
- a striker disposed for reciprocation within said body, said striker having a rearwardly opening recess and a rear radial passage through a wall enclosing said recess;
- a stepped air inlet conduit which cooperates with said striker to reciprocate said striker within said body and impart blows to a front end wall thereof to drive said tool forwardly, including a bushing in sliding, sealing engagement with said recess in said striker, a flexible hose which extends lengthwise through said tool for conducting compressed air to said striker, means for securing said hose to said bushing, a threaded sleeve rearwardly spaced from said bushing, said sleeve having a threaded outer surface, a tubular inner sleeve disposed coaxially inside of said threaded sleeve, and an elastomeric shear coupling securing the inner surface of said threaded sleeve to the outer surface of said inner sleeve; and
- a tail assembly including a lengthwise threaded hole extending through said tail assembly threadedly coupled to said outer surface of said threaded sleeve to permit axial displacement of said air inlet conduit to a rear position for effecting reverse movement of said tool and to a front position for effecting forward movement of said tool, said tail assembly further having exhaust passages which communicate intermittently with said passage in said striker as said passage in said striker passes rearwardly over a rear end of said bushing for exhaust of spent compressed air.

5,025,869

IMPACT DRILL

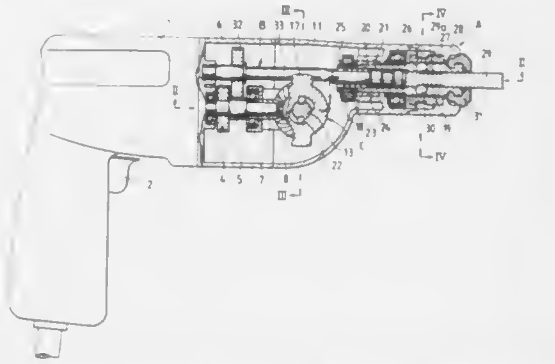
Yukio Terunuma, Hitachi, and Takao Tanabe, Katsuta, both of Japan, assignors to Hitachi Koki Company, Limited, Japan

Filed Sep. 29, 1989, Ser. No. 414,547

Claims priority, application Japan, Sep. 30, 1988, 63-248586

Int. Cl.^{5} B25D *15/02*

U.S. Cl. 173—98 **10 Claims**



1. A power-driven impact drill for use with a drill bit having at least one peripheral groove extending parallel to a longitudinal axis of the drill bit, comprising;
- (a) a drill bit holding portion including a rotatable hollow cylindrical bit holder releasably holding therein a drill bit, at least one steel ball held on said bit holder and releasably engageable with the peripheral groove of the drill bit to couple said bit holder and the drill bit while allowing axial movement of the drill bit within a limited extent equal to the length of the peripheral groove, and a ball holder slidably fitted over said bit holder for holding said steel ball against detachment from said bit holder;
- (b) a rotational power transmitting system operatively connected with said bit holder for rotating said bit holder and the drill bit in unison; and
- (c) an impact power transmitting system including a spindle driven by said rotational power transmitting system and extending at a right angle to a longitudinal axis of said bit holder, a first hammer slidably mounted on said spindle for co-rotation therewith and movable along said spindle between an operative position and an inoperative position remote from said operative position, said first hammer having at least one hammering head alignable with said longitudinal axis of said bit holder when said first hammer is disposed in the operative position, a first hammer spring urging said first hammer in said operative position, a second hammer slidably mounted in said bit holder in end-to-end confrontation to said drill bit and movable to engage said hammering head for arresting rotation of said first hammer when the drill bit is forced rearward, a second hammer spring urging said second hammer in a direction away from said hammering head, and cam means acting between said spindle and said first hammer for causing said first hammer to slide along said spindle toward said inoperative position against the force of said first hammer spring when the rotation of said first hammer is arrested by said second hammer, upon detachment of said hammering head from said second hammer, said cam means permitting said first hammer to slide back to said operative position under the force of said first hammer spring while it is rotating together with said spindle, whereby said hammering head strikes said second hammer to thrust the rotating drill bit forward.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,870
HAND-HELD TOOL WITH DISPLACEABLE SPRING LOADED HANDLE

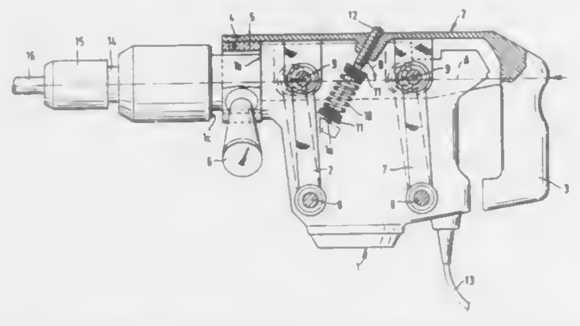
Gebhard Gantner, Nenzing, Austria, assignor to Hilti Aktiengesellschaft, Liechtenstein

Filed Nov. 20, 1989, Ser. No. 439,263

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1988, 3839207

Int. Cl.^{5} B25D *17/04*

U.S. Cl. 173—162.2 **7 Claims**



1. Portable hand-held tool, such as a hammer drill or chisel hammer, comprises a housing having a main vibration axis and a first end and a second end spaced apart in the main vibration axis direction, means within said housing for producing a striking movement in the main vibration axis direction against a tool secured to the first end of said housing, a handle displaceably secured to the second end of said housing, a compression spring held in bearing contact with said housing and said handle, said handle being displaceable toward said housing against said compression spring, wherein the improvement comprises that said spring has a compression axis disposed at an angle to said main vibration axis and said angle increases when said handle is displaced toward said housing, and said compression spring is arranged at an angle relative to the main vibration axis of said housing in the range of 45° to 75°.

5,025,871
DRILLING METHOD AND ROTARY DRILL BIT CROWN

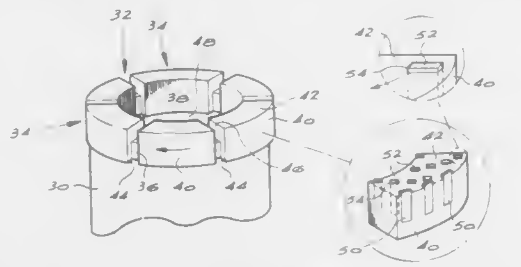
Aulette Stewart, 45 Arend Avenue, Randburg, Transvaal, South Africa, and Ian E. Clark, 24 Silver Drive, Camberley, Surrey, England

Filed Apr. 4, 1990, Ser. No. 504,567

Claims priority, application United Kingdom, Apr. 5, 1989, 8907618

Int. Cl.^{5} E21B *10/02, 10/46, 10/48*

U.S. Cl. 175—57 **7 Claims**



1. A rotatable crown for a rotary drill comprising a working end and an opposite end for engagement in a drill rod, stringer or adaptor coupling, wherein the working end comprises a plurality of segments each of which has a curved inner surface and a curved outer surface and a top cutting face joining these two curved surfaces, the top cutting face having located therein a plurality of discrete, spaced, elongate cutting elements, and the outer curved surface having located therein a plurality of discrete, spaced, cutting elements which act as gauge stones, each of the cutting elements:

(i) being of square or rectangular cross-section;

(ii) presenting a cutting point which is defined by a corner of the element;

(iii) having a longitudinal axis which extends behind the cutting face; and

(iv) being made of thermally stable abrasive compact; and

at least some of the cutting elements located in the outer surface presenting a lower cutting edge.

7. A method of drilling a substrate having a compressive strength of at least 180 MPa including the steps of:

providing a rotatable crown comprising a working end including a plurality of segments each of which has a curved inner surface, a curved outer surface, and a top cutting face joining these two curved surfaces, the top cutting face having located therein a plurality of discrete, spaced, elongate cutting elements, and the outer curved surface having located therein a plurality of discrete, spaced, cutting elements, each of the cutting elements (1) being of square or rectangular cross-section, (2) presenting a cutting point which is defined by a corner of the element, (3) having a longitudinal axis which extends behind the cutting face, and (4) being made of thermally stable abrasive compact;

rotating the crown;

contacting the substrate with the rotating crown such that the cutting points of the cutting elements abrade the substrate;

advancing the rotating crown into the substrate;

using cutting elements in the outer curved surface as gauge stones;

withdrawing the crown from the substrate; and

employing lower edges of at least some of the cutting elements in the outer curved surface as cutting edges during the withdrawing step to cut the substrate.

5,025,872
CORE BARREL ADJUSTING SYSTEM

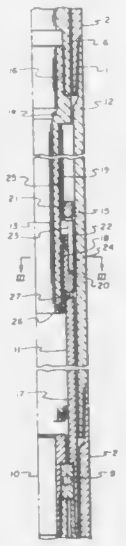
Hans-Ulf Behre, Winsen/Aller, and Jakob Laukart, Celle, both of Fed. Rep. of Germany, assignors to Baker Hughes Incorporated, Houston, Tex.

Filed Dec. 15, 1989, Ser. No. 451,090

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1988, 3843800

Int. Cl.^{5} E21B *25/02*

U.S. Cl. 175—246 **7 Claims**



1. A method for adjusting the axial setting of a core drilling tool, said core drilling tool comprising an upper part and a lower part, an inner unit secured to said upper part, and an axial setting device, said method comprising the steps of:

removing the upper part and the inner unit of said core drilling tool thereby exposing the axial adjustment device, said device including setting threads, a locking element, and an upper and lower setting tube part;

releasing the weight of the lower part of said tool on the axial setting threads;

releasing the locking element;

screwing the upper setting tube part against the lower setting tube part in order to produce the desired setting or adjustment;

relocking said locking element; and

replacing the inner unit and the upper part of the core drilling tool.

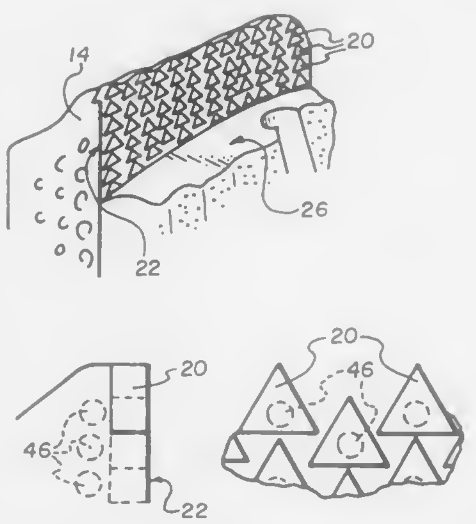
5,025,873
SELF-RENEWING MULTI-ELEMENT CUTTING STRUCTURE FOR ROTARY DRAG BIT

Jerry Cerkovnik, Salt Lake City, Utah, assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Sep. 29, 1989, Ser. No. 414,703

Int. Cl.^{5} E21B *10/46*

U.S. Cl. 175—329 **28 Claims**



1. A rotary drag bit for penetrating a subterranean formation, comprising:

a bit shank for securing said bit to a drill string;

a bit body mounted on said bit shank and including a face for contacting said formation; and

at least one cutting structure mounted on said bit face carrying a plurality of cutting elements, at least some of which include impact fracture inducement means therein, said cutting elements being disposed in an array facing in the direction of bit rotation and comprising a plurality of rows, each of said rows being located in a different substantially vertical distance from said bit face than at least one other of said rows.

5,025,874
CUTTING ELEMENTS FOR ROTARY DRILL BITS

John D. Barr, Cheltenham, England, and Thomas A. Newton, Jr., Houston, Tex., assignors to Reed Tool Company Ltd., Gloucestershire, England

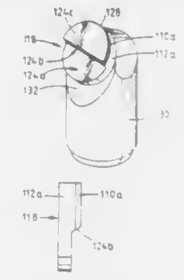
Filed Apr. 4, 1989, Ser. No. 333,120

Claims priority, application United Kingdom, Apr. 5, 1988, 8807875; Nov. 15, 1988, 8826672

Int. Cl.^{5} E21B *10/46*

U.S. Cl. 175—329 **22 Claims**

1. A preform cutting element for a rotary drill bit including a layer of superhard material having a front face, a rear face, and an exposed cutting edge, the rear face of the superhard layer being bonded to the front face of a backing layer of less hard material, the backing layer being an one-piece construction and having a rear face the area of which is substantially greater than the area of the rear face of the superhard layer, and the backing layer extending away from the cutting edge to a greater distance than does the superhard layer, the front face of the backing layer comprising a higher surface portion and a lower surface portion disposed in different planes so as to form a step between them, the superhard layer being bonded to the higher of said two surface portions.



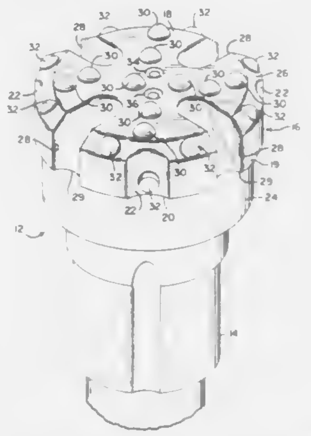
5,025,875
ROCK BIT FOR A DOWN-THE-HOLE DRILL

Lewis Witt, Roanoke, Va., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed May 7, 1990, Ser. No. 519,596

Int. Cl.^{5} E21B *10/00*

U.S. Cl. 175—393 **10 Claims**



1. A rock bit for a down-the-hole drill, the bit comprising:

an elongated shank adapted to be operatively connected at its distal end to a drill string and to a source of fluid pressure which actuates the drilling action;

a head having a working face and a periphery and a center, said head being provided with an array of cutting inserts located about said face;

at least one central exhaust port disposed on said working face adjacent to said center of said working face;

an axially aligned, first bore-like passage means connected to the fluid source and terminating within the shank at a point spaced apart from said working face, said first axial passage means adapted for supplying exhaust fluid received from said source of fluid pressure to the drill bit head;

two or more radially aligned, secondary passage means connecting at their inner end from the first axial passage means proximate its inner end to the periphery of said shank, and being sized and oriented for supplying a major percentage of the total exhaust fluid flowing both to the working face and to the bit head periphery;

at least one axially aligned and substantially reduced diame-

VOL
1127
ISS
4
JE
25
1991
UMI

ter tertiary passage means communicating between said inner end of the axial bore and said at least one central exhaust port disposed on said working face of said head and being sized for supplying a minor portion of the total exhaust fluid flowing both to the working face and to the bit head periphery;

a peripheral exhaust flow channel means formed by undercuts in said periphery of said head and connecting between the outer end of each of the secondary radial passage means and the working face for supplying a major portion of the total exhaust fluid flowing both to the working face and to the bit head periphery;

two or more peripheral cuttings flow exit through means adapted for passing cuttings-loaded exhaust fluid from the working face with each of said cuttings flow exit trough means originating in said working face at a point intermediate of the axial center of said head and of its periphery and between said peripheral exhaust flow channel means with such cuttings flow exit trough means terminating on the periphery of the shank between said peripheral exhaust flow channel means; said peripheral exhaust flow channel means being spaced on said periphery so as not to supply exhaust flow directly to said cuttings flow exit trough means, and wherein the total flow area of the secondary radial passage means exceeds the total flow area of the at least one tertiary axial passage means;

surface means on the shank defining an inwardly oriented shoulder spaced back from the working face of the head and providing an annular channel about the shank adapted for receiving the cuttings loaded exhaust fluid passing from said working face through said cuttings flow exit trough means and for passing the same to the surface via said annular channel.

5,025,876

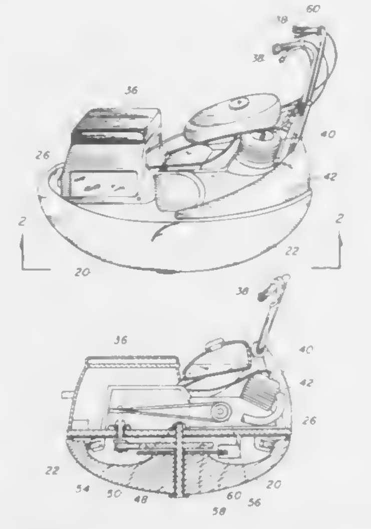
ROTATING DISC MULTI-SURFACE VEHICLE

George B. Barnard, 396 S. Longwood Ct., Newbury Park, Calif. 91320

Filed Dec. 20, 1989, Ser. No. 453,947

Int. Cl.⁵ B62D ***57/00***

U.S. Cl. 180—7.1 **22 Claims**



1. A rotating disc propelled multi-surface omni-directional vehicle comprising:

(a) a rotatable convex shaped disc with an outermost portion in contact with a surface upon which it is resting,

(b) a platform capable of supporting weight pivotally connected to said disc;

(c) a power source providing mechanical energy for spinning said disc;

(d) transmission means to transfer mechanical energy in the form of torque from said power source to said disc enabling the disc to rotatably spin relative to the platform; said transmission means further comprise a belt connected to said power source, a flywheel driven from said belt, and a brake resistantly contiguous with said disc such that the flywheel rotates the disc when rotated by the belt and the brake impedes the rotation of the disc relative to the platform, and

(e) control means producing regulation of the disc rotational speed, and angular disposition of the platform relative to the surface upon which the vehicle is residing, thus enabling omni-directional steering and speed governance as the disc spins on the surface combining resistance, radial shape and torque allowing the vehicle to be propelled and steered.

5,025,877

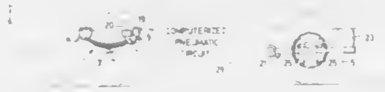
LOAD DISTRIBUTION SYSTEM FOR ROAD VEHICLES HAVING WHEEL AXLES SUPPORTED BY PNEUMATIC SUSPENSION

Daniel Assh, 1155 Turnball, Apt. 715, Quebec City, Canada G1R 5G3

Filed Jul. 21, 1989, Ser. No. 383,012

Int. Cl.⁵ B62D ***61/12***

U.S. Cl. 180—24.02 **20 Claims**



1. A load distribution system for a road vehicle, said system comprising:

a main suspension;

an auxiliary-wheels suspension including air inflatable balloons;

an air compressor for feeding pressure air to said balloons;

a weight sensor operatively connected to said main suspension, said sensor being capable of constantly measuring the weight carried by said main suspension and sending corresponding signals;

a programmed computer connected to said sensor to receive said weight signal, said computer being programmed to compare said weight signals to a preselected weight to be carried by said main suspension and to establish weight variations therefrom; and

a control assembly for controlling the auxiliary-wheels suspension, said control assembly comprising lifting and lowering means for moving the wheels of said auxiliary-wheels suspension between a ground-engaging position and a retracted position of said wheels under control of said computer, said control assembly also comprising an air pressure controller operatively connected to said balloons of said auxiliary-wheels suspension, to said computer, and to said air compressor for feeding pressurized air received from said air compressor to said balloons of said auxiliary-wheels suspension under control of said computer;

wherein said computer is programmed for responding to said weight variations and for moving said control assembly to move the wheels of said auxiliary-wheels suspension to their ground-engaging position and to adjust the air pressure in said balloons of said auxiliary wheels suspension to a value commensurate to the weight variations established by said computer in order to let the auxiliary-wheels suspension carry any extra weight which exceeds the preselected weight to be carried by said main suspension.

5,025,878

AERODYNAMICALLY CONSTRUCTED COVER PART FOR THE UNDERSIDE OF A MOTOR VEHICLE

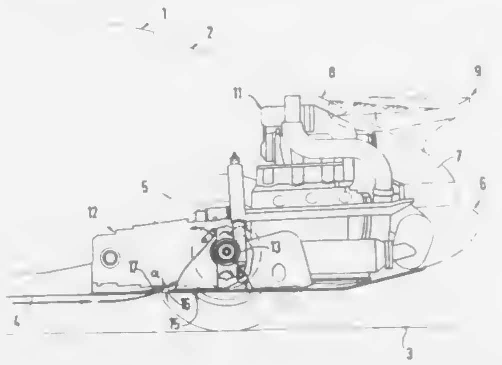
Michael Preiss, Vaihingen-Aurich, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany

Filed May 19, 1988, Ser. No. 197,429

Claims priority, application Fed. Rep. of Germany, May 19, 1987, 3716701

Int. Cl.⁵ B60K ***11/00***

U.S. Cl. 180—68.1 **18 Claims**



1. An aerodynamically constructed cover structure for the underside of a motor vehicle, especially of a passenger motor vehicle, comprising cover means provided with at least one inlet opening for the cooling air flowing-through between the cover means and the road surface, and retaining means for fixing the cover means to the underside of the motor vehicle by detachable fastening elements, said retaining means being arranged at the cover means adjacent the inlet opening and so constructed that the cooling air entering through the inlet opening is guided deliberately onto adjoining aggregates and/or drive unit parts by means of the retaining means.

5,025,879

DRIVING CONTROL APPARATUS FOR AUTOMOBILE

Masahiko Mitsunari, 1-55-202, Kimikagecho 2-chome, Kita-ku, Kobe-shi, Hyogo-ken, Japan

Filed Jan. 23, 1989, Ser. No. 299,687

Claims priority, application Japan, Jan. 22, 1988, 63-13188

Int. Cl.⁵ B62D ***6/04***

U.S. Cl. 180—79 **1 Claim**

1. A steering control apparatus for a vehicle having a plurality of wheels and to be driven by a driver, said apparatus comprising:

first detection means for sensing forces, caused by at least cornering of the vehicle and a driver induced change in velocity of the vehicle, acting upon each one of the wheels;

second detection means for sensing a driver induced desired turning direction and turning radius;

means for determining a magnitude and direction of a resultant force acting upon each one of the wheels from said forces sensed by said first detecting means;

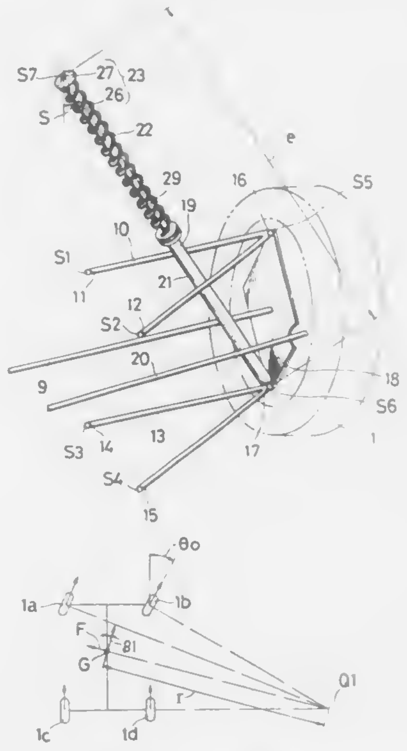
means for determining a steering angle correction for at least one of the wheels for causing said directions of said resultant forces to substantially intersect at said desired turning direction and turning radius;

means for correcting the steering angle of the at least one of the wheels by said steering angle correction;

means for determining a wheel velocity correction for at least one of the wheels for causing said directions of said resultant forces to substantially intersect at said desired turning direction and turning radius;

means for correcting the wheel velocity of the at least one of the wheels for which a wheel velocity correction was determined by said wheel velocity correction means; and

means for controlling said steering angle correcting means and said wheel velocity correcting means by causing said steering angle correcting means to act prior to said wheel velocity correcting means.



5,025,880

CAB LOCKING APPARATUS

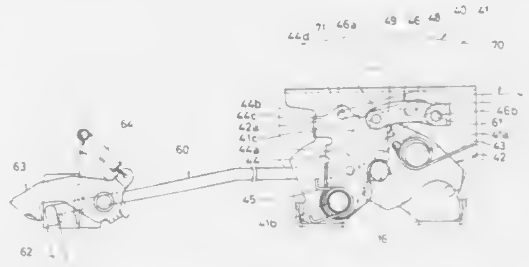
Yuichi Kato, Yokohama, Japan, assignor to Ohi Seisakusho Co., Ltd., Kanagawa, Japan

Filed Jul. 12, 1990, Ser. No. 551,829

Claims priority, application Japan, Jul. 12, 1989, 1-81901[U]

Int. Cl.⁵ B62D ***33/06***

U.S. Cl. 180—89.14 **8 Claims**



1. A cab locking apparatus for locking a cab, which is pivotally supported on a chassis frame and movable between a standing position and a forwardly inclined position, in the standing position by engagement with a striker, which is secured to the chassis frame downwardly of a rear end of the cab, so as to prevent the cab from moving toward the forwardly inclined position, said apparatus comprising:

(a) a base plate adapted to be supported on the chassis downwardly of the rear end of the cab;

(b) a latch member pivotally connected to said base plate and pivotally movable between a locking position in which

VOL
1127
ISS
4
JE
25
1991
UMI

said latch member is engaged with said striker and an unlocking position in which said latch member is removed from said striker, said latch member being normally urged from said locking position toward said unlocking position;

(c) a locking plate pivotally connected to said base plate and pivotally movable between a restricting position in which said locking plate prevents said latch member from being moved from said locking position, and a releasing position in which said locking plate releases said latch member, said locking plate being normally urged from said releasing position toward said restricting position;

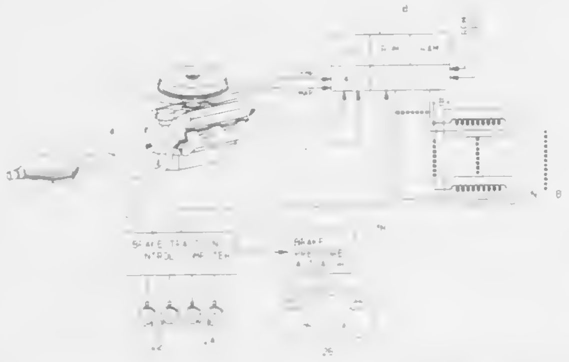
(d) an input lever disposed between said latch member and said locking plate, which are vertically spaced apart, said input lever being movable between a locking operative position and a releasing operative position for pivotally moving said locking plate between said restricting position and said releasing position; and

(e) said base plate having a groove engageable with said input lever to hold said locking plate in said releasing position, when said input lever is moved from said locking operative position to said releasing operative position, so as to prevent said input lever from returning to said locking operative position, said groove being removable from said input lever to allow said locking plate to move from said releasing position to said restricting position under a biasing force when said latch member is pivotally moved from said unlocking position to said locking position.

5,025,881
VEHICLE TRACTION CONTROL SYSTEM WITH FUEL CONTROL

David C. Poirier, Troy; Mark T. Matheny, Canton; George C. Mitchell, Ypsilanti; Steven J. Swantick, Novi; Gerald J. Wroblewski, Plymouth; Douglas W. Menck, Otsego, and Robert C. Simon, Jr., Novi, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 25, 1989, Ser. No. 385,322
Int. Cl.^{5} B60K *28/16;* F02D *17/04*
U.S. Cl. 180—197 4 Claims



1. A method of traction control for a vehicle having wheels driven by an engine having fuel injectors for delivering fuel to the engine and a throttle for regulating air flow into the engine, the method comprising the steps of:

sensing an excessive acceleration spin condition of the wheels;

determining a number of fuel injectors to be disabled to reduce engine torque output to the driven wheels as a predetermined function of a sensed excessive acceleration spin condition;

limiting the determined number of fuel injectors to a maximum number that is a function of the value of a predetermined vehicle operating parameter; and

disabling injection of fuel from the limited determined number of fuel injectors to reduce engine torque output to the driven wheels when an excessive acceleration spin condition is sensed.

5,025,882
VEHICLE TRACTION CONTROL SYSTEM

Youssef A. Ghoneim, Mount Clemens, and Yuen-Kwok Chin, Troy, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 19, 1990, Ser. No. 467,581
Int. Cl.^{5} B60K *31/00*
U.S. Cl. 180—197 7 Claims

1. A traction control method for a vehicle having an engine for applying a driving torque to a driven wheel, the system comprising the steps of:

measuring driven wheel speed;

determining vehicle speed;

determining the magnitude of wheel slip from the measured wheel speed and the determined vehicle speed;

reducing the driving torque applied to the driven wheel by the engine at a rate proportional to the rate of change in the determined magnitude of wheel slip when (A) the determined magnitude of wheel slip represents an excessive acceleration wheel slip condition and (B) the wheel slip is increasing; and

controlling the driving torque applied to the driven wheel by the engine in accord with the difference between the determined wheel slip and a desired wheel slip subsequent to the step of reducing the driving torque when the determined magnitude of wheel slip is decreasing.

5,025,883
MOTORCYCLE PROVIDED WITH TRUNKS

Shigehisa Morinaka, Saitama; Tai Nakashima, Tokyo; Takeshi Yamazaki, Kanagawa; Kazuo Morishima, Saitama; Yoshiaki Kashio, Saitama, and Giichiro Akimori, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 247,259, Sep. 21, 1988, abandoned. This application Dec. 15, 1989, Ser. No. 449,417
Claims priority, application Japan, Oct. 3, 1987, 62-250250
Int. Cl.^{5} B62D *61/02*
U.S. Cl. 180—219 9 Claims

1. A motorcycle comprising:

a front body frame mounting an engine and longitudinally spaced front and rear wheels;

a rear body frame;

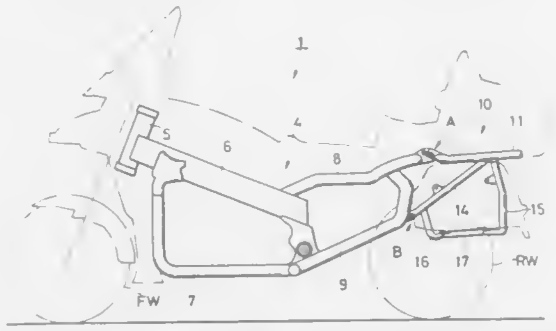
a trunk assembly;

means on said rear body frame for fixedly attaching said trunk assembly;

said rear body frame being positioned longitudinally rearwardly of said front body frame to locate said trunk assembly in enclosing relation with respect to said rear wheel to form the cover thereof;

means for detachably connecting said rear body frame to said front body frame, whereby detachment of said connecting means permits removal of said rear body frame and said trunk assembly to expose said rear wheel; and

a helmet anchoring device attached to said trunk assembly,

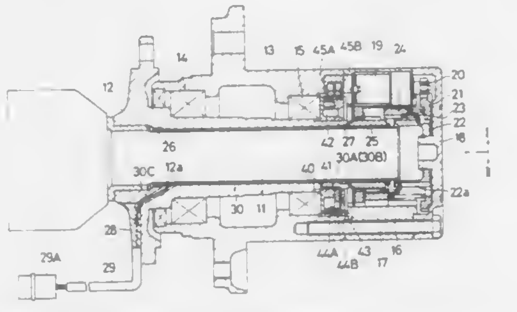


said device comprising a helmet hook, a swingable locking piece for lockingly securing said helmet hook in its closed position, and means disposed in the interior of said trunk assembly for operating said locking piece.

5,025,884
FREE WHEEL HUB SYSTEM

Hideaki Wakabayashi, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 26, 1989, Ser. No. 456,525
Claims priority, application Japan, Dec. 28, 1988, 63-328989
Int. Cl.^{5} B60K *23/08*
U.S. Cl. 180—247 10 Claims



1. A free wheel hub system comprising:

a free wheel hub mechanism disposed between a drive shaft and an axle hub supported by a spindle, and containing an electric element;

a flexible printed circuit disposed between an inner face of said spindle and an outer face of said drive shaft and connected to said electric element of said free wheel hub mechanism, said printed circuit including a conductor layer and an overlying coating layer.

5,025,885
MULTIPLE CHAMBER LOUDSPEAKER SYSTEM

Thomas A. Froeschle, Southboro, Mass., assignor to Bose Corporation, Framingham, Mass.

Filed Jul. 14, 1989, Ser. No. 379,886
Int. Cl.^{5} H05K *5/00*
U.S. Cl. 181—156 9 Claims

1. An improved loudspeaker system comprising:

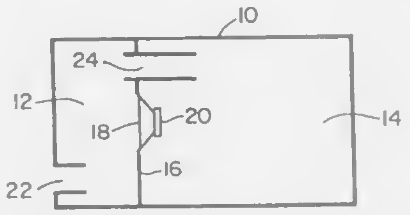
electroacoustic transducing means having a vibratable cone,

enclosure means having an interior for supporting said electroacoustic transducing means for converting an input electrical signal into a corresponding acoustic output signal and adjacent to a region outside said enclosure means,

dividing means coacting with said electroacoustic transducing means for dividing the interior of said enclosure means into first and second subchambers,

said first subchamber being smaller in volume than said second subchamber,

a first surface of said electroacoustic transducing means contacting said first subchamber and a second surface of said electroacoustic transducing means contacting said second subchamber,



first and second passive radiating means each characterized by acoustic mass,

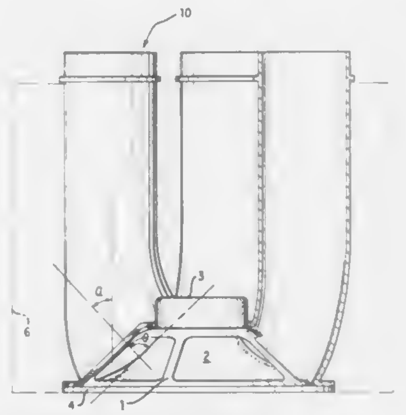
said first passive radiating means directly coupling said first subchamber to the region outside said enclosure means,

said second passive radiating means coupling said second subchamber to the region outside said enclosure means through said first subchamber.

5,025,886
MULTI-PORTED AND MULTI-DIRECTIONAL LOUDSPEAKER SYSTEM

Gin K. Jung, 93-7 3GA Jung Ang Dong, Iri-City, Junbuk 570-120, Rep. of Korea

Filed Jun. 1, 1990, Ser. No. 531,660
Int. Cl.^{5} H05K *5/00*
U.S. Cl. 181—156 24 Claims



1. A loudspeaker system comprising:

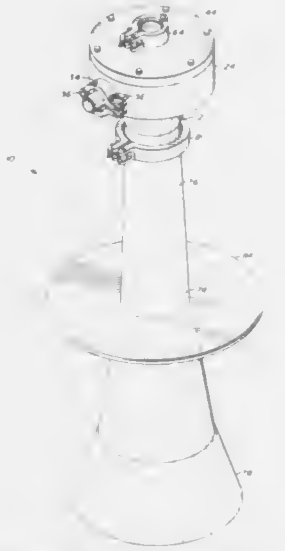
(a) a loudspeaker having a diaphragm having a frontal side which is exposed to an ambient surrounding and a back side which is facing opposite said frontal side; and a supporting means for supporting said diaphragm and facing said back side of said diaphragm, said supporting means forming a plurality of openings to permit sound waves emitted by said diaphragm in a direction toward the rear of said loudspeaker to pass therethrough; and

(b) at least two elongated sound collecting tubes formed with said supporting means and over said openings for passage of said sound waves which are emitted toward the rear of the speaker, whereby said sound collecting tubes direct sound waves passing therethrough out into said ambient surrounding.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,887
SANITARY ACOUSTIC HORN

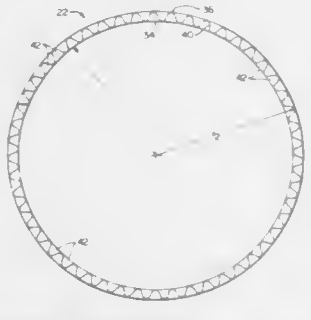
Michael V. Jamison, P.O. Box 806, Spring, Tex. 77383-0806
Filed Nov. 20, 1989, Ser. No. 439,592
Int. Cl.⁵ G10K *11/00*
U.S. Cl. 181—187 **13 Claims**



1. A sanitary acoustic horn comprising:
a driver having internal and external surfaces;
an air delivery chamber having internal corners extending about said driver, and having a predetermined width of sufficient dimension to allow insertion of human fingers;
a first sanitary ferrule connected to said driver;
a bell having a second sanitary ferrule extending therefrom;
a quick connect clamp for connecting said first sanitary ferrule to said second sanitary ferrule, said bell and the internal surfaces of said driver and said air delivery chamber having a minimum number 4 finish.

5,025,888
ACOUSTIC LINER

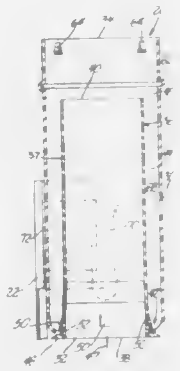
Noe Arcas, Plainview, and Charles A. Parente, Oyster Bay, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.
Filed Jun. 26, 1989, Ser. No. 371,399
Int. Cl.⁵ F01N *1/02;* **F02K** *1/00*
U.S. Cl. 181—213 **10 Claims**



1. An acoustic liner comprising:
a sound permeable inside plate forming a first closed annulus and defining a liner axis;
a sound impermeable outside plate forming a second closed annulus located outside of and extending around the first closed annulus, the inside and outside plates being spaced apart and forming an annular chamber therebetween; and
a core member secured in the annular chamber, between the inside and outside plates, the core member extending axially along and around the liner axis and forming a sine wave form in the annular direction around said axis, said sine wave form extending completely around the liner axis, wherein the core member and the inside plate form a multitude of varying depth sound absorption chambers to attenuate sound waves over a broad range of frequencies; and
wherein the core member has an axial length; and in any plane perpendicular to the liner axis and along said axial length, the core member forms a sine wave form having a generally uniform height and wave length.

5,025,889
ENGINE NOISE REDUCER

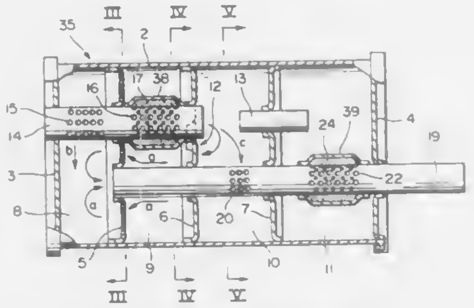
Alan R. Lockwood, Clarkston; Sidney C. Kolongowski, Goodrich, both of Mich., and Dilyard Doolin, Zephyr Hills, Fla., assignors to General Motors Corporation, Detroit, Mich.
Filed Aug. 25, 1989, Ser. No. 398,850
Int. Cl.⁵ F01N *1/02*
U.S. Cl. 181—250 **5 Claims**



1. A noise reducer for an engine induction system comprising:
an outer duct having an inlet and outlet;
an inner duct having an inlet and outlet, said inner duct having a contained portion including said inner duct outlet and a portion of said inner duct adjacent to said inner duct outlet, said contained portion being contained in said outer duct with said inner duct outlet being adjacent said outer duct outlet; a central axis extending through the interior of said inner duct between said inner duct inlet and outlet, said central axis being symmetrical with respect to said inner duct;
a closure extending away from said inner duct into engagement with said outer duct, said closure being spaced apart from said inner duct outlet along said central axis; and a chamber port extending between said inner duct outlet and said outer duct, said chamber port being perpendicular to said central axis; and a resonance chamber being bounded by said contained portion, closure, outer duct and chamber port,
said outer duct outlet being connectable to an upstream end of the induction system so that air flows through said inner duct prior to entering the induction system and said resonance chamber communicates with the induction system enabling sound waves from the induction system to enter and exit said resonance chamber through said chamber port, said chamber port being sized and said resonance chamber having a cross section and length sized so that sound waves exiting said resonance chamber destructively interfere with sound waves in the induction system to reduce noise produced by the induction system.

5,025,890
ENGINE EXHAUST APPARATUS

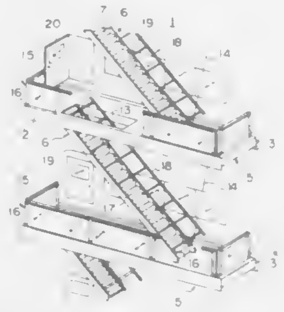
Nobuyasu Hisashige; Fukuichi Yokogawa, and Makoto Shinhama, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan
Filed Feb. 23, 1990, Ser. No. 483,230
Claims priority, application Japan, Feb. 23, 1989, 1-20778
Int. Cl.⁵ F01N *1/02, 1/10*
U.S. Cl. 181—272 **25 Claims**



1. An engine exhaust apparatus comprising
a silencer having:
a shell for accommodating silencer elements;
a front and a rear end plate closing both ends of the shell;
at least three partition walls to divide an inside space of the silencer into a plurality of chambers including a first chamber, a second chamber, a third chamber and a fourth chamber which are arrayed from front to rear of the silencer;
an inlet pipe bypassing the first and the second chambers, and connecting the front end plate and the third chamber;
said inlet pipe having a plurality of small holes located in the first and the second chambers;
said small holes of said inlet pipe located in the second chamber being surrounded by a first sound absorber;
an outlet pipe bypassing the second, the third and the fourth chambers, and connecting the first chamber and the rear end plate;
said outlet pipe having a plurality of small holes located in the third and the fourth chambers; and
said small holes of said outlet pipe located in the fourth chamber being surrounded by a second sound absorber.

5,025,891
ESCAPE FOR A BUILDING

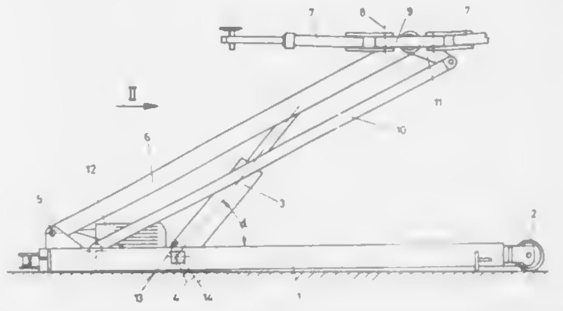
Hiromitsu Naka; Yutaka Asai, both of Saitama, and Shouzi Naka, Tokyo, all of Japan, assignors to Naka Technical Laboratory, Tokyo, Japan
Filed Jan. 23, 1990, Ser. No. 468,863
Int. Cl.⁵ E06C *9/10*
U.S. Cl. 182—86 **6 Claims**



1. An escape for a building, comprising:
a plurality of platforms spaced one above the other, a supporting shaft connected to one end of each of said platforms, the axis of said shaft extending in the horizontal direction, each said shaft being rotatably supported by said building and slidable in the axial direction, said building having a storage space for each platform to receive the corresponding platform in an upright position of the platform and into and out of which storage space the shaft for the corresponding platform is slidable, each said platform being slidable with the corresponding shaft out of said storage space to the outside of said building and turnable on said shaft to a horizontal position when said escape is to be used; and
an escape passageway attached to each of said platforms in such a manner that said escape passageway is stored in the corresponding platform when said escape is not being used, and one end of said passageway is lowered toward the next lower platform in said plurality so that said passageway forms an inclined passage between vertically spaced platforms when said escape is to be used.

5,025,892
PORTABLE LIFT FOR LIFTING MOTOR VEHICLES

Florian Stelzl, Liesing 11, A-8773 Kammern, Austria
Filed Apr. 4, 1989, Ser. No. 332,975
Claims priority, application Austria, Apr. 7, 1988, 905/88
Int. Cl.⁵ B60S *13/00*
U.S. Cl. 187—8.72 **10 Claims**



1. Portable lift for lifting motor vehicles with a pivotable lift arm, said arm being pivotably articulated to a portable base frame and lowerable into a position between lateral parts of the base frame which form a drive-on ramp, with the lift arm having at its free end lateral support arms which are guided parallel to the plane of the ground by a parallelogram guide and the lift arm is pivotable by means of a hydraulic cylinder and piston assembly, said cylinder and piston assembly engaging at a distance from the free end of the lift arm which corresponds to at least 15 percent of the length of the lift arm, characterized by the fact that hydraulic cylinder and piston assembly (3) is mounted at a distance from pivot axis (5) of lift arm (6) which at the maximum operating height of support arms (7) results in a pivot angle for the axis of cylinder and piston assembly (3) with respect to the plane of the ground of between 75 degrees and 105 degrees, preferably approximately 90 degrees, and by the fact that lift arm (6) is formed between the point of engagement of cylinder and piston assembly (3) and the articulation point of support arms (7) essentially as a U-shaped member open toward the free end thereof.

5,025,893
VIBRATION SUPPRESSING DEVICE FOR ELEVATOR

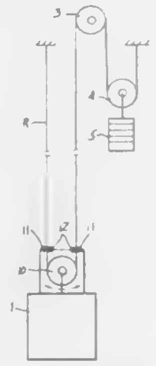
Saburo Saito, Yokohama, Japan, assignor to Otis Elevator Company, Farmington, Conn.
Filed Jun. 6, 1989, Ser. No. 362,172
Claims priority, application Japan, Jun. 10, 1988, 63-143353
Int. Cl.⁵ B66B *11/04*
U.S. Cl. 187—20 **5 Claims**

1. An elevator hoist rope vibration suppressing assembly comprising:
(a) an elevator cab;
(b) a grooved sheave rotatably mounted on top of said eleva-

VOL
1127
ISS
4
JE
25
1991
UMI

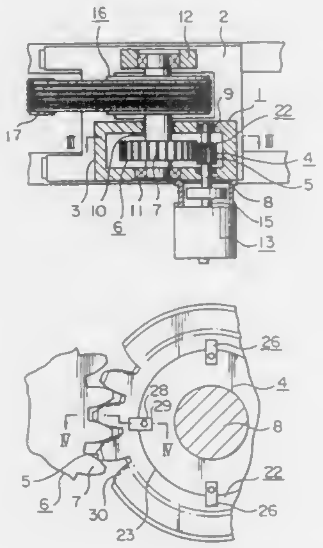
tor cab, said grooved sheave receiving the elevator hoist ropes; and

(c) two pairs of grooved guide rolls mounted on top of said elevator cab with each pair of guide rolls engaging the hoist ropes at points upwardly offset from and on both sides of the grooved sheave to restrain lateral movement of the hoist ropes as the latter are fed onto and off of the grooved sheave, whereby lateral vibratory movement of the hoist ropes above the cab is suppressed.



5,025,894
PARALLEL AXIS GEAR SET AND ELEVATOR HOIST EMPLOYING THE SAME

Shinzi Yamasaki, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan
Continuation of Ser. No. 301,106, Jan. 25, 1989, abandoned. This application Oct. 31, 1990, Ser. No. 609,066
Claims priority, application Japan, Jan. 27, 1988, 63-16237
Int. Cl.⁵ B66B *11/04;* F16H *55/18*
U.S. Cl. 187—20 **13 Claims**



1. A gear set comprising:

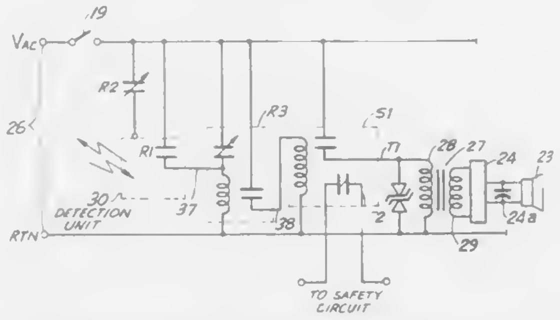
a first gear having a lateral surface and a plurality of teeth;

a second gear having a plurality of teeth and meshing with said first gear; and

a third gear coaxially rotatable relative to said first gear and having a plurality of teeth meshing with said second gear and having a lateral surface in frictional engagement with the lateral surface of said first gear, the tooth thickness of said third gear being greater than the tooth thickness of said first gear.

5,025,895
ELEVATOR CAR TOP INTRUSION DEVICE

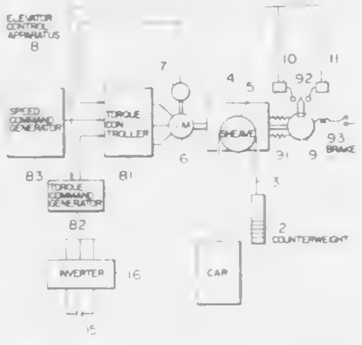
Richard J. Leone; Robert F. Cummins, both of Yonkers; Joseph Vitiello, Riverdale, and Thomas Brochhagan, No. Bellmore, all of N.Y., assignors to G.E.C. Holding Corp., Bronx, N.Y.
Filed Jan. 9, 1990, Ser. No. 462,593
Int. Cl.⁵ B66B *5/00*
U.S. Cl. 187—105 **24 Claims**



9. A detection system for detecting attempted entry onto the shaft-side roof of an elevator cab comprising: power supply means for supplying power to said system; proximity detection means in electrical connection with said power supply means and being disposed proximate said roof for detecting an object entering a zone of detection including the top of said cab comprising optical source means for generating a detection beam and corresponding optical receiver means for receiving said detection beam and for providing a detection signal when said object enters said detection zone; and detection indicating means responsive to said detection signal for indicating said attempted entry.

5,025,896
ELEVATOR CONTROL APPARATUS

Noboru Arabori; Hideaki Takahashi, both of Katsuta; Yoshio Sakai, Ibaraki; Masao Nakazato; Masakatsu Tanaka, both of Katsuta; Tatsuhiko Takahashi, Ibaraki; Katsutaro Masuda; Masanobu Itoh, both of Katsuta, and Yuji Toda, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Mar. 14, 1989, Ser. No. 322,913
Claims priority, application Japan, Mar. 18, 1988, 63-63341
Int. Cl.⁵ B66B *1/28*
U.S. Cl. 187—115 **34 Claims**



1. In an elevator system which includes an elevator driving electric motor, a sheave driven by said electric motor, a car and a counterweight suspended on said sheave by a rope in a well-rope like fashion, and brake means for holding stationarily the elevator dynamic system including the abovementioned components, said brake means being so installed on a structural member of a machine house as to be capable of displacement under an unbalance torque produced due to unbalance in weight between said car and said counterweight,

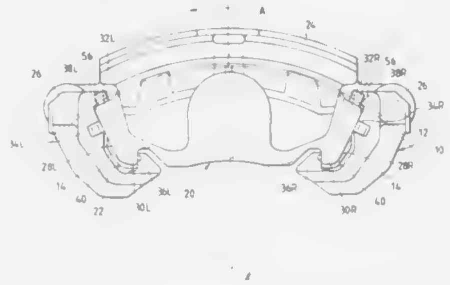
an elevator control apparatus, comprising:

means for causing said electric motor to generate a torque increasing progressively in a direction to cancel out said displacement in the operating state of said brake means; and

means for inhibiting said torque generated by said electric motor from further increasing in response to diminishment of said displacement within a predetermined range which lies within a permissible landing range of said car.

5,025,897
DISK BRAKE

Hiroshi Hirashita, and Seiya Odaka, both of Saitama, Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan
Filed Jul. 11, 1989, Ser. No. 378,101
Claims priority, application Japan, Jul. 18, 1988, 63-94683
Int. Cl.⁵ F16D *55/224*
U.S. Cl. 188—73.38 **7 Claims**



1. A disk brake of a floating caliper type for a motor vehicle, comprising:

a disk rotating with a wheel of the vehicle;

a caliper having a hydraulic cylinder mechanism;

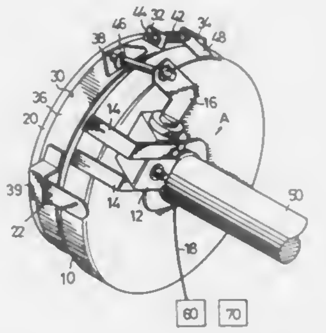
a pair of friction pads frictionally engageable with said disk by an actuation of said hydraulic cylinder mechanism, each of said friction pads is of a sectorial shape and includes a right side and a left side and a radial outer side and a radial inner side, each of said friction pads is provided with an engaging surface positioned at said right side and said left side, respectively, thereof and inclined substantially along a radial direction of said disk, a pair of step portions facing each other positioned at said radial inner side of said friction pads, and a pair of shoulder portions positioned at said radial outer side of said friction pads;

a support member for guiding said pair of friction pads to move in an axial direction of said disk, said support member straddling over said disk, said support member being secured to a stationary portion of the vehicle, said support member being provided with anchors receiving a braking force generated by frictional engagement between said friction pads and said rotating disk, said anchors comprising a pair of pushing anchors facing said engaging surfaces of said friction pads, a pair of pulling anchors facing said step portions of said friction pads, and a pair of float preventing anchors facing said shoulder portions of said friction pads; and

a pad clip member for continuously covering said pulling anchor, said pushing anchor and said float preventing anchor of said support member at least the disk run-in side thereof when said vehicle is moving forwardly, said pad clip member being formed of a single plate, said pad clip member being provided with a spring portion for elastically urging a corresponding one of said friction pads toward the center of rotation of said disk, said spring portion being positioned between said shoulder portion of said corresponding one of said friction pads and said float preventing anchor of said support member, said spring portion contacting a portion of said pad clip member covering said float preventing anchor when said spring portion deforms excessively with respect to a predetermined shape.

5,025,898
DRUM BRAKE

Rui-Yang Hsiao, No. 265, Sec. 3, Huan Ho S. Rd., Taipei, Taiwan
Filed Mar. 7, 1990, Ser. No. 490,072
Int. Cl.⁵ F16D *53/00*
U.S. Cl. 188—76 **1 Claim**



1. In a drum brake of a car controlled by a first brake pedal, comprising a brake plate and a brake drum, at least one brake shoe and a first cylinder actuated by hydraulic oil on depression of said first brake pedal being mounted on an inner side of said brake plate, a first brake lining being mounted on said brake shoe, the improvements further comprising:

a second cylinder having a piston therein being mounted on an outer periphery of said brake plate by mounting means, said second cylinder being actuated by said hydraulic oil on depression of a second brake pedal provided proximate to a clutch pedal of the car, a substantially L-shaped actuating means being mechanically connected to said piston at one end thereof;

A second brake lining being provided around an outer periphery of said brake drum, said second brake lining comprising a first end plate, a second end plate and an annular portion having an inner surface fuctionally engageable with said brake drum between said first end plate and said second end plate, an adjusting screw being mounted to said secon end plate with a distal end thereof towards said first end plate, a restraining member being mounted on said outer periphery of said brake plate at a first end thereof and a second end of said restraining member being transversely mounted to said adjusting screw for restraining said second end plate at its position, a return spring being mounted to said distal end of said adjusting screw at a first end thereof, a second end of said return spring being mounted to said first end plate, a flange being provided on an outer periphery of said second brake lining proximate to said first end plate, a connecting bar mechanically interconnecting the other end of said actuating means and said flange;

a plurality of substantially inverted U-shaped retaining means being mounted on an outer periphery of said second brake lining;

a plurality of flexible holding strips being mounted on said brake drum at one end thereof relative to each said retaining means, each said holding strip extending towards said second brake lining and having an acute angle with said outer periphery of said brake drum, a second end of each said holding strip being attached on an inner surface of each corresponding said retaining means for retaining said brake lining from engaging with said brake drum when said second brake pedal is not depressed; and

said actuating means being movable away from said cylinder via a depression of said second brake pedal and thereby actuating said flange as well as said first end plate to move along said outer periphery of said brake drum toward said second end plate so as to cause said inner surface of said second brake lining contacting with said outer surface of said brake drum, said second brake lining releasing said

VOL 1127 ISS 4 JE 25 1991 UMI

brake drum by said return spring when said second brake pedal is released.

5,025,899
METHOD AND APPARATUS FOR ABSORBING MECHANICAL SHOCK

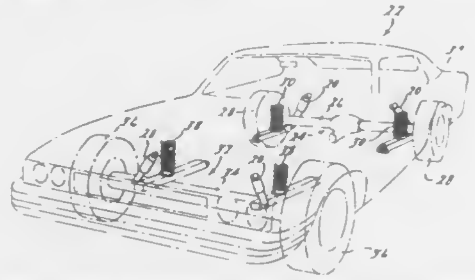
Magnus B. Lizell, 3355 Alexis Rd., Apt. B12, Toledo, Ohio 43623

Continuation of Ser. No. 154,343, filed as PCT US87/00615 on Mar. 18, 1987, published as WO87/07565 on Dec. 17, 1987, Pat. No. 4,923,038. This application Feb. 9, 1990, Ser. No. 478,236

Claims priority, application Canada, Jun. 5, 1986, 510950

Int. Cl.⁵ F16F *9/46;* **B60G** *11/26*

U.S. Cl. 188—299 46 Claims



1. A direct acting hydraulic shock absorber for damping the movement of the body of an automobile comprising:
a pressure cylinder forming a working chamber having first and second portions operable to store damping fluid;
a valve body disposed within said pressure cylinder between said first and second portions, said valve body having a first surface fluidly communicating with said first portion of said pressure cylinder and a second surface fluidly communicating with said second portion of said pressure cylinder;
first valve means for controlling the flow of damping fluid between said first and second portions of said working chamber during compression of said shock absorber, said first valve means comprising a disk member disposed on said second surface of said valve body;
a pressure chamber in continuous fluid communication with said first portion of said working chamber and said first valve means, the pressure of the damping fluid in said pressure chamber operable to axially displace at least a portion of said disk member;
electrical controllable flow means for regulating the flow of damping fluid between said pressure chamber and said second portion of said working chamber; and
second valve means for controlling the flow of damping fluid between said first and second portions of said working chamber during rebound of said shock absorber.

5,025,900
SEALING ARRANGEMENT, PARTICULARLY FOR A RAIL VEHICLE SLACK ADJUSTER

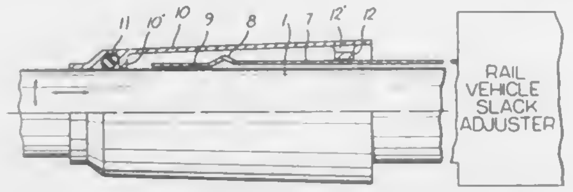
Lars M. Severinsson, Hishult, Sweden, assignor to SAB Nife AB, Landskrona, Sweden

Filed Jun. 26, 1989, Ser. No. 371,279

Claims priority, application Sweden, Jun. 30, 1988, 8802463

Int. Cl.⁵ B61H *15/00;* **F16D** *65/38*

U.S. Cl. 188—322.12 2 Claims



1. A sealing structure to prevent intrusion of foreign matter including water into a generally tubular housing closely encompassing a rod which is both rotatable and axially movable within the housing, comprising in combination, a cuplike member disposed about the rod to closely conform with the outer dimension of the rod near one end and an inner dimension greater than the dimension of the housing near the other end and extending axially along the rod to overlap with the housing, a sealing ring to preventing said intrusion of foreign matter retained by the cuplike member engaging the rod at its closely conforming end to permit rotational movement, and movable with the cuplike member axially with movement of the rod over at least a portion of an axial movement stroke of the rod within the housing while the other end of the cuplike member overlaps the housing and moves axially relative to the housing, and
interengaging structure between the inner surface of the cuplike member and the outer surface of said housing including a ridge on the housing for causing the sealing ring to move along the rod over portions of an axial movement range of the rod within the housing.

5,025,901
SHIFT LEVER APPARATUS FOR AUTOMATIC TRANSMISSION

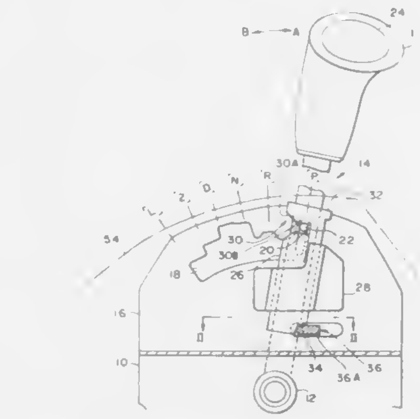
Shozo Kito; Shoichi Harada, and Hajime Imai, all of Aichi, Japan, assignors to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan

Filed Sep. 11, 1989, Ser. No. 405,435

Claims priority, application Japan, Sep. 12, 1988, 63-119431[U]

Int. Cl.⁵ **B60K** *20/00;* **G05G** *11/00*

U.S. Cl. 192—4 A 19 Claims



1. A shift lever apparatus for operating an automatic transmission of a vehicle, comprising:
lock means for locking a shift lever against movement from a specific shift position to another shift position;
lock cancellation means mounted in the vehicle at a position different from that of said lock means, to cancel the lock of the shift lever by manual operation by a driver and enable the shift lever to be moved to another shift position; and
flexible transmission means connecting said lock cancellation means and said lock means to transmit an operating force of said lock cancellation means to said lock means as one of a tensile force and a compressive force, whereby the operating force of said lock cancellation means can be definitely transmitted to said lock means even if said lock means and said lock cancellation means are mounted in different positions in the vehicle.

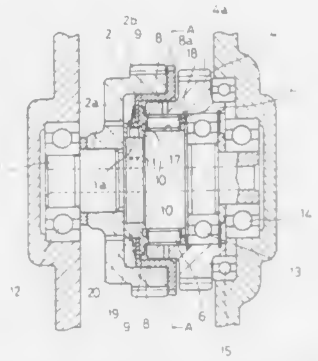
5,025,902
BIDIRECTIONAL DIFFERENTIAL CLUTCH

Munehisa Imai; Atsushi Asano; Tsutomu Yasue, all of Nagoya; Kenichiro Ito, Shizuoka, and Hiromi Nojiri, Shizuoka, all of Japan, assignors to Aichi Kikai Kogyo Kabushiki Kaisha, Nagoya and NTN Corporation, Osaka, both of, Japan

Filed Jan. 3, 1990, Ser. No. 460,545

Int. Cl.⁵ B60K *23/08;* **F16D** *41/10*

U.S. Cl. 192—43 5 Claims



1 A bidirectional differential clutch comprising:
an input member having a first cylindrical surface;
an output member having a second cylindrical surface which is spaced from said first cylindrical surface of said input member, said input member and said output member being rotatable relative to each other;
a plurality of engaging members interposed in the space between said first cylindrical surface and said second cylindrical surface;
holding means inserted into said space and having a plurality of pockets for receiving said engaging members, said holding means being movable in a circumferential direction on said space so as to move each said engaging member form a neutral position in which each said engaging member does not engage with said first and second cylindrical surfaces to an operational position in which each said engaging member is engaged between said first cylindrical surface and said second cylindrical surface, said holding means permitting each said engaging member to move from said operational position toward said neutral position when the rotational speed of said input member is slower than that of said output member; and
a sub-member operatively connected with said holding means and being rotatable in the same direction as said input member at a speed slower than the rotational speed of said input member so as to force said engaging members from said neutral position toward said operational position;
whereby said output member rotates relative to said input member when the rotational speed of said input member is lower than that of said output member, while the rotation of said input member is transmitted to said output member when the rotational speed of said input member is higher than that of said output member.

5,025,903
DUAL MODE ROTARY POWER TOOL WITH ADJUSTABLE OUTPUT TORQUE

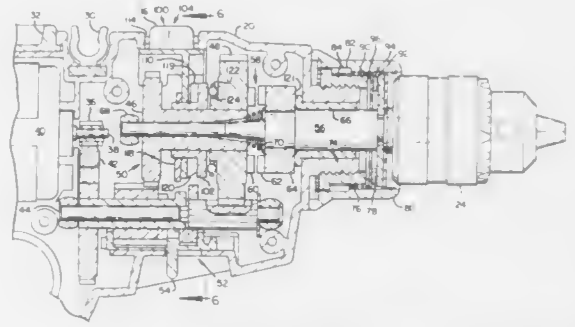
Daniel M. Elligson, Millers, Md., assignor to Black & Decker Inc., Newark, Del.

Filed Jan. 9, 1990, Ser. No. 462,369

Int. Cl.⁵ B23B *45/00;* **B25B** *23/159;* **F16D** *11/14*

U.S. Cl. 192—83 27 Claims

7. A power operated tool said tool comprising:
a housing;
a motor within the housing;
a rotary output member;
a clutch having normally spaced apart input and output halves, the input half drivably connected to the motor and the output half being drivably connected to the rotary output member, the clutch halves axially engageable for transmitting torque from the motor to the rotary output member; and



means mounting (1) the input clutch half for selective axial movement relative to the output clutch half to engage the output clutch half and (2) the output clutch half for selective axial movement relative to the input clutch half to engage the input clutch half.

5,025,904
TORSION DAMPING DEVICE, IN PARTICULAR FOR A FRICTION CLUTCH FOR AN AUTOMOTIVE VEHICLE

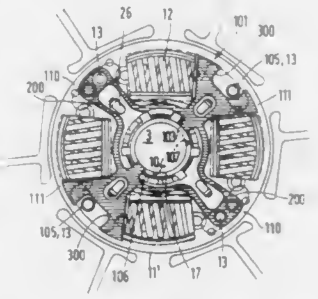
Michel Graton, Paris, and André Dalbiez, Argenteuil, both of France, assignors to Valeo, Paris, France

Filed Mar. 28, 1990, Ser. No. 500,459

Claims priority, application France, Mar. 31, 1989, 89 04228

Int. Cl.⁵ F16D *3/14*

U.S. Cl. 192—106.2 10 Claims



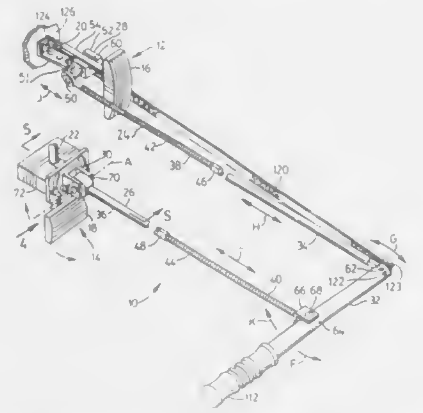
1. A torsion damping device for a friction clutch, comprising a plurality of coaxial parts;
means mounting the said parts coaxially with each other and defining a range of angular displacement with which the said coaxial parts are rotatable relative to each other; and
resilient means coupling the said coaxial parts whereby at least part of the said angular displacement takes place against circumferential action of the said resilient means, one of the said coaxial parts comprising a hub defining an abutment surface on an outer periphery thereof, and one of the said coaxial parts having end stop means facing generally inwardly in a radial direction,
wherein the damping device further comprises at least one intervention plate, radially deformable resiliently and surrounding the hub; return means for biassing the intervention plate against resilient deformation out of a relaxed state thereof; and
means securing said plate axially in at least two points to a said coaxial part other than that comprising the hub, said plate having an inner peripheral surface and an end stop engaging surface radially inward of said end stop means,
whereby in a rest position of said plate, at relatively low speeds of rotation, the plate is in its relaxed state and grips

VOL
1127
ISS
4
JE
25
1991
UMI

the hub through its inner peripheral surface and the abutment surface of the hub, while at higher speeds it is deformed radially under centrifugal force so as to release its grip on the hub, its radial deformation being limited by the end stop means in a service position of the plate, so that the plate modifies operating characteristics of the damping device over at least part of the said range of angular displacement when in its rest position but not in its service position.

5,025,905
HAND CONTROL

Craig R. Lenz, Regina, Canada, assignor to Contact Technologies Inc., Weyburn, Canada
Filed Nov. 16, 1989, Ser. No. 437,158
Claims priority, application Canada, Sep. 6, 1989, 610435
Int. Cl.⁵ G05G *11/00;* **B60K** *41/20*
U.S. Cl. 192—1.52 **22 Claims**



1. A hand control device for operating the accelerator and brake controls of a motor vehicle comprising:

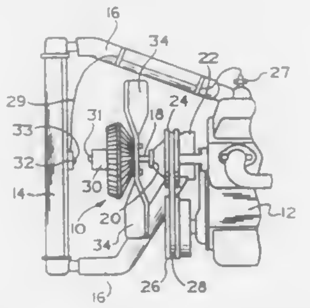
a brake control member and an accelerator control member;
mounting means connected to one end of each control member for securing said members to a respective control; and
a handle member pivotally connected to the other end of each control member, rotation of the handle member in a first direction, with the connection between the handle member and the accelerator control member acting as a fulcrum, operating the brake control, and rotation of the handle member in a second direction opposite to said first direction, with the connection between the handle member and the brake control member acting as a fulcrum, operating the accelerator control.

5,025,906
REMOTE SENSING VISCOUS FLUID COUPLING

Walter K. O'Neil, Birmingham; Carl E. Rockey, Marshall, and Robert J. Mohan, Canton, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio
Filed Jul. 26, 1990, Ser. No. 559,022
Int. Cl.⁵ F16D *19/00*
U.S. Cl. 192—58 B **12 Claims**

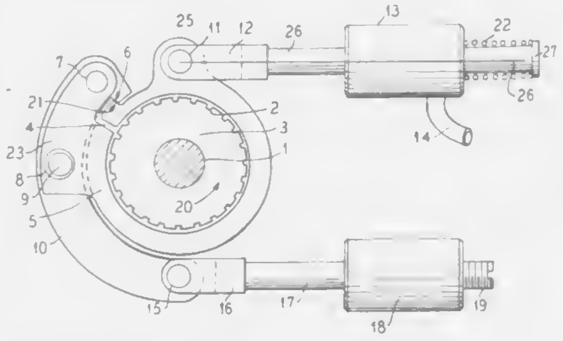
1. An improved viscous fluid clutch of the type including first and second members mounted for relative rotation about a common axis defining cooperating shear surfaces, means to establish a flow of viscous fluid between said surfaces, a valving element carried by one of said members to modulate said fluid flow by limited displacement of said element, actuator means responsive to an electrical current to selectively position said element and a grounded sensor operative to generate a control signal as a function of a system parameter, said improvement comprising:

a source of said electrical current;
circuit means interconnecting said actuator means and source of electrical current, said circuit means operative to modulate the flow of said electrical current in response to said control signal; and
a non-contacting signal link interfacing said sensor and circuit means including a transmitter element in circuit with said sensor operative to radiate said control signal as a function of said parameter measured by said sensor and a receiving element in circuit with said circuit means operative to receive said radiated control signal.



5,025,907
SELECTIVELY OPERABLE SPLIT RING CLUTCH

Harry Ono, 1890 Big Ben Dr., Des Plaines, Ill. 60061
Filed May 22, 1990, Ser. No. 526,827
Int. Cl.⁵ F16D *19/00*
U.S. Cl. 192—80 **9 Claims**

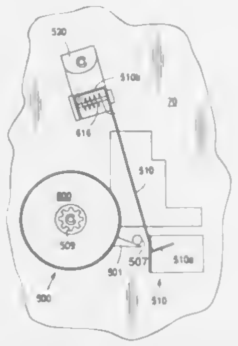


1. A clutch assembly comprising:

a rotatable disk or housing;
a single convolution split ring positioned concentrically in contact or in close peripheral proximity to said disk or housing with one or both contact surfaces containing a multitude of grooves or a rough surface for the purpose of bleeding out air or oil;
said ring having a clamping means operative to compress or expand the ring in response to operation of said clamping means to selectively provide a clamping force between both surfaces when said clamping means is operated, and an output member attached to said ring, said output member being moved by said ring when said clamping means is operated.

5,025,908
MULTIPRICE SETTING SPLIT RING COIN CONTROL MECHANISM

Ralph J. Ullman, and Alan P. Kahanek, both of Shiner, Tex., assignors to Kaspar Wire Works, Inc., Shiner, Tex.
Continuation-in-part of Ser. No. 200,076, May 27, 1988, Pat. No. 4,915,206, which is a continuation-in-part of Ser. No. 154,870, Feb. 11, 1988, Pat. No. 4,828,097. This application Oct. 27, 1989, Ser. No. 428,205
The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.
Int. Cl.⁵ G07F *5/08*
U.S. Cl. 194—227 **17 Claims**

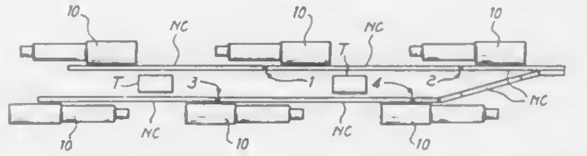


1. A coin mechanism device for use with a dispersing machine accessible from the outside for quickly changing the value of coins required to activate the coin mechanism between resetable high, middle, and low values of coins, the coin mechanism having a totalizer that advance from a non-dispensing position to a dispensing position as coins are inserted into the coin mechanism, the device comprising:

rotation means rotatable among a first angular position, a second angular position, and a third angular position, said rotation means being accessible from the outside of said coin mechanism.
a price control unit comprised of a first ring, a second ring, a third ring, and a release bar in operative association with said rotation means, said rings rotatably mounted to said totalizer and advancing therewith from the non-dispensing position of the dispensing position as coins are inserted into the coin mechanism;
said release bar having a first end and a second end, said first end being fixed and said second end being movable for positioning against said first ring when said rotation means is in the first angular position, and against said second ring when said rotation means is in the second angular position, and against said third ring when said rotation means is in the third angular position wherein said release bar of said price control unit further comprises a release bar bracket, said release bar bracket attached to a housing of the coin mechanism device and to said first end of said release bar for allowing said release bar to pivot in a plane perpendicular to the plane of said totalizer and also pivot in a plane parallel to the plane of said totalizer;
said first ring having a first ring slot therein, the position of the first ring slot being changeable with respect to said release bar by rotating said first ring, the position of said first ring slot determining a lower limit of the totalizer;
said second ring having a second ring slot therein, the position of the second ring slot being changeable with respect to said release bar by rotating said second ring, the position of said second ring slot determining a middle limit of the totalizer;
said third ring having a third ring slot therein, the position of the third ring slot being changeable with respect to said release bar by rotating said third ring, the position of said third ring slot determining an upper limit of the totalizer;
wherein said totalizer causes said first ring, said second ring, and said third ring to rotate from a non-dispensing position to a dispensing position in response to the insertion of coins into said coin mechanism, said release bar is urged against said first ring when said rotation means is rotated to said first angular position, said second ring when said rotation means is rotated to said second angular position, or said third ring when said rotation means is rotated to said third angular position, said release bar engaging the desired ring slot when the desired ring slot reaches the dispensing position and the engagement releases means which allow access to the dispensing machine.

5,025,909
APPARATUS FOR CONTROLLING THE LAYING AND TRANSPORTATION, ON CONVEYOR BELTS, OF INDEXED WORKPIECES MANUFACTURED BY A LINE COMPRISING A PLURALITY OF AUTOMATIC MACHINES

Dario De Benedetti, Milan, Italy, assignor to Start S.r.l., Italy
Filed Mar. 6, 1989, Ser. No. 320,313
Claims priority, application Italy, Mar. 9, 1988, 19711 A/88
Int. Cl.⁵ B65G *43/00*
U.S. Cl. 198—341 **4 Claims**

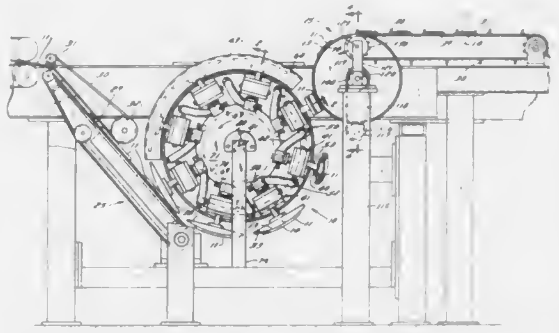


1. An apparatus for controlling the laying and transportation, on a line of conveyor belts, of indexed workpieces manufactured by a plurality of automatic machines, the line of conveyor belts comprising:

a plurality of continuously operating conveyor belts; and
means, associated with the conveyor belts, for temporarily stopping the workpieces;
wherein the temporary stop means comprises:
  a sliding platform connecting a pair of continuously operating conveyor belts; and
  a stop member adapted to set out transverse to the direction of the workpiece forward motion.

5,025,910
ROTARY PAD TURNER

Randal D. Lasure, Wellington; Werner Schweizer, and Ari Venetjoki, both of Boynton Beach, all of Fla., assignors to Curt G. Joa, Inc., Sheboygan Falls, Wis.
Filed Feb. 2, 1990, Ser. No. 474,537
Int. Cl.⁵ B65G *17/32*
U.S. Cl. 198—377 **6 Claims**



3. A device for turning a series of articles including pads which have lateral and longitudinal axes and are transported along the line of one of the axes to a pad pickup station after which the pads are turned about an axis perpendicular to said axes while moving to a pad transfer station, said device being positioned proximate to the pickup station and comprising:

VOL
1127
ISS
4
JE
25
1991
UMI

a rotationally driven power input shaft,

a drum member having a generally flat base plate fastened to said driven shaft for rotation therewith and an annular wall fastened to the base plate concentric to the axis of the driven shaft,

a plurality of support members arranged interiorly of said drum member in uniform circumferentially spaced apart relationship,

a vacuum conducting shaft which has an axial bore and is journaled for rotating on each support member about an axis which extends radially of the drum member, one end of said vacuum conducting shaft extending radially outwardly of the drum member and another end extending radially inwardly of the drum member,

a pad pickup vacuum shoe mounted to the end of each axially bored vacuum conducting shaft which extends radially outwardly of the drum member, said shoe having an internal vacuum chamber which is in communication with the bore of the shaft,

means for coupling an end of each of said vacuum conducting shafts which extends radially inwardly of said drum member to a vacuum source,

cam follower means on each support member and means on said support member coupling said cam follower means in driving relation to the axially bored vacuum conducting shaft for turning the shaft and the shoe mounted thereon through an angle about the axis of the shaft, and

a stationary cam with which said follower means are operatively engaged, rotation of said drum member resulting in actuation of said cam follower means and turning of said shoe beginning with the shoe moving away from said pickup station and terminating at least by the time the shoe reaches a pad transfer station,

a fixedly mounted support extending into said drum member, said cam being mounted to said support,

bearing means in said cam, said rotationally driven power input shaft having one end supported for rotation by said bearing means and a bearing support having a bearing means thereon displaced axially of the bearing means in the cam for additionally supporting said driven power input shaft.

5,025,911

METHOD AND APPARATUS FOR TILTING SUBSTANTIALLY ROTATIONALLY SYMMETRICAL BODIES SUCH AS CROSS-WOUND BOBBINS

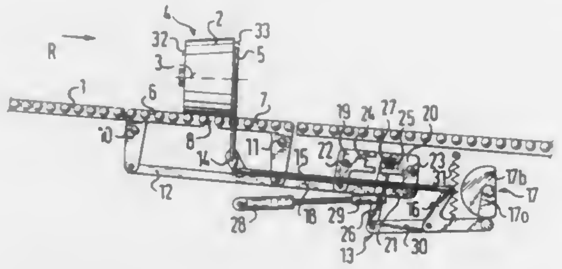
Hans Raasch, Mönchengladbach, and Hans Müllenberg, Erkelenz, both of Fed. Rep. of Germany, assignors to W. Schlafhorst AG & Co., Mönchengladbach, Fed. Rep. of Germany

Filed Mar. 28, 1990, Ser. No. 500,680

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1989, 3909966

Int. Cl.^{5} B65G *47/24*

U.S. Cl. 198—400 **22 Claims**



1. Method for tilting substantially rotationally symmetrical bodies lying on a shell surface thereof onto an end surface thereof, which comprises:

a) moving a substantially rotationally symmetrical body having a shell surface lying on a conveyor path in a given transport direction defining leading and trailing end surfaces of the body, until the body crosses a dividing plane extending transversely between and defining edges of two path segments of the conveyor path;

b) stopping the body when the leading and trailing end surfaces are supported on different path segments;

c) subsequently selectively raising the edge of one of the path segments relative to the other of the path segments, and tilting the body about the raised edge onto the other of the path segments until the end surface located above the other of the path segments comes to rest on the other of the path segments; and

d) removing the tilted body in the given transport direction.

5,025,912

SHUTTLE TYPE CONVEYOR

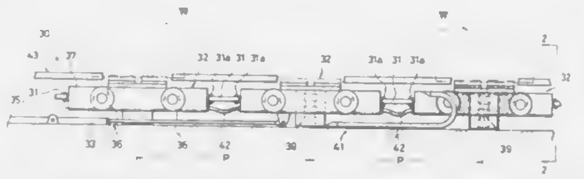
Mitsuo Hashizume, Tsurugashima, and Shoji Miyahara, Tokorozawa, both of Japan, assignors to Tsubakimoto Chain Co., Japan

Continuation of Ser. No. 324,275, Mar. 15, 1989, abandoned. This application Aug. 6, 1990, Ser. No. 563,870

Claims priority, application Japan, May 31, 1988, 63-71136[U]

Int. Cl.^{5} B65G *47/26*

U.S. Cl. 198—459 **8 Claims**



1. A shuttle type conveyor, for conveying a series of metal coils along a horizontal path of movement, comprising horizontal rail means, a series of at least three carriages connected together, said carriages being disposed at a predetermined uniform pitch along said rail means, and guided by said rail means for travel along said horizontal path of movement at a constant height, each of said carriages having an independently operable lift means carried thereby for supporting a metal coil on the carriage and for raising and lowering said metal coil relative to the carriage whereby each metal coil in the series being carried by said carriages can be raised independently of the metal coils ahead of it in the direction of movement of metal coils along said path, driving means for reciprocating said carriages along said horizontal path of movement through a distance equal to said pitch, and rest means extending along said path, said lift means being arranged to lift metal coils selectively from said rest means, and said driving means being arranged to index said metal coils along said rest means through the pitch distance, wherein the rest means comprises a pair of plates positioned, laterally of said path of movement, on opposite sides of said lift means, said plates extending lengthwise along said path of movement through substantially the full range of movement of said at least three carriages and having substantially flat, planar upper faces sloping downwardly and inwardly to provide a stable support for said coils.

5,025,913

ARTICLE CONVEYING DEVICE

Robert G. Colley, Arnold, England, assignor to Imperial Tobacco Limited, Hartcliffe, England

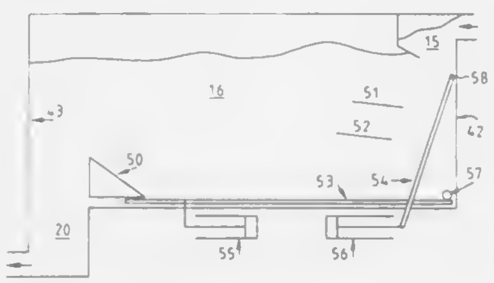
Filed Nov. 16, 1989, Ser. No. 437,377

Claims priority, application United Kingdom, Nov. 16, 1988, 8826777

Int. Cl.^{5} B65G *47/19*

U.S. Cl. 198—550.01 **13 Claims**

1. A conveying device for conveying articles within a chamber from an inlet end of the chamber to an opposed outlet end of the chamber, said conveying device comprising a base support upon which the articles rest, a side support inclined relative to the base support and against which the articles rest, the base support and side support each being moveable relative to the opposed ends of the chamber and being moveable relative one to the other, and means for moving the base support and side support together in the direction from the inlet end to the outlet end to move articles in that direction, and for moving the base support upon which in use the articles rest and side support separately in the direction from the outlet end to the inlet end to cause relative movement between the supports, so that the base support reaches its inlet end position before the side support reaches its inlet end position so as to create a void in an area defined between the supports adjacent the inlet end to receive articles entering the chamber through the inlet.



5,025,914

FEED-SCREW SUPPORT STRUCTURE

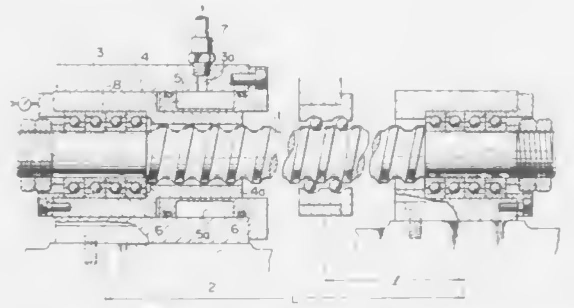
Hiroshi Narushima, Konan, Japan, assignor to Okuma Machinery Works, Ltd., Nagoya, Japan

Filed Aug. 28, 1989, Ser. No. 399,169

Claims priority, application Japan, Aug. 31, 1988, 63-217564

Int. Cl.^{5} B65G *33/26*

U.S. Cl. 198—660 **5 Claims**



1. A feed-screw support structure of a type in which both ends of a feed screw may be fixed in an axial direction, comprising a main-body member; a bearing holding member at one end of the feed screw and arranged in the main-body member slidably in an axial direction; fixing means for fixing the slidable bearing holding member in the axial direction; and operating means for operating said fixing means with respect to factors related to heat generation in the feed screw, said operating means relieving the feed screw of being fixed to enable the feed screw to move in he axial direction when a predetermined amount of heat generation in the feed screw is reached.

5,025,915

DRIVE ROLLER UNIT

Thomas Huber, Iffeldorf, Fed. Rep. of Germany, assignor to Bavaria Cargo Technologie GmbH, Fed. Rep. of Germany

Filed Apr. 13, 1990, Ser. No. 508,451

Claims priority, application European Pat. Off., Feb. 8, 1990, 90102495.0

Int. Cl.^{5} B65G *13/02*

U.S. Cl. 198—782 **5 Claims**

1. A drive roller unit for driving an article on a conveyor track comprising:

a base (2);

a guide body (9) having a space therein and having circular-cylindrical outside peripheral surface means;

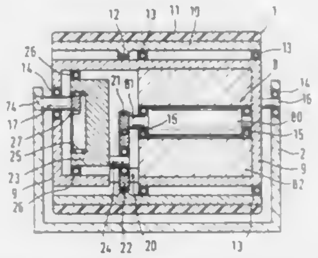
means mounting the guide body (9) rotatably about an axis of rotation which is stationary with respect to the base (2) and which is eccentric with respect to said circular-cylindrical outside peripheral surface means of said guide body (9);

a drive roller (1) substantially in the form of a hollow circular cylinder and rotatably mounted on said outside peripheral surface means of said guide body (9) in concentric relationship therewith;

an electric motor means (8) disposed within the guide body (9) and operable to drive the drive roller (1) in rotation, the electric motor means including a stator fixedly connected to the guide body (9);

an internal gear ring means (12) disposed at the inside of the drive roller (1) non-rotatably relative thereto and concentric with respect thereto;

a planetary transmission (20) operatively disposed between the electric motor means (8) and the drive roller (1) for driving of the drive roller (1), the electric motor means (8), the guide body (9) and the planetary transmission (20) being arranged in the interior of the drive roller (1), and the planetary transmission comprising a crown wheel in the form of said internal gear ring means (12) of said drive roller (1), at least one planet wheel (22) meshing with said internal gear ring means (12), a sun wheel (21) meshing with said planet wheel (22), said sun wheel being adapted to be driven by said electric motor means (8), and a planet carrier which carries said at least one planet wheel (22) and which is rotatably mounted in said guide body (9) concentrically with respect to said outside peripheral surface means thereof, the planet carrier (23) including a tooth means (25, 25') concentric with respect to said outside peripheral surface means of the guide body (9); and



a guide gear (27) rigidly and non-rotatably connected to said base and concentric with respect to said eccentric axis of rotation of the guide body (9), said tooth means (25, 25') being in meshing engagement with said guide gear (27),

the assembly being adapted by virtue of rotational movement of said guide body (9) about said axis of rotation to move said drive roller (1) relative to said base (2) between a lower rest position and an upper drive position in which said drive roller (1) is adapted to engage with the underside of a said article to be driven which is disposed above the unit.

5,025,916

ARTICLE FEEDING APPARATUS

Elton G. Kaminski, Sidney, Ohio, assignor to The Stolle Corporation, Sidney, Ohio

Filed Oct. 25, 1988, Ser. No. 262,526

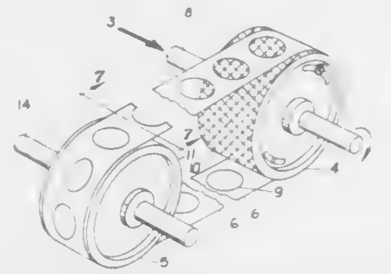
Int. Cl.^{5} B65G *23/06*

U.S. Cl. 198—803.15 **21 Claims**

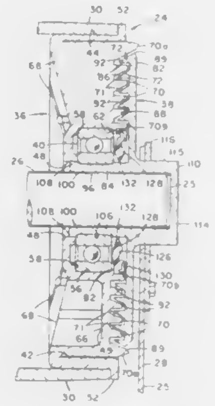
1. An apparatus for intermittently feeding a series of like articles along a path so as to present them in succession to a plurality of operation stations where operations are performed upon said articles in sequence, of the type having at least one pair of spaced drums mounted respectively on parallel axes of rotation, each of said drums having a respective peripheral

VOL
1127
ISS
4
JE
25
1991
UMI

surface, one of said drums being a driven drum, a substantially non-stretchable belt passing around said drums, said belt having a resilient inner surface, said inner surface being at least partially in direct contact with at least part of said peripheral surface of said driven drum, and means for intermittently driving said driven drum whereby to move said belt intermittently a predetermined distance, said belt being driven by said driven drum at an operating pitch diameter, the improvement, in combination therewith, wherein said peripheral surface of said driven drum includes means for substantially preventing slippage between said driven drum and said belt without affecting the operating pitch diameter of said belt so that the movement of said belt may be accurately controlled by controlling the angular rotation of said driven drum, said means including a plurality of substantially non-deformable protuberances extending rigidly outward from said peripheral surface of said driven drum, said protuberances intermeshingly contacting and elastically deforming respective localized portions of said inner surface of said belt, the remaining portions of said inner surface of said belt adjacent said driven drum which are not elastically deformed by said protuberances being in direct contact with said peripheral surface of said driven drum.



5,025,917
BEARING ASSEMBLY FOR CONVEYORS
Ian Smith; Carmin C. Simerly, both of Maryville; Jim E. Hilty, Knoxville, and Mark S. Byerley, Greenback, all of Tenn., assignors to WYKO, Inc., Greenback, Tenn.
Filed Feb. 16, 1989, Ser. No. 311,604
Int. Cl.⁵ B65G *39/10*
U.S. Cl. 198—842 10 Claims



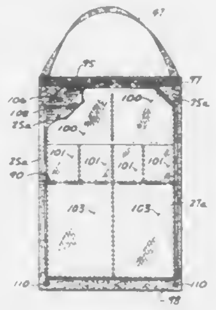
1. A bearing assembly for rotatably supporting a roller tube of a conveyor about an end of a fixed shaft wherein the fixed shaft terminates in an end surface which intersects the longitudinal axis of the shaft, said assembly comprising: a housing defining a central opening arrangeable about a fixed shaft and adjacent an end thereof and a periphery about which a conveyor roller tube is positionable for rotation with the housing about the fixed shaft;

an end cover including a disc portion positioned adjacent the side of the housing which is disposed adjacent the end surface of the fixed shaft and a shaft-receiving hub portion joined to the disc portion and positionable about the shaft in a stationary condition therewith; and

a bearing positioned within the central opening of the housing and about the shaft for accommodating rotation of the housing about the shaft and relative to the end cover;

said end cover further including a closure portion associated with the hub portion for spanning so as to cover the end surface of the shaft when the end cover is operatively positioned about the shaft end, said closure portion defining a solid surface for spanning the shaft end surface to prevent the migration of contaminants between the end cover and the shaft from the shaft end surface.

5,025,918
SHOWCASE FOR STORING AND DISPLAYING POST-TYPE EARRINGS
Margaret Bergeron, 12298 Sawgrass Ct., West Palm Beach, Fla. 33414
Continuation-in-part of Ser. No. 405,240, Sep. 11, 1989. This application Apr. 9, 1990, Ser. No. 506,840
Int. Cl.⁵ B65D *73/00, 85/00*
U.S. Cl. 206—45.14 6 Claims



1. A travel case for personal accessories including post-type earrings, comprising:

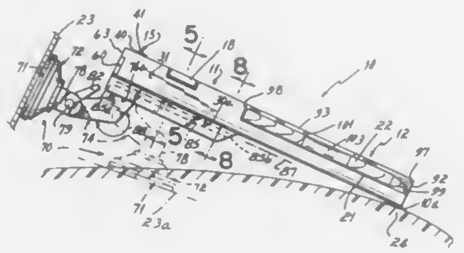
a flexible cover sheet having a top cover sheet edge and a bottom cover sheet edge defining a cover sheet length therebetween; and side cover sheet edges defining a cover sheet width therebetween, said cover sheet having a cover sheet fold therein about half way between and substantially parallel to said top and bottom cover sheet edges;

a flexible, perforated mounting sheet adapted for receiving and holding the posts of said post-type earrings, said mounting sheet having a top mounting sheet edge and a bottom mounting sheet edge defining a mounting sheet length therebetween, and side mounting sheet edges defining a mounting sheet width therebetween, said mounting sheet having a mounting sheet fold therein about half way between and substantially parallel to said top and bottom mounting sheet edges, said mounting sheet width and length being less than or substantially equal to the width and length, respectively, of said cover sheet;

a compartmentalized, flexible, spacer sheet having a plurality of compartments, each of said compartments having a compartment opening, said spacer sheet having a top spacer sheet length therebetween, said spacer sheet length being less than said cover sheet length, and side spacer sheet edges defining a spacer sheet width therebetween, said spacer sheet having a spacer sheet fold therein about half way between and substantially parallel to said top and bottom spacer sheet edges; and,

said mounting sheet fold being superimposed on said cover sheet fold and said spacer sheet fold being superimposed on said mounting sheet fold, said cover sheet, mounting sheet and spacer sheet being permanently attached only along said superimposed folds.

5,025,919
PORTABLE DIRECTORY AND NOTE PAD TRAY
Barry Brinker, and John E. Busse, both of Cincinnati, Ohio, assignors to Totes', Incorporated, Loveland, Ohio
Filed Oct. 31, 1989, Ser. No. 429,405
Int. Cl.⁵ B60R *7/00*
U.S. Cl. 206—214 21 Claims



1. A portable directory comprising:

a directory case with a series of directory cards,

one of a slide track and a slide plate fixed to the underside of said directory case, said plate being slidably received in said track and slidably removed from said track as desired so as to connect and disconnect said plate and said track one with the other, and

a connector device selectively mountable to and de-mountable from a desired surface, the other of said slide track and said slide plate being attached to said connector device, said case and said device being held in assembled relation by slidably interfitting said track and said plate, said case thereby being readily detachable from said connector device simply by sliding said plate out of said track.

14. A note pad tray comprising:

a tray base adapted to receive a note pad in supportive relation on a floor, said base having an upstanding first wall along one edge of said base and an upstanding second wall along another edge of said base,

a first finger gap in said first wall, said first gap permitting individual sheets of said note pad to be easily removed from said base by a user's fingers,

a pencil recess defined in said tray base adjacent said second wall, said recess being sized and configured to receive a pencil therein, said recess's longitudinal axis being generally parallel to said second wall,

a pencil adapted to be received in said pencil recess, and

a second finger gap in said second wall, said second gap permitting said pencil to be easily removed therefrom by a user's fingers.

5,025,920
EVIDENCE GATHERING KIT
Alison J. Walsh, 34 High St., Sharon, Mass. 02067, and Jean T. Walsh, 162-21 Powells Cove Blvd., Beechhurst, N.Y. 11357
Filed Sep. 11, 1990, Ser. No. 581,574
Int. Cl.⁵ B65D *85/00*
U.S. Cl. 206—223 11 Claims

1. An evidence gathering kit for gathering and handling body and body fluid evidence, comprising:

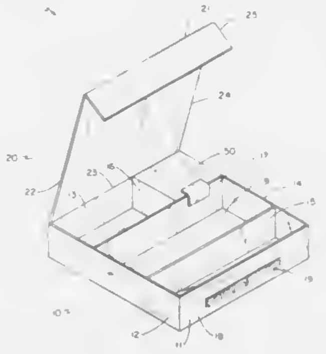
a covered box with a plurality of compartments;

a plurality of applications and swabs contained within one of said compartments;

a plurality of elongated porous bags for enclosing individual applicators and swabs;

a plurality of wipes contained within another of said compartments;

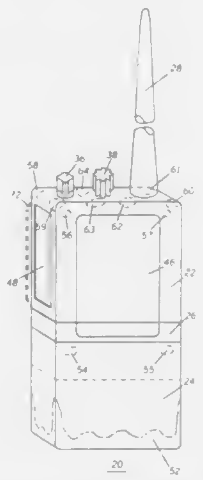
a plurality of envelopes for enclosing individual wipes and other body evidence;



a slide holder contained within another of said compartments; and

a plurality of slides contained within said slide holder.

5,025,921
ENVIRONMENTAL RADIO GUARD
Bernard V. Gasparaitis, Tamarac; José Ruiz, Miami, and Donald F. Gatto, Coral Springs, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Aug. 17, 1990, Ser. No. 574,561
Int. Cl.⁵ B65D *85/38, 65/02*
U.S. Cl. 206—320 11 Claims



1. A protective cover for a communication device comprising:

a protective layer having a first detachable portion and a second detachable portion overlappable around said communication device to have a shape enclosing and closely resembling the shape of said communication device; and

at least one serrated tube for permitting turning a rotary knob of said communication device.

VOL
1127
ISS
4
JE
25
1991
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5,025,922

AGENT FOR IMPARTING ANTISTATIC CHARACTERISTICS TO A THERMOPLASTIC POLYMER AND A THERMOPLASTIC POLYMER COMPOSITION CONTAINING THE AGENT

Marvin R. Havens, and Joseph R. Lovin, both of Greer, S.C., assignors to W. R. Grace & Co.-Conn., Duncan, S.C.

Division of Ser. No. 918,451, Oct. 14, 1986, Pat. No. 4,882,894. This application Jun. 9, 1989, Ser. No. 364,956

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.^{5} B65B *29/00*

U.S. Cl. 206—328 **10 Claims**

1. A packaged static sensitive device protected from electrostatic charges comprising:

a package comprising a static sensitive device having conformed thereabout an antistatic film having one or more layers, wherein at least one layer comprises a composition of a thermoplastic polymer in admixture with an antistatic agent wherein the polymer comprises nylon polymer and the antistatic agent comprises aromatic sulfonamide that is substantially non-hygroscopic and substantially non-migratable.

5,025,923

PACKAGE FOR ELECTRONIC PARTS

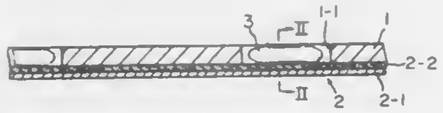
Tokujiro Okui, 3, C-10-204, 3-chome Shinsenri Minamimachi, Toyonaka City, Osaka Prefecture, Japan

Division of Ser. No. 853,211, Apr. 17, 1986, Pat. No. 4,702,788, and a continuation-in-part of Ser. No. 518,544, Jul. 29, 1983, abandoned. This application Jul. 20, 1987, Ser. No. 75,522

Claims priority, application Japan, Feb. 28, 1983, 58-33635

Int. Cl.^{5} B65D *73/02*

U.S. Cl. 206—329 **14 Claims**



1. A package for electronic parts comprising,

an elongated strip of electrically conductive material having a width,

a series of aligned holes in said strip, the width of said holes being less than the width of said strip,

a double-sided adhesive strip having one side bonded to a surface of said elongated strip and bridging over at least some of said holes, said adhesive strip having a width less than the width of said holes,

a release paper of a width at least as great as that of the adhesive strip bonded to the other side of said adhesive strip,

the holes on the side of the elongated strip away from the adhesive strip being open and unobstructed for the insertion or removal of electronic parts,

the package, including the elongated strip, release paper and adhesive, having the physical characteristic of dissipating static electricity due to its electrical conductivity to thereby prevent electronic parts from adhering to the package due to electrical charge,

the adhesive strip having the physical characteristic of releasing from the release paper prior to the time it releases from an electronic part when said part has been inserted into a hole and bonded to said adhesive strip, whereby upon removing said part from its hole a portion of the adhesive strip remains bonded thereto.

5,025,924

CONTAINER

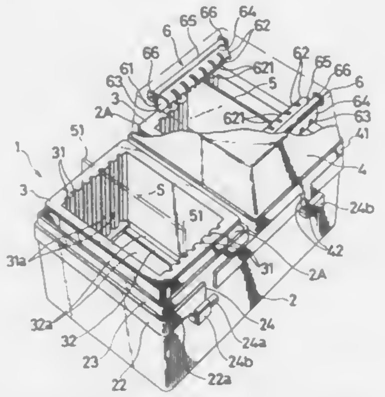
Toshimitsu Watanabe, Tokyo, Japan, assignor to Toppan Printing Co., Ltd., Japan

Filed Nov. 14, 1989, Ser. No. 436,543

Claims priority, application Japan, Nov. 16, 1988, 63-149559

Int. Cl.^{5} B65D *85/48*

U.S. Cl. 206—334 **23 Claims**



1. A container for plate-like articles comprising,

a case having at least one inner compartment, said at least one inner compartment having an open top and a pair of opposed sidewalls,

at least one removable lid member for enclosing said open top of said at least one inner compartment,

a plurality of vertical supporting grooves disposed on said pair of opposed sidewalls of said at least one inner compartment,

supporting means disposed on an inner surface of said at least one removable lid member for supporting said plate-like articles, said supporting means including a supporting member having first and second extending resilient arm portions for engaging adjacent peripheral edges of said plate-like articles, said supporting member adapted to be rotated about a central axis relative to said lid member.

5,025,925

FLEXIBLE CONTAINER FOR FLUIDS

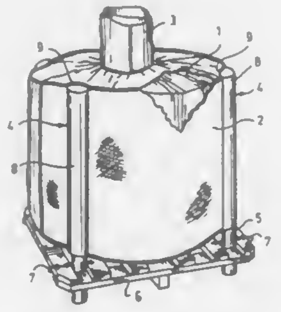
Christian Wiklund, Karleby, Finland, assignor to Oy Fluid-Bag Ab, Jakobstad, Finland

PCT No. PCT/FI88/00047, § 371 Date Oct. 12, 1990, § 102(e) Date Oct. 12, 1990, PCT Pub. No. WO89/09171, PCT Pub. Date Oct. 5, 1989

PCT Filed Mar. 31, 1988, Ser. No. 573,167

Int. Cl.^{5} B65D *19/00*

U.S. Cl. 206—386 **2 Claims**



1. A flexible container for fluids, mounted on a pallet (6) and comprising a liquid-proof inner bag (1); a substantially cylindrical outer sack (2) which surrounds the inner bag and the mantle surface of which is provided with channels (4) for support pillars (5) pivotably secured to the pallet (6), said channels extending in parallel with the central axis of the outer sack; and means (3) for filling and emptying the container, characterized in that an outer and an inner side wall (8,9) of the channels (4) have substantially the same dimension in the peripheral direction of the outer sack (2).

5,025,926

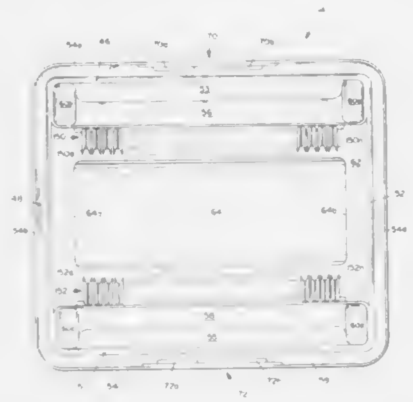
PACKAGE

Barry Gregerson, Shorewood, and Larry Dressen, Waconia, both of Minn., assignors to Empak, Inc., Chanhassen, Minn.

Continuation of Ser. No. 331,291, Mar. 31, 1989, Pat. No. 4,966,286, which is a continuation-in-part of Ser. No. 198,464, May 24, 1988, which is a continuation-in-part of Ser. No. 70,435, Jul. 7, 1987, Pat. No. 4,793,488. This application Oct. 24, 1990, Ser. No. 602,670

Int. Cl.^{5} B65D *85/57*

U.S. Cl. 206—444 **3 Claims**



1. Semiconductor wafer handling cassette comprising:

a. angled, downwardly extending sides, each of opposing mirror image sides including at least one horizontal support and at least two horizontal levels of wash slots in between opposing dividers extending inwardly from each of said sides, said wash slots extending vertically between each of said dividers, lower edge members secured to each of said sides, each of said edge members including a conforming radius seat area for accepting a specific radius size of the wafer, each of said dividers having dual profile teeth where upper profile are deeper in cross section than lower profile teeth and at a smaller angle than said upper tooth extending inwardly;

b. rear end extending between said two sides and including an inverted large reversed arch extending downwardly; and,

c. horizontal cross-bar center member extending between said two sides, and including a partial section of a cylindrical rod equally spaced thereon.

5,025,927

RESPIROMETER

Raj P. Garg, Thapar Institute of Engineering and Technology, Patiala-147 001, India

Continuation-in-part of Ser. No. 130,425, Dec. 9, 1987, Pat. No. 4,783,172, which is a continuation-in-part of Ser. No. 783,632, Oct. 3, 1985, abandoned, and a continuation-in-part of Ser. No. 77,165, Jul. 24, 1987, abandoned, which is a continuation-in-part of Ser. No. 783,631, Oct. 3, 1985, abandoned. This application Oct. 11, 1988, Ser. No. 255,746

The portion of the term of this patent subsequent to Nov. 8, 2005, has been disclaimed.

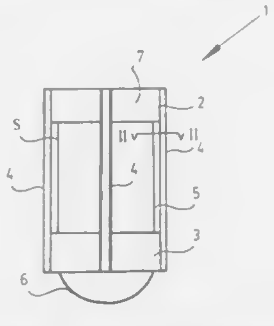
Int. Cl.^{5} G01N *33/18*

U.S. Cl. 206—527 **23 Claims**

1. A respirometer, to determine the oxygen demand of a respiring liquid sample, comprising a chamber to be completely filled with said sample, and said sample being

10. A respirometer used to determine oxygen demand of a respiring liquid sample in continuous flow system, said respirometer comprising a chamber to be completely filled with said sample, said chamber comprising a framed structure and a member permeable to oxygen, said framed structure formed from inlet and outlet sleeves securely held by one or more supports extending between said sleeves, and each said sleeve being provided with two openings, said framed structure comprising of fixed members which are in the form of inlet and outlet sleeves, thickness and stiffness of said members of the framed structure is much more than that of the membrane, said chamber being formed by securely holding said membrane to said inlet and outlet sleeves of the framed structure in air tight relationship, one opening at each said sleeve of the framed structure of the respirometer used for supporting a dissolved oxygen probe in air tight relationship and the other opening at each said sleeve of the framed structure of the respirometer used for inlet and outlet for said sample, said chamber comprising means for interposing said membrane inbetween the respiring liquid and the gas phase and allowing reoxygenation of said sample and said chamber comprising means for providing capability of reproducing and maintaining the geometric mode of said respirometer.

14. A disposable respirometer, to determine the oxygen demand of a respiring liquid sample, comprising a chamber of volumetric capacity up to 125 milliliters, said chamber to be completely filled with said sample, said chamber comprising a framed structure and a membrane permeable to oxygen, said framed structure formed from a top sleeve and a bottom sleeve securely held by one or more supports extending between said sleeves, said framed structure comprising of fixed members which are in the form of sleeves, thickness and stiffness of said members of the framed structure is much more than that of the membrane, said chamber being formed by sealing said membrane to said sleeves of the framed structure and the membrane end at bottom sleeve being sealed while top sleeve having a opening and comprising communication means for said chamber, said chamber comprising means for interposing said membrane inbetween the respiring liquid and the gas phase and allowing reoxygenation of said sample and said chamber comprising means for providing capability of reproducing and maintaining the geometric mode of said respirometer.



16. A disposable respirometer, to determine the oxygen demand of a respiring liquid sample, comprising a chamber of volumetric capacity upto 75 milliliters, said chamber to be completely filled with said sample, said chamber comprising a framed structure and a membrane permeable to oxygen, said framed structure formed from a plurality of sticks sealed to a sleeve extending inbetween the sticks, said framed structure comprising of fixed members which are in the form of sticks, thickness and stiffness of the members of the framed structure is much more than that of the membrane, said chamber being formed by sealing said membrane to said sticks and the sleeve of the framed structure and the lower end of said membrane is closed by sealing while the sleeve opening serving as communication means for said chamber, said chamber comprising means for interposing said membrane inbetween the respiring liquid and the gas phase and allowing reoxygenation of said sample, and said chamber comprising means for providing

VOL
1127
ISS
4
JE
25
1991
UMI

capability of reproducing and maintaining the geometric mode of said respirometer.

17. A respirometer used to determine the oxygen demand of a respiring liquid sample and is in the form of a disposable pouch, said pouch comprising a chamber to be completely filled with said sample, said chamber comprising a framed structure and a membrane permeable to oxygen, said framed structure comprising a peripheral stiffening frame incorporating a opening, said peripheral stiffening frame comprising of fixed and support members which are in the form of strips, and said stiffening frame being formed by securely holding said fixed strip members integral with said support member or members and incorporating a opening in one of the said members, the thickness and stiffness of said peripheral stiffening frame is much more than that of the membrane, said chamber being formed when the periphery of two sheets of said membrane is securely held to said stiffening frame in air tight relationship and the opening in the said frame forming the mouth of said chamber, said mouth comprising communication means for said chamber, said chamber comprising means for interposing said membrane inbetween the respiring liquid and the gas phase and allowing reoxygenation of said sample, and said chamber comprising means for providing capability of reproducing and maintaining the geometric mode of said respirometer

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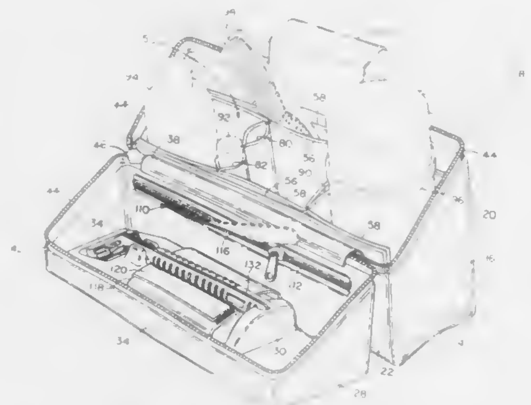
5,025,928
TRAVEL CASE

Gary D. J. Orosy, Franklin, Mass.; Frederick B. Hadtke, New Providence, N.J., and Paul D. Miller, New York, N.Y., assignors to The Gillette Company, Boston, Mass.

Filed Oct. 22, 1990, Ser. No. 602,218

Int. Cl.⁵ B65D *69/00*

U.S. Cl. 206—581 20 Claims



1. A travel case comprising
a base portion that defines a first compartment,
support structure in said base portion for securing the travel case on a support bar or the like;
organizer structure in said first compartment, said organizer structure having a plurality of chambers for receiving in frictionally secured relation a plurality of toiletry components of diverse shapes and sizes;
a cover portion that defines a second compartment,
releasable securing structure in said second compartment for retaining a shaving system;
hinge structure connecting said base portion and said cover portion; and
closure structure for holding said base and cover portions in juxtaposed relation when the case is closed.

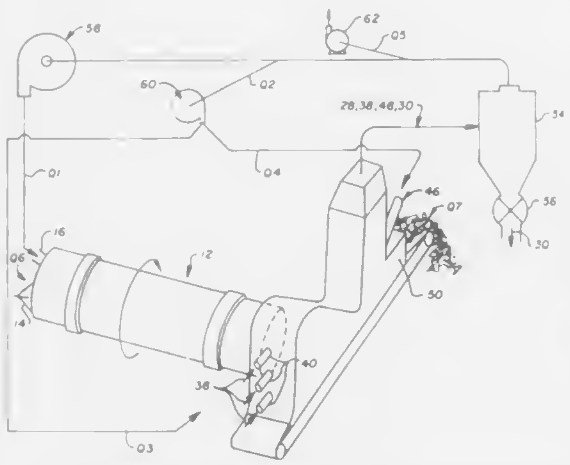
5,025,929
AIR CLASSIFIER FOR LIGHT REUSABLE MATERIALS SEPARATION FROM A STREAM OF NON-SHREDDED SOLID WASTE

Pietru Carrera, Rocca di Papa, Italy, assignor to Sorain Cecchini Recovery, Incorporated, Fairfax, Va.

Filed Aug. 7, 1989, Ser. No. 390,283

Int. Cl.⁵ B03B *7/00;* **B07B** *9/02*

U.S. Cl. 209—19 19 Claims



1. An apparatus for separating a light fraction from solid, non-shredded waste material, comprising
first conveying means for conveying waste material along a first conveyance path;
first inlet means for delivering waste to be separated to said first conveying means;
means for directing a first air stream to and along said first conveyance path in a direction of conveyance thereof so that light fraction materials in said delivered waste are entrained in said air stream and carried along said conveyance path vertically above a heavier fraction of said delivered waste;
second conveying means for conveying waste material along a second conveyance path, said second conveying means receiving delivered waste material form the said first conveying means so that the delivered waste material falls down and is stratified on said second conveying means with said heavier fraction thereof disposed substantially adjacent said second conveying means and said light fraction thereof is disposed substantially vertically above heavier fraction; and
a housing surrounding and enclosing at least said second conveying means and the delivered waste material thereon, said housing receiving said first air stream, so that said first air stream flows longitudinally therethrough, said housing having a heavier waste material outlet and an air outlet for air and light fraction waste material entrained therein, said housing defining an air duct extending longitudinally of said second conveying means, a vertical cross-section of said housing varying along the length of said second conveying means so that said air duct has a reduced cross-section along at least a portion of the length of said second conveying means whereby the velocity of air flowing through said duct increases at said reduced cross-section portion to thereby pick up and entrain light fraction material disposed on and above said second conveying means and conduct said light fraction through said air outlet.

5,025,930
CENTRIFUGAL CLASSIFIER

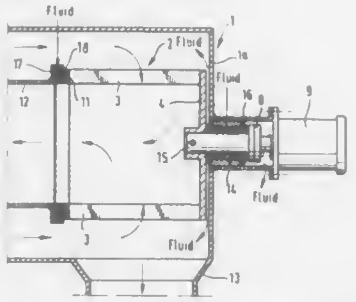
Ulrich Barthelmess, Niederstotzingen, Fed. Rep. of Germany, assignor to OMYA GmbH, Cologne, Fed. Rep. of Germany

Filed Apr. 11, 1988, Ser. No. 180,088

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1987, 3712136

Int. Cl.⁵ B04B *5/08, 7/00;* **B01D** *45/14;* **F16C** *32/06*

U.S. Cl. 209—144 9 Claims



1 A centrifugal classifier comprising: a housing having inlet means for material to be classified and for clasifying air and also having first outlet means for a mixture of classifying air and fines and second outlet means for coarses; at least one rotor comprising blade means; and fluid bearing means rotatably supporting said at least one rotor in said housing and also having passage means adapted to be swept through by a fluid from outside said housing into said housing to form a seal between said housing and the outside, said first outlet means comprises a suction pipe, and a labyrinth seal between said suction pipe and said at least one rotor.

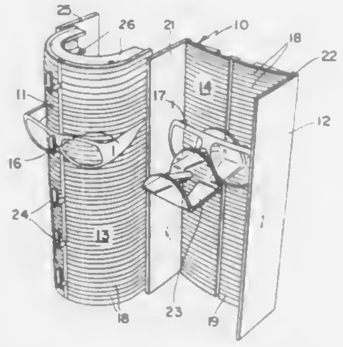
5,025,931
MODULAR DISPLAY SYSTEM

Barry D. Berger, New York, N.Y., assignor to R. N. Koch, Inc., Providence, R.I.

Filed Oct. 19, 1990, Ser. No. 600,494

Int. Cl.⁵ A47F *5/00*

U.S. Cl. 211—13 11 Claims



1. Modular display system, comprising (a) a vertically-elongated convex element having a generally semicylindrical outer surface, (b) a vertically-elongated concave element having a rectangular recess surface joined to the convex element along one side, and (c) means for supporting merchandise, which means is associated with the outermost portion of the surface of the convex element and with the innermost portion of the concave element.

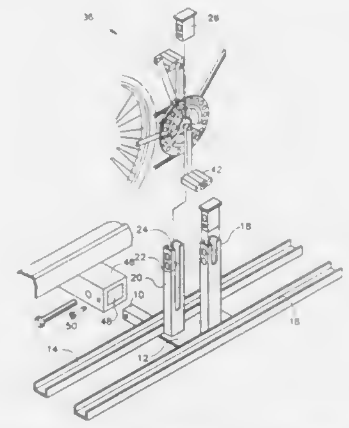
5,025,932
SECURE BICYCLE RACK AND CARRIER

Lanny E. Jay, 723 #5 Laguna Canyon Rd., Laguna Beach, Calif. 92651

Filed Jan. 25, 1990, Ser. No. 470,369

Int. Cl.⁵ A47F *7/00*

U.S. Cl. 211—20 19 Claims



1. A bicycle rack having means for securing a bicycle against theft comprising:
a base support member; and
an elongated vertically extending post member secured at a lower end to said base member and extending upwardly therefrom to a top end terminating at a position above the height of a crank axle of a bicycle to be secured therein, said post member being tubular for receiving a crank arm therein, with an inner slot in an inner wall extending from said top for receiving a crank axle, and an outer slot in an outer wall for receiving a pedal shaft for positioning a pedal outside the post member when the crank arm is received therein.

5,025,933
BICYCLE STAND

Heinrich Kalisch, Lenaustrasse 77, and Rolf Meurer, Am Weimarfloss 9, both of 6000 Frankfurt/Main, Fed. Rep. of Germany

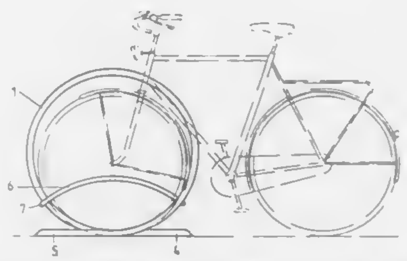
PCT No. PCT/DE86/00399, § 371 Date Jun. 4, 1987, § 102(e) Date Jun. 4, 1987, PCT Pub. No. WO87/02000, PCT Pub. Date Apr. 9, 1987

PCT Filed Oct. 2, 1986, Ser. No. 63,130

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1985, 3535525

Int. Cl.⁵ A47F *7/00*

U.S. Cl. 211—22 21 Claims



1. Bicycle stand for parking one bicycle or two bicycles simultaneously from opposite directions, said bicycle stand comprising a vertically extending spiral portion (1) made of circularly bent pipe or solid material and having ends (2) and (3) standing on the ground, said ends (2) and (3) being lengthened by end pieces (4) and (5), said spiral portion having an upper vertex and an elongated adjoining area extending between said ends and said upper vertex, said vertex together

VOL
1127
ISS
4
JE
25
1991
UMI

with said adjoining area having a height which corresponds to the average height of the steering head pipe/handlebar shaft and seat support/upper portion rear seat stay areas of commercially available bicycles; and a one-piece connecting brace (6) positioned in the lower area of said spiral portion (1) at opposite arc-shaped portions, respectively, said connecting brace having two ends (7) and (8) connected to said spiral portion (1) and bent thereat at such an angle that the spacing between said material of said spiral portion (1) and said connecting brace (6) corresponds at least to the greatest cross-sectional width of the tires and rims of the commercially available bicycles.

5,025,934

STANDING CONTAINER

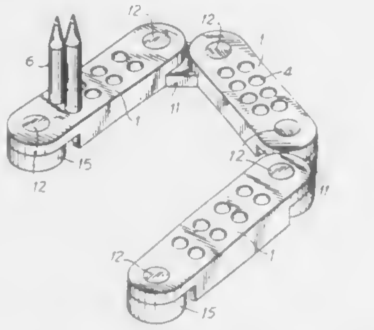
Helmut Vogel, Nürnberg, Fed. Rep. of Germany, assignor to A. W. Faber-Castell GmbH & Co., Stein, Fed. Rep. of Germany

Filed Jun. 4, 1990, Ser. No. 532,968

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1989, 392310

Int. Cl.^{5} A47F *7/00*

U.S. Cl. 211—69.5 13 Claims



1. A standing container for pin-shaped writing or drawing instruments, comprising a plurality of receiving elements pivotally connected with one another, each of said receiving elements being formed as a strip-shaped receptacle with at least two parallel rows of insertion openings, with a groove provided on its lower side and extending in a longitudinal direction, and an upper part having an extension at least at one end thereof; a spring element located in said groove and provided with a plurality of individual spring tongues arranged to abut against pin-shaped elements lying in a region of said groove; and means for pivotally connecting said receptacle with an adjacent receptacle and including a hinge piece extending between the one ends of said receptacle and the adjacent receptacle and a pin supported by said extension and connecting a respective end of said hinge piece to the one end of said receptacle; said receptacle having a plurality of partially-cylindrical openings each forming a continuation of a respective one of said insertion openings and being located deeper than the latter, and said receptacle having side legs which limit said groove, said partially-cylindrical openings extending into said side legs.

5,025,935

PORTABLF UPRIGHT SCUBA CYLINDER RETENTION RACK

Josh L. Hadachek, 635 46th Ave. Ct., Greeley, Colo. 80634

Filed Apr. 9, 1990, Ser. No. 506,460

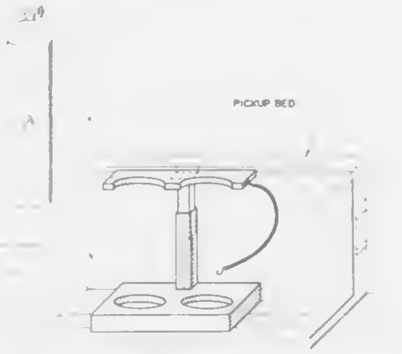
Int. Cl.^{5} A47F *7/00*

U.S. Cl. 211—71 3 Claims

1. A portable upright retention rack for use in the transporting and storage of compressed gas cylinders, without the use of tools, said cylinders having a bottom and upper portion, and said rack comprising:

a. a base piece capable of retaining the bottom of said cylinders,

b. a top piece capable of retaining said cylinders upper portion and providing attachment to a permanent structure,



c. a compressible component extending between and connecting said base piece and said top piece.

5,025,936

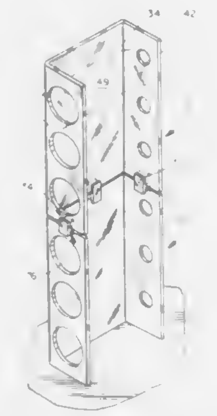
RACK FOR STORING AND DISPLAYING BOTTLES

David Lamoureaux, P.O. Box 38, Arlington Heights, Ill. 60006

Filed Oct. 30, 1989, Ser. No. 428,990

Int. Cl.^{5} A47B *73/00*

U.S. Cl. 211—74 14 Claims



1. A rack for storing and displaying bottles of the type having a) a generally cylindrical body with a first diameter and an identifying label thereon and b) a generally cylindrical neck with a diameter less than the body diameter, said rack comprising:

first and second spaced walls,

there being a first opening through the first wall with a diameter less than the diameter of the body of the bottle and a second opening through the second wall with a diameter greater than the diameter of the body of the bottle;

a third wall connecting the first and second walls so as to define a unitary structure with said first and second walls, said unitary structure having a top, bottom, front and rear;

means on the bottom of the unitary structure for supporting the unitary structure in a free standing upright position on a horizontal subjacent support surface,

said bottom supporting means comprising a continuous first edge on the first, second and third walls that resides in a first plane;

whereby with said unitary structure in an upright position on said first edge, a bottle can be directed neck first through the second opening and into the first opening to a display position so that the bottom is supported cooperatively by the first and second walls in a substantially horizontal position wherein at least part of the body of the bottle and the identifying label thereon is visible between said first and second walls from the front of the unitary structure; and

means on the top of the unitary structure for supporting the unitary structure in a free standing inverted position on a horizontal subjacent support surface,

said top supporting means comprising a continuous second edge on the first, second, and third walls that resides in a second plane,

whereby with a bottle in the display position and the unitary structure in the inverted position on said second edge, the bottom is in a substantially horizontal position,

said third wall being translucent, extending substantially continuously and uninterruptedly between the first and second walls and the first and second planes and defining a planar rear surface on which the rack can be supported,

said first, second and third walls having a one-piece construction,

whereby bottles on the rack can be displayed selectively in any of three different positions.

5,025,937

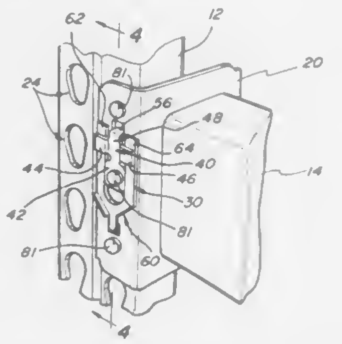
SAFETY LOCK FOR RACK SYSTEMS

John R. King, West Bloomfield, Mich., assignor to S&k Enterprises, Inc., Detroit, Mich.

Filed Sep. 22, 1989, Ser. No. 410,809

Int. Cl.^{5} A47F *5/00*

U.S. Cl. 211—192 8 Claims



1. A beam safety lock comprising:

a cross-shaped member including four legs, one of said legs including means adapted for rigidly securing said cross-shaped member onto a stud on a beam; and

a U-shaped member including a pair of legs connected by a web and a hook means extending from said web, said legs of said U-shaped member associating with said cross member for operatively coupling said V-shaped member with said cross member, said hook means adapted for cooperating with an aperture in the support for locking the beam with the support.

5,025,938

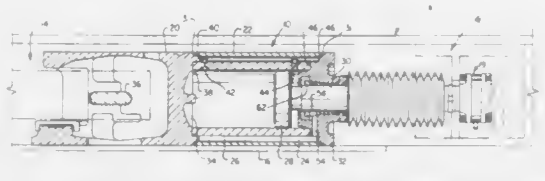
RAIL CAR CUSHION SLIDER VALVE

Charles T. Bomgardner, Burleson, and D. Bradley Dumler, Arlington, both of Tex., assignors to FM Industries, Inc., Ft. Worth, Tex.

Filed Dec. 13, 1989, Ser. No. 450,170

Int. Cl.^{5} B61G *9/00*

U.S. Cl. 213—43 7 Claims



6. A rail car cushioning apparatus including: a cylinder having a first end mounted into a first cylinder seat of a cushion apparatus body and a second end mounted into a second cylinder seat of a rod end cylinder head assembly; a piston slidably mounted in said cylinder and connected to a piston rod which is slidably mounted in a piston rod bore extending through said cylinder head assembly; a support housing having a first end mounted to said cushion apparatus body and a second end mounted to said cylinder head assembly to form an annular reservoir between said support housing and said cylinder; said apparatus further comprising:

a flow chamber and flow passage means in said cylinder head assembly for providing liquid flow from said reservoir to around said piston rod within said cylinder;

a sleeve valve chamber formed in a said cylinder head assembly adjacent to said flow chamber and having a sleeve valve sealing surface;

a sleeve valve retainer lip integrally formed on said sleeve valve chamber on an opposite end of said sleeve valve chamber from said sleeve valve sealing surface;

an annular sleeve valve mounted to slide along said piston rod;

said sleeve valve being located within said sleeve valve chamber;

said sleeve valve being confined for limited movement in a first direction by contact of said sleeve valve with said sleeve valve sealing surface and for limited movement in a second direction by contact of said sleeve valve with said sleeve valve retainer lip;

said sleeve valve forming a liquid seal between said flow chamber and said sleeve valve chamber when moved during movement of said piston rod in the first direction into contact with said sleeve valve sealing surface;

said sleeve valve permitting liquid flow through said flow chamber and said sleeve valve chamber when moved during movement of said piston rod in a second direction into contact with said sleeve valve retainer lip; and

said sleeve valve retainer lip having two circumferentially extending portions separated by two discontinuous portions, said discontinuous portions being located on opposite sides from each other to provide space for said sleeve valve to be tilted and slipped through said discontinuous portions past said circumferentially extending portions into said sleeve valve chamber before said piston rod is inserted into said rod bore.

5,025,939

COFFEE DECANTER WITH INTEGRAL HANDLE

Arthur H. Bunn, Springfield, and Frank J. Lang, Lemont, both of Ill., assignors to Bunn-O-Matic Corporation, Springfield, Ill.

Continuation of Ser. No. 245,779, Sep. 16, 1988, abandoned. This application Dec. 11, 1989, Ser. No. 449,432

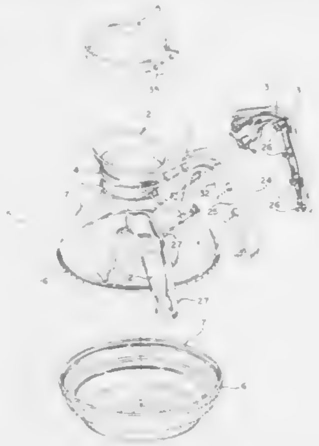
Int. Cl.^{5} B65D *25/28, 25/40*

U.S. Cl. 215—100 A 9 Claims

1. In a decanter having at least its upper body formed of plastic and having a multi-part pistol-grip handle integrally formed on one side thereof and a mouth from which the decanter contents are poured when the decanter is tilted by means of said handle, said multi-part pistol-grip handle comprising a skeletal handle integrally secured to said plastic upper body and sandwiched between handle-completing members secured to opposite sides of said skeletal handle; said skeletal handle comprising an internal narrow vertical web formed generally perpendicular to said decanter and a relatively wide substantially continuous band portion providing a portion of the gripping surface of said multi-part pistol-grip handle formed generally perpendicular to and substantially surrounding said relatively narrow vertical internal web which has a plurality of transverse pin-receiving openings therein; said handle-completing members having exterior gripping surfaces which lie on opposite sides of said skeletal handle and in conjunction with said gripping surface of said skeletal handle provide the overall gripping surface of said multi-part pistol-

VOL
1127
ISS
4
JE
25
1991
UMI

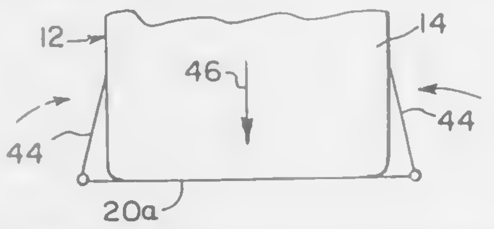
grip handle, each of said handle completing members having an integral transverse flange the outer surface of which mates with the inner surface of said substantially continuous band portion on the adjacent side of said internal web with the free edge of each said flange abutting said internal web and each said handle-completing member having a continuous vertical shoulder surrounding its said transverse flange and abutting the adjacent side of said continuous band portion of said skeletal handle whereby each said handle-completing member has three surfaces which mate with three surfaces of said skeletal handle; one of said handle-completing members having a plurality of socket providing pins which project through and substantially fill said pin-receiving openings and the other handle-completing member having a plurality of pins which project into and are secured in said socket-providing pins; the open side of the space within said transverse flange on each said handle-completing member being closed by the adjacent surface of said internal web and the resulting enclosed space on each side of said multi-part piston-grip handle having drain openings at the proximal and distal ends of said handle; said mouth being formed on a neck formation portion of said upper body, a flexible band embracing said neck and having a pair of parallel ears on the ends of said band with each of said ears having an opening therethrough, said vertical web of said skeletal handle having a pair of ear-retaining pins projecting from opposite sides thereof and extending through said openings in said ears, and each of said handle-completing members having an integral socket formation into which one of said ear-retaining pins projects with the inner face of each said socket formation engaging one of said ears and holding it against said vertical web, and said substantially continuous band portion on said skeletal handle being interrupted on each side to provide an opening through which said band extends.



5,025,940

BOTTLE HOLDER

Cesar Akly, 50-20 61 St., Woodside, N.Y. 11377
Filed Apr. 2, 1990, Ser. No. 503,244
Int. Cl.⁵ B65D *23/10*
U.S. Cl. 215—100 A **2 Claims**



1. A bottle holder for use with a bottle having a large body and a narrow neck with an annular flange, said bottle holder comprising:

(a) a substantially horizontal base member which is sized and shaped to fit against the bottom of the large body of the bottle;

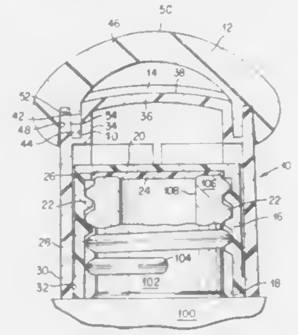
(b) a strap member having one end connected to said base member;

(c) a substantially horizontal fork gripping member connected to the other end of said strap member which is sized and shaped to engage the neck of the bottle under the annular flange, so that a person can grip said strap member and pour out the liquid contents of the bottle, wherein said base member has a circular perimeter with a center normally curved upwardly and includes a plurality of engagement fingers extending upwardly spaced about the perimeter of said base member and includes means so that when the bottle is placed upon said base member, said base member center will be forced downward at its center causing the base perimeter and said fingers to pivot upwardly and inwardly against the side of the large body of the bottle to stabilize the bottle on said base member.

5,025,941

DOME SHAPED CLOSURE CAP

Robert Petit, Paris, France, assignor to L.I.R. France, Chevilly la Rue, France
Filed May 17, 1990, Ser. No. 525,347
Int. Cl.⁵ B65D *51/18*
U.S. Cl. 215—228 **10 Claims**

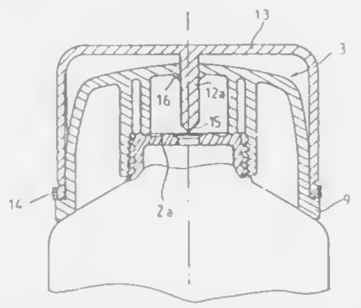


1. A cap for a container including a hollow cylindrical body, a section of reduced diameter within said body; a support member rising above said section of reduced diameter; means for securing said body to the container comprising a threaded inner sleeve concentric within said body and below said section of reduced diameter; a first detent means on an upper end of said body; and an upwardly extending arcuate dome including a second detent means; wherein said first and second detent means engage each other so as to interchangeably secure said upwardly extending arcuate dome to the cap.

5,025,942

DEVICE FOR HANGING VARIOUS ACCESSORIES ON A SCREW RING OR ENDPIECE OF A CONTAINER

Marthe Lucas, La Grande Motte, France, assignor to Societe de Conseils et d'Tudes des Emballages S.C.E.E., Danmartin en Goele, France
Filed Aug. 1, 1989, Ser. No. 387,926
Claims priority, application France, Aug. 3, 1988, 88 10480
Int. Cl.⁵ B65D *41/00*
U.S. Cl. 215—318 **14 Claims**



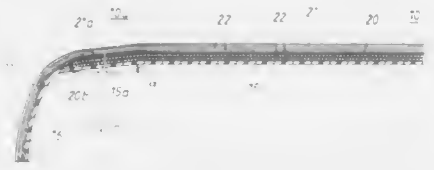
1. Hooking device for attaching an accessory to a container

having a threaded neck with deformable helicoidal threads, said hooking device comprising an inside sleeve, rigid superimposed snap rings on an inner periphery of said inside sleeve, said rigid superimposed snap rings being adapted to be force driven in between the helicoidal threads of the container whereby the helicoidal threads are resiliently deformed between said snap rings and said accessory is thereby positively prevented from rotating with respect to said container.

5,025,943

PRESSURE VESSEL HAVING A FILAMENTARY WOUND STRUCTURE

Jan-Erik Forsman, Luleå, Sweden, assignor to ABB Plast AB, Piteaå, Sweden
Continuation of Ser. No. 322,105, Mar. 13, 1989, abandoned. This application Jun. 11, 1990, Ser. No. 535,972
Claims priority, application Sweden, Mar. 15, 1988, 8800917
Int. Cl.⁵ B65D *8/08*
U.S. Cl. 220—589 **5 Claims**



1. A pressure vessel of a fibre-reinforced resin, which has an essentially cylindrical central portion and two domed end portions, the central portion of which comprises a tangential winding of fibre material, in which the fibre material is oriented essentially in a tangential direction, and an axial winding, located outside said tangential winding, of fibre material in which the fibre material is oriented in an essentially axial direction and the fibre material of which forms a reinforcement of the fibre material in the domed end portions; wherein the central portion, its tangential winding and its axial winding each have two end parts, each end part adjoining a respective end portion and formed with an internal diameter which decreases in a direction towards the respective end portion; wherein each end part of the tangential winding has an end facing the respective domed end portion, each said end facing the respective domed end portion having an at least substantially wedge-shaped cross-section; and wherein each end part of the central portion, tangential winding and axial winding, respectively, in at least substantially its entire extension forms an angle of 0.5°–10° with generatrices on the central portion which are parallel to an axially oriented symmetry axis of the central portion.

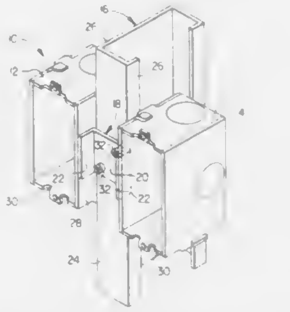
5,025,944

OUTLET ASSEMBLY FOR MOUNTING TO A WALL STUD

Steven F. Rodick, 10917 Indian Trail, Dallas, Tex. 75229
Continuation of Ser. No. 56,226, Jun. 1, 1987, abandoned. This application Oct. 19, 1990, Ser. No. 600,131
Int. Cl.⁵ F16M *13/00*
U.S. Cl. 220—3.9 **9 Claims**

1. An outlet assembly for mounting electrical and communications interface equipment and wiring to a wall stud having contiguous front and side surfaces, comprising:

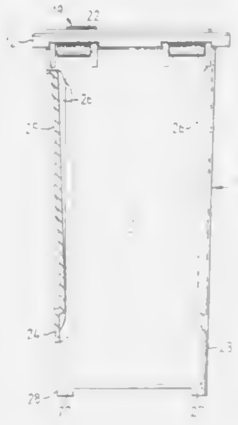
a pair of receptacles having a front face and a side portion;
a mounting bracket for securing said receptacles to said wall stud, said mounting bracket including a mounting plate and two leg members contiguous with and substantially perpendicular to said mounting plate;
each of said leg members being secured to a side portion of a receptacle so that said mounting plate extends laterally outwardly from a side portion of each receptacle; and
said leg members extending away from said mounting plate toward the front face of the receptacles and having a distal edge; whereby upon attachment of a leg member to the side portion of a receptacle, said mounting plate is positioned a predetermined distance rearwardly of said front face of the receptacle, said mounting plate being securable to said front surface of said wall stud to automatically position the front face of said receptacle said predetermined distance forwardly of said front surface of said wall stud.



5,025,945

BEVERAGE CONTAINERS

Christopher J. Lyon, Rte. 2, Box 400, Estill, S.C. 29918
PCT No. PCT/GB88/00564, § 371 Date Jan. 10, 1990, § 102(e) Date Jan. 10, 1990, PCT Pub. No. WO89/00533, PCT Pub. Date Jan. 26, 1989
PCT Filed Jul. 13, 1988, Ser. No. 457,684
Int. Cl.⁵ B65D *17/44*
U.S. Cl. 220—85 H **10 Claims**



1. A beverage container comprising an open topped vessel having a rectangular cross-section and being formed of a rigid material in which a sealed semi-rigid rectangular beverage package is to be placed, the cross-section of the bottom of the open topped vessel being substantially the same as that of the package that is to be placed thereon, and a hinged lid which has depending puncture means associated respectively with a vent hole and an outlet through which liquid contained in the semi-rigid package can be poured from the container, the outlet and the vent hole being formed in the lid which is arranged so that the puncture means pierce the top of the sealed package when that sealed package is placed upon the bottom of the open topped vessel as the lid is closed, there being passages in each puncture means leading to the respective one of the outlet and the vent hole whereby the liquid contained in the semi-rigid package can be poured through the outlet via the respective passage in the puncture means wherein the open topped vessel tapers from its top to its bottom and has a recess formed in a side wall to receive fingers of a hand by which the container is gripped, the taper being formed so as to permit insertion of the sealed beverage package into the open topped vessel without obstruction by the inner wall of the recess, and

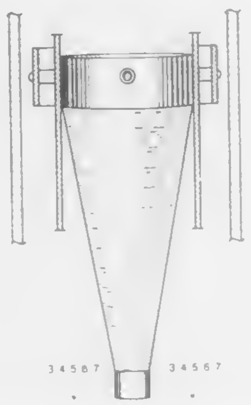
VOL
1127
ISS
4
JE
25
1991
UMI

to permit stacking of such beverage containers one upon another, as well as side by side, with minimal waste space between them, there being inwardly projecting means which locate the sealed package relative to the puncture means when the sealed package is placed upon the bottom of the open topped vessel, the inwardly projecting means comprising the inner wall of the recess.

5,025,946
ANTI-THEFT DEVICE FOR TANK OPENINGS

Michael S. Butkovich, Aurora; Gerard V. LaLonde, Naperville, both of Ill., and Irwin Ginsburgh, Newhall, Calif., assignors to Amoco Corporation, Chicago, Ill.

Filed Jul. 29, 1990, Ser. Nn. 574,457
Int. Cl.^{5} B65D *51/18*
U.S. Cl. 220—86.3 13 Claims



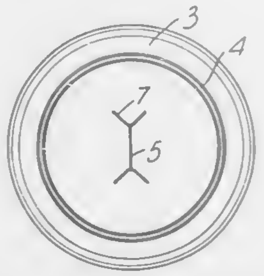
1. An anti-theft device, for use in a liquid storage tank having an opening in an upper wall of the tank for receiving and mounting an access fill pipe which receives therein a drop tube having an access port:

a mounting ring;
a plug;
a truncated porous hollow cone having a larger upper end fixed to said mounting ring and a smaller lower end fixed to said plug which is disposed generally concentric with the elongate axis of the drop tube; and
means for attaching said mounting ring of said truncated porous hollow cone to the drop tube within the access fill pipe at a point below the access port of the drop tube and above the upper wall of the storage tank.

5,025,947
SINGLE-DOSE BEVERAGE CUP AND RECTANGULAR CROSS-SECTION STRAW ASSEMBLY

Marcello Leone, Via. M. Celentano, 87 - 70121 Bari, Italy

Filed Oct. 27, 1989, Ser. No. 427,711
Claims priority, application Italy, Oct. 28, 1988, 22461 A/88
Int. Cl.^{5} B65D *41/50*
U.S. Cl. 220—90.2 1 Claim

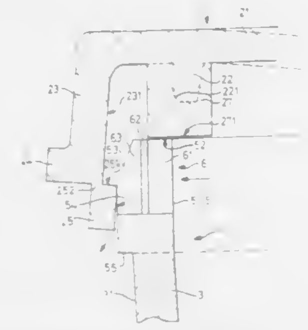


1. A single-dose cup of frustoconical shape for beverages, comprising a cup body and a ribbed circular cover, to be perforated by a rectangular cross-section multiple suction duct suction straw, said cover being formed with a breakage-facilitating surface weakened line arrangement including a diametrical weakened rectilinear line having first and second ends and end weakened line pairs substantially converging to said first and second ends of said diametrical weakened rectilinear line.

5,025,948
SEALED PACKAGING BOX WITH MECHANICAL OR MANUAL VACUUM, FULL OR PARTIAL VACUUM

Georges Fixon, Chalet Prevert, Oberbort, CH 3780 Gstaadt, Switzerland

Filed Jun. 8, 1990, Ser. No. 536,006
Claims priority, application France, Jun. 13, 1989, 89 07810
Int. Cl.^{5} B65D *51/16*
U.S. Cl. 220—366 8 Claims



1. A sealed packaging box comprising:

a receptacle having an opening;
a reinforced packing ring bordering the opening;
at least one flared passage penetrating the packing ring and connecting an inside of the receptacle with an outside of the receptacle through an outside orifice, the passage being flared toward the inside of the receptacle;
a cover adapted to close the box in a sealed manner, said cover having a bottom, an annular rib projecting from the bottom for mating with an inside surface of the packing ring, a peripheral outside edge for coming over a corresponding edge of the packing ring to mate with an outside surface of the packing ring, said peripheral outside edge also capping the outside orifice of the flared passage; and
a sealing element corresponding to said at least one flared passage, said sealing element arranged so as to come into the flared passage and seal it at least partially when the cover is mounted on the receptacle.

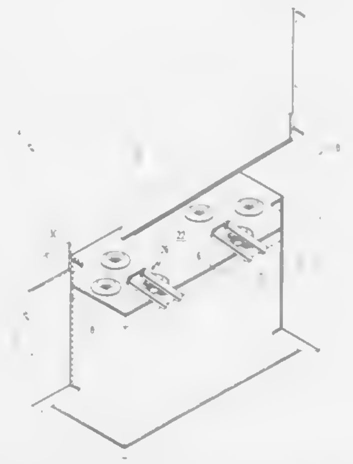
5,025,949
OIL-FILLED TRANSFORMER HOUSING

Herbert S. Adkins, Vienna, and Darrell D. Harris, Fulton, both of Mo., assignors to ABB Power T & D Company, Blue Bell, Pa.

Division of Ser. No. 294,074, Jan. 6, 1989. This application Jun. 20, 1990, Ser. No. 541,026
Int. Cl.^{5} B65D *25/24*
U.S. Cl. 220—481 2 Claims

1. In a transformer housing assembly including: a tank having a generally horizontal bottom and a generally vertical front wall; and a base supporting the tank and having a generally vertical front wall substantially co-planar with the tank front wall, the improvement comprising:

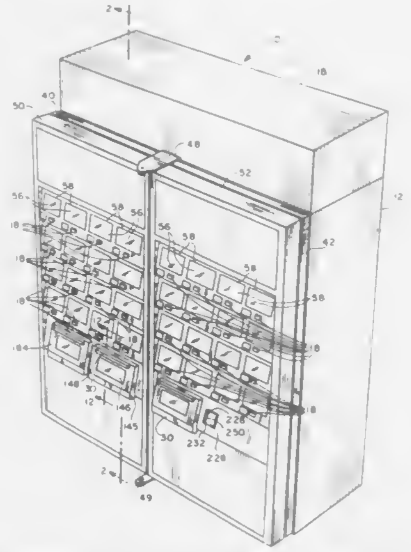
an elongate baffle member having a T-shaped cross section composed of a cross-piece having two opposed, longitudinally extending side edges, and a leg secured to said cross piece along a line parallel to and between said side edges, said leg extending transversely to said cross piece, wherein said leg is clamped between said tank bottom and said base so that a first portion of said cross piece located to one side of said leg is disposed adjacent said tank front wall, and a second portion of said cross piece located to the other side of said leg is disposed adjacent said base front wall.



5,025,950
APPARATUS FOR STORING AND DISPENSING FROZEN COMESTIBLES

Lee E. Trouteaud, Huber Heights, and Robert J. Hadick, Kettering, both of Ohio, assignors to Hobart Corporation, Troy, Ohio

Filed Jan. 16, 1990, Ser. No. 405,635
Int. Cl.^{5} G07F *11/16;* **B65G** *59/00*
U.S. Cl. 221—5 9 Claims



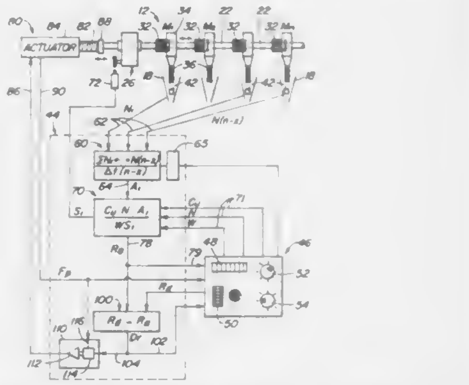
1. An apparatus for storing and dispensing frozen comestibles, comprising:

a cabinet having a frozen comestible delivery station;
cooling means coupled to said cabinet for cooling said cabinet;
a plurality of food product storage locations within said cabinet;
a plurality of food product selection switches positioned on an exterior portion of said cabinet;
a food product code sensor associated with each of said food product selection switches on said cabinet for reading a product code from a removable product identifier removably associated with each of said product storage locations;
product characteristic storage means coupled to said cabinet for storing information related to the characteristics and locations of food products within said cabinet;
mapping means coupled to said plurality of food product selection switches and to said food product code sensors for mapping a switch signal from one of said food product selection switches to a selected food product;
interrogating means coupled to said product characteristic storage means, to said food product selection switches, and to said mapping means for interrogating said product characteristic storage means and identifying the storage location of a selected food product within said cabinet; and
handling means coupled to said interrogating means and to said cabinet for transferring said selected food product from its storage location within said cabinet to the frozen comestible delivery station of said cabinet.

5,025,951
ELECTRONIC SEED RATE SYSTEM FOR A GRAIN DRILL

Richard W. Hook, Des Moines, Iowa, and Duane A. Coordes, Rock Island, Ill., assignors to Deere & Company, Moline, Ill.

Filed Oct. 31, 1989, Ser. No. 429,664
Int. Cl.^{5} G07F *11/00*
U.S. Cl. 221—13 20 Claims



1. In a seeding device having a plurality of transversely spaced seed meters each with a rotatable metering member supported within a metering housing, means for adjustably providing a preselected seeding rate comprising:

transversely movable drive means operably connected to the rotatable metering members for rotating the metering members, wherein the rotatable members are transversely movable with the drive means for changing the seeding rate of the meters in response to transverse movement of the drive means, means for rotating the drive means at a speed dependent on the forward ground speed of the seeding device, actuator means for moving the drive means transversely on-the-go, and means for controlling the actuator means from a remote location away from the drive means and actuator means to vary the seeding rate of the plurality of the meters.

VOL
1127
ISS
4
JE
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1991
UMI

5,025,952
GAS RESUPPLY VALVE WITH MICROSCOPIC APERTURE AND WITH SEALING MEMBER SUPPORTED BY VALVE BODY

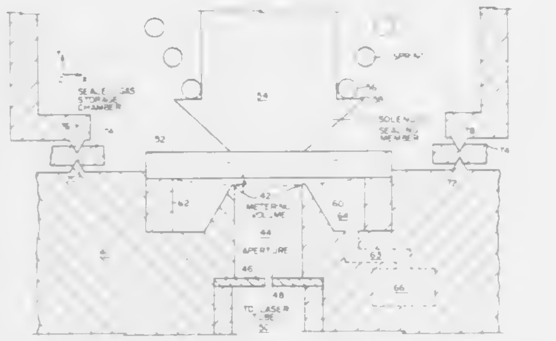
Lee Carlson, Pleasanton; Mike Green, San Jose; Mike Miller, Mountain View; Rudy Nissen, Pescadero, and Steve Sbeng, Sunnyvale, all of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.

Continuation of Ser. No. 103,231, Sep. 30, 1987, abandoned. This application Dec. 7, 1989, Ser. No. 449,244

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.^{5} B67D *5/00*

U.S. Cl. 222—3 18 Claims



1. A gas resupply apparatus for a gas laser having a gas therein comprising:

a valve body;

a metering volume formed in said valve body having an opening and having a valve seat formed integrally with a wall forming a circumference of said opening and having at least one wall which has an aperture formed therein;

a gas storage chamber for storing said gas and formed in said valve body so as to surround said opening of said metering volume;

a sealing member formed of a material having elasticity and capable of cold flow and capable of forming a seal with said valve seat, said sealing member for deforming so as to form a seal with said valve seat when force is applied to said sealing member and, when force is removed, for moving out of sealing engagement with said valve seat under the influence of the elasticity of said sealing member, thereby allowing said gas from said sealed gas storage chamber to enter said metering volume;

a sealing member support surrounding said valve seat and sized for supporting said sealing member in a position such that when external force is not applied to said sealing member, said sealing member is not in sealing engagement with said valve seat, but such that, when external force is applied to said sealing member, said sealing member is close enough to said valve seat to deform under the influence of said force so as to come into sealing engagement with said valve seat;

means for applying force to said sealing member to cause it to stay deformed and in sealing engagement with said valve seat, and, upon receipt of a control signal, for removing force from said sealing member to allow said sealing member to unseat itself from said valve seat thereby allowing said metering volume to fill with said gas from said gas storage chamber, said control signal for removing said force so as to unseal said metering volume for a predetermined time interval;

said aperture in said metering volume having a size relative to said diffusion constant of said gas and the gradient of concentration between gas molecules in said metering volume and said laser such that no appreciable amount of said gas escapes from said metering volume during said predetermined time interval when said metering volume is being filled; and

a fluid communication path means formed in said valve body for providing a path for said gas in said metering volume to leave said metering volume through said aperture and to be guided into said laser.

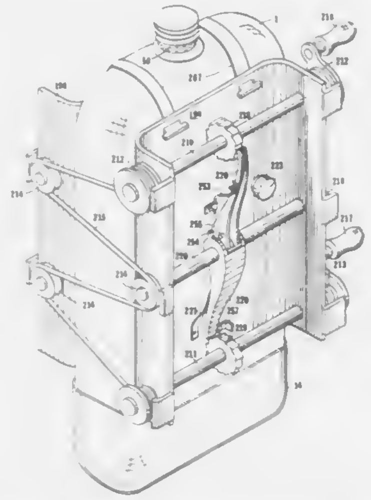
5,025,953
DEFORMABLE BEVERAGE CONTAINERS FOR PRESERVING CARBONATION

George J. Doundoulakis, 2498 Kayron Ln., North Bellmore, N.Y. 11710

Continuation-in-part of Ser. No. 258,893, Oct. 17, 1988, abandoned. This application Jul. 10, 1989, Ser. No. 377,730

Int. Cl.^{5} B67D *5/06*

U.S. Cl. 222—23 4 Claims



1. A beverage container, at least partially deformable, for preserving the CO_2 gas in carbonated beverages, comprising:

a beverage the carbonation of which is to be preserved;

cap means for covering said container;

a deformable portion means of said container;

force means for deforming said deformable portion means for diminishing the internal volume of said container, therefore raising the level of said beverage to near the top of said container; thereby drastically reducing the empty volume over said beverage, to which CO_2 gas could escape;

said force means being capable of also providing for an increase in the pressure inside said container to a desirable pressure, approximately equal to the CO_2 pressure in the body of said beverage, while said cap has been tightly secured on said container;

latching means for substantially maintaining the final shape of said deformable portion means during further storage of said beverage in said container; and

pressure indicator means for showing when a desirable pressure has been reached inside the container by the operation of said force means.

5,025,954
MULTI-COMPONENTS MEASURING AND DISPENSING SYSTEM

Jack Dunnous, Philadelphia, Pa., assignor to Hamburger Color Company, King of Prussia, Pa.

Filed Feb. 1, 1990, Ser. No. 473,311

Int. Cl.^{5} B67D *5/08;* **B05B** *3/00*

U.S. Cl. 222—56 10 Claims

1. A multi-component fluid measuring, mixing and dispensing system in which the components added all increase the volume of the mixture by the volume of the fluid component added comprising:

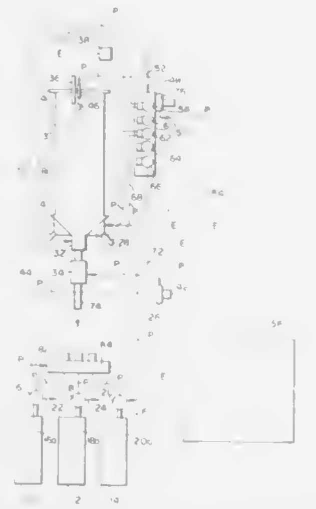
a measuring container of fixed configuration such that it may be precisely calibrated for volume at various discrete levels of fluid;

ultrasonic wave source and detector means, each having a precise location in the top of the container for measuring the level of fluid in the container in terms of the distances of the fluid surface from the ultrasonic means;

a plurality of precision valves located at the container wall at the bottom of the measuring container providing access to selected fluid components to be measured and such that the fluid components when physically mixed maintain a constant volume;

conduit means connected to the valves for connecting each valve to a source of that valve's selected fluid component;

valve control means for each valve respon ive to valve opeon and valve close signals;



computer means controlling selection of each fluid component through selection of a valve connected to a known component fluid supply to open the valve and allow the selected fluid component to flow into the chamber until the computer means determines from ultrasonic detector means that collection of a predetermined volume of the selected fluid component is occurring, at which time the computer means causes the valve control means to close the valve precisely;

repetition of the valve selection process until all fluid components required for a particular mix have been added and precisely measured; and

means for draining fluid from the container into a mixer

5,025,955
CONTAINER CLOSURE WITH IMPROVED SEALING MEMBRANE

Tracy K. Stenger, Rockford, Ill., assignor to Johnson Enterprises, Inc., Rockford, Ill.

Filed Jul. 16, 1990, Ser. No. 553,560

Int. Cl.^{5} B67D *1/12*

U.S. Cl. 222—82 9 Claims

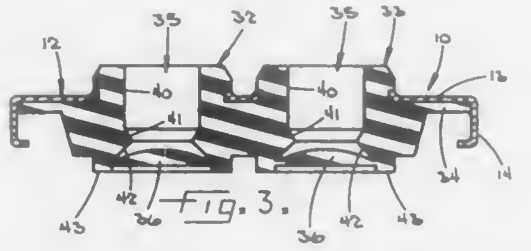


Fig. 3.

6. The combination of, a walled container for holding a charged beverage and having an opening in the top thereof, a dispensing tap having a tube with a beveled lower end portion whereby a pointed region is defined along one side of the tube at the extreme lower end thereof, and a seal for closing said opening and for admitting said tube into said container for the purpose of withdrawing beverage from the container, said seal comprising a plug made of resiliently yieldable material and adapted to close said opening, a vertically extending bore formed within said plug to permit insertion of the tube into the container through the bore, said bore having an open upper end portion and a closed lower end portion, the closed end portion of said bore being defined by a membrane of resiliently yieldable material formed integrally with and extending radially across said bore to seal off the bore and confine the beverage in the container, said membrane being sufficiently thin to be punctured by said pointed region of said tube as an incident to insertion of the tube into the container and to tear along that side of the membrane adjacent said one side of said tube, said membrane being flexible and swinging downwardly along the opposite side of the tube and interiorly of said container along a hinge line located along the opposite side of the membrane, said bore being of circular cross-section and having a generally cylindrical upper section, having a downwardly tapered and generally frustoconical section adjacent the lower end of said cylindrical section and having a downwardly flared and generally frustoconical section adjacent the lower end of said tapered section, said flared section defining a backing for said membrane when the latter is flexed upwardly by the pressure of said beverage, and said tapered section flexing downwardly and outwardly and sealing against said tube when the latter is inserted into said bore beyond said cylindrical section.

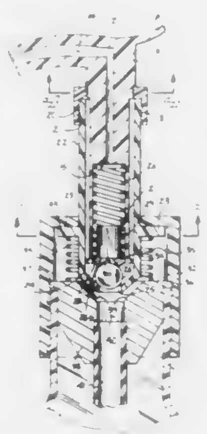
5,025,956
SAFETY TOP SPRAYER

James G. Linsenbigler, 153 F Hague Blvd., Glenmont, N.Y. 12077

Filed Oct. 11, 1988, Ser. No. 255,952

Int. Cl.^{5} B67B *5/00*

U.S. Cl. 222—153 9 Claims



1. A safety top sprayer for use in combination with a fluid container comprising,

a manually reciprocatable spray head including a through-extending conduit formed to an orthogonally oriented tubular body formed with a second conduit wherein said first conduit and said second conduit are of a first diameter, and

said first cap including an upper diametrically opening formed with first selective securement means to cooperate with a second selective securement means on an exterior surface of said tubular body for selective engagement of said tubular body to said first diametrical opening, and

said cap formed with a second opening underlying said first opening for securement of a downwardly depending enclosure tube axially aligned with and in surrounding rela-

VOL
1127
ISS
4
JE
25
1991
UMI

tionship to said tubular body underlying said first diametrical opening, and

a third conduit of a second diameter formed in said tubular body wherein said second conduit is directed into said third conduit, and

a first spring captured in said third conduit between a step defined by the second conduit opening into said third conduit, and

a spring follower formed on a further terminal end of said spring, and

a check ball captured between said spring follower at a lower terminal end of said enclosure tube, and

at least one flange directed orthogonally and secured to said enclosure tube selectively nestable within a recess formed on an interior horizontal surface of a second cap wherein said second cap accepts said enclosure tube therethrough to cooperate with a plug seal positionable within a mouth of said container to direct said fluid through said spray head from said container, and

wherein said first selective securement means and said second selective securement means comprise interrupted threads wherein said first selective securement means comprises two sections of interrupted thread diametrically opposed comprising substantially 90 degrees of arc about said upper diametrical opening, and said second selective securement means comprises a plurality of interrupted thread portions diametrically opposed and formed on substantially 90 degrees of arch about exterior surface of said tubular body.

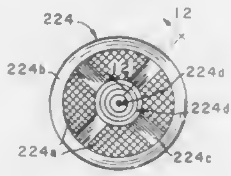
5,025,957
LIQUID DISPENSER NOZZLE ASSEMBLY

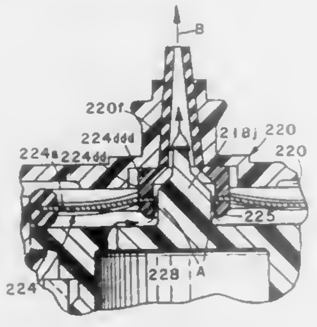
Joseph V. Ranalletta, Guntersville; Fred E. Williams, Jr., Arab, and Rowland W. Kanner, Guntersville, all of Ala., assignors to Ryder International Corp., Arab, Ala. and pK Scientific Inc., Frederick, Md.

Continuation-in-part of Ser. No. 255,365, Oct. 7, 1988, abandoned. This application Sep. 11, 1989, Ser. No. 406,053

Int. Cl.^{5} B67D *5/58. 37/00*

U.S. Cl. 222—189 45 Claims





1. An elastomeric diaphragm structure for controlling liquid flow from a storage container or the like, integrally comprising; a resiliently deflectable valve element for biased sealing against a valve seat to form a one-way valve therewith and allowing only one-way flow of liquid therebetween when said valve element is resiliently unseated from the valve seat to open said valve; and an air filter portion integrally formed with said valve element, for filtering air aspiration into said storage container.

5,025,958
SPRAY PUMP

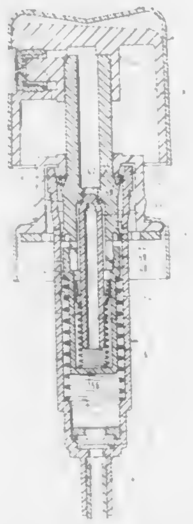
Pedro P. Montaner, Esplugues Dc Llobregat, and Victor R. Turró, Barcelona, both of Spain, assignors to Monturas, S.A., Barcelona, Spain

Filed Nov. 9, 1990, Ser. No. 611,077

Claims priority, application Spain, Apr. 26. 1990, 9001196

Int. Cl.^{5} G01F *11/36*

U.S. Cl. 222—321 1 Claim



1. In a spray pump of the type comprising: a main cylinder in which a pumping chamber is defined; a main plunger slidingly mounted within said main cylinder between a first rest position and a second end-of-stroke position, said plunger being extended by a hollow stem and having a valve seat therein; first resilient means urging said plunger to said first position; a secondary cylinder comprised within said main cylinder; a secondary plunger slidingly mounted in said secondary cylinder between a first closed position and a second open position, said secondary plunger having an upper extension with one end engageable with said valve seat; and second resilient means urging said secondary plunger to said first position, said main plunger being fixedly attached to said secondary cylinder determining a space having a closed bottom end and an upper open mouth, through which the pumping chamber and the said space are in communication, the improvement wherein said secondary plunger is provided with a cavity closed in the proximity of the end engaging the valve seat, while it is open at the lower end thereof, maintaining communication with said space.

5,025,959
APPARATUS FOR DISCHARGING PASTY MATERIALS, PARTICULARLY SEALING MATERIALS

Wilhelm Segatz, Zell u.A., Fed. Rep. of Germany, assignor to Ara-Werk Krämer GmbH & Co., Unterensingen, Fed. Rep. of Germany

Filed Jun. 2, 1989, Ser. No. 360,392

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1988, 8807574[U]

Int. Cl.^{5} B67D *5/42*

U.S. Cl. 222—389 33 Claims

1. Apparatus for discharging pasty materials comprising

a reception cylinder for receiving said materials having an opening for the discharge of said materials therefrom;

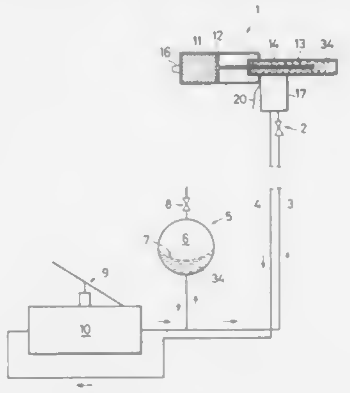
a plunger arranged within said reception cylinder to be axially displaceable therein by a pressurized liquid medium acting thereon;

a pressure cylinder for containing pressurized liquid medium coupled to said plunger so that the presence of pressurized

liquid medium in the pressure cylinder will axially displace said plunger,

liquid medium pressurizing means spaced away from said pressure cylinder and reception cylinder;

a flexible hydrostatic pressure line for carrying liquid medium under pressure having a supply portion and a return portion both of said portions being in communication with said liquid medium pressurizing means;



valving means remote from said liquid medium pressurizing means for alternately connecting the supply portion or the return portion of said hydrostatic pressure line to said pressure cylinder; and

a reservoir for containing pressurized gas to maintain hydrostatic pressure in said hydrostatic pressure line in communication with said supply portion of said hydrostatic pressure line at a location intermediate said liquid medium pressurizing means and said valving means.

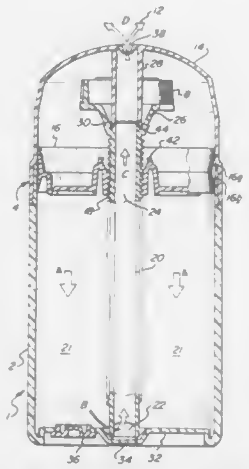
5,025,960
DISPENSER WITH HOLLOW DRIVE ROD

Richard Seager, Mystic, Conn., assignor to Risdon Corporation, Naugatuck, Conn.

Filed Dec. 5, 1989, Ser. No. 446,137

Int. Cl.^{5} B67D *5/42*

U.S. Cl. 222—390 12 Claims



1. A dispenser for flowable material comprising:

an elongate container having sidewalls extending between an open end and a closed end and defining a chamber for storing material to be dispensed;

a hollow, threaded rod having an axis extending longitudinally within the chamber, said rod having an opening adjacent the closed end of said container, and an axial opening at a bevelled end of said rod adjacent the open end of said container, said bevelled end being surrounded by a cup attached to said rod;

a piston mounted on said threaded rod by means of a threaded opening through said piston and being slidably sealingly fitted inside said container sidewalls and being axially movable in said container;

a dispensing head mounted on the open end of said container and having a product outlet for dispensing material stored in the chamber, said dispensing head having a hollow tube extending from said product outlet toward the end of said rod adjacent the open end of said container and having an open tube end located and adapted to receive and sealingly fit together with said bevelled end of said rod whereby said hollow rod and hollow tube are maintained in a joined and sealed relationship while said rod is rotated relative to said hollow tube;

a wheel coaxially mounted to and circumferentially above said cup and accessible for manual turning to rotate said hollow rod, whereby rotation of said threaded rod moves said piston along said rod toward the closed end, causing material within the chamber to pass through the opening adjacent the closed end, through said hollow rod, through the opening adjacent the open end, through the hollow tube, and out of the product outlet to the dispensing head.

5,025,961
REFRACTORY SHUTOFF ASSEMBLY CAPABLE OF IMPROVED EMERGENCY CLOSING

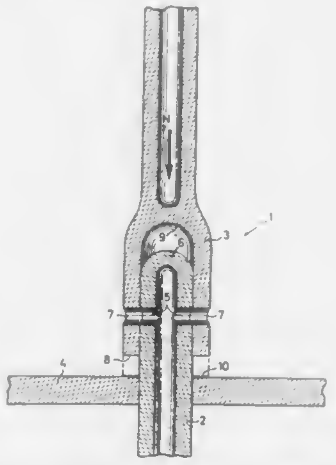
Ullrich Hintzen, Taunusstein-Watzhahn; Ernst Lührsen, Bad Schwalbach, and Andreas Schuler, Taunusstein, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed Aug. 13, 1990, Ser. No. 567,012

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1989, 3926678

Int. Cl.^{5} B22D *41/14*

U.S. Cl. 222—599 9 Claims



1. A refractory shutoff assembly for controlling the discharge of molten metal from a metallurgical vessel, said assembly comprising:

a refractory inner pipe to be fixedly mounted in a bottom of the metallurgical vessel, said inner pipe having therethrough at least one opening at a position to be above the vessel bottom when said inner pipe is fixedly mounted therein;

a refractory outer pipe to be mounted about said inner pipe, said outer pipe having therethrough at least one opening, and said outer pipe having a lower end with an annular end surface;

said outer pipe being movable relative to said inner pipe axially thereof between an open position, whereat said at least one opening in said outer pipe aligns with said at least

VOL
1127
ISS
4
JE
25
1991
UMI

one opening in said inner pipe, and a closed position, whereat said at least one opening in said inner pipe is isolated from said at least one opening in said outer pipe; and

the length of possible axial movement of said outer pipe relative to said inner pipe from said open position being sufficient to enable movement of said outer pipe to another closed position, whereat said at least one opening in said inner pipe also is isolated from said at least one opening in said outer pipe and whereat said annular end surface is to be sealingly seated on an annular surface to extend around said inner pipe.

5,025,962

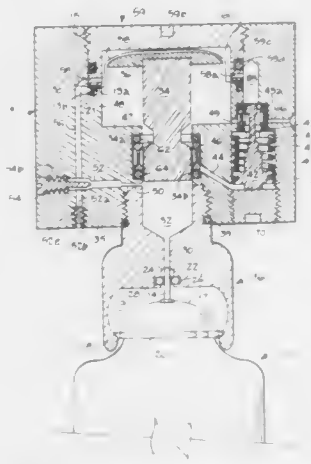
AUTOMATIC TIMED RELEASE SPRAY DISPENSER

Wesley E. Renfro, Baton Rouge, La., assignor to Robert J. LeBlanc, Baton Rouge, La.

Filed Jan. 12, 1990, Ser. No. 464,533

Int. Cl.^{5} B65D *83/26*

U.S. Cl. 222—649 20 Claims



1. An automatic and adjustable valve assembly for the timed release of pressurized fluid from an output valve means of a pressurized fluid reservoir, said valve assembly comprising:

a. first cavity means for receiving the pressurized contents of said pressurized fluid reservoir and for receiving metering rod means for metering the amount of said pressurized contents released from said valve assembly, said metering rod means having a lower end and an upper end, said lower end of said metering rod means being movable upwardly and downwardly in said first cavity means,

b. second cavity means for receiving the pressurized contents of said pressurized fluid reservoir and said upper end of said metering rod means, said second cavity means being cylindrical in shape and having generally cylindrical side walls, said metering rod means being movable upwardly and downwardly in said second cavity means,

c. diaphragm means connected to said sidewalls of said second cavity means for dividing said second cavity means into upper cavity means for receiving a first portion of said pressurized contents of said pressurized fluid reservoir and lower cavity means for receiving a second portion of said pressurized contents of said pressurized fluid reservoir,

d. first channel means for conveying said pressurized contents of said pressurized fluid reservoir from said first cavity means to said upper cavity means in said second cavity means,

e. metering valve means connected to said first channel means for varying the flow of said pressurized contents of said pressurized fluid reservoir delivered to said upper cavity means in said second cavity means,

f. exhaust valve means for periodically releasing said pressurized contents of said pressurized fluid reservoir to the atmosphere, said exhaust valve means having an upper end and a lower end,

g. biasing means for biasing said exhaust valve means in one direction,

h. upper exhaust valve cavity means for slidably receiving said upper end of said exhaust valve means and for receiving the pressurized contents of said pressurized fluid reservoir contained in said upper cavity means of said second cavity means,

i. lower exhaust valve cavity means for slidably receiving the lower end of said exhaust valve means and said biasing means,

j. second channel means for conveying said pressurized contents of said pressurized fluid reservoir from said first cavity means to said lower exhaust valve cavity means and for conveying said pressurized contents of said pressurized fluid reservoir contained in said lower exhaust valve cavity means to said lower cavity means of said second cavity means,

k. third channel means for conveying said pressurized contents of said pressurized fluid reservoir to the atmosphere,

l. fourth channel means for conveying said pressurized contents of said pressurized fluid reservoir to said upper exhaust valve cavity means, and

m. fluid reservoir adapter means for connecting said valve assembly to said pressurized fluid reservoir.

5,025,963

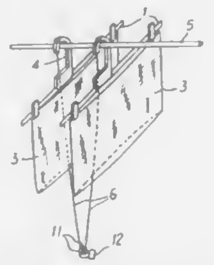
ANTI-THEFT HANGER FOR GARMENTS, FOR USE IN STORES OR CLOCKROOMS

Charles Goldfarb, Paris, and Yvon David, Dunkerque, both of France, assignors to Societe Engiplast, Roubaix, France

Filed Dec. 22, 1988, Ser. No. 288,983

Int. Cl.^{5} E05B *69/00*

U.S. Cl. 223—85 19 Claims



1. An anti-theft hanger for garments, for use in stores or cloakrooms, comprising:

a support means shaped for hanging garments, said support means having a central part provided with a lower hole;

a suspension hook located in the central part of said hanger for passing around a suspension bar, said suspension hook having an opening and including a curved part having an upper hole therein;

at least one flexible anti-theft member connected to said support means adapted to pass through a tubular part of the garment, and having at least one end fixed to a ring;

a first of said anti-theft flexible members having a free lower end provided with a first ring having provision for passage therethrough of padlock means and said first anti-theft flexible member extending across said hook opening by passing through said upper hole in said curved part; and

stop member means fixed to another end of said first flexible anti-theft member;

said first anti-theft flexible member also passing through said lower hole formed in said central part of said support means and said stop member means opposing passage through said upper hole when said first flexible member is pulled downwardly.

5,025,964

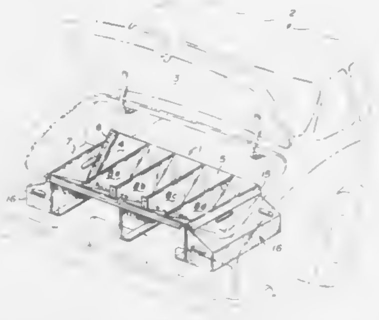
UNIVERSAL MODULAR CATALOG AND SAMPLES ORGANIZER FOR VEHICLES

George A. Phirippidis, 5815 Commerce Dr., Fremont, Calif. 94555

Filed Jul. 9, 1990, Ser. No. 550,714

Int. Cl.^{5} B60R *7/00;* **A47F** *3/14, 3/00*

U.S. Cl. 224—42.42 21 Claims



1 Universal modular storage system for vehicles comprising in operative combination:

a) a first unit comprising;

  i) a laterally extending trough unit, V-shaped in cross section having a shorter front panel and a longer back panel, each panel having an outer edge;

  ii) the bottom of the trough being oriented downwardly, and said trough being tilted with the vertex of the V oriented so that catalogs, parts books, reference manuals, etc. having a labeled backs are easily presented for reading at an angle within the range of from about 30° to about 60° up from the horizontal;

  iii) a pair of upstanding end walls, one disposed at each end of said trough and bounding the ends of said trough, each of said end walls having disposed in the area spanning the interior of the trough an opening therethrough adapted as a hand hold;

  iv) said end walls being securable to said trough to provide a unitary construction;

  v) at least one of the outer edges of said trough and said end walls having means for engaging an auxiliary storage unit;

b) at least one auxiliary storage unit removably engaged with said first unit, said auxiliary unit comprising:

  i) a plurality of side walls including a front panel, a rear panel spaced from said front panel, and a pair of opposed side panels spaced from each other and connecting said front and said back panel; and

  ii) said auxiliary unit back panel having means for permitting said auxiliary storage unit to be removably engagable with at least one of said trough end walls or said front or back trough panel.

5,025,965

BACKPACK WITH COMBINATION BELT, BELT-RECEIVING POCKET AND CLOSURE THEREFOR

Patrick D. Smith, 12790 West 6th Pl., Golden, Colo. 80401

Continuation-in-part of Ser. No. 245,023, Sep. 16, 1988. This application Aug. 30, 1990, Ser. No. 574,791

Int. Cl.^{5} A45F *4/00*

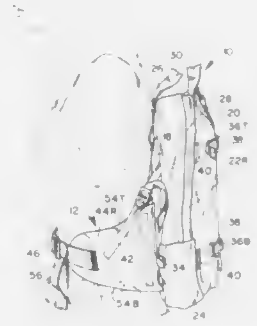
U.S. Cl. 224—151 7 Claims

1. In a backpack of the type having front and rear panels joined together along the side margins and at least the bottom thereof to define a bag, the improvement comprising:

a laterally-extending tubular pouch open at both ends, said pouch being disposed on the front panel of the bag;

a tapered waist-encircling belt comprising two belt halves, each having narrowed free ends and widened terminal ends, the terminal ends thereof fastened to the front panel of the bag alongside the open ends of the pouch, positioned and adapted to fold into the latter from each such open end; and

strap means interconnecting each of the belt halves and the bag.



5,025,966

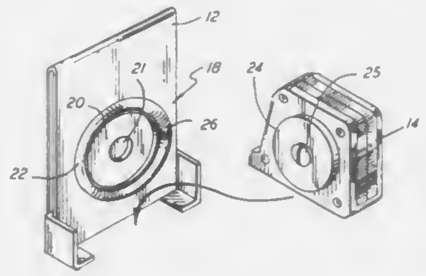
MAGNETIC TOOL HOLDER

Stephen B. Potter, 5 W. Main St., Marcellus, N.Y. 13108

Filed May 7, 1990, Ser. No. 519,586

Int. Cl.^{5} A45F *5/00*

U.S. Cl. 224—183 12 Claims



1. A magnetic tool holder comprising:

a base;

a receptacle having a flat magnet portion,

a cooperating flat keeper;

a central hole formed in one of said magnet portion or keeper;

one of said receptacle and cooperating flat keeper being mounted on said base and the other on a tool to be mounted in the tool holder; and

at least one centering guide means disposed in operative relationship with said receptacle and keeper to provide a self-alignment action on the tool as it is placed in the holder.

5,025,967

SNAP-TOGETHER LUGGAGE CARRIER SLAT

Gary M. Cronce, Port Huron; William Rasor, Goodells, and Dean Graboske, Romeo, all of Mich., assignors to Huron/St. Clair Incorporated, Port Huron, Mich.

Filed May 5, 1989, Ser. No. 348,346

Int. Cl.^{5} B60R *9/00*

U.S. Cl. 224—326 6 Claims

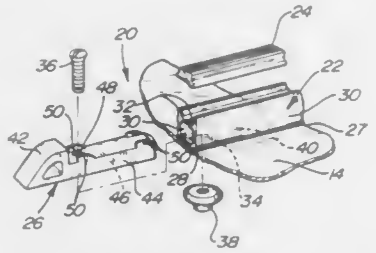
1. An article carrier for a vehicle, said article carrier comprising:

VOL
1127
ISS
4
JE
25
1991
UMI

a load-bearing slat constructed to be mounted on a vehicle surface, said slat including a base wall, two side walls extending upwardly from said base wall to form a channel, and retaining shoulders formed at the upper end of said side walls for receiving a rub strip within said channel; and

an end piece matingly received within at least one end of said slat, said end piece having an outer body portion and a tongue portion integrally formed with said slat body portion, said tongue portion received within said at least one end of said slat;

said tongue portion of said end piece including at least two flanges extending upwardly from opposite sides of said tongue portion, said flanges extending along a portion of the length of said tongue portion, said flanges engaging the underside of said retaining shoulders of said side walls to prevent rotation and misalignment of said end piece within the end of said slat; and



said tongue portion of said end piece including downwardly depending boss means formed on the underside of said tongue portion and said base wall of said slat including an opening for receiving said boss means of said tongue portion upon insertion of said tongue portion within said slat, said slat opening having a longitudinally outer lateral edge which cooperates with a longitudinally outer edge of said boss means to prevent inadvertent withdrawal of said tongue portion from said slat, said slat opening having a width substantially greater than the width of said boss means such that the cooperating engagement of said boss means with said slat opening does not prevent alignment of said end piece within the slat.

5,025,968
FURNITURE TOOL

John R. Nasiatka, Northbrook, Ill., assignor to Duo-Fast Corporation, Franklin Park, Ill.

Filed Jun. 19, 1989, Ser. No. 367,787

Int. Cl.^{5} B25C *5/06*

U.S. Cl. 227—8 25 Claims

1 A fastener driving tool for securing J-type furniture clips having a first depending leg portion with one or more first fastener receiving apertures and a second depending leg portion relatively longer than said first depending leg portion with one or more second fastener receiving apertures to a workpiece comprising:

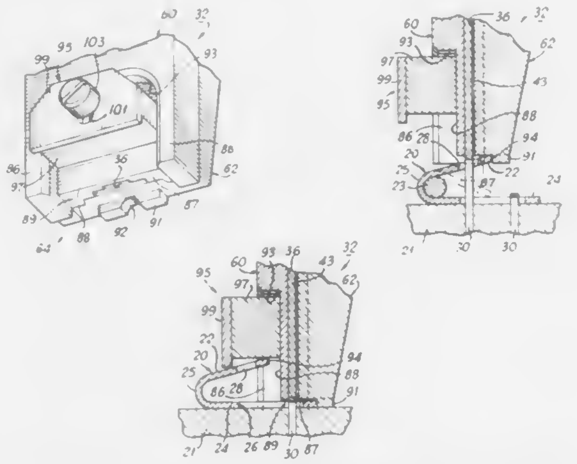
a housing;

a handle coupled to said housing;

a drive assembly disposed in said housing for driving fasteners in a feed track into a workpiece;

a nosepiece assembly forming a drive track, disposed adjacent said drive assembly;

a magazine operatively coupled to said nosepiece assembly for supplying fasteners to said drive track; and



means spaced apart from said handle for vertically aligning said drive track with said one or more fastener receiving apertures to allow fasteners to be driven therethrough.

5,025,969
DUAL ACTUATION STAPLE INSERTION APPARATUS

William L. Koester, R.R. #1, Box 232, and Daniel L. Koester, R.R. #1, Box 232A, both of, Poseyville, Ind. 47633

Continuation-in-part of Ser. No. 48,739, May 11, 1987, Pat. No. 4,826,066. This application Aug. 15, 1988, Ser. No. 232,151

Int. Cl.^{5} B25L *1/102*

U.S. Cl. 227—120 20 Claims

1. A staple insertion apparatus, which comprises:

a) a chamber formed within a housing having a bottom, opposing sides and a top portion, the chamber having first and second open end portions sized to receive a plurality of generally U-shaped staples therein;

b) a vertically disposed tubular member secured to the housing above the first open end portion of the chamber;

c) an elongated drive means slidably disposed within the tubular member, with the upper end extending above the tubular member and a handle secured to the upper end of the drive means;

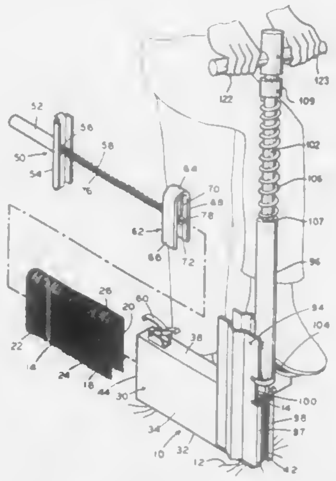
d) a staple retaining means disposed in spaced relation beyond the first open end portion of the chamber and positioned to locate the forward most staple beneath the elongated drive means;

e) a staple drive member secured to the lower portion of the elongated drive means and slidably disposed between the first open end portion of the chamber and the staple retaining means, the staple drive member having a staple confronting portion configured to generally conform to the external profile of the top of the generally U-shaped staples;

f) a staple support member secured within the chamber to the housing bottom, with sides extending in spaced relation from the housing sides and top and the sides of the staple support member extending substantially the length of the chamber to support a plurality of generally U-shaped staples thereon;

g) a staple advancing means, releasably secured to the housing about the second open end portion of the chamber, for urging the plurality of staples within the chamber towards the first open end portion of the chamber;

h) a stop secured to the elongated drive means below the handle at a height sufficient to allow movement between first and second operating positions, while restricting the staple drive member from extending substantially below the bottom of the housing;



i) a biasing member disposed about the elongated drive means between the stop and the tubular member, to raise the drive means from a lower operating position to an upper operating position;

wherein the staple insertion apparatus is positioned upon a selected material and a substantial downward force is applied to bias the drive means from the upper operating position to the lower operating position to drive the forward most staple through the selected material and into the ground; and the staple advancing means urges the plurality of staples towards the first open end portion of the chamber as the downward force is released, in preparation for insertion of the next staple.

5,025,970
PROTECTIVE SLEEVE FOR CARPET TACKING GUN

Martin L. Anderson, Maple Lake, Minn., and Gregory Nickel, Independence, Mo., assignors to National Carpet Equipment Inc., Maple Grove, Minn.

Filed Mar. 20, 1990, Ser. No. 496,239

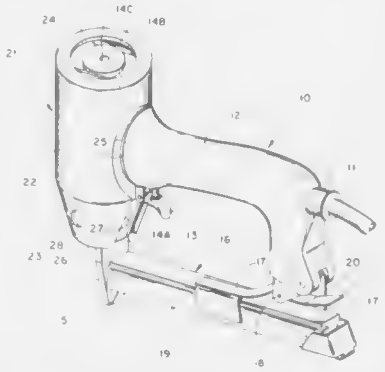
Int. Cl.^{5} B25C *7/26, 7/36*

U.S. Cl. 227—156 10 Claims

1. A protective sleeve for a powered stapling machine having a generally cylindrical body, a stp ling head connected to the bottom end of the body, and a handle connected to the side wall of the body, comprising:

a unitary sleeve member formed of a resilient memoried polymeric material shaped generally as hollow cylinder to encase, and prevent marring of surfaces contacted by, the body of the powered tacking machine, the sleeve member further having spaced bottom and side openings to accommodate the stapling head an the handle of the stapling machine and a top opening to allow convection cooling of the body of the stapling machine;

wherein a further slit is provided connecting the side and bottom openings in the sleeve member such that the bottom portion of the sleeve member can be opened or spread to enable and accommodate placement of the sleeve on the machine;



wherein the memory of the material thereafter returns the sleeve to its original shape on the stapling machine; and

wherein no other means is provided for retaining the sleeve member on the tacking machine.

5,025,971
ANNULAR CUSHIONING BUFFER FOR FASTENER-DRIVING TOOLS

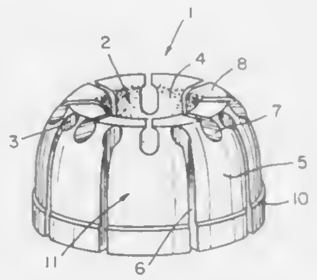
Manfred Schäfer, Bad Homburg; Kurt Schumann, Wiesbaden-Naurod, and Horst Tacke, Bad Vilbel, all of Fed. Rep. of Germany, assignors to Paslode GmbH, Eschborn-Niederhochstadt, Fed. Rep. of Germany

Filed Sep. 18, 1989, Ser. No. 408,360

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1988, 3831864

Int. Cl.^{5} B25C *1/04*

U.S. Cl. 227—156 20 Claims



1. An annular cushioning buffer (1), comprising:

an annular body (11) having an axial passage (2) defined therethrough with an axis (M);

a plurality of axially extending holes (3) defined within said annular body (11) and arranged upon a circular locus about said axis (M);

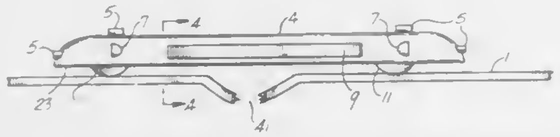
said annular body (11) having an inner peripheral surface (4) and an outer peripheral surface (5); and

a plurality of slots (6) extending from said holes (3) toward said inner peripheral surface (4) and said outer peripheral surface (5).

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,972
APPARATUS FOR PATCHING A HOLE IN THE HULL OF A MOVING SHIP

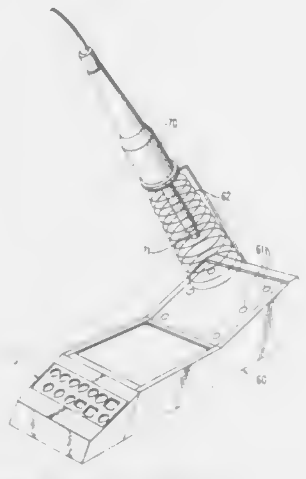
William P. Finlan, 5130 Baldwin Avenue, Temple City, Calif. 91780
Filed Feb. 6, 1990, Ser. No. 475,848
Int. Cl.^{5} B23K *37/02, 37/04*
U.S. Cl. 228—32 12 Claims



1. Apparatus for remotely repairing a breach in the surface of a ferromagnetic structure comprising:
a metallic patch plate having a selected area and shape;
a frame having a surface cooperable with the breached surface of the structure and defining a chamber sized and configured for the receipt of the patch therein in a desired positional relation to said surface of the frame;
means for moving the frame to the surface to be repaired;
electromagnetic means on the frame in cooperation with the frame surface for holding the frame on the structure;
means on the frame for driving the frame along the surface to be repaired;
means on the frame for carrying the patch plate within the chamber and for holding the patch plate on the surface to be repaired over the breach;
means disposed on the frame for welding the patch plate to the surface to be repaired;
optical viewing means disposed on the frame for remote viewing of the operation the apparatus;
means for remotely controlling the operation of the apparatus.

5,025,973
SURFACE MOUNT SOLDERING TIP HOLDER

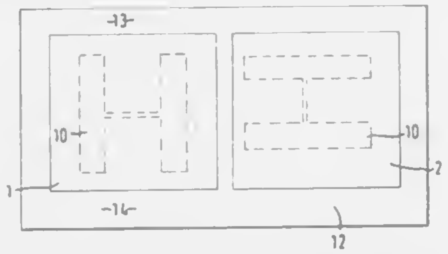
Charles M. Newton, and Paul L. Urban, both of Cheraw, S.C., assignors to Cooper Industries, Houston, Tex.
Filed Dec. 27, 1989, Ser. No. 457,949
Int. Cl.^{5} B23K *3/00*
U.S. Cl. 228—55 24 Claims



1. A soldering tip stand comprising:
a base including an upper surface, said upper surface having a plurality of recesses formed therein, wherein said recesses have different configurations and sizes;
a cover plate having a plurality of apertures formed therethrough, wherein said cover plate is fastened to said upper surface of the base such that said apertures are aligned with said recesses, said cover plate further including a portion adjacent each aperture that extends over part of a respective recess and forms a ledge thereabove.

5,025,974
PROCESS FOR PRODUCING COMPOSITE METALLIC STRUCTURES

George Strickland, Preston, United Kingdom, assignor to British Aerospace Plc, London, England
Filed Jul. 7, 1989, Ser. No. 376,503
Claims priority, application United Kingdom, Jul. 7, 1988, 8816179
Int. Cl.^{5} B23K *20/08, 20/18, 101/02, 103/10*
U.S. Cl. 228—107 23 Claims



1. A process of forming a bonded composite article made of two or more components, at least one of which is made of a material having a protective surface layer and at least one of which is made of a material that can be superplastically formed, which process comprises applying a stopping-off material to a discrete area of a first component, juxtaposing the first component with a second component so that the said discrete area lies between the first and second components, placing an explosive adjacent to one of the components, explosion bonding the first and second components together to form a composite article in which the components are joined together in areas to which the stopping-off material had not been applied and heat treating the composite article:
(a) at a temperature at which diffusion bonding can occur for a time such as to increase the strength of the bond between the components and to partially inflate the stopped-off area while still maintaining superplastic properties of the superplastic component(s), and
(b) in a step in which the temperature of the composite article is gradually increased from the said diffusion bonding temperature to a temperature at which superplastic forming can take place, the rate of the said increase in temperature not exceeding 3° C. per minute.

5,025,975
COMPOSITE TUBULAR PRODUCTS

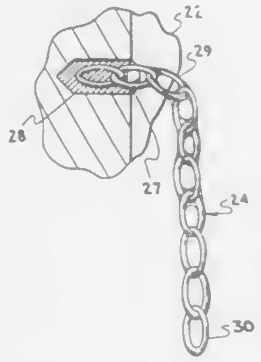
Graham Oakes; Terrence Marrison, and Martin Bridge, all of Sheffield, England, assignors to Special Melted Products Limited, Yorkshire, England
Filed Dec. 21, 1989, Ser. No. 454,304
Int. Cl.^{5} B23K *20/22*
U.S. Cl. 228—127 6 Claims

1. A method of producing a composite tubular product comprising an inner tube of a first chemical composition fusion bonded within an outer tube of a second chemical composition different to that of the first, the method comprising:
locating the inner tube within the outer tube;
locating within the assembly of the inner and outer tubes a solid core of a material having a structure which transforms from face centered cubic to body centered cubic at a transformation temperature which approximates to a transformation temperature at which a structure of the outer tube is transformed from face centered cubic to body centered cubic following fusion bonding of the assembly of the tubes and the core;
heating the assembly of the tubes and core while under pressure to a temperature at which diffusion bonding of the core to the inner tube and the inner tube to the outer tube takes place;
cooling the assembly of the tubes and the core;

forging the fusion bonded assembly of the tubes and core to produce an elongate tubular product; and
removing the core from the elongate forged product by a boring process.

5,025,976
MANUFACTURING METHOD FOR A SCULPTURE HAVING SIMULATED HAIR

Jack V. Miller, and Ruth E. Miller, both of 700 North Auburn Avenue, Sierra Madre, Calif. 91024
Continuation-in-part of Ser. No. 185,396, Apr. 25, 1988, Pat. No. 4,874,676. This application Apr. 17, 1989, Ser. No. 339,998
The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.
Int. Cl.^{5} B23K *31/02*
U.S. Cl. 228—165 20 Claims

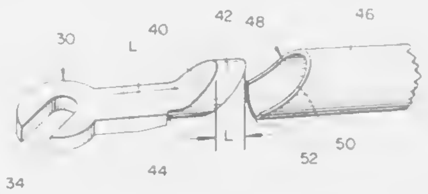


1. A method for manufacturing a sculpture having simulated hair including:
casting a rigid body of an animal figure;
providing a plurality of small holes in said animal figure;
selecting cut lengths of metallic link chain; and:
bonding said chains into the holes of the body.

5,025,977
BICYCLE DROP-OUT AND METHOD OF ATTACHMENT

Joel R. Hartman, Kennewick, Wash., assignor to Sandvik Special Metals Corporation, Kennewick, Wash.
Filed Mar. 5, 1990, Ser. No. 487,925
Int. Cl.^{5} B23K *31/02*
U.S. Cl. 228—171 25 Claims

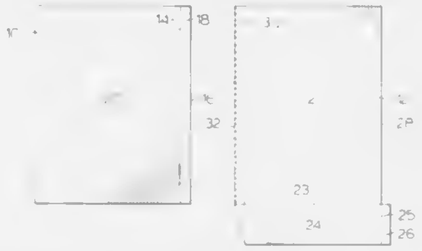
1. A method of attaching a metal drop-out to a receiving tube of a bicycle frame, wherein said drop-out is adapted to retain an axle, said receiving tube comprising an annular hollow metal tube, said method comprising the steps of:
providing a drop-out having a slotted axle-retaining section and a mounting section which is of one-piece integral construction with said axle-retaining section,
bending said mounting section relative to said axle-retaining section along a transverse bend region by an angle of from about 10° to 90°,
machining an end edge of said mounting section to a gener-



ally cylindrical configuration defining a first longitudinal axis,
inserting said machined end edge of said mounting section into an end of a receiving tube with said first longitudinal axis aligned with a second longitudinal axis of said tube, and
bonding said end edge to said tube

5,025,978
TWO-PIECE FOLDER

Peter L. Pacione, 755 The Queensway East, Mississauga, Ontario, Canada L4Y 4C5
Filed May 7, 1990, Ser. No. 519,770
Claims priority, application Canada, Apr. 24, 1990, 2015286
Int. Cl.^{5} B65D *27/00*
U.S. Cl. 229—1.5 R 15 Claims

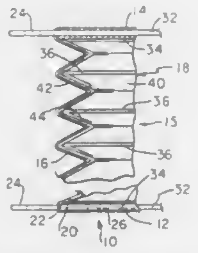


1. A kit for a portfolio folder comprising:
a separate first panel;
a separate second panel;
adhesive means for securing the first panel to the second panel,
said first panel comprising a rectangular sheet having a thin elongate flap portion along one side edge thereof delineated from a remaining rectangular portion of the first panel by a hinge-forming scoreline parallel to said one side edge,
said second panel comprising a rectangular sheet of dimensions substantially the same as that of said remaining rectangular portion,
one of said first and second panels having pocket means on a surface thereof,
said first panel adapted to be secured to the second panel with said flap portion folded along said scoreline and said flap portion overlying a thin elongate side portion of said second panel along a side edge thereof,
said adhesive means secured to one of said flap portion and side portion,
said adhesive means having a removable release sheet for removal to activate the adhesive means for adhesion to the other of the flap portion and side portion.

VOL
1127
ISS
4
JE
25
1991
UMI

5,025,979
HANGING EXPANDABLE FILE

Cheryl Dellacroce, Baldwin, N.Y., assignor to Esselte Pendaflex Corporation, Garden City, N.Y.
Filed Aug. 15, 1989, Ser. No. 394,357
Int. Cl.⁵ B65D *5/00*
U.S. Cl. 229—1.5 R **7 Claims**



1. A hanging expandable file comprising:

a body portion having front and rear faces;

an open top;

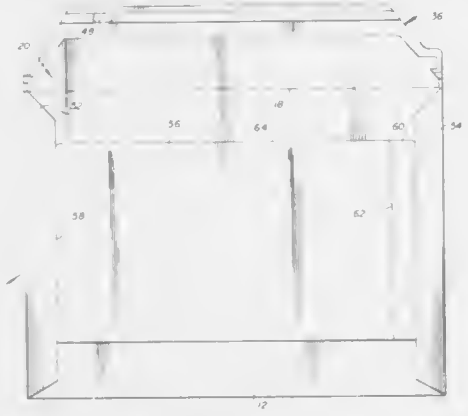
connection means for expandably securing the hottom and side edges of said front and rear faces said connection means including lateral sides and a bottom, the ends of the lateral sides and bottom being fixed to the side and bottom edges, respectively, of said front and rear faces, the top of each lateral side having a reinforcing strip;

means for sorting items to be stored in the file, said means for sorting including a series of partitions, each partition having an integral reinforcing flange at its sides which are attached to the lateral sides of said body portion; and

hanging means for storing the file in a standard file container.

5,025,980
DOUBLE USE EXPRESS MAIL ENVELOPE

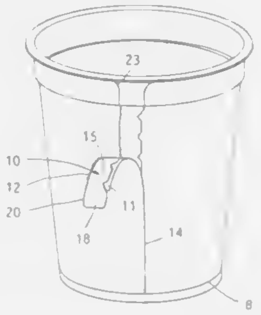
Stephen M. Blackman, Westmont, Ill., assignor to Federal Paper Board Co., Inc., Montvale, N.J.
Filed Jul. 13, 1990, Ser. No. 552,226
Int. Cl.⁵ B65D *27/06*
U.S. Cl. 229—73 **15 Claims**



1. A double use mailing envelope comprising a pocket including parallel first and second panels having remote first and second ends, said pocket being open at said first end, first and second closure flaps hingedly connected to respective ones of said first and second panels at said open end for sequentially closing said pocket, said closure flaps being of different widths with said second closure flap being of a greater width than said first closure flap and including a sealing strip area spaced greater from said first end than the width of said first closure flap, whereby said first closure flap may be first folded away from said open first end followed by sealing of said open first end by said second closure flap which overlies and conceals said first closure flap, followed by opening of said pocket and by reclosing of said pocket utilizing said first closure flap, and a removable label panel partially overlying said first panel spaced from said first end, said removable label panel being positioned below said first folded position of said first closure flap and forming that portion of said envelope to which said second closure flap is secured in the sealing of said pocket open end.

5,025,981
PACKING CONTAINER

Walter Schellenberg, Diepoldsau, Switzerland, assignor to Rundpack AG, Diepoldsau, Switzerland
Filed Jun. 25, 1990, Ser. No. 543,676
Claims priority, application Switzerland, Jul. 14, 1989, 02654/89
Int. Cl.⁵ B65D *5/42*
U.S. Cl. 229—118 **9 Claims**



1. A packing container comprising:

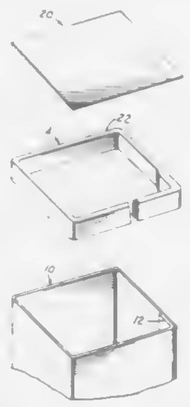
a plastic container having a top rim, a circumferential wall, and a bottom portion; and

a cardboard sleeve surrounding said circumferential wall of said plastic container, said sleeve being formed from a cardboard blank having an upper edge, a lower edge, and inner and outer overlapping edges, said sleeve having a predetermined separation strip and a gripping tab, said predetermined separation strip being formed by said inner and outer overlapping edges being spaced apart to define an overlap area having an inner overlap area and an outer overlap area, said inner overlap area having a weakening line positioned laterally of said inner overlapping edge, said strip at least partially spanning said upper edge and said lower edge of said sleeve, said gripping tab being located at the upper edge of said strip, whereby said sleeve is separated from said plastic container by pulling down on said gripping tab and tearing said separation strip away from said sleeve.

5,025,982
MULTI-PIECE FLAT TOP CONTAINER

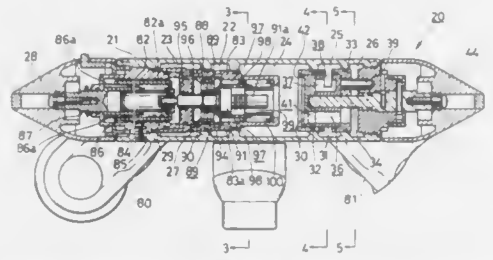
Robert E. Lisiecki, W. Bloomfield, Mich., assignor to Elopak Systems, A.G., Glattbrugg, Switzerland
Filed Oct. 29, 1990, Ser. No. 604,130
Int. Cl.⁵ B65D *5/46*
U.S. Cl. 229—125.35 **6 Claims**

1. A multi-piece container comprising a thermoplastic coated paperboard body of a predetermined cross-sectional configuration, a thermoplastic adapter ring of a predetermined height and having an annular recess formed therein adapted to mount over and sit upon the top edge portion of said body and having an annular seal formed therebetween at an intermediate height thereof, and a substantially flat membrane formed of any suitable material sealed adjacent its peripheral edge to the top edge of said adapter ring, wherein said thermoplastic coated paperboard body includes a side seam which is one of a corner seam or a center seam, and said recess of said adapter ring is formed to accommodate same.



5,025,983
MIXING VALVE

Junji Akita, Aichi, Japan, assignor to Inax Corporation, Aichi, Japan
Filed Mar. 23, 1990, Ser. No. 497,627
Claims priority, application Japan, Mar. 29, 1989, 1-79162
Int. Cl.⁵ G05D *23/13*
U.S. Cl. 236—12.2 **6 Claims**



1. A mixing valve for discharging mixed water selectively to a shower device or to a discharge tube, comprising:

a tubular valve case having an inlet port of water, an inlet port of hot water, an outlet port of mixed water for the shower, and an outlet port of mixed water for the discharge tube,

a thermo valve provided in the tubular valve case at one side thereof,

a flow change valve provided in the tubular valve case at a side opposite to the thermo valve, said flow change valve including a tubular holder coaxially situated in the tubular valve case; a fixed disc valve immovably installed inside the tubular holder and a movable disc valve movably arranged inside the tubular holder, said movable and fixed disc valves being arranged perpendicular to an axial direction of the tubular holder and interfittingly overlapping one another, one of the movable and fixed disc valves having an inlet port passing therethrough parallel to the axial direction of the tubular holder, and the other of the movable and fixed disc valves having a fan-shaped outlet port passing therethrough parallel to the axial direction of the tubular holder, a fan-shaped bypass chamber in a form of a groove extending from a surface contacting the other disc valve, and an outlet port connected to the bypass chamber formed on a peripheral side thereof; a shower chamber connected to the outlet port of mixed water for the shower and formed between an outer periphery of the tubular holder and an inner periphery of the valve case; and a discharge tube chamber connected to the outlet port of mixed water for the discharge tube,

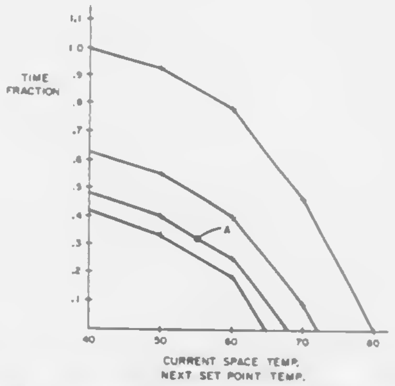
a thermo handle formed outside the tubular valve case at a side of the thermo valve and connected to the thermo valve to operate the same,

a change handle formed outside the tubular valve case at a side of the flow change valve and connected to the movable disc valve of the flow charge valve to operate the same, and

a mixing chamber formed inside the tubular valve case between the thermo valve and the flow change valve so that when the flow change valve is operated, water from the inlet port of water and hot water from the inlet port of hot water enter into the mixing chamber through the thermo valve and supplied to one of the outlet ports of mixed water for the shower and for the discharge tube, connection from the mixing chamber to one of the shower chamber and the discharge tube chamber being performed by rotating the movable disc valve by means of the change handle.

5,025,984
SETBACK THERMOSTAT WITH RECOVERY START TIME SELECTED NON-LINEARLY

Douglas D. Bird, Dayton, and Daniel T. Uhrich, Mayer, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.
Filed Jun. 22, 1990, Ser. No. 542,376
Int. Cl.⁵ F23N *5/20*
U.S. Cl. 236—46 R **20 Claims**



1. A setback thermostat for providing a run signal to a device controlling the temperature in a space, said run signal activating the device so as to change the temperature in the space to reach at a preselectable recovery end time, a preselectable temperature set point range which does not include the current space temperature, including means for receiving and recording the preselectable recovery end time and the preselectable temperature set point range from an external source, said setback thermostat including apparatus for generating the length value of a recovery time interval during which the run signal is provided and at the end of which the space temperature is projected to reach the preselectable temperature set point range, comprising

(a) means for periodically generating a time fraction value according to a function dependent on the preselectable temperature set point range and of the type having a temperature derivative whose absolute value generally increases with increasing temperature;

(b) timing means for recording as the measured recovery end time, the time at which the space temperature actually enters the preselectable temperature set point range;

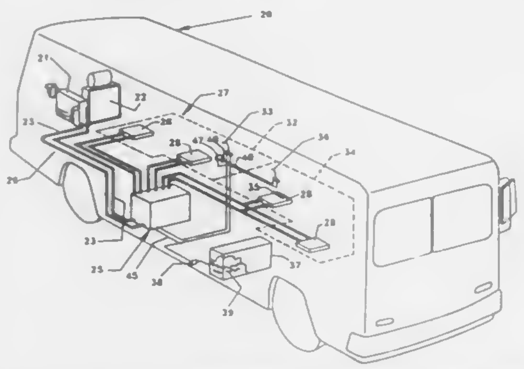
(c) means for generating and recording a current lag constant value as the sum of a previously recorded lag constant plus a function of the time fraction value and the difference between a previously measured recovery end time and the preselectable recovery end time;

VOL 1127 ISS 4 JE 25 1991 UMI

- (d) means for periodically generating and recording a length value of the recovery time interval as a function of the current lag constant value and the current time fraction value; and
- (e) means receiving a recently generated recovery time interval length value, for providing the run signal for the time specified thereby to the space temperature control device.

5,025,985
SUPPLEMENTAL VEHICLE HEATING APPARATUS WITH LONG HEATING CYCLE

Harold R. Enander, 23451 E. 156 Ave., Brighton, Colo. 80601
Filed Mar. 2, 1989, Ser. No. 318,392
Int. Cl.⁵ G05D *23/00*
U.S. Cl. 237—2 A **15 Claims**

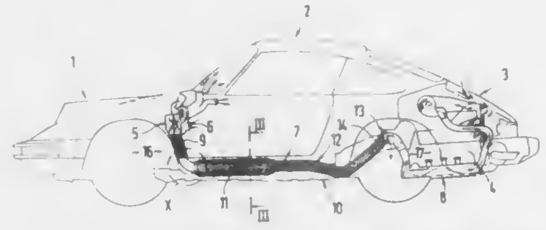


1. In a system for supplementing the thermal energy supplied to a vehicle, wherein said vehicle has an auxiliary burner having a minimum operational cycle during which a given amount of thermal energy is supplied to a heating chamber, the improvement comprising:

- a quantity of heat transfer liquid selected to have a thermal energy storage capacity no less than that of said given amount of thermal energy; and
- a reservoir surrounding said heating chamber for containing said quantity of heat transfer liquid in heat transfer relationship with said heating chamber.

5,025,986
HEATING SYSTEM FOR A MOTOR VEHICLE WITH AN AIR-COOLED REAR ENGINE

Hermann Burst, Rutesheim, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany
Filed Jul. 31, 1989, Ser. No. 387,525
Claims priority, application Fed. Rep. of Germany, Jul. 30, 1988, 3826022
Int. Cl.⁵ B60H *1/02*
U.S. Cl. 237—12.3 A **12 Claims**

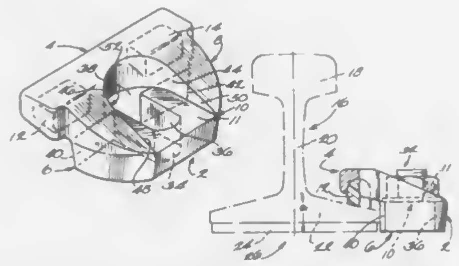


1. A method of manufacturing a heating system for a motor vehicle with an air-cooled rear engine, comprising:

- forming a heating line with an integrated sound absorbing device as a prefabricated flexible mounting part,
- inserting said flexible mounting part into a vehicle body part through a mounting opening provided in a front wheel housing of the vehicle, after surface treatment of the vehicle, and
- subsequently connecting at least one end face of the flexible mounting part with adjacent components of the heating system and of the vehicle body.

5,025,987
RAIL SECUREMENT APPARATUS

Michael R. Kotecki, Brookfield, and Duane J. Bunchkowski, Muskego, both of Wis., assignors to Harnischfeger Engineers, Inc., Brookfield, Wis.
Filed Aug. 7, 1989, Ser. No. 390,555
Int. Cl.⁵ E01B *9/48, 13/02*
U.S. Cl. 238—351 **11 Claims**

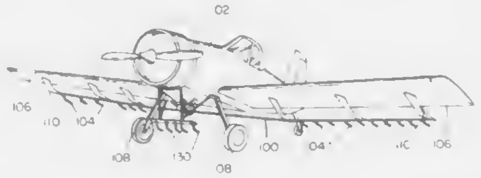


1. A rail clip for securing a rail to a foundation, the rail clip engaging a rail foot extending laterally from the rail and being attached to an anchor projecting from the foundation, comprising:

- a base positioned on the foundation and having an opening through which the anchor projects, said anchor having an upper portion not projecting above the base;
- a nose overlying and engaging the rail foot; and
- a pair of spaced apart fingers affixed to and forming a unitary body with the nose and the base, the pair of fingers straddling said opening in the base and the anchor projecting therethrough; and
- securement means positioned between the pair of fingers laterally opposite the rail foot and engaging the anchor for attaching the rail clip to the foundation.

5,025,988
AIRBORNE LIQUID SPRAYING SYSTEM FOR CROP SPRAYING

Maynard Lund, 409 East St., Ritzville, Wash. 99169
Continuation-in-part of Ser. No. 258,663, Oct. 17, 1988, abandoned. This application Jun. 12, 1990, Ser. No. 536,786
Int. Cl.⁵ B64D *1/18*
U.S. Cl. 239—171 **8 Claims**

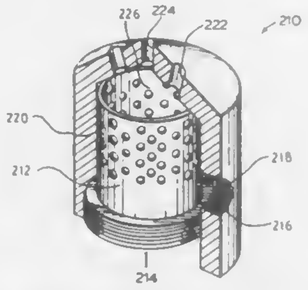


1. An aircraft-mounted liquid spray distribution for discharging an agricultural spray liquid from beneath a propeller-driven aircraft having a forward-mounted engine and propeller and being provided with a supply of spraying liquid and means to deliver said liquid to spray liquid distribution means and to dispense the same from spray nozzles without interference from prop blast emitted by the forward-mounted aircraft propeller, said distribution means comprising a main header means supported beneath the wings of said aircraft and extending substantially from wingtip to wingtip, an auxiliary header means supported beneath the aircraft engine forward of said main header and extending across the aircraft belly region, a

plurality of spray discharge nozzle means fitted to said main header means along the length thereof except across the region beneath the aircraft belly whereby spraying liquid may be discharged therefrom substantially from wingtip to wingtip exclusive of the region beneath the aircraft belly, and a second plurality of spray discharge nozzle means fitted to said auxiliary header means along the length thereof whereby spraying liquid may be discharged therefrom essentially beneath the aircraft belly, said auxiliary header means and the nozzle means associated therewith being so arranged and positioned with respect to the aircraft propeller whereby spray liquid is discharged therefrom below the aircraft propeller prop blast region to combine with spray liquid dispensed from said main header means to form a unitary spray pattern unaffected by prop blast.

5,025,989
SPRAY NOZZLE DESIGN

Donald R. Spink, and Edward F. Spink, both of Waterloo, Canada, assignors to Turbotak Inc., Waterloo, Canada
Division of Ser. No. 190,828, May 6, 1988, Pat. No. 4,893,752. This application Aug. 14, 1989, Ser. No. 393,259
Claims priority, application United Kingdom, May 6, 1987, 8710685
Int. Cl.⁵ B05R *7/08*
U.S. Cl. 239—431 **3 Claims**

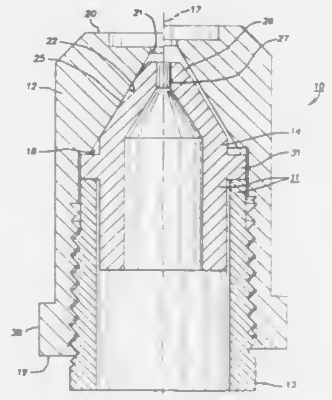


1. An elongate axially-extending nozzle of cylindrical shape for the formation of an atomized spray of fine liquid droplets in a continuous gaseous phase or of fine gas bubbles in a continuous liquid phase, which comprises:

- a cylindrical side wall having an internal and an external surface and a conical end wall having an internal and an external surface defining a hollow interior and an open end,
- a cylindrical sleeve having an internal and an external surface and extending within said hollow interior from said open end to engagement only with the internal surface of said end wall with the external surface of said sleeve being spaced radially inwardly from the internal surface of said cylindrical side wall,
- first chamber means located in said cylindrical sleeve for communicating with a source of liquid through said open end,
- second chamber means located between the external surface of said sleeve and the internal surface of said cylindrical side wall for communicating with a source of gas through an opening formed through said cylindrical side wall from the outer surface to the inner surface thereof,
- mixing chamber means located in said cylindrical sleeve downstream of said first chamber means and communicating with said first chamber means in an axial direction with respect to said sleeve and said second chamber means in a radial direction with respect to said sleeve by a plurality of openings extending from the internal to the external surface of said sleeve for mixing the gas and liquid to form a two-phase mixture in said mixing chamber means for ejection from said nozzle through said end wall, and
- a plurality of orifice means extending with constant transverse dimension from the external to the internal surface of the end wall and normal to said surfaces and communicating with said mixing chamber means for ejection of said two-phase mixture to form said atomized spray,
- said plurality of orifice means comprising a central orifice means arranged coaxially with the nozzle and a pair of other orifice means arranged on a straight line with and equidistant from said central orifice means.

5,025,990
ADJUSTABLE GAS NOZZLE

Ralph G. Ridenour, Mansfield, Ohio, assignor to Universal Enterprises, Inc., Mansfield, Ohio
Filed Oct. 12, 1989, Ser. No. 420,330
Int. Cl.⁵ B05B *1/16*
U.S. Cl. 239—438 **23 Claims**



1. An adjustable gas nozzle comprising, in combination:

- a body having an axis and a longitudinal conduit therethrough with an inlet opening at a first end;
- a second end of said body having an outlet;
- conduit means having an outlet;
- coupling means between said conduit means and said body to permit first and second alternative relative positions therebetween;
- one of said outlets being a first restricted orifice;
- a bypass passageway around said first restricted orifice;
- means in said first position to seal between said body and said conduit means to close off flow through said bypass passageway to permit a first gas flow through the two outlets in series so that gas flow rate is regulated by said first restricted orifice;
- means upstream of said sealing means for restricting further upstream axial displacement of said body relative to said conduit means in said first position; and
- said body being movable into said second position relative to said conduit means to relieve said seal means and to permit a second gas flow of an amount greater than said first gas flow through the combination of said first restricted orifice and said bypass passageway.

5,025,991
VALVE ARRANGEMENT FOR A LIQUID DISPENSING DEVICE

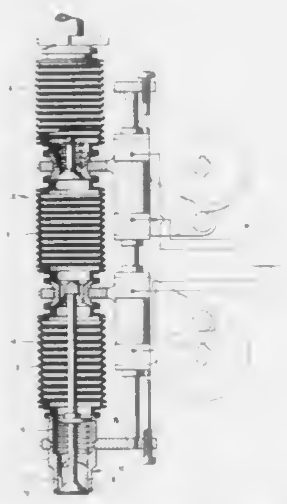
Marlan L. Stainbrook, Maple Grove, and John Rodrigue, St. Paul, both of Minn., assignors to Tetra Pak Holdings & Finance S.A., Pully, Switzerland
Filed Sep. 12, 1989, Ser. No. 405,970
Int. Cl.⁵ B05B *1/34*
U.S. Cl. 239—459 **16 Claims**

1. A valve arrangement for a liquid dispensing unit, comprising:

- a discharge nozzle casing having a central bore, said bore having a central axis, an inner wall, and an edge of said casing forming a valve seat;

VOL
1127
ISS
4
JE
25
1991
UMI

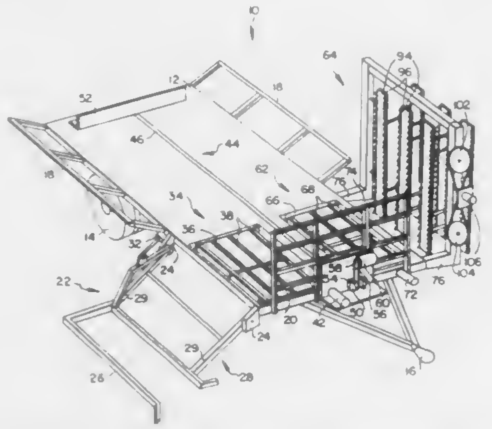
a movable valve element cooperating with said bore to control liquid flow out of said nozzle;
said valve element including a valve base and a valve stem extending along said central axis, said valve element being movable along said central axis;
said valve base being substantially frustoconical and having an outer circumferential edge;
said valve base including a shear step at the outer circumferential edge thereof, and a seal area adjacent said shear step and in position to contact said valve seat to seal said valve in a closed position;



said valve stem having a plurality of arms spaced substantially equally from each other around the valve stem, said arms being positioned to engage the inner wall of said bore, said arms projecting from said valve stem at a location spaced from said valve base, wherein the axial distance between the base of the valve element and the arms is sufficient to enable the liquid to rejoin before reaching the valve base, whereby the turbulence in the liquid flow is minimized.

5,025,992
HAY FEEDING APPARATUS

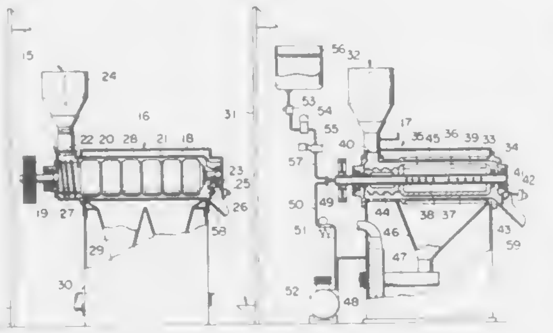
Mark J. Niehur, 602 S. 1st Ave. West, Malta, Mont. 59538
Filed Nov. 30, 1989, Ser. No. 443,779
Int. Cl.^{5} A01D *87/02;* **B02C** *13/286*
U.S. Cl. 241—101.7 **5 Claims**



1. A feeding apparatus mounted on a vehicle for separating hay from a bale of hay, the feeding apparatus comprising:
a bed mounted on the vehicle for supporting the bale of hay;
a chute for diverting hay away from the bed;
a hay walker mounted to the bed above the chute, the haywalker including a moveable elongate walker member having a front face and a rear surface and further having teeth attached to the front face and extending outwardly from the face, means for maintaining the teeth in substantially the same direction relative to the hay bale during movement of the elongate member, and means for moving the teeth and the elongate member toward the hay bale, then downward toward the upper end of the chute, then away from the hay bale, then upward to a point of beginning, the teeth separating hay from the bale and directing the hay to an upper end of the chute as the teeth move downwardly;
a first conveyor means located on the bed for conveying the bale of hay to the hay walker; and
switch means for selectively activating the conveyor.

5,025,993
SYSTEM FOR GRINDING GRAIN

Toshihiko Satake, Higashihiroshima, Japan, assignor to Satake Engineering Co., Ltd., Tokyo, Japan
Filed Apr. 25, 1989, Ser. No. 343,533
Claims priority, application Japan, Apr. 26, 1988, 63-104853
Int. Cl.^{5} B02C *9/00, 9/04*
U.S. Cl. 241—74 **13 Claims**

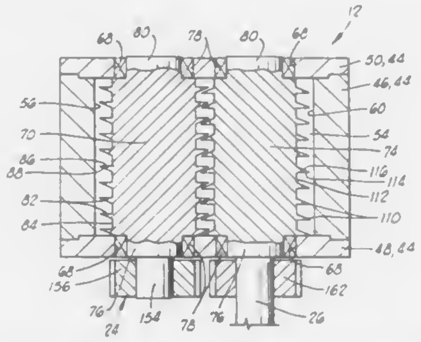


1. A system for flouring grains comprising:
pretreatment means including means for polishing the grains to produce polished grains;
means for milling and sifting the polished grains to provide a flour having a desired mesh size; and
means provided in association with said milling and sifting means for adding moisture to the grains milled in said milling and sifting means,
wherein said polishing means includes a perforated polishing cylinder and a grinding roll inserted into said polishing cylinder, said polishing cylinder cooperating with said grinding roll to define therebetween a polishing chamber.

5,025,994
MEDICAL WASTE GRINDER

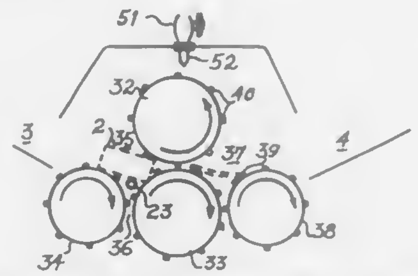
C. Gene Maitlen, Cushing, and Simon G. Franks, Edmond, both of Okla., assignors to Pelibe, an OK Partnership, Cushing, Okla.
Filed Nov. 15, 1989, Ser. No. 436,602
Int. Cl.^{5} B02C *18/16, 19/14*
U.S. Cl. 241—99 **26 Claims**

1 An apparatus for grinding medical waste into fine particles, said apparatus comprising:
case means for forming an enclosure having a plurality of interconnecting cylindrical bores, an inlet and an outlet, said plurality of interconnecting cylindrical bores including first and second interconnecting cylindrical bores positioned side by side adjacent to said inlet, and said interconnecting bores comprising a third interconnecting cylindrical bore adjacent said outlet;
a plurality of cylindrical rotors rotatably disposed in said enclosure, each of said rotors disposed in one of said cylindrical bores and having a plurality of longitudinally spaced rows of teeth thereon, said plurality of cylindrical rotors including first and second cylindrical rotors disposed adjacent to one another in said first and second cylindrical bores, respectively said cylindrical rotors comprising a third cylindrical rotor disposed in the third cylindrical bore, the teeth on one of said second and third rotors and the teeth on said first rotor being substantially aligned along a longitudinal axis, said teeth on said one of said second and third rotors and said teeth on said first rotor each comprising a first side extending substantially radially from said corresponding rotor and a second angled side extending angularly with respect to the first side, said angled sides of said teeth on said one of said second and third rotors being angled in an opposite direction from and overlapping with said angled sides of said teeth on said first rotor such that said angled sides of said teeth on said one of said second and third rotors are substantially parallel to and generally face said angled sides of said teeth on said first rotor, whereby medical waste inserted into said enclosure through said inlet is forced between said first and second rotors and ground by said teeth thereon; and
means for rotating said first and second rotors in opposite directions.



5,025,995
APPARATUS AND CRUSHING DISPOSABLE CONTAINERS

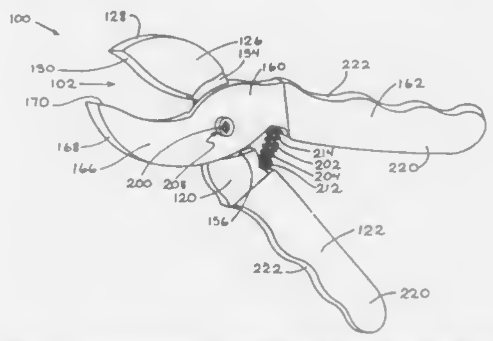
Leo F. Smith, P.O. Box 1868, San Marcos, Calif. 92069
Continuation-in-part of Ser. No. 383,720, Jul. 24, 1989, abandoned. This application Apr. 30, 1990, Ser. No. 516,563
Int. Cl.^{5} B02C *19/14*
U.S. Cl. 241—101.1 **14 Claims**



1. An apparatus for crushing disposable container which comprises:
a crushing mechanism and a feeding mechanism;
wherein said crushing mechanism consists of two counter-rotating rollers having parallel axes lying in the same vertical plane and peripheral surfaces separated by a distance lesser than the smallest dimension of the smallest of said containers; and
wherein said feeding mechanism consists of a single non-crushing feeding roller horizontally adjacent and parallel tot eb lowest of said crushing rollers and rotating in the same direction as said lowest crushing roller, and means for free-dropping said containers against an upper surface area of said roller; wherein
said feeding roller has a plurality of peripheral indentations;
said means for free-dropping comprises a hopper having an outlet immediately above and spaced apart from said upper area of the feeding roller; and
which further comprises a single non-crushing ejecting roller horizontally adjacent and parallel to said lowest crushing roller, positioned on the opposite side of said lowest crushing roller from the feeding roller, and rotating in the same direction as said feeding roller.

5,025,996
TABLET OR PILL PULVERIZER

Janice A. Lavin, and Terence J. Lavin, both of 242 Lake Shore Dr., Crystal Lake, Ill. 60014
Filed Mar. 13, 1990, Ser. No. 492,743
Int. Cl.^{5} B02C *19/08*
U.S. Cl. 241—168 **4 Claims**



1. A tablet pulverizer for crushing a tablet used as medicine, wherein:
a. said tablet pulverizer has a first convex arm and a second concave arm;
b. said first convex arm has a first handle at one end thereof and a jaw having a convex crushing surface at an opposing end thereof;
c. said second concave arm has a second handle at one end thereof and a jaw having a concave crushing surface at an opposing end thereof;
d. said tablet pulverizer has a pivotal connecting means pivotally joining said first convex arm to said second concave arm;
e. said pivotal connecting means is situated between said first handle at one end and said convex crushing surface;
f. said pivotal connecting means is situated between said second handle at one end and said concave crushing surface;
g. said first convex arm is movably adjacent to said second concave arm;
h. said convex crushing surface is movably adjacent to said concave crushing surface;
i. said convex crushing surface is arcuate;
j. said concave crushing surface is arcuate;
k. said convex crushing surface and said concave crushing surface are smooth, flat and nestable;
l. said tablet pulverizer includes a spring release means to assist said tablet pulverizer moving from a closed position to an open position;
m. said tablet is insertable between said convex crushing surface and said concave crushing surface when said tablet pulverizer is in said open position;
n. said tablet is crushable between said convex crushing surface and said concave crushing surface when said tablet pulverizer approaches said closed position;
o. a convex jaw is oppositely disposed from said first bandle as a part of said first arm;

VOL
1127
ISS
4
JE
25
1991
UMI

- p. said convex jaw includes said convex crushing surface and a convex jaw head oppositely disposed from said convex crushing surface;
- q. a concave jaw is oppositely disposed from said second handle as a part of said second arm;
- r. said concave jaw includes said concave crushing surface and a concave jaw head oppositely disposed from said concave crushing surface;
- s. said first arm includes a convex slot between said convex jaw and said first handle;
- t. said second arm includes a concave slot between said concave jaw and said second handle;
- u. said convex slot is joined to said concave slot by said pivotal connecting means;
- v. said pivotal connecting means includes a joining rod;
- w. said convex slot includes a bottom convex slot edge;
- x. said concave slot includes a bottom concave slot edge; and
- y. said convex slot and said concave slot restrict separation of said concave crushing surface and said convex crushing surface.

5,025,997

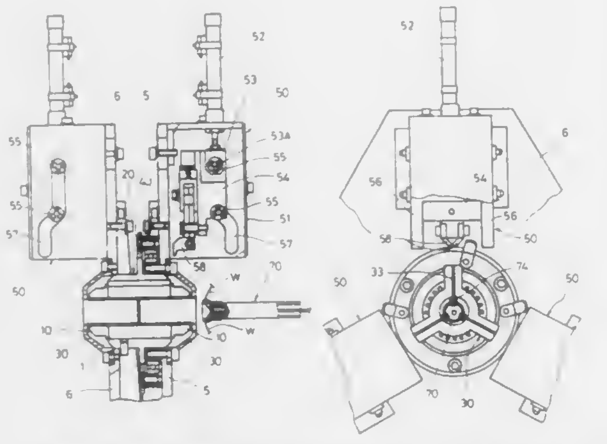
MULTI-PHASE SYNCHRONOUS AUTOMATIC WINDING METHOD AND APPARATUS FOR MOTOR STATORS

Kwo-Xyan Shi, and Fuh-Chyun Tang, both of Hsin, Taiwan, assignors to Industrial Technology Research Institute, Hsinchu, Taiwan

Filed Dec. 4, 1989, Ser. No. 444,936

Int. Cl.^{5} H02K *15/085*

U.S. Cl. 242—1.10 R **11 Claims**



1. A multi-phase motor stator automatic winding method for winding enamel wires into a multi-phase motor stator having a central hole, a first longitudinal end, a second longitudinal end, and a plurality of wire slots which are formed into the surface of the central hole and extend between the two longitudinal ends for receiving the wires therein, said method comprising:

- (i) attaching a first wire stopper and a second wire stopper, respectively, to the first longitudinal end and the second longitudinal end of the motor stator;
- (ii) holding the motor stator with a stator fixture which may be operated to precisely rotate the motor stator through a predetermined angle as required;
- (iii) covering the first end and the second end of the motor stator, respectively, with a first wire guiding member and a second wire guiding member, each of said wire guiding members including a plurality of equally-spaced guiding slits which commence from outward of a longitudinal end of the motor stator, extend longitudinally along the inner surface of the central hole of the motor stator, and radially align, respectively, with the center of one of the wire slots for accurately guiding the wires into the wire slots;
- (iv) mounting a plurality of wires, the same in number as the number of phase of the motor stator, into a wire carrying means capable of moving periodically through the central hole of the motor stator for carrying the wires to two extremities externally of the two ends of the motor stator, and fixing the end portion of each wire to said stator fixture;
- (v) carrying the plurality of wires to said extremity externally of the first longitudinal end of the motor stator with said wire carrying means;
- (vi) catching and pulling each of the wires with one of a plurality of first wire feeding means and feeding each wire into a first wire slot of the motor stator under the guidance of said guiding slits of said first wire guiding member;
- (vii) rotating the motor stator relative to said wire guiding members through a predetermined angle so as to move a second wire slot of the motor stator, which is of the same pole as said first wire slot of the motor stator, into the original location of said first wire slot, whereby winding a length of each wire onto said first wire stopper covering an angular range of said predetermined angle and stopping the wound wires from moving inward with said first wire stopper;
- (viii) carrying each wire outward of the second end of the motor stator with said wire carrying means and releasing the wires caught by said first wire feeding means at a proper position during the movement of said carrying means toward the second end of the motor stator;
- (ix) catching and pulling each wire with one of a plurality of second wire feeding means and feeding the wire into said second wire slot of the motor stator under the guidance of said guiding slits of said second wire guiding member;
- (x) rotating the motor stator, in a direction opposite to the rotation direction of the motor stator in said step (vii), through said predetermined angle so as to move the motor stator back to the original location thereof in said step (vi) whereby winding a length of each wire onto said second wire stopper covering an angular range of said predetermined angle and stopping the wound wires from moving inward with said second wire stopper;
- (xi) carrying each the wires to said extremity externally of the first end of the motor stator with said wire carrying means and releasing the wires caught by said second wire feeding means at a proper position during the movement of said wire carrying means toward the first end of the motor stator;
- (xii) repeating said steps (vi) through (xi) until each wire has been wound in said first and second wire slots for predetermined turns so as to complete the winding operation of the first pole of the motor stator;
- (xiii) rotating the motor stator to a position suitable for the winding operation of the next pole of the motor stator, and performing the winding operation according to said steps (vi) through (xii); and
- (xiv) repeating said step (xiii) until all of the poles of the motor stator have finished winding operation.

6. A multi-phase motor stator automatic winding apparatus for winding enamel wires into a multi-phase motor stator having a central hole, a first longitudinal end, a second longitudinal end, and a plurality of wire slots which are formed into the surface of the central hole and extend between the two longitudinal ends for receiving the wires therein, said apparatus comprising:

- a first wire stopper and a second wire stopper respectively attached to the first end and the second end of the motor stator so as to stop the wires which have been wound into the wire slots of the motor stator from sliding radially inward under the action of the tension of the wires;
- a stator fixture for holding the motor stator having said first wire stopper and said second wire stopper attached to its two ends;
- first wire guiding member and second wire guiding member which cover, respectively, the first end and the second end of the motor stator, and which extend longitudinally into the central hole of the motor stator, with each of said wire guiding members including a plurality of equally-spaced guiding slits, which commence from outward of an end of the motor stator, extend longitudinally along the inner surface of the central hole of the motor stator, and radially align, respectively, with the center of one of the wire slots for accurately guiding the wires into the wire slots;
- rotating means adapted to accurately rotate said stator fixture together with the motor stator, relative to said wire guiding members, through a predetermined angle as required;
- wire carrying means capable of moving periodically through the central hole of the motor stator for carrying the wires to two extremities externally of the two ends of the motor stator;
- a plurality of pairs of first wire feeding means and second wire feeding means, with the number of pairs being the same as the phase number of the motor stator, said plurality of first wire feeding means being disposed externally of the first longitudinal end of the motor stator in a circumferentially equally spaced manner, and said plurality of second wire feeding means being disposed externally of the second longitudinal end of the motor stator in a circumferentially equally spaced manner; each of said first wire feeding means being adapted to catch and pull a wire and feed the wire into a wire slot of the motor stator under the guidance of said guiding slits of said first wire guiding member, and each of said second wire feeding means being adapted to catch and pull a wire and feed the wire into another wire slot of the motor stator under the guidance of said guiding slits of said second wire guiding member; and
- a plurality of tension control means each of which being adapted to properly control the tension of a wire to be wound in the motor stator.

5,025,998

UNWINDING CARRIAGE FOR ROLLS OF STRIP MATERIALS

Armin Hutzenlaub, Wiehl, and Reinhard Dick, Nümbrecht, both of Fed. Rep. of Germany, assignors to Kampf GmbH & Co. Maschinenfabrik, Wiehl, Fed. Rep. of Germany

Filed Mar. 1, 1990, Ser. No. 487,496

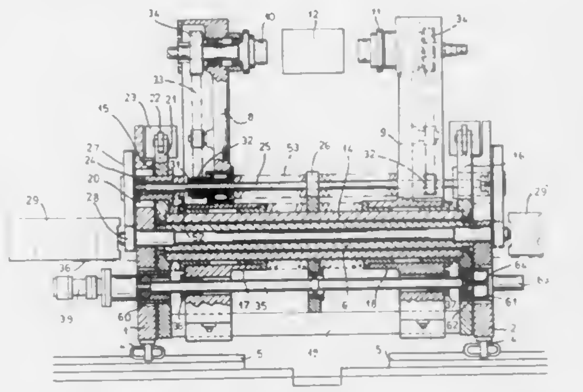
Claims priority, application Fed. Rep. of Germany, Mar. 1, 1989, 3906506

Int. Cl.^{5} B65H *16/06, 16/10*

U.S. Cl. 242—55 **15 Claims**

I. A roll-unwinding carriage for strip material, comprising:

- a pair of transversely spaced substantially vertical support plates;
- , traverse means spanned between said support plates and forming a rigid support therewith, said traverse means including a plurality of spaced-apart mutually parallel traverse bars, one of said traverse bars being a central traverse of round cross section defining an axis;
- a central tube coaxial with said central traverse and angularly displaceable on said central traverse about said axis;
- a pair of swingable plates fixed to said central tube and axially spaced apart therealong;
- actuating means connected to at least one of said swingable plates for angularly displacing said swingable plates and said central tube about said axis;
- a pair of arms provided with respective guide sleeves mounted on said central tube for angular displacement therewith about said axis and axially shiftable along said central tube toward and away from one another, another of said traverse bars being engaged by said arms to take up torque of arm weight and weight of a roll of strip material supported by said arms, said arms being provided with roll-engaging members adapted to grip a roll of said strip material between them;



- a drive shaft journaled in at least one of said swingable plates and in said arms;
- a drive wheel on said drive shaft in one of said arms operatively connected with the roll-engaging member of said one of said arms for driving a roll gripped by said members upon rotation of said shaft, at least one of said support plates having an arcuate slot traversed by an end of said shaft passing freely through said slot;
- a drive motor mounted on said support and operatively connected to said end of said shaft for rotating same; and
- a threaded spindle extending parallel to said shaft and said axis and operatively connected to said arms for displacing said arms toward and away from one another to grip said roll between said members.

5,025,999

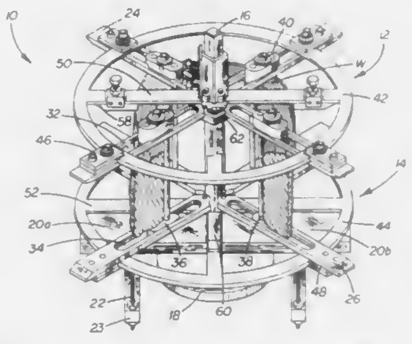
COIL WINDING FORM APPARATUS

Chester G. Littrell, 1106 Kees Rd., Lexington, Ky. 40505

Filed Feb. 22, 1990, Ser. No. 482,855

Int. Cl.^{5} B65H *75/22, 75/24*

U.S. Cl. 242—110.3 **14 Claims**



1. A coil winding form apparatus, comprising:

- a support rod;
- a first flange;

VOL
1127
ISS
4
JE
25
1991
UMI

a second flange;

means for mounting said first and second flanges in a selected position on said support rod;

a first series of arms pivotally mounted to said first flange adjacent said support rod;

a second series of arms pivotally mounted to said second flange adjacent said support rod;

a series of coil forming guide rods extending between said first and second series of arms;

bracket means for engaging said guide rods received in sliding engagement in elongated slots in said first and second series of arms; and

means for clamping said first and second series of arms and said bracket means in a selected position so as to allow the forming of a wire coil of desired dimensions.

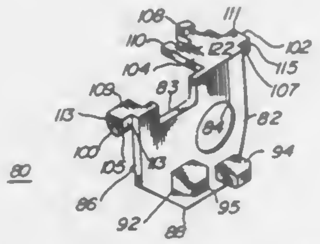
5,026,000
VIDEO CASSETTE INTEGRAL DUST DOOR LATCH/SPRING

Anthony L. Gelardi, Cape Porpoise, and Craig Lovecky, Old Orchard Beach, both of Me., assignors to Shape Inc., Biddeford, Me.

Filed Aug. 4, 1989, Ser. No. 389,401

Int. Cl.^{5} G11B *23/04*

U.S. Cl. 242—199 **16 Claims**



1. An integral dust door latch/spring capable of being received within a tape cassette base and cover for latching and unlatching a dust door, comprising:

a substantially rectangular, planar latch body formed separate from the cover and base of a first thickness, and having;

(a) a first longitudinal end including two lateral supports and being fixed against movement by being abutted by the base and cover;

(b) a second, longitudinal opposite end; and

(c) means, formed of a second, lesser thickness integrally and coplanar to the plane of the latch body substantially midway and longitudinally between the first and the second ends for allowing the second end to flex relative to the first end between a first dust door latching position and a second dust door unlatching position,

wherein the second end includes;

(i) a first projection which is abutted to flex the second end relative to the first end, and

(ii) a second projection used to removably latch the dust door.

5,026,001
PITOT STATIC TUBE COVER

H. Burk Wright, and Jay Miller, both of Sierra Madre, Calif., assignors to Western Filament, Inc., Glendale, Calif.

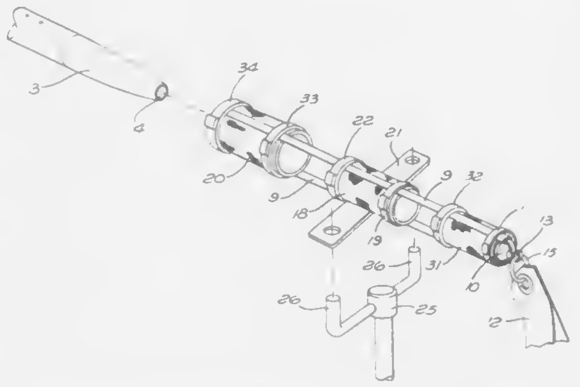
Filed Jan. 25, 1990, Ser. No. 471,301

Int. Cl.^{5} B64D *45/00*

U.S. Cl. 244—1 R **14 Claims**

1. A Pitot static tube cover comprising:

a rigid skeleton, overbraided with heat resistant braid, adapted to slide over a Pitot static tube; said skeleton further comprising a forward member, an intermediate member, a distal member and connecting members whereby said connecting members are used to connect the said forward, intermediate and distal members together with open space between the said members to allow heat from the Pitot static tube to escape to avoid overheating.



5,026,002
HELIHOVER AMPHIBIOUS AIRCRAFT

Arthur G. Yarrington, M.S. 1073, Crows Nest, Old 4355, Australia

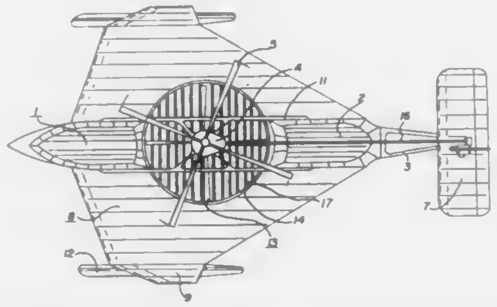
PCT No. PCT/AU87/00168, § 371 Date Oct. 4, 1988, § 102(e) Date Oct. 4, 1988, PCT Pub. No. WO88/00898, PCT Pub. Date Feb. 11, 1988

PCT Filed Jun. 5, 1987, Ser. No. 283,996

Claims priority, application Australia, Jun. 13, 1986, PH6401

Int. Cl.^{5} B64C *29/00*

U.S. Cl. 244—12.1 **8 Claims**



1. An amphibious aircraft capable of V.T.O.L. (vertical take-off and landing) modes, hover and translational flight in and out of ground effect, comprising:

a winged main fuselage defined by an aerodynamic wing and having a duct extending through said fuselage and a lower portion including a centrally positioned channel flow tunnel;

at least one large diameter in-fuselage ducted down-draft variable pitch rotor fan assembly housed within said duct in said main fuselage;

at least one main helicopter-like rotor assembly having variable pitch, collective pitch and cyclic pitch modes mounted directly above said at least one fan assembly;

a supporting superstructure extending from said main fuselage and connected to said helicopter-like rotor assembly for supporting said helicopter-like rotor assembly well clear of said main fuselage;

a tail connected to said main fuselage, said tail having an anti-torque tail propulsion means; and

a common drive assembly operatively linked to said at least one fan assembly, said at least one helicopter-like rotor assembly, and said anti-torque tail propulsion means.

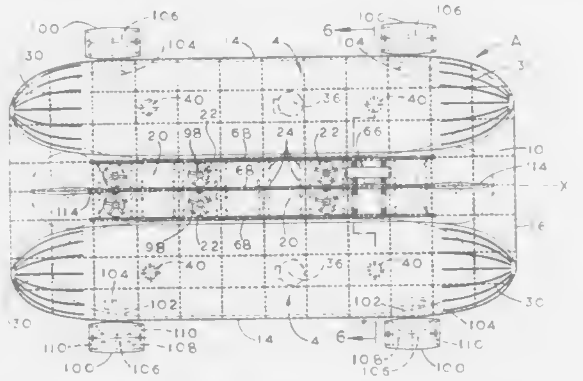
5,026,003
LIGHTER-THAN-AIR AIRCRAFT

William R. Smith, R. R. 2 Box 306, Godfrey, Ill. 62035

Filed Aug. 28, 1989, Ser. No. 399,260

Int. Cl.^{5} B64B *1/34, 1/22, 1/06;* **B64D** *9/00*

U.S. Cl. 244—26 **27 Claims**



11. An aircraft comprising: a rigid platform having a longitudinal centerline, sides on each side of the centerline, and ends extending between the sides, the platform also having an upper surface which extends between the sides and a lower surface which likewise extends between the sides, the platform being essentially hollow in the space between its upper and lower surfaces, so as to be capable of accommodating passengers, holding cargo, containing helium, or holding equipment; a pair of upper gas bags attached to the platform along its upper surface and covering a portion of the upper surface, but being spaced apart, so that another portion of the upper surface is exposed in the region of the longitudinal centerline; a pair of lower gas bags attached to the platform along its lower surface and covering a portion of the lower surface, but being spaced apart so that another portion of the lower surface is exposed between the lower gas bags; a gas within each gas bag, the gas having a density less than air, whereby the gas bags impart lift to the platform; propulsion means mounted on the platform along its sides for exerting a thrust on the platform so as to move the aircraft through the air; ducts located within the platform and extending between the upper and lower surfaces thereof, the ducts opening out of the upper and lower surfaces in the exposed regions between the gas bags; and means within each duct for drawing air into one end of the duct and discharging it from the other end so as to exert a vertically directed force on the platform.

5,026,004
VARIABLE AIR INTAKE RAMPS FOR AEROSPACE VEHICLES

William B. S. Dobie, Bristol, and Nigel Penistone, North Humberside, both of England, assignors to British Aerospace Public Limited Company, London, England

Filed Aug. 25, 1989, Ser. No. 398,866

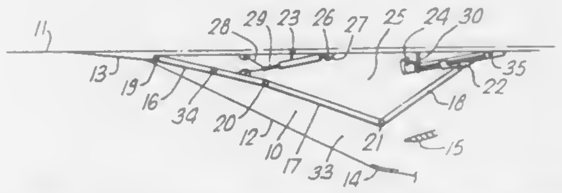
Claims priority, application United Kingdom, Sep. 9, 1988, 8821278

Int. Cl.^{5} B64D *33/02*

U.S. Cl. 244—53 B **2 Claims**

1. A variable air intake arrangement for an aircraft propulsion engine, said air intake arrangement comprising:

an air intake duct, variable geometry ramp means mounted within said air intake duct and movable to selected positions across said air intake duct for controlling the amount of air passing therethrough to match propulsion engine demand, actuator means for moving said ramp means and for reacting induced intake air pressure loads on said ramp means, an air intake duct opening defined by a forward fixed ramp and an intake lip, variable geometry ramp means comprising at least three interconnected adjustable ramp panels, a first ramp panel having a forward pivotal attachment to said forward fixed ramp and a pivotal attachment at its rearward end to a second ramp panel, said second ramp panel pivotally attached at its rearward end to a third ramp panel said third ramp panel slidably engaging guideway means at its rearward end; said variable geometry ramp means further defining an enclosure in which is mounted first and second irreversible screw jacks pivotally attached to aircraft structure and to first and third ramp panels respectively, said enclosure further including ram air intake means and first and second outlet means, said first air outlet means permanently vented to local external airstream adjacent the extreme forward position of said variable geometry ramp means, said second air outlet means actively controlled together with said ram air intake means as a function of load on said second irreversible screw jack.



5,026,005
METHOD AND APPARATUS FOR REEL-UP OF A PAPER WEB

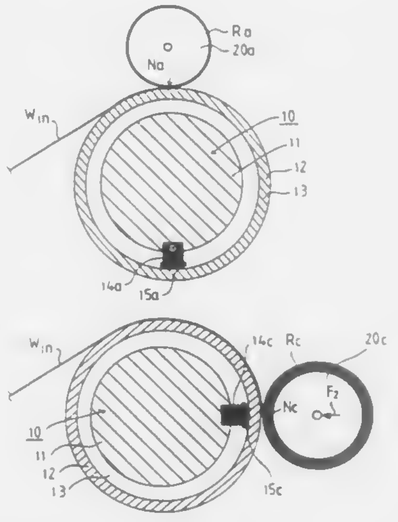
Juha Ehrola, Jyväskylä , Finland, assignor to Valmet Paper Machinery Inc., Finland

Filed Nov. 6, 1989, Ser. No. 431,937

Claims priority, application Finland, Nov. 17, 1988, 885338

Int. Cl.^{5} B65H *18/16, 75/18;* **B30B** *3/04*

U.S. Cl. 242—65 **6 Claims**



1. A method of operating a reel-up apparatus for reel-up of a paper web wherein said web is formed as a roll comprising a plurality of layers of said web around a reeling drum and wherein the web passes through a reeling nip formed between a reeling cylinder and said drum, and wherein said reeling cylinder further comprises a cylinder mantle which revolves around a central axle of said cylinder, said method comprising the step of adjusting deflection of the cylinder mantle during its revolution so that distribution of line pressure in the reeling nip is controlled in an axial direction, wherein at the initial stage of reel-up the reeling drum is relieved of its own weight at both its ends by means of particularly directed forces, comprising the following steps:

VOL
1127
ISS
4
JE
25
1991
UMI

rotating a plurality of loading members away from the reeling nip, positioned at the top of said cylinder, 180°, thus compensating for free deflection of the cylinder mantle resulting in substantially uniform line pressure in the reeling nip;

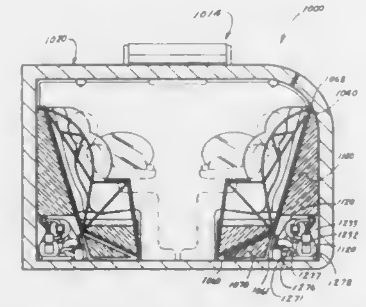
moving the reeling nip downwardly along the circumference of the reeling cylinder toward its horizontal center plane while, at the same time, the loading members are rotated upwardly toward said plane reducing the distance between said loading members and said reeling nip, whereupon the reeling drum is shifted onto secondary ford means comprised by the reel-up apparatus;

loading the reeling drum at both its ends, at which said axle journals are located, with particularly directed adjustable forces applied by said forks, such that the loading members and the reeling cylinders are in face to face contact, whereby pressure is directed inwardly toward the loading members resulting in uniform line pressure at the reeling nip.

5,026,006
SAFETY ENCLOSURES AND SYSTEMS FOR HIGH SPEED VEHICLES

Landon D. Tinder, 12860 Sundown La., Chino Hills, Calif. 91709, and Richard F. Tinder, SW. 640 Winter Cir., Pullman, Wash. 99163

Filed Feb. 22, 1989, Ser. No. 313,990
Int. Cl.^{5} B64D *11/06*
U.S. Cl. 244—122 AG **87 Claims**



24. A protective safety enclosure for use within aircraft to accommodate and protect passengers riding therein against crash forces, fire and noxious gases, comprising:

a protective enclosure shell; said enclosure shell having at least inner and outer spaced shell wall members with thermally insulating and impact resistant material contained therebetween; said enclosure shell defining an interior cabin in which passengers ride;

at least one passenger seat within said cabin to support at least one passenger therein and, to restrain the passenger against movement relative to the interior cabin;

at least one door opening in said enclosure shell allowing access into and from the cabin;

at least one power operated automatic door means which is operable to open and close the door opening; the enclosure shell and door means forming a substantially fluid-tight interior cabin against inward migration of gases and liquids when the door means closes the door opening;

at least one automatically controlled gas-expandable crash bag mounted for controlled deployment to restrain a passenger within the at least one passenger seat and to in combination with the passenger seat limit and cushion passenger movement within the cabin;

an automatic cooling system adapted to sense the temperature of the safety enclosure and to automatically cool the cabin during periods of exposure of the safety enclosure to fire or other high temperature conditions;

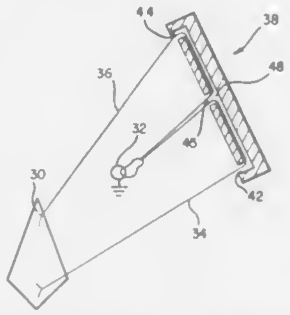
an automatic contained compressed breathable gas supply for automatically supplying a breathable gas to passengers within the cabin during periods when the door means is closed, and for creating a positive pressure within the cabin to exclude fumes and noxious gases which result during a fire within the vehicle in which the safety enclosure is mounted;

at least one controller for automatically controlling the door means. crash bag, cooling system, and breathable gas supply.

5,026,007
KITE CONTROLLER

Donald P. Gellert, Birchwood #9 South Down Shores, Laconia, N.H. 03246

Filed Mar. 2, 1990, Ser. No. 487,523
Int. Cl.^{5} B64C *31/06*
U.S. Cl. 244—155 A **9 Claims**



1. A control system for tethering an airborne object such as a kite or an airplane comprising:

an anchor;

a pair of lines;

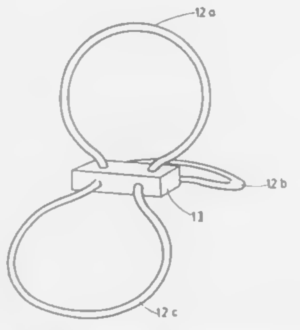
means for attaching said lines to said anchor; and

a control bar having a first end and a second end, said control bar being provided with means for centrally engaging and passing said pair of lines, separating said lines, and directing said separated lines to said first end and said second end of said control bar from which said lines advance to the airborne object, said control bar being spaced apart from said anchor and positioned along said pair of lines between said anchor and the airborne object.

5,026,008
FLUID-LOOP REACTION SYSTEM

Boris J. Lurie, La Crescenta; J. Alan Schier, Tujunga, and Theodore C. Iskenderian, Pasadena, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jan. 31, 1990, Ser. No. 473,242
Int. Cl.^{5} B64G *1/28*
U.S. Cl. 244—164 **9 Claims**



1. In a spacecraft, an attitude control system for imparting movement to the spacecraft, comprising:

a main body portion having a mass center;

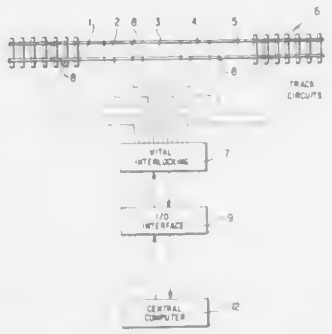
fluid path means for enabling a fluid to circulate about the mass center of the main body portion, said fluid path means defining a mass centroidal axis and including a plurality of looped paths through which said fluid can circulate;

a common centralized pumping means for pumping said fluid through said looped paths, each of the plurality of looped paths extending radially outward from the common centralized pumping means, a portion of each of the plurality of looped paths being positioned radially beyond the mass center of the main body portion.

5,026,009
METHOD FOR TRACKING TRAINS THROUGH MULTIPLE FALSE TRACK CIRCUIT OCCUPANCIES

Robert D. Milnes, Pittsburgh, Pa., assignor to AEG Westinghouse Transportation Systems, Inc., Pittsburgh, Pa.

Filed Jul. 26, 1989, Ser. No. 385,196
Int. Cl.^{5} B61L *25/02, 27/00*
U.S. Cl. 246—122 R **2 Claims**



1. In a centralized electronic control system, having a computer which maintains a train location table for monitoring train locations along track sections of a transit system by assigning train designators to individual trains and section designators to individual track sections, and monitors the occupancy of track sections by trains such that the presence of a train within a track section will cause said computer to store the train designators in said train location table at locations associated with appropriate track section designators, a computer based method of handling false occupancies, a false occupancy being an indication in said train location table of occupancy of a track section when it is not actually occupied, occurring when a track circuit signals and occupancy at a track section where the system does not expect an occupancy to occur, said computer based method comprising the steps of:

assigning and storing an individual false occupancy code for each false occupancy in said train location table;

monitoring the approach of any train to any track section indicating a false occupancy;

replacing the false occupancy code associated with the track section with the approaching train's designator when the train enters a track section adjacent to it and simultaneously storing the false occupancy code in an indexed false occupancy location table; and

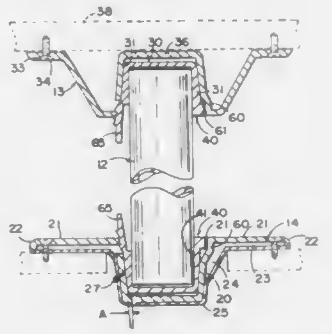
restoring the false occupancy code to said train location table after the train has passed the track section on the other side of the track section associated with the false occupancy code.

5,026,010
LATCHED DETACHABLE LEG ASSEMBLY

Richard J. Camarota, Holland, Mich., assignor to ITC Incorporated, Zeeland, Mich.

Filed May 4, 1990, Ser. No. 518,917
Int. Cl.^{5} F16M *11/20*
U.S. Cl. 248—188.1 **8 Claims**

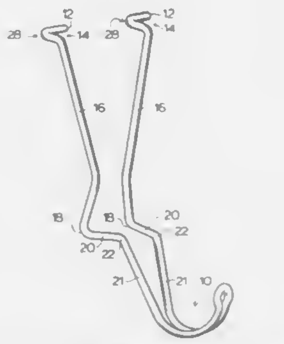
1. A detachable pedestal for supporting an object, said pedestal having an elongated rigid leg member and a bracket for securing one end of said leg member to the object; said bracket having a conical socket surrounded by a radially extending supporting flange, said one end of said member having a sleeve of synthetic resinous material bonded thereto and when compressed between the leg and the socket forming a rigid connection between said leg member and socket for supporting the leg against lateral rocking movement when under eccentric loading; said bracket having an opening through the side of said socket extending a minor portion of both the circumference and the depth of the socket, the edge of the socket wall at the end of the opening forming a lip facing toward said socket, said sleeve having a finger integral therewith and extending beyond the leg receiving end of said sleeve, the sides of said finger being separated from said sleeve for a minor portion of the length of said sleeve, said finger having outwardly extending teeth adapted to engage beneath said lip for holding said leg against axial disenagement from said socket.



5,026,011
PEG BOARD HANGER

Heiner J. Hoefkes, 4218 Melia Drive, Mississauga, Canada L5C 4J5

Filed Sep. 12, 1990, Ser. No. 581,531
Int. Cl.^{5} A47B *5/00*
U.S. Cl. 248—220.4 **6 Claims**

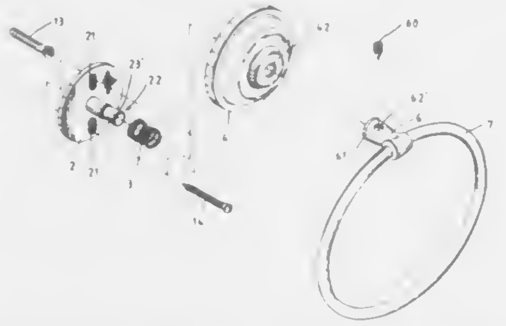


5. A peg board hanger constructed of a length of stiffly resilient wire having a diameter to pass through holes in said peg board and adapted to hang in a rest attitude relative to the peg board, having two free ends for attachment to the peg board, the wire adjacent the free ends having an extent defining a longitudinal axis and curved extensions between each extent and a free end, both extensions curving in the same sense in a plane approximately perpendicular to the respective extend and dimensioned to pass through a hole in said peg board with the free end therebehind.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,012
TOWEL SUPPORT

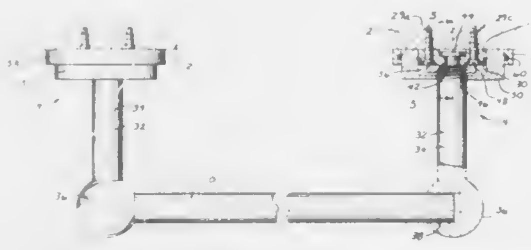
Wen-Mu Wang, No. 32, Lane 266, Fu Te I Rd., Hsi Tze Chien, Taipei Hsien, Taiwan
Filed Mar. 6, 1990, Ser. No. 489,168
The portion of the term of this patent subsequent to Mar. 13, 2007, has been disclaimed.
Int. Cl.⁵ A47G *29/00*
U.S. Cl. 248—222.1 **4 Claims**



1. A towel support comprising a mounting member having holes formed therethrough for fastening said mounting member to a wall, said mounting member including a stem extending from a central portion thereof, said stem including an outer end portion terminating in a distal end remote from said mounting member, said outer end portion having a tapered outer surface thereon tapering from a smaller outer dimension to a larger outer dimension in a direction toward said distal end, a cover plate covering said mounting member and including an opening formed therethrough, said stem extending through said opening, spring means surrounding said stem and engaging said mounting member and said cover plate to urge said mounting member and said cover plate apart, a connector having a first hole formed therein receiving said outer end portion of the stem, said connector including a second hole intersecting said first hole and being threaded, a threaded bolt received in said second hole and including an inner end for engaging the tapered outer surface on the outer end portion of said stem to retain said outer end portion of the stem within said first hole in the connector, and a hanging device supported by said connector for supporting a towel.

5,026,013
SUPPORT POST MOUNTING ASSEMBLY

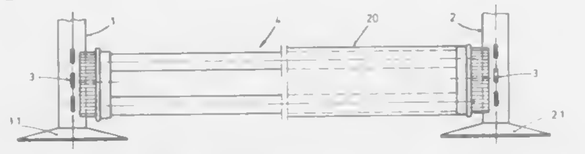
Tom E. Robbins, San Leandro, Calif., assignor to Kallista, Inc., San Leandro, Calif.
Filed Sep. 15, 1989, Ser. No. 408,169
Int. Cl.⁵ A47H *1/14*
U.S. Cl. 248—223.1 **4 Claims**



1 An assembly for mounting an accessory support post to a wall, comprising:
a bracket mountable against the wall, said bracket having a mounting hole formed by a first hole section and a smaller second hole section, said first hole section being joined to said second hole section;
a jam nut having internal threads;
a support post having:
(a) an inward end;
(b) an opposite outward end;
(c) a neck formed adjacent said inward end;
(d) an enlarged head formed inwardly of said neck, said enlarged head being sized to pass through said first hole section but not said second hole section, and said neck positionable within said second hole section after said enlarged head has been inserted through said first hole section; and
(e) threads on said post formed outwardly of said neck;
a shroud secured to said bracket by a first friction fit between the inside of said shroud and a peripheral surface of said bracket, said first friction fit due to an O-ring positioned between said shroud and said bracket, said shroud substantially covering the outward and peripheral sides of both said jam nut and said bracket; and
a decorative member positioned around said shroud and held in place by a second friction fit;
whereby rotation of said jam nut on said post threads when said neck is positioned in said second hole section can cause said enlarged head to clamp against said bracket.

5,026,014
SUPPORTING FRAME

Bernd Korth, Weil am Rhein, Fed. Rep. of Germany, assignor to Protoned B. V., Amsterdam, Netherlands
Filed Mar. 16, 1990, Ser. No. 494,574
Claims priority, application Switzerland, Mar. 21, 1989, 1033/89
Int. Cl.⁵ A47K *1/00*
U.S. Cl. 248—225.2 4 Claims



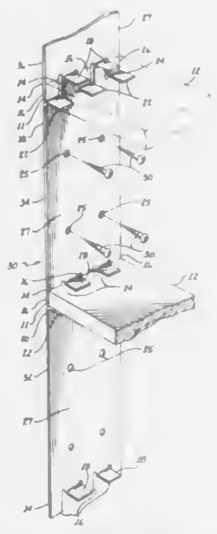
1. A supporting frame, comprising two or more free-standing tubular columns having respective longitudinal axes, each column being provided with slots parallel to the longitudinal axis thereof for locating extension arms or supporting arrangements, and a cross connection which couples adjacent tubular columns to one another to form a modular construction, the cross connection including two or more connecting tubes detachably secured at their two ends in one attachment housing of a pair of attachment housings, each of the attachment housings having a clamping bracket provided with catch projections facing a corresponding one of the tubular columns for engaging the slots of the corresponding one of the tubular columns, a front face, which faces the corresponding one of the tubular columns and which has a surface configuration complementary to the surface of the corresponding one of the tubular columns, and clamping means for clamping the clamping bracket against its associated attachment housing to thereby connect the attachment housing to the corresponding one of the tubular columns by pressure applied by the clamping means.

5,026,015
SHELF FRAME BRACKET

Michael E. Patrick, 9630 N. 100th St., Scottsdale, Ariz. 85258
Filed Feb. 12, 1990, Ser. No. 478,914
Int. Cl.⁵ A47G *29/02*
U.S. Cl. 248—248 11 Claims

1. A frame bracket for supporting shelf boards, the frame bracket comprising:
a. a rectangular vertically extending main surface;
b. three equally spaced first legs extending vertically from a first end of the main surface;

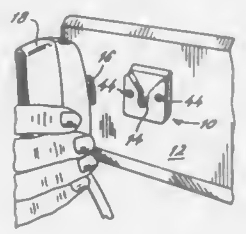
c. a first horizontally extending arm located between adjacent first legs;
d. three equally spaced second arms extending horizontally from a second end of the main surface in the same direction as the first arms, the second arms adapted to support an edge of a shelf board thereon;



e. a second vertically extending leg located between adjacent second arms, the second leg extending in a direction opposite from that of the first legs; and
f. wherein the first and second legs are approximately the same shape and have a length approximately equal to a standard shelf board thickness.

5,026,016
RETAINER CLIP

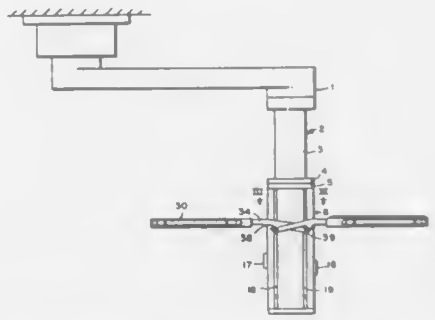
Walter E. Lisowski, Chicago, Ill., assignor to Helm Products, Inc., Chicago, Ill.
Filed Dec. 20, 1989, Ser. No. 453,919
Int. Cl.⁵ A47F *5/00;* **A47B** *96/06*
U.S. Cl. 248—314 **18 Claims**



1. A retainer clip for retaining various devices having an affixed mounting button with a reduced central portion and an enlarged end comprising:
a one-piece molded plastic clip body adapted to be mounted to a wall or other surface and to retain the mounting button therein;
said clip body including a back wall having a back surface to be mounted to said wall;
said clip body including a raised front wall portion, including an access slot formed therein adapted to receive said reduced central portion of the mounting button in said access slot, and including a pair of inclined guide walls to guide said reduced central portion of the mounting button into said access slot; and
said clip body including side wall portions extending rearward from the front wall to the back wall;
said clip body including a clip finger depending from the back wall portion and having an end portion extending downward into said access slot, said clip finger having at least a section of the end portion which is thinner than the back wall and offset from the back surface so that the end portion of said clip finger is rendered resilient to bear against said mounting button when inserted into said access slot, whereby the reduced central portion of the mounting button extends through the access slot and the clip finger bears against the mounting button to hold the enlarged end of the mounting button against the front wall portion to retain the device when it is disposed within the retainer clip.

5,026,017
APPLIANCE CARRIER

Friedhelm Kreuzer, Munich, Fed. Rep. of Germany, assignor to F.M.K. Kruezer GmbH & Co., Benzstrabe, Fed. Rep. of Germany
Filed May 8, 1990, Ser. No. 520,510
Claims priority, application Fed. Rep. of Germany, May 24, 1989, 3916975
Int. Cl.⁵ A47H *1/10*
U.S. Cl. 248—324 5 Claims



1. An appliance carrier comprising an arm for carrying support members for appliances and supply lines for operating the appliances, the carrier having two opposite sides and two grooves one each of the opposite sides, said grooves extending parallel and in longitudinal direction of the carrier, carrier members slidably received in the respective grooves, and support members having forked arms, formed to rest on said carrier members adjacent to the respective support member, and to grip below said carrier members with the ends of said arms.

5,026,018
APPARATUS FOR FORMING RISERS FOR CONCRETE STEPS

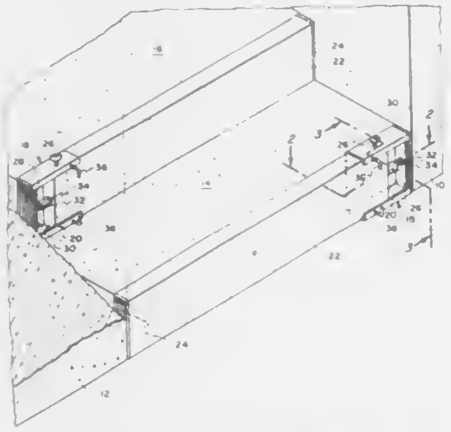
Harry J. Ayala, 4023 E. Burgess La., Phoenix, Ariz. 85040
Filed Feb. 26, 1990, Ser. No. 484,919
Int. Cl.⁵ E04G *13/06*
U.S. Cl. 249—14 **2 Claims**

1. An apparatus for forming risers for concrete steps poured between a pair of spaced vertical walls, said apparatus comprising:
an elongated rigid member having a fixed length less than the spacing between said vertical walls, said elongated rigid member having a first end and a second end, said elongated rigid member having a longitudinal center axis;
a bracket having an internal chamber, said first end being telescopingly received within said internal chamber, said bracket being slidably movable on said elongated rigid member in a direction parallel to said center axis, guide means on said bracket preventing movement of said bracket relative to said rigid member transverse to said longitudinal center axis, said bracket having an end plate, said end plate abutting against one of said walls with said

VOL
1127
ISS
4
JE
25
1991
UMI

second end of said elongated rigid member abutting against the other said wall;

a threaded member located in said internal chamber, said threaded member located between said end plate and said first end of said elongated rigid member, a nut threadedly mounted on said threaded member, rotation of said nut in one direction on said threaded member causes moving of said end plate away from said elongated rigid member tightly clamping said elongated rigid member and said bracket between said vertical walls; and



said elongated rigid member closely conforming to the interior wall surface of said internal chamber, adjustment means mounted on said bracket, said adjustment means for laterally adjusting the size of said internal chamber to insure that there is a close fit between said elongated rigid member and said bracket since various widths of said elongated rigid member may be utilized.

5,026,019
ONE-PIECE SLIDABLE HOSE CLAMP

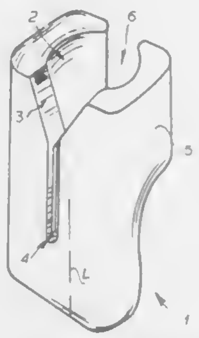
Frank T. Biekart, and Hubertus E. Hilbrink, both of Emmen, Netherlands, assignors to NPBI Nederlands Produktielaboratorium voor Bloedtransfusieapparatuur en Infusievloeistoffen B.V., HM Emmer-Compascuu, Netherlands

Filed Jun. 26, 1990, Ser. No. 453,953

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1989, 3921585

Int. Cl.⁵ F16K *7/04*

U.S. Cl. 251—4 6 Claims



1. A clamp for blocking flow through a flexible hose, the clamp being formed of a one-piece L-shaped body of rigid material having one leg formed with a generally circular throughgoing hole through which the hose can pass loosely enough for flow through the tube and another leg formed with a throughgoing slot narrow enough that when the tube passes through it flow through the tube is blocked, the hole and slot communicating with and opening into each other.

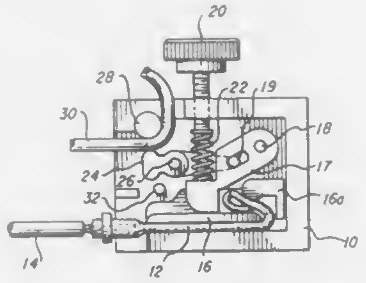
5,026,020
MINIATURE COMPOUND LEVER PINCH VALVE/REGULATOR

Frank A. Betush, 375 Hargrave, Inglewood, Calif. 90302

Filed May 14, 1990, Ser. No. 522,599

Int. Cl.⁵ F16K *7/07, 31/126;* **F16L** *55/14*

U.S. Cl. 251—5 12 Claims



1. A pinch valve/regulator comprising: a housing; a planar member mounted in said housing for rectilinear movement therein; a swell tube positioned between said planar member and said housing to displace said planar member with respect to said housing in response to the introduction of pressurized fluid into said swell tube, said planar member being disposed along substantially the entire length of said swell tube, a pinch bar mounted in said housing; a pinch lever pivotally mounted in said housing with one end in pinching relationship with said pinch bar; and actuating lever pivotally coupled to said housing and being interposed between said pinch lever and said planar member with a portion of said actuating lever being in engagement with said planar member to enable rectilinear movement of said planar member to cause said pinch lever to perform a pinching function to control a fluid through the pinch valve/regulator.

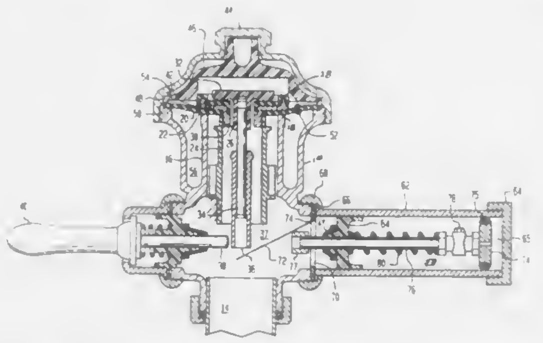
5,026,021
FLUSH CONTROL ASSEMBLY FOR PRESSURE FLUSH VALVES

Wilton J. Pino, 922 Sharp Rd., Baton Rouge, La. 70815

Filed Sep. 19, 1990, Ser. No. 585,719

Int. Cl.⁵ F16K *31/145, 35/00*

U.S. Cl. 251—40 16 Claims



1. A fluid control assembly connectable to a pressure flush valve having:

a hollow body having an inlet connectable to a source of water under pressure, and an outlet connectable to a plumbing fixture, and a connection port;

an upstanding barrel portion in said flush valve having a main valve seat around the top end thereof;

a flexible diaphragm having a central opening therein surrounded by a main valve seating portion which diaphragm contains a by-pass valve to fill a portion of said body located above the diaphragm with water from said inlet and a detachable inner cover;

a cylindrical hollow guide member depending from said diaphragm and extending through said barrel portion;

a relief valve seatable across the diaphragm opening and having an operating stem depending downward through said guide member, which stem is also characterized as having a slidable sleeve attached to and extending downward therefrom;

an internal detachable cover member positioned above said relief valve and spaced therefrom,

an actuating assembly attached to a side of the body having an actuating means located within actuating distance of the slidable sleeve for actuating said pressure flush valve by contacting the slidable sleeve of the relief valve stem thereby tilting the relief valve and the diaphragm off of their seat and permitting water to flow through said flush valve, and by so doing causing the slidable sleeve to slide up the relief valve stem and out of contact with said actuating means, thus allowing the relief valve and diaphragm to reseat,

wherein said fluid control assembly is comprised of a means actuated by the water pressure at the outlet of the flush valve for delaying the return of the slidable sleeve to its normally downward position for preventing the actuating means from actuating the relief valve stem for a pre-determined period of time after the relief valve and the diaphragm reseat.

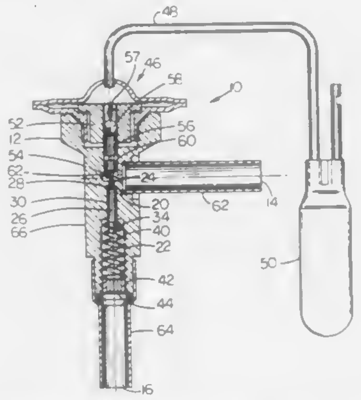
5,026,022
THERMOSTATIC EXPANSION VALVE FOR LOW REFRIGERANT FLOW RATES

Clifford F. Bastle, Gurnee, Ill., assignor to Parker Hannifin Corporation, Cleveland, Ohio

Filed Aug. 28, 1990, Ser. No. 576,243

Int. Cl.⁵ F16K *1/52, 47/04*

U.S. Cl. 251—122 9 Claims



1. A thermostatic expansion valve for controlling the flow of refrigerant material at low flow rates, comprising:

a body, said body including an inlet and an outlet, said body further including an orifice intermediate said inlet and outlet, and a cylindrical chamber intermediate said orifice and said outlet, said cylindrical chamber including an inner wall;

a movable pin member in said body;

means for moving said pin member; and

retaining means for supporting said pin member;

said pin member including a head portion at a first and adjacent said orifice, said head portion moveable into blocking relation of said orifice to control flow therethrough;

said pin member further including a cylindrical portion extending in said cylindrical chamber of said body, said cylindrical portion substantially coaxial with said chamber, said cylindrical portion having an outer wall adjacent but slightly disposed from the inner wall of the cylindrical chamber, whereby an opening is formed, said refrigerant material flowing through said opening;

said pin member further including a second end opposed to said first end, said second end extending from said cylindrical chamber and including a reduced diameter portion;

said retaining means comprising a retaining member for accepting said reduced diameter portion of said pin member.

5,026,023
SEALING ARRANGEMENT IN A PLUG-AND-SOCKET COUPLING WITH A PRESSURE FLUID PASSAGE, PARTICULARLY BETWEEN THE SPOUT OF A LIQUID GAS CONTAINER AND A DISCHARGE REGULATOR MOUNTED THEREON

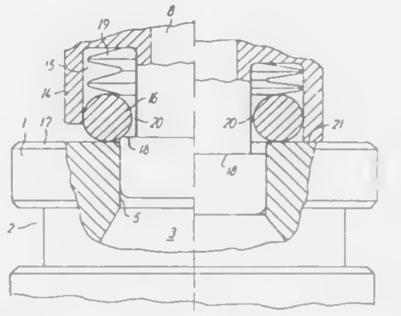
Ove Jensen, Ålsgårde, Denmark, assignor to Kosan Teknova A/S, Niva, Denmark

Continuation of Ser. No. 190,411, May 5, 1988, abandoned. This application Jan. 31, 1990, Ser. No. 472,411

Claims priority, application Denmark, May 21, 1987, 2572/87

Int. Cl.⁵ F16K *51/00*

U.S. Cl. 251—144 13 Claims



1. A sealing arrangement in a plug-and-socket coupling comprising:

a first coupling part having a first pressure fluid passage and including:
  a valve to be opened upon assembling of the sealing arrangement;
  a top surface surrounding an axis; and
  a bore defining an outlet for the first pressure fluid passage which opens at the top surface of the first coupling part;

a second coupling part having a main body with a second pressure fluid passage, said body engaging an outer periphery of the first coupling part adjacent said top surface of said first coupling part and including:
  a protrusion surrounding said axis and partly inserted into and with a small clearance fitting the bore of the outlet of the first coupling part so that a non-inserted part extends axially away from said top surface and said first coupling part; and
  a skirt disposed radially inwardly of the outer periphery of the first coupling part, encircling substantially the non-inserted part of the protrusion, and including an internal surface facing the protrusion, which together with the non-inserted part of the protrusion defines a downwardly open annular chamber facing said top surface; and

an annular gasket within the annular chamber and abuting the internal surface of the skirt, the gasket being axially displaceable relative to the internal surface of the skirt and the protrusion, while access for pressurized fluid from the outlet of the first pressure fluid passage of the first coupling part to the annular chamber is provided between the gasket and the protrusion so that pressurized fluid leaking past the inserted part of the protrusion, between the protrusion and the bore of said outlet, enters the annular chamber and presses the annular gasket sealingly against the internal surface of the skirt and the top surface of the first coupling part.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,024

HOSE SNAP-ACTION JOINT

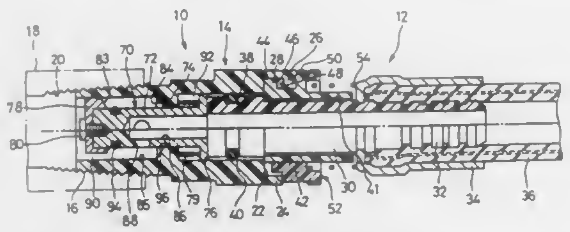
Hisayuki Ito, Mie, Japan, assignor to Tokai Rubber Industries, Ltd., Komaki, Japan

Filed Oct. 13, 1989, Ser. No. 420,875

Claims priority, application Japan, Oct. 14, 1988, 63-259969

Int. Cl.^{5} F16L *37/28*

U.S. Cl. 251—149.5 **10 Claims**



1. A hose snap-action joint comprising:

a cylinder member formed in a cylinder shape, disposed integrally with or independently of a mating member to be connected, and comprising an arc-shaped radially inwardly-directing engaging portion disposed on the inner surface thereof and a first locking portion disposed on an end thereof in a manner projecting in the axial direction thereof;

an insert pipe member, to be fixed at one end of a hose and inserted rotatably into said cylinder member, for communicating said mating member and said hose;

an engaging member disposed rotatably on the outer surface of said insert pipe having an arc-shaped radially outwardly-directing engaging portion, corresponding to said inwardly-directing engaging portion, and said outwardly-directing engaging portion made engageable with said inwardly-directing engaging portion at a predetermined angle position;

a locking ring disposed on the outer surface of said insert pipe member in a manner rotatable integrally with said engaging member and relatively movable in the axial direction of said engaging member by a predetermined distance and having a second locking portion disposed on the end thereof in a manner locking with said first locking portion of said engaging member, and

a spring means for urging said locking ring toward said cylinder member in the axial direction thereof.

5,026,025

HOSE JOINT WITH OPENING-CLOSING VALVE

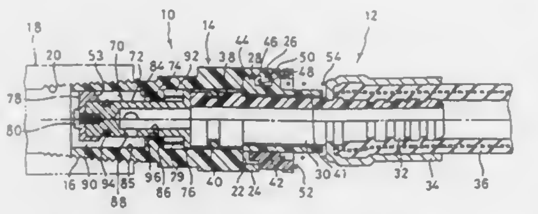
Hisayuki Ito, Suzuka, Japan, assignor to Tokai Rubber Industries, Ltd., Komaki, Japan

Filed Oct. 13, 1989, Ser. No. 420,900

Claims priority, application Japan, Oct. 14, 1988, 63-134845[U]; Oct. 14, 1988, 63-134846[U]

Int. Cl.^{5} F16L *37/40*

U.S. Cl. 251—149.6 **2 Claims**



1. A hose joint having an opening-closing valve comprising:

a cylinder member having a valve seat extending in a radial direction from an intermediate portion of an inner cylindrical surface of said cylinder member, wherein said valve seat comprises a center bore connecting a primary liquid chamber of said cylinder member to a secondary liquid chamber of said cylinder member;

an insert pipe member connected to an end of a hose and capable of being inserted into said secondary liquid chamber;

a valve body inserted in said primary and secondary liquid chambers and said center bore of said cylinder member, wherein a stopper block comprising an end portion of said valve body in said primary liquid chamber has a larger diameter than an intermediate portion of said valve body;

an O-ring seated in a groove in an outer surface of said valve body between said stopper block and said valve seat;

spring means for urging said valve body in a direction toward said insert pipe member inserted in said secondary liquid chamber of said cylinder member;

wherein said valve body and said cylinder member form a double seal and water flow ceases when said spring means closes said cylinder member by urging said stopper block against said valve seat, a radially extending surface of said stopper block mating with a radially extending surface of said valve seat to form one seal of said double seal, and by inserting said O-ring into said center bore against an inner surface of said valve seat, to form the other seal of said double seal whereby said insert pipe member is not in communication with said secondary liquid chamber, and

wherein when said spring means is compressed, water flow takes place through said cylinder member by separating said stopper block from said valve seat and by separating said O-ring from said center bore when said insert pipe member pushes against said valve body.

5,026,026

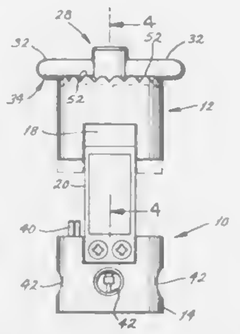
LOCKING DEVICE FOR GAS REGULATOR AND CONTROL APPARATUS

Robert E. Sever, Florissant, and Dave L. Woodring, St. Louis, both of Mo., assignors to Essex Industries, Inc., St. Louis, Mo.

Filed Jul. 2, 1990, Ser. No. 546,869

Int. Cl.^{5} F16K *31/44, 35/00*

U.S. Cl. 251—230 **13 Claims**



1. A locking device for use with a gas flow distribution device to be connected to a source of gas under pressure, the device having a yoke for securement to the source and a fastening screw threaded in the yoke for securing the device to the gas source, the locking screw having a handle portion, the locking device comprising a collar including a sleeve defining opposed openings for engagement of the yoke to permit longitudinal movement relative to the yoke but substantially preventing rotation of the sleeve relative to the yoke when the collar engages the handle portion, the collar having a yoke-remote portion including a plurality of handle-engaging recesses, and means resiliently biasing the collar outwardly from the yoke into locking engagement of the handle-engaging recesses with the handle portion for generating a ratcheting effect to reliably lock the handle portion within the handle-engaging recesses to ensure that the handle portion does not become loose either from vibration or misuse, and thereby preventing unintended unfastening of the screw from the gas source to prevent a hazardous leakage condition.

5,026,027

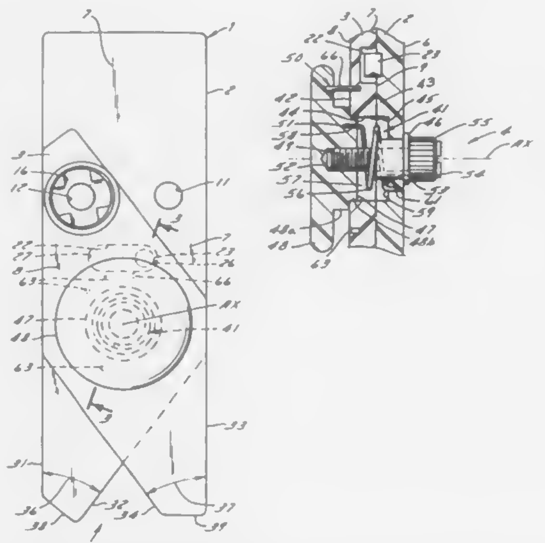
MANUALLY ACTUATABLE SELECTOR VALVE FOR BREATH SAMPLING APPARATUS

Lyle H. Hamilton, 1034 N. 124th St., Wauwatosa, Wis. 53226

Filed Oct. 1, 1990, Ser. No. 591,059

Int. Cl.^{5} F16K *3/04*

U.S. Cl. 251—301 **5 Claims**



1. A selector valve comprising:

A. a pair of plate-like members including a pilot carrying member and a cooperating member having a connection with one another for relative edgewise swinging about an axis, each having

an outer surface,

an inner surface which is flat and normal to said axis and which slidably opposes the inner surface of the other of said members,

a substantially round aperture therethrough that is concentric to said axis, said apertures together defining a spring chamber, and

a port therethrough, said ports being spaced at like distances from said axis, the port in one of said plate-like members being surrounded by a portion of the inner surface of that member which is in slidable engagement with the inner surface of the other plate-like member;

B. a pilot element received in said aperture in said pilot carrying member for rotation relative to that member, said pilot element having

a knob portion which projects outwardly beyond the outer surface of the pilot carrying member to be accessible for manual rotation and

an abutment portion within said aperture having a first spring anchorage thereon spaced from said axis;

C. a spring having

a coiled body portion received in said spring chamber substantially concentrically to said axis,

one end portion secured to said first spring anchorage, and an opposite end portion;

D. means on said cooperating member defining a second spring anchorage to which said opposite end portion of the spring is secured;

E. selector means on said pilot element and on said pilot carrying member cooperable to define a plurality of abutments at positions of rotation that are alternatively and selectably engageable to releasably confine the pilot element in any one of said plurality of positions of rotation to provide a biasing of said plate-like members towards one of said positions of their swinging motion under a force that is adjustably variable; and

F. cooperating stop means on said plate-like members defining

a first position of their swinging motion about said axis wherein said ports are in register with one another for communication between them, and

a second position of their swinging motion wherein said ports are spaced apart and wherein said port in said one plate-like member is blocked by the other plate-like member and is thus sealed.

5,026,028

APPARATUS FOR CONNECTING STRUT AND HORIZONTAL MEMBER

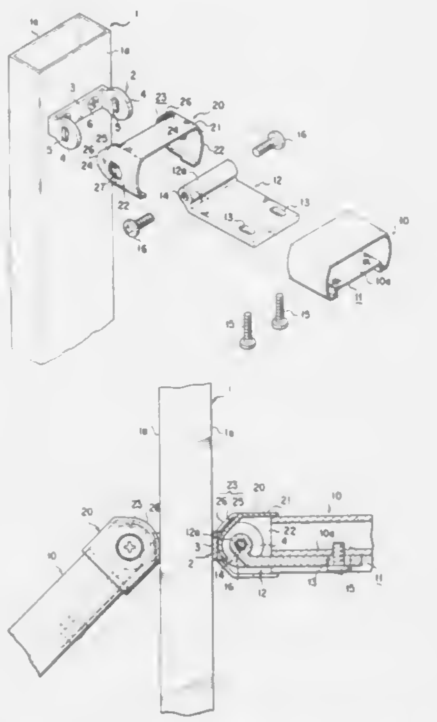
Akihiko Ooi, and Toshiaki Hirono, both of Toyama, Japan, assignors to Yoshida Kogyo, K. K., Tokyo, Japan

Filed Dec. 18, 1989, Ser. No. 452,045

Claims priority, application Japan, Dec. 19, 1988, 63-163482[U]

Int. Cl.^{5} F16B *7/00*

U.S. Cl. 256—67 **5 Claims**



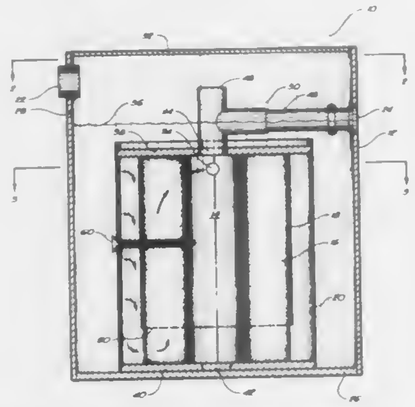
1. An apparatus for connecting a strut and at least one horizontal member, comprising a U-shaped strut bracket **2** formed by a mounting plate **3** and left and right support plates **4, 4** and adapted to be mounted on each of side faces 1*a* of a strut; a horizontal member **10**; a plate-shaped horizontal member bracket **12** whose end is arranged to be located between the left and right support plates **4, 4** and adapted to be mounted on the lower portion of the horizontal member **10**, the horizontal member bracket **12** being connected to the left and right support plates **4, 4** by means of screws **16, 16**; and a cover member **20** adapted to be fitted from above to each end of the horizontal member **10**, wherein the cover member **20** has left and right slit grooves **24, 24** formed therein in proximity to the longitudinal ends thereof, a central cover plate **25** formed integrally with the cover member **20** and extending between the left and right slit grooves **24, 24**, and side cover plates **26, 26** located outside the slit grooves, respectively, and formed integrally with the cover member **20**, the left and right slit grooves **24, 24** being configured to allow the left and right support plate **4, 4**

VOL
1127
ISS
4
JE
25
1991
UMI

to be fitted therein, respectively said central cover plate **25** being bent in a circular arc shape so as to allow it to keep contact with the mounting plate **3** in a manner of being elastically deformable, and each of said side cover plates **26, 26** being formed substantially in a circular arc shape so as to allow it to keep contact with the side face **1***a* f the strut **1**.

5,026,029
SILVER CONTROLLER

David Peterson, P.O. Box 3099, Baytown, Tex. 77522
Filed Oct. 13, 1989, Ser. No. 421,062
Int. Cl.⁵ C22B *3/02, 11/00*
U.S. Cl. 266—170 **16 Claims**

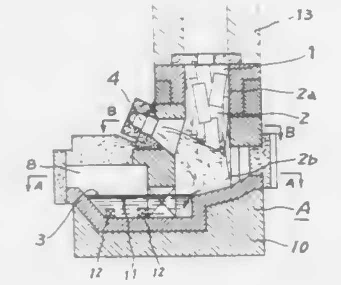


1. A silver controller apparatus comprising:
a container having an inlet and an outlet, said container having a base;
a core member positioned within said container, said core member having an aperture distal said base, said aperture for passing fluid to said outlet, said core member having a flange member extending outwardly therefrom, said flange member located above said aperture within said container;
a filler material adjacent said core member, said filler material being a metal above silver in the electromotive force series;
a fluid deflector extending around said core member and said filler material, said fluid deflector positioned so as to extend below said aperture in said core member, said fluid deflector surrounding said core member and said filler material; and
a plating shield positioned exterior of said fluid deflector within said container, said plating shield having perforations extending therethrough, said plating shield in sealed engagement with said flange member and said base, said perforations for passing a fluid through said plating shield of a material allowing for the plating of silver thereon, said plating shield encircling said fluid deflector and said filler material.

5,026,030
MELTING AND HOLDING FURNACE

Masayuki Inukai, and Masao Yamaoka, both of Yao, Japan, assignors to Kabushiki Kaisha Daiki Aluminum Kogyosho, Osaka, Japan
Filed Sep. 29, 1989, Ser. No. 414,350
Claims priority, application Japan, Sep. 30, 1988, 63-248861
Int. Cl.⁵ F27B *3/04*
U.S. Cl. 266—229 **3 Claims**

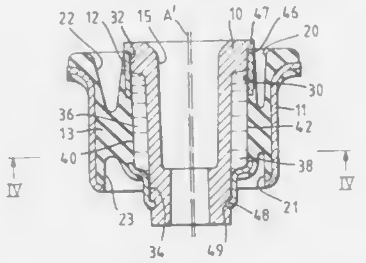
1. A melting and holding furnace for raw material comprising:
a base (**10**),
a melting chamber (**2**) including a preheating tower section **2***a*, a holding chamber (**8**), and a well (**5**) disposed on said base (**10**),
said preheating tower (**2***a*) having a material inlet (**1**) at a top portion thereof disposed above said melting chamber and having a longitudinal axis,
said melting chamber (**2**) includes a bottom,
a melting burner is disposed at a base portion of the preheating tower on a lower side wall of the preheating tower for jetting out flames of the melting burner obliquely downwardly relative to the longitudinal axis of the preheating tower toward the melting chamber,
said holding chamber being adjacent the melting chamber and including an inlet for communicating therewith to receive a molten metal from an outlet of the melting chamber, said holding chamber having a bottom at a lower level than said bottom of said melting chamber,



a sustaining burner positioned in an upper area of said holding chamber to direct a flame from said inlet end of said holding chamber which receives a molten metal from said outlet of said melting chamber toward an outlet end of said holding chamber for sustaining the molten metal in the holding chamber at a temperature sufficient to sustain a molten metal, and
said well is disposed adjacent the holding chamber to receive the molten metal from said outlet end of said holding chamber.

5,026,031
FLUID-DAMPED RESILIENT BUSH

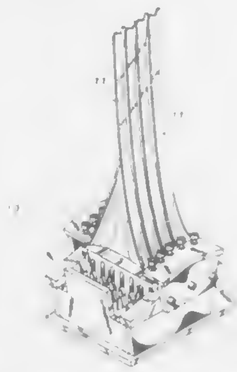
Peter T. Court, Corsham, England, assignor to BTR plc a British Company, United Kingdom
Filed May 25, 1988, Ser. No. 198,743
Claims priority, application United Kingdom, Jun. 17, 1987, 8714221; Feb. 13, 1988, 8803354
Int. Cl.⁵ F16F *5/00*
U.S. Cl. 267—140 15 Claims



1. A fluid-damped resilient bush comprising an outer sleeve, an intermediate sleeve and a resilient member moulded between the outer sleeve and the intermediate sleeve to provide a one-piece moulding, an inner member being mounted within the one-piece moulding and sealed thereto by axially separate annular areas of the one-piece moulding engaging but not bonded to the inner member, at least two cavities being formed between the one-piece moulding and the inner member, the cavities being arranged to contain damping fluid and to communicate with one another.

5,026,032
BLADE ASSEMBLY TOOL

Ralph J. Ortolano, Rancho Palos Verdes; Kenneth A. Ball, Huntington Beach, and Gary Bowman, Riverside, all of Calif., assignors to Southern California Edison, Rosemead, Calif.
Filed Feb. 22, 1990, Ser. No. 483,129
Int. Cl.⁵ B23P *19/04*
U.S. Cl. 269—43 **14 Claims**

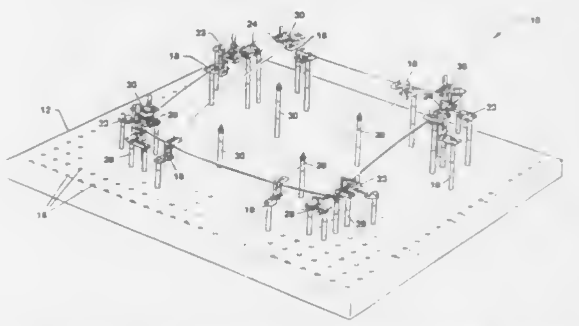


1. A pre-assembly verification tool for temporarily locating a predetermined number of blades of a rotor in relative operative adjacent relationship with each other comprising a support, spaced sidewalls affixed to the support, the support and sidewalls forming a space for locating roots of respective blades in adjacent abutting relationship, the spaced sidewalls being separated to accommodate the thickness of the roots so that the roots may be located snugly between the sidewalls, a portion of the sidewalls having an arc of curvature representative of an arc of curvature for a rotor for temporarily accommodating the blades such that when the blades are temporarily located with the roots in the space, the blades adopt a temporary location relative to each other representative of a permanent blade position in the rotor, and wherein the arc of curvature forms a regular smooth uninterrupted curved surface, and including a holding fixture for securing the roots in the space, the holding fixture being for removable attachment to a sidewall, set screws interacting with the holding fixture and the sidewalls through threaded apertures provided in the holding fixture and the sidewalls, the holding fixture having a sidewall for parallel location with the sidewall adjacent to the support, and wherein with the holding fixture in operative position relative to the sidewall, a portion of the blade is sandwiched between the smooth curved surface and the holding fixture, and wherein the holding fixture is operative wholly outside a plane of the arc of curvature of the surface of the sidewall.

5,026,033
UNIVERSAL SYSTEM FOR THE SUPPORT AND POSITIONING OF A WORKPIECE

Frank W. Roxy, Utica, Mich., assignor to The Budd Company, Troy, Mich.
Continuation of Ser. No. 440,594, Nov. 22, 1989, abandoned. This application Aug. 20, 1990, Ser. No. 569,745
Int. Cl.⁵ B25B *1/00*
U.S. Cl. 269—45 **18 Claims**

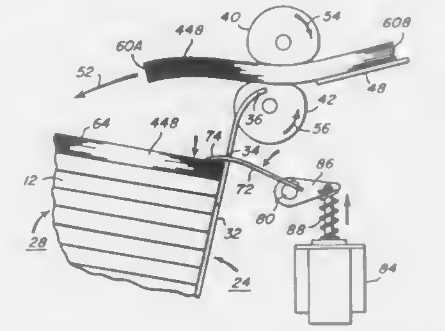
1. A workpiece supporting apparatus comprising:
a platform having a matrix of holes in predetermined locations;
a plurality of alignment devices, each alignment device being secured in a selected hole and readily moveable and securable from one hole to another such that the relation of said alignment devices to each other is known; and
said alignment device being adjustable in at least one of three coordinate axes and having a sufficient range of movement to support and position a variety of different workpieces, each alignment device being assembled from a plurality of interchangeable elements, and each alignment device including at least one elongated stanchion having a predetermined length, said elongated stanchion includign means at one end surface thereof for connecting another elongated stanchion thereto along a common axis and at least one stanchion referencing the workpiece relative to the platform, said elongated stanchion is removably connected at its lower end to one of the holes in the platform and carrying another element at its upper end; and



said plurality of interconnected elements includes an extension element secured to the upper end of the at least one stanchion, said extension element carrying a rotatable member for rotating at least one reference bushing in a plane substantially parallel to the platform, and said reference bushing being movably positionable.

5,026,034
DOCUMENT OUTPUT APPARATUS HAVING ANTI-DISHEVELMENT DEVICE

Steven M. Russel, Pittsford, and Robert H. Shea, Victor, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Jun. 19, 1989, Ser. No. 368,685
Int. Cl.⁵ B65H *39/00*
U.S. Cl. 270—52 **12 Claims**



1. In an electrostatographic copier or printer, apparatus for feeding and stacking sets of sheets, the apparatus including:
(a) a receiving member for receiving and holding a stack of such sets including means for moving said receiving member downward in response to each new set so fed and stacked;
(b) means for feeding a plurality of such sets one at a time onto the top of the stack in said receiving member; and
(c) an anti-dishevelment device for preventing the tearing, dishevelment and other damaging of the top sheet of the top set in the stack by contacting an holding down such top sheet during the feeding of a new set onto the stack.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,035

PAPER HANDLING APPARATUS

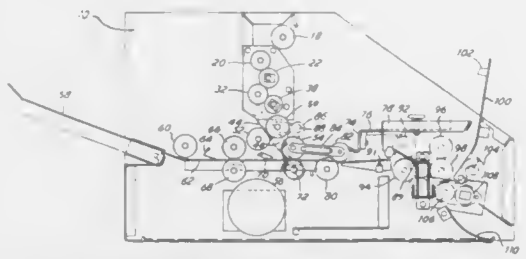
Jose A. Martinez Sanz, Barcelona, Spain, and Rex M. K. Gough, Cambridge, United Kingdom, assignors to Pitney Bowes plc, Harlow, England

Filed Apr. 7, 1989, Ser. No. 334,964

Claims priority, application United Kingdom, Apr. 8, 1988, 8808313; May 6, 1988, 8810699

Int. Cl.^{5} B42C *1/00*

U.S. Cl. 270—45 5 Claims



1. Paper handling apparatus including a paper path, two feed rollers in driving association located on said paper path and movement sensor means for detecting separating movement of said feed rollers, said sensor means being operable to output a first single in response to the presence of a single stationery item between said feed rollers and to output a second signal when more than one stationery item passes between said feed rollers, whereby in use passage of a single item between said feed rollers causes said first signal to be output and passage of more than one stationery item causes said second signal to be output, and wherein said sensor means is adjustable so that the separation at which said second signal is output may be varied to suit the thickness of the stationery items being handled by the paper handling apparatus.

5,026,036

DEVICE FOR CONTROLLING STACKING OF PAPER SHEETS ON AN INTERMEDIATE TRAY OF AN IMAGE FORMING APPARATUS

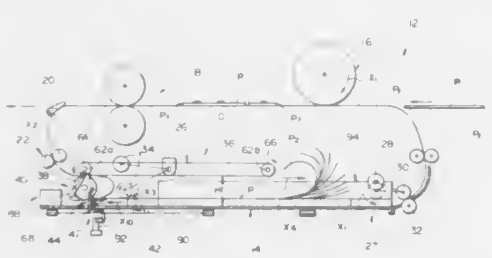
Yasuhiro Takahashi, Tokyo, Japan, assignor to Ricob Company, Ltd., Tokyo, Japan

Filed Mar. 29, 1989, Ser. No. 330,290

Claims priority, application Japan, Mar. 31, 1988, 63-79953; Aug. 23, 1988, 63-110276[U]

Int. Cl.^{5} B65H *29/40*

U.S. Cl. 271—3.1 13 Claims



1. In an image forming apparatus in which a paper sheet carrying an image on one surface thereof is temporarily stacked on an intermediate tray which is disposed on a paper transport path, a device for controlling stacking of said paper sheet on said intermediate tray, comprising:

transport means having a portion thereof juxtaposed to said intermediate tray for transporting the paper sheet to said intermediate tray;

rotatable reversing means, attached to a drive shaft by a slip clutch, for stacking the paper sheet on said intermediate tray while turning over the paper sheet, said rotatable reversing means having a retaining portion for receiving and retaining a leading edge of the paper sheet to be turned over when said rotatable reversing means is rotated to a paper receive position and a contact surface for contacting an adjacent surface to thereby exert a load on said rotatable reversing means greater that a predetermined load so that the slip clutch idles to temporarily stop rotation of said rotatable reversing means prior to the paper receive position when the paper sheet has a size greater than a predetermined size;

positioning means for positioning said leading edge of the paper sheet stacked on said intermediate tray by said reversing means at a paper hold position which is defined at said intermediate tray; and

restraining means for restraining the paper sheet positioned on said intermediate tray by said positioning means at said paper hold position.

5,026,037

COPYING MACHINE WITH MULTIPLE TRANSPORT FUNCTIONS INCLUSIVE OF DUPLEX AND COMPOSITE COPYING FROM AN INTERMEDIATE FEED TRAY BY SELECTIVES TOP OR BOTTOM FEED

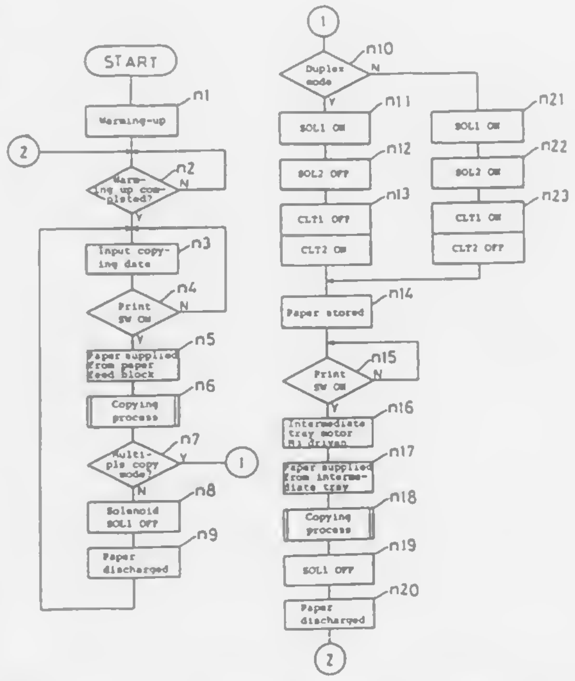
Zitsuo Masuda, Yamatotakada, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 20, 1987, Ser. No. 87,342

Claims priority, application Japan, Aug. 20, 1986, 61-127298[U]

Int. Cl.^{5} G03G *15/21*

U.S. Cl. 271—3.1 5 Claims



1. A copying machine with multiple transport functions and multiple copying modes capable of operating a composite copy mode ad duplex copy mode utilizing a single intermediate copy tray which comprises a main transport path running from a paper feed means through a copy process station to a paper discharge means, an auxiliary transport path running from said paper discharge means by way of said intermediate copy tray to said paper feed means, either through a path which includes a reverse transport means which selectively reverses a copy paper during said duplex copy mode or, directly to said intermediate copy tray avoiding said reverse transport means during said composite copy mode, a multiple copy mode selecting means for selecting which of said duplex or composite copy modes is to be implemented when said copy paper is passed through said auxiliary transport path, an intermediate copy tray having a paper supply section with two paper feed rollers each capable of being driven independently disposed adjacent to upper and lower sides of said paper supply section of said intermediate copy tray and paper feed roller selecting means which selects one of said two paper feed rollers to be driven depending upon which copy mode has been selected by said multiple copy mode selecting means, wherein whether in the composite copy mode or the duplex copy mode, copy paper sheets having a toner image formed on one side thereof are delivered from said intermediate copy tray by a paper feed roller facing the image-carrying side of said copy paper sheets in said intermediate copy tray, so that said toner image on each copy paper does not stick to and soil another copy paper in said intermediate copy tray.

5,026,038

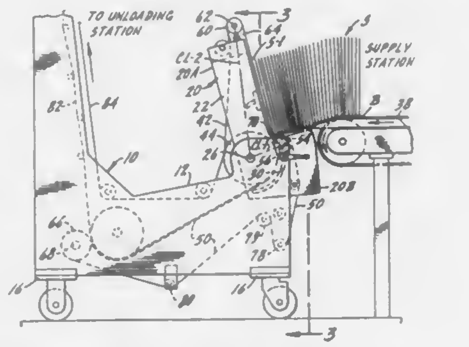
SIGNATURE FEEDER OPERABLE WITH EITHER FLAT OR STANDING STACKS

Ronald W. Weller, Orland Park, and James Wrona, Burbank, both of Ill., assignors to McCain Manufacturing Corporation, Chicago, Ill.

Filed May 17, 1990, Ser. No. 524,730

Int. Cl.^{5} B65H *5/22*

U.S. Cl. 271—3.1 5 Claims



1. A signature loader for feeding signatures between a supply station and an unloading station, comprising a telescopically related main floor-mounted frame and a smaller auxiliary frame, a first and second horizontal rotatable shafts extending within both frames with the axes of the shafts spaced apart by a predetermined distance, said shafts respectively supporting rollers for opposed infeed belts and so positioned that the infeed belts thereon converge to define between them an infeed entry bight or throat into which the signatures are to be fed one by one from the supply station and advanced by said belts in the direction of the unloading station, one of said shafts also constituting a pivotal axis about which the auxiliary frame may be pivoted so that said throat may be seleetively positioned in one of two alternate attitudes to receive signatures by either a substantially vertical drop into the throat or by a substantially horizontal movement of the signatures into the throat, and a manually settable lock by which the two frames are rigidly joined with the said throat in one attitude, whereby upon releasing the lock the auxiliary frame may be turned on said axis to locate the throat in its other attitude.

5,026,039

SHEET STORAGE CASE FOR USE IN IMAGE RECORDING APPARATUS

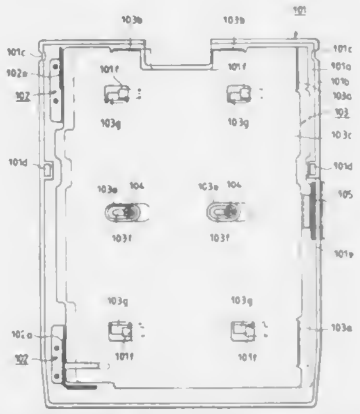
Susumu Kuzuya, Gifu; Shigeyuki Hayashi, Nagoya; Hiroaki Kimura, Nagoya; Tsutomu Suzuki, Nagoya; Katsuyoshi Sonobe, Nagoya; Takashi Nakata, Nagoya, and Naoyuki Hatta, Gamagori, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan and Takayuki Hayashi, Nagoya, Japan

Filed Dec. 21, 1989, Ser. No. 454,405

Claims priority, application Japan, Dec. 21, 1988, 63-165922[U]; Dec. 28, 1988, 63-332373; Dec. 28, 1988, 63-332374; Dec. 28, 1988, 63-332375; Jan. 30, 1989, 1-10354 [U]; Apr. 13, 1989, 1-93651; Apr. 28, 1989, 1-50405[U]

Int. Cl.^{5} B65H *5/08*

U.S. Cl. 271—11 12 Claims



1. A sheet storage case for storing therein a stack of sheets, the sheet storage case being adapted to be assembled into a sheet feeding device which feeds out an uppermost sheet of the stack of sheets, the stack of sheets having first, second, third and fourth edges, the sheet storage case comprising:

a bottom plate being configured in a substantially rectangular shape and having first, second, third and fourth edges, the first and second edges extending in a direction along which the uppermost sheet of the stack of sheets is fed out by the sheet feeding device when the sheet storage case is assembled into the sheet feeding device;

a first positioning member fixedly secured to said bottom plate for positioning the first edge of the stack of sheets, said first positioning member having a sheet positioning face oriented in a first direction substantially parallel to the first edge of said bottom plate and substantially orthogonal to said bottom plate;

a second positioning member provided on said bottom plate to be slidably movable in a second direction perpendicular to the first direction for positioning the second edge of the stack of sheets, said second positioning member having a sheet receiving portion for receiving the stack of sheets and a sheet positioning face for positioning the second edge of the stack of sheets;

guide means for guiding the sliding movement of said second positioning member;

a third positioning member fixedly secured to said bottom plate for positioning the third edge of the stack of sheets;

a fourth positioning member provided on said bottom plate to be slidably movable in the first direction, wherein said second and fourth positioning members are movable in interlocking relation with each other;

an urging member for applying an urging force to said fourth positioning member in the first direction;

a cam provided on said second positioning member, said cam having a cam surface; and

a cam follower provided on said fourth positioning member, said cam follower being in engagement with the cam surface of said cam due to the urging force, said fourth

VOL
1127
ISS
4
JE
25
1991
UMI

positioning member being moved in accordance with a movement of said second positioning member.

5,026,040
DEVICE FOR THE SEQUENTIAL INTRODUCTION OF SHEETS IN A SHAPING OR FORMING MACHINE

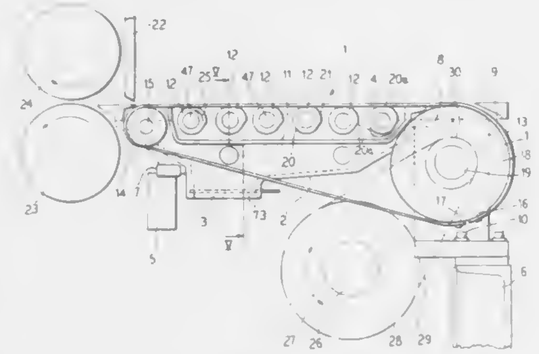
Henri Gibert, Calluire et Cuire, France, assignor to SA Martin, France

Filed Apr. 24, 1990, Ser. No. 513,810

Claims priority, application France, Apr. 27, 1989, 89 05947

Int. Cl.⁵ B65H *3/04*

U.S. Cl. 271—35 14 Claims



1. In a device for sequential introduction of sheets into a shaping or forming machine from a pile of sheets located in a magazine that is found above a feeding table, said magazine having a front gate for holding back the sheets and the magazine being located upstream from two introduction rollers for the shaping or forming machine, said device comprising a vacuum chamber, and sequential transportation means being placed side-by-side and being vertically displaceable, first means to linearly drive said sequential transportation means along a linear direction and second means to drive said sequential transportation means along a vertical direction, the improvements comprising the sequential transportation means being formed of a linear member that passes around a return pulley located in the neighborhood of the front gate and the two introduction rollers and around a control pulley keyed to a first shaft, said linear member being attached at both of its ends to said control pulley to move therewith, an upper run of the linear member extending between the axis of the return pulley and the axis of the control pulley being supported by a series of small rollers having a non-circular periphery being mounted on transverse shafts supported at their ends in two lateral plates, the linear member being placed under tension between said return pulley and control pulley, said first means comprising a second shaft being imparted with a pendular rotating motion produced by a connecting rod, crankshaft assembly, with the crankshaft being mounted on a third rotating shaft, means for rotating the third shaft in a continuous direction, kinematic means for transferring the movement of the second shaft to said first shaft, said sequential transportation means including a train of gears for transmitting the continuous rotation of the third shaft to each of the small rollers so as to rotate the small rollers with a high point of their periphery engaging an upper run of the linear member to shift the linear member from a retracted position to a position to engage a bottom sheet of said stack, said first and second means being interconnected so that forward displacement of the linear member occurs after lifting the linear member into engagement with said bottom sheet.

5,026,041
AUTOMATIC SHEET FEEDING APPARATUS

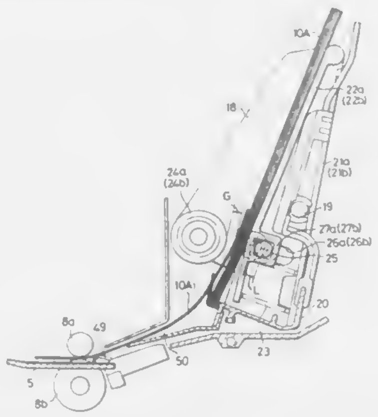
Koicbi Kitazume, and Kimikazu Arai, both of Tokyo, Japan, assignors to Daiwa Seiko, Inc., Tokyo, Japan

Filed Dec. 1, 1989, Ser. No. 444,446

Claims priority, application Japan, Dec. 5, 1988, 63-159044; Dec. 5, 1988, 63-159045; Dec. 5, 1988, 63-309098; Dec. 5, 1988, 63-309099

Int. Cl.⁵ B65H *3/06*

U.S. Cl. 271—118 5 Claims



1. An automatic sheet feed apparatus comprising
a pressure plate supported to be movable back and forth by a stacker frame body to push stacked sheets,
a sheet feed roller rotatably supported by the frame body,
a pushing means to press the stacked sheets against the sheet feed roller through the pressure plate,
a sheet feed motor rotatable in either direction mounted on the frame body,
a rotation transmission mechanism to transmit the rotation of the positive rotation of the sheet feed motor to the sheet feed roller,
an operating mechanism to move the pressure plate back and forth,
a rotation transmission mechanism to move backward the pressure plate against the pushing means by transmitting the reverse rotation of the sheet feed motor to the operating mechanism, and
a retaining mechanism to hold the pressure plate in the retracted position.

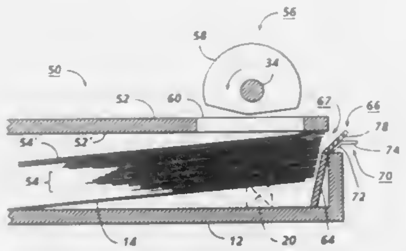
5,026,042
SHEET FEEDER FOR COPIERS AND PRINTERS

Donald P. Miller, Walworth, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 22, 1990, Ser. No. 468,394

Int. Cl.⁵ B65H *3/06. 3/52*

U.S. Cl. 271—119 8 Claims



1. A sheet feeder for feeding sheets of various thickness and stiffness including envelopes in electrostatographic reproduction machines comprising the combination of:

(a) a tray for supporting a stack of sheets for feeding, said tray having a sheet discharge end, said tray being supported for pivotal movement adjacent the end opposite said discharge end;

(b) sheet feeding means above said tray adapted when actuated to feed the topmost one of the sheets in said sheet stack from said tray;

(c) said tray having a cover, said cover having opening means for permitting said sheet feeding means to engage and feed said topmost sheet in said sheet stack from said tray;

(d) tray biasing means for pivoting said tray upwardly toward said cover so that said topmost sheet in said sheet stack contacts said cover adjacent said tray sheet discharge end;

(e) an inclined surface adjacent said sheet discharge end for engaging the leading edge of the sheets in said sheet stack to pre-shingle the sheets in said tray; and

(f) a flexible retard pad extending above said tray to a point adjacent said cover at the sheet discharge end of said tray, said pad cooperating with said cover to form a sheet discharge opening through which sheets are discharged from said tray by said sheet feeding means, the height of said pad being such that said pad normally interferes with discharge of sheets through said discharge opening;

(g) actuation of said sheet feeding means moving the topmost sheet in said sheet stack toward said discharge opening, whereby the leading edge of said topmost sheet engages and deflects said retard pad in the direction of movement of said sheet;

(h) movement of said topmost sheet causing sheets below said topmost sheet to move as a result of contact between said sheets with said topmost sheet whereby the leading edge of said moving sheets engage said retard pad in the direction of movement of said sheets;

deflection of said retard pad allowing said topmost sheet to be discharged from said tray through said discharge opening while engagement of said additional sheets with said retard pad stops movement of said additional sheets and prevents discharge of said additional sheets with said topmost sheet.

5,026,043
OVERLAPPED-TRANSFER PREVENTING PAPER SUPPLY DEVICE IN IMAGE FORMING APPARATUS

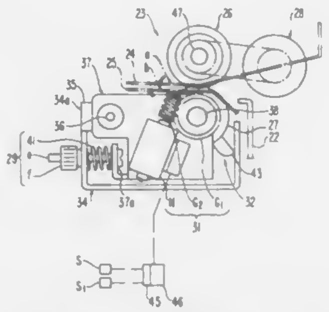
Toru Tanjo, Toyonaka, and Noboru Fukuoka, Ozu, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Nov. 27, 1989, Ser. No. 441,320

Claims priority, application Japan, Nov. 28, 1988, 63-301407

Int. Cl.⁵ B65H *3/52*

U.S. Cl. 271—121 12 Claims



1. In an overlapped-transfer prevent paper supply device for use in an image-forming apparatus wherein sheets of paper are supplied sequentially from a sheet source in a conveying direction along a transfer path, said device including along a portion of said transfer path means for preventing transfer of plural overlapped sheets, said preventing means comprising a rotary paper supply member rotatable in said conveying direction and an overlapped-transfer preventing member operable in cooperation with said supply member to prevent overlapped transfer of plural sheets, such that only a single sheet is transferred in said conveying direction beyond said portion of said transfer path and such that any other sheet supplied from the sheet source will be retained in said portion of said transfer path, the improvement comprising:

means for returning a sheet retained in said portion of said transfer path in a return direction toward the sheet source, said returning means comprising a returning member movable in said return direction from a downstream end of said portion of said transfer path to an upstream end thereof;

means for generating a sheet returning signal; and

means for receiving a signal generated by said generating means and operative in response thereto for driving said returning member in said return direction.

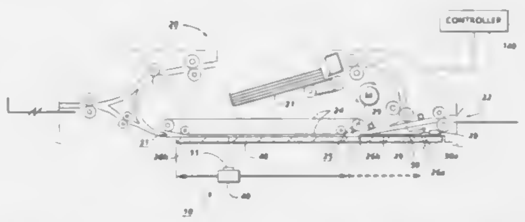
5,026,044
DUAL MODE DOCUMENT REGISTRATION SYSTEM

Randall C. Ryon, Fairport; Lamia K. Canal, and Donald R. Tickner, both of Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 2, 1990, Ser. No. 546,984

Int. Cl.⁵ B65H *9/00*

U.S. Cl. 271—227 15 Claims



1. A document feeder for feeding both normal sized and oversized document sheets into imaging positions overlying an imaging platen from a document infeeding entrance position substantially downstream from the effective upstream end of said imaging system, with sensing means for sensing the input of a document which is oversized in the direction of movement thereof, comprising bi-directional platen transport means for feeding normal sized documents unidirectionally downstream from said document infeeding entrance position over said imaging platen into an imaging position overlying said imaging platen, and for initially also so feeding oversized documents downstream, but then, in response to said sensing means sensing that it is an oversized document, and after the trail edge of said oversized document has cleared said document infeeding entrance position, reversing said bi-directional platen transport means to reverse feed said oversized document upstream towards said upstream end of said imaging platen into a special registration and imaging position for oversized documents which is partially overlying at least a portion of said imaging platen between said document infeeding position and said upstream end of said imaging platen.

5,026,045
SHEET-GUIDING DRUM ASSEMBLY FOR SHEET-FED ROTARY PRINTING MACHINES

Arno Wirz, Bammental, and Rudi Haupenthal, Epfenbach, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Mar. 16, 1989, Ser. No. 325,674

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1988, 3808749

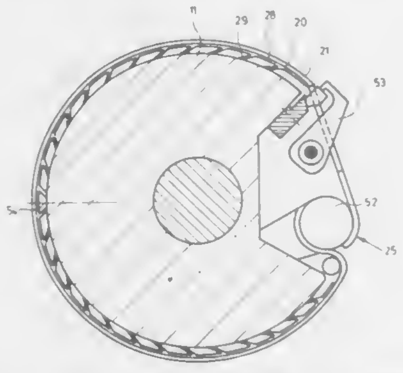
Int. Cl.⁵ B65H *5/12*

U.S. Cl. 271—277 19 Claims

1. Sheet-guiding drum assembly for sheet-fed rotary printing machines, the assembly comprising a rotatable drum formed with a casing surface and a casing foil disposed peripherally around said casing surface so as to have an outer diameter, said casing foil having an edge leading in direction of rotation of

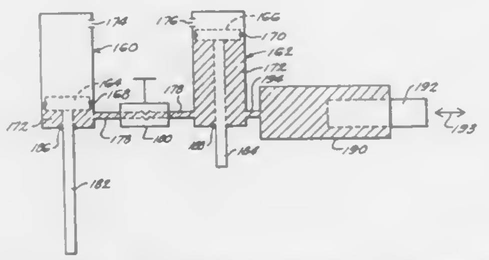
VOL
1127
ISS
4
JE
25
1991
UMI

said drum, and an edge trailing in said direction, respective tensioning locations at least at said leading and trailing edges of said casing foil at which said casing foil is fastened to said drum, adjustment means located at least at one of said tensioning locations for imparting a tensioning movement to said casing foil in peripheral direction of said casing surface, a member arranged beneath the casing foil and on the casing surface of the drum, said member having a multiplicity of individual support elements for yieldingly supporting said casing foil over the entire surface thereof on said casing surface of said drum, and means for substantially uniformly varying the height of said member on the casing surface and thereby substantially uniformly varying said outer diameter of said casing foil over substantially the entire periphery thereof.



5,026,046
ADJUSTABLE AUXILIARY HYDRAULIC FLUID ACCUMULATOR CONTROL FOR HYDRAULICALLY-PHASED STAIR CLIMBING EXERCISE APPARATUS

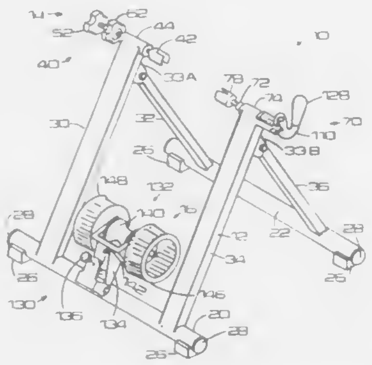
Richard J. DeCloux, 1485 Belmont St., Manchester, N.H. 03104
Filed Jan. 10, 1990, Ser. No. 462,835
Int. Cl.^{5} A63B *23/04, 21/00*
U.S. Cl. 272—70 **4 Claims**



1. A hydraulic energy absorption system for exercise stairs comprising steps, two operating cylinders having rods engaging respective steps for phasing said steps, a hydraulic circuit connected between said two cylinders at one side only of said rods, the other side of said rods being open to the atmosphere for providing opposed motion of said rods, said circuit including a throttling valve, and means for adding fluid to or subtracting fluid from said circuit, said fluid adding or subtracting means including an auxiliary cylinder in communication with said circuit via a single conduit means, and user adjustable means for selectively forcing fluid from said auxiliary cylinder to said circuit.

5,026,047
QUICK RELEASE MECHANISM FOR BICYCLE TRAINER

Irving W. Kosecoff, 2852 Sawtelle Blvd., No. 25, Los Angeles, Calif. 90064
Filed Sep. 29, 1989, Ser. No. 414,916
Int. Cl.^{5} A63B *21/00*
U.S. Cl. 272—73 **15 Claims**



1. A quick release mechanism for a bicycle trainer comprising:

a fastener that is axially moveable between an engagement position at which the fastener engages and securely holds an axle of a bicycle and an axially displaced release position;

a handle that is positionable at engagement and release positions; and

a linkage coupled to control axial movement of the fastener between the engagement and release positions in response to positioning of the handle at engagement and release positions respectively, the linkage including a threaded shaft supporting the fastener at one end thereof, the axial position of the threaded shaft being adjustable to enable adjustable positioning of the fastener the linkage further including a plunger in threaded, adjustable engagement with the threaded shaft at one end and coupled to the handle at a second opposite end, the plunger being axially movable without rotation thereof between engagement and release positions in response to positioning of the handle.

5,026,048
MARTIAL ARTS 360 DEGREE STRIKING TARGET

Thomas G. Jones, 20422 Beach Blvd., #325, Huntington Beach, Calif. 92648
Int. Cl.^{5} A63B *69/00*
U.S. Cl. 272—77 **4 Claims**

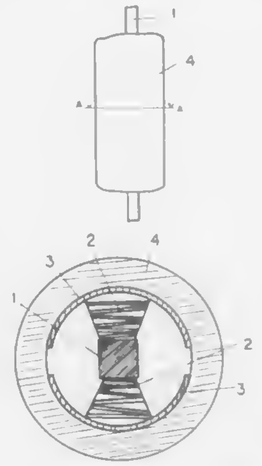
1. An improved martial arts striking surface comprised of:

a) an interior substantially rigid support pole;

b) a plurality of springs radially extending around the support pole, having one end attached at right angles to the interior support pole;

c) at least one plate attached to the other end of the springs opposite the interior support pole; and

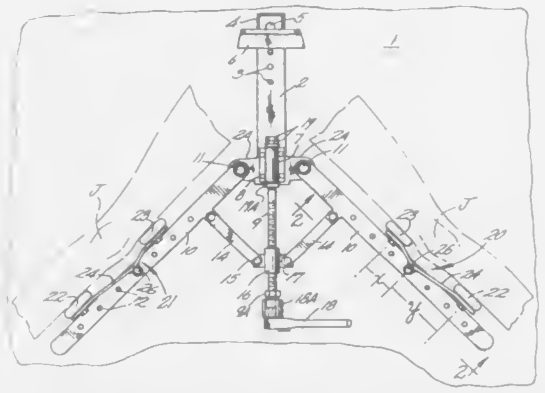
d) an outside cushioned covering to encircle said plate and said springs;



wherein said support pole extends beyond the ends of said covering a sufficient distance to be securely held at either end.

5,026,049
LEG STRETCHING APPARATUS

John F. Goodman, Rte. 1, Box 59, Worley, Id. 83876
Filed Aug. 15, 1990, Ser. No. 567,761
Int. Cl.^{5} A63B *21/00*
U.S. Cl. 272—126 **4 Claims**



4. An apparatus for stretching the upper leg muscles of adults and children, said apparatus comprising,

an elongate base including a backrest for placement on a floor surface,

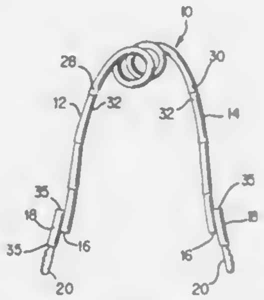
arms each pivotally attached at one of their ends to said base adjacent one end of the base,

arm positioning means including a threaded shaft journalled on said base, a traveler sleeve on said shaft, links pivotally coupled to said traveler sleeve and said arms to impart arcuate opening and closing movement to the arms upon rotation of said shaft, manually operable means for imparting rotation to said shaft for movement of said traveler sleeve along the shaft, and

leg engaging members one each pivotally mounted on said arms and each including an elongate member, pads on each elongate member for contact with the inner side of the leg above and below the knee joint of the leg, said leg engaging members each further including a sleeve, fastener means extending through said sleeve and one of said arms, said elongate member carried by said sleeve and transversely attached to the side of the sleeve asymmetrically along the longitudinal axes of said sleeve whereby upon removal of the sleeve from the fastening means and upon inverting of the leg engaging member the pads thereon will be relocated at a different height from the floor surface to best adapt the apparatus to a user.

5,026,050
EXERCISE APPARATUS

Paul Leung, 8145 Ohio River Blvd., Emsworth, Pa. 15202, and Ansel M. Schwartz, Pittsburgh, Pa., assignors to Paul Leung, Pittsburgh, Pa.
Filed Mar. 13, 1990, Ser. No. 492,783
Int. Cl.^{5} A63B *23/00*
U.S. Cl. 272—143 **6 Claims**



1. An apparatus for exercising comprising:

a first extension and a second extension, each extension being collapsible for portability but rigid when deployed, each extension having in proximity to its first end a pad, said pad connected to the extension such that it can rotate and translate to a desired position and then be fixed relative to the extension, each pad having a deployable handle with which to grip the extension and move it, an opening in the pad in which the handle can be disposed when not deployed, the handle rotatably connected to the pad such that the handle can be moved out of the opening until it is fixed relative thereto and aligned with the extension when deployed, each pad having a second opening and each extension having a knob that is received by the second opening such that the pad can rotate and translate with respect to the first end of the extension and then be fixed relative to the first end; and

means for providing resistance to the first and second extension when they are moved relative to each other, said first and second extension extending from and connected to the resistance providing means.

5,026,051
SOUND IMAGING APPARATUS FOR A VIDEO GAME SYSTEM

Danny D. Lowe, and John W. Lees, both of Calgary, Canada, assignors to QSound Ltd., Calgary, Canada
Filed Dec. 7, 1989, Ser. No. 447,071
Int. Cl.^{5} A63F *9/22*
U.S. Cl. 273—435 **9 Claims**

1. An interactive video game system, including a central processing unit, for displaying and controlling a video game display on a video monitor, and including an associated audio program for driving a sound synthesizer to produce audio signals, comprising:

a pair of audio transducers in spaced-apart relationship for receiving audio signals and reproducing the audio program;

a single game cartridge containing interactive video game play data and containing the associated audio program including sound positioning data of the kind for positioning a sound to appear to a listener to be at a location other than the locations of said pair of audio transducers;

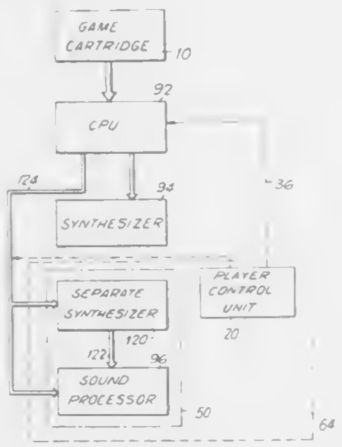
a control unit including a housing for use by a player playing the interactive video game;

VOL
1127
ISS
4
JE
25
1991
UMI

first and second bus means;

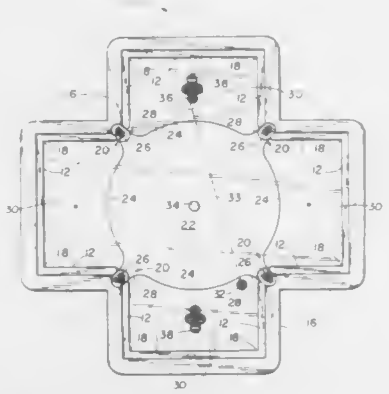
a game console connected to said control unit and including means whereby the central processing unit is electrically connected to said game cartridge inserted therein for operating on said game play data and audio program data for subsequent display on the video monitor and playback on said audio transducers, respectively;

a second, separate, sound synthesizer arranged in said control unit housing and receiving the audio program data from the game cartridge through said first bus means from the central processing unit and producing a plurality of monaural sound signals therefrom within the audio frequency band; and



sound position processing means also arranged in said control unit housing and connected to receive said plurality of monaural sound signals from said second, separate, sound synthesizer means over said second bus means and said sound positioning data from said game cartridge over said first bus means for producing therefrom two-channel audio output signals having differential amplitude and phase therebetween in accordance with a predetermined frequency dependent transfer function of said sound position processing means, said two-channel audio output signals being fed respectively to said pair of audio transducers for playback.

5,026,052
GAME AND CRUCIFORM GAME TABLE
Robert C. Shelnutt, Palm Harbor, Fla., assignor to American Fun & Games, Inc., Palm Harbor, Fla.
Filed Aug. 9, 1990, Ser. No. 566,007
Int. Cl.^{5} A63D *15/00*
U.S. Cl. 273—3 A **11 Claims**



1. A game table, comprising:

a flat, cruciform-in-configuration playing surface;

a rail positioned about an outer periphery of said playing surface;

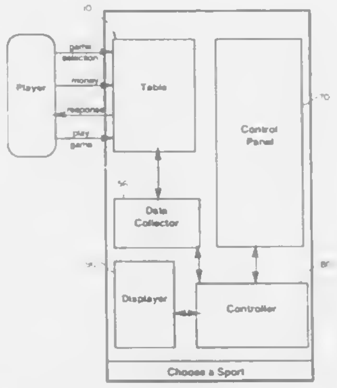
said rail defining eight enclosing corners, all of said enclosing corners being coincident with a first circle having a first predetermined diameter;

said rail defining four diverging corners, all of said diverging corners being coincident with a second circle having a second predetermined diameter;

said second predetermined diameter being less than said first predetermined diameter; and

a ball-receiving receptacle positioned at each of said diverging corners.

5,026,053
BILLIARD TABLE MULTIPLE ELECTRONICS GAME DEVICE AND METHOD
William D. Paterson; John Wester; Norman L. Pulliam, all of Calgary, and Henning von Eyben, Kelowna, all of Canada, assignors to Entertainment International, Inc. 1987, Kelowna, Canada
Filed Dec. 28, 1989, Ser. No. 458,076
Int. Cl.^{5} A63D *15/00, 15/20*
U.S. Cl. 273—3 R **9 Claims**



1. Electronic table game device combining features of a pocket billiards table and multiple, selectable electronics sports and games, comprising:

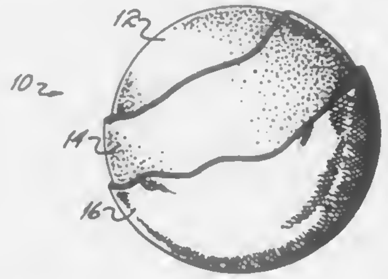
(a) a pocket billiards table with a planar playing surface substantially rectangular in shape and having side portions with raised, continuous cushioned edges around said rectangular playing surface and further including a predetermined number of ball pocket openings,

(b) each of said pocket openings being provided with an electrical signal generating means so that as a ball drops through a pocket opening an electrical signal is generated,

(c) said table being provided with electrical computer control means including a valid ball discriminator circuit to determine whether a ball falling through a pocket opening generates a valid and acceptable signal, said computer control means also including memory circuit means for storing rules for the various games and sports to be played and memory circuit means for temporary storage for game information input, and further including random play assigning circuit means for assigning play designations to each of said pocket openings at predetermined intervals,

(d) a visual electronic scoreboard and game display means supported near said table playing surface including a game or sport design thereon with player identifications and further including electronic control means for receiving signals from said ball openings and displaying different game and sport play selections for each of said openings, said scoreboard display through said electronic control means displaying game beginning and ending, player identifications, scoring and game progress information.

5,026,054
TOY
John D. Osher, Shaker Heights, Ohio; Allison W. Katzman, Chicago, Ill.; Mark Luecke, Chicago, Ill., and John R. Wildman, North Riverside, Ill., assignors to Cap Toys, Inc., Bedford Heights, Ohio
Continuation-in-part of Ser. No. 475,716, Feb. 6, 1990, Pat. No. 4,944,363. This application Jul. 18, 1990, Ser. No. 553,582
The portion of the term of this patent subsequent to Jul. 31, 2007, has been disclaimed.
Int. Cl.^{5} A63B *37/06, 45/00, 37/08*
U.S. Cl. 273—58 A **19 Claims**

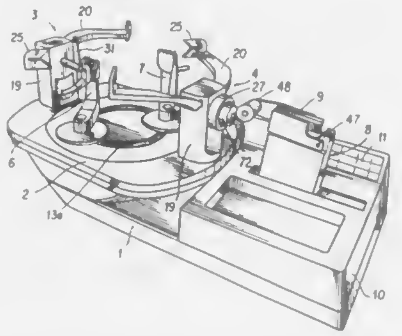


1. A toy ball having a soft and supple feeling, comprising:

a highly plasticized polymeric core which is resiliently deformable due to its highly plasticized state and normally bleeds plasticizer; and

a flexible polymer shell encasing said core for containing bleeding of said plasticizer from said core.

5,026,055
EQUIPMENT FOR STRINGING A TENNIS RACKET
Gérard Longeat, Lyon, France, assignor to Babolat VS, Lyons, France
Filed Jan. 26, 1990, Ser. No. 470,739
Claims priority, application France, Feb. 7, 1989, 89 01920
Int. Cl.^{5} A63B *51/14*
U.S. Cl. 273—73 A **22 Claims**



1. Equipment for stringing a racket having a string mesh plane, comprising:

a support;

a stringing cradle;

means rotatably mounting the stringing cradle on the support, whereby the angular position of the cradle with respect to the support is adjustable;

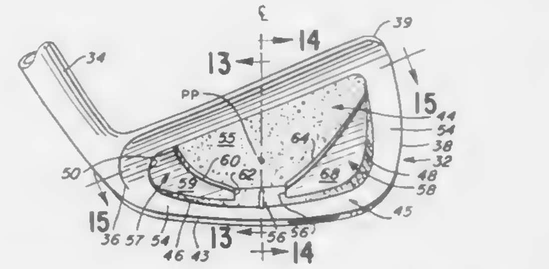
means for holding a racket on the stringing cradle comprising two movable gripping jaws for engaging a racket, said racket holding means including means for defining a reference stringing plane;

means for mounting the gripping jaws on the stringing cradle for movement between an open position for receiving and releasing a racket, and a closed position, for securing the racket on the stringing cradle;

string tensioning means for tensioning strings during formation of a string mesh on a racket; and

said gripping jaws including means for moving the string mesh plane of a racket into alignment with said reference stringing plane as the gripping jaws move to the closed position to secure the racket on the stringing cradle.

5,026,056
WEIGHT-BALANCED GOLF CLUB SET
Robert F. McNally, Hinsdale, and John B. Hoeflich, Arlington Heights, both of Ill., assignors to Tommy Armour Golf Company, Morton Grove, Ill.
Continuation of Ser. No. 96,731, Sep. 15, 1987, abandoned. This application Aug. 17, 1989, Ser. No. 395,157
Int. Cl.^{5} A63B *53/04*
U.S. Cl. 273—77 A **14 Claims**



1. An improved correlated set of iron-type golf clubs, in which each club has a head including a front face for striking a golf ball at a percussion point centered on said front face, a heel portion, a toe portion, a sole portion extending generally between said heel and toe portions, and back surface, said back surface having a peripheral back frame forming a single cavity therewithin, the improvement comprising weight re-distribution means formed integrally with each said club head within said back cavity and positioned in said back cavity in abutting relationship to said peripheral back frame respectively along said toe portion and heel portion, said weight re-distribution means for each club within said correlated set comprising two discrete weighting elements presenting stepped pad portions relative to said back cavity, said discrete weighting elements being so configured in size and shape as to locate the center of gravity of the club head substantially in centered alignment with said centered percussion point.

5,026,057
TOP AND LAUNCHER BOXING SIMULATION GAME AND METHOD
Roger L. Watford, 2126 Wilderness Pt., Kingwood, Tex. 77339
Continuation-in-part of Ser. No. 209,044, Jun. 20, 1988, and a continuation-in-part of Ser. No. 235,192, Aug. 23, 1988. This application Nov. 6, 1989, Ser. No. 432,223
Int. Cl.^{5} A63F *7/06;* **A63H** *1/02, 1/20*
U.S. Cl. 273—85 R **18 Claims**

1. A method for simulating a boxing match with tops comprising:

A. providing at least two tops, each top comprising a body portion, a head portion, and a tapering portion functional for spinning the tops, said head portion having the configuration of a real-life boxer, and said body portion having protruding simulated boxing gloves;

VOL
1127
ISS
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25
1991
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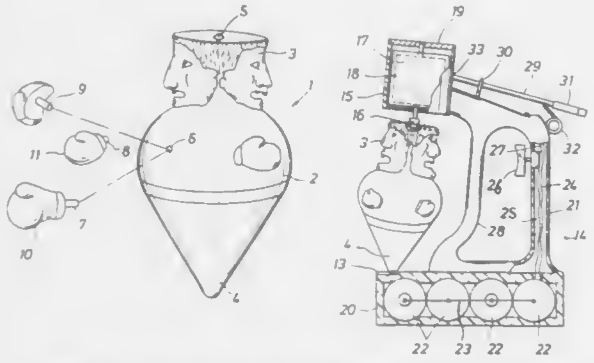
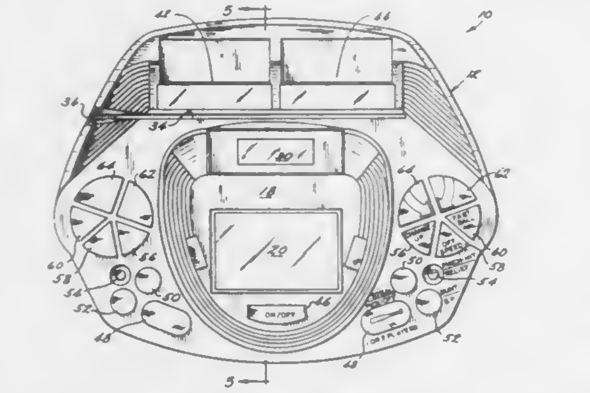
B. spinning said at least two tops in a simulated boxing ring; and



C. allowing the tops to spin and make contact by means of the simulated boxing gloves protruding from the tops.

5,026,058
ELECTRONIC BASEBALL GAME APPARATUS

Eric Bromley, 4 Watson Dr., West Simsbury, Conn. 06092
Filed Mar. 29, 1989, Ser. No. 333,569
Int. Cl.⁵ A63F *9/00*
U.S. Cl. 273—93 C **34 Claims**

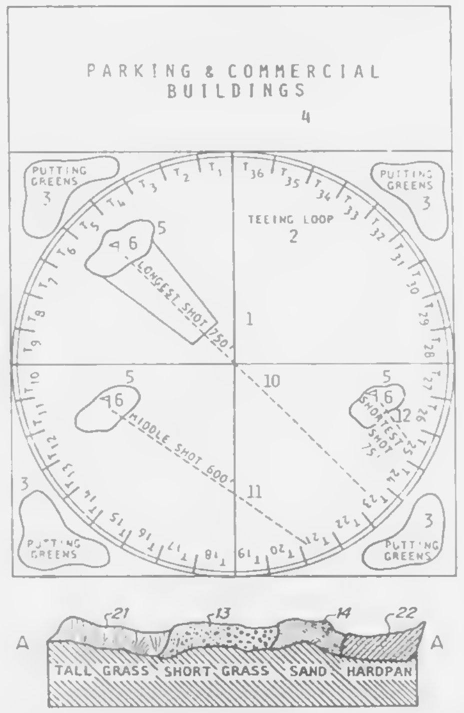


1. An electronic sports game having a preselected game play comprising:
housing means;
at least one input means having at least one specific player's encoded skill information thereon;
electronic sensor means in said housing means for reading said encoded player's information from said input means; and
control means for integrating said encoded player's information received from said electronic sensor means into the game play of the sports game.

5,026,059
GOLF SHOT DUPLICATOR

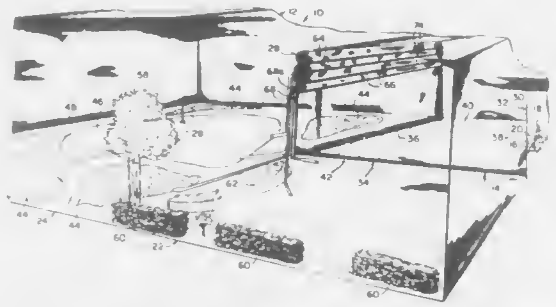
Dwight W. Pate, 101 Mirada Rd., Half Moon Bay, Calif. 94019, assignor to Dwight W. Pate, Half Moon Bay, Calif.
Division of Ser. No. 302,926, Jan. 30, 1989, Pat. No. 4,941,664. This application Apr. 23, 1990, Ser. No. 520,359
The portion of the term of this patent subsequent to Jul. 17, 2007, has been disclaimed.
Int. Cl.⁵ A63B *67/02*
U.S. Cl. 273—176 A **1 Claim**

1. A course for duplicating golf shots comprising:
a bounded target area including a plurality of targets at spaced locations within the boundaries of the target area;
a teeing loop disposed along a boundary of the target area and including a plurality of teeing locations at spaced-apart positions there along for playing selected ones of said plurality of targets, said teeing locations having a plurality of different teeing surfaces selected from the group consisting of tall grass, short grass, sand, and hardpan dirt, with such surfaces disposed at various elevations and degrees of level, up-sloping, down-sloping and side-sloping terrain to simulate the various "lies" of a ball according to standard golf.



5,026,060
INDOOR GOLF GAME

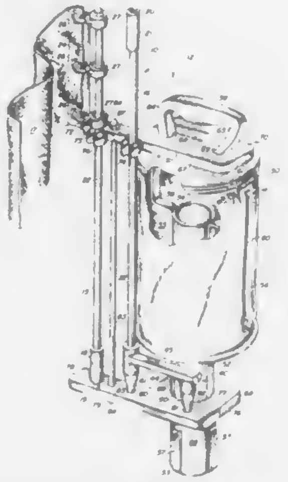
Paul S. Beeber, 101 Bay Ave., Hicksville, N.Y. 11801
Filed May 3, 1990, Ser. No. 518,999
Int. Cl.⁵ A63B *69/36*
U.S. Cl. 273—176 F **9 Claims**



1. An indoor golf game having a plurality of playing areas, in which each said playing area is enclosed by a netting frame and comprises:
(a) a golf driving enclosure from which a golf ball may be propelled by a player swinging a golf club at the golf ball, said golf driving enclosure including a cage being a frame with two netting walls thereabout, one being a rear netting wall, and an elevated tee platform at one end of said cage, and bad shot means for allowing a bad shot of the golf ball to enter said fairway directly, said bad shot means including a sloped annular floor in said cage, and a side wall of said cage adjacent said fairway being slightly elevated; thus having a space therealong high enough to allow the golf ball to roll under said side wall onto said fairway;
(b) a fairway located to one side of said golf driving enclosure where subsequent shots of the golf ball may be played therefrom;
(c) a putting green having a hole therein located adjacent said golf driving enclosure and said fairway, where additional subsequent shots of the golf ball may be played therefrom; and
(d) means for selectively conveying the golf ball after being struck by the player in one instance from said golf driving enclosure to said putting green and in another instance from said golf driving enclosure to said fairway depending upon how the player hits the golf ball with the golf club within said golf driving enclosure; whereby the object of said indoor golf game is to finally hit the golf ball into the hole in said putting green with the least amount of strokes of the golf club by the player in each said playing area.

5,026,061
GOLF PRACTICE FLAG ASSEMBLY AND BALL RETRIEVER HOLDER THEREFOR

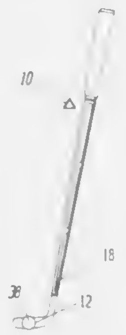
Dana B. Davis, 1805 E. Marks St., Orlando, Fla. 32803
Filed Jun. 25, 1990, Ser. No. 543,265
Int. Cl.⁵ A63B *69/36, 47/02;* **G09F** *17/00*
U.S. Cl. 273—177 R **11 Claims**



1. A golf practice device, comprising:
a flag;
a portable flagstaff adapted to support said flag at an upper end thereof, said staff including at least upper and lower vertically elongated staff segments; means for detachably connecting said upper and lower segments in coaxial alignment to form the vertical height of said flagstaff; a tapered main prong coaxially depending from a lower end of said lower segment; a tapered secondary prong depending from said lower end, in lateral spacing and parallel to said main prong; and a crosspiece extending generally horizontally between said prongs; said prongs being adapted for insertion into the ground, and said crosspiece being adapted to provide a foothold for assisting said insertion, and being further adapted to act with said prongs to limit the depth of insertion and to anchor said staff in the ground in a substantially upright position; and
connecting means joining said flag to said upper end of said staff.

5,026,062
GOLF PUTTER WITH ALIGNMENT DEVICE

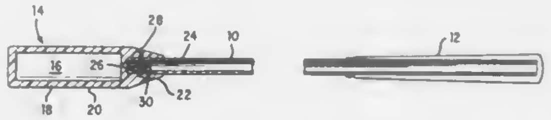
Lloyd L. Freeberg, 1953 E. Chapman Ave., Fullerton, Calif. 92631
Continuation-in-part of Ser. No. 177,134, Apr. 4, 1988, Pat. No. 4,932,659. This application May 7, 1990, Ser. No. 519,890
The portion of the term of this patent subsequent to Jun. 12, 2007, has been disclaimed.
Int. Cl.⁵ A63B *69/36*
U.S. Cl. 273—183 D **14 Claims**



1. A golf putter including:
a. a head having a flat ball-striking face;
b. a handle with a hand grip having a rectangular cross section;
c. an optically opaque shaft extending between said head and handle with a tapered rectangular cross section having a flat, front surface parallel to said ball-striking face with its narrowest end adjacent said head and widest end adjacent said handle; and
d. at least one visible marker carried on said shaft at a location which is shielded by said shaft from view of the user of the putter when properly held, and exposed to said view when the club face is open or closed.

5,026,063
GOLF SWING TRAINING CLUB

Stephen B. Rhodes, 412 West 2nd St., Roswell, N. Mex. 88201
Filed Aug. 8, 1990, Ser. No. 564,286
Int. Cl.⁵ A63B *69/36*
U.S. Cl. 273—186 A **7 Claims**



1. In a golf training club comprising a shaft having a weighted, cylindrical head at one end, and a handgrip at the other end, the improvement wherein
that portion of the shaft between the handgrip and the head consists of only a single piece of tubular plastic material of uniform cross-section and uniform composition and provides an extra flexible shaft in a club capable of being used to correct in a proper club swing motion and strengthen the muscles used in swinging a golf club.

5,026,064
GOLF CLUB SWING TRAINING DEVICE

John M. Novosel, 12708 Pembroke La., Leawood, Kans. 66209
Filed Feb. 6, 1989, Ser. No. 307,001
Int. Cl.⁵ A63B *69/36*
U.S. Cl. 273—186 E **15 Claims**

1. A golf training device comprising:
an elongate shaft having a pair of opposed ends, one of said

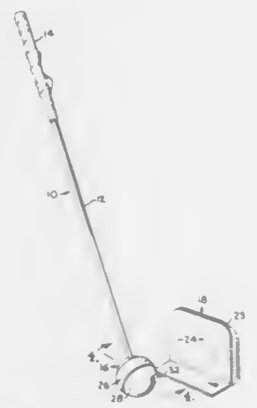
VOL
1127
ISS
4
JE
25
1991
UMI

ends being provided with a handle adapted to be grasped by a suer to swing the shaft in a golfing stroke;

a training head of a size greater than a wood golf club head on the other of said ends of the shaft presenting a striking face larger than the striking face of a wood golf club head on a portion thereof for said golfing stroke;

a movable, normally upright target of an overall target presenting area substantially greater in size than the striking face of said head positionable on the ground at a strike zone where a golf ball could otherwise lie when addressed by the said user;

means on at least a portion of said training head striking face and at least a portion of said target presenting area for releasably uniting the same for movement together upon impact of the two through the remaining part of the golf swing after the user strikes the target with the striking face of the training head;



said uniting means causing at least a portion of said target presenting area to adhere to the striking face portion of said head with the rest of said target collapsing around said striking face and head upon impact thereby;

said target and presenting area thereof composed of a yieldable, strong, at least somewhat collapsible, yet relatively lightweight material and structure, compared to the weight of said training head, whereby not to seriously impede the continued motion of the training head when said head strikes the target at speed; and

the addition of the target upon impact to, collapsing therearound and carriage thereof collapsed by the training head providing sufficient and substantial mass and air resistance at impact and through to the finish of the swing to be clearly perceived as such throughout such latter swing interval by the user, yet not substantially impeding the carrying out of the golfing stroke.

5,026,065
GOLF TRAINING APPARATUS

Miro D. Bellagamba, 5161 Vineland Rd., Orlando, Fla. 32811
Filed Feb. 25, 1991, Ser. No. 661,056
Int. Cl.⁵ A63B *69/36*
U.S. Cl. 273—191 A **8 Claims**

1. A golf training apparatus comprising:

a frame;

a golf club swing guide attached to said frame, said golf club swing guide for guiding a person's swing;

said frame including:

a pair of base members;

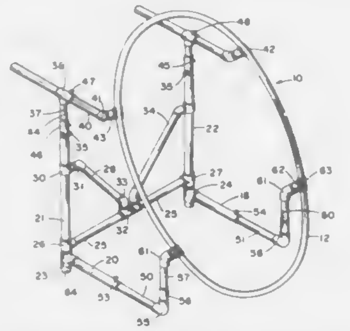
a pair of lower swing guide support members, each lower swing guide support member attached to one said base member and to said swing guide;

a pair of vertically extending frame members, each vertically extending frame member being attached at one end to one said base member;

a pair of upper swing guide support members slidably attached to said vertically extending frame members at the other end thereof, each said upper swing guide support member being attached to said swing guide; and

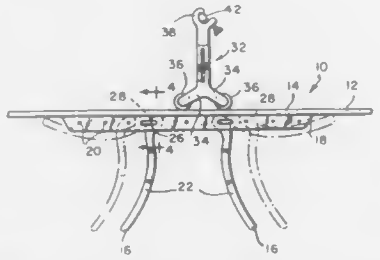
a cross brace member;

guide adjustment means for adjusting the position of said golf club swing guide, said guide adjustment means having height adjustment means for said golf club swing guide including said pair of vertically extending frame members and said lower swing guide support members being telescoping members and having means for locking said telescoping members in a preset position to thereby raise and lower said upper swing guide support members and said swing guide; and angle adjustment means for said golf club swing guide including said frame base members being telescoping members and said upper swing guide members being slidable on said vertically extending frame members to thereby adjust the angular position of said swing guide; whereby a simplified golf swing training apparatus can be adjusted for height and angle to fit a particular golfer.



5,026,066
PRACTICE PUTTING GUIDE

John F. Kane, P.O. Box 1149, East Dennis, Mass. 02641
Filed Oct. 3, 1990, Ser. No. 592,224
Int. Cl.⁵ A63B *69/36*
U.S. Cl. 273—192 **3 Claims**



1. A putting guide for use in improving a golfer's stroke during practice putting, said guide comprising in combination: a guide member having a forwardly facing flat surface and a pair of rearwardly extending mutually spaced leg engaging members suitably contoured to be held between a golfer's legs; mounting means for adjustably positioning said leg engaging members to vary the spacing therebetween; a guide clamp separate from and freely moveable relative to said guide member, means for removably mounting said guide clamp in a radially extending fashion on the shaft of a putter with one end of said clamp disposed laterally from the longitudinal axis of said shaft, whereby said guide member may be held between a golfer's legs with said forwardly facing flat surface aligned with the cup and, the putter having said guide clamp attached thereto swung by said golfer in a controlled swing by maintaining the laterally disposed end of said guide clamp in constant contact with the flat surface of said guide member.

5,026,067
GOLF BALL

Joseph A. Gentiluomo, 1456 Belmont Ave., Schenectady, N.Y. 12308
Filed Nov. 8, 1990, Ser. No. 611,290
Int. Cl.⁵ A63B *37/06*
U.S. Cl. 273—220 **9 Claims**

1. A regulation golf ball, comprising:

(a) a low density center having a maximum diameter of 1.25 inches;

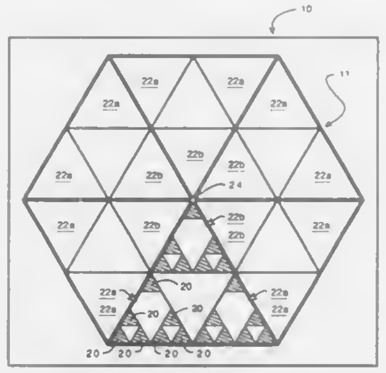
(b) a molded encapsulating mass surrounding said center, wherein the material in contact with said center is further characterized as a highly resilient synthetic elastomer composition having a minimum Shore A Durometer hardness of 70, and a minimum specific gravity of 1.00;

(c) and a patterned surface contouring of predetermined structure contained within the outer surface of said golf ball;

(d) said center having a compressibility of less than 10 percent of the compressibility of the material in contact therewith, and a density less than the maximum prevailing density of said encapsulating mass, for the purpose of effectuating an increase in ball moment of inertia.

5,026,068
GAME EQUIPMENT

Carl Weisser, 38 Livingston St., Brooklyn, N.Y. 11201
Continuation of Ser. No. 155,370, Feb. 12, 1988, abandoned.
This application Apr. 10, 1990, Ser. No. 512,096
Int. Cl.⁵ A63F *3/00*
U.S. Cl. 273—241 **41 Claims**



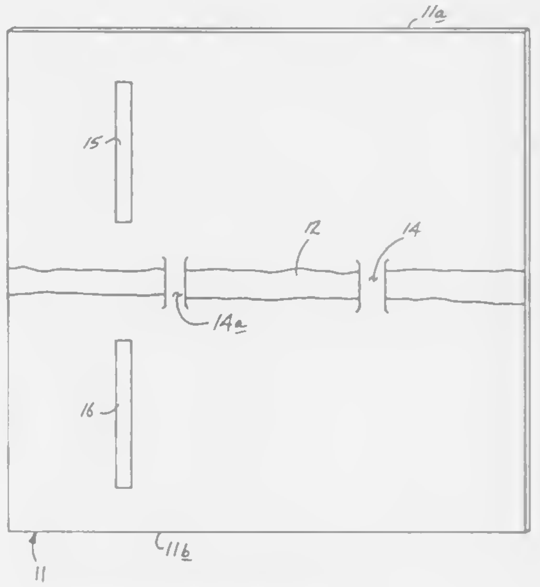
1. Game equipment comprising:

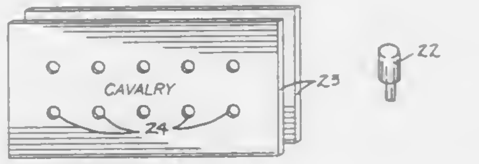
a plurality of game pieces, said game pieces defining a plurality of sets of game pieces, each set being comprised of at least one game piece, the game piece of each set having unique piece indicia distinguishing the game pieces of one set from the game pieces of other sets; and

a playing area defined by a plurality of space units, said space units being physically arranged in and defining a plurality of stages, said stages being physically arranged in an defining a plurality of modules with sequential stages, said modules being arranged in and defining at least one level; the number of space units in each sequential stage of a module continuously increasing from a minimum in the stage at one end of the sequence of stages to a maximum in the stage at the other end of the sequence of stages according to a geometric progression K^n, where K is a number greater than one and n is the inverse sequential number minus one of the stage; the groupings of space units into stages, stages into modules, and modules into level being done according to play area indicia directing the movement of said game pieces over said playing area; said playing area comprising a game board defined by an assembly of a plurality of movable sections, a plurality of said sections each defining a plurality of space units, and the configuration of said assembly of said sections determining the movement of said game pieces over said playing area.

5,026,069
METHOD OF PLAYING A BATTLE STRATEGY GAME

Harald J. Leask, Sumburgh Head Lighthouse, Virkie, Shetland Island, Scotland
Filed Apr. 4, 1990, Ser. No. 504,674
Int. Cl.⁵ A63F *3/00*
U.S. Cl. 273—255 **5 Claims**





1. A method of playing a battle strategy game comprising the steps of, providing a playing board free of movement demarcation, and

providing said board with a medially positioned simulated river with a bridge-like crossing over said river; and

said river defining two open spaces on either side of said river, said open spaces representing two opposing playing sides,

providing a plurality of apertured plates for each player, and

providing soldier tokens positionable within said apertured plates, and

providing a single dice with three sides of a first coloration, one side of a second coloration, and top and bottom sides of a third coloration, and

each player initially placing their said apertured plates on their said respective opposing sides of the board, each player in turn throwing said dice, and when a player'-throw results in said first coloration being presented in an upward orientation, said first coloration directing said player to advance one inch or equivalent, advancing said player's plates across said river and into said opposing side of the board, and upon said player's throw resulting in attaining said second coloration, said second coloration directing said player, having at least one plate on said opposing side of the board, to remove two soldier tokens on opposing player's plates which are also on the opposing side of the board, and upon said player attaining said

VOL
1127
ISS
4
JE
25
1991
UMI

third coloration direction said player to retreat one inch equivalent.

5,026,070
STRATEGY BOARD GAME

James S. Watt, P.O. Box 1104, Kapaa, Hi. 96746
Filed Mar. 16, 1990, Ser. No. 494,583
Int. Cl.^{5} A63F *3/02*

U.S. Cl. 273—261 **15 Claims**

1. A naval battle board game, which comprises:

a game board having a playing surface, the playing surface having a plurality of squares of alternating colors and arranged contiguously in a checkerboard fashion;

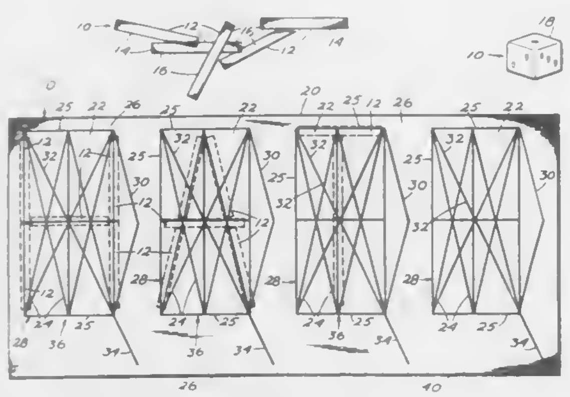
a plurality of primary playing pieces, at least some of the primary playing pieces having a base member and a post mounted vertically on the base member and representing various types of naval vessels having different amounts of power and being capable of receiving different amounts of damage before being sunk; and

a plurality of first and second visually distinguishable secondary playing pieces, the first and second secondary playing pieces being in the form of cylindrical rings, the inner diameter of the rings being at least slightly greater than the outer diameter of the posts of the primary playing pieces so as to be loosely mountable on the posts of the primary playing pieces in a stacked arrangement and easily removable therefrom during game play, the ring-shaped first secondary playing pieces indicating a unit of vessel power and the ring-shaped second secondary playing pieces indicating a unit of vessel damage, a stacked arrangement of first ring-shaped secondary playing pieces on a primary playing piece indicating a measured amount of vessel power, and a stacked arrangement of second ring-shaped secondary playing pieces on a primary playing piece indicating a measured amount of vessel damage.

5,026,071
WORD GAME

Humbert G. Miraglia, Jr., 1409 North St., Corning, Calif. 96021
Filed Mar. 5, 1990, Ser. No. 487,873
Int. Cl.^{5} A63F *3/00*

U.S. Cl. 273—272 **6 Claims**



1. A word game apparatus comprising:

a game board having at least one flat horizontal surface with at least one ordered matrix pattern affixed on said surface; said matrix pattern produced by a series of connecting lines forming triangle shapes with said connecting lines adapted to provide guidance for structuring letters of a specified alphabet;

a plurality of rectangular elongated uniform strips sized to fit at least a half portion of any said connecting lines;

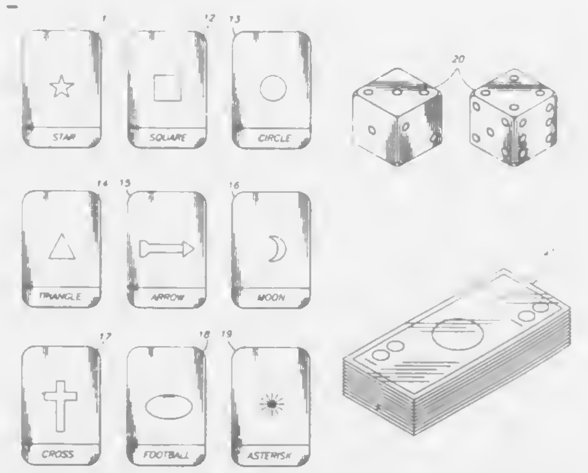
means for temporary adherence of said uniform strips to said at least one flat horizontal surface of said game board and along said connecting lines producing said matrix patterns;

means for randomly generating numerical information effecting player-agreed use options for disposition of said strips relative to said matrix patterns and for advancing said game to a win conclusion.

5,026,072
METHOD OF PLAYING A PICK-A-CARD GAME

Gabriel A. Ayisi, 622 E. 59th St., Brooklyn, N.Y. 11234
Filed Oct. 15, 1990, Ser. No. 597,555
Int. Cl.^{5} A63F *1/00*

U.S. Cl. 273—308 **4 Claims**



1. A method of playing a card game comprising the steps of,

providing a deck of predetermined number of cards each card being distinguishably identifiable wherein each card has a distinct geometric symbol upon a forward face of each card, and

providing a plurality of gaming dice, and

providing a scorekeeping board, and

providing a predetermined number of individual bills of representative money, and each bill of an equal denomination, and

selecting a predetermined number of players, and

each player of the predetermined number of players sequentially throwing the dice and obtaining a representative number, a highest number of the representative number determining an initial dealer, and

each of the predetermined number of players obtaining a sequential turn as a dealer subsequent to the initial dealer, and

defining a cycle when each player effects a turn as a dealer, and

arbitrarily determining a predetermined number of cycles, and

each player sequentially shuffling the cards as a dealer and subjectively selecting a single representative card of the predetermined number of cards, and

said dealer returning said representative card to the deck of cards and shuffling the cards again, and

said dealer requesting said adjacent player to select a card in an attempt to select said representative card, and

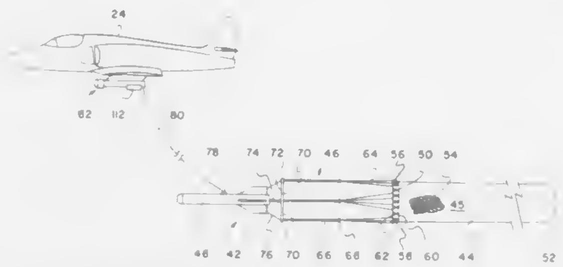
awarding bills of the predetermined number of bills to the dealer or to the adjacent player based upon success of the adjacent player selecting the single representative card, and

tabulating the recording of the predetermined number of bills upon the scorekeeping card.

5,026,073
AERIAL GUNNERY TARGET

Clyde K. Luttrell, New Market, and Donald T. Moore, Huntsville, both of Ala., assignors to Teledyne Industries, Inc., Los Angeles, Calif.
Filed Apr. 26, 1989, Ser. No. 343,438
Int. Cl.^{5} F41J *9/10*

U.S. Cl. 273—360 **58 Claims**



1. An aerial gunnery target, comprising:

a forebody assembly;

a visual augmenter formed of mesh netting; said mesh netting having interconnected strands which are joined together at points of intersection by knitting; and

attachment means for attaching said visual augmenter to said forebody assembly.

5,026,074
ANNULAR METAL-TO-METAL SEAL

Larry M. Hoes, Spring, and Joseph H. Hynes, Houston, both of Tex., assignors to Cooper Industries, Inc., Houston, Tex.
Continuation of Ser. No. 374,475, Jun. 30, 1989, abandoned.
This application Sep. 20, 1990, Ser. No. 587,632
Int. Cl.^{5} F16J *15/48;* **E21B** *33/03*

U.S. Cl. 277—27 **6 Claims**

1. An annular metal-to-metal seal for sealing against the flow of pressure fluid through an annular space between an outer member having an internal cylindrical sealing surface and an inner member having an external cylindrical sealing surface comprising

a first tubular metal ring having a pressure end and an opposite end,

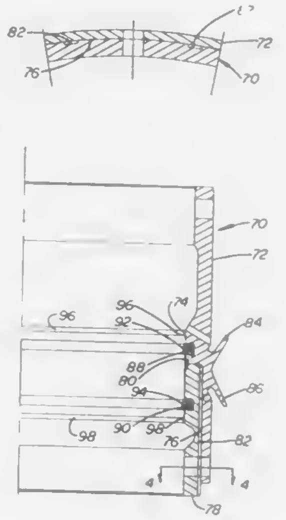
a second tubular metal ring positioned within said first tubular metal ring and having a pressure end and an opposite end,

sealing means on the exterior of said first tubular metal ring spaced from the opposite end thereof,

sealing means on the interior of said second tubular metal ring spaced from the opposite end thereof,

a plurality of longitudinally circumferentially spaced directed passages between said first metal ring and said second metal ring to allow entry of fluid between said metal rings at their pressure end to urge the first and second metal rings into sealing engagement with said inner and outer members, and

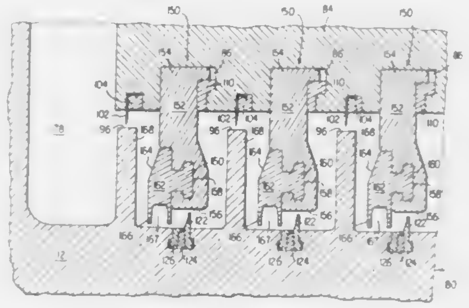
means securing said metal rings together in sealed relationship at their opposite ends to block the flow of pressure fluid between the metal rings in the longitudinal passage so that such pressure in the portion of the passages near their sealed ends will urge the unsealed end of the rings apart.



5,026,075
RADIAL SEAL

Madhat Massarani, Heathrow, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed Feb. 16, 1989, Ser. No. 310,991
Int. Cl.^{5} F16J *15/447*

U.S. Cl. 277—56 **18 Claims**



1. A seal for use between a stationary member having an opening and a rotating member which extends through the opening, said seal comprising:

an arcuate carrier element which is mounted on the stationary member and which extends toward the axis of the rotating member, the carrier element having first and second radially extending sides and an inner peripheral surface between the sides, the inner peripheral surface being spaced apart from the rotating member by a gap, the first side of the carrier element being exposed to a higher side of the carrier element being exposed to a higher pressure than the second side, the first side of the carrier element having an elongated slot therein;

an arcuate seal element having an extending portion; and

means in the slot for mounting the seal element on the carrier element so that the seal element is spaced apart from the stationary member and so that the extending portion extends past eh inner peripheral surface of the carrier element and toward the rotating member,

wherein the means for mounting includes a foot portion

VOL
1127
ISS
4
JE
25
1991
UMI

affixed to the seal element, the foot portion extending into the slot.

5,026,076
MECHANICAL FACE SEALS

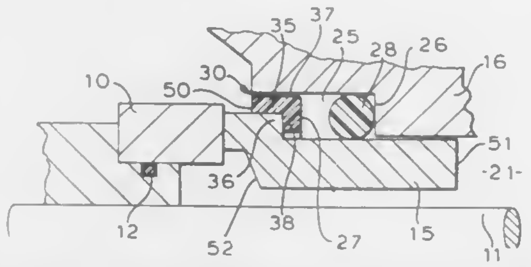
Anthony C. Back, Slough, United Kingdom, assignor to John Crane UK Ltd., United Kingdom

Filed Jun. 4, 1990, Ser. No. 532,431

Claims priority, application United Kingdom, Jun. 6, 1989, 8913000

Int. Cl.^{5} F16T *15/36*

U.S. Cl. 277—82 **5 Claims**



1. A mechanical face seal for providing a seal between a pair of relatively rotatable components comprising a first seal face member mounted in fixed axial and rotational relationship and sealed with respect to one component and a second seal face member mounted in fixed rotational relationship but moveable axially of the other component, said first and second seal face members being axially aligned so that opposed faces may be urged into sealing engagement, said second seal face member being sealed with respect to said other component by means of a sealing element located in a circumferential groove defined between opposed surfaces of the second seal face member and said other component, the wall of the groove between the sealing element and the side of the seal exposed to a product being defined at least in part by a low friction insert slidingly mounted on one of the opposed surfaces of the seal face member and said other component and a close clearance with the other opposed surface.

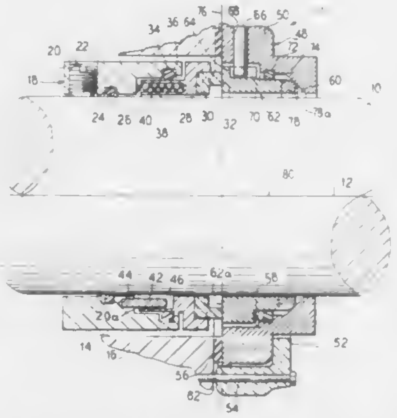
5,026,077
OMNI-DIRECTIONAL ARTICULATED MOUNTING ASSEMBLY FOR SHAFT SEALS

Dale J. Warner, Palm Harbor, Fla., assignor to Gits Bros. Mfg. Co., Tampa, Fla.

Filed Feb. 21, 1990, Ser. No. 482,825

Int. Cl.^{5} F16J *15/34*

U.S. Cl. 277—93 SD **20 Claims**



1. A seal assembly adapted to maintain a seal between a housing and a rotary shaft extending from the housing, said seal assembly comprising first and second seal ring assemblies having radial faces in mutual sealing engagement, first means sealingly connecting said first seal ring assembly to the shaft, a seal housing for the second seal ring assembly having an internal contact surface, second means sealingly connecting said second sealing ring assembly to the seal housing, a free floating slip ring outboard from said second means and sealing ring assembly in rockable engagement with said contact surface and in sliding engagement with said second seal ring assembly, said second sealing ring assembly and said slip ring accommodating tilting movement of said shaft in the seal housing to maintain full face-to-face engagement of the sealing faces of the first and second ring assemblies without exposing the slip ring to a leakage path between the housing and shaft.

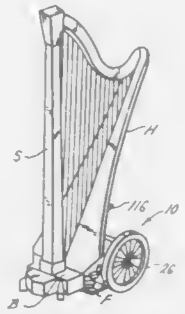
5,026,078
HARP CADDY

Kenneth P. Pinckney, P.O. Box 24136, St. Louis, Mo. 63130

Filed Oct. 12, 1989, Ser. No. 420,189

Int. Cl.^{5} B62B *5/02*

U.S. Cl. 280—5.2 **22 Claims**



1. A harp caddy for use in transporting a harp of the type having a base with feet projecting laterally outwardly from the base, the harp caddy comprising,

a frame including a generally horizontally extending platform for supporting the harp feet on the frame, the platform having a front edge and back edge, and a back wall projecting generally upwardly from the back edge of the platform,

clamp means slidably attached to the back wall of the frame for movement between a first position in which said clamp means is spaced relatively far apart from the platform and a second position in which said clamp means is relatively closer to the platform, said clamp means engaging the harp feet in said second position for clamping the harp feet downwardly against the platform to secure the harp to the frame, and

wheels attached to the frame for rolling the frame across a surface.

5,026,079
BALANCED MULTI-WHEEL WHEELBARROW

Pierre Donze, "Clos Varegues" St. Andrieux, 76930 Octeville/Mer, and Jean P. Frank, 3 rue des Songes, 68850 Staffelfelden, both of France

Continuation of Ser. No. 369,836, Jun. 22, 1989, abandoned, which is a continuation of Ser. No. 313,754, Feb. 22, 1989, abandoned, which is a continuation of Ser. No. 208,242, Jun. 17, 1988, abandoned, which is a continuation of Ser. No. 117,983, Nov. 9, 1987, abandoned, which is a continuation of Ser. No. 912,071, Sep. 25, 1986, abandoned. This application Jun. 4, 1990, Ser. No. 532,236

Claims priority, application France, Sep. 25, 1985, 85 14194

Int. Cl.^{5} B62B *1/18*

U.S. Cl. 280—47.31 **13 Claims**

1. A wheelbarrow comprising:

a frame having two sides;

a container mounted on said frame, said container having a forward edge and two side edges;

bearings secured to said frame for receiving an axle;

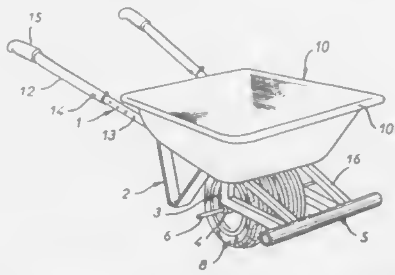
an axle removably secured in said bearings;

a plurality of wheels mounted on said axle;

arms extending rearwardly from said frame, said arms having handles for grasping by a user;

supporting legs depending from said frame to support said wheelbarrow, in cooperation with said wheels, in a static position; and

an elongate abutment member connected to said frame, said abutment member being transverse to the direction of travel of the wheelbarrow, in vertical alignment with the forward edge of the container, and in substantial horizontal alignment with said axle, said abutment member extending laterally beyond the side of said frame and beyond a line extending from the ground-engaging portion of the wheel closest to said side of said frame and the closer side edge of the container,



whereby said abutment member serves as a fulcrum for tipping the wheelbarrow, selectively, forward and to the side to empty the wheelbarrow.

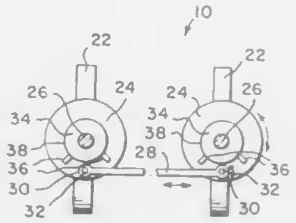
5,026,080
CASTERING WHEELS FOR ROLLER SKATES

John C. Steffl, 3555 Oxford Ave. 7F, Bronx, N.Y. 10463, and George Spector, 233 Broadway, New York, N.Y. 10007

Filed Mar. 30, 1990, Ser. No. 502,417

Int. Cl.^{5} A63C *17/02*

U.S. Cl. 280—87.042 **2 Claims**



1. An improved skateboard comprising:

(a) a deck having a tail and a nose;

(b) a pair of rear wheels mounted on the underside of said deck at said tail;

(c) a pair of front casters each having an upper plate swivelly attached to a shaft on said deck;

(d) means tying said front casters together whereby said casters will swivel simultaneously;

(e) means secured to said shaft for limiting the swivel of said front casters to forty-five degrees in either direction for increased maneuverability of said skateboard.

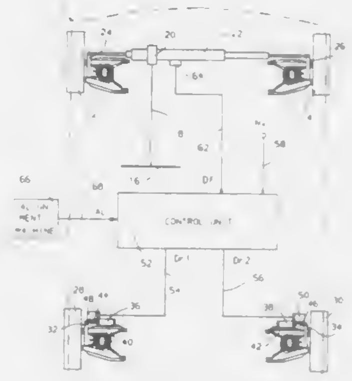
5,026,081
REAR WHEEL STEERING SYSTEM HAVING TOE ERROR COMPENSATION

Harry J. Bauer, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 25, 1990, Ser. No. 470,005

Int. Cl.^{5} B62D *7/14*

U.S. Cl. 280—91 **3 Claims**



3. A system for steering the rear wheels of a motor vehicle, comprising:

first and second actuator means for individually steering first and second rear wheels in relation to first and second steering commands applied thereto;

control means adapted for electrical connection with a toe error measurement apparatus capable of electrically transmitting signals corresponding to measured toe error values for said first and second rear wheels, the control means including

(a) means effective in response to the receipt of an electrical transmission from said toe error measurement apparatus for (1) applying first and second steering commands to said first and second actuator means for steering said first and second wheels in a straight orientation and (2) storing the transmitted signals corresponding to the measured toe error values of said first and second wheels respectively; and

(b) means effective upon disconnection of said toe error measurement apparatus for applying first and second steering commands to said first and second actuator means to steer the first and second wheels as a combined function of an overall rear wheel steering command and the respective stored first and second toe error values, thereby to individually compensate for the measured toe errors.

5,026,082
STEP FOR TRANSPORT VEHICLE SIDE DOOR

Charles L. Sipp, and Margaret M. Sipp, both of E. 24416 Joseph, Otis Orchards, Wash. 99027

Filed Mar. 26, 1990, Ser. No. 499,047

Int. Cl.^{5} B60R *3/02*

U.S. Cl. 280—163 **5 Claims**

1. A releasably positionable step and fastening structure, to aid access to a side door of a transport vehicle having a frame with side beams supported for locomotion by at least one wheel truck, said frame supporting a cargo container defining said side door for access, comprising in combination:

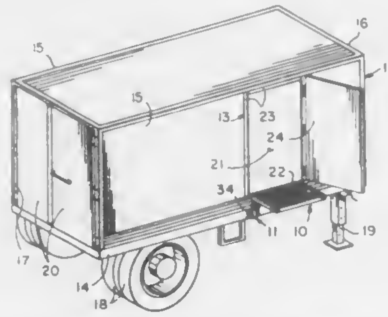
a step, having a peripheral frame with a linear inner edge, said frame having first and second surfaces and supporting a rigid step element on its first surface and structurally carrying two configurationally similar depending fastening legs on its second surface at opposed ends of the inner edge of the frame, each fastening leg extending substantially perpendicularly a spaced distance from the peripheral frame and having angled braces structurally commu-

VOL
1127
ISS
4
JE
25
1991
UMI

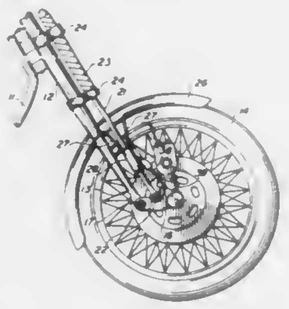
nicating from a medial portion of each fastening leg to the peripheral frame;

fastening structure comprising two configurationally similar fastening plates, each having a vertically extending fastening tube defining an internal channel to slidably receive one aforesaid fastening leg of the step, each said fastening plate structurally carried on a side beam of the transport vehicle frame beneath the side door defined therein and in spaced relationship to receive the fastening legs of the step; and

releasable fastening means for maintaining the fastening legs of the step within the channels defined by the fastening tubes.



5,026,083
CYCLE FENDER MOUNT
Wayne S. Wendorf, 1801 N. 66th Ave., Phoenix, Ariz. 85035
Filed Aug. 13, 1990, Ser. No. 566,079
Int. Cl.^{5} B62K *25/08*
U.S. Cl. 280—277 **6 Claims**



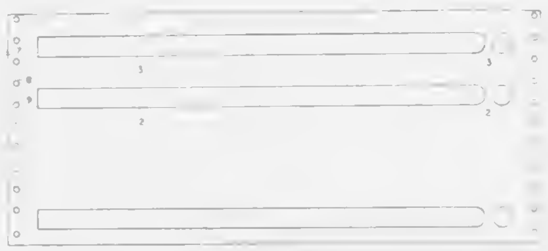
1. In combination,

a cycle wheel suspension system comprising first and second suspension components, said first suspension component comprising a yoke, said second suspension component the other of said comprising a pair of connecting rods, a pair of rocker arms pivotally connected to said yoke, a wheel having an axle extending between said rocker arms, said connecting rods having distal ends pivotally connected, respectively, to said rocker arms intermediate said yoke and said axle, and a spring assembly connected between said first and second suspension components whereby road shocks imparted to the wheel are transmitted to said spring assembly by movement of said connecting rods,

and an improvement comprising fender mounting means,

said mounting means comprising a pair of push rods each having one end pivotally connected to one of said rocket arms near said axle, a glide assembly mounted for sliding movement along each of said first or second suspension components, said push rods each having an opposite end connected, respectively, to one of said glide assemblies, a fender partially surrounding said wheel and brackets connecting said fender to said glide assemblies.

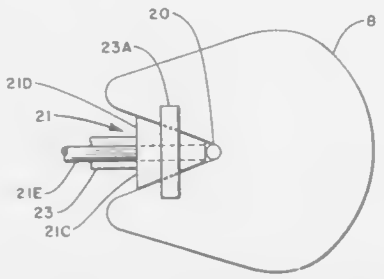
5,026,084
COLOR CARE CODED PATIENT IDENTIFICATION SYSTEM
Gail Pasfield, 28 Orchard Dr., Woodbury, N.Y. 11797
Filed Sep. 14, 1990, Ser. No. 582,145
Int. Cl.^{5} G09F *3/14*
U.S. Cl. 283—75 **1 Claim**



1. Hospital identification bands adapted to be mounted on a patient and bed rails in combination with an alert chart for correlating with said bands comprising:

a strip of pin feed computer paper having a plurality of color coded synthetic paper bands adhered thereon in parallel, and a first set of color coded flags adhesively mounted adjacent to said bands on said strip of paper, said flags having the same color as the respective bands; and a chart having a list of care conditions, and a second set of color coded flags adhesively mounted on said chart, one flag being mounted for each condition listed, all of said flags being of different colors, said first and second sets of color coded flags being identical, whereby said chart may be mounted in a convenient place for persons providing care to patients so that anyone can interpret corresponding color coded bands with said care conditions listed on said chart.

5,026,085
REMOTE-STEERING TRAILER
Edgar A. Ducote, P.O. Box 45654, Baton Rouge, La. 70895
Filed Apr. 13, 1989, Ser. No. 337,292
The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.
Int. Cl.^{5} B62D *13/04*
U.S. Cl. 280—426 **8 Claims**



1. A directional sensor conformable to a slot in a fifth wheel of a tractor articulated to a trailer, the sensor comprising:

(a) a flexible, substantially triangular member including first, second, third, and fourth sides, the first side defining a base of the triangular member, the second and third sides extending from the first to the fourth side, the fourth side defining a vertex of the triangular member, the fourth side being substantially shorter than the first, second, and third sides, the first side including an opening opposite the fourth side;

(b) a sealed first hollow, elongated member extending from the first side of the triangular member away from the fourth side of the triangular member;

(c) a close-fitting, freely movable, flexible second hollow elongated member, the second elongated member being closed at one end, the other end being open and continuous with the opening in the first side of the triangular member, the second elongated member being substantially shorter than the first elongated member;

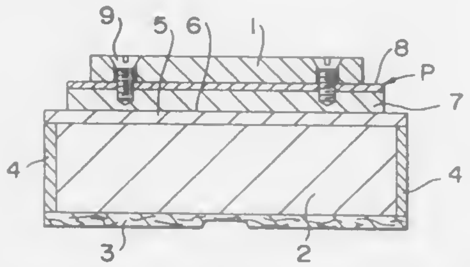
(d) a first compartment extending from the closed end of the second elongated member to one end of the first elongated member;

(e) a second compartment extending from the fourth side of the triangular member to the closed end of the second elongated member;

(f) a first inlet for admitting a pressurized fluid into the first compartment, thereby pressure-loading the sensor into the fifth wheel; and

(g) a second inlet for admitting a pressurized fluid into the second compartment, thereby inflating the second compartment and maintaining the sensor in pressurized contact with the outer surface of the slot in the fifth wheel.

5,026,086
DEVICE FOR ABSORPTION OF SHOCKS AND VIBRATIONS BETWEEN A SKI AND A BINDING
Francois Guers, Annecy, and Axel Phelipon, Annecy Le Vieux, both of France, assignors to Salomon S.A., Annecy, France
Filed Nov. 3, 1989, Ser. No. 431,202
Claims priority, application France, Nov. 4, 1988, 8815778
Int. Cl.^{5} A63C *5/00*
U.S. Cl. 280—607 **27 Claims**



1. Device for absorbing shocks and vibrations between a ski having an upper surface and a binding for the shoe or boot of a skier, said device comprising at least one platform having at least one layer of viscoelastic shock absorbing material, a lower surface of said shock absorbing material being adapted to be mounted solely by adhesive means onto the upper surface of the ski in an area provided for the binding, a rigid plate attached by adhesive means to an upper surface of said shock absorbing material, and screws having a predetermined length for securing said binding to an upper surface of said rigid plate, wherein said screws extend through said rigid plate and are anchored directly into said shock absorbing material and wherein said screws extend into said shock absorbing material but do not penetrate into the upper surface of the ski.

5,026,087
SKI BOOT AND SKI BOOT-BINDING
Elmer B. Wulf, 1907 Jasmine, Denton, Tex. 76205, and Mark E. Wulf, 24447 Boulevard DeJohn, Naperville, Ill. 60564
Continuation-in-part of Ser. No. 224,887, Jul. 27, 1988, Pat. No. 4,880,251. This application Nov. 8, 1989, Ser. No. 433,849
Int. Cl.^{5} A63C *9/08*
U.S. Cl. 280—613 **26 Claims**

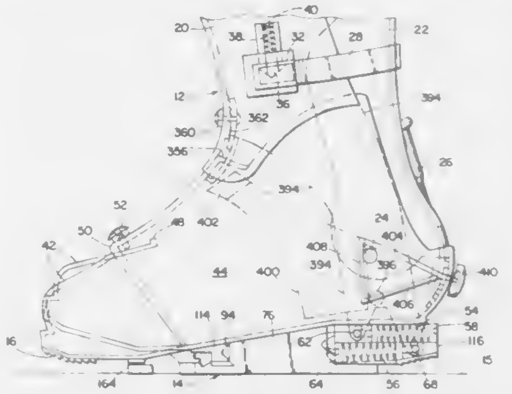
1. A ski boot for attachment to and releasably attaching to a ski, comprising

a. a foot shell rigidly attached to a sole, said foot shell having a portion extending above an ankle on opposite sides thereof when the boot is worn,

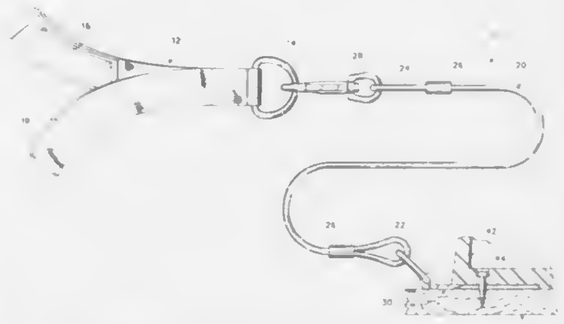
b. a hinged forward cuff and a hinged rear cuff secured to said foot shell, said cuffs, when fastened about the leg of a skier, permitting forward and rearward leg lean by the skier,

c. means for securing said forward cuff to said rear cuff, said securing means further including means responsive to rearward pressure on said rear cuff for detaching said cuffs so that under predetermined rearwardly-directed load on said rear cuff said rear cuff will separate from said forward cuff to permit free movement of said rear cuff, and

d. means connected to said forward cuff for controlling the forward and rearward leg lean by a skier.



5,026,088
SNOWBOARD SAFETY STRAP
Robert B. Stuart, Medford, Oreg., assignor to Squeeze Lock, Inc.
Filed Jun. 1, 1989, Ser. No. 359,527
Int. Cl.^{5} A63C *11/00*
U.S. Cl. 280—637 **4 Claims**



1. A snowboard safety strap for use on a snowboard having a binding fixed thereon, comprising:

a fastener secured to the snowboard at a predetermined location between an upper surface of the snowboard and a lower surface of the binding which includes a tab, said tab having a first portion which contacts the upper surface of the snowboard and which has plural bores therethrough for securing said first portion to the snowboard, and a second portion, and a D-ring connector secured to said second portion for allowing connection of said cable to said tab;

a length of substantially non-elastic cable having a loop at each end thereof, the loop at one end of said cable being secured to said D-ring connector, and an attachment device attached to the loop at the other end thereof; and

an elongate, adjustable-length web which extends about the user's leg, said web having loop-and-hook fasteners thereon to secure the ends of the web to one another about the user's leg, said web having a connection thereon, including a flap formed from a doubled portion of said web intermediate the ends thereof and having a D-ring

VOL
1127
ISS
4
JE
25
1991
UMI

fixed between the doubled portion for receiving said cable.

5,026,089

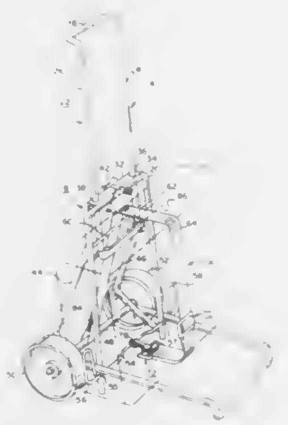
LUGGAGE SECURING STRAP FOR USE WITH COLLAPSIBLE LUGGAGE CARRIER

Gerald D. Grimmonpre, 6310 W. Round Up Rd., McHenry, Ill. 60050

Filed Sep. 26, 1989, Ser. No. 412,659

Int. Cl.⁵ B62B *1/06*

U.S. Cl. 280—655 **4 Claims**



1. A luggage securing strap for use with a wheeled luggage cart having a luggage supporting platform, a handle extending from the luggage support platform, an axle having wheels thereon for supporting the cart, and the luggage supporting platform and the handle including cross-members which extend generally parallel to the axle, said securing strap comprising

a flat elongated strap having first and second ends,

a buckle, said buckle being secured to said first end of said strap,

a pair of elongated segments of mutually engageable fastening material, said pair of elongated segments of mutually engageable fastening material being secured in a spaced apart relationship to one side of said strap adjacent the second end of said strap,

a fastener, said fastener including a loop portion forming a slot, and a hook, said second end of said strap passing through said slot in said loop portion, and then through said buckle, with a portion of said strap intermediate said first end and said pair of elongated segments of mutually engageable fastening material being engaged in said buckle, said fastener being located on a loop of said strap formed between said first end of said strap and said portion of said strap engaged in said buckle, whereby said second end of said strap may be looped around a member of the luggage cart, and said pair of elongated segments of mutually engageable fastening material engaged with each other, said strap then being wrapped around the luggage on the cart, and said hook engaged with another member of the cart, said buckle then being adjusted to tighten said strap around the luggage, thereafter said pair of elongated segments of mutually engageable fastening material may be disengaged, and said strap pulled tightly around the first member of the cart and the pair of elongated segments of mutually engageable fastening material re-engaged to secure the luggage to the cart.

5,026,090

WHEEL SUSPENSION SYSTEM FOR AUTOMOBILES

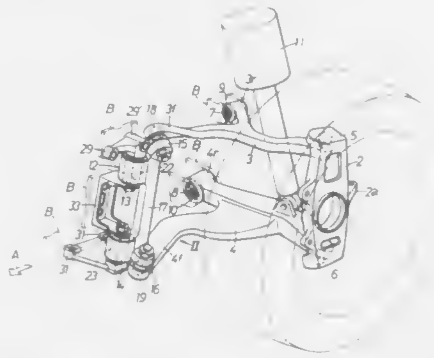
Yohsuke Sekino, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 13, 1989, Ser. No. 434,752

Claims priority, application Japan, Nov. 16, 1988, 63-289876; Jan. 27, 1989, 1-19098

Int. Cl.⁵ B60G *3/00*

U.S. Cl. 280—673 **7 Claims**



1. A wheel suspension system for automobiles, comprising a pair of upper and lower control arms, each having a tip end and a base end, said upper and lower control arms being linked at their tip ends to a knuckle for carrying a wheel and being pivotally connected at one side of their base ends to a vehicle body for vertical swinging movement and being connected at the other side of their base ends to a pair of upper and lower support arms projectingly provided on a support shaft which is supported on the vehicle body through elastic members to extend vertically thereof,

said support shaft comprising an upper tubular shaft portion having the upper support arm provided on one side thereof so as to project therefrom, a lower tubular shaft portion located below the upper tubular shaft portion and having the lower support arm provided on one side thereof so as to project therefrom, and a connecting rod which integrally interconnects said upper and lower support arms and vertically extends at a location eccentric from central axes of the upper and lower tubular shaft portions, an elastic member being interposed between each of the tubular shaft portions and a core shaft centrally disposed in the tubular shaft portion and secured to the vehicle body.

5,026,091

ANTI-ROLL SYSTEM USING CASTER CONTROL FOR USE IN VEHICLES

Un K. Lee, Ulsan, Rep. of Korea, assignor to Hyundai Motor Company, Seoul, Rep. of Korea

Filed Dec. 21, 1989, Ser. No. 454,626

Claims priority, application Rep. of Korea, Dec. 23, 1988, 88-17347

Int. Cl.⁵ B60G *7/00*

U.S. Cl. 280—675 **2 Claims**

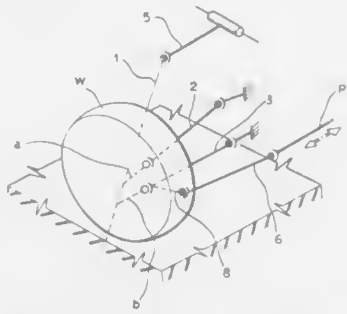
1. An anti-roll system for vehicles comprising:

an upper link and a plurality of lower links, said links connecting a vehicle body to vehicle front wheels via steering knuckles, said links connected to said knuckles via ball joints,

a steering rack disposed within a steering gear box, said steering rack connected to said steering knuckles via tie rods and steering arms, said steering arms formed integrally with the steering knuckles, said tie rods positioned rearwardly of center of the vehicle wheels,

a theoretical kingpin axis defined as a line passing through the ball joint connecting the upper link to the knuckle and through a point of intersection of two extension lines of the lower links,

a caster defined as a tilt angle of the theoretical kingpin axis from vertical when viewed from a side of the vehicle, positive caster defined as tilt angle toward the vehicle rear and negative caster defined as tilt angle toward the vehicle front,



the upper and lower links configured and connected to the knuckle whereby the vehicle wheels have positive caster during straight driving, and during a turn, shifting of the steering rack pivots the knuckle causing tiny displacements of the links such that the positive caster shifts to negative caster on the wheel toward the inside of a turn.

5,026,092

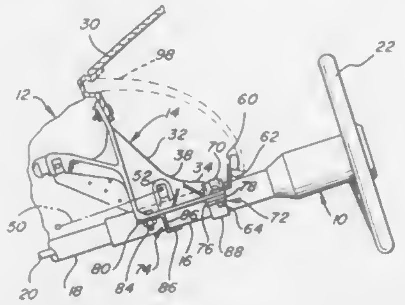
ENERGY ABSORBING STEERING COLUMN ASSEMBLY HAVING A PASSIVE RESTRAINT LOAD LIMITING SUPPORT SYSTEM

William M. Abramczyk, Rochester Hills, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Nov. 15, 1989, Ser. No. 437,411

Int. Cl.⁵ B62D *1/18*

U.S. Cl. 280—777 **14 Claims**



1. In combination for a motor vehicle, a collapsible energy absorbing steering column assembly and a passive restraint load limiting support system;

said collapsible energy absorbing steering column assembly comprising:

an upper column tube;

a lower column tube telescopically engaged with said upper column tube;

a steering shaft rotatably suspended within said telescopically engaged upper and lower column tubes;

a steering wheel secured to the rearward end of said steering shaft;

support means for mounting said upper column tube within a vehicle body;

first means fixed to said upper column tube for mounting said upper column tube to said support means and for restraining said upper column tube from moving axially relative to said lower column tube until sustaining an impact load of a first predetermined magnitude;

second means fixed to said upper column tube for mounting said upper column tube to said support means and for absorbing impact loads through plastic deformation as said column tubes move axially relative to one another over a predetermined distance following release by said first means;

said passive restraint load limiting support system comprising said support means being disposed in a manner straddling said upper column tube and normally restraining movement of said upper column tube in a direction vertically transverse of the axis thereof; and

said support means including means for providing a controlled break across the support means in a direction generally transverse of the axis of said upper column tube upon receiving a vertical impact load of a second predetermined magnitude substantially greater than said first predetermined magnitude, whereby said steering column assembly may swing upwardly in the direction of the vehicle windshield thereby relieving the occupant of incurring a greater resultant impact load.

5,026,093

SEAT OCCUPANT RESTRAINING APPARATUS

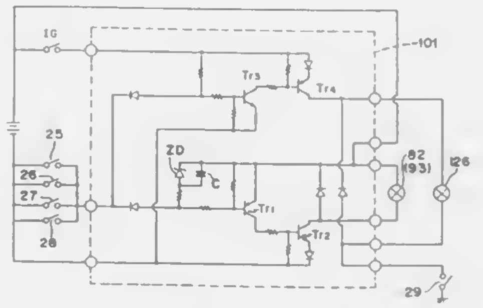
Satoshi Nishikaji, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Oct. 25, 1989, Ser. No. 426,228

Claims priority, application Japan, Oct. 26, 1988, 63-270260

Int. Cl.⁵ B60R *22/44*

U.S. Cl. 280—807 **6 Claims**



1. In an automotive vehicle having a vehicle body structure defining a plurality of access openings and a passenger compartment therein, a seat assembly disposed within the vehicle body structure, and a plurality of closure members hingedly connected to the body structure over the access openings, respectively, so as to be movable between open and closed positions at which the access openings are respectively opened and closed by the closure members, the closure members including at least one rear, side door hingedly connected over one of the access openings leading into the passenger compartment at the rear of the seat assembly, a seat belt apparatus for restraining an occupant of the seat assembly, said seat belt apparatus comprising:

a length of flexible belt having first and second opposite ends;

a belt anchor fixing the first end of said flexible belt relative to the vehicle body structure;

seat belt retractor means, disposed within the rear, side door at a location to the rear of the seat assembly and connected to the second end of said flexible belt, for exerting a tension force on said belt that tends to forcibly wind the belt into the seat belt retractor means;

tension relieving means connected to said seat belt retractor means for selectively preventing said seat belt retractor means from exerting the tension force on said flexible belt; and

control means including belt detecting means for detecting whether the flexible belt is in an operative position which can restrain an occupant in the seat assembly and door detecting means for detecting when the rear, side door has been opened,

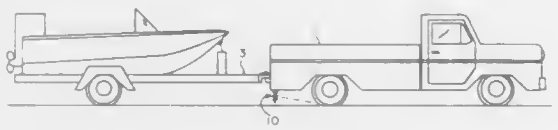
said control means operatively connected to said tension relieving means for rendering said tension relieving means operative, in a manner which enables said tension reliev-

VOL
1127
ISS
4
JE
25
1991
UMI

ing means to selectively prevent said belt retractor means from exerting the tension force on said flexible belt, once said belt detecting means detects that the seat belt apparatus is in the operative position, said control means for maintaining said tension relieving means operative as the rear, side door is opened, and said control means for rendering said tension relieving means inoperative once the rear, side door has been opened whereby the tension force will once again be exerted on said flexible belt by said seat belt retractor means.

5,026,094
ADJUSTABLE MUD FLAP ASSEMBLY

John Haddox, 2370 S. Maple Grove, Boise, Id. 83709
Filed Nov. 3, 1989, Ser. No. 431,083
Int. Cl.^{5} B62D *25/16*
U.S. Cl. 280—848 **7 Claims**



1. An adjustable position mud flap for use on a vehicle a to prevent projectiles propelled by the vehicle's wheel from impinging on a trailer in tow, which comprises:

transverse bar member being attached to the rear underside of the vehicle;

an L shaped mud flap frame having an upright frame member and a horizontal mud flap mounting member and a transverse bar receiving stub attached to a lower end of said upright frame member being configured to position an attached mud flap in any one of a plurality of positions with respect to the wheel of the vehicle and to maintain an attached mud flap in substantially different vertical planes and at different heights in each one of the plurality of positions;

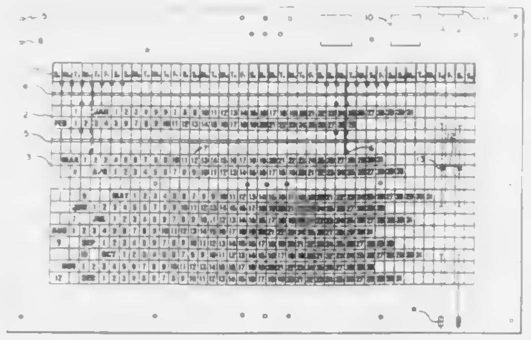
a mud flap being attached to said mud flap frame; along said horizontal mud flap mounting member with said upright frame member extending along an inside edge of said mud flap and

removable attachment means located proximate said transverse bar receiving stub, being operably connected between said mud flap frame and said transverse bar member for removably attaching said mud flap frame in one of said plurality of position with respect to said transverse bar member.

5,026,095
PERPETUAL BLIND CALENDARS SERIES 2

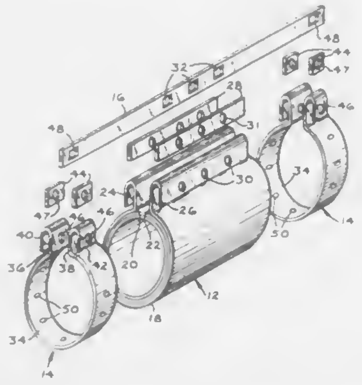
Ralph H. Hoyeck, 80 Somerville, Westmount, Quebec, Canada H3Z 1J5
Continuation of Ser. No. 303,930, Jan. 30, 1987, abandoned. This application May 22, 1990, Ser. No. 526,539
Claims priority, application Canada, Apr. 20, 1988, 564569
Int. Cl.^{5} B42D *15/00*
U.S. Cl. 283—2 **17 Claims**

1. A perpetual yearly calendar comprising a first part and a second part, said first part and said second part are parallel to each other, said first part and said second part are movable with respect to one another, said first part and said second part are sub-divided into equal and alignable divisions, said first part comprising an elongated strip having a plurality of equidistant transversial lines, disposed on the said strip, defining equal transversial first divisions, carrying identifications of consecutive weekdays, the number of said consecutive weekdays, is equal at least to the number of days in the longest month in a given calendar system plus twelve, occupying an equal number of the said first divisions, said second part having a surface area containing inscriptions thereon, said second part comprising a grid having a plurality of equidistant vertical lines, spaced by the same spacing as the said transversial lines, and equidistant horizontal lines, intersecting one another to define second equal divisions, corresponding to and alignable with the said first divisions, distributed into twelve rows, representing the twelve months of the year and a number of columns equal to at least the number of days in the longest month in a given calendar system plus six, each row carrying numerals in consecutive order, representative of the number of days in a given month, occupying an equal number of the said second divisions, the twelve months of the year are positioned on the said grid in their constant relation with each other, with respect to the weekdays' sequences, i.e. the first numeral of each of the twelve rows, appearing in a division of a given column, which corresponds to its constant position with respect to the other first numerals as determined by the weekdays' sequences when changing from one month to the next one, resulting in a twelve months' table, so constructed and arranged, that by aligning any date shown on the twelve months' table, with its corresponding weekday shown on the said flexible strip, the remaining 364 days of the year shown on the twelve months' table, would be automatically aligned with their corresponding weekdays shown on the said flexible strip.



5,026,096
AXIAL FORCE RESISTING PIPE COUPLING

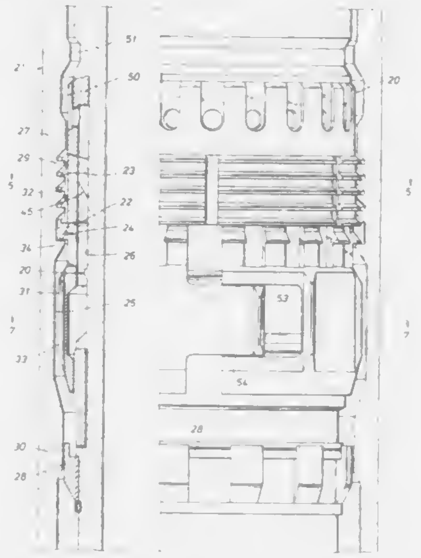
Milton F. Lutz, II, Jackson, Mich., assignor to Midbrook Products, Inc., Jackson, Mich.
Filed Mar. 16, 1990, Ser. No. 494,427
Int. Cl.^{5} F16L *13/04*
U.S. Cl. 285—114 **5 Claims**



1. An axial force resisting pipe coupling for connecting pipes in aligned end-to-end relation characterized by its economical construction and ability to resist high tension forces comprising, in combination, an elongated separate strap, a plurality of circumferentially contractible band clamps, each of said clamps having a generally circular configuration defining a band portion terminating in opposed end flanges, fastening means associated with each of said clamps connecting said clamps to said strap in axially aligned relation with respect to one another and adapted to draw said opposed flanges toward and away from each other contracting and expanding said bands, respectively, said plurality of clamps including two outer clamps and a central clamp, radially contractible sleeve elements disposed within said central clamp band portion, said sleeve elements including a metal sleeve and a elastomeric sleeve disposed within said metal sleeve, said elastomeric sleeve overlapping the associated pipe ends and circumferentially contracted upon tightening of said fastening means.

5,026,097
WELLHEAD APPARATUS

Larry E. Reimert, Spring, Tex., assignor to Dril-Quip, Inc., Houston, Tex.
Filed Jul. 28, 1989, Ser. No. 387,517
Int. Cl.^{5} E21B *43/01;* **F16L** *39/00*
U.S. Cl. 285—141 **6 Claims**



6. Apparatus for use in suspending an inner casing within an outer casing of an offshore well at the ocean floor, comprising

an outer body having a bore therethrough with an upwardly facing landing surface therein and adapted to be connected to the outer casing for lowering therewith into a landed position at the ocean floor,

an inner hanger body including a tubular body adapted to be connected to the inner casing for lowering therewith into the bore of the outer body, and

a circumferentially split ring having a landing shoulder thereon and being carried about the hanger body for radial movement with respect thereto between a contracted position in which it may be moved into and out of the bore and an expanded position in which the landing shoulder is above the landing surface for seating thereon,

said ring having a lateral groove therein which opens to one free edge and a tongue extending from the other free edge and guidably received in the groove as said ring expands and contracts.

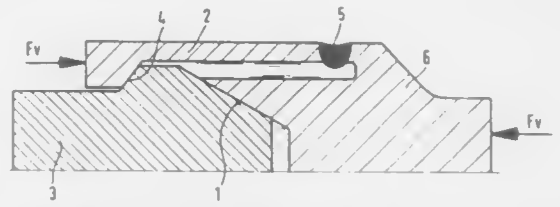
5,026,098
COUPLING

Thomas Schmid, Augsburg, Fed. Rep. of Germany, assignor to MTU Motoren- und Turbinen-Union Munchen GmbH, Fed. Rep. of Germany
Filed Jul. 14, 1989, Ser. No. 379,963
Claims priority, application Fed. Rep. of Germany, Jul. 19, 1988, 3824453
Int. Cl.^{5} F16L *55/00*
U.S. Cl. 285—174 **37 Claims**

1. A coupling arrangement for connecting first and second relatively non-weldable components in abutting contact with one another at least one mating surface, said coupling arrangement comprising:

a coupling sleeve surrounding the first and second components and overlapping the at least one mating surface, said coupling sleeve being formed from first and second sleeve parts, and

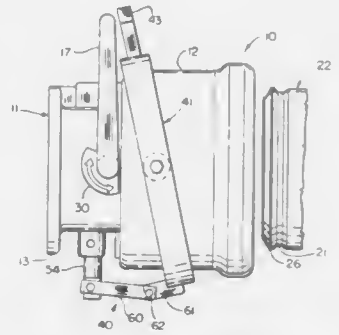
a welded joint connecting the first and second sleeve parts,



wherein the welded joint and the first and second sleeve parts having dimensional and thermal expansion coefficient characteristics such that when the welded joint in applied and cooled, a pre-stress is generated which forces the first and second sleeve parts closer together so that the sleeve clamping holds the first and second components with respect to one another in a heat resistant and undetachable manner without utilizing any detachable connection of said two components and said sleeve.

5,026,099
DRY BREAK COUPLER WITH RING COLLAR SLEEVE OPERATOR

Raymond R. Hendrix, Magnolia, Ohio, assignor to BP America Inc., Cleveland, Ohio
Filed Feb. 28, 1990, Ser. No. 486,391
Int. Cl.^{5} F16L *37/05*
U.S. Cl. 285—315 **14 Claims**



1. A quick disconnect coupler comprising a coupler body, latching means for holding said coupler body to another component, a telescoping sleeve moveable axially on said coupler body to engage and disengage said latching means, and sleeve operator means for moving said telescoping sleeve axially between engaged and disengaged positions, said sleeve operator means including a yoke having opposite ends and opposite side portions straddling and surrounding said telescoping sleeve, means connecting said opposite side portions of said yoke to respective sides of said telescoping sleeve at diametrically opposite connection points, a handle at one of said opposite ends of said yoke, and constraining means for constraining movement of said yoke at the other of said opposite ends of said yoke.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,100

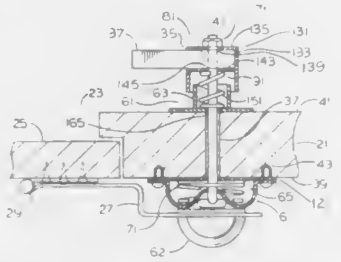
LOCK RELEASE APPARATUS

Francis J. Hulkenberg, Jr., North Richland Hills, Tex., assignor to General Dynamics Corporation, Fort Worth, Tex.

Filed Sep. 19, 1989, Ser. No. 409,239

Int. Cl.^{5} E05B *65/10*

U.S. Cl. 292—92 **24 Claims**



1. Apparatus for releasably securing a hasp holding means to structural means having first and second sides with an aperture formed through said structural means, said apparatus comprising:

rod means having first and second ends with cam means formed at said first end,

housing means comprising structure having a first end and an open second end with said second end being adapted to be located next to said first side of said structural means,

means for preventing said housing means from rotating relative to said structural means when said second end of said housing means is located next to said first side of said structural means,

hasp holding means connected to said first end of said housing means for allowing a hasp to be coupled to said hasp holding means when said second end of said housing means is located next to said first side of said structural means,

first spring means adapted to be located in said housing means by way of said second end of said housing means for applying pressure between said first side of said structural means and said first end of said housing means when said second end of said housing means is located next to said first side of said structural means for urging said housing means away from said first side of said structural means,

a rod receiving aperture formed through said first end of said housing means for receiving said rod means for allowing said rod means to be inserted through said aperture formed through said structural means and through said aperture formed through housing means such that said first and second ends of said rod means may extend beyond said first and second sides of said structural means respectively,

handle means,

means for coupling said handle means to said second end of said rod means for allowing said handle means to be rotated for rotating said rod means in said aperture formed through said structural means and in said rod receiving aperture of said housing means,

said rod receiving aperture being formed to prevent said cam means from passing through said rod receiving aperture when said rod means and said cam means are rotated to a holding position and for allowing said cam means to pass through said rod receiving aperture when said rod means and said cam means are rotated to a release position,

second spring means adapted to be located between said second side of said structural means and said handle means and coupled to said second end of said rod means for normally urging said handle means away from said second side of said structural means and by way of said rod means and said cam means, said second end of said housing means against said first side of said structural means when said rod means and said cam means are rotated to said holding position,

when said rod means and said cam means are rotated by said handle means to said release position, allowing said cam means to move through said rod receiving aperture of said housing means, said first spring means is allowed to move said housing means away from said first side of said structural means to release said housing means and its hasp holding means from said structural means.

5,026,101

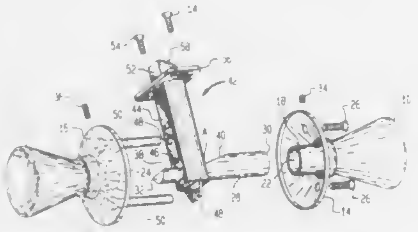
PUSH-PULL OR TWIST DOOR KNOB/HANDLE MECHANISM

John E. Dotterweich, 512 Teakwood Drive, Lanoka Harbor, N.J. 08734, and Stephen B. Demick, 68 Cedar Avenue, West End, N.J. 07740

Filed Apr. 27, 1990, Ser. No. 516,036

Int. Cl.^{5} E05C *1/12*

U.S. Cl. 292—166 9 Claims



1. Apparatus for opening a hinged door by a pair of knobs located on either side thereof, comprising:

first and second knobs each having a tubular extension extending therefrom;

a shaft member having first and second opposing ends, an intermediate portion and a longitudinal axis, said first end having a flat camming surface lying in a plane parallel to said longitudinal axis and being of a uniform cross section, said intermediate portion having a flat camming surface inclined to said axis, each said end telescopically fitted within one of said tubular extensions on said pair of knobs;

means for securing said extensions on said first and second opposing ends;

a latch bolt;

camming means coupled between said shaft member and said latch bolt for cooperating with said flat camming surfaces on said shaft member for actuating said bolt to a retract position upon rotation of either of said pair of knobs, and for actuating said bolt to said retract position upon pushing on one of said pair of knobs and upon pulling of the other of said pair of knobs, and for permitting said shaft member to freely slide with respect to said camming means while preventing actuation of said bolt by said shaft member upon pulling on said one of said pair of knobs and upon pushing on said other of said pair of knobs; and

an elongated cartridge, having substantially a uniform cross section, housing said latch bolt and said camming means, said cartridge having an opening at one end through which said latch bolt extends when not in said retract position and a passage near said opposite end for receiving said shaft member and an end of said camming means.

5,026,102

MECHANICAL SECURITY DEVICE FOR DOORS

James Pitman, 1233 Commonwealth Blvd., Toms River, N.J. 08757

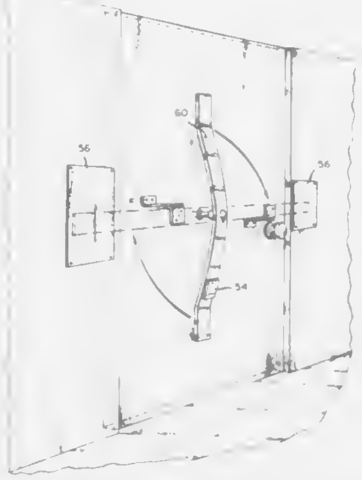
Filed Dec. 11, 1989, Ser. No. 448,229

Int. Cl.^{5} E05C *9/00*

U.S. Cl. 292—259 R 5 Claims

1. A security apparatus for mounting on the interior side of a door and overlying said door to prevent the opening thereof by intruders and characterized by its ability to absorb a forcible battering of said door and transfer said forcible battering to adjacent walls, said security apparatus comprising:

an elongate, rigid, arcuate crossbar having a length sufficient to extend transversely across and beyond said door opening, said crossbar being concave in its respective position to said door for said door opening inwardly and said crossbar being convex with respect to its position to said door for said door opening outwardly, said crossbar having planer longitudinal end portions for engagement with said adjacent walls to said door opening, said crossbar being rotatably secured to said door;



a pair of brackets for engaging said crossbar in a secure position, one of said brackets having a depending lip and said opposing bracket having an upstanding lip, said brackets having a series of apertures coincidental with apertures in said crossbar for locking said crossbar in a horizontal transverse position securing said door.

5,026,103

SPRING SUPPORT FOR A MOTOR VEHICLE DOOR FASTENER

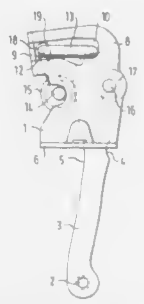
Karl-Heinz Tölle, Wuppertal, and Willi Steckel, Remscheid, both of Fed. Rep. of Germany, assignors to Ed. Scharwächter GmbH & Co. KG, Remscheid, Fed. Rep. of Germany

Filed Feb. 1, 1990, Ser. No. 473,612

Claims priority, application Fed. Rep. of Germany, Feb. 1, 1989, 3902879

Int. Cl.^{5} E05C *17/18*

U.S. Cl. 292—275 8 Claims



1. A spring support for a motor vehicle door fastener in which a rigid door holding bar, which is hinged so as to be swivelable at one of a door arrangement part, a door and a door post and penetrates a holder housing which is rigidly fastened at another door arrangement part, is acted upon by means of a loading roller which is arranged so as to be freely rotatable on a free loading arm of a torsion bar spring arranged in and supported at the holder housing via a support arm, the spring support comprising an elongated recess **10** in the holder housing **1**, in which recess the torsion bar spring **11** is received, the housing being folded from a sheet metal material blank; a bearing shell **18** of self-supporting and maintenance-free bearing material provided so as to support the torsion bar spring with respect to a shaft part **12** thereof, within the holder housing **1**, the bearing shell **18** being held in a position inside the holder housing by a preselected pretensioning between the shaft part **12** and the support arm **13**; and mechanically acting holding means **19** for additionally holding the bearing shell **18**.

5,026,104

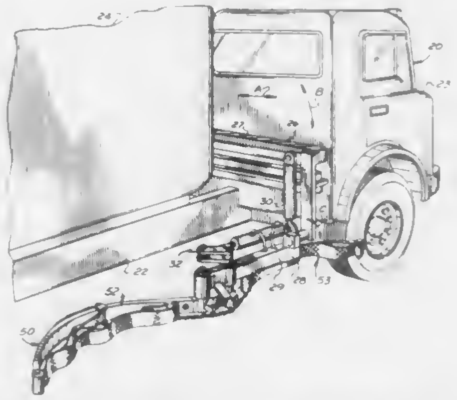
GRIPPING APPARATUS

John W. Pickrell, Scottsdale, Ariz., assignor to Government Innovators, Inc., Phoenix, Ariz.

Continuation of Ser. No. 308,839, Feb. 9, 1989. This application Jan. 30, 1990, Ser. No. 472,616

Int. Cl.^{5} B66F *9/18*

U.S. Cl. 294—86.4 **4 Claims**



1. A gripping apparatus for use in combination with

a container handling mechanism having grip actuation means selectively movable between a retracted position and an extended position

and for alternately gripping

a first container having a perimeter, and a second container having a perimeter smaller than the perimeter of the first container

said gripping apparatus comprising:

a) a first arm mounted for rotation about a first pivot point on said actuating means, said first arm including a fixed end rigidly secured to said actuating means and a free end spaced from said fixed end;

b) a second arm mounted for rotation about a second pivot point on said actuating means, said second arm including a fixed end rigidly secured to said actuating means and a free end spaced from said fixed end;

said first and second arms being movable in opposing directions in response to said actuating means between

a retracted position for alternately receiving said first container and said second container,

and an extended position for at least partially encircling the respective said container in spaced relationship to the perimeter thereof;

c) a first elongate flexible member having a first end secured to the fixed end of said first arm and a second end secured to the free end of said first arm;

d) a second elongate flexible member having a first end secured to the fixed end of said first arm and a second end secured to the free end of said first arm; and

e) grip control means carried by each said arm for normally presenting the respective said flexible member for tautly engaging the perimeter of said second container and for alternately presenting said flexible member for tautly

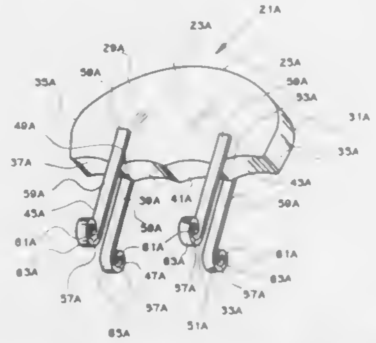
VOL
1127
ISS
4
JE
25
1991
UMI

engaging the perimeter of said first container in automatic response to the presence of said first container as said arms move from the retracted position to the extended position wherein each said grip control means comprises

i) divider means for dividing said respective flexible member into a first segment and a second segment, wherein the effective length of said first segment is less than half the perimeter of said second container and the effective length of said first and second segments combined is less than half the perimeter of said first container; and

ii) means responsive to the movement of said arm into an extended position for normally presenting the full effective length of said first segment for engagement with the perimeter of said second container and for automatically moving the effective combined lengths of said first and second segments into engagement with the perimeter of said first container when said first container is present between said arms.

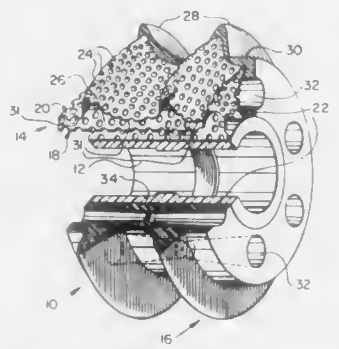
5,026,105
HAND GRIP FOR CARRYING LOADED PLASTIC BAGS
Lennard Feldman, 6658 Via Regina, Boca Raton, Fla. 33433
Filed Dec. 27, 1988, Ser. No. 289,779
Int. Cl.⁵ A45C *13/26;* **B65D** *33/06*
U.S. Cl. 294—170 **1 Claim**



1. A hand grip for carrying a plurality of loaded bags made of flexible plastic sheet material, each of said bags having an open side for loading articles into said bag and flexible plastic bag handles formed in the opposite walls of said bag at said open side,

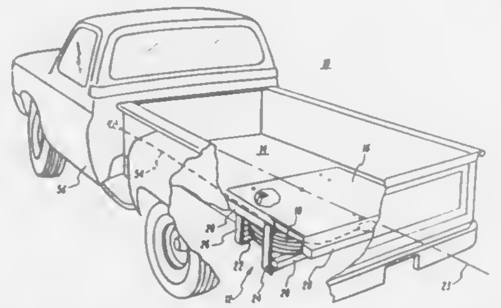
said hand grip comprising and elongated yoke shaped to be grasped by a human hand with the four adjacent fingers therefore around said yoke, said yoke having opposite side surfaces, opposite end surfaces, a top surface and a bottom surface, said bottom surface having finger-gripping undulations therein, and four symmetrically-spaced hooks attached to said yoke and positioned to hang said bags from said hooks when said yoke is grasped by and supported by said hand, each of said hooks being spaced inwardly from said end surfaces so that at least one gripping undulation is positioned between each said hook and the nearest end surface, said hooks being positioned in transversely spaced-apart pairs, said pairs of hooks being longitudinally spaced-apart to permit the ring finger and middle finger of said hand to fit comfortably therebetween, with the little finger and index finger of said hand outboard of said hooks when said yoke is grasped by said hand, each of said hooks attached to and extending downwardly from respective said side surfaces of said yoke, and each of said pair of hooks having oppositely directed hook openings for receiving said bags, each of said hooks having a restricted means for sliding the handles of one of said bags onto and off of a hanging positions on said hook.

5,026,106
TRAM CAR WHEEL
Paul Biermann, 14728 - 116 Avenue, Edmonton, Alberta, T5M 3G1, Canada
Continuation-in-part of Ser. No. 278,220, Nov. 30, 1988, abandoned. This application Sep. 29, 1989, Ser. No. 415,021
Int. Cl.⁵ B60B *17/00*
U.S. Cl. 295—1 **33 Claims**



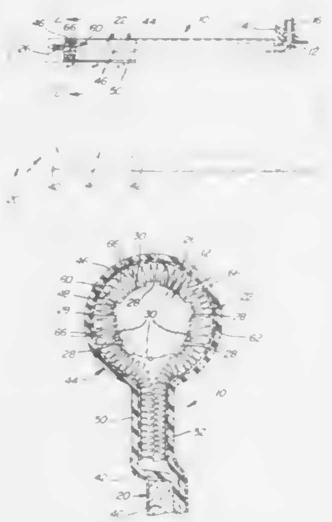
1. A tram car wheel comprising
a metallic hub section;
a formed non-metallic wheel on said hub;
a pair of cable flanges on said non-metallic wheel; and
an open reinforcing structure in said non-metallic wheel, said reinforcing structure comprising an inner wheel stabilizing section anchored to said hub section and an outer flange stabilizing section anchored to said inner wheel stabilizing section to thereby form a unitary reinforcing cage, said outer flange stabilizing section extending into said flanges.

5,026,107
VEHICLE SPARE TIRE STORAGE APPARATUS
Kenneth J. Hess, Rte. 2, Box 38, Muenster, Tex. 76252
Filed Oct. 10, 1989, Ser. No. 418,486
Int. Cl.⁵ B62D *43/04*
U.S. Cl. 296—37.2 **7 Claims**



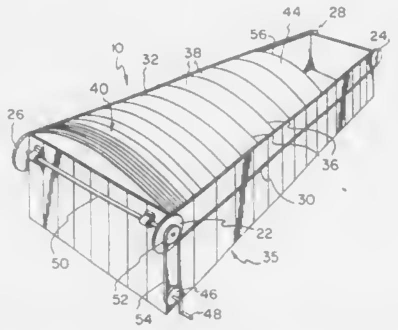
1. Apparatus for supporting a spare tire beneath a vehicle, said apparatus comprising:
first and second spaced-apart support bars;
first and second pairs of suspension arms attached to a bottom part of said vehicle and depending therefrom, respective distal portions of said first and second pairs of suspension arms extending laterally, said first support bar extending between said first pair of suspension arms and being coupled to the respective extension portions of the first pair of suspension arms, said second support bar extending between said second pair of suspension arms and being coupled to the respective extension portions of said second pair of suspension arms; wherein
said first support bar is detachably coupled to at least one of said first pair of suspension arms, such that when said first support bar is detached therefrom, said first support bar is rotatable with respect to the other one of said first pair of suspension arms, thereby facilitating removal of said spare tire from said apparatus.

5,026,108
SLIDING AND PIVOTING SUN VISOR
Charles E. Leahy, Grosse Pointe Farms, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed May 17, 1990, Ser. No. 524,531
Int. Cl.⁵ B60J *3/02*
U.S. Cl. 296—97.11 **3 Claims**



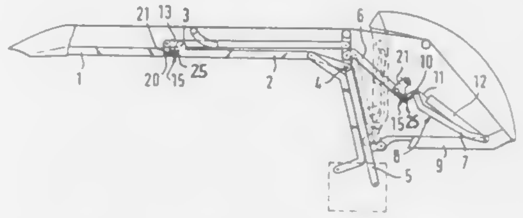
1. A vehicle sun visor comprising:
a rod mounted on the vehicle body and having a splined shaft;
a sunshade panel;
a carrier encircling the rod in radially spaced relation therefrom and having the sunshade panel mounted thereon; and
a low friction slide element interposed in the space between the carrier and the rod, the slide element including a base attached to the carrier and a plurality of radially projecting resilient fingers projecting into frictional engagement with the splined shaft of the rod so that slideable and rotational movement of the carrier relative to the rod is permitted by the compression and the frictional slip of the resilient fingers to adjust the position of the sun visor.

5,026,109
SEGMENTED COVER SYSTEM
Vincent J. Merlot, Jr., Oakmont, Pa., assignor to Sundance, Inc., Pittsburgh, Pa.
Filed Sep. 28, 1989, Ser. No. 414,193
Int. Cl.⁵ B60D *25/06*
U.S. Cl. 296—105 **18 Claims**



18. A segmented cover system for use on a truck trailer comprising a plurality of cover sections with a plurality of substantially parallel supporting bows spaced therebetween wherein each cover section is detachably connected between substantially parallel supporting bows such that one cover section can be removed from the cover system independent of the other cover sections.

5,026,110
CONVERTIBLE TOP FOR MOTOR VEHICLES
Georg Koop, Plattling, and Raimund Völkl, Deggendorf, both of Fed. Rep. of Germany, assignors to ED Scharwächter GmbH & Co. KG, Remscheid, Fed. Rep. of Germany
Filed May 2, 1990, Ser. No. 517,760
Claims priority, application Fed. Rep. of Germany, May 3, 1989, 3914638
Int. Cl.⁵ B60J *7/00*
U.S. Cl. 296—108 **22 Claims**



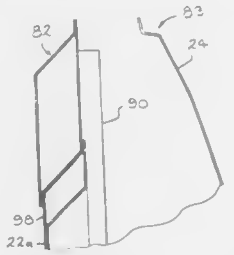
1. Collapsible convertible top for motor vehicles movable between an extended or closed position and a collapsed or open position, including a front roof frame, a rear roof frame, a main roof arch and a linkage system, said linkage system comprising a two-part retaining rod supporting said main roof arch against a tension bracket, the two parts of said retaining rod being displaceable together with said front and rear roof frames by a linkage into an extended position and being secured in the extended position, wherein the improvement comprises a mechanism for locking in the extended position at least one of said front roof frame and rear roof frame and said parts of said retaining rod, said front and rear roof frames and said parts of said retaining rod being pivotally displaceable relative to one another each about an articulation axis (10) in the extended position, said locking mechanism comprising a pivotally movable locking bar (15), an actuating lever (21) movable in accordance with operation of said convertible top between an engaged position and a released position for securing said convertible top in the extended or closed position, and said locking bar being pivotally mounted on and about an axis (14) in said front roof frames (1) and one of said parts (6) of said retaining rod with said locking bar pivotal axis (14) being in spaced parallel relation to the corresponding articulation axis (10), and means (18) on said rear roof frame (7) and another said parts (7) of said retaining rod for cooperation with said locking bar for maintaining the extended or closed position.

5,026,111
VEHICLE DOOR STRUCTURE WITH IMPROVED ENERGY ABSORPTION CHARACTERISTICS
Marc D. Hewko, Canton, Mich., assignor to Excel Industries, Inc., Elkhart, Ind.
Filed Oct. 16, 1989, Ser. No. 422,006
Int. Cl.⁵ B60R *27/00*
U.S. Cl. 296—146 **20 Claims**

1. A vehicle door assembly comprising:
a generally upright exterior door skin;
a generally upright inner door panel spaced inwardly from said door skin forming a cavity therebetween;
a generally horizontal beam extending longitudinally of said door assembly adjacent said inner door panel, said beam including inner and outer substantially parallel walls spaced from one another with the top edges of said inner and outer walls connected by a top wall and the bottom

VOL
1127
ISS
4
JE
25
1991
UMI

edges of said inner and outer walls connected by a bottom wall forming a hollow beam formed of said walls joined together along the longitudinal edges of said walls forming corners of said beam, said beam being collapsible upon



a predetermined transverse impact by bending at said corners to reduce the space between said inner and outer walls whereby said beam absorbs energy to reduce the impact force experienced by a vehicle occupant striking said inner door panel.

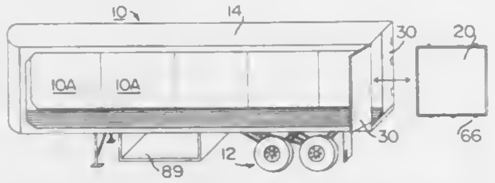
5,026,112
TRUCK TRAILER WITH REMOVABLE SIDE PANELS

Ronald K. Rice, Maud, Tex., assignor to James S. Waldron, Washington, D.C.

Filed Jun. 21, 1990, Ser. No. 541,729

Int. Cl.^{5} B62D *27/00*

U.S. Cl. 296—181 **17 Claims**



1. A vehicular truck trailer or cargo area having removable side panels comprising a floor, a roof, a forward wall, two side walls and at least one door forming a rearward wall which can be opened to provide access to said floor and closed to completely enclose said floor, said floor having a floor track along at least one side thereof, said roof having at least one ceiling track along at least one side thereof positioned directly over and parallel to said floor track, and at least one of said side walls comprising at least one side panel engaged with said floor and ceiling tracks such that when said rear door is in an open position, said side wall panel can be moved rearwardly disengaging said side wall panel from said floor and ceiling tracks and removed from said truck trailer or cargo area, and such that said side wall panel can be reinserted to engage said floor and ceiling tracks and moved back into position to form said side wall and said rear door closed so that said side wall panel cannot then be removed.

5,026,113
SLIDING AND VENTING SUNROOF

Leonard DiCarlo, Maryland Heights, and Robert J. Reese, Saint Charles, both of Mo., assignors to Sky-Top Sunroofs Ltd., St. Louis, Mo.

Filed Sep. 9, 1988, Ser. No. 242,686

Int. Cl.^{5} B60J *0/4*

U.S. Cl. 296—221 **39 Claims**

1. An assembly for moving a cover with respect to an opening, said assembly comprising:

a) a housing defining a first guide groove; and

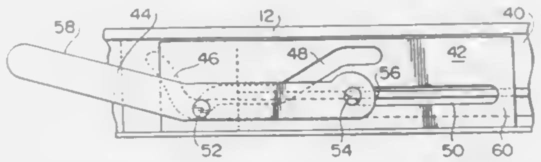
b) means for movably mounting said cover on said housing; said means for movably mounting comprising:

i) a stop plate mounted on said housing, said stop plate having groove portions defining a continuation and termination of said first guide groove;

ii) a slide plate mounted on said housing for sliding movement, said slide plate having portions defining a second guide groove;

iii) a lift arm pivotally attached to said slide plate and operatively connected to said cover; and

iv) a first pin attached to said lift arm, and, during sliding movement of said slide plate, for slidingly riding simultaneously in said first guide groove and in said second guide groove, and for entering into and exiting from said groove portions defining said continuation and termination of said first guide groove, so that while simultaneously riding inn said second guide groove and in said groove portions defining said continuation and termination of said first guide groove, said first pin pivots said lift arm to move said cover, said first guide groove remaining stationary during movement of said first pin in relation thereto.



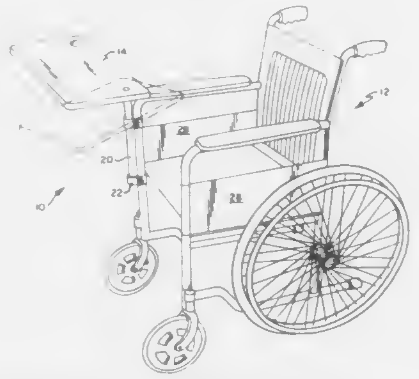
5,026,114
SWIVEL WHEELCHAIR TRAY

Robert L. Miller, Biloxi, Miss., assignor to Tasrop, Inc., Miss.

Filed Mar. 20, 1990, Ser. No. 496,351

Int. Cl.^{5} A47C *7/62*

U.S. Cl. 297—194 **10 Claims**



1. A wheelchair tray assembly comprising:

a tray;

a rod;

means for coupling said tray to said rod, said means for coupling including means for selectively locking said tray to said rod, said means for selectively locking comprising a spring urged button mounted to said rod so as to be substantially coaxial therewith and so as to extend upwardly from a vertically uppermost end of said rod, said spring urged button engaging a corresponding aperture defined through said tray; and

means for pivotally mounting said rod to the leg of a wheelchair so that the tray is freely pivotal relative to said wheelchair leg from an in use position in from of an individual in the wheelchair to an out of use position out of the path of the user, said tray being disposed in a horizontal plane in said in use position and in said out of use position.

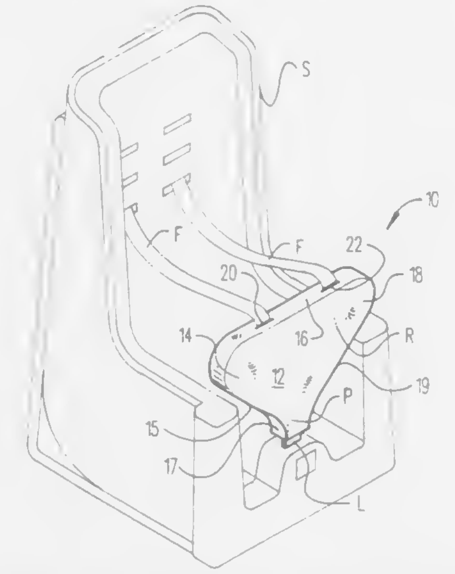
5,026,115
CHILD CAR SEAT COVER

Laura A. Barnes, 17232 Park Ave., Lansing, Ill. 60438

Filed Jan. 3, 1990, Ser. No. 460,661

Int. Cl.^{5} A47C *31/10*

U.S. Cl. 297—219 1 Claim



1. A child car seat cover for covering a generally triangular front retaining plate of a child car seat having a generally rectangular locking member extending from a lower apex portion and a pair of shoulder straps extending from a top edge portion extending between two spaced radiused corners, comprising:

a generally triangular cover formed from a fabric material and having spaced parallel front and back surface connected by side walls;

two upper arcuate corners of said front surface of said triangular cover dimensioned to overlie the radiused corners of the font retaining plate;

a lower apex portion of said triangular cover flaring to a rectangular portion dimensioned for close fitting overlying abutment with the rectangular locking member;

said side walls on said triangular cover extending in converging relation from said arcuate corners to said lower apex of said cover;

an elastic strap within said lower apex, said elastic strap dimensioned for surrounding the rectangular locking member;

a top edge portion of said cover extending between said arcuate corners;

a pair of slits formed in said cover top edge portion for receiving the shoulder straps;

a pair of corner flaps formed by continuations of said arcuate corners of said front surface of said cover;

a first hook and loop type fastening strip secured on a front surface of each of said corner flaps;

a second hook and loop type fastening strip secured on a back surface of each of said corner flaps;

third and fourth hook and loop type fastening strips secured in spaced relation on said back surface of said cover, for engagement with said second fastening strips;

a top flap formed by a continuation of said top edge of said cover;

and

fifth and sixth hook an loop type fastening strips secured in spaced relation on a back surface of said top flap, for engagement with said first fastening strips.

5,026,116
ADJUSTABLE BACKREST FOR THE SEATS OF VEHICLES, PARTICULARLY CARS

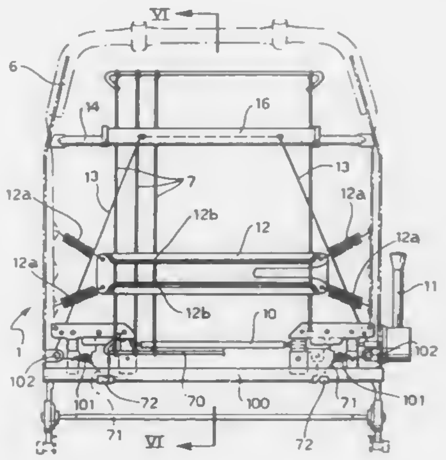
Antonio Dal Monte, Rome, Italy, assignor to Fiat Auto S.p.A., Turin, Italy

Division of Ser. No. 257,247, Oct. 13, 1988, Pat. No. 4,909,568. This application Dec. 22, 1989, Ser. No. 455,029

Claims priority, application Italy, Oct. 16, 1987, 67868 A/87

Int. Cl.^{5} A47C *7/46*

U.S. Cl. 297—284 **4 Claims**



1. A backrest for vehicle seats with a support structure for the back of a person occupying the seat wherein said support structure comprises an inverted U-shaped frame member with an upper cross bar and two side arms having spaced apart lower ends,

a bar interconnected between said lower ends and shaft means rotatably supported by said frame member for rotation parallel to said bar,

an array of flexible elements extending generally vertically side-by-side and connected at opposite ends thereof to first and second transverse elements, said first transverse element being connected to said frame adjacent said upper cross bar and said second transverse element disposed parallel to said bar and said shaft means,

said flexible elements having a generally S-shaped configuration with a lower forwardly convex curve for supporting the lumbar region of the back and an upper forwardly concave curve for supporting the upper dorsal region,

a spacer cross member disposed parallel to said cross bar of said frame and disposed in engagement with said flexible elements adjacent said upper forwardly concave curve,

guide bar means secured to said U-shaped frame member between said side arms and extending parallel to said cross bar,

tensioning elements connected to said spacer cross member extending over said guide means, downwardly under said bar and upwardly into engagement with said second transverse element to act substantially radially on said upper curve of said flexible elements for applying a tensioning force to said flexible elements, operating means connected to said shaft means for rotating said shaft means and radial arms on said shaft means engaging said tensioning elements adjacent said bar whereby upon rotating said shaft means in a first direction, the tensioning elements increase the tensioning force that said spacer cross member applies to the flexible elements and said second transverse element is left free to move upwardly, while rotating the shaft means in a second direction opposite to said first direction the tensioning elements reduce the tensioning force applied to the flexible elements and pull downwards said second transverse element.

VOL
1127
ISS
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1991
UMI

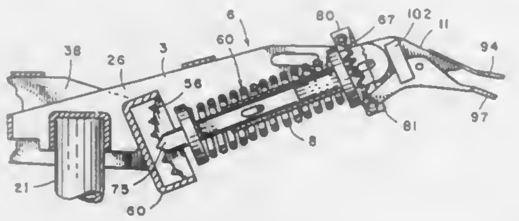
5,026,117
CONTROLLER FOR SEATING AND THE LIKE

Frederick S. Faiks, Greenville; Craig M. Anderson, Kentwood, and Daniel R. Bischoff, Grand Rapids, all of Mich., assignors to Steelcase Inc., Mich.

Continuation of Ser. No. 317,036, Feb. 28, 1989, abandoned, which is a continuation of Ser. No. 251,057, Sep. 26, 1988, abandoned, which is a continuation of Ser. No. 117,385, Nov. 10, 1987, abandoned. This application Jul. 18, 1989, Ser. No. 380,782

Int. Cl.⁵ A47C *3/00*

U.S. Cl. 297—304 48 Claims



1. In a chair of the type having a support and a back which tilts about an axis with respect to said support, the improvement of an adjustable, back tension controller comprising:

an abutment surface disposed on said back, and including a plurality of selected locations which are spaced apart different distances form said tilt axis;

a spring having a first end thereof connected with said support, and a second end thereof operably engaging the abutment surface of said back at the selected locations thereon, whereby rearward tilting of said back deflects said spring, thereby generating a torque which resiliently resists rearward tilting of said back; and

means for shifting said spring second end between the selected locations on said back, whereby said back tension controller is easily and quickly adjusted to adapt said chair for different users and various applications.

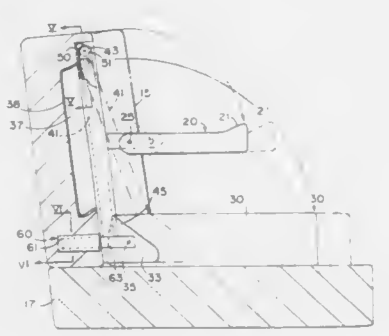
5,026,118
BUILT-IN INFANT'S SEAT FOR VEHICLES

Louis M. Vander Stel, and Polly A. Vander Stel, both of 8601 - 60th St., Alto, Mich. 49302

Filed Jun. 7, 1990, Ser. No. 534,473

Int. Cl.⁵ B60N *1/12*

U.S. Cl. 297—338 10 Claims



1. A seating unit for accommodating an adult in a seated position and having a child restraint seat convertible from a position stored within the back of said adult seat to a position for holding and restraining a child, comprising:

said adult seating unit having a seat and a back;

said back including a first back portion separable from the remainder of said back and in a first position extending upwardly from said seat and normally providing a portion of the back support for an adult; said first back portion being pivotally mounted at its lower end adjacent said seat permitting it to be pivoted downwardly to a second position extending forwardly from said back to form a seat for a child; said back portion being dimensioned so that when pivoted upwardly to form a portion of said back the upper edge of said first back portion is spaced a distance below the remaining edge of said back;

a second back portion having an inverted U shape with two legs and a bight portion extending between said legs; said second back portion in a first position having its legs extending downwardly and contiguous to each side of said first back portion and its bight portion extending along the top edge of said first back portion thereby providing a portion of said back support for an adult, said second back portion extending upwardly when in said first portion;

an indented space in said back behind said first back portion and second back portion;

a child's back support normally located within the indented space behind both of said first back portion and second back portion;

means associated with the second back portion and said upper edge of said back whereby when said upper back portion is pivoted to said second position a void is provided along said upper edge of said back thereby exposing the entire vertical length of said child's back support for accommodating the upper part of a tall child;

means for pivotally mounting said U-shaped second back portion to a second position extending substantially perpendicular to said back;

a means in said back for pivoting the top of said child back support for moving the lower end of said child's back support so as to tip said child's back support to a position for receiving and supporting a child in an inclined position when said first and second back portions are pivoted downwardly from the normal adult support first positions to said second positions whereby said child can sit on said first back portion and rest against said child's back support in an inclined position and is restrained by the U-shaped second back portion.

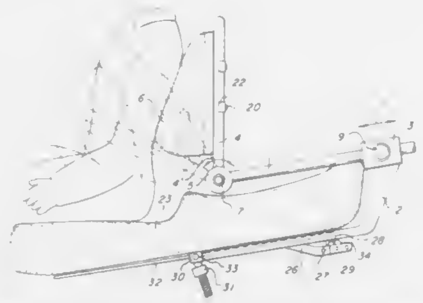
5,026,119
BACK SUPPORT FOR MOTORCYCLES

Harvey A. Frank, 1321 S. Andrews Ave., Ft. Lauderdale, Fla. 33316, and Rhoda Lynge, 4541 N.W. 6th St., Plantation, Fla. 33317

Continuation of Ser. No. 655,208, Sep. 27, 1984, abandoned. This application Aug. 14, 1986, Ser. No. 898,728

Int. Cl.⁵ B60N *2/02*

U.S. Cl. 297—383 17 Claims



1. In a motorcycle having a seat with a given length, a front edge and a rear edge defining an upper surface over the entire given length between the edges for supporting a rider sitting on the upper surface within a given seating range along the upper surface between the front and rear edges of the given length of the seat, the improvement comprising a support for the back of the rider, said support including a back rest, and means connected to said back rest for continuously biasing said back rest against the back of the rider regardless of the angle formed by the back of the rider and the upper surface and regardless of the location of the rider within the given seating range along the entire given length of the seat.

5,026,120
HEADREST ASSEMBLY FOR VEHICLE SEATS

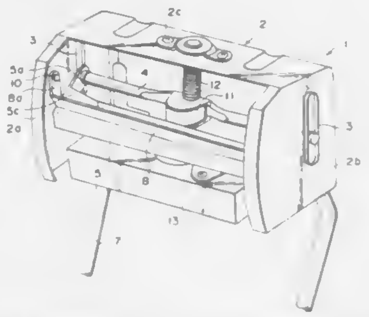
Nobuhiko Takeda, Ohu; Isao Morishita, and Satoshi Aida, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Jul. 24, 1990, Ser. No. 556,389

Claims priority, application Japan, Jul. 27, 1989, 1-88161[U]

Int. Cl.⁵ A47C *7/36, 7/38*

U.S. Cl. 297—408 4 Claims



1. A headrest assembly for vehicle seats having a seat backrest comprising:

a bracket having opposed side walls and adjustably swivelingly arranged with respect to a stay of the seat backrest, the opposed side walls being provided with vertically extending slots,

a rod of which end portions are received in the slots, respectively,

a first link disposed between the opposed side walls and fixedly secured to the stay of the seat backrest, side panels of the first link which are located inside the opposed side walls being rotatably connected to the rod,

a second link disposed between the opposed side wall and having connecting plates at its ends, the connecting plates being pivoted to the opposed side walls and connected to the side plates of the first link, and

means for swiveling the bracket around the connecting point of the first link and the second link.

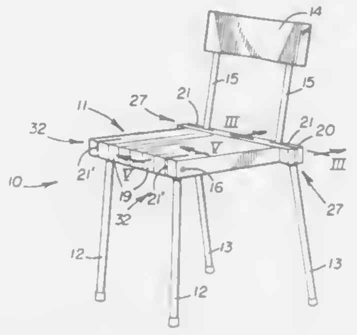
5,026,121
MODULAR FURNITURE ASSEMBLY AND KIT THEREFOR

Matti Ratalahti, Paimenpolku 8, 15900 Lahti 90, Finland

Filed Jul. 10, 1990, Ser. No. 551,437

Int. Cl.⁵ A47C *3/00*

U.S. Cl. 297—440 8 Claims



1. A modular chair assembly comprising

a horizontally disposed and at least generally rectangular seat having frontal and rearward sides to define a pair of laterally spaced font corners and a pair of laterally spaced rear corners,

slot means formed at each of the front and rear corners of said seat to define and separate a pair of integral clamping members thereat,

a first receptacle formed at each of the front and rear corners of said seat to bridge across a respective one of said slot means,

a pair of laterally spaced front legs disposed beneath the front corners at the frontal side of said seat and a pair of laterally spaced rear legs disposed beneath the rear corners of the rearward side of said seat,

an upper end of each of said front and rear legs being disposed in a said first receptacle and positioned between a respective pair of said clamping members,

fastening means for drawing said clamping members together to releasably clamp and secure the upper end of each respective one of said front and rear legs therebetween,

a backrest disposed vertically above the rearward side of said seat,

a pair of laterally spaced support members having upper ends thereof secured to said backrest and lower ends thereof secured to said seat, and

a pair of laterally spaced second receptacles formed in the rearward, side of said seat adjacent to the rear corners thereof and bridging across the respective slot means, the lower end of each of said support members being disposed in a respective one of said second receptacles and the fastening means securing the upper ends of said rear legs to said seat also simultaneously securing the lower ends of said support members to said seat.

5,026,122
WHEEL FOR A COMMERCIAL VEHICLE

Vatroslav Grubisic, Zumm Stetteritz 1, 6107 Reinheim 4, and Gerhard Fischer, Menzelweg 6, 6100 Darmstadt, both of Fed. Rep. of Germany

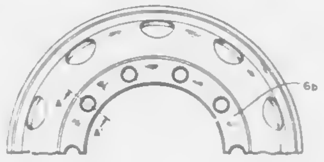
Continuation of Ser. No. 445,253, Nov. 29, 1982, Pat. No. 4,842,338. This application Mar. 10, 1986, Ser. No. 837,885

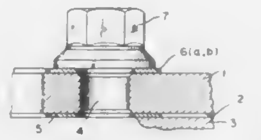
Claims priority, application Fed. Rep. of Germany, Dec. 3, 1981, 3147820

The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.

Int. Cl.⁵ B60B *3/00*

U.S. Cl. 301—9 DN 20 Claims





1. A wheel for a commercial vehicle comprising

a wheel disk having bolt holes in the region of the wheel mounting face for attaching the wheel disk to wheel support means by way of wheel bolts; and

intermediate disks for covering an area of the bolt holes in the wheel for attachment bolts, which intermediate disks are attached to the wheel disk on the two opposite sides of the wheel disk, which intermediate disks have a hole for each bolt with the hole surrounding the bolt holes directly and concentrically, which intermediate disks have a thickness of less than about 0.1 of the thickness of the wheel disk and which intermediate disks disposed between wheel and support means provide a support surface between support means and wheel mounting face.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,123

FLOW CONTROL VALVE FOR ANTILOCK BRAKE CONTROL DEVICE

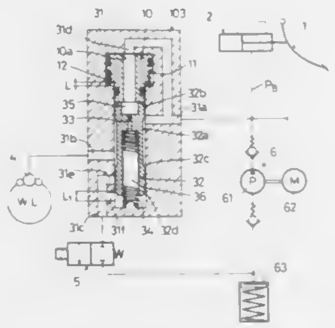
Seiji Nokubo; Terubisa Kohno; Koichi Hashida; Takashi Usuki, and Hideaki Higashimura, all of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Sep. 21, 1989, Ser. No. 410,587

Claims priority, application Japan, Sep. 24, 1988, 63-239420

Int. Cl.⁵ B60T *8/48, 13/70*

U.S. Cl. 303—117 8 Claims



5. A flow control valve for use in an antilock control device, said valve comprising: a housing defining an inlet port and an outlet port; spool means axially slidably mounted in said housing and defining a fluid channel including an orifice therethrough for forming a large-flow passage connecting said inlet port and said outlet port together when the spool means is in a first position in said housing and for forming a restricted flow passage extending from said inlet port to said outlet port through said orifice when the spool means is in a second position in said housing; first biasing means for exerting a biasing force that acts on an end of said spool means in one axial direction in said housing; slide means having first and second axially opposite ends and mounted in said housing for sliding axially relative to said housing; said second biasing means for biasing said slide means on the second end thereof; said spool means being movable relative to said housing when said slide means is slid axially against the biasing force of said second biasing means.

5,026,124

BRAKING SYSTEM FOR A ROAD VEHICLE EQUIPPED WITH A DRIVE-SLIP CONTROL (ASR) AND AN ANTI-LOCK SYSTEM (ABS)

Reinhard Resch, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Fed. Rep. of Germany

Filed Dec. 26, 1989, Ser. No. 457,185

Claims priority, application Fed. Rep. of Germany, Jan. 13, 1989, 3900850

Int. Cl.⁵ B60T *8/64, 8/32, 8/48, 8/88*

U.S. Cl. 303—100 20 Claims

1. A hydraulic dual-circuit vehicle brake system comprising:

a plurality of wheel brakes;

a first brake circuit assigned to driven wheels of a vehicle;

a second brake circuit assigned to non-driven wheels of the vehicle;

a brake unit that actuates vehicle brakes and having first and second outlet-pressure spaces, said first brake circuit being coupled to said first outlet-pressure space and said second brake circuit being coupled to the second outlet-pressure space:

a buffer accumulator that accumulates brake fluid;

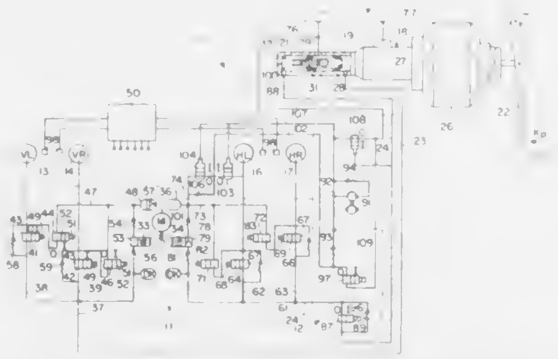
a return line connected between a wheel brake and the buffer accumulator during anti-lock control;

a return pump having an inlet side connected to the buffer accumulator and an outlet side connected to the brake unit;

an anti-lock system ABS that operates on the first brake circuit in a return-flow manner such that, during pressure-reduction phases of anti-lock control by the anti-lock system ABS, a quantity of brake fluid corresponding to a quantity of brake fluid that flows off from a wheel brake into the return line connected to the buffer accumulator during anti-lock control, is pumped into the brake unit by the return;

a drive-slip control device ASR having an auxiliary-pressure source that decelerates a vehicle wheel that is tending to spin by subjecting the wheel brake of the vehicle wheel to brake pressure from the auxiliary-pressure source in such a way that a drive slip of the vehicle wheel remains within a value range compatible with a sufficient dynamic stability of the vehicle;

a precharging pump connected to the inlet side of the return pump via an outlet non-return valve for supplying the auxiliary pressure source brake pressure to driven wheel brakes of the vehicle wheels to be decelerated by the drive-slip control ASR such that brake fluid is conveyed from a reservoir of the brake unit to an inlet side of the return pump of the first brake circuit, said precharging pump having an outlet;



an ASR control valve that has a basic position for normal braking in which brake fluid is positively displaced into the brakes of the driven vehicle wheels as a result of the actuation of the brake unit, and an alternative functional ASR position in which brake fluid is prevented from flowing off from a main brake line of the first brake circuit towards the first outlet-pressure space of the brake unit;

an ASR outlet valve connected between the reservoir of the brake unit and a pressure medium line;

valve means activatable by outlet pressure of the precharging pump through a control line coupled between the precharging pump and the valve means;

wherein during normal braking the valve means connects the outlet non-return valve of the precharging pump and the ASR outlet valve to the pressure medium line subjected to brake pressure, and during drive-slip control ASR connects the pressure medium line to the return line and the outlet of the precharging pump to the inlet of the return pump of the first brake circuit.

5,026,125

PRESSURE ACTUATOR

Michael F. Matouka, Utica, and Robert J. Hammersmith, Rochester Hills, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 25, 1989, Ser. No. 398,685

Int. Cl.⁵ B60T *8/32*

U.S. Cl. 303—100 10 Claims

1. A pressure actuator for a vehicle braking system including a pressurized fluid source and a wheel brake cylinder fluidly connected with said actuator, and a controller for signaling said actuator, said actuator in combination comprising:

a frame with an interior bore with fluid connections with said pressurized fluid source and said wheel cylinder;

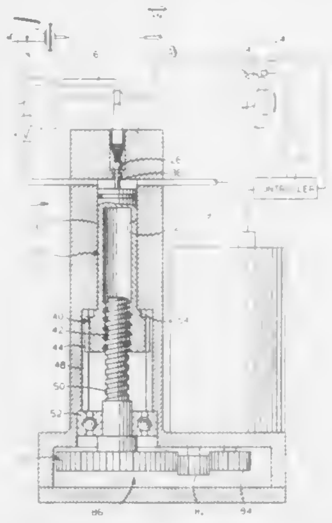
a piston slidably sealably mounted within said interior bore;

a nut operatively associated with said piston for moving said piston;

a first driven member threadably engaged with said nut for translating said nut within said interior bore;

a motor for powering said driven member in response to a signal given by said controller; and

a gear train having at least two gears, one of said gears being torsionally connected with said first driven member and another said gear being torsionally connected with said motor for transmitting torque from said motor to said first driven member, at least one of said gears having an inner hub element and an outer ring element, one of said elements having a generally radial tab, and said gear having a generally circular spring means captured between said hub element and said ring element being compliantly biased to engage and join itself to said other element than said element with said tab, said radial tap making contact with said spring means for transmitting torque between said ring and said hub, and said spring means preventing relative motion between said hub and said ring unless a predetermined torque value is experienced whereby said hub has angular rotation with respect to said ring, and said spring means has sliding frictional engagement with said element said spring means is engaged with moving in a radially aligned manner with said element having said hub.



5,026,126

CAM ACTUATED TRACTION CONTROL SYSTEM APPARATUS AND METHOD

Guruswamy Umasankar, Sterling Heights; Alexander Kade, Grosse Pointe Woods, and Alroy G. Fabris, Mt. Clemens, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 29, 1989, Ser. No. 416,245

Int. Cl.⁵ B60T *8/32*

U.S. Cl. 303—100 11 Claims

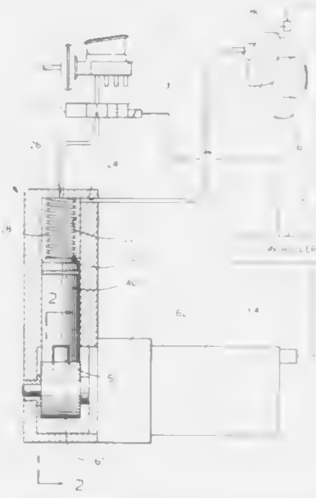
1. A traction control (TC) pressure actuator with fluid connections for a wheel cylinder and a master cylinder via a solenoid valve, said actuator being responsive to a fluid pressure controller, said actuator in combination comprising:

a frame having a central bore fluidly exposed to said solenoid valve and said wheel cylinder connections;

a piston slidably mounted within said central bore having a contact surface and said piston having a first predetermined position within said central bore;

power means actuated by said controller;

a cam moved by said power means having a ramp surface in contact with said piston contact surface and whereby the position of said piston within said wheel cylinder is determined by the piston of said cam.



5,026,127

FLUID PRESSURE BRAKE CONTROL APPARATUS FOR A VEHICLE

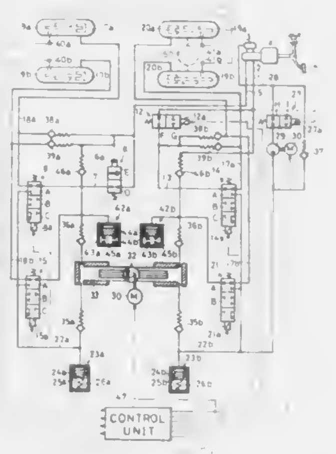
Tetsuro Arikawa, Kanagawa, Japan, assignor to Nippon A.B.S., Ltd., Tokyo, Japan

Filed Aug. 30, 1989, Ser. No. 400,570

Claims priority, application Japan, Sep. 5, 1988, 63-221530; Jan. 30, 1989, 1-9713[U]

Int. Cl.⁵ B60T *8/40*

U.S. Cl. 303—116 17 Claims



1. A fluid pressure brake control apparatus for a vehicle having at least one front wheel and at least one rear wheel, comprising:

(a) a tandem master cylinder;
(b) a front wheel brake apparatus for said front wheel;
(c) a rear wheel brake apparatus for said rear wheel;
(d) a control unit for judging braking slip and/or driving slip of said front and rear wheels;
(e) a fluid pressure control valve means for receiving instructions from said control unit to control brake fluid pressures to said front and rear wheel brake apparatuses;
(f) a hydraulic reservoir means for reserving brake fluid discharged through said fluid pressure control valve means from said front and/or rear wheel brake apparatuses, said hydraulic reservoir means consisting of a first

VOL
1127
ISS
4
JE
25
1991
UMI

hydraulic reservoir for reserving brake fluid and a second hydraulic reservoir for reserving brake fluid;

(g) a main conduit means connecting said tandem master cylinder with said fluid pressure control valve means;

(h) a first fluid pressure pump means for pressurizing and supplying brake fluid from said hydraulic reservoir means into said main conduit means, said pump means having a discharging side and a master cylinder side;

(i) a first valve device arranged between said tandem master cylinder and said first fluid pressure pump means in said main conduit means, said first valve device being connected through said fluid pressure control valve means to said front and/or rear wheel brake apparatuses for said front and/or rear wheels as driven wheels, said first valve device being normally in free communication and being changed over into a position to prohibit brake fluid to flow from the discharging side of said first fluid pressure pump means towards said master cylinder side under a first predetermined condition;

(j) a second valve device arranged between said tandem master cylinder and said first fluid pressure pump means in said main conduit means, said second valve device being connected through said fluid pressure control valve means at least to said front brake apparatus for said front wheel, wherein said front wheels are more apt to lock than said rear wheels, said second valve device being normally in free communication and being changed over into a position to prohibit brake fluid to flow from the discharging side of said first fluid pressure pump means towards said master cylinder side under a second predetermined condition;

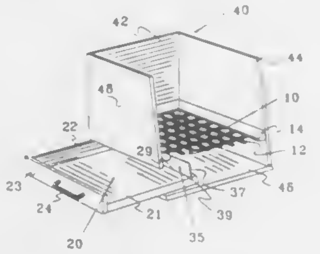
(k) a second conduit connecting said first hydraulic reservoir with said second hydraulic reservoir; and

(l) a second fluid pressure pump means arranged in said second conduit, said second pump means having a discharging side directed to the suction side of said first fluid pressure pump means.

5,026,128

TOY BOX WITH SMALL PART SIFTER

Charles R. Groetzinger, 904 Montclair Dr., Racine, Wis. 53402
Filed Aug. 7, 1989, Ser. No. 390,633
Int. Cl.^{5} A47J *43/22*
U.S. Cl. 312—210.5 **12 Claims**



1. A toy box comprising:

a container having four walls and a base, said four walls being disposed adjacent to said base to form, in cooperation with said base, said toy box;

a first of said four walls having an opening;

a tray received in said container and arranged to be movable through said opening for gaining access to toys stored in said tray; and,

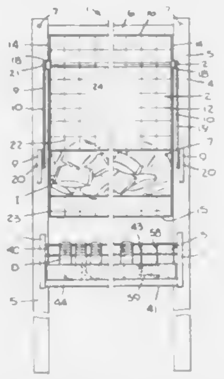
a grill structure mounted in said container above said tray and configured to permit smaller toys to fall therethrough while retaining larger toys thereon;

wherein said tray is disposed between said base and said grill structure and includes a flexible lip mounted thereon, said lip operating to retain smaller toys in said tray while yielding during tray movement to interfering objects protruding through said grill structure.

5,026,129

MERCHANDISE DISPLAY ASSEMBLY

Milton Merl, New York, N.Y., assignor to Marlboro Marketing, Inc. D/B/A TH Howard Marlboro Group, New York, N.Y.
Filed Feb. 7, 1990, Ser. No. 477,065
Int. Cl.^{5} A47B *49/06*
U.S. Cl. 312—266 **16 Claims**



1. Merchandise display assembly, comprising

a vertical bin movable between an upper storage position and a lower filling position, and having a front side and a rear side, an upper side defining an open top surface forming an upwardly facing upper opening for downwardly filling the bin with dispensable merchandise items when the bin is in lower filling position, and a lower opening at the front side for manual removal of the items from the bin when the bin is in upper storage position,

bracket means adapted to be attached to a generally vertical support structure, and

a suspension linkage for mounting the bin vertically on the bracket means for arcuate path swinging movement of the bin forwardly outwardly and downwardly from an upper storage position at which the rear side is at a horizontally recessed point adjacent the bracket means and the lower opening is at an upper vertical dispensing level at which the items can be readily removed therefrom, to a lower filling position at which the rear side is at a horizontally extended point spaced a selective distance forwardly outwardly from its horizontal recessed point and also spaced forwardly outwardly from the bracket means and the upper opening is at a lower vertical loading level at which the items can be readily filled thereinto, while maintaining the bin generally vertical in any position of such arcuate path swinging movement.

5,026,130

GEAR/RACK FLIPPER DOOR MECHANISM

Alan R. Wright, Wyoming, and Edward D. Soberalski, Belmont, both of Mich., assignors to Haworth, Inc., Holland, Mich.
Continuation of Ser. No. 446,922, Dec. 6, 1989, abandoned. This application Nov. 30, 1990, Ser. No. 620,452
Int. Cl.^{5} A47B *88/00*
U.S. Cl. 312—323 **9 Claims**

1. In a storage cabinet having a housing defined by generally parallel top and bottom walls rigidly joined together by side walls, the housing defining therein an interior storage compartment and having an opening in a front side thereof for access to said storage compartment, a door positionable adjacent the front side of said housing when in a closed position for closing off said access opening, and a pair of support mechanisms disposed in sidewardly spaced relationship and connected between said door and said housing for permitting the door to be both swingably moved into an open position wherein the door extends generally horizontally in closed proximity to the elevation of the top wall and linearly into a storage position wherein the door is positioned at least partially closely adjacent and directly over said top wall, the improvement wherein said support mechanisms comprise:

a support bracket fixed to said housing in the vicinity of the front edge of said top wall;

a rigid leverlike support member pivotally mounted on said support bracket about a generally horizontal pivot axis which is fixedly disposed in close proximity to and extends approximately parallel with the front edge of said top wall, said support member being constrained solely for vertical swinging movement about said pivot axis;

elongate linear gear rack means fixed to said door and being accessible solely from the inner surface of the door, said gear rack means being elongate in a direction which extends generally perpendicularly between upper and lower edges of said door when the door is in said closed position;

elongate guide rail means fixed to said door in close proximity to said gear rack means and extending in generally parallel relationship with the elongate direction of said gear rack means;

gear wheel means rotatably supported on said support member for rotation about a generally horizontal rotational axis which is parallel to but spaced radially a predetermined distance from said pivot axis, said gear wheel means being supported on said support member for vertical swinging movement of said rotational axis about said pivot axis due to vertical swinging movement of said support member, said gear wheel means being continuously maintained in meshing engagement with said gear rack means;

said support member having guiding means fixedly mounted thereon and maintained in linear slidable engagement with said guide rail means for permitting solely linear slidably displacement along said rail means in the elongated direction thereof when said door is being moved between said closed and storage positions; and

said support member and said guide rail means having cooperating structure which permits solely said relative slidable movement but which normally prevents separation of said door from said housing.

5,026,131

HIGH CHANNEL DENSITY, BROAD BANDWIDTH WAVELENGTH DIVISION MULTIPLEXER WITH HIGHLY NON-UNIFORM BRAGG-LITTROW HOLOGRAPHIC GRATING

Tomasz P. Jannson; Joanna L. Jannson, both of Torrance; Christopher C. Rich, San Pedro, and Behzad Moslehi, Redondo Beach, all of Calif., assignors to Physical Optics Corporation, Torrance, Calif.
Continuation-in-part of Ser. No. 158,396, Feb. 22, 1988, Pat. No. 4,926,412. This application Nov. 13, 1989, Ser. No. 435,608
Int. Cl.^{5} G02B *5/18*
U.S. Cl. 350—3.7 **4 Claims**

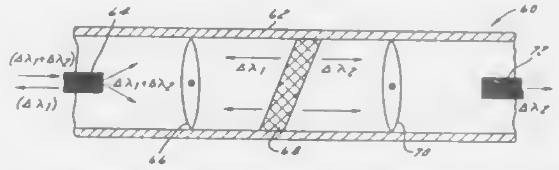
1. A multiplexer/demultiplexer comprising:

an input for a light signal;

an output;

focusing means positioned to receive the light signal from said input;

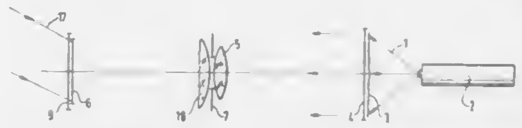
means for diffracting the light signal according to wavelength positioned to receive light from and reflect diffracted light to the focusing means, said focusing means focusing said diffracted light to said output, said diffracting means comprising volume holographic means having vertically nonuniform Bragg planes.



5,026,132

METHOD OF PRODUCING AND REPRODUCING HOLOGRAMS

Günther Dausmann, Erding, Fed. Rep. of Germany, assignor to Karl Rubenberger, Erding, Fed. Rep. of Germany
Continuation of Ser. No. 634,063, Jul. 25, 1984, abandoned. This application Sep. 20, 1989, Ser. No. 410,026
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1983, 3327463
Int. Cl.^{5} G03H *1/04, 1/22*
U.S. Cl. 350—3.84 **5 Claims**



1. In a method of producing and reproducing a hologram using an image-forming system having object and reference beams, coding optical means, decoding optical means, aperture stop means and a base layer by superposing said object and reference beams which originate from the same light source, on said base layer, said object beam carrying a first set of information, the improvement comprising:

disposing said coding means in the path of said object beam between said aperture stop and said base layer, wherein said coding means comprises a first phase-modifying optical element having a surface relief pattern on one surface which produces predetermined phase disturbances in said first set of information, and having another surface curved to form a lens surface;

recording the coded first set of information in said base layer and developing said base layer to form said hologram; and

reconstructing the first set of information by placing said decoding means in the path of a reconstruction beam, wherein said decoding means comprises a second phase-modifying optical element having a surface relief pattern on one surface which produces complementary phase disturbances to said predetermined phase disturbances produced by said coding means, and having another surface curved to form a lens element of said image-forming system and produce an undistorted image of the first set of information.

5,026,133

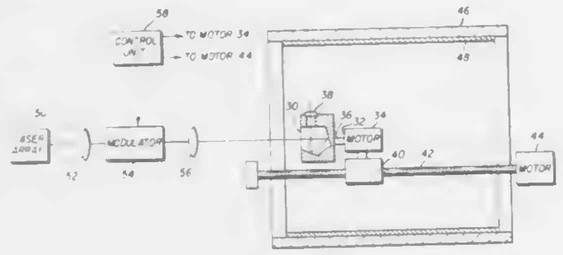
LARGE FORMAT LASER SCANNER WITH WAVELENGTH INSENSITIVE SCANNING MECHANISM

James E. Roddy; Badhri Narayan; Richard A. Stark, all of Rochester, and Laurie L. Voci, Farmington, all of N.Y., assignors to Torii Winding Machine Co., Ltd., Kyoto, Japan
Filed May 1, 1990, Ser. No. 517,133
Int. Cl.^{5} G02B *26/10*
U.S. Cl. 350—6.4 **6 Claims**

6. A laser scanner comprising: a scanning drum; light source means for generating multiple independently modulated light beams; a wobble free and wavelength insensitive scanning

VOL 1127 ISS 4 JE 25 1991 UMI

assembly located within said scanning drum, said scanning assembly including a spherical lens and at least one of a pentaprism and pentamirror mounted to a frame assembly; a motor mounted on a motor mount assembly; means for supplying said multiple light beams generated by said light source means to said scanning assembly; and drive means for moving said



motor mount assembly along a lateral dimension of said scanning drum;

wherein said motor rotates said frame assembly about an axis parallel to the lateral dimension of said scanning drum and said spherical lens focuses the multiple light beams supplied to said scanning assembly on an interior surface of said scanning drum.

5,026,134
OPTICAL COMMUNICATION APPARATUS WITH BASE FOR FIXING ELEMENTS

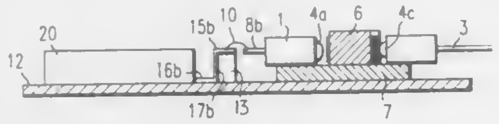
Mitsuru Sugawara; Akitoshi Yoshinaga; Fumihiko Shimizu, and Masayuki Takami, all of Kanagawa, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 28, 1989, Ser. No. 316,666

Claims priority, application Japan, Mar. 1, 1988, 63-45809; Mar. 25, 1988, 63-69637

Int. Cl.^{5} G02B *6/12*

U.S. Cl. 350—96.11 **16 Claims**



1. An optical communication apparatus comprising:

a first component-mounting member having a metal film coating on at least one surface;

a plurality of optical components fixed to said first component-mounting member, one of said optical components having a lead;

a second component-mounting member for fixedly supporting said first component-mounting member;

a connecting member on said second component-mounting member; and

a conductive member for electrically connecting the lead of said optical component to corresponding said connecting member, said conductive member having a rigidity smaller than the rigidity of the corresponding leads of said optical components for absorbing thermal stresses on the apparatus.

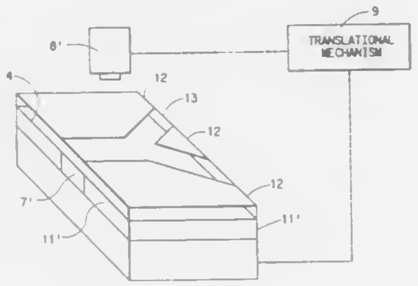
5,026,135
MOISTURE SEALING OF OPTICAL WAVEGUIDE DEVICES WITH DOPED SILICON DIOXIDE

Bruce L. Booth, West Chester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 20, 1990, Ser. No. 513,321

Int. Cl.^{5} G02B *6/10*

U.S. Cl. 350—96.12 **28 Claims**



1. An optical polymer waveguide device having superior barrier properties, comprising:

(a) an optical waveguide device substrate, and

(b) a glassy coating of silicon dioxide doped with at least one metal selected from the group consisting of antimony, aluminum, chromium, cobalt, copper, indium, iron, lead, manganese, tin, titanium, tungsten, zinc, and zirconium, said coating and metal dopant contained therein being present in an amount suitable to provide an oxygen transmission value through the coated structure of at most about 5 mL/day-m^{2}-atm.

5,026,136
OPTICAL FIBER SWITCH

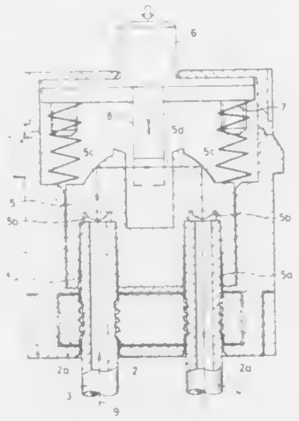
Tasukazu Sano; Hideyuki Tanaka; Keijirou Nakamura; Hideo Kume, and Kiyoshi Tanigawa, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Dec. 26, 1989, Ser. No. 456,853

Claims priority, application Japan, Dec. 29, 1988, 63-332811; Jun. 13, 1989, 1-149806; Sep. 1, 1989, 1-226818; Sep. 26, 1989, 1-250304; Dec. 4, 1989, 1-314654

Int. Cl.^{5} G02B *6/26;* **H01J** *5/16*

U.S. Cl. 350—96.15 **26 Claims**



1. An optical switch connected to an emitting optical fiber and a receiving optical fiber, said optical switch having a light-transmission path between the emitting optical fiber and the receiving optical fiber, said light-transmission path being mechanically opened and closed by means of an actuating means, thereby turning on and off a light signal transmitted through the light-transmission path, said optical switch characterized by comprising:

light-conducting means including said light-transmitting path which comprises two corner-reflecting surfaces and an air gap located between said corner-reflecting surfaces;

shutter means for turning on and off the light-transmission path by changing position in said air gap in said light-conducting means, said shutter means being driven by said actuating means;

housing means for incorporating said light-conducting means and said shutter means; and

focusing lensing means provided on the entering area and the emitting area of said light-conducting means, said focusing lensing means facing the end face of said emitting optical fiber and the end face of said receiving optical fiber, respectively.

5,026,137
LIGHT SIGNAL TRANSMISSION SYSTEM

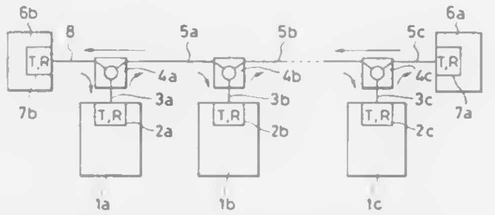
Jun Tokumitsu, Sagamihara, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 22, 1989, Ser. No. 410,909

Claims priority, application Japan, Sep. 26, 1988, 63-238907; Sep. 26, 1988, 63-238908

Int. Cl.^{5} G02B *6/28*

U.S. Cl. 350—96.16 **21 Claims**



1. A light signal transmission system comprising:

first, second and third terminal stations each having a light transmitter and a light receiver;

first and second light transmission paths each having one end connected to said first and second terminal stations, respectively, and each of said first and second light transmission paths comprising a single optical waveguide for transmitting a light signal bidirectionally; and

connectors for connecting the other ends of said first and second light transmission paths to said third terminal station, said connectors being designed so that a light signal transmitted from said first terminal station through said first light transmission path is inputted to said third terminal station, a light signal emitted from said third terminal station is inputted to said second terminal station through said second light transmission path, and a light signal emitted from said second terminal station is inputted to said first terminal station through said first and second light transmission paths, without passing through said third terminal station.

5,026,138
MULTI-FIBER ALIGNMENT PACKAGE FOR TILTED FACET OPTOELECTRONIC COMPONENTS

Robert A. Boudreau, Hampton, N.H., and Joanne S. LaCourse, Hudson, Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Aug. 29, 1989, Ser. No. 400,593

Int. Cl.^{5} G02B *6/36*

U.S. Cl. 350—96.20 **21 Claims**

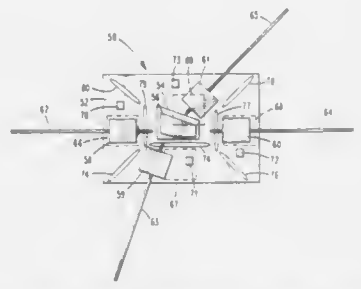
1. A multi-fiber alignment package providing precise, stable alignment of a tilted facet optoelectronic component within said package to optical fibers connecting said component to an external device, comprising:

a carrier of a thermally conductive material, said carrier having two opposed major surfaces;

a plurality of fiber-positioning means on said first major surface of said carrier, each holding one of said optical fibers at a predetermined angle relative to the sides of said carrier;

at least one tilted facet optoelectronic component mounted on a first major surface of said carrier such that a perpendicular to said facet is offset from each of said optical fibers by an angle calculated to compensate for the angle of tilt of said facet;

a plurality of local cooling means positioned on the second major surface of said carrier, each of said cooling means positioned below one of said fiber-positioning means and each being capable of locally controlling the temperature of said carrier in its immediate vicinity;



each one of said fiber-positioning means being soldered sequentially to said carrier with its optical fiber actively aligned with said tilted facet component;

said cooling means serving to locally cool said carrier under said fiber-positioning means during soldering of the fiber-positioning means above it and serving to locally control the temperature of said carrier during operation of said component; and

such that said local cooling causes the heat of said soldering to be conducted away from said carrier at the connection point, thus enabling the sequential soldering of each of said fiber-positioning means without affecting a previously soldered connection point.

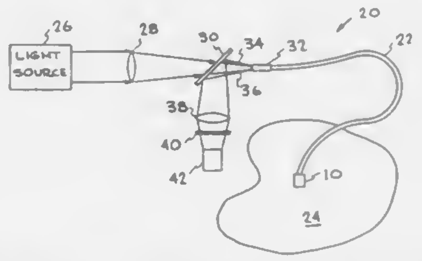
5,026,139
FIBER OPTIC REFRACTIVE INDEX SENSOR USING METAL CLADDING

Stanley M. Klainer; Dileep K. Dandge; Marcus Butler, and Kisholoy Goswami, all of Henderson, Nev., assignors to Fiber-Chem Inc., Las Vegas, Nev.

Continuation-in-part of Ser. No. 150,197, Jan. 29, 1988, Pat. No. 4,929,049. This application Mar. 28, 1990, Ser. No. 501,144

Int. Cl.^{5} G02B *6/16*

U.S. Cl. 350—96.29 **25 Claims**



1. A fiber optic sensor for measuring refractive index of a surrounding medium, comprising:

a fiber optic core;

a thin film metal clad of metal or metal oxide or other metal compound or alloy formed on and surrounding the fiber optic core, the metal clad having an effective thickness and light transmissivity which in combination with the surrounding medium produces a localized refractive index and a controlled leakage of light which modulates the transmission of light through the fiber optic core as a

VOL
1127
ISS
4
JE
25
1991
UMI

function of the refractive index of the surrounding medium.

5,026,140
DISTORTION-FREE FIBER OPTIC SENSORS EMBEDDED IN TITANIUM

Jeff D. Russom, Maryland Heights, Mo., assignor to McDonnell-Douglas Corporation, St. Louis, Mo.

Division of Ser. No. 272,906, Nov. 18, 1988, Pat. No. 4,950,043. This application Dec. 29, 1989, Ser. No. 459,353

Int. Cl.^{5} G02B *6/02*

U.S. Cl. 350—96.29 3 Claims

1. A method for making a highly sensitive, distortion-free optical sensor, embedded in the skin of an aircraft comprising;

a) coating optical fibers with aluminum;
b) mixing the coated fibers with powdered titanium and prefabricated titanium alloy material; and
c) consolidating the mixture in a hot isostatic press at temperatures of from about 1500° to 2000° F. at pressures of from about 15,000 psi to about 50,000 psi.

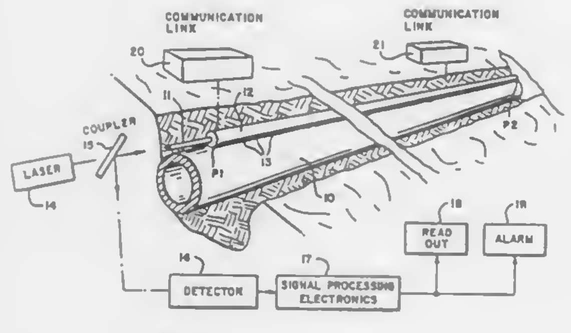
5,026,141
STRUCTURAL MONITORING SYSTEM USING FIBER OPTICS

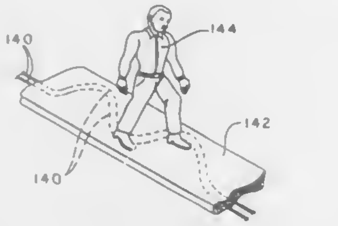
Richard W. Griffiths, Pacific Palisades, Calif., assignor to G2 Systems Corporation, Pacific Palisades, Calif.

Division of Ser. No. 323,498, Mar. 13, 1989, Pat. No. 4,927,232, which is a continuation-in-part of Ser. No. 32,042, Mar. 27, 1987, Pat. No. 4,812,645, which is a continuation-in-part of Ser. No. 712,889, Mar. 18, 1985, Pat. No. 4,654,520, which is a continuation-in-part of Ser. No. 571,364, Jan. 16, 1984, which is a continuation of Ser. No. 295,600, Aug. 24, 1981, abandoned. The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.

Int. Cl.^{5} G02B *6/26*

U.S. Cl. 350—96.29 3 Claims





1. An apparatus for monitoring a physical movement between spaced points on a structure including, in combination:

at least one optical fiber;

means for coupling said optical fiber continuously to said structure to extend from at least one of the spaced points to the other and thereby engage all points between said spaced points so that physical movement of the structure at a location between said spaced points will result in physical movement of the optical fiber at a location corresponding with the location of movement of the structure;

means for passing a first light signal into said optical fiber; and

means for detecting and indicating changes in said first light signal to thereby detect that a physical movement has taken place;

said at least one optical fiber comprising an optical fiber sensor cable including a core, a cladding surrounding said core and having an index of refraction different from the index of refraction of said core, and a coating surrounding said cladding, said coating including a particulate material in intimate engagement with said cladding, said particulate material being movable radially toward and away from said cladding to distort the homogeneity of at least a portion of said cladding to change the index of refraction thereof.

5,026,142
HOLLOW GLASS WAVEGUIDE

Clive A. Worrell, Sussex, and Vladimir Skarda, Ashtead, both of United Kingdom, assignors to Cogent Limited, London, England

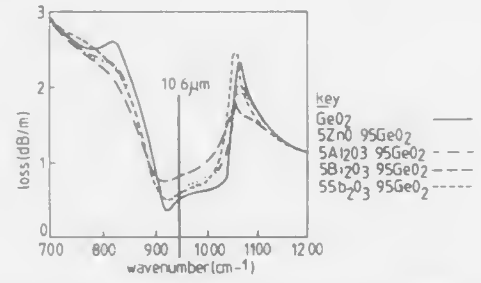
PCT No. PCT/GB89/00194, § 371 Date Oct. 20, 1989, § 102(e) Date Oct. 20, 1989, PCT Pub. No. WO89/08274, PCT Pub. Date Sep. 8, 1989

PCT Filed Feb. 24, 1989, Ser. No. 424,283

Claims priority, application United Kingdom, Feb. 26, 1988, 8804523

Int. Cl.^{5} A02B *6/20*

U.S. Cl. 350—96.32 16 Claims



1. A hollow glass waveguide comprising a glass cladding containing germanium dioxide (GeO_2) and at least one modifying metal oxide; characterised in that:

the GeO_2 is present in the cladding at a concentration in excess of 90 mole %;

and provided that the cladding does not comprise a binary combination of GeO_2 and PbO.

5,026,143
ACTIVE TYPE LIQUID CRYSTAL MATRIX DISPLAY HAVING SIGNAL ELECTRODES WITH EXPANDED SECTIONS AT GROUP EXPOSURE BOUNDARIES

Hirohisa Tanaka, Gose; Kohhei Kishi, Nara, and Kohzo Yano, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 825,924, Feb. 4, 1986, abandoned. This application Aug. 17, 1989, Ser. No. 395,187

Claims priority, application Japan, Feb. 6, 1985, 60-22196

Int. Cl.^{5} G02F *1/133*

U.S. Cl. 350—336 16 Claims

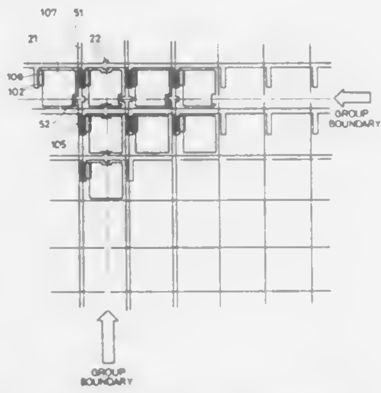
9. A liquid crystal matrix display panel, comprising:

a plurality of X and Y driver electrodes; and

a plurality of picture elements arranged in a matrix on a substrate and connected to said X and Y driver electrodes through thin film switching elements;

said plurality of picture elements and said X and Y driver electrodes being formed on said substrate in groups by a group photolithography exposure method, each group being a sub-matrix of said matrix;

each X and Y electrode including an expanded portion at a boundary of each group to form an electrical connecting region with respective X and Y electrodes of contiguous groups, each expanded portion having a portion which overlaps a portion of an adjacent expanded portion to form said electrical connecting regions.



5,026,144
LIQUID CRYSTAL DEVICE, ALIGNMENT CONTROL METHOD THEREFOR AND DRIVING METHOD THEREFOR

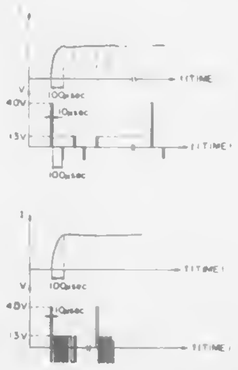
Osamu Taniguchi, Chigasaki; Hideyuki Kawagishi, Kawasaki; Akira Tsuboyama, Sagamihara; Shinjiro Okada, Kawasaki; Yutaka Inaba, Kawaguchi, and Junichiro Kanbe, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 52,695, May 20, 1987, abandoned. This application Jan. 22, 1990, Ser. No. 469,809

Claims priority, application Japan, May 27, 1986, 61-122420

Int. Cl.^{5} G02F *1/133; G09G 3/36*

U.S. Cl. 350—350 S 8 Claims



1. A driving method for a liquid crystal device comprising a plurality of pixels arranged two-dimensionally, each pixel comprising a pair of opposite electrodes and a ferroelectric liquid crystal showing a first and a second molecular alignment state depending on the direction of an electric field applied thereto, the ferroelectric liquid crystal being disposed between the opposite electrodes and being placed in a relaxed state in accordance with a time constant of the ferroelectric liquid crystal such that when a voltage pulse equal to or greater than the threshold voltage of the ferroelectric liquid crystal is applied between the opposite electrodes, the ferroelectric liquid crystal changes its molecular alignment state from one molecular alignment state towards the other molecular alignment state and the ferroelectric liquid crystal continues such change after the removal of the voltage pulse until the change reaches a saturation within a predetermined period; said driving method comprising the steps of:

applying a first writing pulse to a selected pixel to change the molecular alignment state of the ferroelectric liquid crystal at the selected pixel from one molecular alignment state toward the other molecular alignment state such that the ferroelectric liquid crystal continues such change after the removal of the first writing pulse until the change reaches the saturation within the predetermined period; and

applying a second writing pulse to a subsequently selected pixel during the predetermined period,

wherein in the predetermined period, the selected pixel supplied with the first writing pulse is supplied with a voltage pulse Vr which satisfies the relation with a threshold voltage Vth of:

$$Vr/Vth \leqq 0.8,$$

wherein the threshold voltage Vth denotes a voltage required for causing a switching such that when a pulse of Vth is applied between the opposite electrodes of a pixel, the ferroelectric liquid crystal at the pixel is caused to change its molecular alignment state from the one molecular alignment state toward the other molecular alignment state and the change in the molecular alignment state continuously occurs until a saturation even after the removal of the pulse.

5,026,145
EXPOSURE APPARATUS

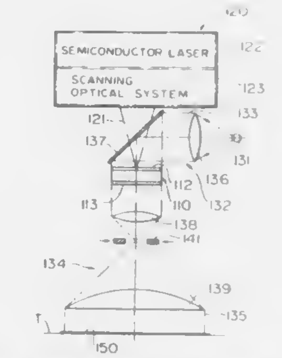
Masatoshi Marui, Saitama; Tomonori Inage, Tokyo; Vuji Matsui, Kawagoe, and Tazuko Ishizuka, Urawa, all of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 26, 1988, Ser. No. 249,764

Claims priority, application Japan, Sep. 24, 1987, 62-239832; Jun. 14, 1988, 63-146134

Int. Cl.^{5} G02F *1/13*

U.S. Cl. 350—351 24 Claims



1. An exposure apparatus for exposing a subject with an optical image, comprising:

a thermally-written liquid-crystal light valve having accommodated therein a liquid crystal layer;

means for reciprocatively moving said liquid-crystal light valve in a Y direction;

means for emitting an optical writing heat spot directed onto said liquid-crystal light valve, said optical writing heat spot being reciprocatively movable in an X direction, either said liquid-crystal light valve or said emitting means being movable relative to each other to cause said heating spot to write a predetermined pattern into said liquid-crystal light valve; and

an optical projection system having a light source, a first optical means arranged between said light source and said liquid-crystal light valve for transmitting a first luminous flux that is emitted from said light source, through said liquid crystal layer formed into said predetermined pattern, and second optical means arranged between said liquid-crystal light valve and said subject for bringing a luminous flux transmitted through said liquid crystal layer

VOL
1127
ISS
4
JE
25
1991
UMI

to a substantially telecentric second luminous flux and for illuminating said subject with said second luminous flux, whereby said subject is exposed to an optical image corresponding to said predetermined pattern into which said liquid crystal layer is formed.

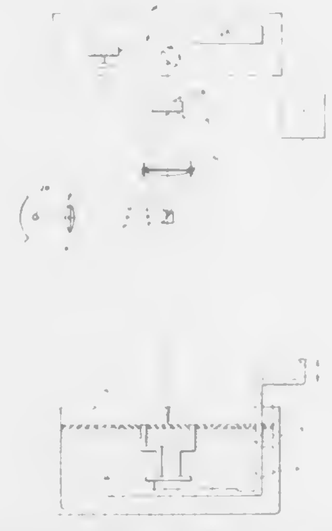
5,026,146
SYSTEM FOR RAPIDLY PRODUCING PLASTIC PARTS

William F. Hug, 382 E. California Blvd., #106, Pasadena, Calif. 91106, and Ray D. Reid, 1125 E. Foothill, #5, Glendora, Calif. 91740

Continuation-in-part of Ser. No. 333,385, Apr. 3, 1989, abandoned. This application Jun. 16, 1989, Ser. No. 367,741

Int. Cl.^{5} G11C *13/04*

U.S. Cl. 350—356 **4 Claims**



1. A system for rapidly producing a plastic part from a curable liquid which solidifies when subjected to ultra-violet light energy in combination with a processor and computer aided design software, said system comprising:

- a. a receptacle for storing the curable liquid which lies in a solidification plane within said receptacle;
- b. an electronically erasable mask which is an ultra-violet is an ultraviolet wavelength isolating image buffer and which is electrically coupled to the processor;
- c. drawing means for electronically drawing a plurality of images of successive cross-sectional laminae onto a Ruticon, said drawing means being electrically coupled to the processor;
- d. projecting means for projecting ultra-violet light energy onto said Ruticon that said Ruticon transfers frame-by-frame exposure of said plurality of images in order to reflect said ultra-violet light energy onto the curable liquid in said solidification plane thereby forming said successive cross-sectional lamina; and
- e. moving means for incrementally moving said cross-section laminae which are being formed in order to build up the plastic part in stepwise fashion

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5,026,147
NON LINEAR OPTICAL POLYMERIC ARTICLE AND METHOD

David S. Soane, Piedmont, and Stephen E. Barry, Berkeley, both of Calif., assignors to Regents of the University of California

Filed Mar. 23, 1990, Ser. No. 498,028

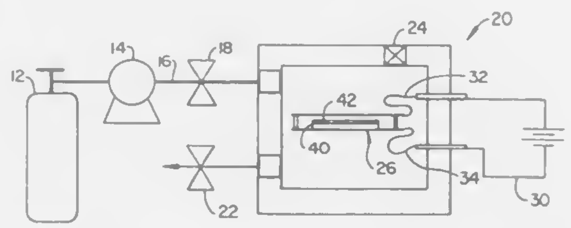
Int. Cl.^{5} G02B *5/30*

U.S. Cl. 350—374 **35 Claims**

1. An intermediate article, useful in preparing articles therefrom exhibiting non-linear optical properties, comprising:

a body formed primarily of a polymer, the polymer having a first glass transition temperature representable by Tg_1, the Tg_1 being at least greater than room temperature;

a minor amount of dopant moieties being dispersed in the body, the dopant moieties having a high intrinsic molecular hyperpolarizability, the dopant moieties being alignable upon application of sufficient electric field into a determinable degree of the same orientation, the degree of orientation being representable by a value $X^{(2)}$; and,



a diluent for the polymer being sorbed by the body in an amount sufficient to form a second glass transition temperature representable by Tg_2, the Tg_2 being lower than the Tg_1, the diluent including a fluid that is gaseous at about atmospheric pressure and that is pressurized with respect to atmospheric pressure.

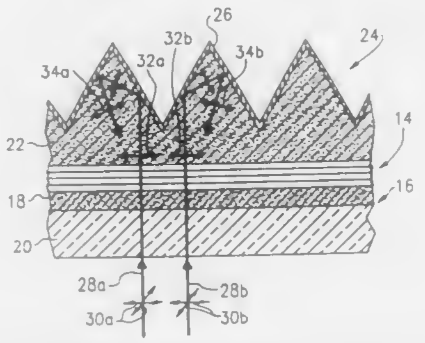
5,026,148
HIGH EFFICIENCY MULTIPLE QUANTUM WELL STRUCTURE AND OPERATING METHOD

Cheng P. Wen, Mission Viego; Chan-Shin Wu, Torrance, and Robert N. Sato, Palos Verdes Estates, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 26, 1989, Ser. No. 457,207

Int. Cl.^{5} G02B *5/30*

U.S. Cl. 350—386 **15 Claims**



1. A high efficiency, multiple quantum well structure comprising:

a multiple quantum well superlattice structure;

means for reflecting radiation which is transmitted through said superlattice structure with a polarization parallel to said superlattice structure, back through said superlattice structure with its polarization shifted to a substantially non-parallel angle to said superlattice structure, thus enabling said superlattice structure to absorb at least part of said reflected radiation; and

means for shifting the angle of received radiation, said means being positioned on the opposite side of said superlattice structure from said radiation reflecting means, wherein said means for shifting the angle of received radiation is oriented to shift received radiation at a cross-angle to the angular shift of said reflection means.

5,026,149
PROJECTION LENS SYSTEM

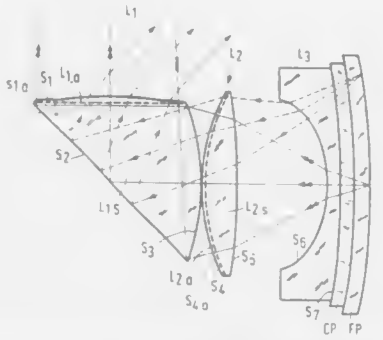
Josephus J. M. Braat, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 2, 1987, Ser. No. 9,443

Claims priority, application Netherlands, Nov. 24, 1986, 8602974

Int. Cl.^{5} G02B *13/18*

U.S. Cl. 350—432 **10 Claims**



1. A projection lens system for projecting in an image space an image from an image source present in an object space, which lens system comprises from the image end successively a first, positive lens group and at least a second, negative lens group whose surface facing the image end is concave, characterized in that the first lens group is constituted by a single lens element having, in addition to a first refractive surface facing the image end and a second refractive surface facing the object end, a third radiation-reflecting surface located between the first and the second surface, in that the pupil of the projection lens system is located within the first single lens element and in that the first refractive surface is an aspherical surface.

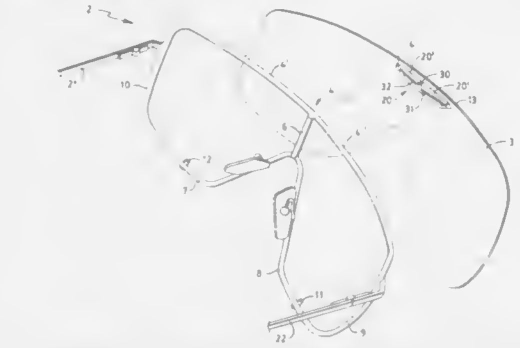
5,026,150
SPECTACLES

Karl Weber, Stuttgart, Fed. Rep. of Germany, assignor to Polaroid Corporation, Cambridge, Mass.

PCT No. PCT/EP88/00244, §371 Date: Sep. 26, 1989 §102(e), Date: Sep. 26, 1989, PCT Pub. No. WO88/07699, PCT Pub. Date: May 15, 1980

Int. Cl.^{5} G02C *1/00*

U.S. Cl. 351—47 **7 Claims**



1. Spectacles comprising a metallic frame (2) comprising an upper cross piece (4), a nose piece (5), lateral sections (9, 10) and lower frame sections (7, 8) as well as a lens (3) which is supported in front of the frame by hooks (11, 12) arranged on the lower frame sections (7, 8), characterized by the fact that the upper cross piece (4) and the nose piece (5) are connected by a metallic rod (6) extending vertically centrally of the spectacles, that additional hooks (13, 14) are provided on the lens (3) below the upper cross piece (4) which extend from below around the sections (4′, 4″) of the upper cross piece (4) extending on either side of the rod (6), the sections (4′, 4″) of the cross piece (4) extending on either side of the rod (6) being elastically deformable to the point where the additional hooks (13, 14) provided on the lens (3) are released, and that protrusions (31, 32) also provided on the lens abut against both sides of the rod (6).

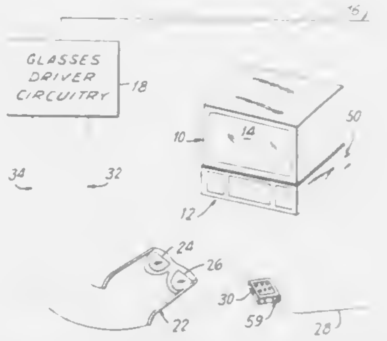
5,026,151
VISUAL FUNCTION TESTER WITH BINOCULAR VISION TESTING

Morey H. Waltuck, Sharon; Robert N. McKnight, Andover, and Eliezer Peli, Newton, all of Mass., assignors to Mentor O & O, Inc., Norwell, Mass.

Filed Jun. 23, 1989, Ser. No. 370,630

Int. Cl.^{5} A61B *3/02, 3/08*

U.S. Cl. 351—246 **14 Claims**



1. A method for testing binocular vision using a display comprising the steps of:

alternately displaying images on the display at a frequency sufficient to maintain fusion;

alternately blocking or permitting a patient's viewing of the display; and

synchronizing the displaying of the alternating images with blocking or permitting the patient's viewing such that some images are visible only to the patient's left eye, some images are visible only to the patient's right eye, and some images may be visible to both of the patient's eyes.

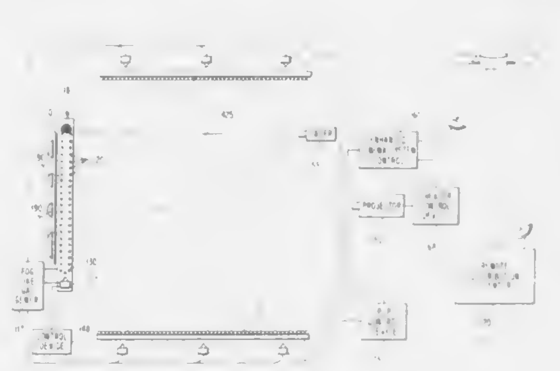
5,026,152
ENHANCED CINEMA SYSTEM

Steven D. Sharkey, 8714 Bradmoor Dr., Bethesda, Md. 20817

Filed Feb. 15, 1989, Ser. No. 310,574

Int. Cl.^{5} G03B *21/32*

U.S. Cl. 352—85 **35 Claims**



1. An enhanced cinema system comprising:

a movie screen;

means for generating a fog-like gas;

a plurality of retractable shafts mounted in front of said movie screen and coupled to said generating means, said plurality of retractable shafts having slits;

means coupled to said plurality of retractable shafts for spinning said plurality of retractable shafts, wherein the fog-like gas flows from said generating means through

VOL
1127
ISS
4
JE
25
1991
UMI

said plurality of retractable shafts and escapes from the slits of said plurality of retractable shafts;

movie means responsive to a movie film for generating an interact signal and a lighting signal, and for projecting a movie onto said movie screen;

means coupled to said movie means and responsive to the interact signal for generating a beam of light for interacting with the movie projected onto said movie screen;

programmable lighting panels having a plurality of lights; and

control means coupled to said programmable lighting panels and said movie means, and responsive to the lighting signal, for activating the lights in said programmable lighting panels during the movie.

5,026,153
VEHICLE TRACKING CONTROL FOR CONTINUOUSLY DETECTING THE DISTANCE AND DIRECTION TO A PRECEDING VEHICLE IRRESPECTIVE OF BACKGROUND DARK/LIGHT DISTRIBUTION

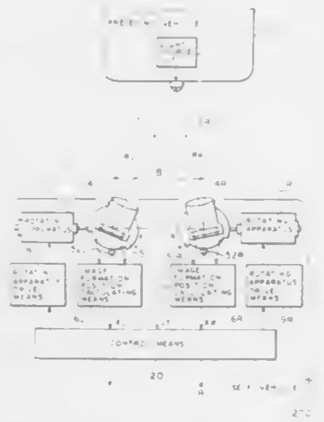
Hiroyoshi Suzuki; Kenji Ogawa; Hiroko Maekawa; Seiya Kominami, and Yoshiaki Asayama, all of Hyogo, Japan, assignors to Mitsubishi Denki K.K., Tokyo, Japan

Filed Feb. 16, 1990, Ser. No. 480,983

Claims priority, application Japan, Mar. 1, 1989, 1-49307; Mar. 6, 1989, 1-54402; Mar. 24, 1989, 1-72615; Mar. 27, 1989, 1-75727

Int. Cl.^{5} G01C *3/08;* G08G *1/16*

U.S. Cl. 356—1 11 Claims



1. An automobile radar apparatus comprising:

light source means installed at a predetermined position on a rear side of a preceding vehicle, for projecting light backwards;

a pair of spaced-apart light-receiving optical systems separately positioned on a front side of a self-vehicle (tracking vehicle), each of said optical systems having a respective light-receiving light path for receiving and focusing the light emitted from said light source means into an image;

at least one photoelectric transducer provided at a focal plane of each light-receiving light path, for converting said focused image into electrical output signals;

image formation position calculating means for calculating image formation positions in a horizontal direction at the focal plane with respect to the two light-receiving paths based upon outputs of the photoelectric transducer(s);

rotating means for rotating said light-receiving optical systems in the horizontal direction, and,

angle detecting means for detecting a turning angle of said light-receiving optical system driven by the rotating means,

wherein said light-receiving optical systems are rotated in response to an output from said image formation position calculating means to realign the light-receiving paths of said light-receiving optical systems with said light source, a direction of the preceding vehicle is calculated based on an output from said angle detecting means, and a distance up to the preceding vehicle is calculated based on the output from said image formation position calculating means.

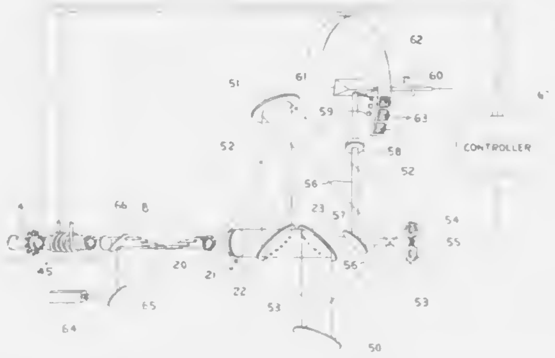
5,026,154
MULTIPULSED DYNAMIC MOIRE INTERFEROMETER

Vance A. Deason, Idaho Falls, Id., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 6, 1989, Ser. No. 418,069

Int. Cl.^{5} G01L *1/24*

U.S. Cl. 356—35.5 13 Claims



1. An apparatus for determining full field in-plane surface displacement of a sample during application of stress using the method of diffraction moire, comprising:

a single lasing medium providing a plurality of beams of coherent light,

pulsing means for pulsing said beams of coherent light independently to provide a plurality of pulsed beams,

combining means for combining said pulsed beams into a single pulse train lying nearly on a single axis,

splitting means for splitting said pulse train into a plurality of mutually coherent beams and directing said mutually coherent beams at one or more diffraction gratings replicated on the surface of said sample,

observation means for observing interference patterns created by diffraction of said mutually coherent beams during application of stresses to said sample, and

controlling means for synchronization of firing of said lasing medium with operation of said pulsing means and said observation means, and with application of stress to said sample,

wherein said pulsing means includes means for pulsing said beams of coherent light sequentially, and

wherein said pulsing means comprises a multiple q-switch which is circular and non-rotating, with a plurality of independent q-switches arranged in a circle near the periphery of said multiple q-switch and a single q-switch pulsing each of said beams of light.

5,026,155
PROCESS FOR SIZING PARTICLES USING CONDENSATION NUCLEUS COUNTING

Richard C. Ockovic; Wayne T. McDermott, and Alexander Schwarz, all of Allentown, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Sep. 6, 1989, Ser. No. 403,646

Int. Cl.^{5} G01N *15/02, 15/14*

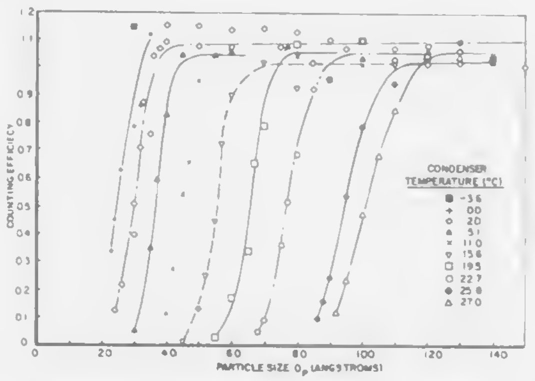
U.S. Cl. 356—37 15 Claims

1. A continuous process for sizing particles in a particle-containing gas using condensation nucleus counting, comprising

(a) passing a particle-containing gas mixed with a working fluid vapor into a condensation zone,

(b) condensing working fluid on that portion of the particles of a minimum size corresponding to a minimum temperature of the condensation zone to form droplets,

(c) detecting the resulting droplets and counting the number of droplets by appropriate sensing of scattered light for each droplet and tabulation,



(d) incrementally adjusting the degree of saturation of the working fluid in the gas by incrementally adjusting the temperature of the condensation zone to increase the degree of saturation at lower temperatures, and

(e) performing step c) at each increment of temperature adjustment.

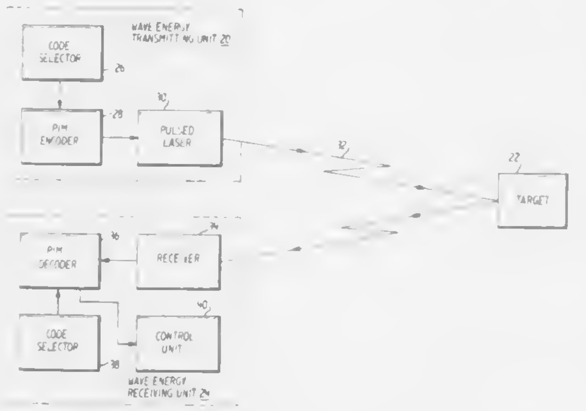
5,026,156
METHOD AND SYSTEM FOR PULSE INTERVAL MODULATION

Thomas E. Bayston; Roy C. Weidler, Jr.; Arthur B. Thompson, Jr., and Allen C. Layton, all of Orange County, Fla., assignors to Martin Marietta Corporation, Bethesda, Md.

Filed Jul. 24, 1972, Ser. No. 277,180

Int. Cl.^{5} G01C *3/08;* G01S *7/36;* H03K *7/04;* G06F *15/336*

U.S. Cl. 356—45 85 Claims



1. A reflected wave energy system comprising:

means for transmitting a psuedo-random, cyclically repetitive code including a series of pulses of wave energy, the spacing of the pulses of said code defining a plurality of sequential pairs of time intervals, each pair of time intervals being unique within one cycle of said code;

means for receiving pulses of wave energy;

a first shift register;

means responsive to said pulse receiving means for clocking pulses into a first serial shift register at a first predetermined rate;

means for generating a series of pulses defining said psuedo-random, cyclically repetitive code;

a second shift register;

means responsive to said pulse generating means for clocking pulses into said second shift register at a second predetermined rate higher than said first predetermined rate;

means for comparing the signal levels of corresponding stages of said first and second shift registers; and,

means responsive to said comparison means for generating a specific signal.

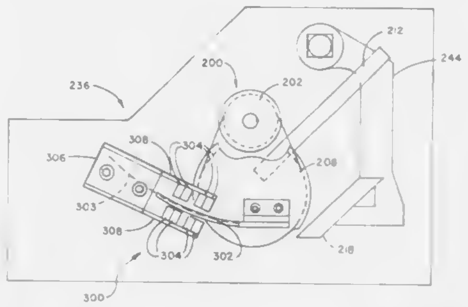
5,026,157
MAGNETIC MOTION DAMPING SYSTEM FOR PENDULOUS COMPENSATOR

Peter S. Winckler, Dayton, Ohio, assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Jul. 14, 1989, Ser. No. 380,611

Int. Cl.^{5} G01C *9/12*

U.S. Cl. 356—250 20 Claims



1. In a light beamprojector including a light source for generating a light beam and a pendulous compensator adapted to movably support a mirror for deflecting the light beam to compensate for tilting of the projector, apparatus for damping motion of a pendulous compensator to rapidly stabilize the light beam emanating from the projector comprising:

a least one motion damping plate formed of an electrically conducting material and coupled to the pendulous compensator, said at least one motion damping plate being curvilinear and coupled to the pendulous compensator to move in substantial conformity with a curvilinear plane defied by movement of the pendulous compensator; and

magnetic means positioned adjacent to and one both sides of said at least one motion damping plate for generating a magnetic field through which said plate passes upon movement of the pendulous compensator to damp motion o the pendulous compensator by the interaction of magnetic fields produced by said magnetic means an by eddy currents generated in said plate, said magnetic means being positioned on opposite sides of said curvilinear plane whereby said at least one plate can be closely spaced to said magnetic means for efficient damping operation of said apparatus and said spacing is substantially maintained without contact between said plate and said magnetic means through the operating range of said pendulous compensator.

5,026,158
APPARATUS AND METHOD FOR DISPLAYING AND STORING IMPACT POINTS OF FIREARM PROJECTILES ON A SIGHT FIELD OF VIEW

Victor G. Golubic, 3321 W. Orchid La., Phoenix, Ariz. 85051

Filed Jul. 15, 1988, Ser. No. 219,567

Int. Cl.^{5} G02B *23/10*

U.S. Cl. 356—252 19 Claims

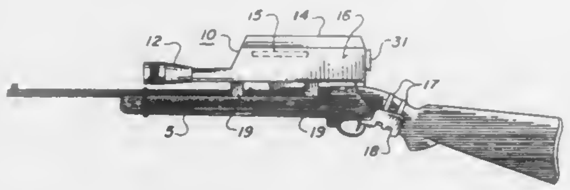
1. Apparatus for sighting a target for an actual or simulated firearm by means of simulating the impact point of a projectile discharged from the same, said apparatus comprising:

a) trajectory calculating unit on or adjacent to said firearm programmed to calculate the effect of trajectory modifying conditions on a location of at least one projectile

VOL
1127
ISS
4
JE
25
1991
UMI

impact point in relationship to the zero-range reticle calibration;

b) a display unit for displaying images;
c) means for providing a zero-range reticle on a display unit image;
d) an optical image conversion unit on said firearm for converting an optical image viewed by said optical image conversion unit to electronic signals, said optical image conversion unit sending said electrical signals to an appropriately interfaced display unit on or adjacent to said firearm, said display unit responsive to said electronic signals for displaying a field of view image;



e) image means coupled to the display unit and responsive to said trajectory calculating unit for superimposing at least one impact point reticle on said field of view; and

storage means for storing said electronic signals including electronic signals representing said reticle in response to activation of a firearm trigger, wherein said trajectory calculating unit determines a time of flight of said projectile after said firearm trigger activation, said storage means storing second field of view from said optical image conversion unit after a time equal to said time of flight.

5,026,159

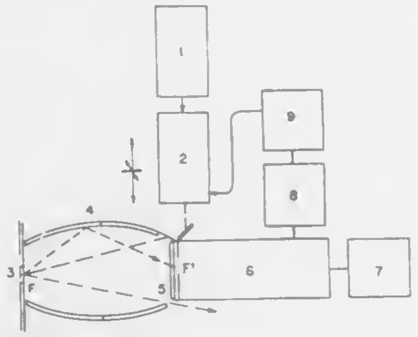
AREA-MODULATED LUMINESCENCE (AML)

Fritz S. Allen, Corrales; Carlos Bustamante; Thomas M. Niemczyk, both of Albuquerque, all of N. Mex., and Burton P. Dorman, Berkeley, Calif., assignors to Acrogen, Inc., Oakland, Calif.

Filed May 19, 1989, Ser. No. 354,137

Int. Cl.^{5} G01N *21/64*

U.S. Cl. 356—318 6 Claims



1. A device comprising:

an excitation optical system projecting excitation light of a constant radiant power or photon flux at a wavelength or wavelengths selected for a sample into said sample;

a sample cell for said sample;

means for alternately irradiating different regions of said sample having different volumes;

emitted light sensing means sensing the emitted light;

means for comparing the difference in the emitted light from said regions of different volumes.

5,026,160

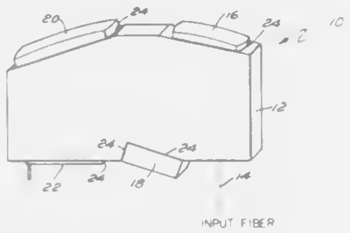
MONOLITHIC OPTICAL PROGRAMMABLE SPECTROGRAPH (MOPS)

Paul B. Dorain, South Hadley, Mass., and Judith B. Snow, Branford, Conn., assignors to The United States of America as represented by the Secretary of the Navy

Filed Oct. 4, 1989, Ser. No. 417,623

Int. Cl.^{5} G01J *3/18*

U.S. Cl. 356—328 5 Claims



1. A spectrograph comprising:

a solid transparent base, said base made of BK7 glass and painted optically black on non-transmitting surfaces, formed in a Czerny-Turner configuration;

input means for providing input rays to said base;

an input mirror affixed to said base and positioned so as to receive and reflect said input rays;

a grating affixed to said base and positioned so as to receive said reflected rays from said input mirror and to disperse said rays in a diffraction pattern;

an output mirror affixed to said base and positioned so as to receive said diffraction pattern and to reflect and focus said diffraction pattern into a diffraction spectrum;

a photodiode detector array affixed to said base for receiving and processing said diffraction spectrum; and

optical index of refraction matching glue affixing said input mirror, said grating, said output mirror, and said photodiode detector array to said base.

5,026,161

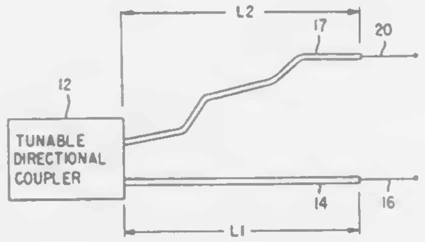
FIBER-OPTIC GYROSCOPE WITH REDUCED BIAS DRIFT ERROR CAUSED BY OPTICAL BACK REFLECTIONS

Walter V. Werner, Caldwell, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Nov. 17, 1989, Ser. No. 437,855

Int. Cl.^{5} G01B *9/02*

U.S. Cl. 356—350 9 Claims



1. A fiber-optic gyroscope, comprising:

a light source for transmitting a light beam;

a fiber-optic coil having first and second ends;

means disposed between the light source and the first and second coil ends including means for receiving the light beam, means for splitting the received light beam into first and second counterpropagating light beams, means for interfacing with two ends of the fiber-optic coil, first means for providing a first path for the first counterpropagating light beam between the beam splitting means and the interface means, and second means for providing a second path for the second counterpropagating light beam between the beam splitting means and the interface means;

the paths provided by the first and second path providing means differing in length whereby optical back reflections at the interface means are reduced for reducing gyroscope bias drift error;

the difference in the lengths of the paths provided by the first and second path providing means being provided by bending one of the first and second path providing means, whereby optical back reflections at the interface means are reduced for reducing gyroscope bias drift error without increasing the length of the means disposed between the light source and the first and second coil ends; and

the one of the first and second path providing means being bent to provide a plurality of segments, each of which is of a discrete length and is at a discrete angle, so as to provide a predetermined path length.

5,026,162

OPTICAL INTERFERENCE POSITION MEASUREMENT SYSTEM

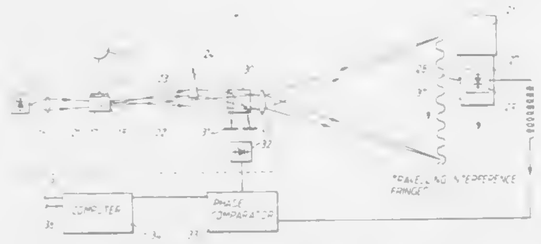
Roger M. Langdon, Colchester, United Kingdom, assignor to General Electric Company, p.l.c., London, United Kingdom

Filed May 9, 1989, Ser. No. 349,229

Claims priority, application United Kingdom, May 10, 1988, 8811027

Int. Cl.^{5} G01B *9/02*

U.S. Cl. 356—354 7 Claims



1. An optical position measurement system comprising a light source, a light sensor, a phase comparator, means for generating a reference signal and an interference pattern generator including a Bragg cell for receiving light from the light source, wherein the Bragg cell splits the light received by the interference pattern generator into two beams by Bragg diffraction and the two resultant beams interfere to generate a moving interference pattern which falls on the light sensor, and the phase comparator compares the phase of the moving interference pattern with the phase of a reference signal thereby producing an indication of the relative angular positions of the light source and light sensor.

5,026,163

STRAIGHTNESS INTERFEROMETER SYSTEM

David R. McMurtry, Wotton-Under-Edge, and Raymond J. Chaney, Berkeley, both of United Kingdom, assignors to Renishaw plc, Gloucestershire, United Kingdom

PCT No. PCT/GB88/00693, § 371 Date Apr. 20, 1989, § 102(e) Date Apr. 20, 1989, PCT Pub. No. WO89/02059, PCT Pub. Date Mar. 9, 1989

PCT Filed Aug. 24, 1988, Ser. No. 347,047

Claims priority, application United Kingdom, Aug. 25, 1987, 8720014

Int. Cl.^{5} G01B *9/02*

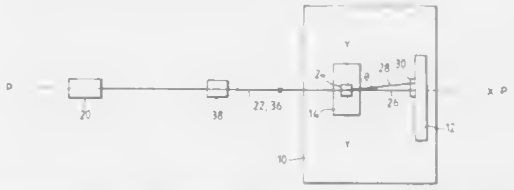
U.S. Cl. 356—363 31 Claims

1. A straightness interferometer system comprising: a light source (**20**) for producing a light beam (**22**) along a principal axis (P),

beam splitting means (**24**) for producing from the light beam two outgoing secondary beams (**26,28**),(**55,58**),(**75,80**)

reflecting means (**30,59**) spaced from the beam splitting means (**24**) in the direction of the principal axis (P) and positioned in the paths of the two secondary beams (**26,28**) for returning the two secondary beams to the beam splitting means,

said two returning secondary beams (**32,34**),(**61,62**),(**81,82**) re-combining at the beam splitting means to form a combined beam (**36**),(**63**),(**83**) and,



a detection system (**38**) for receiving said combined beam and for producing signals indicative of relative movement between the beam splitting means and the reflecting means transverse to the principal axis,

characterised in that a first one (**26**),(**55**),(**75**) of the secondary beams is directed in a direction parallel to said principal axis and the other one (**28**),(**58**),(**80**) of the secondary beams is directed at a small angle to the principal axis.

5,026,164

OPTICAL ENCODER

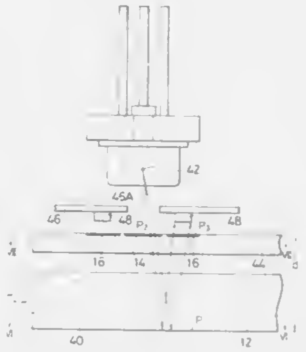
Souji Ichikawa, Sagamihara, Japan, assignor to Mitutoyo Corporation, Tokyo, Japan

Filed Feb. 10, 1989, Ser. No. 308,465

Claims priority, application Japan, Feb. 22, 1988, 63-22031[U]; Oct. 4, 1988, 63-130027 [U]

Int. Cl.^{5} G01B *11/14;* H01J *40/14*

U.S. Cl. 356—373 4 Claims



1. A reflection type optical encoder comprising:

a reflection type first scale fixed to one of two relatively movable members and formed with a first grating;

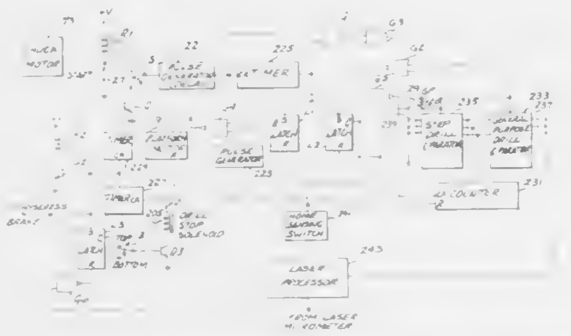
the other of the two relatively movable members including a light source for emitting an uncollimated illuminating light; a second scale formed with a second grating for partially shielding the illuminating light from said light source and illuminating the first grating and a plurality of third gratings different in phase from one another and separated from the second grating, for further restricting the illuminating light which has been restricted by the second and the first gratings; and a plurality of light receiving elements for detecting the illuminating light which has been restricted by the first to the respective third gratings, respectively;

wherein a relative displacement between the relatively movable members is detected from a periodic variation of detection signals from said light receiving elements.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,165
DRILL DIAMETER MEASURING MACHINE

Paul E. Faville, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.
Filed Jun. 25, 1986, Ser. No. 878,311
Int. Cl.⁵ G01B *11/10*
U.S. Cl. 356—386 32 Claims



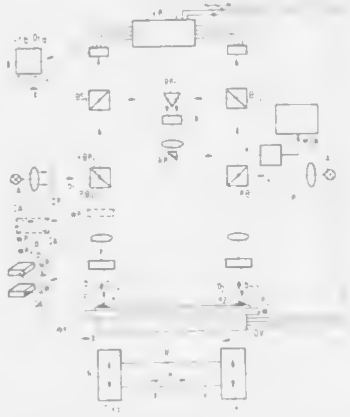
1. Apparatus for measuring the diameter of drills comprising:

(A) a platform;
(B) raising and lowering means coupled to said platform for raising and lowering said platform;
(C) a chuck rotatably mounted in said platform for receiving a drill whose diameter is to be measured;
(D) electromechanical means coupled to said chuck for opening, closing and rotating said chuck;
(E) laser measuring means positioned adjacent to said chuck for measuring the diameter of a drill held and rotated by said chuck; and,
(F) electronic means coupled to said raising and lowering means, said electromechanical means and said laser measuring means for sequentially causing:
  (1) said electromechanical means to close said chuck onto and grip a drill placed in said chuck;
  (2) said electromechanical means to rotate said chuck and a drill gripped by said chuck;
  (3) said laser measuring means to measure the diameter of said rotating drill at a first axial location;
  (4) said platform raising and lowering means to move said platform and said chuck;
  (5) said laser measuring means to measure the diameter of said rotating drill at a second axial location spaced from the first location; and,
  (6) said electromechanical means to open said chuck and release said drill.

5,026,166
APPARATUS FOR PRE-ALIGNING SUBSTRATE PREPARATORY TO FINE ALIGNMENT

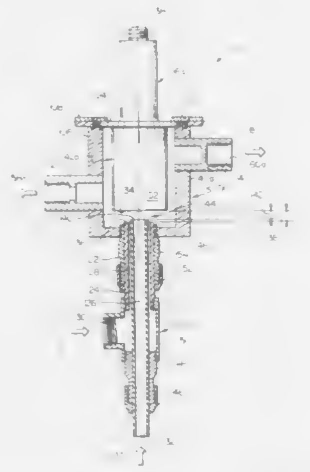
Jan E. van der Werf, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Oct. 1, 1984, Ser. No. 656,218
Claims priority, application Netherlands, May 29, 1984, 8401710
Int. Cl.⁵ G01B *11/00*
U.S. Cl. 356—401 9 Claims

1. Apparatus for imaging a mask pattern on a substrate, which apparatus comprises a projection column provided with an optical imaging system and an optical fine-alignment system for aligning two alignment marks which extend on the substrate relative to associated alignment marks in the mask, which apparatus further comprises a pre-alignment station for pre-aligning the substrate, and transfer means for transferring the substrate to a position beneath the projection column without disturbing the pre-alignment, wherein said pre-alignment station comprises two radiation-sensitive detection systems and two optical imaging systems for imaging the two alignment marks on the substrate onto said two radiation-sensitive detection systems, each of said radiation-sensitive detection systems including an even number of at least two detectors arranged beside each other in a direction associated with a direction in which an associated substrate mark is to be aligned, each said detector producing output signals, the difference in output signals of said at least two detectors of each said detection system being indicative of the alignment of the associated substrate mark in the associated direction relative to the associated detection system, said apparatus including drive means responsive to said output signals for controlling the position of a substrate relative to said detectors.



5,026,167
ULTRASONIC FLUID PROCESSING SYSTEM

Samuel Berliner, III, Glen Cove, N.Y., assignor to He290501ems Incorporated, Farmingdale, N.Y.
Filed Oct. 19, 1989, Ser. No. 423,999
Int. Cl.⁵ B01F *11/00, 15/00*
U.S. Cl. 366—150 11 Claims



1. An ultrasonic fluid processing system comprising:

vibration means having an end portion with an axis and with a vibration face which partly encloses and forms a sonication zone during vibration of the vibration face for fluid cavitation during processing of a first fluid with a second fluid within the sonication zone:

a cell having walls forming a cavity for the vibration face and having an outlet opening for exit of the fluids from the cavity after cavitation and processing of the fluids in the sonication zone;

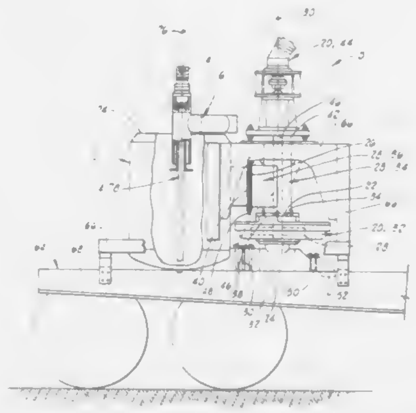
first inlet means supported by the cell having a first opening in the cavity facing the sonication zone;

second inlet means supported by the cell having a second opening in the cavity adjacent to the sonication zone; and

said first and second openings being coaxial with the vibration end portion and face along said axis.

5,026,168
SLURRY MIXING APPARATUS

Leslie N. Berryman; Herbert J. Horinek; Max L. Phillippi; David A. Prucha; Vincent G. Reidenbach, and Stanley V. Stephenson, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.
Division of Ser. No. 340,110, Apr. 18, 1989. This application Dec. 18, 1989, Ser. No. 452,043
Int. Cl.⁵ B01F *5/04, 15/02*
U.S. Cl. 366—168 4 Claims



1. A mixing apparatus for mixing a slurry of solid material and fluid, comprising:

a mixing tub having a generally round horizontal cross-sectional shape defining a tub diameter;

a rotating agitator means for mixing said slurry, said agitator means extending downward into said tub and being oriented to rotate about a generally vertical axis, said agitator means having a plurality of rotating blades defining an agitator diameter at least one-half as large as said tub diameter;

a fluid inlet means for directing a stream of fluid downward into said tub proximate said vertical axis of said agitator means;

wherein said fluid inlet means includes concentric inner and outer cylindrical sleeves defining an annular flow passage therebetween so that said stream is an annular stream and so that said fluid inlet means provides a means for directing said annular stream of fluid downward into said tub substantially coaxially with said vertical axis of said agitator means; and

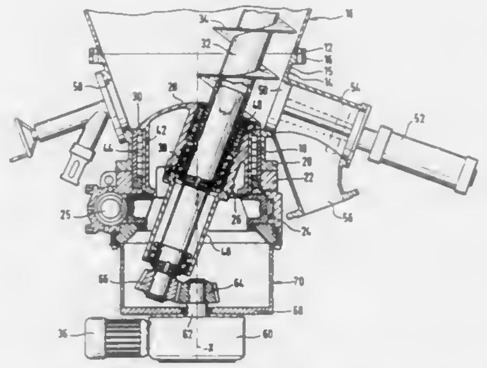
wherein said agitator means includes a rotating shaft extending down through said inner sleeve, said rotating blades being located below said fluid inlet means.

5,026,169
MIXER-DRYER

Hans-Joachim Titus, Kufstein, Austria, assignor to Krauss-Maffei AG, Munich, Fed. Rep. of Germany
Filed Jun. 22, 1990, Ser. No. 542,107
Claims priority, application Fed. Rep. of Germany, Jun. 23, 1989, 3920589; Sep. 6, 1989, 3929502
Int. Cl.⁵ B01F *9/22*
U.S. Cl. 366—287 18 Claims

1. A mixer, comprising:

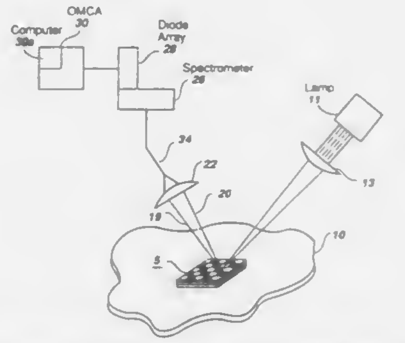
(a) a container flaring conically upwardly and having a conical inside wall and an open lower end portion;
(b) a connecting unit detachably secured to said container lower end portion, said connecting unit including a conical upper portion and a cylindrical lower portion, said conical upper portion forming an extension of said container wall and including a product discharge aperture;
(c) a rotary head operably secured in said cylindrical lower portion, said rotary head being rotatable about a vertical axis of said container;
(d) means for sealing said rotary head relative to said cylindrical lower portion;
(e) said rotary head including a surface communicating with the interior of said container and forming a bottom surface of said container;
(f) a transmission housing operably secured to said cylindrical lower portion;



(g) a horizontal support collar operably secured in said transmission housing, said collar being operably secured to said rotary head and rotatable therewith about said vertical axis;
(h) a mixing screw having a shaft portion extending through said rotary head and said support collar;
(i) means operably associated with said shaft portion for rotatably driving said screw along its longitudinal axis; and
(j) means for rotating said rotary head, thereby moving said screw parallel to and along said container conical wall.

5,026,170
OPTICAL HEAT FLUX GAUGE

Bruce W. Noel, Espanola, N. Mex.; Henry M. Borella, Santa Barbara, Calif.; Michael R. Cates, Oak Ridge, Tenn.; W. Dale Turley, Santa Barbara, Calif.; Charles D. MacArthur, Clayton, and Gregory C. Cala, Dayton, both of Ohio, assignors to The United States of America as represented by the United States Department of Energy and The United States of America as represented by the Secretary of the Air Force, both of Washington, D.C.
Filed Jun. 7, 1989, Ser. No. 362,541
Int. Cl.⁵ G01K *17/00*
U.S. Cl. 374—29 7 Claims



1. An optically interrogated gauge for measuring heat flux incident on a plurality of points on a surface comprising:

VOL
1127
ISS
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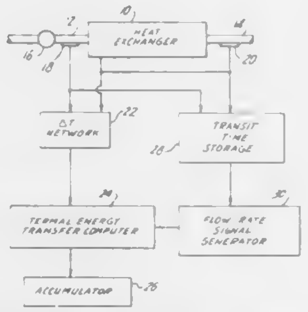
JE
25
1991
UMI

a plurality of first thermographic phosphors in direct contact with said surface;
a plurality of second thermographic phosphors overlying and spaced apart from said plurality of first thermographic phosphors;
thermal insulating means having a predetermined thickness and thermal conductivity between said plurality of first thermographic phosphors and said plurality of second thermographic phosphors for thermally isolating said plurality of first thermographic phosphors from said plurality of second thermographic phosphors;
light means incident on said plurality of first and second thermographic phosphors, for producing first luminescence from each of said first plurality of thermographic phosphors and second luminescence from each of said plurality of second thermographic phosphors, collecting means for collecting said first and second luminescences, wherein said first luminescence and said second luminescence are indicative of the temperatures of said first and second thermographic phosphors at a plurality of points on said surface; and computing means connected to said collecting means for determining heat flux on said plurality of points on said surface using numerical differences between said temperatures of said pluralities of first and second thermographic phosphors, and said thickness and thermal conductivity of said thermal insulating means.

5,026,171
APPARATUS FOR FLOW RATE AND ENERGY TRANSFER MEASUREMENTS

Murray F. Feller, Box 1247, Dunnellon, Fla. 32630
Filed Jun. 7, 1989, Ser. No. 362,682
Int. Cl.^{5} G01K *17/16, 17/10*
U.S. Cl. 374—41 22 Claims

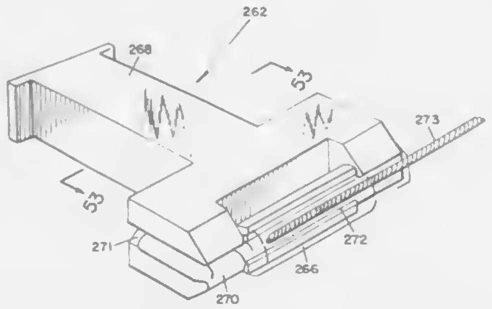


1. Apparatus for providing a measure of the thermal energy transferred between an energy transfer device and liquid traversing a passage that extends through the device from an inlet end to an outlet end of the device, said apparatus including
first means for sensing the temperatures at the inlet and outlet ends of the device,
second means for providing and storing a representation of the flow rate of the liquid flowing through the device during a preliminary time interval,
third means responsive to the flow rate representation stored during the preliminary time interval for providing a succession of flow-rate representing signals during an extended period of time following said preliminary time interval, and
fourth transferred-energy representing means responsive to said first means and to said third means for providing a measure of the thermal energy transferred during said extended period of time.

22. A method of making operational measurements of a heat exchange device in a circulating liquid system having a device operable to start a flow of liquid and to stop the liquid flow, including the steps of
starting a flow of supplied liquid through the heat exchange device, a temperature gradient forming initially between the liquid that starts to enter the heat exchange device and the liquid theretofore in the heat exchange device,
detecting the temperature gradient of the liquid as it passes two locations spaced apart along the liquid passage through the heat exchange device,
deriving a representation of the flow rate of the liquid from the time between detections of the gradient at said two locations, successively,
storing the derived representation of the flow rate and thereafter
generating a succession of representations of the flow rate in dependence on the stored representation of the flow rate,
continuously determining the difference between the temperatures of the liquid at said inlet and outlet ends of the heat exchanger, and
deriving the product (a) of the initially derived flow rate representation and of each of the generated succession of flow rate representations, and (b) the temperature difference at the time of each of said flow rate representations, thereby to derive a succession of increments of transferred thermal energy, and accumulating said increments of transferred thermal energy.

5,026,172
TEMPERATURE SENSOR FOR MEASURING THE SURFACE TEMPERATURE OF A ROTATING ROLL

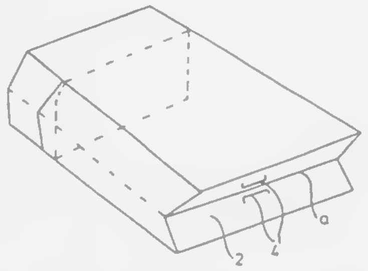
Amedeo Candore, Bodio Lomnago, Italy, assignor to Morton International, Inc., Chicago, Ill.
Division of Ser. No. 371,572, Jun. 26, 1989. This application Mar. 26, 1990, Ser. No. 499,139
Claims priority, application Italy, Aug. 26, 1988, 48305 A/88
Int. Cl.^{5} G01K *1/14, 13/00*
U.S. Cl. 374—153 4 Claims



1. A temperature detector for measuring the temperature of a moving surface comprising,
an elongated bifurcated support member having first and second sides with the branches thereof having forward edge portions,
a hollow pin extending between and supported by the said forward edge portions of said branches of said support member, said hollow pin having a first end wrapped around said first side of said support member and retained in a groove therein and having a second end terminating at said second side of said support member,
a hollow sleeve bearing positioned for rotation on said hollow pin between the branches of said support member,
a bushing for said hollow sleeve bearing comprising a thin layer of thermoplastic polyester reinforced with glass fiber, and
a thermocouple extending onto said second end of said hollow pin with the hot junction thereof substantially coincidental with the center of rotation of said hollow sleeve bearing.

5,026,173
BLOCK-SHAPED BAG WITH A HANDLE AND A METHOD OF PRODUCING SUCH BAG

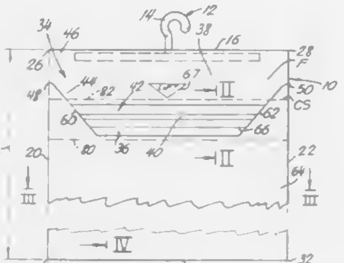
Jorn B. Jensen, Hovedgaard, Denmark, assignor to Schur Plastic A/S, Vejle, Denmark
Filed Jun. 1, 1988, Ser. No. 200,978
Claims priority, application Denmark, Jun. 1, 1987, 2789/87
Int. Cl.^{5} B65D *33/08*
U.S. Cl. 383—10 7 Claims



1. A bag of plastic sheet and of the type which in a distended condition has the shape of a block, said bag having a carry grip side with a flat carry grip area in which a carry strip portion of the plastic sheet is located between one of carry grip apertures or easily breakable weakening lines in the carry grip side, an additional sheet layer is located adjacent and inside of the carry grip side and is connected to the carry grip side outside of said carrying grip area, and in that said additional layer is imperforate.

5,026,174
PLASTIC FILM BAG WITH SPECIAL FLAP ARRANGEMENT

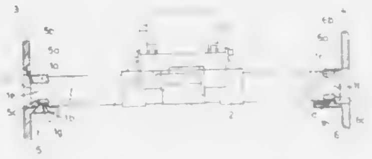
Eli Blatt, Brookville, N.Y., assignor to Ultra Creative Corporation, Brooklyn, N.Y.
Continuation of Ser. No. 163,297, Mar. 1, 1988. This application Aug. 7, 1989, Ser. No. 390,157
Int. Cl.^{5} B65D *33/34*
U.S. Cl. 383—86 11 Claims



1. An article of manufacture comprising a bag provided with a mouth, a first flap section of generally rectangular shape on said bag at said mouth to close the same, a generally trapezoidal second flap section in extension of but separate from said first flap section, at least one of said sections defining a gap, and adhesive means spanning and exposed through said gap, said bag and flap sections being of plastic film, said bag being of first and second films of corresponding widths and having lateral edges, said first flap section corresponding in width to said first and second films and having lateral edges corresponding to the lateral edges of the first and second films, the corresponding lateral edges of the first and second films and the first flap section being connected together, said adhesive means providing for detachable attachment of at least one of the flap sections to the second film, the second flap section having sloped lateral edges sloping away from the lateral edges of the first and second films, said bag having a generally ink receptive outer surface except for a portion corresponding generally to the adhesive means exposed through said gap, said portion providing for ready detachment and reattachment of the adhesive means thereat, said sloped lateral edges being formed while the second flap section is temporarily elevated from said second film.

5,026,175
SHAFT SUPPORTING STRUCTURE

Hiroyuki Sato, Tokyo, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan
Filed Nov. 27, 1989, Ser. No. 442,045
Claims priority, application Japan, Dec. 9, 1988, 63-160247[U]
Int. Cl.^{5} F16C *29/00, 35/02;* **F16B** *21/00*
U.S. Cl. 384—29 12 Claims



1. A shaft supporting structure comprising a shaft having a longitudinal axis and longitudinal end portions, support means supporting said longitudinal end portions of said shaft, at least one of said end portions of said shaft having at least one planar surface parallel to said axis, said support means comprising a receiver means for receiving said one end portion of said shaft, said receiver means having regulate means defining a recess through which said one end portion of said shaft can pass when said one end portion is moved in an insertion direction parallel to said planar surface, said regulate means being operable to restrict radial displacement of said shaft after said shaft has been received in said receiver means and said shaft has been rotated so that said planar surface is no longer parallel to said insertion direction, said support means having a resilient pawl operable to engage said planar surface and restrict rotation of said shaft in said receiver means.

5,026,176
EXTENDABLE RAIL SYSTEM

Claus Jensen, West Vancouver, and Leslie M. Nunn, Richmond, both of Canada, assignors to C. J. Management, Ltd., New Westminster, Canada
Filed Oct. 10, 1989, Ser. No. 418,865
Int. Cl.^{5} A47B *1/10;* **B65H** *59/10;* **F16C** *19/00*
U.S. Cl. 384—53 25 Claims

17. A system as described in claim 1, further comprising:
(a) a second flange extending laterally along a second side of said first beam, opposite said first side, to form parallel, spaced inner tracks along a first face of said second flange adjacent said first beam;
(b) a second beam;
(c) second rolling means rotatably connected to said second beam for movement with said second beam on said first beam;
(d) second guide means connected to said first beam for guiding said second rolling means in said pre-determined direction, said second rolling means being responsive to said second guide means to move in said pre-determined direction;
(e) second support means connected to said first beam for supporting said second beam as said second beam moves between the retracted position and the extended position;
(f) second support guiding means connected to said second support means for guiding said second beam on said second support means in said pre-determined direction, said second beam being responsive to said second support guiding means to move in said pre-determined direction;

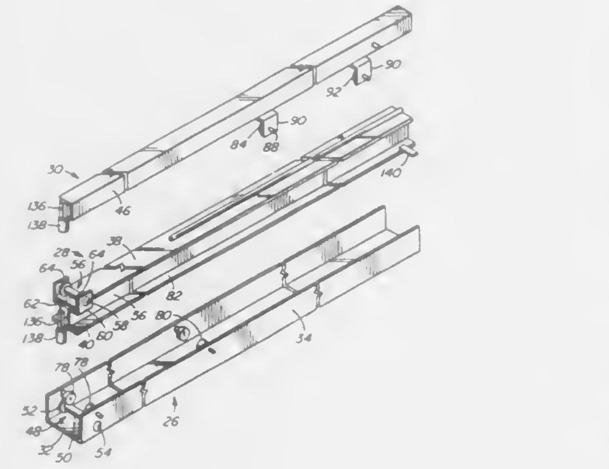
VOL
1127
ISS
4
JE
25
1991
UMI

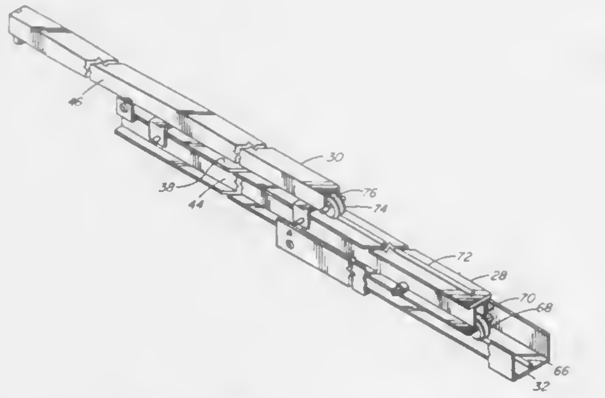
(g) a first pair of opposed second roller members rotatably connected to said second beam, each second roller adapted for rolling along a corresponding inner track of said second flange to constrain said second beam against said second support means and to constrain said second rolling means against said first beam as said second beam is moved between its retracted position and its extended position.

25. A system for releasably securing an extendable beam with respect to a support structure, comprising:

(a) a tube adjacent said beam extending substantially the length of the beam;

(b) a first member connected to said beam having a first opening extending therethrough for slidable movement of the first member along said tube, said tube extending through said first opening;





(c) a second member having a second opening extending therethrough for slidable movement of the second member along said tube, said tube extending through said first opening, said second opening having an axis offset from the axis of the first opening; and

(d) twisting means rotatably attaching said first and second members for twisting said second member with respect to said first member to a position wherein said openings are in co-axial alignment, said first and second members being slidable along said tube when said openings are in co-axial alignment and said first and second members being prevented from slidable movement along said tube when said openings are not in co-axial alignment.

5,026,177
LUBRICATABLE ROTARY BEARING ASSEMBLY

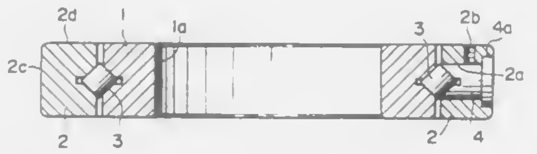
Ichiro Masuda, Hyogo, Japan, assignor to Nippon Thompson Co., Ltd., Tokyo, Japan

Filed Jul. 11, 1989, Ser. No. 378,114

Claims priority, application Japan, Jul. 12, 1988, 63-171913

Int. Cl.^{5} F16C *19/30*

U.S. Cl. 384—447 5 Claims



1. A rotary bearing assembly, comprising:

a first ring having a first grooved bearing surface;

a second ring having a second grooved bearing surface disposed opposite said first ring such that said grooved surfaces form an annular path for rolling members, one of said rings means for forming a peripheral aperture for reception of a plurality of rolling members;

a closure member insertible into said peripheral aperture said member including an axial hole extending inwardly from a distal end of said member and a radial hole extending from an exterior surface of said member intersecting said axial hole; and

a lubricant supply hole extending through said one ring and oriented with a longitudinal axis of said member radial hole for supplying lubricant from the exterior of said one ring to a groove bearing surface of said one ring through said supply hole, said radial hole, and said axial hole.

5,026,178
SENSOR BEARINGS FOR DETERMINING ROTATIONAL SPEED AND/OR ANGLE OF TORSION

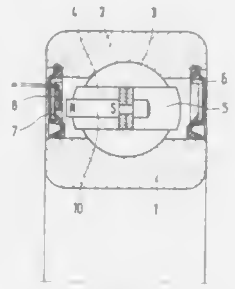
Heribert Ballhaus, Nuremberg, Fed. Rep. of Germany, assignor to GMN Georg Miller Nurnberg AG Aktiengessellschaft, Fed. Rep. of Germany

Filed Mar. 28, 1990, Ser. No. 500,371

Claims priority, application European Pat. Off., May 5, 1989, 89108079.8

Int. Cl.^{5} F16C *33/54*

U.S. Cl. 384—448 15 Claims



1. A sensor bearing for the detection of rotational speed and angle of torsion of a shaft or hub or axle comprising:

a bearing comprising an inner raceway, an outer raceway, and cage means situated between said inner raceway and said outer raceway;

a plurality of magnetic means constituting an even number situated between said inner raceway and said outer raceway, each of said magnetic means being kept at a constant distance from another magnetic means respectively adjacent thereto by said cage means, said magnetic means rotating at a speed which is constantly proportional to said rotational speed to said shaft or hub or axle, and each of said magnetic means comprising a magnet of opposite polarity to the polarity of a magnet of said another magnetic means respectively adjacent thereto; and

at least two magnetic sensors, each of said magnetic sensors situated in proximity to said outer raceway and spaced apart from each other and along the inner periphery of said outer raceway, and each of said magnetic sensors generating an electrical signal each time one of said rotating magnetic means comes into close proximity to said magnetic sensor during said magnetic means' rotation.

5,026,179
ANGULAR BALL BEARING METHOD FOR ASSEMBLING THE SAME

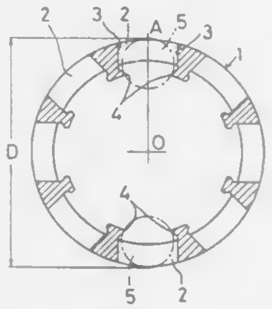
Yukifusa Ito, Gifu, Japan, assignor to NTN Corporation, Osaka, Japan

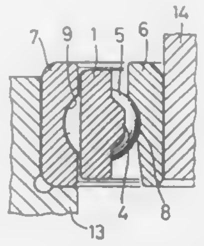
Filed Mar. 14, 1990, Ser. No. 493,161

Claims priority, application Japan, Mar. 17, 1989, 1-66798

Int. Cl.^{5} F16C *33/38*

U.S. Cl. 384—523 I Claim





1. An angular ball bearing comprising an outer ring having an inner peripheral surface, a ball rolling surface at a central portion of said inner peripheral surface and having a diameter larger than the diameter of said inner peripheral surface of said outer ring, a cage mounted inward of said outer ring and formed at equal circumferential intervals with pockets, an inner ring mounted inward of said cage, said cage having an outer peripheral surface guided by said outer ring, and balls received in said pockets, said cage being formed on the inner surface of said pockets with projections extending outwardly of said cage and toward said inner ring for preventing said balls from coming out of said pockets at said inner surface of said pockets in said cage when said inner ring is removed from said cage, the diameter of the circle circumscribed by said balls being no greater than the diameter of said inner peripheral surface of said outer ring when said balls are in abutment contact with said projections, said balls being out of abutment contact with said projections when said balls are in said pockets in said cage and said outer ring and said inner ring are mounted on said cage and said balls in said pockets in said cage.

5,026,180
THERMAL INK-TRANSFER PRINTER CAPABLE OF PREVENTING OFF-REGISTRATION OF COLORS AT COLOR PRINTING

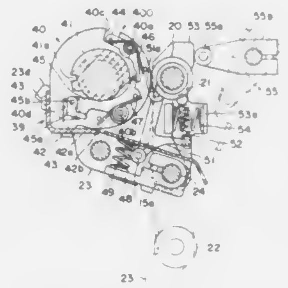
Osamu Tajima, Moriya; Terumasa Kuramoto, Noda, and Yoshitaka Suzuki, Moriya, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Dec. 22, 1988, Ser. No. 288,211

Claims priority, application Japan, Dec. 22, 1987, 62-324367

Int. Cl.^{5} B41J *2/325*

U.S. Cl. 400—120 7 Claims



1. A thermal ink-transfer printer for printing a color image on a printing paper wound along an outer surface of a platen roller by pressing a thermal head against the paper and an ink film interposed therebetween and by melting an ink on the ink film caused by the thermal head, said paper being moved by rotation of the platen roller, said printer comprising:

driving means for causing controlled rotation of the platen roller;

clamp means provided rotatably at both ends of said platen roller for clamping and holding an end of the paper fed to the outer surface of said platen roller, said clamp means being rotatable independently from the platen roller and comprising supporting rings rotatably provided at both ends of a shaft of said platen roller for supporting a holding member parallel to said platen roller along a longitudinal direction, and clamp levers mounted respectively on inner surfaces of both said supporting rings for clamping corners of said end of the paper in conjunction with said holding member;

clutch means for coupling and decoupling said clamp means to and from said platen roller so that said clamp means rotate together with said platen roller when coupled thereto by said clutch means, said clutch means comprising clutch levers arranged respectively at inner surfaces of said supporting rings and arranged to engage with said clamp levers for causing said clamp levers to separate from said holding member, and clutch rings mounted on both ends of the shaft of the platen roller between the platen and inner sides of the clamp and clutch levers for rotation with said platen, each of said clutch rings having a recess with which a projection provided on each of said clutch levers engages;

a pinch roller for pressing the paper against said platen roller, when the paper is clamped by said clamp means and is moved by said platen roller in a printing mode;

encoder means mounted on said platen roller for generating a control signal for controlling a print starting time for each color; and

control means for controlling said clutch means to couple said platen roller to said clamp means so that said platen roller and said clamp means holding the end of the paper rotate together for a predetermined angular range thereof and to decouple said platen roller from said clamp means to allow said platen roller to rotate beyond said predetermined angular range independent from the clamp means so that the paper continues to move for full printing range thereof in the printing mode, for controlling operations of

VOL
1127
ISS
4
JE
25
1991
UMI

said pinch roller and said driving means and for controlling said print starting timing for each color on the basis of said control signal from said encoder means.

5,026,181
RIBBON CARTRIDGE FOR AN ELECTRONIC TYPEWRITER

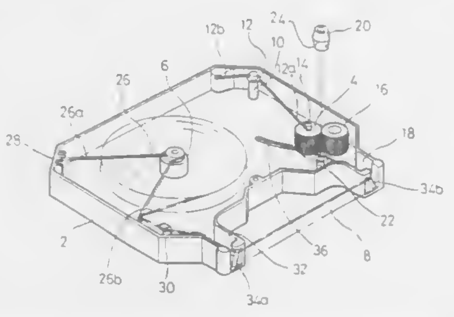
Myeong-Dal Ahn, Suwon, D.P.R. of Korea, assignor to SamSung Electronics Co., Ltd., Suwon Kyung Ki, Rep. of Korea

Filed May 30, 1989, Ser. No. 358,411

Claims priority, application D.P.R. of Korea, Oct. 26, 1988, 17347/1988

Int. Cl.⁵ B41J *35/28*

U.S. Cl. 400—208 **20 Claims**



1. A ribbon cartridge for an electronic typewriter, comprising:

a case for containing a ribbon therein, said case having an outlet opening for letting out the ribbon and an inlet opening for letting in the ribbon, said outlet and inlet openings being spaced apart from each other enough to receive therebetween a hammer for pressing the ribbon to print characters, said outlet and inlet openings each having a guide for guiding the ribbon, said guides being sloped symmetrically relative to each other,

a supplying spool including a spindle, said supplying spool being for supplying the ribbon positioned behind said outlet opening in said case,

a winding spool for winding the ribbon supplied from said supplying spool, said winding spool being positioned behind said inlet opening in said case,

a winding gear for rotating said winding spool by resiliently contacting said winding spool,

a tension member comprising a substantially L-shaped spring, middle curved portion of said L-shaped spring being supported on a spindle of said supplying spool, a first branch of said L-shaped spring being fixed on a corner structure formed on the corner of said case, a second branch of said L-shaped spring holding the ribbon released from said supplying spool to tension the ribbon,

said corner structure comprising a plurality of tension adjustment slots so that the second branch can hold said ribbon with variable tension force according to the position of one of said adjustment slots receiving said first branch,

resilient pressing means for contacting said winding spool with said winding gear, said resilient pressing means comprising a pin spring resiliently pressing the spindle of said winding spool toward said winding gear,

a long guide groove formed in said case for guiding the spindle of said winding spool as the ribbon wound around said winding spool is expanded so as to increase the space between said winding spool and said winding gear, and

a guide roll positioned between said guide of said inlet opening and said winding spool, said guide roll being tapered bidirectionally from the center line between the both ends thereof toward the both ends whereby said guide roll guides and disengages the ribbon to travel from said guide roll and onto said winding spool.

5,026,182
ROCKING MECHANISM FOR A RIBBON CASSETTE

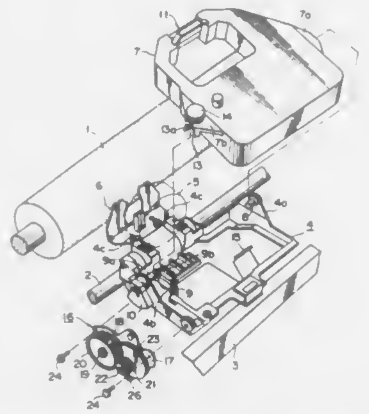
Hiroshi Suzuki, Aichi, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Mar. 5, 1990, Ser. No. 488,689

Claims priority, application Japan, Mar. 3, 1989, 1-52575

Int. Cl.⁵ B41J *35/28*

U.S. Cl. 400—208 **8 Claims**



1. A rocking mechanism, adapted to be positioned in a printing device for rocking a ribbon cassette mounting a print ribbon, said ribbon being provided with a number of longitudinally extending print zones comprising at least one, said rocking mechanism comprising:

a drive member for driving said ribbon cassette to be rocked in a vertical direction; and

a transmit control portion, provided on said ribbon cassette, for transmitting a driving force of said drive member to said ribbon cassette to rock said cassette, while inhibiting said transmission in case that said number of said print zones provided on said print ribbon is a predetermined value whereby said driving force is not transmitted to said cassette so that said cassette is not rocked.

5,026,183
APPARATUS FOR FEEDING CUT SHEET PAPER AND FAN FOLD PAPER IN A PRINTER

Keiichi Oshima; Takashi Kato, and Susumu Murayama, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

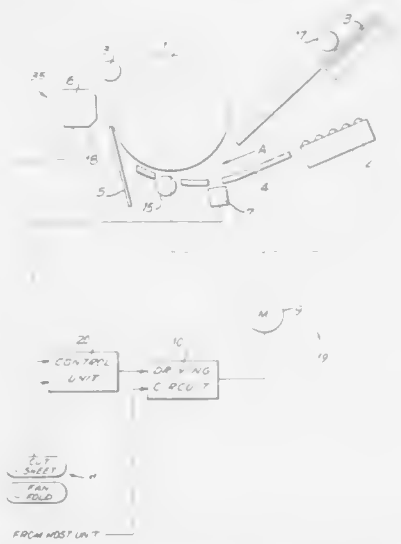
Filed Mar. 14, 1989, Ser. No. 323,528

Claims priority, application Japan, Mar. 14, 1988, 63-59688; Jun. 17, 1988, 63-149301

Int. Cl.⁵ B41J *11/50*

U.S. Cl. 400—605 **3 Claims**

1. An apparatus for individually feeding both cut sheet paper and fan fold paper in a printer comprising a platen, a paper pressing member for elastically contacting the platen, the fan fold paper and cut sheet passing between the paper pressing member and the platen when printing is to occur thereon, a push tractor located upstream of the platen in the paper feed path, the push tractor feeding the fan fold paper when printing is to occur thereon, and control means for driving said push tractor in a reverse direction to remove said fan fold paper from the paper feeding path upon the feeding of cut sheet paper, means to tension from fan fold paper against said platen and thereby eliminate sag including means in said control means acting to feed the fan fold paper forward and backward in at least one reciprocation after the cut sheet paper has been fed to tension the fan fold paper and to feed the fan fold paper again in a forward direction for a length equal to the amount that the fan fold paper was fed in the reverse direction by the push tractor, whereby the fan fold paper is returned to its previous printing position.



5,026,184
OFFICE MACHINE

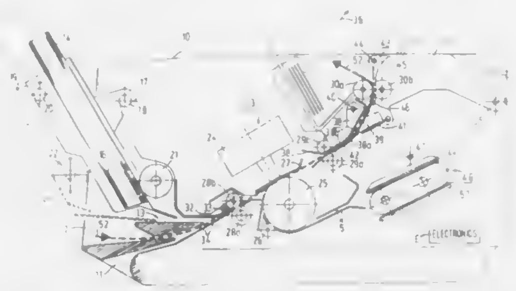
Heinrich Dürr, Wilnsdorf; Horst Kringe, Netphen; Manfred Rosenthal, Kirchen-Freusburg, and Eduard Tercic, Siegen, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 9, 1989, Ser. No. 321,620

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1988, 3807807

Int. Cl.⁵ B41J *11/00*

U.S. Cl. 400—605 **34 Claims**



1. An office printing machine having a plurality of operating modes comprising:

a printing unit having a paper entry region and at least one paper exit region;

a plurality of drive rollers secured to the printing unit for transporting individual paper for printing by the printing unit, a first of said rollers being in front of said printing unit between the unit and said entry region;

a tractor pivotally secured to the printing unit behind the printing unit for transporting endless paper for printing by the printing unit, said tractor being adjustable into pushing and pulling positions;

means coupled to the printing unit for releasably receiving at least one paper cassette for individual paper at said entry region; and

means including means responsive to the position of said tractor for selecting an operating mode of the office machine comprising:

a. first means including at least a portion of said plurality of rollers for providing a first approximately straight paper transport path from the entry region for said individual paper from a first infeed path at said entry region for manual feeding of said individual paper and a second infeed path for automatic feeding of said individual paper while said tractor is in said pushing position;

b. second means for providing a second curved endless paper transport path from said at least one exit region via a portion of said plurality of rollers and said tractor while said tractor is in said pushing position; and

c. third means for providing a third approximately straight paper path from said entry region through said tractor while the tractor is in said pulling position.

5,026,185
PRINTER WITH ADJUSTABLE PRESSING PLATE

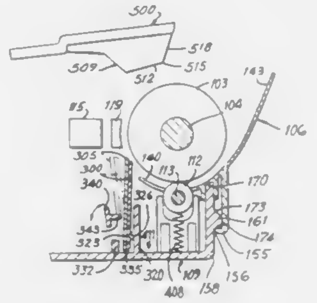
Yoshito Kusabuka, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Filed Mar. 18, 1988, Ser. No. 171,491

Claims priority, application Japan, Mar. 23, 1987, 62-68347; Mar. 31, 1987, 62-79451; Mar. 31, 1987, 62-79452

Int. Cl.⁵ B41J *11/20*

U.S. Cl. 400—618 **12 Claims**



1. A printer comprising:

a platen;

plate means for exerting different levels of pressure against the platen and including a first plate facing the platen and a second plate disposed adjacent to the first plate;

release assembly means for controlling the level of pressure exerted by the plate means against the platen and including shaft means having at least one protrusion extending along the length of the shaft means for pressing against the second plate and control means for controlling the position of the shaft means relative to the plate means;

said control means including release lever means and intermediate lever means, said intermediate lever means coupled to the shaft means; and

a frame;

wherein said intermediate lever means includes projection means for securing the intermediate lever means to the frame and, wherein the projection means includes claw means and the frame includes a hole, said claw means operable for being pushed through the hole and, once beyond the hole, locking itself to the frame.

5,026,186
VIBRATING APPARATUS INCLUDING MEANS FOR ABSORBING VIBRATION AND FOR LOCKING VIBRATING UNIT AGAINST MOVEMENT

Kazumi Hasegawa; Takashi Moriya; Hiromi Hibino, and Akira Takamura, all of Tokyo, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Jul. 11, 1989, Ser. No. 378,288

Claims priority, application Japan, Jul. 12, 1988, 63-91489; Jul. 20, 1988, 63-179269

Int. Cl.⁵ B41J *29/04*

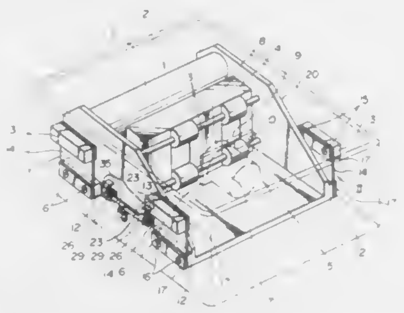
U.S. Cl. 400—691 **6 Claims**

1. A vibrating printing apparatus comprising:

a casing for said apparatus;

VOL
1127
ISS
4
JE
25
1991
UMI

a frame movably mounted in said casing and having opposite lateral end walls;
a printing vibrating unit mounted on said frame, including a printing head and operable to move recroprocatively in directions toward said lateral end walls for generating vibrations which move said frame;
a locking means for locking said frame in position relative to said casing, said locking means having a locking member on said frame, a lock arm pivotally mounted on said casing and pivotable into and out of locking engagement with the locking member, spring means engaged with said lock arm urging said lock arm into locking engagement with the locking member, said lock arm having an arm portion extending therefrom with a free end; and
a pressing member extending through said casing and having the end thereof within said casing in engagement with the free end of the lock arm and having the other end projecting out of the casing a distance sufficient for, when the casing is placed on a supporting surface, the frame is freed from said casing by said lock arm being urged out of locking engagement with said locking member by means of pivoting rotation of the lock arm, whereby when the casing is lifted off the supporting surface, the frame is fixed to the casing by the spring means urging said lock arm into locking engagement with said locking member.



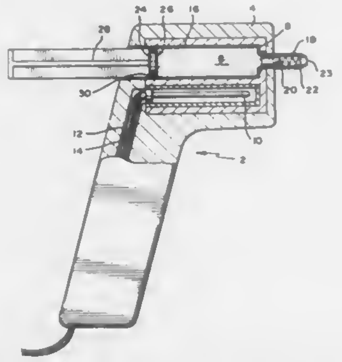
5,026,187
DISPENSER FOR HOT-MELT MATERIAL

Richard A. Belanger, Lamprey Rd, R.D. 1, Box 802, Kensington, N.H. 03827; Peter S. Melendy, 11 Crestview Dr., Exeter, N.H. 03833, and Robert L. Ornsteen, 1405 Washington St., Key West, Fla. 33040

Continuation of Ser. No. 889,519, Jul. 25, 1986, abandoned. This application May 17, 1988, Ser. No. 196,774

Int. Cl.^{5} B67D *5/62*

U.S. Cl. 401—1 9 Claims



1. A dispenser for an air or moisture sensitive adhesive material to be melted comprising heat conductive cartridge means comprising a hermetically sealed chamber storing said material to be melted and preventing contact of said material with air or moisture, heat conductive chamber means receiving the cartridge means, heating means for melting the material stored in the cartridge means, outlet means communicating with the cartridge means for dispensing the melted material and plunger means for advancing the melted material into the outlet means, said cartridge means, chamber means and heating means being in thermal contact with each other, wherein said material stored in said chamber is an adhesive selected from the group consisting of polyamide adhesives, moisture cure hot melt urethane, cyanoacrylate, epoxy adhesive, and acrylate adhesives.

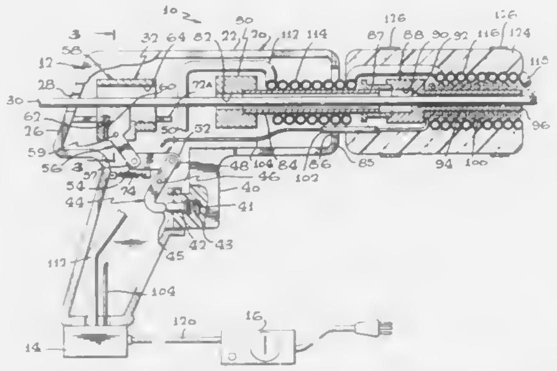
5,026,188
RESIN DISPENSER WITH COMBINED COOLING AND HEATING TUBE

Ronald F. Capodieci, Saugus, Calif., assignor to Lockbeed Corporation, Calabasas, Calif.

Filed Dec. 11, 1989, Ser. No. 448,415

Int. Cl.^{5} B05C *5/04*

U.S. Cl. 401—1 3 Claims



1. A resin dispenser for receiving solid resin in the form of a tubular rod and dispensing melted resin on a surface comprising:
a housing assembly having an inlet and outlet passage and a guide passage there between, said inlet for receiving the rod and said outlet passage having a nozzle for dispensing the melted resin to the surface;
means to sequentially move the rod from said inlet passage towards said outlet passage;
heating coil means positioned about said outlet passage for melting the rod;
air supply means comprising:
  a source of pressurized gas; and
  a gas transfer tube having an inlet coupled to said source of pressurized gas and an outlet in proximity to said nozzle, said outlet for directing air to the surface, said tube further having first and second coil sections, said first coil section wound about said heating coil means and said second coil section positioned behind said first coil section and would about said guide passage; and
power supply means coupled to said heating coil means to control the temperature thereof.

5,026,189
WRITING IMPLEMENT WITH COAXIAL ALTERNATELY USABLE TIPS

Georg Keil, Gross-Bieberau, Fed. Rep. of Germany, assignor to Firma Merz & Kreel GmbH & Co., Gross-Bieberau, Fed. Rep. of Germany

Filed Apr. 5, 1990, Ser. No. 505,875

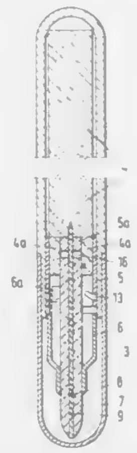
Claims priority, application Fed. Rep. of Germany, May 2, 1989, 3914465

Int. Cl.^{5} B43K *1/06, 17/00, 27/00*

U.S. Cl. 401—29 10 Claims

1. A writing implement comprising:
a hollow body extending along and centered on an axis;
a reservoir tampon in the body holding a supply of ink;

a casing fixed in the body over the reservoir tampon;
a small-diameter core writing element having a rear end fixed in and projecting rearwardly through the casing into the reservoir tampon and a front end;
a sleeve slidable axially in the body adjacent and around the core element; and
a large-diameter outer writing element formed with a central throughgoing small-diameter bore through which the core element extends slidably, the outer element having a rear end fixed in the slidable sleeve and projecting into the reservoir tampon and a front end, the sleeve and outer element being axially jointly displaceable between a forward position with the front end of the outer element level with the front end of the core element and a rear position with the front end of the core element projecting axially outward past the front end of the outer element.



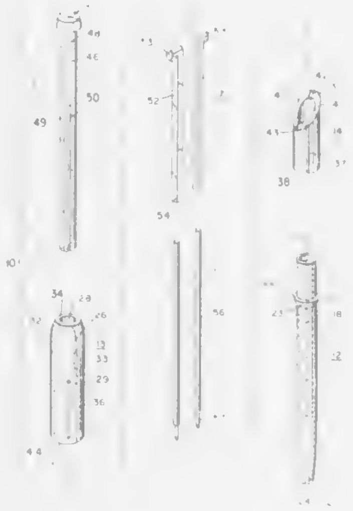
5,026,190
DUAL WRITING ELEMENT RETRACTABLE PEN

Roland Longarzo, Valley Stream, N.Y., assignor to 2C Co. Corp., New York, N.Y.

Filed Sep. 26, 1989, Ser. No. 412,344

Int. Cl.^{5} B43K *27/00*

U.S. Cl. 401—30 27 Claims



1. A writing instrument comprising:
an upper barrel member having integrally formed on its upper inside face a cylindrical cam first part having along its bottom a top cam face;
a separate cylindrical cam second part telescoping and contiguous to the lower part of said upper barrel member and having along its top a bottom cam face complementing said top cam face and positioned and oriented relative to said top cam face to delineate a cylindrical cam track including peripherally spaced oppositely longitudinally peripherally inclined cam track sections, said upper barrel member and said cylindrical cam second part having confronting peripheral faces in mutual interference engagement;
a longitudinal guide member coaxial with and rotatable relative to said cam track and including a pair of peripherally space longitudinal guide tracks;
a chuck member slidably engaging each of said guide tracks and including a follower projecting transversely into sliding engagement with a respective cam track section;
a lower barrel member depending from and coaxial with said upper barrel member and terminating at its bottom end in an axial aperture; and
a writing element engaging and movable with each of said chucks and extending downwardly toward said lower barrel member bottom end.

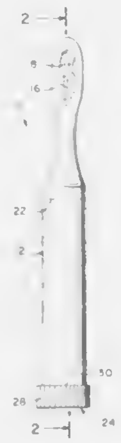
5,026,191
RECHARGEABLE AND DISPOSABLE TOOTHBRUSH

Cesar Akly, 50-20 61 St., Woodside, N.Y. 11377

Filed May 14, 1990, Ser. No. 523,865

Int. Cl.^{5} A46B *11/02*

U.S. Cl. 401—175 1 Claim



1. An improved fountain toothbrush comprising:
(a) a tubular handle having a sealed toothbrush storage compartment therein;
(b) a head with a plurality of bristles thereon having a conduit therein, said head removably connected to a sealed end of said handle, including means for connecting said conduit with said toothpaste storage compartment in said handle to provide toothpaste to said bristles on said head when said head is mounted on said handle; and
(c) means for forcing toothpaste in said toothpaste storage compartment through said conduit to said bristles; wherein said urging means includes:
(d) a snap-off rotary knob removably attached to other end of said tubular handle opposite said head;
(e) an elongated removable screw mounted at one end to the rotary knob and extending into said toothpaste storage compartment in said handle;
(f) a follower is threaded on said screw;
(g) means for preventing rotation of said follower with said screw so that when said rotary knob is turned in the right direction said follower will travel toward said head on said screw to urge the toothpaste through said conduit to said bristles; wherein said rotation preventing means includes:

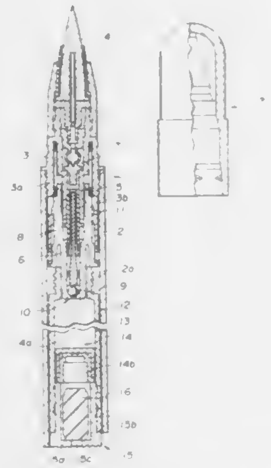
VOL
1127
ISS
4
JE
25
1991
UMI

(h) said storage compartment in said handle having at least one elongated key track on the inner surface thereof; and
(i) said follower having at least one key way that travels along said at least one elongated key track to prevent the rotation of the follower with said screw; further including:
(j) a rib ring having a pair of oppositely disposed transverse slots, said rib ring affixed to the other end of said tubular handle opposite said head; and
(k) said rotary knob having a pair of oppositely disposed hook members, in which said hook members are retained onto said rib ring through said slots when said rotary knob fits over said rib ring; and
(l) an alignment arrow carried on said tubular handle above one of said slots so that said rotary knob can be properly positioned to remove said hook members from said rib ring.

5,026,192
LIQUID APPLICATOR

Toshiaki Kiuchi, Yachiyo, and Shigeo Iizuka, Funabashi, both of Japan, assignors to Yoshino Kogyosho Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 343,955, Apr. 27, 1989, abandoned. This application Jun. 25, 1990, Ser. No. 542,982
Claims priority, application Japan, Apr. 28, 1988, 63-58113
Int. Cl.^{5} A46B *11/02*
U.S. Cl. 401—176 **9 Claims**

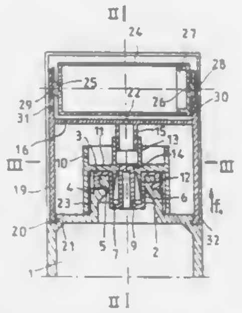


1. A liquid container comprising:
a main member having a barrel, a head fitted in an upper portion of the barrel, a discharge section provided at an upper end of the head, a passage cylinder communicating with the discharge section and extended downwardly into the upper portion and towards the bottom of the barrel, a cylindrical piston formed at a lower end of the passage cylinder, and a resilient discharge valve in the passage cylinder:
an elevationally movable cylinder movably inserted into the barrel to be engaged with an outer surface of the lower portion of the passage cylinder and to be urged downwardly towards the bottom of the barrel; the cylinder including a suction valve;
a container body movably inserted into the barrel, the container body having a neck portion tightly engaged with an outer surface of a lower portion of the cylinder, and the container body having a slidable bottom plate, said slidable bottom plate comprising an outer member composed of a soft material and an inner member composed of a hard material;
wherein a lower end of the container body is closed by a bottom cover; and
an elevationally movable hammer inserted into a gap between the bottom cover and the slidable bottom plate.

5,026,193
DISTRIBUTOR AND APPLICATOR DEVICE WITH A MANUAL CLOSING MEMBER

Marthe Lucas, 22 allée des Fauvettes, 34280 La Grande Motte, Hérault, France

Filed Dec. 15, 1989, Ser. No. 450,986
Claims priority, application France, Dec. 15, 1988, 88 16563
Int. Cl.^{5} A45D *34/04*
U.S. Cl. 401—219 **10 Claims**

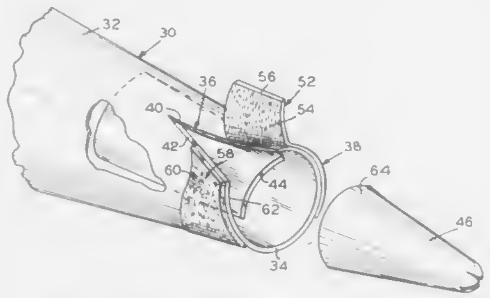


1. A distributor and applicator device with a manual closing member including a plug connected to neck of a container and provided with a closing finger leaving flowing apertures free and controlling passage of a ring leading to a distributor part of a product contained in the container and directed to an applicator member, wherein a socket is placed around the neck and is mobile axially, said socket including a ring for cooperating with said closing finger and at least one actuation knob protruding through at least one aperture of said distributor part fixed to the container, said knob being axially guided by the at least one aperture in which it slides for axially displacing said socket.

5,026,194
VARIABLE TIP PASTRY BAG

Elvin L. Lewis, 39933 Jasper-Lowell Rd., Lowell, Oreg. 97452

Filed Sep. 10, 1990, Ser. No. 579,738
Int. Cl.^{5} A23P *1/00*
U.S. Cl. 401—261 **4 Claims**

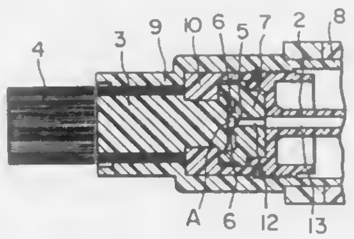


1. A variable tip pastry bag, as used to hold and apply decorative icings to cakes, pastries and the like, comprising:
a. a flexible, conical-shaped bag having a curved surface tapering toward an apex;
b. said bag having an end opening formed by truncation of the bag proximate the apex of the cone and by a split formed in said surface longitudinally from said end opening, the split having two opposing edges;
c. means for adjustably fastening the edges of the split relative to each other so as to vary the size of the end opening and preclude a decorating tip from exiting said end opening; and
d. a flap member, attached to the inside of the bag surface and formed to extend inside of and across the split so as to preclude loss of icing through the split.

5,026,195
FLUID APPLICATION TOOL WITH CONVEX SPACERS

Masaru Kimura, Gunma, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Filed Dec. 15, 1989, Ser. No. 450,941
Claims priority, application Japan, Jan. 9, 1989, 1-1130
Int. Cl.^{5} A46B *11/00*
U.S. Cl. 401—283 **1 Claim**

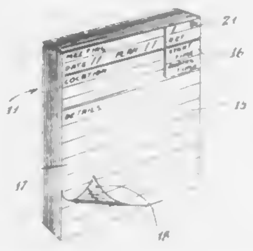


1. A fluid application tool so configured that fluid to be applied is passed from a reservoir tank through an induction tube to an air-permeable immersion substance located at the front of the induction tube and then to an application material, characterized by a gap A provided between the front edge of a fluid exit of the immersion substance support and the rear end of the immersion substance abutted on the immersion substance support, said gap being formed by convexities on the front edge portion of the immersion substance support surrounding the exit.

5,026,196
INFORMATION ORGANIZING SYSTEM

Robert L. Brass, Four Norwood La., Westport, Conn. 06880

Filed May 25, 1989, Ser. No. 356,525
Int. Cl.^{5} B42F *3/00*
U.S. Cl. 402—79 **10 Claims**

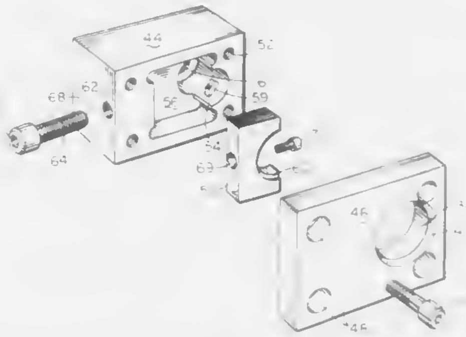


1. A pad of organizational sheets, said sheets being adapted to be attached to a page,
each said sheet having a front surface and a reverse surface, said sheets being releasably adhered to one another by releasable, pressure-sensitive adhesive on said reverse surface of each said sheet only proximate to the lower edge thereof,
printed indicia on the front surface of said sheets, said indicia being so oriented that said indicia are usàble when said lower edge is at the bottom, and said printed indicia being divided into an upper printed area and a lower printed area,
whereby said sheets can be removed from said pad and mounted on a page in any sequence and in overlapping juxtaposition with all said upper printed portions being visible to the reader.

5,026,197
EJECTOR ROD QUICK COUPLER

Michael L. Johnson; Chetan N. Patel, both of Houlton; Marcel D. Plourde, and Brian J. Wiederin, both of Somerset, all of Wis., assignors to Scientific Molding Corporation, Ltd., Somerset, Wis.

Filed Dec. 4, 1989, Ser. No. 445,423
Int. Cl.^{5} F16D *1/00*
U.S. Cl. 403—24 **11 Claims**

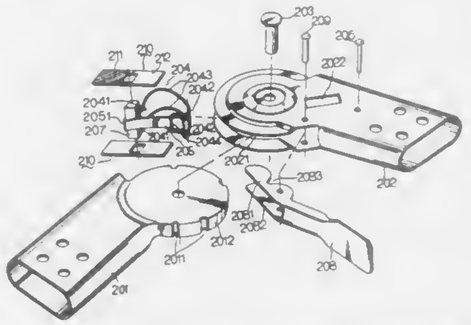


1. Injection molding apparatus comprising:
a. a housing having a cavity shaped to receive a portion of an ejector bar and including a channelway defined in transverse relation thereto;
b. a jaw slidably mounted along said channelway including a gripping surface in communication with the cavity and adapted to couple with the ejector bar; and
c. means for extending and retracting said jaw relative to said cavity, comprising first and second threaded members, said first threaded member being rotatively mounted to said housing and including a lengthwise threaded bore and said second threaded member extending through a bore in said jaw to secure said jaw to said first threaded member such that said jaw is free to rotate on the end of said threaded member as said first threaded member extends and retracts.

5,026,198
LOCKABLE FOLDING JOINT FOR FOLDAWAY LADDER

Ching T. Lin, No. 12 Alley 30 Lane 371, Hwacheng Road, Hsin Chuang City, Taipei Hsien, Taiwan

Filed Sep. 7, 1990, Ser. No. 578,797
Claims priority, application Taiwan, Jul. 23, 1990, 79208044
Int. Cl.^{5} B25G *3/00*
U.S. Cl. 403—27 **2 Claims**



1. A folding joint for a foldaway ladder comprising:
a substantially flat first hollow arm having a first head which is forked and two opposite slide apertures adjacent to said forked first head,
a substantially flat second hollow arm having a second head which is provided between and pivoted to said forked first head, said second head having a periphery provided with spaced engaging notches,

VOL
1127
ISS
4
JE
25
1991
UMI

a detent block movably disposed in said first hollow arm, projecting outward through said slide apertures and urged toward said periphery of said second head so as to engage one of said engaging notches,

means for holding and urging said detent block disposed in said first hollow arm,

a handling lever pivotally mounted to said first hollow arm adjacent to said periphery of said second head, said lever having a push portion extending into said forked first head so as to push said detent block away from one of said notches upon operating said handling lever, and

improvements wherein said holding and urging means includes a one-piece curved spring member having two opposite arc-shaped rod portions each having a first end attached to said detent block, two coiled portions each formed at a second end of each of said arc-shaped rod portions opposite to said first end, and a U-shaped rod portion interconnecting said coiled portions and extending from said cooled portions toward said first end,

said holding and urging means further including a mounting pin which is disposed across said first hollow arm and inserted into said coiled portions, and a spring plate which has a rolled end sleeved around said mounting pin and a hook end opposite to said rolled end, said spring plate being extending between said U-shaped rod portion and said arc-shaped rod portions and toward said detent block, said hook end holding said detent block against said first ends of said arc-shaped rod portions, said U-shaped rod portion providing a measure of pressure on said spring plate so as to enable said hook end to hold said detent block firmly.

5,026,199

RELEASABLE CONNECTION OF TUBULAR SLIDING RODS OF A TEXTILE MACHINE

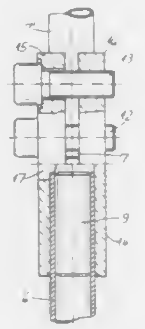
Reinbold Schmid; Hans-Willi Esser, both of Monchen-Gladbach, and Friedhelm Mistler, Wegberg, all of Fed. Rep. of Germany, assignors to W. Schlafhorst AG & Co., Monchen-Gladbach, Fed. Rep. of Germany

Filed Apr. 12, 1989, Ser. No. 337,557

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1988, 3812493

Int. Cl.⁵ F16B *7/04*

U.S. Cl. 403—313 17 Claims



1. Releasable connection for hollow tubular metal sliding yarn guide rods with ends in a textile machine, comprising at least one pressureproof solid insert being disposed within and completely filling the rod ends, and a metal clamping socket fitting flush over the rod ends for transmitting force, releasable clamping screws clamping said metal clamping socket for holding and frictionally engaging the rod ends in slide-free contact with said at least one insert and said clamping socket under changing loads.

5,026,200

RELEASABLE CONNECTOR

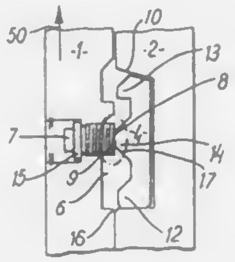
Bernard H. van Bilderbeek, Aberdeen, United Kingdom, assignor to Plexus Pipe Products Limited, Aberdeen, Scotland

Filed Jun. 28, 1990, Ser. No. 546,020

Claims priority, application United Kingdom, Jun. 29, 1989, 8914931

Int. Cl.⁵ B25G *3/18*

U.S. Cl. 403—322 9 Claims



1. A releasable connector for connecting a first member to a second member, said members being adapted to be inserted one within the other, comprising a lock element located in a recess in a surface of said first member; biasing means to bias said lock element to a first position in which said lock element extends from said recess to engage a shoulder on said second member to lock said first member to said second member against withdrawal; and a movable release device located on said second member whereby actuation of said release device causes a surface of said release device to co-operate with a surface of said lock element to move said lock element to a second position, against the action of said biasing means, in which said lock element is disengaged from said shoulder on said second member with the cooperating surface of said release device terminating spaced from said recess in said first member, the lock element being configured such that during withdrawal of said members one from the other said lock element is moved to a third position in which said lock element is further into said recess than in said second position.

5,026,201

FASTENING DEVICE

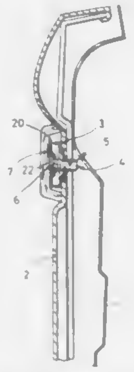
Klaus-Dieter Dehn, Mainz-Kostheim; Hans-Peter Weidner, Russelsheim, and Eberhard A. Storch, Walldorf, all of Fed. Rep. of Germany, assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 11, 1990, Ser. No. 507,220

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1989, 39124347

Int. Cl.⁵ F16D *1/00*

U.S. Cl. 403—407.1 4 Claims



1. Device for attaching a component to a support comprising:

a receptacle element mounted on the support and having a plurality of receptacle openings therein and having opposed facing clamp springs projecting into the receptacle openings, and a plurality of clamp bodies rotatably mounted on the component and arranged to register with the receptacle openings, each such clamp body being a cylindrical shank and having flattened surfaces on the opposite sides thereof, the rotation of the clamp bodies to a first rotary condition aligning the flattened surfaces with the clamp springs permitting the insertion of the clamp bodies into the receptacle openings, the rotation of the clamp bodies 90 degrees from the first rotary condition causing the cylindrical shank to engage with the clamp springs to thereby attach the component to the support.

5,026,202

SIDEWALL EXTENSION MEMBER FOR A DRAINAGE CHANNEL

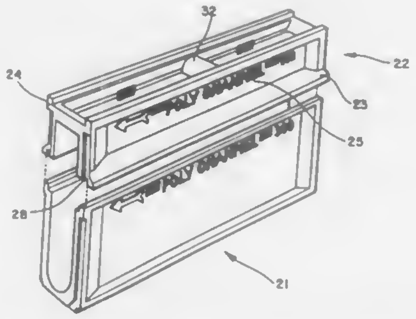
Roland Thomann, Hehlstrasse 6, 8135 Langnau, Switzerland

Filed Nov. 30, 1989, Ser. No. 443,763

Claims priority, application Switzerland, Nov. 30, 1988, 4446/88

Int. Cl.⁵ E01F *5/00*

U.S. Cl. 404—4 12 Claims



1. In a drainage channel system of the type characterized by a plurality of drainage channel segments of progressively greater depth adapted to be interlocked end-to-end to provide a below grade gravity feed sloping drainage run of a predetermined length, each of said channel segments comprising a pair of opposing, spaced-apart side walls, a bottom wall connecting said side walls adjacent one end thereof, and a top opening opposite said bottom wall, said side walls and said bottom wall defining a fluid carrying space therebetween and said top opening defining a fluid entrance adapted to receive a grate; the combination therewith of a sidewall extension member comprising:

(a) first and second sidewall extension panels formed of a cementitious material for being positioned on and received and supported by respective side walls of the drainage channel in longitudinally extending alignment therewith, said first and second sidewall extension panels defining a fully unobstructed bottom opening communicating with the top opening of said drainage channel, opposing end openings and an opposing top opening; and

(b) first and second spaced-apart crossbars extending across said sidewall extension member from said first sidewall extension panel to said second sidewall extension panel to connect the first and second sidewall extension panels together into a unit.

5,026,203

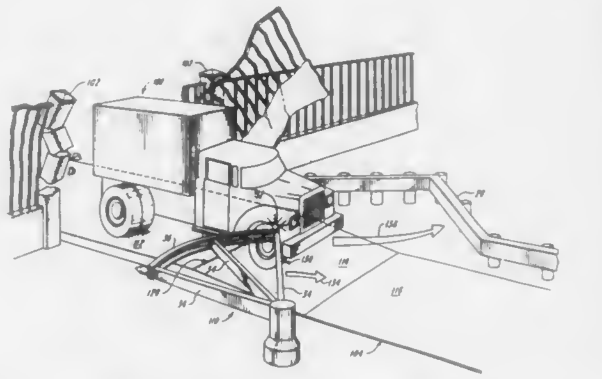
FRICTION REDUCTION FOR TERRORIST VEHICLE ARRESTING SYSTEM

Alexander M. Gorlov, Brookline, Mass., assignor to Flexible Barricades, Inc., Watertown, Mass.

Filed Mar. 16, 1990, Ser. No. 495,265

Int. Cl.⁵ E01E *13/00*

U.S. Cl. 404—6 6 Claims



1. A system for deflecting a terrorist vehicle so that the terrorist vehicle is prevented from proceeding down a driveway comprising:

a crash barrier to one side of said driveway;

means for deflecting an oncoming vehicle away from its original direction of travel and into said crash barrier;

means for removably positioning said deflecting means in said driveway including means for removing said deflecting means from a position in the driveway for normal vehicular traffic; and,

means for causing the front wheels of said vehicle to leave the driveway just prior to impact of said deflecting means with said vehicle.

5,026,204

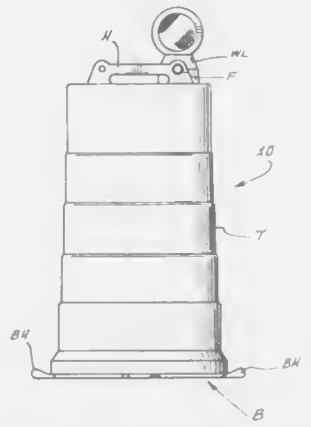
TRAFFIC CONTROL ELEMENT AND METHOD OF ERECTING AND STABILIZING SAME

Jack H. Kulp, San Juan Capistrano, Calif.; John D. McKenney, Taos, N. Mex., and James P. Sullivan, Orange, Calif., assignors to TrafFix Devices, Inc., San Clemente, Calif.

Filed Nov. 29, 1989, Ser. No. 443,517

Int. Cl.⁵ E01F *9/00*

U.S. Cl. 404—10 36 Claims



1. A base element for a two-piece traffic control element comprising a molded plastic base element having a dome-like external shape and pre-selected hollow configuration for storing a pre-selected quantity of ballast means within the hollow, and having an opening for introducing ballast means within the hollow, ballast means comprising loose, particulate material

VOL
1127
ISS
4
JE
25
1991
UMI

packed for filling the hollow portion of the base element and means for securing the base opening to prevent any loss of the ballast means from the base element and to maintain the ballast means in place within the base element, the thus defined and ballasted base element permitting reusability of the base element, including after being subjected to the weight of a motor vehicle thereon traveling thereover.

5,026,205

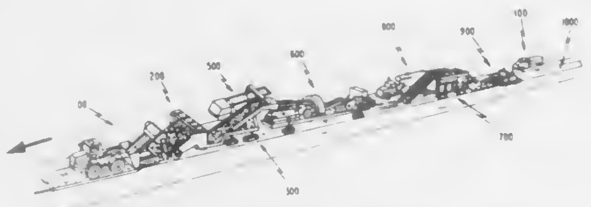
APPARATUS AND METHOD FOR CONTINUOUSLY REMOVING EXISTING REINFORCED PAVEMENT AND SIMULTANEOUSLY REPLACING THE SAME BY A NEW PAVEMENT

George L. Gorski, and Donald D. Zamzow, both of P.O. Box 358, Wausau, Wis. 54402-0358

Continuation-in-part of Ser. No. 292,053, Dec. 20, 1988. This application Dec. 29, 1989, Ser. No. 456,796

Int. Cl.^{5} E01C *23/12. 19/46*

U.S. Cl. 404—72 **17 Claims**



15. A method for continuously replacing pavement by breaking up and removing existing reinforced pavement, simultaneously separating a bulk component thereof from a reinforcement component and delivering small pieces thereof in two separate flows for utilization of the recovered bulk component pieces in forming the replacement pavement, comprising the steps of:

- forcibly driving a flexibly suspended acute-angled elongate wedge having a horizontal forward edge under an approaching portion of reinforced pavement;
- applying a first plurality of blows onto an upper surface of reinforced pavement over an upper surface of the wedge to crack the reinforced pavement;
- applying a second plurality of blows onto an upper surface of the cracked reinforced pavement supported over a plurality of spaced-apart bars to break up into small pieces a bulk component of the reinforced pavement from a reinforcement component thereof;
- applying a cutting force to cut the reinforcement component into small pieces;
- delivering the small pieces of the bulk component and the reinforced component separately; and,
- rendering at least a first portion of the small pieces of the bulk component into smaller pieces within a first size range to form a first aggregate;
- mixing a binder material with said first aggregate to form replacement pavement material therefrom.

5,026,206

PAVEMENT AND BASE RECYCLE METHOD AND APPARATUS

Patrick L. O'Connor, 4343 Hough Rd., Dryden, Mich. 48428

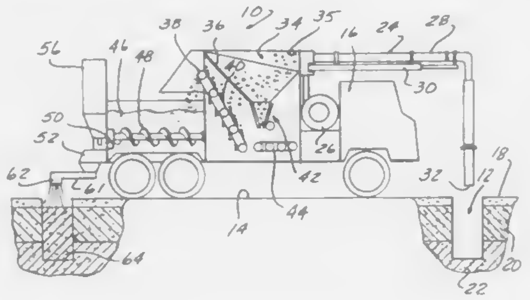
Filed Mar. 30, 1990, Ser. No. 501,876

Int. Cl.^{5} E01C *7/06*

U.S. Cl. 404—77 **24 Claims**

1. A method for refilling an opening in a section of pavement and through the underlying pavement base material comprising the steps of:

- transferring a quantity of broken pavement and underlying base material from an opening in the pavement;
- mixing the transferred material with predetermined quantities of water and a binder material to form a fluid, unshrinkable, settable filler mixture; and



- applying the filler mixture to the opening in the section of pavement.

5,026,207

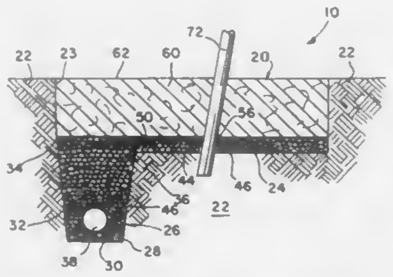
RECREATIONAL AREA CONSTRUCTION

Robert G. Heath, 823 West St., Harrison, N.Y. 10528

Continuation of Ser. No. 403,447, Sep. 6, 1989, abandoned, which is a continuation of Ser. No. 227,817, Aug. 3, 1988, abandoned. This application Dec. 18, 1989, Ser. No. 451,931

Int. Cl.^{5} E02B *13/00*

U.S. Cl. 405—46 **11 Claims**



1. A recreational area construction, comprising:

- a base;
- a plurality of borders forming a perimeter around said base;
- a layer of water pervious fabric-like material on the base between the borders;
- a layer of resilient material support on top of said layer of water pervious material, said resilient material comprising an open mesh body formed by a tangled mass of strands having a substantial depth and defining a drainage means for enhancing drainage of water away from said recreational area construction and improving the cushioning of said area; and
- a top layer of cushioning materal above the layer of water pervious fabric-like material, said layer of water pervious material enabling water to flow down to the base and percolate naturally into the ground and allowing water to flow upwardly therethrough under hydrostatic pressure, while preventing contamination of the cushioning material by said base material and also strengthening said construction.

5,026,208

PROCESS FOR THE DISPOSAL OF WASTE

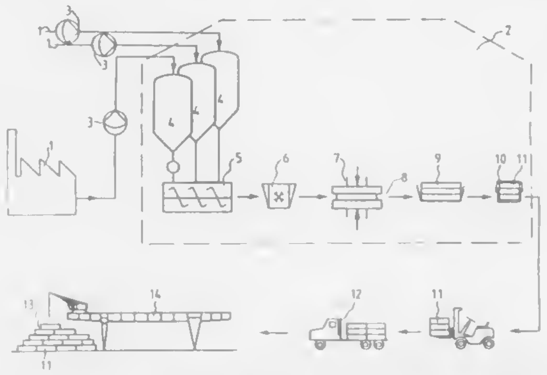
Joachim Beyer, Odenthal; Bernd Koglin, Bergisch-Gladbach; Rolf Rink, Cologne, and John-Edwin Roth, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 27, 1989, Ser. No. 441,803

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1988, 3842215

Int. Cl.^{5} E02D *3/08*

U.S. Cl. 405—129 **23 Claims**



1. A process for the disposal of solid waste, comprising: compacting granular bulk material of solid waste without coarse fractions under high pressure of at least 10 bar to form coherent and highly stabilized blocks or boards having low elutability and low permeability, wrapping the blocks or boards in a film or foil in a dust-tight and water-tight manner, and depositing the wrapped blocks or boards into a dump in a regular and brick-like assembly.

5,026,209

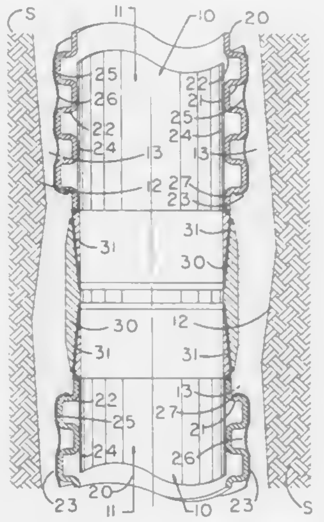
CONTAINMENT CASING FOR A DEEP WELL GRAVITY PRESSURE REACTOR VESSEL

James A. Titmas, Kent, and Robert A. Saffian, Akron, both of Ohio, assignors to Eau-Viron Incorporated, Hudson, Ohio

Filed Aug. 4, 1989, Ser. No. 389,639

Int. Cl.^{5} E21B *36/00, 43/24*

U.S. Cl. 405—133 **5 Claims**



1. A containment casing for a gravity pressure reactor vessel wherein the casing is positioned inn a bore in the earth and held in place by a grouting material, the casing comprising a plurality of casing sections each including a wall portion having an interior and an exterior side, said wall portion having corrugations therein, an inner liner attached to the interior side of said wall portion, and an outer liner on said wall portion between said exterior wall and the grouting material, sad inner liner not intruding into said corrugations, said outer liner including indentations extending slightly into said corrugations in said wall portion.

5,026,210

OFFSHORE SUPPORT STRUCTURE METHOD AND APPARATUS

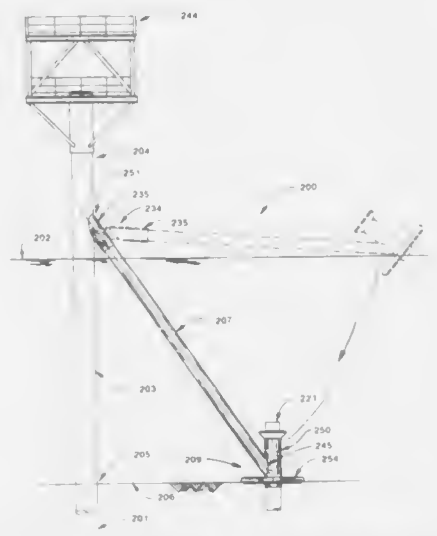
Samuel C. Carruba, Houston, Tex., assignor to CBS Engineering, Inc., Houston, Tex.

Filed Apr. 3, 1990, Ser. No. 503,704

The portion of the term of this patent subseqnent to Apr. 4, 2006, has been disclaimed.

Int. Cl.^{5} E02B *17/00*

U.S. Cl. 405—203 **10 Claims**



1 A support structure for use with a well located in a body of water, the well having an upstanding conductor pipe having upper and lower ends, extending from the ground below the body of water to, above the surface of the water, comprising:

- two tubular legs, each leg having upper and lower ends and adapted to extend from the ground to at least the surface of the water;
- a pile skirt fixedly secured to each of the two legs, at the lower end of each of the two legs; and
- means for pivotably connecting the upper ends of each of the two legs to the conductor pipe, the two legs being radially spaced from one another, the pivotal connection means being adapted to be disposed upon the conductor pipe at least at the surface of the water or higher, whereby the two legs and pivotal connection means can be secured at their upper ends to the conductor pipe and the lower ends of the legs can be pivoted downwardly into contact with the ground.

5,026,211

WATER-BASED CORRECTIONAL FACILITY AND SYSTEM, AND METHOD OF MAKING THE SAME

Victor R. Schellenberg, Hampton; James Zsoldos, Grafton; Joy L. Hartman, Chesapeake, all of Va.; William H. Smith, deceased, late of Newport News, Va. by Monteen B. Smith, executor ; Wilbur T. Covington, Grafton, and Allen Conley, Tabb, both of Va., assignors to Newport News Shipbuilding and Dry Dock Company, Newport News, Va.

Filed Sep. 22, 1988, Ser. No. 247,608

Int. Cl.^{5} E02B *17/00;* E04H *3/08*

U.S. Cl. 405—204 **47 Claims**

1. A water-based correctional facility, comprising:

- a ship hull in contact with a bottom of a body of water;

VOL
1127
ISS
4
JE
25
1991
UMI

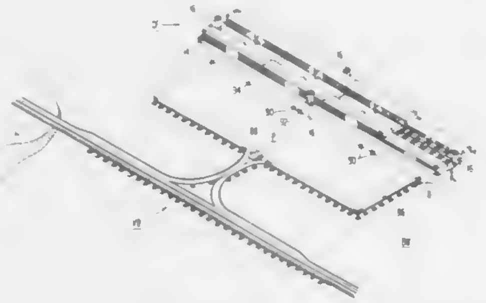
a main level supported by said hull, said main level including a cambered deck;

a multiplicity of prison cells located above said main level;

leveling means supported by said cambered deck, said leveling means having an upper and lower surface, said lower surface conforming to said cambered deck and said supper surface being substantially flat, said leveling means providing a substantially flat main level portion wherein at least some of said multiplicity of prison cells are at least partially supported on top of said main level portion;

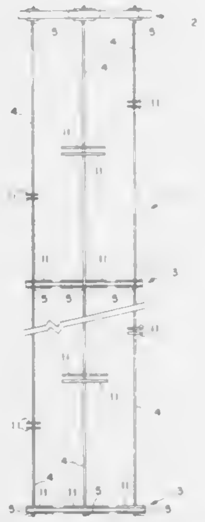
said leveling means being substantially continuous eliminating void spaces below said prison cells along the length and width of said ship; and

a perimeter security means encompassing said prison cells for preventing prison inmates from escaping the correctional facility.



5,026,212
APPARATUS FOR THE COMBATTING OF MARINE GROWTH ON OFFSHORE STRUCTURES

Christopher N. Do, Damansara Utama, Malaysia, assignor to IEV International Pty. Limited, Malaysia
PCT No. PCT/AU88/00139, § 371 Date Nov. 6, 1989, § 102(e) Date Nov. 6, 1989, PCT Pub. No. WO88/08808, PCT Pub. Date Nov. 17, 1988
PCT Filed May 13, 1988, Ser. No. 439,353
Claims priority, application Australia, May 15, 1987, PI1958
Int. Cl.⁵ E02D *5/60*
U.S. Cl. 405—211 **3 Claims**



1. Apparatus for the combatting of marine growth on offshore marine structures, said apparatus being adapted to surround a submerged structural support member of said structure and to scrape marine growth therefrom, said apparatus being powered by utilization of ocean forces in the form of waves, swells, tides and currents; said apparatus comprising:

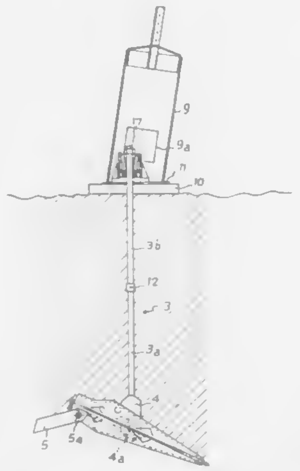
a floating ring and at least one submerged ring connected thereto in spaced apart array by linking members disposed substantially parallel to said submerged structural support member so that said rings surround said submerged structural support member;

said floating ring including a plurality of cleaning bars linked together via hinge members to thereby constitute a flexible cleaning collar, each cleaning bar having attached thereto a cleaning member provided with a non-metallic, submerged structural support member-engaging roller and one or more detachable flotation blocks of sufficient volume to buoy up the apparatus, said cleaning member acting to remove marine growth by a continuous hammering action generated in response to said ocean forces; and

said at least one submerged ring including a plurality of cleaning bars linked together via an equal plurality of scraper blades to thereby constitute a flexible cleaning collar, each submerged cleaning bar being provided with a wire brush, said scraper blades and wire brushes being adapted to engage said submerged structural support member.

5,026,213
METHOD AND APPARATUS FOR MAKING A FOUNDATION BY CREATING A BLOCK CONSTITUTED BY THE GROUND ITSELF

Pierre Habib, Paris; Andre Martin, Toulon, and Minh P. Luong, Vigneux/Seine, all of France, assignors to Technologie Speciales Ingenierie -T.S.I., Toulon, France
PCT No. PCT/FR88/00549, § 371 Date Jun. 21, 1989, § 102(e) Date Jun. 21, 1989, PCT Pub. No. WO89/04402, PCT Pub. Date May 18, 1989
PCT Filed Nov. 8, 1988, Ser. No. 381,746
Claims priority, application France, Nov. 9, 1987, 87 15654
Int. Cl.⁵ E02D *27/28*
U.S. Cl. 405—229 **14 Claims**



1. A method of making a foundation by creating a block constituted by prestressed ground, for holding a structure means to be built on the surface of the ground, said method comprising establishing at least one deep anchor point by using anchor means buried underground by pile-driving, said anchor means comprising extensions, extending up to the surface of the ground, in order to project beyond said surface,

placing a slab on the surface of the ground, said slab including at least one opening for passing the said extensions, which extend from said anchor means, said extensions being connected to traction means, and said anchor means being able to pivot around a transversal axis and substantially parallel to the surface of the ground,

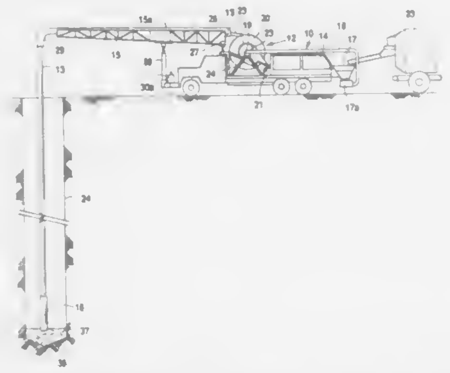
the method further comprising the following steps:

exerting an action to said traction means, from the surface of the ground, first to the said anchor means, so that an underground effect of abutment against the ground can be obtained by suitable means of said anchor means for taking up a position, which is substantially parallel to the surface of the ground, on which said slab is disposed, and,

pursuing the traction to be exerted on the said slab, in order to prestress the ground between said anchor means and said slab, by using the said traction means situated above said slab to put the said anchor means under tension, until an in-service force is obtained, suitable for holding the said structure means.

5,026,214
APPARATUS FOR PLACING CEMENTITIOUS MATERIALS IN EARTH EXCAVATIONS

August H. Beck, III, 206 Northcrest, San Antonio, Tex. 78213
Filed Jul. 13, 1989, Ser. No. 379,429
Int. Cl.⁵ E02D *15/00*
U.S. Cl. 405—240 7 Claims



1. A mobile apparatus for placing cementitious material into a construction excavation comprising:

a reel mounted flexible hose means for connecting to a cementitious material pump and for extending a hose mounted thereon into and out of a construction excavation;

an elongate boom for supporting said hose means and guiding said hose means in a substantially linear path along the length of said boom between proximal and distal ends thereof, said boom being pivotally connected at a pivot point to a frame and extending from said frame for positioning the distal end of the boom above a pour point of the construction excavation, said distal end further having a radius bend for directing the hose downwardly from a distal end of said boom;

means for pivoting said boom relative to said pivot point in a vertical plane for raising and lowering the distal end of said boom to position the distal end over the construction excavation pour point; and

weight means on the end of the hose to cause the hose end to sink to the bottom of the construction excavation pour point so that cementitious material pumped through the hose will fill the construction excavation with cementitious material and the hose will remain in a desired position.

5,026,215
METHOD OF GROUTING FORMATIONS AND COMPOSITION USEFUL THEREFOR

William J. Clarke, Ridgewood, N.J., assignor to Geochemical Corporation, Ridgewood, N.J.
Filed Dec. 2, 1988, Ser. No. 278,970
The portion of the term of this patent subsequent to Jan. 30, 2007, has been disclaimed.
Int. Cl.⁵ E02D *3/12;* C04B *7/14;* C09K *17/00*
U.S. Cl. 405—266 **20 Claims**

1. In a method of grouting formations, which comprises injecting into a formation a composition, the improvement wherein the composition comprises:

(a) water;

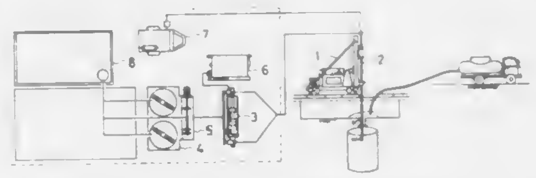
(b) particulate slag comprising a microfine slag having a specific surface area greater than about 9,500 cm^2/g with less than 3 wt. percent of the particles of said slag being larger than 7.8 micrometers in diameter; the proportions of water and slag being within a water to slag weight ratio of between 0.5:1 and 10:1;

(c) at least one dispersant in an amount effective to disperse the particles of said particulate slag; and

(d) an accelerator in an amount effective to provide hydraulic reactivity to said slag.

5,026,216
SHAFT CONSTRUCTION METHOD

Yoshinobu Koiwa, 172-14, Kotehashicho, Chiba-shi, Chiba-pref., Japan, assignor to Yoshinobu Koiwa, Chiba, Japan
Filed Mar. 23, 1989, Ser. No. 328,052
Claims priority, application Japan, Mar. 31, 1988, 63-79049; Apr. 11, 1988, 63-88622
Int. Cl.⁵ E02D *3/12, 5/46*
U.S. Cl. 405—267 **5 Claims**



1. A method for constructing a shaft comprising:

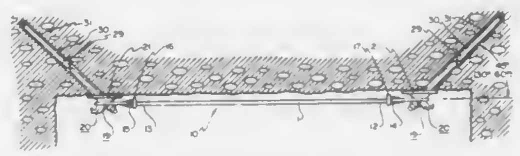
injecting air and a ground hardener in a depthwise direction through a revolving jetting element and forming a columnar mixed region of soil and hardener in the ground;

injecting an inhibitor which inhibits the hardening of the hardener into the columnar mixed region in a depthwise direction through the jetting element at a pressure producing a diameter that is smaller than the diameter of the columnar mixed region, and

removing the portion of the ground the hardening of which was inhibited by the inhibitor.

5,026,217
MINE ROOF SUPPORT TRUSS AND COMPONENTS

Ben L. Seegmiller, 143 S. 400 East, Salt Lake City, Utah 84111
Filed May 14, 1990, Ser. No. 522,784
Int. Cl.⁵ E21D *21/00*
U.S. Cl. 405—288 **12 Claims**



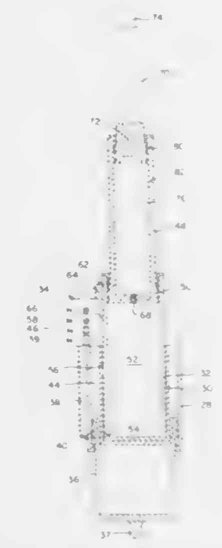
1. In combination, a mine roof support bracket for a truss and comprising a first portion having an upper bearing surface for engaging an exposed mine roof surface, and a horn portion

VOL
1127
ISS
4
JE
25
1991
UMI

part of and depending from said first portion, said horn portion having a rear reaction surface; an elongated U-shaped stirrup operatively horizontally disposed for the application of tension and engaging said reaction surface, said horn portion also being provided with a vertically raised, J-shaped lip means, forming an upwardly facing stirrup-support cradle, and disposed beneath and contiguous with said reaction surface for preserving truss integrity and supporting said stirrup when in a vertical hanging position in said cradle in non-tensioned condition, said vertically raised, J-shaped lip means being dimensioned to extend horizontally beyond said U-shaped stirrup for both operative-horizontal and vertical-hanging positions of said stirrup, the combination of said first portion and said horn portion being provided with an upwardly and outwardly canted aperture for receiving an external anchor bolt.

5,026,218
TEMPORARY ROOF SUPPORT CYLINDER

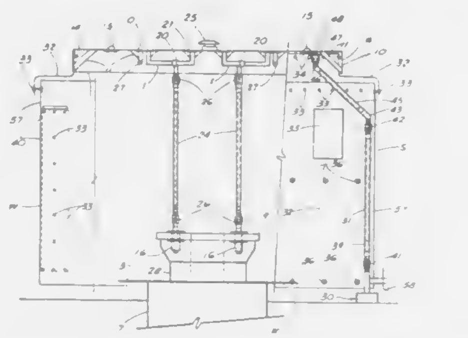
Joseph J. Zimmerman, Franklin, Pa., assignor to Joy Technologies Inc., Pittsburgh, Pa.
Filed Nov. 16, 1989, Ser. No. 437,486
Int. Cl.⁵ E21D *15/44*
U.S. Cl. 405—290 7 Claims



1. A support jack apparatus, comprising:
a. an outer elongated member;
b. an inner elongated member disposed coaxially within and attached to said outer member so as to form a first chamber between said outer member and said inner member opening in a first direction, said inner member forming a second chamber opening in a second direction opposite from said first direction;
c. a first piston coaxially disposed within said first chamber, said first piston being mounted for longitudinal displacement relative to said outer member;
d. means for longitudinally displacing said first piston relative to said outer member;
e. a sleeve piston having a second piston, said sleeve piston being coaxially disposed within said inner member and mounted for longitudinal displacement relative thereto, said sleeve piston forming a third chamber opening in said second direction;
f. means for longitudinally displacing said sleeve piston relative to said inner member;
g. a piston rod having a third piston, said piston rod being coaxially disposed within said third chamber and mounted for longitudinal displacement relative thereto; and
h. means for longitudinally displacing said piston rod relative to said sleeve piston.

5,026,219
PORTABLE WELLHEAD AND WELDER PROTECTOR SYSTEM

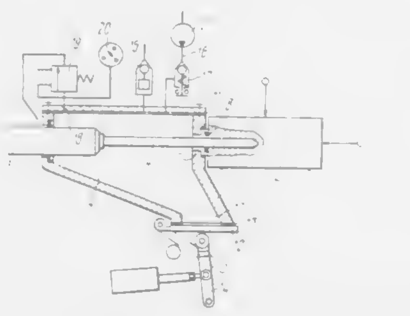
Henry Wallace, 58 Mason St., Gretna, La. 70053
Continuation of Ser. No. 241,965, Sep. 8, 1988, Pat. No. 4,865,490. This application Aug. 28, 1989, Ser. No. 399,770
Int. Cl.⁵ E02B *17/02;* E21B *7/12*
U.S. Cl. 405—303 26 Claims



1. A portable wellhead and welder protector system for a wellhead on a well, comprising:
adjustable support means for supporting said wellhead and welder protector, said support means comprising:
  a. adjustable connection means for connecting said support means to the wellhead,
  b. telescoping support means emanating from said adjustable connection means, said telescoping support means adjustably extending the height of said wellhead and welder protector,
  c. connection means for connecting said telescoping support means to said overhead protection means;
overhead protection means associated with said adjustable support means, said overhead protection means comprising a surface designed to protect occupants, the wellhead and well from overhead falling objects and liquids;
side wall means associated with said overhead protection means, said side wall means vertically projecting downward around the periphery of said overhead protection means.

5,026,220
DEVICE FOR SUPPLYING LUBRICATING-AND-COOLING AGENT TO CUTTING TOOLS

Lev G. Yudovin, ulitsa Uralskaya, 10, kv. 26, and Boris G. Sergeev, ulitsa Ya. Kolosa, 84, kv. 18, both of Minsk, U.S.S.R.
PCT No. PCT/SU88/00163, § 371 Date Apr. 23, 1990, § 102(e) Date Apr. 23, 1990, PCT Pub. No. WO90/02021, PCT Pub. Date Mar. 8, 1990
PCT Filed Aug. 23, 1988, Ser. No. 477,825
Int. Cl.⁵ B23B *41/02, 51/06*
U.S. Cl. 408—56 2 Claims

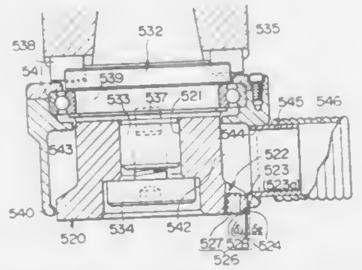


1. A device for supplying coolant to a cutting tool comprising:

a housing defining a space and having an end face, a hole adapted to receive an arbor carrying a cutting tool, a first seal mounted on the end face in a zone of interaction between the cutting tool and a workpiece being machined, a first piping for transporting coolant to the housing, a second piping for withdrawing coolant from the housing, a chip disposal opening communicating with the space, said opening and said space arranged on opposite sides with respect to the end face of the housing in the zone of interaction, a safety valve operatively connected to the second piping, and a second seal in the hole adapted to receive the arbor.

5,026,221
ROTARY CUTTING TOOL

Tatsuo Arai; Hidehisa Shiratori; Ryoei Hasegawa, and Kazuo Iizuka, all of Tokyo, Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan
Filed May 11, 1990, Ser. No. 521,973
Claims priority, application Japan, May 11, 1989, 1-54052; Aug. 15, 1989, 1-210360; Mar. 28, 1990, 2-32011; Mar. 28, 1990, 2-32012; Mar. 28, 1990, 2-32013
Int. Cl.⁵ B23C *7/00*
U.S. Cl. 409—137 28 Claims

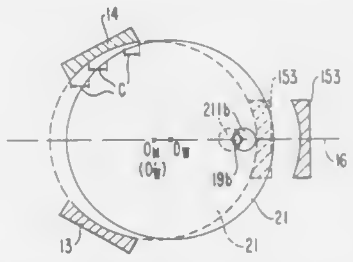


1. A rotary cutting tool comprising a cutter body having a rotational axis therethrough and having forward and proximal ends, cutting means provided on the outer periphery of said cutter body and chip suction means attached to said cutter body for drawing chips generated by said cutting means, said chip suction means including:
generally cylindrical cover means supported by said cutter body for rotation relative thereto and covering the outer peripheral surface of the forward end of said cutter body so as to define a chip accommodating chamber between said cover means and the outer peripheral surface of said cutter body;
a chip guide member arranged at the forward end of said cutter body in facing relation to said cutting means for guiding the chips generated by said cutting means to said chip accommodating chamber; and
suction port means provided on said cover means so as to be communicated with said chip accommodating chamber.

5,026,222
PIN FOR USE IN A WORKPIECE CLAMPING APPARATUS

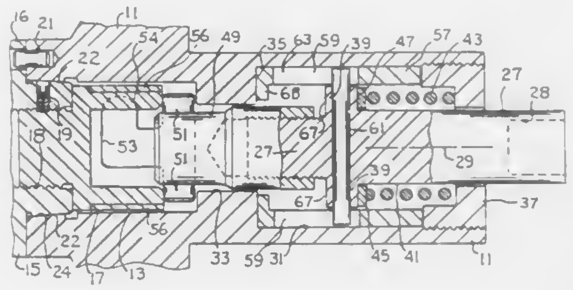
Satoshi Kawano, Tamamura; Yoshio Kimura, Maebashi, and Eiji Fukushima, Fujimi, all of Japan, assignors to Sanden Corporation, Japan
Division of Ser. No. 316,099, Feb. 28, 1989, Pat. No. 4,930,955. This application Mar. 8, 1990, Ser. No. 490,385
Claims priority, application Japan, Feb. 28, 1988, 63-44495
Int. Cl.⁵ B23Q *3/00*
U.S. Cl. 409—225 10 Claims

1. A chuck for clamping a discoid portion of a workpiece, said chuck including a base, at least two fixed clamps secured on a front end surface of said base, a movable clamp adjacent to said front end surface and movable toward said two fixed clamps, and a pin secured to said front end surface of said base and adapted to fit within a hole formed in said discoid portion when said discoid portion is mounted on said chuck, the improvement comprising:
said pin having a generally rhombic transverse section with a long diagonal and a short diagonal, said pin being truncated by a predetermined amount at each end thereof along said long diagonal to allow the workpiece to move a limited distance relative to said pin along a line formed by said short diagonal.



5,026,223
BAYONET TOOL LOCKING DEVICE

Carl E. Hunt, White Lake, Mich., assignor to GTE Valenite Corporation, Troy, Mich.
Filed Dec. 20, 1990, Ser. No. 630,589
Int. Cl.⁵ B23C *5/26*
U.S. Cl. 409—233 11 Claims



11. In a cutting machine: the improvement comprising a tool holder having an exposed face, a pocket inset into said exposed face to define a tapered mouth surface; a large diameter axial bore in said holder spaced axially from said pocket to define a radial shoulder; a reduced diameter connector bore extending through the holder between the pocket and the radial shoulder; a tool insertable axially into said pocket, said tool holder having a tapered shank adapted to abut against said tapered mouth surface; a rotary drawbar extending through the axial bore into the connector bore; spring means biasing said drawbar toward the pocket; a nose element having a threaded connection on the drawbar for floating disposition with the connector bore; said nose element having a radial lock pin, and said tool having oppositely directed bayonet slots whereby the biasing action of the spring means enables the lock pin to move into the bayonet slots; a rotary sleeve within said axial bore in surrounding relation to said drawbar, said sleeve having an axial slot and a circumferential slot extending from the axial slot; said sleeve having a radial flange in near proximity to said radial shoulder; said drawbar having a radial connector element extending into said axial slot so that the sleeve can rotate with the drawbar; said nose element being threaded onto the drawbar so that when the lock pin is within the bayonet slots the drawbar and nose element can rotate together until the lock pin reaches the blind ends of the bayonet slots, after which the nose element ceases to rotate while the drawbar continues to rotate, whereby the thread action between the nose element and drawbar moves the lock pin axially to produce pressure en-

VOL
1127
ISS
4
JE
25
1991
UMI

gagement between the tapered shank and the tapered mouth surface; said drawbar being rotatable so that said radial connector element moves into the associated circumferential slot, whereby the thread action between the nose element and drawbar causes the sleeve flange to be squeezed between the radial shoulder and the drawbar.

5,026,224

TOOL ASSEMBLY

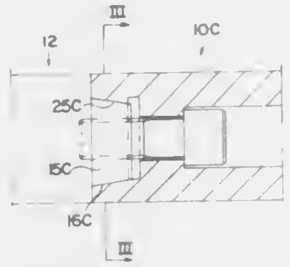
Ken G. E. Andersson, Årsunda; Sven E. O. Engstrand, Sandviken, and Lars G. Asberg, Järbo, all of Sweden, assignors to Sandvik Aktiebolag, Sandviken, Sweden

Division of Ser. No. 268,717, Nov. 9, 1988, Pat. No. 4,934,883, which is a division of Ser. No. 181,379, Apr. 14, 1988, Pat. No. 4,834,597. This application Feb. 9, 1990, Ser. No. 477,752

Claims priority, application Sweden, Apr. 21, 1987, 8701621

Int. Cl.^{5} B23C *5/26;* B23B *31/11*

U.S. Cl. 409—234 **8 Claims**



1. A tool component for a tool assembly, said component adapted to be connected to another element of the assembly, said component comprising a body defining a front-to-rear extending center axis, said body including a rearwardly facing surface and a truncated conical recess extending rearwardly from said rearwardly facing surface and adapted to receive a correspondingly configured projection of the other element, a portion of said rearwardly facing surface disposed laterally outwardly of said recess defining a support surface engageable with the other element, said recess being non-circular in a cross-section taken perpendicular to said center axis so as to be rendered non-rotatable relative to the other element when receiving the projection thereof, said recess including a rearwardly open hole extending along said axis and a threaded fastening bolt disposed in said hole to draw the projection into said recess.

5,026,225

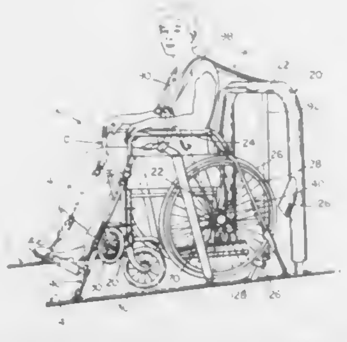
PASSENGER AND WHEELCHAIR SECUREMENT SYSTEM FOR VEHICLES

Jack L. McIntyre, 6423 - 174th SW., Lynnwood, Wash. 98037

Continuation-in-part of Ser. No. 181,562, Apr. 14, 1988, abandoned. This application Mar. 3, 1989, Ser. No. 319,369

Int. Cl.^{5} B60P *7/08*

U.S. Cl. 410—23 **3 Claims**



1. In a vehicle having a floor area for securement of a wheelchair having frame structure, securement system improvements comprising:

a) elongated tie-down track means secured to said vehicle floor area, said elongated tie-down track means including spaced apart and generally parallel tie-down track sections having a series of attachment means along the length thereof at predetermined intervals, each of said spaced apart track sections being located on the floor to secure a side of said wheelchair frame structure,

b) first securement belt means for said wheelchair frame structure, said first belt means including belt means for the forward and rearward parts of said frame structure on each side thereof so that four said first securement belt means attach to said attachment means on said track sections and attach to said forward and rearward parts of said wheelchair frame structure to securely hold said wheelchair in its designated floor area,

c) wheelchair occupant belt securement means including a lap belt means which secures to track sections at both ends thereof at either side of said wheelchair and which detachably buckles between the ends thereof, and

d) occupant shoulder harness means having a floor strap one end of which attaches to anchoring means to the rear of and generally central to said track sections and which said harness means includes a double shoulder strap portion so that one shoulder portion passes over each shoulder of the occupant, each said shoulder portion detachably connecting to said lap belt and converging to be connected to each other to the rear of the occupant, wherein the occupant belt securement means is independent of said wheelchair frame structure first securement belt means,

e) a "D" ring means disposed between said double shoulder strap means and said floor strap such that the floor strap is secured thereto and said double shoulder strap portion loops through and slides with respect to said "D" ring to permit the pressure on both shoulders of the chair occupant to be equalized by allowing said double shoulder strap means to slide through said ring,

f) stanchion means provided to the rear of said chair and attached to said track means independently of securement for said wheelchair frame and for said occupant, said "D" ring means of said shoulder harness means being located generally rearwardly of said occupant's shoulders and forwardly of said stanchion means so that said floor strap means passes over said stanchion means to said anchoring means to the rear of said stanchion.

5,026,226

MOTION ABSORBING DOCKING ASSEMBLY

James A. Hollowell, Northwood; Hal C. Wells, London, and Robert W. Robinson, Chessington, all of England, assignors to Marathon Oil Company, Findlay, Ohio

Filed Aug. 27, 1990, Ser. No. 573,956

Claims priority, application United Kingdom, Dec. 6, 1989, 8927609

Int. Cl.^{5} E02B *17/00*

U.S. Cl. 405—211 **16 Claims**

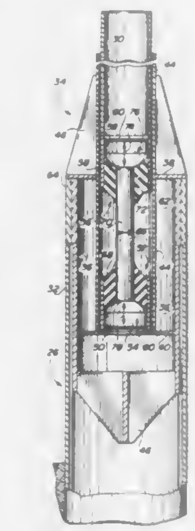
1. Apparatus for use in docking a jacket over a subsea template, comprising:

a docking pile secured to the sea floor, the docking pile having an upper open-ended tubular portion;

a separate pile head assembly mounted in the upper portion of the docking pile;

a retractable pile head mounted in and extending upwardly from the pile head assembly;

the pile head being maintained in its upwardly extended condition by elastomeric shock cell means mounted in the pile head assembly; and



the elastomeric shock cell means being capable of absorbing downward movement of the pile head caused by contact with the jacket as the jacket is lowered to the sea floor.

5,026,227

CERMET SOLID END MILL

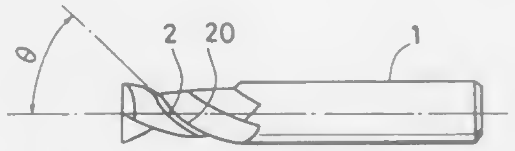
Masami Nishi, Kyoto; Kiyoshi Kishimoto, Osaka, and Haruo Matsumoto, Osaka, all of Japan, assignors to Kyocera Corporation, Kyoto, Japan

Continuation of Ser. No. 183,415, Apr. 18, 1988, abandoned, which is a continuation of Ser. No. 891,252, Jul. 28, 1986, abandoned. This application Oct. 3, 1989, Ser. No. 418,738

Claims priority, application Japan, Aug. 30, 1985, 60-192257; Feb. 28, 1986, 61-44355

Int. Cl.^{5} B23C *5/16*

U.S. Cl. 407—119 **11 Claims**



2. A solid end mill comprising a generally cylindrical body having a central axis, a shank portion and a cutting portion attached to said shank portion, said cutting portion comprising at least one helically extending cutting edge, wherein said at least one cutting edge has a helix angle in the range of about 40 to 50 degrees, said solid end mill consisting essentially of a NbC-TaC-TiC-TiN-based cermet composition comprising from greater than 0 greater to up to 50 weight percent of NbC in admixture with TaC, TiC and TiN.

5,026,228

TRUCK TRAILER WITH HYDRAULIC CARGO CONTAINER POSITIONING MECHANISM

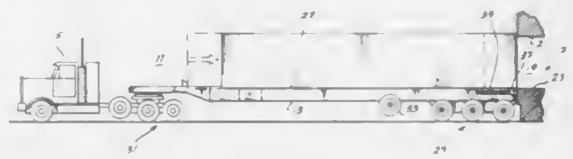
P. Michael Mansfield, 517 Central, Moses Lake, Wash. 98337

Filed Jan. 6, 1988, Ser. No. 202,890

Int. Cl.^{5} B65G *67/02;* B60P *1/64*

U.S. Cl. 410—52 **3 Claims**

1. In a wheeled vehicle of fixed length for transporting between destinations a large cargo container having a cargo entryway located at one end, said wheeled vehicle including an elongate frame and a set of wheels, said set of wheels being immovably attached to said frame at a fixed position adjacent to one end of said elongate frame, the improvement comprising a positioning mechanism located beneath said large cargo container for sliding said large cargo container along the longitudinal axis of said elongate frame of said wheeled vehicle between: (i) a loading and unloading position whereat said end of the cargo container containing a cargo entryway is vertically aligned with said one end of said frame of said wheeled vehicle; and, (ii) a traveling position whereat the container is longitudinally load centered between the wheels of the said wheeled vehicle, said positioning mechanism including: a horizontal bar positioned beneath said container such that the longitudinal axis of said bar lies orthogonal to the longitudinal axis of said wheeled vehicle; an attachment mechanism for attaching said horizontal bar to said container; and, a fluid powered movement mechanism for moving said bar along the longitudinal axis of said wheeled vehicle.



5,026,229

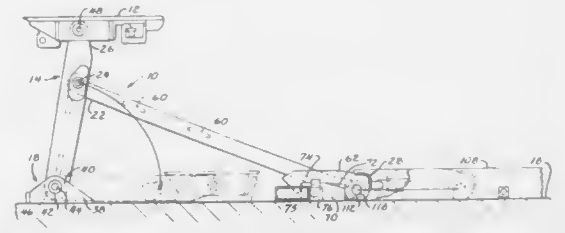
COLLAPSIBLE HITCH

Tibor Matyas, Lawrenceville, Ga., and Richard J. Vanderlinden, Fletcher, N.C., assignors to Trinity Industries, Inc., Dallas, Tex.

Filed Dec. 15, 1989, Ser. No. 451,214

Int. Cl.^{5} B60P *3/06*

U.S. Cl. 410—60 **8 Claims**



8. A collapsible load supporting apparatus adapted to be secured to a deck of a transport carrier, comprising a vertically extending strut assembly having an upper end adapted to support a load, a first pivotable means adapted to be rigidly secured to the deck and securing a lower end of said vertical strut assembly, a diagonally extending strut assembly having an upper end pivotally secured to said vertically extending strut assembly adjacent the upper end thereof, a locking hook assembly connected by a second pivotal means to a lower end of said diagonally extending strut assembly, spaced locking means adapted to be rigidly secured to said deck and engageable by said locking hook assembly for locking said vertically extending strut in an erected load supporting position, said spaced locking means defining a space therebetween, spaced anchor means for limiting the movement of said second pivotable means during erection of said apparatus, said anchor means comprising a pair of spaced anchor members rigidly secured with respect to each other and positioned in the space defined by said spaced locking means, said anchor means and said locking means defining therebetween a path for reciprocal movement of said lower end of said diagonally extending strut assembly, each locking means and adjoining anchor member further acting as guide means for movement of said lower end therebetween, release means disposed on either side of said locking means and rigidly secured to said deck and cooperatively engageable with said locking hook assembly for collapsing said load supporting apparatus, and retarding means secured to the deck and coupled to said locking hook assembly for retarding the collapse of said apparatus.

VOL
1127
ISS
4
JE
25
1991
UMI

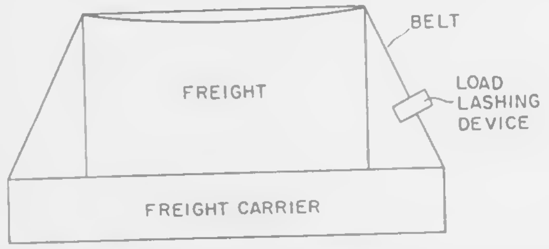
5,026,230
LOAD LASHING DEVICE WITH TENSIONER FOR USE ON A FREIGHT CARRIER

Udo Dolezych, Im Grund 26, 5804 Herdecke, and Rupprecht Graf, Frechen-Königsdorf, both of Fed. Rep. of Germany, assignors to Udo Dolezych, Herdecke, Fed. Rep. of Germany

Filed Feb. 12, 1990, Ser. No. 478,587

Int. Cl.⁵ B60P *7/10*

U.S. Cl. 410—100 **17 Claims**



1. Load lashing device with tensioner for use on a freight carrier having tensioning in a first direction between a first end and a second end of belt means comprising;

a first generally U-shaped element having a transverse wall substantially transverse to said first direction and two side walls extending from the opposite ends of said transverse wall along said first direction toward said first end of said belt means;

each of said side walls of said first element having an extended end remote from said transverse wall;

means for securing said extended ends of said side walls of said first element to said first end of said belt means;

a second generally U-shaped element having a transverse wall substantially transverse to said first direction and two side walls extending from opposite ends of said transverse wall along said first direction toward said second end of said belt means;

each of said side walls of said second element having an extended end remote from said transverse wall;

means for securing said extended ends of said side walls of said second element to said second end of said belt means;

said first and second U-shaped elements being positioned in interlocking relation with said sidewalls of said first and second elements positioned in overlapping relation and said respective transverse walls positioned oppositely of one another in spaced relation to form a housing;

said side walls of said first element each having a recess extending longitudinally on said side wall from said transverse wall to an edge spaced from said extended end remote from said transverse wall, said recesses on said side walls of said first element forming a slide;

said side walls of said second element each having a recess extending longitudinally on said side wall from said transverse wall to an edge spaced from said extended end remote from said transverse wall, said recesses on said side walls of said second element forming a slide;

said side walls of said first element being positioned on said slide of said second element side walls and said side walls of said second element being positioned on said slide of said first element side walls;

resiliently compressible biasing means disposed loosely between said transverse wall of said first element and said transverse wall of said second element within said housing;

said biasing means exerting a force on said oppositely positioned transverse walls with said respective side walls being guided in a longitudinal direction by movement on said respective slides of said first and second elements, and;

means for indicating the relative movement of said transverse wall of said first element and said transverse wall of said second element during compression of said biasing means by a tensile force applied between said first end of said belt means and said second end of said belt means.

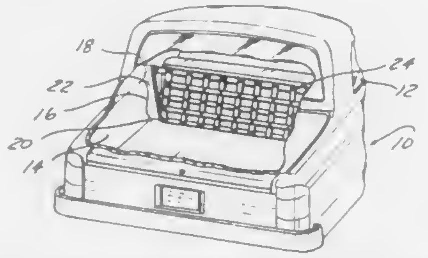
5,026,231
AUTOMOTIVE BARRIER NET

Donal Moore, Northville, Mich., assignor to Polytech Netting Industries, L.P.

Filed Jan. 25, 1990, Ser. No. 469,966

Int. Cl.⁵ B61D *45/00*

U.S. Cl. 410—118 **2 Claims**



1. In an automobile having a car body with a passenger compartment and a trunk compartment, the trunk compartment having a forward end with a top wall, a bottom wall, and two side walls extending upwardly and outwardly from the bottom wall, the improvement comprising:

a barrier net at the trunk forward end and suspended between the passenger compartment and the trunk compartment, the barrier net comprising:

flexible, substantially inelastic webbing, the webbing comprising:

a plurality of vertical, spaced straps;

a plurality of horizontal, spaced straps traversing the vertical straps; and

means for securing the vertical strap to the horizontal strap at each point where the two straps cross;

wherein a lower horizontal webbing strap has a length less than that of a middle horizontal webbing strap, and the middle horizontal webbing strap length is less than that of an upper horizontal webbing strap;

an aperture formed in each end of each of the lower, middle and upper horizontal webbing straps;

two mounting brackets each having two ends and a middle, and an aperture formed in each of the ends and the middle of both brackets;

screws receivable through each of the respective bracket apertures, each of the respective strap apertures and each respective aperture in the forward end side walls; and

nuts securing the respective screws to the forward end side walls.

5,026,232
BOUNDARY LAYER DEVICES

Anthony M. Savill, Cambridge, England, assignor to Rolls-Royce plc, London, England

Continuation of Ser. No. 264,380, Oct. 31, 1988, Pat. No. 4,865,271, which is a continuation of Ser. No. 157,630, Feb. 19, 1988, Pat. No. 4,863,121. This application Sep. 22, 1989, Ser. No. 410,881

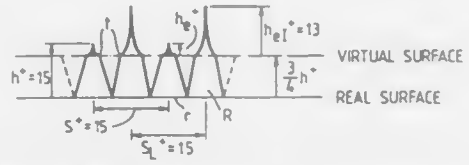
Claims priority, application United Kingdom, Mar. 19, 1987, 8706554

The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.

Int. Cl.⁵ B64C *21/10*

U.S. Cl. 244—130 **10 Claims**

1. An aerodynamic or hydrodynamic wall surface adapted to modify a turbulent fluid flow boundary layer on said surface, said surface being provided with a series of elongate projections for alignment with the direction of fluid flow relative to said surface, at least some of said projections having side faces which intermediate their heights have a region at a lesser steepness than adjacent regions above and below said region, each said region of lesser steepness forming a lower part of a concave profile peak on an associated projection



wherein said side faces have surface portions located between said wall surface and said regions of lesser steepness with said surface portions being smooth when viewed in elevation and free of any abrupt discontinuity in steepness.

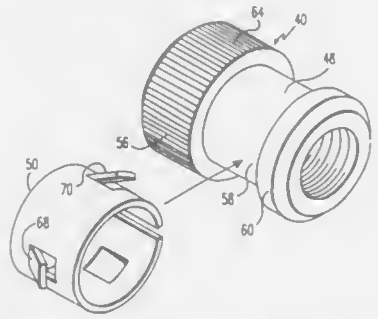
5,026,233
LOCKING NUT INSERT IN A SCREW-NUT ARRANGEMENT

Arthur D. Carothers, Beaver Falls, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 13, 1990, Ser. No. 508,456

Int. Cl.⁵ F16B *13/06*

U.S. Cl. 411—177 **27 Claims**



1. A locking nut insert mounted in a counterbore of a first member which is attached to a second member by fastening means extending into a through bore formed by cooperative bores in said first and second members, wherein said bore and said counterbore of said first member form a shoulder, said locking nut inert comprising:

a cylindrical member having a recess with means for securing said fastening means to said nut insert,

a first cylindrical portion abutting said shoulder formed by said bore and said counterbore of said first member to prevent axial movement of said insert in a first axial direction and having a knurled section for engaging the wall of said counterbore to prevent rotation of said nut insert within said counterbore upon rotation of said fastening means,

a second cylindrical portion having radial gripper projections extending axially outwardly relative to said counterbore for engaging and gripping said wall of said counterbore to prevent axial movement of said nut insert in a second axial direction opposite to that of said first axial direction, and

said second cylindrical portion having a sleeve member with said gripping projections thereon.

5,026,234
EXPANDABLE HEAD RIVET

Ralph R. Luhm, La Habra Heights, Calif., assignor to Allfast Fastening Systems, Inc., City of Industry, Calif.

Filed Mar. 23, 1990, Ser. No. 498,100

Int. Cl.⁵ F16B *19/06*

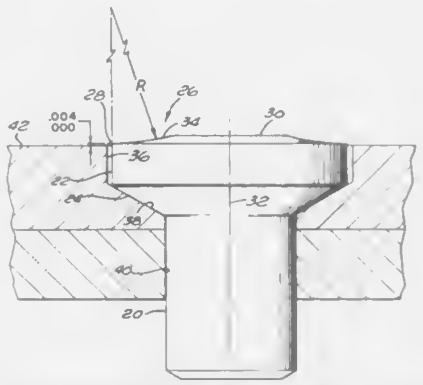
U.S. Cl. 411—507 **9 Claims**

1. For combination with a workpiece having a bore, a first counterbore of a first length which is substantially cylindrical, and a second counterbore which is frustro-conical and tapers forwardly between the first counterbore and the bore:

(a) a rivet having an axially extending shank receivable in the bore and defining an axis;

(b) the rivet having a head including an endface, a first section located forwardly of the endface, and a second and forwardly tapered section located forwardly of the first section;

(c) the first section having a periphery with an undeformed length which is about the same as but not less than the length of the first counterbore in the workpiece;



(d) the first section having an undeformed outer surface of a diameter which is less than but about the same as the diameter of the first counterbore so that the first section is radially outwardly deformable into tight peripheral engagement with the first counterbore;

(e) said head endface having a raised central section having a substantially flat surface perpendicular to the axis of the rivet, the ratio between the area of said raised central section and the cross sectional area of said shank being constant for all rivet sizes and types, the ratio being approximately 70%, said head endface tapering from said raised central section to the periphery of said first section.

5,026,235
CLASP-LIKE SHEET METAL NUT

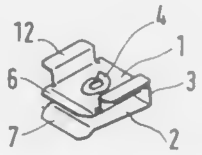
Klaus Muller, Weil-Haltingen; Uwe Motsch, Rheinfelden, and Gerhard Mack, Reinfelden-Adelhausen, all of Fed. Rep of Germany, assignors to A. Raymond, Lorrach, Fed. Rep. of Germany

Filed Apr. 2, 1990, Ser. No. 502,827

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1989, 3910423

Int. Cl.⁵ F16B *21/18*

U.S. Cl. 411—523 **8 Claims**



1. A sheet-metal nut comprising a thread leg having a thread portion therein for receipt of a threaded member, a clasp leg having a through hole in line with said thread portion and integrally connected at one end to one end of the thread leg by a cross-piece to form a C-shaped structure, said legs inclining toward each other in the direction of their free ends opposite their said one ends, an insertion plate that inclines forwardly and upwardly from said free end of the thread leg away from said clasp leg, a pair of guide lugs integrally connected with respect to and projecting away from one of said legs in a direction remote from the other of said legs, each of said lugs having at their remote end a guide fin that is spaced from and

VOL
1127
ISS
4
JE
25
1991
UMI

projects laterally outwardly in a direction substantially parallel to the plane of said one leg.

5,026,236
PHOTOGRAPH BINDING APPARATUS

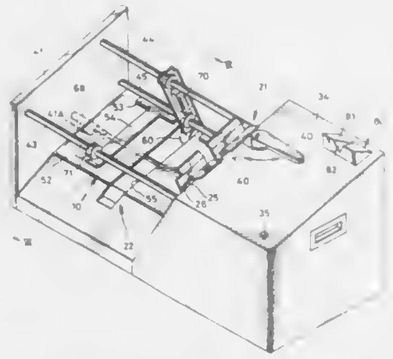
Katsumi Otake; Takekazu Yanagimoto; Shuichi Nakajima, and Yuhei Kishimura, all of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 11, 1990, Ser. No. 521,865

Claims priority, application Japan, May 11, 1989, 1-54040[U]; May 11, 1989, 1-117682; May 11, 1989, 1-117683

Int. Cl.⁵ B42B *5/00*

U.S. Cl. 412—33 **13 Claims**



1. An apparatus for making a booklet or album of a plurality of photographs, said apparatus comprising:

photograph nipping means having a pair of nipping plates, for nipping together said plurality of photographs, said pair of photograph nipping plates being displaced between a nipping situation and an insertable situation, such that, when said plates are in said nipping situation, said pair of plates approach each other to nip said plurality of photographs inserted therebetween from both sides, and when in said insertable situation, said pair of plates are separated to hold gently said plurality of photographs inserted therebetween in upright states;

photograph receiving means for supporting lower ends and one side edge of said plurality of photographs in an inclined state so that said plurality of photographs inserted therebetween are not dropped when said nipping means are in said insertable situation;

vibration means for vibrating said photograph receiving means, when said photograph nipping means are in said insertable situation, in order to straighten the lower ends and one side edges of said plurality of photographs;

actuator means for setting said photograph nipping means in said insertable situation when said plurality of photographs are inserted, and for setting said photograph nipping means in said nipping situation after said plurality of photographs are straightened by said vibration means; and

bonding means for bonding the lower ends of said plurality of photographs nipped by said photograph nipping means onto an adhesive layer of a cover sheet, said cover sheet serving as a front cover portion, a rear cover portion and a back cover portion.

5,026,237
METHOD AND APPARATUS FOR CRIMPING A CONTAINER CAP

Jan L. Dorfman, Littleton, Colo., assignor to Coors Brewing Company, Golden, Colo.

Filed Jan. 24, 1990, Ser. No. 469,255

Int. Cl.⁵ B21D *51/34*

U.S. Cl. 413—43 **9 Claims**

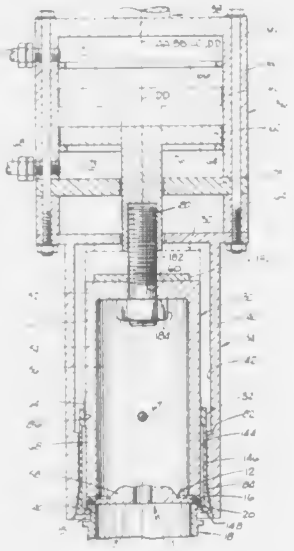
1. A crimping tool for attaching a cap member to a container neck flange, comprising:

(a) next means for axially locating said crimping tool at a predetermined position relative to said cap member;

(b) unitary collet means mounted in fixed axial relationship with said nest means for engaging and crimpingly deforming said cap member about said container neck flange, said collet means comprising an integrally formed member having a generally cylindrical cavity defined by a tubular sidewall;

(c) sleeve means positioned in circumscribing relationship with said collet means in axially displaceable relationship therewith for engaging a lower portion of said collet means and urging said collet means into crimping relationship with said cap member during axial displacement of said sleeve means relative said collet means; and

(d) axial displacement means mechanically linked to said collet means and said sleeve means for selectively axially displacing said sleeve means relative said collet means said collet means comprising a plurality of radially deflectable jaw portions defined by a plurality of circumferentially spaced, axially extending, radial cuts through said tubular sidewall; wherein said jaw portions each comprise: a first radially outwardly located, unstressed position and a second radially inwardly located, stressed position associated with crimping engagement of a cap member skirt portion; and said jaw portions being deflectable from said first position to said second position by said sleeve means and being elastically deflectable from said second position to said first position; said sleeve means comprising beveled inner surface portion adapted to coact with predetermined outer surface portions of said jaw portions for urging said jaw portion radially inwardly during axial displacement of said collet means relative said sleeve means; said sleeve means inner beveled surface portion being formed at a lower end portion thereof; said predetermined outer surface portions of said jaw portions which coact with said beveled surface portion of said sleeve means being provided at lower end portions of said jaw portions; said predetermined outer surface portions of said jaw portions comprising beveled surface portions sloping outwardly and downwardly relative the central longitudinal axis of said sleeve means at a first acute angle, said sleeve means beveled inner surface portion sloping outwardly and downwardly at a second angle, said first acute angle being greater than said second acute angle whereby said beveled surface portions of said jaw portions are adapted to make line contact with said sleeve means beveled surface portion.



5,026,238
BALE HANDLER

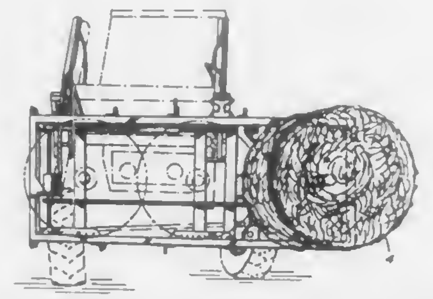
William G. Walt, 642 Sydney Street, Belleville, Ontario, Canada K8P 4A8

Filed Feb. 20, 1990, Ser. No. 481,248

Claims priority, application Canada, Dec. 19, 1989, 2005958

Int. Cl.⁵ B65B *11/04;* **A01D** *87/12*

U.S. Cl. 414—24.5 **6 Claims**



1. A bale handling and wrapping apparatus adapted to be installed on a front-end loader or three-point hitch of a power source comprising: a rectangular main frame, said main frame adapted to be mounted transverse to the line of travel of said power source and extending laterally from one side to the opposite side and extending outwardly on at least said opposite side thereof; a large spindle probe rotatably mounted on a sliding frame mounted within said frame and extending perpendicularly outwardly from the plane of said frame; said spindle probe being activated by a hydraulic motor and being adapted to engage a round bale of hay and rotate the same; said spindle probe including a circular backing plate on which are mounted a plurality of smaller, bale engaging probes extending perpendicularly outward therefrom; said frame including at least one aperture adapted to receive a wrapping means; said wrapping means being adapted to receive a roll of plastic sheeting and dispense the same; said wrapper means extending perpendicularly outwards from at least said one side of said frame and parallel to said spindle probe; wherein in operation, said spindle probe on said sliding frame is adapted to be moved laterally across said main frame to said one side and to a position located at said opposite side by a transversing means; said transversing means comprising a hydraulic motor, an endless chain extending from side to side of said frame and over idler sprockets adjacent each of said sides; thereby facilitating the wrapping of bales of varying diameter when said sliding frame is positioned relative to said one side and permitting the dispensing of hay on the said opposite side of the line of travel of said power source when said sliding frame is positioned extending outwardly at said opposite side, such that as said power source moves in a forward direction, a linear bunk feeder can be filled with hay without backing up said power source.

5,026,239
MASK CASSETTE AND MASK CASSETTE LOADING DEVICE

Yuji Chiba, Isehara; Hidehiko Fujioka, Atsugi; Nobutoshi Mizusawa, Yamato; Takao Kariya, Hino, and Isamu Shimoda, Zama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 5, 1989, Ser. No. 402,601

Claims priority, application Japan, Sep. 6, 1988, 63-221269; Sep. 6, 1988, 63-221270

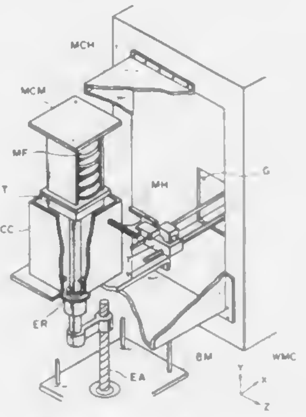
Int. Cl.⁵ B65G *65/30;* **B65H** *1/00;* **G21K** *5/00*

U.S. Cl. 414—217 **13 Claims**

1. A device for loading a mask cassette for accommodating therein, a mask for use in the manufacture of semiconductor chips, said device comprising:

a chamber isolated from a surrounding atmosphere; and

a driving mechanism for separating, in said chamber, the mask cassette into a cassette major part and a cover, said driving mechanism comprising means for moving the cassette major part and the cover relative to each other, to position the cassette major part above the cover after separation.



5,026,240
CHARGING DEVICE

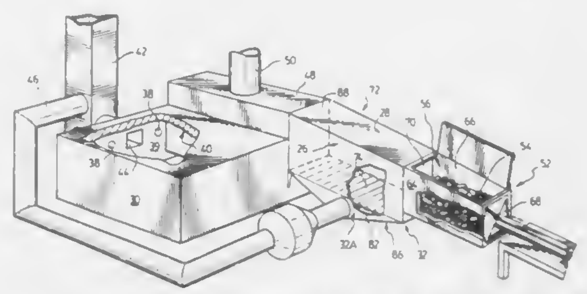
Leon Kozierok, and Robert A. Gallagher, both of Weston, Canada, assignors to Indalloy, Division of Indal Limited, Weston, Canada

Continuation of Ser. No. 39,156, Apr. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 705,214, Feb. 25, 1985, Pat. No. 4,676,742. This application Nov. 16, 1988, Ser. No. 271,699

The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.

Int. Cl.⁵ B65G *1/00*

U.S. Cl. 414—300 **26 Claims**



1. A changing device suitable for use in processing scrap comprising a charge box open at the top, a pusher, and a separate moveable plate, separate from the pusher and moveable in advance of the pusher, and separately supported for sliding movement from a position with the charge box open to a position to close the charge box;

the charge box having a top, bottom, front and rear, the charge box for receiving scrap through the top thereof and being in communication at the front thereof with an apparatus for handling scrap;

the scrap being pushed by the pusher for pushing the contents of the charge box into the apparatus for handling scrap, the pusher being moveable from a position at the rear of the charge box remote the apparatus for handling scrap to a position at the front of the charge box proximate the apparatus for handling scrap;

the pusher being supported by a support frame fully enclosing the pusher, when the pusher is remote the apparatus for handling scrap;

the separate moveable plate having a shearing edge at its leading edge and for separate co-operative movement with, and in advance of the pusher, the separate moveable

VOL
1127
ISS
4
JE
25
1991
UMI

plate being separately moveable in advance of the pusher from a position wherein the shearing edge is proximate the rear of the charge box to a position wherein the shearing edge is proximate the front of the charge box adjacent the apparatus for handling scrap.

whereby when scrap is received within the charge box, the separate moveable plate separately advances to shear any excess scrap extending through the top of the charge box in advance of the pusher and thereby effects co-operative motion of the pusher to push the scrap into the apparatus for handling scrap.

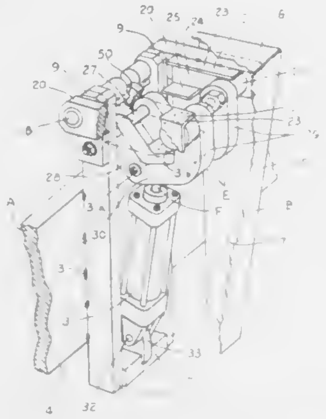
5,026,241
APPARATUS AND METHOD FOR DUMPING A WASTE RECEPTACLE

Robert E. Wyman, Greenville, S.C., assignor to Barker Products, Greenville, S.C.

Filed Mar. 12, 1990, Ser. No. 496,716

Int. Cl.^{5} B65F *3/02*

U.S. Cl. 414—303 **5 Claims**



1. Apparatus for lifting and dumping a waste receptacle attachable for use on refuse loaders and compactors comprising:

a stationary frame attachable adjacent said loaders and compactors;

a pivoted depending housing supporting said waste receptacle carried by said stationary frame;

a track carried by said housing;

a cam roller extending into said track wherein said cam roller is free of said track until engaged thereby when raising said pivotal housing;

a linkage mechanism carrying the cam roller pivotally carried by said frame; and

a mechanism for producing linear motion pivotally mounted adjacent a lower end on said frame having connection to said linkage mechanism;

whereby linear motion is converted to rotary motion to raise said pivoted housing carrying said waste receptacle for rotation to dumping position.

5,026,242
AUTOMATIC VEHICLE RESTRAINT

James C. Alexander, London, Canada, assignor to Serco Corporation, Ontario, Canada

Filed Feb. 21, 1990, Ser. No. 482,476

Int. Cl.^{5} B65G *69/00*

U.S. Cl. 414—401 **18 Claims**

1. A device for restraining a vehicle comprising:

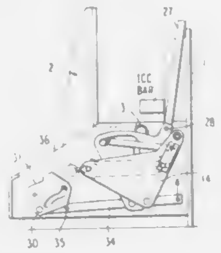
a frame rigidly mounted to a surface,

an arm pivotably mounted to said frame and projecting from said frame to engage said vehicle and move in response to vehicle movement,

a first cam plate coupled to said arm and movable in response to movement of said arm, said first cam plate having a cam surface, a cam follower in operative engagement with said cam surface,

a locking arm pivotably mounted to said frame, said locking arm movable from a retracted inoperative position to an operative position where it prevents vehicle movement, and

means responsive to motion of said cam follower for moving said locking arm from said inoperative position to said operative position.



5,026,243
PORTABLE UNLOADING PLATFORM AND RAMP

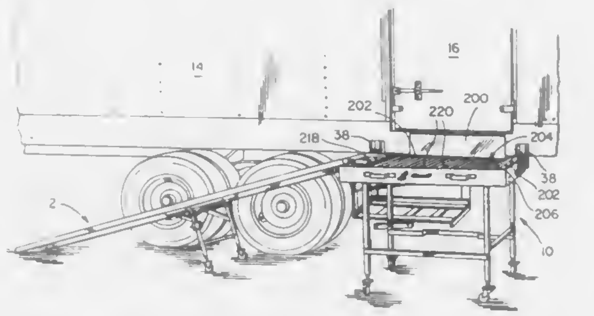
Travis E. Dell, 2609 N. Ellis Loop Rd., Plant City, Fla. 33566

Continuation-in-part of Ser. No. 168,245, Mar. 15, 1988, Pat. No. 4,878,800. This application Nov. 1, 1989, Ser. No. 430,000

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.^{5} B65G *67/00*

U.S. Cl. 414—401 10 Claims



1. An assembly carried by a semi-trailer for loading or unloading of the semi-trailer, said assembly comprising:

a platform separated from the semi-trailer, said platform having a pair of forward legs and a pair of rear legs pivotally mounted on said platform and extendable between a retracted and an extended position,

carrier means mounted on the bottom of the semi-trailer for transporting and removably securing said platform beneath the bottom of the semi-trailer,

said carrier means including a frame having guide surfaces for sequentially engaging a leading edge of said platform, said rear legs and said forward legs and for guiding said rear legs to pivot between the retracted or extended position when said platform is pushed or pulled from said carrier means and for guiding said front legs to pivot to the extended position when said platform is pulled from said carrier means.

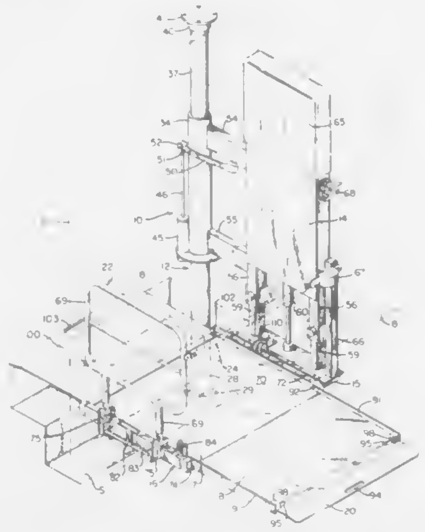
5,026,244
WHEELCHAIR LIFT APPARATUS FOR COMMERCIAL VEHICLES

Russell J. Dorn, Aurora, Colo., assignor to Stewart & Stevenson Power, Inc., Commerce City, Colo.

Filed May 17, 1990, Ser. No. 524,747

Int. Cl.^{5} B60P *1/00*

U.S. Cl. 414—540 **1 Claim**



1. A lift apparatus for lifting and lowering articles through an opening in a vehicle between a first level and a second level vertically spaced from said first level; a vertical rotation column, means for mounting the upper and lower ends of said column to said vehicle adjacent said opening, a platform support unit mounted in a swivel relation on said column for swinging movement about a vertical axis between a first position located inside of said vehicle and a second position located outside of said vehicle, a platform assembly mounted on said support unit for movement therewith about said vertical axis and adapted to raise and lower articles between said levels, the improvement comprising:

said rotation column having a sleeve at its lower end, said sleeve including said means for mounting the lower end of said column to said vehicle, a vertical support shaft with a larger upper diameter and a smaller lower diameter extension journalled in said sleeve, a tube fixed to said larger diameter of said shaft;

means mounting said support unit to said tube;

said support unit including a pair of spaced parallel, vertically oriented, tubular support members, a pair of vertically movable inner members telescopically mounted in said tubular support members, a base member attached to the lower end of said inner members;

means mounting said platform assembly to said base member for pivotal movement about a first horizontal axis between a generally horizontal operative position and a generally vertical storage position,

said platform assembly including a plurality of sections pivotal about a second horizontal axis, generally perpendicular to said first horizontal axis between a first horizontal article supporting position and a second horizontal folded position, said sections in said latter position being adapted for pivotal movement about said first horizontal axis;

means for retaining articles on said platform assembly when it is in said operative position;

means for resisting pivotal movement of said platform assembly from said storage position to said operative position including a cable with a first end connected to said platform assembly and a second spring-load adjustable end connected to said base member, means for guiding said cable between said platform assembly and said base member; and

means for moving said base member and platform assembly attached thereto between said vertically spaced levels.

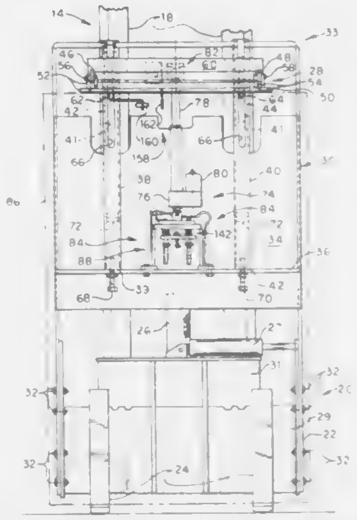
5,026,245
CLAMPING ARRANGEMENT FOR A LIFT MAST

Joseph F. Sabo, Lyndhurst, Ohio, assignor to Caterpillar Industrial Inc., Mentor, Ohio

Filed Jun. 29, 1989, Ser. No. 373,301

Int. Cl.^{5} B66F *9/18*

U.S. Cl. 414—622 **11 Claims**



1. A lift mast having a pair of spaced apart uprights, a carriage and a plurality of load engaging forks mounted on the carriage and extending from the carriage in a direction transverse the uprights, said carriage being mounted on the pair of uprights and elevationally movable along the pair of uprights between spaced apart locations, and means for moving the carriage along the uprights, comprising:

an elongated first guide member mounted on the carriage and oriented in an axial direction transverse the direction of extension of the forks;

a first guided member being slidably connected to said elongated guide member and moveable in directions along said guide member;

a load engaging clamp connected to the first guided member and movable in a transverse direction relative to the load engaging forks between first and second elevationally spaced apart locations from the forks in response to movement of the first guided member;

an actuator having a housing and a rod slidably connected to the housing and selectively extensibly movable relative to the housing between extended and retracted positions;

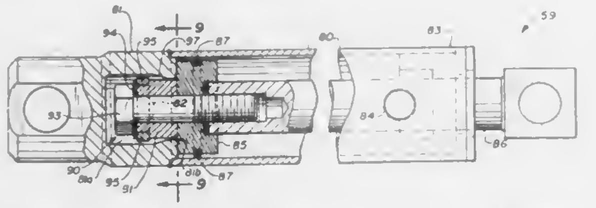
means for attaching one of said rod and housing to the load engaging clamp;

means for connecting the other one of the housing and the rod to the carriage and maintaining said load engaging clamp from movement toward said second position during extensible movement of said rod in response to engagement between the load engaging clamp and the load, said connecting means including a biasing means for permitting a preselected amount of extensible movement of the actuator relative to the load engaging clamp subsequent to engagement between the load engaging clamp and the load, and limiting the applied force of the load engaging clamp against the load to a preselected magnitude.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,246
HYDRAULIC CYLINDER DETENT

Tod A. Bay, Denver; Jeffry R. Frahm, Ephrata, both of Pa.; David F. Roesler, Bloomington, and Robert Gilbert, Stillwater, both of Minn., assignors to Ford New Holland, Inc., New Holland, Pa.
Filed Nov. 22, 1989, Ser. No. 440,935
Int. Cl.^{5} E02F *3/32*
U.S. Cl. 414—694 **13 Claims**



1. In a backhoe having a prime mover including a wheeled frame movable over the ground; an articulated boom assembly pivotally connected to said frame for movement about a generally vertical axis, said boom assembly having a working tool connected to a distal end thereof and being operable with articulated movement to move said working tool toward and away from said generally vertical axis; and a pair of outriggers pivotally connected to said frame for generally vertical movement between a raised transport position and a lowered ground engaging position to stabilize the movement of said frame relative to the ground during operation of said boom, each said outrigger having a hydraulic cylinder interconnecting said outrigger and said frame to power the operation of said outriggers between said transport and ground engaging positions, a collapsing of said hydraulic cylinders to a preselected retracted position corresponds to the placement of said outriggers in said transport position, each said hydraulic cylinder having a barrel defining a chamber retaining pressurized hydraulic fluid, said barrel having a retraction end and an extension end and a port at each opposing said end for communication with a source of hydraulic fluid under pressure, and a piston translatable within said barrel in response to changes in hydraulic pressure on opposing sides thereof to effect movement of a rod extending outwardly from said barrel and connectable with the corresponding said cutrigger, said piston including a seal engageable with said barrel to prevent the passage of hydraulic fluid to opposing sides of said piston, the improvement comprising:

detent means in each said hydraulic cylinder for maintaining said hydraulic cylinders in said preselected retracted position until said hydraulic cylinders are pressurized to extend said hydraulic cylinders beyond said retracted position, the weight of each said corresponding outrigger being insufficient to effect disengagement of said detent, means said detent means including a deformable urethane detent ring carried by said piston for movement within said barrel and a projection extending inwardly from said barrel at said retraction end and positioned for engagement with said detent ring, which is deformable to permit said detent ring to move past said projection.

5,026,247
INTERFACING LIFT HITCH

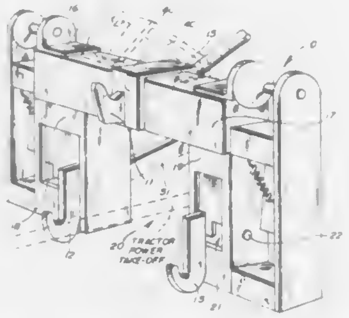
Emil F. Zimmerman, Box 332, Richardton, N. Dak. 58662
Filed Jun. 9, 1989, Ser. No. 364,654
The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.
Int. Cl.^{5} B66F *11/00*
U.S. Cl. 414—703 **15 Claims**

1. An interfacing lift hitch for efficiently attaching implements to a tractor having a power takeoff, comprising:

a frame having front and rear ends,

attachment means connected to the rear end for connecting the frame to the tractor, the attachment means being accessible from the rear of the frame,

first hitching means having a set of three hooks connectable to the frame for attachment to an implement, each of the hooks being movable to an out of the way position relative the front end of the frame to provide an unobtrusive front end for the frame.

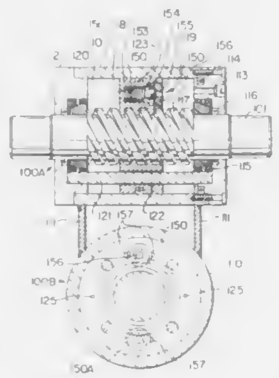


second hitching means connected to the frame for attachment to an implement and being functional after each of said hooks is movable to the out of the way position, and

the frame having a U-like shape to allow an implement to be connected to the power takeoff of the tractor whereby implements may be attached to either first or second hitching means.

5,026,248
HYDRODYNAMIC SWING DAMPER AND TREE HANDLING VEHICLE INCORPORATING THE SAME

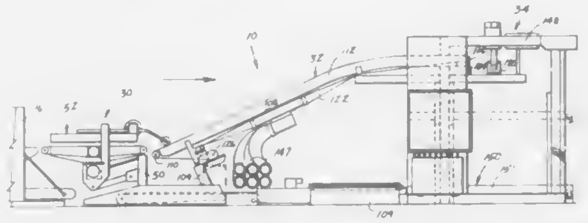
Douglas D. Hamilton, Town of Mount Royal, Canada, assignor to Logging Development Corporation, Montreal, Canada
Filed Aug. 4, 1989, Ser. No. 389,687
Claims priority, application Canada, Mar. 17, 1989, 594167
Int. Cl.^{5} B66C *11/00*
U.S. Cl. 414—729 **21 Claims**



1. Improvements in dampening oscillation of a work tool suspended from a boom comprising at least one hydraulically damped pivot joint connecting said work tool to said boom, said pivot joint including a housing fixed to one or the other of the boom and work tool suspended therefrom; a chamber in said housing, a piston reciprocally mounted in said chamber and separating the same into first and second inter-related variable volume chamber portions; a shaft pivotally mounted on said housing and connected to the other of said boom and work tool, motion translating means comprising a screw thread of selected pitch on a portion of said shaft in said chamber and internal thread means on an aperture through said piston mating with said threaded portion of said shaft whereby said piston moves linearly along the shaft in response to rotation of such shaft in response to pivotal relative movement at said joint between the boom and the work tool; means preventing rotation of said piston; a fluid flow passage from one to the other of said first and second chamber portions and means restricting the rate of flow through said passage means.

5,026,249
APPARATUS FOR STACKING CORRUGATED SHEET MATERIAL

David Shill, Spokane, Wash., assignor to Thermoguard Equipment, Inc., Spokane, Wash.
Filed May 26, 1989, Ser. No. 358,256
Int. Cl.^{5} B31B *1/14*
U.S. Cl. 414—789.1 **16 Claims**



7. A corrugated container blank stacker for receiving rows of side-by-side corrugated container blanks from a corrugated sheet cutter at a prescribed lower elevation and for stacking such corrugated container blanks in side-by-side stacks on a storage surface at a stacking station, comprising:

an elevator at the stacking station for incrementally moving the storage surface downward from an elevated position in response to successively receiving rows of the side-by-side container blanks to form side-by-side stacks on the storage surface;

a backstop at the stacking station at the elevated position for vertically aligning leading edges of the container blanks in the side-by-side stack;

a vacuum conveyor having a curved upper flight for receiving the side-by-side corrugated container blanks at the prescribed lower elevation from the corrugated sheet cutter and for successively conveying rows of the side-by-side container blanks forward in an upward curved path from the prescribed lower elevation at an initial upward inclined angle and then progressively at decreasing inclined angles to the elevated position at a slight upward inclined angle and propelling the container blanks against the backstop;

said vacuum conveyor having a plurality of laterally spaced elongated arched vacuum plenums defining the upper conveyor flight extending upward from rear ends at the lower elevation to forward ends adjacent to elevated position in a curved upward extending arc;

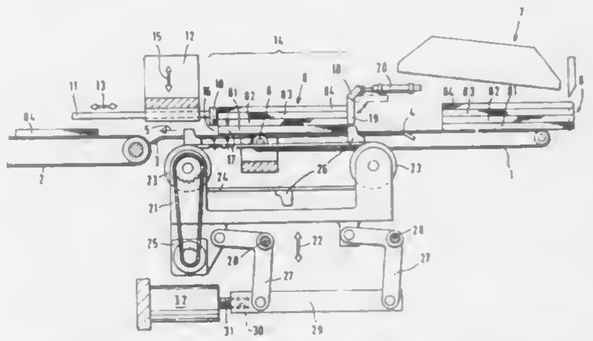
said vacuum conveyor having a plurality of perforated belts entrained about the vacuum plenums for receiving side-by-side container blanks thereon at the lower elevation and conveying successive rows of container blanks upward from the lower elevation in the curved path to the elevated position;

vacuum means communicating with the vacuum plenum for applying vacuum pressure to the plenums and through the perforated belts to secure the container blanks to the arched upward conveyor flights of the belts; and

a transfer conveyor intermediate the corrugated sheet cutter and the vacuum conveyor for conveying the side-by-side blanks from the corrugated sheet cutter to the vacuum conveyor.

5,026,250
APPARATUS FOR SINGULARIZING STACKED PORTIONS OF BOOKS AND THE LIKE

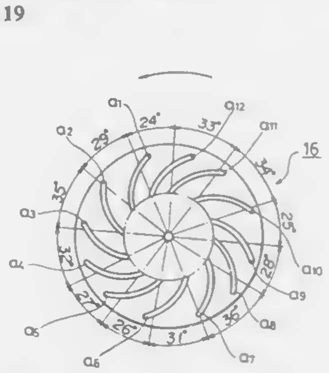
Peter Hofer, Wigoltingen, Switzerland, assignor to GRAPHA-Holding AG, Hergiswil, Switzerland
Filed Jan. 10, 1990, Ser. No. 462,810
Claims priority, application Switzerland, Feb. 27, 1989, 715/89
Int. Cl.^{5} B65G *59/06*
U.S. Cl. 414—796.1 **19 Claims**



1. Apparatus for singularizing a series of stacks of superimposed groups of sheets wherein each group has a predetermined height, comprising means for transporting successive stacks of the series above a predetermined plane in a predetermined direction along a first path; a barrier extending transversely of said path above said plane and defining with said plane a clearance having a width between n and 2n wherein n is the height of a group so that the barrier intercepts each but the lowermost group of an oncoming stack; means for advancing successive lowermost groups of a thus intercepted stack, including at least one pusher and means for moving said at least one pusher along a second path including a top portion wherein the at least one pusher extends above said plane a distance at most equaling n and advances toward said clearance from a position behind an intercepted stack, said moving means comprising an endless conveyor having an upper reach which is substantially parallel to said plane and defines the top portion of said second path, and a lower reach which defines a second portion of said second path at a level beneath said plane for advancement of said at least one pusher back to said position thereof; and means for varying the level of the top portion of said second path.

5,026,251
COMPACT FAN UNIT FOR AUTOMOBILE

Tsutomu Kinoshita, Kosai, and Toshihiko Osakabe, Hamamatsu, both of Japan, assignors to Asmo Co., Ltd., Japan
Filed Jul. 12, 1989, Ser. No. 379,436
Claims priority, application Japan, Jul. 14, 1988, 63-92404
Int. Cl.^{5} F01D *5/00*
U.S. Cl. 415—119 **16 Claims**



1. A compact automobile fan unit comprising:

VOL
1127
ISS
4
JE
25
1991
UMI

- (a) a motor having a yoke and a drive shaft rotatably supported at its one end by said yoke;
- (b) a turbofan fixedly mounted on said drive shaft for co-rotation therewith and having a plurality of blades curving in a direction opposite to a direction of rotation of said turbofan, said blades being circumferentially spaced at different angular intervals, said turbofan having a center of gravity located at an axis of said drive shaft, and said blades being arranged in a pattern defined by a combination of a pair of blades circumferentially equidistant from one another and a set of three blades circumferentially equidistant from one another; and
- (c) a substantially cup-shaped housing connected to said yoke of said motor and containing said turbofan, said housing including an end wall having at least one intake opening and a side wall having at least one discharge opening.

5,026,252
SEALING DEVICE FOR TURBO ENGINES AND THE LIKE

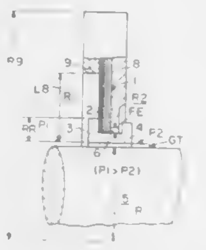
Herbert Hoffelner, Markt Indersdorf, Fed. Rep. of Germany, assignor to MTU Motoren- und Turbinen- Union München GmbH, Fed. Rep. of Germany

Filed Aug. 21, 1989, Ser. No. 396,354

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1988, 3828363

Int. Cl.^{5} F04D *29/08*

U.S. Cl. 415—174.2 **12 Claims**



1. A sealing arrangement for sealing different pressure spaced from one another in a gas turbo engine of the like which has rotor means and stator means, comprising:

at least one sliding ring means for surrounding the rotor means in a self centering manner to seal off a radial gap with respect to the rotor means,

and at least one brush sealing means anchorable at the stator means with free brush bristle ends facing the rotor means and sealingly guidably supported at the at least one sliding ring means.

5,026,253
BELT-DRIVEN WATER PUMP

Herbert Börger, Heidelberg, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany

Filed May 22, 1989, Ser. No. 355,174

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1988, 3822702

Int. Cl.^{5} F01D *25/16*

U.S. Cl. 415—229 **15 Claims**

1. A belt-driven water pump for use with an internal combustion engine comprising:

a pump shaft;

a housing lid having an opening through which one end of the pump shaft extends;

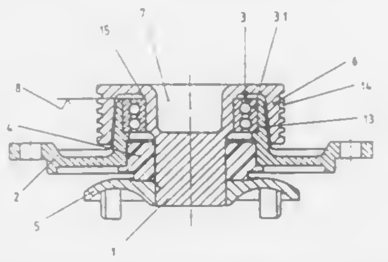
a pump shaft seal for sealing the opening in the housing lid;

a pump rotor connected to the other end of the pump shaft;

a pulley integrally formed with the pump shaft as a single piece;

an antifriction bearing supported on an inner surface of the housing lid for rotatably supporting the pump shaft, said antifriction bearing having an inner ring connected to the pump shaft and an outer ring connected to the housing lid; and

a recess in said one end of the pump shaft, said recess extending axially through the pulley into a region opposite an axially inner end of the inner ring of the antifriction bearing wherein said pump shaft is connected to the inner ring of the antifriction bearing by an interference fit between the recessed end of the pump shaft and the inner ring of the antifriction bearing, said interference fit preventing removal of said pump shaft from said antifriction bearing.



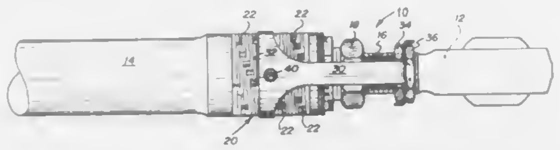
5,026,254
CALIBRATED PITCH CHANGE LINK

Russell W. Ford, McDonough, Ga., and David S. Shepherd, Wallingford, Pa., assignors to Bell Helicopter Textron Inc., Fort Worth, Tex.

Filed Oct. 13, 1989, Ser. No. 421,020

Int. Cl.^{5} B64C *27/54*

U.S. Cl. 416—61 **3 Claims**



1. A calibration device for a pitch change link for a helicopter rotor grip, the link including a bearing, comprising:

a plurality of position indicia concentrically disposed and spaced apart around the link and including sequential reference numbers equally spaced along the link representing the length of the link; and

means for indexing mounted to the bearing and disposed adjacent to the link for locating one of said plurality of positioned indicia.

5,026,255
PULSELESS PUMP APPARATUS HAVING PRESSURE CROSSOVER DETECTOR AND CONTROL MEANS

Clarence W. Carpenter, 8610 Cedarbrake, Houston, Tex. 77055; and Coleman Wood, both of Houston, Tex., assignors to Clarence W. Carpenter, Houston, Tex.

Filed Nov. 18, 1988, Ser. No. 272,821

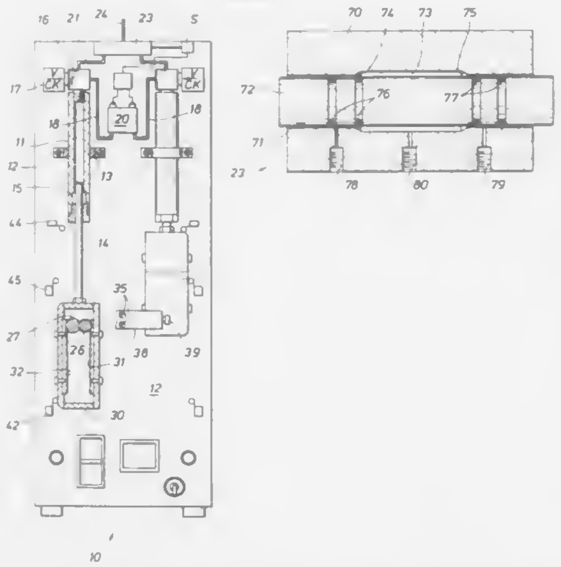
Int. Cl.^{5} F04B *41/06*

U.S. Cl. 417—5 **4 Claims**

1. A multi-cylinder pulseless pump mechanism comprising:

- (a) first and second positive displacement pumps which have a chamber and piston means therein said piston means being connected to a piston rod and extending therefrom and driven by a motive means which reciprocates the piston rod to thereby pump fluid from the cylinder into an outlet line wherein each of said positive displacement pumps includes a valve means selectively connected to a downstream system and wherein the downstream system has a specific pressure and one of said pumps has a pump pressure equal to the downstream pressure and the other of said pumps has a pressure below the downstream pressure;

- (b) a differential pressure cell incorporating a pair of pressure sensing transducers each coupled in pressure sensing relation to said respective pumps for sensing pump pressure and each generating a finite pressure signal reflecting pump pressure and system pressure;
- (c) a control valve having:
  - (1) a valve body defining a valve spool passage therein;
  - (2) a pair of inlet ports and a single outlet port;
  - (3) a movable internal valve element for selectively communicating said inlet ports with said outlet port;
  - (4) said inlet ports spaced from one another and in communication with said spool passage;
  - (5) said outlet port located intermediate said inlet ports and in communication with said spool passage;
  - (6) a spool member moveably positioned within said spool passage;
  - (7) spaced sealing means which maintain a seal between said spool member and said valve body; and



  - (8) wherein said spool passage in said valve body is enlarged intermediate the extremities thereof to form an annulus permitting flow of fluid from only one of said valve inlet ports to said valve outlet port;
- (d) means first amplifying and comparing said pressure signals to generate a differential switch output signal that is coupled with said control valve for selective, electrically powered operation of said control valve to cause pump output crossover at a specified differential and thereby achieve a continuous pulseless flow of fluid at said outlet of said control valve;
- (e) pressure sensing transducers connected to said pumps and having a pressure capability above system pressure, said transducers forming output signals of pump output pressure; and
- (f) wherein said means for amplifying and comparing said pressure signals comprises;
  - (1) means receiving the voltage output of each of said transducers to amplify said voltages;
  - (2) said means further inverting and amplifying aid amplified voltages of said transducers to provide scaled output voltages according to a predetermined voltage scale; and
  - (3) means comparing said scaled output voltages to generate a differential switch output signal for controlling operation of said control valve.

5,026,256
VARIABLE SPEED PUMPING-UP SYSTEM

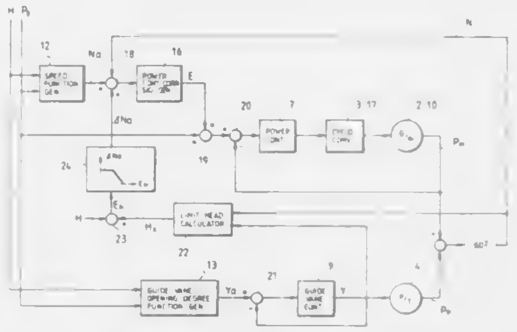
Takao Kuwabara; Hisao Inoue, both of Hitachi; Hiroto Nakagawa, Mishima, and Eizo Kita, Kyoto, all of Japan, assignors to Hitachi, Ltd. and The Kansai Electric Power Co. Ltd., both of Tokyo, Japan

Filed Dec. 16, 1988, Ser. No. 285,753

Claims priority, application Japan, Dec. 18, 1987, 62-318846; Dec. 18, 1987, 62-318850

Int. Cl.^{5} F04B *49/00*

U.S. Cl. 417—45 **7 Claims**



1. A variable speed pumping-up system connected to an electric power system having means to pump water, having electric motor means for driving said pump means and having a regular control means for operating said electric motor means in a regular control state at a variable rotating speed as a function of current operating conditions of said pump means while receiving electric power from said electric power system of a given frequency, comprising:

said pump means exhibiting a hump characteristic in an operating region thereof; and

said variable speed pumping-up system including an overriding control unit, said overriding control unit having means for monitoring operating conditions of said pump means including rotating speed, guide vane opening and dynamic head so that, when an operation point of said pump means closely approaches said hump characteristic region during regular control by said regular control means, said regular control means is substantially interrupted, and an overriding control by said overriding control unit is commenced to provide an extra acceleration to said pump means temporarily so that a close approach of said operation point of said pump means to said hump-characteristic region is avoided.

5,026,257
VARIABLE DISPLACEMENT VANE-TYPE ROTARY COMPRESSOR

Toshinori Aihara, and Masahiko Hara, both of Kanagawa, Japan, assignors to Atsugi Unisia Corporation, Atsugi, Japan

Filed Sep. 14, 1989, Ser. No. 407,366

Claims priority, application Japan, Sep. 14, 1988, 63-119817[U]

Int. Cl.^{5} F04B *49/02*

U.S. Cl. 417—295 **8 Claims**

1. A variable displacement vane-type rotary compressor comprising: a cam ring;

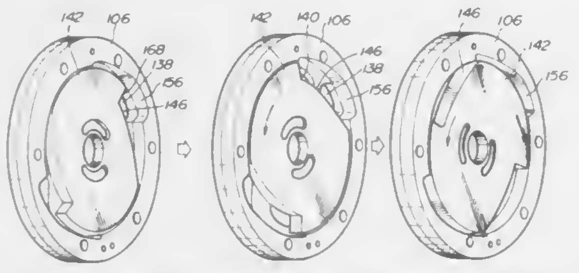
a front member closing a front end of said cam ring, said front member having a pair of induction ports located in a rotation symmetry with respect to an axis of the compres-

VOL
1127
ISS
4
JE
25
1991
UMI

sor, a pair of bypass ports located in a rotation symmetry with respect to the axis of the compressor, and recess means communicating with each of said induction ports and extension therefrom so as to overlap a portion of one of each of said pair of bypass ports;

a rear member closing a rear end of said cam ring;

a rotor rotatably provided in said cam ring between said front and rear members to define working chamber means in said cam ring, said rotor having a plurality of vanes each of which is reciprocatively mounted to said rotor for compressing working fluid introduced from an induction chamber provided in said compressor into said working chamber means through said induction opening means and for discharging the compressed working fluid from said working chamber into a discharge chamber provided in said compressor;



an adjust member having a pair of bypass openings, said adjust member rotatably provided in said cam ring between said rotor and said front member, a rotational displacement of said adjust member changing a position of said bypass openings relative to said induction ports and said bypass ports so as to vary a compression starting point of the vane in said working chamber means;

said induction ports and said bypass openings being effectively communicated with each other in said working chamber means under all of said rotational displacement of said adjust member irrespective of a position of the vane to establish a communication between said bypass ports and said induction ports in said working chamber means via said recess means and said bypass openings irrespective of the position of the vane when said bypass ports overlap with said bypass openings.

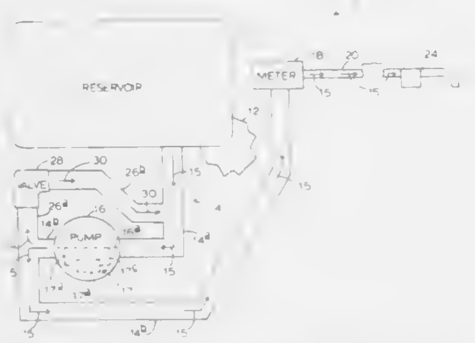
5,026,258
HIGH-VOLUME AUXILIARY-OVERLOAD-BYPASS VALVE

Shawn D. Mosley, 17400 S.E. Decker Road, Boring, Oreg. 97009

Filed Jun. 19, 1989, Ser. No. 369,062

Int. Cl.^{5} F04B *49/08*

U.S. Cl. 417—304 **4 Claims**



1. A vehicle-carried liquid-fuel-delivery system, comprising

a vehicle including an auxiliary drive shaft,

a fuel reservoir,

a fuel pump being operatively connectable to said auxiliary drive shaft and including an overload bypass valve effective to shunt the pump when output fuel pressure exceeds a first predetermined level,

an extreme-pressure-damage-protection, auxiliary-overload-bypass valve operatively connected across said pump, and operable to shunt the pump when output fuel pressure exceeds an extreme, second predetermined level which is greater than such first predetermined level, and which is due to the auxiliary drive shaft remaining connected to said pump while the vehicle is driven, said auxiliary-overload-bypass valve thus being operable to protect said system from extreme-pressure damage that can occur due to such auxiliary-drive-shaft/pump connection existing when the vehicle is driven.

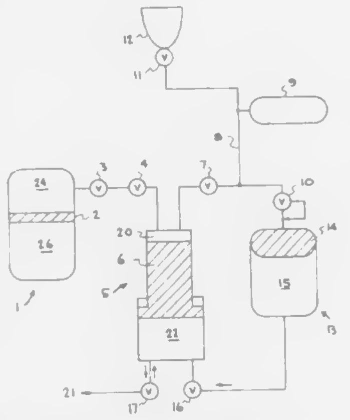
5,026,259
MINIATURIZED PRESSURIZATION SYSTEM

John C. Whitehead, Davis, Calif., and Don G. Swink, Woodinville, Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 9, 1990, Ser. No. 550,280

Int. Cl.^{5} F04B *9/08*

U.S. Cl. 417—379 **24 Claims**



1. A method for providing higher pressure for a fluid stored at a low pressure, comprising the steps of:

storing the fluid at the low pressure in a low pressure fluid storage tank;

venting the fluid from the low pressure fluid storage tank into a fluid bore of a differential pump;

moving a piston by the fluid in the fluid bore of the differential pump, so that the piston is being moved out of the fluid bore of the differential pump into a gas bore of the differential pump;

venting the fluid from the fluid bore of the differential pump to a gas generator;

transforming the fluid to a gas in the gas generator;

venting the gas from the gas generator to the gas bore of the differential pump;

driving the piston from the gas bore into the fluid bore of the differential pump;

stopping the flow of gas from the gas generator to the gas bore once the piston has reached a full stroke;

venting the gas from the gas bore to an exhaust system; and

regulating the pressure of the gas.

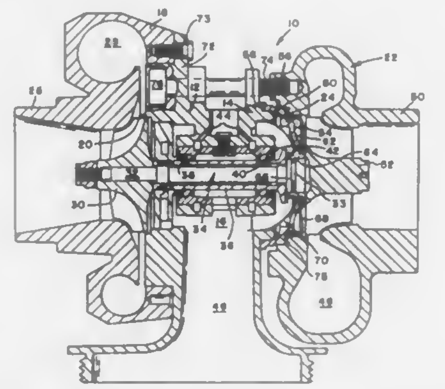
5,026,260
TURBOCHARGER WITH TURBINE BACKPLATE AND CENTER HOUSING OIL SHIELD

Daniel A. Gutknecht, Torrance, and I-Chung Ho, Rancho Palos Verdes, both of Calif., assignors to Allied-Signal Inc., Morristown, N.J.

Filed Sep. 8, 1989, Ser. No. 404,384

Int. Cl.^{5} F04B *17/00*

U.S. Cl. 417—407 **8 Claims**



1. A turbocharger comprising a center housing, a compressor housing, and a turbine housing, means for securing the turbine housing and the compressor housing to the center housing, said center housing including a circumferentially extending wall defining a cavity therewithin, means carried by the center housing for rotatably supporting a shaft in said cavity, said shaft including portions extending into the compressor housing and into the turbine housing, a turbine wheel mounted on the portion of the shaft in the turbine housing, a compressor wheel mounted on the portion of the shaft in the compressor housing, said cavity having opposite ends facing said turbine and compressor housings respectively, said end facing said turbine housing being an open end, and an annular backplate member separate from said center housing and from said turbine housing, said annular backplate member circumscribing said shaft for closing said open end of the center housing, said securing means including fastening means extending between the center housing and the turbine housing, said backplate member including a portion clamped between the center housing housing and the turbine housing by compressive forces generated by said fastening means and transmitted from the turbine housing to the compressor housing through said portion of the backplate member, and a circumferentially extending shroud between said annular backplate member and said turbine wheel.

5,026,261
COMPACT AIR PUMP

Wen-San Jou, No. 258-4, An Chia Tsun, An Ting Hsiang, Tainan Hsien, Taiwan

Filed Oct. 24, 1989, Ser. No. 425,969

Int. Cl.^{5} F04B *21/02;* **F16L** *37/18*

U.S. Cl. 417—555.1 **1 Claim**

1. A portable air pump comprising:

(a) an air cylinder housing having a vertically directed upper compartment and a horizontally directed lower compartment, said air cylinder upper and lower compartments being in fluid communication;

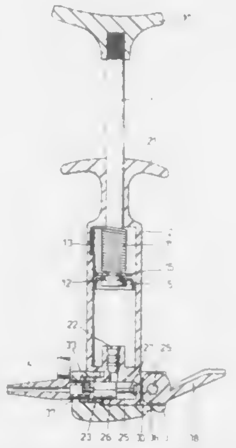
(b) a check valve positionally located within a valve seat member between said air cylinder upper and lower compartments;

(c) an air compression rod member having a handle fixedly secured to a first end thereof, said air compression rod member being slidably mounted to a grip member, said grip member being coupled to said air cylinder housing at an upper surface thereof;

(d) a drum contoured air compression member secured to a second end of said air compression rod member for contiguously interfacing with an internal wall surface of said air cylinder housing compartment as said air compression rod member is slidingly displaced therein;

(e) a helical spring member surrounding said air compression rod member, said helical spring member having a retaining hook member formed on one end thereof for coupling to air cylinder housing within a groove formed therein;

(f) a base member displaceably coupled to said air cylinder housing and in fluid communication with said air cylinder lower compartment, said base member having an air outlet passage formed through a first end thereof, an elastic disk shaped member mounted in said base member and having a through opening and axially aligned with said air outlet passage for allowing flow of air therethrough;



(g) an air cylinder housing displacement member rotatively coupled to a second end of said base member, said displacement member being rotatable to displace said air cylinder housing with respect to said base member and compressively couple said air cylinder housing to said base member by compressively deforming and releaseably capturing said elastic disk shaped member therebetween; and,

(h) an air guide block member positionally located at least partially within said air cylinder lower compartment for guiding air in a horizontal direction through said air outlet passage of said base member to an air nozzle member secured to said first end of said base member.

5,026,262
MULTIPIECE ECCENTRIC SHAFT

David C. Baumann, and Howard H. Fraser, Jr., both of Lafayette, N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Nov. 28, 1989, Ser. No. 444,944

Int. Cl.^{5} F04C *18/04, 29/00;* **F01M** *11/02;* **F16C** *3/14*

U.S. Cl. 418—55.6 **7 Claims**

1. A multipiece drive shaft adapted for use in driving an object in an orbital path of movement about a central axis comprising:

a bearing cap for receiving a portion of an object to be driven in an orbital path of movement about a central axis,

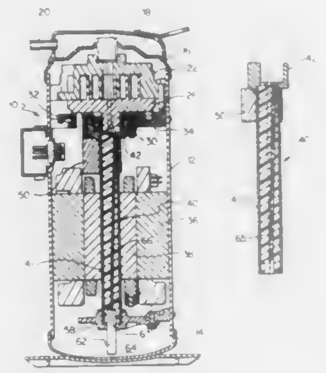
a tubular rotor shaft having a central axis and affixed to said bearing cap for effecting rotary movement thereto about said central axis,

counterbalancing means carried by said tubular rotor shaft for balancing the forces applied by the object being driven in an orbital path of movement about said central axis upon the rotary movement of said tubular rotor shaft said counterbalancing means being secured about said tubular rotor shaft adjacent said bearing cap and;

a plastic cylindrical oil bore member disposed in said tubular

VOL 1127
ISS 4
JE 25
1991
UMI

rotor shaft, said oil bore member having therein oil distribution channel means extending at an angle to the axis of



rotation thereby and to provide an easily manufactured economical drive shaft.

5,026,263

ROTARY VANE PUMP WITH VALVE TO CONTROL VANE BIASSING

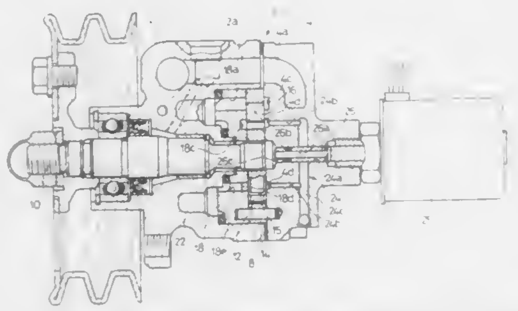
Hiroto Iwata, Saitama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Nov. 22, 1989, Ser. No. 441,036

Claims priority, application Japan, Dec. 2, 1988, 63-305512

Int. Cl.⁵ F04C *2/344, 15/02*

U.S. Cl. 418—82 4 Claims



1. An oil pump having a pump housing, which oil pump is driven by a driven input shaft rotatably mounted in a space in the housing including a cam ring having a cam around its internal surface, a rotor disposed for rotation within the cam ring, a plurality of vanes disposed in radial slits formed in the rotor for reciprocating motion, wherein first and second plates are disposed on the opposite sides of the cam ring and the rotor to hold them therebetween, thus causing the volume of a pump chamber defined by a pair of adjacent vanes to change to perform an oil suction and discharge; wherein the first and second plates include a suction region where its pump chamber undergoes a suction stroke and in which a first groove is formed to allow discharged oil to be introduced thereinto directly, wherein the first and second plates also include a discharge region where each pump chamber undergoes a discharge stroke and in which a second groove is also formed, the first groove in the suction region and the second groove in the discharge region communicating with each other through an orifice to allow the oil in each first and second groove to act upon the back side of the vane in the slits to urge the vane into abutment against the cam, wherein there is provided a communication passage in the second plate which connects the second groove in the discharge region to a source of low pressure, and a valve for opening and closing the passage, and wherein the source of low pressure is the space surrounding the input shaft in the pump housing.

5,026,264

FLUID COMPRESSOR

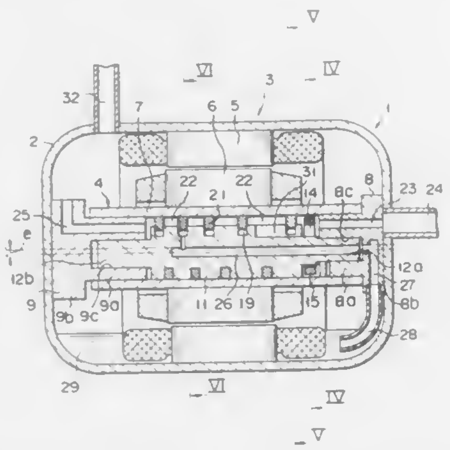
Naoya Morozumi, Machida; Hirotsugu Sakata, Chigasaki; Makoto Hayano, Tokyo; Masayuki Okuda; Takayoshi Fujiwara, both of Kawasaki; Moriaki Shimoda, Yokohama, and Hitoshi Hattori, Fuji, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 30, 1990, Ser. No. 472,177

Claims priority, application Japan, Jan. 31, 1989, 1-21096

Int. Cl.⁵ F04B *29/00*

U.S. Cl. 418—220 4 Claims



1. A fluid compressor comprising;

a cylinder having a suction-side end and a dischargeside end, said cylinder having an inner circumferential surface;

supporting means for rotatably supporting the suctionside and discharge-side end of said cylinder;

a columnar rotary member, having an outer circumferential surface, arranged in said cylinder so as to extend in the axial direction of said cylinder and be eccentric thereto, said rotary member having two axial ends rotatably supported by said supporting means, and being orbitable relative to said cylinder without rotation with respect to the cylinder while part of said rotary member is in contact with said inner circumferential surface of said cylinder, said rotary member having a spiral groove formed on said outer circumferential surface thereof, said spiral groove having pitches gradually narrowing with a distance from said suction-side end to said discharge-side end of said cylinder;

a spiral blade fitted in said spiral groove so as to be slidable in the radial direction of said rotary member, said spiral blade having an outer circumferential surface which is in tight contact with the inner circumferential surface of said cylinder and dividing the space between said inner circumferential surface of said cylinder and said outer circumferential surface of said rotary member into a plurality of operating chambers, said groove having an overall length larger than that of said blade by a predetermined length so that said blade is displaceable relative to said rotary member in the circumferential of direction the rotary member, and

drive means for rotating said cylinder and said rotary member, thereby continuously transferring a fluid, introduced into the operating chambers from the suction-side end of said cylinder, toward the discharge-side end of the cylinder through said operating chambers, and delivering the fluid from the discharge-side end of said cylinder, said drive means having means for rotating said cylinder, and means for transmitting the rotational force of said cylinder to said rotary member so as to rotate said rotary member in synchronism with said cylinder.

5,026,265

MULTI-INJECTION MOLDING MACHINE FOR MOLDING A MULTI-INJECTION BODY

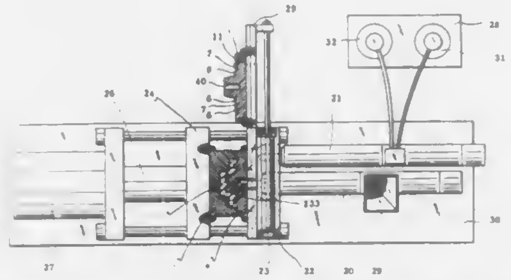
Toshiyuki Kanai, and Nobuo Shinnoh, both of Sakaki, Japan, assignors to Nissei Jushi Kogyo Kabushiki Kaisha, Nagano, Japan

Division of Ser. No. 347,908, May 5, 1989, abandoned. This application Jul. 17, 1989, Ser. No. 380,460

Claims priority, application Japan, May 11, 1988, 63-114453

Int. Cl.⁵ B29C *45/16*

U.S. Cl. 425—127 6 Claims



1. A multi-injection molding machine for molding a multi-injection body, said body including at least a first molded body made of a first resin and a second molded body made of a second resin, said machine comprising a first mold having first and second mold halves forming a first mold cavity for molding said first molded body, a first injecting means for injecting said first resin into said first mold cavity, said first molded body having an aperture provided with side walls, said aperture on a surface of the first molded body, and said surface surrounding said aperture, said surface to be joined to said second molded body, a third mold half operable to be in contact with said second mold half when said second mold half is separated from said first mold half, wherein

the second mold half holds the first molded body when said second mold half is separated from said first mold half, said second mold half and said third mold half forming a second mold having a second mold cavity, said third mold half having a pressing section for pressing at least a part of the surface surrounding said aperture of said first molded body, said pressing section forcing at least one side wall of said aperture inward to form an undercut section, said third mold half accommodating said first molded body, wherein said second resin is injected into said second cavity of said third mold half and into said undercut section by way of a second injecting means.

5,026,266

LABEL FEEDER FOR A MOLD FOR PLASTICS MOLDINGS

Chiaki Takasaki; Tatuo Furuse, and Morio Amagasaki, all of Tokyo, Japan, assignors to Toppan Publishing C., Ltd., Tokyo, Japan and Kabushiki Kaisha Tahara, Tokyo, Japan

Filed Dec. 21, 1989, Ser. No. 452,736

Claims priority, application Japan, Dec. 16, 1988, 63-328569; Feb. 16, 1989, 1-37110

Int. Cl.⁵ B29C *45/80*

U.S. Cl. 425—150 3 Claims

1. A label feeder for attaching labels to at least one cavity surface of a mold used with a plastic molding machine, said label feeder comprising:

a base frame located laterally to the plastic molding machine;

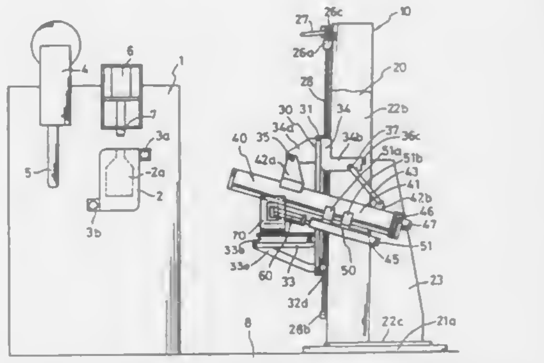
first adjustment means on said base frame for vertically adjusting said frame in relation to the plastic molding machine;

at least one label magazine mounted on the base frame adapted for storing therein a pile of labels to be attached to the at least one cavity surface of the mold on said molding machine, said magazine permitting removal of a predetermined number of labels from the pile of labels;

a loader mounted on said base frame, said loader having a longitudinal profile extending toward said plastic molding machine;

second adjustment means, cooperating with said loader and said base frame, for adjusting an inclination of the axis of said longitudinal profile of said loader in relation to the mold on said molding machine;

an arm mechanism attached to said loader, said arm mechanism comprising label sucking means for consecutively sucking a label from said label magazine and attaching the label to the at least one cavity surface of the mold;



an expansion means for consecutively moving the arm mechanism toward the at least one cavity surface of the mold after said label sucking means has sucked a label from said label magazine and toward the label magazine after said label sucking means has attached the label to the at least one cavity surface of the mold;

said expansion means being mounted on the loader so as to be movable along the longitudinal profile of the loader; and

a linkage provided between said expansion means and said label sucking means for maintaining said label sucked on said label sucking means at a constant angle when said label sucking means approaches the at least one cavity surface of the mold.

5,026,267

APPARATUS FOR FORMING THERMOPLASTIC MATERIAL

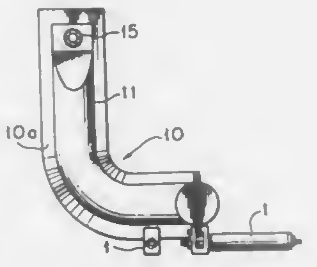
Hideki Miyabe, Kakamigahara, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha and Japan Aircraft Development Corporation, both of, Japan

Filed Dec. 6, 1989, Ser. No. 446,803

Claims priority, application Japan, Dec. 14, 1988, 63-315944

Int. Cl.⁵ B29C *33/20*

U.S. Cl. 425—451.9 10 Claims



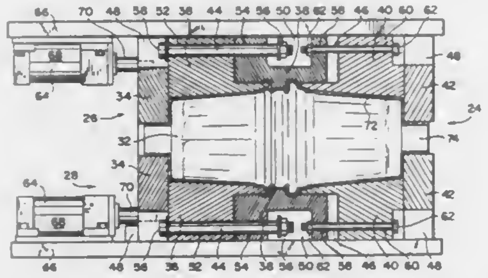
1. An apparatus for manufacturing a product of a thermoplastic resin which includes a pair of molds each having a peripheral flange provided with a mating surface, and clamp means for clamping said flanges of the molds so that the molds are secured together with the mating surfaces in contact with

VOL
1127
ISS
4
JE
25
1991
UMI

each other, said clamp means including a pair of clamp members for engagement with said flanges of the molds, shaft means passing through said clasp members, first stop means provided on said shaft means for engagement with one of said clamp members, spacer means provided on said shaft means for axial slidable movement and adapted for engagement with the other of said clamp members, second stop means provided on said shaft means for engagement with said spacer means at an end opposite to the other of said clamp members, said shaft means being made of a material having a coefficient of thermal expansion which is smaller than that of a material from which said spacer means is made so that the spacer means has a thermal expansion in the axial direction which is not smaller than a thermal expansion in the axial direction of said shaft means under the same temperature increase.

5,026,268
APPARATUS FOR BLOW MOLDING AN ARTICLE WITH COMPRESSION MOLDED AREAS

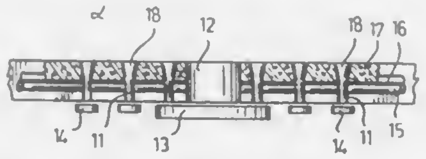
Norman C. Lee, Greensboro, N.C., assignor to Zarn, Inc., Reidsville, N.C.
Filed Mar. 30, 1990, Ser. No. 502,317
Int. Cl.⁵ B29C *49/30*
U.S. Cl. 425—525 10 Claims



1. Apparatus for blow molding an article having a pair of longitudinally spaced compression molded areas, said apparatus comprising a mold defining a mold cavity for receiving a plastic parison for blow molding into conformity with said mold cavity, said mold having at least three mold sections longitudinally arranged end to end relative to one another, guide means comprising at least one guide rod connecting said mold sections for longitudinal movement toward and away from one another, said guide means comprising stop means for defining predetermined spacings between said mold sections when moved away from one another, said stop means comprising stop members on said guide rode, and actuating means connected with an endwise one of said mold sections for selectively moving said one mold section toward the other said mold sections to move said mold sections into abutting relationship and for selectively moving said one mold section away from the other said mold sections to separate them from one another by said predetermined spacings, and control means for operating said actuating means to move said mold sections into abutting relationship after blow molding of a parison into conformity with said mold cavity to compress the parison between said mold sections, thereby forming a pair of compression molded areas longitudinally spaced by the intermediate one of said mold sections.

5,026,269
METHOD AND A DEVICE FOR CONTROLLING THE MIXING OF GASEOUS FLOWS IN A FLUIDIZED BED COMBUSTION CHAMBER

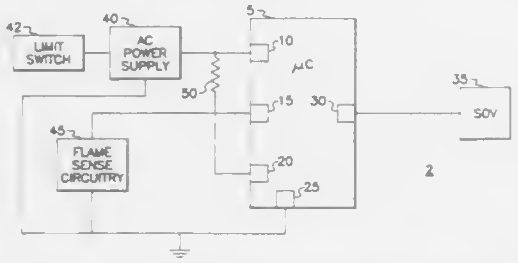
Seppo K. Ruottu, Karhula, Finland, assignor to Einco Oy, Karhula, Finland
PCT No. PCT/FI87/00102, § 371 Date Mar. 27, 1990, § 102(e) Date Mar. 27, 1990, PCT Pub. No. WO89/01115, PCT Pub. Date Feb. 9, 1989
PCT Filed Aug. 6, 1987, Ser. No. 460,873
Int. Cl.⁵ F23D *3/40*
U.S. Cl. 431—7 3 Claims



1. A method for controlling the staging of the combustion process in fluidized bed reactors and circulating fluidized bed reactors, in which method combustion air is introduced through a nozzle bottom in such a way that part of the combustion air is introduced into a reactor chamber through a plurality of vertically directed fluidizing nozzles positioned in said nozzle bottom and the remaining part of the combustion air is introduced through a plurality of essentially vertically directed jet nozzles positioned in said nozzle bottom, the ratio of the diameter of the fluidizing and jet nozzles being approximately 5 to 20, said fluidizing and jet nozzles being in communication with a common air cabinet, wherein the vertical air penetration of said jet nozzles is maintained at a value essentially higher than that of said fluidized nozzles, and the vertical air penetration of said jet nozzles is adequate to penetrate the fluidized bed.

5,026,270
MICROCONTROLLER AND SYSTEM FOR CONTROLLING TRIAL TIMES IN A FURNACE SYSTEM

John T. Adams, Minneapolis, and Timothy M. Tinsley, Coon Rapids, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.
Filed Aug. 17, 1990, Ser. No. 569,872
Int. Cl.⁵ F23N *1/00*
U.S. Cl. 431—24 9 Claims



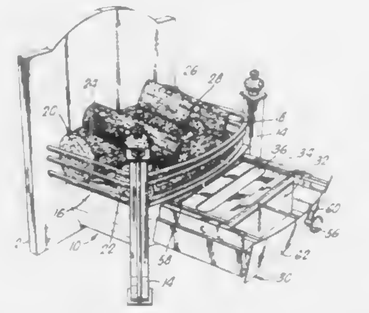
1. A microcontroller for controlling the operation of a gas valve in a furnace during a trial, comprising:

an input port adapted to receive electrical signals, and;

trial time select means connected to the gas valve, said trial time select means being adapted to open the gas valve for a first time period during a trial when an alternating current signal is received at said input port, said trial time select means being further adapted to open the gas valve for a second time period when a direct current signal is received at said input port.

5,026,271
LOG OR COAL EFFECT FIRE

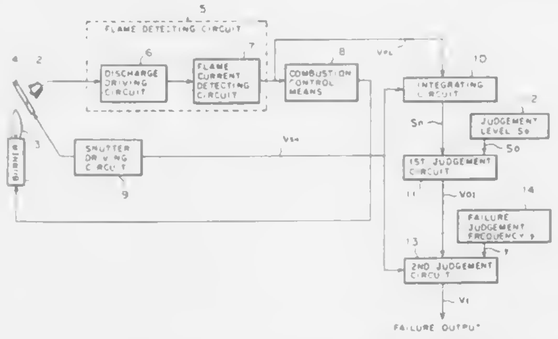
Alexei D. Orlov, Bucks; Ross O. Nixon, and John H. D. Misick, both of London, all of United Kingdom, assignors to Hunter Douglas International NV, Willemstad, Netherlands
Filed Jul. 12, 1990, Ser. No. 551,532
Claims priority, application United Kingdom, Jul. 20, 1989, 8916638
Int. Cl.⁵ F23Q *2/32*
U.S. Cl. 431—125 18 Claims



1. A log or coal effect fire comprising a frame, imitation logs or coal mounted on or supported by said frame, a drawer slidable or pivotable with respect to said frame from a first, operational position in which it is located below said imitation logs or coal, to a second, access position in which access can be gained to the interior of the drawer, an open topped fuel container for a gel or wax fuel mounted or mountable in the drawer at a location below the imitation logs or coal and an aperture means, having at least one aperture formed therein, said aperture means being positioned to overlie the open topped fuel container.

5,026,272
COMBUSTION CONTROL DEVICE

Masato Takahashi, Kamakura; Kazuo Seki, Ebina; Tetsuya Yamada, Fujisawa, and Yukuo Morohoshi, Nakai, all of Japan, assignors to Yamatake-Honeywell Co., Ltd., Tokyo, Japan
Filed May 23, 1989, Ser. No. 356,203
Claims priority, application Japan, Jun. 3, 1988, 63-136829
Int. Cl.⁵ F23N *5/00*
U.S. Cl. 431—79 4 Claims



1. A device for generating a failure signal which indicates failure of flame detecting means for detecting flames generated by combustion means, and for controlling the combustion means, the device comprising:

said flame detecting means generating detection signals when said flame detecting means detects flames generated by the combustion means and when the flame detecting means experiences a failure;

combustion control means connected to said flame detecting means and to the combustion means for controlling the flames of the combustion means in accordance with the detection signals from said flame detecting means;

a shutter for opening and closing between the combustion means and said flame detecting means, for opening and closing access of the flame detecting means to the flames;

a shutter driving circuit connected to said shutter for controlling in the opening and closing of said shutter;

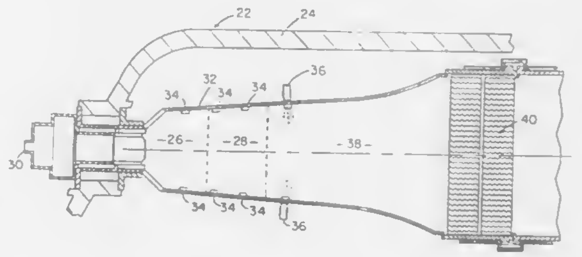
an integrating circuit connected to said flame detecting means for integrating the detection signals only when said shutter is closed;

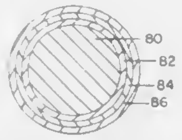
a first judgement circuit connected to said integrating circuit for comparing the result of an integration of said integrating circuit with a preset judgement level, and, if the result of the integration exceeds the preset judgement level, generating a tentative failure signal; and

a second judgement circuit connected to said first judgement circuit for comparing the result of a judgement of said first judgement circuit with a preset failure judgement frequency, and, if the tentative failure signal exceeds the preset failure judgement frequency, generating a failure signal which indicates failure of the flame detecting means.

5,026,273
HIGH TEMPERATURE COMBUSTER

Richard C. Cornelison, Hiram, Ohio, assignor to W. R. Grace & Co. -Conn., New York, N.Y.
Filed Jul. 15, 1988, Ser. No. 219,261
Int. Cl.⁵ F23D *21/00*
U.S. Cl. 431—170 10 Claims





1. A catalytic combustor device for gas turbine power plants comprising

a housing,

a primary fuel mixing zone, and

a catalytic combustor in axially spaced relation to said fuel mixing zone within said housing,

said catalytic combustor being characterized by a coated catalyst support member disposed in air/fuel intercepting relation in said fuel mixing zone within said housing,

said catalyst combustor comprising nonnesting layers of said coated catalyst support member which is nonlinearly corrugated and which is made of

a first layer composed of a high temperature resistant refractory metal or a ferritic stainless steel,

a second layer composed of a noble metal adhered to said first layer,

a third layer composed of a refractory metal oxide on said second layer, and

fourth layer composed of a catalytically active noble metal catalyst supported on said third layer,

VOL
1127
ISS
4
JE
25
1991
UMI

said coated catalyst support member being in the form of a metal-ceramic honeycomb which is opaque to infrared.

5,026,274

HOLDING DEVICE FOR A LIGHTER

Hannes Jacob, Köschenrütistrasse 77, CH-8052 Zürich, Switzerland

Filed Aug. 15, 1989, Ser. No. 393,991

Claims priority, application Switzerland, Aug. 31, 1988, 03253/88

Int. Cl.^{5} F23Q *2/32*

U.S. Cl. 431—253 **8 Claims**

1. A lighter in combination with a holding device therefor comprising: a lighter having a top, including a sparking mechanism and flame source, and a lower body portion; a housing with means for attachment and suspension of the housing, an extension device contained in the housing and formed by a return spring and reel with an attached tension cord having one end which passes through an opening in the housing and is attached to the top of the lighter, the opening of the housing being surrounded by a receiving well for the lighter.

5,026,275

REDUCTION OF NITROGEN OXIDE (NO_x) EMISSION FROM A KILN PLANT

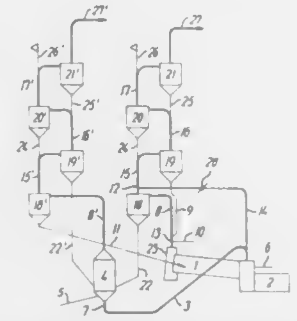
Soren Hundebol, Valby, Denmark, assignor to F. L. Smidth & Co. A/S, Valby, Denmark

Filed Apr. 4, 1990, Ser. No. 504,536

Claims priority, application Denmark, Apr. 5, 1989, 1630/89

Int. Cl.^{5} F27B *15/00*

U.S. Cl. 432—14 **3 Claims**



1. A method for the reduction of nitrogen oxide (NO_x) emission from a kiln plant for burning mineral raw materials by the use of a nitrogen-containing solid fuel, comprising the steps of

(1) preheating separate portions of said raw material in at least two separate multistage preheater strings, one said string being a kiln string in direct connection with a kiln riser pipe, another said string being a calciner string connected to a separate precalcining zone;

(2) introducing into said precalcining zone heated air from a material cooling zone, said material cooling zone being connected to said kiln and receiving hot treated material from the kiln;

(3) further introducing into said precalcining zone preheated raw material from said kiln string and said calcining string together with nitrogen-containing solid fuel;

(4) calcining said preheated raw material in said precalcining zone by burning fuel with said air;

(5) passing the calcined raw material from the precalcining zone to the kiln and burning said material in said kiln together with air and said fuel;

(6) passing the burned raw material in the form of clinker to said material cooling zone and thence out of the plant as final treated product;

(7) passing NO_x-containing combustion gases from the kiln upwardly through a riser pipe in said multistage kiln string and reducing said NO_x to harmless N_2 in said riser pipe by adding nitrogen-containing solid fuel to said combustion gases in said riser pipe, said fuel being added in an amount greater than the amount of fuel combustible in the riser pipe by the oxygen in the combustion gases from the kiln and further in an amount constituting from 20% to 50% of the total amount of solid fuel supplied to the plant;

(8) combusting only a portion of said fuel in said riser pipe and causing the nitrogen in said fuel, both combusted and non-combusted, to react with NO_x generated in the kiln to form said harmless N_2;

(9) passing non-combusted nitrogen-depleted fuel from said riser pipe to said calcining zone and combusting said nitrogen-depleted fuel and said nitrogen-containing fuel in said calcining zone with said air in the presence of said preheated raw material, thereby reducing NO_x emission from the calcining zone; and

(10) thereby reducing the overall NO_x emission from said kiln plant.

5,026,276

IMAGE FIXING APPARATUS USING A DETACHABLE FILM

Hiromitsu Hirabayashi, Yokohama; Kensaku Kusaka, Kawasaki, and Morikazu Mizutani, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 24, 1989, Ser. No. 426,082

Claims priority, application Japan, Oct. 24, 1988, 63-267679; Oct. 24, 1988, 63-267680; Nov. 11, 1988, 63-285541; Dec. 13, 1988, 63-315334; Dec. 21, 1988, 63-324504

Int. Cl.^{5} G03G *15/20*

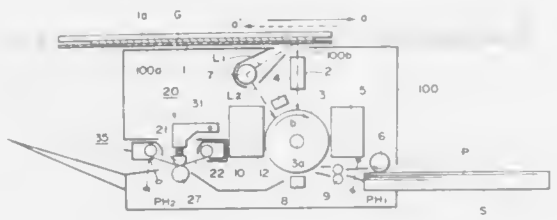
U.S. Cl. 432—59 **50 Claims**

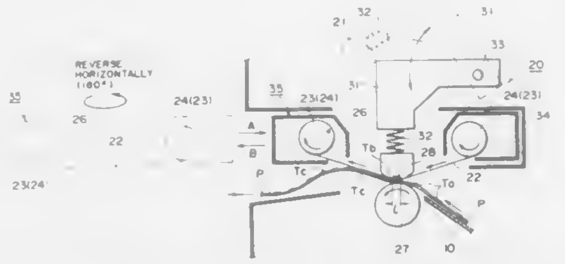
6. An image fixing apparatus, comprising:

a heating source for heating a toner image;

a film movable in contact with a supporting member for

supporting the toner image, wherein the toner image is heated by heat from said heating source through said film;





wherein said film is detachably mountable into said apparatus and both sides of said film are useable for image fixing, each of said sides having a different surface roughness.

5,026,277

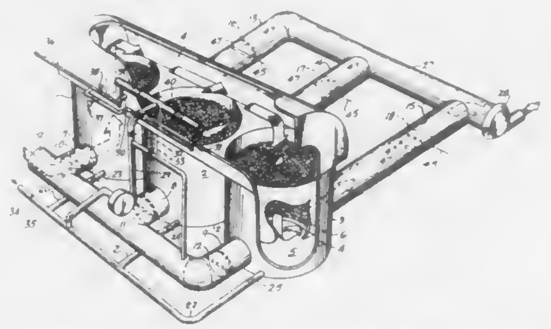
REGENERATIVE THERMAL INCINERATOR APPARATUS

James A. York, deceased, late of Glendale, Calif. by Dorothy M. York, legal representative , assignor to Smith Engineering Company, Duarte, Calif.

Filed Nov. 30, 1989, Ser. No. 443,753

Int. Cl.^{5} F27D *17/00*

U.S. Cl. 432—181 **11 Claims**



1. A regenerative thermal incineration apparatus comprising:

three regenerators each containing refractory heat exchange materials;

means for directing an effluent to be processed into the regenerators;

means for removing the effluent after processing from the regenerators and exhausting the processed effluent to atmosphere;

a combustion chamber common to and communicating with all of the regenerators having an air-fuel system and at least one burner;

means or selectively directing the effluent to be processed through a heating first regenerator, then to the combustion chamber and thereafter to a cooling second regenerator;

means for purging an idle third regenerator of any residual effluent therein and reciting the purged effluent out of the third regenerator in a direction away from combustion chamber; and

means for periodically altering the direction of flow of the effluent through the apparatus such that the former heating regenerator becomes the idle regenerator, the former cooling regenerator becomes the heating regenerator and the former idle regenerator becomes cooling regenerator.

5,026,278

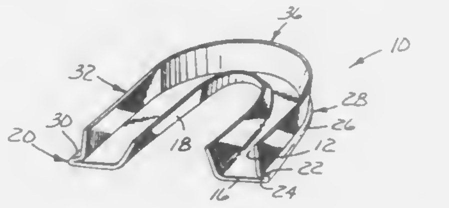
DENTAL IMPRESSION TRAY WITH FLANGE

Joel D. Oxman, and F. Andrew Ubel, III, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 23, 1990, Ser. No. 484,105

Int. Cl.^{5} A61C *9/00*

U.S. Cl. 433—41 **4 Claims**



1. A dental impression tray having an overall, generally U-shaped configuration in plan view, said tray having an elongated channel adapted to receive a quantity of impression material, said channel having a buccal side, an occlusal side and a lingual side, said tray including a flange extending substantially along the entire length of said channel, said buccal side, said occlusal side, said lingual side and said flange each comprised of a thermoplastic material that is solid at 38° C. and that has a melting or softening temperature that can comfortably be withstood by oral tissues, said channel including opposed posterior portions and being of a size sufficient to extend about at least a portion of a dental arch, said flange including a first flange section connected on one of said posterior portions, and a second flange section connected to the other of said posterior portions, each of said flange sections extending outwardly in opposite directions from said channel for facilitating removal of said tray from the mouth.

5,026,279

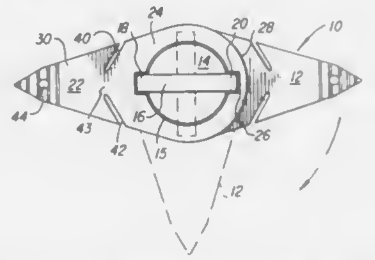
DENTAL ARTICULATOR

Dutch B. Wilkes, P.O. Box 1250, Bartow, Fla. 33830-1250

Filed Jan. 17, 1990, Ser. No. 466,608

Int. Cl.^{5} A61C *11/00, 19/00*

U.S. Cl. 433—60 **19 Claims**



1. An articulator apparatus for orienting the upper dental cast and the lower dental cast to each other for building dental appliances such as crown and bridge work comprising a cast engaging jaw member; a unitary hinge means mounted to said cast engaging jaw member, a second cast engaging jaw member rotatably mounted on said unitary hinge means and detachable from said unitary hinge means, said unitary hinge means

VOL
1127
ISS
4
JE
25
1991
UMI

comprising a key member secured on said first cast engaging jaw member and a keyway defined by the second cast engaging jaw member and removable cast engaging means mounted on the distal end of each jaw member to engage respective dental casts, said jaw members of said articulator apparatus engaging a dental cast by wet embedment in the initial pour of dental stone, each jaw member's distal end defining an arrow shaped heat of a thickness defining a width surface in turn defining bore means and locking serrations, said bore means receiving a rod means which extends from the width surface to form a mechanical wedge for embedment in wet dental stone.

5,026,280
ENOSSAL IMPLANT WITH AN ELASTIC INTERMEDIATE ELEMENT AND A METAL SPACER ELEMENT

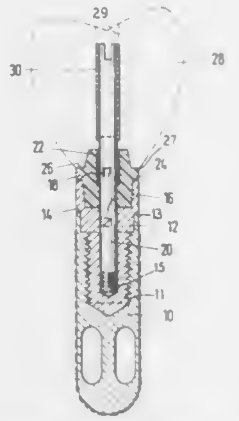
Walter Dürr, Remchingen, and Axel Kirsch, Filderstadt, both of Fed. Rep. of Germany, assignors to IMZ Fertigungs und Vertriebsgellschaft fur dentale Technologie mbH, Fed. Rep. of Germany

Filed Nov. 22, 1989, Ser. No. 440,257

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1988, 3839724; Mar. 23, 1989, 3909580

Int. Cl.⁵ A61C *8/00*

U.S. Cl. 433—175 23 Claims



1. An enossal implant comprising a basic structure for snugly receiving in a bore in a jaw of a patient, said basic structure having a threaded bore surrounded by an annular shoulder at an upper end, a spacing element being composed of metal and having external threads for securing the spacing element in the threaded bore of the basic structure with a first annular shoulder of the spacing element engaging the annular shoulder of said basic element, said spacing element having an axial bore with a threaded portion and a counterbore adjacent the end opposite a closed end of the spacing element forming a second annular shoulder, an intermediate element being inserted in said counterbore and having a ring shoulder engaging said second annular shoulder of the spacing element, the intermediate element having an inner bore aligned with the axial bore of the spacing element, and an implant post having a threaded portion and extending through the intermediate element to be threaded into the threaded portion of the axial bore of the spacing element, said intermediate element having at least a portion of the bore of a diameter greater than an external diameter of said implant post, said ring shoulder of the intermediate element being of a plastic material having an annular surface engageable by a bearing face of a denture secured by said post on said base structure.

5,026,281
DENTAL INSTRUMENT FOR PREVENTING ACCIDENTAL SWALLOW

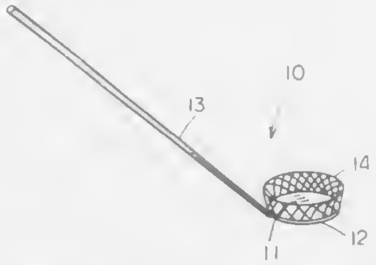
Masahiro Sugiyama, 32-8, Kurobaru 2-chome, Kokurakita-ku, Kitakyushu-shi, Fukuoka, Japan

Filed Dec. 1, 1989, Ser. No. 444,240

Claims priority, application Japan, Dec. 14, 1988, 63-163003[U]; Aug. 25, 1989, 1-99261[U]

Int. Cl.⁵ A61B *1/24*

U.S. Cl. 433—30 4 Claims



3. A dental instrument for preventing accidental swallow comprising:
a receiving plate having a mirror on the top face;
a circumferential wall for drop prevention which is made of wire net and mounted on a periphery of said receiving plate; and
a grip attached to one of the receiving plate and the circumferential wall.

5,026,282
PHYSIOLOGICAL STEREO ARTICULATOR

Isao Koike, 7-chome, Minami, Fukuoka 815, Japan

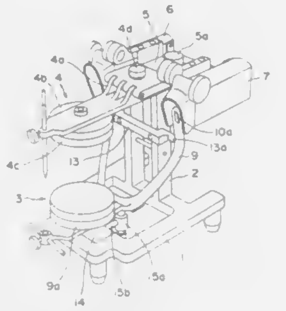
PCT No. PCT/JP89/00335, § 371 Date Nov. 28, 1989, § 102(e) Date Nov. 28, 1989, PCT Pub. No. WO89/09033, PCT Pub. Date Oct. 5, 1989

PCT Filed Mar. 30, 1989, Ser. No. 445,865

Claims priority, application Japan, Apr. 1, 1988, 63-81638

Int. Cl.⁵ A61C *11/00*

U.S. Cl. 433—62 11 Claims



1. An articulator comprising:
a frame having a frame base and a frame upright;
a maxillary mechanism comprising an upper frame member pivotably mounted on said frame upright for pivotable movement about a horizontal axis;
a mandibular mechanism comprising a base part pivotably mounted on said frame upright for pivotal movement about a vertical axis, said mandibular mechanism comprising a lower frame member and support means supporting said lower frame member;
said support means comprising operating blocks pivotably mounted on said base part, said operating blocks having extendable and retractable activators, pivot means pivotably mounting said lower frame member on said activators. said operating blocks having an inclined surface engageable by said lower frame member as said activators extend and retract such that said engagement effects pivoting of said operating blocks to thereby effect raising and lowering of said lower frame member.

5,026,283
CAPSULES FOR TOOTH-RESTORING MATERIALS

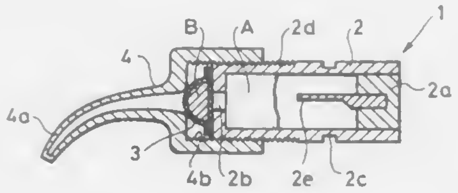
Satoshi Osanai, Kawajima, and Manabu Hiraoka, Fujimi, both of Japan, assignors to G-C Dental Industrial Corporation, Tokyo, Japan

Continuation of Ser. No. 74,028, Jul. 16, 1987, abandoned. This application Jun. 1, 1989, Ser. No. 361,705

Claims priority, application Japan, Aug. 8, 1986, 61-185140

Int. Cl.⁵ A61C *5/04*

U.S. Cl. 433—90 11 Claims



1. A capsule for a tooth restoring material, comprising:
a cylinder containing therein a predetermined amount of a powder component of the tooth restoring material;
plunger slidably fitted in one end opening of said cylinder;
a breakable package having a face formed of a weak material covering another end opening of said cylinder and containing therein an amount of a liquid component of the tooth restoring material, whereby said face formed of a weak material may be ruptured to mix said liquid and powder components;
a member having a nozzle and being positioned relative to said cylinder such that said package is held between said member and said cylinder; and
a package breaking member mounted on said plunger for movement therewith and having a length in the direction of movement of said plunger which is greater than a thickness of said package in said direction of movement,
wherein said nozzle, said another end opening and said package breaking member are aligned and sized such that said package breaking member may break said package, pass through said another end opening and enter said nozzle during advancement of said plunger towards said another end opening for dispensing the mixed liquid and powder components, said package breaking member being smaller in width than said nozzle by an amount such that said package breaking member does not close said another end opening and said nozzle during the advancement of said plunger toward said another end opening.

5,026,284
APEX ROOT CANAL FILE

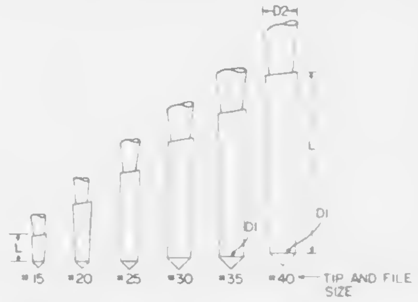
Howard Martin, 909 Pershing Dr., Silver Spring, Md. 20910

Filed Feb. 17, 1988, Ser. No. 156,813

Int. Cl.⁵ A61C *5/02*

U.S. Cl. 433—102 9 Claims

1. A set of endodontic files for use with a tooth, comprising, a set of files, with each said file having a smooth sided probe with a pointed tip to facilitate penetration and cutting through blockages and debris of said tooth, each said file also having a cutting edge along the longitudinal axis adjacent to said smooth sided probe, and with each said file in said set of files having a different combination of length of said smooth sided probe and width of said smooth sided probe across the diameter at the base of said pointed tip of said smooth sided probe and of files including files with varying diameters at the base of said pointed tip of said smooth sided probe.



5,026,285
ENOSSAL INDIVIDUAL TOOTH IMPLANT AND LOCKING TOOL FOR USE WITH SUCH AN IMPLANT

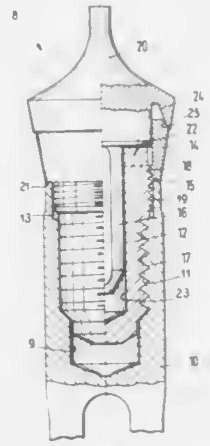
Walter Dürr, Remchingen, and Axel Kirsch, Talstrasse 23, D-7024 Filderstadt, both of Fed. Rep. of Germany, assignors to Axel Kirsch and Eberle Medizintechnische Elemente GmbH, both of, Fed. Rep. of Germany

Filed Apr. 18, 1990, Ser. No. 510,861

Claims priority, application Fed. Rep. of Germany, May 31, 1989, 3917690

Int. Cl.⁵ A61C *8/00*

U.S. Cl. 433—173 15 Claims



1. In an implant for individual teeth having a metal implant post with a head portion for receiving a removable denture with a snug fit, said post being an inner bore of a spacer sleeve, which sleeve is threaded into a bore of a basic structure mounted in the jaw of the patient, the improvements comprising locking means for locking the spacer sleeve in the basic structure against twisting and turning, said locking means including the spacer sleeve having a base element with a first threaded portion with a first pitch threaded in the bore of the basic structure and a second threaded portion adjacent an upper end of the base element of a second pitch smaller than the first pitch and a ring element threadably received on the second portion, said ring element having a shoulder engaging an upper annular face of the basic structure, said ring element on a surface facing away from said shoulder and said base element on an upper end face each being provided with means for attaching a tool to enable simultaneously holding the base element against twisting as the ring element is threaded tightly on the second thread portion of the base element to press the shoulder of the ring element against the upper annular face of the basic structure.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,286
COLOR STANDARD ARRANGEMENT

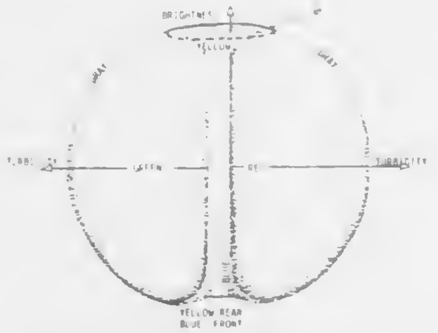
Gerriet Hellwig, Teufenerstrasse 13, 9001 St. Gallen, Switzerland

Continuation of Ser. No. 12,297, Feb. 9, 1987, abandoned. This application May 19, 1989, Ser. No. 356,648

Claims priority, application Switzerland, Feb. 10, 1986, 1017/86

Int. Cl.⁵ G09B *19/00*

U.S. Cl. 434—98 **20 Claims**



1. A color order spacial system for classifyably arranging distinct color shades to be derived from a number of at least three pure colors **(31,33,35)** related to complementary colors **(30,32,34)** and a color white **(6)**, said spacial system comprising;
  display means having areas **(14** to **19)** in a spacial configuration for receiving each of said color shades in a predefined spacial location,
  said spacial configuration defining an inner surface zone **(8)** and an outer surface zone **(7)**,
  said color shades of said spacial locations varying in respective radial and axial directions of said spacial configuration in visually substantially equal gradations:
    a. of density values extending from a spacial location for a maximum brightness value approaching the color white toward a spacial location for a maximum density value;
    b. of tint values derived from substantially uniformly varying mixing ratios of at least two of the pure colors and of decreasing chroma values defined by an increasing gray tint value,
  the associated spacial locations for at least three pure colors **(30** to **35)** being provided near the inner zone **(8)** and the chroma values decreasing toward the outer zone **(7)** whereby the most turbid colors are on the outside of said spacial configuration.

5,026,287
THREE-DIMENSIONAL CONSTELLATION MODEL AND CONSTRUCTION KIT THEREOF

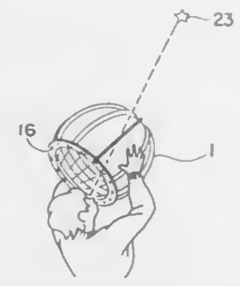
Shiro Yamada, No. 2-7-1-606, Mita, Mita Minato-ku, Tokyo, Japan

Filed Feb. 21, 1990, Ser. No. 483,615

Claims priority, application Japan, Mar. 20, 1989, 1-66371

Int. Cl.⁵ G04B *27/00*

U.S. Cl. 434—137 **8 Claims**



2. A construction kit of a three-dimensional constellation model, the combination of which comprises (a) a zenith section having an external shape of a circular form, the back side of said zenith section being drawn with a celestial map of a zenith part; (b) 6- to 24-in-a-set body plate sections having each a ship's bottom-like shape, each of said body plate sections being provided with an overlap width for boding to the zenith section on its upper edge, overlap widths for forming rib-like projections on its both right and left edges and an overlap width for forming an annular flange on its bottom edge, and being drawn with a serial celestial map on its back side; and (c) a flange-reinforcing plate adapted to bond together the overlap widths provided on the bottom edges of the adjacent body plate sections thereto.

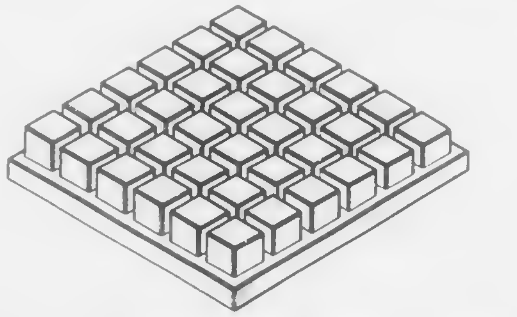
5,026,288
ILLUMINATED EDUCATIONAL BLOCKS

Helen Castiglia, 7 Linden La., and Joseph Cardamone, 47 Musket Dr., both of, Shirley, N.Y. 11967

Filed Jun. 12, 1989, Ser. No. 364,870

Int. Cl.⁵ G09B *5/00*

U.S. Cl. 434—169 4 Claims



1. An educational illuminated block assembly, comprising a support provided with conductive means coded so as to determine a plurality of conductive locations on said conductive means; said conductive means being connectable with an electric power supply; and a plurality of blocks each having illuminating means and also having contact means coded in correspondence with a respective one of said locations of said conductive means of said support, so that when a respective one of said blocks is placed on said support at a location such that said contact means of said block correspond to said location, electric current is supplied through said conductive means to said block and said block is illuminated, while when a respective one of said blocks is displaced on said support at a location such that said contact means of said block does not coincide to said location, electric current is not supplied from said conductive means to said block and said block is not illuminated.

5,026,289
CLOCK SPRING INTERCONNECTOR FOR STEERING

Mitsunori Matsumoto, and Hironori Kato, both of Miyagi, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

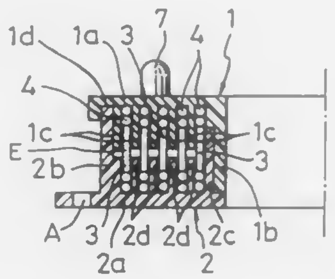
Filed Oct. 20, 1989, Ser. No. 425,143

Claims priority, application Japan, Dec. 14, 1988, 63-161261[U]

Int. Cl.⁵ H01R *35/04*

U.S. Cl. 439—15 4 Claims

1. A clock spring interconnector including a fixed member; a movable member rotatably engaged with said fixed member such that a space is defined between said fixed member and said movable member; a first direction winding portion of a flexible cable wound so that the cable is concentrically wound in said first direction around one of said fixed member and said movable member at a constant diameter; a second direction winding portion of said flexible cable concentrically wound around one of said fixed member and said movable member at a constant diameter in a second direction opposite to said first direction; and a cable turned-back portion of said flexible cable located between said first direction and said second direction winding portions in said space, characterized in that a first end of said first direction winding portion is secured to a first side of one of said fixed member and said movable member, and a second end of the second direction winding portion is secured to a second side of the other one of said fixed member and said movable member.



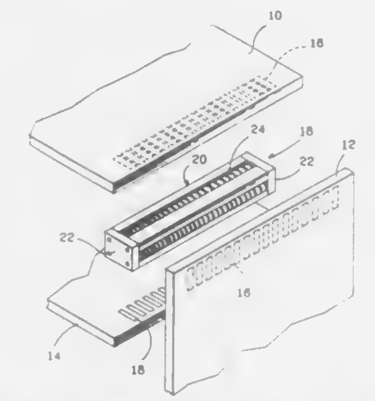
5,026,290
ELECTRICAL CONNECTOR FOR ELECTRICALLY INTERCONNECTING NON-PARALLEL SUBSTRATES

Ronald A. Dery, Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 6, 1990, Ser. No. 563,005

Int. Cl.⁵ H01R *9/09*

U.S. Cl. 439—65 **5 Claims**



1. An electrical connector for electrically interconnecting two parallel substrates and one non-parallel substrate, said connector comprising:
  a housing having a channel on each of two parallel surfaces and a third channel on another surface not parallel relative to the two parallel surfaces and a first passage through said housing extending and open to said channels on said two parallel surfaces and a second passage extending and open to said third channel and said first passage; and
  a contact element comprising a flexible, circuit carrying film wrapped around and extending between three, spaced apart coil springs with circuits on the film facing outwardly, said contact element being positioned in said housing with each spring being received in respective said channels and said film extending between said springs being received in said passages, said circuits extending outwardly from said channels to electrically engage substrates placed against said surfaces of said housing.

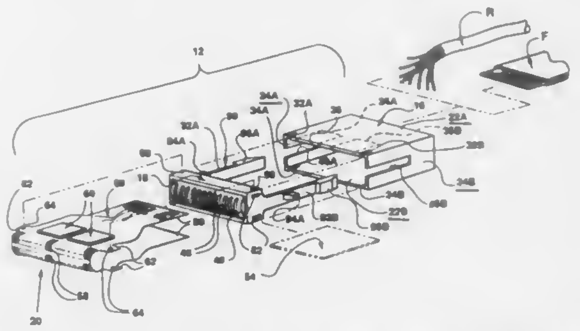
5,026,291
BOARD MOUNTED CONNECTOR SYSTEM

James J. David, Sturbridge, Mass., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 10, 1990, Ser. No. 566,021

Int. Cl.⁵ H01R *9/09*

U.S. Cl. 439—67 **4 Claims**



1. A connector system for use with a planar circuit board having an array of planar pads on at least a first surface thereof, the system comprising:
  (a) a modular connector, the modular connector itself comprising:
    a support cover having a first, open, end;
    a spring frame having a biasing member therein, the frame being receivable by the support cover with the biasing member extending from the open end thereof;
    a flexible circuit having an interior and an exterior surface thereon, the flexible circuit having an array of electrically conductive pads arranged in a predetermined pattern on the exterior surface thereof, the flexible circuit being flexed over the biasing member such that the interior surface of the flexible circuit bears against the biasing member;
  (b) a frame, the frame being mountable on a surface of the circuit board; and
  (c) means for securing the connector within a predetermined distance of the surface of the board having the planar pads thereon so that the springs extending from the cover are flexed, thereby to impose a biasing force on the flexible circuit so that the contact pads on the flexible circuit are disposed in electrical contact with the planar pads on the board.

5,026,292
CARD EDGE CONNECTOR

Charles S. Pickles, Hummelstown; Matthew M. Sucheski, Harrisburg, and Mark R. Thumma, Oberlin, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 10, 1990, Ser. No. 458,071

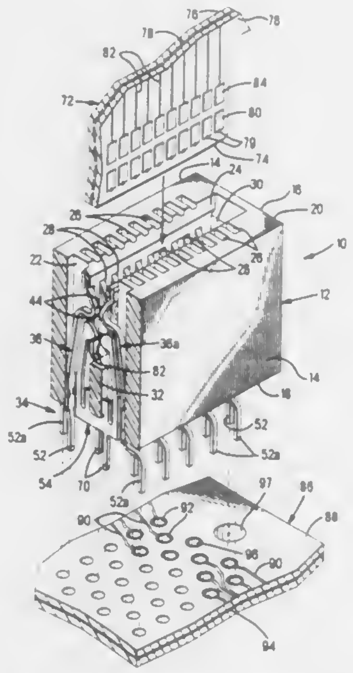
Int. Cl.⁵ H01R *13/652, 9/09*

U.S. Cl. 439—108 **5 Claims**

1. An electrical connector for use with a circuit card of the type having ground contact means disposed along a leading edge and proximate thereto and signal traces having signal contact means located rearwardly from said ground contact means on each major surface of the circuit card, said connector having a dielectric housing member with a mounting face and an opposed card receiving face, a card receiving cavity extending into said housing from said card receiving face to a card stop means, a plurality of contacts adapted for mating with said card at respective contact locations spaced laterally along said cavity and associated with trace locations along a circuit card received in said cavity, said plurality of contacts including signal contact members arranged in opposed pairs along opposite sides of said card receiving cavity at each said contact location and secured in respective contact receiving passageways thereat in communications with said card receiving cavity, said signal contact members having contact sections for

VOL
1127
ISS
4
JE
25
1991
UMI

engaging respective opposed signal traces on opposite major surfaces of said card upon card insertion therebetween, said contact sections being defined on free ends of cantilevered beams extending into said cavity to be deflected outwardly by said card upon card insertion whereupon said contact sections become engaged with respective contact sections of signal traces upon full card insertion, said signal contact members having second contact sections at least exposed along the mounting face of the housing and adapted to be mated with corresponding signal contact means of another electrical article, and said connector further including means for grounding said card; said connector being characterized in that:
  said ground means of said connector includes a plurality of ground contact members, each said ground contact member being an essentially planar member and including a body section extending from first to second side edges and having a pair of opposed cantilevered beams extending upwardly from said body section proximate said first and second side edges;
  said housing and said signal contact members secured therein at each said signal contact location being adapted to permit a said ground contact member to be mounted into said housing at each said signal contact location and between ones of a respective said pair of signal contact members thereat and spaced therefrom, said pair of opposed cantilevered beams extending upwardly into respective ones of said contact receiving passageways and into said card receiving cavity, said beams being deflectable in the plane of said ground contact members by said card upon insertion thereof into said card receiving cavity, said beams including ground contact sections thereon engageable with respective said ground contact means of said card upon full card insertion; and
  said ground contact members including second ground contact sections at said contact locations, said second ground contact sections at least exposed along the mounting face of said housing and engageable with corresponding ground contacts of said electrical article; whereby said connector has an assured ground connection associated with each signal connection at each location of said signal contact pair and between the signal contact members of the respective said pair.



5,026,293
INTERACTIVE CONNECTOR UNIT FOR A WIRING HARNESS

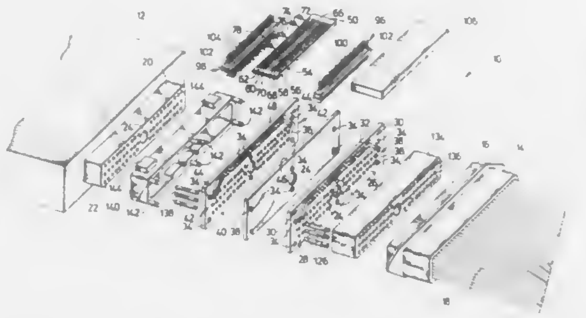
Wayne G. Wilson, Flint, Tex., assignor to Automotive Digital Systems, Inc., Flint, Tex.

Filed Dec. 19, 1989, Ser. No. 452,819

Claims priority, application Canada, Sep. 29, 1989, 614723

Int. Cl.^{5} H01R *13/66*

U.S. Cl. 439—76 36 Claims



1. An interactive connector unit insertable between a wiring harness and an automotive electronic control assembly of the type which receives input from sensors of operating parameters and produces control signals in response thereto, the connector unit in operable combination comprising:
  first board means for electrically interconnecting a first set of contact points with a first set of adapter points, each contact point being connected to one of said adapter points;
  second board means for electrically interconnecting a second set of contact points with a second set of adapter points, each contact point being connected to one of said adapter points;
  third board means for electrically interconnecting spaced apart third and fourth sets of adapter points which correspond to said first and second set of adapter points;
  means on said third board means for inserting circuit altering devices between selected ones of said third and fourth sets of adapter points;
  electrical adapters for completing the circuit between individual ones of the adapter points on the first board means with individual ones of the adapter points on one of the third or fourth sets of adapter points on the third board means and between individual ones of the adapter points on the second board means and individual ones of the other of the third or fourth sets of adapter points.

5,026,294
IGNITION PLUG SOCKET STRUCTURE

Masahiro Hisatomi, Kanagawa; Yoshihiro Togasaki, Hyogo, and Mitsuyasu Tanaka, Shizuoka, all of Japan, assignors to Nissan Motor Co., Ltd.; Hanshin Electric Co., Ltd. and Yazaki Corporation, all of, Japan

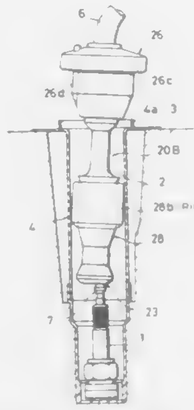
Filed Mar. 1, 1990, Ser. No. 486,929

Claims priority, application Japan, Mar. 3, 1989, 1-24397[U]

Int. Cl.^{5} H01R *11/11, 13/631*

U.S. Cl. 439—125 4 Claims

1. An ignition plug socket structure mounted on an engine body, for connecting an ignition coil to an ignition plug, comprising:
  (a) a cylindrical plug socket protective cover disposed in an ignition plug socket mounting hole formed in an engine body; and
  (b) an ignition plug socket having:
    (1) a resin plug socket body for holding a plug socket terminal therewithin;
    (2) an elastic upper cap attached to an upper end of said socket body and formed with a first plurality of axially extending outer straight ribs brought into contact with an inner circumferential surface of said plug socket protective cover; and
    (3) an elastic lower cap attached to a lower end of said socket body and formed with a second plurality of axially extending outer straight ribs separate from said first plurality of ribs and also brought into contact with the inner circumferential surface of said plug socket protective cover, whereby said ignition plug socket can be aligned with the ignition plug socket mounting hole and protected from engine vibration.



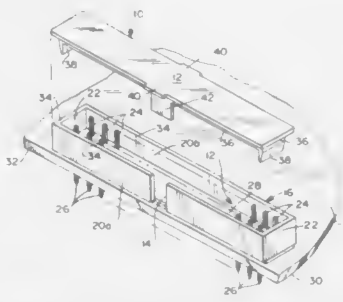
5,026,295
COVER FOR AN ELECTRICAL CONNECTOR

Jennifer L. C. Fong, and Alan B. Berg, both of Singapore, Singapore, assignors to Molex Incorporated, Lisle, Ill.

Filed Jul. 31, 1990, Ser. No. 560,911

Int. Cl.^{5} H01R *13/44*

U.S. Cl. 439—135 14 Claims



1. For use with an electrical connector in the form of a header for mounting on a printed circuit board, the header having a cavity with an open top defined by side wall means and a bottom wall, terminals disposed in the cavity with solder tails projecting through the bottom wall for soldering to circuit traces on the printed circuit board, and a polarizing slot in the side wall means, a cover for closing said cavity and said polarizing slot to protect the terminals during a soldering process, the cover comprising lid means including a top wall overlying top edges of the open top, complementary interengaging means between the lid means and the side wall means of the header for positioning the cover on the header to close the cavity, and projection means depending from the lid means in position for closing the polarizing slot in the side wall means.

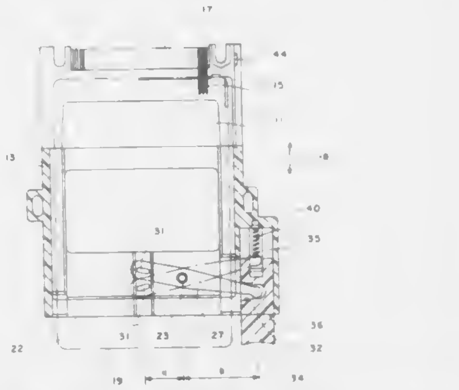
5,026,296
ELECTRICAL CONNECTOR EQUIPPED WITH RELEASE MECHANISM

Osamu Hashiguchi, Tokyo, Japan, assignor to Japan Aviation Electronics Industry, Limited, Tokyo, Japan

Filed Mar. 5, 1990, Ser. No. 488,651

Int. Cl.^{5} H01R *13/62*

U.S. Cl. 439—159 5 Claims



1. An electrical connector having an electric contact and being equipped with a release mechanism for releasing a mating element from engagement with said connector, said mating element having a mating contact for electrically connecting with said contact, said connector comprising;
  an insulator frame body having a hollow portion with an open end defined by an inner surface thereof, said electric contact being fixed in the hollow portion for connecting said mating element;
  an insulator flat plate having a first surface and an opposite second surface with a size which is similar to said mating element for carrying said mating element on said first surface, said insulator flat plate being slidably mounted in the hollow portion of said frame body to carry said mating element in an engaging and a release direction to connect and disconnect said mating contact with said electric contact, said flat plate having hooking means for mechanically engaging said mating element carried on said flat plate;
  fewer means pivotally supported at a position in the vicinity of the open end on said inner surface of said frame body which faces said second surface of said insulator flat plate, said lever means having an end portion which is mechanically coupled with said flat plate and an opposite end portion; and
  manually-operated means coupled to said opposite end portion of the lever means and manually operated for rotating said lever means to move said flat plate in said release direction so that said mating element on said flat plate can be forcedly released from the connection between said electric contact and said mating contact.

5,026,297
ELECTRICAL SOCKET ASSEMBLY FOR SINGLE IN-LINE CIRCUIT PACKAGE

Fred L. Krehbiel, Lake Forest, Ill., assignor to Molex Incorporated, Lisle, Ill.

Filed Jun. 28, 1990, Ser. No. 545,215

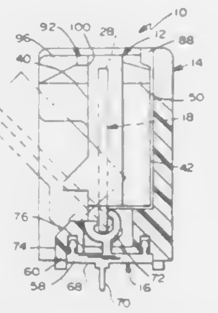
Int. Cl.^{5} H01R *13/00*

U.S. Cl. 439—326 18 Claims

1. A socket assembly for receiving a circuit member having a planar substrate with a mating edge having a plurality of conductive regions disposed therealong, said socket assembly comprising:
  a cover for receiving and releasably mounting therein the planar substrate of the circuit member with the mating edge extending from the cover; and,

VOL 1127 ISS 4 JE 25 1991 UMI

a housing having an opening adapted to receive said cover and having a mating slot formed in said housing for receiving the mating edge of the circuit member, latch means defined on said housing in proximity to the slot for lockingly engaging the cover when the mating edge of the circuit member is disposed in the slot at a selected angular alignment.



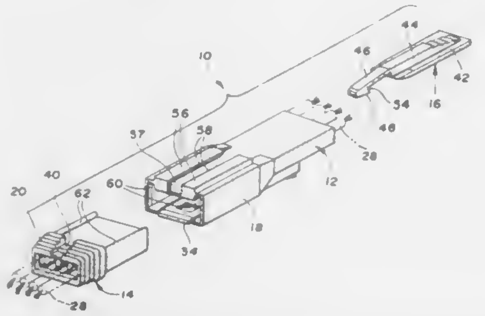
5,026,298
ELECTRICAL CONNECTOR WITH CONNECTOR POSITION ASSURANCE DEVICE

Stacy A. Brussalis, Niles; Jeffrey W. Heston, Warren, and Stewart L. Yang, Cortland, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 23, 1990, Ser. No. 556,683

Int. Cl.^{5} H01R *13/627*

U.S. Cl. 439—358 **10 Claims**



7. An electrical connector comprising;

a first electrical connector and a second electrical connector which include mating electrical terminals when the electrical connectors are mated,

a primary lock for locking the electrical connectors in a fully mated position, and

connector position assurance means for assuring that the electrical connectors are fully mated comprising a connector position assurance device that slideably mounts on one side of the first electrical connector and a cooperating lock projection of the second electrical connector,

the connector position assurance device comprising a slide and a slat which is integrally attached to the top of the slide so as to provide a resilient inclined lock arm that projects forwardly and downwardly of the slide,

the resilient inclined lock arm having an enlargement at its free forward end that includes a forward facing surface comprising an upper abutment and a lower cam, and a rearward facing lock shoulder,

the resilient lock arm being deflected outwardly at the free end when the slide is slideably mounted on the first electrical connector so that the enlargement at the free forward end of the resilient lock arm biasingly engages the one side when it is slid forwardly on the first electrical connector,

the lower cam engaging the cooperating lock projection of the second electrical connector and camming the enlargement over the lock projection so that the lock shoulder engages behind the lock projection to lock the electrical connectors in a mated position providing a redundant primary lock when the connector position assurance device is slid forwardly on the first electrical connector and the lock projection is located within a predetermined maximum distance from a forward edge on the one side of the first electrical connector, and

the upper abutment engaging the lock projection and pushing the electrical connectors apart when the connector position assurance device is slid forwardly on the first electrical connector body and the lock projection is located at a distance from the forward edge on the one side of the first electrical connector that exceeds the predetermined maximum distance.

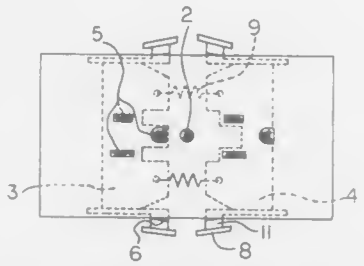
5,026,299
CHILD RESISTANT ELECTRICAL OUTLET

Donald J. Foulk, R.D. 1, Box 1145 Burrs Rd., Mt. Holly, N.J. 08060

Filed Aug. 7, 1990, Ser. No. 563,695

Int. Cl.^{5} H01R *13/44*

U.S. Cl. 439—137 **10 Claims**



1. A child resistant electrical outlet which comprises:

(a) a means for conducting electrical current from an existing electrical outlet to electrical appliance plugs while the plugs are inserted in the child resistant electrical outlet;

(b) a means for securing to existing electrical outlets in such a manner to prevent easy removal by infants and children;

(c) a blocking device to prevent insertion of objects into the child resistant electrical outlet while not in use;

(d) a means for automatically closing the blocking device when the outlet is taken out of service;

(e) a mechanism for automatically locking the blocking device in the closed position while the child resistant electrical outlet is not in service.

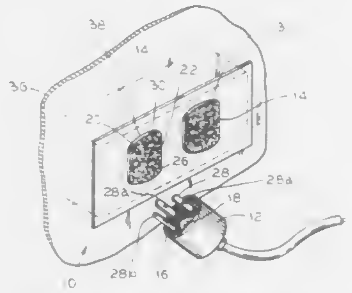
5,026,300
KIT, METHOD AND PLUG-RECEPTACLE ARRANGEMENT

Charles J. Varner, 805 Paradise La., Libertyville, Ill. 60048

Filed Mar. 5, 1990, Ser. No. 488,987

Int. Cl.^{5} H01R *13/62*

U.S. Cl. 439—371 **9 Claims**



1. A kit for enhancing the releasable securement of a plug to a receptacle, comprising:

a pair of generally disc-like securing members, each of said securing members including a thin substrate having a plurality of holes therein sized and arranged to matingly receive a plurality of prongs on said plug, said securing members also including complementary releasable engagement means comprising hooks on one surface of one of said substrates and loops on a corresponding surface of the other of said substrates for enhancing the releasable securement of said plug to said receptacle, each of said securing member further including means on the surface of said substrate opposite said releasable engagement means for permanently securing said substrate to a respective one of said plug and receptacle, said holes being arranged in mirror image fashion; and

means intermediate said hooks and loops for facilitating separation of said securing members.

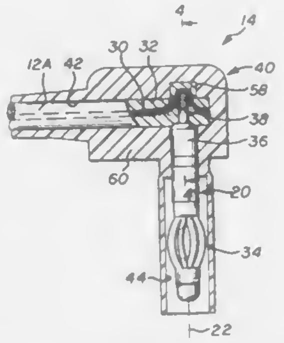
5,026,301
LEAD TERMINATION

Marik Balyasny, Burbank; Raul A. Olivares, Ontario, and Arthur C. Sepmeyer, Alhambra, all of Calif., assignors to ITT Corporation, New York, N.Y.

Filed May 21, 1990, Ser. No. 526,087

Int. Cl.^{5} H01R *4/24*

U.S. Cl. 439—391 **14 Claims**



1. A substantially perpendicular lead termination comprising:

a substantially insulative body having first and second perpendicular arms and having walls forming first and second intersecting perpendicular bores lying respectively in said first and second arms;

a wire having a wire conductor and a wire insulator surrounding said conductor, said wire having an end portion lying in said first bore;

a contact device which lies in said second bore, said device having a pin portion which penetrates said wire insulation and presses said wire conductor through said wire insulation and against the walls of said first bore.

5,026,302
CONNECTOR

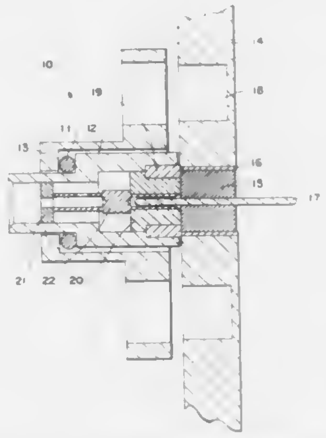
Mark Spencer, Maricopa, Ariz., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Jun. 8, 1990, Ser. No. 535,795

Int. Cl.^{5} H01R *13/00*

U.S. Cl. 439—573 **2 Claims**

1. A connector for mating an electrical cable to an opposing hermetically sealed glass or ceramic surface containing an electrical contact, wherein the electrical assembly in the connector is axially movable against a compressible, spring action member located behind the electrical assembly to provide a cushion that prevents deterioration of the glass or ceramic hermetic seal as the connector and hermetic seal are tightened against one another.



5,026,303
SLOTLESS TYPE IC CARRIER

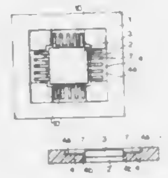
Noriyuki Matsuoka, and Masaaki Kubo, both of Tokyo, Japan, assignors to Yamaichi Electric Manufacturing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 318,714, Mar. 3, 1989, abandoned. This application May 18, 1990, Ser. No. 525,308

Claims priority, application Japan, Mar. 10, 1988, 63-57898; May 23, 1988, 63-67831[U]

Int. Cl.^{5} B65D *73/02*

U.S. Cl. 439—526 **7 Claims**



1. An IC carrier for holding an integrated circuit having an IC package body and groups of lead wires respectively projecting from sides of the IC package body, said IC carrier comprising:

means for holding an integrated circuit, having an IC package body including a bottom and sides and groups of lead wires respectively projecting from the sides of the IC package body, in a state in which the lead wires are supported by said IC carrier and the IC package body is clamped to said IC carrier with the bottom of the IC package body out of contact with said IC carrier,

said means for holding comprising a generally rectangular thin one-piece substrate having a top, a bottom, a central opening extending in a direction therethrough from said top to said bottom, an IC accommodating section extending around said central opening, and lock means for clamping the IC package body of the integrated circuit to said substrate,

said IC accommodating section comprising a stepped portion of said substrate defined by at least one flat supporting surface lying in a plane disposed perpendicular to the direction in which the central opening extends through said substrate, a rear wall extending upright from said flat

VOL
1127
ISS
4
JE
25
1991
UMI

supporting surface at a radially outermost side thereof with respect to said central opening, and a respective angular portion defining an edge at which each said at least one flat supporting surface terminates at a radially innermost side thereof with respect to said central opening, each respective said flat supporting surface being the only means of direct support provided in said IC carrier for a group of the lead wires of the integrated circuit to be held by said IC carrier, said rear wall substantially adjacent and confronting free ends of the group of lead wires of the integrated circuit to be held by said IC carrier so as to protect the lead wires from being damaged when the integrated circuit is held by said IC carrier, said angular portion for positioning the integrated circuit to be held by said IC carrier, and said flat supporting surface consisting of electrically non-conductive material,

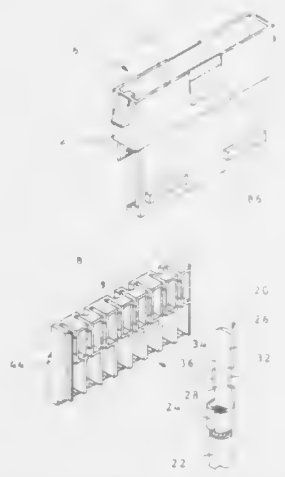
said lock means comprising a plurality of projections integral with and extending from said substrate, said projections being resiliently displaceable relative to said substrate.

5,026,304

CONNECTOR AND CONNECTOR ASSEMBLY HAVING IMPROVED TERMINAL INSERTION FEATURE

Randy M. Furrow, Kernersville, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 22, 1989, Ser. No. 456,001
Int. Cl.⁵ H01R *13/424, 13/514*
U.S. Cl. 439—595 **20 Claims**



1. An electrical connector assembly comprising a housing assembly and contact terminals in the housing assembly, the housing assembly having a mating face and a rear face, first and second sidewalls extend from the mating face to the rear face, a plurality of cavities extending through the housing assembly from the rear face to the mating face, the terminals being in the cavities, the connector assembly being characterized in that:

the housing assembly comprises an inner housing and an outer housing which surrounds the inner housing when the inner and outer housings are assembled to each other, the cavities extending through the inner housing,

the inner housing has a terminal receiving surface which extends from the mating face to the rear face, a plurality of terminal receiving openings extend into the terminal receiving surface, each of the openings extend into the terminal receiving surface, each of the openings extending from the mating face to the rear face and communicating with one of the cavities, terminal retaining means are provided in each of the cavities, and

the inner housing is insertible into the outer housing after insertion of terminals into the cavities, the outer housing having wall portions which are in covering relationship to the openings after insertion of the inner housing into the outer housing,

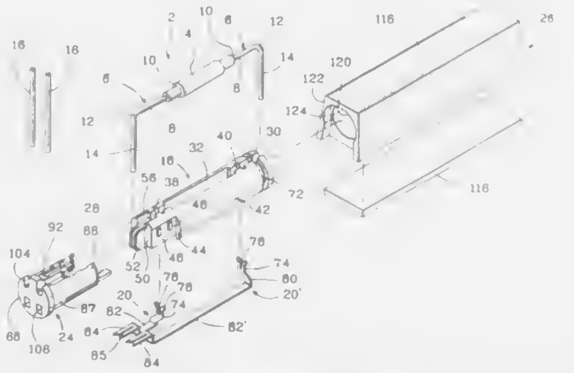
a first portion of the second sidewall is part of the inner housing whereby, terminals can be inserted into the cavities by movement of the terminals laterally of their axes and into the cavities, and the inner housing can thereafter by inserted into the outer housing to complete the connector assembly.

5,026,305

CONNECTOR FOR REED SWITCH OR SIMILAR ELECTRICAL COMPONENT

Henry L. Del Guidice, and George H. Foster, Jr., both of Winston-Salem, N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 28, 1990, Ser. No. 546,489
Int. Cl.⁵ H01R *13/66*
U.S. Cl. 439—620 **21 Claims**



1. A connector for connecting first and second external conductors to first and second leads which extend from an electrical component, the component comprising a component body having opposite component body ends, the first and second leads extending from the component body ends, the connector comprising:

a connector body and first and second contact members,

the connector body having first and second connector body ends and a component receiving cavity which is between the connector body ends, first and second lead receiving channels extending from the cavity towards the first and second connector body ends, first and second contact recesses extending into the connector body and intersecting the first and second channels,

each of the contact members having a lead contacting portion at one end, an external conductor contacting portion at the other end, and an intermediate portion extending between its ends, the lead contacting portions being in the first and second contact recesses, the intermediate portions extending from the lead contacting portion to the external conductor contacting portions at a location proximate to the first end whereby,

upon placement of the component in the cavity and placement of the first and second leads in the first and second channels, the first and second leads will be connected to the first and second contact members, and the first and second external conductors can thereafter be connected to the external conductor contacting portions of the first and second contact members,

characterized in that the component is a reed switch,

the first and second contact recesses are spaced from the cavity by the same distance whereby electrical contact between the first and second leads and the lead contacting portions of the first and second contact members is established at the same distance from the first and second component body ends, and

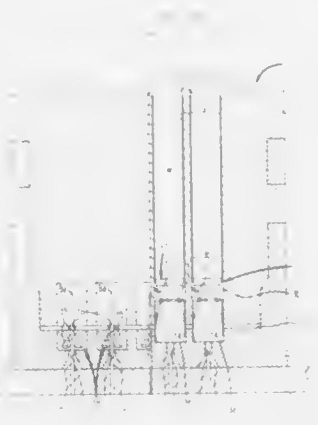
the connector body has first and second ends for storing the excess portions of the first and second leads which extend beyond the first and second contact recesses.

5,026,306

CONNECTOR SUITABLE FOR HIGH-SPEED TRANSMISSION OF SIGNALS

Kouzou Uekido; Michiaki Nishiyama, both of Tokyo, and Katsuhiko Sakamoto, Kanagawa, all of Japan, assignors to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 253,589, Oct. 5, 1988, abandoned. This application Mar. 26, 1990, Ser. No. 499,555
Claims priority, application Japan, Oct. 5, 1987, 62-251265
Int. Cl.⁵ H01R *17/18*
U.S. Cl. 439—675 82 Claims



1. A connector comprising:

a plurality of coaxial pins each having an inner conductor connected to a signal line of a coaxial cable, an outer conductor connected to a ground line of said coaxial cable, and an insulator providing electrical insulation between said inner conductor and said outer conductor;

a housing having a first surface and a plurality of first bores extending from said first surface for receiving said coaxial pins, each of said first bores having a predetermined length;

a flat member made of a good electrically conductive material and disposed in said housing to face said first bores;

first arms formed by cutting and raising those portions of said flat member which are associated one-to-one with said first bores, said first arms being electrically connected to said outer conductors of said coaxial pins;

a plurality of second bores extending toward said flat member from a second surface of said housing which is opposite to said first surface and receiving ground pins; and

second arms formed by cutting and raising those portions of said flat member which are associated one-to-one with said second bores, said second arms being electrically connected to said ground pins,

wherein said flat member extends in a substantially perpendicular direction to the direction of insertion of said coaxial pins into respective said first bores, said first arms extend in a direction opposite to the direction of insertion of said coaxial pins into respective said first bores, and said second arms extend in a direction opposite to the direction of insertion of said ground pins into respective said second bores.

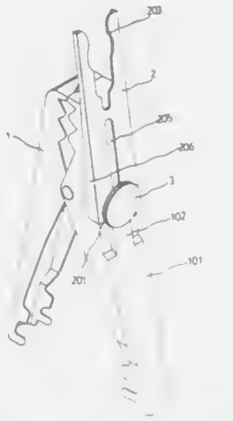
5,026,307

BATTERY TERMINAL CLAMP

Kuo-Shu Lee, 7F, 16, Alley 3, Lane 227, Nung-An Street, Taipei, Taiwan

Filed Dec. 21, 1990, Ser. No. 631,645
Int. Cl.⁵ H01R *4/30*
U.S. Cl. 439—755 **3 Claims**

1. A battery terminal clamp of the type comprising a conductive sliding clip movably secured to a terminal clamp at one side by a screw, wherein said conductive sliding clip has an opening at the front end thereof for retaining a battery terminal, an elongated sliding slot longitudinally disposed at a lower end through which said screw is inserted to secure said sliding clip to said terminal clamp, and two opposite edges at two opposite sides respectively bent downward through 90° angle to retain said terminal clamp at two opposite sides and protect said sliding clip against torsional force, and wherein said sliding clip can be pushed out to protrude beyond the top edge of said terminal clamp and stopped, at a clamping position for clamping on a battery terminal, by a side projection made on said terminal clamp at one side.

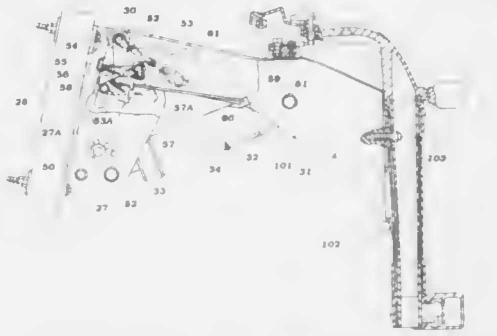


5,026,308

TWO PIECE SWIVEL BRACKET

Yukio Sumigawa, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jun. 13, 1989, Ser. No. 365,660
Claims priority, application Japan, Jun. 13, 1988, 63-143505
Int. Cl.⁵ B63H *21/26*
U.S. Cl. 440—61 **8 Claims**



1. An outboard drive unit carrying propelling means for propelling a marine vessel having a hull through the water, said outboard drive unit further comprising a drive shaft housing including a steering shaft, a clamp bracket attached to the hull of said vessel, a tilt shaft, a swivel bracket having a first piece and a second piece, each of the pieces having a connecting face, the first piece of said swivel bracket pivotally secured to said clamp bracket by said tilt shaft, the second piece of said swivel bracket rotatably secured to said steering shaft of said drive shaft housing for steering movement, connecting means for connecting the connecting faces of the first and second pieces of said swivel bracket such that the first and second pieces of said swivel bracket are able to be separated from one another and such that at least the top edge of the connecting faces is below said tilt shaft when said outboard drive unit is in a tilted-down position and above said tilt shaft when said outboard drive unit is in a tilted-up position, the connecting face of the first piece facing upwardly and rearwardly when said outboard drive unit is in the tilted-up position, thereby allowing said outboard drive unit to be easily detached from the hull of said vessel, said clamp bracket having a slot said slot having

VOL
1127
ISS
4
JE
25
1991
UMI

a stop surface and a stop pin engagable with the stop surface to maintain the first piece of said swivel bracket in the tilted-up position.

5,026,309

CASING ARRANGEMENT FOR MARINE PROPULSION UNIT

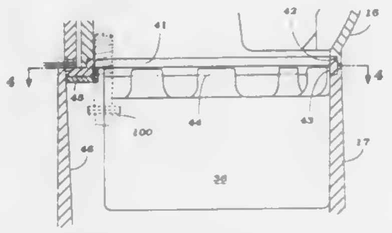
Akihiro Onoue, Hamamatsu, Japan, assignor to Sansbin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jan. 31, 1990, Ser. No. 473,222

Claims priority, application Japan, Feb. 1, 1989, 1-20748

Int. Cl.^{5} B63H *21/26*

U.S. Cl. 440—76 **14 Claims**



1. A marine propulsion unit including an internal combustion engine having an exhaust port for discharging exhaust gas from said engine, said propulsion unit comprising, a driveshaft housing having a chamber formed therein, a lower unit connected to said driveshaft housing including propulsion means driven by said engine, conduit means formed within said engine and said drivehsaft housing for conveying exhaust gas from said exhaust port to said chamber, an exhaust gas discharge passage in said lower unit for discharging exhaust gas from said chamber to the exterior, and packing means interposed between adjoining ends of said drivehsaft housing and said lower unit surrounding said discharge passage to prevent exhaust gas from leaking out from between said driveshaft housing and said lower unit said adjoining ends having an outer periphery and an inner periphery, but wherein at least a portion of the adjoining ends of the said driveshaft housing and said lower unit forwardly of the exhaust discharge passage abut directly against each other.

5,026,310

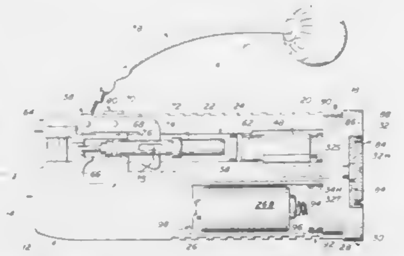
ELECTRIC AUTOINFLATOR

Glenn H. Mackal, St. Petersburg, and Jacek H. Weinheimer, Treasure Island, both of Fla., assignors to Halkey-Roberts Corporation, St. Petersburg, Fla.

Filed Feb. 28, 1990, Ser. No. 486,592

Int. Cl.^{5} B67B *7/24*

U.S. Cl. 441—93 **10 Claims**



1. A water-activated, squib-powered inflator for fracturing a frangible seal of a gas cartridge allowing the gas therein to flow into an inflatable device, comprising in combination:

a body including a longitudinal hole having a rearward end for receiving the gas cartridge allowing the gas therein to flow into the inflatable device via a manifold connected in fluid communication with said longitudinal hole;

a pierce pin reciprocatably mounted within said longitudinal hole for fracturing the frangible seal of the gas cartridge when urged rearwardly;

a squib assembly positioned within said longitudinal hole forwardly of said pierce pin, said squib assembly including a piston pin and an electrically actuable explosive charge, said piston pin and said charge being positioned within a housing dimensioned to slidably fit within said longitudinal hole in alignment with said pierce pin, said housing comprising a frangible rearward end, said squib assembly further including terminal means for transmitting electrical energy supplied thereto to said explosive charge to actuate same;

cap for sealingly positioning at said forward end of said body; and

water sensing means in said cap for sensing the presence of water and transmitting electrical energy from battery to said terminal means of said squib assembly to actuate said explosive charge, whereby said piston pin of said squib assembly is forcibly urged rearwardly to fracture said frangible rearward end and impact said pierce pin and forcibly urge said pierce pin rearwardly to pierce the frangible seal of the gas cartridge allowing the gas contained therein to flow through said longitudinal hole and said manifold into the device to be inflated.

5,026,311

ARC TUBE FABRICATION PROCESS

Philip J. White, Georgetown, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 277,468, Nov. 23, 1988, abandoned, which is a continuation of Ser. No. 473,896, Mar. 10, 1983, abandoned. This application Nov. 13, 1990, Ser. No. 611,377

Int. Cl.^{5} H01J *9/00*

U.S. Cl. 445—26 **7 Claims**

1. A process for fabricating an arc tube of an unsaturated vapor pressure type high pressure sodium lamp comprising the steps of:

sealing a first electrode into one end of a tubular envelope;

depositing a dosing of a sodium-mercury amalgam and an oxygen-absorbing getter into said tubular envelope;

flushing said tubular envelope with a noble gas;

filling said flushed tubular envelope with said noble gas at a pressure substantially equal to the desired finished arc tube pressure; and

sealing a second electrode into an opposite end of said tubular envelope whereby said amalgam is decomposed within said envelope to provide sodium and mercury for lamp operation and said getter absorbs oxygen impurities to prevent sodium loss during said lamp operation.

5,026,312

METHOD OF MANUFACTURING A SHADOW MASK, SHADOW MASK MANUFACTURED ACCORDING TO SUCH A METHOD, AND COLOR DISPLAY TUBE COMPRISING SUCH A SHADOW MASK

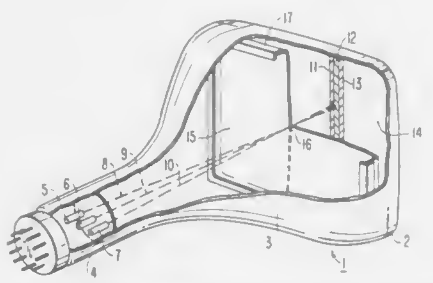
Adrianus H. M. Van Den Berg, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 434,639, Nov. 8, 1989, abandoned, which is a continuation of Ser. No. 293,559, Jan. 3, 1989, abandoned, which is a continuation of Ser. No. 4,930, Jan. 20, 1987, abandoned. This application May 17, 1990, Ser. No. 526,946

Claims priority, application Netherlands, Jan. 23, 1986, 8600141

Int. Cl.^{5} H01J *9/00*

U.S. Cl. 445—47 **7 Claims**



1. A method of manufacturing a shadow mask from a shadow mask sheet of an iron-nickel alloy, said method comprising successively the steps of:

heating the shadow mask sheet in a reducing atmosphere to produce recrystallization in the sheet,

forming the shadow mask sheet into a shaped shadow mask,

heating the shaped shadow mask in a non-oxidizing gas atmosphere at a temperature between 700° C. and 1200° C. to produce a substantial recrystallization in the shadow mask,

and then heating the shaped shadow mask in an oxidizing atmosphere to produce an oxide layer on the shaped shadow mask.

5,026,313

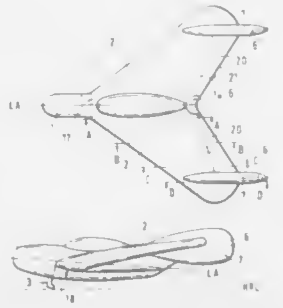
MODEL AIRPLANE

Brunhilde Meyer, Gerhart-Hauptmann-Weg 8, 5068 Odenthal-Gloebusch, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 142,719, Jan. 11, 1988, abandoned. This application Jun. 29, 1989, Ser. No. 374,914

Int. Cl.^{5} A63H *27/14, 27/00*

U.S. Cl. 446—64 **5 Claims**



1. A model airplane comprising a fuselage having a bottom side and a longitudinal axis; a catapulting means fixed to said bottom side in vicinity of a center of gravity of said model airplane and located in a central vertical plane extending through the longitudinal axis of said fuselage; and wings, each wing having a wing root at a connection of the wings with the fuselage, a wing tip, and a sweptback profile with a large sweepback, the sweptback profile having a decreasing thickness from the wing root to the wing tip which thickness is measured in a vertical cross-sectional plane, the sweptback profile comprising a plurality of profile cross-sections extending parallel to the central vertical plane and having outermost opposite points connected by a respective plurality of imaginary lines, each imaginary line forming with the longitudinal axis of the fuselage, in a downward direction toward the bottom side of the fuselage, a respective angle of wing setting that increases, with an increase in distance of a respective profile cross-section from the wing root, from substantially 4° for a profile cross-section taken adjacent to the wing root, to substantially 9° for a profile cross-section taken adjacent to the wing tip, and each wing having a rear edge provided with a rigid control surface extending upward and rearward, said control surface being substantially triangular in shape, tapering toward said fuselage, and defining a trailing edge having a height measured in a horizontal plane passing through the trailing edge of substantially ⅛ to 1/25 of a wing span and at least 1 cm, and each wing further comprising vertical stabilizing means extending at an end of said rigid control surface remote from said fuselage, and parallel to the longitudinal axis of said fuselage.

5,026,314

MAGNETICALLY ACTUATED AMUSEMENT DEVICE

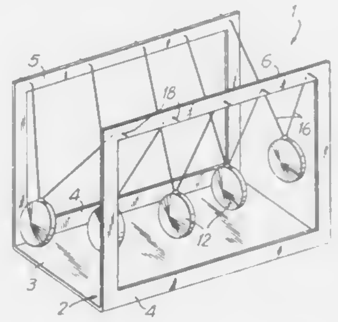
Ilan Samson, 62 Eshkol Street, Tel Aviv, Israel

Filed Jan. 4, 1990, Ser. No. 461,029

Claims priority, application United Kingdom, Jan. 4, 1989, 8900064

Int. Cl.^{5} A63H *33/26*

U.S. Cl. 446—133 **8 Claims**



1. An apparatus for amusement, comprising:

a supporting structure,

at least two permanent magnets arranged in a row and spaced one from the next, each magnet being suspended from the structure by means of a suspending element including pivot portions by which said element is pivotally mounted on the structure so as to pivot around an axis extending transversely of the row whereby each of the magnets in the row is displaceable both towards and away from its neighbouring magnets in the row and is able to swing repeatedly as a pendulum;

each suspending element comprising rigid material extending from its pivot parts to its magnet, thereby to constrain motion of its magnet only to swinging in an arc extending generally along the row.

each magnet being secured to its suspending element, with adjacent magnets in the row oriented such that there is mutual repulsion between them.

5,026,315

STUFFED WISHBONE TOY

Ramona R. Chap, 1201 E. Spring St., Tucson, Ariz. 85253

Filed Jun. 20, 1990, Ser. No. 541,068

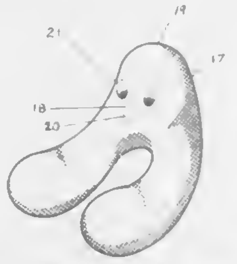
Int. Cl.^{5} A63H *3/02*

U.S. Cl. 446—372 **3 Claims**

1. A stuffed toy generally in the configuration of the wish-

VOL
1127
ISS
4
JE
25
1991
UMI

bone of a bird, said toy including a pair of elongated stuffed legs of generally uniform cross-section with rounded ends and which are arcuately convexly curved along their length in a downward direction, said legs enabling said toy to be rocked on a flat surface and being capable of being twisted at least substantially into a cross-legged configuration and resiliently returning to the original wishbone configuration, and



an upwardly tapering vertex head portion formed at the intersection of the legs including a rounded face portion having eyes and a mouth.

5,026,316
VARIABLE CAPACITY WOBBLE PLATE COMPRESSOR

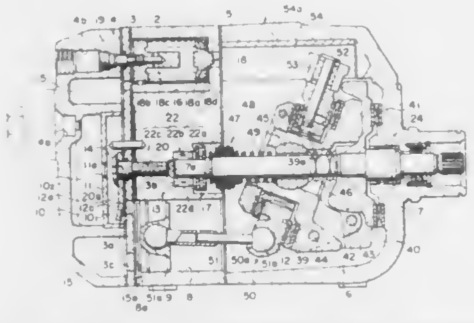
Juetsu Kurosawa, and Katsuhiko Arai, both of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Mar. 28, 1990, Ser. No. 500,751

Claims priority, application Japan, Apr. 28, 1989, 1-50407[U]

Int. Cl.⁵ F04B *1/14*

U.S. Cl. 417—222 13 Claims



1. In a variable capacity wobble plate compressor including a housing having a cylinder block, said cylinder block having a plurality of cylinders formed therethrough, said housing having a discharge pressure chamber, a suction chamber, and a crankcase defined therein, a discharge valve provided at each of said cylinders for allowing compressed compression medium to be discharged from said each cylinder into said discharge pressure chamber when it is open, a drive shaft arranged in said housing, bearing means arranged in a portion of said cylinder block toward said crankcase for rotatably supporting said drive shaft, a wobble plate accommodated within said crankcase and mounted on said drive shaft for swinging motion about said drive shaft, a fixing member inserted into a portion of said cylinder block toward said discharge pressure chamber for fixing said discharge valves in place, a communicating passage extending between said crankcase and said suction chamber, and a pressure-control valve disposed across said communicating passage for adjusting pressure of said compression medium within said crankcase to change the inclination angle of said wobble plate whereby the delivery quantity or capacity of said compressor is varied,

the improvement comprising a high pressure-introducing passage formed through said fixing member and extending from said discharge pressure chamber to said bearing means, said high pressure-introducing passage introducing said compression medium having high pressure from said discharge pressure chamber to said bearing means so that said compression medium having high pressure leaks through said bearing means into said crankcase.

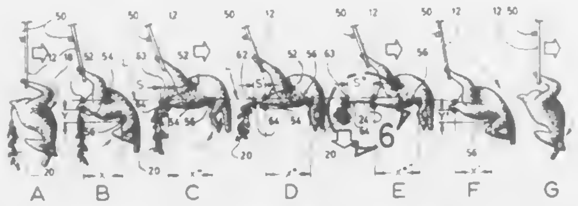
5,026,317
VISCERA EXCISION FOR POULTRY AND THE LIKE

Claude D. Kennedy, 310, Grande-Ligne, Iberville Québec J2X 4J2, Canada

Filed Mar. 20, 1990, Ser. No. 496,292

Int. Cl.⁵ A22C *21/00*

U.S. Cl. 452—106 8 Claims



1. An assembly for excising viscera hanging by a proventriculus, on the back of a poultry body vertically suspended by the leg from a shackle moving sideways along a substantially planar path on a conveyor track, said assembly adapted to be mounted adjacent said planar path, said assembly comprising:

first guide rail means substantially parallel to said planar path and located at a level corresponding to the upper part of said body,

second guide rail means located across a transversal part of said body generally above the wing of the poultry, said second guide rail means horizontally extending in the direction of movement of the shackle, said second guide rail means adapted to raise said transversal part of the body and lift the poultry in a substantially horizontal position while said upper part of said body abuts against said first guide rail means,

third guide rail means horizontally extending from said first guide rail means towards said path for pulling said viscera away from said upper part of said body for stretching said proventriculus during the sideway movement of the poultry, when the latter has reached its horizontal position,

cutting means mounted on said first rail means at a location corresponding to the stretched proventriculus and adjacent the latter for excising the viscera from the body.

5,026,318
METHOD AND APPARATUS FOR GUTTING NON-DECAPITATED FISH

Joachim Jahnke, Lübeck, Fed. Rep. of Germany, assignor to Nordischer Maschinebau Rud.Baader GmbH + Co K.G., Lubeck, Fed. Rep. of Germany

Filed May 14, 1990, Ser. No. 523,335

Claims priority, application Fed. Rep. of Germany, May 16, 1989, 3915815

Int. Cl.⁵ A22C *25/16*

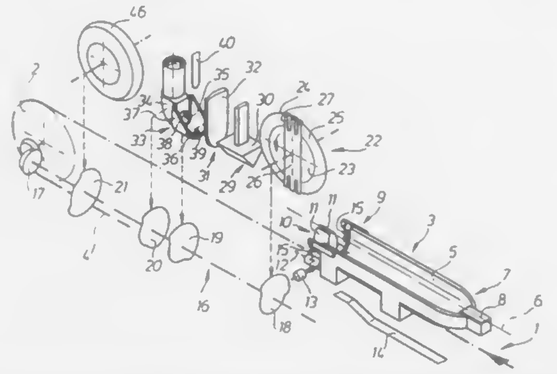
U.S. Cl. 452—116 20 Claims

1. A method for processing non-decapitated fish, in particular breeding fish such as trout, by gutting, the method comprising the steps of

(a) opening the belly cavity of said fish through slitting the belly walls surrounding the belly cavity, beginning in the anal region, along the belly seam;

(b) simultaneously with said opening of said belly cavity, releasing the intestine of said fish in the region of the anus from the belly walls;

(c) removing the entrails through a sucking action while continuously collecting them from the anus towards the head of said fish; and



(d) seizing in a clamping manner and tearing off in the region of the mouth cavity of said fish, its gullet and, selectively, its gills.

5,026,319
FISH PROCESSING MACHINE

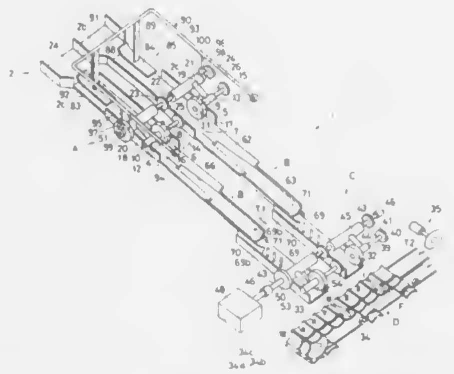
Masatoshi Miyazaki, Yokohama; Ken Sasaki, Higashiyamato; Hachiro Maeda, Tama; Hisami Sakai, Kasukabe; Sumio Kamikawa, Hachioji; Kiyoshi Takai, Tama; Yutaka Ogawa, Ibaraki, and Yuichi Tanaka, Toyonaka, all of Japan, assignors to Nippon Suisan Kaisha, Ltd., Tokyo and Nippon Fillestar Co., Ltd., Osaka, both of, Japan

Division of Ser. No. 406,968, Sep. 13, 1989. This application Oct. 15, 1990, Ser. No. 596,390

Claims priority, application Japan, Feb. 25, 1989, 1-44870

Int. Cl.⁵ A22C *25/12;* B65G *47/24*

U.S. Cl. 452—177 6 Claims



1. A fish body feeder apparatus in a fish processing machine, said apparatus comprising:

a conveying trough for conveying fish bodies one-by-one in a conveying direction with the heads/tails of the fish bodies uniformly aligned;

first constant feed means disposed above said conveying trough in a manner to freely move toward and away from said conveying trough, said first constant feed means including a first rotary feed member which is driven to convey fish bodies on said conveying trough from an upstream side thereof to a downstream side thereof;

a feed trough inclined downwardly in said conveying direction, said feed trough including a concave fish body conveying surface, and said feed trough having formed therein a notch at a downstream end thereof;

a receiving trough disposed beneath said notch;

back-belly aligning means having a fish body tilting mechanism disposed on a discharge trough disposed at a downstream end of said receiving trough;

second constant feed means including a second rotary feed member mounted for discharging fish bodies from said discharge trough one-by-one and intermittently; and

transportation means including plural trays for holding the fish bodies one-by-one and disposed at equal pitches on a moving body driven in a running direction orthogonal to said conveying direction.

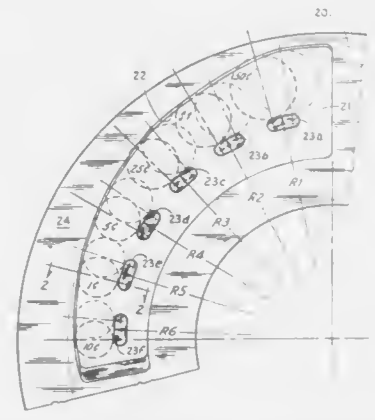
5,026,320
DISC-TYPE COIN SORTER WITH RETRACTABLE GUIDE SURFACES

James M. Rasmussen, Chicago, Ill., assignor to Cummins-Allison Corporation, Mt. Prospect, Ill.

Filed Nov. 6, 1989, Ser. No. 432,625

Int. Cl.⁵ G07D *3/16*

U.S. Cl. 453—6 8 Claims



7. A disc-type coin sorter having a rotatable disc with a resilient top surface and a stationary sorting head positioned above said disc with the lowermost surface of the sorting head only slightly spaced from the resilient top surface of the disc, said sorting head having

coin queuing means for arranging coins of mixed denominations in a single row and a single layer with selected edges of the coins aligned at a common radial position,

a first guide surface for engaging selected edges of the aligned coins and progressively moving the engaged coins circumferentially along said first guide surface,

a plurality of elongated second guide surfaces spaced radially from, and facing toward, said first guide surface for forcing coins of selected denominations under and past said first guide surface at selected circumferential locations, each of said elongated second guide surfaces being elongated in the direction of coin movement and having a substantially constant radius from the axis of rotating of said disc so that the coins engaged thereby are not moved radially,

the distance between said first and second guide surfaces progressively decreasing in the circumferential direction so that coins of progressively smaller diameter are engaged by successive second guide surfaces, and

said plurality of second guide surfaces arranged with respect to said axis of rotation and the first guide surface so that the edges of each denomination of coin forced past said first guide surface are located at a unique radial position, thereby permitting discrimination among coins of different denominations according to the radial positions of the edges of said coins.

VOL
1127
ISS
4
JE
25
1991
UMI

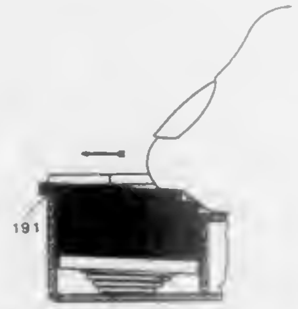
5,026,321
COIN DISPENSER

Anders B. Benson, 40 Linus Huang, P.O. Box 10160, Taipei, Taiwan

Filed Dec. 18, 1989, Ser. No. 451,614

Int. Cl.⁵ G07D *1/08*

U.S. Cl. 453—54 **2 Claims**



1. A coin dispenser in the form of a plastic casing of pocket size for accommodating and storing coins comprising a plurality of individual coin compartments (**10**) each coin compartment having its central portion formed with a chamber or cell (**11**) for receiving a stack of coins (**15**) of a specific denomination or value, each compartment being defined by a bottom (**17**), a plurality of surrounding walls (**12, 14, 16**) including an outer wall (**14**) and a pair of supporting ledges (**20**) formed on a top portion of said compartment, against which ledges the stack of coins is urged by a spring means (**25, 26**) retained on the bottom (**17**) of the compartment, each said compartment having an entrance and exit opening (**18**) for feeding coin therein or pushing out coin therefrom formed as a groove or slot directed outwardly, a plurality of said coin compartments (**10**) being coordinated to integrally form the coin dispenser with each said compartment (**10**) being formed by integrating each said bottom (**17**), said surrounding walls (**14, 14′, 16, 12**) and said supporting ledges (**20**);

each said coin compartment (**10**) having two cantilevered supporting ledges (**20**) respectively formed on two opposite upper side portions of the compartment defining a path x between the two ledges (**20**) for revealing a central portion of a top coin of the stack of coins stored in the compartment;

said entrance and exit opening (**18**) of each said compartment recessed and lowered from two outer or front ends of the two ledges (**20**);

a push opening (**24**) recessed and lowered from two inner or rear ends of the two ledges (**20**) of each compartment through which push opening (**24**) the stack of coins is easily accessible for pushing out the coins;

said supporting ledges (**20**) of each compartment having their front or outer ends formed with guiding edges (**22**) for leading the coins into the compartment;

a central well (**32; 36**) formed in an upper central portion of the coin dispenser communicated with each said inner push opening (**24**) of each coin compartment, adapted for the pushing out of the coins from the compartment by a user's finger preferably his or her thumb, the improvement which comprises:

said outer wall (**14**) of each said compartment (**10**) formed with a curved top edge (**19**) having a central apex portion (**191**) formed on a central portion of said top edge (**19**), a distance y projectively defined between an underside of said ledges (**20**) and said apex portion (**191**) being slightly smaller than a height or a thickness of a coin (**15**), especially an uppermost coin, stored in said cell (**11**) so as to prevent an unintentional lateral sliding out of the uppermost coin from the stack of coins stored in the cell.

5,026,322
THRESHING DEVICE

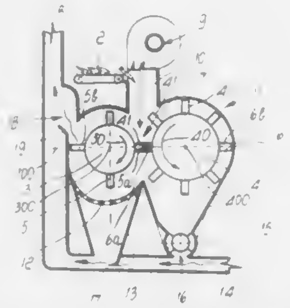
Aldo Tognana, Treviso, Italy, assignor to SEV S.r.l., Treviso, Italy

Filed May 1, 1990, Ser. No. 517,274

Claims priority, application Italy, May 5, 1989, 82540 A/89

Int. Cl.⁵ A01F *7/04, 11/00, 12/22*

U.S. Cl. 460—76 **20 Claims**



1. Threshing device, particularly for tobacco leaves, comprising:

at least one first threshing rotor having a first rotor axis,

a plurality of first blades rigidly connected to and protruding radially from said first threshing rotor,

at least one second rotor having a second rotor axis,

a plurality of second blades rigidly connected to and protruding radially from said second rotor,

a threshing zone defined between said first rotor and said second rotor,

wherein said first rotor axis and said second rotor axis lie side by side on a threshing plane, said first rotor and said second rotor being driven at different speeds, said plurality of first blades and said plurality of second blades comprising different numbers of blades, and

wherein said first blades and said second blades sequentially meet on said threshing plane at said threshing region,

said device further comprising:

means for generating a flow of forced air at said threshing region, whereby to place and pre-orientate leaves on said second blades at said threshing plane, and

at least one rear outlet provided rearwardly of said first rotor, said outlet defining an outlet for threshed leaves.

5,026,323
STRUCTURE FOR MOUNTING BOOT

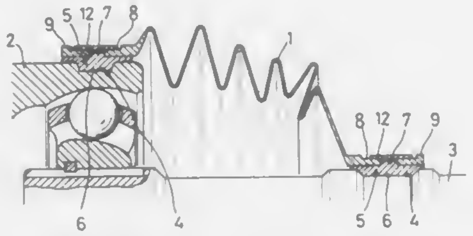
Yoshikazu Fukumura, and Toshiyuki Ohki, both of Iwata, Japan, assignors to NTN Corporation, Osaka, Japan

Filed Jul. 30, 1990, Ser. No. 559,801

Claims priority, application Japan, Aug. 28, 1989, 1-100570

Int. Cl.⁵ F16D *3/84*

U.S. Cl. 464—175 **5 Claims**



1. A structure for mounting a boot for a homokinetic joint on an outer ring of the homokinetic joint and a shaft, the structure comprising rubber rings mounted on said outer ring and said shaft and having engaging means for engagement with said boot, said boot made of a polyester elastomer having both ends thereof adapted for engagement with said engaging means on said rubber rings, said boot being formed in both end portions thereof with a plurality of slits axially inwardly extending from its ends, and bands put around both end portions of said boot for fastening said boot in position.

5,026,324
SEALING DEVICE FOR BEARINGS, PARTICULARLY BEARING BUSHINGS OF UNIVERSAL JOINTS

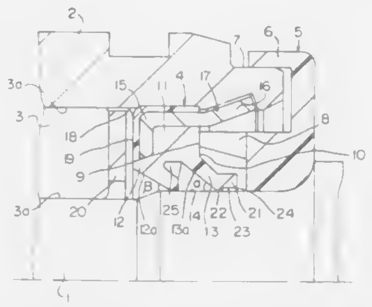
Rainer Schurger, Schwanfeld, and Bernhard Bauer, Hassfurt, both of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurtl, Fed. Rep. of Germany

Filed Apr. 26, 1989, Ser. No. 343,295

Claims priority, application Fed. Rep. of Germany, May 3, 1988, 8805833[U]

Int. Cl.⁵ F16C *33/78;* **F16D** *3/41*

U.S. Cl. 464—131 **7 Claims**



1. Seal for a bearing bushing of a universal joint having inner and outer members with confronting spaced annular raceways (3*a*) comprising means for mounting the seal (4) in the annular space between the raceways and including a base element (11), at least one circumferentially extending sealing lip (12, 13) extending therefrom which engages a surface of one of the members outboard of the raceway and means for stiffening or rigidifying said at least one sealing lip to prevent inversion on assembly comprising the sealing lip having a series of circumferentially spaced axially extending support ribs connecting the base element (11) of the seal (4) to said one sealing lip on the side facing away from the raceway surface (3*a*).

5,026,325
CONSTANT VELOCITY RATIO PLUNGING UNIVERSAL JOINT

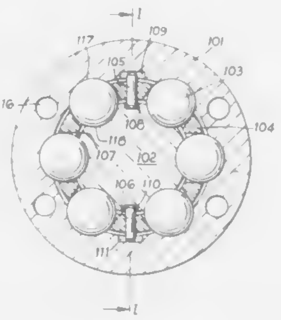
Hans-Heinrich Welschof, Rodenbach, Fed. Rep. of Germany, assignor to Löhr & Bromkamp GmbH, Offenbach am Main, Fed. Rep. of Germany

Filed Mar. 16, 1989, Ser. No. 324,397

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1988, 3808947; Mar. 17, 1988, 3808948

Int. Cl.⁵ F16D *3/227*

U.S. Cl. 464—146 **15 Claims**



1. A constant velocity ratio plunging universal joint, comprising:

an inner joint member having a rotational axis and an external cylindrical surface thereon;

an outer joint member having a rotational axis and an internal cylindrical surface thereon;

a number of tracks provided in each of said cylindrical surfaces and spaced circumferentially apart relative to said rotational axes and arranged in facing pairs, each of said tracks having a centre line parallel to the rotational axis of the corresponding joint member;

a plurality of balls, each disposed in one of said facing pairs of said tracks for torque transmission between said joint members;

a sleeve slidable on said external cylindrical surface of said inner joint member and having an external part-spherical surface;

a cage of annular form disposed between said joint members and provided with internal and external part-spherical surfaces and with apertures for receiving said balls so that all of the centres thereof lie in a common plane, said internal and external part-spherical surfaces of the cage having corresponding centres of curvature equally offset to opposite sides of said plane, said internal part-spherical surface of said cage engaging the external part-spherical surface of said sleeve and said external part-spherical surface of said cage engaging said internal cylindrical surface of said outer joint member;

at least one facing pair of further tracks each located in a different one of said joint members,

a control member engaged in said pair of further tracks and engaging said cage;

each track of said further pair having a centre line inclined to the rotational axis of the corresponding said joint member, the inclinations to the corresponding rotational axes of the corresponding tracks of said further pair being equal and opposite when said rotational axes are aligned so that when said joint plunges, said cage is moved by the control member relative to each said joint member by an axial distance equal to half of the total plunging movement of said joint.

5,026,326
LEVER MECHANISM FOR ADJUSTING PHASE RELATIONSHIP BETWEEN DRIVE WHEELS

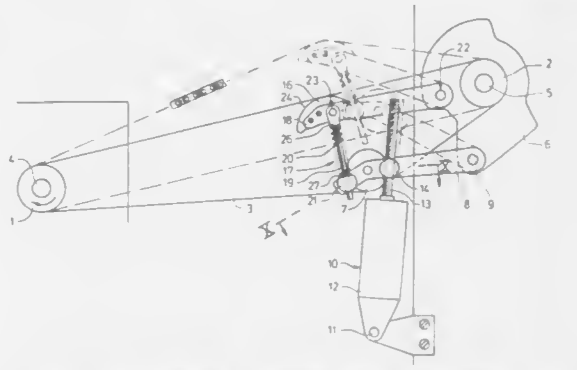
Gerhard Pollich, Heidelberg, and Erwin Unterseher, Stutensee-Büchig, both of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Filed Jun. 6, 1990, Ser. No. 534,048

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1989, 3918643

Int. Cl.⁵ F16H *7/12*

U.S. Cl. 474—134 **11 Claims**



1. Device for adjusting a mutual phase relationship of respective rotational angles of two drive wheels, which are mounted on drive shafts parallel to one another and connected by continuous transmission drive means to one another, the transmission drive means being deflectable so that the drive

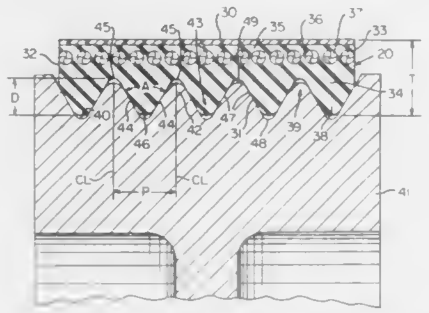
VOL
1127
ISS
4
JE
25
1991
UMI

wheels are angularly set relative to one another, a first spanner being engageable with a tight strand of the transmission drive means, and a second spanner being engageable with a slack strand of the transmission drive means, comprising an adjusting lever for deflecting the tight strand of the transmission drive means, said adjusting lever being mounted swivellably with respect to a swivelling axis, and carrying the first spanner, and an adjusting device for swivelling said adjusting lever with respect to said swivelling axis, and spreading means comprising guiding means for the second spanner, a spring device for pressing the second spanner against the slack strand of the transmission drive means, and a counter-bearing for said spring device, said spreading means being braced against the adjusting lever by said spring device.

5,026,327

BELT CONSTRUCTION, ROTATABLE PULLEY AND COMBINATION THEREOF AND METHODS OF MAKING THE SAME

Jack D. White, Jr., and Clinton L. Bishop, both of Springfield, Mo., assignors to Dayco Products, Inc., Dayton, Ohio
Division of Ser. No. 524,592, May 17, 1990, Pat. No. 4,981,462. This application Oct. 15, 1990, Ser. No. 597,960
Int. Cl.^{5} F16H *7/02*
U.S. Cl. 474—152 **2 Claims**



1. In a rotatable pulley means having an outer peripheral ribbed surface means for meshing with a portion of a ribbed inner surface means of an endless power transmission belt construction, said ribbed surface means of said pulley means defining a plurality of longitudinally disposed and alternately spaced apart like projections and grooves, each projection of said pulley means having a generally V-shaped transverse cross-sectional configuration defined by two substantially straight side edges that converge from the respective apexes of said grooves of said pulley means that are on opposite sides of that projection to an apex of that projection, the improvement wherein said side edges of each said projection of said pulley construction define an angle of approximately 60° therebetween with the height thereof being approximately 0.095 of an inch and with the pitch of said projection being approximately 0.170 of an inch.

5,026,328

BELT DRIVING SPROCKET IN PAPER FEEDER

Sadao Unuma, Yokonemachi, Japan, assignor to Tokai Kogyo Kabushiki Kaisha, Aichi, Japan
Filed May 2, 1990, Ser. No. 517,684
Claims priority, application Japan, May 19, 1989, 1-127062
Int. Cl.^{5} F16H *7/02*
U.S. Cl. 474—153 **2 Claims**

1. A structure for a feed belt driving sprocket for use in a paper feeder comprising:

a pair of side frames opposed to each other at a predetermined spacing;

an endless feed belt interposed between said pair of side frames;

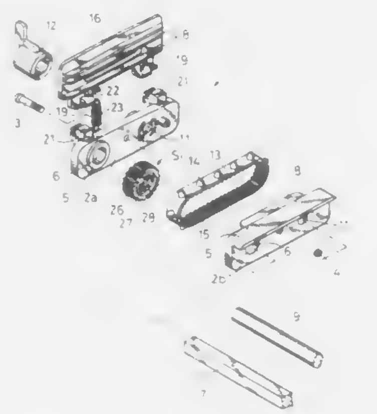
a sprocket adapted to be interposed between said pair of side frames and borne rotatably at first end portions of said pair of side frames;

a guide member disposed at the other end portions of said pair of side frames, wherein said feed belt is adapted to run on said sprocket and said guide member;

a square-shaped axial hole formed at the center of said sprocket adapted to receive a square shaped drive shaft, whereby said feed belt is adapted to be circulated to run by the driving rotations of said sprocket to thereby feed a sheet of paper; and

wherein said sprocket is molded as a one piece homogenous body of an elastic material, has a pair of opposed side faces, and has round fitting recesses formed in said pair of opposed side faces on an inner circumferential portion of said sprocket and an outer circumferential portion having teeth thereon concentric with said axial hole such that said inner circumferential portion is thinner than said outer circumferential portion, said square shaped axial hole having four inner faces with protrusions projecting therefrom, and said sprocket further having through holes adjacent to and radially aligned with said protrusions for facilitating elastic deformation of said sprocket adjacent said protrusions;

whereby a drive shaft can be fitted in said square-shaped axial hole of said sprocket to elastically deform said sprocket adjacent said axial hole and said protrusions on said inner faces of said axial hole can be brought into elastic contact with the outer circumferential faces of the drive shaft.



5,026,329

ISOLATED DRIVE SPROCKET ASSEMBLY

Mark S. Diekevers, East Peoria, Ill., assignor to Catepillar Inc., Peoria, Ill.
Filed Aug. 2, 1990, Ser. No. 562,498
Int. Cl.^{5} F16H *55/30*
U.S. Cl. 474—162 **17 Claims**

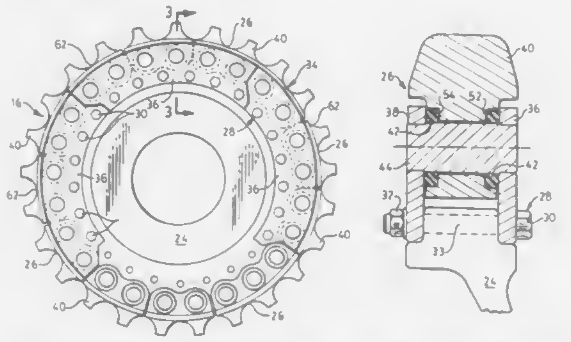
1. An isolated drive sprocket assembly, comprising:

a support hub having a flange portion;

a plurality of composite sprocket segments, each composite segment positioned adjacent at least two other composite segments, said plurality of composite segments forming a circular sprocket wheel;

each composite sprocket segment includes first and second spaced apart side plates, a plurality of replaceable drive teeth positioned between said side plates, a plurality of resilient discs positioned between said side plates and said drive teeth, and a plurality of retaining pins penetrating said side plates, said resilient discs and said drive teeth, said retaining pins being adapted to secure said side plates, said resilient discs, and said drive teeth together to form said composite sprocket segments; and

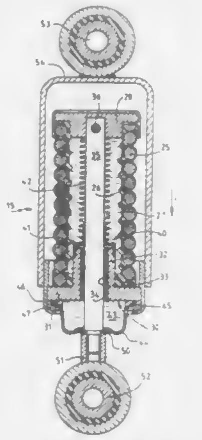
means for releasably securing said composite sprocket segments to said support hub.



5,026,330

TENSIONER FOR A POWER TRANSMISSION BELT

Charles Zermati, Maurepas, and Pierre Bristot, Montargis, both of France, assignors to Hutchinson, Paris, France
Filed Mar. 15, 1990, Ser. No. 494,274
Claims priority, application France, Mar. 17, 1989, 89 03512
Int. Cl.^{5} F16H *7/12*
U.S. Cl. 474—138 **6 Claims**



1. A tensioner for a power transmission belt having a tensioning roller with which the belt cooperates,

a return spring, formed by a coil spring working under compression and prestressed in its rest state, for controlling the displacement of said roller when the tension of the belt decreases,

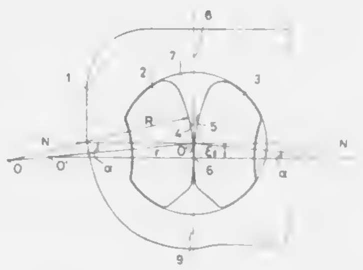
means for damping the vibrations likely to occur in the belt and comprising two variable volume chambers filled with a liquid and communicating together at one of their ends through a bi-directional flow valve device through which the passage of the liquid entering and leaving said chambers introduces a damping effect, and

wherein the sidewall of at least one of the chambers is a membrane made from an elastomer material, having a general bell-shape and without a spring.

5,026,331

ROCKER JOINT PIN TYPE CVT CHAIN

Yoshiaki Sugimoto; Toshihiro Hosokawa; Yutaka Uchiumi, all of Saitama; Shuji Sasamoto, Osaka, and Nobuyuki Fujimoto, Saitama, all of Japan, assignors to Tsubakimoto Chain Co., Japan
Filed Apr. 12, 1990, Ser. No. 509,465
Claims priority, application Japan, May 26, 1989, 1-60315[U]
Int. Cl.^{5} F16G *13/02*
U.S. Cl. 474—214 **5 Claims**



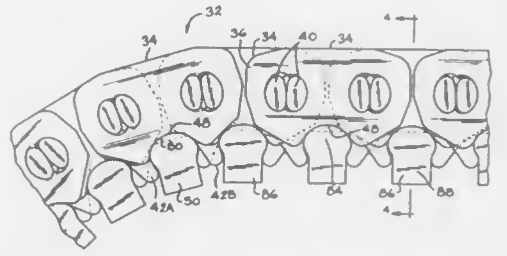
1. An improved rocker joint pin type CVT chain of a type having a plurality of link plates connected endlessly by means of rocker joint pins disposed within insertion bores in the link plates, the chain having lateral inclined surfaces for bearing against inclined peripheral flanges of a pulley, each of the rocker joint pins comprising a rocker pin and a seat pin in rolling contact at an opposing pair of arcuate contact surfaces of said rocker pin and said seat pin, the improvement comprising:

the link plate having a minimum cross-sectional area between the link plate insertion bore and an outer periphery of the link plate that is greater than a minimum cross-sectional area between the link plate insertion bore and an inner periphery of the link plate.

5,026,332

CHAIN-BELT

Philip J. Mott, Dryden; Roger K. Updike, Sr., Ithaca, and David C. White, Dryden, all of N.Y., assignors to Borg-Warner Automotive Transmission & Engine Components Corporation, Sterling Heights, Mich.
Filed Mar. 20, 1990, Ser. No. 496,488
Int. Cl.^{5} F16G *1/24*
U.S. Cl. 474—242 **24 Claims**



1. A power transmission (**10**) chain-belt (**32**) especially adaptable for connecting the pulleys (**12, 14**) of a pulley transmission (**16**) comprising:

a plurality of interleaved sets (**34**) of links (**36**), each set (**34**) having a plurality of transversely arranged links (**36**);

VOL
1127
ISS
4
JE
25
1991
UMI

pivot means (**40**) joining said adjacent sets (**34**) of links (**36**) to form an endless loop;

at least one toe (**42A, 42B**) extending from each link (**36**) in said sets (**34**) of links (**36**), at least said toes (**42A, 42B**) on adjacent links (**36**) being in opposed relationship and said toes (**42A, 42B**) defining a passageway (**80**);

a plurality of load blocks (**50**) positioned in said passageways (**80**) defined by said toes (**42A, 42B**) and extending from said passageway (**80**) in a direction away from said sets (**34**) of links (**36**), said passageway (**80**) acting to maintain said load blocks (**50**) adjacent said links, each load block (**50**) having edge surfaces (**88**) for contacting said pulleys (**12, 14**) of said transmission (**10**); and

at least one spring link (**131**) positioned in said sets (**34**) of interleaved links (**36**), said spring link (**131**) having a pair of spaced apart, opposed toes (**132A, 132B**), said toes (**132A, 132B**) defining a channel (**134**) for receiving said load blocks (**50**), said channel (**134**) of said spring link (**131**) having a press fit with said load block (**50**) whereby said spring link (**131**) restrains said load block (**50**) from movement transverse to the direction of travel of said chain-belt (**32**) and retains said load block (**50**) in said passageway (**80**) defined by said sets (**34**) of links (**36**).

5,026,333

INFINITELY VARIABLE DRIVING AND STEERING TRANSMISSION MECHANISM FOR TRACK-LAYING VEHICLES

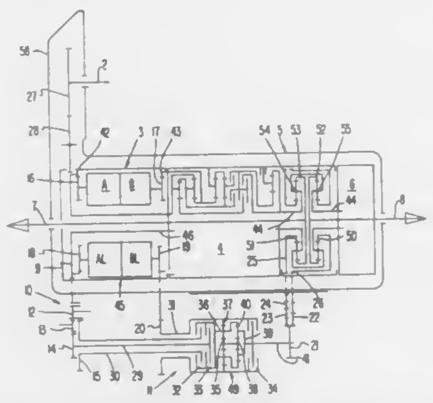
Michael Meyerle, Kiefernweg 9, D-7996 Meckenbeuren, Fed. Rep. of Germany

Continuation of Ser. No. 477,146, Feb. 8, 1990, abandoned, which is a continuation of Ser. No. 273,820, Oct. 3, 1988, abandoned. This application Sep. 18, 1990, Ser. No. 584,499

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1986, 3641648

Int. Cl.⁵ F16H *47/08*

U.S. Cl. 475—23 **10 Claims**



1. A drive mechanism for a track-laying vehicle comprising:

a hydrostatic/mechanical infinitely variable branched driving transmission including a hydrostatic unit and a summation gear train for summing hydrostatic and mechanical input power, said summation gear train having one or more summed power outlet shafts;

a first multiple shaft steering summation transmission operably coupled to said summed power outlet shafts and having left and right steering output shafts; and

a second multiple shaft steering summation transmission having respective output shafts operably connected to said first steering summation transmission,

the shafts of said summation gear train of the driving transmission and the shafts of said first steering summation transmission all being coaxially arranged for rotation about a common axis.

5,026,334

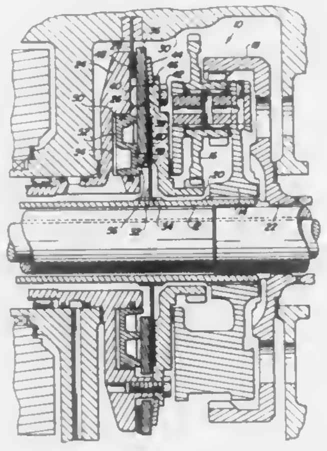
SINGLE PISTON ACTIVATION OF A PLANETARY TRANSMISSION

Dennis L. Jeffries, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Apr. 3, 1989, Ser. No. 331,914

Int. Cl.⁵ F16H *57/10*

U.S. Cl. 475—142 **12 Claims**



1. A planetary transmission comprising:
(a) a transmission housing;
(b) a sun gear mounted in said housing;
(c) a ring gear mounted in said housing;
(d) a planetary carrier mounted in said housing;
(e) at least one planetary gear rotatably mounted to said planetary carrier and engaged with said sun gear and said ring gear;
(f) a brake for selectively braking one of said sun gear, said ring gear and said planetary carrier against rotation relative to said transmission housing;
(g) a clutch for selectively clutching together two of said sun gear, said ring gear and said planetary carrier to prevent relative motion therebetween;
(h) piston means for selectively activating either one of said brake and said clutch, but not both simultaneously, said piston means comprising:
  (i) activating means movable between a braking position activating said brake and a clutching position activating said clutch, said activating means including an annular plate;
  (ii) spring means for biasing said activating means toward one of said braking and said clutching positions; and
  (iii) a piston for moving said activating means to the other one of said braking and said clutching positions; and
(i) a component extension connected to one of said sun gear, said ring gear and said planetary carrier, said component extension being engagable with said clutch and said brake and having an annular slot formed therein in which said annular plate is at least partially received.

5,026,335

DOWNSHIFTING WORK VEHICLE USING DIFFERENTIAL LOCK SWITCH

Teryl M. Oftedal, Tsukuba, Japan; Clarence G. Bourgeous, Dubuque, Iowa; Haruyuki Morita, Ibaraki, and Masayoshi Miyaji, Oyama, both of Japan, assignors to Deere & Company, Moline, Ill.

Filed Mar. 3, 1989, Ser. No. 319,381

Int. Cl.⁵ F16H *1/44*

U.S. Cl. 475—198 **14 Claims**

1. A self-propelled work vehicle for performing a work operation, the vehicle comprising:

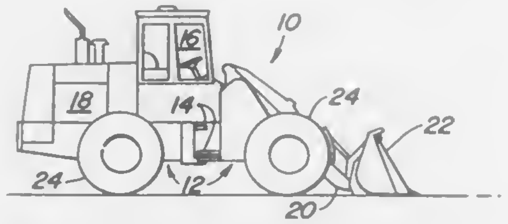
a supporting structure;

ground engaging wheels mounted to the support structure;

a prime mover supported by the supporting structure, the prime mover supplying power to the vehicle;

a transmission operatively coupled between the prime mover and the ground engaging wheels for propelling the vehicle, the transmission having at least two gear positions, the transmission is also provided with a lockable differential, the lockable differential having an actuation switch for locking the lockable differential; and

a control system for shifting the transmission from one gear to the other, the control system having a control switch that triggers the system and is interconnected with the differential lock switch, whereby actuation of the differential lock switch triggers the control system for shifting the transmission when the control switch is actuated.



5,026,336

APPARATUS FOR CONTROLLING THE FEED OF AN INTERMITTENT WEB FEEDING APPARATUS

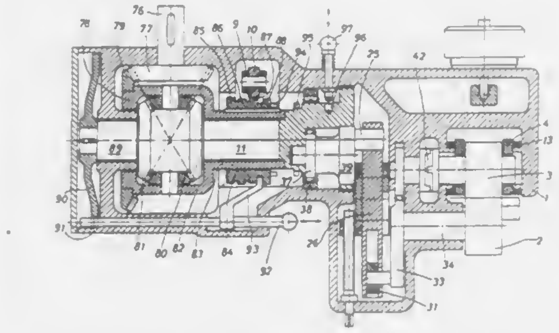
Helmut Messner, Arbon, Switzerland, assignor to Bruderer AG, Frasnacht, Switzerland

Filed Oct. 24, 1989, Ser. No. 426,842

Claims priority, application Switzerland, Oct. 26, 1988, 3983/88

Int. Cl.⁵ F16H *1/445;* **B65H** *18/18*

U.S. Cl. 475—224 **5 Claims**



1. An apparatus for controlling the feed of a feeding apparatus for an intermittent feeding of a web-shaped workpiece, comprising a planetary gear having a web including a tooth rim which meshes with a driving gear wheel, which web supports planet pinions which mesh with an arrestable sun wheel and with an output sun wheel seated on a shaft which is rotatably supported in an axial sleeve section of said web and coupled to an eccentric member of a transmitting unit operative to transform a rotational movement of the shaft of the output sun wheel into an oscillating movement for a driving of said feeding apparats, and wherein said apparatus further comprises a plurality of control disks formed on a slidable shifting sleeve arranged rotationally fixed but axially displaceable on said axial sleeve section of the web, which control disks are operative to control the movement of a link member resting via a roller on one respective disk, which link member is part of a pressing unit operative to exert intermittently a pressure force onto a respective workpiece to be advanced.

5,026,337

SUPPORTING DEVICE OF A PLANETARY RING GEAR FOR AN AUTOMATIC TRANSMISSION

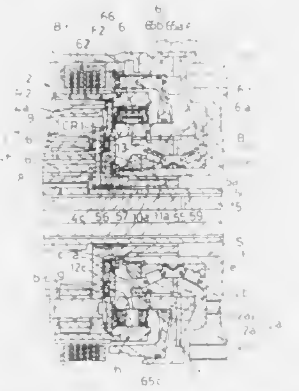
Masakatsu Miura, Kariya, and Masahiko Ando, Okazaki, both of Japan, assignors to Aisin AW Co., Ltd., Anjo, Japan

Continuation-in-part of Ser. No. 127,358, Dec. 1, 1987. This application Jan. 23, 1989, Ser. No. 300,530

Claims priority, application Japan, Dec. 9, 1986, 61-293663

Int. Cl.⁵ F16H *1/28, 47/06*

U.S. Cl. 475—283 **3 Claims**



1. A supporting device of a planetary ring gear for an automatic transmission including a planetary gear unit with a rotating element, a gear with a boss section connected to the rotating element and a rotating member, comprising,

a disc type supporting member for supporting the ring gear of the planetary gear unit, said supporting member having an outer peripheral portion fixed on the ring gear, an inner portion arranged so that a space is formed between the inner portion and the rotating member, and an annular side groove with an indent formed on the inner portion of the supporting member, said annular groove and indent on the supporting member being radially spaced apart from each other,

a first thrust bearing situated inside the annular side groove and arranged between the supporting member and the planetary gear and

a second thrust bearing situated inside the indent of the supporting member, said second thrust bearing being located at the opposite side of the first thrust bearing and arranged either between the supporting member and the boss section of the gear.

5,026,338

METHOD FOR FORMING A ROLLED RIM IN A FABRICATED THERMOPLASTIC CONTAINER

Maurice W. Blackwelder, Bardstown, Ky., and James A. Hill, Toledo, Ohio, assignors to Owens-Illinois Plastic Products Inc., Toledo, Ohio

Filed Apr. 14, 1989, Ser. No. 338,026

Int. Cl.⁵ B29C *57/12*

U.S. Cl. 493—158 **5 Claims**

1. A method for forming a rolled rim at the mouth of a container having a closed end, the container further having a body which defines such mouth and which is formed from a thin, rollable thermoplastic material, said method comprising:

providing a first member having a first annular rim-forming surface;

positioning a container without a rolled rim at the mouth over the first member so that the mouth engages said first annular rim-forming surface;

providing a second member having a second annular rim-forming surface;

positioning said second member and said first member relative to one another such that said first annular rim-forming surface and said second annular rim-forming surface form

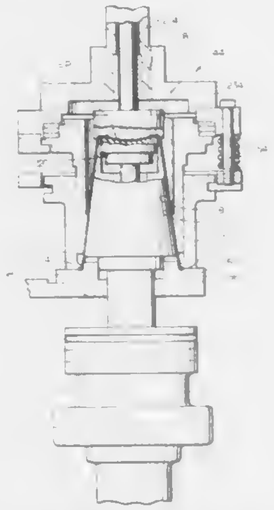
VOL 1127 ISS 4 JE 25 1991 UMI

a substantially closed rim-forming chamber while the mouth of the container is in engagement with said first annular rim-forming chamber to form a rolled rim at the mouth;

repositioning said second member and said first member relative to one another to move said first annular surface and said second annular surface away from one another and to thereby permit the withdrawal of a container with a rolled rim at the mouth from said first member; and

withdrawing a container with a rolled rim from said first member;

wherein the portion of said container at the mouth thereof is at an elevated temperature during the forming of a rolled rim therein;



wherein there is no relative rotational movement between the container and said first member during the forming of the rolled rim at the mouth of the container;

wherein there is no relative rotational movement between the container and said second member during the forming of the rim at the mouth of the container; and

wherein the body of the container is formed by fabrication from a sheet of an expanded material selected from the group consisting of general purpose polystyrene and medium impact polystyrene, and wherein the mouth of the container is heated to a temperature of approximate 190–230 degrees F. during the forming of the rolled rim at the mouth of the container.

5,026,339

SHEET PLASTIC CHECK VALVE TECHNIQUE

Thomas A. Kasper, Agour Hills, Calif., assignor to Royce Medical Company, Westlake Village, Calif.

Filed Feb. 22, 1990, Ser. No. 483,902

Int. Cl.^{5} B31B *25/84, 41/84*

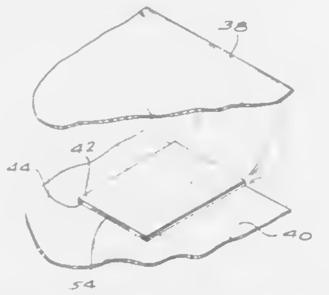
U.S. Cl. 493—189 16 Claims

1. A method of forming a fluid bladder including a valve, comprising the steps of:

providing a first plastic sheet and a second plastic sheet, the first plastic sheet having a first extended strip on one end, and the second plastic sheet having a second strip on one end corresponding to the first extended strip;

welding the first and second extended strips together by applying a high frequency electric field along two substantially parallel weld lines, the substantially parallel weld lines extending toward and ending adjacent the aligned edges of the first and second extended strips to form a central channel;

accomplishing the welding using a plurality of electrodes with a pair of electrodes contacting at least one side of said strips and an adjacent support structure extending between the electrodes with the electrodes and the adjacent supporting structure forming a substantially continuous surface with no significant discontinuities and additional conductive means cooperating with said pair of electrodes and having a mating surface configuration substantially parallel to said continuous surface; said electrodes and conductive means serving to maintain the first and second extended strips parallel and in contact with each other in a closed gap-free configuration during welding and further wherein the electrodes contact the strips during the welding along the two substantially parallel weld lines, thereby forming a check valve with the central channel having adjacent surfaces of the first and second extended strips normally touching each other;



inverting and folding the first and second plastic sheets back over the check valve to enclose the check valve;

welding the first and second plastic sheets together to form an enclosed bladder enclosing the check valve; and

trimming the first and second plastic sheets to remove excess plastic material outside the desired outline of the bladder, whereby the check valve forms an inlet to the bladder with a slightly enlarged mouth through which the bladder may be inflated or filled, and furthermore the untreated normally closed central channel of the valve forms the check valve for normally blocking or inhibiting deflation or leaking of the bladder.

5,026,340

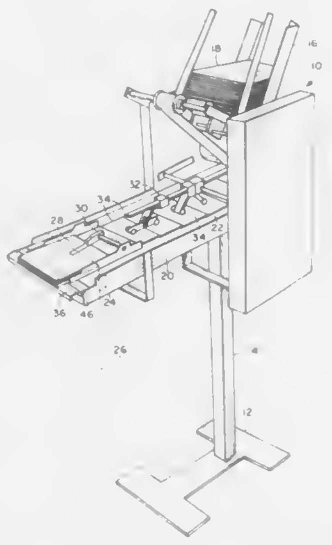
FLAP CLOSER

Clyde W. Thompson, Tulsa, Okla., assignor to Thompson Manufacturing Company, Inc., Tulsa, Okla.

Filed May 1, 1990, Ser. No. 517,574

Int. Cl.^{5} B31B *1/48*

U.S. Cl. 493—460 5 Claims



1. In combination with an envelope feeder of the type having a frame supporting a generally horizontal feeder tray having an outer end, and a rack holding a stack of envelopes, the feeder having an endless belt supported by the feeder tray and having an outer roll adjacent the tray outer end, around which the belt passes, the belt moving in a generally horizontal plane and provisions for delivering envelopes from the stack onto the endless belt, the envelopes being transported in sequential manner on the belt to form a short-height stack of envelopes past the outer roller, the short-height stack being useable by a printing press, the envelopes each having a top and a bottom and a pivotal flap on the bottom, a flap closer comprising:

an elongated stationary member suppported adjacent the feeder tray outer end, the member being parallel and spaced from the outer roller, the member having a first upper surface portion inclined upwardly from the plane of the belt in the direction away from the outher roller and a second, generally horizontal upper surface contiguous to the first and spaced in the direction away from the surface, the second upper surface being in a generally horizontal plane parallel to and spaced above the plane of the endless belt, the envelopes engaging and riding up the first surface and onto the second surface as the envelopes are moved by the endless belt, the second surface serving to position the flap of each envelope generally horizontally so that each succeeding envelope is positioned under the flap of the next adjacent forwardly advanced envelope.

5,026,341

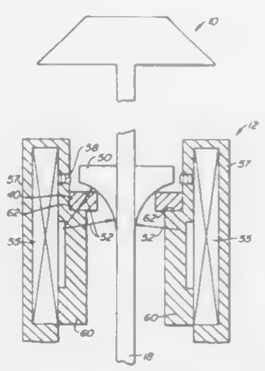
LOW SPEED DISENGAGEABLE DAMPER

Robert Giebeler, 21084 Red Fir, Cupertino, Calif. 94014

Filed May 22, 1987, Ser. No. 53,452

Int. Cl.^{5} B04B *9/14*

U.S. Cl. 494—82 3 Claims



1. In a damper for a shaft driven centrifuge changing rotational velocity through critical vibrational rotation speeds wherein said damper includes a conically shaped shaft extension; a bushing; means for thrusting said bushing into engagement with said conically shaped shaft extension whereby side-to-side translation of said conically shaped shaft extension translates to up and down movement of said bushing, the improvement to said conically shaped shaft extension including a radius of curvature to provide initial low slope between said conical shaft extension and bushing at small vibration and high slope between said conical shape shaft extension and bushing at large vibration.

5,026,342

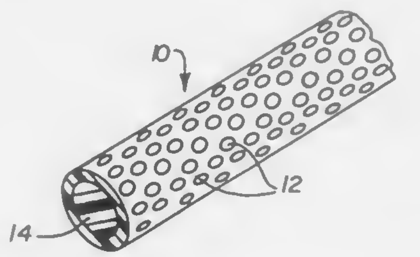
NONINGESTIBLE SEPARATION BARRIER WITH PLUGGED PORES

Roy H. Hammerstedt; Alec D. Keith, both of Boalsburg, Pa., and Rupert P. Amann, Fort Collins, Colo., assignors to Biopore, Inc., Centre Hall, Pa.

Division of Ser. No. 416,347, Oct. 6, 1989, which is a continuation-in-part of Ser. No. 263,049, Oct. 26, 1988, abandoned. This application Mar. 14, 1990, Ser. No. 493,475

Int. Cl.^{5} A01N *1/02;* **C12N** *11/04*

U.S. Cl. 600—35 9 Claims



1. A method for separating a mixture including spermatozoa and glycerol comprising:

(a) selecting a noningestible barrier material suitable for containing said mixture;

(b) providing at least one pore to said barrier material, which pore is small enough to prevent passage of at least one of the said spermatozoa or glycerol;

(c) plugging said pore, with a material responsive to an environmental stimulus, to yield a plugged pore and a plugged barrier;

(d) isolating together said mixture by means of said plugged barrier; and

(e) exposing said plugged barrier at a preselected time to the environmental stimulus to which said plug in said pore is responsive.

5,026,343

DEVICE FOR NEEDLELESS HYPODERMIC INJECTION OF MEDICATIONS

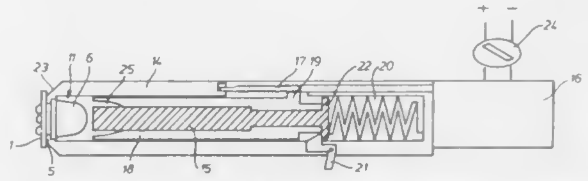
Walter Holzer, Drosteweg 19, D-7758 Meersburg, Fed. Rep. of Germany

Filed Nov. 17, 1989, Ser. No. 438,729

Claims priority, application Fed. Rep. of Germany, Nov. 21, 1988, 3839287; Jan. 20, 1989, 3901691

Int. Cl.^{5} A61M *5/30*

U.S. Cl. 604—68 11 Claims



1. A device for needleless hypodermic injection of medications by means of and injection an ampoule (11) pistol means (14) and, the ampoule including a front plate (1) having openings (2, 8) therethrough and a flexible membrane (3, 6), the ampoule forming a receptacle (4) having a cavity between the membrane and front plate, and the ampoule having a liquid medication in the cavity, the ampoule being mounted in the front end of the injection pistol with its membrane extended into the pistol means, the pistol means having a spring loaded punch (15) driven abruptly forwardly in response to which the punch engages the membrane and drives the medication through the openings,

wherein,

the front plate (1) of the ampoule (11) extends across and

VOL
1127
ISS
4
JE
25
1991
UMI

covers the front end of the pistol means (14), the device being applied to the skin of a patient by applying the front plate to the skin at an injection location, the openings (2, 8, 13) are formed in flat, tuncated cones arranged in circular formation on the front surface of the front plate.

5,026,344
IMPLANTABLE INJECTION CHAMBER DEVICE

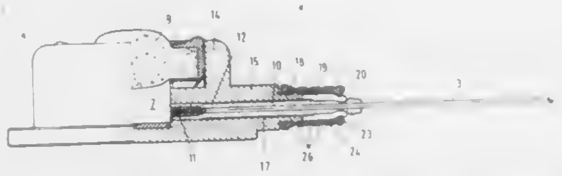
Klaas Dijkstra, Wolddijk 80, 9784 TE Noordwolde, and Frans P. Boersma, Brabantselaan 26, 9501 AC Stadskanaal, both of Netherlands

Filed Dec. 19, 1989, Ser. No. 452,789

Claims priority, application Netherlands, Oct. 19, 1988, 8802577

Int. Cl.^{5} A61M *11/00;* **A61K** *9/22*

U.S. Cl. 604—93 **16 Claims**



1. An implantable injection chamber device comprising a housing which encloses an injection chamber and has at least one wall that can be pierced with a hollow needle, and a bore provided in a wall of the chamber, there being further provided connecting means for connecting a catheter to the bore, characterized in that the connecting means comprise a tube of pliable material which is connected to the bore and in operation extends through a bore in a first member of the connecting means, at least a part of said first member surrounding the tube relatively tightly and said part being provided with a plurality of radially disposed longitudinal grooves; and that a second member of the connecting means is provided, which in operation surrounds the part of the first member that is provided with longitudinal grooves and is capable of pressing inwardly the parts of the first member between the longitudinal grooves.

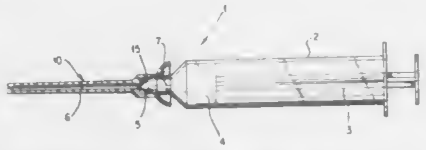
5,026,345
NON-MECHANICAL INCAPACITATION SYRINGE SAFETY NEEDLE GUARD

William Teringo, 201 Country Club Dr., SW., Leesburg, Va. 22075

Filed Apr. 18, 1990, Ser. No. 510,916

Int. Cl.^{5} A61M *5/00*

U.S. Cl. 604—110 **18 Claims**



1. A non-mechanical locking syringe safety needle guard means for incapacitating a syringe assembly having a luer lock attached to a discharge end thereof and a hypodermic needle attached to said luer lock, said needle guard comprising:

an elongated sheath means having a chamber for encapsulating the entire needle and said luer lock, said chamber containing adhesive therein; and

means for sealing said adhesive within said chamber,

whereby said adhesive incapacitates said syringe assembly and bonds said entire needle and said luer lock to said needle guard when said needle portion is fully inserted into said sheath means.

5,026,346
NON-REUSABLE SYRINGE

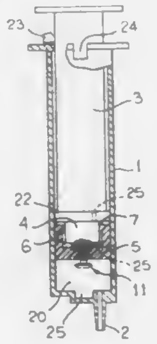
John R. Spanner, Cheltenham; Nonton Hill-Male, Winchcombe, and Harinder S. Soomal, Bexley, all of England, assignors to Dowty Seals Limited, Tewkesbury, England

Filed Jul. 18, 1988, Ser. No. 220,465

Claims priority, application United Kingdom, Jul. 21, 1987, 8717170; Jan. 21, 1988, 8801358; Mar. 19, 1988, 8806595

Int. Cl.^{5} A61M *5/00*

U.S. Cl. 604—110 **10 Claims**



1. A syringe comprising a barrel with means for positioning a needle at a forward end thereof, a plunger displaceable within the barrel, sealing means to maintain the integrity of a dispensing chamber forwardly of the barrel, and disabling means in the form of an insert which is adapted for displacement within the sealing means during a first use of the syringe and thereby subsequently render the sealing means inoperative in any attempted re-use of the syringe, the insert being substantially plate shaped and being manufactured from a more rigid material than that of the sealing means.

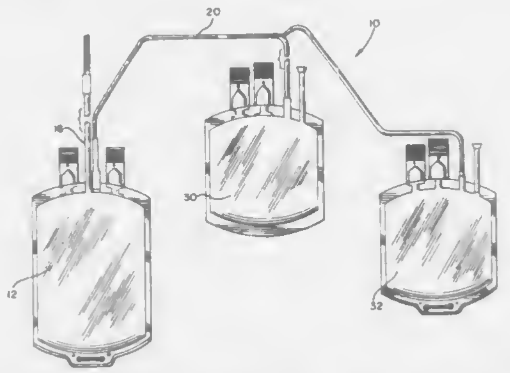
5,026,347
PLASTIC COMPOSITION WITH ANTI-HEMOLYTIC EFFECT

Indrajit Patel, Algonquin, Ill., assignor to Baxter International Inc., Deerfield, Ill.

Filed Nov. 14, 1988, Ser. No. 270,006

Int. Cl.^{5} A61B *19/00;* **C08K** *5/10;* **A01N** *1/02*

U.S. Cl. 604—410 **21 Claims**



1. A flexible, plastic composition comprising the combination of a polyolefin copolymer and a selected quantity of citrate ester, the quantity of said citrate ester being sufficient to suppress hemolysis of red blood cells, said polyolefin copolymer consisting of polymerized mono-olefin compounds.

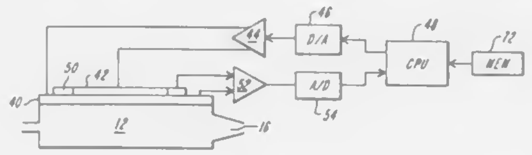
5,026,348
APPARATUS AND METHOD FOR THE DETECTION OF IV CATHETER OBSTRUCTION AND EXTRAVASATION

Jose G. Venegas, Nahant, Mass., assignor to The General Hospital Corporation, Boston, Mass.

Filed Jun. 6, 1988, Ser. No. 203,280

Int. Cl.^{5} A61M *5/00;* **G08B** *21/00*

U.S. Cl. 604—122 **36 Claims**



1. An in-line fluid conduit condition analyzer comprising

a chamber adapted for insertion in the flow path of a fluid conduit;

means for varying the volume of the chamber in response to a predetermined drive signal;

means for sensing a variation in volume or pressure in said chamber in response to the variation in volume produced by said drive signal, said sensing means including a capacitive sensor having first and second capacitor plates, one of which is a part of said varying means; and

means for independently detecting each of a set of abnormalities in the flow path in response to the sensed variation.

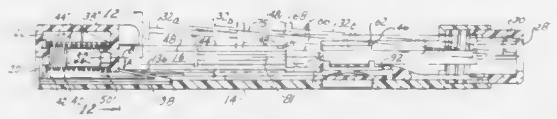
5,026,349
LIQUID MEDICAMENT INJECTOR SYSTEM

William B. Schmitz, and William L. Schmitz, both of Hemet, Calif., assignors to Autoject Systems Inc., Hemet, Calif.

Continuation-in-part of Ser. No. 254,262, Oct. 5, 1988, Pat. No. 4,902,279. This application Feb. 16, 1990, Ser. No. 482,003

Int. Cl.^{5} A61M *5/20*

U.S. Cl. 604—134 **25 Claims**



1. A hypodermic syringe safety injector apparatus for use with a medical syringe comprising a cylindrical barrel having a syringe axis, a lateral projection on the barrel, a hypodermic needle carried by and in fluid connection with one end of the barrel, the needle having a tip extending a fixed distance relative to the lateral projection, a fluid expelling plunger in the barrel and having a portion extending from an opposite end of the barrel, the injector apparatus comprising:

(a) an elongated body for receiving the syringe, the body having a forward end for the needle and a rearward end portion for the extending portion of the plunger;

(b) a trigger member supported by the body and having a trigger surface projecting forward of the forward end of the body, the trigger member being adapted for rearward movement from an extended position relative to the body in response to pressure exerted against the trigger surface by the flesh of a patient;

(c) receiver means for holding the syringe in axial alignment with the body, comprising a guide member having a cavity for releasably holding the barrel of the syringe, the cavity having a lateral opening for radial movement of the barrel into the cavity;

(d) means for holding the syringe in lateral alignment with the body during insertion of the syringe into the receiver means, comprising opposite entry surfaces at a forward extremity of the guide member for laterally centering a contacted portion of the barrel, and rear guide means located rearwardly of the entry surfaces for laterally centering a rear portion of the syringe;

(e) stop means for limiting movement of the syringe barrel within the guide member from a rearward first position to a forward second position relative to the body, the tip of the needle being located rearwardly of the trigger surface in the first position when the trigger member is in the extended position, the needle being projected beyond the trigger surface in the second position for piercing the flesh of a user;

(f) actuator means for moving the plunger in a direction toward the forward end of the body;

(g) catch means for preventing operation of the actuator means; and

(h) release means activated by the trigger member for releasing the catch means, whereby the plunger is projected forwardly within the barrel and the syringe is moved from the first position to the second position in response to movement of the plunger.

5,026,350
SET OF DOUBLE NEEDLES FOR INJECTING LIQUID MEDICINE

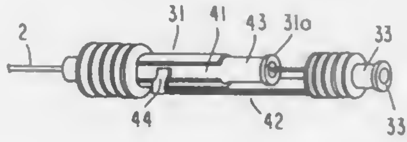
Masataka Tanaka, Togura; Masao Ohto, Togane; Tetsuo Sekine; Hiroshi Takahashi, both of Tokyo, and Masaru Maruyama, Togura, all of Japan, assignors to Hakko Electric Machine Works Co., Ltd., Nagano, Japan

Continuation-in-part of Ser. No. 2,993, Jan. 13, 1987, Pat. No. 4,846,799. This application May 26, 1989, Ser. No. 358,009

Claims priority, application Japan, Jun. 22, 1988, 63-82695[U]

Int. Cl.^{5} A61M *5/00*

U.S. Cl. 604—158 **8 Claims**



1. Apparatus for injecting liquid medicine at each of a plurality of user-selected nearby locations through a common entry point of the injected body, comprising:

an inner needle, and an outer needle into which said inner needle is slidably and rotatably inserted, each of said needles having a sharp distal end and a proximate end formed for selectively communicating with a source of liquid medicine for pressurized injection thereof into said injected body at a selected first location of said body for injection through said sharp distal end of said outer needle and at a plurality of selected second locations in said body through said sharp distal end of said inner needle;

said inner needle being longer than said outer needle and having a curved portion at the distal end thereof which protrudes from the distal end of said outer needle when fully inserted thereinto, said inner and outer needles cooperating such that said curved portion of said inner needle is straightened within said outer needle when retracted therein and said inner and outer needles are then rotatable to different angular disposition relative to each other for subsequent reinsertion of said inner needle into said outer needle to thereby locate the sharp distal end of said inner needle at a selected other one of said plurality of second locations for injection of said liquid medicine thereat;

said apparatus further comprising

an inner needle base fixed to the proximate end of said inner needle,

an outer needle base fixed to the proximate end of said outer needle, and

a guide means for regulating the rotation of said inner needle base stepwise by a predetermined angle,

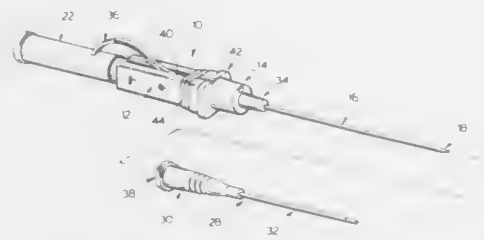
wherein said guide means comprises a plurality of longitudi-

VOL
1127
ISS
4
JE
25
1991
UMI

nally formed guide grooves formed on the outer surface of said outer needle base and a guide arm which is fixed on the inner needle base to extend adjacent to and along the inner needle and is capable of sliding along at least one of said guide grooves engaged therewith, said guide grooves being distant form each other by a predetermined angle and said guide means further comprises a neck portion formed around the outer surface of said outer needle base adjacent and connected to said guide grooves with said guide arm being capable of sliding around said neck portion.

5,026,351
1V STYLET CATHETER

Cipriano L. Dizon, 161 Springhead Gardens, Richmond Hill, Ontario, Canada
Filed Feb. 26, 1990, Ser. No. 484,944
Int. Cl.⁵ A61M *5/178*
U.S. Cl. 604—164 **4 Claims**



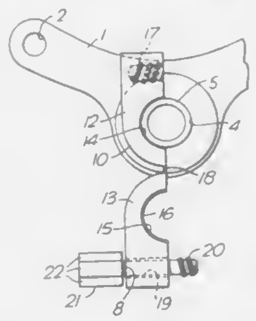
1. A catheter insertion apparatus for the subcutaneous insertion of a catheter into a patient, comprising;

a) a body member having a forwardly projecting hub and a central opening therein defining a backflow chamber;
b) a stylet mounted forwardly on said body having a central opening therethrough with the forward end extending to a point for insertion into a patient and a rearward end connected through said hub in communication with said backflow chamber;
c) a catheter member having an adaptor portion for releasable mounting over said hub and a shaft portion for extending axially from said adaptor portion over said stylet and terminating short of said stylet point when the hub portion is so mounted;
d) a chamber guard releasably mounted on said body member rearwardly of said backflow chamber for closing the rear end thereof, said chamber guard including a single threader member integral therewith and in a forwardly extending loop, the leading end of which further extends along an outer surface of said body member and said hub to abut the adaptor portion of said catheter member whereby downward finger pressure on said loop causes the leading end to advance and displace the catheter member along a line of axial displacement beyond said stylet point said outer surface including a grooved surface thereon for directing said leading end along said line of axial displacement.

5,026,352
ADJUSTABLE FITMENTS FOR MEDICAL TUBES

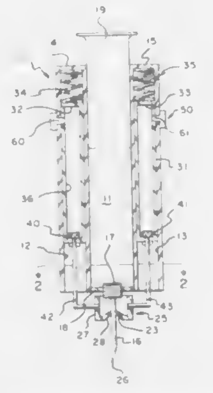
Gregor J. M. Anderson, Folkestone, England, assignor to Smiths Industries Public Limited Company, London, England
Filed Dec. 22, 1989, Ser. No. 455,101
Claims priority, application United Kingdom, Feb. 3, 1989, 8902459
Int. Cl.⁵ A61M *16/00*
U.S. Cl. 604—178 **8 Claims**

1. An adjustable fitment for a medical tube comprising: a flange having a circular aperture, an integral polymeric moulding secured to said flange and having first and second substantially rigid arms, an integral hinge member linking said rigid arms, said first and second arms each having a region of semi-circular section, the semi-circular region in one of said arms being aligned with said circular aperture, said semi-circular sections being shaped to embrace a portion of said tube, one of said arms having a threaded recess therein, the other arm having a mounting aperture therethrough which is aligned with aid threaded recess in said one arm; and a locking bolt rotatably received in said mounting aperture and extending therethrough, said locking bolt having a threaded end which engages in said threaded recess so that the two arms can be tightened about the tube to lock the fitment in position by means of the locking bolt.



5,026,353
MULTI-CHAMBER SAFETY SYRINGE

Thomas F. Bartman, 6601 Langdon Ave., Van Nuys, Calif. 91406
Continuation-in-part of Ser. No. 542,886, Jun. 25, 1990, abandoned. This application Aug. 10, 1990, Ser. No. 565,145
Int. Cl.⁵ A61M *5/32*
U.S. Cl. 604—192 **15 Claims**

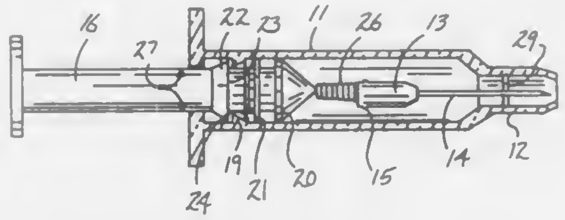


1. A hypodermic syringe including a protective sheath for enclosing the distal end of a needle comprising:

(a) a syringe body having a cylindrical central chamber and at least one slide chamber disposed adjacent said central chamber and being in parallel spaced relation therewith;
(b) an injection needle including a chamber hub, a shank and a distal end, the chamber hub being coupled to the central chamber, said shank and distal end being axially aligned with and extending from said central chamber;
(c) a protective sheath including a cylindrical member having an open upper end and a plurality of biased flaps radially depending inwardly from the lower end of said cylindrical member and being adapted to be concentrically disposed about the shank of said injection needle;
(d) biasing means disposed within said slide chamber for providing a force to urge said protective sheath toward the distal end of said injection needle;
(e) means for coupling said biasing means to said protective sheath; and
(f) release means for limiting the movement of said protective sheath toward the distal end of said injection needle coupled intermediate said biasing means and said syringe body.

5,026,354
SAFETY SYRINGE APPARATUS

Joseph W. Kocses, 117 Rochelle Pkwy., Saddle Brook, N.J. 07662
Filed Jun. 21, 1990, Ser. No. 541,324
Int. Cl.⁵ A61M *5/32*
U.S. Cl. 604—195 **4 Claims**



1. A safety syringe apparatus comprising,

an elongate cylindrical barrel, the barrel including a lower skirt and including a needle body defined by a second diameter lesser than a first diameter defined by the cylindrical barrel, the cylindrical barrel including an opened upper end receiving a plunger within the cylindrical barrel to permit reciprocation of the plunger relative to the barrel, and
the needle body defining a needle chamber mounted within the needle body, the needle chamber including a tubular needle coaxially mounted to the needle chamber and the needle member arranged in fluid communication with an interior cavity of the cylindrical barrel through the needle chamber, wherein the cavity is defined between a plunger head mounted to a forward terminal end of the plunger and the needle body, and
an upper locking skirt integrally mounted to an interior surface of the barrel adjacent the upper terminal end of the barrel, and
a lower locking skirt mounted to the plunger positioned below the upper locking skirt in a first position and displaced above the upper annular locking skirt to a second position between the upper annular locking skirt and the upper terminal end of the barrel, and
wherein the lower annular locking skirt includes a lower annular edge, and the lower annular edge spaced about the plunger, including a lower conical surface directed upwardly toward the upper terminal end of the cylindrical barrel, and the upper annular locking skirt including an upper annular edge, and an upper conical surface directed downwardly towards the needle body, and the lower annular locking skirt defining a lower planar surface, and the upper locking skirt including an upper planar surface, the lower planar surface and the upper planar surface arranged in confronting relationship in the second position, and
wherein the plunger head includes a coil spring fixedly mounted to the plunger head at an upper terminal end of the coil spring and fixedly mounted to the needle chamber at a lower terminal end of the coil spring to effect retraction of the needle chamber when the plunger is in the second position.

5,026,355
NEEDLE AND HUB ASSEMBLY WITH NEEDLE CONTACTING MEMBER

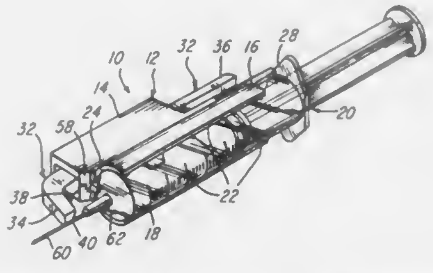
Niall Sweeney, East Rutherford, and Sandor Gyure, West Orange, both of N.J., assignors to Becton Dickinson and Company, Franklin Lakes, N.J.
Filed Jan. 23, 1990, Ser. No. 468,495
Int. Cl.⁵ A61M *5/31*
U.S. Cl. 604—243 **18 Claims**

1. A needle assembly comprising:

an elongate cannula having a first end, an opposite end and a sidewall therebetween, said cannula having a lumen therethrough defining a cannula longitudinal axis;
hub means having a proximal end for engaging fluid transfer apparatus, a distal end and a passageway therethrough defining a hub longitudinal axis;
said passageway having an enlarged first portion at said distal end, a second portion adjacent to said first portion and a third portion adjacent to said proximal end, said first portion, said second portion and said third portion being in fluid communication, said cannula being positioned in said hub means so that said opposite end is within said second portion and said first end projecting outwardly from said distal end of said hub means;
said second portion including proximally located ledge means for establishing the most proximal position of said cannula in said passageway, said second portion including inwardly projecting holding means, located distally from said ledge means, for contacting and holding said cannula with sufficient force to prevent said cannula from falling out of said hub means when said needle assembly is positioned in any static orientation while allowing said cannula to pivot with respect to said holding means, said holding means and said ledge means interacting with said cannula so that the angular relationship between said cannula longitudinal axis and said hub longitudinal axis can be varied and the cannula movably held in a selected angular relationship; and
bonding means in the volume described by said first portion and the portion of said cannula sidewall within said first portion for holding said cannula fixedly in said selected angular relationship with respect to said hub.

5,026,356
SAFETY DEVICE FOR NEEDLES OF HYPODERMIC SYRINGES

Daniel E. Smith, 6377 Post Town Rd., Dayton, Ohio 45426
Filed Oct. 17, 1990, Ser. No. 598,980
Int. Cl.⁵ A61M *5/32*
U.S. Cl. 604—192 **22 Claims**



1. A safety device for a hypodermic syringe and an accompanying hypodermic syringe needle comprising:

an elongated structure having a channel-like member with an opening in the floor of the channel-like member and having a flexible, longitudinally slotted sleeve member for releasable attachment of the structure to a hypodermic syringe;
securement means for preventing forward and rearward movement of the structure with respect to the hypodermic syringe;

VOL
1127
ISS
4
JE
25
1991
UMI

- a L-shaped member having an elongated recess in the backside of its shorter arm and having a plurality of slots in the bottomside of its longer arm, the L-shaped member being forwardly and downwardly slidable in the channel-like member;
- a rocker spring housed in the channel-like member for downwardly urging the slidable L-shaped member; and
- structural means for embedding a hypodermic syringe needle of the hypodermic syringe into the recess of the back wall of the shorter arm of the slidable L-shaped member in response to the downwardly urging of the rocker spring.

5,026,357

INJECTION DEVICE

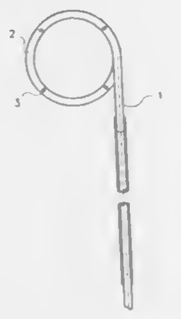
Horst Przuntek, Bochum, and Simon Bittkau, Würzburg, both of Fed. Rep. of Germany, assignors to Schering AG, Berlin, Fed. Rep. of Germany

Filed Mar. 21, 1989, Ser. No. 326,707

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1986, 8625574[U]; Sep. 22, 1986, 8625575[U]

Int. Cl.⁵ A61M *5/00*

U.S. Cl. 604—258 **20 Claims**



1. An injection device for the dispensation of medicaments comprising:
   - a hollow support and duct member having a longitudinal axis which is substantially parallel with an outer body-contacting surface containing orifices;
   - said hollow support and duct member being flexible for conforming to contours of the body of a user and lying against the contours;
   - said orifices having longitudinal axes which are transverse to the longitudinal axis of the support and duct member;
   - said orifices communicating with the duct of said member; and
   - cannulae communicating with said orifices.

5,026,358

DRAINAGE DEVICE

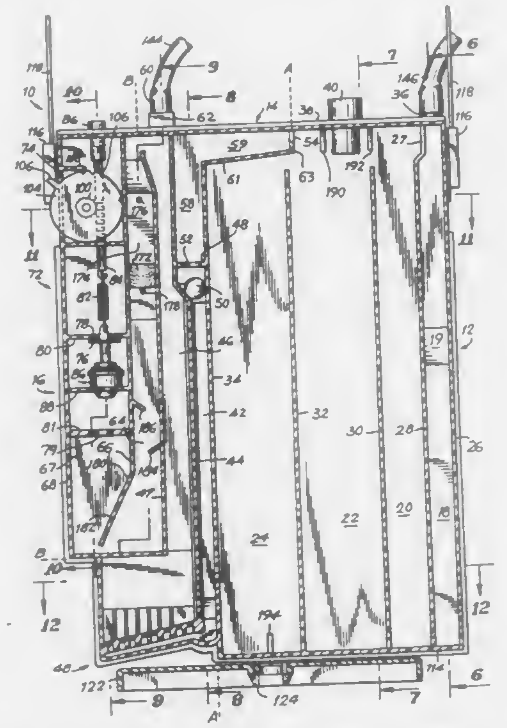
Frederick A. Everett, Jr., Bloomfield, and Quinton J. Farrar, Wyckoff, both of N.J., assignors to Pfizer Products Hospital Group Inc., New York, N.Y.

Division of Ser. No. 215,693, Jul. 6, 1988, abandoned, which is a division of Ser. No. 916,342, Oct. 7, 1986, Pat. No. 4,784,642. This application Jan. 16, 1990, Ser. No. 464,820

Int. Cl.⁵ A61M *1/00*

U.S. Cl. 604—320 **24 Claims**

1. Apparatus for draining fluids comprising:
   - a. collection chamber for collecting fluids including an inlet for entry of the fluids;
   - b. suction control chamber in fluid communication with said collection chamber for regulating the degree of vacuum imposed in the collection chamber and including:
     - 1) first inlet for coupling to a suction source;
     - 2) second inlet communicating with the ambient;
     - 3) waterless means for regulating the degree of suction imposed in said collection chamber at a plurality of predetermined preset levels of suction, said regulating means disposed between said suction inlet and said ambient inlet; and
     - 4) indicator means disposed between said regulating means and said suction inlet for providing immediate confirmation of proper operation of suction in said collection chamber; wherein said regulation suction means comprises:
   - a. member having an aperture and being disposed within and separating said suction control chamber into a first portion adjacent said ambient inlet and a remaining second portion adjacent said suction inlet and in fluid communication with the collection chamber;
   - b. valve means dimensioned and configured for sealing said aperture; and
   - c. means for tensioning said valve means closed when the collection chamber suction is at said preset level of suction and otherwise opening said valve means so as to permit ambient to flow into said second portion and thereby return the suction in the collection chamber to said preset level;



wherein said tensioning means comprises a spring under tension and coupled at one end to said valve means and at its other end to a support member within said first portion, so as to maintain said valve means in a closed sealing relationship with said aperture in accordance with said predetermined preset level of suction; and further comprising means for adjusting said spring tension in predetermined preset discrete steps so as to provide one of said predetermined preset levels of suction; and wherein said adjusting means comprises:

   - a. worm gear disposed on at least a portion of said support member;
   - b. pinion gear being rotatably supported and cooperatively engaging said worm gear;
   - c. dial coupled to said pinion gear and having a plurality of predetermined preset grooves along its periphery;
   - d. detent member resiliently disposed against said periphery and configured and dimensioned for seating within one of said grooves and such that upon rotating said dial, said detent member rides along said periphery until seating within next one of said grooves.

5,026,359

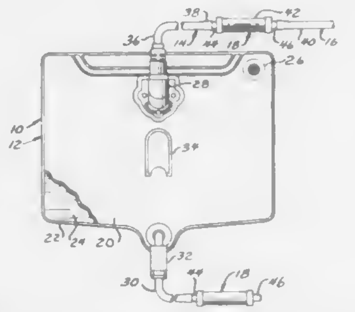
ADAPTER WITH ANTISEPTIC AGENT

James E. Burroughs, Mount Prospect, Ill., assignor to The Kendall Company, Mansfield, Mass.

Continuation of Ser. No. 766,180, Aug. 16, 1985, abandoned, which is a continuation of Ser. No. 496,167, May 19, 1985, abandoned. This application Feb. 11, 1987, Ser. No. 13,489

Int. Cl.⁵ A61M *1/00*

U.S. Cl. 604—326 4 Claims



1 An adapter for use with a collection device for urine, comprising:
   - a tube defining a chamber;
   - a vial received in the chamber and having closed liquid pervious walls constructed from cellulose paper such that the urine passes through the closed walls;
   - a closed cap releasably closing the vial; and
   - a solid antiseptic agent received in the vial.

5,026,360

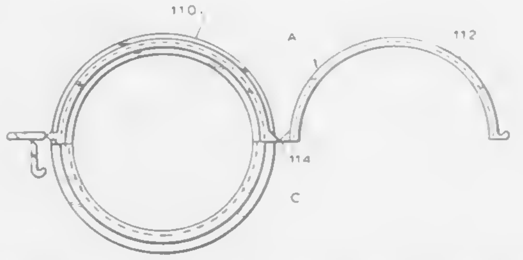
CLAMPING SYSTEMS FOR TWO PIECE OSTOMY DEVICE

Kenneth A. Johnsen, Piscataway, N.J., and Walter F. Leise, Jr., Yardley, Pa., assignors to E. R. Squibb & Sons, Princeton, N.J.

Division of Ser. No. 372,439, Jun. 27, 1989, abandoned. This application Sep. 18, 1990, Ser. No. 585,021

Int. Cl.⁵ A61F *5/44*

U.S. Cl. 604—338 23 Claims



1. For use with a two piece ostomy device of the type including adhesive body mounting means with a coupling member and waste collection means with a coupling member, each of the coupling members comprising a substantially upstanding wall with a substantially outwardly extending projection, means for sealingly connecting the coupling members, said connecting means comprising a clamping member having a recess adapted to receive the projections therein, said clamping member being divided into first and second sections, one of said first and second sections being permanently affixed to one of said coupling members and means for locking said clamping member in a position wherein said projections are received in said recess in said other of said first and second clamping member sections.

5,026,361

POST-OPERATIVE FITTING DEVICE FOR A LATERAL COLOSTOMY

Lucien Matysiak, 32 rue Henri Lebert, 68000 Colmar, France

Filed Aug. 9, 1989, Ser. No. 391,421

Claims priority, application France, Aug. 10, 1988, 88 10905

Int. Cl.⁵ A61F *5/44*

U.S. Cl. 604—338 7 Claims

1. A device for a side colostomy post-operation installation, the device comprising:
   - a male half-ring terminating into opposite ends, an external edge and a center, each of the ends including tenons, the external edge including an overhanging edge lip;
   - a female half-ring terminating into opposite ends, an external edge and a center, each of the ends of the female half-ring including mortises, the external edge of the female half-ring including an overhanging edge lip, wherein the tenons are configured to fit together with the mortises to form a ring, wherein the ring having a diameter;
   - a solid tubular segment which extends from the center of the male half-ring;
   - a hollow tubular segment which extends from the center of the female half-ring, the hollow tubular segment having a length which is approximately equal to the diameter of the ring; and configured to slidably engage said solid tubular segment; and
   - a first adhesive cutaneous protective half-ring which is located on a lower side of the male half-ring, the first protective half-ring extending inwardly beyond a radially inner side and outwardly beyond a radially outer side of the male half-ring, a second adhesive cutaneous protective half-ring which is located on a lower side of the female half-ring, the second protective half-ring inwardly beyon a radially inner side and outwardly beyond a radially outer side of the female half-ring, the first and second half-rings being larger than the ring, a first half shoulder of micro-porous adhesive which extends exteriorly away from the first protective half-ring and a second half shoulder of micro-porous adhesive which extends exteriorly away from the second protective half-ring.

5,026,362

OSTOMY BAG HOLDER AND COVER

Elsie M. Willett, 1641 Jeanette St., Abilene, Tex. 79602

Continuation of Ser. No. 253,485, Oct. 5, 1988, abandoned. This application Jun. 1, 1990, Ser. No. 531,770

Int. Cl.⁵ A61F *5/44*

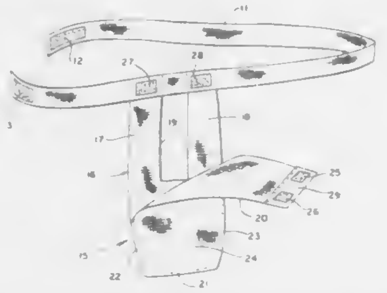
U.S. Cl. 604—345 **1 Claim**

1. A self-belted ostomy bag holder and cover of lightweight fabric material for an ostomy patient for holding and covering an ostomy appliance without attachment thereto, consisting essentially of a inseparably connected unit of a belt or loop and a pouch unconnected to the user's stoma,

VOL
1127
ISS
4
JE
25
1991
UMI

the belt or loop having adjustably securing and quick release means thereon for securing and releasing the belt or loop around the waist of the user, and

the pouch inseparably connected to and suspended from the belt or loop for covering an ostomy bag to which it is sized, said pouch including a back panel attached at an upper end to the belt or loop and being a part thereof, and bifurcated at its upper end to form a pair of spaced-apart arms defining a cutout therein sized to receive the ostomy bag and provide lateral access to a passage formed on the skin of the user, said arms joined at their upper ends to the belt and a front panel jointed at a lower end portion thereof to a lower portion of the back panel.



5,026,363

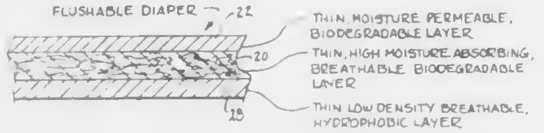
FLUSHABLE DIAPER DEVICE AND METHOD

Darin D. Pratt, Montrose, Colo., assignor to RMED International, Inc., Delta, Colo.

Filed Dec. 27, 1989, Ser. No. 457,336

Int. Cl.^{5} A61F *13/00*

U.S. Cl. 604—385.1 **13 Claims**


FLUSHABLE DIAPER
22
20
28
THIN, MOISTURE PERMEABLE, BIODEGRADABLE LAYER
THIN, HIGH MOISTURE ABSORBING, BREATHABLE BIODEGRADABLE LAYER
THIN LOW DENSITY BREATHABLE, HYDROPHOBIC LAYER

1. A flushable diaper comprising, in combination, a three layered combined structure configured as a lightweight, small bikini bottom; the top layer of said three layered combined structure having a thickness of about 1 mil; the middle layer of said three layered combined structure having a thickness of several mils; and the bottom layer of said three layered combined structure having a thickness of about 1 mil, wherein said bottom layer consists of a 40% polyester fiber and 60% calcium carbonate composition available under the trade name "EVLON."

5,026,364

ABSORBENT ARTICLE HAVING UNITARY WAISTCAP AND WAISTBAND

Anthony J. Robertson, Blue Ash, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 287,944, Dec. 21, 1988, abandoned. This application Aug. 21, 1990, Ser. No. 571,000

Int. Cl.^{5} A61F *13/15*

U.S. Cl. 604—385.1 **22 Claims**

1. An integral disposable absorbent article having longitudinal edges and end edges, the absorbent article comprising:

an absorbent core having a garment surface and a body surface;

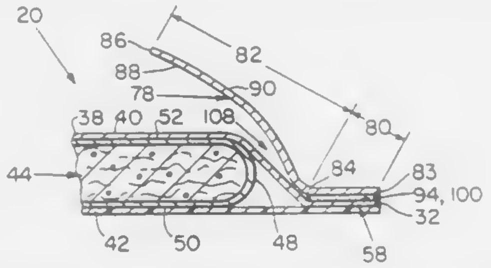
a liquid impervious backsheet positioned adjacent said garment surface of said absorbent core;

a liquid pervious topsheet positioned adjacent said body surface of said absorbent core;

a unitary waistcap/waistband disposed to overlay the topsheet adjacent at least one of the end edges of the absorbent article, said unitary waistcap comprising a single piece of elastomeric material comprising an elastomeric film laminate comprising a coverstock layer and an elastomeric film, said unitary waistcap/waistband having

an outward portion operatively associated in an elastically contractible condition with the absorbent article adjacent said end edge so as to form an elasticized waistband to enhance the fit of the absorbent article about the wearer's waist and to retard leakage from the waist area, and

an inward portion contiguous with said outward portion, said inward portion having a proximal edge, a distal edge, and ends, said proximal edge being joined to the absorbent article and said distal edge spaced inboard from said proximal edge, said inward portion being operatively associated in an elastically contractible condition with the absorbent article adjacent said ends of said inward portion, at least a portion of said inward portion being unsecured to the underlying portion of the absorbent article between said ends so that said inward portion is spaced away from the liquid-receiving surface of the absorbent article to provide a stand-up waistcap to restrain the flow of body exudates along the liquid-receiving surface of said absorbent article and to contain such exudates within the absorbent article.



5,026,365

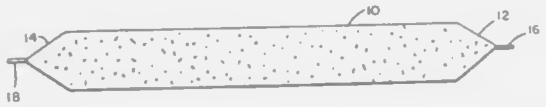
METHOD AND APPARATUS FOR THERAPEUTICALLY TREATING IMMUNOLOGICAL DISORDERS AND DISEASE STATES

Aldo A. Rossini, Sudbury; John P. Mordes, Waban, and Eugene S. Handler, West Newton, all of Mass., assignors to The University of Massachusetts, Boston, Mass.

Filed Apr. 29, 1987, Ser. No. 43,934

Int. Cl.^{5} A61K *9/22;* **A01N** *93/00*

U.S. Cl. 604—891.1 **12 Claims**



1. An in-situ immunological method for therapeutically treating disorders and disease states which are characterized by the presence of immunologically abnormal leukocytes in the body of an afflicted subject, said method comprising the steps of:

obtaining a sealed diffusion chamber of definable configuration and internal volume, said diffusion chamber comprising at least one semi-permeable membrane and at least a suspension of viable, immunologically normal, T-cell keukocytes, said semi-permeable membrane retaining said normal, T-cell leukocyte suspension within said diffusion chamber while allowing non-cellular materials and fluids to pass therethrough, said T-cell keukocytes in said suspension being demonstratably able to provide normal T-cell functions and to produce normal, non-antibody, T-cell secretory products within said diffusion chamber;

implanting said sealed diffusion chamber at a preselected site within the afflicted subject; and

allowing the non-cellular materials and fluids of the afflicted subject to pass through said semi-permeable membrane and to interact with said normal T-cell keukocyte suspension within said implanted diffusion chamber, said interaction yielding an in-situ production and release of normal, non-antibody, T-cell secretory products from said leukocyte suspension sufficient to therapeutically treat the immunological abnormality of the afflicted subject.

5,026,366

ANGIOPLASTY CATHETER AND METHOD OF USE THEREOF

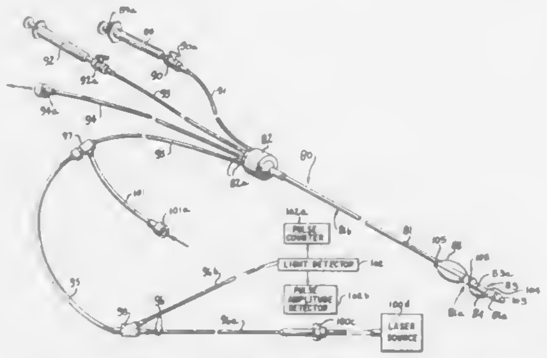
Michael E. Leckrone, Indianapolis, Ind., assignor to Cardiovascular Laser Systems, Inc., Indianapolis, Ind.

PCT No. PCT/US86/02617, § 371 Date Jul. 26, 1988, § 102(e) Date Jul. 26, 1988, PCT Pub. No. WO88/04157, PCT Pub. Date Jun. 16, 1988

Continuation-in-part of Ser. No. 585,112, Mar. 1, 1984, Pat. No. 4,627,436. This PCT application Dec. 2, 1986, Ser. No. 321,621

Int. Cl.^{5} A61B *17/36*

U.S. Cl. 606—7 **36 Claims**



1. A catheter device for use in disintegrating undesired material from a duct within a patient's body comprising:

a catheter having a proximal end portion and a distal end portion adapted to be inserted within a duct in the patient's body;

means disposed adjacent the distal end portion of the catheter for intersecting and releasing undesired material from the interior of the duct in the patient's body when the distal end portion of the catheter is disposed adjacent to the undesired material, the intersecting and releasing means including the catheter having an open chamber disposed therein and formed by a bottom wall portion extending along the length of the catheter and a first abutment and a second abutment extending radially from the outer surface of the catheter to opposite end portions respectively of the bottom wall portion, the first abutment and the second abutment being spaced apart from one another along the length of the catheter with the second abutment disposed adjacent the distal end portion of the catheter, the first and second abutments being adapted to have the open chamber therebetween disposed adjacent to the inner surface of the duct for receiving undesired material therein when an outer portion of each of the first and second abutments is urged against the inner surface of the duct, and a fiber optic extending within the interior of the catheter from the proximal end portion thereof to the chamber for delivering laser energy into the chamber and toward the second abutment when the fiber optic is connected to a source of laser energy, the second abutment when intercepting laser energy from the fiber optic which has passed through the chamber preventing the laser energy from impinging on the inner surface of the duct and reflecting at least a portion of the laser energy intercepted thereby as the undesired material is disintegrated;

an additional fiber optic extending within the interior of the catheter from the proximal end portion thereof to the chamber to receive light energy emitted from the second abutment in response to laser energy directed thereto as the undesired material is disintegrated; and

means connected to the second fiber optic for enabling the emitted light energy to be sensed to permit determining the extent of disintegration of the undesired material.

5,026,367

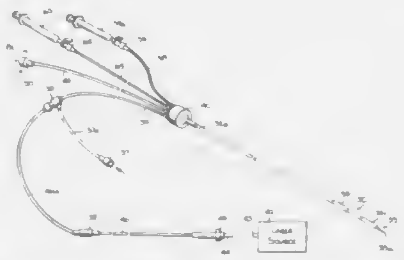
LASER ANGIOPLASTY CATHETER AND A METHOD FOR USE THEREOF

Michael E. Leckrone; Jonathan Kagan; Darryl A. Knight, and Larry A. Gunseor, all of Indianapolis, Ind., assignors to Cardiovascular Laser Systems, Inc., Indianapolis, Ind.

Filed Mar. 18, 1988, Ser. No. 169,937

Int. Cl.^{5} A61B *17/36*

U.S. Cl. 606—7 **15 Claims**



1. A laser angioplasty catheter device comprising a catheter having a distal end portion adapted to be inserted within a duct in the body of a patient and a proximal end portion,

the distal end portion comprising a tip disposed at one side of the catheter, the distal end portion having a tapered surface extending from the tip to the side of the catheter opposite the one side,

the catheter having a lumen extending through the length thereof and having a distal end portion intersecting the tapered surface extending from the tip of the catheter, the intersection of the lumen and the distal end portion forming an elongated opening extending along the length of the tapered surface,

an optical fiber extending within the interior of the lumen from the proximal end thereof to adjacent and spaced apart from the distal end portion of the lumen, the optical fiber being adapted to be connected to a source of laser energy,

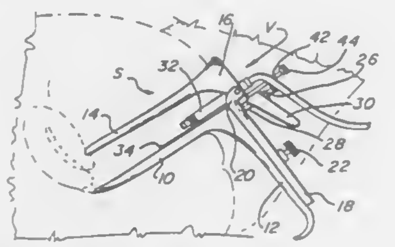
an elongated annular element disposed adjacent the distal end of the lumen and the distal end of the optical fiber, the annular element having an opening therein for transmitting laser energy from the optical fiber toward the elongated opening in the tapered surface to deliver said laser energy through the elongated opening into the duct, and further comprising

a cylindrical shield attached to the annular element and extending away from the distal end of the lumen with the longitudinal axis of the cylindrical shield being substantially parallel to the longitudinal axis of the lumen, the shield being formed of material for absorbing laser energy which does not pass through the opening in the annular element to protect the interior surface of the distal end portion of the lumen.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,368
METHOD FOR CERVICAL VIDEOSCOPY

Edwin L. Adair, 2800 S. University Blvd., Denver, Colo. 80210
Division of Ser. No. 291,238, Dec. 28, 1988, Pat. No. 4,905,670. This application Dec. 22, 1989, Ser. No. 456,469
Int. Cl.^{5} A61B *17/36*
U.S. Cl. 606—15 4 Claims



1 A method of locating and removing cervical lesions, said method comprising the steps of:

providing a light source to supply light over a wide spectrum of frequencies;

successively stepping through each frequency to sequentially illuminate the cervix with light of each successive frequency;

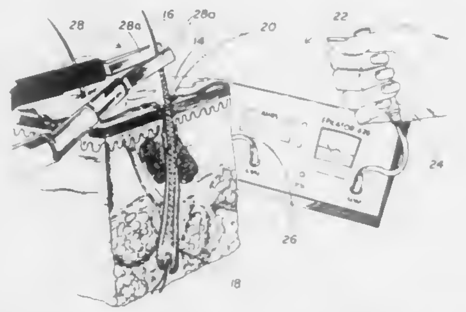
observing the cervix as it is illuminated with each successive light frequency;

locating lesions by their florescence or reflectance to one of the selected light frequencies; and

removing the lesions which have been located.

5,026,369
NON-INVASIVE METHOD OF REMOVING HAIR THROUGH ELECTROLYSIS

Hubert L. Cole, 160 S. May St., Southern Pines, N.C. 28387
Filed Mar. 5, 1990, Ser. No. 487,917
Int. Cl.^{5} A61B *17/38*
U.S. Cl. 606—36 10 Claims



1. A non-invasive method of removing hair having a remote end from a patient by electrolysis, comprising the steps thereof:

(a) cleaning an area of the patients skin having one or more hairs extending therefrom;

(b) treating respective hairs to be removed by bathing them in an electrode solution;

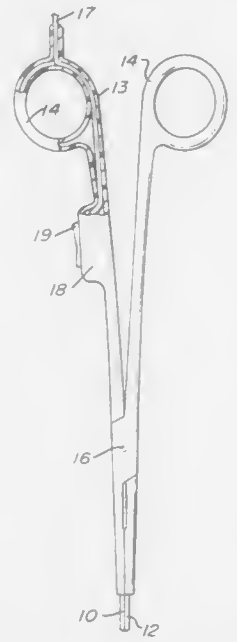
(c) electrically connecting a respective treated hair to an electrical source and directing an electrical current down the electrode solution coating the hair to the soft moist tissue surrounding hair within the skin;

(d) producing sodium hydroxide (NaOH) at the hair follicle site by chemically reacting water and sodium chloride (NaCl) in the presence of the electrical current causing the germ cells forming a part of the hair follicle to die, resulting in the hair follicle decomposing and permitting the hair stemming from the hair follicle to be easily extracted; and

(e) allowing the treated hair to remain in the hair follicle for at least approximately 30 minutes prior to pulling the treated hair from the hair follicle.

5,026,370
ELECTROCAUTERY INSTRUMENT

Edward A. Lottick, 41 Gershom Pl., Kingston, Pa. 18704
Continuation of Ser. No. 663,091, Oct. 24, 1984, abandoned, Continuation-in-part of Ser. No. 443,517, Nov. 22, 1982, Pat. No. 4,552,143, Continuation-in-part of Ser. No. 242,746, Mar. 11, 1981, Pat. No. 4,370,980. This application Jul. 2, 1986, Ser. No. 881,750
Int. Cl.^{5} A61B *17/38*
U.S. Cl. 606—42 33 Claims



1. An electrocautery instrument, comprising:

a surgical instrument made of a conductive material;

said conductive surgical instrument being comprised of a pair of members pivotally mounted together at a point between the ends of said members, each member having a tissue engaging portion at one end and a handle portion at the opposite end;

an electrical switch having a non-conductive housing and a first and a second electrical contact therein and a control member for operating said contacts mounted to said housing and positioned such that it is movable to control said contacts;

an electrically conductive wire insulated from said conductive members, said conductive wire being electrically connected to said first electrical contact of said switch and the other end of said electrical wire being adapted to be connected to a source of electrical energy;

said second electrical contact of said switch being electrically connected to one of the conductive member of said surgical instrument enabling current flow through said conductive member when said switch is engaged to enable current flow through a tissue;

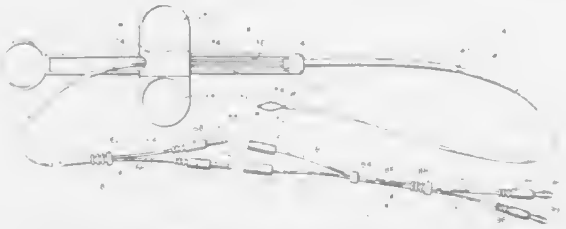
said non-conductive housing of said switch being mounted on said one member of said surgical instrument;

said electrically conductive wire, with one end of the conductive wire connected to said first electrical contact of said switch, running along a portion of said one of said pair of said electrically conductive surgical instrument members and insulated therefrom; and

a layer of insulating material covering said switch housing, said wire running along said portion of one of said instrument members and at least a portion of said conductive surgical instrument, but not said tissue engaging ends of said members.

5,026,371
HANDLE FOR POLYPECTOME SNARE WITH BIPOLAR ELECTRODES

Mark A. Rydell, Golden Valley, and Brent L. Anderson, Corcoran, both of Minn., assignors to Everest Medical Corporation, Minneapolis, Minn.
Filed Oct. 1, 1990, Ser. No. 590,783
Int. Cl.^{5} A61B *17/39*
U.S. Cl. 606—47 7 Claims



1 In an electrosurgical instrument of the type including a first elongated flexible plastic tube having a proximal end, a distal end and at least one lumen extending from said proximal end to said distal end and first and second wires extending through said lumen and longitudinally displaceable therein, said wires being insulatedly spaced from one another throughout the majority of their length and including an uninsulated segment comprising electrodes which when unconstrained forms an open loop, an improved manually operable handle means for imparting longitudinal displacement to said first and second wires within said lumen of said tube comprising:

(a) a rigid housing of a predetermined length having a proximal end, a distal end and a longitudinal slot formed between said proximal and distal ends and including a thumb receiving member affixed to said proximal end, said housing being attached to said proximal end of said first tube;

(b) a slide member including a slide block fitted into said longitudinal slot and a pair of extending finger receiving members extending oppositely and transversely from said slide block, the walls of said slot constraining said slide block to longitudinal movement between said proximal and distal ends of said slot with at least one longitudinally extending channel formed in said slide block;

(c) first and second electrical lead means for applying power to said first and second wires;

(d) means disposed in said channel(s) for attaching said lead means to said first and second wires whereby longitudinal displacement of said slide member in said slot in the distal direction causes said electrode segments to extend beyond said distal end of said tube opening said loop and longitudinal displacement of said slide member causes said electrode segments to retract into said distal end of said tube, closing said loop; and

(e) second and third tubes individually containing said first and second wires wherein said second and third tubes are contained within the lumen of said first tube.

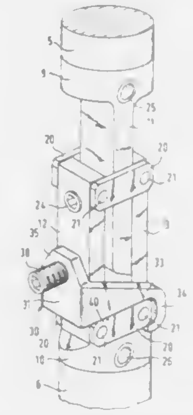
5,026,372
FIXATION DEVICE FOR THE EXTERNAL ADJUSTING OF BONE FRAGMENTS

Robert Sturtzkopf, Wilhelm-Hey-Strasse 14, 8000 Munich 40, and Hans-Werner Stedtfeld, Schlossweiherstrasse 43, 8500 Nuremberg, both of Fed. Rep. of Germany
Filed Nov. 3, 1988, Ser. No. 266,809
Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3737617; Nov. 2, 1988, 3837228
Int. Cl.^{5} A61F *5/04*
U.S. Cl. 606—54 16 Claims

1. A fixation device for externally adjusting a pair of bone fragments comprising:

a pair of clamping means, each means anchored to each bone fragment,

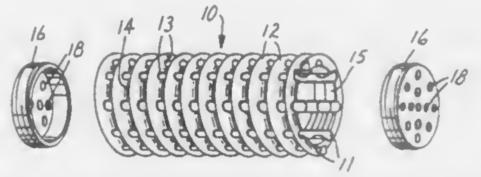
a pair of opposing members each of which is connected to each of said clamping means by a joint means, and



a parallelogram hinge connecting the pair of opposing members to each other and enabling longitudinal displacement of the members relative to each other when the hinge is actuated.

5,026,373
SURGICAL METHOD AND APPARATUS FOR FUSING ADJACENT BONE STRUCTURES

Charles D. Ray, Deephaven, and Eugene A. Dickhudt, New Brighton, both of Minn., assignors to Surgical Dynamics, Inc., Alameda, Calif.
Division of Ser. No. 259,031, Oct. 17, 1988, Pat. No. 4,961,760. This application Nov. 6, 1989, Ser. No. 432,088
Int. Cl.^{5} A61F *1/03*
U.S. Cl. 606—61 12 Claims



1. Surgical method of fusing adjacent vertebral bony structures, said method comprising the steps of

(a) spreading apart the adjacent vertebral bony structures, and forming between said vertebral bony structures a lateral bore, which extends into the disc space between adjacent vertebral bony structures, with a female threat that penetrates into cancellous regions of the bony structures,

(b) selecting an appropriately sized hollow cylindrical fusion cage which has an external, substantially continuous helical threat which defines a plurality of turns with a valley between adjacent turns and that is perforated in the valley between adjacent turns and that can mate with said female thread,

(c) screwing the cage into said threaded bore, and

(d) packing the cage with bone-inducing substance.

5,026,374
BOLT FOR ORTHOPAEDIC SURGICAL USE

Ottavio Dezza, Bergamo, and Giovanni Faccioli, Donatori di Sangue Monzambano, both of Italy, assignors to Orthofix S.r.l., Bussolengo VR, Italy
Filed Oct. 2, 1989, Ser. No. 415,991
Claims priority, application Italy, May 12, 1989, 84929 A/89
Int. Cl.^{5} A61F *5/04*· **E01B** *9/10*
U.S. Cl. 606—72 11 Claims

1. A bolt for orthopaedic surgical use for the elongation of

VOL
1127
ISS
4
JE
25
1991
UMI

bones, which can be used with an external fixing device, said bolt comprising:
(a) a substantially cylindrical upper portion having an upper end adapted to turn the bolt by means of a suitable instrument,
(b) a lower threaded portion which terminates at its end in a point,
(c) a central portion located between said upper and lower portions, the lateral surface of said central portion defining on one side a cutting member having a cutting edge which extends parallel to the longitudinal axis of the bolt over the entire length of the central portion, and in which the other side of the lateral surface of said central portion is graded into the lateral surfaces of the upper portion and the lower portion in order to eliminate sharp edges at the transition between the central and upper portion and the central and lower portion, said central portion remaining outside of the bone during the elongation process.

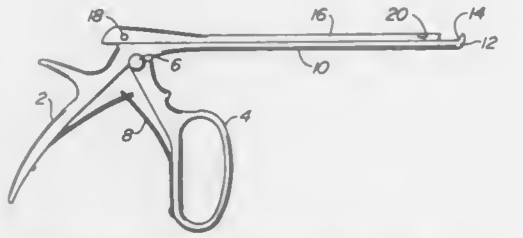
5,026,375
SURGICAL CUTTING INSTRUMENT

Raymond J. Linovitz, Rancho Santa Fe, and Randy J. Kesten, Redwood City, both of Calif., assignors to Origin Medsystems, Inc., San Mateo, Calif.

Filed Oct. 25, 1989, Ser. No. 427,180

Int. Cl.^{5} A61F *5/04;* **B26B** *9/00*

U.S. Cl. 606—79 **9 Claims**



1. A surgical cutting implement comprising:
(a) a fixed elongated member having a first jaw means projecting therefrom at an end, said first jaw means having a cutting surface which faces back along said elongated member,
(b) a slidable member slidably engaged with the fixed member, said slidable member being confined to rectilinear motion along the fixed member to a range of motion,
(c) a second jaw means having a cutting edge face, the second jaw means being releasably affixed to an end of the slidable member for opposing the first jaw means, the second jaw means being adapted to be squarely closed against the first jaw means at one extremity of the range of motion of the slidable member,
(d) means for moving the slidable member in relation to the fixed member to change the spacing between the first and second jaw means and apply a force to an object disposed between the first and second jaw means,
(e) a rigid joint means for affixing said second jaw means to the end of the slidable member,
(f) a key projecting from said second jaw means which is held by and travels in a keyway defined by the fixed member, and
(g) an opening in the fixed member through which the key can be inserted into and removed from the keyway,
wherein said rigid joint means comprises a coupling means, said second jaw means and said slidable member and said second jaw means having aligned bores through which said coupling means projects to releasably couple said second jaw means to said slidable member.

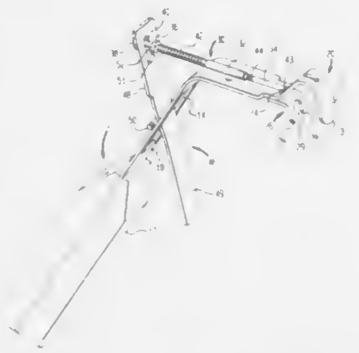
5,026,376
SURGICAL DRILL GUIDE AND RETRACTOR

Alex M. Greenberg, 145 W. 67th St., New York, N.Y. 10023

Filed Jul. 13, 1990, Ser. No. 552,703

Int. Cl.^{5} A61M *25/02*

U.S. Cl. 606—96 **22 Claims**



1. A combined surgical drill guide and retractor, comprising
a) an L-shaped member having first and second legs;
b) a major retractor extending from said first leg, said major retractor being of arcuate shape so that it can be inserted into an incision and will extend around and behind a bone located in the vicinity of said incision, said major retractor including an aperture located at a point adjacent to where said major retractor extends from said first leg;
c) a minor retractor extending from said first leg in a direction substantially opposite to the direction at which said major retractor extends from said first leg, said major and minor retractors cooperating to retract opposite sides of said incision;
d) an outer sleeve mounted on said first leg, said outer sleeve including a through-going bore aligned with said aperture of said major retractor;
e) an inner sleeve mounted in said through-going bore of said outer sleeve, said inner sleeve including a through-going bore for receiving a drill bit therein, said inner sleeve being movable within said outer sleeve between a retracted position and an extended position; and
f) a lever having first and second lever arms, said lever being hingedly mounted on said second leg of said L-shaped member for scissoring movement in cooperation with said second leg, said first lever arm coming into contact with said inner sleeve and causing said inner sleeve to move into its extended position when said second lever arm is brought into proximity with said second leg of said L-shaped member,
whereby said inner sleeve is brought into contact with a template positioned on a front of said bone.

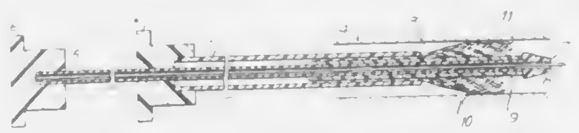
5,026,377
STENT PLACEMENT INSTRUMENT AND METHOD

John H. Burton, and Bradford G. Staehle, both of Minnetonka, Minn., assignors to American Medical Systems, Inc., Minnetonka, Minn.

Continuation of Ser. No. 379,458, Jul. 13, 1989, abandoned. This application Aug. 17, 1990, Ser. No. 569,267

Int. Cl.^{5} A61B *17/00*

U.S. Cl. 606—108 **24 Claims**



1. In combination, a self-expanding braided stent and an instrument for the deployment or retraction of said stent in a body canal, which comprises an elongated tubular outer sleeve having a proximal end and a distal end, an elongated core disposed within said sleeve and movable relative to said sleeve, said core being longer than said sleeve and having a proximal end and a distal end and including a grip member at or near said distal end of the core, said grip member being an integral portion of the core or a sleeve or coating attached around the periphery of the core and being adapted to: (i) releasably hold said self-expanding stent within said outer sleeve, there being sufficient clearance between said grip member and said outer sleeve to accommodate said stent without distortion, (ii) deploy said stent beyond the distal lend of said outer sleeve when said outer sleeve is moved in a backward direction relative to said core and (iii) retract said stent back within said outer sleeve when said core is pulled in a backward direction relative to said outer sleeve.

5,026,378
PUNCH MYRINGOTOMY SYSTEM AND METHOD

Manning M. Goldsmith, III, 11 Avenue of Pines, Savannah, Ga. 31406

Filed Nov. 9, 1989, Ser. No. 434,076

Int. Cl.^{5} A61B *17/32*

U.S. Cl. 606—109 **9 Claims**

1. Apparatus for performing a myringotomy and substantially simultaneously positioning a resilient drain in the resulting incision of the tympanic membrane to facilitate drainage of fluids from the middle ear passage to the outer ear passage comprising, an otological vent tube of a first predetermined axial length, said vent tube including a distal end flange and a proximal end, said distal end flange having a truncated conical end portion and said vent tube having an axial passageway open at the truncated end of said conical end portion and at the proximal end, a hollow tubular sleeve member having proximal and distal end portions and being of a second predetermined axial length, a shaft member of a third predetermined axial length greater than said second predetermined axial length, said shaft member positioned within said sleeve member and having a proximal end portion extending from one end of said sleeve member and a distal end portion extending from the other end of said sleeve member, said shaft member being axially movable within said sleeve member and having a pointed conical tip portion at the distal end thereof formed such that the conical tip portion and the truncated conical portion can be rendered substantially continuous surface extensions of one another, means for axially holding said shaft member relative to said sleeve member with the pointed conical tip portion of the shaft member extending beyond the distal end of said sleeve member by a fourth predetermined axial amount so said vent tube is mounted on the distal end portion of said shaft member with its proximal end in abutment with the distal end of said sleeve member such that said pointed conical tip forms a substantial continuation of the truncated conical end portion of said distal flange of said vent tube to facilitate puncturing of the patient's tympanic membrane and insertion of the distal flange of the vent tube through the tympanic membrane and into the middle ear passage, and, means for retracting said extending distal end portion of said shaft member into said distal end portion of said sleeve member to disengage said apparatus from said vent tube after said vent tube has been positioned in the tympanic membrane.

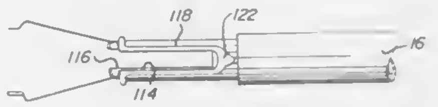
5,026,379
MULTI-FUNCTIONAL INSTRUMENTS AND STRETCHABLE LIGATING AND OCCLUDING DEVICES

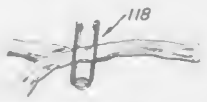
InBae Yoon, 2101 Highland Ridge Dr., Phoenix, Md. 21131

Filed Dec. 5, 1989, Ser. No. 446,555

Int. Cl.^{5} A61B *17/00*

U.S. Cl. 606—141 **34 Claims**





1. An applicator device for use in applying a flexible and resilient ligature, to an anatomical tubular structure or the like, comprising: an inner, elongated tubular member telescopically slidably received within a middle elongated tubular member which, in turn, is telescopically slidably received within an outer, elongated tubular member, said inner, middle and outer members each having a proximal end and a distal end, said inner member having forceps means mounted on a distal end thereof, means for moving said forceps means into and out of said middle member, said distal end of said middle member being configured to receive at least one ligature, thereon, and means for ejecting a ligature, from said middle member whereby sliding movement of said outer member with respect to said middle member and towards the distal end thereof results in the distal end of the outer member engaging the ligature, and ejecting the same from the middle member distal end.

5,026,380

Patent Not Issued For This Number

5,026,381
MULTI-LAYERED, SEMI-PERMEABLE CONDUIT FOR NERVE REGENERATION COMPRISED OF TYPE 1 COLLAGEN, ITS METHOD OF MANUFACTURE AND A METHOD OF NERVE REGENERATION USING SAID CONDUIT

Shu-Tung Li, Oakland, N.J., assignor to Colla-Tec, Incorporated, Plainsboro, N.J.

Division of Ser. No. 341,572, Apr. 20, 1989, Pat. No. 4,963,146. This application Aug. 1, 1990, Ser. No. 561,736

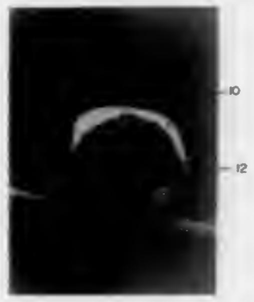
Int. Cl.^{5} A61B *17/00*

U.S. Cl. 606—152 **2 Claims**

1. A method of promoting in vivo regeneration of a mamma-

VOL
1127
ISS
4
JE
25
1991
UMI

lian severed nerve so as to bridge a gap between its severed ends comprising bringing the respective ends of the severed nerve into contact with each end of a hollow conduit whose walls are comprised of Type I collagen, said walls characterized by having an inner layer communicating with the hollow interior of the conduit having a pore size in the range of from about 0.006 μm to about 5.0 μm and a substantially porous outer layer communicating with the exterior of the conduit.



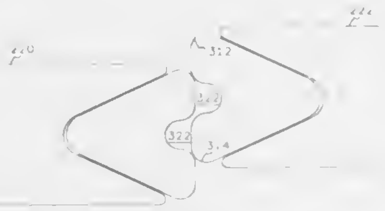
5,026,382
HEMOSTATIC CLIP

James E. Peiffer, Evergreen, Colo., assignor to Horizon Surgical, Inc., Evergreen, Colo.

Filed Aug. 27, 1990, Ser. No. 573,359

Int. Cl.^{5} A61B *17/00*

U.S. Cl. 606—158 **11 Claims**



1. A hemostatic clip comprising:
- a pair of arms formed from a single elongated strip of deformable material, said arms being interconnected at one end and open at the other end and arranged in laterally spaced apart substantially parallel relation, each of said arms being substantially triangular in cross-section with a flat side facing inwardly and with the apex facing outwardly;
- a longitudinal groove formed along said flat side of said arms, said groove having a width less than one third the width of said flat side, and said groove being formed substantially in the center of said flat side.

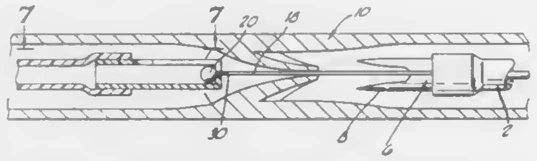
5,026,383
APPARATUS FOR IN-SITU CUTTING OF VALVES WITHIN VEINS AND METHOD THEREFOR

Anthony A. Nobles, 8686 Tern Ave., Fountain Valley, Calif. 92708

Filed Jun. 14, 1989, Ser. No. 366,427

Int. Cl.^{5} A61F *17/132*

U.S. Cl. 606—159 **12 Claims**



1. An apparatus for the in-situ cutting of valves within a vein when pulled reversely through the vein, the valves having valve cusps extending from diametrically spaced regions attachment to the vein into contact with each other to open and permit flow of blood in a normal direction through the vein but closing together to prevent reverse flow, the apparatus comprising,
- a cutting catheter sufficiently flexible to follow the contour of the vein when passed through it, having,
  - a cylindrical cutting head secured within an open end of said catheter, said cutting head comprising support means having an opening for mounting a viewing scope therein,
  - a pair of cutting blades secured to one end of said cutting head, said blades having sharp cutting edges and being shaped to engage and cut through the valve cusps when the cutting blades are aligned therewith, said blades having exterior sides which are contoured to generally follow the curvature of the interior walls of the vein, said blades being disposed relative to said opening in said support means to provide an unobstructed space for viewing interior sides of the blades,
- a pulling catheter sufficiently flexible to follow the contour of the vein when passed through it,
- linkage means for releasably connecting said catheters, said linkage means including,
  - a filament fixed at one of its ends to said one end of said cutting catheter,
  - a detent secured to said filament adjacent its other end,
  - retaining means immovably attached to said pulling catheter for releasably engaging the detent; and
- a viewing scope mounted within the opening in the support means of said cutting catheter to view through the space between said blades, said scope having a field of view of said blades and the adjacent regions within the vein to enable said cutting catheter to be rotated as necessary to align said cutting blades with the valve cusps.

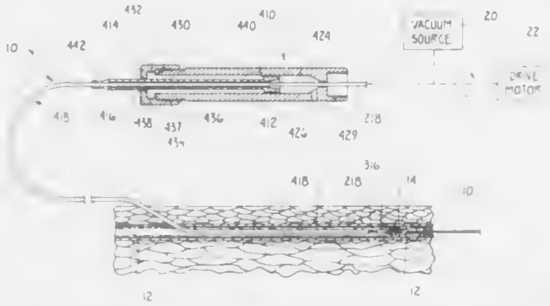
5,026,384
ATHERECTOMY SYSTEMS AND METHODS

Andrew F. Farr, Spring Valley, and Herbert R. Radisch, Jr., San Diego, both of Calif., assignors to InterVentional Technologies, Inc., San Diego, Calif.

Filed Nov. 7, 1989, Ser. No. 433,032

Int. Cl.^{5} A61B *17/32*

U.S. Cl. 606—159 **25 Claims**



1. An atherectomy system for excising obstructive tissue from an artery of a patient comprising:
- a guide wire insertable into the artery;
- a support sheath insertable into the artery over the guide wire, the support sheath having a proximal end and a distal end;
- a torque tube having a proximal end and a distal end insertable into the artery through the support sheath over the guide wire;
- a cutter connected to the distal end of the torque tube;
- a substantially cylindrical-shaped hollow housing;
- a tube-shaped insert coaxially aligned and slidingly disposed within said housing, said insert having its distal end connected to said support sheath; and
- a releasable insert holding means mounted on said housing for selectively moving said insert within said housing for selectively controlling the extent to which the cutter on the distal end of the torque tube extends from the distal end of the support sheath.

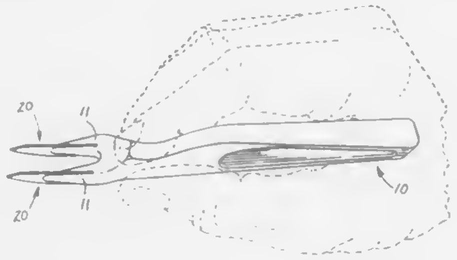
5,026,385
DOUBLE-BLADED SCALPEL

Michael J. Schutte, and Jerry J. King, both of 2825 Fort Missoula Rd., Missoula, Mont. 59801

Filed Apr. 3, 1990, Ser. No. 503,706

Int. Cl.^{5} A61B *17/32*

U.S. Cl. 606—167 **9 Claims**



1. A double bladed scalpel, comprising:
- a rigid elongated solid handle formed integrally of plastic resin material;
- a pair of identical elongated metal cutting blades outwardly protruding from one end of the handle in transversely-spaced parallel side-by-side positions across the handle, each blade having a sharpenend lower edge extending to an outer blade end;
- the blades each having an inner blade end, the inner blade ends of the two blades being permanently connected to the one end of the handle;
- the one end of the elongated handle being bifurcated into two integral rigid extensions having lengths less than the lengths of the blades and being arranged in transversely-spaced parallel side-by-side positions across the one end of the handle, each extension substantially overlapping and individually supporting one of the blades to prevent splaying of the outwardly protruding blade portions.

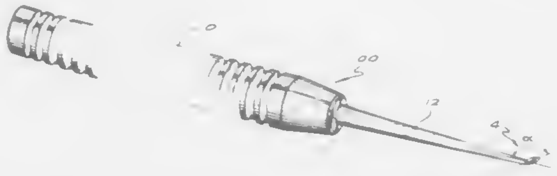
5,026,386
FLAVAL SEPARATOR

Gary K. Michelson, 438 Sherman Canal, Venice, Calif. 90291

Filed Dec. 23, 1988, Ser. No. 289,258

Int. Cl.^{5} A61B *17/32*

U.S. Cl. 606—170 **4 Claims**



1. A surgical instrument comprising a shaft, said shaft having a tip attached to said shaft at an angle less than 180 degrees, said tip being generally oval in shape and having a substantially flat top surface and a convex bottom surface, said top surface having a smooth sharp edge around its perimeter.

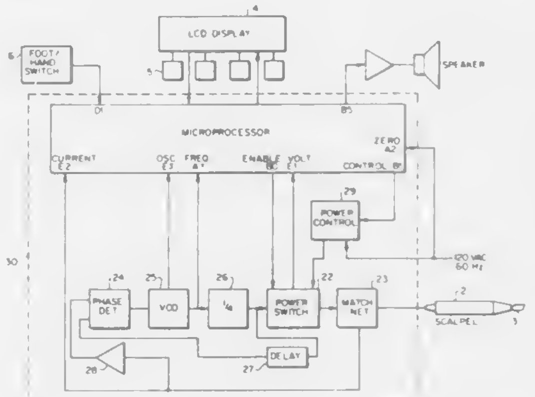
5,026,387
METHOD AND APPARATUS FOR ULTRASONIC SURGICAL CUTTING AND HEMOSTATIS

Alan E. Thomas, Ocean City, N.J., assignor to Ultracision Inc., Smithfield, R.I.

Filed Mar. 12, 1990, Ser. No. 492,491

Int. Cl.^{5} A61B *17/32*

U.S. Cl. 606—169 **34 Claims**



1. An ultrasonic surgical apparatus having at least two operating modes, said apparatus comprising:
- an instrument for performing a surgical function including cutting and cauterization;
- means for transmitting power at an ultrasonic frequency to the instrument at a relatively high level when in a first operating mode wherein the surgical function is to be effected and the load on said instrument is relatively high;
- said means also transmitting power to the instrument at a relatively low level in a second operating mode wherein the surgical function is not be effected;
- means responsive to said power transmitting means for sensing an electrical parameter with an instantaneous value indicative of a loaded or an unloaded condition wherein, respectively, the instrument is or is not in contact with a medium on which the surgical function is to be performed;
- means responsive to said sensing means for operating the means for transmitting in said first operating mode when the instrument is in contact with said medium and for operating the transmitting means in said second mode when the instrument is not in contact with said medium.

5,026,388
SINGLE-USE SKIN PUNCTURE DEVICE

Thomas J. Ingalz, 1528 Hallcrest Dr., San Jose, Calif. 95118

Filed Sep. 26, 1989, Ser. No. 412,511

Int. Cl.^{5} A61B *17/32*

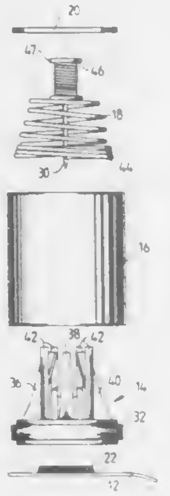
U.S. Cl. 606—182 **18 Claims**

1. A single-use skin puncture device comprising,
- a housing having a skin-engagement region and an access aperture through said skin-engagement region, said housing further having a sidewall and a flexible diaphragm connecting said skin engagement region to said sidewall at a front end of said housing, the application of force at said skin-engagement region causing deformation of said diaphragm about said skin-engagement region, said deformation defining a limited range of motion of said skin-engagement region relative to said sidewall,
- movable lance means aligned with said access aperture for piercing skin, said lance means having a puncture point having an armed position within said housing, a neutral position within said housing and a propelled position wherein said puncture point is at the exterior of said housing,
- spring means coupled to said lance means for displacing said

VOL
1127
ISS
4
JE
25
1991
UMI

puncture point in and out of said housing, from said armed position to said propelled position, and

catch means for releasably holding said spring means in a condition in which potential energy is stored for said displacing of said puncture point, said spring means coupled to said housing in a manner to release said spring means in response to said deformation, said spring means moving toward a relaxed condition after said displacing to locate said puncture point in said neutral position spaced apart from said skin-engagement region by a distance exceeding said limited range of motion of the skin-engagement region.



5,026,389

METHOD AND APPARATUS FOR OPENING AND CLOSING SURGICAL WOUNDS

William R. Thieler, 2175 Via Tuscany, Winter Park, Fla. 32789
Division of Ser. No. 225,377, Jul. 28, 1988, Pat. No. 4,966,605. This application Oct. 26, 1990, Ser. No. 604,059
Int. Cl.^{5} A61B *17/00;* A61L *15/00*
U.S. Cl. 606—215 **15 Claims**

1. Apparatus for use in facilitating the opening and closing of surgical wounds, comprising:

an elongated member having an elastic memory, the elastic member being substantially non-absorptive to blood and body fluids and having an adhesive disposed along one surface thereof; and

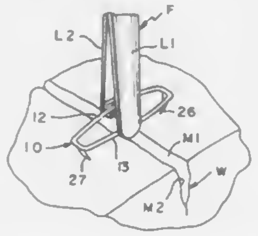
an elongated, relatively inelastic sealing member dimensioned to overlay the elastic member and having an adhesive along one surface thereof for adhering the sealing member to a second surface of the elastic member opposite from its one surface.

5,026,390

SURGICAL STAPLE

Alan W. Brown, 4 Hartley Cir., Apt. 824, Owing Mills, Md. 21117
Division of Ser. No. 426,373, Oct. 26, 1989. This application Sep. 20, 1990, Ser. No. 587,830
Int. Cl.^{5} A61B *17/00*
U.S. Cl. 606—221 **12 Claims**

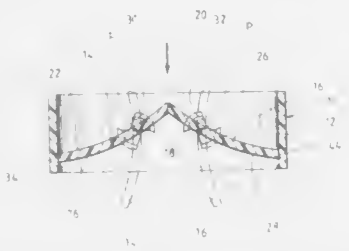
1. A surgical staple comprising a generally closed loop planar member formed of relatively resilient material possessing inherent spring-back characteristics; said generally closed loop planar member having opposite surfaces and a pair of skin piercing projections projecting transversely away from one of said opposite surfaces and generally toward each other at generally opposite ends of said generally closed loop member; said pair of skin piercing projections being spaced from each other a first predetermined linear distance in a generally unstressed, neutral, operative condition of said staple; said skin piercing projections being spaced from each other a second predetermined linear distance greater than said first predetermined linear distance in a generally stressed, force-induced inoperative condition of said staple; and said generally closed loop planar member having spaced surface means against which forces are applied for transforming said generally planar member from its generally unstressed condition to its generally stressed condition whereby said piercing projections can be pierced into the skin on opposite sides of a wound and upon cessation of such applied forces said generally planar member automatically returns to its generally unstressed condition to automatically draw opposite margins of the wound toward each other.



5,026,391

CURVED BUTTERFLY BILEAFLET PROSTHETIC CARDIAC VALVE

David M. McQueen, 185 Hillside Ave., Chatham, N.J. 07928, and Charles S. Peskin, 186 Harvard Dr., Hartsdale, N.Y. 10530
Continuation of Ser. No. 758,611, Jul. 24, 1985, abandoned. This application Nov. 14, 1989, Ser. No. 434,621
Int. Cl.^{5} A61F *2/24*
U.S. Cl. 623—2 5 Claims



1. A heart valve prosthesis comprising,

an annular valve body having a central passageway for the flow of blood therethrough from upstream to downstream,

first and second curved symmetrical leaflets pivotally supported for movement between closed and open positions in the central passageway of the body, said leaflets when closed preventing flow through said passageway and when open defining a posterior opening, a central opening, and an anterior opening through the passageway, each curved leaflet having a concave and a convex side,

eccentric position axis means pivotally supporting said curved leaflets,

said leaflets being curved in a plane normal to the eccentric axis and positioned with the convex sides of the leaflets facing each other when the leaflets are in the open position, and said concave sides of the leaflets facing upstream when in the closed position,

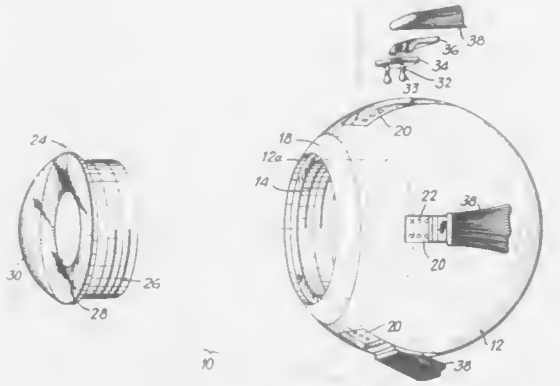
means in the body for limiting the maximum angle of opening of the leaflets to approximately 90° from a transverse plane to the central passageway, and

said first and second leaflets are pivotally supported at a position and have a curvature for maximizing the minimum peak velocity flowing through said openings and for maximizing the ratio of the net stroke volume to the mean pressure difference across the valve during forward flow thereby avoiding stagnation in all of said openings of the valve and reducing the pressure drop that is required to move fluid through the valve.

5,026,392

PROSTHETIC EYE

Gregg E. Gordon, 3 Sadore La., Apt. 6T, Yonkers, N.Y. 10710
Filed May 21, 1990, Ser. No. 525,819
Int. Cl.^{5} A61F *2/14*
U.S. Cl. 623—4 **35 Claims**



1. A prosthetic eye for use in replacing the natural eye of a user in an eye cavity having eye muscles, comprising a spherical body having a shape and form of a natural eye, a plurality of receiving regions located on said spherical body, a plurality of tabs, attaching means for attaching said tabs to said eye muscles, inserting means for inserting said plurality of attached tabs with attached eye muscles respectively into said plurality of receiving regions to couple said muscles to said prosthetic eye, and adjusting means for permitting removal and repositioning of said tabs in said respective receiving regions without damage to said tabs or said spherical body to adjust said prosthetic eye to a natural position in said eye cavity.

5,026,393

METHOD OF IMPLANTING AN INTRAOCULAR LENS IN A HUMAN EYE AND INTRAOCULAR LENS FOR SAME

Richard J. Mackool, 31-27 41st St., Astoria, N.Y. 11103
Filed Jan. 20, 1988, Ser. No. 145,906
Int. Cl.^{5} A61F *2/16*
U.S. Cl. 623—6 **10 Claims**

1. A method of implanting an intraocular lens in a human eye, comprising the steps of:

(a) making a first incision in the eye of a size sufficient to allow a cataractous lens to be extracted therefrom and a rolled intraocular lens to be inserted therethrough;

(b) pushing a rolled intraocular lens having a pliable wrapping about at least a portion of the rolled intraocular lens into the eye through said first incision;

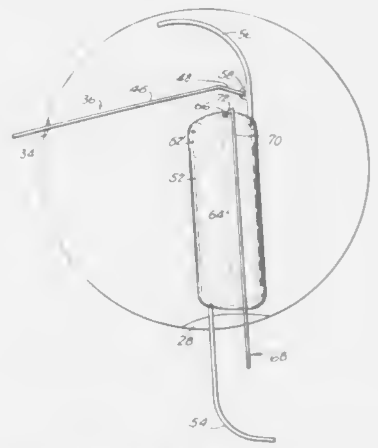
(c) removing said wrapping from said rolled intraocular lens in the eye so that said rolled intraocular lens unrolls in the eye;

(d) positioning said unrolled intraocular lens in the eye;

(e) rolling said intraocular lens together with said wrapping so that said wrapping surrounds at least a portion of the rolled intraocular lens.

9. An intraocular lens for implantation in a human eye, comprising:

(a) an intraocular lens rolled about itself; and

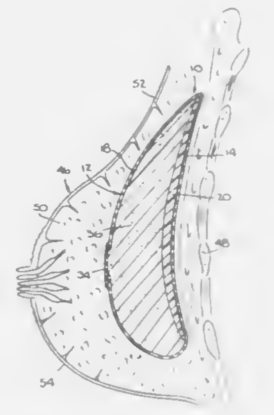


(b) a wrapping wrapped about at least a portion of said rolled intraocular lens, said wrapping including a perforation extending longitudinally therealong.

5,026,394

MAMMARY IMPLANT

James L. Baker, 1017 Temple Grove. Winter Park, Fla. 32789
Filed Jan. 10, 1989, Ser. No. 295,434
Int. Cl.^{5} A61F *2/12*
U.S. Cl. 623—8 **24 Claims**



1. A mammary implant comprising

(a) a base,

(b) a flexible, hollow shell formed of collapsible material having a first predetermined peripheral contour at said base and a promontory portion projecting from said base,

(c) a cohesive filler material of predetermined volume provided in said shell to prevent collapse of said promontory portion and to permit the promontory portion to project a predetermined amount from the base, and

(d) a resilient reinforcement member at said base, preformed in substantially solid form, and having a predetermined maximum thickness greater than the thickness of said shell, said reinforcement member being substantially coextensive with said base and being free of containment spaces for disposition of filler material, said reinforcement member having a second predetermined peripheral contour corresponding in shape to said first predetermined peripheral contour and a predetermined minimum stiffness attributable to said preformed solid form for enabling said implant to resist scar tissue contractures.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,395
INTRAOCULAR LENS HAVING A COATING LAYER AND A METHOD FOR MANUFACTURING THE SAME

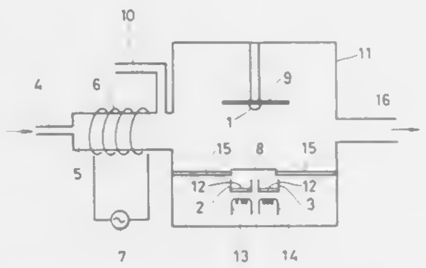
Ikuo Nakajima, Tokyo; Moriyuki Okamura, Sagamihara, and Toshiji Nishiguchi, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 25, 1989, Ser. No. 356,560

Claims priority, application Japan, May 31, 1988, 63-133154

Int. Cl.⁵ A61F *2/16*

U.S. Cl. 623—6 6 Claims



1. An intraocular lens comprising a lens base and a coating layer on at least a first surface of said lens base, said coating layer being a plasma-polymerized layer separate from said lens base and including an ultraviolet absorber mixed therein.

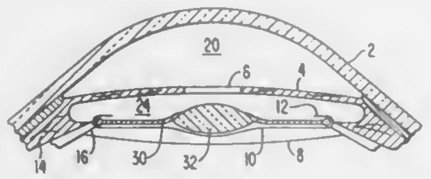
5,026,396
TWO-PIECE INTRAOCULAR LENS

John J. Darin, 1250 La Venta Dr., Suite 208, Westlake Village, Calif. 91361

Filed May 7, 1990, Ser. No. 519,951

Int. Cl.⁵ A61F *2/16*

U.S. Cl. 623—6 14 Claims



1. An implantable intraocular lens assembly comprising:
- a first member having an annular form, an outer periphery and an inner periphery delimiting an opening; and
- a second member of transparent material having at least one curved surface and an outer periphery;
- wherein: said second member is separated from said first member before implantation and is inserted into said opening of said first member after implantation of said first member, and
- wherein: said first member has an optical region adjacent said inner periphery and configured such that said optical region and said second member together constitute an optical converging lens.

5,026,397
TRANSCUTANEOUSLY IMPLANTABLE ELEMENT

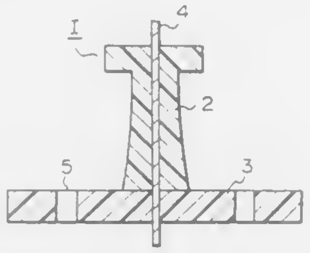
Hideki Aoki, Ibaraki; Masaru Akao, Kawasaki, and Yoshiharu Shin, Higashimurayama, all of Japan, assignors to Kabushiki Kaisya Advance Kaihatsu Kenkyujo, Tokyo, Japan

Continuation of Ser. No. 470,438, Jan. 24, 1990, abandoned, which is a continuation of Ser. No. 333,876, Apr. 3, 1989, abandoned, which is a continuation of Ser. No. 841, Mar. 30, 1987, abandoned, which is a division of Ser. No. 917,247, Oct. 7, 1986, abandoned, which is a continuation of Ser. No. 592,436, Mar. 22, 1984, abandoned. This application Sep. 10, 1990, Ser. No. 581,122

Claims priority, application Japan, Mar. 24, 1983, 58-47896; Sep. 6, 1983, 58-162645; Sep. 12, 1983, 58-166502; Oct. 28, 1983, 58-200733

Int. Cl.⁵ A61F *2/02*

U.S. Cl. 623—11 4 Claims



1. A transcutaneously implantable element in which at least a portion thereof in contact with the cutaneous tissue of a living body is composed of a ceramic material comprising, as the main raw material, at least one member selected from the group consisting of hydroxyapatite, tricalcium phosphate, and tetracalcium phosphate, and which comprises an electrically conductive member for electrically connecting the interior and exterior of the living body to each other.

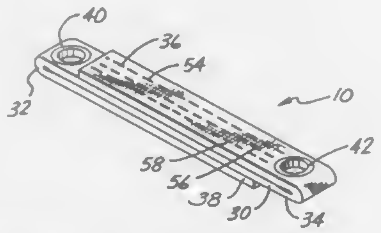
5,026,398
ABRASION RESISTANT PROSTHETIC DEVICE

Steven J. May, Minnetonka; David J. Andrews, West St. Paul, and Craig L. VanKampen, Oakdale, all of Minn., assignors to The Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 214,699, Jul. 1, 1988, abandoned. This application Oct. 9, 1990, Ser. No. 595,641

Int. Cl.⁵ A61F *2/08*

U.S. Cl. 623—13 23 Claims



1. A prosthetic device comprising:
- a flexible, load-bearing strap-like element of a stable biocompatible material, the strap-like element including a main load-bearing layer with first and second surface and first and second ends for attachment to a patient; and
- a first abrasion-resistant sacrificial layer attached to the first surface of the main load-bearing layer at a first position where abrasion between the prosthetic device and a bone of the patient occurs, the first sacrificial layer being capable of substantial sacrificial abrasion which does not substantially alter load-bearing capabilities of the strap-like element.

5,026,399
PROSTHETIC DEVICE

Eckart Engelbrecht, Hamburg; Elmar Nieder, Jork, and Arnold Keller, Kaihude, all of Fed. Rep. of Germany, assignors to GMT Gesellschaft fur Medizinsche Texhnik mbH and Waldemar Link GmbH & Co., both of Hamburg, Fed. Rep. of Germany

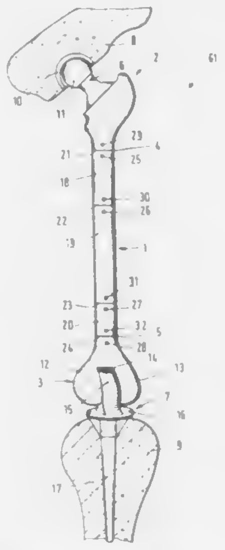
Continuation of Ser. No. 423,080, Sep. 24, 1982, abandoned. This application Aug. 14, 1985, Ser. No. 766,072

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1981, 3138848

Int. Cl.⁵ A61F *2/30, 2/34*

U.S. Cl. 623—18 6 Claims

1. An internal push-through prosthesis for performing the load-bearing function of a tubular bone between two joints, particularly the load-bearing function of a femur, which is capable of covering a portion of the prosthesis at least in the region of one of the joints, comprising an elongated variable-length bridging member having first and second ends and a portion of said bridging member being arranged to extend through the tubular bone upon implantation of the prosthesis, said bridging member comprising a plurality of separable sections disposed end-to-end and joining means for separably connecting said sections to each other, adjacent ones of said sections being provided with cooperating tapering joining elements; a first abutment member at said first end and constituting at least a portion of a first artificial joint; a second abutment member arranged to be mounted at said second end and constituting at least a portion of a second artificial joint; and means for joining at least one of said abutment members to the respective end of said bridging member in any one of a plurality of different angular positions relative to said bridging member.



VOL
1127
ISS
4
JE
25
1991
UMI

5,026,400

BUILT PARTICULATE DETERGENT CONTAINING A NARROW RANGE ALCOHOL ETHOXYLATE AND A PET-POET COPOLYMER SOIL RELEASE AGENT

Richard J. Holland, Trenton, and Charles Buda, Middlesex, both of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Continuation of Ser. No. 84,524, Aug. 10, 1987, Pat. No. 4,908,039. This application Dec. 4, 1989, Ser. No. 445,565

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.^{5} C11D *1/72, 3/37, 11/00;* **D06M** *15/507*

U.S. Cl. 8—137 **15 Claims**

1. A soil release promoting built particulate detergent composition of improved soil release promoting properties in cold water washing of polyester-containing fabrics that have been soiled with oily soils, which improved soil release is due to the presence therein of narrow range ethoxylate (NRE) nonionic detergent and soil release promoting polyethylene terephthalate-polyoxyethylene terephthalate (PET-POET) copolymer instead of broad range ethoxylate (BRE) nonionic detergent and PET-POET copolymer, which comprises a detersive proportion of such a NRE type of a nonionic detergent, which is a polyethoxylated lipophile, ethoxylated with an average of 5 to 10 ethylene oxide groups per mole, and with at least 70% of the ethylene oxide being in polyethoxy groups of 4 to 12 ethylene oxides, a building proportion of builder for the nonionic detergent, and a soil release promoting proportion of PET-POET copolymer soil release promoting agent.

5,026,401

DYEING COMPOSITIONS FOR KERATING FIBRES BASED ON NITROANILINES AND NITROANILINES FOR USE THEREIN

Andree Bugaut, Boulogne-Billancourt, and Herve Borowiak, Aulnay-sous-Bois, both of France, assignors to L'Oreal, Paris, France

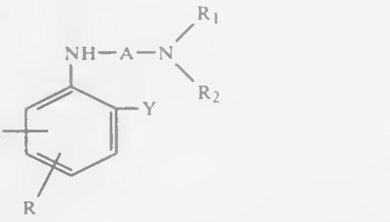
Continuation of Ser. No. 783,070, Oct. 3, 1985, abandoned, which is a continuation of Ser. No. 425,857, Sep. 28, 1982, abandoned. This application Sep. 13, 1989, Ser. No. 406,818

Claims priority, application Luxembourg, Oct. 8, 1981, 83685; Nov. 4, 1981, 83730

Int. Cl.^{5} A61K *7/13;* **C07C** *211/49, 215/20, 217/44*

U.S. Cl. 8—408 **18 Claims**

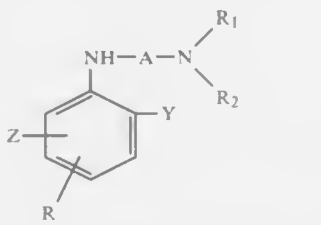
1. A composition suitable for dyeing keratin fibres which comprises, in an acceptable diluent or carrier, at least one dyestuff corresponding to the formula:



(I)

in which A denotes an alkylene group, an alkylene group substituted by one or more OH groups, or an alkylene group containing a chain hetero-atom group, R_1 and R_2, which are identical or different, denote hydrogen, alkyl, monohydroxyalkyl or polyhydroxyalkyl, R denotes hydrogen or lower alkyl, and Y denotes alkoxy or NO_2, such that if Y denotes alkoxy, Z denotes NO_2 and is located in the para-position to the amine group, and if Y denotes NO_2, (a) Z denotes alkoxy or OH and is located in the para-position to the NO_2 group, or (b) Z denotes OH and is located in the para-position to the amine group, or a cosmetically acceptable salt thereof.

16. A nitroaniline which corresponds to the formula:



(I)

in which A denotes an alkylene group substituted by one or more OH groups or an alkylene group containing a chain hetero-atom, R_1 and R_2, which are identical or different, denote hydrogen, alkyl, monohydroxyalkyl or polyhydroxyalkyl, R denotes hydrogen or lower alkyl, and Y denotes an alkoxy or NO_2, such that:

- if Y denotes alkoxy, then Z denotes NO_2 and is located in the para-position with respect to the amine group; and
- if Y denotes NO_2, then either (a) Z denotes alkoxy or OH and is located in the para-position with respect to the NO_2 or (b) Z denotes OH and is located in the para-position with respect to the amine group.

5,026,402

METHOD OF MAKING A FINAL CELL ELECTRODE ASSEMBLY SUBSTRATE

Sudhangshu Bose, and Michael E. Gorman, both of Manchester, Conn., assignors to International Fuel Cells Corporation, South Windsor, Conn.

Division of Ser. No. 432,335, Nov. 3, 1989, Pat. No. 4,985,316. This application Oct. 22, 1990, Ser. No. 602,111

Int. Cl.^{5} H01M *6/00*

U.S. Cl. 29—623.5 **5 Claims**

1. A method for forming a fuel cell electrode assembly substrate comprising the steps of:

a) forming a precursor carbon fiber mat using a wet paper making procedure;
b) drying said precursor mat to remove entrained liquid therefrom;
c) saturating the dried precursor mat with a carbonizable liquid binder so that substantially all interstitial spaces in the precursor mat will be filled with the liquid binder;
d) removing the liquid portion of the binder from the saturated precursor mat; and
e) subjecting the mat to graphitizing temperatures to convert the binder to a glassy form of carbon which coats substantially all the carbon fibers and substantially all of the interfiber junctures in the mat.

5,026,403

THREE STAGE PROCESS FOR PRODUCING PRODUCER GAS FROM COMBUSTIBLE WASTE PRODUCTS

Herwig Michel-Kim, Bamberger Strasse 41, D - 1000 Berlin 30, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 918,461, Oct. 14, 1986, abandoned, which is a division of Ser. No. 655,062, Sep. 26, 1984, abandoned. This application May 10, 1988, Ser. No. 319,264

Claims priority, application Fed. Rep. of Germany, Sep. 28, 1983, 3335544

Int. Cl.^{5} C10J *3/06*

U.S. Cl. 48—203 **10 Claims**

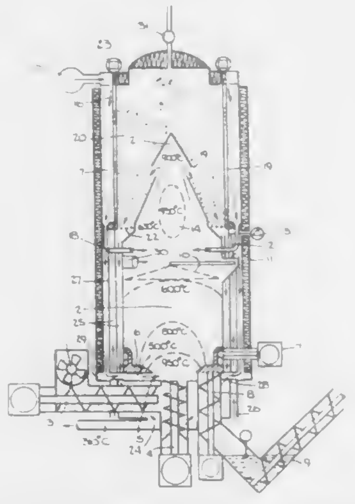
1. A process for producing producer gas from a combustible material comprising:

a. supplying a primary gasifier with the combustible material and preheated primary air in a concurrent flow in relation to each other, controlling the supply of the combustible material to said primary gasifier as a function of the rate of consumption of the combustible material and reacting said combustible material and preheated air, thereby producing a primary gas including tar and phenol fractions;

VOL
1127
ISS
4
JE
25
1991
UMI

b. supplying the primary gas together with entrained carbon particles to an intermediate gasifier and mixing said primary gas with secondary air for the purposes of increased heat production within said intermediate gasifier, the amount of secondary air being fed to said intermediate gasifier by a plurality of nozzles as a function of the temperature in the intermediate gasifier;

c. maintaining the mixture of primary gas, secondary air, and carbon particles, under reducing conditions in the intermediate gasifier, thereby cracking the tar and phenol fractions of the primary gas and producing a partially combusted producer gas containing carbon particles; and



d. conveying the partially combusted producer gas containing carbon particles to a secondary gasifier which is a coke gasifier filled with highly reactive glowing coke, such that the residence time of the partially combusted gas is sufficiently long to reduce the partially combusted gas and to further crack the tar and phenol fraction of the partially combusted gas such that the gas exiting the secondary gasifier is a pure producer gas with high heating value.

5,026,404
ABRASIVES

Reiner Kunz, Waldshut-Tiengen; Albert Babl, Dogern; Ales Zahradnicek, Albbruck, all of Fed. Rep. of Germany, and Rainer Dietrich, Basel, Switzerland, assignors to Lonza Ltd., Gampel/Valais, Switzerland

Continuation of Ser. No. 215,542, Jul. 6, 1988, abandoned. This application Dec. 7, 1989, Ser. No. 445,108

Claims priority, application Switzerland, Jul. 24, 1987, 2830/87; Aug. 31, 1987, 3334/87

Int. Cl.^{5} B24B *1/00*

U.S. Cl. 51—295 9 Claims

1. Abrasive grain having an aluminum oxide base, comprising the aluminum oxide base with a hydrophilic substance coated on its surface, the amount of said hydrophilic substance being 0.001 to 5.0 percent by weight relative to the amount of the abrasive grain, measured in grain beds, being smaller than 3.5×10^{10} ohms × cm, the hydrophilic substance being a metal oxide in the form of superfine particles with a particle size of the primary particles in the d_{50} value of 1 to 500 nm and a specific surface according to BET of 5 to 500 m^2/g.

5,026,405
BOND FOR ABRASIVE TOOLS

Gerald J. Guerro, Trumbull, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Jan. 22, 1990, Ser. No. 468,314

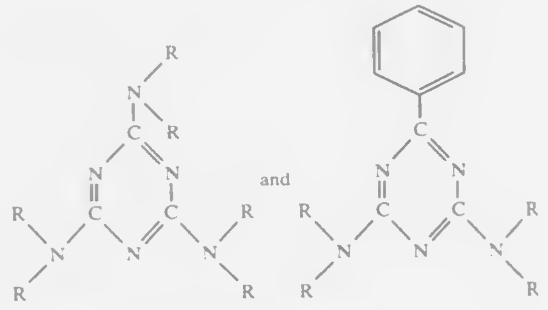
Int. Cl.^{5} C09K *3/14*

U.S. Cl. 51—298 7 Claims

1. In an abrasive tool comprising abrasive grains bonded with thermosetting resin bond, the improvement wherein the thermosetting resin bond composition comprises 5 to 20 weight percent based on total resin content, of

(a) a triazine composition selected from

(i) compounds of the structural formulas



wherein at least two R groups are

$CH_2NHCOOR^1$

wherein R^1 is selected from alkyl having 1-20 carbon atoms, and beta-hydroxyalkyl having 2-18 carbon atoms, and the remainder, if any, of R groups are

CH_2OR^2

wherein R^2 is hydrogen or alkyl having 1-12 carbon atoms; and

(ii) mixtures of the above defined compounds, oligomers of the above defined compounds and mixtures of such compounds with such oligomers; and

(iii) compounds of the structural formulas shown above wherein at least two R groups are

$CH_2CH_2NHCOOR^1$

wherein R^1 is alkyl having 1-20 carbon atoms or beta-hydroxyalkyl having 2-10 carbon atoms, and the remainder, if any, of R groups are selected from Cl, Br, I, and alkoxy having 1 to 6 carbon atoms, including oligomers and mixture of such compounds, and

(b) a cure catalyst.

5,026,406
ADSORPTIVE PROCESS FOR PRODUCING TWO GAS STREAMS FROM A GAS MIXTURE

Ravi Kumar, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 354,182, May 18, 1989, Pat. No. 4,915,711. This application Mar. 30, 1990, Ser. No. 502,490

The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.

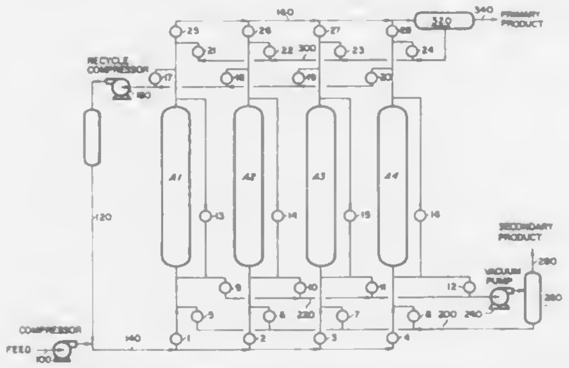
Int. Cl.^{5} B01D *53/04*

U.S. Cl. 55—26 16 Claims

1. A pressure swing adsorption process for recovery of two gas products at high recovery and high purity from a feed gas stream containing said products wherein a first gas product is one or more, less strongly adsorbed components and a second gas product is one or more, more strongly adsorbed components, comprising:

(a) introducing a feed gas stream at elevated pressure containing said one or more, less stronglY adsorbed components and said one or more, more strongly adsorbed components into one of a plurality of parallel adsorptive beds filled with one or more adsorbents selective for said one or more, more strongly adsorbed components, so as to retain said one or more, more strongly adsorbed components on sad one or more adsorbents and allow said one or more, less strongly adsorbed components to pass through said bed for recovery as said first gas product at high recovery and high purity;

(b) terminating the introduction of said feed gas stream into said bed before said one or more, more strongly adsorbed components break through the downstream end of said bed and depressurizing said bed to approximately ambient pressure to remove said one or more, less strongly adsorbed components from said bed and recycling the resulting depressurization effluent to said feed gas stream;



(c) passing a low pressure purge gas stream of one or more, more strongly adsorbed components through said bed to remove any residual one or more, less strongly adsorbed components from said bed and recycling the resulting effluent from said purged bed to the feed gas stream;

(d) evacuating said bed to a subambient pressure to recover said one or more, more strongly adsorbed component as said second gas product at high recovery and high purity, and

(e) repressurizing said bed with one or more, less strongly adsorbed components to approximately the pressure of the feed gas stream, wherein the steps (a) through (e) are performed on said plurality of beds to result in a continuous process.

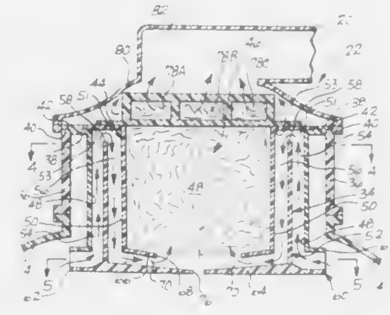
5,026,407
EXTERNAL SEPARATOR FOR VACUUM WASTE SYSTEM

Jon B. Tobey, Kirkland, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 6, 1990, Ser. No. 578,748

Int. Cl.^{5} B01D *19/00*

U.S. Cl. 55—185 13 Claims



1. An apparatus for separating entrained matter from an airflow, comprising:

an inner wall defining a filtering region having an inlet and an outlet, and an air-filtering material received in said region;

an outer wall surrounding said inner wall in spaced relationship therefrom;

an intermediate wall also surrounding said inner wall and extending inwardly into and terminating in the space between said inner and outer walls, said intermediate wall defining an outer passageway between said intermediate wall and said outer wall, and an inner passageway between said intermediate wall and said inner wall, and an air-turning region adjacent said intermediate wall's inwardly-extending end, said region permitting an airflow in said outer passageway to turn around said inwardly-extending end from said outer to inner passageways; and

a plurality of air inlets leading into said outer passageway, wherein said outer passageway leads upwardly from said inlets, and said inner passageway leads downwardly from said air-turning region, said inner passageway being in airflow communication with said filtering region, to deliver said airflow into said region and through said filtering material therein before said airflow exits through said region's top outlet.

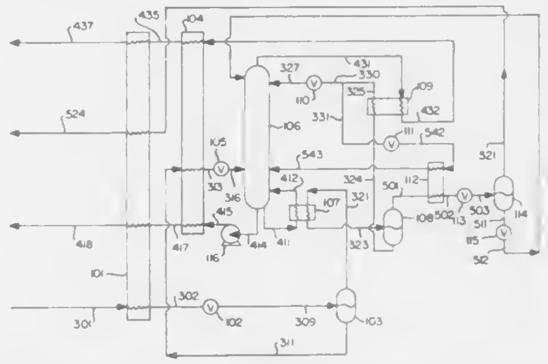
5,026,408
METHANE RECOVERY PROCESS FOR THE SEPARATION OF NITROGEN AND METHANE

John B. Saunders, Grand Island, and James J. Maloney, Tonawanda, both of N.Y., assignors to Union Carbide Industrial Gases Technology Corporation, Danbury, Conn.

Filed Jun. 1, 1990, Ser. No. 531,772

Int. Cl.^{5} F25J *3/02*

U.S. Cl. 62—24 16 Claims



1. A process for the separation of nitrogen and methane comprising:

(A) separating a feed comprising nitrogen and methane into nitrogen-enriched vapor and methane-enriched liquid;

(B) introducing the methane-enriched liquid into a column;

(C) partially condensing the nitrogen-enriched vapor to produce a first vapor and a first liquid, and introducing the first liquid into the column;

(D) partially condensing the first vapor to produce a second vapor and a second liquid, and introducing the second liquid into the column; and

(E) separating the fluids passed into the column into nitrogen-richer and methane-richer components and recovering methane-richer component as product methane.

VOL
1127
ISS
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1991
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5,026,409

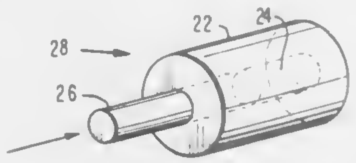
PREPARATION OF FLUORIDE GLASS OPTICAL PREFORMS AND FIBERS

M. Robinson, Agoura; Antonio C. Pastor, Santa Monica, and Ricardo C. Pastor, Manhattan Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jan. 3, 1989, Ser. No. 292,792

Int. Cl.^{5} C03B *37/14*

U.S. Cl. 65—3.11 15 Claims



1. A process for producing an optical fiber preform, comprising the steps of:

fabricating a hollow cylinder of a first fluoride glass in a reactive environment that reacts and removes oxygen and hydrogen containing species from the glass, the hollow cylinder having an inner bore;

fabricating an inner cylinder of a second fluoride glass in a reactive environment that reacts and removes oxygen and hydrogen containing species from the glass, the second fluoride glass having a refractive index greater than that of the first fluoride glass and having a cylindrical diameter less than that of the inner bore of the hollow cylinder;

inserting the inner cylinder into the inner bore of the hollow cylinder, the inner cylinder and hollow cylinder together being a preform precursor; and

processing the preform precursor to bond together the inner cylinder and the hollow cylinder including hot pressing the preform precursor by applying a hydrostatic force to the exterior surface of the hollow cylinder.

5,026,410

PROCESS FOR IMPREGNATING FILAMENT STRANDS

Jean-Claude Pollet, Granville; Gary L. Williams; Gordon P. Armstrong, both of Newark, and Martin C. Flautt, Granville, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 24,953, Mar. 12, 1987, abandoned. This application Nov. 9, 1988, Ser. No. 269,089

Int. Cl.^{5} B05D *3/02;* C03C *25/02;* D02G *3/00*

U.S. Cl. 65—3.43 5 Claims

1. A method for impregnating a strand of glass fiber filaments with thermoplastic reinforcing resin during a fiber forming process to form a thermoplastic reinforcing resin impregnated strand comprising the steps of:

forming a plurality of glass fiber filaments;

keeping the filaments separate;

impregnating the filaments with an aqueous slurry comprising water; from 30–50%, by weight, thermoplastic reinforcing resin powder, from 0.05–5.0% by weight, organosilane coupling agent; and, from 0.5–5.0% by weight, film former;

collecting the impregnated filaments into a strand;

drying the strand to remove the water and produce the strand impregnated with the thermoplastic reinforcing resin powder; and,

curing the impregnated strand during the drying step in order to bond the thermoplastic reinforcing resin powder to the filaments.

5,026,411

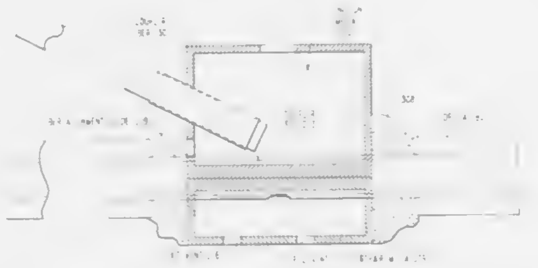
FABRICATION OF OPTICAL COUPLERS

Richard J. Coyle, Jr., Lawrenceville, N.J.; Gary J. Grimes, Thornton; Lawrence J. Haas, Broomfield, both of Colo.; Anthony J. Serafino, Cranbury, and George J. Shevchuk, Old Bridge, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 21, 1989, Ser. No. 454,084

Int. Cl.^{5} C03B *23/20*

U.S. Cl. 65—4.21 7 Claims



1. A method for fabricating an optical coupler on a first optical fiber having an optical core surrounded by a cladding, comprising the steps of:

firstly providing said first optical fiber;

secondly forming an opening in said cladding that is approximately elliptical in shape of said first optical fiber at a coupler site so that light emerging from said opening has a predefined exit cone; and

finally positioning at said coupler site a free end of a coupling optical fiber and said free end having an acceptance cone substantially matching said predefined exit cone of said emerging light.

5,025,412

PRODUCTION PROCESS OF MACHINABLE CERAMICS

Takashi Ooishi, Tochigi, and Akira Matsumoto, Funabashi, both of Japan, assignors to Mitsui Mining Company, Limited, Tokyo, Japan

Filed Sep. 27, 1990, Ser. No. 588,724

Claims priority, application Japan, Oct. 3, 1989, 1-257070

Int. Cl.^{5} C03C *10/16*

U.S. Cl. 65—18.1 11 Claims

1. A process for the production of machinable ceramics, which comprises the following steps:

calcining a mixture of fine particulate raw materials under first heat treatment conditions in which a maximum temperature is in the range of 1,000°–1,100° C., said raw materials comprising kaolin and activated clay as principal raw materials, Mg-containing, K-containing and F-containing compounds as auxiliary raw materials and B_2O_3 as a sintering aid, whereby a fluorophlogopite- and glass-containing calcined mass containing 30–60 vol. % of fluorophlogopite crystals is obtained;

grinding said calcined mass into fine particles;

forming a green body of a desired shape from said fine particles; and

sintering said green body into a fired body under second heat treatment conditions in which a maximum temperature is in the range of 1,100°–1,250° C.

5,026,413

PROCESS FOR MANUFACTURING QUARTZ GLASS PIPES HAVING A HIGH CONTENT OF SILICA WITH ONLY MINOR DIAMETER DEVIATIONS

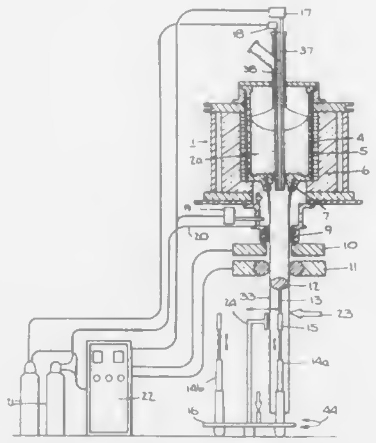
Helmut Lebert, Hanau, and Nigel R. Whippey, Seligenstadt, both of Fed. Rep. of Germany, assignors to Heraeus Quarzglas GmbH, Hanau, Fed. Rep. of Germany

Filed Apr. 17, 1990, Ser. No. 510,453

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1989, 3913875

Int. Cl.^{5} C03B *15/14*

U.S. Cl. 65—29 7 Claims



1. Process for manufacturing vertically withdrawn pipes from at least one of quartz glass and glasses having a high content of silica comprising:

heating initial material up to a softening point in an electrically heated furnace;

forming a pipe in a deformation zone and downwardly withdrawing the pipe including feeding gas into the interior of the pipe in the deformation zone;

continuously measuring the pressures in the interior of the pipe and in at least one of a chamber and heating chamber enclosing the pipe;

controlling said pressures in response to said measuring so as to maintain, in the deformation zone, a constant pressure difference between the pressure in the interior of the pipe and the pressure in at least one of the chamber and heating chamber enclosing the pipe and including sealing an end of the withdrawn pipe to maintain a pressure in the pipe interior which is higher than the pressure in the at least one of the chamber and the heating chamber.

5,026,414

HIGH-CAPACITY PROCESS FOR BENDING GLASS PLATES INTO CONVEX SHAPE

Denis Mathivat, Thourotte; Daniel Colmon, Franconville, and Daniel Philibert, Thourotte, all of France, assignors to Saint-Gobain Vitrage, Courbevoie, France

Continuation of Ser. No. 117,513, Nov. 6, 1987. This application Jan. 16, 1990, Ser. No. 465,508

Claims priority, application France, Nov. 6, 1986, 86 15489

Int. Cl.^{5} C03B *23/023*

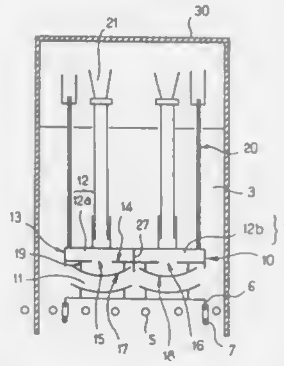
U.S. Cl. 65—106 4 Claims

1. A process for the bending of glass plates into convex shapes, comprising:

advancing a plurality of glass plates one after the other on a single general conveyor through a furnace to a plurality of stations including at least a bending station,

picking up a plurality of said glass plates from the conveyor in the bending station on a single upper unit termed a bending unit if bending occurs thereon, or a transfer unit if no bending occurs thereon, prior to discharge of any one of said picked up glass plates,

discharging said pick up glass plates on separate lower units wherein the discharge of each of said picked up plates is independent of the discharge of the other of said picked up plates, wherein when said single upper unit is a transfer unit, said glass plates are bent on said lower units,



wherein said glass plates are bent on at least one of said upper unit and said lower units.

5,026,415

MOLD WITH HYDROGENATED AMORPHOUS CARBON FILM FOR MOLDING AN OPTICAL ELEMENT

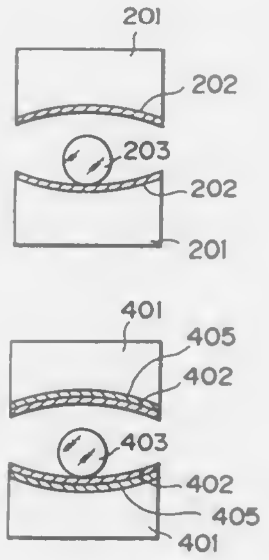
Kiyoshi Yamamoto, Yokohama; Keiji Hirabayashi; Noriko Kurihara, both of Tokyo; Yasushi Taniguchi, Kawasaki, and Keiko Ikoma, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 15, 1989, Ser. No. 394,208

Claims priority, application Japan, Aug. 16, 1988, 63-202739; Sep. 16, 1988, 63-230148; Sep. 16, 1988, 63-230149; Sep. 19, 1988, 63-232234

Int. Cl.^{5} C03B *19/02, 40/02, 40/033*

U.S. Cl. 65—305 6 Claims



1. A mold for press-molding an optical element formed of glass comprising a pair of molding members, each molding member comprising a mold base and a glass contacting, hydrogenated amorphous carbon film thereon, said glass contacting film having an inner surface interfacing with said mold base and an outer surface for contacting said glass, wherein the hydrogen content of said glass contacting film decreases from a maximum concentration at the inner surface of said glass contacting film to a minimum concentration at said outer surface for contacting said glass.

VOL
1127
ISS
4
JE
25
1991
UMI

5. A mold for press-molding an optical element, said mold comprising a pair of molding members, each of said molding members comprising, in sequence, (a) a mold base, (b) an intermediate layer comprising a carbide of an element of said mold base and (c) an outer coating of a hydrogenated amorphous carbon film for contacting a heated glass material.

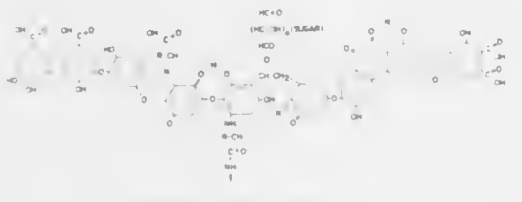
5,026,416
LIQUID CROP STIMULANT

William Alexander, Naperville, Ill., assignor to American Colloid Company, Arlington Heights, Ill.

Filed Mar. 9, 1987, Ser. No. 23,614

Int. Cl.^{5} C05F *11/02*

U.S. Cl. 71—24 **34 Claims**



THEORETICAL STRUCTURE OF HUMIC ACID

1. A crop stimulating composition consisting essentially of water-soluble alkali metal salt of humic acid obtained from the alkali metal hydroxide treatment of an oxidized humic acid containing ore: about 0.05% to about 2.0% by weight ascorbic acid; and water.

5,026,417
METHODS AND COMPOSITIONS FOR INCREASING THE AMOUNTS OF PHOSPHORUS AND/OR MICRONUTRIENTS AVAILABLE FOR PLANT UPTAKE FROM SOILS

Reginald M. N. Kucey, Alberta, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of Agriculture, Canada

Continuation of Ser. No. 293,758, Jan. 5, 1989, abandoned, which is a continuation-in-part of Ser. No. 167,035, Mar. 11, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 488,944

Claims priority, application Canada, Mar. 17, 1987, 532255; Jul. 22, 1987, 542706; Dec. 24, 1987, 555378

Int. Cl.^{5} C05B *21/00;* C05G *3/00*

U.S. Cl. 71—35 **40 Claims**

1. A method of increasing the availability of phosphorus and/or micronutrients for plant uptake from soil, which method comprises introducing into the soil an inoculum of a strain of the fungus *Penicillium bilaji* (also known as *Penicillium bilaii*), said strain being selected from the group consisting of strains identified by the deposit numbers ATCC 22348, ATCC 18309 and ATCC 20851 of the American Type Culture Collection, to release for plant uptake said phosphorus and/or micronutrients from a source thereof selected from the group consisting of sources originally present in the soil, sources added to the soil as amendments and combinations thereof.

5,026,418
PYRIMIDINE DERIVATIVES

Kevin R. Lawson, Piddington, United Kingdom, assignor to Imperial Chemical Industries PLC, London, England

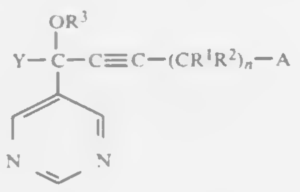
Filed Feb. 20, 1990, Ser. No. 481,232

Claims priority, application United Kingdom, Feb. 17, 1989, 8903649

Int. Cl.^{5} A01N *43/54;* C07D *239/26, 401/06, 403/06*

U.S. Cl. 71—92 **10 Claims**

1. A pyrimidine compound having the formula (I):



(I)

and stereoisomers thereof, wherein

Y is an optionally halo-substituted secondary or tertiary alkyl group containing from 3 to 7 carbon atoms or an optionally halo-substituted cycloalkyl or alkylcycloalkyl group containing from 3 to 7 carbon atoms;

R^1 and R^2, which may be the same or different are hydrogen or a lower alkyl group;

A is a heterocyclic group selected from the group consisting of

tetrazol-1-yl; tetrazol-5-yl; 1,2,4-thiadiazol-3-yl, 1,2,4-thiadiazol-5-yl; 1,3,4-thiadiazol-2-yl; 1,3,4-thiadiazol-5-yl; 1,2,3-triazol-1-yl; 1,2,3-triazol-4-yl; 1,2,3-triazol-5-yl; 1,2,4-triazol-1-yl; 1,2,4-triazol-3-yl; 1,2,4-triazol-5-yl; isoxazol-3-;yl; isoxazol-4-yl; isoxazol-5-yl; oxazol-2-yl; oxazol-4-yl; oxazol-5-yl; isothiazol-3-yl; isothiazol-4-yl; isothiazol-5-yl; thiazol-2-yl; thiazol-4-yl; thiazol-5-yl; imidazol-1-yl; imidazol-2-yl; imidazol-4-yl; imidazol-5-yl; pyrazol-1-yl; pyrazol-3-yl; pyrazol-5-yl; pyrazol-5-yl; 1,3-dioxol-2-yl; 1,3-dioxol-4-yl; 1,3-dithiol-2-yl; 1,3-dithiol-4-yl; pyrrol-1-yl; pyrrol-2-yl; pyrrol-3-yl; fur-2-yl; fur-3-yl; thien-2-yl; thien-3-yl; 1,3,5-thiadiazin-2-yl; 1,3,5-thiadiazin-4-yl; 1,3,5-thiadiazin-6-yl; 1,2,4-triazin-3-yl; 1,2,4-triazin-5-yl; 1,2,4-triazin-6-yl; 1,3,5-triazinyl; 1,3,5-trioxanyl; 1,3,5-trithianyl; 1,4-oxazin-2-yl; 1,4-oxazin-3-yl; 1,4-oxazin-5-yl; 1,4-oxazin-6-yl; 1,4-thiazin-2-yl; 1,4-thiazin-3-yl; pyrazinyl; pyridazin-3-yl; pyridazin-4-yl; pyrimidin-2-yl; pyrimidin-4-yl; pyrimidin-5-yl; 1,4-oxathiin-2-yl; 1,4-oxathiin-3-yl; 1,3-dithiin-2-yl; 1,3-dithiin-4-yl; 1,3-dithiin-5-yl; 1,3-dithiin-6-yl; 1,3-dithian-2-yl; 1,3-dithian-4-yl, 1,3-dithian-5-yl; pyrid-2-yl; pyrid-3-yl; pyrid-4-yl; pyran-2-yl; pyran-3-yl; pyran-4-yl; pyran-6-yl; pyran-6-yl; 7-oxabicyclo[2.2.1]heptanyl; 1,2,4-triazolo[4,3-a]pyridinyl; 1H-benzotriazolyl; benzothiazolyl; 7H-purinyl; 1H-benzimidazolyl; 1H-indazolyl; 1,3-benzodioxolyl; benzofuranyl; 1H-indolyl; 2H-isoindolyl; 1-benzothienyl; pteridinyl; quinoxalinyl; quinazolinyl; isoquinolinyl; quinolinyl; tetrahydrothien-2-yl; tetrahydrothien-3-yl; tetrahydrofur-2-yl or tetrahydrofur-3-yl; tetrahydropyrrol-2-yl; tetrahydropyrrol-3-yl; piperidin-1-yl; piperidin-2-yl; piperidin-3-yl; piperidin-4-yl; piperazin-1-yl; piperazin-2-yl; morpholinyl; tetrahydropyranyl; tetrahydrothiopyranyl; and dioxanyl, each of which may be optionally substituted by halogen, lower alkyl, lower alkoxy, lower haloalkyl, lower alkoxycarbonyl, nitro, amino, formamido, acetamido, dialkylsulphamoyl and cyano;

n is an integer which may be from 0 to 2; and

R^3 is hydrogen, an alkyl group containing from 1 to 4 carbon atoms, an alkenyl group containing from 2 to 4 carbon atoms or an alkynyl group containing from 2 to 4 carbon atoms; and agrochemically acceptable salts and metal complexes of the compounds of formula (I) and acylates of compounds of formula (I) wherein R^3 is hydrogen.

9. A plant growth regulating composition comprising a plant growth regulating amount of a pyrimidine compound according to claim 1.

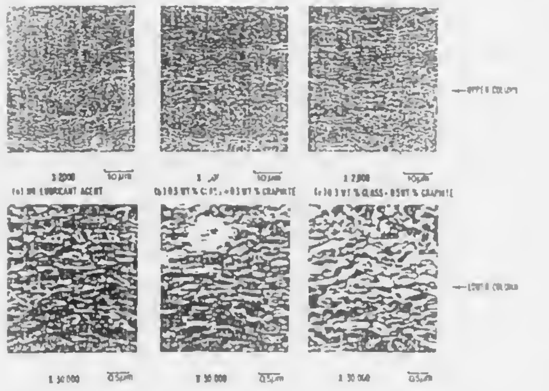
5,026,419
MAGNETICALLY ANISOTROPIC HOTWORKED MAGNET AND METHOD OF PRODUCING SAME

Katsunori Iwasaki, Kumagaya; Shigeho Tanigawa, Kounosu, and Masaaki Tokunaga, Fukaya, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Division of Ser. No. 355,641, May 23, 1989, Pat. No. 4,952,251. This application Apr. 25, 1990, Ser. No. 520,653

Int. Cl.^{5} B22F *1/00*

U.S. Cl. 75—254 **10 Claims**



1. Composition of matter for use in forming multigrained hot-worked anisotropic magnets comprising:

R-T-B type alloy powder, wherein R is selected from the group consisting of the rare earth elements, yttrium, and mixtures thereof, T is a transition metal, and B is boron; and

an internal lubricant comprising at least two additives homogenously distributed throughout said R-T-B alloy powder, said at least two additives including

(a) a glass material, and

(b) a carbon-based material.

5,026,420
PURIFICATION PROCESS FOR GOLD-BEARING IODINE LIXIVIANT

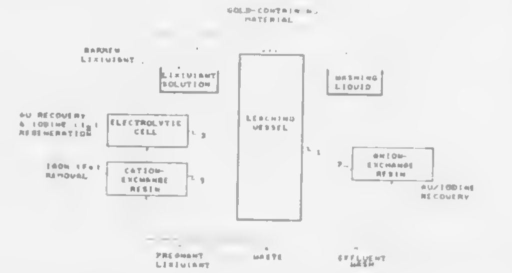
Susumu Kubo, 101 Chuo Apartment, 849 Zyouzankei, Minami-ku, Sapporo City, Hokkaido, Japan

Filed May 1, 1990, Ser. No. 515,496

Claims priority, application Japan, May 12, 1989, 1-117376

Int. Cl.^{5} C22B *11/04*

U.S. Cl. 75—712 **13 Claims**



1. A process for the purification of a gold-bearing iodine lixiviant comprising the step of contacting a pregnant, gold-bearing iodide lixiviant in which gold has been leached from a gold-containing material with a styrenic, strongly acidic cation-exchange resin, to selectively absorb and remove heavy metals from the lixiviant while allowing gold and iodine to pass through the resin.

5,026,421
POLISHING COMPOSITIONS BASED ON CERIUM AND PROCESS FOR THE PREPARATION THEREOF

Jean-Luc Le Loarer, La Rochelle, and Francis Tastu, Nieul/-Sur/Mer, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Continuation of Ser. No. 282,314, Dec. 9, 1988, abandoned. This application Dec. 27, 1989, Ser. No. 457,587

Claims priority, application France, Dec. 9, 1987, 87 17129

Int. Cl.^{5} C09G *1/00*

U.S. Cl. 106—3 **33 Claims**

1. A cerium based polishing composition comprising a polishing agent comprising a ceric oxide and a boron compound.

5,026,422
POWDER COATING COMPOSITIONS

Timothy W. Osborne, Brooklyn, Ohio, assignor to Union Carbide Coatings Service Technology Corporation, Danbury, Conn.

Filed Nov. 3, 1989, Ser. No. 431,191

Int. Cl.^{5} C04B *9/02, 35/56, 35/58;* C09K *3/30*

U.S. Cl. 106—14.11 **11 Claims**

1. A powder-containing coating composition consisting of particulate powder selected form the group consisting of borides, carbides, oxides of metals, and mixtures thereof, dispersed in water and clay dispersed in water; said particulate powder sized from 0.1 micron to 50 microns and present in the composition in an amount from 20 to 99 weight percent based on the weight of the solid components of the composition; said clay sized from 0.1 micron to 50 microns and present in the composition in an amount from 1 to 80 weight percent based on the weight of the solid components of the composition.

5,026,423
COMPOSITIONS AND PROCESS FOR METAL TREATMENT

Toan M. Ngo, Eureka, Mo., assignor to Monsanto Chemical Company, St. Louis, Mo.

Filed Feb. 22, 1989, Ser. No. 313,768

Int. Cl.^{5} C23F *11/167*

U.S. Cl. 106—14.12 **7 Claims**

1. A particulate Jernstedt salt concentrate to prepare activating compositions for use in producing protective phosphate coatings on metal surfaces by admixture with water comprising a blend of (1) an alkali metal phosphate salt and (2) a mixture comprising an activated titanium ion producing salt and an alkali metal phosphate salt, said mixture formed by dissolving at least said titanium ion producing salt in water and combining said solution with the phosphate salt followed by heating to a temperature above about 60° C. and below the deactivating temperature of said titanium ion thereby evaporating said solution to precipitate said salts and to remove free water, said mixture (2) containing from about 20 % to about 40 %, by weight, of the total amount of alkali metal phosphate salt in said concentrate.

5,026,424
AQUATIC ANTIFOULING COMPOSITIONS

Motomi Ohta, Yokkaichi; Teruyoshi Takahashi, Kawaguchi; Hirotake Ikari, Chiba, and Wataru Agui, Tokyo, all of Japan, assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Aug. 28, 1989, Ser. No. 399,661

Int. Cl.^{5} C09D *5/14, 5/16*

U.S. Cl. 106—18.34 **13 Claims**

1. An aquatic antifouling composition consisting essentially of a vehicle and/or solvent and sufficient compound of the formula

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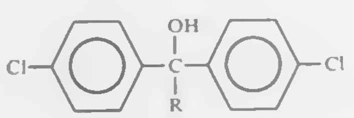


(I)

wherein R represents (C_1–C_4)alkyl, cyclohexyl, trichloromethyl, ethoxycarbonyl, or isopropoxycarbonyl to prevent adhesion of aquatic organisms to articles on which said composition is applied, said composition optionally containing an amount of at least one dithiocarbamate compound sufficient to enhance the antifouling effect of said composition.

5,026,425

WATERFASTNESS OF DB-168 INK BY CATION SUBSTITUTION

Suraj L. Hindagolla; Charles L. Thierheimer, Jr., both of Corvallis, and John M. Skene, Lake Oswego, all of Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 11, 1989, Ser. No. 449,654

Int. Cl.^{5} C09D *11/02*

U.S. Cl. 106—22 **16 Claims**

1. An ink suitable for ink-jet printing, comprising, by weight:

(a) from about 5 % to about 15 % of a pyrrolidone selected from the group consisting of N-2-hydroxy ethyl)-2-pyrrolidone, N-methyl pyrrolidone, and 2-pyrrolidone and mixtures thereof,

(b) from about 0.5 % to about 10 % DB-168 dye having cations associated therewith selected from the group consisting of ammonium, polyfunctional amine cations, and volatile amine cations, and

(c) the balance water.

5,026,426

INK COMPOSITIONS HAVING IMPROVED WATERFASTNESS

Dale D. Russell, Corvallis, Oreg., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 15, 1989, Ser. No. 407,605

Int. Cl.^{5} C09D *11/02*

U.S. Cl. 106—22 **13 Claims**

1. A thermal ink-jet printing ink comprising, by weight:

(a) from about 0.01% to about 20% water-soluble dye;

(b) from 0% to about 15% water-soluble organic solvent for said dye;

(c) from about 0.01 to about 5% nitrile selected from the group consisting of cyanoguanadine, 3-cyano-6-methyl-2-(1H)-pyridinone, cyanopyridine, 1-cyanoisourea, cyanoindole, cyanoacetylurea, 3-cyano-4,6-dimethyl-2-hydroxypyridine,1-(2-cyanoethyl)pyrrole, cyanoacetamide, cyanoacetic acid, cyanoacetophenone, cyanoaniline, cyanobenzoic acid, cyanobenzaldehyde, 3-(1-cyanoethyle)benzoic acid, 2-cyanoethyl ether, 2-cyano-6-methoxybenzothiazole, 6-cyanopurine, and cyanothiophene; and

(d) from about 73% to 99% water.

5,026,427

PROCESS FOR MAKING PIGMENTED INK JET INKS

Robert D. Mitchell, Pittsford, N.Y., and Torence J. Trout, Yorklyn, Del., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.

Filed Oct. 12, 1988, Ser. No. 256,809

Int. Cl.^{5} C09D *11/02*

U.S. Cl. 106—23 **10 Claims**

1. A process for the preparation of pigmented ink jet inks comprising:

(a) mixing at least one pigment and at least one water soluble pigment dispersant in a carrier liquid selected from the group consisting of water or a mixture of water and at least one water-soluble organic solvent to form a pigmented ink mixture wherein pigment is present in an amount from about 0.1% to about 30% by weight based on the total weight of the mixture; and

(b) deflocculating the pigmented ink mixture by passing the pigmented ink mixture through at least a plurality of nozzles within a liquid jet interaction chamber at a liquid pressure of at least 1,000 psi to produce a substantially uniform dispersion of pigment in the carrier liquid.

F I G 2

5,026,428

MANUFACTURING PLASTER ARTICLES

Peter B. L. Cook, Fairfields House, Norwich Road, Horstead, Norwich, Norfolk, Great Britain NR12 7EE

Filed Jan. 3, 1989, Ser. No. 292,680

Int. Cl.^{5} C04B *28/14;* **B28B** *7/34*

U.S. Cl. 106—38.3 **12 Claims**

1. A method of manufacturing a plaster article, which method comprises

forming an aqueous solution from boric oxide and concentrated aqueous silicic acid, said solution consisting of a homogeneous solution of boric acid and silicic acid,

mixing a selected amount of said homogeneous solution of boric acid and silicic acid with powdered calcium sulfate to produce a thixotropic composition which sets in 12–15 minutes to a workable form,

forming said thixotropic composition into an article, and

allowing said article to set for at least two hours to a usable form.

5,026,429

METAL OXIDE COATED PLATELET-LIKE ORGANIC PIGMENTS

Norbert Mronga, Dossenheim; Werner Ostertag, Gruenstadt, and Gustav Bock, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 25, 1990, Ser. No. 470,360

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1989, 3903023

Int. Cl.^{5} C09B *47/00, 67/00, 69/00*

U.S. Cl. 106—400 7 Claims

1. A luster pigment compound of a metal oxide film on a colored platelet-like support particle, wherein the support particle is a platelet-like organic color pigment particle having the dimensions of from 3 to 150 μm in length, from 3 to 150 μm in width and from 0.1 to 2 μm in thickness.

5,026,430

METHOD OF PREPARING LACTULOSE

Walterus T. de Haar, and Hendrik Pluim, both of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

Continuation of Ser. No. 342,882, Apr. 25, 1989, abandoned. This application Aug. 13, 1990, Ser. No. 566,314

Claims priority, application Netherlands, Apr. 28, 1988, 8801102

Int. Cl.^{5} C08B *30/00*

U.S. Cl. 127—34 5 Claims

1. A method of preparing lactulose by basic isomerization of lactose, comprising basically isomerizing lactose with sodium hydroxide to produce a reaction mixture; and

treating the reaction mixture with hydrogen peroxide or sodium chlorite in an amount effective to produce oxidation of decomposition products which can be removed by means of ion exchangers.

5,026,431

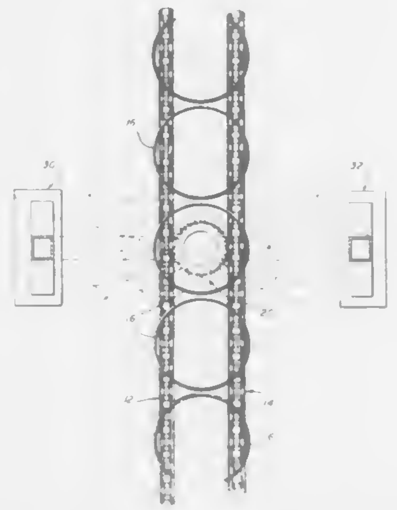
PROCESS OF KOSHERING CONTAINERS

Howard Skolnik, Chicago, Ill.; Paul R. Dukes, Jr., Maunee, Ohio, and Jonah Gewirtz, Silver Spring, Md., assignors to Skolnik Industries, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 131,291, Feb. 8, 1987, Pat. No. 4,830,675, which is a continuation of Ser. No. 872,016, Jun. 9, 1986, abandoned. This application May 8, 1989, Ser. No. 348,803

Int. Cl.^{5} B08B *7/00*

U.S. Cl. 134—3 19 Claims



1. A process for koshering metallic food storage containers, said containers manufactured from flat sheet steel on whose interior surface oils, greases, and dirt are suspected of being present, said process comprising:

conveying a series of containers through an oven having first flame-burner means and second flame-burner means, said step of conveying comprising exposing the interior surface of each container to the flames of the first flame-burner means, and exposing the exterior surface of each container to the flames of the second flame-burner means, for removing oils, grease and other contaminants entrained within the pores of and on the interior and exterior surfaces.

5,026,432

METHOD AND APPARATUS FOR REMOVING AND DISPOSING OF CONTAMINATED CONCRETE

Dennis W. Johnson, Barberton, Ohio, assignor to ENSR Corporation, Houston, Tex.

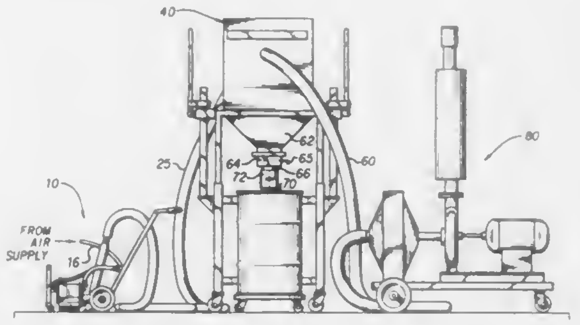
Filed Aug. 14, 1989, Ser. No. 392,889

Int. Cl.^{5} B08B *5/04*

U.S. Cl. 134—21 17 Claims

1. A method for removing contaminated masonry in large volumes and simultaneously collecting same in a series of containers which comprises:

(a) breaking said contaminated masonry into pieces in the presence of a vacuum which pneumatically removes said pieces to a collector; and



(b) simultaneously collecting said pieces in a closed system while filling said series of containers.

5,026,433

GRAIN REFINEMENT OF A COPPER BASE ALLOY

Richard P. Vierod, Branford; Harvey P. Cheskis, North Haven, and Derek E. Tyler, Cheshire, all of Conn., assignors to Olin Corporation, Cheshire, Conn.

Filed Jan. 2, 1990, Ser. No. 459,885

Int. Cl.^{5} C22C *9/00;* **C22F** *1/08*

U.S. Cl. 148—2 **10 Claims**

1. A method of casting a grain refined copper-iron alloy, wherein the iron content is less than 2.3% by weight, said method comprising:

a. providing a melt of said copper-iron alloy,

b. adding an effective amount of a component consisting essentially of calcium to said melt to result in grain refinement of tbe cast ingot, and

c. casting said metal containing said calcium to form an ingot.

5,026,434

COPPER-IRON-COBALT-TITANIUM ALLOY WITH HIGH MECHANICAL AND ELECTRICAL CHARACTERISTICS AND ITS PRODUCTION PROCESS

Alain Picault, Mantes-la-Ville; Christian Gandossi, Séifontaine, and Laurent Mineau, Grenoble, all of France, assignors to Trefimetaux, Courbevoie, France

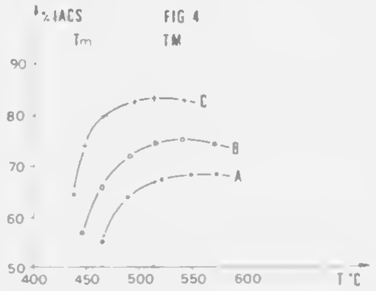
Filed Jun. 25, 1990, Ser. No. 542,919

Claims priority, application France, Jul. 7, 1989, 89 09906

Int. Cl.^{5} C22F *1/08;* **C22C** *9/00*

U.S. Cl. 148—2 12 Claims

FIG 4



1. Process for the production of a Cu-Fe-Co-Ti alloy including a step of producing the alloy and a step of alloy transformation with a precipitation heat treatment, comprising:

(a) preparing a molten alloy bath having a composition which satisfies the following conditions, by weight:
Co/Fe ratio between 0.10 and 0.90;
Ti/(Fe+Co) ratio between 0.30 and 1;
iron content between 0.030 and 2%;

VOL
1127
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1991
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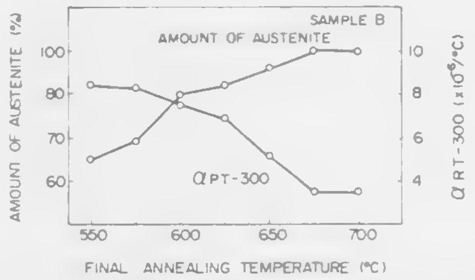
cobalt content between 0.025 and 1.8%;
titanium content between 0.025 and 4%;
oxygen content below 50 ppm;
content of metallic impurities below 0.1% with each impurity below 0.015%; the remainder being copper;
(b) deoxidizing the molten alloy bath by introducing boron therein and eliminating the boron oxide formed;
(c) casting the molten alloy, then homogenizing, cold drawing, and subjecting the cold drawn alloy to a precipitation heat treatment, with the precipitation heat treatment at a temperature lower, by at the most 80° C., than a temperature TM leading to the maximum electrical conductivity.

5,026,435
HIGH STRENGTH LEAD FRAME MATERIAL AND METHOD OF PRODUCING THE SAME
Shuichi Nakamura, Yasugi; Hakaru Sasaki, Matsue, and Rikizo Watanabe, Yasugi, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan
Filed Jun. 25, 1990, Ser. No. 542,714
Claims priority, application Japan, Jun. 26, 1989, 1-163595; Aug. 21, 1989, 1-214607; Mar. 8, 1990, 2-57566
Int. Cl.^{5} C22C *38/08;* **C21D** *8/00*
U.S. Cl. 148—12 A 5 Claims



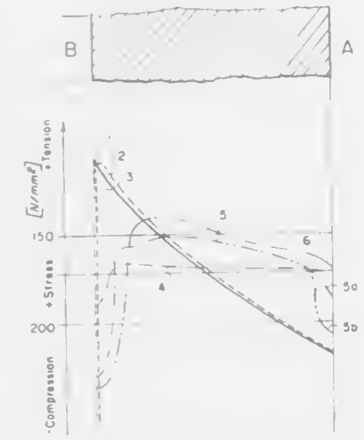
1. A high strength lead frame material consisting essentially of, by weight, of 0.5 to 22% Co, 22 to 32.5% Ni, wherein 0.5 to 3% of Ni may be replaced by the same amount of Cu, not more than 1.0% Mn and not more than 0.5% Si and the balance Fe and incidental impurities, the contents of Ni and Co being selected so that the Ni content is 27 to 32.5% when the Co content is less than 12%, and so that, when the Co content is not less than 12%, the Ni content and the Co content meet the condition of $66\% \leqq 2Ni + Co \leqq 74\%$, said material also having a two-phase structure formed of martensitic phase and inverse-transformation austenitic phase with or without residual austenitic phase, the austenitic phase occupying not less than 50% of said structure.

5,026,436
PROCESS FOR THE PRODUCTION OF TUBULAR BODIES
Helmut Pohl, Neunkirchen, Austria, assignor to Schoeller-Bleckmann Gesellschaft m.b.H., Ternitz, Austria
Filed Aug. 3, 1989, Ser. No. 388,868
Claims priority, application Austria, Aug. 4, 1988, 1965/88
Int. Cl.^{5} C21D *9/08, 8/10*
U.S. Cl. 148--12 B **10 Claims**

1. A process for the production of an austenitic steel tubular body that is resistant to stress corrosion cracking wherein after the steps of solution treatment, quenching, and deforming the body at a temperature under 500° C., in order to improve its mechanical properties, the tubular body is further processed by the steps of:
heating the body to a temperature of 220° to 600° C., at least to temperature equalization with a temperature differential of at most 10° C. in the walls of the body;
maintaining the body for at most a time t in minutes at a temperature T in degrees Celsius in accordance with the expression

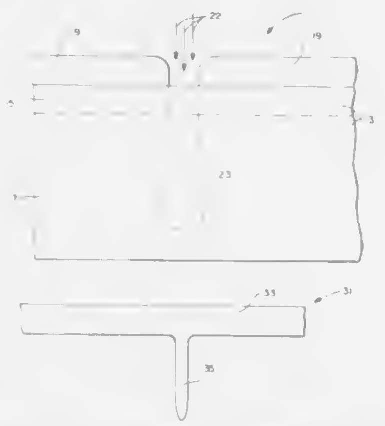
$$T = 10^{(T-638)/50};$$

and



cooling the body by the increased withdrawal of thermal energy, at least from the internal surface of the tubular body, wherein the cooled surface exhibits a temperature drop of at least 100° C./min from a starting temperature to a half value between the starting temperature and room temperature.

5,026,437
CANTILEVERED MICROTIP MANUFACTURING BY ION IMPLANTATION AND ETCHING
Armand P. Neukermans, Palo Alto, and Josef Berger, Los Altos, both of Calif., assignors to Tencor Instruments, Mountain View, Calif.
Filed Jan. 22, 1990, Ser. No. 467,976
Int. Cl.^{5} H01L *21/266, 21/306*
U.S. Cl. 148—33.3 39 Claims



1. A method of producing a cantilevered microtip, the method comprising the steps of:
providing a two-layer structure of materials, having a first layer that is resistant to etching by a selected etchant, adjacent to a second layer of semiconductor material with doping of a first electrical conductivity type, where the first layer has an exposed surface and where the second layer of material is rapidly etched by the selected etchant;
providing an ion implant mask adjacent to the exposed surface of the first layer, the mask having at least one aperture therein that exposes a small area of the adjacent exposed surface;
implanting ions, formed from an element of a second electrical conductivity type, of predetermined kinetic energy

into the two-layer structure through the mask in a predetermined direction so that the ions implanted form an ion profile with a controllable aspect ratio in the second layer;
removing the mask material; and
removing the portion of the second layer that is not implanted with ions by etching with the selected etchant, to expose the ion profile and the first layer as a single connected unit.

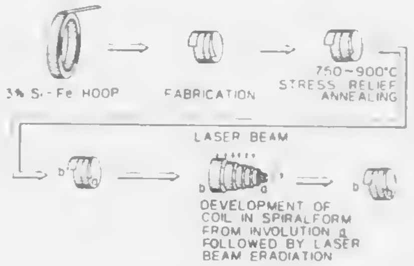
9. A product produced by the method of claim 1.

5,026,438
METHOD OF MAKING SELF-ALIGNING ANISOTROPIC POWDER FOR MAGNETS
Kevin A. Young, Fairmount, and Dennis L. Plackard, Alexandria, both of Ind., assignors to General Motors Corporation, Detroit, Mich.
Continuation-in-part of Ser. No. 219,551, Jul. 14, 1988, abandoned. This application Oct. 5, 1989, Ser. No. 417,540
Int. Cl.^{5} H01F *41/02*
U.S. Cl. 148—101 **12 Claims**

1. A method of making a magnetically anisotropic bonded magnet comprising particles of a composition that has as its magnetic constituent the tetragonal crystal phase $RE_2TM_{14}B$ such that the particles have an intrinsic coercivity at room temperature of at least 1,000 Oersteds, said method comprising:
providing a hot worked body comprising plastically deformed, platelet-shaped grains of said phase in which body the grains are aligned and have an average smallest dimension no greater than about 500 nanometers, the composition of said body comprising, on an atomic percent basis, about 40 to 90 percent transition metal (TM) taken from the group consisting of iron and mixtures of iron and cobalt such that iron makes up at least 40 percent of the total composition, about 10 to 40 percent rare earth metal (RE) such that at least about 6 percent of the total composition is neodymium and/or praseodymium, and at least 0.5 percent boron,
comminuting said body to form platelet-shaped particles having relatively large faces on opposites sides thereof and a relatively small thickness between said faces wherein the ratio between the area of a said face (expressed in square microns) and said thickness (expressed in microns) is greater than about 300:1 and said particles have a preferred magnetic orientation normal to said faces;
delivering said particles to a die such that they can move sufficiently to align face-to-face upon the application of suitable mechanical force, and
in the absence of an external particle-aligning magnetic field, applying pressure to said particles to cause face-to-face alignment thereof and prevent further relative motion of the particles.

5,026,439
PROCESS FOR PREPARING WOUND CORE HAVING LOW CORE LOSS
Masaki Tanaka; Norito Abe; Masao Yabumoto; Yoshiyuki Ushigami, and Tadao Nozawa, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan
Filed Oct. 12, 1990, Ser. No. 596,857
Claims priority, application Japan, Oct. 14, 1989, 1-267630
Int. Cl.^{5} H01F *1/04*
U.S. Cl. 148—111 9 Claims

1. A process for preparing a core having a low core loss, comprising a step of fabricating a very thin silicon steel strip having a high magnetic flux density into a wound core, a step of subjecting the wound core to stress relief annealing, a step of loosening the wound state of the steel strip in the annealed wound core within the elastic limit to expose the surface of the steel strip, a step of introducing a local strain into the exposed surface of the steel strip, and a step of rewinding the steel strip



having a local strain introduced thereinto onto said wound core.

5,026,440
CHROMIUM FREE TREATMENT BEFORE COATING METAL SURFACES
Cornelia Finnenthal, Bergheim-Fliesteden; Wolf-Achim Roland, Solingen, and Roland Morlock, Bergheim, all of Fed. Rep. of Germany, assignors to Gerhard Collardin GmbH, Koeln-Ehrenfeld, Fed. Rep. of Germany
Filed Aug. 24, 1989, Ser. No. 398,108
Claims priority, application Fed. Rep. of Germany, Aug. 27, 1988, 3829154
Int. Cl.^{5} C23C *22/48, 22/75*
U.S. Cl. 148—247 **20 Claims**

1. A process for treating a degreased, etched, and pickled metallic surface to improve the adhesion and corrosion protection of organic surface coatings applied to the metallic surface after treatment, comprising the steps of:
(a) contacting the degreased, etched, and pickled surface with a treating liquid that is an aqueous solution, emulsion, or dispersion of aluminum-zirconium complexes which are obtainable as the product of reaction of a chelated aluminum component, an organo-functional ligand component, and a zirconium oxyhalide component, the organo-functional ligand being chemically bonded in the product of reaction to the chelated aluminum unit and the zirconium unit;
(b) rinsing the surface contacted in step (a) with water; and
(c) contacting the rinsed surface from step (b) with an aqueous solution, emulsion, or dispersion of one or more inorganic and/or organic film-forming materials, the concentration of all film-forming materials and other solids in said aqueous solution, emulsion, or dispersion being not more than about 2 g/L.

5,026,441
HIGH STRENGTHS COPPER BASE SHAPE MEMORY ALLOY AND ITS MANUFACTURING PROCESS
Young-gil Kim; Jin-woong Kim, and Dong-wan Nho, all of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science & Technology, Seoul, Rep. of Korea
Filed Aug. 23, 1990, Ser. No. 572,119
Claims priority, application Rep. of Korea, Sep. 19, 1989, 13418/1989
Int. Cl.^{5} C22C *9/01*
U.S. Cl. 148—402 **3 Claims**

1. A Cu-base shape memory alloy consisting essentially of: 10 to 15 percent by weight Al, 0.5 to 5.0 percent by weight Ni, 0.01 to 1.0 percent by weight Si, 0.01 to 1.5 percent by weight Zr, with the remaining balance being Cu.

VOL
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5,026,442
MELT-IN-FUEL EMULSION EXPLOSIVE COMPOSITION AND METHOD

Michael Yabsley, Cheltenham; Waclaw Skinder, Essendon, and Ken Mitchell, Cheltenham, all of Australia, assignors to ICI Australia Operations Proprietary Limited, Melbourne, Australia

Filed Apr. 11, 1990, Ser. No. 507,217

Claims priority, application Australia, Apr. 11, 1989, 3630

Int. Cl.^{5} C06B *45/00*

U.S. Cl. 149—2 **41 Claims**

1. An explosive composition comprising a blend of a solid particulate oxygen-releasing salt and a melt-in-fuel emulsion wherein said melt-in-fuel emulsion comprises a discontinuous oxygen-releasing salt phase, a continuous water-immiscible organic fuel phase and an emulsifier component, wherein the explosive composition contains less than 4% water by weight of the melt-in-fuel emulsion.

5,026,443
STABILIZED EXPLOSIVE AND ITS PRODUCTION PROCESS

Dietmar Müller, Karlsruhe, and Mathias Helfrich, Landau/Pfalz, both of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft zur Forderung der angewandten, Munich, Fed. Rep. of Germany

Filed Aug. 27, 1990, Ser. No. 572,430

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1989, 3934368

Int. Cl.^{5} C06B *45/00*

U.S. Cl. 149—18 **30 Claims**

1. A stabilized, high energy explosive, comprising explosive particles having a particle size up to 5 μm and a stabilizer incorporated into the explosive particles.

5,026,444
METHOD OF MAKING A FIBER-LOADED POLYMERIC SHEET

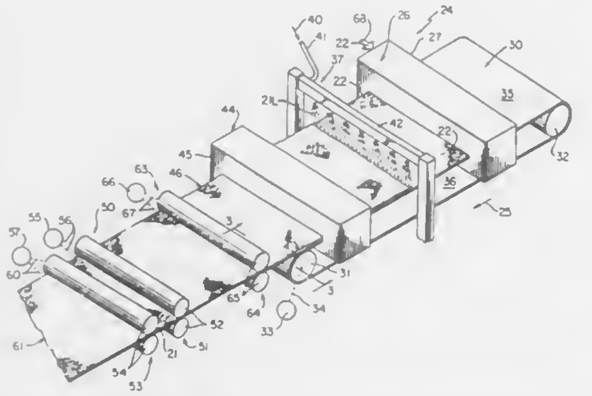
Gerald C. Hollaway, Jr., Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio

Continuation of Ser. No. 181,297, Apr. 14, 1988, abandoned, which is a continuation-in-part of Ser. No. 46,970, May 6, 1987, abandoned, which is a division of Ser. No. 574,439, Jan. 27, 1984, Pat. No. 4,634,413, which is a division of Ser. No. 281,153, Jul. 7, 1981, Pat. No. 4,445,949. This application Aug. 30, 1989, Ser. No. 400,602

The portion of the term of this patent subsequent to May 1, 2001, has been disclaimed.

Int. Cl.^{5} B29C *55/18, 65/02*

U.S. Cl. 156—62.2 **8 Claims**



1. In a method of making a fiber-loaded polymeric sheet in a substantially continuous uninterrupted manner, said method comprising the steps of, disposing a quantity of discrete elongate fibers as a layer thereof on movable support means therefor which is movable along a rectilinear path and in a substantially horizontal plane, providing a quantity of liquid-containing polymeric material around said fibers during movement of said support means and fibers, and removing the liquid contained in said polymeric material to define said sheet, the improvement in which said disposing step comprises disposing said quantity of fibers in a dry form thereof and in substantially parallel relation and parallel to said rectilinear path, said providing step comprises providing said polymeric material so that it defines a substantially solid matrix for said fibers upon removing the liquid contained therein during said removing step and while said sheet is still on said movable support means, said removing step comprising the step of moving said support means with the liquid-containing polymeric material and fibers thereon through a heated environment so that said sheet is substantially self-supporting following said removing step, then withdrawing said support means from said sheet immediately following said removing step, then compacting said sheet substantially perpendicular to said horizontal plane, and then stretching said sheet along said fibers following said compacting step to improve the parallelism of said fibers. said sheet having at least 70% of said fibers in substantially parallel relation.

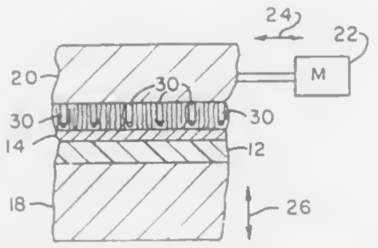
5,026,445
METHOD AND APPARATUS FOR PRODUCING CARPETED PANELS

Sylvio J. Mainolfi, Watertown; Gerald F. Patry, Brookfield, and Henry A. Pensiero, Stamford, all of Conn., assignors to Branson Ultrasonics Corporation, Danbury, Conn.

Filed May 11, 1990, Ser. No. 539,198

Int. Cl.^{5} B29C *65/00*

U.S. Cl. 156—73.5 **12 Claims**



1. The method of producing a carpeted panel comprising:
- superposing upon one another a substrate of thermoplastic material and a carpet made of thermoplastic material adapted to bond to said substrate responsive to the generation of frictional heat at the interface between said substrate and said carpet;
- providing forced engagement between said carpet and said substrate which includes using a pattern of closely spaced pins engaging said carpet, and
- subjecting said substrate and carpet while in forced engagement to translating reciprocating motion relative to one another for a predetermined time interval for causing during said interval the generation of frictional heat, whereby upon cessation of said motion and the dissipation of said heat said carpet is bonded to said substrate.

5,026,446
METHOD OF MANUFACTURING A DISPOSABLE DIAPER HAVING AN ABRADED TARGET STRIP

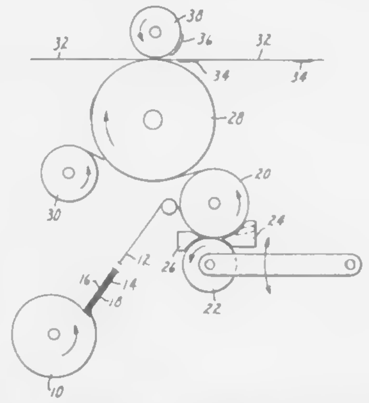
Manley R. Johnston, Paris, France; Robert S. Mulder, Eagan, and Alan J. Sipinen, Hugo, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 5, 1989, Ser. No. 361,417

Int. Cl.^{5} A61F *13/60;* B32B *31/00*

U.S. Cl. 156—153 **8 Claims**

1. In a method of continuously manufacturing disposable diapers, which method includes the steps of unwinding a roll of pressure-sensitive adhesive tape which has a backing having a thickness of less than about 40 μm that bears a low-adhesion backsize coating on its nonadhesive face, cutting the tape into pieces, and adhering at least one piece of the tape by its pressure-sensitive adhesive layer to each diaper to provide a target strip, said method being characterized by the added step of treating the tape with an abrasive surface so as to remove at least part, but not all, of the low-adhesion backsize coating on the backing with the abrasive surface having a grit size which will so remove only a portion of the backsize coating to improve peel adhesion thereof to pressure-sensitive adhesive tape.



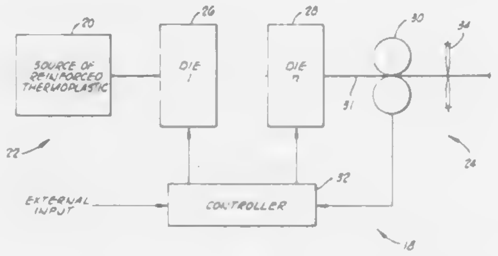
5,026,447
METHOD FOR MAKING VARIABLE CROSS SECTION PULTRUDED THERMOPLASTIC COMPOSITE ARTICLES

James E. O'Connor, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 10, 1989, Ser. No. 308,560

Int. Cl.^{5} B29C *43/22*

U.S. Cl. 156—166 **13 Claims**



1. A method of making a length of a thermoplastic product with different cross-sectional shapes in a pultrusion process, comprising the steps of:
- (a) forming the length of the thermoplastic product to have a first cross-sectional shape;
- (b) converting at least a portion of the length of the thermoplastic product having the first cross-sectional shape to have a second cross-sectional shape; and
- (c) stopping said step (b) while continuing said step (a) so that one section of the length of the thermoplastic product has the second cross-sectional shape and a trailing section of the length of the thermoplastic product has the first cross-sectional shape.

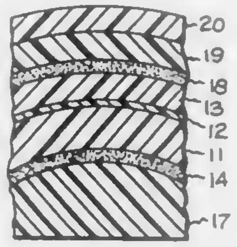
5,026,448
METHOD OF FORMING A GLOSSY BASECOAT-CLEARCOAT SURFACE ON A SUBSTRATE

Gerald G. Reafler, and Gordon D. Shattuck, Jr., both of 343 State St., Rochester, N.Y. 14652-3901

Filed Apr. 3, 1989, Ser. No. 332,061

Int. Cl.^{5} B32B *31/00*

U.S. Cl. 156—212 **14 Claims**



1. A method for reducing the loss of gloss when forming a glossy protective and decorative basecoat-clearcoat surface on a three-dimensional substrate by stretching and bonding a paint-coated film to the substrate, which comprises:
- heating, stretching and bonding to the substrate a thermoplastic basecoat sheet comprising a paint layer coated on a thermoplastic carrier film, and thereafter
- heating, stretching and bonding a prefabricated thermoplastic clearcoat sheet
- over the stretched paint layer of the basecoat sheet which is bonded to the substrate.

5,026,449
METHOD FOR MOULDING FIBRE REINFORCED LAMINATES

Roger M. Sloman, Little Eaton, and Christopher Ridgard, Oakwood, both of England, assignors to Advanced Composite Components Limited, United Kingdom

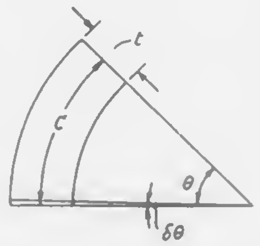
Continuation of Ser. No. 90,590, Aug. 28, 1987, Pat. No. 4,836,876. This application Apr. 25, 1989, Ser. No. 343,485

Claims priority, application United Kingdom, Sep. 3, 1986, 8621236

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.^{5} B32B *31/14*

U.S. Cl. 156—242 **10 Claims**



1. In a method of molding an article from an initially non-solid fiber reinforced material including the steps of providing a mold on which to form the molded article and laying in the mold a fiber reinforced material having fibrous reinforcement in a non-solid matrix, the improvement which comprises the steps of:
- (a) initiating a cycle which will result in the solidification of the matrix;
- (b) including in said cycle a processing phase resulting in solidification of the matrix and a subsequent processing phase or phases;
- (c) for a given matrix system and processing phases, commencing the pre-solidification phase at a temperature which will result in the sum of the fractional thickness change during the pre-solidification phase and the frac-

VOL
1127
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1991
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tional thickness change during the subsequent processing phase or phases being equal to the fractional dimensional change in the plane fiber of the reinforcement at the desired end use temperature at which the greatest dimensional accuracy is required; and

(d) completing the processing cycle according to step (c).

5,026,450

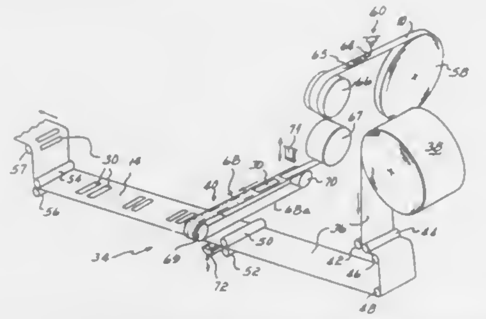
METHOD OF APPLYING ADHESIVE TO THE WAIST ELASTIC MATERIAL OF DISPOSABLE GARMENTS

Carl C. Cucuzza, Loganville; John M. Raterman, and John P. Keuter, both of Lawrenceville, all of Ga., assignors to Nordson Corporation, Westlake, Ohio

Filed Oct. 13, 1989, Ser. No. 421,614

Int. Cl.^{5} B29C *47/00;* **B32B** *31/04*

U.S. Cl. 156—244.11 4 Claims



1. A method of applying adhesive onto the heat shrinkable waist elastic member of a disposable garment, comprising:

extruding an elastic bead from a dispensing device and directing the extruded adhesive bead toward the heat shrinkable waist elastic member;

impacting the extruded adhesive bead with jets of air directed substantially tangent to the periphery thereof prior to contact with the heat shrinkable waist elastic member to form an elongated adhesive fiber and to impart a twisting motion to the adhesive fiber;

depositing the elongated adhesive fiber in a spiral pattern onto the heat shrinkable waist elastic member at an application temperature which substantially reduces activation of the heat shrinkable waist elastic member.

5,026,451

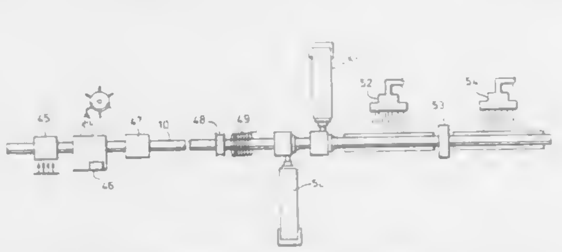
METHOD AND APPARATUS FOR APPLYING THERMO-PLASTIC PROTECTIVE COATING TO PIPES

Michael A. Trzecieski, Toronto, and Clifford R. Ferguson, Alberta, both of Canada, assignors to Shaw Industries Ltd., Rexdale, Canada

Continuation-in-part of Ser. No. 193,814, Jun. 12, 1988, abandoned. This application Jun. 8, 1989, Ser. No. 352,934

Int. Cl.^{5} B29C *47/06, 47/20*

U.S. Cl. 156—244.27 15 Claims



1. A method of applying a protective jacket to a steel pipe, comprising the steps of:

selecting a thermoplastic jacketing material;

applying a coating of liquid epoxy primer to the outer surface of the pipe, of a substantially even thickness between about 25μ and about 100 μ;

raising the temperature of the pipe to between about 135° C. and about 200° C. so as to bring about partial curing of said primer coating in a state at which it is fluid;

conveying the heated pipe longitudinally through a first cross-head extruder and extruding onto said primer coating before it has gelled a layer of adhesive, of thickness between about 100μ and about 300μ, composed of a copolymer capable of bonding to the curing surface of said primer coating and to said selected thermoplastic jacketing material, the extrusion temperature being sufficiently high to maintain said adhesive layer in a molten state;

immediately after application of said adhesive layer, further conveying the heated pipe through a second crosshead extruder and extruding onto said molten adhesive an outer jacket of said selected thermoplastic material having a thickness between about 0.5 mm and about 1.5 mm; and

further conveying the jacketed pipe longitudinally through a water spray cooling quench while applying steady radial pressure to the surface of the jacketed pipe over an annular region located within said quench at a position along the path of travel of the pipe where the outer surface of said outer jacker has hardened while the inner portion thereof remains above the softening temperature of said thermoplastic material, wherein said step of applying steady radial pressure occurs after the primer has gelled.

5,026,452

METHOD OF PRODUCING IC CARDS

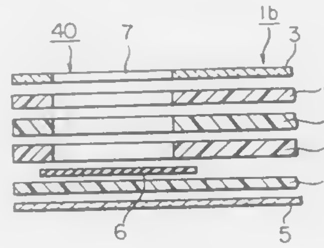
Syojiro Kodai, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 128,936, Dec. 4, 1987, abandoned. This application Aug. 31, 1989, Ser. No. 401,520

Claims priority, application Japan, Dec. 11, 1986, 61-296367

Int. Cl.^{5} B32B *31/06*

U.S. Cl. 156—293 9 Claims



1. A method of making a card in which an IC module is embedded comprising:

preparing at least two similar resin core sheets by forming a through hole in at least a first of said resin core sheets in which an IC module may be disposed, at least a second of said resin core sheets not containing a through hole;

disposing a thermally softenable adhesive sheet having an area that is smaller than that of said core sheets and larger than that of said through hole and having a shape that covers said through hole to cover said through hole in said first resin core sheet;

bringing said first and second resin core sheets into contact with each other with said adhesive sheet therebetween covering said through hole;

inserting an IC module into said through hole;

heating said resin core sheets and said adhesive sheet to soften said adhesive sheet and pressing said resin core sheets, said adhesive sheet, and said IC module so that said softened adhesive sheet flows between said first and second core sheets toward the through hole to fill voids, if any, between the through hole and said IC module and away from the through hole to form an integral structure;

applying at least one surface protection sheet to a side of said integral structure; and

heating and pressing said protection sheet and said integral structure to adhere said surface protection sheet to said integrated structure.

5,026,453

APPARATUS FOR ORNAMENT PRODUCTION

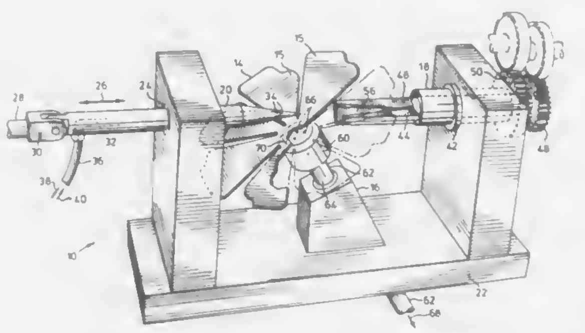
James D. Mancel, Brampton, and Olaf B. Raiskums, Milton, both of Canada, assignors to Rainbow Star Licensing, S.A., Freibourg, Switzerland

Continuation of Ser. No. 188,891, Apr. 29, 1988, Pat. No. 4,855,009, which is a division of Ser. No. 318, Dec. 29, 1986, Pat. No. 4,849,042, which is a division of Ser. No. 772,576, Sep. 4, 1985, Pat. No. 4,661,197. This application Apr. 14, 1989, Ser. No. 338,235

The portion of the term of this patent subsequent to Apr. 28, 2004, has been disclaimed.

Int. Cl.^{5} B31F *1/00*

U.S. Cl. 156—443 21 Claims



1. Apparatus for producing, for use in an ornament, at least one ornament element having a three dimensional shape from a bendable blank having at least one leaf, said apparatus comprising:

a form having a three dimensional shape corresponding to said three-dimensional shape of said ornament element;

means for releasably holding said at least one leaf against said form;

a winding surface having a shape at least in part conforming to said shape of said form;

means for relatively arcuately moving said form and said winding surface while said leaf is between said winding surface and said form and held against said form by said holding means to wind said leaf about said form;

means for treating said leaf such that said leaf after being at least partially wound on said form retains a wound configuration when said leaf is separated from said form as an ornament element.

5,026,454

VACUUM EVAPORATION AND DEPOSITION

John J. Parmenter, Crawley; Robert B. Phillips, Horsham, and Paul R. Stonestreet, Pagnall, all of Great Britain, assignors to VG Instruments Group Limited, Crawley, England

Filed Nov. 10, 1988, Ser. No. 269,570

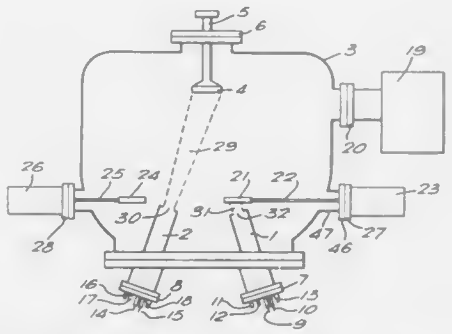
Claims priority, application United Kingdom, Nov. 13, 1987, 8726639

Int. Cl.^{5} C23C *14/24*

U.S. Cl. 156—614 24 Claims

1. In a method for the deposition of material onto a substrate, the material being evaporated from a source and the method including the exercise of control over the dosage of said material at said substrate by moving a shutter with substantially rectilinear motion along an axis between (i) an open position in which said shutter does not block the path of said material from said source to said substrate, and (ii) a closed position in which said shutter substantially blocks said path, a member having a pin-guiding slot angled with respect to said axis being coupled to the shutter, the improvement comprising: rotating a radius arm to which a pin is attached, said pin being located in said pin-guiding slot, and thereby urging said pin against said member and moving said shutter along said axis; beginning to decelerate said shutter before it reaches said closed position, and subsequently thereby bringing said shutter substantially to rest at said closed position.

11. Apparatus for the deposition of material from a source onto a substrate, said apparatus comprising a shutter disposed between said source and said substrate, there being a closed position and an open position of said shutter, said shutter blocking the path of said material from said source to said substrate when in the closed position, and in said open position said shutter permitting the passage of said material from said source to said substrate; said apparatus also comprising a shutter control mechanism for imparting movement to said shutter, said movement comprising substantially simple harmonic motion centered about a mean point substantially mid-way between said closed position and said open position of said shutter.



5,026,455

METHOD FOR AUTOMATIC DETERMINATION OF THE DRY PULP CONTENT, THE INFILTRATION CAPACITY AND THE WIRE RETENTION OF A PULP SUSPENSION

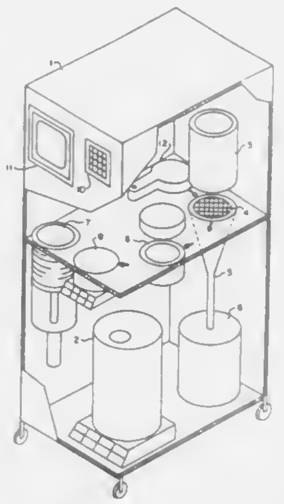
Olavi Lehtikoski, and Pekka Lehtikoski, both of Varkaus, Finland, assignors to Lehtikoski Development OY, Varkaus, Finland

Filed Jan. 25, 1989, Ser. No. 301,129

Claims priority, application Finland, Feb. 2, 1988, 880480

Int. Cl.^{5} D21F *1/08;* **G01N** *5/00*

U.S. Cl. 162—49 7 Claims



1. A method for determining the dry pulp content, the filtration capacity and the wire retention of a pulp suspension and for making a dried test cake in connection with the production or use of pulp comprising:

providing a pulp suspension sample;

placing the pulp suspension sample in a sample container;

VOL
1127
ISS
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1991
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measuring the quantity of the sample in the sample container by weighing;
diluting the sample to a predetermined processing consistency range, the diluted sample having a height of a fluid surface level in the sample container;
filtrating a portion of the sample to provide a sample cake;
transferring the sample cake obtained to a desiccator;
drying the sample cake with the desiccator;
weighing the dried sample cake to determine a dry pulp content of the cake; and
generating an output from the foregoing test results, wherein during the step of filtrating, the height of the fluid surface level is read as a function of time so that filtration speed as a function of dry pulp content of the cake can be determined.

5,026,456

ARAMID PAPERS CONTAINING ARAMID PAPER PULP

Lee J. Hesler, Richmond, and Stanley C. Park, Midlothian, both of Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 14, 1990, Ser. No. 538,281
Int. Cl.^{5} D21H *13/26*
U.S. Cl. 162—146 **14 Claims**

1. A high porosity paper containing 30–85% of aramid paper pulp prepared by comminuting dry aramid paper containing 50 to 60% aramid fibrids and 40 to 50% aramid floc to a particle size capable of passing through a sorting screen of 6.4–12.7 mm, the remainder of the sheet comprising fibrids and high temperature resistant floc.

5,026,457

PROCESS FOR SIZING IN THE PRODUCTION OF PAPER, CARDBOARD, PAPERBOARD AND OTHER CELLULOSE CONTAINING MATERIALS

Rudolf Eichinger, Graz; Horst Michaud, and Josef Seeholzer, both of Trostberg, all of Fed. Rep. of Germany, assignors to SKW Trostberg Aktiengesellschaft, Trostberg, Fed. Rep. of Germany

Continuation of Ser. No. 91,317, Aug. 28, 1987, abandoned, which is a continuation of Ser. No. 815,409, Dec. 31, 1985, abandoned. This application Feb. 28, 1989, Ser. No. 317,113
Claims priority, application Fed. Rep. of Germany, Jan. 8, 1985, 3500408
Int. Cl.^{5} D21H *17/49*
U.S. Cl. 162—158 **10 Claims**

1. In a process for sizing in the production of paper, cardboard, paperboard and other cellulose-containing materials by natural sizing agents, the improvement comprising:
sizing the cellulose-containing materials, under neutral to weakly basic pH conditions and without the use of aluminium salts, by the steps of first adding a natural sizing agent to a suspension of said materials and then adding an aqueous solution, containing up to 50% by weight of solids, of a condensation product consisting essentially of dicyandiamide with formaldehyde in molar ratio of from 1:1.0 to 1:4.0, said product having been prepared in the presence of at least one inorganic or organic acid and/or at least one ammonium or amine salt of an inorganic or organic acid.

5,026,458

METHOD FOR CONTROLLING BASIS WEIGHT IN THE PRODUCTION OF STRETCHABLE WEBS

Paul D. Beuther, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Aug. 31, 1990, Ser. No. 576,240
Int. Cl.^{5} D21F *7/06;* **G05D** *5/00*
U.S. Cl. 162—198 **3 Claims**

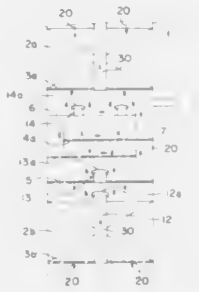
1. In a method for making a stretchable web in which the web is formed and wound onto a reel, the improvement comprising:
(a) measuring the basis weight and speed of the web at a point upstream of the reel;
(b) calculating the basis weight of the web at the reel in accordance with the formula: $BW_R = BW\ (V/V_R)$ wherein "BW_R" is the basis weight of the web at the reel, "BW" is the basis weight as measured in step (a), "V" is the speed of the web as measured in step (a), and "V_R" is the speed of the web at the reel; and
(c) controlling the basis weight of the web at the reel by adjusting the speed of the reel in response to the calculated basis weight as determined in step (b).

5,026,459

APPARATUS FOR REACTIVE DISTILLATION

Dang Vu Quang, Neuilly; Pierre Amigues, Francheville, and Jean-Ferdinand Gaillard, Lyon, all of France, assignors to Institut Francais Du Petrole, Rueil-Malmaison and Elf France, Courbevoie, both of, France

Division of Ser. No. 171,339, Mar. 21, 1988, Pat. No. 4,847,431. This application May 24, 1989, Ser. No. 356,087
The portion of the term of this patent subsequent to May 7, 2008, has been disclaimed.
Int. Cl.^{5} B01D *3/20;* **B01J** *8/04*
U.S. Cl. 202—158 **9 Claims**



1. An apparatus for reactive distillation comprising:
a substantially cylindrical vessel having an upper portion and a lower portion, at least one feed inlet means for introducing a charge, at least one vapor outlet means in said upper portion of said vessel for withdrawing a vapor phase, at least one reflux inlet means in said upper portion of said vessel for a reflux feed, at least one liquid outlet means in said lower portion of said vessel for withdrawing a liquid phase, at least one vapor inlet means in said lower portion of said vessel for introducing an at least partially vaporized phase;
at least two superposed non-contiguous fixed catalyst beds positioned within said vessel, each of said beds being placed on a perforated support member, each bed and each corresponding support member being traversed by at least one funnel;
at least one distillation tray placed in at least one free space between two consecutive beds; and
at least one discontinuous liquid redistribution tray placed in at least one free space between a distillation tray and the catalyst bed just below said distillation tray, each discontinuous liquid redistribution tray being further provided with at least one duct for passage of an upwardly flowing vapor stream
wherein said catalyst bed, distillation tray, and redistribution tray are positioned to direct a downwardly flowing liquid discharged from said distillation tray onto and through said redistribution tray and then to flow downwardly through said catalyst bed.

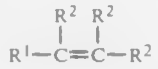
5,026,460

PROCESS FOR THE PREPARATION OF UNSATURATED HALOGENATED HYDROCABONS

Steffen Dapperheld, Kriftel, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

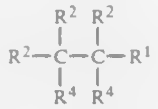
Filed Mar. 16, 1989, Ser. No. 324,572
Claims priority, application Fed. Rep. of Germany, Mar. 19, 1988, 3809296; Feb. 15, 1989, 3904475
Int. Cl.^{5} C25B *3/00*
U.S. Cl. 204—59 R **17 Claims**

1. A process for the preparation of a compound of the formula



$$\mathrm{R^1-\overset{\overset{R^2}{|}}{C}=\overset{\overset{R^2}{|}}{C}-R^2} \qquad (I)$$

which comprises electrolyzing A) a compound of the formula



$$\mathrm{R^2-\underset{\underset{R^4}{|}}{\overset{\overset{R^2}{|}}{C}}-\underset{\underset{R^4}{|}}{\overset{\overset{R^2}{|}}{C}}-R^1} \qquad (II)$$

in which the
R^1s independently of one another are hydrogen, chlorine or fluorine, the
R^2s are R^1 or $—C(R^1)_2—R^3$, or the grouping $[C(R^1)_2]_m—C(R^1)_2$ represents two of the radicals R^2,
R^3 is $—(CH_2)_n—CH_2—R^5$, $—(CF_2)_n—CH_2—R^5$, $—(CF_2)_n—CF_2—R^5$ or C_1-C_{12}-alkyl which is partly or completely fluorinated, the
R^4s independently of one another are chlorine, bromine or iodine,
R^5 is R^1, bromine, iodine, $—CO—R^6$ or $—SO_2—R^6$,
R^6 is —OH, —O—alkyl having 1 to 6 carbon atoms in the alkyl radical, fluorine or chlorine.
m and n independently denote zero or an integer from 1 to 12, and at least one R^1 is fluorine,
in a divided or undivided electrolysis cell in the presence of B) at least one onium compound containing at least one nitrogen or phosphorus atom, and C) at least one soluble metal salt having a hydrogen overvoltage greater than 0.25 volts, relative to a current density of 100 mA/cm^2, in D) an electrolyte and E) optionally in the absence or presence of 5 to 60% by weight, relative to the total amount of the electrolyte, of at least one inorganic or organic acid or mixtures of said acids or salts thereof, under atmospheric pressure or under an elevated pressure of up to 10 bar at a current density of 1 to 600 mA/cm^2 and at a temperature within the range from −40° C. to the boiling point of the electrolyte, at a carbon electrode.

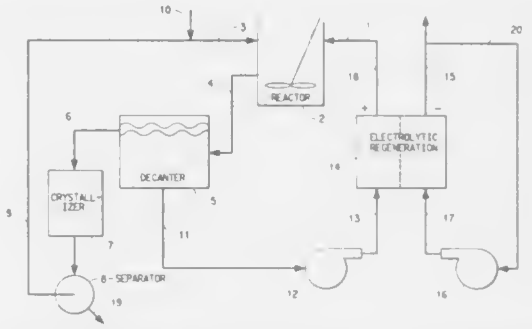
5,026,461

PROCESS FOR THE PREPARATION OF DODECANEDIOIC ACID

Darwin D. Davis, and David L. Sullivan, both of Victoria, Tex., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 19, 1990, Ser. No. 467,520
Int. Cl.^{5} C07C *5/00;* **C25B** *3/02*
U.S. Cl. 204—86 **11 Claims**

1. A process for oxidation of cyclododecene to dodecanedioic acid which comprises forming a mixture having an aqueous phase comprising an aqueous solution containing (a) Ce+4 ions, (b) ruthenium tetroxide and (c) one or more acids selected from the class consisting of methanesulfonic acid and sulfuric acid, and an organic phase containing an acid selected from the class consisting of valeric acid, isovaleric acid, pivalic acid, isobutyric acid, 2-ethylbutyric acid, butyric acid, heptanoic acid, octanoic acid, and mixtures of such acids, and cyclododecene, in which the overall mole ratio of Ce+4 to ruthenium tetroxide in the mixture is greater than 1, and oxidizing cyclododecene in the mixture to dodecanedioic acid at a temperature in the range of about 25 to 85 degrees C.

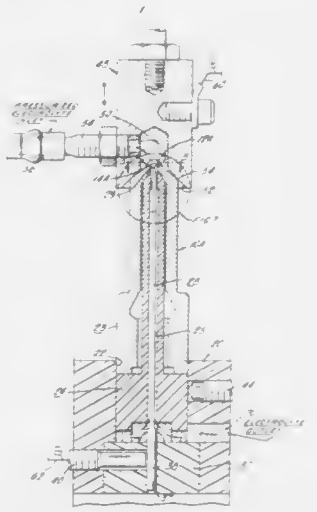


5,026,462

METHOD AND APPARATUS FOR ELECTROCHEMICAL MACHINING OF SPRAY HOLES IN FUEL INJECTION NOZZLES

Donald B. Butterfield, Longmeadow, Mass., and Alcide Sgarzi, Brescia, Italy, assignors to AIL Corporation, Columbia, S.C.

Filed Mar. 6, 1990, Ser. No. 489,371
Int. Cl.^{5} B23H *3/08, 3/10, 9/14, 9/02*
U.S. Cl. 204—129.55 **14 Claims**



1. The method of electrochemically machining material at the inner end of least one spray hole formed in the body of a fuel injection nozzle for an internal combustion engine, comprising:
providing an electrode within, and electrically insulated from, said body; and
maintaining said electrode at a negative electrical potential with respect to said body while applying a pressurized electrolyte to the exterior of said nozzle body so as to pass said electrolyte through said at least one spray hole inwardly of said body, thereby to electrochemically machine away portions of said body adjacent to the inner end of each said spray hole.

VOL
1127
ISS
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5,026,463

PROCESS AND APPARATUS FOR PREPARING THE SURFACE OF A PLASTIC MOLDING BY MEANS OF AN ELECTRICAL CORONA DISCHARGE

Peter Dinter, Oestrich-Winkel; lothar Bothe, Mainz, and John D. Gribbin, Schlangenbad, all of Fed. Rep. of Germany, assignors to Hoechst Atkiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

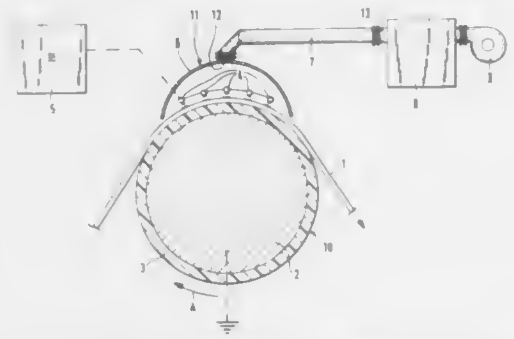
Filed Aug. 8, 1989, Ser. No. 390,868

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1988, 3827628

The portion of the term of this patent subsequent to Jul. 10, 2007, has been disclaimed.

Int. Cl.⁵ B05D *3/14*

U.S. Cl. 204—164 23 Claims



1. A process for pretreating the surface of a molding of plastic by means of an electrical corona discharge treatment taking place in the space between high voltage electrodes and a grounded counter-electrode space therefrom, said space between said high voltage electrodes and said grounded counter-electrode forming a corona discharge zone, said process comprising: locating at least a portion of said surface of said molding of plastic within said corona discharge zone; applying a high-frequency alternating current voltage in the range from 20 to 70 kV at a frequency of 20 to 25 kHz to said high-voltage electrodes to produce a homogeneous corona discharge in said corona discharge zone to corona treat said portion of said surface of said molding of plastic; and at the same time introducing, by means of a gas stream an aerosol into the corona discharge zone, said aerosol being formed by atomizing a liquid.

5,026,464

METHOD AND APPARATUS FOR DECOMPOSING HALOGENATED ORGANIC COMPOUND

Koichi Mizuno, Ibaraki; Takeshige Wakabayashi; Yutaka Koinuma, both of Chiba; Reiji Aizawa, Ibaraki; Satoshi Kushiyama, Ibaraki; Satoru Kabayashi, Ibaraki; Hideo Ohuchi, Ibaraki; Toyonobu Yoshida, Tokyo; Yoshiro Kubota, Tokyo; Takanobu Amano, Tokyo; Hisashi Komaki, Tokyo, and Shoji Hirakawa, Tokyo, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan; Toyonobu Yoshida, Tokyo, Japan and JEOL Ltd., Tokyo, Japan

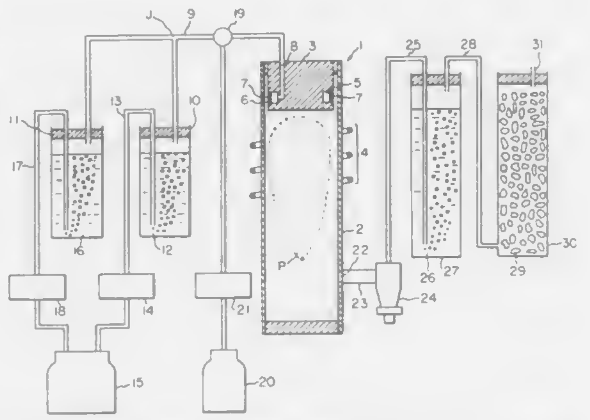
Filed Nov. 7, 1989, Ser. No. 433,361

Claims priority, application Japan, Aug. 31, 1988, 1-225211; Nov. 10, 1988, 63-284098; Sep. 1, 1989, 1-227083; Sep. 1, 1989, 1-277084

Int. Cl.⁵ H05F *3/00*

U.S. Cl. 204—164 6 Claims

1. A method of decomposing a halogenated organic compound, said method comprising the step of introducing the halogenated organic compound together with a substance into a plasma to decompose the organic compound, the substance selected to react with dissociated components of the halogenated organic compound decomposed in the plasma and such that the decomposition of the organic compound is not inhibited and carbon deposits are suppressed.



5,026,465

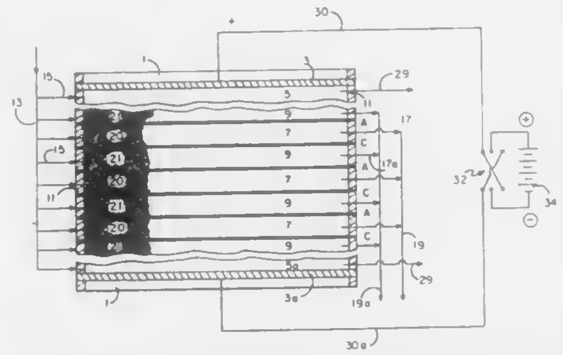
ELECTRODEIONIZATION POLARITY REVERSAL APPARATUS AND PROCESS

William E. Katz, Weston; Irving D. Elyanow, Somerville, and Keith J. Sims, Framingham, all of Mass., assignors to Ionics, Incorporated, Watertown, Mass.

Filed Aug. 3, 1989, Ser. No. 389,850

Int. Cl.⁵ B01D *13/02*

U.S. Cl. 204—182.4 12 Claims



1. In the method of substantially preventing fouling of ion-exchange membranes and ion-exchange filler, and preventing scale formation in the chambers of an electrodeionization apparatus during the electrical transfer of ions from one electrolyte solution to another, comprising the steps of passing a first electrolyte solution through the ion-depleting chambers of said apparatus having a plurality of alternating ion-depleting and ion-concentrating chambers, said chambers being defined between alternating anion and cation perm-selective membranes, the said ion-depleting and ion-concentrating chambers containing a fluid-permeable filler of ion-exchange material, passing a second solution through the ion-concentrating chambers of said apparatus, passing a third and fourth solutions through the electrode chambers, passing a direct current transversely across the chambers, periodically reversing the polarity of the said direct current and simultaneously therewith interchanging the first and second solutions between their respective chambers.

5,026,466

METHOD AND DEVICE FOR COATING CAVITIES OF OBJECTS

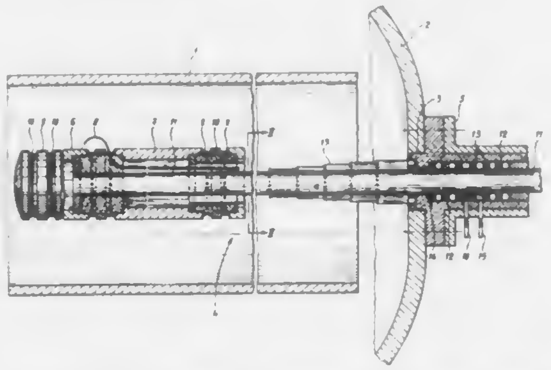
Harald Wesemeyer, Wiehl, Fed. Rep. of Germany, and Hans Veltrop, Grubbenvorst, Netherlands, assignors to Hauzer Holding B.V., Venlo, Netherlands

Continuation of Ser. No. 212,495, Jun. 28, 1988, abandoned. This application Mar. 9, 1990, Ser. No. 492,252

Claims priority, application European Pat. Off., Jun. 29, 1987, 87201244.8

Int. Cl.⁵ C23C *14/32;* B05D *3/06*

U.S. Cl. 204—192.38 20 Claims



1. A cathode arc deposition apparatus for coating an internal surface of a hollow body comprising: a shaft; a tubular cathode terminal having a cathode surface containing a deposition material for coating said internal surface of said hollow body, and having a cathode bore through said cathode terminal for receiving the longitudinal axis of said shaft; an anode terminal mounted about the longitudinal axis of said shaft; ignition means for igniting an arc between said cathode and anode terminals; magnet means, within said cathode bore, for controlling a shape and path of said arc by controllably moving a magnetic field with respect to said cathode surface; and said cathode and anode terminals having external dimensions such that said terminals are capable of being positioned within said hollow body without contacting said hollow body while said internal surface is being coated.

5,026,467

AUTOMATIC DEVELOPING APPARATUS

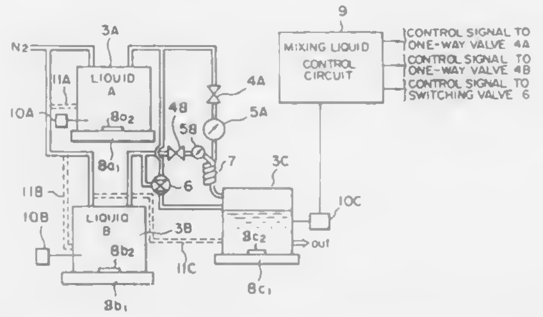
Yasuo Matsuoka, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 2, 1990, Ser. No. 473,722

Claims priority, application Japan, Feb. 3, 1989, 1-25225

Int. Cl.⁵ C25D *21/14, 21/10;* G01N *27/02*

U.S. Cl. 204—194 5 Claims


9
3A
N2
MIXING LIQUID CONTROL CIRCUIT
CONTROL SIGNAL TO ONE-WAY VALVE 4A
CONTROL SIGNAL TO ONE-WAY VALVE 4B
CONTROL SIGNAL TO SWITCHING VALVE 6
11A
LIQUID A
10A
8a2
8a1
4A
4B
5A
5B
6
7
3C
10C
11B
10B
LIQUID B
8b2
3B
11C
8c2
8c1
out
8b1

1. In an automatic developing apparatus in which an electroconductive body upon which a predetermined pattern has been written on a resist film applied to a surface of that body, is placed in a solution of developer and containing an electrode, and then the value of the change of the current that flows between the electroconductive body and the electrode is used as the basis for then determining the point at which developing of the written pattern is completed,

wherein said automatic developing apparatus comprises;

means for including a electrolytic substance into said developing solution,

means for detecting an electroconductive ratio of said developing solution, and

means for controlling said means for including so that a value detected by said means for detecting is used as the basis for controlling the electroconductive ratio of said developing solution so that there a developing completion point is clearly indicated.

5,026,468

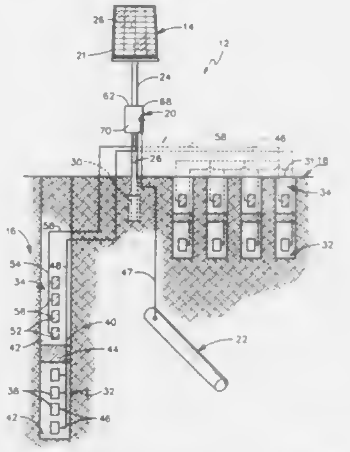
DUAL BED CATHODIC PROTECTION SYSTEM WITH AUTOMATIC CONTROLS

Ronald L. Carpenter; Craig E. Yates, and Robert G. Morris, all of Beaver, Okla., assignors to Colorado Interstate Gas Company, Colorado Springs, Colo.

Filed May 22, 1989, Ser. No. 354,835

Int. Cl.⁵ C23F *13/00*

U.S. Cl. 204—196 8 Claims



7. A cathodic protection system for a metallic structure buried in the earth, the system comprising:

a ground bed assembly buried in the earth, said ground bed assembly comprising an impressed anode assembly and a sacrificial anode assembly, each operatively associated with the metallic structure;

a solar power source for providing an output voltage that increases with increasing intensity of sunlight incident thereon and that decreases with decreasing intensity of the sunlight incident thereon; and

a system automatic control assembly, coupled to said solar power source and to said ground bed assembly, said system automatic control assembly being powered solely by said solar power source and being generally operative for selectively controlling said impressed anode assembly and said sacrificial anode assembly, said system automatic control assembly being specifically operative for connecting the output voltage provide by said solar power source to said impressed anode assembly during periods of time when sunlight is incident on said solar power source.

VOL
1127
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5,026,469

APPARATUS FOR HOLDING AND TURNING EYEGLASS LENSES IN A HIGH-VACUUM VAPOR DEPOSITION OR SPUTTERING SYSTEM

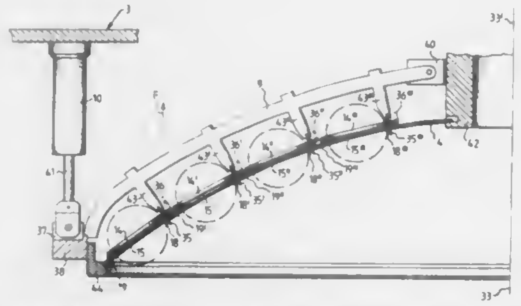
Georg Kunkel, Heigenbruecken; Dieter Klingenstein, Erlensee; Heinz Mahr, Buedingen, and Michael Fliedner, Bruchkoebel, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 26, 1989, Ser. No. 456,474

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1989, 3921672

Int. Cl.^{5} C23C *14/00, 16/00*

U.S. Cl. 204—298.15 7 Claims



1. An apparatus for holding and turning eyeglass lenses to be coated in a high-vacuum vapor deposition or sputtering system, said apparatus comprising:

a half-shell shaped substrate holder adapted for mounting in a process chamber of said high-vacuum system;

at least one lens holder pivotably connected to said substrate holder;

at least one sickle-shaped sheet metal rake partially overlapping said substrate holder;

fork means on said at least one rake actuatable for engaging and pivoting said at least one lens holder;

means for holding an edge of said rake a slight distance from, and in facing relationship to, an outside surface of said substrate holder; and

means for moving said rake around a rotational axis of said substrate holder and actuating said fork means.

5,026,470

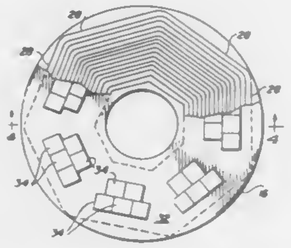
SPUTTERING APPARATUS

Peter I. Bonyhard, San Martin; David C. Cheng, Palo Alto; William J. Glover, San Jose; Howard A. Hendrix, Livermore; Ernest S. Ward, and John W. Williams, both of San Jose, all of Calif., assignors to International Business Machines, Armonk, N.Y.

Filed Dec. 19, 1989, Ser. No. 452,984

Int. Cl.^{5} C23C *14/34*

U.S. Cl. 204—298.16 6 Claims



1. Sputtering apparatus for coating a substrate with a magnetic material having an axis oriented in a chosen direction comprising:

a first electrode for supporting target material;

a second electrode for supporting at least one substrate adjacent to and in alignment with said first electrode; said second electrode having a polygon-shaped planar coil having polygon faces adjacent a surface thereof and means for energizing said coil to form a uniform magnetic field on said surface oriented substantially normal to the polygon faces of said coil;

a source of RF power arranged to impose an RF voltage across said first and said second electrodes to produce a glow discharge in the space between said first and said second electrodes; and

means for producing relative motion between said first and said second electrodes in a plane parallel to said planar coil whereby a uniform coating of magnetic material can be deposited on a substrate supported on said second electrode with the coating of magnetic material having an axis oriented in a chosen direction.

5,026,471

DEVICE FOR COATING A SUBSTRATE

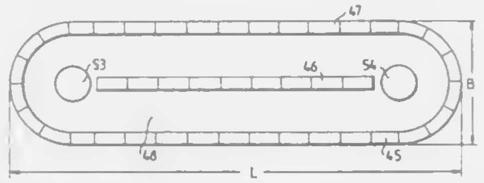
Rudolf Latz, Rodgau, and Michael Scherer, Rodenbach, both of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Nov. 29, 1989, Ser. No. 443,674

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1989, 3929695

Int. Cl.^{5} C23C *14/34*

U.S. Cl. 204—298.19 10 Claims



1. Cathode sputtering device for coating a substrate, comprising;

an electrode connected to a current source,

an evacuable chamber,

means for introducing a process gas into said chamber,

a cathode through containing a yoke on said electorde,

a substantially oval target supported on said trough and disposed in said chamber, said target being electrically connected to said electrode, said target having a front surface which faces the substrate,

a magnet arrangement supported on said yoke in said trough and comprising a center row of magnets extending in the longitudinal direction of the target, a continuous row of magnets disposed about the circumference of the yoke, and a pair of round magnets located at respective ends of the center row, said magnets being arranged so that circular magnetic fields are generated across the target to trap plasma, whereby plasma is densest at said front surface,

a dark space shield which surrounds said target but is recessed from the front surface thereof.

5,026,472

HYDROCRACKING PROCESS WITH INTEGRATED DISTILLATE PRODUCT HYDROGENATION REACTOR

Richard K. Hoehn, Mt. Prospect, and Mark E. Reno, Villa Park, both of Ill., assignors to UOP, Des Plaines, Ill.

Filed Dec. 29, 1989, Ser. No. 459,158

Int. Cl.^{5} C10G *37/06, 23/04*

U.S. Cl. 208—58 16 Claims

1. A hydrocracking process which comprises the steps of:

a) passing a feed stream which comprises an admixture of hydrocarbons boiling above 240 degrees Centigrade and hydrogen through a hydrocracking reaction zone maintained at hydrocracking conditions and producing a mixed-phase hydrocracking reaction zone effluent stream;

b) separating the mixed-phase hydrocracking reaction zone effluent stream into a first vapor stream, which comprises hydrogen, light hydrocarbons and distillate hydrocarbons, and a first liquid stream, which comprises distillate hydrocarbons;

c) forming a second vapor stream and a second liquid, stream by partially condensing the first vapor stream, with the second liquid stream comprising distillate hydrocarbons and having a lower average boiling point than the first liquid stream;

d) passing the second liquid stream and added hydrogen through a hydrogenation reaction zone maintained at hydrogenation conditions and producing a hydrogenation zone effluent stream; and,

e) passing distillate hydrocarbons present in the hydrogenation zone effluent stream and the first liquid stream into a fractionation zone, and recovering a hydrocracking zone product stream.

5,026,473

TRANSITION METAL TRIS-DITHIOLENE AND RELATED COMPLEXES AS PRECURSORS TO ACTIVE CATALYSTS

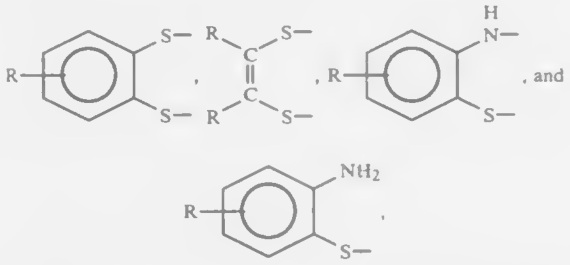
Thomas R. Halbert, Annandale; Russell R. Chianelli, Somerville; Edward I. Stiefel, Bridgewater, and Allan J. Jacobson, Princeton, all of N.J., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Division of Ser. No. 378,565, Jul. 11, 1989, Pat. No. 4,962,077. This application May 11, 1990, Ser. No. 521,952

Int. Cl.^{5} C10G *45/08, 45/00*

U.S. Cl. 208—143 5 Claims

1. A process for hydrotreating petroleum feedstocks to lower the sulfur, nitrogen and aromatic contents thereof comprising: contacting a petroleum feedstock at an elevated temperature of above about 200° C. and in the presence of hydrogen with a catalyst formed by heating a precursor ML^{n}_{3} wherein M is a metal selected from Mo, W, Re and mixtures thereof, n represents the total charge of the metal complex and is 0, −1, or −2; L is selected from dithiolene or aminobenzenethiolate ligands having the formula



wherein R is an alkyl, aryl or alkylaryl group and when L is a dithiolene, R also is CF_3, or CN, the heating being conducted at temperatures of from about 200° C. to about 350° C. in a reducing atmosphere for a time sufficient to form said catalyst.

5,026,474

PROCESS FOR THE FIXED-BED SWEETENING OF PETROLEUM FRACTIONS

Rene Blondeau; Claude Marty, both of Le Havre, and Patrick Ansquer, Lillebonne, all of France, assignors to Compagnie de Raffinage et de Distribution Total France, Le Vallois-Perret, France

Filed Dec. 21, 1989, Ser. No. 454,712

Claims priority, application France, Dec. 21, 1988, 88 16907

Int. Cl.^{5} C10G *27/10*

U.S. Cl. 208—189 20 Claims

1. A process for reducing the mercaptan content of a petroleum fraction comprising oxidizing the petroleum fraction with a supported catalyst in a fixed bed in the absence of an aqueous phase and in the presence of an oxidizing agent, and removing from the supported catalyst the water molecules formed during the oxidation reaction by periodic washing of the supported catalyst with a substantial quantity of a polar solvent that is miscible with water.

5,026,475

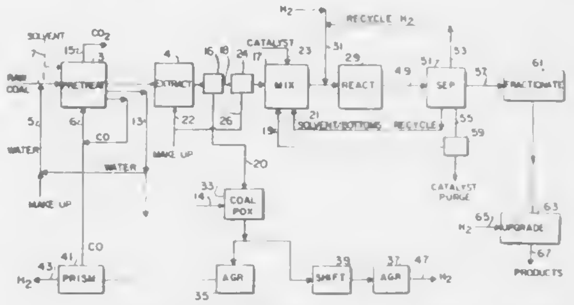
COAL HYDROCONVERSION PROCESS COMPRISING SOLVENT EXTRACTION (OP-3472)

Gordon F. Stuntz; Claude C. Culross, and Steve D. Reynolds, all of Baton Rouge, La., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

Filed Dec. 21, 1989, Ser. No. 455,654

Int. Cl.^{5} C10G *1/02, 1/06*

U.S. Cl. 208—403 53 Claims



1. A process for hydroconverting coal to produce a carbonaceous liquid, which comprises:

a) forming a mixture comprising coal particles, carbon monoxide and water in a pretreatment zone and heating said mixture to a temperature within the range of about 550° to 700° F. and under a system pressure of at least about 1800 psi for a period of time sufficient to cause an increase in the solubility of the coal in organic solvent, the weight ratio of liquid water to coal present during said heating stage being at least about 0.5:1;

b) extracting the pretreated coal with an organic solvent in an extraction zone to obtain from said coal an extract, comprising a substantial amount of soluble hydrocarbonaceous materials, and a residue comprising substantially all of the inorganic ash;

c) forming a mixture comprising said extract and a catalyst, wherein the catalyst is comprised of dispersed particles of a sulfided metal containing compound, said metal being selected from the group consisting of Groups VA, VIA, VIIA and VIIIA of the Periodic Table of Elements and mixtures thereof; and

d) reacting the mixture of coal extract and catalyst with a hydrogen-containing gas under coal hydroconversion conditions, in a hydroconversion zone to obtain a hydrocarbonaceous liquid.

5,026,476

ANTIVIBRATION COVER FOR ROTARY MACHINE

Noriyuki Ishimoto, Aichi, and Hirofumi Iida, Obu, both of Japan, assignors to Sumitomo Heavy Industries, Ltd., Tokyo, Japan

Filed Jun. 6, 1990, Ser. No. 534,606

Int. Cl.^{5} H12K *5/24*

U.S. Cl. 210—89 2 Claims

1. A rotary machine comprising:

a machine body rotatably mounting a shaft and having an opening at one end of said body;

a fan secured to said shaft at said one end of said body;

a cover covering said opening and said fan at said one end of said body; and

means for fixing said cover to said machine body, said means comprising: a plurality of plate-spring-shaped mounting brackets provided on a peripheral edge of said cover adjacent said machine body with distal end portions of said brackets projecting from said cover; a plurality of mounting portions provided on said machine body at said

VOL
1127
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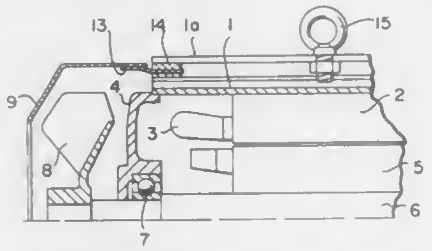
one end adjacent to said cover, said mounting portions being a plurality of grooves or holes receiving said distal



end portions of said brackets; and rubber vibration insulating members in said mounting portions between said distal end portions of said brackets and said mounting portions.

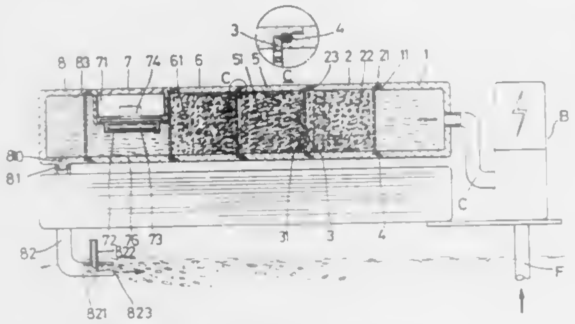
5,026,477
WATER PURIFYING COMBINATION AND ULTRAVIOLET LAMP THEREFOR

Jung-Chuan Yen, Tainan, Taiwan, assignor to Huan Ting Enterprise Co., Ltd., Tainan, Taiwan

Filed Jul. 24, 1990, Ser. No. 556,415

Int. Cl.^{5} B01D *24/00*

U.S. Cl. 210—169 **2 Claims**



1. A purifying combination comprising:

an elongated tube separated into a first end barrel member having an inlet end and a second end barrel member spaced from the first end barrel member and having an outlet end and a plurality of intermediate barrel members containing filtering materials, said intermediate barrels threadedly coupled each to the other and located substantially coaxial each to the other;

an ultraviolet lamp mounted in at least one of said intermediate barrels for treating water passing therethrough;

an annular sealing ring and a perforated disc located between adjacent intermediate barrel members for sealing against water pressure and retaining the filtering materials contained within respective intermediate barrels;

a water supplier having a discharge end connected to the inlet end of the first end barrel member for supplying water to be filtered and treated by said ultraviolet lamp, said water supplier drawing water from a water source;

an outlet pipe connected to the outlet end of the second barrel member, extending into the water source and contoured to extend substantially parallel to the water level of the water source for discharging filtered and treated water into the water source; and

an air pipe extending from above the water level into the outlet pipe through a top wall thereof for mixing fresh air into the filtered and treated water passing therethrough.

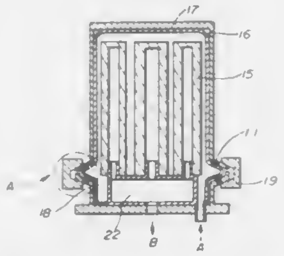
5,026,478
METAL HOLDER AND PROTECTOR FOR A DISPOSABLE PLASTIC CAPSULE

Kazushige Tanabe, Tokyo, and Katsutoshi Bonkohara, Yokohama, both of Japan, assignors to Nippon Roki Co., Ltd., Tokyo, Japan

Filed May 3, 1990, Ser. No. 518,520

Int. Cl.^{5} B01D *27/08*

U.S. Cl. 210—232 **2 Claims**



1. A filter for pressurized filtration comprising a disposable capsule accommodating one or more filter elements and a metal holder accommodating said capsule for the purpose of preventing rupture of said capsule, said capsule being formed from a plastic material by blow molding or pressure forming, said capsule having an outwardly projecting swelling portion, said metal holder comprising upper and lower metal holder parts, both said metal holder parts being coupled together about said outwardly projecting swelling portion of said capsule so as to be in contact therewith, the lower metal holder part being formed with a ring like recess and having an O-ring fitted in said recess and contacted by said outwardly projecting swelling portion upon pressurization of the capsule.

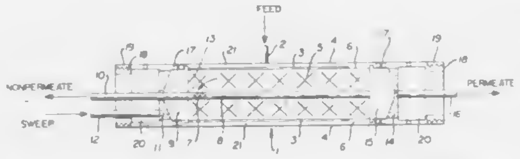
5,026,479
FLUIDS SEPARATION DEVICE

Benjamin Bikson, Brookline, and Salvatore Giglia, Norwood, both of Mass., assignors to Union Carbide Industrial Gases Technology Corporation, Danbury, Conn.

Filed Feb. 13, 1990, Ser. No. 479,475

Int. Cl.^{5} B01D *63/04*

U.S. Cl. 210—321.8 **5 Claims**



1. In a fluids separation device having an annular hollow fiber membrane bundle enclosed in a shell containing a fluid feed entrance port, a nonpermeate exit port, a sweep fluid-permeate exit port and a sweep fluid entrance port, with tubesheets encapsulating both ends of said membrane bundle, and with a center core member extending or communicating through at least one of the tubesheets to permit the flow of fluid therethrough, said membrane bundle being in a cylindrical shape positioned in said shell around said center core member, with the hollow fibers therein extending essentially the whole length of the shell with both ends of the hollow fibers embedded in and extending through the tubesheet in a fluid tight relationship thereto, and with a fluid tight relationship between the shell and the bore side of said hollow fiber bundle, the improvement enabling enhanced fluid separation to be achieved in said four port device upon introduction of sweep gas therein during fluid separation operations comprising:

(a) said center core member comprising a center core tube having perforated holes in the wall thereof at a location close to one of the tubesheets, said holes providing fluid communication between the exterior surfaces of the hollow fibers and the interior of said center core tube;

(b) an essentially non-permeable film barrier encasing essentially the entire longitudinal length of the exposed hollow fibers in the bundle except for a non-encased circumferential region near the ned of the membrane bundle opposite the end where said holes are present, said film barrier being in intimate contact with the exterior surface of the membrane bundle so as to prevent fluid channeling such as to cause fluid to bypass the active surface areas of the hollow fiber membrane surfaces by the fluid stream passing thereover, said film barrier causing fluid on the shell side thereof to flow along the annular space between the shell and said impermeable film barrier,

whereby said device enables a sweep fluid to be employed effectively without channeling and by-passing a portion of the hollow fibers in the bundle, enhancing the efficiency of the fluid separation operation.

5,026,480
DECANTING APPARATUS

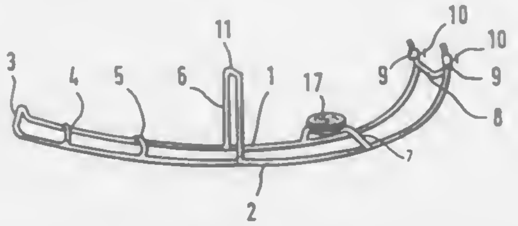
Rudolf Fischer, Habsburgstrasse 13, Rudolfstetten-Friedlisberg, CH-8968 Mutschellen, Switzerland

Filed May 17, 1990, Ser. No. 525,149

Claims priority, application Switzerland, May 17, 1989, 1842/89

Int. Cl.^{5} B01D *21/00*

U.S. Cl. 210—515 **20 Claims**



1. Apparatus for gradually decanting a flowable substance from the mouth of a first vessel into the mouth of a second vessel, particularly for ;; decanting red wine or port from a bottle into a carafe, comprising means for providing an alternative to decanting by hand, including a mobile carrier having a first portion including means for supporting the first vessel and a second portion including means for supporting the second vessel so that the mouth of the second vessel registers with the mouth of the first vessel, said carrier being movable by the flowable substance (a) from a starting position in which the upper level of flowable substance in the first vessel is sufficiently high to permit gravity-induced flow of flowable substance into the second vessel, (b) through a plurality of intermediate positions, and (c) to a further position in which at least the major part of the flowable substance is confined in the second vessel.

5,026,481
LIQUID MEMBRANE CATALYTIC SCALE DISSOLUTION METHOD

James M. Paul, DeSoto, and Richard L. Morris, Duncanville, both of Tex., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 332,147, Apr. 3, 1989. This application Mar. 14, 1990, Ser. No. 493,165

Int. Cl.^{5} B01D *61/38, 61/40*

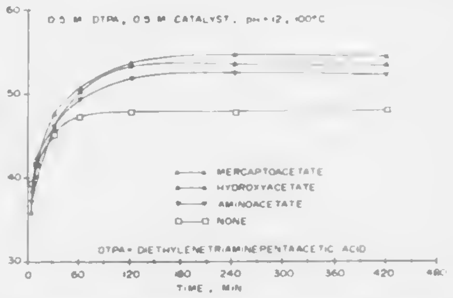
U.S. Cl. 210—638 **31 Claims**

1. A liquid membrane method for removing scale from equipment containing same via an emulsion consisting essentially of:

(a) contacting said scale-containing equipment with an external aqueous phase which causes said scale to solubilize into scale-forming ions in said external aqueous phase which consists essentially of:

   i) an aqueous solution having a pH of from about 8 to about 14;
   ii) a first complexing agent of a polyaminopolycarboxylic acid or a salt of such acid;
   iii) a catalytic quantity of anions of at least one monocarboxylic acid which acts with said first complexing agent to substantially enhance said agent's ability to solubilize scale;

(b) mixing an emulsion into said external aqueous phase which emulsion contains an immiscible liquid hydrocarbonaceous membrane phase having a second complexing agent for said scale-forming ions therein stronger than said first complexing agent enveloped around droplets of an internal aqueous phase having a stronger third complexing agent for scale-forming ions than said second complexing agent; and



(c) transferring said scale-forming ions from said external aqueous phase into said hydrocabonaceous membrane phase which ions are then transferred from said hydrocarbonaceous membrane phase into said internal aqueous phase where said ions are accumulated and concentrated which causes scale to be removed from said equipment within a substantially reduced time period than is possible with said first and third complexing agents alone.

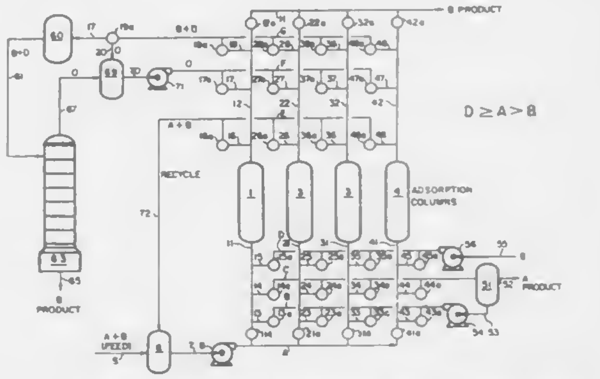
5,026,482
SEPARATION OF LIQUID MIXTURES BY CONCENTRATION SWING ADSORPTION

Shivaji Sircar, Wescosville, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Sep. 26, 1989, Ser. No. 412,961

Int. Cl.^{5} B01D *15/00*

U.S. Cl. 210—674 **18 Claims**



1. A process for separating a liquid feedstock comprising a more adsorbable component (A) and a less adsorbable component (B) wherein the relative adsorptivity of component (A), component (B) and a desorbent liquid (D) with respect to an adsorbent is in the order D>A>B in a system comprising a plurality of adsorption columns operated in cycle in a predetermined timed sequence, each adsorption column containing an adsorbent, which process comprises the following sequence of

VOL
1127
ISS
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operational steps performed in the order recited in each of the adsorption columns in its turn:

(a) passing the feedstock through the adsorption column and selectively adsorbing the more adsorbable component (A) while discharging a stream enriched in component (B);
(b) rinsing the adsorption column in a direction co-current to the feedstock with the more adsorbable component (A) whereby the less adsorbable component (B) is displaced from the adsorption column and withdrawing a stream comprising a mixture of the more adsorbable component (A) and the less adsorbable component (B) from the adsorption column;
(c) rinsing the adsorption column with a liquid desorbent (D) whereby the more adsorbable component (A) and the less adsorbable component (B) are displaced from the adsorbent bed and withdrawing a stream enriched in component (A) from the adsorption column; and
(d) rinsing the adsorption column with component (B) whereby the desorbent liquid (D) is displaced from the adsorption column and withdrawing therefrom a stream comprising less adsorbable component (B) and desorbent liquid (D) wherein
  the more adsorbable component (A) is ethanol, the less adsorbable component (B) is water, the desorbent liquid (D) is acetone and the adsorbent is activated carbon; or
  the more adsorbable component (A) is acetic acid, the less adsorbable component (B) is water, the desorbent liquid (D) is acetone and the adsorbent is activated carbon.

5,026,483
METHODS FOR TREATING HYDROCARBON RECOVERY OPERATIONS AND INDUSTRIAL WATERS

Neil E. S. Thompson, Creve Coeur, and Robert G. Asperger, Des Peres, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Continuation of Ser. No. 375,119, Jun. 30, 1989, which is a continuation-in-part of Ser. No. 208,627, Jun. 20, 1988, Pat. No. 4,864,075, which is a continuation-in-part of Ser. No. 7,701, Jan. 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 645,740, Aug. 30, 1984, abandoned. This application Nov. 21, 1990, Ser. No. 616,480

The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.

Int. Cl.^{5} C02F *1/54*

U.S. Cl. 210—708 2 Claims

1. A method of water clarification by demulsification of an oil emulsion from an aqueous effluent and the removal of this separated oil to produce clarified water comprising adding to said aqueous effluent an effective clarifying amount of a compound having the formula

$$R[(OR_1)_x\text{—}NH\text{—}C(=S)SR_2]_n$$

wherein R is a divalent, or tetravalent saturated hydrocarbon radical; R_1 is a C_2-C_4 alkylene; x is an integer of 1 to about 30; n is an integer corresponding to the valence of R; R_2 is an alkali metal, alkaline earth metal or $N(R_3)_4$ where R_3 is a lower alkyl and removing the resulting separated oil from the effluent.

5,026,484
CONTINUOUS FLOW METHOD FOR PROCESSING LIQUIDS USING HIGH-ENERGY DISCHARGE

Christian H. A. Juvan, 10053 Judy Ave., Cupertino, Calif. 95014

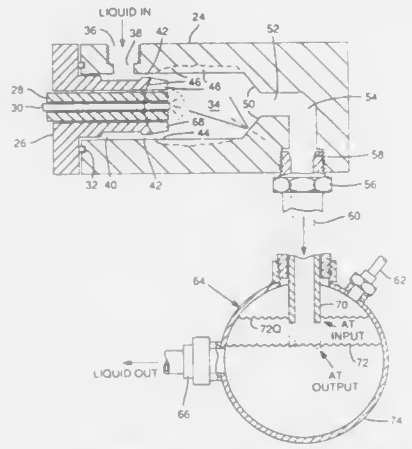
Division of Ser. No. 78,655, Jul. 28, 1987, Pat. No. 4,917,785. This application Apr. 2, 1990, Ser. No. 502,875

Int. Cl.^{5} C02F *1/463*

U.S. Cl. 210—717 4 Claims

1. A method for treating a liquid containing dissolved or undissolved substances by an endothermic photochemical process occurring when high-intensity electrical energy is discharged into the liquid while the liquid is contained in a chamber thereby precipitating solids from the liquid, comprising:

supplying a volume of liquid to a rigid, shock-withstanding firing chamber having two electrodes extending into the chamber for creating an arc discharge of electrical energy across the electrodes,
moving said liquid through the firing chamber via an inlet and an outlet of the chamber, in a substantially continuous flow,
building up and discharging high-intensity electrical energy across the two electrodes in the chamber, at a rate of at least about once per six seconds, with the discharge producing intense light energy in the chamber as well as a shock wave through the liquid in the chamber causing molecular bonding in said substances to break down thereby forming free ions in solution, said free ions reacting to form precipitates,



restraining surges of liquid created by said shock wave away from the firing chamber by hydraulic shock absorber means upstream and downstream of the chamber, said hydraulic shock absorbers allowing said substantially continuous flow by not rigidly blocking flow away from the chamber, and
separating said precipitates from the liquid at a point downstream of the chamber.

5,026,485
METHOD OF TREATING WASTEWATER FROM POLYMERIZATION PROCESS

Oscar E. Anderson, Parkersburg, W. Va., assignor to General Electric Company, Parkersburg, W. Va.

Filed Mar. 30, 1990, Ser. No. 501,465

Int. Cl.^{5} C02F *1/52*

U.S. Cl. 210—723 3 Claims

1. A method for treating wastewater containing styrene-acrylonitrile particles and polyvinyl alcohol from a suspension styrene-acrylonitrile copolymerization process, said process utilizing polyvinyl alcohol as a suspending agent, comprising the steps of adding to said wastewater a floc forming effective amount of a) a water soluble borate salt and b) a water soluble ferrous salt; and separating the resulting floc containing said particles and polyvinyl alcohol from the treated wastewater.

5,026,486
METHOD FOR CONTROLLING APEX FLOW IN AN ARRAY OF PARALLEL HYDROCYCLONES FOR CLEANING AQUEOUS FIBER SUSPENSIONS

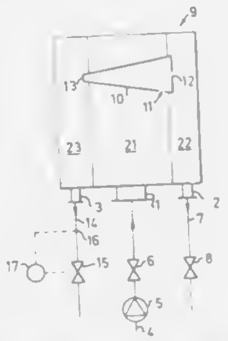
Nils A. L. Wikdahl, Bravallavagen 42, S-182 64 Djursholm, Sweden

Continuation of Ser. No. 691,975, Jan. 16, 1985, abandoned. This application Sep. 26, 1986, Ser. No. 912,758

Claims priority, application Sweden, Apr. 26, 1984, 8402296

Int. Cl.^{5} B01D *45/04;* B04C *11/00*

U.S. Cl. 210—787 2 Claims



1. A method of inhibiting blockage of apex outlets of hydrocyclones arranged in parallel in an array of hydrocyclones while separating impurities from aqueous cellulose fiber suspensions, comprising:

(1) collecting and combining apex flows of aqueous cellulose fiber suspension from hydrocyclones in the array to form a common apex flow of aqueous cellulose fiber suspension;
(2) automatically and continuosly sensing the said common apex flow;
(3) comparing the sensed common apex flow to a predetermined standard set-point apex flow corresponding substantially to a desired apex flow of aqueous cellulose fiber suspension; and
(4) adjusting and controlling by increasing or decreasing the said common apex flow so that it is maintained at substantially the said standard set-point apex flow.

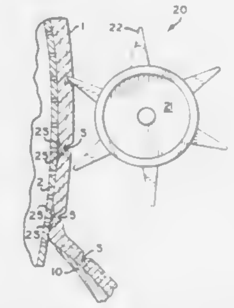
5,026,487
METHOD AND APPARATUS FOR INTERMITTENT COMPRESSION OF FIBROUS MATERIAL TO AID REMOVAL FROM A FILTER SURFACE

Antoine G. Abdulmassih, Burlington, Mass., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Jan. 29, 1990, Ser. No. 471,953

Int. Cl.^{5} B01D *33/76*

U.S. Cl. 210—791 12 Claims



1. An apparatus for aiding in the continuous removal of a wet fibrous material pulp sheet from a smooth porous filter surface comprising:

means for impressing a pattern of round-bottomed compression irregularities upon said fibrous material pulp sheet; and
doctor means for lifting said pulp sheet away from said filter surface.

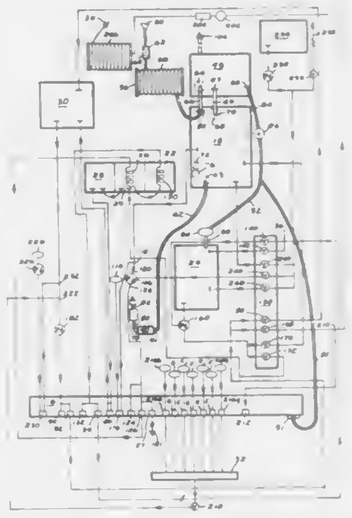
5,026,488
LIQUID RECYCLING SYSTEM

John S. Mesheau, Granby, Mass., assignor to Butler Associates, Ludlow, Mass.

Filed Feb. 20, 1990, Ser. No. 482,342

Int. Cl.^{5} B01D *17/02*

U.S. Cl. 210—799 24 Claims



1. A method of recycling contaminated liquid, which comprises.

a. pumping recycling liquid through a filter-loop assembly that includes the steps of:
  i. adjusting the flow-rate of recycling liquid as it is pumped through the filter-loop assembly;
  ii. heating the flow-rate adjusted recycling liquid;
  iii. passing the heated recycling liquid through a mechanical separator;
  iv. cooling the separated recycling liquid;
  v. testing the separated recycling liquid to determine the quality of separation; and
b. pumping the recycling liquid from the filter-loop assembly through an additive-loop assembly, when the quality of separation of the recycling liquid achieved by the filter-loop assembly step is adequate, that includes the steps of:
  i. testing the separated recycling liquid to determine what additive compounds are needed, and the quantity of any said additive compounds needed, to achieve desired recycling;
  ii. adjusting additive metering valves to inject quantities of additive compounds into the separated recycling liquid determined by the testing;
  iii. directing the separated recycling liquid to flow by an additive suction "T"-joint;
  iv. directing additive compounds through the adjusted additive compound metering valves, and through the additive suction "T"-joint into the separated recycling liquid;
  v. directing the separated, additive-injected recycling liquid to flow out of the additive-loop assembly.

VOL 1127 ISS 4 JE 25 1991 UMI

5,026,489

SOFTENING COMPOSITIONS INCLUDING ALKANOLAMINO FUNCTIONAL SILOXANES

Steven A. Snow, and Linda M. Madore, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Apr. 4, 1990, Ser. No. 504,517

Int. Cl.⁵ C06M *13/322, 13/513, 1/62;* **C07F** *7/10*

U.S. Cl. 252—8.8 **8 Claims**

1. In a rinse cycle softening composition consisting essentially of an anionic surfactant and a fabric softening agent, the improvement comprising said fabric softening agent being a silicone compound having a formula selected from group consisting of

$$(R_3SiO)_2SiR\text{—}(CHR')_aN^+R'_bR''_{3-b}X^-$$

and

$$(R_3SiO)_2SiR\text{—}(CHR')_aNR'_bR''_{2-b}$$

wherein

R is an alkyl radical having one to six carbon atoms;

R′ is selected from the group consisting of hydrogen, alkyl and aryl radicals having one to eighteen carbon atoms;

R″ is (CHR′)OH;

X is chloride, bromide, iodide, nitrate, or $RSO4^-$;

a is an integer having a value of one to ten; and

b is an integer having a value of one or two.

5,026,490

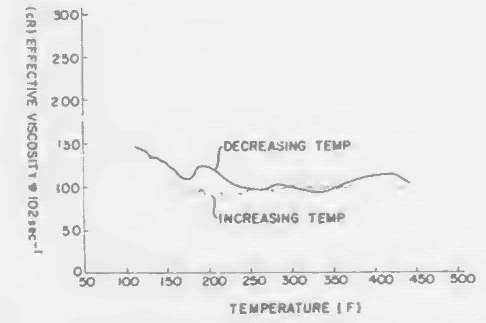
ZWITTERIONIC FUNCTIONALIZED POLYMERS AS DEFLOCCULANTS IN WATER BASED DRILLING FLUIDS

Dennis G. Peiffer, Annandale; Jan Bock, Bridgewater, both of N.J., and Julie Elward-Berry, Houston, Tex., assignors to Exxon Research & Engineering, Florham Park, N.J.

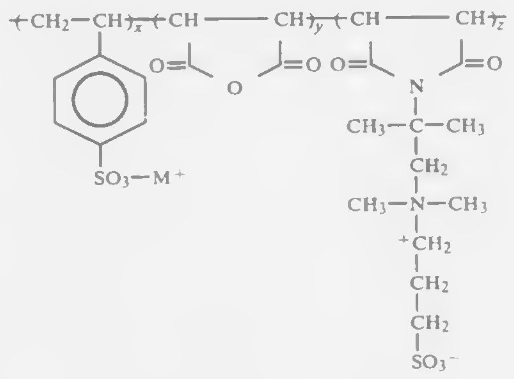
Filed Aug. 8, 1990, Ser. No. 564,205

Int. Cl.⁵ C09K *7/00;* **C08F** *8/36*

U.S. Cl. 252—8.510 **2 Claims**



1. A water soluble polymer which is characterized by the formula:



wherein x is 50 mole percent of 66⅔ mole percent or 75 mole percent and y+z is 50 mole percent, when x is 50 mole percent, y+z is 33⅓ mole percent, when x is 66⅔ mole percent, and y+z is 25 mole percent, when x is 75 mole percent, wherein the molar ratio of y to z is about 100:1 to 1:100, and M^+ is hydrogen or a metal cation selected from the group consisting of lead, aluminum, iron and Groups IA, IIA, IB and IIB of the Periodic Table of Elements and the level of sulfonation based upon the styrene monomer is about 75 to about 100 mole percent.

5,026,491

CONTROLLING SULFATE REDUCING BACTERIA BY SLUG DOSING WITH QUICK-KILL ANTIMICROBIALS AND BY CONTINUOUS DOSING WITH ISOTHIAZOLONES

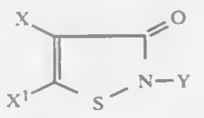
Thomas K. Haack, North Wales, and David E. Greenley, Blue Bell, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 179,698, Apr. 11, 1988, abandoned. This application Mar. 30, 1990, Ser. No. 503,203

Int. Cl.⁵ E21B *41/02*

U.S. Cl. 252—8.552 **10 Claims**

1. In a process for controlling biological contamination of oil production water injection systems by sulfate-reducing sessile bacteria wherein a slug dose of a quick-kill antimicrobial selected from one or more of the group consisting of (C_3–C_7)alkanedials, formaldehyde, cationic polymeric biguanides, quaternary ammonium compounds (alkyldimethylbenzylammonium chlorides), quaternary phosphonium compounds, phenolics, cocodiamine, 2-bromo-2-nitropropanediol, acrolein, dibromonitrilopropionamide and organic thiocyanates is applied to said injection water, the improvement comprising substantially continuously dosing said injection water at a concentration of about 0.25 to 5 ppm based on the weight of injection water with a maintenance antimicrobial selected from the group consisting of an isothiazolone of the formula



(I)

wherein Y is (C_1–C_8)alkyl or (C_3–C_8)cycloalkyl, X is H or Cl, and X^1 is H or Cl.

5,026,492

LUBRICATING OIL CONTAINING AN ALKYL ALKOXYALKYLXANTHATE AND ZINC DIALKYLDITHIOPHOSPHATE

Gopal H. Singhal, Baton Rouge, La., and Jacob J. Habeeb, Westfield, N.J., assignors to Exxon Research & Engineering Company, Florham Park, N.J.

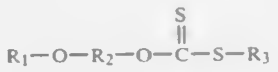
Filed Sep. 7, 1989, Ser. No. 404,037

Int. Cl.⁵ C10M *135/14*

U.S. Cl. 252—32.7 E **8 Claims**

1. A lubricating oil composition which comprises a major amount of a lubricating oil basestock and an additive mixture containing

(a) from about 0.1 to about 5 wt. % of an alkyl alkoxyalkyxanthate having the formula



$$R_1\text{—}O\text{—}R_2\text{—}O\text{—}\overset{\overset{S}{\|}}{C}\text{—}S\text{—}R_3$$

where

R_1 is an alkyl group containing from 1 to 10 carbon atoms,

R_2 is a straight or branched alkylene group containing from 2 to 4 carbon atoms,

R_3 is a straight or branched alkyl group containing from 4 to 6 carbon atoms; and

(b) from about 0.1 to about 2 wt. % of zinc dialykldithiophosphate.

5,026,493

REDUCED ASH CONTENT LUBRICANTS

William Y. Lam, Ballwin, and David L. Wooton, St. Louis, both of Mo., assignors to Ethyl Petroleum Additives, Inc., St. Louis, Mo.

Continuation-in-part of Ser. No. 388,843, Aug. 3, 1989, abandoned. This application Jun. 11, 1990, Ser. No. 535,780

Int. Cl.⁵ C10M *141/02*

U.S. Cl. 252—32.7 HC **29 Claims**

1. A lubricant composition comprising a major amount by weight of oil of lubricating viscosity and a minor amount by weight of an additive combination which comprises an animated phosphosulfurized polyalkene, a polyalkene substituted phenol and a polyalkene sulfonate, wherein the polyalkene groups have a number average molecular weight of from about 700 to 5,000.

5,026,494

AMINO GROUP-CONTAINING GRAFT POLYMER, AND ITS USE AS A DISPERSING VISCOSITY INDEX IMPROVER

Walter Denzinger, Speyer; Helmut Mach, Heidelberg; Juergen Mohr, Gruenstadt; Knut Oppenlaender, Ludwigshafen; Roland Schwen, Friedelsheim, and Hans-Henning Vogel, Frankenthal, all of Fed. Rep. of Germany, assignors to BASF, Parsippany, N.J.

Filed May 8, 1990, Ser. No. 504,485

Claims priority, application Fed. Rep. of Germany, Apr. 5, 1989, 3910943

Int. Cl.⁵ C10M *149/04*

U.S. Cl. 252—50 **4 Claims**

1. An amino group containing graft polymer, comprising a main chain polymer having allylamine grafted to it, said main chain polymer comprising a hydrogenated styrene/butadiene copolymer wherein the total nitrogen content of said graft polymer is from 0.001 to 0.05 weight percent.

5,026,495

OIL SOLUBLE DISPERSANT ADDITIVES USEFUL IN OLEAGINOUS COMPOSITIONS

Jacob Emert, Brooklyn, N.Y.; Robert D. Lundberg, Bridgewater, and Antonio Gutierrez, Mercerville, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Continuation-in-part of Ser. No. 122,832, Nov. 19, 1987. This application Dec. 29, 1988, Ser. No. 291,573

Int. Cl.⁵ C10M *159/16*

U.S. Cl. 252—51.5 R **24 Claims**

1. An oil soluble composition dispersant useful as a dispersant additive for lubricating composition comprising the reaction products of:

(1) at least one nitrogen containing adduct selected from the group consisting of (i) Mannich condensation product formed by condensing a long chain hydrocarbyl substituted hydroxy aromatic compound with aldehyde and a polyalkylene polyamine; and (ii) Mannich condensation product formed by reacting long chain hydrocarbyl substituted mono or dicarboxylic acid or its anhydride with amine containing hydroxy aromatic compound, which may be optionally hydrocarbyl substituted, to form long chain hydrocarbyl substituted amide or imide-containing hydroxy aromatic compound intermediate adduct, and condensing said long chain hydrocarbyl substituted amide or imide-containing hydroxy aromatic compound adduct with aldehyde and polyamine; said adduct containing at least one reactive group selected from reactive amino groups and reactive hydroxyl groups; and

(2) at least one polyepoxide.

5,026,496

POLYMER COMPOSITION USEFUL AS VISCOSITY INDEX IMPROVER

Shoji Takigawa, Yawata; Kiyoshi Teranishi, Neyagawa; Tomio Nomura, Moriyama; Toshiro Suzuki, Kyoto, and Kozo Sakai, Ohmihachiman, all of Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

Filed Jul. 1, 1988, Ser. No. 214,539

Claims priority, application Japan, Jul. 1, 1987, 62-164287; Jan. 14, 1988, 63-6310

Int. Cl.⁵ C10M *145/10*

U.S. Cl. 252—56 R **20 Claims**

1. A polymer composition, useful as a lubricating oil additive to improve the viscosity index thereof, comprising:

(A) an olefinic copolymer;

(B) a copolymer of an olefin with an acrylate or methacrylate;

(C) a polyacrylate or polymethacrylate; and

(D) an oxyalkylated active hydrogen atom-containing surfactant, which is a poor solvent for both components (A) and (C), which acts as a solubilizer or phase-stabilizer for components (A) and (C), and which in combination with component (B) which has surface active properties functions as a phase-stabilizer, wherein the total polymer content is 30%–30% based on the weight of the composition, the contents of (A) being 10%–60%, the content of (B) being at least 5% and the content of (C) being 25%–80%, based on the total weight of the total polymer, and the content of (D) is 2%–70% based on the weight of the composition.

VOL
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AZEOTROPIC COMPOSITIONS OF PERFLUORO-1,2-DIMETHYLCYCLOBUTANE WITH METHANOL AND 1,1-DICHLORO-1-FLUOROETHANE OR DICHLOROTRIFLUOROETHANE

Abid N. Merchant, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 12, 1990, Ser. No. 491,576

The portion of the term of this patent subsequent to Feb. 19, 2008, has been disclaimed.

Int. Cl.^{5} C11D *2/30, 2/50;* **C23G** *5/028;* **C09K** *5/04*

U.S. Cl. 252—171 **16 Claims**

1. An azeotropic composition consisting essentially of about 51 to 61 weight percent perfluoro-1,2-dimethylcyclobutane, about 1 to 3 weight percent methanol and about 37 to 47 weight percent 1,1-dichloro-1-fluoroethane wherein the composition boils at about 24.2° C. when the pressure is adjusted to substantially atmospheric pressure.

2. An azeotropic composition consisting essentially of about 29 to 39 weight percent perfluoro-1,2-dimethylcyclobutane, about 0.7 to 1.7 weight percent methanol and about 60 to 70 weight percent dichlorotrifluoroethane wherein said dichlorotrifluoroethane is 1,1-dichloro-2,2,2-trifluoroethane or 1,1-dichloro-2,2,2-trifluoroethane which contains 1,2-dichoro-1,2,2-trifluoroethane in an amount up to 5 percent, and wherein the composition boils at about 26.0° C. when the pressure is adjusted to substantially atmospheric pressure.

5,026,498

BINARY AZEOTROPIC COMPOSITIONS OF 1,1,1,2,3,3-HEXAFLUORO-3-METHOXYPROPANE WITH ONE OF TRANS-1,2-DICHLOROETHYLENE, CIS-1,2-DICHLOROETHYLENE, 1,1-DICHLORO-1,2-DIFLUOROETHANE OR 1,2-DICHLORO-1,1,-DIFLUOROETHANE

Abid N. Merchant, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 3, 1990, Ser. No. 592,561

Int. Cl.^{5} C11D *7/30, 7/50;* **C23G** *5/028;* **B08B** *3/00*

U.S. Cl. 252—171 **12 Claims**

1. An azeotropic composition consisting essentially of
   (a) about 45–55 weight percent 1,1,1,2,3,3-hexafluoro-3-methoxypropane and about 45–55 weight percent trans-1,2-dichloroethylene, wherein the composition has a boiling point of about 44.3° C. when the pressure is adjusted to substantially atmospheric pressure;
   (b) about 64–74 weight percent 1,1,1,2,3,3-hexafluoro-3-methoxypropane and about 26–36 weight percent cis-1,2-dichloroethylene, wherein the composition has a boiling point of about 50.2° C. when the pressure is adjusted to substantially atmospheric pressure;
   (c) about 5–15 weight percent 1,1,1,2,3,3-hexafluoro-3-methoxypropane and bout 85–95 weight percent 1,1-dichloro-1,2-difluoroethane, wherein the composition has a boiling point of about 48.8° C. when the pressure is adjusted to substantially atmospheric pressure; or
   (d) about 82–92 weight percent 1,1,1,2,3,3-hexafluoro-3-methoxypropane and bout 8–18 weight percent 1,2-dichloro-1,2-difluoroethane, wherein the composition has a boiling point of about 52.5° C. when the pressure is adjusted to substantially atmospheric pressure.

5,026,499

TERNARY AZEOTROPIC COMPOSITIONS OF HEXAFLUOROPROPYLENE/ETHYLENE CYCLIC DIMER WITH TRANS-1,2-DICHLOROETHYLENE AND METHANOL

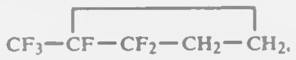
Abid N. Merchant, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 21, 1990, Ser. No. 496,916

Int. Cl.^{5} C11D *7/30, 7/50;* **C09K** *5/04;* **C23G** *5/028*

U.S. Cl. 252—171 **12 Claims**

1. An azeotropic composition consisting essentially of about 21–27 weight percent of a hexafluoropropylene/ethylene cyclic dimer of the formula



$$CF_3—CF—CF_2—CH_2—CH_2.$$

64–72 weight percent trans-1,2-dichloroethylene and about 5–11 weight percent methanol wherein the composition boils at a temperature of about 40.8° C. to 41.2° C. at substantially atmospheric pressure.

5,026,500

SOLVENT COMPOSITION FOR DEFLUXING PRINTED CIRCUITS

Domenico Vianello, Venezia, Italy, assignor to Ausimont S.r.l., Milan, Italy

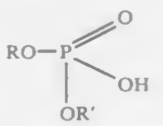
Filed Sep. 6, 1989, Ser. No. 403,388

Claims priority, application Italy, Sep. 7, 1988, 21842 A/88

Int. Cl.^{5} C09D *9/00;* **C11D** *7/50;* **C23G** *5/028*

U.S. Cl. 252—171 **4 Claims**

1. A solvent composition suitable for cleaning printed circuits at room temperature which comprises:
   (a) from 4 to 10% by weight of ethyl alcohol;
   (b) from 0.5 to 1.5% by weight of a nitroalkane having 1 to 3 carbon atoms;
   (c) from 0.5 to 10% by weight of a phosphoric mono-and/or diester of formula I



(I)

wherein R is an alkyl group having a number of carbon atoms greater than 11 and less than 18 and R′ is H or R; and
   (d) from 95% to 78.5% by weight of perfluorochlorocarbons having 1 to 3 carbon atoms.

5,026,501

AZEOTROPE-LIKE COMPOSITIONS OF 1,1-DICHLORO-I-FLUOROETHANE; DICHLOROTRIFLUOROETHANE; AND DICHLOROMETHANE

Ellen L. Swan, Ransomville; Peter B. Logsdon, North Tonawanda; Leonard M. Stachura, Hamburg, and Rajat S. Basu, Williamsville, all of N.Y., assignors to Allied-Signal Inc., Morristown, N.J.

Filed Dec. 22, 1989, Ser. No. 455,709

Int. Cl.^{5} C11D *7/30, 7/50*

U.S. Cl. 252—171 **13 Claims**

1. Azeotrope-like compositions consisting essentially of from about 55 to about 98.5 weight percent 1,1-dichloro-1-fluoroethane, from about 1 to about 41 weight percent 1,1-dichloro-2,2,2-trifluoroethane, and from about 0.5 to 4.0 weight percent dichloromethane which boil at about 31.8° C. at 760 mm Hg.

4. Azeotrope-like compositions consisting essentially of from about 55 to about 98.5 weight percent 1,1-dichloro-1-fluoroethane, from about 1 to about 41 weight percent 1,2-dichloro-1,1,2-trifluoroethane, and from about 0.5 to 4.0 weight percent dichloromethane which boil at about 31.8° C. at 760 mm Hg.

5,026,502

AZEOTROPE-LIKE COMPOSITIONS OF 1,1-DICHORO-1-FLUOROETHANE; DICHLOROTRIFLUOROETHANE; AND ALKANE OR CYCLOALKANE HAVING 5 CARBON ATOMS

Peter B. Logsdon, North Tonawanda; Ellen L. Swan, Ransomville; Leonard M. Stachura, Hamburg, and Rajat S. Basu, Williamsville, all of N.Y., assignors to Allied-Signal Inc., Morristown, N.J.

Filed May 25, 1990, Ser. No. 529,086

Int. Cl.^{5} C11D *7/30, 7/50;* **C23G** *5/028;* **B08B** *3/00*

U.S. Cl. 252—172 **19 Claims**

1. Azeotrope-like compositions consisting essentially of from about 55 to about 94.5 weight percent 1,1-dichloro-1-fluoroethane, from about 5 to about 44.5 weight percent dichlorotrifluoroethane selected from the group consisting of 1,1-dichloro-2,2,2-trifluoroethane, 1,2-dichloro-1,1,2-trifluoroethane, and mixtures thereof, and from about 0.5 to about 45 weight percent alkane or cycloalkane having 5 carbon atoms selected from the group consisting of n-pentane and cyclopentane wherein said azeotrope-like components consist of said 1,1-dichloro-1-fluoroethane, said dichlorotrifluoroethane, and said n-pentane or cyclopentane and said azeotrope-like compositions boil at about 31.0° C.±1.1° C. at 760 mm Hg.

5,026,503

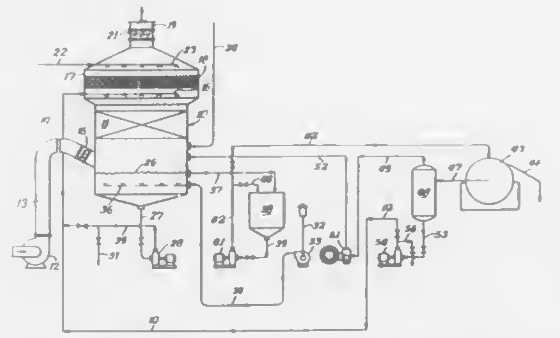
COMPOSITION AND METHOD FOR REMOVING HYDROGEN SULFIDE FROM GAS STREAMS

Robert C. Stewart, Tulsa, Okla., assignor to Amoco Corporation, Chicago, Ill.

Filed Jul. 21, 1989, Ser. No. 383,844

Int. Cl.^{5} C01B *17/20, 17/04*

U.S. Cl. 252—192 **23 Claims**



1. A composition for oxidizing hydrogen sulfide to form elemental sulfur in the composition and for effecting settling of the elemental sulfur from the composition, said composition comprising an aqueous solution containing chelated water soluble polyvalent metal ions and at least one water soluble nonionic surfactant having an HLB of from 8 to 10.

6. A composition for oxidizing hydrogen sulfide to form elemental sulfur in the composition and for effecting settling of the elemental sulfur from the composition, said composition comprising an aqueous solution containing chelated water soluble polyvalent metal ions and at least one water soluble ethoxylated alkyl phenol surfactant having an HLB of from about 8 to about 10, in which the HLB is defined as E/5 where E is ethylene oxide weight percent.

5,026,504

CURING COMPOSITION FOR POLYSULPHIDE POLYMERS

John S. Campbell, Gerrards Cross, and Michael E. Foulkes, Plymouth, both of United Kingdom, assignors to Cookson Group PLC, London, United Kingdom

Continuation of Ser. No. 52,779, May 21, 1987, abandoned. This application Feb. 16, 1990, Ser. No. 480,886

Claims priority, application United Kingdom, May 23, 1986, 862707

Int. Cl.^{5} C08F *28/00;* **C01B** *15/047*

U.S. Cl. 252—186.43 **6 Claims**

1. A composition for curing a polysulphide polymer, the composition comprising a curing agent which consists essentially of sodium birnessite, $Na_4Mn_{14}O_{27}.9H_2O$, containing not more than about 5 percent hausmannite, Mn_3O_4, by total weight of sodium birnessite and hausmannite and a chlorinated aliphatic hydrocarbon mixed with the curing agent to form a paste.

5,026,505

GUEST-HOST TYPE LIQUID CRYSTAL COMPOSITION

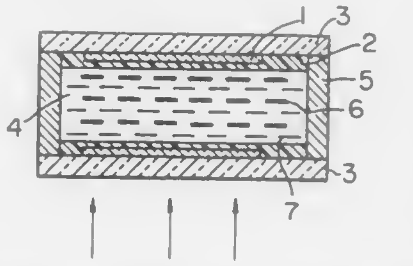
Masaharu Kaneko, Yamato; Tetsuo Ozawa, Tokyo; Tomio Yoneyama, Kawasaki; Shuji Imazeki, Hitachi; Akio Mukoh, Mito, and Mikio Sato, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Mitsubishi Kasei Corporation, both of Tokyo, Japan

Filed Sep. 29, 1982, Ser. No. 426,962

Claims priority, application Japan, Oct. 2, 1981, 56-156192

Int. Cl.^{5} C09K *19/00*

U.S. Cl. 252—299.1 **41 Claims**



1. A guest-host type liquid crystal composition which comprises:
   one or more host liquid crystals, said liquid crystals being in the nematic state, or in the cholesteric state by the addition of at least one optically active substance, and
   one or more pleochroic dyes, including at least one pleochroic dye which has a trans-4-substituted cyclohexyl group, said one or more pleochroic dyes being dissolved in said host liquid crystals, the pleochroic dye having a trans-4-substituted cyclohexyl group being present in an amount of 70% or more in said one or more pleochroic dyes, wherein the dye having a trans-4-substituted cyclohexyl group is represented by the formula:

$D—B_lW$ (I)

wherein W is a trans-4-substituted cyclohexyl group; D is a grouping of organic dye containing no ionic group, B is —COO—; and l is an integer of 1.

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5,026,506
CHIRAL SMECTIC LIQUID CRYSTAL COMPOSITION

Mitsuhiro Koden; Tomoaki Kuratate, both of Nara; Fumiaki Funada, Yamatokoriyama; Kazuhiko Sakaguchi, Toyonaka; Naoya Kasai, Amagasaki, and Yoshikazu Takehira, Itami, all of Japan, assignors to Sharp Kabushiki Kaisha and Daiso Co., Ltd., both of Osaka, Japan

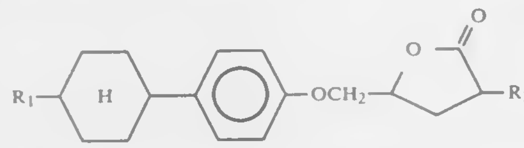
Filed Mar. 3, 1989, Ser. No. 318,817

Claims priority, application Japan, Mar. 4, 1988, 63-51818

Int. Cl.^{5} C09K *19/34, 19/00*

U.S. Cl. 252—299.61 **11 Claims**

1. A chiral smectic crystal composition comprising a liquid crystalline compound exhibiting a smectic C phase and at least one compound of the formula (A):



(A)

wherein R_1 and R_2 are the same or different and are each a straight-chain or branched-chain alkyl group having 1 to 12 carbon atoms.

5,026,507
FLUORESCENT WHITENING AGENTS, PRODUCTS COMPRISING THE AGENT AND METHOD OF USE THEREOF

John W. Gowan, Jr., Washington, D.C., and David K. Lo, Silver Spring, Md., assignors to Westvaco Corporation, New York, N.Y.

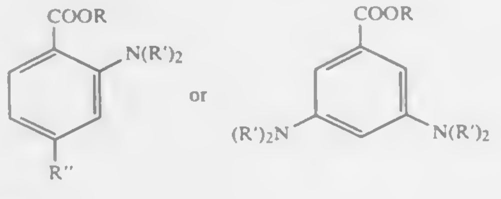
Filed May 4, 1989, Ser. No. 347,260

Int. Cl.^{5} C09K *11/06;* **D21H** *17/14;* **C08K** *5/09;* **C08L** *101/00*

U.S. Cl. 252—301.21 **13 Claims**

8. A fluorescent paper filler composition of high whiteness and low biological toxicity, comprising as an additive

a fluorescent whitening-by-filling amount of a compound of the formula



wherein

R is H or (C_1–C_6) alkyl,

R′ is independently H or (C_1–C_6) alkyl;

R″ is H or NR′$_n$, and

n is 2 or 3; wherein if $n=3$ the compound further comprises X^-, wherein X^- is an anion; and

a paper filler or filler carrier.

9. A fluorescent paper filler composition according to claim 8, further comprising other pigments, binders or additives.

5,026,508
GROUND ELECTRODE BACKFILL COMPOSITION, ANODE BED

Joseph F. Tatum, Jr., and Thomas H. Lewis, Jr., both of Hattiesburg, Miss., assignors to Cathodic Engineering Equipment Co., Inc., Hattiesburg, Miss.

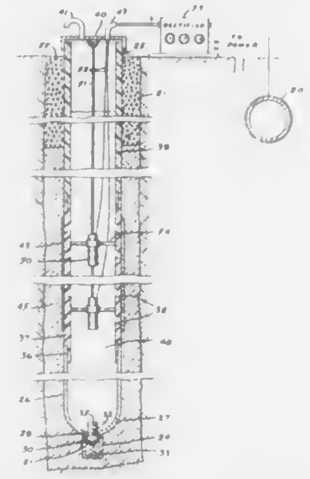
Filed May 11, 1990, Ser. No. 522,035

The portion of the term of this patent subsequent to Feb. 19, 2008, has been disclaimed.

Int. Cl.^{5} H01B *1/18;* **C23F** *13/06*

U.S. Cl. 252—502 **9 Claims**

1. A conductive non-porous cementitious composition comprising, a hydrated mixture of portland cement, sized calcined fluid petroleum coke, micro-carbon rods and carbon black installed in an earth anode bed in which the cement is in the range of approximately 30–50% and the coke is in the range of approximately 50–70%.



5,026,509
TRACKING CONTROL SYSTEM FOR INFORMATION REPRODUCING APPARATUS

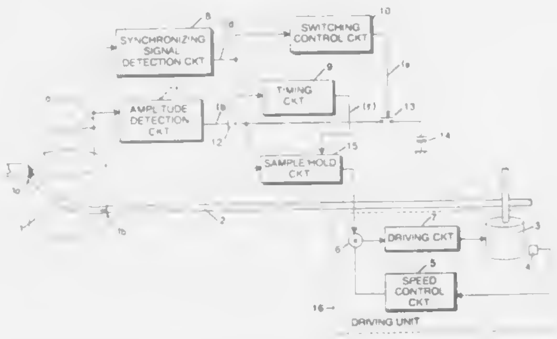
Kazuo Arai, Hirakata, and Shinji Okada, Uji, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 19, 1988, Ser. No. 146,603

Claims priority, application Japan, Jan. 19, 1987, 62-9304

Int. Cl.^{5} G11B *5/584;* **H03K** *5/153*

U.S. Cl. 360—77.15 **12 Claims**



9. A detection circuit for detecting an amplitude change of a signal which contains therein a synchronizing signal, comprising:

a synchronizing signal detection circuit for detecting said synchronizing signal;

an amplitude detecting circuit for detecting an amplitude of said signal, the detected amplitude appearing at an output terminal of said amplitude detecting circuit;

a capacitor which is connected at one terminal thereof to the output terminal of said amplitude detecting circuit;

a switching circuit which is connected at one terminal thereof to the other terminal of said capacitor, the other terminal of said switching circuit being fixed at a fixed electrical potential;

a switching control circuit responsive to the synchronizing signal detected by the synchronizing signal detection circuit for producing a first pulse signal for controlling said switching circuit so that a voltage difference between an amplitude of said signal appearing at that time at the output terminal of said amplitude detecting circuit and said fixed electric potential is stored in said capacitor;

a timing circuit for producing a second pulse signal which is delayed by a predetermined time from a leading edge of said first pulse signal;

a sample and hold circuit for sampling and holding a voltage appearing at the terminal of said capacitor connected to the switching circuit in response to said second pulse signal.

5,026,510
MOLD FOR CAST MOLDING SUBSTRATE HAVING PREFORMAT WITH INFORMATION PITS AND METHOD OF USING SAME

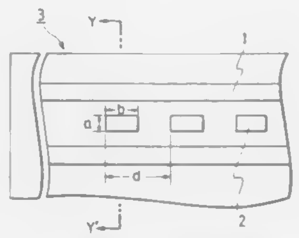
Masataka Yashima, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 10, 1989, Ser. No. 321,404

Claims priority, application Japan, Mar. 17, 1988, 63-61844

Int. Cl.^{5} B29C *39/02, 39/12*

U.S. Cl. 264—300 **9 Claims**



1. A method for preparing a substrate for an information recording medium comprising the steps of:

selecting a casting mold having a mold surface for casting said substrate, said casting mold having an uneven preformat pattern, said mold surface comprising an uneven preformat pattern formed thereon, said uneven preformat pattern having tracking groove portions corresponding to tracking grooves and information pit portions corresponding to information pits, wherein

each information pit portion has a size with a length b of 2 to 15 μm in the direction parallel to the pattern of the tracking groove, a width a of 1 to 6 μm in the direction perpendicular thereto and a height c of 300 to 3500 Å, said pit pattern having a pitch in the direction parallel to the pattern of the tracking grooves, said pitch being at least 1.8 times said pit length b;

pouring a composition comprising monomer, prepolymer or a mixture thereof into said mold; and

polymerizing and curing said composition.

5,026,511
PROCESS FOR THE PRODUCTION OF POLYETHYLENE MATERIALS

Akira Sano, Kawasaki; Hirofumi Kamiishi; Seizo Kobayashi, both of Yokohama; Kazuo Matsuura, Tokyo, and Shigeki Yokoyama, Yokohama, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 249,946, Sep. 27, 1988, abandoned. This application Feb. 26, 1990, Ser. No. 485,248

Claims priority, application Japan, Oct. 1, 1987, 62-248818

Int. Cl.^{5} B29C *35/02*

U.S. Cl. 264—28 **8 Claims**

1. A process for producing a polyethylene material having an elastic modulus higher than 150 GPa, a mechanical strength greater than 4 GPa and a total draw ratio of 120–150 times, which comprises the steps of:

(a) forming particulate polyethylene by polymerization of ethylene at a temperature lower than the melting point of said polyethylene and in the presence of a catalyst comprising a solid catalyst component containing a titanium compound and an organometallic compound, said polyethylene having an intrinsic viscosity of from 5 to 50 dl/g at 135° C. in decalin and a viscosity average molecular weight of from 400,000 to 12,000,000;

(b) compression molding said polyethylene from step (a) at a temperature not higher than the melting point thereof to obtain preform (b);

(c) immersing said preform (b) in an organic solvent, without dissolution, at a temperature of from 0° to 250° C. for from 1 second to 60 minutes whereby preform (b) is swollen to obtain preform (c);

(d) solid-phase extruding or rolling said swollen preform (c) to obtain preform (d) and;

(e) subsequently drawing preform (d).

5,026,512
METHOD FOR MANUFACTURING MOLDED PRODUCTS OF THERMOPLASTIC AND INORGANIC MATERIALS

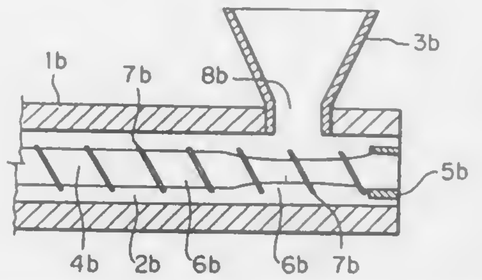
Shao C. Chang, Room No. 503, Brier Lamtam, No. 57, Nakanoshinden, Shizuoka-shi, Japan

Continuation of Ser. No. 51,738, May 18, 1987, Pat. No. 4,863,652, which is a continuation of Ser. No. 636,079, Jul. 31, 1984, Pat. No. 4,670,203, which is a continuation of Ser. No. 321,535, Nov. 16, 1981, abandoned, which is a continuation of Ser. No. 715,348, Aug. 17, 1976, abandoned. This application Aug. 15, 1989, Ser. No. 394,761

The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.

Int. Cl.^{5} B29C *47/76*

U.S. Cl. 264—40.6 **23 Claims**



1. A method of molding thermoplastic material comprising; a primary component selected from the group consisting of polyethylene, polypropylene, polystyrene, acrylonitrile-butadiene-styrene, polybutylene terephthalate, its isomer, and its similar polymer, polyamide 6, polyamide 66, polyamide 7, polyamide 11, polyamide 12, and a combination of said above polymer; and a second polymer selected from the group consisting of polyethylene, polypropylene, polystyrene, acrylontrile-butadiene-styrene, polybutylene terephthalate, similar polymer, polyamide 6, polyamide 66, polyamide 7, polyamide 11, polyamide 12, cotton, hemp, and rayon, in an amount of from 5% to 60% by weight, or a blend of said above polymer as the primary component and an inorganic material selected from the group consisting of boron nitride, glass fiber, glass balls, glass powder, feldspar, quartz, carbon, aluminum oxide, ceramics, marble, metal fibers, metal powder and whiskers, and a mixture of said above thermoplastics as the primary components with said polymer component and said inorganic material, by one of injection and extrusion means in a molding machine having a screw conveyor cylinder provided with controllable heating means, a hopper at one end of said cylinder, and a discharge means at the other end of said cylinder selected from at least one of a nozzle, die, and adapter, comprising:

(a) providing said material with a water content of less than about 1.0% by weight;

(b) maintaining the inside wall temperature of said cylinder within a range of plus or minus 35° C. of said melting temperature of the material;

(c) keeping the temperature of a first portion of the inside wall of said cylinder located adjacent said one end lower than the melting temperature of said material;

(d) controlling the temperature of the second portion of said inside wall of said cylinder which extends from a position intermediate its opposite ends to said other end at a temperature higher than the melting temperature of said material, while controlling the temperature difference between said first and second portions of said inside wall below 70° C.;

(e) bringing the temperature of said molding material to a predetermined maximum at the outlet zone adjacent said discharge means;

(f) controlling the temperature of the inside of the cylinder by directly measuring the actual temperature of the molding material as it passes through the one of the nozzle, die and adapter of the molding machine;

(g) controlling the residence time of said molding material in said cylinder in response to the cylinder temperature so that the residence time is reduced as the temperature is increased whereby the residence time of said material in said cylinder is less than about 23 minutes; and

(h) maintaining the temperature of the nozzle or die of the discharge means within the range of plus 35° C. or minus 25° C. of the melting temperature of the material.

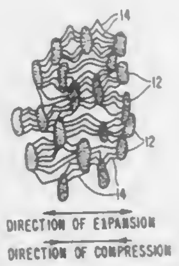
5,026,513
PROCESS FOR MAKING RAPIDLY RECOVERABLE PTFE

Wayne D. House, Flagstaff, and David J. Myers, Camp Verde, both of Ariz., assignors to W. L. Gore & Associates, Inc., Newark, Del.

Division of Ser. No. 110,145, Oct. 19, 1987, Pat. No. 4,877,661. This application May 22, 1989, Ser. No. 355,236

Int. Cl.^{5} B29C *61/06*

U.S. Cl. 264—127 **4 Claims**



1. A process for making rapid recoverable polytetrafluoroethylene (PTFE) material having a microstructure of nodes and fibrils comprising extruding a preformed billet of a mixture of coagulated dispersion of PTFE and liquid lubricant, expanding said PTFE after removal of liquid lubricant by stretching said PTFE longitudinally and maintaining said PTFE at a temperature between about 35° C. and the crystalline melt point during stretching, compressing said extruded and expanded PTFE in the direction of the fibrils to reduce its size, restraining said PTFE in its compressed state, and heating said compressed PTFE.

5,026,514
INCREMENTAL FORMING OF THERMOPLASTIC COMPOSITES

Paul B. Hauwiller, 1102 Crabtree La., Mt. Prospect, Ill. 60056, and A. Brent Strong, 2250 Pine Creek Cir., Sandy, Utah 84093

Filed May 5, 1989, Ser. No. 348,297

Int. Cl.^{5} B29C *43/04, 43/20, 43/36*

U.S. Cl. 264—258 **10 Claims**

1. A method for forming an object by incrementally mold-forming sequential component sections of a continuous length of fiber reinforced thermoplastic material into a composite product; said method comprising the steps of:

(a) preparing a laminate of fiber reinforced thermoplastic material;

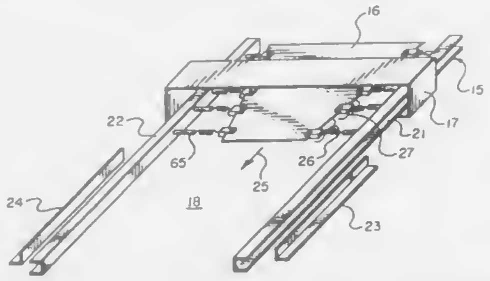
(b) preparing at least one section of a laminate for forming by bringing the fiber reinforced thermoplastic material in said at least one section to a flowable condition with respect to the fiber reinforcement of said at least one section;

(c) transporting said at least one section of the prepared laminate to a forming area;

(d) applying forming forces to said at least one section to reconfigure said at least one section to a first desired configuration;

(e) cooling the formed at least one section to a stable condition;

(f) removing the formed at least one section from the forming area;



(g) preparing at least one other section of the laminate for forming by bringing the fiber reinforced thermoplastic material in said at least one other section to a flowable condition with respect to the fiber reinforcement of said at least one other section;

(h) transporting said at least one other section of the prepared laminate to a forming area;

(i) applying forming forces to said at least one other section to reconfigure said at least one other section to a desired second configuration, said desired second configuration being different than the first desired configuration of said at least one section;

(j) cooling the formed at least one other section to a stable condition;

(k) removing the formed at least one other section from the forming area; and

(l) repeating steps g) through k) until said product is fully formed.

5,026,515
CRUDE TIRE SETTING METHOD IN TIRE VULCANIZING PRESS

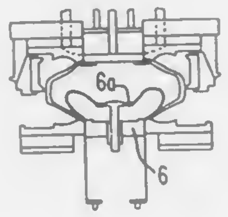
Akira Hasegawa; Yoshinobu Kato, and Toshifumi Murakami, all of Nagasaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 30, 1989, Ser. No. 334,884

Claims priority, application Japan, Apr. 1, 1988, 63-78255

Int. Cl.^{5} B29C *35/00*

U.S. Cl. 264—315 **1 Claim**



1. A method of setting a crude tire in a tire vulcanizing press having upper and lower mold units movable relative to each other, the upper mold unit including an upper mold having an upper bead ring, and a bead holder device movable vertically

relative to the upper mold and having supporting means for supporting an upper bead of a crude tire to be vulcanized in the press, and the lower mold unit including a lower mold having a lower bead ring, a bladder having upper and lower portions, and a bladder holder mechanism having means holding the lower portion of the bladder and an elevatable upper portion fixing ring disposed within the lower bead ring and to which the upper portion of the bladder is fixed, said method comprising:

pushing an upper bead of a crude tire into the upper bead ring of the upper mold by moving the bead holder device vertically towards the upper mold with the upper bead of the crude tire supported by the supporting means;

positioning a lower bead of the crude tire against the lower bead ring of the lower mold;

subsequent to said step of positioning, inflating the bladder, while maintaining the upper portion fixing ring at a fixed elevation in the vulcanizing press, to generate expansion forces exerted by the inflating bladder which push the lower bead of the crude tire into the lower bead ring of the lower mold; and

ceasing to maintain the upper portion fixing ring at a fixed elevation in the vulcanizing press, after the lower bead of the crude tire had been pushed into the lower bead ring of the lower mold under the expansion forces exerted by the inflating bladder, so as to cause the upper portion fixing ring to elevate owing to the inflated state of the bladder.

5,026,516
CORROSION RESISTANT CLADDING FOR NUCLEAR FUEL RODS

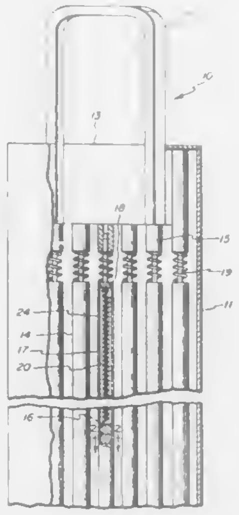
Dale F. Taylor, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed May 25, 1989, Ser. No. 356,482

The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.

Int. Cl.^{5} G21C *3/00*

U.S. Cl. 376—416 **24 Claims**



1. A corrosion resistant nuclear fuel element, comprising:

an elongated cladding container formed from a zirconium alloy tube consisting essentially of, by weight percent; 0.5 to 2.0 percent tin, 0.28 to 1.4 percent of a solute selected from the group consisting of molybdenum and tellurium, niobium and tellurium, niobium and molybdenum, wherein the niobium is less than 0.5 percent, molybdenum and tellurium and niobium, wherein the niobium is at least 0.5 percent; and the balance zirconium; and

a central core of a body of nuclear fuel material selected from the group consisting of compounds of uranium, plutonium, thorium and mixtures thereof disposed in and partially filling the container so as to leave a gap between the container and the core and an internal cavity at one end of the container, an enclosure integrally secured and sealed at each end of the container and a nuclear fuel material retaining means positioned in the cavity.

5,026,517
NUCLEAR POWER PLANT WITH WATER OR LIQUID SODIUM COOLANT AND A METALLIC COMPONENT CONTACTING THE COOLANT

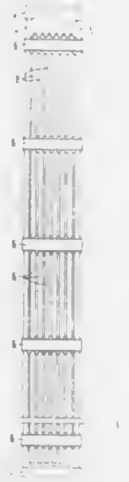
Günther Menken, Overath; Hans-Jürgen Romeiser, Nuremberg, and Josef Steven, Neunkirchen am Brand, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 263,275, Oct. 27, 1988, abandoned, which is a continuation-in-part of Ser. No. 806,706, Dec. 9, 1985, abandoned. This application Sep. 4, 1990, Ser. No. 579,241

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1984, 3445166; Oct. 28, 1987, 3736565

Int. Cl.^{5} G21C *3/30*

U.S. Cl. 376—438 **40 Claims**



1. Nuclear reactor fuel assembly in the form of a metallic component for a nuclear power plant, comprising fuel rods containing nuclear fuel, structural parts formed of zirconium or a zirconium alloy in the form of cladding tubes of the fuel rods for the nuclear fuel and spacer grids for the fuel rods, said structural parts having surfaces coming into contact with a water or liquid sodium coolant, and a coating from the group consisting of titanium carbide (TiC), titanium nitride (TiN), zirconium nitride (ZrN), chromium carbide (CrC), titanium aluminum vanadium nitride (TiAlVN), tantalum nitride (TaN), zirconium carbide (ZrC) and tungsten carbide (WC) disposed on the surfaces of said structural parts.

5,026,518
RARE EARTH-IRON MAGNET

Teruo Suzuki; Matsuo Kishi; Katsuyoshi Muraishi; Kenichi Ogawa, and Hiroshi Takashio, all of Tokyo, Japan, assignors to Seiko Instruments Inc., Japan

Division of Ser. No. 59,737, Jun. 8, 1987, Pat. No. 4,863,805. This application Jun. 22, 1989, Ser. No. 369,733

Claims priority, application Japan, Jun. 6, 1986, 61-131487; Jun. 6, 1986, 61-131488; Jul. 1, 1986, 61-154456; Jul. 2, 1986, 61-155751

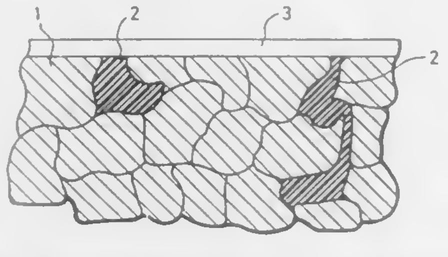
Int. Cl.^{5} B22F *3/26*

U.S. Cl. 419—12 **19 Claims**

1. A method of making a permanent magnet, comprising the steps of: providing Fe-B-R type alloy particles, wherein R is at least one element selected from the group consisting of rare earth elements and yttrium; compacting the particles into a compact and forming the compact into a desired magnet shape

VOL
1127
ISS
4
JE
25
1991
UMI

having voids between some of the compacted particles; filling the voids between the compacted particles with a sealing agent; and then coating the outer surface of the magnet shape with an organic coating layer.



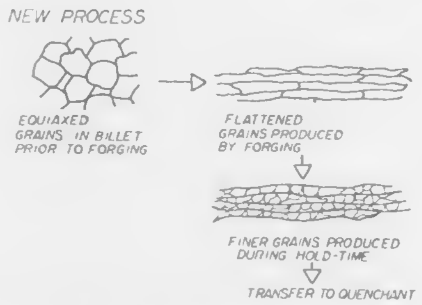
5,026,519
METHOD OF MAKING TUNGSTEN POWDER COMPACTS

Roselin E. Peralta, Athens, Pa., assignor to GTE Products Corporation, Stamford, Conn.
Filed Oct. 19, 1990, Ser. No. 600,377
Int. Cl.⁵ B22F *1/00*
U.S. Cl. 419—30 **1 Claim**

1. A process for forming a compact consisting essentially of pure tungsten metal powder by the steps of contacting a tungsten metal powder with and aqueous acid mixture at a sufficient concentration and for a sufficient period of time of etch the surface of said powder, said acid comprises a mixture of hydrofluroic acid and hydrochloric acid, and isostaticly pressing said powder at an ambient temperature at a pressure of from about 18,000 to about 20,000 psi. for a sufficient period of time to form a compact.

5,026,520
FINE GRAIN TITANIUM FORGINGS AND A METHOD FOR THEIR PRODUCTION

Prabir R. Bhowal, and Samuel V. Thamboo, both of Houston, Tex., assignors to Cooper Industries, Inc., Houston, Tex.
Filed Oct. 23, 1989, Ser. No. 425,608
Int. Cl.⁵ C22F *1/18*
U.S. Cl. 420—417 **15 Claims**

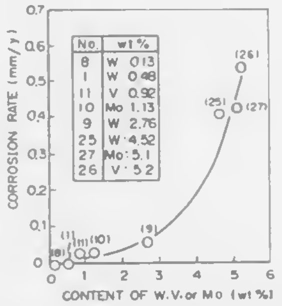

NEW PROCESS
EQUIAXED GRAINS IN BILLET PRIOR TO FORGING
FLATTENED GRAINS PRODUCED BY FORGING
FINER GRAINS PRODUCED DURING HOLD-TIME
TRANSFER TO QUENCHANT

1. A product having a maximum prior beta-grain size less than or equal to 0.5 mm and made from a titanium base alloy, by the process including the steps of

- selecting a billet of titanium base alloy,
- heating said billet to a first temperature within a range from 100% β-transus temperature to approximately 100° F. above said β-transus temperature,
- providing a forging press heated to a second temperature within said range which second temperature is not appreciably different from said first temperature,
- placing said billet within said forging press,
- then activating said forging press and pressing said billet while maintaining said billet's temperature at said second temperature,
- then holding said pressed billet at a third temperature within said range which is not appreciably different from said first and second temperatures for a time sufficient to allow mutual impingement of recrystallized fine grains one within another, but for a time insufficient to allow further grain growth, and
- then removing said billet from said forging press and quenching said billet to a fourth temperature, which fourth temperature is below the β-transus temperature, to arrest further grain growth and to establish said maximum prior beta-grain size.

5,026,521
ZIRCONIUM-TITANIUM AND/OR TANTALUM OXYGEN ALLOY

Haruhiko Kajimura; Hiroo Nagano, both of Kobe; Kazuo Yamanaka, Minoo, and Tsuyoshi Kodama, Otsu, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan
Filed Dec. 8, 1989, Ser. No. 447,843
Claims priority, application Japan, May 8, 1989, 1-114789; Sep. 21, 1989, 1-245419
Int. Cl.⁵ C22C *15/00*
U.S. Cl. 420—422 **18 Claims**

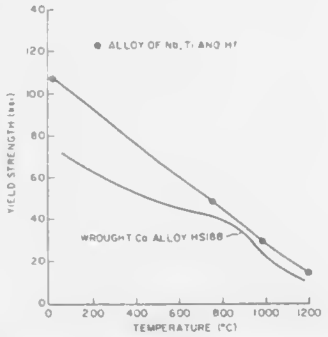


1. A zirconium alloy having improved resistance to general corrosion and stress corrosion cracking in nitric acid and good creep strength and bending properties, which consists essentially of, by weight percent:

Ta: 1.0–20%,
Fe: not greater than 0.3%, Cr: not greater than 0.1%,
oxygen: 0.05–0.2%, N: not greater than 0.05%,
H: not greater than 0.01%,
one or more of W, V, and Mo: 0–3.0% in total, and the balance Zr and inevitable impurities.

5,026,522
NB-TI-HF HIGH TEMPERATURE ALLOYS

Melvin R. Jackson, Schenectady, and Shyh-Chin Huang, Latham, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.
Filed Dec. 22, 1988, Ser. No. 288,667
Int. Cl.⁵ C22C *27/00*
U.S. Cl. 420—426 **6 Claims**



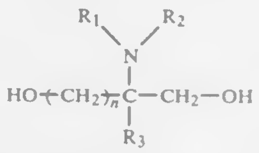
1. An alloy consisting essentially of the following ingredients and ingredient concentrations in atomic percent:

Ingredient	Concentration in Atom % From	To
Niobium	balance essentially	
Titanium	35	45
Hafnium	10	15.

5,026,523
PROCESS FOR INHIBITING CORROSION OF VAPOR/CONDENSED WATER SYSTEM

Shiro Taya, Tokyo, Japan, assignor to Kurita Water Industries Ltd., Tokyo, Japan
Filed Jan. 23, 1990, Ser. No. 469,061
Claims priority, application Japan, Feb. 9, 1989, 1-30195
Int. Cl.⁵ C23F *11/04*
U.S. Cl. 422—16 **7 Claims**

1. A process for inhibiting corrosion of vapor/condensed water systems, which comprises adding to boiler feed water an anticorrosive comprising at least one aminodiol represented by General formula (I) of the following:

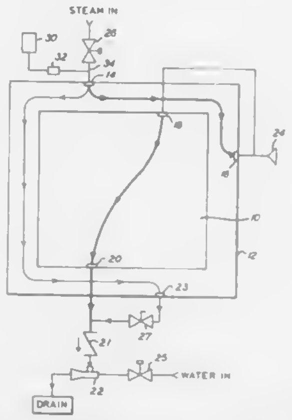

(I)

$$HO\!\left(CH_2\right)_n\!-\!\underset{\displaystyle R_3}{\overset{\displaystyle R_1\!-\!N\!-\!R_2}{C}}\!-\!CH_2\!-\!OH \qquad (I)$$

(in which R_1, R_2 and R_3 each represents —H, —CH_3, —C_2H_5 or —C_3H_7; and n represents an integer of 0 to 2) in an amount of 0.1 to 500 mg per liter of said boiler feed water so that the aminodiol is contained in vapor and condensed water and changes CO_2contained in the vapor and condensed water to an amine carbonate.

5,026,524
APPARATUS FOR SUBJECTING A LOAD TO A CONSTANT TEMPERATURE BELOW 100° C. IN A CLOSED CHAMBER

Anthony D. Powell, Lima, and Raymond J. Miller, Penfield, both of N.Y., assignors to MDT Corporation, Torrance, Calif.
Continuation-in-part of Ser. No. 901,230, Aug. 28, 1986, abandoned. This application May 27, 1987, Ser. No. 54,809
Int. Cl.⁵ A61L *2/00*
U.S. Cl. 422—26 **22 Claims**

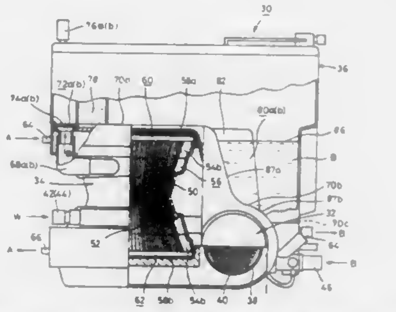


1. An apparatus for sterilizing a load at substantially constant and uniform temperature below 100° C. within a closed sterilization chamber connected through an inlet to a steam source and through an outlet to a vacuum source, said apparatus comprising:

- steam valve means operably associated with said inlet for regulating the flow of steam from the steam source to the interior of said chamber through the inlet;
- temperature sensor means positioned for sensing the temperature in the interior of said chamber and operable to generate signals corresponding to said temperature; and
- control means for controlling the admission of steam to said chamber and the evacuation of said chamber by said vacuum source, thereby maintaining the temperature within said chamber between a preset lower boundary value and a preset upper boundary value, including
  - steam flow control means connected to said temperature sensor and said steam valve means to receive signals from said sensor means and in response to said signals selectively to operate said steam valve means to admit steam to said chamber interior when the temperature sensed by said sensor means is below said lower boundary value and to prevent admission of steam to the chamber when the temperature sensed by said sensor means exceeds said upper boundary value, and
  - evacuation control means responsive to a condition of steam within said chamber and operably associated with said outlet and said vacuum source for evacuating the interior of said chamber during sterilization, said evacuation control means operable to intermittently evacuate said chamber through said outlet in response to a particular steam condition sensed within said chamber.

5,026,525
EXTRACORPOREAL BLOOD CIRCULATING APPARATUS

Yoshiro Katsura, Fuji, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan
Filed May 19, 1988, Ser. No. 195,884
Claims priority, application Japan, May 19, 1987, 62-122243; Dec. 25, 1987, 62-331480
Int. Cl.⁵ A61M *1/14*
U.S. Cl. 422—45 **10 Claims**



1. An extracorporeal blood circulating apparatus comprising an artificial lung and a blood reservoir which are joined to each other by at least one tube and a blood inlet port for delivering blood from said artificial lung into said blood reservoir, said blood inlet port being further defined in the same plane as that of a bottom of said blood reservoir and lying horizontally, the bottom of said blood reservoir comprising step portions joined by smoothly slanted surfaces, thereby defining a smoothly curved surface extending from an uppermost step portion toward a lowermost step portion, said blood inlet port being defined in said uppermost step portion of the bottom of said blood reservoir.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,526

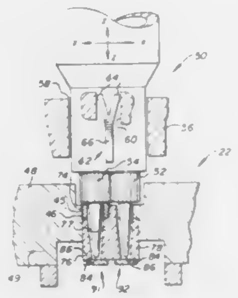
AUTOMATED CAPPING MEANS FOR ANALYZER PIPETTE

John A. Quenin, Rochester, and Raymond F. Jakubowicz, Rush, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 9, 1990, Ser. No. 477,405

Int. Cl.^{5} G01N *35/06*

U.S. Cl. 422—64 5 Claims



1. In an analyzer for assaying an analyte of a body liquid dispensed onto a test element, the analyzer including

means for guiding a test element along a predetermined path and means adjacent said path for positioning a pipette to dispense a patient sample on a test element on a portion of said path;

the improvement wherein said analyzer further includes capping means for blocking air access to the dispensing end of the pipette to prevent evaporation of liquid, and means for movably mounting said capping means within said path, said mounting means being constructed to allow said capping means to move from a first position that blocks said path and covers said pipette dispensing end, to a second position that unblocks said path and uncovers said pipette dispensing end;

said mounting means being further constructed to permit a test element advancing along said path to push said capping means into said second position, and further including a test element support below said pipette-positioning means for positioning a test element to receive liquid from said pipette, wherein said mounting means are pivotally attached to said test element support.

5,026,527

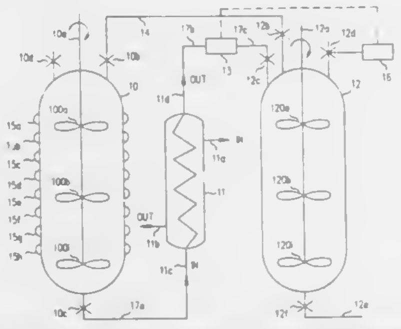
STRUCTURE FOR FORMING A REACTION PRODUCT

Pieter Krijgsman, 10, Groteweg, 8191JW - Wapenveld, Netherlands

Division of Ser. No. 887,753, Jul. 18, 1986, Pat. No. 4,753,787. This application Mar. 7, 1988, Ser. No. 164,743

Int. Cl.^{5} G05D *7/06, 16/20;* **F04F** *11/02*

U.S. Cl. 422—110 5 Claims



1. A system for forming reaction products comprising:

an autoclave for reacting reaction constituents for a selected time and pressure to form non-gaseous reaction products and gas under pressure;

a vessel adapted for receiving said non-gaseous reaction products;

a pressure release valve on said vessel;

a flow passage connecting said autoclave to said vessel, said flow passage being adapted for the transfer of said non-gaseous reaction products from said autoclave to said vessel;

means for transferring said gas under pressure from said autoclave to said vessel prior to the transfer of said non-gaseous reaction products and after a reaction process is substantially completed in said autoclave; and

means for controlling as a function of time the pressure in said vessel to be beneath the pressure in said autoclave so as to maintain constant the flow rate of said non-gaseous reaction products from said autoclave to said vessel.

5,026,528

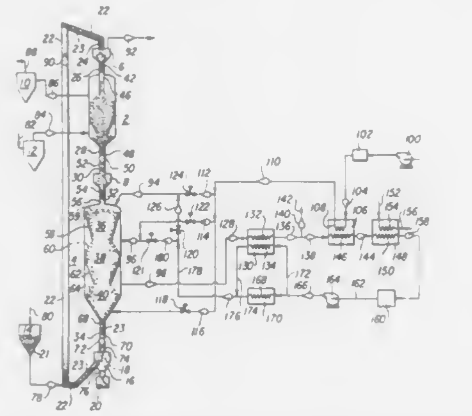
SYSTEM FOR REMOVAL OR SULFUR COMPOUNDS FROM GASES AND FOR REGENERATING SPENT SORBENTS

Eli Gal, Lancaster, Pa., assignor to General Electric Environmental Services, Inc., Lebanon, Pa.

Continuation of Ser. No. 354,167, May 19, 1989, abandoned, which is a division of Ser. No. 58,060, Jun. 4, 1987, Pat. No. 4,857,285. This application Sep. 27, 1990, Ser. No. 590,455

Int. Cl.^{5} B01J *8/12*

U.S. Cl. 422—111 15 Claims



1. A system for the desulfurization of hot gases with sorbent which reacts with sulfur compounds in the hot gas, comprising:

(a) a gravity fed absorber having means for feeding the sorbent into the top of the absorber, means for moving a bed of sorbent through the absorber in contact with the hot gas containing sulfur compounds and means for introducing the hot gases containing sulfur compounds into the absorber and for withdrawing hot gas having sulfur compounds removed therefrom in such a manner that the hot gases move in a direction countercurrent to the direction of movement of the moving bed;

(b) a gravity fed regenerator having means defining a first regeneration stage, means defining a second regeneration stage and a means defining a third stage for regenerating, cooling and purging in a single vessel;

(c) means for feeding spent sorbent from the absorber to the first regeneration stage of the regenerator;

(d) means for moving the bed of spent sorbent from the first regeneration stage to the second regeneration stage and thereafter to the third stage for regenerating, cooling and purging;

(e) a gas inlet means for adding an oxygen-containing gas to the first regeneration stage to contact the spent sorbent and to regenerate at least part of the spent sorbent, the oxygen-containing gas being added to the first regeneration stage to provide a flow of oxygen-containing gas in a direction which is cocurrent with the direction of flow of the spent sorbent;

(f) means to control the amount of oxygen contacting the spent sorbent and thereby control heat generated by reaction between the oxygen and the spent sorbent in the first regeneration stage;

(g) a gas inlet means for adding an oxygen-containing gas to the second regeneration stage to contact the spent sorbent and thereby form a bed of regenerated sorbent, the oxygen-containing gas being added to the second regeneration stage to provide a flow of oxygen-containing gas in a direction which is cocurrent with the direction of flow of the spent sorbent in the second regeneration stage;

(h) means to control the amount of oxygen contacting the spent sorbent and thereby control heat generated by reaction between the oxygen and the spent sorbent in the second regeneration stage;

(i) a gas inlet means for passing an oxygen-containing gas into the third stage for regenerating, cooling and purging regenerated sorbent therein, the oxygen-containing gas being added to the third stage to provide a flow of oxygen-containing gas in a direction countercurrent to the direction of flow of the movable bed of regenerated sorbent;

(j) a gas outlet means for removing from the regenerator the gas from the two gas inlets which flows in a direction cocurrent with the movable bed in the first and second regeneration stages and the gas from the gas inlet which flows in a direction countercurrent with the direction of the movable bed in the third stage;

(k) means for diverting at least part of the gas removed from the regenerator through the gas outlet to the gas inlet of the first regeneration stage and to the gas inlet of the second regeneration stage, the remainder of the gas being removed as product; and

(l) means for removing regenerated sorbent from the regenerator and feeding the regenerated sorbent into the top of the absorber.

5,026,529

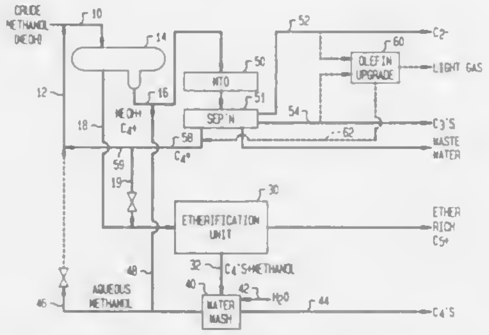
PRODUCTION OF ETHERS FROM METHANOL

Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 124,525, Nov. 24, 1987, Pat. No. 4,831,195. This application Jan. 17, 1989, Ser. No. 297,731

Int. Cl.^{5} B01J *8/00*

U.S. Cl. 422—190 3 Claims



1. A continuous catalytic reactor system for converting crude methanol to methyl t-alkyl ethers comprising:

(a) extraction means for contacting a crude methanol feedstock containing a minor amount of water with a liquid hydrocarbon extraction stream rich in $C_4{}^+$ iso-olefinic hydrocarbons under extraction conditions favorable to selective extraction of the methanol, thereby providing an extract liquid stream rich in methanol and an aqueous raffinate stream containing unextracted methanol;

(b) first etherification reactor means including means for charging the extract liquid stream with $C_4{}^+$ olefinic hydrocarbon and extracted methanol substantially free of water to a catalytic etherification reaction zone in contact with acid etherification catalyst under process conditions for converting methanol and iso-olefin to predominantly methyl tertiary-alkyl ether;

(c) second catalytic reactor means for catalytically converting the aqueous raffinate stream in contact with methanol-to-olefin catalyst to produce a hydrocarbon mixture containing C_2–C_5 olefins, including $C_4{}^+$ iso-olefinic component;

(d) washing means for contacting at least a portion of etherification reaction effluent from step (b) with water to recover methanol from the effluent; and

(e) means for recovering from the second reactor means a product stream rich in methyl tert-alkyl ether.

5,026,530

METHOD FOR PRODUCING COPPER ARSENATE COMPOSITIONS

William F. Drinkard, Jr., Charlotte, and Hans J. Woerner, Mt. Pleasant, both of N.C., assignors to Drinkard Developments, Charlotte, N.C.

Filed Mar. 30, 1990, Ser. No. 502,564

Int. Cl.^{5} C01G *28/02*

U.S. Cl. 423—87 **24 Claims**

1. A process for the production of copper arsenate comprising:

a) reacting arsenic trioxide with aqueous ammonia to produce ammonium arsenite solution,

b) reacting ammonium arsenite solution so produced with copper and oxygen in the presence of cupric ion and a halide catalyst to produce cuprammonium arsenate solution, and

c) removing ammonia from the cuprammonium arsenate solution so produced to yield a slurry of copper arsenate.

5,026,531

SILICATE TREATMENT OF MOLECULAR SIEVE AGGLOMERATES

Medhat K. Tannous, Mobile, Ala.; John D. Sherman, Chappaqua, N.Y., and Alan P. Cohen, New Fairfield, Conn., assignors to UOP, Des Plaines, Ill.

Filed Feb. 10, 1989, Ser. No. 310,121

Int. Cl.^{5} C10B *79/00*

U.S. Cl. 423—328 9 Claims

1. Method for preparing attrition resistant molecular sieve agglomerates, comprising:

(a) forming an initial agglomerate comprising zeolite and binder selected from the group consisting of metal oxides, clays, silicas, aluminas, silica-aluminas, silica-zierconias, silica-thorisas, silica-berylias, silica-titanias, silica-alumina-thorias, silica-alumina-zirconias and mixtures thereof.

(b) heating the initial agglomerate at a temperature within the range of from about 200–700° C. and sufficient to set the binder and form a calcined agglomerate;

(c) contacting the calcined agglomerate with an aqueous alkali metal silicate solution containing from about 1 to 10 wt. % alkali metal oxide and from about 2 to 20 wt. % silicon dioxide to form a treated agglomerate; and

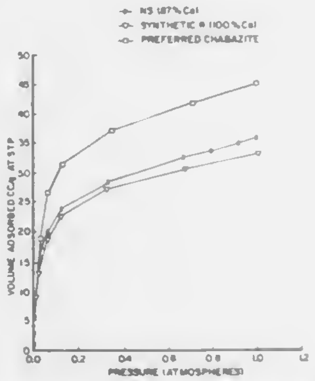
(d) drying the treated agglomerate at a temperature of from about ambient temperature to about 650° C. and sufficient to remove water therefrom.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,532

PROCESS FOR THE PREPARATION OF AN IMPROVED CHABAZITE FOR THE PURIFICATION OF BULK GASES

Thomas R. Gaffney, Allentown, and Charles G. Coe, Macungie, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.
Filed Apr. 6, 1989, Ser. No. 334,642
Int. Cl.^{5} C01B *33/34*
U.S. Cl. 423—328 **19 Claims**

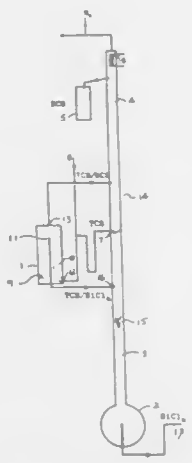


1. A batch process for preparing a synthetic chabazite having a Si/Al ratio of 1.8 to 2.3 which comprises mixing an alumina source, sodium hydroxide, potassium hydroxide, a TMA reagent at a $(TMA)_2O:Al_2O_3$ ratio of about 0.005, and a silica source to form an aqueous gel, and crystallizing the gel by heating to form the chabazite product, wherein said process is carried out on a scale such that at least 60.6 g of the alumina source is utilized in the process.

5,026,533

METHOD AND APPARATUS FOR THE PREPARATION OF DICHLOROSILANE

Reinhard Matthes; Reinhold Schork, both of Rheinfelden, and Hans-Joachim Vahlensieck, Wehr, all of Fed. Rep. of Germany, assignors to Hüls Troisdorf AG, Cologne, Fed. Rep. of Germany
Filed Mar. 28, 1988, Ser. No. 173,969
Claims priority, application Fed. Rep. of Germany, Apr. 4, 1987, 3711444
Int. Cl.^{5} C01B *33/08*
U.S. Cl. 423—342 **15 Claims**

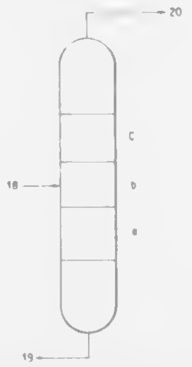


1. A method of preparing dichlorosilane comprising:
introducing trichlorosilane into a reactor having a bed containing a solid catalyst of an alkylamino trialkoxysilane chemically bound to a support material;
disproportionating the trichlorosilane in the reactor to form a liquid reaction phase and a gas phase containing dichlorosilane and trichlorosilane wherein the reaction is conducted at a temperature of from 10° C. up to the boiling point of the reaction mixture;
removing the gas phase from the reactor;
condensing trichlorosilane from the gas phase and recycling the condensed trichlorosilane into the reactor;
removing at least a portion of the liquid reaction phase from the reactor;
separating the removed portion of the liquid reaction phase into $SiCl_4$ and trichlorosilane;
recycling the separated trichlorosilane into the reactor; and
recovering the dichlorosilane from the gas phase.

5,026,534

PROCESS FOR THE PREPARATION OF AQUEOUS AMMONIUM THIOCYANATE SOLUTIONS

Gerhard Meyer, Obernburg; Gunter Sudheimer, Darmstadt; Hans Zengel, Kleinwallstadt, and Hans Grothaus, Cologne, all of Fed. Rep. of Germany, assignors to Akzo N.V., Netherlands
Continuation of Ser. No. 18,822, Feb. 24, 1987, abandoned, which is a continuation of Ser. No. 836,072, Mar. 4, 1986, abandoned. This application Apr. 20, 1990, Ser. No. 512,497
Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, 3508404
Int. Cl.^{5} C01C *3/20*
U.S. Cl. 423—366 **21 Claims**



1. A process comprising reacting ammonia with carbon disulfide in the presence of water or a first aqueous ammonium thiocyanate solution and a catalytic amount of activated carbon in a reaction vessel to produce a second aqueous ammonium thiocyanate solution, said ammonia being reacted with said carbon disulfide in a single reaction zone to form intermediate, all of said intermediates being decomposed in situ in said single reaction zone at a temperature of from 90° to 150° C. and a pressure of from 2 to 7 bar.

5,026,535

METHOD FOR DECOLORING SULPHURIC ACID DERIVING FROM ACID PRODUCTION PROCESSES

Jan L. Jonsson, Skellefteå, and Sten A. Nilsson, Ursviken, both of Sweden, assignors to Boliden Contech AB, Stockholm, Sweden
Filed Oct. 18, 1989, Ser. No. 423,361
Claims priority, application Sweden, Nov. 16, 1988, 8804123
Int. Cl.^{5} C01B *17/90, 17/76*
U.S. Cl. 423—525 **17 Claims**

1. A method for decoloring sulphuric acid produced by the contact method having one or more absorption circuit stages and in which hydrogen peroxide is added for decoloring the sulphuric acid produced, comprising adding the hydrogen peroxide to the sulphuric acid in the final absorption circuit stage, and simultaneously maintaining the temperature in said final stage at above about 70° C.

5,026,536

HYDROGEN PRODUCTION FROM HYDROCARBON

Tomonori Shioiri, Kanagawa; Shinichi Satake; Yasuo Sekido, both of Yokohama; Tokuo Fujisou, Yokosuka; Akira Obuchi, and Hideharu Kato, both of Yokohama, all of Japan, assignors to Nippon Oil Co., Ltd. and Petroleum Energy Center, both of Tokyo, Japan
Filed Dec. 18, 1989, Ser. No. 452,197
Claims priority, application Japan, Dec. 20, 1988, 63-321495; Feb. 2, 1989, 1-24422
Int. Cl.^{5} C01B *3/26*
U.S. Cl. 423—652 **17 Claims**

1. A process for producing hydrogen from a hydrocarbon feed which is naphtha, kerosene or natural gas, said hydrocarbon feed having sulfur content between 0.5 and 300 ppm by weight, which consists of steps of 1) contacting said hydrocarbon feed with a nickel-containing sorbent in the presence of steam and hydrogen-containing gas at a pressure of lower than 50 kg/cm^2G, at a temperature of 250° to 500° C. and at a GHSV of 100 to 5,000 hr^{-1} or at an LHSV of 0.1 to 10 hr^1 to obtain a reaction mixture, and 2) subsequently treating said reaction mixture with a steam reforming catalyst in a steam reformer at a pressure of lower than 50 kg/cm^2G, at a temperature of 400° to 600° C. at a catalyst bed inlet and 600° to 850° C. at a catalyst bed outlet and recovering reformed gas from the steam reformer.

5,026,537

METHODS FOR IMAGING ATHEROSCLEROTIC PLAQUE

Peter E. Daddona, West Chester; Harvey J. Berger, Devon, both of Pa., and Rodger P. McEver, Oklahoma City, Okla., assignors to Centocor, Inc., Malvern, Pa.
Filed Apr. 6, 1989, Ser. No. 334,459
Int. Cl.^{5} A61K *49/02*
U.S. Cl. 424—1.1 **6 Claims**

1. A method of imaging an atherosclerotic plaque, comprising the steps of:
a. administering to an individual suspected of having an atherosclerotic plaque, an effective amount of a radiolabeled monoclonal antibody or fragment thereof, specific for activated platelet or endothelial cell membrane protein GMP-140;
b. allowing the radiolabeled monoclonal antibody or antibody-fragment to accumulate at the plaque site;
c. detecting the signal generated by the radiolabel by means of a photoscanning device;
d. converting the detected signal into an image of the plaque.

5,026,538

METHOD OF TREATING ARTHRITIS, INCLUDING RHEUMATOID ARTHRITIS, WITH 166 HOLMIUM RADIONUCLIDE

Ephraim Lieberman, Suffern; Maurice E. Bordoni, Westtown, and Alfred K. Thornton, New Hampton, all of N.Y., assignors to Cadema Medical Products, Inc., Middletown, N.Y.
Division of Ser. No. 7,597, Jan. 28, 1987, Pat. No. 4,849,209, which is a continuation-in-part of Ser. No. 742,402, Jun. 7, 1985, Pat. No. 4,572,464. This application Jun. 16, 1989, Ser. No. 367,050
Int. Cl.^{5} A61K *43/00;* A61N *5/10*
U.S. Cl. 424—1.1 **3 Claims**

1. A method for the treatment of arthritis comprising administering an effective amount of a radioactive composition including an aggregated suspension having particles, the particles having a minimum particle size of one micron, the aggregated suspension including particles containing ^{166}Holmium, to the inflamed synovium of the particular joint of a mammal body in need of such treatment.

5,026,539

ANTICARIES DENTIFRICE

Robert J. Jackson; Susan A. Duke, and Paul Barnett, all of Weybridge, England, assignors to Beecham Group p.l.c., England
Filed Mar. 27, 1990, Ser. No. 499,712
Claims priority, application United Kingdom, Mar. 28, 1989, 8906913
Int. Cl.^{5} A61K *7/16, 7/18, 7/24*
U.S. Cl. 424—49 **9 Claims**

1. An oral hygiene composition in the form of a non-fluoride dentifrice, comprising:
(a) greater than 0 to 10% by weight of a source of hydrogen citrate ions;
(b) greater than 0 to 7% by weight of an oxalate salt;
(c) an orally acceptable excipient; and
(d) a dentally acceptable abrasive;
the composition having a pH of from 4 to 7 and containing no fluoride anti-caries agent.

5,026,540

SUNSCREEN COMPOSITION

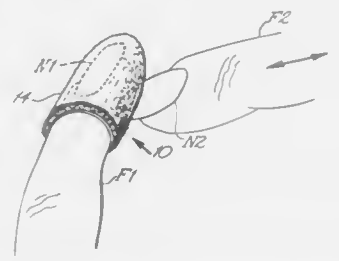
Richard P. Dixon, Aberdeen, and Leonard J. Kedzierski, III, Hamilton, both of N.J., assignors to Chesebrough-Pond's USA Co., Greenwich, Conn.
Filed Jun. 4, 1987, Ser. No. 58,019
Int. Cl.^{5} A61K *7/44, 7/42*
U.S. Cl. 424—60 **7 Claims**

1. A clear sunscreen composition consisting essentially of a film-forming copolymer of vinylpyrrolidone and an alpha-olefin, an ethanol solvent for said film-forming polymer, and an ultraviolet sunscreening agent and an emollient.

5,026,541

DISPOSABLE FINGERNAIL POLISH REMOVING DEVICE

Ann M. Lanier, 1523 Field Rd., Sarasota, Fla. 34231
Filed Jun. 7, 1989, Ser. No. 363,970
Int. Cl.^{5} A61K *7/04*
U.S. Cl. 424—61 **8 Claims**



1. A disposable fingernail polish removing device structured to be worn on a first finger end to remove old fingernail polish from a nail of a second finger comprising:
an elongated inner finger end cover having an end opening and formed of generally non-porous material structured to allow insertion of a first finger end thereinto;
a porous compressible outer layer connected over, and generally coextensively covering, said inner cover, said outer layer structured to absorbently receive a quantity of liquid fingernail polish remover and to absorb and collect old fingernail polish from the nail of a second finger as said outer layer is rubbed transversely against the second fingernail when said device is worn on the first finger end;
said inner cover preventing liquid fingernail polish remover from coming into contact with fingernail polish on the fingernail of the first finger.

VOL
1127
ISS
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5,026,542
DEPILATORY COMPOSITION

Frederick C. Baines, Dunstable, and Richard Johnston, Reading, both of England, assignors to The Gillette Company, Boston, Mass.

Filed Sep. 28, 1989, Ser. No. 414,156

Int. Cl.^{5} A61K *7/15, 7/155*

U.S. Cl. 424—73 **6 Claims**

1. A two part depilatory composition in which the first part comprises 10 to 25 percent by weight of polyvinyl alcohol and the second part comprises a cross-linking agent selected from the class consisting of (a) borax and a polyhydroxy alcohol and (b) Congo red, said depilatory composition further comprising 6 to 20 percent by weight of a depilatory agent in at least one of said first and second parts, the two parts containing such proportions said first part having from 30 to 70 parts by weight and said second part having from 70 to 30 parts by weight of the ingredients specified that when the parts are mixed in such proportions that there is sufficient borax or Congo red to effect cross-linking of the polyvinyl alcohol, the mixed composition contains sufficient depilatory agent to effect depilation in an acceptable period and, when the second part comprises borax, sufficient polyhydroxy alcohol to moderate the rate of cross-linking.

5,026,543
ADJUVANT MIXTURE

Eric O. Rijke, Boxmeer, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands

Continuation of Ser. No. 168,287, Mar. 15, 1988. This application Sep. 27, 1989, Ser. No. 414,648

Claims priority, application Netherlands, Mar. 17, 1987, 8700629

Int. Cl.^{5} A61K *31/78, 31/745, 31/74, 39/00*

U.S. Cl. 424—81 **6 Claims**

1. Oil-free adjuvant mixture comprising an immunostimulatory amount of polyoxypropylene/polyoxyethylene polyols having HLB values less than or equal to 2, and at least one acrylic acid polymer wherein the ratio of polyols to acrylic acid polymer is from 160:1 to 5:1 on a weight basis.

5,026,544
METHODS AND COMPOSITIONS FOR INHIBITING THE GROWTH OF NEOPLASTIC CELLS

Thomas B. Albrecht; Thomas E. Albrecht, and William R. Fleischmann, all of Galveston, Tex., assignors to Board of Reagents, The University of Texas System, Austin, Tex.

Filed Feb. 16, 1988, Ser. No. 156,704

Int. Cl.^{5} A61K *31/485, 37/66*

U.S. Cl. 424—85.4 **14 Claims**

1. A method for inhibiting the growth of neoplastic cells comprising subjecting the cells to an effective concentration of a papaverine family agent in combination with an interferon.

5,026,545
TREATMENT OF ALLERGY AND COMPOSITION THEREFOR

Jean-Marie Saint-Remy, Grez-Doiceau; Philippe Lebrun, Namur; Serge Lebeque, and Pierre L. Masson, both of Brussels, all of Belgium, assignors to Baxter International, Inc., Deerfield, Ill. and International Institute of Cellular and Molecular Pathology, Brussels, Belgium

Continuation-in-part of Ser. No. 651,073, Sep. 17, 1984, Pat. No. 4,740,371. This application Sep. 20, 1989, Ser. No. 410,021

Int. Cl.^{5} A61K *39/395, 39/35*

U.S. Cl. 424—85.8 **26 Claims**

1. A pharmaceutical composition for administration to human beings for the treatment of immediate hypersensitivity to an allergen, said composition consisting essentially of:

an immune complex of the allergen and a purified antibody specific thereto, said allergen being selected from a specific subclass of antigen that can cause immediate hypersensitivity that is mediated by IgE antibody, said antibody being present in said composition in a molar excess with respect to said allergen present in said composition; and

a pharmacologically acceptable carrier or diluent.

5,026,546
STABILIZED ADJUVANT SUSPENSION COMPRISING DIMETHYL DIOCTADECYL AMMONIUM BROMIDE

Lucas A. T. Hilgers, and Marinus W. Weststrate, both of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

Filed Dec. 17, 1987, Ser. No. 134,046

Claims priority, application Netherlands, Dec. 19, 1986, 8603232

Int. Cl.^{5} A61K *39/39, 31/78, 47/14, 47/32*

U.S. Cl. 424—88 **4 Claims**

1. A stabilized aqueous adjuvant suspension comprising dimethyl dioctadecyl ammonium bromide stabilized with at least 0.1 part by weight of a polymer of acrylic acid crosslinked with polyallyl sucrose per part by weight of dimethyldioctadecyl ammonium bromide.

5,026,547
COMPOUND HAVING INSECTICIDAL ACTIVITY AND INSECTICIDE COMPOSITION CONTAINING THE SAME

Kei-ichi Imamura; Shuichi Gomi; Michiaki Iwata; Shinji Miyadoh; Masaru Shimura; Takashi Shomura; Masaji Sezaki, and Shigeharu Inoye, all of Kanagawa, Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Nov. 9, 1989, Ser. No. 434,954

Claims priority, application Japan, Nov. 11, 1988, 63-283715

Int. Cl.^{5} A61K *35/70;* **C12P** *1/02*

U.S. Cl. 424—122 **2 Claims**

1. A compound having the following properties:

(1) Appearance: pale yellow grain like crystal;

(2) Elemental analysis as $C_{28}H_{35}NO_3.H_2O$: calculated: C, 74.47%, H, 8.26%, N, 3.10%; found: C, 75.08%, H, 8.06%, N, 3.38%;

(3) Mass spectrum (FD-MS): m/z 433 (M+);

(4) Melting point: 182°–184° C.;

(5) Specific rotation: $[\alpha]_D^{24} = -185°$ (c 1.0, $CHCl_3$);

(6) UV and visible spectra: shown in FIG. 1;

(7) IR spectrum: shown in FIG. 2;

(8) ^1H NMR spectrum: shown in FIG. 3;

(9) ^{13}C NMR spectrum: shown in FIG. 4;

(10) Solubility: soluble in chloroform, ethyl acetate, acetone and methanol but insoluble in water; and

(11) Basic, acidic or neutral: acidic or salts thereof.

5,026,548
SURFACTANT

Roger Evans; Michael H. Jee; Nigel H. Sander; Ian H. Smith, and Raymond K. Gibson, all of Berkshire, Great Britain, assignors to Cadbury Schweppes plc, Bournville, England

Filed Dec. 28, 1988, Ser. No. 293,163

Claims priority, application United Kingdom, Apr. 28, 1987, 8710041; Oct. 29, 1988, 8825371

Int. Cl.^{5} A61K *35/78*

U.S. Cl. 424—195.1 **10 Claims**

1. A process for the preparation of a surfactant, comprising:

(a) extracting oats with a permitted aliphatic alcohol, which has at least two carbon atoms, to produce an alcohol extract;

(b) extracting said alcohol extract with methanol to produce a methanol extract;

(c) evaporating methanol from said methanol extract to produce said surfactant.

5,026,549
METHOD OF EXTRACTING SOLID MATERIALS USING A SOLVENT AND AN APPARATUS FOR IMPLEMENTING SAME

Dominique Coutiere, Labrit, France, assignor to Biolandes Technologies, Labrit, France

Filed Jan. 25, 1989, Ser. No. 301,410

Claims priority, application France, Aug. 26, 1988, 88 11246

Int. Cl.^{5} A61K *35/78*

U.S. Cl. 424—195.1 **13 Claims**

1. A process for extracting solid materials using a solvent, comprising the following steps:

(a) mixing said solid material with a solvent to form a solvent solute mixture, wherein at least one component of said solid material is soluble in said solvent;

(b) vaporizing said mixture to form a vapor that contains at least a portion of the less volatile liquid components of said mixture in the form of liquid droplets;

(c) separating the vapor from the droplets in a centrifugal separator at a controlled wall temperature, whereby the droplets coalesce on the wall and wherein the temperature of the wall of the separator is selected such that a sufficient amount of the vapor continuously condenses on the wall in order to permit recovery of the coalesced droplets.

5,026,550
PROCESS FOR THE PREPARATION OF AN ANTIOXYDANT EXTRACT OF SPICES

Robert Aeschbach, Vevey, and Georges Philippossian, Lausanne, both of Switzerland, assignors to Nestec S.A., Vevey, Switzerland

Filed Aug. 25, 1988, Ser. No. 236,504

Claims priority, application Switzerland, Sep. 16, 1987, 3574/87

Int. Cl.^{5} A61K *35/28*

U.S. Cl. 424—195.1 **17 Claims**

1. A process for preparation of an antioxidant composition comprising extracting a spice selected from a group of spices consisting of rosemary and sage at least once with a nonpolar solvent thereby obtaining a first extract and an extracted residue, separating the first extract from the extracted residue, extracting the extracted residue at least once with a polar solvent thereby obtaining a second extract, concentrating the second extract and then drying the concentrated extract for obtaining an antioxidant composition.

5,026,551
BATH ADDITIVE COMPOSITION

Hidenori Yorozu; Yasuteru Eguchi; Wataru Ohkawa, all of Utsunomiya, and Yasunobu Matsumoto, Ichikai, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Jan. 8, 1987, Ser. No. 1,461

Claims priority, application Japan, Jan. 8, 1986, 61-1779; Jan. 8, 1986, 61-1780; Oct. 9, 1986, 61-240248

Int. Cl.^{5} A61K *7/48, 7/50*

U.S. Cl. 424—44 **9 Claims**

1. A weakly acidic bath additive composition comprising:

(1) carbon dioxide gas or a mixture of a carbonate and an acid capable of producing carbon dioxide gas,

(2) an oily ingredient which is liquid or solid at ambient temperature in an amount effective to provide a moistened feel on the skin,

(3) an effective amount of a dispersant or emulsifier, and

(4) fine powder having particle size of less than 3μm, a precipitation ratio in water after 24 hours of less than 50 wt % and substantially insoluble in water, in an amount effective when dispersed in a bath water to suppress the sticky feeling due to the oily ingredient and to increase the fresh feeling after taking a bath.

5,026,552
SHEET MATERIAL FOR PERFORMING A SKIN OR HAIR TREATMENT, METHOD FOR ITS MANUFACTURE, AND ARTICLES MADE OF THIS MATERIAL

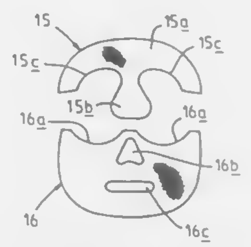
Jean-Louis Gueret, Paris; Jean-Claude Contamin, Morangis, and Liliane Ayache, Paris, all of France, assignors to L'Oreal, Paris, France

Filed Sep. 26, 1988, Ser. No. 248,937

Claims priority, application France, Sep. 25, 1987, 87 13264

Int. Cl.^{5} A61K *6/00, 7/06, 31/74*

U.S. Cl. 424—401 **8 Claims**



1. A dry sheet for performing a local skin treatment or hair conditioning treatment upon temporary application in a dry state to a wet cutaneous surface or scalp, said sheet which is a flexible mesh made out of a fabric having a thickness between 0.01 and 2 mm with between approximately 2 to 100 holes per centimeter, the ratio between the surface area of said holes to the total surface area of said sheet being between 5 and 80% and a film of hydratable polymer gel being coated on said mesh and said gel having a mean thickness ranging between 5 and 100 μm.

5,026,553
SWINNEY'S HAIR GROWTH FORMULA

Dale E. Swinney, 102 S. Ballentine, Du Quoin, Ill. 62832, assignor to Dale E. Swinney, Du Quoin, Ill.

Continuation-in-part of Ser. No. 390,066, Aug. 7, 1989, abandoned. This application Apr. 20, 1990, Ser. No. 512,140

Int. Cl.^{5} A61K *6/00*

U.S. Cl. 424—401 **5 Claims**

1. A composition consisting of 90 to 95% by weight soybean oil, 2 to 3% by weight olive oil, 2 to 3% by weight isopropyl alcohol, and 1 to 2% by weight water (H2O).

5,026,554
METHOD OF INHIBITING FUNGAL GROWTH USING SQUALENE SYNTHETASE INHIBITORS

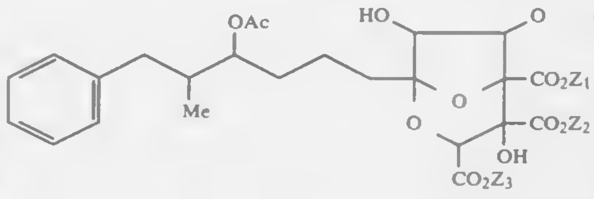
Kenneth F. Bartizal, Somerset, and Janet C. Onishi, Mountainside, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Sep. 13, 1990, Ser. No. 582,303

Int. Cl.^{5} A61K *31/335*

U.S. Cl. 424—404 **6 Claims**

1. A method of inhibiting fungal growth comprising applying to the area where growth is to be controlled an antifungally effective amount of a compound of formula 1:.



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VOL
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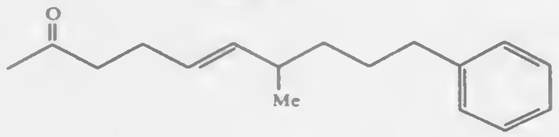
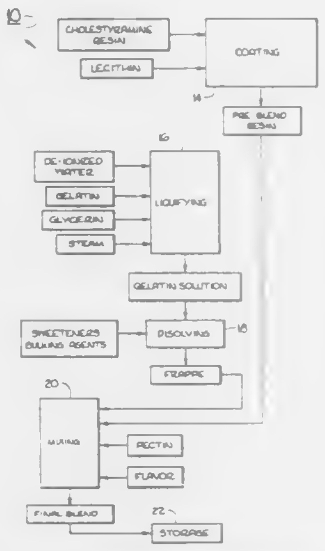


wherein Z_1, Z_2, and Z_3 are each independently selected from
(a) H;
(b) C_{1-5} alkyl;
(c) C_{1-5} alkyl substituted with a member of the group consisting of
  (i) phenyl,
  (ii) phenyl substituted with methyl, methoxy, halogen (Cl, Br, I, F) or hydroxy; or
a pharmaceutically acceptable salt of a compound of formula (I).

5,026,555
METHOD FOR PREPARING AN ANION EXCHANGE RESIN DELIVERY SYSTEM

Michael J. Killeen, Lafayette, N.J., assignor to Warner-Lambert Co., Morris Plains, N.J.
Filed Oct. 28, 1988, Ser. No. 263,846
Int. Cl.⁵ A61K *47/00*
U.S. Cl. **424—439** **13 Claims**



1. A method for preparing an edible anion exchange resin delivery system which comprises the steps of:
(A) Coating edible anion exchange resin granules having anticholesteremic properties with lecithin by mixing for about one minute said anion exchange resin granules with said lecithin in a hollow, generally cylindrical-shaped mixing chamber having a circular sidewall by rotating at about 1750 revolutions per minute or greater a plurality of blades within said chamber around the longitudinal axis of said chamber and in a plane substantially perpendicular thereto
(B) Preparing a gelatin-frappe;
(C) Placing said lecithin-coated anion exchange anion granules and said gelatin-frappe in said mixing chamber;
(D) Moving one or more blade(s) within said mixing chamber for combining said granules with said frappe to create a mixture thereof; and
(E) Removing said mixture from said mixing chamber before said gelatin frappe sets up.

5,026,556
COMPOSITIONS FOR THE TRANSDERMAL DELIVERY OF PHARMACEUTICAL ACTIVES

Eugene G. Drust, Norwich, N.Y.; Gerald B. Kasting, Wyoming, Ohio; Ronald L. Smith, and Joan B. Szkutak, both of West Chester, Ohio, assignors to Norwich Eaton Pharmaceuticals, Inc., Norwich, N.Y.
Filed Nov. 10, 1988, Ser. No. 269,944
Int. Cl.⁵ A61F *13/00;* **A61L** *15/03;* **A61K** *9/06*
U.S. Cl. **424—449** **18 Claims**

1. A composition for the transdermal delivery of buprenorphine, comprising a safe and effective amount of buprenorphine in a carrier comprising:
(a) a polar solvent material selected from the group consisting of C_3–C_4 diols, C_3–C_6 triols, and mixtures thereof; and
(b) a polar lipid material selected from the group consisting of fatty alcohol esters, fatty acid esters, and mixtures thereof;
wherein said polar solvent material and said polar lipid material are present in a weight ratio of solvent material:lipid material of from about 60:40 to about 99:1.

5,026,557
ADJUVANT COMPOSITION

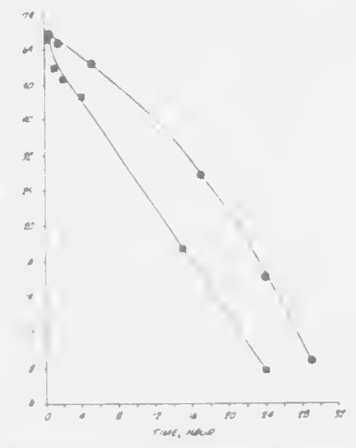
Leonard Estis, Upton, Mass., and Phillip Livingston, New York, N.Y., assignors to The Liposome Company, Inc., Princeton, N.J.
Continuation of Ser. No. 94,564, Sep. 9, 1987, abandoned. This application Feb. 14, 1990, Ser. No. 483,263
Int. Cl.⁵ A61K *37/22*
U.S. Cl. **424—450** **29 Claims**

1. A composition comprising liposomes of diameter less than about 500 nm, an incubation associated immuno-potentiator and an incubation associated ganglioside antigen, both associated with said liposomes.

24. A method of augmenting an immune response in an animal comprising administering to said animal an adjuvant composition comprising liposomes of diameter less than about 500 nm, an incubation associated immuno-potentiator and an incubation associated ganglioside antigen, both associated with said liposome.

5,026,558
TARGETING DRUGS TO HEPATOCYTES IN THE LIVER

Karl J. Hwang, South Pasadena, Calif. assignor University of Southern California, Los Angeles, Calif.
Filed Jan. 31, 1989, Ser. No. 304,961
Int. Cl.⁵ A61K *37/22*
U.S. Cl. **424—400** **23 Claims**



1. A method for selectively targeting a substance to parenchymal cells of the liver of a mammalian body, comprising the steps of:
(a) administering to the body a blocking agent for at least partially blocking uptake of liposomes by non-parenchymal cells of the liver; and
(b) administering to the body the substance in carrier liposomes, the carrier liposomes being stable serum at 37° C., having a diameter of less than about 200 nm, and having a half-life in the circulation of the body of at least about 5 hours as measured at an injection dose of about 30–50 micrograms of lipid per gram of body weight, the substance being substantially taken up by the parenchymal cells.

5,026,559
SUSTAINED-RELEASE PHARMACEUTICAL PREPARATION

Herman J. Eichel, and Brent D. Massmann, both of Columbus, Ohio, assignors to Kinaform Technology, Inc., Dayton, Ohio
Filed Apr. 3, 1989, Ser. No. 332,154
Int. Cl.⁵ A61K *9/54*
U.S. Cl. **424—458** **18 Claims**

1. A sustained-release pharmaceutical preparation comprising an admixture of:
(a) immediate release drug which will release in the stomach, and;
(b) multi-units of microparticles, said microparticles comprising a core, an inner wall, a solid acid layer, and an outer wall, said core being a drug which is the same as said immediate release drug, said inner wall being a microencapsular enteric coating which will not dissolve or disperse readily in the stomach, but which dissolves or disperses in the intestines, said solid acid layer being incorporated in or layered onto said inner wall microencapsular enteric coating in order to preserve the impermeability of the enteric coating and delay drug release, and said outer wall being a microencapsular control coating which will not dissolve or disperse readily in the intestines, but which permits release of said drug through said microencapsular control coating.

5,026,560
SPHERICAL GRANULES HAVING CORE AND THEIR PRODUCTION

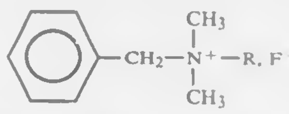
Tadashi Makino; Tetsuro Tabata, both of Osaka, and Shin-ichiro Hirai, Kyoto, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan
Filed Jan. 14, 1988, Ser. No. 143,957
Claims priority, application Japan, Jan. 29, 1987, 62-19178
Int. Cl.⁵ A61K *9/16, 9/36, 9/62*
U.S. Cl. **424—494** **30 Claims**

1. Spherical granules having a core coated with a binder and spraying powder containing a drug and low substituted hydroxypropylcellulose having a mean particle diameter not more than 200 μm, wherein the low substituted hydroxypropylcellulose contains 4 to 20% of a hydroxypropoxyl group.

5,026,561
METHOD WHICH INHIBITS OR DESTROYS AT LEAST ONE UNICELLULOR LIVING ORGANISM CONTAINING A QUATERNARY AMMONIUM FLUORIDE

Pierre Bourbon, Toulouse, France; Pierre Lagny, Clebridge, Ireland, and Pierre Billot, Neuilly Sur Seine, France, assignors to Atlantic Pharmaceutical Products Limited, Celbridge, Ireland
Filed Sep. 20, 1988, Ser. No. 246,878
Claims priority, application France, Sep. 23, 1987, 87 13156; European Pat. Off., Nov. 23, 1987, 87402632.1
Int. Cl.⁵ A61K *31/14, 33/14*
U.S. Cl. **424—673** **44 Claims**

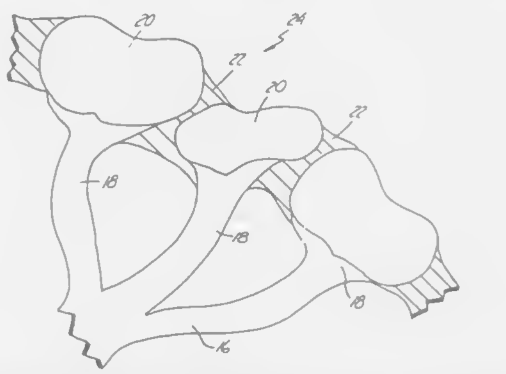
1. A method for inhibiting or destroying unicellular living organisms of a human or animal, except those present in the dental area of said human or animal, which method comprises contacting the unicellular living organisms with a composition which comprises an effective amount of an effective amount of at least one quaternary ammonium salt of the formula:



wherein R is an alkyl radical of from C_8H_{17} through $C_{18}H_{37}$.

5,026,562
METHOD OF FREEZING AND ICE GLAZING BROCCOLI

William G. Schmidt, Maple Grove, and Dean H. Lockwood, Burnsville, both of Minn., assignors to The Pillsbury Company, Minneapolis, Minn.
Filed Apr. 4, 1990, Ser. No. 504,338
Int. Cl.⁵ A23B *7/04*
U.S. Cl. **426—68** **13 Claims**



1. A method of forming a frozen broccoli product comprising individual broccoli florets having a floret structure including an irregularly shaped exterior surface, a plurality of stems, each stem hang a pedicel, and buds attached to the stem pedicels, and an area between the uppermost portions of the adjacent stems, pedicels, and between attached buds defining a plurality of crevices, the method comprising:
individually quick freezing each of said broccoli florets such that each floret is completely frozen throughout; immersing each frozen broccoli floret in water for a length of time and at a water temperature sufficient to form an ice glaze within said crevices of the floret comprising at least about 8% by weight of the glazed frozen floret and such that the ice glaze substantially fills the crevices, and such that an insignificant amount of ice glaze is present on the exterior surface of the floret after the floret is removed from the water; and then refreezing said ice glazed florets.

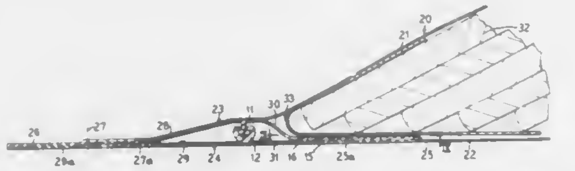
5,026,563
ZIPPERED CLOSURE FOR THERMOFORMED PACKAGE

Donald L. Van Erden, Wildwood, and Daniel P. McDonald, Arlington Heights, both of Ill., assignors to Zip-Pak Incorporated, Northbrook, Ill.
Filed Mar. 23, 1989, Ser. No. 327,619
Int. Cl.⁵ B65D *33/16*
U.S. Cl. **426—122** **5 Claims**

1. A plastic film bag for foodstuffs or the like, comprising in combination:
a first plastic film bag wall joined at its edge to a second plastic film bag wall with a bag mouth between the walls at one side;
reclosable fastener strips between the walls at the bag mouth having facing releasably interlocking profiles thereon each with a base web bonded to the confronting surfaces

VOL
1127
ISS
4
JE
25
1991
UMI

of the film, each base web having an inner portion between the profiles and the bag interior and an outer portion outwardly of the profiles;
the inner portion of said base webs being continuous with each other to seal the bag interior;
frangible tear means on the inner portion of the base webs



for breaking into the bag interior so that the profiles can be separated and thereafter afford a reclosable bag mouth; and
said frangible tear means being in the form of a perforation line through the base webs with the bond line following an undulating path to define points of stress concentration for tearing the perforation line.

5,026,564
APPARATUS AND METHOD FOR TREATMENT OF VARIOUS LIQUID OR SLURRY BY ULTRASONIFICATION IN CONJUCTION WITH HEAT AND PRESSURE

Hayden Steven M., 407 N. Broad St., Wetumpka, Ala. 36092
Filed Jul. 2, 1990, Ser. No. 548,492
Int. Cl.⁵ A23L *3/00;* **A23C** *3/00*

U.S. Cl. 426—237 **12 Claims**

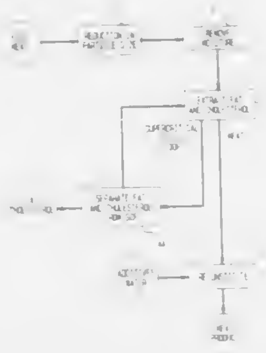
9. A method of treating a liquid or slurry to reduce bacteriological contamination comprising the steps of:
(a) saturating liquid or slurry with gas or gaseous molecules;
(b) pressurizing liquid or slurry within a predetermined pressure range;
(c) maintaining of temperature of liquid and slurry within a predetermined temperature range; and
(d) sonificating liquid or slurry at a predetermined intensity, the combination of said steps yielding a reduction in bacterial contamination.

5,026,565
REMOVAL OF LIPID COMPONENTS FROM FOODSTUFFS AND PRODUCTS THEREOF

Corran N. S. McLachlan, 29 Summer Street, Devonport, Auckland, New Zealand; Owen J. Catchpole, Birmingham, England, and Ross S. Nicol, Victoria, Australia, assignors to Corran Norman Stuart McLachlan, Devonport, New Zealand
Continuation-in-part of Ser. No. 314,216, Feb. 22, 1989, abandoned, which is a continuation-in-part of Ser. No. 269,760, Nov. 10, 1988, abandoned, which is a continuation-in-part of Ser. No. 144,384, Jan. 26, 1988, abandoned. This application Nov. 13, 1989, Ser. No. 434,818
Claims priority, application New Zealand, Aug. 19, 1987, 221503
Int. Cl.⁵ A23L *1/31, 1/325;* **C11B** *3/00*

U.S. Cl. 426—241 **29 Claims**

1. A method of removing sterols and/or lipids from proteinaceous foods comprising the steps of:
(a) drying a proteinaceous food of the group consisting of meat, poultry and fish to remove all or substantially all of the "free water" and optionally some but not all of the "bound water" therefrom to produce an intermediate moisture containing proteinaceous food product containing not less than about 25 percent of water by weight of such proteinaceous food product; and,
(b) removing some of the sterols and/or lipids from such intermediate moisture containing proteinaceous food



products using a sub or supercritical physiologically acceptable gas.

5,026,566
DRIED FOOD CONTAINING TREHALOSE AND METHOD FOR PREPARING SAME

Bruce J. Roser, Cambridgeshire, Great Britain, assignor to Quadrant Bioresources, Limited, Cambridge, United Kingdom
PCT No. PCT/GB88/00511, § 371 Date May 1, 1989, § 102(e) Date May 1, 1989, PCT Pub. No. WO89/00012, PCT Pub. Date Jan. 12, 1989
PCT Filed Jun. 29, 1988, Ser. No. 327,187
Claims priority, application United Kingdom, Jun. 29, 1987, 8715238
The portion of the term of this patent subsequent to Jan. 2, 2007, has been disclaimed.
Int. Cl.⁵ A23B *4/03;* **A23C** *1/14;* **A23L** *1/32*

U.S. Cl. 426—443 **7 Claims**

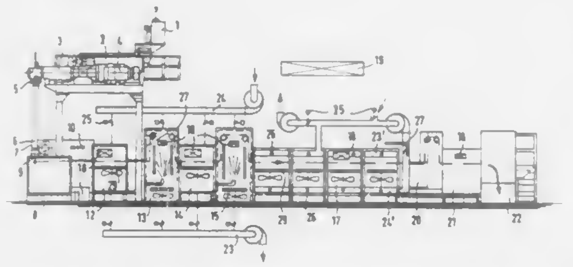
1. A method of drying a water-containing food material to be made into or used as food, comprising the steps of incorporating an effective amount of trehalose into the food material and drying said food material at a temperature above ambient temperature.

5,026,567
PROCESS FOR PRODUCING LONG PASTA PRODUCTS AND APPARATUS FOR PERFORMING SUCH A PROCESS

Josef Manser, Uzwil; Friedrich Egger, Niederuzwil, and Werner Seiler, Zuberwangen, all of Switzerland, assignors to Gebruder Buhler AG, Uzwil, Switzerland
Division of Ser. No. 122,543, Nov. 12, 1987, Pat. No. 4,775,542, which is a continuation of Ser. No. 703,101, Feb. 15, 1985, abandoned. This application Apr. 25, 1988, Ser. No. 196,937
Claims priority, application Switzerland, Jun. 24, 1983, 3459/83; Fed. Rep. of Germany, Jan. 5, 1984, 3400300
Int. Cl.⁵ A23L *1/16*

U.S. Cl. 426—458 **2 Claims**

1. A computerized method for controlling a multi-stage process for making pasta products comprising the steps of:
commencing the multi-stage process based on initial product control parameter set points inserted in a store annexed to a central computer, the process including a raw material preparation stage, dough preparation stage, heating stage and drying stage, said process responsive to measured product parameters;
automatically controlling at least one of the individual stages of said process by regulators responsive to said initial set points in said store, the regulators also providing sensing signals from a corresponding stage to the control computer;
disconnecting the control of predetermined regulator stages from said store in turn to allow for human expert monitoring of the product, each disconnected regulator continuing to provide the same set points prior to disconnection to control said stage while disconnected and continuing to provide sensing signals of said stage to the control computer;



resetting new set points for each stage in said store and in each disconnected regulator based on evaluations of the expert;
reconnecting each disconnected regulator so that said control process will operate with said new set points; and
repeating said disconnecting, resetting and reconnecting steps at predetermined intervals.

5,026,568
SOYBEAN SNACK AND A PROCESS FOR PRODUCING IT

Toshio Takemori, Tokyo; Masaru Ishiga, Kasukabe, and Toshimi Ootsubo, Urawa, all of Japan, assignors to Lotte Company Limited, Tokyo, Japan
Filed Jun. 19, 1989, Ser. No. 369,346
Claims priority, application Japan, Jun. 22, 1988, 63-152231
Int. Cl.⁵ A21D *2/00;* **A23L** *1/10*

U.S. Cl. 426—549 **6 Claims**

3. A process for producing a soybean snack comprising grinding whole grain soybean or soybean of hull-removed grain, adding to 25–70 parts by weight of the resultant soybean powder 75–30 parts by weight of at least one of starch and cereal flour and water, adding an alkaline agent in an amount sufficient to make the pH of dry material after steam treatment 7.5–9.5, treating with steam to form a dough having elasticity and plasticity, rolling, molding, and forming a dry material to fry or to bake.

5,026,569
COTTON FIBER PARTICLES FOR USE IN BAKED GOODS

Karen M. Forand, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Jan. 18, 1989, Ser. No. 298,522
Int. Cl.⁵ A21D *13/04*

U.S. Cl. 426—549 **25 Claims**

1. A composition comprising food-grade powdered cellulose derived from cotton fiber, said powdered cellulose having:
1. a particle size distribution in which:
(a) at least about 90% has a largest dimension of less than about 150 microns;
(b) at least about 75% has a largest dimension of less than about 75 microns;
(c) at least about 30% has a largest dimension of less than about 25 microns; and
2. a hydration capacity of between about 2.7 and 3.4 grams of water per gram of fiber.

5,026,570
METHOD FOR PREPARING FREEZE-DRIED RICE

Toshio Shibata, Shizuoka, Japan, assignor to Futaba Shokuhin Kogyo Kabushiki Kaisha, Shizuoka, Japan
Filed Apr. 10, 1990, Ser. No. 507,027
Int. Cl.⁵ A23L *1/20*

U.S. Cl. 426—626 **2 Claims**

1. A method for producing freeze-dried rice consisting essentially of the steps of:
(a) boiling rice in water containing acetic acid and sodium chloride, wherein the acetic acid comprises about 4–8% by weight of the water and the sodium chloride comprises about 0.5–3% by weight of the water; and
(b) freeze-drying the boiled rice.

5,026,571
CHEMICALLY TREATING FORAGE

Leslie J. Halliday, Charlottetown, Canada, assignor to Her Majesty The Queen in right of Canada as represented by the Minister of Agriculture Canada, Canada
Filed Feb. 8, 1990, Ser. No. 476,775
Int. Cl.⁵ A23K *1/00*

U.S. Cl. 426—636 **7 Claims**

1. A method of improving the nutritive value of forage comprising:
(a) mixing a composition comprising 0.3–9.0 g of hydrogen peroxide and 0.2–6.0 g of ethanolamine wherein the composition has a pH from 8 to 12, with 100 g of forage, and
(b) maintaining the composition in contact with the forage at atmospheric pressure for a period of from one to five days.

5,026,572
JERKY-STYLE PET PRODUCTS

Denny W. Neiberger, Wayzata, Minn., assignor to ConAgra Pet Products Company, Omaha, Nebr.
Continuation of Ser. No. 336,044, Apr. 11, 1989, abandoned. This application Oct. 24, 1990, Ser. No. 604,339
Int. Cl.⁵ A23L *1/31*

U.S. Cl. 426—641 **26 Claims**

1. A method of making a food product comprising the steps of:
forming a first blend, the first blend including a wet beef product and a flour;
extruding the first blend at a first extrusion temperature in a temperature range of from about 260° F. to about 280° F. to form a first run product;
forming a second blend, the second blend including the first run product and a wet beef product;
extruding the second blend at a temperature second extrusion temperature in a range of from about 240° F. to about 275° F. to form a second run product; and
processing the second run product into jerky.

5,026,573
METHOD FOR THE PREPARATION OF LEACHED FISH FLESH AND PRODUCT THEREOF

Fujio Nishioka, Tokyo, Japan, assignor to Tokai Regional Fishery Research Laboratory, Tokyo, Japan
Continuation of Ser. No. 316,245, Feb. 28, 1989, abandoned. This application Aug. 14, 1990, Ser. No. 567,684
Claims priority, application Japan, Mar. 2, 1988, 63-47521
Int. Cl.⁵ A23L *1/325*

U.S. Cl. 426—643 **5 Claims**

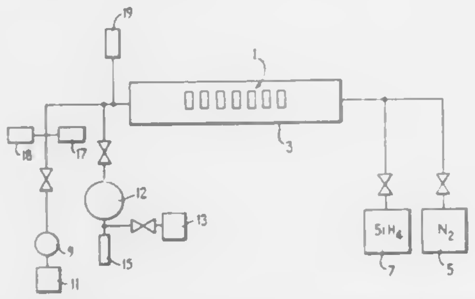
1. A method for the preparation of leached fish flesh having a high gel formation ability, which comprises the steps of adding a phosphate solution, a sodium bicarbonate solution or a mixed solution of phosphate and sodium bicarbonate as a leaching liquid to fillets or chops obtained from fresh fish or frozen fish, said solution having a pH of about 6 to about 10;
mashing said fish to the level of muscle fiber by means of a homogenizer, thereby producing a mashed fish-containing solution;

VOL
1127
ISS
4
JE
25
1991
UMI

subjecting the resultant mashed fish-containing solution to a reduced pressure of 100 mmHg or less to leach out impurities from the fish;
then removing fats, substrate proteins and small bones from the mashed fish-containing solution in order to raise the concentration of the muscle fiber in the solution; and
finally dehydrating the remaining fish flesh to obtain fish flesh containing a high concentration of muscle fiber proteins.

5,026,574
CHEMICAL VAPOR DEPOSITION PROCESS FOR DEPOSITING LARGE-GRAIN POLYSILICON FILMS

Nikolaos A. Ecooomu, Thessaloniki, Greece, and Douglas B. Meakin, Harrow-on-the-Hill, England, assignors to The General Electric Company, p.l.c., England
Continuation of Ser. No. 26,144, Mar. 16, 1987, abandoned. This application Jan. 25, 1989, Ser. No. 302,543
Claims priority, application United Kingdom, Mar. 19, 1986, 8606784
Int. Cl.^{5} C23C *16/00;* **H01L** *21/469*
U.S. Cl. 427—248.1 **7 Claims**



1. A process for depositing a polycrystalline silicon film on a substrate, comprising the steps of:
(a) heating said substrate in a hot wall reactor to a temperature up to about 630° C;
(b) passing silane gas at a deposition pressure up to about 1 Pascal over said substrate so that said heated substrate causes decomposition of said silane gas; and
(c) maintaining the deposition pressure within a predetermined pressure range up to about 1 Pascal during passage of said silane gas;
whereby a film of undoped polysilicon having a grain size of at least about 4000Å with substantially no twinning is deposited on said substrate.

5,026,575
GROWTH OF POLYCRYSTALLINE CAF_2 VIA LOW TEMPERATURE OMCVD

Richard A. Jones; Alan H. Cowley, and Al F. Tasch, Jr., all of Austin, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.
Filed Jul. 11, 1989, Ser. No. 379,016
Int. Cl.^{5} C23C *16/30, 16/46*
U.S. Cl. 427—255 **29 Claims**

27. A method for preparing a silicon substrate coated with CaF_2, the method comprising:
preparing an organocalcium compound, said compound volatilizing at a temperature of less than 550° C.;
placing the organocalcium compound in a heatable portion of a reactor;
introducing a gas which is a source of fluorine into the reactor, said reactor defined further as comprising a second portion containing a silicon substrate;
sealing the reactor;
heating the heatable portion of the reactor to between 100° C. and 550° C. until said silicon substrate is coated with CaF_2; and
removing coated silicon substrate from the reactor.

5,026,576
METHOD AND COMPOSITION FOR FINISHING STRUCTURAL BUILDING SURFACES

Francis S. Benvenuto, 522 West Carson St., and Jeff S. Silva, 23230 Mehden, both of Carson, Calif. 90745
Filed Nov. 16, 1989, Ser. No. 437,192
Int. Cl.^{5} B05D *3/12, 3/02, 1/36*
U.S. Cl. 427—355 **14 Claims**

10. A method of finishing a building surface comprising:
preparing a first constituent by mixing together quantities of a acrylic mortar admix, concrete plaster adhesive, joint compound, hydrated lime and water, wherein for each twenty five pounds of joint compound said first constituent contains a volume of between about one quart and one gallon each of acrylic mortar admix and concrete plaster adhesive, a volume of between about one half gallon and one gallon of hydrated lime and a volume of between about one half gallon and four gallons of water,
mixing said first constituent with a second constituent comprised of Portland cement, and
smoothing the resultant mixture of constituents onto a surface of a building structure.

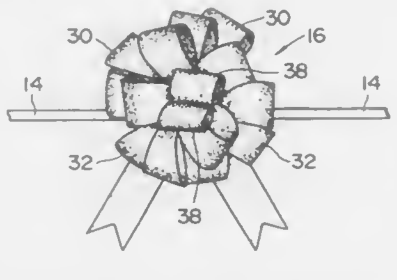
5,026,577
MAGNETIC RECORDING MEDIUM LUBRICATED WITH A CHOLESTERIC LIQUID CRYSTAL

Girma Biresaw, Lower Burrell; Daniel J. Boland, New Kensington; Vince A. Paola, Penn Township, Westmoreland County; W. Thomas Evans, Indiana; William P. Kampert, Lower Burrell, all of Pa., and Ronald L. Abels, Anna, Ohio, assignors to Aluminum Company of America, Pittsburgh, Pa.
Filed Feb. 8, 1989, Ser. No. 307,498
Int. Cl.^{5} G11B *23/00*
U.S. Cl. 428—1 **23 Claims**

1. A recording medium comprising:
(a) a substrate,
(b) a memory layer supported by said substrate, and
(c) an organic lubricant overlying said recording medium, said organic lubricant consisting essentially of a cholesteric liquid crystal.

5,026,578
ARTIFICIAL-FLOWER-FORMING RIBBON

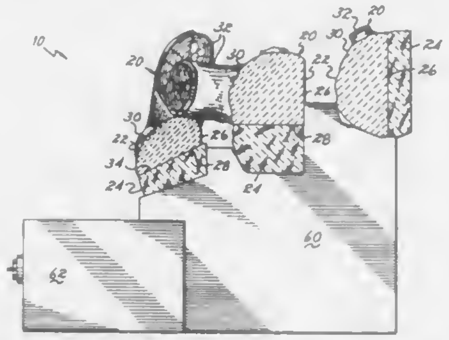
Morito Iname, Aichi, Japan, assignor to Kubushiki Kaisha Aoyama, Aichi, Japan
Filed Jul. 2, 1990, Ser. No. 546,865
Claims priority, application Japan, Nov. 9, 1989, 1-290114; Jan. 8, 1990, 2-472
Int. Cl.^{5} A41G *1/00;* **D04D** *7/10*
U.S. Cl. 428—4 **12 Claims**



1. An artificial-flower-forming ribbon comprising:
a pair of strips overlapping to each other; and
at least one string placed between and along said strips;
both said strips being joined together at a plurality of joint portions placed at opposite sides of said string and also on a plurality of lines spaced apart from each other in the longitudinal direction of said strips;
said string being joined at its one end to one ends of said strips; and
a pair of adjoining lines being in parallel to two equilateral sides of an isosceles triangle where a segment parallel to a longitudinal center line of said strips is defined as the base;
wherein said both strips have a pair of notches provided at opposite sides of each line in the neighborhood of said joint portions to be respectively open to opposite side edges of said strips, and substantially confronting each other in the transverse direction of said strips whereby the ribbon loops formed on pulling of the string being such that upper and lower pairs of loops deviate one from the next rotationally about the string and are there maintainable without any tendency to untwist.

5,026,579
COMPOSITE ARTIFICIAL LOG

Ian Thow, Merseyside, England, assignor to Yale and Valor p.l.c., Chiswick, England
Filed Nov. 28, 1989, Ser. No. 443,109
Int. Cl.^{5} F24C *3/04*
U.S. Cl. 428—15 **8 Claims**

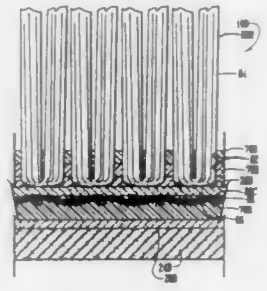


1. A composite artificial log for use in gas-fired fireplaces and stove assemblies comprising:
an elongated ceramic concrete section having a surface outwardly exposed in said assemblies, said section molded to provide the appearance of a real log, said section having a cross-section constituting a substantial fraction of the cross-section of the log and a relatively high thermal conductivity for radiating heat to the surroundings when heated; and
an elongated ceramic fiber section having at least one surface outwardly exposed in said assemblies, said section secured to said ceramic concrete section and having a cross-section constituting a substantial fraction of the cross-section of the log, said ceramic fiber section having a relatively high thermal conductivity which glows visibly when heated above about 1470° F.

5,026,580
LAMINATED GOLF MAT

Mark A. Hammon, Woodward, Iowa, assignor to AGR Inc., Perry, Iowa
Continuation-in-part of Ser. No. 328,232, Mar. 24, 1989, abandoned, which is a continuation-in-part of Ser. No. 202,398, Jun. 6, 1988, Pat. No. 4,844,470. This application Jul. 25, 1990, Ser. No. 557,592
Int. Cl.^{5} A63B *69/36*
U.S. Cl. 428—17 **9 Claims**

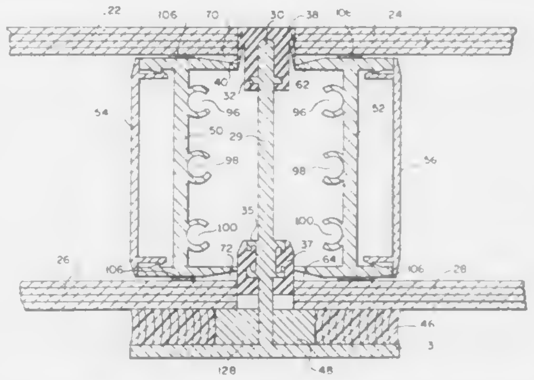
1. A laminated golf mat comprising,
a first layer of durable flexible belting-type material having top and bottom sides,
woven fabric-like material embedded in said first layer and being partially exposed on the top side of said layer,
a second layer of turf having top and bottom sides on the top side of said first layer and said turf having filaments of yarn exposed on the bottom side adjacent the fabric-like material in the top side of said first layer, and



adhesive between said first layer and said second layer forming chemical and mechanical bonds between said filaments and fabric material.

5,026,581
INVISIBLE MULLION ASSEMBLY

John R. Shea, Jr., 6404 Murray Hill Rd., Baltimore, Md. 21212, and A. Risher Hall, 702 Willow Valley Lakes Dr., Willow Street, Pa. 17584
Filed Aug. 3, 1989, Ser. No. 389,236
Int. Cl.^{5} E04C *2/54;* **E06B** *3/24*
U.S. Cl. 428—34 **11 Claims**



1. In a multiple pane window glass unit of the type having abutting pairs of panes fitted between head and sill, a mullion assembly comprising:
(a) a pair of H-shaped vertical channels extending vertically between head and sill and interposed between the vertical edges of each abutting pair of panes, so as to stabilize and support the panes of each pair;
(b) a T-shaped mullion including:
  (i) an elongate shank with an outer tip vertically extending between abutting pairs of glass pane edges, such that the outer tip is supported between the outer pane edges, and
  (ii) a flat inner base extending vertically over the abutting inner glass pane edges; and
(c) an elongate gasket fitted over said T-shaped mullion so as to be compressed between the abutting pairs of glass pane edges while engaging said H-shaped channels, said gasket having a deformable outer head fitted onto the mullion tip and engaging the edges of the outer panes and a centering guide engaging the edges of the inner panes.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,582
EXTRUDED AMORPHOUS THERMOPLASTIC PIPE HAVING REDUCED INTERNAL STRESS AND METHOD OF MAKING THE SAME

J. Ernst Hartitz, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Brecksville, Ohio

Division of Ser. No. 232,070, Aug. 15, 1988, Pat. No. 4,888,148. This application Sep. 18, 1989, Ser. No. 408,964

Int. Cl.^{5} F16L *9/00*

U.S. Cl. 428—36.6 **3 Claims**

1. An amorphous thermoplastic pipe having improved impact resistance comprising a pipe of polyvinyl chloride or chlorinated polyvinyl chloride and having a final inner diameter and a final outer diameter defining a wall thickness therebetween, said pipe being discharged from an extruder as an extrudate having an extruded inner diameter smaller than said final inner diameter and an extruded outer diameter smaller than final outer diameter, the internal stresses of said extrudate being dissipated by allowing said extrudate to expand so that the inner diameter is up to about 110 percent of the final inner diameter and the outer diameter is up to about 110 percent of the final outer diameter, and the further introduction of internal stresses being avoided by drawing said extrudate at substantially the same speed as it is discharged, said expanded extrudate being sized to the final inner diameter and outer diameter.

5,026,583
PROCESS FOR PREPARATION OF RUBBER LAMINATES

Takashi Nakagawa, Kawasakishi, and Osamu Sugimoto, Kawasaki, both of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

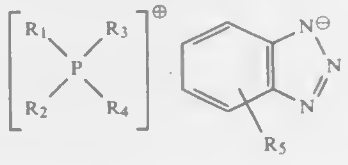
Filed Aug. 12, 1988, Ser. No. 231,429

Claims priority, application Japan, Aug. 14, 1987, 62-202849; Apr. 27, 1988, 63-105187

Int. Cl.^{5} B29D *22/00*

U.S. Cl. 428—36.8 **24 Claims**

1. A process for the preparation of rubber laminates, which comprises contacting an uncured composition A comprising a fluororubber and a metal oxide with an uncured composition B comprising an epichlorohydrin rubber and a phosphonium salt represented by the following general formula:



wherein R_1, R_2, R_3 and R_4 each stand for a hydrocarbon residue having 1 to 20 carbon atoms, which may be substituted, with the proviso that up to three of R_1, R_2, R_3 and R_4 may be primary, secondary or tertiary amino group of a fluoroalkyl group, and R_5 stands for a hydrogen atom or an alkyl group having 1 to 20 carbon atoms and a curing agent selected from the group consisting of imidazoline compound, and mercapto-s-triazine compound, and curing the uncured compositions.

5,026,584
SIGN MAKING WEB WITH DRY ADHESIVE LAYER

David J. Logan, Glastonbury, Conn., assignor to Gerber Scientific Products, Inc., Manchester, Conn.

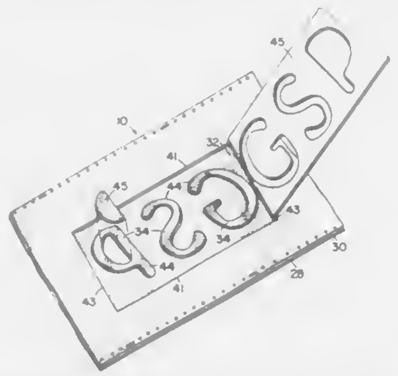
Filed May 29, 1987, Ser. No. 56,458

Int. Cl.^{5} A61F *13/02;* **B32B** *3/00*

U.S. Cl. 428—41 **14 Claims**

1. A laminated web for use in making signs having cut shapes adhesively attached to a supporting surface, said web comprising:

a base layer of sheet material having first and second faces;
a layer of sign material in sheet form superimposed on said base layer and having a first face facing said base layer and a second face facing away from said base layer;
a layer of permanently tacky adhesive between said base layer and said layer of sign material;
adhesive means having bonding strength when activated for forming on said second face of said layer of sign material an initially dry layer of adhesive and for subsequently forming on portions of said second face a tacky layer of adhesive provided by activating corresponding portions of said initially dry layer of adhesive for adhesively attaching the portions of said layer of sign material underlying the activated portions of said layer of dry adhesive to a supporting surface, said layer formed by said adhesive means defining an outer, exposed surface of said web extending generally parallel with said second face of said layer of sign material; and
the activated bonding strength of said adhesive mans formed on said second face of said sign material layer being greater than the bonding strength of said layer of permanently tacky adhesive existing between said base layer and said layer of sign material;
and wherein said adhesive of said layer of permanently tacky adhesive adheres more strongly to said face of said base layer than to said first face of said layer of sign material allowing said layer of sign material to be peeled from said layer of permanently tacky adhesive with the adhesive of said layer of permanently tacky adhesive in the course of such peeling remaining on said base layer and coming completely free of said layer of sign material.



5,026,585
MAT FOR A CHAIR

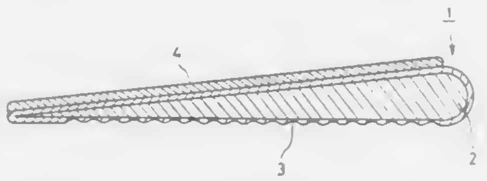
Hiroyuki Funatogawa, 3208-1 Tori 5-chome, Ashikago-City, Tochigi-Perfecture, Japan

Filed Mar. 27, 1990, Ser. No. 500,043

Claims priority, application Japan, Mar. 30, 1989, 1-36594[U]

Int. Cl.^{5} B32B *3/26*

U.S. Cl. 428—71 **8 Claims**



1. An auxiliary article for a chair which comprises a mat corresponding in size to the seat of an ordinary chair, and having a top surface which is inclined forwardly and downwardly from its rear edge adapted for positioning at the bottom of the back of the chair, and a bottom surface adapted for resting on said seat, said top and bottom surfaces having an angle between 5° and 8° therebetween.

5,026,586
HEADLINER SHELL FOR VEHICLES

Thomas E. Tabor, 1396-A W. Thibodaux By-Pass, Thibodaux, La. 70301

Filed Apr. 7, 1989, Ser. No. 334,356

Int. Cl.^{5} B32B *7/00, 15/00;* **D03D** *9/00;* **D04D** *1/00*

U.S. Cl. 428—90 **12 Claims**

1. A vehicle headliner which comprises (i) a substantially rigid vehicle headliner shell of the approximate size and contour of the underside of the roof of the vehicle, said shell comprising a core of substantially rigid wire mesh embedded in and tightly bonded to an essentially void-free unitary layer of a relatively rigid plastic material enveloping said wire mesh; and (ii) a coating of short, adjacently-disposed fibers affixed to and projecting from said shell on the side thereof adapted to face toward the interior of the vehicle such that when the finished headliner is installed in place in the vehicle, such coating serves as an interior finish thereof simulating a velour finish.

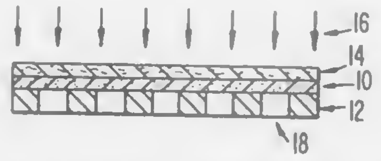
5,026,587
WIPING FABRIC

Jared A. Austin, Greer, S.C.; Joseph H. Miller, Menasha, and Robert F. Hyslop, De Pere, both of Wis., assignors to The James River Corporation, Richmond, Va.

Filed Oct. 13, 1989, Ser. No. 421,463

Int. Cl.^{5} B32B *33/00*

U.S. Cl. 428—91 **11 Claims**



1. A nonwoven textile fabric having high performance aqueous fluid retention and wiping characteristics, said fabric comprising:

(a) a reinforcing web formed of an interconnecting network of continuous filament synthetic fibers; and
(b) a mixture of synthetic textile staple fibers and short natural fibers interentangled and entangled with said continuous filament fibers so as to form a cohesive structure;
(c) at least one surface of said fabric having a plurality of spaced apart clusters of said synthetic staple fibers and short natural fibers, said clusters being generally surrounded and interconnected by areas having a concentration of synthetic staple fibers and short natural fibers which is lower than such concentration in said clusters.

5,026,588
EDGE PROTECTING FRAME FOR PLATE-SHAPED STRUCTURAL ELEMENTS

Bernd Diekmann, Halle, Fed. Rep. of Germany, assignor to Schüco International GmbH & Co., Bielefeld, Fed. Rep. of Germany

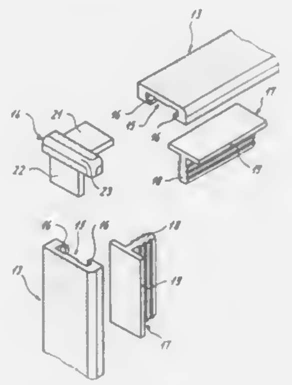
Filed Jan. 10, 1990, Ser. No. 462,800

Claims priority, application Fed. Rep. of Germany, Jan. 11, 1989, 3900565

Int. Cl.^{5} B32B *3/06*

U.S. Cl. 428—100 **15 Claims**

1. An edge protecting frame for plate-shaped structural elements, comprising a plurality of edge protecting strips abutting against one another in abutment regions; a plurality of corner connectors each connected with two neighboring ones of said edge protecting strips in said abutment regions so as to connect said two neighboring edge protecting strip with one another; a plurality of harpoon webs engageable in the grooves of a structural part; and a plurality of insertion profile portions each having one of said harpoon webs and form-lockingly connected with a respective one of said edge protecting strips.



5,026,589
DISPOSABLE SANITARY ARTICLES

Lee A. Schechtman, Fairfield, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 458,107, Dec. 28, 1989, abandoned. This application Sep. 12, 1990, Ser. No. 580,998

Int. Cl.^{5} A61F *13/15, 13/46;* **B32B** *5/22, 5/24*

U.S. Cl. 428—138 **8 Claims**

1. A disposable absorbent structure, comprising a water-permeable topsheet, an absorbent core, and a water-impermeable backsheet, said structure being characterized in that said backsheet comprises a flexible film comprising a dioxanone-based polymer.

5,026,590
TRANSFER RECORDING MEDIUM AND PROCESS FOR PRODUCTION THEREOF

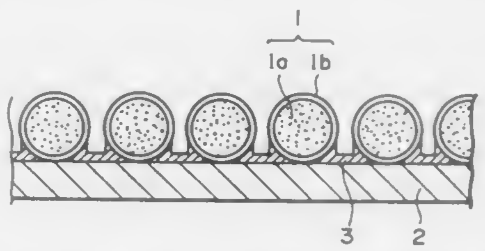
Kazuhiro Nakajima; Toshiharu Inui; Noriyoshi Ishikawa, and Masashi Miyagawa, all of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 94,740, Sep. 9, 1987, Pat. No. 4,847,110. This application May 1, 1989, Ser. No. 345,227

Claims priority, application Japan, Sep. 10, 1986, 61-211471; Sep. 12, 1986, 61-213810; Sep. 18, 1986, 61-217895; Sep. 25, 1986, 61-224803; Sep. 25, 1986, 61-224804; Sep. 25, 1986, 61-224806; Sep. 25, 1986, 61-224814; Mar. 26, 1987, 62-070275; Jul. 20, 1987, 62-179194

Int. Cl.^{5} B32B *19/00, 27/14*

U.S. Cl. 428—141 **9 Claims**



1. A transfer recording medium comprising a substrate, a layer of a binder disposed thereon, and a plurality of image forming elements bonded to the substrate by the binder, wherein each image forming element comprises a microcapsule having an uncured core which is cured under the application of heat and light energy;

wherein the surface of each said image forming element at

VOL
1127
ISS
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25
1991
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least partially protrudes out of and is not covered with the binder.

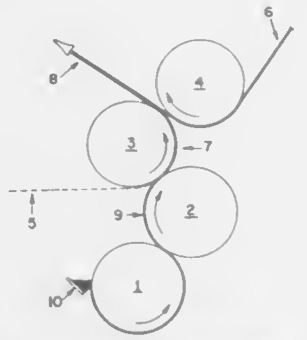
5,026,591
COATED PRODUCTS AND METHODS FOR MAKING

Robert L. Henn, Wilmington; Carol H. Morell, Hockessin, both of Del., and Edward J. Daniel, Landenberg, Pa., assignors to W. L. Gore & Associates, Inc., Newark, Del.

Continuation of Ser. No. 40,962, Apr. 21, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 338,479

Int. Cl.^{5} B32B *7/04, 7/10*

U.S. Cl. 428—198 **24 Claims**



1. An article of manufacture comprising:
(a) a substrate comprising a fabric having an irregular surface profile and
(b) a preformed, continuous coating which comprises (i) a microporous scaffold material comprised of a microporous polymer selected from the class consisting of plastics and elastomers having a microstructure of interconnecting voids and a void volume of greater than 40% and (ii) a chemical substance comprising a thermoplastic or thermosetting resin.
said chemical substance being incorporated into the void spaces of said microporous scaffold material and substantially filling the void spaces; said coating being affixed to at least one face of said fabric substrate by adherence of the chemical substance to the substrate at specific points of contact between the coating and the irregular surface of the fabric substrate; the thickness of the coating being less than 35 microns.

5,026,592
OPAQUE MULTILAYERED FILM HAVING AN INHERENT RESISTANCE TO DELAMINATION

Siegfried Janocha, Wiesbaden; Gunter Schloegl, Kelkheim; Guenther Crass, Taunusstein, and Lothar Bothe, Mainz-Gonsenheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 22, 1988, Ser. No. 288,268

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743791

Int. Cl.^{5} B32B *3/00*

U.S. Cl. 428—204 **22 Claims**

1. A coextruded, biaxially stretch-oriented, opaque polyolefinic multilayered film comprising:
a) a first transparent top layer;
b) an opaque core layer comprising a mixture of
i) about 45 to 90% by weight of a thermoplastic polymer comprising propylene,
2) about 5 to 25% by weight of an inert, particulate filler, and
3) about 5 to 30% by weight of a hydrocarbon resin which is compatible with the thermoplastic polymer and has a softening point between about 100° to 160° C., and
c) a second transparent top layer, the percentages being each time related to the total weight of the mixture.

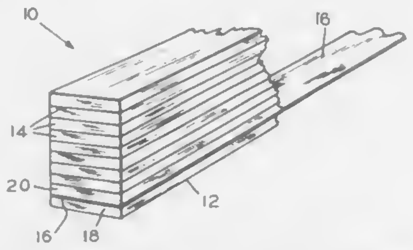
5,026,593
REINFORCED LAMINATED BEAM

Michael E. O'Brien, Eugene, Oreg., assignor to Elk River Enterprises, Inc., Eugene, Oreg.

Filed Aug. 25, 1988, Ser. No. 236,187

Int. Cl.^{5} B32B *15/10;* **E04B** *1/82;* **C09J** *4/00*

U.S. Cl. 428—215 **4 Claims**



1. A reinforced laminated wood beam, comprising:
a. an elongated bottom layer of wood, formed to be supported at its ends, when said beam is placed under a downward load, results in a lengthwise tensile stress in said bottom layer of wood, said bottom layer of wood having a first tensile strength;
b. an elongated reinforcing member adhesively bonded atop said bottom layer of wood, which, when said beam is placed under the downward load, results in a lengthwise tensile stress in said reinforcing member, said reinforcing member having a second tensile strength greater then said first tensile strength;
c. a second elongated layer of wood adhesively bonded atop said reinforcing member, which when said beam is placed under the downward load, results in a lengthwise tensile stress in said second layer of wood, said second layer of wood having a third tensile strength substantially the same as said first tensile strength;
d. at least one additional elongated layer of wood adhesively bonded atop said second layer of wood;
e. said reinforcing member including a continuous flat strip of aluminum alloy which extends the length and width of the two adjacent layers of wood;
f. wherein a load-bearing, horizontally layered, laminated wood beam is formed having a reinforcing member adhesively positioned between the two lower most layers of wood.

5,026,594
PACKAGING MATERIAL FOR PHOTOSENSITIVE MATERIALS

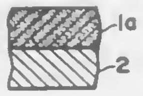
Mutsuo Akao, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Feb. 17, 1989, Ser. No. 311,974

Claims priority, application Japan, Feb. 18, 1988, 63-034022; Apr. 20, 1988, 63-95677

Int. Cl.^{5} B32B *7/02*

U.S. Cl. 428—220 **6 Claims**



1. A packaging material for photosensitive materials, which comprises a coextruded multilayer film having a thickness of more than 120 μm and comprising a linear low density polyethylene resin film layer containing more than 50 wt. % of linear low density polyethylene having a density of less than 0.925 g/cm^3 and a melt index of 1.0 to 7.0 g/10 minutes allocated as one surface layer and a polyethylene resin film layer containing more than 5 wt. % of polyethylene resin having a density of more than 0.930 g/cm^3 and a melt index of more than 0.5 g/10 minutes allocated as the other surface layer, and containing a light-shielding material in either or both of the above layers.

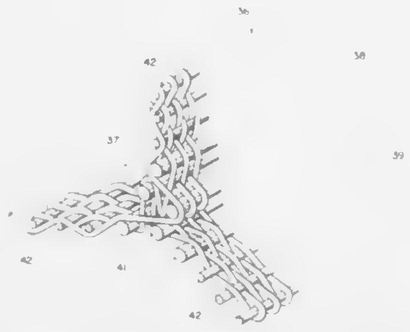
5,026,595
WOVEN GAP FILLER FOR USE IN THE LAY-UP OF COMPOSITE PLASTIC STRUCTURAL UNITS

James A. Crawford, Jr., and Keith E. Burgess, both of Kennebunk, Me., assignors to Techniweave, Inc., Rochester, N.H.

Filed Nov. 9, 1989, Ser. No. 433,839

Int. Cl.^{5} B32B *7/00*

U.S. Cl. 428—246 **8 Claims**



1. A woven gap filler for use in the lay-up of composite plastic structural units comprising a plurality of longitudinally-extending filler warp yarns transversed by woof yarns and grouped to provide a multi-sided geometrical configuration over the cornerless sides of which lay-ups of multiple epoxy fabric sheets will be extended and heat treated to form there with a final hardened plastic structural unit.

5,026,596
WATER ABSORBENT POLYMER-COATED ARTICLE AND METHOD OF PRODUCING SAME

Kazuo Saotome, Tokyo, Japan, assignor to Taiyo Fishery Co., Ltd., Tokyo, Japan

Division of Ser. No. 287,521, Dec. 19, 1988, Pat. No. 4,910,250, which is a continuation of Ser. No. 876,539, Jun. 20, 1986, abandoned. This application Dec. 13, 1989, Ser. No. 450,210

Claims priority, application Japan, Jun. 22, 1985, 60-136653; Feb. 7, 1986, 61-26625

Int. Cl.^{5} B32B *7/00*

U.S. Cl. 428—264 **8 Claims**

1. A method of producing a water absorbent polymer-coated article, which comprises the steps of:
(1) providing an aqueous mixture consisting essentially of water and a polymer dissolved or swollen in said water, said polymer having at least 70% by weight, based on the total weight of said polymer, of acrylic acid monomeric units, 60 to 90% of the carboxyl groups of said monomeric units being in the form of an alkali metal salt, with the balance of the polymer comprising monomeric units of methacrylic acid, maleic anhydride, fumaric acid, acrylamide, or methacrylamide;
(2) adding a water soluble persulfate radical initiator, said initiator being adapted to decompose at a temperature of from about 40° to about 180° C. and act on said polymer to crosslink said polymer, to said mixture in an amount sufficient to crosslink said polymer and in such an amount that said water substantially dissolves said initiator therein thereby to obtain an aqueous composition, said composition containing said water in an amount of at least about 10% by weight based on the weight of said composition;
(3) coating or impregnating a substrate with said aqueous composition; and
(4) heating the resulting coated or impregnated substrate at a temperature of from about 40° to about 180° C.

5,026,597
SOLUBLE POLYMER INTERLEAVING MATERIAL

Helmut Franz; James H. Hanlon, both of Pittsburgh, and Lloyd G. Shick, Natrona Heights, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 481,419, Apr. 1, 1983, abandoned. This application Jul. 24, 1987, Ser. No. 77,967

Int. Cl.^{5} B05D *5/00;* **B32B** *17/10, 3/14;* **B65D** *85/48*

U.S. Cl. 428—323 **17 Claims**

1. A method for providing temporary protection to a sheet surface comprising the steps of:
a. contacting said surface with a solution comprising
  1. a water-soluble film-forming polymer; and
  2. microsized inert, insoluble particles, wherein said particles act as spacers when said sheet is stacked;
b. evaporating the solvent to form a water soluble film of polymer containing insoluble spacer particles on the sheet surface; and
c. subsequently removing said film by contacting the coated surface with water thereby dissolving said water soluble film.

5,026,598
MAGNETIC RECORDING MEDIUM

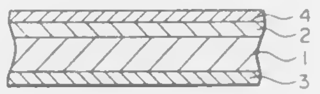
Noboru Koyama; Yasushi Nakano; Setsuko Kawahara, and Noboru Nakajima, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Dec. 11, 1989, Ser. No. 448,664

Claims priority, application Japan, Dec. 12, 1988, 63-314491

Int. Cl.^{5} G11B *23/00*

U.S. Cl. 428—323 **14 Claims**



1. A magnetic recording medium comprising a support and provided thereon a plurality of layers comprising an outermost magnetic layer containing at least a magnetic powder and a binder, and a lower magnetic layer containing at least a magnetic powder and a binder, wherein said outermost magnetic layer contains carbon black having an average primary particle size ranging from 40 mμ to 300 mμ, and said lower magnetic layer contains carbon black having an average primary particle size ranging from 5 mμ to 30 mμ; and said outermost layer is coated on said lower layer while the lower layer is in a wet condition.

5,026,599
ARRAY OF DENSELY PACKED DISCRETE METAL MICROSPHERES COATED ON A SUBSTRATE

David C. Koskenmaki, St. Paul, Minn., assignor to Minnesota Mining & Manufacturing, St. Paul, Minn.

Continuation of Ser. No. 237,998, Aug. 29, 1988, abandoned. This application Mar. 27, 1990, Ser. No. 500,225

Int. Cl.^{5} B32B *5/16, 15/02*

U.S. Cl. 428—328 **10 Claims**

1. A substrate having a discontinuous metal coating, said metal coating comprising an array of discrete, metal microspheres, said microspheres having a diameter of about 0.1–10 micrometers; said microspheres are crowded closely together such that when one microsphere of the array is substantially deformed it will make contact with one or more neighboring

VOL
1127
ISS
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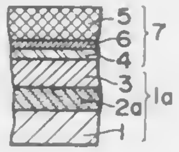
JE
25
1991
UMI

spheres; said metal having a Brinell Hardness of less than about 50; wherein said microspheres are individually electrically conductive but said discontinuous metal coating is not electrically conductive in the plane of the coating.

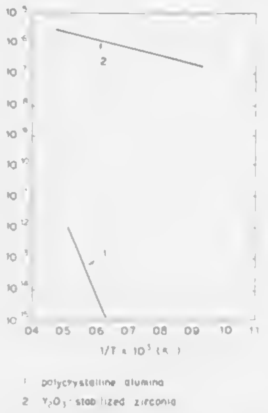
5,026,600
PACKAGING MATERIAL FOR PHOTOSENSITIVE MATERIALS
Mutsuo Akao, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan
Filed Aug. 22, 1988, Ser. No. 234,694
Claims priority, application Japan, Aug. 24, 1987, 62-208221
Int. Cl.^{5} B32B *5/16. 9/00;* **B29D** *22/00*
U.S. Cl. 428—328 6 Claims



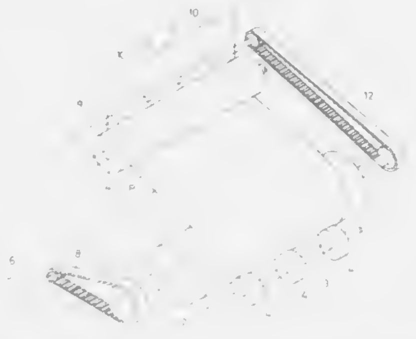
1. A packaging material for photosensitive materials which comprises a coextruded multilayer light-shielding film comprising an ethylene copolymer resin layer containing more than 30 wt. % of ethylene copolymer resin and an antioxidant, a thermoplastic resin layer having a melting point higher than said ethylene copolymer resin layer, and an adhesive thermoplastic resin layer containing more than 20 wt. % of a thermoplastic resin selected from the group consisting of ethylene-ethylacrylate copolymer resin, ethylene-vinyl acetate copolymer resin, ethylene-acrylic acid copolymer resin, ionomer resin and graft modified polyolefin resin and containing a conductive light shielding material disposed between said ethylene copolymer resin layer and said thermoplastic resin layer.

5,026,601
ZIRCONIA-BASE SINTERED BODIES HAVING COATING FILMS
Satoshi Iio, Konan; Masakazu Watanabe, Nagoya; Toru Imura, Nagoya; Kotaro Kuroda, both of Nagoya, and Hiroyasu Saka, Aichi, all of Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan
Continuation of Ser. No. 749,237, Jun. 27, 1985, abandoned. This application Feb. 29, 1988, Ser. No. 165,378
Claims priority, application Japan, Dec. 28, 1984, 59-279163
Int. Cl.^{5} B32B *17/06*
U.S. Cl. 428—336 9 Claims

1. A zirconia base sintered body comprising a sintered substrate containing 30% by volume or more of tetragonal zirconia and a coating film of a thickness no less than 0.1 micron disposed thereon, wherein the diffusion coefficient of oxygen in material forming said coating film at a temperature of no higher than 550° C. is at least 10^3 less than that of oxygen in said tetragonal zirconia at a temperature no higher than said temperature, said sintered body being stable within a range of 200°–400° C. in an oxygen-containing atmosphere.



5,026,602
MECHANICAL COMPONENT CONSISTING OF ANTI-STATIC MATERIAL
Hiroji Kitagawa, Nagoya, Japan, assignor to Kitagawa Industries Co., Ltd., Nagoya, Japan
Filed Aug. 28, 1989, Ser. No. 398,977
Claims priority, application Japan, Sep. 19, 1988, 63-234293
Int. Cl.^{5} B32B *15/08*
U.S. Cl. 428—336 4 Claims



1. A mechanical component comprising an anti-static material, comprising:
- a roller comprised of synthetic rubber and having an elasticity;
- a conductive metallic membrane on a surface of the roller such that he conductive metallic membrane grounds the roller, wherein the conductive metallic membrane is formed by evaporation, a thickness of the conductive metallic membrane being between about 1.5–4 μm so that the conductive metallic membrane does not impair the elasticity of said roller.

5,026,603
STAPLE FIBERS AND PROCESS FOR MAKING THEM
David J. Rodini, Midlothian, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Division of Ser. No. 361,319, Jun. 5, 1989. This application Nov. 8, 1990, Ser. No. 610,655
Int. Cl.^{5} D01G *1/04;* **D02G** *1/12*
U.S. Cl. 428—362 5 Claims

1. A blend of staple fibers suitable for making permanently antistatic fabrics comprising an intimate blend of:
- crimped staple fibers including crimped monocomponent nonconductive staple fibers and from about 1 to about 5 wt. % of crimped undrawn, spin-oriented sheath-core staple fibers having an electrically conductive carbon black core and a sheath of a nonconductive polymer,

all of said crimped fibers having a crimp frequency in the range of about 3 to 6 crimps per centimeter.

5,026,604
COMPOSITE MATERIAL WITH REFRACTORY FIBROUS REINFORCEMENT AND CERAMIC MATRIX
Jacques Thebault, Bordeaux, France, assignor to Societe Europeenne de Propulsion, Puteaux, France
Division of Ser. No. 756,347, Jul. 18, 1985, Pat. No. 4,752,503. This application Apr. 6, 1988, Ser. No. 178,247
Claims priority, application France, Jul. 20, 1984, 84 11591
Int. Cl.^{5} B32B *9/00*
U.S. Cl. 428—367 6 Claims

1. A composite structure comprising
- (a) a fibrous reinforcing body formed from fibers of a refractory material;
- (b) a ceramic matrix surrounding the fibers of the reinforcing body; and
- (c) an intermediate layer of a refractory material having a laminar structure disposed between the fibers of the refractory material and the ceramic matrix and adherent to both, wherein said intermediate layer has a thickness sufficient to reduce the susceptibility of the structure to crack propagation and to increase impact strength not exceeding 3.0 microns is elastically deformable in shear and has an elongation at break greater than the matrix.

5,026,605
COATED IRON CARBIDE FINE PARTICLES
Ikuo Kitamura, Kyoto; Hideki Aomi; Satoshi Koyama, both of Osaka; Katsushi Tokunaga, Habikino, and Kazuo Okamura, Itami, all of Japan, assignors to Daikin Industries Ltd., Osaka, Japan
Filed Apr. 27, 1989, Ser. No. 343,649
Claims priority, application Japan, Apr. 28, 1988, 63-105806
Int. Cl.^{5} B32B *15/02*
U.S. Cl. 428—403 1 Claim

1. Iron carbide fine particles which have a coating layer of at least one metal compound selected from the group consisting of copper compound and manganese compound wherein the coated amount of said metal compound is 0.01 to 10% by weight in terms of the metal element based on the weight of the iron carbide in terms of Fe_2O_3.

5,026,606
FILM FOR THERMAL IMAGING
Russell R. Isbrandt, White Bear Township, Ramsey County, and Chung I. Young, Roseville, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Aug. 4, 1986, Ser. No. 892,204
The portion of the term of this patent subsequent to Jan. 21, 2003, has been disclaimed.
Int. Cl.^{5} B32B *27/34. 27/30*
U.S. Cl. 428—421 8 Claims

1. Thermally imageable film comprising a substrate, a layer of thermally imageable material applied to at least one major surface of said substrate, and a release coating overlying the layer of imageable material, said release coating being the hydroxilation product of (a) a polyorganohydrosiloxane, (b) an ethylenically-unsaturated perfluoroether monomer, and (c) an effective amount of a hydrosilation catalyst.

4. The film of claim 1 wherein said film is transparent to visible light.

8. Method of preparing a transparency by means of a thermal imaging process comprising the steps of
- (a) contacting an image-bearing original with the film of claim 4,
- (b) applying thermal energy to the original whereby the original image wise absorbs said thermal energy and transfers said thermal energy to the transparent film to form a copy of the image of the original on the transparent film, and
- (c) separating said original from said transparent film.

5,026,607
MEDICAL APPARATUS HAVING PROTECTIVE, LUBRICIOUS COATING
Margaret P. Kiezulas, Carlisle, Mass., assignor to C. R. Bard, Inc., Murray Hill, N.J.
Filed Jun. 23, 1989, Ser. No. 370,917
Int. Cl.^{5} B32B *27/00. 27/40*
U.S. Cl. 428—423.7 32 Claims

26. An article of manufacture comprising a medical device having a protective, lubricious coating on a surface thereof, the coating provided by the method comprising:
- a) providing a coating solution having a solids content of between about 2% and about 80% by weight, the coating solution comprising an aqueous dispersion of a urethane having a solids content of between about 30% and about 50%, and a silicone or siloxane emulsion having a solids content of at least about 15%;
- b) applying the coating solution to a surface of the medical device; and,
- c) allowing the coating to set into a layer upon the device surface.

5,026,608
PROCESS FOR IMPROVING THE ADHESIVE PROPERTIES OF POLYOLEFIN PRODUCTS
Felice Polato, and Giuliano Cecchin, both of Ferrara, Italy, assignors to Himont Incorporated, Wilmington, Del.
Filed May 31, 1989, Ser. No. 359,232
Claims priority, application Italy, May 31, 1988, 20812 A/88
Int. Cl.^{5} B32B *9/04, 27/08;* **B05D** *3/06, 7/00*
U.S. Cl. 428—484 20 Claims

1. A process for the surface modification of polyolefin products comprising the following steps:
- A) application to the product surface of a layer of one or more photosensitive materials selected from the group consisting of
  - 1) chloroparaffins containing 5 to 80 wt % of chlorine and having an average molecular weight between 400 and 2000;
  - 2) polyvinyl chloride, having a chlorine content between 25 and 80 wt %, and a K value between 40 and 60; and
  - 3) vinylidene chloride homopolymers and copolymers; and
- B) exposure of the surface layer of photosensitive material to ultraviolet radiation.

11. A polyolefin product treated according to the process of claim 1.

5,026,609
ROAD REPAIR MEMBRANE
Thomas R. Jacob, Newark; Leonard A. Stenger, Granville, and William E. Uffner, Newark, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed Sep. 15, 1988, Ser. No. 244,362
Int. Cl.^{5} B32B *11/02, 11/10*
U.S. Cl. 428—489 14 Claims

1. A repaired composite roadway comprising distressed pavement, an asphaltic concrete overlay and an intermediate multi-ply laminate applied to the distressed pavement to minimize the propagation of the cracks into said asphaltic concrete overlay, said laminate comprising:
- (a) a first ply of a first asphalt-polymer blend adhered to the distressed pavement and having a relatively high modulus of elasticity, said first ply including a permeable mat having open interstices permeated by said first blend; and
- (b) a second ply of a second asphalt-polymer blend different from said first blend, said second blend being adhered to

VOL
1127
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JE
25
1991
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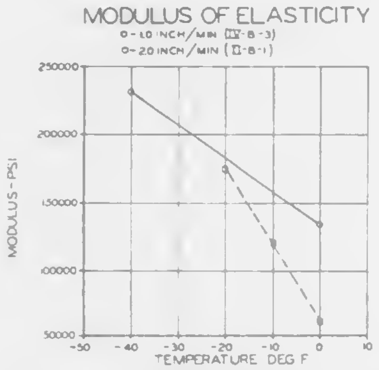
said permeated mat and in contact with said overlay, said second blend having a modulus of elasticity substantially less than that of the first blend and the first and second



plies in combination being adapted to to inhibit enlargement of any cracks in the distressed pavement as the road is subjected to thermal and traffic stress.

5,026,610

POLYMERIC FILMS

John Harrison, Bridgwater, England, assignor to Courtaulds Films & Packaging (Holdings) Ltd., England

Filed Oct. 4, 1988, Ser. No. 253,074

Claims priority, application United Kingdom, Oct. 20, 1987, 8724533

Int. Cl.^{5} B32B *27/08*

U.S. Cl. 428—516 9 Claims

1. A twist warp polymeric film comprising a layer of a blend of high density polyethylene with a polyethylene of lower density than high density polyethylene, and a layer of high density polyethylene on each surface of the layer of the blend, wherein the weight ratio of high density polyethylene to polyethylene of lower density than high density polyethylene in said blend is from 20:80 to 80:20.

5,026,611

METAL-MADE CARRIER BODY FOR EXHAUST GAS CLEANING CATALYST AND PRODUCTION OF THE CARRIER BODY

Masayoshi Usui, and Haruo Serizawa, both of Shizuoka, Japan, assignors to Usui Kokusai Kangyo Kabushiki Kaisha, Japan

Filed Jul. 6, 1989, Ser. No. 376,056

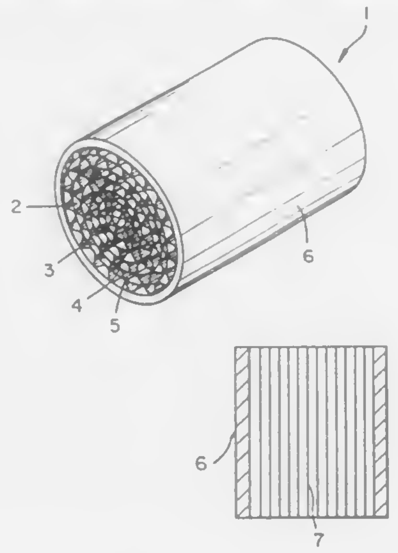
Claims priority, application Japan, Jul. 6, 1988, 63-166835; Aug. 13, 1988, 63-201033

The portion of the term of this patent subsequent to Aug. 14, 2007, has been disclaimed.

Int. Cl.^{5} B01J *25/04;* **F01N** *3/28*

U.S. Cl. 428—593 16 Claims

1. A metal-made carrier body for carrying thereon an exhaust gas cleaning catalyst, said carrier body being formed by superposing a sheet metal band made of a thin metal sheet and a corrugated band made from another thin metal sheet one over the other in a contiguous relation into a honeycomb core structure of a spiral or laminate form defining many network-patterned gas flow passages along the central axis thereof, and then fixing the honeycomb core structure within a tubular metal casing, characterized in that the tubular metal casing defines, in an inner wall thereof, fine recesses for promoting the penetration of a molten brazing material.



5,026,612

STRUCTURES FABRICATED FROM ALUMINUM COMPONENTS AND PROCESSES INVOLVED IN MAKING THESE STRUCTURES

Patrick G. Selwood, Deddington; Anthony N. Maddison, Tamworth, and Peter G. Sheasby, Banbury, all of England, assignors to Alcan International Limited, Montreal, Canada and BL Technology Limited, London, England

Continuation-in-part of Ser. No. 186,666, Apr. 20, 1988, which is a continuation of Ser. No. 607,260, May 4, 1984, abandoned.

This application Jun. 21, 1989, Ser. No. 369,133

Claims priority, application United Kingdom, May 7, 1983, 8312616

Int. Cl.^{5} C22F *1/04*

U.S. Cl. 428—594 12 Claims

1. A process for forming a structure of aluminium components, which process comprises pre-treating aluminium sheet to produce an inorganic non-metallic surface coating thereon, said surface coating being a chemical conversion coating or a deposited coating of the no-rinse type, forming the pre-treated sheet to produce components of desired shapes, applying adhesive to the components and securing the components together by means of the adhesive.

5,026,613

Patent Not Issued For This Number

5,026,614

MAGNETIC RECORDING MEDIUM WITH A ZINC COBALT OXIDE NON-MAGNETIC SUBSTRATE CONTAINING NICKEL OR MANGANESE

Eiji Itoh; Ryuichi Nagase; Kazuhiro Saito, all of Urawa; Hiroshi Hosaka, and Hihumi Nagai, both of Toda, all of Japan, assignors to Nippon Mining Co., Ltd., Tokyo, Japan

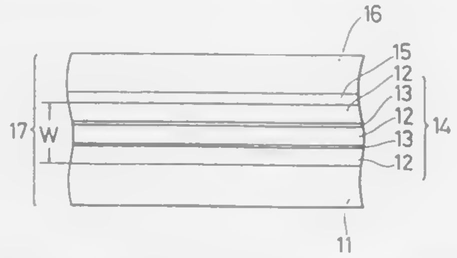
Filed Feb. 24, 1989, Ser. No. 314,738

Claims priority, application Japan, Feb. 25, 1988, 63-43028; Sep. 30, 1988, 63-243995; Sep. 30, 1988, 63-243996; Sep. 30, 1988, 63-243997

Int. Cl.^{5} B32B *15/00*

U.S. Cl. 428—658 9 Claims

4. A magnetic layer structure comprising: a magnetic layer vapor deposited on a non-magnetic substrate, wherein said substrate has a composition expressed by $Zn_xM_yCo_{2-x-y}O_2$, wherein M is selected from the group consisting of Mn and Ni, $0 \leqq x \leqq 0.4$, $0.4 \leqq y \leqq 1.0$, $0.8 \leqq x+y \leqq 1.0$, and said substrate has a rock-salt structure.



5,026,615

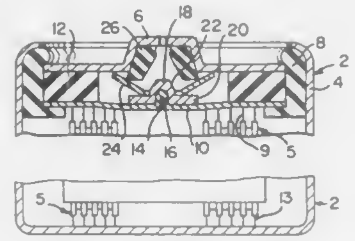
ELECTROCHEMICAL CELL WITH DISCONNECT SWITCH DEVICE

Gary R. Tucholski, Parma Heights, Ohio, assignor to Eveready Battery Company, Inc., St. Louis, Mo.

Filed Aug. 6, 1990, Ser. No. 563,140

Int. Cl.^{5} H01M *2/00*

U.S. Cl. 429—61 20 Claims



1. An electrochemical cell comprising an electrode assembly containing a first electrode of one polarity and a second electrode of an opposite polarity; a housing containing the electrode assembly; a first terminal electrically connected to the first electrode and a second terminal electrically insulated from the first terminal; switch means within the housing comprising a spring member biased to electrically contact the second terminal and positioned adjacent to a nonconductive fulcrum member secured to the housing and having a segment disposed and positioned with respect to the spring member so that said spring member can pivot on said segment when said spring member is exposed to an internal applied force, and a moveable conductive member which electrically connects the second electrode to said spring member, and wherein when the internal pressure in the cell exceeds a predetermined level the moveable conductive member exerts a force against the spring member to pivot the spring member on the segment of the nonconductive fulcrum member and thereby break the electrical connection between the spring member and the second terminal.

5,026,616

ELECTROLESS PLATED PLASTIC COVERS FOR GALVANIC CELLS

Brooke Schumm, Jr., Bay Village, Ohio, assignor to Eveready Battery Company, Inc., St. Louis, Mo.

Filed Nov. 15, 1989, Ser. No. 436,607

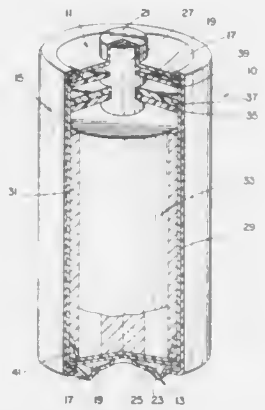
Int. Cl.^{5} H01M *2/02*

U.S. Cl. 429—168 11 Claims

1. An electrical battery comprising:

a housing having an elongated shell and first and second open ends for containing the components of a voltaic cell;

a first metal plated plastic end cover for closing off the first end of said housing and for forming a first electrical contact for said battery; and



a second metal plated plastic end cover for closing off the second end of said housing and for forming a second electrical contact for said battery.

5,026,617

SEPARATOR FOR ALKALINE CELL AND ALKALINE CELL PREPARED BY USING THIS SEPARATOR

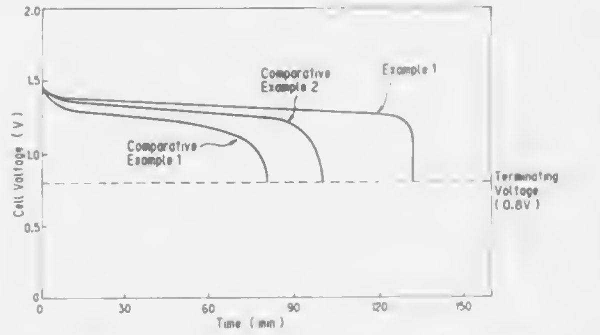
Takemi Kosaka, Tokyo; Fukashi Sakamoto, and Setsuo Hidaka, both of Chiba, all of Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed Jan. 31, 1990, Ser. No. 472,945

Claims priority, application Japan, Feb. 13, 1989, 1-30984; Feb. 13, 1989, 1-30985

Int. Cl.^{5} H01M *2/16*

U.S. Cl. 429—206 20 Claims



1. A separator which is used for preparing an alkaline cell comprising a substrate of a separator and from 0.1 to 10% by weight, based on the weight of the substrate of the separator, of ultra-fine particles, said ultra-fine particles consists essentially of titanium dioxide, hydrated titanium dioxide or a mixture thereof, and wherein each particle is substantially amorphous and has a primary particle diameter of a maximum of 500 Å and a specific surface area of a minimum of 100 square meters per gram.

5,026,618

PHOTOSENSITIVE MATERIAL AND VOLUME TYPE PHASE HOLOGRAM MEMBER FORMED THEREFROM

Nobuo Kushibiki, Yamato; Yoko Yoshinaga, Machida; Tetsuro Kuwayama, Yokohama, and Naosato Taniguchi, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 310,616

Claims priority, application Japan, Feb. 16, 1988, 63-31957

Int. Cl.^{5} G03C *1/73, 1/795*

U.S. Cl. 430—2 8 Claims

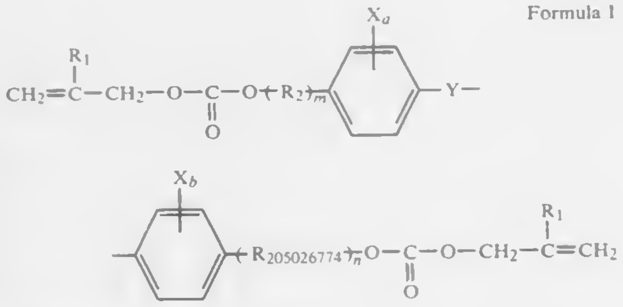
1. A hologram recordable material comprising (i) a substrate

VOL
1127
ISS
4
JE
25
1991
UMI

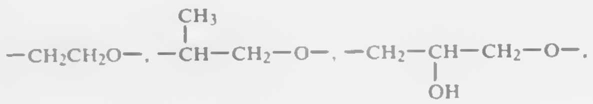
comprising a crosslinked polymer having a transmittance of at least 90% in a wavelength region of from 400 to 700 nm and a refractive index of at least 1.55 and (ii) a photosensitive material layer positioned on said substrate, said photosensitive material layer comprising a substituted or unsubstituted vinyl carbazole polymer and an iodine compound.

5. The photosensitive material according to claim **1**, wherein said crosslinked polymer is a polymer obtained from a monomer selected from the group consisting of Formula (I), (II) or (III):

Formula I

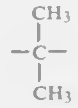


wherein R_1 is H or CH_3; R_2 is



$$-CH_2CH_2O-,\ -\overset{CH_3}{\overset{|}{C}H}-CH_2-O-,\ -CH_2-\underset{OH}{\underset{|}{C}H}-CH_2-O-.$$

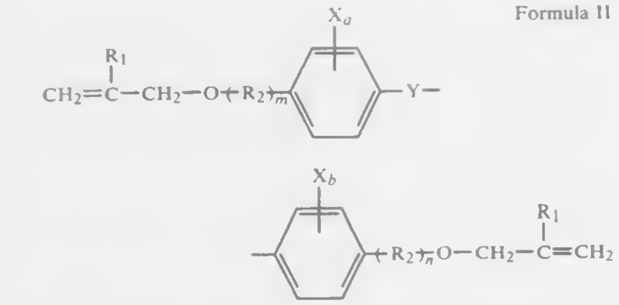
X is Cl or Br; Y is —, —O—, —CO—, $—SO_2—$, $—CH_2—$, —CH=CH—, or



$$-\overset{CH_3}{\overset{|}{\underset{CH_3}{\underset{|}{C}}}}-$$

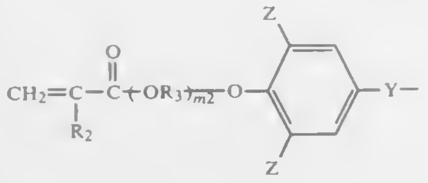
m and n are each an integer of 1 to 4; and a and b are each independently an integer of 0 to 4;

Formula II



wherein R_1, R_2, X, Y, m, n, a, and b are as defined above;

Formula III



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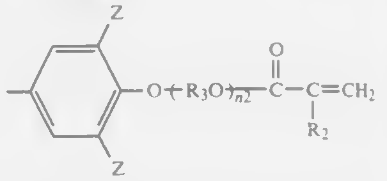


wherein R_2 is H or CH_3; R_3 is an alkylene group having 2 to 3 carbon atoms; Z is Cl, Br, OCH_3, OEt, SCH_3 or SEt; and m2 and n2 are such that the sum of m2 and n2 is an integer from 0 to 6.

5,026,619

REVERSIBLE INFRA-RED RECORDING MEDIUM

Clive Trundle, Towcester, England, assignor to Plessey Overseas Limited, Essex, England

PCT No. PCT/GB88/00587, § 371 Date Mar. 24, 1989, § 102(e) Date Mar. 24, 1989, PCT Pub. No. WO89/01220, PCT Pub. Date Feb. 9, 1989

PCT Filed Jul. 20, 1988, Ser. No. 341,098

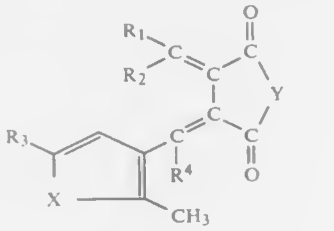
Claims priority, application United Kingdom, Jul. 24, 1987, 8717619

Int. Cl.^{5} G03C *1/73;* G11B *7/24*

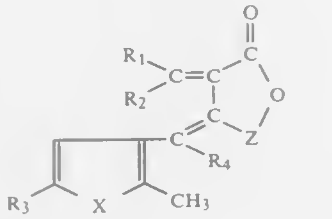
U.S. Cl. 430—19 **6 Claims**

1. An optical data recording method which comprises addressing a recording device using an infra-red laser modulated with the information to be recorded, wherein said recording device comprises an infra-red absorbing material and a photochromic fulgide or lactone having the general formula (I) and (II) below, said fulgide or lactone being convertible to a coloured form by heat;

(I)



(II)



wherein

X represents oxygen or sulphur;

Y represents oxygen or N—A, (where A is alkyl, aryl or aralky!), one of R_1 and R_2 is hydrogen while the other is alkyl or aryl, R_3 is hydrogen, alkyl or aryl and R_4 is alkyl or aryl and Z is methylene or a dialkyl substituted methylene.

5,026,620

METHOD FOR FORMING ELECTROPHOTOGRAPHIC IMAGES

Hiroya Masaki; Hiroyuki Takagiwa; Meizo Shirose, and Michiaki Ishikawa, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jun. 16, 1989, Ser. No. 367,855

Claims priority, application Japan, Jun. 24, 1988, 63-157720

Int. Cl.^{5} G03G *13/20, 13/22*

U.S. Cl. 430—99 **12 Claims**

1. A method for forming an electrophotographic image, comprising forming an electrostatic latent image on a latent image carrier, developing said latent image with a developer to form a toner image, transferring said toner image onto a recording material, and fixing the toner image with a heat roller, wherein said method is characterized by:

1) said developer comprises a toner containing carbon black and inorganic fine particles having a pH of at least 7.0, wherein said pH is measured by
   a) adding 4 grams of said fine particles to 100 ml of distilled water to form a mixture, and stirring said mixture vigorously,
   b) stopping the stirring and measuring the pH of said mixture with a pH meter,
2) said heat roller having an outer layer containing carbon black and being grounded.

5,026,621

TONER FOR ELECTROPHOTOGRAPHY

Kazuo Tsubuko; Shinichi Kuramoto, both of Numazu; Kazuhiko Umemura, Susono, and Makoto Ohkawara, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed May 12, 1989, Ser. No. 351,025

Claims priority, application Japan, May 17, 1988, 63-119481

Int. Cl.^{5} G03G *9/00;* C08F *259/00*

U.S. Cl. 430—109 **12 Claims**

1. A toner for electrophotography comprising as the main components a coloring component and a binder resin which is a block copolymer comprising a functional segment (A) consisting of at least one of a fluoroalkyl acryl ester block unit or a fluoroalkyl methacryl ester block unit, and a compatible segment (B) consisting of a fluorine-free vinyl or olefin monomer block unit.

5,026,622

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL RESTRAINED FROM PRODUCING PIN-HOLES

Taketoshi Yamada, and Takeshi Habu, both of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Oct. 27, 1989, Ser. No. 427,479

Claims priority, application Japan, Oct. 31, 1988, 63-276556

Int. Cl.^{5} G03C *1/06*

U.S. Cl. 430—264 **16 Claims**

1. A silver halide photographic light-sensitive material comprising

a support,

a silver halide emulsion layer being provided on a surface of said support and containing a tetrazolium compound or a hydrazine compound,

a metal oxide-containing layer containing a tin oxide or an indium oxide and being provided on the surface of said support opposite to said surface, on which said emulsion layer is provided,

and a polymer-containing layer containing a homopolymer or a copolymer comprising sodium styrenesulfonate, and being provided directly or through an intermediate layer on the surface of said metal oxide containing layer further to said support.

5,026,623

OPTICAL RECORDING MEDIUM

Hiroyuki Imataki, Kawasaki; Mizubo Hiraoka, Isehara; Yoshibiro Ogawa, Tokyo; Hitoshi Yoshino, Atsugi; Sachiko Ichikawa, and Seijiro Kato, both of Sagamihara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

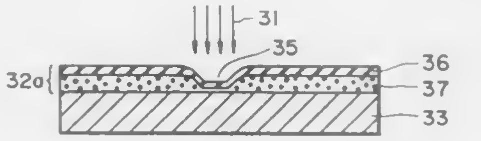
Continuation of Ser. No. 249,233, Sep. 21, 1988, abandoned, which is a division of Ser. No. 39,020, Apr. 16, 1987, abandoned.

This application Jun. 4, 1990, Ser. No. 532,127

Claims priority, application Japan, Apr. 21, 1986, 61-89954; Apr. 21, 1986, 61-89955; Apr. 21, 1986, 61-89956; Apr. 24, 1986, 61-93227

Int. Cl.^{5} G03C *1/72;* G11B *7/00*

U.S. Cl. 430—270 **14 Claims**



1. An optical recording method which comprises the step of irradiating an optical recording medium comprising a substrate and a recording layer which consists of a porous light-absorptive layer and a light-reflective layer on said porous light-absorptive layer with a beam of light to cause thermal softening and melting deformation of the porous light-absorption layer, thereby deforming said light-reflective layer corresponding to said deformation of said porous light-absorptive layer and forming a recording pit without a rim in the light-reflective layer.

5,026,624

COMPOSITION FOR PHOTO IMAGING

Richard A. Day, Whitney Point, N.Y.; Jeffrey D. Gelorme, Plainville, Conn.; David J. Russell, Apalachin, and Steven J. Wih, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 3, 1989, Ser. No. 318,536

Int. Cl.^{5} G03C *1/675*

U.S. Cl. 430—280 **26 Claims**

1. A photosensitive cationically polymerizable epoxy base imaging system comprising;

an epoxy resin system consisting essentially of between about 20% and about 40% by weight of a polyol resin which is a condensation product of epichlorohydrin and bisphenol A having a molecular weight of between about 40,000 and 130,000;

between about 20% and about 35% by weight of a epoxidized octafunctional bisphenol A formaldehyde novolak resin having a molecular weight of between about 4,000 and about 10,000;

between about 35% and about 50% by weight of an epoxidized glycidyl ether of tetrabromo bisphenol A having a softening point of between about 60° C. and about 110° C. and a molecular weight of between about 600 and about 2,500; and

from about 0.1 to about 15 parts by weight of a cationic photoinitiator capable to initiating polymerization in said epoxidized resin system upon exposure to actinic radiation;

said resin system being further characterized by having an absorbance of light in the 330 to 700 nm region of less than 0.1 for a 2 mil thick film.

VOL
1127
ISS
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1991
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5,026,625

TITANOCENES, THE USE THEREOF, AND N-SUBSTITUTED FLUOROANILINES

Martin Riediker, Riehen; Eginbard Steiner, Füllinsdorf; Harry Beyeler, Basel; Franciszek Sitek, Therwill, and Rinaldo Hüsler, Marly, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

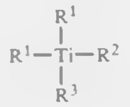
Filed Nov. 21, 1988, Ser. No. 273,526

Claims priority, application Switzerland, Dec. 1, 1987, 4682/87

Int. Cl.⁵ C07F *17/00;* **G03F** *7/029;* **C08F** *2/50;* **B01F** *31/00*

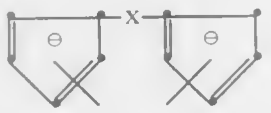
U.S. Cl. 430—281 **17 Claims**

1. A titanocene of formula I



$$R^1-\overset{\displaystyle R^1}{\underset{\displaystyle R^3}{Ti}}-R^2 \qquad I$$

in which both R^1 radicals, independently of one another, are cyclopentadienyl$^{\ominus}$, idenyl$^{\ominus}$ or 4,5,6,7-tetrahydroindenyl$^{\ominus}$, each of which is unsubstituted or substituted by C_1–C_{18}alkyl or -alkoxy, C_2–C_{18}alkenyl, C_5–C_8cycloalkyl, C_6–C_{16}aryl, C_7–C_{16}aralkyl, $SiR_3{}^4$, $GeR_3{}^4$, cyano or halogen, or both R^1 together are a radical of the formula II

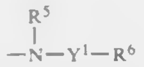


II

unsubstituted or substituted as above, in which X is $—CH_{2n}$ where n=1, 2 or 3, unsubstituted or phenyl-substituted alkylidene having 2 to 12 carbon atoms, cycloalkylidene having 5 to 7 ring carbon atoms, $SiR_2{}^4$, $SiR_2{}^4—O—SiR_2{}^4$, $GeR_2{}^4$ or $SnR_2{}^4$, and R^4 is C_1–C_{12}alkyl, C_5–C_{12}cycloalkyl, C_6–C_{16}aryl or C_7–C_{17}aralkyl, R^2 is a 6-membered carbocyclic aromatic radical which is substituted by fluorine atoms in at least one of the two ortho-positions to the titanium-carbon bond, and in which the aromatic radical may contain further substituents, R^3 has one of the definitions given for R^2, or R^2 and R^3 together are a radical of the formula III

$$—Q—Y—Q— \qquad III$$

in which Q is a carbocyclic aromatic radical where the two bonds are each in the ortho-position to the Y group and the second ortho-position to the titanium-carbon bond is in each case substituted by a fluorine atom, and where Q may contain further substituents, and Y is CH_2, alkylidene having 2 to 12 carbon atoms, cycloalkylidene having 5 to 7 ring carbon atoms, NR^4, O, S, SO, SO_2, CO, $SiR_2{}^4$, $GeR_2{}^4$, or $SnR_2{}^4$, and R^4 is as defined above, wherein, in the titanocenes, R^2 and R^3 or the radical of the formula III are substituted by a radical of the formula IV



$$—\overset{\displaystyle R^5}{N}—Y^1—R^6 \qquad IV$$

in which R^5 is hydrogen, linear or branched C_1–C_{20}alkyl, C_2–C_{20}alkenyl, C_3–C_8cycloalkyl, C_4–C_{20}cycloalkylalkyl or -alkylcycloalkyl, C_5–C_{20}alkylcycloalkylalkyl, C_6–C_{20}cycloalkenylalkyl, C_6–C_{14}aryl, C_7–C_{20}aralkyl or -alkaryl, C_8–C_{20}alkararalkyl or C_3–C_{12}trialkylsilyl, where these radicals are unsubstituted or substituted by C_1–C_{18}alkoxy, C_1–C_{18}alkylthio, C_1–C_{18}alkylsulphonyl, C_6–C_{10}arylsulphonyl, C_7–C_{20}alkarylsulphonyl or cyano, R^6 has one of the definitions given for R^5 or is C_1–C_{20}halogenoalkyl, C_2–C_{20}alkyl which is interrupted by —CO—, or C_1–C_{12}alkyl which is substituted by —COOH or $—COOR^4$, and, in the case where Y^1 is —CO—, —CS— or $—SO_2—$, may also be $—NR^7R^8$ in which R^7 and R^8, independently of one another, have one of the definitions given for R^5, Y^1 is a —CO—, —CS—, —COO—, $—SO_2—$ or $SiR_2{}^4—$ in which R^4 is as defined above, with the proviso, that when R^5 is hydrogen or alkyl, R^7 is hydrogen or alkyl, and Y^1 is —COO— or $—CONR^7—$, R^6 or R^8 is not alkoxyalkyl.

12. A radiation-polymerizable compositon containing (a) at least one non-volatile, monomeric, oligomeric or polymeric compound containing at least one polymerizable, ethylenically unsaturated double bond, and (b) at least one titanocene of the formula I according to claim **1** as photoinitiator.

16. A photoinitiator mixture containing a photoinitiator of the benzophenone, benzoin alkyl ether, benzil ketal, 4-aroyl-1,3-dioxolane, dialkoxyacetophenone, -hydroxyacetophenone, -hydroxycycloalkyl phenyl ketone or -aminoacetophenone type, or mixtures thereof, and a titanocene of the formula I according to claim **1**.

5,026,626

OXYGEN RESISTANT RADIATION-POLYMERIZABLE COMPOSITION AND ELEMENT CONTAINING A PHOTOPOLYMER COMPOSITION

Oliver A. Barton, 49 Afton Dr., Florham Park, N.J. 07932, and James D. Wright, 411A R.D. #5, Flemington, N.J. 08822

Division of Ser. No. 376,150, Jul. 5, 1989, Pat. No. 4,952,432, which is a continuation of Ser. No. 80,947, Aug. 3, 1987, abandoned. This application Jun. 14, 1990, Ser. No. 538,180

Int. Cl.⁵ G03C *1/725*

U.S. Cl. 430—288 **23 Claims**

1. A radiation-polymerizable composition which consists essentially of in admixture:

(a) a polymerizable component which consists essentially of polybutane diol diacrylate having a molecular weight of from about 700 to about 800; and

(b) a photoinitiator; and

(c) an aqueous alkaline soluble binding resin; wherein said binding resin is present in an amount of from about 18.0% to about 40.0% based on the weight of the solids in the composition; and wherein said photoinitiator is present in an amount of from about 2.0% to about 10.0% based on the weight of the solids in the composition; and wherein said polymerizable component is present in an amount of from about 18.0% to about 40.0% based on the weight of the solids in the composition.

5,026,627

HIGH STRENGTH ALKALI BLUE PIGMENT TONER USEFUL IN BOTH OIL-BASED AND WATER-BASED SYSTEMS

Doreswamy R. Iyengar, Ann Arbor, and Thomas L. Praamsma, Holland, both of Mich., assignors to BASF Corporation

Continuation of Ser. No. 258,003, Oct. 14, 1988, abandoned. This application Jun. 11, 1990, Ser. No. 536,050

Int. Cl.⁵ G03C *5/00*

U.S. Cl. 430—331 **6 Claims**

1. A dry toner useful in both water-based and oil-based printing inks, the toner comprising:

(a) between 60 percent, by weight, and 98 percent, by weight, alkali blue pigment particles;

(b) between 1 percent by weight and 20 percent by weight of a surfactant selected from the group consisting of di- and tri-decyl phosphate esters of free acids;

(c) between 1 percent by weight and 20 percent by weight of dehydroabietyl amine, said weights based on total composition.

5,026,628

PHOTOGRAPHIC MATERIAL AND PROCESS COMPRISING A COMPOUND CAPABLE OF FORMING A WASH-OUT DYE

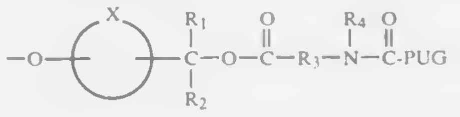
William J. Begley, Webster; Teh-Hsuan Chen, Fairport; Kenneth N. Kilminster, Rochester; Jerrold N. Poslusny, Rochester, and Wojciech Slusarek, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 22, 1990, Ser. No. 483,600

Int. Cl.⁵ G03C *5/54, 7/32, 1/06, 1/34*

U.S. Cl. 430—382 **12 Claims**

1. A photographic element comprising a support bearing at least one photographic silver halide emulsion layer and at least one compound (A) represented by the formula SOL-CAR-LINK-PUG wherein SOL is a water solubilizing group, CAR is a carrier moiety that, upon reaction with oxidized developing agent, is capable of releasing LINK-PUG and capable of forming a compound that is washed out of the photographic element during photographic processing; LINK-PUG is in turn capable of releasing a photographically useful group (PUG) during photographic processing; and, LINK-PUG is represented by the formula:



wherein

X represents the atoms necessary to complete an unsubstituted or substituted arylene or heterocyclic group;

R_1 and R_2 individually are hydrogen, alkyl, aryl or R_1 and R_2 together complete a 5- or 6-member ring;

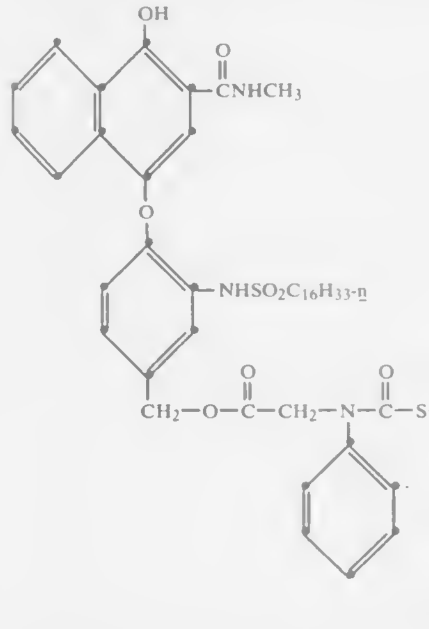
R_3 is a divalent group that enables formation of a 5-, 6-, or 7-member ring upon processing of the photographic element;

R_4 is hydrogen, unsubstituted or substituted alkyl, or unsubstituted or substituted aryl or represents the atoms completing a ring with R_3; and,

PUG is a releasable photographically useful group.

10. A process of forming a photographic image which comprises developing an exposed photographic silver halide emulsion layer with a color developing agent in the presence of a compound (A) as defined in claim **1**.

12. A process as in claim **10** wherein the compound (A) is:



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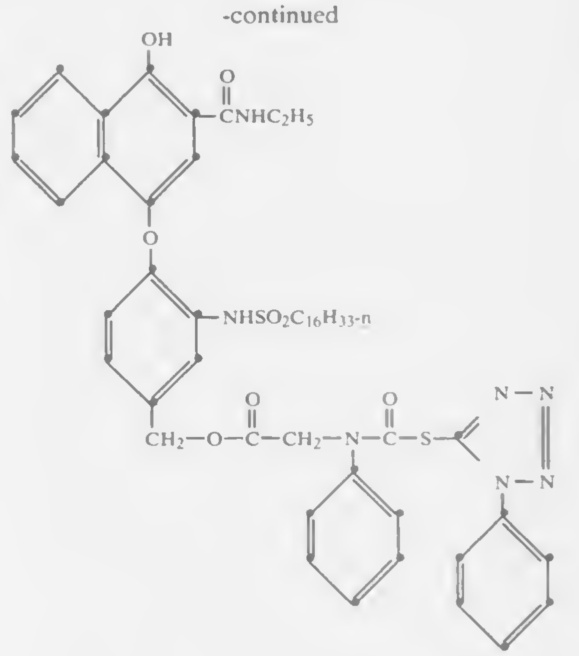

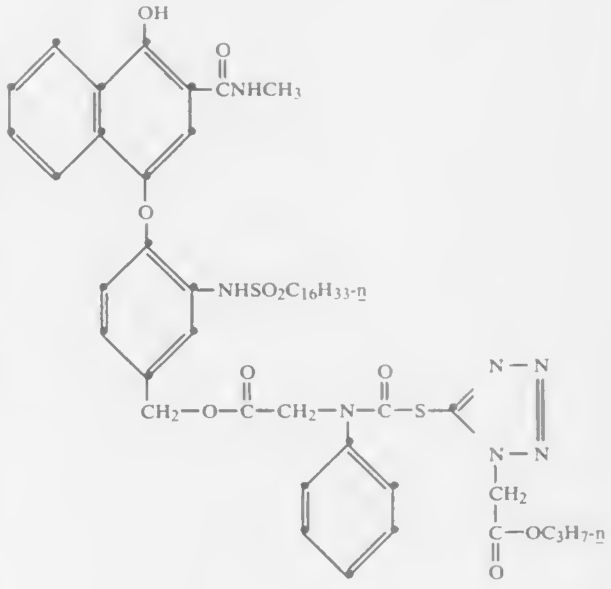

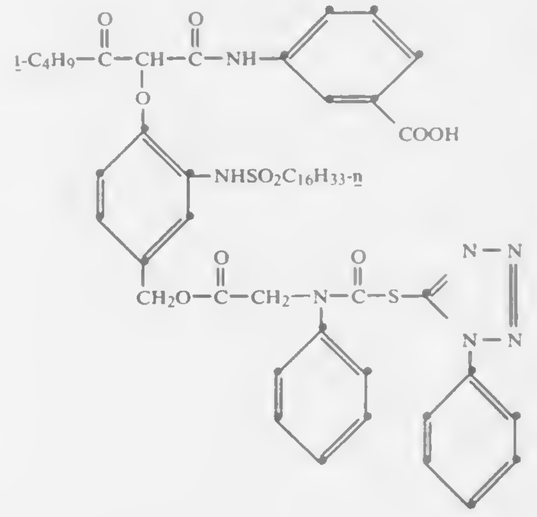

VOL
1127
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1991
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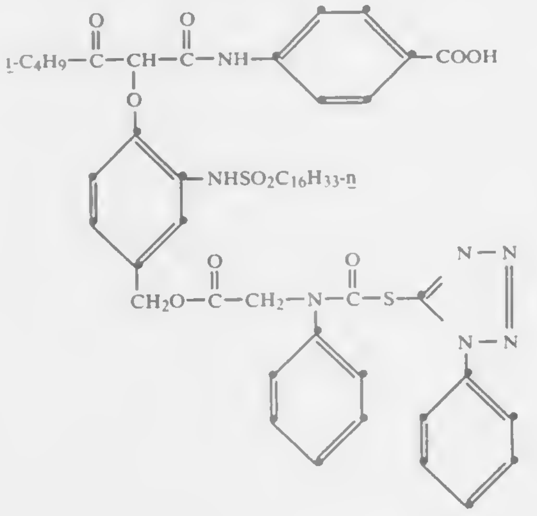


5,026,629
FIXING BATH FOR BLACK AND WHITE PHOTOGRAPHIC ELEMENTS

Hugh G. McGuckin, Rochester; Michael G. Blount, Rochester; Paul Schwartz, Webster; Donald F. McLaeo, Rochester; James L. Lyon, Holcomb, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

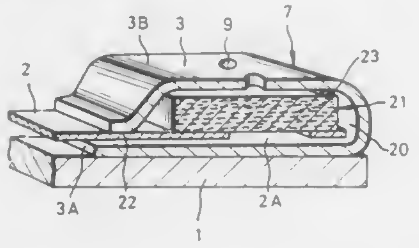
Filed Feb. 7, 1990, Ser. No. 476,203
Int. Cl.^{5} G03C *5/24*
U.S. Cl. 430—428 **17 Claims**

1. A photographic fixing bath for black and white light sensitive elements consisting essentially of an aqueous solution of a thiosulfate fixing agent and an effective amount of an imidazole compound to reduce the retained thiosulfate ion concentration of the film to less than one-half the value utilizing a fixing bath without the presence of imidazole compound.

5,026,630
SELF-PROCESSING PHOTOGRAPHIC FILM UNIT WITH NONWOVEN CLOTH IN TRAP

Kazunori Mizuno, and Kenji Sashihara, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 4, 1990, Ser. No. 532,421
Claims priority, application Japan, Jun. 2, 1989, 1-141311; Jun. 2, 1989, 1-141312; Jun. 2, 1989, 1-141313
Int. Cl.^{5} G03C *3/00, 5/54*
U.S. Cl. 430—498 **25 Claims**



1 In a self-processing photographic film unit, a trap member for catching surplus processing solution, said trap member comprising:

a nonwoven cloth for absorbing said surplus processing solution;

a neutralizing agent contained in said nonwoven cloth for neutralizing said surplus processing solution said neutralizing agent being a polymer having carboxyl groups; and

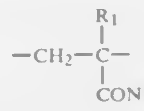
a hardening agent contained in said nonwoven cloth in order to harden said polymer, said hardening agent being present in an amount of at least 1 mol % relative to cross linkage groups of said polymer.

5,026,631
SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Hiroyuki Yoneyama, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

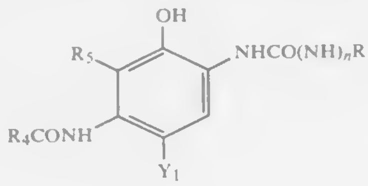
Filed Jun. 20, 1990, Ser. No. 540,735
Claims priority, application Japan, Jun. 21, 1989, 1-158923
Int. Cl.^{5} G03C *7/34*
U.S. Cl. 430—545 **8 Claims**

1. A silver halide color photographic material having a support and at least one hydrophilic colloid layer provided thereon, the hydrophilic colloid layer containing a dispersion obtained by dissolving a diffusion resistant oil-soluble cyan coupler which forms a substantially nondiffusible dye by coupling with an oxidation product of an aromatic primary amine developing agent and a hydrophobic polymer latex formed in an aqueous medium in each other, in which the polymer latex has a recurring unit represented by the following general formula (I,), the cyan coupler is represented by the following general formula (II) or (III), and the dispersion is formed through a water-in-oil emulsion at least once when the hydrophobic polymer latex formed in the aqueous medium is mixed with a solution of the cyan coupler in a coupler solvent:

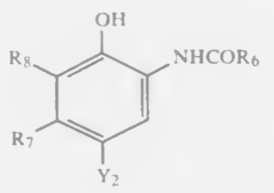


$$-CH_2-\overset{\displaystyle R_1}{\underset{\displaystyle CONHR_2}{C}}- \qquad (I)$$

wherein R_1 represents a hydrogen atom, a halogen atom or a methyl group; and R_2 represents a substituted or unsubstituted aliphatic, aromatic or heterocyclic group;



(II)



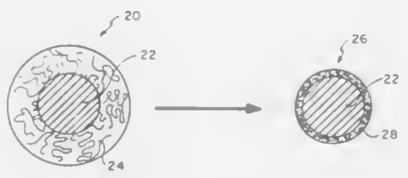
(III)

wherein R_3, R_4 and R_6 each represents a substituted or unsubstituted aliphatic, aromatic or heterocyclic group; R_5, R_7 and R_8 each represents a hydrogen atom, a halogen atom, an aliphatic group, an aromatic group or an acylamino group; R_5 may represent a nonmetallic atom which combines together with R_4 to form a nitrogen-containing 5-membered or 6-membered ring; Y_1 and Y_2 each represents a hydrogen atom or a group which is eliminable by coupling reaction with an oxidation product of a developing agent; and n represents 0 or 1.

5,026,632
USE OF GELATIN-GRAFTED AND CASE-HARDENED GELATIN-GRAFTED POLYMER PARTICLES FOR RELIEF FROM PRESSURE SENSITIVITY OF PHOTOGRAPHIC PRODUCTS

Pranab Bagchi, Webster, and William L. Gardner, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 22, 1990, Ser. No. 497,472
Int. Cl.^{5} G03C *1/08*
U.S. Cl. 430—545 **20 Claims**



1. A silver halide photographic element comprising radiation sensitive silver halide grains, gelatin and a composite polymer particle comprising a soft polymer core having a mean diameter from about 10 nm to 500 nm in diameter covered with a gelatin shell that has been cross-linked with a conventional hardener to form a hard case particle with a case thickness less than 10 nm wherein the hard case particle is incorporated into at least one layer comprising gelatin and said silver halide grains.

5,026,633
COLOR PHOTOTHERMOGRAPHIC MATERIALS WITH DEVELOPMENT ACCELERATOR

David C. Weigel, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 27, 1989, Ser. No. 386,294
Int. Cl.^{5} G03C *1/10*
U.S. Cl. 430—551 **6 Claims**

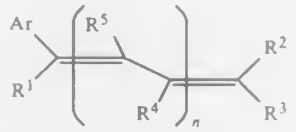
1. A photothermographic emulsion capable of producing an image having a visible yellow color upon exposure to actinic radiation and thermal development comprising:

(a) a binder;

(b) a silver salt of an organic acid;

(c) a light sensitive silver halide in catalytic proximity to said silver salt;

(d) a benzylidene leuco dye which is oxidizable by silver ions into a yellow dye of the general formula:



in which:

n=0, 1 or 2,

R^1 represents H, CN, lower alkyl of 1 to 5 carbon atoms, aryl or $COOR^6$ in which R^6 is lower alkyl of 1 to 5 carbon atoms or aryl,

R^2 and R^3 independently represent CN, NO_2, $COOR^6$, SO_2R^6, and $CONHR^6$, in which R^6 is as defined above, or R^2 and R^3 together represent the necessary atoms to form a 5-or 6-membered carbocyclic ring or heterocyclic ring having ring atoms selected from C, N, O and S atoms, which carbocyclic or heterocyclic rings possess at least one conjugated electron withdrawing substituent,

R^4 and R^5 independently represent H, CN or lower alkyl of 1 to 5 carbon atoms or together represent the necessary atoms to complete a 5- or 6-membered carbocyclic ring, and

Ar represents a thienyl group, a furyl group or a phenyl group; and

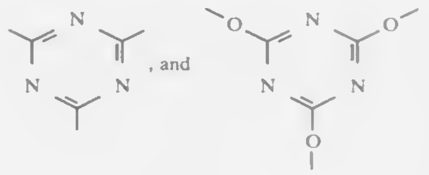
(e) a development accelerator having the general formula:

$(Ph)_3—X$

in which:

Ph is phenyl, and

X is a nitrogen containing bridging group selected from the group consisting of

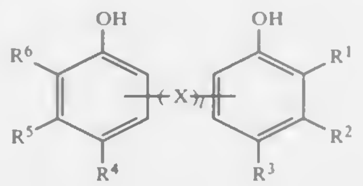


5,026,634
COLOR LIGHT-SENSITIVE MATERIAL

Michio Ono; Hiroyuki Hirai; Nobutaka Ohki, Kouichi Hanaki and Koki Nakamura, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 20, 1989, Ser. No. 382,447
Claims priority, application Japan, Jul. 21, 1988, 63-182673; Jul. 26, 1988, 63-186087
Int. Cl.^{5} G03C *1/08*
U.S. Cl. 430—559 **9 Claims**

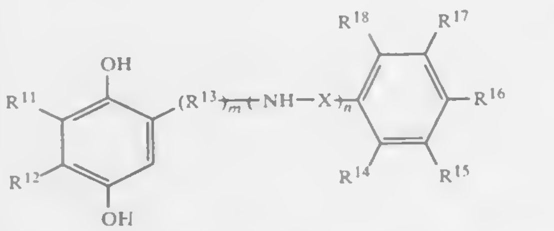
1. A color light-sensitive material comprising a support having provided thereon a light-sensitive silver halide, a binder, a reducible dye donating compound, and at least one reducing agent selected from the group consisting of a compound represented by formula (IA) and a compound represented by formula (IB):



(IA)

wherein R^1, R^2, R^3, R^4, R^5, and R^6, which may be the same or different, each represents a hydrogen atom, a halogen atom, a hydroxyl group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, a substituted or unsubstituted acylamino group, a substituted or unsubstituted alkoxy group, a substituted or unsubstituted aryloxy group, a substituted or unsubstituted alkylthio group, a substituted or unsubstituted arylthio group, a substituted or unsubstituted acyl group, a substituted or unsubstituted sulfonyl group, a substituted or unsubstituted carbamoyl group, or a substituted or unsubstituted sulfamoyl group, provided that at least one of R^1 and R^3 and at least one of R^4 and R^6 represent a hydroxyl group; or any adjacent two of R^1, R^2, R^3, R^4, R^5, and R^6 are connected to each other to form a carbocyclic ring; X represents a divalent linking group; and l represents 0 or 1;

VOL 1127
ISS 4
JE 25
1991
UMI



(IB)

wherein R^{11} and R^{12}, which may be the same or different, each represents a hydrogen atom, a halogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, a substituted or unsubstituted acylamino group, a substituted or unsubstituted alkoxy group, a substituted or unsubstituted aryloxy group, a substituted or unsubstituted alkylthio group, a substituted or unsubstituted arylthio group, a substituted or unsubstituted acyl group, a substituted or unsubstituted sulfonyl group, a substituted or unsubstituted carbamoyl group, or a substituted or unsubstituted sulfamoyl group, or R^{11} and R^{12} are taken together to form a carbocyclic ring; R^{13} represents an unsubstituted or alkyl-substituted alkylene group: R^{14}, R^{15}, R^{16}, R^{17}, and R^{18}, which may be the same or different, each represents a hydrogen atom, a halogen atom, a cyano group, a nitro group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted acylamino group, a substituted or unsubstituted sulfonamido group, a substituted or unsubstituted alkoxy group, a substituted or unsubstituted aryloxy group, a substituted or unsubstituted alkylthio group, a substituted or unsubstituted arylthio group, a substituted or unsubstituted amino group, a substituted or unsubstituted acyl group, a substituted or unsubstituted acyloxy group, a substituted or unsubstituted carbamoyl group, a substituted or unsubstituted carbamoylamino group, a substituted or unsubstituted sulfamoyl group, a substituted or unsubstituted sulfamoylamino group, a substituted or unsubstituted alkoxycarbonyl group, a substituted or unsubstituted aryloxycarbonyl group, a substituted or unsubstituted heterocyclic group, a substituted or unsubstituted alkoxysulfonyl group, or a substituted or unsubstituted aryloxysulfonyl group; R^{14}, R^{15}, and R^{16} each may further represent a hydroxyl group; or any adjacent two of R^{14}, R^{15}, R^{16}, R^{17}, and R^{18} are connected to each other to form a carbocyclic or heterocyclic ring; X represents —CO—or —SO_2—; m represents 1 and n represents 0 or 1; and the total number of carbon atoms in R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16}, R^{17}, and R^{18} is 8 or more.

5,026,635
STABLE HUMAN CELL LINES EXPRESSING AN INDICATOR GENE PRODUCT UNDER VIRUS-SPECIFIC GENETIC CONTROLS

Blair Q. Ferguson, Wilmington; Lee T. Bacbeler, Newark; Stephen R. Petteway, Hockessin, all of Del., and Russell H. Neubauer, West Chester, Pa., assignors to Du Pont Merck Pharmaceutical, Wilmington, Del.

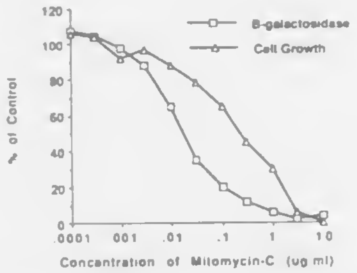
Division of Ser. No. 51,970, May 19, 1987. This application Apr. 26, 1990, Ser. No. 515,132

Int. Cl.⁵ C12Q *1/70, 1/68, 1/00;* **C12P** *21/06*

U.S. Cl. 435—5 **2 Claims**

1. A method of identifying an agent which specifically inhibits the function of human immunodeficiency virus (HIV) TAT protein, comprising:

(a) exposing a stable genetically engineered human cell line to a potential inhibiting agent, said cell line stably expressing HIV TAT protein and stably expressing *E. coli* β-galactosodase under the control of a fully TAT-induced HIV LTR; and



(b) measuring a decrease in the expression of the β-galactosidase by the cell line following exposure to the potential inhibiting agent.

5,026,636
METHODS AND COMPOSITIONS FOR PRODUCTION OF MYCOPLASMAL ADHESINS

Joel B. Baseman; C. J. Su, and S. F. Dallo, all of San Antonio, Tex., assignors to The University of Texas Board of Regents, Austin, Tex.

Filed Nov. 10, 1987, Ser. No. 118,967

Int. Cl.⁵ C12Q *1/68;* **C12N** *1/21, 15/31*

U.S. Cl. 435—6 **44 Claims**

1. A substantially purified nucleic acid molecule comprising a nucleotide sequence encoding a *M. pneumoniae* P1 protein or a C-terminal portion thereof.

5,026,637
IMMORTAL HUMAN MAMMARY EPITHELIAL CELL LINES

Herbert Soule, 6344 Jonathan, Dearborn, Mich. 48126, and Charles M. McGrath, 6669 Beach, Troy, Mich. 48098

Filed Feb. 28, 1989, Ser. No. 317,610

Int. Cl.⁵ C12Q *1/02, 1/18;* **C12N** *5/06*

U.S. Cl. 435—29 **3 Claims**

1. A biologically pure culture of an immortal human mammary epithelial cell subline designated ATCC Registration No. CRL 10317.

5,026,638
ANTIBIOTIC SENSITIVITY TEST FOR PATHOGENIC ORGANISMS PRESENT IN MASTITIC MILK

George Saperstein, R.F.D. #1, Box 127, Pomfret Center, Conn. 06259

Filed Jul. 27, 1988, Ser. No. 224,613

Int. Cl.⁵ C12Q *1/18, 1/02;* **C12N** *1/00*

U.S. Cl. 435—32 **21 Claims**

1. A method for determining the antibiotic sensitivity of pathogenic microorganisms present in milk obtained from a mammal afflicted with mastitis comprising the steps of:

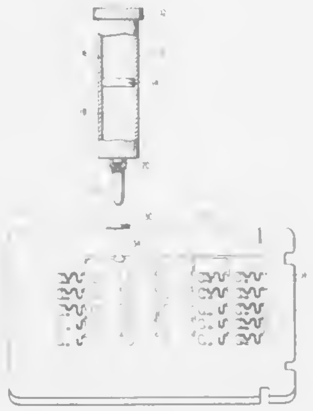
(A) collecting a sample of milk from a mammal afflicted with mastitis;

(B) admixing the resulting collected sample of milk of step (A) with sterilized milk and incubating the resulting mixture at about 34° to 38° C. for about 2 to 12 hours so as to obtain a culture of said microorganisms in the milk admixture;

(C) admixing the resulting culture of step (B) or an aliquot thereof, with an antibiotic and incubating at about 34° to 38° C. for about 4 to 24 hours; and

(D) determining the antibiotic sensitivity of the resulting antibiotic containing culture of step (C) by measuring the

pH of said antibiotic containing culture, whereby a culture which is more acidic than the original culture indicates that said pathogenic microorganisms are not sensitive to said antibiotic.



5,026,639
METHOD TO IMPROVE MRNA TRANSLATION AND USE THEREOF FOR PRODUCTION OF PLATELET FACTOR-4

Paul H. Johnson, Menlo Park, Calif., assignor to Nippon Mining Company, Limited, Tokyo, Japan

Filed Jan. 14, 1988, Ser. No. 143,731

Int. Cl.⁵ C12N *15/67, 15/03, 15/12;* **C12P** *21/00*

U.S. Cl. 435—69.1 **24 Claims**

1. In a method to improve expression of platelet factor 4 which method comprises constructing a hybrid gene consisting of a first DNA sequence encoding the amino terminus of said hybrid gene, separated by a cleavage site sequence, and a second DNA sequence encoding platelet factor 4, culturing host cells transformed with a vector comprising the hybrid gene, and recovering said fusion protein from the transformed cells wherein the improvement comprises:

selecting a colicin El structural gene sequence for the first DNA sequence of said hybrid gene, which DNA is in the range of 15 to about 450 basepairs in length, sufficient to disrupt secondary structure formation between messenger RNA encoding platelet factor 4 and the messenger RNA region containing the ribosome binding site whereby said secondary structure formation renders said ribosome binding site inaccessible to ribosomes.

5,026,640
PROCESS FOR THE CONVERSION OF CORRINOIDS PRODUCED BY MICROORGANISMS INTO CYANOCORRINOIDS

Ágnes Kelemen; Éva Cserey Pechány, and István Jaksa, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt, Budapest, Hungary

Filed Oct. 4, 1984, Ser. No. 657,748

Claims priority, application Hungary, Oct. 4, 1983, 3440/83

Int. Cl.⁵ C12P *19/42, 19/28;* **C07H** *23/00*

U.S. Cl. 435—86 **4 Claims**

1. A process for converting microbiologically produced corrinoids to cyanocorrinoids practically devoid of free cyanide ions which comprises the steps of:

(a) acidifying a fermentation broth containing corrinoids which are bound to microorganism cells to a pH of 4;

(b) disrupting the cells in the fermentation broth containing corrinoids by heating to a temperature of 100° to 120° C. for 10 minutes to release the microorganism cells;

(c) passing the fermentation broth whose microorganism cells were disrupted during step (b) through an adsorbent or cation exchange resin so that the corrinoids from the fermentation broth are adsorbed on the surface of the adsorbent or cation exchange resin;

(d) converting the corrinoids adsorbed on the adsorbent or cation exchange resin to cyanocorrinoids by treating the corrinoids with an aqueous solution containing cyanide ions or a compound capable of supplying cyanide ions in a 1.1 to 2.0 molar ratio with respect to the corrinoids wherein the cyanide ions are present in excess;

(e) washing the adsorbent or cation exchange resin with water;

(f) eluting the cyanocorrinoids from the adsorbent or cation exchange resin by passing therethrough an eluant selected from the group consisting of methanol, ethanol and acetone, and recovering an eluate rich in cyanocorrinoids; and

(g) evaporating the eluate to drive off the eluant and recovering the cyanocorrinoids.

5,026,641
BACTERIA CULTURE AND FERMENTATION USING THE SAME

Ayaaki Ishizaki, Fukuoka, Japan, assignor to The Yokohama Rubber Co., Ltd. and The Board of The Rubber Research Institute of Malaysia, both of, Japan

Filed Feb. 24, 1989, Ser. No. 314,842

Claims priority, application Japan, Feb. 25, 1988, 63-43140

Int. Cl.⁵ C12N *1/00, 1/38;* **C12P** *1/00, 19/14*

U.S. Cl. 435—101 **9 Claims**

1. A process for culturing bacteria, which comprises: preparing a culture medium containing a nutrient component selected from the group consisting of a natural rubber latex serum which results from the removal of rubber components by coagulation from a natural rubber latex, the product which results from the hydrolysis of said serum in the presence of a proteolytic or starch-saccharified enzyme and mixtures of said serum and said hydrolysis product; inoculating said culture medium with a bacterium selected from the group consisting of *Streptococcus lactis, Zymomonas mobilis, Saccharmyces urarum Pseudomonas aeruginosa* KYU-1 and *Brevibacterlium flavum*; and growing said bacterium in said culture medium.

5,026,642
PROCESS FOR THE ENZYMATIC PRODUCTION OF KETONES

Hans-Eckart Radunz, Mühltal; Harry Schwartz, Hochheim/-Main, and Martin Heinrich, Darmstadt, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit Beschränkter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Jul. 22, 1988, Ser. No. 223,051

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1987, 3724197

Int. Cl.⁵ C07C *125/065, 101/30;* **C12P** *7/02, 7/42*

U.S. Cl. 435—117 **24 Claims**

1. In a process for the synthesis of a renin inhibiting agent containing the structural element

$$—NH—\underset{|}{CH}—CHOH—CH_2—CO—$$

using as an intermediate a secondary alcohol according to the formula

$$R^3NH—CHR^1—CHOH—CH_2—COOR^2,$$

the improvement wherein said secondary alcohol was prepared according to the process comprising reducing a keto compound of the formula

$$R^3HN—CHR^1—CO—CH_2—COOR^2$$

in which

R^1 is a A, Ar, Ar-alkyl, Het, Het-alkyl, cycloalkyl having

VOL
1127
ISS
4
JE
25
1991
UMI

3-7 C atoms which is unsubstituted or mono- or polysubstituted by A, AO and/or Hal, cycloalkylalkyl having 4-11 C atoms or bicycloalkyl having 7-14 C atoms or bicycloalkylalkyl having 8-18 C atoms,

R^2 is H or alkyl having 1-5 C atoms,

R^3 is H, benzyl, triphenylmethyl, benzyloxycarbonyl, tert.-butyloxycarbonyl or 9-fluorenylmethoxycarbonyl,

Ar is phenyl which is unsubstituted or mono- or polysubstituted by A, AO, Hal, CF3, HO, hydroxyalkyl having 1-8 C atoms, H_2N and/or aminoalkyl having 1-8 C atoms or is unsubstituted naphthyl,

Het is a saturated or unsaturated 5- or 6.membered heterocyclic radical having 1-4 N, O and/or S atoms which can be fused with a benzene ring and/or mono- or polysubstituted by A, AO, Hal, CF_3, HO, O_2N, carbonyl oxygen, H_2N, HAN, A_2N, AcNH, AS, ASO, ASO_2, AOOC, CN, H_2NCO, HOOC, H_2NSO_2, ASO_2NH, Ar, Ar-alkenyl wherein the alkenyl portion has 2.8 C atoms, hydroxyalkyl and/or aminoalkyl each having 1-8 C atoms and/or whose N and/or S heteroatoms can also be oxidizede.

Hal is F, Cl, Br or I,

Ac is A-CO-, Ar-CO- or A-NH-CO- and

A is alkyl having 1-8 C atoms, by microorganisms to obtain the corresponding secondary alcohols.

5,026,643

FERMENTATION PROCESS FOR THE PREPARATION OF NOVEL C.25 (SUBSTITUTED(2-PROPENYL) MILBEMYCINS

Christopher J. Dutton, and David A. Perry, both of New York, N.Y., assignors to Pfizer Inc., New York, N.Y.

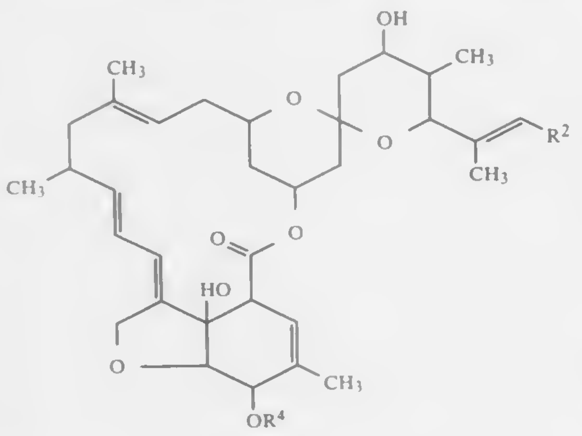
Division of Ser. No. 382,016, Jul. 18, 1989, Pat. No. 4,927,847, which is a continuation of Ser. No. 227,921, Aug. 3, 1988, abandoned. This application Feb. 26, 1990, Ser. No. 485,397

Claims priority, application United Kingdom, Sep. 15, 1987, 8721647

Int. Cl.⁵ C12R *1/465;* **C12P** *17/18;* **A61K** *31/37*

U.S. Cl. 435—119 **2 Claims**

1. A process for producing a compound of the formula



wherein

R^2 is a C_3–C_8 straight or branched-chain alkyl, alkenyl or alkynyl group which may optionally contain an oxygen or sulphur atom as part of the chain, or a C_3–C_8 cycloalkyl or cycloalkenyl group, or a 3 to 6 membered oxygen or sulphur containing heterocyclic ring which may be saturated or fully or partially unsaturated and which may optionally be substituted by one or more C_1–C_4 alkyl groups or halogen atoms; and

R^4 is hydrogen or methyl; with the proviso that, when R^2 is branched chain alkyl, it is not isopropyl or 2-butyl, which process comprises aerobically fermenting a strain of the milbemycin producing organism *Streptomyces cyaneogriseus* subsp. *noncyanogenus* NRRL 15773 or *Streptomyces thermoarchaensis* NCIB 12015 in the presence of an aqueous nutrient medium comprising an assimilable source of carbon, nitrogen and inorganic salts and a carboxylic acid of the formula R^2CO_2H, wherein R^2 is as defined above, or a salt, ester or amide thereof or oxidative precursor therefor.

5,026,644

PROCESS FOR PREPARING A LIPID COMPOSITION HAVING A HIGH GAMMA-LINOLENIC ACID CONTENT

Yumiko Manoh, and Akira Seto, both of Yokohama, Japan, assignors to The Nisshin Oil Mills, Ltd., Tokyo, Japan

Continuation of Ser. No. 40,248, Apr. 20, 1987, which is a continuation of Ser. No. 681,197, Dec. 13, 1984, abandoned. This application Sep. 6, 1989, Ser. No. 403,791

Claims priority, application Japan, Dec. 14, 1983, 58-234295

Int. Cl.⁵ C12P *7/64*

U.S. Cl. 435—134 **44 Claims**

1. A process for preparing a lipid composition having a high γ-linolenic acid content of at least 20%, comprising:

culturing mold fungi of the genus Cunninghamella in an aqueous nutrient culture medium having a relatively high concentration of carbon source of 3-20% by weight, said carbon source being an organic source of carbon assimilable by the fungi and capable of producing fatty acids containing at least 20% γ-linolenic acid when assimulated by the fungi in the nutrient medium; said culturing being performed under weakly acidic or neutral conditions; and

recovering the lipid composition from the cultured mold fungi, said lipid composition containing at least 20% γ-linolenic acid.

5,026,645

RNA POLYMERASE GENE, MICROORGANISM HAVING SAID GENE AND THE PRODUCTION OF RNA POLYMERASE BY THE USE OF SAID MICROORGANISM

Hirokazu Kotani; Nobutsugu Hiraoka, both of Muko, and Akira Obayashi, Uji, all of Japan, assignors to Takara Shuzo Co., Ltd., Kyoto, Japan

Filed Oct. 19, 1987, Ser. No. 109,615

Claims priority, application Japan, Oct. 21, 1986, 61-248503

Int. Cl.⁵ C12N *15/00, 9/12, 15/54, 15/70*

U.S. Cl. 435—194 **3 Claims**

3. Process for producing SP6 bacteriophage RNA polymerase which comprises cultivating *Escherichia coli* containing a plasmid that carries an isolated SP6 bacteriophage RNA polymerase gene under conditions sufficient to produce the SP6 bacteriophage RNA polymerase and recovering the SP6 bacteriophage RNA polymerase from the culture.

5,026,646

BOVINE MONOCLONAL ANTIBODIES TO BOVINE HERPESVIRUS 1 FROM SEQUENTIAL FUSION HETEROHYBRIDOMAS

Randall L. Levings, Ames, and Ione R. Stoll, Story City, both of Iowa, assignors to The United States of America, as represented by the Secretary of Agriculture, Washington, D.C.

Filed Nov. 16, 1988, Ser. No. 271,825

Int. Cl.⁵ C12N *5/00, 15/00*

U.S. Cl. 435—240.27 **10 Claims**

1. A stable heterohybridoma comprising a re-fusion product of a bovine:murine heterohybridoma and a bovine lymphocyte which had been primed to secrete antibodies against bovine herpesvirus-1, said heterohybridoma characterized by the production of neutralizing monoclonal antibodies to bovine herpesvirus-1.

3. A method for producing a stable heterohybridoma characterized by the production of neutralizing monoclonal antibodies to bovine herpesvirus-1, comprising the steps:

a. harvesting lymphocytes from a bovine animal immunized against bovine herpesvirus-1 and fusing said lymphocytes with cells from an immortal cell line, and selecting for monoclonal antibody-producing, bovine:immortal cell line heterohybridomas;

b. culturing the bovine:immortal cell line heterohybridoma from step (a) under monoclonal antibody-secreting conditions until detectable antibody secretion ceases;

c. harvesting lymphocytes from a bovine animal immunized against bovine herpesvirus-1 and fusing said lymphocytes with cells of the heterohybridoma from step (b), and selecting for re-fusion products producing monoclonal antibodies neutralizing bovine herpesvirus-1;

d. repeating steps (b) and (c) until a re-fusion product is stable for antibody production; and

e. recovering said stable re-fusion product as the stable heterohybridoma.

5,026,647

SELECTIVE MEDIUM FOR PROPIONIBACTERIUM GROWTH

Nancy J. Tomes, Cumming; Carol A. Henderick, Des Moines, and Bonita A. Glatz, Ames, all of Iowa, assignors to Pioneer Hi-Bred International, Inc., Des Moines, Iowa

Filed May 3, 1990, Ser. No. 518,493

Int. Cl.⁵ C12N *1/38, 1/36, 1/20;* **C12R** *1/01*

U.S. Cl. 435—244 **14 Claims**

1. A method of selective growth of propionibacteria from culture samples containing several different genus and species of bacteria, comprising:

adding to a mixed culture sample containing propionibacteria a medium containing lactate as its primary energy source;

adding to said medium and culture sample a small but effective amount of a heavy metal salt to which *Propionibacterium Jensenii* is resistant, selected from the group of water-soluble cadmium salts and water-soluble arsenic salts; and

allowing the culture to grow whereby propionibacteria selectively increase to the exclusion of other bacteria which are less resistant to the added heavy metal salts.

5,026,648

MICROBIAL CULTURE HAVING CATECHOL 1,2-OXYGENASE ACTIVITY

Peter C. Maxwell, New Providence, N.J., assignor to Celgene Corporation, Warren, N.J.

Continuation of Ser. No. 516,088, Jul. 22, 1983, Pat. No. 4,731,328, which is a continuation-in-part of Ser. No. 287,344, Jul. 27, 1981, abandoned. This application Jan. 14, 1986, Ser. No. 818,707

The portion of the term of this patent subsequent to Oct. 19, 1999, has been disclaimed.

Int. Cl.⁵ C12N *1/20, 9/04;* **C12P** *7/44*

U.S. Cl. 435—253.3 **2 Claims**

1. A microbial culture comprising a microorganism having the following characteristics:

(a) possesses active benzoate dioxygenase and 1,2-dihydrodihydroxybenzoate dehydrogenase and catechol 1,2-oxygenase;

(b) lacks active catechol 2,3-oxygenase; and

(c) does not grow on benzoate or monohalobenzoate;

wherein the microbial culture is capable of metabolizing an aromatic substrate selected from toluene and other benzoic acid-precursors by the ortho pathway via catechol quantitatively to an accumulated quantity of muconic acid greater than about one gram per liter of a bioconversion medium.

5,026,649

APPARATUS FOR GROWING TISSUE CULTURES IN VITRO

George Lyman, Cape Porpoise, Me.; Gregory Mathus, Concord, and David Root, Lexington, both of Mass:, assignors to Costar Corporation, Cambridge, Mass.

Filed Mar. 20, 1986, Ser. No. 841,562

Int. Cl.⁵ C12M *3/06*

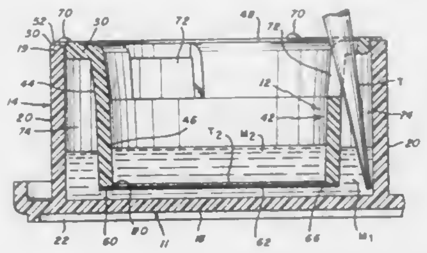
U.S. Cl. 435—284 **40 Claims**

1. In combination with a culture cluster dish having a matrix of wells closed at the bottom and open at the top and having an interior surface, apparatus for growing tissue cultures in vitro comprising,

a membrane support having top and bottom ends and a generally cylindrical side wall with an external diameter smaller than the internal diameter of the wells so that the support may be disposed within a well of the dish,

an outwardly extending flange at the top end of the support engaging the top of the well in which it is disposed to position the bottom end of the support a fixed and predetermined distance from the bottom of the well for providing access for fluid in the well to contact the lower side of a membrane when attached to the bottom end of the support,

a permeable membrane attached to the bottom end of the support and forming a growth surface on the bottom of the membrane support, said permeable membrane spaced a fixed distance from the bottom of the well when the flange engages the top of the well for supporting and growing a tissue culture on its top surface,



the membrane support having means for engaging a wall of the well for centering the support in the well so that said side wall is spaced from the interior surface of the well a sufficient distance to prevent the flow by capillary action up the space between the wall and the interior surface, and

openings of sufficient size in the side wall of the membrane support providing access to the well bottom and between the bottom portion of the side wall and the interior surface of the well for a pipette to introduce and withdraw fluid therefrom and for gas exchange between the fluid and atmosphere.

5,026,650

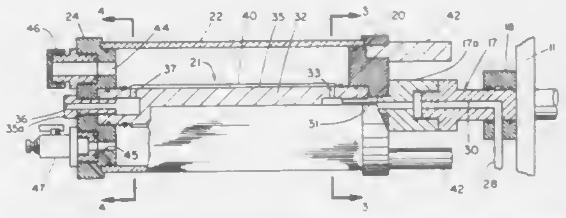
HORIZONTALLY ROTATED CELL CULTURE SYSTEM WITH A COAXIAL TUBULAR OXYGENATOR

Ray P. Schwarz, League City; David A. Wolf, and Tinh T. Trinh, both of Houston, all of Tex., assignors to The United States of Amercia as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jun. 30, 1988, Ser. No. 213,558

Int. Cl.⁵ C12M *3/02*

U.S. Cl. 435—286 **8 Claims**



1. A bio-reactor for maintaining mammalian cells in suspension while subjecting such cells to nutrients and oxygen, said bio-reactor including

an elongated tubular culture vessel;

end caps enclosing the ends of said culture vessel;

a shaft co-axially disposed in said culture vessel and extending between said end caps;

a tubular membrane disposed over said shaft between said

VOL
1127
ISS
4
JE
25
1991
UMI

end caps and sealed with respect to said shaft for defining an annular passageway between said membrane and said shaft and for defining an annular culture chamber between said membrane and the inner wall of said culture vessel;

oxygenation means for admitting an oxygen containing gas under pressure at one end of said annular passageway defined by said membrane and for exiting the gas at the other end of said annular passageway defined by said membrane, said membrane being oxygen permeable for exchange of component gases with said culture chamber;

means for admitting a fluid culture medium microcarrier beads and cells into said culture chamber for completely filling said culture chamber and for development of cell growth on the beads; and

means for rotating said culture vessel, said shaft and said membrane about a horizontal axis at a rate sufficient to suspend the beads in a fluid motion while admitting oxygen about the circumference of the membrane on said shaft.

5,026,651

METHODS AND COMPOSITIONS FOR THE PRODUCTION OF HUMAN TRANSFERRIN

Barbara H. Bowman, and Funmei Yang, both of San Antonio, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Apr. 25, 1985, Ser. No. 727,335

Int. Cl.^{5} C12N *15/00, 1/20;* **C12P** *19/34, 21/02;* **C07H** *15/12*

U.S. Cl. 435—320.1 **16 Claims**

1. A recombinant DNA vector comprising a DNA sequence encoding human transferrin.

5,026,652

METHOD AND DEVICE FOR MERCURY ANALYSIS

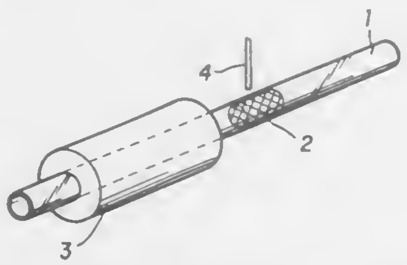
Bernhard Huber, Uberlingen, Fed. Rep. of Germany, assignor to Bodenseekwerk Perkin Elmer GmbH, Uberlingen, Fed. Rep. of Germany

Filed Aug. 29, 1989, Ser. No. 399,801

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1988, 3830504

Int. Cl.^{5} G01N *21/00, 25/00*

U.S. Cl. 436—81 **2 Claims**



1. A method of mercury analysis comprising the steps of:

introducing a mercury sample reacted with a reducing agent into a collection tube having a metallic net for collecting mercury thereon,

heating the collection tube and metallic net so as to abruptly release the mercury collected on the metallic net in an atomic state, said step of heating the collection tube and metallic net comprising heating the collection tube and metallic net in a furnace,

passing the mercury in atomic state into a measuring cuvette for analysis, and

quickly cooling the collection tube and metallic net by fluid flow for introduction of a further mercury sample, said step of quickly cooling the collection tube and metallic net comprising removing the collection tube and metallic net from said furnace and subjecting it to a cooling fluid flow.

5,026,653

SCAVENGER ANTIBODY MIXTURE AND ITS USE FOR IMMUNOMETRIC ASSAY

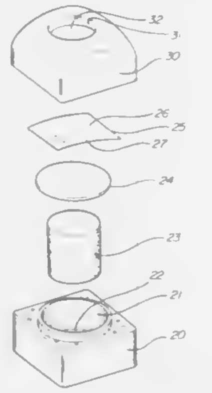
Jin P. Lee, Troy; F. Brad Salcedo, Ann Arbor; Martin F. Robins, Troy, all of Mich., assignors to Leeco Diagnostic, Inc., Southfield, Mich.

Division of Ser. No. 34,779, Apr. 3, 1987, abandoned, which is a continuation-in-part of Ser. No. 718,921, Apr. 2, 1985, Pat. No. 4,722,889. This application Sep. 30, 1987, Ser. No. 103,067

The portion of the term of this patent subsequent to Feb. 2, 2005, has been disclaimed.

Int. Cl.^{5} G01N *33/543, 33/48, 21/08, 1/48*

U.S. Cl. 436—518 **10 Claims**



1. A storage-stable reagent kit for immunoassay of the antigen human chorionic gonadotropin (hCG) in an aliquot of body fluid, comprising:

(a) as a first component, a label conjugated to an antibody which is immunospecific for the hCG antigen;

(b) as a second component, an antibody immobilized by solid support means, the immobilized antibody being immunospecific for the hCG antigen;

(c) a further component that is a scavenger antibody characterized by both low affinity for the hCG antigen and high affinity for the cross reactant analogs luteinizing hormone (LH), follicle stimulating hormone (FSH), and thyroid stimulating hormone (TSH), the scavenger antibody being present in an amount sufficient to prevent unwanted reactivity between the antibody of said first component and the antibody of said second component with said antigen cross reactant analog of the hCG antigen;

(d) detection means responsive to the label for determining the presence thereof;

the components being constituted such that, when subjected to liquid phase incubation with an aliquot containing the hCG antigen, the cross reactant analogs are scavenged and the first and second components become mutually bound at immunospecific binding sites with the hCG antigen in sandwich relation thereby preventing said cross reactivity and enabling separation of the bound hCG antigen in solid form free of non-specific antigen and unbound labeled antibody.

5,026,654

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE UTILIZING A SINGLE POLYCRYSTALLINE LAYER FOR ALL ELECTRODES

Nobuo Tanba, Ohme, and Takahide Ikeda, Tokorozawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 24, 1988, Ser. No. 159,925

Claims priority, application Japan, Mar. 27, 1987, 62-71438

Int. Cl.^{5} H01L *21/265*

U.S. Cl. 437—31 **17 Claims**

1. A method of manufacturing a semiconductor integrated

circuit device having at least one bipolar transistor comprising the steps of:

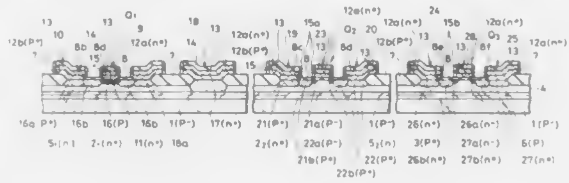
(a) providing a semiconductor substrate having a main surface;

(b) introducing impurities of a first conductivity type into said substrate to form an intrinsic base region of said bipolar transistor;

(c) forming a polycrystalline silicon film over said main surface, said polycrystalline silicon film being formed so as to connect to at least a portion of said intrinsic base region and a portion of said main surface which surrounds said intrinsic base region;

(d) introducing impurities of a second conductivity type opposite to said first conductivity type into said polycrystalline silicon film over said intrinsic base region, and introducing impurities of said first conductivity type into said polycrystalline silicon film;

(e) patterning said polycrystalline silicon film, thereby simultaneously forming a first polycrystalline silicon film part of said second conductivity type on said intrinsic base region and a second polycrystalline silicon film part of said first conductivity type on the portion of said main surface which surrounds said intrinsic base region, the first and second polycrystalline silicon film parts being spaced from each other, said first and second polycrystalline silicon film parts serving as an emitter lead-out electrode and a base lead-out electrode of said bipolar transistor;



(f) diffusing said impurities introduced in said first and second polycrystalline silicon film parts into said intrinsic base region and the portion of said main surface which surrounds said intrinsic base region, thereby respectively forming an emitter region in said intrinsic base region and an extrinsic base region in said main surface, of said bipolar transistor; and

(g) introducing impurities of said first conductivity type into said main surface using said first and second polycrystalline silicon film parts as a mask, thereby forming a linking base region of said bipolar transistor so as to electrically connect said intrinsic base region with said extrinsic base region.

5,026,655

PROCESS OF FABRICATING A HETEROJUNCTION FIELD EFFECT TRANSISTOR

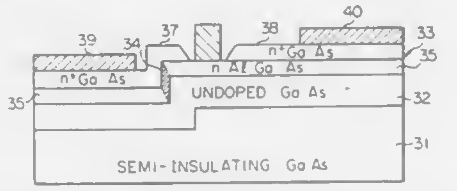
Keiichi Ohata, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Division of Ser. No. 194,370, May 16, 1988, Pat. No. 4,893,155. This application Sep. 21, 1989, Ser. No. 410,070

Claims priority, application Japan, May 14, 1987, 62-115904

Int. Cl.^{5} H01L *21/20*

U.S. Cl. 437—40 **6 Claims**



1. A process of fabricating a heterojunction field effect transistor, comprising the steps of:

a) preparing a semi-insulating substrate having a major surface;

b) removing a portion of said semi-insulating substrate to form a side wall substantially perpendicular to said major surface;

c) growing a first layer of a first compound semiconductor material on said semi-insulating substrate;

d) growing a second layer of a second compound semiconductor material on said first layer, said second compound semiconductor material containing at least first and second elements the former of which is obliquely supplied to said second layer with respect to said major surface and the latter of which is perpendicularly supplied to the second layer with respect to the major surface, said second layer having a portion over said side wall different in composition than the remaining portion of said second layer;

e) growing a third layer of a third compound semiconductor material on said second layer;

f) removing a part of said third layer to expose a part of said second layer;

g) forming electrodes, one of which is formed on the part of said second layer and the others of which are provided on said third layer.

5,026,656

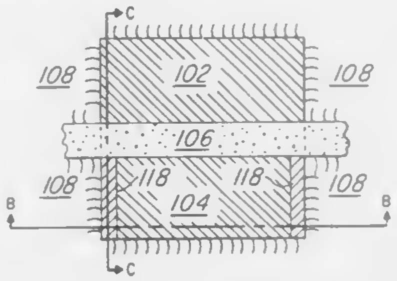
MOS TRANSISTOR WITH IMPROVED RADIATION HARDNESS

Mishel Matloubian, Dallas; Cheng-Eng D. Chen, Richardson, and Terence G. Blake, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 150,799, Feb. 11, 1988, Pat. No. 4,974,051. This application Mar. 2, 1990, Ser. No. 488,360

Int. Cl.^{5} H01L *21/425*

U.S. Cl. 437—41 **6 Claims**



1. A method for forming an insulated-gate field effect transistor in a surface of a semiconductor, comprising:

forming an insulator layer over selected portions of said surface to define an active region;

forming a gate dielectric over said active region;

forming a gate electrode over a selected portion of said gate dielectric and extending onto said insulator layer;

forming a source and a drain region of a first conductivity type on opposing sides of said gate electrode, said drain region extending to the edge of said insulator layer at a location adjacent to said gate electrode; and

forming a guard region of a second conductivity type at a location between said source region and the edge of said said insulator layer at a location adjacent said gate electrode.

VOL
1127
ISS
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25
1991
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SPLIT-POLYSILICON CMOS DRAM PROCESS INCORPORATING SELF-ALIGNED SILICIDATION OF THE CELL PLATE, TRANSISTOR GATES, AND N+ REGIONS

Ruojia Lee; Tyler A. Lowrey; Fernando Gonzalez; Joseph J. Karniewicz, and Pierre C. Fazan, all of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Mar. 12, 1990, Ser. No. 491,784

Int. Cl.^{5} H01L *21/265, 21/336, 27/092, 27/108*

U.S. Cl. 437—47 10 Claims

1. A split-polysilicon process for creating CMOS DRAM circuitry having self-alignedly silicided transistor gates and N+active areas, on a silicon substrate having both N-type material regions and P-type material regions, both types of said regions being covered by a gate dielectric layer, said process comprising the following sequential steps:
a) blanket deposition of a first polysilicon layer on top of the gate dielectric layer;
b) masking of said first polysilicon layer with a first photomask which, in P-type material regions, defines N-channel gates and interconnects and in N-type material regions, blankets said first polysilicon layer;
c) removal of those portions of said first polysilicon layer that are not subjacent to the first photomask with a first polysilicon etch;
d) stripping of said first photomask;
e) self-aligned, implant of a P-type conductivity-creating impurity which functions as a punch-through implant in N-channel active areas;
f) blanket deposition of a silicon dioxide spacer layer;
g) anisotropically etching the silicon dioxide spacer layer to create N-channel transistor gate spacers and remove all silicon dioxide from N-channel active areas;
h) self-aligned, high-dosage implanting of an N-type conductivity-creating impurity to create heavily-doped drain and source regions for N-channel transistors;
i) blanket deposition of a first silicon nitride layer;
j) blanket deposition of a second polysilicon layer;
k) creation of a second photomask on top of previously deposited layers, said second photomask defining a cell plate;
l) removal of those portions of said second polysilicon layer that are not subjacent to the second photomask with a second polysilicon etch to create the cell plate;
m) stripping of the second photomask;
n) using a third photomask to blanket the P-type material regions and to define the P-channel gates and interconnects in the N-type material regions;
o) removal of those portions of said first nitride layer that are not subjacent to the third photomask with a nitride etch;
p) removal of those portions of the first polysilicon layer that were exposed by the nitride etch with a third polysilicon etch;
q) self-aligned, high-dosage implanting of a P-type conductivity-creating impurity to create heavily-doped drain and source regions for P-channel transistors;
r) oxidation of all exposed silicon, whether of the polycrystalline or monocrystalline types;
s) removal of all exposed silicon nitride with a nitride etch;
t) deposition of a refractory metal layer;
u) sintering of the refractory metal layer to create refractory metal silicide on unoxidized silicon surfaces;
v) removal of all refractory metal that has not been converted to silicide.

5,026,658
METHOD OF MAKING A TRENCH CAPACITOR DRAM CELL

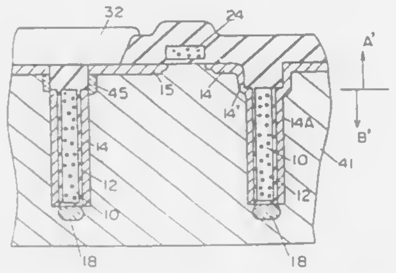
Genshu Fuse; Toshio Yamada, both of Hirakata; Shinji Odanaka, Sakai, and Masaki Fukumoto, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 218,456, Jul. 7, 1988, Pat. No. 4,920,390, which is a continuation of Ser. No. 877,968, Jun. 24, 1986, abandoned. This application Sep. 8, 1989, Ser. No. 404,470

Claims priority, application Japan, Jul. 2, 1985, 60-145568; Sep. 6, 1985, 60-198076

Int. Cl.^{5} H01L *21/70*

U.S. Cl. 437—52 6 Claims



1. A method of fabricating a semiconductor memory device comprising:
forming a first groove in a semiconductor substrate of a predetermined conductivity type, the side of the first groove defined by a sidewall of the substrate and the bottom of the first groove defined by a bottom wall of the substrate;
selectively forming, in the semiconductor substrate, a region of said predetermined conductivity type and a region of conductivity type opposite to said predetermined conductivity type by doping the sidewall defining said first groove with impurity using an ion-implantation technique;
depositing a film in said first groove;
etching the deposited film using an etching process having a strong anisotropy as measured in the vertical direction so as to expose said bottom wall of the substrate and leave the deposited film only on the sidewall of the substrate defining said first groove;
etching the semiconductor substrate at the exposed bottom wall thereof to form a second groove in the semiconductor substrate which extends from the bottom of said first groove to a location disposed within said substrate at which the bottom of said second groove is defined;
forming a capacitor of the memory device by forming a first electrode connected to said region of opposite conductivity type, a capacitor insulation layer, and a second electrode in said second groove;
burying an insulating layer for isolation in said first groove; and
forming an MOS transistor having a source or drain region of another conductivity type defined in a portion of said semiconductor substrate.

5,026,659
PROCESS FOR FABRICATING STACKED TRENCH CAPACITORS OF DYNAMIC RAM

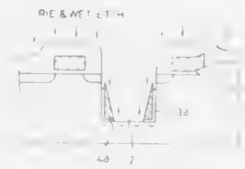
Young J. Lee, Seoul, Rep. of Korea, assignor to Gold Star Electron Co., Ltd., Chung Cheong, Rep. of Korea

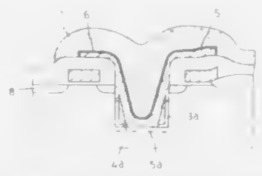
Filed Jun. 7, 1990, Ser. No. 534,927

Claims priority, application Rep. of Korea, Aug. 23, 1989, 12019/1989

Int. Cl.^{5} H01L *21/70*

U.S. Cl. 437—52 11 Claims





9. A process for fabricating a trench capacitor by anisotropic etch of poly silicon comprising the steps of:
forming a trench and growing a thermal oxide film for preventing current leakage through side walls of the trench;
ion implanting with an opposite type of dopants to those of transistor diffusion area for preventing current leakage through a bottom of the trench;
forming a side-spacer silicon layer on a side wall of the trench by depositing a silicon layer and performing anisotropic reactive ion etch on said side-spacer silicon layer;
performing wet etch on a thermal oxide film which is not protected by the side spacer silicon layer and then depositing a silicon layer for a storage node of the capacitor; and
forming a thin dielectric layer and capacitor plate.

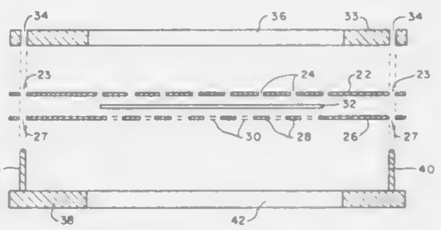
5,026,660
METHODS FOR MAKING PHOTODECTORS

Bulusu V. Dutt, Yorktown Heights, N.Y., and Peter G. Abbott, Greenwich, Conn., assignors to Codenoll Technology Corporation, New York, N.Y.

Filed Sep. 6, 1989, Ser. No. 403,545

Int. Cl.^{5} H01L *21/00, 31/18*

U.S. Cl. 437—80 6 Claims



1. A method of manufacturing a photodetector of the type having metallization contacts and an anti-reflection coating deposited on a semiconductor wafer wherein the improvement comprises the steps of shadow-masking said semiconductor wafer by positioning patterned shadow-masks on said wafer and depositing patterned layers therethrough, wherein a patterned metallization layer is deposited through a patterned shadow-mask onto each of two opposite sides of said semiconductor wafer to form two metallic contacts, and a patterned anti-reflection coating is deposited through another patterned shadow-mask onto one side of said semiconductor wafer and adjacent to one of said patterned metallization layers.

5,026,661
METHOD OF MANUFACTURING ZINC CHALCOGENIDE SEMICONDUCTOR DEVICES USING LP-MOCVD

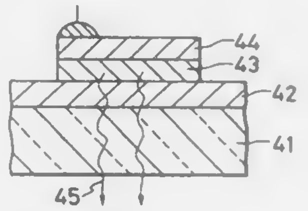
Masahito Migita, Hachioji; Osamu Kanehisa, Kodaira; Masatoshi Shiiki, Musashimurayama, and Hajime Yamamoto, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 190,751, May 5, 1988, abandoned. This application Oct. 13, 1989, Ser. No. 423,552

Claims priority, application Japan, May 8, 1987, 62-110676

Int. Cl.^{5} H01L *21/20*

U.S. Cl. 437—81 22 Claims



1. A method of manufacturing a semiconductor device wherein manganese-doped zinc chalcogenide is grown by bringing a heated substrate into contact with a non-plasma atmosphere which contains the vapor of an organozinc compound, the vapor of a chalcogenide compound, and at least one vapor selected from the group consisting of di-π-cyclopentadienyl manganese and di-π-alkylcyclopentadienyl manganese.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,662

METHOD FOR FABRICATING A SEMICONDUCTOR STRIPE LASER

Leslie D. Westbrook, Ipswich, England, assignor to British Telecommunications public limited company, London, England

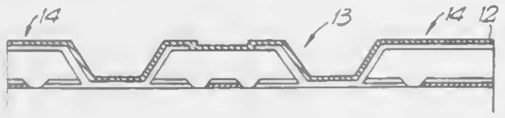
Continuation of Ser. No. 174,995, filed as PCT GB87/00537 on Jul. 28, 1987, published as WO88/01100 on Feb. 11, 1988, abandoned. This application May 24, 1990, Ser. No. 527,692

This application May 24, 1990, Ser. No. 527,692

Claims priority, application United Kingdom, Jul. 28, 1986, 8618373

Int. Cl.^{5} H01L *21/00, 21/76*

U.S. Cl. 437—129 **16 Claims**



13. A fabrication technique, for use in making a semiconductor stripe laser structure of the type having a stripe of active material, comprising the steps of:

(i) creating a first epitaxial semiconductor layer on a substrate;

(ii) making two neighbouring channels through the first layer to the substrate;

(iii) creating a second semiconductor material layer which extends over, and fills, both the neighbouring channels; and

(iv) selectively removing the semiconductor material of the first layer with respect to the semiconductor material of the second layer so as to leave only the semiconductor material of the first layer which lies between the neighbouring channels and which will provide the strips of active material in said stripe laser structure.

5,026,663

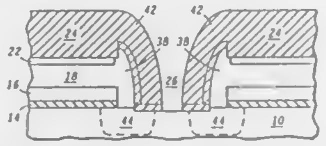
METHOD OF FABRICATING A STRUCTURE HAVING SELF-ALIGNED DIFFUSED JUNCTIONS

Peter J. Zdebel, Mesa, and Barbara Vasquez, Chandler, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 21, 1989, Ser. No. 382,879

Int. Cl.^{5} H01L *21/225*

U.S. Cl. 437—160 **8 Claims**



1. A method of fabricating a semiconductor structure having self-aligned diffused junctions comprising the steps of:

providing a semiconductor substrate;

forming a first dielectric layer on said substrate;

forming a doped semiconductor layer on said first dielectric layer;

forming a second dielectric layer on said doped semiconductor layer;

forming an opening through said second dielectric layer;

forming dielectric spacers in said opening;

forming a dielectric lens in said opening between said dielectric spacers;

removing said dielectric spacers;

forming openings through said doped semiconductor layer and said first dielectric layer at the regions where said dielectric spacers were formerly disposed;

forming undoped semiconductor material in said openings formed where said dielectric spacers were formerly disposed;

removing said doped semiconductor layer and said first dielectric layer from between said undoped semiconductor material; and

diffusing dopant from said doped semiconductor layer through said undoped semiconductor material and into said substrate to form junctions in said substrate.

5,026,664

METHOD OF PROVIDING A SEMICONDUCTOR IC DEVICE WITH AN ADDITIONAL CONDUCTION PATH

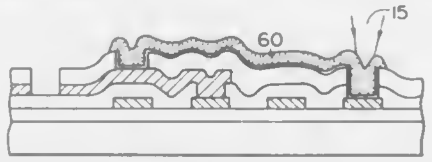
Mikio Hongo; Katsuro Mizukoshi; Shuzo Sano; Takashi Kamimura, all of Yokohama; Fumikazu Itoh, Fujisawa; Akira Shimase; Satoshi Haraichi, both of Yokohama, and Takahiko Takahashi, Iruma, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 6, 1989, Ser. No. 334,145

Claims priority, application Japan, Apr. 7, 1988, 63-84203

Int. Cl.^{5} H01L *21/285, 21/268*

U.S. Cl. 437—189 **26 Claims**



17. A method of forming an additional connection wiring on a multilayer IC device, comprising the steps of:

forming at least one hole in an insulating layer on said multilayer IC device, by radiating a focused ion beam to expose a part of a conductive layer provided under said insulating layer on said multilayer IC device;

selectively depositing a patterned-interposed thin metal film, by scanning the multilayer IC device with a focused ion beam due to relative movement between the focused ion beam and the multilayer IC device so as to form said patterned-interposed thin metal film, the focused ion beam being radiated in an atmosphere of a metal compound gas onto said hole and onto a predetermined portion of said surface of said insulating layer, an electron shower being directed, simultaneously with said focused ion beam radiation, onto the surface of the insulating layer, to neutralize electric charges accumulated on the surface of the insulating layer; and

selectively depositing said additional connection wiring by scanning the multilayer IC device with a focused laser beam due to relative movement between the laser beam and the multilayer IC device so as to form said additional connection wiring, the focused laser beam being radiated in an atmosphere of a conductor metal compound gas on said patterned-interposed thin metal film so that said additional connection wiring is electrically connected with said conductive layer.

5,026,665

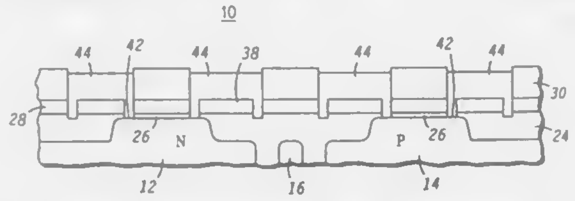
SEMICONDUCTOR DEVICE ELECTRODE METHOD

Peter J. Zdebel, Starnberg, Fed. Rep. of Germany, assignor to Motorola Inc., Schaumburg, Ill.

Filed Dec. 24, 1990, Ser. No. 632,564

Int. Cl.^{5} H01L *21/283*

U.S. Cl. 437—191 **15 Claims**



1. A method of fabricating electrodes comprising the steps of:

providing a semiconductor structure having doped tube;

forming a first dielectric layer of a first dielectric material on said structure;

forming a second dielectric layer of a second dielectric material on said first dielectric layer;

forming openings in said second dielectric layer that extend to said first dielectric layer;

forming a semiconductor layer in said openings;

forming spacers of said first dielectric material in said openings on said semiconductor layer;

oxidizing said semiconductor layer so that only semiconductor slivers remain beneath said spacers;

removing said spacers;

removing said semiconductor slivers;

removing the portions of said first dielectric layer beneath where said semiconductor slivers were formerly disposed; and

forming conductive electrodes coupled to said doped tubs in said openings.

5,026,666

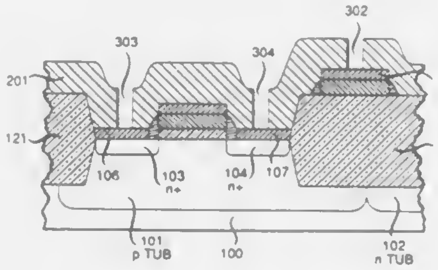
METHOD OF MAKING INTEGRATED CIRCUITS HAVING A PLANARIZED DIELECTRIC

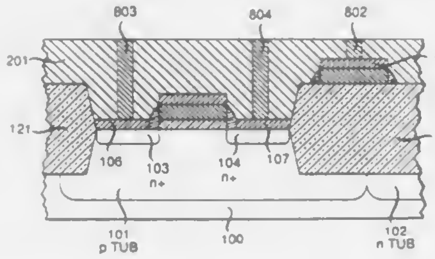
Graham W. Hills, Los Gatos, Calif.; Robert D. Huttemann, Lower Macungie Township, Lebigh County, and Kolawole R. Olasupo, Kutztown, both of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 28, 1989, Ser. No. 458,114

Int. Cl.^{5} H01L *21/90*

U.S. Cl. 437—195 **12 Claims**





1. A method of making an integrated circuit in a semiconductor body by steps comprising:

forming a gate region that includes a gate dielectric overlying said body, and a gate conductor overlying said gate dielectric; and

forming source and drain doped regions in said semiconductor body,

characterized by the further steps of:

forming a dielectric layer so as to have an approximately equal thickness on gate, source and drain contact regions;

etching contact windows into said dielectric layer;

planarizing said dielectric layer after said etching; and

forming electrically conductive material in said windows after said planarizing so as to form electrical contacts to said gate, source, and drain contact regions through said windows.

5,026,667

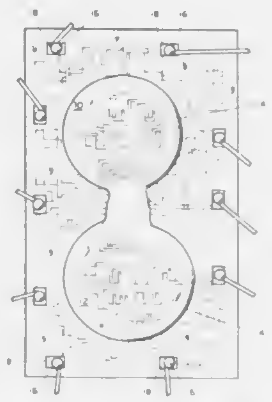
PRODUCING INTEGRATED CIRCUIT CHIPS WITH REDUCED STRESS EFFECTS

Carl M. Roberts, Jr., Topsfield, Mass., assignor to Analog Devices, Incorporated, Norwood, Mass.

Continuation of Ser. No. 139,480, Dec. 29, 1987, abandoned. This application Oct. 18, 1989, Ser. No. 423,356

Int. Cl.^{5} H01L *21/60, 21/56*

U.S. Cl. 437—209 **10 Claims**



1. In making plastic-encapsulated IC ships formed with an integrated circuit having stress-sensitive portions, the method of reducing stress-induced effects on the performance of the integrated circuit, comprising:

forming the IC chip including wire-bond pads;

applying over the stress-sensitive portions of the chip a coating of flowable insulating material while restricting the flow of the insulating material to provide an insulation free region around each of the wire-bond pads preventing contact between the insulation material and the pads;

before or after said coating is applied, bonding wires to the bond pads; and

encapsulating said coated chip in plastic.

5,026,668

APPARATUS AND METHOD FOR PRODUCING SEMICONDUCTOR DEVICE

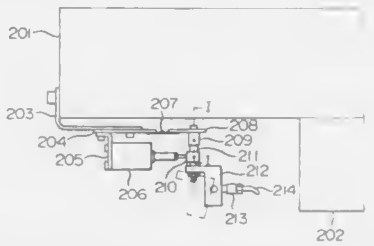
Shunji Yamauchi; Minoru Tanaka; Kenitiro Sakamoto; Yutaka Morita; Toru Kidera, and Hiroki Mieda, all of Fukuoka Prefecture, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Division of Ser. No. 206,743, Jun. 15, 1988, Pat. No. 4,934,920. This application Nov. 15, 1989, Ser. No. 436,747

Claims priority, application Japan, Jun. 17, 1987, 62-151654; Nov. 30, 1987, 62-303689; Nov. 30, 1987, 62-303691; Dec. 18, 1987, 62-322009

Int. Cl.^{5} H01L *21/46*

U.S. Cl. 437—210 **3 Claims**



1. A method of processing a semiconductor chip mounted on a lead frame comprising:

shielding from ambient air a space around a semiconductor chip and a lead frame on which the chip is mounted with

VOL
1127
ISS
4
JE
25
1991
UMI

a dust-proof cover for containing dust created during processing of the chip and lead frame;

carrying out the process on the lead frame and the semiconductor chip within said dust-proof cover that produces dust;

directing a stream of a gas within the dust-proof cover and varying the flow direction of the stream within the dust-proof cover to blow the dust produced in the process into the space within the dust-proof cover; and

collecting the dust from within the dust-proof cover.

5,026,669

METHOD OF ELUMINATING BURRS ON A LEAD FRAME WITH A THIN METAL COATING

Toshiaki Shinohara, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

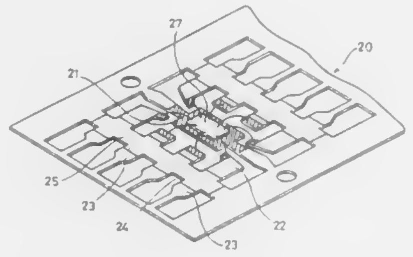
Division of Ser. No. 108,907, Oct. 13, 1987, Pat. No. 4,942,455.

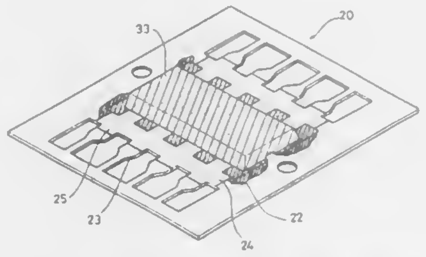
Tais application Feb. 24, 1989, Ser. No. 315,054

Claims priority, application Japan, Oct. 13, 1986, 61-243612

Int. Cl.^{5} H01L *21/56, 23/495*

U.S. Cl. 437—224 **3 Claims**





1. A method for manufacturing a semiconductor device, comprising the steps of:

preparing a lead frame for a semiconductor device, said lead frame including a die pad disposed in a central portion for mounting a chip; an inner lead, a tie bar and an outer lead disposed around the die pad; disposing a thin metal layer on surface areas of the inner lead, the outer lead and the tie bar which predetermined surface areas are not to be covered with sealing resin and which surface areas surround another surface area on which sealing resin is to be disposed;

mounting a semiconductor chip on said lead frame;

clamping said lead frame containing the semiconductor chip between an upper mold and a lower mold of a metal mold so that gaps between said lead frame and said upper mold and said lower mold are filled with and by deformation of said thin metal layer deformed by the clamping pressure;

injecting the resin material into a cavity of said metal mold containing and to cover said another surface area, at a temperature which is less than the melting temperature of said thin metal layer;

ejecting said resin molded lead frame out of said metal mold; and

removing said thin metal layer from said lead frame.

5,026,670

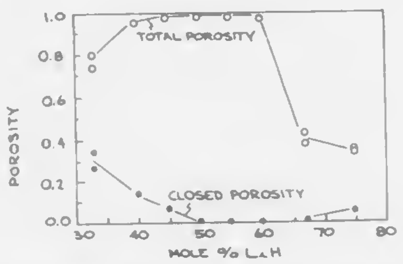
LOW DENSITY METAL HYDRIDE FOAMS

Jon L. Maienschein, Oakland, and Patrick E. Barry, Pleasant Hill, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 31, 1990, Ser. No. 531,363

Int. Cl.^{5} C01B *6/04;* **C04B** *38/00*

U.S. Cl. 501—80 **18 Claims**



5. A porous foam having a density less than about 0.67 gm/cc comprising an expanded mixture of lithium hydride and beryllium hydride.

6. A method of making a low density, porous foam comprising the steps of:

(a) preparing a mixture of powdered lithium hydride and beryllium hydride,

(b) grinding said mixture,

(c) heating said mixture in an inert atmosphere to a temperature ranging from about 455 to about 490 K for a period of time sufficient to cause foaming thereof, and

(d) cooling the product thus formed.

5,026,671

SINTERED SILICON NITRIDE AND METHOD FOR MAKING THE SAME

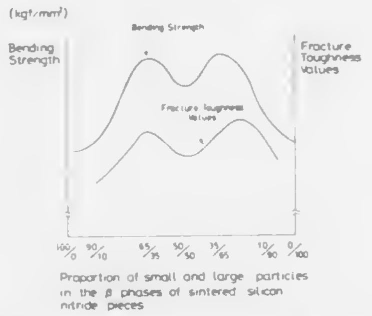
Shigeru Hanzawa, Kagamihara; Hiroto Matsuda, Nagoya, and Kouzi Fusimi, Gifu, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Mar. 14, 1990, Ser. No. 493,162

Claims priority, application Japan, Mar. 17, 1989, 1-66625

Int. Cl.^{5} C04B *35/52, 35/58, 35/02, 35/08*

U.S. Cl. 501—96 **2 Claims**



1. A sintered silicon nitride comprising at least 90% of β-type silicon nitride, said β-type silicon nitride consisting essentially of 35 to 80% of large crystal particles having a mean particle length of 5.0 to 14 μm with the remainder being small crystal particles having a mean particle length of 0.5 to 5 μm, wherein the large and small crystal particles have an aspect ratio of at least 3 and the mean particle length of the large crystal particles is at least twice the mean particle length of the small crystal particles.

5,026,672

METHOD OF FABRICATING A SINTERED BODY CONTAINING TIN OXIDE

Michel L. Bayard, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 25, 1990, Ser. No. 542,603

Int. Cl.^{5} C04B *35/02, 35/46, 35/48;* **C01B** *9/00*

U.S. Cl. 501—134 **9 Claims**

1. A method of fabricating a sintered body of tin oxide, comprising:

(a) forming a finely divided mixture containing at least about 0.2 weight percent ZnO, at least about 0.2 weight percent SiO_2, up to about 0.5 weight percent Al_2O_3, balance pure SnO_2,with the sum of the proportions of ZnO and SiO_2 being less than about 2 weight percent,

(b) compacting the mixture, and

(c) heating the mixture to a sintering temperature.

5,026,673

STABLE ZEOLITE-SUPPORTED TRANSITION METAL CATALYSTS, METHODS FOR MAKING THEM, AND USES THEREOF

Bruce C. Gates, Newark, Del., and Pei-Ling Zhou, Beijing, China, assignors to University of Delaware, Newark, Del.

Filed Jun. 23, 1989, Ser. No. 370,599

Int. Cl.^{5} B01J *29/04, 31/20*

U.S. Cl. 502—62 **15 Claims**

1. A basic-molecular sieve-supported transition metal carbonyl-containing catalyst for catalyzing a reaction of or between carbon- and hydrogen-containing species, said catalyst comprising:

a basic molecular sieve containing supercages and said supercages having openings therein, said supercages having diameters in the range of about 1 to about 2 nm, and the openings in said supercages having internal diameters in the range of about 0.5 to about 1.4 nm, said molecular sieve having been rendered basic by the thermal decomposition of NaN_3 in situ within the molecular sieve structure, and, entrapped within said supercages, a transition metal carbonyl species which, after heating of the transition metal carbonyl species in situ in the supercage to a temperature of at least about 250° C., has a shortest dimension which is greater than the diameter of the opening in the supercage in which it is entrapped and is resistant to decomposition to the transition metal at temperatures of at least about 250° C.

8. A method for preparing a molecular sieve-supported transition metal catalyst, comprising the steps of:

(a) combining a shape-selective molecular sieve material with a solution of NaN_3 in a solvent, until NaN_3 is introduced into the intracrystalline space of the molecular sieve, evaporating the solvent, and then thermaily decomposing the NaN_3, thereby obtaining a basic molecular sieve,

(b) introducing the vapor from a volatile transition metal carbonyl compound into said intracrystalline space, and

(c) interacting said vapor with the basic molecular sieve to obtain said molecular sieve-supported transition metal catalyst, at least until molecular sieve non-extractable transition metal carbonyl compound or anion or combination thereof is formed within said intracrystalline space.

5,026,674

PROCESS FOR PREPARING POLYKETONES

Stephen L. Brown, Ashford, and Andrew R. Lucy, Camberley, both of England, assignors to The British Petroleum Company p.l.c., London, England

Division of Ser. No. 249,848, Sep. 27, 1988, Pat. No. 4,925,918.

This application Jan. 8, 1990, Ser. No. 462,233

Claims priority, application United Kingdom, Oct. 8, 1987, 8723603

Int. Cl.^{5} B01J *31/22, 31/24*

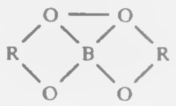
U.S. Cl. 502—154 **6 Claims**

1. A palladium catalyst prepared by reacting together:

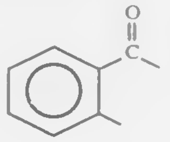
(a) a source of palladium,

(b) a bidentate amine, phosphine, arsine or stibine having the formula $(R^1)_2M—R^2—M(R^1)_2$ wherein the M atoms are independently selected from nitrogen, phosphorus, arsenic or antimony, the R^1 groups are independently alkyl, cyclcoalkyl or aryl groups and R^2 is an alkylene group, and

(c) a source of an anion having the formula:



wherein the R groups are independently selected from the group consisting of C_1 to C_6 alkylene groups, ortho-phenylene groups or substituted derivatives thereof and groups having the formula:



or substituted derivatives, thereof wherein any substituents present are selected from the group consisting of halogen, alkyl and sulphonic acid moieties.

5,026,675

POLYMERIZATION CATALYST, THE PROCESS FOR ITS PREPARATION AND ITS USE IN ETHYLENE HOMO AND COPOLYMERIZATION

Giuseppe Braca, Pisa; Alessandro Ricci, Cascina; Glauco Sbrana, Pisa; Maurizio Brunelli, San Donato Milanese; Aldo Giusti, Lucca; Guglielmo Bertolini, Pavia, and Anna M. R. Galletii, Cascina, all of Italy, assignors to Eniricerche S.p.A., Milan, Italy

Filed Apr. 10, 1990, Ser. No. 506,845

Claims priority, application Italy, Apr. 18, 1989, 20186 A/89

Int. Cl.^{5} C08F *4/26*

U.S. Cl. 502—159 **7 Claims**

1. A nickel complex catalyst bonded to a polystyrene substrate, which is active in the polymerization of ethylene and in the copolymerization of ethylene with another unsaturated monomer, and is definable by the formula (1):

VOL
1127
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1991
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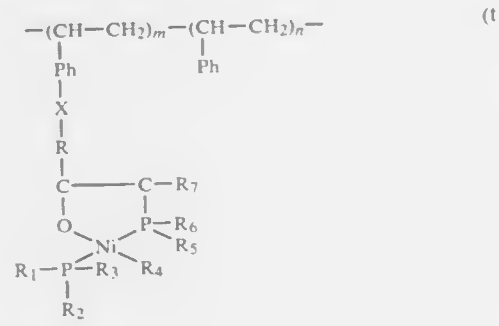

(t)

where:
- Ph = phenyl;
- X = —O—, —N=N—. a linear or branched C_1-C_{10} alkylene, or a direct bond;
- R = C_6-C_{12} aryl;
- R_2, R_3, R_4, R_5 and R_6 are independently chosen from C_1-C_{20} alkyl, C_1-C_{20} alkoxy, C_6-C_{12} aryl, C_6-C_{12} aryloxy, C_1-C_{20} alkyl-C_6-C_{12} aryl, C_6-C_{12} aryl-C_1-C_{20} alkyl and C_3-C_8 cycloalkyl groups; said groups possibly carrying one or more substituents chosen from halogen, hydroxy, dimethylamino, cyano, C_1-C_{20} alkoxy, C_6-C_{12} aryloxy, C_6-C_{12} aryl or C_1-C_{20} alkyl;
- R_1 is hydrogen or any of R_2, R_3, R_4, R_5, R_6;
- R_7 is H or has the same meaning as R_1-R_6; and
- m and n are numbers which depend on the molecular weight of the polystyrene, the ratio n/m varying from 1/1 to 100/1.

5,026,676

CATALYST FOR THE COPOLYMERIZATION OF EPOXIDES WITH CO_2

Stephen A. Motika, Kutztown; Timothy L. Pickering, Emmaus; Andrzej Rokicki, Alburtis, and Beatrice K. Stein, Fogelsville, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown; Arco Chemical Company, Newtown Square, both of, Pa. and Mitsui Petrochemical Industries Ltd., Tokyo, Japan

Continuation of Ser. No. 362,894, Jun. 7, 1989, abandoned. This application Apr. 20, 1990, Ser. No. 513,325

Int. Cl.⁵ B01J *31/04*

U.S. Cl. 502—170 **11 Claims**

1. A zinc carboxylate catalyst for the copolymerization of carbon dioxide and epoxides to form poly (alkylene carbonates) prepared by reacting zinc oxide with a dicarboxylic acid selected from the group consisting of glutaric acid and adipic acid in an aprotic reaction solvent.

5,026,677

DYES AND DYE-DONOR ELEMENTS FOR USE IN THERMAL DYE SUBLIMATION TRANSFER

Luc J. Vanmaele, Lochristi, Belgium, assignor to Agfa-Gevaert, N.V., Mortsel, Belgium

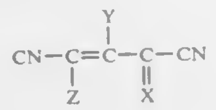
Filed May 17, 1990, Ser. No. 524,461

Claims priority, application European Pat. Off., May 31, 1989, 89201382.2

Int. Cl.⁵ B41M *5/035, 5/26*

U.S. Cl. 503—227 **13 Claims**

1. Dye-donor element for use according to thermal dye transfer, said dye-donor element comprising a support having thereon a dye layer containing a binder and a dye corresponding to the following formula



$$\mathrm{CN{-}\underset{Z}{C}{=}\overset{Y}{C}{-}\underset{\overset{\|}{X}}{C}{-}CN}$$

wherein
- Z represents CN, $COOR^1$ or $CONR^2R^3$;
- R^1, R^2 and R^3 each independently represent hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted aryl, or R^2 and R^3 together represent the necessary atoms to close a heterocyclic nucleus or substituted heterocyclic nucleus;
- Y represents OR^4 or NR^5R^6 OR CN;
- R^4 represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted aryl, SO_2R^7, COR^7, CSR^7, POR^7R^8;
- R^5 and R^6 each independently represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted aryl, SO_2R^7, COR^7, CSR^7, POR^7R^8 or represent substituted or unsubstituted amino, or R^5 and R^6 together represent the necessary atoms to close a heterocyclic nucleus or substituted heterocyclic nucleus or a heterocyclic nucleus with an aliphatic or aromatic ring fused-on;
- R^7 and R^8 each independently represent substituted or unsubstituted alkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted alkenyl, substituted or unsubstituted aralkyl, substituted or unsubstituted aryl, substituted or unsubstituted alkyloxy, substituted or unsubstituted alkylthio, substituted or unsubstituted arylthio, substituted or unsubstituted amino or a substituted or unsubstituted heterocyclic group or R^7 and R^8 together represent the necessary atoms to close a 5- or 6-membered ring;
- X represents N—Ar, N—Het, CR^9R^{10}, $N—NR^{11}R^{12}$ or $N—N{=}CR^{13}R^{14}$;
- Ar represents an aromatic nucleus substituted in para position by a substituent chosen from the group consisting of substituted or unsubstituted amino, substituted or unsubstituted alkyloxy, substituted or unsubstituted aryloxy, substituted or unsubstituted alkylthio, substituted or unsubstituted arylthio, hydroxy, mercapto;
- Het represents a substituted or unsubstituted heterocyclic ring;
- R^9 and R^{10} each independently represent hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted aryl, substituted or unsubstituted alkenyl, substituted or unsubstituted alkynyl, a substituted or unsubstituted heterocyclic ring, cyano, halogen, SO_2R^7, COR^7, CSR^7, POR^7R^8 or R^9 and R^{10} together represent the necessary atoms to close a substituted or unsubstituted ring;
- R^{11} represents a substituted or unsubstituted aromatic ring;
- R^{12} represents hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted aryl, SO_2R^7, COR^7, CSR^7, POR^7R^8; and
- R^{13} and R^{14} each independently represent hydrogen, substituted or unsubstituted alkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted aryl, or R^{13} and R^{14} together represent the necessary atoms to close a substituted or unsubstituted heterocyclic nucleus or a heterocyclic nucleus with an aliphatic or aromatic ring fused-on.

5,026,678

PYRIDONEINDOANILINE DYE-DONOR ELEMENT FOR THERMAL DYE TRANSFER

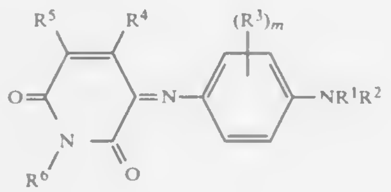
Steven Evans, and Derek D. Chapman, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1990, Ser. No. 606,369

Int. Cl.⁵ B41M *5/035, 5/26*

U.S. Cl. 503—227 **20 Claims**

9. In a process of forming a dye transfer image comprising imagewise-heating a dye-donor element comprising a support having thereon a dye layer comprising a dye dispersed in a polymeric binder and transferring a dye image to a dye-receiving element to form said dye transfer image, the improvement wherein said dye comprises a pyridoneindoaniline dye having the formula:



wherein:
- R^1 and R^2 each independently represents hydrogen; a substituted or unsubstituted alkyl group having from 1 to about 6 carbon atoms; a substituted or unsubstituted cycloalkyl group having from about 5 to about 7 carbon atoms; a substituted or unsubstituted allyl group; a substituted or unsubstituted aryl group having from about 6 to about 10 carbon atoms; or a substituted or unsubstituted hetaryl group; or
- R^1 and R^2 can be joined together to form, along with the nitrogen to which they are attached, a 5- to 7-membered heterocyclic ring; or
- either or both of R^1 and R^2 can be combined with R^3 to form a 5- to 7-membered heterocyclic ring;
- each R^3 independently represents a substituted or unsubstituted alkyl group having from 1 to about 6 carbon atoms; a substituted or unsubstituted cycloalkyl group having from about 5 to about 7 carbon atoms; a substituted or unsubstituted allyl group; a substituted or unsubstituted aryl group having from about 6 to about 10 carbon atoms; a substituted or unsubstituted hetaryl group; alkoxy; aryloxy; halogen; nitro; cyano; thiocyano; hydroxy; acyloxy; acyl; alkoxycarbonyl; aminocarbonyl; alkoxycarbonyloxy; carbamoyloxy; acylamido; ureido; imido; alkylsulfonyl; arylsulfonyl; alkylsulfonamido; arylsulfonamido; alkylthio; arylthio or trifluoromethyl; or
- any two of R^3 may be combined together to form a 5- or 6-membered carbocyclic or heterocyclic ring; or
- one or two of R^3 may be combined with either or both of R^1 and R^2 to complete a 5- to 7-membered ring;
- m is an integer of from 0 to 4;
- R^4 and R^5 each independently represents hydrogen; a substituted or unsubstituted alkyl group having from 1 to about 6 carbon atoms; a substituted or unsubstituted aryl group having from about 6 to about 10 carbon atoms; a substituted or unsubstituted hetaryl group; or an electron withdrawing group;
- R^6 represents hydrogen; a substituted or unsubstituted alkyl, aryl or hetaryl group as described above for R^1 and R^2; NH_2, NHR^1, NR^1R^2, $NHCOR^1$, $NHSO_2R^1$ or OR^1.

5,026,679

MIXTURE OF DYES FOR CYAN DYE DONOR FOR THERMAL COLOR PROOFING

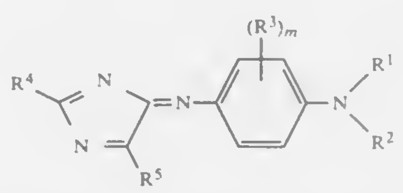
Steven Evans, and Derek D. Chapman, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 21, 1990, Ser. No. 616,524

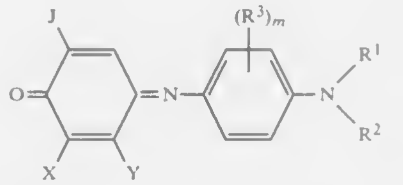
Int. Cl.⁵ B41M *5/035, 5/26*

U.S. Cl. 503—227 **20 Claims**

12. In a process of forming a dye transfer image comprising imagewise-heating a cyan dye-donor element comprising a support having thereon a dye layer comprising a mixture of cyan dyes dispersed in a polymeric binder, at least one of the cyan dyes having the formula:


I

wherein:
- R^1 and R^2 each independently represents hydrogen; a substituted or unsubstituted alkyl group having from 1 to about 6 carbon atoms; a substituted or unsubstituted cycloalkyl group having from about 5 to about 7 carbon atoms; a substituted or unsubstituted allyl group; or a substituted or unsubstituted aryl or hetaryl group having from about 6 to about 10 carbon atoms;
- or R^1 and R^2 represent atoms which can be joined together to form, along with the nitrogen to which they are attached, a 5- to 7-membered heterocyclic ring;
- or either or both of R^1 and R^2 together with one or two of R^3 represent atoms which can form a 5- to 7-membered heterocyclic ring;
- each R^3 independently represents substituted or unsubstituted alkyl, cycloalkyl, allyl, aryl or hetaryl as described above for R^1 and R^2; alkoxy, aryloxy, halogen, nitro, cyano, thiocyano, hydroxy, acyloxy, acyl, alkoxycarbonyl, aminocarbonyl, alkoxycarbonyloxy, carbamoyloxy, acylamido, ureido, imido, alkylsulfonyl, arylsulfonyl, alkylsulfonamido, arylsulfonamido, alkylthio, arylthio or trifluoromethyl;
- or atoms at any two adjacent positions of R^3 may be combined together to form a 5-or 6-membered carbocyclic or heterocyclic ring;
- m is an integer of from 0 to 4;
- R^4 represents R^5, alkylthio or arylthio, with the proviso that when R^4 is alkylthio or arylthio, then m must be at least 1; and
- R^5 represents a substituted or unsubstituted aryl or hetaryl group as described above for R^1 and R^2; and at least one of the other of the dyes having the formula:


II

wherein:
- R^1, R^2, R^3 and m represent the same as above;
- X represents hydrogen, halogen or may be combined together with Y to represent the atoms necessary to complete a 6-membered aromatic ring, thus forming a fused bicyclic quinoneimine, such as a naphthoquinoneimine; with the proviso that when X is hydrogen, then J represents $NHCOR_F$, where R_F represents a perfluorinated alkyl or aryl group; and with the further proviso that when X is halogen, then J represents $NHCOR^6$, $NHCO_2R^6$, $NHCONHR^6$ or $NHSO_2R^6$; and with the further proviso that when X is combined with Y, then J represents $CONHR^6$, SO_2NHR^6, CN, SO_2R^6 or SCN;
- R^6 is a substituted or unsubstituted alkyl, cycloalkyl, allyl, aryl or hetaryl group as defined for R^1 above; and
- Y is R^1, acylamino or may be combined together with X as described above.

VOL
1127
ISS
4
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5,026,680

METHOD OF MANUFACTURING A POWDER OF BI-BASED SUPERCONDUCTIVE OXIDE CONTAINING LEAD AND METHOD OF MANUFACTURING A SINTERED BODY THEREFROM

Tadashi Sugihara; Takuo Takeshita, and Yukihiro Ohuchi, all of Ohmiya, Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan

Filed Aug. 7, 1989, Ser. No. 390,281

Claims priority, application Japan, Aug. 11, 1988, 63-200408; Aug. 11, 1988, 63-200409

Int. Cl.^{5} C01B *13/32;* **C01F** *11/02;* **C01G** *29/00, 3/02*

U.S. Cl. 505—1 **15 Claims**

1. In a method of manufacturing a powder of a Bi-based superconductive oxide containing Pb from a Ca carbonate powder, a Sr carbonate powder, a Cu oxide powder, a Bi oxide powder, and a Pb oxide powder, the improvement comprising the steps of:

(1) mixing said Ca carbonate powder, said Sr carbonate powder, and said Cu oxide powder, and sintering the resulting mixed powder at a temperature of from 850° to 1050° C. into a sintered body of a Ca—Sr—Cu—O oxide;

(2) mixing said Bi oxide powder and said Pb oxide powder, and sintering the resulting mixed powder at a temperature of from 500° to 670° C. into a sintered body of a Bi—Pb—O oxide, wherein said Bi—Pb—O oxide is $PbO\text{-}Bi_2O_3$;

(3) crushing said Ca—Sr—Cu—O oxide sintered body and said Bi—Pb—O oxide sintered body into a powder of said Ca—Sr—Cu—O oxide and a powder of said Bi—Pb—O oxide, respectively;

(4) mixing said Ca—Sr—Cu—O oxide powder and said Bi—Pb—O oxide powder in proportions which when sintered will form a Bi—Pb—Sr—Ca—Cu—O superconductive oxide, and sintering the resulting mixed powder at a temperature of from 500° to 670° C. into a sintered body of a Bi—Pb—Sr—Ca—Cu—O superconductive oxide; and

(5) crushing said Bi—Pb—Sr—Ca—Cu—O superconductive oxide sintered body into said powder of said Bi-based superconductive oxide containing Pb.

5,026,681

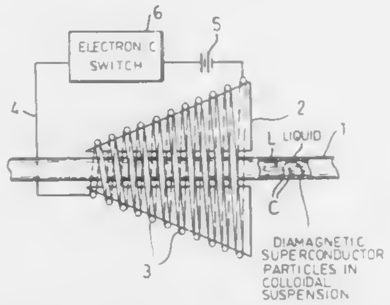
DIAMAGNETIC COLLOID PUMPS

Aharon Z. Hed, Nashua, N.H., assignor to International Superconductor Corp., Riverdale, N.Y.

Filed Mar. 21, 1989, Ser. No. 334,581

Int. Cl.^{5} H02K *44/02*

U.S. Cl. 505—1 **14 Claims**


6
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ELECTRONIC SWITCH
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LIQUID
1
C
3
DIAMAGNETIC SUPERCONDUCTOR PARTICLES IN COLLOIDAL SUSPENSION

1. A method of pumping a liquid, comprising the steps of:

(a) dispersing an amount of superconducting particles in said liquid sufficient to enable the resulting dispersion to be displaced by a magnetic field;

(b) maintaining said particles at a temperature below the critical temperature for superconductivity thereof; and

(c) moving said liquid in which said particles have been dispersed by applying a varying magnetic field gradient thereto.

5,026,682

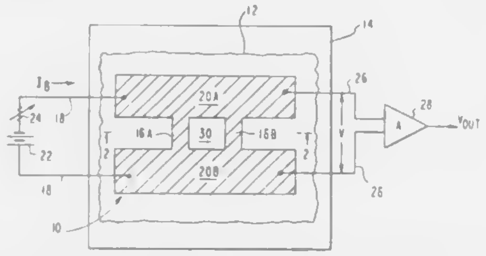
DEVICES USING HIGH T_c SUPERCONDUCTORS

Gregory J. Clark, Katonah; Richard J. Gambino, Yorktown Heights; Roger H. Koch, Amawalk; Robert B. Laibowitz, Peekskill; Allan D. Marwick, Yorktown Heights, and Corwin P. Umbach, Peekskill, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 13, 1987, Ser. No. 37,912

Int. Cl.^{5} G01R *33/02;* **H01L** *39/22*

U.S. Cl. 505—1 **22 Claims**



7. A superconducting quantum interference device (SQUID) device operable at temperatures greater than 60° K., said device comprising:

a layer of high T_c superconducting material capable of exhibiting superconductivity at temperatures greater than 60° K.,

implanted regions of said layer having a sufficiently damaged structure that said implanted regions are nonsuperconducting,

nonimplanted regions of said layer which have high T_c superconductivity and form a superconductivity loop, wherein said implanted and nonimplanted regions have substantially coplanar surfaces,

wherein said implanted regions constrict the width of said loop in at least two locations therein, the constriction being sufficient to form weak links at each of said locations, wherein said superconducting loop including said weak links operates as a DC SQUID device when electrical currents exist therein at temperatures greater than 60° K.

5,026,683

CERAMIC SUPERCONDUCTOR WIRE APPARATUS AND METHODS

Tihiro Ohkawa, La Jolla, Calif., assignor to General Atomics, San Diego, Calif.

Filed Oct. 27, 1988, Ser. No. 264,324

Int. Cl.^{5} B32B *9/00*

U.S. Cl. 505—1 **12 Claims**

1. A superconducting wire comprising:

an elongated support structure; and

a continuous layer of superconducting particles, each of said particles having a general formula $MBa_2\ CO_3\ O_{7-x}$, where M is yttrium or a rare earth element, and x is between approximately 0 and 0.2, a majority of said particles being no more than 20 (twenty) angstroms distant from its immediately adjacent particles, a majority of said particles having a radius equal to or less than approximately one-fourth (0.25) micron, the surface of said superconducting particles being cleansed by sputtering, said superconducting particles being disposed along said elongated support structure.

5,026,684

PROCESS FOR PREPARING CERAMIC SUPERCONDUCTIVE SUBSTANCES

Ronald H. Baney, Midland, Mich., and Shin-ichi Hirano, Aichi, Japan, assignors to Dow Corning Corporation, Midland, Mich. and Shin-Ichi Hirano, Aichi, Japan

Continuation-in-part of Ser. No. 254,636, Oct. 7, 1988, abandoned. This application Apr. 12, 1989, Ser. No. 336,935

Claims priority, application Japan, Oct. 13, 1987, 62-256449

Int. Cl.^{5} H01L *39/12;* **B05D** *3/02*

U.S. Cl. 505—1 **17 Claims**

1. A method for preparation of superconductive substances having compositions represented by the general formula:

$$LnBa_2Cu_3O_{7-\delta}$$

in which Ln represents a rare earth element selected from the group consisting of yttrium and gadolinium and δ has a value of about 0 to 0.5, which method comprises,

forming a solution containing an organic compound of a rare earth element selected from the group consisting of yttrium triisopropoxide, yttrium acetylacetonate, and gadolinium triisopropoxide; an organic barium compound selected from the group consisting of barium carboxylic acid salts, barium ether compounds, barium chelates, and barium amides; and an organic copper compound selected from the group consisting of copper carboxylic acid salts, copper ether compounds, copper chelates, and copper amides; in an organic solvent,

wherein each organic substituent of the organic barium compound and the organic copper compound contains one to five carbon atoms,

homogenizing the resulting solution,

stripping the organic solvent from the homogenized solution by evaporation to give a precipitate and

pyrolyzing the precipitate to obtain the superconductive substance.

5,026,685

NPY PEPTIDE ANALOGS

Jaroslav H. Boublik, Solana Beach; Jean E. F. Rivier, La Jolla; Marvin R. Brown, Del Mar, and Neal A. Scott, San Diego, all of Calif., assignors to The Salk Institute for Biological Studies, San Diego and The Reagents of the University of California, Oakland, both of, Calif.

Filed Jul. 15, 1988, Ser. No. 219,596

Int. Cl.^{5} A61K *37/02;* **C07K** *7/08*

U.S. Cl. 514—13 **20 Claims**

1. A synthetic peptide having the formula: X-Q-R_{19}-R_{20}-R_{21}-R_{22}-R_{23}-Leu-R_{25}-R_{26}-R_{27}-R_{28}-R_{29}-R_{30}-R_{31}-R_{32}-Arg-R_{34}-Arg-R_{36}-Y wherein X is H or C^{α}Me or N^{α}Me or desamino or an acyl group having 7 carbon atoms or less; Q is R_{17}-R_{18}, R_{18} or desQ; R_{17} is Met, Arg, Nle, Nva, Leu, Ala or D-Ala; R_{18} is Ala, Ser, Ile, D-Ala, D-Ser or D-Ile; R_{19} is Arg, Lys or Gln; R_{20} is Tyr or Phe; R_{21} is Tyr, Glu, His or Ala; R_{22} is Ser, Ala, Thr, Asn or Asp; R_{23} is Ala, Asp, Glu, Gln, Asn or Ser; R_{25} is Arg or Gln; R_{26} is His, Arg or Gln; R_{27} is Phe or Tyr; R_{28} is Ile, Leu, Val or Arg; R_{29} is Asn or Ile; R_{30} is Leu, Met, Thr or Val; R_{31} is Ile, Val or Leu; R_{32} is Thr or Phe; R_{34} is Gln, Pro or His; R_{36} is Phe or Tyr; and Y is NH_2 or OH; provided that when Q is R_{18}, then at least one of R_{27} and R_{36} is Phe.

11. A pharmaceutical composition for lowering blood pressure comprising an effective amount of a peptide as set forth in claim 1 or a nontoxic salt thereof, and a pharmaceutically acceptable liquid or solid carrier therefor.

5,026,686

ANTIVIRAL PEPTIDES

Milton J. Schlesinger, St. Louis, and Steven P. Adams, St. Charles, both of Mo., assignors to Washington University, St. Louis, Mo.

Filed Feb. 1, 1989, Ser. No. 305,148

Int. Cl.^{5} A61K *37/02;* **C07K** *5/10, 7/06*

U.S. Cl. 514—17 **11 Claims**

1. An antiviral peptide having a sequence of about 4 to 10 amino acids which is substantially identical to a small portion of the cytoplasmic domain of a glycoprotein in Sindbis virus.

5,026,687

TREATMENT OF HUMAN RETROVIRAL INFECTIONS WITH 2′,3′-DIDEOXYINOSINE ALONE AND IN COMBINATION WITH OTHER ANTIVIRAL COMPOUNDS

Robert Yarchoan, Bethesda; Hiroaki Mitsuya, Rockville, and Samuel Broder, Bethesda, all of Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Jan. 3, 1990, Ser. No. 460,490

Int. Cl.^{5} A61K *31/70*

U.S. Cl. 514—45 **27 Claims**

2. A method of treating HIV infection which comprises administering to an HIV infected patient in need thereof about 0.4 to 25.6 mg/kg/day of 2′,3′-dideoxyinosine in combination with a member selected from the group consisting of 3′-azido-2′,3′-dideoxythymidine, acyclovir, gancyclovir, pentamidine and ribovirin.

16. A method of administering 2′,3′-dideoxyinosine (ddI) to a patient infected with HIV in a manner to minimize treatment induced pancreatitis or other pancreatic dysfunction which comprises:

(a) administering said ddI to said patient at a dosage of about 0.4 to about 25.6 mg/kg/day;

(b) monitoring said patient for indications of an increased risk of pancreatitis or other pancreatic dysfunction;

(c) interrupting the administration of said ddI when said indications are noted; and

(d) resuming administration of said ddI at a dosage of about 0.4 to about 14 mg/kg/day when said indications subside.

20. A method of administering 2′,3′-dideoxyinosine (ddI) to a patient infected with HIV in a manner to minimize treatment induced neuropathy which comprises:

(a) administering said ddI to said patient at a dosage of about 0.4 to about 25.6 mg/kg/day;

(b) monitoring said patient for indications of potential onset of neuropathy;

(c) interrupting the administration of said ddI when said indications are noted; and

(d) resuming administration of said ddI when said indications subside.

24. A method of administering 2′,3′-dideoxyinosine (ddI) to a patient infected with HIV in a manner to minimize treatment induced hepatitis which comprises:

(a) administering said ddI to said patient at a dosage of about 0.4 to about 25.6 mg/kg/day;

(b) monitoring said patient for indications of potential onset of hepatitis;

(c) interrupting the administration of said ddI when said indications are noted; and

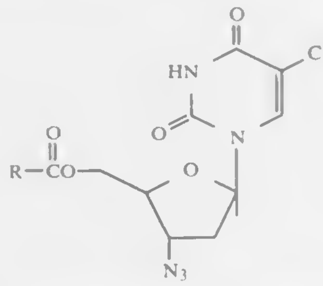
(d) resuming administration of said ddI when said indications subside.

VOL
1127
ISS
4
JE
25
1991
UMI

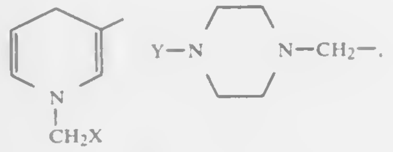
5,026,688
NOVEL AZT ANALOGS

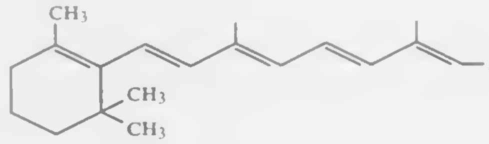
Krishna Agrawal, New Orleans, La., assignor to Administrators of the Tulane Educational Fund, New Orleans, La.
Filed Oct. 31, 1988, Ser. No. 265,201
Int. Cl.^{5} A61K *31/70*
U.S. Cl. 514—50 **28 Claims**

1. A compound having the formula



wherein R is selected from the group consisting of



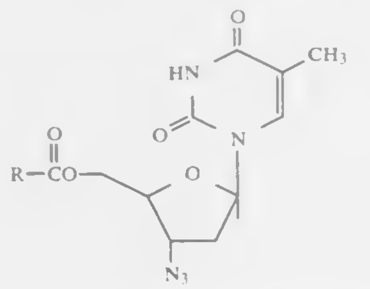


, and

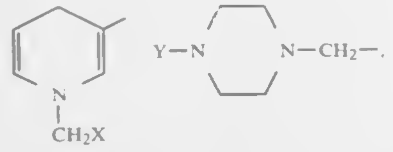
an amino acid residue;
wherein X is hydrogen, carboxyl, C_1-C_6 alkyl or benzyl, and Y is C_1-C_6 alkyl or C_6-C_{10} aryl.

7. A pharmaceutical composition useful for treatment of retroviral infection which comprises an effective amount of a compound of claim 1 in combination with a pharmaceutically acceptable carrier.

19. A method for treatment of retroviral infection which comprises administering to an individual in need of such treatment an effective amount of a compound having the formula:



wherein R is selected from the group consisting of



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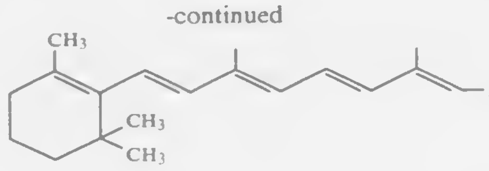


, and

an amino acid residue;
and wherein X is hydrogen, carboxyl, C_1-C_6 alkyl or benzyl, and Y is C_1-C_6 alkyl or C_6-C_{10} aryl.

5,026,689
R-T-E CEREAL WITH PSYLLIUM

Mitchell L. Ringe, and James R. Stoll, both of Maple Grove, Minn., assignors to General Mills, Inc., Minneapolis, Minn.
Filed Mar. 29, 1989, Ser. No. 330,245
Int. Cl.^{5} A23L *1/42, 1/29;* **A21D** *8/00, 13/00*
U.S. Cl. 514—57 **18 Claims**

1. A ready-to-eat (R-T-E) cereal high in total dietary fiber, comprising a cereal composition including:

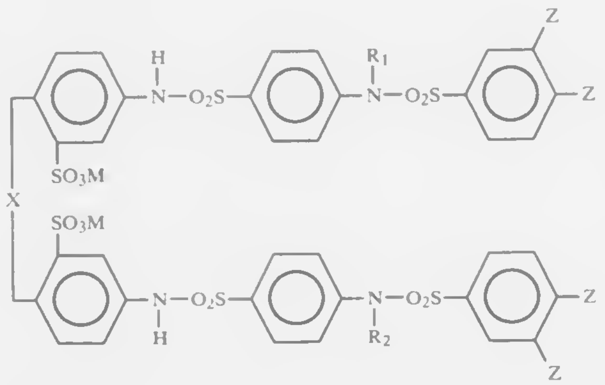
A. about 2% to 37% by weight of the cereal composition of psyllium having a soluble fiber content of at least about 65% by weight;
B. about 20% to 80% by weight of the cereal composition of a starchy cereal ingredient;
C. sufficient amounts of an insoluble fiber source so as to provide the cereal composition with a weight ratio of soluble fiber to insoluble fiber of about 1 to 5:1;
D. a moisture content of about 1% to 6% by weight of the cereal composition; and

wherein the total fructose content is less than about 5% by weight, and
wherein the minimum soluble fiber content is about 3 g/oz of the cereal composition.

5,026,690
ANTIVIRAL AGENT

Joachim Kresken, Krefeld Forstwald; Bernd Komp, Seligenstadt, and Dolf Stockhausen, Krefeld, all of Fed. Rep. of Germany, assignors to Chemische Fabrik Stockhausen GmbH, Krefeld, Fed. Rep. of Germany
PCT No. PCT/EP87/00417, § 371 Date Dec. 28, 1988, § 102(e) Date Dec. 28, 1988, PCT Pub. No. WO88/00828, PCT Pub. Date Feb. 11, 1988
PCT Filed Jul. 30, 1987, Ser. No. 299,916
Claims priority, application Fed. Rep. of Germany, Aug. 2, 1986, 3626309
Int. Cl.^{5} A01N *51/00, 41/06*
U.S. Cl. 514—155 **3 Claims**

1. A method of combating a virus infection in a patient in need thereof which comprises administering to said patient an antivirally effective amount of a sulphonamide of the formula



wherein
X represents the group $—CH=CH—$ or $—CH_2—CH_2—$,
Z represents chlorine or bromine,
M represents a non-toxic cation, and
R^1 and R^2 each independently represent hydrogen of 3,4-dihalogenobenzene sulphonyl group.

5,026,691
COMBINATION OF MINOXIDIL AND AN ANTIINFLAMMATORY AGENT FOR TREATING PATTERNED ALOPECIA

Albert M. Kligman, Philadelphia, Pa., assignor to The Upjohn Company, Kalamazoo, Mich.
Continuation-in-part of Ser. No. 55,674, May 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 32,362, Mar. 30, 1987, abandoned. This application Sep. 29, 1989, Ser. No. 415,077
Int. Cl.^{5} A01N *45/00, 43/54, 37/10*
U.S. Cl. 514—171 **9 Claims**

1. A method of treating humans for patterned alopecia which comprises the concomitant administration to a human susceptible to said alopecia of an effective amount of:
(a) minoxidil, administered topically; and
(b) an anti-inflammatory compound, selected from the group consisting of steroidal and non-steroidal anti-inflammatory agents, administered topically or orally.

5,026,692
USE OF SEX HORMONE

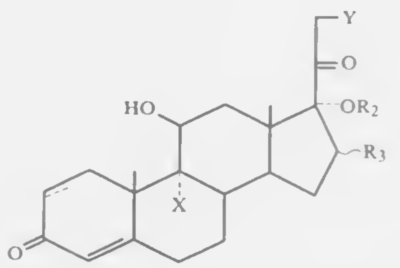
Sachiko Kuno, Ibaraki; Ryuji Ueno, and Osamu Hayaishi, both of Kyoto, all of Japan, assignors to Research Development Corporation of Japan and Ueno Seiyaku Kabushikikaisha, both of Osaka, Japan
Continuation of Ser. No. 923,791, Oct. 27, 1986, abandoned. This application Jun. 5, 1989, Ser. No. 361,687
Claims priority, application Japan, Nov. 13, 1985, 60-255791
Int. Cl.^{5} A61K *9/02, 31/565*
U.S. Cl. 514—178 **1 Claim**

1. A method of preventing lowering of cellular immunological activity of healthy lymphocytes due to an excess of prostaglandin having the capacity to lower said activity, which comprises administering anally or intrarectally, to a male afflicted rectally by prostaglandin E_2 in an amount effective to lower cellular immunological competence, a compound selected from the group consisting of testosterone, testosterone propionate, methyltestosterone, androsterone, progesterone, mestanolone, methenolone enanthate, androstanolone, methandienone, oxandrolone, fluoxymesterone, stanozolol, thiomesterone, cyproterone acetate, estradiol, ethynyl estradiol, estradiol benzoate, estradiol cypionate, estriol and diethylstilbestrol in am amount effective to prevent such lowering.

5,026,693
NOVEL 9-α-FLUORO- OR CHLORO-CORTICOSTEROID ESTERS AND A PROCESS FOR THEIR PREPARATION

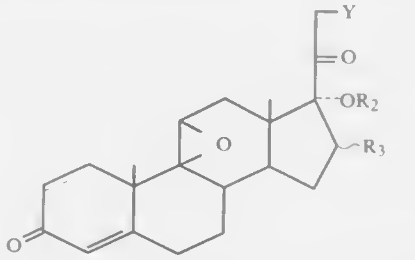
Ivan Villax, Lisbon; William Heggie, Barreiro, and Philip R. Page, Parede, all of Portugal, assignors to Hovione Inter Ltd., Switzerland
Continuation of Ser. No. 758,289, Jul. 24, 1985, abandoned. This application May 21, 1990, Ser. No. 527,718
Claims priority, application Portugal, Jul. 25, 1984, 78973
Int. Cl.^{5} A61K *31/56;* **C07J** *9/00, 7/00*
U.S. Cl. 514—180 **24 Claims**

1. A process for the preparation of 17,21-diacylates of 9α-fluoro- or chloro-17,21-dihydroxy-corticosteroids and of 17-acylates of 9α-fluoro- or chloro-17-hydroxy-corticosteroids of the formula



(I)

wherein Y is chlorine or OR $_1$, R_1 and R_2 represent an acyl group of 2 to 6 carbon atoms or a benzoyl group and where R_1 and R_2 can be the same or different in the same molecule, R_3 is methyl or fluorine in either the α- orβ- orientation, X is chlorine or fluorine, and the C_1 C_2 bond can be saturated or not, characterised by the fact that a compound of the formula

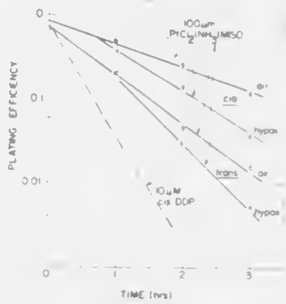


(II)

wherein Y, R_2 and R_3 and C_1 C_2 have the significance given above, is reacted with hydrogen chloride or fluoride.

5,026,694
PLATINUM COMPLEXES WITH ONE RADIOSENSITIZING LIGAND

Kirsten A. Skov, Vancouver, Canada; Nicholas P. Farrell, Winooski, both of Vt., and David J. Chaplin, Richmond, Canada, assignors to The British Columbia Cancer Foundation, Vancouver, Canada
Continuation-in-part of Ser. No. 37,498, Apr. 13, 1987, Pat. No. 4,921,963. This application Jun. 30, 1989, Ser. No. 374,356
Int. Cl.^{5} A61K *31/555*
U.S. Cl. 514—184 **30 Claims**



1. A pharmaceutical composition for sensitization of hypoxic cells to radiation or for the inhibition of tumor growth in those tumors sensitive to treatment therewith which comprises an effective amount of the compound of the formula:

$$PtX_n(NR_2H)(L) \quad (1)$$

wherein n is 1 or 2, and
wherein when n is 2, X is a monovalent biologically accept-

VOL
1127
ISS
4
JE
25
1991
UMI

able anion, and when n is 1, X is a divalent biologically acceptable anion;

each R is independently H or alkyl, or both Rs together are a piperidino or morpholino residue; and

L is a radiosensitizing ligand selected from a mononitro-substituted imidazole, a mononitro-substituted pyrazole, a mononitro-substituted thiazole and a mononitro-substituted isothiazole,

in admixture with a suitable pharmaceutically acceptable excipient.

5,026,695
7-ACYLAMINO-3-SUBSTITUTED CEPHALOSPORANIC ACID DERIVATIVES

Takao Takaya, Kawanishi; Hisashi Takasugi, Osaka; Takashi Masugi, Ikeda; Hideaki Yamanaka, Hirakata, and Kohji Kawabata, Osaka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

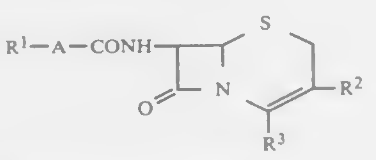
Division of Ser. No. 785,048, Oct. 9, 1985, Pat. No. 4,904,652, which is a continuation of Ser. No. 489,236, Apr. 28, 1983, abandoned, which is a division of Ser. No. 206,831, Nov. 14, 1980, Pat. No. 4,409,215. This application Jan. 5, 1990, Ser. No. 461,340

Claims priority, application United Kingdom, Nov. 19, 1979, 7939985; Feb. 8, 1980, 8004335; Apr. 21, 1980, 8012991

Int. Cl.^{5} C07D *501/26;* **A61K** *31/545*

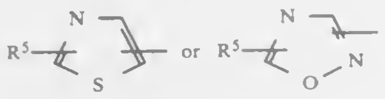
U.S. Cl. 514—202 **9 Claims**

1. A compound of the formula:



(I)

in which R^1 is a group of the formula:



wherein

R^5 is amino or a protected amino group,

R^2 is lower alkoxymethyl, lower alkythiomethyl or lower aklenythiomethyl,

R^3 is carboxy or a protected carboxy group, and

A is lower alkylene which may have a substituent selected from the groups consisting of amino, a protected amino group, hydroxy, oxo and a group of the formula: $=N\sim OR^6$, wherein R^6 is lower alkenyl, lower alkynyl or lower alkyl substituted by one or more substituent(s) selected from amino, a protected amino group and pyridyl, and a pharmaceutically acceptable salt thereof.

5,026,696
KETONE DERIVATIVES WHICH ARE ANTAGONISTS OF 5-HT AT 5-HT$_3$ RECEPTORS, COMPOSITIONS CONTAINING THEM, AND METHOD OF USE

Peter C. North; Alexander W. Oxford, both of Hertfordshire, and David J. Cavalla, London, all of England, assignors to Glaxo Group Limited, England

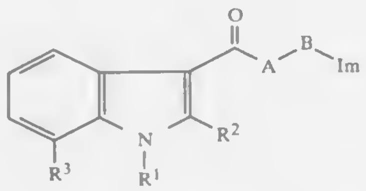
Division of Ser. No. 304,269, Jan. 31, 1989, Pat. No. 4,963,546. This application Jul. 18, 1990, Ser. No. 553,750

Claims priority, application United Kingdom, Feb. 1, 1988, 8802127

Int. Cl.^{5} A61K *31/415;* **C07D** *471/06, 487/06, 487/02*

U.S. Cl. 514—214 **7 Claims**

1. A compound of the formula (I):



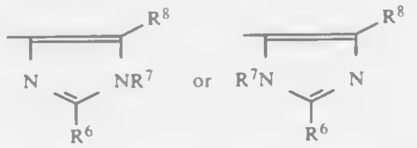
(I)

wherein R^1 and R^2 together form a C_{3-5}alkylene chain and R^3 is a hydrogen atom;

A—B represents the group $R^4R^5C\text{-}CH_2$ or $R^4C{=}CH$;

R^4 and R^5, which may be the same or different, each represent a hydrogen atom or a C_{1-6}alkyl group; and

Im represents an imidazol group of formula:



wherein one of the groups represented by R^6, R^7 and R^8 is a hydrogen atom or a C_{1-6}alkyl, C_{3-7}cycloalkyl, C_{3-6}alkenyl, phenyl or phenylC_{1-3}alkyl group and each of the other two groups, which may be the same or different, represents a hydrogen atom or a C_{1-6}alkyl group;

or a physiologically acceptable salt or solvates thereof.

6. A pharmaceutical composition for treating a condition mediated through 5-HT$_3$ recetors which comprises an effective amount to relieve said condition of at least one compound of formula (I) as defined in claim **1** or a physiologically acceptable salt or solvates thereof together with at least one physiologically acceptable carrier or excipient.

5,026,697
RAPID METHOD FOR INTERRUPTING OR ATTENUATING THE NICOTINE/TOBACCO DEPENDENCY SYNDROME

Howard S. Lotsof, Staten Island, N.Y., assignor to NDA International, Inc., Staten Island, N.Y.

Filed May 30, 1990, Ser. No. 530,263

Int. Cl.^{5} A61K *3/55*

U.S. Cl. 514—214 **10 Claims**

1. A method for treating nicotine/tobacco dependency comprising internally administering to a person in need of such treatment an effective amount of at least one member of the group consisting of Apocynaceae alkaloids and physiologically acceptable salts thereof.

5,026,698
THIENOPYRIDINE TYPE MEVALONOLACTONES

Yoshihiro Fujikawa; Mikio Suzuki; Hiroshi Iwasaki, all of Funabashi; Mitsuaki Sakashita, and Masaki Kitahara, both of Shiraoka, all of Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

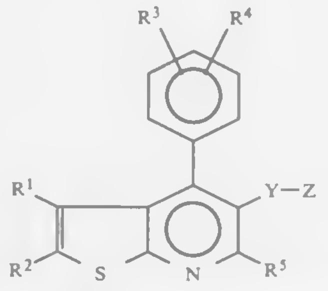
Filed Oct. 19, 1989, Ser. No. 423,956

Claims priority, application Japan, Nov. 2, 1988, 63-277795; Mar. 15, 1989, 1-62931; Sep. 7, 1989, 1-230392

Int. Cl.^{5} A61K *31/435, 31/44;* **C07D** *401/00, 403/00*

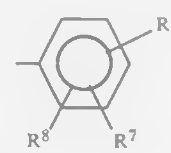
U.S. Cl. 514—215 **21 Claims**

1. A compound of the formula

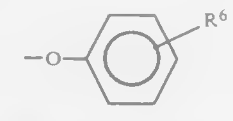


(I)

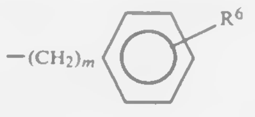
wherein R^1 and R^2 are independently hydrogen, C_{1-8} alkyl, C_{2-6} alkenyl, C_{3-7} cycloalkyl, C_{1-6} alkoxy, fluoro, chloro, bromo,



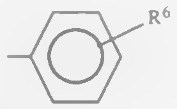
(wherein R^6, R^7 and R^8 are independently hydrogen, C_{1-4} alkyl, C_{1-3} alkoxy, C_{3-7} cycloalkyl, trifluoromethyl, fluoro, chloro or bromo), 2-, 3- or 4-pyridyl, 2- or 5-pyrimidyl, 2- or 3-thienyl, 2- or 3-furyl,



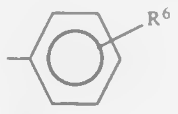
wherein R_6 is as defined above), $-NR^9R^{10}$ (wherein R^9 and R^{10} are independently hydrogen, C_{1-4} alkyl,



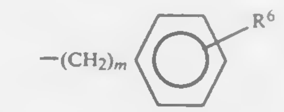
(wherein R^6 is as defined above, and m is 1, 2 or 3), or ^{9} and R^{10} together form $-(CH_2)_j-$ (wherein j is 3, 4 or 5)); or C_{1-3} alkyl substituted by



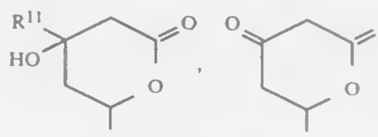
(wherein R^6 is as defined above) and by 0, 1 or 2 members selected from the group consisting of C_{1-8} alkyl or α- or β-naphthyl; or R^1 and R^2 together form C_{2-6} alkylene unsubstituted or substituted by 1 to 3 members selected from the group consisting of C_{1-4} alkyl, C_{3-7} cycloalkyl, fluoro, chloro and bromo, and by one member selected from the group consisting of



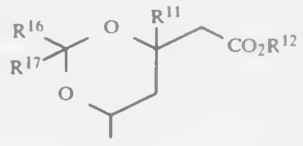
(wherein R^6 is as defined above), or $-(CHR^{23-})_k-A-(CHR^{24})_l-$ (wherein k and l are respectively 0, 1, 2 or 3, and A is $-C(R^{18}){=}C(R^{19})-$ (wherein R^{18} and R^{19} are independently hydrogen or C_{1-3} alkyl), —O—, —S— or $-N(R^{20})-$ (wherein R^{20} is hydrogen, C_{1-4} alkyl or



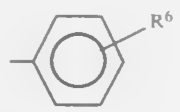
(wherein R^6 is as defined above, and m is 1, 2 or 3)), and R^{23} and R^{24} are independently hydrogen or C_{1-4} alkyl), or $-CH{=}CH-CH{=}CH-$; R^3 and R^4 are independently hydrogen, C_{1-8} alkyl, C_{3-7} cycloalkyl, C_{1-3} alkoxy, n-butoxy, i-butoxy, sec-butoxy, t-butoxy, $R^{25}R^{26}N-$ (wherein R^{25} and R^{26} are independently hydrogen or C_{1-3} alkyl), trifluoromethyl, trifluoromethoxy, difluoromethoxy, fluoro, chloro, bromo, phenyl, phenoxy, benzyloxy, hydroxy, trimethylsilyloxy, diphenyl-t-butylsilyloxy, hydroxymethyl or $-O(CH_2)_lOR^{15}$ (wherein R^{15} is hydrogen or C_{1-3} alkyl, and l is 1, 2 or 3); or when located ortho position to each other, R^3 and R^4 may together form $-CH{=}CH-CH{=}CH-$ or methylenedioxy; Y is $-CH_2-$, $-CH_2CH_2-$, $-CH{=}CH-$, $-CH_2-CH{=}CH-$, $-CH{=}CH-CH_2-$, $-C(CH_3){=}CH-$ or $-CH{=}C(CH_3)-$; Z is $-Q-CH_2WCH_2-CO_2R^{12}$,



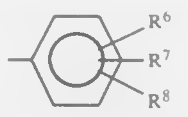
or



(wherein Q is $-C(O)-$, $-C(OR^{13})_2-$ or $-CH(OH)-$: W is $-C(O)-$, $-C(OR^{13})_2-$ or $-C(R^{11})(OH)-$; R^{11} is hydrogen or C_{1-3} alkyl; R^{12} is hydrogen or R^{14} (wherein R^{14} is alkyl moiety of chemically or physiologically hydrolyzable alkyl ester or M (wherein M is $NHR^{27}R^{28}R^{29}$ (wherein R^{27}, R^{28} and R^{29} are independently hydrogen or C_{1-4} alkyl), sodium potassium or ½ calcium); two R^{13} are independently primary or secondary C_{1-6} alkyl; or two R^{13} together form $-(CH_2)_2-$ or $-(CH_2)_3-$; R^{16} and R^{17} are independently hydrogen or C_{1-3} alkyl; or R^{16} and R^{17} together form $-(CH_2)_2-$ or $-(CH_2)_3-$; and R^5 is hydrogen, C_{1-8} alkyl, C_{2-6} alkenyl, C_{3-7} cycloalkyl, C_{5-7} cycloalkenyl, or



(wherein R^6 is as defined above), or C_{1-3} alkyl substituted by one member selected from the group consisting of



(wherein R^6, R^7 and R^8 are as defined above) and by 0, 1 or 2 members selected from the group consisting of C_{1-3} alkyl.

21. A method for reducing hyperlipidemia, hyperlipoproteinemia or atherosclerosis, which comprises administering an effective amount of the compound of the formula I as defined in claim **1**.

VOL
1127
ISS
4
JE
25
1991
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5,026,699
USE OF 5,11-DIHYDRO-6H-PYRIDO[2,3-B][1,4]-BENZODIAZEPIN-6-ONES SUBSTITUTED IN THE 11-POSITION FOR TREATING BRADYCARDIA AND BRADYARRHYTHMIA IN HUMAN AND VETERINARY MEDICINE

Gerhard Mihm; Wolfgang Eberlein; Welfhard Engel, all of Biberach; Günter Trummlitz, Warthausen; Norbert Mayer, Biberach; Henri Doods, Warthausen, and Rudolf Hammer, Ingelheim am Rhein, all of Fed. Rep. of Germany, assignors to Dr. Karl Thomae GmbH, Biberach an der Riss, Fed. Rep. of Germany

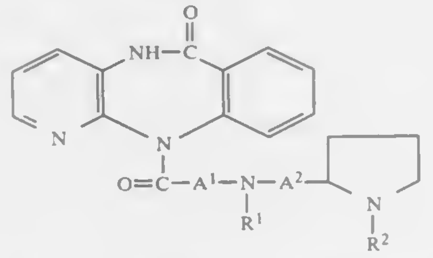
Filed Jun. 15, 1989, Ser. No. 367,397

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1988, 3820347

Int. Cl.^{5} A61K *31/55*

U.S. Cl. 514—220 **3 Claims**

1. A method for treating bradycardia and bradyarrhythmia in a warm-blooded animal which comprises administering to said animal a therapeutically effective amount of an 11-substituted 5,11-dihydro-6H-pyrido-[2,3-b][1,4]benzodiazepin-6-ones of general formula I



(I)

wherein R^1 and R^2, which may be identical or different, are hydrogen atoms or alkyl groups having 1 to 3 carbon atoms and A^1 is a straight-chained or branched alkylene group having 1 to 5 carbon atoms, A^2 is a methylene group or, if R^1 is hydrogen and R^2 is methyl, A^2 is a methylene or ethylene group, or the physiologically acceptable acid addition salt thereof.

5,026,700
CERTAIN QUINOLINES AND THIENOPYRIDINES AS EXCITATORY AMINO ACID ANTAGONISTS

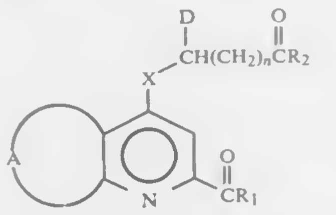
Boyd L. Harrison, and Bruce M. Baron, both of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals, Cincinnati, Ohio

Continuation-in-part of Ser. No. 352,423, May 16, 1989, abandoned. This application Mar. 21, 1990, Ser. No. 496,748

Int. Cl.^{5} A61K *31/47. 31/435;* **C07D** *215/56. 471/04*

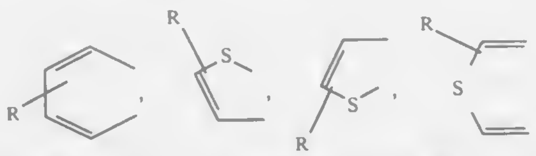
U.S. Cl. 514—233.8 **43 Claims**

1. A compound of the formula:



Formula I

in which X is represented by a substituent selected from the group consisting of O, S, or NH; n is represented by an integer from 0 to 6; R_1 and R_2 are each independently represented by a substituent selected from the group consisting of $—NR_4R_4$, $—OH$, $—OH_5$, $—OCH_2OCOR_6$ and $—O—(CH_2)p\ NR_7R_8$, in which p is an integer from 1–4. R_3 and R_4 are each independently represented by hydrogen or C_{1-6} alkyl; R_5 and R_6 are each independently represented by C_{1-6} alkyl, pehnyl, substitued phenyl, or a phenylaklyl substituent in which the phenyl ring may be optionally substituted; R_7 and R_6 are each independently represented by C_{1-6} represented by C_{1-6} alkyl or together with the adjacent nitrogen atom by piperidino, morpholino, or pyrrolidinyl group D is represented by hydrogen or C_{1-3} aklyl; and A is represented by:



R is represented by 1 to 3 substituents in the case where the phenyl moiety is substituted and 1 and 2 substituents in the case where a thienyl moiety is substituted said substituents being selected from the group consisting of hydrogen, OH, halogen, CN, NO_2, C_{1-6} alkyul, C_{1-6} alkoxy, CF_3, OCF_3, $COOR_3$, and $CONR_3R_4$ in which R_3 and R_4 are each independently as defined above; the pharmaceutically acceptable acid addition salts thereof and the pharmaceutically acceptable basic addition salts thereof.

5,026,701
MORPHOLINE COMPOUNDS, COMPOSITIONS AND USE

Gilbert Regnier, Chatenay Malabry; Claude Guillonneau, Clamart; Jean Lepagnol, Chatou, and Pierre Lestage, Paris, all of France, assignors to Adir et Compagnie, Courbevoie, France

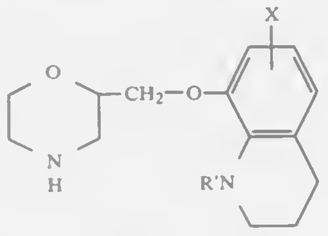
Filed Oct. 25, 1990, Ser. No. 603,522

Claims priority, application France, Nov. 6, 1989, 89 14489

Int. Cl.^{5} A61K *31/535;* **C07D** *413/12*

U.S. Cl. 514—235.2 **10 Claims**

1. A compound selected from the group consisting of: morpholine compounds of the general formula (I):



(I)

in which

X, bonded to the aromatic nucleus, is selected from the group consisting of:
- a halogen atom and
- a trifluoromethyl radical; and

R′ is selected from the group consisting of:
- a hydrogen atom,
- a straight-chain or branched alkyl radical containing 1 to 5 carbon atoms and such radical including a double bond, and
- an aralkyl radical in which the alkyl moiety contains 1 to 5 carbon atoms;
- in racemic and enantiomeric forms; and physiologically tolerable salts thereof with appropriate acids.

5,026,702
MORPHOLINES AND MORPHOLINE-N-OXIDES AND PHARMACEUTICAL COMPOSITIONS CONTAINING THESE COMPOUNDS

Manfred Reiffen; Michael Mark, both of Biberach; Robert Sauter, Laupheim, and Wolfgang Grell, Biberach, all of Fed. Rep. of Germany, assignors to Dr. Karl Thomae, GmbH, Biberach an der Riss, Fed. Rep. of Germany

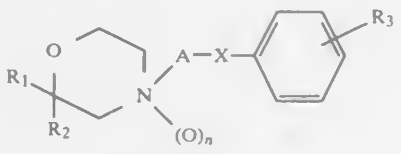
Filed Mar. 23, 1989, Ser. No. 327,665

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1988, 380977

Int. Cl.^{5} A61K *31/535;* **C07D** *413/04*

U.S. Cl. 514—235.5 **22 Claims**

1. A compound of formula



(I)

wherein
- A is C_2–C_3 n-alkylene unsubstituted or mono-or di-substituted by methyl or ethyl,
- X is $(O)_m$, wherein m is 1 or 0
- R_1 is a heteroaromatic 6-membered ring containing 1 or 2 nitrogen atoms and unsubstituted or substituted by halo, hydrogen, trifluoromethyl or alkyl,
- R_2 is hydrogen or hydroxy,
- R_3 is hydroxy, alkoxy, carboxy, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl or dialkylaminocarbonyl, C_1–C_6 alkoxy substituted in the end position by carboxy, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl or dialkylaminocarbonyl, C_2–C_7 alkoxy substituted in the end position by hydroxy, alkoxy or phenylalkoxy, or ethenylene unsubstituted or substituted by alkyl and substituted in the end position by carboxy, alkoxycarbonyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, pyrrolidino, piperidino or hexamethyleneimino and
- n is 0 or 1,

where all the alkyl or alkoxy groups mentioned hereinbefore without carbon limitation may contain from 1 to 3 carbon atoms, the optical isomer, diastereoisomer or acid addition salt thereof.

5,026,703
PEPTIDE OXYTOCIN ANTAGONISTS

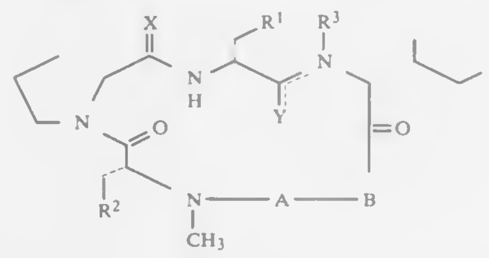
Mark G. Bock, Hatfield; Roger M. Freidinger, Lansdale, and Robert M. DiPardo, Lansdale, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jun. 11, 1990, Ser. No. 535,816

Int. Cl.^{5} C07D *521/00;* **A61K** *31/50*

U.S. Cl. 514—247 **8 Claims**

1. A compound having the formula:

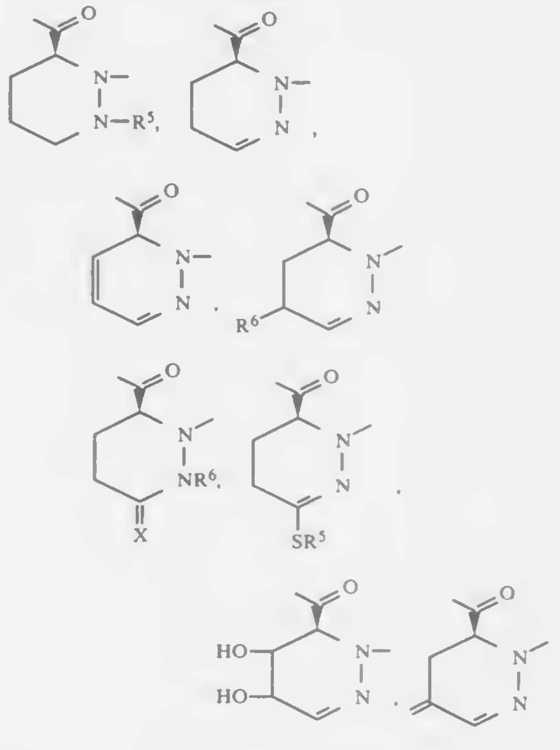


I

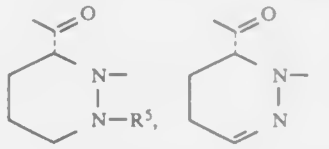
wherein:

-continued

A is

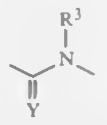


B is

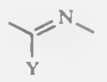


R^1 and R^2 are the same and are cyclohexyl or phenyl;

R^3 is hydrogen, C_{1-4}alkyl, or acetyl, when Y is O, S or H_2 for



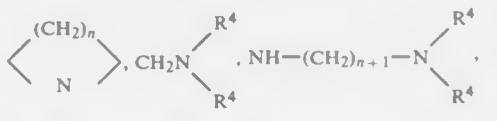
or R^3 is absent when Y is $S—C_{1-4}$alkyl or $SCH_2CO_2R^4$ for



R^4 is hydrogen, C_{1-4} straight or branch chained alkyl;

R^5 is hydrogen except when attached to S, C_{1-4}alkyl, $CH_2CO_2R^4$;

R^6 is



or $CH(CO_2R^4)_2$, where $R^4 \neq H$ and n is 1–4;

X is O or S;

Y is O, S, H_2, $S—C_{1-4}$alkyl or $S—CH_2—CO_2R^4$;

and the pharmaceutically acceptable salts thereof.

5. A method of antagonizing the binding of oxytocin to an oxytocin receptor which comprises contacting said receptor with a compound of claim 1.

VOL
1127
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5,026,704
BENZO[F]QUINOXALINE-2,3(1H,4H)-DIONES

Tage Honore, Copenhagen; Poul Jacobsen, Rodovre; Flemming E. Nielsen, Virum, and Lars Naerum, Gentofte, all of Denmark, assignors to Novo Nordisk A/S, Bagsvaerd, Denmark

Continuation of Ser. No. 268,939, Nov. 8, 1988, Pat. No. 4,948,794. This application Dec. 26, 1989, Ser. No. 456,325

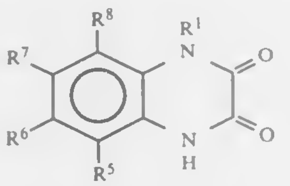
Claims priority, application Denmark, Nov. 10, 1987, 5862/87; Mar. 16, 1988, 1422/88

The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.

Int. Cl.^{5} A61K *31/495;* **C07D** *241/38, 241/44*

U.S. Cl. 514—250 **12 Claims**

1. A quinoxaline compound having the formula I



I

wherein

R^1 is C_{1-12}-alkyl, which may optionally be substituted by hydroxy, formyl, carboxy, carlomoyl, piperedino, amino, C_{3-8}-cycloalkyl, or phenyl; or R is C_{3-6} cycloalkyl and in any case

R^5 and R^6 together form a further fused benzene ring, which may be substituted with halogen, NO_2, CN, CF_3 or OR', wherein R' is C_{1-4}-alkyl, and R^7 and R^8 independently are hydrogen, halogen, CN, CF_3, NO_2 or OR', wherein R' is C_{1-4}-alkyl; or

R^7 and R^8 together form a further fused benzene ring, which may be substituted with halogen, NO_2, CN, CF_3 or OR', wherein R' is C_{1-4}-alkyl, and R^5 and R^6 independently are hydrogen, halogen, CN, CF_3, NO_2 or OR', wherein R' is C_{1-4}-alkyl.

5,026,705
BENZIMIDAZOLYLPYRIDAZINONES

Helmut Prücher, Heppenheim; Rochus Jonas, Darmstadt, both of Fed. Rep. of Germany; Jaime Piulats, Barcelona, Spain, and Michael Klockow, Ro dorf, Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft Mit Beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 240,011, Sep. 1, 1988, abandoned, which is a continuation of Ser. No. 830,781, Feb. 19, 1986, Pat. No. 4,923,869. This application May 30, 1990, Ser. No. 530,520

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1985, 3505609

Int. Cl.^{5} C07D *401/14;* **A61K** *31/50*

U.S. Cl. 516—253 **8 Claims**

1. 5-methyl-6-[2-(3-pyrazolyl)-5-benzimidazolyl]-4,5-dihydropyridazin-3-one or a physiologically acceptable salt thereof.

5,026,706
METHOD FOR TREATING DYSURIA USING NAFTOPIDIL

Gisbert Sponer, Laudenbach; Ulrich Relcke, Hirschberg-Leutershusen, and Michael Nelboeck-Hochstetter, Tutzing, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed May 30, 1990, Ser. No. 530,362

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1989, 3918543

Int. Cl.^{5} A61K *31/495*

U.S. Cl. 514—255 **4 Claims**

1. A method for treating the dysuria in a patient afflicted with dysuria, which comprises orally administering to the patient an amount of naftopidil, or a pharmaceutically acceptable salt thereof, sufficient to improve micturition

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5,026,707
RING-SUBSTITUTED 2-AMINO-1,2,3,4-TETRAHYDRONAPHTHALENES

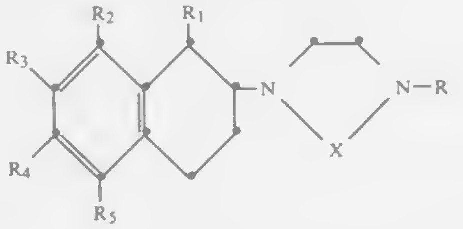
James A. Nixon; Richard P. Pioch; John M. Schaus, and Robert D. Titus, all of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 197,236, May 23, 1988, abandoned. This application Jan. 16, 1990, Ser. No. 464,826

Int. Cl.^{5} A61K *31/495, 31/395;* **C07D** *295/02, 243/08*

U.S. Cl. 514—255 **36 Claims**

1. A compound of the formula



in which

R is hydrogen or methyl; R_1 is hydrogen or methyl; X is $—CH_2CH_2—$ or $—CH_2CH_2CH_2—$;

R_2 is selected from the group consisting of hydrogen, halo, C_1–C_3 alkoxy, C_1–C_3 thioalkyl, C_1–C_3 alkyl, and hydroxy:

R_3 is selected from the group consisting of hydrogen and halo;

R_4 is selected from the group consisting of hydrogen, halo, C_1–C_3 alkyl, and C_1–C_3 thioalkyl;

R_5 is selected from the group consisting of hydrogen, halo, C_1–C_3 alkyl, C_1–C_3 acyl, fluorosubstituted C_2–C_3 acyl, fluoro-substituted C_1–C_3 alkyl, cyano, carboxamido, carboxyl, and C_1–C_3 hydroxyalkyl;

all subject to the following provisos;

(a) if R_1 is methyl, both R_2 and R_4 may be hydrogen;

(b) if R_1 is hydrogen, one of R_2 and R_4 is hydrogen and the other is other than hydrogen;

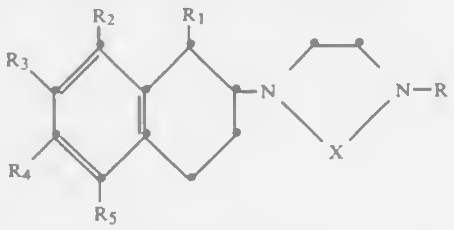
(c) R_5 may be other than hydrogen only when R_2 is other than hydrogen;

(d) when R_2 is other than hydrogen, R_5 also is other than hydrogen; and

(e) R_3 may be halo only when R_4 is other than hydrogen;

or pharmaceutically acceptable acid addition salts thereof.

21. A method for inhibiting serotonin reuptake in mammals which comprises administering to a mammal requiring increased neurotransmission of serotonin a pharmaceutically effective amount of a compound of the formula



in which

R is hydrogen or methyl; R_1 is hydrogen or methyl; X is $—CH_2CH_2—$or $—CH_2CH_2CH_2—$

R_2 is selected from the group consisting of hydrogen, halo, C_1–C_3 alkoxy, C_1–C_3 thioalkyl, C_1–C_3 alkyl, and hydroxy;

R_3 is selected from the group consisting of hydrogen and halo;

R_4 is selected from the group consisting of hydrogen, halo, C_1–C_3 alkyl, C_1–C_3 alkoxy, C_1–C_3 thioalkyl, and hydroxy;

R_5 is selected from the group consisting of hydrogen, halo, C_1–C_3 alkyl, C_1–C_3 alkoxy, C_1–C_3 acyl, fluorosubstituted C_2–C_3 acyl, fluoro-substituted C_1–C_3 alkyl, and cyano;

all subject to the following provisos:

(a) if R_1 is methyl, both R_2 and R_4 may be hydrogen;

(b) if R_1 is hydrogen, one of R_2 and R_4 is hydrogen and the other is other than hydrogen;

(c) R_2 may be other than hydrogen only when R_2 is other than hydrogen; and

(d) R_3 may be halo only when R_4 is other than hydrogen;

and pharmaceutically acceptable acid addition salts thereof.

5,026,708
PYRIMIDINE TYPE MEVALONOLACTONES

Yoshihiro Fujikawa; Mikio Suzuki; Hiroshi Iwasaki, all of Funabashi; Mitsuaki Sakashita, and Masaki Kitahara, both of Saitama, all of Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

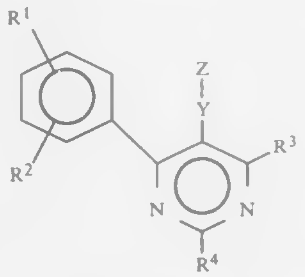
Filed Sep. 12, 1988, Ser. No. 243,468

Claims priority, application Japan, Sep. 12, 1987, 62-229357; Jan. 25, 1988, 63-14027; Jun. 11, 1988, 63-142695; Aug. 16, 1988, 63-203381

Int. Cl.^{5} A61K *31/505;* **C07D** *239/26, 407/06, 407/14*

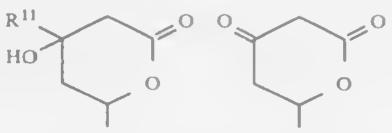
U.S. Cl. 514—256 **37 Claims**

1. A compound of the formula:

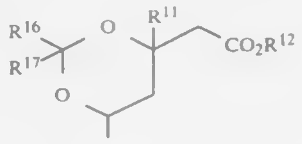


(I)

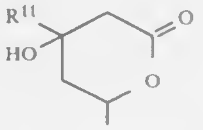
wherein R^1 and R^2 are independently hydrogen, C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{1-3} alkoxy, n-butoxy, i-butoxy, sec-butoxy, R^5R^6N- (wherein R^5 and R^6 are independently hydrogen or C_{1-3} alkyl), trifluoromethyl, trifluoromethoxy, difluoromethoxy, fluoro, chloro, bromo, phenyl, phenoxy, benzyloxy, hydroxy, trimethylsilyloxy, diphenyl-t-butysilyloxy, hydroxymethyl or $—O(CH_2)_lOR^{15}$ (wherein R^{15} is hydrogen or C_{1-3} alkyl, and l is 1, 2 or 3); or when located at the ortho position to each other, R^1 and R^2 together form $—CH═CH—CH═CH—$ or methylene dioxy; Y is $—CH_2—$, $—CH_2CH_2—$, $—CH═CH—$, $—CH_2—CH═CH—$ or $—CH═CH—CH_2$; Z is $—Q —CH_2WCH_2—CO_2R^{12}$,



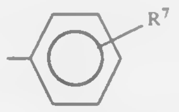
or



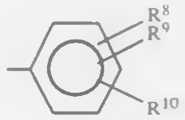
(wherein Q is $—C(O)—$, $—C(OR^{13})_2—$ or $—CH(OH)—$, proviso that when Z is



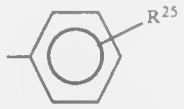
then Y is not $—CH_2CH_2—$ or $—CH═CH—$; W is $—C(O)—$, $—C(OR^{13})_2—$ or $—C(R^{11})(OH)—$; R^{11} is hydrogen or C_{1-3} alkyl; R^{12} is hydrogen or R^{14} (wherein R^{14} is physiologically hydrolyzable alkyl or M (wherein M is NH_4, sodium, potassium, ½ calcium or a hydrate of lower alkylamine, di-lower alkylamine or tri-lower alkylamine)); two R^{13} are independently primary or secondary C_{1-6} alkyl; or two R^{13} together form $—(CH_2)_2—$ or $—(CH_2)_3—$; R^{16} and R^{17} are independently hydrogen or C_{1-3} alkyl; R^3 is hydrogen, C_{1-6} alkyl, C_{2-3} alkenyl, C_{3-6} cycloalkyl,



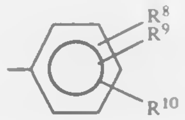
(wherein R^7 is hydrogen, C_{1-4} alkyl, C_{1-3} alkoxy, fluoro, chloro, bromo or trifluoromethyl), phenyl-$(CH_2)_m$— (wherein m is 1, 2 or 3), $—(CH_2)_nCH(CH_3)$-phenyl or phenyl-$(CH_2)_nCH(CH_3)—$ (wherein n is 0, 1 or 2; R^4 is C_{1-8} alkyl, C_{3-7} cycloalkyl, α- or β- naphthyl, 2-, 3-, or 4-pyridyl,



(wherein R^8, R^9 and R^{10} are independently hydrogen, C_{1-4} alkyl, C_{1-8} alkoxy, C_{1-3} alkylthio, chloro, bromo, fluoro, $—NR^{18}R^{19}$ (wherein R^{18} and R^{19} are independently C_{1-3} alkyl), trichloromethyl, trifluoromethyl, trifluoromethoxy, difluoromethoxy, phenoxy, benzyloxy, hydroxy, trimethylsilyloxy, diphenyl-t-butysilyloxy, hydroxymethyl or $—O(CH_2)_kOR^{20}$ (wherein R^{20} is hydrogen or C_{1-3} alkyl, and k is 1, 2 or 3); when R^9 and R^{10} are hydrogen at the same time, R^8 is



(wherein R^{25} is hydrogen, C_{1-4} alkyl, C_{1-3} alkoxy, chloro, bromo, or fluoro)) or C_{1-3} alkyl substituted by 1 member selected from the group consisting of



(wherein R^8, R^9 and R^{10} are as defined above) and naphthyl and by 0, 1 or 2 members selected from the group consisting of C_{1-8} alkyl.

34. An anti-hyperlipidemia composition containing an effective amount of the compound of formula I, as defined in claim **1**, and a pharmaceutically acceptable carrier.

VOL
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5,026,709

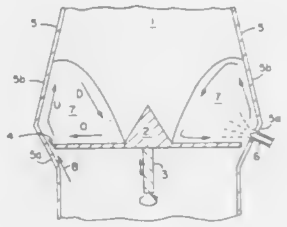
METHOD FOR THE PREPARATION OF A THEOPHYLLINE SUSTAINED RELEASE PHARMACEUTICAL COMPOSITION AND THE COMPOSITION PREPARED THEREBY

Richard J. Harwood, Bensalem; Gunvant N. Mehta, Lansdale; Ramesh C. Jhawar, Yardley; Liang-Lii Huang, Maple Glen; Wayne M. Grim, Doylestown, and Shun P. Li, Upper Darby, all of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

Continuation of Ser. No. 848,991, Apr. 7, 1986, abandoned. This application Jun. 7, 1988, Ser. No. 203,435

Int. Cl.^{5} A01N *43/90;* **A01K** *31/52*

U.S. Cl. 514—263 **24 Claims**



1. A process for the preparation of a sustained release pharmaceutical composition, including a seed particle coated with a pharmacologically active compound-containing layer, comprising

(A) forming a fluidized ring of said seed particles by subjecting simultaneously said particles to a centrifugal force, a perpendicular gravitational force, and a circumferential positive fluid pressure force substantially opposed to said gravitational force; and

(B) contacting said particles while they are maintained suspended in said ring with a liquid composition containing said pharmacologically active compound and an alkali soluble material and for a period of time sufficient to coat said particles.

5,026,710

(2-CYANO-2-OXIMINOACETYL)-AMINO ACID DERIVATIVES

Winfried Lunkenheimer, Wuppertal; Wilhelm Brandes, Leichlingen, and Gerd Hässler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

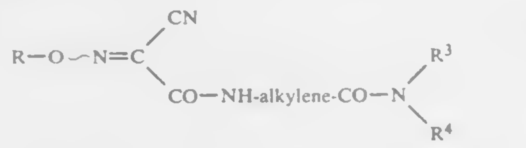
Division of Ser. No. 200,084, May 27, 1988, Pat. No. 4,963,548. This application Jul. 10, 1990, Ser. No. 551,692

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1987, 3719227

Int. Cl.^{5} A61K *31/38, 31/505;* **C07D** *239/42, 277/18*

U.S. Cl. 514—275 **8 Claims**

1. A (2-cyano-2-oximinoacetyl)-amino acid derivative of the formula



(I)

in which

R represents straight-chain or branched alkyl having 1 to 4 carbon atoms, straight-chain or branched cyano alkyl having 1 to 4 carbon atoms in the alkyl part, in each case straight-chain or branched alkenyl or alkinyl having 2 to 6 carbon atoms, cycloalkyl or cycloalkylalkyl each of which has 3 to 6 carbon atoms per cycloalkyl part and 1 to 4 carbon atoms in the straight-chain or branched part and each of which is optionally monosubstituted to pentasubstituted by identical or different alkyl having 1 to 4 carbon atoms, or represents benzyl or phenethyl, each of which is optionally monosubstituted to pentasubbstituted by identical or different substituents, phenyl substituents in each case being halogen, alkyl or alkoxy in each case having 1 to 4 carbon atoms, halogenoalkyl and halogenoalkoxy in each case having 1 or 2 carbon atoms and 2 to 5 identical or different halogen atoms;

alkylene represents a straight-chain or branched alkylene chain having 1 to 4 carbon atoms,

R^3 is H or alkyl having 1 to 4 carbon atoms, and

R^4 is pyrimidinyl or thiazolyl.

5,026,711

4-AMINO QUINOLINES AND NAPHTHYRIDINES AND THEIR USE AS MEDICINES

Etienne Mendes, Toulouse; Jean-Claude Vernieres, Muret; Peter E. Keane, Garonne, and André Bachy, Toulouse, all of France, assignors to Sanofi, Paris, France

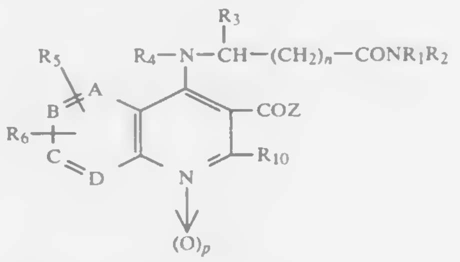
Filed Jun. 6, 1989, Ser. No. 362,105

Claims priority, application France, Jun. 6, 1988, 88 07498; Jun. 15, 1988, 88 08075

Int. Cl.^{5} A61K *31/435, 31/47;* **C07D** *215/54, 471/04*

U.S. Cl. 514—300 **20 Claims**

1. A compound of formula 1:



1

in which

R_1 and R_2, identical or different, is each selected from hydrogen, C_1–C_6 alkyl or C_2–C_6 alkenyl, phenyl or benzyl, or R_1 and R_2 form together with the nitrogen atom to which they are attached a C_4–C_8 saturated heterocycle,

R_3 is selected from hydrogen, C_1–C_6 alkyl, phenyl or C_7–C_9 phenylalkyl,

R_4 is selected from hydrogen or C_1–C_4 alkyl,

R_5 and R_6, identical or different, is each selected from hydrogen or halogen, C_1–C_3 alkyl or alkoxy, nitro or trifluoromethyl, or form together a methylenedioxy group,

Z is OR_7 in which R_7 is selected from hydrogen or C_1–C_6 alkyl; NR_8R_9 in which R_8 and R_9 is each selected from hydrogen, C_1–C_4 alkyl, phenyl or benzyl; benzyl; C_4–C_6 aryl with or without a heteroatom or imidazolyl

R_{10} is selected from hydrogen, C_1–C_4 alkyl or phenyl, with the proviso that when Z is not benzyl or aryl, R_3 is not H, the phenyl and benzyl groups may be substituted by halogen, C_1–C_3 alkoxy, alkyl or thioalkyl, nitro, trifluoromethyl or hydroxy, the alkyl and alkoxy groups being straight, branched or cyclic;

n is 0, 1 or 2, p is 0 or 1 and one of the symbols A, B, C, D is N and the others CH or A, B, C, D each represents CH,

in the form of a racemate or enantiomers, as well as their addition salts with pharmaceutically acceptable acids or bases.

5,026,712

NOVEL IMIDAZO(1,5-A)PYRIDINES, USEFUL AS CARDIOVASCULAR AND CNS AGENTS

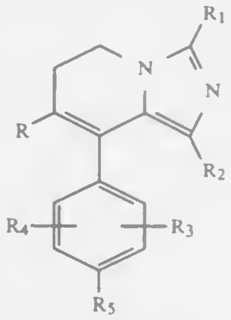
David D. Davey, Succasunna, N.J., assignor to Schering AG, Berlin, Fed. Rep. of Germany

Continuation of Ser. No. 741,428, Jun. 5, 1985, abandoned. This application Apr. 12, 1990, Ser. No. 507,824

Int. Cl.^{5} A61K *31/41;* **C07D** *471/04*

U.S. Cl. 514—300 **16 Claims**

1. A compound of the Formula 1



1

wherein R is hydrogen or lower alkyl;

R_1 is hydrogen, lower alkyl, halogen, amino, hydroxy or trifluoromethyl;

R_2 is hydrogen, halogen, lower alkyl, lower alkoxycarbonyl, aminocarbonyl, lower alkylaminocarbonyl or di-lower alkylaminocarbonyl;

R_3 and R_4 are the same or independently hydrogen, halogen, hydroxy, amino, nitro, aminocarbonyl, lower alkyl, lower alkoxy, lower alkanoylamino or lower alkylsulfonylamino;

R_5 is hydrogen, halogen, hydroxy, amino, lower alkyl, lower alkoxy, carboxy, lower alkanoylamino, lower alkysulfonylamino or 1-imidazolyl optionally substituted by 1 or more lower alkyl groups;

and the pharmaceutically acceptable acid addition, base addition and quaternary salts thereof.

16. A pharmaceutical composition comprising at least one compound according to claim 1, together with one or more non-toxic pharmaceutically acceptable carriers.

5,026,713

1,3-DIDEOXY-3-FLUORONOJIRIMYCIN WHICH INHIBITS GLYCOSIDASE ACTIVITY

Daniel P. Getman, St. Louis, and Gary A. DeCrescenzo, St. Peters, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

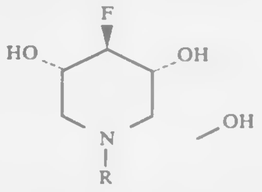
Filed Aug. 29, 1989, Ser. No. 400,252

The portion of the term of this patent subsequent to Jun. 18, 2008, has been disclaimed.

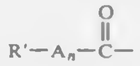
Int. Cl.^{5} C07D *211/42, 491/056*

U.S. Cl. 514—302 **27 Claims**

1. Compound represented by the formula:



wherein R represents hydrogen, alkyl radicals having from 1 to about 10 carbon atoms, alkenyl radicals having from 2 to about 10 carbon atoms, aryl, alkaryl and aralkyl radicals having from about 6 to about 16 carbon atoms and radicals represented by the formula:



$$R'-A_n-\overset{\overset{\displaystyle O}{\|}}{C}-$$

wherein R′ represents alkyl radicals, having from about 1 to about 10 carbon atoms, and aryl, aralkyl and alkaryl radicals having from about 6 to about 26 carbon atoms, A represents oxygen, and n is 0 or 1.

5,026,714

NOVEL 1-ALKYL-SUBSTITUTED 1,4-DIHYDROPYRIDINELACTONE ANTI-DIABETICS

Siegfried Goldmann; Friedrich Bossert; Hilmar Bischoff, all of Wuppertal; Dieter Petzinna, Wesel; Walter Puls, and Klaus Schlossmann, both of Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

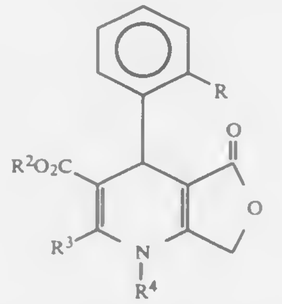
Continuation of Ser. No. 713,053, Mar. 18, 1985, abandoned. This application Nov. 13, 1989, Ser. No. 436,157

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1984, 3410645

Int. Cl.^{5} A61K *31/435;* **C07D** *491/048*

U.S. Cl. 514—302 **13 Claims**

1. A dihydropyridinelactone of the formula



in which

R represents chlorine, bromine, cyano or C_1–C_3-alkyl,

R^2 represents straight or branched C_1–C_6-alkyl which is optionally interrupted by oxygen,

R^3 represents C_1–C_3-alkyl, and

R_4 represents C_1–C_3-alkyl.

5,026,715

2-GUANIDINO-4-ARYLTHIAZOLES FOR TREATMENT OF PEPTIC ULCERS

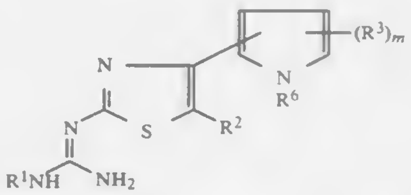
John L. LaMattina, Ledyard; Peter A. McCarthy, Pawcatuck, and Lawrence A. Relter, Mystic, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Continuation of Ser. No. 178,058, filed as PCT US86/01795 on Aug. 29, 1986, abandoned. This application Oct. 20, 1989, Ser. No. 426,455

Int. Cl.^{5} C07D *417/04;* **A61K** *31/425*

U.S. Cl. 514—326 **25 Claims**

1. A compound of the formula



or a pharmaceutically acceptable cationic or acid addition salt thereof

wherein

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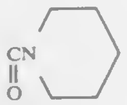
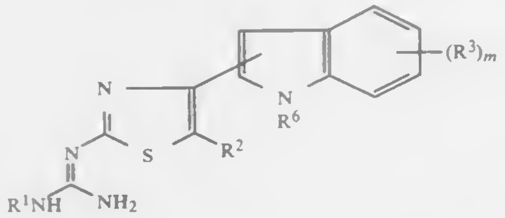
R^1 is H or $C_6H_5CH_2$;
R^2 is H or $(C_1–C_4)$alkyl;
m is 1; and
R^6 is $R^{10}SO_2$ where R^{10} is phenyl and R^3 is CH_3; or
R^6 is H and R^3 is



8. A compound of the formula



or a pharmaceutically acceptable cationic or acid addition salt thereof, wherein

R^1 is H, a straight chain or branched chain $(C_1–C_{10})$alkyl, $(R^4)_pC_6H_3$ or $(R^4)_pAr^1(CH_2)_n$ where p is zero, 1 or 2; n is an integer from 1 to 4, the R^4 groups are the same or different and are H, F, Cl, Br, I, CH_3, CH_3O, NO_2, OH, CN, $COOR^5$ or $OCOR^5$ and R^5 is $(C_1–C_3)$alkyl;
Ar^1 is the residue of a phenyl, naphthyl, furyl, thienyl, pyridyl, pyrimidinyl, thiazolyl or imidazolyl group, R^2 is H or $(C_1–C_4)$alkyl;
m is 1, 2 or 3;
R^6 is H, $(C_1–C_4)$alkyl or $R^{10}SO_2$ and R^{10} is $(C_1–C_4)$alkyl-, phenyl, tolyl, benzyl or phenylethyl; and
at least one R^3 is H or $(C_1–C_4)$alkyl and each of the remaining R^3 is H, $(C_1–C_4)$alkyl, $(C_1–C_4)$alkoxy, $(R^4)_2C_6H_3$, $(R^4)_2C_6H_3(CH_2)_n$, $(R^4)_2C_6H_3(CH_2)_nO$, $COOR^7$, COR^8, $NHCOR^8$, $NHCH_2R^8$, NR^8R^9, $(CH_2)_nNR^8R^9$, $(CH_2)_{n-1}CONR^8R^9$, OH, CN, CF_3, F, Cl or Br, wherein n and R^4 are as previously defined;
R^7 is H, $(C_1–C_4)$ alkyl or benzyl;
R^8 and R^9 taken separately are each H, $(C_1–C_{10})$alkyl, phenyl or benzyl, or when taken together with the nitrogen atom to which they are attached, form a 5-membered or 6-membered ring, optionally containing an atom of O or S or the group NR^{11} as a ring member and R^{11} is H, methyl or ethyl.

5,026,716
METHOD OF TREATMENT OF ANXIETY AND ANXIO-DEPRESSIVE DISORDERS

Alberto Bianchetti, Milan, Italy; Gérard Le Fur, Montmorency, France; Jacques Simiand, Muret, France, and Philippe Soubrie, Saint-Mathieu de Treviers, France, assignors to Sanofi, France

Filed Nov. 17, 1989, Ser. No. 437,674

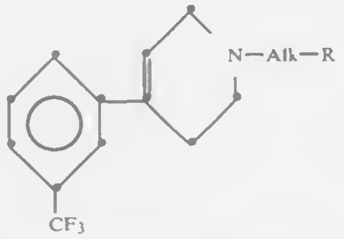
Claims priority, application France, Nov. 18, 1988, 88 15036

Int. Cl.^{5} A01H *43/40;* **C07D** *499/46*

U.S. Cl. 514—336 **7 Claims**

1. A method of treatment of anxiety and anxio-depressive disorders in mammals which comprises administering to a mammal in need thereof an effective amount of a trifluoromethylphenyl-tetrahydropyridine of general formula I

I



wherein Alk represents a straight or branched $(C_1–C_4)$alkylene chain and R is a radical selected from the group consisting of cyano, acetyl, $(C_3–C_7)$cycloalkyl, pyridyl, 1-oxide-pyridyl and naphthyl, or of a pharmaceutically acceptable salt thereof.

5,026,717
2-IMINO-6-POLYFLUOROALKOXYBENZOTHIAZOLE DERIVATIVES, AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Francois Audiau, Charenton le Pont; Claude Gueremy, Houilles; Patrick Jimonet, Villepreaux, and Serge Mignani, Livry, all of France, assignors to Rhone-Poulenc Sante, Antony, France

Filed Jun. 26, 1990, Ser. No. 543,418

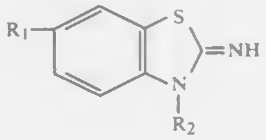
Claims priority, application France, Dec. 15, 1988, 88 16547; Jul. 13, 1989, 89 09482

Int. Cl.^{5} A61K *31/44;* **C07D** *417/12*

U.S. Cl. 514—338 **5 Claims**

1. A compound of formula:

(I)



and its pharmaceutically acceptable salts which are nontoxic, in which R_1 represents polyfluoroalkoxy, and R_2 represents pyridylthioalkyl, pyridylalkylthioalkyl, pyridylsulphinylalkyl, or pyridylalkylsulphinylalkyl, the said slkyl and alkoxy portions containing 1 to 4 carbon atoms each in a straight or branched chain.

5,026,718
TRIAZOLE ALKANOLS INCLUDING AN ALKENYL SUBSTITUENT HAVING FUNGICIDAL AND PLANT GROWTH REGULATING PROPERTIES

Paul A. Worthington, Maidenhead; Patrick J. Crowley, Crowthorne, and Michael B. Gravestock, Stockport, all of England, assignors to Imperial Chemical Industries plc, London, England

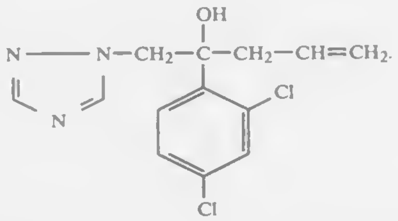
Continuation of Ser. No. 503,545, Jun. 13, 1983, abandoned. This application Dec. 28, 1988, Ser. No. 291,235

Claims priority, application United Kingdom, Jun. 14, 1982, 8217191; Jan. 21, 1983, 8301677

Int. Cl.^{5} A01N *43/653;* **C07D** *249/08*

U.S. Cl. 514—383 **2 Claims**

1. The compound:



5,026,719
MICROBICIDAL AGROCHEMICAL COMPOSITIONS

Edward Nowak, Histon, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 1, 1987, Ser. No. 56,827

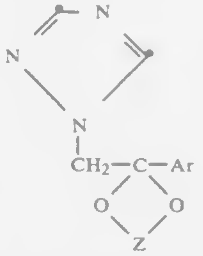
Claims priority, application United Kingdom, Jun. 7, 1986, 8613913

Int. Cl.^{5} A01N *43/64*

U.S. Cl. 514—383 **7 Claims**

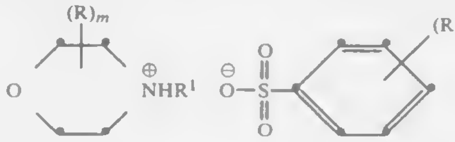
1. A microbicidal composition comprising a compound of formula I

I



or an acid addition salt thereof; in which Z is $—CH_2CH_2—$, $—CH_2CH_2CH_2—CH(CH_3)—CH(CH_3)—$ or $—CH_2—CH(C_1–C_{10}$ alkyl); and Ar is a phenyl, thienyl, halothienyl or naphthyl group, or phenyl substituted with 1 to 3 halogen, $C_1–C_4$alkyl, $C_1–C_4$alkoxy, cyano or nitro substituents together with a synergistically active amount of a compound of formula II

II



in which R is selected from the group consisting of $C_1–C_4$alkyl, R_1 is hydrogen or $C_1–C_4$alkyl, m is 0, 1, 2, 3 or 4 and n is 0, 1, 2, 3 or 4.

5,026,720
1-HYDROXYAZOLE COMPOUNDS AND FUNGICIDES CONTAINING THESE

Ulf Baus, Dossenheim; Wolfgang Reuther, Heidelberg; Gisela Lorenz, Neustadt, and Eberhard Ammermann, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 30, 1990, Ser. No. 502,237

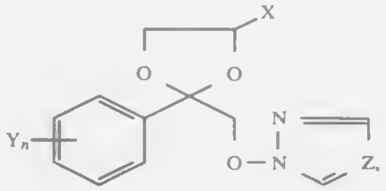
Claims priority, application Fed. Rep. of Germany, May 3, 1989, 3914632

Int. Cl.^{5} A01N *43/653;* **C07D** *249/08*

U.S. Cl. 514—383 **5 Claims**

1. A compound of the formula I

(I)

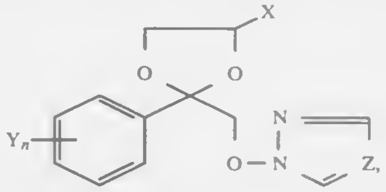


where X is alkyl of 1 to 9 carbon atoms, alkoxy of 1 to 4 carbon atoms, phenoxy, phenyl or phenyl substituted 1 to 5 times by identical or different substituents selected from the group consisting of halogen, phenyl, phenoxy and alkoxy of 1 to 4 carbon atoms,

Y is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, halogen, phenyl or phenoxy,
n is an integer from 0 to 5, and
Z is N,
and their acid addition salts and metal complexes which are tolerated by plants.

4. A fungicidal composition containing a carrier and fungicidally effective amount of a compound of the formula

(I)



where X is alkyl of 1 to 9 carbon atoms, alkoxy of 1 to 4 carbon atoms, phenoxy, phenyl or phenyl substituted 1 to 5 times by identical or different substituents selected from the group consisting of halogen, phenyl, phenoxy and alkoxy of 1 to 4 carbon atoms,

Y is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, halogen, phenyl or phenoxy,
n is an integer from 0 to 5, and
Z is N,
or an acid addition salt or metal complex thereof which is tolerated by plants.

5,026,721
AMINO ACID NUTRITIONAL SUPPLEMENT AND REGIMEN FOR ENHANCING PHYSICAL PERFORMANCE THROUGH SOUND NUTRITION

Stanley J. Dudrick, 702 Pine St., Philadelphia, Pa. 19106; Edward J. Guinn, 23 S. Brokenfern, The Woodlands, Tex. 77380; Stanley J. Gerlich, 11434 Loyola, Cypress, Tex. 77429, and Andrew S. Feste, 4219 S. Judson, Houston, Tex. 77005

Filed Jun. 5, 1989, Ser. No. 361,295

Int. Cl.^{5} A61K *31/40, 31/195, 31/415*

U.S. Cl. 514—396 **34 Claims**

1. An amino acid nutritional supplement for use in enhancing physical performance through sound nutrition, comprising a mixture of biologically active amino acids comprising:

from about 10.0 wt% to about 30.0 wt% glutamic acid;
from about 3.5 wt% to about 10.0 wt% arginine;
from about 10.5 wt% to about 25.0 wt% leucine;
from about 12 0 wt% to about 40.0 wt% valine; and
from about 4.5 wt% to about 12.0 wt% lysine,
wherein said wt% is based upon the total weight of said biologically active amino acids in said mixture.

5,026,722
INDOLE DERIVATIVES

Alexander W. Oxford; Peter C. North, both of Royston, and David J. Cavalla, Cambridge, all of England, assignors to Glaxo Group Limited, England

Filed Jun. 15, 1989, Ser. No. 366,462

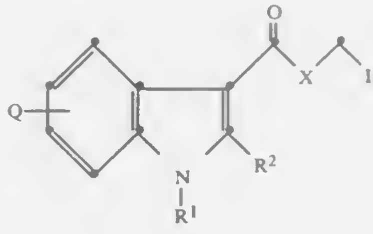
Claims priority, application United Kingdom, Jun. 16, 1988, 8814277

Int. Cl.^{5} C07D *403/12, 403/14;* **A61K** *31/55, 31/415*

U.S. Cl. 514—397 **10 Claims**

1. A compound of the formula (I)

(I)



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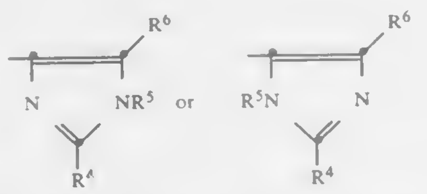
wherein
Im represents an imidazolyl group of the formula:



and R^1 represents a hydrogen atom or a group selected from C_{1-6}alkyl, C_{3-6}alkenyl, C_{3-10}alkynyl, C_{3-7}cycloalkyl, C_{3-7}cycloalkylC_{1-4}alkyl, phenyl or phenylC_{1-3}alkyl;
R-hu 2 represents a hydrogen atom or a group selected from C_{1-6}alkyl, C_{3-6}alkenyl, C_{3-7}cycloalkyl, phenyl or phenylC_{1-3}alkyl;
X represents an oxygen atom or the group NR^3 (where R^3 represents a hydrogen atom or a C_{1-6}alkyl group);
one of the groups represented by R^4, R^5 and R^6 is a hydrogen atom or a C_{1-6}alkyl, C_{3-7}cycloalkyl, C_{3-6}alkenyl, phenyl or phenylC_{1-3}alkyl group, and each of the other two groups, which may be the same or different, represents a hydrogen atom or a C_{1-6} alkyl group;
Q represents a hydrogen or a halogen atom, or a hydroxy, C_{1-4}alkoxy, phenylC_{1-3}alkoxy or C_{1-6}alkyl group or a group $—NR^7R^8$ or $—CONR^7R^8$ (wherein R^7 and R^8, which may be the same or different, each represents a hydrogen atom or a C_{1-4}alkyl or C_{3-4}alkenyl group, or together with the nitrogen atom to which they are attached form a saturated 5 to 7 membered ring);
or a physiologically acceptable salt or solvate thereof.

5,026,723
MICROBICIDAL/MICROBIOSTATIC COMPOSITION FOR INDUSTRIAL USE

Sakae Katayama, Osaka; Yosuke Ito, Ohtsu, and Hidenori Hirashima, Osaka, all of Japan, assignors to Katayama Chemical, Inc., Japan

Filed Apr. 14, 1989, Ser. No. 339,124
Claims priority, application Japan, Apr. 18, 1988, 63-96523
Int. Cl.⁵ A01N *37/00, 37/02, 43/26*
U.S. Cl. 514—441 **13 Claims**

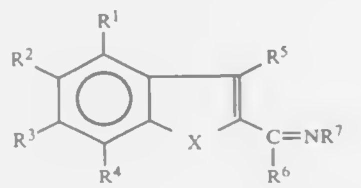
1. A microbicidal/microbistatic composition for industrial use comprising
(I) a nitrobromopropane derivative selected from the group consisting of:
(a) 2-bromo-2-nitro-1,3-diacetyloxypropane, and
(b) 2-bromo-2-nitro-1,3-diformyloxypropane; and
(II) 4,5-dichloro-1,2-dithiol-3-one wherein (I) and (II) are present in a synergistic ratio of from 100:1 to 1:5 by weight.

5,026,724
COMPOUNDS WITH BRONCHODILATOR ACTIVITY

Robert T. Logan, Lanark; James Redpath, Bishopbriggs; George McGarry, Airdrie, and Robert G. Roy, Larkhall, all of Scotland, assignors to Akzo N.V., Arnhem, Netherlands

Filed Jul. 5, 1989, Ser. No. 375,654
Claims priority, application European Pat. Off., Jul. 5, 1988, 88.306121.0
Int. Cl.⁵ C07C *69/94;* **C07D** *209/08*
U.S. Cl. 514—443 **16 Claims**

1. Method of treating asthma in a patient, comprising adminstering a bronchodilating effective amount of a compound of the formula I



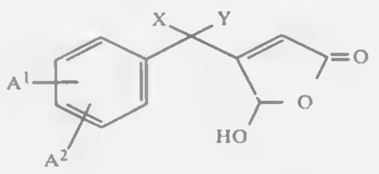
wherein each of R^1, R^2, R^3 and R^4 is independently H, (1-4C) alkyl, (1-4C) halogen substituted alkyl, OH, (1-4C) alkoxy, (1-4C) halogen substituted alkoxy or halogen,
X is S;
R^5 is H, or (1-4C) alkyl;
R^6 is H, NH, or (1-4C) alkyl; and
R^7 is H, or (1-4C) alkyl or OR^8 in which R^8 is H, (1-4C) alkyl or (1-8C) acyl; or its pharaceutically acceptable salts.

5,026,725
INHIBITION OF BONE LOSS BY 4-SUBSTITUTED-5-HYDROXY-2(5H)-FURANONES

Marshall A. Hayward, Lawrenceville; Joseph P. Sabatucci, Plainsboro; Ivo L. Jirkovsky, Plainsboro, and Yvon Lefebvre, Plainsboro, all of N.J., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 205,147, Jun. 6, 1988, Pat. No. 4,916,241. This application Feb. 23, 1990, Ser. No. 463,091
Int. Cl.⁵ A61K *31/36, 31/365*
U.S. Cl. 514—465 **2 Claims**

1. A method for the treatment of a host animal in order to modify the balance between the rate of bone resorption and the rate of bone formation in said host animal whereby the ratio of said rate of bone resorption to said rate of bone formation is reduced, comprising administering to said host animal an amount of a compound of formula



(I)

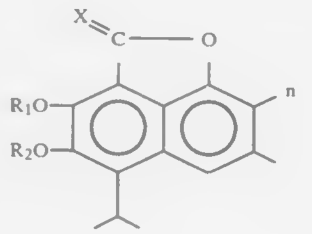
wherein X is hydroxy; Y is lower alkyl containing 1 to 6 carbon atoms; A^1 and A^2 are independently selected from the group consisting of phenyl, OR, OAr, or halogen wherein R is lower alkyl containing 1 to 6 carbon atoms or A^1A^2 represents $—OCH_2O—$ sufficient to modify said balance and reduce said ratio.

5,026,726
GOSSYLIC IMINOLACTONES AND GOSSYLIC LACTONES AND THEIR ANTI-VIRAL ACTIVITIES

David L. Jagt, Albuquerque, and Robert E. Royer, Bosque Farms, both of N. Mex., assignors to The University of New Mexico, Albuqueque, N. Mex.

Filed Dec. 11, 1989, Ser. No. 448,432
Int. Cl.⁵ A61K *31/34;* **C07D** *307/92*
U.S. Cl. 514—468 **12 Claims**

1. A compound of the chemical formula



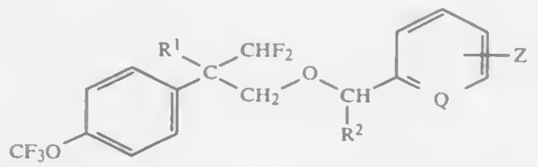
wherein
n is 1 or 2:
X is NH; and
R_1 and R_2 are independently of one another H, $(C_1–C_{12})$alkyl $(C_2–C_{12})$alkenyl, $(C_2–C_{12})$alkynyl, $(C_2–C_{12})$acyl, $(C_6–C_{12})$aryl or $(C_7–C2_1)$alkylaryl, or a pharmaceutically-acceptable salt thereof.

5,026,727
INSECTICIDAL COMPOUNDS

Michael J. Bushnell, Wokingham, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Sep. 28, 1989, Ser. No. 413,560
Claims priority, application United Kingdom, Sep. 28, 1988, 8822793
Int. Cl.⁵ C07C *43/225, 255/03;* **A01N** *37/34, 31/14*
U.S. Cl. 514—520 **5 Claims**

1. A compound of formula:



or a stereoisomer thereof, wherein R^1 represents alkyl containing up to four carbon atoms; R^2 is selected from hydrogen, cyano, methyl, trifluoromethyl and ethynyl; Q is carbon bearing a hydrogen atom; and Z represents one or more substituents selected from fluoro, benzyl, phenoxy, chlorophenoxy, fluorophenoxy and bromophenoxy.

4. An insecticidal composition comprising an insecticidally effective amount of a compound according to claim **1** in association with an insecticidally inert diluent or carrier.

5. A method of combating insect pests at a locus which comprises treating the locus with an insecticidally effective amount of the composition of claim **4**.

5,026,728
TREATMENT OF ARTHRITIS AND INFLAMMATION USING N,N-DIMETHYLGLYCINE

Roger V. Kendall, Williston, Vt., and John W. Lawson, Clemson, S.C., assignors to Foodscience Corporation, Essex Junction, Vt.

Filed Oct. 5, 1989, Ser. No. 416,788
Int. Cl.⁵ A61K *31/195*
U.S. Cl. 514—561 **8 Claims**

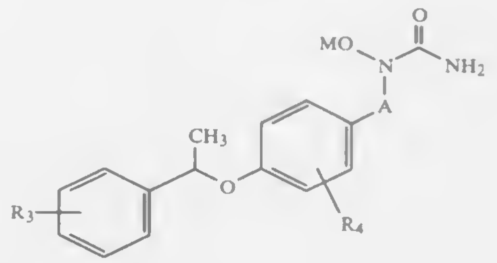
1. A method of ameliorating the inflammation associated with arthritis, comprising administering to a patient afflicted with arthritis an amount of N,N-dimethylglycine or a pharmaceutically acceptable salt thereof effective to ameliorate the inflammation.

5,026,729
LIPOXYGENASE INHIBITING COMPOUNDS

Dee W. Brooks; James B. Summers, both of Libertyville, and James H. Holms, Gurnee, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Continuation-in-part of Ser. No. 12,978, Feb. 10, 1987, Pat. No. 4,897,422. This application Nov. 2, 1989, Ser. No. 430,841
Int. Cl.⁵ A61K *31/17, 31/185;* **C07C** *259/00*
U.S. Cl. 514—575 **6 Claims**

1. A compound having the formula



wherein
A is straight or branched divalent alkylene of from one to four carbon atoms;
$R_3$is one or more substituents selected from
  hydrogen,
  alkyl of from one to six carbon atoms,
  alkoxy of from one to six carbon atoms,
  thioalkoxy of from one to six carbon atoms,
  halogen,
  cyano, and
  trihalomethyl;
R_4 is one or more substituents selected from
  hydrogen,
  alkyl of from one to six carbon atoms,
  alkoxy of from one to six carbon atoms,
  thioalkoxy of from one to six carbon atoms,
  hydroxy,
  halogen,
  cyano, and
  trihalomethyl; and
M is
hydrogen,
a pharmaceutically acceptable cation, or
a metabolically cleavable group selected from the group consisting of
  formyl,
  acetyl,
  benzoyl,
  methoxycarbonyl,
  ethoxycarbonyl,
  tert-butylcarbonyl
  glutaryl,
  succinyl, and
  carbamoyl;
with the proviso that when A is $>CHCH_3$, R_3 and R_4 may not both be hydrogen.

4. A pharmaceutical composition for use in inhibiting 5-and 12-lipoxygenase comprising a lipoxygenase inhibiting effective amount of a compound as defined by claim **1** in combination with a pharmaceutically acceptable carrier.

5. A method of inhibiting 5- or 12- lipoxygenase activity in a host mammal in need of such treatment comprising administering a pharmaceutical composition as defined by claim **4**.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,730

ANILINOPHENYLTHIOUREAS, COMPOSITIONS CONTAINING THEM, AND THE USE THEREOF IN PEST CONTROL

Manfred Böger, Weil am Rhein, Fed. Rep. of Germany; Jozef Drabek, Oberwil, and Josef Ehrenfreund, Allschwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

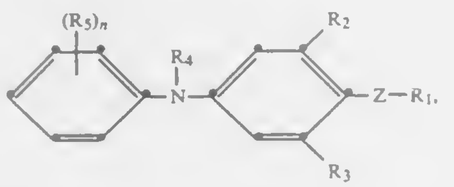
Filed Aug. 11, 1988, Ser. No. 230,814

Claims priority, application Switzerland, Aug. 21, 1987, 3213/87; Jun. 21, 1988, 2382/88

Int. Cl.^{5} A01N *47/28;* **A61K** *31/17*

U.S. Cl. 514—586 **8 Claims**

1. A compound of formula I



(I)

wherein

R_1 is C_1–C_{12}alkyl, unsubstituted or substituted by one or more halogen atoms and/or C_1–C_6alkoxy groups; C_3–C_8-cycloalkyl, unsubstituted or substituted by one or more C_1–C_3alkyl groups; or C_3–C_8cycloalkyl C_1–C_4alkyl,

R_2 and R_3 are each C_1–C_5alkyl or C_5–C_6cycloalkyl,

R_4 is hydrogen, methyl or —CHO,

R_5 is halogen; C_1–C_4alkyl, unsubstituted or substituted by one or more halogen atoms; C_1–C_4alkoxy, unsubstituted or substituted by one or more halogen atoms; or is a $—CH{=}CH—_2$, $—CH_2—_3$ or $—CH_2—_4$ bridge in 2,3- or 3,4-position,

n is 0, 1, 2, 3 or 4 , and

Z is —NH—CS—NH—,

or a salt thereof with an organic or inorganic acid.

5,026,731

PHARMACEUTICAL COMPOSITION AND METHOD OF TREATING PSYCHOSES

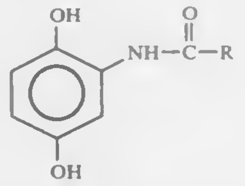
Vinod R. Hegde, Rockaway, and Mahesh G. Patel, Verona, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Jun. 13, 1990, Ser. No. 537,178

Int. Cl.^{5} A61K *3/16*

U.S. Cl. 514—629 **5 Claims**

1. A method of treating psychoses in a mammal which comprises administering to a mammal in need of such treating an antipsychotic effective amount of a compound represented by



wherein R is a C_1 to C_9 straight or branched chain alkyl group or a pharmaceutical composition thereof.

5,026,732

USE OF AVARONE FOR THE CONTROL OF AIDS AND ARC

Werner E. G. Müller, Wiesbaden-Biebrich, Fed. Rep. of Germany, assignor to Merz + Co. GmbH & Co., Frankfurt (Main), Fed. Rep. of Germany

Division of Ser. No. 58,200, Jun. 4, 1987, Pat. No. 4,939,177, which is a continuation-in-part of Ser. No. 820,440, Jan. 17, 1986. This application Dec. 29, 1989, Ser. No. 458,892

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1986, 3619202

Int. Cl.^{5} A61K *31/12*

U.S. Cl. 514—691 **2 Claims**

1. A method of treating AIDS/ARC comprising the step of administering an effective anti-AIDS/ARC amount of avarone to a living animal body in need of said treatment.

5,026,733

BRAIN FUNCTION-IMPROVING MEDICINE

Kouichi Itoh; Atsushi Ishige, and Eikichi Hosoya, all of Ibaraki, Japan, assignors to Tsumura & Co., Tokyo, Japan

PCT No. PCT/JP89/00290, § 371 Date Nov. 17, 1989, § 102(e) Date Nov. 17, 1989, PCT Pub. No. WO89/08451, PCT Pub. Date Sep. 21, 1989

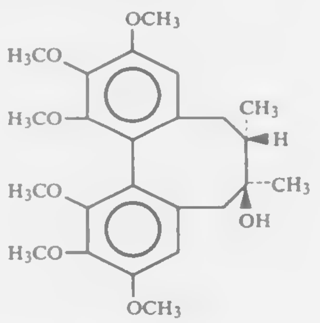
PCT Filed Mar. 17, 1989, Ser. No. 439,393

Claims priority, application Japan, Mar. 17, 1988, 63-61871; Sep. 16, 1988, 63-230142

Int. Cl.^{5} A01N *31/14*

U.S. Cl. 514—718 **5 Claims**

1. A brain function-improving medicine comprising, as an active ingredient, in an effective amount, a compound represented by the following formula:



in a pharmaceutically acceptable carrier.

5,026,734

METHOD OF CONTROLLING FUNGUS, MITES, WORMS, TERMITES, NEMATODES AND OTHER INSECTS

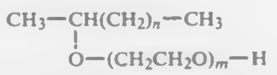
Henry A. Browning, Rte. 1, Box 90, Quitman, Ga. 31643

Continuation-in-part of Ser. No. 297,185, Jan. 12, 1989, abandoned. This application Dec. 29, 1989, Ser. No. 459,273

Int. Cl.^{5} A01N *31/14*

U.S. Cl. 514—723 **13 Claims**

1. A method for controlling fungus, mites, termites, and other insect pest which comprises applying to the location thereof a pesticidal effective amounts of a composition comprising a liquid carrier and at least one nonionic surfactant represented by the formula:



$$\begin{array}{l} CH_3—CH(CH_2)_n—CH_3 \\ \quad\quad\;\; | \\ \quad\quad\;\; O—(CH_2CH_2O)_m—H \end{array}$$

where n is from 9–15 and m is from 3–40.

5,026,735

TREATMENT OF HAZARDOUS MATERIALS WITH AQUEOUS AIR FOAM OF POLYHYDROXY POLYMER

Richard M. Stern, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 204,110, Jun. 8, 1988, abandoned. This application Jun. 12, 1990, Ser. No. 537,049

Int. Cl.^{5} C08J *9/06*

U.S. Cl. 521—50 **21 Claims**

1. A method of treating a substrate with an aqueous air foam, comprising the steps of

(1) preparing an aqueous solution or dispersion comprising (a) water-soluble polyhydroxy polymer having a plurality of hydrogen-bondable diol structures in the polymer chain in the form of 1,2-diol and/or 1,3-diol structures which are capable of complexation with borate anion, (b) water-soluble polyprotic inorganic acid salt which crosslinks said polymer by hydrogen-bonding complexation said salt comprising alkali metal borate, (c) foaming agent to impart persistence to the fluid air foam generated upon aeration of said solution or dispersion, (d) pH modifier to impart an appropriate pH to said solution or dispersion necessary for time-controlled formation of gelled or viscous foam from said fluid air foam, and (e) water as the major component by weight;

(2) aerating said aqueous solution or dispersion to form an aqueous fluid air foam therefrom; and

(3) applying said fluid air foam to exposed surface of said substrate, the resulting applied foam forming a gelled, aqueous air foam or viscous, aqueous air foam in the form of a highly vapor-impermeable coating on said surface.

5,026,736

MOLDABLE SHRUNKEN THERMOPLASTIC POLYMER FOAM BEADS

Thomas M. Pontiff, Gansevoort, N.Y., assignor to Astro-Valcour, Inc., Glens Falls, N.Y.

Continuation-in-part of Ser. No. 73,642, Jul. 15, 1987, Pat. No. 4,870,111, which is a division of Ser. No. 17,674, Feb. 24, 1987, Pat. No. 4,702,868. This application Jan. 10, 1989, Ser. No. 295,618

Int. Cl.^{5} C08J *9/224, 9/232*

U.S. Cl. 527—60 **22 Claims**

1. A thermoplastic polymer foam bead, comprising: a moldable and shrunken thermoplastic polymer foam bead having a density, cell size and degree of shrinkage effective to provide a predetermined molding expansion ratio, wherein the density is in the range of from about 0.8 to about 20 pcf (12.8 to 320 $Kg.m^{-3}$), and wherein the molding expansion ratio is in the range of from about 1.1 to about 4.

5,026,737

PROCESS FOR THE PRODUCTION OF URETHANE-MODIFIED POLYISOCYANURATE FOAM

Yoshiyuki Ohnuma, and Norio Tanaka, both of Ashikaga, Japan, assignors to Achilles Corporation, Tokyo, Japan

Filed Nov. 22, 1989, Ser. No. 440,210

Claims priority, application Japan, Nov. 24, 1988, 63-296947

Int. Cl.^{5} C08G *18/14*

U.S. Cl. 521—78 **13 Claims**

1. A process for producing a urethane-modified polyisocyanurate foam by mixing a polyisocyanate component, a polyol component containing an aromatic polyester polyol, a catalyst, a foaming agent, a surfactant and other additives under high pressure in a mixing head and then spraying the resultant mixture to expand the foaming ingredient therein, which comprises using, as the catalyst, at least three compounds of N,N′,N″-tris(dimethylaminopropyl)-S-hexahydrotriazine, an alkali metal carboxylate and a lead compound in combination.

5,026,738

PROCESS FOR THE PRODUCTION OF RIGID FOAM COMPRISING ACRYLIC AND/OR METHACRYLIC POLYMERS WITHOUT USING FLUOROCARBONS AS A FOAMING AGENT

Stefan Meinhard, Reutlingen, Fed. Rep. of Germany, assignor to Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V., Munich, Fed. Rep. of Germany

PCT No. PCT/EP88/01005, § 371 Date May 3, 1990, § 102(e) Date May 3, 1990, PCT Pub. No. WO89/04342, PCT Pub. Date May 18, 1989

PCT Filed Nov. 4, 1988, Ser. No. 466,320

Claims priority, applicatioo Fed. Rep. of Germany, Nov. 13, 1987, 3738624

Int. Cl.^{5} C08J *9/10*

U.S. Cl. 521—95 **7 Claims**

1. A process for the production of rigid foam having a bulk density ranging from 50 to 100 g/l and being composed of monomeric and polymeric acrylic and/or methacrylic compounds by polymerizing and foaming the acrylic acid and/or methacrylic acid compounds in the presence of catalysts and/or initiators liberating N_2 at elevated temperature and upon completed polymerization removing the foam from the mold, which comprises mixing 65.5 to 92.7% by weight of an oligomer mixture containing 10 to 30% by weight of monomer and 90 to 70% by weight of dimers to hexamers and having a viscosity ranging from 300 to 1200 mPa.s and being selected from the group consisting of acrylic acid, methacrylic acid, acrylic acid or methacrylic acid C_1–C_6 alkyl ester or the mixtures thereof, 5 to 20% by weight of flame retardant, 0.2 to 1.5% by weight of catalysts liberating N_2 and being selected from the group consisting of 2,2′-azobis-(2-methylpropanenitrile), 2,2′-azobis-(2,4-dimethylpentanenitrile), 2,2′-azobis-(2-methylbutanenitrile), 1,1′-azobis-(cyclohexane carbonitrile) and the mixtures thereof, 1 to 2% by weight of cell regulating agent, 0.5 to 3% by weight of foam stabilizer and foam regulator, respectively, 0.5 to 6% by weight of cross-linking agent, 0.1 to 2% by weight of wetting agent, all weight percentages being based on the entire reaction mixture, preheating the mixture to a temperature ranging from room temperature to 40° C., continuously or discontinuously pouring the mixture into molds, keeping the temperature at a value of from 50° C. to 70° C., optionally cooling it, the temperature control being such that 80° C. are not exceeded, and upon completed polymerization removing the product from the mold.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,739

METHODS OF PRODUCING RIGID POLYURETHANE FOAMS FOR INTERIOR OR EXTERIOR USE FOR AUTOMOBILES

Yuzo Matsushima; Yoshiyuki Ito, both of Utsunomiya, and Satofumi Yamamori, Kawabe, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo and Takeda Chemical Industries, Ltd., Osaka, both of, Japan

Filed Jul. 12, 1989, Ser. No. 378,618

Claims priority, application Japan, Jul. 15, 1988, 63-176795

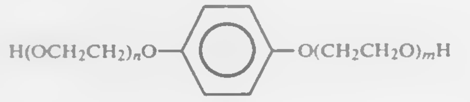
Int. Cl.^{5} C08G *18/14*

U.S. Cl. 521—177 **7 Claims**

1. A method of producing interior and exterior structural members of automobiles composed of rigid polyurethane foam, which comprises foaming a composition comprising:

(a) polyisocyanates selected from the group consisting of diphenylmethane diisocyanate, polyphenylenepolymethylene polyisocyanate and their modified products; and

(b) polyols which have a hydroxyl value of 400–550 and contain an ethylene oxide adduct to hydroquinone having a hydroxyl value of 60–430 in amounts of 20–40% by weight based on the polyols, the adduct being represented by the general formula of



wherein m and n are integers of not less than 1, respectively.

5,026,740

SULPHURATED DERIVATIVES OF AROMATIC-ALIPHATIC AND ALIPHATIC KETONES AS POLYMERIZATION PHOTOINITIATORS

Giuseppe Li Bassi, Gavirate; Luciano Cadonà, and Carlo Nicora, both of Varese, all of Italy, assignors to Fratelli Lamberti SPA, Albizzate, Italy

Continuation of Ser. No. 880,930, Jul. 1, 1986, abandoned. This application Jul. 15, 1988, Ser. No. 219,801

Int. Cl.^{5} C08F *2/50;* **C08G** *59/17;* **C08K** *5/07;* **C08L** *63/10*

U.S. Cl. 522—14 **12 Claims**

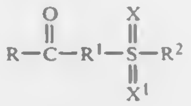
1. A photopolymerizable mixture comprising:

(a) a photopolymerizable composition including at least one of esters formed from acrylic or methacrylic acid and aliphatic alcohols, glycols, polyhydroxylated compounds or amino alcohols; acrylonitrile; acrylamide or substituted acrylamides; esters formed from vinyl alcohol and aliphatic acids or acrylic acid; vinyl ethers; N-vinylpyrrolidone; mono-or poly-functional allyl ethers; styrene; alphamethylstyrene; polyesters; polyacrylates; polyurethanes; epoxides; acrylic, fumaric or maleic modified polyethers; or unsaturated polyesters in combination with styrene; or

(b) a polycondensable composition including at least one aminoplast and ethers thereof prepared from at least one methyolated member selected from the group consisting of melamine, urea, glycourea and benzoguanamine in combination with at least one resin selected from the group consisting of acrylic, polyester, alkyd, phenolic and polyvinyl resins having hydroxyl, carboxyl, amido, amino, or thiol groups to provide mobile hydrogens; or

(c) a photopolymerizable composition as defined in (a) and a polycondensable composition as defined in (b); and

(d) at least one photoinitiator of the formula:



$$R-\overset{\overset{O}{\|}}{C}-R^1-\underset{\underset{X^1}{\|}}{\overset{\overset{X}{\|}}{S}}-R^2 \qquad (I)$$

in which

R signifies C_6–C_{14} aryl, C_6–C_{14} thioaryl, or polyaryl;

R^1 signifies C_1–C_6 alkylene, C_2–C_{18} alkylidene, C_3-C_7 cycloalkylidene, or C_2–C_{10} alkenylene;

R^2 signifies linear or branched C_1–C_{18} alkyl, C_3-C_7 cycloalkyl, C_6–C_{14} aryl, polyaryl; and

X and X^1, are each oxygen independently represent an electronic doublet or O.

5,026,741

PHOTOCURABLE ORGANOPOLYSILOXANE COMPOSITION

Masatoshi Arai; Kazutoshi Fujioka, both of Annaka, and Masaharu Satou, Takasaki, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Japan

Filed May 30, 1989, Ser. No. 357,850

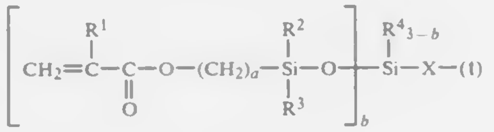
Claims priority, application Japan, May 30, 1988, 63-132354

Int. Cl.^{5} C08G *77/20, 77/24*

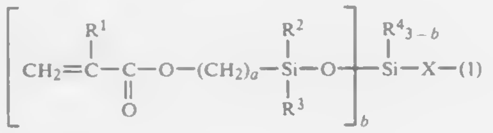
U.S. Cl. 522—33 **15 Claims**

1. A photocurable organopolysiloxane composition comprises:

100 parts by weight of an organopolysiloxane having at least one group of the following general formula (1) in one molecule



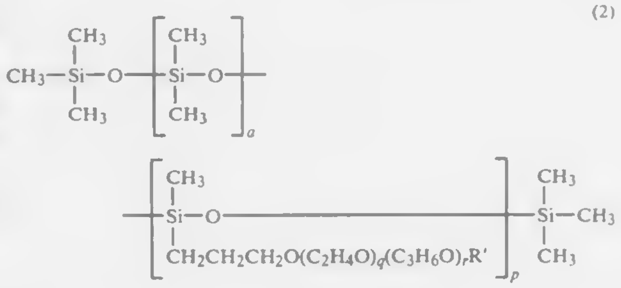
$$\left[CH_2=\overset{\overset{R^1}{|}}{C}-\underset{\underset{O}{\|}}{C}-O-(CH_2)_a-\underset{\underset{R^3}{|}}{\overset{\overset{R^2}{|}}{Si}}-O\right]_b\overset{\overset{R^4{}_{3-b}}{|}}{Si}-X-(1)$$



$$\left[CH_2=\overset{\overset{R^1}{|}}{C}-\underset{\underset{O}{\|}}{C}-O-(CH_2)_a-\underset{\underset{R^3}{|}}{\overset{\overset{R^2}{|}}{Si}}-O\right]_b\overset{\overset{R^4{}_{3-b}}{|}}{Si}-X-(1)$$

wherein R^1 represents a hydrogen atom or a methyl group, R^2, R^3 and R^4 independently represent an unsubstituted or substituted monovalent hydrocarbon group, X represents an ethylene group, and a and b are independently an integer of 1 to 3;

from 0.1 to 20 parts by weight of a polyether-modified organopolysiloxane of the following general formula (2)



$$CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{Si}}-O-\left[\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{Si}}-O\right]_a-\left[\underset{\underset{CH_2CH_2CH_2O(C_2H_4O)_q(C_3H_6O)_rR'}{|}}{\overset{\overset{CH_3}{|}}{Si}}-O\right]_p-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{Si}}-CH_3 \qquad (2)$$

wherein R^1 represents a hydrogen atom or an unsubstituted or substituted monovalent hydrocarbon group, and o, p, q and r are independently an integer defined such that $0 \leqq o \leqq 50$, $1 \leqq p \leqq 50$, $1 \leqq q \leqq 100$ and $0 \leqq r \leqq 100$; and

from 0.01 to 10 parts by weight of a photo-initiator.

5,026,742

RADIATION-CROSSLINKABLE CONTACT ADHESIVE MIXTURES

Gerd Rehmer, Bobenheim-Roxheim, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 15, 1989, Ser. No. 393,963

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1988, 3828400

Int. Cl.^{5} C08F *8/30;* **C08L** *77/00*

U.S. Cl. 522—116 **9 Claims**

1. A process for the preparation of a radiation-crosslinkable contact adhesive mixture from

(a) from 5 to 120 parts by weight of polymers having a glass transition temperature of less than 0° C. and a K value of from 20 to 80 and

(b) 100 parts by weight of derivatives of dihydroxypropyl (meth)acrylates, wherein 30–80% strength by weight solutions of the polymers (a) are mixed with the derivatives (b) and (c) from 0.01 to 0.1% by weight, based on the polymers (a), of a polymerizable tertiary amino compound, the mixture is heated at 80°–120° C. for not more than 2 hours and the solvent is then separated off under atmospheric or reduced pressure.

5,026,743

AQUEOUS DISPERSION OF AN AMINO-EPOXIDE REACTION PRODUCT

Michael P. Beresford, Victoria, Australia, and Richard P. Redman, Reading, England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 71,543, Jul. 7, 1987, abandoned, which is a continuation of Ser. No. 852,110, Apr. 15, 1986, abandoned. This application Oct. 18, 1989, Ser. No. 423,712

Claims priority, application United Kingdom, Apr. 18, 1985, 8509955; Mar. 17, 1986, 8606495

Int. Cl.^{5} C08G *59/14, 59/16*

U.S. Cl. 523—404 **18 Claims**

1. An aqueous dispersion of an ionizable salt of a non-gelled amine-epoxide reaction product which is obtained by co-reacting:

(A) a secondary amine NHR_1R_2, wherein R_1 and R_2 are the same or different and are C_{1-18} alkyl, cycloalkyl, substituted alkyl or substituted cycloalkyl, or R_1 and R_2 represents together with the N atom a cyclic structure, said cyclic structure being substituted or unsubstituted;

(B) a polyepoxide;

(C) a polyoxyalkylene polyamine;

(D) a monoepoxide; and

(E) a monoprimary amine.

5,026,744

SYNTHETIC CLAY

Keith A. Callander, Sarnia, Canada, assignor to Polysar Limited, Sarnia, Canada

Filed Jan. 17, 1989, Ser. No. 297,336

Int. Cl.^{5} C08K *5/10, 3/26, 3/34;* **C08L** *91/08*

U.S. Cl. 524—27 **7 Claims**

1. A nontacky, shock absorbing rubber composition suitable as a replacement for natural clay in horseshoe pits comprising:

(i) about 70 to about 99 parts by weight of a butyl rubber with a Mooney viscosity (ML +8 at 125° C.) of from about 40 to about 60,

(ii) about 1 to about 30 parts by weight of a crosslinked butyl rubber having a solubility from about 15 weight percent to about 30 weight percent in cyclohexane, for a total of 100 parts by weight of (i) and (ii),

(iii) about 20 to about 40 parts by weight per 100 parts by weight of the total of (i) and (ii) of cellulose fibre having an oil absorption of between 600 and 900 percent,

(iv) about 500 to about 1200 parts by weight per 100 parts by weight of the total of (i) and (ii) of particulate filler selected from the group consisting of hydrated silica, talc, calcium carbonate, and mixtures thereof,

(v) and about 280 to about 800 parts by weight per 100 parts by weight of the total of (i) and (ii) of plasticizer selected from the group consisting of low molecular polybutenes, naphthenic, paraffinic and aromatic processing oils, epoxidized soyabean oil, and mixtures thereof.

5,026,745

BIODETERIABLE PLASTICS AND BLENDS

Richard C. Weil, Monroeville Borough, Pa., assignor to Aristech Chemical Corporation, Pittsburgh, Pa.

Filed Jun. 12, 1989, Ser. No. 364,280

Int. Cl.^{5} C08L *3/02;* **C08J** *3/00, 5/04*

U.S. Cl. 524—47 **8 Claims**

1. A biodeteriable composition comprising a blend of (1) a graft-copolymer of maleic anhydride and polypropylene and (2) about 1% to about 50% by weight starch based on the total composition.

5,026,746

STARCH BASED BINDER COMPOSITION FOR NON-WOVEN FIBERS OR FABRICS

William C. Floyd, Chester; louis R. Dragner, Rock Hill, and Blanche H. Black, York, all of S.C., assignors to Sequa Chemicals, Inc., Chester, S.C.

Filed Jun. 26, 1989, Ser. No. 371,493

Int. Cl.^{5} C08L *3/02, 3/04, 5/02;* **C08G** *18/00*

U.S. Cl. 524—50 **31 Claims**

1. A starch-based binder composition for non-woven fibers or fabrics which comprises:

a starch-polymer graft comprising a starch hydrolyzate having a water solubility in excess of 70% by weight at 25° C. and a viscosity equivalent to a dextrose equivalent of 1–20, wherein said starch hydrolyzate includes at least one millimole of graft sites per mole of starch hydrolyzate where the polymer is bound to said starch hydrolyzate to form the starch-polymer graft, and wherein during or prior to a grafting reaction which forms the graft the anhydro-glucose ring of the starch hydrolyzate is cleaved between carbons 2 and 3;

a starch; and a non-formaldehyde starch crosslinking agent.

5,026,747

FLAME RETARDANT ASPHALT COMPOSITION

Randal J. Jolitz, Algonquin, Ill., and Donald R. Kirk, Pittsburg, Kans., assignors to Tamko Asphalt Products, Inc., Joplin, Mo.

Filed Nov. 1, 1989, Ser. No. 429,985

Int. Cl.^{5} C08L *95/00*

U.S. Cl. 524—64 **2 Claims**

1. A flame retardant composition comprising:

(a) about 45–65% wt asphalt;

(b) about 1–20% wt styrene-butadiene-styrene polymer;

(c) about 15–40% wt flame retardant where the flame retardant comprises about:

(i) 65–95% wt potassium citrate,

(ii) 1–5% wt methyl hydrogen polysiloxane.

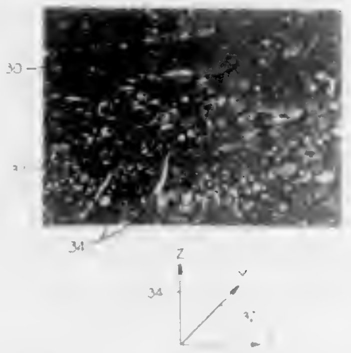
VOL
1127
ISS
4
JE
25
1991
UMI

5,026,748
THERMALLY CONDUCTIVE ADHESIVE
Jerome T. Adams, Hockessin, and Bruce A. Yost, Newark, both of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed May 7, 1990, Ser. No. 520,286

Int. Cl.^{5} C08J *00/00;* **C08L** *00/00*

U.S. Cl. 524—66 **10 Claims**



1. A thermally conductive adhesive material comprising an adhesive resin filled with from about 20 to about 60 weight percent of a three-dimensional structure of pitch based carbon fibers.

5,026,749
PIPERIDINE COMPOUNDS FOR USE AS LIGHT STABILIZERS, HEAT STABILIZERS AND OXIDATION STABILIZERS FOR ORGANIC MATERIAL
Giuseppe Cantatore, Bitonto; Valerio Borzatta, Bologna, and Franca Masina, Anzola Emilia, all of Italy, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

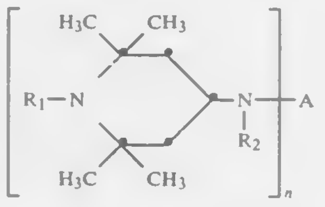
Continuation of Ser. No. 393,034, Aug. 10, 1989, abandoned, which is a continuation of Ser. No. 187,174, Apr. 28, 1988, abandoned. This application May 14, 1990, Ser. No. 523,288

Claims priority, application Italy, May 7, 1987, 20419 A/87

Int. Cl.^{5} C08K *5/3435;* **C07D** *211/58*

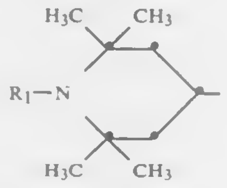
U.S. Cl. 524—99 **15 Claims**

1. A compound of the formula (I)



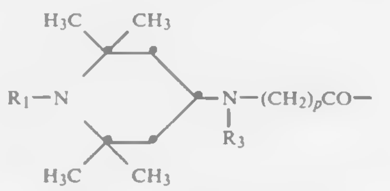
(I)

in which n is 1 or 2, R_1 is hydrogen, O·, OH, NO, CH_2CN, C_1–C_8-alkyl, allyl, benzyl, OH-monosubstituted C_2–C_4-alkyl, C_1–C_{18}-alkyloxy, C_5–C_{12}-cycloalkyloxy or C_1–C_8-acyl, R_2 is C_1–C_{18}-alkyl, C_5–C_{12}-cycloalkyl, C_7–C_{12}-phenylalkyl, C_1–C_{12}-alkoxy-monosubstituted C_2–C_4-alkyl, tetrahydrofurfuryl or a group of the formula (II)



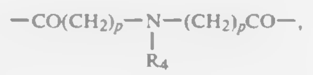
(II)

in which R_1 is as defined above, and, when n = 1, A is a group of the formula (III)

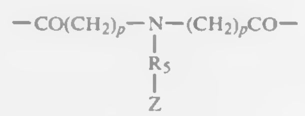


(III)

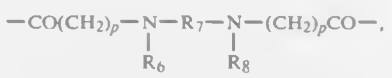
in which R_1 is as defined above, R_3 is as defined for R_2 and p is an integer from 1 to 5, or, when n = 2, A is a group of the formula (IV), (V), (VI) or (VII)



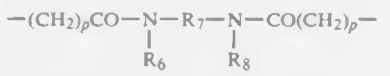
$$-CO(CH_2)_p-\underset{\underset{R_4}{|}}{N}-(CH_2)_pCO-, \qquad (IV)$$



$$-CO(CH_2)_p-\underset{\underset{\underset{\underset{Z}{|}}{R_5}}{|}}{N}-(CH_2)_pCO- \qquad (V)$$

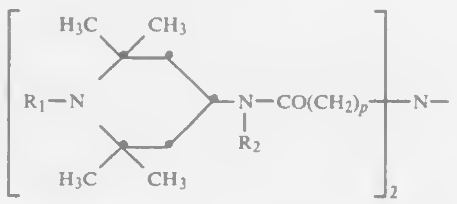


$$-CO(CH_2)_p-\underset{\underset{R_6}{|}}{N}-R_7-\underset{\underset{R_8}{|}}{N}-(CH_2)_pCO-, \qquad (VI)$$



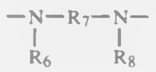
$$-(CH_2)_pCO-\underset{\underset{R_6}{|}}{N}-R_7-\underset{\underset{R_8}{|}}{N}-CO(CH_2)_p- \qquad (VII)$$

in which p is as defined above, R_4 is as defined above for R_2, R_5 is C_2–C_{12}-alkylene, C_6–C_{15}-cycloalkylene or xylylene, Z is a group of the formula (VIII)



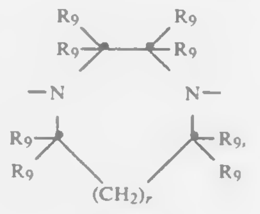
(VIII)

in which R_1, R_2 and p are as defined above, R_6 and R_8 which are identical or different are C_1–C_8-alkyl, cyclohexyl, benzyl or a group of the formula (II) and R_7 is C_2–C_{12}-alkylene, C_6–C_{15}-cycloalkylene or xylylene, or the group

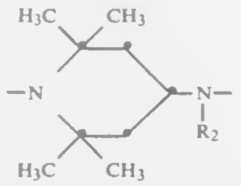


$$-\underset{\underset{R_6}{|}}{N}-R_7-\underset{\underset{R_8}{|}}{N}-$$

is a heterocyclic radical of the formula (IX) or (X)



(IX)



(X)

in which each R_9 independently is hydrogen or methyl, r is zero or 1 and R_2 is as defined above.

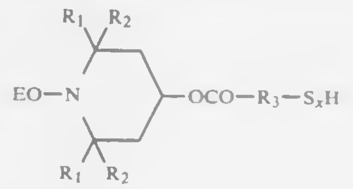
5,026,750
1-HYDROCARBYLOXY HINDERED AMINE MERCAPTOACID ESTERS, THIOACETALS, SULFIDES AND DISULFIDES
Ramanathan Ravichandran, Nanuet, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 326,348, Mar. 21, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 479,908

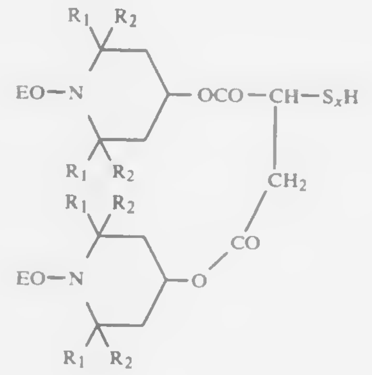
Int. Cl.^{5} C08K *5/34, 5/35;* **C07D** *211/34, 211/40, 211/54*

U.S. Cl. 524—99 **22 Claims**

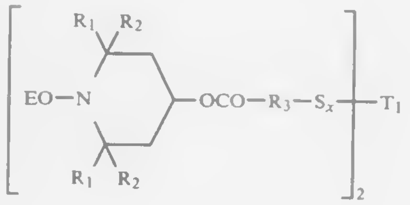
1. A compound which is a 1-hydrocarbyloxy hindered amine derivative having the formula



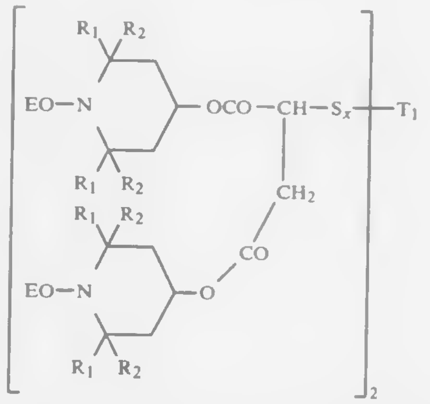
(I)



(II)



(III)



(IV)

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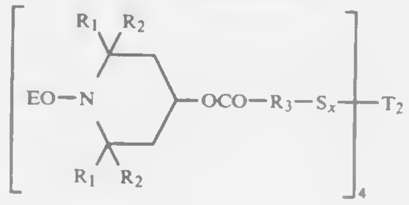
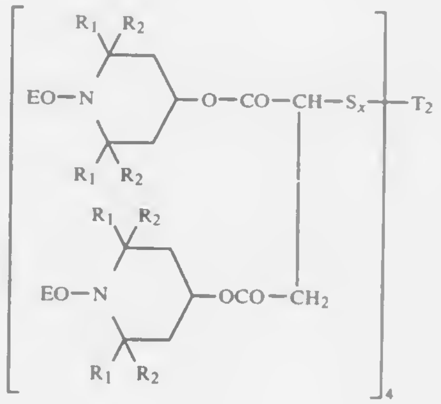
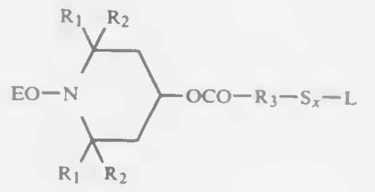


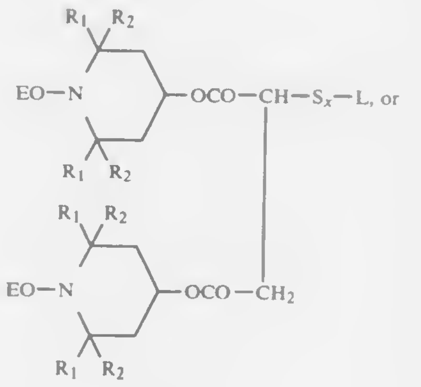
(V)



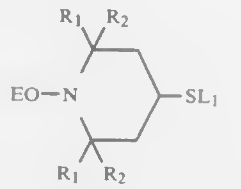
(VI)



(VII)



(VIII)



(IX)

where

X is 1 or 2,

R_1 and R_2 are independently methyl or ethyl, or R_1 and R_2 together are pentamethylene,

R_3 is alkylene of 1 to 3 carbon atoms,

E is alkyl of 1 to 18 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, alkenyl of 2 to 18 carbon atoms, cycloalkenyl of 5 to 12 carbon atoms, aralkyl of 7 to 15 carbon atoms, a radical of a saturated or unsaturated bicyclic or tricyclic hydrocarbon of 7 to 12 carbon atoms or aryl of 6 to 10 carbon atoms or said aryl substituted by alkyl,

T_1 is 1,1-alkylidene of 1 to 18 carbon atoms, 1,1-cycloalkylidene of 5 to 12 carbon atoms, benzylidene, 3,5-di-tert-butyl-4-hydroxybenzylidene or naphthal,

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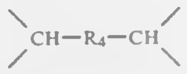
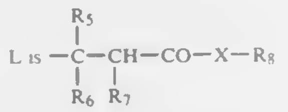
T_2 is

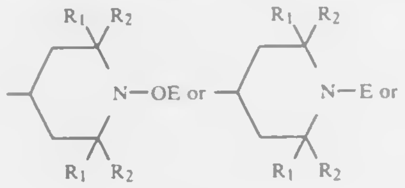


where R_4 is a direct bond, alkylene of 1 to 10 carbon atoms or arylene of 6 to 10 carbon atoms, and

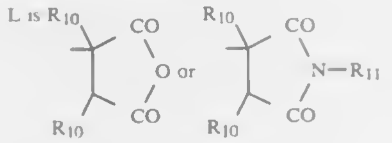


L is $-\underset{R_6}{\overset{R_5}{\overset{|}{\underset{|}{C}}}}-\underset{R_7}{\underset{|}{CH}}-CO-X-R_8$ (X)

where R_5 is hydrogen, methyl or phenyl,
R_6 is hydrogen or methyl
R_7 is hydrogen, alkyl of 1 to 4 carbon atoms, $-CH_2CO-X-R_8$, $-CH_2CH_2CO-X-R_8$ or $-CH(CH_3)CO-X-R_8$,
X is —O— or $-NR_8-$,
R_8 is hydrogen, alkyl of 1 to 18 carbon atoms, aralkyl of 7 to 15 carbon atoms, cycloalkyl of 5 to 12 carbon atoms,



L is $-CH_2CH_2CN$ or $-CH_2CH_2PO(OR_9)$ where R_9 is alkyl of 1 to 4 carbon atoms, or



where R_{10} is hydrogen or methyl,
R_{11} is alkyl of 1 to 8 carbon atoms or phenyl, and
L_1 is hydrogen or has the same meaning as L.

5,026,751

UV LIGHT STABILIZER COMPOSITION COMPRISING CYCLIC ALIPHATIC EPOXY UV SCREENER, AND POLYALKYLDIPIPERIDINE (HALS) COMPOUNDS

Richard C. Bopp, West Coxsackie, N.Y., assignor to General Electric Company, Selkirk, N.Y.

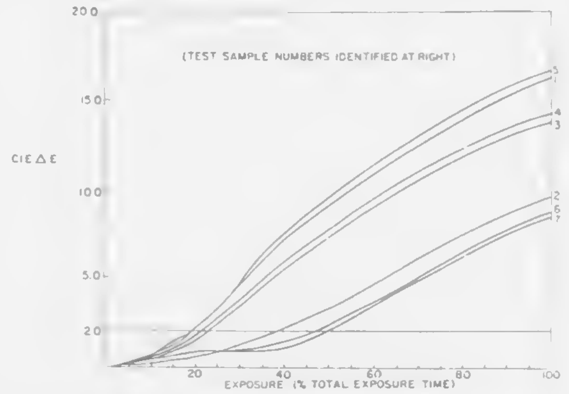
Division of Ser. No. 840,391, Mar. 17, 1986, Pat. No. 4,843,116. This application Jun. 20, 1989, Ser. No. 369,074

Int. Cl.^{5} C08H *5/3435*

U.S. Cl. 524—102 **15 Claims**

1. An ultraviolet light stabilized thermoplastic composition, comprising:

(a) a polyphenylene ether resin, alone, or together with a styrenic polymer; and
(b) an ultraviolet light stabilizer comprising a combination of



(i) a β-hydroxy-substituted benzophenone,
(ii) a polyalkyl-substituted dipiperidine compound, and
(iii) a cyclic aliphatic epoxide.

5,026,752

AMORPHOUS-POLYPROPYLENE-BASED HOT MELT ADHESIVE

Toshinori Wakabayashi, and Shinji Sugii, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 175,933, Mar. 31, 1988, abandoned. This application Aug. 28, 1989, Ser. No. 399,366

Int. Cl.^{5} C08L *53/02, 23/10*

U.S. Cl. 524—271 **17 Claims**

1. A composition consisting essentially of the following:
(a) between about 10 and about 70 weight percent of amorphous polypropylene;
(b) between about 2 and about 70 weight percent of styrene-based thermoplastic elastomer, said elastomer being styrene-diene block copolymer or hydrogenated styrene-diene block copolymer;
(c) between about 1 and about 35 weight percent of tackifier: and
(d) up to about 24 weight percent of wax;
and having a dissipation factor of about 0.010 or less at 1 kilohertz at 23° C., and a volume resistivity of at least about 1×10^{14} ohm-cm at 23° C.

5,026,753

RESINOUS BINDERS COMPRISING A METAL ROSIN RESINATE AND A CARBOXYLATED POLYSTYRENE RESIN

James C. West, and Mark S. Pavlin, both of Lawrenceville, N.J., assignors to Union Camp Corporation, Wayne, N.J.

Filed Feb. 22, 1989, Ser. No. 313,926

Int. Cl.^{5} C08L *93/04*

U.S. Cl. 524—272 **16 Claims**

1. A resinous binder comprised of (a) a major proportion of a metal rosin resinate and (b) a minor proportion of a carboxylated polystyrene resin having a weight average molecular weight of at least 50,000 and an acid number less than 200; said carboxylated polystyrene resin being present in the resinous binder in an amount which is effective to increase the dilution of the resinous binder as compared to the dilution of the metal rosin resinate alone.

5,026,754

RESINOUS BINDERS COMPRISING A METAL ROSIN RESINATE AND A PENDANT TERTIARY AMINE POLYMER

Mark S. Pavlin, Lawrenceville, N.J., assignor to Union Camp Corporation, Wayne, N.J.

Filed Apr. 18, 1989, Ser. No. 340,108

Int. Cl.^{5} C08L *93/04*

U.S. Cl. 534—272 **16 Claims**

1. A resinous binder comprised of (a) a major proportion of a metal rosin resinate and (b) a minor proportion of a pendant tertiary amine polymer having a weight average molecular weight of at least 50,000 and 0.01-3 meg/g of tertiary amine groups; said pendant tertiary amine polymer being present in the resinous binder in an amount which is effective to increase the dilution of the resinous binder as compared to the dilution of the metal rosin resinate alone.

5,026,755

WATER-BASED PRINTING INK PREPARED FROM POLYAMIDE/ACRYLIC GRAFT COPOLYMERS

Albert A. Kveglis, Pine Brook, and Robert J. Catena, Orange, both of N.J., assignors to Sun Chemical Corporation, Fort Lee, N.J.

Division of Ser. No. 166,143, Mar. 10, 1988, Pat. No. 4,870,139, which is a continuation-in-part of Ser. No. 776,757, Sep. 16, 1985, abandoned, which is a continuation-in-part of Ser. No. 711,219, Mar. 13, 1985, abandoned. This application Jul. 5, 1989, Ser. No. 376,078

Int. Cl.^{5} C09B *23/00, 69/00;* **C09D** *1/00, 11/10*

U.S. Cl. 524—389 **30 Claims**

1. A water-based printing ink comprising
(a) a resin component, said resin component comprising at least about 15 wt. %, based on the weight of the resin component, of a graft copolymer of a polyamide and at least one acrylic monomer, said polyamide having a weight average molecular weight of at least about 15,000, the remainder of the resin component comprising unreacted polyamide and polymers of said acrylic monomer, said graft copolymer having a pH of at least
(b) water; and
(c) at least one pigment.

5,026,756

HOT MELT ADHESIVE COMPOSITION

William D. Arendt, Mundelein, Ill., assignor to Velsicol Chemical Corporation, Rosemont, Ill.

Filed Aug. 3, 1988, Ser. No. 227,705

Int. Cl.^{5} C08K *5/09*

U.S. Cl. 524—293 **17 Claims**

1. A solid non-aqueous hot melt adhesive composition comprising a polymer, a tackifier, and a plasticizing amount in the range of about 5–40% by weight of 1,4-cyclohexane dimethanol dibenzoate.

5,026,757

RED PHOSPHORUS FLAME RETARDANT AND NONFLAMMABLE RESINOUS COMPOSITION CONTAINING THE SAME

Ichiro Sakon, Toyama; Masao Sekiguchi, Uozu, and Atsushi Kanayama, Toyama, all of Japan, assignors to Rinkagaku Kogyo Co., Ltd., Toyama, Japan

Division of Ser. No. 40,522, Apr. 17, 1987, Pat. No. 4,879,067. This application Jul. 25, 1989, Ser. No. 385,912

Claims priority, application Japan, Jun. 19, 1986, 61-143714; Oct. 27, 1986, 61-255419

Int. Cl.^{5} C08K *3/32;* **C09K** *21/00;* **C01B** *25/01, 25/02*

U.S. Cl. 524—414 **9 Claims**

1. A nonflammable resinous composition comprising a mixture of synthetic resin and a flame retardant comprising spherical particles consisting of red phosphorus and agglomerates of said spherical particles, said spherical particles having particle sizes of not greater than 200 μm and having continuous external surfaces which are substantially free of ridges and active sites formed by pulverizing which would be capable of adsorbing moisture and oxygen whereby the surfaces of said particles are stable and adsorption of oxygen and moisture and disproportionation do not occur on said surfaces.

5,026,758

THERMOPLASTIC MOLDING COMPOUNDS OF POLYCARBONATE, POLYALKYLENE TEREPHTHALATE, SPECIAL BARIUM SULFATE AND OPTIONALLY, ELASTOMERS

Ulrich Grigo, Kempen; Jürgen Kirsch; Dieter Wittmann, both of Cologne; Karsten-Josef Idel, and Peter Horlacher, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 4, 1990, Ser. No. 578,979

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1989, 3929672

Int. Cl.^{5} C08K *3/30*

U.S. Cl. 524—423 **4 Claims**

1. Thermoplastic molding compositions of
(A) 1 to 99 parts by weight polycarbonate,
(B) 1 to 99 parts by weight polyalkylene terephthalate,
(C1) 0.1 to 50 parts by weight barium sulfate having a chemoreactive surface produced by precipitation of barium ions with sulfate ions in aqueous medium in the presence of additional anions of water soluble compounds which can be precipitated with barium ions and form sparingly soluble barium compounds, the chemoreactive barium sulfate obtained, optionally aftertreated with coupling agents, having particle sizes of >0.1 μm [80 to 5 m^2/g (BET)], and/or
(C2) 0.1 to 50 parts by weight ultrafine barium sulfate produced by combining separate aqueous solutions respectively containing equivalent quantities of barium ions and sulfate ions and separating the precipitate; to produce precipitated barium sulfate having a primary particle size of <0.1 μm in a closed reactor, the aqueous solutions of the reactants are continuously divided up into large numbers of partial volumes which are combined to form discrete precipitation volumes having an average volume size of <1 μl and the resulting suspension of the precipitate is continuously removed from the reactor,
and, optionally,
(D) 0.1 to 30 parts by weight of an elastomer with the proviso that components (A) to (C) or (D) add up to 100 parts by weight.

5,026,759

2-SUBSTITUTED-1-NAPHTHOLS AS 5-LIPOXYGENASE INHIBITORS

Douglas G. Batt, Wilmington, Del., assignor to Du Pont Merck Pharmaceutical, Wilmington, Del.

Division of Ser. No. 324,533, Mar. 16, 1989, Pat. No. 4,906,636, which is a division of Ser. No. 839,912, Mar. 19, 1986, Pat. No. 4,833,164, which is a continuation-in-part of Ser. No. 731,791, May 8, 1985, abandoned. This application Dec. 4, 1989, Ser. No. 445,776

The portion of the term of this patent subseqnent to Jan. 15, 2008, has been disclaimed.

Int. Cl.^{5} A61K *31/38;* **C07D** *333/16, 277/20, 233/54*

U.S. Cl. 514—438 **15 Claims**

1. A compound having the formula:

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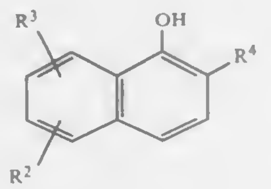
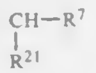


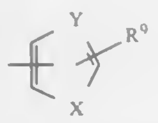
(II)

wherein

R^2 and R^3 independently are H, CH_3, C_2H_5, CH_3O, or C_2H_5O;

R^4 is


$$\underset{\displaystyle R^{21}}{\underset{|}{CH}}-R^7$$

R^7 is


where X is S, O, or NR^{10}, and Y is CH or N; R^9 and R^{10} independently are H or C_9, —C_4 alkyl; and R^{21} is H, lower alkyl, or phenyl, optionally monosubstituted with Cl, Br, F, CH_3 or CH_3O.

5,026,760
WARPAGE CONTROLLED POLYESTERS

Ping Y. Liu, Naperville, Ill., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Nov. 2, 1989, Ser. No. 430,405

Int. Cl.^{5} C08L *67/02*

U.S. Cl. 524—449 18 Claims

1 A thermoplastic molding composition which after molding, possesses increased resistance to warpage, the composition comprising, in admixture:

(a) at least one polyester resin; and

(b) a warpage decreasing amount comprising from about 5 to about 15 parts by weight, per 100 parts by weight of the total composition of a high molecular weight polyetherimide ester resin that has an intrinsic viscosity of at least 1.2 when measured in a solution comprising 60% by weight tetrahydrofuran and 40% by weight phenol at ambient temperature.

5,026,761
ELASTIC PAINT COMPOSITION

Motoyuki Takagi, Higashi-Nakajima; Takuji Yoshimura, Toyonaka, and Yoshihiro Yamano, Tokyo, all of Japan, assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Aug. 1, 1989, Ser. No. 388,092

Claims priority, application Japan, Aug. 19, 1988, 63-205015

Int. Cl.^{5} C09D *4/02*

U.S. Cl. 524—460 3 Claims

3. An elastic paint composition, having a substantially uniform mixture comprising:

(A) a water-based polymer or copolymer emulsion containing at least one monomer selected from the group consisting of acrylate esters and methacrylate esters having a glass transition temperature of 30° C., to −60° C., and

(B) a reactive compound dissolved in an organic solvent having a poor affinity with the water-based polymer emulsion and comprising mainly of aromatic hydrocarbons having a maximum solubility parameter (SP value) of 9.0, and selected from the group consisting of (1) a ray-hardenable compound having at least three methacryloyl radicals and a molecular weight of at least 200 that becomes hardened by the reaction of their methacryloyl radicals with ultraviolet rays, and (2) an oxidation hardenable compound having at least one double bond and a molecular weight of at least 300 that becomes hardened by the oxidation reaction at the double bond, wherein the amount of said organic solvent is in the range of 5 to 50%, based on the weight of the water in said mixture and the amount of said reactive component B is within the range of 2 and 40%, based on the weight of the polymer of said water based polymer emulsion A.

5,026,762
RUBBER COMPOSITION FOR ALL-WEATHER TIRES

Masashi Kida, Hiratsuka; Shingo Midorikawa, Ebina; Ichiro Suzuki, Hiratsuka; Yoshihiko Suzuki, Hiratsuka, and Youichi Yamaguchi, Hiratsuka, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed May 4, 1990, Ser. No. 519,138

Claims priority, application Japan, May 25, 1989, 1-130158

Int. Cl.^{5} C08L *7/00, 9/00, 23/16, 61/12*

U.S. Cl. 524—495 7 Claims

1. A rubber composition for use in tire treads which comprises:

(a) 100 parts by weight of a base rubber comprising a first rubber and a second rubber blended in a weight ratio of from 50:50 to 72:25, said first rubber containing natural rubber in an amount of at least 80% by weight, and said second rubber consisting essentially of a butadiene rubber;

(b) from 55 to 90 parts by weight of a carbon black having an iodine adsorption of from 90 to 200 mg/g and a dibutyl phthalate adsorption of from 100 to 140 ml/100 g; and

(c) from 1 to 10 parts by weight of a novolak-type m-cresol-formaldehyde resin said composition having a dynamic Young's modulus of not less than 8 MPa at 0° C.

5,026,763
POLYAMIDE MOLDING MATERIALS

Volker Lohrbaecher, Weinheim, and Erich Pellkofer, Mutterstadt, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 19, 1989, Ser. No. 381,973

Claims priority, application Fed. Rep. of Germany, Aug. 9, 1988, 3826950

Int. Cl.^{5} C08L *77/00*

U.S. Cl. 524—495 9 Claims

1. A polyamide molding material having high heat distortion resistance for the production of blow-molded articles, consisting essentially of two different polyamides which have a high melt viscosity suitable for blow molding, are homogeneously miscible with one another in the melt and have melting points which differ by 10°–50° C., wherein the amount of polyamide (a) having a low melting point has a viscosity numer according to DIN 53,727 (sulfuric acid) of not less than 280 and is from 5 to 40% by weight and the amount of polyamide (b) having the higher melting point has a viscosity number according to DIn 53,727 (sulfuric acid) of not less than 150 and is from 60 to 95% per weight.

5,026,764
RESIN COMPOSITION BASED ON MODIFIED POLYPHENYLENE ETHER AND POLYPHENYLENE SULFIDE, AND MOLDED ARTICLES THEREFROM

Masao Okabe, Abiko; Akikzau Amgai, Tokyo; Haruaki Eto, Toyonaka, and Yasuo Tanaka, Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Division of Ser. No. 356,325, May 23, 1989. This application Apr. 30, 1990, Ser. No. 516,901

Claims priority, application Japan, May 25, 1988, 63-125669

Int. Cl.^{5} C08L *71/12*

U.S. Cl. 524—540 8 Claims

1. A resin composition consisting essentially of

(A) a polyphenylene ether (component A'),

(B) a polyphenylene sulfide (component B),

(C) a polyisocyanate (component C), and

(D) an unsaturated carboxylic acid having 3 to 10 carbon atoms or an anhydride thereof (component D), the weight ratio of component A' to component B being from 5:95 to 95:5 and the amount of component C being from 0.01 to 10 % by weight based on the total weight of components A' and B and the amount of component D being from 0.01 to 5 % by weight based on the weight of component A'.

5,026,765
EMULSION BINDER FOR CARPET AND CARPET TILES

Howard G. Katz, Hightstown, N.J.; David Lunsford, Simpsonville, S.C., and Paul R. Mudge, Belle Mead, N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Dec. 15, 1989, Ser. No. 451,843

Int. Cl.^{5} C08L *33/06*

U.S. Cl. 524—561 4 Claims

1. Carpet coating compositions comprising 30 to 80 percent by weight filler and 20 to 70 percent by weight of a latex binder, the binder comprising an polymer of:

a) 40 to 80% by weight of a vinyl ester of an alkanoic acid, the acid having from 1 to 13 carbon atoms;

b) 5 to 25% by weight of a copolymerizable comonomer having a Tg of at least 50° C., and;

c) 10 to 30% ethylene said polymer made by an emulsion polymerization procedure.

5,026,766
HOT-BONDING SILICONE ADHESIVE COMPOSITION

Shosaku Sasaki, Chiba, Japan, assignor to Toray Silicone Company, Limited, Tokyo, Japan

Filed Jun. 26, 1989, Ser. No. 371,348

Claims priority, application Japan, Jun. 29, 1988, 63-161356

Int. Cl.^{5} C08L *83/00*

U.S. Cl. 524—588 6 Claims

1. A hot-bonding silicone adhesive composition comprising

(A) 100 weight parts organopolysiloxane compound prepared by kneading with heating

  (a) 60 to 90 weight parts of a polydiorganosiloxane represented by the average unit formula $R_aSiO_{(4-a)/2}$ wherein R is a monovalent hydrocarbon group and a=1.9 to 2.05, and

  (b) 10 to 40 weight parts dry-method or wet-method silica, said heating being sufficient to increase the hot-bonding adhesive strength of the hot-bonding adhesive composition,

(B) 20 to 200 weight parts organopolysiloxane resin constituted of the $R^1{}_3SiO_{1/2}$ unit wherein R^1 is a monovalent hydrocarbon group or the hydroxyl group, at least 50% of all R^1 being alkyl, and the SiO_2 unit in a molar ratio of (0.6:1.0) to (1.0:1.0), and

(C) an arbitrary quantity of organic solvent sufficient to facilitate the use of the composition.

5,026,767
ANTISTATIC AROMATIC POLYIMIDE ARTICLE

Hiroshi Inoue; Tadashi Miura, and Tetsuji Hirano, all of Hirakata, Japan, assignors to Ube Industries, Ltd., Ube, Japan

Division of Ser. No. 202,131, Jun. 2, 1988, abandoned. This application Jul. 13, 1990, Ser. No. 554,152

Claims priority, application Japan, Jun. 3, 1987, 62-139169

Int. Cl.^{5} C08K *5/41*

U.S. Cl. 524—745 8 Claims

1. A process for the preparation of an antistatic aromatic polyimide article comprising an aromatic polyimide and an antistatic agent in an amount of 0.01 to 10 parts by weight based on 100 parts by weight of the aromatic polyimide, said antistatic agent being selected from the group consisting of a sulfonate having the formula (I):

$$R(SO_3M)_n \qquad (I)$$

wherein R is an unsubstituted aryl group or an aryl group having a lower alkyl substituent having 1–4 carbon atoms, M is an alkali metal; and n is 1 or 2; and a sulfinate having the formula (II):

$$RSO_2M \qquad (II)$$

wherein R and M have the same meanings as defined above; which comprises the steps of:

coating a composition comprising a polyamic acid prepared from an aromatic diamine component and an aromatic tetracarboxylic acid component, the antistatic agent and an organic solvent over a support to form a composition layer containing 5 to 60wt. % of the solvent;

removing solvent by heating to a temperature of not higher than 200° C., removing the composition layer from the support; and

heating the composition layer to a temperature of not lower than 300° C. to perform ring-closure and imidation reaction.

5,026,768
METHOD OF PRODUCING SILICONE EMULSION

Donald T. Liles, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 130,764, Dec. 9, 1987, Pat. No. 4,978,710. This application Aug. 6, 1990, Ser. No. 563,227

Int. Cl.^{5} C08L *83/05*

U.S. Cl. 524—837 7 Claims

1. A method of producing an aqueous silicone emulsion which dries to an elastomer comprising

(A) homogenizing a mixture of

(1) 100 parts by weight of hydroxyl endblocked polydiorganosiloxane free of aliphatic unsaturation,

(2) from 0.1 to 10 parts by weight of silicon hydride cross-linker,

(5) anionic or nonionic surfactant, and

(6) sufficient water to yield a polydiorganosiloxane content in the mixture of from 40 to 70 percent by weight, then

(B) emulsion polymerizing the mixture of (A) by addition of anionic polymerization catalyst to yield a polymer, then

(C) arresting polymerization by raising the pH to 6 to 7.5, to obtain emulsion A, then

(D) homogenizing a mixture of

(1) from 0 to 100 parts by weight of hydroxyl endblocked polydiorganosiloxane free of aliphatic unsaturation, and

(3) platinum compound catalyst, compatible with the polydiorganosiloxane,

(5) anionic or nonionic surfactant, and

(6) water, then, when (1) is greater than 0,

(E) emulsion polymerizing the mixture of (D) by addition of anionic polymerization catalyst, then

(F) arresting polymerization by raising the pH to 6 to 7.5, to obtain emulsion B, then

(G) mixing emulsion A and sufficient emulsion B to obtain from 1 to 200 parts by weight of platinum per million parts of polydiorganosiloxane (1),

whereby an aqueous silicone emulsion is obtained which gives an elastomer upon removal of the water at room temperature.

5,026,769
METHOD OF PRODUCING SILICONE EMULSION

Donald T. Liles, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 130,764, Dec. 9, 1987, Pat. No. 4,978,710. This application Aug. 6, 1990, Ser. No. 563,159

Int. Cl.^{5} C08L *83/05*

U.S. Cl. 524—837 7 Claims

1. A method of producing an aqueous silicone emulsion which dries to an elastomer comprising

(A) homogenizing a mixture of

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(1) 100 parts by weight of hydroxyl endblocked polydiorganosiloxane free of aliphatic unsaturation, and
(3) sufficient platinum compound catalyst, compatible with the polydiorganosiloxane, to give from 1 to 200 parts by weight of platinum per million parts of polydiorganosiloxane (1),
(5) anionic or nonionic surfactant, and
(1) sufficient water to give a polydiorganosiloxane content in the mixture of from 40 to 70 percent by weight, then
(B) emulsion polymerizing the mixture of (A) by addition of anionic polymerization catalyst, then
(C) arresting polymerization by raising the pH to 6 to 7.5, to obtain emulsion A, then
(D) homogenizing a mixture of
(2) silicon hydride crosslinker,
(5) anionic or nonionic surfactant, and
(6) water,
to obtain emulsion B, then
(E) mixing emulsion A and emulsion B in sufficient quantity to obtain from 0.1 to 10 parts by weight of silicon hydride crosslinker in Emulsion B per 100 parts by weight of hydroxyl endblocked polydiorganosiloxane in Emulsion A, whereby an aqueous silicone emulsion is obtained which gives an elastomer upon removal of the water at room temperature.

5,026,770

RESIN COMPOSITION AND PROCESS FOR PREPARING THIS RESIN COMPOSITION

Paulus J. H. M. Smeets, Meerssen; Caspar G. M. Paas, Heerlen, and Willem P. M. Kraanen, Sittard, all of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Jan. 3, 1990, Ser. No. 460,559

Claims priority, application Netherlands, Jan. 4, 1989, 8900009

Int. Cl.^{5} C08L *67/08*

U.S. Cl. 525—7.1 **8 Claims**

1. A resin composition comprising a mixture of resins, a first resin which consists of the reaction product of an expoxidized fatty acid ester of a polyvalent alcohol with a carboxylic acid and a second resin which consists of an ester of a polyvalent alcohol, modified with carboxylic acid, wherein the resin mixture also contains an unsaturated polyester resin with a molecular weight of 1200–20,000 per double bond and an acid number of 5–50, from about 50% to about 90% of the unsaturation being formed by a semi-ester of an α,β-unsaturated dicarboxylic acid.

5,026,771

COATING COMPOSITIONS CONTAINING ETHYLENICALLY UNSATURATED CARBAMATES

William A. Dupont, and Jerome W. Knapczyk, both of Wilbraham, Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 3, 1989, Ser. No. 389,100

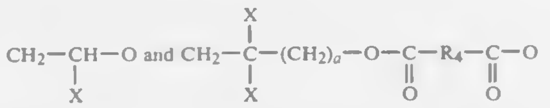
Int. Cl.^{5} C08G *63/48;* **C08F** *283/04;* **B32B** *9/04, 21/08*

U.S. Cl. 525—50 **26 Claims**

1. An air-dry coating composition comprising (a) an ethylenically unsaturated carbamate derived from a polyvinyl acetal of number average molecular weight in the range of about 10,000 to about 70,000 daltons and an ethylenically unsaturated isocyanate selected from the group consisting of 1-(1-isocyanatoethyl)-3-vinylbenzene, 1-(1-isocyanatoethyl)-4-vinylbenzene, 1-(1-isocyanato-1-methylethyl)-3-(1-methylethenyl)benzene and 1-(1-isocyanato-1-methylethyl)-4-(1-methylethenyl)benzene and (b) a β,γ-ethylenically unsaturated coreactant selected from the group represented by the formulae:

$$R_2((E)_mR_3)_n,\ R_5(OCH_2Y)_p,\ R_6(CH(OCH_2Y)_2)_q \text{ and } R_7(O_2CHY)_b,$$

where R_2 is a radical of molecular weight less than about 15,000 daltons obtained by removal of active hydrogen from an active hydrogen compound selected from the group consisting of water, alcohols, thiols, carboxylic acids, carboxylic amides and amines, where the functionality of R_2 is n and is in the range of 1 to 10, where E is a divalent radical selected from the group represented by the formulae



$$CH_2-\underset{\underset{X}{|}}{CH}-O \text{ and } CH_2-\overset{\overset{X}{|}}{\underset{\underset{X}{|}}{C}}-(CH_2)_a-O-\underset{\underset{O}{\|}}{C}-R_4-\underset{\underset{O}{\|}}{C}-O$$

where X is selected from the group consisting of H, CH_3, C_2H_5 and CH_2OCH_2Y, Y being selected from the group consisting of

$$CH=CH_2,\ CH_3-C=CH_2, \text{ and } C_2H_5-C=CH_2$$

where a is 0 or 1, where R_3 is hydrogen or an unsubstituted or substituted C_1 to C_{10} hydrocarbyl radical, where R_4 is a divalent unsubstituted or substituted C_2 to C_{10} hydrocarbyl radical and where the product of m and n is at least 2 and not more than about 60; where R_5 is a C_2 to C_{12} aliphatic hydrocarbyl or oxahydrocarbyl radical of equivalence p in the range of 2 to 12; where R_6 is absent or is a C_1 to C_{20} unsubstituted or substituted hydrocarbyl group and q is in the range of 2 to about 30; where R_7 is a radical of molecular weight less than about 10,000 daltons obtained by removal of 2b hydrogens from a polyol and b is in the range of about 2 to about 60; and wherein the allyloxy compound contains from 2 to 60 allyloxy groups per molecule.

5,026,772

LYOPHILIZED PHARMACEUTICAL COMPOSITION OF NEOCARZINOSTATIN DERIVATIVE

Mitsugu Kobayashi, Yaizu; Go Ohtani, Tokyo; Jun Sekino, Yaizu; Toshimitsu Konno, and Hiroshi Maeda, both of Kumamoto, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Aug. 29, 1988, Ser. No. 237,950

Claims priority, application Japan, Sep. 1, 1987, 62-218639

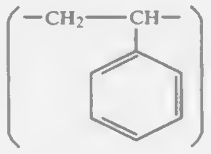
Int. Cl.^{5} C08G *63/48, 63/91;* **C08L** *89/00;* **A01N** *25/00*

U.S. Cl. 525—54.1 **16 Claims**

1. A lyophilized pharmaceutical composition, comprising:
a neocarzinostatin derivative and at least one saccharide selected from the group consisting of monosaccharides, disaccharides and dextran,
wherein the neocarzinostatin derivative is represented by the following formula:

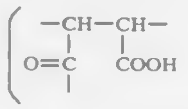
(SMA)-(NCS)-(SMA),

wherein -(NCS)-is a divalent neocarzinostatin residue which has an N-terminal, which has an alanine residue therein at the N-terminal thereof having two primary amino groups and having one hydrogen atom removed from each of the two primary amino groups, and which has a lysine residue at the 20th position from the N-terminal thereof, and
wherein (SMA)- is a monovalent styrene-maleic acid copolymeric residue which may be partially half-esterified and consists of structural units for:
(1) a styrene residue



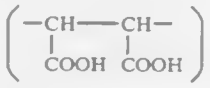
;

(2) a residue having the following formula in which a hydroxyl group of one carboxyl group of a maleic acid residue is removed to provide a carbonyl group and



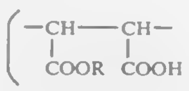
$$\left(\begin{array}{ll} -CH- & CH- \\ \ \ \ | & \ | \\ O=C & COOH \\ \ \ \ | & \end{array}\right.$$

wherein the carbon of the carbonyl group is bonded to the neocarzinostatin residue); and
(3) (a) a maleic acid residue



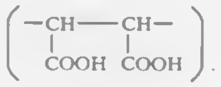
$$\left(\begin{array}{ll} -CH- & CH- \\ \ | & \ | \\ COOH & COOH \end{array}\right)$$

or in (3)(b) a half-esterified maleic acid residue



$$\left(\begin{array}{ll} -CH- & CH- \\ \ | & \ | \\ COOR & COOH \end{array}\right.$$

in which R is an alcohol residue wherein an hydroxyl group is removed from an alkanol having 1 to 4 carbon atoms, an ethylene glycol monoalkyl ether in which the alkyl group has 1 to 2 carbon atoms, or an glycerine dialkyl ether wherein the alkyl group has 1 to 2 carbon atoms) and a maleic acid residue



$$\left(\begin{array}{ll} -CH- & CH- \\ \ | & \ | \\ COOH & COOH \end{array}\right).$$

5,026,773

APPARATUS FOR A SOLID PHASE SYNTHESIS OF PEPTIDE ANALOGS

Samuel Steel, 3817 Davis Pl., Apt. 6, Washington, D.C. 20007

Continuation of Ser. No. 24,602, Mar. 11, 1987, Pat. No. 4,794,150. This application Dec. 5, 1988, Ser. No. 280,023

The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.

Int. Cl.^{5} C08F *283/00;* **C08G** *63/48, 63/91*

U.S. Cl. 525—54.11 **4 Claims**

1. Apparatus for a solid phase peptide synthesis of peptide analogs, comprising:
a polymeric resin being insoluble and capable of permitting an attachment to it of a first amino acid in said solid phase peptide synthesis wherein said polymeric resin includes an inert support which is capable of permitting a transfer of said polymeric resin from a first reaction vessel to a second reaction vessel by means of a tongs instrument; and,
reactor cell means for use in combination with said polymeric resin, said reactor cell means including a plurality of reaction vessels wherein at least one of said reaction vessels of said reactor cell means is capable of at least partially containing a plurality of said polymeric resins during said solid phase peptide synthesis, said polymeric resin being suitably shaped and sized for use in combination with said reactor cell means wherein said polymeric resin is not separately contained in a foraminous container within said reactor cell means which would be capable of inhibiting the flow of reagents to said polymeric resin.

5,026,774

POLYMER COMPOSITION CONTAINING PENDANT ORGANIC CHARGE TRANSFER SALT MOIETIES USEFUL IN SWITCHING DEVICES

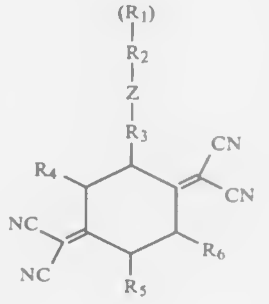
Roger W. Day, Cheshire, and Michael J. Morgan, Northford, both of Conn., assignors to Olin Corporation, Cheshire, Conn.

Division of Ser. No. 9,845, Feb. 2, 1987, abandoned. This application Sep. 22, 1988, Ser. No. 249,627

Int. Cl.^{5} C08F *16/06*

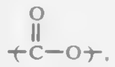
U.S. Cl. 525—56 **1 Claim**

1. A composition of matter comprising a polymer containing pendant organic charge transfer salt moieties and having the empirical structural formula:

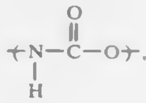


wherein
$R_1=H$ or CH_3,
R_2 and R_3 are the same or different organic radical linking groups having up to 6 carbon atoms,

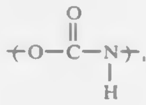
and Z =



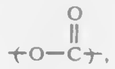
$$\leftarrow\!\overset{\overset{O}{\|}}{C}-O\!\rightarrow,$$



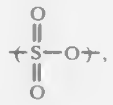
$$\leftarrow\!\underset{\underset{H}{|}}{N}-\overset{\overset{O}{\|}}{C}-O\!\rightarrow,$$



$$\leftarrow\!O-\overset{\overset{O}{\|}}{C}-\underset{\underset{H}{|}}{N}\!\rightarrow,$$

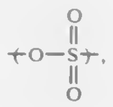


$$\leftarrow\!O-\overset{\overset{O}{\|}}{C}\!\rightarrow,$$



$$\leftarrow\!\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-O\!\rightarrow,$$

or



$$\leftarrow\!O-\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}\!\rightarrow,$$

and wherein R_4, R_5, and R_6 are the same or different groups selected from the group consisting of hydrogen, bromine, iodine, chlorine, fluorine, alkyl, and alkoxy groups having up to 6 carbon atoms.

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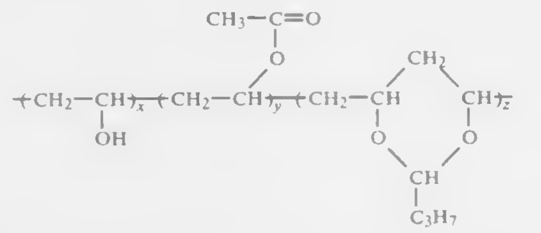
POLYVINYL BUTYRAL PELLICLE COMPOSITIONS

Irl E. Ward, 1526 Leon Dr., Hatfield, Pa. 19440
Filed Aug. 3, 1989, Ser. No. 389,280
Int. Cl.^{5} C08F *8/28;* **C08G** *63/12;* **B32B** *27/36*
U.S. Cl. 525—61 4 Claims

1. A pellicle film produced from a solution wherein dimethylformamide in the solvent, for use in projection printing comprising a film formed from a polyvinyl butyral of the formula



wherein x is greater than or equal to 0.18, y is 0.0 to 0.025 and z is less than or equal to 0.80, said polyvinyl butyral having an average molecular weight of between about 50,000 and 150,000.

5,026,776

OLEFINIC IMPACT MODIFIERS FOR, AND BLENDS WITH, THERMOPLASTIC POLYESTERS RESINS

Charles F. Pratt, Brasschaat, Belgium; Shrikant V. Phadke, and Errol Olivier, both of Baton Rouge, La., assignors to General Electric Company, Pittsfield, Mass.
Continuation-in-part of Ser. No. 161,361, Feb. 22, 1988, abandoned, which is a continuation-in-part of Ser. No. 4,089, Jan. 16, 1987, abandoned. This application Aug. 23, 1988, Ser. No. 235,432
Int. Cl.^{5} C08L *67/02*
U.S. Cl. 525—64 25 Claims

1. The method of producing a thermoplastic polyester based composition having improved knit-line strength and impact strength comprising:
- (a) providing a masterbatch by reacting:
  - (1) less than the full increment of a high molecular weight thermoplastic polyester matrix resin;
  - (2) a rubber polymer in the molten phase selected from the group consisting essentially of the interpolymerization reaction product of ethylene, one or more C_3–C_{16} mono-olefins and a polyene;
  - (3) a composition selected from the group consisting of an epoxy functional acrylate, an epoxy functional methacrylate, an epoxy functional acrylate in combination with a C_1–C_{18} alkyl acrylate, and an epoxy functional methacrylate in combination with a C_1–C_{18} alkyl acrylate; and
  - (4) an initiator present in an amount of at least 0.3 percent by weight of the rubber polymer to provide a reaction product having a gel content in the range of from about 10 to about 80 percent; and
- (b) thereafter melt blending the masterbatch with the remainder of the high molecular weight thermoplastic matrix resin.

5,026,777

LOW GLOSS THERMOPLASTIC MOLDING COMPOSITIONS

Ronald L. Jalbert, and David O. Phillips, both of Parkersburg, W. Va., assignors to General Electric Company, Parkersburg, W. Va.
Filed Nov. 17, 1989, Ser. No. 437,795
Int. Cl.^{5} C08L *51/04*
U.S. Cl. 525—65 20 Claims

1. A thermoplastic molding composition comprising:
- (A) a polymer blend containing about 5 to about 95 wt % of a polycarbonate and about 95 to about 5 wt % of an emulsion grafted ABS polymer; and
- (B) a low gloss enhancing amount of a poly(epoxide).

5,026,778

POLYPROPYLENE-BASED RESIN COMPOSITION AND PROCESS FOR PREPARATION OF SHEETS COMPRISING THE RESIN COMPOSITION

Atsushi Fujii, and Kazuyuki Fukuda, both of Himeji, Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan
Continuation-in-part of Ser. No. 354,341, May 19, 1989, abandoned. This application May 4, 1990, Ser. No. 519,319
Claims priority, application Japan, May 26, 1988, 63-127139
Int. Cl.^{5} C08L *23/10, 23/16, 45/00;* **C08J** *5/18*
U.S. Cl. 525—210 23 Claims

1. A polypropylene-based resin composition consisting essentially of 60–97% by weight of a polypropylene-based resin selected from the group consisting of (i) homopolypropylene, (ii) a crystalline random copolypropylene and (iii) a mixture of homopolypropylene and a crystalline random copolypropylene, 2–20% by weight of a petroleum resin, and 1–20% by weight of a low-crystalline or amorphous ethylene-α-olefin copolymer having a refractive index of from 1.480 to 1.505 at 25° C., and when said polypropylene-based resin is a crystalline random copolypropylene or a mixture of a homopolypropylene and a crystalline random copolypropylene, said ethylene-α-olefin is an amorphous copolymer.

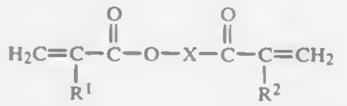
5,026,779

MIXTURES OF CHLOROPRENE POLYMERS

Rüdiger Musch, Bergisch Gladbach; Hans Magg, Kuerten; Werner Obrecht, Moers, and Eberhard Müller, Dormagen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany
Contiouation-in-part of Ser. No. 723,381, Jul. 25, 1988, abandoned. This application Jan. 8, 1990, Ser. No. 462,005
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1987, 3725902; European Pat. Off., Jul. 25, 1988, 88111933.3; Canada, Aug. 3, 1988, 573676; Japan, Aug. 3, 1988, 63-192869
Int. Cl.^{5} C08L *11/00*
U.S. Cl. 525—215 5 Claims

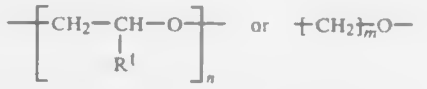
1. Polychloroprene mixtures of
- (i) 20 to 90% by weight of sol polymer and
- (ii) 80 to 10% by weight of gel polymer, these percentages being based on the mixtures (i)+(ii), characterised in that the sol component (i) consists of a copolymer of
- (a) 82 to 97% by weight of chloroprene,
- (b) 3 to 12% by weight of 2.3-dichlorobutadiene, and
- (c) 0 to 6% by weight of other non-crosslinking monomer, these percentages being based on sol (i), and the gel component (ii) consists of a copolymer of
- (d) 86 to 97% by weight of chloroprene,
- (e) 3 to 10% by weight of 2.3-dichlorobutadiene and
- (f) 0 to 4% by weight of other non-crosslinking monomer, these percentages being based on the sum of non-crosslinking monomers of (ii), and

from 7.5×10^{-3} to 4.0×10^{-2} mol, based on 100 g of the total quantity of monomer in the gel polychloroprene, of a compound corresponding to the formula



$$H_2C=\underset{\underset{R^1}{|}}{C}-\overset{\overset{O}{\|}}{C}-O-X-\overset{\overset{O}{\|}}{C}-\underset{\underset{R^2}{|}}{C}=CH_2$$

wherein
R^1 and R^2 denote, independently of one another, hydrogen or C_1 to C_4 alkyl, and
X denotes



$$-\!\!\left[CH_2-\underset{\underset{R^1}{|}}{CH}-O\right]_n\!\!- \quad \text{or} \quad -(CH_2)_m-O-$$

n denotes a number from 1 to 10 and
m denotes a number from 2 to 10

with the proviso, that the sum of (b) and (e) amounts to 8 to 20% by weight, based on the total polychloroprene (i)+(ii).

5,026,780

WATER SWELLABLE RESIN COMPOSITION

Minoru Takizawa, Moriya; Michiei Nakamura, Soka; Hitoshi Takeuchi, Showa; Shigeru Sakamoto, Kuki, and Shojiro Horiguchi, Omiya, all of Japan, assignors to Dainichiseika Color & Chemicals Mfg. Co., Ltd., Tokyo, Japan
Continuation of Ser. No. 329,779, Mar. 28, 1989, abandoned. This application Sep. 28, 1990, Ser. No. 590,518
Claims priority, application Japan, Mar. 31, 1988, 63-076204
Int. Cl.^{5} C08F *265/02;* **C08L** *53/02, 51/06;* **C08K** *9/06*
U.S. Cl. 525—301 1 Claim

1. A water swellable resin composition comprising a water swellable resin, a hydrophobic block copolymer or hydrophobic graft copolymer and a medium, wherein said water swellable resin is an alkali metal salt and/or hydrophilic amine salt of a polymer, wherein said polymer is a copolymer of a hydrophobic polymer chain having an α,β-ethylenically-unsaturated group at an end thereof and a monomer composed principally of (meth)acrylic acid, wherein said medium is selected from the group consisting of natural rubber, polybutadiene, polyisoprene, polyisobutylene, butadiene-styrene copolymers, butadiene-acrylonitrile copolymers, polychloroprene, ethylene-propylene rubber, acrylic polymers, ethylene-vinyl acetate copolymers, polyvinylbutyral resins, silicone rubbers, urethane rubbers, organic solvent, plasticizer, process oil, liquid paraffin, and vaseline, and wherein said hydrophobic block copolymer or hydrophobic graft copolymer is represented by (A)-(B)-(A), wherein A is polystyrene or poly(methyl methacrylate) and B is polybutadiene or polyisoprene and said hydrophobic block copolymer or hydrophobic graft copolymer amounts to from 0.5 wt.% to 5 wt.% of the said copolymer of the hydrophobic polymer chain.

5,026,781

METHOD OF MAKING HYDROPHOBIC COPOLYMERS HYDROPHILIC

Maris J. Ziemelis, and William R. R. Park, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.
Division of Ser. No. 334,501, Apr. 7, 1989, Pat. No. 4,898,913, and Ser. No. 460,771, Jan. 4, 1990. This application Aug. 6, 1990, Ser. No. 563,123
Int. Cl.^{5} C08F *267/02, 265/02*
U.S. Cl. 525—301 14 Claims

1. A hydrophilic powder comprising a macroporous highly cross-linked hydrophobic copolymer, produced by precipitation polymerization in a solvent of at least one monounsaturated ester monomer and at least one polyunsaturated ester monomer soluble therein, the copolymer being saponified by reacting the surface of the hydrophobic copolymer with an aqueous alkali, the copolymer being in the form of a powder, the powder being a combined system of particles, the system of powder particles including unit particles of less than about one micron in average diameter, agglomerates of fused unit particles of sizes in the range of about twenty to eighty microns in average diameter, and aggregates of clusters of fused agglomerates of sizes in the range of about two hundred to about twelve hundred microns in average diameter.

5,026,782

POLYMERIC OPAQUE PARTICLES AND PROCESS FOR MAKING SAME

John Biale, Anaheim, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.
Filed Sep. 23, 1988, Ser. No. 248,783
Int. Cl.^{5} C08F *259/06, 265/06;* **B05D** *7/04;* **B32B** *27/10*
U.S. Cl. 525—317 45 Claims

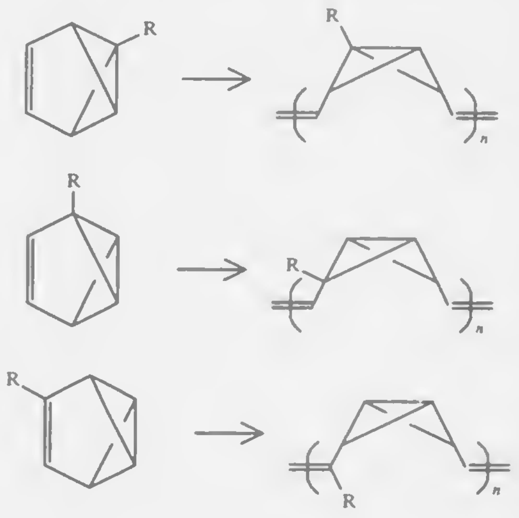
1. An opaque core/shell polymer comprising:
- (a) a non-swellable core polymer having an outer surface and a T_g of at least about 50° C., and comprising a vinyl halide monomer; and
- (b) a shell polymer in physical contact with and covering the outer surface of at least a part of the core polymer, the shell polymer (i) comprising a sufficient vinylidene chloride monomer concentration so that the shell polymer has a crystalline structure and (ii) having a different composition from that of the core polymer, wherein the weight percent of the core polymer, based upon the total weight of the opaque polymer is less than the weight percent of the shell polymer, and the opaque polymer has a particle size of about 200 to about 1,000 nm.

5,026,783

HIGH ENERGY POLYMERS FORMED BY RING OPENING METATHESIS POLYMERIZATION

Robert H. Grubbs; Dennis A. Dougherty, both of S. Pasadena, Calif.; Timothy M. Swager, Brookline, Mass., and Eric J. Ginsburg, Pasadena, Calif., assignors to California Institute of Technology, Pasadena, Calif.
Filed Oct. 24, 1988, Ser. No. 261,092
Int. Cl.^{5} C08F *8/48, 4/78, 32/04, 32/08*
U.S. Cl. 525—326.1 18 Claims

1. A process for forming a high energy polymer comprising subjecting monomer to a ring opening metathesis polymerization in the presence of a non-Lewis acidic tungsten alkylidene metathesis catalyst to form said high energy polymer, wherein said monomer and said polymer are selected from the group consisting of



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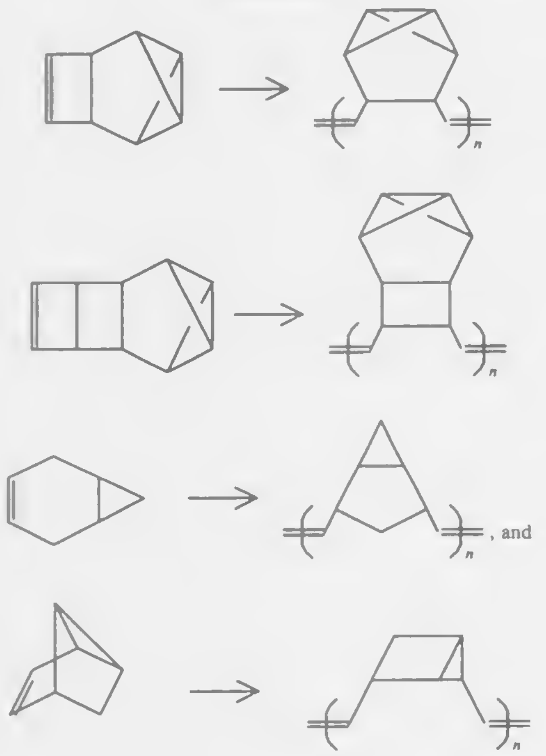


where R is an alkyl and n ranges from about 8 to 7,700.

5,026,784

POLYMER COMPOSITIONS AND ABSORBENT FIBERS PRODUCED THEREFROM

Bi Le-Khac, West Chester, Pa., assignor to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Jan. 4, 1990, Ser. No. 460,681

Int. Cl.^{5} C08F *8/32*

U.S. Cl. 525—327.6 **4 Claims**

1. An absorbent fiber which is the cured attenuated reaction product of:

(a) a partially neutralized, aqueous, uncured polymer composition prepared by reacting a strong base with a polymer containing at least 25 mole percent recurring units of an α,β-unsaturated monomer having in its molecule one or two carboxyl groups or one or two other groups convertible to and converted to carboxyl groups, the degree of neutralization of said partially neutralized polymer being within the range of from about 0.2 to about 0.8 equivalent of total carboxyl groups of the α,β- unsaturated monomer, with

(b) from about 0.1 to about 10 total parts by weight of at least one reactive compound per 100 parts by weight of the partially neutralized polymer, the reactive compound being a water soluble compound bearing one amine group and at least one hydroxyl group.

5,026,785

AVIDIN AND STREPTAVIDIN MODIFIED WATER-SOLUBLE POLYMERS SUCH AS POLYACRYLAMIDE, AND THE USE THEREOF IN THE CONSTRUCTION OF SOLUBLE MULTIVALENT MACROMOLECULAR CONJUGATES

Michael Mage, Bethesda; Bernardetta Nardelli, Kensington, and Louise McHugh, Bethesda, all of Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed May 12, 1989, Ser. No. 351,042

Int. Cl.^{5} C08F *120/56, 8/12, 8/30;* **C01N** *33/546*

U.S. Cl. 525—329.4 **6 Claims**

1. A water-soluble avid or streptavidin modified polyacrylamide, prepared by the process steps of:

(I) converting about 1 to 50% of the amide groups of a water-soluble polyacrylamide into carboxyl groups, said polyacrylamide being soluble in two parts of purified water, USP, at about 23° C. on a weight/weight basis;

(II) activating, in an aqueous solution subsequent to step (I), certain carboxyl groups on said polyacrylamide with an excess of a carbodiimide;

(III) separating the resultant product of step (II) from said excess of said carbodiimide;

(IV) reacting, subsequent to step (III), said resultant product with an excess of avidin or streptavidin, and thereby forming said avidin or streptavidin modified polyacrylamide in situ; and

(V) separating, subsequent to step (IV), said avidin or streptavidin modified from excess streptavidin or avidin.

5,026,786

PERFLUOROPOLYETHERS HAVING BROMINATED END GROUPS AND FLUOROELASTOMERS OBTAINED THEREFROM

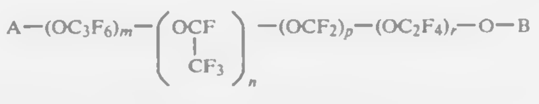
Giuseppe Marchionni, Milan; Gian T. Viola, Cervia; Giulio Tommasi; Raffaele Ferro, both of Milan, and Gianna Cirillo, Genova, all of Italy, assignors to Ausimont S.p.A. and Montedison S.p.A., both of Milan, Italy

Continuation of Ser. No. 832,735, Feb. 25, 1988, abandoned, and a continuation-in-part of Ser. No. 917,550, Oct. 10, 1988, abandoned. This application Sep. 30, 1988, Ser. No. 251,356

Int. Cl.^{5} G08F *8/22*

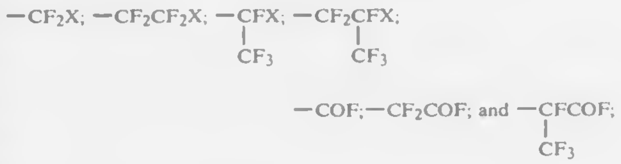
U.S. Cl. 525—356 **5 Claims**

1. Process for the manufacture of perfluoropolyethers of the formula:



$$A-(OC_3F_6)_m-\left(\underset{CF_3}{OCF}\right)_n-(OCF_2)_p-(OC_2F_4)_r-O-B$$

wherein m, n, r and p are integers from 0 to 50, m+n+r+p being at least 2, and wherein A and B, equal to or different from each other, are end groups selected from the group consisting of:



$$-CF_2X;\ -CF_2CF_2X;\ -\underset{CF_3}{CFX};\ -CF_2\underset{CF_3}{CFX};\ -COF;\ -CF_2COF;\ \text{and}\ -\underset{CF_3}{CFCOF};$$

wherein X is fluorine or bromine, at least one of the end groups A and B containing a bromine atom, the perfluoro oxyalkylene units being distributed randomly along the perfluoropolyether chain; consisting of subjecting a perfluoropolyether containing peroxidic oxygen, obtained by reacting at low temperature tetrafluoroethylene and/or hexafluoropropene with oxygen in the presence of U.V. radiations and in an inert solution, to U.V. radiations in liquid phase in the presence of bromine, at temperatures from −40° to 120° C., the liquid reaction medium being saturated with bromine.

5,026,787

IMPACT RESISTANT THERMOPLASTIC RESIN COMPOSITION

Kiyoji Takagi, and Koji Nisbida, both of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Jan. 17, 1990, Ser. No. 466,640

Claims priority, application Japan, Jan. 31, 1989, 1-19664

Int. Cl.^{5} C08L *71/12, 77/00, 51/04, 53/02*

U.S. Cl. 525—391 **8 Claims**

I. A resin composition comprising:

(A) 10 to 70% by weight of an intermediate composition obtained by melting and kneading:

(A_1) 75 to 99% by weight of a polyphenylene ether resin;

(A_2) 0.1 to 19.9% by weight of a polyamide resin;

(A_3) 0.01 to 10% by weight of a compound having an unsaturated group and a polar group in the same molecule in combination, and

(A_4) 0 to 20% by weight of an impact resistance improving material,

(B) 30 to 90% by weight of a polyamide resin, and

(C) 0 to 35% by weight of an impact resistance improving material kneaded therein.

5,026,788

PHOTOSENSITIVE POLYMER HAVING THIOL GROUP

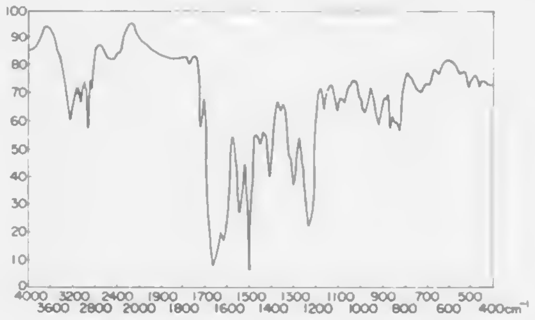
Hirotosbi Maeda, Yokobama, and Kouicbi Kunimune, Ichihara, both of Japan, assignors to Chisso Corporation, Osaka, Japan

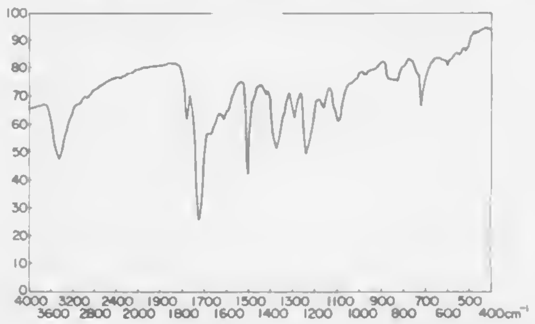
Filed Jun. 2, 1989, Ser. No. 360,873

Claims priority, application Japan, Jun. 20, 1988, 63-151664

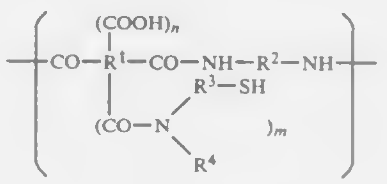
Int. Cl.^{5} C08F *283/04;* **C08L** *77/06*

U.S. Cl. 525—420 **2 Claims**

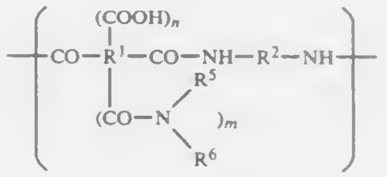




1. A photosensitive polymer having an inherent viscosity of 0.1 to 5 dl/g when measured in a solvent at a temperature of 30°±0.01° C. at a concentration of 0.5 g/dl, containing a repeating unit represented by the following general formula (I), and containing or not containing a repeating unit represented by the following general formula (II):



$$\left[\mathrm{CO}-\underset{(\mathrm{CO}-\mathrm{N}(\mathrm{R}^3-\mathrm{SH})(\mathrm{R}^4))_m}{\overset{(\mathrm{COOH})_n}{\mathrm{R}^1}}-\mathrm{CO}-\mathrm{NH}-\mathrm{R}^2-\mathrm{NH}\right] \qquad \text{(I)}$$



$$\left[\mathrm{CO}-\underset{(\mathrm{CO}-\mathrm{N}(\mathrm{R}^5)(\mathrm{R}^6))_m}{\overset{(\mathrm{COOH})_n}{\mathrm{R}^1}}-\mathrm{CO}-\mathrm{NH}-\mathrm{R}^2-\mathrm{NH}\right] \qquad \text{(II)}$$

wherein R^1 is independently a trivalent or tetravalent carbon cyclic aromatic group or hetrocyclic group; R^2 is independently an aliphatic group having at least 2 carbon atoms, an alicyclic group, an aromatic aliphatic group, a carbon cyclic aromatic group, a heterocyclic group or a polysiloxane group; R^3 is a divalent organic group; R^4 is $-R^3-SH$, a hydrogen atom or a monovalent organic group; R^5 is a monovalent organic group having a photosensitive unsaturated group; R^6 is a hydrogen atom or a monovalent organic group; m is independently 1 or 2; n is independently 0 or 1; and m and n satisfy $1 \leqq m + n \leqq 2$.

5,026,789

CURABLE IMPACT MODIFIED EPOXY RESIN HAVING STABILIZED MULTIPHASE MORPHOLOGY

Thomas Weber, Ludwigshafen; Walter Heckmann, Weinheim; Jürgen Mertes, Ludwigshafen; Helmut Tesch, Roedersheim-Gronau; Volker Altstaedt, Gernsheim; Wolfgang Eberle, Mainz; Thomas Folda, Neuleiningen; Herbert Stutz, Karlsruhe, all of Fed. Rep. of Germany, and Hans-Gert Recker, Irvine, Calif., assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 15, 1989, Ser. No. 451,387

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1988, 3842306

Int. Cl.^{5} C08G *59/50*

U.S. Cl. 525—423 **5 Claims**

1. A curable impact modified epoxy resin mixture which upon curing exhibits a stabilized multiphase morphology containing

A. an aromatic, at least bifunctional epoxy compound having an average molecular weight M_n of less than 2000,

B. an at least bifunctional amine curing agent, and

C. from 10 to 40 percent by weight of an aromatic thermoplastic polymer which contains reactive groups and has a number average molecular weight of from 4000 to 20,000 and a glass transition temperature of above 120° C.,

with the proviso that epoxy groups and the active hydrogen atoms of components B and C are present in a ratio of from 0.8:1 to 1.6:1, also containing

D. from 0.1 to 10 percent by weight of a high molecular weight emulsifier which is compatible not only with epoxy compound A but also with polymer C, the amount of emulsifier (D) being effective to result in a cured multiphase system wherein the dispersed phase is of uniform size and shape,

wherein said emulsifier (D) is a phenoxy resin having a molecular weight M_n of more than 4000 to about 42,600.

VOL
1127
ISS
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5,026,790

POLYESTER COMPOSITIONS EXHIBITING ENHANCED MELT VISCOSITY

John A. Tyrell, Dalton, Mass., and S. Jack Willey, Chatham, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Aug. 14, 1990, Ser. No. 567,205
Int. Cl.^{5} C08F *20/00*
U.S. Cl. 525—438 **12 Claims**

1. A thermoplastic polyester resin composition comprising:
(a) a thermoplastic polyester resin;
(b) a melt viscosity increasing amount of an alkali metal salt of an aliphatic polycarboxylic acid having a molecular weight from between 300 and 1500;
(c) a melt viscosity increasing amount of a multifunctional epoxide having an average epoxy functionality of greater than 2.0 epoxy groups per epoxide molecule.

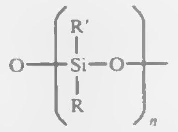
5,026,791

AROMATIC CARBONATE POLYMER COMPOSITION

Christopher M. Hawkins, Evansville; Robert R. Gallucci, Mt. Vernon, both of Ind., and John S. Razzano, Cohoes, N.Y., assignors to General Electric Company, Mt. Vernon, Ind.

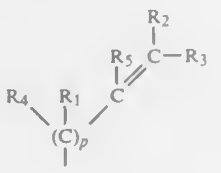
Filed Sep. 14, 1989, Ser. No. 407,371
Int. Cl.^{5} C08F *283/02*
U.S. Cl. 525—464 **17 Claims**

1. A composition comprising an aromatic carbonate polymer wherein there is a siloxane unit of the structure below



$$O-\left(\overset{R'}{\underset{R}{Si}}-O\right)_n-$$

wherein n is an integer of one to about 100, R and R′ are each selected from the group consisting of alkyl of one to twelve carbon atoms, inclusive, cycloalkyl of four to eight carbon atoms, inclusive, aryl of six to twenty carbon atoms, inclusive, aryl substituted alkyl of seven to twenty two carbon atoms, inclusive, and A which is



wherein p is an integer of zero to about 4. R_1, R_2, R_3, R_4 and R_5, are the same or different and are selected from hydrogen, alkyl of one to six carbon atoms, inclusive, and with the proviso that there is sufficient A present that the flame retardance of the polymer is enhanced compared to the polymer without the said siloxane unit.

5,026,792

RESIN COMPOSITION

Saburo Akiyama, Tokyo; Naoyuki Murakami, and Kazuo Kitamura, both of Mihara, all of Japan, assignors to Teijin Chemicals, Ltd., Tokyo, Japan

PCT No. PCT/JP89/00546, § 371 Date Mar. 7, 1990, § 102(e) Date Mar. 7, 1990, PCT Pub. No. WO89/12078, PCT Pub. Date Dec. 14, 1989

PCT Filed May 31, 1989, Ser. No. 460,055
Claims priority, application Japan, Jun. 1, 1988, 63-132604
Int. Cl.^{5} C08L *69/00*
U.S. Cl. 525—468 **3 Claims**

1. A resin composition comprising 30 to 99.5 wt. % of an aromatic polycarbonate and 70 to 0.5 wt. % of a fluorine type copolymeric elastomer obtained by copolymerization of vinylidene fluoride and hexafluoroacetone.

5,026,793

RESIN COMPOSITIONS AND A METHOD OF CURING THE SAME

Noboru Nakai, Hiratsuka; Osamu Isozaki, Yokohama, and Naozumi Iwasawa, Hiratsuka, all of Japan, assignors to Kansai Paint Company Limited, Hyogo, Japan

Filed Sep. 5, 1989, Ser. No. 402,408
Claims priority, application Japan, Sep. 9, 1988, 63-227093
Int. Cl.^{5} C08F *283/00*
U.S. Cl. 525—476 **4 Claims**

1. A resin composition comprising (A) a high molecular weight hydroxy compound containing an average of 2 or more hydroxyl groups per molecule and having a number average molecular weight of 3,000 to 200,000 (B) an epoxy compound containing an average of 2 or more epoxy groups per molecule and having a number average molecular weight of 120 to 200,000, (C) a silane compound containing an average of 1 or more functions groups selected from the class consisting of alkoxysilane, silanol and acyloxysilane groups per molecule and having a number average molecular weight of 104 to 200,000, and (D) at least one metal chelate of aluminum, titanium, titanium or zirconium with a ligand which exhibits keto-enol tautomerism and which forms a stable ring with the metal.

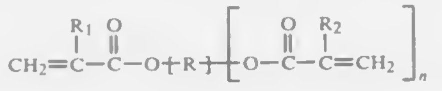
5,026,794

ADDUCTS OF AN HYDROXY-FREE ACRYLATE RESIN AND AN EPOXY RESIN

Kam W. Ho, and Patrick W. Lam, both of Sarnia, Canada, assignors to Polysar Limited, Sarnia, Canada

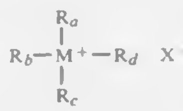
Filed May 23, 1989, Ser. No. 355,472
Int. Cl.^{5} C08L *63/10*
U.S. Cl. 525—532 **6 Claims**

1. A liquid adduct which is copolymerizable with at least one ethylenically unsaturated monomer, said adduct consisting of
(i) an epoxy resin having from 2 to 4 epoxy functional groups, and
(ii) a hydroxy-free acrylate resin according to the formula



$$CH_2=\overset{R_1}{C}-\overset{O}{\overset{\|}{C}}-O+R+\left[O-\overset{O}{\overset{\|}{C}}-\overset{R_2}{C}=CH_2\right]_n$$

wherein R is the hydroxy-free residue of a polyhydric alcohol, R_1 and R_2 are independently hydrogen or methyl, and n is from 1 to 3, characterized in that said adduct is prepared by reacting said epoxy resin and said hydroxy-free acrylate resin in the presence of a catalyst selected from (a) an tertiery amine and (b) an onium salt according to the formula:



$$R_b-\overset{R_a}{\underset{R_c}{M^+}}-R_d \quad X^-$$

where M is selected from elemental nitrogen and elemental phosphorous, X is selected from bromine, chlorine and iodine, and R_a, R_b, R_c and R_d are the same or different and are selected from the group consisting of alkyl, aryl and cycloalkyl hydrocarbons having from 1 to 20 carbon atoms.

5,026,795

PROCESS FOR PREVENTING FOULING IN A GAS PHASE POLYMERIZATION REACTOR

John P. Hogan, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 24, 1987, Ser. No. 18,167
Int. Cl.^{5} C08F *2/34*
U.S. Cl. 526—74 **3 Claims**

1. In a process in which comonomers are polymerized in the polymerization zone of a gas phase polymerization reactor in the presence of catalyst particles to produce copolymer particles, the improvement comprising admixing an antistatic agent with a liquid carrier comprising one of said comonomers, introducing the resulting mixture to said polymerization zone and allowing said liquid carrier to vaporize whereby at least a portion of said antistatic agent is present in said polymerization zone and is able to contact said copolymer particles directly during said process, said antistatic agent being compatible with said catalyst particles and being introduced to said polymerization zone in an amount sufficient to prevent fouling of said reactor.

5,026,796

PEPTIZED AND PHOSPHATED INORGANIC OXIDES, CATALYSTS, AND POLYMERIZATION PROCESSES

Max P. McDaniel; Emory W. Pitzer, and Floyd E. Farha, Jr., all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 250,589, Sep. 29, 1988, Pat. No. 4,900,704. This application Nov. 27, 1989, Ser. No. 441,572
Int. Cl.^{5} C08F *4/06, 4/24*
U.S. Cl. 526—100 **19 Claims**

1. A polymerization process comprising contacting at least one mono-1-olefin having 2 to 8 carbon atoms per molecule with a catalyst system produced by:
(a) forming a phosphated aluminum oxide by peptizing fine, boehmite alumina crystallites with a peptizing agent selected from the group consisting of nitric acid, aluminum nitrate, and mixtures thereof to form a clear solution;
(b) adding a phosphating agent selected from the group consisting of phosphoric acid, ammonium phosphates, and mixtures thereof to said clear solution to form a partially precipitated, phosphated alumina;
(c) further hardening said partially precipitated, phosphated alumina by neutralizing the clear solution with the base selected from the group consisting of ammonia, ammonium hydroxide, alkyl ammonium hydroxides, amines, and mixtures thereof;
(d) removing substantially all water from the thus further hardened phosphated alumina xerogel to form a substantially water-free precipitate; and
(e) incorporating a chromium compound into said phosphated alumina xerogel.

5,026,797

PROCESS FOR PRODUCING ETHYLENE COPOLYMERS

Tadashi Takahashi, Yokkaichi, Japan, assignor to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Oct. 20, 1988, Ser. No. 260,599
Claims priority, application Japan, Oct. 22, 1987, 62-267500
Int. Cl.^{5} C08F *4/648, 210/02*
U.S. Cl. 526—124 **20 Claims**

1. A process for producing ethylene copolymers which comprises contacting, in the gas phase, ethylene and an α-olefin having 3 to 10 carbon atoms with a catalyst thereby to copolymerize ethylene with the α-olefin, the catalyst comprising:
a solid component, component (A), which is a zirconium compound having formed a π-bonding with a conjugated five-membered ring carried on a support of water-insoluble porous inorganic oxide particles that have been preliminary treated with an alumoxane; and
an alumoxane, component (b);
the alumoxane as the component (B) being in the form of a solution in an aromatic hydrocarbon in a concentration of at least 5% (w/v), the component (A) and the component (B) being introduced into a polymerization vessel after they have been contacted with each other, and the quantities of the component (A) and the component (B) being such that the atomic ratio of Al/Zr is in the range of 150 to 10,000.

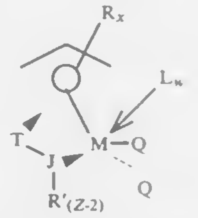
5,026,798

PROCESS FOR PRODUCING CRYSTALLINE POLY-α-OLEFINS WITH A MONOCYCLOPENTADIENYL TRANSITION METAL CATALYST SYSTEM

Jo Ann M. Canich, Webster, Tex., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Continuation-in-part of Ser. No. 533,245, Jun. 4, 1990, which is a continuation-in-part of Ser. No. 406,945, Sep. 13, 1989, abandoned. This application Sep. 13, 1990, Ser. No. 581,817
Int. Cl.^{5} C08F *4/642*
U.S. Cl. 526—127 **13 Claims**

1. A process for producing crystalline poly-α-olefins comprising the steps of
(i) contacting an α-olefin monomer at a temperature and pressure sufficient to polymerize such monomer with a catalyst system comprising;
(A) an alumoxane, and
(B) a group IV-B transition metal component of the formula



wherein M is Zr, Hf or Ti in its highest formal oxidation state;
R is a substituent group with "x" denoting the degree of substitution (x=0, 1, 2, 3 or 4) and each R is, independently, a radical selected from a group consisting of C_1–C_{20} hydrocarbyl radicals, substituted C_1–C_{20} hydrocarbyl radicals wherein one or more hydrogen atoms is replaced by a halogen radical, an amido radical, a phosphido radical, an alkoxy radical or any other radical containing a Lewis acidic or basic functionality, C_1–C_{20} hydrocarbyl-substituted metalloid radicals wherein the metalloid is selected from the Group IV A of the Periodic Table of Elements, and halogen radicals, amido radicals, phosphido radicals, alkoxy radicals. alkylborido radicals or a radical containing Lewis acidic or basic functionality, or at least two adjacent R-groups are joined forming C_4–C_{20} ring to give a saturated or unsaturated polycyclic cyclopentadienyl ligand;
(JR'_{z-2}) is a heteroatom ligand in which J is an element with a coordination number of three from Group V A or an element with a coordination number of two from Group VI A of the Periodic Table of Elements, and each R′ is, independently a radical selected from a group consisting of C_1–C_{20} hydrocarbyl radicals, substituted C_1–C_{20} hydrocarbyl radicals where one or more hydrogen atom is replaced by a halogen radical, an amido radical, a phosphido radical, and alkoxy radical or a radical containing a Lewis acidic or basic function-

VOL 1127
ISS 4
JE 25
1991
UMI

ality, and "z" is the coordination number of the element J;

each Q is, independently, any univalent anionic ligand or two Q's are a divalent anionic chelating ligand;

T is a covalent bridging group containing a Group IV A or V A element;

L is a neutral Lewis base where "w" denotes a number from 0 to 3;

(ii) recovering a crystalline poly-α-olefin.

5,026,799

LIVING CATIONIC POLYMERIZATION OF VINYLIC UNSATURATED COMPOUNDS

Thomas L. Heitz, and Young H. Kim, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 30, 1990, Ser. No. 530,679

Int. Cl.^{5} C08F *4/06*

U.S. Cl. 526—192 **25 Claims**

1. A process for the living cationic polymerization of electron rich vinyl monomers containing electron donating substituents, comprising contacting said electron rich vinyl monomers under polymerizing conditions, in a substantially anhydrous reaction medium, with an initiator/catalyst combination including one or more saturated halogenated aliphatic acids of the formula

$$C_nH_aX_bCX_2CO_2H$$

wherein:

$n=0–3$,

$a=0–7$,

$b=0–7$, and

X is selected from the group consisting of fluorine, chlorine and bromine

as the initiator, and the zinc salts of the same or different said saturated halogenated aliphatic acids, as the catalyst.

5,026,800

WATER-ABSORBENT RESIN AND PRODUCTION PROCESS

Kazumasa Kimura, Nara; Kinya Nagasuna, Hyogo; Takashi Namba, Osaka; Kenji Kadonaga, Hyogo; Koji Miyake, Osaka, and Tadao Shimomura, Osaka, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Filed Jun. 26, 1989, Ser. No. 371,175

Claims priority, application Japan, Jun. 28, 1988, 63-158086; Jul. 4, 1988, 63-164940; Oct. 13, 1988, 63-255866

Int. Cl.^{5} C08F *2/08, 20/06, 120/06*

U.S. Cl. 526—200 **9 Claims**

1. A process for producing a water absorbent resin wherein an aqueous solution of an acrylic or sulfonyl acid, or their salts, having a viscosity of 15 to 5,000 cps, determined by a Brookfield rotational viscometer (25 C, 0.6 rpm), using a sucrose fatty acid ester and/or a polyglycerol fatty acid ester as dispersing agent, is polymerized to obtain a gel-like water containing polymer, said gel-like water containing polymer is dried, the dried polymer is pulverized, and sieved to obtain a polymer powder having an average particle diameter of 100 to 600 μm and a particle diameter distribution of 0.35 or less (logarithmic standard deviation), and the surface of said powder is crosslinked.

5,026,801

POLYHALODIHYDRODIOXINS AND POLYHALODIOXOLES

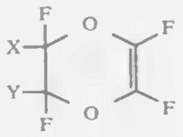
Carl G. Krespan, and Paul R. Resnick, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 18, 1989, Ser. No. 408,593

Int. Cl.^{5} C08F *116/00;* **C07D** *319/14*

U.S. Cl. 526—247 **23 Claims**

1. A fluorodihydrodioxin of the formula



wherein:

X and Y independently are F or R_F provided that X and Y are not both F;

R_F is a C_1 to C_8 linear or branched ether oxygen; and

X and Y taken together are $(CF_2)n$, where $n=2–4$.

5,026,802

POLYMERS DERIVED FROM 2,6-SUBSTITUTED-4-AMINO-PYRIDINES

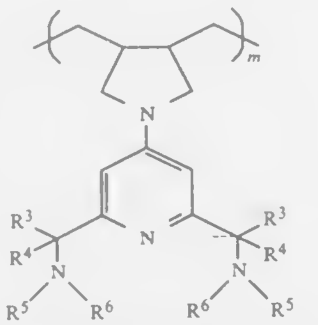
Lon J. Mathias, and Gustavo Cei, both of Hattiesburg, Miss., assignors to The University of Southern Mississippi, Hattiesburg, Miss.

Division of Ser. No. 324,817, Mar. 17, 1989, Pat. No. 4,940,796. This application May 8, 1990, Ser. No. 520,450

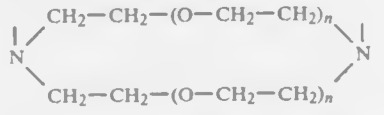
Int. Cl.^{5} C80F *226/06*

U.S. Cl. 526—259 **5 Claims**

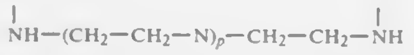
1. A composition comprising a polymer having repeating units of the formula



wherein R^3 and R^4 are independently hydrogen, or C_{1-20} alkyl unsubstituted or substituted with a C_{1-3} alcohol or together R^3 and R^4 are oxygen, and R^5 and R^6 are independently C_{1-20} alkyl unsubstituted or substituted with C_{1-3} alcohol or phenyl, hydroxy $—(CH_2)_{1-3}COOH$, $—CHR^7COOH$ wherein R^7, is C_{1-5} alkyl or C_{1-5} alkyl substituted with hydroxy, amino, or carboxy, or allyl unsubstituted or substituted with a C_{1-4} alkyl or phenyl or together R^5 and R^6 with the two nitrogen atoms form a fused ring having the formula



wherein n is 1 or 2, or form a fused ring having the formula



$$\overset{|}{N}H-(CH_2-CH_2-N)_p-CH_2-CH_2-\overset{|}{N}H$$

wherein p is an integer from 0 to 3, and m is an integer from 10–10,000.

5,026,803

CROSSLINKED TRIAZINE POLYMERS AND THEIR USE AS CROSSLINKING AGENTS

Christian Lindner, Cologne, and Karl-Erwin Piejko, Bergisch Gladbach, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 25, 1990, Ser. No. 542,822

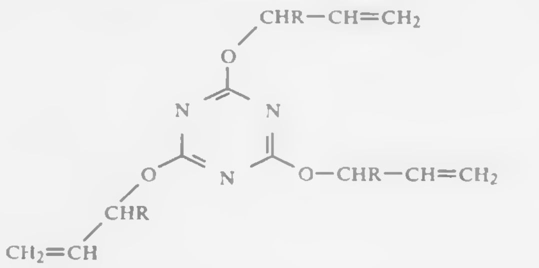
Claims priority, application Fed. Rep. of Germany, Jul. 8, 1989, 3922498

Int. Cl.^{5} C08F *226/06, 222/06, 218/02, 212/06*

U.S. Cl. 526—261 **2 Claims**

1. Crosslinked particulate polymers having ethylenically unsaturated groups, an iodine number of 15 to 200, a median particle diameter (d_{50}) of 0.05 to 1 μm and consisting of

A) from 11 to 60% by weight of 2,4,6-tris-(2-propyenyloxy)-1,3-5-triazine of the formula (I)



(1)

wherein

R denotes hydrogen, CH_3 or C_2H_5 and

B) from 89 to 40% by weight of at least one vinylmonomer.

5,026,804

POLYMERIZATION OF HALO ARYL OLEFIN

Walter Heitz, Kirchhain, and Andreas Greiner, Marburg-Moischt, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

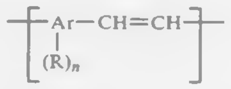
Division of Ser. No. 201,879, Jun. 3, 1988, Pat. No. 4,950,737. This application Feb. 1, 1990, Ser. No. 473,584

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1987, 3719851

Int. Cl.^{5} C08F *114/14*

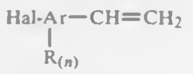
U.S. Cl. 526—293 **1 Claim**

1. Process for the preparation of a polymer having recurrent structural units of the formula (I)



$$\left[\underset{\substack{|\\(R)_n}}{Ar}-CH=CH\right] \qquad (I)$$

wherein Ar denotes an aromatic or heterocyclic group, R denotes hydrogen or an inert substituent and n denotes an integer with a value from 0–8, comprising reacting halogen compounds of the formula (III)



$$Hal\text{-}\underset{\substack{|\\R_{(n)}}}{Ar}-CH=CH_2 \qquad (III)$$

wherein Ar denotes an aromatic or heterocyclic group, R denotes hydrogen or an inert substituent, Hal denotes halogen, n denotes 0, 1, 2 or 3 in an inert polar solvent at 70°–150° C. in the presence of a catalyst in the presence of a base in excess.

5,026,805

LOW-HYGROSCOPIC COPOLYMER

Kazuhiro Hosoya, Tokyo; Ikuji Ohtani, Yokohama, and Kimio Imaizumi, Kiyose, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Dec. 1, 1989, Ser. No. 444,438

Claims priority, application Japan, Dec. 5, 1988, 63-306100

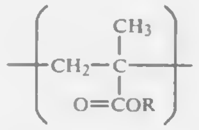
Int. Cl.^{5} C08F *220/06, 8/48*

U.S. Cl. 526—309 **7 Claims**

1. A low hygroscopic, random copolymer comprising:

(A) methyl methacrylate units,

(B) methacrylate units represented by the formula



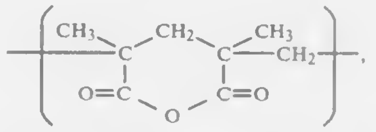
$$\left(CH_2-\overset{\substack{CH_3\\|}}{\underset{\substack{|\\O=COR}}{C}}\right) \qquad [1]$$

wherein R denotes an alicyclic hydrocarbon radical of 6–20 carbon atoms,

(C) aromatic vinyl units,

(D) methacrylic acid units and

(E) six-membered ring acid anhydride units represented by the formula



[2]

said copolymer being characterized in that the contents of units (A), (B), (C), (D), and (E), are represented by a, b, c, d, and e % by weight, respectively, and satisfying the conditions:

$$93.9>a\geqq 25,$$

$$49\geqq b\geqq 5,$$

$$30\geqq c\geqq 0,$$

$$20\geqq d\geqq 0.1,$$

$$40\geqq e\geqq 1,$$

$$98.9\geqq a+b\geqq 50,$$

$$98.0\geqq a+b+c\geqq 60 \text{ and}$$

$$a+b+c+d+e=100$$

and that a chloroform solution of the copolymer in a concentration of 0.15 g/0.5 dl has a reduced viscosity of 0.2–1.0 dl/g at 25° C.

VOL
1127
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5,026,806

UV-CROSSLINKABLE MATERIALS BASED ON ISOAMYL (METH)ACRYLATE COPOLYMERS

Gerd Rehmer, Beindersheim; Andreas Boettcher, Nussloch; Peter Pfoehler, Speyer; Oral Aydin, Mannheim, and Gerhard Nestler, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengeselischaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 5, 1989, Ser. No. 417,698

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1988, 3836968

Int. Cl.^{5} C08F *216/36*

U.S. Cl. 526—316 **9 Claims**

1. A material which is crosslinkable by ultraviolet radiation under atmospheric oxygen and is based on (meth)acrylate copolymers having a K value of from 10 to 100, obtained by free radical polymerization, in the presence or absence of a solvent, of

- a) from 5 to 97.4% by weight of isoamyl acrylate, isoamyl methacrylate, or mixtures thereof,
- b) from 0 to 89.9% by weight of (meth)acrylates whose homopolymers have a glass transition temperature below −30° C.,
- c) from 2.5 to 30% by weight of α,β-monoolefinically unsaturated compounds whose homopolymers have a glass transition temperature above −30° C.,
- d) from 0 to 10% by weight of monoolefinically unsaturated acids, their anhydrides or mixtures thereof, and
- e) from 0 to 20% by weight of further olefinically unsaturated monomers having one or more of the following functional groups: hydroxyl, amide, epoxide, ether, ester, urethane, urea, primary, secondary and tertiary amine and ether groups, and
- f) from 0.1 to 5% by weight of a copolymerizable benzophenone derivative or acetophenone derivative,

the sum of the percentages by weight X (=a+b+c+d+f) being 100 in each case.

5,026,807

NOVEL ESTER GROUP-CONTAINING (METH)ACRYLIC ACID ESTER, NOVEL (CO)POLYMER THEREOF, COMPOSITION COMPRISING THE (CO)POLYMER AND COMPOSITION COMPRISING THE ESTER GROUP CONTAINING (METH)ACRYLIC ACID ESTER

Yosihiro Ohira; Toshio Ohhara, both of Yokkaichi, and Toshio Miyabayashi, Chiba, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

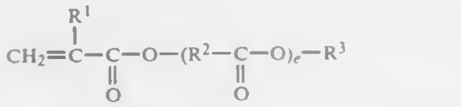
Continuation-in-part of Ser. No. 429,544, Oct. 31, 1989, abandoned. This application May 15, 1990, Ser. No. 523,180

Claims priority, application Japan, Oct. 31, 1988, 63-273330

Int. Cl.^{5} C08F *22/10*

U.S. Cl. 526—321 **10 Claims**

1. An ester group-containing (meth)acrylic acid ester (co)polymer composed of (A) 5–100% by weight of an ester group-containing (meth)acrylic acid ester of the general formula (I)



$$CH_2{=}\overset{\overset{\displaystyle R^1}{|}}{C}-\underset{\underset{\displaystyle O}{\|}}{C}-O-(R^2-\underset{\underset{\displaystyle O}{\|}}{C}-O)_e-R^3 \qquad (I)$$

wherein R^1 is a hydrogen atom or a methyl group, R^2 is a $C_{3\text{-}20}$ alkylene group, R^3 is a $C_{1\text{-}20}$ hydrocarbon group or its derivative, and e is an integer of 1–20 and (B) 0–95% by weight of another monomer copolymerizable with the component (A).

5,026,808

METHOD FOR RECOVERING AND USING LIGNIN IN ADHESIVE RESINS BY EXTRACTING DEMETHYLATED LIGNIN

Herbert A. Schroeder, Ft. Collins, Colo., assignor to Colorado State University Research Foundation, Ft. Collins, Colo.

Filed Apr. 3, 1989, Ser. No. 332,716

Int. Cl.^{5} C08H *5/02*

U.S. Cl. 527—400 **15 Claims**

1. A method for extracting demethylated lignin from a demethylated lignin-containing aqueous solution, said method comprising:

(1) mixing the demethylated lignin-containing aqueous solution with a polar, partially water immiscible organic solvent to form a demethylated lignin-containing aqueous solution/organic solvent mixture;
(2) allowing the demethylated lignin-containing aqueous solution/organic solvent mixture to form at least two phases wherein at least one of the at least two phases is an aqueous phase and at least one of the at least two phases is an organic solvent phase which contains at least a portion of the demethylated lignin which was contained in the demethylated lignin-containing aqueous solution;
(3) separating the aqueous phase from the organic solvent phase; and
(4) recovering the demethylated lignin contained in the organic solvent phase.

5,026,809

LEWIS BASE ADDUCTS OF DECARBORANE FOR FORMING NEW PRECERAMIC POLYMERS, USING AS BINDERS, FORMING SHAPED BODIES AND FORMING FIBERS

Seyferth Dietmar, Lexington, and William S. Rees, Jr., Arlington, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 65,224, Jun. 22, 1987, Pat. No. 4,871,826. This application Jun. 2, 1989, Ser. No. 361,019

The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.

Int. Cl.^{5} C08G *79/08;* **C01B** *35/14;* **C04B** *35/58*

U.S. Cl. 528—4 **20 Claims**

1. A preceramic polymer soluble in an organic solvent formed by reacting

(a) $B_{10}H_{14-n}R_n$,

where R is a lower alkyl group having from 1 to about 8 carbon atoms. a substituted or unsubstituted cycloalkyl group having from 3 to about 8 carbon atoms. a substituted or unsubstituted lower alkenyl group having from 2 to about 8 carbon atoms, or a substituted or unsubstituted lower aryl group having from 6 to about 10 carbon atoms, and n is a number from zero to about six, with

(b) a diamine of the formula
$R^1R^2N\text{-}(E)_q\text{-}NR^4R^5$,

where R^1, R^2, R^4 and R^5 are H. a lower alkyl group having from 1 to about 8 carbon atoms, a substituted or unsubstituted cycloalkyl group having from 3 to about 8 carbon atoms a substituted or unsubstituted lower alkenyl group having from 2 to about 8 carbon atoms, a substituted or unsubstituted lower aryl group having from 6 to about 10 carbon atoms, or a di- or triorganosilyl group, R^1, R^2, R^4 and R^5 can be the same or different, E is a difunctional substituted or unsubstituted heteroatom-containing group q is a number 1 or greater,

in an organic solvent for a sufficient time to form said preceramic polymer.

5,026,810

VINYL ETHER SILOXANES

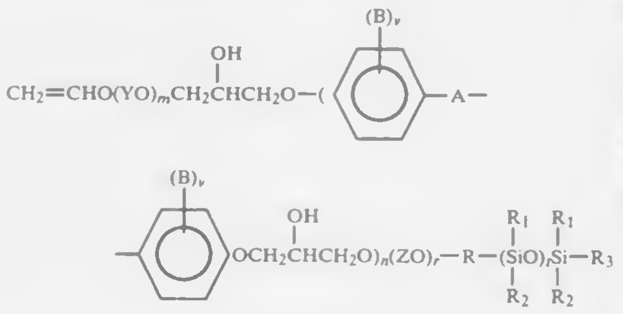
Kou-Chang Liu, Wayne, N.J., assignor to GAF Chemicals Corporation, Wayne, N.J.

Continuation-in-part of Ser. No. 481,037, Feb. 16, 1990, Pat. No. 4,980,430, and Ser. No. 424,453, Oct. 20, 1989, abandoned. This application Aug. 9, 1990, Ser. No. 564,936

Int. Cl.^{5} C08G *77/06*

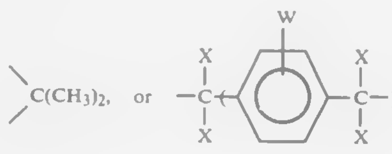
U.S. Cl. 528—14 **10 Claims**

1. A vinyl ether siloxane having the formula

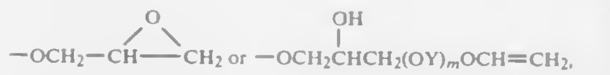


wherein

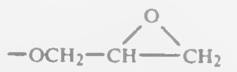
Y is alkylene or phenylene optionally substituted with fluorine,
R is alkylene or alkylene phenylene,
R_1 and R_2 are lower alkyl,
R_3 is C_1 to C_{20} alkyl,
A is



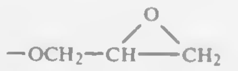
W is



with the proviso W is



when p is one and at least one of W is



when p is greater than one;
Z is C_2 to C_3 alkylene,
X is hydrogen or methyl,
B is halo or lower alkyl,
m has a value of from 1 to 10,
n has a value of from 1 to 20,
p has a value of from 0 to 10,
r has a value of from 0 to 20,
t has a value of from 1 to 100 and
v has a value of from 0 to 4.

5,026,811

SILICONE RESIN THERMOSET MOLDING COMPOSITIONS

Gust J. Kookootsedes, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Feb. 16, 1990, Ser. No. 481,086

Int. Cl.^{5} C08G *77/06*

U.S. Cl. 528—14 **25 Claims**

1. A silicone resin composition comprising (A) a siloxane resin having an R:Si ratio of 1:1 to 1.7:1, where R is a radical selected from the group consisting of monovalent hydrocarbon radicals and monovalent halogenated hydrocarbon radicals, and the siloxane resin containing at least 0.25 percent by weight of silicon-bonded hydroxyl groups, (B) a filler, and (C) a catalytic amount of an alkali metal salt selected from the group consisting of an alkali metal carbonate plus a carboxylic acid, an alkali metal bicarbonate plus a carboxylic acid, an alkali metal carbonate plus an ammonium salt of a carboxylic acid, an alkali metal bicarbonate plus an ammonium salt of a carboxylic acid, an alkali metal salt of a carboxylic acid, and mixtures thereof.

5,026,812

ORGANOPOLYSILOXANE COMPOSITION CURABLE TO AN ELASTOMER AND USE THEREOF

Klaus M. Geilich, Wiesbaden, Fed. Rep. of Germany, assignor to Dow Corning GmbH, Vienna, Austria

Filed Nov. 9, 1989, Ser. No. 433,934

Claims priority, application United Kingdom, Nov. 24, 1988, 8827466

Int. Cl.^{5} C08G *77/06*

U.S. Cl. 528—17 **9 Claims**

1. A composition curable to an elastomer in the presence of moisture and comprising the product obtained by mixing (A) 100 parts by weight of a polydiorganosiloxane having at least two silicon-bonded hydroxyl groups and wherein at least 50 percent of the total organic substituents are methyl groups, (B) from 1 to 40 parts by weight of one or more oxime silanes of the general formula

$$R_{4-n}Si(ON{=}CR'_2)_n$$

wherein each R represents an alkyl group having less than 6 carbon atoms, a vinyl group, an allyl group or a phenyl group, each R′ represents an alkyl group having from 1 to 6 carbon atoms or a phenyl group and n has an average value of from 2.1 to 3 and (C) from 0.1 to 1.5 parts by weight of one or more alkanolamines.

5,026,813

POLYSILSEQUIOXANE AND POLYMETHYL-N-HEXYLSILSESQUIOXANE COATING COMPOSITIONS

Martin G. Meder, Hightstown, N.J., assignor to General Electric Company, East Windsor, N.J.

Filed Dec. 27, 1989, Ser. No. 457,622

Int. Cl.^{5} C08G *77/06*

U.S. Cl. 528—18 **12 Claims**

1. A moisture-curable polysilsesquioxane comprising a partially water-hydrolyzed, silane catalyst-containing, condensation product of about 10 to about 50 mole percent trimethoxysilane having substituted thereon a lower alkyl group containing 1 to about 9 carbon atoms, a halo lower alkyl group containing 1 to about 9 carbon atoms, a phenyl group or a substituted phenyl group, and about 50 to about 90 mole percent methyltrimethoxysilane, the silane catalyst having at least one aminoalkyl-substituted group, at least one alkoxy-substituted group having at least 2 carbon atoms in the alkoxy group and optionally, an alkyl group, whereby the silane catalyst is a co-curing agent and condenses with the methyltrimethoxysilane and with the trimethoxysilane having the substituted group thereon.

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5,026,814
FLUORINATED POLYURETHANES ENDOWED WITH IMPROVED MECHANICAL PROPERTIES, CONTAINING RUBBER-LIKE POLYOXYPERFLUOROALKYLENE-STRUCTURE BLOCKS AND HYDROGENATED RIGID BLOCKS

Alberto Re, Milan, and Francesco Giavarini, Castelli Calepio, Italy, assignors to Ausimont S.r.l., Milan, Italy

Filed Sep. 15, 1989, Ser. No. 407,951

Claims priority, application Italy, Sep. 15, 1988, 21946 A/88

Int. Cl.^{5} C08G *18/30*

U.S. Cl. 528—61 **7 Claims**

1. Polyurethanes comprising in their structure polyoxyperfluoroalkylene blocks of rubber-like nature deriving from a polyfluoropolyether having hydroxylated and/or isocyanate end groups, and rigid blocks or segments deriving from short-chain aliphatic diols and/or from low molecular weight aliphatic or aromatic diamines, the number of rigid segments being equal to or greater than the number of the rubber-like blocks, the polyurethanes being prepared using aliphatic, cycloaliphatic, or aromatic diisocyanates or polyfluoropolyether diisocyanates and characterized by a tensile strength greater than 30 kg/cm^2, by a glass transition temperature lower than −80° C. and by a hardness ranging from 50 Shore A to 75 Shore D.

5,026,815
CHAIN-LENGTHENING AGENTS FOR P-PHENYLENE-METHYLENEDIISOCYANATE-PREPOLYMERS FOR CAST POLYURETHANE ELASTOMERS

Theodor Völker, Reinach; Hans Althaus, Glis, and Andreas Schmidt, Reinach, all of Switzerland, assignors to Lonza Ltd., Gampel/Valais, Switzerland

Filed Mar. 15, 1990, Ser. No. 493,748

Claims priority, application Switzerland, Mar. 17, 1989, 1002/89

Int. Cl.^{5} C08G *18/10*

U.S. Cl. 528—64 **9 Claims**

1. A chain-lengthening agent based on chlorinated 4,4′-methylenebisanilines for p-phenylenemethylenediisocyanate prepolymers for cast polyurethane elastomers, containing:

(a) 1 to 70 percent by weight of 4,4′-methylenebis (2,3-dichloro-6-ethyl-aniline),
(b) 0 to 70 percent by weight of 4,4′-methylenebis(2,5-dichloro-6-ethyl-aniline),
(c) 0.1 to 15 percent by weight of 4,4′-methylenebis(3-chloro-2,6-diethyl-aniline), plus
(d) 30 to 60 percent by weight of 2′3,3′,6-tetrachloro-2,6′-diethyl-4,4′-methylenedianiline and 3,3′, 6-trichloro-2,2′-triethyl-4,4′-methylenedianiline and 2′, 3,3′-trichloro-2,6,6′-triethyl-4,4′-methylenedianiline as a mixture, or
(e) 30 to 48 percent by weight of 2′,3,3′-trichloro-2,6,6′-triethyl-4,4′-methylenedianiline alone.

5,026,816
METALLIC OXIDE-OXIRANE POLYMERS AND PREPOLYMERS

Donald J. Keehan, 31012 Huntington Woods, Bay Village, Ohio 44140

Filed Jan. 19, 1989, Ser. No. 299,887

Int. Cl.^{5} C08G *59/40, 65/00*

U.S. Cl. 528—94 **13 Claims**

1. An oxirane prepolymer comprising the reaction product of an inorganic oxide having at least one hydrolyzable oxygen with a difunctional oxirane oligomer having at last one aromatic moiety and at least one oxirane containing aliphatic moiety, characterized in that said reaction is conducted in the presence of from about 0.01 to about 1.5 parts by weight of an imidazole catalyst per 100 parts by weight of oligomer, and substantially all of the hydrolyzable oxygen atoms in said oxide are bonded to said oligomer and there is substantially no bonding between oligomer moieties.

5,026,817
CATALYTIC PROCESS FOR PREPARING POLYCARBONATES FROM CARBONIC ACID

Takeshi Sakashita, and Tomoaki Shimoda, both of Kuga, Japan, assignors to GE Plastics Japan, Ltd., Tokyo, Japan

Filed Jul. 10, 1989, Ser. No. 377,272

Claims priority, application Japan, Jul. 11, 1988, 63-172297; Sep. 22, 1988, 63-238427

Int. Cl.^{5} C08G *64/30*

U.S. Cl. 528—199 **13 Claims**

1. A process for preparing polycarbonates by melt polycondensation of at least one aromatic dihydroxy compound and at least one carbonic acid diester in the presence of a catalyst comprising

(a) a nitrogen containing basic compound,
(b) from 10^{-8} to 10^{-3} mole, based on 1 mole of the aromatic dihydroxy compound, of an alkali metal or alkaline earth metal compound, and
(c) boric acid or boric ester.

5,026,818
MELT PREPARATION OF POLYAMIDE WITH ADDITIVE COMBINATION

Hans-Detlef Heinz; Rolf-Volker Meyer; Helmut Schulte, all of Krefeld, and Franz Zimmerman, Neuss, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Filed Sep. 5, 1989, Ser. No. 402,665

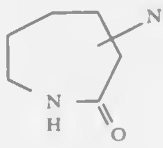
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1988, 3831707

Int. Cl.^{5} C08G *69/04, 69/28*

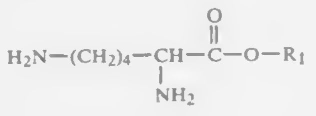
U.S. Cl. 528—313 **5 Claims**

1. A process for the accelerated production of high molecular weight (co)polyamide from monomer mixtures of diamine/dicarboxylic acid mixture or nylon salts, amino carboxylic acids, or lactams by melt polycondensation in the presence of an additive combination consisting of:

(a) 0.05 to 1.5% by weight of a compound corresponding to the formula (I) or (II)



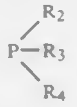
(I)



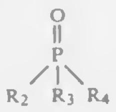
$$\mathrm{H_2N{-}(CH_2)_4{-}\underset{\displaystyle NH_2}{\underset{|}{CH}}{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}O{-}R_1}$$

(II)

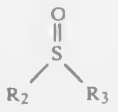
or mixtures of (I) and (II);
(b) a polycarboxylic acid in a quantity substantially equivalent to the free amino group in (I) or the second amino group in (II) respectively;
(c) and 0.001 to 2% by weight of a polyamide catalyst selected from compounds corresponding to the formulae (III) to (VII)



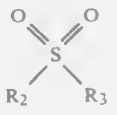
(III)



(IV)



(V)



(VI)

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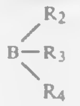


(VII)

in which
R_1 is hydrogen or C_{1-18} alkyl or C_{6-14} aryl,
R_2-R_4 independently of one another represent —OH, —OM wherein M is a monovalent or polyvalent metal, C_{1-18} (ar)alkoxy, C_6-(alk)aryloxy, a C_{1-18} (ar)alkyl or C_{6-20} (alk)aryl radical which is optionally substituted and the substituents R_2 to R_4 being partly replaceable by hydrogen, C_{1-18} (ar)alkyl or C_{6-20} (alk)aryl.

5,026,819
HIGH STRENGTH FIBER OR FILM OF AROMATIC COPOLYAMIDE WITH PENDANT CARBOXYL GROUPS

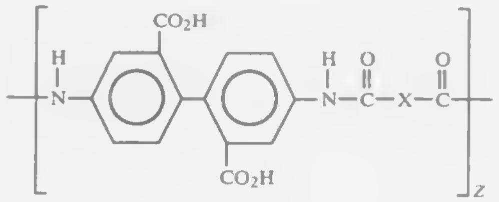
Robert S. Irwin, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 5, 1989, Ser. No. 446,339

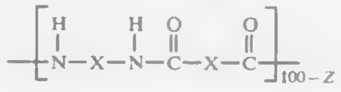
Int. Cl.^{5} C08G *69/32*

U.S. Cl. 528—329.1 **3 Claims**

1. Aromatic polyamide of fiber-forming molecular weight consisting essentially of the following repeat units in the indicated molar proportions:



and



$$-\!\!\left[\overset{\displaystyle H}{\overset{|}{N}}{-}X{-}\overset{\displaystyle H}{\overset{|}{N}}{-}\overset{\displaystyle O}{\overset{\|}{C}}{-}X{-}\overset{\displaystyle O}{\overset{\|}{C}}\right]_{100-Z}\!\!-$$

where X is 1,4-phenylene and where Z is from about 4 to 30 mole percent.

5,026,820
PROCESS FOR CONTINUOUS MIXING OF A TWO-LIQUID CURING TYPE RESIN

Takehiko Noguchi, Nagaokakyo; Takashi Sakubata, Ohtsu; Akinori Hisanaga, Takasago; Tetsuo Yoshioka, and Hirosaku Nagano, both of Ohtsu, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

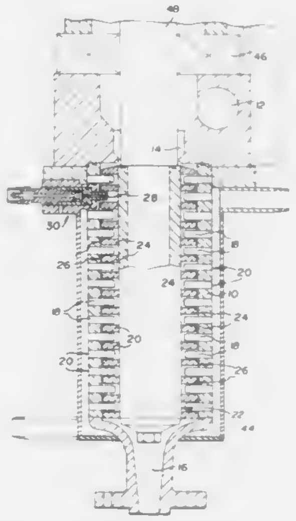
Filed Apr. 11, 1989, Ser. No. 336,389

Claims priority, application Japan, Apr. 12, 1988, 63-91199; Aug. 17, 1988, 63-205304

Int. Cl.^{5} C08G *69/26*

U.S. Cl. 528—350 **5 Claims**

1. A process for continuously mixing two liquid components, whose one liquid component is a two-liquid curing type resin which comprises continuously supplying one liquid component under stirring into a mixing container and pouring the other liquid component into said container by pushing open a needle forcibly provided to a check valve, the improvement



wherein said needle is pushed open with a non-curing liquid, thereafter, a curing liquid is poured into said mixing container.

5,026,821
POLYMERS OF CITRIC ACID AND DIAMINES, A PROCESS FOR THEIR PREPARATION AND THEIR USES, IN PARTICULAR AS CARRIERS OF DRUG

Mahfoud Boustta, Rouen; Jovanka Huquet, St. Martin Boscherville, and Michel Vert, Mont Saint Aignan, all of France, assignors to Sanofi, Paris, France

Filed Mar. 2, 1989, Ser. No. 318,032

Claims priority, application France, Mar. 8, 1988, 88 02956

Int. Cl.^{5} C08G *69/26;* **C07C** *59/08*

U.S. Cl. 528—350 **23 Claims**

1. Polyamides produced by the condensation of diamines with citric acid through the carboxyl groups attached to the carbon atoms in positions 1 and 3.

5,026,822
HIGH MOLECULAR WEIGHT POLYIMIDE, METHOD OF MAKING SAME AND ARTICLES FORMED THEREFROM

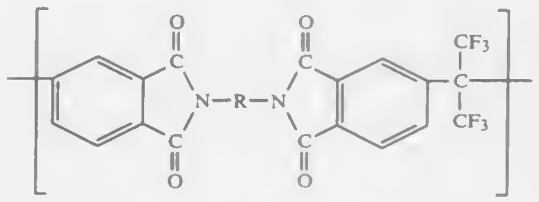
Rohitkumar H. Vora, West Warwick, R.I., assignor to Hoechst Celanese Corp., Somerville, N.J.

Filed Jul. 12, 1988, Ser. No. 217,797

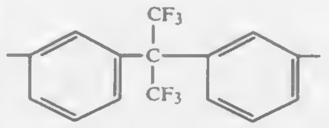
Int. Cl.^{5} C08G *69/26, 12/00, 63/00*

U.S. Cl. 528—353 **20 Claims**

1. A composition essentially of polyimide of the formula:



wherein R is



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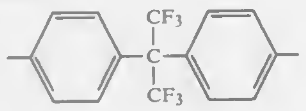


and wherein said composition has a weight average molecular weight, M_w of at least about 100,000 and a polydispersity of from about 1.8 to about 2.6; said weight average molecular weight being measured by gel permeation chromatography using a polystyrene calibration standard ranging in molecular weight from 1,250 to 470,000.

5,026,823

ALICYCLIC POLYMIDES AND A PROCESS FOR MAKING THE SAME

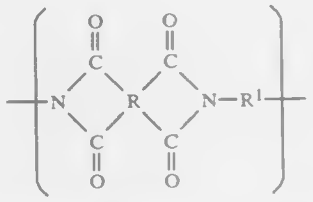
John D. Summers, Walnut Creek, and Thomas O. Jeanes, Antioch, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 12, 1989, Ser. No. 406,677

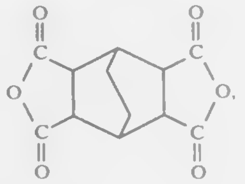
Int. Cl.^{5} C08G *69/26, 69/42, 63/00*

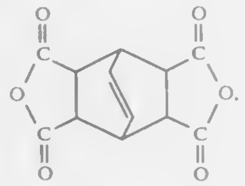
U.S. Cl. 528—353 **20 Claims**

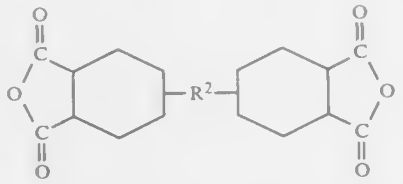
1. An alicyclic polyimide having recurring units corresponding to the formula:



wherein R is the tetravalent residue of at least one unsubstituted or inertly substituted alicyclic dianhydride, said dianhydride selected from the group consisting of:

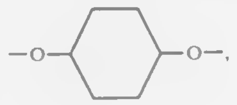


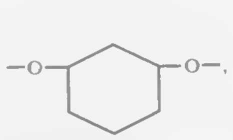




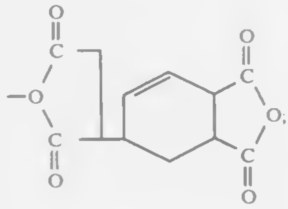
wherein R^2 is:

—, —O—, —CO—, —S–, —SO_2—,





a C_{1-6} divalent hydrocarbon radical, or a C_{1-6} halo-substituted hydrocarbon radical, and



wherein the groups inertly substituted on the dianhydride comprise C_{1-4} alkyl, and R^1 is the divalent residue of at least one aliphatic, alicyclic, or aromatic diamine; and wherein said polyimide is soluble in dipolar aprotic solvents.

5,026,824

COPOLY(PHENYLENE SULFIDE)

Mark Rule, Kingsport; Jerry S. Fauver, Blountville; David R. Fagerburg, Kingsport; Paul B. Lawrence, Blountville, and Joseph J. Watkins, Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

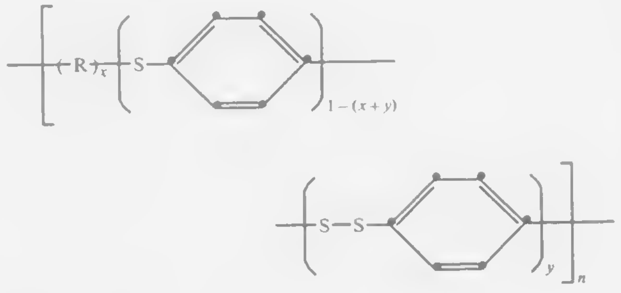
Continuation of Ser. No. 382,457, Jul. 20, 1989, abandoned, which is a continuation-in-part of Ser. No. 232,969, Aug. 17, 1988, abandoned. This application May 14, 1990, Ser. No. 522,495

The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.

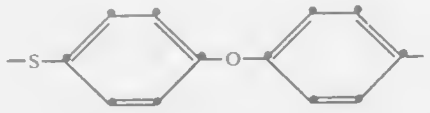
Int. Cl.^{5} C08G *75/14*

U.S. Cl. 528—389 **2 Claims**

1. A process for producing elemental iodine and a copoly(arylene sulfide) of repeating units corresponding to the structure



wherein R is

 or

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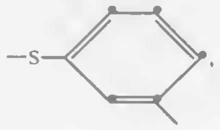
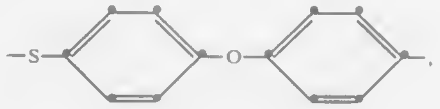
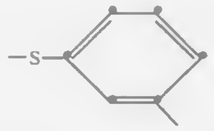


y is in the range of 0.005 to 0.10, x is in the range of 0.01 to 0.50 when R is



x is in the range of 0.01 to 0.30 when R is



and n is at least 200, consisting essentially of

(1) reacting at a temperature above about 175° C., a mixture of a diiodoaromatic compound and elemental sulfur to produce the elemental iodine and the copoly(arylene sulfide), and

(2) recovering the elemental iodine.

5,026,825

INTRANASAL CALCITONIN FORMULATIONS

Peter E. Grebow, Penllyn; Herschel H. Li, Ambler, both of Pa., and Lewis J. Klunk, Jr., Trumbull, Conn., assignors to Rhone-Poulenc Rorer Pharmaceuticals Inc., Fort Washington, Pa.

Filed Sep. 8, 1988, Ser. No. 242,000

Int. Cl.^{5} A61K *37/24;* **C07K** *7/36*

U.S. Cl. 530—307 **39 Claims**

1. An intranasal composition comprising from about 0.0001% W/V to about 15% W/V of a polypeptide having calcitonin activity (as hereinbefore defined); from about 0.0005% W/V to about 10% W/V of Δ-aminolevulinic acid; and a pharmaceutically acceptable excipient in a quantity to make volume.

5,026,826

HUMAN NEUTROPHILIC GRANULOCYTE END-STAGE MATURATION FACTOR AND ITS PREPARATION AND USE

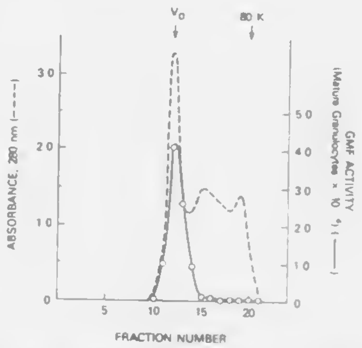
Warren H. Evans, Kensington, Md., and Shirley M. Wilson, Washington, D.C., assignors to The United States of America as represented by the Secretary of the Department of Health and Human Services, Washington, D.C.

Filed Nov. 21, 1988, Ser. No. 273,569

Int. Cl.^{5} C07K *15/00;* **A61K** *37/02*

U.S. Cl. 530—351 **6 Claims**

1. Purified inhibitor-free human neutrophilic granulocyte end-stage maturation factor which is substantially free of non-specific proteins, which is distinct from human granulocyte colony stimulating factor, which elutes from a size exclusion HPLC column in the molecular weight range of an albumin standard having a molecular weight of about 65,000 daltons, which binds tightly at pH 7 to a DEAE-Fractogel chromatographic column, which promotes maturation of neutrophilic granulocyte precursors to form end-stage neutrophilic granulocytes, which is capable of inducing human neutrophilic granulocytes to produce alkaline phosphatase, which does not substantially promote proliferation of human granulocyte precursors in a liquid medium, which is inactivated by treatment with protease and wherein the human neutrophilic granulocyte maturation effect can be potentiated by purified human transferrin.



5,026,827

AMPHETAMINE-PROTEIN COMPLEX AS IMMUNOGEN FOR OBTAINING ANTIBODIES SPECIFIC TO METHAMPHETAMINE

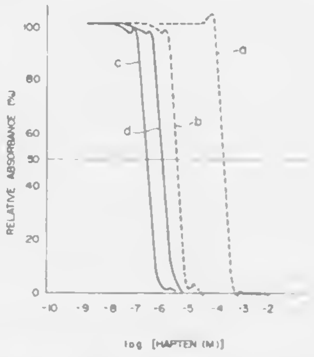
Jinsei Miyazaki, Higashiosaka; Makoto Taketani, Ashiya, and Tadayasu Mitsumata, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Aug. 31, 1989, Ser. No. 401,247

Claims priority, application Japan, Sep. 2, 1988, 63-220931

Int. Cl.^{5} C07K *17/02;* **A61K** *39/385*

U.S. Cl. 530—405 **2 Claims**



1. An immunogen, which is composed of N-(4-aminobutyl) amphetamine bound to a protein and which induces the production of an antibody having a higher affinity to methamphetamine than to N-(4-aminobutyl)methamphetamine.

5,026,828

METHOD OF PURIFYING RECOMBINANT PRES-1/S-2/S/S HEPATITIS B ANTIGEN FROM YEAST

Shigeko Yamazaki, Hatfield, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 19,820, Feb. 27, 1987, abandoned. This application Dec. 1, 1988, Ser. No. 279,323

The portion of the term of this patent subsequent to Apr. 30, 2008, has been disclaimed.

Int. Cl.^{5} C07K *3/26*

U.S. Cl. 530—414 **8 Claims**

1. A method of substantially purifying recombinant preS-1/S-2/S hepatitis B antigen, or portion thereof, from yeast membranes, comprising the steps of

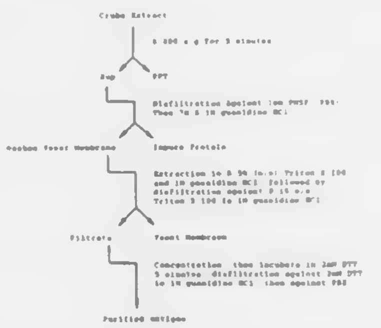
a) taking a portion of yeast membrane associated antigen extract;

b) removing the debris of the extract of step (a) by centrifugation;

VOL
1127
ISS
4
JE
25
1991
UMI

c) subjecting the supernatant to diafiltration under positive pressure between about 10 psi and about 15 psi, in the presence of a solution effective to release undesired yeast membrane-bound proteins, said solution comprising guanidine.HCl in concentrations varying during said diafiltration from between about 7M to about 1M, and thereafter removing said undesired yeast membrane-bound proteins to yield washed yeast membranes as a retentate product;

d) subjecting the retentate product of step (c) to a second solution effective to release the membrane bound surface anitgen, said second solution comprising octoxynol-9.5 at a concentration of between about 0.1% (w/v) and about 1.0% (w/v);



e) separating the surface antigen released in step (d) from yeast membrane, by diafiltration in the presence of a third solution effective to promote passage of said surface antigen across the diafiltration membrane; and

f) subjecting the filtrate of step (e) to diafiltration to remove low molecular weight impurities, resulting in a substantially purified recombinant preS-1/S-2/S hepatitis B antigen, or portion thereof.

5,026,829

CYCLO SUBSTITUTED PROPYLENEAMINE OXIME AND ITS USE AS A BRAIN IMAGING AGENT

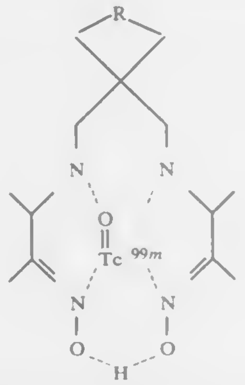
Edward A. Deutsch, Cincinnati, Ohio, assignor to University of Cincinnati, Cincinnati, Ohio

Division of Ser. No. 300,617, Jan. 23, 1989, Pat. No. 4,895,960. This application Dec. 20, 1989, Ser. No. 453,696

Int. Cl.⁵ A61K *43/00;* **C07F** *13/00*

U.S. Cl. 534—14 **4 Claims**

1. A brain perfusion imaging agent having the following general formula:



wherein R represents a bivalent radical completing a four or five member ring and is selected from the group consisting of ethylene, methylene, ether, sulfide, secondary amine and C_1–C_{12} substituted tertiary amine.

5,026,830

PROCESS FOR THE PREPARATION OF AZO DYES BY CARRYING OUT COUPLING IN THE PRESENCE OF AN ALKALI METAL CHLORIDE AND AMMONIUM CHLORIDE

Horst Langfeld; Claudio Puebla, both of Grenzach-Wyhlen, and Günter Sereinig, Schopfheim, all of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

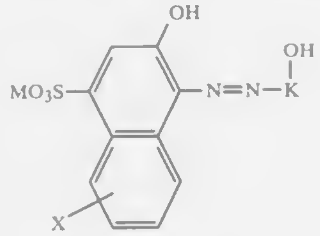
Filed Aug. 29, 1988, Ser. No. 237,474

Claims priority, application Switzerland, Sep. 8, 1987, 3447/87

Int. Cl.⁵ C09B *29/02, 41/00*

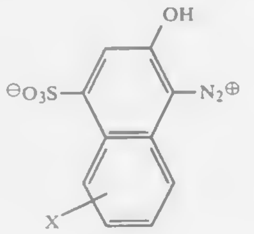
U.S. Cl. 534—582 **15 Claims**

1. A process for the preparation of azo dyes of the formula



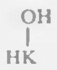
(1)

in which K is benzene, naphthalene or heterocyclic radical in which the hydroxyl group is attached to K in a position adjacent to the azo group, X is hydrogen or nitro and M is an alkali metal ion or ammonium ion consisting essentially of coupling a diazo component of the formula



(2)

in the presence of 5-molar to 15-molar amount of an alkali metal chloride and ammonium chloride, relative to the molar amount of the diazo component of the formula (2), with a coupling component of the formula (3)



$$\overset{\displaystyle OH}{\overset{|}{HK}} \qquad (3)$$

K and X in the formulae (2) and (3) being as defined under formula (1).

5,026,831

WATER-INSOLUBLE DISAZO COLORANTS HAVING HETERO-BICYCLIC METHYLENE-ACTIVE COMPOUNDS AS COUPLING COMPONENT

Rüdiger Jung, Kelkheim, and Reinhold Deubel, Bad Sodeo am Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

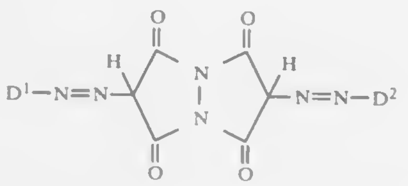
Filed Nov. 10, 1988, Ser. No. 269,565

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 3738542

Int. Cl.⁵ C09B *33/12;* **D06P** *1/04, 3/24, 3/52, 3/79*

U.S. Cl. 534—752 **3 Claims**

1. A compound of the formula (I)



or a mixture thereof, wherein D^1 and D^2 are each independently of the other an aryl or heteroaryl radical from the group consisting of:

- phenyl, phenyl having 1–3 substituents, naphthyl, naphthyl having 1–4 substituents,
- an anthraquinone or fluorene each thereof being unsubstituted or having up to 4 substituents, and a single five- or six-membered nitrogen-containing heterocyclic nucleus which contains 1–3 identical or different nuclear hereto atoms from the group consisting of nitrogen, oxygen and sulfur,
- or at least 1 five- or six-membered nitrogen-containing heterocyclic nucleus being fused with at least 1 benzene nucleus thus forming a polycyclic structure with up to 5 condensed aromatic rings, the heterocyclic nuclei thereof each containing 1–3, together at most up to 4, identical or different nuclear heteroatoms from the group consisting of nitrogen, oxygen and sulfur, each of the foregoing single heterocyclic or benzo-condensed ring structures thereof being unsubstituted or having up to 4 identical or different substituents such substituents on the aforesaid aryl or heteroaryl radicals D^1 and D^2 independently of the other having the following meaning of A^1 and A^2 where
- A^1 stands for a radical from the group consisting of saturated or unsaturated straight-chain or branched C_1–C_{24}-alkyl, C_1–C_{24}-alkoxy, C_1–C_{24}-hydroxyalkyl, C_5–C_{10}-cycloalkyl, [C_1–C_{24}]C_2–C_{25}-alkoxycarbonyl, C_2–C_{25}-alkanoyloxy, C_2–C_{25}-alkanoylamino, C_1–C_{24}-alkylsulfonyl, carbamoyl, N-(C_1–C_{12}-alkyl)aminacarbonyl, N,N-di-(C_1–C_{12}-alkyl) amino-carbonyl, C_1–C_{12}-alkylamino, N,N-di-(C_1–C_{12}-alkyl) amino, sulfamoyl, N-(C_1–C_{12}-alkyl-)aminosulfonyl, N,N-di-(C_1–C_{12}-alkyl) aminosulfonyl, halogen, nitro, cyano, trifluoromethyl, carboxyl, sulfo, C_1–C_{12}-alkylthio, C_2–C_{25}-alkanoyl and hydroxyl and A^2 stands for a radical of the formula Ar—W—where W is a direct bond or a divalent group of the formula —S—, —O—, —CO—, —CO—O—, —O—CO—, —CO—NH—, —NH—CO—, —SO—, —SO_2—, —SO_2NH—, —$NHSO_2$—, —CH_2—, —CH(CH_3)—, —C(CH_3)$_2$—, —NR′— (where R′ denotes hydrogen or C_1–C_6—alkyl) or is —N═N— or a combination of at least two of the foregoing divalent groups and
- Ar denotes phenyl, naphthyl, or a phenyl with one being fused with a five- or six-membered nitrogen-containing heterocyclic nucleus thus forming a bicyclic structure of 2 condensed aromatic rings, the heterocyclic nucleus thereof containing 1–3 identical or different nuclear heteroatoms from the group consisting of nitrogen, oxygen or sulfur, or one of the aforesaid radicals Ar having 1–3 identical or different substituents as above defined for A^1.

5,026,832

9-DIHYDRO-9-O-ALKYLDESMYCOSIN DERIVATIVES

Tatsuro Fujiwara; Yuji Kogami, both of Shizuoka, and Asako Watanabe, Mishima, all of Japan, assignors to Toyo Jozo Co., Ltd., Shizuoka, Japan

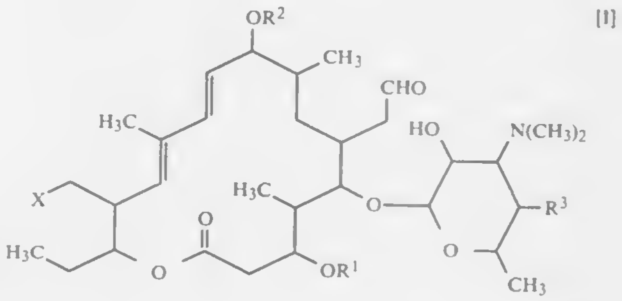
Filed Dec. 14, 1989, Ser. No. 450,398

Claims priority, application Japan, Dec. 26, 1988, 63-328327; Aug. 24, 1989, 1-218327; Nov. 1, 1989, 1-285228

Int. Cl.⁵ A61K *31/70;* **C07H** *17/08*

U.S. Cl. 536—7.1 **3 Claims**

1. A 9-dihydro-9-O-alkyldesmycosin derivative represented by the following formula (1),



[1]

wherein X represents an —O— mycinose or a di-lower alkylamino group, R^1 represents a h ydrogen atom or a lower alkanoyl group, R^2 represents a lower alkyl group, a C_3–C_6 cycloalkyl-lower alkyl gorup, or substituted phenyl-lower alkyl group wherein the substituent is selected from the group consisting of hydrogen, halogen, C_1–C_4 alkyl and a C_1–C_4 alkoxy, and R^3 represents a hydrogen atom or a hydroxyl group; or a salt thereof.

5,026,833

4^G-ALPHA-D-GLUCOPYRANOSYL RUTIN, AND ITS PREPARATION AND USES

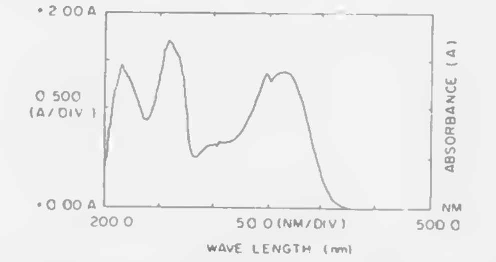
Yukio Suzuki; Kei Suzuki; Masaru Yoneyama, and Toshio Miyake, all of Okayama, Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyuju, Okayama, Japan

Filed Mar. 7, 1990, Ser. No. 489,568

Claims priority, application Japan, Sep. 28, 1989, 1-253269

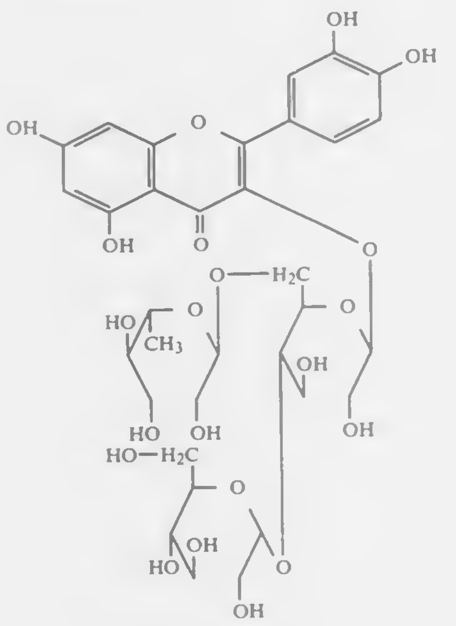
Int. Cl.⁵ C07H *15/24, 15/00*

U.S. Cl. 536—18.1 **1 Claim**



1. A substantially pure 4^G-Alpha-glucopyranosyl rutin shown by the formula [I]:

VOL
1127
ISS
4
JE
25
1991
UMI



5,026,834
MODIFIED CELLULOSE FOR BIOCOMPATIBLE DIALYSIS MEMBRANES

Michael Diamantoglou, Erlenbach, and Helmut Kuhne, Kreuzau, both of Fed. Rep. of Germany, assignors to Akzo N.V., Netherlands

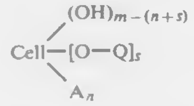
Filed Dec. 9, 1988, Ser. No. 281,629

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1987, 3742071

Int. Cl.⁵ C08B *37/08, 5/00, 15/05, 15/06*

U.S. Cl. 536—20 **10 Claims**

1. A modified carbohydrate, wherein the modified carbohydrate has a structure represented by the formula

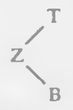


$$\mathrm{Cell}\left<\begin{matrix}(\mathrm{OH})_{m-(n+s)}\\ -[\mathrm{O}-\mathrm{Q}]_s\\ \mathrm{A}_n\end{matrix}\right.$$

wherein:

Cell is a framework of an unmodified carbohydrate molecule or of a chitin molecule, in each case without hydroxyl groups;

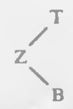
A is selected from the group consisting of



and Z-B;

Z is a nitrogen or sulfur atom;

in the case where Z is a nitrogen atom, A is



and T and Z together are an acylamide or urea group and Q is at least one member selected from the group consisting of (X'-Y'), together with the O an ester group, and together with the O a carbamate group;

in the case where Z is a sulfur atom, A is Z-B and Q is at least one member selected from the group consisting of (X'-Y'), together with the O an ester group. and together with the O a carbamate group;

$O<n<m$ and $0\leqq s<m$;

$(n+s)$ is the mean degree of substitution;

$m=3$ in the case of the unmodified carbohydrate molecule and $m=2$ in the case of the chitin molecule;

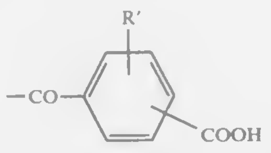
B is selected from the group consisting of Y and X-Y;

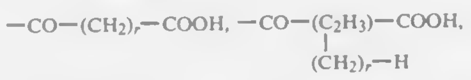
—X— and —X'— are each at least one member selected from the group consisting of a substituted or unsubstituted, straight or branched chain alkylene, alkenylene or alkynylene radical in which the carbon chain may be interrupted by hetero atoms or by CO—, CONR— or COO— groups, a substituted or unsubstituted cycloalkylene which may contain hetero atoms, a substituted or unsubstituted arylene, arylalkylene, arylalkenylene, or arylalkynylene radical which may contain hetero atoms, a substituted or unsubstituted bisarylalkylene or bisarylene radical, a substituted or unsubstituted radical of a condensed aromatic compound and a substituted or unsubstituted radical of a heterocyclic compound;

—Y and —Y' are each at least one member selected from the group consisting of —H, $-\mathrm{NR_2}$, $-\mathrm{NR^+R_3}$, —COOH or a salt thereof, —COOR, $-\mathrm{CONR_2}$, —CO—R, —CS—R, —CSOH or a salt thereof, —CSOR, $-\mathrm{CSNR_2}$, $-\mathrm{SO_3H}$ or a salt thereof, $-\mathrm{SO_3R}$, $-\mathrm{SO_2}-\mathrm{R}$, $-\mathrm{SO_2NR_2}$, —SR, —SOR, $-\mathrm{SONR_2}$, $-\mathrm{PO_3H_2}$ or a salt thereof, $-\mathrm{PO(OR)_2}$, $-\mathrm{PO_2H(NR_2)}$, $-\mathrm{PO(NR_2)_2}$, $-\mathrm{PO_2H_2}$, —PO-H(OR), —CN, $-\mathrm{NO_2}$, —OR, halogen and $-\mathrm{Si(OR)_3}$; R is at least one member selected from the group consisting of a hydrogen atom, a straight or branched chain alkyl, alkenyl or alkynyl group having 1 to 36 C atoms in which the carbon chain may be interrupted by hetero atoms or by CO—, CONR— or COO— groups, a substituted or unsubstituted cycloalkyl group which may contain hetero atoms, a substituted or unsubstituted aryl, arylalkyl, arylalkenyl or arylalkynyl radical which may contain hetero atoms, a substituted or unsubstituted bisarylalkyl or bisaryl radical, a substituted or unsubstituted radical of a condensed aromatic compound, and a substituted or unsubstituted radical of a heterocyclic compound;

X is identical to or different from X' and Y is identical to or different from Y';

where Q together with the O is at least one member selected from the group consisting of an ester and a carbamate group, Q is at least one member selected from the group consisting of





$$-\mathrm{CO}-(\mathrm{CH_2})_r-\mathrm{COOH},\ -\mathrm{CO}-\underset{\substack{|\\ (\mathrm{CH_2})_r-\mathrm{H}}}{(\mathrm{C_2H_3})}-\mathrm{COOH},$$

$-\mathrm{CO}-(\mathrm{C_2R'_4})-\mathrm{COOH}$, $-\mathrm{CO}-\mathrm{CR'}{=}\mathrm{CR'}-\mathrm{COOH}$, $-\mathrm{CO}-\mathrm{CH}{=}\mathrm{CH}-\mathrm{COOH}$, $-\mathrm{CO}-\mathrm{NR'_2}$, $-\mathrm{CO}-\mathrm{NHR'}$, $-\mathrm{CO}-\mathrm{NHSO_2R'}$, $-\mathrm{CO}-\mathrm{R'}$, $-\mathrm{CS}-\mathrm{R'}$, $-\mathrm{CO}-\mathrm{OR'}$, $-\mathrm{CSNH}-\mathrm{R'}$, $-\mathrm{CSNR'_2}$, $-\mathrm{SO_2}-\mathrm{OR'}$, $\mathrm{SO_2}-\mathrm{R'}$, $-\mathrm{SO_2NR'_2}$, $-\mathrm{SO}-\mathrm{R'}$, $-\mathrm{SONR'_2}$, $-\mathrm{PO_3H_2}$ or a salt thereof, $-\mathrm{PO_2R'_2}$, $-\mathrm{POR'_2}$, and $-\mathrm{PO(OR')_2}$;

$r=1$ to 20;

R' is at least one member selected from the group consisting of the same radical as R, Y, and Y'.

5,026,835
PYRIMIDINE 2'-METHYLIDENE NUCLEOSIDE COMPOUNDS

Tohru Ueda, Sapporo; Takuma Sasaki, Kanazawa; Akira Matsuda, Sapporo; Takanori Miyashita; Shinji Sakata, both of Choshi, all of Japan; Keiji Yamagami, Baltimore, Md., and Akihiro Fujii Kiyose, Japan, assignors to Yamasa Shoyu Co., Ltd., Chiba and Yoshitomi Pharmaceutical Industries, Ltd., Osaka, both of, Japan

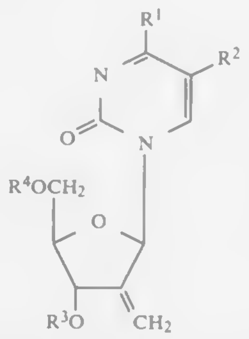
Filed Dec. 7, 1989, Ser. No. 447,512

Claims priority, application Japan, Dec. 7, 1988, 63-310865

Int. Cl.⁵ C07H *19/00*

U.S. Cl. 536—23 **2 Claims**

1. A pyrimidine 2'-deoxy-2'-methylidene nucleoside compound of the formula:



wherein R^1 represents amino or hydroxy; R^2 represents hydrogen, halogen, a lower alkyl, a lower alkenyl, a lower alkynyl or a haloalkyl; $R^3$and R^4may be the same or different and represent hydrogen, stearoyl or aminoacyl, or a pharmaceutically acceptable salt or hydrate thereof, except that both of R^3 and R^4 may be hydrogen.

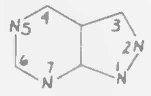
5,026,836
6-SULFENAMIDE, 6-SULFINAMIDE AND 6-SULFONAMIDE PURINES, PURINE NUCLEOSIDES, PURINE NUCLEOTIDES, PHARMACEUTICAL COMPOSITIONS, AND PROCESSES OF MAKING

Roland K. Robins; Ganapathi R. Revankar, both of Irvine, and Naeem B. Hanna, Costa Mesa, all of Calif., assignors to Nucleic Acid Research Institute, Costa Mesa, Calif.

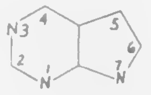
Continuation-in-part of Ser. No. 133,143, Dec. 14, 1987, abandoned. This application Nov. 22, 1988, Ser. No. 275,113

Int. Cl.⁵ C07H *19/14, 19/167, 19/173, 19/20*

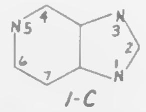
U.S. Cl. 536—24 **28 Claims**



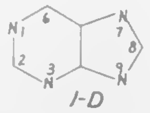
I-A



I-B

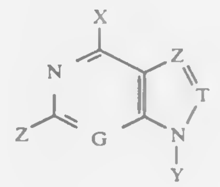


I-C



I-D

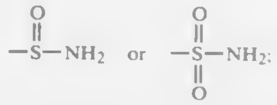
1. A compound of the structure:



wherein

Z is H or $-\mathrm{NH_2}$;

X is —S—$\mathrm{NH_2}$,



$$-\overset{\overset{\mathrm{O}}{\|}}{\mathrm{S}}-\mathrm{NH_2}\quad\text{or}\quad-\underset{\underset{\mathrm{O}}{\|}}{\overset{\overset{\mathrm{O}}{\|}}{\mathrm{S}}}-\mathrm{NH_2};$$

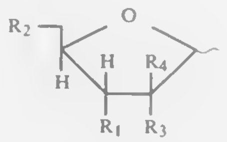
T is C—H, G is N and O is N; or

T is C—H, G is N and O is C—H; or

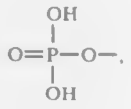
T is N, G is N and O is C—H; or

T is C—H, G is C—H and O is N;

Y is H or an α-pentofuranose or β-pentofuranose of the formula:

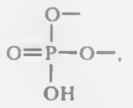


wherein R_1 and R_2 independently are H, OH, —O -acyl or



$$\mathrm{O}{=}\underset{\underset{\mathrm{OH}}{|}}{\overset{\overset{\mathrm{OH}}{|}}{\mathrm{P}}}{-}\mathrm{O}{-},$$

or together R_1 and R_2 are



$$\mathrm{O}{=}\underset{\underset{\mathrm{OH}}{|}}{\overset{\overset{\mathrm{O}-}{|}}{\mathrm{P}}}{-}\mathrm{O}{-},$$

and R_3 and R_4 are H or one of R_3 or R_4 is OH and the other is H; provided that when Y is H, Z is $-\mathrm{NH_2}$; and pharmaceutically acceptable salts thereof.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,837

DNA PROBE WHICH REVEALS A HYPERVARIABLE REGION ON HUMAN CHROMOSOME 16

Michael Litt, Portland, Oreg., and Linda L. Bufton, Palo Alto, Calif., assignors to The State of Oregon acting by and through the State Board of Higher Education on behalf of Oregon Health Sciences University, Eugene, Oreg.

Continuation-in-part of Ser. No. 46,831, May 4, 1987, and a continuation-in-part of Ser. No. 53,320, May 22, 1987, and a continuation-in-part of Ser. No. 54,760, May 27, 1987. This application Sep. 30, 1987, Ser. No. 103,021

Int. Cl.^{5} C07H *21/04;* C12Q *1/68*

U.S. Cl. 536—27 **12 Claims**

1. A plasmid having ATCC accession No. 40327, which plasmid is a clone of DNA probe p79-2-23.

5,026,838

PHOSPHORAMIDITE COMPOUNDS AND PROCESS FOR PRODUCTION THEREOF

Ryuji Nojiri, Aichi; Yoshihiro Hayakawa, Ichinomiya; Mamoru Uchiyama, Kawasaki; Hisatoyo Kato, Ohbu; Yasuyoshi Chino, Tokyo, and Shinichiro Tahara, Yokohama, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

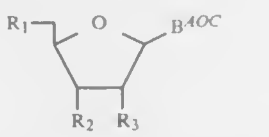
Continuation of Ser. No. 909,728, Sep. 22, 1986, abandoned. This application Aug. 4, 1988, Ser. No. 229,773

Claims priority, application Japan, Sep. 25, 1985, 60-211240; Oct. 7, 1985, 60-223138

Int. Cl.^{5} C07H *19/167, 19/173*

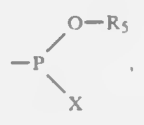
U.S. Cl. 536—27 **14 Claims**

1. A phosphoramidite commpound of the general formula



[1]

wherein each of R_1 and R_2, represents a hydroxyl group having an hydroxyl protective group or the group —OR_4, R_3 represents a hydrogen atom, a hydroxyl group having an hydroxyl protective group, or the group —OR_4 wherein the protective group for the hydroxyl group in R_1, R_2 and in R_3 when R_3 is a hydroxyl group having a protective group, is independently selected from the group consisting of trityl, monomethoxytrityl, dimethoxytrityl, trimethylsilyl, triethylsily, triphenylsilyl, t-butyldimetylsilyl, tetrahydropyranyl, 4-methoxyhydrofuranyl, benzoyl, tetrahydrofuranyl, methoxymethyl, methoxyethoxymethyl, phenoxymethyl, methylthiomethyl and phenylthiomethyl, R_4 represents the group



$$-P\begin{matrix} / \, O-R_5 \\ \backslash \, X \end{matrix} \; ,$$

X represents a secondary amino group, R_5 represents an allylic residue having not more than 10 carbon atoms and which does not essentially impede the deprotecting reaction, and B^{AOC} represents a nucleoside base residue in which the amino or imino group is protected with an allyloxycarbonyl residue, with the proviso that only one of R_1, R_2 and R_3 represents the group —OR_4 .

5,026,839

DNA ENCODING A BASIC FIBROBLAST GROWTH FACTOR

David A. Moscatelli; Daniel B. Rifkin, both of New York, N.Y., and Andreas Sommer, Boulder, Colo., assignors to Synergen, Inc, Boulder, Colo. and New York University, N.Y.

Continuation of Ser. No. 366,186, Jun. 14, 1989, abandoned, which is a continuation of Ser. No. 302,080, Jan. 26, 1989, abandoned, which is a continuation of Ser. No. 163,142, Feb. 24, 1988, abandoned, which is a continuation of Ser. No. 895,829, Aug. 12, 1986, abandoned, which is a continuation-in-part of Ser. No. 809,873, Dec. 17, 1985, abandoned. This application Apr. 5, 1990, Ser. No. 506,570

Int. Cl.^{5} C12N *15/018*

U.S. Cl. 536—27 **1 Claim**

1. An isolated DNA sequence encoding an angiogenic factor protein consisting of a single-polypeptide-chain protein having at least one active site possessing mitotic and chemotactic activity and the ability to stimulate protease synthesis, wherein said protein consists of the amino acid sequence:

G—T—M—A—A—G—S—I—T—T—L—P—A—L—P—E—D—
—G—G—S—G—A—F—P—P—G—H—F—K—D—P—K—
—R—L—Y—C—K—N—G—G—F—F—L—R—I—H—P—D—
—G—R—V—D—G—V—R—E—K—S—D—P—H—I—K—L—
—Q—A—E—E—R—G—V—V—S—I—K—G—V—C—A—N—
—R—Y—L—A—M—K—E—D—G—R—L—L—A—S—K—C—
—V—T—D—E—C—F—F—F—E—R-—L—E—S—N—N—Y—
—N—T—Y—R—S—R—K—Y—T—S—W—Y—V—A—L—K—
—R—T—G—Q—Y—K—L—G—S—K—T—G—P—G—Q—K—
—A—I—L—F—L—P—M—S—A—K—S

5,026,840

PHOTOCHEMICAL NUCLEIC ACID-LABELING REAGENT HAVING A POLYALKLAMINE SPACER

Nanibhushan Dattagupta, New Haven, Conn., and James P. Albarella, Elkhart, Ind., assignors to Molecular Diagnostics, Inc., West Haven, Conn.

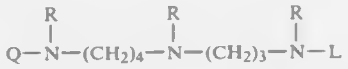
Continuation of Ser. No. 27,384, Mar. 18, 1987, Pat. No. 4,950,744, which is a continuation-in-part of Ser. No. 690,336, Jan. 10, 1985, abandoned. This application Feb. 6, 1990, Ser. No. 475,639

The portion of the term of this patent subsequent to Aug. 21, 2007, has been disclaimed.

Int. Cl.^{5} C07H *15/12;* C12Q *1/00*

U.S. Cl. 536—27 **25 Claims**

1. A photochemical nucleic acid-labeling reagent of the formula



$$Q-\overset{R}{\underset{|}{N}}-(CH_2)_4-\overset{R}{\underset{|}{N}}-(CH_2)_3-\overset{R}{\underset{|}{N}}-L$$

wherein Q is a photoreactive residue of a nucleic acid-binding ligand; L is a detectable label residue; R is hydrogen, C_1 to C_7-alkyl, aryl, hydroxy, or C_1 to C_7-alkoxy; wherein R can be the same or different each time R appears in the formula.

5,026,841

PROCESS FOR THE PREPARATION OF FINELY DIVIDED POROUS CELLULOSE PARTICLES

Eric Francotte, Nuglar, Switzerland, and Gabriele Baisch, Weil-Friedlingen, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 16, 1989, Ser. No. 367,163

Claims priority, application Switzerland, Jun. 24, 1988, 2432/88

Int. Cl.^{5} C08B *3/00, 5/00, 7/00, 3/16*

U.S. Cl. 536—58 **20 Claims**

1. A process for the preparation of finely divided porous cellulose in the form of essentially spherical particles having an average diameter of 1 to 200 μm and a specific surface area of at least 10 m^2/g, in which a solution of a cellulose ester in an organic solvent containing 1 to 50% by volume, based on the amount of solvent, of a C_5-C_{22}alkanol is slowly added, with vigorous stirring, to a solution of an anionic surfactant in water, the organic solvent is removed, while stirring is continued, the solid particles are isolated and the carboxylic acid groups are then split off under heterogeneous conditions, wherein the solution of a cellulose ester in an organic solvent contains a cellulose ester of aromatic or aromatic-aliphatic carboxylic acids.

5,026,842

PROCESS FOR PREPARING CEPHALOSPORIN COMPOUNDS

Kazuhiro Watanabe; Husayoshi Kakizaki; Isao Arai, all of Kawasaki; Kimihiro Murakami, Gotenba, and Kazuo Kato, Mishima, all of Japan, assignors to Ajinomoto Co., Inc. and Mochida Pharmaceutical Co., Ltd., both of Tokyo, Japan

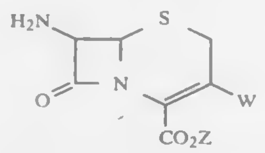
Filed Jun. 28, 1989, Ser. No. 373,268

Claims priority, application Japan, Jun. 28, 1988, 63-158022

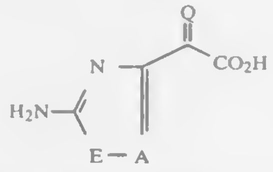
Int. Cl.^{5} C07D *501/06*

U.S. Cl. 540—222 **2 Claims**

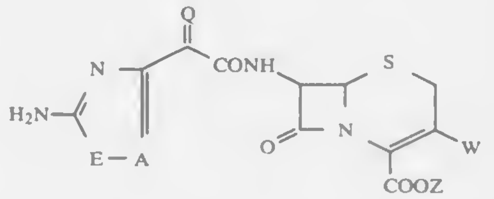
1. A process for preparing an amide compound, which comprises reacting a 7-aminocephalosporanic acid with a carboxylic acid in the presence of a dehydration condensing agent and at least a 0.1 equal molar amount of an acid or an acid complex, wherein said 7-aminocephalosporanic acid is represented by the formula



said carboxylic acid is represented by the formula:



and said amide compound is a 7-substituted amino-3-substituted methylcephem-carboxylic acid represented by the formula:



wherein W represents a hydrogen atom, ethenyl, 2-carboxyethenyl, chlorine, methoxy, or a group represented by —CH_2Y, wherein Y represents a hydrogen atom or a nucleophilic compound residue, Z represents a hydrogen atom, a metal atom, or an alkyl group having 1 to 5 carbon atoms, an aryl group having 6 to 10 carbon atoms, a cycloalkyl group having 6 to 10 carbon atoms, or an aralkyl group having 7 to 20 carbon atoms; and A represents =CH— or =N—, E represents —S— or —O—; Q represents =O or a functional group represented by $=N\sim R^4$, wherein R^4 represents a hydroxy group or an alkoxy group and ~ in $=N\sim R^4$ represents syn- or anti-form, wherein said dehydration condensing agent is a carbodiimide represented by formula:

$$R^1-N=C=N-R^2$$

wherein R^1 and R^2, which may be the same or different, each represents an alkyl group having 1 to 5 carbon atoms, an aryl group having 6 to 10 carbon atoms, a cycloalkyl group having 6 to 10 carbon atoms, or an aralkyl group having 7 to 20 carbon atoms, and wherein said acid or acid complex is a sulfonic acid represented by R^3SO_3H, a hydrohalogen acid represented by HX, a Lewis acid, or a Lewis acid complex; wherein R^3 represents a hydroxy group, an alkyl group having 1 to 5 carbon atoms, an aryl group having 6 to 10 carbon atoms, a cycloalkyl group having 6 to 10 carbon atoms, or an aralkyl group having 7 to 20 carbon atoms; and X represents a halogen atom.

5,026,843

PROCESS FOR THE PREPARATION OF CEFTRIAXONE

Monguzzi Riccardo, Monza; Menaspace Silvano, Rho, and Anzaghi Piergiorgio, San Colombano Al Lambro, all of Italy, assignors to S.B.D. Synthetic and Biological Dvlpmnts. S.r.l., S. Giuliano, Italy

Filed Oct. 3, 1989, Ser. No. 416,627

Claims priority, application Italy, May 23, 1989, 20612 A/89

Int. Cl.^{5} C07D *501/36;* A61K *31/545*

U.S. Cl. 540—227 **3 Claims**

1. A process for preparing disodium 7-{[2-(2-aminothiazol-4-yl)-2-syn-methoxyimino]acetamido}-3-{[(2,5-dihydro-6-hydroxy-2-methyl-5-oxo-1,2,4-triazin-3-yl)thio]methyl}-3-cephem-4-carboxylate hemiheptahydrate, which comprises reacting 7-amino-3-(2,5-dihydro-6-hydroxy-2-methyl-5-oxo-1,2,4-triazin-3-yl)thiomethyl-3-cephem-4-carboxylate with 2-mercaptobenzothiazole 2-(2-aminothiazol-4-yl)-2-syn-methoxyiminoacetate in an aqueous solution in the presence of an organic solvent and an amine selected from the group consisting of trimethylamine, triethylamine, 1,4-dimethylpiperazine, N-ethylpiperidine, pyridine and dimethylaminopyridine, at a temperature of from −20° to 30° C. and treating the aqueous solution with a salt of a base selected from the group consisting of dicyclohexylamine, diphenylamine, diisopropylamine, N-tert-butylcyclohexylamine and N,N-dibenzylethylenediamine, to form a precipitate; and reacting the precipitate with aqueous sodium 2-ethylhexanoate in the presence of an organic solvent.

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5,026,844
PROCESS FOR THE PREPARATION OF 4-ACYLOXY-2-AZETIDINONE DERIVATIVES

Masaji Ishiguro, Osaka; Hiromitsu Iwata, Takatsuki; Takashi Nakatsuka, Mishima, and Yasuo Yamada, Takaoka, all of Japan, assignors to Suntory Limited, Osaka and Nippon Soda Company, Ltd., Tokyo, both of, Japan

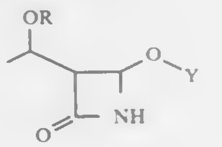
Filed Oct. 13, 1989, Ser. No. 421,331

Claims priority, application Japan, Oct. 19, 1988, 63-263766; Oct. 11, 1989, 1-264193

Int. Cl.⁵ C07D *205/085;* **C07B** *41/12*

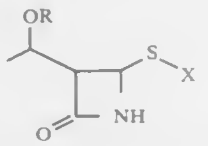
U.S. Cl. 540—357 9 Claims

1. A process for preparing a 4-acyloxy-2-azetidinone derivative having the formula (II):



(II)

wherein OR is a protected hydroxy group and Y is an acyl group, which comprises reacting a 2-azetidinone derivative having the formula (I):



(I)

wherein OR has the same meaning as defined above and X is an alkyl group or an aromatic group, and a copper oxide or copper salt of an organic carboxylic acid, in the presence of an organic carboxylic acid or a salt thereof as an acyl group source.

5,026,845
1,4-DIAZABICYLLO[3.2.2.]NONANE AND INTERMEDIATES FOR THE PREPARATION THEREOF

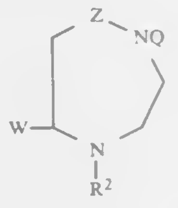
Robert C. Friedmann; John W. Lackey, and Brian T. O'Neill, all of Pfizer Inc. 235 E. 42nd St., New York, N.Y. 10017

Division of Ser. No. 262,542, Oct. 25, 1988, Pat. No. 4,895,943. This application Oct. 4, 1989, Ser. No. 417,120

Int. Cl.⁵ C07D *243/08*

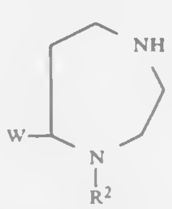
U.S. Cl. 549—492 13 Claims

1. A compound of the formula



wherein Z is $C{=}O$ or CH_2, R^2 is hydrogen, naphthoyl, substituted naphthoyl, benzyl, substituted benzyl, benzoyl or substituted benzoyl, wherein each of said substituted naphthoyl, substituted benzyl, and substituted benzoyl is substituted with one to three substituents selected from the group consisting of halo, C_1–C_4 alkoxy and C_1–C_4 alkyl, Q is hydrogen, and W is $—CH_2CH_2OH$, $—CH_2CH_2X$ or $—CH_2COOR^1$ wherein R^1 is C_1–C_4 alkyl or C_1–C_4 aklyl substituted with 1 to 6 halo groups, and X a leaving group with the proviso that Z is $C{=}O$ when W is $—CH_2COOR^1$ and Z is CH_2 when W is $—CH_2CH_2OH$ or $—CH_2CH_2X$.

6. A compound according to claim 1, said compound having the formula



wherein W is as defined in claim 1 and R^2 is as defined in claim 3 but is other than hydrogen.

5,026,846
PROCESS FOR THE PREPARATION OF DIARYL SULPHIDES AND DIARYL SELENIDES

Jean-Pierre Duchesne, Lyons, France, assignor to Rhone-Poulenc Sante, Antony, France

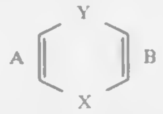
Filed Aug. 15, 1989, Ser. No. 393,777

Claims priority, application France, Aug. 18, 1988, 88 10982

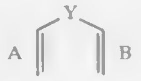
Int. Cl.⁵ C07D *279/20, 293/10;* **C07F** *9/6553*

U.S. Cl. 544—1 6 Claims

1. A process for the preparation of a product of formula:



in which rings A and B, which may be identical or different, each represent a phenyl ring which may be substituted by one or more atoms or radicals selected from the class consisting of hydrogen, halogen, alkyl, alkoxy, hydroxyl, amino, alkylamino, dialkylamino, acyl and acylamino, the said alkyl radicals and alkyl portions of the other radicals containing 1 to 4 carbon atoms each and being unsubstituted or substituted by phenyl, or a six-membered heterocyclic aromatic ring containing 1 or 2 nitrogen atoms, and Y represents —NH— or —PH—, and X represents sulphur or selenium, it being understood that Y can only represent —NH— when X is selenium, which comprises reacting an aromatic compound of formula:



in which A, B and Y are as defined above, with sulphur or selenium and sulphur dioxide or selenium dioxide in the proportions of half an equivalent or sulphur or selenium and half an equivalent of sulphur dioxide or selenium dioxide for each mole of the starting aromatic product, at a temperature greater than 80° C., optionally in the presence of a catalyst, and isolating the product obtained.

5,026,847
REACTIVE DYES, THEIR PREPARATION AND THEIR USE

Athanassios Tzikas, Pratteln, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

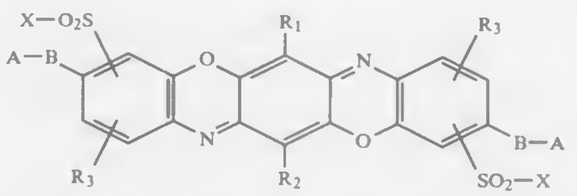
Filed Oct. 17, 1989, Ser. No. 422,862

Claims priority, application Switzerland, Oct. 20, 1988, 3913/88

Int. Cl.⁵ C07D *498/00*

U.S. Cl. 544—76 11 Claims

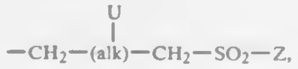
1. A compound of the formula



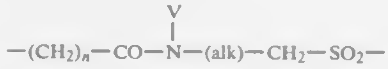
(1)

in which R_1 and R_2 independently of one another are hydrogen, halogen, C_1–C_4alkyl, C_1–C_4alkoxy, phenoxy, carboxyl, carbamoyl or C_1–C_4alkanoylamino and R_3 is hydrogen, sulfo, C_1–C_4alkyl, C_1–C_4alkoxy, halogen, carboxyl, carbamoyl, N-C_1–C_4alkylcarbamoyl, N,N-di-C_1–C_4alkylcarbamoyl, C_1–C_4alkylsulfonyl, sulfamoyl, N-C_1–C_4alkylsulfamoyl or N,N-di-C_1–C_4alkylsulfamoyl, B is a direct bond or the radical —O—, X is hydroxyl and A is a radical of the formula

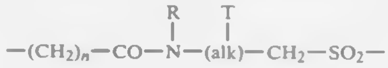
$$—(CH_2)_m—SO_2—Z, \qquad (2a)$$



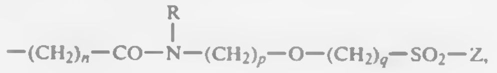
$$—CH_2—\underset{}{\overset{U}{\overset{|}{(alk)}}}—CH_2—SO_2—Z, \qquad (2b)$$



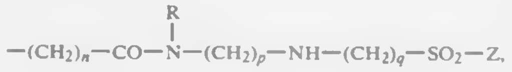
$$—(CH_2)_n—CO—\overset{V}{\overset{|}{N}}—(alk)—CH_2—SO_2—Z, \qquad (2c)$$



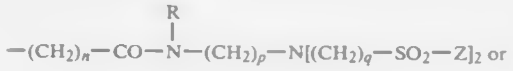
$$—(CH_2)_n—CO—\overset{R}{\overset{|}{N}}—\overset{T}{\overset{|}{(alk)}}—CH_2—SO_2—Z, \qquad (2d)$$



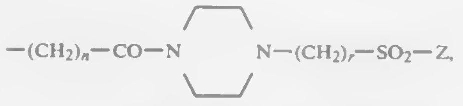
$$—(CH_2)_n—CO—\overset{R}{\overset{|}{N}}—(CH_2)_p—O—(CH_2)_q—SO_2—Z, \qquad (2e)$$



$$—(CH_2)_n—CO—\overset{R}{\overset{|}{N}}—(CH_2)_p—NH—(CH_2)_q—SO_2—Z, \qquad (2f)$$

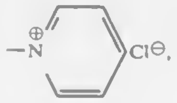


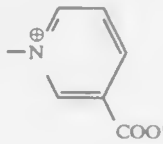
$$—(CH_2)_n—CO—\overset{R}{\overset{|}{N}}—(CH_2)_p—N[(CH_2)_q—SO_2—Z]_2 \text{ or} \qquad (2g)$$



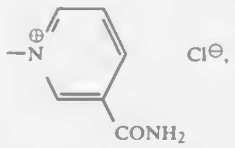
(2h)

in which U is hydroxyl, sulfato, sulfo or halogen, V is hydrogen, substituted or unsubstituted C_1–C_4alkyl or a radical $—(alk)—CH_2—SO_2—Z$, (alk) is a C_1–C_6alkylene radical, R is hydrogen or C_1–C_6alkyl, T is hydrogen, halogen, hydroxyl, sulfato, carboxyl, cyano, C_1–C_4alkanoyloxy, C_1–C_4alkoxycarbonyl or a radical $—SO_2—Z$, Z is a radical of the formula $—CH—CH_2$ or $CH_2—CH_2—Y$, Y is $—OSO_3H$, $—S—SO_3H$, $—OCOCH_3$, $—OCO—C_6H_5$, $—OPO_3H_2$, Cl, Br, F,



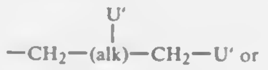


or

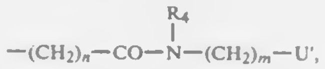


m is an integer from 2 to 6 and n, p, q and r independently of one another are an integer from 1 to 6, or X is as defined above for Z and A is a radical of the formula

$$—(CH_2)_m—U' \qquad (3a)$$



$$—CH_2—\overset{U'}{\overset{|}{(alk)}}—CH_2—U' \text{ or} \qquad (3b)$$



$$—(CH_2)_n—CO—\overset{R_4}{\overset{|}{N}}—(CH_2)_m—U', \qquad (3c)$$

in which R_4 is hydrogen, C_1–C_4alkyl or a radical $—(CH_2)_m—U'$, U' is hydroxy or sulfato and (alk), n and m are in each case as defined above.

5,026,848
GENERATION OF HETEROARYLOXYALKL HETEROCYCLES WITH ANTIPICORNAVIRUSES ACTIVITIES

Mohsen Daneshtalab; Dai Q. Nguyen; Chan M. Ha; Hiep T. Lun; Laurence M. Tempest, all of Edmonton, and Ronald G. Micetich, Sherwood Park, all of Canada, assignors to Synphar Laboratories Incorporated, Alberta, Canada

Filed Mar. 27, 1989, Ser. No. 329,147

Claims priority, application United Kingdom, Mar. 26, 1988, 8807275

Int. Cl.⁵ C07D *413/12, 215/60, 261/06;* **A61K** *41/31*

U.S. Cl. 544—137 39 Claims

1. A heteroaryloxyalkylheterocycle of the Formula I

$$R—(CH_2)_n—O—R^1 \qquad I$$

wherein

R is a non-fused azole moiety selected from the group consisting of:

3-methyl-5-isoxazolyl; 4-methylthiazol-2-yl; 4-methylisothiazol-5-yl; 3,5-dimethylpyrazol-1-yl; 1-phenylpyrazol-5-yl; 4-chloro-1-phenylpyrazol-5-yl; 5-isothiazolyl and 1-imidazolyl,

n is 5, 6, 7 or 8 and

R^1 is selected from the group consisting of 1-naphthyl; 2-naphthyl; 1-benzotriazolyl; naphth-(1,2-b)-1,4-oxazin-4-yl; N-dibenzylamino; 4-(1,2,4-triazol-1-yl)-phenyl; 2-benzoxazolyl; 4-(imidazol-1-yl)phenyl; 2-benzofuryl; 1-bornyl; 1-adamantanyl; 4-methylquinolin-2-yl; 2-methylquinoline-4-yl; 2-benzimidazolyl; fluoren-9-yl; 2-carbazolyl and 4-acridyl.

5,026,849
SOLVENTLESS PROCESS FOR PREPARING A TRI-SUBSTITUTED TRIAZINE

George Kletecka, Fairview Park, and Victor L. Ledesma, Avon Lake, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Jun. 9, 1989, Ser. No. 364,342

Int. Cl.⁵ C07D *401/12, 403/12*

U.S. Cl. 544—198 15 Claims

1. A process for preparing a tri-substituted triazine having a heterocyclic amine group in the substituent derived from a polysubstituted piperidine, polysubstituted piperazine, or polysubstituted piperazin-2-one, each referred to as a PSP amine reactant, said process comprising,

(a) reacting, in a solventless reaction zone, solid, finely divided particles of cyanuric halide with a PSP amine reactant, present in a molar excess in the range from 2 to 10 times the amount required to displace each of the halogen atoms of the cyanuric halide, in the absence of a solvent for either reactant, at a temperature and pressure sufficient to complete tri-substitution in less than 12 hr;

(b) adding a lower C_1–C_6-alkanol and a relatively concentrated aqueous solution of an aqueous alkali, the amount of

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the latter being sufficient to neutralize the hydrohalide of the PSP amine reactant which is formed by reaction of hydrohalide generated during the reaction, with excess amine reactant, but the amount of water being less than will precipitate PIP-T from solution; the amount of the alkanol, in combination with the water present, being sufficient to precipitate at least 90% of all salt formed upon neutralization, as solid;

(c) separating solid salt from a solution of PIP-T in a first mixture of said lower alkanol, water, excess amine reactant, and the hydrohalide of said amine reactant, which first mixture is recovered as a first filtrate;

(d) adding a sufficient amount of water to the first filtrate to reach the cloud point, and precipitating solid particles of white PIP-T from a second mixture of excess amine reactant, alkanol and water;

(e) separating solid PIP-T which is at least 97% pure, from the second mixture of excess amine reactant, alkanol and water which second mixture is recovered as a second filtrate;

(f) stripping the alkanol and water from said second filtrate in a first stripping zone; and,

(g) recovering stripped, excess amine reactant contaminated with by-products.

5,026,850
PYRIDAZINONE DERIVATIVES, PREPARATION THEREOF, AND INSECTICIDAL, ACARICIDAL, FUNGICIDAL COMPOSITIONS

Masakazu Taniguchi, Funabashi; Masatoshi Baba, Narashino; Yoshinori Ochiai, Hasuda; Masayoshi Hirose, Kawaguchi, and Kiminori Hirata, Urawa, all of Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

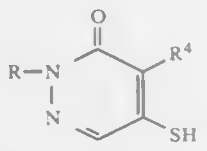
Division of Ser. No. 27,191, Mar. 17, 1987, Pat. No. 4,877,787, which is a continuation of Ser. No. 621,458, Jun. 18, 1984, abandoned. This application Jun. 6, 1989, Ser. No. 362,348

Claims priority, application Japan, Jun. 23, 1983, 58-113409; Jul. 29, 1983, 58-138878

Int. Cl.^{5} C07D *237/18;* **A61K** *31/50;* **A01N** *43/58*

U.S. Cl. 544—240 **3 Claims**

1. A compound of the formula:



wherein R is a member selected from the group consisting of lower alkyls having from 2 to 4 carbon atoms; and wherein R^4 is a member selected from the group consisting of chlorine and bromine.

5,026,851
PYRIDO[2,3-]PYRIMIDINE DERIVATIVES

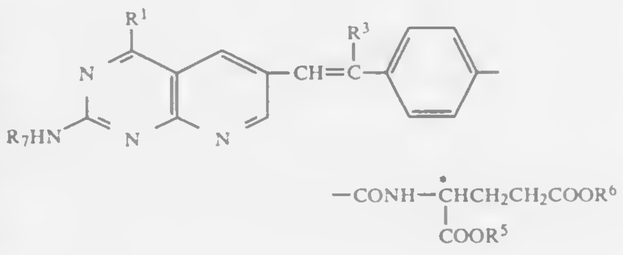
Edward C. Taylor, Princeton, N.J.; George P. Beardsley, Essex, Conn.; Peter J. Harrington, Endicott, N.Y., and Stephen R. Fletcher, Milton Keynes, England, assignors to The Trustees of Princeton University, Princeton, N.J.

Division of Ser. No. 74,623, Jul. 17, 1987, Pat. No. 4,845,216, which is a continuation of Ser. No. 835,457, Mar. 3, 1986, Pat. No. 4,684,653, which is a continuation-in-part of Ser. No. 709,622, Mar. 8, 1985, abandoned. This application Apr. 21, 1989, Ser. No. 341,497

Int. Cl.^{5} C07D *471/04*

U.S. Cl. 544—279 **6 Claims**

1. A compound of the formula



wherein

R^1 is —NH$_2$ or —OH;

R^3 is hydrogen, methyl, or ethyl;

R^7 is hydrogen or an amino acid protecting group removable by hydrolysis or hydrogenolysis;

R^5 and R^6 are each independently hydrogen, or are the same or different carboxylic acid protecting group removable by hydrolysis or hydrogenolysis;

and the configuration about the carbon atom designated * is L.

5,026,852
PROCESS FOR THE PREPARATION OF CYTOSINES

Franz-Albert von Itter, Bonn, Fed. Rep. of Germany, assignor to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Jan. 3, 1990, Ser. No. 460,424

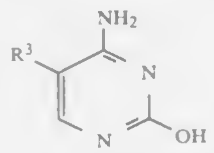
Claims priority, application Fed. Rep. of Germany, Mar. 3, 1989, 3906855

Int. Cl.^{5} C07D *239/47*

U.S. Cl. 544—317 **11 Claims**

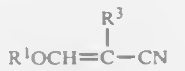
1. In the method of preparing a cytosine of the formula

(I)



wherein R^3 is hydrogen, alkyl of 1 to 6 carbon atoms or aralkyl, which comprises reacting a β-alkoxy-acrylonitrile of the formula

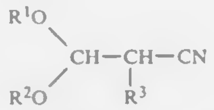
(II)



$$R^1OCH{=}\overset{\displaystyle R^3}{\overset{|}{C}}{-}CN$$

wherein R^1 is alkyl of 1 to 6 carbon atoms which may be alkoxy- or halo-substituted, and R^3 has the meanings defined above, or a β,β-dialkoxy-propionitrile of the formula

(III)



wherein R^1 and R^2 are alkyl of 1 to 6 carbon atoms which may be alkoxy- or halo-substituted, and R^3 has the meanings previously defined, with urea in the presence of an alkali metal alcoholate of the formula MeOR^4 wherein R^4 is alkyl of 1 to 4 carbon atoms and Me is an alkali metal, and recovering the cytosine by neutralization at temperatures of 0° to 150° C., the improvement which comprises using as a reaction medium a sparsely water-miscible organic solvent or solvent mixture which is inert under the reaction conditions and may contain alcohols as minor components.

5,026,853
4-SUBSTITUTED-2(OR 3)AMINOCARBONYL-1-PIPERAZINEACETAMIDE

Georges H. P. Van Daele, Turnhout; Freddy F. Vlaeminck, Lille, and Marc G. C. Verdonck, Turnhout, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

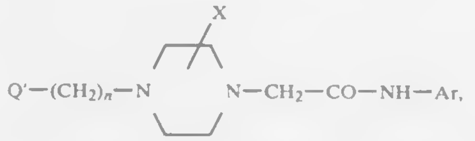
Continuation of Ser. No. 419,349, Oct. 10, 1989, Pat. No. 4,968,684, which is a continuation of Ser. No. 165,965, Mar. 9, 1988, Pat. No. 4,880,808, which is a continuation-in-part of Ser. No. 34,129, Apr. 1, 1987, abandoned. This application Sep. 20, 1990, Ser. No. 585,842

Int. Cl.^{5} C07D *295/10, 295/12, 403/12, 403/14*

U.S. Cl. 544—390 **5 Claims**

1. A compound of the formula:

(I')



a pharmaceutically acceptable acid addition salt or a stereochemically isomeric form thereof,

wherein:

X represents hydroxyC$_{1-6}$alkyl, aminocarbonyl, or mono- or di(C$_{1-6}$alkyl)amino-carbonyl;

Ar represents phenyl, optionally substituted with up to 3 substituents each independently selected from the group consisting of hydroxy, C$_{1-6}$alkyl, C$_{1-6}$alkyloxy, halo, trifluoromethyl, C$_{1-6}$alkylcarbonyl, mono- and di(C$_{1-6}$alkyl)aminocarbonyl, aminocarbonyl, C$_{1-6}$alkyloxycarbonyl, nitro, cyano, amino, aminomethyl, mono-and di(C$_{1-6}$alkyl)amino, (C$_{1-6}$alkylcarbonyl)amino,(aminocarbonyl)amino, and phenylmethoxy;

provided that when X represents aminocarbonyl, then Ar represents other than 2,6-dihalophenyl substituted in the 4-position with amino, mono- and di(C$_{1-4}$alkyl)amino, C$_{1-4}$alkylcarbonylamino, aminocarbonylamino, C$_{1-4}$alkylcarbonyl, aminocarbonyl, cyano, or halo;

—(CH$_2$)$_n$— represents a bivalent radical wherein n represents 3 or 4 and wherein one hydrogen in said bivalent radical may be replaced by C$_{1-6}$alkyl; and

Q' represents 2,2-dihalophenylethenyl or 2,2-dihalophenylethyl; provided that Q' represents other than 2,2-di(halophenyl)ethyl when Ar represents dihalophenyl and X represents aminocarbonyl.

5,026,854
METHOD FOR THE PRODUCTION OF 2-BROMO-5,6,7,8-TETRAHYDROQUINOLINE AND THE ANALOGOUS 2-BROMO-TRIMETHYLENE AND PENTAMETHYLENE PYRIDINES

Robin G. Shepherd, Windsor, United Kingdom, assignor to John Wyeth & Brother Limited, Maidenhead, England

Division of Ser. No. 367,531, Jun. 16, 1989, Pat. No. 4,975,431. This application Aug. 8, 1990, Ser. No. 564,264

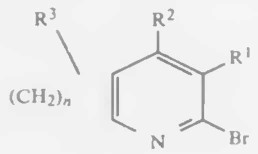
Claims priority, application United Kingdom, Jun. 17, 1988, 8814458

Int. Cl.^{5} C07D *215/18, 231/04*

U.S. Cl. 546—112 **1 Claim**

1. A process for preparing a compound of formula IVa

(IVa)

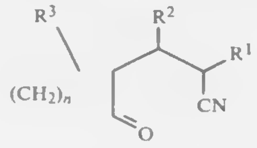


wherein R^1 and R^2 each independently represent hydrogen, lower alkyl, lower alkoxy, carboxyloweralkyl, carboxy, hydroxyloweralkyl, halogen, haloloweralkyl, lower alkoxycarbonyl, optionally substituted aryl or optionally substituted aralkyl,

n represents an integer from 3 to 6,

R^3 which is optionally present represents single or multiple substitution on one or more of the aliphatic carbons by one or more substituents selected from lower alkyl, optionally substituted aryl and optionally substituted aralkyl, which comprises reacting a compound of formula VII

(VII)



where n, R^1, R^2 and R^3 are as defined above, in an inert solvent with either HBr and bromine or with bromine.

5,026,855
STEREOSPECIFIC PROCESS FOR THE PREPARATION OF FURO(3,4-C) PYRIDINE, ENANTIOMER, COMPOUNDS THUS OBTAINED AND THERAPEUTICAL COMPOSITIONS THEREOF

Marc Bonato, Aramon, France, and Charles Eck, Schrewsbury, Mass., assignors to Societe de Consels de Recherches et d Applications Scientifiques, France

Filed Nov. 28, 1989, Ser. No. 449,946

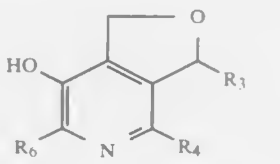
Claims priority, application United Kingdom, Apr. 6, 1988, 8808001

Int. Cl.^{5} C07D *491/48*

U.S. Cl. 546—116 **12 Claims**

1. Stereospecific process for the preparation of enantiomers of 3-substituted-furo-[3,4-c]pyridine of the formula I

I



wherein

R$_3$ stands for a straight chain saturated or unsaturated hydrocarbon group having from 1 to 5 carbon atoms, a furyl or thienyl group, a phenyl or cyclohexyl group, a phenylalkyl group or a phenylalkenyl group, each of said groups being optionally substituted by one or more chlorine, bromine or fluorine atoms, trifluoromethyl groups, alkyl groups having from 1 to 5 carbon atoms, alkoxy groups having from 1 to 5 carbon atoms, dialkylamino groups in which each alkyl group has from 1 to 5 carbon atoms or an α- or β-alkoxy-N-pyrrolidinyl group in which the alkoxy group has from 1 to 5 carbon atoms; R$_4$ stands for a hydrogen or a halogen atom; and R$_6$ stands for a straight chain or branched chain alkyl or alkenyl group having up to 6 carbon atoms, optionally substituted by a hydroxy, cyano, amino or amino group substituted by an alkyl or alkenyl group having up to 4 carbon atoms, comprising the steps of

(a) oxidizing a racemic pyridine derivative of the formula I!

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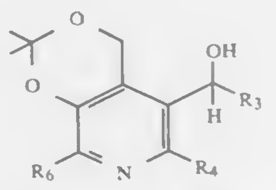
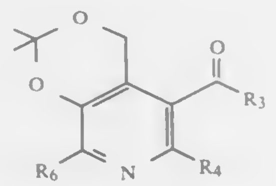


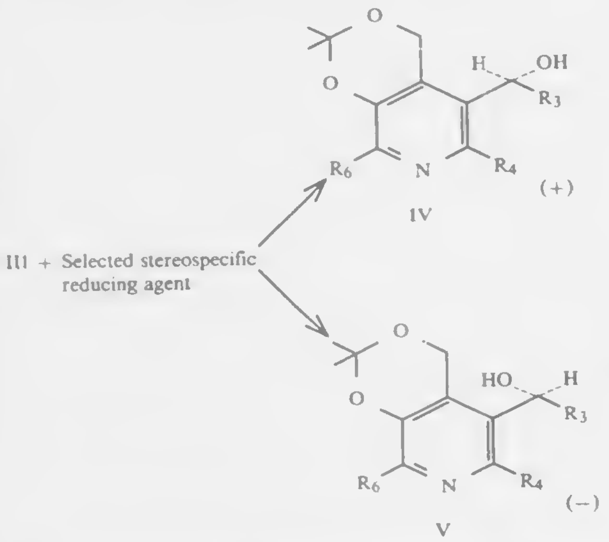
II

wherein R_3, R_4 and R_6 are as above defined;
(b) reducing the resulting ketone of the formula III



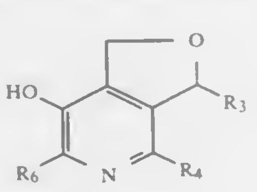
III

wherein R_3, R_4 and R_6 are as above defined with a chiral reducing agent or a catalyst for asymmetrical hydrogenation, which gives, according to the selected chiral reducing agent or catalyst, the following compounds:



(c) stereospecific locking or blocking of the OH group of the selected enantiomer alcohol;
(d) opening of the acetonide ring by protic acids with concomitant liberation of the CH_2OH and OH groups on the pyridine ring; and
(e) cyclizing the resulting compound.

9. (+) or mixtures of predominant (+) enantiomers of the 3-substituted-furo-[3,4-c]pyridine of the formula I



I

wherein
R_3 stands for a straight chain saturated or unsaturated hydrocarbon group having from 1 to 5 carbon atoms, a furyl or thienyl group a phenyl or cyclohexyl group, a phenylalkyl group or a phenylalkenyl group, each of said groups being optionally substituted by one or more chlorine bromine or fluorine atoms, trifluoromethyl groups, alkyl groups having from 1 to 5 carbon atoms, alkoxy groups having from 1 to 5 carbon atoms, alkylthio groups having from 1 to 5 carbon atoms, dialkylamino groups in which each alkyl group has from 1 to 5 carbon atoms, dialkylaminoalkoxy groups in which each of the two alkyl groups and the alkoxy group has from 1 to 5 carbon atoms or an α- or β-alkoxy-N-pyrrolidinyl group in which the alkoxy group has from 1 to 5 carbon atoms; R_4 stands for a hydrogen or a halogen atom and R_6 stands for a straight chain or branched chain alkyl or alkenyl group having up to 6 carbon atoms, optionally substituted by a hydroxy, cyano, amino or amino group substituted by an alkyl or alkenyl group having up to 4 carbon atoms.

5,026,856

ISOINDOLINE DERIVATIVE

Takashi Yatsunami; Akira Yazaki; Satoshi Inoue; Hitoshi Yamamoto; Masaharu Yokomoto; Jun Nomiyama, and Shuichiro Noda, all of Hiroshima, Japan, assignors to Wakunaga Seiyaku Kabushiki Kaisha, Osaka, Japan

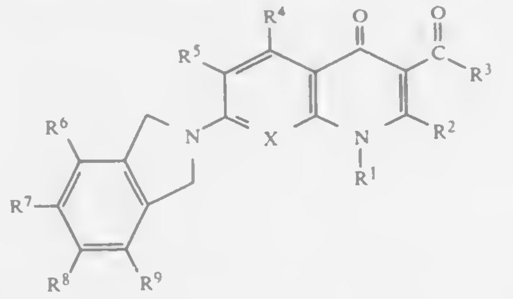
Filed May 23, 1989, Ser. No. 356,059

Claims priority, application Japan, May 23, 1988, 63-125496; Nov. 2, 1988, 63-277892

Int. Cl.^{5} C07D *401/10, 471/04, 471/06, 513/04*

U.S. Cl. 546—156 2 Claims

1. An isoindoline derivative of formula (I),



(I)

wherein:

R^1 is a lower alkyl group; an alkyl group substituted by an amino group, a mono-, di-, or tri-alkylamino group, a cyano group, a hydroxyl group, a lower alkoxy group, a carboxyl group, a lower alkoxycarbonyl group, a halogen atom, or a lower alkylthio group; a cyclo-lower alkyl group; a lower alkenyl group; a mono- or di-lower alkylamino group; a lower alkoxy group; a C_{7-8} aralkyl group; a C_{7-8} aralkyl group which is substituted by a t least one member selected from the group consisting of halogen atoms, lower alkoxy groups, a hydroxy group, an amino group, and amino-lower alkyl groups; or a phenyl group; a phenyl group substituted by at least one member selected from the group consisting of halogen atoms, lower alkyl groups, lower alkoxy groups, a hydroxy group, an amino group, and amino-lower alkyl groups;

R^2 is a hydrogen atom; a group; or a lower alkylthio group;

R^3 is a hydroxy group; an amino group; a mono- or di-lower alkylamino group; or a group —OR^{10} wherein R^{10} is a carboxyl ester protective group selected from the group consisting of methyl, ethyl, benzyl, trialkyl silyl, acetoxymetyl, pivaloyloxymethyl, ethoxycarbonyloxyethyl, dimethylaminoethyl, 1-piperidinylethyl, trimethylaminoethyl and phthalidyl;

R^4 is a hydrogen atom; a halogen atom; a hydroxy group; a lower alkoxy group; a lower alkyl group; an amino group; or a mono-, di- or tri-lower alkylamino group;

R^5 is a halogen atom; a hydroxy group; or a lower alkoxy group;

R^6, R^7, R^8 and R^9, which each are the same or different, individually are a hydrogen atom; a halogen atom; a lower alkyl group; a lower alkyl group substituted by at least one member selected from the group consisting of an amino group, mono-, di-, and tri-alkylamino groups, a cyano group, a hydroxyl group, lower alkoxy groups, a carboxyl group, lower alkoxycarbonyl groups, halogen atoms, and lower alkylthio groups; a cyclo-lower alkyl group; a C_{6-10} aryl group; a C_{6-10} aryl group which is substituted by at least one member selected from the group consisting of halogen atoms, lower alkoxy groups, a hydroxy group, an amino group, and amino-lower alkyl groups; a C_{7-8} aralkyl group; a C_{7-8} aralkyl group which is substituted by at least one member selected from the group consisting of halogen atoms, lower alkoxy groups, a hydroxy group, an amino group, and amino-lower alkyl groups; a carboxyl groups; a lower alkoxycarbonyl group; a mono- or di-lower alkylcarbamoyl group; an C_6–C_{10} arylcarbamoyl group; a CONH—Ar group, wherein Ar is an C_{6-10} aryl group which is substituted by at least one member selected from the group consisting of halogen atoms, lower alkoxy groups, a hydroxy group, an amino group, and amino-lower alkyl groups; a formyl group; a nitrile group; a lower alkanoyl group; a —CO—Alk group, wherein Alk is a lower alkyl group substituted by at least one member selected from the group consisting of halogen atoms, lower alkoxy groups, and a phenyl group; an C_6–C_{10} aroyl group; a —CO—Ar group, wherein Ar is an C_6–C_{10} aryl group which is substituted by at least one member selected from the group consisting of halogen atoms, lower alkoxy groups, a hydroxy group, an amino group, and amino-lower alkyl groups; a hydroxy group; a lower alkoxy group; an C_6–C_{10} aryloxy group; an O-Ar group, wherein Ar is an C_6–C_{10} aryl group which is substituted by at least one member selected from the group consisting of halogen atoms, lower alkoxy groups, a hydroxy group, an amino group, and amino-lower alkyl groups; a lower alkanoyloxy group; an C_5–C_{10} aroyloxy group; a —O-CO—Ar group, wherein Ar is an C_6–C_{10} aryl group which is substituted by at least one member selected from the group consisting of halogen atoms, lower alkoxy groups, a hydroxy group, an amino group, and amino-lower alkyl groups; an amino group; a mono-, di- or tri-lower alkylamino group; a lower C_6–C_{10} alkanoylamino group; a lower aroylamino group; an —NH—Aro group, wherein Aro is an C_6–C_{10} aroyl group which is substituted by at least one member selected from the group consisting of halogen atoms, lower alkoxy groups, a hydroxy group, an amino group, and amino-lower alkyl groups; a nitro group; a lower C_6–C_{10} alkylsulfonyl group; an arylsulfonyl group; a —SO_2—Ar group, wherein Ar is an C_6–C_{10} aryl group which is substituted by at least one member selected from the group consisting of halogen atoms, lower alkoxy groups, a hydroxy group, an amino group, and amino-lower alkyl groups; a group; a lower alkylthio group; a sulfonamide group; a lower C_6–C_{10} alkylsulfonamide group; a lower arylsulfonamide group; a —SO_2NH—Ar group, wherein Ar is an C_6–C_{10} aryl group which is substituted by at least one member selected from the group consisting of halogen atoms, lower alkoxy groups, a hydroxy group, an amino group, and amino-lower alkyl groups;

X represents a =CY— group, wherein Y represents a hydrogen atom, a halogen atom, a lower alkyl group, or a lower alkoxy group,

or salt of said isoindoline derivative.

5,026,857

SUBSTITUTED BASIC 2-AMINOTETRALIN IN PHARMACEUTICALS

Rudolf Schohe, Wuppertal; Thomas Glaser, Röesrath; Jörg Traber, Lohmar, all of Fed. Rep. of Germany, and George S. Allen, Nashville, Tenn., assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

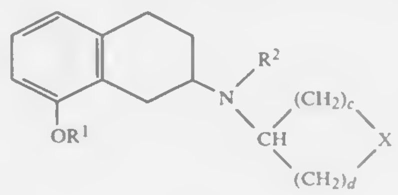
Division of Ser. No. 130,373. Dec. 8, 1987, Pat. No. 4,880,802. This application Jul. 12, 1989, Ser. No. 378,733

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1986, 3642192; Jun. 1, 1987, 3718317

Int. Cl.^{5} A61K *31/445;* **C07D** *211/58*

U.S. Cl. 514—319 8 Claims

1. A substituted basic 2-aminotetralin of the formula



wherein
R^1 represents hydrogen or lower alkyl,
R^2 represents hydrogen, lower alkyl, lower alkylcarbonyl, or benzoyl,
c denotes a number 0, 1 or 2,
d denotes a number 2 or 3,
X denotes oxygen or the group NR^5,
where
R^5 represents hydrogen, or represents lower alkyl which is optionally substituted by hydroxyl or amino, or represents phenyl, benzyl, lower alkoxycarbonyl, lower alkylsulphonyl or carbamoyl, or its salt.

5,026,858

PIPERIDINE DERIVATIVE

Armando Vega-Noverola; Jose Boix-Iglesias; Jose Prieto-Soto, and Jacinto Moragues-Mauri, all of Barcelona, Spain, assignors to Walton S.A., Madrid, Spain

Continuation of Ser. No. 425,705, Sep. 28, 1982, abandoned, which is a continuation of Ser. No. 852,074, Nov. 16, 1977, abandoned. This application Apr. 5, 1985, Ser. No. 720,295

Claims priority, application United Kingdom, Nov. 16, 1976, 47739/76

Int. Cl.^{5} C07D *211/58;* **A61K** *31/445*

U.S. Cl. 546—224 1 Claim

1. N-(1-cyclohexa-3'-enylmethylpiperid-4-yl)-2-ethoxy-4-amino-5-nitrobenzamide and pharmaceutically-acceptable acid addition salts thereof.

5,026,859

ALKYL ESTERS OF 5-HETEROCYCLIC-PYRIDINE-2,3-DICARBOXYLIC ACIDS

John M. Finn, Mercerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Dec. 27, 1989, Ser. No. 457,607

Int. Cl.^{5} C07D *405/04*

U.S. Cl. 546—268 6 Claims

1. A compound having the structure:

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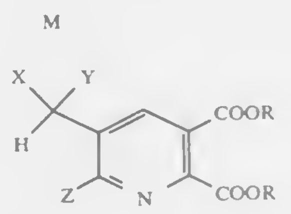


wherein

R is C_1–C_6 alkyl;

X and Y are each independently oxygen;

M is C_2–C_5 alkylene optionally substituted with 1 or 2 C_1–C_4 alkyl, C_1–C_4 alkoxy, halogen, CO_2R_6 or oxo groups, and optionally interrupted by one oxygen or one sulfur,

C_2 alkenylene optionally substituted with 1 or 2 C_1–C_4 alkyl or CO_2R_6,

C_3 alkenylene optionally substituted with 1 or 2 C_1–C_4 alkyl, CO_2R_6 or oxo groups,

methyleneamino, optionally substituted with C_1–C_4 alkyl or CO_2R_6, or

provided that the ring formed by M, X and Y and the carbon to which they are attached is no more than 8 atoms and provided that when the substituents on M are either alkoxy or halogen the substituted carbon is not bound to X or Y;

R_6 is hydrogen, methyl or ethyl;

Z is hydrogen, halogen, C_1–C_6 alkoxy or C_1–C_6 alkyl optionally substituted with C_1–C_4 alkoxy or halogen.

5,026,860
BIDENTATE CHELATING MONOMERS AND POLYMERS

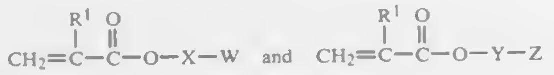
Gavin M. Buchan, Harlow, and Ian J. Ferguson, Ickleton, both of England, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 527,333, Aug. 29, 1983, abandoned. This application Nov. 27, 1984, Ser. No. 675,127

Int. Cl.⁵ C07D *235/04*

U.S. Cl. 546—271 **13 Claims**

1. A compound having a formula selected from:

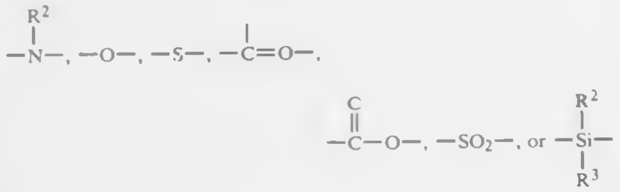


$$CH_2=\overset{R^1}{\overset{|}{C}}-\overset{O}{\overset{\|}{C}}-O-X-W \quad \text{and} \quad CH_2=\overset{R^1}{\overset{|}{C}}-\overset{O}{\overset{\|}{C}}-O-Y-Z$$

wherein

R^1 is H, lower alkyl, chlorinated lower alkyl, CN, or Cl;

X is an organic connecting linkage selected from a single bond and a branched or straight chain aliphatic group of up to 22 carbon atoms, providing that groups of two or more carbon atoms may be interrupted by one phenylene,

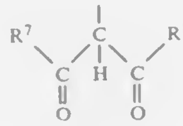


$$-\overset{R^2}{\overset{|}{N}}-,\ -O-,\ -S-,\ -\overset{|}{C}=O-,\ -\overset{C}{\overset{\|}{C}}-O-,\ -SO_2-,\ \text{or}\ -\underset{R^3}{\underset{|}{\overset{R^2}{\overset{|}{Si}}}}-$$

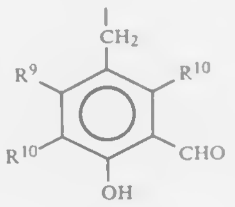
moiety, wherein R^2 and

R^3 are independently H or lower alkyl having 1 to 4 carbon atoms, provided that the total number of atoms of connecting linkage X is not more than 75, and providing that X does not react with W, nor enter into any chelating action, nor have polymerizing units within it; and

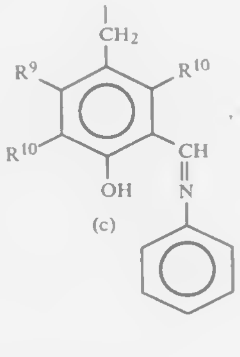
W is a bidentate chelating moiety selected from the group consisting of



(a)

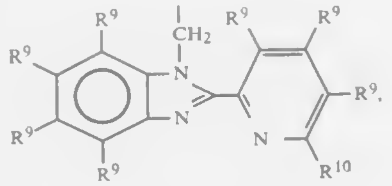


(b)



(c)

, and



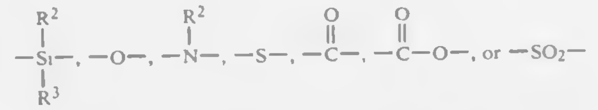
(d)

wherein R^7, R^8 are independently lower alkyl (C_1–C_4);

R^9 is independently selected from a hydrogen atom, a halogen atom selected from fluorine, chlorine, bromine and iodine, an NO_2 group, an alkyl group having 1 to 10 carbon atoms, an alkoxy group having 1 to 10 carbon atoms, an alkylthio group having 1 to 10 carbon atoms, a phenyl group, and a phenyl group substituted with up to 3 groups chosen from a halogen atom, an NO_2 group, and a lower alkyl group having 1 to 4 carbon atoms;

R^{10} is independently selected from a hydrogen atom, a halogen atom selected from fluorine, chlorine and bromine, an NO_2 group, an alkyl group having 1 to 10 carbon atoms, an alkoxy group having 1 to 4 carbon atoms, an alkylthio group having 1 to 4 carbon atoms, and a phenyl group;

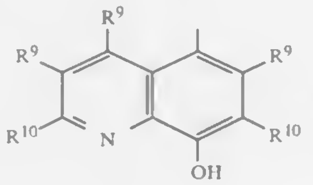
Y is an organic connecting linkage chosen from a single bond and the group —CH_2L— where L is a branched or straight chain aliphatic group of up to 21 carbon atoms, providing that groups of two or more carbon atoms may be interrupted by up to one phenylene,



$$-\underset{R^3}{\underset{|}{\overset{R^2}{\overset{|}{Si}}}}-,\ -O-,\ -\overset{R^2}{\overset{|}{N}}-,\ -S-,\ -\overset{O}{\overset{\|}{C}}-,\ -\overset{O}{\overset{\|}{C}}-O-,\ \text{or}\ -SO_2-$$

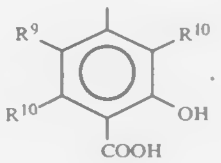
moiety for every group of two or more C atoms, wherein R^2 and R^3 are independently H or lower alkyl or 1 to 4 carbon atoms, providing that the total number of atoms of connecting linkage Y is not more than 75, and providing that Y does not react with Z, nor enter into any chelating action, nor have polymerizing units within it; and

Z is a bidentate chelating moiety selected from the group consisting of



(e)

and



(f)

wherein R^9 and R^{10} are as defined above.

5,026,861
SUBSTITUTED 1,5-DIHYDRO-4-(N-METHYLHYDROXYLAMINO)-2H-PYRROL-2-ONES

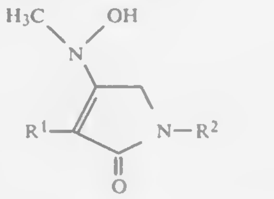
Gary A. Flynn, and Douglas W. Beight, both of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals, Cincinnati, Ohio

Filed Jul. 17, 1989, Ser. No. 380,937

Int. Cl.⁵ C07D *207/26, 207/335;* **A61K** *31/40*

U.S. Cl. 514—424 **12 Claims**

1. A substituted 1,5-dihydro-4-(N-methylhydroxylamino)-2H-pyrrol-2-one having the formula:



(I)

wherein R_1 is phenyl or substituted phenyl, said substitution being selected from the group consisting of methoxy, chloro, trifluoromethyl, phenyl, phenoxy or benzyloxy; R_2 is selected from the group consisting of methyl, phenyl, 4-methylthiophenyl and 4 -methylsuflinylphenyl; and the non-toxic physiologically acceptable salts thereof.

5,026,862
PROCESS FOR THE PREPARATION OF 1.R, CIS CYCLOPROPANE DI-CARBOXYLIC ACID DERIVATIVES

Jean Tessier, Vincennes, and Jean-Pierre Demoute, Montreuil-sous-Bois, both of France, assignors to Roussel Uclaf, Paris, France

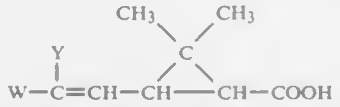
Continuation of Ser. No. 120,868, Nov. 16, 1987, abandoned, which is a continuation of Ser. No. 808,845, Dec. 12, 1985, abandoned, which is a continuation of Ser. No. 491,013, May 3, 1983, abandoned. This application Oct. 3, 1989, Ser. No. 416,718

Claims priority, application France, May 6, 1982, 82 07870

Int. Cl.⁵ C07C *69/743, 69/593, 69/52*

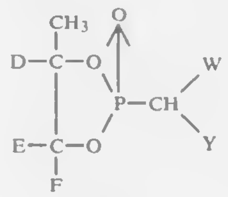
U.S. Cl. 560—124 **5 Claims**

1. A process for the preparation of 1R, cis compounds in all their possible isomeric forms of the formula



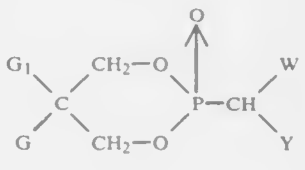
I

wherein W is hydrogen when Y is —COOR′ or —COSR′ and W is halogen when Y is —COOR′ and R′ is selected from the group consisting of (1) hydrogen, tert.-butyl, —CH_2OCH_3 benzyl and —CH_2—SCH_3 with the double bond having Z configuration when W is hydrogen and the E configuration when W is halogen comprising reacting the lactone of cis 2,2-dimethyl-3-dihydroxymethyl-cyclopropane-1-carboxylic acid in the presence of a strong base with a phosphorane of the formula



III_1

or



III_2

wherein C, D, E, F, G AND G_1 are selected from the group consisting of hydrogen and alkyl of 1 to 3 carbon atoms to obtain the corresponding compound of formula I with the cyclopropane and carboxy of Y both being in the 1R cis position with respect to the double bond.

5,026,863
1,4-DIHYDROPYRIDINE COMPOUNDS

Jean L. Peglion, Le Vesinet; Yves M. Gargouil, Paris, and Jean P. Vilaine, Chatenay Malabry, all of France, assignors to Adir et Compagnie, Neuilly-sur-Seine, France

Division of Ser. No. 386,430, Jul. 27, 1989, Pat. No. 4,983,740, which is a continuation of Ser. No. 81,303, Aug. 3, 1987, Pat. No. 4,870,091. This application May 2, 1990, Ser. No. 518,019

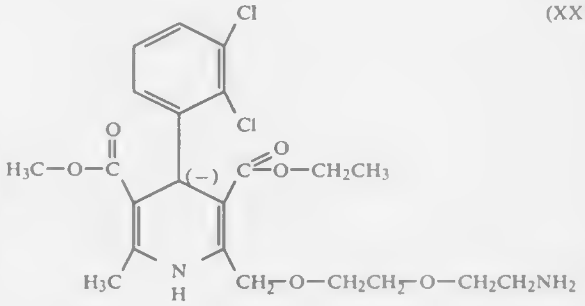
Claims priority, application France, Aug. 4, 1986, 86 11260; Jul. 4, 1989, 89 08920

The portion of the term of this patent subsequent to Sep. 26, 2006, has been disclaimed.

Int. Cl.⁵ C07D *211/86*

U.S. Cl. 546—321 **5 Claims**

1. The compound (−)-2-{[2-(2-aminoethoxy)ethoxy]methyl}-4-(2,3-dichlorophenyl)-3-ethoxycarbonyl-5-methoxycarbonyl-6-methyl-1,4-dihydropyridine, of formula XXIV:



(XXIV)

or an addition salt thereof with a pharmaceutically acceptable inorganic or organic acid.

5,026,864
PREPARATION OF 2-CHLORO-5-AMINOMETHYL-PYRIDINE

Hans-Joachim Diehr, Wuppertal, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 30, 1990, Ser. No. 502,604

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1989, 3911224

Int. Cl.⁵ C07D *213/26, 213/36*

U.S. Cl. 546—345 **9 Claims**

1. A process for the preparation of 2-chloro-5-aminomethypyridine of the formula

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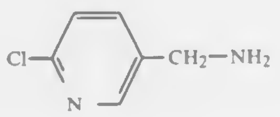
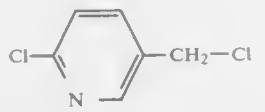


(I)

comprising reacting 2-chloro-5-chloromethyl-pyridine of the formula



(II)

with excess ammonia, optionally in the presence of a diluent, at a temperature between about −50° C. and +50° C.

5,026,865

SUBSTITUTED 2,5-DIMERCAPTO-1,3,4-THIADIAZOLES AND LUBRICATING COMPOSITIONS CONTAINING SAME

Thomas J. Karol, Norwalk, Conn., assignor to R. T. Vanderbilt Company, Inc., Norwalk, Conn.

Continuation-in-part of Ser. No. 759,211, Jul. 26, 1985, abandoned. This application Jun. 3, 1987, Ser. No. 56,917

Int. Cl.⁵ C07C *285/125;* **C10M** *135/36*

U.S. Cl. 548—142 **4 Claims**

1. The compound 2,5-bis(3-dodecyloxy-2-hydroxypropylthio)-1,3,4-thiadiazole.

3. The compound 2,5-bis(2-acetoxyhexadecylthio)-1,3,4-thiadiazole.

5,026,866

SYNTHESIS OF 2,2′-BIS-Δ^2-OXAZOLINE

Giuseppe Messina, Alghero; Loreno Lorenzoni, Porto Torres, and Giovanna Chessa, Sassari, all of Italy, assignors to Enichem Anic S.p.A., Palermo, Italy

Filed Dec. 21, 1989, Ser. No. 454,407

Claims priority, application Italy, Dec. 23, 1988, 23100 A/88

Int. Cl.^{5} C07D *263/08*

U.S. Cl. 548—238 **8 Claims**

1. Process for the synthesis of 2,2′-bis-Δ^2-oxazoline comprising the steps of:

(a) reacting N,N′-bis-(2-hydroxyethyl)oxamide (I) in an anhydrous inert liquid environment, with gaseous hydrogen chloride and acetonitrile, the amount of HCl being from 5 to 20 times the stoichiometrically necessary amount, the molar ratio of acetonitrile to the oxamide(I) being greater than 15:1, at a temperature of from −10° C. to 80° C., to form the corresponding hydrochloride N,N′-bis(2-iminoacyloxy).2HCl(II); optionally

(b) slurrying the compound (II) in a liquid paraffin;

(c) heating the compound (II) from step (a) or the optionally slurried compound (II) from step (b) to a temperature of from 120° C. to 200° C. to convert the compound (II) into N,N′-bis(2-chloroethyl)$_2$oxamide (III), and

(d) cyclizing the compound (III) in methanol, at the refluxing temperature and in the presence of a catalyst selected from sodium hydroxide, sodium methoxide and sodium ethoxide, the molar ratio of the catalyst to the compound (III) being at least stoichiometric.

5,026,867

PYRAZOLOAZOLEAZOMETHINE DYES

Shigeki Yokoyama; Tadahisa Sato; Keizo Kimura; Nobuo Furutachi, and Osamu Takahashi, all c/o Fuji Photo Film Co., Ltd., No. 210, Nakanuma, Minami Ashigara-shi, Kanagawa, Japan

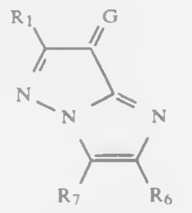
Division of Ser. No. 130,489, Dec. 9, 1987, Pat. No. 4,921,968. This application Feb. 5, 1990, Ser. No. 475,069

Claims priority, application Japan, Dec. 9, 1986, 61-292751

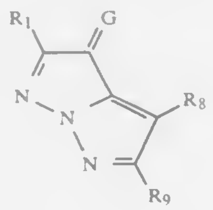
Int. Cl.^{5} C07D *487/04*

U.S. Cl. 548—251 **9 Claims**

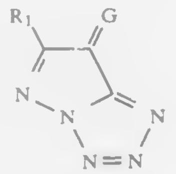
1. A pyrazoloazoleazomethine dye represented by formulae (II), (III), (VI), or (VII):



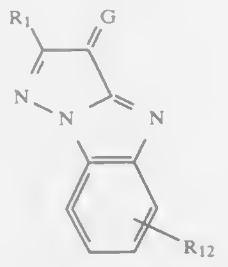
(II)



(III)

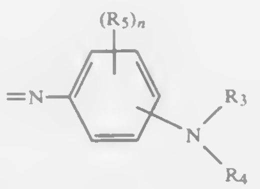


(VI)



(VII)

wherein, R^1 represents a substituent having a Hammet's substituent constant value of at least 0.6; G represents a structural moiety represented by formula (VIII):



(VIII)

wherein R_3, R_4, and R_5 each represents a hydrogen atom or a substituent; and n represents 1 or 2; wherein R_6, R_7, R_8, R_9, and R_{12} each represents a hydrogen atom or a substituent; or dimers or polymers thereof formed by combining two or more of the dyes with each other through a divalent group at R_1, R_6, R_8, R_9, or R_{12}.

5,026,868

INDENYL IMIDAZOLES

Arja L. Karjalainen, and Arto J. Karjalainen, both of Oulu, Finland, assignors to Farmos-Yhtyma Oy, Turku, Finland

Division of Ser. No. 49,882, May 14, 1987, Pat. No. 4,933,359. This application Nov. 6, 1989, Ser. No. 431,959

Claims priority, application Finland, May 15, 1986, 862039; Feb. 4, 1987, 870462

Int. Cl.^{5} C07D *233/56*

U.S. Cl. 548—346 **1 Claim**

1. 4(5)-(2,3-dihydro-2-vinyl-1H-inden-2-yl)imidazole.

5,026,869

6-SUBSTITUTED-4-DIALKYLAMINOTETRAHYDROBENZ(C,D)INDOLES

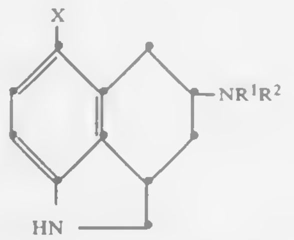
Michael E. Flaugh, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 697,310, Feb. 1, 1985, Pat. No. 4,983,622, which is a continuation-in-part of Ser. No. 577,096, Feb. 6, 1984, abandoned. This application Oct. 31, 1990, Ser. No. 606,228

Int. Cl.^{5} C07D *209/90*

U.S. Cl. 548—436 **13 Claims**

1. An intermediate of the formula



wherein R^1 and R^2 are individually methyl, ethyl, n-propyl or allyl, and X is OC_{1-3} alkyl, and pharmaceutically acceptable salts thereof.

5,026,870

METHOD OF PREPARING BICYCLIC TETRAHYDROXYLATED PYRROLIZIDINES

George W. J. Fleet, Oxford, United Kingdom, assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 404,800, Sep. 8, 1989, Pat. No. 4,992,460. This application Sep. 24, 1990, Ser. No. 587,144

Int. Cl.^{5} C07D *487/10*

U.S. Cl. 548—453 **1 Claim**

1. A method for the production of $1\alpha,2\alpha,6\alpha,7\alpha,7\alpha\beta$-1,2,6,7-tetrahydroxypyrrolizidine comprising:

a) reacting D-glycerol-D-gulo-heptono-1,4-lactone with a silyl blocking agent to protect the primary hydroxyl group and give a protected lactone,

b) reacting the protected lactone with 2,2-dimethoxypropane to provide a fully protected lactone,

c) reducing the fully protected lactone to give a silyl diol,

d) reacting the silyl diol with methanesulfonyl chloride to provide a dimesylate,

e) reacting the dimesylate with benzylamine to introduce nitrogen into the ring and give a monocyclic pyrrolidine,

f) reacting the monocyclic pyrrolidine with fluoride ion to remove the silyl protecting group and provide a primary diol,

g) reacting the primary diol with methanesulfonyl chloride to give a mesylate which spontaneously closes to form a second pyrrolidine ring and give a N-benzyl pyrrolizidinium salt,

h) cleaving the N-benzyl group in the N-benzyl pyrrolizidinium salt by catalytic hydrogenation,

i) neutralizing the resulting product to give a tetracyclic pyrrolizidine, and

j) removing the acetonide protecting groups of the tetracyclic pyrrolizidine by acid hydrolysis to give $1\alpha,2\alpha,6\alpha,7\alpha,$-$7\alpha\beta$-1,2,6,7-tetrahydroxypyrrolizidine.

5,026,871

OLIGOMERS USEFUL FOR MAKING CURED FIBRE REINFORCED COMPOSITES

Mark R. Southcott, Cambridge, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

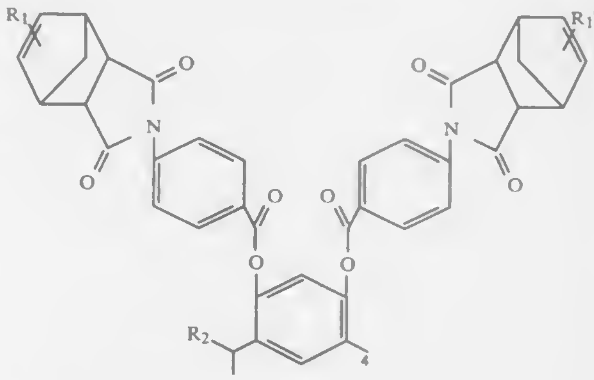
Filed Oct. 22, 1990, Ser. No. 601,146

Claims priority, application United Kingdom, Oct. 26, 1989, 8924143

Int. Cl.^{5} C07D *209/70*

U.S. Cl. 548—435 **2 Claims**

1. A compound of the general formula I



(I)

in which R_1 is hydrogen or methyl and R_2 is C_1–C_{12} alkyl.

5,026,872

AROMATIC ETHER-KETONE POLYAMINES, INTERMEDIATES AND PRODUCTS, AND METHODS FOR PREPARING SAME

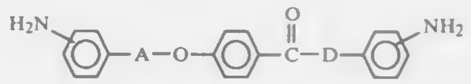
Dalip K. Kohli, Norwalk, Conn., assignor to American Cyanamid, Me.

Filed Feb. 1, 1984, Ser. No. 576,231

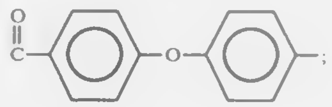
Int. Cl.^{5} C07D *207/452;* **C07C** *211/00, 213/00, 221/00*

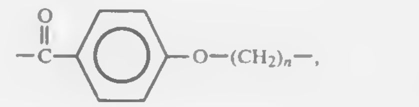
U.S. Cl. 548—521 **8 Claims**

1. A compound of the formula:

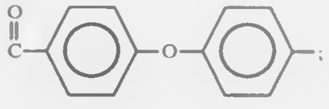


wherein A is valence bond or a divalent radical selected from the group consisting of:





wherein A is a valence bond or a divalent radical selected from the group consisting of:



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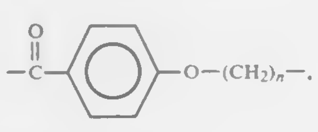
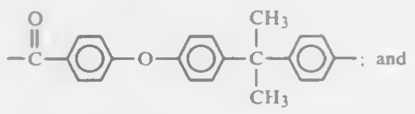
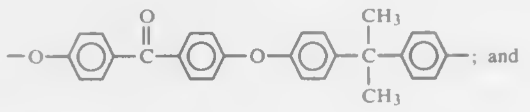
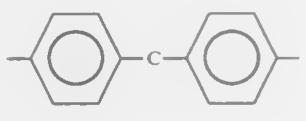


wherein n is an integer of from 1 to 10;





D is valence bond or a



radical.

5,026,873

PROCESS FOR DIRECT ISOLATION OF CAPTOPRIL

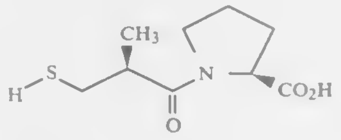
Neal G. Anderson, Somerset; David A. Lust, Roosevelt; Barbara J. Bennett, North Brunswick, all of N.J.; Alan F. Feldman, Philadelphia, Pa., and Robert E. Polomski, Franklin Park, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Nov. 6, 1989, Ser. No. 432,028

Int. Cl.^{5} C07D *207/08*

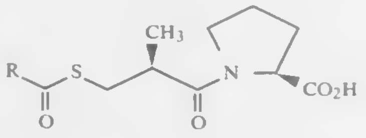
U.S. Cl. 548—533 **26 Claims**

1. A process for preparing a product of the formula

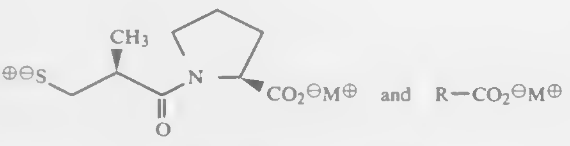


which comprises:

(a) reacting a substrate of the formula



wherein R is lower alkyl or lower alkoxy with an aqueous solution of about 4M or greater of sodium hydroxide, lithium hydroxide or potassium hydroxide to form a reaction mixture comprising



wherein $M^{\oplus}$ is a sodium, lithium or potassium ion; and

(b) neutralizing the reaction mixture to form the product.

5,026,874

PESTICIDAL COMPOUNDS

John P. Larkin; John A. Wyatt, and Deborah J. Hawkes, all of Berkhamsted, England, assignors to Wellcome Foundation Limited, London, England

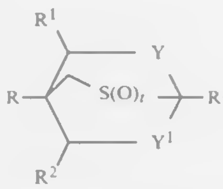
Filed Dec. 14, 1989, Ser. No. 450,514

Claims priority, application United Kingdom, Jan. 24, 1989, 8901492

Int. Cl.^{5} C07D *495/08*

U.S. Cl. 549—15 **9 Claims**

1. A compound of the formula (I):



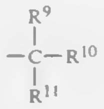
where R is a C_{2-10} non-aromatic hydrocarbyl group, or a C_{2-10} non-aromatic hydrocarbyl group substituted by cyano, halo, C_{1-4} alkoxy, substituted by halo, or a group $S(O)_mR^4$ where R^4 is C_{1-4} alkyl or C_{1-4} alkylsubstituted by halo, and m is 0, 1 or 2, or R is phenyl or phenyl substituted by halo, C_{1-4} alkoxy, C_{1-3} alkyl, C_{2-4} alkynyl, C_{1-4} haloalkyl, cyano or a group $S(O)_mR^4$ as defined above;

R^1 and R^2 may be the same or different, and each is hydrogen, a C_{1-3} aliphatic group or a C_{1-3} aliphatic group substituted by halo;

R^3 is a group:

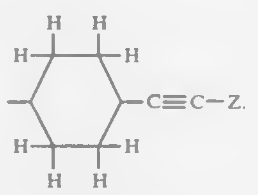
(i) $—A(C≡C)Z$, where A is a C_{3-5} aliphatic chain or a C_{3-5} aliphatic chain containing a hetero atom selected from oxygen and $S(O)_q$ wherein q is 90, 1, or 2; or a substituted C_{3-5} aliphatic chain or a substituted C_{3-5} aliphatic chain containing a hetero atom as defined above wherein the substituents are halo, c_{1-4} alkyl, C_{1-4} haloalkyl, C_{2-4} carbalkoxy or cyano and z is hydrogen, C_{1-5} alkyl, C_{1-3} alkoxymethyl ro a silyl group substituted by three C_{1-4} aliphatic groups or two C_{1-4} aliphatic groups and a phenyl group;

(ii) $—BZ^1$, where B is a group $—CH_2O—$or $CH_2S(O)_q$ where q is 0, 1 or 2 or a C_{2-3} aliphatic group or each of these groups substituted by one to three halo atoms and Z^1 is silyl substituted by three C_{1-4} alkyl groups or Z^1 is a group



$$-\overset{\displaystyle R^9}{\underset{\displaystyle R^{11}}{\overset{|}{\underset{|}{C}}}}-R^{10}$$

where R^9, R^{10} and R^{11} are the same or different and are each independently selected from halo, cyanao, C_{2-5} carbalkoxy, a C_{1-4} aliphatic group or a C_{1-4} aliphatic group substituted by halo, cyano, C_{2-5} carbalkoxy, C_{1-4} alkoxy or a group $S(O)_qR^{12}$ where q is 0, 1 or 2 and R^{12} is C_{1-4} alkyl, or R^9, R^{10} and R^{11} are selected from C_{1-4} alkoxy or a group $S(O)_pR^{13}$ where p is 0, 1 or 2 and R^{13} is C_{1-4} alkyl or C_{1-4} alkyl substituted by fluoro or R^9 and R^{10} are linked to form a C_{3-6} cycloalkyl ring, or one of R^9, R^{10} and R^{11} may be hydrogen; or



(iii)

wherein Z is as defined above; and

Y is $S(O)_{t'}$ and Y^1 is $S(O)_{t''}$ where t' and t" are each selected from 0, 1 or 2; and r is 1 or 2.

5,026,875

STABILITY-IMPROVED TRIOXANE COMPOSITION

Mutsuhiko Takeda, Tokyo; Minoru Kakuda, Matsudo; Masafumi Shimpo, Kashiwa, and Kiyoshi Yoshida, Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Apr. 27, 1989, Ser. No. 343,675

Claims priority, application Japan, May 23, 1988, 63-123941

Int. Cl.^{5} C07D *326/06*

U.S. Cl. 549—201 **18 Claims**

1. A stability-improved trioxane composition comprising 1,3,5-trioxane and a stabilizing effective amount of a ketoxime compound.

5,026,876

PROCESS FOR PRODUCING MALEIC ANHYDRIDE

Harusige Sugawara, and Takasi Okawa, both of Osaka, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Jan. 19, 1990, Ser. No. 467,377

Claims priority, application Japan, Jan. 25, 1989, 1-13985; Apr. 7, 1989, 1-87014

Int. Cl.^{5} C07D *307/60*

U.S. Cl. 549—257 **6 Claims**

1. In a process for producing maleic anhydride by the catalytic oxidation of benzene and /or a fraction of hydrocarbons containing 4 carbon atoms, the improvement which comprises adding tridecyl phosphite to crude maleic anhydride, and distilling the crude maleic anhydride.

5,026,877

OPTICALLY PURE 1,3-DIOXENONES, METHODS FOR PREPARING SAME AND USE THEREOF

Kurt Schaffner, and Martin Demuth, both of Mülheim/Ruhr, Fed. Rep. of Germany, assignors to Studiengesellschaft Kohle mbH, Mulheim, Fed. Rep. of Germany

Division of Ser. No. 76,417, Jul. 21, 1987, Pat. No. 4,864,037. This application May 10, 1989, Ser. No. 350,077

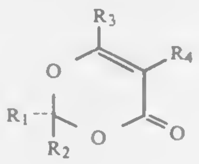
Claims priority, application Fed. Rep. of Germany, Jul. 23, 1986, 3626912

The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.

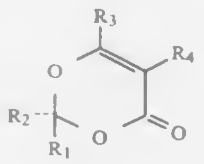
Int. Cl.^{5} C07D *319/08*

U.S. Cl. 549—265 **2 Claims**

1. A process for the preparation of an optically pure 1,3-dioxenone of the formula Ia or Ib



Ia



Ib

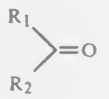
wherein

R_1 and R_2 together form a ring of up to 12 atoms having at least one center of chirality and optionally substituted by at least one member selected from the group consisting of C_1-C_8-alkyl, C_1-C_8-alkoxy, hydroxy, carboxy, phenyl, napththyl, anthracyl and pyridyl, which ring may include at least one hetero atom selected from the group consisting of nitrogen, oxygen, sulfur and boron,

R_3 and R_4 are each independently selected from the group consisting of H, C_1–C_8-alkyl, C_1–C_8-alkoxy, hydroxy-C_1–C_8-alkyl, carboxy-C_1–C_8-alkyl, C_1–C_8-alkenyl, C_1–C_8-alkenoxy, hydroxy-C_1–C_8-alkenyl, carboxy-C_1–C_8-alkenyl, phenyl, naphthyl, anthracyl, pyridyl, Cl, Br, F, CN, COOH, COO-alkyl or $—C(=O)—R$, and

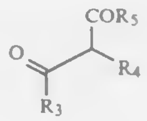
R is H, C_1–C_8-alkyl, C_1–C_8-alkoxy, hydroxy-C_1–C_8-alkyl, carboxy-C_1–C_8-alkyl, C_1–C_8-alkenyl, C_1–C_8-alkenoxy, hydroxy-C_1–C_8-alkenyl, carboxy-C_1–C_8-alkenyl or phenyl,

which comprises reacting an optically active compound of the formula



(III)

with an acetoacetic acid derivative of the formula



(IV)

in which

R_5 is OH or alkoxy, thereby to form a mixture of compounds Ia and Ib, and separating Ia and Ib by chromatography, distillation or crystallization.

5,026,878

PROCESS FOR PREPARING SORAPHEN COMPOUNDS

Bettina Böhlendorf, Braunschweig; Norbert Bedorf, Königslutter; Gerhard Höfle; Dietmar Schummer, both of Braunschweig, all of Fed. Rep. of Germany, and Marius Sutter, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

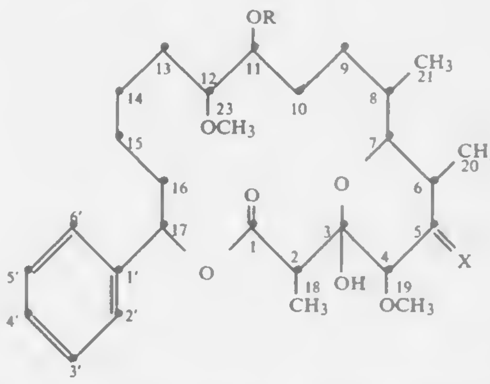
Division of Ser. No. 485,120, Feb. 23, 1990, Pat. No. 4,987,149, which is a division of Ser. No. 405,379, Sep. 8, 1989, Pat. No. 4,940,804. This application Oct. 25, 1990, Ser. No. 602,825

Claims priority, application Switzerland, Sep. 9, 1988, 3376/88

Int. Cl.^{5} C07D *321/00*

U.S. Cl. 549—267 **7 Claims**

1. A process for the preparation of compounds of the formula



in which the dotted line in the 9,10-position is a saturated bond or a double bond, alternatively, while

R is hydrogen, CH_3 or —COA, where

VOL
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A is hydrogen, C_3–C_6cycloalkyl or C_1–C_6alkyl which is unsubstituted or substituted by halogen or C_1–C_1alkoxy, and

X is oxygen or one of the groups =N-OY or =N-N(R_1)(R_2), where

Y is hydrogen, C_1–C_6alkyl, C_3–C_6alkenyl, C_3–C_6alkynyl or an acyl group —CO—Z in which

Z is phenyl, or a C_1–C_6alkyl group which is substituted by halogen or

C_1–C_4alkoxy, or is hydrogen, C_1–C_6alkyl, C_2–C_6alkenyl or C_2–C_6alkynyl;

R_1 is hydrogen or C_1–C_6alkyl and

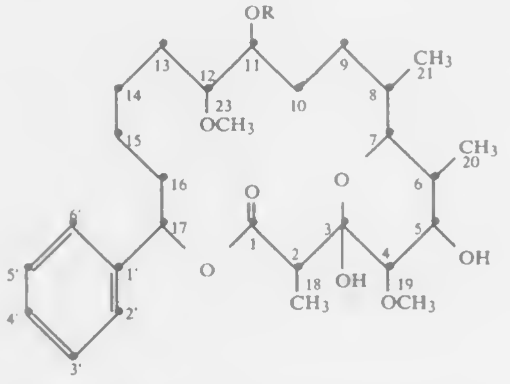
R_2 is hydrogen, C_1–C_6alkyl, phenyl, carbamoyl($CONH_2$), —COA or —SO_2—R_3,

where

R_3 is C_1–C_6alkyl, or is phenyl which is unsubstituted or substituted by C_1–C_4alkyl;

with the proviso that R is methyl if there is a double bond in the 9,10-position;

which process comprises the oxidation of a compound of the formula



at the OH group in the 5-position relative to the 1-keto group and in which formula the functional groups are protected or unprotected.

5,026,879
1,3-DIOXANE DERIVATIVES AND COMPOSITION INCLUDING SAME

Tsuyoshi Obikawa, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

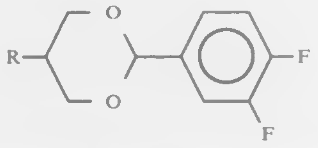
Filed Mar. 20, 1990, Ser. No. 500,985

Claims priority, application Japan, Apr. 28, 1989, 1-109649

Int. Cl.^{5} C07D *319/06;* **G02F** *1/13;* **C09K** *3/24*

U.S. Cl. 549—369 **13 Claims**

1. A 2-(3',4'-difluorophenyl)-1,3-dioxane derivative having the general formula:



(I)

wherein R is a linear alkyl group having from 1 to 8 carbon atoms.

5,026,880
METHOD FOR PRODUCTION OF 1,3-DIOXOLANES

Yoshiaki Urano, Kawasaki, and Yukio Kadono, Yokohama, both of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

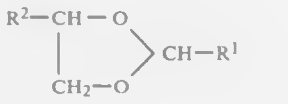
Filed Aug. 9, 1990, Ser. No. 564,742

Claims priority, application Japan, Aug. 15, 1989, 1-209596

Int. Cl.^{5} C07D *317/12*

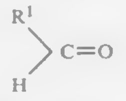
U.S. Cl. 549—430 **10 Claims**

1. A method for the production of a 1,3-dioxolane represented by the general formula III:



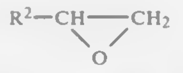
(III)

wherein R^1 is hydrogen atom or an alkyl group of 1 to 5 carbon atoms and R^2 is hydrogen atom or an alkyl group of 1 to 2 carbon atoms or a phenyl group, which method comprises reacting an aldehyde represented by the general formula I



(I)

wherein R^1 has the same meaning as defined above, with an alkylene oxide represented by the general formula II:



(II)

wherein R^2 has the same meaning as defined above, in an alkylene glycol solvent corresponding to said alkylene oxide in the presence of at least one catalyst selected from the group consisting of bromides of alkali metals, iodides of alkali metals, bromides of alkaline earth metals, and iodides of alkaline earth metals.

5,026,881
PROCESS FOR THE PRODUCTION OF EPOXIDIZED FATTY ALCOHOLS

Bert Gruber, Bedburg, Fed. Rep. of Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany

Filed Apr. 8, 1988, Ser. No. 179,171

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1987, 3712183

Int. Cl.^{5} C07D *301/12*

U.S. Cl. 549—531 **10 Claims**

1. A process for the preparation of an epoxidized fatty alcohol comprising the steps of

A. reacting a fatty alcohol containing at least one olefinic double bond with formic acid and an aqueous solution containing from about 60 to about 92% by weight hydrogen peroxide, in the absence of any catalyst at a temperature in the range of from about 40° to about 70° C. in the presence of from about 1 to about 10% by weight of a buffer, based on the weight of aqueous hydrogen peroxide calculated as 70% aqueous solution, wherein from about 1.1 to about 3.5 moles of hydrogen peroxide and from about 0.05 to about 1 mole of formic acid are present per mole of double bond to be epoxidized, to form a reaction mixture containing the epoxidized fatty alcohol, and

B. isolating the resulting epoxidized fatty alcohol from the reaction mixture.

5,026,882
PHOSPHINIC ACID SUBSTITUTED STEROIDS AS INHIBITORS OF STEROID 5 ALPHA-REDUCTASE

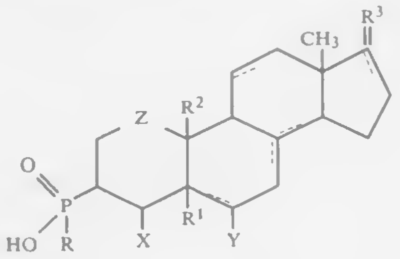
Dennis A. Holt, Downingtown; Mark A. Levy, Wayne, and Brian W. Metcalf, Radnor, all of Pa., assignors to SmithKline Beecham Corporation, Philadelphia, Pa.

Filed Dec. 23, 1988, Ser. No. 290,212

Int. Cl.^{5} C07J *53/00, 71/00, 43/00;* **A01N** *59/26*

U.S. Cl. 552—506 **20 Claims**

1. A compound represented by the formula:



in which:

The A ring has up to 2 double bonds;

The B, C, and D rings have optional double bonds where indicated by the broken lines, provided that the A, B and C rings do not have adjacent double bonds;

R is hydrogen or $C_{1\text{-}4}$alkyl;

Z is CH_2 or, when part of a double bond, CH

X is H, F, Cl, Br, I, CF, or $C_{1\text{-}6}$alkyl;

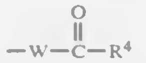
Y is H, F, Cl, CF_3, or CH_3 provided that Y is H when there is no C_5–C_6 double bond;

R^2 is absent or present as H or CH_3 Provided R^2 is absent when the carbon to which it is attached is double bonded;

R^1 is absent when there is a C_4–C_5, C_5–C_6 or C_5–C_{10} double bond, or present as an alpha hydrogen; abnd

R^3 is

(1) α-hydrogen, α-hydroxyl, or α-acetoxy and/or



$$—W—\overset{\overset{O}{\|}}{C}—R^4$$

where W is a bond or

$C_{1\text{-}12}$alkyl, and R^4 is

(i) hydrogen,

(ii) hydroxy,

(iii) $C_{1\text{-}8}$alkyl;

(iv) $C_{1\text{-}8}$alkoxy;

(v)N(R^5), where each R^5 is independently selected from hydrogen, $C_{1\text{-}8}$-alkyl, $C_{3\text{-}6}$-cycloalkyl, phenyl; or taken together with the nitrogen to which they are attached represent a 5–6 membered saturated ring comprising up to one other heteroatom selected from oxygen and nitrogen, or

(vi) OR^6, where R^6 is hydrogen, alkali metal, $C_{1\text{-}18}$-alkyl, benzyl, or

(b) Alk-OR^7, where Alk is $C_{1\text{-}12}$-alkyl, and R^7 is

(i) phenyl-$C_{1\text{-}16}$alkylcarbonyl,

(ii) $C_{5\text{-}10}$cYcloalkylcarbonyl,

(iii) benzoyl,

(iv) $C_{1\text{-}18}$alkoxycarbonyl,

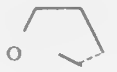
(v) aminocarbonyl or $C_{1\text{-}8}$-alkyl substituted aminocarbonyl,

(vi) hydrogen, or

(vii) $C_{1\text{-}8}$-alkyl,

(2)=CH—W—COR^4 or =CH—W—OR^7, where W is a bond or $C_{1\text{-}12}$alkylidene, R^4 and R^7. have the same meaning as above and R^7 also is hydrogen or $C_{1\text{-}20}$-alkylcarbonyl;

(3)



where the dashed bond replaces the 17α-hydrogen,

(4) α-hydrogen and $NHCOR^8$ where R^8 is $C_{1\text{-}12}$alkyl or N(R^5)$_2$ where R^5 has the same meaning as above,

(5) α-hydrogen and cyano,

(6) α-hydrogen and tetrazolyl, or

(7) keto;

or a pharmaceutically acceptable salt thereof.

5,026,883
DERIVATIVES OF SCYMOL SULFATE

Takuo Kosuge; Kuniro Tsuji; Hitoshi Ishida, and Yoshiki Kosuge, 3-14-18 Kamiashiarai, all of Shizuoka, Japan, assignors to Yoshiki Kosuge, Shizuoka, Japan and James Meredyth Broadbent, Hawthorn, Australia

PCT No. PCT/AU87/00281, § 371 Date Mar. 29, 1989, § 102(e) Date Mar. 29, 1989, PCT Pub. No. WO88/01274, PCT Pub. Date Feb. 25, 1988

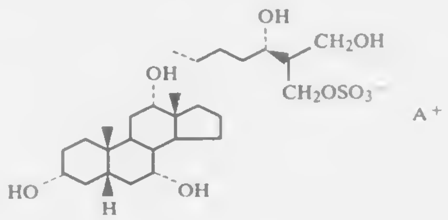
PCT Filed Aug. 21, 1987, Ser. No. 328,040

Claims priority, application Australia, Aug. 21, 1986, 7614/86

Int. Cl.^{5} C07J *31/00*

U.S. Cl. 552—542 **2 Claims**

I. A compound of the formula I, in substantially pure form,



I

wherein A is a cation.

5,026,884
REDUCTIVE COUPLING OF CARBON COMPOUNDS VIA TRANSITION METAL COMPLEXES

Patricia A. Bianconi, Boalsburg, Pa.; Stephen J. Lippard, Cambridge, Mass.; Chebrolu P. Rao, Bombay, India, and Raymond N. Vrtis, Cambridge, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

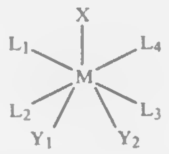
Continuation-in-part of Ser. No. 78,305, Jul. 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 761,399, Aug. 1, 1985, Pat. No. 4,683,315. This application Feb. 16, 1989, Ser. No. 311,931

Int. Cl.^{5} C07F *7/02*

U.S. Cl. 556—12 **19 Claims**

1. A process for the formation of an isolable compound containing a C—X—C, C—X—N, or N—X—N group, where X is selected from the group consisting of a single, double, or triple bond consisting of the steps:

(a) reacting an early transition metal seven coordinate complex of the formula (I) with a reducing agent and a Lewis Acid;



(I)

wherein;

M is an early transition metal selected from the group con-

VOL
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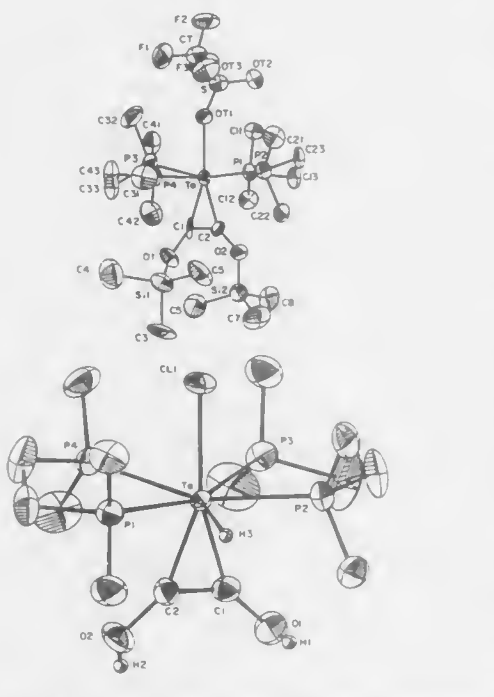
sisting of titanium, zirconium, molybdenum, tungsten , manganese, technetium, and rhenium;

Y_1 and Y_2 are each linear carbon containing ligands independently selected from the group consisting of C≡O, CNR, NCR, C≡CR, CN, C=S, CO_2 and CS_2, wherein R is hydrogen, an alkyl group, or an aryl group;

L_1, L_2, L_3, and L_4, are each neutral 2-electron donor ligands;

X is halogen or pseudohalogen; and

(b) reacting the species formed in step (a) with a sufficient quantity of a second Lewis Acid such that the isolable species containing a C—X—C, C—X—N, or N—X—N group, where X is selected from the group consisting of a single, double, or triple bond is formed.

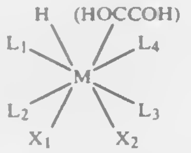


11. The compound having the formula:

[Nb(Me_3SiOCCOSiMe_3)(1,2-bis(dimethylphosphino)ethane$)_2$Cl]

prepared by the process of claim 1.

15. The process of forming a compound having the formula (II):



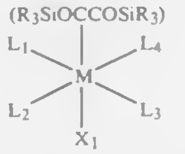
(II)

wherein:

M is an early transition metal selected from the group consisting of titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, technetium, and rhenium;

L_{1-4} are each independently selected from ligands that are neutral 2-electron donors; and

X_1 and X_2 are each independently halogen or pseudohalogen; which comprises a two step reaction, the first step of which involves the hydrolysis and the second step of which involves the oxidation of the compound having the formula (III)



(III)

with protons from a suitable source.

5,026,885

PROCESS FOR PREPARING TRANSITION METAL CYCLOPENTADIENYL CARBONYL COMPOUNDS

Donald R. Bell, and Bruce C. Berris, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Mar. 6, 1990, Ser. No. 488,886

Int. Cl.^{5} C07F *13/00, 11/00, 15/06*

U.S. Cl. 556—47 **14 Claims**

1. A process for preparing a transition metal cyclopentadienyl carbonyl compound of the formula:

$$[R_xC_pM(CO)_y]_n$$

wherein R is hydrocarbyl, C_p is cyclopentadienyl, M is a transition metal, x is 0 or an integer from 1 to 5, y is an integer from 1 to 7, and n is 1 or 2, provided that when x is 2 to 5, R can represent two or more different hydrocarbyl groups and any two R groups can together form a fused ring with the cyclopentadienyl moiety; said process comprising forming in an organic solvent under an inert atmosphere a mixture comprising (i) a transition metal salt of an organic carboxylic acid, a β-diketone or a β-keto ester, (ii) a cyclopentadiene compound and (iii) a metal alkyl reducing agent, in mole ratios of about 0.3 to 10 moles of metal alkyl reducing agent and about 1 to 12 moles of cyclopentadiene compound per mole of said transition metal salt, and reacting mixture under carbon monoxide pressure at a temperature of about 75° to 225° C. so as to form said transition metal cyclopentadienyl carbonyl compound.

5,026,886

PREPARATION OF BIDENTATE LIGANDS

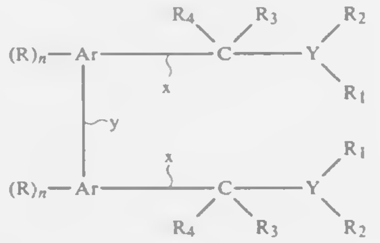
Jerome L. Stavinoha; Gerald W. Phillips; Thomas A. Puckette, and Thomas J. Devon, all of Longview, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 25, 1988, Ser. No. 148,241

Int. Cl.^{5} C07F *9/66, 9/92, 9/94, 9/50*

U.S. Cl. 556—70 **26 Claims**

1. A process for preparing a bidentate ligand of the formula:



wherein:

each Ar is independently selected from aromatic ring compounds having 6 up to 14 carbon atoms;

the x bonds and the y bonds are attached to adjacent carbon atoms on the ring structures;

each R, when present as a substituent, is independently selected from alkyl, alkoxy, aryloxy, aryl, aralkyl, alkaryl, alkoxyalkyl, aryloxy alkyl, cycloaliphatic, halogen, alkanoyl, aroyl, alkanoyloxy, aroyloxy, alkoxycarbonyl, aryloxy carbonyl, carboxyl, sulfonic acid, cyano or formyl radicals;

n is a whole number in the range of 0–4 where Ar is phenyl; 0–6 where Ar is naphthyl; and 0–8 where Ar is phenanthryl or anthracenyl;

each R_1 and R_2 is independently selected from alkyl, aryl, aralkyl, alkaryl or cycloaliphatic radicals, or substituted derivatives thereof; wherein substituted derivatives include ethers, amines, amides, sulfonic acids, esters, hydroxyl groups and alkoxy groups;

each R_3 and R_4 is independently selected from hydrogen and the R_1 substituents;

each of the above alkyl groups or moieties is straight or branched chain of 1–20 carbons;

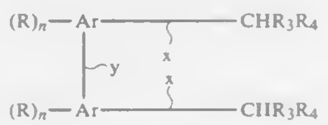
each aryl group or moiety contains 6–10 ring carbons;

each cycloaliphatic group contains from 4–8 ring carbons; and

each Y is independently selected from the elements P, As, Sb and Bi;

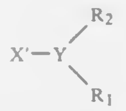
said process comprising:

(1) contacting a biaryl compound having the structure:



with a proton abstracting agent under conditions suitable to form a biaryl dianion, which is then

(2) contacted with a Group V compound of the formula:



where X' is halogen or a suitable leaving group.

5,026,887

METAL-CONTAINING POLYMER AND PRODUCTION PROCESS THEREOF

Shiro Kobayashi, 1-1-302, Kawauchi Juutaku, Kawauchi Mubanchi, Sendai-shi, Miyagi, 980, Japan

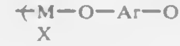
Filed Mar. 26, 1990, Ser. No. 498,501

Claims priority, application Japan, Apr. 20, 1989, 1-98695

Int. Cl.^{5} C07F *7/22, 7/24, 7/02, 7/30*

U.S. Cl. 556—81 **8 Claims**

1. A metal-containing polymer represented by the general formula:



$$\left(\overset{X}{\underset{X}{M}}-O-Ar-O \right)_n$$

where M represents a group IV metal atom, X represents $N(SiR^1R^2R^3)_2$ or $N(R^4)SiR^1R^2R^3$, each of R^1, R^2, R^3 and R^4 represents an alkyl group or aryl group, Ar represents a (substituted) phenylene, (substituted) naphthylene or (substituted) anthrylene group, and n represents an integer of 2 to 5000.

5,026,888

RUTHENIUM TEREPHTHALATE

Richard F. Grossman, Shelton, Conn., and David M. Tanno, Richmond Heights, Ohio, assignors to Synthetic Products Company, Cleveland, Ohio

Continuation of Ser. No. 224,828, Jul. 27, 1988, abandoned. This application May 24, 1989, Ser. No. 356,638

Int. Cl.^{5} C07F *15/00*

U.S. Cl. 556—136 **1 Claim**

1. Ruthenium terephthalate.

5,026,889

CATALYST SYSTEM FOR OLEFIN POLYMERIZATION AND METHOD FOR PRODUCTION OF OLEFIN POLYMERS BY USING THE SAME

Akinobu Shiga; Yoshiharu Fukui; Toshio Sasaki, all of Niihama; Masahisa Okawa, Hirakata, and Hideaki Matsuura, Hiihama, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation-in-part of Ser. No. 39,729, Apr. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 601,716, Apr. 18, 1984, abandoned, which is a contiouation of Ser. No. 160,479, Jun. 18, 1980, abandoned. This application Dec. 21, 1988, Ser. No. 287,491

Claims priority, application Japan, Jun. 20, 1979, 54-78604; Jan. 24, 1980, 55-7545; Jan. 24, 1980, 55-7547; May 10, 1980, 55-62141

Int. Cl.^{5} C08F *4/649, 10/06*

U.S. Cl. 526—142 **1 Claim**

1. A method for producing a highly crystalline polypropylene having a broad molecular weight distribution which comprises:

polymerizing propylene at a temperature of from 0° to 100° C. in the presence of a catalyst system consisting essentially of:

(a) $TiCl_3$,

(b) an organoaluminum compound of the formula

$$(Et)_{3-(m+n)}Al(OBu)_mCl_n \text{ or } (ET)_{3-(m+n)}Al(OEt)_mCl_n$$

wherein Et is ethyl and Bu is butyl, and wherein m and n are numbers which satisfy the equations $0.2 \leqq m \leqq 0.7$, $0 \leqq n \leqq 1.8$ and $0.2 \leqq m+n \leqq 2$; and

(c) an electron-donor compound selected from the group consisting of ethyl benzoate and methyl p-toluate, wherein the molar ratio of electron-donor to organoaluminum compound is 0.01:1 to 1 to 1 and the molar ratio of organoaluminum compound to $TiCl_3$ is 0.5:1.0 to 200:1.

5,026,890

METHOD AND INTERMEDIATES FOR PREPARATION OF BIS(AMINOALKYL)POLYDIORGANOSILOXANES

Jimmy L. Webb, Ballston Lake, N.Y.; Hans V. Ritschard, Pasadena, Calif., and James M. Lambert, Clifton Park, N.Y., assignors to General Electric Company, Schenectady, N.Y.

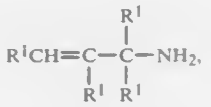
Continuation-in-part of Ser. No. 196,910, May 20, 1988, abandoned. This application Apr. 28, 1989, Ser. No. 344,713

Int. Cl.^{5} C07F *7/08, 7/10, 7/18*

U.S. Cl. 556—408 **29 Claims**

1. A method for preparing a silicon-nitrogen which comprises effecting reaction between the components of a mixture comprising

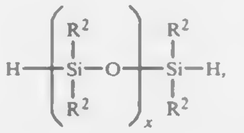
(A) at least one olefinic amine of the formula



$$R^1CH=\underset{R^1}{\underset{|}{C}}-\overset{R^1}{\overset{|}{\underset{R^1}{\underset{|}{C}}}}-NH_2, \quad (I)$$

wherein each R^1 is independently hydrogen, C_{1-4} primary or secondary alkyl, phenyl or substituted phenyl, and

(B) at least one polydiorganosiloxane of the formula



$$H-\left(\overset{R^2}{\overset{|}{\underset{R^2}{\underset{|}{Si}}}}-O \right)_x-\overset{R^2}{\overset{|}{\underset{R^2}{\underset{|}{Si}}}}-H, \quad (II)$$

wherein R^2 is C_{1-4} primary or secondary alkyl, phenyl or

VOL
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substituted phenyl and x has an average value from 1 to about 300, in the presence of a catalytic amount of

(C) a platinum-containing hydrosilation catalyst;

said mixture containing titratable acid, if any, in an amount up to 0.5 equivalent per gram-atom of platinum.

5,026,891

CARBOSILANE SURFACTANTS

André R. L. Colas, Glashutten, Fed. Rep. of Germany; Franck A. D. Renauld, Barry, Wales, and George C. Sawicki, Rixensart, Belgium, assignors to Dow Corning Limited, Barry, Wales

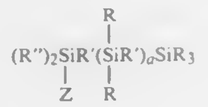
Filed Jul. 28, 1989, Ser. No. 386,068

Claims priority, application United Kingdom, Aug. 17, 1988, 8819567

Int. Cl.^{5} C07F *7/08, 7/10, 7/18*

U.S. Cl. 556—413 **17 Claims**

1. An organosilicon compund represented by the general formula



$$(R'')_2\underset{\substack{|\\ Z}}{Si}R'(\overset{\substack{R\\ |}}{\underset{\substack{|\\ R}}{Si}}R')_aSiR_3$$

wherein each R is independently selected from alkyl, aryl, halogenated alkyl and halogenated aryl groups having up to 18 carbon atoms, each R′ represents an alkylene group separating neighboring silicon atoms by up to 6 carbon atoms, each R″ independently deontes R when a is no 0, and when a is 0, is selected from R groups an the group R_3SiR'—, Z is selected from hydrophilic substituents containing sulphur, hydrophilic substituents containing nitrogen, hydrophilic substituents containing phosphorus, hydrophilic substituents containing a carboxy-functional group and hydrophilic substituents containing a salt of a carboxy group and a has the value 0, 1 or 2.

5,026,892

NOVEL POLY(ARYLCYCLOBUTENES)

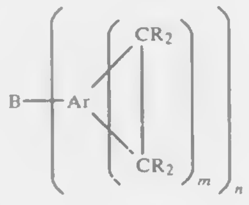
Robert A. Kirchhoff, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 883,240, Jul. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 644,836, Aug. 27, 1984, abandoned. This application Jun. 2, 1989, Ser. No. 360,665

Int. Cl.^{5} C07F *7/10*

U.S. Cl. 556—419 **8 Claims**

1. A poly(arylcyclobutene) which corresponds to the formula

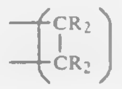


wherein

B is an amidoalkyl terminated polysiloxane, wherein the carbonyl carbon of each amide is bound to Ar;

R is separately in each occurrence hydrogen, an electron-withdrawing substituent or an electron-donating substituent;

Ar is an aromatic moiety or an aromatic moiety substituted with an electron-withdrawing substituent or electron-donating substituent with the proviso that the carbons of the cyclobutene ring



are bonded to adjacent carbon atoms on the same aromatic ring of Ar;

m is an integer of 1 or greater;

n is an integer of 2 or greater; and

with the further proviso that the compound be polymerizable through opening of the cyclobutene rings.

5,026,893

POLYSILAHYDROCARBON LUBRICANTS

Kazimiera J. L. Paciorek, Corona del Mar; Joseph G. Shih, La Palma; Bruce B. Randolph, Newport Beach, all of Calif., and Carl E. Snyder, Jr., Trotwood, Ohio, assignors to Lubricating Specialties Company, Pico Rivera, Calif.

Filed Jun. 11, 1990, Ser. No. 535,606

Int. Cl.^{5} C07F *7/08*

U.S. Cl. 556—435 **17 Claims**

1. A tetrasilahydrocarbon synthetic lubricant base stock having the general formula

$$R_1—Si—R—Si(R_2R_3R_4)]_3$$

wherein R_1, R_2, R_3, and R_4 are alkyl groups having from one to 20 carbon atoms and mixtures thereof, and —R— is an alkylene group, or mixture of alkylene groups, having from three to 10 carbon atoms.

5,026,894

COMPOUND FOR USE IN THE SYNTHESIS OF SEMICONDUCTING POLYMERS WITH PERPENDICULARLY ARRANGED CORES AND METHOD OF SYNTHESIZING SAID COMPOUND

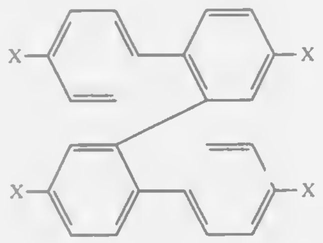
James M. Tour; Ruilian Wu, and Jeffry S. Schumm, all of Columbia, S.C., assignors to University of South Carolina, Columbia, S.C.

Filed Mar. 12, 1990, Ser. No. 492,549

Int. Cl.^{5} C07C *303/00, 22/00;* **C08G** *76/06*

U.S. Cl. 558—46 **4 Claims**

1. A compound of the formula



wherein X is a reactive group through which conducting or pro-conducting polymeric subunits can be bonded to the compound selected from the group consisting of bromine, iodine, —O—SO_2—CF_3, and reactive groups comprising one or more polymer subunits terminally substituted with bromine, iodine or —O—SO_2—CF_3.

5,026,895

NOVEL (TRIFLUOROMETHYL)-PHENOXY-BENZOIC ACID DERIVATIVES, PROCESS FOR THE PREPARATION THEREOF AND FUNGICIDES CONTAINING THESE COMPOUNDS AS ACTIVE INGREDIENT

József Bakos; Bálint Neil, both of Veszprém; László Kollár, Szeged; Szilárd Torös, Pécs; Gvula Eifert, Dunaharaszti; Ferenc Bihari, Budapest; Péter Boros, Budapest; Anna Durkó née Pónácz, Budapest; István Küronya, Budapest; István Magyari, Stromfeld A.sétány; Judit Timár, Budapest; Péter Bohus, Budapest, and László Wohl, Budapest, all of, Hungary, assignors to Budapesti Vegyimüvek, Budapest, Hungary

Filed Nov. 12, 1985, Ser. No. 797,373

Claims priority, application Hungary, Nov. 12, 1984, 4191/84

Int. Cl.^{5} C07C *205/00;* **A01N** *37/12*

U.S. Cl. 560—21 **15 Claims**

1. A fungicidal composition comprising as active ingredient an amount of from about 0.001 to about 95% by weight of a following acid or its salt:

3-{[5-chloro-4-(trifluoromethyl)-2-nitro]-phenoxy}-benzoic acid;

3-[2-(trifluoromethyl)-phenoxy]-benzoic acid;

3-{[2-chloro-4-(trifluoromethyl)-6-nitro]-phenoxy}-benzoic acid;

3-{[2-chloro-4-(trifluoromethyl)-5-nitro]-phenoxy}-benzoic acid; or

3-[3-chloro-4-(trifluoromethyl)phenoxy]-benzoic acid;

or mixtures thereof.

5,026,896

TRISUBSTITUTED BENZOIC ACID INTERMEDIATES

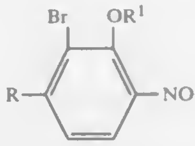
William J. Michaely, El Cerrito, Calif., assignor to ICI Americas Inc., Wilmington, Del.

Continuation of Ser. No. 386,649, Jul. 31, 1989, abandoned, which is a division of Ser. No. 272,841, Nov. 18, 1988, abandoned. This application May 8, 1990, Ser. No. 520,345

Int. Cl.^{5} C07C *205/06, 321/28, 255/50, 63/10*

U.S. Cl. 560—23 **18 Claims**

4. A compound of the structural formula



wherein R is C_1–C_2 alkyl, formyl, cyano, carboxy or —CO_2R^a wherein R^a is C_1–C_4 alkyl, R^1 is C_1–C_4 haloalkyl; —$CH_2CH_2OCH_3$; —$CH_2CH_2OC_2H_5$; —$CH_2CH_2SCH_3$; —$CH_2CH_2SC_2H_5$ with the proviso that when R is carboxy, then R^1 is only —$CH_2CH_2OCH_3$, —$CH_2CH_2OC_2H_5$, —$CH_2CH_2SCH_3$ or —$CH_2CH_2SC_2H_5$.

5. The compound of claim 4 wherein R is carboethoxy and R^1 is —$CH_2CH_2OCH_3$.

5,026,897

CARBAPHENS: APROPHEN ANALOGS THAT ARE BINARY ANTIDOTES FOR ORGANOPHOSPHATE POISONING

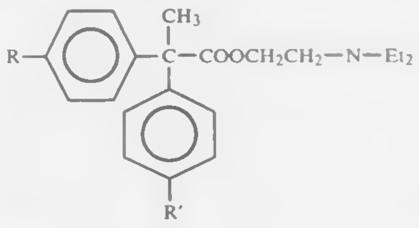
Peter K. Chiang, Bethesda, Md.; Haim Leader, Ramat Hasharm, Israel; Ruthann M. Smejkal, Silver Spring; Richard K. Gordon, Rockville, both of Md.; Charlotte S. Payne, Washington, D.C.; Bhupendra P. Doctor, Potomac, and Felipe N. Padilla, Wheaton, both of Md., assignors to The United States of America, as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 325,806, Mar. 17, 1989. This application Sep. 10, 1990, Ser. No. 580,223

Int. Cl.^{5} C07C *69/76*

U.S. Cl. 560—58 **14 Claims**

1. An organophosphate poisoning inhibitory composition, comprising an organophosphate poisoning inhibitory amount of a compound of the formula



wherein

R is OH or $OCON(CH_3)_2$; and

R′ is H, OH or $OCON(CH_3)_2$, provided that when R is OH, R′ cannot be H; stereoisomers thereof, pharmaceutically-acceptable salts thereof or mixtures thereof.

5,026,898

PROCESS FOR REGIOSELECTIVELY PREPARING PHOSPHORYLATED INOSITOLS AND OTHER CYCLITOLS

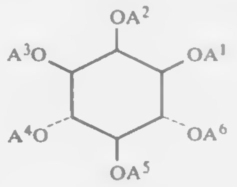
Frank W. Hobbs, and James L. Meek, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 372,242, Jun. 27, 1989, Pat. No. 4,924,023, which is a division of Ser. No. 56,181, May 29, 1987, Pat. No. 4,873,355. This application Jan. 31, 1990, Ser. No. 472,922

Int. Cl.^{5} C07C *69/76*

U.S. Cl. 560—106 **2 Claims**

1. A 2,6-diacyl-{2,4-diacyl-}myo-inositol of the formula



wherein

A^2 and A^6 are —C(=O)W, where W is aryl, or a C_1–C_{15} straight chain, branched or cyclic alkyl, where alkyl may be internally interrupted with ether oxygen and where aryl or the alkyl may be substituted or unsubstituted with nitro, sulfonyl, halogen, ester and ketone groups,

and each of A^1, A^3, A^4 and A^5 is H and the enantiomer thereof.

5,026,899

ACYLCYLOHEXANEDIONES AND THE OXIME ETHERS THEREOF WITH HERBICIDAL AND PLANT GROWTH REGULATING PROPERTIES

Hans Tobler, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 159,803, Feb. 24, 1988, Pat. No. 4,909,835, which is a continuation-in-part of Ser No. 39,039, Apr. 16, 1987, abandoned. This application Dec. 13, 1989, Ser. No. 450,128

Claims priority, application Switzerland, Apr. 24, 1986, 1664/86

Int. Cl.^{5} C07C *69/74*

U.S. Cl. 560—122 **4 Claims**

1. A compound of the formula IV

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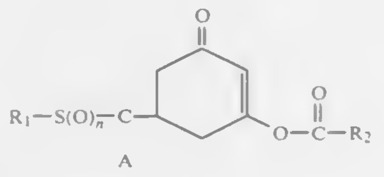


(IV)

wherein

- A is a 2- to 7-membered alkylene bridge, or a 3- to 7-membered alkenylene bridge which may be mono- or polyunsaturated,
- n is 0, 1 or 2,
- R_1 is C_1–C_4alkyl or benzyl and
- R_2 is C_1–C_6alkyl which is unsubstituted or substituted by halogen, C_1–C_4alkoxy or C_1–C_4alkylthio; or is C_3–C_6cycloalkyl; or phenyl, benzyl or phenylethyl, the phenyl ring of each of which may be substituted by halogen, C_1–C_4alkyl, C_1–C_4alkoxy, C_1–C_4alkylthio, C_1–C_4haloalkyl, C_1–C_4haloalkoxy, cyano or nitro.

5,026,900
PROCESS FOR THE PREPARATION OF DIALKYL MALONATES

Philippe Coste, Villeurbanne; Philippe Leconte, Lyon; Robert Perron, Charly, and Michel Baudoin, Craponne, all of France, assignors to Rhone-Poulenc, Courbevoie Cedex, France

Filed May 18, 1989, Ser. No. 353,612

Claims priority, application France, May 19, 1988, 88 06732

Int. Cl.^{5} C07C *67/36;* **B01J** *38/68*

U.S. Cl. 560—204 **26 Claims**

1. A process for the preparation of a dialkyl malonate comprising the step of carbonylation of an alkyl chloroacetate in the presence of an aliphatic alcohol, a carbon monoxide and a carbonylation catalyst, wherein the carbonylation is carried out in a two-phase liquid medium.

18. A process for recycling a cobalt carbonyl complex employed during a carbonylation carried out in a two-phase liquid medium, comprising the steps of

(1) oxidizing the cobalt to oxidation state (+2) by addition of a strong acid,

(2) extracting the oxidized cobalt (Co II) by converting the oxidized cobalt to cobalt dicarboxylate by utilizing a carboxylic acid effective for said converting in the presence of an alkaline inorganic base and extracting the cobalt dicarboxylate by utilizing an organic solvent;

(3) reducing the cobalt carboxylate with a mixture of hydrogen and carbon monoxide in the presence of a Co^0 initiator to form cobalt octacarbonyl; and

(4) disproportionating the reduced cobalt by addition of an inorganic base and separating the resulting tetracarbonylcobaltate.

5,026,901
PALLADIUM CATALYZED CARBOALKOXYLATION OF BUTADIENE

Michael B. D'Amore, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 29, 1990, Ser. No. 501,111

Int. Cl.^{5} C07C *67/36*

U.S. Cl. 560—207 **10 Claims**

1. A process for the preparation of linear alkyl pentenoates which comprises reacting butadiene, carbon monoxide, and an alkyl alcohol in an organic solvent, with a homogeneous catalytic mixture comprising palladium, chloride, a strong acid, an aryl monodentate phosphine, and a N-heterocyclic base, at a temperature in the range of between about 80 and 170 degrees C. in which palladium is present in the reaction mixture in the amount of about 0.005 to 0.5 weight % of the reaction mixture, in which the chloride to palladium molar ratio is in the range of 1 to 10, in which the aryl monodentate phosphine to palladium molar ratio is greater than 1 and less than about 15, in which the strong acid has a pKa of less than 3.5, and the molar ratio of strong acid to palladium is in the range of 0.5 to 10, in which the N-heterocyclic base has a pKa of at least about 3 and the N-heterocyclic base is present in a molar ratio to strong acid of at least 0.5, and in which the alkyl alcohol has 1 to 12 carbon atoms and the alcohol to butadiene ratio is 1:1 to 3:1, and carbon monoxide is present in an amount at least sufficient to satisfy the stoichiometry of the carbonylation reaction.

5,026,902
DENTAL COMPSITION OF PERFLUOROALKYL GROUP-CONTAINING (METH-)ACRYLATE ESTERS

Jürgen Fock, Düsseldorf; Günter Hahn, Mühlheim/Ruhr, and Günter Wagenknecht, Echzell, all of Fed. Rep. of Germany, assignors to Th. Goldschmidt AG & GDF Gesellschaft für Dentale Forschung u. Innovationen GmbH, Essen, Fed. Rep. of Germany

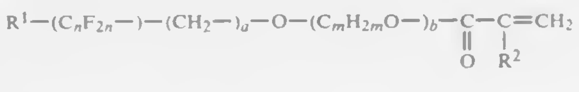
Filed Nov. 27, 1989, Ser. No. 441,764

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1988, 3844619

Int. Cl.^{5} C07C *69/54*

U.S. Cl. 560—223 **1 Claim**

1. In a method of relining dental prostheses, wherein a curable dental preparation is applied to the prosthesis to be relined and is cured, the improvement which comprises that the curable dental preparation contains an effective amount of a (meth-)acrylate ester of the general formula



$$R^1-(C_nF_{2n}-)-(CH_2-)_a-O-(C_mH_{2m}O-)_b-\underset{O}{\underset{\|}{C}}-\underset{R^2}{\underset{|}{C}}=CH_2$$

wherein

- R^1 is the same or different and represents a hydrogen or fluorine group,
- R^2 is the same or different and represents a hydrogen or methyl group,
- a has a value of 0, 1, 2,3 or 4,
- b has an average value of 2 to 30,
- n has an average value of 4 to 12, and
- m has an average value of 3 to 14.

5,026,903
PRODUCTION OF ETHYLIDENE DIACETATE FROM DIMETHYL ACETAL

Edgar C. Baker, Bridgewater, N.J., assignor to Union Carbide Chemicals and Plastics Technology Corporation, Danbury, Conn.

Continuation of Ser. No. 594,717, Mar. 29, 1984, abandoned. This application Mar. 21, 1986, Ser. No. 843,920

Int. Cl.^{5} C07C *67/36, 67/37, 69/16*

U.S. Cl. 560—232 **5 Claims**

1. A process for the production of ethylidene diacetate by the reaction of mixtures of dimethyl acetal, methyl acetate and carbon monoxide in contact with a homogeneous catalyst system consisting essentially of a rhodium component and a lithium iodide component, and optionally a ligand of the formula ER_3^{11} wherein E is a Group VA element selected from the group consisting of nitrogen, phosphorus, arsenic, antimony and bismuth and where R^{11} is an organic moiety, at a temperature of from about 100° C. to 250° C. and a pressure of about 100 psig to 10,000 psig, and wherein the rhodium component is provided for by rhodium or a compound of rhodium and wherein the lithium iodide component is provided for by a direct charge of lithium iodide.

5,026,904
PRODUCTION OF HYDROCARBYL FORMATES

Philip G. Lodge, Staines, and David J. H. Smith, Camberley, both of England, assignors to The British Petroleum Company p.l.c., London, England

Continuation of Ser. No. 491,582, May 4, 1983, abandoned. This application Feb. 15, 1985, Ser. No. 701,796

Claims priority, application United Kingdom, May 15, 1982, 8214203

Int. Cl.^{5} C07C *51/12*

U.S. Cl. 560—232 **10 Claims**

1. A process for the production of a hydrocarbyl formate which process comprises reacting carbon dioxide and hydrogen with a compound of formula ROH wherein R is a hydrocarbyl group in the presence of a substantially insoluble compound of an element selected from Groups III to VIII of the Periodic Table which element exhibits amphoteric or basic properties, and as catalyst a compound of a transition metal of Group VIa, VIIa or VIII of the Periodic Table.

5,026,905
FLUORESCENT DYES

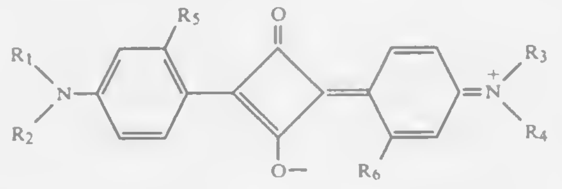
Thomas L. Tarnowski, South San Francisco; Mae W. Hu, Los Altos Hills; Maureen Laney, Palo Alto; John S. Pease, Los Altos, and Vartan Ghazarossian, Menlo Park, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 645,458, Aug. 28, 1984, Pat. No. 4,748,129. This application Aug. 19, 1988, Ser. No. 234,361

Int. Cl.^{5} C07C *229/18;* **C07F** *9/09*

U.S. Cl. 562—43 **4 Claims**

1. A compound of the formula:



wherein:

- R_1 and R_2 are independently selected from the group consisting of lower alkyl (1–5 carbon atoms) with the proviso that at least one of the R_1 and R_2 groups has a substituent selected from the group consisting of $—SO_3H$, $—OSO_3H$, $—PO_3H_2$, $—OPO_3H_2$, —COOH and $—NHSO_3H$;
- R_3 and R_4 are independently selected from the group consisting of alkyl (5–15 carbon atoms); and
- R_5 and R_6 are independently selected from the group consisting of hydrogen, hydroxyl, and lower alkoxyl (1–5 carbon atoms).

5,026,906
METHOD OF PREPARATION OF OPTICALLY ACTIVE ALPHA-AMINO-ACIDS

Sandro Di Gioacchino; Antonio Paolinelli, and Luciano Re, all of Rome, Italy, assignors to Eniricerche S.p.A., Milan, Italy

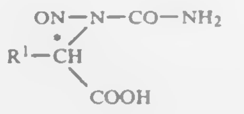
Division of Ser. No. 181,673, Apr. 14, 1988, Pat. No. 4,925,978. This application Feb. 28, 1990, Ser. No. 486,307

Claims priority, application Italy, Apr. 28, 1987, 20291 A/87

Int. Cl.^{5} C07C *227/00*

U.S. Cl. 562—437 **2 Claims**

1. A process for preparing a mixture of N-nitroso derivatives of formulas (III) and (IV)



(III)

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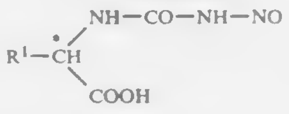
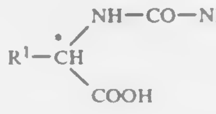


(IV)

wherein

- the asterisk denotes an asymmetric carbon atom having a particular stereochemical configuration, and
- R^1 represents an optionally substituted alkyl, cycloalkyl, cycloalkenyl, aryl, or arylalkyl group,

which comprises nitrosating the corresponding N-carbamyl derivative of general formula (II)



(II)

wherein

- R^1 is as defined above and the asterisk indicates that the absolute configuration of the starred carbon atom is the same as the corresponding carbon atom in the nitroso derivatives (III) and (IV),

with nitrogen oxides in a non-aqueous, aprotic system.

5,026,907
PRODUCTION OF CARBOXYLIC ACIDS FROM ALCOHOLS USING RHODIUM COMPLEX CATALYSTS AND ORGANIC ESTER SOURCE

Richard W. Wegman, South Charleston, and David J. Schreck, Cross Lanes, both of W. Va., assignors to Union Carbide Chemicals and Plastics Technology Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 641,477, Aug. 16, 1984, abandoned. This application Nov. 6, 1985, Ser. No. 794,606

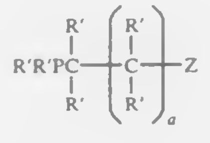
Int. Cl.^{5} C07C *51/12, 53/08, 53/12*

U.S. Cl. 562—519 **20 Claims**

1. Process for the production of organic carboxylic acids of the formula RCOOH and carboxylic acid anhydrides of the formula RC(O)O(O)CR which comprises catalytically reacting an alcohol, which is methanol or a mixture of methanol and at least one higher alcohol selected from the group consisting of ethanol and propanol, carbon monoxide, and an organic ester of the formula RC(O)OR or a compound which, under the reaction conditions, can be converted to said organic ester, in contact with a homogeneous catalyst system consisting essentially of (a) a rhodium component selected from the group consisting of rhodium metal and a rhodium compound, (b) lithium iodide, potassium iodide or sodium iodide, and (c) a phosphorus containing ligand in which there is present at least one oxo oxygen atom attached to a phosphorus atom or a carbon atom to form a Z group and in which the

$$\underset{O}{\underset{\|}{P}} \text{ or } \underset{O}{\underset{\|}{C}} \text{ group}$$

in Z group is located at least one carbon atom removed from the phosphorus atom of the molecules represented by the formulas



(V)

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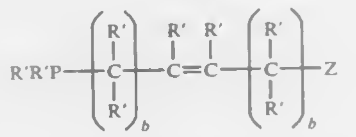
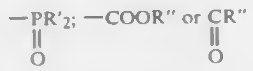


(VI)

$$R'R'P-\left(\overset{R'}{\underset{R'}{C}}\right)_b-\overset{R'}{C}=\overset{R'}{C}-\left(\overset{R'}{\underset{R'}{C}}\right)_b-Z$$

wherein R is an alkyl group having from 1 to 3 carbons; R' is H—, an aryl group having from 6 to 10 ring carbon atoms and any alkyl moiety thereof having from 1 to 10 carbon atoms, or an aralkyl group having 6 to 10 ring carbons with from 1 to 10 carbon atoms in the alk-moiety thereof, or an alkyl group having from 1 to 10 carbon atoms; and wherein one or more of said R' groups can be substituted with a Z group but not more than 3 of said R' groups in the molecule are so substituted; where a is an integer from 0 to 4, b is an integer from 0 to 3, and Z is a member selected from the group consisting of



$$-\underset{\underset{O}{\|}}{P}R'_2;\ -COOR''\ \text{or}\ \underset{\underset{O}{\|}}{C}R''$$

wherein R" is R' and said reaction is carried out at a reaction temperature of up to about 170° C. and a reaction pressure of up to about 450 psig.

5,026,908

METHANOL CARBONYLATION PROCESS

Brad L. Smith, Matthews, N.C.; G. Paull Torrence; Adolfo Aguilo', both of Corpus Christi, and James S. Alder, Plano, all of Tex., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Division of Ser. No. 870,267, Jun. 3, 1986, Pat. No. 5,001,259, which is a continuation-in-part of Ser. No. 699,525, Feb. 8, 1985, abandoned, which is a continuation-in-part of Ser. No. 606,730, May 3, 1984, abandoned. This application May 25, 1990, Ser. No. 528,496

The portion of the term of this patent subsequent to Mar. 19, 2008, has been disclaimed.

Int. Cl.^{5} C07C *51/12, 53/08*

U.S. Cl. 562—519 **10 Claims**

1. In a process for producing acetic acid by reacting methanol with carbon monoxide in a liquid reaction medium containing a rhodium catalyst and comprising water, acetic acid, methyl iodide, and methyl acetate and subsequently recovering acetic acid from the resulting reaction product, the improvement which comprises:

maintaining catalyst stability and system productivity by maintaining in said reaction medium during the course of said reaction about 0.1 wt % to about 8 wt % of water together with (a) an effective amount in the range of about 2 wt % to 20 wt % of a catalyst stabilizer selected from the group consisting of iodide salts which are soluble in said reaction medium in effective concentration at reaction temperature, (b) about 5 wt % to 20 wt % of methyl iodide, and (c) about 0.5 wt % to 30 wt % of methyl acetate.

5,026,909

METHOD FOR PREPARING BIOLOGICALLY ACTIVE ORGANIC COMPOUND LABELLED WITH HYDROGEN ISOTOPE

Jury A. Zolotarev, ulitsa Rogova, 16, korpus 1, kv. 168; Dmitry A. Zaitsev, ulitsa Rogova, 2, kv. 160; Vadim J. Tatur, ulitsa Novopetrovskaya, 17, kv. 15, and Nikolai F. Myasoedov, ulitsa Narodnogo opolchenia, 5, korpus 2, kv. 117, all of Moscow, U.S.S.R.

Filed Mar. 22, 1989, Ser. No. 327,327

Int. Cl.^{5} C07C *229/00*

U.S. Cl. 562—575 **3 Claims**

1. In a method for labelling an organic compound selected from the group consisting of amino acids, peptides, nucleosides, sugars, aminosugars, amines and carboxylic acids, by the catalytic isotope exchange wherein said compound is reacted with tritium or deuterium, the improvement which comprises:

(a) forming a solid phase mixture of said organic compound, or a complex of said organic compound with a platinum group metal, an inorganic carrier and a platinum group metal catalyst in an ampule;
(b) evacuating said ampule and introducing gaseous tritium or deuterium at a pressure of up to 0.04 MPa;
(c) heating said mixture up to a temperature of from 373 ° to 523° K., and maintaining the mixture at said temperature for 10 to 160 minutes;
(d) cooling the mixture to a temperature of from 288° to 303° K.; and
(e) thereafter isolating a labelled compound which is identical to said organic compound except for the exchanged isotope.

5,026,910

POLYFLUOROALKYL NITROGEN COMPOUNDS, PROCESSES FOR THEIR PREPARATION AND THEIR USE

Eric Bollens, Nice; Francois Szonyi, Monaco, and Aime Cambon, Nice, all of France, assignors to Societe Atochem, Puteaux, France

Filed May 22, 1990, Ser. No. 526,992

Claims priority, application France, May 22, 1989, 8906639

Int. Cl.^{5} C07C *335/10, 385/08*

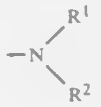
U.S. Cl. 564—27 **3 Claims**

1. Polyfluoroalkyl nitrogen compounds, comprising those corresponding to the formula:

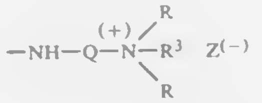
$$R_F(CH_2)_2-X$$

wherein X is a thiourea group —NH—CS—A and A is chosen from the groups (A1) to (A5) of formulae:

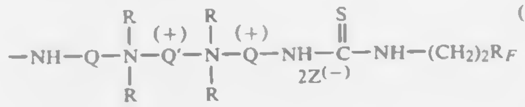
$$-NH_2 \tag{A1}$$



(A2)

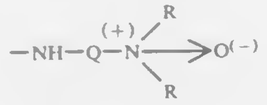


(A3)



(A4)

$$-NH-Q-\overset{R}{\underset{R}{\overset{(+)}{N}}}-Q'-\overset{R}{\underset{R}{\overset{(+)}{N}}}-Q-NH-\overset{S}{\overset{\|}{C}}-NH-(CH_2)_2R_F\quad 2Z^{(-)}$$



(A5)

each of Q and Q', which are identical or different, denotes and alkylene bridge of 2 to 8 carbon atoms,

R denotes an unsubstituted linear alkyl radical containing from 1 to 4 carbon atoms,

R^1 denotes a linear or branched alkyl radical containing form 1 to 18 carbon atoms and optionally substituted, and optionally substituted aryl or aralkyl radical, and allyl, methallyl or propargyl radical, a $—(CH_2)_2R'_F$ group or a $Q—NR_2$ group, said optional substituents being selected from at least one halogen atom, a hydroxyl or mercapto group, or a sulphonate or sulfate functional group,

R^2 denotes a hydrogen atom, an alkyl radical as defined for R^1 or, provided that R^1 is an alkyl or allyl radical, and allyl radical,

R^3 denotes an alkyl or aralkyl radical as defined for R^1, an allyl, methallyl or propargyl radical, or a $—CH_2S—(CH_2)_2—R'_F$ group,

$Z(-)$ denotes a monovalent anion or its equivalent, and each of R_F and R'_F, which are identical or different, denotes a linear or branched perfluoroalkyl radical containing from 2 to 16 carbon atoms.

5,026,911

PROCESS FOR OXIDIZING SATURATED PRIMARY AMINES TO OXIMES

Carlo Venturello, and Rino D'Aloisio, both of Novara, Italy, assignors to Istituto Guido Donegani S.p.A., Milan, Italy

Filed Apr. 25, 1990, Ser. No. 514,218

Claims priority, application Italy, Apr. 27, 1989, 20293 A/89

Int. Cl.^{5} C07C *249/04*

U.S. Cl. 564—253 **14 Claims**

1. A process for the manufacture of aliphatic or cycloaliphatic oximes comprising:

reacting the corresponding saturated aliphatic or cycloaliphatic primary amine, containing a C—H bond in the alpha position with respect to the aminic group, with oxygen;

wherein the reaction is carried out in the liquid phase, at a temperature of 50°-150° C. and a pressure of 3-50 atmospheres, in the presence of a catalyst selected from the group consisting of titanium-silicalites, and the salts, oxides and metallorganic compounds of a metal selected from the group consisting of Ti, Zr and Hf, the amount of metal being from 0.005 to 0.300 mol per mol of amine substrate;

wherein the concentration of the substrate in the solvent is from 10% to 40% by weight and the solvent is selected from the group consisting of water, an excess of amine substrate acetonitrile, dioxane, dimethoxyethane, diglyme, C_1-C_{10} alcohols, aromatic hydrocarbons, dimethylformamide, dimethylsulphoxide and triethylamine, and mixtures thereof.

5,026,912

ALKYLATION OF AROMATIC AMINES OVER THERMALLY PRETREATED ZEOLITES

Rakesh Agrawal, Allentown, and Steven R. Auvil, Macungie, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Mar. 27, 1990, Ser. No. 499,925

Int. Cl.^{5} C07C *209/68*

U.S. Cl. 564—409 **15 Claims**

1. A process for producing an alkylated aromatic amine which comprises: reacting an aromatic amine having at least one hydrogen atom ortho to the amine functionality and an olefin under conditions sufficient to effect an alkylation reaction in the presence of an ammonium exchanged Y zeolite catalyst which has been thermally pretreated by heating the catalyst to a temperature greater than about 600° C. for a period ranging from 1 to 10 hours while sweeping an inert gas over the heated catalyst to remove water and ammonia formed during the thermal treatment and recovering the alkylated aromatic amine.

5,026,913

HYDROCARBYLPHENYL DIAMINODITHIOL DERIVATIVES

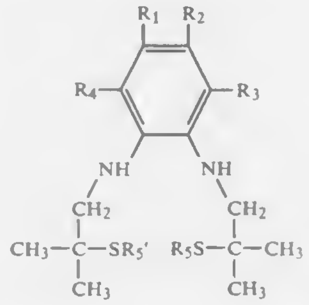
William J. McBride, Oakland; Ronald M. Baldwin, Concord; Janice M. Kerr, San Jose; Lisa M. Schultze, Oakland, and Nilda Salazar, Hercules, all of Calif., assignors to Medi-Physics, Inc., Arlington Heights, Ill.

Continuation of Ser. No. 445,212, Dec. 12, 1989, abandoned. This application Aug. 30, 1990, Ser. No. 576,163

Int. Cl.^{5} C07C *321/00, 323/00, 381/00*

U.S. Cl. 564—440 **37 Claims**

1. A compound of the formula



I

wherein R_1, R_2, R_3 and R_4 are halogen, hydrogen or lower alkyl, with at least one of R_3 and R_4 being hydrogen; and one of R_5 and R_5' being hydrogen whereas the other of said R_5 and R_5' being alkyl containing from 1 to 10 carbon atoms, alkenyl containing 2 to 10 carbon atoms, alkynyl containing from 2 to 10 carbon atoms or lower alkylcyclo loweralkyl;

or salts thereof.

5,026,914

HYDROGENATION OF AROMATIC AMINES USING RHODIUM ON TITANIA OR ZIRCONIA SUPPORT

Richard J. Jenkins, Coopersburg; Robert A. Treskot, Walnutport; Gamini A. Vedage, Bethlehem, and James F. White, Macungie, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Apr. 11, 1989, Ser. No. 336,184

The portion of the term of this patent subsequent to Oct. 2, 2004, has been disclaimed.

Int. Cl.^{5} C07C *209/72*

U.S. Cl. 564—451 **27 Claims**

1. In a process for the catalytic hydrogenation of aromatic amines to their ring, hydrogenated counterparts, by contacting the aromatic amine with hydrogen in the presence of a rhodium catalyst, the improvement which comprises effecting said hydrogenation in the presence of a catalyst comprising rhodium on a support selected from the group consisting of titania chemically bonded with silica, optionally via a sol, and titania chemically bonded with titania via a sol.

5,026,915

PROCESS FOR THE MANUFACTURE OF DIALKYL DISULFIDES

Bernard Buchholz, Whitpain; Edward J. Dzierza, Philadelphia, and John R. Baltrus, Whitpain, all of Pa., assignors to Atochem North America, Inc., Philadelphia, Pa.

Continuation of Ser. No. 312,511, Feb. 17, 1989, abandoned, which is a continuation of Ser. No. 733,551, May 13, 1985, abandoned. This application Mar. 16, 1990, Ser. No. 496,044

Int. Cl.^{5} C07C *319/24*

U.S. Cl. 568—26 **10 Claims**

1. A process of preparing di(C_1-C_{12}) alkyl disulfides comprising feeding a C_1-C_{12} alkyl alcohol hydrogen sulfide in a molar ratio of 1:2 to 1:20 into contact with a solid, particulate catalyst in a first reaction zone at a catalyst temperature ranging from about 100° to about 500° C. to thereby produce crude

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alkyl mercaptan, continuously separating water from said crude alkyl mercaptan, and continuously reacting said crude alkyl mercaptan in the vapor phase with molten sulfur in a second reaction zone at a molar ratio of from 1:0.05 to 1:2 in contact with a solid, particulate Type X or Y zeolite catalyst containing from 3 to 13% by weight of an alkali metal, expressed as Me_2O, said catalyst having a temperature ranging from about 125° to about 400° C., to thereby continuously produce a di (C_1–C_{12}) alkyl disulfide.

5,026,916
PROCESS FOR THE PREPARATION OF 1-ALKYLTHIO-AND 1-BENZYLTHIO-1-FORMYLCYCLOPROPANES

Hans Tobler, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

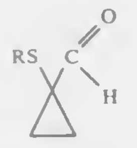
Filed Jan. 26, 1990, Ser. No. 471,174

Claims priority, application Switzerland, Feb. 2, 1989, 366/89

Int. Cl.^{5} C07C *319/12, 321/22*

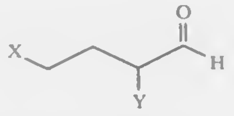
U.S. Cl. 568—41 **14 Claims**

1. A process for the preparation of a compound of formula I



(I)

wherein R is C_1–C_4alkyl or benzyl, which comprises reacting a butanal of formula II

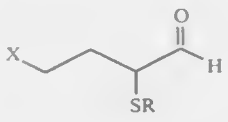


(II)

wherein X and Y are each independently of the other chloro, bromo or iodo, in an inert solvent, with a compound of formula III

R—S—Me (III)

wherein R is as defined above and Me is an alkali metal cation, and converting the resultant compound of formula IV



(IV)

wherein X and R are as defined above, in an inert solvent and in the presence of a base, into a compound of formula I.

5,026,917
PREPARATION OF 2-ACYL-6-METHYLNAPHTHALENES

Gary P. Hagen, Chicago; Gregory E. Schmidt, Batavia; John M. Weis, and Thomas G. Smith, both of Naperville, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Mar. 1, 1990, Ser. No. 486,783

Int. Cl.^{5} C07C *45/45*

U.S. Cl. 568—323 **50 Claims**

1. A process for making a 2-acetyl-6-methylnaphthalene compound which comprises the steps of:

(A) combining
  a 2-methylnaphthalene compound selected from the group consisting of 2-methylnaphthalene and 2,3-dimethylnaphthalene with
  an electron-rich complex constituted by a Friedel-Crafts catalyst, acetyl chloride, and at least one carbon-based complexing agent which has at least one electron-rich carbon center and is selected from the group consisting of a peralkylated aromatic hydrocarbon compound containing 12 to 22 carbon atoms, inclusive, per molecule; a sterically hindered aliphatic hydrocarbon compound containing 4 to 22 carbon atoms, inclusive, per molecule; a peralkylated metallocene compound; a peralkylated heterocyclic ring compound containing 5 to 18 ring atoms, inclusive, per molecule; in an inert organic solvent that is liquid at 0° C. so as to produce a reaction mixture containing an aromatic ketone/Friedel-Crafts catalyst reaction product;

(B) contacting said reaction mixture with a solubilizing agent to complex said Friedel-Crafts catalyst to produce a water-extractable catalyst complex wherein said solubilizing agent is a monohydric aliphatic alcohol containing 1 to 12 carbon atoms, inclusive; and

(C) removing said catalyst complex from said reaction mixture to produce a 2-acetyl-6-methylnaphthalene-rich acetylmethylnaphthalene isomer mixture.

5,026,918
SYNTHESIS OF 2,3,5-TRISUBSTITUTED-2-CYCLOPENTENONES VIA BASE INDUCED CYCLIZATION OF ALPHA-CHLORO UNSATURATED KETONES

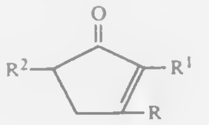
Jacob Mathew, Fenton, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Apr. 27, 1990, Ser. No. 515,299

Int. Cl.^{5} C07C *45/65*

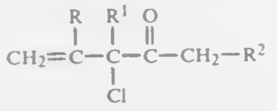
U.S. Cl. 568—348 **21 Claims**

1. A method of preparing a cyclopentenone compound of the formula:



comprising bringing into reactive contact

a. a penteneone of the formula:



$$CH_2{=}\overset{R}{\overset{|}{C}}-\underset{\underset{Cl}{|}}{\overset{\overset{R^1}{|}}{C}}-\overset{\overset{O}{\|}}{C}-CH_2-R^2$$

wherein R and R^1 are each independently alkyl, alkenyl, or aryl radicals having 1 to 32 carbon atoms and R^2 is H or a C_1 to C_{12} hydrocarbon moiety; with

b. a strong base.

5,026,919
BASE-CATALYZED REACTIONS USING ZEOLITE CATALYSTS

Ralph M. Dessau, Edison, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Dec. 20, 1985, Ser. No. 811,198

Int. Cl.^{5} C07C *45/45*

U.S. Cl. 568—433 **6 Claims**

1. In a base catalyzed aldol condensation the combination including passing a feed consisting essentially of an aldehyde through an inlet of a reactor containing a basic zeolite which is ZSM-5 or ZSM-11, allowing that feed to contact the basic zeolite at a temperature of 150° to 500° C.; and recovering product of the aldol condensation via an outlet of said reactor.

5,026,920
OBTAINING ALKANALS HAVING A 2-ALKYL BRANCH FROM ALKANAL MIXTURES

Michael Roeper, Wachenheim; Franz Merger; Joerg Liebe, both of Frankenthal; Armin V. Grenacher, Mutterstadt, and Edgar Hahl, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Nov. 8, 1989, Ser. No. 433,661

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1988, 3842186

Int. Cl.^{5} C07C *45/78, 47/00*

U.S. Cl. 568—492 **16 Claims**

1. A process for obtaining alkanals having a 2-alkyl branch from mixtures which contain alkanals having a 2-alkyl branch in addition to n-alkanals and 3-alkyl-alkanals and further isomers, such alkanals and further isomers having not more than 20 carbon atoms, which process comprises:

a) reacting the alkanal mixture with an aqueous formaldehyde solution in the presence of a secondary amine and a carboxylic acid as a catalyst, at a pH of from 2.5 to 7 and at a temperature of from 0° to 150° C.;

b) separating off the aqueous phase containing the catalyst and any uncovered excess formaldehyde; and

c) isolating the alkanals having a 2-alkyl branch by distillation from the condensates of the other alkanals with formaldehyde.

5,026,921
AROMATIZATION PROCESS UTILIZING A PILLARED LAYERED SILICATE PLUS GALLIUM OR ZINC

Thomas F. Degnan, Jr., Morristown, and Ivy D. Johnson, Medford, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Dec. 21, 1989, Ser. No. 454,531

Int. Cl.^{5} C07C *2/00, 5/367*

U.S. Cl. 585—415 **9 Claims**

1. A process for producing aromatic hydrocarbons which comprises contacting a feed containing non-aromatic C_2 to C_{12} hydrocarbons with a catalyst at a pressure of about atmospheric to 1000 psig, a weight hourly space velocity of about 0.05 to 300 and a temperature of about 204° to 675° C., wherein said catalyst comprises a layered silicate and pillars of an oxide of at least one element selected from Groups IB, IIB, IIIA, IIIB, IVA, IVB, VA, VB, VIA, VIIA and VIIIA of the Periodic Table of the Elements separating the layers of the silicate, said catalyst comprising at least one element selected from gallium and zinc.

5,026,922
PROCESS FOR PREPARING CLYCOL ALDEHYDE

Takatoshi Seto, Ami; Takashi Yokoi, Shiga; Masaki Odagiri, and Makoto Imanari, both of Ami, all of Japan, assignors to Research Association for Utilization of Light Oil, Tokyo, Japan

Filed Dec. 22, 1989, Ser. No. 455,147

Claims priority, application Japan, Dec. 27, 1988, 63-329850

Int. Cl.^{5} C07C *45/29, 45/32*

U.S. Cl. 568—486 **13 Claims**

1. A highly selective and long lived catalytic process for preparing glycol aldehyde from ethylene glycol which comprises allowing ethylene glycol to be in contact with a copper-containing catalyst in the presence of 0.001 to 0.3 mole of oxygen per mole of ethylene glycol at a temperature in the range of about 180° to 400° C.

5,026,923
ALKOXYLATION PROCESS CATALYZED BY BORATE SALTS OF THE RARE EARTH ELEMENTS

Richard A. Kemp, Stafford, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 401,220, Aug. 31, 1989. This application May 29, 1990, Ser. No. 529,296

Int. Cl.^{5} C07C *41/03*

U.S. Cl. 568—618 **26 Claims**

1. A process for the preparation of alkylene oxide adducts of active hydrogen containing organic compounds, which comprises contacting and reacting an alkylene oxide reactant comprising one or more vicinal alkylene oxides with an active hydrogen containing reactant comprising one or more active hydrogen containing organic compounds, in the presence of a catalytically effective amount of one or more of the borate salts of the rare earth elements.

5,026,924
PROCESS FOR PRODUCTION OF 1,2,2,2-TETRAFLUOROETHYL DIFLUOROMETHYL ETHER

Charles F. Cicco, Cleveland Heights, Ohio, assignor to Anaquest, Inc., Murray Hill, N.J.

Continuation-in-part of Ser. No. 323,579, Mar. 14, 1989, abandoned. This application Jan. 4, 1990, Ser. No. 461,134

Int. Cl.^{5} C07C *41/22*

U.S. Cl. 568—683 **19 Claims**

1. A process for the preparation of a compound of the formula $CF_3CHFOCHF_2$ comprising reacting a starting compound of the formula $CF_3CHClOCHF_2$ with hydrogen fluoride and a catalytically effective amount of substantially pure antimony pentachloride or antimony pentachloride in combination with antimony trichloride at a temperature of from about −10° C. to about 30° C. wherein the ratio of CF3CHClOCHF2 to hydrogen fluoride is from about 1.0:0.1 to about 1:7.

5,026,925
METHOD OF PRODUCING CATECHOL AND HYDROQUINONE

Karl-Heinz Drauz, Freigericht; Axel Kleeman, Mülheim; Günter Prescher, Hanau, and Gebhard Ritter, Darmstadt, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 27, 1987, Ser. No. 7,351

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1986, 3602180

Int. Cl.^{5} C07C *37/60, 39/08*

U.S. Cl. 568—771 **6 Claims**

1. A method of producing catechol and hydroquinone comprising the nuclear hydroxylation of phenol with aqueous hydrogen peroxide in the presence of sulfur dioxide or selenium dioxide.

5,026,926
CHLORINATION OF ORTHO-CHLOROPHENOL

Jean-Claude Leblanc, Grenoble; Serge Ratton, Villefontaine; Bernard Besson, Pont de Claix, and Jean-Roger Desmurs, Saint-Symphorien d'Ozon, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Mar. 7, 1988, Ser. No. 164,966

Claims priority, application France, Mar. 5, 1987, 87 03207

Int. Cl.^{5} C07C *37/62, 39/32*

U.S. Cl. 568—779 **19 Claims**

1. A process for the preparation of a polychlorophenol, comprising reacting ortho-chlorophenol with gaseous chlorine, in a solvent-free reaction medium, in the presence of a catalytically effective amount of a primary, secondary or tertiary amine.

VOL
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5,026,927

HYDROCRACKING OF CARBOHYDRATES MAKING GLYCEROL, GLYCOLS AND OTHER POLYOLS

Mark A. Andrews, Ridge, N.Y., and Stephen A. Klaeren, Corpus Christi, Tex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 16, 1989, Ser. No. 437,403

Int. Cl.⁵ C07C *29/14, 31/20, 31/22, 29/136*

U.S. Cl. 568—863 **14 Claims**

1. A process for hydrocracking a monosaccharide, a disaccharide, or a pretreated polysaccharide substrate, or a mixture of such substrates, which comprises bringing the substrate into contact with hydrogen in a solution containing a soluble Group VIII metal hydrogenation catalyst selected from the group consisting of $H_2Ru(PPh_3)_4$; $H_2Ru(CO)(PPh_3)$; $H_3Ru(PPh_3)_3{}^{-1}$; $H_3Ir(PPh_3)_3$; $HMX(CO)(PPh_3)_n$ wherein M = Ru or Os, X is selected from the group consisting of Cl, Br and CH_3CO_2, and n = 2 or 3; $HRh(PPh_3)_4$; and $H_2Rh(PPhMe_2)_2(solvent)_2{}^{+1}$.

5,026,928

PERFLUOROALKENES AND FLUORINATION PRODUCTS THEREOF

Claudio Tonelli, and Vito Tortelli, both of Milan, Italy, assignors to Ausimont S.r.l., Milan, Italy

Filed Apr. 14, 1989, Ser. No. 348,003

PCT No.: **EP88/00768, §371 Date: Apr. 1989 §102(e), Date: Apr. 14, 1989, PCT Pub. No. WO89/0127, PCT Date: Mar. 9, 1989**

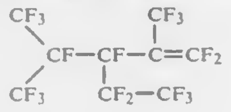
PCT Filed Aug. 26, 1988

Claims priority, application Italy, Aug. 27, 1987, 21726 A/87

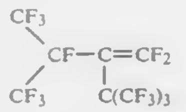
Int. Cl.⁵ C07C *17/04, 17/00, 19/08, 21/18*

U.S. Cl. 570—136 **1 Claim**

1. Terminal perfluoroolefines of formulas:



(IV)



(V)

5,026,929

SYNTHESIS OF HIGHLY FLUORINATED AROMATIC COMPOUNDS

John A. Marsella; Guido P. Pez, both of Allentown, and Anne M. Coughlin, Bethlehem, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 8, 1990, Ser. No. 477,289

Int. Cl.⁵ C07C *17/24, 17/00, 25/13, 25/18*

U.S. Cl. 570—146 **10 Claims**

1. A process for making a highly fluorinated aromatic compound which comprises contacting a perfluorocycloalkane with a complex of a Group IA or IIA metal and an organic electron acceptor in an organic solvent under reducing conditions.

5,026,930

GAS-PHASE FLUORINATION PROCESS

Leo E. Manzer, and V. N. Mallikarjuna Rao, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 197,220, May 23, 1988, abandoned, which is a continuation-in-part of Ser. No. 85,027, Aug. 13, 1987, Pat. No. 4,766,259. This application Jan. 16, 1990, Ser. No. 465,401

The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.

Int. Cl.⁵ C07C *17/04, 17/20, 19/02*

U.S. Cl. 570—168 **10 Claims**

1. A process for the preparation of 1,1-difluoro-1,2-dichloroethane and/or 1-fluoro-1,1,2-trichloroethane by fluorination of a trihaloethylene, CClX=CHCl, wherein X = Cl or F, and/or tetrahaloethane, CCl_2XCH_2Cl, wherein X = Cl or F, which process comprises

contacting in the gaseous phase at about 100° to about 200° C. said trihaloethylene and/or tetrahaloethane with HF and a catalyst composition comprising a catalytically effective amount of at least one metal in an oxidation state greater than zero,

said metal selected from the group consisting of iron, manganese, magnesium, and nickel,

said metal in combination with an aluminum-containing compound consisting essentially of aluminum and fluorine in such proportions that the fluorine content corresponds to an AlF_3 content of at least 90% by weight of the catalyst composition exclusive of the metal, said AlF_3 content being obtained by pretreatment of the unfluorinated catalyst composition with a vaporizable fluorine-containing compound,

said contacting step producing a product stream containing 1,1-difluoro-1,2-dichloroethane and/or 1-fluoro-1,1,2-trichloroethane, and, thereafter,

separating the 1,1-difluoro-1,2-dichloroethane and/or 1-fluoro-1,1,2-trichloroethane from the product stream.

5,026,931

PROCESS FOR PREPARING A PRODUCT STREAM RICH IN NAPHTHALENE AND 2-MONOIODONAPHTHALENE

Victor H. Agreda, and Thomas H. Larkins, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 10, 1990, Ser. No. 580,418

Int. Cl.⁵ C07C *17/34*

U.S. Cl. 570—204 **6 Claims**

1. A process for preparing a product stream rich in naphthalene and 2-monoiodonaphthalene and low in 1-diiodonaphthalene comprising contacting, at a temperature in the range of 125 to 350° C, hydrogen and a feed stream containing iodonaphthalenes selected from the group consisting of monoiodonaphthalene, diiodonaphthalene and triiodonaphthalene and mixtures thereof with an X or Y type zeolite containing an ion selected from the group consisting of sodium, potassium and rubidium and a metal selected from the group selected from the group consisting of palladium, platinum, rhodium and ruthenium.

5,026,932

PREPARATION OF 4-BROMO-O-XYLENE IN LIQUID SULFUR DIOXIDE

Mark W. Meszaros, Batavia, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Feb. 22, 1990, Ser. No. 484,341

Int. Cl.⁵ C07C *17/12*

U.S. Cl. 570—206 **13 Claims**

1. A regioselective process for producing a mixture rich in 4-bromo-o-xylene comprising combining bromine with o-xylene in liquid sulfur dioxide and within a bromine-to-o-xylene mole ratio range of about 0.4:1 to about 1:1, respectively, and within a sulfur dioxide to o-xylene mole ratio range of at least about 1:1 but no more than about 20:1 while maintaining the resulting admixture at a temperature in the range of about −20° C. to about 40° C. to produce a product mixture.

5,026,933

OLEFIN OLIGOMERIZATION WITH SURFACE MODIFIED ZEOLITE CATALYST

David A. Blain, Morrisville; Nancy M. Page, Yardley, both of Pa., and Lewis B. Young, Skillman, N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Division of Ser. No. 140,361, Jan. 4, 1988, Pat. No. 4,870,038, which is a continuation-in-part of Ser. No. 105,438, Oct. 7, 1987, abandoned. This application Jul. 18, 1989, Ser. No. 381,230

Int. Cl.⁵ C10L *1/16;* **C07C** *2/64*

U.S. Cl. 585—7 **29 Claims**

1. A mixture of liquid hydrocarbons, said hydrocarbons comprising at least 95% by weight of mono-olefin oligomers of the empirical formula

$$C_{(n+nm)}H_{2(n+nm)}$$

where n is 3 or 4 and m is an integer from 1 to 6, said mono-olefin oligomers comprising at least 20 percent by weight of olefins having at least 12 carbon atoms, said olefins having at least 12 carbon atoms having an average of from 0.80 to 2.00 methyl side groups per carbon-chain, said olefins not having any side groups other than methyl.

18. A process for the selective alkylation of an aromatic compound with a relatively long chain length alkylating agent to produce substantially linear phenylalkanes, said alkylating agent comprising a mixture of mono-olefins having 12 carbon atoms, said mono-olefins having a straight backbone chain of at least 10 carbon atoms, said mono-olefins having an average of from 0.40 to 2.00 methyl side groups per carbon chain, said mono-olefins comprising at least 5 mole percent of dodecene, at least 30 mole percent methylundecene and at least 5 mole percent dimethyldecene; said process comprising contacting said aromatic compound with said alkylating agent in the presence of a selective zeolite catalyst under sufficient reaction conditions, wherein said reaction conditions include a temperature of between about 50° C. and about 500° C. and a pressure within the approximate range of 2.5×10^4 N/m² to 2.5×10^7 N/m², said selective zeolite catalyst being characterized by a crystal structure having channels or network of pores therethru, the major dimension of the openings to said channels or networks of pores being between about 6 and about 7 angstroms.

5,026,934

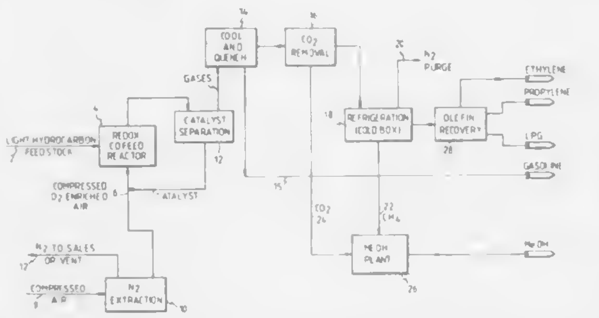
METHOD FOR CONVERTING LIGHT HYDROCARBONS TO OLEFINS, GASOLINE AND METHANOL

Charanjit S. Bains, Houston, and Martio P. Grosboll, Kingwood, both of Tex., assignors to Lyondell Petrochemical Company, Houston, Tex.

Filed Feb. 12, 1990, Ser. No. 479,086

Int. Cl.⁵ C07C *2/00, 29/00, 27/00*

U.S. Cl. 585—314 **46 Claims**



46. In an improved method for converting light hydrocarbons to gasoline wherein a gas containing one or more light hydrocarbons is passed at synthesizing conditions over an oxidative synthesizing agent to synthesize higher hydrocarbons including gasoline, the improvement which comprises:

(a) passing the gas one time only over the synthesizing agent;
(b) recovering the higher hydrocarbons;
(c) separating the gasoline from the recovered higher hydrocarbons;
(d) recovering carbon dioxide produced during synthesis;
(e) recovering the light hydrocarbons that remain unsynthesized and carbon monoxide produced during synthesis;
(f) reforming at least part of the unsynthesized light hydrocarbons and carbon monoxide to hydrogen, carbon monoxide and carbon dioxide;
(g) mixing the recovered carbon dioxide with the products of the reformed unsynthesized light hydrocarbons;
(h) contacting the mixture at methanol synthesizing conditions with an agent capable of synthesizing methanol;
(i) recovering the methanol; and
(j) converting at least part of the methanol to gasoline.

5,026,935

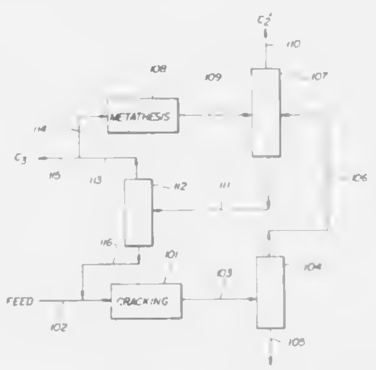
ENHANCED PRODUCTION OF ETHYLENE FROM HIGHER HYDROCARBONS

David W. Leyshon; John A. Sofranko, both of West Chester, and C. Andrew Jones, Newtown Square, all of Pa., assignors to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Oct. 2, 1989, Ser. No. 415,506

Int. Cl.⁵ C07C *4/06*

U.S. Cl. 585—315 **2 Claims**



1. The method for the production of ethylene which comprises:

(a) cracking a C_4 or higher hydrocarbon over a zeolite catalyst at conditions favoring production of ethylene and propylene to form a mixture comprised of ethylene, propylene and butene,
(b) recovering ethylene from the step (a) reaction mixture,
(c) metathesizing propylene from the step (a) reaction mixture to form additional ethylene together with butene,
(d) recovering said additional ethylene from the step (c) reaction mixture, and
(e) recycling butene contained in the mixture from step (a) and formed in step (c) to the cracking reaction of step (a).

5,026,936

ENHANCED PRODUCTION OF PROPYLENE FROM HIGHER HYDROCARBONS

David W. Leyshon; John A. Sofranko, both of West Chester, and C. Andrew Jones, Newtown Square, all of Pa., assignors to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Oct. 2, 1989, Ser. No. 415,747

Int. Cl.⁵ C07C *4/06*

U.S. Cl. 585—315 **1 Claim**

1. The method for the production of propylene which comprises:

(a) cracking a C_4 or higher olefin and/or paraffin hydrocarbon over a zeolite catalyst at conditions favoring production of ethylene and propylene to form a mixture comprised of ethylene, propylene and butene,

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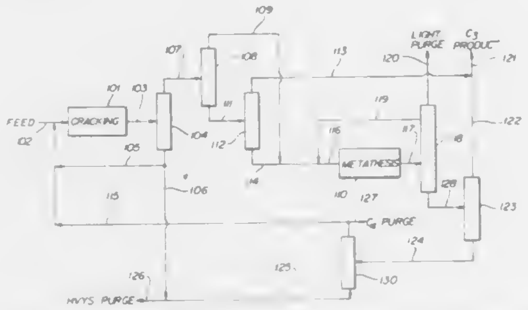
(b) separating ethylene and butene from the step (a) reaction mixture,



(c) metathesizing said separated ethylene and butene from the step (a) reaction mixture to form additional propylene, and

(d) recovering propylene formed in step (a) and step (c).

5,026,937
AROMATIZATION OF METHANE USING ZEOLITE INCORPORATED IN A PHOSPHORUS-CONTAINING ALUMINA

Jeffery C. Bricker, Buffalo Grove, Ill., assignor to UOP, Des Plaines, Ill.

Filed Dec. 29, 1989, Ser. No. 459,162

Int. Cl.^{5} C67C *1/20, 2/00*

U.S. Cl. 585—415 **10 Claims**

1. A process for aromatization of methane which comprises the steps of passing a feed stream, which comprises over 0.5 mole percent hydrogen and 50 mole percent methane, into a reaction zone having at least one bed of solid catalyst comprising a pentasil zeolite and phosphorous-containing alumina at conversion conditions which include a temperature of about 550–750° C., a pressure less than 10 atmospheres absolute and a gas hourly space velocity of 400–7,500 hu^{-1} and producing a reaction zone effluent stream comprising methane, hydrogen, at least 3 mole % C_2 hydrocarbons and at least 5 mole % C_6–C_8 aromatic hydrocarbons, and recovering C_6–C_8 aromatic hydrocarbons as a product.

5,026,938
PROCESS FOR UPGRADING LIGHT APPARATUS

Victor K. Shum, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 256,414, Oct. 12, 1988, Pat. No. 4,946,812, which is a division of Ser. No. 82,031, Aug. 5, 1987, Pat. No. 4,808,763. This application Jun. 30, 1989, Ser. No. 375,143

Int. Cl.^{5} C07C *2/00*

U.S. Cl. 585—417 **15 Claims**

1. A process for converting a gaseous hydrocarbon feed containing C_3 through C_5 paraffinic hydrocarbons to aromatic hydrocarbons which comprises contacting the feed under conversion conditions with a catalyst composition comprising a molecular sieve consisting essentially of a gallosilicate molecular sieve, a platinum metal component, and a rhenium metal component.

5,026,939
METHOD FOR PRODUCING 4-ISOBUTYLSTYRENE

Isoo Shimizu; Yasuo Matsumura, both of Yokohama, and Yoshihisa Inomata, Kawasaki, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan

Filed May 5, 1988, Ser. No. 190,508

Claims priority, application Japan, May 6, 1987, 62-110175; May 6, 1987, 62-110176

Int. Cl.^{5} C07C *4/24*

U.S. Cl. 585—439 **16 Claims**

1. A method for producing 4-isobutylstyrene which is characterized in that 1,2-di(4-isobutylphenyl)ethane is brought into contact with an acid catalyst at 200° C. to 650° C. in the presence of an inert gas at a dilution ratio of at least 50 moles of inert gas per mole of 1,2-di(4-isobutylphenyl)ethane to crack it into 4-isobutylstyrene and isobutylbenzene.

5,026,940
MANUFACTURE OF 4'4-DIISOPROPYLBIPHENYL

Jere Fellmann, Livermore; Paul Weotrcek, Redwood City, and Phat T. Lu, San Jose, all of Calif., assignors to Catalytica, Inc., Mountain View, Calif.

Filed Sep. 8, 1989, Ser. No. 404,665

Int. Cl.^{5} C07C *2/68*

U.S. Cl. 585—467 **10 Claims**

1. A process for producing a diisopropylbiphenyl stream containing more than an equilibrium amount of 4,4′-diisopropylbiphenyl, which process comprises the steps of:

(a) providing biphenyl or 4-isopropylbiphenyl and propylene to a catalyst characterized as having relative pore diameters between approximately 5.7 and 6.1 Å; and

(b) reacting said biphenyl or 4-isopropylbiphenyl with propylene in the presence of said catalyst under conditions sufficient to convert said biphenyl or 4-isopropylbiphenyl to 4,4′-diisopropylbiphenyl and thereby produce the diisopropylbiphenyl stream containing 4,4′-diisopropylbiphenyl.

5,026,941
Y ZEOLITE CATALYST

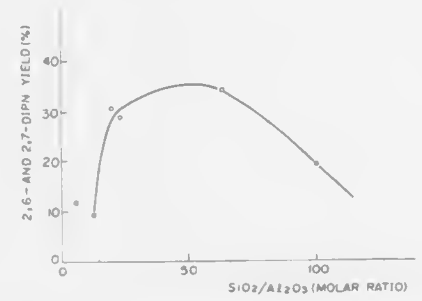
Motohiro Oguri; Yoshiaki Kano; Kiyotaka Mishima; Masahiko Yamada, all of Yotsukaichi; Kenji Kasano, Mie, and Masaru Uemura, Yotsukaichi, all of Japan, assignors to Tosho Corporation, Japan

Continuation of Ser. No. 329,631, Mar. 28, 1989, abandoned. This application Oct. 26, 1990, Ser. No. 604,989

Claims priority, application Japan, Mar. 28, 1988, 63-73945; Mar. 28, 1988, 63-73946

Int. Cl.^{5} C07G *2/68*

U.S. Cl. 585—467 **14 Claims**



1. A method for preparation of mono and/or diisopropylnaphthalenes comprising reacting naphthalene and/or monoisopropylnaphthalene with propylene. in the presence of at least one saturated polycarbocyclic compound and a catalyst comprising a Y zeolite having the silica/alumina molar ratio of from 10 to 350.

5,026,942
PROCESS FOR SELECTIVE DIISOPROPYLATION OF NAPHTHYL COMPOUNDS USING SHAPE SELECTIVE ACIDIC CRYSTALLINE MOLECULAR SIEVE CATALYSTS

Jere D. Fellmann, Livermore; Robert J. Saxton, Sunnyvale; Paul R. Wentrcek, Redwood City, all of Calif.; Eric G. Derouane, Namur, Belgium, and Pascale Massiani, Sunnyvale, Calif., assignors to Catalytica, Inc., Mountain View, Calif.

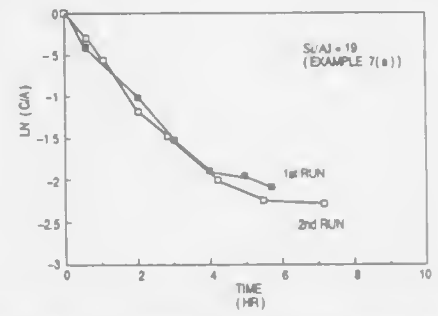
PCT No. PCT/US89/04485, § 371 Date Dec. 12, 1989, § 102(e) Date Dec. 12, 1989

Continuation-in-part of Ser. No. 254,284, Oct. 5, 1988. This PCT application Oct. 5, 1989, Ser. No. 438,496

The portion of the term of this patent subsequent to Mar. 26, 2008, has been disclaimed.

Int. Cl.^{5} C07C *2/68*

U.S. Cl. 585—467 **29 Claims**



1. A process for producing a diisopropylnaphthalene stream enriched in 2,6-diisopropylnaphthalene comprising the steps of:

(a) contacting a naphthyl compound selected from naphthalene, monoisopropylnaphthalene, and mixtures thereof with propylene in the presence of an acidic crystalline molecular sieve catalyst having twelve membered oxygen rings and pore aperture widths between 5.5Åand 7.0Åwhich catalyst is dealuminated to obtain a Si/Al ratio between 5–100 and the ^{27}Al—MAS—NMR ratio is less than 5.0 under conditions sufficient to convert the naphthyl compound and propylene to diisopropylnaphthalene; and

(b) recovering the diisopropylnaphthalene.

5,026,943
CATALYTIC CONVERSION OVER CATALYST COMPRISING SYNTHETIC CRYSTAL MCM-35

Mae K. Rubin, Bala Cynwyd, Pa., and Pochen Chu, Voorhees, N.J., assignors to Mobil Oil Corp, Fairfax, Va.

Continuation-in-part of Ser. No. 471,173, Jan. 26, 1990, Pat. No. 4,981,663, which is a continuation-in-part of Ser. No. 191,528, May 9, 1988, abandoned. This application Sep. 25, 1990, Ser. No. 587,837

Int. Cl.^{5} C07C *63/34*

U.S. Cl. 585—467 **32 Claims**

1. A process for converting feedstock organic compounds to conversion product which comprises contacting said feedstock at conversion conditions including a temperature of from about 0° C. to about 800° C., a pressure of from about 0.1 atmosphere to about 250 atmospheres and a weight hourly space velocity of from about 0.08 hr^{-1} to about 500 hr^{-1}, with catalyst comprising a synthetic crystalline material characterized by an X-ray diffraction pattern exhibiting interplanar d-spacing values including those at 15.4±0.23; 9.03±0.14; 6.62±0.10; 4.99±0.07; 4.04±0.05; 3.31±0.04; and 2.00±0.03 Angstroms.

5,026,944
SYNTHESIS OF ISOBUTENE FROM METHANE AND ACETYLENE

Vincenza Allenger, Kanata; Raj N. Pandey, Guelph, both of Canada, and Prasad Yarlagadda, Amherst, N.Y., assignors to Energy Mines and Resources Canada, Ottawa, Canada

Filed Dec. 20, 1989, Ser. No. 453,937

Int. Cl.^{5} C07C *2/00, 2/56*

U.S. Cl. 585—500 **7 Claims**

1. A gas-phase process for producing isobutene which comprises contacting methane with acetylene in the presence of a solid superacid catalyst at a temperature below 50° C.

5,026,945
PEROVSKITE CATALYSTS FOR OXIDATIVE COUPLING

Kenneth D. Campbell, Charleston, W. Va., assignor to Union Carbide Chemicals and Plastics Technology Corporation, Danbury, Conn.

Filed Sep. 19, 1989, Ser. No. 409,376

Int. Cl.^{5} C07C *2/00*

U.S. Cl. 585—500 **12 Claims**

1. A process for oxidative coupling of alkane of 1 to 3 carbon atoms to heavier hydrocarbon comprising contacting the alkane in the presence of reactive oxygen-containing material under oxidative coupling conditions with a catalytically-effective amount of catalyst contained in a reaction zone, said catalyst comprising perovskite of the empirical formula $A_xLn_yTi_zO_{10}$ wherein A is one or more alkali metal; Ln is one or more of lanthanum, cerium, neodymium, samarium, praseodymium, gadolinium and dysprosium; x is about 2; y is about 2; and z is about 3; provided said perovskite is other than a manganese-containing perovskite.

5,026,946
HOMOGENEOUS PARTIAL OXIDATION OF A METHANE-CONTAINING PARAFFINIC HYDROCARBON

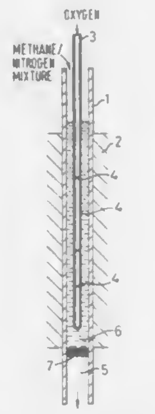
Mark J. Howard, Feltham, England, assignor to The British Petroleum Company p.l.c., London, England

Filed Jul. 26, 1988, Ser. No. 224,166

Claims priority, application United Kingdom, Aug. 5, 1987, 8718488

Int. Cl.^{5} C07C *2/00*

U.S. Cl. 585—500 **12 Claims**



1. A process for the production of a C_2 and higher hydrocarbon product including ethylene from a methane-containing gaseous paraffinic hydrocarbon feedstock which process comprises heating under elevated pressure in a pre-heating zone a mixture of the feedstock and oxygen in an amount of at least 5% mol to a temperature sufficient to cause spontaneous reaction, the pre-heating and mixing being effected in a manner such that (i) substantial oxygen consumption is avoided, and (ii) a "flash-back" of the reaction to form a diffusion flame at

VOL
1127
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1991
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the point of gaseous mixing is prevented, and thereafter in a reaction zone allowing the feedstock mixture to spontaneously react under essentially adiabatic conditions.

5,026,947
METHANE CONVERSION PROCESS

Harry Mazurek, Bala Cynwyd, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Apr. 9, 1990, Ser. No. 506,129

Int. Cl.^{5} C07C *2/00*

U.S. Cl. 585—500 **3 Claims**

1. In a process for the oxidative conversion of methane to higher hydrocarbons wherein a feed comprised of a mixture of methane and oxygen is contacted with a reducible metal oxide at reactive conditions effective to form higher hydrocarbons and water, the improvement which comprises maintaining the said reducible metal oxide in a high oxidation state in the process by periodically discontinuing methane feed while maintaining molecular oxygen feed and contacting said reducible metal oxide with said molecular oxygen in the absence of said methane at conditions effective to substantially fully oxidize said reducible metal oxide.

5,026,948
DISPROPORTIONATION OF ALPHA-OLEFIN DIMER TO LIQUID LUBRICANT BASESTOCK

Thomas R. Forbus, Newton, Pa., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Feb. 21, 1989, Ser. No. 313,401

Int. Cl.^{5} C07C *2/10, 6/02*

U.S. Cl. 585—646 **9 Claims**

1. A process for the preparation of low viscosity lubricant range hydrocarbons having high viscosity index, comprising: contacting olefinic dimer, or mixtures thereof, with a tungsten oxide disproportionation catalyst on a solid support under disproportionation reaction conditions, said dimer comprising the product of the oligomerization of C_6–C_{20} alpha-olefins in contact with reduced chromium oxide catalyst on silica support, wherein said disproportionation catalyst has been treated by oxidation at a temperature between 200° C. and 900° C. in the presence of an oxidizing gas and then by treatment with a reducing agent at a temperature and a time sufficient to reduce said catalyst and; separating said disproportionation reaction effluent and recovering said lubricant range hydrocarbons having a viscosity between 3 and 10 cS at 100° C. with a viscosity index greater than 100.

5,026,949
METHOD OF CRACKING A BATCH OF HEAVY HYDROCARBONS INTO LIGHTER HYDROCARBONS

Jacques Amouroux, Bures Sur Yvette; Mehrdad Nikravech, Paris; Jacques Saint-Just, Le Pecq, and Isabelle Vedrenne, Paris, all of France, assignors to Gaz de France, Paris, France

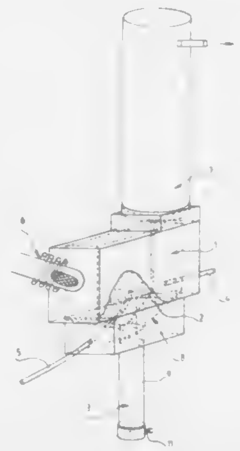
Filed Nov. 22, 1989, Ser. No. 440,300

Claims priority, application France, Nov. 24, 1988, 88 15363

Int. Cl.^{5} C07C *4/02*

U.S. Cl. 585—648 **22 Claims**

1. A method of cracking a batch of heavy hydrocarbons into lighter hydrocarbons in a reaction chamber, comprising steps of:
providing in a reaction chamber a fluidized bed of particles by a fluidizing gaseous stream;
feeding a plasma jet comprising argon into said reaction chamber, said jet being directed towards a portion of said fluidized bed to create a zone of higher temperature;
feeding a batch of heavy hydrocarbons to be cracked into a portion of said fluidized bed remote from said plasma jet, said remote portion of said fluidized bed comprising a zone of lower temperature;
feeding a light alkane into the zone of higher temperature to produce free radicals for carrying out the cracking of said heavy hydrocarbons within said zone of lower temperature, said fluidized bed effecting a quenching of the reaction medium and catalyzing the cracking; and



discharging the products thus obtained downstream of the zone of lower temperature.

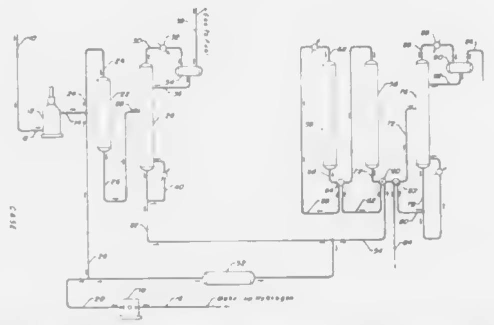
5,026,950
HYDROTREATMENT-ISOMERIZATION WITHOUT HYDROGEN RECYCLE

Robert J. Schmidt, and Robert S. Haizmann, both of Rolling Meadows, Ill., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 292,034, Nov. 30, 1989, Pat. No. 4,929,794. This application May 29, 1990, Ser. No. 530,142

Int. Cl.^{5} C07C *5/13*

U.S. Cl. 585—737 **12 Claims**



1. A method of supplying hydrogen to a combined hydrotreatment and isomerization process, said method comprising:
(a) forming a hydrotreater feed by combining a hydrocarbon feedstock comprising C_4–C_7 hydrocarbons, and including sulfur and oxygen-containing hydrocarbon compounds, with a first hydrogen containing stream to produce a hydrogen to hydrocarbon ratio of from 0.2 to 0.9 stdm^3/m^3 (10 to 50 SCFB) in said hydrotreater feed;
(b) contacting said hydrotreater feed in a hydrotreater reactor with a hydrotreating catalyst comprising a Group VIB metal and a Group VIII metal on an alumina support at conditions including a temperature in the range of 200°–350° C., a pressure of from 700 to 5600 kPa and a liquid hourly space velocity of from 1 to 20 to convert said sulfur and oxygen-containing compounds to hydrocarbons, hydrogen sulfide and water;
(c) recovering a hydrotreater effluent from said hydrotreater reactor;
(d) passing said hydrotreater effluent to a first separator, and separating said effluent into a first gas stream comprising hydrogen, hydrogen sulfide, and water and a treated stream comprising hydrocarbons having from 4–7 carbon atoms;
(e) rejecting said first gas stream from said process;
(f) forming an isomerization feed by combining said treated stream with a second hydrogen-containing stream in a proportion that produces a hydrogen to hydrocarbon ratio of from 6.3 to 18 stdm^3/m^3 (350 to 1000 SCFB);
(g) contacting said isomerization feed in an isomerization reaction zone with an isomerization catalyst comprising a crystalline alumino-silicate and containing at least one Group VIII noble metal alumina, at isomerization conditions including a temperature in a range of from 200°–350° C., a pressure of from 700 to 7000 kPa and a space velocity of from 0.1 to 10;
(h) recovering a second effluent stream from said isomerization reaction zone; and
(i) separating said second effluent stream in a stabilizer column into a product stream, C_4–C_7 hydrocarbons and a second gas stream which is removed from the process.

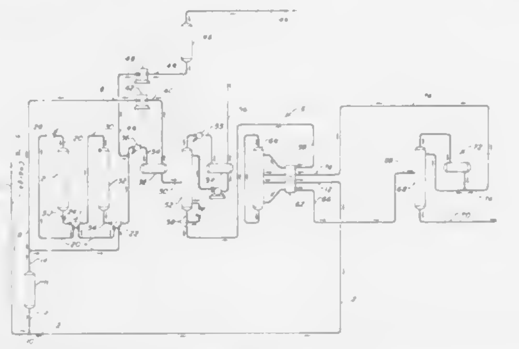
5,026,951
PROCESS FOR PARAFFIN ISOMERIZATION WITH LIQUID PHASE ADSORPTIVE PRODUCT SEPARATION

Robert J. Schmidt, Rolling Meadows; Lynn H. Rice, Palatine, and Srikantiah Raghuram, Darien, all of Ill., assignors to UOP, Des Plaines, Ill.

Filed Jan. 9, 1990, Ser. No. 462,262

Int. Cl.^{5} C07C *5/13*

U.S. Cl. 585—738 **17 Claims**



1. A process for the isomerization of hydrocarbons, said process comprising:
(a) passing a feed stream comprising straight chain feed hydrocarbons to an isomerization zone;
(b) passing a recycle stream comprising straight chain feed hydrocarbons and desorbent to said isomerization zone;
(c) contacting said feed stream and said recycle stream with an isomerization catalyst in said isomerization zone and recovering an isomerization zone effluent comprising branched chain hydrocarbons, straight chain feed hydrocarbons and desorbent;
(d) passing said isomerization zone effluent to an adsorption section and contacting said effluent stream with an adsorbent, said adsorbent containing a desorbent in its selective pore volume and said adsorbent being selective for said straight chain feed hydrocarbons, to adsorb straight chain feed hydrocarbons and produce a first stream comprising desorbent and branched chain hydrocarbons and an adsorbent containing straight chain feed hydrocarbons in its selective pore volume;
(e) separating desorbent from said first stream and recovering a product stream rich in branched chain hydrocarbons; and
(f) desorbing said straight chain feed hydrocarbons from said adsorbent containing straight chain feed hydrocarbons by passing a volume of desorbent to said adsorbent containing straight chain feed hydrocarbons that is less than twice the selective pore volume of the absorbent containing straight chain feed hydrocarbons and contacting said adsorbent with said quantity of desorbent to produce said recycle stream comprising straight chain hydrocarbons and desorbent and said adsorbent-containing desorbent.

5,026,952
PROCESS FOR SEPARATING C_2+ OR C_3+ OR C_4 HYDROCARBONS FROM A GASEOUS MIXTURE

Heinz Bauer, Munich, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

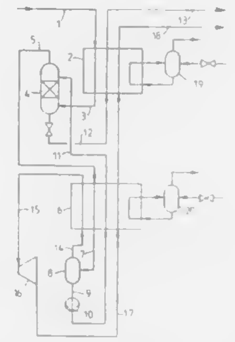
PCT No. PCT/EP87/00427, § 371 Date Feb. 2, 1989, § 102(e) Date Feb. 2, 1989, PCT Pub. No. WO88/00936, PCT Pub. Date Feb. 11, 1988

PCT Filed Aug. 4, 1987, Ser. No. 328,192

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1986, 3626560; Aug. 6, 1986, 3626561

Int. Cl.^{5} C07C *7/00*

U.S. Cl. 585—800 **25 Claims**



1. A process for separating C_{2+} or C_{3+} or C_4 hydrocarbons from a gaseous mixture containing these components and lower-boiling constituents, predominantly hydrogen, said process comprising:
initially cooling and partially condensing said gaseous mixture so that only a minor portion of the C_{2+}, C_{3+} or, respectively, C_4 hydrocarbons is condensed;
delivering the partially condensed mixture into a lower zone of a fractionating column;
withdrawing a gaseous fraction from an upper zone of said fractionating column;
further cooling and partially condensing said gaseous fraction in an additional heat exchanger whereupon the resultant condensed proportion is introduced as return flow to said upper zone of said fractionating column and the resultant uncondensed portion is subjected to engine expansion and thereafter heated by heat exchange with process streams to be cooled; and
recovering C_{2+}, C_{3+} or, respectively, C_4 hydrocarbons from said lower zone of said fractionating column as a product stream.

VOL
1127
ISS
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1991
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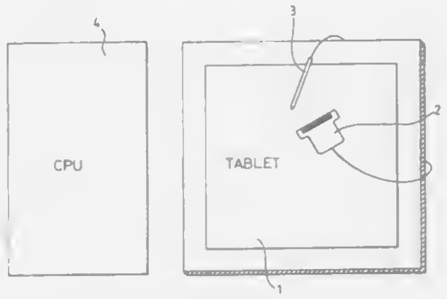
5,026,953
SCANNER SYSTEM WITH LOCAL SCANNING CAPABILITY FOR GRAPHIC READING

Danny Hsu, Taiwan, China, assignor to Wintime Technology Inc., Taipei, Taiwan

Filed Mar. 20, 1990, Ser. No. 495,993

Int. Cl.⁵ G08C *21/00*

U.S. Cl. 178—19 **2 Claims**



1. A scanner system with local scanning capability for graphic reading, including:

a tablet comprising a plane of circuit formed of horizontal and vertical multiplex circuits for scanning and controlled by a tablet CPU to indicate the corresponding location of an induced current, said induced current being treated through a sample-and-hold amplifier circuit and A/D converter circuit and sent to said tablet CPU to provide the corresponding coordinate data of the induced location;

a scanner connected to said tablet CPU, comprising a plurality of oscillators at both sides by the light source thereof to induce an induced current on said plane of circuit permitting said plane of circuit to induce the X, Y coordinate data of patterns, characters and lines, said light source being to projecting light on a reading target for reflection an image of said reading target to a CCD through glasses to produce digital data corresponding to said image through the operation of a scanning circuit and a graphic digitizing circuit;

a stylus connected to said tablet CPU, comprising an oscillator and being used to localize a preferred scanning region on said plane of circuit permitting said tablet to provide the coordinate data of the localized region; and

a main frame comprising a CPU to process and store the digital data provided from said tablet CPU via an input-/output circuit;

characterized in that when said scanner is placed on said plane of circuit it obtains the X, Y coordinate data of the detected lines from the start to the end through its oscillators and simultaneously obtains the digital data of the image which is reflected from the reading target placed on said plane of circuit to said CCD by the light projected from its light source; when said scanner is moving on said plane of circuit its oscillators to move and the change of X, Y coordinate data is simultaneously detected by said tablet to drive said scanner to read the digital data of the new image detected for matching with the last digital data it obtained so as to modify any distorted graphic character.

5,026,954
LIQUID LEVEL SENSING SWITCH ASSEMBLY

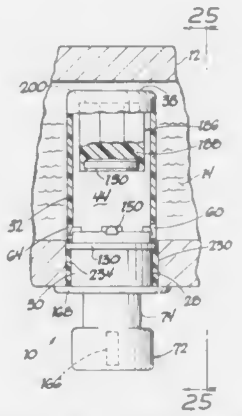
David J. Cebulski, Whitmore Lake, Mich., assignor to Hi-Stat Manufacturing Co., Inc., Sarasota, Fla.

Filed Oct. 16, 1989, Ser. No. 422,083

Int. Cl.⁵ H01H *35/18*

U.S. Cl. 200—84 C **18 Claims**

1. A liquid level responsive electrical switch assembly responsive to the level of a monitored liquid, comprising housing means, said housing means comprising body means and chamber-like means, electrical conductor means carried by said body means for operative connection to associated electrical load means, electrical reed switch means connected to said electrical conductor means and having first and second states of operation, wherein when in said first state of operation said reed switch means is effective for opening an electrical circuit through said electrical conductor means, wherein when in said second state of operation said reed switch means is effective for closing an electrical circuit through said electrical conductor means, wherein said electrical reed switch means is encapsulated by and within said body means, magnet means situated within said chamber-like means, said magnet means when moved toward said body means and said electrical reed switch means so as to be spaced from said electrical reed switch means by a preselected distance being effective to cause said reed switch means to change from one of said states of operation to the other of said states of operation, buoyant float means operatively connected to said magnet means and acted upon and responsive to the level of said monitored liquid for causing said magnet means to be moved towards and away from said body means and said electrical reed switch means in response to the rise and fall of the level of said monitored liquid, a housing section, wherein said chamber-like means is formed generally within said housing section, wherein said housing section is comprised of non-magnetizable material, wherein said housing section is of a generally tubular configuration and connected at one tubular end portion to said body means, abutment means carried by said housing section as to thereby contain said magnet means and said buoyant float means within said chamber-like means and between said body means and said abutment means, wherein said housing section comprises wall means situated generally transversely thereof, and wherein said wall means carries said abutment means, and further comprising passage means formed through said wall means and extending through said abutment means for the flow therethrough and into said chamber-like means of said monitored liquid.



5,026,955
DRIVE CONTROL METHOD FOR AN ELECTROMAGNETIC INDUCTION HEATING APPARATUS

Myung J. Park, Wonmoon-Dong, Jukong Apt., 253-401 Kwacheon, Kyunggi-Do, Rep. of Korea

Filed Jan. 27, 1989, Ser. No. 302,468

Claims priority, application Rep. of Korea, Jan. 29, 1988, 745/1988

Int. Cl.⁵ H05B *6/08*

U.S. Cl. 219—10.41 **7 Claims**

1. A method of controlling a plower level of a power transistor in an electromagnetic induction heating apparatus, comprising the steps of:

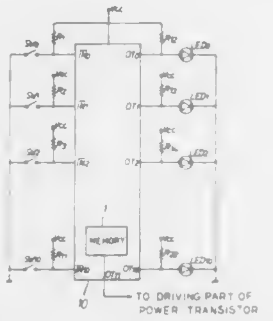
storing a plurality of time control pulse signals in a microprocessor memory corresponding in number to a plurality of first power level setting switches, said time control

VOL
1127
ISS
4
JE
25
1991
UMI

pulse signals switching said power transistor at a plurality of power level frequencies;

storing a plurality of linear control pulse signals in said microprocessor memory corresponding in number to a plurality of second power level setting switches, said linear control pulse signals turning on said power transistor for a plurality of predetermined times;

selecting said power level of said apparatus responsive to an operator closing one of said plurality of first and second power level setting switches;



controlling said power level of said apparatus by outputting one of said plurality of time control pulse signals to said power transistor for switching said power transistor at one of said power level frequencies in response to an operator closing one of said first power level switches; and

controlling said by outputting one of said plurality of linear control pulse signals to said power transistor for turning on said power transistor for one of said predetermined times in response to an operator closing one of said second power level setting switches.

5,026,956

INDUCTIVELY HEATED RING PULLER

Dieter Busch, Ismaning, Fed. Rep. of Germany, assignor to Prüftechnik Dieter Busch & Partner GmbH & Co., Ismaning, Fed. Rep. of Germany

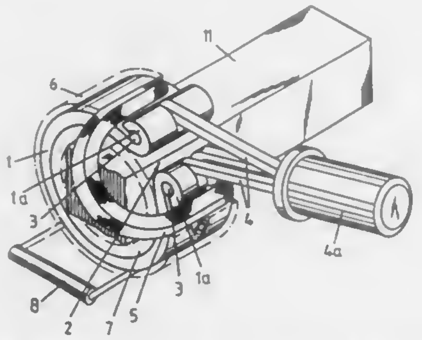
PCT No. PCT/EP87/00394, § 371 Date Mar. 29, 1988, § 102(e) Date Mar. 29, 1988, PCT Pub. No. WO88/00873, PCT Pub. Date Feb. 11, 1988

PCT Filed Jul. 20, 1987, Ser. No. 187,519

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1986, 3625658

Int. Cl.^{5} H05B *6/14*

U.S. Cl. 219—10.491 10 Claims



1. A ring puller for removing rings from a shaft on which they are mounted, said ring puller comprising a heat accumulator ring formed of steel; a transverse slot extending across the ring to separate the ring into a band with separated ends; a clamping device coupled to the accumulator ring to permit the separated ring ends to be brought together; and an electrical conductor extending between the ring ends, said steel accumulator ring characterized in that as compared to aluminum it has a relatively low specific heat and thermal conductivity, whereby it may be efficiently inductively heated.

5,026,957

APPARATUS FOR BAKING OR HEATING VARIOUS PRODUCTS BY APPLICATION OF MICROWAVES AND OVEN APPLYING SAME

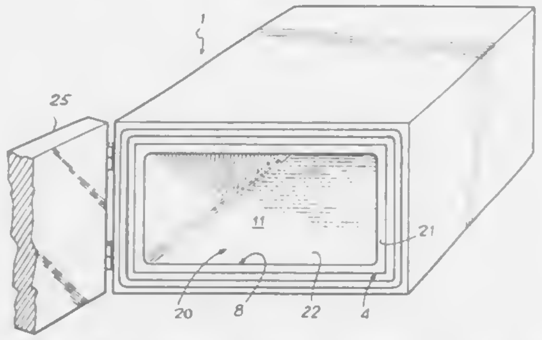
Georges Pralus, Briennon, 42720 Pouilly Sous Charlieu, France

Filed Feb. 27, 1989, Ser. No. 315,584

Claims priority, application France, Mar. 3, 1988, 88 02993

Int. Cl.^{5} H05B *6/80*

U.S. Cl. 219—10.55 M 16 Claims



1. A process of baking or heating products in a microwave oven through the action of steam which comprises the steps of: forming an enclosure in a microwave oven; said enclosure having a water containing porous microwave permeable layer facing the interior of the enclosure and a water proof microwave permeable layer facing the exterior of the enclosure to confine steam within said enclosure; placing a product to be baked or heated within the enclosure; and energizing the microwave oven to vaporize the water and form steam whereby said steam is prevented from passing through the water proof layer and said steam thereby enters the enclosure containing the product so that the product is at least partially cooked by the action of the steam.

5,026,958

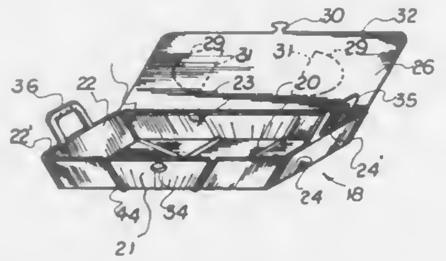
COOKING CONTAINER OR LIKE ASSEMBLY FOR THE COOKING OF FOOD UTILIZING A MICROWAVE OVEN

Urania Palacios, 3709 Largo Dr., Miramar, Fla. 33023

Filed Jan. 22, 1990, Ser. No. 468,311

Int. Cl.^{5} H05B *6/80*

U.S. Cl. 219—10.55 E 9 Claims



1. A container assembly for cooking food in a microwave oven, said assembly comprising:

a. a base including a floor and surrounding sidewalls secured thereto and formed from a material permeable to microwaves,

b. said floor and said sidewalls cooperatively dimensioned and configured to define a chamber means for the containment of food therein, said chamber including an open mouth,

c. a lid structure mounted on said base along a peripheral edge of said sidewalls and selectively positionable between an open, uncovered and a closed, covered position relative to said chamber means and food contained therein,

d. handle means integrally secured to oppositely disposed ones of said sidewalls and extending outwardly therefrom and dimensioned and configured to facilitate gripping by the hands of the user,

e. a crimping structure integrally formed in said base and disposed to strengthen said base and allow containment and carrying of substantial quantities of food therein,

f. said base and said lid structure being formed from a paperboard material coated over the entire outer exposed surface thereof with a plastic, heat resistant coat permeable to microwaves,

g. an integrally formed hinge pivotally attaching said lid structure to said base, and

h. a latch structure integrally formed in both said lid structure and said base adjacent opposite peripheral edges relative to said hinge structure.

5,026,959

MICROWAVE RADIATOR FOR WARMING THERAPY

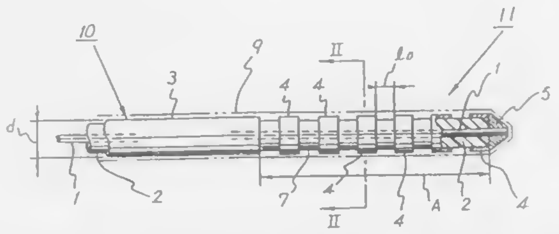
Koichi Ito, Chiba; Motomu Matsunaga, Kawasaki; Satoru Kurokawa, Chiba, and Koji Ueno, Funabashi, all of Japan, assignors to Tokyo Keiki Co. Ltd., Tokyo, Japan

Filed Oct. 18, 1989, Ser. No. 423,753

Claims priority, application Japan, Nov. 16, 1988, 63-289670; Mar. 24, 1989, 1-33649[U]

Int. Cl.^{5} H05B *6/72, 6/80*

U.S. Cl. 219—10.55 A 17 Claims



1. A microwave radiator having an axially extending length, for therapeutic treatment, said radiator comprising:

an inner conductor extending along the axial length of said radiator;

a first high frequency coaxial cable, comprising an outer conductor and a portion of said inner conductor, said outer conductor being coaxially disposed about said inner conductor and extending along said portion of said inner conductor;

a dielectric disposed between said inner conductor and said outer conductor and extending along the entire length of said inner conductor; and

a second high frequency coaxial cable adjacent to said first coaxial cable, said second coaxial cable having spaced conductive rings disposed around said dielectric along a remaining portion of said inner conductor, whereby electromagnetic radiation may flow in between said rings, in a direction generally perpendicular to said axial length of said inner conductor.

5,026,960

CHIP BREAKER FOR POLYCRYSTALLINE CBN AND DIAMOND COMPACTS

David E. Slutz, Columbus, and Friedel S. Knemeyer, Granville, both of Ohio, assignors to The General Electric Company, Worthington, Ohio

Filed Oct. 31, 1989, Ser. No. 429,661

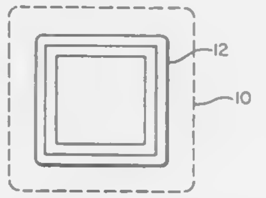
Int. Cl.^{5} B23H *9/00*

U.S. Cl. 219—69.17 6 Claims

1. A method for forming a chip breaker in a polycrystalline diamond or CBN compact which comprises:

providing an oversize compact blank having a surface and edges that establish it as oversize;

forming a chip breaker pattern on said surface of said oversize compact blank; and



thereafter subjecting the edges of said patterned oversize compact blank to finishing to reduce the size thereof.

5,026,961

FEED APPARATUS

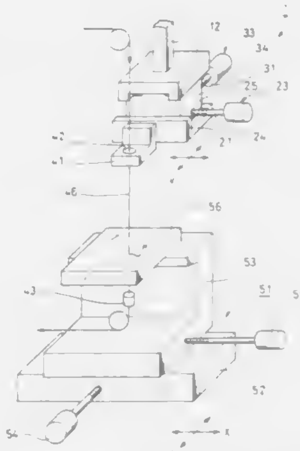
Toshiya Watanabe, and Tasuku Kawanabe, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Sep. 21, 1989, Ser. No. 410,356

Claims priority, application Japan, Oct. 5, 1988, 63-130709[U]

Int. Cl.^{5} B23Q *5/34;* **B23H** *7/02*

U.S. Cl. 219—69.11 17 Claims



1. A feed apparatus having a base, a first slide supported by the base to slide relative to the base along a first axis and a second slide supported by the first slide to slide relative to the first slide along a second axis intersecting the first axis, wherein an object mounted on the second slide is moved in a plane defined by the first and second axes, said feed apparatus comprising:

a first drive unit attached to said base and including a first feed motor;

first transmitting means disposed between said first slide and said first drive unit for transmitting drive force of said first feed motor to said first slide;

a second drive unit attached to said second slide and including a second feed motor; and

second transmitting means disposed between said first slide and said second drive unit for transmitting drive force of said second feed motor to said first slide, whereby said second slide is moved relative to said first slide.

VOL
1127
ISS
4
JE
25
1991
UMI

5,026,962

WIRE CUTTING ELECTRIC DISCHARGE MACHINE

Asami Morino, and Masahito Umetsu, both of Kanagawa, Japan, assignors to Amada Company, Limited and Amada Wasino Co., Ltd., both of, Japan

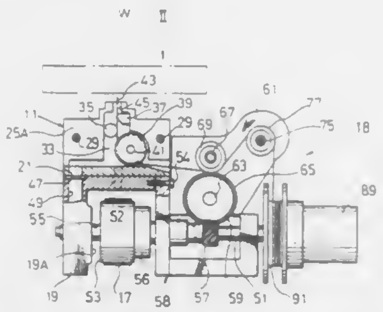
PCT No. PCT/JP89/00136, § 371 Date Nov. 27, 1989, § 102(e) Date Nov. 27, 1989, PCT Pub. No. WO89/07505, PCT Pub. Date Aug. 24, 1989

PCT Filed Feb. 10, 1989, Ser. No. 425,189

Claims priority, application Japan, Feb. 10, 1988, 63-29088

Int. Cl.^{5} B23H *7/10*

U.S. Cl. 219—69.12 3 Claims



1. A wire cutting electric discharge machine comprising:
a frame;
a workpiece support table for supporting a workpiece;
an upper wire guide device supported on the frame at a position above the workpiece; and
a lower wire guide device supported on a lower arm provided on the frame at a position below the workpiece;
wherein an electric discharge is produced between a wire electrode guided by the upper and lower wire guide devices and the workpiece, and the wire electrode is moved relative to the workpiece and an electric discharge process is performed on the workpiece;
and wherein the wire cutting electrical discharge machine comprises:
a wire electrode disposal device provided with a lower arm for disposing the wire electrode by taking up or winding up the wire electrode when an electric discharge process is performed on the workpiece using a wire electrode of normal diameter; and
a wire take-up device, for taking up a fine wire electrode, which can be coupled to a wire electrode handling device, for use when an electric discharge process is performed on the workpiece using a fine wire electrode of a less than normal diameter.

5,026,963

C-TYPE WELDING GUN

Jun Saito, and Motohisa Suzuki, both of Tokyo, Japan, assignors to Obara Corporation, Tokyo, Japan

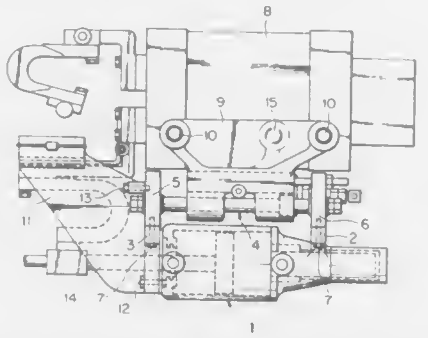
Filed Aug. 2, 1990, Ser. No. 561,960

Claims priority, application Japan, Aug. 9, 1989, 1-92926[U]

Int. Cl.^{5} B23K *11/10*

U.S. Cl. 219—89 6 Claims

1. A C-type welding gun, comprising:
a plurality of individual and separate components;
means for detachably interconnecting said components with each other to permit disassembly of said welding gun into said individual components;
said plurality of individual components including:
  a fluid pressure cylinder having a slidably movable piston rod disposed therein for carrying a welding electrode,
  an equalizer supported on said fluid pressure cylinder, said equalizer including a pair of supports attached to said fluid pressure cylinder and upstanding therefrom in spaced relationship with one another, and a shaft supported on and extending between said supports,
  a welding transformer slidably supported on said equalizer shaft for slidable movement relative to said fluid pressure cylinder, and
  a yoke which is fixed relative to said fluid pressure cylinder and projects away therefrom; and



detachment means for permitting said fluid pressure cylinder to be physically detached and separated from the remaining said interconnected components without physically detaching any of said remaining interconnected components from one another.

5,026,964

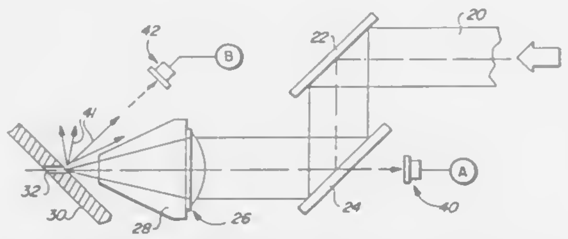
OPTICAL BREAKTHROUGH SENSOR FOR LASER DRILL

Ralph M. Somers, West Chester, and Diana R. Compton, Cincinnati, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Feb. 28, 1986, Ser. No. 835,070

Int. Cl.^{5} B23K *26/04, 26/02*

U.S. Cl. 219—121.7 17 Claims



1. In a pulse laser drilling process having a machine control for controlling a laser, an apparatus to detect when a hole is drilled through a workpiece comprising:
(a) first monitoring means for detecting a laser pulse and producing an output signal representative thereof;
(b) second monitoring means for detecting reflected radiation from an entrance of the hole being drilled and producing an output signal representative thereof; and
(c) evaluating means having a first input for receiving the output signal from said first monitoring means and a second input for receiving the output signal from said second monitoring means, said evaluating means effective for (1) comparing said output signals from said first and second monitoring means and effective for (2) producing an output signal indicative of when a through hole is completed for indicating to the machine control to stop any further laser pulse.

5,026,965

METHOD OF AND APPARATUS FOR MANUFACTURING TUBE HAVING HOLES

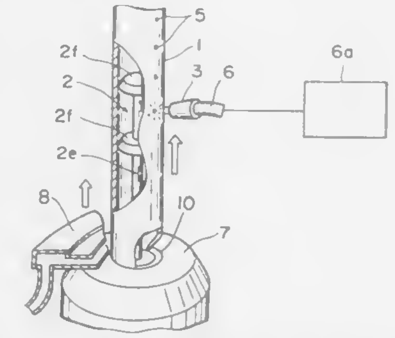
Tatsuya Ohe, and Mitsuaki Fujimura, both of Kuga, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Dec. 28, 1989, Ser. No. 458,424

Claims priority, application Japan, Dec. 28, 1988, 63-332368

Int. Cl.^{5} B23K *26/00*

U.S. Cl. 219—121.70 19 Claims



1. A method of manufacturing a tube having holes, comprising a step of:
continuously drilling holes in a side of said tube at predetermined intervals by a laser beam focused thereon while said tube is being conveyed in its longitudinal direction in a tubular state and in a straight line state.

5,026,966

METHOD AND A DEVICE FOR CUTTING A TUB

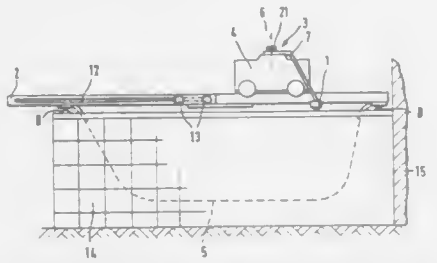
Manfred Roth, Mornshausen, Fed. Rep. of Germany, assignor to Roth Werke GmbH, Dautphetal, Fed. Rep. of Germany

Filed Dec. 21, 1989, Ser. No. 456,111

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1988, 3843897; Mar. 10, 1989, 3907803

Int. Cl.^{5} B23K *26/00, 9/00*

U.S. Cl. 219—121.72 24 Claims



1. A method for cutting up or rather trimming tubs, in particular bath tubs or shower tubs, wherein the tubs are cut by means of a vibration-free cutting method, in particular by a plasma-cutting or laser-cutting method.

5,026,967

VISION ENHANCED METHOD FOR MAKING A FULL ROUND BUSHING

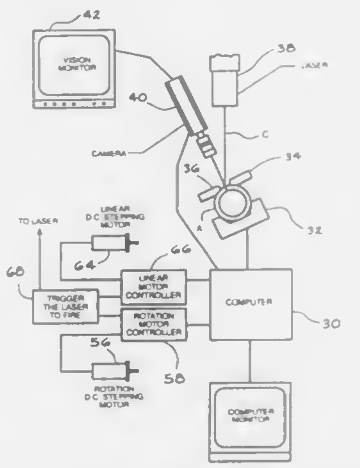
Bruce A. Bell, Marietta, Ohio, and Donald G. Landis, Hollis, N.H., assignors to JPI Transportation Products, Inc., Ann Arbor, Mich.

Filed Jul. 9, 1990, Ser. No. 550,084

Int. Cl.^{5} B23K *26/00*

U.S. Cl. 219—121.64 21 Claims

1. A method of making a full round bushing comprising the steps of:
supplying a hollow generally cylindrical member having an open longitudinal seam defined by opposed edges disposed in generally facing relation, said cylindrical member having at least first and second different metal layers in generally concentric relation, one of said layers defining a bearing surface;
securing said cylindrical member in a fixture clamp;
taking a picture of a predetermined portion of said cylindrical member, said portion including said seam;
analyzing said picture to locate said seam;



rotating said cylindrical member to position said seam at a predetermined location relative to a laser source; and
laser welding said opposed edges to form an integral structure wherein said laser welding is essentially limited to the other of said metal layers such that said bearing surface is not degraded by said welding step.

5,026,968

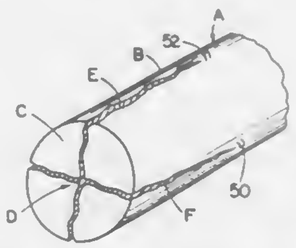
WELDING ELECTRODE TIP CRACKING APPARATUS AND METHOD

Gary W. Cuba, Hopkins, S.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 2, 1990, Ser. No. 517,773

Int. Cl.^{5} B23K *9/26*

U.S. Cl. 219—145.21 20 Claims



16. A welding electrode tip cracking method, comprising the steps of: (a) inserting a tip end of an elongated electrode between and through a first predetermined distance past a pair of spaced crimping dies; (b) moving the crimping dies toward one another and into engagement with the electrode at a first location thereon; (c) crimping the electrode between the crimping dies so as to cause propagation of a first split in the electrode tip; and (d) moving the crimping dies away from one another so as to release engagement with the electrode.

VOL
1127
ISS
4
JE
25
1991
UMI

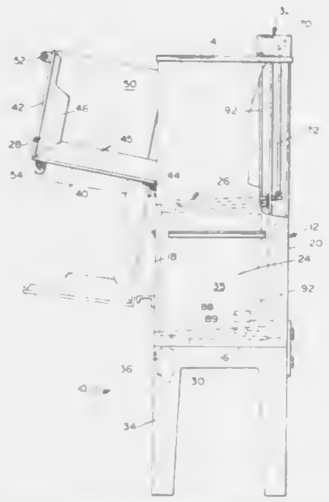
5,026,969
APPARATUS FOR MELTING AND HEATING SHORTENING

John T. Knepler, Chatham; James H. Anson, Auburn, and Alan W. Brewer, Divernon, all of Ill., assignors to Bunn-O-Matic Corporation, Springfield, Ill.

Filed Oct. 25, 1989, Ser. No. 427,046

Int. Cl.^{5} F27B *14/00;* **A23L** *27/00;* **A47J** *27/00;* **B67D** *5/62*

U.S. Cl. 219—421 12 Claims



1. Apparatus for melting and heating shortening, comprising: a housing having a top, a bottom and sidewalls; heating grid means mounted in said housing and spaced above said bottom thereof for heating shortening and allowing at least partially melted shortening to pass therethrough toward said bottom of said housing; door means mounted to said housing for introducing a block of shortening onto said heating grid means; bottom heater means mounted adjacent said housing bottom for completing the melting of said shortening and for maintaining melted shortening at a predetermined temperature; and control means for maintaining control of the operation of both said heating grid means and said bottom heater means in a predetermined fashion for at least partially melting a block of shortening introduced onto said heating grid means to such an extent that the shortening will flow through the grid means into a lower portion of the housing, while substantially preventing smoking of the same, and for maintaining the melted shortening in said lower portion of said housing at said predetermined temperature; wherein said control means comprises weight sensitive switch means for producing a weight signal corresponding in a predetermined fashion to the weight of the shortening on said heating grid means and control circuit means responsive to said weight signal for controlling the temperature of said heating grid means in accordance with the weight of shortening present thereupon in such a fashion as to substantially avoid smoking of the shortening.

5,026,970
COOKING APPLIANCES

Michael H. Buttery, Surrey, United Kingdom, assignor to Emaco Ltd., United Kingdom

Filed Jul. 27, 1989, Ser. No. 385,545

Claims priority, application United Kingdom, Jul. 29, 1988, 8818104

Int. Cl.^{5} H05B *3/72*

U.S. Cl. 219—465 5 Claims

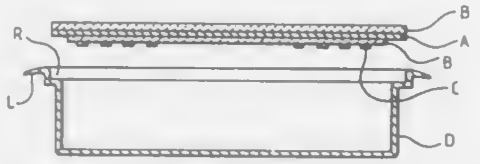
1. A hob assembly for a cooking appliance, said hob comprising:

a substrate made from a sheet metal having an upper side, an underside and a periphery which is common to the upper side and underside;

a layer comprising ceramic material applied to at least said underside of said substrate;

an electrically conducting path applied to said layer;

a supporting dish having a rim in contact with and supporting said substrate; and



the periphery of the substrate constituting a trim which overlays and extends outwardly beyond the rim of the supporting dish, said trim being formed in one piece with said substrate.

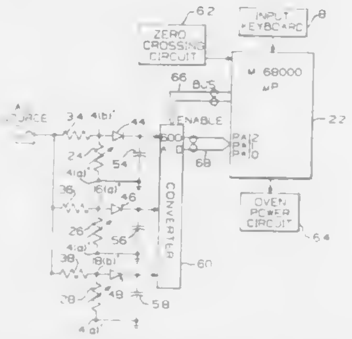
5,026,971
TEMPERATURE CONTROL SYSTEM FOR A HEATING OVEN USING A GLASS-CERAMIC TEMPERATURE SENSOR

Thomas R. Payne, and John Schultz, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Jan. 8, 1990, Ser. No. 462,112

Int. Cl.^{5} H05B *1/02*

U.S. Cl. 219—483 22 Claims



1. In a temperature control system having input means for establishing the setpoint temperature for a controlled environment, and incorporating a temperature sensor characterized by thermal inertia which causes the sensed temperature to lag the actual oven temperature during the transition from one operating temperature for the controlled environment to a different operating temperature, the improvement comprising:

control means responsive to the input means and the temperature sensor means for controlling the temperature of the controlled environment, said control means being operative to control temperature as a function of the setpoint temperature and the value of a temperature control variable, the value of said temperature control variable being set equal to the temperature sensed by the sensor during steady state operating conditions;

said control means including compensating means operative in response to a change in setpoint temperature to adjust the value of said temperature control variable from the sensed temperature value to an adjusted value to compensate for the thermal lag of said sensor;

whereby said control means controls the temperature of the controlled environment as a function of the actual sensed temperature under steady state operating conditions and as a function of a temperature value adjusted to compensate for the thermal lag inherent in the temperature sensing means in response to a change in setpoint temperature.

5,026,972
AUTOMATIC TOLL RECEIVING APPARATUS

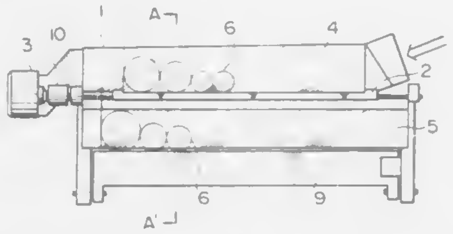
Koichi Kanebara; Kazumi Fukuda, and Kouichi Uenishi, all of Kobe, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 26, 1990, Ser. No. 472,339

Claims priority, application Japan, Feb. 9, 1989, 1-28576

Int. Cl.^{5} G07B *15/00*

U.S. Cl. 235—32 2 Claims



1. In a automatic toll receiving apparatus including a large hopper into which coins are thrown by a driver sitting on a seat in an automotive vehicle, coin selecting means for determining whether the thrown coins are true coins or false coins and discriminating means for discriminating different types of coins, counting means following said selecting means for counting a value of the coins which are determined as true coins by said selecting means, returning means for returning to the driver the coins which are determined as false coins by said coin selecting means and temporary coin holding means for temporarily holding the received coins, the improvement wherein;

said temporary coin holding means comprises a first coin holding portion for a present vehicle and a second coin holding portion for a preceding vehicle, said second coin holding portion being located below said first coin holding means,

the first coin holding portion and the second coin holding portion comprising an inclined passage, respectively, of which width and height are dimensioned equal to a thickness and a diameter of a largest coin among a number of coins passing therethrough,

a side wall of said passage is made of transparent material so as to allow coins held in the passage to be visually confirmed from outside of said passage,

the first coin holding portion includes a bottom which comprises a rod-shaped elongated partition adapted to be displaced in a direction transverse to the passage so that on displacement of said partition the coins in the first coin holding portion fall down into the second coin holding portion, and

the second coin holding portion includes a bottom which comprises a rod-shaped elongated partition adapted to be displaced in the transverse direction of the passage so that on displacement of said partition the coins in the second coin holding portion fall down into a safe.

5,026,973
NUMBER WHEEL COUNTERS

David Woodroffe, Bedfordshire, Great Britain, assignor to ABB Kent plc, Luton, Great Britain

PCT No. PCT/GB88/00993, § 371 Date Aug. 28, 1989, § 102(e) Date Aug. 28, 1989, PCT Pub. No. WO89/05016, PCT Pub. Date Jun. 1, 1989

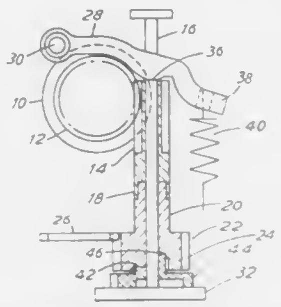
PCT Filed Nov. 14, 1988, Ser. No. 381,495

Claims priority, application United Kingdom, Nov. 18, 1987, 8726924

Int. Cl.^{5} G06M *1/08*

U.S. Cl. 235—136 6 Claims

1. A number wheel counter comprising a plurality of interconnected number wheels; a worm wheel connected with a first one of the number wheels; a worm gear positioned in driving engagement with the worm wheel; and means for rotating the worm gear about its longitudinal axis to effect rotation of the worm wheel and thereby rotation of the first number wheel; wherein there is further provided cam means for displacing the worm gear longitudinally away from a rest position in synchronism with rotation thereof, such that the worm wheel remains stationary over a worm gear rotation corresponding with a number interval of the first number wheel, and biassing means for restoring the worm gear rapidly to its rest position to drive the first number wheel through a number interval.



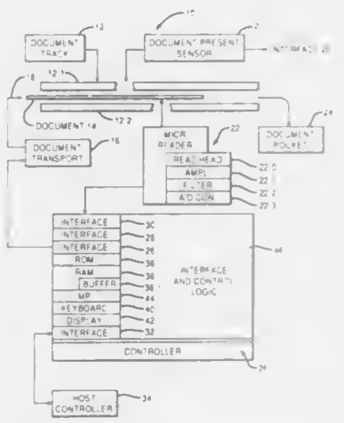
5,026,974
METHOD FOR RECOGNIZING THE LEADING EDGE OF A CHARACTER IN E13B FONT

Gene R. Franklin, Kitchener, and Benedict C. M. Ho, Waterloo, both of Canada, assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 27, 1989, Ser. No. 457,623

Int. Cl.^{5} G06K *9/18*

U.S. Cl. 235—449 8 Claims



1. A method of determining the start of a character in character data printed on a document in magnetic ink in which the start of a character included in said character data always begins with a positive-going signal, and in which the characters in said character data are formed of various combinations of positive peak values, negative peak values, and substantially zero values, said method comprising the steps of:

(a) moving said document in reading relationship with a magnetic reader to generate a waveform corresponding to the character data on said document;

(b) sampling said waveform at periodic times to generate voltage samples;

(c) finding a positive-going voltage sample from step (b) which exceeds a predetermined threshold level;

(d) using said positive-going voltage sample from step (c) to initiate the start of an examining window whose duration is equal to a predetermined number of said voltage samples;

(e) examining the voltage samples within said examining

VOL
1127
ISS
4
JE
25
1991
UMI

window from the start thereof to an end thereof to find the highest voltage sample therein;

(f) examining said voltage samples in an examining order proceeding from the highest voltage sample from step (e) towards the start of said examining window to find a point at which one of said voltage samples becomes negative or the start of said examining window is reached to thereby include a group of positive voltage samples within this examining step;

(g) obtaining a calculated average for the voltage samples included in the group of voltage samples from step (f);

(h) finding the first voltage sample in said group of voltage samples which is greater in voltage than the calculated average from step (g); and

(i) using said first voltage sample from step (h) as the calculated character starting position (CCSP) for character recognition.

5,026,975

BAR CODE LASER SCANNER ARRANGEMENT FOR A CASHIER STAND

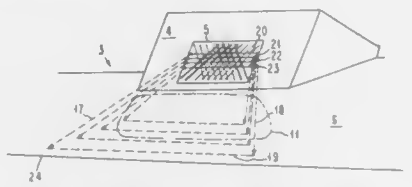
Wolfgang Guber, Ludwigsburg; Juergen Scheffel, Sindelfingen, and Friedrich Wotzka, Herrenberg, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 17, 1989, Ser. No. 311,797

Claims priority, application European Pat. Off., Mar. 12, 1988, 88103955

Int. Cl.⁵ G06K *7/10*

U.S. Cl. 235—462 9 Claims



1. An improved cashier work station for use in a business establishment or the like comprising in combination:

a cashier stand having an opening for receiving legs and knees of an operator seated on a chair or the like and a flat top surface positioned above the legs and knees of said operator; said flat top surface including a front section disposed in close proximity to the operator and forming a horizontal transport plane (6) upon which goods with affixed bar codes are being transported and a rear section contiguous with the front section; and

a scanner having a scan window (5) through which a cluster of scanning rays for scanning the bar codes are being emitted;

said scanner is mounted on the rear section with the scan window (5) inclined at an angle between 110° and 130° relative to the horizontal transport plane thereby causing the scanning rays exiting from the windows to

a) concentrate and focus mainly on a scanning area in front of the window (5),

b) not leave the transport plane (6) area immediately opposite said window, and

c) generally form a ray-free area whereat at least head and chest of an operating cashier (1) sitting in front of said scanning area (11) are situated.

5,026,976

DOUBLE-FOCUS DETECTOR UTILIZING CHROMATIC ABERRATION

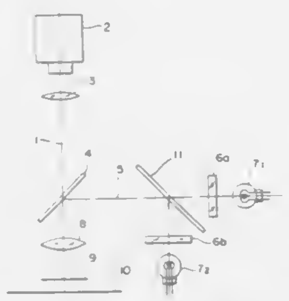
Tsutomu Miyatake, Nihama, Japan, assignor to Sumitomo Heavy Industries Co., Ltd., Japan

Filed Feb. 26, 1990, Ser. No. 485,240

Claims priority, application Japan, Feb. 27, 1989, 1-43292

Int. Cl.⁵ G01J *1/20*

U.S. Cl. 250—201.4 4 Claims



1. A double-focus detector utilizing chromatic aberration for use in a position detector apparatus for detecting a relative position between first and second object which are disposed at a minute interval, in a direction perpendicular to the interval direction, comprising:

vertical illuminator means for simultaneously illuminating said first and second object in the direction normal thereto, by first single wavelength ray and second wavelength-band ray, including a band-pass filter or filters for transmitting said first and second ray, both or respectively;

objective means for producing axial chromatic aberration corresponding to said minute interval with respect to said first and second ray; and

image pickup means for picking up images of said first and second object which are formed by said first and second ray reflected by said first and second object.

5,026,977

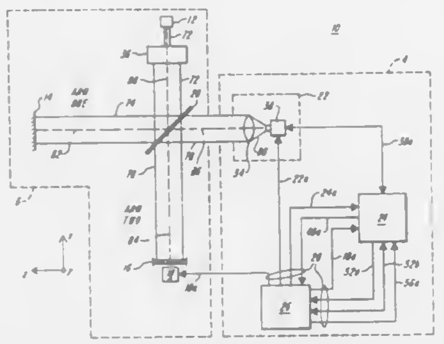
WAVEFRONT SENSING AND CORRECTION WITH DEFORMABLE MIRROR

James E. Hubbard, Jr., Derry, N.H., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 333,637, Apr. 5, 1989, Pat. No. 4,935,614, and a continuation-in-part of Ser. No. 480,955, Mar. 1, 1990. This application Jun. 15, 1990, Ser. No. 538,896

Int. Cl.⁵ G01J *1/20*

U.S. Cl. 250—201.9 15 Claims



1. A system for determining the radiation transmission characteristics of a region along a reference axis comprising:

A. means for generating a first substantially single frequency radiation beam along a first axis said first radiation beam being characterized by a wavelength g;

B. beamsplitter including means for splitting said first beam into a second beam and a third beam, means for directing said second beam along a second axis, and means for directing said third beam along a third axis, wherein one of said directed second and third beams at least in part propagates through said region;

C. a first reflector fixedly positioned along said second axis and including means for reflecting said second beam incident thereon back along said second axis;

D. a second reflector including a reflective surface on a piezoelectrically active support, said second reflector being positioned along said third axis for reflecting said third beam incident thereon back along said third axis;

E. charge deposition means for depositing a distribution of charge on the piezoelectrically active support to deform the support and thus the reflective surface in a range extending along said third axis between a first reference point and a second reference point on said third axis;

F. means for establishing a fourth beam and directing said fourth beam along a fourth axis, said fourth beam being a combination of said reflected second and third beams;

G. an array of radiation detectors positioned along and extending transverse to said fourth axis and including means responsive to portions of said fourth beam incident thereon for generating intensity signals, each of said intensity signals being representative of the intensity of the portion of said fourth beam incident on an associated detector of said array; and

H. processing means responsive to said intensity signals for generating control signals which are provided to the charge deposition means to control the distribution of charge such that said fourth beam has a substantially uniform intensity at said array of radiation detectors.

5,026,978

PHOTOELECTRIC SWITCH HAVING PULSE DRIVER CIRCUITRY

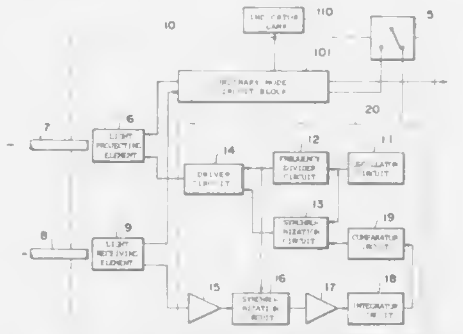
Fumihiko Misumi, Ibaraki; Masazumi Ueda; Masato Hara, both of Kyoto; Yutaka Matsui, Mukou, and Kiyoshi Imai, Kyoto, all of Japan, assignors to Omron Corporation, Kyoto, Japan

Filed Jan. 22, 1990, Ser. No. 468,091

Claims priority, application Japan, Jan. 25, 1989, 1-15772; Feb. 1, 1989, 1-24660

Int. Cl.⁵ G01J *1/32*

U.S. Cl. 250—205 17 Claims



1. A light projecting circuit of a photoelectric switch comprising:

a light projecting element for emitting a visible light;

a driver circuit for driving said light projecting element by use of pulse signals; and

switch means, which is operated when an optical axis alignment of said photoelectric switch is performed, for increasing an amount of light emitted from said light projecting element.

5,026,979

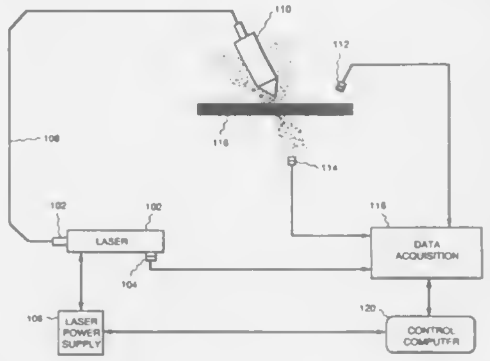
METHOD AND APPARATUS FOR OPTICALLY MONITORING LASER MATERIALS PROCESSING

Angel L. Ortiz, Jr., Scotia, and John L. Schneiter, Latham, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 5, 1990, Ser. No. 489,306

Int. Cl.⁵ G01J *1/32*

U.S. Cl. 250—205 16 Claims



1. An apparatus for monitoring laser materials processing of a workpiece, said apparatus comprising:

means for optically monitoring the processing and generating a processing signal representative of the processing;

means for interpreting said processing signals and generating an interpreted output; and

means for controlling the materials processing based upon said interpreting means interpreted output and by generating a control signal applied to a laser materials processing component, said control means comprising means for determining breakthrough time.

5,026,980

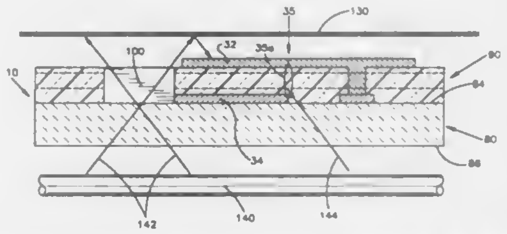
LIGHT BIASED PHOTORESPONSIVE ARRAY HAVING LOW CONDUCTIVITY REGIONS SEPARATING INDIVIDUAL CELLS

Miroslav Ondris, Chagrin Falls, Ohio, assignor to OIS Optical Imaging Systems, Inc., Troy, Mich.

Division of Ser. No. 339,063, Apr. 17, 1989, which is a continuation-in-part of Ser. No. 224,841, Jul. 26, 1988, which is a division of Ser. No. 40,532, Apr. 17, 1987, Pat. No. 4,785,191. This application Jan. 25, 1990, Ser. No. 470,256

Int. Cl.⁵ H01J *40/14*

U.S. Cl. 250—208.1 2 Claims



1. In a device including a substrate supporting an array of photoresponsive semiconductor diode elements spaced closely together, the array being positionable adjacent to a medium presenting light contrasting images to be read by the array, the semiconductor elements being electronically read to provide an electrical signal indicative of the images presented by the medium, each semiconductor element including a portion of a semiconductor material layer sandwiched between an upper electrode and a lower electrode, the improvement wherein at least a portion of the semiconductor material layer between adjacent diodes is removed and replaced by a less electrically

VOL
1127
ISS
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JE
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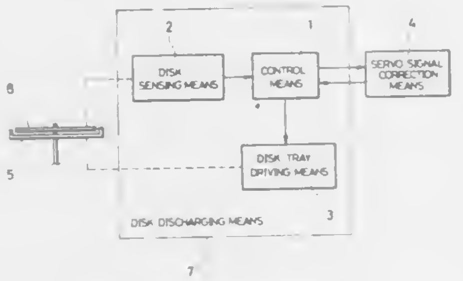
1991
UMI

conductive material so as to minimize leakage current flow or cross-talk therebetween.

5,026,981
SERVO CONTROL GAIN ADJUSTMENT FOR AN OPTICAL DISK APPARATUS

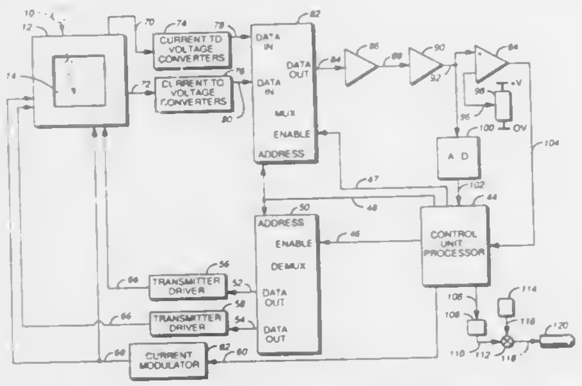
Daiji Yamane, Tenri; Noriaki Sakamoto, Kyoto, and Nobuyuki Horie, Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Dec. 4, 1989, Ser. No. 444,970
Claims priority, application Japan, Dec. 7, 1988, 63-310959
Int. Cl.^{5} H01J *40/14;* **G11B** *3/90*
U.S. Cl. 250—214 B **7 Claims**



1. An optical disk apparatus comprising:
a light emission detection circuit which receives a light emitted from a light source, converts said light into an electric signal and releases said electric signal as a light emission signal;
a photo detector which releases a signal upon reception of a reflected light from a disk and/or stray lights;
a correction signal generating circuit which adjusts a prescribed gain in accordance with the amount of said stray light, generates a correction signal by attenuating said light emission signal based on said gain;
a subtracter in which said correction signal is subtracted from the output signal of said photo detector; and
disk discharging means for discharging said disk from the optical disk apparatus when said disk is present inside the optical disk apparatus during the adjustment of said gain.

5,026,982
METHOD AND APPARATUS FOR INSPECTING PRODUCE BY CONSTRUCTING A 3-DIMENSIONAL IMAGE THEREOF

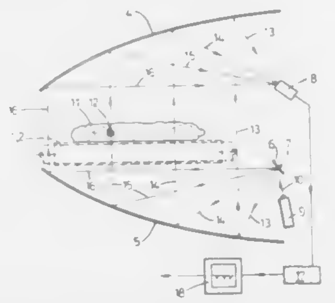
Richard Stroman, 2214 Humbolt Ave., Davis, Calif. 95616
Filed Oct. 3, 1989, Ser. No. 416,854
Int. Cl.^{5} G01N *9/04*
U.S. Cl. 250—223 R **22 Claims**



1. A method for inspecting an article of produce passing through an inspection zone, comprising the steps of:
(a) transmitting a first plurality of beams of light along substantially parallel paths across an inspection zone;
(b) transmitting a second plurality of beams of light along substantially parallel paths across said inspection zone in a direction substantially perpendicular to the direction of said first plurality of beams of light;
(c) sensing the intensity of each said beam of light after it has passed through said inspection zone;
(d) repeating steps (a) through (c) multiple times as an article of produce passes through said inspection zone in a direction substantially perpendicular to the plane defined by the paths along which said first and second plurality of beams of light are transmitted; and
(e) processing the sensed data to determine the light transmittance and absorption characteristics of said article of produce in three dimensions based on variations in intensity of said sensed data, whereby the presence of a pit, defect, abnormality, or other internal or external characteristic of said article of produce is detected.

5,026,983
METHOD AND APPARATUS FOR EXAMINING FOOD PRODUCTS BY MEANS OF IRRADIATION

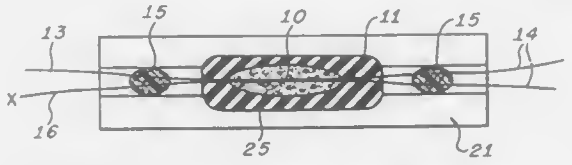
Cornelis Meyn, Oostzaan, Netherlands, assignor to Meyn B.V., Oostzaan, Netherlands
Filed Sep. 28, 1989, Ser. No. 413,836
Claims priority, application Netherlands, Sep. 30, 1988, 8802404
Int. Cl.^{5} G01N *9/04*
U.S. Cl. 250—223 R **19 Claims**



1. Apparatus for examining food products for the presence of undesired ingredients, such as bone fragments, which have a different density than said food products, comprising:
(a) conveying means to convey said food products along a first path;
(b) means for generating a laser beam;
(c) a first parabolic mirror disposed beneath said first path, and having its parabolic axis extending in a plane which is perpendicular to said first path;
(d) a second parabolic mirror disposed above said first path, and having its parabolic axis extending in said perpendicular plane;
(e) means for directing and traversing said laser beam against said first parabolic mirror to reflect said laser beam in a plurality of successive parallel paths in said perpendicular plane and against said second parabolic mirror which is disposed to reflect and focus each of said reflected paths of said laser beam onto a focus point; and
(f) detecting and measuring means disposed at said focus point for detecting and measuring intensity variations in said laser beam to detect undesired ingredients present in food products moving along said first path through said perpendicular plane.

5,026,984
METHODS FOR SENSING TEMPERATURE, PRESSURE AND LIQUID LEVEL AND VARIABLE RATIO FIBER OPTIC COUPLER SENSORS THEREFOR

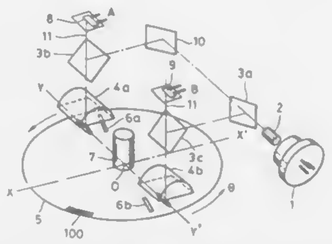
David W. Gerdt, Charlottesville, Va., assignor to Sperry Marine, Inc., Charlottesville, Va.
Filed Jan. 16, 1990, Ser. No. 465,710
Int. Cl.^{5} H01J *5/16*
U.S. Cl. 250—227.21 **14 Claims**



1. A fiber optic coupler pressure sensor comprising
a housing having an aperture therein,
a fiber optic coupler encapsulated in said aperture having a plurality of input optical fibers each having a core, said cores of said optical fibers being merged and fused in a waist region to form a common optical core wherefrom a plurality of output optical fibers emerge, said fiber optic coupler distributing light energy incident to one of said input optical fibers between said plurality of output optical fibers,
encapsulant material for encapsulating said common optical core in said aperture, said encapsulant material having a refractive index variable with stress applied thereto, such that said incident light energy is distributed between said plurality of output optical fibers as a function of stress applied to said encapsulant material, and
compressible means cooperative with said encapsulant material so that pressure applied to said encapsulant material compresses said compressible means, so as to create stress in said encapsulant material in accordance with said applied pressure.

5,026,985
METHOD AND APPARATUS FOR DETECTING A REFERENCE POSITION OF A ROTATING SCALE WITH TWO SENSORS

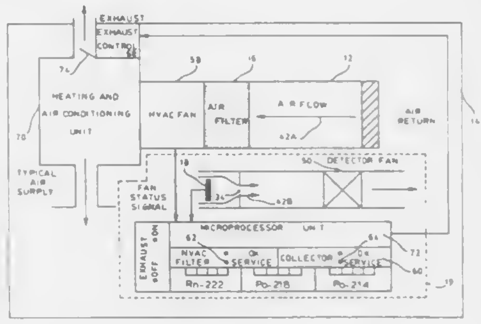
Koh Ishizuka, Urawa; Tetsuharu Nishimura, Kawasaki; Masaaki Tsukiji, and Satoshi Ishii, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 20, 1989, Ser. No. 409,796
Claims priority, application Japan, Sep. 30, 1988, 63-246650
Int. Cl.^{5} G01D *5/34*
U.S. Cl. 250—231.16 **30 Claims**



1. A reference-position detection method for detecting a reference position of a scale comprising the steps of:
supplying first and second patterns to the scale;
detecting the first pattern with a first detection sensor and detecting the second pattern with a second sensor, wherein the timings detected by the first and second sensors are different from each other, with the first and second patterns and the first and second sensors being arranged so that detection timings of the first and second patterns shift inversely to each other in response to a deviation in attitude of the scale from its predetermined attitude; and
determining the reference position of the scale according to the detection made in the detection step.

5,026,986
RADON MONITOR AND CONTROL SYSTEM BASED UPON ALPHA PARTICLE DETECTION

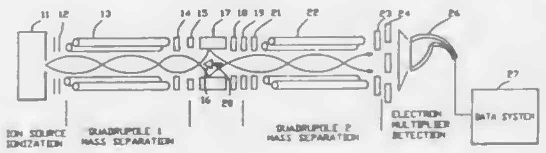
George S. Hurst, Oak Ridge, Tenn., assignor to Consultec Scientific, Inc., Knoxville, Tenn.
Filed Jun. 9, 1989, Ser. No. 364,209
Int. Cl.^{5} G01T *1/00*
U.S. Cl. 250—255 **11 Claims**



6. A monitor of the efficacy of a dust filter in a conventional HVAC system used with an enclosed building environment, said HVAC containing a circulating fan, comprising:
a collector of dust from within said building environment, said dust containing radon daughter atoms including ^{214}Po atoms;
an electrical alpha particle detector for producing electrical signals related to the number of alpha particles emitted by said ^{214}Po atoms within said dust on said collector;
means for acquiring said electrical signals from said alpha particle detector and signals from said HVAC fan to determine the ability of said collector for collecting dust; and
means for communicating to an attendant of said HAC system said efficacy of said dust filter based upon said signals from said electrical alpha particle detector and said signals from said HAC fan.

5,026,987
MASS SPECTROMETER WITH IN-LINE COLLISION SURFACE MEANS

Mark E. Bier; Robert G. Cooks, both of W. Lafayette, Ind., and George C. Stafford, San Jose, Calif., assignors to Purdue Research Foundation, Lafayette, Ind. and Finnigan Corporation, San Jose, Calif., a part interest
Continuation of Ser. No. 201,592, Jun. 2, 1988, abandoned. This application May 23, 1990, Ser. No. 528,900
Int. Cl.^{5} H01J *49/26*
U.S. Cl. 250—281 **12 Claims**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DATA SYSTEM
ION SOURCE IONIZATION
QUADRUPOLE 1 MASS SEPARATION
QUADRUPOLE 2 MASS SEPARATION
ELECTRON MULTIPLIER DETECTION

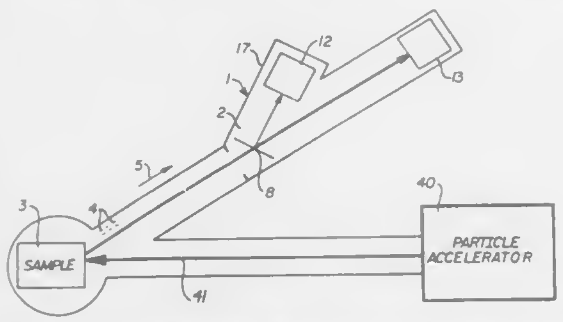
1. A mass spectrometer including:
a mass analyzer for analyzing ions;
means for directing a beam of ions to be analyzed toward said mass analyzer along the axis of said analyzer;
surface collision means including a deflector and a collision surface positioned along said axis whereby said ions are

VOL
1127
ISS
4
JE
25
1991
UMI

deflected by said deflector and collide with said collision surface and undergo surface collision processes and generate surface collision products;
means for focusing and directing said surface collision products along said axis to said mass analyzer; and
mean for detecting the output of said mass analyzer.

5,026,988
METHOD AND APPARATUS FOR TIME OF FLIGHT MEDIUM ENERGY PARTICLE SCATTERING

Marcus H. Mendenhall, Nashville, and Robert A. Weller, Brentwood, both of Tenn., assignors to Vanderbilt University, Nashville, Tenn.
Continuation of Ser. No. 409,460, Sep. 19, 1989, abandoned. This application Dec. 11, 1990, Ser. No. 627,609
Int. Cl.^{5} B01D *59/44;* **H01J** *49/40*
U.S. Cl. 250—287 **34 Claims**

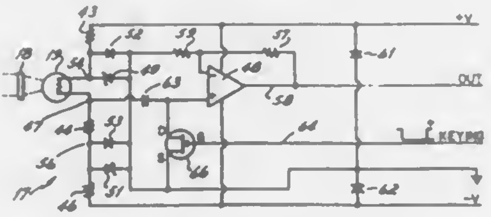


1. A method of analyzing material properties using medium energy particle scattering from a sample member, comprising the steps of:
(a) providing a housing containing a carbon foil and having a first and second flight path disposed between said carbon foil and a first detector and a second detector;
(b) scattering particles from the sample member to generate backscattered particles representative of the full sample member whereby analysis of said material properties is effected by simultaneously examining particles of all energies which are backscattered from said sample member;
(c) directing the backscattered particles through said carbon foil, to establish the emission of secondary electrons from substantially all of said backscattered particles passing through said carbon foil;
(d) accelerating said secondary electrons using an electrostatic field disposed generally in the region of said carbon foil;
(e) generating a start pulse when each said secondary electron strikes the first detector;
(f) generating a stop pulse when each said backscattered particle which had passed through said carbon foil strikes the second detector;
(g) generating flight time information based upon the time interval between said start and stop pulses; and
(h) processing said flight time information and calculating material properties of said sample member.

5,026,989
SYSTEM FOR MONITORING MATERIAL DISPENSED ONTO A SUBSTRATE

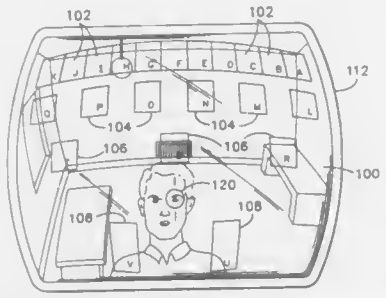
Stephen L. Merkel, Bay Village, Ohio, assignor to Nordson Corporation, Westlake, Ohio
Continuation of Ser. No. 785,332, Oct. 7, 1985, abandoned. This application Feb. 25, 1988, Ser. No. 163,158
Int. Cl.^{5} G01N *21/86*
U.S. Cl. 250—338.1 **23 Claims**

1. A system for monitoring energy radiant from a material dispensed onto a substrate comprising:
a sensor positioned to receive radiant energy from a substrate and from a material dispensed onto the substrate, the sensor having an electrical characteristic whose value varies in part in dependence upon the amount of energy, in at least a given energy band, received by the sensor;
amplifier means electrically connected to the sensor for producing an output signal which varies in dependence upon the value of said electrical characteristic of the sensor, the amplifier means including an amplifier (a) having an input capacitively coupled to the sensor and (b) producing said output signal at an output; and
means for clamping the input of the amplifier to a particular voltage level when the sensor is receiving radiant energy from the substrate and for unclamping the input of the amplifier before the sensor receives radiant energy from material dispensed onto the substrate.



5,026,990
METHOD AND APPARATUS FOR INSTALLING INFRARED SENSORS IN INTRUSION DETECTION SYSTEMS

Douglas H. Marman, Ridgefield, Wash., and Robert C. Winters, Lake Oswego, Oreg., assignors to Sentrol, Inc., Portland, Oreg.
Filed Aug. 28, 1989, Ser. No. 399,629
Int. Cl.^{5} G08B *13/18*
U.S. Cl. 250—342 **46 Claims**



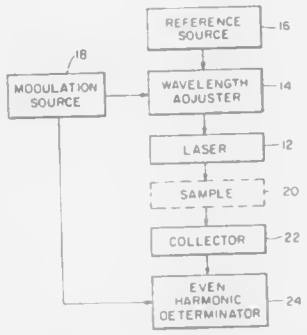
1. A method for installing an infrared radiation sensor having a predetermined zone of coverage and directional reception and defining at least one directional area of sensitivity, in order to prevent reception of infrared radiation from identifiable sources which would cause interference with the operation of said infrared radiation sensor, comprising:
(a) making a photographic image, photographed from a sensor location where said infrared radiation sensor is intended to be mounted, and showing at least a portion of said zone of coverage which said infrared radiation sensor would have when mounted in a sensor location;
(b) visually identifying in said photographic image a source of potentially interfering infrared radiation located in said zone of coverage; and
(c) blocking reception by a sensor in said sensor location of infrared radiation from said source of potentially interfering infrared radiation visually identified from said photographic image.

46. A method for evaluating a proposed location for an infrared sensing device and for adjusting the orientation of said infrared sensing device, comprising:
(a) mounting a support bracket in a proposed location for an infrared sensing device;

(b) mounting a mirror, including indicia representative of the limits of each of a plurality of directional beams of sensitivity of said infrared sensing device, on a movable portion of said support bracket in a predetermined relationship to said movable portion of said support bracket;
(c) from a predetermined position with respect to said mirror, observing an image reflected in said mirror and observing with respect to said image the location of each of said directional beams of sensitivity as represented by said indicia;
(d) adjusting said movable portion of said support bracket as necessary to place said mirror in a position in which observing said reflected image in said mirror with reference to said indicia indicates that each of said directional beams of sensitivity is located in an acceptable orientation;
(e) securing said movable portion of said support bracket in said position; and
(f) mounting said infrared sensing device on said movable portion of said support bracket.

5,026,991
GASEOUS SPECIES ABSORPTION MONITOR

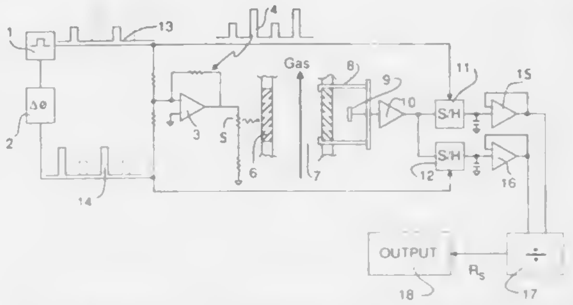
Neil Goldstein, Medford; Fritz Bien, Concord, and Lawrence Bernstein, Lexington, all of Mass., assignors to Spectral Sciences, Inc., Burlington, Mass.
Filed Sep. 20, 1989, Ser. No. 410,106
Int. Cl.^{5} G01N *21/17, 21/59*
U.S. Cl. 250—343 **24 Claims**



1. A wavelength-locked laser gaseous species monitor, comprising:
variable wavelength laser means for providing a laser output;
means for adjusting the central wavelength of said laser output to a first laser wavelength at or near a first absorption wavelength of a species being monitored;
means for modulating said laser output about said first laser wavelength to establish a first modulated output having a first modulation frequency and a first modulation bandwidth and a second modulated output having said first modulation frequency and a second modulation bandwidth;
means for providing said first and second modulated outputs to a sample being monitored;
means for collecting at least some of said modulated outputs transmitted through said sample;
means for determining an even harmonic of the collected outputs with respect to said first modulation frequency;
means, responsive to said means for determining, for detecting from said even harmonic of said fist or said second modulated outputs the presence in said sample of said species being monitored; and
means for resolving the concentration of the species being monitored by comparing said even harmonics of said collected outputs.

5,026,992
SPECTRAL RATIOING TECHNIQUE FOR NDIR GAS ANALYSIS USING A DIFFERENTIAL TEMPERATURE SOURCE

Jacob Y. Wong, Santa Barbara, Calif., assignor to Gaztech Corporation, Goleta, Calif.
Filed Sep. 6, 1989, Ser. No. 403,587
Int. Cl.^{5} G01J *5/12, 5/58*
U.S. Cl. 250—343 **6 Claims**



1. A gas analyzer for determining the concentration of a gas that is included in a sample, comprising in combination:
a sample chamber containing the sample;
differential temperature source means including a radiating element and including means for altering the temperature of said radiating element from T_1 to T_2 and from T_2 to T_1 for producing radiation having a first spectrum when the temperature is T_1 and having a second spectrum when the temperature is T_2;
dual pass band filter means located between the radiating element of said differential temperature source means and said sample chamber, and having two non-overlapping pass bands, one of which is centered at a wavelength at which the gas absorbs radiation and the other of which is centered at a wavelength at which the sample does not absorb radiation, for simultaneously passing radiation within the two nonoverlapping pass bands;
detector means for intercepting radiation that has passed through said dual pass band filter means and through said sample chamber and for converting the intercepted radiation to an electrical signal; and,
circuit means electrically connected to said detector means for processing the electrical signal to determine the concentration of the gas;
said sample chamber, said differential temperature source means, said dual pass band filter means, said detector means, and said circuit means all remaining stationary when the gas analyzer is in use.

5,026,993
APPARATUS FOR MONITORING SETTLEMENT OF A SOLID IN A LIQUID, AND A SYSTEM INCORPORATING SAME

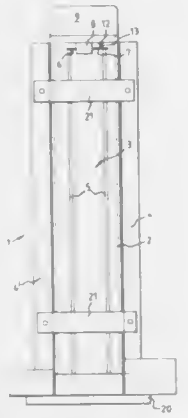
David F. James, Hornchurch, England, assignor to Thames Water Utilities Limited, Reading, United Kingdom
Filed Oct. 30, 1989, Ser. No. 428,520
Int. Cl.^{5} G01N *21/01*
U.S. Cl. 250—357.1 **11 Claims**

11. A system for monitoring settlement of sludge in effluent from a sewage treatment plant, comprising:
(a) a settlement vessel comprising means for containing said effluent;
(b) automatic electronic means for sensing the height of settled sludge in the effluent in said vessel and comprising a plurality of infrared LED's at one side of said vessel, a plurality of infrared sensors horizontally opposed to said LEDs at an opposite side of said vessel, and electronic circuit means for reading said sensors, with said LEDs and said sensors being arranged so as to define an upper set and a lower set of opposed LED-sensor pairs with a vertical

VOL
1127
ISS
4
JE
25
1991
UMI

spacing between successive LED-sensor pairs of the upper set being greater than that of the lower set;

(c) rotatable eccentric stirrer means disposed in said vessel for rotating between said LEDs and said sensors for effecting uniform settlement of the sludge in the effluent in said vessel;



(d) electronic control circuit means for ceasing rotation of said stirrer means when said stirrer means is at an angle to an optical path between said LEDs and said sensors so as not to block said optical path; and

(e) means shielding said vessel from ambient infrared light.

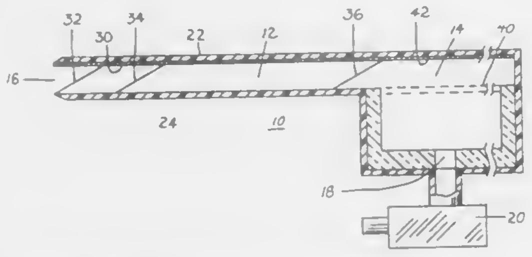
5,026,994
METHOD AND APPARATUS FOR MEASURING THE SIZE DISTRIBUTION OF PARTICLES

Daniel R. Westcott, North Syracuse; William C. Tetley, Syracuse, and Bruce A. Cummings, Baldwinsville, all of N.Y., assignors to RAD-X Ltd., Syracuse, N.Y.

Filed Aug. 6, 1990, Ser. No. 562,803

Int. Cl.⁵ G01T *7/04*

U.S. Cl. 250—435 **25 Claims**



1. In a particle detector of the type having first and second detection chambers connected together for smooth flow of an airstream therethrough, means for measuring size distribution of particles comprising;

a first detection chamber for causing ultrafine particles to plate out therein having an entrance width substantially less than the exit width thereof;

a second detection chamber for trapping out attached particles therein; and

detection means disposed in said first and second detection chambers for recording the characteristics of the particles plated out in said first and second chambers.

5,026,995
PARTICLE BEAM SURFACE ANALYZER

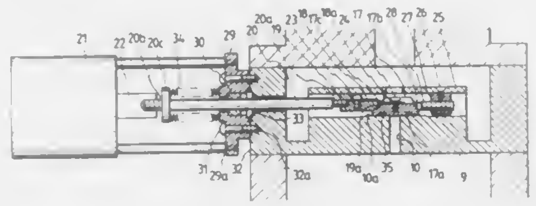
Eiichi Hazaki, Tsuchiura; Tadashi Otaka, and Minoru Shimizu, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 18, 1990, Ser. No. 539,810

Claims priority, application Japan, Jun. 19, 1989, 1-156446

Int. Cl.⁵ H01J *37/18*

U.S. Cl. 250—441.1 **12 Claims**



1. In a particle beam surface analyzer, comprising a partition wall separating a vacuum space, an opening that is provided in the partition wall through which the particle beam is taken out, a seal member which is moved along a seal surface of the partition wall and seals the opening, a condenser lens which converges the particle beam onto the sample, and detector for detecting a physical quantity generated from the sample when the particle beam is irradiated on the sample,

the particle beam surface analyzer characterized by further comprising:

a movable shift member that pushes one side surface of the seal member along the seal surface, an other side surface of the seal member having a predetermined angle to the seal surface greater than 55° and

a stopping member which contacts the other side surface of the seal member so as to exert a force on the other side surface till the seal member reaches the openings, whereby resultant forces between the seal member and the seal surface in the side of the one side surface is equal to that in the side of the other side surface.

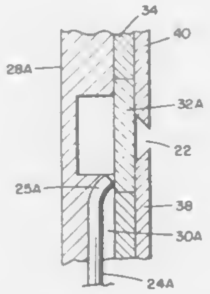
5,026,996
LINE SCANNER

William C. Fricke, 9 Jessie St., New Fairfield, Conn. 06812

Filed Feb. 5, 1990, Ser. No. 475,414

Int. Cl.⁵ G01J *1/58*

U.S. Cl. 250—461.1 **19 Claims**



1. A beam intensity profilometer, comprising:

means to produce a fluorescent emission distribution having a spacial distribution linearly proportional to the local intensity of a linear section of an incident UV beam aimed on the means to produce an emission distribution said means to produce the emission distribution comprising an elongated strip of fluorescent material optically transparent to fluorescent wavelengths; and

means being operatively connected to the fluorescent emission distribution means for displaying and analyzing the spacial distribution of the linear section of the UV beam as a function of the spacial distribution of the fluorescent emission.

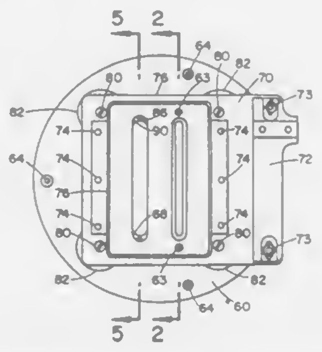
5,026,997
ELLIPTICAL ION BEAM DISTRIBUTION METHOD AND APPARATUS

Victor M. Benveniste, Magnolia, Mass., assignor to Eaton Corporation, Cleveland, Ohio

Filed Nov. 13, 1989, Ser. No. 436,296

Int. Cl.⁵ H01J *37/317*

U.S. Cl. 250—492.2 **7 Claims**



1. An ion implantation system for directing a beam of ions along a travel path to impact a workpiece comprising an ion source having structure that defines an ion confinement chamber including a wall that tapers from a first thickness around an outer periphery of said wall inward from both sides of the wall toward a region bounding an ion exit aperture for allowing ions to exit from the ion confinement chamber and form an ion beam; an electron source mounted within the ion chamber for providing energetic electrons to collide with gas molecules within the ion confinement chamber and ionize those molecules; beam extraction means for accelerating ions within the beam away from the ion source; mass analyzer means for intercepting the ion beam and causing ions of the proper mass to follow an impact trajectory to the workpiece; and structure defining a workpiece implantation station for positioning one or more workpieces for ion beam treatment by ions following the impact trajectory;

said exit aperture characterized by an elongated slot having a maximum width near its center and which narrows from the maximum width toward curved ends.

5,026,998
SHAFT ALIGNMENT CHECKING METHOD

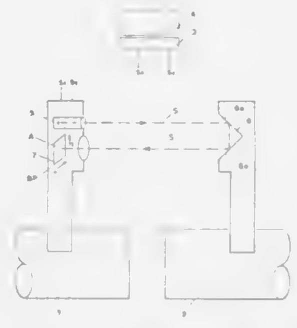
Roland Hölzl, München, Fed. Rep. of Germany, assignor to Prüftechnik Dieter Busch & Partner GmbH & Co., Ismaning, Fed. Rep. of Germany

Filed Apr. 4, 1990, Ser. No. 504,656

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1989, 3911307

Int. Cl.⁵ G01N *21/86*

U.S. Cl. 250—561 **11 Claims**



1. A method for checking tandem-arranged shafts to detect angular and/or parallel offset between the center axes of the shafts using at least one pair elements made up of an indicating pointer which is fixed in relation to one of the shafts and is generally parallel to its center axis and of a reference element fixedly attached to the other shaft, in a plurality of angular positions of measurement of the shafts, which correspond to each other from shaft to shaft, for the production of two mutually independent alignment data signals, which respectively correspond, in a manner related to the respective angular position of measurement, to a component of the minimum distance apart of the center axes of the shafts, i.e. the parallel offset, and to a component of the maximum angle between such center axes, i.e. the angular offset, or from which such components may be derived, characterized in that

(a) the shafts are turned into at least five different and freely selected angular positions of measurement, in which measurements are taken,

(b) the signals produced on taking such measurements are treated as vectors with the same origin or, respectively, pairs of values in a plane coordinate system,

(c) using a computer a process of calculation is performed on the basis of points of measurement given by the ends of the vectors or, respectively, the pairs of values to obtain the characteristic data of the curve which would be produced by a rotation of the shafts through 360°, such process taking into account the fact that for geometrical reasons the points of measurement are practically only able to originate from a curve corresponding to an ellipse but are subject to mensuration uncertainties, and such process using an optimizing method,

(d) the angular position in space of at least one of these angular positions of measurement is ascertained and,

(e) using a computer to ascertain the position in space of the shafts in relation to each other and obtain correction values for the positional correction thereof in order to eliminate any alignment error detected on the basis of the characteristic data of the curve taking into account the ascertained angular positions in space and the known direction of rotation of the shafts on turning into the angular positions of measurement.

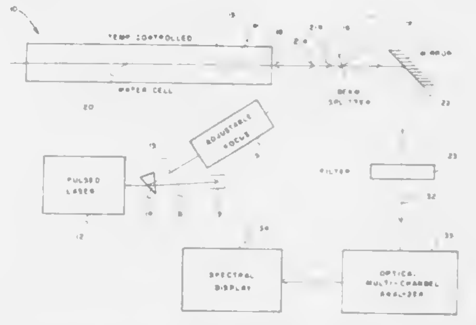
5,026,999
METHOD OF REMOTELY MEASURING SUBSURFACE WATER TEMPERATURES BY STIMULATED RAMAN SCATTERING USING STIMULATED BRILLOUIN BACKSCATTERING

Donald A. Leonard, Cupertino, Calif., assignor to GTE Government Systems Corporation, Stamford, Conn.

Filed Apr. 9, 1990, Ser. No. 506,304

Int. Cl.⁵ G01J *5/48, 3/44*

U.S. Cl. 250—574 **5 Claims**



1. The method of remotely measuring temperature a medium with a pulsed laser consisting of the steps of:

directing the output of said laser in a first direction into a body of said medium;

increasing the intensity of said laser output pulses to a value sufficient to produce in said medium stimulated Brillouin scattering (SBS) pulses in a second direction opposite to said first direction;

increasing the intensity of said SBS pulses sufficiently to

VOL
1127
ISS
4
JE
25
1991
UMI

produce stimulated Raman scattering (SRS) pulses in said second direction in said water; and

analyzing said SRS pulses and thereby producing a spectral record indicative of temperature of the medium.

5,027,000

METHOD AND APPARATUS FOR GENERATING ELECTRICITY USING WAVE ENERGY

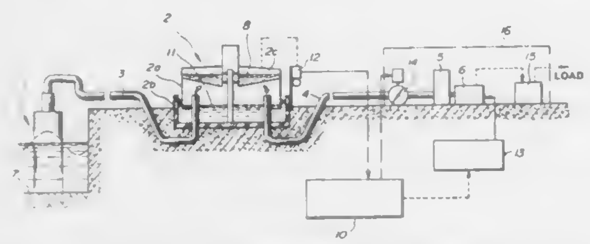
Hidenori Chino, Tokyo; Takashi Hara, Osaka; Kenji Tamura, Tokyo; Yasuhide Nakakuki, Tokyo; Yasuyuki Nii, Tokyo; Zenya Soma, Tokyo, and Kiyoshi Nishihara, Tokyo, all of Japan, assignors to Takenaka Corporation, Osaka, Japan

Filed Sep. 7, 1989, Ser. No. 403,933

Claims priority, application Japan, Oct. 21, 1988, 63-265819

Int. Cl.^{5} F03B *13/24*

U.S. Cl. 290—53 **12 Claims**



1. In a method for generating electricity using wave power including the steps of converting wave energy into air pressure energy, supplying the air pressure energy to a constant air pressure tank to temporarily store and equalize the air pressure energy, and applying the equalized air pressure to an air turbine of a generator stationarily, the wave power generating method further comprising the steps of:

providing a wave amplitude meter within the sea area where wave energy converters are settled;

providing an air pressure meter in the air chamber of the each wave energy converter;

providing a vertically moving air tank as the constant air pressure tank, the top portion thereof having a load container storing a load;

providing an air pressure control apparatus for controlling the air pressure in the tank by adjusting the load supplied to the load container, using a variable turbine as the air turbine;

inputting to a controller the signals representing the amplitude and period of the wave measured by the amplitude meter and the air pressure in the chamber measured by the air pressure meter to cause the controller to calculate an effective wave amplitude and a target air pressure for properly stabilizing the air pressure in response to the effective wave amplitude;

controlling the air pressure controller in accordance with the calculated results to adjust the load applied to the load container whereby the total weight of the load and the air tank is applied to the air in the chamber for setting the pressure to the target value; and

controlling the variable turbine for driving the generator to generate electricity.

5,027,001

MOISTURE SENSITIVE AUTOMATIC WINDSHIELD WIPER AND HEADLIGHT CONTROL DEVICE

William F. Torbert, Rte. 5, Box 894, Valdosta, Ga. 31602

Filed Aug. 29, 1989, Ser. No. 399,979

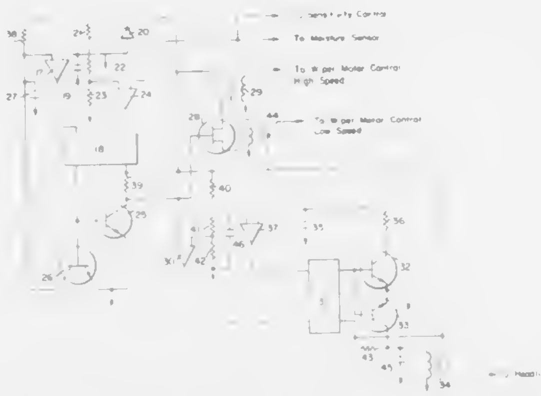
Int. Cl.^{5} B60S *1/08*

U.S. Cl. 307—10.1 **6 Claims**

1. An automatic moisture sensitive control system for a vehicle having a windshield wiper control system and a headlight control system, said moisture sensitive control system comprising;

a moisture sensing unit, said moisture sensing unit having a first narrow moisture sensing band and a second narrow moisture sensing band;

said first narrow moisture sensing band of said moisture sensing unit having notches along an upper edge to channel water running down the windshield when said vehicle is not in motion;



an automatic control circuit for controlling said moisture sensing unit and activating said windshield wiper control system and the said headlight control system to begin operation, said control circuit including a first stage circuitry, wherein said first stage circuitry sends control signals to the windshield wiper control system to automatically activate the said vehicle headlight control system.

5,027,002

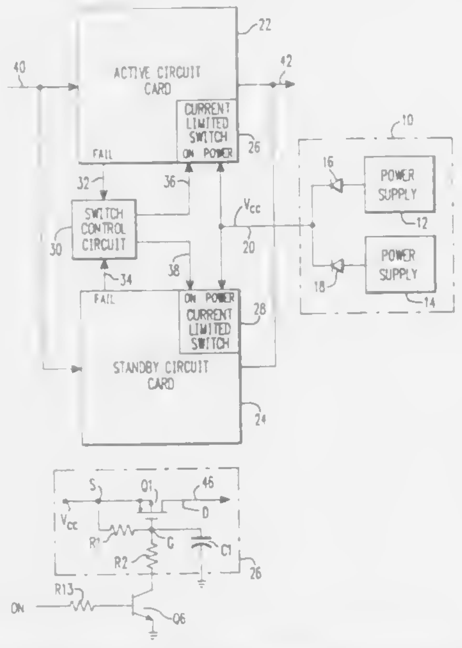
REDUNDANT POWER BUS ARRANGEMENT FOR ELECTRONIC CIRCUITS

Roger D. Thornton, Union Township, Auglaize County, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 4, 1989, Ser. No. 417,168

Int. Cl.^{5} H02J *1/10, 1/14;* **G05F** *1/577*

U.S. Cl. 307—35 9 Claims



1. A redundant power bus arrangement for electronic circuits comprising:

an active circuit to be controlled;

a standby circuit to be controlled;

a power source;

a first current limited switch for connecting said power source to said active circuit;

a second current limited switch for connecting said power source to said standby circuit;

wherein the maximum current permitted by each of said first and second current limited switches is less than the maximum output current rating of said power source; and

a switch control circuit for controlling the conductive state of said first and second current limited switches in response to a control signal generated by at least one of said circuits to be controlled;

wherein each of said current limited switches includes a field effect transistor having a source terminal connected to a power bus which receives power from said power source, a drain terminal connected to one of said circuits to be controlled, and a gate terminal; a first resistor connected between said source and gate terminals; a second resistor connected between said gate terminal and said switch control circuit; and a capacitor connected between said gate terminal and either ground or a bus voltage.

5,027,003

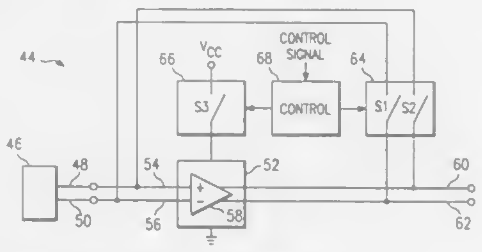
READ/WRITE SWITCHING CIRCIT

Michael H. Haight, Pottsboro, and Mark A. Wolfe, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 29, 1989, Ser. No. 458,914

Int. Cl.^{5} H03K *17/56, 19/173*

U.S. Cl. 307—242 **32 Claims**



1. A read/write circuit, comprising:

an input terminal;

an output terminal;

an amplifier having an input coupled to the input terminal and an output coupled to the output terminal;

a signal switching circuit coupled to a control signal and operable to connect said output terminal to said input terminal in response to the control signal;

a supply switching circuit coupled to the control signal and operable to connect said amplifier to a supply voltage in response to the control signal.

5,027,004

CIRCUIT FOR REGULATING THE BASE CURRENT OF A SEMICONDUCTOR POWER DEVICE

Sergio Palara, Acicastello, Italy, assignor to SGS-Thomson Microelectronics s.r.l., Agrate Brianza, Italy

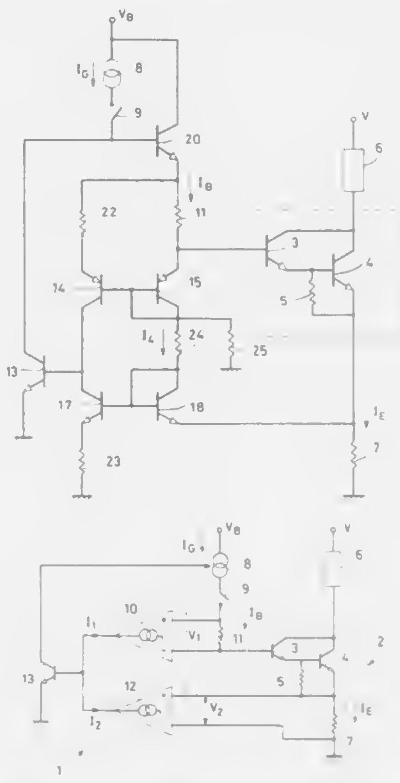
Filed Feb. 14, 1990, Ser. No. 480,047

Claims priority, application Italy, Feb. 21, 1989, 19502 A/89

Int. Cl.^{5} H03K *3/01, 3/26*

U.S. Cl. 307—270 **13 Claims**

1. A regulating circuit, comprising a current generator for generating a base current for a power device also having an emitter current, a first amplifier driven by said base current and having an output producing an output current, a second amplifier driven by the emitter current of said power device and having an output producing an output current, and a sensing means connected to an output of the first amplifier, an output of the second amplifier, and the current generator, said sensing means being sensitive to the difference between the output current of said first amplifier and the output current of said second amplifier, said sensing means controlling said current generator so as to regulate said base current to maintain said



output currents of the first and second amplifiers equal to one another, and thus to maintain constant ratio between the emitter current of the power device and said base current.

5,027,005

LOGIC CIRCUIT WHICH CAN BE SELECTED TO FUNCTION AS A D OR T TYPE FLIP-FLOP

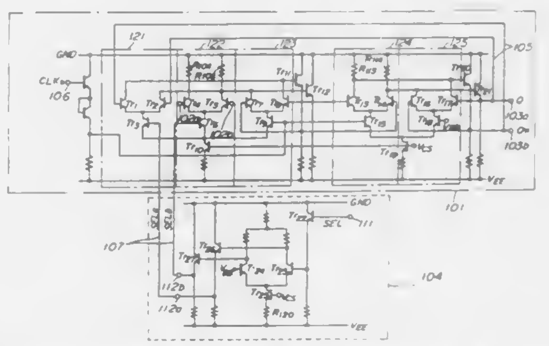
Tatsuaki Kitsuta; Isao Shimotsuhama; Yoshio Watanabe; Masahiro Tanaka, all of Kawasaki; Shinichi Shiotsu, Hachioji, and Kazumi Ogawa, Komaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jan. 18, 1990, Ser. No. 466,951

Claims priority, application Japan, Jan. 20, 1989, 1-12404; Apr. 6, 1989, 1-87284

Int. Cl.^{5} H03K *3/284, 19/086*

U.S. Cl. 307—272.1 **9 Claims**



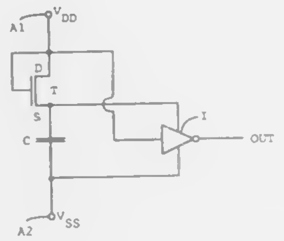
1. A logic circuit having first and second modes, and comprising:

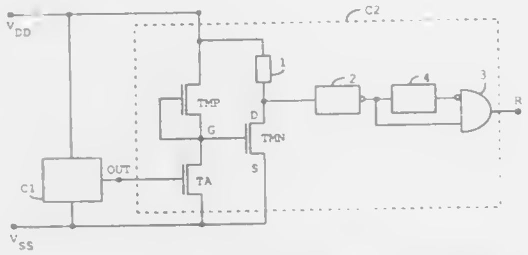
first terminal means for receiving an open-circuited signal

VOL 1127
ISS 4
JE 25
1991
UMI

which designates the first mode and an input data signal which designates the second mode;
second terminal means for receiving a clock signal;
first latch means coupled to said first and said second terminal means for latching and for providing as a first output signal in response to the clock signal, the input data signal;
second latch means coupled to said first latch means for latching, and for providing as a second output signal, the first output signal;
third terminal means for outputting the second output signal; and
selecting means, coupled to said third terminal means, for selectively feeding back the second output signal to said first latch means responsive to said first terminal means receiving one of the open-circuited signal and the input data signal such that the logic circuit functions as a toggle flip-flop in the first mode and functions as a delay flip-flop in the second mode, without requiring a change in physical wiring.

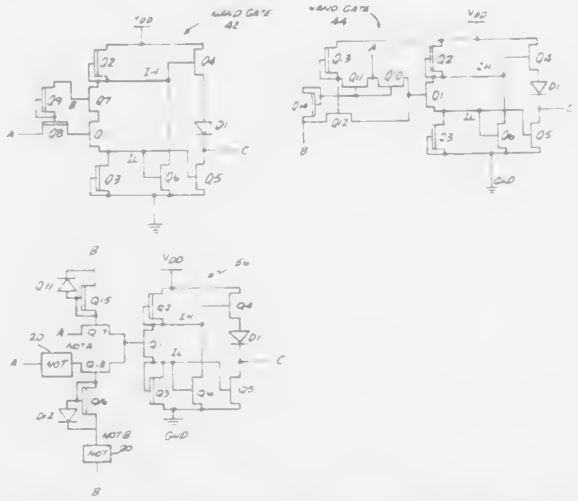
5,027,006
CIRCUIT FOR DETECTING A SUPPLY VOLTAGE DROP AND FOR RESETTING AN INITIALIZATION CIRCUIT
Olivier Queinnec, and Henri Pouget, both of Grenoble, France, assignors to SGS-Thomson Microelectronics S.A., Gentilly, France
Filed Dec. 21, 1989, Ser. No. 452,824
Claims priority, application France, Dec. 22, 1988, 88 17364
Int. Cl.^{5} H03K *17/20, 17/22, 17/687, 19/094*
U.S. Cl. 307—272.3 **4 Claims**





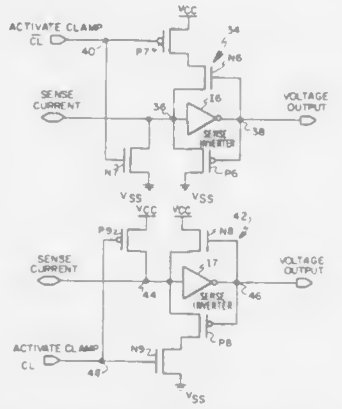
1. A circuit for detecting a voltage drop of an integrated circuit supply voltage supplied between a high voltage supply terminal and a low voltage supply terminal, comprising:
a threshold circuit comprising an input terminal connected to the high voltage supply terminal, an output terminal, and threshold circuit supply terminals,
a MOS capacitor having first and second terminals connected across said threshold circuit supply terminals, said first terminal being connected to the low voltage supply terminal, and
an N-channel MOS transistor, having a source connected to said second terminal of said capacitor and having a drain and gate interconnected to each other and to the high voltage supply terminal.

5,027,007
FFL/QFL FET LOGIC CIRCUITS
George S. LaRue, Redmond, and Timothy J. Williams, Bellevue, both of Wash., assignors to The Boeing Company, Seattle, Wash.
Filed Apr. 12, 1989, Ser. No. 336,709
Int. Cl.^{5} H03K *19/003, 19/017, 19/094, 17/04*
U.S. Cl. 307—443 **47 Claims**



1. A member of a family of logic gates, each of which is for performing a logic operation upon one two-state input to produce a two-state output, said member comprising:
a first input field-effect transistor, operable in an enhancement mode and having gate, drain, and source terminals, said gate terminal being for receiving the two-state input; and
a control field-effect transistor, operable in an enhancement mode and having gate, drain, and source terminals, said gate terminal of said control transistor being coupled to said source terminal of said first input transistor, said drain terminal of said control transistor being coupled to said drain terminal of said first input transistor, said first input transistor and said control transistor cooperatively performing the logic operation to produce the two-state output at said drain terminal of said control transistor.

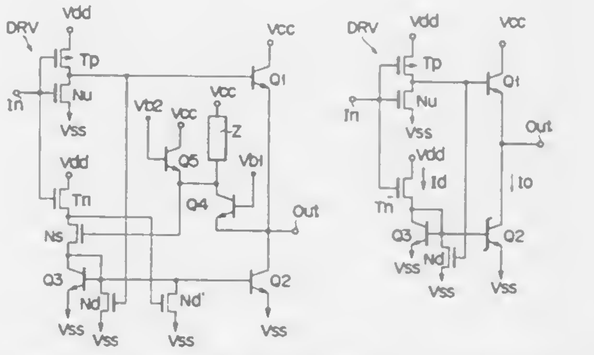
5,027,008
CMOS CLAMP CIRCUITS
Thomas J. Runaldue, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.
Filed Feb. 15, 1990, Ser. No. 480,400
Int. Cl.^{5} H03K *19/017, 19/092, 19/094, 17/04*
U.S. Cl. 307—443 **12 Claims**



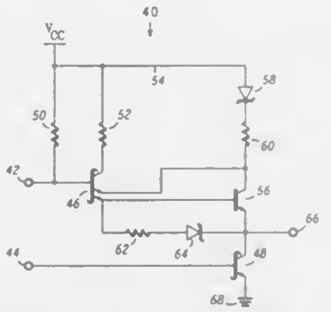
1. A CMOS clamping circuit comprising:
sense inverter means (I6) having an input node for receiving a sense current signal and an output node for generating a voltage output;
an N-channel MOS clamping transistor (N6) having its gate connected to the output node of said inverter means and it source connected to the input node of said inverter means;
a P-channel MOS clamping transistor (P6) having its gate connected to the output of said inverter means, its source connected to the input node of said inverter means, and its drain connected to a lower power supply potential (VSS); and
enabling means responsive to a complementary activate clamp signal for deactivating said N-channel clamping transistor (N6) so as to reduce power consumption when the output node of said inverter means is not being used.

5,027,009
SEMICONDUCTOR LOGIC CIRCUIT WITH A BIPOLAR CURRENT MIRROR ARRANGEMENT
Yukihiro Urakawa, Kawasaki, and Masataka Matsui, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Dec. 26, 1989, Ser. No. 457,190
Claims priority, application Japan, Dec. 28, 1988, 63-333585
Int. Cl.^{5} H03K *19/02, 19/094*
U.S. Cl. 307—446 **27 Claims**

1. A semiconductor logic circuit comprising:
a bipolar totem pole buffer comprising a first npn bipolar transistor whose collector is connected to a first power source node and whose emitter is connected to an output node, and a second npn bipolar transistor whose collector is connected to said output mode and whose emitter is connected to a second power source node;
a third npn bipolar transistor whose collector and base are connected to the base of said second npn bipolar transistor and whose emitter is connected to said second power source node; and
an output transistor drive circuit including a first MOS transistor whose drain-source path is connected between a third power source node and the base of said second npn bipolar transistor, and whose gate is connected to a signal input node and to the base of said first npn bipolar transistor, said third power source node being at a potential equal to or less than the potential of said first power source node.



5,027,010
TTL OUTPUT DRIVER HAVING AN INCREASED HIGH OUTPUT LEVEL
Eric D. Neely, Mesa, and Perng Hsyng, Gilbert, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Oct. 4, 1989, Ser. No. 417,137
Int. Cl.^{5} H03K *19/088, 19/02, 5/08*
U.S. Cl. 307—456 **9 Claims**



1. A circuit having an output for providing an increased high level TTL compatible output signal, comprising:
a first transistor having an emitter coupled to the output, and having a collector and a base;
a second transistor having a base, first and second emitters and a collector, said base being responsive to an applied first input signal, said collector being coupled to a first source of operating potential, said first emitter being coupled to said collector of said first transistor, said second emitter being coupled to said base of said first transistor;
a third transistor having a base, an emitter and a collector, said base being responsive to an applied second input signal, said emitter being coupled to a second source of operating potential, said collector being coupled to the output;
first diode means having an anode coupled to said first source of operating potential and having a cathode; and
a first resistor coupled between said cathode of said first diode means and said collector of said first transistor.

VOL
1127
ISS
4
JE
25
1991
UMI

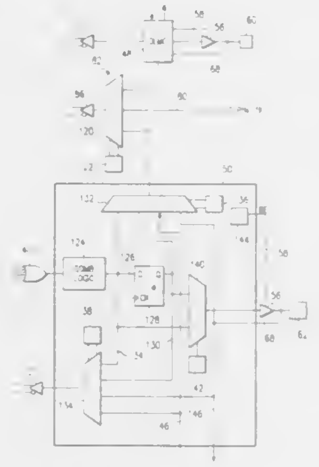
5,027,011
INPUT ROW DRIVERS FOR PROGRAMMABLE LOGIC DEVICES

Randy C. Steele, Southlake, Tex., assignor to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.

Filed Oct. 31, 1989, Ser. No. 429,311

Int. Cl.^{5} H03K *19/177*

U.S. Cl. 307—465 **12 Claims**



1. An input circuit for a programmable logic device having an AND-OR array and a plurality of output circuit blocks, comprising:

a row driver buffer having an output connected to the array; and

a multiplexer having an output connected to said row driver buffer, and having inputs connected to an input pin and to an output of at least a first output circuit block;

wherein one of the multiplexer inputs is connected to the multiplexer output according to program information stored with said multiplexer when the device is programmed.

5,027,012
PROGRAMMABLE LOGIC CIRCUIT USING WIRED-OR TRISTATE GATES

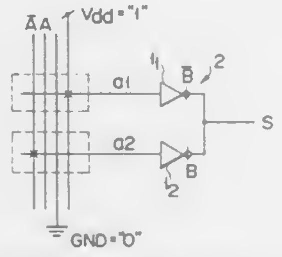
Yukihiro Saeki, and Yasoji Suzuki, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 16, 1990, Ser. No. 480,898

Claims priority, application Japan, Feb. 22, 1989, 1-42402

Int. Cl.^{5} H03K *19/094*

U.S. Cl. 307—465 **16 Claims**



1. A programmable logic circuit for deriving a logic output of first and second signals comprising:

a 2- input logic gate for deriving a logic output of two input signals, said 2-input logic gate including:

a first 3-state circuit having a data input terminal, output control input terminal, and data output terminal, the output control input terminal being connected to receive an inverted signal of the second signal and the data output terminal being set in one of three states of "1", "0", and the high impedance according to the states of signals supplied to the data input terminal and output control input terminal,

a second 3-state circuit having a data input terminal, output control input terminal, and data output terminal, the output control input terminal being connected to receive the second signal and the data output terminal being set in one of the three states of "1", "0", and the high impedance according to the states of signals supplied to the data input terminal and output control input terminal, and

wired OR means for deriving a logical sum of an output signal from the data output terminal of said first 3-state circuit and an output signal from the data output terminal of said second 3-state circuit; and

supplying means for supplying a desired one of the first signal, the inverted signal of the first signal, a signal which is substantially always set at "0", and a signal which is substantially always set at "1" to the data input terminals of said first and second 3-state circuits in a programmable fashion.

5,027,013
METHOD AND APPARATUS FOR COUPLING AN ECL OUTPUT SIGNAL USING A CLAMPED CAPACITIVE BOOTSTRAP CIRCUIT

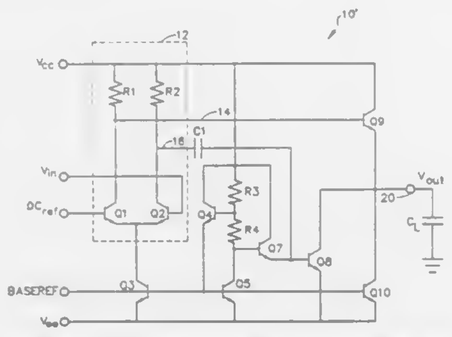
Bruce H. Coy, San Diego, and David S. Rosky, Leucadia, both of Calif., assignors to Applied Micro Circuits Corporation, San Diego, Calif.

Continuation of Ser. No. 240,136, Sep. 2, 1988, Pat. No. 4,926,065, which is a continuation-in-part of Ser. No. 121,612, Nov. 17, 1984, Pat. No. 4,835,420. This application May 9, 1990, Ser. No. 521,340

The portion of the term of this patent subsequent to May 3, 2006, has been disclaimed.

Int. Cl.^{5} H03K *19/01*

U.S. Cl. 307—475 **6 Claims**



1. An apparatus for converting an input signal at a first logic level to an output signal at a second logic level and for providing the output signal to a capacitative load, the apparatus comprising:

differential amplifier means with a first output and a second output for amplifying the input signal and providing, at the first output, a first signal representing amplification of the input signal and, at a second output, a second signal which is the complement of the first signal;

an output driver with a connection for driving a capacitative load, the output driver connected to the first output for producing the output signal at the connection by level-shifting the first signal;

a bootstrap transistor with a base, a collector connected to the connection, and an emitter for connection to a transistor voltage source;

boost capacitor means connected to the first output and to the base of the bootstrap transistor for causing the bootstrap transistor to conduct output capacitance discharge current in response to the second signal;

a clamp transistor means for clamping the base of the bootstrap transistor to a predetermined voltage level, the clamp transistor means including a clamp transistor with a collector for connection to the transistor voltage source, a base, and an emitter connected to the base of the bootstrap transistor for providing a voltage level which biases the bootstrap transistor at a predetermined low level of forward conduction and connected to the boost capacitor means for discharging the boost capacitor means; and

acceleration means connected to the first output and to the base of the clamp transistor for accelerating the discharging of the boost capacitor means in response to the first signal.

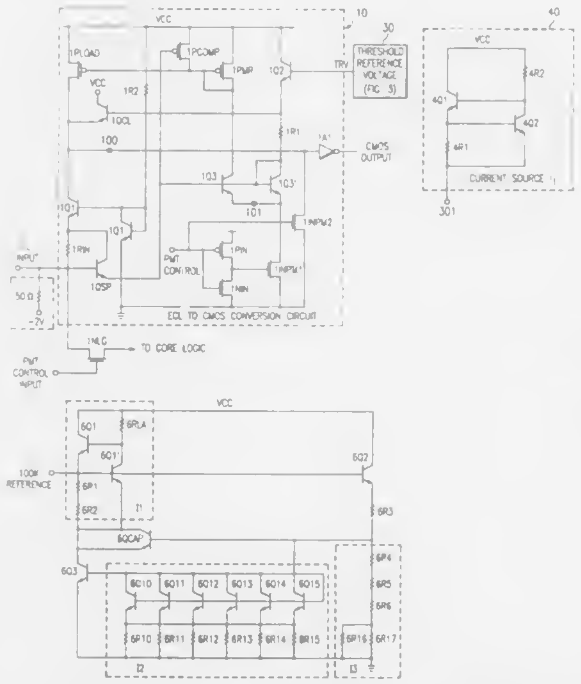
5,027,014
TRANSLATOR CIRCUIT AND METHOD OF OPERATION

Alan S. Bass, Plano; Stephen R. Schenck, McKinney, and Robert C. Martin, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 30, 1990, Ser. No. 502,471

Int. Cl.^{5} H03K *19/092, 19/094, 19/086, 19/003*

U.S. Cl. 307—475 **33 Claims**



1. A circuit for converting from first logic on/off input levels to second logic output levels, said circuit including only positive voltages with respect to ground, said circuit comprising:

a threshold reference voltage measured positive with respect to ground, said reference voltage used to set the level for switching between said on and off levels;

an output node for driving said on/off output levels;

a control switch biased continuously in the conducting condition, said switch operable for providing high and low current to said output node; and

circuitry for quickly changing said control switch between said high and low current conditions dependent upon whether or not the voltage condition presented to said circuit input is above or below said reference voltage where above represents the logical on condition and below represents the logical off condition of an input signal.

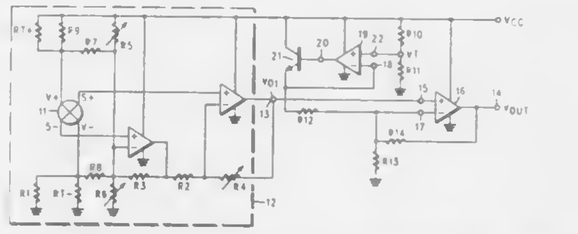
5,027,015
NON-LINEAR CONVERSION OF INPUT FROM A SENSOR TO AN OUTPUT WITH TWO DIFFERENT SLOPES

Walter Czarnocki, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 14, 1989, Ser. No. 407,396

Int. Cl.^{5} G06G *7/10;* **H03K** *3/26*

U.S. Cl. 307—491 **20 Claims**



1. A percentage error reduction circuit, adaptable for use in a pressure sensor circuit, comprising:

means for providing an input sensor signal varying as a predetermined function of a sensed variable over a predetermined range of sensed variable magnitudes; and

circuit means coupled to said input sensor signal providing means for providing, in response to nonlinearly processing said input sensor signal, a corresponding output signal varying as a function of said sensed variable at a first rate during a first low portion of said range and at a second rate, less than said first rate, during a subsequent second higher portion of said range, said first rate of said output signal exceeding the rate of change of said input sensor signal as a function of said variable during said first portion of said range.

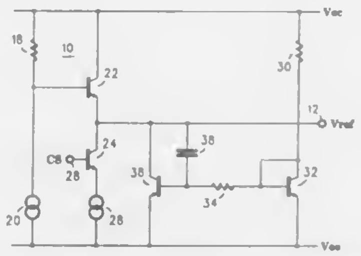
5,027,016
LOW POWER TRANSIENT SUPPRESSOR CIRCUIT

John E. Hanna, Meas, and Behrooz L. Abdi, Chandler, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 29, 1988, Ser. No. 291,833

Int. Cl.^{5} H03K *5/00, 3/01, 17/16;* **G05F** *3/16*

U.S. Cl. 307—542 **2 Claims**



1. A voltage reference circuit for providing a reference voltage at an output thereof, comprising:

a first transistor configured as an emitter-follower and having the emitter thereof coupled to the output, said first transistor being responsive to base current drive being supplied to its base for providing the reference voltage;

VOL
1127
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1991
UMI

circuit means coupled to the base of said first transistor for supplying base current drive thereto;
bias means for providing a substantially constant bias potential;
a second transistor having a base, a collector and an emitter, said collector being coupled to the output of the voltage reference circuit, said emitter being coupled to a power supply conductor;
resistive means for coupling said base of said second transistor to said bias means; and
capacitive means for coupling said base of said second transistor to the output of the voltage reference circuit wherein any positive glitches appearing at the output of the voltage reference circuit are reduced by said second transistor being rendered more conductive responsive thereto.

5,027,017

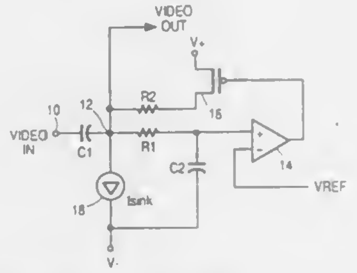
SYNC TIP CLAMP CIRCUITRY

Russell T. Fling, Naperville, Ill., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Jan. 19, 1990, Ser. No. 467,608

Int. Cl.^{5} H03K *5/08*

U.S. Cl. 307—555 13 Claims



1. Clamping circuitry comprising:
a signal input terminal and a signal output terminal;
a coupling capacitor coupled between said signal input and output terminals;
a lowpass filter having an input terminal coupled to said signal output terminal, and having an output terminal;
a comparator having a first input terminal coupled to the output terminal of said lowpass filter, and having a second input terminal coupled to a source of reference potential, for generating a control signal related to differences between signal provided by said lowpass filter and said reference potential;
a controllable current source, having a control input terminal coupled to said comparator, and an output terminal coupled to said signal output terminal, and responsive to said control signal, for providing current to said capacitor in a direction tending to establish a potential at said signal output terminal having a predetermined relationship to said reference potential when said reference potential differs from signal provided by said lowpass filter in a predetermined polarity sense, and provides substantially no current otherwise; and
a constant current source, having an output terminal coupled to said signal output terminal, for continuously providing a substantially constant current in a direction to cause said signal output terminal to exhibit a potential which differs from said reference potential in said predetermined polarity sense.

5,027,018

HIGH VOLTAGE ELECTROPHORESIS APPARATUS

Peter J. Kindlmann, Guilford, and Robert A. Valley, Jr., New Haven, both of Conn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 14, 1988, Ser. No. 244,692

Int. Cl.^{5} H03K *17/687, 17/60, 17/51;* **C25B** *1/00*

U.S. Cl. 307—571 6 Claims

1. In a field modulated electrophoresis apparatus comprising a high voltage power supply connected through a solid state switch to at least two electrodes held in an electrophoretic cell, an improved trigger means for said switch comprising:
means for producing an A.C. trigger signal having a start and an end;
a transformer coupled to receive the A.C. trigger signal;
rectifier means connected to the transformer for converting the A.C. trigger signal coupled through said transformer to a D.C. switching voltage said D.C. switching voltage triggering the solid state switch; and
a conduction means for discharging the D.C. switching voltage at a predetermined time after the end of the A.C. trigger signal;
so that the solid state switch is turned on at the beginning of the A.C. trigger signal and turned off at the predetermined time after the end of the A.C. trigger signal.

5,027,019

ANALOG SWITCH CIRCUIT WITH REDUCED SWITCHING NOISE

Hiroshi Shiohara, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

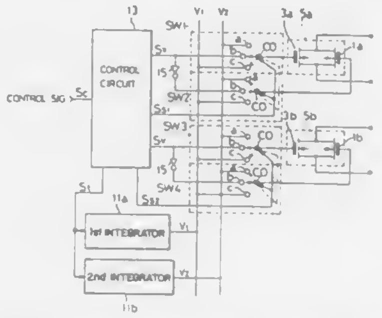
Filed Sep. 11, 1987, Ser. No. 95,265

Claims priority, application Japan, Sep. 26, 1986, 61-226223

Int. Cl.^{5} H03K *17/687*

U.S. Cl. 307—579 5 Claims

1. An analog switch circuit comprising:
a plurality of analog switching elements for transmitting signals;
first integrator for providing an integrated turn-on switching signal to turn on the plurality of analog switching elements at a speed slow enough to avoid the generation of switching noise;
second integrator for providing an integrated turn-off switching signal to turn off the plurality of analog switching elements at a speed slow enough to avoid the generation of switching noise;
a plurality of switches connected between the plurality of analog switching elements and the two integrators; and
a controller selectively providing to the first and second integrators control signal to activate the turn-on and turn-off switching signals, the controller also providing control signals to the plurality of switches so that the turn-on or turn-off switching signals are selectively applied to the plurality of analog switching elements, the controller thereafter supplying signals to the plurality of analog switching elements via the switches to hold the plurality of analog switching elements in their selected states.



5,027,020

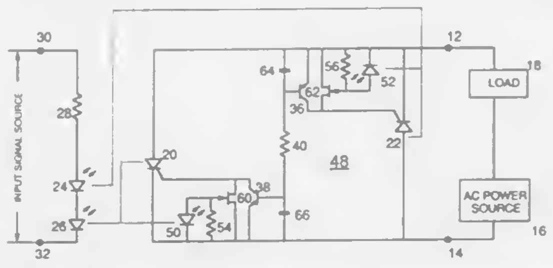
ZERO VOLTAGE SWITCHING AC RELAY CIRCUIT

Ciro Guajardo, Harbor City, Calif., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Oct. 10, 1989, Ser. No. 418,890

Int. Cl.^{5} H03K *17/72, 17/13*

U.S. Cl. 307—647 9 Claims



1. A zero voltage switching circuit for controlling current to a serially arranged load and AC voltage source comprising first and second photosensitive silicon controlled rectifiers each having gate, anode, and cathode terminals, the anode-cathode terminals being arranged to be connected in inverse parallel across the load and AC voltage source, means for applying input signals to generate light to enable the first and second photosensitive silicon controlled rectifiers, means for providing a voltage range within which the photosensitive silicon controlled rectifiers operate, means for clamping the gate terminal of each of the photosensitive silicon controlled rectifiers to its cathode terminal in the absence of input light signals to the photosensitive silicon controlled rectifiers, and means for removing the clamping between the gate terminal and the cathode terminal of each photosensitive silicon controlled rectifier in the presence of input light signals.

5,027,021

ELECTRIC ACTUATOR SWITCH WITH MULTIPLE BRUSHES

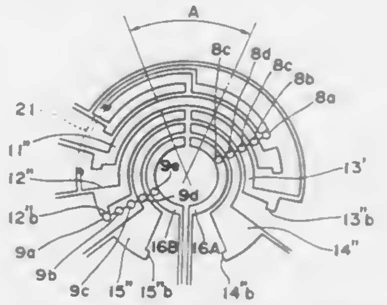
Masumi Tsuchida, Toyokawa, Japan, assignor to ASMO Co., Ltd., Kosai, Japan

Division of Ser. No. 226,055, Jul. 29, 1988, Pat. No. 4,879,803. This application Jul. 17, 1989, Ser. No. 380,331

Int. Cl.^{5} H01H *19/58*

U.S. Cl. 310—68 A 4 Claims

1. A switching mechanism adapted to energize a motor in response to selective actuation of a plurality of switches to rotate an output shaft of the motor by an angle dependent upon the particular switch which is actuated, said switching mechanism comprising:
a base body carrying a plurality of brushes arranged symmetrically relative to a reference axis, each brush including a plurality of slide terminals arranged in a comb-like formation,
a circuit board carrying a plurality of circumferentially extending conductor paths, at least one of which constitutes a common conductor path, and others of which constitute switch conductor paths adapted to be connected to respective ones of the switches,



said base body and circuit board being superimposed such that said slide terminals slidably contact said conductor paths,
said base body adapted to be connected to the output shaft of the motor to be rotated thereby relative to said circuit board about said axis, causing said slide terminals and said conductor paths to undergo relative rotation,
said switch conductor paths including first portions arranged to lie on different circumferences relative to said axis, and end edge portions all arranged to lie substantially on a common circumference relative to said axis and to be circumferentially spaced from one another.

5,027,022

REVERSE ROTATION PREVENTING MECHANISM FOR SYNCHRONOUS MOTORS

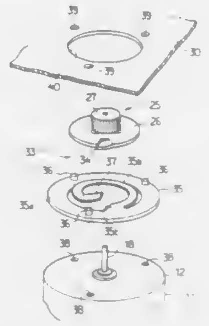
Kanichi Tanaka, Chiryu, and Shigeru Iguchi, Kani, both of Japan, assignors to Tokai Rika Denki Seisakusho Co., Aichi, Japan

Filed Jun. 29, 1990, Ser. No. 545,619

Claims priority, application Japan, Jul. 14, 1989, 1-83255[U]

Int. Cl.^{5} H02K *7/108;* **F16D** *11/00*

U.S. Cl. 310—78 2 Claims



1. A reverse rotation preventing mechanism for synchronous motors, comprising:
(a) a stopper formed of synthetic resin comprising a base portion having a generally central opening and a generally thin annular spring portion positioned in the opening and having a predetermined springiness, the base portion being fixedly located between a frame of a synchronous motor and a suitable stationary member, the base portion having an upper side and a lower side and at least two

VOL
1127
ISS
4
JE
25
1991
UMI

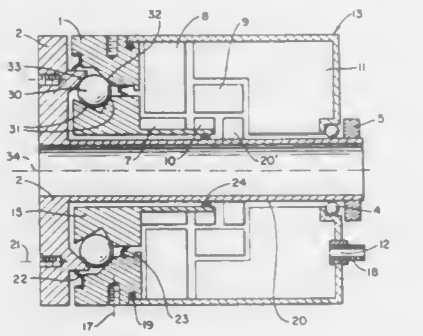
positioning projections integrally formed in an outer periphery of the base portion and extending outwardly from both the upper side and lower side of the base portion, the spring portion being integrally formed with the base portion and having a distal end with a stopping portion which is obliquely angled in an upward direction;

(b) a rotating member fixed to a rotor shaft of the synchronous motor, the rotating member including a metallic flywheel and a molded synthetic resin pinion gear connected to a central portion of the flywheel, the flywheel having at least one engagement portion formed on an outer periphery of the flywheel; and

(c) positioning holes formed in the motor frame and the stationary member, wherein the positioning projections are inserted in the respective positioning holes so that the base portion of the stopper is located between the motor frame and the stationary member, wherein the engagement portion of the flywheel is engaged with the stopping portion when the synchronous motor is rotated in a direction opposite to a predetermined direction, and wherein the engagement portion slides on the stopping portion and pushes the stopping portion down when the motor is rotated in the predetermined direction which allows the motor to continuously rotate in the predetermined direction.

5,027,023
ELECTRIC MOTOR INCLUDING REDUCTION-GEAR AND CIRCUIT

Heikki T. Koivikko, Petaksentie 18, SF-00630 Helsinki, Finland
PCT No. PCT/FI88/00055, § 371 Date Nov. 8, 1989, § 102(e) Date Nov. 8, 1989, PCT Pub. No. WO88/09079, PCT Pub. Date Nov. 17, 1988
PCT Filed Apr. 15, 1988, Ser. No. 435,366
Claims priority, application Finland, May 11, 1987, 872070; Feb. 2, 1988, 880477
Int. Cl.^{5} H02K *5/173;* **F16H** *13/06*
U.S. Cl. 310—83 **10 Claims**



1. Electric motor including gear comprising:

a housing including a fixed part (1) and a removable end part (13) coupled to the fixed part;

a reduction gear mechanism (6) having a fixed portion being secured to the fixed part (1) of the housing;

a motor stator secured to the interior of the removable end part (13) of the housing;

at least one hollow input shaft (15) provided within the motor stator and coupled to the reduction gear mechanism;

a motor rotor (7) secured to the gear with the input shaft (15);

an output shaft (20) provided within the motor stator and extending concentrically through the input shaft;

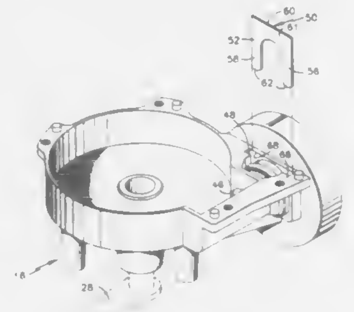
the output shaft having at one end thereof a flange engaging the reduction gear mechanism and covering a space within the housing enclosing the reduction gear mechanism;

first bearing means provided near the end faces of the housing for carrying the output shaft; and

second bearing means provided adjacent to the outer periphery of the housing for carrying the flange.

5,027,024
DYNAMOELECTRIC MACHINE WITH BEARING RETAINER

Alvin L. Slayton, Columbus, Miss., assignor to United Technologies Motor Systems, Inc., Columbus, Miss.
Filed Jun. 18, 1990, Ser. No. 539,504
Int. Cl.^{5} H02K *7/10;* **F16C** *35/06*
U.S. Cl. 310—90 **19 Claims**



1. A dynamoelectric machine comprising:

a housing with a main housing section and an end housing section,

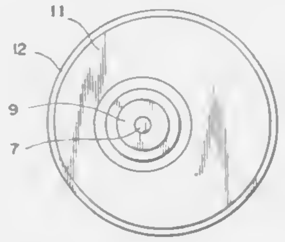
an armature journaled within the main housing section for rotation, said armature having a shaft extending axially through said end housing section,

an antifriction bearing mounted to said shaft and mounted in a bearing seat in said end housing section to support said shaft, said bearing having inner and outer ends with said inner end being disposed toward said armature, and

means for retaining the bearing within said bearing seat against axial loading or impact to said shaft, said retaining means being mounted within said end housing section so as to retentively engage a substantial portion of the inner end of said bearing sufficient to secure said bearing against axial loading or impact to said shaft.

5,027,025
FLAT BRUSHLESS MOTOR

Ryoji Saneshige; Kouzi Kuyama; Makoto Hasegawa, and Miyuki Furuya, all of Yonago, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Feb. 8, 1990, Ser. No. 476,730
Claims priority, application Japan, Feb. 8, 1989, 1-29114
Int. Cl.^{5} H02K *21/12*
U.S. Cl. 310—156 **2 Claims**



1. A flat brushless motor, comprising:

a flat annular magnet magnetized in a circumferential direction on an end face thereof so as to have alternating North and South poles;

a rotor frame to which said magnet is fixed;

a bracket for rotatably bearing said rotor frame;

a back-yoke having a face disposed in face-to-face relationship with said magnet; and

a plurality of flat coils disposed spacedly between said magnet and said back-yoke;

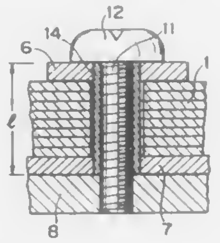
wherein said magnet and said rotor frame together make up a rotor assembly, said rotor assembly having its center of gravity disposed relative to its center of rotation so as to satisfy the relationship

$$\frac{e \times 2\pi N/60}{1000} \geqq 2.5,$$

e representing the displacement of the center of gravity relative to the center of rotation in μm and N representing the number of revolutions in revolutions per minute.

5,027,026
BRUSHLESS MOTOR

Sadayoshi Mineta; Kimio Kitajima, and Kunio Shimazu, all of Komagane, Japan, assignors to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan
Filed Apr. 3, 1989, Ser. No. 333,112
Claims priority, application Japan, Apr. 12, 1988, 63-49210[U]
Int. Cl.^{5} H02K *1/12, 15/14, 5/00, 5/24*
U.S. Cl. 310—259 **8 Claims**



1. A brushless motor comprising:

frame means for mounting said motor, said frame means including a bearing and armature core holder including an axially extending portion in which bearing means are fitted for receiving a shaft of said motor and a radially extending armature core-supporting portion integral with and projecting outwardly from said axially extending portion;

a shaft extending axially through said axially extending portion of said holder and rotatably supported by said bearing means;

rotor means affixed to said shaft, said rotor means including a rotatable rotor housing for enclosing armature core means to be supported on said armature core supporting portion of said frame means, and carrying on the periphery thereof magnet means to confront armature core means to be supported on said holder;

armature core means enveloped by said rotor housing and supported on one side of said radially extending armature core-supporting portion of said holder and including armature coil means wound on said armature core means;

passage means extending axially through said armature core means for receiving the shank portion of a clamping means;

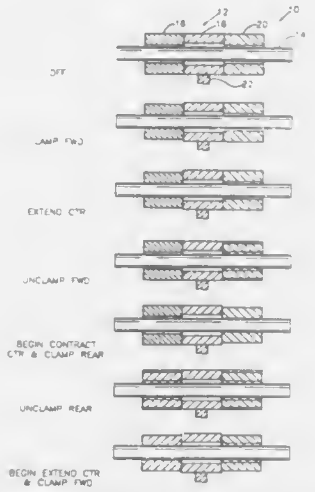
clamping screw means having shank portion means extending through said passage means, said shank portion means terminating at one end in a threaded portion threaded into said radially extending armature core supporting portion of said holder and at the opposite ends in head means adapted to clamp said armature core means upon said holder;

compressible vibration isolating means having at least a first resilient portion disposed between said head means of said clamping means and said armature core means; and

said clamping means including limiting means for limiting the extent to which said threaded portion of said shank means can thread into said radially extending portion of said holder so as to provide a predetermined amount of compression of said compressible isolating means.

5,027,027
ELECTROMECHANICAL TRANSLATION APPARATUS

Zvi Orbach, Haifa, and Zeev Ganor, Herzliya, both of Israel, assignors to Quick Technologies Ltd., an Israeli Company of Advanced Technology Center, Haifa, Israel
Filed Jul. 20, 1989, Ser. No. 382,853
Claims priority, application Israel, Aug. 2, 1988, 87312
Int. Cl.^{5} H01L *41/08*
U.S. Cl. 310—317 **21 Claims**



1. A method of moving along a travel axis and in a selected direction a driven member comprising the following steps:

providing translation apparatus including a driver mounted in a fixed position relative to a base, said driver comprising selectably operable forward, center and rear elements coupled in series and associated with the driven member and being arranged parallel to the travel axis, said forward and rear elements comprising means for clamping the driven member and said center element comprising means for varying the distance between said forward and rear elements; and

in a series of distinct steps, operating said forward, center and rear elements so as to cause movement of the driven member relative to said base including steps of operation, partially overlapping in time, of said forward and center elements and said center and rear elements and steps of clamping operation, non-overlapping and non-simultaneous in time, of said forward and rear elements.

5,027,028
PIEZOELECTRIC MOTOR

John D. Skipper, 3210 Roma Ave. NE., Albuquerque, N. Mex. 87106
Filed Aug. 29, 1989, Ser. No. 400,286
Int. Cl.^{5} H01L *41/08*
U.S. Cl. 310—328 **7 Claims**

1. A piezoelectric motor for providing a powerful and compact source of variable speed rotary motion that can be coupled to a load, said motor comprising:

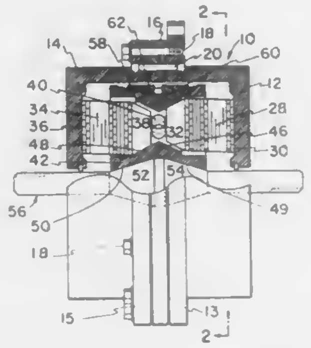
separable housing means that forms the outer casing of said motor;

rotatable means mounted in said housing means for rotation therein and including an output shaft means that extends from said housing so that the rotary motion of said rotatable means can be coupled to a load, and drive roller means positioned adjacent said output shaft means for engaging and rotating said output shaft means;

at least three nutating piezoelectric actuator means attached

VOL
1127
ISS
4
JE
25
1991
UMI

to the interior walls of said housing means and positioned adjacent said drive roller means, said piezoelectric actuator means deforming in both directions along two perpendicular axes when a voltage is applied thereto to engage and rotate said drive roller means and impart rotary motion to said output shaft means;



electrical conducting means mounted in said motor and connected to said piezoelectric actuator means, and

electrical drive means connected to said electrical conducting means for providing a suitable voltage to said motor.

5,027,029
INDIRECTLY HEATED CATHODE ASSEMBLY AND ITS ASSOCIATED ELECTRON GUN STRUCTURE

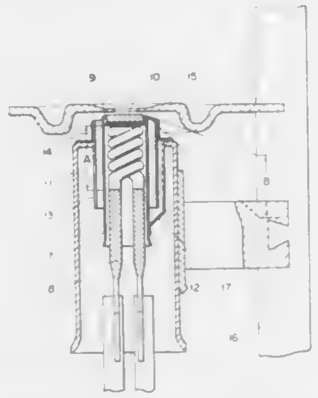
Toshiharu Higuchi, Yokohama; Sadao Matsumoto, Sagamibara; Toru Yakabe, Yokosuka, and Sakae Kimura, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 8, 1989, Ser. No. 447,904

Claims priority, application Japan, Dec. 16, 1988, 63-318238

Int. Cl.^{5} H01J *29/48*

U.S. Cl. 313—446 **7 Claims**



1. A cathode assembly for a cathode ray tube comprising:

a cathode sleeve for supporting a cathode disc emitting an electron beam,

a heater disposed inside the cathode sleeve,

a plurality of straps for supporting the cathode sleeve on a side opposite to that on which the cathode disc is located,

a cylindrical holder for fixing the straps,

a heat reflecting cylinder disposed between the cathode sleeve and the cylindrical holder and held by the cylindrical holder, and

thermally insulated from the straps.

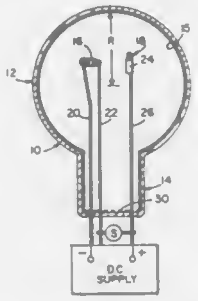
5,027,030
GLOW DISCHARGE LAMP HAVING ZERO ANODE VOLTAGE DROP

Andre C. Bouchard, Peabody; Radomir Lagushenko, and Jakob Maya, both of Brookline, all of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Nov. 30, 1989, Ser. No. 443,521

Int. Cl.^{5} H01J *61/67*

U.S. Cl. 313—619 **5 Claims**



1. A glow discharge lamp comprising:

a light-transmitting envelope containing a rare gas fill material, said envelope including a spherical-shaped region having a predetermined internal radius R;

a phosphor coating disposed on the inner surface of said envelope; and

anode and cathode electrodes disposed within said envelope and spaced a predetermined distance d thereapart, said cathode having a voltage drop less than an excitation potential of said rare gas, said anode electrode having a predetermined effective surface area S_a, such that a relationship Rd/S_a, is within a range of from about 5.0 to 11.0.

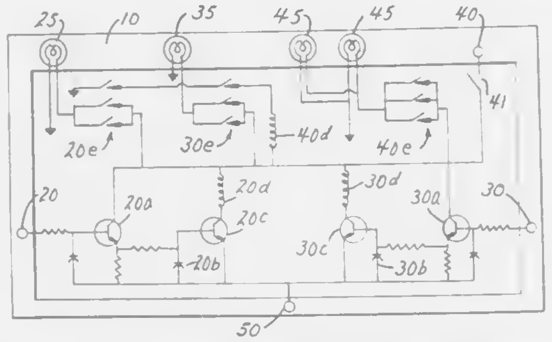
5,027,031
TRUCK TRAILER LIGHTING CONTROL CIRCUIT

Robert K. Wheelock, 1712 Keck Ave., Evansville, Ind. 47711

Filed Aug. 23, 1989, Ser. No. 397,240

Int. Cl.^{5} H05B *37/02*

U.S. Cl. 315—77 **6 Claims**



1. In combination with a first circuit having a selectively blinking first signal light, a second circuit including a first transistor controlled by a blink signal controlling said first signal light and actuated on and off with said first signal light of said first circuit and a second transistor actuated, and maintained actuated, by a capacitor slowly charged by operation of said first transistor, energizing a coil actuated relay controlling the energization of a second non-blinking signal light cause by operation of said first blinking signal light.

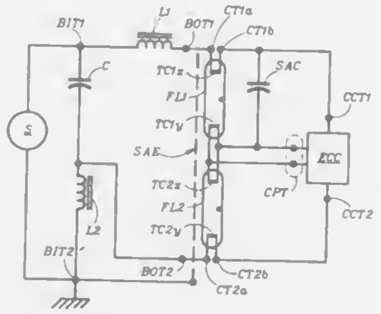
5,027,032
ELECTRONICALLY CONTROLLED MAGNETIC FLUORESCENT LAMP BALLAST

Ole K. Nilssen, Caesar Dr., Barrington, Ill. 60010

Continuation of Ser. No. 788,863, Oct. 18, 1985, abandoned. This application Feb. 20, 1990, Ser. No. 488,366

Int. Cl.^{5} H05B *41/04*

U.S. Cl. 315—103 **22 Claims**



1. An arrangement characterized by comprising:

a) impedance means connected with a source of electric power and operative to provide a current-limited supply voltage across a pair of ballast terminals;

b) gas discharge lamp means having a pair of lamp terminals and being connected with the ballast terminals by way of these lamp terminals; the gas discharge lamp means including at least two individual gas discharge lamps; the lamp means being operative to exist in either of two states: i) a pre-ignition state during which no substantial amount of current flows through the lamp means; and ii) a post-ignition state during which a substantial amount of current does flow through the lamp means; the lamp means having at least one thermionic cathode with a pair of cathode terminals which are electrically isolated from the ballast terminals during the pre-ignition state; and

c) control means connected with the ballast terminals and operative to exist in either of two modes: i) a first mode existing throughout the pre-ignition state and during which the control means alternates between relatively brief periods of effectively constituting an open circuit and relatively long periods of effectively constituting a short circuit, while also during these relatively long periods providing cathode heating power to the thermionic cathode by way of the cathode terminals; and ii) a second mode existing throughout the post-ignition period and during which the control means effectively constitutes a continuous open circuit;

and by being operative to:

1. cause the thermionic cathode to become hot and thereby operative to permit effective ignition of the lamp means; and
2. cause the lamp means to ignite during one of the relatively brief periods and thereby to enter the second state.

5,027,033
HIGH-EFFICIENCY FLUORESCENT LAMP OPERATING CIRCUIT

Anton Zuchtriegel, Taufkirchen, Fed. Rep. of Germany, assignor to Patent Treuhand Gesellschaft für elektrische Glühlampen mbH, Munich, Fed. Rep. of Germany

Filed Jan. 10, 1990, Ser. No. 462,783

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1989, 3901111

Int. Cl.^{5} H05B *37/02*

U.S. Cl. 315—106 **15 Claims**

1. Operating circuit for at least one low-pressure discharge lamp (LP), particularly a fluorescent lamp having first and second heatable electrodes (E1, E2) connected in a heater circuit,

said operating circuit having

a rectifier (2) having d-c terminals;

a smoothing capacitor (C1) connected across the d-c terminals of the rectifier;

an oscillator circuit including

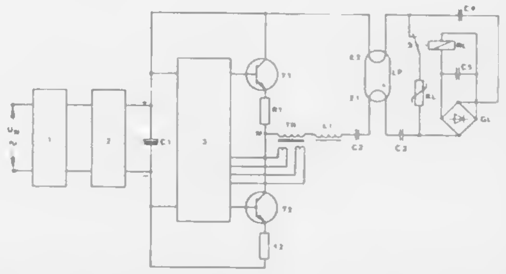
two semiconductor switches (T1, T2) connected for alternating conduction and blocking and defining a common junction (M), and a feedback circuit (3) for said semiconductor switches to cause the oscillator circuit to oscillate;

first circuit means connecting the first electrode (E1) of said at least one lamp to said common junction (M);

second circuit means connecting the second electrode (E2) of said at least one lamp with one of the d-c terminals of the rectifier (2);

a series resonance circuit including a resonance inductance (L1, L1′), a resonance capacitor (C3) and coupling capacitor (C2) coupling the series resonance circuit to the electrodes of the lamp,

the resonance inductance (L1) and the coupling capacitor (C2) being connected serially in said first circuit means between said common junction (M) and said first electrode of the at least one lamp;



third circuit means including a positive temperature coefficient resistor (KL) connecting said positive temperature coefficient resistor and said resonance capacitor (C3) serially from the first electrode (E1) to the second electrode (E2) of said at least one lamp;

and comprising, in accordance with the invention,

interrupt relay means (RL; S) including an interrupt means (S) add a control means (RL) for said interrupt means, said interrupt means (S) being connected serially in said third circuit means to break the heater circuit connection between said electrodes (E1, E2) of the at least one lamp; and

fourth circuit means (C4, GL, C5) coupled to the positive temperature coefficient resistor (KL) and connected to said control means (RL) for the interrupt means (S), to control said control means (RL) for the interrupt means to effectively open the interrupt means in dependence on the resistance of said positive temperature coefficient resistor (KL).

5,027,034
ALTERNATING CATHODE FLORESCENT LAMP DIMMER

Joseph H. Ruby, Glendale, and Richard W. Steinke, Phoenix, both of Ariz., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 12, 1989, Ser. No. 420,333

Int. Cl.^{5} H05B *41/36, 41/38*

U.S. Cl. 315—106 **15 Claims**

1. Apparatus for dimming a florescent lamp having first and second filaments comprising:

(a) first means for sensing current in the first filament;

(b) second means for sensing current in the second filament;

(c) means for measuring a predetermined period of elapsed time;

(d) means for selecting the filaments to be heated responsive to the first and second current sense means and the time

VOL
1127
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1991
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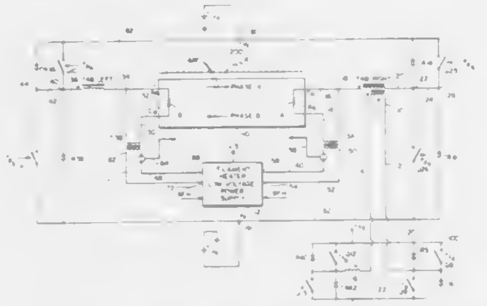
period measurement means so as to alternately switch between filaments;

(e) means for heating the selected filament responsive to the selection means;



(f) means for providing a full bridge power drive alternately to one of said first or second filaments in response to the selection means; and

(g) means for providing a full bridge trigger drive alternately to one of said first or second filaments in response to the selection means.

5,027,035

SEARCH LAMPS AND TORCHES

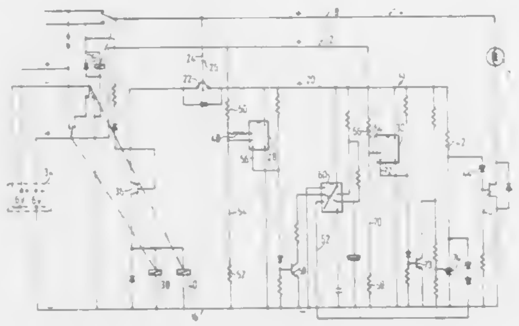
Peter McGrail; Grace McGrail, both of Bury; Geoffrey A. Williams, Castleton, and Brian J. Ward, Rochdale, all of England, assignors to Topline Leisure Limited, Cheshire, England

Filed Sep. 6, 1989, Ser. No. 403,408

Claims priority, application United Kingdom, Sep. 6, 1988, 8821846

Int. Cl.⁵ H05B *41/00*

U.S. Cl. 315—119 13 Claims



1. A torch having a direct current power supply, comprising:

at least one light source connected to the power supply by conductive elements, part of at least one said element comprising a length of frangible conductive material attached to a removable and breakable part of the torch; and

a power supply control circuit having a manually operated switch, the switch having at least two positions allowing the power source to be connected or disconnected to the light source, the frangible conductive material being located in the conductive path to the manual switch.

5,027,036

DRIVE CIRCUIT FOR AN ELECTROLUMINESCENCE DISPLAY DEVICE

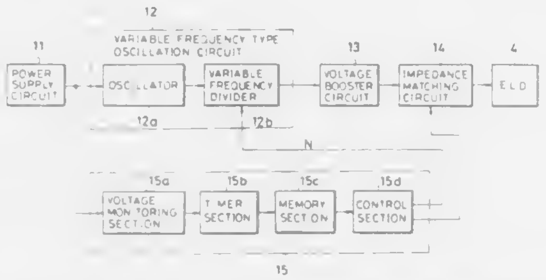
Masami Ikarashi, and Kenichi Mitsumori, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Aug. 21, 1989, Ser. No. 396,505

Claims priority, application Japan, Nov. 25, 1988, 63-297406

Int. Cl.⁵ G09G *3/10, 3/30*

U.S. Cl. 315—169.3 2 Claims



1. A drive circuit for an electroluminescence display device comprising

a power supply for supplying DC power at a constant rate,

a variable frequency oscillator circuit whose output signal frequency is externally modifiable so that the required drive frequency is obtained at any time during operation,

a voltage booster circuit for boosting the output signal of said variable frequency oscillator circuit to a predetermined level and supplying it to said display device as drive voltage,

an impedance matching circuit whose impedance is externally modifiable so that the portion of the circuit from the voltage booster circuit to said electroluminescence display device resonates with the determined drive frequency,

a timing means for timing the duration of application of drive voltage to said display device and

a control means for switching the output signal frequency of said variable frequency oscillator circuit and the impedance of said impedance matching circuit in accordance with said duration of voltage application.

5,027,037

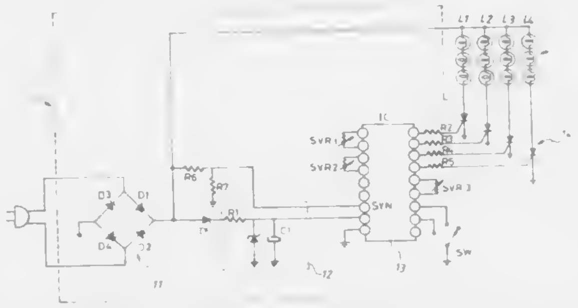
CONTROLLER FOR CONTINUOUS TRACING LIGHTS

Shih A. Wei, Taipei, Taiwan, assignor to Tone World International Corp., Taipei, Taiwan

Filed Jan. 5, 1990, Ser. No. 461,429

Int. Cl.⁵ H05B *39/04*

U.S. Cl. 315—200 A 1 Claim



1. A continuous tracing light controller for controlling the flashing of a plurality of bulbs, comprising:

a bridge rectifier for the conversion of AC to DC;

an inverter phase circuit for the reverting of the above obtained DC; and

a programmable central control integrated circuit having a plurality of output terminals for the individual controlling of bulbs in series, a three-step switch and 3 variable resistors which can control the light bulbs full-lighted, forward tracing direction and reverse tracing direction of lighting being connected to said control Integrated Circuit;

after the input voltage through said bridge rectifier, a part thereof being input into said programmable central control Integrated Circuit after passing through said inverted phase circuit, another portion of the current being input into a signal which synchronized with the voltage to said programmable central control Integrated Circuit by a branch input, by means of Pulse Width Modulation in sampling said synchronized signal producing an output signal to control the flashing of bulbs;

a time delay means being provided to the central control Integrated Circuit for delaying said output signal for a period and being output at the second output of the central control Integrated Circuit to control the flashing of the bulbs in second group similarly, after a time delay, said output signal being provided at the third output to control the third serial bulbs group; the number of outputs depending on the number of serial bulbs; and

the first variable resistor connected by the central control Integrated Circuit controlling the period of the Pulse Width Modulation, the second variable resistor controlling the length of said time delay and the third variable resistor varying the time of forward or reverse lighting sequence.

5,027,038

DC/AC CONVERTER FOR THE SUPPLY OF A GAS AND/OR VAPOR DISCHARGE LAMP

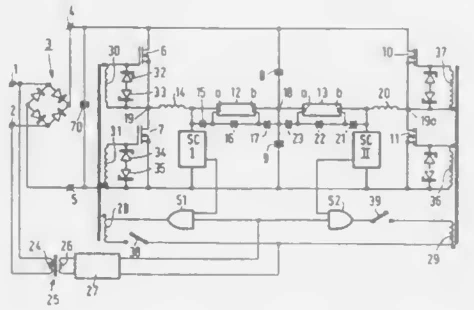
Andrianus M. J. De Bijl; Wilhelmus H. Iding, and Bernardus J. Overgoor, all of Eindhoven, Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.

Filed Apr. 27, 1990, Ser. No. 516,014

Claims priority, application Netherlands, Apr. 28, 1989, 8901074

Int. Cl.⁵ H05B *37/02, 39/04*

U.S. Cl. 315—209 R 11 Claims



1. A DC/AC converter for supplying a discharge lamp comprising: two input terminals for connection to a DC-voltage source, means interconnecting said two input terminals via a first series circuit comprising a first switching element and a second switching element, a capacitor and at least two output circuits means connecting the capacitor to one of the input terminals and to a first end of each of the two output circuits, a second end of the first output circuit being connected to a junction point between the first switching element and the second switching element, each of the output circuits including connection members between which a lamp to be supplied can be connected, a control device for rendering said switching elements alternately conductive, second means interconnecting the input terminals via a second series circuit comprising a third switching element and a fourth switching element each of which is connected to the control device, and means connecting a second end of the second output circuit to a junction point between the third and fourth switching elements.

5,027,039

ELECTRONIC FLASH APPARATUS

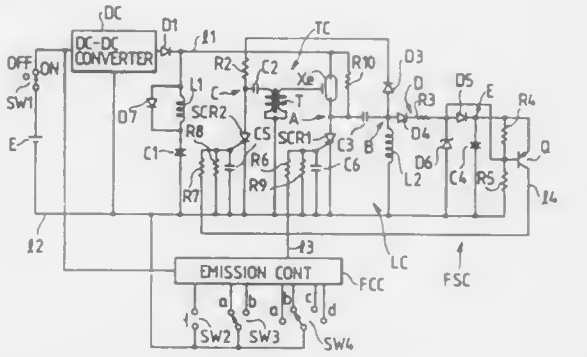
Hideki Matsui, Yokohama, and Nobuyoshi Hagiuda, Kawasaki, both of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Jan. 24, 1990, Ser. No. 469,933

Claims priority, application Japan, Jan. 30, 1989, 1-21840

Int. Cl.⁵ H05B *37/00*

U.S. Cl. 315—241 P 5 Claims



1. An electronic flash apparatus comprising:

a flash discharge tube provided between a power supply line and a ground line;

a main capacitor to be charged by a power source for accumulating a charge for causing flash emission from said flash discharge tube;

a trigger circuit comprising at least a trigger capacitor and a trigger transformer and adapted to supply said flash discharge tube with a trigger voltage;

signal generating means for releasing a flash preparation signal at a first timing and releasing a flash start signal at a later second timing;

a first switching device serially connected to said flash discharge tube, rendered conductive by said flash preparation signal to transmit a current only in a direction from the power supply line to the ground line, and rendered non-conductive when inversedly biased after the termination of said flash preparation signal;

a second switch device for activating the function of said trigger circuit in response to said flash start signal;

a flash amount controlling capacitor connected to the junction between said flash discharge tube and said first switching device, adapted to be charged by the flash current and serving to define the amount of flash emission from said flash discharge tube; and

a coil so connected as to form a LC resonance circuit together with said flash amount controlling capacitor and as that said LC resonance circuit forms a closed loop in cooperation with said first switching device;

wherein, after said first timing, and during the resonant function of said LC resonance circuit caused by the conductive state of said first switching device in response to said flash preparation signal, said LC resonance circuit is connected to said trigger capacitor thereby charging the same; and said second timing is selected after that the LC resonance circuit starts a resonant function by the conductive state of said first switching device in response to said flash preparation signal, thereby bringing the junction point between said flash discharge tube and the first switching device to a negative potential and inversely biasing said first switching device.

VOL 1127
ISS 4
JE 25
1991
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5,027,040

EL OPERATING POWER SUPPLY CIRCUIT

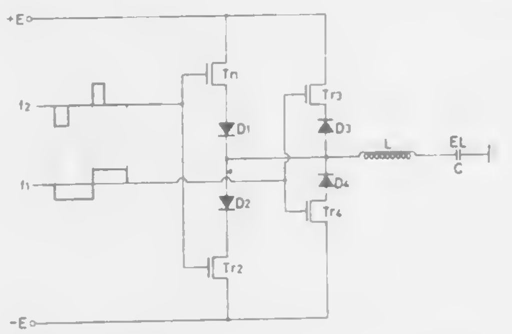
Takaaki Ikeda, Ageo; Toshihiko Suga, Kawasaki, and Akihiko Kuroiwa, Yokohama, all of Japan, assignors to Daichi Company, Ltd. and Nihon Beam Electronics Company, Ltd., both of Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 406,237

Claims priority, application Japan, Sep. 14, 1988, 63-231362; Mar. 8, 1989, 1-55534; Mar. 17, 1989, 1-30613[U]; Mar. 17, 1989, 1-30614[U]

Int. Cl.^{5} H05B *37/00*

U.S. Cl. 315—241 R **23 Claims**



13. An EL operating power supply circuit comprising:

a DC power supply,

a first inverter connected across the power supply for changing the DC power into an AC power at an output thereof, and

a transformer having primary and secondary windings,

a bipolar capacitor, said transformer and said bipolar capacitor being serially connected to the first inverter, and

electroluminescent (EL) means connected to the transformer such that an AC output power available on the transformer secondary winding is applied to the electroluminescent means to emit light;

wherein the inverter has a switching frequency f given by the following equation:

$$f = \frac{1}{4\pi\sqrt{LC}}$$

wherein L is an inductance of the inductor, C is a capacitance of the EL means, and the resistance component and resistance equivalent component of the circuit are negligibly small.

5,027,041

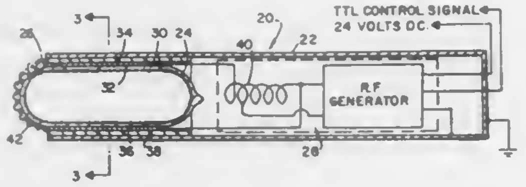
INTEGRATED RADIO-FREQUENCY LIGHT SOURCE FOR LARGE SCALE DISPLAY

Valery Godyak, North Andover, and Iosif Sheynberg, Lynn, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Jan. 16, 1990, Ser. No. 466,103

Int. Cl.^{5} H05B *41/16*

U.S. Cl. 315—248 **22 Claims**



1. A light source for a video display comprising:

a cylindrical housing;

an electrodeless lamp including a tubular envelope having a major portion thereof enclosed within said housing and a minor portion extending outwardly from said housing;

circuit means disposed within said housing for starting and operating said electrodeless lamp and including RF generator means for producing RF energy, said RF generator means including an oscillator means comprising a semiconductor switch having an input terminal and control means coupled to said input terminal of said semiconductor switch, said control means adapted to receive a control signal whereby conduction of said oscillator means is interrupted in response to said control signal; and

means for coupling said RF energy from said RF generator means to said electrodeless lamp, said coupling means located within said housing and proximate said major portion of said tubular envelope.

5,027,042

COLOR DISPLAY TUBE SYSTEM WITH REDUCED SPOT GROWTH

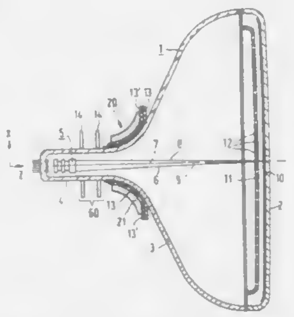
Albertus A. S. Sluyterman; Lambert J. Stil, and Marinus L. A. Vrinten, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 1, 1990, Ser. No. 591,344

Claims priority, application Netherlands, Oct. 2, 1989, 8902436; Aug. 24, 1990, 9001868

Int. Cl.^{5} H01J *29/70, 29/76*

U.S. Cl. 315—368 **8 Claims**



1. A colour display tube system comprising

(a) an evacuated envelope having a neck, a cone and a display window,

(b) an electron gun in the neck, which gun has a beam-forming part for generating a central electron beam and first and second outer electron beams whose axes are co-planar, and a first and a second electrode system which in operation jointly constitute a main lens and are connectable to means for supplying an energizing voltage, and

(c) a deflection unit for generating first and second deflection fields for deflecting the electron beams in the horizontal and vertical directions and for scanning the display window by means of convergent beams,

characterized in that a first convergence influencing element is arranged between the beam-forming part of the electron gun and a side of the deflection unit facing the display window for generating a magnetic field exerting a force on each outer electron beam having a component in the plane of the electron beams directed towards the central electron beam, and in that a second convergence influencing element is arranged between the first convergence influencing element and the beam-forming part of the electron gun for generating a magnetic field exerting a force on each outer electron beam having a component in the plane of the electron beams directed away from the central electron beam.

5,027,043

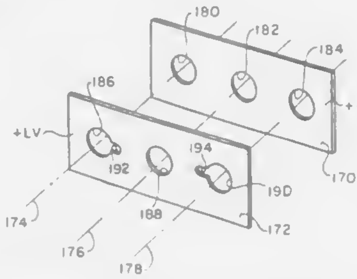
ELECTRON GUN SYSTEM WITH DYNAMIC CONVERGENCE CONTROL

Hsing-Yao Chen, Barrington; Eugene A. Babicz, Evanston, and Richard M. Gorski, Arlington Heights, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Continuation-in-part of Ser. No. 392,630, Aug. 11, 1989. This application May 10, 1990, Ser. No. 521,505

Int. Cl.^{5} H01J *29/70, 29/76*

U.S. Cl. 315—368 **54 Claims**



1. A three-beam in-line electron gun for a color cathode ray tube, comprising:

means for generating three beams of electrons aligned in a common plane—a center beam and two outer beams; and

beam bending means for producing asymmetrical fields in the paths of said outer beams for diverting said outer beams from respective straight line paths toward a common point of convergence, comprising at least two facing electrodes, a first electrode being adapted to receive a relatively higher excitation potential and a second electrode a relatively lower excitation potential, said second electrode having a center opening and two outer openings arranged in line along an electrode horizontal axis orthogonal to the gun axis, said outer openings having inwardly extending enlargements which are symmetrical about said electrode horizontal axis and a vertical axis through the center opening, but asymmetrical about respective vertical axes through the outer openings to thereby produce said asymmetrical fields for said outer beams.

5,027,044

LOAD STATE DECISION APPARATUS FOR SERVOMOTOR

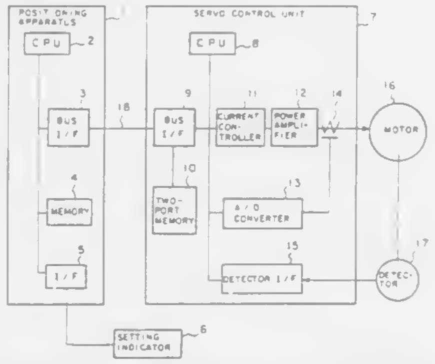
Makoto Nishimura, and Shigeaki Takase, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 4, 1990, Ser. No. 504,209

Claims priority, application Japan, Apr. 11, 1989, 1-42111[U]

Int. Cl.^{5} G06F *15/46*

U.S. Cl. 318—568.11 **10 Claims**



1. A load state decision apparatus for a servomotor having a rated current value, comprising:

means for detecting a load current value of a load current supplied to said servomotor;

means for sampling the detected load current value at predetermined time intervals;

means for storing the sampled load current value as current value data;

means for calculating an effective current value from said current value data; and

means for comparing said effective current value with said rated current value and deciding the load state of the servomotor from the result of the comparison.

5,027,045

HIGH-PRECISION PULSE INTERPOLATION METHOD

Takashi Iwagaya, Shizuoka, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

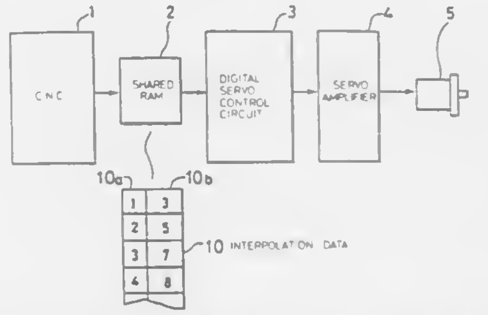
PCT No. PCT/JP89/00028, § 371 Date Sep. 7, 1989, § 102(e) Date Sep. 7, 1989, PCT Pub. No. WO89/06836, PCT Pub. Date Jul. 27, 1989

PCT Filed Jan. 12, 1989, Ser. No. 415,349

Claims priority, application Japan, Jan. 19, 1988, 63-8791

Int. Cl.^{5} G05B *19/29*

U.S. Cl. 318—571 **4 Claims**



1. A high-precision pulse interpolation method in which an amount of movement of individual axes of a numerical control apparatus is interpolated with high precision, said method comprising the steps of:

(a) determining whether the mode is a high speed interpolation mode;

(b) interpolating during an interpolation task period when a high speed interpolation mode is determined and setting an interpolation period;

(c) interpolating in accordance with the interpolation task period when a high speed interpolation mode is not determined, the interpolation period being equal to the interpolation task period; and

(d) carrying out the high speed interpolation.

5,027,046

CIRCUIT AND METHOD FOR MONITORING VOLTAGE PULSE WIDTHS

Mirza A. Beg, Lima, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 29, 1990, Ser. No. 529,842

Int. Cl.^{5} G01R *23/02;* **H03K** *5/22*

U.S. Cl. 318—603 **6 Claims**

1. A method for monitoring the widths of pulses in a pulse train, said method comprising the steps of:

starting a timing device for measuring a predetermined time delay;

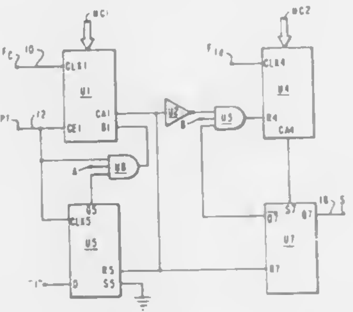
successively measuring the duration of a plurality of pulses in a pulse train;

resetting and restarting said timing device when the duration of any of said pulses is more than a preselected magnitude;

producing an output signal indicative of a non-acceptable

VOL 1127 ISS 4 JE 25 1991 UMI

condition prior to the expiration of said predetermined time delay; and



producing an output signal indicative of an acceptable condition when said timing device indicates the expiration of said predetermined time delay.

5,027,047

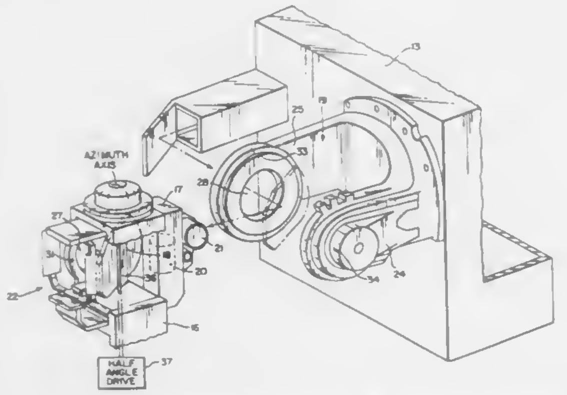
HALF ANGLE MECHANISM FOR A HELIOSTAT

Dale R. Logan, Bowie, and Craig D. Walrath, Catonsville, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 417,750, Sep. 13, 1982, abandoned. This application May 10, 1985, Ser. No. 732,820

Int. Cl.^{5} B64C *17/02*

U.S. Cl. 318—648 **3 Claims**



1. An improved heliostat device for an electro-optical system comprising:

a mirror gimbaled in two axes with the mirror supported from an azimuth gimbal pivotally mounted from an elevation gimbal for line-of-sight direction and stabilization, with a half angle drive system connected to the mirror for controlling azimuth rotation of the mirror relative to the stable body from which the mirror is mounted and which half angle drive system includes torque motor means coupled to the mirror for controlling rotation of the mirror;

the improvement wherein the half angle drive system comprises an N-2N-speed synchro transmitter-receiver pair in which the output signal from the 2N synchro control receiver has an amplitude proportional to sin $(N\theta_{SB}-2N\theta_M)$, with an N-speed synchro control transmitter comprising a transmitter stator and transmitter rotor, with the transmitter stator coupled to the elevation gimbal, and the transmitter rotor coupled to the stable body, and a 2N-speed synchro control receiver comprising a receiver stator and receiver rotor, with the receiver stator coupled to the elevation gimbal and the receiver rotor coupled to the mirror drive shaft, with the torque motor means coupled to the mirror drive shaft, which half angle drive system includes control electronics coupled between the 2N-speed synchro control receiver and the torque motor means, with the synchro control receiver output signal applied as a torque motor current command signal fed to the torque motor means, and wherein the control electronics includes means for comparing the torque motor current command signal to the actual torque motor current such that a null signal difference is provided when mirror angular displacement is one-half the stable body angular displacement.

5,027,048

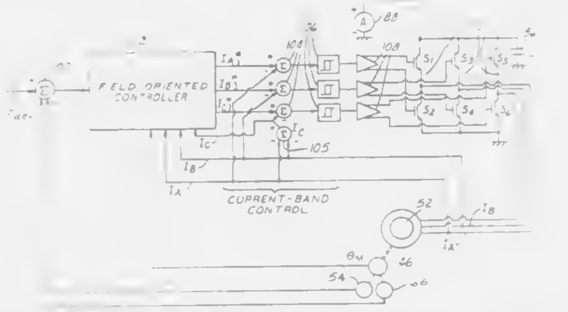
FIELD ORIENTED MOTOR CONTROLLER FOR ELECTRICALLY POWERED ACTIVE SUSPENSION FOR A VEHICLE

Md. A. Masrur, West Bloomfield; John M. Miller, Saline, and Prabbakar B. Patil, Southfield, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 253,456, Oct. 5, 1988, abandoned. This application Nov. 9, 1990, Ser. No. 611,220

Int. Cl.^{5} H02P *5/40*

U.S. Cl. 318—806 **15 Claims**



1. A field oriented controller for generating phase currents for driving a multiple phase electric motor in response to a commanded force signal, said controller generating phase currents to substantially conform the force developed by the motor to the force indicated by said commanded force signal and comprising:

current signalling means for determining the currents flowing in the individual phases of said motor;

motor monitoring means for determining the mechanical rotary position θ_M of an armature of said motor;

processor means for determining the electrical rotary position θ_E of the armature of said motor from its mechanical rotary position θ_M and for transforming the phase currents determined by said current signalling means into a quadrature axis equivalent current, I_Q, and a direct axis equivalent current, I_D;

comparator means for comparing said commanded force signal with a motor force signal representative of the actual force generated by said motor to generate a force error signal;

first converter means for converting said direct axis equivalent current I_D into a desired direct axis equivalent current I_D^*; and

second converter means for converting said force error signal into a desired quadrature axis equivalent current I_Q^*, said processor means further providing for calculating the phase currents, I_A^*, I_B^*, I_C^*, for driving said motor, as a function of θ_E, I_D^* and I_Q^*.

5,027,049

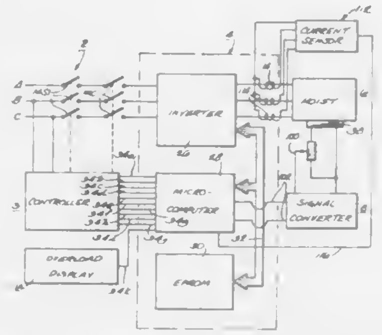
METHOD FOR INCREASING THE SPEED OF AN ALTERNATING CURRENT MOTOR

Richard L. Pratt, Springfield, Ohio, and Craig D. Dewey, River Hills, Wis., assignors to Harnischfeger Corporation, Brookfield, Wis. and Yaskawa Electric Mfg. Co., Ltd., Tokyo, Japan

Filed Jan. 31, 1989, Ser. No. 304,390

Int. Cl.^{5} H02P *5/40*

U.S. Cl. 318—807 **11 Claims**



1. A method for increasing the speed of a motor connected to a selectively adjustable frequency alternating current power supply and running at a speed dependent on the frequency of the power supply, comprising the steps of:

sensing the actual frequency of the power supplied to the motor and providing an actual frequency signal representative of said actual frequency;

selecting a threshold reference frequency as a minimum frequency value at which the motor speed may be increased and providing a threshold reference signal representative of the threshold reference frequency;

comparing the actual frequency signal with the threshold reference signal and, if the actual frequency signal equals or exceeds the threshold reference signal, providing a first output signal;

sensing the actual value of the current supplied to the motor by the power supply and producing an actual current signal representative of said actual current value;

selecting a reference current value as a maximum motor current value at which the motor speed may be increased, and providing a reference current signal representative of the reference current value;

in response to the occurrence of the first output signal, comparing the actual current signal with the reference current signal and, if the actual current signal is equal to or less than the reference current signal, providing a second output signal; and

in response to the second output signal, increasing the value of said actual frequency of the power supplied to the motor to a preselected frequency value whereby the motor speed will also increase.

5,027,050

MULTIPLE BATTERY SYSTEM

Warren H. Slough, 410 Mickle Towers, 200 Mickle Blvd., Camden, N.J. 08103

Filed Jan. 7, 1988, Ser. No. 145,590

Int. Cl.^{5} H02J *7/00*

U.S. Cl. 320—61 **3 Claims**

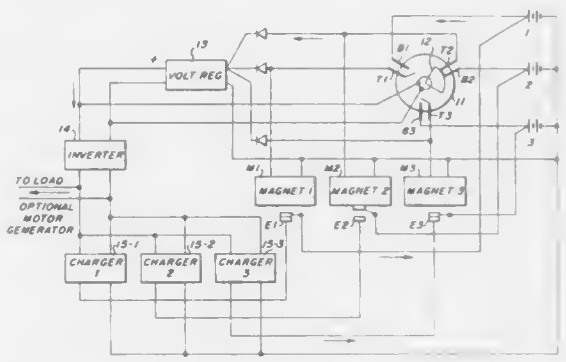
1. A battery powered electric generating system converting low voltage direct current into high voltage alternating current of a value to comply with the demand of a house or the like by means to include:

(a) a battery bank of multiple high ampere rechargable storage batteries to power a inverter;

(b) a high ampere static inverter;

(c) a distributor having a motorized rotating collar and multiple pairs of dual terminal units to couple each battery, in succession, with the inverter and corresponding electromagnets;

(d) multiple high ampere battery chargers;



(e) electromagnets and circuit breakers for coupling corresponding battery chargers with corresponding batteries.

5,027,051

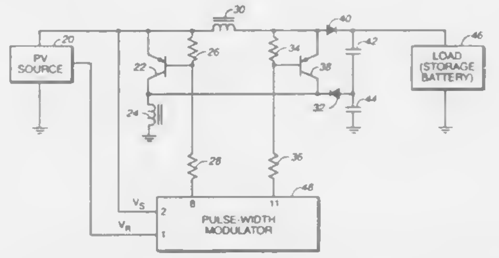
PHOTOVOLTAIC SOURCE SWITCHING REGULATOR WITH MAXIMUM POWER TRANSFER EFFICIENCY WITHOUT VOLTAGE CHANGE

Donald Lafferty, 724 Tampico, Walnut Creek, Calif. 94598

Filed Feb. 20, 1990, Ser. No. 482,279

Int. Cl.^{5} G05F *1/613*

U.S. Cl. 323—222 **20 Claims**



1. A switching circuit for regulating a photovoltaic power source for maximum power transfer to a load without change in voltage, comprising:

first switching means having an input for connection to one output terminal of a photovoltaic power source, said first switching means having an output,

first magnetic energy storage means having an input connected to said output of said first switching means and an output for connection to another output terminal of said photovoltaic power source which is opposite in polarity to said one terminal,

second magnetic energy storage means having an input for connection to said one output terminal of said photovoltaic power source, said second magnetic energy storage means having an output,

second switching means having an input connected to said output of said second magnetic energy storage means, said second switching means having an output,

third switching means having an output connected to said output of said first switching means and to said output of said second switching means, said third switching means having an input,

fourth switching means having an input connected to said output of said second magnetic energy storage means and an output connected to one terminal of said load, said load having another terminal opposite in polarity to said one terminal,

first electric energy storage means having an output connected to said input of said third switching means, and an input connected to said one terminal of said load,

VOL
1127
ISS
4
JE
25
1991
UMI

second electric storage means having an output connected to said output of said first electric energy storage means and an input connected to said other terminal of said load and to said output of said first magnetic storage means,

control means, responsive to an error signal, for causing said first switching means and said second switching means to alternately assume conductive and nonconductive states by alternately closing and opening the respective electric power flow paths between said input and said output of said first switching means and between said input and said output of said second switching means, the relative on an doff times of said first and second switching means being in opposite phase and having a duty cycle determined by said error signal, and

error signal supply means for supplying said error signal to said control means.

5,027,052
CIRCUIT ARRANGEMENT FOR GENERATING A PULSATORY SUPPLY VOLTAGE FOR A LOAD FROM A DIRECT VOLTAGE

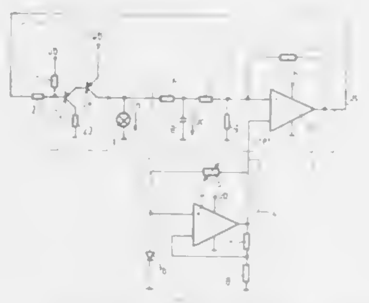
Wolf-Dieter Bauch, Niederzier; Heinz Helmus, Aachen, and Heinz B. Merker, Julich, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 10, 1989, Ser. No. 321,611

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1988, 3809481

Int. Cl.⁵ G05F *1/56*

U.S. Cl. 323—284 **11 Claims**



1. A circuit arrangement for generating a pulsatory supply voltage for a load from a direct voltage source, said circuit arrangement comprising: a switch for coupling the direct voltage source to the load, a low-pass filter coupled to the load for directly generating for a Schmitt trigger circuit a mean value voltage from the load pulsatory supply voltage, wherein the Schmitt trigger circuit maintains the mean value voltage by opening the switch when the mean value voltage reaches a first switching threshold (U2) and closing the switch when the mean value voltage reaches a second switching threshold (U1), wherein the first switching threshold (U2) is derived from a reference voltage which is present at a first input of the Schmitt trigger circuit and is constant, and the second switching threshold (U1) varies oppositely with respect to a decreasing direct voltage, whereby a predetermined effective value of the supply voltage remains substantially constant despite a variation in said direct voltage.

5,027,053
LOW POWER $V_{CC}/2$ GENERATOR

Kul B. Ohri, and Wen-Foo Chern, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Aug. 29, 1990, Ser. No. 575,050

Int. Cl.⁵ G05F *3/24*

U.S. Cl. 323—314 **2 Claims**

1. A circuit to generate an intermediate potential, comprising:

a first potential supply source;

a second potential supply source;

a first resistance having first and second nodes with said first node coupled to said first source;

a second resistance having first and second nodes with said first node of said second resistance coupled to said second node of said first resistance;

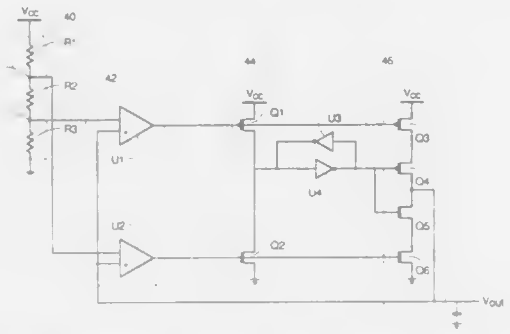
a third resistance having first and second nodes with said first node of said third resistance coupled to second node of said second resistance and with said second node of said third resistance coupled to said second supply;

a first amplifier having positive and negative inputs and an output with said negative input of said first amplifier coupled to said second node of said first resistance and to said first node of said second resistance;

a second amplifier having positive and negative inputs and an output with said negative input of said second amplifier coupled to said second node of said second resistance and to said first node of said third resistance and with said positive inputs of said first and second amplifiers coupled together;

a first PMOS transistor having first and second nodes and a gate with said first node of said first PMOS transistor coupled to said first supply and with said gate of said first PMOS transistor coupled to said output of said first amplifier;

a first NMOS transistor having first and second nodes and a gate with said first node of said first NMOS transistor coupled to said second node of said first PMOS transistor, with said second node of said first NMOS transistor coupled to said second supply and with said gate of said first NMOS transistor coupled to said output of said second amplifier;



a first inverter having input and output nodes with said output node coupled to said second node of said first PMOS transistor and to said first node of said first NMOS transistor;

a second inverter having input and output nodes with said input node of said second inverter coupled to said input node of said first inverter, to said second node of said first PMOS transistor and to said first node of said first NMOS transistor and with said output node of said second inverter coupled to said input node of said first inverter;

a second PMOS transistor having first and second nodes and a gate with said first node of said second PMOS transistor coupled to said first supply and with said gate of said second PMOS transistor coupled to said gate of said first PMOS transistor and to said output node of said first amplifier;

a third PMOS transistor having first and second nodes and a gate with said first node of said third PMOS transistor coupled to said second node of said second PMOS transistor, with said gate of said third PMOS transistor coupled to said output node of said second inverter and to said input node of said first inverter, and with said second node of said third PMOS transistor coupled to said positive input nodes of said first and second amplifiers and to an output node;

a second NMOS transistor having first and second nodes and a gate with said first node of said second NMOS transistor coupled to said second node of said third PMOS transistor, to said output node, to said positive input nodes of said first and second amplifiers and with said gate of said second NMOS transistor coupled to said output node of said second inverter, to said input node of said first inverter, and to said gate of said third PMOS transistor; and

a third NMOS transistor having first and second nodes and a gate with said first node of said third NMOS transistor coupled to said second node of said second NMOS transistor, with said gate of said third NMOS transistor coupled to said gate of said first NMOS transistor and to said output of said second amplifier and with said second node of said third NMOS transistor coupled to said second supply.

5,027,054
THRESHOLD DEPENDENT VOLTAGE SOURCE

Andreas Rusznyak, Geneva, Switzerland, assignor to Motorola, Inc., Schaumburg, Ill.

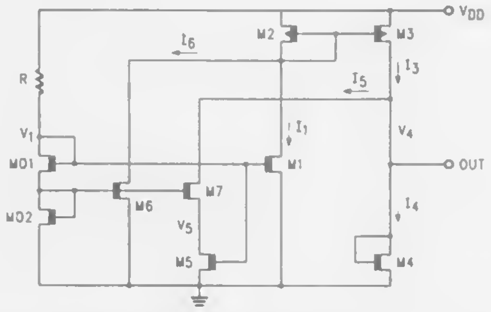
PCT No. PCT/EP88/00940, § 371 Date Sep. 5, 1989, § 102(e) Date Sep. 5, 1989, PCT Pub. No. WO89/06837, PCT Pub. Date Jul. 27, 1989

PCT Filed Oct. 20, 1988, Ser. No. 415,210

Claims priority, application United Kingdom, Jan. 13, 1988, 8800703

Int. Cl.⁵ G05F *3/20*

U.S. Cl. 323—314 **8 Claims**



1. A voltage source circuit comprising:

a current mirror having an input and an output and coupled to a first reference potential line;

a reference current source coupled to the current mirror input for generating a reference current which is proportional to a threshold voltage; and

a bias transistor having a first current electrode coupled to the current mirror output, a second current electrode coupled to a second reference potential line and a control electrode coupled so as to produce at its first current electrode a voltage dependent on the reference current,

wherein said current mirror output forms an output of the voltage source circuit.

5,027,055
COMPACT OPTICAL RF SPECTRUM ANALYZER

John N. Lee, Silver Spring, Md., and Carl M. Verber, Atlanta, Ga., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 10, 1990, Ser. No. 463,063

Int. Cl.⁵ G01R *23/16*

U.S. Cl. 324—77 K **16 Claims**

1. An RF spectrum analyzer for detecting and determining the frequencies of a microwave signal, the analyzer comprising:

waveguide means having opposed ends and opposed sides extending therebetween, the waveguide means being made up of a solid and optically transmissive material and having base means and upper portion means,

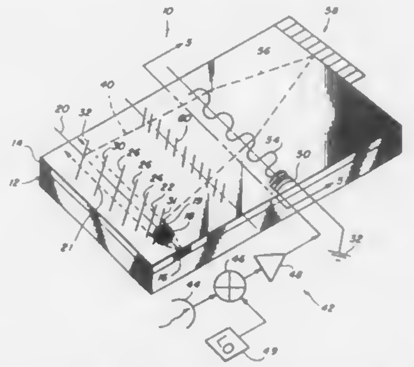
light source for producing a light beam of a particular wavelength,

said light source means being disposed along one side of the waveguide means and arranged adjacent one end thereof, the light source means being also arranged to project the light beam in one direction along a continous path into and through the upper portion means of said waveguide means where the path extends between the opposed sides of the waveguide means and is located adjacent the one end thereof,

collimating lens means being located in the path of the light beam and having a light beam input and a collimated beam output, said lens means being arranged immediately adjacent to the light source means and formed on the upper portion means of the waveguide means so that the light beam enters the input of the lens means and exists the output thereof as a collimated beam of collimated rays,

surface diffraction grating SDG means comprised of a series of differently and relatively spaced grating line GL means formed along the continuous path such that the series of GL means are located in the path of the collimated beam after it exits from the lens means output with the inner end of the SDG means being located adjacent the lens means output and with the outer end thereof being located adjacent the opposed side of the waveguide means; the light source means, lens means and series of GL means of the SDG means having a common optical axis extending there between,

each GL means of the series being constructed and arranged on the upper portion means of the waveguide means so as to be contacted by various collimated rays of the light beam as the beam propagates through the SDG means, each Gl means of the series being arranged at a corresponding predetermined acute angle in relation to the optical axis and the collimated beam such that any adjoining GL means of the series are soaced differently from each other than any other adjoining Gl means of the series so that the spacing between adjoining GL means thereof progressively increases from the inner end of the SDG means to the outer end thereof in order to provide an emerging, expanded and deflected E/D beam as it exists in a direction from the SDG means that is generally transverse to the optical axis and toward the opposed end of the waveguide means and to provide the emerging E/D beam with a diameter substantially equal to the length of the SDG means between the inner and outer GL means thereof and with the E/D beam being Fourier transformed so as to converge and focus toward the opposed end of the waveguide means all as the result of the progressively increasing spacing between adjoining GL means of the SDG means,



detector array means comprised of a series of detector means with each detector means of the series for detecting an RF signal of different frequency including its intensity, the detector array means being disposed at the opposed end of the waveguide means and arranged at the focal plane of the SDG means so that one or more of the detector means of the array means is irradiated by the E/D beam during analyzer use, and

combined signal detection and transducer means, the signal

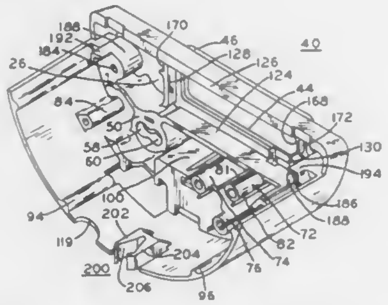
VOL
1127
ISS
4
JE
25
1991
UMI

transducer ST means of the combined means being disposed on one side of the upper portion means of the waveguide means and interposed between the SDG means and the detector array means, the ST means for generating and transmitting a traveling SAW through the upper portion means in a direction generally transverse of the upper portion means and toward the opposed side thereof so as to intercept and further deflect the E/D beam in response to one or more signals detected by the combined means whereby the further deflected E/D beam irradiates one or more detector means of the detector array means in order that the detector array means may analyze one or more signals as to frequency distribution and intensity during analyzer use.

5,027,056
MULTIFUNCTION REGISTER ENCLOSURE FOR ENERGY METER

Joseph G. Russillo, Jr., Rollinsford; Richard A. Balch, North Hampton; Andrius A. Keturakis, Portsmouth, and Scott D. Velte, Rochester, all of N.H., assignors to General Electric Company, Somersworth, N.H.

Filed Apr. 5, 1990, Ser. No. 505,195
Int. Cl.^{5} G01R *1/20, 11/04*
U.S. Cl. 324—103 R **42 Claims**

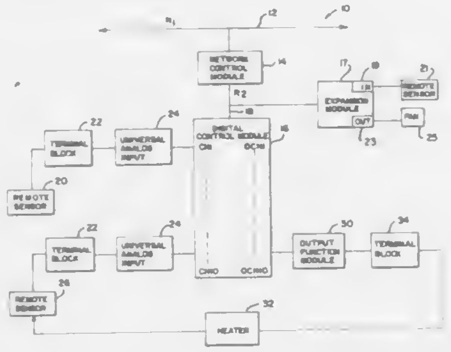


1. An electric energy meter including a watthour meter utilizing an eddy current disk rotating in response to energy consumed by the load being metered and including a power integrating and indicating means positioned substantially on one side of the eddy current disk, an electronic register assembly to provide time of use or demand energy readings configured to be selectively added within the electric energy meter on the other side of the eddy current disk comprising:
- a disk sensing optics assembly including one or more pairs of light emitters and light detectors positioned on either side of a castellated shutter which is coupled to, and rotates with, said eddy current disk;
- said disk sensing optics assembly being positioned on a register circuit board;
- a register enclosure configured for mounting on the other side of said eddy current disk beside said power integration and indicating means;
- said register circuit board being mounted on mounting means integral with said register enclosure;
- a display positioned at one end of said register enclosure through display positioning means integral with said register enclosure;
- said register enclosure further including integral members for supporting and positioning other components of said electronic register;
- said other components including an optical readout assembly for optical communications between said electronic register and the outside of said energy meter;
- means to connect said electronic register in circuit with power lines being metered;
- circuitry of said electronic register assembly providing energy readings; and
- register positioning means integral with said register enclosure to position said electronic register assembly adjacent to said side of said eddy current disk opposite said power integrating and indicating means of said watthour meter.

5,027,057
INPUT CONDITION SENSING CIRCUIT

Otto M. Mageland, Greenfield, and Gregory A. Pascucci, Waukesha, both of Wis., assignors to Johnson Service Company, Milwaukee, Wis.

Filed Jan. 30, 1990, Ser. No. 472,022
Int. Cl.^{5} G01R *15/08*
U.S. Cl. 324—115 **37 Claims**



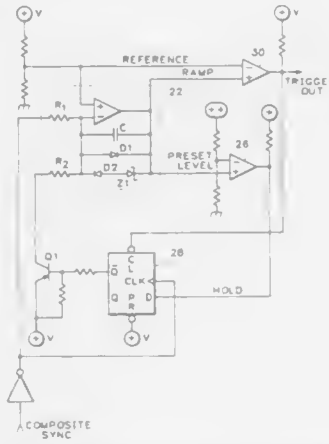
1. An input condition sensing circuit selectively operable in a first mode for sensing the presence or absence of a voltage potential or a second mode for sensing a high or low impedance and providing a binary output signal indicative of the condition being sensed, said circuit comprising:
- an input means for effecting said sensing, said input means being adapted to be coupled to the condition to be sensed;
- an amplifier coupled to said input means for generating a control signal having an amplitude related to the condition being sensed;
- detecting means coupled to said amplifier for providing a binary output in response to said control signal, said control signal being indicative of said condition being sensed; and
- select means to said detecting means for selectively conditioning said circuit for operating in either said first or second mode;
- said select means being arranged to cause said detecting means to provide a first binary output state in response to sensing the presence of a voltage while in said first operating mode and to cause said detecting means to provide said first binary output state in response to sensing a low impedance while in said second operating mode.

5,027,058
MULTI-STANDARD VIDEO OPTION FOR OSCILLOSCOPE

Jeffrey A. Kleck, Vancouver, Wash.; Andrew J. Burkhardt, Guernsey, United Kingdom, and Steven R. Bingold, Portland, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Feb. 26, 1990, Ser. No. 486,021
Int. Cl.^{5} G01R *13/00;* **H04N** *17/02*
U.S. Cl. 324—121 R **17 Claims**

1. A multi-standard video option for an oscilloscope comprising:
- means for generating a ramp signal from a horizontal sync pulse of a composite sync signal derived from an input video signal;
- means for reversing the slope of the ramp signal for a tri-level horizontal sync pulse when the horizontal sync pulse changes polarity;
- means for rapidly discharging the ramp signal to zero for a bi-level horizontal sync pulse when the horizontal sync pulse changes polarity; and

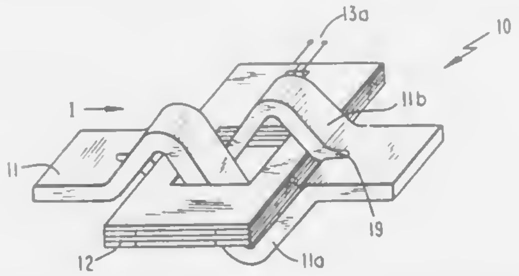


- means for determining from the ramp signal a digital trigger signal pulse having a width equal to the width of the horizontal sync pulse.

5,027,059
DIFFERENTIAL CURRENT SHUNT

Arnaud de Montgolfier, Neuilly-sur-Seine, France, and R. W. Goodwin, Dunwoody, Ga., assignors to Schlumberger Industries, Inc., Norcross, Ga.

Filed Aug. 24, 1989, Ser. No. 397,941
Int. Cl.^{5} G01R *1/22, 15/00*
U.S. Cl. 324—127 **15 Claims**

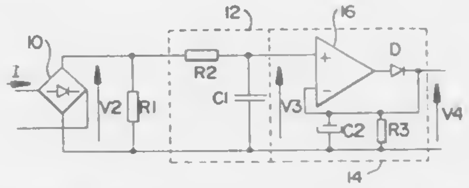


1. An electrical current shunt comprising a single conductor element having an axis coincident with the direction of intended current flow therein and having an aperture therein, said aperture defining first and second conductor portions on opposing sides of said aperture positioned with respect to said aperture in a direction transverse to said axis, said first and second conductor portions differing in resistance from each other,
- core means composed of a low reluctance material, a portion thereof forming a single, unbranched magnetic circuit passing through said aperture twice and extending around both said first and second conductor portions, and
- coil means wound on said core means for sensing at least a portion of the magnetic flux in said core means.

5,027,060
MEASURING DEVICE OF THE RMS VALUE OF A SIGNAL, NOTABLY FOR CURRENT MEASUREMENT IN A SOLID-STATE TRIP DEVICE

Didier Fraisse, St. Martin D'Heres, France, assignor to Merlin Gerin, France

Filed Jul. 17, 1990, Ser. No. 553,325
Claims priority, application France, Jul. 31, 1989, 89 10398
Int. Cl.^{5} G01R *19/00, 19/02*
U.S. Cl. 324—132 **5 Claims**

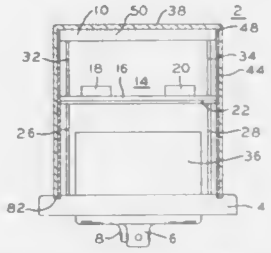


1. A measuring device of the rms value of a signal, notably for current measurement in a solid-state trip device, comprising a full-wave rectifier circuit to whose input the signal to be measured is applied and whose rectified output signal is applied to the input of a first order low-pass filter, the output signal from the filter being applied to the input of a peak detector whose output voltage is representative of the rms value of the input signal, the filter cut-off angular frequency being determined in such a way as to be between $4\pi f/6$ and $4\pi f/5.33$, f being the fundamental frequency of the input signal designed to be applied to the device.

5,027,061
ELECTROMAGNETIC AND THERMAL SHIELD FOR ELECTRONIC ENERGY METER

Ansell W. Palmer, Hampton, and Peter F. Coryea, Salem, both of N.H., assignors to General Electric Company, Somersworth, N.H.

Filed Sep. 25, 1989, Ser. No. 412,353
Int. Cl.^{5} G01R *1/04;* **H05K** *9/00*
U.S. Cl. 324—156 **46 Claims**



1. An electromagnetic interference and thermal shield for an electronic energy meter having a base adapted to be connected in circuit with an electric power source and a load to be metered, a register positioned above the base, a transparent housing, and electronic circuitry associated with said register comprising:
- a metallic shield in a generally tubular shape;
- said shield being a reflector of solar radiation and including a taper such that the internal diameter of the bottom of said shield is greater than the internal diameter of the top of said shield;
- a planar support member positioned between and substantially parallel to said base and said register;
- said shield being positioned within said housing around said electronic circuitry and extending from said base to said register; and
- one or more resilient fasteners positioned on said shield adapted to secure said shield to said planar support member;
- said shield being connected to the ground of said electronic

VOL
1127
ISS
4
JE
25
1991
UMI

circuitry when said shield is securely positioned around said register and on said base.

5,027,062

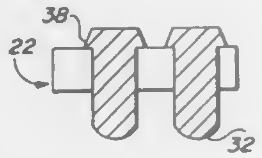
ELECTROFORMED CHEMICALLY MILLED PROBES FOR CHIP TESTING

William P. Dugan, Glendora, and Marvin R. Johnson, Mira Loma, both of Calif., assignors to General Dynamics Corporation, Air Defense Systems Division, Pomona, Calif.

Division of Ser. No. 208,907, Jun. 20, 1988, Pat. No. 4,878,294. This application Jun. 12, 1989, Ser. No. 364,876

Int. Cl.^{5} G01R *31/02, 1/06*

U.S. Cl. 324—158 P **11 Claims**



1. A test probe set for microcircuits comprising:

a plastic dielectric base sheet; and

a plurality of individual conductive metal probe contact elements mounted in an array adjacent a central portion of said plastic base sheet, said elements protruding a predetermined distance beyond one face of said sheet and passing through corresponding individual holes in said sheet to a corresponding array of individual circuit leads on the opposite face of the sheet, both the probe contact elements and the circuit leads being formed integrally on said sheet;

each individual probe contact element including a first portion and an extended portion, said extended portion being affixed to the first portion at a flattened terminal end of the first portion.

5,027,063

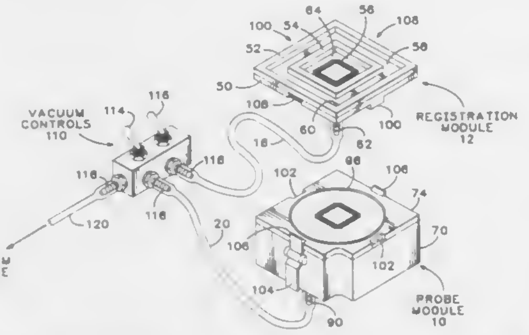
VACUUM-ACTUATED TEST FIXTURE FOR TESTING ELECTRONIC COMPONENTS

Andre P. Letourneau, Everett, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Apr. 24, 1990, Ser. No. 513,561

Int. Cl.^{5} G01R *31/00*

U.S. Cl. 324—158 F **13 Claims**



10. A vacuum-actuated test fixture for testing localized areas of circuitry including individual components on a circuit board, comprising:

a probe module comprising a probe body containing an array of electrical probes carried by a piston that is movable upon application of a vacuum;

a registration module that is attachable to said circuit board upon application of a vacuum, said registration module being separable from said probe module and having an array of holes that are visually alignable with selected nodes on said circuit board and that allow said array of probes to pass therethrough to make electrical contact with said selected nodes; and

vacuum supply means for selectively applying vacuum to said probe module and said registration module.

5,027,064

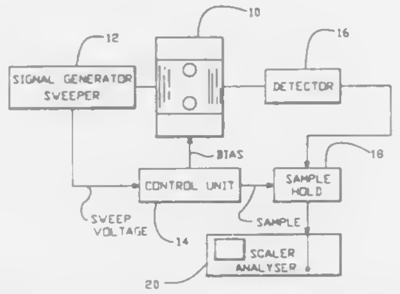
METHOD AND MEANS FOR MEASURING OPERATING TEMPERATURE OF SEMICONDUCTOR DEVICES BY MONITORING RF CHARACTERISTICS

Stephen C. Cripps, Sunnyvale, Calif., assignor to Celeritek, Inc., San Jose, Calif.

Filed Apr. 19, 1989, Ser. No. 340,611

Int. Cl.^{5} G01R *31/26*

U.S. Cl. 324—158 T **22 Claims**



4. Apparatus for determining the operating temperature of the active region of a semiconductor transistor device, the device including input terminal, output terminal, and bias terminal, the apparatus comprising:

input means for providing an RF input signal to the input terminal of the device;

output means for receiving an output signal from the output terminal of the device; and

means, responsive to the input signal and the output signal, for determining RF gain of the active region of the device and for calculating operating temperature of the active region based on the determined RF gain.

5,027,065

PARTICLE SENSOR PLUG WITH WIRELESS CASING CONNECTION

Jean-Paul Y. Bares, 47, Rue De La Vierge, Villiers St Frederic 78640 Neauphie le Chateru, and Eric Y. Blanchard, les Lions-Bat A2 7, av. Simon Vouet, 78560 Le Port Marly, France

Filed May 17, 1990, Ser. No. 524,491

Claims priority, application France, May 18, 1989, 89 06491

Int. Cl.^{5} G01N *27/74;* **G01R** *33/12*

U.S. Cl. 324—204 **9 Claims**

1. A particle sensor for sensing the presence of metallic particles in a lubricating fluid circulating through a machine casing comprising:

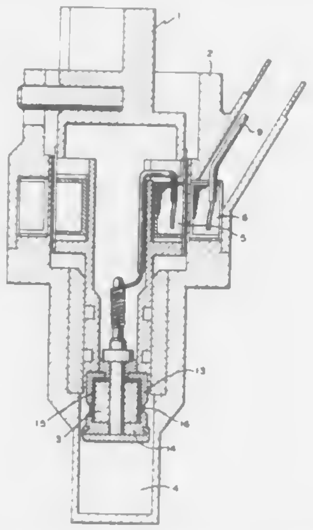
(a) a plug removably attached to the machine casing;

(b) a magnet attached to the plug and located so as to extend into the lubricating fluid such that metallic particles in the lubricating fluid are attracted to the magnet;

(c) a first coil located on and electrically insulated from the plug;

(d) a second coil located on the casing adjacent to the first coil so as to be inductively coupled therewith;

(e) variable resistance means located on the plug and electrically connected to the first coil such that an accumulation of metallic particles on the magnet changes the resistance of the variable resistance means thereby changing the inductance of the first and, consequently, the second coils as metallic particles build up on the magnet; and,



(f) electrical circuit means connected to the second coil to sense the varrying inductance of the second coil and generate an output signal.

5,027,066

INDUCTIVE DISTANCE SENSOR USING A PARTICULAR OSCILLATOR IMPEDANCE RATIO

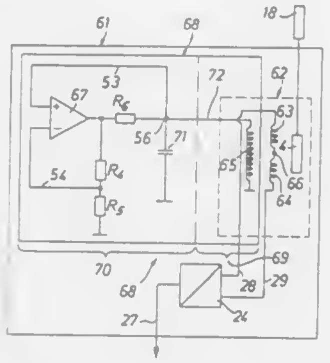
Winfried Reder, Marktbeidenfeld, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

Filed Feb. 2, 1990, Ser. No. 474,505

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1989, 3903278

Int. Cl.^{5} G01B *7/14*

U.S. Cl. 324—207.16 **3 Claims**



1. An inductive position detecting device comprising:

a primary coil receiving an oscillating signal;

at least one secondary coil in which a signal is induced by said primary coil to detect a distance;

a control circuit in the form of an LC oscillator using said primary coil for oscillating and the excitation of said at least one secondary coil; and

an evaluation circuit for supplying an output signal which is representative of the distance; and wherein said control circuit includes an operational amplifier, together with a defined circuit arrangement of resistances, including a first resistance **R4** between its output and input, a second resistance **R5** between said first resistance and ground, and a third resistance **R6** between said output and said LC oscillator, which satisfy the following term:

$$\frac{R4}{R5} > \frac{R6}{Z}$$

wherein Z is an AC-resistance of the LC-resonance circuit formed by the parallel arrangement of a capacitor and an inductance including said coil.

5,027,067

MEASURING DEVICE FOR CONTACTLESS MEASUREMENT OF A ROTATIONAL ANGLE OF A ROTATING SHAFT USING EDDY CURRENTS

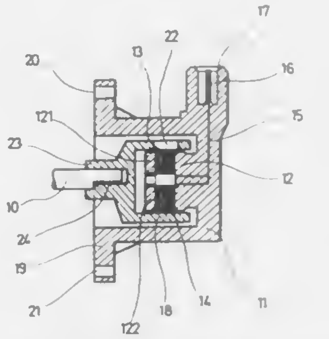
Armin Witzig, Renningen, and Hansjoerg Hachtel, Weissach, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 2, 1990, Ser. No. 487,516

Claims priority, application Fed. Rep. of Germany, May 24, 1989, 3916864

Int. Cl.^{5} G01B *7/30, 7/14*

U.S. Cl. 324—207.19 **11 Claims**

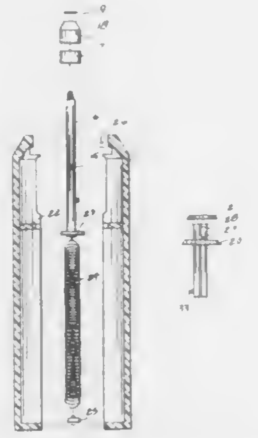


1. A measuring device for contactless measurement of a rotational angle of a rotating part rotatable via a rotating shaft, which comprises a housing cup (**11**) which includes a coaxial, integral cylindrical coil carrier (**12**) protruding from a bottom thereof, said cylindrical coil carrier includes at least two sensor coils, disposed offset by like circumferential angles in a circumferential direction and having coil axes parallel to the cylindrical coil carrier axis, a tubular body which can be firmly joined to the rotating part, said tubular body including a tubular portion that surrounds the coil carrier and sensor coils leaving a radial spacing therebetween, said tubular portion is formed of electrically conductive material including at least one radial electrically non-conducting portion extending in a circumferential direction in an area opposite said coil carrier and sensor coils, the circumferential length of said radial electrically non-conducting portion is approximately equivalent to a circumference of said tubular body portion divided by a number of sensor coils included on said cylindrical coil carrier, said tubular body (**18**) includes a protruding slip-on tang (**23**) integrally coaxial therewith, said slip-on tang includes a slip-on opening (**24**) which form-fittingly slips onto an end of a rotating shaft (**10**), and that said tubular body (**18**) is surrounded with a radial spacing by said housing cup (**22**), and said housing cup includes a securing flange (**19**) which provides a floating connection with a housing receiving the rotating part.

VOL
1127
ISS
4
JE
25
1991
UMI

5,027,068
APPARATUS FOR MEASURING THICKNESS OF A NON-METALLIC LAYER ON A FERROMAGNETIC BASE MATERIAL

Douglas J. Young, P.O. Box 1113, and Shawn C. Williams, Rte. 52 W., both of Liberty, N.Y. of 12754
Filed Jun. 21, 1990, Ser. No. 541,321
Int. Cl.^{5} G01B *7/10;* **G01R** *33/12*
U.S. Cl. 324—229 6 Claims

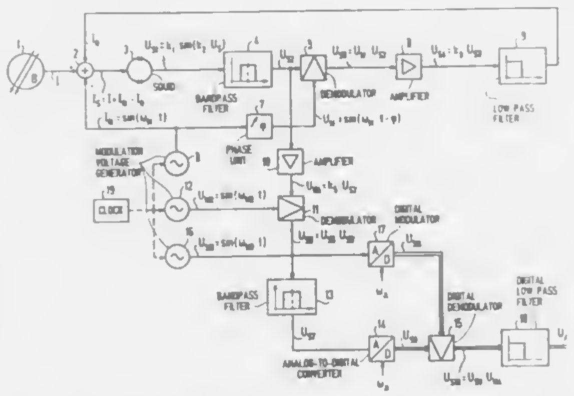


1. An automotive body filler detection apparatus comprising,

an elongate longitudinally aligned body, the body including a lower housing portion and an upper housing portion, the upper housing portion including a bottom web including a medial aperture directed through the bottom web defining a lower end of the upper body portion, and
a top alignment web spaced coaxially above, including an upper body web aperture coaxially aligned with the medial aperture, and
a reciprocatable shaft slidably received through the upper web aperture and the medial aperture, wherein the reciprocatable shaft includes an indicator member orthogonally and integrally mounted to the shaft and captured between the upper web and the bottom web, and
magnetic means mounted to an upper terminal end of the reciprocatable shaft for traction to an automotive metallic body surface, and
a biasing means mounted to a lower terminal end of the reciprocatable shaft to bias the reciprocatable shaft in a retracted position within the housing, and
wherein the magnetic means includes a support plate mounted integrally and orthogonally relative to the upper terminal end of the reciprocatable shaft, and a permanent magnetic body mounted on the support plate, and a fibrous tip mounted overlying the magnetic body, wherein the fibrous tip, the magnetic body, and the support plate are coaxially aligned relative to one another and the reciprocatable shaft, and
wherein the biasing means includes an elongate coil spring including a coil spring upper end mounted to the lower terminal end of the reciprocatable shaft, wherein the lower terminal end of the reciprocatable shaft is positioned below the bottom web, and an abutment plate is integrally and orthogonally mounted adjacent the lower terminal end of the reciprocatable shaft defined by a predetermined aperture to prevent the reciprocatable shaft and abutment plate from passage through the bottom web, and the coil spring including a spring lower end mounted to an anchor mount, wherein the anchor mount is mounted to a floor defined by the housing, the floor orthogonally and integrally mounted to a lower terminal end of the elongate body, wherein the biasing means is coaxially aligned with the housing and the reciprocatable shaft, and
wherein a reset sleeve is captured between the upper web and the bottom web and is defined by a predetermined length equal to a length defined between the upper web and the bottom web, and the sleeve includes an elongate slot directed through the sleeve and coaxially aligned and offset relative to the reciprocatable shaft overlying the reciprocatable shaft and slidably receiving the indicator member therealong, the lot including a first slot side edge and a second slot side edge, the first and second slot side edges arranged parallel to one another to capture the indicator member therebetween.

5,027,069
CIRCUIT ARRANGEMENT FOR A GRADIOMETER HAVING SUPERCONDUCTING QUANTUM INTERFEROMETER (SQUID) FOR MEASURING LOW-INTENSITY BIOMAGNETIC FIELDS

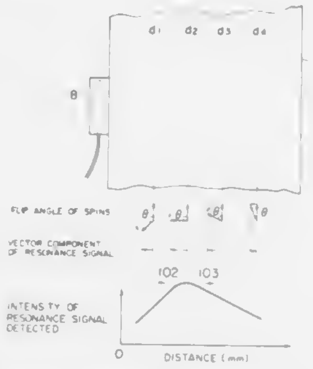
Gerhard Roehrlein, Hoechstadt, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany
Filed Feb. 20, 1990, Ser. No. 481,130
Claims priority, application European Pat. Off., Mar. 1, 1989, 89103585.9
Int. Cl.^{5} G01R *33/035*
U.S. Cl. 324—248 3 Claims



1. In a circuit arrangement for a gradiometer having a superconducting quantum interferometer (SQUID) for measuring low-intensity biomagnetic fields, whereby a pick-up current generated by a gradiometer coil in the gradiometer and which is a function of the intensity of the measured magnetic field is supplied to an in-coupling element which additively mixes the pick-up current with a modulation current generated by a first modulation voltage generator and subtractively mixes the pick-up current with a feedback current and inputs a resultant current to the SQUID which thereby provides a modulated output signal to a demodulator as a modulated voltage via a first bandpass filter, the demodulator multiplying the modulated voltage by a first modulation voltage from said first modulation generator which is phase-shifted by 90° to provide a demodulated voltage and supplying the demodulated voltage via an amplifier to a low-pass filter whose output signal is supplied to the in-coupling element as the feedback current, the improvement comprising the modulated output signal of the first bandpass filter being supplied to an analog-to-digital converter for digitization and quantization, a demodulated output signal of the analog-to-digital converter being a measured signal after passing through a digital low-pass filter, the modulated output voltage of the first bandpass filter conducted to the analog-to-digital converter as an input voltage, the output voltage of the analog-to-digital converter being supplied to a digital demodulator that digitally demodulates this output voltage with a digitized, further modulation voltage generated by a further modulation voltage generator operating synchronously with the first modulation voltage generator and the demodulated voltage being supplied to said digital low-pass filter whose output signal is the measured signal.

5,027,070
MR IMAGING SYSTEM AND METHOD

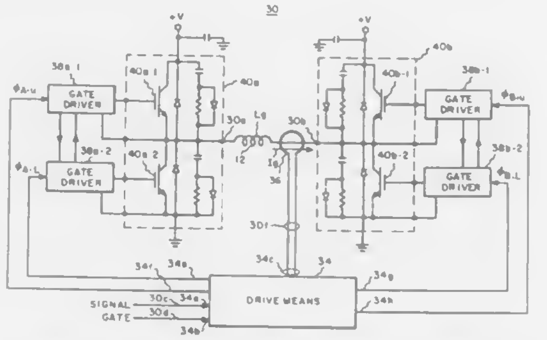
Kazutoshi Higuchi, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan
Filed Dec. 19, 1989, Ser. No. 452,364
Claims priority, application Japan, Dec. 20, 1988, 63-321487
Int. Cl.^{5} G01R *33/20*
U.S. Cl. 324—309 6 Claims


d1 d2 d3 d4
101
8
FLIP ANGLE OF SPINS
VECTOR COMPONENT OF RESONANCE SIGNAL
102 103
INTENSITY OF RESONANCE SIGNAL DETECTED
0
DISTANCE (mm)

1. An MR imaging system comprising:
(a) a surface coil for applying a high frequency magnetic field to an object to be examined and detecting a magnetic resonance signal therefrom;
(b) transmitting means for transmitting a signal for generation of the high frequency magnetic field to said surface coil;
(c) storing means for storing the intensity of a high frequency magnetic field providing a magnetic resonance signal of the maximum intensity for each of distances from a coil plane of said surface coil to planes to be imaged;
(d) reading means in response to setting of a distance from the coil plane of said surface coil to a desired plane to be imaged for reading data of the high frequency magnetic field intensity corresponding to the set distance from said storing means; and
(e) controlling means for controlling said transmitting means on the basis of the read data.

5,027,071
METHOD OF, AND APPARATUS FOR, NMR SLICE SELECTION

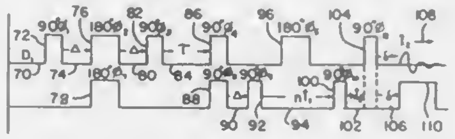
Christopher J. Hardy; Peter B. Roemer, both of Schenectady, and Otward M. Mueller, Ballston Lake, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.
Filed Mar. 5, 1990, Ser. No. 489,124
Int. Cl.^{5} G01R *33/20*
U.S. Cl. 324—309 19 Claims



1. A method of reducing NMR imaging degradation due to magnetic field gradient signal amplitude ripple, comprising the steps of:
(a) sensing the magnitude of gradient signal amplitude ripple;
(b) normalizing the sensed ripple signal amplitude to a commanded gradient amplitude; and
(c) modulating a RF signal, utilized with the gradient signal, with the normalized-amplitude sensed ripple signal, to cause an effective magnetic field to have a vector pointing substantially in the same direction as would an effective field vector formed with a gradient signal devoid of ripple.

5,027,072
ALTERNATE METHOD OF FOURIER TRANSFORM NMR DATA ACQUISITION

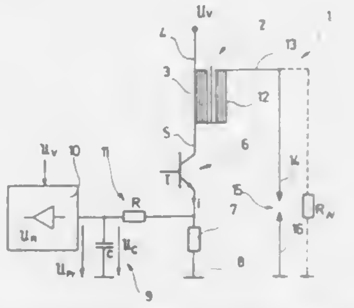
Peter L. Rinaldi, Lodi, Ohio, assignor to The University of Akron, Akron, Ohio
Filed Dec. 7, 1989, Ser. No. 447,371
Int. Cl.^{5} G01R *33/20*
U.S. Cl. 324—312 18 Claims



1. A method of data acquisition for Fourier transform NMR data comprising the steps of:
a) performing an excitation pulse sequence of at least one RF pulse and at least one evolution period wherein magnetization components of excited nuclei will at least partially relax;
b) repeating said pulse sequence a plurality of times with said evolution period varied in a predetermined manner for each of said repetitions;
c) storing for each of said repetitions an acquired NMR transient in computer memory; and
d) performing Fourier transformation by digital data processing of said transients.

5,027,073
HIGH VOLTAGE IGNITION SYSTEM MONITORING CIRCUIT

Ernst Kaller, Tamm; Karl-Heinz Kugler, Vaihingen; Christian Zimmermann, Ingersheim, and Hans Koehnle, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany
Filed Mar. 1, 1990, Ser. No. 486,786
Claims priority, application Fed. Rep. of Germany, Mar. 25, 1989, 3909906
Int. Cl.^{5} F02P *17/00*
U.S. Cl. 324—388 5 Claims



1. Circuit for monitoring a high voltage ignition system, of an internal combustion engine of a motor vehicle having
an ignition coil (2) with primary (3) and secondary (12) windings and a series circuit, formed by said ignition coil primary winding (3) and a breaker switch (5), connected to a supply voltage (U_v), against short circuits,

VOL
1127
ISS
4
JE
25
1991
UMI

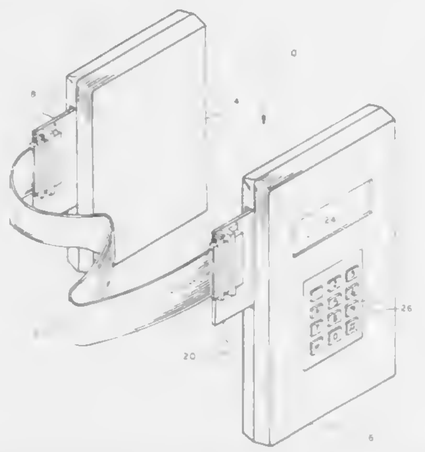
comprising

- a measuring circuit (**11**), having an input tapping said series circuit, which transforms current (i) in said ignition coil primary winding (**3**) into a test primary voltage (U_{pr}), and an output, said measuring circuit (**11**) including a shunt element (**7**) connected in a primary current path of said ignition coil (**2**); and
- an evaluation circuit (**10**) including a comparator having a first input connected to said output of said measuring circuit (**11**) to thereby receive said test primary voltage (U_{pr}) and a second input connected to said supply voltage (U_v), comparing said test primary voltage (U_{pr}, with said supply voltage (U_v) by defining a reference value (U_R) corresponding to said supply voltage (U_v) and sampling at least an instantaneous value of said test voltage (U_{pr}), and generating an error signal whenever said sampled test voltage exceeds said supply voltage by a predetermined amount.

5,027,074
CABLE TESTER

Ernest C. Haferstat, Colorado Springs, Colo., assignor to Premier Technologies, Denver, Colo.

Filed Nov. 16, 1989, Ser. No. 437,379
Int. Cl.^{5} G01R *31/02*
U.S. Cl. 324—539 **20 Claims**



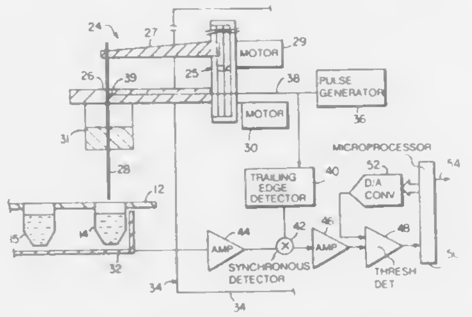
1. A portable cable tester apparatus for testing a multiconductor cable comprising:

- transmitter means for connection to a first end of the cable for connecting with each separate conductor of the cable and including a power source and electrical circuit means for generating a signal in sequence through each separate conductor of the cable;
- receiver means for connection to a second end of the cable for connecting with each separate conductor of the cable and including a separate power source and electrical circuit means for receiving and decoding the signals received from said transmitter means through the separate conductors of the cable;
- adapter means for connecting the first and second ends of the cable and each separate conductor of the cable to said transmitter means and said receiver means respectively;
- microprocessing means having a microcode program for inputting and interpreting data from said receiver means and for control of output commands to a display means;
- keyboard means for inputting data into and accessing said microprocessing means; and
- display means for displaying data from said microprocessing means;
- whereby each conductor of the cable can be tested for continuity, shorts, or crosses; and
- with the electrical circuit means of said transmitter means and the electrical circuit means of said receiver means providing a return path for the signals generated by said transmitter means.

5,027,075
APPARATUS FOR DETERMINATION OF PROBE CONTACT WITH A LIQUID SURFACE

John C. Harding, Jr., Framingham, Mass., assignor to Nova Biomedical Corporation, Waltham, Mass.

Filed Sep. 18, 1989, Ser. No. 408,616
Int. Cl.^{5} G01R *27/26;* **G05D** *9/00*
U.S. Cl. 324—662 **23 Claims**



1. Apparatus for detecting the occurrence of physical contact between a conductive probe and a surface of a liquid held in a container as the probe is moved toward and eventually touches the liquid surface, the apparatus comprising:

- a conductor disposed on the other side of said container from said probe,
- signaling circuitry for sending an electrical signal through said liquid between said conductive probe and said conductor, and for detecting when said physical contact has occurred based on when the resulting electrical signal which has passed through said liquid exceeds a threshold, and
- a threshold determiner for establishing said threshold based on said resulting electrical signal.

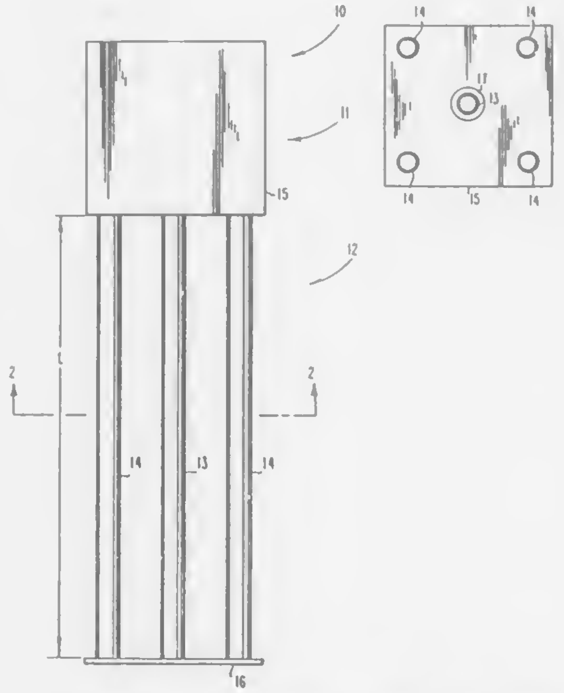
5,027,076
OPEN CAGE DENSITY SENSOR

William J. Horsley, and Virgil R. Tucker, both of Boulder, Colo., assignors to Ball Corporation, Muncie, Ind.

Filed Jan. 29, 1990, Ser. No. 471,577
Int. Cl.^{5} G01R *27/26;* **G01N** *9/00*
U.S. Cl. 324—674 **19 Claims**

1. An apparatus for measuring the density of cryogens, comprising

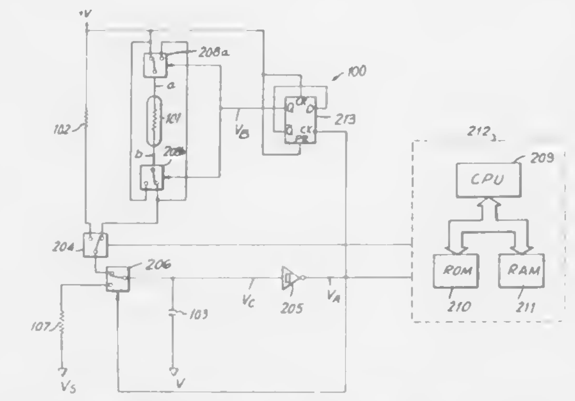
- an immersion cell comprising an elongated inner conductor and four elongated outer conductors equally spaced about the elongated inner conductor, said four outer conductors being electrically connected together and supported at a fixed distance about said inner conductor, said inner conductor being electrically isolated from said four outer conductors and supported centrally within said four outer conductors by an electrically isolating support; and
- an oscillator connected with said inner conductor and with said four outer conductors, said oscillator providing a varied frequency output dependent upon the density of a cryogen that may be disposed between said elongated inner conductor and said four elongated outer conductors.



5,027,077
HUMIDITY MEASURING APPARATUS

Michio Yanagisawa; Masahisa Ikejiri; Hajime Miyazaki; Tsukasa Muranaka; Kunihiro Inoue, and Shouichi Uchiyama, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Filed Aug. 22, 1989, Ser. No. 397,619
Claims priority, application Japan, Aug. 22, 1988, 63-207675; Nov. 17, 1988, 63-290593; Feb. 27, 1989, 1-45600
Int. Cl.^{5} G01R *27/08*
U.S. Cl. 324—712 **20 Claims**



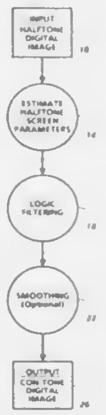
1. A humidity measuring apparatus comprising:

- humidity sensor means for sensing humidity as a function of resistance;
- a reference resistor having a predetermined resistance value;
- a reference capacitor having a predetermined capacitance;
- charge switching means for selectively coupling one of said reference resistor or said humidity sensor means in series to said reference capacitor to charge said reference capacitor;
- voltage judging means for determining whether the terminal voltage of the reference capacitor is at about a predetermined high voltage (H) or at about a predetermined low voltage (L);
- charge/discharge switching means for selectively charging and discharging said reference capacitor in accordance with the output of said voltage judging means producing an oscillating charge/discharge cycle in response to the output of the voltage judging means;
- sensor direction switching means coupled to said charge/-discharge switching means for inverting the direction of current flowing through said humidity sensor means during at least a portion of the period said reference capacitor is charged through said humidity sensor means in response to the output of the charge/discharge switching means;
- determining means coupled to said voltage judging means for determining the resistive value of said humidity sensor means and said humidity as a function of the charge/discharge cycle.

5,027,078
UNSCREENING OF STORED DIGITAL HALFTONE IMAGES BY LOGIC FILTERING

Zhigang Fan, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 10, 1989, Ser. No. 419,517
Int. Cl.^{5} H04N *1/40*
U.S. Cl. 358—456 **9 Claims**


INPUT HALFTONE DIGITAL IMAGE
10
ESTIMATE HALFTONE SCREEN PARAMETERS
14
LOGIC FILTERING
18
SMOOTHING (Optional)
22
OUTPUT CON TONE DIGITAL IMAGE
26

1. In a system for manipulating digital halftone images represented by a plurality of pixels, each pixel having a white or black binary halftone state generated by the conversion of an original continuous tone digital image into a halftone digital image by applying a halftone screen to the original continuous tone image, the halftone screen employing a halftone cell having characteristic dimensions, a shift parameter and threshold values which define the cell, the system having a memory for digitally storing the halftone image pixels, a method of reconstructing a continuous tone digital image from a halftone digital image comprising the steps of:

- estimating the cell dimensions and shift parameter of the halftone screen used to produce the halftone digital image,
- identifying the halftone cell threshold values based on said estimated cell dimensions,
- partitioning the halftone digital image into halftone cell segments according to said estimated cell dimensions and estimated shift parameter,
- identifying all unique halftone cell dot patterns within each of the halftone cell segments,
- selecting certain of said unique halftone cell dot patterns to represent full halftone dot patterns based on the frequency of occurrence of said halftone cell dot patterns and a predetermined selection scheme,

VOL 1127 ISS 4 JE 25 1991 UMI

determining the correspondence of said full halftone dot patterns with said halftone cell threshold values to identify the halftone cell threshold value associated with each halftone cell dot position,

logically filtering the plurality of halftone digital image pixels based on an initial range derived from said halftone cell threshold values,

arriving at a minimal range of potential continuous tone image values for each of said pixels through iterative application of a logical filter,

determining a continuous tone output value associated with each of said pixels based on said minimal range of potential continuous tone values, and

assigning each of said continuous tone output values to a corresponding pixel within the reconstructed continuous tone digital image.

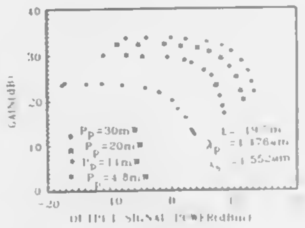
5,027,079
ERBIUM-DOPED FIBER AMPLIFIER

Emmanuel Desurvire, Middletown; Clinton R. Giles, Holmdel, and John L. Zyskind, Shrewsbury, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 467,699, Jan. 19, 1990, abandoned. This application Jul. 31, 1990, Ser. No. 560,664

Int. Cl.^{5} H01S *3/30;* G02B *6/26*

U.S. Cl. 330—4.3 **22 Claims**



1. An optical amplifier comprising a single mode optical fiber having a core surrounded by a cladding, said core being doped with Er^{3+} ions having a distribution profile, said optical amplifier being adapted to be coupled to receive a pump signal of substantially 1.47 μm wavelength and having a power mode radius of substantially between 2 μm and 1 μm, the core-cladding refractive index difference of said fiber being within the range which is substantially equal to or greater than 0.025.

5,027,080
SOURCE FOLLOWER LIGHT RECEPTION CIRCUIT

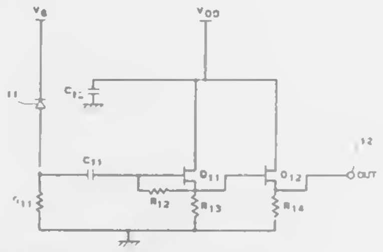
Nobuo Shiga, Yokohama, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jun. 27, 1990, Ser. No. 544,510

Claims priority, application Japan, Jul. 6, 1989, 1-174976

Int. Cl.^{5} H04B *10/06;* H03F *3/08, 3/193*

U.S. Cl. 330—59 **13 Claims**



1. A demodulation circuit comprising

a plurality of source-follower circuits, formed on a single semiconductor substrate, for impedance-converting a reception signal,

wherein a field effect transistor constituting a first source-follower circuit receives the reception signal at a gate thereof, a resistor having a high resistance is connected between the gate and a source, and a resistor is connected to the source,

a gate of a field effect transistor constituting each of second and subsequent source-follower circuits connected to said first source-follower circuit is connected to the source of the field effect transistor constituting the immediately preceding source-follower circuit, and a source thereof is connected to the gate of the field effect transistor constituting the next source-follower circuit and to a resistor,

a product of a gate width of the field effect transistor constituting each of the second and subsequent source-follower circuits and a resistance of the resistor connected to the source thereof is set to be equal to a product of a gate width of the field effect transistor constituting the first source-follower circuit and a resistance of the resistor connected to the source thereof, and

the gate width of the field effect transistor constituting a last source-follower circuit is set so that an output impedance becomes smaller than an impedance of a load circuit connected to the last source-follower circuit.

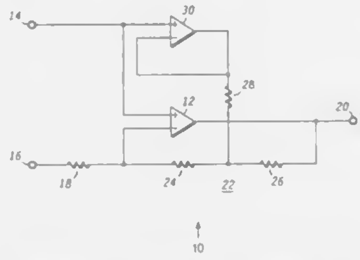
5,027,081
HIGH GAIN DIFFERENTIAL-TO-SINGLE ENDED AMPLIFIER HAVING A TEE NETWORK FEEDBACK LOOP

Jeffery I. Baum, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 3, 1990, Ser. No. 518,627

Int. Cl.^{5} H03F *1/34*

U.S. Cl. 330—84 **7 Claims**



1. A differential-to-single ended amplifier stage, comprising:

an amplifier having inverting and non-inverting inputs and an output; and

a feedback loop including a three port network for providing a short circuit transfer impedance and setting the gain of the amplifier stage wherein said three port network is referenced to the input signal appearing at said non-inverting input of said amplifier, and wherein electrical continuity exists within said three port network from any one port to any other port without intersecting a further port of the three port network.

5,027,082
SOLID STATE RF POWER AMPLIFIER HAVING IMPROVED EFFICIENCY AND REDUCED DISTORTION

David S. Wisberd; Howard D. Bartlow, both of Sunnyvale, and Pablo E. D'Anna, Los Altos, all of Calif., assignors to Microwave Modules & Devices, Inc., Mountain View, Calif.

Filed May 1, 1990, Ser. No. 517,328

Int. Cl.^{5} H03F *3/193*

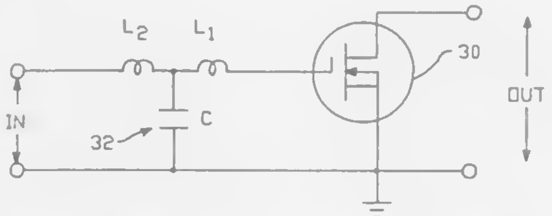
U.S. Cl. 330—277 **10 Claims**

1. An RF power device comprising

a MOS transistor having a source, a drain, and a gate,

first means for applying an input signal between said gate and said source,

second means for receiving an output signal from between said source and said drain, and



a capacitor connected between said gate and said source, said capacitor swamping non-linear variations of parasitic capacitance (C_{GD}) between said gate and said drain.

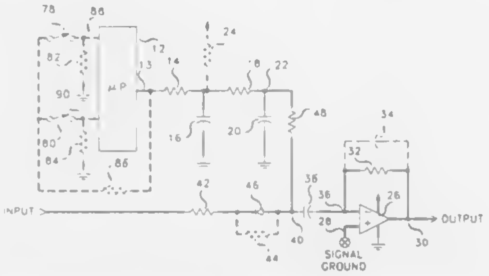
5,027,083
GENERAL PURPOSE LOW COST DIGITAL AMPLITUDE REGULATOR

Walter G. Kutzavitch, Freehold, and Eugene J. Rosenthal, Highland Park, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 20, 1990, Ser. No. 482,443

Int. Cl.^{5} H03G *3/10*

U.S. Cl. 330—284 **13 Claims**



1. Apparatus for digitally regulating the magnitude of an output signal derived from an input signal comprising:

means for generating a stream of pulses with a controllable variable duty cycle;

means for controlling said duty cycle of said pulses;

means for supplying said generated stream of variable duty cycle pulses;

means for filtering said stream of variable duty cycle pulses to develop a reference signal, the magnitude of said reference signal being responsive to and proportional with the duty cycle of said stream of pulses;

a two terminal non-linear element having a resistance value that varies in accordance with a current passing through said element;

an input signal source for supplying said input signal;

means responsive to the magnitude of said reference signal for varying the instantaneous operating resistance of said two terminal non-linear element; and

amplifier means with a variable gain for amplifying an input signal from said signal source, said gain of said amplifying circuit being responsive to said instantaneous operating resistance of said two terminal non-linear element.

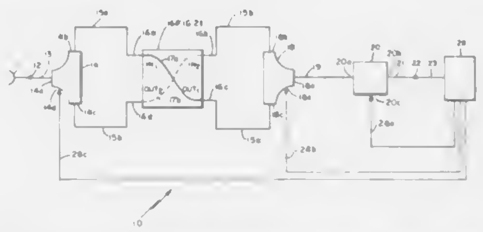
5,027,084
TRANSCEIVER MODULES FOR PHASED ARRAY ANTENNA

Toshikazu Tsukii, Santa Barbara, Calif., assignor to Raytheon Company, Lexington, Mass.

Filed Nov. 30, 1989, Ser. No. 444,191

Int. Cl.^{5} H03F *3/68*

U.S. Cl. 330—295 **12 Claims**



1. A circuit for coupling electromagnetic energy between a pair of terminals comprises:

means for steering electromagnetic energy between said terminals through one of a pair of signal paths selected in accordance with a control signal fed to said means, said means further comprising:

a bi-directional amplifier, having a pair of input signal ports, and a pair of output signal ports, disposed in said pair of signal paths of said steering means.

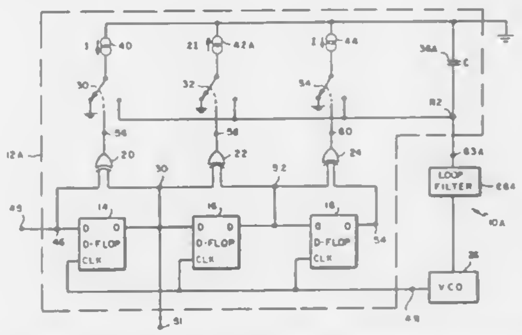
5,027,085
PHASE DETECTOR FOR PHASE-LOCKED LOOP CLOCK RECOVERY SYSTEM

Lawrence M. DeVito, Tewksbury, Mass., assignor to Analog Devices, Inc., Norwood, Mass.

Continuation of Ser. No. 416,357, Oct. 3, 1989, abandoned. This application May 7, 1990, Ser. No. 519,579

Int. Cl.^{5} H03L *7/00*

U.S. Cl. 331—1 A **27 Claims**



1. A phase detector circuit for detecting the phase difference between an information signal and a clock signal and for producing a phase error signal representative of the phase difference, said clock signal being of a pulse type waveform having first and second edges, said information signal being of a pulse type waveform having a high level portion and a low level portion, said phase detector comprising:

a first flip-flop having a data input for receiving said information signal, said first flip-flop being clocked by the first edge of said clock signal;

a second flip-flop having a data input for receiving the data output of said first flip-flop, said second flip-flop being clocked by the second edge of said clock signal;

a third flip-flop having a data input for receiving the data output of said second flip-flop, said third flip-flop being clocked by said first edge of said clock signal;

a first exclusive-OR gate which receives, at one input thereof, said information signal and, at a second input thereof, the data output of said first flip-flop;

a second exclusive-OR gate which receives, at one input

VOL
1127
ISS
4
JE
25
1991
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thereof, the data output of said first flip-flop and, at a second input thereof, the data output of said second flip-flop;

a third exclusive-OR qate which receives, at a first input thereof, the data output of said second flip-flop and, at a second input thereof, the data output of said third flip-flop;

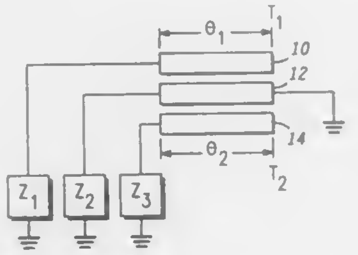
a capacitor having at least a first electrode serving as an output terminal for producing said phase error signal; and

control means, responsive to the output of said first, second and third exclusive-OR gates, for controlling the voltage across said capacitor.

5,027,086
DIELECTRIC RESONATOR OSCILLATOR POWER COMBINER

Bernard E. Sigmon, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 4, 1990, Ser. No. 532,425
Int. Cl.^{5} H03B *7/14*
U.S. Cl. 331—99 **13 Claims**



1. An oscillator comprising:

first oscillating means for generating a first temperature stable resonant frequency from an input bias;

a first high power means for receiving said first resonant frequency to generate a first resonating high impedance, said first high power means inverting said first resonating high impedance to output a first high power oscillating signal;

said first high power means coupled to an electric ground;

said first high power means electromagnetically coupled to said first oscillating means;

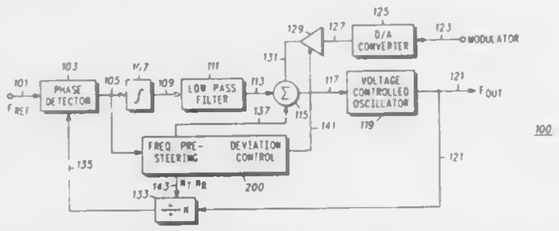
second oscillating means for generating a second temperature stable resonant frequency from said input bias; and

said first high power means electromagnetically coupled to said second oscillating means to receive said second temperature stable resonant frequency.

5,027,087
FAST-SWITCHING FREQUENCY SYNTHESIZER

Alan P. Rottinghaus, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 2, 1990, Ser. No. 474,969
Int. Cl.^{5} H03C *3/09;* H03L *7/085, 7/18*
U.S. Cl. 332—127 **98 Claims**



1. In a frequency synthesizer with a voltage controlled oscillator (VCO) having a voltage control line and an output, a phase detector having a reference, an input and an output, and a frequency divider having an input and an output, said VCO output coupled to said frequency divider input, said frequency divider output coupled to the phase detector input, a method for switching said frequency synthesizer from a first frequency to a second frequency, comprising the steps of:

(a) switching said frequency divider from a first value to a second value;

(b) injecting a predetermined voltage level to the voltage control line of said voltage controlled oscillator at a time essentially fixed with respect to (a);

(c) after (b), waiting at least a predetermined period of time;

(d) measuring the slope of the output of said phase detector.

24. In a frequency synthesizer with a baseband modulator input, a voltage controlled oscillator (VCO) having a voltage control line and an output, a phase detector having a reference, an input and an output, and a frequency divider having an input and an output, said VCO output coupled to said frequency divider input, said frequency divider output coupled to the phase detector input, said baseband modulator input coupled to said VCO voltage control line, a method for switching said frequency synthesizer from a first frequency to a second frequency, comprising the steps of:

(a) switching said frequency divider from a first value to a second value;

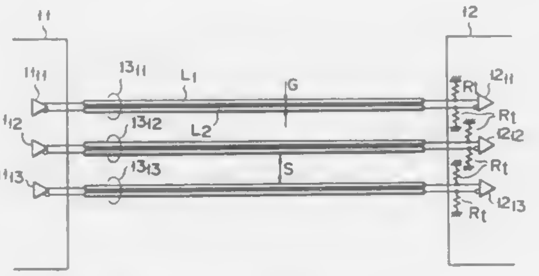
(b) injecting a predetermined voltage level to the voltage control line of said voltage controlled oscillator, and,

(c) adjusting the level of said baseband modulator input responsive to said predetermined voltage level.

5,027,088
SIGNAL WIRING BOARD

Fumihiko Shimizu, Yokohama, and Taro Shibagaki, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 7, 1990, Ser. No. 490,058
Claims priority, application Japan, Mar. 14, 1989, 1-61640
Int. Cl.^{5} H01P *3/08*
U.S. Cl. 333—1 **2 Claims**



1. A signal wiring board comprising:

a dielectric substrate;

a ground layer formed on one surface of the dielectric substrate; and

a plurality of signal transmission paths formed on the other surface of the dielectric substrate and running in parallel with each other, a pair of differential transmission lines being provided for each signal transmission path and running in parallel with each other;

wherein the respective transmission lines are provided as to satisfy a relation:

$$G<H<S$$

where

G: a gap between a pair of differential transmission lines;

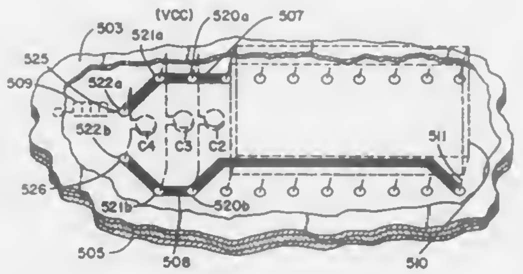
S: a distance between adjacent signal transmission paths; and

H: a thickness of the dielectric substrate.

5,027,089
HIGH FREQUENCY NOISE BYPASSING

Reinhold Henke, St. Paul, Minn., assignor to ADC Telecommunications, Inc., Minneapolis, Minn.

Division of Ser. No. 204,751, Jun. 10, 1988. This application Sep. 21, 1988, Ser. No. 247,350
Int. Cl.^{5} H04B *3/28*
U.S. Cl. 333—12 **10 Claims**



1. A method for connecting an integrated circuit component to the power supply and ground planes on a PC board and for bypassing high frequency noise generated by the circuit component comprising the steps of:

providing a power supply trace on said PC board between the power lead of said component and said power supply plane;

providing a signal ground trace on said PC board between the signal ground lead of said component and said ground plane;

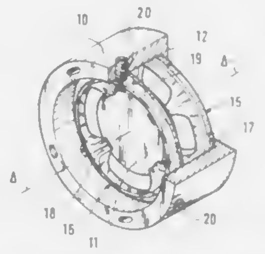
providing one or more bypass capacitors each having first and second leads; and

connecting said first lead of each of said one or more bypass capacitors to said power supply trace between said power lead of said component and where said power supply trace connects to said power supply plane, and said second lead of each of said one or more bypass capacitors to said signal ground trace between said signal ground lead of said component and where said signal ground trace connects to said ground plane.

5,027,090
FILTER HAVING A DIELECTRIC RESONATOR

Jean-Michel Gueble, Plaisance Du Touch; Jean-Bernard Theron, Auzielle; Yannick Latouche, Leguevin; Jean-Bernard Ducrocq, Pechabou, and Bernard Pérez, Saint Orens De Gameville, all of France, assignors to Alcatel Espace, Courbevoie, France

Filed Apr. 13, 1990, Ser. No. 508,445
Claims priority, application France, Apr. 13, 1989, 89 04906
Int. Cl.^{5} H01P *1/20, 7/10*
U.S. Cl. 333—202 **8 Claims**



1. A filter comprising at least one member having a cylindrical cavity (10) having an axis of symmetry, a dielectric resonator (11) inside said cavity (10) having an axis of symmetry (Δ) colinear with the axis of symmetry of the cavity (10), first and second washers (15, 16) having opposite axial ends holding said resonator in said cavity;

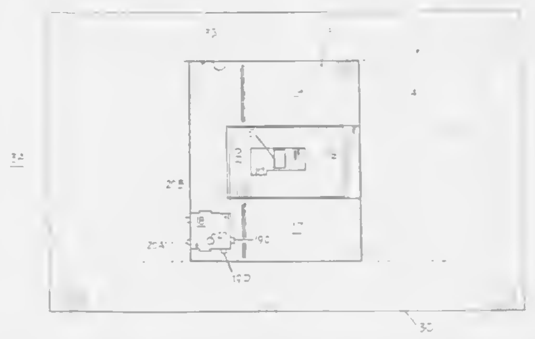
said first washer (15) being terminated at a first end by studs (17) bearing axially against a rim (12) formed on the inside wall of the cavity (10) and at a second axial end by a plurality of circumferentially separated surfaces (18) bearing axially against the resonator (11);

said second washer (16) being terminated at a first axial end by a radially internal conical surface (19) bearing lock screws passing through the cavity defining member and holding the resonator (11) in place in the cavity, and at a second axial end by a plurality of circumferentially separate surfaces (18) bearing axially against the resonator (11).

5,027,091
MOLDED CASE CIRCUIT INTERRUPTER RATING PLUG KEYING AND INTERLOCK ARRANGEMENT

David J. Lesslie, Plainville; Robert A. Morris, Burlington; Alan J. Messerli, Bristol; Graham A. Scott, Avon, all of Conn., and Alexander A. Krajewski, East Hampton, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Feb. 15, 1989, Ser. No. 310,180
Int. Cl.^{5} H01H *67/02*
U.S. Cl. 335—132 **5 Claims**



1. An electronic trip circuit interrupter comprising in combination:

a circuit interrupter cover and case;

an electronic trip circuit within said interrupter cover and arranged for interrupting circuit current through separable contacts arranged within said interrupter case; and

a circuit interrupter cover attached to said interrupter case and containing first recesses formed therein for accepting an actuator-accessory unit and accessories, said circuit interrupter cover further containing a second recess formed therein for accepting a rating plug to set the circuit interrupter ampere rating, said second recess including keying means formed therein to prevent insertion of any said rating plug having an improper rating, said second recess including interlock means formed therein to prevent removal of said rating plug from said second recess when said circuit interrupter is installed within an electrical enclosure.

5,027,092
TRIPPING ARRANGEMENT FOR MOLDED CASE CIRCUIT INTERRUPTER

Roger N. Castonguay, Terryville, and Thomas F. Papallo, Jr., Plainville, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed May 3, 1990, Ser. No. 518,673
Int. Cl.^{5} H01H *9/00*
U.S. Cl. 335—172 **11 Claims**

1. A molded case circuit interrupter comprising:

a molded plastic case and cover;

an actuator unit or accessory unit within said cover;

an electronic trip unit within said cover for determining overcurrent conditions through a protected circuit;

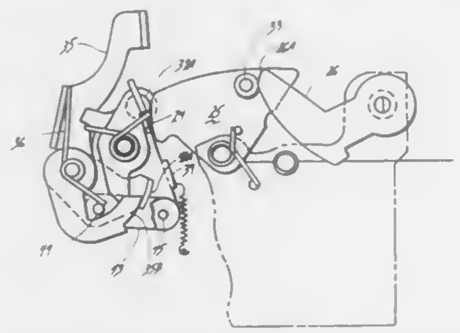
an operating mechanism contained between a pair of opposing sideframes within said case and arranged for separat-

VOL
1127
ISS
4
JE
25
1991
UMI

ing a pair of contacts upon operation of said electronic trip unit;

an externally accessible operating handle connecting with said operating mechanism through a handle yoke arrangement for moving said operating mechanism between closed and open positions;

a tripping system within said case intermediate said actuator unit or accessory unit and said operating mechanism for articulating said operating mechanism upon operation of said actuator unit or accessory unit, said tripping system including a trip link pivotally arranged within said case proximate a trip bar operatively associated with said operating mechanism and a reset driver connected to said trip link by means of a common pivot;



a trip latch pivotally arranged within said case proximate said trip link; and

a reset lever pivotally arranged within said case on a common pivot with said trip latch intermediate said trip link and said operating mechanism, said reset lever being attached to said trip link and said reset driver by means of a reset link whereby rotation of said reset lever causes corresponding rotation of said trip link and said reset driver, one end of said trip latch interferes with one end of said trip link to retain said trip link against rotation bias provided by a trip link spring.

5,027,093

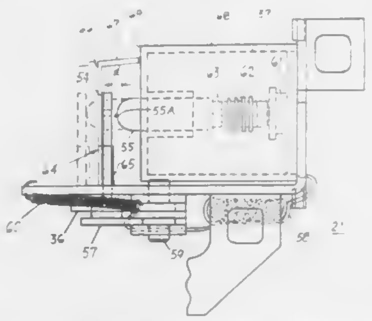
MOLDED CASE CIRCUIT BREAKER ACTUATOR-ACCESSORY UNIT HAVING COMPONENT TOLERANCE COMPENSATION

Thomas M. Palmer, Wallingford, and Roger N. Castonguay, Terryville, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Oct. 29, 1990, Ser. No. 604,535

Int. Cl.⁵ H01H *9/00*

U.S. Cl. 335—176 **11 Claims**



1. A trip actuator unit or accessory unit for molded case circuit breakers comprising:

a housing;

an electromagnetic coil within said housing arranged about a spring-biased armature said armature being restrained from movement by magnetic means;

a trip actuator latch pivotally attached to said housing by means of a pivot pin and being biased for rotation in a first direction by means of a take-up spring;

trip means on said trip actuator latch interfacing with said armature whereby said armature strikes said trip means causing said trip actuator latch to rotate in a second direction when said magnetic means is cancelled; and

gap adjusting means on said trip means interacting with said housing to thereby provide a predetermined separation gap between said armature and said trip actuator latch.

5,027,094

ELECTROMAGNETIC RELAY

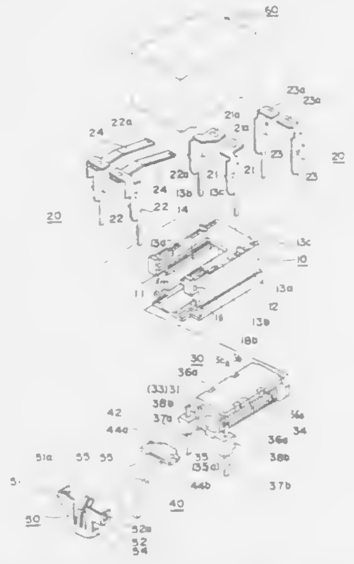
Yuji Yasuoka, Kyoto; Yoshiharu Kitagawa, Kanzaki, and Yoshikiyo Imai, Moriyama, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Continuation of Ser. No. 320,506, Mar. 8, 1989, abandoned. This application Mar. 19, 1990, Ser. No. 496,136

Claims priority, application Japan, Mar. 9, 1988, 63-57272

Int. Cl.⁵ H01H *51/28*

U.S. Cl. 335—78 **13 Claims**



1. An electromagnetic relay, comprising

a box-shaped casing having a bottom wall, a pair of side walls each having an inner surface, a pair of end walls, and a top wall;

an electromagnet unit received in said casing with its axial direction extending in parallel with said top, bottom and side walls of said casing;

at least one contact unit mounted on said top wall;

one of said end walls being provided with an opening for receiving said electromagnet unit therein;

each said inner surface of said side walls of said casings having a guide groove with an interior surface extending along a longitudinal direction of said casing for receiving and guiding said electromagnet unit into said casing.

5,027,095

MOLDED CASE CIRCUIT BREAKER COVER INSERT

Geoffrey H. McKay, West Hartford; Harold F. Larkin; Dennis J. Doughty, both of Plainville, and Michael C. Guerrette, Plymouth, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Oct. 29, 1990, Ser. No. 604,284

Int. Cl.⁵ H01H *9/02*

U.S. Cl. 335—202 **9 Claims**

1. A circuit breaker comprising·

a molded plastic case and cover;

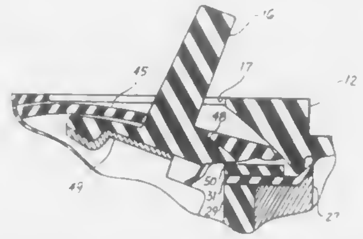
an operating mechanism within said case;

a pair of separable contacts arranged on corresponding fixed

and movable contact arms within said case arranged for becoming separated by operation of said operating mechanism upon occurrence of an overcurrent condition through a protected circuit;

an operating handle within said case and extending through a slot in said cover, said operating handle providing means for manually opening and closing said contacts in the absence of said overcurrent condition;

a handle skirt on a bottom part of said operating handle, said skirt providing connection between said operating handle and said operating mechanism;



an arc chute within said case cooling and quenching an intense arc that occurs upon separation of said contacts, said arc chute extending from a bottom of said case to an interior recess within said cover;

an insert within said interior recess superjacent said arc chute; and

an impact-dampening pad on said insert, said impact-dampening pad positioned for receiving a part of said handle skirt upon operation of said operating mechanism to thereby prevent damage to said operating handle and said cover.

5,027,096

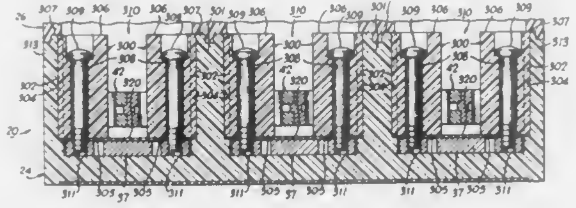
KEY BLOCKS FOR CIRCUIT BREAKER

Richard E. White, Brighton Township, Beaver County, and Alfred E. Maier, Beaver Falls, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 256,878, Oct. 12, 1988, abandoned. This application Apr. 25, 1989, Ser. No. 343,037

Int. Cl.⁵ H01H *9/02*

U.S. Cl. 335—202 **54 Claims**



1. A molded case circuit breaker comprising:

a housing having a base portion and a cover portion, said base portion formed with a plurality of spaced apart sidewalls for defining one or more phase compartments between contiguous sidewalls; each compartment having a first portion and a second portion;

one or more pairs of separable main contacts, each pair carried by an upper contact arm and a line side conductor, disposed in a separate phase compartment, electrically coupled to line and load side conductors, said line side conductor carrying an insulation barrier;

an operating mechanism operatively connected to said upper contact arm, disposed in said second portion of one of said phase compartments;

one or more arc chutes disposed adjacent said separable main contacts in said first portion of said phase compartment; and

means for supporting said sidewall against forces resulting from relatively high overcurrent conditions.

5,027,097

SADDLE-COIL ARRANGEMENT FOR A CATHODE RAY TUBE AND A COIL CARRIER FOR SUCH AN ARRANGEMENT

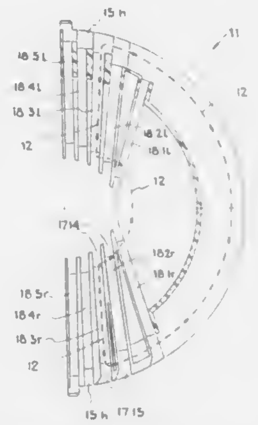
Andreas Ehrhardt, Plochingen, Fed. Rep. of Germany, assignor to Nokia Unterhaltungselektronik, Pforzheim, Fed. Rep. of Germany

Filed Jun. 22, 1990, Ser. No. 542,705

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1989, 3920699

Int. Cl.⁵ H01F *5/00*

U.S. Cl. 335—213 **6 Claims**



1. A coil-carrier half for a saddle coil for a cathode ray tube, said coil carrier half having a funnel shape with a wider diameter at a front than at a rear end thereof, comprising:

a front groove **(13)** at the front;

a rear groove **(14)** at the rear;

several left slots **(18.1*l*–18.5*l*)** which connect the front and rear grooves near the left ends of the grooves; and

several right slots **(18.1*r*–18.5*r*)** which connect the front and rear grooves near the right ends, and which lie in angular symmetry with the left slots, the length of at least one right slot **(189.2*r*–18.5*r*)** is different from the length of the left slot **(18.2*l*–18.5*l*)** lying in angular symmetry with it.

5,027,098

SADDLE TYPE DIPOLAR COIL ELIMINATING ONLY SEXTUPOLE COMPONENTS OF MAGNETIC FIELD

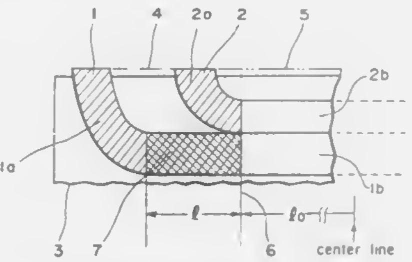
Toru Okazaki, and Shigeki Isojima, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Aug. 10, 1990, Ser. No. 565,241

Claims priority, application Japan, Aug. 22, 1989, 1-215322

Int. Cl.⁵ H01F *5/00*

U.S. Cl. 335—213 **7 Claims**



1. A saddle type dipole coil comprising:

particle conducting means made of insulation material with

VOL
1127
ISS
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JE
25
1991
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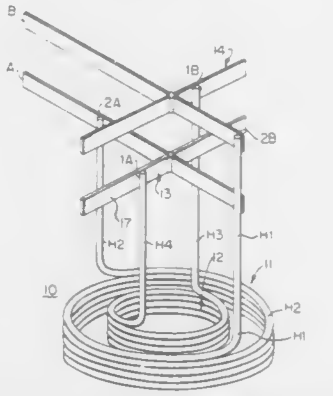
generally cylindrical shape for accelerating charged particles passing therein;

a pair of elongated ring shaped upper and lower coil layers composed of one or more layers laminated in the diameter direction of said particle conducting means, each having an assembly of coil conductors of series-connected turns, said upper and lower coil layers opposing each other disposed on the outer surface of said particle conducting means and respectively elongated in the longitudinal direction thereof, and

offset means for eliminating only sextapole components among entire multi-pole components of a magnetic field generated by the end portion in the longitudinal direction of said saddle type dipole coil.

5,027,099
SENSITIVE FAULT DETECTION SYSTEM FOR PARALLEL COIL AIR CORE REACTORS

Patrick E. Burke, North York; Richard F. Dudley, and Ralph S. Daniel, both of Toronto, all of Canada, assignors to Guthrie Canadian Investments Limited, Toronto, Canada
Filed Mar. 30, 1988, Ser. No. 175,213
Claims priority, application Canada, Mar. 31, 1987, 533505
Int. Cl.⁵ H01F *27/08, 27/28, 15/10*
U.S. Cl. 336—60 17 Claims

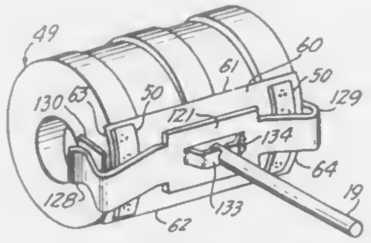


1. An air core reactor comprising a plurality of coaxial helical coil windings, an electrically conductive and structurally rigid first spider at one end of said coil windings and two electrically conductive second and third spiders electrically insulated from one another at the opposite end of said coil windings, said coil windings being connected at said one end to said first spider and at said opposite end to said second and third spiders, a selected number of said coil windings being connected only to said second spider and the remaining ones connected only to said third spider.

5,027,100
GAS TUBE FAIL SAFE DEVICE FOR TELEPHONE PROTECTOR MODULES

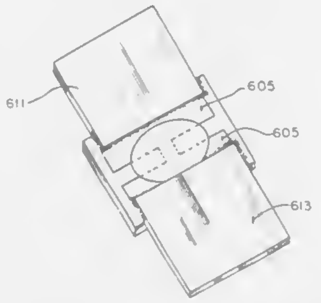
Helmuth Neuwirth, Garden City; Carl H. Meyerhoefer, Dix Hills, and William V. Carney, Oyster Bay, all of N.Y., assignors to Porta Systems Corp., Syosset, N.Y.
Filed Feb. 12, 1990, Ser. No. 478,424
Int. Cl.⁵ H01H *39/00;* **H02H** *7/24*
U.S. Cl. 337—32 1 Claim

1. An improved thermally sensitive secondary protection device for use with 3-element gas tubes employed for protecting individual telephone subscriber circuits, said gas tube including first and second end electrodes, and a centrally disposed electrode, said centrally disposed electrode having a laterally extending contact thereon; said protective device comprising: a length of resilient conductive material having a principal axis parallel to that of said tube, and having first and second end portions and a medially disposed portion therebetween; said first and second end portions being resiliently engageable with said first and second end electrodes on said gas tube, and having a fusible insulative covering normally preventing electrical current conduction therebetween; said medially disposed portion including means engaging said contact on said central electrode on said gas tube in electrically conductive relation; whereby, the development of a predetermined degree of heat by said gas tube upon the occurrence of a sustained current overload, will cause fusing of said insulative covering on said first and second end portions, causing shorting of said end electrodes to said center electrodes; said length of resilient conductive material being in the form of a stamping of planar resilient material, the end portions of which form arcuately shaped recesses for engaging the first and second end electrodes of a gas tube to fix the relative position therebetween, said medially disposed portion including a centrally disposed opening bordered by first and second laterally bent tabs, said tabs resiliently engaging said laterally extending contact; means forming secondary air gap protection positioned between said stamping and said end electrodes, whereby said device provides backup protection against momentary voltage surges in the event of failure of said gas tube; said means forming air gap protection including a generally rectangular thin member of planar insulative material, said member having air holes overlying the end electrodes of said gas tube, and a shorting plate overlying said last mentioned insulative member and positioned beneath said stamping.



5,027,101
SUB-MINIATURE FUSE

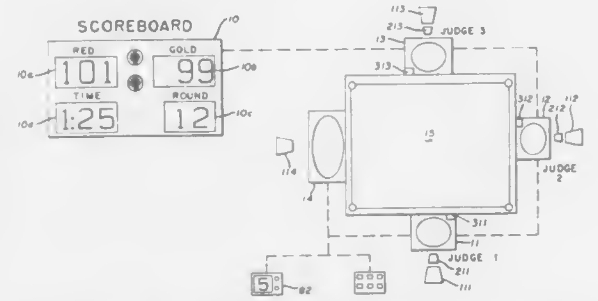
Vaughan Morrill, Jr., 26 S. Spoede Rd., Creve Coeur, Mo. 63141
Continuation-in-part of Ser. No. 504,678, Apr. 4, 1990, which is a continuation-in-part of Ser. No. 492,631, Mar. 13, 1990, which is a continuation-in-part of Ser. No. 396,561, Aug. 21, 1989, Pat. No. 4,926,543, which is a division of Ser. No. 198,762, May 25, 1988, Pat. No. 4,860,437, which is a division of Ser. No. 5,964, Jan. 22, 1987, Pat. No. 4,749,980. This application May 24, 1990, Ser. No. 528,161
Int. Cl.⁵ H01H *85/04, 85/38*
U.S. Cl. 337—297 20 Claims



1. An electric fuse comprising a dielectric sheet having a broad face with a length and breadth, the sheet having a thickness much less than either the length or breadth, an electrical conductor on the broad face of the sheet, the conductor including a fusible link, and a dielectric synthetic polymer adhesive over the link, the adhesive bonding to the link and to the sheet.

5,027,102
SCORING SYSTEM FOR ATHLETIC EVENTS

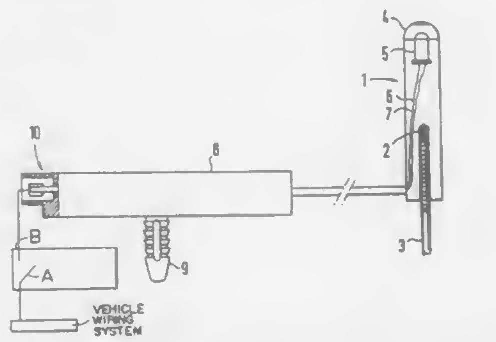
Edward J. Sweeny, Rte. 4, Airport Park, Petersburg, Va. 23803
Filed Sep. 15, 1989, Ser. No. 407,649
Int. Cl.⁵ G08B *23/00*
U.S. Cl. 340—323 R 16 Claims



1. A scoring system for athletic contests wherein one or more judges are positioned about the locus of the contest, comprising:
- (a) signalling means positioned adjacent each judge;
- (b) a computer connected to said signalling means for recording and totalling the input from said signalling means and establishing a score for each contestant therefrom;
- (c) audience observable display means connected to said computer for displaying the score for each contestant;
- (d) a first non-audience observable display means for displaying the input from each signalling means;
- (e) a second non-audience observable display means disposed adjacent each judge for recording and displaying the score recorded by each judge;
- (f) a first camera disposed adjacent each judge and positioned so as to record the action of the contest from substantially the same perspective as the judge;
- (g) a second camera disposed adjacent each judge and positioned so as to record the data recorded on said second non-audience observable display means; and
- (h) means for superimposing the image from said second camera on the image from said first camera.

5,027,103
ARRANGEMENT FOR VISUALLY INDICATING THE READINESS OF A VEHICLE ALARM SYSTEM

Hans Weiner, Mühlacker, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany
Continuation of Ser. No. 371,756, Jun. 27, 1989, abandoned. This application Apr. 13, 1990, Ser. No. 508,461
Claims priority, application Fed. Rep. of Germany, Jun. 25, 1988, 3821561
Int. Cl.⁵ B60Q *9/00*
U.S. Cl. 340—426 11 Claims



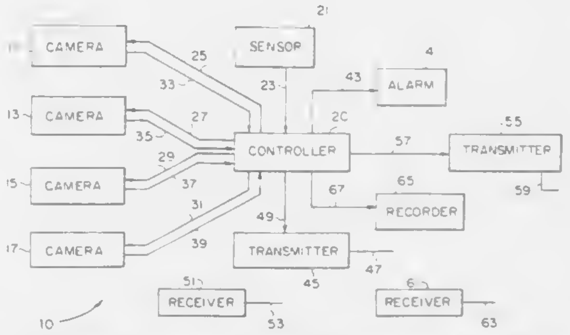
1. An arrangement for the visual indication of the readiness of a vehicle alarm system or of the locked condition of a vehicle door, comprising: an electro-optical indicating element arranged in the area of a locking system of the vehicle being controlled by at least one switching contact actuated when the alarm system is set to be operative or when the vehicle door is locked, wherein the electro-optical indicating element is inserted into a locking button of the locking system, and

electronic power supply means for supplying power wirelessly to the electro-optical indicating element, said electronic power supply means including a pair of coils,

wherein the electro-optical indicating element is operable to flash in a flashing mode with a no-pulse period which is relatively long in comparison to the duration (Tb) of a flashing pulse (b).

5,027,104
VEHICLE SECURITY DEVICE

Donald J. Reid, 12 Vernon Pl., Smithtown, N.Y. 11787
Filed Feb. 21, 1990, Ser. No. 483,543
Int. Cl.⁵ G08B *13/00*
U.S. Cl. 340—541 6 Claims



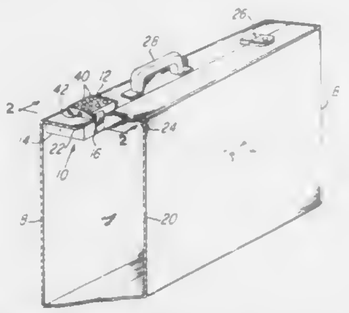
1. An improved security device, mounted in a vehicle having a passenger compartment and comprising:
- (a) a plurality of cameras, at least one of said cameras being mounted in said vehicle but outside said passenger compartment;
- (b) first sensor means of sensing an intrusion condition and second sensor means for sensing striking of the vehicle from outside;
- (c) controller means for receiving signals from said first sensor means indicative of an intrusion and, responsive thereto, activating one of said cameras and further wherein when said controller means receives signals from said second sensor means indicative of a striking of said vehicle, responsive thereto, said controller means activates all of said plurality of cameras;
- (d) said controller means receiving program signals from said cameras;
- (e) first transmitter means for transmitting wireless alarm signals to a remote first receiver responsive to said controller means receiving said program signals;
- (f) second transmitter means for concurrently transmitting further wireless program signals to a remote second receiver, said wireless program signals corresponding to said program signals and;
- (g) recorder means for recording said program signals.

VOL
1127
ISS
4
JE
25
1991
UMI

5,027,105
MOTION DETECTORS AND SECURITY DEVICES INCORPORATING SAME

Thomas A. Dailey, 6300 Carey, Cincinnati, Ohio 45224; Alfred A. Dailey, 3493 Sunbury La., Cincinnati, Ohio 45239, and Richard J. Dailey, 7145 Laboiteaux Ave., Cincinnati, Ohio 45239

Filed Mar. 8, 1988, Ser. No. 165,289
Int. Cl.^{5} G08B *13/14*
U.S. Cl. 340—571 20 Claims



17. A brief case, in combination with a security device,
- said brief case having opening-defining portions movable between a juxtaposed, closed position and a spaced, open position,
- said security device comprising an alarm, a motion detector and electrical means for energizing the alarm in response to a motion signal from said detector, switch means for controlling said electrical means, and conductor means interconnecting said switch means and electrical means,

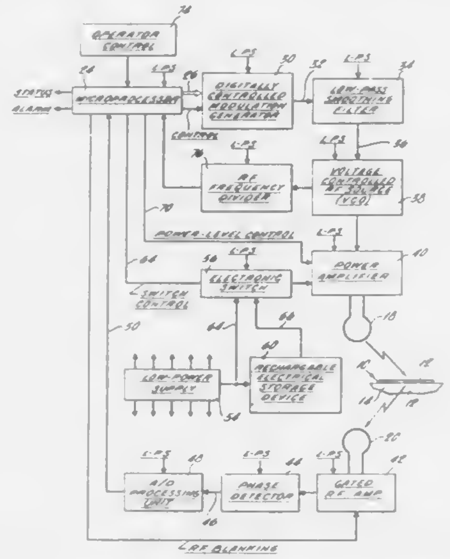
characterized in that
- the switch means are detachably mounted on the exterior of said brief case,
- the alarm, the motion detector and the electrical means are detachably mounted interiorly of said brief case, and
- the conductor means extends between the juxtaposed portions of the brief case in their closed position,
- whereby the security device may be removed from the brief case and used in combination with another brief case or for other security purposes.

5,027,106
METHOD AND APPARATUS FOR ELECTRONIC ARTICLE SURVEILLANCE

Phillip J. Lizzi, Deptford, N.J., and Paul A. Capone, Norristown, Pa., assignors to Checkpoint Systems, Inc., Thorofare, N.J.

Filed Dec. 27, 1989, Ser. No. 457,273
Int. Cl.^{5} G08B *13/14;* H02J *7/00*
U.S. Cl. 340—572 10 Claims

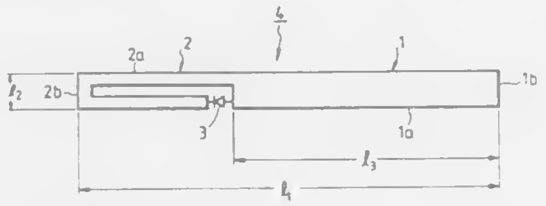
1. In an electronic article surveillance system:
- transmitter means operative, when supplied with low operating supply power from a low-power DC source, to transmit first oscillatory search signals of a first low-power level at the resonant frequency of a tag circuit to be detected, and to transmit second oscillatory deactivation signals of a second higher power level when supplied with higher DC operating supply power from a higher powered DC source;
- a low-power DC supply source for supplying said low operating supply power to said transmitter means during transmission of said oscillatory search signals of said first low-power level;
- rechargeable electronic storage means, and means connecting said rechargeable electronic storage means so as to be charged by said low power DC supply source in the times between transmissions of said second oscillatory deactivation signals; and
- electronically controlled switch means for connecting said rechargeable electronic storage means to supply said higher operating power to said transmitting means when it is transmitting said deactivation signals.



5,027,107
FREQUENCY SENSOR

Yasuhiro Matsuno, Yanai; Hajime Terakado, Toshima; Masaru Mochizuki, Nakakoma; Heiji Moroshima, Koufu, and Hiroyuki Kamei, Suita, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Tokyo Electronics Co., Ltd., Ohme, both of, Japan

Filed Jun. 27, 1989, Ser. No. 371,776
Claims priority, application Japan, Jul. 6, 1988, 63-168098
Int. Cl.^{5} G08B *13/14*
U.S. Cl. 340—572 22 Claims



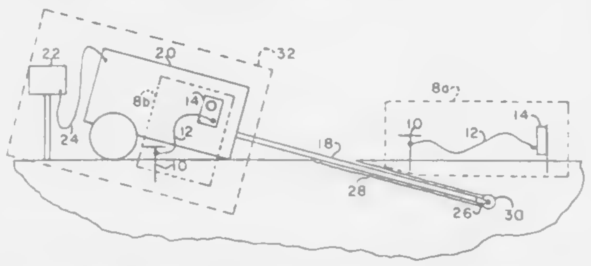
1. A frequency sensor comprising:
- a receiving antenna portion for receiving radio waves;
- a transmitting antenna portion for radiating radio waves; and
- a diode connected between said receiving and transmitting antenna portion, said diode serving to convert a high frequency signal induced in said receiving antenna portion into a signal of a higher frequency equivalent to an integral multiple of an input frequency, and supplying the converted signal to said transmitting antenna portion;
- wherein said transmitting antenna portion is shaped into a closed loop and is disposed outside of said receiving antenna portion so as to arrange said transmitting and receiving antenna portions linearly.

5,027,108
BURIED POWER LINE CONTACT ALERT

Alden J. Gray, P.O. Box 51, Ashfield, Mass. 01330

Filed Mar. 5, 1990, Ser. No. 487,830
Int. Cl.^{5} G08B *21/00*
U.S. Cl. 340—662 5 Claims

1. A method that produces a warning signal when either grounded and ungrounded conductive excavating equipment causes damage to an underground power cable and at least momentarily shorts to earth including:
- locating an excavation site and before excavation begins, placing means for directly, electrically contacting the earth in close enough proximity to said excavating equipment to monitor the condition of any power cables in the path of said excavating equipment,

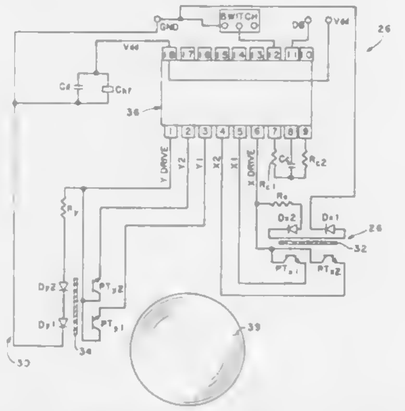


- placing said means for directly, electrically contacting the earth at two isolated spaced points in the vicinity of, but not contacting said excavating equipment,
- sensing a voltage difference between said two spaced points, said voltage difference being produced by a power signal normally carried on said power cable, and
- immediately activating an alarm when said voltage difference exceeds a preset value.

5,027,109
APPARATUS AND METHOD FOR MINIMIZING UNDESIRED CURSOR MOVEMENT IN A COMPUTER CONTROLLED DISPLAY SYSTEM

Paul M. Donovan, 200 Elm St., Menlo Park, Calif. 94025, and Swee T. Chia, BLK 824, Yiishun Street 81 #02-590, Singapore, Singapore 2776

Filed Jun. 8, 1989, Ser. No. 363,586
Int. Cl.^{5} G09G *5/08*
U.S. Cl. 340—706 32 Claims

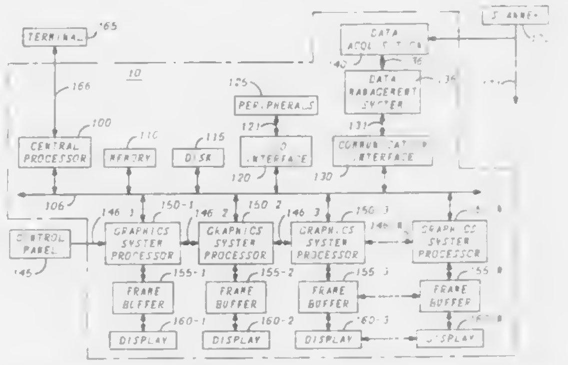


1. A method of minimizing undesired cursor movement in a computer controlled display system, comprising the steps of:
- (a) providing a cursor control device capable of generating an electrical signal indicative of a position of said cursor control device;
- (b) sampling at least two temporally spaced portions of said electrical signal, each of said portions being within a designated period of time, said period of time being a function of the predicted rate of movement of said cursor control device;
- (c) comparing said at least two temporally spaced portions with each other and to an electrical signal previously sampled; and
- (d) analyzing said comparisons for determining whether the cursor should be signaled to move on the display of said computer controlled display system.

5,027,110
ARRANGEMENT FOR SIMULTANEOUSLY DISPLAYING ON ONE OR MORE DISPLAY TERMINALS A SERIES OF IMAGES

Christina L. Chang, Belford, N.J.; Jesus M. Gaeta, Chagrin Falls, Ohio; Kathleen G. O'Malley, Woodbridge, and Stuart W. Rowland, Red Bank, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 5, 1988, Ser. No. 279,696
Int. Cl.^{5} G09G *5/00*
U.S. Cl. 340—731 8 Claims



1. An arrangement for displaying a series of images comprising
- at least one display unit, said display unit having a display whose resolution is insufficient for simultaneously displaying each of said series of images,
- means, responsive to a request entered by a user of said arrangement, for forming, in accordance with a predetermined reduction ratio, a spatially reduced copy of each of said series of images and for simultaneously displaying each such copy on said at least one display unit, and
- means thereafter responsive to another request entered by said user for simultaneously displaying on said display in full spatial resolution that one of said displayed series of images at which a screen cursor is positioned including a predetermined number of succeeding ones of said displayed series of images.

5,027,111
LIQUID-CRYSTAL DISPLAY UNIT FOR ELECTRONIC DIRECTORY

William R. Davis, Pasadena; Dennis W. Mowers, Woodland Hills; Richard P. Greenthal, Los Angeles; Paul Szymanski, Simi Valley; Ronald A. Wray, North Hollywood, and Richard A. Davidson, Chatsworth, all of Calif., assignors to Sentex Systems, Incorporated, Chatsworth, Calif.

Filed Jul. 7, 1988, Ser. No. 215,992
Int. Cl.^{5} G09G *3/36*
U.S. Cl. 340—784 25 Claims

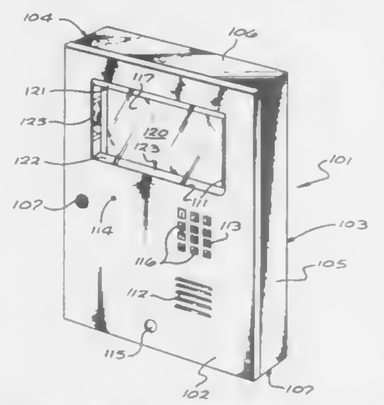
1. A vandalism-resistant and weather-resistant display unit for an outdoor-installed electronic directory, comprising:
- a substantially vandalism-resistant and weather-resistant case for outdoor installation;
- a liquid-crystal display, mounted within the case, and having a display medium and a structure for containing the display medium;
- the liquid-crystal display structure comprising a face disposed in front of the medium, for displaying directory information outdoors in the form of a directory;
- means, at least partially mounted within the case, for protecting the liquid-crystal display against vandalism and rainwater and for maintaining the temperature of the liquid-crystal display medium and structure between practical operating limits for the display, notwithstanding ambient temperature and humidity variations over generally normal ranges for at least the temperate zones, and even if the display unit is placed to receive direct sunlight

VOL
1127
ISS
4
JE
25
1991
UMI

when the sun is out; the protecting and temperature-maintaining means comprising:

an external viewing window mounted to the case and generally spaced away from the liquid-crystal display structure face, along a viewing direction, to protect the liquid-crystal display and to define an air-circulation region immediately adjacent to the face;

means defining an intake plenum leading from the outside of the case to the air-circulation region, and a separate exhaust plenum leading from the air-circulation region to the outside of the case, each plenum being long and narrow enough to substantially deter manual access to the liquid-crystal display through the plena; and



at least one fan disposed to circulate outdoors ambient air from the intake plenum through the air-circulation region to the exhaust plenum to reduce heating by the sun; and

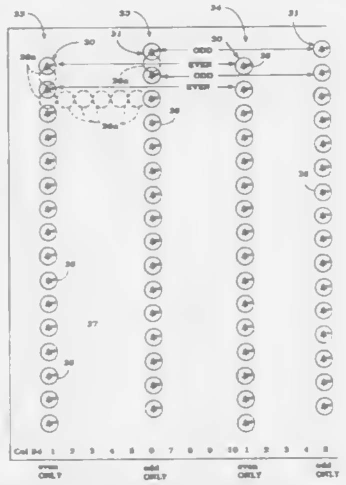
solid-state digital electronic circuitry, electrically interconnected with the liquid-crystal display, for electronically storing directory information and for controlling the liquid-crystal display unit to automatically exhibit stored directory information in the form of a directory having multiple listings in an alphabetical or like order or in classified groupings.

5,027,112
GRAPHIC DISPLAY SYSTEMS

John Ross, Dalkeith, and Amedeo F. Sala-Spini, Dianella, both of Australia, assignors to Ran Data Pty. Ltd., Perth, Australia
PCT No. PCT/AU85/00205, § 371 Date Jun. 29, 1987, § 102(e) Date Jun. 29, 1987, PCT Pub. No. WO87/01493, PCT Pub. Date Mar. 12, 1987
PCT Filed Aug. 29, 1985, Ser. No. 86,045
Claims priority, application Australia, Aug. 20, 1985, 46526/85
Int. Cl.⁵ G09G ***3/26;*** **G04C** ***17/00***
U.S. Cl. 340—792 **16 Claims**

1. A display system for depicting a moving image of a graphic of the type herein defined comprising:

(i) a display means having a display area and an activating means; said display area being defined by an array of first and second groups of elements arranged in the form of a matrix having a series of rows and columns, each element of said first and second groups forming a cell of the matrix, said rows being arranged parallel to the intended direction of movement of said image and said columns being arranged orthogonal to said intended direction of movement; and wherein said element of said first and second groups is an image source operable to emit an image, said image being a portion of said graphic on activation thereof, said first group of elements located in selected rows of said matrix, wherein successive elements of said first group in the same row are spaced apart by one or more columns having a group of coplanar, non-image source elements in said same row which do not emit a portion of said graphic, and a second group of elements of similar formation to said first group of elements but located in other selected rows of said matrix, wherein said second group of elements are disposed in interlacing fashion relative to said first group such that one element of said second group is disposed intermediate to a pair of successive elements of said first group in an adjacent row to the row of said one element, and a cell occupied by an image source in one said group of elements partially overlaps with an immediately adjacent cell in the same column, said adjacent cell being defined by a non-image source element disposed in a row of another said group of elements; and said activating means being associated with each of said image sources to activate an image source in response to the generation of a corresponding electrical signal; and



(ii) a controller means for generating a set of said electrical signals in sequential groups, each set providing encoded data of a sample portion of said graphic to be represented by one column of said matrix at a prescribed instant, and successive groups of said sets providing further encoded data of successive sample portions of said graphic to be represented by said one column at successive prescribed instants, the period between successive prescribed instants being a display state period of said image, said encoded data being sequentially provided to be represented by successive columns of said matrix at said successive prescribed instants, wherein only those rows of image sources within a column of said matrix are activated for which an electrical signal has been generated in accordance with said encoded data.

5,027,113
PROCESS FOR SIMULTANEOUSLY CHECKING THE AUTHENTICITY OF INFORMATION MEDIA AND THE AUTHENTICITY OF THE INFORMATION ITSELF

Michel Bonnaval-Lamothe, "Côte Belle" , 33410 Cadillac sur Garonne, and Renaud Marchand, Lastresne, both of France, assignors to Michel Bonnaval-Lamothe, Cadillac sur Garonne, France
Continuation of Ser. No. 208,494, Jun. 20, 1988, abandoned.
This application Aug. 21, 1990, Ser. No. 570,994
Claims priority, application France, Jun. 18, 1988, 87 08768
Int. Cl.⁵ G07D ***7/00;*** **G06K** ***5/00***
U.S. Cl. 340—825.34 **12 Claims**

1. A process for authenticating an information media and information located on the media comprising the steps of:

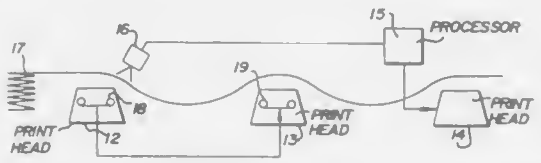
scanning a portion of said information located on said media and transforming it into a first sampling in the form of an electrical signal,

recognizing said information from said first sampling,

processing said first sampling by an algorithm that takes into consideration unique deviations of an actual configuration of said information of said media from an expected configuration of said information to produce a characterized first sampling,

saving said characterized first sampling in memory or by recording directly on said media,

scanning said actual configuration of said information under the same conditions and transforming it into a successive sampling in the form of an electrical signal,

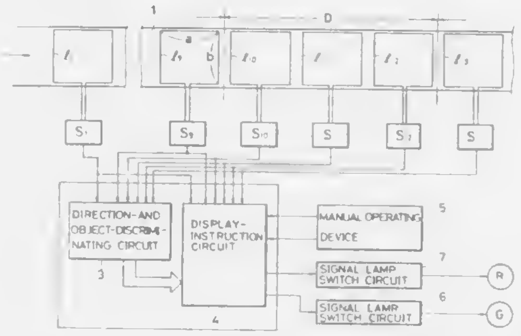


recognizing said information from said successive sampling, and

processing said successive sampling by said algorithm to produce a characterized successive sampling, comparing said characterized first sampling with said characterized successive sampling.

5,027,114
GROUND GUIDANCE SYSTEM FOR AIRPLANES

Kiroshi Kawashima, 14-18, Kamirenjaku 3-chome, Mitaka-shi, Tokyo 181; Koichi Futsuhara, 92-3, Uetake-cho 1-chome, Omiya-shi, Saitama 330, and Fumio Wada, 158, Hirogayado, Urawa-shi, Saitama 336, all of Japan
PCT No. PCT/JP87/00367, § 371 Date Aug. 15, 1988, § 102(e) Date Aug. 15, 1988, PCT Pub. No. WO88/09982, PCT Pub. Date Dec. 15, 1988
PCT Filed Jun. 9, 1987, Ser. No. 249,173
Int. Cl.⁵ G08G ***1/01***
U.S. Cl. 340—941 **36 Claims**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D
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b
S
DIRECTION-AND OBJECT-DISCRIMI-NATING CIRCUIT
DISPLAY-INSTRUCTION CIRCUIT
MANUAL OPERATING DEVICE
SIGNAL LAMP SWITCH CIRCUIT
SIGNAL LAMP SWITCH CIRCUIT
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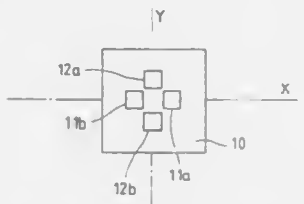
1. A ground guidance system for airplanes in an airplane taxiway divided in a plurality of control sections, which comprises a plurality of loop coils in which the side parallel to the direction of advance of airplanes has a length larger than the length of an automobile but smaller than the length of an airplane and which are arranged in the direction of advance of airplanes in the control sections at intervals smaller than the length of an airplane, a plurality of airplane-detecting means arranged for the respective loop coils to generate detection outputs indicating the presence or absence of an airplane based on changes of self-inductances of the corresponding loop coils, display means for displaying admission of advance or inhibition of advance in the control sections for an airplane, and control means of controlling said display means based on detection outputs of a plurality of said airplane-detecting means,

wherein the airplane-detecting means is constructed so that a high-level output is generated at the time of non-detection of an airplane and a low-level output is generated at the time of detection of an airplane, and at the time of a failure, the output errs to a voltage corresponding to said low-level output at the time of detection of an airplane,

said airplane-detecting means comprising a high-frequency signal generator, a bridge circuit including three resistors and a resonance circuit consisting of one said loop coil and a capacitor, which becomes substantially resonant with the output frequency of the high-frequency signal generator, an alternating current amplifier for amplifying the output of the bridge circuit, a wave-detecting circuit for detecting an envelope of the amplified output of the alternating current amplifier, a window comparator having such a window characteristic that the output signal of the wave-detecting circuit is received as the input signal, the output level of the wave-detecting circuit obtained when an airplane is not present in the taxiway is within the window and the output level of the wave-detecting circuit obtained when an airplane is present and the self-inductance of the loop coil is changed is outside the window, and generating an output when an input signal of the level within the window is put in, and a voltage multiplying rectifying circuit for rectifying the output of the window comparator.

5,027,115
PEN-TYPE COMPUTER INPUT DEVICE

Kimikatsu Sato, Sagamihara; Ryuichi Toyoda, Yokohama, and Takeshi Masaki, Kawasaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan
Filed Aug. 31, 1990, Ser. No. 575,767
Claims priority, application Japan, Sep. 4, 1989, 1-228512
Int. Cl.⁵ H03K ***13/02;*** **G09G** ***3/00;*** **G06F** ***3/00***
U.S. Cl. 341—13 **5 Claims**



1. A pen-type computer input device comprising:

a shank having a tip end;

a ball rotatably supported on said tip end, said ball having a plurality of identifiable regions on an outer peripheral surface thereof; and

means including a sensor unit for detecting said identifiable regions in response to rotation of said ball, and for detecting directions in which said ball rotates and distances by which said ball moves in two perpendicular directions in a plane, and producing an output signal representative of said directions and distances.

5,027,116
SELF-CALIBRATING ANALOG TO DIGITAL CONVERTER

Michael Armstrong, San Jose, and Paul R. Gray, Orinda, both of Calif., assignors to Micro Linear Corporation, San Jose, Calif.
Filed Feb. 24, 1987, Ser. No. 18,019
Int. Cl.⁵ H03M ***1/10***
U.S. Cl. 341—120 **13 Claims**

13. A self-calibrating algorithmic analog to digital converter with reduced input charge injection offset comprising:

means for receiving an analog signal;

means for sampling said analog signal;

means for holding a sample;

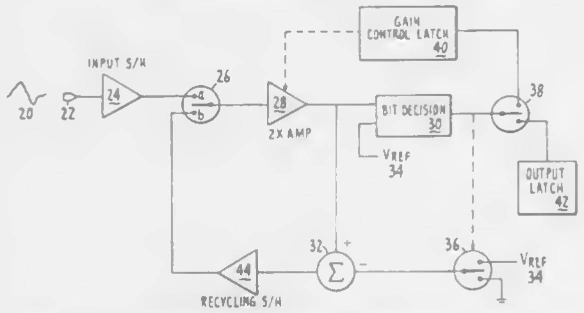
algorithmic means for converting said sample into digital information, bit by bit, one bit per cycle of said algorithm, by sequentially comparing and acting upon said sample to a reference voltage through a gain-of-two amplifier stage with inverting and non-inverting inputs, where a loop gain

VOL
1127
ISS
4
JE
25
1991
UMI

of said comparison sequence is controlled by a ratio of input capacitance to feedback capacitance;

means for causing said sample to be equal to said reference voltage;

means for increasing or decreasing as appropriate a value of said input capacitance to calibrate said loop gain said input capacitance having a plurality of switched capacitors;



means for storing said adjustment to said input capacitance;

means for initiating calibration cycles;

means for electrically connecting said inverting input to said non-inverting inputs through a low impedance path,

whereby said loop gain of said comparison sequence is calibrated to a predetermined desired value in order to obtain accurate analog to digital conversions.

5,027,117
CONVERSION USING A VARIABLE REFERENCE BASED ON IMAGE DENSITY

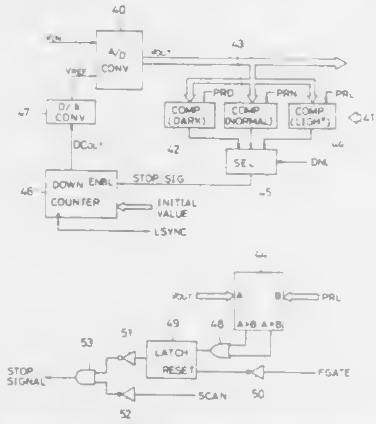
Yoshiki Yoshida; Kiyoto Nagasawa, and Yoshinobu Kagami, all of Yokohama, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 24, 1989, Ser. No. 328,454

Claims priority, application Japan, Mar. 31, 1988, 63-78667

Int. Cl.^{5} H03M *1/34;* H04N *1/40*

U.S. Cl. 341—132 **14 Claims**



1. An apparatus for converting an analog image signal to a digital image signal based on a reference voltage, comprising:

counter means, having a control terminal, for counting a first signal and outputting a counted value in digital form;

digital-to-analog (D/A) converting means, connected to said counter means, for converting said counted value to an analog voltage signal served as said reference voltage;

analog-to-digital (A/D) converting means, connected to said D/A converter means, for converting said analog image signal to said digital image signal based on said reference voltage generated by said D/A converting means; and

comparing means, connected to said A/D converter means, for comparing in magnitude said digital image signal and a threshold level used for limiting the magnitude of said digital image signal, thereby outputting a control signal based on the results of comparison.

said counter means continuing to count said first signal until said control signal derived from said comparing means is supplied to said control terminal of said counter means,

wherein said comparing means comprises a plurality of comparators, each of which is supplied with corresponding threshold levels each used for limiting the magnitude of said digital image signal, and selection means for selecting one of the plurality of comparators and coupling the selected one of said comparators to said control terminal of said counter means.

5,027,118
ANALOG SIGNAL LOGARITHMIC ENVELOPE DETECTOR

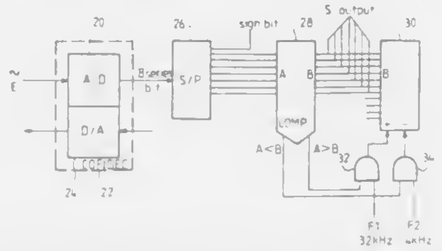
Jean Nicolai, Aix en Provence, France, assignor to SGS Thomson Microelectronics S.A., Gentilly, France

Filed Sep. 12, 1989, Ser. No. 406,158

Claims priority, application France, Sep. 16, 1988, 88 12119

Int. Cl.^{5} H03M *1/62*

U.S. Cl. 341—132 **5 Claims**



1. An analog signal envelope detector including a logarithmic compression analog-digital coder having analog signal input terminals and digital signal output terminals, a digital counter having a counter input and a countdown input, a digital comparator connected, firstly, to the digital output terminals of the coder and, secondly, to the outputs of the counter, and a control logic circuit connected to the output of the comparator and capable of controlling the incrementation of the counter at a first frequency, or the decrementation of the counter at a second frequency which is different from the first frequency, depending on the state of the counter, the output of the detector being connected to receive signals from the outputs of the counter.

5,027,119
NOISE SHAPING REQUANTIZATION CIRCUIT

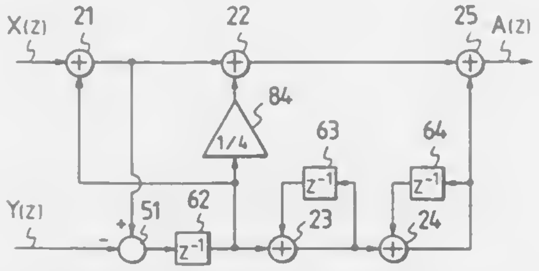
Kazuya Toyomaki, Sagamihara, Japan, assignor to Victor Company of Japan, Ltd., Japan

Filed Jun. 5, 1990, Ser. No. 533,639

Claims priority, application Japan, Jun. 5, 1989, 1-142346

Int. Cl.^{5} H03M *3/00*

U.S. Cl. 341—144 **2 Claims**



1. A noise shaping requantization circuit for converting an input digital signal, which has a high degree of resolution and has been generated using an original sampling frequency, to a requantized output digital signal having a lower degree of resolution that the input digital signal by using a resampling frequency that is higher than the original sampling frequency, comprising:

input terminal means (1) coupled to receive said input digital signal;

operational circuit means (3) coupled to receive said input digital signal from said input terminal means to produce an output signal;

output terminal means (2); and

quantizer circuit means (4) coupled to receive said output signal from said operational circuit means for producing said requantized output digital signal and for supplying said requantized output signal to said output terminal means and to said operational circuit means for producing an output signal A(z) from said operational circuit means;

wherein, respectively expressing said input digital signal as X(z), said requantized output digital signal as Y(z), said output signal from said operational circuit means as A(z), and a unit delay time corresponding to a resampling period as z^{-1}, the signal A(z) is expressed as follows:

$$X(z) + z^{-1}\left\{ \frac{b}{1 - z^{-1}} + \frac{c}{(1 - z^{-1})^2} + \frac{d}{(1 - z^{-1})^3} + \frac{e}{(1 - z^{-1})^4} \right\} \{X(z) - Y(z)\}$$

where respective constants b, c, d and e simultaneously satisfy all of the following relationships:

$b \geqq \frac{1}{2}, e \geqq 0, d + e > 0$

$b(d + e)(c + d + e) - b^2e - 1.2(d + e)^2 > 0$

$8b + 4c + 2d + e < 15$

$8b + 4c + 2d < 14 + e.$

5,027,120
DELTA-SIGMA CONVERTER WITH BANDPASS FILTER FOR NOISE REDUCTION IN RECEIVERS

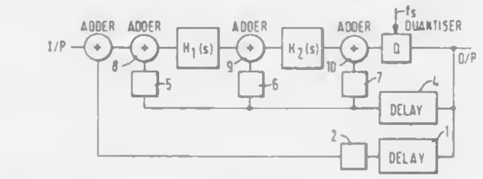
Andrew M. Thurston, Springfield, United Kingdom, assignor to GEC-Marconi Limited, Middlesex, United Kingdom

Filed May 25, 1990, Ser. No. 528,977

Claims priority, application United Kingdom, May 26, 1989, 8912137; Apr. 24, 1990, 9009197

Int. Cl.^{5} H03M *3/00*

U.S. Cl. 341—143 **26 Claims**



1. Analogue-to-digital converter comprising bandpass filter means for filtering a signal derived from an analogue input signal, digitising means for producing, at sampling instants, samples at one of a discrete number of values corresponding to a signal derived from the output of the bandpass filter means, a feedback loop feeding a signal derived from the output of the digitising means to the bandpass filter means, the circuit being arranged to produce a minimum in quantisation noise in the passband of the filter means, in which there is provided means for producing a phase offset between the fedback pulses and the sampling instants of the digitising means to produce a desired response of the bandpass filter means at the sampling instants to a single fedback pulse.

5,027,121
VIDEO PROCESSOR FOR A COUNTER-COUNTERMEASURE SYSTEM

Burton L. Hulland, Glenwood Landing, N.Y., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 9, 1968, Ser. No. 743,536

Int. Cl.^{5} G01S *7/36*

U.S. Cl. 342—16 **7 Claims**

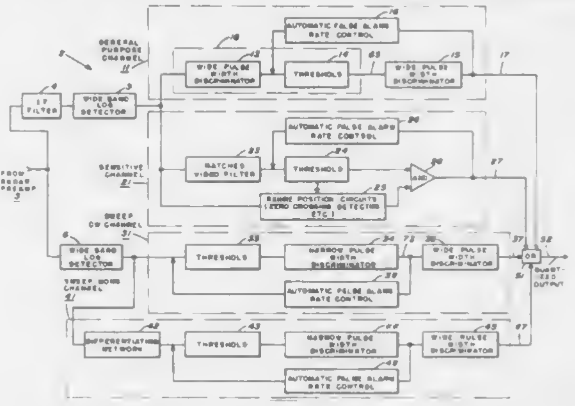
1. A video processor for use in a radar counter-countermeasure system to distinguish between target signals and jamming signals comprising

an input means from said radar wherein target signals and jamming signals are provided;

four channel means connected in parallel to said input means to discriminate between a target signal and a jamming signal wherein a quantized output is produced in any of said channel means when a target signal is present;

said first channel means being operable to produce a quantized output signal when a target signal is present by utilizing wide pulse discrimination and narrow pulse discrimination;

said second channel means being operable to optimize sensitivity in the presence of continuous thermal noise jamming by the identification of the center of a received signal pulse and produce a quantized output signal when a target signal is present;


GENERAL PURPOSE CHANNEL 11
AUTOMATIC PULSE ALARM RATE CONTROL
WIDE PULSE WIDTH DISCRIMINATOR
THRESHOLD
WIDE PULSE WIDTH DISCRIMINATOR
IF FILTER
WIDE BAND LOG DETECTOR
AUTOMATIC PULSE ALARM RATE CONTROL
FROM RADAR PREAMP
SENSITIVE CHANNEL 21
MATCHED VIDEO FILTER
THRESHOLD
AND
RANGE POSITION CIRCUITS (ZERO CROSSING DETECTOR ETC.)
SWEEP CW CHANNEL 31
WIDE BAND LOG DETECTOR
THRESHOLD
NARROW PULSE WIDTH DISCRIMINATOR
WIDE PULSE WIDTH DISCRIMINATOR
OR
QUANTIZED OUTPUT
SWEEP NOISE CHANNEL 41
AUTOMATIC PULSE ALARM RATE CONTROL
DIFFERENTIATING NETWORK
THRESHOLD
NARROW PULSE WIDTH DISCRIMINATOR
WIDE PULSE WIDTH DISCRIMINATOR
AUTOMATIC PULSE ALARM RATE CONTROL

said third channel means being operable to provide a quantized output signal in the presence of high rate CW swept jamming by utilizing short pulse discrimination;

said fourth channel means being operable to provide a quantized output signal in the presence of swept noise jamming by measuring the degree of amplitude fluctuation of a pulse; and

output means connected to said four channel means to provide a quantized output whenever a target signal is present in any of said four channel means.

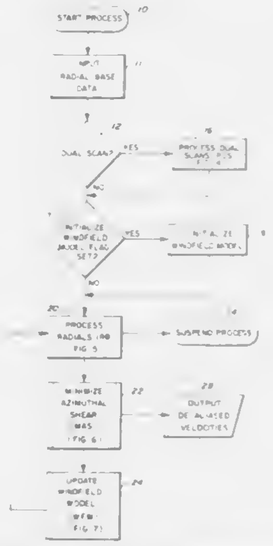
5,027,122
METHOD AND APPARATUS FOR DOPPLER VELOCITY DE-ALIASING

James G. Wieler, Medway, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Mar. 12, 1990, Ser. No. 491,770

Int. Cl.^{5} G01S *13/95*

U.S. Cl. 342—26 **36 Claims**



1. A method of operating a processing apparatus of a radar

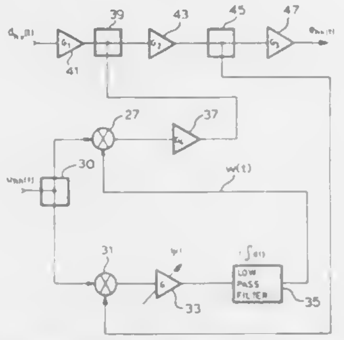
VOL
1127
ISS
4
JE
25
1991
UMI

system for real time de-aliasing of Doppler velocity data comprising the steps of:
- storing initialization data for a Windfield Model;
- adjusting a variable resolution of said Windfield Model depending on an elevation angle and retaining a vector component of the true wind in a plurality of sectors of said Windfield Model;
- processing each range gate return signal of said velocity data along a radar dwell by examining adjacent data along said radar dwell and de-aliasing in accordance with an average of previous range gates when said velocity data is continuous and when said velocity data is not continuous using data from said Windfield Model;
- operating on said processed velocity data by examining adjacent velocity data of said radar dwells in an azimuthal direction to minimize azimuthal velocity differences; and
- updating said Windfield Model with said de-aliased velocity data.

5,027,123
ADAPTIVE INTERFERENCE CANCELLER

Simon Haykin, 475 Ontario Street, Ancaster, Ontario, Canada L9G 3N6 , and Andrew Ukrainec, 28 Stroud Street, Hamilton, Ontario, Canada L8S 1Z6

Filed May 29, 1990, Ser. No. 529,457
Claims priority, application Canada, Jun. 26, 1989, 603935
Int. Cl.^{5} G01S *13/534*
U.S. Cl. 342—188 **11 Claims**



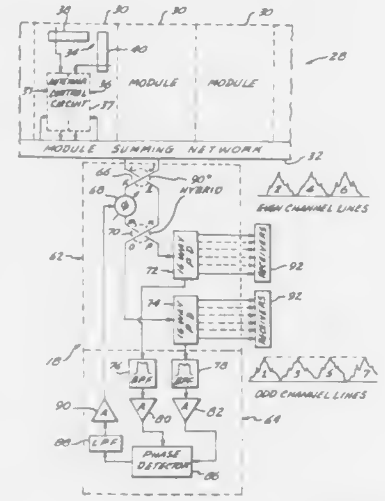
1. In a dual polarized radar system for transmitting a signal in a predetermined polarization plane, receiving cross-polar and like-polar reflected signals, and detecting said cross-polar signal in the presence of said like-polar signal, wherein said cross-polar signal contains an interference component in the form of a variable gain version of said like-polar signal, an adaptive interference canceller, comprising:
- (a) an adaptive filter with a self-adjusting impulse response for filtering said like-polar signal and in response generating an adaptive weighted version of said like-polar signal; and
- (b) means for subtracting said adaptive weighted like-polar signal from said cross-polar signal and in response generating an output signal corresponding to said cross-polar signal with said interference component cancelled therefrom.

5,027,124
SYSTEM FOR MAINTAINING POLARIZATION AND SIGNAL-TO-NOISE LEVELS IN RECEIVED FREQUENCY REUSE COMMUNICATIONS

George W. Fitzsimmons, and Bernard J. Lamberty, both of Kent, Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Mar. 17, 1989, Ser. No. 325,450
Int. Cl.^{5} H01Q *21/06, 21/24*
U.S. Cl. 342—362 **25 Claims**

1. A movable system for receiving staggered frequency reuse communications from a referentially fixed source, said system comprising:
- a controllable antenna for receiving said frequency reuse communications from the source; and

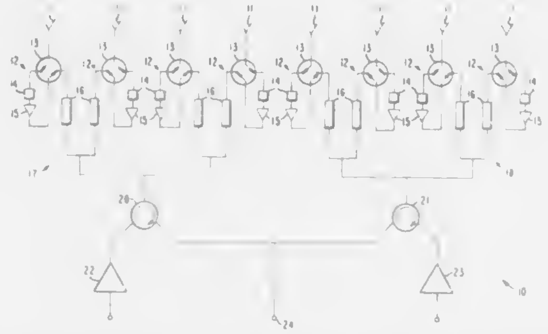


- adaptive polarization tracking means for maintaining a desired polarization of the communications received by said antenna.

5,027,125
SEMI-ACTIVE PHASED ARRAY ANTENNA

Raymond Tang, Fullerton, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 16, 1989, Ser. No. 394,467
Int. Cl.^{5} H01Q *3/26*
U.S. Cl. 342—368 **24 Claims**

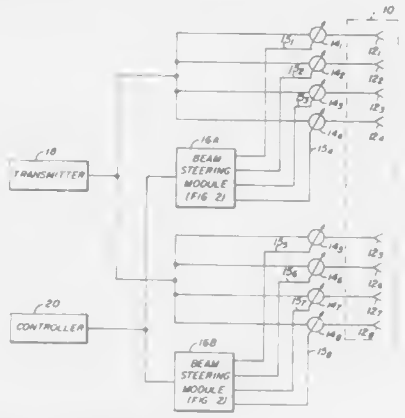


1. A semi-active phased array antenna having individual semi-active modules disposed adjacent individual antenna elements for selectively interconnecting the antenna elements with a single transmit/receive feed line in a first mode on transmit and in a second mode on receive, said modules comprising:
- a receive circuit internal to said module including a limiter and a low noise amplifier;
- a phase shifter disposed within said module;
- a single transmit/receive feed line connected to one end of said phase shifter; and
- switch means in said module connected to the other end of said phase shifter and connected to its associated antenna element and arranged to selectively switch between said first and second modes, said switch means connecting its associated antenna element to said feed line by way of said phase shifter on transmit, said switch means connecting its associated antenna element to said feed line by way of said receive circuit and said phase shifter on receive;
- whereby said phase shifter is included in the circuit from said antenna element to said transmit/receive feed line both on transmit and receive, and whereby said limiter and said low noise amplifier are bypassed on transmit.

5,027,126
BEAM STEERING MODULE

Behshad Basehgi, Santa Barbara, and Mohammad Mazooji, Santa Barbara, both of Calif., assignors to Raytheon Company, Lexington, Mass.

Filed May 17, 1989, Ser. No. 353,298
Int. Cl.^{5} H01Q *3/22*
U.S. Cl. 342—372 **12 Claims**

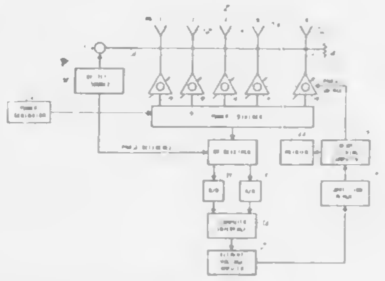


1. Circuitry comprising:
- (a) a plurality of phase shifters;
- (b) controller means for computing a plurality of commands for each phase shifter;
- (c) for each phase shifter, means for storing the plurality of commands;
- (d) a bus connecting each storing means to the controller means;
- (e) buffer means for receiving phase shifter commands from the controller over the bus;
- (f) for each phase shifter, means for selecting one of the plurality of commands from the storing means and applying the selected command to the phase shifter; and
- (g) means for simultaneously transferring a plurality of phase shifter commands from the buffer means to the means for storing.

5,027,127
PHASE ALIGNMENT OF ELECTRONICALLY SCANNED ANTENNA ARRAYS

Harold Shnitkin, Roslyn, N.Y., and Glenn B. Harrison, Fairfield, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 10, 1985, Ser. No. 786,388
Int. Cl.^{5} H01Q *3/30*
U.S. Cl. 342—372 **2 Claims**



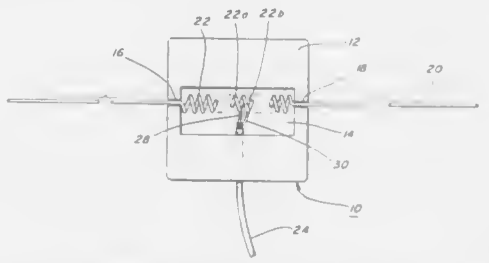
1. A radar system comprising:
- an rf power generator;
- an antenna having a plurality of radiating elements;
- a corresponding plurality of controllable phase adjustment means for adjusting the phase of rf power coupled into said radiating elements, whereby a beam direction of radiation emitted from said antenna may be steered by phase control;
- rf receiver means for receiving radar return signals detected by said antenna and passing through said plurality of phase adjustment means;
- adjustable phase control means for controlling said controllable phase adjustment means;
- test means for generating an rf test signal;
- test distribution means for distributing said rf test signal to predetermined components of said radar system;
- means for forming a set of correction parameters to said controllable phase adjustment means; and
- means for automatically adjusting said adjustable phase control means in accordance with said set of correcting parameters, whereby said phase control means may be calibrated;

characterized in that:
- said antenna is a corporate feed antenna, whereby signals pass along connecting conductive elements between said antenna, said plurality of output power connecting means and said rf power generator;
- said test distribution means is connected to a set of output power connecting means connected between said rf power generator and said plurality of radiating elements by connecting conductive elements;
- said test distribution means includes means adapted to couple a plurality of related signals to individual ones of said controllable phase adjustment means;
- said test distribution means is connected to said test means and to a plurality of output power connecting means connected between said phase adjusting means and said radiating elements and distributes said rf test signal to said output power connecting means to simulate a radar return signal entering said plurality of radiating elements from a simulated source direction; and
- said means for forming a set of correction parameters to said controllable phase adjustment means includes means for storing a plurality of output signals from said plurality of phase adjustment means at each of a plurality of simulated source directions and generating therefrom said set of correction parameters.

5,027,128
INSIDE WINDOW ANTENNA

Herbert R. Blaese, 3314 Olcott Ave., Chicago, Ill. 60634

Filed Jan. 18, 1990, Ser. No. 466,759
Int. Cl.^{5} H01Q *1/320, 9/160*
U.S. Cl. 343—713 **4 Claims**



1. An inside window antenna, which comprises:
- a housing adapted for mounting on an inside facing side of a window;
- a dipole formed of wire radiating elements mounted within said housing, with the opposed dipole ends extending out of the housing;
- a coaxial electrical cable having a main conductor and a ground conductor;
- means connecting the main conductor of said coaxial cable to a first location on the dipole;
- means connecting the ground conductor of said coaxial cable to a second location on the dipole;
- said housing having a rear portion that is flat for attachment of the housing to the window by adhering said rear flat portion directly to the window; and
- pressure-sensitive adhesive means for mounting the housing on the window.

VOL
1127
ISS
4
JE
25
1991
UMI

5,027,129
GIMBALLED ANTENNA

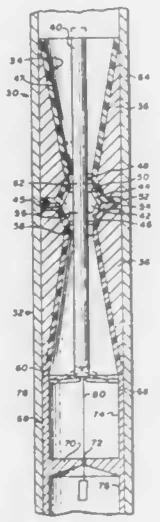
Henry S. More; Louis H. Rorden, both of Los Altos, Calif., and Neil H. Akkerman, Houston, Tex., assignors to Develco, Inc., San Jose, Calif.

Continuation of Ser. No. 865,623, May 21, 1988, Pat. No. 4,926,188. This application Oct. 11, 1989, Ser. No. 419,893

The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.

Int. Cl.^{5} H01Q *1/04*

U.S. Cl. 343—719 **8 Claims**



1. A low frequency electromagnetic subterranean antenna, for use underground as part of a borehole communication system having a communication band chosen for the antenna including:

a winding member having a hollow interior and a winding;

a core member within said interior; and

mounting means to effect mechanical isolation of the core member by mounting said core member within the winding member in a balanced, pivotally movable manner at the center of gravity of the core member within said borehole communication system so that the mechanical natural resonant frequency of the antenna is less than that of the lowest electromagnetic signal frequency of said communication band.

5,027,130
TAPERED ENERGY ABSORBING RADOME PORTION

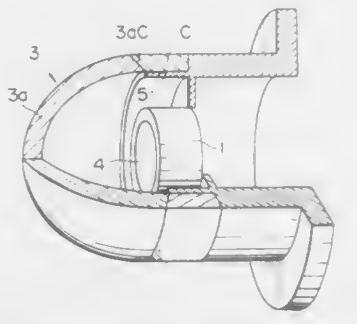
Noriyuki Akaba, and Satoshi Itoh, both of Tokyo, Japan, assignors to Tokyo Keiki Co., Ltd., Tokyo, Japan

Filed Apr. 25, 1990, Ser. No. 514,245

Claims priority, application Japan, May 15, 1989, 1-121182

Int. Cl.^{5} H01Q *1/28, 1/42*

U.S. Cl. 343—872 **16 Claims**



1. A radome comprising:

a metallic structural member;

an antenna element supported by the structural member at generally a center thereof, the antenna element generating an electromagnetic wave; and

a dielectric radome member joined to the periphery of the antenna element and being attached to and supported by the structural member, the radome member enclosing the antenna element to protect the antenna element from the ambient environment, said radome member having first and second portions, the second portion being interposed between the first portion and the structural member, the second portion being formed from a material which will absorb the electromagnetic wave while the first portion is formed from a material which will permit transmission of the electromagnetic wave generated by the antenna element, a boundary between the first portion and second portion being tapered.

5,027,131
RECORDING MEDIUM INCLUDING AN INK-RETAINING LAYER AND AN INK-TRANSPORTING LAYER OF SPECIFIC SIZED PARTICLES AND PROCESS EMPLOYING SAME

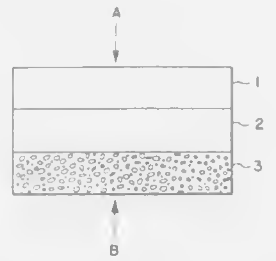
Kenji Hasegawa, Isehara; Takahiro Mori, Ayase, and Masahiko Higuma, Sagamihara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 174,856, Mar. 29, 1988, abandoned. This application May 8, 1990, Ser. No. 519,309

Claims priority, application Japan, Mar. 30, 1987, 62-74235

Int. Cl.^{5} G01D *15/34*

U.S. Cl. 346—1.1 **37 Claims**



5. An ink-jet recording process, comprising forming a recorded image having a density of 200×200 DPI (dots per inch) or more by using a recording medium comprising a non-porous ink-transporting layer and an ink-retaining layer, said ink-transporting layer being chiefly comprised of particles and a binder, wherein $d \geqq 0.1\ \mu m$ when an average value of primary particle diameter of said particles is assumed as d, and the volume of the particles whose particle diameter (x) is inlcuded in the range of $d/2 \leqq x \leqq 2d$ is in a proportion of 90% or more of the whole particles.

5,027,132
POSITION COMPENSATION OF LASER SCAN FOR STAGE MOVEMENT

William G. Manns, Dallas; Don J. Weeks, Southlake; Jerry D. Merryman, Dallas, and Chyi N. Sheng, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 173,492, Mar. 25, 1988, abandoned. This application Aug. 31, 1989, Ser. No. 401,586

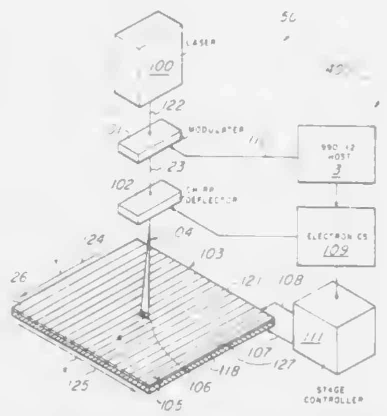
Int. Cl.^{5} H04N *1/21*

U.S. Cl. 346—108 **8 Claims**

1. A computerized method of stage position compensation in a raster scanning laser beam pattern writing system, the writing system writing a pattern with a series of pixels, with a movable stage for providing Y direction motion for raster scanning successive rows, comprising the steps of:

inputting stage position information from stage position encoders, the stream of position pulses from the stage position encoders having a periodicity equal to the pixel spacing;

calculating the stage position; and



timing the beginning of modulation of the raster scanning laser beam for each row to be scanned, using the calculated stage position, and after the stage has moved one pixel.

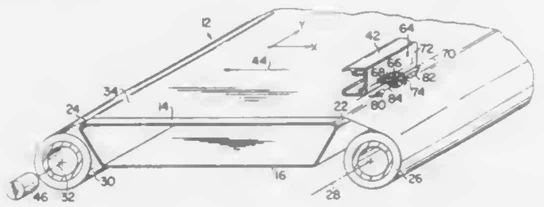
5,027,133
PLOTTER PAPER ADVANCE CONTROL

Jacob Weiselfish, West Hartford, Conn., assignor to Gerber Garment Technology, Inc., West Tolland, Conn.

Continuation of Ser. No. 201,680, Jun. 2, 1988, abandoned. This application Sep. 21, 1989, Ser. No. 411,199

Int. Cl.^{5} G01D *15/24;* **B65H** *23/18;* **B41J** *15/24*

U.S. Cl. 346—136 **9 Claims**



1. In a plotter for producing graphics on an elongated web of paper, the combination comprising:

means providing a support surface for supporting, for drawing on it, a section of an elongated web of paper, means for supporting a supply roll and a take-up roll for respectively supplying and taking up an elongated web of paper with the paper passing from said supply roll over said support surface and to said take-up roll, a drive means for rotatably driving said take-up roll in a take-up direction so as to pull paper from said supply roll and advance it over said support surface, and means for energizing and drive means to controllably rotate said take-up roll at varying speeds to cause the paper of said web to be advanced over said support surface at a fixed predetermined speed not dependent on the diameter of said takeup roll;

said drive means for rotatably driving said take-up roll including a DC drive motor having such a speed when continuously energized to drive said take-up roll in the take-up direction as to advance paper over said support surface at more than said predetermined speed even when said take-up roll is of its minimum diameter, and means for controlling the speed of said motor by pulse-width modulating the voltage supplied to it such that the voltage supplied to the drive motor is in the form of a plurality of successive energization cycles during one portion of each cycle the motor is energization cycles during one portion the motor is de-energized and advancing said web over said support surface at said fixed predetermined speed is accomplished by controllably varying the energized and the de-energized portions of said energization cycles.

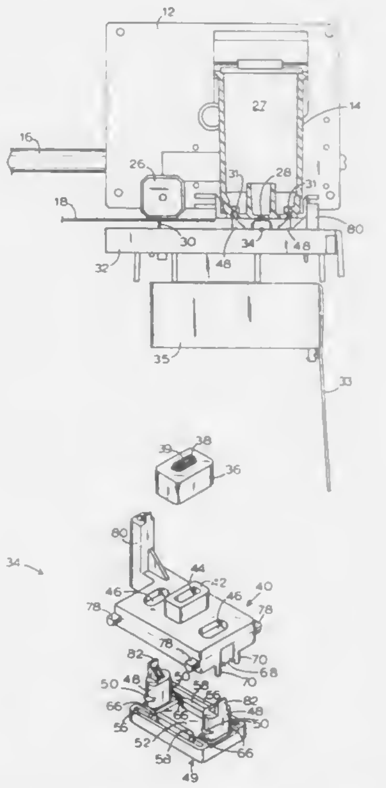
5,027,134
NON-CLOGGING CAP AND SERVICE STATION FOR INK-JET PRINTHEADS

J. P. Harmon, Washougal, and Jefferson P. Ward, Brush Prairie, both of Wash., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 1, 1989, Ser. No. 402,193

Int. Cl.^{5} B41J *2/165*

U.S. Cl. 346—140 R **7 Claims**



1. A combined ventilation/liquid drainage cap for use on the downstream side of an ink-jet printhead comprising:

protection means for enclosing and for defining a cavity around the printhead;

ventilation means for venting/draining liquid and gas from the cavity; and

non-absorbent, wetting-material capillary action means formed by interleaving walls and ridges within the cavity for wicking liquid away from the ventilation means.

5,027,135
PRINTER SELF-DIAGNOSIS DEVICE

Kiyoshi Negishi; Ikuo Negoro, and Masahiro Kita, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1989, Ser. No. 435,949

Claims priority, application Japan, Nov. 14, 1988, 63-286991

Int. Cl.^{5} G01D *15/14*

U.S. Cl. 346—154 **20 Claims**

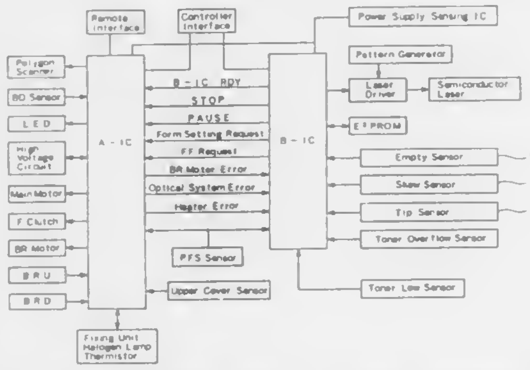
15. A self-diagnosis device for a printer, comprising:

a plurality of functional mechanisms provided in said printer, each of said functional mechanisms performing a predetermined function;

means for testing an operating condition of said functional mechanisms; and

VOL
1127
ISS
4
JE
25
1991
UMI

means for controlling said testing means so as to continue testing predetermined functional mechanisms regardless



of a test result obtained for a previously tested functional mechanism.

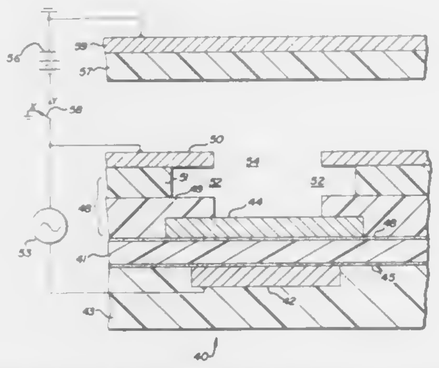
5,027,136
METHOD AND APPARATUS FOR CHARGED PARTICLE GENERATION

Richard A. Fotland, Holliston, and Fred Miekka, Boxborough, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Filed Jan. 16, 1990, Ser. No. 465,810

Int. Cl.⁵ G01D *15/06*

U.S. Cl. 346—159 11 Claims



1. Apparatus for generating charged particles, comprising

a first solid dielectric member having first and second sides;

a drive electrode substantially in contact with the first side of the first solid dielectric member;

an isolation electrode substantially in contact with the second side of the first solid dielectric member opposite said drive electrode, said isolation electrode being a circular disk;

a discharge electrode;

a second solid dielectric member which separates the discharge electrode from the first solid dielectric member, wherein the isolation electrode, discharge electrode, and second solid dielectric member define a discharge region which does not border on the first solid dielectric member; and

a high voltage time varying potential ("excitation potential") placed between said drive electrode and discharge electrode to generate charged particles in said discharged region.

5,027,137
DRAWING SURFACE ADJUSTING MECHANISM FOR USE WITH SCANNING PATTERN DRAWING APPARATUS

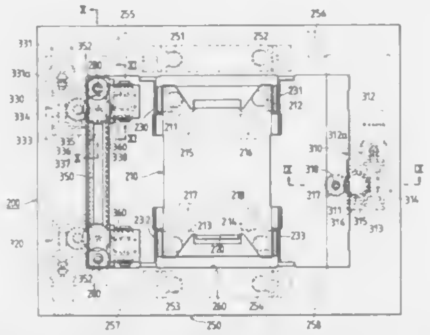
Hiroaki Andoh; Michio Ohshima; Yuji Matsui; Takashi Okuyama; Toshitaka Yoshimura; Hidetaka Yamaguchi; Yasushi Ikeda; Jun Nonaka; Tamihiro Miyoshi; Mitsuo Kakimoto; Masatoshi Iwama; Hideyuki Morita; Satoru Tachihara; Akira Morimoto, and Akira Ohwaki, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Filed Dec. 1, 1989, Ser. No. 444,243

Claims priority, application Japan, Dec. 1, 1988, 63-304780

Int. Cl.⁵ G03B *41/00*

U.S. Cl. 354—4 5 Claims



1. A drawing surface adjusting mechanism for use with a scanning pattern drawing apparatus in which a scanning optical system scans a workpiece with a undirectionally tracing light beam, comprising:

a drawing board for supporting a workpiece that is to be scanned by said unidirectionally tracing light beam;

transport means on which said drawing board is mounted for allowing said drawing board and said scanning optical system to slide relative to each other in a direction that crosses a direction of beam tracing at right angles;

a first and a second drive mechanism spaced apart in said direction of beam tracing and that move one side of said drawing board in a direction parallel to a direction of beam emission;

tilt control means for inclining said drawing board with respect to said transport means by making a drive amount of said first drive means different from a drive amount of said second drive means; and

translation control means for effecting translational movement of said drawing board with respect to said transport means by making the drive amount of said first drive means equal to that of said second drive means.

5,027,138
DENTAL CAMERA SYSTEM

S. Garfield Gandrud, 414 Baywood Dr., Newport Beach, Calif. 92660

Filed Jul. 23, 1990, Ser. No. 557,161

Int. Cl.⁵ A61B *1/04*

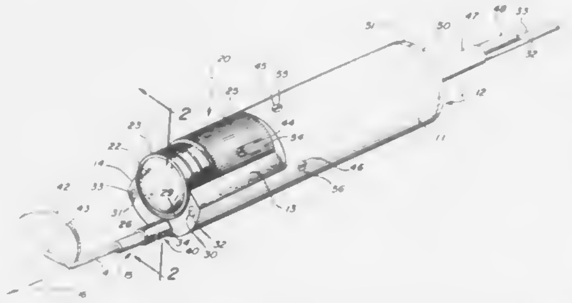
U.S. Cl. 354—62 13 Claims

1. For use in imaging a portion of the mouth and teeth of a patient, a dental camera system comprising:

a video camera defining an elongated generally cylindrical shape and having a frontal lens, an aperture adjustment ring, a focus adjustment ring and a connecting cable;

a housing defining a generally cylindrical shape and having an interior passage configured to receive said camera such that said aperture adjustment ring and focus adjustment ring are exposed;

a pair of light sources positioned in an offset array adjacent said frontal lens;



a mirror support coupled to said housing and adjustably extending thereupon; and

a mirror secured to said mirror support.

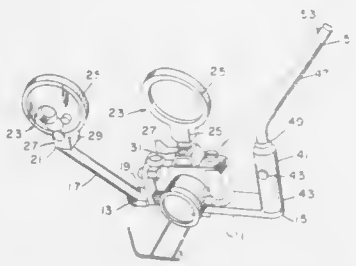
5,027,139
STROBE, LIGHTMETER AND TRAY ASSEMBLY FOR UNDERWATER CAMERAS

Alexander T. Varouxis, and Edward J. Carafa, both of 822 N. Henry St., Alexandria, Va. 22314

Filed Nov. 15, 1989, Ser. No. 436,749

Int. Cl.⁵ G03B *17/08*

U.S. Cl. 354—64 9 Claims



1. A strobe and tray assembly for an underwater camera comprising:

a generally horizontal tray incorporating a central mounting means for a camera wherein a length of the tray is substantially longer than a length between first and second bottom ends of the camera, therefore, providing portions of the tray projecting perpendicularly and oppositely from the bottom ends of the camera to be mounted on the central mounting means;

the perpendicularly projecting portions of the tray form a first platform on one side of the camera and a second platform on an opposite side of the camera, said platforms incorporating means for removably engaging attachments complementary to an underwater camera;

the first platform in provided with a post protruding perpendicular from the platform and parallel to the central mounting means, therein providing a guiding and clamping means for a removable strobe attachment arm, the platform further incorporating a nesting means adjacent the post for seating a base of the removable strobe attachment arm on to the first platform;

said second platform provided with screw attachment means enabling attachment of an auxiliary attachment arm having means for removably engaging a light meter attachment or a second strobe attachment.

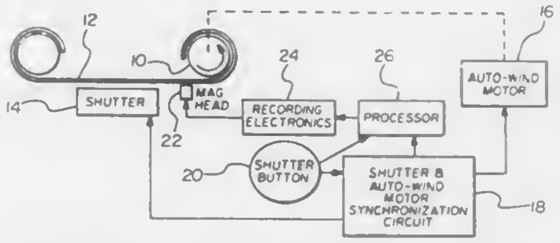
5,027,140
MAGNETIC RECORDING ON FILM OF SERIES SCENE INDICATION BY A CAMERA FOR USE BY A PHOTOFINISHER

Robert P. Cloutier, Spencerport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 405,505, Sep. 11, 1990, Pat. No. 4,907,439. This application Sep. 5, 1990, Ser. No. 582,284

Int. Cl.⁵ G03B *29/00, 17/24*

U.S. Cl. 354—76 3 Claims



1. In a camera which exposes film having a magnetic layer in the film, a shutter controlling the film exposure, an auto wind motor and take-up reel to automatically reposition the film with respect to the shutter and a shutter release button governing a synchronization circuit actuating both the shutter and the auto wind motor, the improvement comprising:

a magnetic head positioned to record data on the film as it is transported by said take-up reel, and

a processor which senses whether said shutter button is operated such that said synchronization circuit is in a rapidfire mode wherein said auto wind motor and shutter are operated in a rapid alternating sequence, said processor including means for transmitting to said magnetic head a series scene indication code for recording in or near corresponding frames in said film in response to said synchronization circuit being in said rapidfire mode.

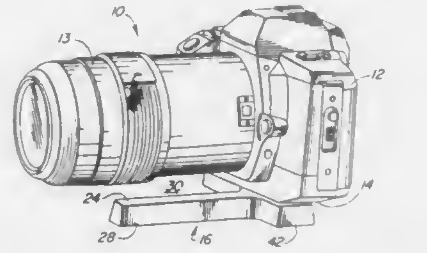
5,027,141
CAMERA SUPPORT

David W. Bowers, 16521 80th Ave. W., Taylor Ridge, Ill. 61284

Filed Aug. 9, 1990, Ser. No. 564,922

Int. Cl.⁵ G03B *17/56*

U.S. Cl. 354—82 6 Claims



1. In combination with a camera having a transverse body including a horizontal bottom, an upright front and a lens projecting forwardly from the frame in vertically spaced relation to the horizontal plane of the bottom, a camera support comprising a member having the shape of an L as seen from above and including means for the fixed attachment thereof to the camera, said member having a transverse leg disposed beneath and essentially flat-wise against the bottom of the body and a forward leg sized with the transverse leg and extending forwardly beneath and in vertically spaced relation to the underside of the lens, said legs having horizontally coplanar bottom faces adapted to rest on a level surface and the forward leg having such length as to prevent forward and downward tilting of the camera because of the overhanging length and weight of the lens.

VOL
1127
ISS
4
JE
25
1991
UMI

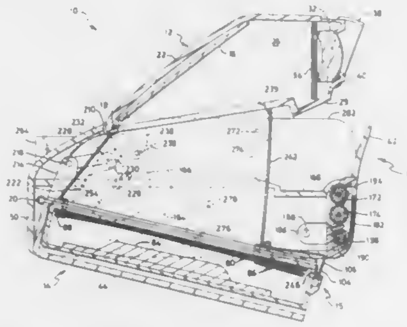
5,027,142
COLLAPSIBLE CAMERA

Lawrence M. Douglas, South Easton, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed May 2, 1990, Ser. No. 517,708

Int. Cl.⁵ G03B *17/50*

U.S. Cl. 354—86 **34 Claims**



1. A camera comprising:

a plurality of housings pivotally coupled to each other for movement between a compact collapsed position in which a subject to be photographed may be viewed and an erected position in which an exposure of the subject may be taken;

an optical and exposure system;

means for initiating an exposure cycle; and

means for moving said plurality of housings between said collapsed and erected positions, said moving means being energized in response to actuation of said initiating means to move said housings from said collapsed position to said erected position, whereat relative movement between said plurality of housings is momentarily stopped while the subject is photographically exposed, and then back to said collapsed position.

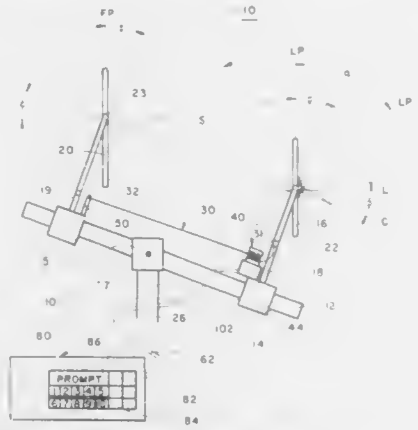
5,027,143
APPARATUS AND METHOD FOR FOCUSING A PHOTOGRAPHIC CAMERA

Clarence R. Clark, III, 164 Layayette St., Denver, Colo. 80214, and David W. Sanso, 701 Harlan, E38, Lakewood, Colo. 80218

Filed Dec. 29, 1989, Ser. No. 459,074

Int. Cl.⁵ G03B *5/06, 5/08, 19/10*

U.S. Cl. 354—160 **21 Claims**



1. A photographic camera comprising:

a lens standard supporting an optical lens having a lens optical axis;

a screen standard supporting an image screen having a screen optical axis, at least one of said lens standard and said screen standard movable to translate in a direction generally parallel to a longitudinal camera axis to vary a distance along the longitudinal camera axis by which said lens and said screen are separated;

a flexible extension member having a reel end and a distal end;

reel means for reeling said flexible member, said reel means including retention means for maintaining said reel means in fixed geometric relation to one of said first standard and said second standard, drum means for coiling said flexible member said drum means rotatable about a drum axis, tensioning means for urging said drum means to rotate in a reeling direction about its axis, and rotation signaling means for generating a rotation signal in response to rotation of said drum means about said drum axis;

attachment means for maintaining a distal end portion of said extension member adjacent said distal end in fixed geometric relation to the other of said first standard and said second standard; and

a reel end portion of said extension member adjacent said reel end is coiled about said drum means such that, when said distance is decreased or increased, said drum means is caused to rotate about the drum axis in said reeling direction or in an opposite, unreeling direction, respectively.

5,027,144
LENS CHANGER FOR CAMERAS

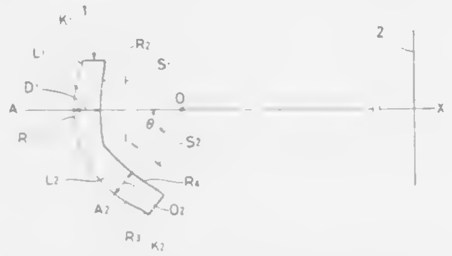
Kazunori Ohno, Omiya, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Jun. 28, 1990, Ser. No. 544,906

Claims priority, application Japan, Jul. 28, 1989, 1-193859

Int. Cl.⁵ G03B *1/18*

U.S. Cl. 354—195.12 **10 Claims**



1. A lens changer for a camera, comprising:

a unitary lens body integrally and contiguously formed with a main lens portion and at least one replacement lens portion of a different type in optical characteristics from said main lens portion, said lens body being movable across the optical axis of a camera to locate either said main lens portion or said replacement lens portion in a predetermined lens position forward of an image forming plane of said camera.

5,027,145
HEAT EXCHANGER FOR FILM PROCESSOR

James T. Samuels, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

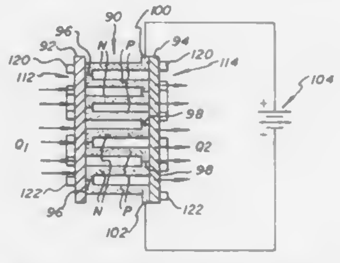
Filed Aug. 29, 1990, Ser. No. 574,842

Int. Cl.⁵ G03D *3/02, 3/08*

U.S. Cl. 354—299 **5 Claims**

1. In a film processor for developing photographic film by moving it through chemicals, said processor including at least two liquid chemical baths wherein one bath contains a developer liquid and the other a wash water liquid, means for advancing film through said baths, and means for controlling the temperature of the liquid of said baths, said controlling means comprising means defining a flow path for the liquid chemical of each bath and a heat exchanger positioned adjacent to said flow paths to at least remove heat from said developer liquid;

the improvement wherein said heat exchanger comprises a thermoelectric Peltier heat transfer device having a heat sink and a heat-emitting source, said heat sink being thermally connected to said flow-path defining means of the developer liquid and said heat-emitting source being thermally connected to said flow-path defining means of said wash water liquid,



so that said developer liquid can be cooled and said wash water liquid can be heated regardless of the relative temperature of each said liquid as it enters said heat exchanger.

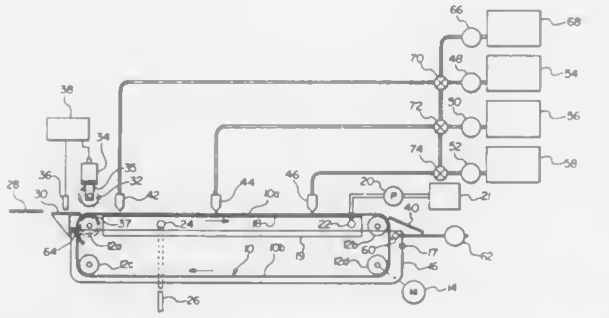
5,027,146
PROCESSING APPARATUS

Joseph A. Manico, and Donald E. Birr, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 31, 1989, Ser. No. 401,389

Int. Cl.⁵ G03D *5/04*

U.S. Cl. 354—299 **17 Claims**



1. Apparatus for processing light sensitive exposed material including a washing station and a plurality of processing stations, said apparatus comprising:

an endless web movable along a predetermined path having one portion adjacent said processing stations for transporting said material past said processing stations to effect processing of the material, said web having a second path portion ending through said washing station;

means for moving said web to effect transport of the material past said processing stations and cleaning of said web at said washing station; and

temperature control means proximate said moving web for controlling the temperature of said material as it is transported past said processing stations.

5,027,147
OPTICAL EQUIPMENT WITH LENS POSITION CONTROL UTILIZING ZOOM AND FOCUSING MOTORS FOR FOCUSING

Naoya Kaneda, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 2, 1990, Ser. No. 487,276

Claims priority, application Japan, Mar. 2, 1989, 1-51726; Mar. 2, 1989, 1-51727

Int. Cl.⁵ G03B *5/00, 13/36;* **G02B** *7/28, 15/14*

U.S. Cl. 354—400 **37 Claims**

1. An optical equipment comprising:

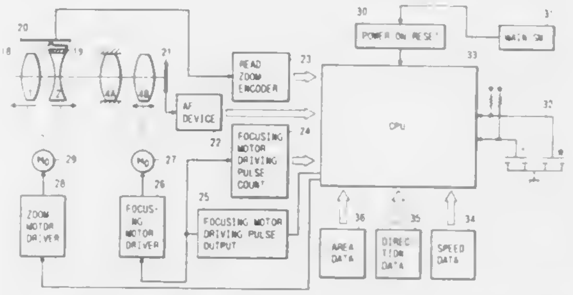
(a) a first lens group for varying image magnification;

(b) a second lens group for focusing, positioned at the focal plane side of said first lens group;

(c) first detection means for detecting at least the state of image magnification of said first lens group;

(d) second detection means for detecting the focus state; and

(e) control means for varying the control for said first and second lens groups according to the discrimination by said first detection means whether the image magnification obtained by said first lens group is at the wide angle side or at the telephoto side of a predetermined image magnification, in case said second detection means identifies a necessity, for the purpose of focusing, of moving said second lens group in a direction for focusing to a shorter object distance, wherein said control means is adapted to effect the focusing operation by moving said second lens group in said direction for focusing to a shorter object distance and said first lens group to the wide angle side only in case said first lens group is at said wide angle side of said predetermined image magnification



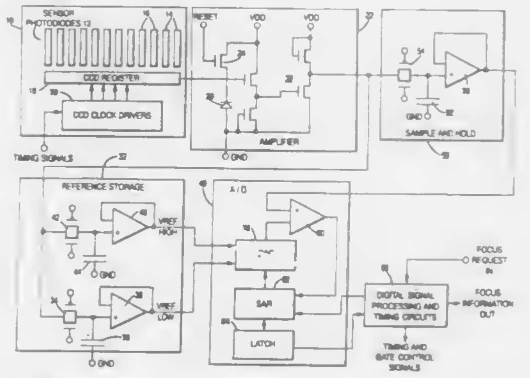
5,027,148
AUTOFOCUS CHIP WITH REFERENCE LEVEL DETERMINATION CIRCUIT

Constantine N. Anagnostopoulos, Mendon, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 13, 1990, Ser. No. 566,207

Int. Cl.⁵ G03B *13/00*

U.S. Cl. 354—402 **9 Claims**



1. A camera autofocus apparatus, comprising:

a photodiode sensor having photodiodes and a full well diode, the full well diode providing a full well charge and the photodiodes providing image values;

reference level storage means for storing a reference voltage equivalent to the full well charge;

converter means for converting the image values to digital values based on the reference voltage; and

autofocus means for performing image correlation operations responsive to the digital values.

VOL
1127
ISS
4
JE
25
1991
UMI

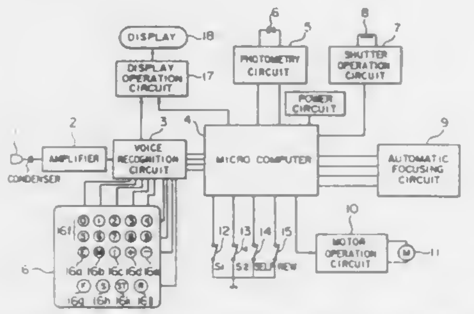
5,027,149
VOICE-RECOGNITION CAMERA

Yasushi Hoshino, Tokyo; Tsuyoshi Kakita, Hoya, and Makoto Yoshida, Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Continuation of Ser. No. 302,175, Jan. 26, 1989, Pat. No. 4,951,079. This application Mar. 21, 1990, Ser. No. 496,646

Int. Cl.^{5} G03B *7/00*

U.S. Cl. 354—412 9 Claims



1. In a photographic camera including functions responsive to voice commands of a user, the camera having a registration mode and an recognition mode, means in the registration mode for registering a particular voice command with a selected function, a memory for storing each registered voice command, means in the recognition mode for recognizing a voice command as registered, and means in the recognition mode responsive to the recognition means for activating the function corresponding to the recognized voice command, the improvement comprising:

first means in the registration mode for visually displaying a symbol representative of each function selected for voice command registration;

second means in the registration mode for visually displaying a symbol representative of each function for which a voice command has been successfully registered; and

third means in the recognition mode responsive to a registered voice command for visually displaying a symbol representative of the function for which the voice command is recognized.

5,027,150
CAMERA

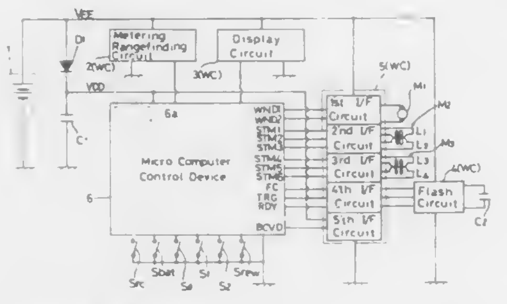
Manabu Inoue, and Hiroyuki Okada, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 349,825, May 10, 1989, abandoned. This application Jun. 15, 1990, Ser. No. 539,366

Claims priority, application Japan, May 11, 1988, 63-115114; May 11, 1988, 63-115115

Int. Cl.^{5} G03B *7/26*

U.S. Cl. 354—484 39 Claims



1. A camera comprising:

power supply means;

detecting means for detecting a voltage of said power supply means and outputting a detection signal when the voltage of said power supply means is below a predetermined level;

timer means for counting a predetermined time period in response to said detection signal; and

control means powered by said power supply means for controlling a camera sequence and load means in the camera, such that said control means discontinues the camera sequence and operation of said load means in response to said detection signal and, after lapse of said predetermined time period, enables the camera sequency and the operation of said load means in the event that said detecting means detects that the voltage of said power supply means is equal to or above the predetermined level.

5,027,151
FILM TRANSPARENCY HOLDER

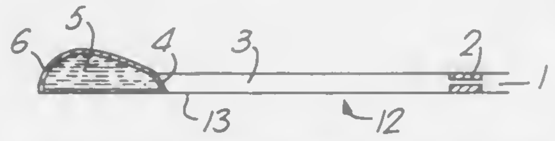
Robert W. Rayner, Hertfordshire, England, assignor to Crosfield Electronics Ltd., England

Filed Aug. 16, 1990, Ser. No. 568,153

Claims priority, application United Kingdom, Aug. 30, 1989, 8919617

Int. Cl.^{5} G03B *27/52, 27/62*

U.S. Cl. 355—30 11 Claims



1. A method of mounting a transparency for use in an input scanner, the method comprising inserting said transparency into an envelope, and spreading a film of liquid over said transparency within said envelope, said liquid having substantially the same refractive index as that of said transparency.

5,027,152
IMAGE-FORMING MACHINE HAVING A PROCESS UNIT DETACHABLY MOUNTABLE ON A MOVABLE SUPPORTING AND GUIDING MEANS

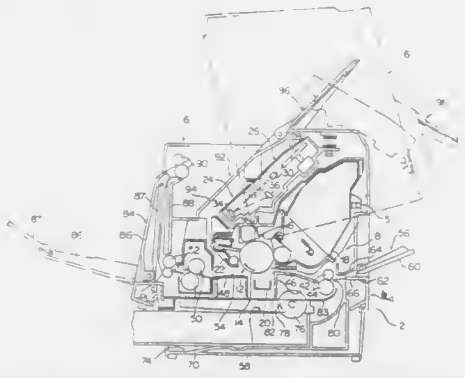
Kenji Oda, Toyonaka; Makoto Eki, Osaka; Eiji Tsutsui, Sanda, and Masanobu Maeshima, Sakai, all of Japan, assignors to Mita Industrial Co., Ltd., Japan

Filed Jun. 22, 1990, Ser. No. 542,031

Claims priority, application Japan, June 27, 1989, 64-164845; June 29, 1989, 64-167329; July 7, 1989, 64-176916; July 14, 1989, 64-183153; Aug. 31, 1989, 64-226502

Int. Cl.^{5} G03G *15/00*

U.S. Cl. 355—200 52 Claims



1. An image-forming machine including a main body of the machine having a lower housing and an upper housing mounted on the lower housing for free pivoting between an open position and a closed position and a process unit mounted detachably on the lower housing of the main body; wherein the lower housing of the main body of the image-forming machine has provided therein a supporting-guiding means mounted movably between an elevated position and a lowered position,

a holding means mounted movably between a holding position at which the supporting-guiding means is held at the elevated position and a release position at which the supporting-guiding means is permitted to move to the lowered position, and a biasing means for biasing the holding means to said holding position, and when the supporting-guiding means is positioned at the elevated position, the process unit may be mounted on and detached from the supporting-guiding means, and when the supporting-guiding means is positioned at the lowered position, the process unit mounted on the supporting-guiding means, the process unit is held at a predetermined action site,

the upper housing of the main body of the machine has provided therein a forced moving means which while the upper housing is pivoted from the open position to the closed position, acts on the holding means, and against the biasing action of the biasing means, moves the holding means from the holding position to the release position.

5,027,153
IMAGE FORMING APPARATUS WITH CARD DEVICE INPUT

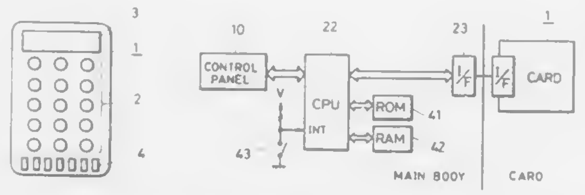
Yutaka Komiya, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 298,334, Jan. 17, 1989, abandoned, which is a continuation of Ser. No. 948,070, Dec. 31, 1986, abandoned. This application Feb. 5, 1990, Ser. No. 474,301

Claims priority, application Japan, Jan. 7, 1986, 61-209

Int. Cl.^{5} G03G *15/00*

U.S. Cl. 355—200 11 Claims



1. An image forming system, comprising:

a card device for reserving and setting an image forming mode, said card device including a first key input means having a plurality of keys disposed on a surface of said card device and being accessible to a user for manually inputting data corresponding to a desired image forming mode, and memory means for storing said data input by said first key input means; and

an image forming apparatus, including:

image forming means for forming an image on a recording medium;

second key input means having a plurality of keys for manually inputting data corresponding to a desired image forming mode;

setting means for demountably receiving said card device therein;

enabling means operative in response to the setting of said card device in said setting means to enable said data stored in said memory means of said card device to be read; and

control means for setting the image forming mode either in accordance with said data read from said memory means or data provided by said second key input means.

5,027,154
METHOD OF STORING AND DISPLAYING ERROR INFORMATION IN PHOTOGRAPHIC PRINTER

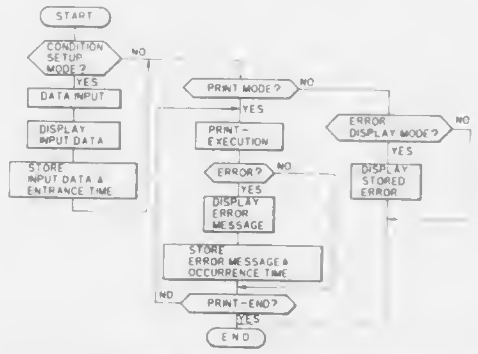
Yoichi Ujiie, and Hiroyuki Isozaki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 10, 1990, Ser. No. 521,499

Claims priority, application Japan, May 23, 1989, 1-129676

Int. Cl.^{5} G03B *27/32;* G06F *11/00*

U.S. Cl. 355—205 8 Claims



1. A method of storing and displaying error information in a photographic printer, said method comprising the steps of:

storing error information including the content of an error and the time of occurrence thereof in a memory when an error occurs during operation of the photographic printer;

reading out said error information from said memory in an order of occurrence in an error display mode; and

displaying said error information on a display means.

5,027,155
IMAGE FORMING APPARATUS INCLUDING MECHANISMS FOR EXPOSURE LAMP EXCHANGE

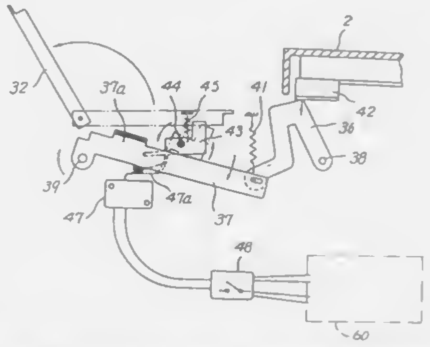
Kazuhito Ishida, and Yoichi Horaguchi, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Jan. 25, 1990, Ser. No. 470,310

Claims priority, application Japan, Jan. 28, 1989, 1-18541; Jan. 30, 1989, 1-9808[U]

Int. Cl.^{5} G03G *15/04*

U.S. Cl. 355—229 33 Claims



1. An image forming apparatus having an exposure device comprising:

a housing;

a lamp house disposed in said housing, said lamp house including an opening;

covering means provided on said housing for opening and closing said opening;

an exposure lamp detachably stored in said lamp house;

original support means movably provided on said housing

VOL 1127
ISS 4
JE 25 1991
UMI

for supporting an original thereon, said original support means being movable in a first regicn for exposing an original supported thereon and a second region located beyond said first region, wherein at least a portion of said original support means is located over said covering means while said original support means is in said first region so that said covering means is prohibited from being opened;

engaging means for engaging said original support means, said engaging means being movable between a first position for restricting the movement of said original support means within said first region by engagement with said original support means and a second position for allowing said original support means to move into said second region by releasing the engagement;

power supply means for supplying electric power to said exposure lamp; and

switching means operatively connected with said engaging means for switching off the electric power supply while said engaging means is in said second position.

5,027,156

SEAL STRUCTURE FOR A CHAMBER MEANS CONTAINING A DEVELOPER MATERIAL

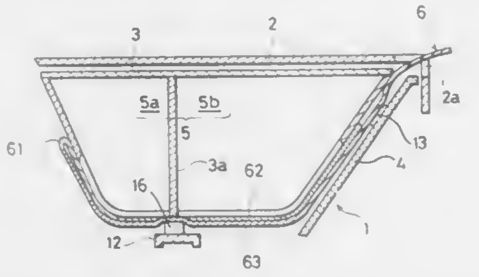
Masahiko Kobayashi, Yamatotakada, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed Aug. 14, 1989, Ser. No. 393,195

Claims priority, application Japan, Aug. 26, 1988, 63-213248

Int. Cl.⁵ G03G *15/06*

U.S. Cl. 355—245 39 Claims



1. A seal structure for a developing device having a developer chamber, the seal structure including a seal member for sealing the developer chamber with an unused developer accommodated therein, the seal member partly extending outward from the developing device to provide a pull portion and being removable from the developing device by pulling the pull portion, the seal structure being characterized in that the seal member is folded over at an intermediate portion thereof to form a folded portion over the pull portion, the folded portion being secured to the body of the developing device and formed in an edge thereof with a tear portion for separating the seal member into an end portion positioned inside the developing device and the other portion when the seal member is pulled.

5,027,157

DEVELOPING DEVICE PROVIDED WITH ELECTRODES FOR INDUCING A TRAVELING WAVE ON THE DEVELOPING MATERIAL

Hideo Hotomi; Yoshihisa Terasaka, and Hiroshi Mizuno, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 1, 1989, Ser. No. 446,799

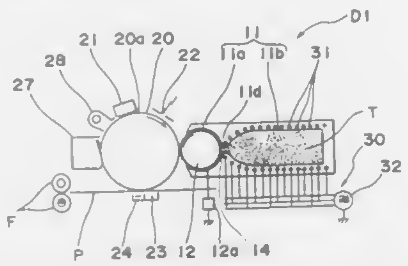
Claims priority, application Japan, Dec. 2, 1988, 63-306605; Dec. 13, 1988, 63-314436; Dec. 13, 1988, 63-314437; Dec. 14, 1988, 63-316014; Dec. 14, 1988, 63-316015

Int. Cl.⁵ G03G *15/06, 15/09*

U.S. Cl. 355—261 13 Claims

1. A developing apparatus for developing an electrostatic latent image, which comprises an electrostatic latent image holding member for holding an electrostatic latent image,

a developing material support member provided to confront said electrostatic latent image holding member, and



an electric field curtain generating means which functions as a developing material supply means for supplying the developing material to said developing material support member, and also causes an electric field curtain force in a form of a travelling wave travelling in terms of time, to act on the developing material.

5,027,158

VERTICAL PRINT ENGINE FOR ELECTROPHOTOGRAPHIC APPARATUS

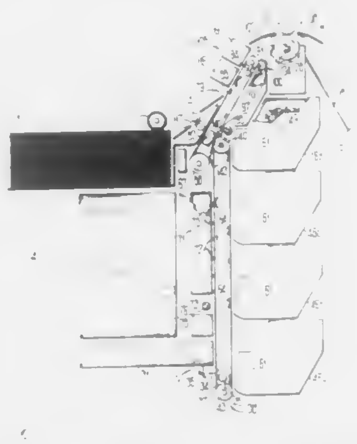
E. Neal Tompkins, Roswell, and Danny L. Slayton, Lilburn, both of Ga., assignors to Colorocs Corporation, Norcross, Ga.

Continuation of Ser. No. 135,113, Dec. 18, 1987, Pat. No. 4,901,110. This application Sep. 5, 1989, Ser. No. 403,171

The portion of the term of this patent subsequent to Feb. 13, 2007, has been disclaimed.

Int. Cl.⁵ G03G *15/16, 15/01*

U.S. Cl. 355—271 16 Claims



1. An electrophotographic printer machine, comprising:

means for controlling the operation of the printer machine;

a photosensitive first endless loop belt stretched across a pair of rollers such that the exterior surface of the first belt defines a developing position for an electrostatic image in a substantially vertical plane;

an exposure station configured to focus light on the developing position of the first belt for forming the electrostatic image;

means for applying toner to the electrostatic image for forming a developed image;

a second endless loop belt stretched between a first roller and a second roller;

the first roller vertically spaced-apart from the second roller and positioned on a first side of the printer horizontally and vertically off-set from one of the pair of rollers, the second roller positioned on a second side of the printer horizontally and vertically off-set from the one of the pair of rollers, the second loop belt thereby oriented at an acute angle to the first loop belt to have an outside surface which wraps over the one of the pair of rollers to define an arcuate contact between the first belt and the second belt;

means for rotating said first belt and said second belt in the same relative direction at said arcuate contact;

means for transferring the developed image from the first belt to the second belt; and

means for receiving an image receptor, communicating the developed image to the image receptor and fixing the developed image to the image receptor.

5,027,159

ELECTROPHOTOGRAPHIC IMAGE FORMING APPARATUS CAPABLE OF DEVELOPING NORMAL AND INVERTED IMAGES

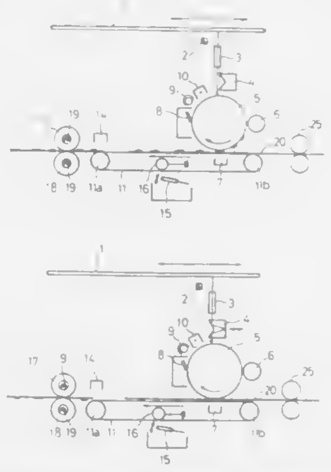
Masataka Oda; Yoshinobu Hara, and Kazuyoshi Hara, all of Azuchi, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 14, 1989, Ser. No. 311,081

Claims priority, application Japan, Feb. 17, 1988, 63-35882

Int. Cl.⁵ G03G *15/00*

U.S. Cl. 355—271 18 Claims



1. An electrophotographic image forming apparatus, comprising:

an image forming means for selectively forming a visualized image by developing a latent image produced by selectively projecting a normal image and an inverted image on an image bearing member;

an endless member for receiving the inverted image from the image bearing member at a transfer position opposite to the image bearing member;

a transporting means for transporting a transfer material to the endless member in order to transport the transfer material to the transfer position;

a first transfer means disposed opposite to the transfer position for transferring the inverted image on the image bearing member to the endless member before the transfer material is transported to the transfer position by the transporting means and for transferring the inverted image on the image bearing member to the transfer material when the transfer material is transported to the transfer position by the transporting means; and

a second transfer means disposed downstream of the first transfer means with respect to the transporting direction of the transfer material for transferring the inverted image having been transferred on the endless member onto the transfer material.

5,027,160

IMAGE FIXING APPARATUS WITH MOVABLE FILM AND MEANS FOR CONTROLLING FILM POSITION

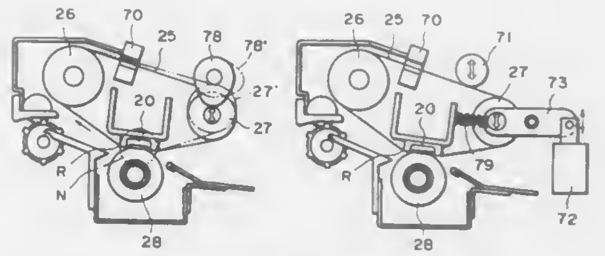
Tamotsu Okada; Atsushi Hosoi, both of Kawasaki; Yoshihiko Suzuki, Tokyo, and Kanji Yano, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 5, 1989, Ser. No. 446,449

Claims priority, application Japan, Dec. 8, 1988, 63-159721[U]; Dec. 12, 1988, 63-313275; Dec. 12, 1988, 63-313278; Dec. 22, 1988, 63-325561; Mar. 31, 1989, 64-80376

Int. Cl.⁵ G03G *15/20*

U.S. Cl. 355—282 72 Claims



1. An image fixing apparatus, comprising:

a heater;

a film through which a toner image on a recording material is heated by heat produced by said heater, said film being movable together with the recording material;

detecting means for detecting a position of said film in a direction perpendicular to its movement; and

control means responsive to an output of said detecting means for controlling the position of said film in the direction perpendicular to the movement of said film.

5,027,161

IMAGE FORMING APPARATUS

Nobuyuki Kume; Masanori Miyata, both of Yokohama, and Nobuo Nakazawa, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 245,377, Sep. 16, 1988, abandoned. This application Sep. 8, 1989, Ser. No. 405,577

Claims priority, application Japan, Sep. 17, 1987, 62-233337; Nov. 13, 1987, 62-287919

Int. Cl.⁵ G03G *21/00*

U.S. Cl. 355—305 43 Claims

1. An image forming apparatus, comprising:

a movable image bearing member;

latent image forming means for forming a latent image on said image bearing member;

developing means for developing the latent image formed on said image bearing member by said latent image forming means with non-magnetic toner;

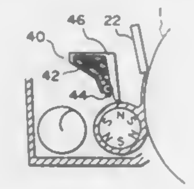
transfer means for transferring an image developed by said developing means to a transfer means;

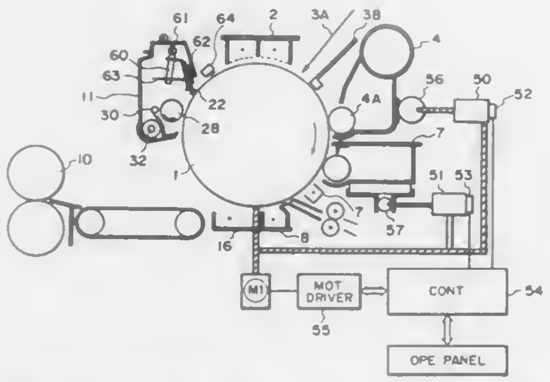
cleaning means for removing residual toner from said image bearing member after the image is transferred;

magnetic particle supplying means for supplying magnetic particles to said cleaning means, wherein when the non-magnetic toner is used for image formation by said image

VOL
1127
ISS
4
JE
25
1991
UMI

forming apparatus, said magnetic particle supplying means supplies the magnetic particles to said cleaning

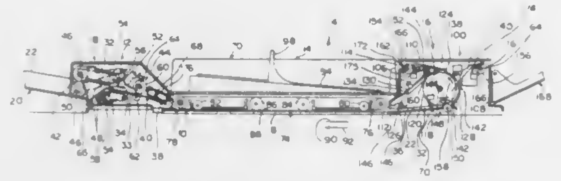




means in accordance with information relating to usage of the non-magnetic toner.

5,027,162
AUTOMATIC DOCUMENT CONVEYING DEVICE

Yasuhiko Kida, Hirakata; Yoichiro Irie, Suita; Yoshiyuki Takeda, Osaka, and Tsuyoshi Nagao, Osaka, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan
Filed Jul. 25, 1990, Ser. No. 557,703
Claims priority, application Japan, Jul. 27, 1989, 1-192544
Int. Cl.^{5} G03G *21/00*
U.S. Cl. 355—320 **16 Claims**



5. An automatic document conveying device to be applied to an image processor disposed in a transparent plate on which to place a document to be processed, the transparent plate being disposed on the upper surface of a housing, said device comprising

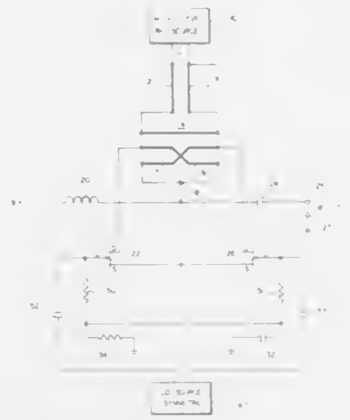
a document table,
a document introduction passage extending from the document table to one end edge of the transparent plate,
a first document receiving tray,
a second document receiving tray,
a document delivering passage comprising a common passage extending from the other end edge of the transparent plate, a first branched passage extending from the downstream end of the common passage to the first document receiving tray, and a second branched extending from the downstream end of the common passage to the second document passage receiving tray,
a branched passage switching means adapted to be positioned selectively at a first branching position to bring the common passage in the document delivering passage into communication with a first branched passage and at a second branching position to bring the common passage into communication with a second branched passage,
a re-introduction passage branching from the first branched passage and extending to the other end edge of the transparent plate,
a discharging re-introduction switching means adapted to be selectively held at a discharging position for discharging the document advanced into the first branched passage through the first branched passage onto the first document receiving tray and a re-introduction position for introducing the document advanced into the first branched passage into the re-introduction passage,
a document sending means for sending out a plurality of documents placed on the document table piece by piece into the document re-introduction passage,
a document introduction means for introducing the document sent out into the document introduction passage onto the transparent plate,
a document conveying means for conveying the document along the transparent plate,
a document delivery means for discharging the document delivered to the common passage of the document delivering passage by the document conveying means onto the first document receiving tray through the common passage and the first branched passage in the document delivery passage, or re-introducing it onto the transparent plate through the common passage of the document delivery passage and through the upstream portion of the first branched passage and the re-introduction passage, or discharging it onto the second document receiving tray through the common passage and the second branched passage in the document delivery passage, and
an operation controlling means;

wherein

the operation controlling means performs either one of a simple mode, a reversing mode, and a double reversing mode selectively,
in the simple mode, the document on the document table is introduced onto the transparent plate through the document introduction passage and positioned at a required position on the transaprent plate, thereafter the branched passage switching means is held at the first branching position and the discharging re-introduction switching means is held at the discharge position, the document is moved through the common passage and the first branched passage in the document delivery passage, and thereby the surface and back of the document are reversed and the document is discharged onto the first document receiving tray;
in the reversing mode, the document on the document table is introduced onto the transparent plate through the document introduction passage and positioned at a required position on the transparent plate, thereafter the branched passage switching means is held at the first branching position and the discharging re-introduction switching means is positioned in the re-introduction position, the document is advanced from the common passage in the document delivery passage into the first branched passage, then introduced into the re-introduction passage and re-introduced onto the transparent plate, and thus, the surface and back of the document are reversed and the document is again held at a required position on the transparent plate, and thereafter the branched passage switching means is held at the second branching position, and the document on the transparent plate is moved through the common passage and the second branched passage in the document delivery passage, and thus, the document is discharged onto the second document receiving tray without reversing its surface and back; and
in the double reversing mode, the branched passage switching means is held at the first branching position and the discharging re-introduction switching means is held at the re-introduction position, and the document delivered to the transparent plate from the document table through the document introduction passage is advanced into the first branched passage from the common passage in the document delivery passage, and then introduced into the re-introduction passage and re-introduced onto the transparent plate, thus the surface and back of the document are reversed and the document is held at a required position on the transparent plate, and thereafter, the document is advanced again into the first branched passage again from the common passage in the document delivery passage, then introduced into the re-introduction passage and re-introduced onto the transparent plate, whereby the surface and back of the document are again reversed and the document is again held at a required position on the transparent plate, and thereafter the discharging re-introduction switching means is held at the discharging position, and the document on the transparent plate is moved through the common passage and the first branched passage in the document delivery passage, and thus the surface and back of the documents are reversed, and the document is discharged onto the first document receiving tray.

5,027,163
HIGH LEVEL WIDE BAND RF MIXER

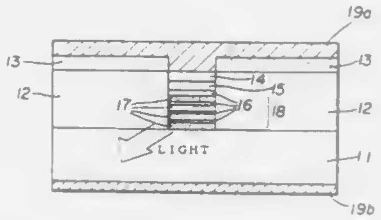
Pierre Dobrovolny, North Riverside, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.
Filed Dec. 6, 1988, Ser. No. 281,156
Int. Cl.^{5} H04B *1/16*
U.S. Cl. 455—326 **12 Claims**



1. A wide band RF mixer comprising:
a pair of field effect transistors, each having a grounded source, a drain and a gate;
symmetric transformer means having first, second and third windings;
means for coupling a symmetrical high level RF signal to said first winding;
means connecting each of said second and said third windings in series with a respective one of said drain-source circuits of said field effect transistors, the connection between said second and said third windings forming a junction;
means for coupling a symmetrical local oscillator signal for alternately activating the gates of said field effect transistors; and
an IF port coupled between said junction and ground for developing an output signal including a desired intermediate frequency component.

5,027,164
SEMICONDUCTOR DEVICE

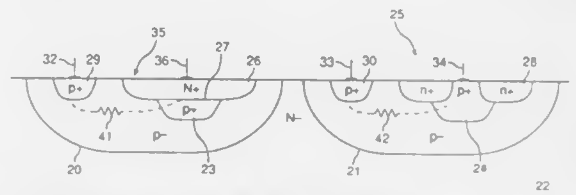
Yuji Awano, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan
Filed Mar. 23, 1989, Ser. No. 327,702
Claims priority, application Japan, Mar. 23, 1988, 63-68758
Int. Cl.^{5} H01L *27/12*
U.S. Cl. 357—4 **16 Claims**



1. A semiconductor device comprising:
an anode layer;
a first semiconductor layer formed on said anode layer;
a first cladding layer formed on said first semiconductor layer and having a superlattice structure;
an active layer formed on said first cladding layer and having a superlattice structure;
a second cladding layer formed on said active layer and having a superlattice structure;
a cathode barrier layer formed on said second cladding layer;
a second semiconductor layer formed on said cathode barrier layer; and
a cathode layer formed on said second semiconductor layer,
said cathode barrier layer allowing electrons to tunnel therethrough when a voltage is applied across said anode and cathode layers so that a potential on a side of the superlattices is positive with respect to said cathode barrier layer,
said active layer having the superlattice with a bottom energy of a miniband from which electrons transit to a lower miniband with a light emission which bottom energy is smaller than those of the superlattices of said first and second cladding layers.

5,027,165
BURIED ZENER DIODE

Tunc Doluca, San Jose, Calif., assignor to Maxim Integrated Products, Sunnyvale, Calif.
Filed May 22, 1990, Ser. No. 526,598
Int. Cl.^{5} H01L *29/90. 27/00;* **G05F** *5/00*
U.S. Cl. 357—13 **14 Claims**



1. An improved zener diode comprising
a layer of semiconductor material having a primary surface;
a zener diode having a PN junction buried beneath said surface;
a pair of spaced contacts for said diode on said surface, the first located on a first region of said surface and the second located on a second region of said surface laterally spaced from said first region, said contacts establishing a diode current path through said diode across said PN junction;
a replica device formed in said layer of semiconductor material generally replicating the physical dimensions of said zener diode;

VOL
1127
ISS
4
JE
25
1991
UMI

said replica device having a pair of spaced surface contacts located on spaced regions of said surface with a replica current path between them having substantially the same resistance as the on-resistance of said diode current path, said replica current path replicating said diode current path except that it has no PN junction;

means coupling said replica device with said diode in a manner such that the voltage across said replica device is subtracted from the voltage across said diode to generate a difference voltage whereby, when current is simultaneously passed through said diode and said replica device, this difference voltage will be substantially independent of changes in the series resistance of said diode current path caused by variations in the manufacturing process and in the ambient temperature at which said diode is being used.

5,027,166

HIGH VOLTAGE, HIGH SPEED SCHOTTKY SEMICONDUCTOR DEVICE AND METHOD OF FABRICATION

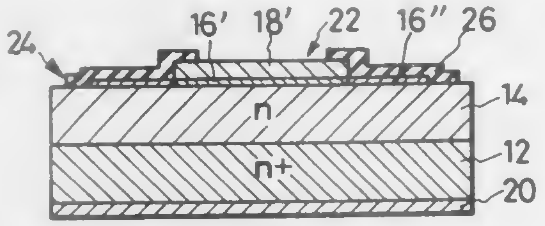
Koji Ohtsuka, Shiki; Yoshiro Kutsuzawa, Asaka; Kimio Ogata, Higashimatsuyama, and Hideyuki Ichinosawa, Kunitachi, all of Japan, assignors to Sanken Electric Co., Ltd., Saitama, Japan

Filed Nov. 29, 1988, Ser. No. 277,333

Claims priority, application Japan, Dec. 4, 1987, 62-307196

Int. Cl.⁵ H01L *29/48, 29/56*

U.S. Cl. 357—15 19 Claims



1. A high voltage, high speed Schottky semiconductor device comprising:

(a) a semiconductor region;

(b) a barrier metal electrode formed on the semiconductor region to create a Schottky barrier therebetween; and

(c) a resistive layer formed on the semiconductor region so as to surround the barrier metal electrode and electrically connected to the barrier metal electrode, the resistive layer having a higher sheet resistance than the barrier metal electrode and being capable of creating a Schottky barrier between the resistive layer and the semiconductor region, the sheet resistance of the resistive layer being from 10 kilohms to 5000 megohms.

5,027,167

SEMICONDUCTOR INTERGRATED CIRCUIT

Osamu Kagaya; Yasunari Umemoto, and Junji Shigeta, all of Kokubunji, Japan, assignors to The Agency of Industrial Science & Technology, Tokyo, Japan

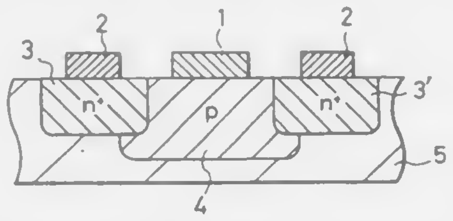
Filed Mar. 31, 1988, Ser. No. 175,705

Claims priority, application Japan, Jan. 22, 1988, 63-10761

Int. Cl.⁵ H01L *21/76, 29/72*

U.S. Cl. 357—15 9 Claims

1. A semiconductor integrated circuit featuring a compound semiconductor substrate, a pair of compound semiconductor layers of the same type of semiconductor material located side by side and spaced from one another on the surface of said compound semiconductor substrate, said pair of compound semiconductor layers being electrically isolated from one another by an isolation layer provided between said compound semiconductor layers, at least one ohmic electrode electrically connected to one of said compound semiconductor layers, and an electrode provided on and electrically connected to said isolation layer to apply an electric field to said isolation layer.



5,027,168

BLUE LIGHT EMITTING DIODE FORMED IN SILICON CARBIDE

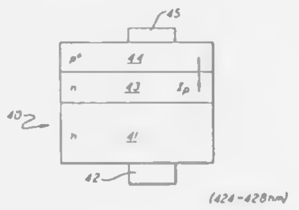
John A. Edmond, Apex, N.C., assignor to Cree Research, Inc., Durham, N.C.

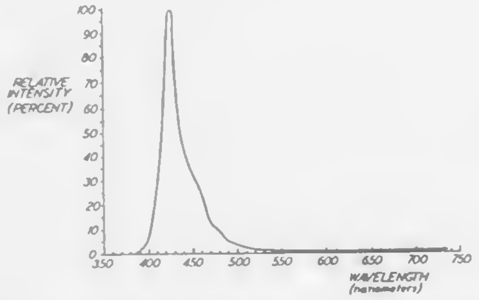
Continuation-in-part of Ser. No. 284,293, Dec. 14, 1988, Pat. No. 4,918,497. This application Aug. 28, 1989, Ser. No. 399,301

The portion of the term of this patent subsequent to Apr. 17, 2007, has been disclaimed.

Int. Cl.⁵ N01L *29/161, 29/205, 29/225*

U.S. Cl. 357—17 65 Claims





22. A light emitting diode formed in silicon carbide that emits light in the blue to violet portion of the visible spectrum and comprising:

a p-type substrate of alpha silicon carbide having a flat interface surface that is inclined more than one degree off axis with respect to a basal plane thereof substantially towards one of the $<11\bar{2}0>$ directions;

an ohmic contact to said substrate;

a substantially uncompensated p-type monocrystalline epitaxial layer of silicon carbide upon said interface surface of said p-type substrate;

a first substantially uncompensated n-type monocrystalline epitaxial layer of alpha silicon carbide upon said p-type epitaxial layer, and having a carrier concentration less than the carrier concentration of said p-type epitaxial layer;

a second substantially uncompensated n-type monocrystalline epitaxial layer of silicon carbide upon said first n-type epitaxial layer, and having a carrier concentration greater than the carrier concentration of said first n-type epitaxial layer; and

an ohmic contact to said second n-type epitaxial layer, wherein said second n-type epitaxial layer forms a conductive surface that moderates the current crowding that would otherwise occur about said contact to said second n-type epitaxial layer, said diode producing a peak emission of between about 424 and 428 nanometers with a spectral half width at peak wavelength of no greater than about 50 nanometers.

5,027,169

SEMICONDUCTOR DEVICE WITH SUBSTRATE MISORIENTATION

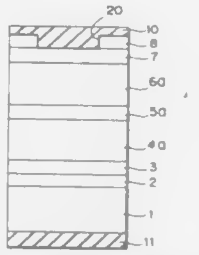
Kosei Takahashi, Nara; Masahiro Hosoda, Kitakatsuragi; Atsuo Tsunoda, Yamatokoriyama; Masafumi Kondo, Nara, and Takahiro Suyama, Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Japan

Filed Jun. 1, 1990, Ser. No. 531,386

Claims priority, application Japan, Jun. 7, 1989, 1-145620

Int. Cl.⁵ H01L *33/00*

U.S. Cl. 357—17 3 Claims



1. A semiconductor device comprising a (111)B single-crystal semiconductor substrate that is misoriented toward (110) and epitaxial layers that are grown on said substrate by molecular beam epitaxy; wherein the misorientation angle of said substrate is within the range of 2.5° to 4.0°.

5,027,170

SEMICONDUCTOR DEVICE MESFET WITH UPPER AND LOWER LAYERS

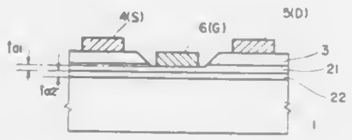
Masanori Nishiguchi, Kanagawa, and Naoto Okazaki, Kyoto, both of Japan, assignors to Sumitomo Electric Industries, Ltd., Japan

Continuation-in-part of Ser. No. 409,600, Sep. 19, 1989, abandoned. This application Nov. 13, 1990, Ser. No. 611,648

Claims priority, application Japan, Sep. 30, 1988, 63-246632; Sep. 30, 1988, 63-246633; Sep. 30, 1988, 63-246634; Sep. 30, 1988, 63-246635

Int. Cl.⁵ H01L *29/80*

U.S. Cl. 357—22 28 Claims



1. A semiconductor device including a MESFET which has an active layer doped in a GaAs crystal and a threshold voltage V_{th}, the active layer comprising an upper layer having a carrier concentration N_{1D} and an effective thickness t_{a1}, and a lower layer having a carrier concentration N_{2D} and an effective thickness t_{a2} ($N_{1D}<N_{2D}$); and which normally operates when a change ΔV_{th} in the threshold voltage V_{th} is within a tolerable amount ΔV_{thL},

an effective thickness $t_a=t_{a1}+t_{a2}$ of the active layer being

$$t_a<\{(2\epsilon\cdot\Delta V_{thL})/(q\cdot\Delta N_D)\}^{\frac{1}{2}}$$

where ΔN_D represents a decrease in the carrier concentrations N_{1D}, N_{2D} due to radiation exposure of a total exposure dose R equal to or higher than 1×10^9 roentgens, ϵ represents a dielectric constant of the active layer, and q represents an electron charge.

5,027,171

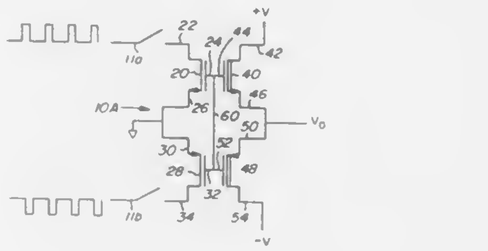
DUAL POLARITY FLOATING GATE MOS ANALOG MEMORY DEVICE

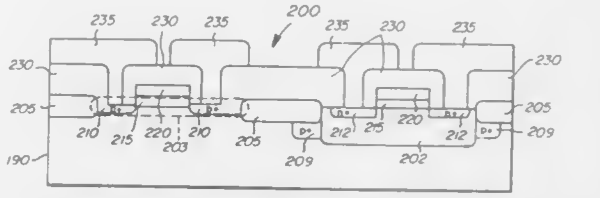
Ronald E. Reedy; Randy L. Shimabukuro, and Graham A. Garcia, all of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 28, 1989, Ser. No. 405,498

Int. Cl.⁵ H01L *29/78;* **G11C** *11/34*

U.S. Cl. 357—23.5 18 Claims





1. A dual-polarity nonvolatile MOS analog memory cell, comprising:

first and second n-channel metal oxide field effect transistors each having a gate, a source, and a drain; and

first and second p-channel metal oxide field effect transistors each having a gate, a source, and a drain, where

said gates of each of said first and second n-channel transistors and said first and second p-channel transistors being operably coupled in common to form a common floating gate, said sources of said first n-channel and p-channel transistors being operably coupled to a common ground, said sources of said second n-channel and p-channel transistors being operably coupled together to form an output junction.

5,027,172

DYNAMIC RANDOM ACCESS MEMORY CELL AND METHOD OF MAKING THEREOF

Jun-Young Jeon, Seoul, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Kyung Ki-Do, Rep. of Korea

Filed Dec. 18, 1989, Ser. No. 451,775

Claims priority, application Rep. of Korea, May 19, 1989, 1989-6720

Int. Cl.⁵ H01L *29/68, 27/02, 27/10, 29/06*

U.S. Cl. 357—23.6 **11 Claims**

1. A DRAM cell having a field oxide layer formed on the surface of a semiconductor substrate of a first conductivity type in order to isolate adjacent cells, drain and source regions of a second conductivity type opposite to the first conductivity type mutually separated by a given distance on the substrate, a gate oxide layer on the substrate between said source and drain regions, and word lines of a conductivity type being grown on said field oxide layer, said DRAM cell comprising:

a trench formed under a given portion between said source

VOL
1127
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1991
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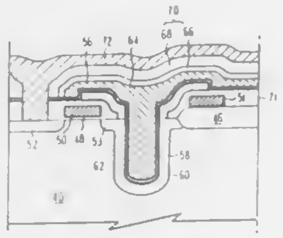
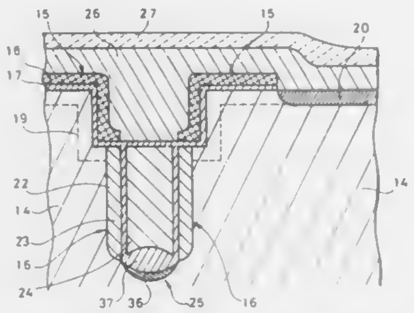
region and field oxide layer; a diffusion layer connected with said source region by ion-implanting impurities of a second conductivity type disposed into the substrate around said trench;
a first polycrystalline silicon layer connected with said source region and isolated from said word lines by a first insulating film;



a dielectric film formed on an inside surface of said trench and on said first polycrystalline silicon layer;
a second polycrystalline silicon layer formed on the dielectric film so as to fill the inside of said trench; and
a bit line connected with said drain region through an opening hole and isolated by a second insulating film.

5,027,173
SEMICONDUCTOR MEMORY DEVICE WITH TWO SEPARATE GATES PER BLOCK

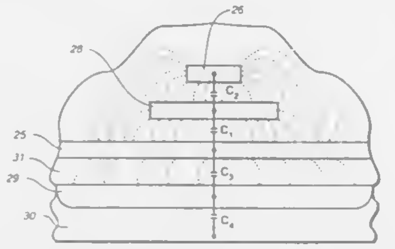
Shinichi Satoh, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 20, 1988, Ser. No. 261,022
Claims priority, application Japan, Nov. 17, 1987, 62-291337
Int. Cl.^{5} H01L *29/68, 29/06, 27/02*
U.S. Cl. 357—23.6 **13 Claims**



1. A semiconductor memory device comprising:
a semiconductor substrate (**1**);
first and second pairs of substantially parallel trenches formed on a major surface (**11**) of said semiconductor substrate (**1**), said first pair of trenches arranged substantially orthogonal to said second pair of trenches thereby defining a rectangular block (**14**) in said substrate (**1**);
first and second gate regions (**15**) formed spaced apart on said major surface (**11**) along opposite side wall surfaces of said block (**14**) formed by said parallel trenches, said first and second gate regions (**15**) being electrically isolated from each other;
a passive element region (**16**) formed on bottom portions of said trenches; and
a source/drain region (**20**) common to said first and second gate regions (**15**) formed on the major surface of said semiconductor substrate (**11**).

5,027,174
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE WITH IMPROVED RESISTANCE AGAINST ELECTROSTATIC NOISE

Toshio Mimoto, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Continuation of Ser. No. 384,874, Jul. 21, 1989, abandoned, which is a continuation of Ser. No. 228,381, Aug. 4, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 489,792
Claims priority, application Japan, Aug. 25, 1987, 62-212130
Int. Cl.^{5} H01L *29/06;* **H02H** *9/00*
U.S. Cl. 357—23.13 **4 Claims**

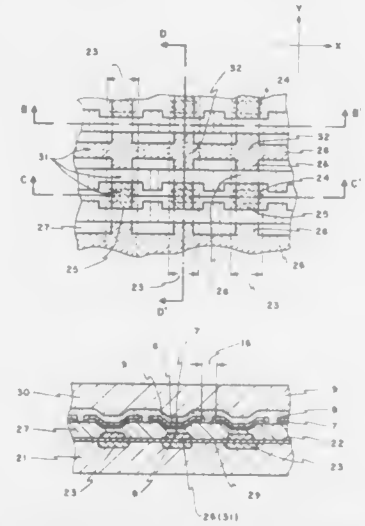


1. A line-crossing structure in a semiconductor integrated circuit device comprising:
a semiconductor substrate,
a first insulative film formed on said semiconductor substrate,
a first conductive line formed on said first insulative film, said first conductive line having a first end and a second end, said first end being connected through a first connecting line to an internal circuit of said device and said second end being connected through a second connecting line to an input protection circuit which is connected to an electrode pad for communicating signals with said internal circuit, and said first and second connecting lines being farther away from said substrate than said first conductive line,
a second conductive line which crosses above said first conductive line inside said line-crossing structure,
a second insulative film between said first and second conductive lines where said first and second conductive lines cross each other,
a conductive layer which is disposed between said first and second conductive lines and completely surrounded by said second insulative film so as to be in electrically floating condition, and
a diffusion layer formed in a surface region of said substrate so as to completely overlap said first conductive line.

5,027,175
INTEGRATED CIRCUIT SEMICONDUCTOR DEVICE HAVING IMPROVED WIRING STRUCTURE

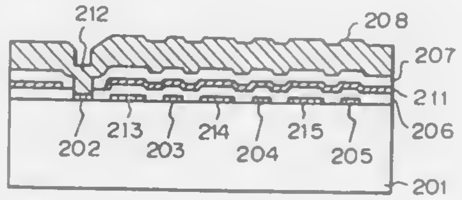
Shoichi Iwasa, Tokyo, Japan, assignor to NEC Corporation, Japan
Filed Aug. 29, 1989, Ser. No. 400,098
Claims priority, application Japan, Aug. 29, 1988, 63-214220
Int. Cl.^{5} H01L *29/680, 29/780, 27/020, 27/100*
U.S. Cl. 357—23.5 **15 Claims**

1. An integrated circuit semiconductor device comprising:
a semiconductor body of a first conductivity type having an upper surface;
a plurality of first wiring diffusions regions of a second conductivity type which is opposite to said first conductivity type formed in said semiconductor body from said upper surface inwardly and extending in a first direction and in parallel with each other;
an insulating film formed on said upper surface of said semiconductor body including said first wiring diffusion regions;
a plurality of contact holes formed in said insulating film so as to reach to surface parts of said first wiring diffusion regions;
a semiconductor layer formed on said insulating film and connected to said first wiring diffusion regions via said contact holes;
a plurality of second wiring diffusion regions formed in said semiconductor layer, extending in parallel with each other and in a second direction perpendicular to said first direction, and crossing over said first wiring diffusion regions by interposing said insulating film; and
a plurality of element forming portions for forming impurity regions of semiconductor elements formed in said semiconductor layer, each of said element forming portions being connected to a corresponding one of said first wiring diffusion regions and to a corresponding one of said second wiring diffusion regions.



5,027,176
PHOTO-ELECTRIC CONVERTER WITH INTERVENING WIRINGS FOR CAPACITIVE SHIELDING

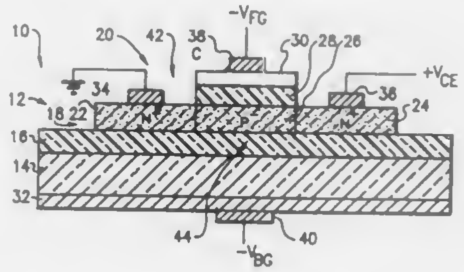
Toshihiro Saika, Hiratsuka, and Katsunori Hatanaka, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Continuation of Ser. No. 382,072, Jul. 17, 1989, abandoned, which is a continuation of Ser. No. 241,839, Sep. 6, 1988, abandoned, which is a continuation of Ser. No. 79,015, Jul. 29, 1987, abandoned. This application Mar. 19, 1990, Ser. No. 496,153
Claims priority, application Japan, Aug. 12, 1986, 61-187841
Int. Cl.^{5} H01L *27/14*
U.S. Cl. 357—30 **24 Claims**



1. A photoelectric converter comprising:
a photoelectric conversion unit comprising a plurality of photoelectric conversion elements arranged in an array extending in a first direction;
a matrix wiring unit comprising a plurality of discrete output electrodes each electrically connected to a respective one of said photoelectric conversion elements for transmitting output signals from corresponding photoelectric conversion elements, and a plurality of common lines each electrically connected to at least two of said discrete output electrodes, for transmitting signals from said at least two corresponding discrete output electrodes, wherein said polarity of common lines are arranged along with, and substantially parallel to, a direction of an arrangement of said plurality of photoelectric conversion elements; and
an intervening wiring provided between a pair of said plurality of common lines along with, and substantially parallel to, a direction of an arrangement of said plurality of photoelectric conversion elements, wherein said intervening wiring is at a constant potential.

5,027,177
FLOATING BASE LATERAL BIPOLAR PHOTOTRANSISTOR WITH FIELD EFFECT GATE VOLTAGE CONTROL

Prahalad K. Vasudev, Thousand Oaks, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.
Filed Jul. 24, 1989, Ser. No. 383,469
Int. Cl.^{5} H01L *27/14, 31/00*
U.S. Cl. 357—30 **5 Claims**



1. A phototransistor device comprising:
a semiconductor layer formed on an insulator substrate;
a lateral bipolar phototransistor formed in the semiconductor layer and having an emitter region, a collector region, and a photosensitive floating base region disposed between the emitter and collector regions, the collector and base regions defining a junction therebetween, at least said junction being exposed to receive light which the phototransistor device is intended to detect;
a transparent front gate electrode formed over the base region;
a transparent insulating layer formed between the front gate electrode and the base region; and
a back gate electrode formed on a surface of the substrate opposite to the semiconductor layer;
the emitter region, collector region, base region and front gate electrode constituting a source, drain, channel and gate of a first field effect transistor respectively;
the emitter region, collector region, base region and back gate electrode constituting a source, drain, channel and gate of a second field effect transistor respectively;
the front and back gate electrodes causing, in response to respective applied bias voltages which are sufficiently high to bias the first and second field effect transistors into cutoff, accumulation of majority carriers in the base region in the form of two charge accumulation regions extending between the emitter and collector regions and facing the front and back gate electrodes respectively.

VOL
1127
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1991
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5,027,178

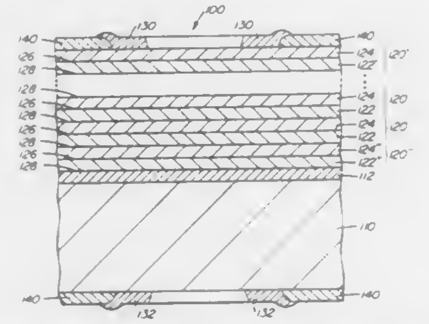
ELECTRICALLY TUNABLE INTERFERENCE FILTERS AND METHODS FOR THEIR USE

Mikelis N. Svilans, Kanata, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Aug. 3, 1989, Ser. No. 389,250

Int. Cl.⁵ H01L *27/14, 29/161, 33/00;* **G02F** *1/01*

U.S. Cl. 357—30 **18 Claims**



1. An electrically tunable interference filter, comprising:

a semiconductor body comprising a plurality of semiconductor layers;

each semiconductor layer comprising a first sublayer of a first semiconductor composition and a second sublayer of a second semiconductor composition, the first and second sublayers together defining a heterojunction, the first semiconductor composition being substantially the same for all layers, the second semiconductor composition being substantially the same for all layers, the first semiconductor composition having a first bandgap, and the second semiconductor composition having a second band gap which exceeds the first band gap; and

each semiconductor layer having a first portion which is doped with an n-type dopant and a second portion which is doped with a p-type dopant, the first and second portions together defining a pn junction which is located at or closely adjacent to the heterojunction; and

electrical contacts to the semiconductor body for biasing the pn junctions, the electrical contacts comprising;

an electrical contact to the top sublayer of the top layer; and

an electrical contact to the bottom sublayer of the bottom layer;

so that the pn junctions are electrically connected in series.

5,027,179

RESONANT-TUNNELING HETEROJUNCTION BIPOLAR TRANSISTOR DEVICE

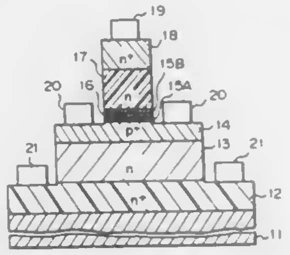
Naoki Yokoyama, and Kenichi Imamura, both of Atsugi, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 293,586, Jan. 4, 1989, abandoned, which is a continuation of Ser. No. 937,615, Dec. 3, 1986, abandoned. This application Oct. 22, 1990, Ser. No. 601,011

Claims priority, application Japan, Dec. 3, 1985, 60-270803

Int. Cl.⁵ H01L *29/72, 27/12, 29/161*

U.S. Cl. 357—34 **10 Claims**



1. A resonant-tunneling hetero junction bipolar transistor device comprising:

a collector semiconductor layer having a first conductivity type;

a base semiconductor layer having a second conductivity type opposite the first conductivity type, a PN junction being formed at an interface between said base semiconductor layer and said collector semiconductor layer;

an emitter semiconductor layer having the first conductivity type and formed on said base semiconductor layer; and

a superlattice structure formed between said emitter semiconductor layer and said base semiconductor layer, said superlattice structure comprising:

a first barrier layer contacting said emitter semiconductor layer, an energy level of said emitter semiconductor layer being lower than that of said first barrier layer for a carrier;

a second barrier layer contacting said base semiconductor layer, an energy level of said base semiconductor layer being lower than that of said second barrier layer for the carrier; and

a quantum well layer formed between said first and second barrier layers, an energy level of said quantum well layer being lower than that of said first and second barrier layers for the carrier, said quantum well layer defining a sub-band in which the carrier resonant tunnels therethrough.

5,027,180

DOUBLE GATE STATIC INDUCTION THYRISTOR

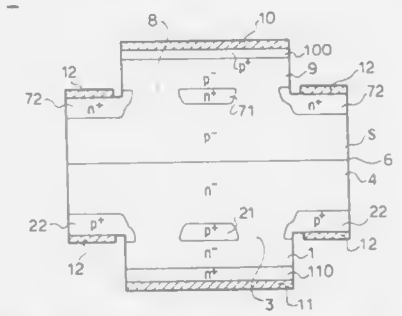
Jun-ichi Nishizawa, Miyagi, and Hisao Kondoh, Osaka, both of Japan, assignors to Mitsubishi Electric Corporation, Tokyo, Japan

Continuation of Ser. No. 132,002, Dec. 11, 1987, abandoned. This application Oct. 18, 1989, Ser. No. 423,661

Claims priority, application Japan, Dec. 11, 1986, 61-295300

Int. Cl.⁵ H01L *29/74*

U.S. Cl. 357—38 **4 Claims**



1. A double gate static induction thyristor comprising a semiconductor substrate having first and second principal surfaces opposite to each other, a first gate region formed at the first principal surface of the semiconductor substrate, a first semiconductor region of a first conduction type formed on the first principal surface of the semiconductor substrate, a second gate region formed at the second principal surface of the semiconductor substrate, a second semiconductor region of a second conduction type opposite to the first conduction type and formed on the second principal surface of the semiconductor substrate, gate electrodes formed on the first and second gate regions, and main electrodes formed on the first and second semiconductor regions, portions of the semiconductor regions surrounded by the gate region forming a current path between the main electrodes, wherein the improvement is that each of the first and second gate regions has a first diffusion region positioned underneath the corresponding gate electrode in ohmic contact with the corresponding gate electrode, and a second diffusion region which extends from the first diffusion region toward a semiconductor region of the semiconductor substrate positioned between the main electrodes, a large part of the second diffusion regions is spaced away from the first diffusion region in a cross-sectional view along the direction of the current flow between said main electrodes, and is electrically connected to the first diffusion region, a diffusion depth of the first diffusion region from the surface in contact with the corresponding gate electrode being larger than that of the second diffusion region from the same level as the surface of the first diffusion region in contact with the corresponding gate electrode.

5,027,181

CIRCUIT CONFIGURATION FOR PROTECTING AN ELECTRONIC CIRCUIT AGAINST OVERLOAD

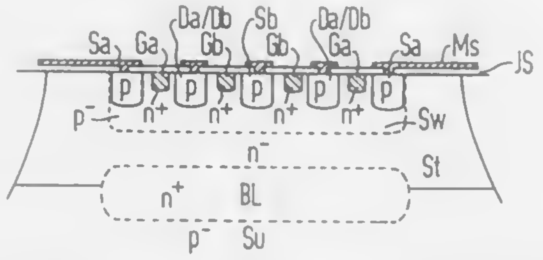
Joost Larik, Nürnberg, and Walter Förder, Fürth/Bay, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jun. 8, 1990, Ser. No. 535,367

Claims priority, application European Pat. Off., Jun. 8, 1989, 89110405.1

Int. Cl.⁵ H01L *27/02, 29/06;* **H02H** *9/00;* **H03B** *1/04*

U.S. Cl. 357—41 **8 Claims**



1. Circuit configuration for protecting electronic circuits against overload of a supply voltage source, comprising a voltage-limiting configuration, and a depletion layer field effect transistor having a drain terminal and interconnected gate and source terminals, said drain terminal being connected to said voltage limiting configuration and said interconnected gate and source terminal being connected to the supply voltage source.

5,027,182

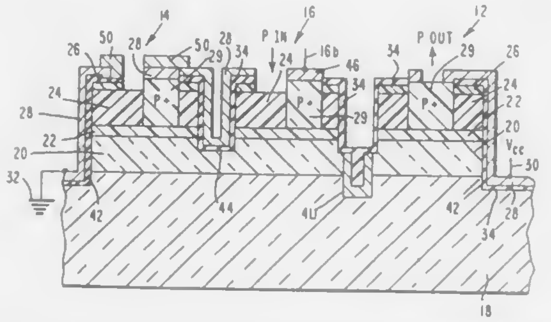
HIGH-GAIN ALGAAS/GAAS DOUBLE HETEROJUNCTION DARLINGTON PHOTOTRANSISTORS FOR OPTICAL NEURAL NETWORKS

Jae H. Kim, Arcadia, and Steven H. Lin, Temple City, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 11, 1990, Ser. No. 596,133

Int. Cl.⁵ H01L *27/02, 29/161, 33/00, 29/72*

U.S. Cl. 357—46 **22 Claims**



1. A neuron for optical neural networks comprising a Darlington double heterojunction phototransistor pair connected in series with a light source, said Darlington double heterojunction phototransistor pair comprising a double heterojunction bipolar transistor and a double heterojunction phototransistor pair.

5,027,183

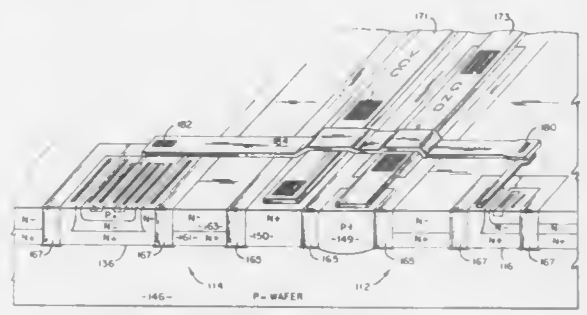
ISOLATED SEMICONDUCTOR MACRO CIRCUIT

Daniel M. Dreps, Endicott, N.Y., assignor to International Business Machines, Armonk, N.Y.

Filed Apr. 20, 1990, Ser. No. 513,310

Int. Cl.⁵ H01L *27/04, 27/12, 27/02*

U.S. Cl. 357—48 **22 Claims**



1. A semiconductor circuit comprising:

first semiconductor layer means for forming a semiconductor device;

a semiconductor device formed at least in part in said first semiconductor layer means;

a first conductive isolation region formed of semiconductor material in said first semiconductor layer means substantially around said semiconductor device;

first contact means, electrically connected to said first isolation region, for connecting said first isolation region to a voltage source or ground;

a second conductive isolation region formed of semiconductor material in said first semiconductor layer means substantially around said first isolation region, said second isolation region having an opposite conductivity type as said first isolation region;

second contact means, electrically connected to said second isolation region, for connecting said second isolation region to a voltage source or ground; and

a second semiconductor layer adjoining said first semiconductor layer means and having an opposite conductivity type as said first semiconductor layer means; and

wherein the isolation region which has the same conductivity type as said second semiconductor layer extends entirely through said first semiconductor layer means to said second semiconductor layer, and

the isolation region which has the same conductivity type as said first semiconductor layer means has a substantially higher concentration of dopants than said first semiconductor layer means, whereby said isolation region which has the same conductivity type as said first semiconductor layer means is distinct from said first semiconductor layer means.

5,027,184

NPN TYPE LATERAL TRANSISTOR WITH MINIMAL SUBSTRATE OPERATION INTERFERENCE

Sidney I. Soclof, San Gabriel, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 239,749, Mar. 2, 1981, abandoned. This application Jun. 17, 1987, Ser. No. 63,541

Int. Cl.⁵ H01L *29/72, 27/12*

U.S. Cl. 357—49 **5 Claims**

1. An array of sub-micron dimensioned NPN type lateral transistors formed in a substrate doped P-type, each comprising in combination:

spaced apart slots in the substrate through selected ones of which P+ type doping is received into the adjacent sub-

VOL
1127
ISS
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1991
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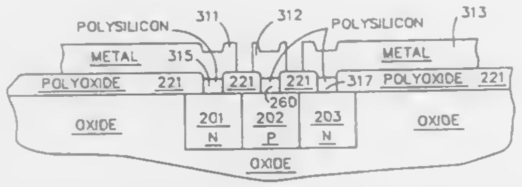
strate and driven in followed by N+ doping driving in through opposed slots;

said spaced apart slots comprising spaced apart pairs of slots orthogonally related to further pairs of slots with each pair of slots and each further pair of slots bounding a portion of the substrate comprising a region;

said slots filled with field oxide and surrounding each said region where a transistor will be formed;



said N+ doping on the inner sides of spaced apart slots within said regions comprising emitter and collector electrode areas;

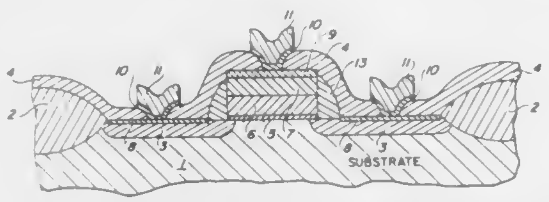
said P+ doping and the P substrate in said region between the N+ doping comprising a graded base electrode;

an electrical contact on each N+ electrode area and on the P+ doping and the P substrate graded electrode area; and,

said contacts measuring approximately 0.1 micron across.

5,027,185
POLYCIDE GATE FET WITH SALICIDE

Her-Rern Liauh, Hsin-Chu Hsien, Taiwan, assignor to Industrial Technology Research Institute, Taiwan
Continuation of Ser. No. 202,374, Jun. 6, 1988, abandoned. This application Mar. 30, 1990, Ser. No. 503,136
Int. Cl.^{5} H01L *29/04, 23/48, 29/46, 29/06*
U.S. Cl. 357—59 **13 Claims**



1. A field-effect-transistor structure having reduced gate sheet resistance and relatively low source and drain sheet resistance, said field effect transistor structure comprising in combination:

a. a substrate of single-crystal silicon having an upper surface;

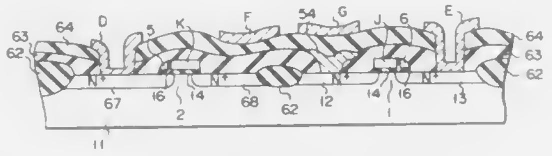
b. source and drain regions formed in said substrate adjacent the upper surface thereof and spaced apart from one another, said source and drain regions each having a sheet resistance associated therewith;

c. a gate structure formed upon the upper surface of said substrate generally between said source and drain regions, said gate structure including a layer of silicon dioxide formed upon the upper surface of said substrate, and a layer of polycide formed upon said silicon dioxide layer, said polycide layer being a composite of a layer of polysilicon over which a layer of a refractory metal silicide is deposited, said polycide layer having lateral edges, said polycide layer having a sheet resistance associated therewith, said gate structure further including a composite annealed layer of a transition metal formed upon and annealed with said polycide layer to reduce the effective sheet resistance of the polycide layer, said composite annealed layer of a transition metal extending between said lateral edges of said polycide layer and being substantially coextensive with the entire polycide layer; and

d. first and second metal silicide layers formed upon said source and drain regions, respectively, each of said first and second metal silicide layers being a composite of a layer of said transition metal formed upon and reacted with said single-crystal silicon at said respective source and drain regions for reducing the effective sheet resistance associated with each of said source and drain regions.

5,027,186
SEMICONDUCTOR DEVICE

Masaaki Kinugawa, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Feb. 1, 1990, Ser. No. 473,436
Claims priority, application Japan, Feb. 2, 1989, 1-24546
Int. Cl.^{5} H01L *29/04*
U.S. Cl. 357—59 **11 Claims**



1. A static random access memory comprising:

a first power source;

a second power source;

a first MOS transistor structure having a first gate, a first source connected to the second power source, and a first drain;

a second MOS transistor structure having a second gate connected to the first drain of said first MOS transistor structure, a second source connected to the second power source, and a second drain connected to the first gate of said first MOS transistor structure and the first power source;

a first resistor connected between the first gate of said first MOS transistor structure and the first power source and substantially formed only over the first source of said first MOS transistor; and

a second resistor connected between the second gate of said second MOS transistor structure and the first power source and substantially formed only over the second source of said second MOS transistor;

wherein said first resistor is arranged to the first gate so that an electrical field generated from the first gate modifies a resistance of said first resistor, and said second resistor is arranged adjacent to the second gate so that an electrical field generated from the second gate modifies a resistance of said second resistor.

5,027,187
POLYCRYSTALLINE SILICON OHMIC CONTACTS TO GROUP III-ARSENIDE COMPOUND SEMICONDUCTORS

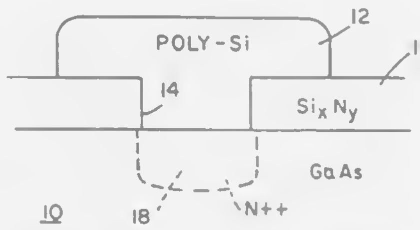
William E. O'Mara, Jr., Kingston, N.H., and Gregory A. Schrantz, Melbourne, Fla., assignors to Harris Corporation, Melbourne, Fla.
Continuation of Ser. No. 497,187, Mar. 22, 1990, abandoned. This application Nov. 6, 1990, Ser. No. 608,622
Int. Cl.^{5} H01L *23/49, 29/40, 29/12, 21/44*
U.S. Cl. 357—65 **4 Claims**

1. A contact structure for group III-arsenide substrate comprising:

a group III-arsenide substrate having a first region of a first impurity concentration;

a contact region in said first region having silicon impurities

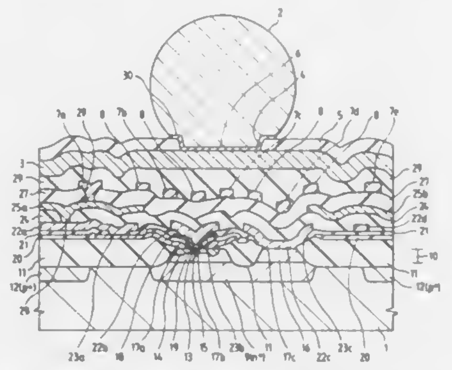
of a greater impurity concentration than said first impurity concentration; and



a polycrystalline silicon contact on a surface of said first region of said substrate forming an ohmic contact with said contact region.

5,027,188
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE IN WHICH A SEMICONDUCTOR CHIP IS MOUNTED WITH SOLDER BUMPS FOR MOUNTING TO A WIRING SUBSTRATE

Nobuo Owada; Kaoru Oogaya, both of Ohme; Tohru Kobayashi, Iruma, and Mikinori Kawaji, Hino, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Sep. 13, 1989, Ser. No. 406,548
Claims priority, application Japan, Sep. 13, 1988, 63-229221
Int. Cl.^{5} H01L *23/48*
U.S. Cl. 357—68 **20 Claims**



1. A semiconductor integrated circuit device comprising:

a semiconductor substrate having a plurality of semiconductor devices formed on a main plane;

a first insulator film being formed over said main plane of said semiconductor substrate;

first wirings being formed on said first insulator film and each of said first wirings extending in a first direction;

a second insulator film being formed on said first wirings;

second wirings being formed on said second insulator film;

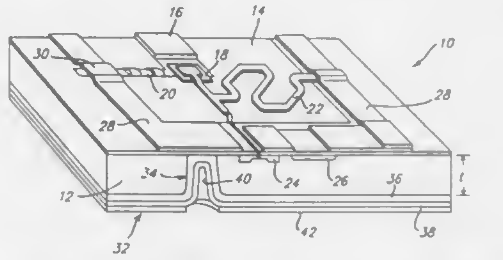
a third insulator film being formed on said second wirings, wherein said third insulator film is formed with holes so as to expose surface portions respectively associated with said second wirings, and wherein each of said holes is respectively disposed over a corresponding pair of adjacent first wirings;

a plurality of bump electrodes being electrically connected to said second wirings via said holes, respectively;

a plurality of dummy wiring patterns being formed between each said pair of adjacent first wirings at a location thereof only in and around said holes corresponding to a transverse area in accordance with an orthogonal projection of said holes toward said semiconductor substrate, wherein said plurality of dummy wiring patterns are arranged in said first direction with a predetermined distance therebetween.

5,027,189
INTEGRATED CIRCUIT SOLDER DIE-ATTACH DESIGN AND METHOD

Michael J. Shannon, and Randolf C. Turnidge, both of Tucson, Ariz., assignors to Hughes Aircraft Company, Los Angeles, Calif.
Filed Jan. 10, 1990, Ser. No. 463,186
Int. Cl.^{5} H01L *23/48, 29/46, 29/54, 29/62*
U.S. Cl. 357—71 **12 Claims**



1. A semiconductor device adapted to be metallurgically bonded to a substrate to provide an electrical interconnection therebetween, comprising:

a semiconductor wafer having first and second major surfaces, said second major surface defining at least one via extending through said wafer to said first major surface;

a ground-plane metallization layer on said second major surface of said semiconductor wafer;

first layer means formed on said ground-plane metallization layer at least within said via for preventing bonding of a solder material with said via;

said first layer means comprising a layer of a first conductive material formed on the ground-plane metallization layer of said wafer and on the surface of said via; and

second layer means formed on a portion of said first layer means and terminating at the peripheral edge of said via for bonding said semiconductor wafer to said substrate.

5,027,190
CARRIER ELEMENT TO BE INCORPORATED INTO AN IDENTITY CARD

Yahya Haghiri-Tehrani, München, and Renée-Lucia Barak, Unterhaching, both of Fed. Rep. of Germany, assignors to GAO Gesellschaft fur Automation und Organisation mbH, Fed. Rep. of Germany
Continuation of Ser. No. 218,273, Jul. 13, 1988, abandoned. This application Sep. 12, 1990, Ser. No. 581,394
Claims priority, application Fed. Rep. of Germany, Jul. 16, 1987, 3723547
Int. Cl.^{5} H01L *23/28, 23/12*
U.S. Cl. 357—74 **3 Claims**

1. An identity card comprising a carrier element including a substrate having at least one aperture; an integrated circuit including at least one terminal and disposed in said aperture; at least one connector path on at least a first surface of the substrate connected to the at least one terminal of the integrated circuit; a heat activatable adhesive film layer disposed on and in direct contact with a second surface of the substrate opposite said first surface; said film surrounding said substrate aperture at a distance therefrom and defining by its thickness a barrier frame adjacent and surrounding said substrate aperture; a casting compound surrounding at least said integrated circuit

VOL
1127
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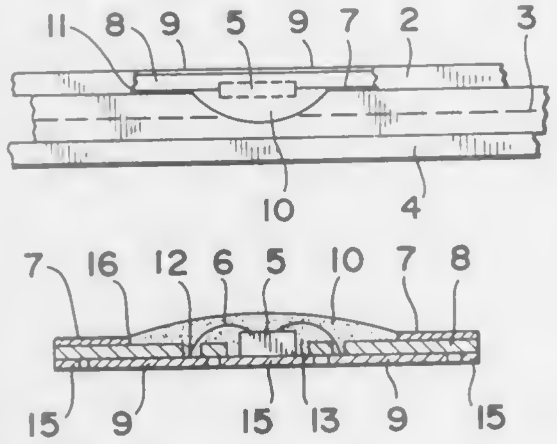
and extending along said second surface only up to the adhesive film barrier frame; and a core layer including a core surface portion adhesively bonded to said second surface by said adhesive film.



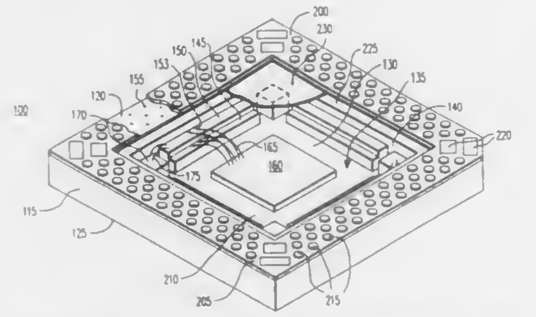
5,027,191
CAVITY-DOWN CHIP CARRIER WITH PAD GRID ARRAY

Robert A. Bourdelaise, Crofton; David B. Harris, Columbia; Denise B. Harris, Columbia, and John A. Olenick, Columbia, all of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 11, 1989, Ser. No. 350,872

Int. Cl.^{5} H01L *23/12, 23/02*

U.S. Cl. 357—74 **6 Claims**



1. An integrated circuit chip carrier package comprised of:
a) a body of an electrically insulating material having
i) planar top and bottom surfaces and having a cavity with cavity walls and a cavity floor located proximate to either one of said body planar surfaces upon which an integrated circuit chip having a plurality of chip connections extending therefrom is mounted and
ii) at least one bonding ledge having an outer surface and extending from the cavity floor along the cavity wall,
b) a plurality of vias of electrically conductive material within the body, each with a first and a second end, the first ends of the vias terminating at the body top surface in a predetermined pattern and the second ends of the vias correspondingly terminating with continuity at the bonding ledge outer surface,
c) electrical connection means extending from each of the chip connections to the second end of a corresponding via such that an electrically conductive path is established between the chip connections and corresponding vias,
d) a cover plate secured to the body planar surface located relatively non-proximate to said cavity floor to fully cover the cavity and
e) a planar electrically insulating layer secured to the body top surface, the layer having an opening therethrough aligned with the body cavity opening and having a plurality of contact pads extending through the layer with each pad associated with and contacted by an associated via first end from the body and each pad having a greater cross-sectional area than that of the associated via and each pad further positioned at a precise predetermined location through the layer such that dimensional variations in the via first end locations caused by fabrication of the body may be compensated by the predetermined locations of the contact pads thereby providing alignment and electrical connection between the via first end and a mating external electrical connection.

5,027,192
FAST POWER SEMICONDUCTOR CIRCUIT

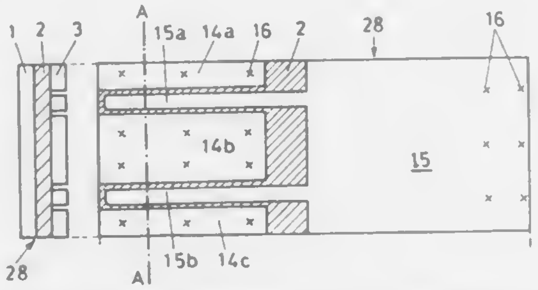
Franz Kloucek, Wettingen, Switzerland, assignor to Asea Brown Boveri Ltd., Baden, Switzerland

Filed Jan. 11, 1990, Ser. No. 463,354

Claims priority, application Switzerland, Feb. 7, 1989, 408/89

Int. Cl.^{5} H01L *27/02, 23/14*

U.S. Cl. 357—75 **10 Claims**



1. A fast power semiconductor circuit, comprising:
a gate turn-off component comprising a large-area semiconductor substrate with an anode side and a cathode side opposite the anode side, an anode arranged on the anode side, and a cathode and a gate arranged on the cathode side;
a drive circuit, which is connected between the gate and the cathode, and generates a current pulse for turning off the component;
the drive circuit connected to the semiconductor substrate by a large-area stripline;
the stripline comprising an insulating layer having opposed first and second sides upon which respective first and second metallizations are formed; and
said drive circuit connected to said semiconductor device by selected portions of said first and second metallizations, which are respectively connected to said gate and said cathode.

5,027,193
SYSTEM FOR TRANSMITTING A DIGITAL VIDEO SIGNAL INCLUDING TIME CODE SIGNALS

Tetsuo Kani, and Takao Inoue, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

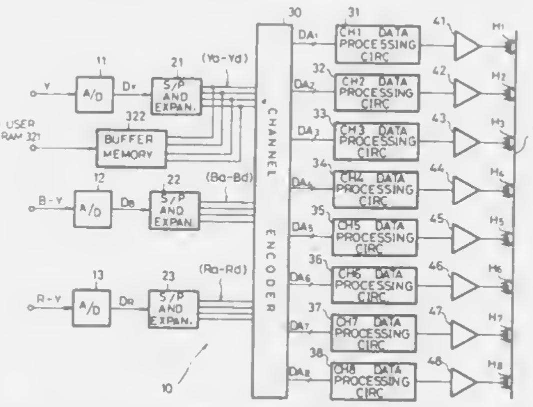
Filed Apr. 23, 1990, Ser. No. 512,822

Claims priority, application Japan, Apr. 28, 1989, 1-110317

Int. Cl.^{5} H04N *11/06, 9/89, 9/79;* **G11B** *5/02*

U.S. Cl. 358—12 **7 Claims**

1. A method of transmitting frames of digital video data signals comprised of digital luminance data signals and first and second digital chrominance data signals, and time code data signals representing addresses of said frames of digital video data, said method comprising the steps of:
dividing said digital luminance data signals into a plurality of sets thereof each consisting of two successive digital luminance data signals;
dividing said first digital chrominance data signals into a plurality of sets thereof, each of said sets of first digital chrominance data signals consisting of two successive first digital chrominance data signals;
dividing said second digital chrominance data signals into a plurality of sets thereof, each of said sets of second digital chrominance data signals consisting of two successive second digital chrominance data signals;
dividing said time code data signals into a plurality of sets thereof, each of said sets of time code data signals consisting of two identical time code data signals;
distributing said sets of digital luminance data signals, said sets of first digital chrominance data signals, said sets of second digital chrominance data signals and said sets of time code data signals into a plurality of transmission channels in such a manner that each said set of digital luminance data signals is interleaved between a set of said first digital chrominance data signals and a set of said second digital chrominance data signals in each of said transmission channels and that each of said sets of time code data signals is distributed into each of said transmission channels; and
inverting one of said two successive data signals in each of said sets of digital luminance data signals and in each of said sets of first and second digital chrominance data signals, and one of said two identical time code data signals in each of said sets of time code data signals for obtaining the complement of said one of the two successive data signals in each set which has been inverted and thereby substantially minimizing any DC component in each of said transmission channels.



5,027,194
METHOD FOR REDUCING NOISE AND CROSS-COLOR INTERFERENCE IN TELEVISION SIGNALS, AND APPARATUS FOR PERFORMING THE METHOD

Günter Scheffler, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

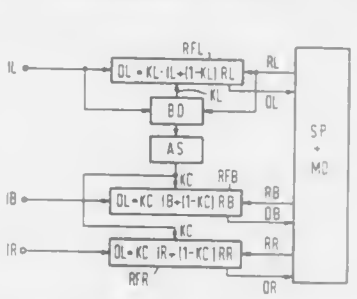
Filed May 31, 1989, Ser. No. 359,100

Claims priority, application Fed. Rep. of Germany, May 31, 1988, 3818539

Int. Cl.^{5} H04N *9/64*

U.S. Cl. 358—36 **8 Claims**

1. Method for the simultaneous reduction of noise and cross-color interference in television signals, which comprises processing a luminance signal and two chrominance signals in a picture processor with a recursive filter. determining filter coefficients for both chrominance signals form the luminance signal with a change detector, and deriving the filter coefficients for both chrominance signals from the luminance signal.



5,027,195
COLOR DETECTION AND/OR RECOGNITION APPARATUS

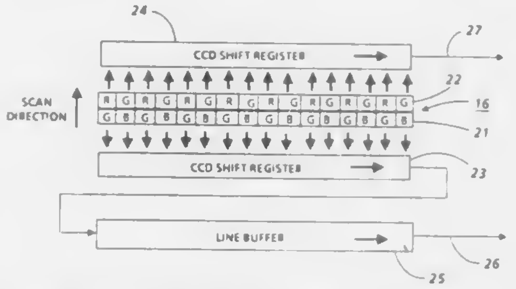
Roderick A. Cooley, Harpenden, and ANthony J. Cronshaw, Stapleford, both of England, assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 10, 1989, Ser. No. 419,562

Claims priority, application United Kingdom, Oct. 18, 1988, 8824340

Int. Cl.^{5} H04N *9/07, 1/46*

U.S. Cl. 358—75 **17 Claims**



1. Color detection and/or recognition apparatus for detecting or recognizing colors on an original surface comprising:
a twin row array of detector elements, each detector element in each row of the array being arranged to produce an electrical signal on detection of a given color;
the two rows each including a plurality of groups of detector elements, with the elements in each group of at least one of the rows being sensitive to a respective different color, with corresponding elements in the two rows being sensitive to different colors, whereby among adjacent elements in one of the rows and corresponding elements in the other of the rows, there are elements sensitive to at least three different colors; and
means for processing said electrical signals to provide a determination of the detection of color or the recognition of a color.

5,027,196
METHOD OF AND APPARATUS FOR SIMULATING OBJECT IMAGE TO BE PRINTED

Yoshio Ono, and Noriyuki Shimano, both of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Jul. 10, 1989, Ser. No. 377,394

Claims priority, application Japan, Jul. 12, 1988, 63-174237

Int. Cl.^{5} G03F *3/10*

U.S. Cl. 358—76 **12 Claims**

1. An apparatus for simulating an object image to be printed which is obtainable by modifying a given original image data into a modified image data and then printing said object image using a process scanner on the basis of said modified image data, said apparatus comprising:

VOL
1127
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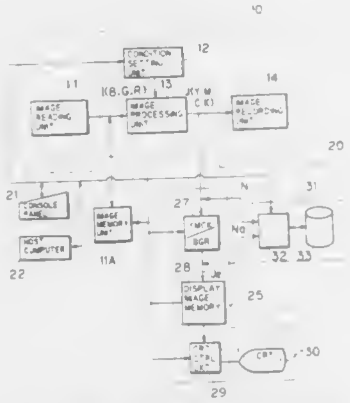
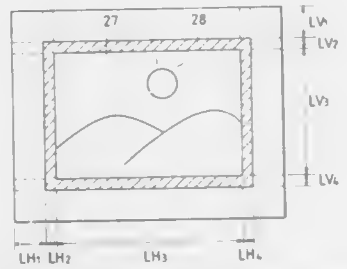
(a) means for inputting said original image data,
(b) means for variably designating modification conditions employable in modification of said original image data,
(c) means coupled to said means (a) and (b) for modifying employable in modification of said original image data,
(c) means coupled to said means (a) and (b) for modifying said original image data into said modified image data in accord with said modification conditions,
(d) means for storing reference image data set by earlier printing a reference image and then confirming that the printed reference image has desired image characteristics,



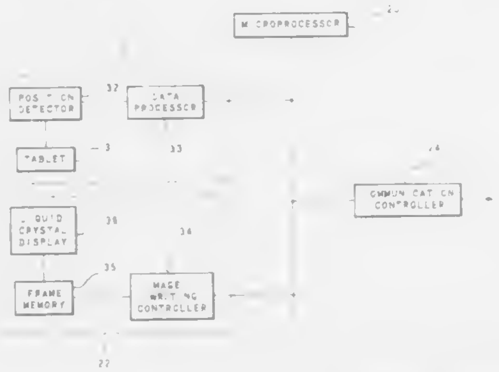
(e) display means for displaying one or more images on the basis of given image data, and
(f) means coupled to said means (c), (d) and (e) for transmitting said modified image data and said reference image data to said display means as said given image data in order to display on said display means first and second images on the basis of said modified image data and said reference image data, respectively, so that said first and second images can be visually compared with each other.

5,027,197
IMAGE EXPOSURE DEVICE HAVING FRAME ADDITION UNIT
Yoshinori Endo, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan
Filed Sep. 13, 1989, Ser. No. 406,531
Claims priority, application Japan, Sep. 19, 1988, 63-234448
Int. Cl.^{5} H04N *1/46;* **G03F** *3/10*
U.S. Cl. 358—76 **6 Claims**



1. An image exposure device for optically forming an image on photosensitive medium, comprising:
luminous display means having a screen for displaying an image data and a frame portion on the screen and projecting the image of the image data and the frame portion on the photosensitive medium, said frame portion defining an area on which the image is formed;
color indicating means for indicating the color of the frame portion and outputting a color signal indicating the color; and
display control means for controlling said display means to display the frame portion on the screen in the color indicated by said color indicating means in response to the color signal.

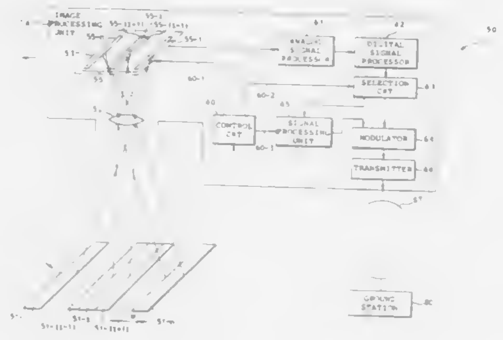
5,027,198
TELECONFERENCE SYSTEM WITH IMAGE DISPLAY AND INPUT MEANS
Kazuo Yoshioka, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 9, 1988, Ser. No. 268,719
Claims priority, application Japan, Nov. 10, 1987, 62-284036
Int. Cl.^{5} G08C *21/00;* **H04N** *7/15*
U.S. Cl. 358—85 **3 Claims**



1. A conference system comprising a plurality of individual terminals which are provided with individual image input means and individual image display means respectively and connected to each other via communication lines, wherein
said image input means of said individual terminals is provided with a transparent image input surface composed of a pressure sensitive transparent tablet for inputting an image drawn thereon;
said image display means of each of said individual terminals, whereupon said image input surface of said image input means is superimposed, is provided with an image display screen whose image display position corresponds to the input position of said image input surface by equivalent scale;
said system further comprising a central processing unit which is connected with said individual terminals via a data transmission line and receives image data inputted by said image input means of said individual terminals and transmits said image data to said image display means of other individual terminals; and
a large display unit which is connected with said central processing unit and which displays said image data transmitted from said individual terminals to show said image data to all attendants of said conference.

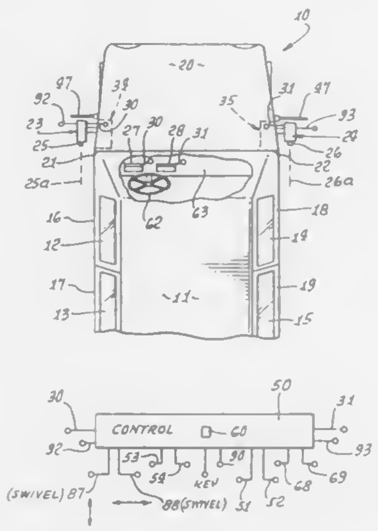
5,027,199
IMAGE PICKUP SYSTEM CAPABLE OF OBTAINING A PLURALITY OF STEREO IMAGES WITH DIFFERENT BASE HEIGHT RATIOS
Naoshi Suzuki, Tokyo, Japan, assignor to NEC Corporation, Japan
Filed Sep. 20, 1989, Ser. No. 410,104
Claims priority, application Japan, Sep. 20, 1988, 63-237073
Int. Cl.^{5} H04N *13/00, 15/00*
U.S. Cl. 358—88 **7 Claims**

1. In an image pickup system for a craft flying in a predetermined direction over an object zone, wherein the image pickup system comprises an optical system located in the craft for producing an optical image of said object zone on a focussing area of the optical system and image processing means coupled to the optical system for electrically processing the optical image, the image processing means comprising:
a predetermined number including at least five photoelectric transducers associated with said focussing area to convert said optical image into partial electrical signals representative of partial zones of said object zone when said craft flies over each of said object zones, said partial zones being in one-to-one correspondence to said photoelectric transducers;



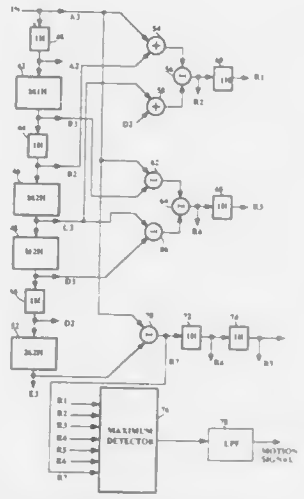
signal processing means coupled to said photoelectric transducers for processing said partial electric signals into a plurality of stereo images; and
means for enabling designating at least two base height ratios for obtaining said stereo signals.

5,027,200
ENHANCED VIEWING AT SIDE AND REAR OF MOTOR VEHICLES
Edward Petrossian, and Ashkhen A. Petrossian, both of 1140 Elm Ave., Apt. 111, Glendale, Calif. 91201
Filed Jul. 10, 1990, Ser. No. 550,556
The portion of the term of this patent subsequent to Mar. 20, 2007, has been disclaimed.
Int. Cl.^{5} H04N *7/18*
U.S. Cl. 358—103 **11 Claims**



1. In apparatus to permit viewing of traffic or other conditions to the rear and side of a motor vehicle having opposite sides, and including
a) video camera means mounted to the vehicle and directed sidewardly relative to the vehicle, and CRT means operatively connected to the camera means to display the camera means output on CRT screen means, to be viewed by the driver, the improvement, in combination with said apparatus, comprising:
b) means for effecting swiveling of said camera means, and
c) enhancement means associated with said video camera means to enhance viewing thereof to the rear and side of the vehicle, said enhancement means including
i) dwell circuitry connected with said swiveling means to automatically effect stopping of said camera means swiveling during a predetermined dwell interval.

5,027,201
MOTION DETECTION APPARATUS AS FOR AN INTERLACE TO NON-INTERLACE SCAN CONVERTER
Francis S. Bernard, Plainsboro, N.J., assignor to RCA Licensing Corporation, Princeton, N.J.
Filed Dec. 21, 1989, Ser. No. 454,819
Int. Cl.^{5} H04N *7/18, 11/20*
U.S. Cl. 358—105 **14 Claims**



1. Image motion detection apparatus for detecting image motion in video signals formatted in fields of interlaced lines, said apparatus comprising:
a source of video signal;
provider means, coupled to said source, for providing a plurality of signals representing a plurality of lines from a plurality of said fields;
first means, coupled to said provider means, for generating first motion indicators representing the magnitude of the difference between a first sum of signals representing lines from first mutually exclusive fields and a second sum of signals representing lines from second mutually exclusive fields;
second means, coupled to said provider means, for generating second motion indicators representing the magnitude of the difference between the magnitude of a first difference of signals representing lines from said first mutually exclusive fields and the magnitude of a second difference of signals representing lines from said second mutually exclusive fields, wherein said first and second differences are formed from signals representing different combinations of lines than the combination of lines from which the first and second sums are formed;
third means, coupled to said provider means, for generating third motion indicators representing the magnitude of a third difference between signals representing lines from said first mutually exclusive fields and a further field exclusive of said first and second mutually exclusive fields;
a maximum detector, responsive to said first, second and third motion indicators, for providing the largest of said first, second and third motion indicators as a motion signal.

VOL
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5,027,202
PICTURE TRANSMISSION SYSTEM OF OPTICAL WAVE GUIDE GUIDED MISSILES

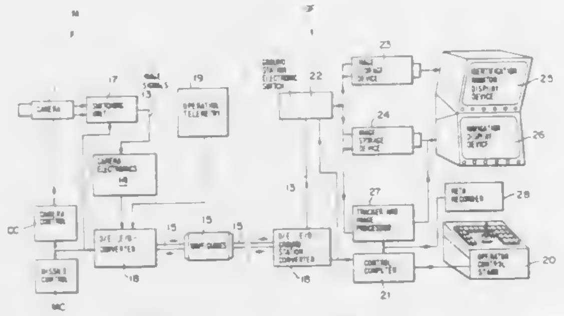
Wolfgang von Hoessle, Hohenbrunn-Riemerling, and Herbert Kuchler, Rosenheim, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Fed. Rep. of Germany

Filed Jun. 28, 1990, Ser. No. 544,891

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1989, 3928244

Int. Cl.⁵ H04B *10/22, 10/24;* **H04N** *7/18*

U.S. Cl. 358—109 **12 Claims**



1. A visual image transmission system for a guided missile which is connected with a ground facility comprising:

a camera disposable in a guided missile and having a first lens of short focal length for sensing navigation aiding images and a second lens of long focal length for sensing target identification aiding images,

a navigational visual display device at a ground facility,

a target identification visual display device at the ground facility,

and optical wave guide and electro-optical transmitting means for transmitting the visual image from the first lens to the navigational visual display device and for transmitting the visual image from the second lens to the target identification visual display device,

wherein means are provided for selectively displaying the target identification image as a still picture on the target identification visual display device without impairing continuous viewing of the navigational aiding images on the navigational visual display device.

5,027,203
MOTION DEPENDENT VIDEO SIGNAL PROCESSING

Raphael Samad, Basingstoke; John W. Richards, Chilbolton Near Stockbridge, and Clive H. Gillard, Basingstoke, all of United Kingdom, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 20, 1990, Ser. No. 512,263

Claims priority, application United Kingdom, Apr. 27, 1989, 8909655

Int. Cl.⁵ H04N *7/01*

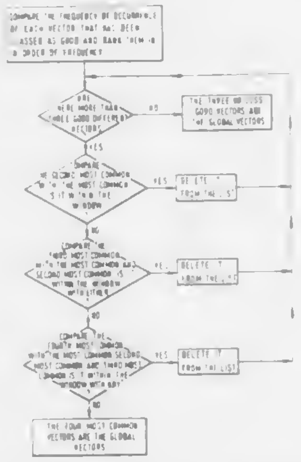
U.S. Cl. 358—140 **10 Claims**

1. A motion compensated video standards converter for converting a video signal conforming with a first video standard to a converted video signal conforming with a second video standard, said video signal being provided as a sequence of intervals selected from fields and frames, each of said intervals being arranged in a plurality of blocks each representing a portion of an image represented by said video signal and comprising a plurality of pixels, comprising:

comparing means for comparing each of a plurality of blocks in a first interval of said video signal with a plurality of blocks in an adjacent interval of the video signal for deriving a respective plurality of motion vectors for at least some of said plurality of blocks in said first interval representing motion of the image portion represented by said at least some of said plurality of blocks;

means for selecting further motion vectors for assignment to those of said plurality of blocks in said first interval for which less than a predetermined plurality of motion vectors are derived as a result of said comparison, by selecting said further motion vectors from a group of non-stationary motion vectors derived for said first interval including those motion vectors which occur most frequently and excluding those motion vectors which fall within a predetermined window of pixel motion of a more frequently occurring motion vector; and

interpolator means for producing said converted video signal, said interpolator means being controlled at least in dependence on said respective plurality of motion vectors and said further motion vectors.



5,027,204
MEMORY FOR VIDEO SIGNALS

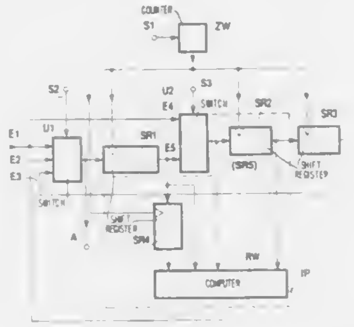
Maximilian Riegel, Nuremberg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 6, 1989, Ser. No. 418,351

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1988, 3835171

Int. Cl.⁵ H04N *5/907*

U.S. Cl. 358—140 **4 Claims**



1. A memory for video signals whose picture information is partitioned into fields and in which the information of the fields is arranged in lines in which separate field information components may be absent and whose fields are separated from one another by a vertical retrace interval when they are read from the memory, comprising:

1.1 a series arrangement of three shift registers (SR1, SR2, SR3) of which the first and third shift registers (SR1, SR3) comprise memory locations for one line more than the number of information-carrying lines constituting a field, and in which the second shift register (SR2) comprises memory locations for one line,

1.2 a first controllable switch (U1) at the input of the first shift register (SR1) via which either the data of an incoming field (E1) or the data of the field stored in the third shift register (SR3) are applied to the first shift register (SR1) and

1.3 a counter (ZW) generating and counting the shift pulses for the shift registers (SR1, SR2, SR3) and generating, during the vertical retrace interval, shift pulses for one line more in one field and shift pulses for two lines more in the subsequent field than the number of information-carrying lines in each field.

5,027,205
MOTION DEPENDENT VIDEO SIGNAL PROCESSING

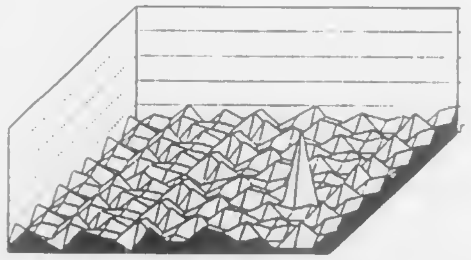
Richard J. A. Avis; Clive H. Gillard, and Raphael Samad, all of Basingstoke, United Kingdom, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 20, 1990, Ser. No. 512,381

Claims priority, application United Kingdom, Apr. 27, 1989, 8909647

Int. Cl.⁵ H04N *7/01*

U.S. Cl. 358—140 **10 Claims**



1. A motion compensated video standards converter for converting a video signal conforming with a first video standard to a converted video signal conforming with a second video standard, said video signal being provided as a sequence of intervals selected from fields and frames, each of said intervals being arranged in a plurality of blocks each representing a portion of an image represented by said video signal, comprising:

means for comparing a respective one of said blocks in a first interval of said video signal with a plurality of blocks in an adjacent interval thereof for deriving motion vectors representing motion of the portion of an image represented by said respective one of said blocks between said first interval and said adjacent interval by generating a respective correlation surface for said respective one of said blocks in said first interval representing respective differences between the image portion represented by said respective one of said blocks in said first interval and the respective image portions represented by each of said plurality of blocks in said adjacent interval;

means for determining shape characteristics of a part of said correlation surface which represents said respective differences which are less than a predetermined threshold level for varying a size of at least one of said plurality of blocks and of said respective one of said blocks in dependence on said shape characteristics; and

interpolator means for producing said converted video signal, said interpolator means being controlled at least in dependence on said motion vectors.

5,027,206
HIGH-DEFINITION TELEVISION SYSTEMS

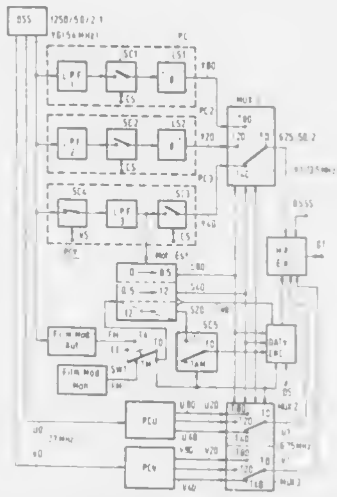
Franciscus W. P. Vreeswijk, Eindhoven, New Zealand, and Christopher M. Carey Smith, Christ Church, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 13, 1989, Ser. No. 406,928

Claims priority, application United Kingdom, Sep. 16, 1988, 8821764; Netherlands, Dec. 19, 1988, 8803100

Int. Cl.⁵ H04N *7/04*

U.S. Cl. 358—141 **3 Claims**



1. Method of encoding a picture signal to obtain an encoded picture signal, comprising the steps of:

receiving said picture signal,

determining motion vectors relating to motion in a picture of said picture signal,

obtaining a selection signal to select one operation mode out of a plurality of possible operation modes on said picture signal depending on said selection signal to obtain a picture signal to be encoded,

digitally encoding said selection signal and said motion vectors to obtain an assisting signal to inform a decoder which one of said plurality of operation modes has been selected and about said motion vectors, and

encoding said picture signal to be encoded and said assisting signal to obtain said encoded picture signal,

characterized by

receiving a film mode information signal indicating whether said picture signal originates from film,

said selecting step further depending on said film mode information signal, and

digitally encoding said film mode information signal, said assisting signal also comprising said film mode information signal to inform said decoder whether said picture signal originates from film.

5,027,207
TELEVISION SIGNAL TRANSMISSION SYSTEM UTILIZING TDMA TECHNIQUE

Masataka Fujisaki; Kiyotaka Fujisaki, both of Tokyo; Hitoshi Mori, Hachioji, and Itugu Takeishi, Machida, all of Japan, assignors to Japan Business Television, Inc., Tokyo and Kabushiki Kaisha Toshiba, Kawasaki, both of, Japan

Filed Sep. 21, 1989, Ser. No. 410,351

Int. Cl.⁵ H04N *7/08, 7/087*

U.S. Cl. 358—142 **11 Claims**

1. A television signal transmission system in which television signal is transmitted from a plurality of transmitting stations to a plurality of receiving stations by using a first carrier, the first carrier forming a plurality of communication frames at predetermined period, each communication frame being time-divided into a plurality of communication channels each of

VOL 1127
ISS 4
JE 25
1991
UMI

which are assigned to the transmitting stations in accordance with specific rules;

each of the transmitting stations comprising:

signal-transmitting means for inserting television signal into the communication channel assigned to the transmitting station, and for transmitting the television signal to the receiving stations; and

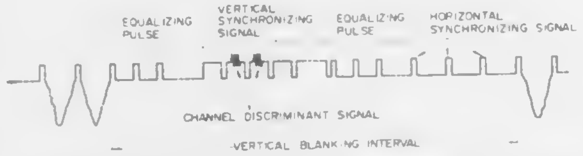
signal-superposing means for superposing a discriminant signal on television signal to be transmitted by said signal-transmitting means, during a vertical-blanking interval of the television signal, said discriminant signal being required for selecting the television signal being formed of a second carrier whose frequency falls within the frequency band of the television signal; and

each of said receiving stations comprising:

signal-receiving means for receiving the television signals transmitted form the transmitting stations;

signal-detecting means for detecting the discriminant signals from television signal in each communication channel received by said signal-receiving means; and

signal-selecting means for selecting the television signal inserted in the desired communication channel from among the television signals received by said signal-receiving means, in accordance with the discriminant signals detected by said signal-detecting means.


EQUALIZING PULSE
VERTICAL SYNCHRONIZING SIGNAL
EQUALIZING PULSE
HORIZONTAL SYNCHRONIZING SIGNAL
CHANNEL DISCRIMINANT SIGNAL
VERTICAL BLANKING INTERVAL

5,027,208

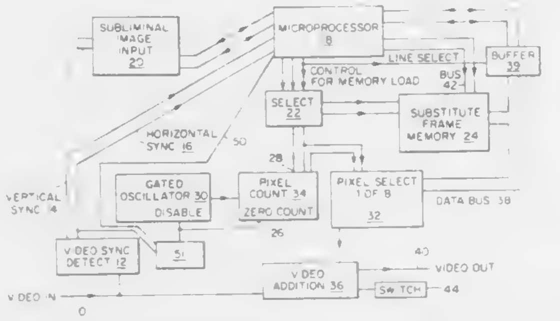
THERAPEUTIC SUBLIMINAL IMAGING SYSTEM

Joseph J. Dwyer, Jr.; Loy R. White, both of Newton, N.H.; Matthew K. Haggerty, Medford, and John A. Purbrick, Arlington, both of Mass., assignors to Sub-Tv Limited Partnership, Newton Junction, N.H.

Continuation-in-part of Ser. No. 260,738, Oct. 21, 1988, abandoned. This application Jan. 16, 1990, Ser. No. 464,906

Int. Cl.^{5} H04W *5/04*

U.S. Cl. 358—148 **16 Claims**



1. A video processing system for generating a subliminal visual message comprising:

a synchronization detector to receive a video signal having a supraliminal image and to provide a synchronization signal;

a one-shot multivibrator triggered by the synchronization signal to produce a pulse signal of selected duration;

a gated oscillator that is stopped by the multivibrator pulse signal for the duration of the pulse signal;

a microprocessor to transmit a subliminal image synchronized with the video signal by the gated oscillator; and

a video mixer to combine the supraliminal image with the subliminal image.

5,027,209

INTERPOLATION CIRCUIT FOR DIGITAL SIGNAL PROCESSOR

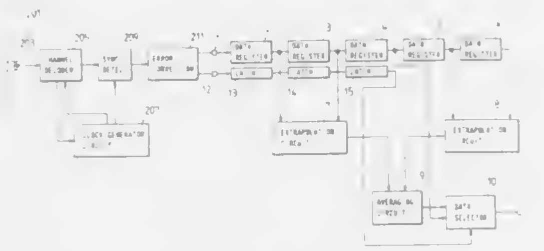
Keizo Nishimura, Yokosuka; Shigemitsu Higuchi, Fujisawa, and Fuzio Okamura, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 15, 1989, Ser. No. 323,780

Claims priority, application Japan, Mar. 17, 1988, 63-61935

Int. Cl.^{5} H04N *5/14*

U.S. Cl. 358—160 **6 Claims**



1. An interpolation circuit comprising:

a data source for generating successive data in time series;

first to fifth holding means for holding five successive data generated successively in time series, respectively;

first estimation circuit for estimating a first extrapolated data for the data held in said third holding means by extrapolation of the data held in said first and second holding means;

second estimation circuit for estimating a second extrapolated data for the data held in said third holding means by extrapolation the data held in said fourth and fifth holding means;

operation means for operating said first and second extrapolated data from said first and second estimation circuits to estimate data in said third holding means;

determination means for determining the correctness of the data held in said third holding means; and

selection means for selecting the data held in said third holding means, if the data held in the third holding means is correct, and the operated result from said operation means in place of said data if the data held in the third means is erroneous.

5,027,210

NOISE REDUCTION IN HIGH DEFINITION TELEVISION SIGNALS

Brian H. Beech, Bishopstroke, United Kingdom, assignor to National Transcommunications Limited, Winchester, England

PCT No. PCT/GB88/00242, § 371 Date Jun. 16, 1989, § 102(e) Date Jun. 16, 1989, PCT Pub. No. WO88/07800, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 30, 1988, Ser. No. 375,005

Claims priority, application United Kingdom, Mar. 30, 1987, 8707533

Int. Cl.^{5} H04N *5/14, 5/208, 5/213*

U.S. Cl. 358—166 **22 Claims**

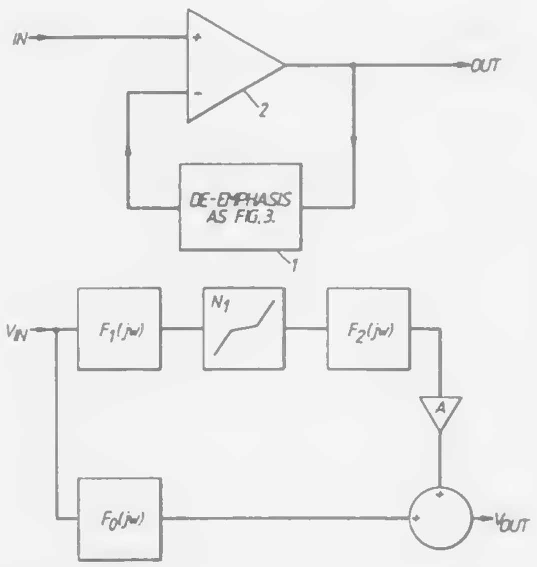
17. A transmitter circuit for a high definition television signal, the circuit comprising:

filter means arranged to split the signal into high and low frequency sub-bands:

means for applying a non-linear pre-emphasis to the signal, the non-linear pre-emphasis characteristic being arranged to be complementary to a non-linear de-emphasis characteristic to be applied at the receiver end; and wherein

the circuit provides analog processing; and

the filter means and means for applying non-linear pre-emphasis comprise a feedback loop into which the signal is input, the feedback loop including circuit means for filtering the feedback signal and applying a non-linear de-emphasis thereto, the non-linear de-emphasis being complementary to the pre-emphasis characteristic being applied.



5,027,211

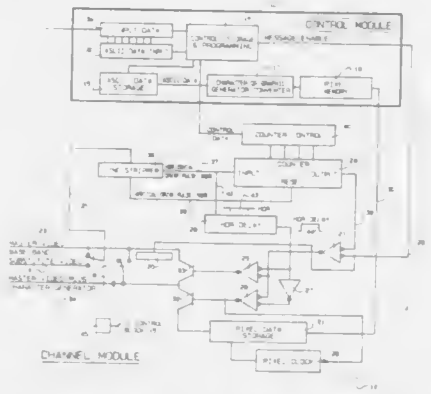
MULTI-CHANNEL MESSAGE DISPLAY SYSTEM AND METHOD

Bruce W. Robertson, 7342 S. 1540 E., Salt Lake City, Utah 84121

Filed Jun. 7, 1989, Ser. No. 362,692

Int. Cl.^{5} H04N *5/272*

U.S. Cl. 358—183 **9 Claims**



1. A multiple channel message display system for a television broadcast or rebroadcast source comprising, a control module means that receives a digital signal input to be substituted for a portion or al of a video transmission, and includes a character generator means with clocking means and pixel memory for converting said digital signal input to pixel digital and control means for controlling transmission of said pixel digital to a plurality of channel module means; a plurality of channel module means one each for each of a plurality of non-synchronous video channels and includes a pixel data storage means that receives said pixel digital from said control module means; and means for clocking said pixel digital into a video signal broadcasted on each said video channel and includes means for synchronizing said pixel digital into each said video signal.

5,027,212

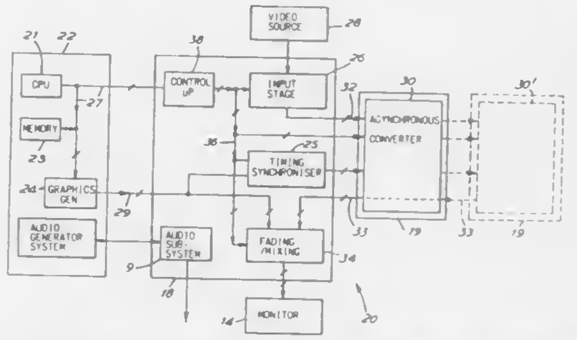
COMPUTER BASED VIDEO/GRAPHICS DISPLAY SYSTEM

Anthony P. Marlton, Saffron Walden; Dennis A. Fielder, Cambridge; Victor G. Halsted, Hempstead, and Trevor R. Stockill, Romford, all of United Kingdom, assignors to Videologic Limited, Hertfordshire, United Kingdom

Filed Dec. 6, 1989, Ser. No. 446,924

Int. Cl.^{5} H04N *5/272, 5/262*

U.S. Cl. 358—183 **30 Claims**



1. In a system for combining a video image from a video source and a computer graphics image from a computer graphics generator, on a display monitor, an apparatus comprising:

video signal input means for receiving a video signal from said video source;

graphics signal input means for receiving a graphics signal from said computer graphics generator;

asynchronous converter means having a signal input coupled to said video signal input means and a control input coupled to said graphics signal input means, for converting said video signal to a modified video signal synchronised to said graphics signal;

mixer means coupled to said asynchronous converter and to said graphics input means for producing a combined signal from said modified video signal and said graphics signal; and

means coupled to said mixer means for feeding said combined signal to said display monitor.

5,027,213

VIDEO SIGNAL MIXER SYSTEM

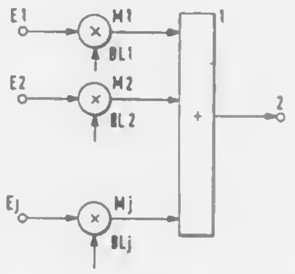
Gerhard Kamin, Mühltal, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 19, 1989, Ser. No. 453,400

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1988, 3842977

Int. Cl.^{5} H04N *5/262, 5/265, 5/45*

U.S. Cl. 358—183 **12 Claims**



1. A video mixer system having at least three video signal inputs respectively connected to a multiplicity of primary multipliers for multiplying video signals respectively present at at lest three of said signal inputs, wherein:

said multipliers have outputs respectively connected to inputs of a single addition circuit to which the outputs of

VOL 1127 ISS 4 JE 25 1991 UMI

all said primary multipliers are connected without any preliminary stage for adding together two or more but less than all outputs of said multipliers being interposed in a connection between an output of a said multiplier and said single addition circuit, said single addition circuit for said multiplied video signals having a sum output for making available an output video signal;

each said video signal input (E1, E2, . . . Ej) is connected to only one of said primary multipliers (M1, M2, . . . Mj);

means are provided for supplying mixing factor control signals (BL) to said primary multipliers (M1, M2, . . . Mj) for determining the relative contributions, if any, of said respective video signals to said output video signal, and

means are provided to assure that the sum of said mixing factor control signals relating to said inputs at which respective video signals simultaneously contributing to said output video signal are present corresponds to a predetermined value representative of the amplitude range of said output video signal.

5,027,214

ELECTRONIC STILL CAMERA USING VARIABLE-LENGTH DATA COMPRESSION FOR STORING STILL IMAGE SIGNALS

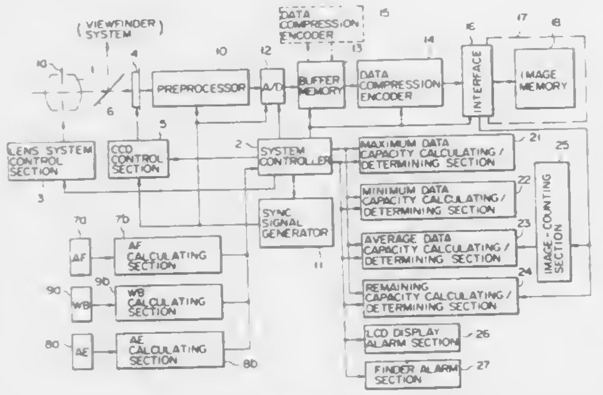
Hiroyoshi Fujimori, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Apr. 9, 1990, Ser. No. 506,927

Claims priority, application Japan, Apr. 20, 1989, 1-101461

Int. Cl.^{5} H04N *5/30*

U.S. Cl. 358—209 **19 Claims**



1. An electronic still camera for recording a plurality of one-frame electronic still image signals, comprising:

image pick-up means for generating an electronic still image signal;

A/D conversion means for converting the electronic still image signal generated by said image pick-up means into a digital signal;

data compressing means for applying variable-length encoding data compression to the digital signal converted by said A/D conversion means so as to obtain compressed image data;

recording means for recording the compressed image data obtained by said data compressing means in a recording medium having a predetermined recording capacity, with a plurality of one-frame compressed image data being assigned spaces, respectively, on said recording means, and wherein the size of a given space is determined in accordance with amount of data in the one-frame compressed image data recorded therein;

calculating means for calculating an estimated count of recordable electronic still image frames which can be recorded in the recording medium in accordance with quantitative data per frame associated with the plurality of one-frame compressed image data recorded in the recording medium by said recording means and quantitative data associated with the recording capacity of the recording medium; and

indicating means for indicating the estimated count of the recordable electronic still image frames calculated by said calculating means.

5,027,215

DRIVING APPARATUS FOR SOLID STATE IMAGE SENSORS INCLUDING A SWEEPING ACTION CONTROLLER

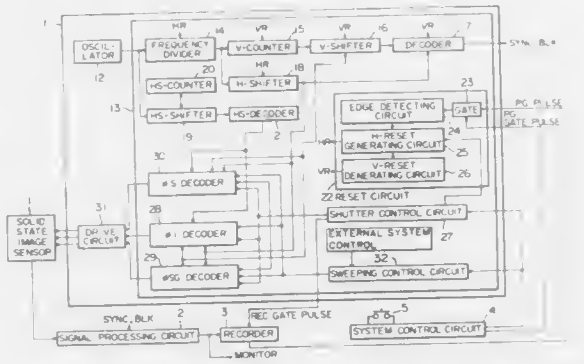
Jun Takayama, and Seiichi Isoguchi, both of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Nov. 27, 1989, Ser. No. 441,301

Claims priority, application Japan, Nov. 29, 1988, 63-301790; Nov. 29, 1988, 63-301791; Nov. 29, 1988, 63-301792; Nov. 30, 1988, 63-303458; Dec. 1, 1988, 63-305058

Int. Cl.^{5} H04N *3/14, 5/335*

U.S. Cl. 358—213.11 **5 Claims**



1. In a driving apparatus for solid state image sensors used for an electronic still camera for taking a still picture with a solid state image sensor, and adapted to generate timing pulses for carrying out an exposure operation of the solid state image sensor and reading electric charges occurring in a light receiving portion of the solid state image sensor due to the exposure of the film, the improvement comprising a means for generating timing pulses for carrying out the exposure and reading operations of the solid state image sensor, and a sweeping action controller adapted to make in said means for generating timing pulses when a predetermined voltage is applied from an external system control, thereto a timing pulse for sweeping the electric charges, which are accumulated in the light receiving element in the solid state image sensor, wherein the predetermined voltage is applied to the sweeping action controller before the starting of the exposure operation to carry out an operation of sweeping out the electric charges in the solid state image sensor.

5,027,216

IMAGE PICKUP APPARATUS

Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa; Hirohiko Shinonaga, and Tsutou Asakura, both of Yokohama, all of Japan, assignors to Victor Company of Japan, Ltd., Japan

Division of Ser. No. 301,324, Jan. 24, 1989, Pat. No. 4,956,714, which is a continuation-in-part of Ser. No. 139,005, Dec. 29, 1987, Pat. No. 4,831,452. This application Jun. 15, 1990, Ser. No. 538,975

Claims priority, application Japan, Jan. 24, 1988, 63-13251; Jan. 25, 1988, 63-13943; Jan. 26, 1988, 63-15263; Jan. 26, 1988, 63-15264

Int. Cl.^{5} H04N *3/14*

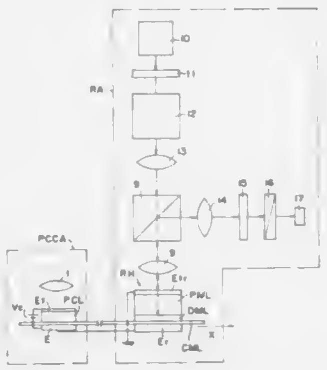
U.S. Cl. 358—213.11 **5 Claims**

4. An image pickup apparatus comprising:

means for focussing an optical image of an object via a taking lens onto a photo-photo conversion element which is constructed of at least a photoconductive layer and a dielectric mirror layer both interposed between two transparent electrodes;

a photo-charge conversion element constructed of at least a photoconductive layer and a charge storage layer;

means for reading optical image information formed on said dielectric mirror layer correspondingly to said optical image of the object by using a mono-wavelength light and projecting a read out optical image onto said photo-charge conversion element;



means for projecting said mono-wavelength light to said photo-photo conversion element and a reference light for forming a hologram of said optical image read out and projected to said photo-charge conversion element; and

means for recording said hologram on said photo-charge conversion element.

5,027,217

SOLID-STATE IMAGING SYSTEM WITH A FEED-BACK CIRCUIT INCLUDING A VARIABLE PHOTO-SENSITIVITY CONTROL CIRCUIT

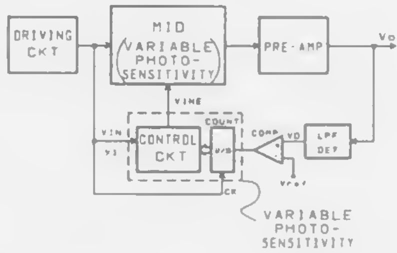
Toshiyuki Oshio, Yokoshiba; Kenji Tawata, Mobara, and Masayoshi Mabashi, Tougane, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 2, 1989, Ser. No. 318,004

Claims priority, application Japan, Mar. 11, 1988, 63-56084

Int. Cl.^{5} H04N *3/14*

U.S. Cl. 358—213.19 **5 Claims**



5. A video camera with an automatic iris control circuit comprising:

a solid-state imaging device including a plurality of photodiodes, a reset circuit for sweeping out at a time t_0 accumulated charges in each of said photo-diodes, and an output circuit for reading out at a time t_1 a signal accumulated in each of said photo-diodes and for providing and output signal based on said reading out from each of said photo-diodes, the sensitivity of each of said photo-diodes depending on a time interval T from the sweeping timing t_0 to the reading timing t_1;

an amplifier for amplifying the output signal derived from said output circuit;

a detecting circuit for detecting an output signal level of said amplifier to produce a detecting voltage;

a comparator providing a first output when said detecting voltage is less than a reference voltage and a second output when said detecting voltage is greater than said reference voltage; and

a timing control circuit for setting said time interval so as to increase said time interval when said comparator provides said first output and to decrease said time interval when said comparator provides said second output,

wherein said timing control circuit varies said time interval T by a first amount of time ΔTL when the preceding time interval T is within a first range and by a second amount of time ΔTH which is greater than said first amount ΔTL when said preceding time interval is within a second range any value in which is greater than any value of said first range.

5,027,218

TELEVISION CAMERA HAVING CCD IMAGING DEVICE WITH DOUBLE LINE CCD SECTION FOR EACH VERTICAL CCD

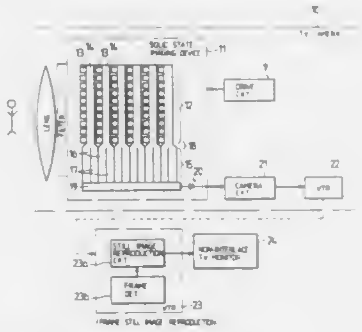
Kazuhiko Ueda, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Japan

Filed Mar. 31, 1989, Ser. No. 331,120

Claims priority, application Japan, Apr. 1, 1988, 63-80756

Int. Cl.^{5} H04N *3/14*

U.S. Cl. 358—213.23 **4 Claims**


SOLID STATE IMAGING DEVICE
11
12
21
22
23a
23b
23
STILL IMAGE REPRODUCTION CKT
NON-INTERLACE TV MONITOR
FRAME DET
FRAME STILL IMAGE REPRODUCTION

1. A television camera comprising:

a CCD imaging device having:
- (a) matrix photoelectric conversion elements for producing charges in response to incident light;
- (b) columns of first vertical CCDs arranged in the main scanning direction for receiving said charges from said photoelectric conversion elements and for transferring said charges in response to a first signal;
- (c) transfer means for transferring charges from horizontal odd lines of said photoelectric conversion elements to said first vertical CCDs in response to a second signal and for transferring charges from horizontal even lines of said photoelectric conversion elements to said first vertical CCDs in response to a third signal;
- (d) a double line CCD section arranged at one end of each of said columns of first vertical CCDs, including:
  - (I) a second vertical CCD, responsive to a fourth signal for receiving, storing and transferring said charges fed from said horizontal odd lines of said photoelectric conversion elements via said first vertical CCD; and
  - (II) a third vertical CCD, responsive to a fifth signal for receiving, storing and transferring said charges fed from said horizontal even lines of said photoelectric conversion elements via said first vertical CCD; and
- (e) a horizontal CCD arranged at one end of said second and third vertical CCDs for receiving said charges stored in said second and third vertical CCDs alternately and for outputting said charges sequentially in response to a horizontal blanking signal; and

a drive circuit for repeatedly generating said first, second, third, fourth, and fifth signals, such that said second signal is generated in response to a vertical blanking

VOL
1127
ISS
4
JE
25
1991
UMI

signal; then said first and fourth signals are generated at the same time; then said third signal is generated; and then said first and fifth signals are generated at the same time.

5,027,219

APPARATUS AND METHOD FOR CONVERTING PICTURES OR IMAGES INTO VIDEO SIGNALS

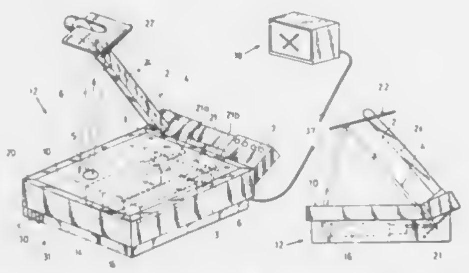
Herbert Stuttler, Rankweil; Josef Wolf, Feldkirch; Wolfgang Held, Hard, all of Austria, and Max Mai, Ingolstadt, Fed. Rep. of Germany, assignors to Josef Wolf Audio-Visuals, Götzis, Austria

Filed Oct. 5, 1989, Ser. No. 417,579

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1988, 8812552[U]; Feb. 1, 1989, 8901098[U]; Mar. 23, 1989, 3909665; Switzerland, Jun. 6, 1989, 2124/89

Int. Cl.⁵ H04N *5/238*

U.S. Cl. 358—228 26 Claims



1. Apparatus for converting an image into video signals, comprising:
- a projection surface for showing an image;
- a video camera having a recording field for taking said image and for converting it into video signals;
- first lens means for forming an image conjugated from that on siad projection surface onto said recording field of said video camera;
- a source of visible light for illuminating said projection surface;
- first mirror means in front of said video camera for deflecting a first beam of light having a first central ray reflected from said projection surface towards said video camera;
- second lens means arranged after said source of light for forming a second beam having central ray to be focused over a predetermined distance from said second lens means onto said projection surface;
- second mirror means between said first mirror means and said projection surface for receiving said second beam from said source of light via said first mirror means and for deflecting said second beam towards said projection surface, while receiving said first beam reflected from said projection surface and deflecting said first beam via said first mirror means towards said video camera; and
- means for adjustably mounting at least one of said first and second mirror means.

5,027,220

IMAGE RECORDING APPARATUS USING A CRT AS A LIGHT SOURCE

Fumihiro Sunda, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

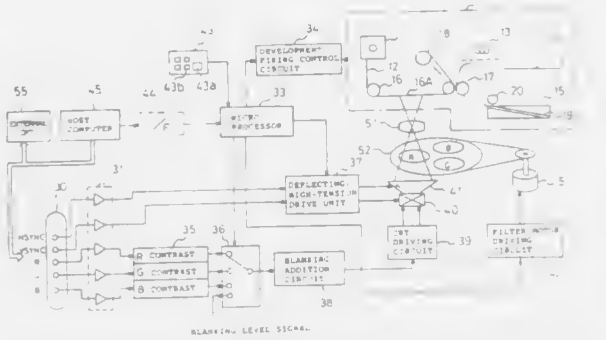
Filed Mar. 20, 1990, Ser. No. 496,009

Claims priority, application Japan, Apr. 24, 1989, 1-46908[U]

Int. Cl.⁵ H04N *5/84, 9/79*

U.S. Cl. 358—244 18 Claims

9. An image recording apparatus comprising:
- video signal receiving means for receiving a video signal from a source which is located external of said image recording apparatus;
- a cathode ray tube for displaying an image thereon;
- image recording means for recording a copy image corresponding to the image displayed on said cathode ray tube on a photosensitive recording medium;
- aspect ratio data receiving means for receiving an aspect ratio data determined according to an aspect ratio of the source; and



- control means for controlling the image displayed on said cathode ray tube based on the aspect ratio data received by said aspect ratio data receiving means and the video signal received by said video signal receiving means so that a shape of the image displayed on said cathode ray tube corresponds to a shape of an image represented by the video signal which would be displayed by said source.

5,027,221

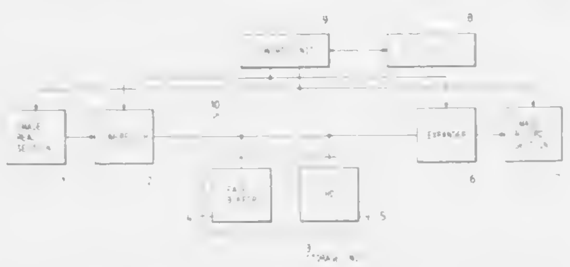
DIGITAL IMAGE RECORDING SYSTEM WITH PRESET CONTROL FOR SELECTING OUTPUT FORMATS BASED ON THE SELECTED AMOUNT OF PIXEL COLOR AND DENSITY DATA

Masayuki Hisatake, and Hiroshi Takayanagi, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Oct. 10, 1990, Ser. No. 595,854

Int. Cl.⁵ H04N *1/21, 1/29, 1/387, 1/46*

U.S. Cl. 358—300 12 Claims



11. A digital image recording system having an image read section for reading an image on an original document and generating image data, transmission data constituting a portion of said image data concerning at least a color and density of the original document, data storage means for storing image data as read by the image read section and receiving the transmission data, and an image output section for outputting the image data read out of the storage means in a prescribed order of pages in the form of a hard copy output document of the original document, the digital image recording system comprising:
- transmission data amount select means generating an amount of data corresponding to the transmission data and selecting a length of said amount of data;
- output format select means receiving said amount of data and selecting the format of the output image in response to said amount of data;
- job entering means for setting a copy job in response to information input thereto, wherein a copy job at least includes one of the functions of setting the type of the original document, setting a page order of the original document, and setting a number of copies to be made; and
- control means for controlling for every page of the output document the transmission data in said transmission data amount select means and the output format in said output format select means in response to said information input from said job entering means.

5,027,222

APPARATUS FOR RECORDING AUDIO SIGNALS AND VIDEO SIGNALS ON A RECORDING MEDIUM

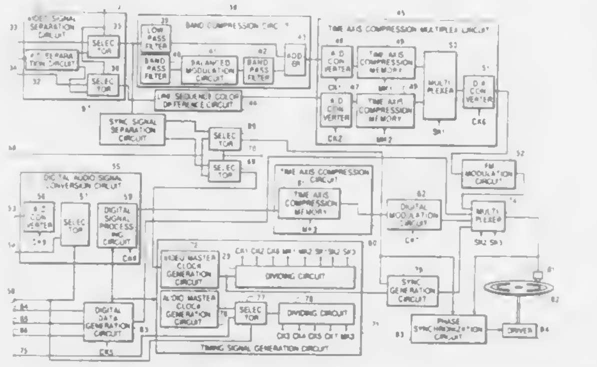
Masatoshi Shinbo, Minoo; Hideki Fnjie, Hirakata; Kaoru Iwakuni, Yawata; Akira Mnto, Sakai, and Kazuhiro Aoki, Moriguchi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 19, 1989, Ser. No. 367,713

Claims priority, application Japan, Jun. 17, 1988, 63-150720

Int. Cl.⁵ H04N *9/81*

U.S. Cl. 358—330 9 Claims


BAND COMPRESSION CIRCUIT
TIME AXIS COMPRESSION MULTIPLEX CIRCUIT
LOW PASS FILTER
BAND PASS FILTER
BALANCED MODULATION CIRCUIT
ADDER
A-D CONVERTER
TIME AXIS COMPRESSION MEMORY
MULTIPLEXER
D-A CONVERTER
SELECTOR
VIDEO MASTER CLOCK GENERATION CIRCUIT
AUDIO MASTER CLOCK GENERATION CIRCUIT
DIVIDING CIRCUIT
DIGITAL DATA GENERATION CIRCUIT
SYNC GENERATION CIRCUIT
PHASE SYNCHRONIZATION CIRCUIT
DRIVER
TIMING SIGNAL GENERATION CIRCUIT

1. An audio and video recording apparatus comprising:
- band compression means for band-compressing a luminance signal of an input video signal thereby to obtain a band-compressed luminance signal;
- means for executing a line sequential color difference processing on a chrominance signal of the input video signal thereby to obtain a line sequential color difference signal;
- first multiplex means for executing a time-axis compression multiplex on each of the band-compressed luminance signal and the line sequential color difference signal in every frame;
- frequency modulation means for frequency-modulating an output signal of the first multiplex means;
- digital audio signal conversion means for converting an input audio signal into a digital audio signal;
- means for executing a time-axis compression on an output signal from the digital audio signal conversion means in every frame thereby to obtain a time-axis compressed audio signal;
- digital modulation means for modulating digitally the time-axis compressed audio signal;
- digital data generation means for generating digital data;
- synchronizing signal generation means for producing a predetermined synchronizing signal from an input video signal;
- second multiplex means for multiplexing output signals from the frequency modulation means, the digital modulation means, the digital data generation means and the synchronizing signal generation means; and
- recording means for recording an output signal from the second multiplex means on a recording medium.

5,027,223

ELECTRONIC STILL CAMERA

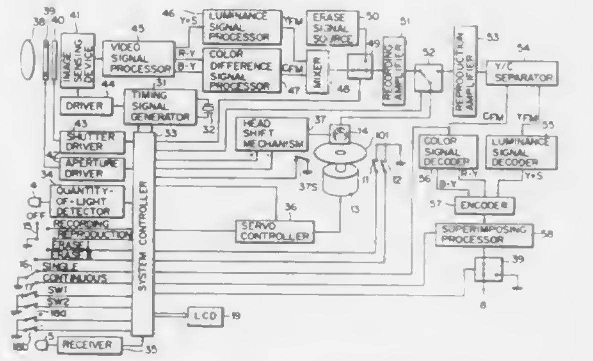
Hiroyuki Suetaka, and Shigeki Kurahashi, both of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Division of Ser. No. 414,603, Sep. 28, 1989, abandoned, Continuation of Ser. No. 131,662, Dec. 11, 1987, abandoned. This application Aug. 23, 1990, Ser. No. 572,342

Claims priority, application Japan, Dec. 18, 1986, 63-193677[U]; Dec. 18, 1986, 63-299976

Int. Cl.⁵ H04N *5/781*

U.S. Cl. 358—342 **30 Claims**



19. An electronic still camera comprising:
- a) optical means for forming an optical image of an object on a predetermined plane;
- b) image sensing means, arranged on said predetermined plane, for converting the optical image into an electronic signal;
- c) signal processing means for converting the electronic signal converted by said image sensing means into a still image data signal;
- d) a disk-type recording medium having a plurality of recording areas;
- e) head means for both recording the still image data signal from said signal processing means on said recording medium through said head means, and for reproducing the still image data recorded on said recording medium; and
- f) erasing means for supplying an erasing signal to said head means, for thereby erasing all of the still image data recorded on said recording medium;

said erasing means comprising first shift means for shifting said head means to a position corresponding to a first recording area of said plurality of recording areas, second shift means for supplying the erase signal to said head means shifted by said first shift means and for sequentially shifting said head means in a radial direction of said disk-type recording medium, and third shift means for detecting at least that said head means is shifted to a last recording area of said plurality of recording areas and for then shifting said head means to said first area.

5,027,224

IMAGE COMMUNICATION SYSTEM

Takahiro Yamada, Ichikawa, Japan, assignor to Aisin Seiki K.K., Tokyo, Japan

Filed Sep. 22, 1988, Ser. No. 247,563

Claims priority, application Japan, Sep. 24, 1987, 62-239800

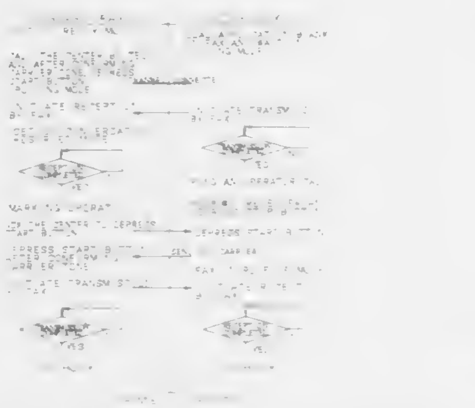
Int. Cl.⁵ H04N *1/32*

U.S. Cl. 358—434 5 Claims

1. An image communication system comprising:
- channel connection means adapted to be connected with a communication channel;
- image recording means connected to said channel connection means for visually recording image information which is received through the channel connection means onto a first surface of a given sheet of recording paper;

VOL
1127
ISS
4
JE
25
1991
UMI

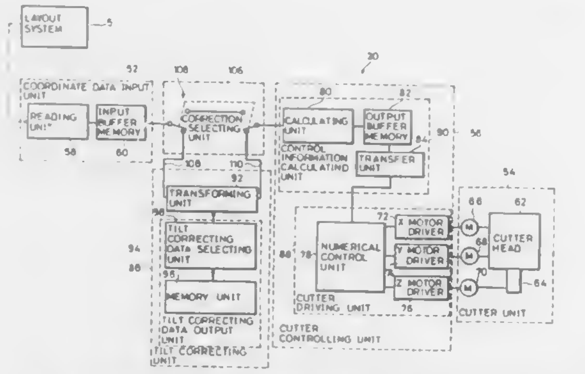
tray means for receiving and retaining said sheet on which an image is recorded by the image recording means;
image reading means connected to said channel connection means for optically reading visual information on the given sheet for transmission through the channel connection means;
reply switch means connected to said channel connection means for automatically setting up a conversation reserved mode while maintaining the communication channel connected after recording of an image by said image recording means;
information entry means for providing reply information are



connected to said image recording means to visually record reply information on said first surface of said sheet;
conveyor means for conveying a sheet to and from said tray past said image recording means and said image reading means respectively;
and electronic control means connected to said channel connection means, said information entry means, said image recording means and said conveying means for initiating conveying of the sheet on the tray means past the image reading means subsequent to recording of said reply information on said sheet to transmit the image information and the reply information through said channel connection means.

5,027,225
APPARATUS FOR FABRICATING PRE-PRESS MASKING FILM

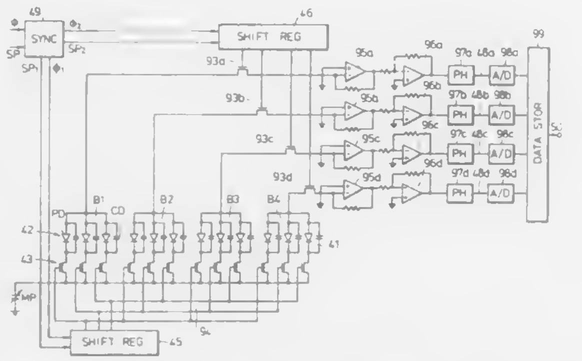
Daiki Kurihara, and Takashi Miyake, both of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan
Filed Jan. 31, 1989, Ser. No. 304,720
Claims priority, application Japan, Feb. 1, 1988, 63-21686
Int. Cl.⁵ H04N *1/40*
U.S. Cl. 358—448 **11 Claims**



1. An apparatus for fabricating a masking film to be used in conjunction with an original layout apparatus, wherein said masking film is compensated for a coordinate data tilt which normally develops in said original layout apparatus as a result of the use therein of coordinate data which defines a shape of a given area of an original image, said apparatus for fabricating a masking film comprising:
coordinate data input means coupled to an image processing means for receiving therefrom said coordinate data;
correcting means coupled to said coordinate data input means for carrying out a correction and for producing thereby corrected coordinate data which is corrected for said coordinate data tilt;
first means responsive to said corrected coordinate data for generating driving signals for fabricating therewith said masking film;
second means responsive to said driving signals for fabricating said masking film;
said given area comprising an arbitrary polygon;
wherein said correcting means is operable in accordance with a valid mode in which said correcting means is enabled to carry out said correction and an invalid mode in which said correction means does not carry out said correction, and
said apparatus for fabricating a masking film further comprises correction selection means for selecting either said valid mode or said invalid mode.

5,027,226
CONTACT TYPE IMAGE SENSOR

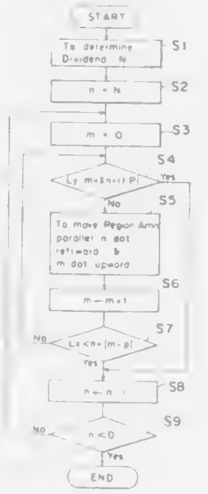
Takehito Nagata; Mitsuhiro Kohata, and Masumitsu Ino, all of Yokohama, Japan, assignors to Ricoh Company, Ltd., Tokyo and Rocoh Research Institute of General Electronics, Natori, both of, Japan
Filed Sep. 16, 1988, Ser. No. 245,204
Claims priority, application Japan, Sep. 18, 1987, 62-234043; Sep. 18, 1987, 62-234044; Sep. 18, 1987, 62-234045; May 19, 1988, 63-122880
Int. Cl.⁵ H04M *1/04*
U.S. Cl. 358—482 **4 Claims**



2. A contact type image sensor comprising:
a photodetector made up of a plurality of photoelectric conversion elements;
switching means including a plurality of switches respectively coupled to the photoelectric conversion elements of said photodetector;
driving means including first and second shift registers coupled to said switching means for sequentially driving the photoelectric conversion elements of said photodetector through said switching means and a synchronizing circuit for synchronizing operation timings of the first and second shift registers;
a substrate on which each of said photodetector, said switching means and said driving means are integrally provided; and
a signal processing circuit for subjecting the output signals of said photoelectric conversion elements within one block to a signal processing including an analog-to-digital conversion,
said first shift register sequentially selecting and passing outputs of said photoelectric conversion elements in blocks through said switching means, each of said blocks having an arbitrary number of the photoelectric conversion elements;
said second shift register sequentially driving the photoelectric conversion elements within one block selected by said first shift register through said switching means;
said switching means including a first group of switches coupled between said photodetector and said first shift register for selecting the photoelectric conversion elements in said blocks responsive to an output of said first shift register and a second group of switches coupled between said photodetector and said second shift register for sequentially driving the photoelectric conversion elements within the block selected by said first shift register through the first group of switches responsive to an output of said second shift register,
said signal processing circuit being provided independently with respect to each of said blocks.

5,027,227
IMAGE ROTATING DEVICE

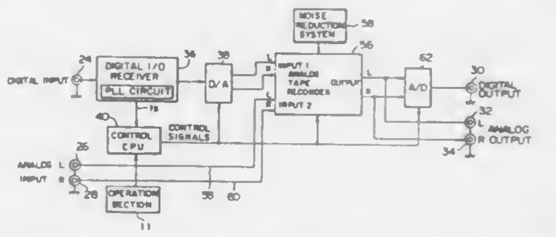
Sumio Kita, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Jul. 20, 1988, Ser. No. 221,873
Claims priority, application Japan, Jul. 24, 1987, 62-186018
Int. Cl.⁵ H04M *1/40*
U.S. Cl. 358—488 **4 Claims**



1. An image rotating apparatus comprising:
storage means for storing image information read from an original image;
tilt indicating means for inputting information based on a plurality of points indicating a angle of tilt of the original image from a display corresponding to the original image;
image processing means for dividing the image information, stored in the storage means, into a plurality of areas according to the information supplied by the tilt indicating means, and for shifting each of the plural areas, in a parallel manner, to accomplish correction of the tilt of the image information; and
central processing means, connecting said tilt indicating means and said image processing means, for receiving said angle of tilt information from said tilt indicating means and determining whether the original image is tilted rightward or leftward.

5,027,228
ANALOG TYPE MAGNETIC RECORDING AND REPRODUCING DEVICE WITH DIGITAL INPUT/OUTPUT COUPLING

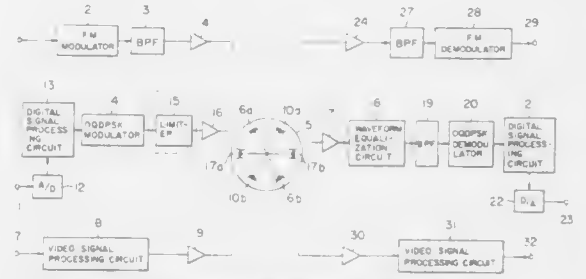
Kenji Yokoyama, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan
Filed Jul. 25, 1989, Ser. No. 385,000
Claims priority, application Japan, Jul. 26, 1988, 63-98863[U]
Int. Cl.⁵ G11B *5/86, 3/64*
U.S. Cl. 360—15 **6 Claims**



1. A magnetic recording and reproducing device, comprising:
a digital input terminal to which a digital audio signal is applied;
digital-to-analog conversion means for converting the digital audio signal applied to said digital input terminal to an analog audio signal;
analog magnetic recording and reproducing means for recording and reproducing an output analog audio signal of the digital-to-analog conversion means;
analog-to-digital conversion means for converting a reproduced analog audio signal of said analog magnetic recording and reproducing means to a digital audio signal; and
a digital output terminal from which an output digital audio signal of said analog-to-digital conversion means is delivered out;
whereby audio signals are transmitted to and from the magnetic recording and reproducing device in digital form such that signal deterioration associated with the transmission of audio signals in analog form is avoided. and maximum fidelity is achieved.

5,027,229
MAGNETIC RECORDING APPARATUS AND MAGNETIC RECORDING/REPRODUCING APPARATUS

Tetsuya Suwa, Yokohama, and Seiji Higurashi, Fuchu, both of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan
Filed Mar. 22, 1989, Ser. No. 327,266
Claims priority, application Japan, Mar. 23, 1988, 63-68694
Int. Cl.⁵ H04N *5/782*
U.S. Cl. 360—19.1 **3 Claims**


2
3
4
FM MODULATOR
BPF
24
27
28
29
BPF
FM DEMODULATOR
13
DIGITAL SIGNAL PROCESSING CIRCUIT
A/D
12
1
17a
17b
10b
6b
EQUALIZATION CIRCUIT
DEMODULATOR
DIGITAL SIGNAL PROCESSING CIRCUIT
22
D/A
23
7
8
VIDEO SIGNAL PROCESSING CIRCUIT
9
30
31
VIDEO SIGNAL PROCESSING CIRCUIT
32

1. A magnetic recording apparatus comprising:
first modulator means for generating a frequency-modulated audio signal;
a first rotary head for recording said audio signal from said first modulation means at a lower layer portion of a magnetic layer of a magnetic tape;
second modulator means for generating a digital signal hav-

VOL
1127
ISS
4
JE
25
1991
UMI

ing undergone poly-phase differential phase shift keying modulation;

amplitude change elimination means for eliminating changes in the amplitude of said digital signal from said second modulator means;

a second rotary head having an azimuth angle different from that of said first rotary head for recording said digital signal from said amplitude change elimination means at an intermediate layer portion of the magnetic layer of said magnetic tape;

video signal recording processing means for processing a video signal; and

a third rotary head having an azimuth angle different from those of said first rotary head and said second rotary head, for recording said video signal from said image signal recording processing means at an upper layer portion of the magnetic layer of said magnetic tape, thus to record said frequency-modulated audio signal and said digital signal along with said video signal at the magnetic layer portions different from each other.

5,027,230

STILL IMAGE INFORMATION REPRODUCING APPARATUS INCLUDING SEARCHING FUNCTION

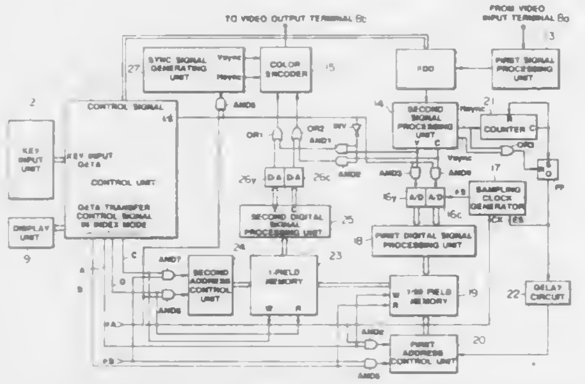
Jin Nakayama, Akishima, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 314,406

Claims priority, application Japan, Feb. 29, 1988, 63-46847

Int. Cl.^{5} H04N *5/76*

U.S. Cl. 360—35.1 16 Claims


TO VIDEO OUTPUT TERMINAL 8c
FROM VIDEO INPUT TERMINAL 8a
SYNC SIGNAL GENERATING UNIT
COLOR ENCODER
FIRST SIGNAL PROCESSING UNIT
SECOND SIGNAL PROCESSING UNIT
COUNTER
SAMPLING CLOCK GENERATOR
CONTROL SIGNAL
KEY INPUT UNIT
KEY INPUT DATA
CONTROL UNIT
DATA TRANSFER CONTROL SIGNAL IN INDEX MODE
DISPLAY UNIT
SECOND DIGITAL SIGNAL PROCESSING UNIT
FIRST DIGITAL SIGNAL PROCESSING UNIT
SECOND ADDRESS CONTROL UNIT
1-FIELD MEMORY
1ST FIELD MEMORY
FIRST ADDRESS CONTROL UNIT
DELAY CIRCUIT

1. An image data recording and reproducing apparatus, which reproduces a desired image out of a plurality of images without using an indexing track, comprising:

recording means having a plurality of recording areas, for recording a plurality of image data in each of said recording areas;

image data output means for outputting a plurality of the image data from each of recording areas of said recording means, in sequence;

reducing means for reducing the image data output from said recording means by said image data output means and for producing reduced data;

uniting means for uniting a plurality of the reduced data produced by said reducing means and for producing united data comprised of a plurality of reduced data; and

video signal output means for outputting a video signal according to the united data produced by said uniting means.

5,027,231

METHOD OF SETTING THE TAPE PITCH OF A MAGNETIC TAPE PLAYBACK EQUIPMENT BY ADJUSTING TAPE GUIDES

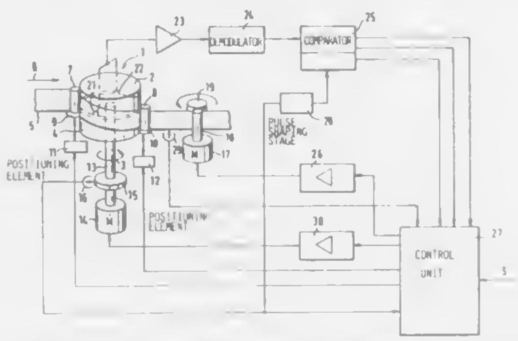
Wolfgang Fell, Seeheim, Fed. Rep. of Germany, assignor to BTS Broadcast Television Systems GmbH, Darmstadt, Fed. Rep. of Germany

Filed Aug. 16, 1989, Ser. No. 394,588

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1988, 3829972

Int. Cl.^{5} G11B *15/61*

U.S. Cl. 360—71 3 Claims



1. A method of setting a tracking adjustment for an oblique track magnetic tape recording and playback equipment including a rotary tapescanner around the periphery surface of which a magnetic tape is helically looped, a magnetic head servo system having a driving motor for rotating said scanner, at least one playback magnetic head at the periphery of said scanner for reading data signals received on oblique tracks of said tape including a capstan coupling to said tape, a capstan servo system for regulating said tape transport drive, means for determining the momentary rotary phase of said scanner and means for adjusting the helical pitch of the tape for setting the scanning track angle of said scanner by height adjustment of tape guides at entrance and exit ends of the tape loop around said scanner, said method comprising the steps of:

deriving an amplitude envelope signal from the data signal produced by said at least one playback head;

regulating the capstan servo system so that said envelope signal has a maximum near or at the middle of each of a succession of tracks, and

thereafter setting said tape pitch adjusting means by height adjustment of said tape guides to that the amplitude of said envelope signal, at the track beginning and at the track end, with reference to a track scan, is substantially equal to said maximum at or near the track middle.

5,027,232

MAGNETIC RECORDING AND REPRODUCING APPARATUS WITH DOUBLE DECKS SYNCHRONIZED FOR DUBBING

Yasuaki Sekii, Tokyo, and Yasushi Matusmoto, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 28, 1986, Ser. No. 901,296

Claims priority, application Japan, Aug. 30, 1985, 60-191711; Jan. 21, 1986, 61-010689

Int. Cl.^{5} G11B *15/44*

U.S. Cl. 360—74.1 1 Claim

1. A magnetic reproducing and recording apparatus for dubbing a signal recorded on both sides of a master magnetic tape to both sides of a copy magnetic tape, said apparatus comprising:

a first tape drive mechanism for transport in a first direction and in a reverse direction of the master magnetic tape;

first detecting means for detecting at least one tape end of the master magnetic tape and producing a detection signal;

a second tape drive mechanism for transport in a first direction and in a reverse direction of the copy magnetic tape;

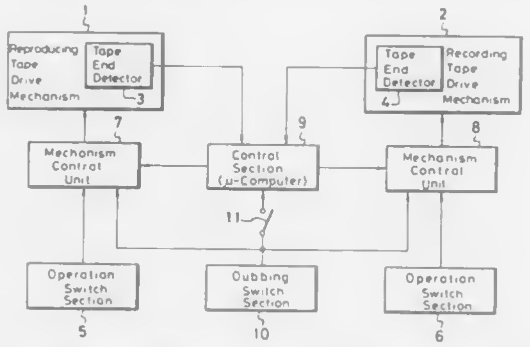
second detecting means for detecting at least one end of the copy magnetic tape and producing a detection signal;

reproducing and recording mans for reproducing said signal recorded on said master magnetic tape and recording said reproduced signal on said copy magnetic tape during simultaneous transport by said first and second tape drive mechanisms in said first direction and also during simultaneous transport by said first and second tape drive mechanisms in said reverse direction;

control means responsive to said detection signals from said first and second detecting means for controlling said first and second tape drive mechanisms so that a tape drive mechanism whose operation in said first direction is finished first is stopped while the other tape drive mechanism finishes its operation in said first direction, and thereafter the first and second tape drive mechanisms simultaneously begin to effect reproducing and recording transport, respectively, in said reverse direction;

whereby the signal recorded at the beginning of each side of the copy tape is identical to the signal recorded at the beginning of the corresponding side of the master tape;

in which said control means carries out such control that when the tape end of said copy magnetic tape is detected by said second detecting means while said first tape drive mechanism is carrying out the reproducing transport, said first tape drive mechanism fast-forwards said master magnetic tape to its tape end.



5,027,233

METHOD FOR DETERMINING SERVO POSITION DATA IN A DISK DRIVE

Eugenio Berti, and Ashraf I. El-Sadi, both of San Jose, Calif., assignors to Unisys Corp. (Formly Burroughs Corp.), Detroit, Mich.

Continuation of Ser. No. 528,291, Aug. 31, 1983, abandoned. This application Aug. 12, 1988, Ser. No. 233,877

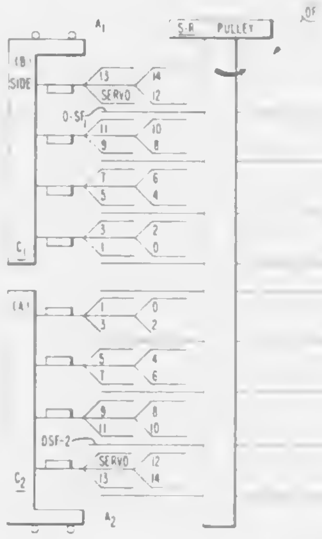
Int. Cl.^{5} G11B *5/596*

U.S. Cl. 360—77.02 4 Claims

1. A method for determining servo position data in a disk drive system characterized by prescribed synchronizing pulses and including one or several disks and one or more data channels along which position signals and other data signals are conducted, each disk having disk tracks which abut and are arranged to be transduced by a prescribed transducer head, this method comprising:

arranging the system to generate distinct, substantially identical timing sequences which reflect initial synchronizing pulses and following "padding" pulses adapted to minimize "tail-overshoot," each data channel of the disk drive system to handle position signals including a prescribed quadrature position code; and

arranging and designing said position signals, and so recording them in track bands flanking prescribed disk tracks, so as to be detected by reading means for centering purposes, said position pulses being recorded to follow said timing sequences and to fall between a said initial synchronizing pulse and its following padding pulse; the center of each such disk track band being arranged to be determined by balancing output signals read from flanking track bands; said transducer head being arranged to span adjacent track-bands to render such a balancing read-out.



5,027,234

SYSTEM FOR DETECTING A REFERENCE TRACK OF A DISC STORAGE UNIT

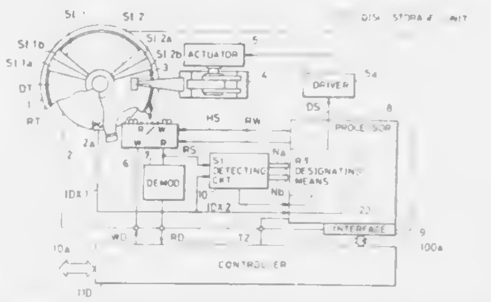
Yuuji Kawahara, Kawasaki, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Nov. 17, 1988, Ser. No. 275,772

Claims priority, application Japan, Dec. 10, 1987, 62-312563

Int. Cl.^{5} G11B *5/596, 5/55*

U.S. Cl. 360—77.08 9 Claims



1. A system for detecting a reference track defined on a main surface of a rotatable disc in a disk storage unit, said disc having a plurality of tracks defined on the main surface of said disc, comprising:

a read/write head for reading out and/or writing data information from and/or onto the main surface of said disc;

head position control means for controlling the position of said read/write head;

said disc further including: at least two servo information portions for each track, each of said at least two servo information portions for detecting a deviation of said read/write head from a normal position in each of said tracks, and each of said at least two servo information portions having a first half and a second half,

said at least two servo information portions being recorded on said main surface of said disc in patterns such that both said first half and second half are staggered from each other in both radial and circumferential directions and are

VOL
1127
ISS
4
JE
25
1991
UMI

displaced on opposite sides with respect to a center line of each of said tracks, respectively, in a radial direction,

said patterns being arranged repeatedly in a radial direction of said main surface of said disc;

said reference track having reference track servo information comprised of at least two servo information portions having a first and second half, one of said at least two servo information portions having one of either the first half or the second half blank;

a read/write circuit for reading out and/or writing data information from and/or onto said main surface of said disc through said read/write head;

a triangular wave generator for generating a triangular waveform signal which is synchronized with a timing signal such that when said read/write circuit reads data information, said triangular waveform signal rises when the first half of each of said servo information portion is read out, and falls when the second half is read out;

a comparator for comparing said triangular waveform signal with a servo information signal read out by said read/write circuit and outputting an output containing pulses signal;

counting means for counting the number of pulses contained in said output signal from said comparator during a time period corresponding to said first half of each of said at least two servo information portions to output a first count value, and said counting means also for counting the number of pulses contained in an output from said comparator during a time period corresponding to said second half of each of said at least two servo information portions to output a second count value;

head position correcting means for detecting a deviation of said head from the normal position in accordance with a difference between said first and second count values output from said counting means, and outputting a deviation signal, said deviation signal being supplied to said head position control means to correct the position of said head;

servo information judgment means for judging whether or not said first and second count values indicate detection of reference track servo information when a reference track detection instruction is applied to said system, and for controlling said head position control means to correct the position of said head when said first and second count values do not indicate detection of reference track servo information;

first comparison means for comparing the count value from said counting means which corresponds to one half, which is blank, of said first and second halves of said reference track servo information, with a first predetermined threshold value;

second comparison means for comparing the count value from said counting means which corresponds to one half which is not blank, of said first and second halves of said reference track servo information, with a second predetermined threshold value; and

reference track signal providing means for providing a reference track signal if said first and second count values indicate detection of said reference track servo information, and if a comparison result from said first comparison means indicates that said count value is smaller than said first threshold value, and if a comparison result from said second comparison means indicates that said count value is greater than said second threshold value.

5,027,235

METHOD FOR CONTROLLING A DYNAMIC TRACKING HEAD OF A DIGITAL VIDEO TAPE RECORDER

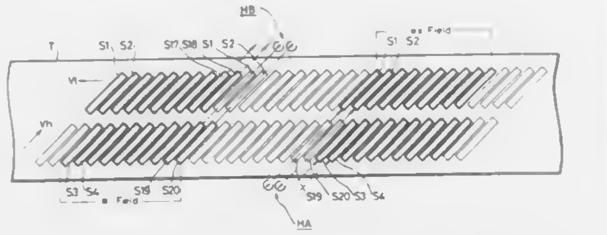
Takenori Furuyama, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jul. 18, 1989, Ser. No. 381,287

Claims priority, application Japan, Jul. 28, 1988, 63-189478

Int. Cl.⁵ G11B *5/592*

U.S. Cl. 360—77.16 6 Claims



1. A method for controlling dynamic tracking heads of a digital video tape recorder of a type which, in a recording mode, records each field of a digital video signal in a respective plurality of segmented video tracks formed on a video tape wrapped around a head drum, while the head drum is rotated at a predetermined normal rotating speed and the tape is transported at a first tape transportation speed, and wherein, in a reproducing mode, said video tape is transported at a second tape transportation speed different from the first tape transportation speed, comprising the steps, in said reproducing mode of:

detecting the transportation speed of the video tape;

forming a predetermined signal waveform in response to a pulse signal generated in accordance with the rotation of said head drum;

reforming said predetermined signal waveform in response to said detected transportation speed of the video tape;

determining an initial head position for said dynamic tracking heads at a beginning position of said segmented video tracks by detecting a position of the video tape

combining said reformed predetermined signal waveform and said determined initial head position for generating a drive signal of said dynamic tracking heads; and

changing said rotation speed of said head drum from said predetermined normal rotation speed for tracing said plurality of segmented video tracks in a shorter time so that enough time is provided for said dynamic tracking heads to jump from an end portion of said plurality of segmented video tracks to a beginning portion of another plurality of segmented video tracks.

5,027,236

MAGNETIC TAPE CASSETTE APPARATUS HAVING A CASSETTE CATCH WITH SPRING ARMS

Norbert Kunze, Ehringshausen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

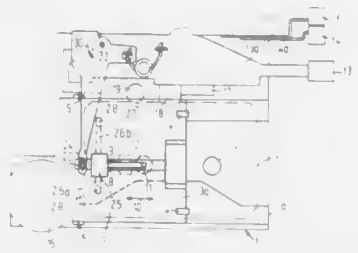
Filed Jul. 18, 1989, Ser. No. 381,568

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1988, 8809235

Int. Cl.⁵ G11B *15/675*

U.S. Cl. 360—96.5 6 Claims

1. Magnetic tape cassette apparatus (1) having a drive mechanism which is used for playing magnetic tape cassettes and a cassette loading mechanism which by means of a lift lever (3) moves a cassette tray (1*a*) with a cassette (2) accommodated by the latter between an eject position and a playing position, a cassette catch (9) being guided in a guideway of the lift lever (3) so as to be displaceable in the draw-in direction of the cassette tray (1*a*) between an eject and a draw-in position and the cassette tray (1*a*) being raised into the eject position when the cassette catch (9) is in the eject position, characterized in that the cassette catch (9) has spring arms (26) which, in the eject position the cassette catch (9), press resiliently against parts of the cassette tray (1*a*) and of the lift lever (3).



5,027,237

RECORDING-REPRODUCTION APPARATUS FOR MAGNETIC DISC PACKS WITH AN AUTOMATIC PACK CHANGING MECHANISM

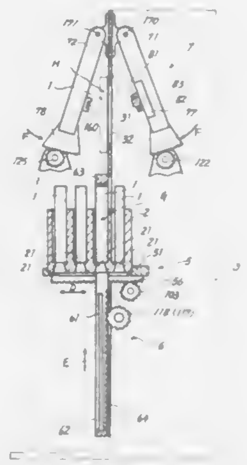
Sueharu Yamaoka, Ikoma, and Tadatoshi Fukuta, Sumoto, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Nov. 17, 1988, Ser. No. 272,595

Claims priority, application Japan, Nov. 18, 1987, 62-290940

Int. Cl.⁵ G11B *17/08*

U.S. Cl. 360—98.06 5 Claims



1. A recording-reproduction apparatus for magnetic disc packs with an automatic pack changing mechanism comprising:

a pack holder for accommodating a plurality of magnetic disc packs in a linear arrangement;

a pack holder drive assembly for driving the pack holder in a first plane direction parallel to the linear arrangement of the magnetic disc packs in the pack holder to position one of the magnetic disc packs selected for recording or reproduction in a first rest position where said selected magnetic disc pack is to be withdrawn from the pack holder;

a pack transport assembly removing the selected magnetic disc pack in the first rest position in a second plane direction perpendicular to said first plane from the pack holder and transporting the selected magnetic disc pack to a second rest position on a line extending in said second plane direction of removal;

a fixed base plate fixedly provided along a path of transport of the selected magnetic disc pack parallel to said second plane direction to support said selected magnetic disc pack in said second rest position;

a pair of bases pivotally connected to and on opposite sides of the fixed base plate, each of the pair of bases movable toward said fixed base plate in an opposed relationship with the second rest position for a recording-reproducing operation;

a drive means, positioned on one of said pair of bases, for rotating a magnetic disc provided within said selected magnetic disc pack; and

a recording-reproducing assembly including a pressing member provided on one of the pair of bases to hold the selected magnetic disc pack in the second rest position against said fixed base plate for recording and reproducing by a magnetic head provided on said other of the pair of bases.

5,027,238

FLOATING TYPE MAGNETIC HEAD WITH FLEXURE CUTOUT

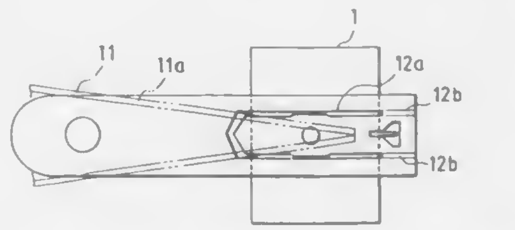
Takahiro Konishi, and Toshihiro Kuriyama, both of Nagaoka, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Aug. 9, 1990, Ser. No. 564,934

Claims priority, application Japan, Sep. 27, 1989, 1-112930[U]

Int. Cl.⁵ G11B *5/48*

U.S. Cl. 360—104 3 Claims



1. A floating type magnetic head for a disk drive device, comprising:

an arm;

a gimbal having a flexure portion secured to a free end of said arm; and

a slider having a magnetic core mounted thereon, the slider fixed by an adhesive to said flexure portion of said gimbal, said flexure portion defining a through hole at a part thereof adjacent said magnetic core, thereby preventing the adhesive from contacting the magnetic core.

5,027,239

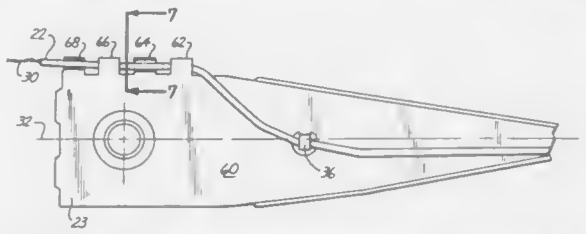
ROUTING A SLEEVE AND CONDUCTORS IN A HEAD-GIMBAL ASSEMBLY

Tracy M. Hagen, Minnetonka, Minn., assignor to Seagate Technology, Inc., Scotts Valley, Calif.

Filed Dec. 22, 1989, Ser. No. 456,099

Int. Cl.⁵ G11B *5/48*

U.S. Cl. 360—104 50 Claims



1. A sleeve capture apparatus suitable for use with a load beam, the load beam used for coupling a gimbal to a support arm in a head-gimbal assembly and the sleeve capture apparatus for supporting a conductor sleeve running from the gimbal to the support arm along the load beam, the sleeve capture apparatus comprising:

a first capture member extending from an edge of the load

VOL 1127 ISS 4 JE 25 1991 UMI

beam and having a sleeve contact surface for contacting the conductor sleeve;

a second capture member extending from the edge of the load beam and having a sleeve contact surface for contacting the conductor sleeve; and

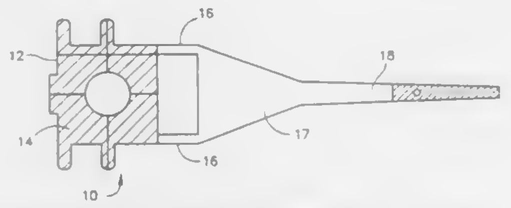
a third capture member extending from the edge of the load beam and having a sleeve contact surface for contacting the conductor sleeve, where the second capture member has its sleeve contact surface displaced from a line defined generally by the sleeve contact surfaces of the first and third capture members by a distance less than the thickness of the conductor sleeve.

5,027,240
DISK HEAD ASSEMBLY LOAD BEAM

Mourad Zarouri, San Diego, and Carl J. Carlson, Poway, both of Calif., assignors to Computer & Communications Technology Corp., San Diego, Calif.

Filed Mar. 27, 1989, Ser. No. 328,874
Int. Cl.⁵ G11B *5/48*

U.S. Cl. 360—104 8 Claims



1. A load beam for a disk head assembly, including:

(a) an elongated arm for supporting an air-bearing read/-write head assembly;

(b) a delta-shaped forebody connected to the elongated arm, the ratio of the length of the delta-shaped forebody to the combined length of the delta-shaped forebody and the elongated arm being in the range of about 24% to about 40%;

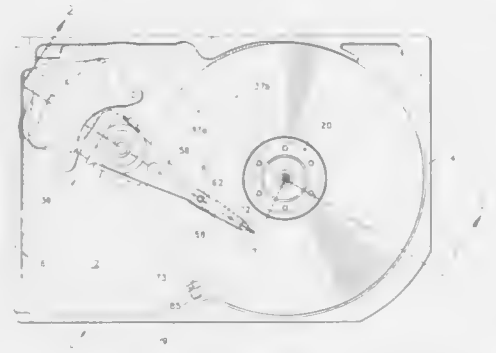
(c) an attachment area connected to the delta-shaped forebody.

5,027,241
DATA HEAD LOAD BEAN FOR HEIGHT COMPACTED, LOW POWER FIXED HEAD AND DISK ASSEMBLY

Michael R. Hatch, Palo Alto, and Willilam G. Moon, Saratoga, both of Calif., assignors to Quantum Corporation, Milpitas, Calif.

Continuation of Ser. No. 491,748, Mar. 12, 1990, abandoned, which is a continuation-in-part of Ser. No. 362,031, Jun. 1, 1989, abandoned. This application Nov. 6, 1990, Ser. No. 610,306
Int. Cl.⁵ G11B *5/54, 21/22*

U.S. Cl. 360—105 42 Claims



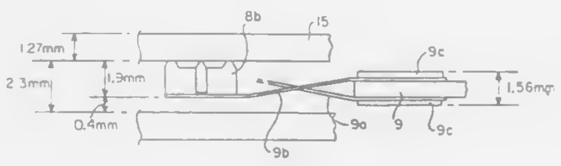
1 A head and disk assembly of a fixed disk drive including a data storage disk rotating at a predetermined angular velocity relative to a base, and a substantially in-line rotary actuator structure rotatably mounted to the base and including a head arm supporting a data transducer head mounting structure, a data transducer head slider being attached to the data transducer head mounting structure in substantial alignment with a longitudinal axis thereof and thereby positionable by the actuator structure at a multiplicity of concentric data track locations defined on a data storage surface of the disk, the data transducer head mounting structure further including an elongated load beam being formed to define a head arm attachment end region for attachment to an outward end of the head arm; a leaf spring loading region adjacent to the attachment end region; a flexure attachment region adjacent a head end region of the load beam for attachment of a gimbal flexure means for mounting the transducer head slider so that it may freely follow the contour of the data storage surface above which it is flying on an air bearing cushion; a dynamic loading tab region at the outermost part of the head end region and extending outwardly beyond the transducer head slider along the longitudinal axis and including longitudinal stiffening means for stiffening the loading tab from the head end region; and, a stiffened load beam region located between the leaf spring loading region and the dynamic loading tab region; and, the head and disk assembly further including stationary loading ramp means fixed to the base adjacent to a peripheral edge of the storage disk, extending from an engagement region overhanging an outer region of the data storage surface to a position beyond a periphery of the data storage surface, and cooperating with the dynamic loading tab region, so that as the rotary actuator structure moves the load beam toward the periphery of the disk, a cam follower means defined by the dynamic loading tab region thereof engages the engagement region of the loading ramp means and progressively lifts the load beam and the transducer head slider away from the data surface as the rotary actuator continues to move the load beam to and beyond the periphery of the data storage disk, the cam follower means being substantially aligned with the longitudinal axis.

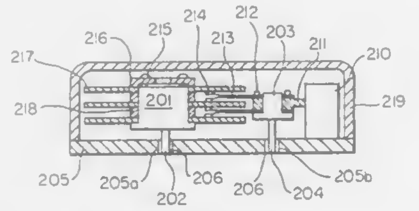
5,027,242
MAGNETIC DISK APPARATUS HAVING AT LEAST SIX MAGNETIC DISKS

Hiroshi Nishida, Oiso; Tatsuya Ishigaki, Yokohama; Atsushi Ito, Odawara; Yoshinobu Kudou, Minami-ashigara; Hiroshi Katou, Hadano, and Kousuke Fujii, Koganei, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 6, 1989, Ser. No. 446,788
Claims priority, application Japan, Dec. 9, 1988, 63-311712
Int. Cl.⁵ G11B *5/55, 5/012*

U.S. Cl. 360—106 18 Claims





1 A magnetic disk apparatus, comprising:

a base member and a cover mounted on said base member to form an enclosure;

support means for rotatably supporting a plurality of magnetic disks within said enclosure, wherein at least six of said magnetic disks are supported by said support means and wherein a space between said magnetic disks is less than substantially 2.3 mm;

motor means for rotating said magnetic disks, said motor means being secured to said base member;

first and second transducer means for writing information on and reading information from upper and lower surfaces of adjacent ones of said magnetic disks;

first and second spring means having opposite ends for securing said first and second transducer means on one of said ends in order to position said first and second transducer means in close proximity to both surfaces of adjacent ones of said magnetic disks, said spring means extending in a radial direction with respect to said magnetic disks;

arm means for supporting both said spring means, each of said spring means being connected at the other of said ends to said arm means and being arranged substantially within the same plane parallel to said magnetic disks;

said first and second spring means being substantially perpendicular to a portion of said arm means;

positioning means for moving said arm means in order to position said first and second transducer means in predetermined positions; and

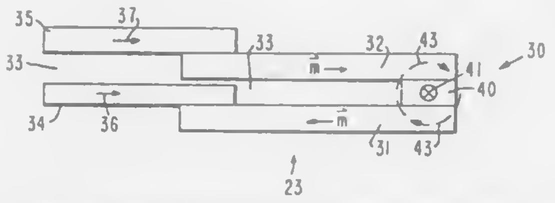
control means mounted on a circuit board for controlling said magnetic disk apparatus, said circuit board being mounted within said enclosure adjacent said base member.

5,027,243
SELF-INITIALIZATION OF SHORT MAGNETORESISTIVE SENSORS INTO A SINGLE DOMAIN STATE

Hardayal S. Gill, Los Altos, and James A. Brug, Palo Alto, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 27, 1989, Ser. No. 441,689
Int. Cl.⁵ G11B *5/39*

U.S. Cl. 360—113 2 Claims



1. A dual element magnetoresistive sensor comprising:

first and second parallel magnetoresistive sensor elements separated by dielectric material, wherein each sensor element has a coupling area;

first and second conductors respectively coupled to one end of the first and second magnetoresistive sensor elements, and wherein each conductor has a coupling area that is oriented in the same direction as the coupling areas of the respective sensor elements, and wherein each conductor is adapted to conduct currents through its respective coupling area that are in the same direction as the orientation of the respective sensor element coupled thereto;

a third conductor disposed at the opposite ends of the first and second magnetoresistive sensor elements that is coupled to both sensor elements and oriented transverse to the directions of the first and second sensor elements, and that is adapted to conduct current therethrough in a direction transverse to the orientation of the sensor elements coupled thereto;

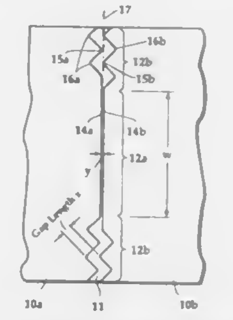
whereby the current flowing in the third conductor creates an anti-parallel longitudinal field in the two sensor elements that is in the same direction as closure fields produced by the magnetostatic coupling between the first and second sensor elements, and whereby currents conducted by the first, second and third conductors self-initializes the magnetoresistive sensor into a single domain state.

5,027,244
READ/WRITE HEAD ASSEMBLY WITH ERASE GAPS OF MEANDERING SHAPE

Yuichi Hayakawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 12, 1989, Ser. No. 378,932
Claims priority, application Japan, Jul. 12, 1988, 63-174720
Int. Cl.⁵ G11B *5/23*

U.S. Cl. 360—119 2 Claims



1. A magnetic transducer head assembly comprising a pair of magnetic core halves of generally C-shaped configuration and a coil wound on one of said core halves, the limbs of the C of each core half being in abutment relationship with those of the other core half to define a medium-contacting face and a magnetic gap on said medium-contacting face, said magnetic gap including an inner, read/write gap section and a pair of outer gap sections respectively disposed on opposite ends of said inner, read/write gap section, each of said outer gap sections having a gap length much greater than the gap length of said inner, read/write gap section and being in the shape of a zigzag configuration which is formed by crests on one of said core halves and troughs on the other core half, tips of said crests being on an imaginary plane which is aligned or retracted from a plane defined by said inner, read/write gap section.

5,027,245
MAGNETIC HEAD FOR MULTI-TRACK RECORDING HAVING READ AND WRITE TRANSDUCERS FORMED BY THIN-FILM TECHNOLOGY

Yuji Nagata, Osaka; Toshio Fukazawa, Kyoto; Kumiko Wada, Kawanishi, and Yoshihiro Tosaki, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 236,813, Aug. 26, 1988, abandoned. This application Aug. 15, 1990, Ser. No. 569,221
Claims priority, application Japan, Aug. 27, 1987, 62-214579
Int. Cl.⁵ G11B *5/29, 5/48*

U.S. Cl. 360—121 8 Claims

1. A magnetic head for writing and reading data on and from respective tracks of a recording medium, comprising a combination of first and second head modules, each of said head modules comprising a plurality of thin -film read transducer elements and a plurality of thin-film write transducer elements arranged in a linear array, in which a number N of read transducer elements of said first head module are positioned in a condition of rotational symmetry with respect to N write transducer elements of said second head module, where N is an integer of value greater than one, and N write transducer elements of said first head module are positioned in said condition of rotational symmetry with respect to N read transducer

VOL
1127
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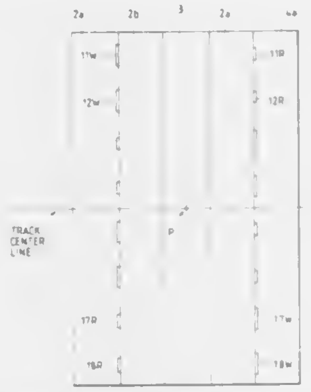
elements of said second head module, with read and write transducer element pairs each comprising elements of said first



and second head modules being respectively aligned with corresponding ones of said tracks

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5,027,246

THIN FILM MAGNETIC HEAD AND A METHOD FOR MANUFACTURING THEREOF

Junji Numazawa, Tokyo, and Fusayoshi Aruga, Shimosuwa, both of Japan, assignors to Nippon Hose Kyokai, Tokyo and Kabushiki Kaisha Sankyo Seiki Seisakusho, Shimosuwa, both of, Japan

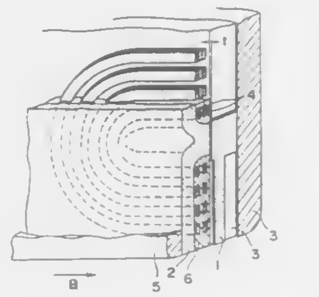
PCT No. PCT/JP88/01338, § 371 Date Aug. 23, 1989, § 102(e) Date Aug. 23, 1989, PCT Pub. No. WO89/06422, PCT Pub. Date Jul. 13, 1989

PCT Filed Dec. 27, 1988, Ser. No. 408,492

Claims priority, application Japan, Dec. 28, 1988, 62-329860

Int. Cl.^{5} G11B *5/147*

U.S. Cl. 360—126 11 Claims



1. A thin film magnetic head for use in a running direction with respect to a magnetic recording medium and in which a first magnetic material, a non-magnetic layer, a conductor layer, and a second magnetic material layer which constitute a pair of magnetic poles in cooperation with said first magnetic material layer, are laminated on a non-magnetic substrate, characterized in that the non-magnetic layer, the conductor layer and the second magnetic material layer are formed to be parallel to the running direction and the first magnetic layer is formed to be nonparallel to the running direction in at least an opposed surface area of said head which is to be opposed to a magnetic recording medium, the second magnetic material layer being formed so that it is opposed to the magnetic recording medium at said opposed surface area and so that the second magnetic material layer progressively extends away from the magnetic recording medium in an area of said head which is outside said opposed surface area.

5,027,247

FILM MAGNETIC HEAD FOR HIGH FREQUENCY RECORDING

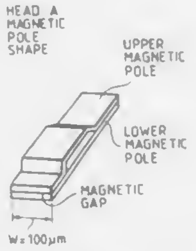
Kanji Nakanishi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 31, 1988, Ser. No. 265,380

Claims priority, application Japan, Oct. 29, 1987, 62-271823; Nov. 6, 1987, 62-279360

Int. Cl.^{5} G11B *5/147*

U.S. Cl. 360—126 4 Claims



1. A film magnetic head capable of recording and reproducing frequencies of at least 1 MHz, comprising:

magnetic pole film material made of a soft metal magnetic film having a uniaxial magnetic anisotropy; and

a magnetic circuit having a magnetic path direction substantially perpendicular to the easy axis direction of said head, said magnetic circuit being disposed in said head,

wherein the length W of said magnetic pole material in an easy axis direction of said head is defined as follows:

$$0.2 \leq d/W \leq 0.3,$$

where d is a 180° magnetic domain wall distance in said magnetic pole film.

5,027,248

MAGNETIC RECORDING AND REPRODUCING APPARATUS WITH A TAPE GUIDE

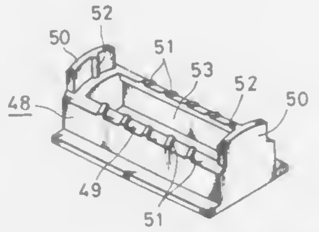
Shinya Nakamura, Shizuoka, Japan, assignor to Tokyo Electric Company, Ltd., Tokyo, Japan

Filed Mar. 21, 1989, Ser. No. 326,730

Claims priority, application Japan, Mar. 24, 1988, 63-70363

Int. Cl.^{5} G11B *15/60*

U.S. Cl. 360—130.21 3 Claims



1. A magnetic recording and reproducing apparatus comprising:

an endless magnetic tape having a wide width, said endless magnetic tape being wound by a pair of rollers including a pinch roller coupled with a motor;

a head running drive member which drives a magnetic head along an area of movement in a widthwise direction of the magnetic tape;

a tape guide having a tape running face which is made to run along one part of a course of said magnetic tape bent by said magnetic head to support the magnetic tape ranging over the full width;

an opening located on the tape running face and made to run along said area of movement of said magnetic head; and guide members formed at both sides of the tape running face to guide both side edges of said magnetic tape.

5,027,249

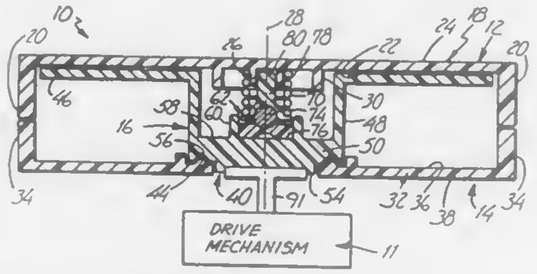
TAPE CARTRIDGE BEARING

Michael W. Johnson, Cottage Grove, Minn., and M. Lee McFarland, Thousand Oaks, Calif., assignors to Michael W. Johnson, St. Paul, Minn.

Filed Nov. 9, 1989, Ser. No. 434,413

Int. Cl.^{5} G11B *23/08*

U.S. Cl. 360—132 8 Claims



1. A tape cartridge which comprises:

an elongated plug having a stem end and a bowl end with an arcuate bowl;

a spherical ball bearing securely retained within the arcuate bowl of the plug;

a bearing disc having a concave recess formed at a center of the disc for receiving the ball bearing;

a first housing member having a hub wall with an outer circular stub wall thereon and an inner concentric circular ring wall, with the ring wall aligned for axial reception of the stem end of the plug;

a coil spring having a first end and a second end, a portion of the plug extending through the spring with the first end of the spring mounting on the bowl end of the plug and the second end of the spring mounting about the ring wall of the first housing member;

a second housing member cooperable with the first housing member to define a tape storage chamber therebetween, the second housing member having an opposed wall generally parallel to and spaced from the hub wall of the first housing member, the opposed wall having a circular hub aperture therethrough and the opposed wall having a circular groove formed therein about an inner side of the aperture; and

a tape support platter having a cylindrical hub with a closed end, the closed end having a circular bore for reception of the bearing disc on an inner side thereof and, the closed end having a circular ridge on an outer side thereof which releasably mates with the circular groove of the second housing member.

5,027,250

ELECTRONIC CIRCUIT WITH A PROTECTION DEVICE AGAINST FLUCTUATIONS IN THE SUPPLY BATTERY VOLTAGE

Carlo Cini, Cornaredo, and Bruno Murari, Monza, both of Italy, assignors to SGS-Thomson Microelectronics S.r.l., Agrate Brianza, Italy

Filed Jun. 23, 1989, Ser. No. 370,442

Claims priority, application Italy, Jul. 5, 1988, 21234 A/88

The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.

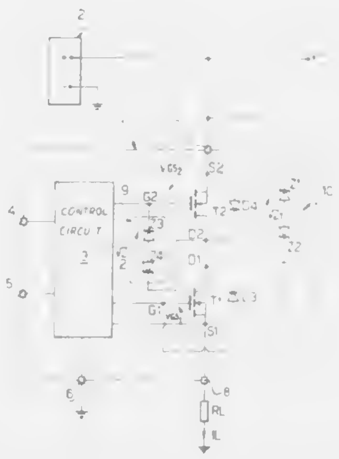
Int. Cl.^{5} H02H *3/24*

U.S. Cl. 361—90 2 Claims

1. An electronic circuit with a protection device against fluctuations in the supply battery voltage, comprising:

(a) a first MOS power transistor connected in series with an electric load between one pole of said battery and ground for driving said load,

(b) a first pair of Zener diodes connected back-to-back to each other between said pole and the gate electrode of said first transistor,



(c) a second MOS transistor connected between said pole and the first transistor and incorporating a protection device formed of a second pair of Zener diodes connected back-to-back to each other between the gate and the drain of said second transistor.

5,027,251

MOSFET INCLUDING CURRENT MIRROR FET THEREIN

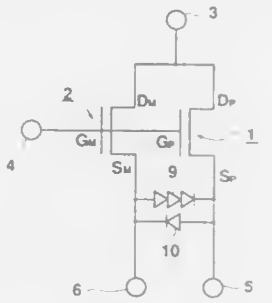
Masaki Hirota; Norio Fujiki, both of Yokohama, and Teruyoshi Mihara, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohami, Japan

Filed Aug. 15, 1989, Ser. No. 394,098

Claims priority, application Japan, Aug. 15, 1988, 63-107577[U]

Int. Cl.^{5} H02H *9/02*

U.S. Cl. 361—18 5 Claims



1. A MOSFET device, comprising:

a power MOSFET having a source, a drain and a gate electrode;

a current mirror MOSFET having a source, a drain and a gate electrode, the drains of the two MOSFETs being linked in common to each other, the gate electrodes of the two MOSFETs being linked in common to each other; and

diode means connected between the sources of the two MOSFETs, for protecting a gate oxide film for the current mirror MOSFET, the diode means including a first diode device for releasing a positive electrostatic surge voltage and a second diode device for releasing a negative electrostatic surge voltage, the first and second diode devices being coupled in parallel with each other.

VOL
1127
ISS
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JE
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1991
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SEMICONDUCTOR INPUT PROTECTION DEVICE

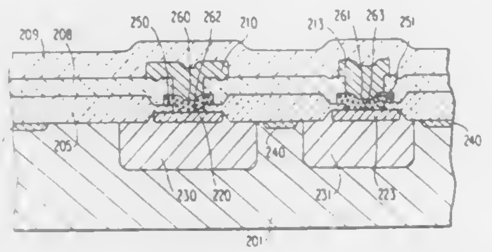
Ryuji Yamamura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Oct. 12, 1990, Ser. No. 596,452

Claims priority, application Japan, Oct. 12, 1989, 1-266943

Int. Cl.^{5} H02H *9/04*

U.S. Cl. 361—58 **48 Claims**



1. A semiconductor input protection device annexed to a semiconductor device formed on the surface of a one-conductivity type semiconductor substrate comprising

an opposite-conductivity type first impurity diffusion layer resistance with one end thereof connected to an input terminal,

an opposite-conductivity first type impurity diffusion layer connected through a wire layer at a reference potential,

a field oxide film for separating elements on the surface of said semiconductor substrate between said first impurity diffusion layer resistance and said first impurity diffusion layer,

an opposite-conductivity type first well layer containing the area of said first impurity diffusion resistance including said end thereof,

an opposite-conductivity type second well layer containing said first impurity diffusion layer and parallel-opposed to said first well layer underneath said field oxide film,

a well-type punch-through transistor including said first well layer and said second well layer, and

a one-conductivity type channel stopper formed on the portions the surface of said semiconductor substrate surrounding said first well layer and said second well layer and at distance apart from said first well layer and said second well layer, wherein

the distances between said channel stopper and the opposed side of said first well layer to said second well layer and between said channel stopper and said second well layer have each a first lower limit value as the permissible smallest value, and

said distance from said channel stopper at least in the area where said first well layer and said first impurity diffusion layer resistance intersect has a second lower limit distance greater than said first lower limit value.

5,027,253

PRINTED CIRCUIT BOARDS AND CARDS HAVING BURIED THIN FILM CAPACITORS AND PROCESSING TECHNIQUES FOR FABRICATING SAID BOARDS AND CARDS

John M. Lauffer, Waverly, and Richard A. Schumacher, Endicott, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Apr. 9, 1990, Ser. No. 506,640

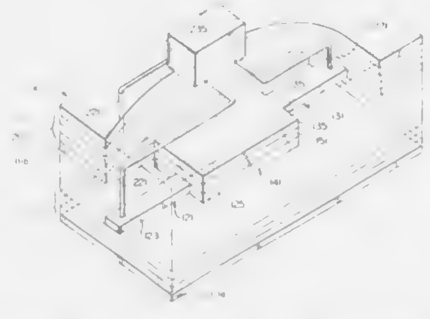
Int. Cl.^{5} H05K *7/20;* **H01L** *27/02;* **H01G** *7/00, 4/10*

U.S. Cl. 361—321 **11 Claims**

1. A multilayer microelectronic circuit package including:

(1) an integral, thin film, buried capacitor comprising:
  (a) a first signal core comprising at least one first thin film copper wire having at least one first thin film copper electrode;
  (b) a second signal core comprising at least one second thin film copper wire having at least one second thin film copper electrode, at least a portion of said first thin film copper electrode overlying at least a portion of said second thin film copper electrode; and
  (c) an epitaxial thin film of a dielectric material between said first copper electrode and said second copper electrode; said thin film first copper electrode, said thin film second copper electrode, and said thin film of dielectric material define the integral buried thin film capacitor capacitively coupling said thin film signal cores within said multilayer circuit package; and

(2) an integrated circuit chip bonded to said multilayer circuit package and electrically interconnected to one of said capacitively coupled thin film signal cores.



5,027,254

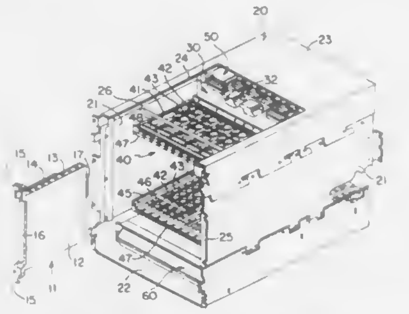
APPARATUS FOR COOLING ELECTRONICS COMPONENTS

William D. Corfits; Maurice F. Holahan; Susan J. Martino; David R. Motschman, all of Rochester, and James R. Thorpe, Stewartville, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 9, 1989, Ser. No. 434,963

Int. Cl.^{5} H05H *7/20*

U.S. Cl. 361—384 **12 Claims**



1. Apparatus for cooling electronics components attached to multiple planar units each having a planar unit connector, said enclosure comprising:

a backplane having front and rear sides each carrying a plurality of connectors all coupled together via electrical conductors to form a bus, said backplanes being substantially impervious to the flow of air between its front and rear sides;

a front cage assembly having upper and lower members containing arrays of openings, and means for holding and positioning said planar units such that said planar unit connectors may engage respective ones of said backplane connectors on said front side of said backplane, said members being positioned adjacent the front side of said backplane;

a rear cage assembly having upper and lower members containing arrays of openings, and means for holding and positioning said planar units such that said planar unit connectors may engage respective ones of said backplane connectors on said rear side of said backplane, said members being positioned adjacent the rear side of said backplane;

an enclosure surrounding both said cages and said backplane and having a pair of solid side walls positioned against said upper and lower members and against said backplane, said enclosure having a solid top wall attached to said side walls and positioned against said backplane so as to prevent air flow between the front and rear of said backplane, said enclosure further having a solid bottom wall attached to said side walls;

means for forming a plenum chamber bounded by said bottom wall, portions of said side walls, and the bottom member of said rear cage;

a powered air mover having an inlet for receiving air flowing through the lower member of said front cage, and having an outlet for exhausting air into said plenum chamber, said air mover creating a flow of air from the upper member of said front cage through the lower member of said front cage, through said air mover and said plenum chamber, thence from said lower member of said rear cage through the upper member of said rear cage in an omega-shaped path having at least four turns.

5,027,255

HIGH PERFORMANCE, HIGH CURRENT MINIATURIZED LOW VOLTAGE POWER SUPPLY

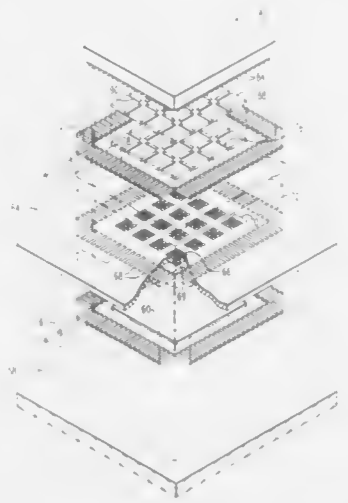
Dan B. Zeitlin, Annapolis; John B. Branthover, Daytona; Brian H. Smith, Easton; Andrew J. Piloto, Columbia; Theresa M. Lengel, Ellicott City; Robert R. Carlson, Jr., Severn; Lanson Y. Shum, Highland; Paul D. Hodges, Jr., Ellicott City, and Denise B. Harris, Columbia, all of Md., assignors to Westinghouse Electric Co., Pittsburgh, Pa.

Filed Oct. 20, 1989, Ser. No. 424,102

Claims priority, application Japan, Oct. 22, 1988, 63-266648

Int. Cl.^{5} H05K *1/14*

U.S. Cl. 361—395 13 Claims



1. A low voltage, high current power supply adapted to be secured within a standard electronic module (SEM) chassis comprising:

a thick-film multilayer copper and ceramic primary board for supporting relatively low power capacity elements including power switches, a house supply, a regulator, a controller and integral connections therebetween;

a secondary board formed of a composite of dielectric and direct bonded copper for supporting relatively high power capacity elements including an output rectifier and capacitors and for carrying high output current; and

inductive power components formed of planar flexible printed metal windings formed on a flexible insulating substrate and a set of monolithic magnetic cores for enclosing the windings therein said windings being connected between selected portions of the primary and secondary boards, the primary board, the secondary board and the inductive power components being directly bonded in thermal contact with the chassis.

5,027,256

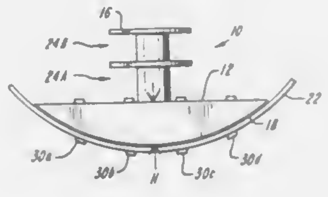
COMPONENT CARRIER WITH CURVED BASE

Fatemeh Abnoosi, East Longmeadow, and Robert L. Theroux, Halyoke, both of Mass., assignors to K and M Electronics, Inc., West Springfield, Mass.

Filed Nov. 16, 1989, Ser. No. 437,976

Int. Cl.^{5} H05K *7/06*

U.S. Cl. 361—417 **2 Claims**



1. A component assembly comprising:

A. a circuit board having a concavely curved component mounting surface.

B. a component carrier including:
  i. a rigid base member having a top surface adapted for supporting a component, and
  ii. a bottom surface convexly curved to mount flush to said mounting surface of said circuit board,

said base member including at lest one hole extending from said top surface to said bottom surface and at least one electrically conductive element extending through one of said holes and fixing said carrier to said circuit board with said bottom surface flush to said mounting surface, and electrically contacting said circuit board.

5,027,257

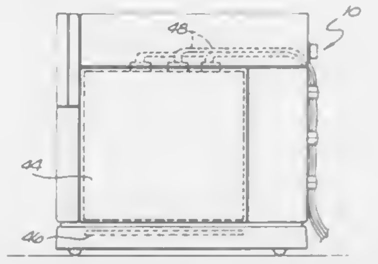
DESKSIDE COMPUTER HOUSING

Alfred Lockwood, Palo Alto; Philip G. Yurkonis, Campbell, and James G. Ammon, San Jose, all of Calif., assignors to Sun Microsystems, Inc., Mountain View, Calif.

Filed Jan. 8, 1990, Ser. No. 462,099

Int. Cl.^{5} H02B *1/20;* **H05K** *7/20*

U.S. Cl. 361—428 **20 Claims**



19. A deskside computer housing, said deskside computer housing comprises at least one plug-in circuit board having at least a first connecting means at a first side and a second connecting means at a second side, said first connecting means mates with a third connecting means of another component enclosed within said deskside computer housing coupling said plug-in circuit board to said component, said second connecting means mates with a fourth connecting means of a cable, said cable extending external to said deskside computer hous-

VOL
1127
ISS
4
JE
25
1991
UMI

ing to couple said plug-in circuit board to an external device, said deskside computer housing comprising:

a frame assembly having a top surface and at least one vertically oriented slot formed therein on said top surface which receives said plug-in circuit board in a vertically oriented direction and results in said second connecting means being disposed on said top surface of said frame assembly; and

a cover assembly enclosing said frame assembly comprising,

a front door covering a front surface of said frame assembly, said front door having a plurality of front inlet vents formed therein;

a base covering a bottom surface of said frame assembly and supporting said frame assembly; and

a rear plenum cover covering a rear surface of said frame assembly, said rear plenum cover having a plurality of rear outlet vents formed therein;

said vertically oriented slots and said other components of said deskside computer are disposed in planes that are substantially perpendicular to said front door and said rear plenum cover thereby allowing said front and rear vents to provide front to rear air cooling;

said cover assembly cooperates with said frame assembly such that cables of said fourth connecting means exit said deskside computer housing, said fourth connecting means mates with said second connecting means of said plug-in board at said top surface of said frame assembly; and

said cover assembly further comprises a top cover that forms an opening with said rear plenum cover such that cables of said fourth connecting means exit said deskside computer housing, and said rear plenum cover further comprising at least one cable retainer attached to said rear plenum cover retaining said cables exiting said deskside computer housing.

5,027,258
DISPLAY UNIT

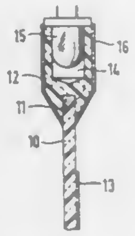
Karl-Heinz Schöniger, Esslingen, and Winfried Scheid, Ebersbach, both of Fed. Rep. of Germany, assignors to Inotec GmbH Gesellschaft für Innovative Technik, Esslingen, Fed. Rep. of Germany

Filed May 4, 1990, Ser. No. 518,989

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1989, 3919925

Int. Cl.⁵ F21V *7/04*

U.S. Cl. 362—31 **20 Claims**



1. A display unit comprising:

a light guide panel having a front surface, a rear surface and edge surfaces;

a display symbol arranged to be illuminated by said panel;

a light guide batten arranged on one lateral limiting edge of said light guide panel and having a thickness in excess of a thickness of said light guide panel, said light guide batten having a groove accommodating a marginal zone of said light guide panel, to define a transition zone between said light guide batten and said light guide panel providing optical conductivity for passing light from inside said light guide batten via said side edge surface, said front surface and said rear surface of said light guide panel into said light guide panel; and

at least one illuminating element mounted in said light guide batten.

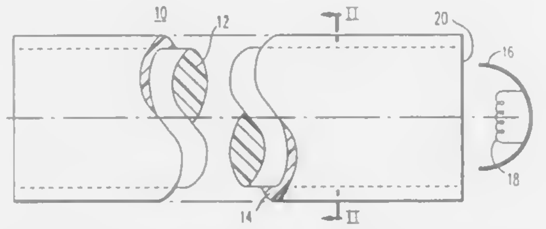
5,027,259
FLEXIBLE LIGHT PIPE WITH IMPROVED PERFORMANCE COATING

Daniel A. Chujko, 295 Silver La., McKees Rocks, Pa. 15136

Filed Mar. 5, 1990, Ser. No. 488,686

Int. Cl.⁵ F21V *8/00*

U.S. Cl. 362—32 7 Claims



1. A flexible elongated light conductor which can be bent into predetermined configurations and which is adapted to be end lighted in order to provide a variety of different light-emitting shapes, said flexible light conductor comprising:

an elongated transparent plastic member having a predetermined cross-sectional configuration of predetermined dimensions as desired for the lighted shapes to be produced, said elongated plastic member having sufficient flexibility that it can be readily conformed into the shapes desired, and at least one end portion of said elongated plastic member adapted to be retained in light-receptive relationship with light source means to direct light received from the light source means along the length of said elongated plastic member;

a thin flexible light-transmitting member snugly overfitting said elongated plastic member, said overfitting member formed of material which is resistant to deleterious effects of the environment in which said shaped end-lighted plastic member is intended to be utilized;

said thin overfitting member prior to application over said elongated plastic member having the characteristic of shrinking in diameter upon being heated under predetermined conditions, and said thin overfitting member after application over said elongated plastic member having been heated to a predetermined temperature and for a predetermined time sufficient to heat shrink said overfitting member onto said elongated plastic member; whereby interface reflections between said elongated plastic member and said overfitting member are minimized, and said flexible light conductor may be bent through small radii turns when conforming said flexible light conductor into different desired shapes without encountering appreciable separation between said elongated plastic member and said snugly overfitting member.

5,027,260
VEHICULAR LIGHTBAR ASSEMBLY

Harold W. Lyons, Killingworth, and James L. Stopa, Old Saybrook, both of Conn., assignors to Whelen Technologies, Inc., Chester, Conn.

Filed Sep. 6, 1989, Ser. No. 403,710

Int. Cl.⁵ B60Q *1/26*

U.S. Cl. 362—74 **15 Claims**

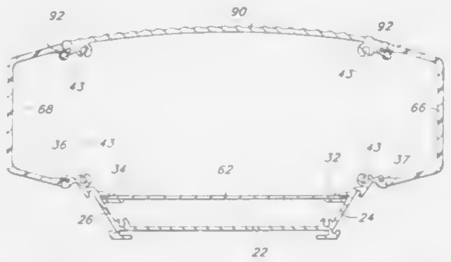
1. A lightbar assembly for an emergency vehicle comprising:

base means including an elongated base having a bottom panel, said base means further including a front panel and a rear panel respectively integrally extending from a pair of opposed sides of said bottom panel at oblique angles to said bottom panel, said side panels terminating at a pair of generally aligned and spaced free ends, rail means integrally extending from said front and rear panels intermediate said bottom panel and the free ends of said front and rear panels to define a pair of aligned transversely spaced support channels, said front and rear panels having connector means at the free ends thereof;

platform means slidably engageable with said rail means defined channels for forming a component support platform which extends between said front and rear panels, a trough being defined between said platform means and said base means bottom panel;

first lens means for defining a plurality of light transmissive elements, said first lens means including connector means on a pair of oppositely disposed edges thereof, the connector means on the first of said first lens means edges being shaped for engaging a said connector means at the free end of a said base means front panel in a generally tongue and groove-type connection;

second lens means for defining a plurality of light transmissive elements, said second lens means including connector means on a pair of oppositely disposed edges thereof, the connector means on the first of said second lens means edges being shaped for engaging the said connector at the free end of said base means panel in a generally tongue and groove-type connection, the said rear second edges of said first and second lens means being parallelly oriented and spaced when said lens means first edge connectors are engaged with said base means front and rear panel connectors;



opaque cover means substantially coextensive in length with said base means, said cover means having a pair of oppositely disposed edge portions which define connectors which are complementary to the second of said first and second lens means edge connectors whereby said cover means may be connected to said first and second lens means in a generally tongue and groove-type manner, said cover means having a width which exceeds the width of said base means bottom panel; and

a pair of end cap means for engaging opposite ends of said base means, lens means and cover means to cooperate therewith to define the enclosure of the lightbar assembly.

5,027,261
NON-GLARE NIGHT READER

Walter Hudson, Jr., 1104 N. Pkwy. #54, Jackson, Tenn. 38305

Filed Jul. 26, 1990, Ser. No. 557,730

Int. Cl.⁵ A47B *19/00*

U.S. Cl. 362—98 **5 Claims**

1. A non-glare night reader which comprises:

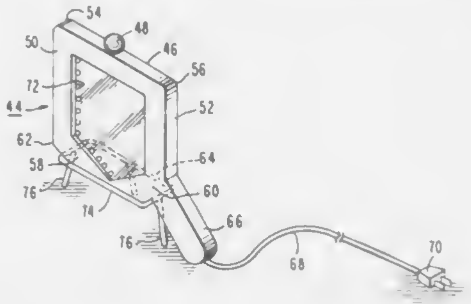
(A) a unitary frame and handle, said handle joined exterior to a multi-sided external frame, the upper surface of said frame being opaque to light;

(B) a transparent plate disposed within the upper surface of the multi-sided external frame;

(C) a plurality light source disposed within the multi-sided frame, and about the inner peripheral area thereof;

(D) means for providing a source of power source for illuminating the light source; and

(E) wherein the multi-sided external frame has five sides each of which define a perimeter of the reader and wherein two of the sides have a modified V-shaped configuration and the remaining three sides are disposed at right angles to each other.



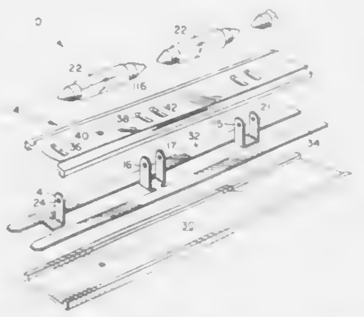
5,027,262
FLEXIBLE LIGHT RAIL

Herbert D. Freed, Miami Beach, Fla., assignor to Lucifier Lighting Company, San Antonio, Tex.

Continuation-in-part of Ser. No. 198,083, May 24, 1988, Pat. No. 4,874,320. This application Apr. 20, 1989, Ser. No. 341,736

Int. Cl.⁵ F21V *21/00*

U.S. Cl. 362—249 **4 Claims**



1. An apparatus for supporting a plurality of lighting fixtures comprising:

a first conductive strip having a first plurality of lateral extensions connected thereto, each of said first plurality of lateral extensions having attached thereto one or more first contact tabs, said first contact tabs being generally perpendicular to the surface of said first conductive strip;

a second conductive strip essentially parallel to said first conductive strip creating a space therebetween, said second conductive strip having a second plurality of lateral extensions connected thereto, each of said second plurality of lateral extensions having attached thereto one or more second contact tabs, said second contact tabs being generally perpendicular to the surface of said second conductive strip, said first and second contact tabs being located along said space between said first and second conductive strips; and

means for electrically insulating said first and second conductive strips integral with means for reflecting light from said lighting fixtures said insulating means comprising an upper track with a concave reflective surface on the outside thereof and a lower track, said concave reflecting surface of said upper trace having a radius of curvature between 0.30 and 0.90 inch.

VOL
1127
ISS
4
JE
25
1991
UMI

5,027,263
SWITCHING POWER SOURCE MEANS

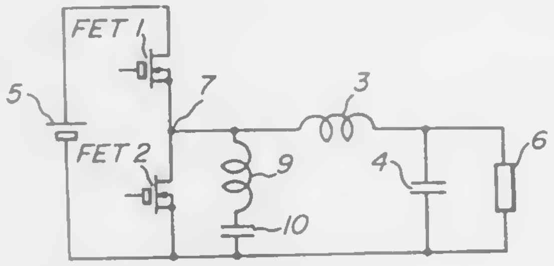
Kosuke Harada, Fukuoka, and Hiroshi Sakamoto, Ohnojyo, both of Japan, assignors to Kyushu University, Fukuoka, Japan

Filed Mar. 14, 1989, Ser. No. 323,381

Claims priority, application Japan, Sep. 16, 1988, 63-230133

Int. Cl.^{5} H02M *3/335*

U.S. Cl. 363—16 8 Claims



1. A switching power source, comprising:
a DC voltage source;
a first switch element connected to said DC voltage source;
low-pass filter means having an output end for connection to a load and an output end selectively connectable to said DC voltage source through said first switch element;
a second switch element connected in parallel relative to the input end of said low-pass filter means, said first and second switch elements having parasitic capacitors and being turned on and off so that an output signal of desired frequency is produced at the output end of said lowpass filter means;
a reactor connected in parallel with said second switch element for charging and discharging said parasitic capacitors during a switching operation when said first switch element is switched off and said second switch element is switched on, and vice versa; and
a capacitor connected in series with said reactor so that the series connection of said reactor and said capacitor is in parallel with said second switch element, wherein said first and second switch elements are directly connected together at a common connection point, and the series connection of said reactor and said capacitor is connected directly to said common connection point, wherein said first and second switch elements each comprise a MOSFET having parasitic capacitors.

5,027,264
POWER CONVERSION APPARATUS FOR DC/DC CONVERSION USING DUAL ACTIVE BRIDGES

Rik W. DeDoncker, Niskayuna, N.Y.; Mustansir H. Kheraluwala, and Deepakraj M. Divan, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Sep. 29, 1989, Ser. No. 415,078

Int. Cl.^{5} H02M *3/335*

U.S. Cl. 363—16 11 Claims

1. DC/DC static power conversion apparatus comprising:
(a) an input converter adapted to receive a DC source voltage from a DC source and containing a plurality of active gate controlled gate turn-off switching elements connected in a bridge configuration to allow the DC input voltage to be converted to an AC output voltage at the output of the converter;
(b) a transformer with primary and secondary windings and leakage inductance, the primary connected to receive the output of the input converter;
(c) an output converter connected to the secondary of the transformer for converting the AC voltage at the secondary of the transformer to a DC output voltage at the output of the converter, the output converter containing a plurality of gate controlled active gate turn-off switching elements arranged in a bridge configuration to allow the AC input to be converted to the DC output voltage from the converter; and
(d) control means connected to the gates of the input converter switching elements and the gates of the output converter switching elements for controlling the input converter switching elements in a soft-switched manner to convert the DC source voltage to an AC output voltage at a selected frequency at the output of the input converter, and for controlling the switching of the output converter switching elements in a soft-switched manner to convert the AC input voltage at the selected frequency at the input of the output converter to a DC voltage at the output of the output converter, the switching of the input converter and output converter switching elements being controlled to provide a phase difference between the voltages at the primary and secondary of the transformer which yields a desired output voltage and power level from the output converter.

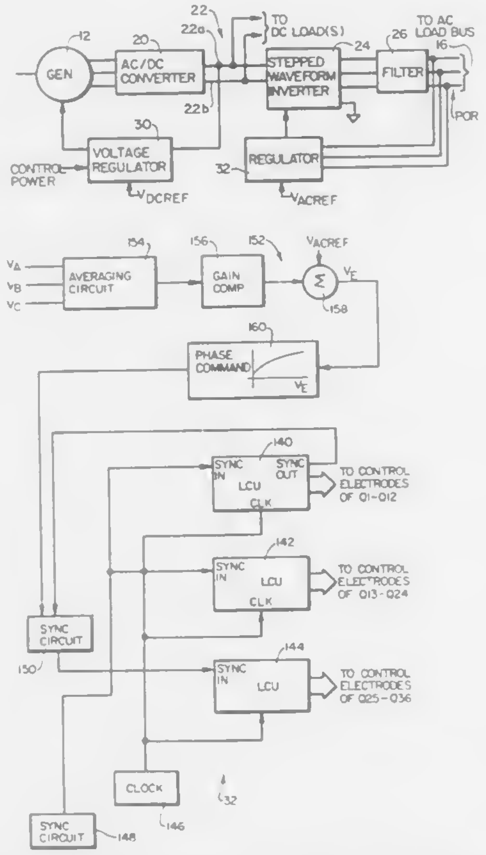
5,027,265
REGULATOR FOR STEPPED-WAVEFORM INVERTER

P. John Dhyanchand; Sunil Patel; Chai-Nam Ng, and Vietson Nguyen, all of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 20, 1989, Ser. No. 453,975

Int. Cl.^{5} H02M *3/335*

U.S. Cl. 363—37 16 Claims



1. A regulator for a stepped-waveform inverter having first and second subinverters, a summing transformer having first and second primary windings coupled to the first and second subinverters, respectively, and a secondary winding in which summed AC output power is produced, the subinverters developing first and second waveforms in the first and second primary windings wherein the second waveform is phase displaced by an angle α relative to the first waveform, comprising:
means for detecting a deviation of a parameter of the AC output power from a reference;
means coupled to the detecting means for deriving a phase command signal from the detected deviation;
a comparator for comparing the phase command signal with a ramp signal to obtain a comparison signal; and
first and second means coupled to the first and second subinverters, respectively, and responsive to the comparison signal for operating same to cause the angle α to vary in accordance with the phase command signal, wherein each of the first and second operating means includes a memory which stores data for developing the first and second waveforms, respectively, and a one-shot wherein the one-shot of the first operating means receives a synchronization signal and wherein the one-shot of the second operating means receives the comparison signal.

5,027,266
VOLTAGE GENERATOR WITH VOLTAGE MULTIPLIER

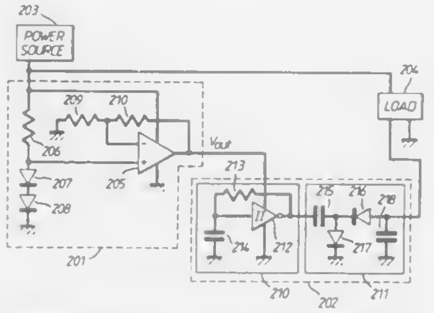
Takaaki Ishii; Masayuki Sakanishi, and Katsuhiko Kita, all of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Apr. 16, 1990, Ser. No. 509,150

Claims priority, application Japan, Apr. 17, 1989, 1-96798

Int. Cl.^{5} H02M *3/18, 7/00*

U.S. Cl. 363—63 13 Claims



1. A voltage generator circuit for providing a potential difference to a load, comprising:
power source means for providing power at a first voltage level;
voltage regulating means coupled to the power source means for providing a regulated output having a level maintained at a second voltage level, the second voltage level being lower than the first voltage level; and voltage generating means coupled to the regulated output for providing a multiplied output having a third voltage level corresponding to said potential difference.

5,027,267
AUTOMATIC MIXTURE CONTROL APPARATUS AND METHOD

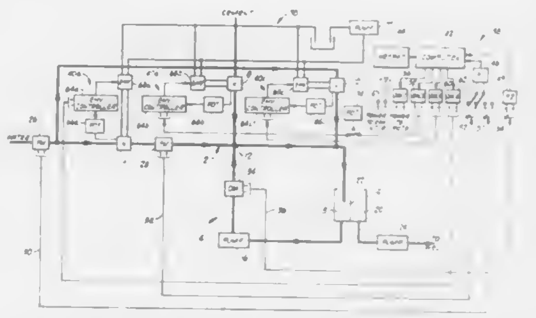
Alan J. Pitts, Comanche; Leonard R. Case, and James E. Broaddus, both of Duncan, all of Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Mar. 31, 1989, Ser. No. 332,314

Int. Cl.^{5} G06F *15/46;* G05D *11/13*

U.S. Cl. 364—172 14 Claims

11. A method of automatically producing a cement slurry having a desired density and mixing rate, comprising the steps of:
(a) entering into a computer data including a desired slurry density, a desired mixing rate, a desired water requirement and a desired yield;
(b) operating a water inlet valve with the computer so that a quantity of water is flowed into a slurry producing circuit;
(c) operating a cement inlet valve with the computer so that a quantity of dry cement is added into the slurry producing circuit and the quantity of water to produce a slurry having the desired slurry density;
(d) circulating the slurry through the slurry producing circuit; and
(e) concurrently operating the water inlet valve and the cement inlet valve with the computer in response to the entered desired slurry density, desired mixing rate, desired water requirement and desired yield to add more water and cement into the slurry producing circuit, thereby producing more slurry, while maintaining the desired slurry density and mixing rate.



5,027,268
SYSTEM FOR ADMINISTERING LIFE OF PLANT

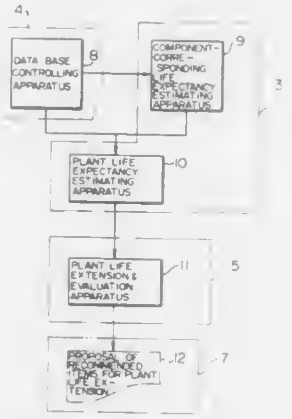
Shigeo Sakurai, Hitachi; Hiroshi Miyata, Mito; Toshimi Tao, Katsuta, and Ryoichi Kaneko, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 12, 1989, Ser. No. 420,520

Claims priority, application Japan, Oct. 19, 1988, 63-261519

Int. Cl.^{5} G06F *15/20*

U.S. Cl. 364—184 10 Claims


4
DATA BASE CONTROLLING APPARATUS
8
COMPONENT-CORRE-SPONDING LIFE EXPECTANCY ESTIMATING APPARATUS
9
3
PLANT LIFE EXPECTANCY ESTIMATING APPARATUS
10
PLANT LIFE EXTENSION & EVALUATION APPARATUS
11
5
PROPOSAL OF RECOMMENDED ITEMS FOR PLANT LIFE EX-TENSION
12
7

1. A system for administering the life of a plant comprising:
a data controlling apparatus for storing and controlling at least the data on the design conditions of the plant, the operation history of the plant, the characteristics of the materials forming members of the plant, and the history of repair and troubles of the plant;
a component-corresponding life expectancy estimating apparatus for estimating the life expectancy of various pieces of component constituting the plant on the basis of the damaged state of each piece of the component, and on the basis of data on the history of each piece of the component which is stored in said data controlling apparatus;
a plant life expectancy estimating apparatus for making an overall judgement of the result of the estimation of said component-corresponding life expectancy estimating apparatus, and for estimating the life expectancy of the entire plant;
a plant life extension and evaluation apparatus for determin-

VOL
1127
ISS
4
JE
25
1991
UMI

ing, on the basis of the result of the estimation of said plant life expectancy estimating apparatus, the optimum plan for the extension of the life of each of certain pieces of component selected on the basis of the degree of importance, and for evaluating the grading-up of the component, including the economical value thereof; and

an output apparatus for outputting and displaying information on the result of the determination of said plant life extension and evaluation apparatus.

5,027,269

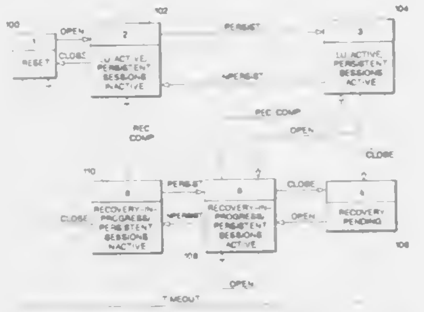
METHOD AND APPARATUS FOR PROVIDING CONTINUOUS AVAILABILITY OF APPLICATIONS IN A COMPUTER NETWORK

John D. Grant; James L. Hall, both of Raleigh, and Barron C. Housel, III, Chapel Hill, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 27, 1989, Ser. No. 344,333

Int. Cl.^{5} G06F *11/20, 13/00*

U.S. Cl. 364—200 **21 Claims**


100
OPEN
1
RESET
CLOSE
102
2
LU ACTIVE, PERSISTENT SESSIONS INACTIVE
PERSIST
NPERSIST
104
3
LU ACTIVE, PERSISTENT SESSIONS ACTIVE
REC COMP
REC COMP
OPEN
CLOSE
110
6
RECOVERY-IN-PROGRESS, PERSISTENT SESSIONS INACTIVE
CLOSE
PERSIST
NPERSIST
5
RECOVERY-IN-PROGRESS, PERSISTENT SESSIONS ACTIVE
108
CLOSE
OPEN
4
RECOVERY PENDING
106
OPEN
TIMEOUT

1. A method for preserving application sessions between pairs of communicating logical units located at a plurality of nodes in a computer network, said computer network having a telecommunications access method program to control communication between network resources and a session monitor to interface with an operator, the method comprising the steps of:

activating a persistent sessions capability at one of the logical units;

suspending the active sessions of the logical unit;

maintaining the status of the suspended sessions during the recovery phase;

initiating recovery actions to resume the suspended sessions;

switching the suspended sessions to a take-over task; and

resuming session activity on at least one of the suspended sessions.

5,027,270

PROCESSOR CONTROLLED INTERFACE WITH INSTRUCTION STREAMING

Thomas J. Riordan, Sunnyvale; Paul S. Ries, San Jose; Edwin L. Hudson, Santa Clara, and Earl A. Killian, Palo Alto, all of Calif., assignors to Mips Computer Systems, Inc., Sunnyvale, Calif.

Filed Oct. 11, 1988, Ser. No. 255,791

Int. Cl.^{5} G06F *12/12, 13/00*

U.S. Cl. 364—200 **3 Claims**

1. In a processor supported interface to cache and main memory, with the processor having a multi-stage pipeline for simultaneously executing one pipeline stage for each instruction in the pipeline and with a cycle being the basic instruction processing unit for the processor, an improved method for performing a main memory read and cache refill operation in the event that an instruction reference misses the cache, said method comprising the steps of:

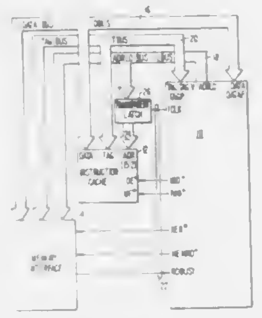
initiating a pipeline stall during the first cycle subsequent to the cache miss to halt processing of instructions in the pipeline;

initiating a main memory block read operation;

reading a block containing a plurality of instructions from said main memory, with said block including said referenced instruction, where the reading step is delayed from the initiating step by a memory latency time interval, where the instructions in said block are sequentially read during successive main memory access cycles staring at a first and ending at a last main memory cycle, and where the referenced instruction is read from main memory during a given main memory access cycle;

refilling the cache by writing each instruction in the block to the cache during the main memory access cycle in which the instruction is read from main memory;

initiating a fix-up operation during said given main memory cycle to load the referenced instruction into the pipeline;



terminating the pipeline stall during the main memory access cycle following the given main memory access cycle to restart the pipeline and to restart processing of the instructions in the block that follow the referenced instruction as they are read from main memory during main memory access cycles;

loading, during a single cycle, at least one particular instruction, included in said block and which follows said referenced instruction, in said cache, and concurrently loading said particular instruction into the pipeline during said single cycle;

referencing a first instruction not included in said block of instructions during the last main memory access cycle in which the last instruction of said block is read; and

processing said first non-block instruction during the cycle following said last main memory access cycle.

5,027,271

APPARATUS AND METHOD FOR ALTERABLE RESOURCE PARTITIONING ENFORCEMENT IN A DATA PROCESSING SYSTEM HAVING CENTRAL PROCESSING UNITS USING DIFFERENT OPERATING SYSTEMS

John L. Curley, North Andover; Thomas S. Hirsch, Bedford, and David A. Wurz, Winchester, all of Mass., assignors to Bull HN Information Systems Inc., Billerica, Mass.

Filed Dec. 21, 1987, Ser. No. 136,056

Int. Cl.^{5} G06F *15/16*

U.S. Cl. 364—200 **22 Claims**

1. A data processing system, said data processing system including a plurality of central processing units having a peer relationship, said data processing system comprising:

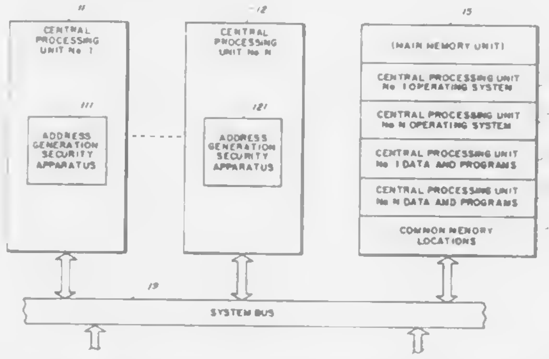
signal transfer means for distributing signals applied thereto throughout said data processing system;

a first central processing unit coupled to said signal transfer means, said first central processing unit applying signals to and receiving signals from said signal transfer means;

a plurality of data processing system resources, said resources being coupled to said signal transfer means for applying signals thereto and for receiving signals therefrom, a first group of said resources being assigned to said

first central processing unit for use by said first central processing unit, wherein said first central processing unit includes security apparatus for preventing access to resources not assigned to said first central processing unit;

a second central processing unit operating under control of an operating system which is non-homogeneous with an operating system controlling said first central processing unit, said second central processing unit having a second group of resources assigned thereto;


11
CENTRAL PROCESSING UNIT No 1
111
ADDRESS GENERATION SECURITY APPARATUS
12
CENTRAL PROCESSING UNIT No N
121
ADDRESS GENERATION SECURITY APPARATUS
15
(MAIN MEMORY UNIT)
CENTRAL PROCESSING UNIT No 1 OPERATING SYSTEM
151
CENTRAL PROCESSING UNIT No N OPERATING SYSTEM
152
CENTRAL PROCESSING UNIT No 1 DATA AND PROGRAMS
153
CENTRAL PROCESSING UNIT No N DATA AND PROGRAMS
154
COMMON MEMORY LOCATIONS
155
19
SYSTEM BUS

interface means coupled between said second central processing unit and said signal transfer means, said interface means including apparatus for permitting access by said second processing unit only to said second group of resources; and

resource allocation means for dynamically reassigning said data processing system resources in response to signal groups from a central processing unit requiring a non-assigned data processing system resource.

5,027,272

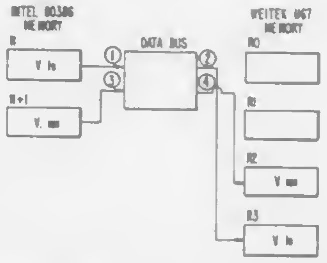
METHOD AND APPARATUS FOR PERFORMING DOUBLE PRECISION VECTOR OPERATIONS ON A COPROCESSOR

Allen R. Samuels, San Jose, Calif., assignor to Weitek Corporation, Sunnyvale, Calif.

Filed Jan. 28, 1988, Ser. No. 149,468

Int. Cl.^{5} G06F *15/16*

U.S. Cl. 364—200 **7 Claims**



1. In a coprocessor being utilized by a processor, the coprocessor utilizing one format for storing double precision data, the processor utilizing a second format for storing double precision data, the communication between the coprocessor and the processor over a data bus limited to one half of a double precision operand at a time, the processor utilizing a loop instruction to generate repetitive commands with incrementing source and destination addresses on an address bus between the processor and the coprocessor, each said repetitive command being for performing a double precision operation on a double precision operands from said source and destination addresses, respectively, and storing the result at the destination address, each said repetitive command providing a double precision indication with the repetitive command, a method of the coprocessor responding to said repetitive commands received from the processor with incrementing source and destination addresses comprising the steps of:

(a) said coprocessor ignoring, in response to the double precision indication, every other said repetitive command starting with the first command and instead loading a half of a double precision operand on the data bus into a temporary register in the coprocessor;

(b) said coprocessor interpreting, in response to the double precision indication, every other said repetitive command starting with the second command as a double precision operation command with one of the double precision operands in the second format having one half on the data bus and the other half in said temporary register; and

(c) said coprocessor executing said double precision operation command.

5,027,273

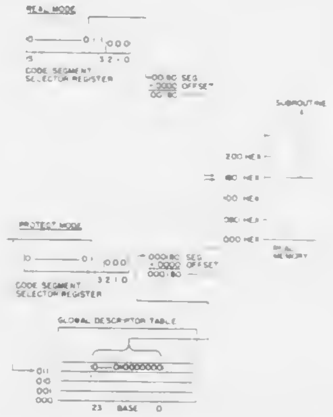
METHOD AND OPERATING SYSTEM FOR EXECUTING PROGRAMS IN A MULTI-MODE MICROPROCESSOR

James Letwin, Kirkland, Wash., assignor to Microsoft Corporation, Redmond, Wash.

Division of Ser. No. 64,117, Jun. 18, 1987, Pat. No. 4,825,358, which is a division of Ser. No. 722,052, Apr. 10, 1985, Pat. No. 4,779,187. This application Apr. 21, 1989, Ser. No. 341,567

Int. Cl.^{5} G06F *12/06*

U.S. Cl. 364—200 **21 Claims**



1. A method for accessing a segment in a multi-mode computer having segmented addressing, the computer having a memory, the computer having a segment selector to select the segment, the segment having a base address, the computer having a first mode wherein the base address of the segment is addressed by the segment selector and a second mode wherein the base address of the segment is addressed indirectly by the segment selector which points to a memory location within a mapping system where the base address of the segment is stored, the method allowing the segment to be accessed by the same segment selector value in both the first and second modes, the method comprising the steps of:

(a) selecting an address that is a multiple of 16 to be the base address of the segment;

(b) when the computer is in either the first mode or the second mode,

(1) setting the segment selector to a value so that the segment selector addresses the base address of the segment when the computer is in the first mode;

(2) storing at a selected memory location within the mapping system the base address of the segment, the memory location being selected so that it is pointed to by the segment selector as set in step (1) when the computer is in the second mode; and

(3) loading the segment into the memory at the base address; and

(c) accessing the segment in both the first and second modes using the segment selector.

VOL
1127
ISS
4
JE
25
1991
UMI

5,027,274

METHOD AND SYSTEM FOR MANAGING A PROCESS OF IMAGE DATA ACQUIRED BY A COMPUTED RADIOGRAPHY TECHNIQUE AND ADDITIONAL INFORMATION ADDED TO THE IMAGE DATA

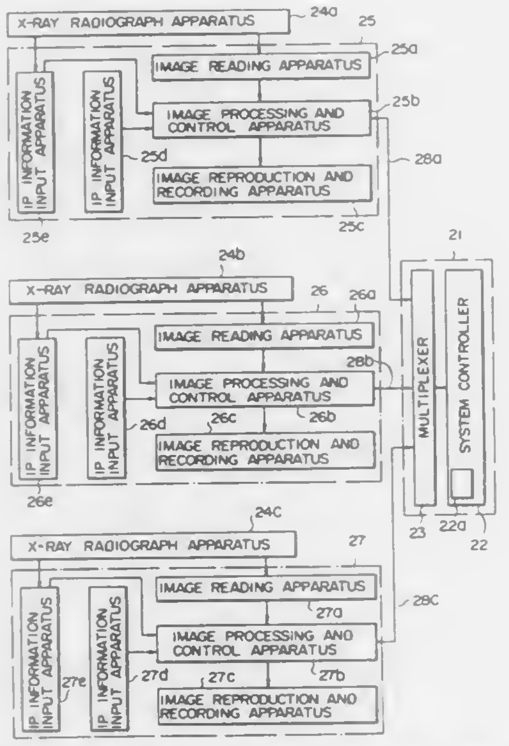
Noboru Takayanagi, Nishinasunomachi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 14, 1988, Ser. No. 257,677

Claims priority, application Japan, Oct. 16, 1987, 62-259626

Int. Cl.^{5} G01N *23/04*

U.S. Cl. 364—413.19 11 Claims


X-RAY RADIOGRAPH APPARATUS
240
25
25a
IMAGE READING APPARATUS
IMAGE PROCESSING AND CONTROL APPARATUS
25b
25d
IMAGE REPRODUCTION AND RECORDING APPARATUS
28a
IP INFORMATION INPUT APPARATUS
IP INFORMATION INPUT APPARATUS
25e
25c
24b
X-RAY RADIOGRAPH APPARATUS
26
26a
28b
26c
26b
26d
26e
21
MULTIPLEXER
SYSTEM CONTROLLER
24c
X-RAY RADIOGRAPH APPARATUS
27
27a
28c
27e
27d
27c
27b
23
22a
22

1. A system for processing radiographic image data corresponding to a subject acquired by a computed radiography technique and additional information corresponding to the radiographic image data, the system comprising:

- a plurality of subsystems for storing additional information corresponding to radiographic image data, and processing radiographic image data in accordance with the corresponding additional information, wherein each of said subsystems includes:
- photographing means for storing a radiographic image data in a storage medium by photographing a subject,
- reading means for reading the stored radiographic image data stored by the photographing means,
- getting means for getting additional information, corresponding to the read radiographic image data,
- image-processing means for image-processing the read radiographic image data and the additional information, and
- reproducing and recording means, including a recording medium, for reproducing the stored radiographic image data image-processed by the image-processing means, and for recording the reproduced radiographic image data in the recording medium; and
- management means for transferring the additional information from the subsystems, for modifying the additional information to identify the subsystems for storing the modified additional information, and for managing the subsystems in accordance with the modified additional information.

5,027,275

METHOD FOR TOE ANGLE ADJUSTMENT FOR A VEHICLE AND A TOE ANGLE ADJUSTING APPARATUS THEREFOR

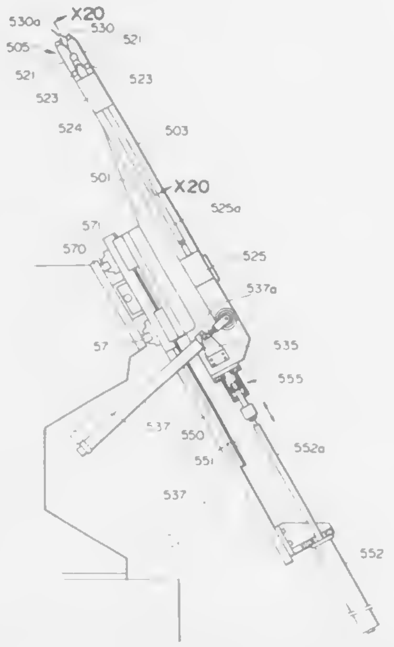
Shunji Sakamoto; Tuyoshi Watanabe, and Hironobu Koda, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Nov. 29, 1988, Ser. No. 277,346

Claims priority, application Japan, Nov. 30, 1987, 62-300193; Dec. 26, 1987, 62-330466; Jan. 14, 1988, 63-4967; Feb. 1, 1988, 63-21778

Int. Cl.^{5} B26D *5/06*

U.S. Cl. 364—424.05 22 Claims



1. A method for adjusting a toe angle of a wheel of a vehicle comprising:

- a step of measuring a first tire angle of each of the front wheels and the rear wheels on the basis of a tire angle measuring unit;
- a step of determining a first toe angle adjusting amount so as to allow a toe angle of the rear wheels to amount to a target toe angle therefor in a relative relationship of one of the rear wheels with the other thereof only by adjusting the toe angle of either one of the rear wheels;
- a step of adjusting a toe angle of either one of the rear wheels on the basis of the first toe angle adjusting amount;
- a step of determining a second tire angle of the rear wheel using the tire angle measuring unit after the toe angle of the rear wheel has been adjusted;
- a step of determining a composite angle of the rear wheels from the second tire angle, the composite angle representing a forward advancing direction of the vehicle, the direction being decided on the basis of a relative relationship of one of the rear wheels with the other thereof;
- a step of converting the first tire angle of the front wheels to a tire angle based on the composite angle of the rear wheels to yield a corrected tire angle therefor;
- a step of detecting a toe angle of the front wheels from the third tire angle thereof;
- a step of determining a second toe angle adjusting amount for the front wheels from the toe angle of the front wheels detected from the corrected tire angle thereof and a target toe angle therefor; and
- a step of adjusting the toe angle of the front wheels on the basis of the second toe angle adjusting amount.

5,027,276

ELECTRIC POWER STEERING DEVICE HAVING A FAIL-SAFE RELAY

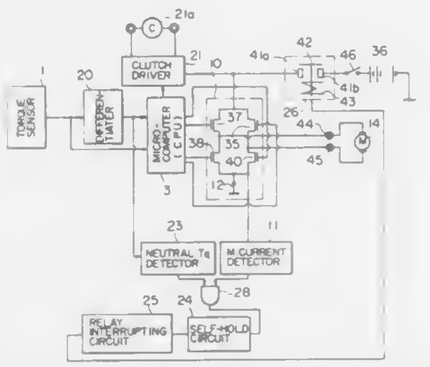
Mitsuharu Morishita; Kosaku Uota, and Takeshi Yasukawa, all of Himeji, Japan, assignors to Mitsubishi Denki K.K., Tokyo, Japan

Filed Apr. 6, 1989, Ser. No. 333,923

Claims priority, application Japan, Apr. 14, 1988, 63-93939

Int. Cl.^{5} B62D *5/04*

U.S. Cl. 364—424.05 4 Claims



1. An electric power steering device for an automotive vehicle which includes a steering wheel operated by an operator of the vehicle, at least one steered wheel, and a steering shaft operatively coupling the steering wheel to the steered wheel, said power steering device comprising:

- an electric motor coupled to the steering shaft to provide an auxiliary torque to the steering shaft of the vehicle;
- a clutch interposed between said electric motor and the steering shaft of the vehicle to connect and disconnect said electric motor to and from the steering shaft;
- torque sensor means for detecting a steering torque of the steering shaft applied by the operator of the vehicle via the steering wheel of the vehicle, said torque sensor means outputting an output signal which is proportional to said steering torque;
- computation means, including a microcomputer coupled to an output of said torque sensor means, for determining a direction and an amount of the auxiliary torque which is to be provided by said electric motor to the steering shaft;
- an electric power source;
- motor driver circuit means, coupled to an output of said computation means, for controlling a current supplied from said electric power source to said electric motor based on the direction and amount determined by said computation means;
- clutch driver circuit means for supplying an electric current from said electric power source to said clutch, thereby energizing said clutch to connect said electric motor to the steering shaft;
- a circuit interruptor relay inserted between said electric power source and said motor driver and clutch driver circuit means;
- neutral torque region detector circuit means coupled to an output of said torque sensor means, for generating, based on the output of said torque sensor means, an output signal when said steering torque is in a neutral torque region in which the auxiliary torque which is to be provided by the electric motor is null;
- motor current detector circuit means, coupled to said motor driver circuit means, for generating an output signal when a current is being supplied to the electric motor from said electric power source via the motor driver circuit means; and
- relay interrupting circuit means, including an AND gate having a pair of inputs coupled to said neutral torque region detector circuit means and said motor current detector circuit means so as to receive inputs directly therefrom, for interrupting said circuit interruptor relay to separate said motor driver and clutch driver circuit means from said electric power source when both output signals of said neutral torque region detector circuit means and motor current detector circuit means are generated.

5,027,277

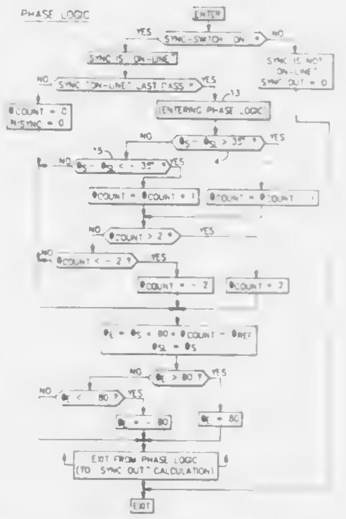
METHOD FOR SYNCHROPHASER MEASUREMENT AND SYNCHROPHASER CONTROL

Roy W. Schneider, Ellington, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Apr. 11, 1989, Ser. No. 336,275

Int. Cl.^{5} B64C *11/50*

U.S. Cl. 364—431.01 11 Claims



1. Apparatus for controlling the relative spatial positioning of blades on different propellers of a multi-engine aircraft of the type having blade pitch control to vary each propeller's blade pitch angle to regulate actual propeller speed in a manner to reduce a difference speed error between an actual speed signal and a propeller reference speed signal, the apparatus controlling blade positioning by adjusting the blade pitch angle of each designated slave propeller to achieve a desired phase angle offset between each slave propeller and a designated master propeller, comprising:

- sensor means, one for each engine, for providing a signal pulse in response to rotation of each propeller blade past a reference point, the real time interval between successive said signal pulses from the master propeller being designated T_M and the real time interval between each master propeller signal pulse and a next succeeding said signal pulse for a slave propeller being designated T_D;
- signal processing means, responsive to said signal pulses from each said sensor means, and having memory means for storing a first executable algorithm for calculating individual phase error signals (ϕ_E), each representative of the difference angular displacement between a reference phase value (ϕ_{REF}) and the actual angular displacement in blade position between the master propeller and each slave propeller, as defined by the equation:

$$\phi_E = \phi_{REF} - \left[\frac{360^\circ}{NP} \times \frac{T_D}{T_M} \right],$$

where NP is equal to the number of propeller blades; and

- signal summing means, for summing each said individual phase error signal with the related propeller reference speed signal to produce a modified difference speed error therefor to adjust each slave propeller's blade pitch angle

VOL 1127 ISS 4 JE 25 1991 UMI

in a manner to reduce the magnitude of each said phase error;

as characterized by the improvement, comprising:

counter means, responsive to each said calculated phase error signal for incrementing a standing count value (ϕ_{COUNT}) by one unit value for each positive value discontinuity occurring in a calculated phase error signal and for decrementing said standing count value for each negative value discontinuity occurring therein; and wherein

said memory means further includes a second executable algorithm for calculating improved accuracy phase error signals as defined by the equation:

$$\phi_E = \phi_{REF} - \left\{ \frac{360^\circ}{NP} \times \frac{T_D}{T_M} + \frac{360^\circ}{NP} \times \phi_{COUNT}; \right.$$

said improved accuracy phase error signals being presented to said signal summing means for summation with the related propeller reference speed signal to produce said modified speed reference speed error.

5,027,278
METHOD OF ENGINE CONTROL TIMED TO ENGINE REVOLUTION

Mikibiko Ohnari, Kokubunji; Teruji Sekozawa, Kawasaki; Motohisa Funabashi, Sagamihara; Takeshi Atago, Katsuta, and Makoto Shioya, Suginami, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

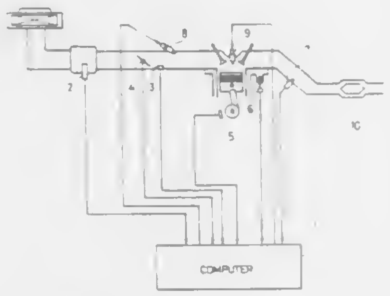
Continuation of Ser. No. 92,613, Sep. 3, 1987, Pat. No. 4,887,216. This application Oct. 27, 1989, Ser. No. 427,373

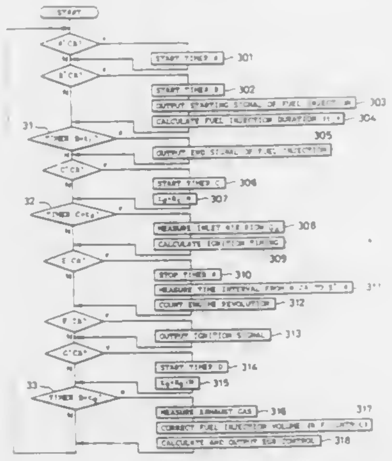
Claims priority, application Japan, Sep. 3, 1986, 61-205994

The portion of the term of this patent subsequent to Dec. 12, 2006, has been disclaimed.

Int. Cl.^{5} F02M *51/00;* F02D *41/04*

U.S. Cl. 364—431.06 76 Claims





50. A system of engine control for an internal combustion engine, comprising a controller which provides for each cylinder of the engine:

means for detecting a plurality of crank angle positions;

means for measuring inlet air volume to a cylinder of an engine upon occurrence of a first reference engine crank angle position measured relative to a predetermined reference point;

means for calculating a value of fuel injection volume corresponding to said measured inlet air volume;

means for supplying a signal representing said value of fuel injection volume, calculated by said means for calculating, to an injector upon occurrence of a second reference engine crank angle position;

means for measuring engine revolution number and exhaust gas content after combustion upon occurrence of respective third and fourth reference engine crank angle positions;

means for identifying combustion characteristics of said cylinder on the basis of said inlet air measured volume and revolution number;

means for correcting said fuel injection volume calculated by said means for calculating following said identifying operation performed by said means for identifying with respect to said identified characteristics and according to an A/F ratio related to said measured exhaust gas content.

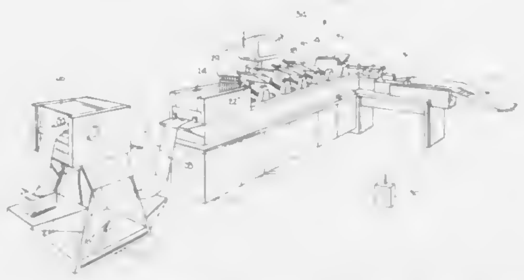
5,027,279
METHOD AND APPARATUS FOR REMOTELY CONTROLLING A DOCUMENT INSERTER

Robert K. Gottlieb, Bridgeport, and Elias B. Haidar, Danbury, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 30, 1988, Ser. No. 292,051

Int. Cl.^{5} G08B *7/06*

U.S. Cl. 364—478 12 Claims



1. In a document inserter having a touch control display screen and a control system for controlling said inserter and said display screen, and wherein said control system comprises means for enabling a plurality of different displays on said display screen, the improvement comprising a portable remote control transmitter for emitting a plurality of control signals, a receiver coupled to said control system for receiving said control signals, and a device for providing an audible alarm, said control system comprising means for controlling said inserter in response to receipt of said control signals by said receiver, only during a predetermined number of displays on said display screen, and said control system comprising means responsive to receipt of a control signal by said signal receiver for energizing said audible alarm device.

5,027,280
MACHINING APPARATUS HAVING A MAIN SPINDLE SUPPORTED BY MAGNETIC BEARINGS

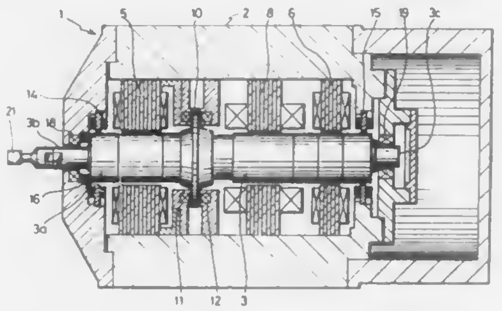
Shigenori Ando, and Ryuji Iijima, both of Narashino, Japan, assignors to Seiko Seiki Kabushiki Kaisha, Japan

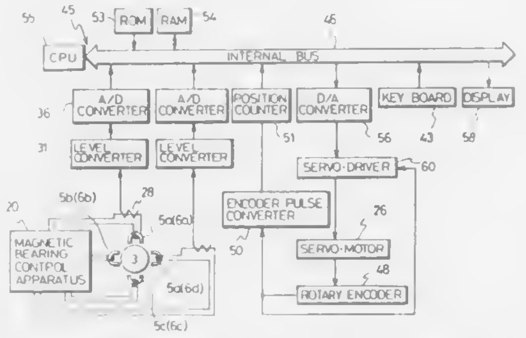
Filed Nov. 1, 1988, Ser. No. 265,689

Claims priority, application Japan, Jun. 11, 1987, 62-280516

Int. Cl.^{5} B24B *5/00*

U.S. Cl. 364—474.16 17 Claims





1. A machining apparatus having a main spindle supported by magnetic bearings, comprising:

a spindle having means at one end thereof for holding a tool;

electromagnets for radially and axially supporting said spindle by magnetic forces without contacting said spindle;

position detecting means for detecting radial and axial position of said spindle;

control means responsive to outputs from said position detecting means for controlling currents flowing in said electromagnets;

current means for measuring current values in at least one of said electromagnets; and

machining control means for controlling at least one controllable variable by controlling current values flowing in said electromagnets according to said measured current values.

5,027,281
METHOD AND APPARATUS FOR SCANNING AND RECORDING OF COORDINATES DESCRIBING THREE DIMENSIONAL OBJECTS OF COMPLEX AND UNIQUE GEOMETRY

Elizabeth D. Rekow, Fridley; Donald R. Riley, Edina; Arthur G. Erdman, New Brighton; Barney Klamecki, Minneapolis; Yang Zhu, St. Paul, all of Minn., and Jeong-Ho Ahn, Seoul, Rep. of Korea, assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Jun. 9, 1989, Ser. No. 364,017

Int. Cl.^{5} G01B *11/24;* G06F *15/46*

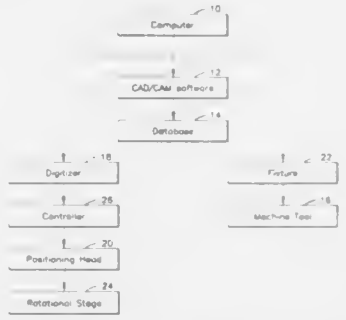
U.S. Cl. 364—474.24 15 Claims

11. A method of fabricating a dental prosthesis, comprising:

(a) digitizing and recording first coordinates from a prepared tooth surface, second coordinates from contact areas with adjacent proximal teeth, and third coordinates from contact areas with opposing teeth in an open position, a static closed position, and in paths of motion during function;

(b) scaling a digitized generic form using gap, height, width, and margin measurements determined from said first and second coordinates, so that said digitized generic form is sized to fit said prepared tooth;

(c) scaling said digitized generic form using mesial-distal measurements determined from said second coordinates, so that a mesial-distal distance between contact areas of said digitized generic form matches a mesial-distal distance between contact areas of said adjacent proximal teeth;



(d) scaling said digitized generic form using occlusal measurements determined from said third coordinates, so that fossae and cusps of said digitized generic form are raised and lowered to match fossae and cusps of said opposing teeth;

(e) resolving interferences in occlusal surfaces of said digitized generic form using relative position measurements between mandible and maxilla teeth determined from said third coordinates; and

(f) fabricating said dental prosthesis based on said digitized generic form.

5,027,282
INTERACTIVE PUMP SYSTEM

Peter W. Hollidge, 46 Rondeau Drive, Willowdale, Ontario, Canada M2H 1R7

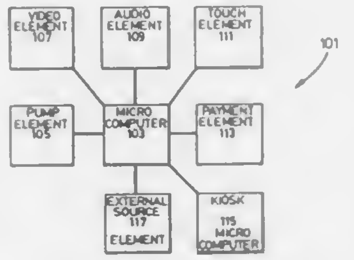
PCT No. PCT/GB88/00651, § 371 Date Dec. 28, 1989, § 102(e) Date Dec. 28, 1989, PCT Pub. No. WO89/00974, PCT Pub. Date Feb. 9, 1989

PCT Filed Aug. 5, 1988, Ser. No. 449,970

Claims priority, application Canada, Aug. 6, 1987, 543862

Int. Cl.^{5} G06F *15/46*

U.S. Cl. 364—479 16 Claims



1. An interactive pump system capable of interacting with and responding to responses from a user, the system comprising;

a pump means;

a central processing unit connected to the pump means; and

a display and input means including a plurality of instruction displays, and being connected to the pump means and the central processing unit;

wherein the pump means is operable to transmit transaction

VOL
1127
ISS
4
JE
25
1991
UMI

data, concerning fluid pumped, to the display and input means which will display the transaction data, display one instruction display, and transfer input responses from a user to the central processing unit, the central processing unit being operable to process the input responses and to control the pump means according to the responses,

characterised in that the central processing unit includes pump task means, display and input task means and application task means, each task means, in operation running concurrently with the other task means, with the pump task means controlling the pump means, the display and input task means controlling the display and input means, and the application task means receiving and processing the input responses and transferring results into pump directions to the pump task means.

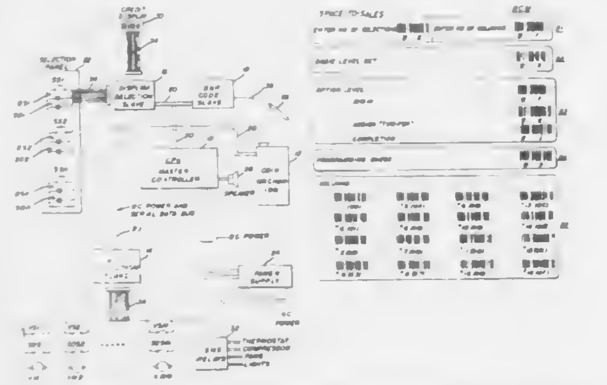
5,027,283
ELECTRONICALLY PROGRAMMABLE SPACE-TO-SALES VENDER

Paul A. Phillips, and Eddie W. King, both of Marietta, Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Filed May 23, 1988, Ser. No. 197,297

Int. Cl.^{5} G06F *15/21, 15/20*

U.S. Cl. 364—479 24 Claims



1. A vending machine having programmable product specific storage space to accommodate product specific sales rates comprising:

A) a plurality of product storage means for storing vendable products;

B) product selection means for selectively designating which of a plurality of products are to be dispensed from said product storage means;

C) central processing means responsive to said product selection means for generating a vend signal corresponding to each product designated by said product selection means;

said central processing means including code responsive means for programming said central processing means;

D) vend control means for each of said product storage means for selectively vending product therefrom in response to a corresponding said vend signal; and

E) encoding means for inputting encoded designations of product and product associated product storage means into said central processing means to constrain said central processing and vend control means to vend a product designated by said selection means from those product storage means designated by said encoding means,

said encoding means including an encoding menu means of a visible readable menu of codes for enabling said encoding means to input to said vend control means the number of products and the number of product storage means assignable to the products in a given machine, and assignment instructions for designating which of said product storage means are assigned to which of the products.

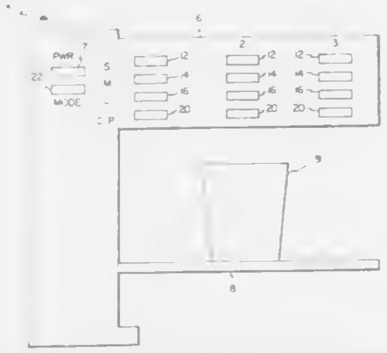
5,027,284
AUTO-SET DRINK DISPENSER

Karl A. Senghaas; Peter Senghaas, and Jerzy Michalec, all of San Antonio, Tex., assignors to The Cornelius Company, Anoka, Minn.

Filed Mar. 28, 1989, Ser. No. 329,754

Int. Cl.^{5} G06F *15/24;* **B67D** *5/14*

U.S. Cl. 364—479 40 Claims



40. A control system for controlling a drink dispenser, comprising:

a mode switch for selecting program and dispense modes of operation;

a plurality of dispenser buttons, each corresponding to a different desired drink volume, for causing the desired drink volume to be dispensed, in the program mode, by causing activation of the dispenser until a main drink volume is dispensed, de-activation of the dispenser until drink foam settles and re-activation of the dispenser until a top-off drink volume is dispensed, and for causing the desired drink volume to be dispensed during the dispense mode;

a volumetric parameter generator for providing volumetric parameter data representative of dispensed drink volume;

memory means for storing the volumetric parameter data; and

a controller, coupled to the dispenser buttons, the mode switch, the volumetric parameter generator and the memory means, for causing volumetric parameter data, representative of the drink volume dispensed during the program mode in response to activation of the dispenser by each dispense button, to be stored in the memory means and for causing drink volume to be dispensed as a function of the stored volumetric parameter data in response to activation of a dispense button in the dispense mode.

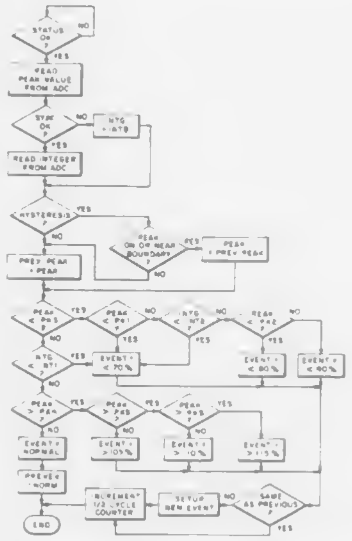
5,027,285
POWER LINE WAVEFORM MEASUREMENT SYSTEM

Andrew McCartney, Libertyville; Charles DeWitt, Park Ridge, and William Elliott, Hawthorn Woods, all of Ill., assignors to Oneac Corporation, Libertyville, Ill.

Filed Feb. 28, 1989, Ser. No. 316,936

Int. Cl.^{5} G06F *15/56*

U.S. Cl. 364—483 17 Claims



1. An AC waveform monitoring system comprising:

detecting means for providing a sensed analog signal;

oscillator means coupled to said detecting means for generating a zero crossing signal; said oscillator means including means for synchronizing said zero crossing signal with a frequency of said sensed analog signal and means for generating a control signal representing nonsynchronous operation with said generated zero crossing signal during a power outage;

signal processing means coupled to both said detecting means and said oscillator means for identifying a peak voltage value of said sensed analog signal responsive to said zero crossing signal, said signal processing means including voltage integrating means for identifying an integral volt-seconds value of said sensed analog signal responsive to said zero crossing signal; and

digital processing means coupled to said signal processing means and said oscillator means for receiving said identified peak voltage value and said identified integral volt-second value, said digital processing means including memory means for storing a plurality of predetermined voltage boundary signal values; and program means utilizing said received peak voltage value, said received integral volt-second value and said stored predetermined signal values responsive to said zero crossing signal for identifying the presence of one of a plurality of predefined abnormal voltage events.

5,027,286
PERIPHERAL CONTROL DEVICE

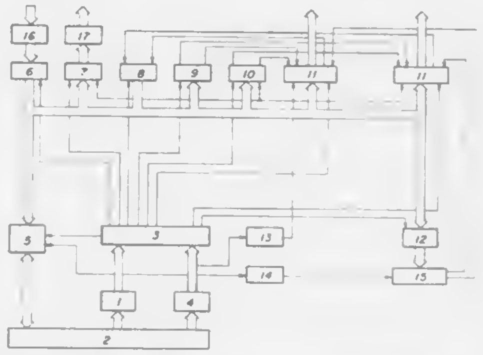
Lyuben P. Atanassov; Yanko A. Kolenzov; Decho I. Vulev; Ivan S. Primov; Peter G. Spassov; Svetlosar K. Kanalev, all of Plovdiv; Dimo P. Andonov, Sofia; Angel V. Yankov, and Nikolay G. Dilkin, both of Plovdiv, all of Bulgaria, assignors to Institute "Kompleksna Avtomatisazia na Montaja", Plovdiv, Bulgaria

Filed Aug. 16, 1989, Ser. No. 395,111

Claims priority, application Bulgaria, Aug. 16, 1988, 85259

Int. Cl.^{5} G06F *15/00*

U.S. Cl. 364—513 4 Claims



1. A peripheral control device for controlling the movements of a robot with a microprocessor, said robot having a plurality of stepper motors and sensors, said peripheral control device comprising:

an address buffer and a decoder, the inputs of said address buffer being connected to the address buses of said microprocessor, and the outputs of the address buffer being connected to the inputs of said decoder;

a control buffer, the outputs of said control buffer being connected to second inputs of the decoder, the inputs of the control buffer being connected to the control buses of the microprocessor;

a bidirectional buffer, the write-read signal from the outputs of the control buffer being connected to the direction control input of the bidirectional buffer and the enable input of the bidirectional buffer being connected to an output of the decoder;

the data buses of the microprocessor being connected bidirectionally to the inputs/outputs of the bidirectional buffer;

a first register and a second register, the second inputs/outputs of the bidirectional buffer being connected to the outputs of said first register and to parallel data inputs of said second register;

a second output of the decoder being connected to the write-enable input of the first register, and a third output of the decoder being connected to the write input of the second register;

a third, fourth, fifth and sixth register and n-number of stepper motor control units, each stepper motor control unit having inputs for clock, parallel data, loading, reset, direction and motion and outputs for ready;

the second inputs/outputs of the bidirectional buffer being connected also to the outputs of said third register, to the parallel data inputs of said fourth register, to the parallel data inputs of said fifth register, to the parallel data inputs of n stepper motor control units. and to the parallel data inputs of said sixth register;

a fourth output of the decoder being connected to the write-enable input of the third register, a fifth output of the decoder being connected to the write input of the fourth register, a sixth output of the decoder being connected to the write input of the fifth register, a seventh output of the decoder being connected to a loading input of the first stepper motor control unit, an n+6th output of said de-

VOL
1127
ISS 4
JE
25
1991
UMI

coder being connected to the loading input of the n-th stepper motor control unit, an n+7th output of said decoder being connected to the write input of the sixth register;

an initial setting circuit, the reset signal from the outputs of the control buffer being connected to the input of the initial setting circuit, the output of the initial setting circuit being connected to the reset inputs of the second and fifth registers and of the first and of the n-th stepper motor control unit;

a monostable multivibrator and a programmable counter, the clock signal from the outputs of the control buffer being connected to the input of said monostable multivibrator;

the output of the monostable multivibrator being connected to the counting input of said programmable counter, the inputs of the programmable counter being connected to the outputs of the sixth register and a first output of the programmable counter being connected to the clock input of the first stepper motor control unit, and an n-th output of the programmable counter being connected to the clock input of the n-th stepper motor control unit;

an output of the fourth register being connected to the direction input of the first stepper motor control unit and an n-th output of the fourth register being connected to the direction input of the n-th stepper motor control unit;

an output of the fifth register being connected to the movement input of the first stepper motor control unit, and an n-th output of the fifth register being connected to the movement input of the n-th stepper motor control unit;

a ready output of the first stepper motor control unit being connected to an input of the third register and the n-th input of the third register being connected to the ready output of the n-th stepper motor control unit;

the control outputs of the first stepper motor control unit being connected to the windings of the first stepper motor of the robot, and the control outputs of the n-th stepper motor control unit being connected to the windings of the n-th stepper motor of the robot; and

a signal shaper, the sensors being connected to the inputs of said signal shaper, the outputs of said signal shaper being connected to the inputs of the first register.

5,027,287

DEVICE FOR THE DIGITAL PROCESSING OF IMAGES TO OBTAIN SPECIAL GEOMETRICAL EFFECTS

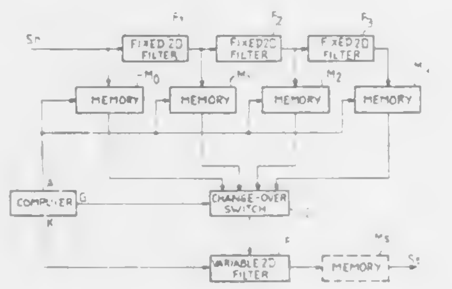
Max Artigalas, Le Chesnay, and Jean-Luc Grimaldi, Ermont, both of France, assignors to Thomson Video Equipement, Cergy Saint Christophe, France

Filed Jun. 6, 1989, Ser. No. 362,349

Claims priority, application France, Jun. 7, 1988, 88 07541

Int. Cl.⁵ G06F *15/66;* **H04N** *9/74*

U.S. Cl. 364—518 3 Claims



1. A digital processing device for obtaining special geometrical effects from an original image formed by digital signals representing points distributed along the intersections of a rectangular grid formed by rows and columns, said device comprising an image memory (MO) to preserve the original image, a two-dimensional filter (F) with variable characteristics and a computer to control, as a function of a pre-established conversion grid, and as a function of the compression factors of this conversion grid, the computation, by the filter, of the digital values to be assigned to the intersections of the conversion grid, said device also comprising n, where n is a whole number at least equal to 1, auxiliary two-dimensional filters, with fixed characteristics, placed in series and each having one output, where the first auxiliary filter in the series receives the digital signals of the original image, n memories (M1–M3) respectively connected to the outputs of the n auxiliary filters and a change-over switch 2 to switch one of the n+1 memories (M0–M3) over to the filter with variable characteristics F, with the computer activating the change-over switch as a function of the compression factors G of the conversion grid.

5,027,288

RECORDING APPARATUS

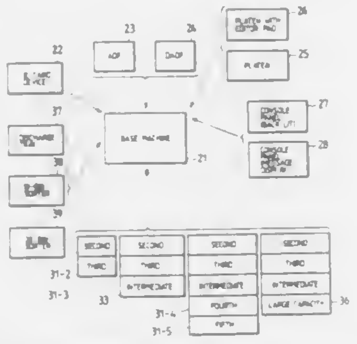
Takanobu Suzuki, and Tsutomu Furusawa, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Division of Ser. No. 206,850, Jun. 15, 1988. This application Nov. 21, 1989, Ser. No. 439,946

Claims priority, application Japan, Jun. 15, 1987, 62-147159; Jun. 15, 1987, 62-147160; Jun. 15, 1987, 62-147161; Sep. 2, 1987, 62-217898

Int. Cl.⁵ G06K *15/00*

U.S. Cl. 364—519 12 Claims



1. A recording apparatus, comprising:

reading means for reading, from a portable storage medium, function data for controlling various functions of said recording apparatus;

function data converting means for converting said function data into feasible data in accordance with functional capabilities of said recording apparatus; and

recording means for recording image data in accordance with said feasible data.

5,027,289

METHOD AND DEVICE FOR CONTROLLING A PLOTTER

Junichi Sugimoto, Iwatsuki, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Jan. 6, 1989, Ser. No. 294,171

Claims priority, application Japan, May 11, 1988, 63-114479

Int. Cl.⁵ G11B *5/00*

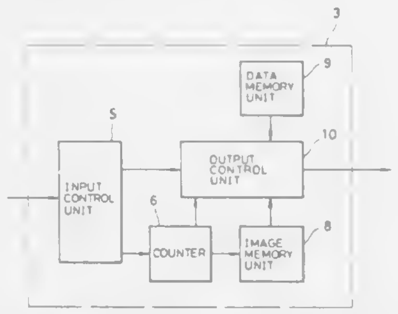
U.S. Cl. 364—520 6 Claims

1. A control method of a plotter for controlling outputting operation of the plotter according to inputted image data and inputted output control data with respect to an output-request size and an output-request number of paper, comprising the steps of:

reading out a range of values representing a predetermined amount of image data, which is uniquely defined for the inputted data with respect to the output-request size;

comparing the read out range of the values representing the predetermined amount of the image data with a value representing an amount of the inputted image data, and

when the value representing the amount of the inputted image data exceeds the read out range of the values representing the predetermined amount of the image data, determining that the inputted output control data are incorrect; and



when the inputted output control data are incorrect, transferring to the plotter, in place of the inputted output control data, an output control data preset as default values which controls to output an image on a sheet of a smallest paper usable for the plotter.

5,027,290

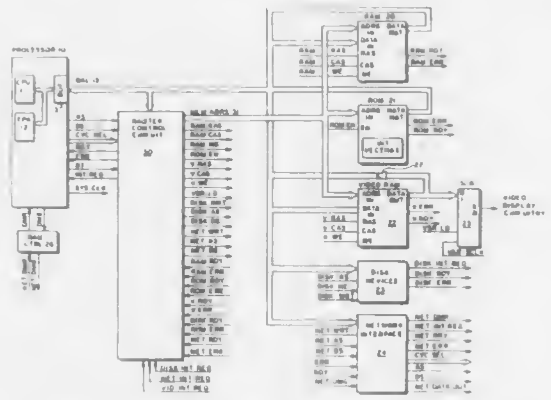
COMPUTER WORKSTATION INCLUDING VIDEO UPDATE ARRANGEMENT

John Kirk, Boxboro, and George H. Lord, Stow, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 303,109, Jan. 25, 1989, abandoned, which is a continuation of Ser. No. 55,106, May 28, 1987, abandoned. This application Oct. 17, 1989, Ser. No. 423,726

Int. Cl.⁵ G06F *15/62*

U.S. Cl. 364—521 27 Claims



5. A digital computer system, comprising:

memory means for storing digital information in a plurality of addressable storage locations, said information including program data stored in program data storage locations and video data stored in video data storage locations;

address receiving means, including in said memory means, for receiving an address identifying a storage location;

memory control signal receiving means, included in said memory means, for receiving memory control signals;

video means, operatively coupled to said memory means, for receiving video data from said memory means for display;

a plurality of memory utilization means, operatively coupled to said memory means, for transferring information to and from said memory means;

arbitration means, operatively coupled to said plurality of memory utilization means, for enabling one of said memory utilization means to initiate an information transfer with said memory means;

global timing means for generating a global timing signal;

memory control means, operatively coupled to said memory means and said plurality of memory utilization means, for controlling access by said plurality of memory utilization means to said memory means, and for controlling said memory means to transfer the video data stored in a predetermined portion of said video data storage locations to said video means;

wherein said memory control means includes

video address generating means for generating a video address that identifies the predetermined portion of said video data storage locations that contain video data to be transferred to said video means,

coupling means, operatively coupled to said video address generating means and said address receiving means, for coupling the video address generated by said video address generating means to said address receiving means,

video timer means, operatively coupled to receive the global timing signal, for generating a video transfer enable signal, and

control circuit means, responsive to said video transfer enable signal and operatively coupled to said video address generating means, said coupling means, said memory means, and said video means, for providing a first control signal to cause said memory means to transmit to said video means the video data stored at the predetermined portion of said video data storage locations identified by the video address generated by said video address generating means, for providing a second control signal to cause said video means to receive the video data, and for inhibiting access by said memory utilization means to said memory means while video data is transferred from said memory means to said video means.

5,027,291

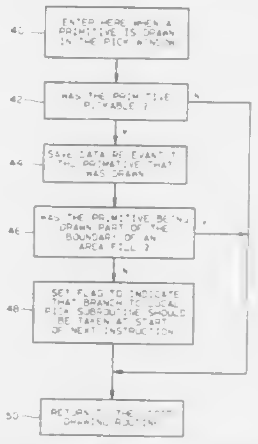
APPLICATION EXIT FOR POTENTIALLY PICKABLE PRIMITIVES IN A GRAPHICS SYSTEM

Robert M. Callahan, Woodstock, and Bruce C. Hempel, Tivoli, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 24, 1987, Ser. No. 124,726

Int. Cl.⁵ G09G *1/00;* **G06F** *15/62*

U.S. Cl. 364—521 7 Claims


40
ENTER HERE WHEN A PRIMITIVE IS DRAWN IN THE PICK WINDOW
42
WAS THE PRIMITIVE PICKABLE ?
44
SAVE DATA RELEVANT TO THE PRIMITIVE THAT WAS DRAWN
46
WAS THE PRIMITIVE BEING DRAWN PART OF THE BOUNDARY OF AN AREA FILL ?
48
SET FLAG TO INDICATE THAT BRANCH TO LOCAL PICK SUBROUTINE SHOULD BE TAKEN AT START OF NEXT INSTRUCTION
50
DRAWING ROUTINE

4. A method for enabling application-specific processing when one of a plurality of graphics drawing instructions draws a drawn graphics object to intersect an operator defined selection region on a computer graphics display system having a processor and a display device, said drawn graphics object defined by said drawing instruction to be either "pickable primitive" or a "non-pickable primitive", said method comprising the steps of:

providing a plurality of application-specific drawing instructions;

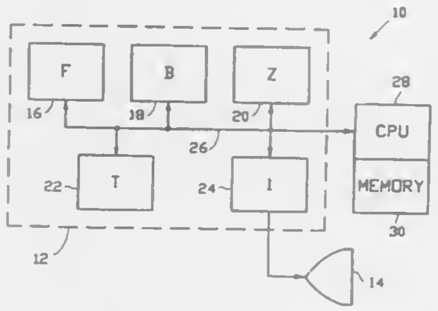
VOL
1127
ISS
4
JE
25
1991
UMI

generating said drawn graphics object from said graphics drawing instruction;
testing, without operator intervention, said drawn graphics object to determine whether said object intersects said operator defined selection region; if said object intersects said region, processing said plurality of application-specific drawing instructions;
processing a next one of said plurality of graphics drawing instructions;
repeating the above steps of generating, testing, and processing application-specific drawing instructions for each of said plurality of graphics drawing instructions.

5,027,292
MULTIPLE DEPTH BUFFERS FOR GRAPHICS AND SOLID MODELLING

Jaroslaw R. Rossignac, Ossining; David A. Epstein, New York; Nader Gharachorloo, Ossining; Frederik W. Jansen, North Tarrytown, and Christos S. Zoulas, Ithaca, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 19, 1989, Ser. No. 340,322
Int. Cl.^{5} G06F *3/153*
U.S. Cl. 364—522 18 Claims



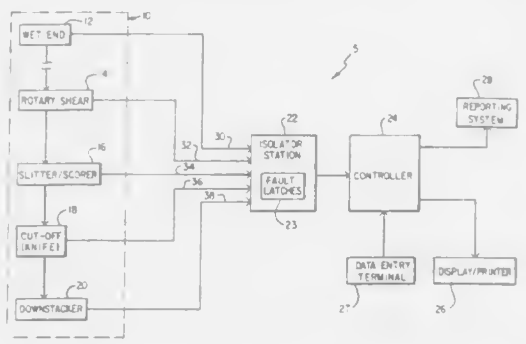
1. Apparatus for displaying a solid represented by a Constructive Solid Geometry (CSG) tree structure, the solid (S) having, relative to a viewpoint, front and back faces disposed along a z-axis which is substantially parallel to a line-of-sight from the viewpoint, comprising:
means for determining from the CSG tree structure at least one z-connected product associated with S;
first z-buffer means (F) for storing a depth representation of a front face associated with the determined z-connected product; and
second z-buffer means (B) for storing a depth representation of a back face associated with the determined z-connected product.

5,027,293
METHOD AND APPARATUS FOR ANALYZING MACHINE CONTROL SYSTEMS

David G. Pung, Minnetonka, and Alan D. Carty, Eden Prairie, both of Minn., assignors to Alliance Technical Services, Inc., Chaska, Minn.

Filed Feb. 3, 1989, Ser. No. 306,876
Int. Cl.^{5} G06F *15/46;* **B65H** *7/00, 26/00*
U.S. Cl. 364—550 73 Claims

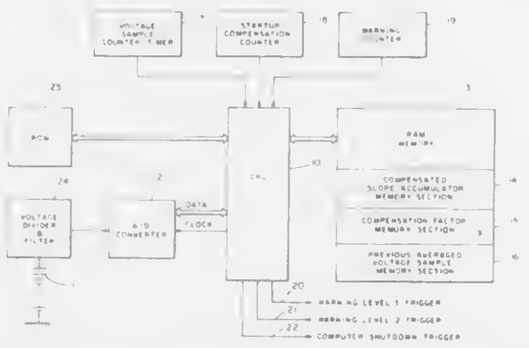
1. A diagnostic system for analyzing conditions of critical points in a corrugator and for generating an operator message based on the conditions, the diagnostic system comprising:
sensing means for sensing the conditions of the critical points in the corrugator and for generating critical point signals representative of the conditions of the critical points;
isolator means having an input port and an output port for receiving the critical point signals generated by the sensing means at the input port, and for generating logic signals representative of the critical point signals at the output port, the output port being isolated from the input port by the isolator means; and
controller means for receiving the logic signals generated by the isolator means and for generating an operator message based on the logic signals wherein the controller means includes:
first fault detection means for prioritizing faults to detect a first fault representing the condition of the particular critical point which caused the corrugator to stop running; and
current condition detection means for periodically detecting a current condition representing whether the corrugator is in a ready to run state or in a most critical fault condition state wherein a most critical fault condition is identified which must be remedied to start the corrugator.



5,027,294
METHOD AND APPARATUS FOR BATTERY-POWER MANAGEMENT USING LOAD-COMPENSATION MONITORING OF BATTERY DISCHARGE

Saifee Fakruddin, St. Joseph, and Mark J. Foster, Stevensville, both of Mich., assignors to Zenith Data Systems Corporation, Mt. Prospect, Ill.

Filed Jan. 27, 1989, Ser. No. 303,604
Int. Cl.^{5} G01R *29/00;* **G08B** *21/50*
U.S. Cl. 364—550 67 Claims

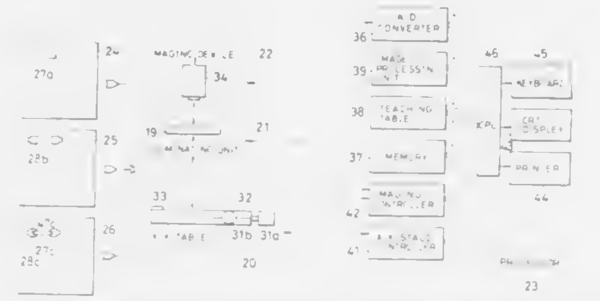

VOLTAGE SAMPLE COUNTER TIMER
STARTUP COMPENSATION COUNTER
18
WARNING COUNTER
19
ROM
RAM MEMORY
COMPENSATED SLOPE ACCUMULATOR MEMORY SECTION
COMPENSATION FACTOR MEMORY SECTION
PREVIOUS AVERAGED VOLTAGE SAMPLE MEMORY SECTION
VOLTAGE DIVIDER & FILTER
A/D CONVERTER
DATA
CLOCK
20
WARNING LEVEL 1 TRIGGER
21
WARNING LEVEL 2 TRIGGER
22
COMPUTER SHUTDOWN TRIGGER

2. Apparatus for managing a battery power supply connected to a load device using compensation for the rate of change of discharge voltage with respect to the elapse of time, comprising:
first means for generating a voltage-discharge value responsive to the rate of change of battery discharge voltage with respect to the elapse of time;
second means for generating a compensation-factor value which is generally numerically different from the voltage-discharge value;
third means for generating a compensated voltage-discharge value responsive to both the voltage-discharge value and the compensation-factor value wherein the battery power supply is characterized by normal voltage-discharge curve with the power supply fully charged having a startup voltage depression section under load, and in which the absolute value of the compensation-factor value during at least the initial portion of the startup voltage depression is numerically several times greater than the absolute value of the voltage-discharge value during the same period; and
means responsive to said third generating means for initiating a shutdown of said load device under predetermined conditions.

5,027,295
APPARATUS FOR INSPECTING PACKAGED ELECTRONIC DEVICE

Teruhisa Yotsuya, Kyoto, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Division of Ser. No. 104,149, Oct. 5, 1987, Pat. No. 4,953,100. This application May 9, 1990, Ser. No. 513,227
Claims priority, application Japan, Oct. 3, 1986, 61-236499; Oct. 30, 1986, 61-256994; Oct. 30, 1986, 61-256995
Int. Cl.^{5} G06F *15/46*
U.S. Cl. 364—552 8 Claims



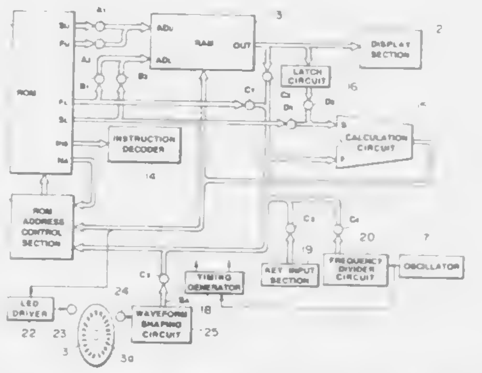
3. A component-mounted printed circuit board inspecting apparatus, comprising:
image taking means for producing color images of a bare printed circuit board and a component-mounted printed circuit board;
land extracting means for extracting conductor lands on which components are to be mounted from said images produced by the image taking means and for obtaining geometrical data of the conductor lands;
positional relation determining means for determining positional relationships between the lands of the component-mounted board and components mounted thereon on the basis of said geometrical data obtained by the land extracting means; and
decision means for deciding if placement of at least one of the components is within a predetermined range of permissible positional deviation based on said positional relationships obtained by the positional relation determining means.

5,027,296
LENGTH MEASURING APPARATUS

Shuji Yamaguchi, Tachikawa, and Atsuko Shimizu, Akishima, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Jun. 28, 1989, Ser. No. 373,157
Claims priority, application Japan, Jul. 4, 1988, 63-88878[U]; Jul. 6, 1988, 63-89729[U]
Int. Cl.^{5} G01B *11/02;* **G06F** *7/00*
U.S. Cl. 364—562 5 Claims

1. A map meter apparatus, comprising:
length-signal output means for outputting a signal corresponding to a length of a course to be measured;
scale-reduction data memory means for storing scale-reduction data;
unit-data memory means for storing a plurality of unit data of length;
unit-data selecting means for selecting one of the unit data stored in said unit-data memory means;
calculation means coupled to said length-signal output means, to said scale-reduction data memory means and to said unit-data selecting means, for obtaining distance data expressed in the unit data selected as a unit of length;
data memory means having a plurality of distance-data memory areas for storing distance data and a plurality of unit-data memory areas for storing unit data;
addressing means for addressing one of the distance-data memory areas and the unit-data memory areas of said data memory means;
externally operated switching means;
judging means for judging if distance data has been obtained by said calculating means, when said externally operated switching means is operated;



data memory control means for storing the distance data obtained by said calculation means and the unit data selected by said unit-data selecting means in the distance-data memory area addressed by said addressing means and in the unit-data memory area addressed by said addressing means respectively, when said judging means judges that distance-data has been obtained, and for executing renewal of addressing by said addressing means to address the next distance-data memory area, and not executing renewal of addressing by said addressing means to address the distance-data memory area when said judging means judges that no distance-data has been obtained; and
display means for successively reading out and displaying the distance data and the unit data stored in the data memory means when said data-memory control means successively executes renewal of addressing by said addressing means to address the next distance-data memory area.

5,027,297
SYSTEM FOR TIME STAMPING EVENTS USING A REMOTE MASTER CLOCK

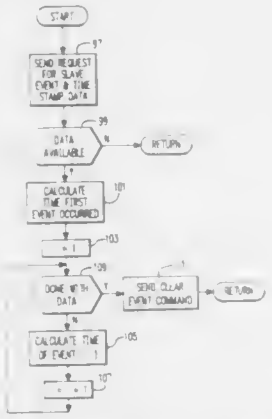
James P. Garitty, Coral Springs, and Thomas M. Yocom, N. Lauderdale, both of Fla., assignors to ABB Power T & D Company Inc., Blue Bell, Pa.

Filed Sep. 29, 1989, Ser. No. 414,999
Int. Cl.^{5} G04F *10/00*
U.S. Cl. 364—569 16 Claims

1. A system for time-stamping events using a remote master clock, said system comprising:
a slave station including:
detection means detecting the occurrence of a predetermined event;
pulse generating means generating clocking pulses at predetermined timed intervals; and
counting means responsive to detection by said detection means of said predetermined event to initiate a count of said clocking pulses;

VOL
1127
ISS
4
JE
25
1991
UMI

communications means transmitting said count in response to a send command;
means generating said send command; and
a master station including:
a master clock maintaining absolute time; and
processing means responsive to said master clock and said count transmitted by said communications means for

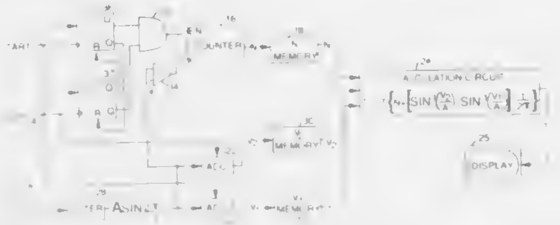


calculating an absolute time at which said predetermined event occurred from said count, the absolute time maintained by the master clock, the predetermined time interval between clocking pulses, and a transmission time representing the time required for transmission of said count from said slave station to said master station over said communication means.

5,027,298
LOW-DEAD-TIME INTERVAL TIMER

Moses Khazam, Lexington, Mass., assignor to GenRad, Inc., Concord, Mass.

Filed Jun. 29, 1989, Ser. No. 373,993
Int. Cl.⁵ G04F *8/00;* **G06F** *15/20*
U.S. Cl. 364—569 **28 Claims**

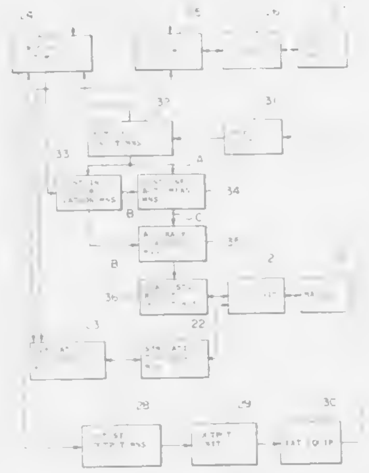


9. For measuring the duration of an interval defined by a start trigger and a stop trigger, an apparatus comprising:
A) a clock for generating pulses that occur with a predetermined frequency;
B) a reference-signal source providing at least one temporally sinusoidal reference signal synchronous with the clock signal;
C. means for receiving the start and stop triggers;
D) analog-to-digital-converter means, responsive to the means for receiving start and stop triggers, for receiving the at least one reference signal and measuring values thereof at the occurrences of the start and stop triggers and generating converter outputs representative thereof;
E) a counter for counting the number of pulses of the clock signal that occur between the start and stop triggers and generating a counter output representative thereof; and
F) calculation means, responsive to the converter and counter outputs, for applying inverse trigonometric functions to the converter outputs, making a determination of the difference between the phase at the start trigger and the phase at the stop trigger of each said reference signal, computing the duration of the time interval between the start trigger and the stop trigger from the counter output and the determined phase difference, and generating a duration signal representative of the time interval.

5,027,299
ELEVATOR TESTING APPARATUS

Kenichi Uetani, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Aug. 1, 1989, Ser. No. 388,017
Claims priority, application Japan, Aug. 4, 1988, 63-195201; Sep. 2, 1988, 63-218264
Int. Cl.⁵ B66B *3/00;* **G05B** *19/02*
U.S. Cl. 364—580 **2 Claims**

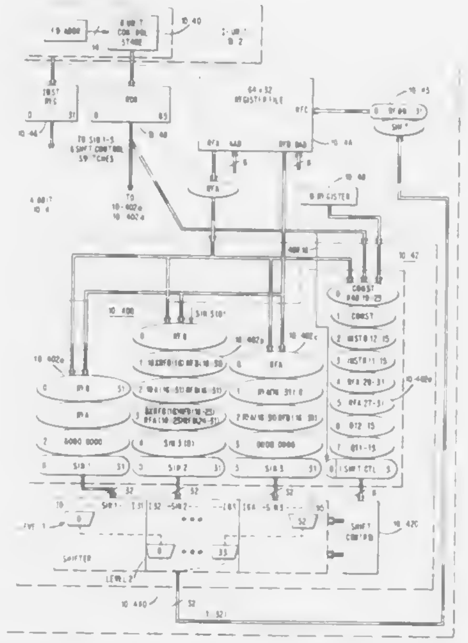


1. A group-supervision control apparatus for an elevator system comprising:
a microprocessor including memory having stored control programs providing group-supervision control of elevator cages including selecting cages from among a plurality of cages, in response to signals from hall call buttons for calling the cages and destination call buttons and on the basis of control information including calculated predictive-information values, and causing the selected cages to travel to destination floors; and
an elevator operation testing apparatus having a processor and memory including stored simulation test operation programs which direct the cages to execute test operations that simulate normal operations of the cages under group-supervision control, said testing apparatus providing:
group-supervisory predictive-information holding means for selecting and holding group-supervisory predictive-information values generated during an executed test operation under group-supervision control;
group-supervisory information actual-measurement means for measuring actual values which correspond to predictive values held in said group-supervisory predictive-information holding means; and
predictive-information accuracy diagnostic means for comparing held predictive values and corresponding measured actual values and for obtaining diagnostic results representing the presence of an abnormality revealed by the comparing.

5,027,300
TWO LEVEL MULTIPLEXER CIRCUIT SHIFTER APPARATUS

Glenn P. Kosteva, Nashua, N.H.; Peili Lin, Malden; Michel M. Raquin, Medford, both of Mass., and Raymond C. Robidoux, Derry, N.H., assignors to Bull HN Information Systems Inc., Billerica, Mass.

Filed Dec. 20, 1989, Ser. No. 453,559
Int. Cl.⁵ G06F *7/38*
U.S. Cl. 364—715.08 **23 Claims**

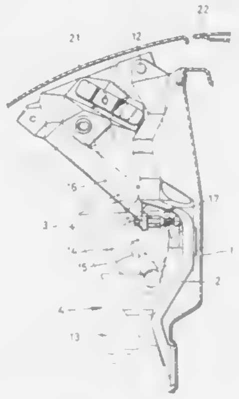


1. Shifting apparatus for performing a variety of shifts on an operand comprising:
a first stage of multiplexer circuit means including input means, output means and control means, said input means being connected for receiving a number of sets of operand signals corresponding to said operand to be shifted;
a second stage of multiplexer circuit means including input means, output means and control means, said input means being connected to said output means of said first stage of multiplexer circuit means; and,
shift control circuit means having input means and a pair of output means, said input means being connected to receive a set of control signals representative of the number of shifts to be performed, a different one of said pair of output means being connected to said control means of said first and second multiplexer circuit means, said shifting control circuit means in response to said set of control signals generating first and second sets of signals at said pair of output means, each set of signals being coded to specify a shift direction and one of a number of shift positions, said first stage multiplexer circuit means selecting as outputs, input operand signals specified by said first set of coded signals corresponding to said operand shifted by a first number of shift positions in a specified shift direction and said second stage multiplexer circuit means selecting as outputs, said shifted operand outputs from said first stage multiplexer circuit means specified by said second set of coded signals corresponding to said shifted operand shifted by a second number of shift positions in a specified shift direction, a result of algebraically summing said first and second number of shift positions in said specified shift directions providing at said second stage multiplexer output means, said operand shifted by said required number of shifts within a single cycle of operation.

5,027,301
RETRACTABLE HEAD LAMP DEVICE AND A METHOD FOR ASSEMBLING THE SAME

Katsura Inoue, Nagoya; Kenichi Fukura, Toyota; Masakatsu Tajima, Toyota; Toru Iwamura, Toyota, and Masatoshi Ohshiro, Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Jun. 7, 1990, Ser. No. 533,136
Claims priority, application Japan, Jun. 12, 1989, 1-148773
Int. Cl.⁵ B60Q *1/06*
U.S. Cl. 362—66 **6 Claims**

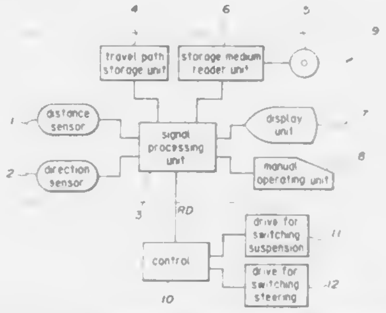


1. A retractable head lamp device including:
a fixed bracket fixed to a vehicle body;
a drive structure including motor and operating rod, the drive structure being fixed to the fixed bracket;
a movable bracket having a head lamp therein rotatably mounted on the fixed bracket and is movable between a retracted and a projected position of the head lamp by the operation of the motor of the drive structure; and
a stopper means for positioning the retracted position of the movable bracket, the stopper means being provided on the fixed bracket and including a bolt portion, and flange portion on which the movable bracket is engaged when the movable bracket is in the retracted position to define the retracted position thereof.

5,027,302
DEVICE FOR SWITCHING VEHICLE OPERATING CHARACTERISTICS

Nobuyoshi Asanuma; Shinnosuke Ishida, and Hiroshi Hasegawa, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 10, 1989, Ser. No. 392,086
Claims priority, application Japan, Aug. 10, 1988, 63-199612
Int. Cl.⁵ B60G *17/00*
U.S. Cl. 364—424.05 **6 Claims**



1. A device for switching operating characteristics of a vehicle, comprising:
means for storing road information concerning a kind of a road on a travel path of the vehicle;

VOL
1127
ISS
4
JE
25
1991
UMI

means for detecting the kind of road on which the vehicle is running including a navigation system in which a position of the vehicle on X-Y coordinates is found by an arithmetic operation, while detecting a running distance and a running direction of the vehicle, and a current position of the vehicle is displayed on a road map having the same X-Y coordinates,

means for producing an output of predetermined road information from said means for storing road information depending upon the detected kind of road at said current position of the vehicle displayed on the road map; and

means for effecting switching of the vehicle operating characteristics in accordance with said output of predetermined road information.

5,027,303

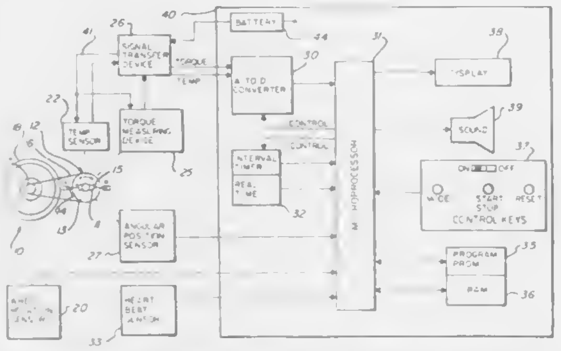
MEASURING APPARATUS FOR PEDAL-CRANK ASSEMBLY

Don C. Witte, 155 Logan Mill Road, Boulder, Colo. 80302

Filed Jul. 17, 1989, Ser. No. 381,110

Int. Cl.^{5} G01L *5/02;* A61B *5/02*

U.S. Cl. 364—511 **30 Claims**



1. Apparatus for measuring selected output parameters of a user of a power-using device comprising:

a power-using device having a frame and a pedal-crank assembly with relative rotation between said pedal-crank assembly and said frame being provided by the user,

torque measuring means mounted on said pedal-crank assembly providing first plurality of electric signals proportional to torque generated by said user in rotating said assembly,

angular position sensing means providing second plurality of electric signals indicating selected angular positions of said assembly as said assembly is rotated by the user, said angular positions being equiangular,

timing means providing third plurality of electric signals proportional to real time,

transfer means for transferring said first electric signals between said rotating assembly and a programmed microprocessor means on said frame,

said programmed microprocessor means on said power-using device and responsive to said first, second and third signals for:

determining a value of torque at each of said equiangular positions as said assembly is rotated by said user and in response to said first and second electric signals,

determining a value of a time interval between two selected angular positions of said assembly as said assembly is rotated by the user in response to said second and third electric signals,

performing an approximate integration of said values of torque over said two selected angular positions to provide a value of work done by the user in rotating said assembly through said two selected angular positions,

dividing said value of work by said value of the time interval to provide a value of power provided by said user during said time interval, and

readout means on said power-using device responsive to outputs from said programmed microprocessor means to display said torque, work and power values.

5,027,304

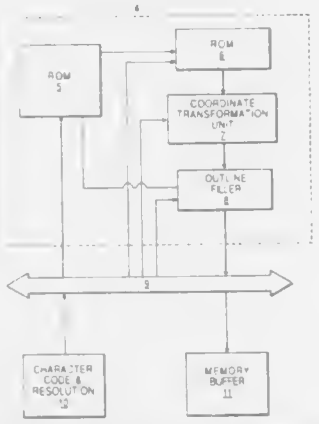
CHARACTER MULTIFONT COMPRESSION AND RESTORATION DEVICE

Bor-Shenn Jeng; Gan-How Change; Kuange-Yao Chang; Chih-Yen Yan; Tieh-Min Wu, and Jang-Keng Lin, all of Tao Yuan Hslen, Taiwan, assignors to Telecommunication Laboratories, Directorate General of Telecommunications, Ministry of Communications, Taiwan

Continuation-in-part of Ser. No. 104,042, Oct. 2, 1987, abandoned. This application May 1, 1989, Ser. No. 345,710

Int. Cl.^{5} G06F *15/20*

U.S. Cl. 364—518 **10 Claims**


4
ROM 6
ROM 5
COORDINATE TRANSFORMATION UNIT 7
OUTLINE FILLER 8
3
CHARACTER CODE & RESOLUTION 12
MEMORY BUFFER 11

1. A realtime generating system for generating multifont and multiresolution characters comprising:

a character compression means for compressing a dot matrix character pattern into a vector type character pattern, said character compression means including means for locating outline points defining an outline of said dot matrix character pattern, and an outline vector generating means for generating vectors in accordance with said outline points;

said outline vector generating means including means for storing a plurality of direction codes each denoting a predetermined vector direction, and means for generating as said vectors a plurality of vector codes connecting adjacent outline points using said plurality of direction codes and distances between adjacent outline points; and,

a realtime character generating means for generating a character pattern in accordance with said vector type character pattern, said realtime character generating means including a first memory for storing said vector type character pattern received from said character compression means, a second memory for storing said outline of said dot matrix character pattern, a coordinate converting means for enlarging and shrinking said outline of said dot matrix character pattern into a character outline having a specified resolution, and an outline filler means for filling the character outline to complete the character pattern.

5,027,305

INTERROGATING DEVICE FOR CHANGING THE PRIORITY OF THE INFERENCE RULES

Toshiyuki Tanaka; Nobuo Nakamura, both of Yamatokoriyama, and Mutsuhiro Yamamoto, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 1, 1988, Ser. No. 278,577

Claims priority, application Japan, Dec. 3, 1987, 62-307998

Int. Cl.^{5} G06F *15/36, 15/18*

U.S. Cl. 364—513 **2 Claims**

1. An interrogating device having a forward inference control system and a backward inference control system, comprising:

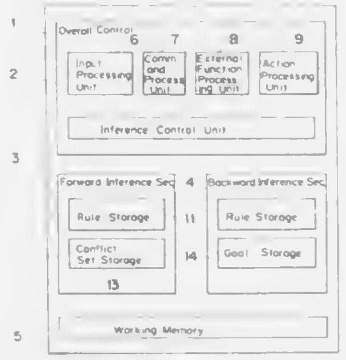
input processing means for reading data and classifying the data into forward inference rules having forward condition sections corresponding to each of said forward inference rules, backward inference rules having backward condition section corresponding to each of said backward inference rules, affirmation facts, negation facts and commands;

a rule memory for storing said forward inference rules and said backward inference rules;

a working memory for storing said affirmation facts and said negation facts;

forward inference control means for adding said affirmation and negation facts to said working memory and selecting said affirmation and negation facts from said working memory in response to said forward inference rules;

backward inference control means for searching said backward condition sections according to said forward and backward inference rules in a sequence of said forward inference rules and then said backward inference rules; and



inference control means for enabling said forward inference control means and said backward inference control means in response to said commands, said commands being applied to a predetermined rule having a priority for said forward and backward inference rules stored in said rule memory for changing the priority of said predetermined rule, deleting said predetermined rule or restoring said predetermined rule;

wherein said forward inference control means changes the priority of said predetermined rules, deletes said predetermined rule and restores said predetermined rule in the device or said backward inference control means changes toe priority of said predetermined rile, deletes said predetermined rule and restored said predetermined rule in the device so that changing the priority of said predetermined rule, deleting said predetermined rule and restoring said predetermined rule may be accomplished by either said forward inference rules or said backward inference rules.

5,027,306

DECIMATION FILTER AS FOR A SIGMA-DELTA ANALOG-TO-DIGITAL CONVERTER

Jon C. Dattorro, 2 Beaumont La., Devon, Pa. 19333; Albert J. Charpentier, 25 Cool Valley Rd., Malvern, Pa. 19355, and David C. Andreas, 1407 Henry Dr., Downingtown, Pa. 19335

Filed May 12, 1989, Ser. No. 351,449

Int. Cl.^{5} G06F *15/31*

U.S. Cl. 364—724.10 **7 Claims**

1. A filtering system for processing a sampled data input signal, comprising:

memory means for holding Q coefficient values representing a single impulse response and for providing N of said coefficient values at a plurality of output ports, where Q and N are integers;

a plurality of processing means, including gating means and an accumulator, for combining said input signal with P of said N coefficient values to generate R filtered output signals, where P and R are integers;

means for combining said R filtered output signals to generate a single filtered output signal;

distributing means, including a barrel shifter, coupled to said memory means and responsive to a control signal for distributing P of said N coefficient values to said plurality of processing means in a correspondence determined by said control signal; and

control means coupled to said distributing means for generating said control signal to change the correspondence between said P coefficient values and said plurality of processing means.

5,027,307

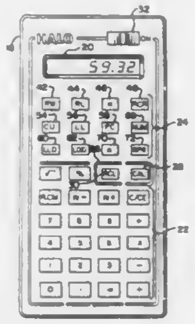
LIGHTING APPLICATION CALCULATOR

Raymond J. Kusmer, La Habra, Calif., assignor to Cooper Industries, Inc., Houston, Tex.

Continuation of Ser. No. 175,824, Mar. 31, 1988, abandoned. This application May 17, 1990, Ser. No. 526,778

Int. Cl.^{5} G06F *3/00;* G09B *25/00*

U.S. Cl. 364—709.02 **5 Claims**



1. An apparatus for selecting lighting fixtures to provide light at a predetermined value of footcandles FC from an array of predetermined fixtures, each characterized by a lamp lumen rating LL, in a space characterized by a length RL, a width RW and a height h, the apparatus comprising:

a) means for entering into a memory values corresponding to RL, RW, and h of the space, wherein said means for entering includes a plurality of input keys and one of said plurality of input keys is specifically associated with one of RL, RW or h;

b) means for determining a room cavity ratio (RCR) according to the pre-programmed formula

$$RCR = \frac{5h \times (RL + RW)}{RL \times RW};$$

VOL
1127
ISS
4
JE
25
1991
UMI

- c) means for displaying the value of RCR as determined:
- d) means for entering a coefficient of utilization CU, a value of lamp lumens LL and the predetermined value of footcandles FC into a memory;
- e) means for calculating a number of fixtures NUM from the values in memory according to the pre-programmed formula

$$NUM = \frac{FC \times RL \times RW}{LL \times CU},$$

- f) means for storing the calculated value of NUM; and
- g) means for displaying the stored value of NUM, which displayed value of NUM is a calculated number of lamps to be installed at equal spacing in the space to provide the predetermined value of footcandles;
- h) wherein said apparatus is hand-held for use by an operator on location.

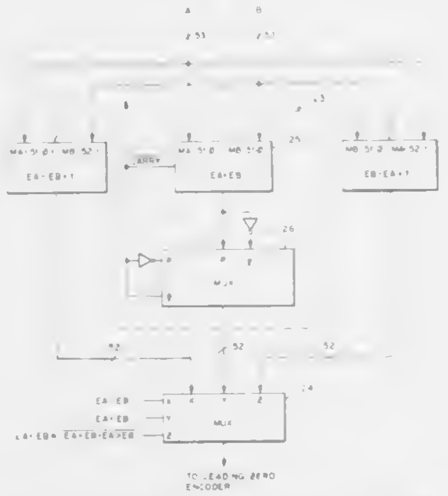
5,027,308
CIRCUIT FOR ADDING/SUBTRACTING TWO FLOATING POINT OPERANDS

Hon P. Sit, Fremont; David Galbi, Mountain View, and Alfred K. Chan, San Jose, all of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Feb. 14, 1989, Ser. No. 311,296

Int. Cl.⁵ G06F *7/38, 7/00*

U.S. Cl. 364—748 17 Claims



1. In a floating-point adder for performing an addition/subtraction operation by adding/subtracting a first operand and a second operand to obtain a sum/difference, a circuit to add/subtract mantissas of said operands, comprising:

a first adder coupled to receive mantissas of said first and second operands for adding/subtracting said two mantissas and generating a first output which is the sum/difference of adding/subtracting said two mantissas;

a second adder coupled to receive mantissas of said first and second operands for adding/subtracting said two mantissas and generating a second output which is the sum/difference of adding/subtracting said two mantissas but said second output is shifted one bit position relative to said first output;

adder selecting means coupled to said first and second adders to receive a carry-out from said first adder when performing addition and detecting a bit value of a sum bit in the most significant bit (msb) position of said first adder when performing subtraction;

said adder selecting means for selecting said first output if said carry-out is of a first state and selecting said second output if said carry-out is of a second state when performing addition;

said adder selecting means for selecting said first output if said bit value of said sum bit has a predetermined value and selecting said second output if said sum bit does not have a predetermined value when performing subtraction;

wherein a normalized resultant mantissa is obtained when performing said addition/subtraction operation.

5,027,309
DIGITAL DIVISION CIRCUIT USING N/M-BIT SUBTRACTOR FOR N SUBTRACTIONS

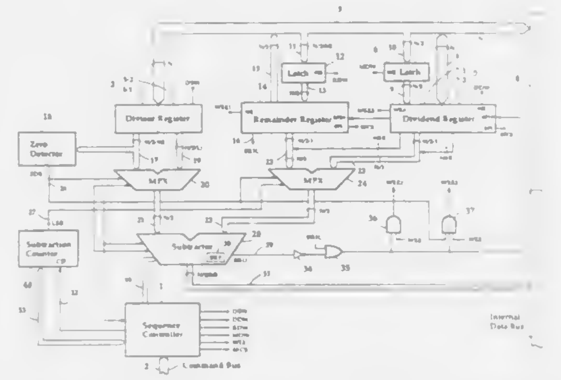
Yasuhiko Koumoto, and Kei Tokunaga, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Aug. 29, 1989, Ser. No. 400,135

Claims priority, application Japan, Aug. 29, 1988, 63-213884

Int. Cl.⁵ G06F *7/52*

U.S. Cl. 364—766 4 Claims



1. A digital division circuit for dividing a dividend by a divisor in accordance with a non-restoring method, comprising:

a first register having a data shift function for temporarily storing said dividend;

a second register for temporarily storing said divisor;

a third register having a data shift function,

a subtractor,

a zero detector for monitoring higher-bit data of said divisor in said second register and for generating a signal when the monitored higher-bit data is all zero;

a first multiplexer connected between said second register and a first input terminal of said subtractor for supplying lower-bit data of said divisor to said subtractor in response to the signal from said zero detector and for selectively supplying lower-bit and higher-bit data of said divisor to said subtractor for each subtraction operation thereof in the absence of the signal from said zero detector; and

a second multiplexer connected between said first and third registers and a second input terminal of said subtractor for supplying the contents of said third register to said subtractor in the presence of the signal from the zero detector and for selectively supplying higher-bit data of the contents of said third and first registers to said subtractor for each subtraction thereof in the absence of the signal from said zero detector.

5,027,310
CARRY CHAIN INCREMENTER AND/OR DECREMENTER CIRCUIT

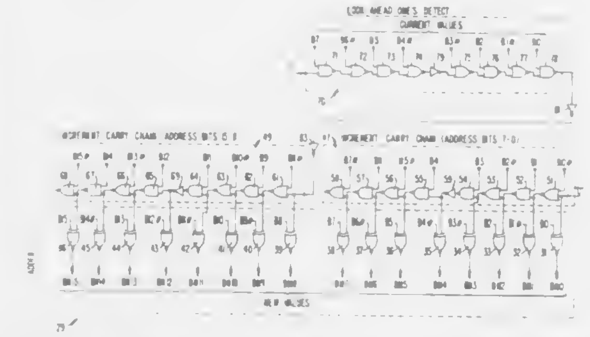
Monte J. Dalrymple, Fremont, Calif., assignor to Zilog, Inc., Campbell, Calif.

Filed Sep. 8, 1989, Ser. No. 404,591

Int. Cl.⁵ G06F *7/50*

U.S. Cl. 364—770 7 Claims

1. In an incrementer and/or decrementer of a binary word of a given number of bits which includes a carry chain having a plurality of serially connected logic element stages substantially equal to said given number of bits and addition logic elements connected in parallel thereto, the improvement wherein said carry chain is separated into at least first and second disconnected groups of serially connected stages, said first group being associated with a least significant group of bits of said binary word and said second group being associated with a mutually exclusive group of more significant bits, and including a look ahead chain having a number of serially connected logic stages substantially equal to that of said first group and having an output connected to an input of said second chain group.



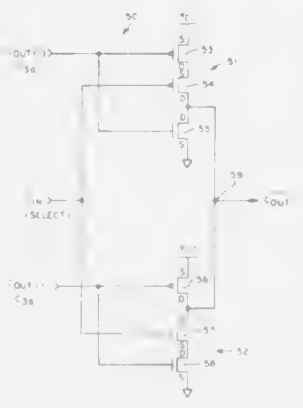
5,027,311
CARRY SELECT MULTIPLEXER

Diane E. Zion, Santa Clara, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Oct. 31, 1989, Ser. No. 429,562

Int. Cl.⁵ G06F *7/50*

U.S. Cl. 364—788 3 Claims



1. In a digital processor having a plurality of adder stages, each for adding corresponding bits of at least two numbers which are to be added along with a carryin to generate a sum and a carryout from each stage, wherein a carryout from each stage is coupled as a carryin to a subsequent stage, each said adder stage having two adders, first of said adders for receiving said corresponding bits of said numbers and generating a sum and a carryout assuming a carryin having a value of zero, and second of said adders for receiving said corresponding bits of said numbers and generating a sum and a carryout assuming a carryin having a value of one, a carry select apparatus for selecting one of said adder outputs for each stage, except when said adder carryouts are equal, comprising:

selecting means for each said stage for selecting between said adder carryouts, except when said adder carryouts are equal, each said selecting means comprising:

a first driver coupled to receive said carryout from said first adder, said first driver having a certain delay;

a second driver coupled to receive said carryout from said second adder, said second driver also having said certain delay;

said carryin from a preceding stage being coupled simultaneously to said first and second drivers for controlling said drivers for selecting between said two carryouts, except when said carryouts are equal, to determine a carryout from said stage, said first and second drivers operating in parallel such that each of said selecting means has a delay equivalent to said certain delay.

5,027,312
CARRY-SELECT ADDER

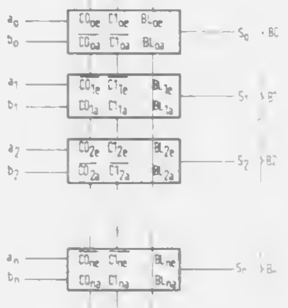
Karl Knauer, Grafing, and Winfried Kamp, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengellschaaft, Munich, Fed. Rep. of Germany

Filed Jul. 17, 1989, Ser. No. 380,601

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3825969

Int. Cl.⁵ G06F *7/50*

U.S. Cl. 364—788 11 Claims



1. A carry-select adder comprising:

first adder cell means for providing first and second inputs, first and second carry inputs, a block carry input, first and second inverted carry outputs, a block carry output, and a sum output, said first adder cell means including a plurality of first adder cells;

second adder cell means for providing first and second inputs, first and second inverted carry inputs, a block carry input, first and second carry outputs, a block carry output, and a sum output, said second adder cell means including a plurality of second adder cells;

input adder cell means for providing first and second carry inputs, a block carry input, first and second inverted carry outputs, a block carry output, and a sum output;

a plurality of sequentially arranged blocks, each block having a first stage and a second stage;

said first stage of each block including said input adder cell means and one of said second adder cells of said second adder cell means, said first and second inverted carry outputs of said input adder means being respectively connected to said first and second inverted carry inputs of said one of said second adder cells of said second adder means, said block carry output of said input adder means being connected to said block carry input of said one of said adder cells of said second adder means, wherein said input adder cell means provides first and second carry inputs and a block carry input for each of said blocks;

said second stage of each block including a plurality of said first adder cells of said first adder cell means arranged in an alternating sequence with a plurality of said second adder cells of said second adder cell means, said sequence beginning with one of said first adder cells, and each of said first and second adder cells of said second stage having said first and second inverted carry outputs of said first adder cells respectively connected to said first and second inverted carry inputs of said second adder cells, said first and second carry outputs of said second adder cells re-

VOL
1127
ISS
4
JE
25
1991
UMI

spectively connected to said first and second carry inputs of said first adder cells, and said block carry outputs of said first adder cells connected to said block carry inputs of said second adder cells, said sequence ending with a predetermined one of said second adder cells, wherein said predetermined one of said second adder cells provides first and second carry outputs and a block carry output for each of said blocks; and

said first and second carry outputs of said one of said second adder cells of said first stage being connected to said first and second carry inputs of said one of said first adder cells of said second stage, and said block carry output of said one of said second adder cells of said first stage being connected to said block carry input of said one of said first adder cells of said second stage.

5,027,313

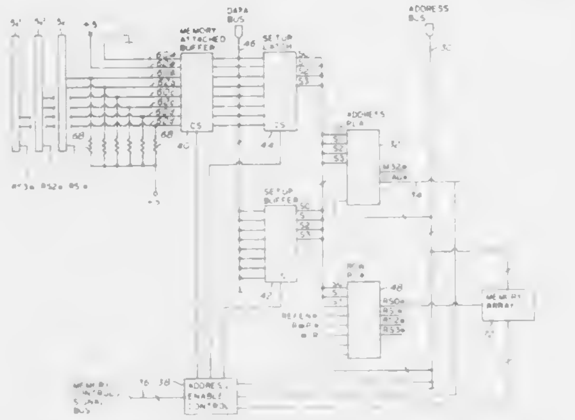
APPARATUS FOR DETERMINING MAXIMUM USABLE MEMORY SIZE

Paul R. Culley, Cypress, Tex., assignor to Compaq Computer Corporation, Houston, Tex.

Filed Aug. 25, 1988, Ser. No. 236,620

Int. Cl.^{5} G06F *12/02*

U.S. Cl. 364—900 **7 Claims**



1. An apparatus for determining usable memory size, comprising:

a base memory unit, said base memory unit including:
  an amount of base memory;
  means for indicating the amount of base memory; and
  means for receiving at least one additional memory module, each of said additional memory modules including:
    an amount of additional memory;
    means for indicating the amount of additional memory; and
    means for connecting said additional memory module to said base memory unit, said means for connecting including means for coupling the output of said additional memory indicating means to said base memory unit;

wherein all said means for indicating are permanent connections on said base memory unit and on said additional memory module;

means for receiving the outputs from all said indicating means;

means responsive to said received indicating means outputs for correlating said received indicating means outputs with maximum usable amount of memory for a given configuration signal value corresponding to said indicating means outputs, wherein said maximum usable amount varies dependent on the amount and physical location combinations of said base memory and any additional memory, some of said memory module additional memory amount and physical location combinations resulting in inaccessibility of some of said amount of additional memory, and for outputting a value indicative of said maximum usable amount of the amount of said base memory and said additional memory actually present; and

means responsive to said maximum usable amount value for generating enabling signals for enabling an amount of said base memory and said additional memory totaling said maximum amount.

5,027,314

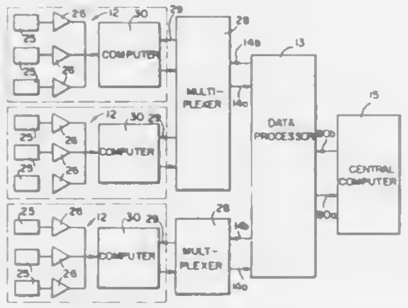
APPARATUS AND METHOD FOR POSITION REPORTING

Gary Linwood, and Wayne Duncan, both of Newark, Del., assignors to United Manufacturing Co., Inc., New Castle, Del.

Continuation of Ser. No. 194,199, May 16, 1988, abandoned, which is a continuation-in-part of Ser. No. 169,285, Mar. 17, 1988, abandoned. This application Mar. 7, 1990, Ser. No. 490,144

Int. Cl.^{5} G06F *1/00;* **G08B** *23/00, 5/22*

U.S. Cl. 364—900 **12 Claims**



1. A system for tracking a number of subjects in a plurality of areas comprising:

a plurality of transmitters, wherein at least one transmitter is associated with each of said subjects, each of said transmitters comprising transmission means for transmitting a light based signal representative of an identifying code unique to that transmitter;

a plurality of receivers, wherein at least one of said receivers is associated with each of said areas, each of said receivers comprising a converter for converting a transmitted light based signal to an electrical signal and a validation circuit for processing said electrical signal to determine whether said electrical signals are representative of the unique identifying codes associated with said transmitters; and

processor means, connected to each of said receivers, for recording those electrical signals which are representative of said unique identifying codes, for recording the receiver which determined that such electrical signals are representative of the unique identifying codes associated with said transmitters and for determining in which of said areas said transmitters are located, wherein said processor means comprises scanning means for scanning said receivers and accumulating means for accumulating with respect to each transmitter those areas in which receivers have determined that an electrical signal is representative of the unique identifying code associated with that particular transmitter and for accumulating a badge count for each accumulated area, said badge count being representative of the number of times a receiver has determined that an electrical signal is representative of the unique identifying code associated with that particular transmitter.

5,027,315

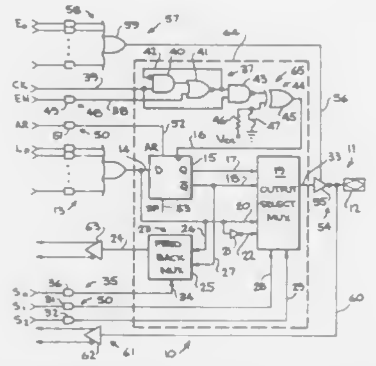
PROGRAMMABLE LOGIC ARRAY USING INTERNALLY GENERATED DYNAMIC LOGIC SIGNALS AS SELECTION SIGNALS FOR CONTROLLING ITS FUNCTIONS

Om P. Agrawal, and Joseph A. Brcich, both of San Jose, Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 656,109, Sep. 28, 1984, abandoned. This application Aug. 30, 1989, Ser. No. 401,528

Int. Cl.^{5} G06F *9/00;* **H03K** *19/20*

U.S. Cl. 364—900 **27 Claims**



22. In a programmable array logic device having a first plurality of logic cells for dynamically generating logic signals, and a second plurality of combinatorial means for combining a subset of said logic signals to generate a plurality of combinatorial signals, the logic signals and combinatorial signals being dynamic signals, an output logic circuit, receiving one of said combinatorial signals and a clock signal, coupled between one of said second plurality of combinatorial means and an input-/output port, comprising:

register means for storage said one of said combinatorial signals and providing a registered signal;

output select means, connected to receive said one of said combinatorial signals and said registered signal and responsive to an output select signal, for dynamically selecting said registered signal or said one of said combinatorial signals as a selected signal for supply to the input/output port;

feedback means for providing a feedback signal to one or more of the logic cells including a feedback select means, connected to receive said one of said combinatorial signals and said registered signal and responsive to a feedback select signal, for dynamically selecting said one of said combinatorial signals or said registered signal as the feedback signal;

means for connecting one of said dynamic signals as said output select signal to said output select means; and

means for connecting another one of said dynamic signals as said feedback select signal to said feedback select means.

5,027,316

VERSIONING OF MESSAGE FORMATS IN A 24-HOUR OPERATING ENVIRONMENT

Billy J. Frantz, Clontarf, Australia, and Sven E. Hellstrom, Vallingby, Sweden, assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 906,109, Sep. 11, 1986, abandoned. This application Aug. 8, 1989, Ser. No. 391,093

Int. Cl.^{5} G06F *15/40*

U.S. Cl. 364—900 **4 Claims**

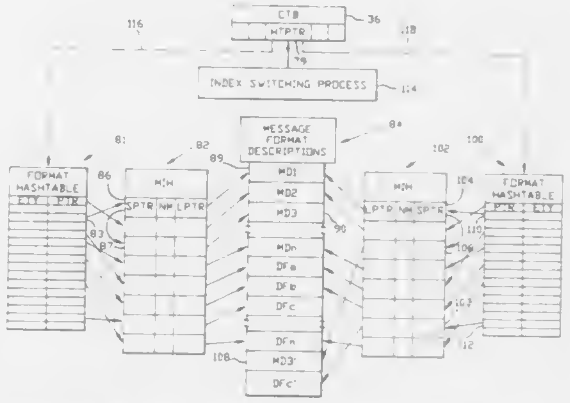
1. In a continuously-operating, multi-tasking computer system which includes a central facility with a data storage facility, a plurality of user terminals and a message exchange facility for conducting a message exchange between the control facility and the user terminals in which a message exchanged between the control facility and a user terminal has a format established by a message format descriptor, a method for changing message format descriptors without stopping operation of the computer system, comprising the steps of:

defining and storing list of message format descriptors in the data storage facility;

creating an initial index to the list;

for a user terminal, establishing a user terminal block at the central facility, the user terminal block including a single index pointer conditioned to identify the initial index;

during a first message exchange between the central facility and the user terminal which includes transfer of messages formatted according to message format descriptors included in the list accessing the list by way of the initial index in response to the index pointer;



modifying the list of message format descriptors;

creating an updated index to the list;

initiating a second message exchange between the central facility and the user terminal, the message exchange including transfer of messages formatted according to modified message format descriptors included in the list;

in response to initiating the second message exchange, executing an atomic instruction to condition the index pointer to identify the update index; and

during the second message exchange, accessing the list by way of the updated index in response to the index pointer.

5,027,317

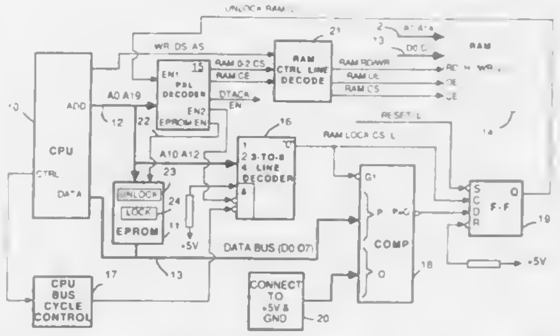
METHOD AND CIRCUIT FOR LIMITING ACCESS TO A RAM PROGRAM MEMORY

Gerald S. Pepera, Mentor, and Richard S. Gunsaulus, Solon, both of Ohio, assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.

Filed Mar. 17, 1989, Ser. No. 325,454

Int. Cl.^{5} G06F *12/16*

U.S. Cl. 364—900 **10 Claims**



1. A method of limiting access to a memory by a processor, the method comprising:

before performing an application program operation, executing an UNLOCK routine of processor instructions to

VOL
1127
ISS
4
JE
25
1991
UMI

allow writing of data to a limited access portion of the memory;

wherein execution of the UNLOCK routine includes the steps of:

(a) generating a selected address to activate a comparator to perform data comparison, and

(b) generating predetermined data to the comparator for matching against a predetermined value to activate decoding circuitry;

during an application program operation, executing at least one instruction to address the decoding circuitry within a selected range of addresses to generate a circuit control signal to the memory, the circuit control signal allowing writing of data to the limited access portion of memory; and

after the application program operation, executing a LOCK routine of processor instructions to prevent writing of data to the limited access portion of the memory;

wherein execution of the LOCK routine includes the steps of:

(c) generating the selected address to activate the comparator a second time, and

(d) generating data to the comparator that does not match the preset value so as to disable the decoding circuitry and prevent further writing of data to the limited access portion of memory without further execution of the UNLOCK routine of processor instructions.

5,027,318
BIT PLACE ORIENTED DATA STORAGE SYSTEM FOR DIGITAL DATA

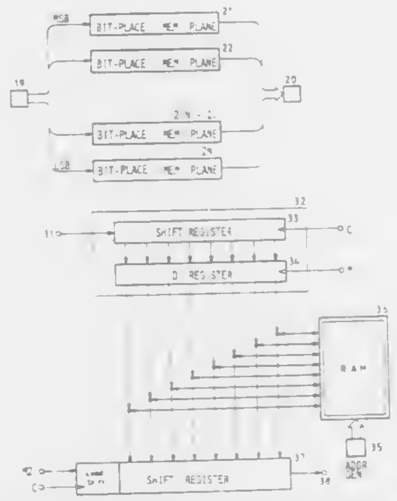
Gerhard Wischermann, Weiterstadt, Fed. Rep. of Germany, assignor to BTS Broadcast Television Systems GmbH, Darmstadt, Fed. Rep. of Germany

Filed Sep. 13, 1989, Ser. No. 406,763

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1988, 3832328

Int. Cl.^{5} G11C *7/00;* **H04N** *5/907*

U.S. Cl. 365—78 **5 Claims**



1. A data storage system for digital signals, especially digital video signals, which consist of digital multibit data words in which each bit has a significance (place) depending on the order of bit transmission when said data words are transmitted in a serial bit stream, whereby in a stream of transmitted data words, however transmitted, significance classes of bits (bit places) are recognizable, said system comprising:

a plurality of write/read memories each capable of entering into storage simultaneously at one address, and reading out from storage under one address, simultaneously, a predetermined plural number of bits and consisting of one said write/read memory for each bit place;

means for selecting, from an input digital data word stream, bits of each bit place from each of successive sequences of a plurality of data words and writing them into said respective memories so that each said memory stores only bits from a single bit place different from the bit places of bits stored by all others of said memories and stores bits from said single place from a single said sequence of a plurality of data words under a single memory address, said sequences of data words each consisting of a number of words equal to said predetermined number of bits which each of said memories is able to store under a single memory address, and

means for concurrently reading out from all said memories the bits respectively stored therein from a said sequence of data words and for regrouping the bits so read out into reproduced data words of said input data word stream, each said reproduced word consisting of one bit from each one of said memories, to provide a corresponding output data word stream.

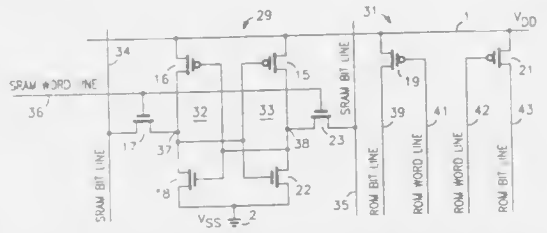
5,027,319
GATE ARRAY MACRO CELL

Stephen W. Lai, Chandler, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 2, 1988, Ser. No. 239,910

Int. Cl.^{5} G11C *5/06*

U.S. Cl. 365—156 **12 Claims**



1. A semicustom integrated circuit having a plurality of core cells, each of said plurality of core cells having a plurality of transistors, said semicustom integrated circuit comprising:

first means for interconnecting a first portion of the plurality of transistors of one of the plurality of core cells in a predetermined manner for providing a first type of memory cell; and

second means for interconnecting the remaining portion of the plurality of transistors of said one of the plurality of core cells in a predetermined manner for providing at least one second type of memory cell.

5,027,320
EPROM CIRCUIT HAVING ENHANCED PROGRAMMABILITY AND IMPROVED SPEED AND RELIABILITY

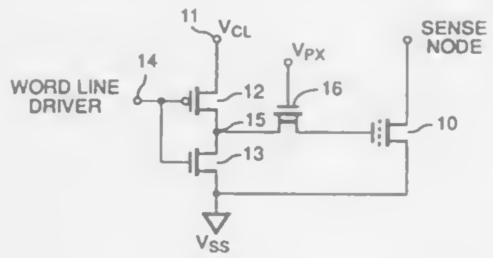
Saroj Pathak, Los Altos Hills, and Bruce Prickett, Fremont, both of Calif., assignors to Cypress Semiconductor Corp., San Jose, Calif.

Filed Sep. 22, 1989, Ser. No. 410,951

Int. Cl.^{5} G11C *7/00*

U.S. Cl. 365—185 **4 Claims**

1. In an MOS integrated circuit having a plurality of floating gate type erasable, programmable read-only memory devices, the improvement comprising a clamping means coupled to the control gates of said memory devices, said clamping means being adapted, as said memory device is being charged to a predetermined voltage by the application of a voltage to its control gates, to clamp the resulting voltage on said control gates below the maximum supply voltage for said circuit, whereby, after said memory device has been properly charged, during a read operation said memory device will continue to read out as a properly charged memory device even though some of the actual charge on its floating gate subsequently may have leaked.



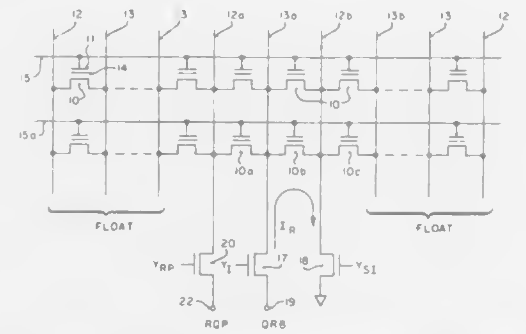
5,027,321
APPARATUS AND METHOD FOR IMPROVED READING/PROGRAMMING OF VIRTUAL GROUND EPROM ARRAYS

Chin S. Park, Sunnyvale, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Nov. 21, 1989, Ser. No. 439,694

Int. Cl.^{5} G11C *16/06*

U.S. Cl. 365—185 **7 Claims**



1. A method of accessing a selected memory cell which avoids parasitic current flow in an adjacent cell, the memory cell being part of an electrically programmable memory device type having an array of rows and columns of memory cells, each memory cell comprising a floating gate field-effect transistor having a control gate, a drain and a source, said method comprising the steps of:

selecting a row line coupled to the control gate of said selected cell;

grounding a first column line coupled to the source of said selected cell; and

simultaneously applying a first potential to a second column line and a second potential to a third column line, said second column line being coupled to the drain of said selected cell and said third column line being coupled to the drain of said adjacent cell, all other column lines within said array being disconnected from said second and third column lines, and wherein said first potential is provided by a first circuit and said second potential is provided by a second circuit, said first potential conditionally flowing a read current through said selected cell, the value of which is indicative of the content of said selected memory cell.

5,027,322
CIRCUIT CONFIGURATION FOR IDENTIFICATION OF INTEGRATED SEMICONDUCTOR CIRCUITRIES

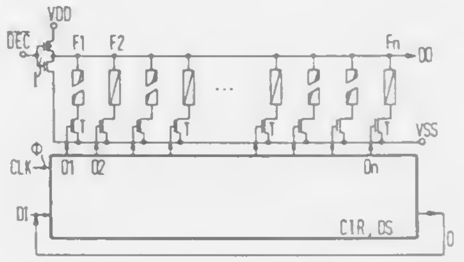
Wolfgang Pribyl, Graz, Austria, and Raymond Sittig, Deerfield, Ill., assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jun. 29, 1990, Ser. No. 546,008

Claims priority, application European Pat. Off., Jun. 29, 1989, 89111870.5

Int. Cl.^{5} G11C *11/40*

U.S. Cl. 365—189.01 **14 Claims**



1. Circuit configuration for the identification of integrated semiconductor circuitries, comprising:

n programmable elements,

a common line connected to said programmable elements,

an n-stage serial-parallel shift register having a data input, n parallel outputs, and a clock input for controlling a shift function of said serial-parallel shift register as a function of a clock signal to be applied to the clock input, and

transistors each having a drain connected to a respective one of said programmable elements, a source connected to a supply potential, and a gate connected to a respective one of the parallel outputs of said serial-parallel shift register.

5,027,323
WRITE PULSE SIGNAL GENERATING CIRCUIT FOR A SEMICONDUCTOR MEMORY DEVICE

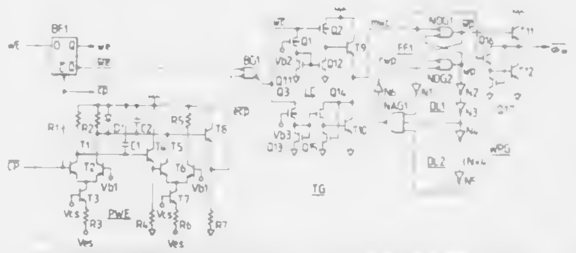
Kazuhisa Miyamoto; Shuuichi Miyaoka; Kazuo Nakamura, and Kenji Imai, all of Tokyo, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 9, 1989, Ser. No. 294,675

Claims priority, application Japan, Jan. 14, 1988, 63-6230; Mar. 1, 1988, 63-48481

Int. Cl.^{5} G11C *7/00;* **H03K** *19/02, 3/017, 5/04*

U.S. Cl. 365—189.11 **13 Claims**



1. A semiconductor integrated circuit device comprising:

a first terminal to which an external control signal is to be supplied;

a second terminal to which a pulse signal having a first signal level and a first pulse width is to be supplied;

latch means coupled to receive said external control signal and responsive to said pulse signal for latching a level of said external control signal;

pulse width expander means coupled to receive said pulse signal and for expanding the first pulse width of said pulse signal into a second pulse width wider than the first pulse width upon receipt of said pulse signal, said pulse width

VOL
1127
ISS
4
JE
25
1991
UMI

expander means including output means for outputting an output signal having the first signal level and the second pulse width;

a gate circuit having a first input coupled to an output of said latch means and a second input coupled to receive the output signal of said pulse width expander means, and for providing a first internal control signal having the first signal level and the second pulse width in response to reception of said output signal of said pulse width expander means;

level conversion means coupled to receive said first internal control signal and for converting the first signal level of said first internal control signal into a second signal level greater than the first signal level, the level conversion means including output means for outputting a second internal control signal having the second signal level and the second pulse width;

a pulse generator coupled to receive said second internal control signal for providing a timing signal based on said second internal control signal; and

an internal circuit responsive to said timing signal, wherein an operation of said internal circuit is controlled by said timing signal.

5,027,324

SENSE AMPLIFIER DRIVER FOR USE IN MEMORY DEVICE

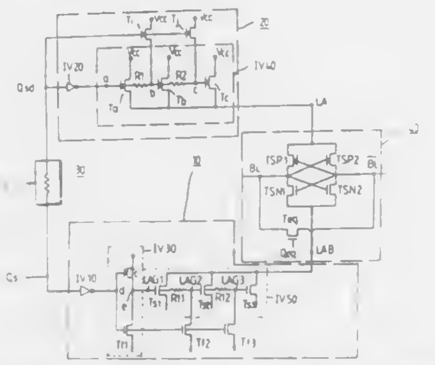
Seungmo Seo, Seoul, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Rep. of Korea

Filed Feb. 27, 1990, Ser. No. 485,913

Claims priority, application Rep. of Korea, Jun. 10, 1989, 89-8066

Int. Cl.⁵ G11C *7/00, 11/40, 11/413*

U.S. Cl. 365—205 2 Claims



1. A sense amplifier driver for a memory device including a sensing clock driver for driving, by means of a multistep sloped sensing enable signal, a sense transistor coupled to a low potential terminal of a sense amplifier for sensing data stored in memory cells, comprising:

a first inverter for inverting sensing clock signals;

a second inverter for re-inverting output signals of said first inverter, said second inverter having terminals;

a third inverter including n-channel MOS transistors and time delaying resistances disposed between the gates of said n-channel MOS transistors and in parallel with the terminals of said second inverter so that said n-channel MOS transistors are turned on successively at different times in response to an output signal from said second inverter, said n-channel MOS transistors having drains commonly connected to the low potential terminal of said sense amplifier; and

pull-down means for reducing a gate voltage of at least one said n-channel MOS transistor, upon cessation of the sensing enable signal, said pull-down means having delaying characteristics and disposed within said third inverter.

5,027,325

SEMICONDUCTOR MEMORY DEVICE HAVING CIRCUIT FOR READING-OUT AND WRITING-IN OF DATA

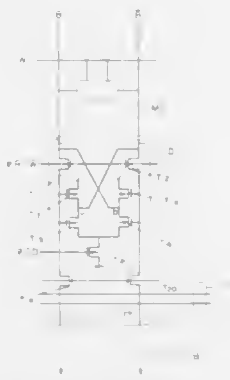
Joji Katsura, Nishinomiya, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 147,346, Jan. 22, 1988, abandoned. This application Nov. 21, 1989, Ser. No. 440,480

Claims priority, application Japan, Jan. 23, 1987, 62-14534

Int. Cl.⁵ G11C *7/00, 11/40, 11/407*

U.S. Cl. 365—205 6 Claims



5. A static RAM device comprising:

a memory cell for storing information data therein;

first and second signal lines through which said information data is transferred from said memory cell;

a first MOS transistor through which said first signal line is coupled to a first data line;

a second MOS transistor through which said second signal line is coupled to a second data line;

a first inverter circuit, including third and fourth MOS transistors, whose input is coupled to said first data line and whose output is coupled to said second signal line;

a second inverter circuit, including fifth and sixth MOS transistors, whose input is coupled to said second data line and whose output is coupled to said first signal line;

a seventh MOS transistor for coupling said first and second data lines to thereby equalize an electric potential on said first and second data lines;

wherein, when said first and second MOS transistors are in an ON state, said first and second inverter circuits and said first, second and seventh MOS transistors operate as a sense amplifier for reading information data; and

wherein, when said first and second MOS transistors are in an OFF state, said first and second inverter circuits operate as drive circuits for writing information data.

5,027,326

SELF-TIMED SEQUENTIAL ACCESS MULTIPORT MEMORY

Brian W. Jones, Garland, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Nov. 10, 1988, Ser. No. 269,907

Int. Cl.⁵ G11C *13/00, 7/00*

U.S. Cl. 365—221 47 Claims

19. A sequential-access multiport memory, comprising:

an array of memory cells;

a first set of peripheral circuits, connected to access bits of data at each address of said array, and a second set of peripheral circuits, connected to access bits of data at each address of said array;

write access control logic, connected to receive an external write command, and accordingly to perform write operations, wherein

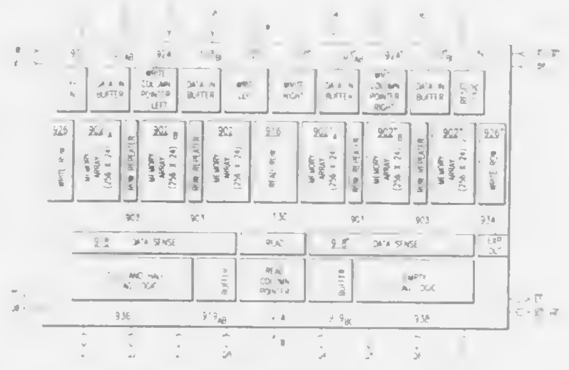
externally received data is written, through said first set of

peripheral circuits, into a location in said memory array indicated by a write address pointer, and

said write address pointer is updated;

read access control logic, connected to receive an external read command, and accordingly to perform read operations, wherein

data is read, through said second set of peripheral circuits, from a location in said memory array indicated by a read address pointer, and



said read address pointer is updated;

a dummy row of memory cells, which has parameters substantially matching the rows of memory cells in said memory array, and wherein said read control logic is connected so that the timing of a reading of said array by said read control logic is conditioned on a delay which is dependent on a time constant of said dummy row.

5,027,327

SEMICONDUCTOR MEMORY

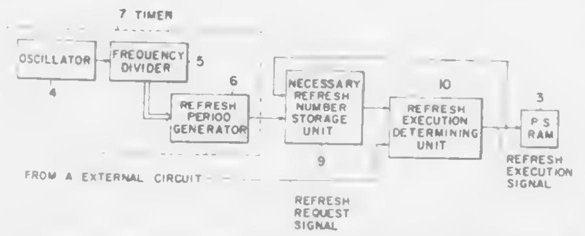
Makiji Kobayashi, Kawasaki; Mitsuo Isobe, Tama; Tatsuya Inatsuki, Tokyo, and Hisashi Ueno, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 18, 1989, Ser. No. 339,661

Claims priority, application Japan, Apr. 19, 1988, 63-96147

Int. Cl.⁵ G11C *11/406*

U.S. Cl. 365—222 10 Claims



1. A semiconductor memory having dynamic memory cells comprising:

means for continuously determining whether or not it is necessary to refresh the dynamic memory cells, and if when refresh is necessary, outputting a refresh the execution signal in response to a refresh request signal from an external circuit; and

means for executing a refresh operation in response to said refresh execution signal.

5,027,328

MEMORY DRIVE DEVICE AND METHOD

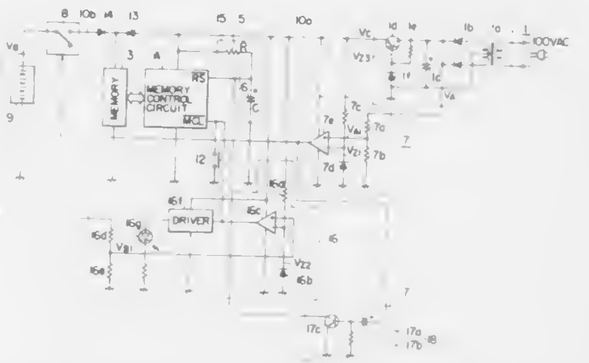
Tomoyuki Nakashima, Hino, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 28, 1990, Ser. No. 500,458

Claims priority, application Japan, Mar. 30, 1989, 1-80160

Int. Cl.⁵ G11C *13/00*

U.S. Cl. 365—226 7 Claims



1. A memory drive device comprising a semiconductor memory, a memory control circuit for controlling the operation of the memory, the control circuit including a reset terminal and operative to initialize the internal status when a reset signal of a predetermined level is applied to the reset terminal, and a main power supply for delivering a power to the memory and to the memory control circuit,

the memory drive device comprising:

a comparator means for comparing a power feed voltage from the main power supply with a predetermined threshold voltage and for outputting a detection signal after detecting that the power feed voltage reaches a predetermined voltage; and

reset means responsive to a detection signal from the comparator means to apply the reset signal for at least a predetermined period of time to the reset terminal of the memory control circuit.

5,027,329

ADDRESSING FOR LARGE DYNAMIC RAM

Richard C. Foss, Kirkcaldy Fife, Scotland, assignor to Mosaid Inc., Canada

Filed Dec. 4, 1989, Ser. No. 445,448

Claims priority, application Canada, Dec. 5, 1988, 585031

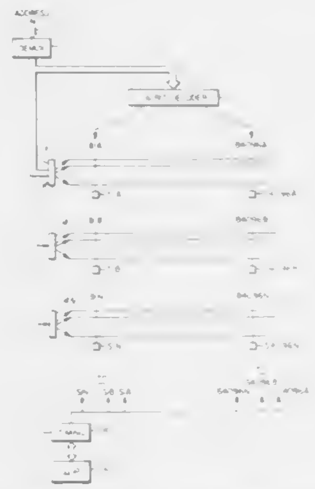
Int. Cl.⁵ G11C *13/00*

U.S. Cl. 365—230.02 21 Claims

1. A DRAM comprised of a matrix of bit lines and word lines, bit storage cells connected to the bit lines and word lines at each matrix intersection, the word lines being grouped into groups, each bit line being divided into bit line segments one associated with each group, an address bus for receiving addresses, means for decoding bit line addresses received on the address bus, means for decoding word line addresses received on the address bus, means for addressing the bit lines by the bit line address, means for addressing a first group of word lines by a word line address, means for separately applying the same word line address to each of the groups of word lines for separately similarly addressing each of the groups of word lines, sense amplifiers for reading all of the bit line segments

VOL
1127
ISS
4
JE
25
1991
UMI

associated with a group of word lines, and means for enabling said sense amplifiers associated with said group of word lines in relative synchronism with the addressing of said group of word lines.



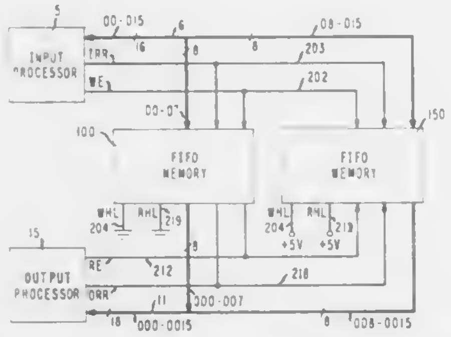
5,027,330
FIFO MEMORY ARRANGEMENT INCLUDING A MEMORY LOCATION FILL INDICATION

Robert W. Miller, Hazlet, N.J., assignor to AT&T Bell Laboratories, Holmdel, N.J.

Filed Dec. 30, 1988, Ser. No. 292,085

Int. Cl.^{5} G11C *8/04, 19/00*

U.S. Cl. 365—239 **9 Claims**



5. A first-in, first-out memory system operating in conjunction with first and second processors comprising

an addressable cyclic memory having a plurality of memory locations, in which an arbitrary number of said memory locations may be filled at any point in time,

a first pointer register for supplying an address identifying a memory location at which a data word is to be stored,

a second pointer register for supplying an address identifying a memory location which is to be read,

means for incrementing said first pointer register by a predetermined value when a word is stored in said addressable cyclic memory and for incrementing said second pointer register by said predetermined value when a word is read from said addressable cyclic memory,

means for forming first and second values from the addresses provided by said first and second pointer registers, respectively, for prefixing a predetermined number to said first value whenever the address contained in said first pointer register goes from a maximum to a minimum value and for transferring said prefixed number from said first value to said second value whenever the address in said second pointer register goes from a maximum to a minimum value,

means for determining, as a function of said first and second values, said arbitrary number and a corresponding number of said plurality of memory locations which are empty, and

means, responsive to receipt of a request signal from said first processor, for outputting to an output terminal said arbitrary number and, responsive to receipt of a request signal from said second processor, for outputting to another output terminal said corresponding number.

5,027,331
ACOUSTIC QUADRUPOLE SHEAR WAVE LOGGING DEVICE

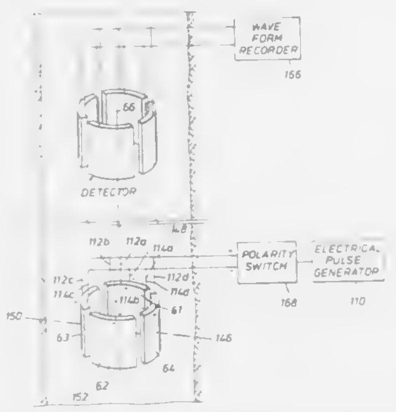
Graham A. Winbow, Houston; Sen-Tsuen Chen, Sugar Land, and James A. Rice, Houston, all of Tex., assignors to Exxon Production Research Company, Houston, Tex.

Continuation of Ser. No. 379,684, May 19, 1982, Pat. No. 4,932,003. This application Mar. 20, 1990, Ser. No. 496,400

The portion of the term of this patent subsequent to Jun. 5, 2007, has been disclaimed.

Int. Cl.^{5} G01V *1/40*

U.S. Cl. 367—75 **15 Claims**



1. A velocity well logging apparatus comprising:

a housing adapted to be raised and lowered into a well containing a fluid;

signal generating means in the housing for transmitting sonic signals into the earth surrounding the well wherein said signal generating means generates two positive pressure waves and two negative pressure waves in the fluid, and the four pressure waves generated have an overlapping frequency range and a common component pressure wave with frequencies in such overlapping frequency range, such that the four pressure waves will interfere to produce a quadrupole shear wave in the earth formation surrounding the well that will be refracted in the earth surrounding the well, and

signal detection means in the housing adapted to detect at least one point longitudinally spaced from said signal generating means the arrival of the sonic signals transmitted into the earth surrounding the well by said signal generating means, said point being spaced apart from the axis of the well, said signal detection means comprising four members so located relative to each other that in a quadrilateral, the four corners of which are defined by the centroids of three of the four members and the normal projection of the centroid of the fourth member onto the plane defined by and containing the centroids of said three of the four members, the four angles of the quadrilateral are each less than 180°, wherein said four members are adapted to produce electrical waveforms indicative of detection of the quadrupole shear wave in response to vibrations of the four members, wherein two of the four members have centroids at diagonally opposite corners of the quadrilateral.

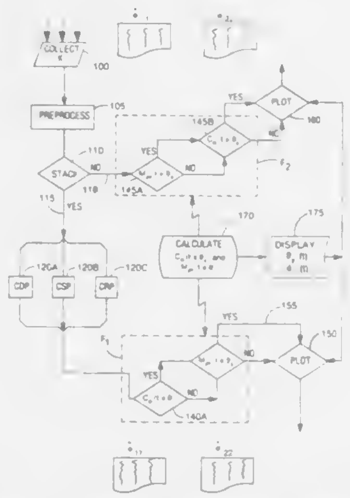
5,027,332
METHOD FOR GEOPHYSICAL EXPLORATION

Richard M. Alford, Broken Arrow, Okla., assignor to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 108,841, Oct. 14, 1987, abandoned. This application Jun. 22, 1989, Ser. No. 370,366

Int. Cl.^{5} G01V *1/28;* **E21B** *49/00*

U.S. Cl. 367—75 **45 Claims**



1. A method of seismic exploration employing seismic sources s_j having at least two linearly independent lines of action j with respect to a survey line and seismic receivers r_i having at least two linearly independent lines of action i with respect to the survey line, comprising the steps of:

(a) imparting seismic energy into the earth with seismic sources s_j;

(b) recording the earth's response to the imparted seismic energy with receivers r_i;

(c) collecting a concord of seismic signals ϕ_{ij}, wherein the seismic energy imparted by seismic source s_j are recorded by seismic receiver r_i; and

(d) processing the full concord of seismic signals ϕ_{ij} consisting essentially of diagonalizing the amplitude values of the concord of seismic signals ϕ_{ij}, as a concord, and obtaining a diagonalized concord of seismic signals ϕ_{cm}, wherein the amplitude values of the cross component seismic signals ϕ_{ij} of the concord of seismic signals are substantially reduced to zero.

5,027,333
ACOUSTIC LOCATOR FOR ELEMENTS OF A FLEXIBLE SONAR ARRAY

Michael A. Halling, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 26, 1979, Ser. No. 97,586

Int. Cl.^{5} H04B *11/00*

U.S. Cl. 367—131 **9 Claims**

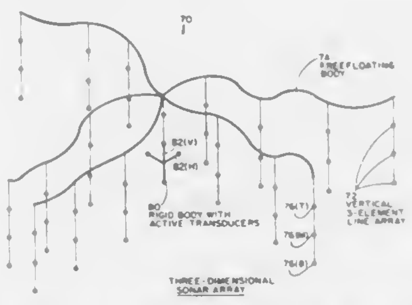
1. An acoustic array, useful for sonar, comprising a plurality of transducing elements which are free floating and not connected to each other and a plurality of means for locating the position of each of the transducer elements, each locating means comprising:

a means for transmitting a signal;

three rigid arms, connected to each other and suspended from the transmitting means, the length of each arm and its orientation with respect to the other two arms being known;

means for generating high-frequency (h-f) acoustic signals, a generating means being located at the end of each arm, the signal from each means being unique and identifiable; and

a means for determining the magnetic orientation of the three-arm structure in space;


70
74 FREEFLOATING BODY
82(V)
82(H)
80 RIGID BODY WITH ACTIVE TRANSDUCERS
76(T)
76(M)
76(B)
72 VERTICAL 3-ELEMENT LINE ARRAY
THREE-DIMENSIONAL SONAR ARRAY

signals from the h-f generating means and the magnetic determining means being transmitted to the transmitting means.

5,027,334
MAGNETO-OPTICAL DISK DEVICE WITH MOVABLE COIL

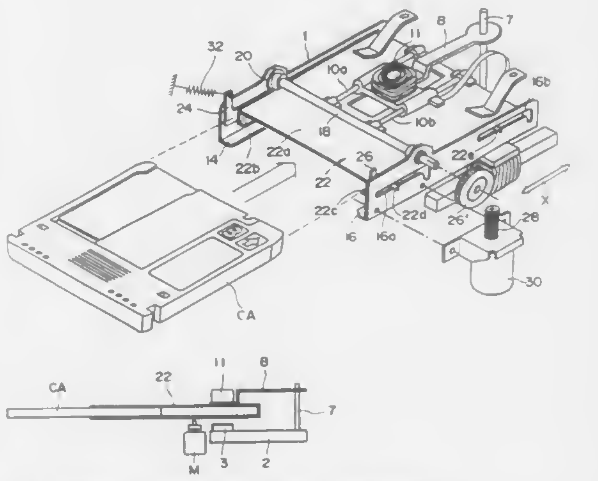
Toshihiro Yamanaka, Ikoma; Tetsuyuki Takemoto, Nara; Masahiro Horii, Nara, and Shoji Taniguchi, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 6, 1989, Ser. No. 334,149

Claims priority, application Japan, Apr. 7, 1988, 63-87654

Int. Cl.^{5} G11B *13/04, 11/12, 11/10*

U.S. Cl. 369—13 **5 Claims**



1. A magneto optical disc device comprising:

a magnetic field coil which applies a magnetic field to a magneto-optical disc;

an optical head which slides parallel to the face of the magneto optical disc;

a first support member which supports said magnetic field coil;

a second support member which is mounted to said optical head and supports said first support member in such a manner said first member is able to slide in a direction perpendicular to the face of the magneto optical disc, whereby said first support member and said magnetic field coil are raised, via said second support member, at the beginning of the insertion of the magneto-optical disc, are then lowered toward a position adjacent said magneto-op-

VOL
1127
ISS
4
JE
25
1991
UMI

tical disc during playing and recording of the optical disc, and are raised at the end of the ejection of the magneto optical disc.

5,027,335

READ APPARATUS HAVING VERTICAL TURRET MAGAZINE FOR INFORMATION DISCS

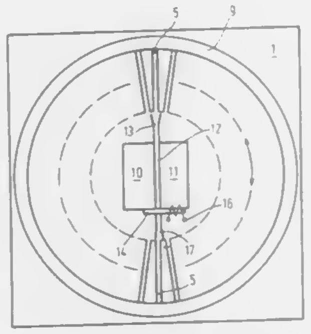
August A. Deis, Siegen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 11, 1988, Ser. No. 235,146

Claims priority, application Fed. Rep. of Germany, May 13, 1987, 3715942

Int. Cl.^{5} G11B *17/22*

U.S. Cl. 369—37 **4 Claims**



1. A read apparatus for information stored on a plurality of information discs, comprising

a turret magazine rotatable about an axis of rotation and comprising a plurality of storage compartments which are equidistantly spaced along its circumference and are adapted to hold the information discs,

a disc-drive arrangement for rotating a disc selected from the turret magazine,

a feed-in device for conveying a disc from a storage compartment into the disc-drive arrangement and back into a storage compartment, and

a scanning device for reading the information stored on a disc which is rotated by the disc-drive arrangement, characterized in that

the turret magazine is rotatable in a first vertical plane,

the disc-drive arrangement is surrounded by the turret magazine in such a way that a disc received from said magazine is rotatable in a second vertical plane which extends substantially perpendicular to the first vertical plane and storage compartments are situated underneath and above said axis of rotation,

the feed-in device essentially comprises a loading funnel and an unloading funnel arranged respectively above and underneath a receiving compartment of the disc-drive arrangement, each funnel guiding the disc while being conveyed, each storage compartment has an associated releasable holding device for the discs, and

the receiving compartment of the disc-drive arrangement has an associated releasable holding device for a disc received from the magazine.

5,027,336

OPTICAL INFORMATION READING APPARATUS WITH TRACKING ADJUSTMENT SYSTEM

Satoshi Sugiura, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sep. 30, 1988, Ser. No. 251,477

Claims priority, application Japan, Oct. 29, 1987, 62-274070

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—44.13 **12 Claims**

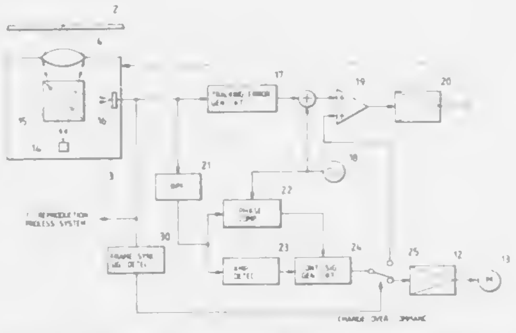
1. An optical information reading apparatus comprising:

an optical system for radiating a light beam in the form of a beam spot on an information recording surface of a disk-like recording medium;

a light detector for receiving said light beam from said information recording surface;

tracking error signal generating means for generating a tracking error signal corresponding to an amount of deviation of said beam spot from a recording track of said recording medium in accordance with an output of said light detector;

tracking servo means for controlling a relative position of said beam spot relative to said recording track in accordance with said tracking error signal to minimize said amount of deviation;



adjustment means for adjusting a tilt of an optical axis of the light beam relative to said information recording surface;

means for superimposing a driving signal of a predetermined frequency on said tracking error signal;

extraction means for extracting a signal components of said predetermined frequency from the output of said light detector and providing an output signal accordingly; and

detection means for detecting an amplitude of said extraction means output signal, for detecting a phase of said extraction means output signal relative to said driving signal, and for providing an output signal accordingly, said adjustment means selectively adjusting said tilt of the optical axis in accordance with said detection means output signal.

5,027,337

OPTICAL RECORDING MEDIUM AND TRACKING METHOD THEREFOR

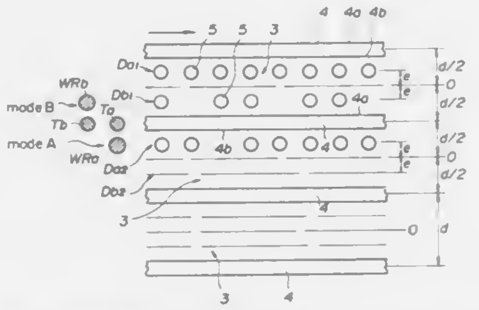
Shunzo Takahashi; Shigeru Izawa; Hidefumi Suzuki, and Takashi Hasemi, all of Tokyo, Japan, assignors to CSK Corporation, Tokyo, Japan

Continuation of Ser. No. 30,996, Mar. 27, 1987, abandoned. This application Mar. 22, 1990, Ser. No. 501,333

Claims priority, application Japan, Mar. 28, 1986, 61-69876; May 12, 1986, 61-108154; Jun. 13, 1986, 61-138730

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—44.26 **4 Claims**



1. A tracking method for an optical recording system including an optical system having means for projecting data reading and tracking line detection light beams, data reading and tracking photoelectric detector pairs, said detector pairs being arranged in fixed positional relationship to each other for detecting said light beams reflected by an optical medium, and tracking means for positioning by an optical medium, and tracking means for positioning said photoelectric detectors relative to said light beams reflected by said optical medium in response to detecting said tracking line detection light reflected from said optical medium, said optical medium having data tracks containing information to be read by said data reading photoelectric detectors extending along tracking lines in a data storage section of the medium wherein said tracking lines are detected by said tracking photoelectric detectors, which method comprises:

projecting said data reading and tracking line detection light beams onto one of said data tracks and onto one of said tracking lines, respectively, of the optical recording medium;

differentially detecting a selected one of said data reading and tracking line detection light beams reflected by said optical medium;

determining a relative movement of said photodetectors with respect to the optical recording medium in response to said differentially detecting step;

positioning said photoelectric detectors relative to said optical recording medium so that when said tracking line detection light beam for track detection is positioned for tracking the tracking line, the data reading light beam is positioned for reading, moving on and along a selected one of said data tracks.

5,027,338

TRACKING DEFECT PREVENTING CIRCUIT

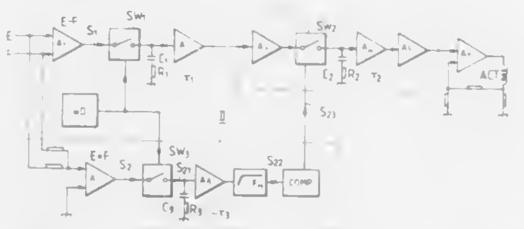
Kazuhisa Ata, Kanagawa, Japan, assignor to Kyocera Corporation, Kyoto, Japan

Filed Dec. 21, 1988, Ser. No. 288,416

Claims priority, application Japan, Dec. 25, 1987, 62-330408

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—44.29 **8 Claims**



1. In a tracking control circuit for providing a tracking control signal for controlling the tracking for an optical pickup with respect to tracks of an optical information recording medium, wherein two tracking error signals corresponding to two respective sub-beam spots are provided, the tracking control being dependent on the difference of the two tracking error signals, the improvement comprising:

a difference circuit for providing a difference signal corresponding to a difference of the two tracking error signals, said difference circuit having a signal path for conducting the difference signal;

a tracking phase compensation circuit comprising a switch (SW2) connected in the signal path of said difference circuit to interrupt the difference signal from the difference circuit in response to an interruption control signal provided thereto;

a defect responding circuit comprising an addition means connected for adding together the two tracking error signals to form an addition signal corresponding to the sum of the two tracking error signals, and means for generating the interruption control signal dependent on the addition signal, said defect responding circuit having a signal path for conducting the addition signal and the interruption control signal; and

means connected in the signal path of one of said difference circuit and said defect responding circuit for establishing a relation between the phases of the difference signal and the interruption control signal so that the interruption control signal reaches the switch (SW2) earlier than the difference signal.

5,027,339

OPTICAL CARD ANALYZING APPARATUS

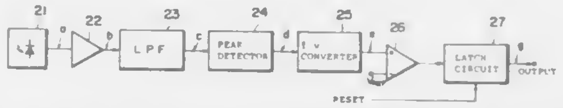
Shigeru Yoda, Mishima, and Kouji Nitto, Takatsuki, both of Japan, assignors to Omron Tateisi Electronics Company, Kyoto, Japan

Filed Aug. 2, 1988, Ser. No. 227,336

Claims priority, application Japan, Aug. 6, 1987, 62-196747; Oct. 28, 1987, 62-165026

Int. Cl.^{5} G11B *7/00*

U.S. Cl. 369—54 **14 Claims**



1. An apparatus for playing back recorded information from an optical card in which by irradiating a light beam for reproducing recorded information onto information recording tracks of the optical card on which pit trains indicative of recording information are formed the pit trains are read on the basis of the difference between a reflectance of the pit portions and reflectance of the other portion and the recorded information on the optical card is reproduced, said apparatus comprising:

a photodetector for receiving reflected light from the optical card and for outputting a photosensing signal;

means for detecting a peak of the photosensing signal and for producing a pit correspondence signal having a frequency indicative of peak detection;

a frequency to voltage converter for converting the frequency of the pit correspondence signal into a voltage signal; and

means for producing an information presence/absence discrimination signal whenever the voltage signal from the frequency to voltage converter exceeds a predetermined value.

5,027,340

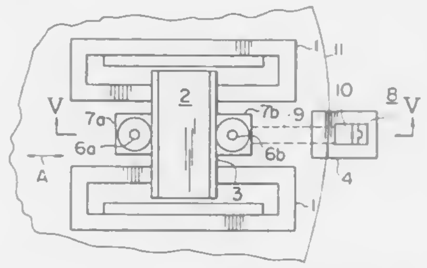
OBJECT LENS HEAD ASSEMBLY

Takashi Yumura, and Tetsu Yamamoto, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 1, 1989, Ser. No. 360,224

Int. Cl.^{5} G11B *17/30*

U.S. Cl. 369—219 **5 Claims**



1. An object lens head assembly for use with an optical recording disc comprising:

VOL
1127
ISS
4
JE
25
1991
UMI

a linear motor disposed adjacent to a face of the optical recording disc and movable in a direction parallel to the face of the disc;
first and second object lenses mounted on said linear motor to move therewith over first and second portions, respectively, of the face of the disc;
first and second reflective mirrors mounted on said linear motor to move therewith along first and second paths, respectively, said first and second reflective mirrors being disposed in attitudes such that:
(a) beams of light bearing information to be written onto the disc travelling along the first and second paths are reflected by said first and second mirrors, respectively, through said first and second object lenses onto the first and second portions of the disc, respectively, and
(b) beams of light bearing information read from the disc passing from the first and second portions of the disc through said first and second object lenses are reflected by said first and second mirrors, respectively, onto said first and second paths, respectively;
a transducer for receiving an electrical signal bearing information to be written to the disc and outputting a beam of light bearing the information to be written and for receiving a beam of light bearing information read from the disc and outputting an electrical signal bearing the information read; and
a light beam shifting mechanism for directing the beam of light from said transducer bearing information to be written onto a selected one of the first and second paths, and for directing a beam of light bearing information read from the disc traveling along a selected one of the first and second paths to said transducer.

5,027,341

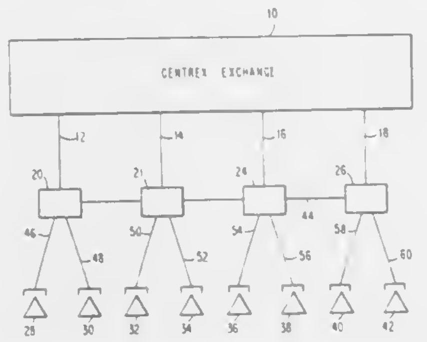
STATION LINE SWITCHING CONTROL SYSTEM

J. Michael Jarvis, Richmond; Andrew F. Bass, Vienna, both of Va., and James B. Sherman, Chapel Hill, N.C., assignors to Charter Leasing Corporation, Richmond, Va.

Filed Mar. 30, 1990, Ser. No. 501,701

Int. Cl.⁵ H04J *3/06;* **H04M** *3/50;* **H04Q** *11/04*

U.S. Cl. 370—13 16 Claims



11. A method of operating a telephone network including a plurality of digital telephone stations and a centrex exchange for managing the flow of telephone calls to and from said telephone stations, and a station controller connected between said telephone stations and said centrex exchange by at least one digital carrier link to said centrex exchange and connected to said telephone stations by digital links; the steps comprising:
sequentially storing incoming data groups from said one digital carrier link;
sequentially polling said digital links to said telephone stations;
sequentially storing incoming data groups from said digital links responsive to said polling;
transferring selected data stored from the polling of said digital links to said digital carrier link or to a digital link to said telephone stations; and
slaving the framing and phase of the signal transfer with and within said station controller to signals from said one digital carrier link.

5,027,342

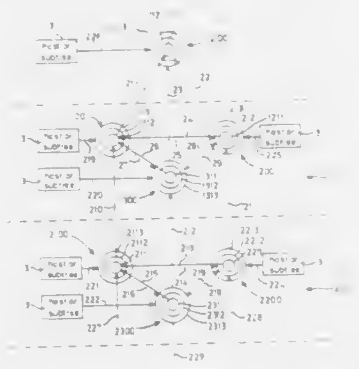
LOCAL AREA NETWORK

Peter I. P. Boulton, and Ernest S. Lee, both of Islington, Canada, assignors to The University of Toronto Innovations Foundation, Toronto, Canada

Filed May 3, 1989, Ser. No. 346,665

Int. Cl.⁵ H04Q *1/20*

U.S. Cl. 370—16 8 Claims



1. A local area network arranged in a rooted tree topology comprising a plurality of access ports connected to one of a plurality of nodes, each node having at least one hub, each hub connected by data links to at least one other hub and each hub further including a selector to select one said data links for transmission through said network and broadcast means to transmit data to each of said data links connected to said hub, at least one of said nodes acting as a nexus whereby data from any access port is transmitted through the nexus to all access ports, at least one of said nodes being a multiple hub node having a plurality of hubs and having internal transmission means and switch means to control said internal transmission means, each hub of said multiple hub node further including detector means to detect failure in one said data link and to operate said switch means to establish communication between said hub and another hub of said multiple hub node through said internal transmission means.

5,027,343

REMOTE TEST ACCESS SYSTEM FOR ISDN TESTING

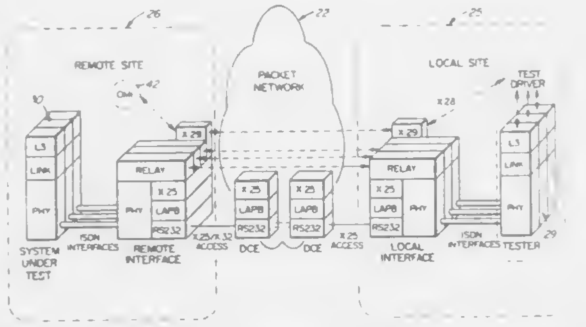
Wing-Man Chan; Quoc H. Tu, and Vithit Chungphaisan, all of Nepean, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jul. 31, 1989, Ser. No. 386,625

Claims priority, application Canada, Apr. 21, 1989, 597507

Int. Cl.⁵ H04L *1/24*

U.S. Cl. 370—017 17 Claims



1. In a communications system having a local terminal defined by a multilayered assembly of interrelated protocols, a corresponding remote terminal, and means for generating at the local terminal a test suite comprising protocol test messages of normal and erroneous behavior for the layers under test, an improved method for protocol testing between predetermined corresponding pairs of layers in the terminals, comprising the steps of:
(a) splitting a network interface disposed at each terminal;
(b) inserting at each split interface a configurable interface for matching predetermined apparatus connectable to each terminal as an element thereof;
(c) communicating the configurable interfaces with a ubiquitous transport network for establishing at least one protocol testing path between the corresponding pairs of layers through at least one virtual circuit of the network adapted to pass transversely protocol test messages of normal behavior and to reject protocol test messages of erroneous behavior; and
(d) identifiably encoding protocol test messages corresponding to erroneous behavior of the layers under test and further encoding such test messages as protocol test messages of normal behavior acceptable for transparent transmission over the at least one virtual circuit.

5,027,344

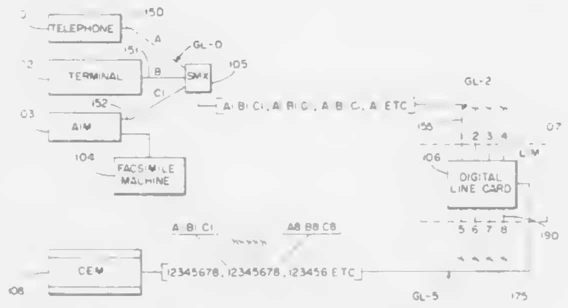
INTEGRATED OFFICE CONTROLLER (IOC)

John C. Bellamy, Coppell; Richard L. Christensen, Richardson, and Charles K. Schroth, both of Richardson, all of, assignors to Data General Corporation, Westboro, Mass.

Filed Jun. 28, 1989, Ser. No. 372,885

Int. Cl.⁵ H04J *3/00*

U.S. Cl. 370—56 23 Claims



1. An integrated office controller (IOC) network for exchanging bearer and channel signal information between user station devices via a switch matrix, comprising:
(a) a plurality of station devices for transmitting and receiving multiplexed bearer and signal channel information;
(b) user port interface means for carrying said multiplexed bearer and signal channel information between at least one of said station devices and a station multiplex/demultiplex (SMX) device;
(c) a plurality of station multiplex/demultiplex devices (SMXs), each associated with and coupled to a predefined cluster of said station devices via user port interface means, wherein each SMX is operative to concentrate multiplexed bearer and signal channel information received from said user port interface means into channel signals and to transmit said channel signals toward said switch matrix over a transmission system, and further wherein each SMX is operative to demultiplex channel signals being transmitted toward a cluster of station devices, via said transmission system, into multiplexed bearer and signal channel information for distribution to said station devices via said user port interface means;
(d) a transmission system, including at least one modular line interface device (LIM), for interconnecting a set of SMX devices, via said LIM, with a separate modular central equipment device (CEM), wherein said transmission system is operative independent of the backplane of said CEM to multiplex the channel signals transmitted by said set of SMXs into multiplexed switch matrix channel signals and to transmit said multiplexed switch matrix channel signals toward said CEM, and further wherein said transmission system is operative independent of the backplane of said CEM to demultiplex multiplexed switch matrix channel signals received from said CEM into channel signals for distribution to said set of SMXs; and
(e) modular central equipment means (CEM), including a call processor, a switch matrix directly coupled to said transmission system, and clock means, for receiving multiplexed switch matrix channel signals from said transmission system, for switching said multiplexed switch matrix channel signals through said switch matrix under the control of said call processor and clock means, and for transmitting switch matrix output, in the form of multiplexed switch matrix channel signals, toward said set of SMX's via said transmission system, thereby providing a continuous path by which user station devices may exchange bearer and channel signal information via said switch matrix using a transmission system that is directly coupled to said switch matrix and operates independent of said CEM backplane.

5,027,345

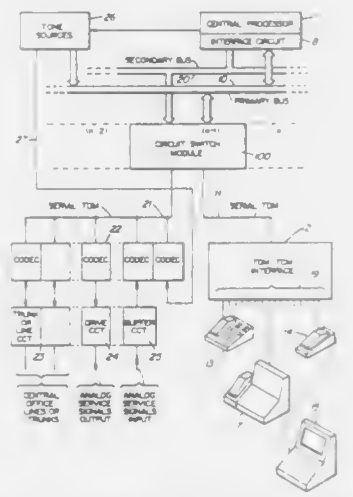
DIGITAL KEY TELEPHONE SYSTEM

Timothy J. Littlewood, Nepean; David J. Robertson, Ottawa, both of Canada; Ronald J. Maginley, Ann Arbor, Mich.; Alan S. J. Chapman, Kanata, Canada; Terence N. Thomas, Nepean, Canada, and Nadir Nizamuddin, Kanata, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Continuation-in-part of Ser. No. 166,345, Mar. 10, 1988, Pat. No. 4,893,310, and a continuation-in-part of Ser. No. 126,710, Nov. 30, 1987, Pat. No. 4,873,682. This application Dec. 29, 1988, Ser. No. 291,949

Int. Cl.⁵ H04Q *11/04*

U.S. Cl. 370—58.2 45 Claims



1. A method of operating a telecommunications system comprising a plurality of ports connected to a common central processing means, each port being adapted to have a terminal apparatus releasably connected thereto, each such terminal apparatus having an identifier that is unique within such system and said central processing means having storage means for storing each said identifier together with administration data specific to such terminal apparatus and a physical address of said terminal apparatus, said method comprising the steps of detecting initial connection of said terminal apparatus to a port, transmitting such identifier to said central processing means, detecting said identifier in the signal at said central processing means, determining the port from which said identifier was transmitted, and writing to said storage means to associate said

VOL 1127 ISS 4 JE 25 1991 UMI

administration data specific to said terminal apparatus with its said identifier in said storage means.

5,027,346
NODE APPARATUS FOR PARALLEL COMMUNICATION

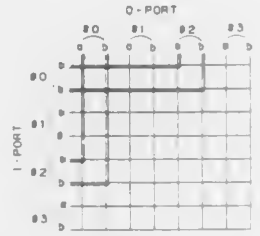
Kazunori Hoshi, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 27, 1988, Ser. No. 290,429

Claims priority, application Japan, Dec. 24, 1987, 62-325586

Int. Cl.^{5} H04J *3/14*

U.S. Cl. 370—58.2 **7 Claims**



1. A node apparatus for use in a communication network having a plurality of nodes in which a communication path is shared by a plurality of terminals, comprising:

- an input port including a plurality of units, each unit being defined by n number of input channels including a main input channel for use in connection control of said unit;
- an output port including a plurality of units, each unit being defined by n number of output channels which correspond to the input channels of said input port;
- connecting means for connecting the input channels of said input port to the output channels of said output port; and
- control means for controlling said connecting means to connect said input channels to said output channels selectively, wherein upon detecting a first main input channel which has received a first input signal in the first place among the main input channels of the respective units, said control means controls said connecting means to have said first main input channel connected to a corresponding output channel of each unit, said control means monitoring whether or not a second input signal has been received within a first predetermined time period after elapsing of a second predetermined time period as from the receipt of said first input signal, whereby if a second input signal has been received within the first predetermined time period, said control means detects the main input channel which has received said second input signal as a second main input channel, connects all of the input channels of the units including said first main input channel to all of the output channels of the units which correspond to the unit including the second main input channel, and connects all of the input channels of units including the second main input channel to all of the output channels of the units which correspond to the unit including the first main input channel.

5,027,347
INTERCOM SYSTEM

Heikki Malkki, Tervaniementie 1, SF-02820 Espoo, Finland

Filed May 30, 1989, Ser. No. 358,684

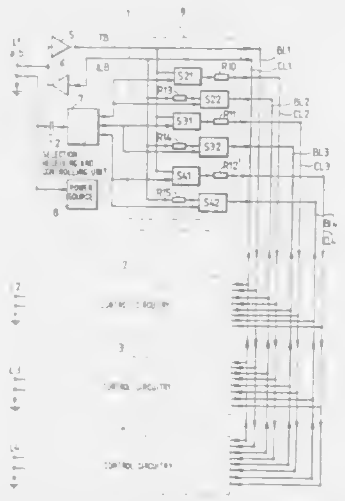
Claims priority, application Finland, Jun. 10, 1988, 882788

Int. Cl.^{5} H04M *7/00;* **H04Q** *11/04*

U.S. Cl. 370—62 **7 Claims**

2. An intercom system comprising a central unit and a plurality of remote stations connected by two-way lines to the central unit to form a network with a star configuration, the lines being interconnectable via the central unit for establishing a connection between desired remote stations in response to selection information received from the lines, communication in each line comprising an inbound signal to the central station and an outbound signal to a selected remote station, at least some of the remote stations comprising means for transmitting a selection information to the central station and said central station comprising means for receiving said selection information; the central unit comprising for each two-way line

- an internal inbound signal bus;
- an internal outbound signal bus;
- a line interface device for applying the outbound signal from the outbound signal bus to the line and for applying the inbound signal from the line to the inbound signal bus; and the central station further comprising
- switching means responsive to the selection information received from the lines for selectively connecting the inbound signal bus and the outbound signal bus of any of the lines to the outbound signal bus and the inbound signal bus of any other of the lines respectively to establish a separate two-way connection between each desired pair of the lines, the switching means being capable of simultaneously connecting inbound buses of at least two different lines to the same outbound signal bus of a third linea nd thereby summing the corresponding inbound signals, when simultaneously separate connections to said third line from each of said at least two different lines are determined by the selection information, said switching means operating such that outgoing signals from plural remote stations directed to a common selected remote station will be summed upon reception at said common station, and such that an outgoing signal from any of said remote stations will be received at only those other remote station or stations directed by said selection information to receive the outgoing signal.



5,027,348
METHOD AND APPARATUS FOR DYNAMIC DATA BLOCK LENGTH ADJUSTMENT

James C. Curry, Jr., Lexington, S.C., assignor to NCR Corporation, Dayton, Ohio

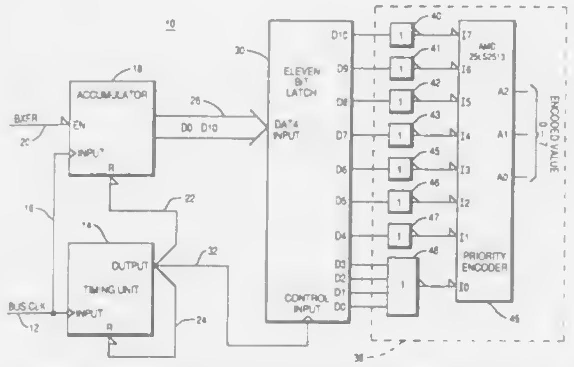
Filed Jun. 30, 1989, Ser. No. 374,120

Int. Cl.^{5} H04J *3/02, 3/16*

U.S. Cl. 370—85.1 **24 Claims**

1. A bus data block length selection apparatus for use with a data bus having a clock signal and a data-transfer-in-process signal, comprising:

- time base means connected for receiving said clock signal and for providing a pulse output after a preselected sample period;
- accumulator means responsive to said pulse output and said data-transfer-in-process signal for accumulating a total of said clock signals within each preselected sample period that jointly occur with said data-transfer-in-process signal and outputting a digital signal representative of said total; and
- decoder means responsive to said pulse output and to said digital signal output for decoding said digital signal output and selecting an appropriate length for a subsequent bus data block according to the total of said clock signals accumulated in said preselected sample period.



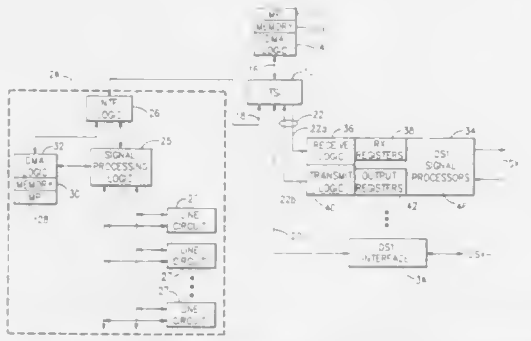
5,027,349
EMBEDDED CONTROL TECHNIQUE FOR DISTRIBUTED CONTROL SYSTEMS

Hal A. Thorne, Wendell, N.C., assignor to Alcatel NA, Hickory, N.C.

Continuation of Ser. No. 349,716, May 10, 1989, abandoned. This application Jul. 3, 1990, Ser. No. 547,383

Int. Cl.^{5} H04J *3/24*

U.S. Cl. 370—85.1 **26 Claims**



1. A method for controlling an electronic system having at least two functional elements, at least one being intelligent and at least one non-intelligent, wherein information is normally conveyed between said elements in time slots of a time-division multiplexed data link, said method comprising the steps of:

- generating a control message in one of said elements, including formatting said control message in a format compatible with both types of elements;
- inserting said control message in a predetermined time slot of said data link; and
- reading said control message from said data link by another of said elements during said time slot, whereby a control message may be transmitted in a predetermined time slot of the same data link used to convey information and one control message format can be used and transmitted on the data link for both types of elements.

5,027,350
METHOD AND APPARATUS FOR PROVIDING A LOCAL AREA NETWORK BRIDGE

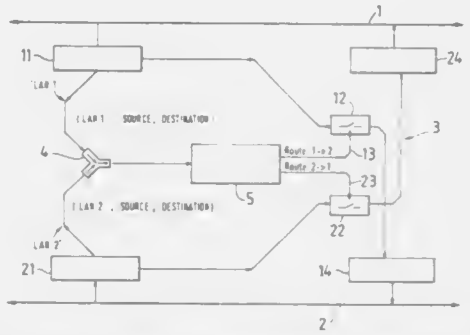
Alan D. Marshall, Merchants Landing, United Kingdom, assignor to Hewlett-Packard, Palo Alto, Calif.

Filed Oct. 18, 1989, Ser. No. 423,954

Claims priority, application European Pat. Off., Oct. 20, 1988, 88309860

Int. Cl.^{5} H04J *3/24*

U.S. Cl. 370—85.13 **13 Claims**



1. A method for using a communication bridge to route data packets containing source address, destination address and routing data, the bridge interconnecting two or more local area networks or the like wherein the stations on the networks have respective unique addresses, the method comprising the following steps:

- storing table data at table locations of a routing table, the table data comprising station addresses together with the respective routing data;
- receiving data packets from said networks;
- applying a hashing algorithm to the destination address of a data packet when received and on the basis thereof accessing one of said table locations to retrieve routing data and the station address therefrom; and
- after a predefined limited number of hash probes, forwarding the data packet onto all networks other than the one from which the packet was received if the accessed table location is empty or does not contain a station address corresponding to said data packet destination address, or in the event that the addresses correspond, forwarding the data packet according to the retrieved routing data without further hash probes.

5,027,351
ASYNCHRONOUS TIME DIVISION COMMUNICATION SYSTEM

Martin L. F. De Prycker, Sint Niklaas; Mark L. M. R. Ryckebusch, Sint-Pieters-Leeuw, and Peter I. A. Barri, Bonheiden, all of Belgium, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Sep. 18, 1989, Ser. No. 415,274

Claims priority, application Belgium, Mar. 18, 1987, 8700282

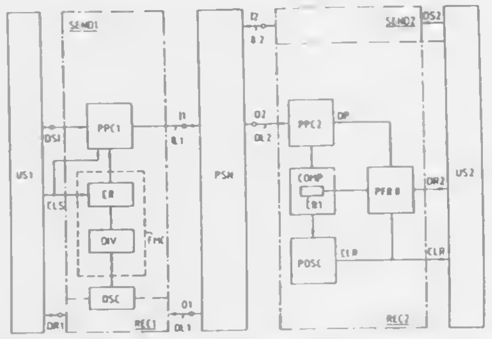
Int. Cl.^{5} H04L *12/56;* **H04J** *3/06*

U.S. Cl. 370—94.1 **14 Claims**

1. Asynchronous time division communication system with at least one station (US2, REC2, SEND2) including a buffer circuit (PFIFO) and associated processing means (PPC2, COMP) to write data packets in said buffer circuit at a send clock (OSC, CLS) frequency and to read data packets from said buffer circuit at a receive clock (POSC, CLR) frequency, said processing means being further able to assess the real packet filling level of said buffer circuit and to adjust said receive clock frequency as a function of the thus assessed real packet filling level, characterized in that said processing means (PPC2, COMP) is able to calculate a mean packet filling level (X) after a measuring time has elapsed, by taking the mean of

VOL
1127
ISS
4
JE
25
1991
UMI

m successively assessed real packet filling levels of said buffer circuit (PFIFO) and to use the thus obtained mean packet filling level for adjusting said receive clock frequency (POSC. CLR).



5,027,352

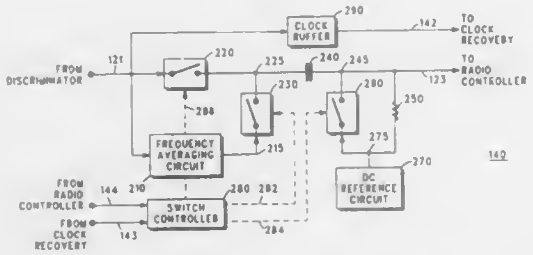
RECEIVER FREQUENCY OFFSET BIAS CIRCUIT FOR TDM RADIOS

Steven H. Goode, Palatine, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 5, 1989, Ser. No. 293,285

Int. Cl.^{5} H04J *3/12*

U.S. Cl. 370—110.1 **33 Claims**



1. A bias control circuit for a radio receiver used in a communication system wherein a signalling preamble is sent to said receiver prior to sending other information, said bias control circuit comprising:

- a coupling capacitor having an input terminal and an output terminal;
- means for selectively coupling said capacitor input terminal to a received input signal in response to a control signal;
- means for biasing said capacitor input terminal to a desired voltage in response to said control signal; and
- controller means for providing said control signal in response to the reception of said signalling preamble,
- whereby said coupling capacitor is properly biased for the subsequent reception of said other information.

5,027,353

METHOD FOR TESTING INTERCONNECTIONS

Najmi T. Jarwala, Plainsboro, N.J., and Chi W. Yau, Holland, Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 17, 1989, Ser. No. 339,337

Int. Cl.^{5} G06F *11/00*

U.S. Cl. 371—27 **3 Claims**

3. A method for testing the integrity of each n interconnections (nets) within a circuit by supplying each of a sequence of p parallel test vectors to the circuit and comparing the response signal produced by the circuit upon receipt of each test vector, the improvement comprising generating the set of vectors by the steps of:

- ordering the nest in the circuit in such a way that net n_i is closer in proximity to net n_{i+1} than net n_{i+2};
- determining the maximum number (E) of adjacent nets likely to be shorted;
- establishing the number p of vectors in accordance with the maximum number (E) of shorted nets;
- successively producing set of unique test vectors, each of the vectors in each set obtained by assigning each of its p bits a one or zero such that all of the vectors in the set have a potential weight less than those in the succeeding set and that the vectors in each set are diagonally independent, and
- concatenating the set of p vectors together until n vectors are obtained.

5,027,354

ELECTRONIC MEMORY TESTING DEVICE

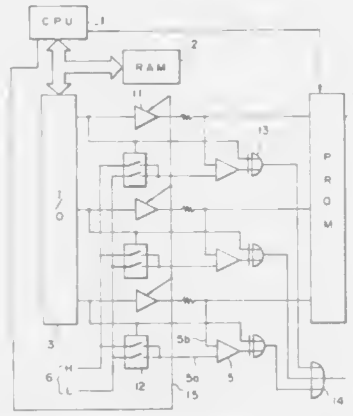
Mitsuyuki Ara, and Yoshihiro Honma, both of Tokyo, Japan, assignors to Ando Electric Co., Ltd., Tokyo, Japan

Filed Nov. 6, 1989, Ser. No. 433,384

Claims priority, application Japan, Mar. 27, 1987, 62-73778

Int. Cl.^{5} G01R *31/28*

U.S. Cl. 371—25.1 **1 Claim**



1. A verification circuit comprising:

- A CPU;
- a RAM wherein a data A having a plurality of bits composed of "1" and "0" are written, said RAM being connected with said CPU;
- an I/O port having connected at an input thereof an output of said CPU and an output of said RAM for receiving the data A from said RAM;
- a plurality of drivers each connected at an input thereof with the output of said RAM via said I/O port, said drivers being turned on w[illegible]ontrol signal issued from said CPU is "1" and tu[illegible] while the control signal is "0";
- a PROM connected with [illegible] output of each of said drivers, the data A being writte[illegible]n said PROM when the control signal is "1", and a d[illegible] to be compared with the data A being read from sa[illegible]M when the control signal is "0";
- reference voltages hav[illegible] respective H and L levels;
- a plurality of analog switches each having means driven directly by said data A for providing at an output thereof said H level when an associated said bit of the data A is "1" and said L level when an associated said bit of the data A is "0";
- a plurality of comparators each having one input terminal connected with a respective said output of said analog switches and an other input terminal connected with an output of said PrOM to receive the data B read from said PROM, a plurality of exclusive OR circuits each having a first input terminal connected with an output of a respective said comparator and second input terminal connected with the output of said RAM to receive the data A via said I/O port, and a gate having input terminals which are each connected with an output of a respective said exclusive OR circuit, said gate being arranged to issue a "1" when the data A from said /RAM and the data B from said PROM are not identical with each other and a "0" when the data A and the data B are identical with each other.

5,027,355

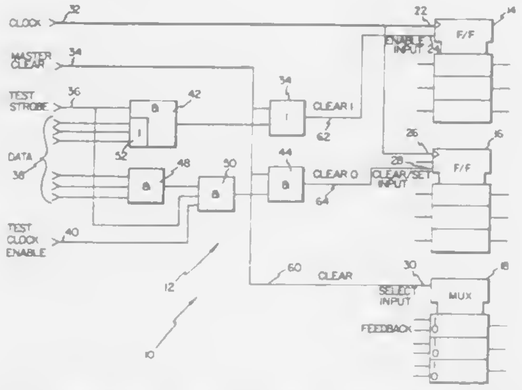
LOGIC CIRCUIT AND DESIGN METHOD FOR IMPROVED TESTABILITY

Susana Stoica, Edina, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Apr. 14, 1989, Ser. No. 338,804

Int. Cl.^{5} G01R *31/28;* G06F *15/60*

U.S. Cl. 371—22.1 **20 Claims**



17. An integrated circuit operable in initialization and test modes, including:

- testability circuitry means for generating testability signals including:
  - CLEAR signals having a first logic state during circuit operation in the initialization mode and having the first and second logic state approximately equal amounts of time during circuit operation in the test mode;
  - CLEAR0 signals having the first logic state during circuit operation in the initialization mode and having the second logic state most of the time and the first logic state the remainder of the time during circuit operation in the test mode; and
  - CLEAR1 signals having the first logic state during circuit operation in the initialization mode and having the first logic state most of the time and the second logic state the remainder of the time during circuit operation in the test mode; and
- a main logic function formed by circuit elements including:
  - first-type circuit elments having Select or other inputs coupled to receive the CLEAR signals;
  - second-type circuit elements having CLEAR, SET or other inputs connected to receive the CLEAR0 signals; and
  - third-type circuit elements having Enable or other inputs coupled to receive the CLEAR1 signals.

5,027,356

ERROR CONTROL SYSTEM

Makoto Nakamura, Kanagawa, and Tomoko Kodama, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 8, 1989, Ser. No. 320,442

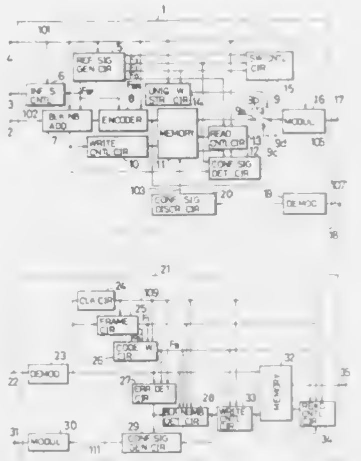
Claims priority, application Japan, Mar. 9, 1988, 63-053620

Int. Cl.^{5} G08C *25/02*

U.S. Cl. 371—32 **12 Claims**

1. A method of error control which retransmits a portion of information if an error occurs on the portion in transmitting the information, the method comprising the steps of:

- forming an information block composed of one or a plurality of bits from the information;
- transmitting the information block from transmitter means to receiver means in one of a plurality of first transmission areas, the first transmission areas being arranged at predetermined time intervals on a time axis and each of the first transmission areas having a first predetermined time length;
- judging whether or not an error has occurred on the information block;
- retransmitting, when it is judged that an error has occurred on the information block, the information block from the transmitter means to the receiver means in one of a plurality of second transmission areas, the second transmission areas being arranged alternately with the first transmission areas on the time axis and each of the second transmission areas having a second predetermined time length.



5,027,357

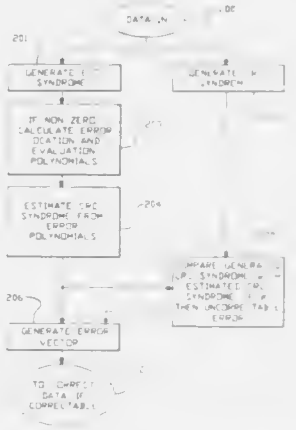
ECC/CRC ERROR DETECTION AND CORRECTION SYSTEM

Chung-Li Yu, San Jose; Edward T. Pak, Fremont, and Ho-Ming Leung, San Francisco, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Oct. 14, 1988, Ser. No. 258,240

Int. Cl.^{5} G11B *20/18*

U.S. Cl. 371—37.7 **25 Claims**


DATA IN
201
GENERATE SYNDROME
IF NON ZERO CALCULATE ERROR LOCATION AND EVALUATION POLYNOMIALS
ESTIMATE CRC SYNDROME FROM ERROR POLYNOMIALS
204
206
GENERATE ERROR VECTOR
TO CORRECT DATA IF CORRECTABLE
ESTIMATED CRC SYNDROME
THEN UNCORRECTABLE ERROR

1. In a data storage system storing sectors of data in a store, each sector including a data block, an error checking and correcting (ECC) block, and an error detecting (ED) block, an apparatus for signalling the occurrence of uncorrectable errors in a sector, the apparatus comprising:

- a data bus, connected to the store, for communication of the sector;
- first means, connected to the data bus and responsive to the ECC block in the sector, for generating an error polyno-

VOL
1127
ISS
4
JE
25
1991
UMI

mial identifying location and value for correctable errors in the sector;

second means, connected to the data bus and responsive to the ED block in the sector, for generating a syndrome identifying detected errors in the data block; and

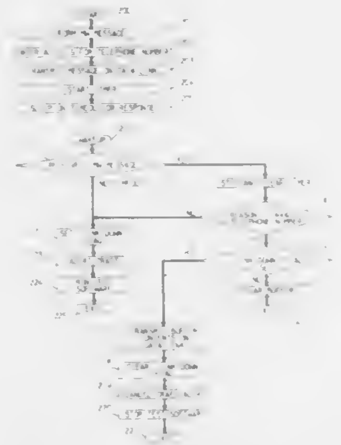
evaluation means, coupled to the first means and the second means and responsive to the error polynomial and the syndrome, for generating an uncorrectable error signal if the detected errors do not match the correctable errors;

wherein the first means includes means for performing a forward Chien Search over the sector so that the error polynomial has an order with respect to bytes of data within the data block, and wherein the syndrome is generated in a reverse order with respect to the order.

5,027,358
SWITCH-ADJUNCT COMMUNICATIONS PROTOCOL

Thomas M. O'Dell, Longmont, and Ricky L. Overmyer, Golden, both of Colo., assignors to AT&T Bell Laboratories, Holmdel, N.J.

Filed Nov. 9, 1989, Ser. No. 434,389
Int. Cl.^{5} G06F *11/00*
U.S. Cl. 371—62 **20 Claims**



10. A method of operating a communication system that includes an adjunct processing system, a communication switching system, and a link having a data communication protocol and interconnecting the switching system and the adjunct processing system, comprising the steps of:

transmitting on the link a formatted first data message of the data communication protocol including data requesting the switching system to perform a task, the format being valid and the data being intentionally invalid;

treating the link as not viable and performing a predetermined action in response to not receiving the second data message following the transmission of the first data message;

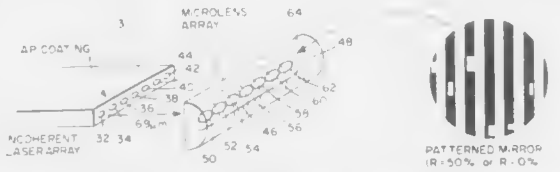
treating the link as viable and not performing the predetermined action in response to receiving on the link a second data message of the data communication protocol informing the adjunct processing system of non-performance of the task requested by the transmitted first data message; and

periodically repeating the preceding steps.

5,027,359
MINIATURE TALBOT CAVITY FOR LATERAL MODE CONTROL OF LASER ARRAY

James R. Leger, Groton, and Gary J. Swanson, Lexington, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Oct. 30, 1989, Ser. No. 428,829
Int. Cl.^{5} H01S *3/098*
U.S. Cl. 372—18 **23 Claims**

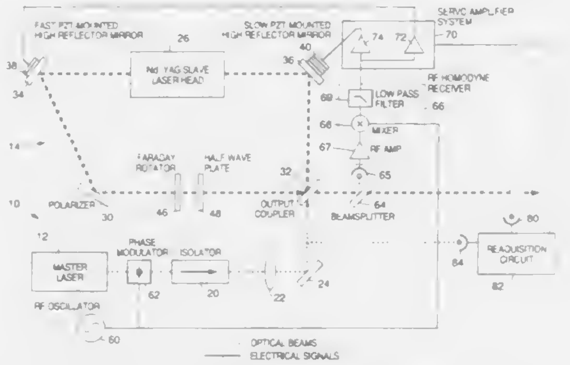


1. An apparatus for coherent beam combining and for lateral mode control of an array of lasers comprising a miniature Talbot cavity formed between said array and a surface spaced apart from said array by a distance $Z=nd^2/\lambda$ where n is a nonnegative integer, λ is the wavelength of the lasers, and d is the laser aperture spacing in said array, said surface being divided into partially reflecting and non-reflecting portions, said partially reflecting portions partially reflecting only that portion of the light from said lasers having a half period shaft corresponding to a fundamental lateral mode.

5,027,360
HIGH POWER CONTINUOUS WAVE INJECTION-LOCKED SOLID STATE LASER

C. David Nabors, Bedford, Mass., and Robert L. Byer, Stanford, Calif., assignors to Stanford University, Standford, Calif.

Filed Jun. 13, 1990, Ser. No. 538,097
Int. Cl.^{5} H01S *3/098, 3/139*
U.S. Cl. 372—18 **13 Claims**



1. An injection locked laser system comprising:

a master laser, said master laser including a solid state gain medium and having a continuous wave, single frequency output;

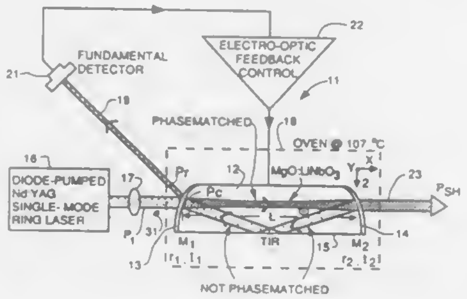
a slave laser including a solid state gain medium located in a resonant cavity and having a continuous wave output at a power at least ten times greater than said master laser, with the output of said master laser being injected into said slave laser in order to cause said slave laser to oscillate at the same frequency as the output of the master laser; and

means for actively stabilizing the slave laser so that its output frequency remains locked with the output frequency of the master laser.

5,027,361
EFFICIENT LASER HARMONIC GENERATION EMPLOYING A LOW-LOSS EXTERNAL OPTICAL RESONATOR

William J. Kozlovsky, Los Altos; Charles D. Nabors, Palo Alto, and Robert L. Byer, Stanford, all of Calif., assignors to Board of Trustees of Leland Stanford, Jr., University, Stanford, Calif.

Filed Jun. 21, 1988, Ser. No. 209,528
Int. Cl.^{5} H01S *3/10;* **H03F** *7/00*
U.S. Cl. 372—22 **18 Claims**



13. In a laser harmonic generator:

a solid monolithic optical resonator of a nonlinear optical material with the optical resonator defined by internally reflective facets of said nonlinear optical material;

an input coupler defined by one of said reflective facets of said nonlinear optical material for coupling an input beam of laser radiation from an external laser source into said optical resonator for exciting a resonant mode thereof to convert resonated fundamental laser radiation into harmonic laser radiation within said optical resonator; and

said input facet having a coating to impedance match said optical resonator to minimize the power of the fundamental laser radiation which is reflected from said input coupler and to maximize the fundamental laser power coupled by said optical coupler into said optical resonator, taking into account the conversion loss to the generated harmonic.

5,027,362
LASER CONTROL METHOD AND CIRCUITRY

John L. Hokanson, Upper Milford Township, Lehigh County, Pa., and Robert G. Swartz, Tinton Falls, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 29, 1988, Ser. No. 291,899
Int. Cl.^{5} H01S *3/00*
U.S. Cl. 372—38 **18 Claims**

1. A laser circuit comprising

means for determining a second derivative signal which is a function of the second derivative of the light output (L) from the laser with respect to the current (I) through the laser (d^2L/dI^2);

control means responsive to said second derivative signal for establishing a laser bias current which results when said second derivative signal equals a predetermined level; and wherein

said determining means includes

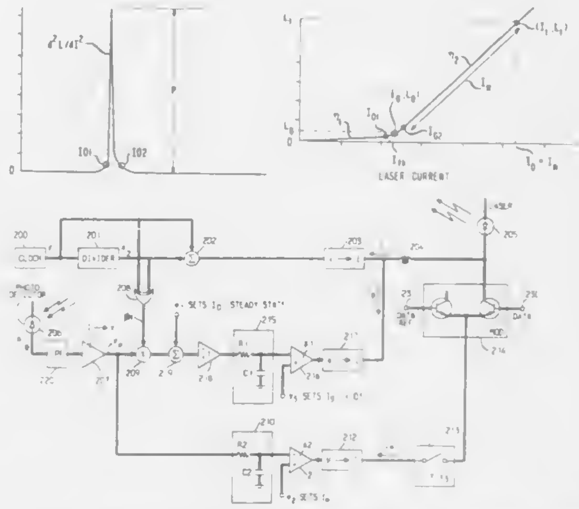
means for combining a test current with said bias current,

detector means for generating a light signal proportional to the light output from said laser,

test current generating means for generating said test current proportional to the sum of first and second frequency signals,

product means for generating a product signal proportional to the product to said first and second frequency signals,

signal mixer means for mixing said light signal and said product signal, and

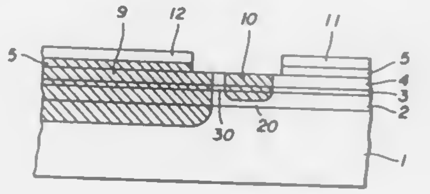


low pass filter means for filtering said mixer output to produce said second derivative signal.

5,027,363
SEMICONDUCTOR LASER

Shogo Takahashi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 6, 1989, Ser. No. 446,931
Claims priority, application Japan, Dec. 9, 1988, 63-312504
Int. Cl.^{5} H01S *3/19*
U.S. Cl. 372—46 **8 Claims**



1. A planar type semiconductor laser comprising, in combination:

a substrate carrying a plurality of layers which include, in sequence, at least a lower cladding layer, an active layer, and an upper cladding layer, the cladding layers being of n-type conductivity,

a first p-type impurity diffusion region extending through said layers to reach the substrate,

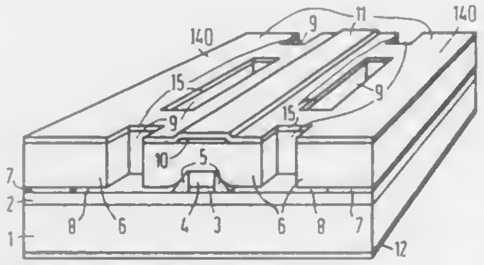
a second p-type impurity diffusion region extending through the upper cladding and active layers into the lower cladding layer, a channel of n-type conductivity in the lower

VOL
1127
ISS
4
JE
25
1991
UMI

cladding layer below the second p-type impurity diffusion region,
the first and second p-type diffusion regions being separated by a narrow stripe defining the laser active region,
an n-side and a p-side electrode formed over said layers,
the n-side electrode being in electrical contact with the n-type cladding layers and thereby the n-type channel in the lower cladding layer, and
the p-side electrode being in electrical contact with the first p-type diffusion region.

5,027,364
LASER DIODE WITH BURIED ACTIVE LAYER AND LATERAL CURRENT LIMITATION

Wolfgang Thulke, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany
PCT No. PCT/DE88/00234, § 371 Date Dec. 18, 1989, § 102(e) Date Dec. 18, 1989, PCT Pub. No. WO88/08215, PCT Pub. Date Oct. 20, 1988
PCT Filed Apr. 18, 1988, Ser. No. 455,411
Claims priority, application Fed. Rep. of Germany, Apr. 16, 1987, 3713045; Apr. 16, 1987, 3713133
Int. Cl.^{5} H02S *3/19*
U.S. Cl. 372—46 **10 Claims**

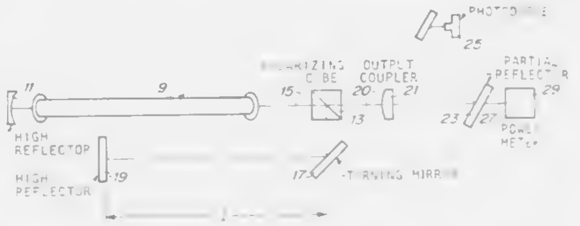


1. A laser diode of a buried double heterostructure that uses lateral current limitation, comprising:
a substrate;
a buffer layer on said substrate;
a cover layer;
at least one laser-active stripe between said buffer layer and said cover layer;
metal contacts on said laser diode to drive said laseractive stripe;
lateral, etched channels provided laterally of said laseractive stripe and proceeding parallel thereto;
a semiconductor material laterally limiting said laseractive stripe; and the lateral limitation of said laser-active stripe proceeds as straight-line as possible upon employment of semiconductor layers manufactured with a mask technique.

5,027,365
PULSED LASER AND METHOD

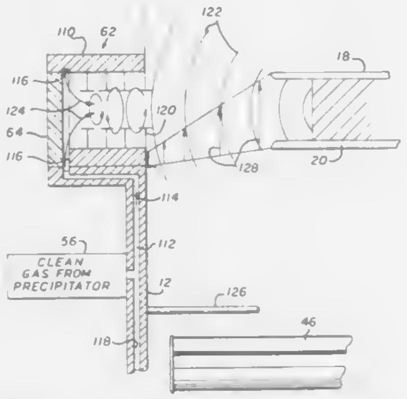
Robert S. Anderson, Livermore, Calif., assignor to Metalaser Technologies, Inc., Pleasanton, Calif.
Filed Apr. 21, 1989, Ser. No. 341,439
Int. Cl.^{5} H01S *3/22*
U.S. Cl. 372—56 **2 Claims**

1. Laser apparatus comprising:
laser means confining a laser medium including copper vapor within an elongated structure;
first reflector disposed near an end of the elongated structure of said laser means to substantially completely reflect radiation from said end of the laser medium back to said laser medium;
a polarizer disposed near the other end of said elongated structure for segregating an incident beam of radiation from said other end of the laser medium into first and second separate beams of radiation, with the first beam including radiation polarized in substantially only one orientation and with the second beam including radiation polarized in substantially only another orientation different from said one orientation;
second reflector means disposed within said first beam for substantially completely reflecting the first beam back through said polarizer to said laser medium; and
partial reflector means disposed in said second beam to transmit a portion of an incident beam therethrough and to reflect another portion of an incident beam back through said polarizer to said laser medium.



5,027,366
COMPACT EXCIMER LASER

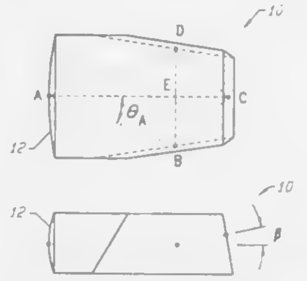
Robert P. Akins; Donald G. Larson, both of San Diego; Uday K. Sengupta, Del Mar, and Richard L. Sandstrom, Encinitas, all of Calif., assignors to Cymer Laser Technologies, San Diego, Calif.
Division of Ser. No. 144,799, Jan. 15, 1988, Pat. No. 4,959,840. This application Jul. 10, 1990, Ser. No. 550,649
Int. Cl.^{5} H01S *3/22*
U.S. Cl. 372—57 **10 Claims**



1. A compact excimer laser, including
a housing structure having a plurality of walls forming an internal laser cavity,
a gas located within the laser cavity and with the gas capable of lasing action,
a pair of spaced electrodes located within the laser cavity and forming an electrical discharge area between the electrodes for stimulating gas within the discharge area to lasing action in accordance with an electrical discharge between the electrodes,
one of the pair of electrodes located along a central position within the cavity and grounded to the housing structure,
the other of the pair of electrodes located adjacent to one of the walls of the housing structure,
means located within the laser cavity for circulating the gas through the discharge area,
means for capturing and filtering at least a portion of the circulated gas to provide a volume of clean gas and with the clean gas supplied to at least selected portions of the laser.
the means for capturing and filtering the circulated gas including an electrostatic precipitator and wherein the captured portion of the circulated gas is filtered by the electrostatic precipitator, and
the electrostatic precipitator formed by a plurality of parallel tubular members each having a high voltage wire running through a tubular member and with each tubular member including an entrance for the gas at a middle position of each tubular member and exits at the ends of each tubular member to provide a laminar flow of the gas from the middle to the ends of the each tubular member to deposit particulates in the gas on the inner wall of each tubular member.

5,027,367
SINGLE-FREQUENCY MONOLITHIC NONPLANAR RING LASER AND METHOD FOR DETERMINING SAME

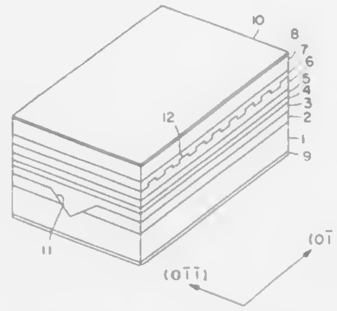
Edward C. Rea, Jr., and Alan C. Nilsson, both of Stanford, Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.
Filed Mar. 31, 1989, Ser. No. 332,010
Int. Cl.^{5} H01S *3/083*
U.S. Cl. 372—94 **25 Claims**



1. A monolithic nonplanar ring laser resonator constructed from a single piece of optically isotropic solid state laser material characterized by a non-zero Verdet constant and several facets which determine a closed internal nonplanar optical path including six points of reflection for propagating light around said internal nonplanar optical path, said optical path being symmetrical about a plane which passes between the two most widely separated points of reflection.

5,027,368
SEMICONDUCTOR LASER DEVICE

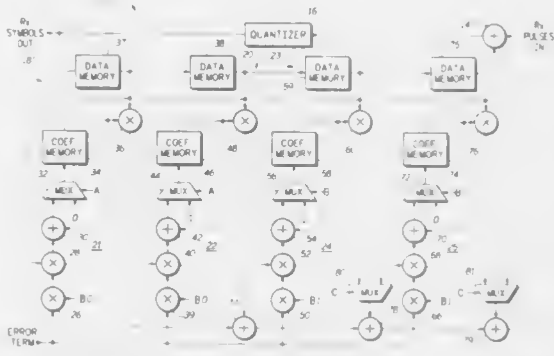
Hiroaki Kudo, Tenri; Haruhisa Takiguchi, Nara; Chitose Sakane, Nara, and Satoshi Sugahara, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Aug. 16, 1989, Ser. No. 394,327
Claims priority, application Japan, Aug. 17, 1988, 63-204231
Int. Cl.^{5} H01S *3/08*
U.S. Cl. 372—96 **8 Claims**



4. In a semiconductor laser device comprising an active layer positioned between a first cladding layer and a second cladding layer, and an optical guiding layer formed on said active layer, said optical guiding layer having a third-order diffraction grating with a periodic corrugation of substantially rectangular shape on a surface opposite said active layer, a device wherein the ratio of the width of each convex portion of said corrugation to the periodicity of said corrugation is in the range of 0.20 to 0.25, 0.40 to 0.60, or 0.7 to 0.95.

5,027,369
RAPID CONVERGENCE DECISION FEEDBACK EQUALIZER

Walter U. Kuenast, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 26, 1990, Ser. No. 498,655
Int. Cl.^{5} H03H *7/30*
U.S. Cl. 375—14 **9 Claims**



1. A communications system for receiving input data pulses which are distorted in shape as a result of transmission, comprising:
combining means having a first input for receiving the input data pulses and a second input for receiving a feedback signal, said combining means combining the feedback signal and the data pulses to provide an output;
quantization means coupled to the combining means for receiving the output of the combining means and quantizing said output signal to provide at an output thereof an indication of signal power of the received input data pulses, said indication having an error component;
feedback means coupled between the second input of the combining means and the output of the quantization means for providing the feedback signal which when combined with the input data pulses causes the error component to converge to a nominal value, said feedback means having first and second coefficient tap portions, said first coefficient tap portion having a first predetermined number of taps and operating without the second coefficient tap portion during a first time period to provide the feedback signal, said second coefficient tap portion having a second predetermined number of taps, and said first and second coefficient tap portions operating together during a second time period to provide the feedback signal; and
control means coupled to the feedback means for controlling lengths of the first and second time periods in response to the error component.

5,027,370
CIRCUIT ARRANGEMENT FOR THE EQUALIZATION OF DIGITAL SIGNALS RECEIVED IN ANALOG FORM

Heinrich Schenk, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany
Filed Sep. 26, 1989, Ser. No. 412,760
Claims priority, application European Pat. Off., Sep. 29, 1988, 88116127.7
Int. Cl.^{5} H04L *5/14*
U.S. Cl. 375—14 **6 Claims**

1. An arrangement for a digital signal receiving system for

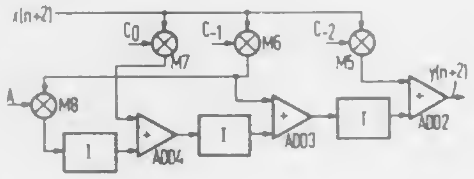
VOL
1127
ISS
4
JE
25
1991
UMI

the equalization of digital signals received from an analog/digital converter of analog signals distorted by precursor effects and postcursor effects in the transmission of signals, comprising:

precursor equalizer means coupled to post cursor equalizer means for equalization processing of the received digital signals, wherein said precursor equalizer means is in the form of a transversal filter connected with said postcursor equalizer means and receives successive digital signals at successive sampling intervals, and

wherein said precursor equalizer means includes;

first multiplier means for multiplying a first digital signal occurring at a sampling interval n by a main coefficient



and each of a predetermined number of digital signals in sampling intervals (n+1), (n+2), . . . immediately following said first digital signal by respective subsidiary coefficients to provide first product signals,

second multiplier means for multiplying the digital signal multiplied by the subsidiary coefficient, which is immediately following said first digital signal multiplied by said main coefficient, by a predetermined factor A and by a digital signal occurring at a sampling interval (n−1) to provide a second product signal, and

adder means for providing a sum signal of said first product signals and said second product signal as an output of said precursor equalizer means.

5,027,371

SELF-ADAPTIVE EQUALIZER CIRCUIT FOR A DIFFERENTIALLY COHERENT DEMODULATION INSTALLATION

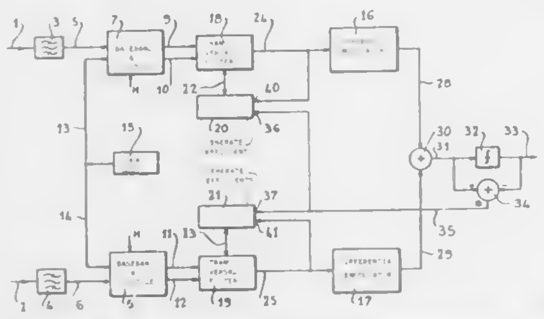
Philippe Sehier, and Ghassan K. Kaleh, both of Levallois Perret, France, assignors to Alcatel Transmission Par Faisceaux Hertziens, Cedex, France

Filed Dec. 29, 1989, Ser. No. 459,411

Claims priority, application France, Dec. 30, 1988, 88 17507

Int. Cl.^{5} H04B *3/04*

U.S. Cl. 375—15 3 Claims



1. A self-adaptive equalizer circuit for differentially coherent demodulation, said circuit comprising:

at least a first differential demodulator receiving an input and providing an output;

a first filter disposed upstream of said first differential demodulator and receiving at least one input and generating an output y(k) in accordance with filter coefficients;

a first baseband and quadrature digitizing circuit for receiving input signals, converting them to baseband and digitizing them into in-phase and quadrature signals for provision to said first filter;

a decision circuit responsive to the output from said differential demodulator for generating an output constituting an output of the self-adaptive equalizer;

an error calculation circuit responsive to input and output signals of said decision circuit for generating error signals e(k); and

a first coefficient calculating unit for calculating the coefficients (C), C1, C2, . . . , Ci, . . . , Cn) for the first filter in accordance with output signals y(k) from the filter and in accordance with said error signals e(k), said coefficients being calculated at each instant kT, where k is an integer and T is an intersymbol spacing, in accordance with the following equation:

$$Ci(k)=Ci(k-1)-\mu.y(k-1).x(k-i)^{*}.e(k)$$

in which:

Ci(k) is the value given to coefficient Ci at instant kT: Ci(k - 1) is the value taken by said coefficient Ci at the instant (K - 1)T; μis a positive real number substantially less than 1; y(K - 1) is an output signal from said filter at instant (k - 1)T; x(k - i)* is a complex conjugate value of a sample x(k - i) present in the filter at said instant kT and relating to the coefficient (Ci); and e(k) is the error at instant kT.

5,027,372

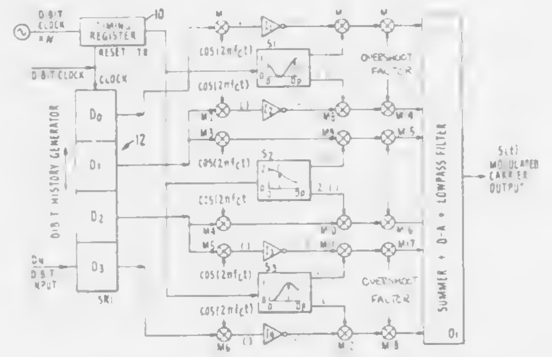
DIFFERENTIAL PHASE SHIFT KEYING MODULATOR

Hee Wong, San Jose, Calif., assignor to National Semiconductor Corp., Santa Clara, Calif.

Filed Mar. 4, 1987, Ser. No. 21,918

Int. Cl.^{5} H04L *27/20*

U.S. Cl. 375—67 6 Claims



1. A differential phase shift keying DPSK modulator for modulating a carrier waveform to provide a phase modulated output signal, the DPSK modulator comprising:

(a) data scrambler means responsive to a digital data input signal sequence for generating a corresponding sequence of dibit signals;

(b) encoding means for differentially encoding the sequence of dibit signals;

(c) a dibit history generator responsive to the sequence of differentially encoded dibit signals for generating corresponding phase modulating vectors; and

(d) modulating means for modulating the carrier waveform utilizing the phase modulating vectors to generate the phase modulated output signal.

5,027,373

N-PI PHASE/FREQUENCY DETECTOR

Steven P. Cok, Seattle, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Continuation of Ser. No. 162,455, Mar. 1, 1988, Pat. No. 4,878,231. This application Oct. 31, 1989, Ser. No. 429,600

Int. Cl.^{5} H04L *27/14*

U.S. Cl. 375—80 13 Claims

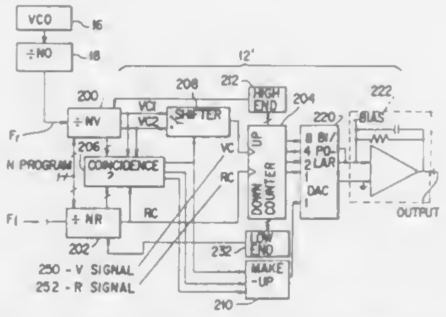
1. A digital phase/frequency detector circuit for detecting

difference in phase or frequency between an input signal and a reference signal, comprising:

means for receiving the input and reference signals;

means for generating square wave signals having a duty ratio corresponding to a phase or frequency difference between said input and reference signals;

means for integrating said square wave signals to provide corresponding sawtooth wave signals, including an up-down counter circuit and a digital-to-analog converter circuit responsive to said counter circuit for generating said sawtooth wave signals;



means for combining said sawtooth wave signals to provide a resultant signal when said phase or frequency difference exceeds a predetermined value;

means responsive to said resultant signal to provide an output signal representative of said phase or frequency difference including an amplifier circuit responsive to an output of said digital-to-analog converter circuit; and

means for establishing an operating point of said detector circuit that is displaced from discontinuities of said sawtooth wave signals.

5,027,374

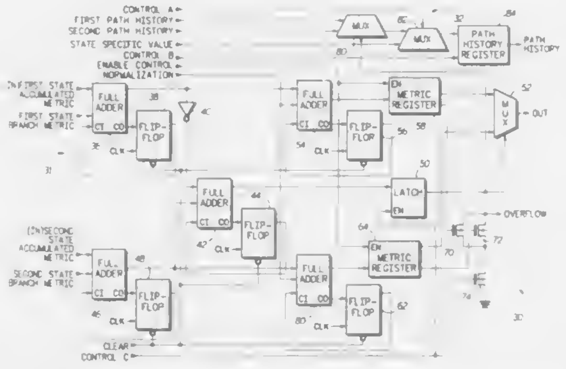
BIT SERIAL VITERBI DECODER ADD/COMPARE/SELECT ARRAY

Mark W. Rossman, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 26, 1990, Ser. No. 498,800

Int. Cl.^{5} G06F *11/00*

U.S. Cl. 375—94 5 Claims



1. In a receiver of a digital communications system, an array of circuit units which each perform an add/compare/select (ACS) function, said array implementing a predetermined code trellis diagram in accordance with a predetermined convolutional code, said array comprising:

a plurality of the circuit units which are interconnected for implementing a predetermined convolutional decoding algorithm, said plurality being equal in number to a number of states existing in the predetermined code trellis diagram, each of said circuit units receiving first and second accumulated state metrics and first and second state branch metrics and providing a predetermined state metric, all of the units being interconnected by single bit-wide conductors for serially transmitting data between the units and all of the units operating concurrently, each of said units comprising:

first and second single bit-wide adder circuits to minimize circuit area for respectively providing first and second sums of predetermined state and branch metrics;

a single bit-wide comparator circuit coupled to the first and second adder circuits for comparing the sums of predetermined state and branch metrics to determine which sum is a state metric with a lowest metric value;

storage means coupled to the first and second bit-wide adder circuits for storing each of the first and second sums; and

a selector coupled to the storage means and comparator circuit for outputting one of the stored first and second sums as the predetermined state metric in response to the comparator circuit.

5,027,375

PROCESS FOR THE RESYNCHRONIZATION OF AN EXCHANGE IN A TELECOMMUNICATION NETWORK

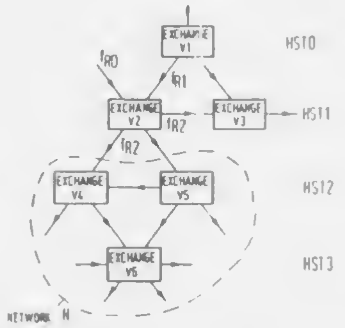
Wolfram Ernst, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiegesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 19, 1989, Ser. No. 409,218

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1988, 3832241; Sep. 22, 1988, 3833940

Int. Cl.^{5} H03L *7/00*

U.S. Cl. 375—107 1 Claim



1. A process for the resynchronization of a switching center (V2) in a telecommunication network, which is synchronized by an adjustment according to a hierarchical structure in accordance with the following steps:

(a) a switching center is synchronized in the synchronous mode by a reference frequency of another switching center which is of the same rank and/or a superior rank;

(b) a switching center generates the reference frequency by means of a central clock pulse generator;

(c) a switching center is equipped with a frequency monitor that detects a loss of accuracy in a reference frequency by which it is currently being synchronized, so that after a frequency alarm is triggered;

(c1) the switching center switches to another unaffected reference frequency, or

(c2) the switching center changes to the free-running mode, when no other unaffected reference frequency is present;

characterized by the step that

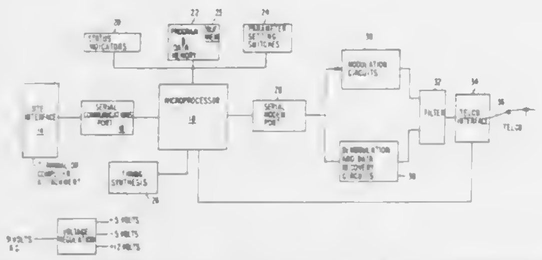
(f) the subsequent frequency flow of the central clock pulse generator of said switching center (V2) being caused by the resynchronization is limited in such a manner that the reference frequency that is generated by said switching center (V2) for synchronization of a network (N) that is synchronized by said switching center (V2) changes slowly enough to avoid said frequency monitors in the switching centers of the network (N) triggering frequency alarms.

VOL
1127
ISS
4
JE
25
1991
UMI

5,027,376
DATA TELECOMMUNICATIONS SYSTEM AND METHOD FOR TRANSMITTING COMPRESSED DATA

Paul Friedman, Westwood, and Nathan Melhorn, Framingham, both of Mass., assignors to Microcom Systems, Inc., Wilmington, Del.

Continuation of Ser. No. 793,581, Oct. 30, 1985, Pat. No. 4,748,638. This application May 31, 1988, Ser. No. 200,626
The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.
Int. Cl.⁵ H04B *1/66*
U.S. Cl. 375—122 **9 Claims**



1. Apparatus for transmitting data in a compressed form between an initiating unit of data terminal equipment and a receiving unit of data terminal equipment connected over communications lines, one of said units having a compressing modem connected between said unit and telephone lines, and the other of said units having a decompressing modem connected between said other unit and telephone lines, said apparatus comprising:

(a) means for fetching a next data character from a data stream to be sent over communication lines;
(b) means for transmitting a compressed character code assigned to said next data character to the decompressing modem;
(c) means for incrementing a relative frequency counter for said next data character;
(d) means for comparing said relative frequency counter for said next data character to a relative frequency counter of a next more frequently occurring character;
(e) means for determining whether the relative frequency of said next data character is greater than the relative frequency of said next more frequently occurring character, and, if so, means for exchanging the compressed character codes assigned to said next data character and to said next more frequently occurring character;
(f) means for repeating the operations of means (d) through (e) until the relative frequency of said next data character is less than the relative frequency of said next more frequently occurring character or said next data character is the most frequent character; and
(g) means for repeating the operations of means (a) through (f) for next data characters and for transmitting said compressed character codes to said decompressing modem.

5,027,377
CHROMATIC X-RAY MAGNIFYING METHOD AND APPARATUS BY BRAGG REFLECTIVE PLANES ON THE SURFACE OF ABBE SPHERE

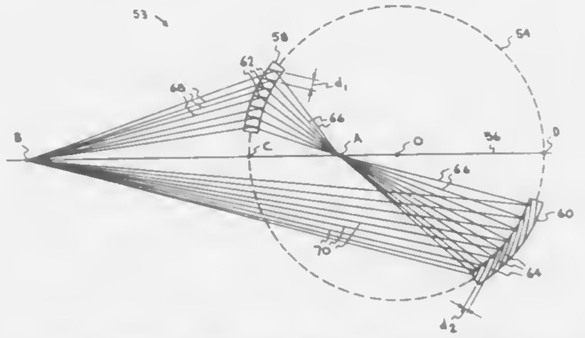
Robert S. Thoe, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 9, 1990, Ser. No. 462,254
Int. Cl.⁵ G21K *1/00, 7/00*
U.S. Cl. 378—145 **33 Claims**

1. A method for producing a sharp chromatic image, from radiation within an X-ray bandwidth, of a portion of an object plane extending from a point A on the object plane, upon a portion of an image plane extending from a point B on the image plane, with B being a conjugate point of A, with the points A and B being upon and thereby defining a system axis, with the object plane and the image plane each being perpendicular to the system axis, and with the sharp image having a magnification M, the method comprising the steps of:

directing radiation, within the X-ray bandwidth, propagating from the portion of the object plane extending from the point a, onto a connected collection of Bragg reflecting planes disposed on and adjacent to a locus determined by a spherical surface of radius R, with R being equal to $MS/M^{2}-1$), with S being the distance between the points A and B and being positive when M is greater than unity and negative when M is less than unity, with the spherical surface being centered on the system axis, and with the point A being positioned a distance R/M from the center of the spherical surface and with the point B being positioned a distance MR from the center of the spherical surface; and

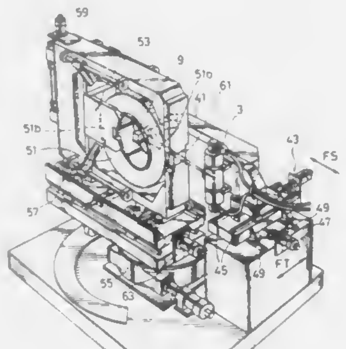
spatially orienting the Bragg reflecting planes to Bragg reflect radiation, within the X-ray bandwidth, propagating from the portion of the object plane extending from the point a toward the portion of the image plane extending from the point B.



5,027,378
INDUSTRIAL COMPUTED TOMOGRAPHY APPARATUS

Masashi Fujii; Kiichiro Uyama; Takao Shoji, all of Tokyo, and Kenji Arai, Saitama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 9, 1990, Ser. No. 564,613
Int. Cl.⁵ G01B *15/06*
U.S. Cl. 378—11 **8 Claims**



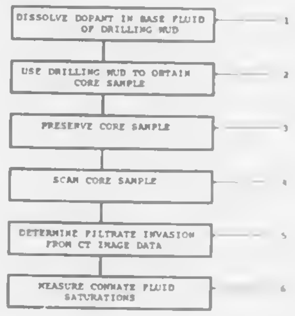
1. An industrial computed tomography apparatus, comprising:

X-ray tube means for emitting X-ray onto an object to be examined;
detector means for detecting the X-ray penetrated through the object to obtain detection data, the detector means being located within a central bore of the object;
means for rotating the object by an increment of a prescribed angle around a normal direction passing through a scanning center on a tomographic imaging plane;
means for moving the X-ray tube means and the detector means with respect to the object, in a traverse direction perpendicular to the normal direction; and
means for obtaining tomographic image of the object from the detection data obtained by the detector means.

5,027,379
METHOD FOR IDENTIFYING DRILLING MUD FILTRATE INVASION OF A CORE SAMPLE FROM A SUBTERRANEAN FORMATION

Patricia K. Hunt, Solon, and Bernard Zemel, Shaker Heights, both of Ohio, assignors to BP America Inc., Cleveland, Ohio

Filed Feb. 22, 1990, Ser. No. 483,232
Int. Cl.⁵ A61B *6/80;* **G01N** *23/223;* **C09K** *7/00*
U.S. Cl. 378—4 17 Claims


DISSOLVE DOPANT IN BASE FLUID OF DRILLING MUD
1
USE DRILLING MUD TO OBTAIN CORE SAMPLE
2
PRESERVE CORE SAMPLE
3
SCAN CORE SAMPLE
4
DETERMINE FILTRATE INVASION FROM CT IMAGE DATA
5
MEASURE CONNATE FLUID SATURATIONS
6

1. A method of determining the invasion of drilling mud filtrate into a core sample from a borehole in a subterranean rock formation, the method comprising:

using a drilling mud which forms a filter cake during coring of the borehole thereby to limit invasion of drilling mud solids into the subterranean rock to an extent less than invasion of the base fluid in which the mud solids otherwise are normally suspended;
dissolving a dopant in the base fluid of the drilling mud to form a solution having an X-ray attenuation characteristic different from the X-ray attenuation characteristic of the connate fluids in the subterranean formation;
obtaining a core sample from the borehole using the doped drilling mud with the dopant remaining in solution in the base fluid under subterranean conditions at the core sample depth;
scanning the core sample with a computed tomography scanner to determine the attenuation characteristic at a plurality of points in a cross-section in the core sample; and
determining from the attenuation characteristics for the plurality of points the depth of invasion of the dopant-base fluid solution into the core sample.

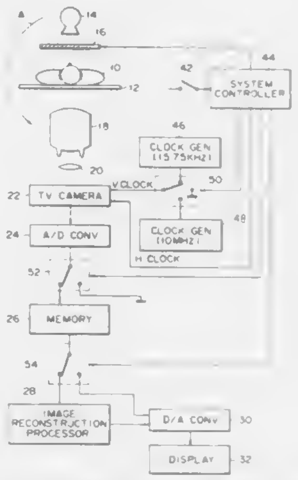
5,027,380
DIAGNOSTIC X-RAY APPARATUS

Masayuki Nishiki, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 17, 1989, Ser. No. 422,661
Claims priority, application Japan, Oct. 24, 1988, 63-267497
Int. Cl.⁵ H05G *1/64;* **A61B** *1/00;* **H04N** *5/32*
U.S. Cl. 378—4 11 Claims

1. An X-ray apparatus comprising:

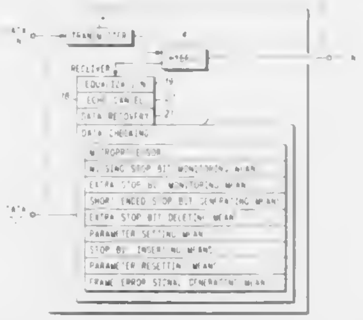
an X-ray source for emitting an X-ray onto an object;
means for setting an operation mode in a first or second operation mode;
diaphragm means for limiting the X-ray emitted from said X-ray source to emit the X-ray onto a slice of said object, a tomogram of which is to be obtained, in the first operation mode, and not limiting the X-ray to emit the X-ray onto a portion of said object, a fluorogram of which is to be obtained, in the second operation mode;
an image intensifier for converting an X-ray image transmitted through said object into an optical image;
solid-state image pickup means for imaging an optical image output from said image intensifier and received in an imaging area to output an image data;
memory means for storing an output from said solid-state image pickup means; and
means for reading image data of a region corresponding to said slice in the imaging area from said solid-state image pickup means at a predetermined speed, storing the readout data in said memory means, discharging image data of a region except for said region corresponding to said slice from said solid-state image pickup means at a speed higher than the predetermined speed, without storage in said memory means, in the first operation mode, and for reading image data of the entire imaging area from said solid-state image pickup means at the predetermined speed to store the readout data in said memory means in the second operation mode.



5,027,381
OVER SPEED DATA RATE ADJUSTMENT METHOD AND APPARATUS IN AN ASYNCHRONOUS DATA STREAM

Kevin B. Theobald, Cambridge, Mass., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 15, 1990, Ser. No. 494,080
Int. Cl.⁵ H04L *25/39*
U.S. Cl. 375—117 12 Claims



6. A modem including means for generating a second asynchronous data stream based on a received first asynchronous data stream having data frames defined by character data normally sandwiched between a start bit and a stop bit, said first data stream permitting certain stop bits to be deleted and extra stop bits to be transmitted to accommodate speed differ-

VOL
1127
ISS
4
JE
25
1991
UMI

ences between the rate of data output from a data source and the rate data from said data source is transmitted via said first data stream, said modem comprising:

a) means for monitoring said first data stream for a missing stop bit;

b) means for generating stop bits in said second data stream having a shorter duration than corresponding received stop bits for a predetermined number of subsequent data frames upon said monitoring means detecting a missing stop bit in said first data stream;

c) means for monitoring said first data stream for an extra stop bit; and

d) means for deleting said extra stop bit from said second data stream upon said extra stop bit monitoring means detecting an extra stop bit in said first data stream during said predetermined number of frames.

5,027,382
SHIFT REGISTER CIRCUIT

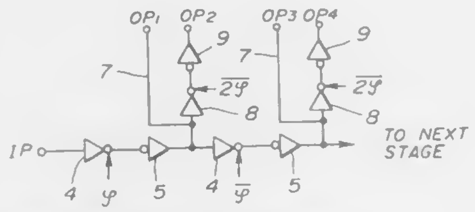
Akihiko Hiroe, Fujisawa, and Noriyuki Terao, Sendai, both of Japan, assignors to Ricoh Company, Ltd., Tokyo and Ricoh Research Institute of General Electronics Co., Ltd., Natori, both of, Japan

Filed Dec. 15, 1989, Ser. No. 451,176

Claims priority, application Japan, Dec. 20, 1988, 63-321718; Dec. 20, 1988, 63-321720; Jun. 16, 1989, 1-154062

Int. Cl.^{5} G11C *19/28*

U.S. Cl. 377—76 **12 Claims**



1. A shift register circuit comprising:

a series circuit comprising a plurality of first clocked gate inverters and inverters which are alternately connected in series, a first one of said first clocked gate inverters being adapted to receive an input pulse signal;

an output line connected to an output of each of said inverters for outputting an output pulse signal; and

a second clocked gate inverter connected to the output of each of said inverters for outputting an output pulse signal,

said first clocked gate inverters operating responsive to a first clock signal,

said second clocked gate inverters operating responsive to a second clock signal which is a mutually different frequency from said first clock signal.

5,027,383
SUPERVISED, INTERACTIVE ALARM REPORTING SYSTEM

Eliezer A. Sneffer, Loog Island, N.Y., assignor to VerSuS Technology, Inc., Trenton, N.J.

Continuation-in-part of Ser. No. 62,174, Jun. 12, 1987, Pat. No. 4,868,859. This application Feb. 17, 1989, Ser. No. 312,670

Int. Cl.^{5} H04M *11/04*

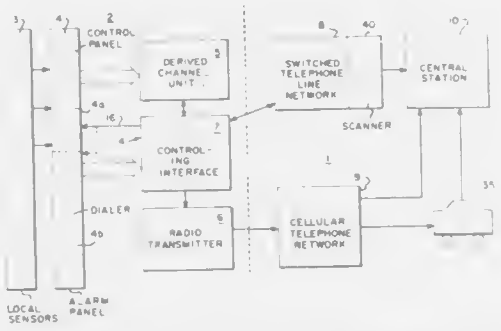
U.S. Cl. 379—39 **47 Claims**

1. A supervised, interactive alarm reporting system for providing communication between an alarm device associated with a premises and including means for controlling operations of said alarm device responsive to signals received from a plurality of sensors associated with said premises and means for dialing a selected number responsive to signals received from said controlling means, and a central facility for monitoring the alarm device at said premises, comprising:

first means for establishing communication between the controlling means of said alarm device and said central facility using wired communicating lines;

second means for establishing communication between the dialing means of said alarm device and said central facility using radio transmissions; and

means connecting said first means and said second means for controlling operation of the first means and the second means according to the condition of at least said first means;



wherein said connecting means is at all times connected for controlling operation of said first means and said second means according to the condition of at least said first means and independent of the state of said alarm device.

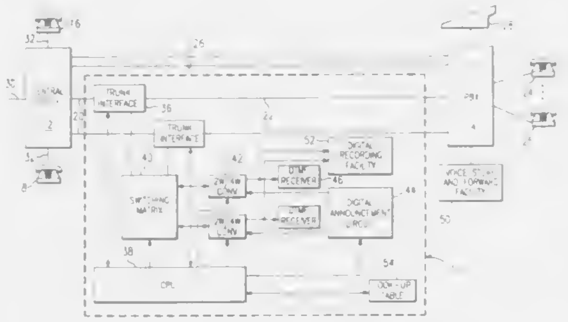
5,027,384
PERSONALIZED AUTOMATIC CALL ROUTING

Sanford J. Morganstein, Elgin, Ill., assignor to Dytel Corporation, Schumburg, Ill.

Continuation-in-part of Ser. No. 909,755, Sep. 26, 1986, Pat. No. 4,809,321. This application Jul. 11, 1988, Ser. No. 217,426

Int. Cl.^{5} H04M *3/54*

U.S. Cl. 379—67 **45 Claims**



18. A method for providing personalized routing of telephone calls in a telecommunication system, comprising the steps of:

receiving information from a programmer of the system defining a programming mode;

receiving information from the programmer defining a telephone extension for which programming is to be associated;

transmitting an instructional message to the programmer soliciting the input of a personalized greeting uniquely associated with said telephone extension for subsequent transmission to calling parties desiring to communicate to the telephone extension; and

receiving information from the programmer indicating destination information for programming a call route to direct incoming telephone calls to a desired destination, said incoming telephone calls to a desired destination, said destination selectable by the programmer from a plurality of destinations including real-time destinations other than the first and telephone extension.

5,027,385
FACSIMILE APPARATUS FOR COMMUNICATING ON EXTERNAL AND INTERNAL TELEPHONE SETS

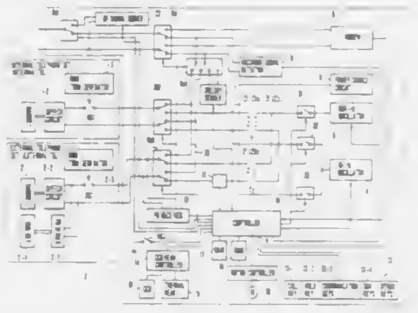
Hidetoshi Nakagawa; Keiji Kawano, both of Kanagawa, and Masakatu Miyazaki, Saitama, all of Japan, assignors to Tamura Electric Works, Ltd., Japan

Filed Sep. 25, 1989, Ser. No. 416,364

Claims priority, application Japan, Sep. 26, 1988, 63-238856

Int. Cl.^{5} H04M *1/32*

U.S. Cl. 379—100 **3 Claims**



1. A facsimile apparatus which is selectively connected to an office line together with an external telephone set having a ring tone generator and is constituted by an internal telephone set and a facsimile main body, comprising:

an extension channel for connecting said external and internal telephone sets to each other;

an office line channel for connecting said external and internal telephone sets to said office line;

a call key for calling said external telephone set;

a call signal generator for outputting a call signal to said ring tone generator;

first switching means for switching said office line to one of said facsimile main body and said office line channel;

second switching means for normally connecting said internal telephone set to said office line channel;

third switching means for normally connecting said external telephone set to said extension channel and switching said external telephone set to said office line channel in accordance with an office line outgoing call request and an office incoming call of said external telephone set; and

a control section for controlling said second switching means so as to switch said internal telephone set from the office line channel side to the extension channel side in accordance with depression of said call key and an off-hook operation of said internal telephone set and for controlling said call signal generator so as to output a call signal to said ring tone generator in accordance with depression of said call key and said off-hook operation, wherein

a channel is formed between said external and internal telephone sets by setting said external telephone set in an off-hook state in response to said call signal.

5,027,386
LAN INTERFACED FACSIMILE MACHINE

Kyosuke Hisano, Yamato, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 16, 1989, Ser. No. 324,557

Claims priority, application Japan, Mar. 16, 1988, 63-62858

Int. Cl.^{5} H04N *1/00*

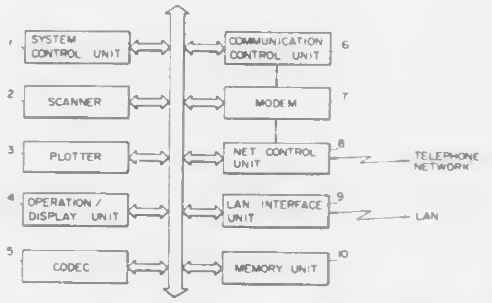
U.S. Cl. 379—100 **2 Claims**

1. A facsimile machine connected to a communication network and interfaced to a local area network (LAN), comprising:

storing means for storing information including address information of another facsimile machine connected to the communication network;

communicating means for communicating with another facsimile machine connected to the communication network through the communication network;

LAN interface means for interfacing with said another facsimile machine interfaced to the LAN through the LAN; and



controlling means for controlling the operation of said facsimile machine, said controlling means including means for controlling transfer of said address information stored in said storing means to said another facsimile machine interfaced to said LAN through said LAN under a predetermined condition.

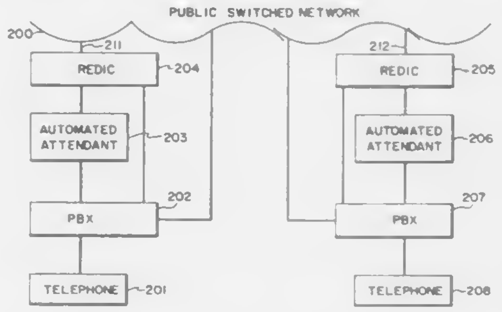
5,027,387
REVERSE DIRECTION CALLING SYSTEM

Edward W. Moli, 7A Bluebell La., Mt. Laurel, N.J. 08054

Filed Feb. 26, 1990, Ser. No. 484,370

Int. Cl.^{5} H04M *7/10, 15/16*

U.S. Cl. 379—112 **1 Claim**



1. In combination with a digital processing system including a data base, a process of deriving information from said data base to connect a call through a telecommunications network from a calling location to a called location having different calling rates, characterized by:

a. retrieving data from said data base relating to the calling rates at said calling and called locations when said call is placed,

b. comparing the calling rates of said calling and called locations to provide information to determine which location has the lower calling rate at the time said call is placed,

c. originating the call from the location having the lower call rate, and

d. utilizing said telecommunications network between said calling and called terminal locations to utilize the networks calling party identification to notify the called location that the called location should initiate a call initiation and a call connection.

VOL
1127
ISS
4
JE
25
1991
UMI

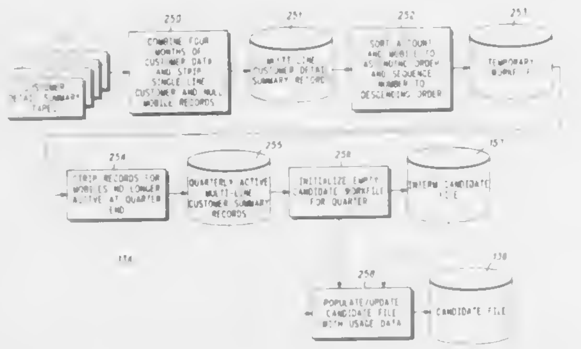
5,027,388
METHOD OF SELECTING THE MOST COST EFFECTIVE CELLULAR SERVICE PLAN PROVIDED BY CELLULAR TELEPHONE RESELLERS TO MULTI-LINE CUSTOMERS

Andrea E. Bradshaw, Schaumburg, Ill.; David M. Baum, Alexandria, Va., and Dionne A. Rivera, Glendale Heights, Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 473,787, Feb. 1, 1990, Pat. No. 4,979,207. This application Jun. 1, 1990, Ser. No. 532,132

Int. Cl.^{5} H04M *7/16, 15/06*

U.S. Cl. 379—112 7 Claims



1. A method of selecting one of a plurality of rate plans for cellular radiotelephone users each having corresponding user records from one or more cellular systems gathered in a billing pool, said billing pool including user records for at least a current billing period and a previous billing period, each user record including a current rate plan and usage information for the current and previous billing periods, said method comprising the steps of:

a) selecting all user records from the billing pool for each cellular radiotelephone user which has non-zero usage information for the current billing period;

b) creating a current usage pool and a previous usage pool by accumulating the usage information in the selected user records for the current billing period and the previous billing period, respectively;

c) creating a summary user record for each cellular radiotelephone user by accumulating the usage information in all corresponding user records;

d) appending current and previous usage pools to each summary user record;

e) calculating costs for each cellular radiotelephone user based upon the accumulated usage information in the corresponding summary user record and at least two of the rate plans; and

f) selecting for each cellular radiotelephone user the rate plan which has the lowest calculated cost.

5,027,389
SELF-COMPENSATED DUAL TONE MULTIPLE FREQUENCY GENERATOR

Tzu-Ching Chiue, Taipei, and Yarn-Chern Chen, Nan-Tou, both of Taiwan, assignors to Industrial Technology Research Institute, Taiwan, Taiwan

Filed Mar. 8, 1989, Ser. No. 320,720

Claims priority, application Japan, Aug. 29, 1988, 63-214757

Int. Cl.^{5} H04M *1/00*

U.S. Cl. 379—361 12 Claims

1. A self-compensated dual tone multiple frequency (DTMF) generator, comprising:

(1) a DC voltage shift-down bias generator circuit having first and second voltage terminals;

(2) a voltage divider connected between the first and second voltage terminals;

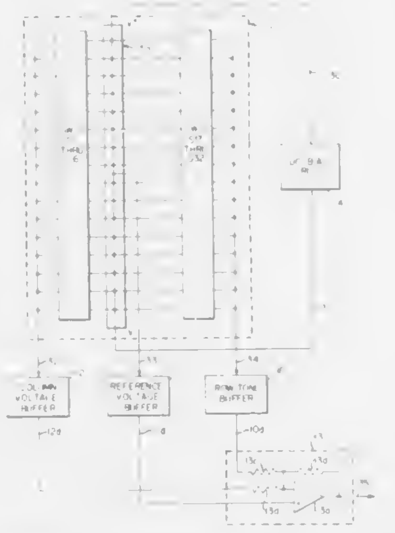
(3) a plurality of row voltage sampling switches having first terminals connected to separate outputs of said voltage divider and second terminals connected together and to a row tone output terminal;

(4) a plurality of column sampling switches having first terminals connected to separate outputs of said voltage divider and second terminals connected together and to a column tone output terminal;

(5) a row tone level-shift-up buffer follower stage having an input terminal connected to the row tone output terminal;

(6) a column tone level shift-up buffer follower stage having an input terminal connected to the column tone output terminal;

(7) a reference voltage level-shift-up buffer follower stage having an input terminal connected to a determined output of said voltage divider resistor;



(8) a summation operational amplifier connected to output terminals of each of the buffer follower stages for adding the outputs of the row tone level-shift-up buffer follower and the column tone level-shift-up buffer follower and for offsetting the adding of the outputs by the output from the reference voltage level-shift-up buffer stage to generate a dual tone multiple frequency signal; and

(9) means for compensating for a voltage level shift between input and output terminals of each of said buffer follower stages, said compensating means being part of said DC voltage shift-down bias generator circuit so that said circuit self-compensates.

5,027,390
COIN VALIDATION METHOD AND APPARATUS FOR A COIN TELEPHONE OR SIMILAR SYSTEM HAVING AN ESCROW MECHANISM

Larry M. Hughes, Largo, Fla., assignor to Protel, Inc., Lakeland, Fla.

Filed Jun. 6, 1989, Ser. No. 362,018

Int. Cl.^{5} H04M *17/02*

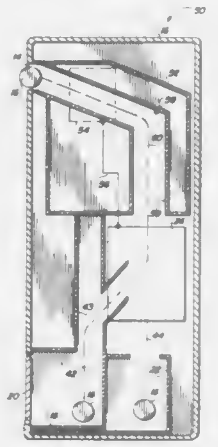
U.S. Cl. 379—150 5 Claims

1. A method for separating valid and invalid coins, comprising the steps of:

passing every coin along a coin track;

analyzing every coin for authenticity and providing an output for each coin indicative of whether each coin is valid or invalid;

thereafter diverting every coin into a single escrow mechanism capable of holding the coin in escrow; and the



operating the escrow mechanism responsive to the output to dispense the coin out of the escrow mechanism in one of two directions depending upon it valid or invalid status.

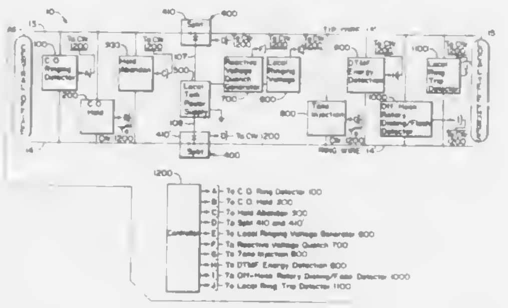
5,027,391
CALL MANAGEMENT SYSTEM

John F. O'Neill, Boulder, and Lawrence R. Benko, Broomfield, both of Colo., assignors to Call Management Products, Inc., Broomfield, Colo.

Filed Aug. 17, 1989, Ser. No. 395,750

Int. Cl.^{5} H04M *1/72, 9/02, 19/04*

U.S. Cl. 379—373 22 Claims



20. A method of creating a high voltage oscillating ring signal for actuating a high voltage bell-type alerting device of a low voltage powered telephone or telephone-like device, comprising the steps of:

powering said telephone or telephone-like device by a low voltage produced by a local low voltage "battery" feed connected to said telephone or telephone-like device by a circuit, and

generating an oscillating ring signal comprising a sequence of alternating high and low voltages with an oscillation frequency and high and low voltage levels adapted to actuate said high voltage bell-type alerting device by alternately boosting and not boosting said low voltage in said circuit in sequential periodic time intervals.

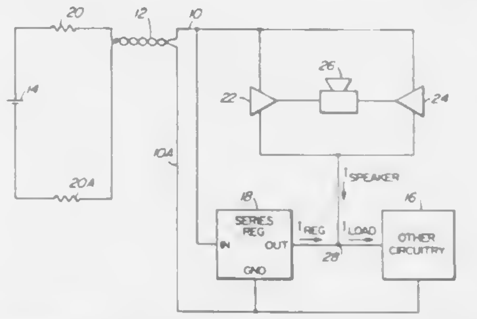
5,027,392
SPEAKER DRIVE ARRANGEMENT FOR LOUDSPEAKER TELEPHONE

Terence N. Thomas; Marc E. Bonneville, both of Nepean, and Douglas C. Wadsworth, Manotick, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jul. 12, 1989, Ser. No. 378,777

Int. Cl.^{5} H04M *1/60*

U.S. Cl. 379—388 10 Claims



8. A telephone set comprising first and second connecting means for connecting the set to respective wires of a subscriber line, a loudspeaker, a drive circuit for the loudspeaker, other circuitry, and a series regulator;

said series regulator having an input connected to one of said first and second connecting means, a ground terminal connected to the other of said first and second connecting means, and an output;

said other circuitry being connected between said output and said ground terminal;

said drive circuit having input and output power supply connections connected one to each of said input and said output, the series regulator, in dependence upon the difference between the currents of said drive circuit and said other circuitry, alternatively supplying and absorbing current, by way of said output to maintain a predetermined potential difference across said other circuitry; and

wherein said series regulator comprises an operational amplifier with reference voltage means for maintaining a non-inverting input of said amplifier at a predetermined potential, and feedback means for applying to an inverting input of said operational amplifier a signal corresponding to the voltage at the output of said amplifier.

5,027,393
VOICE CONFERENCE SYSTEM USING ECHO CANCELLERS

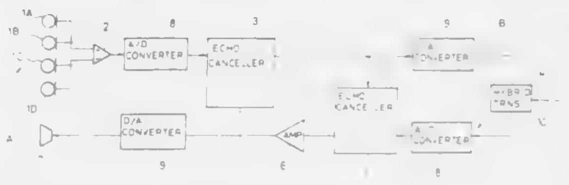
Yoshihiro Yamamura, and Hitoshi Fuda, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jun. 20, 1989, Ser. No. 368,646

Claims priority, application Japan, Jun. 20, 1988, 63-152770

Int. Cl.^{5} H04M *1/00*

U.S. Cl. 379—410 3 Claims



2. A voice conference system comprising:

(a) a first microphone;

(b) a second microphone;

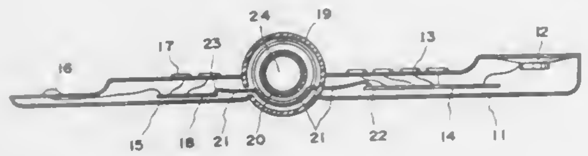
(c) a comparator having a first input connected to said first microphone, a second input connected to said second microphone, said comparator transmitting an electrical send-out signal with reduced reverberations;

VOL
1127
ISS
4
JE
25
1991
UMI

(c) a hybrid transformer receiving said electrical send-out signal and transmitting an electrical receive-in signal;
(d) a speaker which receives said electrical receive-in signal and transmits an audio sound which can be received by said first microphone and said second microphone; and
(e) an echo canceller receiving said electrical receive-in signal and said electrical send-out signal and transmitting said electrical send-out signal with further reduced reverberations.

5,027,394
FOLDING TYPE TELEPHONE CONTAINING A WOUND ELECTRICAL CONNECTION

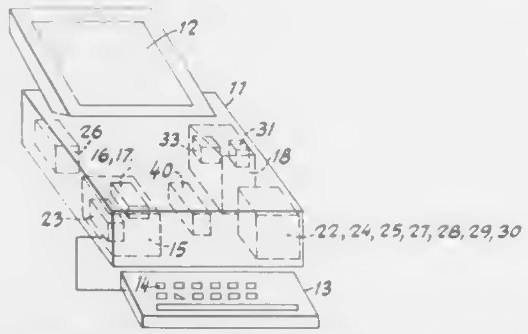
Kenji Ono, and Hajime Iribe, both of Fukuoka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Sep. 30, 1988, Ser. No. 251,399
Claims priority, application Japan, Sep. 30, 1987, 62-246434
Int. Cl.^{5} H04M *1/02*
U.S. Cl. 379—434 **3 Claims**



1. A telephone apparatus comprising:
a first housing having electrical and electronic components including a speaker;
a second housing having electrical and electronic components including a microphone;
a hinge having a shaft, an outer sleeve, and a space between the outside of said shaft and the inside of said outer sleeve for rotatably connecting said first housing to said second housing, said hinge having the ability to rotate about 180°; and
an electrical connecting member for electrically connecting said electrical and electronic components of said first housing to said electrical and electronic components of said second housing, said electrical connecting member being wound at least two times around said shaft of said hinge.

5,027,395
DATA-LOCKING SYSTEM

Richard J. Anderson, Morristown; Bruce J. Goodman, Livingston, both of N.J.; Robert T. Riggio, Staten Island, N.Y.; Solomon Kopolovics, Brooklyn, N.Y.; Lisa C. Hernandez, New York, N.Y.; Chengkuo Chen, Somerset, N.J., and Russell J. Romei, Williston Park, N.Y., assignors to Metropolitan Life Insurance Company, New York, N.Y.
Filed Jun. 20, 1990, Ser. No. 541,256
Int. Cl.^{5} H04L *9/00*
U.S. Cl. 380—4 **44 Claims**



1. A data-locking system comprising
a data entry device having a keyboard for inputting information including data,
at least one video display screen for displaying inputted information in a predetermined application format,
a storage medium for storing information, and
means for locking at least some of the inputted data in said storage medium to maintain the integrity of said data.

5,027,396
EXECUTION PROTECTION FOR FLOPPY DISKS

Dale T. Platteter, Fairport; Robert S. Westfall, Rochester, and Jeff C. Carter, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed May 7, 1990, Ser. No. 520,332
Int. Cl.^{5} H04L *9/00*
U.S. Cl. 380—4 **14 Claims**

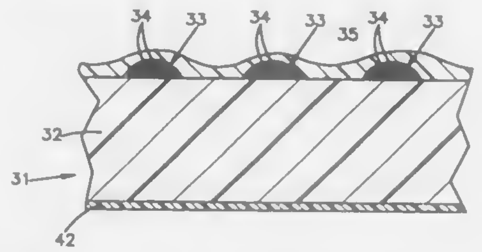
1. In a control system for an image processing apparatus including a main memory and a floppy disk drive, the method of inhibiting the execution of a floppy disk loaded into the floppy disk drive, the floppy disk having a predetermined key track, the key track including random data unrecognizable to the control but including an arbitrarily positioned index pattern and a password related to the index pattern, comprising the steps of:
transferring the contents of the key track from the floppy disk to the main memory,
recognizing an error signal manifesting the unrecognizable random data,
ignoring the error signal and scanning the random data to find the arbitrarily positioned index pattern,
locating the password related to the index pattern among the random data, and
comparing the password to a second password stored in the main memory to be able to execute the instructions stored on the floppy disk.

5,027,397
DATA PROTECTION BY DETECTION OF INTRUSION INTO ELECTRONIC ASSEMBLIES

Glen P. Double, Concord, N.C., and Steve H. Weingart, Peekskill, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Sep. 12, 1989, Ser. No. 405,910
Int. Cl.^{5} H04L *9/00*
U.S. Cl. 380—4 **21 Claims**

1. An electronic circuit comprising;
a circuit card;
a plurality of electronic circuit components disposed on said circuit card;
said components including an electronic assembly;
a barrier for protecting against intrusions into said electronic assembly including;

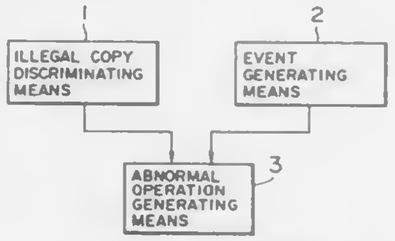
screen means surrounding said electronic assembly, said screen means including a unitary flexible membrane wrapped around said electronic assembly and line means formed on said membrane in a pattern that resists access without disturbing said line means, said line means being formed of discrete conductive particles of material disposed in a solidified matrix of material, the resistance of said line means changing when said line means are disturbed,
encapsulating material encapsulating said line means and bonded to said line means said bond strength of line means to the membrane having a first predetermined strength and said bond strength of the encapsulating material to the line means having a second predetermined strength said second predetermined strength being greater than said first predetermined strength;



and, electrical supply and signal detection means adapted to supply an input signal to said line means and generate an output signal responsive to a given change in said resistance of said line means;
whereby said resistance of said line means changes, a signal will be generated.

5,027,398
COPY PREVENTION APPARATUS AND METHOD THEREFOR

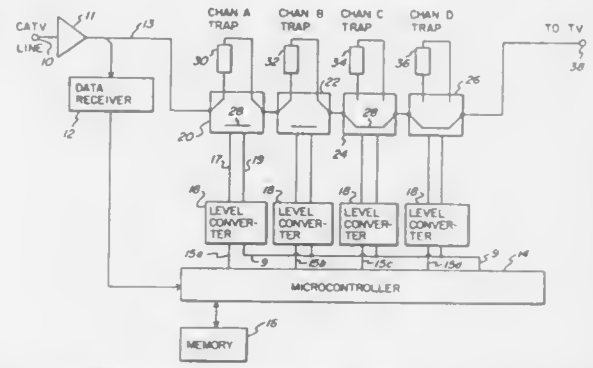
Akio Miyoshi, Ome, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Continuation-in-part of Ser. No. 269,358, Nov. 10, 1988, abandoned. This application Apr. 24, 1990, Ser. No. 512,590
Claims priority, application Japan, Nov. 13, 1987, 62-286985
Int. Cl.^{5} G11B *23/28;* **G05B** *9/02*
U.S. Cl. 380—4 **9 Claims**


1
ILLEGAL COPY DISCRIMINATING MEANS
2
EVENT GENERATING MEANS
3
ABNORMAL OPERATION GENERATING MEANS

1. A copy prevention apparatus, comprising:
illegal copy discriminating means for discriminating whether an object, including computer software, is illegally copied;
time judging means for judging whether the current time at a preselected moment is a specific time which occurs at or below a predetermined probability; and
abnormal operation generating means for generating a predetermined abnormal operation if the two conditions of said illegal copy discriminating means having discriminated an illegal copy, and said time judging means having judged that the current time is the specific time, are satisfied.

5,027,399
SIGNAL SWITCHING APPARATUS

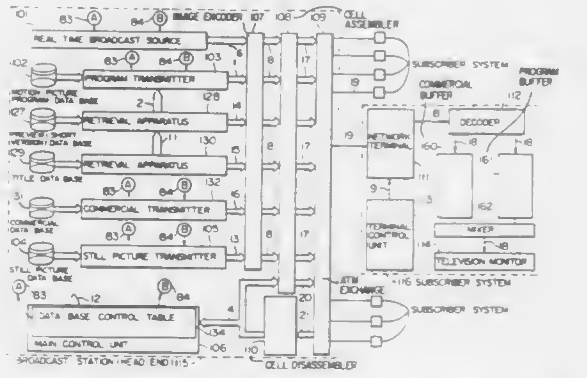
Kevin G. Cordle, Rowlett; Thomas F. Martin, Richardson, and James E. Austin, McKinney, all of Tex., assignors to General Instrument Corporation, New York, N.Y.
Filed Apr. 16, 1990, Ser. No. 510,289
Int. Cl.^{5} H04N *7/167*
U.S. Cl. 380—7 **24 Claims**



1. Apparatus for switching traps in and out of a signal path comprising:
a plurality of double pole double throw switches in series with a signal path, each switch having a first actuated position, a second actuated position, and an off position;
means for coupling each switch to connect a corresponding trap to said signal path in said first actuated position;
means for coupling each switch to provide a through connection in series with said signal path in said second actuated position;
means for coupling each switch to provide an open circuit along said signal path in said off position;
means for selectively actuating said switches to the first and second actuated positions in response to actuation signals received by said switches; and
means for turning at least one of said switches to the off position in response to a disconnect signal received by said switch.

5,027,400
MULTIMEDIA BIDIRECTIONAL BROADCAST SYSTEM

Toru Baji, Inagi; Yukio Nakano; Shiro Tanabe, both of Hachioji; Tetsuya Nakagawa, Koganei, and Hirotsugu Kojima, Tokyo, all of Japan, assignors to Hitachi Ltd., Tokyo, Japan
Filed Aug. 16, 1989, Ser. No. 394,786
Claims priority, application Japan, Aug. 19, 1988, 63-204721
Int. Cl.^{5} H04N *7/167, 1/00;* **H04H** *1/00*
U.S. Cl. 380—20 **47 Claims**



1. A multimedia bidirectional broadcast system comprising:
(a) a broadcast station including:
a main control unit having therein data base control table

VOL
1127
ISS
4
JE
25
1991
UMI

in which program and commercial down load sequences are recorded depending on a setting effected by a subscriber;

a motion picture program data base;

a commercial data base;

a program transmitter for accessing said motion picture program data base and transmitting content thereof based on the setting of said main control unit;

a commercial transmitter for accessing said commercial date base and for transmitting content thereof based on the setting of said main control unit;

an image encoder for achieving a bandwidth compression on video signals from said program and said commercial transmitters;

a cell assembler for processing data to be transmitted onto a broadband transmission line so as to generate a cell of the data from said image encoder; and

an asynchronous transfer mode exchange for delivering the cell to a subscriber system associated therewith;

(b) transmission lines, one end of each of which is connected with said broadcast station; and

(c) subscriber systems, each including:

a network terminal connected with the other end of the corresponding transmission line, receiving the cell;

a decoder connected with the network terminal, decoding the cell;

a program buffer for storing program video signals obtained from said decoder;

a commercial buffer for storing commercial video signals obtained from said decoder;

a mixer for effecting a change-over operation between the program video signals and the commercial video signals; and

a television monitor for displaying the video signals from the mixer.

5,027,401

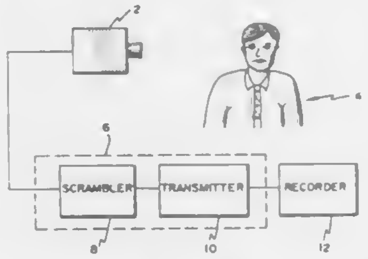
SYSTEM FOR THE SECURE STORAGE AND TRANSMISSION OF DATA

John A. Soltesz, 1082 Broadway Ave., Masury, Ohio 44438

Filed Jul. 3, 1990, Ser. No. 547,224

Int. Cl.⁵ G09C *5/00;* G07F *7/08*

U.S. Cl. 380—54 **12 Claims**



1. A security system for discouraging unauthorized use of a data card, comprising:

a data card including storage means for storing data in scrambled form;

encoder means for encoding the storage means with personal identification data made up of individual data units, each unit having a specific value, said encoder means including means for reading a set of said units having a common value, rearranging said set of units having a common value according to a predetermined algorithm, reading a second set of units having a different common value, rearranging the second set of units, and repeating the process of reading and rearranging sets of data units until the personal identification data is substantially scrambled;

decoder means for reading and unscrambling the scrambled personal identification data; and

recorder means for recording the personal identification data to establish a record of the card user.

5,027,402

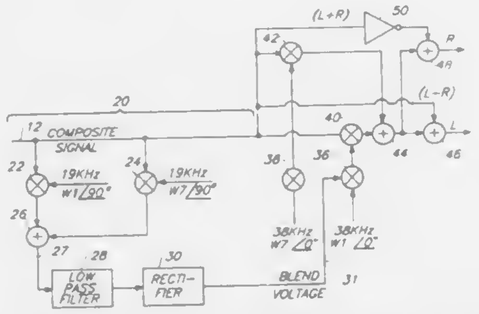
BLEND-ON-NOISE STEREO DECODER

Oliver L. Richards, Jr., N. Grosvenor Dale, Conn., and Thomas L. Field, Rutland, Mass., assignors to Allegro Microsystems, Inc., Worcester, Mass.

Filed Dec. 22, 1989, Ser. No. 455,051

Int. Cl.⁵ H04H *5/00*

U.S. Cl. 381—10 **8 Claims**



1. An FM stereo decoder of the kind comprising a composite signal conductor adapted for carrying a standard stereo composite signal containing a pilot signal, and a stereo decoding circuit means connected to said composite signal conductor for demodulating the composite signal and generating separate left and right stereo audio signals and including a blend-control means with a blend-control signal input for changing the degree of separation of the left and right audio signals as a function of the level of a signal applied to said blend-control input, said decoder additionally comprising:

a first generating means for generating at least a first signal having a dominant frequency component equal to the frequency of the pilot signal component in the composite signal; and

a noise monitor means connected to said composite signal conductor and to said first generating means for producing at a noise-monitor-means output a noise-indication signal of amplitude that is related to the magnitude of the noise in the composite stereo signal within a narrow frequency band near the pilot signal component in the composite signal, the output of said noise monitor means connected to said blend-control means input so that blending and the changing of the separation of the left and right signal is a function of the magnitude of the noise near the pilot signal component in the composite signal,

said noise monitor means comprises a noise demodulator means connected to said composite signal conductor and to said generating means for mixing said composite and first signal to transform said narrow frequency band of the composite signal to a demodulated noise-containing band the lower end of which is at zero frequency, a multiplier having one input connected to the output of said noise demodulator means; and a low pass filter having about half the band width of said noise containing frequency band, the input of said filter connected to the output of said multiplier; a rectifier connected between the output of said low pass filter and said blend-control input; the other input of said multiplier being feed-back connected to the output of said noise demodulator means for stabilizing and controlling the gain of said noise monitor means.

5,027,403

VIDEO SOUND

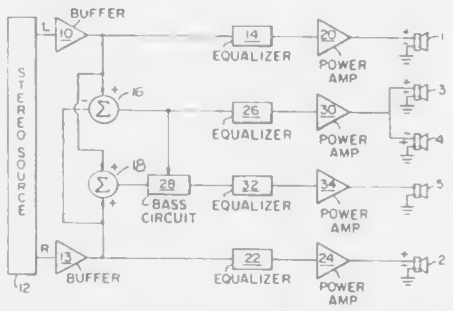
William Short; Christopher Ickler; Timothy Holl, and William Keezer, all of Framingham, Mass., assignors to Bose Corporation, Framingham, Mass.

Continuation of Ser. No. 274,381, Nov. 21, 1988, abandoned.

This application Jan. 26, 1990, Ser. No. 469,689

Int. Cl.⁵ H04R *5/02*

U.S. Cl. 381—24 **23 Claims**



1. Sound projection apparatus for a video and audio playback device, having a video display device, comprising;

left and right speakers,

left and right ambience speakers,

an amplifier having a right channel and a left channel for carrying R and L signals respectively, and

ambience circuitry,

said left channel being coupled to said left speaker,

said right channel being coupled to said right speaker,

said left and right channels being coupled to said ambience circuitry,

said ambience circuitry being coupled to said left ambience speaker and said right ambience speaker for radiating respective L-R and R-L ambience signals which ambience signals are essentially zero when said L and R signals are equal,

wherein said right and left speakers are forward facing, projecting sound directly from the video display device to the viewer,

wherein said left and right ambience speakers are positioned to respectively radiate primarily to the left and right of said video display device to provide a sound image perceived by a viewer to extend significantly to the side of said video display device when said L and R signals are unequal, and

wherein said right and left speakers are located in front of the viewer to provide a sound image perceived by a viewer to come from said video display device when said L and R signals are equal.

5,027,404

PATTERN MATCHING VOCODER

Tetsu Taguchi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 841,961, Mar. 20, 1986, abandoned.

This application May 11, 1990, Ser. No. 522,411

Claims priority, application Japan, Mar. 20, 1985, 60-57327; Apr. 12, 1985, 60-77827; May 7, 1985, 60-96222; Jun. 13, 1985, 60-128587

Int. Cl.⁵ G10L *9/18*

U.S. Cl. 381—37 **8 Claims**

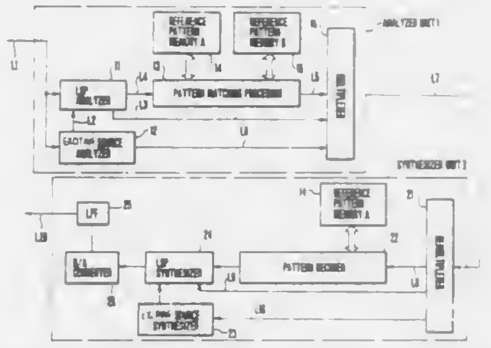
1. A pattern matching vocoder comprising:

pattern analyzing means for receiving a speech signal and extracting spectral envelope vector patterns thereof;

a first reference pattern memory for storing first reference vector patterns obtained in advance by clustering the spectral envelope vector patterns of a speech sample at a spectral equidistance by using said pattern matching vocoder;

a second reference pattern memory for storing second reference vector patterns obtained in advance by clustering the spectral vector patterns of the same speech sample as that used for said first reference memory according to frequencies of occurrence of the spectral envelope vector patterns of the speech sample; and

pattern matching means for matching an output from said pattern analyzing means with a content of said first reference pattern memory to preliminarily select a reference vector pattern, and then for matching the output from said pattern analyzing means with a content of said second reference pattern memory to finally select an optimal reference vector pattern.



5,027,405

COMMUNICATION SYSTEM CAPABLE OF IMPROVING A SPEECH QUALITY BY A PAIR OF PULSE PRODUCING UNITS

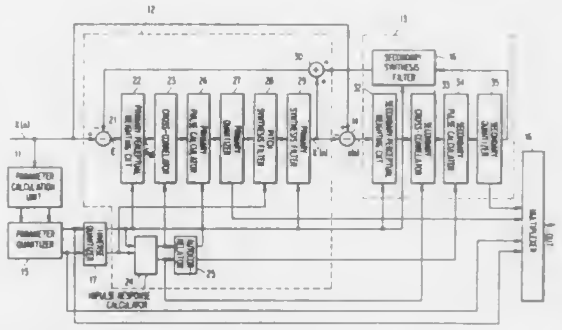
Kazunori Ozawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 15, 1989, Ser. No. 450,983

Claims priority, application Japan, Mar. 22, 1989, 1-71203

Int. Cl.⁵ G10L *5/00*

U.S. Cl. 381—35 **4 Claims**


12
13
SECONDARY SYNTHESIS FILTER
PARAMETER CALCULATION UNIT
PARAMETER QUANTIZER
IMPULSE RESPONSE CALCULATOR
MULTIPLEXER

1. In an encoder device supplied with a sequence of digital speech signals at every frame to produce a sequence of output signals, said encoder device comprising parameter calculation means responsive to said digital speech signals for calculating first and second primary parameters which specify a spectrum envelope and pitch parameters of the digital speech signals at every frame to produce first and second parameter signals representative of said spectrum envelope and said pitch parameters, respectively, calculation means coupled to said parameter calculation means for calculating a set of calculation result signals representative of said digital speech signals, and output signal producing means for producing said set of the calculation result signals as said output signal sequence, the improvement wherein said calculation means comprises:

primary pulse producing means responsive to said digital speech signals and said first and said second parameter signals for calculating a first set of prediction excitation multipulses with respect to a preselected one of subframes

VOL
1127
ISS
4
JE
25
1991
UMI

which result from dividing every frames and each of which is shorter than said frame, said primary pulse producing means producing said first set of prediction excitation multipulses, as a primary sound source signal, and a sequence of primary synthesized signals specified by said first set of prediction excitation multipulses and said spectrum envelope and said pitch parameters;

subtraction means coupled to said primary pulse producing means for subtracting said primary synthesized signals from said digital speech signals to produce a sequence of difference signals representative of differences between said primary synthesized signals and said digital speech signals;

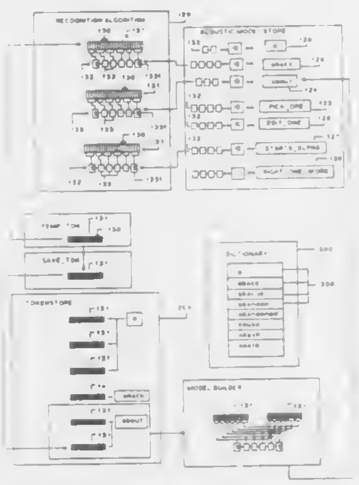
secondary pulse producing means coupled to said subtraction means and responsive to said difference signals and said first and said second parameter signals for producing a second set of secondary excitation multipulses, as a secondary sound source signal, as said set of calculation result signals; and

means for supplying a combination of said first set of prediction excitation multipulses, said second set of secondary excitation multipulses, and said first and said second parameter signals to said output signal producing means as said output signal sequence.

5,027,406
METHOD FOR INTERACTIVE SPEECH RECOGNITION AND TRAINING

Jed Roberts, Cambridge; James K. Baker, West Newton, and Edward W. Porter, Boston, all of Mass., assignors to Dragon Systems, Inc., Newton, Mass.

Filed Dec. 6, 1988, Ser. No. 280,700
Int. Cl.⁵ G10L *7/08*
U.S. Cl. 381—43 48 Claims



6. An adaptive speech recognition method for recognizing a plurality of spoken words over a period of time and for improving a set of acoustic models used during that recognition, said method comprising the steps of:

storing a set of said acoustic models, with each said model being stored in association with a word label;

forming an acoustic description of the sound of each of a succession of spoken words to be recognized substantially as each such word is spoken, each of said acoustic descriptions including acoustic data on the sound of the spoken word it describes;

performing automatic speech recognition upon the acoustic descriptions of said succession of spoken words by comparing the acoustic description of each such spoken word against a plurality of said acoustic models to select, substantially as each such word is spoken, which one or more of said models best matches it, by indicating to a user of the system said one or more best matching model's one or more associated word labels, and by responding to feedback from said user to select one of said indicated word labels, or another word label as being associated with said acoustic description;

storing at least some of said acoustic descriptions in association with the word label associated with it by said speech recognition;

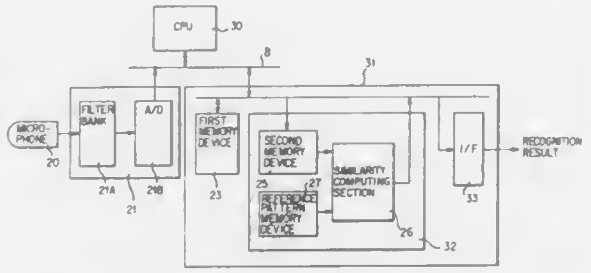
updating the acoustic models associated with individual word labels in conjunction with which one or more of said acoustic descriptions have been stored by finding the one or more acoustic descriptions currently stored in association with that word label and by merging acoustic data from those one or more acoustic descriptions to make updated versions of those acoustic models;

storing the updated acoustic models in said set of models and using those updated acoustic models in the subsequent performance of said automatic speech recognition upon successive ones of said spoken words.

5,027,407
PATTERN RECOGNITION APPARATUS USING A PLURALITY OF CANDIDATES

Jun Tsunoda, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 349,910, May 9, 1989, abandoned, which is a continuation of Ser. No. 158,727, Feb. 22, 1988, abandoned. This application Jan. 23, 1990, Ser. No. 469,820
Claims priority, application Japan, Feb. 23, 1987, 62-37787
Int. Cl.⁵ G10L *7/08*
U.S. Cl. 381—43 15 Claims



1. A pattern recognition apparatus for recognizing a pattern of an input signal, the apparatus comprising:

means for extracting pattern feature data representing pattern features of the input signal, and for detecting an effective signal duration of the input signal;

first memory means for storing the extracted pattern feature data;

means for reading out selected ones of the pattern feature data stored in said first memory means, said reading out means including means for defining a plurality of unique candidate durations denoting a plurality of different input signal durations similar to the effective signal duration for the pattern feature data stored in said first memory means;

second memory means having a plurality of memory units for storing the selected pattern feature data read out by said reading out means;

means for storing reference pattern data;

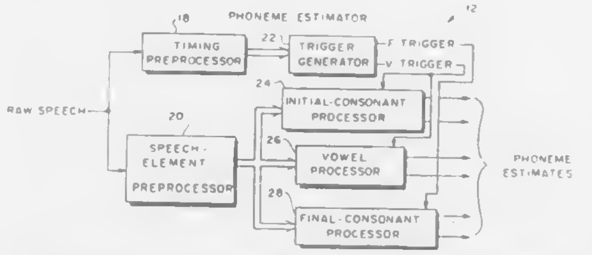
similarity computing means including a plurality of similarity computing sections for computing similarities between the selected pattern feature data read out from said second memory means and said reference pattern data read out from said reference pattern data storing means; and

means for recognizing the pattern of the input signal based on the computed similarities.

5,027,408
SPEECH-RECOGNITION CIRCUITRY EMPLOYING PHONEME ESTIMATION

John P. Kroeker, 19 McKinley Ave., Beverly, Mass. 01915, and Robert L. Powers, 37 Manslon Dr., Topsfield, Mass. 01983

Filed Apr. 9, 1987, Ser. No. 36,380
Int. Cl.⁵ G10L *5/06*
U.S. Cl. 381—43 29 Claims

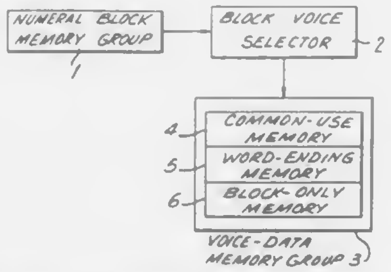


2. A method of processing speech comprising the steps of:
A. receiving a speech signal;
B. converting the speech signal to a sequence of digital quantities;
C. subjecting the digital quantities to a sequence of digital processing steps including a sequence of vector-processing steps whose outputs are multi-element vectors and whose inputs include vector outputs of previous processing steps, the sequence of vector-processing steps including a first nonlinear step, which comprises computing nonlinear combinations of different ones of its input elements to produce a first-nonlinear-step output vector that includes a separate first-nonlinear-step element representing the result of each such computed combination, and a second nonlinear step, which comprises computing nonlinear combinations of different elements of the first-nonlinear-step output vector to produce a second-nonlinear-step output vector that includes a separate second-nonlinear-step element representing the result of each such computed combination; and
D. modeling the vector output of the sequence of vector-processing steps to generate speech-element-estimate signals that represent respective figures of merit related to the likelihoods that the speech contains respective speech elements.

5,027,409
APPARATUS FOR ELECTRONICALLY OUTPUTTING A VOICE AND METHOD FOR OUTPUTTING A VOICE

Yumi Sakamoto, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Filed May 10, 1989, Ser. No. 350,173
Claims priority, application Japan, May 10, 1988, 63-113012; Dec. 21, 1988, 63-323067
Int. Cl.⁵ G10L *5/00*
U.S. Cl. 381—51 15 Claims



1. An apparatus for audibly outputting a series of numbers represented by words, the words being divided into blocks of sound, said blocks of sound being serially connected and including at least two general blocks and a last block at the end of the series of numbers to be output, the blocks being connected to form an audio output of the series of numbers comprising:

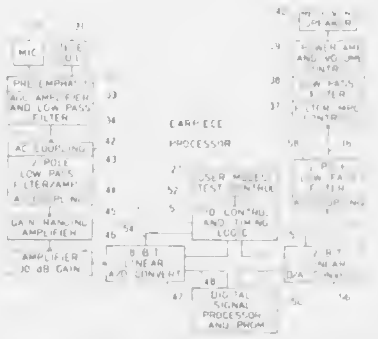
a voice data memory group for storing voice data to be utilized in connection with said blocks of sound, the voice data memory group including commonly used memory means for storing voice data which may be utilized for at least one of the general blocks, word ending memory means for storing voice data corresponding to word endings having at least two distinct intonations, and block only memory means for storing voice data which is only used for one of the general blocks of last block; and

block voice selecting means for selecting a memory means from which the voice data is to be output from among the commonly used memory means, word ending memory means and the block only memory means in accordance with the block type and the number to be output, the voice data stored in said block only memory means being a subset of at least a portion of said voice data stored in said commonly used memory means, said voice data stored in said block only memory means differentiating from said portion of said voice data stored in said commonly stored memory means in intonation only and the voice data stored in said word ending memory means being stored as a first set of voice data and a second set of voice data, said first set of voice data differentiating from said second set of voice data in intonation only.

5,027,410
ADAPTIVE, PROGRAMMABLE SIGNAL PROCESSING AND FILTERING FOR HEARING AIDS

Malcolm J. Williamson; Kenneth L. Cummins, and Kurt E. Hecox, all of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Nov. 10, 1988, Ser. No. 269,937
Int. Cl.⁵ H04R *25/00*
U.S. Cl. 381—68.4 58 Claims


MIC
PRE EMPHASIS AMPLIFIER AND LOW PASS FILTER
33
34
AC COUPLING
42
43
2 POLE LOW PASS FILTER/AMP
44
45
GAIN RANGING AMPLIFIER
46
AMPLIFIER 30 dB GAIN
54
8 BIT LINEAR A/D CONVERTER
48
47
DIGITAL SIGNAL PROCESSOR AND PROM
EARPIECE PROCESSOR
52
USER MODE TEST CONTROL
I/O CONTROL AND TIMING LOGIC
SPEAKER
POWER AMP AND VOLUME CONTROL
38
LOW PASS FILTER
37
58
D/A
56

1. A digital signal processing hearing aid system comprising:
(a) input means for providing an electrical input signal corresponding to a sound signal;
(b) analog to digital converter means for converting the input signal from the input means to input signal digital data at a selected sample rate;
(c) digital signal processing means for receiving the input signal digital data from the analog to digital converter means and providing processed output data, the digital signal processing means including:
  (1) means for analyzing the input signal data and estimating the energy contained in a plurality of selected frequency bands which cover the range of frequency content of the input signal data, wherein the means for analyzing the input signal data includes a first high pass digital filter for passing the higher half of the input signal frequency range, a first low pass digital filter for

VOL
1127
ISS
4
JE
25
1991
UMI

passing the lower half of the input signal frequency range and providing a second frequency range signal data, a second high pass digital filter selected to pass the higher half of the second frequency range signal and a second low pass digital filter selected to pass the lower half of the second frequency range signal to provide a third frequency range signal, a third high pass digital filter selected to pass the higher half of the third frequency range signal and a third low pass digital filer selected to pass the lower half of the third frequency range signal to provide a fourth frequency range signal, the fourth high pass filter selected to pass the higher half of the fourth frequency range signal and a fourth low pass digital filter selected to pass the lower half of the fourth frequency range signal, and wherein the means for analyzing further includes means for estimating the energy in the data corresponding to the outputs of the first, second, third, and fourth high pass filters and the fourth low pass filter;

(2) gain calculation means for calculating a gain for each band which is a function of estimated energy in each band;

(3) digital spectral filter means, having a plurality of filter coefficients which are changeable, for receiving the input signal digital data and providing spectrally shaped output data for output from the digital signal processing means;

(4) coefficient calculation means for calculating the coefficients of the digital spectral filter means based on the gains for each band calculated by the gain calculation means, the coefficients of the digital spectral filter means being periodically changed to the new coefficients calculated by the coefficient calculation means;

(d) digital to analog converter means for converting the processed output data from the digital signal processing means to an analog signal; and

(e) means for converting the analog signal to a corresponding sound.

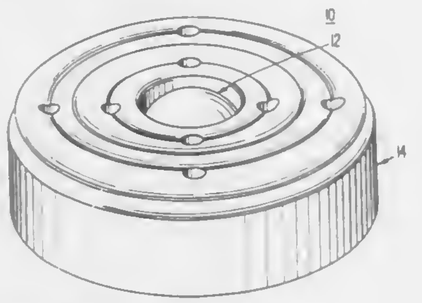
5,027,411
HIGH FREQUENCY LOUDSPEAKER

Amel L. Hill, Cassel Berry, Fla., assignor to Clyde W. Pierce, DeLand, Fla.

Filed Jan. 6, 1989, Ser. No. 294,366

Int. Cl.^{5} H04R *25/00*

U.S. Cl. 381—160 10 Claims



1. A tweeter assembly comprising:

a dome tweeter driver for transmitting high frequency sound to a listening audience; and

a housing for centrally mounting said tweeter driver; said housing comprising at least one annular ridge, spaced outwardly from the dome of the tweeter driver, and having a curvilinear surface shaped to diffuse sound energy transmitted from said tweeter driver in a horizontal direction.

5,027,412
VOICE COIL WITH RECTANGULAR COIL WIRE AND FOIL LEADS

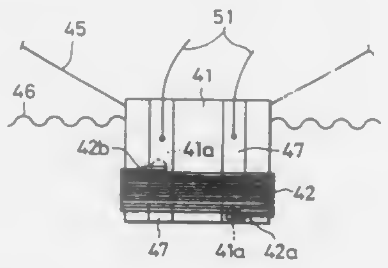
Junkichi Hayashi, and Tamotu Uchida, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 16, 1989, Ser. No. 311,254

Claims priority, application Japan, Oct. 11, 1985, 60-224946; May 6, 1986, 61-103521

Int. Cl.^{5} H04R *25/00*

U.S. Cl. 381—199 6 Claims



1. A coil structure, comprising:

a bobbin;

a coil comprising an electrical wire wound on a winding region of said bobbin, and

two conducting foils laid on said bobbin and extending in an axial direction thereof, at least one of said foils extending between said bobbin and coil substantially entirely through said winding region;

wherein two terminal ends of said electrical wire are welded to respective ones of said two conductive foils.

5,027,413
TARGET DETECTION SYSTEMS

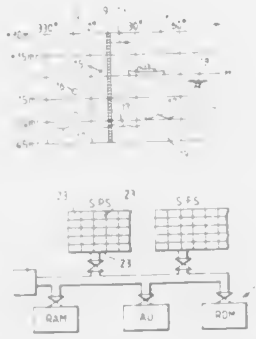
Michael E. Barnard, Reigate, England, assignor to U.S. Philips Corp., New York, N.Y.

Filed Jun. 13, 1989, Ser. No. 366,102

Claims priority, application United Kingdom, Jun. 17, 1988, 8814411

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—1 4 Claims



1. A target detection system comprising: means for repetitively deriving picture signals representing an image of a scene, which picture signals may contain a target signal to be detected against background signals, in that the image is divided into a plurality of sub-images; a plurality of sub-stores, one for each of the sub-images; means for calculating and storing values of a set of features of background picture signals associated with each sub-image in the respective sub-store; means for calculating and storing a statistical distribution of the background features; means for calculating and storing values of a set of features of target signals associated with each sub-image in the respective sub-store; means for calculating and storing a statistical distribution of the target feature; means for comparing the statistical distribution of the background features with that of the target features to set a target decision threshold as a function of feature values for each sub-image; and means for comparing feature values of an incoming picture signal in a sub-image with the target decision threshold in the associated sub-store to detect a target.

5,027,414
METHOD AND APPARATUS FOR CAPTURING INFORMATION IN DRAWING OR WRITING

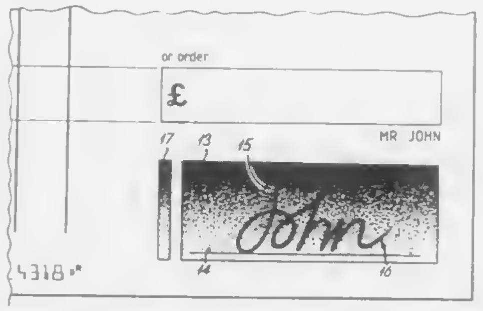
Colin S. Hilton, London, England, assignor to National Research Development Corporation, London, England

Filed Jan. 19, 1988, Ser. No. 145,098

Claims priority, application United Kingdom, Jan. 20, 1987, 8701206; Apr. 22, 1987, 8709502; Aug. 19, 1987, 8719625

Int. Cl.^{5} G06K *9/20*

U.S. Cl. 382—3 12 Claims



1. A method of obtaining information as writing or drawing is carried out, comprising

using a tip of a writing or drawing instrument to write or draw symbols in relation to a surface having shading which varies with position, the surface being of a type which is divided into a plurality of areas with each area being divided into a number of regions and each region having a color characteristic which is different from that of all the other regions in that area,

deriving an output signal from light reflected or transmitted by the surface at a point where said tip is currently located, said output signal being representative of the color characteristic of said shading at said point,

said symbols being written or drawn in respective ones of said areas with each symbol extending to several of said regions in that area,

detecting, from said output signal, a sequence of regions entered in writing or drawing each symbol, and

analyzing said sequences obtained to indicate which symbols have been written or drawn.

5,027,415
BILL DISCRIMINATING APPARATUS

Kazuhiro Hara, Chiba, and Kiyosi Fujii, Tokyo, both of Japan, assignors to Laurel Bank Machines Co., Ltd., Tokyo, Japan

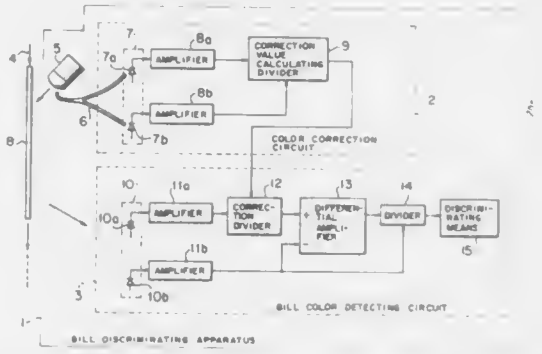
Filed May 24, 1989, Ser. No. 356,138

Claims priority, application Japan, May 31, 1988, 63-133214

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—7 **14 Claims**

1. A bill discriminating apparatus having light emitting means for emitting light onto bills and two color detecting means for selectively and photoelectrically detecting light components contained in light emitted from said light emitting means and transmitted through the bills to be discriminated and having different wavelengths, each being for outputting signals corresponding to a detected amount of the light component, said bill discriminating apparatus comprising two reference color detecting means for selectively and photoelectrically detecting light contained in light emitted from said light emitting means and having different wavelengths, each being for outputting signals corresponding to a detected amount of light, correction value calculating means for calculating a ratio of signals output from said two reference color detecting means, correction means for correcting the signals output from one of said two color detecting means based upon signals output from said correction value calculating means, differential amplifying means for differentially amplifying a difference between signals output from said correction means and the signals output from the other of said two color detecting means, dividing means for dividing signals output from said differential amplifying means by the signals output from said other of said two color detecting means and discriminating means for discriminating at least one of denomination and genuineness of the bills based upon signals output from said dividing means.



5,027,416
METHOD OF RECOGNIZING AND LOCATING THE POSITIONS OF TEMPLATES DISPOSED ON SHEET OR PLATE MATERIAL

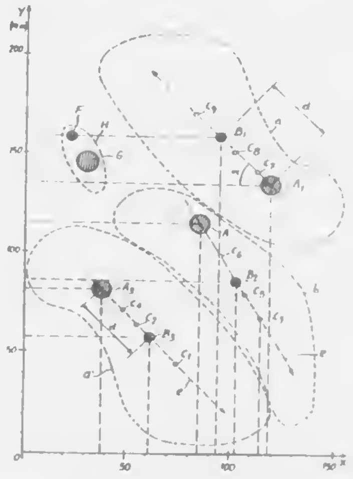
Jean-Marc Loriot, 15 rue Lakanal, 75015 Paris, France

Continuation of Ser. No. 777,051, Sep. 17, 1985, abandoned. This application Dec. 7, 1988, Ser. No. 283,051

Claims priority, application France, Sep. 18, 1984, 84 14281

Int. Cl.^{5} G06K *9/00*

U.S. Cl. 382—8 **16 Claims**



1. A method for recognizing templates and detecting their position on a planar material, said templates serving as guides for cutting out pieces of a given shape from said planar material, said method comprising the steps of:

providing a plurality of templates of a plurality of types characterized by differing shapes and sizes of said templates, a template of a given type having on an upper surface thereof marker means of at least one geometrical figure having a finite area and at least a characteristic line, said marker means identifying said type of template;

selectively placing and selectively orienting on said planar material at least one of said templates;

VOL
1127
ISS
4
JE
25
1991
UMI

imaging with recording means said planar material and said template placed thereupon;

determining a size and a position of said at least one geometrical figure from said imaged planar material and template, thereby determining said type of template and a position and an orientation of said template on said planar material which is to be cut.

5,027,417

METHOD OF AND APPARATUS FOR INSPECTING CONDUCTIVE PATTERN ON PRINTED BOARD

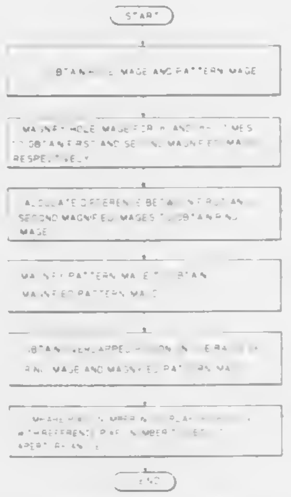
Ryuji Kitakado; Hironobu Yano; Hiroaki Kakuma; Tetsuo Hoki, and Takao Kanai, all of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Mar. 27, 1990, Ser. No. 500,294

Claims priority, application Japan, Mar. 31, 1989, 1-82117; May 12, 1989, 1-119056; May 25, 1989, 1-131876; Jun. 27, 1989, 1-164330; Jun. 27, 1989, 1-164331

Int. Cl.⁵ G06K *9/00;* **G01B** *11/26;* **H04N** *7/18*

U.S. Cl. 382—8 18 Claims



1 A method of inspecting a printed board for pattern defects, said printed board being provided with an electrically-conductive pattern and a through hole thereon, said method comprising the steps of:

(a) photoelectrically reading an image of said printed board;

(b) dividing said image of said printed board into a pattern image representing said conductive pattern and a hole image representing said through hole;

(c) obtaining first and second images by selectively performing one of the steps of:

(c-1) obtaining said first image by magnifying said pattern image and defining said second image with said hole image itself;

(c-2) defining said first image with said pattern image itself and obtaining said second image by magnifying said hole image; and

(c-3) obtaining said first and second images by magnifying said pattern image and said hole image, respectively;

(d) detecting positional relation between said first and second images and representing said positional relation with a parameter value; and

(e) comparing said parameter value with a predetermined reference value and thereby judging whether said conductive pattern has a non-allowable defect or not.

5,027,418

ELECTRO-OPTICAL INSPECTION APPARATUS FOR PRINTED-CIRCUIT BOARDS WITH COMPONENTS MOUNTED THEREON

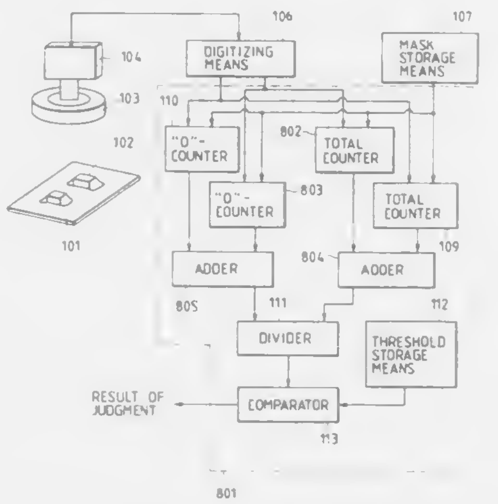
Kazutoshi Ikegaya, Sagamihara; Yuji Maruyama, Tokyo; Kunjo Sannomiya, Atsugi; Yukifumi Tsuda, Kawasaki, and Hiroto Toba, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Feb. 12, 1990, Ser. No. 478,339

Claims priority, application Japan, Feb. 13, 1989, 1-33040; Feb. 13, 1989, 1-33041

Int. Cl.⁵ G06K *9/52*

U.S. Cl. 382—8 10 Claims



1. An apparatus for inspecting a printed-circuit board with circuit components mounted thereon by soldering at least a portion of each component to a land on the printed-circuit board, wherein the circuit component has two portions to be soldered to mating lands on the printed-circuit board, comprising:

(a) a light source for illuminating each component from a normal direction of the printed-circuit board;

(b) image pickup means for taking up an optical image of the printed-circuit board from said normal direction and converting the optical image into a luminance signal;

(c) digitizing means for coverting said luminance signal into binary signals by comparison with a given threshold level;

(d) mask storage means for storing mask data having a given size and predetermined to set a mask on the position of a land on a surface of the printed-circuit board to which a portion of each component is to be soldered; and

(e) judgment processing means for calculating the ratio of an area represented by the number of signals of binary "1" in said mask to an area represented by the number of signals of binary "0" in said mask based on said binary signals received from said digitizing means and said mask data received from said mask storage means, and judging the soldering quality of the component based on said area ratio,

wherein said mask is set on the position of each of the two lands, and said judgment processing means is operative to calculate said area ratio based on the sum of an area represented by the number of binary "1" signals in the mask on the position of one of the lands and an area represented by the number of binary "1" signals in the mask on the position of the other land, and the sum of an area represented by the number of binary "0" signals in the mask on the position of said one land and an area represented by the number of binary "0" signals in the mask on the position of said other land.

5,027,419

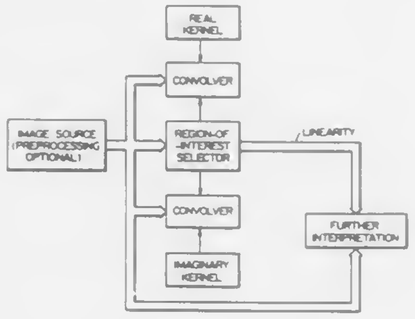
OPTICAL IMAGES BY QUADRUPOLE CONVOLUTION

Ronald S. Davis, Deep River, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Mar. 31, 1989, Ser. No. 330,895

Int. Cl.⁵ G06K *9/52, 9/64*

U.S. Cl. 382—28 15 Claims



1. A machine recognition process for recognizing the shape, location or orientation of an object by determining the linearity in an optical image of the said object in an (x,y) Cartesian coordinate system, comprising steps of:

capturing the said optical image in an image field defined in the said (x,y) system,

generating an image signal v(x′,y′) for each point (x′,y′) in the said image field,

deriving a linearity signal L(x,y) for each point (x,y) in the said image field by means of convolution expressed by the following equation:

$$L(x,y) = \underset{\text{The image}}{\int\int} dx'dy'\, Q(x-x',y-y')\, v(x',y')$$

where Q(x−x′,y−y′) is the kernel and has the value:

$$Q(x-x',y-y') = 1/\left((x-x')+i(y-y')\right)^2$$

where i is the square root of −1,

selecting a certain set of said linearity signals for points in the said image field, and

analyzing the said set of linearity signals in view of prestored reference parameters so that the optical image of the object is recognized.

5,027,420

METHOD AND APPARATUS FOR GENERATING PATTERNS WITH A USER PREFERENCE LEARNING FUNCTION

Yoichi Takebayashi, Yokohama; Isamu Iwai; Miwako Doi, both of Kawasaki, and Mika Fukui, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 16, 1988, Ser. No. 285,020

Claims priority, application Japan, Dec. 25, 1987, 62-327510

Int. Cl.⁵ G06K *9/68*

U.S. Cl. 382—38 20 Claims

1. An apparatus for generating patterns, comprising:

data input means for enabling introduction of input data to said apparatus;

data processing means for processing said input data to generate pattern data;

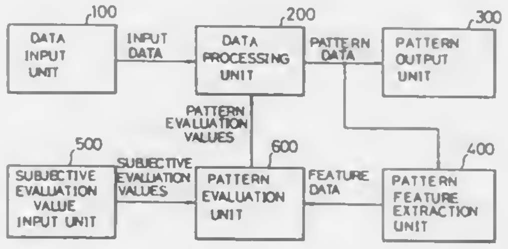
pattern output means for producing a pattern specified by said pattern data, said pattern defining a representation of said input data;

pattern feature extraction means for extracting feature data indicating physical features of said pattern from said pattern data;

means for allowing a user to enter subjective evaluation values indicating evaluation by said user for characterizing quantities defined in terms of said physical features;

means for deriving objective evaluation values indicating evaluation by said apparatus for said characterizing quantities with respect to prescribed reference values;

pattern evaluation means for determining pattern evaluation values in accordance with said subjective evaluation values and said objective evaluation values;



means for adjusting a manner of processing by said data processing means in accordance with said pattern evaluation values; and

feedback loop means for causing said data processing means to re-process said input data in said manner adjusted by said adjusting means.

5,027,421

DATA PROCESSING APPARATUS HAVING FUNCTION FOR REGISTERING ABSTRACT IMAGE DATA

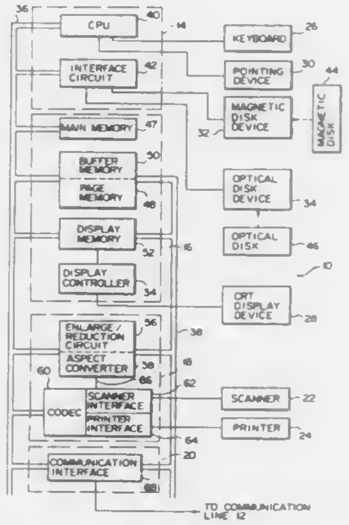
Masayuki Kanno, Fujisawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 30, 1988, Ser. No. 277,838

Claims priority, application Japan, Nov. 30, 1987, 62-302672

Int. Cl.⁵ G06K *9/42*

U.S. Cl. 382—47 12 Claims



1. An image information filing apparatus comprising:

means for inputting a retrieval code of a series of original images to be registered;

means for inputting an original image, said original image being one of said series of original images and input in accordance with the retrieval code;

first memory means for temporarily storing the original image input by the inputting means;

means for displaying the original image temporarily stored in the first memory means;

means for designating the presence and absence of a request for addition of an abstract image associated with the original image displayed on the displaying means;

means for preparing the abstract image based on the original

VOL
1127
ISS
4
JE
25
1991
UMI

image temporarily stored in the first memory means when the designating means designates the presence of the request for the addition of the abstract image;

second memory means for storing the original image temporarily stored in the first memory means and the abstract image prepared by the preparing means; and

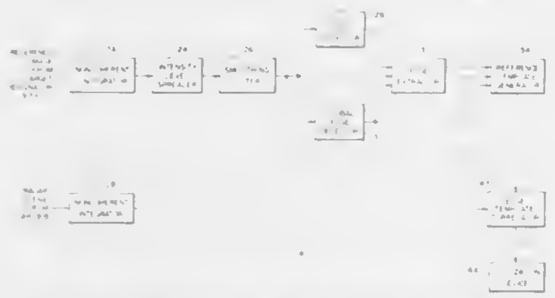
third memory means for storing retrieval data corresponding to the retrieval code.

5,027,422
CONFIRMED BOUNDARY PATTERN MATCHING

Theodore J. Peregrim; Gordon L. Kettering, both of Bedford, and Irving Kanter, Lexington, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Aug. 29, 1988, Ser. No. 237,927
Int. Cl.⁵ G06K *9/32*

U.S. Cl. 382—48 3 Claims



1. A method of aligning two images of the same scene, each of such images comprising an array of pixels, said method comprising the steps of:

(a) forming a template map of a portion of a first image, the template map comprising an array of pixels, selected ones of said pixels having:
  (i) a first value to indicate that the corresponding pixels in the first image represents a portion of the image, said portion being near an edge of the image and having an intensity greater than the intensity of another portion of the image on another side of the edge; or
  (ii) a second value to indicate that the corresponding pixel in the first image represents a portion of the image, said portion being near an edge of the image and having an intensity less than the intensity of another portion on another side of the edge;

(b) forming a correlation threshold indicative of the ratio of the average intensity of pixels in the template map having the first value to the average intensity of pixels in the first image corresponding to pixels in the template map having the second value;

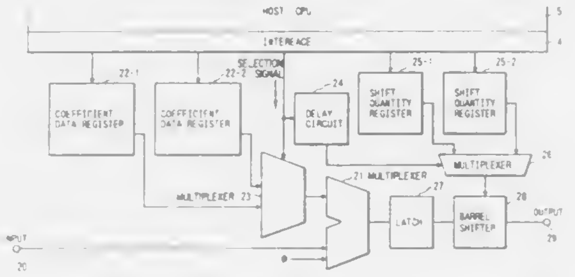
(c) applying the template map to a plurality of local windows of pixels formed in the second image, computing a score for each local window, and selecting the local window producing the highest score to represent alignment, and wherein computing a score for each local window comprises the steps of:
  (i) computing a first threshold equal to the inverse of the correlation threshold multiplied by the average value of pixels in the local window of the second image corresponding to pixels in the template map having the first value;
  (ii) computing a second threshold equal to the correlation threshold multiplied by the average value of pixels in the local window of the second image corresponding to pixels in the template map having the second value;
  (iii) computing a score reflecting the number of pixels in the local window having values above the second threshold and corresponding to pixels in the template map having the first value plus the number of pixels in the local window having values below the first threshold and having the corresponding to pixels in the template map second value pluse the number of pixels in the local window having values above the second threshold and corresponding to pixels in the template map having the second value, plus the number of pixels in the local window having values below the first threshold and corresponding to pixels in the template map having the first value.

5,027,423
IMAGE-PROCESSING INTEGRATED CIRCUIT DEVICE

Tetsuro Kawata; Eiri Hashimoto, and Nobuaki Miyakawa, all of **Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan**

Filed Jul. 12, 1989, Ser. No. 378,543
Claims priority, application Japan, Jul. 15, 1988, 63-176442
Int. Cl.⁵ G06K *9/40*

U.S. Cl. 382—54 4 Claims



1. An image-processing integrated circuit device comprising:

delay circuit and adder means for adding up image data in a window for every one of a group of said image data corresponding to coefficient data of the same value;

multiplication block means, comprising a plurality of multiplication blocks, for multiplying the results of the additions performed by the delay circuit and adder means for said every group of ones of said image data by a corresponding one of said coefficient data, in which each of said multiplication blocks comprises:
  a multiplier;
  a plurality of coefficient data register means for registering coefficient data for every one of a plurality of different filtering characteristics; and
  first switching means responsive to at least one changeable selection signal, for switching said coefficient data to be fed from said plurality of coefficient data register means to said multiplier, said changeable selection signal being fed to each of said plurality of multipliers of said multiplication blocks simultaneously; and

adder means for adding the results of the multiplication for all the groups of said image data obtained from said multiplication block means to thereby obtain a filter output.

5,027,424
IMAGE READER

Yoshihiro Yamazaki, and Manabu Imoto, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Continuation of Ser. No. 91,136, Aug. 31, 1987, abandoned. This application May 12, 1989, Ser. No. 351,301
Claims priority, application Japan, Aug. 29, 1986, 61-203470; Aug. 29, 1986, 61-230471
Int. Cl.⁵ G06K *9/00*

U.S. Cl. 382—65 21 Claims

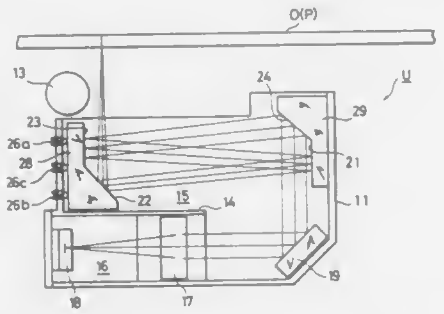
5. An image reader in which, upon application of an illuminating light beam to an original by an illuminating optical system, a light beam reflected from said original is applied through a contracting optical system to a line sensor for converting an optical image of said original into an image signal, comprising:

a first mirror provided for said original to reflect said light beam reflected from said original;

a repetitive reflection optical system including mirrors for causing said light beam reflected by said first mirror to go and return at least once in a reflection mode;

a second mirror provided for a contracting optical system to reflect said light beam passed through said repetitive reflection optical system; and

means for adjusting the direction of the reflecting surface of one of said mirrors of said repetitive reflection optical system to change the direction of said reflected light beam incident to said line sensor;



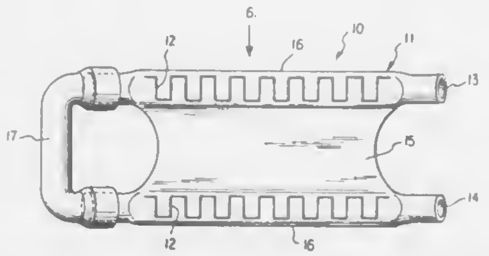
in which said first mirror provided for said original and one of said mirrors of said repetitive reflection optical system are mirror facets of a multifaceted mirror, while a transfer mirror for sending said reflected light beam from said repetitive reflection system to said second mirror provided for said contracting optical system and the other of the mirrors of said repetitive reflection optical system are mirror facets of a second multifaceted mirror, said first and second multifaceted mirrors being disposed in such a manner as to confront with each other, and the direction of the reflecting surface of one of said first and second multifaceted mirrors is adjustable.

5,027,425
FLOW-THROUGH HEATER, PARTICULARLY FOR A COFFEE OR TEA MAKER

Hans-Jürgen Slomka, Minden, Fed. Rep. of Germany, assignor to Melitta-Werke Bentz & Sohn, Minden, Fed. Rep. of Germany

Filed Mar. 20, 1989, Ser. No. 326,045
Claims priority, application Fed. Rep. of Germany, Mar. 30, 1988, 3810736
Int. Cl.⁵ F24H *1/10*

U.S. Cl. 392—480 5 Claims



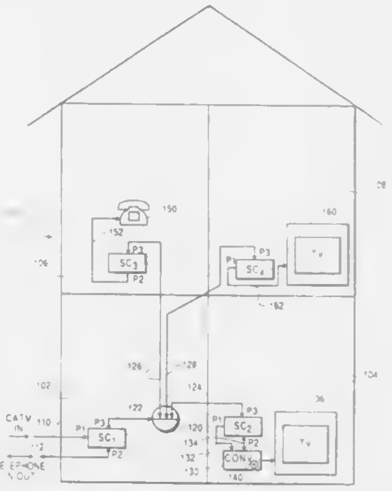
1. A flow-through fluid heater for a coffeemaker or teamaker, comprising a tubular hollow body having an exterior surface, flattened regions, a fluid inlet and a fluid outlet, and an electrical resistance heating element which at least partially surrounds said hollow body for heating a fluid received therein, wherein said hollow body comprises an electrically non-conductive material and said electrical resistance heating element comprises a resistive paste which is printed and sintered onto said flattened regions.

5,027,426
SIGNAL COUPLING DEVICE AND SYSTEM

Joseph J. Chiocca, Jr., 9948 Goshawk Ct., Jacksonville, Fla. 32257

Filed Jul. 7, 1989, Ser. No. 376,520
Int. Cl.⁵ H04H *1/00*

U.S. Cl. 455—5 27 Claims



1. Signal coupling apparatus, comprising:

a radio frequency (RF) signal port for at least one of transmitting and receiving RF signals;

a bidirectional telephone signal port;

a bidirectional composite signal port for transmitting and receiving composite signals including telephone and RF signals; and

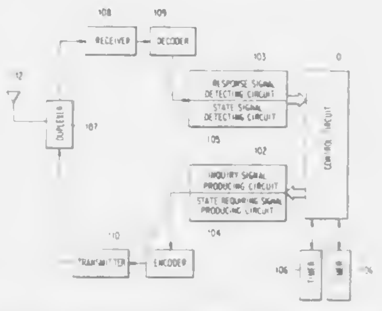
bidirectional means, operatively coupled between said RF signal port, telephone signal port and composite signal port, for providing on said composite signal port a composite signal including RF and telephone signals respectively present on said RF and telephone signal ports and for respectively providing, on said RF and telephone signal ports, RF and telephone signals that are included in a composite signal present on said composite signal port.

5,027,427
MONITORING SYSTEM FOR RADIO COMMUNICATION APPARATUS

Toshimitsu Shimizu, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed May 30, 1989, Ser. No. 358,103
Claims priority, application Japan, May 28, 1988, 63-131234
Int. Cl.⁵ H04B *17/00*

U.S. Cl. 455—67 4 Claims


RECEIVER
DECODER
RESPONSE SIGNAL DETECTING CIRCUIT
STATE SIGNAL DETECTING CIRCUIT
INQUIRY SIGNAL PRODUCING CIRCUIT
STATE REQUIRING SIGNAL PRODUCING CIRCUIT
TRANSMITTER
ENCODER

3. A monitoring method for a radio communication apparatus including a base station and a plurality of portable units, said method comprising the steps of:

transmitting a first requiring signal from said base station to

VOL
1127
ISS
4
JE
25
1991
UMI

each of said portable units at occurrences of a first predetermined cycle period;

replying a first response signal from a portable unit to said base station only when said portable unit has a change of an operation state;

transmitting a second requiring signal from said base station to each of said portable units when said base station receives said first response signal from said portable unit;

transmitting a third requiring signal from said base station to each of said portable units at occurrences of a second predetermined cycle period, said second predetermined cycle period being longer than said first predetermined cycle period; and

replying a second response signal from each of said portable units to said base station in response to said second or third requiring signal, said second response signal including information of the operation state in each of said portable units.

5,027,428

POWER SAVING ARRANGEMENT AND POWER SAVING METHOD

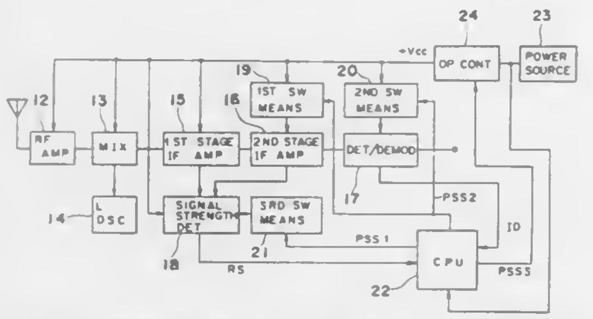
Kazuhisa Ishiguro, Nitta, and Yutaka Sekiguchi, Oora, both of Japan, assignors to Sanyo Electric Co. Ltd., Osaka, Japan

Filed Sep. 5, 1989, Ser. No. 403,101

Claims priority, application Japan, Sep. 7, 1988, 63-224038

Int. Cl.^{5} H04B *01/16, 17/00*

U.S. Cl. 455—67 **10 Claims**



1. A power saving arrangement for use in a subsidiary unit which communicates with a base unit in response to the detection of an ID signal leading data signal which are produced from said base unit and received by said subsidiary unit, said power saving arrangement comprising:

power control circuit for selectively producing a full power and a reduced power;

a processing circuit means for receiving and processing said data signal when the full power is applied thereto, and for detecting the level of the received signal when the reduced electric power is applied thereto;

detecting circuit connected to said processing circuit means for detecting said data signal when the full power is applied thereto, and for detecting only said ID signal when the reduced power is applied thereto;

first switching means for making and breaking a power supply path to said detecting circuit means from said power control circuit; and

control means responsive to a signal representing the level of the received signal obtained from said processing means and also to said ID signal obtained from said detecting circuit means for controlling said power control circuit and said first switching means to establish either one of first standby mode, second standby mode and use mode such that:

under the first standby mode, said first switching means breaks the power supply to said detecting circuit means and, at the same time, said power control circuit produces the reduced power to said processing circuit means, ready to detect the level of the received signal;

under the second standby mode as established when said control means detects that the received signal level exceeds a predetermined level, said first switching means makes the power supply to said detecting circuit means and, at the same time, power control circuit produces the reduced power to said processing circuit means and also to said detecting circuit means, ready to detect and read the pattern of said ID signal; and

under the use mode as established when said control means detects that said ID signal has a predetermined pattern, said first switching means makes the power supply to said detecting circuit means and, at the same time, power control circuit produces the full power to said processing circuit means and also to said detecting circuit means, ready to detect and read said data signal.

5,027,429

FREQUENCY MODULATOR UTILIZING FREQUENCY SYNTHESIZER

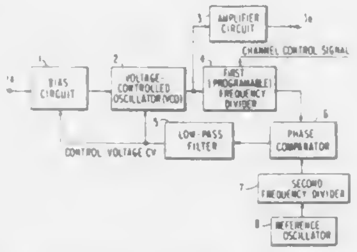
Tatsuru Kojima, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Aug. 14, 1989, Ser. No. 393,179

Claims priority, application Japan, Aug. 12, 1988, 63-201276

Int. Cl.^{5} H04B *1/04*

U.S. Cl. 455—113 3 Claims



1. A frequency modulator utilizing a frequency synthesizer comprising:

a voltage controlled oscillator having a variable capacitor for generating a frequency-modulated signal, said variable capacitor receiving an input modulation signal;

a programmable frequency divider for frequency-dividing the frequency-modulated signal delivered from said voltage controlled oscillator;

a reference oscillator for generating a reference signal;

a phase comparator for comparing phases of the output of said programmable frequency divider and said reference signal to produce a control signal of said voltage controlled oscillator; and

bias means for controlling a bias of said variable capacitor contained in said voltage controlled oscillator in response to said control signal delivered from said phase comparator.

5,027,430

OUTDOOR UNIT LOW NOISE CONVERTER FOR SATELLITE BROADCAST RECEPTION USE

Miyoshi Yamauchi, and Mitsuhiro Noboru, both of Osaka, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 200,555, May 31, 1988, abandoned.

This application Mar. 30, 1990, Ser. No. 503,095

Claims priority, application Japan, Jul. 24, 1987, 62-185877; Jul. 27, 1987, 62-115478

Int. Cl.^{5} H04B *1/10*

U.S. Cl. 455—188 **26 Claims**

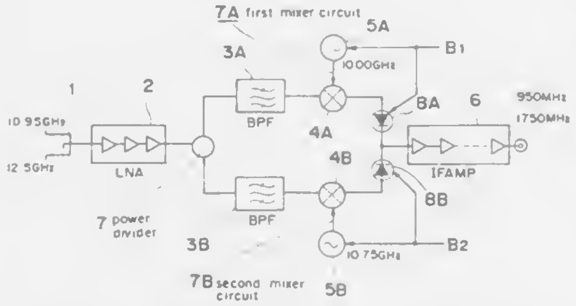
1. A low noise frequency converter for satellite broadcasting reception use for converting and selecting one of a plurality of input signal bands, comprising:

input means for receiving multiple input signals having different frequency bands consisting essentially of,

a single low-noise amplifier means for amplifying all of the multiple input signals and outputting amplified signals, and

power dividing means for dividing the output signals of the amplifier means into a plurality of divided amplified signals;

a plurality of band-pass filter means, each operatively connected to said input means and corresponding to a different set of said amplified signals, for passing only signals within a specified frequency band to eliminate amplified noise outside of the specified frequency band;



a plurality of mixing means, each operatively connected to a different one of said plurality of band-pass filter means, for converting said passed signals into IF signals, said plurality of mixing means converting signals of limited bandwidth to substantially eliminate noise; and

output selecting means, operatively connected to said plurality of mixing means, for selecting signals converted by one of said plurality of mixing means.

5,027,431

RADIO COMMUNICATION APPARATUS

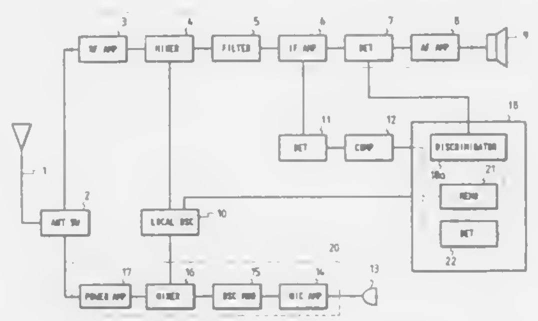
Takakazu Tanaka, and Yuji Hirai, both of Fukuoka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Feb. 27, 1989, Ser. No. 316,061

Claims priority, application Japan, Mar. 4, 1988, 63-51901

Int. Cl.^{5} H04B *7/00*

U.S. Cl. 455—214 3 Claims



1. A radio communication apparatus comprising:

discriminating means for sequentially scanning a plurality of frequency channels to determine whether or not the frequency channels are open or occupied and generating channel-condition signals representative thereof during each channel scanning cycle, wherein the channel-condition signals correspond to the channels respectively;

holding means for holding the channel-condition signals;

means for detecting a variation between a current channel-condition signal and a preceding channel-condition signal with respect to each of the channels, wherein the current channel-condition signal is currently generated by the discriminating means, and the preceding channel-condition signal is retrieved from the holding means;

means for detecting whether or not a given identification signal is present in the channel where the detected variation occurs;

means for establishing a receiving condition in the channel where the detected variation occurs if the identification signal is present, and

means for, in respect of the channel where the detected variation occurs, updating the channel-condition signal in the holding means by the current channel-condition signal.

5,027,432

MOTOR VEHICLE RADIO WITH AN AUTOMATIC VOLUME CONTROL DEVICE

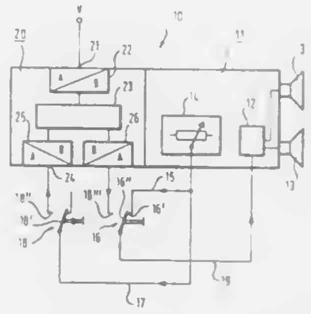
Otto Skala, Rüsselsheim, and Walter Rauth, Hochheim, both of Fed. Rep. of Germany, assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed May 10, 1989, Ser. No. 349,628

Claims priority, application Fed. Rep. of Germany, May 18, 1988, 3816918

Int. Cl.^{5} H04B *1/16*

U.S. Cl. 455—238 **6 Claims**



1. A motor vehicle radio with an automatic volume control device, to which is fed a speed signal detected by a speed sensor and which delivers a volume signal associated with the detected speed signal, and with a manual volume-setting device which generates a volume signal corresponding to the volume which has been set, characterized by the fact that a two-position switch (**16**) is provided for selectively transmitting the volume signal of the automatic volume control device (**20**) or of the manual volume-setting device (**14**) to an output stage (**12**) of the radio (**10**) which feeds loudspeakers (**13**); and a storage and control circuit (**23**) which includes a memory in which the volume signal corresponding to the adjusted volume can be stored when the manual volume-setting device (**14**) is switched on following a detection signal for a desired vehicle speed.

5,027,433

REMOTE INFRARED TRANSCEIVER AND METHOD OF USING SAME

Michael A. Menadier, Vista; Michael A. Williams, and David B. Rose, both of San Diego, all of Calif., assignors to HM Electronics, Inc., San Diego, Calif.

Continuation-in-part of Ser. No. 326,225, Mar. 20, 1989, which is a continuation-in-part of Ser. No. 176,939, Apr. 4, 1988, abandoned, and a continuation-in-part of Ser. No. 427,690, Oct. 27, 1989. This application Oct. 27, 1989, Ser. No. 427,650

Int. Cl.^{5} H04B *10/00*

U.S. Cl. 455—606 **19 Claims**

1. An optical transceiver for use with a second optical transceiver, comprising:

a headset unit for being worn by a user;

circuit means mounted to said unit for converting an optical message carrying beam into a message carrying frequency signal and for converting a message carrying frequency signal into an optical message carrying beam;

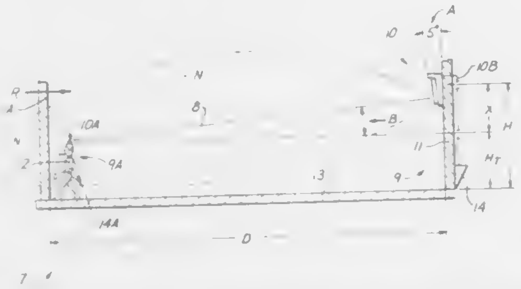
said circuit means including emitter means for converting said message carrying frequency signal into an optical

VOL
1127
ISS
4
JE
25
1991
UMI

message carrying beam for transmission to optical communication base means mounted within a room;

said circuit means further including receptor means for receiving an optical message carrying beam transmitted by said optical communication base means;

wall means mounted between said emitter means and said receptor means for preventing the optical message carrying beam transmitted to the optical communication base means from being received by said receptor means, thereby inhibiting feedback interference;



receptor inclining means for positioning said receptor means upwardly at a sufficient angle relative to the horizontal for helping to prevent line of sight obstruction between said optical communication means and said receptor means; and

emitter inclining means for positioning said emitter means upwardly at a sufficient angle relative to the horizontal for helping to prevent line of sight obstruction between said optical communication base means and said emitter means.

5,027,434

APPARATUS FOR BIDIRECTIONAL TRANSMISSION OF OPTICAL SIGNALS

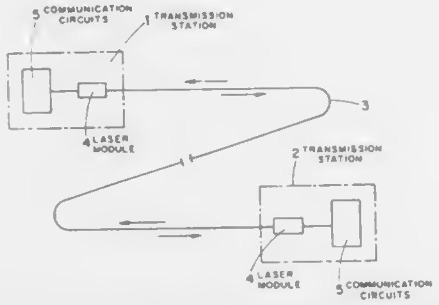
Martin Brahms, Hanover; Ziaedin Chahabadi, Bad Munder, and Johannes Ocker, Hanover, all of Fed. Rep. of Germany, assignors to ke kommunikations-Elektronik GmbH & Co., Hanover, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 261,344, Oct. 24, 1988, abandoned. This application Dec. 7, 1989, Ser. No. 447,400

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1987, 3736082

Int. Cl.^{5} H04B *10/00*

U.S. Cl. 455—606 **5 Claims**



1. Apparatus for bidirectional transmission of optical signals between a first station and a second station connected by a light transmission path including optical fibers, comprising:

means for transmitting optical signals in a first direction to said second station, said first transmitting means including a first optical transmitter located at said first station, said first optical transmitter including a first laser module comprised of:

a first laser diode positioned adjacent to the end of said light transmission path for emitting light into said path; and

a first monitor diode positioned behind said first laser diode for detecting light emitted by said first laser diode upon the transmission of optical signals from said first station to said second station, and for detecting light transmitted through said light transmission path and said first laser diode upon the transmission of optical signals from said second station to said first station; and

a second means for transmitting optical signals in a second direction to said first station, said second transmitting means including a second optical transmitter located at said second station, said second optical transmitter including a second laser module comprised of:

a second laser diode positioned adjacent to the other end of said transmission path for emitting light into said path; and

a second monitor diode positioned behind said second laser diode for detecting light emitted by said second laser diode upon transmission of optical signals from said second station to said first station, and for detecting light transmitted through said light transmission path and said second laser diode upon the transmission of optical signals from said first station to said second station.

5,027,435

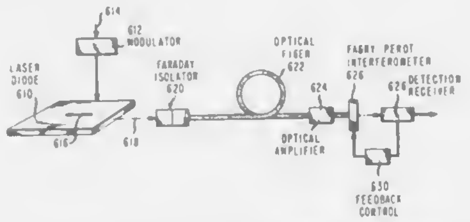
OPTICAL COMMUNICATION SYSTEMS USING FABRY-PEROT CAVITIES

Andrew R. Chraplyvy, Matawan; Patrick P. Iannone, Edison; Ivan P. Kaminow, Holmdel; Tingye Li; Julian Stone, both of Rumson; Lawrence W. Stulz, Neptune, and Robert W. Tkach, Little Silver, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 72,956, Jul. 15, 1987. This application Jan. 27, 1989, Ser. No. 303,525

Int. Cl.^{5} H04B *10/00;* **H04J** *14/02*

U.S. Cl. 455—617 **9 Claims**



1. An optical communication system comprising a single-electrode distributed feedback laser diode,

modulation means coupled to shift the frequency of the optical signal from said laser diode between a first frequency and a second frequency, said first and second frequencies representing logic ones and zeros, to provide frequency-shift keyed modulation of the optical signal from said laser diode, where the differential of frequency between the ones and zeros (fd) divided by the modulation frequency (B) is equal to or greater than one,

an optical fiber for transmitting the frequency-shift keyed optical signal from said laser diode to a remote location, and

a demodulator coupled to said optical fiber at said remote location, said demodulator having a passband which passes one of said frequencies and blocks the others of said frequencies.

5,027,436

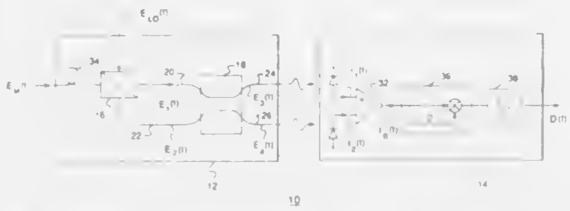
OPTICAL HYBRID FOR COHERENT DETECTION SYSTEMS

Jean-Marc P. Delavaux, Wescosville, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 27, 1990, Ser. No. 515,983

Int. Cl.^{5} G02F *1/00;* **H04J** *11/00*

U.S. Cl. 455—619 **27 Claims**



26. A polarization independent coherent lightwave detection arrangement capable of recovering a data signal (D(t)) from a received message signal (E_M(t)), the detection arrangement comprising:

an optical hybrid including

polarization splitting means responsive at a first input to the received message signal (E_M(t)) and at a second, orthogonal input to a local oscillator signal (E_{LO}(t)), the polarization splitting means for dividing each signal into first and second orthogonal components of first (E_{MH}(t), E_{LH}(t)) and second (E_{MV}(t), E_{LV}(t)) polarization states and forming first (E_1(t)) and second E_2(t)) output signals therefrom, each output comprising a sum of orthogonal components of each input signal; and

polarization maintaining combining means disposed to receive as separate inputs the first and second outputs of the polarization splitting means and provide as the output of said optical hybrid a pair of combined signals (E_3(t), E_4(t)), said pair of combined signals representative of orthogonal vector sums of the first and second outputs of the polarization splitting means; and

the detection arrangement further comprising

a receiver responsive to the pair of combined output signals from the polarization maintaining combining means for converting the optical signals into electrical representations thereof and combining said electrical representations to provide as an output the recovered data signal, said receiver comprising

first converting means responsive to a first optical signal of the pair of combined signal outputs from the optical hybrid for providing as an output a first photocurrent;

second converting means responsive to a second, remaining optical signal of the pair of combined signal outputs from the optical hybrid for providing as an output a second photocurrent;

differentially amplifying means responsive to the first and second photocurrents for subtracting said second photocurrent from said first photocurrent and generating as an output a difference photocurrent;

delay means responsive to the difference photocurrent for generating a delayed difference photocurrent;

multiplying means responsive to both the difference photocurrent and the delayed difference photocurrent, the multiplicative product being the squared representation of the difference photocurrent; and

filtering means responsive to the squared representation output from the multiplying means for removing components of said squared representation at frequencies other than the difference frequency (ω_{IF}) between the local oscillator carrier frequency (ω_{LO}) and the message signal carrier frequency (ω_M), the output of the filtering means representing the recovered data signal.

VOL
1127

ISS
4

JE
25

1991

UMI

DESIGN PATENTS

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ERRATA

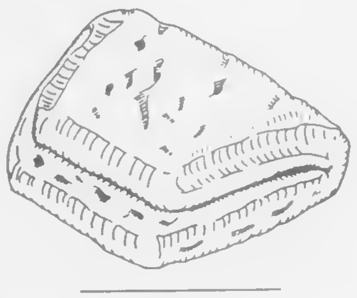
For CLASS	See PATENT NO.
D13-174	317,776

VOL
1127
ISS
4
JE
25
1991
UMI

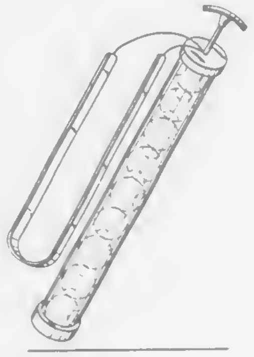
DESIGNS

JUNE 25, 1991

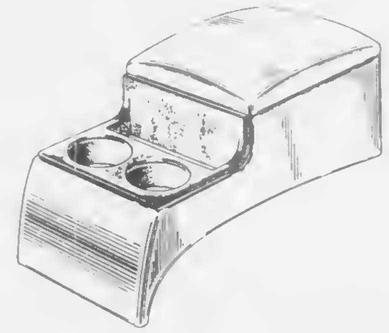
317,672
SANDWICH BREAD
Gottfried Presl, Lake Barrington, Ill., assignor to Sara Lee Corporation, Winston-Salem, N.C.
Filed Dec. 23, 1988, Ser. No. 288,814
Term of patent 14 years
U.S. Cl. D1—122



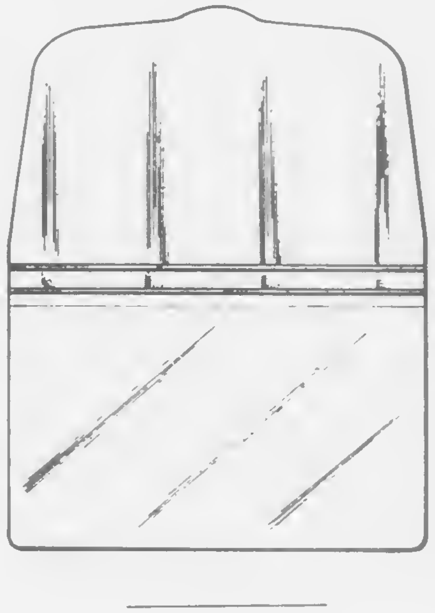
317,673
PORTABLE BALL CONTAINER
Mark Movitz, 12 Bonn Pl., Weehawken, N.J. 07087
Filed Nov. 17, 1986, Ser. No. 931,193
The portion of the term of this patent subsequent to Dec. 12, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D3—36



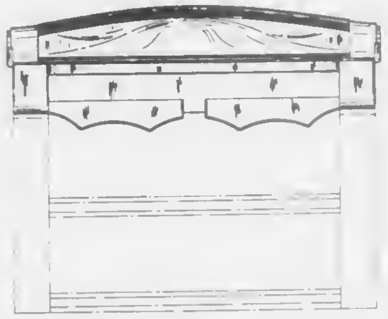
317,674
SEAT CADDY
Rex G. Smith, Grand Prairie, Tex., assignor to Texas Saddlebags, Inc., Arlingotn, Tex.
Filed Dec. 22, 1988, Ser. No. 288,724
Term of patent 14 years
U.S. Cl. D3—40



317,675
PHOTO WALLET OR SIMILAR ARTICLE
Robert D. Shipp, Bel Air, and Mary A. Sarandon, Marina del Rey, both of Calif., assignors to Rembrandt Photo Services, Los Angeles, Calif.
Filed Jan. 26, 1988, Ser. No. 149,072
Term of patent 14 years
U.S. Cl. D3—56



317,676
TRUNK LID
Estelee M. Wood, and Charles M. Wood, both of 720 N. Union, Jackson, Mo. 63755
Filed Dec. 28, 1988, Ser. No. 290,918
Term of patent 14 years
U.S. Cl. D3—70



VOL 1127 ISS 4 JE 25 1991 UMI

317,677
TOOL BOX

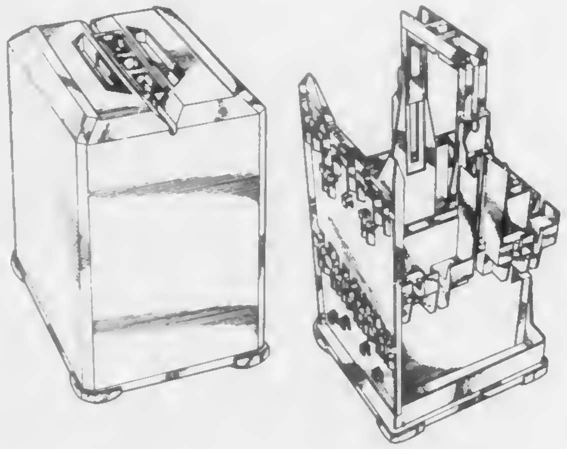
Patrick P. P. Posso, Lausanne, Switzerland, assignor to Gefitec S.A., Lausanne, Switzerland

Filed Mar. 24, 1988, Ser. No. 172,842

Claims priority, application World Int. Prop. O., Oct. 13, 1987, DM/009452

Term of patent 14 years

U.S. Cl. D3—30.1



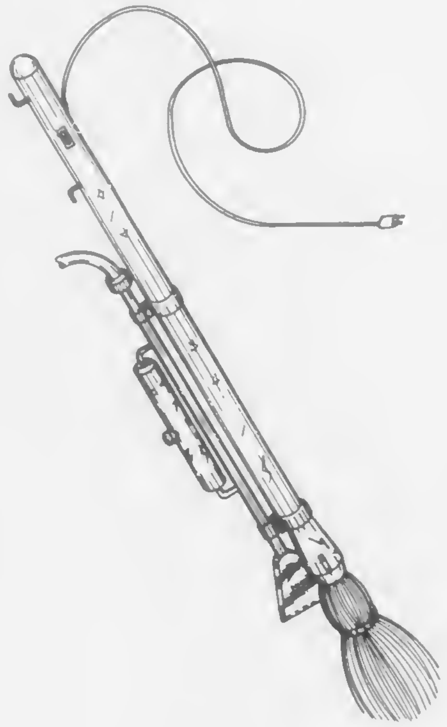
317,678
COMBINED BROOM AND VACUUM CLEANER OR SIMILAR ARTICLE

Samuel Butcher, Box 97 Valley Manor, Pine Grove, and William W. Murner, Rt. 1, Box 225, Middleburg, both of W. Va. 26149

Filed May 19, 1988, Ser. No. 196,112

Term of patent 14 years

U.S. Cl. D4—116



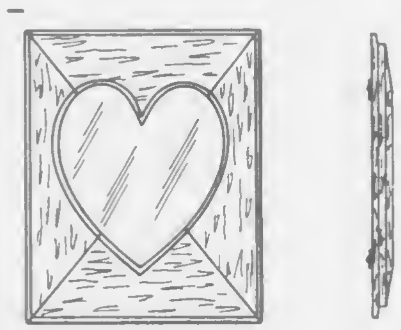
317,679
DECORATIVE PICTURE FRAME

Raymond W. LaRochelle, 23 Ross Hill Rd. Ext., Libson, Conn. 06357

Filed Apr. 18, 1989, Ser. No. 340,158

Term of patent 14 years

U.S. Cl. D6—303



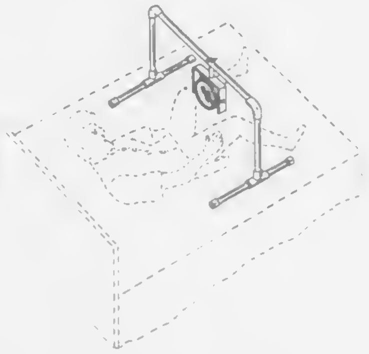
317,680
TAKE-APART FRAME WITH ADJUSTABLE MIRROR

Randall L. Smith, Rt. 1, Box 12, Scottville, N.C. 28672

Filed Jan. 9, 1989, Ser. No. 294,805

Term of patent 14 years

U.S. Cl. D6—309



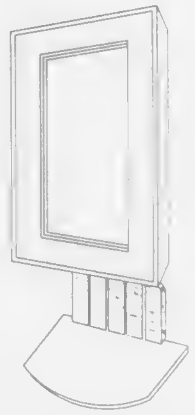
317,681
PICTURE FRAME ASSEMBLY OR SIMILAR ARTICLE

Brian S. Stewart, San Francisco, and William G. Moggridge, Palo Alto, both of Calif., assignors to Acme Frame Products, Inc., Chicago, Ill.

Filed Aug. 23, 1988, Ser. No. 235,434

Term of patent 14 years

U.S. Cl. D6—310



317,682
ARMCHAIR

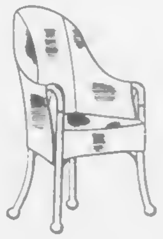
Carlo Giorgetti, Meda, Italy, assignor to Giorgetti S.p.A., Milan, Italy

Filed May 12, 1988, Ser. No. 193,427

Claims priority, application World Int. Prop. O., Jan. 15, 1988, DM/010073

Term of patent 14 years

U.S. Cl. D6—379



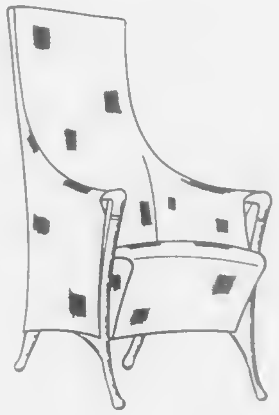
317,683
ARMCHAIR

Carlo Giorgetti, Meda, Italy, assignor to Giorgetti S.p.A., Milan, Italy

Filed May 12, 1988, Ser. No. 193,432

Term of patent 14 years

U.S. Cl. D6—379



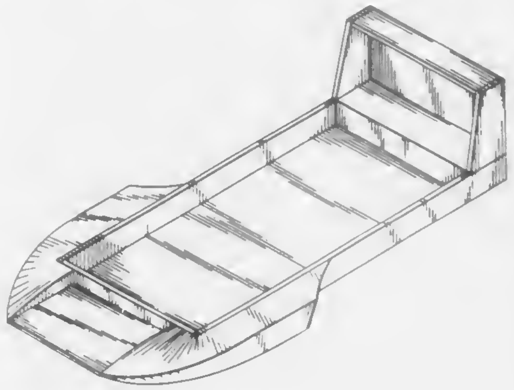
317,684
BED

Michael E. Manthei, 805 Cottonwood Loop, Richland, Wash. 99352

Filed Oct. 20, 1988, Ser. No. 260,481

Term of patent 14 years

U.S. Cl. D6—384



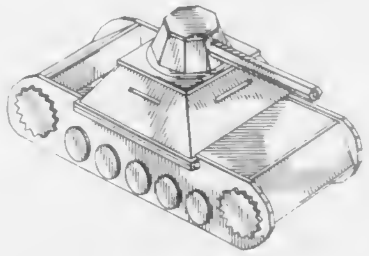
317,685
BED

Jerry W. Osborne, 3280 Agarter, Deltona, Fla. 32738

Filed Sep. 26, 1988, Ser. No. 248,570

Term of patent 14 years

U.S. Cl. D6—388



VOL
1127
ISS
4
JE
25
1991
UMI

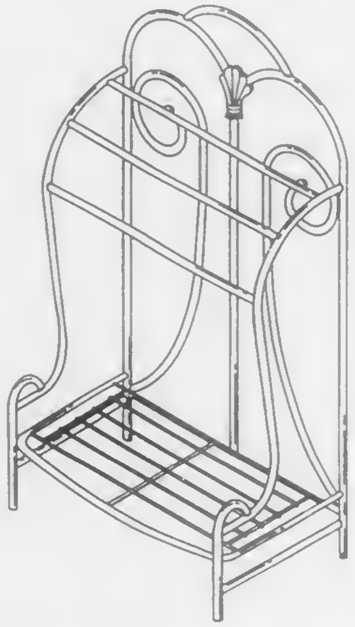
317,686
BLANKET RACK

Peter M. Y. Kee, Happy Valley, Hong Kong, assignor to Rosalco, Inc., Louisville, Ky.

Filed Jul. 31, 1990, Ser. No. 560,317

Term of patent 14 years

U.S. Cl. D6—410



317,687
TELESCOPIC SUPPORT ARM FOR COMPUTERS AND PERIPHERAL COMPUTER EQUIPMENT

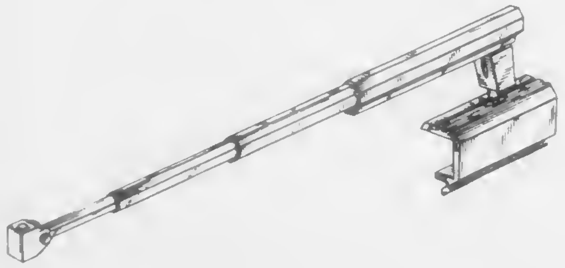
Albert Fabius, and Antonius F. M. Bende, both of Ingelandenweg 1, 1069 WE Amsterdam, Netherlands

Filed Jun. 16, 1989, Ser. No. 368,220

Claims priority, application Benelux, Dec. 23, 1988, 63914-00

Term of patent 14 years

U.S. Cl. D6—429



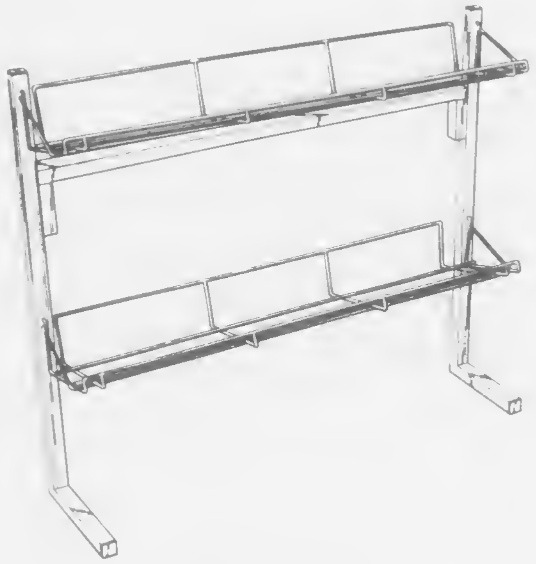
317,688
DISPLAY RACK

George A. Bezzerides, Benicia, and Norman Feldner, Los Angeles, both of Calif., assignors to Bezzerides Company, Benicia, Calif.

Filed Jun. 17, 1988, Ser. No. 208,409

Term of patent 14 years

U.S. Cl. D6—463



317,689
ROLLUP FOR TOOTHPASTE TUBES OR THE LIKE

William A. Curtis, 704 W. Pine St., Stillwater, Minn. 55082

Filed Jan. 30, 1989, Ser. No. 303,404

Term of patent 14 years

U.S. Cl. D6—541

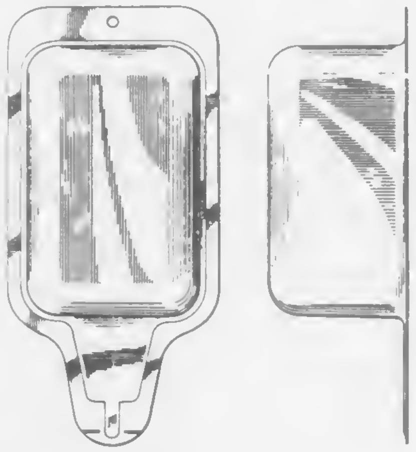
317,690
POUCH CONTAINING LIQUID SOAP OR THE LIKE FOR USE WITH A DISPENSER UNIT

Peter Thomsen, 100 North Hill Dr., No. 28, Brisbane, Calif. 94005

Continuation-in-part of Ser. No. 807,293, Dec. 10, 1985. This application May 25, 1989, Ser. No. 356,405

Term of patent 14 years

U.S. Cl. D6—542



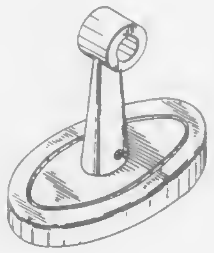
317,691
BATHWARE SUPPORT BRACKET

Wen-Mu Wang, No. 32, Lane 266, Fu Te 1 Rd., Hsi Tze Chen, Taipei Hsien, Taiwan

Filed Dec. 20, 1989, Ser. No. 454,861

Term of patent 14 years

U.S. Cl. D6—550



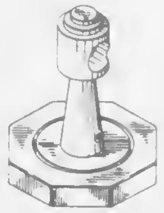
317,692
BATHWARE SUPPORT BRACKET

Wen-Mu Wang, No. 32, Lane 266, Fu Te 1 Rd., Hsi Tze Chen, Taipei Hsien, Taiwan

Filed Dec. 20, 1989, Ser. No. 454,864

Term of patent 14 years

U.S. Cl. D6—550



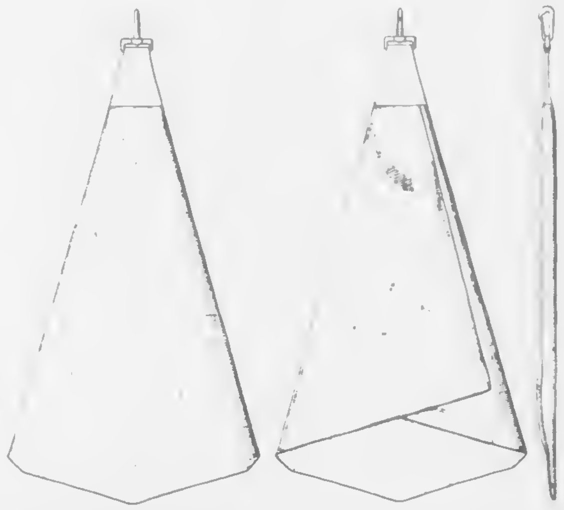
317,693
GOLF TOWEL

Alan C. Jencks, 861 Arlington Blvd., El Cerrito, Calif. 94630, and Jeremiah Sullivan, 1525 Spruce St., #31, Berkeley, Calif. 94709

Filed Jan. 2, 1990, Ser. No. 459,594

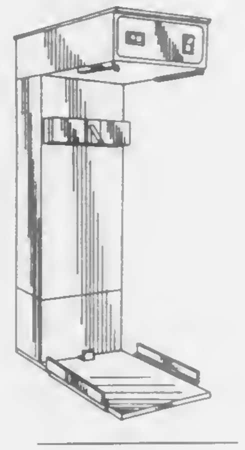
Term of patent 14 years

U.S. Cl. D6—608

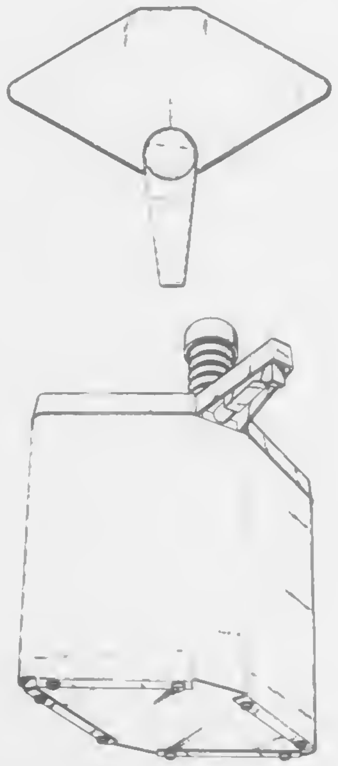


VOL
1127
ISS
4
JE
25
1991
UMI

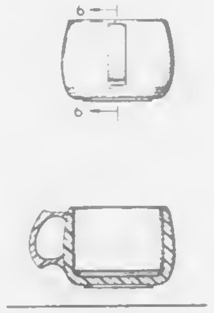
317,694
TEA BREWER
Maurice J. Dust, Springfield, Ill., assignor to Bunn-O-Matic Corporation, Springfield, Ill.
Filed Oct. 24, 1988, Ser. No. 261,184
Term of patent 14 years
U.S. Cl. D7—309



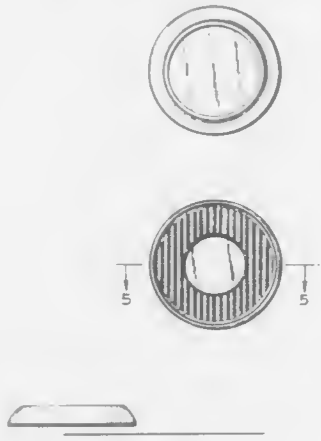
317,695
DISPENSER FOR LIQUID FOOD
Leif E. Stern, Fattersbus, Lund, Sweden S-225 90
Filed Sep. 20, 1988, Ser. No. 246,643
Claims priority, application Sweden, Mar. 21, 1988, 88-0719
Term of patent 14 years
U.S. Cl. D7—313



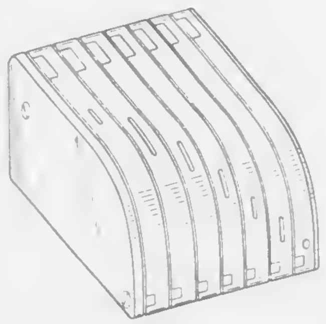
317,696
BEVERAGE CUP
David P. Lage, St. Louis County, Mo., assignor to Quick Point, Inc., Fenton, Mo.
Filed Aug. 19, 1988, Ser. No. 234,289
Term of patent 14 years
U.S. Cl. D7—536



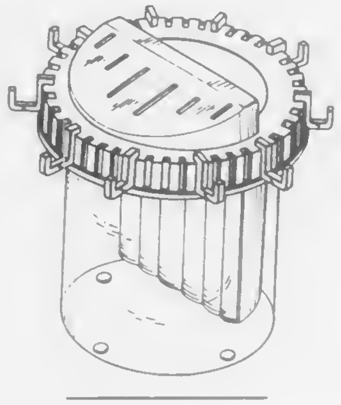
317,697
COMBINED COASTER AND CUP COVER
David P. Lage, St. Louis County, Mo., assignor to Quick Point, Inc., Fenton, Mo.
Filed Aug. 22, 1988, Ser. No. 234,503
Term of patent 14 years
U.S. Cl. D7—624



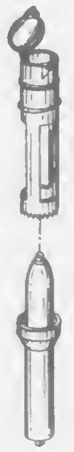
317,698
KNIFE HOLDING BLOCK
Arturo Martinez, Milan, Italy, assignor to Coltellerie Montana S.r.l., Como, Italy
Filed Aug. 4, 1989, Ser. No. 389,552
Claims priority, application Italy, Feb. 6, 1989, 20530B/89[U]
Term of patent 14 years
U.S. Cl. D7—637



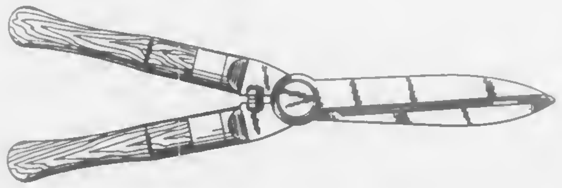
317,699
COMBINED CUTLERY AND KITCHEN UTENSIL HOLDER OR SIMILAR ARTICLE
Stony Lin, No. 11, Shing-Gong Rd., Yeong-Kang Industrial District, Tainan Hsien, Taiwan
Filed Jun. 2, 1989, Ser. No. 360,711
Term of patent 14 years
U.S. Cl. D7—640



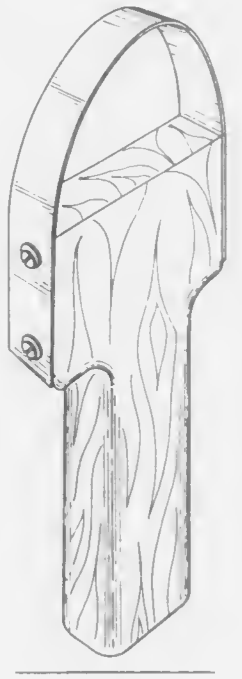
317,700
COMBINATION FOOD CARVER AND DECORATIVE ILLUMINATOR
Thomas Callahan, P.O. Box 928, Stamford, Conn. 06904
Filed Aug. 25, 1988, Ser. No. 236,126
Term of patent 14 years
U.S. Cl. D7—693



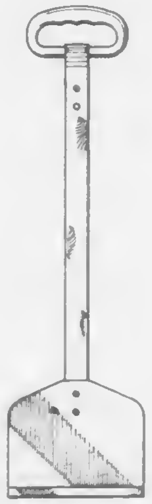
317,701
HEDGE SHEAR
James E. Grove, 6514 Graves Ave., Van Nuys, Calif. 91406
Filed Oct. 16, 1989, Ser. No. 421,723
Term of patent 14 years
U.S. Cl. D8—5



317,702
WEED CUTTER
Willie F. Rentz, 1121 E. 1st Ave., Ellensburg, Wash. 98926
Filed May 23, 1990, Ser. No. 527,549
Term of patent 14 years
U.S. Cl. D8—7



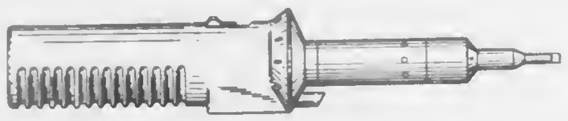
317,703
DRYWALL CARRIER
Robert A. Cydrus, 9515 Ave. "N", Chicago, Ill. 60617
Filed Jul. 7, 1988, Ser. No. 216,238
Term of patent 14 years
U.S. Cl. D8—14



VOL 1127 ISS 4 JE 25 1991 UMI

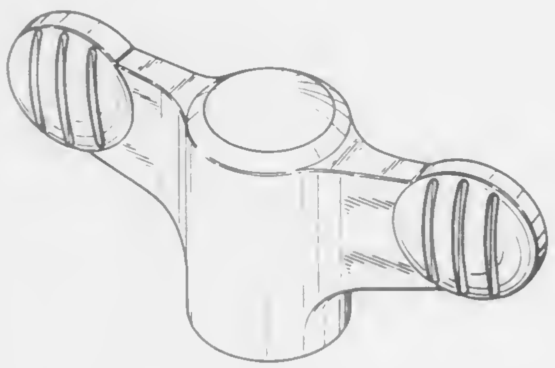
317,704
BUTANE POWERED SOLDERING IRON

Thaddeus Zaborowski, Cambridge, and Alan R. MacLeod, Chelmsford, both of Mass., assignors to The Schawbel Corporation, Cambridge, Mass.
Filed Jul. 25, 1988, Ser. No. 228,960
Term of patent 14 years
U.S. Cl. D8—30



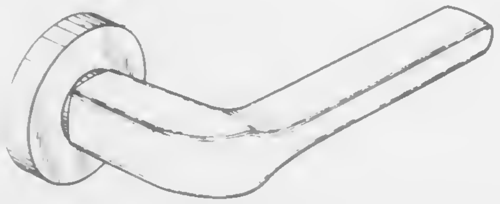
317,705
WING HANDLE

Bernhard Tinz, Stuttgart, Fed. Rep. of Germany, assignor to Heinrich Kipp Werk, Sulz/Neckar, Fed. Rep. of Germany
Filed Dec. 8, 1988, Ser. No. 281,849
Claims priority, application Fed. Rep. of Germany, Jul. 18, 1988, 88 00 383
Term of patent 14 years
U.S. Cl. D8—307



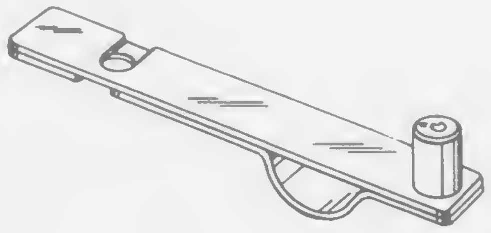
317,706
DOOR HANDLE

Cini Boeri, Piazza S. Ambrogio, 14-20123 Milan, Italy
Filed Jul. 6, 1988, Ser. No. 215,907
Claims priority, application Italy, Jan. 15, 1988, 20450B/88
Term of patent 14 years
U.S. Cl. D8—308



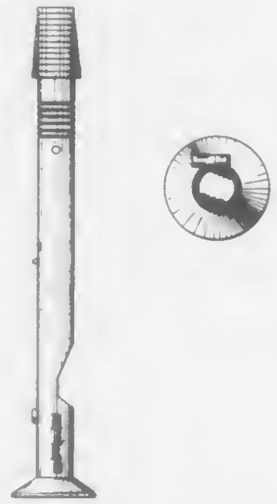
317,707
AUTOMOBILE LOCK FOR ATTACHMENT TO A STEERING WHEEL AND A STEERING COLUMN-MOUNTED GEARSHIFT LEVER

Agneta Nordberg, Nidarosgatan 5, S-163 34 Spånga, and Gerard Crossdal, Birger Jarlsgatan 120C, S-114 20 Stockholm, both of Sweden
Filed Jan. 5, 1989, Ser. No. 293,866
Claims priority, application Sweden, Jul. 28, 1988, 88-1755
Term of patent 14 years
U.S. Cl. D8—331



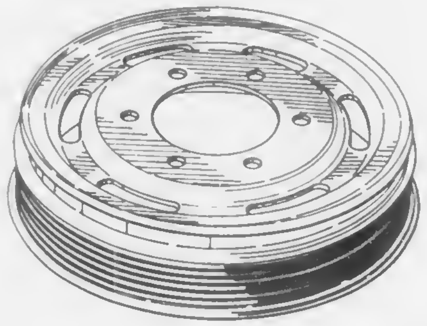
317,708
COMBINED STEERING WHEEL-ATTACHED LOCK AND ALARM FOR ALTERNATIVE USE AS A VERTICALLY-POSITIONED VISUAL WARNING LIGHT FOR PLACEMENT IN A ROADWAY

Kip L. Fuller, Littleton, Colo., assignor to Innovision Technologies Group, Inc., Lakewood, Colo.
Filed Apr. 11, 1990, Ser. No. 507,590
Term of patent 14 years
U.S. Cl. D8—331



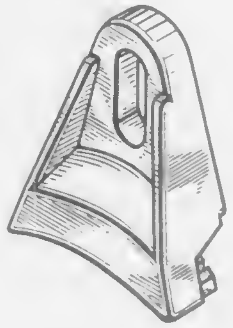
317,709
POLY-V PULLEY

Toshiaki Kanemitsu, Kobe, Japan, assignor to Kabushiki Kaisha Kanemitsu, Akashi, Japan
Filed Sep. 6, 1988, Ser. No. 240,247
Term of patent 14 years
U.S. Cl. D8—360



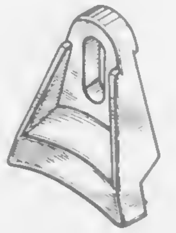
317,710
SPEAKER CLAMP

Roland Sollner, Battle, England, assignor to Penn Fabrication (U.S.A.), Inc., Newberry Park, Calif.
Filed Aug. 10, 1989, Ser. No. 392,141
Term of patent 14 years
U.S. Cl. D8—394



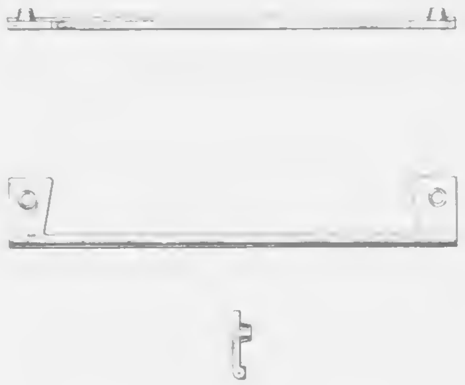
317,711
SPEAKER CLAMP

Roland Sollner, Battle, England, assignor to Penn Fabrication (U.S.A.), Inc., Newberry Park, Calif.
Filed Aug. 10, 1989, Ser. No. 392,144
Term of patent 14 years
U.S. Cl. D8—394



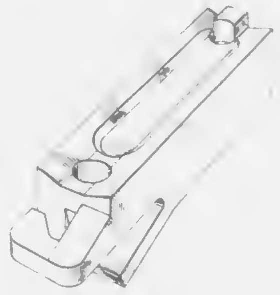
317,712
NUT RETAINER

George R. Jones, Arlington, Tex., assignor to Firstech Industries, Inc., Grand Prairie, Tex.
Continuation of Ser. No. 66,409, Jun. 25, 1987, abandoned. This application Oct. 24, 1990, Ser. No. 602,060
Term of patent 14 years
U.S. Cl. D8—399



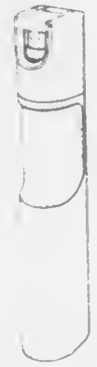
317,713
WINDOW JAM FRICTION SHOE

Donald T. Kaplan, R.R. 1, Janesville, Minn. 56048
Filed Oct. 19, 1987, Ser. No. 109,854
Term of patent 14 years
U.S. Cl. D8—402



317,714
SPRAY DISPENSER

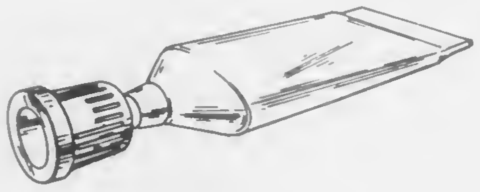
Juergen Greubel, Heidenrod, Fed. Rep. of Germany, assignor to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany
Filed Dec. 11, 1989, Ser. No. 450,002
Term of patent 14 years
U.S. Cl. D9—300



VOL
1127
ISS
4
JE
25
1991
UMI

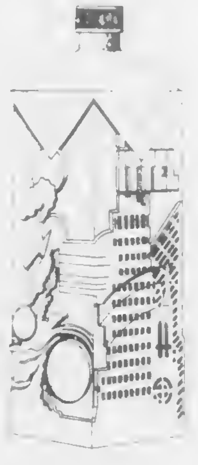
317,715
LIQUID DISPENSING CONTAINER

Joseph A. Bauwens, Danville, Calif., assignor to Dey Laboratories, Inc., Napa Valley, Calif.
Filed Oct. 10, 1989, Ser. No. 418,456
Term of patent 14 years
U.S. Cl. D9—302



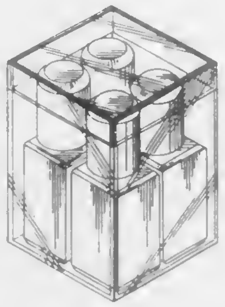
317,716
BOTTLE

Peter Cook, London, England, assignor to Societe Generale des Eaux Minerales de Vittel, Vittel, France
Filed Jan. 20, 1987, Ser. No. 4,685
Claims priority, application France, Jul. 18, 1986, 863983
Term of patent 14 years
U.S. Cl. D9—307



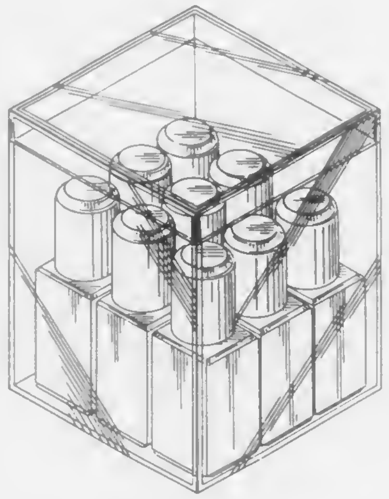
317,717
COMBINED NAIL POLISH CONTAINERS AND PACKAGE THEREFOR

Joyce Carol, 278 Leucadia Rd., La Habra Heights, Calif. 90631
Filed Nov. 9, 1988, Ser. No. 268,845
The portion of the term of this patent subsequent to Jun. 25, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—341



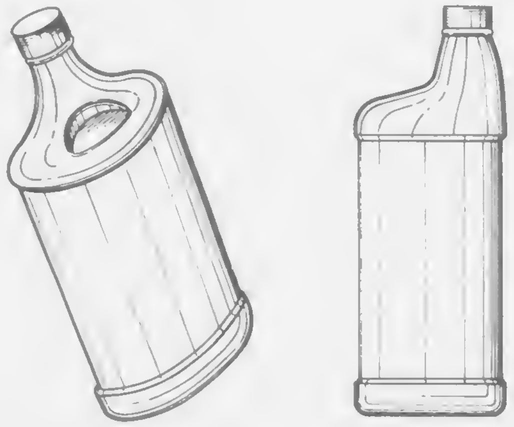
317,718
COMBINED NAIL POLISH CONTAINERS AND PACKAGE THEREFOR

Joyce Carol, 278 Leucadia Rd., La Habra Heights, Calif. 90631
Filed Nov. 9, 1988, Ser. No. 268,850
The portion of the term of this patent subsequent to Jun. 25, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—341



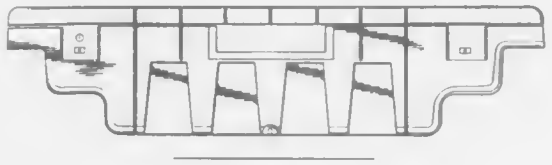
317,719
STACKABLE BOTTLE

Borge Hestehave, Alta Loma, and Kjeld Hestehave, Upland, both of Calif., assignors to Bomatic, Inc., Ontario, Calif.
Filed Jul. 7, 1987, Ser. No. 70,524
Term of patent 14 years
U.S. Cl. D9—375



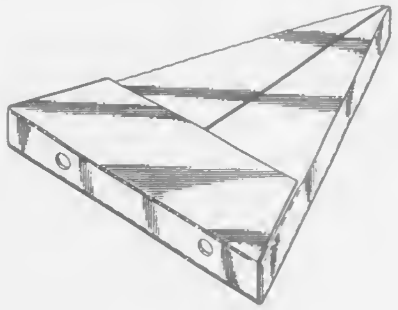
317,720
VEHICLE TOOL BOX

Jeffrey L. Fielder, Jonesboro, Ark., assignor to Advanced Plastics, Inc., Jonesboro, Ark.
Filed May 11, 1989, Ser. No. 350,321
Term of patent 14 years
U.S. Cl. D9—425



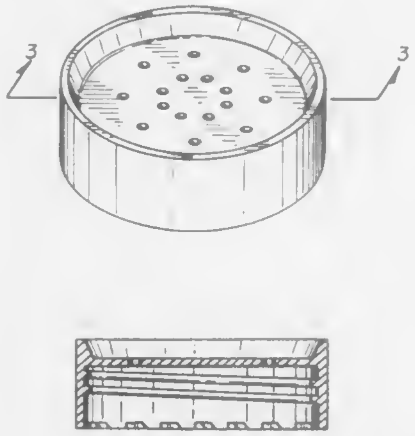
317,721
BOX

Appio Fiorillo, and Wally Petrac, both of Toronto, Canada, assignors to Paperboard Industries Corporation, Mississauga, Canada
Filed May 12, 1989, Ser. No. 351,552
Term of patent 14 years
U.S. Cl. D9—430



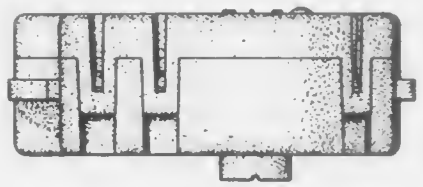
317,722
DISPENSER CLOSURE

Burt K. Todd, Foxley Farm, Pa., assignor to Kerr-Hays Company, Ligonier, Pa.
Filed Apr. 10, 1989, Ser. No. 335,241
Term of patent 14 years
U.S. Cl. D9—447



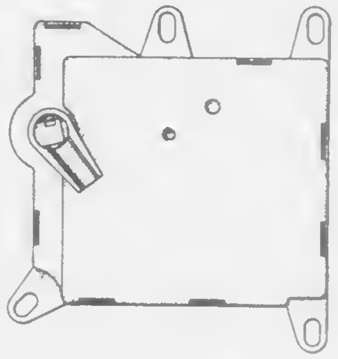
317,723
AUTOMATIC TEMPERATURE CONTROL ACTUATOR

Murray J. Marvin, Durham, and Ernest K. Hairr, Garner, both of N.C., assignors to Buehler Products, Inc., Raleigh, N.C.
Filed Aug. 15, 1988, Ser. No. 232,601
Term of patent 14 years
U.S. Cl. D10—49



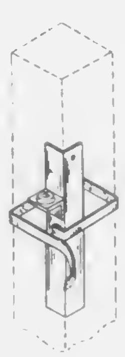
317,724
AUTOMATIC TEMPERATURE CONTROL ACTUATOR

Murray J. Marvio, Durbam, and Ernest K. Hairr, Garner, both of N.C., assignors to Buehler Products, Inc., Raleigh, N.C.
Filed Jul. 20, 1988, Ser. No. 222,367
Term of patent 14 years
U.S. Cl. D10—50



317,725
ADJUSTABLE LEVEL

David W. McCord, 13616 W St., Omaha, Nebr. 68137
Filed Apr. 24, 1989, Ser. No. 342,400
Term of patent 14 years
U.S. Cl. D10—69



VOL
1127
ISS
4
JE
25
1991
UMI

317,726

PORTABLE ELECTRONIC COUNTER

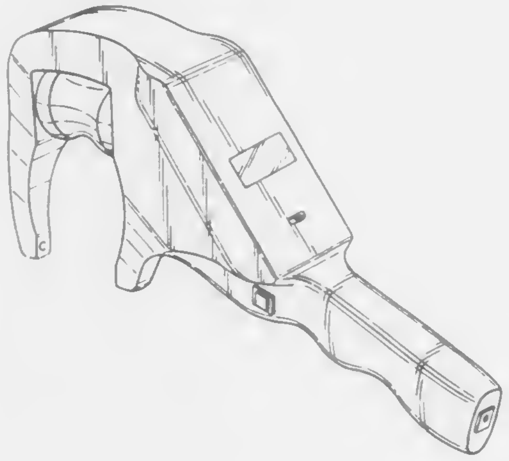
Richard N. Sutton, 10 Angel Hill Drive, Sutton SM1 3BX, Great Britain

Filed Oct. 5, 1988, Ser. No. 253,738

Claims priority, application United Kingdom, Apr. 5, 1988, 1049699

Term of patent 14 years

U.S. Cl. D10—97



317,727

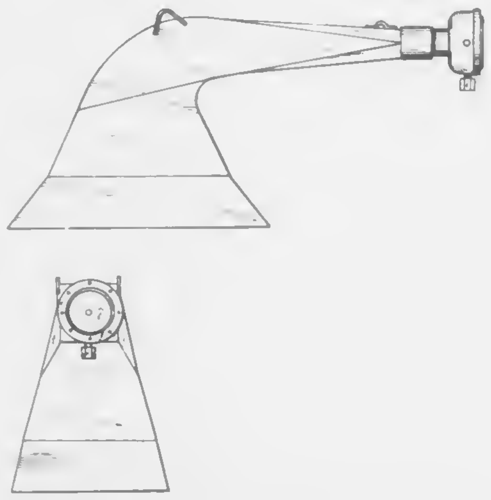
ACOUSTIC HORN

James J. Schwab, Napa, Calif., assignor to Precipteeb, Inc., Kansas City, Mo.

Filed Jul. 20, 1989, Ser. No. 383,135

Term of patent 14 years

U.S. Cl. D10—120



317,728

WATCH MOVEMENT

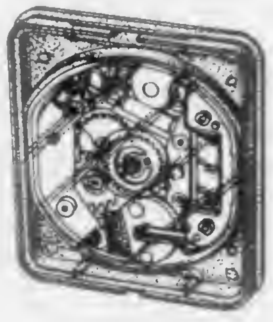
Nobuhiro Tanaka, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Jun. 1, 1988, Ser. No. 201,092

Claims priority, application Japan, Dec. 26, 1987, 62-53172

Term of patent 14 years

U.S. Cl. D10—129



317,729

WATCH MOVEMENT

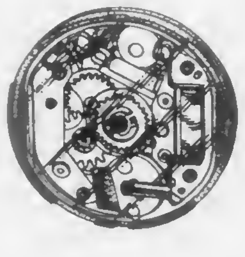
Nobuhiro Tanaka, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Jun. 1, 1988, Ser. No. 201,101

Claims priority, application Japan, Dec. 26, 1987, 62-53173

Term of patent 14 years

U.S. Cl. D10—129



317,730

COMBINED MAGNETIC HOLDER WITH ARM BAND

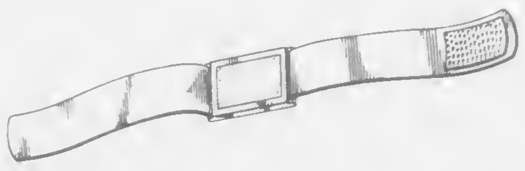
Chan C. Mo, Tsuen Wan, Hong Kong, assignor to Topfair Industries Ltd., Tsuen Wan, Hong Kong

Filed Jan. 4, 1989, Ser. No. 293,381

Claims priority, application United Kingdom, Jul. 5, 1988, 1052067

Term of patent 14 years

U.S. Cl. D11—5



317,731

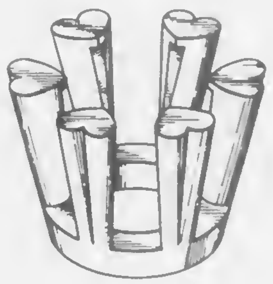
GEM SETTING

Simon Sagie, 1220 S. Shenandoah, Unit 2, Los Angeles, Calif. 90035

Filed Aug. 1, 1988, Ser. No. 227,060

Term of patent 14 years

U.S. Cl. D11—92



317,732

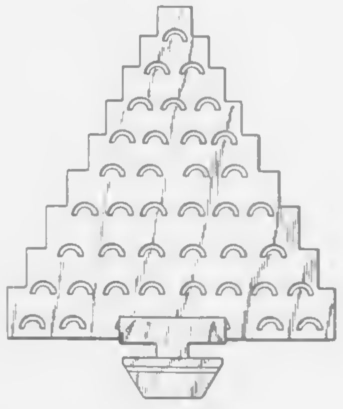
HOLDER FOR GREETING CARDS

Frank J. Vernon, 16 Powell Rd., Emerson, N.J. 07630

Filed May 16, 1989, Ser. No. 352,482

Term of patent 14 years

U.S. Cl. D11—117



317,733

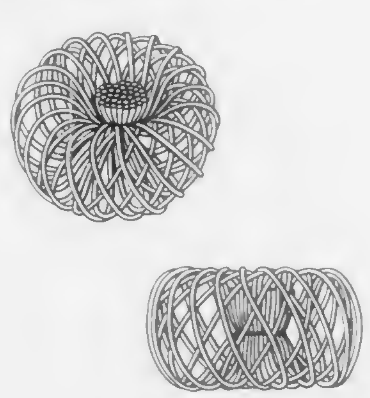
TUFTED BOW

Peter S. C. Cheng, 5 Ross Street, Toronto, Ontario, Canada M5T 1Z8

Filed Jun. 9, 1988, Ser. No. 204,412

Term of patent 14 years

U.S. Cl. D11—184



317,734

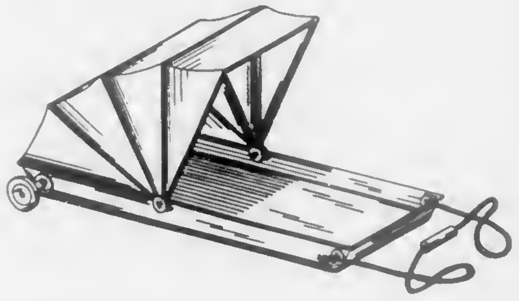
INFANT BEACH SLED

Cynthia Cunha, 17 Holland St., Lexington, Mass. 02173; Leslie Cotty, 6 Doona Rd., and Laura J. Francia, 9 Sandra Dr., both of Chelmsford, all of Mass. 01824

Filed Mar. 20, 1989, Ser. No. 325,466

Term of patent 14 years

U.S. Cl. D12—11



317,735

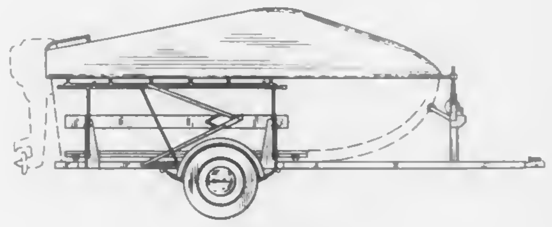
BOAT TRAILER

Virgil L. Andrews, 11953 Shroyer Dr., Oklahoma City, Okla. 73170

Filed May 26, 1989, Ser. No. 357,592

Term of patent 14 years

U.S. Cl. D12—101



317,736

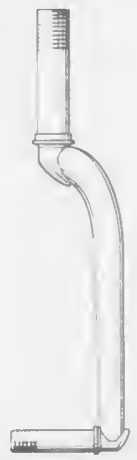
BICYCLE FORK

B. Linn Kastan, 6643 Aranda Ave., La Jolla, Calif. 92037

Filed Jan. 23, 1989, Ser. No. 300,799

Term of patent 14 years

U.S. Cl. D12—118



VOL
1127
ISS
4
JE
25
1991
UMI

317,737
AUTOMOBILE TIRE

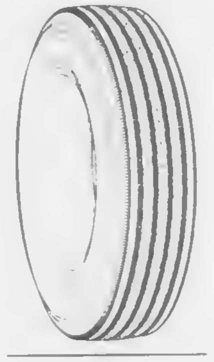
Yasutaka Enoki, Sayama; Shigeo Makino, Tokorozawa, and Yasutoshi Aoki, Kodaira, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Oct. 4, 1988, Ser. No. 253,287

Claims priority, application Japan, Apr. 4, 1988, 63-13505

Term of patent 14 years

U.S. Cl. D12—143



317,738
AUTOMOBILE TIRE

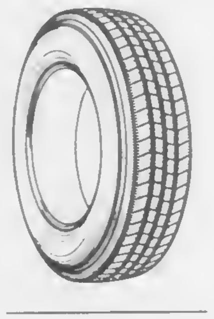
Tetsuhiro Fukumoto, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Dec. 14, 1988, Ser. No. 284,445

Claims priority, application Japan, Jun. 15, 1988, 63-23740

Term of patent 14 years

U.S. Cl. D12—143



317,739
TIRE

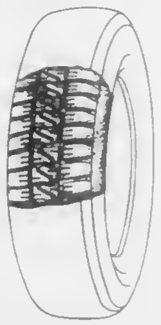
Tiziano Bondini, San Giuliano Milanese, Italy, assignor to Pirelli Coordinamento Pneumatici S.p.A., Italy

Filed May 3, 1988, Ser. No. 192,895

Claims priority, application Italy, Nov. 13, 1987, 22711/87[U]

Term of patent 14 years

U.S. Cl. D12—146



317,740
AUTOMOBILE TIRE

Kenji Takehara, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

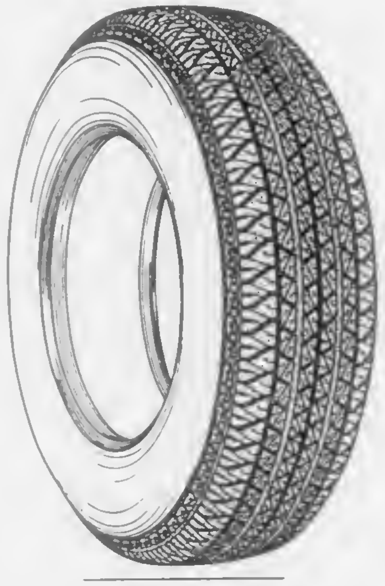
Filed Jun. 13, 1988, Ser. No. 205,807

Claims priority, application Japan, Dec. 15, 1987, 62-51128

The portion of the term of this patent subsequent to Sep. 29, 2001, has been disclaimed.

Term of patent 14 years

U.S. Cl. D12—146



317,741
AUTOMOBILE TIRE

Yutaka Kuroda, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

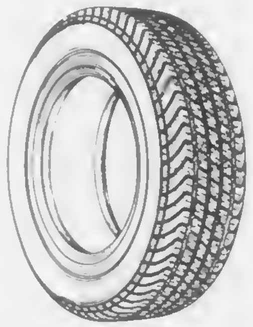
Filed Feb. 25, 1988, Ser. No. 160,089

Claims priority, application Japan, Aug. 29, 1987, 62-35364

The portion of the term of this patent subsequent to Oct. 16, 2007, has been disclaimed.

Term of patent 14 years

U.S. Cl. D12—147



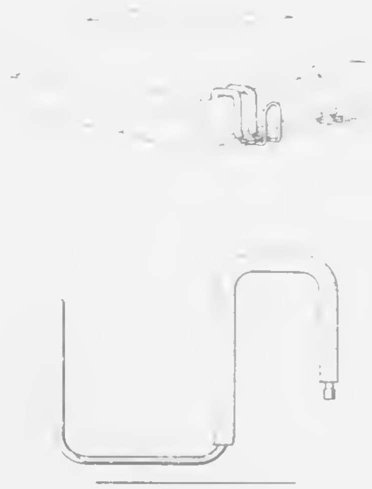
317,742
VEHICLE ATTACHED ARTICLE CARRIER FOR LUMBER OR THE LIKE

Kevin W. Miller, Southfield, Mich., assignor to Jupiter Products, Inc., Ceoterline, Mich.

Filed Jun. 26, 1989, Ser. No. 372,302

Term of patent 14 years

U.S. Cl. D12—157



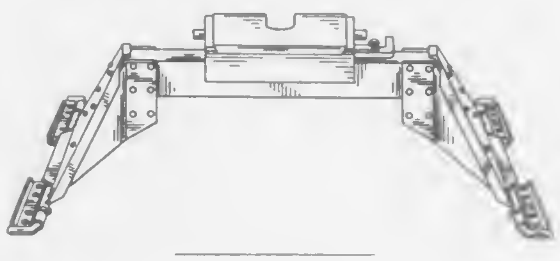
317,743
FIFTH WHEEL HITCH

James W. Chambers, Rockford, Ill., assignor to Atwood Industries, Inc., Rockford, Ill.

Filed Jan. 30, 1989, Ser. No. 303,676

Term of patent 14 years

U.S. Cl. D12—161



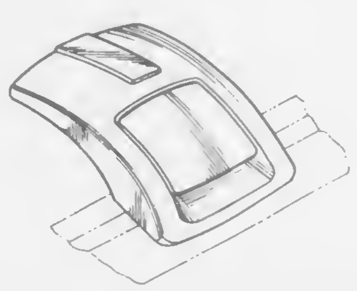
317,744
ARTICLE CARRIER STANCHION

John A. Bott, 931 Lakeshore Dr., Grosse Pointe Shores, Mich.

Filed Dec. 9, 1988, Ser. No. 282,285

Term of patent 14 years

U.S. Cl. D12—157



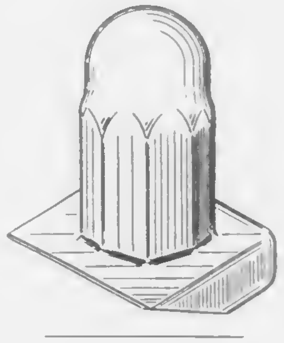
317,745
COVER FOR A TRAILER HITCH

Frank S. Beckerer, Jr., 40 Dock Rd., Milford, Conn. 06460

Filed Oct. 31, 1988, Ser. No. 264,513

Term of patent 14 years

U.S. Cl. D12—162



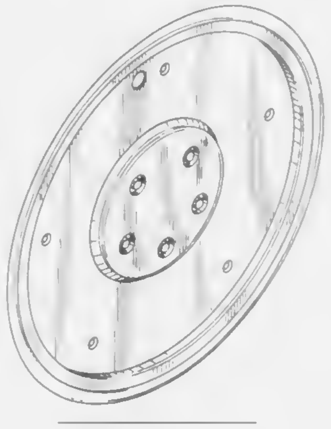
317,746
AUTOMOTIVE WHEEL COVER

George A. Carter, III, 6614 Lakeshore Dr., Garland, Tex. 75042

Filed May 22, 1989, Ser. No. 355,544

Term of patent 14 years

U.S. Cl. D12—204



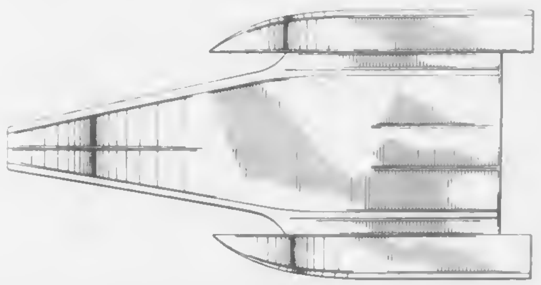
317,747
BOAT HULL

Robert Q. Riley, 6835 E. Sheena, Scottsdale, Ariz. 85254

Filed Dec. 7, 1989, Ser. No. 447,022

Term of patent 14 years

U.S. Cl. D12—300

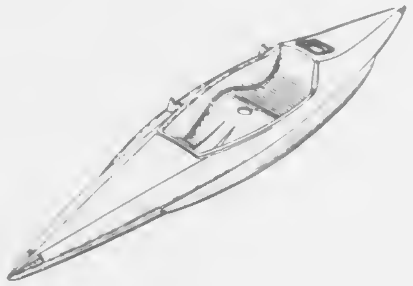


VOL
1127
ISS
4
JE
25
1991
UMI

317,748

WATERCRAFT

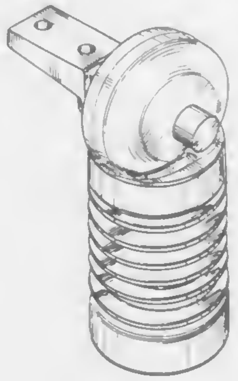
Pierre Arcouette, Route 243, R.R. 3, Masonville, Canada J0E 1X0
Filed Nov. 24, 1989, Ser. No. 440,745
Term of patent 14 years
U.S. Cl. D12—302



317,749

ELECTRICAL ISULATOR WITH INTEGRAL CURRENT SENSOR

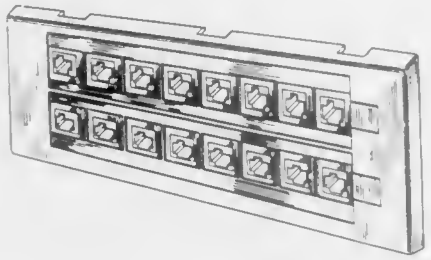
Roy T. Swanson, North Riverside; Bruce A. Biller, Chicago, and Henry W. Scherer, Mt. Prospect, all of Ill., assignors to S&C Electric Company, Chicago, Ill.
Filed Mar. 30, 1989, Ser. No. 331,574
Term of patent 14 years
U.S. Cl. D13—132



317,750

PATCH PANEL

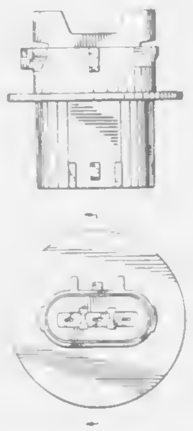
Peter Bellomo, Dedham; Robert Christiano, Andover; Stephen Fidrych, Boxborough; Michael Freeman, Marlboro; Stuart Morgan, Westford; Jon Mysel, Leominster, and Michael Romm, Brighton, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.
Filed Sep. 4, 1987, Ser. No. 93,897
Term of patent 14 years
U.S. Cl. D13—147



317,751

HOUSING FOR A BULB SOCKET

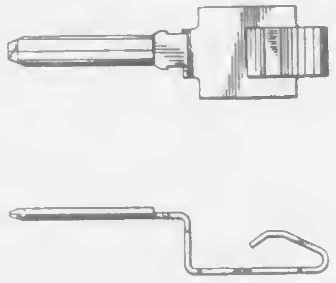
Seiji Kozono, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan
Filed Dec. 2, 1988, Ser. No. 279,134
Claims priority, application Japan, Jun. 3, 1988, 63-21754
Term of patent 14 years
U.S. Cl. D13—147



317,752

TERMINAL FOR A BULB SOCKET

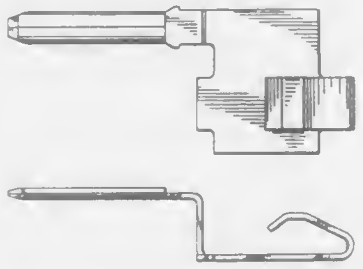
Seiji Kozono, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan
Filed Dec. 2, 1988, Ser. No. 279,136
Claims priority, application Japan, Jun. 3, 1988, 63-21756
Term of patent 14 years
U.S. Cl. D13—148



317,753

TERMINAL FOR A BULB SOCKET

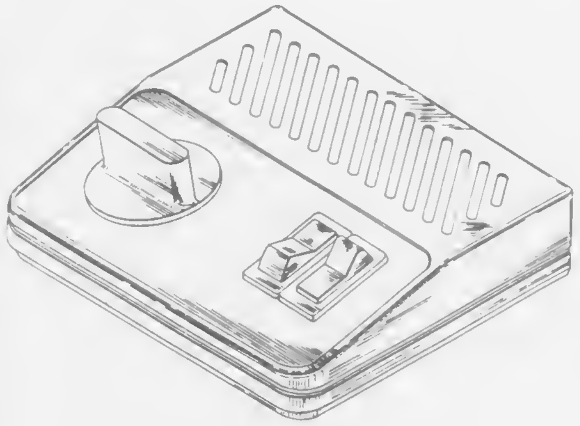
Seiji Kozono, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan
Filed Dec. 2, 1988, Ser. No. 279,138
Claims priority, application Japan, Jun. 3, 1988, 63-21757
Term of patent 14 years
U.S. Cl. D13—148



317,754

DOUBLE SWITCH ELECTRIC FAN CONTROL

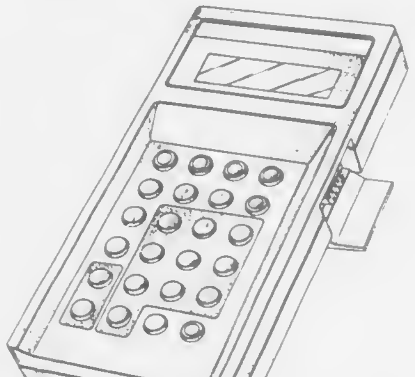
Mario B. Accumanno, Cedar Grove, N.J., assignor to SSMC Inc., Edison, N.J.
Filed Mar. 24, 1989, Ser. No. 328,357
Term of patent 14 years
U.S. Cl. D13—162



317,755

PROGRAMMING AND ADJUSTING TERMINAL

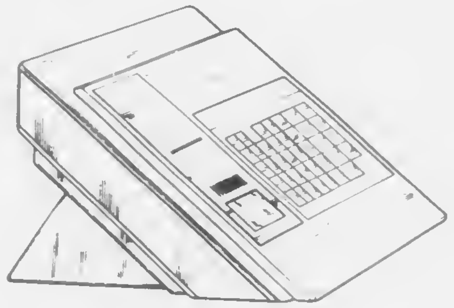
Gérard Lerude, Antibes, and Guy Boucher, Paris, both of France, assignors to Telemecanique, France
Filed Jun. 29, 1987, Ser. No. 67,172
Claims priority, application France, Dec. 30, 1986, 866897
Term of patent 14 years
U.S. Cl. D14—100



317,756

CASH REGISTER

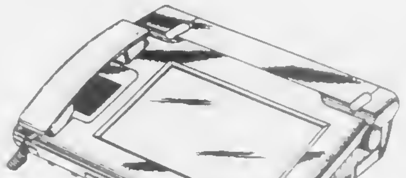
Emilio Fabri, Via Del Decoratore, 4, 40138 Bologna, Italy
Filed Apr. 4, 1988, Ser. No. 177,012
Claims priority, application Italy, Oct. 12, 1987, 22520/87[U]
Term of patent 14 years
U.S. Cl. D14—100



317,757

ORDER TERMINAL FOR INVENTORY CONTROL

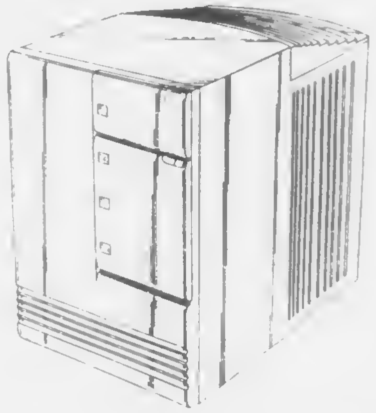
Mitsuo Yokoi; Katsuhiro Ishida, and Maki Tomoike, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Feb. 27, 1989, Ser. No. 316,312
Claims priority, application Japan, Aug. 30, 1988, 63-34388
Term of patent 14 years
U.S. Cl. D14—101



317,758

ARITHMETIC PROCESSOR FOR USE IN ELECTRONIC COMPUTERS

Benito Mishiro, Osaka, and Yoshihiko Sugiyama, Nara, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan and Solutions are Everything, Inc., Colo.
Filed Apr. 8, 1988, Ser. No. 179,112
Claims priority, application Japan, Dec. 15, 1987, 62-51132
Term of patent 14 years
U.S. Cl. D14—102



VOL 1127 ISS 4 JE 25 1991 UMI

317,759
LAPTOP COMPUTER OR SIMILAR ARTICLE

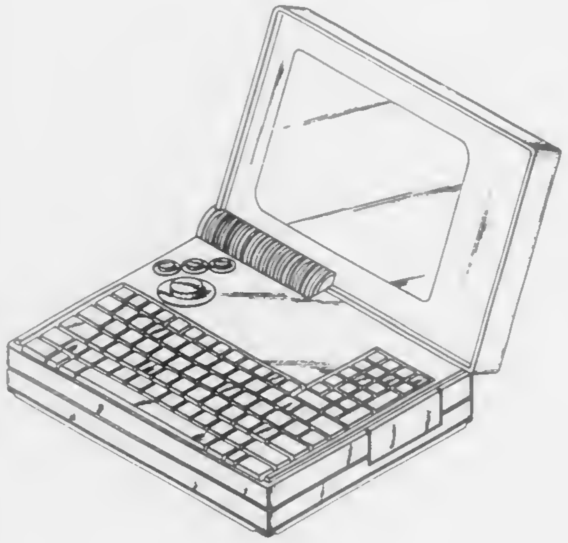
Farad Azima, Cambridge, England, assignor to Mission Cyrus Corporation, Burnaby, Canada

Filed Dec. 27, 1989, Ser. No. 457,936

Claims priority, application United Kingdom, Nov. 10, 1989, 2002365

Term of patent 14 years

U.S. Cl. D14—106



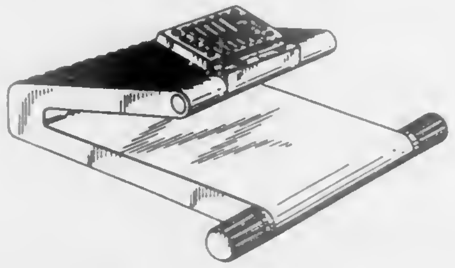
317,760
COMPUTER MONITOR STAND

Hartmut Esslinger, Los Gatos, Calif., assignor to NeXT Computer, Inc., Redwood City, Calif.

Filed Jun. 30, 1988, Ser. No. 214,143

Term of patent 14 years

U.S. Cl. D14—114



317,761
TELEVISION RECEIVER

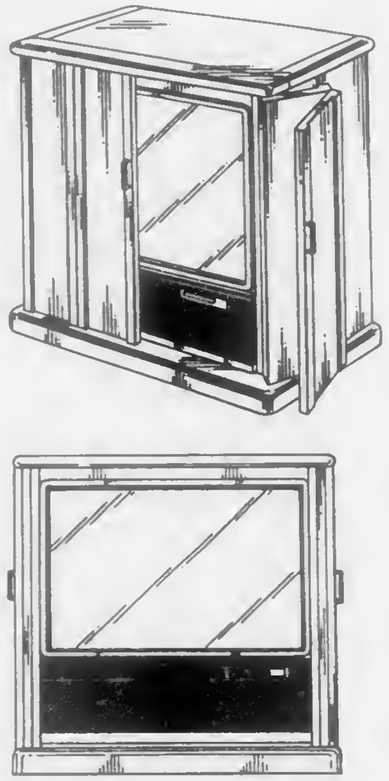
Takashi Abe, Chiba, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 11, 1989, Ser. No. 336,305

Claims priority, application Japan, Oct. 13, 1988, 63-39858

Term of patent 14 years

U.S. Cl. D14—132



317,762
AUTOMOTIVE TELEPHONE CONTROL UNIT

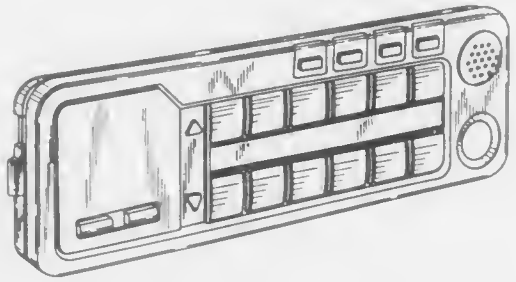
Katsuhito Watanabe, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Feb. 13, 1990, Ser. No. 479,531

Claims priority, application Japan, Oct. 17, 1989, 1-37608

Term of patent 14 years

U.S. Cl. D14—138



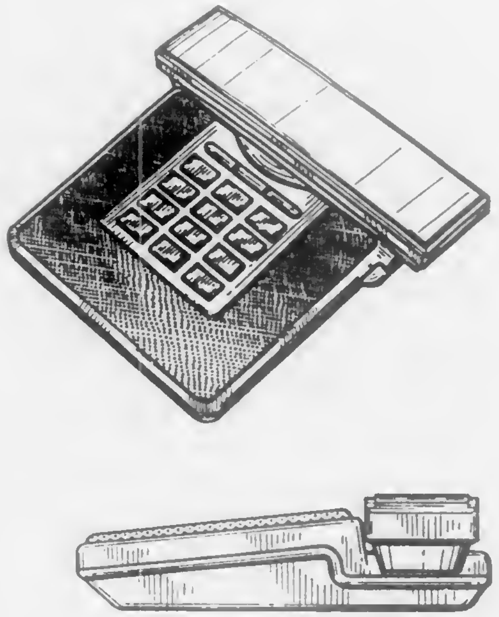
317,763
TELEPHONE SET

Haur-Jou Lin, 4F, No. 4, Lane 75, Yung-Li Rd., Yung-Ho City, Taipei, Taiwan

Filed Apr. 10, 1990, Ser. No. 506,877

Term of patent 14 years

U.S. Cl. D14—150



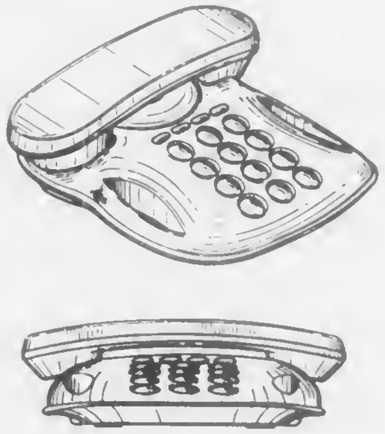
317,764
TELEPHONE SET

Haur-Jou Lin, 4F, No. 4, Lane 75, Yung-Li Rd., Yung-Ho City, Tapei, Taiwan

Filed Apr. 10, 1990, Ser. No. 506,879

Term of patent 14 years

U.S. Cl. D14—150



317,765
CASSETTE TAPE PLAYER

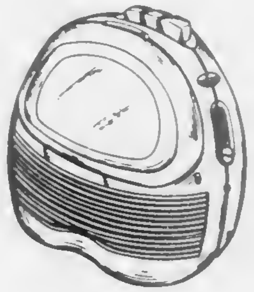
Hidekatsu Nomizu, Sanjo, and Hitoshi Fujino, Nilgata, both of Japan, assignors to Twinbird Industrial Company Limited, Japan

Filed Feb. 15, 1989, Ser. No. 311,188

Claims priority, application Japan, Sep. 9, 1988, 63-35873

Term of patent 14 years

U.S. Cl. D14—165



317,766
COMBINED SOUND RECORDER AND REPRODUCER

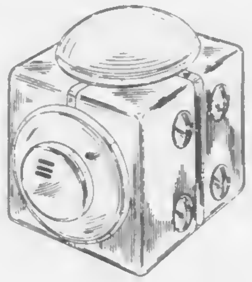
Shinji Ikeya; Kenichi Ogawa; Chihiro Fuse; Yasuhiro Ohe; Hiroyuki Miyai; Koji Nobuchi, and Hiroko Kitano, all of Osaka, Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Aug. 18, 1988, Ser. No. 234,219

Claims priority, application Japan, Feb. 29, 1988, 63-8141

Term of patent 14 years

U.S. Cl. D14—167



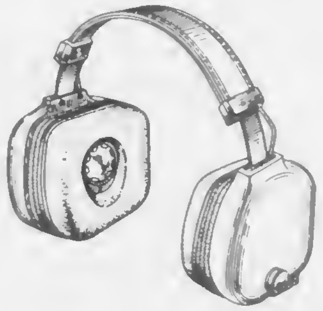
317,767
HEADPHONE OR SIMILAR ARTICLE

Seth R. Banks, Glendale, Wis., assignor to Koss Corporation, Milwaukee, Wis.

Filed Jan. 19, 1989, Ser. No. 299,975

Term of patent 14 years

U.S. Cl. D14—205



VOL
1127
ISS
4
JE
25
1991
UMI

317,768
SPEAKER GRILLE

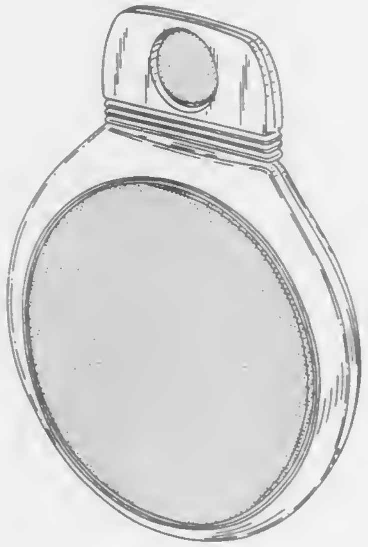
Grant M. N. Davidson, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 16, 1988, Ser. No. 286,913

Claims priority, application United Kingdom, Jul. 15, 1988, 1052318

Term of patent 14 years

U.S. Cl. D14—219



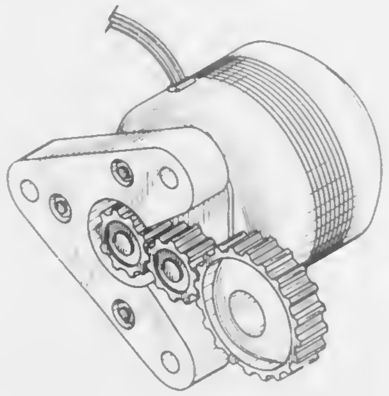
317,769
ELECTRONIC MOTOR AND GEARING UNIT FOR ACTUATING SEMITRAILER SUPPORT WHEELS

Raymond D. Vining, Sr., R.R. #2, Box 231, Wapakoneta, Ohio 45895

Filed Sep. 14, 1988, Ser. No. 244,458

Term of patent 14 years

U.S. Cl. D15—1



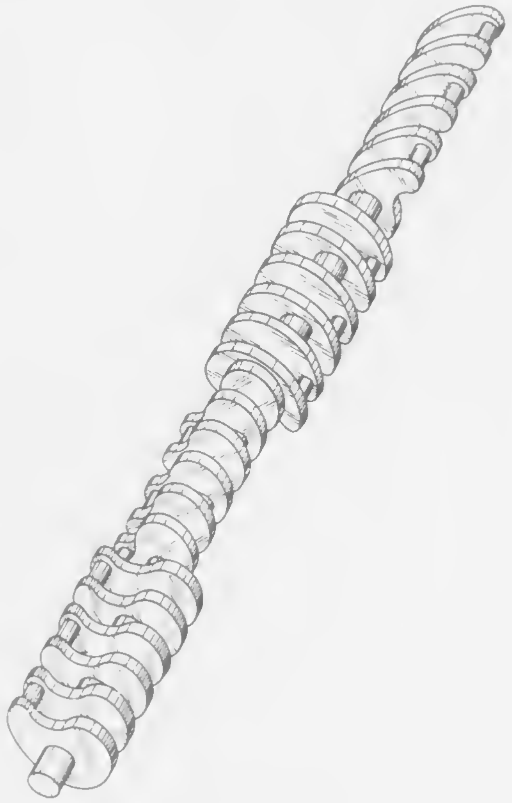
317,770
CRANKSHAFT

William J. Burke, 2902 Airport Rd., Colorado Springs, Colo. 80910

Filed Nov. 29, 1988, Ser. No. 277,219

Term of patent 14 years

U.S. Cl. D15—5



317,771
SUNGLASSES WITH LENS SHADING VISOR

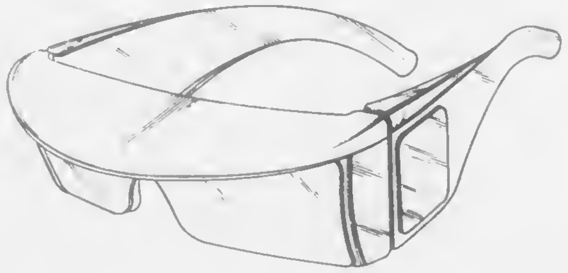
Frederick G. Mackay, Calif., assignor to William John Wichman, Glendora, Calif.

Filed Jun. 28, 1988, Ser. No. 212,457

The portion of the term of this patent subsequent to Dec. 25, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D16—102



317,772
CAMERA

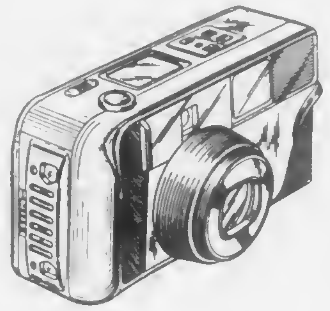
Hiroshi Kobayashi, Kawasaki, and Yasuki Nagaoka, Ohmiya, both of Japan, assignors to Nikon Corporation, Tokyo, Japan

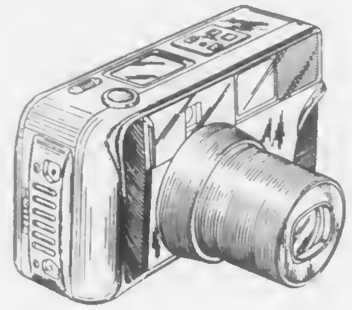
Filed Jul. 29, 1988, Ser. No. 225,945

Claims priority, application Japan, Mar. 1, 1988, 63-8420

Term of patent 14 years

U.S. Cl. D16—209





317,773
CAMERA

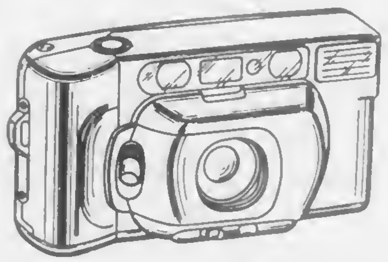
Makoto Isozaki, and Eiichi Okamoto, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 30, 1988, Ser. No. 277,851

Claims priority, application Japan, May 30, 1988, 63-21264; May 30, 1988, 63-21265

Term of patent 14 years

U.S. Cl. D16—209



317,774
ELECTRONIC KEYBOARD MUSICAL INSTRUMENT

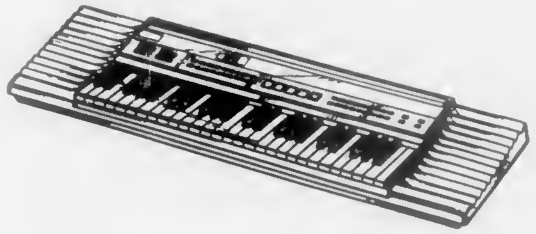
Kazuyuki Mizushima, Hamamatsu, Japan, assignor to Yamaha Corporation, Shizuoka, Japan

Filed May 23, 1989, Ser. No. 355,402

Claims priority, application Japan, Nov. 30, 1988, 63-46982

Term of patent 14 years

U.S. Cl. D17—1



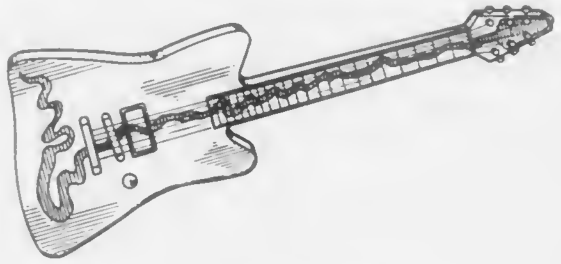
317,775
GUITAR

William F. Gibbons, Houston, Tex., assignor to Gizmochine, Inc., Houston, Tex.

Filed Nov. 2, 1988, Ser. No. 266,352

Term of patent 14 years

U.S. Cl. D17—14



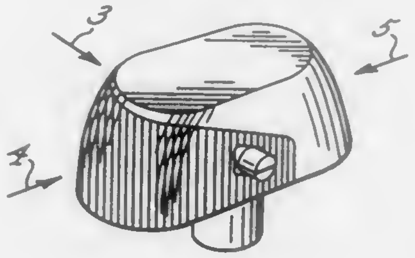
317,776
ELECTRICAL ROCKER SWITCH ACTUATOR ASSEMBLY

John Stuhlmacher, Crown Point, Ind., assignor to McGill Manufacturing Company, Inc., Valparaiso, Ind.

Filed Oct. 13, 1989, Ser. No. 421,389

Term of patent 14 years

U.S. Cl. D13—174

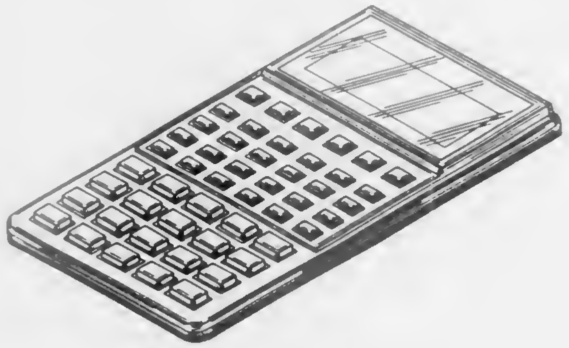


VOL
1127
ISS
4
JE
25
1991
UMI

317,777

ELECTRONIC CALCULATOR

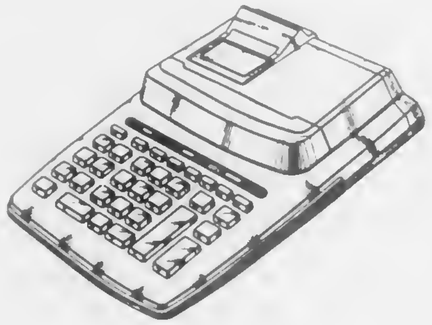
Hiroshi Sakaguchi, and Keiichi Koyama, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jun. 14, 1988, Ser. No. 206,687
Claims priority, application Japan, Dec. 15, 1987, 62-51309
Term of patent 14 years
U.S. Cl. D18—7



317,778

ELECTRONIC CALCULATOR

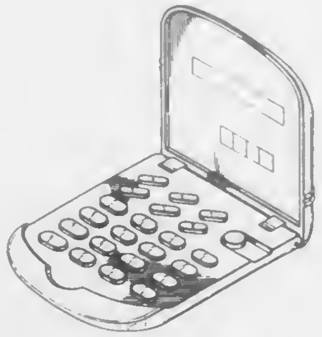
Yuichi Onumata, Kunitachi, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Jan. 27, 1989, Ser. No. 304,120
Term of patent 14 years
U.S. Cl. D18—7



317,779

CALCULATOR OR SIMILAR ARTICLE

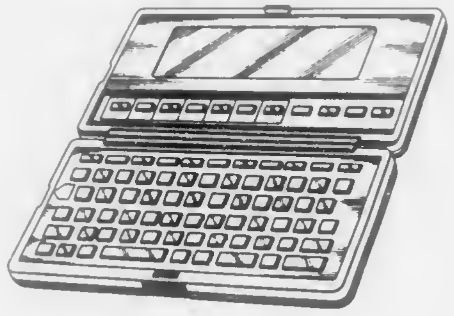
Ray Chen, Taipei, Taiwan, assignor to Cal-Camp Electronics, Inc., Taipei, Taiwan
Filed May 11, 1989, Ser. No. 350,686
Term of patent 14 years
U.S. Cl. D18—7



317,780

MULTI-FUNCTION PROGRAMMABLE ELECTRONIC CALCULATOR

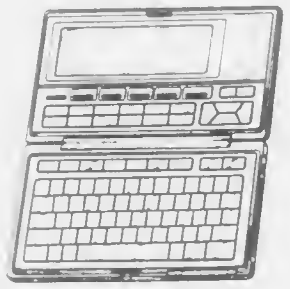
Shigeki Arai, Higashikurume, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Jun. 26, 1989, Ser. No. 371,401
Claims priority, application Japan, Dec. 27, 1988, 63-50875
Term of patent 14 years
U.S. Cl. D18—7



317,781

MULTI-FUNCTION PROGRAMMABLE ELECTRONIC CALCULATOR

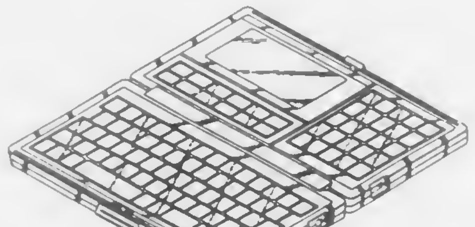
Kenji Takahata, Hino, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Jun. 28, 1989, Ser. No. 372,935
Term of patent 14 years
U.S. Cl. D18—7



317,782

MULTI-FUNCTION PROGRAMMABLE ELECTRONIC CALCULATOR

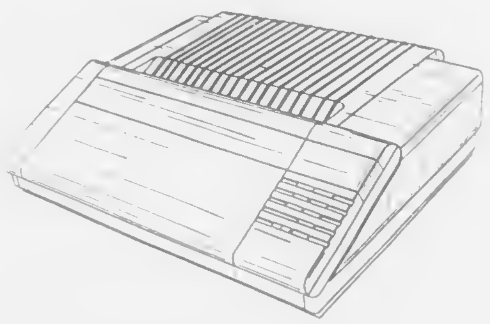
Masanori Haneda, Hamura, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Aug. 14, 1989, Ser. No. 393,567
Term of patent 14 years
U.S. Cl. D18—7



317,783

THERMAL PRINTER

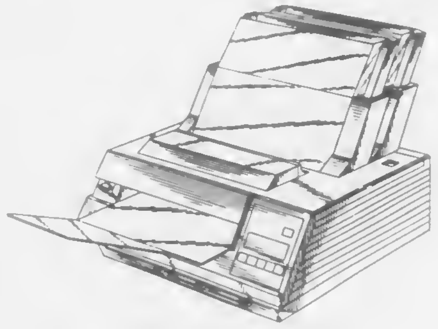
Shinji Matsumoto, Toyokawa, and Tsutomu Takano, Aichi, both of Japan, assignors to Calcomp, Anaheim, Calif.
Filed Oct. 9, 1987, Ser. No. 107,034
Claims priority, application Japan, Apr. 14, 1987, 62-14766
Term of patent 14 years
U.S. Cl. D18—13



317,784

PRINTER

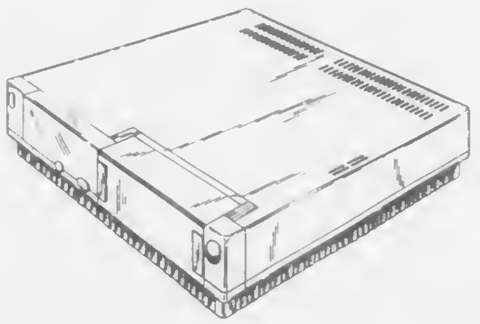
Yoshinoro Kakiuchi; Toru Irie, and Makoto Maki, all of Kawasaki, Japan, assignors to Fujitsu Limited, Kanagawa, Japan
Filed Dec. 10, 1987, Ser. No. 131,548
Claims priority, application Japan, Jun. 12, 1987, 62-24171
Term of patent 14 years
U.S. Cl. D18—13



317,785

ELECTRONIC FILM PRINTER

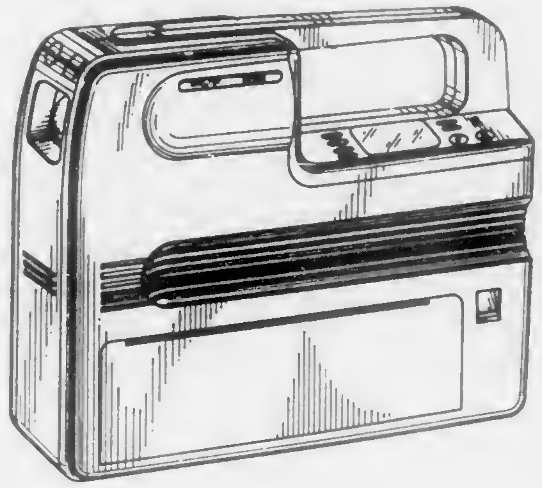
Philip R. Norris, North Reading; Stephen E. Lane, and Aiden J. Petrie, both of Boston, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.
Filed May 6, 1988, Ser. No. 191,212
Term of patent 14 years
U.S. Cl. D18—13



317,786

PORTABLE PHOTOCOPYING MACHINE

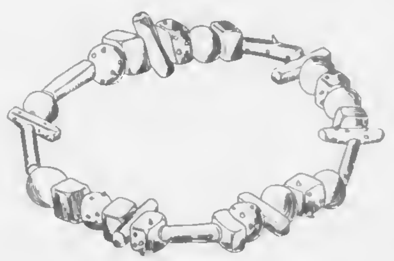
Kazuhisa Horikiri, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Sep. 13, 1989, Ser. No. 406,574
Claims priority, application Japan, Apr. 3, 1989, 01-12237
Term of patent 14 years
U.S. Cl. D18—36



317,787

MATHEMATICAL AID

William A. Davidson; Silvia Davidson, both of 73 Joel Terrace, Perth, and John D. Charters, 280 Great Eastern Highway, Midland, all of Australia
Filed Feb. 21, 1990, Ser. No. 482,749
Claims priority, application Australia, Aug. 22, 1989, 02712/89
Term of patent 14 years
U.S. Cl. D19—62



VOL
1127
ISS
4
JE
25
1991
UMI

317,788

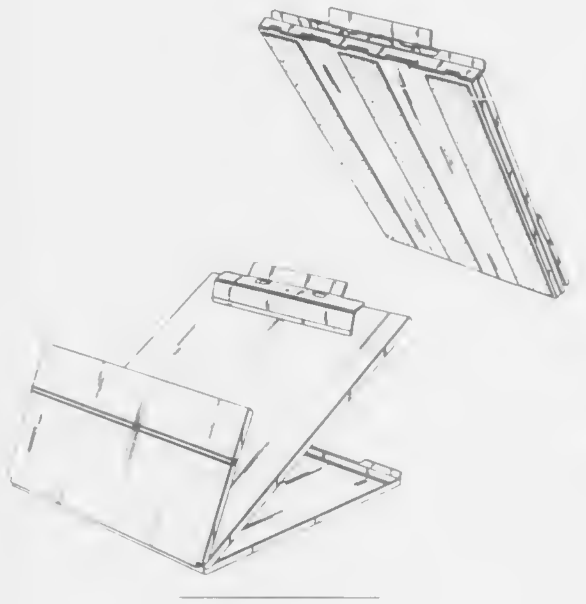
AVIATION LAP BOARD

F. Carlos DeWitt, Long Beach, Calif., assignor to Romana Acosta, Los Angeles, Calif.

Continuation of Ser. No. 31,443, Mar. 30, 1987, abandoned. This application Jul. 27, 1990, Ser. No. 563,992

Term of patent 14 years

U.S. Cl. D19—88



317,789

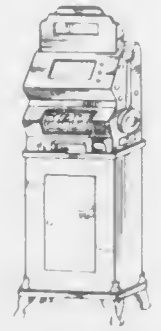
ADVERTISING MACHINE

Vincent A. La Mantia, P.O. Box 6406, Reno, Nev. 89513, and Ernest W. Mullins, P.O. Box 21277, Reno, Nev. 89519

Filed Jul. 8, 1988, Ser. No. 222,103

Term of patent 14 years

U.S. Cl. D20—3



317,790

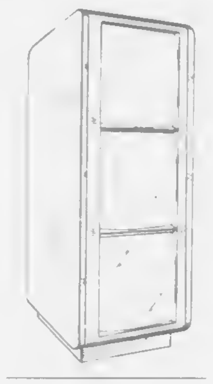
ELECTRONIC BILLBOARD FOR ADVERTISING DISPLAY OR THE LIKE

Kenneth E. Hey, Long Beach, Calif., assignor to Innovision Network, Inc., Fountain Valley, Calif.

Filed Aug. 14, 1989, Ser. No. 393,707

Term of patent 14 years

U.S. Cl. D20—39



317,791

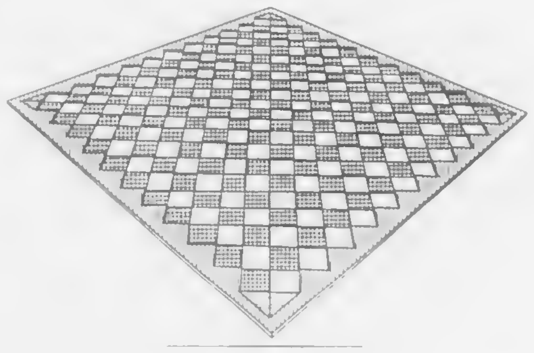
CHESS GAME BOARD

Anthony L. Britton, 2730 Orchard Hill Pl., Lake Oswego, Oreg. 97035

Continuation-in-part of Ser. No. 505,854, Jun. 20, 1983, abandoned. This application Mar. 17, 1986, Ser. No. 845,006

Term of patent 14 years

U.S. Cl. D21—24



317,792

TOY HARMONICA

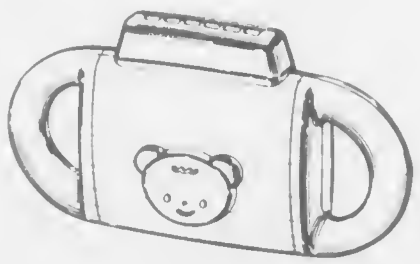
Takehiko Takahashi; Yoshiyasu Ishii, and Taira Hanashima, all of Tokyo, Japan, assignors to Combi Co., Ltd., Tokyo, Japan

Filed Aug. 7, 1989, Ser. No. 390,258

Claims priority, application Japan, Feb. 7, 1989, 1-4023

Term of patent 14 years

U.S. Cl. D21—64



317,793

TOY TAMBOURINE

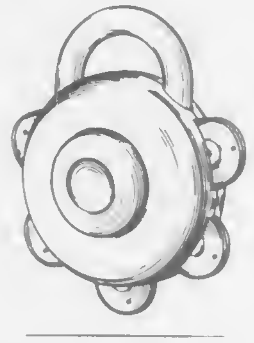
Takehiko Takahashi; Yoshiyasu Ishii, and Taira Hanashima, all of Tokyo, Japan, assignors to Combi Co., Ltd., Tokyo, Japan

Filed Aug. 7, 1989, Ser. No. 390,260

Claims priority, application Japan, Feb. 7, 1989, 1-4024

Term of patent 14 years

U.S. Cl. D21—64



317,794

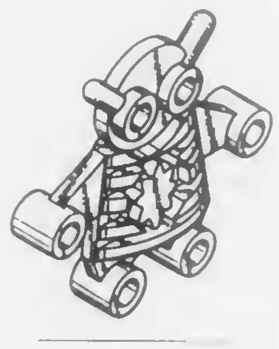
CONSTRUCTION TOY FIGURE

Daniel B. Klitsner, San Francisco, Calif., assignor to Discovery Toys, Inc., Martinez, Calif.

Filed Mar. 23, 1990, Ser. No. 498,150

Term of patent 14 years

U.S. Cl. D21—108



317,795

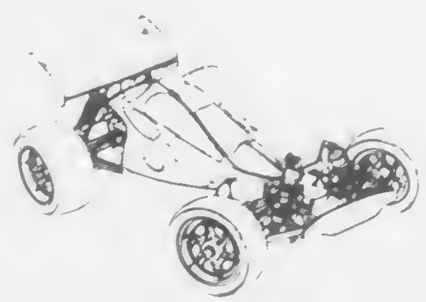
TOY RACING CAR

Fumito Taki, Shizuoka, Japan, assignor to Kabushiki Kaisha Tamiya Mokei, Shizuoka, Japan

Filed Jul. 27, 1989, Ser. No. 385,483

Term of patent 14 years

U.S. Cl. D21—137



317,796

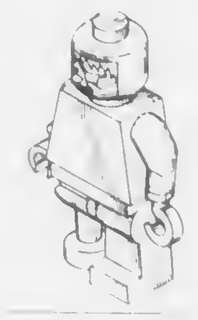
TOY FIGURE

Janni D. Laursen, Århus N, Denmark, assignor to Interlego A.G., Switzerland

Filed Nov. 29, 1988, Ser. No. 277,914

Term of patent 14 years

U.S. Cl. D21—150



317,797

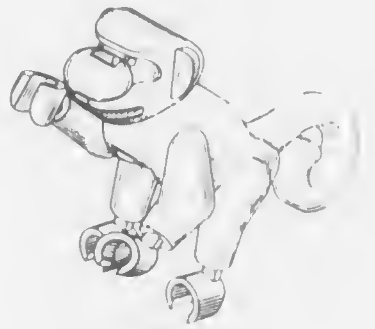
TOY MONKEY

Niels M. Pedersen, Århus C, Denmark, assignor to Interlego A.G., Switzerland

Filed Nov. 29, 1988, Ser. No. 277,911

Term of patent 14 years

U.S. Cl. D21—156



317,798

MONKEY DOLL

Doris Warcholik, 481 Highland Ave., Clifton, N.J. 07011

Filed Dec. 5, 1988, Ser. No. 280,252

Term of patent 14 years

U.S. Cl. D21—156

VOL
1127
ISS
4
JE
25
1991
UMI

317,799

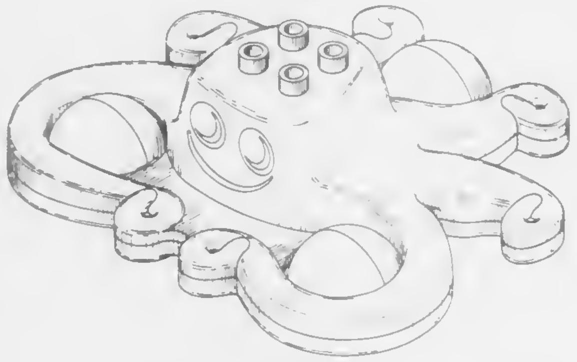
TOY OCTOPUS

Erik P. Tapdrup, Virum, Denmark, assignor to Interlego A.G., Switzerland

Filed Nov. 29, 1988, Ser. No. 277,906

Term of patent 14 years

U.S. Cl. D21—157



317,800

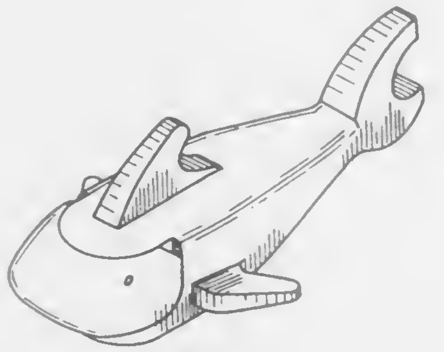
TOY SHARK

Janni D. Laursen, Århus N, Denmark, assignor to Interlego A.G., Switzerland

Filed Nov. 29, 1988, Ser. No. 277,912

Term of patent 14 years

U.S. Cl. D21—157



317,801

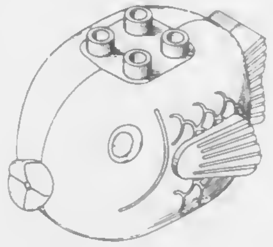
TOY FISH

Erik P. Tapdrup, Virum, Denmark, assignor to Interlego A.G., Switzerland

Filed Nov. 29, 1988, Ser. No. 278,160

Term of patent 14 years

U.S. Cl. D21—157



317,802

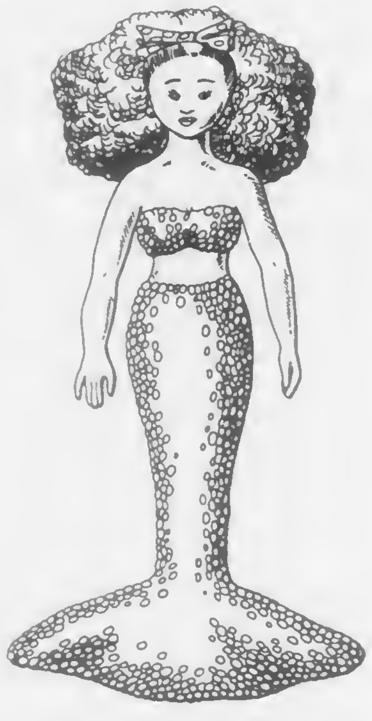
DOLL

Amy J. Rogers, Gilbert, Ariz., assignor to Julie Lynn Davis, Las Vegas, Nev.

Division of Ser. No. 283,879, Dec. 12, 1988, Pat. No. Des. 301,549. This application Jun. 28, 1990, Ser. No. 545,986

Term of patent 14 years

U.S. Cl. D21—157



317,803

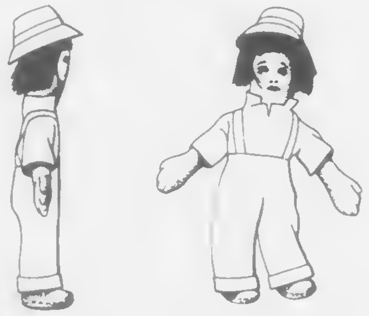
DOLL

Madeline Ziolkowski, 345 NW. 49th Ave., Plantation, Fla. 33313

Filed Feb. 13, 1989, Ser. No. 309,716

Term of patent 14 years

U.S. Cl. D21—184



317,804

CRIB TOY

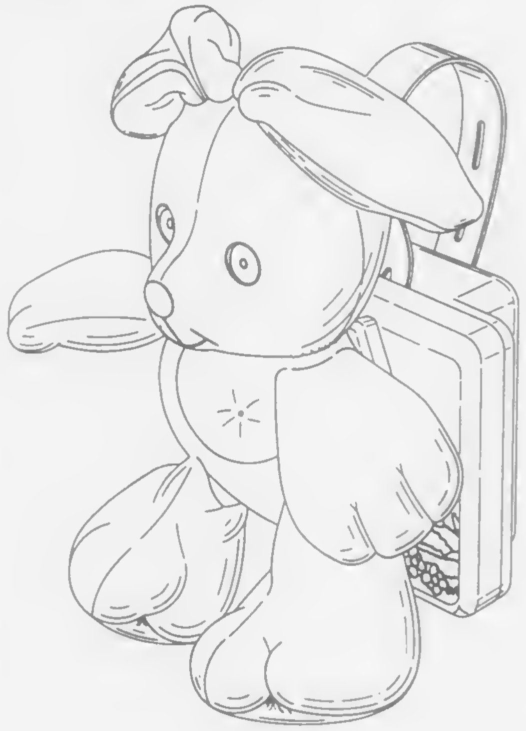
Ruth Elliott, 409 Chester Road, Woodford Bramhall, Cheshire, England SK7 1QP , and Ian T. Revell, 3 Whitebear Yard, Canute Place, Knutsford, England

Filed Jun. 23, 1988, Ser. No. 210,618

Claims priority, application United Kingdom, Jan. 14, 1988, 1047715

Term of patent 14 years

U.S. Cl. D21—187



317,805

IRREGULAR BOUNCING BALL

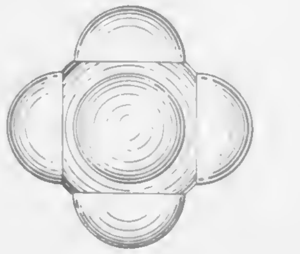
Glenn M. Swan, 21 Fitzwilliam Street, Kew, Victoria 3101, Australia

Filed Nov. 17, 1986, Ser. No. 931,117

Claims priority, application Australia, May 16, 1986, 5238/86

Term of patent 14 years

U.S. Cl. D21—204



317,806

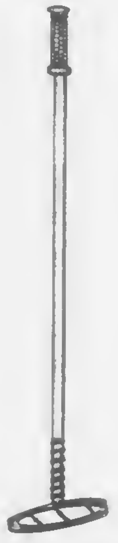
BICYCLE POLO MALLET

Louis S. Gonzalez, 77 E. Crosscut, Bailey, Colo. 80421

Filed Sep. 6, 1988, Ser. No. 240,579

Term of patent 14 years

U.S. Cl. D21—211



317,807

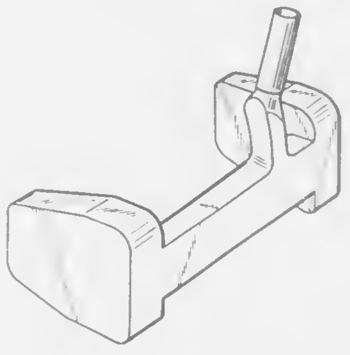
GOLF PUTTER HEAD

Peter E. Adams, 38 Meernaa Ave., Fairfax, Calif. 94930

Filed Sep. 8, 1988, Ser. No. 241,567

Term of patent 14 years

U.S. Cl. D21—219



317,808

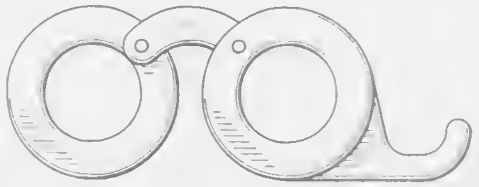
BILLIARD CUE BRACE

Arnold J. Reyes, 627 E. Tujunga #M, Burbank, Calif. 91501

Filed Jun. 1, 1989, Ser. No. 359,940

Term of patent 14 years

U.S. Cl. D21—232



VOL 1127 | ISS 4 JE 25 1991 UMI

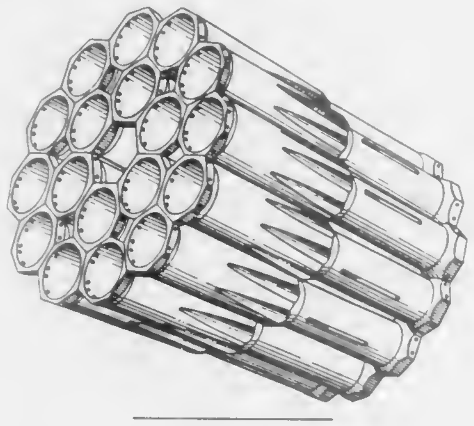
317,809
AMMUNITION MAGAZINE

Michael D. Golden, Corona del Mar, Calif., assignor to Western Design Corporation, Irvine, Calif.

Filed Mar. 24, 1988, Ser. No. 172,349

Term of patent 14 years

U.S. Cl. D22—108



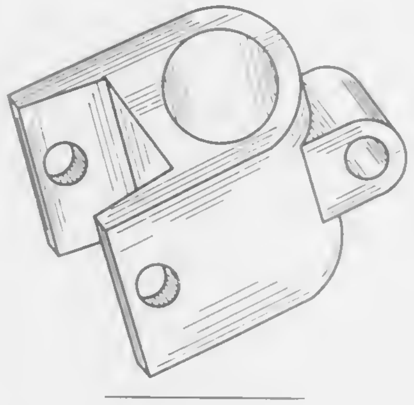
317,810
RIFLE SLING ATTACHING CLAMP

Robert W. Rightnour, Box 107, Sue St. Mingoville, Pa. 16856

Filed Jun. 23, 1988, Ser. No. 210,615

Term of patent 14 years

U.S. Cl. D22—108



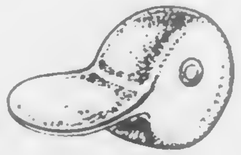
317,811
FISHING LURE

John T. Potter, R.R. #3, Ashton, Ontario K0A 1B0, Canada, and Andre Antoine Sabourin, 42 Binscarth Crescent, Kanata, Ontario K2L 1S1, Canada

Filed Dec. 29, 1987, Ser. No. 139,333

Term of patent 14 years

U.S. Cl. D22--132



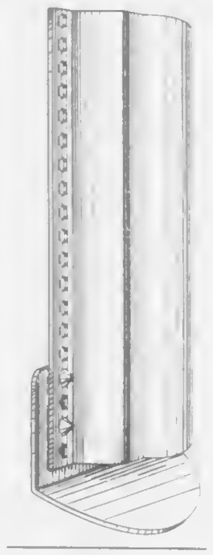
317,812
SEPTIC TANK BAFFLE

Norman W. Gavin, 2545 Ridge Rd., North Haven, Conn. 06473

Filed Aug. 4, 1988, Ser. No. 228,555

Term of patent 14 years

U.S. Cl. D23—206



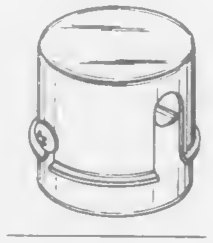
317,813
MAGNETIC WATER CONDITIONER

Mearl E. Ellison, Paramount, and Stanley R. Wirick, Diamond Bar, both of Calif., assignors to Softron International, Chino, Calif.

Filed Apr. 2, 1990, Ser. No. 503,368

Term of patent 14 years

U.S. Cl. D23—207



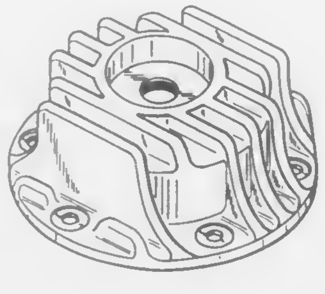
317,814
OIL FILTER CANNISTER

Robert A. Tomlinson, 28813 Farmersville Blvd., Farmersville, Calif. 93223

Filed Apr. 12, 1989, Ser. No. 338,142

Term of patent 14 years

U.S. Cl. D23—209



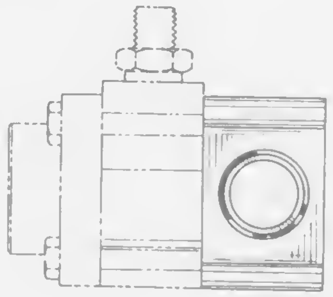
317,815
VALVE BODY PART

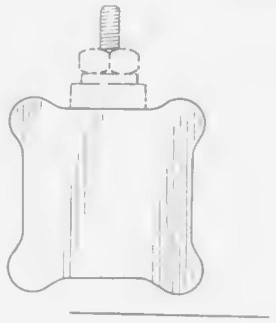
Jeffrey T. Jeromson, Willoughby, and Peter C. Williams, Cleveland Heights, both of Ohio, assignors to Whitey Co., Highland Heights, Ohio

Filed May 24, 1988, Ser. No. 197,901

Term of patent 14 years

U.S. Cl. D23—233





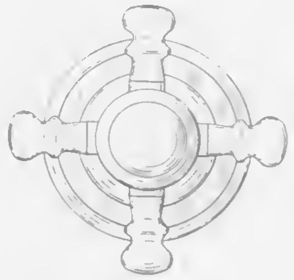
317,816
FAUCET HANDLE

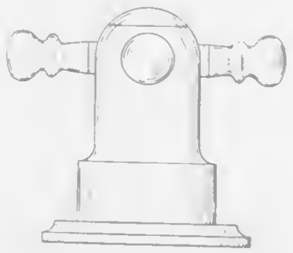
Tom E. Robbins, San Leandro, Calif., assignor to Kallista, Inc., San Leandro, Calif.

Filed Sep. 19, 1988, Ser. No. 245,531

Term of patent 14 years

U.S. Cl. D23—250





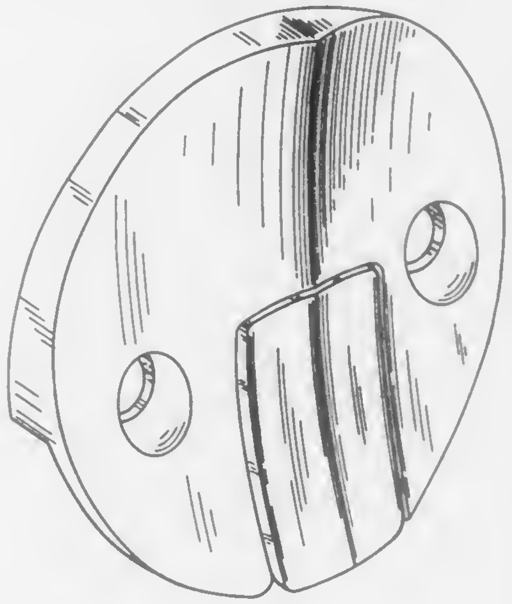
317,817
BATHTUB OVERFLOW AND DRAIN

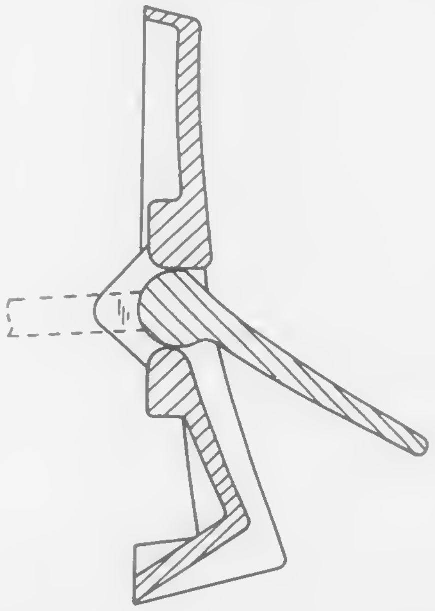
Henry M. Stairs, Jr., Neshanic, N.J., assignor to American Standard Inc., New York, N.Y.

Filed Mar. 21, 1988, Ser. No. 178,037

Term of patent 14 years

U.S. Cl. D23—254





VOL
1127
ISS
4
JE
25
1991
UMI

317,818
UNIVERSAL PNEUMATIC SWIVEL

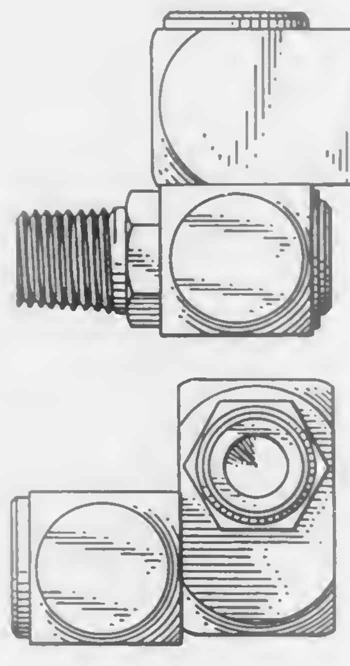
Paul W. Huber, Lancaster, N.Y., assignor to Dynabrade, Inc., Tonawanda, N.Y.

Continuation-in-part of Ser. No. 766,588, Aug. 19, 1985, Pat. No. Des. 295,553, which is a continuation-in-part of Ser. No. 707,140, Mar. 1, 1985, Pat. No. Des. 295,552. This application Feb. 10, 1988, Ser. No. 154,607

The portion of the term of this patent subsequent to May 3, 2002, has been disclaimed.

Term of patent 14 years

U.S. Cl. D23—264



317,819
AIR DIFFUSER

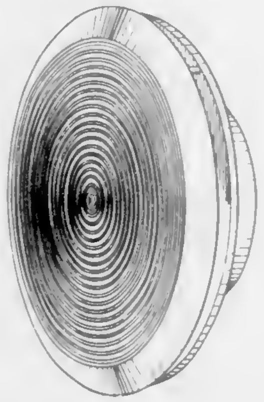
Bengt Sello, Stockholm, Sweden, assignor to Soft Construction AB, Stockholm, Sweden

Filed Jul. 17, 1989, Ser. No. 380,270

Claims priority, application Sweden, Feb. 27, 1989, 890518

Term of patent 14 years

U.S. Cl. D23—390



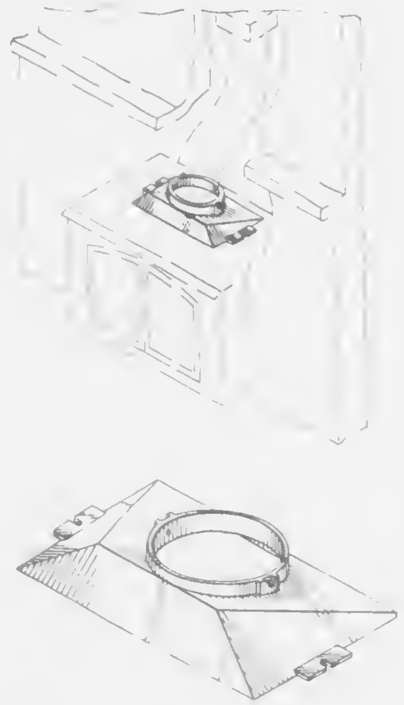
317,820
FIREPLACE INSERT SMOKE PIPE CONNECTOR

Thomas E. Buehler, 3010 18th Ave. W., Bradenton, Fla. 33505

Filed Feb. 16, 1989, Ser. No. 311,200

Term of patent 14 years

U.S. Cl. D23—403



317,821
TONGUE DEPRESSOR

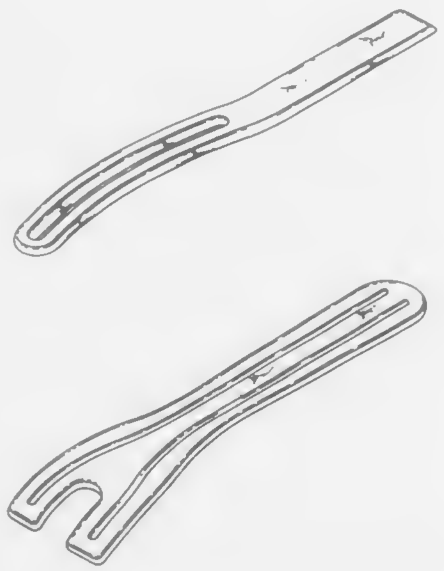
Juuro Aoyagi, Tokyo, Japan, assignor to Tokyo Bi-Tech Laboratories, Inc., Tokyo, Japan

Filed Aug. 25, 1988, Ser. No. 236,631

Claims priority, application Japan, Feb. 26, 1988, 63-7813; Feb. 26, 1988, 63-7814; Mar. 8, 1988, 63-9447; Mar. 8, 1988, 63-9448

Term of patent 14 years

U.S. Cl. D24—136



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  Vogel, Helmut, 5,025,934, Cl. 211-69.500.
ABB Kent plc: *See—*
  Woodroffe, David, 5,026,973, Cl. 235-136.000.
ABB Plast AB: *See—*
  Forsman, Jan-Erik, 5,025,943, Cl. 220-589.000.
ABB Power T & D Company: *See—*
  Adkins, Herbert S.; and Harris, Darrell D., 5,025,949, Cl. 220-481.000.
ABB Power T & D Company Inc.: *See—*
  Garitty, James P.; and Yocom, Thomas M., 5,027,297, Cl. 364-569.000.
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Abels, Ronald L.: *See—*
  Biresaw, Girma; Boland, Daniel J.; Paola, Vince A.; Evans, W. Thomas; Kampert, William P.; and Abels, Ronald L., 5,026,577, Cl. 428-1.000.
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  Henke, Reinhold, 5,027,089, Cl. 333-12.000.
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  Ferrari, Christopher, 5,025,781, Cl. 128-64.000.
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Aguilo', Adolfo: *See—*
  Smith, Brad L.; Torrence, G. Paull; Aguilo', Adolfo; and Alder, James S., 5,026,908, Cl. 562-519.000.
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  Rekow, Elizabeth D.; Riley, Donald R.; Erdman, Arthur G.; Klamecki, Barney; Zhu, Yang; and Ahn, Jeong-Ho, 5,027,281, Cl. 364-474.240.
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  Ockovic, Richard C.; McDermott, Wayne T.; and Schwarz, Alexander, 5,026,155, Cl. 356-37.000.
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  Miura, Masakatsu; and Ando, Masahiko, 5,026,337, Cl. 475-283.000.
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  Yamada, Takahiro, 5,027,224, Cl. 358-434.000.
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VOL
1127
ISS
4
JE
25
1991
UMI

Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, 5,026,464, Cl. 204-164.000

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  - Watanabe, Kazuhiro; Kakizaki, Husayoshi; Arai, Isao; Murakami, Kimihiro; and Kato, Kazuo, 5,026,842, Cl. 540-222.000.
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- Akao, Masaru: *See—*
  - Aoki, Hideki; Akao, Masaru; and Shin, Yoshiharu, 5,026,397, Cl. 623-11.000.
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- Akao, Mutsuo, to Fuji Photo Film Co., Ltd. Packaging material for photosensitive materials. 5,026,600, Cl. 428-328.000.
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- Akimori, Giichiro: *See—*
  - Morinaka, Shigehisa; Nakashima, Tai; Yamazaki, Takeshi; Morishima, Kazuo; Kashio, Yoshiaki; and Akimori, Giichiro, 5,025,883, Cl. 180-219.000.
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- Akita, Junji, to Inax Corporation. Mixing valve. 5,025,983, Cl. 236-12.200.
- Akiyama, Motoharu: *See—*
  - Shinpo, Yoshiharu; and Akiyama, Motoharu, 5,025,678, Cl. 74-473.0SW
- Akiyama, Saburo; Murakami, Naoyuki; and Kitamura, Kazuo, to Teijin Chemicals, Ltd. Resin composition. 5,026,792, Cl. 525-468.000.
- Akkerman, Neil H.: *See—*
  - More, Henry S.; Rorden, Louis H.; and Akkerman, Neil H., 5,027,129, Cl. 343-719.000.
- Akly, Cesar. Bottle holder. 5,025,940, Cl 215-100.00A
- Akly, Cesar. Rechargeable and disposable toothbrush. 5,026,191, Cl. 401-175.000.
- Aktiebolaget Bofors: *See—*
  - Gustavsson, Lennart; Karlsson, Ewa; and Reinholdsson, Jan, 5,025,732, Cl. 102-521.000.
- Akzo N.V.: *See—*
  - Diamantoglou, Michael; and Kuhne, Helmut, 5,026,834, Cl. 536-20.000.
  - Logan, Robert T.; Redpath, James; McGarry, George; and Roy, Robert G., 5,026,724, Cl. 514-443.000.
  - Meyer, Gerhard; Sudheimer, Gunter; Zengel, Hans; and Grothaus, Hans, 5,026,534, Cl. 423-366.000.
  - Rijke, Eric O., 5,026,543, Cl. 424-81.000.
- Albarella, James P.: *See—*
  - Dattagupta, Nanibhushan; and Albarella, James P., 5,026,840, Cl. 536-27.000.
- Albert, David E.; and Berbari, Edward J., to Corazonix Corporation. Method for analysis of electrocardiographic signal QRS complex. 5,025,794, Cl. 128-696.000.
- Albrecht, Thomas B.; Albrecht, Thomas E.; and Fleischmann, William R., to Board of Reagents, The University of Texas System. Methods and compositions for inhibiting the growth of neoplastic cells. 5,026,544, Cl. 424-85.400.
- Albrecht, Thomas E.: *See—*
  - Albrecht, Thomas B.; Albrecht, Thomas E.; and Fleischmann, William R., 5,026,544, Cl. 424-85.400.
- Alcan International Limited: *See—*
  - Selwood, Patrick G.; Maddison, Anthony N.; and Sheasby, Peter G., 5,026,612, Cl. 428-594.000.
- Alcatel Espace: *See—*
  - Gueble, Jean-Michel; Theron, Jean-Bernard; Latouche, Yannick; Ducrocq, Jean-Bernard; and Perez, Bernard, 5,027,090, Cl. 333-202.000.
- Alcatel NA: *See—*
  - Thorne, Hal A., 5,027,349, Cl. 370-85.100.
- Alcatel N.V.: *See—*
  - De Prycker, Martin L. F.; Ryckebusch, Mark L. M. R.; and Barri, Peter I. A., 5,027,351, Cl. 370-94.100.
- Alcatel Transmission par Faisceaux Hertziens: *See—*
  - Sehier, Philippe; and Kaleh, Ghassan K., 5,027,371, Cl. 375-15.000.
- Alder, James S.: *See—*
  - Smith, Brad L.; Torrence, G. Paull; Aguilo', Adolfo; and Alder, James S., 5,026,908, Cl. 562-519.000.
- Alexander, James C., to Serco Corporation. Automatic vehicle restraint. 5,026,242, Cl. 414-401.000.
- Alexander, William, to American Colloid Company. Liquid crop stimulant. 5,026,416, Cl. 71-24.000.
- Alford, Richard M., to Amoco Corporation. Method for geophysical exploration. 5,027,332, Cl. 367-75.000.
- Allegro Microsystems, Inc.: *See—*
  - Richards Oliver L., Jr.; and Field, Thomas L., 5,027,402, Cl. 381-10.000.
- Allen-Bradley Company, Inc.: *See—*
  - Pepera, Gerald S.; and Gunsaulus, Richard S., 5,027,317, Cl. 364-900.000.
- Allen, Fritz S.; Bustamante, Carlos; Niemczyk, Thomas M., and Dorman, Burton P., to Aerogen, Inc. Area-modulated luminescence (AML). 5,026,159, Cl. 356-318.000.
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  - Schohe, Rudolf; Glaser, Thomas; Traber, Jorg; and Allen, George S., 5,026,857, Cl. 514-319.000
- Allenger, Vincenza; Pandey, Raj N.; and Yarlagadda, Prasad, to Energy Mines and Resources Canada. Synthesis of isobutene from methane and acetylene. 5,026,944, Cl. 585-500.000.
- Allfast Fastening Systems, Inc.: *See—*
  - Luhm, Ralph R., 5,026,234, Cl. 411-507.000.
- Alliance Technical Services, Inc.: *See—*
  - Pung, David G.; and Carty, Alan D., 5,027,293, Cl. 364-550.000.
- Allied-Signal Inc.: *See—*
  - Baughman, Ray H.; Buff, Ernest D.; Eckhardt, Helmut, and Fuchs, Gerhard H., 5,025,602, Cl 52-171.000.
  - Brunskill, Michael R.; Manus, George R.; and Monegan, Edgar A., 5,025,642, Cl. 62-402.000.
  - Gutknecht, Daniel A.; and Ho, I-Chung, 5,026,260, Cl. 417-407.000
  - Logsdon, Peter B.; Swan, Ellen L.; Stachura, Leonard M.; and Basu, Rajat S., 5,026,502, Cl. 252-172.000.
  - McCormack, William H., 5,025,661, Cl. 73-180.000.
  - Swan, Ellen L.; Logsdon, Peter B.; Stachura, Leonard M.; and Basu, Rajat S., 5,026,501, Cl. 252-171.000.
  - Werner, Walter V., 5,026,161, Cl. 356-350.000.
- Alps Electric Co., Ltd.: *See—*
  - Ikarashi, Masami; and Mitsumori, Kenichi, 5,027,036, Cl 315-169.300.
  - Konishi, Takahiro; and Kuriyama, Toshihiro, 5,027,238, Cl. 360-104.000.
  - Matsumoto, Mitsunori; and Kato, Hironori, 5,026,289, Cl. 439-15.000.
- Althaus, Hans: *See—*
  - Volker, Theodor; Althaus, Hans; and Schmidt, Andreas, 5,026,815, Cl. 528-64.000.
- Altstaedt, Volker: *See—*
  - Weber, Thomas; Heckmann, Walter; Mertes, Jurgen, Tesch, Helmut; Altstaedt, Volker; Eberle, Wolfgang; Folda, Thomas; Stutz, Herbert; and Recker, Hans-Gert, 5,026,789, Cl. 525-423.000.
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  - Biresaw, Girma; Boland, Daniel J.; Paola, Vince A.; Evans, W. Thomas; Kampert, William P.; and Abels, Ronald L., 5,026,577, Cl. 428-1.000.
  - Sheu, Shen; and Hector, Louis G., 5,025,547, Cl. 29-527.400.
- Amada Company, Limited: *See—*
  - Morino, Asami; and Umetsu, Masahito, 5,026,962, Cl. 219-69.120.
- Amada Wasino Co., Ltd.: *See—*
  - Morino, Asami; and Umetsu, Masahito, 5,026,962, Cl. 219-69.120.
- Amagasaki, Morio: *See—*
  - Takasaki, Chiaki; Furuse, Tatuo; and Amagasaki, Morio, 5,026,266, Cl. 425-150.000.
- Amann, Rupert P.: *See—*
  - Hammerstedt, Roy H.; Keith, Alec D.; and Amann, Rupert P., 5,026,342, Cl. 600-35.000.
- Amano, Takanobu: *See—*
  - Mizuno, Koichi; Wakabayashi, Takeshige; Koinuma, Yutaka; Aizawa, Reiji; Kushiyama, Satoshi; Kabayashi, Satoru; Ohuchi, Hideo; Yoshida, Toyonobu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, 5,026,464, Cl. 204-164.000.
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  - Salerno, Laurie, 5,025,782, Cl. 128-80.00C.
- American Colloid Company: *See—*
  - Alexander, William, 5,026,416, Cl. 71-24.000.
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  - Kohli, Dalip K., 5,026,872, Cl. 548-521.000.
- American Cyanamid Company: *See—*
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  - Guerro, Gerald J., 5,026,405, Cl. 51-298.000.
- American Fun & Games, Inc.: *See—*
  - Shelnutt, Robert C., 5,026,052, Cl. 273-3.00A.
- American Home Products Corporation: *See—*
  - Hayward, Marshall A.; Sabatucci, Joseph P.; Jirkovsky, Ivo L.; and Lefebvre, Yvon, 5,026,725, Cl. 514-465.000.
- American Medical Systems, Inc.: *See—*
  - Burton, John H.; and Staehle, Bradford G., 5,026,377, Cl 606-108.000.
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  - Okabe, Masao; Amgai, Akikzau; Eto, Haruaki; and Tanaka, Yasuo, 5,026,764, Cl. 524-540.000.
- Amigues, Pierre: *See—*
  - Quang, Dang Vu; Amigues, Pierre; and Gaillard, Jean-Ferdinand, 5,026,459, Cl. 202-158.000.
- Ammermann, Eberhard: *See—*
  - Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, 5,026,720, Cl. 514-383.000.
- Ammon, James G.: *See—*
  - Lockwood, Alfred; Yurkonis, Philip G.; and Ammon, James G., 5,027,257, Cl. 361-428.000.
- Amoco Corporation: *See—*
  - Alford, Richard M., 5,027,332, Cl. 367-75.000.
  - Butkovich, Michael S.; LaLonde, Gerard V.; and Ginsburgh, Irwin, 5,025,946, Cl. 220-86.300.
  - Hagen, Gary P.; Schmidt, Gregory E.; Weis, John M.; and Smith, Thomas G., 5,026,917, Cl. 568-323.000.
  - Meszaros, Mark W., 5,026,932, Cl. 570-206.000.
  - Shum, Victor K., 5,026,938, Cl. 585-417.000.
  - Stewart, Robert C., 5,026,503, Cl. 252-192.000.
- Amouroux, Jacques; Nikravech, Mehrdad; Saint-Just, Jacques; and Vedrenne, Isabelle, to Gaz de France. Method of cracking a batch of heavy hydrocarbons into lighter hydrocarbons. 5,026,949, Cl. 585-648.000.

- AMP Incorporated: *See—*
  - Del Guidice, Henry L.; and Foster, George H., Jr., 5,026,305, Cl. 439-620.000.
  - Dery, Ronald A., 5,026,290, Cl. 439-65.000.
  - Furrow, Randy M., 5,026,304, Cl. 439-595.000.
  - Hornung, Craig W.; and Long, Alden O., 5,025,549, Cl. 29-564.400.
  - Pickles, Charles S.; Sucheski, Matthew M.; and Thumma, Mark R., 5,026,292, Cl. 439-108.000.
- Amsel, Klaus: *See—*
  - Firatli, Ahmet; Burger, Diethard; Amsel, Klaus; and Lindstaedt, Bernd, 5,025,578, Cl. 38-93.000.
- Amtel, Inc.: *See—*
  - Pollack, Jack, 5,025,743, Cl. 114-230.000.
- Anagnostopoulos, Constantine N., to Eastman Kodak Company. Autofocus chip with reference level determination circuit. 5,027,148, Cl. 354-402.000.
- Analog Devices, Inc.: *See—*
  - DeVito, Lawrence M., 5,027,085, Cl. 331-1.00A
  - Roberts, Carl M., Jr., 5,026,667, Cl. 437-209.000.
- Anaquest, Inc.: *See—*
  - Cicco, Charles F., 5,026,924, Cl 568-683.000.
- Anderson, Brent L.: *See—*
  - Rydell, Mark A., and Anderson, Brent L., 5,026,371, Cl. 606-47.000.
- Anderson, Craig M.: *See—*
  - Faiks, Frederick S.; Anderson, Craig M., and Bischoff, Daniel R., 5,026,117, Cl. 297-304.000.
- Anderson, Gregor J. M., to Smiths Industries Public Limited Company. Adjustable fitments for medical tubes. 5,026,352, Cl. 604-178.000.
- Anderson, Kevin M. Furrow opener. 5,025,736, Cl. 111-152.000.
- Anderson, Martin L.; and Nickel, Gregory, to National Carpet Equipment Inc. Protective sleeve for carpet tacking gun. 5,025,970, Cl. 227-156.000.
- Anderson, Neal G.; Lust, David A.; Bennett, Barbara J.; Feldman, Alan F.; and Polomski, Robert E., to E. R. Squibb & Sons, Inc. Process for direct isolation of captopril. 5,026,873, Cl. 548-533.000.
- Anderson, Oscar E., to General Electric Company. Method of treating wastewater from polymerization process. 5,026,485, Cl. 210-723.000.
- Anderson, Richard J.; Goodman, Bruce J.; Riggio, Robert T.; Kopolovics, Solomon; Hernandez, Lisa C.; Chen, Chengkuo; and Romei, Russell J., to Metropolitan Life Insurance Company. Data-locking system. 5,027,395, Cl. 380-4.000.
- Anderson, Robert S., to Metalaser Technologies, Inc. Pulsed laser and method. 5,027,365, Cl. 372-56.000.
- Andersson, Ken G. E.; Engstrand, Sven E. O.; and Asberg, Lars G., to Sandvik Aktiebolag. Tool assembly. 5,026,224, Cl. 409-234.000.
- Ando Electric Co., Ltd.: *See—*
  - Ara, Mitsuyuki; and Honma, Yoshihiro, 5,027,354, Cl. 371-25.100.
- Ando, Masahiko: *See—*
  - Miura, Masakatsu; and Ando, Masahiko, 5,026,337, Cl. 475-283.000.
- Ando, Shigenori; and Iijima, Ryuji, to Seiko Seiki Kabushiki Kaisha. Machining apparatus having a main spindle supported by magnetic bearings. 5,027,280, Cl. 364-474.160.
- Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, to Asahi Kogaku Kogyo K.K. Drawing surface adjusting mechanism for use with scanning pattern drawing apparatus. 5,027,137, Cl. 354-4.000.
- Andonov, Dimo P.: *See—*
  - Atanassov, Lyuben P.; Kolenzov, Yanko A.; Vulev, Decho I.; Primov, Ivan S.; Spassov, Peter G.; Kanalev, Svetlosar K.; Andonov, Dimo P.; Yankov, Angel V.; and Dilkin, Nikolay G., 5,027,286, Cl. 364-513.000.
- Andra, Rainer H., to Carl Freudenberg, Firma. Torsional vibration damper. 5,025,681, Cl. 74-574.000.
- Andreas, David C.: *See—*
  - Dattorro, Jon C.; Charpentier, Albert J.; and Andreas, David C., 5,027,306, Cl. 364-724.100.
- Andrews, David J.: *See—*
  - May, Steven J.; Andrews, David J., and VanKampen, Craig L., 5,026,398, Cl. 623-13.000.
- Andrews, Mark A.; and Klaeren, Stephen A., to United States of America, Energy. Hydrocracking of carbohydrates making glycerol, glycols and other polyols. 5,026,927, Cl. 568-863.000.
- Anson, James H.: *See—*
  - Knepler, John T.; Anson, James H.; and Brewer, Alan W., 5,026,969, Cl. 219-421.000.
- Ansquer, Patrick: *See—*
  - Blondeau, Rene; Marty, Claude; and Ansquer, Patrick, 5,026,474, Cl. 208-189.000.
- Anstey, Henry D.: *See—*
  - Viaud, Jean; Roth, Arsene; and Anstey, Henry D., 5,025,717, Cl 100-88.000.
  - Viaud, Jean; Roth, Arsene; and Anstey, Henry D., 5,025,718, Cl. 100-88.000.
- Aoki, Hideki; Akao, Masaru; and Shin, Yoshiharu, to Kabushiki Kaisya Advance Kaihatsu Kenkyujo. Transcutaneously implantable element. 5,026,397, Cl. 623-11.000.
- Aoki, Kazuhiro: *See—*
  - Shinbo, Masatoshi; Fujie, Hideki; Iwakuni, Kaoru, Muto, Akira; and Aoki, Kazuhiro, 5,027,222, Cl. 358-330.000.
- Aoki, Teruyuki: *See—*
  - Hirakoso, Hiroyuki; and Aoki, Teruyuki, 5,025,623, Cl. 60-257.000.
- Aomi, Hideki: *See—*
  - Kitamura, Ikuo; Aomi, Hideki; Koyama, Satoshi; Tokunaga, Katsushi; and Okamura, Kazuo, 5,026,605, Cl. 428-403.000.
- Apollo Manufacturing Corporation: *See—*
  - Ouellette, Thomas C., Jr., 5,025,713, Cl. 98-115.200.
- Applied Micro Circuits Corporation: *See—*
  - Coy, Bruce H.; and Rosky, David S., 5,027,013, Cl. 307-475.000.
- Ara, Mitsuyuki; and Honma, Yoshihiro, to Ando Electric Co., Ltd. Electronic memory testing device. 5,027,354, Cl. 371-25.100.
- Ara-Werk Kramer GmbH & Co.: *See—*
  - Segatz, Wilhelm, 5,025,959, Cl. 222-389.000.
- Arabori, Noboru; Takahashi, Hideaki; Sakai, Yoshio; Nakazato, Masao; Tanaka, Masakatsu; Takahashi, Tatsuhiko; Masuda, Katsutaro; Itoh, Masanobu; and Toda, Yuji, to Hitachi, Ltd. Elevator control apparatus. 5,025,896, Cl. 187-115.000.
- Arai, Isao: *See—*
  - Watanabe, Kazuhiro; Kakizaki, Husayoshi; Arai, Isao; Murakami, Kimihiro; and Kato, Kazuo, 5,026,842, Cl. 540-222.000.
- Arai, Katsuhiko: *See—*
  - Kurosawa, Juetsu; and Arai, Katsuhiko, 5,026,316, Cl. 417-222.000.
- Arai, Kazuo; and Okada, Shinji, to Matsushita Electric Industrial Co., Ltd Tracking control system for information reproducing apparatus. 5,026,509, Cl. 360-77.150.
- Arai, Kenji: *See—*
  - Fujii, Masashi; Uyama, Kiichiro; Shoji, Takao; and Arai, Kenji, 5,027,378, Cl. 378-11.000.
- Arai, Kimikazu: *See—*
  - Kitazume, Koichi; and Arai, Kimikazu, 5,026,041, Cl. 271-118.000.
- Arai, Masatoshi, Fujioka, Kazutoshi; and Satou, Masaharu, to Shin-Etsu Chemical Co., Ltd. Photocurable organopolysiloxane composition. 5,026,741, Cl. 522-33.000.
- Arai, Tatsuo; Shiratori, Hidehisa; Hasegawa, Ryoei; and Iizuka, Kazuo, to Mitsubishi Metal Corporation. Rotary cutting tool. 5,026,221, Cl. 409-137.000.
- Arcas, Noe; and Parente, Charles A., to Grumman Aerospace Corporation. Acoustic liner. 5,025,888, Cl. 181-213.000.
- Arco Chemical Company: *See—*
  - Motika, Stephen A.; Pickering, Timothy L.; Rokicki, Andrzej; and Stein, Beatrice K., 5,026,676, Cl. 502-170.000.
- Arco Chemical Technology, Inc.: *See—*
  - Le-Khac, Bi, 5,026,784, Cl. 525-327.600.
  - Leyshon, David W.; Sofranko, John A.; and Jones, C. Andrew, 5,026,935, Cl. 585-315.000.
  - Leyshon, David W.; Sofranko, John A.; and Jones, C. Andrew, 5,026,936, Cl. 585-315.000.
- Arendt, William D., to Velsicol Chemical Corporation. Hot melt adhesive composition. 5,026,756, Cl. 524-293.000.
- Arikawa, Tetsuro, to Nippon A.B.S., Ltd Fluid pressure brake control apparatus for a vehicle. 5,026,127, Cl. 303-116.000.
- Aristech Chemical Corporation: *See—*
  - Weil, Richard C., 5,026,745, Cl. 524-47.000.
- Armstrong, Gordon P.: *See—*
  - Pollet, Jean-Claude; Williams, Gary L.; Armstrong, Gordon P.; and Flautt, Martin C., 5,026,410, Cl. 65-3.430.
- Armstrong, Graham A. W., to Advanced Escalator and Travelator Cleaner Pty. Ltd. Escalator cleaning device. 5,025,527, Cl. 15-256.500.
- Armstrong, Michael; and Gray, Paul R., to Micro Linear Corporation. Self-calibrating analog to digital converter. 5,027,116, Cl. 341-120.000.
- Artigalas, Max; and Grimaldi, Jean-Luc, to Thomson Video Equipement. Device for the digital processing of images to obtain special geometrical effects. 5,027,287, Cl. 364-518.000.
- Aruga, Fusayoshi: *See—*
  - Numazawa, Junji; and Aruga, Fusayoshi, 5,027,246, Cl. 360-126.000.
- Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
  - Hosoya, Kazuhiro; Ohtani, Ikuji; and Imaizumi, Kimio, 5,026,805, Cl. 526-309.000.
- Asahi Kogaku Kogyo K.K.: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000
  - Yamazaki, Yoshihiro; and Imoto, Manabu, 5,027,424, Cl. 382-65.000.
- Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
  - Marui, Masatoshi; Inage, Tomonori; Matsui, Vuji; and Ishizuka, Tazuko, 5,026,145, Cl. 350-351.000.
  - Negishi, Kiyoshi; Negoro, Ikuo; and Kita, Masahiro, 5,027,135, Cl. 346-154.000.
- Asai, Haruo, to Shobundo Insatsu Kabushiki Kaisha. Three-dimensional cards. 5,025,580, Cl. 40-152.100.
- Asai, Yutaka: *See—*
  - Naka, Hiromitsu; Asai, Yutaka; and Naka, Shouzi, 5,025,891, Cl. 182-86.000.
- Asakura, Tsutou: *See—*
  - Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; and Asakura, Tsutou, 5,027,216, Cl. 358-213.110.
- Asano, Atsushi: *See—*
  - Imai, Munehisa; Asano, Atsushi; Yasue, Tsutomu; Ito, Kenichiro; and Nojiri, Hiromi, 5,025,902, Cl. 192-43.000.
- Asanuma, Nobuyoshi; Ishida, Shinnosuke; and Hasegawa, Hiroshi, to Honda Giken Kogyo Kabushiki Kaisha. Device for switching vehicle operating characteristics. 5,027,302, Cl. 364-424.050.

VOL
1127
ISS
4
JE
25
1991
UMI

Asayama, Yoshiaki: *See—*
Suzuki, Hiroyoshi; Ogawa, Kenji; Maekawa, Hiroko; Kominami, Seiya; and Asayama, Yoshiaki, 5,026,153, Cl. 356-1.000.
Asberg, Lars G.: *See—*
Andersson, Ken G E.; Engstrand, Sven E. O.; and Asberg, Lars G., 5,026,224, Cl. 409-234.000.
Asea Brown Boveri Ltd.: *See—*
Kloucek, Franz, 5,027,192, Cl. 357-75.000.
Asmo Co., Ltd : *See—*
Kinoshita, Tsutomu; and Osakabe, Toshihiko, 5,026,251, Cl. 415-119.000.
Semura, Norio; Tsuchida, Masumi; and Shimamura, Yoshihiro, 5,027,021, Cl. 310-68.00A.
Asperger, Robert G : *See—*
Thompson, Neil E. S.; and Asperger, Robert G., 5,026,483, Cl. 210-708.000.
Asquith, Nicholas A. Flexible file holder. 5,025,540, Cl. 29-80.000.
Assh, Daniel. Load distribution system for road vehicles having wheel axles supported by pneumatic suspension. 5,025,877, Cl. 180-24.020.
Asten Group, Inc.: *See—*
Wright, Walter P., 5,025,839, Cl. 139-383.00A
Astro-Valcour, Inc.: *See—*
Pontiff, Thomas M., 5,026,736, Cl. 527-60.000.
AT&T Bell Laboratories: *See—*
Chang, Christina L.; Gaeta, Jesus M ; O'Malley, Kathleen G.; and Rowland, Stuart W., 5,027,110, Cl. 340-731.000.
Chraplyvy, Andrew R.; Iannone, Patrick P.; Kaminow, Ivan P.; Li, Tingye; Stone, Julian; Stulz, Lawrence W ; and Tkach, Robert W., 5,027,435, Cl. 455-617.000.
Coyle, Richard J., Jr.; Grimes, Gary J.; Haas, Lawrence J., Serafino, Anthony J.; and Shevchuk, George J., 5,026,411, Cl. 65-4.210.
Delavaux, Jean-Marc P., 5,027,436, Cl. 455-619.000.
Desurvire, Emmanuel; Giles, Clinton R.; and Zyskind, John L., 5,027,079, Cl. 330-4.300.
Hills, Graham W.; Huttemann, Robert D., and Olasupo, Kolawole R., 5,026,666, Cl. 437-195.000.
Hokanson, John L.; and Swartz, Robert G., 5,027,362, Cl. 372-38.000.
Jarwala, Najmi T.; and Yau, Chi W., 5,027,353, Cl. 371-27.000.
Kutzavitch, Walter G.; and Rosenthal, Eugene J., 5,027,083, Cl 330-284.000.
Miller, Robert W., 5,027,330, Cl. 365-239.000.
O'Dell, Thomas M.; and Overmyer, Ricky L., 5,027,358, Cl 371-62.000.
Ata, Kazuhisa, to Kyocera Corporation. Tracking defect preventing circuit. 5,027,338, Cl. 369-44.290.
Atago, Takeshi: *See—*
Ohnari, Mikihiko; Sekozawa, Teruji; Funabashi, Motohisa; Atago, Takeshi; and Shioya, Makoto, 5,027,278, Cl. 364-431.060
Atanassov, Lyuben P.; Kolenzov, Yanko A.; Vulev, Decho I., Primov, Ivan S.; Spassov, Peter G.; Kanalev, Svetlosar K.; Andonov, Dimo P.; Yankov, Angel V.; and Dilkin, Nikolay G , to Institute "Komplek-sna Avtomatisazia na Montaja". Peripheral control device. 5,027,286, Cl. 364-513.000.
Atlantic Pharmaceutical Products Limited *See—*
Bourbon, Pierre; Lagny, Pierre; and Billot, Pierre, 5,026,561, Cl. 424-673.000.
Atlantic Richfield Company: *See—*
Mazurek, Harry, 5,026,947, Cl. 585-500.000.
Atochem North America, Inc.: *See—*
Buchholz, Bernard; Dzierza, Edward J.; and Baltrus, John R., 5,026,915, Cl. 568-26.000.
Atomic Energy of Canada Limited *See—*
Davis, Ronald S., 5,027,419, Cl. 382-28.000.
Atsugi Unisia Corporation: *See—*
Aihara, Toshinori; and Hara, Masahiko, 5,026,257, Cl. 417-295.000.
Audiau, Francois; Gueremy, Claude; Jimonet, Patrick; and Mignani, Serge, to Rhone-Poulenc Sante. 2-imino-6-polyfluoroalkoxybenzothiazole derivatives, and pharmaceutical compositions containing them. 5,026,717, Cl. 514-338.000.
Ausimont S.r.l.: *See—*
Re, Alberto; and Giavarini, Francesco, 5,026,814, Cl. 528-61.000.
Tonelli, Claudio; and Tortelli, Vito, 5,026,928, Cl. 570-136.000.
Vianello, Domenico, 5,026,500, Cl. 252-171.000.
Ausimont S.p.A.: *See—*
Marchionni, Giuseppe; Viola, Gian T., Tommasi, Giulio; Ferro, Raffaele; and Cirillo, Gianna, 5,026,786, Cl. 525-356.000.
Austin, James E.: *See—*
Cordle, Kevin G.; Martin, Thomas F.; and Austin, James E., 5,027,399, Cl. 380-7.000.
Austin, Jared A.; Miller, Joseph H.; and Hyslop, Robert F., to James River Corporation, The. Wiping fabric. 5,026,587, Cl. 428-91.000.
Autoject Systems Inc.: *See—*
Schmitz, William B.; and Schmitz, William L., 5,026,349, Cl. 604-134.000.
Automatic Control Components, Inc.: *See—*
Hendrick, Fred W., 5,025,833, Cl. 137-625.310.
Automotive Digital Systems, Inc.: *See—*
Wilson, Wayne G., 5,026,293, Cl. 439-76.000.
Auvil, Steven R.: *See—*
Agrawal, Rakesh; and Auvil, Steven R., 5,026,912, Cl. 564-409.000.
Avis, Richard J. A.; Gillard, Clive H.; and Samad, Raphael, to Sony Corporation. Motion dependent video signal processing. 5,027,205, Cl. 358-140.000.
Awano, Yuji, to Fujitsu Limited Semiconductor device. 5,027,164, Cl. 357-4.000.
Ayache, Liliane: *See—*
Gueret, Jean-Louis; Contamin, Jean-Claude; and Ayache, Liliane, 5,026,552, Cl. 424-401.000.
Ayala, Harry J. Apparatus for forming risers for concrete steps 5,026,018, Cl. 249-14.000.
Aydin, Oral: *See—*
Rehmer, Gerd; Boettcher, Andreas; Pfoehler, Peter; Aydin, Oral, and Nestler, Gerhard, 5,026,806, Cl. 526-316.000.
Ayisi, Gabriel A. Method of playing a pick-a-card game. 5,026,072, Cl 273-308.000.
Ayusawa, Shirou: *See—*
Sato, Shuichi; and Ayusawa, Shirou, 5,025,738, Cl. 112-286.000.
Azuma, Hideki: *See—*
Fukuda, Hiroshi; and Azuma, Hideki, 5,025,650, Cl. 72-220.000.
B F. Goodrich Company, The: *See—*
Hartitz, J. Ernst, 5,026,582, Cl. 428-36.600.
Kletecka, George; and Ledesma, Victor L., 5,026,849, Cl 544-198.000.
Baba, Masatoshi: *See—*
Taniguchi, Masakazu, Baba, Masatoshi; Ochiai, Yoshinori; Hirose, Masayoshi; and Hirata, Kiminori, 5,026,850, Cl. 544-240.000
Babicz, Eugene A.: *See—*
Chen, Hsing-Yao, Babicz, Eugene A., and Gorski, Richard M., 5,027,043, Cl. 315-368.000.
Babl, Albert: *See—*
Kunz, Reiner; Babl, Albert, Zahradnicek, Ales, and Dietrich, Rainer, 5,026,404, Cl. 51-295.000.
Babolat VS: *See—*
Longeat, Gerard, 5,026,055, Cl 273-73.00A
Bacheler, Lee T.: *See—*
Ferguson, Blair Q., Bacheler, Lee T., Petteway, Stephen R . and Neubauer, Russell H , 5,026,635, Cl. 435-5.000
Bachy, Andre: *See—*
Mendes, Etienne; Vernieres, Jean-Claude; Keane, Peter E , and Bachy, Andre, 5,026,711, Cl. 514-300.000.
Back, Anthony C., to John Crane UK Ltd. Mechanical face seals 5,026,076, Cl. 277-82.000.
Bagchi, Pranab; and Gardner, William L., to Eastman Kodak Company Use of gelatin-grafted and case-hardened gelatin-grafted polymer particles for relief from pressure sensitivity of photographic products 5,026,632, Cl. 430-545.000
Baines, Frederick C.; and Johnston, Richard, to Gillette Company, The Depilatory composition 5,026,542, Cl. 424-73.000.
Bains, Charanjit S.; and Grosboll, Martin P., to Lyondell Petrochemical Company. Method for converting light hydrocarbons to olefins, gasoline and methanol. 5,026,934, Cl. 585-314.000.
Baisch, Gabriele: *See—*
Francotte, Eric; and Baisch, Gabriele, 5,026,841, Cl. 536-58.000.
Baji, Toru; Nakano, Yukio; Tanabe, Shiro; Nakagawa, Tetsuya, and Kojima, Hirotsugu, to Hitachi Ltd. Multimedia bidirectional broadcast system. 5,027,400, Cl. 380-20.000.
Baker, Edgar C., to Union Carbide Chemicals and Plastics Technology Corporation. Production of ethylidene diacetate from dimethyl acetal. 5,026,903, Cl. 560-232.000.
Baker Hughes Incorporated: *See—*
Behre, Hans-Ulf; and Laukart, Jakob, 5,025,872, Cl. 175-246.000.
Cerkovnik, Jerry, 5,025,873, Cl. 175-329.000.
Baker, James K : *See—*
Roberts, Jed; Baker, James K.; and Porter, Edward W., 5,027,406, Cl. 381-43.000.
Baker, James L. Mammary implant. 5,026,394, Cl. 623-8.000.
Bakos, Jozsef; Neil, Balint; Kollar, Laszlo ; Toros, Szilard, Eifert, Gyula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna; Kuronya, Istvan; Magyari, Istvan; Timar, Judit; Bohus, Peter; and Wohl, Laszlo, to Budapesti Vegyimuvek. Novel (trifluoromethyl)-phenoxybenzoic acid derivatives, process for the preparation thereof and fungicides containing these compounds as active ingredient 5,026,895, Cl. 560-21.000.
Balch, Richard A.: *See—*
Russillo, Joseph G , Jr.; Balch, Richard A., Keturakis, Andrius A . and Velte, Scott D., 5,027,056, Cl. 324-103.00R.
Baldwin, Ronald M.: *See—*
McBride, William J.; Baldwin, Ronald M.; Kerr, Janice M . Schultze, Lisa M.; and Salazar, Nilda, 5,026,913, Cl. 564-440.000
Ball Corporation: *See—*
Horsley, William J.; and Tucker, Virgil R., 5,027,076, Cl. 324-674.000.
Ball, Kenneth A.: *See—*
Ortolano, Ralph J.; Ball, Kenneth A.; and Bowman, Gary, 5,026,032, Cl. 269-43.000.
Ballard Medical Products: *See—*
Palmer, Darrel; and Radford, Richard, 5,025,806, Cl. 128-203.120.
Ballhaus, Heribert, to GMN Georg Miller Nurnberg AG Aktiengesellschaft. Sensor bearings for determining rotational speed and/or angle of torsion. 5,026,178, Cl. 384-448.000.
Baltrus, John R.: *See—*
Buchholz, Bernard; Dzierza, Edward J.; and Baltrus, John R., 5,026,915, Cl. 568-26.000.
Balyasny, Marik; Olivares, Raul A.; and Sepmeyer, Arthur C., to ITT Corporation. Lead termination. 5,026,301, Cl. 439-391.000.
Baney, Ronald H.; and Hirano, Shin-ichi, to Dow Corning Corporation, and Shin-Ichi Hirano. Process for preparing ceramic superconductive substances. 5,026,684, Cl. 505-1.000.

Barak, Renee-Lucia: *See—*
Haghiri-Tehrani, Yahya; and Barak, Renee-Lucia, 5,027,190, Cl. 357-74.000.
Baran, Gregory W. Automated biopsy instrument. 5,025,797, Cl. 128-754.000.
Barbour, William P., to Datacard Corporation. Replaceable ink cartridge and imprinter. 5,025,727, Cl. 101-483.000.
Barcon, Jean-Paul: *See—*
Burey, Bernard P.; and Barcon, Jean-Paul, 5,025,528, Cl. 15-302.000.
Bares, Jean-Paul Y.; and Blanchard, Eric Y. Particle sensor plug with wireless casing connection. 5,027,065, Cl. 324-204.000.
Barker Products: *See—*
Wyman, Robert E., 5,026,241, Cl. 414-303.000.
Barnard, George B. Rotating disc multi-surface vehicle. 5,025,876, Cl. 180-7.100.
Barnard, Michael E., to U.S. Philips Corp. Target detection systems. 5,027,413, Cl. 382-1.000.
Barnes, Laura A. Child car seat cover. 5,026,115, Cl. 297-219.000.
Barnett, Paul: *See—*
Jackson, Robert J.; Duke, Susan A.; and Barnett, Paul, 5,026,539, Cl. 424-49.000.
Baroid Technology, Inc.: *See—*
Smith, Denzil B.; and Whitby, Melvyn F., 5,025,708, Cl. 92-19.000.
Baron, Bruce M.: *See—*
Harrison, Boyd L.; and Baron, Bruce M., 5,026,700, Cl. 514-233.800.
Barr, John D.; and Newton, Thomas A., Jr., to Reed Tool Company Ltd. Cutting elements for rotary drill bits. 5,025,874, Cl. 175-329.000.
Barr, Lance: *See—*
Ichitsubo, Norio; Kamada, Hiroshi; and Barr, Lance, 5,025,526, Cl. 15-210.00R.
Barri, Peter I. A.: *See—*
De Prycker, Martin L. F.; Ryckebusch, Mark L. M. R.; and Barri, Peter I. A., 5,027,351, Cl. 370-94.100.
Barry, Patrick E.: *See—*
Maienschein, Jon L.; and Barry, Patrick E., 5,026,670, Cl. 501-80.000.
Barry, Stephen E.: *See—*
Soane, David S.; and Barry, Stephen E., 5,026,147, Cl. 350-374.000.
Barthelmess, Ulrich, to OMYA GmbH. Centrifugal classifier. 5,025,930, Cl. 209-144.000.
Bartizal, Kenneth F.; and Onishi, Janet C., to Merck & Co., Inc. Method of inhibiting fungal growth using squalene synthetase inhibitors. 5,026,554, Cl. 424-404.000.
Bartlow, Howard D.: *See—*
Wisherd, David S.; Bartlow, Howard D.; and D'Anna, Pablo E., 5,027,082, Cl. 330-277.000.
Bartman, Thomas F. Multi-chamber safety syringe. 5,026,353, Cl. 604-192.000.
Barton, Oliver A.; and Wright, James D. Oxygen resistant radiation-polymerizable composition and element containing a photopolymer composition. 5,026,626, Cl. 430-288.000.
Bartsch, Gisbert: *See—*
Meyer, Jurgen; Sippel, Achim; Wildau, Monika; Kruse, Heinz J.; Diel, Rainer; Becker, Wilfried; Bartsch, Gisbert; Pahnke, Klaus-Dieter; Huege, Jurgen; and Luther, Hans-Werner, 5,025,731, Cl. 102-521.000.
Basehgi, Behshad; and Mazooji, Mohammad, to Raytheon Company. Beam steering module. 5,027,126, Cl. 342-372.000.
Baseman, Joel B.; Su, C. J.; and Dallo, S. F., to University of Texas Board of Regents, The. Methods and compositions for production of mycoplasmal adhesins. 5,026,636, Cl. 435-6.000.
BASF: *See—*
Denzinger, Walter; Mach, Helmut; Mohr, Juergen; Oppenlaender, Knut; Schwen, Roland; and Vogel, Hans-Henning, 5,026,494, Cl. 252-50.000.
BASF Aktiengesellschaft: *See—*
Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, 5,026,720, Cl. 514-383.000.
Lohrbaecher, Volker; and Pellkofer, Erich, 5,026,763, Cl. 524-495.000.
Mronga, Norbert; Ostertag, Werner; and Bock, Gustav, 5,026,429, Cl. 106-400.000.
Rehmer, Gerd, 5,026,742, Cl. 522-116.000.
Rehmer, Gerd; Boettcher, Andreas; Pfoehler, Peter; Aydin, Oral; and Nestler, Gerhard, 5,026,806, Cl. 526-316.000.
Roeper, Michael; Merger, Franz; Liebe, Joerg; Grenacher, Armin V.; and Hahl, Edgar, 5,026,920, Cl. 568-492.000.
Weber, Thomas; Heckmann, Walter; Mertes, Jurgen; Tesch, Helmut; Altstaedt, Volker; Eberle, Wolfgang; Folda, Thomas; Stutz, Herbert; and Recker, Hans-Gert, 5,026,789, Cl. 525-423.000.
BASF Corporation: *See—*
Iyengar, Doreswamy R.; and Praamsma, Thomas L., 5,026,627, Cl. 430-331.000.
Basile, Pauline R. Toilet having hygienic cleaning apparatus. 5,025,510, Cl. 4-447.000.
Bass, Alan S.; Schenck, Stephen R.; and Martin, Robert C., to Texas Instruments Incorporated. Translator circuit and method of operation. 5,027,014, Cl. 307-475.000.
Bass, Andrew F.: *See—*
Jarvis, J. Michael; Bass, Andrew F.; and Sherman, James B., 5,027,341, Cl. 370-13.000.
Bastle, Clifford F., to Parker Hannifin Corporation. Thermostatic expansion valve for low refrigerant flow rates. 5,026,022, Cl. 251-122.000.
Basu, Rajat S.: *See—*
Logsdon, Peter B.; Swan, Ellen L.; Stachura, Leonard M.; and Basu, Rajat S., 5,026,502, Cl. 252-172.000.
Swan, Ellen L.; Logsdon, Peter B.; Stachura, Leonard M.; and Basu, Rajat S., 5,026,501, Cl. 252-171.000.
Bates, Chester. Tri-fold cotton tromper. 5,025,720, Cl. 100-226.000.
Batt, Douglas G., to Du Pont Merck Pharmaceutical. 2-substituted-1-naphthols as 5-lipoxygenase inhibitors. 5,026,759, Cl. 514-438.000.
Bauch, Wolf-Dieter; Helmus, Heinz; and Merker, Heinz B., to U.S. Philips Corporation. Circuit arrangement for generating a pulsatory supply voltage for a load from a direct voltage. 5,027,052, Cl. 323-284.000.
Baudoin, Michel: *See—*
Coste, Philippe; Leconte, Philippe; Perron, Robert; and Baudoin, Michel, 5,026,900, Cl. 560-204.000.
Bauer, Bernhard: *See—*
Schurger, Rainer; and Bauer, Bernhard, 5,026,324, Cl. 464-131.000.
Bauer, Harry J., to General Motors Corporation. Rear wheel steering system having toe error compensation. 5,026,081, Cl. 280-91.000.
Bauer, Heinz, to Linde Aktiengesellschaft. Process for separating C_2+ or C_3+ or C_4 hydrocarbons from a gaseous mixture. 5,026,952, Cl. 585-800.000.
Baughman, Ray H.; Buff, Ernest D.; Eckhardt, Helmut; and Fuchs, Gerhard H., to Allied-Signal Inc. Dual-pane thermal window with liquid crystal shade. 5,025,602, Cl. 52-171.000.
Baum, David M.: *See—*
Bradshaw, Andrea E.; Baum, David M.; and Rivera, Dionne A., 5,027,388, Cl. 379-112.000.
Baum, Jeffery I , to Motorola, Inc. High gain differential-to-single ended amplifier having a tee network feedback loop. 5,027,081, Cl. 330-84.000.
Baumann, David C.; and Fraser, Howard H., Jr., to Carrier Corporation. Multipiece eccentric shaft. 5,026,262, Cl. 418-55.600.
Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, to BASF Aktiengesellschaft. 1-hydroxyazole compounds and fungicides containing these. 5,026,720, Cl. 514-383.000.
Bavaria Cargo Technologie GmbH: *See—*
Huber, Thomas, 5,025,915, Cl. 198-782.000.
Baxter International Inc.: *See—*
Patel, Indrajit, 5,026,347, Cl. 604-410.000.
Saint-Remy, Jean-Marie; Lebrun, Philippe; Lebeque, Serge; and Masson, Pierre L., 5,026,545, Cl. 424-85.800.
Bay, Tod A.; Frahm, Jeffry R.; Roesler, David F.; and Gilbert, Robert, to Ford New Holland, Inc. Hydraulic cylinder detent. 5,026,246, Cl. 414-694.000.
Bayard, Michel L., to Tektronix, Inc. Method of fabricating a sintered body containing tin oxide. 5,026,672, Cl. 501-134.000.
Bayer Aktiengesellschaft: *See—*
Beyer, Joachim; Koglin, Bernd; Rink, Rolf; and Roth, John-Edwin, 5,026,208, Cl. 405-129.000.
Diehr, Hans-Joachim, 5,026,864, Cl. 546-345.000.
Goldmann, Siegfried; Bossert, Friedrich; Bischoff, Hilmar; Petzinna, Dieter; Puls, Walter; and Schlossmann, Klaus, 5,026,714, Cl. 514-302.000.
Grigo, Ulrich; Kirsch, Jurgen; Wittmann, Dieter; Idel, Karsten-Josef; and Horlacher, Peter, 5,026,758, Cl. 524-423.000.
Heinz, Hans-Detlef; Meyer, Rolf-Volker; Schulte, Helmut; and Zimmerman, Franz, 5,026,818, Cl. 528-313.000.
Heitz, Walter; and Greiner, Andreas, 5,026,804, Cl. 526-293.000.
Lindner, Christian; and Piejko, Karl-Erwin, 5,026,803, Cl. 526-261.000.
Lunkenheimer, Winfried; Brandes, Wilhelm; and Hassler, Gerd, 5,026,710, Cl. 514-275.000.
Musch, Rudiger; Magg, Hans; Obrecht, Werner; and Muller, Eberhard, 5,026,779, Cl. 525-215.000.
Schohe, Rudolf; Glaser, Thomas; Traber, Jorg; and Allen, George S., 5,026,857, Cl. 514-319.000.
Bayston, Thomas E.; Weidler, Roy C., Jr.; Thompson, Arthur B., Jr.; and Layton, Allen C., to Martin Marietta Corporation. Method and system for pulse interval modulation. 5,026,156, Cl. 356-45.000.
Beardsley, George P.: *See—*
Taylor, Edward C.; Beardsley, George P.; Harrington, Peter J.; and Fletcher, Stephen R., 5,026,851, Cl. 544-279.000.
Beck, August H., III. Apparatus for placing cementitious materials in earth excavations. 5,026,214, Cl. 405-240.000.
Becker, Wilfried: *See—*
Meyer, Jurgen; Sippel, Achim; Wildau, Monika; Kruse, Heinz J.; Diel, Rainer; Becker, Wilfried; Bartsch, Gisbert; Pahnke, Klaus-Dieter; Huege, Jurgen; and Luther, Hans-Werner, 5,025,731, Cl. 102-521.000.
Becton Dickinson and Company: *See—*
Sweeney, Niall; and Gyure, Sandor, 5,026,355, Cl. 604-243.000.
Bedorf, Norbert: *See—*
Bohlendorf, Bettina; Bedorf, Norbert; Hofle, Gerhard; Schummer, Dietmar; and Sutter, Marius, 5,026,878, Cl. 549-267.000.
Beeber, Paul S. Indoor golf game. 5,026,060, Cl. 273-176.00F.
Beech, Brian H., to National Transcommunications Limited Noise reduction in high definition television signals. 5,027,210, Cl. 358-166.000.
Beecham Group p.l.c.: *See—*
Jackson, Robert J.; Duke, Susan A.; and Barnett, Paul, 5,026,539, Cl. 424-49.000.
Beg, Mirza A., to Westinghouse Electric Corp. Circuit and method for monitoring voltage pulse widths. 5,027,046, Cl. 318-603.000.
Begley, William J.; Chen, Teh-Hsuan; Kilminster, Kenneth N.; Poslusny, Jerrold N.; and Slusarek, Wojciech, to Eastman Kodak Com-

VOL
1127
ISS
4
JE
25
1991
UMI

pany. Photographic material and process comprising a compound capable of forming a wash-out dye. 5,026,628, Cl. 430-382.000.

Behre, Hans-Ulf; and Laukart, Jakob, to Baker Hughes Incorporated. Core barrel adjusting system. 5,025,872, Cl. 175-246.000.

Beight, Douglas W.: *See—*

Flynn, Gary A.; and Beight, Douglas W., 5,026,861, Cl. 514-424.000.

Belanger, Richard A.; Melendy, Peter S.; and Ornsteen, Robert L. Dispenser for hot-melt material. 5,026,187, Cl. 401-1.000.

Belanger, Stephen D.: *See—*

Hanley, Roger T.; and Belanger, Stephen D, 5,025,776, Cl. 126-194.000.

Bell, Bruce A.; and Landis, Donald G., to JPI Transportation Products, Inc. Vision enhanced method for making a full round bushing. 5,026,967, Cl. 219-121.640.

Bell, Donald R.; and Berris, Bruce C., to Ethyl Corporation. Process for preparing transition metal cyclopentadienyl carbonyl compounds. 5,026,885, Cl. 556-47.000.

Bell Helicopter Textron Inc.: *See—*

Ford, Russell W.; and Shepherd, David S., 5,026,254, Cl. 416-61.000.

Bell & Howell Phillipsburg Co.: *See—*

Moser, James R.; Warden, Gerald D.; and Bieber, Thomas E., 5,025,609, Cl. 53-266.100.

Bellagamba, Miro D. Golf training apparatus. 5,026,065, Cl. 273-191.00A.

Bellamy, John C.; Christensen, Richard L.; and Schroth, Charles K., to Data General Corporation. Integrated office controller (IOC). 5,027,344, Cl. 370-56.000.

Bendix Espana S.A.: *See—*

Guasch, Esteve C., 5,025,67' . Cl. 74-422.000.

Benko, Lawrence R.: *See—*

O'Neill, John F.; and Benko, Lawrence R., 5,027,391, Cl. 379-373.000.

Bennett, Barbara J.: *See—*

Anderson, Neal G.; Lust, David A.; Bennett, Barbara J.; Feldman, Alan F.; and Polomski, Robert E., 5,026,873, Cl. 548-533.000.

Benson, Anders B. Coin dispenser. 5,026,321, Cl. 453-54.000.

Benston, Phyllis S.; and Cotie, Michael E., to Weyerhaeuser Company. Liner for a helmet, hat, cap or other head covering. 5,025,504, Cl. 2-181.400.

Benveniste, Victor M., to Eaton Corporation. Elliptical ion beam distribution method and apparatus. 5,026,997, Cl. 250-492.200.

Benvenuto, Francis S.; and Silva, Jeff S. Method and composition for finishing structural building surfaces. 5,026,576, Cl. 427-355.000.

Berbari, Edward J.: *See—*

Albert, David E.; and Berbari, Edward J., 5,025,794, Cl. 128-696.000.

Beresford, Michael P.; and Redman, Richard P., to Imperial Chemical Industries PLC. Aqueous dispersion of an amino-epoxide reaction product. 5,026,743, Cl. 523-404.000.

Berg, Alan B.: *See—*

Fong, Jennifer L. C.; and Berg, Alan B., 5,026,295, Cl. 439-135.000.

Berg, Gerald G.: *See—*

Page, Dorothy R.; and Berg, Gerald G., 5,025,821, Cl. 135-112.000.

Berger, Barry D., to R. N. Koch, Inc. Modular display system 5,025,931, Cl. 211-13.000.

Berger, Harvey J.: *See—*

Daddona, Peter E.; Berger, Harvey J., and McEver, Rodger P., 5,026,537, Cl. 424-1.100.

Berger, Josef: *See—*

Neukermans, Armand P.; and Berger, Josef, 5,026,437, Cl. 148-33.300.

Bergeron, Margaret. Showcase for storing and displaying post-type earrings. 5,025,918, Cl. 206-45.140.

Berliner, Samuel, III, to He29050lems Incorporated. Ultrasonic fluid processing system. 5,026,167, Cl. 366-150.000.

Bernard, Francis S., to RCA Licensing Corporation. Motion detection apparatus as for an interlace to non-interlace scan converter. 5,027,201, Cl. 358-105.000.

Bernstein, Lawrence: *See—*

Goldstein, Neil; Bien, Fritz; and Bernstein, Lawrence, 5,026,991, Cl. 250-343.000.

Berris, Bruce C.: *See—*

Bell, Donald R.; and Berris, Bruce C., 5,026,885, Cl. 556-47.000.

Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G.; and Stephenson, Stanley V., to Halliburton Company. Slurry mixing apparatus. 5,026,168, Cl. 366-168.000.

Berti, Eugenio; and El-Sadi, Ashraf I., to Unisys Corp. Method for determining servo position data in a disk drive. 5,027,233, Cl. 360-77.020.

Bertolini, Guglielmo: *See—*

Braca, Giuseppe; Ricci, Alessandro; Sbrana, Glauco; Brunelli, Maurizio; Giusti, Aldo; Bertolini, Guglielmo; and Galletti, Anna M. R., 5,026,675, Cl. 502-159.000.

Besson, Bernard: *See—*

Leblanc, Jean-Claude; Ratton, Serge; Besson, Bernard; and Desmurs, Jean-Roger, 5,026,926, Cl. 568-779.000.

Betush, Frank A. Miniature compound lever pinch valve/regulator. 5,026,020, Cl. 251-5.000.

Beuther, Paul D., to Kimberly-Clark Corporation. Method for controlling basis weight in the production of stretchable webs. 5,026,458, Cl. 162-198.000.

Beyeler, Harry: *See—*

Riediker, Martin; Steiner, Eginhard, Beyeler, Harry; Sitek, Franciszek; and Husler, Rinaldo, 5,026,625, Cl. 430-281.000.

Beyer, Joachim; Koglin, Bernd; Rink, Rolf; and Roth, John-Edwin, to Bayer Aktiengesellschaft. Process for the disposal of waste 5,026,208, Cl. 405-129.000.

Bhowal, Prabir R.; and Thamboo, Samuel V., to Cooper Industries, Inc Fine grain titanium forgings and a method for their production. 5,026,520, Cl. 420-417.000.

Biale, John, to Union Oil Company of California. Polymeric opaque particles and process for making same. 5,026,782, Cl. 525-317.000.

Bianchetti, Alberto; Le Fur, Gerard; Simiand, Jacques; and Soubrie, Philippe, to Sanofi. Method of treatment of anxiety and anxio-depressive disorders. 5,026,716, Cl. 514-336.000.

Bianconi, Patricia A.; Lippard, Stephen J.; Rao, Chebrolu P.; and Vrtis, Raymond N., to Massachusetts Institute of Technology. Reductive coupling of carbon compounds via transition metal complexes. 5,026,884, Cl. 556-12.000.

Biasiotto Contrafforti Di Biasiotto Vittorio & C.s.a.s.: *See—*

Biasiotto, Vittorio; and Masiero, Leonildo, 5,025,576, Cl. 36-134.000.

Biasiotto, Vittorio; and Masiero, Leonildo, to Biasiotto Contrafforti Di Biasiotto Vittorio & C.s.a.s. Sole for sports shoes. 5,025,576, Cl. 36-134.000.

Bieber, Thomas E.: *See—*

Moser, James R.; Warden, Gerald D.; and Bieber, Thomas E., 5,025,609, Cl. 53-266.100.

Biekart, Frank T.; and Hilbrink, Hubertus E., to NPBI Nederlands Produktielaboratorium voor Bloedtransfusieapparatuur en Infusievloeistoffen B.V. One-piece slidable hose clamp. 5,026,019, Cl. 251-4.000.

Bielfeldt, Friedrich B., to Maschinenfabrik J. Dieffenbacher GmbH & Co. Collet surface structure for a hydraulic high-speed press. 5,025,652, Cl. 72-444.000.

Bien, Fritz: *See—*

Goldstein, Neil; Bien, Fritz; and Bernstein, Lawrence, 5,026,991, Cl. 250-343.000.

Bier, Mark E.; Cooks, Robert G.; and Stafford, George C., to Purdue Research Foundation; and Finnigan Corporation, a part interest Mass spectrometer with in-line collision surface means. 5,026,987, Cl. 250-281.000.

Biermann, Paul. Tram car wheel. 5,026,106, Cl. 295-1.000.

Bihari, Ferenc: *See—*

Bakos, Jozsef; Neil, Balint; Kollar, Laszlo ; Toros, Szilard; Eifert, Gvula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna; Kuronya, Istvan; Magyari, Istvan; Timar, Judit; Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.

Bikson, Benjamin; and Giglia, Salvatore, to Union Carbide Industrial Gases Technology Corporation. Fluid separation device. 5,026,479, Cl. 210-321.800.

Billot, Pierre: *See—*

Bourbon, Pierre; Lagny, Pierre; and Billot, Pierre, 5,026,561, Cl. 424-673.000.

Bingold, Steven R.: *See—*

Kleck, Jeffrey A.; Burkhardt, Andrew J.; and Bingold, Steven R., 5,027,058, Cl. 324-121.00R.

Biolandes Technologies: *See—*

Coutiere, Dominique, 5,026,549, Cl. 424-195.100.

Biopore, Inc.: *See—*

Hammerstedt, Roy H.; Keith, Alec D.; and Amann, Rupert P., 5,026,342, Cl. 600-35.000.

Bird, Douglas D.; and Uhrich, Daniel T., to Honeywell Inc. Setback thermostat with recovery start time selected non-linearly. 5,025,984, Cl. 236-46.00R.

Biresaw, Girma; Boland, Daniel J.; Paola, Vince A.; Evans, W Thomas; Kampert, William P.; and Abels, Ronald L., to Aluminum Company of America. Magnetic recording medium lubricated with a cholesteric liquid crystal. 5,026,577, Cl. 428-1.000.

Birr, Donald E.: *See—*

Manico, Joseph A.; and Birr, Donald E., 5,027,146, Cl. 354-299.000.

Bischoff, Daniel R.: *See—*

Faiks, Frederick S.; Anderson, Craig M.; and Bischoff, Daniel R., 5,026,117, Cl. 297-304.000.

Bischoff, Hilmar: *See—*

Goldmann, Siegfried; Bossert, Friedrich; Bischoff, Hilmar; Petzinna, Dieter; Puls, Walter; and Schlossmann, Klaus, 5,026,714, Cl. 514-302.000.

Bishop, Clinton L.: *See—*

White, Jack D., Jr.; and Bishop, Clinton L., 5,026,327, Cl. 474-152.000.

Biswas, Borendra K.: *See—*

Tidland, John W.; Schable, Reinhold A.; Vander Bom, Casey M., Biswas, Borendra K.; and Miller, William R., 5,025,693, Cl. 83-482.000.

Bittkau, Simon: *See—*

Przuntek, Horst; and Bittkau, Simon, 5,026,357, Cl. 604-258.000.

BL Technology Limited: *See—*

Selwood, Patrick G.; Maddison, Anthony N.; and Sheasby, Peter G., 5,026,612, Cl. 428-594.000.

Black, Blanche H.: *See—*

Floyd, William C.; Dragner, louis R., and Black, Blanche H., 5,026,746, Cl. 524-50.000.

Black & Decker Inc.: *See—*

Elligson, Daniel M., 5,025,903, Cl. 192-83.000.

Blackman, Stephen M., to Federal Paper Board Co., Inc. Double use express mail envelope. 5,025,980, Cl. 229-73.000.

Blackwelder, Maurice W.; and Hill, James A., to Owens-Illinois Plastic Products Inc. Method for forming a rolled rim in a fabricated thermoplastic container. 5,026,338, Cl. 493-158.000.

Blaese, Herbert R. Inside window antenna. 5,027,128, Cl. 343-713.000.

Blain, David A.; Page, Nancy M.; and Young, Lewis B., to Mobil Oil Corporation Olefin oligomerization with surface modified zeolite catalyst. 5,026,933, Cl. 585-7.000.

Blake, Terence G.: *See—*

Matloubian, Mishel; Chen, Cheng-Eng D.; and Blake, Terence G., 5,026,656, Cl. 437-41.000.

Blanchard, Eric Y.: *See—*

Bares, Jean-Paul Y.; and Blanchard, Eric Y., 5,027,065, Cl. 324-204.000.

Blatt, Eli, to Ultra Creative Corporation. Plastic film bag with special flap arrangement. 5,026,174, Cl. 383-86.000.

Blondeau, Rene; Marty, Claude; and Ansquer, Patrick, to Compagnie de Raffinage et de Distribution Total France. Process for the fixed-bed sweetening of petroleum fractions. 5,026,474, Cl. 208-189.000.

Bloomquist, Robert O.: *See—*

Switall, Thomas G.; and Bloomquist, Robert O., 5,025,722, Cl. 101-147.000.

Board of Reagents, The University of Texas System: *See—*

Albrecht, Thomas B.; Albrecht, Thomas E.; and Fleischmann, William R., 5,026,544, Cl. 424-85.400.

Board of Regents, The University of Texas System: *See—*

Bowman, Barbara H.; and Yang, Funmei, 5,026,651, Cl. 435-320.100.

Jones, Richard A.; Cowley, Alan H.; and Tasch, Al F., Jr., 5,026,575, Cl. 427-255.000.

Bock, Gustav: *See—*

Mronga, Norbert; Ostertag, Werner; and Bock, Gustav, 5,026,429, Cl. 106-400.000.

Bock, Jan: *See—*

Peiffer, Dennis G.; Bock, Jan; and Elward-Berry, Julie, 5,026,490, Cl. 252-8.510.

Bock, Mark G.; Freidinger, Roger M.; and DiPardo, Robert M., to Merck & Co., Inc. Peptide oxytocin antagonists. 5,026,703, Cl. 514-247.000.

Bodenseekwerk Perkin Elmer GmbH: *See—*

Huber, Bernhard, 5,026,652, Cl. 436-81.000.

Boehringer Mannheim GmbH: *See—*

Sponer, Gisbert; Reicke, Ulrich; and Nelboeck-Hochstetter, Michael, 5,026,706, Cl. 514-255.000.

Boehringer Werkzeugmaschinen GmbH: *See—*

Mayer, Theo, 5,025,689, Cl. 82-106.000.

Boeing Company, The: *See—*

Faville, Paul E., 5,026,165, Cl. 356-386.000.

Fitzsimmons, George W.; and Lamberty, Bernard J., 5,027,124, Cl. 342-362.000.

LaRue, George S.; and Williams, Timothy J., 5,027,007, Cl. 307-443.000.

Tobey, Jon B., 5,026,407, Cl. 55-185.000.

Boersma, Frans P.: *See—*

Dykstra; and Boersma, Frans P., 5,026,344, Cl. 604-93.000.

Boettcher, Andreas: *See—*

Rehmer, Gerd; Boettcher, Andreas; Pfoehler, Peter; Aydin, Oral; and Nestler, Gerhard, 5,026,806, Cl. 526-316.000.

Boger, Manfred; Drabek, Jozef; and Ehrenfreund, Josef, to Ciba-Geigy Corporation. Anilinophenylthioureas, compositions containing them, and the use thereof in pest control. 5,026,730, Cl. 514-586.000.

Bohlendorf, Bettina; Bedorf, Norbert; Hofle, Gerhard; Schummer, Dietmar; and Sutter, Marius, to Ciba-Geigy Corporation. Process for preparing soraphen compounds. 5,026,878, Cl. 549-267.000.

Bohus, Peter: *See—*

Bakos, Jozsef; Neil, Balint; Kollar, Laszlo ; Toros, Szilard; Eifert, Gvula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna; Kuronya, Istvan; Magyari, Istvan; Timar, Judit; Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.

Boix-Iglesias, Jose: *See—*

Vega-Noverola, Armando; Boix-Iglesias, Jose; Prieto-Soto, Jose; and Moragues-Mauri, Jacinto, 5,026,858, Cl. 546-224.000.

Boland, Daniel J.: *See—*

Biresaw, Girma; Boland, Daniel J.; Paola, Vince A.; Evans, W. Thomas; Kampert, William P.; and Abels, Ronald L., 5,026,577, Cl. 428-1.000.

Boliden Contech AB: *See—*

Jonsson, Jan L.; and Nilsson, Sten A., 5,026,535, Cl. 423-525.000.

Bolin, Odell F.: *See—*

Lytton, Kenneth G.; Bolin, Odell F.; and Koehler, Robert J., 5,025,532, Cl. 19-80.00R.

Bollens, Eric; Szonyi, Francois; and Cambon, Aime, to Societe Atochem. Polyfluoroalkyl nitrogen compounds, processes for their preparation and their use. 5,026,910, Cl. 564-27.000.

Bomgardner, Charles T.; and Dumler, D. Bradley, to FM Industries, Inc. Rail car cushion slider valve. 5,025,938, Cl. 213-43.000.

Bonato, Marc; and Eck, Charles, to Societe de Consels de Recherches et d'Applications Scientifiques. Stereospecific process for the preparation of furo[3,4-c]pyridine, enantiomer, compounds thus obtained and therapeutical compositions thereof. 5,026,855, Cl. 546-116.000.

Bonkohara, Katsutoshi: *See—*

Tanabe, Kazushige; and Bonkohara, Katsutoshi, 5,026,478, Cl. 210-232.000.

Bonnaval-Lamothe, Michel; and Marchand, Renaud, to Bonnaval-Lamothe, Michel. Process for simultaneously checking the authenticity of information media and the authenticity of the information itself. 5,027,113, Cl. 340-825.340.

Bonneville, Marc E.: *See—*

Thomas, Terence N.; Bonneville, Marc E., and Wadsworth, Douglas C., 5,027,392, Cl. 379-388.000.

Bonyhard, Peter I.; Cheng, David C.; Glover, William J.; Hendrix, Howard A.; Ward, Ernest S.; and Williams, John W., to International Business Machines. Sputtering apparatus. 5,026,470, Cl. 204-298.160.

Booth, Bruce L., to Du Pont de Nemours, E. I., and Company. Moisture sealing of optical waveguide devices with doped silicon dioxide. 5,026,135, Cl. 350-96.120.

Bopp, Richard C., to General Electric Company UV light stabilizer composition comprising cyclic aliphatic epoxy UV screener, and polyalkyldipiperidine (HALS) compounds. 5,026,751, Cl. 524-102.000.

Bordoni, Maurice E.: *See—*

Lieberman, Ephraim; Bordoni, Maurice E.; and Thornton, Alfred K., 5,026,538, Cl. 424-1.100.

Borella, Henry M.: *See—*

Noel, Bruce W.; Borella, Henry M.; Cates, Michael R.; Turley, W Dale; Macarthur, Charles D.; and Cala, Gregory C., 5,026,170, Cl. 374-29.000.

Borg-Warner Automotive Transmission & Engine Components Corporation: *See—*

Mott, Philip J.; Updike, Roger K., Sr.; and White, David C., 5,026,332, Cl. 474-242.000.

Borger, Herbert, to Carl Freudenberg, Firma. Belt-driven water pump. 5,026,253, Cl. 415-229.000.

Boros, Peter: *See—*

Bakos, Jozsef, Neil, Balint; Kollar, Laszlo ; Toros, Szilard, Eifert, Gvula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna; Kuronya, Istvan; Magyari, Istvan; Timar, Judit; Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.

Borowiak, Herve: *See—*

Bugaut, Andree; and Borowiak, Herve, 5,026,401, Cl. 8-408.000.

Borzatta, Valerio: *See—*

Cantatore, Giuseppe; Borzatta, Valerio; and Masina, Franca, 5,026,749, Cl. 524-99.000.

Bose Corporation: *See—*

Froeschle, Thomas A., 5,025,885, Cl. 181-156.000.

Short, William; Ickler, Christopher; Holl, Timothy; and Keezer, William, 5,027,403, Cl. 381-24.000.

Bose, Sudhangshu; and Gorman, Michael E., to International Fuel Cells Corporation. Method of making a final cell electrode assembly substrate. 5,026,402, Cl. 29-623.500.

Bossert, Friedrich: *See—*

Goldmann, Siegfried; Bossert, Friedrich; Bischoff, Hilmar; Petzinna, Dieter; Puls, Walter; and Schlossmann, Klaus, 5,026,714, Cl. 514-302.000.

Bothe, Lothar: *See—*

Dinter, Peter; Bothe, Lothar; and Gribbin, John D., 5,026,463, Cl. 204-164.000.

Janocha, Siegfried; Schloegl, Gunter; Crass, Guenther; and Bothe, Lothar, 5,026,592, Cl. 428-204.000.

Botsolas, Carol: *See—*

Botsolas, Chris J., 5,025,836, Cl. 138-110.000.

Botsolas, Chris J., to Botsolas, Carol. Pipe fitting cover for covering pipe fitting. 5,025,836, Cl. 138-110.000.

Boublik, Jaroslav H.; Rivier, Jean E. F.; Brown, Marvin R.; and Scott, Neal A., to Salk Institute for Biological Studies, The; and Reagents of the University of California, The. NPY peptide analogs. 5,026,685, Cl. 514-13.000.

Bouchard, Andre C.; Lagushenko, Radomir; and Maya, Jakob, to GTE Products Corporation. Glow discharge lamp having zero anode voltage drop. 5,027,030, Cl. 313-619.000.

Boudreau, Robert A.; and LaCourse, Joanne S., to GTE Laboratories Incorporated. Multi-fiber alignment package for tilted facet optoelectronic components. 5,026,138, Cl. 350-96.200.

Boulter, Alan J. W. Sea anchor assembly for kayak. 5,025,746, Cl. 114-311.000.

Boulton, Peter I. P.; and Lee, Ernest S., to University of Toronto Innovations Foundation, The. Local area network. 5,027,342, Cl. 370-16.000.

Bourbon, Pierre; Lagny, Pierre; and Billot, Pierre, to Atlantic Pharmaceutical Products Limited. Method which inhibits or destroys at least one unicellular living organism containing a quaternary ammonium fluoride. 5,026,561, Cl. 424-673.000.

Bourdelaise, Robert A.; Harris, David B.; Harris, Denise B ; and Olenick, John A., to Westinghouse Electric Corp. Cavity-down chip carrier with pad grid array. 5,027,191, Cl. 357-74.000.

Bourgeous, Clarence G.: *See—*

Oftedal, Teryl M.; Bourgeous, Clarence G.; Morita, Haruyuki; and Miyaji, Masayoshi, 5,026,335, Cl. 475-198.000.

Boustta, Mahfoud; Huquet, Jovanka; and Vert, Michel, to Sanofi. Polymers of citric acid and diamines, a process for their preparation and their uses, in particular as carriers of drugs. 5,026,821, Cl. 528-350.000.

Bowers, David W. Camera support. 5,027,141, Cl. 354-82.000.

Bowman, Barbara H.; and Yang, Funmei, to Board of Regents, The University of Texas System. Methods and compositions for the production of human transferrin. 5,026,651, Cl. 435-320.100.

Bowman, Gary: *See—*

Ortolano, Ralph J.; Ball, Kenneth A.; and Bowman, Gary, 5,026,032, Cl. 269-43.000.

BP America Inc.: *See—*

Hendrix, Raymond R., 5,026,099, Cl. 285-315.000.

Hunt, Patricia K.; and Zemel, Bernard, 5,027,379, Cl. 378-4.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Braat, Josephus J. M., to U.S. Philips Corporation. Projection lens system. 5,026,149, Cl. 350-432.000.
- Braca, Giuseppe; Ricci, Alessandro; Sbrana, Glauco; Brunelli, Maurizio; Giusti, Aldo; Bertolini, Guglielmo; and Galletii, Anna M. R., to Eniricerche S.p.A. Polymerization catalyst, the process for its preparation and its use in ethylene homo and copolymerization. 5,026,675, Cl. 502-159.000.
- Bradshaw, Andrea E.; Baum, David M.; and Rivera, Dionne A., to Motorola, Inc. Method of selecting the most cost effective cellular service plan provided by cellular telephone resellers to multi-line customers. 5,027,388, Cl. 379-112.000.
- Brahms, Martin; Chahabadi, Ziaedin; and Ocker, Johannes, to ke kommunikations-Elektronik GmbH & Co. Apparatus for bidirectional transmission of optical signals. 5,027,434, Cl. 455-606.000.
- Brandes, Wilhelm: *See—*
  - Lunkenheimer, Winfried; Brandes, Wilhelm; and Hassler, Gerd, 5,026,710, Cl. 514-275.000.
- Branson Ultrasonics Corporation: *See—*
  - Mainolfi, Sylvio J.; Patry, Gerald F.; and Pensiero, Henry A., 5,026,445, Cl. 156-73.500.
- Branthover, John B.: *See—*
  - Zeitlin, Dan B.; Branthover, John B.; Smith, Brian H.; Piloto, Andrew J.; Lengel, Theresa M.; Carlson, Robert R., Jr.; Shum, Lanson Y.; Hodges, Paul D., Jr.; and Harris, Denise B., 5,027,255, Cl. 361-395.000.
- Brass, Robert L. Information organizing system. 5,026,196, Cl. 402-79.000.
- Braun Aktiengesellschaft: *See—*
  - Firatli, Ahmet; Burger, Diethard; Amsel, Klaus; and Lindstaedt, Bernd, 5,025,578, Cl. 38-93.000.
- Braun, Stephen A., to Deere & Company. Fuel tank with stepped interior gauge. 5,025,618, Cl. 56-16.700.
- Brcich, Joseph A.: *See—*
  - Agrawal, Om P.; and Brcich, Joseph A., 5,027,315, Cl. 364-900.000.
- Brewer, Alan W., to Bunn-O-Matic Corporation. Tea maker. 5,025,714, Cl. 99-300.000.
- Brewer, Alan W.: *See—*
  - Knepler, John T.; Anson, James H., and Brewer, Alan W., 5,026,969, Cl. 219-421.000.
- Bricker, Jeffery C., to UOP. Aromatization of methane using zeolite incorporated in a phosphorus-containing alumina. 5,026,937, Cl. 585-415.000.
- Bridge, Martin: *See—*
  - Oakes, Graham; Marrison, Terrence; and Bridge, Martin, 5,025,975, Cl. 228-127.000.
- Bridgestone Corporation: *See—*
  - Ueda, Hiroshi; Yoshigai, Hisaaki; and Masunaga, Mikio, 5,025,844, Cl. 152-454.000.
- Brimhall, Frank E. Fence rail and method and apparatus of manufacturing the same. 5,025,842, Cl. 144-367.000.
- Brinker, Barry; and Busse, John E., to Totes', Incorporated. Portable directory and note pad tray. 5,025,919, Cl. 206-214.000.
- Bristot, Pierre: *See—*
  - Zermati, Charles; and Bristot, Pierre, 5,026,330, Cl. 474-138.000.
- British Aerospace plc: *See—*
  - Strickland, George, 5,025,974, Cl. 228-107.000.
- British Aerospace Public Limited Company: *See—*
  - Dobie, William B. S.; and Penistone, Nigel, 5,026,004, Cl. 244-53.00B.
- British Columbia Cancer Foundation, The: *See—*
  - Skov, Kirsten A.; Farrell, Nicholas P.; and Chaplin, David J., 5,026,694, Cl. 514-184.000.
- British Petroleum Company p.l.c., The: *See—*
  - Brown, Stephen L.; and Lucy, Andrew R., 5,026,674, Cl. 502-154.000.
  - Caldwell, Trevor D.; and Villanueva, Carlos, 5,025,865, Cl. 166-366.000.
  - Howard, Mark J., 5,026,946, Cl. 585-500.000.
  - Lodge, Philip G.; and Smith, David J. H., 5,026,904, Cl. 560-232.000.
- British Telecommunications public limited company: *See—*
  - Westbrook, Leslie D., 5,026,662, Cl. 437-129.000.
- Broadbent, James Meredyth: *See—*
  - Kosuge, Takuo; Tsuji, Kuniro; Ishida, Hitoshi; and Kosuge, Yoshiki, 5,026,883, Cl. 552-542.000.
- Broaddus, James E.: *See—*
  - Pitts, Alan J.; Case, Leonard R.; and Broaddus, James E., 5,027,267, Cl. 364-172.000.
- Broadhurst, John A. Modular ice machine. 5,025,641, Cl. 62-347.000.
- Brochhagan, Thomas: *See—*
  - Leone, Richard J.; Cummins, Robert F.; Vitiello, Joseph; and Brochhagan, Thomas, 5,025,895, Cl. 187-105.000.
- Broder, Samuel: *See—*
  - Yarchoan, Robert; Mitsuya, Hiroaki; and Broder, Samuel, 5,026,687, Cl. 514-45.000.
- Bromley, Eric. Electronic baseball game apparatus. 5,026,058, Cl. 273-93.00C.
- Brooks, Dee W.; Summers, James B.; and Holms, James H., to Abbott Laboratories. Lipoxygenase inhibiting compounds. 5,026,729, Cl. 514-575.000.
- Brother Kogyo Kabushiki Kaisha: *See—*
  - Endo, Yoshinori, 5,027,197, Cl. 358-76.000.
  - Horie, Fujio; and Inoue, Tomo, 5,025,740, Cl. 112-456.000.
  - Ishida, Kazuhito; and Horaguchi, Yoichi, 5,027,155, Cl. 355-229.000.
  - Kamiya, Osamu, 5,025,737, Cl. 112-296.000.
  - Kuzuya, Susumu, Hayashi, Shigeyuki; Kimura, Hiroaki; Suzuki, Tsutomu; Sonobe, Katsuyoshi; Nakata, Takashi; and Hatta, Naoyuki, 5,026,039, Cl. 271-11.000.
  - Sunda, Fumihiro, 5,027,220, Cl. 358-244.000.
  - Suzuki, Hiroshi, 5,026,182, Cl. 400-208.000.
  - Watanabe, Toshiya; and Kawanabe, Tasuku, 5,026,961, Cl. 219-69.110.
  - Yamamori, Masayoshi; and Nakashima, Yoshihiko, 5,025,592, Cl 51-165.710.
- Brown, Alan W. Surgical staple. 5,026,390, Cl. 606-221.000.
- Brown, Fred: *See—*
  - Hargreaves, Kenneth M.; Dubner, Ronald; and Brown, Fred, 5,025,796, Cl. 128-742.000.
- Brown, James L., to Haas Cabinet Co., Inc. Method of attaching and adjusting a cabinet drawer guide assembly. 5,025,545, Cl. 29-434.000.
- Brown, John M. Partially fretted fingerboard. 5,025,696, Cl. 84-314.00R.
- Brown, Marvin R : *See—*
  - Boublik, Jaroslav H.; Rivier, Jean E. F.; Brown, Marvin R.; and Scott, Neal A., 5,026,685, Cl 514-13.000.
- Brown, Roger J.: *See—*
  - Giese, Erik O.; and Brown, Roger J., 5,025,573, Cl. 36-30.00R.
- Brown, Stephen L.; and Lucy, Andrew R., to British Petroleum Company p.l.c., The. Process for preparing polyketones. 5,026.674, Cl. 502-154.000.
- Browning, Henry A. Method of controlling fungus, mites, worms, termites, nematodes and other insects. 5,026,734, Cl. 514-723.000.
- Bruderer AG: *See—*
  - Messner, Helmut, 5,026,336, Cl. 475-224.000.
- Brug, James A.: *See—*
  - Gill, Hardayal S.; and Brug, James A., 5,027,243, Cl. 360-113.000.
- Brunelli, Maurizio: *See—*
  - Braca, Giuseppe; Ricci, Alessandro; Sbrana, Glauco; Brunelli, Maurizio; Giusti, Aldo; Bertolini, Guglielmo; and Galletii, Anna M. R., 5,026,675, Cl. 502-159.000.
- Brunskill, Michael R.; Manus, George R.; and Monegan, Edgar A., to Allied-Signal Inc. Fluid conditioning apparatus and system. 5,025,642, Cl. 62-402.000.
- Brussalis, Stacy A., Heston, Jeffrey W.; and Yang, Stewart L., to General Motors Corporation. Electrical connector with connector position assurance device. 5,026,298, Cl. 439-358.000.
- BTR plc a British Company: *See—*
  - Court, Peter T., 5,026,031, Cl. 267-140.000.
- BTS Broadcast Television Systems GmbH: *See—*
  - Fell, Wolfgang, 5,027,231, Cl. 360-71.000.
  - Wischermann, Gerhard, 5,027,318, Cl. 365-78.000.
- Buchan, Gavin M.; and Ferguson, Ian J., to Minnesota Mining and Manufacturing Company. Bidentate chelating monomers and polymers. 5,026,860, Cl. 546-271.000.
- Buchholz, Bernard; Dzierza, Edward J.; and Baltrus, John R., to Atochem North America, Inc. Process for the manufacture of dialkyl disulfides. 5,026,915, Cl. 568-26.000.
- Buda, Charles: *See—*
  - Holland, Richard J.; and Buda, Charles, 5,026,400, Cl. 8-137.000.
- Budapesti Vegyimuvek: *See—*
  - Bakos, Jozsef; Neil, Balint; Kollar, Laszlo ; Toros, Szilard; Eifert, Gvula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna; Kuronya, Istvan; Magyari, Istvan; Timar, Judit; Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.
- Budd Company, The: *See—*
  - Roxy, Frank W , 5,026,033, Cl. 269-45.000.
- Buff, Ernest D.: *See—*
  - Baughman, Ray H ; Buff, Ernest D.; Eckhardt, Helmut; and Fuchs, Gerhard H., 5,025,602, Cl. 52-171.000.
- Bufton, Linda L.: *See—*
  - Litt, Michael; and Bufton, Linda L., 5,026,837, Cl. 536-27.000.
- Bugaut, Andree; and Borowiak, Herve, to L'Oreal. Dyeing compositions for kerating fibres based on nitroanilines and nitroanilines for use therein. 5,026,401, Cl. 8-408.000.
- Bugge, Mogens. Device intended to be used for opening the chest during surgery. 5,025,779, Cl. 128-20.000.
- Bull HN Information Systems Inc.: *See—*
  - Curley, John L.; Hirsch, Thomas S.; and Wurz, David A., 5,027,271, Cl. 364-200.000.
  - Kosteva, Glenn P.; Lin, Peili; Raquin, Michel M.; and Robidoux, Raymond C., 5,027,300, Cl. 364-715.080.
- Bunchkowski, Duane J.: *See—*
  - Kotecki, Michael R.; and Bunchkowski, Duane J., 5,025,987, Cl. 238-351.000.
- Bunn, Arthur H.; and Lang, Frank J., to Bunn-O-Matic Corporation. Coffee decanter with integral handle. 5,025,939, Cl. 215-100.00A.
- Bunn-O-Matic Corporation: *See—*
  - Brewer, Alan W., 5,025,714, Cl. 99-300.000.
  - Bunn, Arthur H.; and Lang, Frank J., 5,025,939, Cl. 215-100.00A.
  - Knepler, John T.; Anson, James H.; and Brewer, Alan W., 5,026,969, Cl. 219-421.000.
- Burey, Bernard P.; and Barcon, Jean-Paul. Multiple station machine for brushing or cleaning footwear. 5,025,528, Cl. 15-302.000.
- Burger, Diethard: *See—*
  - Firatli, Ahmet; Burger, Diethard; Amsel, Klaus; and Lindstaedt, Bernd, 5,025,578, Cl. 38-93.000.
- Burgess, Keith E.: *See—*
  - Crawford, James A., Jr.; and Burgess, Keith E., 5,026,595, Cl. 428-246.000.

- Burke, Patrick E.; Dudley, Richard F.; and Daniel, Ralph S., to Guthrie Canadian Investments Limited. Sensitive fault detection system for parallel coil air core reactors. 5,027,099, Cl. 336-60.000.
- Burkhardt, Andrew J.: *See—*
  - Kleck, Jeffrey A.; Burkhardt, Andrew J.; and Bingold, Steven R., 5,027,058, Cl. 324-121.00R.
- Burroughs, James E., to Kendall Company, The. Adapter with antiseptic agent. 5,026,359, Cl. 604-326.000.
- Burst, Hermann, to Dr. Ing. h.c.F. Porsche AG. Heating system for a motor vehicle with an air-cooled rear engine. 5,025,986, Cl. 237-12.30A.
- Burton, John H.; and Staehle, Bradford G., to American Medical Systems, Inc. Stent placement instrument and method. 5,026,377, Cl. 606-108.000.
- Busch, Dieter, to Pruftechnik Dieter Busch & Partner GmbH & Co. Inductively heated ring puller. 5,026,956, Cl. 219-10.491.
- Bushnell, Michael J., to Imperial Chemical Industries PLC. Insecticidal compounds. 5,026,727, Cl. 514-520.000.
- Busse, John E.: *See—*
  - Brinker, Barry; and Busse, John E., 5,025,919, Cl. 206-214.000.
- Bustamante, Carlos: *See—*
  - Allen, Fritz S.; Bustamante, Carlos; Niemczyk, Thomas M.; and Dorman, Burton P., 5,026,159, Cl. 356-318.000.
- Butkovich, Michael S.; LaLonde, Gerard V.; and Ginsburgh, Irwin, to Amoco Corporation. Anti-theft device for tank openings. 5,025,946, Cl. 220-86.300.
- Butler Associates: *See—*
  - Mesheau, John S., 5,026,488, Cl. 210-799.000.
- Butler, John D., to Mechtrix Corporation. Interlocking die-type tooling for stripping insulated electrical conductors. 5,025,687, Cl. 81-9.510.
- Butler, Marcus: *See—*
  - Klainer, Stanley M.; Dandge, Dileep K.; Butler, Marcus; and Goswami, Kisholoy, 5,026,139, Cl. 350-96.290.
- Butterfield, Donald B.; and Sgarzi, Alcide, to AIL Corporation. Method and apparatus for electrochemical machining of spray holes in fuel injection nozzles. 5,026,462, Cl. 204-129.550.
- Butterwick, Gerry A., Sr. Fishing rod holder. 5,025,584, Cl. 43-21.200.
- Buttery, Michael H., to Emaco Ltd. Cooking appliances. 5,026,970, Cl 219-465.000.
- Byer, Robert L.: *See—*
  - Kozlovsky, William J.; Nabors, Charles D ; and Byer, Robert L., 5,027,361, Cl. 372-22.000.
  - Nabors, C. David; and Byer, Robert L., 5,027,360, Cl. 372-18.000.
- Byerley, Mark S.: *See—*
  - Smith, Ian; Simerly, Carmin C.; Hilty, Jim E.; and Byerley, Mark S., 5,025,917, Cl. 198-842.000.
- Byers, Gary L.: *See—*
  - Byers, Timothy W.; and Byers, Gary L., 5,025,543, Cl. 29-401.100.
- Byers, Timothy W.; and Byers, Gary L., to Creative Sales & Mfg. Co., Inc. Method of preparing a support mechanism for vehicle side view mirror. 5,025,543, Cl. 29-401.100.
- C. J. Management, Ltd.: *See—*
  - Jensen, Claus; and Nunn, Leslie M., 5,026,176, Cl. 384-53.000.
- C. R. Bard, Inc.: *See—*
  - Kiezulas, Margaret P., 5,026,607, Cl. 428-423.700.
- Cadbury Schweppes plc: *See—*
  - Evans, Roger; Jee, Michael H.; Sander, Nigel H.; Smith, Ian H.; and Gibson, Raymond K., 5,026,548, Cl. 424-195.100.
- Cadema Medical Products, Inc.: *See—*
  - Lieberman, Ephraim; Bordoni, Maurice E.; and Thornton, Alfred K., 5,026,538, Cl. 424-1.100.
- Cadona, Luciano: *See—*
  - Li Bassi, Giuseppe; Cadona, Luciano; and Nicora, Carlo, 5,026,740, Cl. 522-14.000.
- Cala, Gregory C.: *See—*
  - Noel, Bruce W.; Borella, Henry M.; Cates, Michael R.; Turley, W. Dale; Macarthur, Charles D.; and Cala, Gregory C., 5,026,170, Cl 374-29.000.
- Caldwell, Trevor D.; and Villanueva, Carlos, to British Petroleum Company p.l.c., The. Subsea oil production system. 5,025,865, Cl. 166-366.000.
- California Institute of Technology: *See—*
  - Grubbs, Robert H.; Dougherty, Dennis A.; Swager, Timothy M.; and Ginsburg, Eric J., 5,026,783, Cl. 525-326.100.
- Call Management Products, Inc.: *See—*
  - O'Neill, John F.; and Benko, Lawrence R., 5,027,391, Cl. 379-373.000.
- Callahan, Robert M.; and Hempel, Bruce C., to International Business Machines Corporation. Application exit for potentially pickable primitives in a graphics system. 5,027,291, Cl. 364-521.000.
- Callander, Keith A., to Polysar Limited. Synthetic clay. 5,026,744, Cl. 524-27.000.
- Callaway, James J. Universal intravenous arm support. 5,025,801, Cl. 128 877.000.
- Camarota, Richard J., to ITC Incorporated. Latched detachable leg assembly. 5,026,010, Cl. 248-188.100.
- Cambon, Aime: *See—*
  - Bollens, Eric; Szonyi, Francois; and Cambon, Aime, 5,026,910, Cl. 564-27.000.
- Cambridge Applied Systems, Inc.: *See—*
  - Wright, Hubert A., 5,025,656, Cl. 73-32.00A.
- Cameron, Robert W. Aerial distress flare. 5,025,729, Cl. 102-336.000.
- Campbell, John S.; and Foulkes, Michael E., to Cookson Group PLC. Curing composition for polysulphide polymers. 5,026,504, Cl. 252-186.430.
- Campbell, Kenneth D., to Union Carbide Chemicals and Plastics Technology Corporation. Perovskite catalysts for oxidative coupling. 5,026,945, Cl. 585-500.000.
- Canada, Her Majesty The Queen in right of, as represented by the Minister of Agriculture: *See—*
  - Halliday, Leslie J., 5,026,571, Cl. 426-636.000.
  - Kucey, Reginald M. N., 5,026,417, Cl. 71-35.000.
- Canal, Lamia K.: *See—*
  - Ryon, Randall C.; Canal, Lamia K.; and Tickner, Donald R., 5,026,044, Cl. 271-227.000.
- Candore, Amedeo, to Morton International, Inc. Temperature sensor for measuring the surface temperature of a rotating roll. 5,026,172, Cl. 374-153.000.
- Canich, Jo Ann M., to Exxon Chemical Patents Inc. Process for producing crystalline poly-α-olefins with a monocyclopentadienyl transition metal catalyst system. 5,026,798, Cl. 526-127.000.
- Cannon, Robert W., to Cannon, Robert W. Method and apparatus for incubating and hatching eggs. 5,025,619, Cl. 119-41.000.
- Canon Kabushiki Kaisha: *See—*
  - Chiba, Yuji; Fujioka, Hidehiko; Mizusawa, Nobutoshi; Kariya, Takao; and Shimoda, Isamu, 5,026,239, Cl. 414-217.000.
  - Hasegawa, Kenji; Mori, Takahiro; and Higuma, Masahiko, 5,027,131, Cl. 346-1.100.
  - Hirabayashi, Hiromitsu; Kusaka, Kensaku; and Mizutani, Morikazu, 5,026,276, Cl. 432-59.000.
  - Imataki, Hiroyuki; Hiraoka, Mizuho; Ogawa, Yoshihiro; Yoshino, Hitoshi; Ichikawa, Sachiko; and Kato, Seijiro, 5,026,623, Cl. 430-270.000.
  - Ishizuka, Koh; Nishimura, Tetsuharu; Tsukiji, Masaaki; and Ishii, Satoshi, 5,026,985, Cl. 250-231.160.
  - Kaneda, Naoya, 5,027,147, Cl. 354-400.000.
  - Komiya, Yutaka, 5,027,153, Cl. 355-200.000.
  - Kume, Nobuyuki; Miyata, Masanori; and Nakazawa, Nobuo, 5,027,161, Cl. 355-305.000.
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  - Drucker, Alan S., 5,025,640, Cl. 62-324.600.
- Carruba, Samuel C., to CBS Engineering, Inc Offshore support structure method and apparatus. 5,026,210, Cl. 405-203.000.
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  - Jarvis, J. Michael; Bass, Andrew F.; and Sherman, James B., 5,027,341, Cl. 370-13.000.
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  - Lizzi, Phillip J.; and Capone, Paul A., 5.027,106, Cl. 340-572.000.
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  - Chiue, Tzu-Ching; and Chen, Yarn-Chern, 5,027,389, Cl. 379-361.000.
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  - Bonyhard, Peter I.; Cheng, David C.; Glover, William J., Hendrix, Howard A.; Ward, Ernest S.; and Williams, John W., 5,026,470, Cl. 204-298.160.
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  - Dixon, Richard P.; and Kedzierski, Leonard J., III, 5,026,540, Cl. 424-60.000.

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  - Vierod, Richard P.; Cheskis, Harvey P.; and Tyler, Derek E., 5,026,433, Cl. 148-2.000.
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  - Donovan, Paul M.; and Chia, Swee T., 5,027,109, Cl. 340-706.000.
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  - Chan, Ronald E.; and Colby, Gerald F., 5,025,735, Cl. 108-55 300.
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  - Kobayashi, Kazuyuki; and Takahashi, Kouji, 5,025,764, Cl. 123-198.00R.
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  - Boger, Manfred, Drabek, Jozef; and Ehrenfreund, Josef, 5,026,730, Cl. 514-586.000.
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  - Phillips, Paul A.; and King, Eddie W., 5,027,283, Cl 364-479.000.
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  - Dutt, Bulusu V.; and Abbott, Peter G., 5,026,660, Cl. 437-80.000.
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  - Gaffney, Thomas R.; and Coe, Charles G., 5,026,532, Cl. 423-328.000.
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  - McCabe, Ralph P.; and McAuliffe, Lawrence, Jr., 5,025,682, Cl. 74-606.00R.
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  - Hanson, Merle E.; and Thorson, Lewis D., 5,025,859, Cl. 166-252.000.
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  - Giese, Erik O.; and Brown, Roger J., 5,025,573, Cl. 36-30.00R
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  - Culley, Paul R., 5,027,313, Cl. 364-900.000.
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  - Neiberger, Denny W., 5,026,572, Cl. 426-641.000.
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  - Gloor, Hans, 5,025,851, Cl. 164-423.000.
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  - Gueret, Jean-Louis; Contamin, Jean-Claude, and Ayache, Liliane, 5,026,552, Cl. 424-401.000.
- Control Data Corporation: *See—*
  - Stoica, Susana, 5,027,355, Cl. 371-22.100.
- Cook, Peter B. L. Manufacturing plaster articles. 5,026,428, Cl. 106-38.300.
- Cooks, Robert G.: *See—*
  - Bier, Mark E.; Cooks, Robert G.; and Stafford, George C., 5,026,987, Cl. 250-281.000.
- Cookson Group PLC: *See—*
  - Campbell, John S.; and Foulkes, Michael E., 5,026,504, Cl. 252-186.430.

VOL
1127
ISS
4
JE
25
1991
UMI

- Cooley, Roderick A.; and Cronshaw, ANthony J , to Xerox Corporation. Color detection and/or recognition apparatus. 5,027,195, Cl. 358-75.000.
- Cooper Industries: *See—*
  - Newton, Charles M.; and Urban, Paul L., 5,025,973, Cl. 228-55.000.
- Cooper Industries, Inc.: *See—*
  - Bhowal, Prabir R.; and Thamboo, Samuel V., 5,026,520, Cl 420-417.000.
  - Hoes, Larry M.; and Hynes, Joseph H , 5,026,074, Cl 277-27.000.
  - Kusmer, Raymond J., 5,027,307, Cl 364-709 020.
- Coordes, Duane A.: *See—*
  - Hook, Richard W.; and Coordes, Duane A., 5,025,951, Cl 221-13.000.
- Coors Brewing Company: *See—*
  - Dorfman, Jan L., 5,026,237, Cl. 413-43.000.
- Corazonix Corporation: *See—*
  - Albert, David E.; and Berbari, Edward J., 5,025,794, Ci. 128-696.000.
- Cordier, Ann. Pet dryer apparatus. 5,025,572, Cl. 34-202.000.
- Cordle, Kevin G.; Martin, Thomas F.; and Austin, James E., to General Instrument Corporation. Signal switching apparatus. 5,027,399, Cl 380-7.000.
- Corfits, William D.; Holahan, Maurice F.; Martino, Susan J ; Motschman, David R.; and Thorpe, James R., to International Business Machines Corporation. Apparatus for cooling electronics components. 5,027,254, Cl. 361-384.000.
- Cornelison, Richard C., to W R. Grace & Co -Conn. High temperature combuster. 5,026,273, Cl 431-170.000.
- Cornelius Company, The: *See—*
  - Senghaas, Karl A.; Senghaas, Peter; and Michalec, Jerzy, 5,027,284, Cl. 364-479.000.
- Coryea, Peter F.: *See—*
  - Palmer, Ansell W.; and Coryea, Peter F., 5,027,061. Cl. 324-156.000.
- Costar Corporation: *See—*
  - Lyman, George; Mathus, Gregory; and Root, David, 5,026,649, Cl 435-284.000.
- Coste, Philippe; Leconte, Philippe; Perron, Robert; and Baudoin, Michel, to Rhone-Poulenc. Process for the preparation of dialkyl malonates. 5,026,900, Cl. 560-204.000.
- Cotie, Michael E.: *See—*
  - Benston, Phyllis S.; and Cotie, Michael E., 5,025,504, Cl. 2-181.400.
- Coughlin, Anne M.: *See—*
  - Marsella, John A.; Pez, Guido P ; and Coughlin, Anne M., 5,026,929, Cl. 570-146.000.
- Court, Peter T., to BTR plc a British Company. Fluid-damped resilient bush. 5,026,031, Cl. 267-140.000.
- Courtaulds Films & Packaging (Holdings) Ltd . *See—*
  - Harrison, John, 5,026,610, Cl. 428-516.000.
- Coutiere, Dominique, to Biolandes Technologies. Method of extracting solid materials using a solvent and an apparatus for implementing same. 5,026,549, Cl. 424-195.100.
- Covington, Wilbur T.: *See—*
  - Schellenberg, Victor R.; Zsoldos, James; Hartman, Joy L., Smith, William H., deceased; Covington, Wilbur T ; and Conley, Allen, 5,026,211, Cl. 405-204.000.
- Cowley, Alan H.: *See—*
  - Jones, Richard A.; Cowley, Alan H ; and Tasch, Al F., Jr., 5,026,575, Cl. 427-255.000.
- Coy, Bruce H.; and Rosky, David S., to Applied Micro Circuits Corporation. Method and apparatus for coupling an ECL output signal using a clamped capacitive bootstrap circuit. 5,027,013, Cl 307-475.000.
- Coyle, Richard J., Jr.; Grimes, Gary J.; Haas, Lawrence J.; Serafino, Anthony J.; and Shevchuk, George J., to AT&T Bell Laboratories. Fabrication of optical couplers. 5,026,411, Cl. 65-4 210.
- Crane, Robert F.: *See—*
  - Wentworth, Steven W.; Crane, Robert F.; and Haas, Jon A., 5,025,868, Cl. 173-91.000.
- Crass, Guenther: *See—*
  - Janocha, Siegfried; Schloegl, Gunter; Crass, Guenther; and Bothe, Lothar, 5,026,592, Cl. 428-204.000.
- Crawford, James A., Jr.; and Burgess, Keith E., to Techniweave, Inc. Woven gap filler for use in the lay-up of composite plastic structural units. 5,026,595, Cl. 428-246.000.
- Creative Sales & Mfg. Co., Inc.: *See—*
  - Byers, Timothy W.; and Byers, Gary L., 5,025,543, Cl. 29-401.100.
- Cree Research, Inc.: *See—*
  - Edmond, John A., 5,027,168, Cl. 357-17.000.
- Creed, Ronald D. Fish stringer and retainer. 5,025,587, Cl. 43-55.000.
- Cripps, Stephen C., to Celeritek, Inc. Method and means for measuring operating temperature of semiconductor devices by monitoring RF characteristics. 5,027,064, Cl. 324-158.00T.
- Crisp, Duane L., to Lincoln Foodservice Products, Inc. Air delivery system and oven control circuitry cooling system for a low profile impingement oven. 5,025,775, Cl. 126-21.00A.
- Cronce, Gary M.; Rasor, William; and Graboske, Dean, to Huron/St. Clair Incorporated Snap-together luggage carrier slat. 5,025,967, Cl. 224-326.000.
- Cronshaw, ANthony J.: *See—*
  - Cooley, Roderick A.; and Cronshaw, ANthony J., 5,027,195, Cl. 358-75.000.
- Crosfield Electronics Ltd.: *See—*
  - Rayner, Robert W., 5,027,151, Cl. 355-30.000.
- Crosser, Jeffery A., Mooberry, Randall L., Rinaldo, James D . and Salazar-Vior, Jose M., to Caterpillar Inc Cushioned swing circuit 5,025,626, Cl. 60-460.000.
- Crossley, Roger; Opalko, Albert. and Shepherd, Robin G., to John Wyeth & Brother Limited Method for the production of 2-bromo-5,6,7,8-tetrahydroquinoline and the analogous 2-bromo-trimethylene and pentamethylene pyridines. 5,026,854, Cl. 546-112.000.
- Crowley, Patrick J.: *See—*
  - Worthington, Paul A.; Crowley, Patrick J., and Gravestock. Michael B., 5,026,718, Cl. 514-383.000.
- Cserey Pechany, Eva: *See—*
  - Kelemen, Agnes, Cserey Pechany, Eva, and Jaksa, Istvan. 5,026,640, Cl. 435-86.000.
- CSK Corporation. *See—*
  - Takahashi, Shunzo; Izawa, Shigeru; Suzuki, Hidefumi; and Hasemi, Takashi, 5,027,337, Cl. 369-44 260.
- Cuba, Gary W., to Westinghouse Electric Corp. Welding electrode tip cracking apparatus and method. 5,026,968, Cl. 219-145.210.
- Cucuzza, Carl C.; Raterman, John M.; and Keuter, John P., to Nordson Corporation. Method of applying adhesive to the waist elastic material of disposable garments. 5,026,450, Cl. 156-244.110.
- Culley, Paul R., to Compaq Computer Corporation. Apparatus for determining maximum usable memory size. 5,027,313, Cl. 364-900.000.
- Culross, Claude C.. *See—*
  - Stuntz, Gordon F.; Culross, Claude C.; and Reynolds, Steve D. 5,026,475, Cl. 208-403.000.
- Cummings, Bruce A.: *See—*
  - Westcott, Daniel R.; Tetlev, William C , and Cummings. Bruce A., 5,026,994. Cl. 250-435.000.
- Cummins-Allison Corporation: *See—*
  - Rasmussen, James M., 5,026,320, Cl. 453-6.000.
- Cummins, Kenneth L.: *See—*
  - Williamson, Malcolm J.; Cummins, Kenneth L.; and Hecox. Kurt E., 5,027,410, Cl. 381-68 400.
- Cummins, Robert F.: *See—*
  - Leone, Richard J.; Cummins, Robert F.; Vitiello, Joseph, and Brochhagan, Thomas, 5,025,895, Cl. 187-105.000.
- Curley, John L.; Hirsch, Thomas S., and Wurz, David A., to Bull HN Information Systems Inc. Apparatus and method for alterable resource partitioning enforcement in a data processing system having central processing units using different operating systems. 5,027,271, Cl. 364-200.000.
- Curry, James C., Jr., to NCR Corporation. Method and apparatus for dynamic data block length adjustment. 5,027,348, Cl. 370-85.100.
- Curt G. Joa, Inc.: *See—*
  - Lasure, Randal D.; Schweizer, Werner; and Venetjoki, Ari, 5,025,910, Cl. 198-377.000.
- Cymer Laser Technologies: *See—*
  - Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,027,366, Cl. 372-57.000.
- Cypress Semiconductor Corp.: *See—*
  - Pathak, Saroj; and Prickett, Bruce, 5,027,320, Cl. 365-185.000.
- Czarnocki, Walter, to Motorola, Inc. Non-linear conversion of input from a sensor to an output with two different slopes. 5,027,015, Cl. 307-491.000.
- Daddona, Peter E.; Berger, Harvey J.; and McEver, Rodger P , to Centocor, Inc. Methods for imaging atherosclerotic plaque 5,026,537, Cl. 424-1.100.
- Daichi Company, Ltd.: *See—*
  - Ikeda, Takaaki; Suga, Toshihiko; and Kuroiwa, Akihiko, 5,027,040, Cl. 315-241.00R.
- Daikin Industries Ltd.: *See—*
  - Kitamura, Ikuo; Aomi, Hideki; Koyama, Satoshi; Tokunaga, Katsushi; and Okamura, Kazuo, 5,026,605, Cl. 428-403.000.
- Dailey, Alfred A.: *See—*
  - Dailey, Thomas A.; Dailey, Alfred A , and Dailey, Richard J.. 5,027,105, Cl. 340-571.000.
- Dailey, Richard J.. *See—*
  - Dailey, Thomas A.; Dailey, Alfred A.; and Dailey, Richard J., 5,027,105, Cl. 340-571.000.
- Dailey, Thomas A.; Dailey, Alfred A.; and Dailey, Richard J. Motion detectors and security devices incorporating same. 5,027,105, Cl 340-571.000.
- Daimler-Benz AG *See—*
  - Resch, Reinhard, 5,026,124, Cl. 303-100.000
  - Strauss, Wolfgang, 5,025,624, Cl 60-274.000.
- Dainichiseika Color & Chemicals Mfg. Co., Ltd.: *See—*
  - Takizawa, Minoru; Nakamura, Michiei; Takeuchi, Hitoshi; Sakamoto, Shigeru; and Horiguchi, Shojiro, 5,026,780, Cl 525-301.000.
- Dainihon Glass Industry Co., Ltd.: *See—*
  - Sekijima, Kenzo; and Kitagawa, Seiho, 5,025,605, Cl. 52-309.160.
- Dainippon Screen Mfg. Co., Ltd.: *See—*
  - Kitakado, Ryuji; Yano, Hironobu; Kakuma, Hiroaki; Hoki, Tetsuo; and Kanai, Takao, 5,027,417, Cl. 382-8.000.
  - Kurihara, Daiki; and Miyake, Takashi, 5,027,225, Cl. 358-448.000.
  - Ono, Yoshio; and Shimano, Noriyuki, 5,027,196, Cl. 358-76.000.
- Daiso Co., Ltd.: *See—*
  - Koden, Mitsuhiro; Kuratate, Tomoaki; Funada, Fumiaki; Sakaguchi, Kazuhiko; Kasai, Naoya; and Takehira, Yoshikazu, 5,026,506, Cl. 252-299.610.
- Daiwa Seiko, Inc.: *See—*
  - Kitazume, Koichi; and Arai, Kimikazu, 5,026,041, Cl. 271-118.000.
- Dal Monte, Antonio, to Fiat Auto S.p.A. Adjustable backrest for the seats of vehicles, particularly cars. 5,026,116, Cl. 297-284.000.

- Dalbiez, Andre : *See—*
  - Graton, Michel; and Dalbiez, Andre , 5,025,904, Cl. 192-106.200.
- Dallas Semiconductor Corporation: *See—*
  - Jones, Brian W., 5,027,326, Cl. 365-221.000.
- Dallo, S. F.: *See—*
  - Baseman, Joel B.; Su, C. J.; and Dallo, S. F., 5,026,636, Cl. 435-6.000.
- D'Aloisio, Rino: *See—*
  - Venturello, Carlo; and D'Aloisio, Rino, 5,026,911, Cl. 564-253.000.
- Dalrymple, Monte J., to Zilog, Inc. Carry chain incrementer and/or decrementer circuit. 5,027,310, Cl. 364-770.000.
- D'Amore, Michael B., to Du Pont de Nemours, E. I., and Company. Palladium catalyzed carboalkoxylation of butadiene. 5,026,901, Cl. 560-207.000.
- Dandge, Dileep K.: *See—*
  - Klainer, Stanley M.; Dandge, Dileep K.; Butler, Marcus; and Goswami, Kisholoy, 5,026,139, Cl. 350-96.290.
- Daneshtalab, Mohsen; Nguyen, Dai Q.; Ha, Chan M.; Luu, Hiep T.; Tempest, Laurence M.; and Micetich, Ronald G., to Synphar Laboratories Incorporated. Novel generation of heteroaryloxyalkyl heterocycles with antipicornaviruses activities. 5,026,848, Cl. 544-137.000.
- Daniel, Edward J.: *See—*
  - Henn, Robert L.; Morell, Carol H.; and Daniel, Edward J., 5,026,591, Cl. 428-198.000.
- Daniel, Ralph S.: *See—*
  - Burke, Patrick E.; Dudley, Richard F.; and Daniel, Ralph S., 5,027,099, Cl. 336-60.000.
- D'Anna, Pablo E.: *See—*
  - Wisherd, David S.; Bartlow, Howard D.; and D'Anna, Pablo E., 5,027,082, Cl. 330-277.000.
- Dapperheld, Steffen, to Hoechst Aktiengesellschaft. Process for the preparation of unsaturated halogenated hydrocabons. 5,026,460, Cl. 204-59.00R.
- Darin, John J. Two-piece intraocular lens. 5,026,396, Cl. 623-6.000.
- Data General Corporation: *See—*
  - Bellamy, John C.; Christensen, Richard L.; and Schroth, Charles K., 5,027,344, Cl. 370-56.000.
- Datacard Corporation: *See—*
  - Barbour, William P., 5,025,727, Cl. 101-483.000.
- Dattagupta, Nanibhushan; and Albarella, James P., to Molecular Diagnostics, Inc. Photochemical nucleic acid-labeling reagent having a polyalklamine spacer. 5,026,840, Cl. 536-27.000.
- Dattorro, Jon C.; Charpentier, Albert J.; and Andreas, David C. Decimation filter as for a sigma-delta analog-to-digital converter. 5,027,306, Cl. 364-724.100.
- Dausmann, Gunther, to Rubenberger, Karl. Method of producing and reproducing holograms. 5,026,132, Cl. 350-3.840.
- Davey, David D., to Schering AG. Novel imidazo[1,5-a]pyridines, useful as cardiovascular and CNS agents. 5,026,712, Cl. 514-300.000.
- David, James J., to Du Pont de Nemours, E. I., and Company. Board mounted connector system. 5,026,291, Cl. 439-67.000.
- David, Yvon: *See—*
  - Goldfarb, Charles; and David, Yvon, 5,025,963, Cl. 223-85.000.
- Davidson, Richard A.: *See—*
  - Davis, William R.; Mowers, Dennis W.; Greenthal, Richard P.; Szymanski, Paul; Wray, Ronald A.; and Davidson, Richard A., 5,027,111, Cl. 340-784.000.
- Davis, Dana B. Golf practice flag assembly and ball retriever holder therefor. 5,026,061, Cl. 273-177.00R.
- Davis, Darwin D.; and Sullivan, David L., to Du Pont de Nemours, E. I., and Company. Process for the preparation of dodecanedioic acid. 5,026,461, Cl. 204-86.000.
- Davis, Richard L., to Airjack Wireless Systems Incorporated. Cordless guitar transmitter. 5,025,704, Cl. 84-723.000.
- Davis, Richard M., to Ryder International Corp.; and Textron Inc. Expandable drive tool tip for screw retention. 5,025,688, Cl. 81-448.000.
- Davis, Ronald S., to Atomic Energy of Canada Limited. Optical images by quadrupole convolution. 5,027,419, Cl. 382-28.000.
- Davis, William R.; Mowers, Dennis W.; Greenthal, Richard P.; Szymanski, Paul; Wray, Ronald A.; and Davidson, Richard A., to Sentex Systems, Incorporated. Liquid-crystal display unit for electronic directory. 5,027,111, Cl. 340-784.000.
- Day, Richard A.; Gelorme, Jeffrey D.; Russell, David J.; and Wih, Steven J., to International Business Machines Corporation. Composition for photo imaging. 5,026,624, Cl. 430-280.000.
- Day, Roger W.; and Morgan, Michael J., to Olin Corporation. Polymer composition containing pendant organic charge transfer salt moieties useful in switching devices. 5,026,774, Cl. 525-56.000.
- Dayco Products, Inc.: *See—*
  - Hollaway, Gerald C., Jr., 5,026,444, Cl. 156-62.200.
  - White, Jack D., Jr.; and Bishop, Clinton L., 5,026,327, Cl. 474-152.000.
- Daylight Corporation: *See—*
  - Sutherland, Jackie R., 5,025,749, Cl. 118-28.000.
- Deason, Vance A., to United States of America, Energy. Multipulsed dynamic moire interferometer. 5,026,154, Cl. 356-35.500.
- De Benedetti, Dario, to Start S.r.l. Apparatus for controlling the laying and transportation, on conveyor belts, of indexed workpieces manufactured by a line comprising a plurality of automatic machines. 5,025,909, Cl. 198-341.000.
- De Bijl, Andrianus M. J.; Iding, Wilhelmus H.; and Overgoor, Bernardus J., to U.S. Philips Corporation. DC/AC converter for the supply of a gas and/or vapor discharge lamp. 5,027,038, Cl. 315-209.00R.
- DeCloux, Richard J. Adjustable auxiliary hydraulic fluid accumulator control for hydraulically-phased stair climbing exercise apparatus. 5,026,046, Cl. 272-70.000.
- DeCrescenzo, Gary A.: *See—*
  - Getman, Daniel P.; and DeCrescenzo, Gary A., 5,026,713, Cl. 514-302.000.
- DeDoncker, Rik W.; Kheraluwala, Mustansir H.; and Divan, Deepakraj M., to Wisconsin Alumni Research Foundation. Power conversion apparatus for DC/DC conversion using dual active bridges. 5,027,264, Cl. 363-16.000.
- Deere & Company: *See—*
  - Braun, Stephen A., 5,025,618, Cl. 56-16.700.
  - Hook, Richard W.; and Coordes, Duane A., 5,025,951, Cl. 221-13.000.
  - Jeffries, Dennis L., 5,026,334, Cl. 475-142.000.
  - Kuhn, John B.; Hunt, Kenneth E.; and Thorman, Christopher S., 5,025,617, Cl. 56-15.600.
  - McAskill, John P., 5,025,674, Cl. 74-360.000.
  - Oftedal, Teryl M.; Bourgeous, Clarence G.; Morita, Haruyuki; and Miyaji, Masayoshi, 5,026,335, Cl. 475-198.000.
  - Viaud, Jean; Roth, Arsene; and Anstey, Henry D., 5,025,717, Cl. 100-88.000.
  - Viaud, Jean; Roth, Arsene; and Anstey, Henry D., 5,025,718, Cl. 100-88.000.
- Deflandre, Jean-Pierre: *See—*
  - Sarda, Jean-Paul; Grard, Guy; Deflandre, Jean-Pierre; and Perreau, Philippe, 5,025,669, Cl. 73-798.000.
- Degnan, Thomas F., Jr.; and Johnson, Ivy D., to Mobil Oil Corporation. Aromatization process utilizing a pillared layered silicate plus gallium or zinc. 5,026,921, Cl 585-415.000.
- Degussa Aktiengesellschaft: *See—*
  - Drauz, Karl-Heinz; Kleeman, Axel; Prescher, Gunter; and Ritter, Gebhard, 5,026,925, Cl. 568-771.000.
- de Haar, Walterus T.; and Pluim, Hendrik, to Duphar International Research B.V. Method of preparing lactulose. 5,026,430, Cl. 127-34.000.
- Dehn, Klaus-Dieter; Weidner, Hans-Peter; and Storch, Eberhard A., to General Motors Corporation. Fastening device. 5,026,201, Cl. 403-407.100.
- Deis, August A., to U.S. Philips Corporation. Read apparatus having vertical turret magazine for information discs. 5,027,335, Cl. 369-37.000.
- DeLand, Daniel L.; and Semke, Douglas L., to Masco Industries, Inc. Varying radius helical cable spool for powered vehicle door systems. 5,025,591, Cl. 49-360.000.
- Delavaux, Jean-Marc P., to AT&T Bell Laboratories. Optical hybrid for coherent detection systems. 5,027,436, Cl. 455-619.000.
- Delco Electronics Corporation: *See—*
  - Skala, Otto; and Rauth, Walter, 5,027,432, Cl. 455-238.000.
- Del Fabro, Giorgio: *See—*
  - Del Fabro, Marcello; and Del Fabro, Giorgio, 5,025,651, Cl. 72-294.000.
- Del Fabro, Marcello; and Del Fabro, Giorgio, to M.E.P. Macchine Elettroniche Piegatrici S.p.A. Movable shears upstream of a bending assembly and method to bend the trailing end of bars. 5,025,651, Cl. 72-294.000.
- Del Guidice, Henry L.; and Foster, George H., Jr., to AMP Incorporated. Connector for reed switch or similar electrical component. 5,026,305, Cl. 439-620.000.
- Dell, Travis E. Portable unloading platform and ramp. 5,026,243, Cl. 414-401.000.
- Dellacroce, Cheryl, to Esselte Pendaflex Corporation. Hanging expandable file. 5,025,979, Cl. 229-1.50R.
- DeMarco, Vito A. Combination garden implement. 5,025,621, Cl. 56-400.050.
- Demick, Stephen B.: *See—*
  - Dotterweich, John E.; and Demick, Stephen B., 5,026,101, Cl. 292-166.000.
- de Montgolfier, Arnaud; and Goodwin, R. W., to Schlumberger Industries, Inc. Differential current shunt. 5,027,059, Cl. 324-127.000.
- Demoute, Jean-Pierre: *See—*
  - Tessier, Jean; and Demoute, Jean-Pierre, 5,026,862, Cl. 560-124.000.
- Demuth, Martin: *See—*
  - Schaffner, Kurt; and Demuth, Martin, 5,026,877, Cl. 549-265.000.
- Demuth, Robert: *See—*
  - Faas, Jurg; Nuessli, Eduard; Grundler, Christof; Staheli, Paul; Hanselmann, Daniel; Demuth, Robert; Waeber, Rene; and Fritzsche, Peter, 5,025,533, Cl. 19-145.500.
- Deni, Frank. Punch guide. 5,025,691, Cl. 83-140.000.
- Dennison Manufacturing Company: *See—*
  - Fotland, Richard A.; and Miekka, Fred, 5,027,136, Cl. 346-159.000.
- Denzinger, Walter; Mach, Helmut; Mohr, Juergen; Oppenlaender, Knut; Schwen, Roland; and Vogel, Hans-Henning, to BASF. Amino group-containing graft polymer, and its use as a dispersing viscosity index improver. 5,026,494, Cl. 252-50.000.
- De Prycker, Martin L. F.; Ryckebusch, Mark L. M. R.; and Barri, Peter I. A., to Alcatel N.V. Asynchronous time division communication system. 5,027,351, Cl. 370-94.100.
- Derouane, Eric G.: *See—*
  - Fellmann, Jere D.; Saxton, Robert J.; Wentreck, Paul R.; Derouane, Eric G.; and Massiani, Pascale, 5,026,942, Cl. 585-467.000.
- Dery, Ronald A., to AMP Incorporated. Electrical connector for electrically interconnecting non-parallel substrates. 5,026,290, Cl. 439-65.000.

VOL
1127
ISS
4
JE
25
1991
UMI

Desmurs, Jean-Roger: *See—*
Leblanc, Jean-Claude; Ratton, Serge; Besson, Bernard; and Desmurs, Jean-Roger, 5,026,926, Cl. 568-779.000.

Dessau, Ralph M., to Mobil Oil Corporation. Base-catalyzed reactions using zeolite catalysts. 5,026,919, Cl. 568-433.000.

Desurvire, Emmanuel; Giles, Clinton R.; and Zyskind, John L., to AT&T Bell Laboratories. Erbium-doped fiber amplifier. 5,027,079, Cl. 330-4.300.

Deubel, Reinhold: *See—*
Jung, Rudiger; and Deubel, Reinhold, 5,026,831, Cl. 534-752.000.

Deutsch, Edward A., to University of Cincinnati. Cyclo substituted propyleneamine oxime and its use as a brain imaging agent. 5,026,829, Cl. 534-14.000.

Develco, Inc.: *See—*
More, Henry S.; Rorden, Louis H.; and Akkerman, Neil H., 5,027,129, Cl. 343-719.000.

DeVito, Lawrence M., to Analog Devices, Inc. Phase detector for phase-locked loop clock recovery system. 5,027,085, Cl. 331-1.00A.

Devon, Thomas J.: *See—*
Stavinoha, Jerome L.; Phillips, Gerald W.; Puckette, Thomas A.; and Devon, Thomas J., 5,026,886, Cl. 556-70.000.

Dewey, Craig D.: *See—*
Pratt, Richard L.; and Dewey, Craig D., 5,027,049, Cl. 318-807.000.

DeWitt, Charles: *See—*
McCartney, Andrew; DeWitt, Charles; and Elliott, William, 5,027,285, Cl. 364-483.000.

DeWitt, Scott H.: *See—*
Edwards, Floyd V.; and DeWitt, Scott H., 5,025,829, Cl. 137-512.000.

Dezza, Ottavio; and Faccioli, Giovanni, to Orthofix S.r.l. Bolt for orthopaedic surgical use. 5,026,374, Cl. 606-72.000.

Dhyanchand, P. John; Patel, Sunil; Ng, Chai-Nam; and Nguyen, Vietson, to Sundstrand Corporation. Regulator for stepped-waveform inverter. 5,027,265, Cl. 363-37.000.

Diamantoglou, Michael; and Kuhne, Helmut, to Akzo N.V. Modified cellulose for biocompatible dialysis membranes. 5,026,834, Cl. 536-20.000.

Dias, J. Fleming, to Hewlett-Packard Company. Graded frequency sensors. 5,025,790, Cl. 128-662.030.

DiCarlo, Leonard; and Reese, Robert J., to Sky-Top Sunroofs Ltd. Sliding and venting sunroof. 5,026,113, Cl. 296-221.000.

Dick, Reinhard: *See—*
Hutzenlaub, Armin; and Dick, Reinhard, 5,025,998, Cl. 242-55.000.

Dickhudt, Eugene A.: *See—*
Ray, Charles D.; and Dickhudt, Eugene A., 5,026,373, Cl. 606-61.000.

Didier-Werke AG: *See—*
Hintzen, Ullrich; Luhrsen, Ernst; and Schuler, Andreas, 5,025,961, Cl. 222-599.000.

Diehr, Hans-Joachim, to Bayer Aktiengesellschaft. Preparation of 2-chloro-5-aminomethyl-pyridine. 5,026,864, Cl. 546-345.000.

Diekevers, Mark S., to Catepillar Inc. Isolated drive sprocket assembly. 5,026,329, Cl. 474-162.000.

Diekmann, Bernd, to Schuco International GmbH & Co. Edge protecting frame for plate-shaped structural elements. 5,026,588, Cl. 428-100.000.

Diel, Rainer: *See—*
Meyer, Jurgen; Sippel, Achim; Wildau, Monika; Kruse, Heinz J.; Diel, Rainer; Becker, Wilfried; Bartsch, Gisbert; Pahnke, Klaus-Dieter; Huege, Jurgen; and Luther, Hans-Werner, 5,025,731, Cl. 102-521.000.

Diesel Kiki Co., Ltd.: *See—*
Kurosawa, Juetsu; and Arai, Katsuhiko, 5,026,316, Cl. 417-222.000.

Dietmar, Seyferth; and Rees, William S., Jr., to Massachusetts Institute of Technology. Lewis base adducts of decarborane for forming new preceramic polymers, using as binders, forming shaped bodies and forming fibers. 5,026,809, Cl. 528-4.000.

Dietrich, Rainer: *See—*
Kunz, Reiner; Babl, Albert; Zahradnicek, Ales; and Dietrich, Rainer, 5,026,404, Cl. 51-295.000.

Di Gioacchino, Sandro; Paolinelli, Antonio; and Re, Luciano, to Enricerche S.p.A. Method of preparation of optically active α-aminoacids. 5,026,906, Cl. 562-437.000.

Digital Equipment Corporation: *See—*
Kirk, John; and Lord, George H., 5,027,290, Cl. 364-521.000.

Digital Instruments, Inc.: *See—*
Elings, Virgil B.; Gurley, John A.; and Sarid, Dror, 5,025,658, Cl 73-105.000.

Dilkin, Nikolay G.: *See—*
Atanassov, Lyuben P.; Kolenzov, Yanko A.; Vulev, Decho I.; Primov, Ivan S.; Spassov, Peter G.; Kanalev, Svetlosar K.; Andonov, Dimo P.; Yankov, Angel V.; and Dilkin, Nikolay G., 5,027,286, Cl. 364-513.000.

Dillon, John L. Medical garment and method for manufacturing the same. 5,025,501, Cl. 2-51.000.

Dimsa, Robert D.: *See—*
Romansky, Michael E.; Dimsa, Robert D.; and Munday, Howard R., 5,025,734, Cl. 105-26.050.

Dinter, Peter; Bothe, Lothar; and Gribbin, John D., to Hoechst Atkiengesellschaft. Process and apparatus for preparing the surface of a plastic molding by means of an electrical corona discharge. 5,026,463, Cl. 204-164.000.

DiPardo, Robert M.: *See—*
Bock, Mark G.; Freidinger, Roger M.; and DiPardo, Robert M., 5,026,703, Cl. 514-247.000.

Divan, Deepakraj M.: *See—*
DeDoncker, Rik W.; Kheraluwala, Mustansir H.; and Divan, Deepakraj M., 5,027,264, Cl. 363-16.000.

Divecha, Amarnath P.: *See—*
Karmarkar, Subhash D.; and Divecha, Amarnath P., 5,025,849, Cl. 164-97.000.

Dixon, Richard P.; and Kedzierski, Leonard J., III, to Chesebrough-Pond'S USA Co. Sunscreen composition. 5,026,540, Cl. 424-60.000.

Dizon, Cipriano L. IV stylet catheter. 5,026,351, Cl. 604-164.000.

Djurdjevic, Joco. Gas injection system. 5,025,758, Cl. 123-527.000.

Do, Christopher N., to IEV International Pty. Limited. Apparatus for the combatting of marine growth on offshore structures. 5,026,212, Cl. 405-211.000.

Dobie, William B. S.; and Penistone, Nigel, to British Aerospace Public Limited Company. Variable air intake ramps for aerospace vehicles. 5,026,004, Cl. 244-53.00B.

Dobrogowski, Michael J.; and Latina, Mark A. Method for focal destruction of eye tissue by electroablation. 5,025,811, Cl. 128-898.000.

Dobrovolny, Pierre, to Zenith Electronics Corporation. High level wide band RF mixer. 5,027,163, Cl. 455-326.000.

Doctor, Bhupendra P.: *See—*
Chiang, Peter K.; Leader, Haim; Smejkal, Ruthann M.; Gordon, Richard K.; Payne, Charlotte S.; Doctor, Bhupendra P.; and Padilla, Felipe N., 5,026,897, Cl. 560-58.000.

Dr. Ing. h.c.F. Porsche AG: *See—*
Burst, Hermann, 5,025,986, Cl. 237-12.30A.
Muller, Robert; and Wacker, Bernd, 5,025,677, Cl. 74-473.00R.
Preiss, Michael, 5,025,878, Cl. 180-68.100.
Stehle, Heinz; Wehr, Thomas; Petersmann, Joseph; Seidel, Willi; Hamm, Ludwig; Foeldi, Thomas; Eschrich, Gerhard, Schwamm, Ronald; Runge, Wolfgang; Gruhle, Wolf-Dieter; and Wendel, Peter, 5,025,684, Cl. 74-862.000.
Weiner, Hans, 5,027,103, Cl. 340-426.000.

Dr. Karl Thomae GmbH: *See—*
Mihm, Gerhard; Eberlein, Wolfgang; Engel, Welfhard; Trummlitz, Gunter; Mayer, Norbert; Dodds, Henri; and Hammer, Rudolf, 5,026,699, Cl. 514-220.000.
Reiffen, Manfred; Mark, Michael; Sauter, Robert; and Grell, Wolfgang, 5,026,702, Cl. 514-235.500.

Dodds, Henri: *See—*
Mihm, Gerhard; Eberlein, Wolfgang; Engel, Welfhard; Trummlitz, Gunter; Mayer, Norbert; Dodds, Henri; and Hammer, Rudolf, 5,026,699, Cl. 514-220.000.

Dohi, Hikoo, to Yazalci Corporation. Method of connecting a crimp-style terminal to electrical conductors of an electrical wire. 5,025,554, Cl. 29-860.000.

Doi, Miwako: *See—*
Takebayashi, Yoichi; Iwai, Isamu; Doi, Miwako; and Fukui, Mika. 5,027,420, Cl. 382-38.000.

Dolezych, Udo; and Graf, Rupprecht, to Dolezych, Udo. Load lashing device with tensioner for use on a freight carrier. 5,026,230, Cl 410-100.000.

Doluca, Tunc, to Maxim Integrated Products. Buried zener diode. 5,027,165, Cl. 357-13.000.

Donovan, Paul M.; and Chia, Swee T. Apparatus and method for minimizing undesired cursor movement in a computer controlled display system. 5,027,109, Cl. 340-706.000.

Donze, Pierre; and Frank, Jean P. Balanced multi-wheel wheelbarrow 5,026,079, Cl. 280-47.310.

Doolin, Dilyard: *See—*
Lockwood, Alan R.; Kolongowski, Sidney C.; and Doolin, Dilyard, 5,025,889, Cl. 181-250.000.

Dorain, Paul B.; and Snow, Judith B., to United States of America, Navy. Monolithic optical programmable spectrograph (MOPS). 5,026,160, Cl. 356-328.000.

Dorfman, Jan L., to Coors Brewing Company. Method and apparatus for crimping a container cap. 5,026,237, Cl. 413-43.000.

Dorman, Burton P.: *See—*
Allen, Fritz S.; Bustamante, Carlos; Niemczyk, Thomas M, and Dorman, Burton P., 5,026,159, Cl 356-318.000.

Dorn, Russell J., to Stewart & Stevenson Power, Inc. Wheelchair lift apparatus for commercial vehicles. 5,026,244, Cl. 414-540.000.

Dotterweich, John E.; and Demick, Stephen B Push-pull or twist door knob/handle mechanism. 5,026,101, Cl. 292-166.000.

Double, Glen P.; and Weingart, Steve H., to International Business Machines Corporation. Data protection by detection of intrusion into electronic assemblies. 5,027,397, Cl. 380-4.000.

Dougherty, Dennis A.: *See—*
Grubbs, Robert H.; Dougherty, Dennis A.; Swager, Timothy M. and Ginsburg, Eric J., 5,026,783, Cl. 525-326.100.

Doughty, Dennis J.: *See—*
McKay, Geoffrey H.; Larkin, Harold F.; Doughty, Dennis J.; and Guerrette, Michael C., 5,027,095, Cl. 335-202.000.

Douglas, Lawrence M., to Polaroid Corporation. Collapsible camera 5,027,142, Cl. 354-86.000.

Doundoulakis, George J. Deformable beverage containers for preserving carbonation. 5,025,953, Cl. 222-23.000.

Dow Chemical Company, The: *See—*
Kirchhoff, Robert A., 5,026,892, Cl. 556-419.000.
Summers, John D.; and Jeanes, Thomas O., 5,026,823, Cl 528-353.000.

Dow Corning Corporation: *See—*
Baney, Ronald H.; and Hirano, Shin-ichi, 5,026,684, Cl. 505-1.000.
Kookootsedes, Gust J., 5,026,811, Cl. 528-14.000.
Liles, Donald T., 5,026,768, Cl. 524-837.000.
Liles, Donald T., 5,026,769, Cl. 524-837.000.

Snow, Steven A.; and Madore, Linda M., 5,026,489, Cl. 252-8.800.
Ziemelis, Maris J.; and Park, William R. R., 5,026,781, Cl. 525-301.000.

Dow Corning GmbH: *See—*
Geilich, Klaus M., 5,026,812, Cl 528-17.000.

Dow Corning Limited. *See—*
Colas, Andre R. L.; Renauld, Franck A D., and Sawicki, George C., 5,026,891, Cl. 556-413.000.

Dowty Seals Limited *See—*
Spanner, John R.; Hill-Male, Nonton; and Soomal, Harinder S., 5,026,346, Cl. 604-110.000.

Drabek, Jozef: *See—*
Boger, Manfred, Drabek, Jozef; and Ehrenfreund, Josef, 5,026,730, Cl. 514-586.000.

Dragner, louis R.: *See—*
Floyd, William C.; Dragner, louis R., and Black, Blanche H., 5,026,746, Cl. 524-50 000.

Dragon Systems, Inc.: *See—*
Roberts, Jed; Baker, James K.; and Porter, Edward W., 5,027,406, Cl 381-43.000.

Drauz, Karl-Heinz; Kleeman, Axel; Prescher, Gunter; and Ritter, Gebhard, to Degussa Aktiengesellschaft. Method of producing catechol and hydroquinone. 5,026,925, Cl. 568-771.000.

Dreps, Daniel M., to International Business Machines. Isolated semiconductor macro circuit 5,027,183, Cl. 357-48.000.

Dressen, Larry: *See—*
Gregerson, Barry; and Dressen, Larry, 5,025,926, Cl. 206-444.000.

Dresser-Rand Company: *See—*
Kursar, James V., 5,025,830, Cl 137-522.000.

Dressler, William E. Heating and cooling apparatus. 5,025,634, Cl 62-79.000.

Dril-Quip, Inc.: *See—*
Reimert, Larry E., 5,026,097, Cl. 285-141.000.

Drinkard Developments. *See—*
Drinkard, William F., Jr.; and Woerner, Hans J., 5,026,530, Cl. 423-87.000.

Drinkard, William F., Jr.; and Woerner, Hans J., to Drinkard Developments Method for producing copper arsenate compositions. 5,026,530, Cl. 423-87 000

Drucker, Alan S., to Carrier Corporation. Refrigerant expansion device for optimizing cooling and defrost operation of a heat pump. 5,025,640, Cl. 62-324.600.

Drust, Eugene G.; Kasting, Gerald B.; Smith, Ronald L.; and Szkutak, Joan B., to Norwich Eaton Pharmaceuticals, Inc. Compositions for the transdermal delivery of pharmaceutical actives. 5,026,556, Cl. 424-449.000.

Du Pont Merck Pharmaceutical: *See—*
Batt, Douglas G., 5,026,759, Cl 514-438.000.
Ferguson, Blair Q.; Bacheler, Lee T.; Petteway, Stephen R.; and Neubauer, Russell H., 5,026,635, Cl. 435-5.000.

Dubner, Ronald: *See—*
Hargreaves, Kenneth M.; Dubner, Ronald; and Brown, Fred, 5,025,796, Cl. 128-742.000.

Duchesne, Jean-Pierre, to Rhone-Poulenc Sante. Process for the preparation of diaryl sulphides and diaryl selenides. 5,026,846, Cl 544-1.000.

Duclo, Marley: *See—*
Webb, Edward H.; and Duclo, Marley, 5,025,760, Cl. 123-73.0PP.

Ducote, Edgar A. Remote-steering trailer. 5,026,085, Cl. 280-426.000.

Ducrocq, Jean-Bernard: *See—*
Gueble, Jean-Michel; Theron, Jean-Bernard; Latouche, Yannick; Ducrocq, Jean-Bernard; and Perez, Bernard, 5,027,090, Cl. 333-202.000.

Dudley, James M. Nut harvesting apparatus. 5,025,620, Cl. 56-328.100.

Dudley, Richard F.: *See—*
Burke, Patrick E.; Dudley, Richard F., and Daniel, Ralph S., 5,027,099, Cl. 336-60 000.

Dudrick, Stanley J.; Guinn, Edward J.; Gerlich, Stanley J.; and Feste, Andrew S. Amino acid nutritional supplement and regimen for enhancing physical performance through sound nutrition. 5,026,721, Cl. 514-396.000.

Dufau, Oscar: *See—*
Schoepe, Adolf; and Dufau, Oscar, 5,025,826, Cl. 137-315.000.

Duffy, Richard. *See—*
Sessa, Eugene D.; and Duffy, Richard, 5,025,750, Cl. 118-69.000.

Dugan, William P.; and Johnson, Marvin R., to General Dynamics Corporation, Air Defense Systems Division. Electroformed chemically milled probes for chip testing. 5,027,062, Cl. 324-158.00P.

Duke, Susan A.: *See—*
Jackson, Robert J.; Duke, Susan A.; and Barnett, Paul, 5,026,539, Cl. 424-49.000.

Dukes, Paul R., Jr.: *See—*
Skolnik, Howard; Dukes, Paul R., Jr.; and Gewirtz, Jonah, 5,026,431, Cl. 134-3.000.

Dull, Gary M.: *See—*
Fagg, Barry S.; Dull, Gary M.; Haberkern, Richard G.; Merricks, Robert A.; and Stewart, John E., 5,025,812, Cl. 131-297.000.

Dumler, D. Bradley: *See—*
Bomgardner, Charles T.; and Dumler, D Bradley, 5,025,938, Cl. 213-43.000.

Dumoulin, Charles L., to General Electric Company. Method of acquiring NMR angiograms in selected flow component directions. 5,025,788, Cl. 128-653.0AF.

Duncan, Patty S. Scarf construction. 5,025,508, Cl 2-207.000.

Duncan, Wayne: *See—*
Linwood, Gary; and Duncan, Wayne, 5,027,314, Cl. 364-900.000.

Dunnous, Jack, to Hamburger Color Company Multi-components measuring and dispensing system. 5,025,954, Cl 222-56.000.

Duo-Fast Corporation: *See—*
Nasiatka, John R., 5,025,968, Cl 227-8.000.

Duphar International Research B V: *See—*
de Haar, Walterus T.; and Pluim, Hendrik, 5,026,430, Cl. 127-34.000.
Hilgers, Lucas A. T.; and Weststrate, Marinus W., 5,026,546, Cl. 424-88.000.

Du Pont de Nemours, E. I., and Company: *See—*
Adams, Jerome T.; and Yost, Bruce A., 5,026,748, Cl 524-66.000.
Booth, Bruce L., 5,026,135, Cl. 350-96.120.
D'Amore, Michael B., 5,026,901, Cl. 560-207.000.
David, James J., 5,026,291, Cl. 439-67.000.
Davis, Darwin D.; and Sullivan, David L., 5,026,461, Cl. 204-86.000.
Green, James R., 5,025,537, Cl. 26-18.500.
Heitz, Thomas L.; and Kim, Young H., 5,026,799, Cl. 526-192.000.
Hesler, Lee J.; and Park, Stanley C., 5,026,456, Cl. 162-146.000.
Hobbs, Frank W.; and Meek, James L., 5,026,898, Cl. 560-106.000.
Irwin, Robert S., 5,026,819, Cl. 528-329.100.
Krespan, Carl G.; and Resnick, Paul R., 5,026,801, Cl 526-247.000.
Manzer, Leo E.; and Rao, V. N. Mallikarjuna, 5,026,930, Cl 570-168.000.
Merchant, Abid N., 5,026,497, Cl. 252-171.000
Merchant, Abid N., 5,026,498, Cl. 252-171.000.
Merchant, Abid N., 5,026,499, Cl. 252-171.000.
Mitchell, Robert D.; and Trout, Torence J., 5,026,427, Cl 106-23.000.
Rodini, David J., 5,026,603, Cl. 428-362.000.

Dupont, William A.; and Knapczyk, Jerome W., to Monsanto Company. Coating compositions containing ethylenically unsaturated carbamates. 5,026,771, Cl. 525-50.000.

Durko nee Ponacz, Anna: *See—*
Bakos, Jozsef; Neil, Balint; Kollar, Laszlo ; Toros, Szilard, Eifert, Gvula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna, Kuronya, Istvan; Magyari, Istvan; Timar, Judit; Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.

Durr, Heinrich; Kringe, Horst; Rosenthal, Manfred; and Tercic, Eduard, to U.S. Philips Corporation. Office machine. 5,026,184, Cl. 400-605.000.

Durr, Walter; and Kirsch, Axel, to IMZ Fertigungs und Vertriebsgellschaft fur dentale Technologie mbH Enossal implant with an elastic intermediate element and a metal spacer element. 5,026,280, Cl. 433-175.000.

Durr, Walter; and Kirsch, Axel, to Kirsch, Axel; and Eberle Medizintechnische Elemente GmbH. Enossal individual tooth implant and locking tool for use with such an implant. 5,026,285, Cl 433-173.000

Dutt, Bulusu V.; and Abbott, Peter G., to Codenoll Technology Corporation. Methods for making photodectors. 5,026,660, Cl. 437-80.000.

Dutton, Christopher J.; and Perry, David A., to Pfizer Inc. Fermentation process for the preparation of novel C.25 (substituted(2-propenyl) milbemycins. 5,026,643, Cl. 435-119.000.

Dwyer, Joseph J., Jr.; White, Loy R.; Haggerty, Matthew K.; and Purbrick, John A., to Sub-Tv Limited Partnership. Therapeutic subliminal imaging system. 5,027,208, Cl. 358-148.000.

Dykstra; and Boersma, Frans P. Implantable injection chamber device. 5,026,344, Cl. 604-93.000.

Dytel Corporation: *See—*
Morganstein, Sanford J., 5,027,384, Cl. 379-67.000

Dzierza, Edward J.: *See—*
Buchholz, Bernard: Dzierza, Edward J. and Baltrus, John R., 5,026,915, Cl. 568-26.000.

E. Philip Levine, Inc.: *See—*
Grimes, Steven K., 5,025,568, Cl 33-371.000.

E. R. Squibb & Sons: *See—*
Johnsen, Kenneth A.; and Leise, Walter F., Jr., 5,026,360, Cl. 604-338.000.

E. R. Squibb & Sons, Inc.: *See—*
Anderson, Neal G.; Lust, David A.; Bennett, Barbara J.; Feldman, Alan F.; and Polomski, Robert E., 5,026,873, Cl 548-533.000.

Earth Tool Corporation: *See—*
Wentworth, Steven W.; Crane, Robert F.; and Haas, Jon A., 5,025,868, Cl. 173-91.000.

Eastman Kodak Company: *See—*
Agreda, Victor H.; and Larkins, Thomas H., Jr., 5,026,931, Cl 570-204.000.
Anagnostopoulos, Constantine N., 5,027,148, Cl. 354-402.000.
Bagchi, Pranab; and Gardner, William L., 5,026,632, Cl. 430-545.000.
Begley, William J.; Chen, Teh-Hsuan; Kilminster, Kenneth N.; Poslusny, Jerrold N.; and Slusarek, Wojciech, 5,026,628, Cl. 430-382.000.
Cloutier, Robert P., 5,027,140, Cl. 354-76.000.
Evans, Steven; and Chapman, Derek D., 5,026,678, Cl. 503-227.000.
Evans, Steven; and Chapman, Derek D., 5,026,679, Cl. 503-227.000.
Kindlmann, Peter J; and Valley, Robert A., Jr., 5,027,018, Cl 307-571.000.
Manico, Joseph A.; and Birr, Donald E., 5,027,146, Cl. 354-299.000.
McLaen, Donald F.; and Lyon, James L., 5,026,629, Cl 430-428.000.
Quenin, John A.; and Jakubowicz, Raymond F., 5,026,526, Cl 422-64.000.
Rule, Mark; Fauver, Jerry S.; Fagerburg, David R.; Lawrence, Paul B.; and Watkins, Joseph J., 5,026,824, Cl. 528-389.000.
Russel, Steven M.; and Shea, Robert H., 5,026,034, Cl. 270-52.000.

VOL
1127
ISS
4
JE
25
1991
UMI

  - Samuels, James T., 5,027,145, Cl. 354-299.000.
  - Stavinoha, Jerome L.; Phillips, Gerald W.; Puckette, Thomas A., and Devon, Thomas J., 5,026,886, Cl. 556-70.000.
- Eaton Corporation: *See—*
  - Benveniste, Victor M., 5,026,997, Cl. 250-492.200.
  - O'Neil, Walter K.; Rockey, Carl E.; and Mohan, Robert J., 5,025,906, Cl. 192-58.00B.
- Eau-Viron Incorporated *See—*
  - Titmas, James A.; and Saffian, Robert A., 5,026,209, Cl. 405-133.000.
- Eberle Medizintechnische Elemente GmbH. *See—*
  - Durr, Walter; and Kirsch, Axel, 5,026,285, Cl. 433-173.000.
- Eberle, Wolfgang: *See—*
  - Weber, Thomas; Heckmann, Walter; Mertes, Jurgen; Tesch, Helmut, Altstaedt, Volker; Eberle, Wolfgang; Folda, Thomas; Stutz, Herbert; and Recker, Hans-Gert, 5,026,789, Cl. 525-423.000.
- Eberlein, Wolfgang: *See—*
  - Mihm, Gerhard; Eberlein, Wolfgang, Engel, Welfhard; Trummlitz, Gunter; Mayer, Norbert; Dodds, Henri; and Hammer, Rudolf, 5,026,699, Cl. 514-220.000.
- Ebina, Toshihiko: *See—*
  - Funabashi, Isao; Ebina, Toshihiko; and Numauchi, Hiromitsu, 5,025,726, Cl. 101-352.000.
- Echols, John B. Jig and fly box. 5,025,588, Cl. 43-57.100.
- Eck, Charles. *See—*
  - Bonato, Marc; and Eck, Charles, 5,026,855, Cl. 546-116.000.
- Eck, Werner; Harrsch, Ernst; and Geiger, Friedrich, to Passat-Maschinenbau GmbH. Washing machine. 5,025,645, Cl. 68-27.000.
- Eckert, Konrad, to Robert Bosch GmbH. Fuel injection system for internal combustion engines. 5,025,768, Cl. 123-506.000.
- Eckhardt, Helmut: *See—*
  - Baughman, Ray H.; Buff, Ernest D.; Eckhardt, Helmut; and Fuchs, Gerhard H., 5,025,602, Cl. 52-171.000.
- Econo Max Manufacturing: *See—*
  - McCarty, Lon H., 5,025,531, Cl. 16-313.000.
- Economu, Nikolaos A.; and Meakin, Douglas B., to General Electric Company, p.l.c., The. Chemical vapor deposition process for depositing large-grain polysilicon films. 5,026,574, Cl. 427-248.100.
- ED Scharwachter GmbH & Co. KG: *See—*
  - Koop, Georg; and Volkl, Raimund, 5,026,110, Cl. 296-108.000.
  - Tolle, Karl-Heinz; and Steckel, Willi, 5,026,103, Cl. 292-275.000
- Edmond, John A., to Cree Research, Inc. Blue light emitting diode formed in silicon carbide. 5,027,168, Cl. 357-17.000.
- Edwards, Arnold G.: *See—*
  - Huber, Klaus B., Hromas, Joe C., and Edwards, Arnold G., 5,025,861, Cl. 166-297.000.
- Edwards, Floyd V.; and DeWitt, Scott H., to Harmac Medical Products, Inc. Parenteral check valve. 5,025,829, Cl. 137-512.000.
- Egger, Friedrich: *See—*
  - Manser, Josef; Egger, Friedrich, and Seiler, Werner, 5,026,567, Cl. 426-458.000.
- Eguchi, Yasuteru: *See—*
  - Yorozu, Hidenori; Eguchi, Yasuteru, Ohkawa, Wataru; and Matsumoto, Yasunobu, 5,026,551, Cl. 424-44.000.
- Ehrenfreund, Josef: *See—*
  - Boger, Manfred; Drabek, Jozef, and Ehrenfreund, Josef, 5,026,730, Cl. 514-586.000.
- Ehrhardt, Andreas, to Nokia Unterhaltungselektronik. Saddle-coil arrangement for a cathode ray tube and a coil carrier for such an arrangement. 5,027,097, Cl. 335-213.000.
- Ehrola, Juha, to Valmet Paper Machinery Inc. Method and apparatus for reel-up of a paper web. 5,026,005, Cl. 242-65.000.
- Eichel, Herman J.; and Massmann, Brent D., to Kinaform Technology, Inc. Sustained-release pharmaceutical preparation. 5,026,559, Cl. 424-458.000.
- Eichinger, Rudolf, Michaud, Horst; and Seeholzer, Josef, to SKW Trostberg Aktiengesellschaft. Process for sizing in the production of paper, cardboard, paperboard and other cellulose containing materials. 5,026,457, Cl. 162-158.000.
- Eickvonder, Wolfgang; Passmann, Norbert; Thomas, Gerhard, Tummers, Peter; and Steven, Hubert, to L. & C. Steinmuller GmbH. Apparatus for burning carbonaceous material in a fluidized bed reactor. 5,025,755, Cl. 122-4.00D
- Eifert, Gyula: *See—*
  - Bakos, Jozsef, Neil, Balint; Kollar, Laszlo, Toros, Szilard; Eifert, Gyula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna, Kuronya, Istvan; Magyari, Istvan, Timar, Judit; Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.
- Einco Oy: *See—*
  - Ruottu, Seppo K., 5,026,269, Cl. 431-7.000
- Eki, Makoto: *See—*
  - Oda, Kenji; Eki, Makoto; Tsutsui, Eiji; and Maeshima, Masanobu, 5,027,152, Cl. 355-200.000
- Elf France: *See—*
  - Quang, Dang Vu; Amigues, Pierre; and Gaillard, Jean-Ferdinand, 5,026,459, Cl. 202-158.000.
- Eli Lilly and Company: *See—*
  - Flaugh, Michael E., 5,026,869, Cl. 548-436.000.
  - Nixon, James A., Pioch, Richard P.; Schaus, John M., and Titus, Robert D., 5,026,707, Cl. 514-255.000.
- Elings, Virgil B.; Gurley, John A.; and Sarid, Dror, to Digital Instruments, Inc. Compact atomic force microscope. 5,025,658, Cl. 73-105.000.
- Elk River Enterprises, Inc.: *See—*
  - O'Brien, Michael E., 5,026,593, Cl. 428-215.000.
- Elligson, Daniel M., to Black & Decker Inc. Dual mode rotary power tool with adjustable output torque. 5,025,903, Cl. 192-83.000.
- Elliott, William: *See—*
  - McCartney, Andrew, DeWitt, Charles; and Elliott, William, 5,027,285, Cl. 364-483.000.
- Elopak Systems, A.G.: *See—*
  - Lisiecki, Robert E., 5,025,982, Cl. 229-125.350.
- El-Sadi, Ashraf I.: *See—*
  - Berti, Eugenio; and El-Sadi, Ashraf I., 5,027,233, Cl. 360-77.020
- Elsag International B.V.: *See—*
  - Keyes, Marion A., IV; and Thompson, William L., 5,025,665, Cl. 73-597.000.
- Elward-Berry, Julie: *See—*
  - Peiffer, Dennis G.; Bock, Jan; and Elward-Berry, Julie, 5,026,490, Cl. 252-8.510.
- Elyanow, Irving D.: *See—*
  - Katz, William E.; Elyanow, Irving D.; and Sims, Keith J., 5,026,465, Cl. 204-182.400.
- Emaco Ltd.: *See—*
  - Buttery, Michael H., 5,026,970, Cl. 219-465.000.
- Emerson Electric Co.: *See—*
  - Hult, David R.; and Tomasiak, Mark J., 5,025,529, Cl. 15-344.000
- Emert, Jacob; Lundberg, Robert D.; and Gutierrez, Antonio, to Exxon Chemical Patents Inc. Oil soluble dispersant additives useful in oleaginous compositions. 5,026,495, Cl. 252-51.50R
- Empak, Inc.: *See—*
  - Gregerson, Barry, and Dressen, Larry, 5,025,926, Cl. 206-444.000
- Enander, Harold R. Supplemental vehicle heating apparatus with long heating cycle. 5,025,985, Cl. 237-2.00A.
- Endo, Yoshinori, to Brother Kogyo Kabushiki Kaisha. Image exposure device having frame addition unit. 5,027,197, Cl. 358-76.000.
- Energy Mines and Resources Canada: *See—*
  - Allenger, Vincenza; Pandey, Raj N., and Yarlagadda, Prasad, 5,026,944, Cl. 585-500.000.
- Engel, Welfhard. *See—*
  - Mihm, Gerhard, Eberlein, Wolfgang, Engel, Welfhard; Trummlitz, Gunter; Mayer, Norbert; Dodds, Henri; and Hammer, Rudolf, 5,026,699, Cl. 514-220.000.
- Engelbrecht, Eckart, Nieder, Elmar; and Keller, Arnold, to GMT Gesellschaft fur Medizinsche Texhnik mbH; and Waldemar Link GmbH & Co. Prosthetic device. 5,026,399, Cl. 623-18.000.
- Engstrand, Sven E. O.: *See—*
  - Andersson, Ken G. E., Engstrand, Sven E. O.; and Asberg, Lars G., 5,026,224, Cl. 409-234.000.
- Enichem Anic S.p.A.: *See—*
  - Messina, Giuseppe; Lorenzoni, Loreno; and Chessa, Giovanna, 5,026,866, Cl. 548-238.000.
- Eniricerche S.p.A.: *See—*
  - Braca, Giuseppe; Ricci, Alessandro; Sbrana, Glauco; Brunelli, Maurizio; Giusti, Aldo; Bertolini, Guglielmo; and Galletti, Anna M. R., 5,026,675, Cl. 502-159.000.
  - Di Gioacchino, Sandro; Paolinelli, Antonio; and Re, Luciano, 5,026,906, Cl. 562-437.000.
- ENSR Corporation: *See—*
  - Johnson, Dennis W., 5,026,432, Cl. 134-21.000.
- Entertainment International, Inc. 1987: *See—*
  - Paterson, William D.; Wester, John; Pulliam, Norman L., and von Eyben, Henning, 5,026,053, Cl. 273-3.00R.
- Epstein, David A.: *See—*
  - Rossignac, Jaroslaw R., Epstein, David A., Gharachorloo, Nader, Jansen, Frederik W., and Zoulas, Christos S., 5,027,292, Cl. 364-522.000.
- Erdman, Arthur G.: *See—*
  - Rekow, Elizabeth D.; Riley, Donald R.; Erdman, Arthur G., Klamecki, Barney; Zhu, Yang, and Ahn, Jeong-Ho, 5,027,281, Cl. 364-474.240
- Ernst, Wolfram, to Siemens Aktiengesellschaft. Process for the resynchronization of an exchange in a telecommunication network. 5,027,375, Cl. 375-107.000.
- Eschrich, Gerhard: *See—*
  - Stehle, Heinz, Wehr, Thomas; Petersmann, Joseph, Seidel, Willi, Hamm, Ludwig; Foeldi, Thomas; Eschrich, Gerhard, Schwamm, Ronald, Runge, Wolfgang, Gruhle, Wolf-Dieter; and Wendel, Peter, 5,025,684, Cl. 74-862.000.
- Eskew, Larry R., and Simpson, Claude S. Bridge deck panel support system and method. 5,025,522, Cl. 14-73.000.
- Esselte Pendaflex Corporation. *See—*
  - Dellacroce, Cheryl, 5,025,979, Cl. 229-1.50R
- Esser, Hans-Willi. *See—*
  - Schmid, Reinhold; Esser, Hans-Willi; and Mistler, Friedhelm, 5,026,199, Cl. 403-313.000.
- Essex Industries, Inc.: *See—*
  - Sever, Robert E.; and Woodring, Dave L., 5,026,026, Cl. 251-230.000.
- Estis, Leonard; and Livingston, Phillip, to Liposome Company, Inc. The. Adjuvant composition. 5,026,557, Cl. 424-450.000.
- Ethyl Corporation: *See—*
  - Bell, Donald R.; and Berris, Bruce C., 5,026,885, Cl. 556-47.000.
- Ethyl Petroleum Additives, Inc.: *See—*
  - Lam, William Y.; and Wooton, David L., 5,026,493, Cl. 252-32.7HC.
- Eto, Haruaki: *See—*
  - Okabe, Masao; Amgai, Akikzau; Eto, Haruaki, and Tanaka, Yasuo, 5,026,764, Cl. 524-540.000.

- Evans, Roger, Jee, Michael H., Sander, Nigel H., Smith, Ian H.; and Gibson, Raymond K., to Cadbury Schweppes plc. Surfactant. 5,026,548, Cl. 424-195.100.
- Evans, Steven; and Chapman, Derek D., to Eastman Kodak Company. Pyridoneindoaniline dye-donor element for thermal dye transfer. 5,026,678, Cl. 503-227.000.
- Evans, Steven; and Chapman, Derek D., to Eastman Kodak Company. Mixture of dyes for cyan dye donor for thermal color proofing. 5,026,679, Cl. 503-227.000.
- Evans, W. Thomas: *See—*
  - Biresaw, Girma; Boland, Daniel J.; Paola, Vince A., Evans, W. Thomas; Kampert, William P.; and Abels, Ronald L., 5,026,577, Cl. 428-1.000.
- Evans, Warren H.; and Wilson, Shirley M., to United States of America, Health and Human Services. Human neutrophilic granulocyte end-stage maturation factor and its preparation and use. 5,026,826, Cl. 530-351.000.
- Eveready Battery Company, Inc.: *See—*
  - Schumm, Brooke, Jr., 5,026,616, Cl. 429-168.000.
  - Tucholski, Gary R., 5,026,615, Cl. 429-61.000.
- Everest Medical Corporation: *See—*
  - Rydell, Mark A.; and Anderson, Brent L., 5,026,371, Cl. 606-47.000.
- Everett, Frederick A., Jr.; and Farrar, Quinton J., to Pfizer Products Hospital Group Inc. Drainage device. 5,026,358, Cl. 604-320.000.
- Excel Industries, Inc.: *See—*
  - Hewko, Marc D., 5,026,111, Cl. 296-146.000
- Excelermatic Inc.: *See—*
  - Kraus, Charles E., 5,025,671, Cl. 74-206.000.
- Exxon Chemical Patents Inc.: *See—*
  - Canich, Jo Ann M., 5,026,798, Cl. 526-127.000
  - Emert, Jacob; Lundberg, Robert D., and Gutierrez, Antonio, 5,026,495, Cl. 252-51.50R.
- Exxon Production Research Company: *See—*
  - Winbow, Graham A.; Chen, Sen-Tsuen; and Rice, James A., 5,027,331, Cl. 367-75.000.
- Exxon Research & Engineering: *See—*
  - Peiffer, Dennis G.; Bock, Jan; and Elward-Berry, Julie, 5,026,490, Cl. 252-8.510.
- Exxon Research & Engineering Company: *See—*
  - Halbert, Thomas R.; Chianelli, Russell R.; Stiefel, Edward I., and Jacobson, Allan J., 5,026,473, Cl. 208-143.000.
  - Singhal, Gopal H.; and Habeeb, Jacob J., 5,026,492, Cl. 252-32.70E.
  - Stuntz, Gordon F.; Culross, Claude C.; and Reynolds, Steve D., 5,026,475, Cl. 208-403.000.
  - Wong, Yiu Wah; Frederick, Jeffrey W., and Patel, Rutton D., 5,025,831, Cl. 137-561.00A.
- F. L. Smidth & Co. A/S: *See—*
  - Hundebol, Soren, 5,026,275, Cl. 432-14.000.
- F M K. Kruezer GmbH & Co.: *See—*
  - Kreuzer, Friedhelm, 5,026,017, Cl. 248-324.000.
- Faas, Jurg; Nuessli, Eduard; Grundler, Christof; Staheli, Paul; Hanselmann, Daniel; Demuth, Robert; Waeber, Rene; and Fritzsche, Peter, to Rieter Machine Works, Ltd. Method of blending textile fibers. 5,025,533, Cl. 19-145.500.
- Fabris, Alroy G.: *See—*
  - Umasankar, Guruswamy; Kade, Alexander; and Fabris, Alroy G., 5,026,126, Cl. 303-100.000.
- Faccioli, Giovanni: *See—*
  - Dezza, Ottavio; and Faccioli, Giovanni, 5,026,374, Cl. 606-72.000.
- Fagerburg, David R.: *See—*
  - Rule, Mark; Fauver, Jerry S.; Fagerburg, David R.; Lawrence, Paul B.; and Watkins, Joseph J., 5,026,824, Cl. 528-389.000.
- Fagg, Barry S.; Dull, Gary M.; Haberkern, Richard G.; Merricks, Robert A.; and Stewart, John E., to R. J. Reynolds Tobacco Company. Tobacco processing. 5,025,812, Cl. 131-297.000.
- Faiks, Frederick S.; Anderson, Craig M.; and Bischoff, Daniel R., to Steelcase Inc. Controller for seating and the like. 5,026,117, Cl. 297-304.000.
- Fakruddin, Saifee; and Foster, Mark J., to Zenith Data Systems Corporation. Method and apparatus for battery-power management using load-compensation monitoring of battery discharge. 5,027,294, Cl. 364-550.000.
- Fan, Zhigang, to Xerox Corporation. Unscreening of stored digital halftone images by logic filtering. 5,027,078, Cl. 358-456.000.
- Fanuc Ltd.: *See—*
  - Iwagaya, Takashi, 5,027,045, Cl. 318-571.000.
- Farha, Floyd E., Jr.: *See—*
  - McDaniel, Max P.; Pitzer, Emory W.; and Farha, Floyd E., Jr., 5,026,796, Cl. 526-100.000.
- Farley, Daniel K. Table mounted surgical retractor. 5,025,780, Cl. 128-20.000.
- Farmos-Yhtyma Oy: *See—*
  - Karjalainen, Arja L.; and Karjalainen, Arto J., 5,026,868, Cl. 548-346.000.
- Farr, Andrew F.; and Radisch, Herbert R., Jr., to InterVentional Technologies, Inc. Atherectomy systems and methods. 5,026,384, Cl. 606-159.000.
- Farrar, Quinton J.: *See—*
  - Everett, Frederick A., Jr.; and Farrar, Quinton J., 5,026,358, Cl. 604-320.000.
- Farrell, Nicholas P.: *See—*
  - Skov, Kirsten A.; Farrell, Nicholas P.; and Chaplin, David J., 5,026,694, Cl. 514-184.000.
- Fauver, Jerry S.: *See—*
  - Rule, Mark, Fauver, Jerry S.; Fagerburg, David R.; Lawrence, Paul B.; and Watkins, Joseph J., 5,026,824, Cl. 528-389.000.
- Faville, Paul E., to Boeing Company, The. Drill diameter measuring machine. 5,026,165, Cl. 356-386.000.
- Fazan, Pierre C.: *See—*
  - Lee, Ruojia; Lowrey, Tyler A.; Gonzalez, Fernando; Karniewicz, Joseph J.; and Fazan, Pierre C., 5,026,657, Cl. 437-47.000.
- Federal Paper Board Co., Inc.: *See—*
  - Blackman, Stephen M., 5,025,980, Cl. 229-73.000.
- Fekete, Joseph, Sr. Adjustable-fit flat-top hat. 5,025,505, Cl. 2-197.000.
- Feldman, Alan F.: *See—*
  - Anderson, Neal G.; Lust, David A.; Bennett, Barbara J., Feldman, Alan F.; and Polomski, Robert E., 5,026,873, Cl. 548-533.000.
- Feldman, Lennard. Hand grip for carrying loaded plastic bags. 5,026,105, Cl. 294-170.000.
- Fell, Wolfgang, to BTS Broadcast Television Systems GmbH. Method of setting the tape pitch of a magnetic tape playback equipment by adjusting tape guides. 5,027,231, Cl. 360-71.000.
- Feller, David E.; and Wood, Carl G. Apparatus for measuring lip pressure on reed of woodwind instruments. 5,025,698, Cl. 84-453.000.
- Feller, Murray F. Apparatus for flow rate and energy transfer measurements. 5,026,171, Cl. 374-41.000.
- Fellmann, Jere; Wentrcek, Paul; and Lu, Phat T., to Catalytica, Inc. Manufacture of 4,4'-diisopropylbiphenyl. 5,026,940, Cl. 585-467.000.
- Fellmann, Jere D.; Saxton, Robert J.; Wentrcek, Paul R.; Derouane, Eric G.; and Massiani, Pascale, to Catalytica, Inc. Process for selective diisopropylation of naphthyl compounds using shape selective acidic crystalline molecular sieve catalysts. 5,026,942, Cl. 585-467.000.
- Feng, Jianhua: *See—*
  - Shao, Shuyong; Feng, Jianhua; and Zhang, Xinchao, 5,025,784, Cl. 128-419.0PG.
- Ferguson, Blair Q.; Bacheler, Lee T.; Petteway, Stephen R.; and Neubauer, Russell H., to Du Pont Merck Pharmaceutical. Stable human cell lines expressing an indicator gene product under virus-specific genetic controls. 5,026,635, Cl. 435-5.000.
- Ferguson, Clifford R.: *See—*
  - Trzecieski, Michael A.; and Ferguson, Clifford R., 5,026,451, Cl. 156-244.270.
- Ferguson, Ian J.: *See—*
  - Buchan, Gavin M.; and Ferguson, Ian J., 5,026,860, Cl. 546-271.000.
- Ferrari, Christopher, to Advanced Instruments, Inc. Compression device with a safety pressure release. 5,025,781, Cl. 128-64.000.
- Ferrari, Franco; and Migli, Carlo, to Ferrari, Franco. Quick coupling door hinge. 5,025,530, Cl. 16-236.000.
- Ferro, Raffaele: *See—*
  - Marchionni, Giuseppe; Viola, Gian T.; Tommasi, Giulio; Ferro, Raffaele; and Cirillo, Gianna, 5,026,786, Cl. 525-356.000.
- Feste, Andrew S.: *See—*
  - Dudrick, Stanley J.; Guinn, Edward J.; Gerlich, Stanley J.; and Feste, Andrew S., 5,026,721, Cl. 514-396.000.
- Festo KG: *See—*
  - Stoll, Kurt, 5,025,834, Cl. 137-560.000.
- Fiat Auto S.p.A.: *See—*
  - Dal Monte, Antonio, 5,026,116, Cl. 297-284.000.
- Fiber Controls Corporation: *See—*
  - Lytton, Kenneth G.; Bolin, Odell F.; and Koehler, Robert J., 5,025,532, Cl. 19-80.00R.
- FiberChem Inc.: *See—*
  - Klainer, Stanley M.; Dandge, Dileep K.; Butler, Marcus; and Goswami, Kisholoy, 5,026,139, Cl. 350-96.290.
- Fiechter, Rene A. Electronic gage and levelmeter. 5,025,566, Cl. 33-338.000.
- Field, Thomas L.: *See—*
  - Richards, Oliver L., Jr.; and Field, Thomas L., 5,027,402, Cl. 381-10.000.
- Fielder, Dennis A.: *See—*
  - Marlton, Anthony P.; Fielder, Dennis A.; Halsted, Victor G.; and Stockill, Trevor R., 5,027,212, Cl. 358-183.000.
- Filter Materials Limited: *See—*
  - Hill, Michael; and Nichols, Walter A., 5,025,815, Cl. 131-332.000.
- Finlan, William P. Apparatus for patching a hole in the hull of a moving ship. 5,025,972, Cl. 228-32.000.
- Finn, John M., to American Cyanamid Company. Alkyl esters of 5-heterocyclic-pyridine-2,3-dicarboxylic acids. 5,026,859, Cl. 546-268.000.
- Finnenthal, Cornelia; Roland, Wolf-Achim; and Morlock, Roland, to Gerhard Collardin GmbH. Chromium free treatment before coating metal surfaces. 5,026,440, Cl. 148-247.000.
- Finnigan Corporation: *See—*
  - Bier, Mark E.; Cooks, Robert G.; and Stafford, George C., 5,026,987, Cl. 250-281.000.
- Firatli, Ahmet; Burger, Diethard; Amsel, Klaus; and Lindstaedt, Bernd, to Braun Aktiengesellschaft. Roughened smoothing iron soleplate having an anti-corrosive, scratch-resistant and easily slidable coating thereon. 5,025,578, Cl. 38-93.000.
- Fischer, Gerhard: *See—*
  - Grubisic, Vatroslav; and Fischer, Gerhard, 5,026,122, Cl. 301-9.0DN.
- Fischer, Rudolf. Decanting apparatus. 5,026,480, Cl. 210-515.000.
- Fitzsimmons, George W.; and Lamberty, Bernard J., to Boeing Company, The. System for maintaining polarization and signal-to-noise levels in received frequency reuse communications. 5,027,124, Cl. 342-362.000.

VOL
1127
ISS
4
JE
25
1991
UMI

Fixon, Georges. Sealed packaging box with mechanical or manual vacuum, full or partial vacuum. 5,025,948, Cl 220-366.000.
Flaugh, Michael E., to Eli Lilly and Company. 6-substituted-4-dialkylaminotetrahydrobenz(c,d)indoles. 5,026,869, Cl. 548-436.000.
Flautt, Martin C.: *See—*
Pollet, Jean-Claude; Williams, Gary L.; Armstrong, Gordon P.; and Flautt, Martin C., 5,026,410, Cl. 65-3.430.
Fleet, George W. J., to Monsanto Company. Method of preparing bicyclic tetrahydroxylated pyrrolizidines. 5,026,870, Cl. 548-453.000.
Fleischmann, William R.: *See—*
Albrecht, Thomas B.; Albrecht, Thomas E.; and Fleischmann, William R., 5,026,544, Cl. 424-85.400.
Fletcher, Stephen R.: *See—*
Taylor, Edward C.; Beardsley, George P.; Harrington, Peter J. and Fletcher, Stephen R., 5,026,851, Cl. 544-279.000.
Flexible Barricades, Inc.: *See—*
Gorlov, Alexander M., 5,026,203, Cl. 404-6.000.
Fliedner, Michael: *See—*
Kunkel, Georg; Klingenstein, Dieter; Mahr, Heinz; and Fliedner, Michael, 5,026,469, Cl. 204-298.150
Fling, Russell T., to RCA Licensing Corporation. Sync tip clamp circuitry. 5,027,017, Cl. 307-555.000.
Floyd, William C.; Dragner, louis R.; and Black, Blanche H., to Sequa Chemicals, Inc. Starch based binder composition for non-woven fibers or fabrics. 5,026,746, Cl. 524-50.000.
Flynn, Gary A.; and Beight, Douglas W., to Merrell Dow Pharmaceuticals. Substituted 1,5-dihydro-4-(N-methylhydroxylamino)-2H-pyrrol-2-ones. 5,026,861, Cl. 514-424.000.
FM Industries, Inc.: *See—*
Bomgardner, Charles T; and Dumler, D. Bradley, 5,025,938, Cl. 213-43.000.
Fock, Jurgen; Hahn, Gunter; and Wagenknecht, Gunter, to Th. Goldschmidt AG & GDF Gesellschaft fur Dentale Forschung u. Innovationen GmbH. Dental compsition of perfluoroalkyl group-containing (meth-)acrylate esters. 5,026,902, Cl. 560-223.000.
Foeldi, Thomas: *See—*
Stehle, Heinz; Wehr, Thomas; Petersmann, Joseph; Seidel, Willi; Hamm, Ludwig; Foeldi, Thomas; Eschrich, Gerhard; Schwamm, Ronald; Runge, Wolfgang; Gruhle, Wolf-Dieter; and Wendel, Peter, 5,025,684, Cl. 74-862.000.
Folda, Thomas: *See—*
Weber, Thomas; Heckmann, Walter; Mertes, Jurgen; Tesch, Helmut; Altstaedt, Volker; Eberle, Wolfgang; Folda, Thomas; Stutz, Herbert; and Recker, Hans-Gert, 5,026,789, Cl. 525-423.000.
Fong, Jennifer L. C.; and Berg, Alan B., to Molex Incorporated. Cover for an electrical connector. 5,026,295, Cl. 439-135.000.
Food Industry Equipment International, Inc.: *See—*
McCullough, Timothy J., 5,025,559, Cl. 30-276.000.
Foodscience Corporation: *See—*
Kendall, Roger V.; and Lawson, John W., 5,026,728, Cl. 514-561.000.
Forand, Karen M., to Procter & Gamble Company, The. Cotton fiber particles for use in baked goods. 5,026,569, Cl. 426-549.000.
Forbus, Thomas R., to Mobil Oil Corporation. Disproportionation of alpha-olefin dimer to liquid lubricant basestock. 5,026,948, Cl. 585-646.000.
Ford Motor Company: *See—*
Abramczyk, William M., 5,026,092, Cl. 280-777.000.
Masrur, Md. A.; Miller, John M; and Patil, Prabhakar B., 5,027,048, Cl. 318-806.000.
Ford New Holland, Inc.: *See—*
Bay, Tod A.; Frahm, Jeffry R.; Roesler, David F.; and Gilbert, Robert, 5,026,246, Cl. 414-694.000.
Ford, Russell W.; and Shepherd, David S., to Bell Helicopter Textron Inc. Calibrated pitch change link. 5,026,254, Cl. 416-61.000.
Forder, Walter. *See—*
Larik, Joost; and Forder, Walter, 5,027,181, Cl. 357-41.000.
Forsman, Jan-Erik, to ABB Plast AB. Pressure vessel having a filamentary wound structure. 5,025,943, Cl. 220-589.000.
Foss, Richard C., to Mosaid Inc. Addressing for large dynamic RAM 5,027,329, Cl. 365-230.020.
Foster, George H., Jr.: *See—*
Del Guidice, Henry L.; and Foster, George H., Jr., 5,026,305, Cl. 439-620.000.
Foster, Mark J.: *See—*
Fakruddin, Saifee; and Foster, Mark J., 5,027,294, Cl. 364-550.000.
Fotland, Richard A.; and Miekka, Fred, to Dennison Manufacturing Company. Method and apparatus for charged particle generation. 5,027,136, Cl 346-159.000.
Foulk, Donald J. Child resistant electrical outlet. 5,026,299, Cl. 439-137.000.
Foulkes, Michael E.: *See—*
Campbell, John S.; and Foulkes, Michael E., 5,026,504, Cl. 252-186.430.
Frahm, Jeffry R.: *See—*
Bay, Tod A.; Frahm, Jeffry R.; Roesler, David F.; and Gilbert, Robert, 5,026,246, Cl. 414-694.000.
Fraisse, Didier, to Gerin, Merlin. Measuring device of the rms value of a signal, notably for current measurement in a solid-state trip device. 5,027,060, Cl. 324-132.000.
Framatome: *See—*
Frizot, Alain, 5,025,541, Cl. 29-240.000.
Francotte, Eric; and Baisch, Gabriele, to Ciba-Geigy Corporation Process for the preparation of finely divided porous cellulose particles. 5,026,841, Cl 536-58.000.
Frank, Harvey A., and Lynge, Rhoda Back support for motorcycles 5,026,119, Cl. 297-383.000.
Frank, Jean P.. *See—*
Donze, Pierre; and Frank, Jean P, 5,026,079, Cl. 280-47.310.
Franklin, Gene R.; and Ho, Benedict C. M., to NCR Corporation Method for recognizing the leading edge of a character in E13B font 5,026,974, Cl. 235-449.000.
Franks, Simon G: *See—*
Maitlen, C. Gene; and Franks, Simon G., 5,025,994, Cl. 241-99.000
Frantz, Billy J., and Hellstrom, Sven E., to International Business Machines Corporation. Versioning of message formats in a 24-hour operating environment. 5,027,316, Cl 364-900.000.
Franz, Helmut, Hanlon, James H.; and Shick, Lloyd G., to PPG Industries, Inc. Soluble polymer interleaving material 5,026,597, Cl 428-323.000.
Fraser, Howard H, Jr. *See—*
Baumann, David C.; and Fraser, Howard H, Jr., 5,026,262, Cl 418-55.600.
Fratelli Lamberti S.p.A *See—*
Li Bassi, Giuseppe; Cadona, Luciano; and Nicora, Carlo, 5,026,740, Cl. 522-14.000.
Fraunhofer-Gesellschaft zur Forderung der angewandten *See—*
Muller, Dietmar; and Helfrich, Mathias, 5,026,443, Cl. 149-18.000
Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e V.: *See—*
Meinhard, Stefan, 5,026,738, Cl. 521-95.000.
Frederick, Jeffrey W.: *See—*
Wong, Yiu Wah, Frederick, Jeffrey W.; and Patel, Rutton D. 5,025,831, Cl. 137-561.00A.
Freeberg, Lloyd L. Golf putter with alignment device. 5,026,062, Cl 273-183.00D
Freed, Herbert D., to Lucifier Lighting Company Flexible light rail 5,027,262, Cl. 362-249.000.
Freidinger, Roger M.: *See—*
Bock, Mark G.; Freidinger, Roger M., and DiPardo, Robert M 5,026,703, Cl 514-247.000.
Fricke, William C. Line scanner 5,026,996, Cl. 250-461 100.
Friedman, Paul; and Melhorn, Nathan, to Microcom Systems, Inc Data telecommunications system and method for transmitting compressed data. 5,027,376, Cl. 375-122.000.
Friedmann, Robert C.; Lackey, John W.; and O'Neill, Brian T 1,4-diazabicyclo[3.2.2.]nonane and intermediates for the preparation thereof. 5,026,845, Cl. 549-492.000.
Frink America, Inc.: *See—*
Verseef, Jan H., 5,025,577, Cl. 37-280.000.
Fritzsche, Peter: *See—*
Faas, Jurg; Nuessli, Eduard; Grundler, Christof, Staheli, Paul. Hanselmann, Daniel; Demuth, Robert; Waeber, Rene; and Fritzsche, Peter, 5,025,533, Cl. 19-145.500.
Frizot, Alain, to Framatome. Device and a process for screwing and unscrewing a nut on a coupling member. 5,025,541, Cl. 29-240.000
Froeschle, Thomas A., to Bose Corporation. Multiple chamber loudspeaker system. 5,025,885, Cl. 181-156.000.
Frommelt Industries, Inc.: *See—*
West, Floyd D., 5,025,846, Cl. 160-199.000.
Fuchs, Gerhard H *See—*
Baughman, Ray H.; Buff, Ernest D.; Eckhardt, Helmut; and Fuchs. Gerhard H., 5,025,602, Cl. 52-171 000.
Fuda, Hitoshi: *See—*
Yamamura, Yoshihiro; and Fuda, Hitoshi, 5,027,393, Cl 379-410.000.
Fuji, Akihiro: *See—*
Ueda. Tohru, Sasaki, Takuma; Matsuda, Akira; Miyashita. Takanori; Sakata, Shinji; Yamagami, Keiji; and Fuji, Akihiro. 5,026,835, Cl. 536-23.000.
Fuji Electric Co., Ltd.: *See—*
Kawahara. Yuuji, 5,027,234, Cl. 360-77.080.
Sano, Tasukazu; Tanaka, Hideyuki; Nakamura, Keijirou, Kume. Hideo; and Tanigawa, Kiyoshi, 5,026,136, Cl. 350-96.150.
Fuji Kiko Company, Limited: *See—*
Yamamoto, Yoshio, 5,025,679, Cl. 74-493.000.
Fuji Photo Film Co., Ltd.: *See—*
Akao, Mutsuo, 5,026,594, Cl. 428-220.000.
Akao, Mutsuo, 5,026,600, Cl. 428-328.000.
Mizuno, Kazunori; and Sashihara, Kenji. 5,026,630, Cl 430-498.000.
Nakanishi, Kanji, 5,027,247, Cl. 360-126.000.
Ono, Michio; Hirai, Hiroyuki; Ohki, Nobutaka; and Nakamura. Koki, 5,026,634, Cl. 430-559.000.
Otake, Katsumi, Yanagimoto, Takekazu; Nakajima, Shuichi, and Kishimura, Yuhei, 5,026,236, Cl. 412-33.000.
Ujiie, Yoichi; and Isozaki, Hiroyuki, 5,027,154, Cl 355-205.000
Yoneyama, Hiroyuki, 5,026,631, Cl. 430-545.000.
Fuji Photo Optical Co., Ltd.: *See—*
Kondo, Mituo, 5,025,804, Cl. 128-4 000.
Ohno, Kazunori, 5,027,144, Cl. 354-195.120.
Fuji Xerox Co., Ltd.: *See—*
Hisatake, Masayuki; and Takayanagi, Hiroshi, 5,027,221, Cl 358-300.000.
Kawata, Tetsuro; Hashimoto, Eiri, and Miyakawa, Nobuaki. 5,027,423, Cl. 382-54.000.
Sugimoto, Junichi, 5,027,289, Cl. 364-520.000.
Suzuki, Takanobu; and Furusawa, Tsutomu, 5,027,288, Cl 364-519.000.

Fujie, Hideki: *See—*
Shinbo, Masatoshi; Fujie, Hideki; Iwakuni, Kaoru; Muto, Akira; and Aoki, Kazuhiro, 5,027,222, Cl. 358-330.000.
Fujii, Atsushi; and Fukuda, Kazuyuki, to Idemitsu Petrochemical Co, Ltd. Polypropylene-based resin composition and process for preparation of sheets comprising the resin composition. 5,026,778, Cl. 525-210.000.
Fujii, Kiyosi: *See—*
Hara, Kazuhiro; and Fujii, Kiyosi, 5,027,415, Cl. 382-7.000.
Fujii, Kousuke: *See—*
Nishida, Hiroshi; Ishigaki, Tatsuya, Ito, Atsushi; Kudou, Yoshinobu; Katou, Hiroshi; and Fujii, Kousuke, 5,027,242, Cl. 360-106.000.
Fujii, Masashi; Uyama, Kiichiro; Shoji, Takao, and Arai, Kenji, to Kabushiki Kaisha Toshiba. Industrial computed tomography apparatus. 5,027,378, Cl. 378-11.000.
Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kitahara, Masaki, to Nissan Chemical Industries, Ltd. Thienopyridine type mevalonolactones. 5,026,698, Cl. 514-215.000
Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kitahara, Masaki, to Nissan Chemical Industries Ltd Pyrimidine type mevalonolactones. 5,026,708, Cl. 514-256.000.
Fujiki, Norio: *See—*
Hirota, Masaki; Fujiki, Norio; and Mihara, Teruyoshi, 5,027,251, Cl. 361-18.000.
Fujimori, Hiroyoshi, to Olympus Optical Co., Ltd. Electronic still camera using variable-length data compression for storing still image signals. 5,027,214, Cl. 358-209.000.
Fujimoto, Nobuyuki: *See—*
Sugimoto, Yoshiaki; Hosokawa, Toshihiro; Uchiumi, Yutaka; Sasamoto, Shuji; and Fujimoto, Nobuyuki, 5,026,331, Cl. 474-214.000.
Fujimura, Mitsuaki: *See—*
Ohe, Tatsuya; and Fujimura, Mitsuaki, 5,026,965, Cl. 219-121 700.
Fujioka, Hidehiko: *See—*
Chiba, Yuji; Fujioka, Hidehiko; Mizusawa, Nobutoshi, Kariya, Takao; and Shimoda, Isamu, 5,026,239, Cl 414-217.000.
Fujioka, Kazutoshi *See—*
Arai, Masatoshi; Fujioka, Kazutoshi; and Satou, Masaharu, 5,026,741, Cl. 522-33.000.
Fujisaki, Kiyotaka: *See—*
Fujisaki, Masataka; Fujisaki, Kiyotaka, Mori, Hitoshi; and Takeishi, Itugu, 5,027,207, Cl. 358-142.000.
Fujisaki, Masataka; Fujisaki, Kiyotaka; Mori, Hitoshi, and Takeishi, Itugu, to Japan Business Television, Inc.; and Kabushiki Kaisha Toshiba Television signal transmission system utilizing TDMA technique. 5,027,207, Cl. 358-142.000.
Fujisawa Pharmaceutical Co., Ltd.: *See—*
Takaya, Takao; Takasugi, Hisashi, Masugi, Takashi; Yamanaka, Hideaki; and Kawabata, Kohji, 5,026,695, Cl. 514-202.000.
Fujisou, Tokuo: *See—*
Shioiri, Tomonori; Satake, Shinichi; Sekido, Yasuo; Fujisou, Tokuo; Obuchi, Akira; and Kato, Hideharu, 5,026,536, Cl. 423-652.000.
Fujita, Yasumasa. *See—*
Kobayashi, Akio; Tanaka, Hiroshi; Yamashita, Shoji; Fujita, Yasumasa; Hikichi, Koichi; and Kumagai, Chiaki, 5,025,685, Cl. 74-866.000.
Fujitsu Limited: *See—*
Awano, Yuji, 5,027,164, Cl. 357-4.000.
Kitsuta, Tatsuaki; Shimotsuhama, Isao; Watanabe, Yoshio; Tanaka, Masahiro; Shiotsu, Shinichi, and Ogawa, Kazumi, 5,027,005, Cl 307-272.100.
Yokoyama, Naoki; ano Imamura, Kenichi, 5,027,179, Cl 357-34.000.
Fujiwara, Takayoshi: *See—*
Morozumi, Naoya; Sakata Hirotsugu; Hayano, Makoto; Okuda, Masayuki; Fujiwara, Takayoshi, Shimoda, Moriaki; and Hattori, Hitoshi, 5,026,264, Cl. 418-220.000.
Fujiwara, Tatsuro; Kogami, Yuji; and Watanabe, Asako, to Toyo Jozo Co., Ltd. 9-dihydro-9-O-alkyldesmycosin derivatives. 5,026,832, Cl 536-7.100.
Fukazawa, Toshio: *See—*
Nagata, Yuji; Fukazawa, Toshio; Wada, Kumiko; and Tosaki, Yoshihiro, 5,027,245, Cl. 360-121.000.
Fukino, Hiroshi, to Seiko Instruments, Inc. Double paper cut system for printer mechanism. 5,025,725, Cl. 101-227.000.
Fukuda, Hiroshi; and Azuma, Hideki, to Kabushiki Kaisha Kawai Gakki Seisakusho. Apparatus for forming plates of irregular cross-sectional shape. 5,025,650, Cl. 72-220.000.
Fukuda, Kazumi: *See—*
Kanehara, Koichi; Fukuda, Kazumi; and Uenishi, Kouichi, 5,026,972, Cl. 235-32.000.
Fukuda, Kazuyuki: *See—*
Fujii, Atsushi; and Fukuda, Kazuyuki, 5,026,778, Cl 525-210.000.
Fukui, Mika: *See—*
Takebayashi, Yoichi; Iwai, Isamu; Doi, Miwako; and Fukui, Mika, 5,027,420, Cl. 382-38.000.
Fukui, Yoshiharu: *See—*
Shiga, Akinobu; Fukui, Yoshiharu; Sasaki, Toshio; Okawa, Masahisa; and Matsuura, Hideaki, 5,026,889, Cl. 526-142.000.
Fukumoto, Masaki: *See—*
Fuse, Genshu; Yamada, Toshio; Odanaka, Shinji; and Fukumoto, Masaki, 5,026,658, Cl. 437-52.000.
Fukumoto, Takaaki. *See—*
Tada, Masuo; Hata, Takeki, Fukumoto, Takaaki; and Ohmori, Toshiaki, 5,025,597, Cl. 51-410.000.
Fukumura, Yoshikazu; and Ohki, Toshiyuki, to NTN Corporation. Structure for mounting boot. 5,026,323, Cl. 464-175.000.
Fukuoka, Noboru: *See—*
Tanjo, Toru; and Fukuoka, Noboru, 5,026,043, Cl 271-121 000.
Fukura, Kenichi: *See—*
Inoue, Katsura; Fukura, Kenichi; Tajima, Masakatsu; Iwamura, Toru; and Ohshiro, Masatoshi, 5,027,301, Cl 362-66.000.
Fukushima, Eiji: *See—*
Kawano, Satoshi; Kimura, Yoshio; and Fukushima, Eiji, 5,026,222, Cl. 409-225.000.
Fukuta, Tadatoshi: *See—*
Yamaoka, Sueharu; and Fukuta, Tadatoshi, 5,027,237, Cl 360-98.060.
Funabashi, Isao; Ebina, Toshihiko; and Numauchi, Hiromitsu, to Komori Corporation. Movable inker type printing machine 5,025,726, Cl. 101-352.000.
Funabashi, Motohisa: *See—*
Ohnari, Mikihiko; Sekozawa, Teruji; Funabashi, Motohisa, Atago, Takeshi; and Shioya, Makoto, 5,027,278, Cl 364-431.060.
Funada, Fumiaki: *See—*
Koden, Mitsuhiro; Kuratate, Tomoaki; Funada, Fumiaki, Sakaguchi, Kazuhiko; Kasai, Naoya; and Takehira, Yoshikazu, 5,026,506, Cl. 252-299.610.
Funatogawa, Hiroyuki. Mat for a chair. 5,026,585, Cl 428-71.000.
Furmanek, Daniel J. CFC recycling system. 5,025,633, Cl. 62-77.000
Furrow, Randy M., to AMP Incorporated. Connector and connector assembly having improved terminal insertion feature 5,026,304, Cl 439-595.000.
Furusawa, Tsutomu: *See—*
Suzuki, Takanobu; and Furusawa, Tsutomu, 5,027,288, Cl 364-519.000.
Furuse, Tatuo: *See—*
Takasaki, Chiaki; Furuse, Tatuo; and Amagasaki, Morio, 5,026,266, Cl. 425-150.000.
Furutachi, Nobuo: *See—*
Yokoyama, Shigeki; Sato, Tadahisa; Kimura, Keizo; Furutachi, Nobuo; and Takahashi, Osamu, 5,026,867, Cl. 548-251.000
Furuya, Miyuki: *See—*
Saneshige, Ryoji; Kuyama, Kouzi; Hasegawa, Makoto; and Furuya, Miyuki, 5,027,025, Cl. 310-156.000.
Furuyama, Takenori, to Sony Corporation Method for controlling a dynamic tracking head of a digital video tape recorder 5,027,235, Cl. 360-77.160.
Fuse, Genshu; Yamada, Toshio; Odanaka, Shinji; and Fukumoto, Masaki, to Matsushita Electric Industrial Co., Ltd. Method of making a trench capacitor dram cell. 5,026,658, Cl. 437-52.000.
Fusimi, Kouzi: *See—*
Hanzawa, Shigeru; Matsuda, Hiroto; and Fusimi, Kouzi, 5,026,671, Cl. 501-96.000.
Futaba Shokuhin Kogyo Kabushiki Kaisha. *See—*
Shibata, Toshio, 5,026,570, Cl. 426-626.000.
Futsuhara, Koichi: *See—*
Kawashima, Kiroshi. Futsuhara, Koichi, and Wada, Fumio, 5,027,114. Cl. 340-941 000.
G-C Dental Industrial Corporation: *See—*
Osanai, Satoshi; and Hiraoka, Manabu, 5,026,283, Cl. 433-90.000
G E.C. Holding Corp.: *See—*
Leone, Richard J.; Cummins, Robert F.; Vitiello, Joseph; and Brochhagan, Thomas, 5,025,895, Cl. 187-105.000.
Gaeta, Jesus M.: *See—*
Chang, Christina L.; Gaeta, Jesus M.; O'Malley, Kathleen G.; and Rowland, Stuart W., 5,027,110, Cl 340-731 000
GAF Chemicals Corporation: *See—*
Liu, Kou-Chang, 5,026,810, Cl. 528-14.000.
Gaffney, Thomas R.; and Coe, Charles G., to Air Products and Chemicals, Inc. Process for the preparation of an improved chabazite for the purification of bulk gases. 5,026,532, Cl. 423-328.000.
Gaillard, Jean-Ferdinand: *See—*
Quang, Dang Vu; Amigues, Pierre; and Gaillard, Jean-Ferdinand, 5,026,459, Cl. 202-158.000.
Gal, Eli, to General Electric Environmental Services, Inc. System for removal or sulfur compounds from gases and for regenerating spent sorbents. 5,026,528, Cl. 422-111.000.
Galbi, David: *See—*
Sit, Hon P.; Galbi, David; and Chan, Alfred K., 5,027,308, Cl 364-748.000.
Gallagher, Robert A.: *See—*
Kozierok, Leon; and Gallagher, Robert A., 5,026,240, Cl. 414-300.000.
Galletti, Anna M. R.: *See—*
Braca, Giuseppe; Ricci, Alessandro; Sbrana, Glauco; Brunelli, Maurizio; Giusti, Aldo; Bertolini, Guglielmo; and Galletti, Anna M. R., 5,026,675, Cl. 502-159.000.
Gallucci, Robert R.: *See—*
Hawkins, Christopher M.; Gallucci, Robert R., and Razzano, John S., 5,026,791, Cl. 525-464.000.
Galvin, Lance J.: *See—*
Haines, Hiemi K.; Monger, Teresa G.; Kenyon, Douglas E., and Galvin, Lance J., 5,025,863, Cl. 166-305.100.
Gambino, Richard J.: *See—*
Clark, Gregory J.; Gambino, Richard J., Koch, Roger H., Laibowitz, Robert B.; Marwick, Allan D.; and Umbach, Corwin P., 5,026,682, Cl. 505-1.000.

VOL 1127 ISS 4 JE 25 1991 UMI

- Gamper, William B. Self-adjusting collapsible crutch. 5,025,820, Cl. 135-69.000.
- Gandossi, Christian: *See—*
  - Picault, Alain; Gandossi, Christian, and Mineau, Laurent, 5,026,434, Cl. 148-2.000.
- Gandrud, S. Garfield. Dental camera system. 5,027,138, Cl. 354-62.000.
- Ganor, Zeev: *See—*
  - Orbach, Zvi; and Ganor, Zeev, 5,027,027, Cl. 310-317.000.
- Gantner, Gebhard, to Hilti Aktiengesellschaft. Hand-held tool with displaceable spring loaded handle. 5,025,870, Cl. 173-162.200.
- GAO Gesellschaft fur Automation und Organisation mbH: *See—*
  - Haghiri-Tehrani, Yahya; and Barak, Renee-Lucia, 5,027,190, Cl 357-74.000.
- Garbo, Paul W. Cogeneration system with low NO_x combustion of fuel gas. 5,025,631, Cl. 60-655.000.
- Garcia, Graham A.: *See—*
  - Reedy, Ronald E.; Shimabukuro, Randy L.; and Garcia, Graham A., 5,027,171, Cl. 357-23.500.
- Gardner, William L.: *See—*
  - Bagchi, Pranab; and Gardner, William L., 5,026,632, Cl. 430-545.000.
- Garg, Raj P. Respirometer. 5,025,927, Cl. 206-527.000.
- Gargouil, Yves M.: *See—*
  - Peglion, Jean L.; Gargouil, Yves M. and Vilaine, Jean P., 5,026,863, Cl. 546-321.000.
- Garitty, James P.; and Yocom, Thomas M., to ABB Power T & D Company Inc. System for time stamping events using a remote master clock. 5,027,297, Cl. 364-569.000.
- Garwood, Anthony J. M., to Garwood Ltd. Thermoplastic skin packing means. 5,025,611, Cl. 53-509.000.
- Garwood Ltd.: *See—*
  - Garwood, Anthony J. M., 5,025,611, Cl. 53-509.000.
- Gasparaitis, Bernard V.; Ruiz, Jose ; and Gatto, Donald F., to Motorola, Inc. Environmental radio guard. 5,025,921, Cl. 206-320.000.
- Gates, Bruce C.; and Zhou, Pei-Ling, to University of Delaware. Stable zeolite-supported transition metal catalysts, methods for making them, and uses thereof. 5,026,673, Cl. 502-62.000.
- Gatto, Donald F.: *See—*
  - Gasparaitis, Bernard V.; Ruiz, Jose ; and Gatto, Donald F., 5,025,921, Cl. 206-320.000.
- Gayton, David E., to Moen Incorporated. Riser spout diverter assembly. 5,025,825, Cl. 137-119.000.
- Gaz de France: *See—*
  - Amouroux, Jacques; Nikravech, Mehrdad; Saint-Just, Jacques; and Vedrenne, Isabelle, 5,026,949, Cl. 585-648.000
- Gaztech Corporation: *See—*
  - Wong, Jacob Y., 5,026,992, Cl. 250-343.000.
- GE Plastics Japan, Ltd.: *See—*
  - Sakashita, Takeshi; and Shimoda, Tomoaki, 5,026,817, Cl. 528-199.000.
- Gebruder Buhler AG: *See—*
  - Manser, Josef; Egger, Friedrich, and Seiler, Werner, 5,026,567, Cl. 426-458.000.
- GEC-Marconi Limited: *See—*
  - Thurston, Andrew M., 5,027,120, Cl. 341-143.000.
- Geiger, Friedrich: *See—*
  - Eck, Werner; Harrsch, Ernst; and Geiger, Friedrich, 5,025,645, Cl. 68-27.000.
- Geilich, Klaus M., to Dow Corning GmbH. Organopolysiloxane composition curable to an elastomer and use thereof. 5,026,812, Cl. 528-17.000.
- Gelardi, Anthony L.; and Lovecky, Craig, to Shape Inc. Video cassette integral dust door latch/spring. 5,026,000, Cl. 242-199.000.
- Gellert, Donald P. Kite controller. 5,026,007, Cl. 244-155.00A.
- Gelorme, Jeffrey D.: *See—*
  - Day, Richard A.; Gelorme, Jeffrey D.; Russell, David J.; and Wih, Steven J., 5,026,624, Cl. 430-280.000.
- General Atomics: *See—*
  - Ohkawa, Tihiro, 5,026,683, Cl. 505-1.000.
  - Spritzer, Michael H., 5,025,632, Cl. 62-64.000.
- General Dynamics Corporation: *See—*
  - Hulkenberg, Francis J., Jr., 5,026,100, Cl. 292-92.000.
- General Dynamics Corporation, Air Defense Systems Division: *See—*
  - Dugan, William P.; and Johnson, Marvin R., 5,027,062, Cl. 324-158.00P.
- General Electric Company: *See—*
  - Anderson, Oscar E., 5,026,485, Cl. 210-723.000.
  - Bopp, Richard C., 5,026,751, Cl. 524-102.000.
  - Castonguay, Roger N.; and Papallo, Thomas F., Jr., 5,027,092, Cl. 335-172.000.
  - Dumoulin, Charles L., 5,025,788, Cl. 128-653.0AF.
  - Hardy, Christopher J.; Roemer, Peter B.; and Mueller, Otward M., 5,027,071, Cl. 324-309.000.
  - Hawkins, Christopher M.; Gallucci, Robert R.; and Razzano, John S., 5,026,791, Cl. 525-464.000.
  - Jackson, Melvin R.; and Huang, Shyh-Chin, 5,026,522, Cl. 420-426.000.
  - Jalbert, Ronald L.; and Phillips, David O., 5,026,777, Cl. 525-65.000.
  - Lesslie, David J.; Morris, Robert A.; Messerli, Alan J.; Scott, Graham A.; and Krajewski, Alexander A., 5,027,091, Cl. 335-132.000.
  - Liu, Ping Y., 5,026,760, Cl. 524-449.000.
  - McKay, Geoffrey H.; Larkin, Harold F.; Doughty, Dennis J.; and Guerrette, Michael C., 5,027,095, Cl. 335-202.000.
  - Meder, Martin G., 5,026,813, Cl. 528-18.000.
  - Ortiz, Angel L., Jr. and Schneiter, John L., 5,026,979, Cl 250-205.000.
  - Palmer, Ansell W.; and Coryea, Peter F., 5,027,061, Cl. 324-156.000.
  - Palmer, Thomas M.; and Castonguay, Roger N., 5,027,093, Cl 335-176.000.
  - Payne, Thomas R.; and Schultz, John, 5,026,971, Cl. 219-483.000.
  - Pratt, Charles F.; Phadke, Shrikant V.; and Olivier, Errol, 5,026,776, Cl. 525-64.000
  - Russillo, Joseph G., Jr.; Balch, Richard A., Keturakis, Andrius A., and Velte, Scott D., 5,027,056, Cl 324-103.00R.
  - Slutz, David E.; and Knemeyer, Friedel S., 5,026,960, Cl 219-69.170.
  - Somers, Ralph M.; and Compton, Diana R., 5,026,964, Cl 219-121.700.
  - Taylor, Dale F., 5,026,516, Cl. 376-416.000.
  - Tyrell, John A.; and Willey, S. Jack, 5,026,790, Cl. 525-438.000.
  - Webb, Jimmy L.; Ritschard, Hans V.; and Lambert, James M., 5,026,890, Cl. 556-408.000.
- General Electric Company, p.l.c., The: *See—*
  - Economu, Nikolaos A.; and Meakin, Douglas B., 5,026,574, Cl 427-248.100.
  - Langdon, Roger M., 5,026,162, Cl. 356-354.000.
- General Electric Environmental Services, Inc.: *See—*
  - Gal, Eli, 5,026,528, Cl. 422-111.000.
- General Hospital Corporation, The: *See—*
  - Venegas, Jose G., 5,026,348, Cl. 604-122.000.
- General Instrument Corporation: *See—*
  - Cordle, Kevin G.; Martin, Thomas F.; and Austin, James E., 5,027,399, Cl. 380-7.000.
- General Mills, Inc.: *See—*
  - Ringe, Mitchell L.; and Stoll, James R., 5,026,689, Cl. 514-57.000
- General Motors Corporation: *See—*
  - Bauer, Harry J., 5,026,081, Cl. 280-91.000.
  - Brussalis, Stacy A.; Heston, Jeffrey W.; and Yang, Stewart L., 5,026,298, Cl. 439-358.000.
  - Cassidy, Donald C., 5,025,711, Cl. 98-208.000.
  - Dehn, Klaus-Dieter; Weidner, Hans-Peter; and Storch, Eberhard A., 5,026,201, Cl. 403-407.100.
  - Ghoneim, Youssef A.; and Chin, Yuen-Kwok, 5,025,882, Cl. 180-197.000.
  - Layman, John C.; and Pugh, Cecil C., 5,025,628, Cl. 60-585.000
  - Leahy, Charles E., 5,026,108, Cl. 296-97.110.
  - Lewis, Charles W., 5,025,683, Cl. 74-606.00R.
  - Lockwood, Alan R.; Kolongowski, Sidney C.; and Doolin, Dilyard, 5,025,889, Cl. 181-250.000.
  - Matouka, Michael F.; and Hammersmith, Robert J., 5,026,125, Cl. 303-100.000.
  - Poirier, David C.; Matheny, Mark T.; Mitchell, George C.; Swantick, Steven J.; Wroblewski, Gerald J.; Menck, Douglas W.; and Simon, Robert C., Jr., 5,025,881, Cl. 180-197.000.
  - Stevenson, Paul D., 5,025,823, Cl. 137-110.000.
  - Umasankar, Guruswamy; Kade, Alexander; and Fabris, Alroy G., 5,026,126, Cl. 303-100.000.
  - Young, Kevin A.; and Plackard, Dennis L., 5,026,438, Cl. 148-101.000.
- Genovese, Philip A., Jr. Disposable toilet seat wipe apparatus with separation actuation. 5,025,524, Cl. 15-104.940.
- GenRad, Inc.: *See—*
  - Khazam, Moses, 5,027,298, Cl. 364-569.000.
- Gentiluomo, Joseph A. Golf ball. 5,026,067, Cl. 273-220.000.
- Geochemical Corporation: *See—*
  - Clarke, William J., 5,026,215, Cl. 405-266.000.
- Gerber Garment Technology, Inc.: *See—*
  - Weiselfish, Jacob, 5,027,133, Cl. 346-136.000.
- Gerber Scientific Products, Inc.: *See—*
  - Logan, David J., 5,026,584, Cl. 428-41.000.
- Gerdt, David W., to Sperry Marine, Inc. Methods for sensing temperature, pressure and liquid level and variable ratio fiber optic coupler sensors therefor. 5,026,984, Cl. 250-227.210.
- Gerhard Collardin GmbH: *See—*
  - Finnenthal, Cornelia; Roland, Wolf-Achim; and Morlock, Roland, 5,026,440, Cl. 148-247.000.
- Gerin, Merlin: *See—*
  - Fraisse, Didier, 5,027,060, Cl. 324-132.000.
- Gerlich, Stanley J.: *See—*
  - Dudrick, Stanley J.; Guinn, Edward J.; Gerlich, Stanley J.; and Feste, Andrew S., 5,026,721, Cl. 514-396.000.
- Getman, Daniel P.; and DeCrescenzo, Gary A., to Monsanto Company 1,3-dideoxy-3-fluoronojirimycin which inhibits glycosidase activity 5,026,713, Cl. 514-302.000.
- Gewirtz, Jonah: *See—*
  - Skolnik, Howard; Dukes, Paul R., Jr.; and Gewirtz, Jonah, 5,026,431, Cl. 134-3.000.
- Gharachorloo, Nader: *See—*
  - Rossignac, Jaroslaw R.; Epstein, David A.; Gharachorloo, Nader; Jansen, Frederik W.; and Zoulas, Christos S., 5,027,292, Cl 364-522.000.
- Ghazarossian, Vartan: *See—*
  - Tarnowski, Thomas L.; Hu, Mae W.; Laney, Maureen; Pease, John S.; and Ghazarossian, Vartan, 5,026,905, Cl. 562-43.000.
- Ghoneim, Youssef A.; and Chin, Yuen-Kwok, to General Motors Corporation. Vehicle traction control system. 5,025,882, Cl 180-197.000.
- Giavarini, Francesco: *See—*
  - Re, Alberto; and Giavarini, Francesco, 5,026,814, Cl. 528-61.000.

- Gibert, Henri, to SA Martin Device for the sequential introduction of sheets in a shaping or forming machine. 5,026,040, Cl. 271-35.000.
- Gibson, Raymond K.: *See—*
  - Evans, Roger; Jee, Michael H.; Sander, Nigel H.; Smith, Ian H.; and Gibson, Raymond K., 5,026,548, Cl. 424-195.100.
- Giebel, Gerhard: *See—*
  - Price, Frank C.; and Giebel, Gerhard, 5,025,521, Cl. 12-12.400.
- Giebeler, Robert. Low speed disengageable damper 5,026,341, Cl. 494-82.000.
- Gielen, Markus, to Lindauer Dornier Gesellschaft mbH. Apparatus for measuring loom warp tension. 5,025,837, Cl. 139-35.000
- Giese, Erik O.; and Brown, Roger J., to Comfort Products, Inc. Multi-density shoe sole. 5,025,573, Cl. 36-30.00R.
- Giglia, Salvatore: *See—*
  - Bikson, Benjamin, and Giglia, Salvatore, 5,026,479, Cl 210-321.800.
- Gilbert, Richard, to Stanley Works Limited, The. Utility knives 5,025,558, Cl. 30-162.000
- Gilbert, Robert: *See—*
  - Bay, Tod A.; Frahm, Jeffry R.; Roesler, David F.; and Gilbert, Robert, 5,026,246, Cl. 414-694.000.
- Giles, Clinton R.: *See—*
  - Desurvire, Emmanuel; Giles, Clinton R.; and Zyskind, John L., 5,027,079, Cl. 330-4.300.
- Gill, Hardayal S.; and Brug, James A., to Hewlett-Packard Company Self-initialization of short magnetoresistive sensors into a single domain state. 5,027,243, Cl 360-113.000.
- Gillard, Clive H.: *See—*
  - Avis, Richard J. A.; Gillard, Clive H.; and Samad, Raphael, 5,027,205, Cl 358-140.000.
  - Samad, Raphael; Richards, John W.; and Gillard, Clive H., 5,027,203, Cl. 358-140.000.
- Gillette Company, The: *See—*
  - Baines, Frederick C.; and Johnston, Richard, 5,026,542, Cl 424-73.000.
  - Orosy, Gary D. J.; Hadtke, Frederick B., and Miller, Paul D., 5,025,928, Cl. 206-581.000.
- Ginsburg, Eric J.: *See—*
  - Grubbs, Robert H., Dougherty, Dennis A.; Swager, Timothy M.; and Ginsburg, Eric J., 5,026,783, Cl. 525-326.100.
- Ginsburgh, Irwin: *See—*
  - Butkovich, Michael S., LaLonde, Gerard V.; and Ginsburgh, Irwin, 5,025,946, Cl. 220-86.300.
- Gits Bros. Mfg. Co.: *See—*
  - Warner, Dale J., 5,026,077, Cl 277-93.0SD
- Giusti, Aldo: *See—*
  - Braca, Giuseppe; Ricci, Alessandro; Sbrana, Glauco; Brunelli, Maurizio; Giusti, Aldo; Bertolini, Guglielmo; and Galletti, Anna M. R., 5,026,675, Cl. 502-159.000.
- Glaenzer Spicer: *See—*
  - Orain, Michal, 5,025,595, Cl. 51-291.000.
- Glaser, Mark C., to Weatherford U.S., Inc. Well apparatuses and anti-rotation device for well apparatuses. 5,025,858, Cl. 166-156.000.
- Glaser, Thomas: *See—*
  - Schohe, Rudolf; Glaser, Thomas; Traber, Jorg; and Allen, George S., 5,026,857, Cl. 514-319.000.
- Glatz, Bonita A.: *See—*
  - Tomes, Nancy J.; Henderick, Carol A. and Glatz, Bonita A., 5,026,647, Cl. 435-244.000.
- Glaxo Group Limited: *See—*
  - North, Peter C.; Oxford, Alexander W. and Cavalla, David J., 5,026,696, Cl. 514-214.000.
  - Oxford, Alexander W.; North, Peter C.; and Cavalla, David J., 5,026,722, Cl. 514-397.000.
- Gloor, Hans, to Concast Standard AG. Apparatus for casting thin tapes 5,025,851, Cl. 164-423.000.
- Glover, William J.: *See—*
  - Bonyhard, Peter I.; Cheng, David C., Glover, William J.; Hendrix, Howard A.; Ward, Ernest S.; and Williams, John W., 5,026,470, Cl. 204-298.160.
- GMN Georg Miller Nurnberg AG Aktiengesellschaft: *See—*
  - Ballhaus, Heribert, 5,026,178, Cl. 384-448.000.
- GMT Gesellschaft fur Medizinsche Texhnik mbH: *See—*
  - Engelbrecht, Eckart; Nieder, Elmar; and Keller, Arnold, 5,026,399, Cl. 623-18.000.
- Godyak, Valery; and Sheynberg, Iosif, to GTE Products Corporation. Integrated radio-frequency light source for large scale display 5,027,041, Cl. 315-248.000.
- Goenka, Lakhi N.: *See—*
  - Starr, Rogers F., Jr.; and Goenka, Lakhi N., 5,025,659, Cl. 73-147.000.
- Gogol, Carl A.: *See—*
  - Kendrick, Mark F.; and Gogol, Carl A., 5,025,664, Cl 73-579.000.
- Gohara, Yoshihiro; and Miyazaki, Masaharu, to Sanshin Kogyo Kabushiki Kaisha. Two cycle engine for small boat 5,025,762, Cl. 123-196.00S.
- Gold Star Electron Co., Ltd.: *See—*
  - Lee, Young J., 5,026,659, Cl. 437-52.000.
- Goldfarb, Charles; and David, Yvon, to Societe Engiplast. Anti-theft hanger for garments, for use in stores or cloakrooms. 5,025,963, Cl. 223-85.000.
- Goldmann, Siegfried; Bossert, Friedrich; Bischoff, Hilmar; Petzinna, Dieter; Puls, Walter; and Schlossmann, Klaus, to Bayer Aktiengesellschaft. Novel 1-alkyl-substituted 1,4-dihydropyridinelactone anti-diabetics. 5,026,714, Cl. 514-302.000.
- Goldsmith, Manning M., III. Punch myringotomy system and method. 5,026,378, Cl. 606-109.000.
- Goldstein, Neil; Bien, Fritz; and Bernstein, Lawrence, to Spectral Sciences, Inc. Gaseous species absorption monitor 5,026,991, Cl 250-343.000.
- Golubic, Victor G. Apparatus and method for displaying and storing impact points of firearm projectiles on a sight field of view 5,026,158, Cl. 356-252.000.
- Gomi, Shuichi: *See—*
  - Imamura, Kei-ichi; Gomi, Shuichi; Iwata, Michiaki; Miyadoh, Shinji; Shimura, Masaru; Shomura, Takashi, Sezaki, Masaji; and Inoye, Shigeharu, 5,026,547, Cl. 424-122.000.
- Gonzalez, Fernando: *See—*
  - Lee, Ruojia; Lowrey, Tyler A.; Gonzalez, Fernando; Karniewicz, Joseph J.; and Fazan, Pierre C., 5,026,657, Cl. 437-47.000.
- Gonzalez, Rene, to United States of America, Army High pressure gas actuated reactive armor. 5,025,707, Cl. 89-36.170.
- Goode, Steven H., to Motorola, Inc. Receiver frequency offset bias circuit for TDM radios. 5,027,352, Cl. 370-110.100.
- Goodman, Bruce J.: *See—*
  - Anderson, Richard J.; Goodman, Bruce J., Riggio, Robert T., Kopolovics, Solomon; Hernandez, Lisa C.; Chen, Chengkuo; and Romei, Russell J., 5,027,395, Cl. 380-4.000.
- Goodman, John F. Leg stretching apparatus. 5,026,049, Cl. 272-126.000.
- Goodwin, R. W.: *See—*
  - de Montgolfier, Arnaud, and Goodwin, R. W., 5,027,059, Cl 324-127.000.
- Gordon, Gregg E. Prosthetic eye. 5,026,392, Cl 623-4.000.
- Gordon, Richard K.: *See—*
  - Chiang, Peter K.; Leader, Haim; Smejkal, Ruthann M.; Gordon, Richard K.; Payne, Charlotte S.; Doctor, Bhupendra P., and Padilla, Felipe N., 5,026,897, Cl. 560-58.000.
- Gorlov, Alexander M., to Flexible Barricades, Inc Friction reduction for terrorist vehicle arresting system. 5,026,203, Cl 404-6.000.
- Gorman, Michael E.: *See—*
  - Bose, Sudhangshu; and Gorman, Michael E., 5,026,402, Cl. 29-623.500.
- Gorski, George L.; and Zamzow, Donald D Apparatus and method for continuously removing existing reinforced pavement and simultaneously replacing the same by a new pavement. 5,026,205, Cl. 404-72.000.
- Gorski, Richard M.: *See—*
  - Chen, Hsing-Yao; Babicz, Eugene A and Gorski, Richard M., 5,027,043, Cl. 315-368.000.
- Goswami, Kisholoy: *See—*
  - Klainer, Stanley M.; Dandge, Dileep K., Butler, Marcus, and Goswami, Kisholoy, 5,026,139, Cl. 350-96.290.
- Goto, Shigeo: *See—*
  - Takatani, Shinichiro; Goto, Shigeo; Kawata, Masahiko; and Hiruma, Kenji, 5,025,751, Cl. 118-733.000.
- Gotoh, Taiji; Yamamoto, Hidetoshi; and Yamada, Kiyoshi, to Mie Hooro Co., Ltd. Method of joining pipes. 5,025,546, Cl. 29-508.000.
- Gottlieb, Robert K.; and Haidar, Elias B., to Pitney Bowes Inc. Method and apparatus for remotely controlling a document inserter. 5,027,279, Cl. 364-478.000.
- Gough, Rex M. K.: *See—*
  - Martinez Sanz, Jose A.; and Gough, Rex M. K., 5,026,035, Cl 270-45.000.
- Government Innovators, Inc.: *See—*
  - Pickrell, John W., 5,026,104, Cl. 294-86.400.
- Gowan, John W., Jr.; and Lo, David K., to Westvaco Corporation Fluorescent whitening agents, products comprising the agent and method of use thereof. 5,026,507, Cl. 252-301.210.
- Graboske, Dean: *See—*
  - Cronce, Gary M.; Rasor, William, and Graboske, Dean, 5,025,967, Cl. 224-326.000.
- Graf, Rupprecht: *See—*
  - Dolezych, Udo; and Graf, Rupprecht, 5,026,230, Cl. 410-100.000.
- Grant, John D.; Hall, James I.; and Housel, Barron C., III, to International Business Machines Corporation. Method and apparatus for providing continuous availability of applications in a computer network. 5,027,269, Cl. 364-200.000.
- GRAPHA-Holding AG: *See—*
  - Hofer, Peter, 5,026,250, Cl. 414-796.100.
- Grard, Guy: *See—*
  - Sarda, Jean-Paul; and Grard, Guy, 5,025,668, Cl 73-795.000.
  - Sarda, Jean-Paul; Grard, Guy; Deflandre, Jean-Pierre; and Perreau, Philippe, 5,025,669, Cl. 73-798.000.
- Graton, Michel; and Dalbiez, Andre, to Valeo. Torsion damping device, in particular for a friction clutch for an automotive vehicle 5,025,904, Cl. 192-106.200.
- Graushar, William T., to Quad/Tech, Inc. Apparatus and method for selectively packaging magazines. 5,025,610, Cl. 53-411.000.
- Gravestock, Michael B.: *See—*
  - Worthington, Paul A.; Crowley, Patrick J., and Gravestock, Michael B., 5,026,718, Cl. 514-383.000.
- Gray, Alden J. Buried power line contact alert. 5,027,108, Cl. 340-662.000.
- Gray, Paul R.: *See—*
  - Armstrong, Michael; and Gray, Paul R., 5,027,116, Cl. 341-120.000.
- Grayson, James L. Flotation supported submersible swim platform. 5,025,747, Cl. 114-362.000.
- Grebow, Peter E.; Li, Herschel H.; and Klunk, Lewis J., Jr., to Rhone-Poulenc Rorer Pharmaceuticals Inc. Intranasal calcitonin formulations. 5,026,825, Cl. 530-307.000.
- Green, James R., to Du Pont de Nemours, E. I., and Company. Process for making preshrunk size-free denim. 5,025,537, Cl. 26-18.500.

VOL 1127
ISS 4
JE 25
1991
UMI

Green, Mike: *See—*
Carlson, Lee; Green, Mike; Miller, Mike; Nissen, Rudy; and Sheng, Steve, 5,025,952, Cl. 222-3.000.

Green, William A. D., and Tregarthen, David N. Apparatus to aid in the installation of doors. 5,025,607, Cl. 52-749.000.

Greenberg, Alex M. Surgical drill guide and retractor. 5,026,376, Cl. 606-96.000.

Greenley, David E.: *See—*
Haack, Thomas K.; and Greenley, David E., 5,026,491, Cl. 252-8.552.

Greenthal, Richard P.: *See—*
Davis, William R.; Mowers, Dennis W., Greenthal, Richard P., Szymanski, Paul; Wray, Ronald A., and Davidson, Richard A., 5,027,111, Cl. 340-784.000.

Gregerson, Barry; and Dressen, Larry, to Empak, Inc. Package. 5,025,926, Cl. 206-444.000.

Greiner, Andreas: *See—*
Heitz, Walter; and Greiner, Andreas, 5,026,804, Cl. 526-293.000.

Grell, Wolfgang: *See—*
Reiffen, Manfred, Mark, Michael; Sauter, Robert, and Grell, Wolfgang, 5,026,702, Cl. 514-235.500.

Grenacher, Armin V.: *See—*
Roeper, Michael; Merger, Franz; Liebe, Joerg; Grenacher, Armin V.; and Hahl, Edgar, 5,026,920, Cl. 568-492.000.

Gribbin, John D.: *See—*
Dinter, Peter; Bothe, Lothar; and Gribbin, John D., 5,026,463, Cl. 204-164.000.

Griffiths, Richard W., to G2 Systems Corporation. Structural monitoring system using fiber optics. 5,026,141, Cl. 350-96.290.

Grigo, Ulrich; Kirsch, Jurgen; Wittmann, Dieter; Idel, Karsten-Josef, and Horlacher, Peter, to Bayer Aktiengesellschaft. Thermoplastic molding compounds of polycarbonate, polyalkylene terephthalate, special barium sulfate and optionally, elastomers. 5,026,758, Cl. 524-423.000.

Grim, Wayne M.: *See—*
Harwood, Richard J.; Mehta, Gunvant N., Jhawar, Ramesh C., Huang, Liang-Lii; Grim, Wayne M., and Li, Shun P., 5,026,709, Cl. 514-263.000.

Grimaldi, Jean-Luc: *See—*
Artigalas, Max; and Grimaldi, Jean-Luc, 5,027,287, Cl. 364-518.000.

Grimes, Gary J.: *See—*
Coyle, Richard J., Jr.; Grimes, Gary J.; Haas, Lawrence J., Serafino, Anthony J.; and Shevchuk, George J., 5,026,411, Cl. 65-4.210.

Grimes, Steven K., to E. Philip Levine, Inc. Photographic enlarger alignment tool and method for aligning a photographic enlarger. 5,025,568, Cl. 33-371.000.

Grimmonpre, Gerald D. Luggage securing strap for use with collapsible luggage carrier. 5,026,089, Cl. 280-655.000.

Groetzinger, Charles R. Toy box with small part sifter. 5,026,128, Cl. 312-210.500.

Grosboll, Martin P.: *See—*
Bains, Charanjit S.; and Grosboll, Martin P., 5,026,934, Cl. 585-314.000.

Grossman, Richard F.; and Tanno, David M., to Synthetic Products Company. Ruthenium terephthalate. 5,026,888, Cl. 556-136.000.

Grothaus, Hans: *See—*
Meyer, Gerhard; Sudheimer, Gunter, Zengel, Hans, and Grothaus, Hans, 5,026,534, Cl. 423-366.000.

Grubbs, Robert H.; Dougherty, Dennis A.; Swager, Timothy M.; and Ginsburg, Eric J., to California Institute of Technology. High energy polymers formed by ring opening metathesis polymerization. 5,026,783, Cl. 525-326.100.

Gruber, Bert, to Henkel Kommanditgesellschaft auf Aktien. Process for the production of epoxidized fatty alcohols. 5,026,881, Cl. 549-531.000.

Grubisic, Vatroslav; and Fischer, Gerhard. Wheel for a commercial vehicle. 5,026,122, Cl. 301-9.0DN.

Gruhle, Wolf-Dieter: *See—*
Stehle, Heinz; Wehr, Thomas; Petersmann, Joseph; Seidel, Willi; Hamm, Ludwig; Foeldi, Thomas; Eschrich, Gerhard; Schwamm, Ronald; Runge, Wolfgang; Gruhle, Wolf-Dieter; and Wendel, Peter, 5,025,684, Cl. 74-862.000.

Grumman Aerospace Corporation: *See—*
Arcas, Noe; and Parente, Charles A., 5,025,888, Cl. 181-213.000.

Grundler, Christof: *See—*
Faas, Jurg; Nuessli, Eduard; Grundler, Christof, Staheli, Paul; Hanselmann, Daniel; Demuth, Robert; Waeber, Rene; and Fritzsche, Peter, 5,025,533, Cl. 19-145.500.

GTE Government Systems Corporation: *See—*
Leonard, Donald A., 5,026,999, Cl. 250-574.000.

GTE Laboratories Incorporated: *See—*
Boudreau, Robert A.; and LaCourse, Joanne S., 5,026,138, Cl. 350-96.200.

GTE Products Corporation: *See—*
Bouchard, Andre C.; Lagushenko, Radomir; and Maya, Jakob, 5,027,030, Cl. 313-619.000.
Godyak, Valery; and Sheynberg, Iosif, 5,027,041, Cl. 315-248.000.
Peralta, Roselin E., 5,026,519, Cl. 419-30.000.
White, Philip J., 5,026,311, Cl. 445-26.000.

GTE Valenite Corporation: *See—*
Hunt, Carl E., 5,026,223, Cl. 409-233.000.

Guajardo, Ciro, to Teledyne Industries, Inc. Zero voltage switching AC relay circuit. 5,027,020, Cl. 307-647.000.

Guasch, Esteve C., to Bendix Espana S.A. Gear assembly. 5,025,675, Cl. 74-422.000.

Guber, Wolfgang; Scheffel, Juergen; and Wotzka, Friedrich, to International Business Machines Corporation. Bar code laser scanner arrangement for a cashier stand. 5,026,975, Cl. 235-462.000.

Gueble, Jean-Michel; Theron, Jean-Bernard; Latouche, Yannick, Ducrocq, Jean-Bernard; and Perez, Bernard, to Alcatel Espace. Filter having a dielectric resonator. 5,027,090, Cl. 333-202.000.

Gueremy, Claude: *See—*
Audiau, Francois; Gueremy, Claude; Jimonet, Patrick; and Mignani, Serge, 5,026,717, Cl. 514-338.000.

Gueret, Jean-Louis; Contamin, Jean-Claude; and Ayache, Liliane, to L'Oreal. Sheet material for performing a skin or hair treatment, method for its manufacture, and articles made of this material. 5,026,552, Cl. 424-401.000.

Guerrette, Michael C.: *See—*
McKay, Geoffrey H.; Larkin, Harold F.; Doughty, Dennis J., and Guerrette, Michael C., 5,027,095, Cl. 335-202.000.

Guerro, Gerald J., to American Cyanamid Company. Bond for abrasive tools. 5,026,405, Cl. 51-298.000.

Guers, Francois; and Phelipon, Axel, to Salomon S.A. Device for absorption of shocks and vibrations between a ski and a binding. 5,026,086, Cl. 280-607.000.

Guggisberg, Steven J. Water disinfecting system. 5,025,822, Cl. 137-1.000.

Guilford Mills, Inc.: *See—*
Nielsen, Arne; and Moghaddassi, Majid, 5,025,644, Cl. 66-147.000.

Guillonneau, Claude: *See—*
Regnier, Gilbert, Guillonneau, Claude; Lepagnol, Jean, and Lestage, Pierre, 5,026,701, Cl. 514-235.200.

Guinn, Edward J.: *See—*
Dudrick, Stanley J.; Guinn, Edward J.; Gerlich, Stanley J. and Feste, Andrew S., 5,026,721, Cl. 514-396.000.

Gunsaulus, Richard S.: *See—*
Pepera, Gerald S.; and Gunsaulus, Richard S., 5,027,317, Cl. 364-900.000.

Gunseor, Larry A.: *See—*
Leckrone, Michael E., Kagan, Jonathan; Knight, Darryl A. and Gunseor, Larry A., 5,026,367, Cl. 606-7.000.

Gurley, John A.: *See—*
Elings, Virgil B.; Gurley, John A.; and Sarid, Dror, 5,025,658, Cl. 73-105.000.

Gustavsson, Lennart; Karlsson, Ewa; and Reinholdsson, Jan, to Aktiebolaget Bofors. Ammunition units. 5,025,732, Cl. 102-521.000.

Guthrie Canadian Investments Limited: *See—*
Burke, Patrick E.; Dudley, Richard F.; and Daniel, Ralph S., 5,027,099, Cl. 336-60.000.

Gutierrez, Antonio: *See—*
Emert, Jacob; Lundberg, Robert D.; and Gutierrez, Antonio, 5,026,495, Cl. 252-51.50R.

Gutknecht, Daniel A.; and Ho, I-Chung, to Allied-Signal Inc. Turbocharger with turbine backplate and center housing oil shield. 5,026,260, Cl. 417-407.000.

Gyure, Sandor: *See—*
Sweeney, Niall; and Gyure, Sandor, 5,026,355, Cl. 604-243.000.

G2 Systems Corporation: *See—*
Griffiths, Richard W., 5,026,141, Cl. 350-96.290.

Ha, Chan M.: *See—*
Daneshtalab, Mohsen; Nguyen, Dai Q.; Ha, Chan M., Luu, Hiep T., Tempest, Laurence M.; and Micetich, Ronald G., 5,026,848, Cl. 544-137.000.

Haack, Thomas K.; and Greenley, David E., to Rohm and Haas Company. Controlling sulfate reducing bacteria by slug dosing with quick-kill antimicrobials and by continuous dosing with isothiazolones. 5,026,491, Cl. 252-8.552.

Haas Cabinet Co., Inc.: *See—*
Brown, James L., 5,025,545, Cl. 29-434.000.

Haas, Jon A.: *See—*
Wentworth, Steven W.; Crane, Robert F., and Haas, Jon A., 5,025,868, Cl. 173-91.000.

Haas, Lawrence J.: *See—*
Coyle, Richard J., Jr.; Grimes, Gary J., Haas, Lawrence J.; Serafino, Anthony J.; and Shevchuk, George J., 5,026,411, Cl. 65-4.210.

Habeeb, Jacob J.: *See—*
Singhal, Gopal H.; and Habeeb, Jacob J., 5,026,492, Cl. 252-32.70E.

Haberkern, Richard G.: *See—*
Fagg, Barry S.; Dull, Gary M.; Haberkern, Richard G.; Merricks, Robert A.; and Stewart, John E., 5,025,812, Cl. 131-297.000.

Habib, Pierre; Martin, Andre; and Luong, Minh P., to Technologie Speciales Ingenierie -T.S.I. Method and apparatus for making a foundation by creating a block constituted by the ground itself. 5,026,213, Cl. 405-229.000.

Habu, Takeshi: *See—*
Yamada, Taketoshi; and Habu, Takeshi, 5,026,622, Cl. 430-264.000.

Hachtel, Hansjoerg: *See—*
Witzig, Armin; and Hachtel, Hansjoerg, 5,027,067, Cl. 324-207.190.

Hacker, Keith: *See—*
Hintze, Kurt; and Hacker, Keith, 5,025,773, Cl. 124-445.000.

Hadachek, Josh L. Portable upright scuba cylinder retention rack. 5,025,935, Cl. 211-71.000.

Hadden, Leonard D.: *See—*
Zirbes, Glen L.; Hadden, Leonard D.; and Troyk, Philip R., 5,025,550, Cl. 29-605.000.

Haddox, John. Adjustable mud flap assembly. 5,026,094, Cl. 280-848.000.

Hadick, Robert J.: *See—*
Trouteaud, Lee E.; and Hadick, Robert J., 5,025,950, Cl. 221-5.000.

Hadtke, Frederick B.: *See—*
Orosy, Gary D. J.; Hadtke, Frederick B., and Miller, Paul D., 5,025,928, Cl. 206-581.000.

Haefner, Hans W., to Pfister GmbH. Pressure standard device. 5,025,654, Cl. 73-4.00D.

Haferstat, Ernest C., to Premier Technologies. Cable tester. 5,027,074, Cl. 324-539.000.

Hafner, Curtis R., to Marquette Electronics, Inc. Cardiac monitoring method and apparatus. 5,025,808, Cl. 128-696.000.

Hagen, Gary P.; Schmidt, Gregory E.; Weis, John M.; and Smith, Thomas G., to Amoco Corporation. Preparation of 2-acyl-6-methylnaphthalenes. 5,026,917, Cl. 568-323.000.

Hagen, Tracy M., to Seagate Technology, Inc. Routing a sleeve and conductors in a head-gimbal assembly. 5,027,239, Cl. 360-104.000.

Haggerty, Matthew K.: *See—*
Dwyer, Joseph J., Jr.; White, Loy R.; Haggerty, Matthew K.; and Purbrick, John A., 5,027,208, Cl. 358-148.000.

Haghiri-Tehrani, Yahya; and Barak, Renee-Lucia, to GAO Gesellschaft fur Automation und Organisation mbH. Carrier element to be incorporated into an identity card. 5,027,190, Cl. 357-74.000.

Hagiuda, Nobuyoshi: *See—*
Matsui, Hideki; and Hagiuda, Nobuyoshi, 5,027,039, Cl. 315-241.00P.

Hahl, Edgar: *See—*
Roeper, Michael, Merger, Franz; Liebe, Joerg; Grenacher, Armin V.; and Hahl, Edgar, 5,026,920, Cl. 568-492.000.

Hahn, Gunter: *See—*
Fock, Jurgen; Hahn, Gunter; and Wagenknecht, Gunter, 5,026,902, Cl. 560-223.000.

Haidar, Elias B.: *See—*
Gottlieb, Robert K.; and Haidar, Elias B., 5,027,279, Cl. 364-478.000.

Haight, Michael H.; and Wolfe, Mark A., to Texas Instruments Incorporated. Read/write switching circuit. 5,027,003, Cl. 307-242.000.

Haines, Hiemi K.; Monger, Teresa G.; Kenyon, Douglas E.; and Galvin, Lance J., to Marathon Oil Company. Enhanced liquid hydrocarbon recovery process. 5,025,863, Cl. 166-305.100.

Haizmann, Robert S.: *See—*
Schmidt, Robert J.; and Haizmann, Robert S., 5,026,950, Cl. 585-737.000.

Hakko Electric Machine Works Co., Ltd.: *See—*
Tanaka, Masataka; Ohto, Masao; Sekine, Tetsuo; Takahashi, Hiroshi; and Maruyama, Masaru, 5,026,350, Cl. 604-158.000.

Halbert, Thomas R.; Chianelli, Russell R.; Stiefel, Edward I.; and Jacobson, Allan J., to Exxon Research & Engineering Company. Transition metal tris-dithiolene and related complexes as precursors to active catalysts. 5,026,473, Cl. 208-143.000.

Halkey-Roberts Corporation: *See—*
Mackal, Glenn H.; and Weinheimer, Jacek H., 5,026,310, Cl. 441-93.000.

Hall, A. Risher: *See—*
Shea, John R., Jr.; and Hall, A. Risher, 5,026,581, Cl. 428-34.000.

Hall, James L.: *See—*
Grant, John D.; Hall, James L.; and Housel, Barron C., III, 5,027,269, Cl. 364-200.000.

Halliburton Company: *See—*
Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G.; and Stephenson, Stanley V., 5,026,168, Cl. 366-168.000.
Pitts, Alan J.; Case, Leonard R.; and Broaddus, James E., 5,027,267, Cl. 364-172.000.

Halliday, Leslie J., to Canada, Her Majesty The Queen in right of, as represented by the Minister of Agriculture. Chemically treating forage. 5,026,571, Cl. 426-636.000.

Halling, Michael A., to United States of America, Navy. Acoustic locator for elements of a flexible sonar array. 5,027,333, Cl. 367-131.000.

Halsted, Victor G.: *See—*
Marlton, Anthony P.; Fielder, Dennis A.; Halsted, Victor G.; and Stockill, Trevor R., 5,027,212, Cl. 358-183.000.

Hamasaki, Tatsumi: *See—*
Kawaguchi, Keishi; Hamasaki, Tatsumi, Tadera, Yoshihiro; and Yamazaki, Sachio, 5,025,593, Cl. 51-165.770.

Hamburger Color Company: *See—*
Dunnous, Jack, 5,025,954, Cl. 222-56.000.

Hamilton, Douglas D., to Logging Development Corporation. Hydrodynamic swing damper and tree handling vehicle incorporating the same. 5,026,248, Cl. 414-729.000.

Hamilton, Lyle H. Manually actuatable selector valve for breath sampling apparatus. 5,026,027, Cl. 251-301.000.

Hamm, Ludwig: *See—*
Stehle, Heinz; Wehr, Thomas; Petersmann, Joseph; Seidel, Willi; Hamm, Ludwig; Foeldi, Thomas; Eschrich, Gerhard; Schwamm, Ronald; Runge, Wolfgang; Gruhle, Wolf-Dieter; and Wendel, Peter, 5,025,684, Cl. 74-862.000.

Hammer, Rudolf: *See—*
Mihm, Gerhard; Eberlein, Wolfgang; Engel, Welfhard; Trummlitz, Gunter; Mayer, Norbert; Dodds, Henri; and Hammer, Rudolf, 5,026,699, Cl. 514-220.000.

Hammersmith, Robert J.: *See—*
Matouka, Michael F.; and Hammersmith, Robert J., 5,026,125, Cl. 303-100.000.

Hammerstedt, Roy H., Keith, Alec D.; and Amann, Rupert P., to Biopore, Inc. Noningestible separation barrier with plugged pores. 5,026,342, Cl. 600-35.000.

Hammon, Mark A., to AGR Inc. Laminated golf mat. 5,026,580, Cl. 428-17.000.

Hand, Hugh R. Pool wall support. 5,025,601, Cl. 52-169.700.

Handler, Eugene S.: *See—*
Rossini, Aldo A.; Mordes, John P.; and Handler, Eugene S., 5,026,365, Cl. 604-891.100.

Hanley, Roger T.; and Belanger, Stephen D., to Stanley Works, The. Door mounted hinge for oven doors and the like. 5,025,776, Cl. 126-194.000.

Hanlon, James H.: *See—*
Franz, Helmut; Hanlon, James H.; and Shick, Lloyd G., 5,026,597, Cl. 428-323.000.

Hanna, John E.; and Abdi, Behrooz L., to Motorola, Inc. Low power transient suppressor circuit. 5,027,016, Cl. 307-542.000.

Hanna, Naeem B.: *See—*
Robins, Roland K.; Revankar, Ganapathi R., and Hanna, Naeem B., 5,026,836, Cl. 536-24.000.

Hanselmann, Daniel: *See—*
Faas, Jurg; Nuessli, Eduard; Grundler, Christof; Staheli, Paul; Hanselmann, Daniel; Demuth, Robert; Waeber, Rene; and Fritzsche, Peter, 5,025,533, Cl. 19-145.500.

Hanshin Electric Co., Ltd.: *See—*
Hisatomi, Masahiro; Togasaki, Yoshihiro; and Tanaka, Mitsuyasu, 5,026,294, Cl. 439-125.000.

Hanson, Brooks K. Crossbow. 5,025,771, Cl. 124-25.000.

Hanson, Merle E.; and Thorson, Lewis D., to Comdisco Resources, Inc. Overlapping horizontal fracture formation and flooding process. 5,025,859, Cl. 166-252.000.

Hanzawa, Kohtaro: *See—*
Morikawa, Shigenori; Hanzawa, Kohtaro; and Nakamura, Kazuhisa, 5,025,700, Cl. 84-603.000.

Hanzawa, Shigeru; Matsuda, Hiroto; and Fusimi, Kouzi, to NGK Insulators, Ltd. Sintered silicon nitride and method for making the same. 5,026,671, Cl. 501-96.000.

Hara, Kazuhiro; and Fujii, Kiyosi, to Laurel Bank Machines Co., Ltd. Bill discriminating apparatus. 5,027,415, Cl. 382-7.000.

Hara, Kazuyoshi: *See—*
Oda, Masataka; Hara, Yoshinobu; and Hara, Kazuyoshi, 5,027,159, Cl. 355-271.000.

Hara, Masahiko: *See—*
Aihara, Toshinori; and Hara, Masahiko, 5,026,257, Cl. 417-295.000.

Hara, Masato: *See—*
Misumi, Fumihiko; Ueda, Masazumi, Hara, Masato; Matsui, Yutaka; and Imai, Kiyoshi, 5,026,978, Cl. 250-205.000.

Hara, Takashi: *See—*
Chino, Hidenori; Hara, Takashi; Tamura, Kenji; Nakakuki, Yasuhide; Nii, Yasuyuki; Soma, Zenya; and Nishihara, Kiyoshi, 5,027,000, Cl. 290-53.000.

Hara, Yasuo, to Hoshizaki Denki Kabushiki Kaisha. Automatic ice making machine. 5,025,637, Cl. 62-138.000.

Hara, Yoshinobu: *See—*
Oda, Masataka; Hara, Yoshinobu; and Hara, Kazuyoshi, 5,027,159, Cl. 355-271.000.

Harada, Kosuke; and Sakamoto, Hiroshi, to Kyushu University. Switching power source means. 5,027,263, Cl. 363-16.000.

Harada, Shoichi: *See—*
Kito, Shozo; Harada, Shoichi; and Imai, Hajime, 5,025,901, Cl. 192-4.00A.

Haraichi, Satoshi: *See—*
Hongo, Mikio; Mizukoshi, Katsuro; Sano, Shuzo; Kamimura, Takashi; Itoh, Fumikazu; Shimase, Akira; Haraichi, Satoshi; and Takahashi, Takahiko, 5,026,664, Cl. 437-189.000.

Harandi, Mohsen N.; and Owen, Hartley, to Mobil Oil Corporation. Production of ethers from methanol. 5,026,529, Cl. 422-190.000.

Harbin Polytechnic University: *See—*
Shao, Shuyong; Feng, Jianhua; and Zhang, Xinchao, 5,025,784, Cl. 128-419.0PG.

Harding, John C., Jr., to Nova Biomedical Corporation. Apparatus for determination of probe contact with a liquid surface. 5,027,075, Cl. 324-662.000.

Hardwick, Eugene R., to Worchell, Karen. Chemically heated blanket. 5,025,777, Cl. 126-263.000.

Hardy, Christopher J.; Roemer, Peter B.; and Mueller, Otward M., to General Electric Company. Method of, and apparatus for, NMR slice selection. 5,027,071, Cl. 324-309.000.

Hargreaves, Kenneth M.; Dubner, Ronald; and Brown, Fred, to United States of America, Health and Human Services. Apparatus and methods for determining in vivo response to thermal stimulation in in an unrestrained subject. 5,025,796, Cl. 128-742.000.

Harmac Medical Products, Inc.: *See—*
Edwards, Floyd V.; and DeWitt, Scott H., 5,025,829, Cl. 137-512.000.

Harmon, J. P.; and Ward, Jefferson P., to Hewlett-Packard Company. Non-clogging cap and service station for ink-jet printheads. 5,027,134, Cl. 346-140.00R.

Harnischfeger Corporation: *See—*
Pratt, Richard L.; and Dewey, Craig D., 5,027,049, Cl. 318-807.000.

Harnischfeger Engineers, Inc.: *See—*
Kotecki, Michael R.; and Bunchkowski, Duane J., 5,025,987, Cl. 238-351.000.

Harrington, Peter J.: *See—*
Taylor, Edward C.; Beardsley, George P.; Harrington, Peter J., and Fletcher, Stephen R., 5,026,851, Cl. 544-279.000.

Harris Corporation: *See—*
O'Mara, William E., Jr.; and Schrantz, Gregory A., 5,027,187, Cl. 357-65.000.

VOL
1127
ISS
4
JE
25
1991
UMI

Harris, Darrell D.: *See—*
  Adkins, Herbert S.; and Harris, Darrell D., 5,025,949, Cl. 220-481.000.

Harris, David B.: *See—*
  Bourdelaise, Robert A.; Harris, David B., Harris, Denise B.; and Olenick, John A., 5,027,191, Cl. 357-74.000.

Harris, Denise B.: *See—*
  Bourdelaise, Robert A.; Harris, David B.; Harris, Denise B.; and Olenick, John A., 5,027,191, Cl. 357-74.000.
  Zeitlin, Dan B.; Branthover, John B.; Smith, Brian H.; Piloto, Andrew J.; Lengel, Theresa M.; Carlson, Robert R., Jr.; Shum, Lanson Y.; Hodges, Paul D., Jr.; and Harris, Denise B., 5,027,255, Cl. 361-395.000.

Harrison, Boyd L.; and Baron, Bruce M., to Merrell Dow Pharmaceuticals. Certain quinolines and thienopyridines as excitatory amino acid antagonists. 5,026,700, Cl 514-233.800.

Harrison, Glenn B.: *See—*
  Shnitkin, Harold; and Harrison, Glenn B., 5,027,127, Cl. 342-372.000.

Harrison, John, to Courtaulds Films & Packaging (Holdings) Ltd. Polymeric films. 5,026,610, Cl. 428-516.000.

Harrsch, Ernst: *See—*
  Eck, Werner; Harrsch, Ernst; and Geiger, Friedrich, 5,025,645, Cl. 68-27.000.

Hartitz, J. Ernst, to B. F. Goodrich Company, The Extruded amorphous thermoplastic pipe having reduced internal stress and method of making the same. 5,026,582, Cl. 428-36.600.

Hartman, Joel R., to Sandvik Special Metals Corporation. Bicycle drop-out and method of attachment. 5,025,977, Cl. 228-171.000.

Hartman, Joy L.: *See—*
  Schellenberg, Victor R.; Zsoldos, James; Hartman, Joy L.; Smith, William H., deceased; Covington, Wilbur T.; and Conley, Allen, 5,026,211, Cl. 405-204.000.

Harwood, Richard J.; Mehta, Gunvant N.; Jhawar, Ramesh C.; Huang, Liang-I ii; Grim, Wayne M.; and Li, Shun P., to Rorer Pharmaceutical Corporation. Method for the preparation of a theophylline sustained release pharmaceutical composition and the composition prepared thereby. 5,026,709, Cl. 514-263.000.

Hasegawa, Akira; Kato, Yoshinobu; and Murakami, Toshifumi, to Mitsubishi Jukogyo Kabushiki Kaisha. Crude tire setting method in tire vulcanizing press. 5,026,515, Cl. 264-315.000.

Hasegawa, Hiroshi: *See—*
  Asanuma, Nobuyoshi; Ishida, Shinnosuke, and Hasegawa, Hiroshi, 5,027,302, Cl. 364-424.050.

Hasegawa, Kazumi; Moriya, Takashi; Hibino, Hiromi; and Takamura, Akira, to Citizen Watch Co., Ltd. Vibrating apparatus including means for absorbing vibration and for locking vibrating unit against movement. 5,026,186, Cl. 400-691.000.

Hasegawa, Kenji; Mori, Takahiro; and Higuma, Masahiko, to Canon Kabushiki Kaisha. Recording medium including an ink-retaining layer and an ink-transporting layer of specific sized particles and process employing same. 5,027,131, Cl. 346-1.100.

Hasegawa, Makoto: *See—*
  Saneshige, Ryoji; Kuyama, Kouzi; Hasegawa, Makoto; and Furuya, Miyuki, 5,027,025, Cl. 310-156.000.

Hasegawa, Ryoei. *See—*
  Arai, Tatsuo; Shiratori, Hidehisa; Hasegawa, Ryoei; and Iizuka, Kazuo, 5,026,221, Cl. 409-137.000.

Hasemi, Takashi: *See—*
  Takahashi, Shunzo; Izawa, Shigeru; Suzuki, Hidefumi; and Hasemi, Takashi, 5,027,337, Cl. 369-44.260.

Hashida, Koichi: *See—*
  Nokubo, Seiji; Kohno, Teruhisa; Hashida, Koichi; Usuki, Takashi; and Higashimura, Hideaki, 5,026,123, Cl. 303-117.000.

Hashiguchi, Osamu, to Japan Aviation Electronics Industry, Limited. Electrical connector equipped with release mechanism. 5,026,296, Cl. 439-159.000.

Hashimoto, Eiri: *See—*
  Kawata, Tetsuro; Hashimoto, Eiri; and Miyakawa, Nobuaki, 5,027,423, Cl. 382-54.000.

Hashizume, Mitsuo; and Miyahara, Shoji, to Tsubakimoto Chain Co. Shuttle type conveyor 5,025,912, Cl. 198-459.000.

Hassler, Dietrich, to Siemens Aktiengesellschaft. Shock wave source having a central ultrasound locating system. 5,025,789, Cl. 128-660.030.

Hassler, Gerd: *See—*
  Lunkenheimer, Winfried; Brandes, Wilhelm; and Hassler, Gerd, 5,026,710, Cl. 514-275.000.

Hata, Takeki. *See—*
  Tada, Masuo; Hata, Takeki; Fukumoto, Takaaki; and Ohmori, Toshiaki, 5,025,597, Cl. 51-410.000.

Hatanaka, Katsunori: *See—*
  Saika, Toshihiro; and Hatanaka, Katsunori, 5,027,176, Cl. 357-30.000.

Hatch, Michael R.; and Moon, Willilam G., to Quantum Corporation. Data head load beam for height compacted, low power fixed head and disk assembly. 5,027,241, Cl. 360-105.000.

Hatta, Naoyuki: *See—*
  Kuzuya, Susumu; Hayashi, Shigeyuki; Kimura, Hiroaki; Suzuki, Tsutomu; Sonobe, Katsuyoshi; Nakata, Takashi; and Hatta, Naoyuki, 5,026,039, Cl. 271-11.000.

Hattori, Hitoshi: *See—*
  Morozumi, Naoya; Sakata, Hirotsugu; Hayano, Makoto; Okuda, Masayuki; Fujiwara, Takayoshi; Shimoda, Moriaki; and Hattori, Hitoshi, 5,026,264, Cl. 418-220.000.

Haupenthal, Rudi. *See—*
  Wirz, Arno; and Haupenthal, Rudi, 5,026,045, Cl. 271-277.000

Hauwiller, Paul B.; and Strong, A. Brent. Incremental forming of thermoplastic composites. 5,026,514, Cl. 264-258.000.

Hauzer Holding B.V.: *See—*
  Wesemeyer, Harald; and Veltrop, Hans, 5,026,466, Cl. 204-192.380

Havens, Marvin R.; and Lovin, Joseph R., to W. R. Grace & Co.-Conn. Agent for imparting antistatic characteristics to a thermoplastic polymer and a thermoplastic polymer composition containing the agent. 5,025,922, Cl. 206-328.000.

Hawkenson, Bruce R. Scarifier attachment for chain saw 5,025,615, Cl 56-12.700.

Hawkes, Deborah J.: *See—*
  Larkin, John P.; Wyatt, John A.; and Hawkes, Deborah J., 5,026,874, Cl. 549-15.000.

Hawkins, Christopher M.; Gallucci, Robert R.; and Razzano, John S., to General Electric Company. Aromatic carbonate polymer composition. 5,026,791, Cl. 525-464.000.

Haworth, Inc.: *See—*
  Wright, Alan R., and Soberalski, Edward D., 5,026,130, Cl 312-323.000.

Hayaishi, Osamu: *See—*
  Kuno, Sachiko; Ueno, Ryuji; and Hayaishi, Osamu, 5,026,692, Cl 514-178.000.

Hayakawa, Yoshihiro: *See—*
  Nojiri, Ryuji; Hayakawa, Yoshihiro; Uchiyama, Mamoru; Kato, Hisatoyo; Chino, Yasuyoshi; and Tahara, Shinichiro, 5,026,838, Cl. 536-27.000.

Hayakawa, Yuichi, to NEC Corporation. Read/write head assembly with erase gaps of meandering shape 5,027,244, Cl. 360-119.000.

Hayano, Makoto: *See—*
  Morozumi, Naoya; Sakata, Hirotsugu, Hayano, Makoto; Okuda, Masayuki; Fujiwara, Takayoshi; Shimoda, Moriaki; and Hattori, Hitoshi, 5,026,264, Cl. 418-220.000.

Hayashi, Junkichi; and Uchida, Tamotu, to Pioneer Electronic Corporation. Voice coil with rectangular coil wire and foil leads. 5,027,412, Cl 381-199.000.

Hayashi, Shigeyuki: *See—*
  Kuzuya, Susumu; Hayashi, Shigeyuki; Kimura, Hiroaki; Suzuki, Tsutomu; Sonobe, Katsuyoshi; Nakata, Takashi; and Hatta, Naoyuki, 5,026,039, Cl. 271-11.000.

Hayashi, Takayuki. *See—*
  Kuzuya, Susumu; Hayashi, Shigeyuki; Kimura, Hiroaki; Suzuki, Tsutomu; Sonobe, Katsuyoshi; Nakata, Takashi; and Hatta, Naoyuki, 5,026,039, Cl. 271-11.000.

Hayden, Steven M. Apparatus and method for treatment of various liquid or slurry by ultrasonification in conjuction with heat and pressure. 5,026,564, Cl. 426-237.000.

Haykin, Simon; and Ukrainec, Andrew. Adaptive interference canceller. 5,027,123, Cl. 342-188.000.

Hayward, Marshall A.; Sabatucci, Joseph P.; Jirkovsky, Ivo L.; and Lefebvre, Yvon, to American Home Products Corporation. Inhibition of bone loss by 4-substituted-5-hydroxy-2(5H)-furanones. 5,026,725, Cl. 514-465.000.

Hazaki, Eiichi; Otaka, Tadashi; and Shimizu, Minoru, to Hitachi, Ltd. Particle beam surface analyzer. 5,026,995, Cl. 250-441 100.

Heath, Robert G. Recreational area construction. 5,026,207, Cl 405-46.000.

Heckmann, Walter: *See—*
  Weber, Thomas; Heckmann, Walter; Mertes, Jurgen; Tesch, Helmut, Altstaedt, Volker; Eberle, Wolfgang; Folda, Thomas, Stutz, Herbert; and Recker, Hans-Gert, 5,026,789, Cl. 525-423.000.

Hecox, Kurt E.: *See—*
  Williamson, Malcolm J.; Cummins, Kenneth L., and Hecox, Kurt E., 5,027,410, Cl 381-68.400.

Hector, Louis G.: *See—*
  Sheu, Shen; and Hector, Louis G., 5,025,547, Cl 29-527.400.

Hed, Aharon Z., to International Superconductor Corp. Diamagnetic colloid pumps. 5,026,681, Cl. 505-1.000.

Hegde, Vinod R.; and Patel, Mahesh G., to Schering Corporation Pharmaceutical composition and method of treating psychoses. 5,026,731, Cl. 514-629.000.

Heggie, William: *See—*
  Villax, Ivan; Heggie, William; and Page, Philip R., 5,026,693, Cl 514-180.000.

Heidelberger Druckmaschinen AG: *See—*
  Pollich, Gerhard; and Unterseher, Erwin, 5,026,326, Cl 474-134.000.
  Wirz, Arno; and Haupenthal, Rudi, 5,026,045, Cl 271-277.000

Heinrich, Martin: *See—*
  Radunz, Hans-Eckart, Schwartz, Harry; and Heinrich, Martin, 5,026,642, Cl. 435-117.000.

Heinz, Hans-Detlef; Meyer, Rolf-Volker; Schulte, Helmut; and Zimmerman, Franz, to Bayer Aktiengesellschaft. Melt preparation of polyamide with additive combination. 5,026,818, Cl. 528-313.000.

Heitz, Thomas L.; and Kim, Young H., to Du Pont de Nemours, E. I., and Company. Living cationic polymerization of vinylic unsaturated compounds. 5,026,799, Cl. 526-192.000.

Heitz, Walter; and Greiner, Andreas, to Bayer Aktiengesellschaft Polymerization of halo aryl olefin. 5,026,804, Cl. 526-293.000.

Held, Wolfgang: *See—*
  Stuttler, Herbert; Wolf, Josef; Held, Wolfgang; and Mai, Max, 5,027,219, Cl. 358-228.000.

Helfrich, Mathias: *See—*
  Muller, Dietmar; and Helfrich, Mathias, 5,026,443, Cl. 149-18.000.

Hellstrom, Sven E.: *See—*
  Frantz, Billy J.; and Hellstrom, Sven E., 5,027,316, Cl. 364-900.000.

Hellwig, Gerriet. Color standard arrangement. 5,026,286, Cl. 434-98.000.

Helm Products, Inc.. *See—*
  Lisowski, Walter E., 5,026,016, Cl. 248-314.000.

Helmus, Heinz: *See—*
  Bauch, Wolf-Dieter; Helmus, Heinz; and Merker, Heinz B., 5,027,052, Cl. 323-284.000.

Hempel, Bruce C.: *See—*
  Callahan, Robert M.; and Hempel, Bruce C., 5,027,291, Cl. 364-521.000.

Henderick, Carol A.: *See—*
  Tomes, Nancy J.; Henderick, Carol A.; and Glatz, Bonita A., 5,026,647, Cl. 435-244.000.

Hendrick, Fred W., to Automatic Control Components, Inc. Disk valve. 5,025,833, Cl. 137-625.310.

Hendrix, Howard A.: *See—*
  Bonyhard, Peter I.; Cheng, David C.; Glover, William J.; Hendrix, Howard A.; Ward, Ernest S.; and Williams, John W., 5,026,470, Cl. 204-298.160.

Hendrix, Raymond R., to BP America Inc. Dry break coupler with ring collar sleeve operator. 5,026,099, Cl. 285-315.000.

Henke, Reinhold, to ADC Telecommunications, Inc. High frequency noise bypassing. 5,027,089, Cl. 333-12.000.

Henkel Kommanditgesellschaft auf Aktien: *See—*
  Gruber, Bert, 5,026,881, Cl. 549-531.000.

Henn, Robert L.; Morell, Carol H.; and Daniel, Edward J., to W. L. Gore & Associates, Inc. Coated products and methods for making. 5,026,591, Cl. 428-198.000.

Heraeus Quarzglas GmbH: *See—*
  Lebert, Helmut; and Whippey, Nigel R., 5,026,413, Cl. 65-29.000.

Herman Miller, Inc.: *See—*
  Johnson, Gary C., 5,025,603, Cl. 52-221.000.

Hernandez, Lisa C.: *See—*
  Anderson, Richard J.; Goodman, Bruce J.; Riggio, Robert T.; Kopolovics, Solomon; Hernandez, Lisa C.; Chen, Chengkuo; and Romei, Russell J., 5,027,395, Cl. 380-4.000.

Hesler, Lee J.; and Park, Stanley C., to Du Pont de Nemours, E. I., and Company. Aramid papers containing aramid paper pulp. 5,026,456, Cl. 162-146.000.

Hess, Kenneth J. Vehicle spare tire storage apparatus. 5,026,107, Cl. 296-37.200.

Heston, Jeffrey W.: *See—*
  Brussalis, Stacy A.; Heston, Jeffrey W.; and Yang, Stewart L., 5,026,298, Cl. 439-358.000.

Heusser, Eduard, to Zellweger Uster AG Apparatus and method for the automatic determination of the count of a textile test sample. 5,025,660, Cl. 73-160.000.

Hewko, Marc D., to Excel Industries, Inc. Vehicle door structure with improved energy absorption characteristics. 5,026,111, Cl 296-146.000.

Hewlett-Packard: *See—*
  Marshall, Alan D., 5,027,350, Cl 370-85.130.

Hewlett-Packard Company: *See—*
  Dias, J. Fleming, 5,025,790, Cl. 128-662.030.
  Gill, Hardayal S.; and Brug, James A., 5,027,243, Cl. 360-113.000.
  Harmon, J. P.; and Ward, Jefferson P., 5,027,134, Cl. 346-140.00R.
  Hindagolla, Suraj L.; Thierheimer, Charles L., Jr.; and Skene, John M., 5,026,425, Cl. 106-22.000.
  Russell, Dale D., 5,026,426, Cl. 106-22.000.

Heyer, Raymond F.; and Hubbard, Connie L., to Minnesota Mining and Manufacturing Company. Hand scouring pad. 5,025,596, Cl. 51-400.000.

He290501ems Incorporated: *See—*
  Berliner, Samuel, III, 5,026,167, Cl. 366-150.000.

Hi-Stat Manufacturing Co., Inc.: *See—*
  Cebulski, David J., 5,026,954, Cl. 200-84.00C.

Hibino, Hiromi: *See—*
  Hasegawa, Kazumi; Moriya, Takashi; Hibino, Hiromi; and Takamura, Akira, 5,026,186, Cl. 400-691.000.

Hickman, Fred R.: *See—*
  McGinnis, Henry J.; Hickman, Fred R.; and Ludwig, Wesley N., 5,025,606, Cl. 52-741.000.

Hidaka, Setsuo: *See—*
  Kosaka, Takemi; Sakamoto, Fukashi; and Hidaka, Setsuo, 5,026,617, Cl. 429-206.000.

Higashimura, Hideaki: *See—*
  Nokubo, Seiji; Kohno, Teruhisa; Hashida, Koichi; Usuki, Takashi; and Higashimura, Hideaki, 5,026,123, Cl. 303-117.000.

Higuchi, Kazutoshi, to Hitachi, Ltd. MR imaging system and method. 5,027,070, Cl. 324-309.000.

Higuchi, Shigemitsu: *See—*
  Nishimura, Keizo; Higuchi, Shigemitsu; and Okamura, Fuzio, 5,027,209, Cl. 358-160.000.

Higuchi, Toshiharu; Matsumoto, Sadao; Yakabe, Toru; and Kimura, Sakae, to Kabushiki Kaisha Toshiba. Indirectly heated cathode assembly and its associated electron gun structure. 5,027,029, Cl. 313-446.000.

Higuma, Masahiko: *See—*
  Hasegawa, Kenji; Mori, Takahiro; and Higuma, Masahiko, 5,027,131, Cl. 346-1.100.

Higurashi, Seiji: *See—*
  Suwa, Tetsuya; and Higurashi, Seiji, 5,027,229, Cl. 360-19.100.

Hikichi, Koichi: *See—*
  Kobayashi, Akio; Tanaka, Hiroshi; Yamashita, Shoji; Fujita, Yasumasa; Hikichi, Koichi; and Kumagai, Chiaki, 5,025,685, Cl. 74-866.000.

Hilbrink, Hubertus E.: *See—*
  Biekart, Frank T.; and Hilbrink, Hubertus E., 5,026,019, Cl. 251-4.000.

Hilgers, Lucas A. T.; and Weststrate, Marinus W., to Duphar International Research B.V. Stabilized adjuvant suspension comprising dimethyl dioctadecyl ammonium bromide. 5,026,546, Cl. 424-88.000.

Hill, Amel L., to Pierce, Clyde W. High frequency loudspeaker 5,027,411, Cl. 381-160.000.

Hill, James A.: *See—*
  Blackwelder, Maurice W.; and Hill, James A., 5,026,338, Cl. 493-158.000.

Hill-Male, Nonton: *See—*
  Spanner, John R.; Hill-Male, Nonton; and Soomal, Harinder S., 5,026,346, Cl. 604-110.000.

Hill, Michael; and Nichols, Walter A., to Filter Materials Limited. Polyolefin filter tow and method of making it. 5,025,815, Cl. 131-332.000.

Hills, Graham W.; Huttemann, Robert D.; and Olasupo, Kolawole R., to AT&T Bell Laboratories. Method of making integrated circuits having a planarized dielectric. 5,026,666, Cl. 437-195.000.

Hilti Aktiengesellschaft: *See—*
  Gantner, Gebhard, 5,025,870, Cl. 173-162.200.

Hilton, Colin S., to National Research Development Corporation. Method and apparatus for capturing information in drawing or writing. 5,027,414, Cl. 382-3.000.

Hilty, Jim E.: *See—*
  Smith, Ian; Simerly, Carmin C.; Hilty, Jim E.; and Byerley, Mark S., 5,025,917, Cl. 198-842.000.

Himont Incorporated. *See—*
  Polato, Felice; and Cecchin, Giuliano, 5,026,608, Cl 428-484.000.

Hindagolla, Suraj L.; Thierheimer, Charles L., Jr.; and Skene, John M., to Hewlett-Packard Company. Waterfastness of DB-168 ink by cation substitution. 5,026,425, Cl. 106-22.000.

Hintze, Kurt; and Hacker, Keith. Archery arrow support. 5,025,773, Cl. 124-445.000.

Hintzen, Ullrich; Luhrsen, Ernst; and Schuler, Andreas, to Didier-Werke AG. Refractory shutoff assembly capable of improved emergency closing. 5,025,961, Cl. 222-599.000.

Hirabayashi, Hiromitsu; Kusaka, Kensaku; and Mizutani, Morikazu, to Canon Kabushiki Kaisha. Image fixing apparatus using a detachable film. 5,026,276, Cl. 432-59.000.

Hirabayashi, Keiji: *See—*
  Yamamoto, Kiyoshi; Hirabayashi, Keiji, Kurihara, Noriko; Taniguchi, Yasushi; and Ikoma, Keiko, 5,026,415, Cl. 65-305.000.

Hirai, Hiroyuki: *See—*
  Ono, Michio; Hirai, Hiroyuki; Ohki, Nobutaka; and Nakamura, Koki, 5,026,634, Cl. 430-559.000.

Hirai, Shin-ichiro. *See—*
  Makino, Tadashi; Tabata, Tetsuro; and Hirai, Shin-ichiro, 5,026,560, Cl. 424-494.000.

Hirai, Yuji: *See—*
  Tanaka, Takakazu; and Hirai, Yuji, 5,027,431, Cl. 455-214.000.

Hirakawa, Shoji: *See—*
  Mizuno, Koichi; Wakabayashi, Takeshige; Koinuma, Yutaka; Aizawa, Reiji; Kushiyama, Satoshi; Kabayashi, Satoru; Ohuchi, Hideo; Yoshida, Toyonobu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, 5,026,464, Cl. 204-164.000.

Hirakoso, Hiroyuki; and Aoki, Teruyuki, to Mitsubishi Jukogyo Kabushiki Kaisha. Rocket engine. 5,025,623, Cl. 60-257.000.

Hirano, Shin-ichi: *See—*
  Baney, Ronald H.; and Hirano, Shin-ichi, 5,026,684, Cl. 505-1.000.

Hirano, Tetsuji: *See—*
  Inoue, Hiroshi; Miura, Tadashi; and Hirano, Tetsuji, 5,026,767, Cl. 524-745.000.

Hiraoka, Manabu: *See—*
  Osanai, Satoshi; and Hiraoka, Manabu, 5,026,283, Cl. 433-90.000.

Hiraoka, Mizuho: *See—*
  Imataki, Hiroyuki; Hiraoka, Mizuho; Ogawa, Yoshihiro; Yoshino, Hitoshi; Ichikawa, Sachiko; and Kato, Seijiro, 5,026,623, Cl. 430-270.000.

Hiraoka, Nobutsugu: *See—*
  Kotani, Hirokazu; Hiraoka, Nobutsugu; and Obayashi, Akira, 5,026,645, Cl. 435-194.000.

Hirashima, Hidenori: *See—*
  Katayama, Sakae; Ito, Yosuke; and Hirashima, Hidenori, 5,026,723, Cl. 514-441.000.

Hirashita, Hiroshi; and Odaka, Seiya, to Akebono Brake Industry Co., Ltd. Disk brake. 5,025,897, Cl. 188-73.380.

Hirata, Kiminori: *See—*
  Taniguchi, Masakazu; Baba, Masatoshi; Ochiai, Yoshinori; Hirose, Masayoshi; and Hirata, Kiminori, 5,026,850, Cl. 544-240.000.

Hiroe, Akihiko; and Terao, Noriyuki, to Ricoh Company, Ltd.; and Ricoh Research Institute of General Electronics Co., Ltd. Shift register circuit. 5,027,382, Cl. 377-76.000.

Hirono, Toshiaki: *See—*
  Ooi, Akihiko; and Hirono, Toshiaki, 5,026,028, Cl. 256-67.000.

Hirose, Masayoshi: *See—*
  Taniguchi, Masakazu; Baba, Masatoshi; Ochiai, Yoshinori; Hirose, Masayoshi; and Hirata, Kiminori, 5,026,850, Cl. 544-240.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Hirota, Masaki; Fujiki, Norio; and Mihara, Teruyoshi, to Nissan Motor Co., Ltd. MOSFET including current mirror FET therein. 5,027,251, Cl. 361-18.000
- Hirsch, Thomas S.: *See—*
  - Curley, John L.; Hirsch, Thomas S., and Wurz, David A., 5,027,271, Cl. 364-200.000.
- Hiruma, Kenji: *See—*
  - Takatani, Shinichiro; Goto, Shigeo, Kawata, Masahiko; and Hiruma, Kenji, 5,025,751, Cl. 118-733.000.
- Hisanaga, Akinori: *See—*
  - Noguchi, Takehiko; Sakubata, Takashi; Hisanaga, Akinori; Yoshioka, Tetsuo; and Nagano, Hirosaku, 5,026,820, Cl. 528-350.000.
- Hisano, Kyosuke, to Ricoh Company, Ltd LAN interfaced facsimile machine. 5,027,386, Cl. 379-100.000.
- Hisashige, Nobuyasu; Yokogawa, Fukuichi, and Shinhama, Makoto, to Mazda Motor Corporation. Engine exhaust apparatus. 5,025,890, Cl. 181-272.000.
- Hisatake, Masayuki; and Takayanagi, Hiroshi, to Fuji Xerox Co., Ltd. Digital image recording system with preset control for selecting output formats based on the selected amount of pixel color and density data. 5,027,221, Cl. 358-300.000.
- Hisatomi, Masahiro; Togasaki, Yoshihiro; and Tanaka, Mitsuyasu, to Nissan Motor Co., Ltd.; Hanshin Electric Co., Ltd.; and Yazaki Corporation. Ignition plug socket structure. 5,026,294, Cl. 439-125.000.
- Hitachi Automotive Engineering Co., Ltd.: *See—*
  - Sato, Kazuhiko; and Watanabe, Shizuhisa, 5,025,686, Cl. 74-866.000.
- Hitachi Construction Machinery Co., Ltd.. *See—*
  - Morikawa, Rindo, 5,025,625, Cl. 60-426.000.
- Hitachi Koki Company, Limited. *See—*
  - Terunuma, Yukio; and Tanabe, Takao, 5,025,869, Cl. 173-98.000.
- Hitachi, Ltd · *See—*
  - Arabori, Noboru; Takahashi, Hideaki; Sakai, Yoshio; Nakazato, Masao; Tanaka, Masakatsu; Takahashi, Tatsuhiko; Masuda, Katsutaro; Itoh, Masanobu; and Toda, Yuji, 5,025,896, Cl. 187-115.000.
  - Baji, Toru; Nakano, Yukio; Tanabe, Shiro; Nakagawa, Tetsuya; and Kojima, Hirotsugu, 5,027,400, Cl 380-20.000.
  - Hazaki, Eiichi, Otaka, Tadashi; and Shimizu, Minoru, 5,026,995, Cl. 250-441.100.
  - Higuchi, Kazutoshi, 5,027,070, Cl. 324-309.000.
  - Hongo, Mikio; Mizukoshi, Katsuro; Sano, Shuzo; Kamimura, Takashi, Itoh, Fumikazu; Shimase, Akira; Haraichi, Satoshi; and Takahashi, Takahiko, 5,026,664, Cl. 437-189.000.
  - Kaneko, Masaharu; Ozawa, Tetsuo; Yoneyama, Tomio; Imazeki, Shuji, Mukoh, Akio; and Sato, Mikio, 5,026,505, Cl. 252-299.100.
  - Kuwabara, Takao; Inoue, Hisao; Nakagawa, Hiroto; and Kita, Eizo, 5,026,256, Cl. 417-45.000.
  - Matsuno, Yasuhiro; Terakado, Hajime, Mochizuki, Masaru; Moroshima, Heiji; and Kamei, Hiroyuki, 5,027,107, Cl. 340-572.000.
  - Migita, Masahito; Kanehisa, Osamu; Shiiki, Masatoshi; and Yamamoto, Hajime, 5,026,661, Cl. 437-81.000.
  - Miyamoto, Kazuhisa; Miyaoka, Shuuichi; Nakamura, Kazuo; and Imai, Kenji, 5,027,323, Cl. 365-189.110.
  - Nishida, Hiroshi, Ishigaki, Tatsuya, Ito, Atsushi; Kudou, Yoshinobu, Katou, Hiroshi; and Fujii, Kousuke, 5,027,242, Cl. 360-106.000.
  - Nishimura, Keizo; Higuchi, Shigemitsu: and Okamura, Fuzio, 5,027,209, Cl. 358-160.000.
  - Ohnari, Mikihiko; Sekozawa, Teruji; Funabashi, Motohisa; Atago, Takeshi; and Shioya, Makoto, 5,027,278, Cl 364-431.060.
  - Oshio, Toshiyuki; Tawata, Kenji; and Mabashi, Masayoshi, 5,027,217, Cl. 358-213.190.
  - Owada, Nobuo; Oogaya, Kaoru; Kobayashi, Tohru; and Kawaji, Mikinori, 5,027,188, Cl. 357-68.000.
  - Sakurai, Shigeo; Miyata, Hiroshi; Tan, Toshimi, and Kaneko, Ryoichi, 5,027,268, Cl. 364-184.000.
  - Sato, Kazuhiko; and Watanabe, Shizuhisa, 5,025,686, Cl. 74-866.000.
  - Suwanai, Naokatsu; and Tsuchiya, Osamu, 5,025,741, Cl. 437-52.000.
  - Takatani, Shinichiro; Goto, Shigeo; Kawata, Masahiko; and Hiruma, Kenji, 5,025,751, Cl. 118-733.000.
  - Tanba, Nobuo; and Ikeda, Takahide, 5,026,654, Cl 437-31.000.
  - Yamauchi, Teruo; Nogi, Toshiharu; and Ohyama, Yoshishige, 5,025,766, Cl. 123-472.000.
- Hitachi Metals, Ltd.: *See—*
  - Iwasaki, Katsunori; Tanigawa, Shigeho; and Tokunaga, Masaaki, 5,026,419, Cl. 75-254.000.
  - Nakamura, Shuichi, Sasaki, Hakaru, and Watanabe, Rikizo, 5,026,435, Cl. 148-12.00A.
- Hitachi Tokyo Electronics Co., Ltd.: *See—*
  - Matsuno, Yasuhiro; Terakado, Hajime; Mochizuki, Masaru; Moroshima, Heiji; and Kamei, Hiroyuki, 5,027,107, Cl 340-572 000.
- HM Electronics, Inc.: *See—*
  - Menadier, Michael A.; Williams, Michael A ; and Rose, David B., 5,027,433, Cl. 455-606.000.
- Ho, Benedict C. M.: *See—*
  - Franklin, Gene R., and Ho, Benedict C. M., 5,026,974, Cl. 235-449.000.
- Ho, I-Chung: *See—*
  - Gutknecht, Daniel A , and Ho, I-Chung, 5,026,260, Cl. 417-407.000.
- Ho, Kam W.; and Lam, Patrick W., to Polysar Limited. Adducts of an hydroxy-free acrylate resin and an epoxy resin. 5,026,794, Cl. 525-532.000.
- Hobart Corporation: *See—*
  - Trouteaud, Lee E.; and Hadick, Robert J., 5,025,950, Cl 221-5.000.
- Hobbs, Frank W., and Meek, James L., to Du Pont de Nemours, E. I., and Company. Process for regioselectively preparing phosphorylated inositols and other cyclitols. 5,026,898, Cl. 560-106.000.
- Hodges, Paul D., Jr.: *See—*
  - Zeitlin, Dan B.; Branthover, John B., Smith, Brian H . Piloto, Andrew J.; Lengel, Theresa M.; Carlson, Robert R., Jr.; Shum, Lanson Y.; Hodges, Paul D., Jr.: and Harris, Denise B , 5,027,255, Cl. 361-395.000.
- Hoechst Aktiengesellschaft. *See—*
  - Dapperheld, Steffen, 5,026,460, Cl 204-59.00R
  - Janocha, Siegfried; Schloegl, Gunter; Crass, Guenther; and Bothe, Lothar, 5,026,592, Cl. 428-204.000.
  - Jung, Rudiger; and Deubel, Reinhold, 5,026,831, Cl. 534-752 000.
- Hoechst Atkiengesellschaft: *See—*
  - Dinter, Peter; Bothe, Lothar; and Gribbin, John D., 5,026,463, Cl 204-164.000.
- Hoechst Celanese Corporation: *See—*
  - Saleh, Lotfy L., 5,025,538, Cl. 28-263.000.
  - Smith, Brad L ; Torrence, G Paull; Agulo', Adolfo; and Alder, James S., 5,026,908, Cl 562-519.000.
  - Vora, Rohitkumar H., 5,026,822, Cl. 528-353.000
- Hoefkes, Heiner J. Peg board hanger 5,026,011, Cl. 248-220.400.
- Hoeflich, John B : *See—*
  - McNally, Robert F.; and Hoeflich, John B , 5,026,056, Cl. 273-77.00A
- Hoehn, Richard K.; and Reno, Mark E., to UOP. Hydrocracking process with integrated distillate product hydrogenation reactor 5,026,472, Cl. 208-58.000.
- Hoes, Larry M.; and Hynes. Joseph H., to Cooper Industries, Inc. Annular metal-to-metal seal. 5,026,074, Cl. 277-27.000.
- Hofer, Peter, to GRAPHA-Holding AG. Apparatus for singularizing stacked portions of books and the like. 5,026,250, Cl. 414-796.100.
- Hoffelner, Herbert, to MTU Motoren- und Turbinen- Union Munchen GmbH. Sealing device for turbo engines and the like 5,026,252, Cl 415-174.200.
- Hofle, Gerhard *See—*
  - Bohlendorf, Bettina; Bedorf, Norbert; Hofle, Gerhard, Schummer, Dietmar, and Sutter, Marius, 5,026,878, Cl. 549-267.000.
- Hogan, John P., to Phillips Petroleum Company. Process for preventing fouling in a gas phase polymerization reactor. 5,026,795, Cl 526-74.000.
- Hogue, John H. Tuning the wood of a musical instrument bow 5,025,694, Cl. 84-282.000.
- Hokanson, John L.; and Swartz, Robert G., to AT&T Bell Laboratories. Laser control method and circuitry 5,027,362, Cl. 372-38 000.
- Hoki, Tetsuo. *See—*
  - Kitakado, Ryuji; Yano, Hironobu; Kakuma, Hiroaki; Hoki, Tetsuo; and Kanai, Takao, 5,027,417, Cl. 382-8.000.
- Holahan, Maurice F.· *See—*
  - Corfits, William D.; Holahan, Maurice F.; Martino, Susan J Motschman, David R.; and Thorpe, James R., 5,027,254, Cl 361-384 000.
- Holl, Roland, Hummel, Peter; and Rebel, Herbert, to MAN Roland Druckmaschinen AG. Change-over device for an intermediate damping roller in an offset printing press. 5,025,724, Cl. 101-148.000.
- Holl, Timothy: *See—*
  - Short, William; Ickler, Christopher; Holl, Timothy; and Keezer, William, 5,027,403, Cl. 381-24.000.
- Holland, Richard J.; and Buda, Charles, to Colgate-Palmolive Company. Built particulate detergent containing a narrow range alcohol ethoxylate and a pet-poet copolymer soil release agent. 5,026,400, Cl 8-137.000.
- Hollaway, Gerald C., Jr , to Dayco Products, Inc. Method of making a fiber-loaded polymeric sheet. 5,026,444, Cl. 156-62.200.
- Hollidge, Peter W. Interactive pump system. 5,027,282, Cl 364-479.000.
- Hollowell, James A.; Wells, Hal C.; and Robinson, Robert W , to Marathon Oil Company. Motion absorbing docking assembly 5,026,226, Cl 405-211.000.
- Holms, James H : *See—*
  - Brooks, Dee W.; Summers, James B.; and Holms, James H . 5,026,729, Cl. 514-575.000.
- Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., to SmithKline Beecham Corporation. Phosphinic acid substituted steroids as inhibitors of steroid 5α-reductase. 5,026,882, Cl. 552-506.000.
- Holt, Peter K.; and Olorenshaw, George M Overflow level controller for a bathtub. 5,025,509, Cl. 4-206.000
- Holzer, Walter. Device for needleless hypodermic injection of medications. 5,026,343, Cl 604-68.000.
- Holzl, Roland, to Pruftechnik Dieter Busch & Partner GmbH & Co Shaft alignment checking method. 5,026,998, Cl 250-561.000.
- Hon, Edward D.: *See—*
  - Hon, Edward H.; and Hon, Edward D., 5,025,792, Cl. 128-672.000.
- Hon, Edward H ; and Hon, Edward D., to Hon Group, The. Continuous cutaneous blood pressure measuring apparatus and method 5,025,792, Cl. 128-672.000.
- Hon Group, The: *See—*
  - Hon, Edward H.; and Hon, Edward D., 5,025,792, Cl. 128-672.000
- Honda Giken Kogyo Kabushiki Kaisha: *See—*
  - Asanuma, Nobuyoshi; Ishida, Shinnosuke; and Hasegawa, Hiroshi, 5,027,302, Cl. 364-424.050.
  - Kobayashi, Akio; Tanaka, Hiroshi; Yamashita, Shoji; Fujita, Yasumasa; Hikichi, Koichi; and Kumagai, Chiaki, 5,025,685, Cl. 74-866.000.

  - Matsushima, Yuzo, Ito, Yoshiyuki and Yamamori, Satofumi, 5,026,739, Cl. 521-177.000.
  - Morinaka, Shigehisa; Nakashima, Tai; Yamazaki, Takeshi, Morishima, Kazuo; Kashio, Yoshiaki; and Akimori, Giichiro, 5,025,883, Cl. 180-219.000.
  - Sekino, Yohsuke, 5,026,090, Cl. 280-673.000.
- Honeywell Inc.: *See—*
  - Adams, John T : and Tinsley, Timothy M., 5,026,270, Cl. 431-24.000
  - Bird, Douglas D.; and Uhrich, Daniel T , 5,025,984, Cl. 236-46.00R.
  - Ruby, Joseph H . and Steinke, Richard W., 5,027,034, Cl. 315-106.000.
- Hongo, Mikio; Mizukoshi, Katsuro; Sano, Shuzo; Kamimura, Takashi, Itoh, Fumikazu; Shimase, Akira, Haraichi, Satoshi; and Takahashi, Takahiko, to Hitachi, Ltd. Method of providing a semiconductor IC device with an additional conduction path. 5,026,664, Cl. 437-189.000.
- Honma, Yoshihiro: *See—*
  - Ara, Mitsuyuki; and Honma, Yoshihiro, 5,027,354, Cl. 371-25.100.
- Honore, Tage; Jacobsen, Poul; Nielsen, Flemming E.; and Naerum, Lars, to Novo Nordisk A/S. Benzo[f]quinoxaline-2,3(1H,4H)-diones. 5,026,704, Cl. 514-250.000.
- Hook, Richard W.; and Coordes, Duane A., to Deere & Company Electronic seed rate system for a grain drill. 5,025,951, Cl. 221-13.000.
- Horaguchi, Yoichi: *See—*
  - Ishida, Kazuhito; and Horaguchi, Yoichi, 5,027,155, Cl. 355-229.000.
- Horie, Fujio; and Inoue, Tomo, to Brother Kogyo Kabushiki Kaisha Stitch pattern sewing machine 5,025,740, Cl. 112-456.000.
- Horie, Nobuyuki: *See—*
  - Yamane, Daiji; Sakamoto, Noriaki, and Horie, Nobuyuki, 5,026,981, Cl. 250-214.00B.
- Horiguchi, Shojiro: *See—*
  - Takizawa, Minoru; Nakamura, Michiei; Takeuchi, Hitoshi, Sakamoto, Shigeru; and Horiguchi, Shojiro, 5,026,780, Cl 525-301.000.
- Horii, Masahiro: *See—*
  - Yamanaka, Toshihiro; Takemoto, Tetsuyuki; Horii, Masahiro; and Taniguchi, Shoji, 5,027,334, Cl. 369-13.000.
- Horinek, Herbert J.: *See—*
  - Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G.; and Stephenson, Stanley V., 5,026,168, Cl. 366-168.000.
- Horizon Surgical, Inc.: *See—*
  - Peiffer, James E., 5,026,382, Cl. 606-158.000.
- Horlacher, Peter: *See—*
  - Grigo, Ulrich; Kirsch, Jurgen; Wittmann, Dieter; Idel, Karsten-Josef; and Horlacher, Peter, 5,026,758, Cl. 524-423.000.
- Hornung, Craig W.; and Long, Alden O., to AMP Incorporated. Lead making machine having improved wire feeding system. 5,025,549, Cl. 29-564.400.
- Horsley, William J.; and Tucker, Virgil R., to Ball Corporation. Open cage density sensor. 5,027,076, Cl 324-674.000.
- Hosaka, Hiroshi: *See—*
  - Itoh, Eiji; Nagase, Ryuichi; Saito, Kazuhiro; Hosaka, Hiroshi; and Nagai, Hihumi, 5,026,614, Cl. 428-658.000.
- Hoshi, Kazunori, to Ricoh Company, Ltd. Node apparatus for parallel communication. 5,027,346, Cl. 370-58.200.
- Hoshino, Ryoichi; Sasaki, Hironaka; and Yasutake, Takayuki, to Showa Aluminum Kabushiki Kaisha. Condenser for use in a car cooling system. 5,025,855, Cl. 165-150.000.
- Hoshino, Yasushi; Kakita, Tsuyoshi; and Yoshida, Makoto, to Konica Corporation. Voice-recognition camera. 5,027,149, Cl 354-412.000.
- Hoshizaki Denki Kabushiki Kaisha· *See—*
  - Hara, Yasuo, 5,025,637, Cl. 62-138.000.
- Hosoda, Masahiro *See—*
  - Takahashi, Kosei; Hosoda, Masahiro; Tsunoda, Atsuo; Kondo, Masafumi; and Suyama, Takahiro, 5,027,169, Cl. 357-17.000.
- Hosoi, Atsushi: *See—*
  - Okada, Tamotsu; Hosoi, Atsushi; Suzuki, Yoshihiko; and Yano, Kanji, 5,027,160, Cl. 355-282.000.
- Hosokawa, Toshihiro: *See—*
  - Sugimoto, Yoshiaki; Hosokawa, Toshihiro; Uchiumi, Yutaka; Sasamoto, Shuji; and Fujimoto, Nobuyuki, 5,026,331, Cl. 474-214.000.
- Hosoya, Eikichi: *See—*
  - Itoh, Kouichi; Ishige, Atsushi; and Hosoya, Eikichi, 5,026,733, Cl 514-718.000.
- Hosoya, Kazuhiro; Ohtani, Ikuji; and Imaizumi, Kimio, to Asahi Kasei Kogyo Kabushiki Kaisha. Low-hygroscopic copolymer. 5,026,805, Cl. 526-309.000.
- Hotomi, Hideo; Terasaka, Yoshihisa; and Mizuno, Hiroshi, to Minolta Camera Kabushiki Kaisha. Developing device provided with electrodes for inducing a traveling wave on the developing material. 5,027,157, Cl. 355-261.000.
- House, Wayne D.; and Myers, David J., to W. L. Gore & Associates, Inc. Process for making rapidly recoverable PTFE. 5,026,513, Cl. 264-127.000.
- Housel, Barron C., III: *See—*
  - Grant, John D.; Hall, James L.; and Housel, Barron C., III, 5,027,269, Cl. 364-200.000.
- Hovione Inter Ltd.: *See—*
  - Villax, Ivan; Heggie, William; and Page, Philip R., 5,026,693, Cl. 514-180.000.
- Howard, Mark J., to British Petroleum Company p.l.c., The. Homogeneous partial oxidation of a methane-containing paraffinic hydrocarbon. 5,026,946, Cl. 585-500.000.
- Hoyeck, Ralph H. Perpetual blind calendars series 2. 5,026,095, Cl 283-2.000.
- Hromas, Joe C.: *See—*
  - Huber, Klaus B.; Hromas, Joe C ; and Edwards, Arnold G., 5,025,861, Cl. 166-297.000.
- Hsiao, Rui-Yang. Drum brake. 5,025,898, Cl. 188-76.000.
- Hsu, Danny, to Wintime Technology Inc. Scanner system with local scanning capability for graphic reading. 5,026,953, Cl. 178-19.000
- Hsyng, Perng: *See—*
  - Neely, Eric D.; and Hsyng, Perng, 5,027,010, Cl. 307-456.000.
- Hu, Mae W.: *See—*
  - Tarnowski, Thomas L., Hu, Mae W.; Laney, Maureen, Pease, John S.; and Ghazarossian, Vartan, 5,026,905, Cl. 562-43.000.
- Huan Ting Enterprise Co., Ltd.: *See—*
  - Yen, Jung-Chuan, 5,026,477, Cl. 210-169.000.
- Huang, James R. C. One piece mask body having vertically stitched nose accomodating portion. 5,025,506, Cl. 2-206.000.
- Huang, Liang-Lii: *See—*
  - Harwood, Richard J.; Mehta, Gunvant N ; Jhawar, Ramesh C.; Huang, Liang-Lii; Grim, Wayne M., and Li, Shun P., 5,026,709, Cl. 514-263.000.
- Huang, Shyh-Chin: *See—*
  - Jackson, Melvin R.; and Huang, Shyh-Chin, 5,026,522, Cl. 420-426.000.
- Hubbard, Connie L.: *See—*
  - Heyer, Raymond F.; and Hubbard, Connie L., 5,025,596, Cl 51-400.000
- Hubbard, James E., Jr., to Charles Stark Draper Laboratory, Inc., The. Wavefront sensing and correction with deformable mirror 5,026,977, Cl. 250-201.900.
- Huber, Bernhard, to Bodenseekwerk Perkin Elmer GmbH. Method and device for mercury analysis. 5,026,652, Cl. 436-81.000.
- Huber, Klaus B.; Hromas, Joe C.; and Edwards, Arnold G., to Schlumberger Technology Corporation. Tubing and wireline conveyed perforating method and apparatus. 5,025,861, Cl. 166-297.000.
- Huber, Thomas, to Bavaria Cargo Technologie GmbH. Drive roller unit. 5,025,915, Cl. 198-782.000.
- Hudson, Edwin L.: *See—*
  - Riordan, Thomas J.; Ries, Paul S.; Hudson, Edwin L.; and Killian, Earl A., 5,027,270, Cl. 364-200.000.
- Hudson, Walter, Jr. Non-glare night reader. 5,027,261, Cl. 362-98.000.
- Huege, Jurgen: *See—*
  - Meyer, Jurgen; Sippel, Achim; Wildau, Monika; Kruse, Heinz J.; Diel, Rainer; Becker, Wilfried; Bartsch, Gisbert; Pahnke, Klaus-Dieter; Huege, Jurgen; and Luther, Hans-Werner, 5,025,731, Cl. 102-521.000.
- Huels Aktiengesellschaft: *See—*
  - von Itter, Franz-Albert, 5,026,852, Cl. 544-317.000.
- Hug, William F.; and Reid, Ray D. System for rapidly producing plastic parts. 5,026,146, Cl. 350-356.000.
- Hughes Aircraft Company: *See—*
  - Robinson, M.; Pastor, Antonio C.; and Pastor, Ricardo C., 5,026,409, Cl. 65-3.110.
  - Shannon, Michael J.; and Turnidge, Randolf C., 5,027,189, Cl. 357-71.000.
  - Tang, Raymond, 5,027,125, Cl. 342-368.000.
  - Vasudev, Prahalad K., 5,027,177, Cl. 357-30.000.
  - Wen, Cheng P.; Wu, Chan-Shin; and Sato, Robert N., 5,026,148, Cl. 350-386.000.
- Hughes, Larry M., to Protel, Inc. Coin validation method and apparatus for a coin telephone or similar system having an escrow mechanism. 5,027,390, Cl. 379-150.000.
- Hulkenberg, Francis J., Jr., to General Dynamics Corporation. Lock release apparatus. 5,026,100, Cl. 292-92.000.
- Hulland, Burton L., to United States of America, Navy. Video processor for a counter-countermeasure system. 5,027,121, Cl. 342-16.000.
- Huls Troisdorf AG: *See—*
  - Matthes, Reinhard; Schork, Reinhold; and Vahlensieck, Hans-Joachim, 5,026,533, Cl. 423-342.000.
- Hult, David R.; and Tomasiak, Mark J., to Emerson Electric Co. Portable hand held vacuum cleaner. 5,025,529, Cl. 15-344.000.
- Hultberg, Richard M. Automotive wheel balancing apparatus and method. 5,025,662, Cl. 73-459.000.
- Hummel, Peter: *See—*
  - Holl, Roland; Hummel, Peter; and Rebel, Herbert, 5,025,724, Cl. 101-148.000.
- Hundebol, Soren, to F. L. Smidth & Co. A/S. Reduction of nitrogen oxide (NO_x) emission from a kiln plant. 5,026,275, Cl. 432-14.000.
- Hunt, Carl E., to GTE Valenite Corporation. Bayonet tool locking device. 5,026,223, Cl. 409-233.000.
- Hunt, Kenneth E.: *See—*
  - Kuhn, John B.; Hunt, Kenneth E.; and Thorman, Christopher S., 5,025,617, Cl. 56-15.600.
- Hunt, Patricia K.; and Zemel, Bernard, to BP America Inc. Method for identifying drilling mud filtrate invasion of a core sample from a subterranean formation. 5,027,379, Cl. 378-4.000.
- Hunter Douglas International NV: *See—*
  - Orlov, Alexei D.; Nixon, Ross O.; and Misick, John H. D., 5,026,271, Cl. 431-125.000.
- Huquet, Jovanka: *See—*
  - Boustta, Mahfoud; Huquet, Jovanka; and Vert, Michel, 5,026,821, Cl. 528-350.000.

VOL
1127
ISS
4
JE
25
1991
UMI

Huron/St. Clair Incorporated: *See—*

Cronce, Gary M., Rasor, William; and Graboske, Dean, 5,025,967, Cl. 224-326.000.

Hurst, George S., to Consultec Scientific, Inc. Radon monitor and control system based upon alpha particle detection 5,026,986, Cl. 250-255.000.

Husler, Rinaldo: *See—*

Riediker, Martin; Steiner, Eginhard; Beyeler, Harry; Sitek, Franciszek; and Husler, Rinaldo, 5,026,625, Cl 430-281.000

Hutchinson: *See—*

Zermati, Charles; and Bristot, Pierre, 5,026,330, Cl. 474-138.000

Huttemann, Robert D.: *See—*

Hills, Graham W.; Huttemann, Robert D., and Olasupo, Kolawole R., 5,026,666, Cl. 437-195.000.

Hutzenlaub, Armin; and Dick, Reinhard, to Kampf GmbH & Co. Maschinenfabrik Unwinding carriage for rolls of strip materials. 5,025,998, Cl. 242-55.000.

Hwang, Karl J Targeting drugs to hepatocytes in the liver. 5,026,558, Cl. 424-400.000.

Hynes, Joseph H.: *See—*

Hoes, Larry M; and Hynes, Joseph H., 5,026,074, Cl. 277-27.000.

Hyslop, Robert F.: *See—*

Austin, Jared A.; Miller, Joseph H. and Hyslop, Robert F., 5,026,587, Cl 428-91.000.

Hyundai Motor Company: *See—*

Lee, Un K., 5,026,091, Cl. 280-675.000.

Iannone, Patrick P.. *See—*

Chraplyvy, Andrew R.; Iannone, Patrick P., Kaminow, Ivan P.; Li, Tingye; Stone, Julian; Stulz, Lawrence W., and Tkach, Robert W., 5,027,435, Cl. 455-617.000.

Iba, Akio; Murata, Yoshiyuki; and Manabe, Hajime, to Casio Computer Co., Ltd. Electronic stringed instrument. 5,025,703, Cl. 84-718.000.

Ichikawa, Sachiko: *See—*

Imataki, Hiroyuki; Hiraoka, Mizuho; Ogawa, Yoshihiro; Yoshino, Hitoshi; Ichikawa, Sachiko; and Kato, Seijiro, 5,026,623, Cl. 430-270.000.

Ichikawa, Souji, to Mitutoyo Corporation Optical encoder 5,026,164, Cl. 356-373.000.

Ichinosawa, Hideyuki: *See—*

Ohtsuka, Koji; Kutsuzawa, Yoshiro; Ogata, Kimio; and Ichinosawa, Hideyuki, 5,027,166, Cl 357-15.000.

Ichitsubo, Norio; Kamada, Hiroshi; and Barr, Lance, to Nintendo of America, Inc. Apparatus for cleaning electronic game consoles and cartridges. 5,025,526, Cl. 15-210.00R.

ICI Americas Inc.: *See—*

Michaely, William J., 5,026,896, Cl. 560-23.000.

ICI Australia Operations Proprietary Limited *See—*

Yabsley, Michael; Skinder, Waclaw; and Mitchell, Ken, 5,026,442, Cl. 149-2.000.

Ickler, Christopher: *See—*

Short, William; Ickler, Christopher; Holl, Timothy, and Keezer, William, 5,027,403, Cl. 381-24.000.

Idel, Karsten-Josef: *See—*

Grigo, Ulrich; Kirsch, Jurgen; Wittmann, Dieter; Idel, Karsten-Josef; and Horlacher, Peter, 5,026,758, Cl. 524-423.000.

Idemitsu Kosan Company Limited: *See—*

Kosaka, Takemi; Sakamoto, Fukashi; and Hidaka, Setsuo, 5,026,617, Cl. 429-206.000.

Idemitsu Petrochemical Co., Ltd.: *See—*

Fujii, Atsushi; and Fukuda, Kazuyuki, 5,026,778, Cl. 525-210.000.

Iding, Wilhelmus H.: *See—*

De Bijl, Andrianus M J.; Iding, Wilhelmus H.; and Overgoor, Bernardus J., 5,027,038, Cl. 315-209.00R.

IEV International Pty. Limited: *See—*

Do, Christopher N., 5,026,212, Cl. 405-211 000.

Iguchi, Shigeru: *See—*

Tanaka, Kanichi; and Iguchi, Shigeru, 5,027,022, Cl 310-78.000.

IHT, Inc.: *See—*

Miller, Archie M., 5,025,514, Cl 4-518.000.

Iida, Hirofumi: *See—*

Ishimoto, Noriyuki; and Iida, Hirofumi, 5,026,476, Cl. 210-89.000.

Iijima, Ryuji: *See—*

Ando, Shigenori; and Iijima, Ryuji, 5,027,280, Cl. 364-474.160.

Iino, Hiroshi; and Mori, Shinichi, to Yokohama Rubber Co., Ltd., The. Pneumatic bias tire with carcass plies having different cord angle. 5,025,845, Cl. 152-559.000.

Iio, Satoshi; Watanabe, Masakazu; Imura, Toru; Kuroda, Kotaro; and Saka, Hiroyasu, to NGK Spark Plug Co., Ltd. Zirconia-base sintered bodies having coating films. 5,026,601, Cl. 428-336.000.

Iizuka, Kazuo: *See—*

Arai, Tatsuo; Shiratori, Hidehisa; Hasegawa, Ryoei, and Iizuka, Kazuo, 5,026,221, Cl. 409-137.000.

Iizuka, Shigeo: *See—*

Kiuchi, Toshiaki; and Iizuka, Shigeo, 5,026,192, Cl. 401-176.000.

Ikarashi, Masami; and Mitsumori, Kenichi, to Alps Electric Co., Ltd. Drive circuit for an electroluminescence display device. 5,027,036, Cl. 315-169.300.

Ikari, Hirotake: *See—*

Ohta, Motomi; Takahashi, Teruyoshi; Ikari, Hirotake; and Agui, Wataru, 5,026,424, Cl. 106-18.340.

Ikeda, Takaaki; Suga, Toshihiko; and Kuroiwa, Akihiko, to Daichi Company, Ltd.; and Nihon Beam Electronics Company, Ltd EL operating power supply circuit. 5,027,040, Cl. 315-241.00R.

Ikeda, Takahide: *See—*

Tanba, Nobuo, and Ikeda, Takahide, 5,026,654, Cl. 437-31.000.

Ikeda, Yasushi *See—*

Andoh, Hiroaki; Ohshima, Michio, Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka, Ikeda, Yasushi, Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira, and Ohwaki, Akira, 5,027,137, Cl 354-4.000.

Ikegaya, Kazutoshi; Maruyama, Yuji; Sannomiya, Kunjo; Tsuda, Yukifumi; and Toha, Hiroto, to Matsushita Electric Industrial Co., Ltd Electro-optical inspection apparatus for printed-circuit boards with components mounted thereon. 5,027,418, Cl. 382-8.000.

Ikejiri, Masahisa *See—*

Yanagisawa, Michio; Ikejiri, Masahisa; Miyazaki, Hajime. Muranaka, Tsukasa; Inoue, Kunihiro, and Uchiyama, Shouichi. 5,027,077, Cl. 324-712.000

Ikoma, Keiko: *See—*

Yamamoto, Kiyoshi; Hirabayashi, Keiji; Kurihara, Noriko; Taniguchi, Yasushi; and Ikoma, Keiko, 5,026,415, Cl. 65-305.000.

Imai, Hajime: *See—*

Kito, Shozo; Harada, Shoichi; and Imai, Hajime, 5,025,901, Cl 192-4.00A

Imai, Kenji: *See—*

Miyamoto, Kazuhisa, Miyaoka, Shuuichi; Nakamura, Kazuo, and Imai, Kenji, 5,027,323, Cl. 365-189 110.

Imai, Kiyoshi. *See—*

Misumi, Fumihiko; Ueda, Masazumi, Hara, Masato, Matsui, Yutaka; and Imai, Kiyoshi, 5,026,978, Cl. 250-205.000.

Imai, Munehisa; Asano, Atsushi; Yasue, Tsutomu; Ito, Kenichiro; and Nojiri, Hiromi, to Aichi Kikai Kogyo Kabushiki Kaisha; and NTN Corporation. Bidirectional differential clutch. 5,025,902, Cl 192-43.000.

Imai, Yoshikiyo: *See—*

Yasuoka, Yuji; Kitagawa, Yoshiharu, and Imai, Yoshikiyo. 5,027,094, Cl. 335-78.000.

Imaizumi, Kimio: *See—*

Hosoya, Kazuhiro; Ohtani, Ikuji; and Imaizumi, Kimio, 5,026,805, Cl. 526-309.000.

Imamura, Kei-ichi; Gomi, Shuichi; Iwata, Michiaki; Miyadoh, Shinji; Shimura, Masaru; Shomura, Takashi; Sezaki, Masaji; and Inoye, Shigeharu, to Meiji Seika Kaisha, Ltd Novel compound having insecticidal activity and insecticide composition containing the same 5,026,547, Cl. 424-122.000.

Imamura, Kenichi: *See—*

Yokoyama, Naoki; and Imamura, Kenichi, 5,027,179, Cl 357-34.000.

Imanari, Makoto: *See—*

Seto, Takatoshi; Yokoi, Takashi; Odagiri, Masaki, and Imanari, Makoto, 5,026,922, Cl. 568-486.000.

Imataki, Hiroyuki; Hiraoka, Mizuho; Ogawa, Yoshihiro; Yoshino, Hitoshi; Ichikawa, Sachiko; and Kato, Seijiro, to Canon Kabushiki Kaisha. Optical recording medium. 5,026,623, Cl. 430-270.000.

Imazeki, Shuji *See—*

Kaneko, Masaharu, Ozawa, Tetsuo; Yoneyama, Tomio; Imazeki, Shuji; Mukoh, Akio; and Sato, Mikio, 5,026,505, Cl. 252-299.100.

Imoto, Manabu: *See—*

Yamazaki, Yoshihiro; and Imoto, Manabu, 5,027,424, Cl. 382-65.000.

Imperial Chemical Industries PLC: *See—*

Beresford, Michael P.; and Redman, Richard P., 5,026,743, Cl. 523-404.000.

Bushnell, Michael J., 5,026,727, Cl. 514-520.000.

Lawson, Kevin R., 5,026,418, Cl. 71-92.000.

Worthington, Paul A.; Crowley, Patrick J.; and Gravestock, Michael B., 5,026,718, Cl. 514-383.000.

Imperial College of Science, Technology & Medicine, The *See—*

Sutherland, Ian A.; Randall, Nigel J.; and Steer, Philip J., 5,025,787, Cl. 128-642.000.

Imperial Tobacco Limited: *See—*

Colley, Robert G., 5,025,913, Cl. 198-550.010.

Imura, Toru: *See—*

Iio, Satoshi; Watanabe, Masakazu; Imura, Toru; Kuroda, Kotaro; and Saka, Hiroyasu, 5,026,601, Cl. 428-336.000.

IMZ Fertigungs und Vertriebsgellschaft fur dentale Technologie mbH *See—*

Durr, Walter; and Kirsch, Axel, 5,026,280, Cl. 433-175.000.

Inaba, Yutaka: *See—*

Taniguchi, Osamu; Kawagishi, Hideyuki; Tsuboyama, Akira; Okada, Shinjiro; Inaba, Yutaka; and Kanbe, Junichiro, 5,026,144, Cl. 350-350.00S.

Inagaki, Jitsuo. Installation for processing foods in a sterilized condition. 5,025,716, Cl. 99-468.000.

Inage, Tomonori *See—*

Marui, Masatoshi; Inage, Tomonori; Matsui, Vuji; and Ishizuka, Tazuko, 5,026,145, Cl. 350-351.000.

Iname, Morito, to Kubushiki Kaisha Aoyama Artificial-flower-forming ribbon. 5,026,578, Cl 428-4.000.

Inatsuki, Tatsuya: *See—*

Kobayashi, Makiji; Isobe, Mitsuo; Inatsuki, Tatsuya, and Ueno, Hisashi, 5,027,327, Cl. 365-222.000.

Inax Corporation: *See—*

Akita, Junji, 5,025,983, Cl. 236-12 200.

Indalloy, Division of Indal Limited: *See—*

Kozierok, Leon; and Gallagher, Robert A., 5,026,240, Cl. 414-300.000.

Industrial Technology Research Institute *See—*

Chiue, Tzu-Ching; and Chen, Yarn-Chern. 5,027,389, Cl. 379-361.000.

Liauh, Her-Rern, 5,027,185, Cl. 357-59.000.

Shi, Kwo-Xyan; and Tang, Fuh-Chyun, 5,025,997, Cl. 242-1 10R.

Ingalz, Thomas J Single-use skin puncture device. 5,026,388, Cl. 606-182.000.

Ingersoll-Rand Company: *See—*

Abdulmassih, Antoine G., 5,026,487, Cl. 210-791.000.

Witt, Lewis, 5,025,875, Cl. 175-393.000.

Ino, Masumitsu: *See—*

Nagata, Takehito; Kohata, Mitsuhiro; and Ino, Masumitsu, 5,027,226, Cl. 358-482.000.

Inomata, Yoshihisa: *See—*

Shimizu, Isoo; Matsumura, Yasuo; and Inomata, Yoshihisa, 5,026,939, Cl. 585-439.000.

Inotec GmbH Gesellschaft fur Innovative Technik *See—*

Schoniger, Karl-Heinz; and Scheid, Winfried, 5,027,258, Cl. 362-31.000.

Inoue, Hiroshi; Miura, Tadashi, and Hirano, Tetsuji, to Ube Industries, Ltd. Antistatic aromatic polyimide article. 5,026,767, Cl. 524-745.000.

Inoue, Hisao. *See—*

Kuwabara, Takao; Inoue, Hisao; Nakagawa, Hiroto; and Kita, Eizo, 5,026,256, Cl. 417-45.000.

Inoue, Katsura; Fukura, Kenichi; Tajima, Masakatsu; Iwamura, Toru; and Ohshiro, Masatoshi, to Aisin Seiki Kabushiki Kaisha. Retractable head lamp device and a method for assembling the same. 5,027,301, Cl. 362-66.000.

Inoue, Kunihiro: *See—*

Yanagisawa, Michio; Ikejiri, Masahisa; Miyazaki, Hajime; Muranaka, Tsukasa; Inoue, Kunihiro; and Uchiyama, Shouichi, 5,027,077, Cl. 324-712.000.

Inoue, Manabu; and Okada, Hiroyuki, to Minolta Camera Kabushiki Kaisha. Camera. 5,027,150, Cl. 354-484 000.

Inoue, Satoshi. *See—*

Yatsunami, Takashi; Yazaki, Akira, Inoue, Satoshi; Yamamoto, Hitoshi; Yokomoto, Masaharu; Nomiyama, Jun; and Noda, Shuichiro, 5,026,856, Cl. 546-156.000.

Inoue, Tadashi, to Pegasus Sewing Machine Mfg., Co., Ltd Needle thread wiper of sewing machine. 5,025,739, Cl 112-286 000.

Inoue, Takao: *See—*

Kani, Tetsuo; and Inoue, Takao, 5,027,193, Cl. 358-12.000.

Inoue, Tomo: *See—*

Horie, Fujio; and Inoue, Tomo, 5,025,740, Cl. 112-456.000.

Inoye, Shigeharu. *See—*

Imamura, Kei-ichi; Gomi, Shuichi; Iwata, Michiaki; Miyadoh, Shinji; Shimura, Masaru; Shomura, Takashi; Sezaki, Masaji, and Inoye, Shigeharu, 5,026,547, Cl. 424-122.000.

Institut Francais du Petrole: *See—*

Quang, Dang Vu; Amigues, Pierre; and Gaillard, Jean-Ferdinand, 5,026,459, Cl. 202-158.000.

Sarda, Jean-Paul; and Grard, Guy, 5,025,668, Cl 73-795.000.

Sarda, Jean-Paul; Grard, Guy; Deflandre, Jean-Pierre; and Perreau, Philippe, 5,025,669, Cl 73-798.000.

Institute "Kompleksna Avtomatisazia na Montaja". *See—*

Atanassov, Lyuben P.; Kolenzov, Yanko A.; Vulev, Decho I., Primov, Ivan S.; Spassov, Peter G; Kanalev, Svetlosar K., Andonov, Dimo P.; Yankov, Angel V. and Dilkin, Nikolay G., 5,027,286, Cl 364-513.000.

Intel Corporation. *See—*

Park, Chin S., 5,027,321, Cl. 365-185.000.

Sit, Hon P.; Galhi, David; and Chan, Alfred K., 5,027,308, Cl 364-748.000.

Zion, Diane E., 5,027,311, Cl. 364-788.000

International Business Machines: *See—*

Bonyhard, Peter I.; Cheng, David C., Glover, William J; Hendrix, Howard A.; Ward, Ernest S.; and Williams, John W., 5,026,470, Cl 204-298.160.

Dreps, Daniel M., 5,027,183, Cl. 357-48.000

International Business Machines Corporation *See—*

Callahan, Robert M.; and Hempel, Bruce C., 5,027,291, Cl 364-521.000.

Clark, Gregory J.; Gambino, Richard J., Koch, Roger H., Laibowitz, Robert B; Marwick, Allan D, and Umbach, Corwin P., 5,026,682, Cl 505-1.000.

Corfits, William D.; Holahan, Maurice F; Martino, Susan J Motschman, David R., and Thorpe, James R., 5,027,254, Cl 361-384.000

Day, Richard A.; Gelorme, Jeffrey D., Russell, David J. and With, Steven J., 5,026,624, Cl. 430-280.000.

Double, Glen P., and Weingart, Steve H., 5,027,397, Cl. 380-4.000

Frantz, Billy J.; and Hellstrom, Sven E., 5,027,316, Cl 364-900.000.

Grant, John D.; Hall, James L.; and Housel, Barron C., III. 5,027,269, Cl. 364-200.000.

Guber, Wolfgang, Scheffel, Juergen; and Wotzka, Friedrich, 5,026,975, Cl. 235-462.000.

Lauffer, John M.; and Schumacher, Richard A., 5,027,253, Cl 361-321.000.

Rossignac, Jaroslaw R.; Epstein, David A, Gharachorloo, Nader; Jansen, Frederik W., and Zoulas, Christos S, 5,027,292, Cl. 364-522.000.

International Cultured Pearl Company, Inc. *See—*

Chan, David; and Chan, Raymond, 5,025,643, Cl. 63-12.000.

International Fuel Cells Corporation *See—*

Bose, Sudhangshu, and Gorman, Michael E., 5,026,402, Cl. 29-623.500.

International Institute of Cellular and Molecular Pathology *See—*

Saint-Remy, Jean-Marie; Lebrun, Philippe; Lebeque, Serge, and Masson, Pierre L., 5,026,545, Cl. 424-85.800.

International Superconductor Corp.. *See—*

Hed, Aharon Z., 5,026,681, Cl. 505-1.000.

InterVentional Technologies, Inc.: *See—*

Farr, Andrew F.; and Radisch, Herbert R. Jr, 5,026,384, Cl. 606-159.000.

Inui, Masaki: *See—*

Umeyama, Mitsuhiro; Inui, Masaki; Yamamoto, Kenichi, and Wakahara, Kaoru, 5,025,680, Cl. 74-574.000.

Inui, Toshiharu: *See—*

Nakajima, Kazuhiro; Inui, Toshiharu, Ishikawa, Noriyoshi; and Miyagawa, Masashi, 5,026,590, Cl. 428-141.000.

Inukai, Masayuki; and Yamaoka, Masao, to Kabushiki Kaisha Daiki Aluminum Kogyosho. Melting and holding furnace. 5,026,030, Cl. 266-229.000.

Ionics, Incorporated: *See—*

Katz, William E.; Elyanow, Irving D., and Sims, Keith J., 5,026,465, Cl. 204-182.400.

Iribe, Hajime: *See—*

Ono, Kenji; and Iribe, Hajime, 5,027,394, Cl. 379-434.000.

Irie, Teruo: *See—*

Umemura, Kiyoshi; and Irie, Teruo, 5,025,655, Cl 73-11.000.

Irie, Yoichiro: *See—*

Kida, Yasuhiko; Irie, Yoichiro; Takeda, Yoshiyuki; and Nagao, Tsuyoshi, 5,027,162, Cl. 355-320.000.

Irwin, Robert S., to Du Pont de Nemours, E. I., and Company High strength fiber or film of aromatic copolyamide with pendant carboxyl groups. 5,026,819, Cl. 528-329.100.

Isbrandt, Russell R.; and Young, Chung I, to Minnesota Mining and Manufacturing Company Film for thermal imaging 5,026,606, Cl 428-421.000.

Ishida, Hitoshi: *See—*

Kosuge, Takuo; Tsuji, Kuniro, Ishida, Hitoshi, and Kosuge, Yoshiki, 5,026,883, Cl. 552-542.000

Ishida, Kazuhito; and Horaguchi, Yoichi, to Brother Kogyo Kabushiki Kaisha. Image forming apparatus including mechanisms for exposure lamp exchange. 5,027,155, Cl. 355-229.000.

Ishida, Shinnosuke: *See—*

Asanuma, Nobuyoshi; Ishida, Shinnosuke, and Hasegawa, Hiroshi, 5,027,302, Cl. 364-424.050.

Ishiga, Masaru: *See—*

Takemori, Toshio; Ishiga, Masaru, and Ootsubo, Toshimi, 5,026,568, Cl. 426-549.000.

Ishigaki, Tatsuya: *See—*

Nishida, Hiroshi; Ishigaki, Tatsuya; Ito, Atsushi, Kudou, Yoshinobu; Katou, Hiroshi; and Fujii, Kousuke, 5,027,242, Cl 360-106.000.

Ishige, Atsushi: *See—*

Itoh, Kouichi, Ishige, Atsushi, and Hosoya, Eikichi, 5,026,733, Cl 514-718.000.

Ishiguro, Kazuhisa, and Sekiguchi, Yutaka, to Sanyo Electric Co. Ltd Power saving arrangement and power saving method 5,027,428, Cl 455-67.000.

Ishiguro, Masaji; Iwata, Hiromitsu; Nakatsuka, Takashi; and Yamada, Yasuo, to Suntory Limited; and Nippon Soda Company, Ltd Process for the preparation of 4-acyloxy-2-azetidinone derivatives. 5,026,844, Cl. 540-357.000.

Ishii, Koji; Toyama, Kozo; and Tagami, Jun, to Kajima Corporation Compound seismic response and wind control system 5,025,599, Cl 52-167.0DF.

Ishii, Satoshi. *See—*

Ishizuka, Koh; Nishimura, Tetsuharu, Tsukiji, Masaaki, and Ishii, Satoshi, 5,026,985, Cl. 250-231.160.

Ishii, Takaaki, Sakanishi, Masayuki; and Kita, Katsuhiko, to Kabushiki Kaisha Toshiba Voltage generator with voltage multiplier 5,027,266, Cl. 363-63.000

Ishikawa, Michiaki. *See—*

Masaki, Hiroya, Takagiwa, Hiroyuki; Shirose, Meizo; and Ishikawa, Michiaki, 5,026,620, Cl. 430-99 000.

Ishikawa, Noriyoshi: *See—*

Nakajima, Kazuhiro; Inui, Toshiharu; Ishikawa, Noriyoshi; and Miyagawa, Masashi, 5,026,590, Cl. 428-141 000.

Ishimoto, Noriyuki; and Iida, Hirofumi, to Sumitomo Heavy Industries, Ltd. Antivibration cover for rotary machine 5,026,476, Cl. 210-89.000.

Ishizaki, Ayaaki, to Yokohama Rubber Co., Ltd., The; and Rubber Research Institute of Malaysia, The Board of The. Bacteria culture and fermentation using the same. 5,026,641, Cl. 435-101.000.

Ishizuka, Koh; Nishimura, Tetsuharu, Tsukiji, Masaaki, and Ishii, Satoshi, to Canon Kabushiki Kaisha Method and apparatus for detecting a reference position of a rotating scale with two sensors. 5,026,985, Cl. 250-231.160.

Ishizuka, Tazuko: *See—*

Marui, Masatoshi; Inage, Tomonori; Matsui, Vuji; and Ishizuka, Tazuko, 5,026,145, Cl 350-351.000.

Iskenderian, Theodore C. *See—*

Lurie, Boris J.; Schier, J. Alan. and Iskenderian, Theodore C., 5,026,008, Cl. 244-164 000.

Isobe, Mitsuo: *See—*

Kobayashi, Makiji; Isobe, Mitsuo, Inatsuki, Tatsuya, and Ueno, Hisashi, 5,027,327, Cl. 365-222.000

Isoguchi, Seiichi: *See—*

Takayama, Jun; and Isoguchi, Seiichi, 5,027,215, Cl. 358-213.110

Isojima, Shigeki: *See—*

Okazaki, Toru; and Isojima, Shigeki, 5,027,098, Cl 335-213.000.

Isozaki, Hiroyuki: *See—*

Ujiie, Yoichi; and Isozaki, Hiroyuki, 5,027,154, Cl. 355-205.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Isozaki, Osamu: *See—*
  - Nakai, Noboru; Isozaki, Osamu, and Iwasawa, Naozumi, 5,026,793, Cl. 525-476.000.
- Istituto Guido Donegani S.p.A. *See—*
  - Venturello, Carlo; and D'Aloisio, Rino, 5,026,911, Cl 564-253.000
- Isuzu Ceramics Research Institute Co Ltd. *See—*
  - Kawamura, Hideo, 5,025,765, Cl. 123-254 000.
- ITC Incorporated. *See—*
  - Camarota, Richard J., 5,026,010, Cl. 248-188.100.
- Ito, Atsushi. *See—*
  - Nishida, Hiroshi; Ishigaki, Tatsuya; Ito, Atsushi, Kudou, Yoshinobu; Katou, Hiroshi, and Fujii, Kousuke, 5,027,242, Cl. 360-106.000.
- Ito, Hisayuki, to Tokai Rubber Industries, Ltd. Hose snap-action joint. 5,026,024, Cl. 251-149.500.
- Ito, Hisayuki, to Tokai Rubber Industries, Ltd. Hose joint with opening-closing valve. 5,026,025, Cl. 251-149.600.
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  - Imai, Munehisa, Asano, Atsushi; Yasue, Tsutomu, Ito, Kenichiro; and Nojiri, Hiromi, 5,025,902, Cl. 192-43.000.
- Ito, Koichi; Matsunaga, Motomu; Kurokawa, Satoru, and Ueno, Koji, to Tokyo Keiki Co. Ltd. Microwave radiator for warming therapy 5,026,959, Cl. 219-10.55A.
- Ito, Yoshiyuki: *See—*
  - Matsushima, Yuzo; Ito, Yoshiyuki, and Yamamori, Satofumi, 5,026,739, Cl. 521-177.000.
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  - Katayama, Sakae; Ito, Yosuke; and Hirashima, Hidenori, 5,026,723, Cl. 514-441.000.
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- Itoh, Eiji; Nagase, Ryuichi; Saito, Kazuhiro; Hosaka, Hiroshi: and Nagai, Hihumi, to Nippon Mining Co., Ltd Magnetic recording medium with a zinc cobalt oxide non-magnetic substrate containing nickel or manganese. 5,026,614, Cl. 428-658.000.
- Itoh, Fumikazu: *See—*
  - Hongo, Mikio; Mizukoshi, Katsuro, Sano, Shuzo; Kamimura, Takashi; Itoh, Fumikazu; Shimase, Akira, Haraichi, Satoshi; and Takahashi, Takahiko, 5,026,664, Cl. 437-189.000.
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- Itoh, Masanobu: *See—*
  - Arabori, Noboru; Takahashi, Hideaki, Sakai, Yoshio; Nakazato, Masao; Tanaka, Masakatsu; Takahashi, Tatsuhiko; Masuda, Katsutaro; Itoh, Masanobu; and Toda, Yuji, 5,025,896, Cl. 187-115.000.
- Itoh, Satoshi: *See—*
  - Akaba, Noriyuki; and Itoh, Satoshi, 5,027,130. Cl 343-872.000.
- Itoh, Toshiharu: *See—*
  - Kobayashi, Hiroshi; and Itoh, Toshiharu, 5,025,666, Cl 73-632.000.
- ITT Corporation: *See—*
  - Balyasny, Marik; Olivares, Raul A.; and Sepmeyer, Arthur C., 5,026,301, Cl. 439-391.000.
- Iwagaya, Takashi, to Fanuc Ltd High-precision pulse interpolation method. 5,027,045, Cl. 318-571.000.
- Iwai, Isamu: *See—*
  - Takebayashi, Yoichi; Iwai, Isamu, Doi, Miwako; and Fukui, Mika, 5,027,420, Cl. 382-38.000.
- Iwakuni, Kaoru: *See—*
  - Shinbo, Masatoshi; Fujie, Hideki; Iwakuni, Kaoru, Muto, Akira; and Aoki, Kazuhiro, 5,027,222, Cl. 358-330.000.
- Iwama, Masatoshi: *See—*
  - Andoh, Hiroaki, Ohshima, Michio, Matsui, Yuji; Okuyama, Takashi, Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi, Nonaka, Jun, Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki, Tachihara, Satoru, Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000.
- Iwamura, Toru: *See—*
  - Inoue, Katsura; Fukura, Kenichi; Tajima, Masakatsu, Iwamura, Toru; and Ohshiro, Masatoshi, 5,027,301, Cl. 362-66.000.
- Iwasa, Shoichi, to NEC Corporation. Integrated circuit semiconductor device having improved wiring structure. 5,027,175, Cl. 357-23.500.
- Iwasaki, Hiroshi: *See—*
  - Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kitahara, Masaki, 5,026,698, Cl. 514-215.000.
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- Iwasawa, Naozumi: *See—*
  - Nakai, Noboru; Isozaki, Osamu; and Iwasawa, Naozumi, 5,026,793, Cl. 525-476.000.
- Iwata, Hiromitsu. *See—*
  - Ishiguro, Masaji; Iwata, Hiromitsu; Nakatsuka, Takashi, and Yamada, Yasuo, 5,026,844, Cl. 540-357.000.
- Iwata, Hiroto, to Jidosha Kiki Co., Ltd. Rotary vane pump with valve to control vane biassing. 5,026,263, Cl. 418-82.000.
- Iwata, Michiaki: *See—*
  - Imamura, Kei-ichi; Gomi, Shuichi; Iwata, Michiaki; Miyadoh, Shinji; Shimura, Masaru; Shomura, Takashi; Sezaki, Masaji; and Inoye, Shigeharu, 5,026,547, Cl. 424-122.000.
- Iyengar, Doreswamy R.; and Praamsma, Thomas L., to BASF Corporation. High strength alkali blue pigment toner useful in both oil-based and water-based systems. 5,026,627, Cl. 430-331.000.
- Izawa, Shigeru: *See—*
  - Takahashi, Shunzo; Izawa, Shigeru, Suzuki, Hidefumi; and Hasemi, Takashi, 5,027,337, Cl 369-44.260.
- J C. Bamford Excavators Limited *See—*
  - Richardson, David A., 5,025,770, Cl 123-585.000.
- J I. Case Company: *See—*
  - Orsborn, Jesse H.; Chambers, Timothy L.; and Watt, John D., 5,025,614, Cl. 56-10.200.
- Jacks, Floyd B. Bushing extractor/installer 5,025,542, Cl 29-252 000
- Jackson, Melvin R.; and Huang, Shyh-Chin, to General Electric Company. Nb-Ti-Hf high temperature alloys. 5,026,522, Cl 420-426.000
- Jackson, Robert J.; Duke, Susan A., and Barnett, Paul, to Beecham Group p.l.c. Anticaries dentifrice. 5,026,539, Cl. 424-49.000.
- Jacob, Hannes. Holding device for a lighter 5,026,274, Cl. 431-253.000.
- Jacob, Thomas R.; Stenger, Leonard A., and Uffner, William E., to Owens-Corning Fiberglas Corporation Road repair membrane. 5,026,609, Cl. 428-489 000.
- Jacobsen, Poul: *See—*
  - Honore, Tage; Jacobsen, Poul, Nielsen, Flemming E.; and Naerum, Lars, 5,026,704, Cl. 514-250.000.
- Jacobson, Allan J.: *See—*
  - Halbert, Thomas R., Chianelli, Russell R., Stiefel, Edward I., and Jacobson, Allan J., 5,026,473, Cl. 208-143.000.
- Jagt, David L.; and Royer, Robert E., to University of New Mexico, The. Gossylic iminolactones and gossylic lactones and their anti-viral activities. 5,026,726, Cl. 514-468.000.
- Jahnke, Joachim, to Nordischer Maschinebau Rud.Baader GmbH + Co K.G. Method and apparatus for gutting non-decapitated fish 5,026,318, Cl. 452-116.000.
- Jaksa, Istvan: *See—*
  - Kelemen, Agnes, Cserey Pechany, Eva, and Jaksa, Istvan, 5,026,640, Cl. 435-86.000
- Jakubowicz, Raymond F.: *See—*
  - Quenin, John A.; and Jakubowicz, Raymond F., 5,026,526, Cl 422-64.000.
- Jalbert, Ronald L.; and Phillips, David O., to General Electric Company. Low gloss thermoplastic molding compositions 5,026,777, Cl 525-65.000
- James, David F., to Thames Water Utilities Limited. Apparatus for monitoring settlement of a solid in a liquid, and a system incorporating same. 5,026,993, Cl 250-357 100.
- James River Corporation, The: *See—*
  - Austin, Jared A., Miller, Joseph H.; and Hyslop, Robert F., 5,026,587, Cl 428-91.000.
- Jamison, Michael V. Sanitary acoustic horn. 5,025,887, Cl. 181-187.000
- Jannson, Joanna L. *See—*
  - Jannson, Tomasz P., Jannson, Joanna L.; Rich, Christopher C.; and Moslehi, Behzad, 5,026,131, Cl. 350-3.700.
- Jannson, Tomasz P.; Jannson, Joanna L.; Rich, Christopher C.; and Moslehi, Behzad, to Physical Optics Corporation. High channel density, broad bandwidth wavelength division multiplexer with highly non-uniform Bragg-Littrow holographic grating. 5,026,131, Cl. 350-3.700.
- Janocha, Siegfried, Schloegl, Gunter; Crass, Guenther; and Bothe, Lothar, to Hoechst Aktiengesellschaft Opaque multilayered film having an inherent resistance to delamination. 5,026,592, Cl. 428-204 000.
- Jansen, Frederik W. *See—*
  - Rossignac, Jaroslaw R., Epstein, David A.; Gharachorloo, Nader, Jansen, Frederik W., and Zoulas, Christos S., 5,027,292, Cl 364-522.000.
- Janssen Pharmaceutica N V.: *See—*
  - Van Daele, Georges H. P., Vlaeminck, Freddy F.; and Verdonck, Marc G. C., 5,026,853, Cl. 544-390.000
- Japan Aircraft Development Corporation: *See—*
  - Miyabe, Hideki, 5,026,267, Cl. 425-451.900.
- Japan Aviation Electronics Industry, Limited: *See—*
  - Hashiguchi, Osamu, 5,026,296, Cl 439-159.000.
- Japan Business Television, Inc.: *See—*
  - Fujisaki, Masataka; Fujisaki, Kiyotaka; Mori, Hitoshi; and Takeishi, Itugu, 5,027,207, Cl. 358-142.000.
- Japan Synthetic Rubber Co., Ltd.: *See—*
  - Ohira, Yosihiro; Ohhara, Toshio; and Miyabayashi, Toshio, 5,026,807, Cl. 526-321.000.
- Jarvis, J. Michael; Bass, Andrew F.; and Sherman, James B., to Charter Leasing Corporation. Station line switching control system. 5,027,341, Cl 370-13.000.
- Jarwala, Najmi T.; and Yau, Chi W., to AT&T Bell Laboratories. Method for testing interconnections. 5,027,353, Cl 371-27.000.
- Jay, Lanny E. Secure bicycle rack and carrier. 5,025,932, Cl 211-20.000.
- Jeanes, Thomas O.: *See—*
  - Summers, John D., and Jeanes, Thomas O., 5,026,823, Cl. 528-353.000.
- Jee, Michael H.: *See—*
  - Evans, Roger; Jee, Michael H.; Sander, Nigel H.; Smith, Ian H., and Gibson, Raymond K., 5,026,548, Cl 424-195.100.
- Jeffries, Dennis L., to Deere & Company Single piston activation of a planetary transmission. 5,026,334, Cl. 475-142.000.
- Jeng, Bor-Shenn; Change, Gan-How; Chang, Kuange-Yao; Yan, Chih-Yen; Wu, Tieh-Min; and Lin, Jang-Keng, to Telecommunication Laboratories, Directorate General of Telecommunications, Ministry of Communications. Character multifont compression and restoration device. 5,027,304, Cl. 364-518.000.
- Jenkins, Richard J.; Treskot, Robert A., Vedage, Gamini A.; and White, James F., to Air Products and Chemicals, Inc. Hydrogenation of aromatic amines using rhodium on titania or zirconia support. 5,026,914, Cl. 564-451.000.
- Jensen, Claus; and Nunn, Leslie M., to C. J. Management, Ltd. Extendable rail system 5,026,176, Cl 384-53.000.
- Jensen, Jorn B., to Schur Plastic A/S. Block-shaped bag with a handle and a method of producing such bag. 5,026,173, Cl. 383-10.000.
- Jensen, Ove, to Kosan Teknova A/S. Sealing arrangement in a plug-and-socket coupling with a pressure fluid passage, particularly between the spout of a liquid gas container and a discharge regulator mounted thereon. 5,026,023, Cl. 251-144.000.
- JEOL Ltd.: *See—*
  - Mizuno, Koichi, Wakabayashi, Takeshige; Koinuma, Yutaka; Aizawa, Reiji; Kushiyama, Satoshi; Kabayashi, Satoru; Ohuchi, Hideo; Yoshida, Toyonobu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, 5,026,464, Cl. 204-164.000.
- Jeon, Jun-Young, to SamSung Electronics Co., Ltd Dynamic random access memory cell and method of making thereof. 5,027,172, Cl. 357-23.600.
- Jhawar, Ramesh C.: *See—*
  - Harwood, Richard J.; Mehta, Gunvant N.; Jhawar, Ramesh C.; Huang, Liang-Lii; Grim, Wayne M.; and Li, Shun P., 5,026,709, Cl. 514-263.000.
- Jidosha Kiki Co., Ltd.: *See—*
  - Iwata, Hiroto, 5,026,263, Cl. 418-82.000
- Jimonet, Patrick: *See—*
  - Audiau, Francois; Gueremy, Claude; Jimonet, Patrick, and Mignani, Serge, 5,026,717, Cl. 514-338.000.
- Jirkovsky, Ivo L.: *See—*
  - Hayward, Marshall A.; Sabatucci, Joseph P.; Jirkovsky, Ivo L.; and Lefebvre, Yvon, 5,026,725, Cl 514-465.000.
- John Crane UK Ltd.: *See—*
  - Back, Anthony C., 5,026,076, Cl. 277-82.000.
- John Fluke Mfg. Co., Inc.: *See—*
  - Cok, Steven P., 5,027,373, Cl. 375-80.000.
  - Letourneau, Andre P., 5,027,063, Cl. 324-158.00F
- John Wyeth & Brother Limited *See—*
  - Crossley, Roger; Opalko, Albert, and Shepherd, Robin G., 5,026,854, Cl. 546-112.000.
- Johnsen, Kenneth A.; and Leise, Walter F., Jr., to E. R. Squibb & Sons. Clamping systems for two piece ostomy device. 5,026,360, Cl. 604-338.000.
- Johnson, Dennis W., to ENSR Corporation. Method and apparatus for removing and disposing of contaminated concrete. 5,026,432, Cl. 134-21.000.
- Johnson, Edward, to Kolcraft Enterprises, Inc. Collapsible structure suitable for use as a portable play yard. 5,025,517, Cl. 5-99.100.
- Johnson Enterprises, Inc.: *See—*
  - Stenger, Tracy K., 5,025,955, Cl. 222-82.000.
- Johnson, Gary C., to Herman Miller, Inc. Modular space dividing panels having wire management channels. 5,025,603, Cl. 52-221.000.
- Johnson, Ivy D.: *See—*
  - Degnan, Thomas F., Jr.; and Johnson, Ivy D., 5,026,921, Cl 585-415.000.
- Johnson, Keith H.; and Underwood, David A., to Cardionics, Inc Recording, digital stethoscope for identifying PCG signatures 5,025,809, Cl. 128-715.000.
- Johnson, Marvin R.: *See—*
  - Dugan, William P.; and Johnson, Marvin R., 5,027,062, Cl 324-158.00P.
- Johnson, Michael L.; Patel, Chetan N.; Plourde, Marcel D.; and Wiedenin, Brian J., to Scientific Molding Corporation, Ltd Ejector rod quick coupler. 5,026,197, Cl. 403-24.000.
- Johnson, Michael W.; and McFarland, M. Lee, to Johnson, Michael W. Tape cartridge bearing. 5,027,249, Cl. 360-132.000.
- Johnson, Paul H., to Nippon Mining Company, Limited. Method to improve mRNA translation and use thereof for production of platelet factor-4 5,026,639, Cl. 435-69.100.
- Johnson Service Company: *See—*
  - Mageland, Otto M.; and Pascucci, Gregory A., 5,027,057, Cl 324-115.000.
- Johnston, Manley R.; Mulder, Robert S., and Sipinen, Alan J., to Minnesota Mining and Manufacturing Company. Method of manufacturing a disposable diaper having an abraded target strip. 5,026,446, Cl 156-153.000.
- Johnston, Richard: *See—*
  - Baines, Frederick C.; and Johnston, Richard, 5,026,542, Cl. 424-73.000.
- Jolitz, Randal J.; and Kirk, Donald R., to Tamko Asphalt Products, Inc. Flame retardant asphalt composition. 5,026,747, Cl. 524-64.000.
- Jonas, Rochus: *See—*
  - Prucher, Helmut; Jonas, Rochus; Piulats, Jaime; and Klockow, Michael, 5,026,705, Cl. 516-253.000.
- Jones, Brian W., to Dallas Semiconductor Corporation. Self-timed sequential access multiport memory. 5,027,326, Cl. 365-221.000.
- Jones, C. Andrew: *See—*
  - Leyshon, David W.; Sofranko, John A.; and Jones, C. Andrew, 5,026,935, Cl. 585-315.000.
  - Leyshon, David W.; Sofranko, John A.; and Jones, C. Andrew, 5,026,936, Cl. 585-315.000.
- Jones, Lois F. Hair roller. 5,025,816, Cl. 132-247.000.
- Jones, Richard A.; Cowley, Alan H.; and Tasch, Al F., Jr., to Board of Regents, The University of Texas System. Growth of polycrystalline CaF_2 via low temperature OMCVD. 5,026,575, Cl. 427-255.000.
- Jones, Thomas G Martial arts 360 degree striking target. 5,026,048, Cl. 272-77.000.
- Jonsson, Jan L.; and Nilsson, Sten A., to Boliden Contech AB. Method for decoloring sulphuric acid deriving from acid production processes. 5,026,535, Cl. 423-525.000
- Josef Wolf Audio-Visuals: *See—*
  - Stuttler, Herbert; Wolf, Josef; Held, Wolfgang, and Mai, Max, 5,027,219, Cl. 358-228.000.
- Jou, Wen-San. Compact air pump. 5,026,261, Cl. 417-555.100
- Joy Technologies Inc.: *See—*
  - Zimmerman, Joseph J., 5,026,218, Cl. 405-290.000.
- JPI Transportation Products, Inc.: *See—*
  - Bell, Bruce A.; and Landis, Donald G., 5,026,967, Cl. 219-121 640.
- Jung, Gin K. Multi-ported and multi-directional loudspeaker system 5,025,886, Cl 181-156.000.
- Jung, Rudiger; and Deubel, Reinhold, to Hoechst Aktiengesellschaft. Water-insoluble disazo colorants having hetero-bicyclic methylene-active compounds as coupling component. 5,026,831, Cl. 534-752 000
- Justesen, Scott F. Right-angle drive for vertical milling machine. 5,025,548, Cl. 29-560.000.
- Juvan, Christian H. A. Continuous flow method for processing liquids using high-energy discharge. 5,026,484, Cl 210-717.000.
- K and M Electronics, Inc.: *See—*
  - Abnoosi, Fatemeh; and Theroux, Robert L., 5,027,256, Cl. 361-417.000.
- Kabayashi, Satoru: *See—*
  - Mizuno, Koichi; Wakabayashi, Takeshige; Koinuma, Yutaka; Aizawa, Reiji; Kushiyama, Satoshi; Kabayashi, Satoru, Ohuchi, Hideo; Yoshida, Toyonobu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, 5,026,464, Cl 204-164.000.
- Kabushiki Kaisha Daiki Aluminum Kogyosho: *See—*
  - Inukai, Masayuki; and Yamaoka, Masao, 5,026,030, Cl. 266-229.000.
- Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: *See—*
  - Suzuki, Yukio; Suzuki, Kei; Yoneyama, Masaru, and Miyake, Toshio, 5,026,833, Cl. 536-18.100.
- Kabushiki Kaisha Kawai Gakki Seisakusho: *See—*
  - Fukuda, Hiroshi; and Azuma, Hideki, 5,025,650, Cl. 72-220.000.
- Kabushiki Kaisha Sankyo Seiki Seisakusho: *See—*
  - Mineta, Sadayoshi; Kitajima, Kimio; and Shimazu, Kunio, 5,027,026, Cl. 310-259.000.
  - Numazawa, Junji; and Aruga, Fusayoshi, 5,027,246, Cl 360-126.000.
- Kabushiki Kaisha Tahara: *See—*
  - Takasaki, Chiaki; Furuse, Tatuo; and Amagasaki, Morio, 5,026,266, Cl. 425-150.000.
- Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho: *See—*
  - Kito, Shozo; Harada, Shoichi; and Imai, Hajime, 5,025,901, Cl. 192-4.00A.
- Kabushiki Kaisha Toshiba: *See—*
  - Fujii, Masashi; Uyama, Kiichiro; Shoji, Takao; and Arai, Kenji, 5,027,378, Cl. 378-11.000.
  - Fujisaki, Masataka; Fujisaki, Kiyotaka; Mori, Hitoshi; and Takeishi, Itugu, 5,027,207, Cl. 358-142.000.
  - Higuchi, Toshiharu; Matsumoto, Sadao; Yakabe, Toru; and Kimura, Sakae, 5,027,029, Cl. 313-446.000.
  - Ishii, Takaaki; Sakanishi, Masayuki; and Kita, Katsuhiko, 5,027,266, Cl. 363-63.000.
  - Kanno, Masayuki, 5,027,421, Cl. 382-47.000.
  - Kinugawa, Masaaki, 5,027,186, Cl. 357-59.000.
  - Kobayashi, Makiji; Isobe, Mitsuo; Inatsuki, Tatsuya, and Ueno, Hisashi, 5,027,327, Cl. 365-222.000.
  - Matsuoka, Yasuo, 5,026,467, Cl. 204-194.000.
  - Miyoshi, Akio, 5,027,398, Cl. 380-4.000.
  - Morozumi, Naoya; Sakata, Hirotsugu; Hayano, Makoto; Okuda, Masayuki; Fujiwara, Takayoshi; Shimoda, Moriaki; and Hattori, Hitoshi, 5,026,264, Cl. 418-220.000.
  - Nakamura, Makoto; and Kodama, Tomoko, 5,027,356, Cl 371-32.000.
  - Nakashima, Tomoyuki, 5,027,328, Cl. 365-226.000.
  - Nishiki, Masayuki, 5,027,380, Cl. 378-4.000.
  - Saeki, Yukihiro; and Suzuki, Yasoji, 5,027,012, Cl 307-465.000.
  - Shimizu, Fumihiko; and Shibagaki, Taro, 5,027,088, Cl. 333-1.000.
  - Shiohara, Hiroshi, 5,027,019, Cl. 307-579.000.
  - Sugawara, Mitsuru; Yoshinaga, Akitoshi; Shimizu, Fumihiko; and Takami, Masayuki, 5,026,134, Cl. 350-96.110.
  - Takayanagi, Noboru, 5,027,274, Cl. 364-413.190.
  - Takebayashi, Yoichi; Iwai, Isamu; Doi, Miwako; and Fukui, Mika, 5,027,420, Cl. 382-38.000.
  - Tsunoda, Jun, 5,027,407, Cl. 381-43.000.
  - Urakawa, Yukihiro; and Matsui, Masataka, 5,027,009, Cl 307-446.000.
  - Yamagishi, Katsuaki; Matsui, Koichi; Tanaka, Toshimasa; Matsui, Nobuo; Suma, Sei, and Mino, Yoshihito. 5,025,638, Cl. 62-180.000.
- Kabushiki Kaisya Advance Kaihatsu Kenkyujo: *See—*
  - Aoki, Hideki; Akao, Masaru; and Shin, Yoshiharu, 5,026,397, Cl 623-11.000.
- Kade, Alexander: *See—*
  - Umasankar, Guruswamy; Kade, Alexander; and Fabris, Alroy G., 5,026,126, Cl. 303-100.000.
- Kadonaga, Kenji: *See—*
  - Kimura, Kazumasa; Nagasuna, Kinya; Namba, Takashi; Kadonaga, Kenji; Miyake, Koji; and Shimomura, Tadao, 5,026,800, Cl 526-200.000.
- Kadono, Yukio: *See—*
  - Urano, Yoshiaki; and Kadono, Yukio, 5,026,880, Cl. 549-430.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Kagami, Yoshinobu: *See—*
  - Yoshida, Yoshiki; Nagasawa, Kiyoto; and Kagami, Yoshinobu, 5,027,117, Cl. 341-132.000.
- Kagan, Jonathan: *See—*
  - Leckrone, Michael E.; Kagan, Jonathan; Knight, Darryl A.; and Gunseor, Larry A., 5,026,367, Cl. 606-7.000.
- Kagaya, Osamu; Umemoto, Yasunari; and Shigeta, Junji, to Agency of Industrial Science and Technology, The. Semiconductor intergrated circuit 5,027,167, Cl. 357-15.000.
- Kahanek, Alan P.: *See—*
  - Ullman, Ralph J.; and Kahanek, Alan P., 5,025,908, Cl 194-227.000.
- Kaihatsu Architects & Engineers, Inc.: *See—*
  - Sugimoto, Hajime; and Seko, Yasuo, 5,025,600, Cl. 52-167.000.
- Kajima Corporation: *See—*
  - Ishii, Koji; Toyama, Kozo; and Tagami, Jun, 5,025,599, Cl. 52-167.0DF.
- Kajimura, Haruhiko; Nagano, Hiroo; Yamanaka, Kazuo; and Kodama, Tsuyoshi, to Sumitomo Metal Industries, Ltd. Zirconium-titanium and/or tantalum oxygen alloy. 5,026,521, Cl. 420-422.000.
- Kakimoto, Mitsuo: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000.
- Kakita, Tsuyoshi: *See—*
  - Hoshino, Yasushi; Kakita, Tsuyoshi, and Yoshida, Makoto, 5,027,149, Cl. 354-412.000.
- Kakizaki, Husayoshi: *See—*
  - Watanabe, Kazuhiro; Kakizaki, Husayoshi; Arai, Isao; Murakami, Kimihiro; and Kato, Kazuo, 5,026,842, Cl. 540-222.000.
- Kakuda, Minoru: *See—*
  - Takeda, Mutsuhiko; Kakuda, Minoru; Shimpo, Masafumi; and Yoshida, Kiyoshi, 5,026,875, Cl 549-201.000.
- Kakuma, Hiroaki: *See—*
  - Kitakado, Ryuji; Yano, Hironobu; Kakuma, Hiroaki; Hoki, Tetsuo; and Kanai, Takao, 5,027,417, Cl. 382-8.000.
- Kalar, David L. Paint pump cleaning system 5,025,818, Cl. 134-170.000.
- Kaleh, Ghassan K.: *See—*
  - Sehier, Philippe; and Kaleh, Ghassan K., 5,027,371, Cl. 375-15.000.
- Kalisch, Heinrich; and Meurer, Rolf. Bicycle stand. 5,025,933, Cl. 211-22.000.
- Kaller, Ernst, Kugler, Karl-Heinz; Zimmermann, Christian; and Koehnle, Hans, to Robert Bosch GmbH. High voltage ignition system monitoring circuit. 5,027,073, Cl. 324-388.000.
- Kallista, Inc.: *See—*
  - Robbins, Tom E., 5,026,013, Cl. 248-223.100
- Kamada, Hiroshi: *See—*
  - Ichitsubo, Norio; Kamada, Hiroshi; and Barr, Lance, 5,025,526, Cl. 15-210.00R.
- Kamei, Hiroyuki: *See—*
  - Matsuno, Yasuhiro; Terakado, Hajime; Mochizuki, Masaru; Moroshima, Heiji; and Kamei, Hiroyuki, 5,027,107, Cl. 340-572.000.
- Kamiishi, Hirofumi. *See—*
  - Sano, Akira; Kamiishi, Hirofumi; Kobayashi, Seizo; Matsuura, Kazuo; and Yokoyama, Shigeki, 5,026,511, Cl. 264-28.000.
- Kamikawa, Sumio: *See—*
  - Miyazaki, Masatoshi; Sasaki, Ken, Maeda, Hachiro; Sakai, Hisami: Kamikawa, Sumio; Takai, Kiyoshi; Ogawa, Yutaka, and Tanaka, Yuichi, 5,026,319, Cl. 452-177.000.
- Kamimura, Takashi: *See—*
  - Hongo, Mikio; Mizukoshi, Katsuro; Sano, Shuzo; Kamimura, Takashi; Itoh, Fumikazu; Shimase, Akira; Haraichi, Satoshi; and Takahashi, Takahiko, 5,026,664, Cl. 437-189.000.
- Kamin, Gerhard, to Robert Bosch GmbH. Video signal mixer system. 5,027,213, Cl. 358-183.000.
- Kaminow, Ivan P.: *See—*
  - Chraplyvy, Andrew R.; Iannone, Patrick P.; Kaminow, Ivan P., Li, Tingye; Stone, Julian; Stulz, Lawrence W.; and Tkach, Robert W., 5,027,435, Cl. 455-617.000.
- Kaminski, Elton G., to Stolle Corporation, The. Article feeding apparatus. 5,025,916, Cl. 198-803.150.
- Kamiya, Osamu, to Brother Kogyo Kabushiki Kaisha. Automatic bobbin thread guiding apparatus. 5,025,737, Cl. 112-296.000.
- Kamp, Winfried: *See—*
  - Knauer, Karl; and Kamp, Winfried, 5,027,312, Cl. 364-788.000.
- Kampert, William P.: *See—*
  - Biresaw, Girma; Boland, Daniel J., Paola, Vince A.; Evans, W. Thomas; Kampert, William P.; and Abels, Ronald L., 5,026,577, Cl. 428-1.000.
- Kampf GmbH & Co. Maschinenfabrik: *See—*
  - Hutzenlaub, Armin; and Dick, Reinhard, 5,025,998, Cl. 242-55 000
- Kanai, Takao: *See—*
  - Kitakado, Ryuji; Yano, Hironobu; Kakuma, Hiroaki; Hoki, Tetsuo; and Kanai, Takao, 5,027,417, Cl. 382-8.000.
- Kanai, Toshiyuki, and Shinnoh, Nobuo, to Nissei Jushi Kogyo Kabushiki Kaisha. Multi-injection molding machine for molding a multi-injection body. 5,026,265, Cl. 425-127.000.
- Kanalev, Svetlosar K.: *See—*
  - Atanassov, Lyuben P.; Kolenzov, Yanko A.; Vulev, Decho I.; Primov, Ivan S.; Spassov, Peter G.; Kanalev, Svetlosar K.; Andonov, Dimo P.; Yankov, Angel V.; and Dilkin, Nikolay G., 5,027,286, Cl. 364-513.000.
- Kanayama, Atsushi: *See—*
  - Sakon, Ichiro; Sekiguchi, Masao; and Kanayama, Atsushi, 5,026,757, Cl. 524-414.000.
- Kanbe, Junichiro: *See—*
  - Taniguchi, Osamu; Kawagishi, Hideyuki; Tsuboyama, Akira; Okada, Shinjiro; Inaba, Yutaka; and Kanbe, Junichiro, 5,026,144, Cl. 350-350.00S.
- Kane, John F. Practice putting guide. 5,026,066, Cl. 273-192.000.
- Kaneda, Naoya, to Canon Kabushiki Kaisha. Optical equipment with lens position control utilizing zoom and focusing motors for focusing. 5,027,147, Cl. 354-400.000.
- Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
  - Noguchi, Takehiko; Sakubata, Takashi; Hisanaga, Akinori; Yoshioka, Tetsuo; and Nagano, Hirosaku, 5,026,820, Cl. 528-350.000.
- Kanehara, Koichi; Fukuda, Kazumi; and Uenishi, Kouichi, to Mitsubishi Jukogyo Kabushiki Kaisha. Automatic toll receiving apparatus. 5,026,972, Cl. 235-32.000.
- Kanehisa, Osamu: *See—*
  - Migita. Masahito; Kanehisa, Osamu; Shiiki, Masatoshi; and Yamamoto, Hajime, 5,026,661, Cl. 437-81.000.
- Kaneko, Masaharu; Ozawa, Tetsuo; Yoneyama, Tomio; Imazeki, Shuji, Mukoh, Akio; and Sato, Mikio, to Hitachi, Ltd.; and Mitsubishi Kasei Corporation. Guest-host type liquid crystal composition. 5,026,505, Cl. 252-299.100.
- Kaneko, Ryoichi: *See—*
  - Sakurai, Shigeo; Miyata, Hiroshi; Tan, Toshimi; and Kaneko, Ryoichi, 5,027,268, Cl. 364-184.000.
- Kani, Tetsuo; and Inoue, Takao, to Sony Corporation. System for transmitting a digital video signal including time code signals. 5,027,193, Cl. 358-12.000.
- Kanner, Rowland W.: *See—*
  - Ranalletta, Joseph V.; Williams, Fred E., Jr.; and Kanner, Rowland W., 5,025,957, Cl. 222-189.000.
- Kanno, Masayuki, to Kabushiki Kaisha Toshiba. Data processing apparatus having function for registering abstract image data. 5,027,421, Cl. 382-47.000.
- Kano, Yoshiaki: *See—*
  - Oguri, Motohiro; Kano, Yoshiaki; Mishima, Kiyotaka; Yamada, Masahiko; Kasano, Kenji; and Uemura, Masaru, 5,026,941, Cl 585-467.000.
- Kansai Electric Power Co. Ltd., The: *See—*
  - Kuwabara, Takao; Inoue, Hisao; Nakagawa, Hiroto; and Kita, Eizo, 5,026,256, Cl. 417-45.000.
- Kansai Paint Company Limited: *See—*
  - Nakai, Noboru; Isozaki, Osamu; and Iwasawa, Naozumi, 5,026,793, Cl. 525-476.000.
- Kanter, Irving: *See—*
  - Peregrim, Theodore J.; Kettering, Gordon L.; and Kanter, Irving. 5,027,422, Cl. 382-48.000.
- Kao Corporation: *See—*
  - Yorozu, Hidenori; Eguchi, Yasuteru; Ohkawa, Wataru; and Matsumoto, Yasunobu, 5,026,551, Cl. 424-44.000.
- Karg, Robert L.: *See—*
  - McWilliams, Robert E.; and Karg, Robert L., 5,025,567, Cl 33-348.200.
- Kariya, Takao: *See—*
  - Chiba, Yuji; Fujioka, Hidehiko; Mizusawa, Nobutoshi; Kariya, Takao, and Shimoda, Isamu, 5,026,239, Cl. 414-217.000.
- Karjalainen, Arja L.; and Karjalainen, Arto J., to Farmos-Yhtyma Oy Indenyl imidazoles. 5,026,868, Cl. 548-346.000.
- Karjalainen, Arto J.: *See—*
  - Karjalainen, Arja L.; and Karjalainen, Arto J., 5,026,868, Cl. 548-346.000.
- Karlsson, Ewa: *See—*
  - Gustavsson, Lennart; Karlsson, Ewa; and Reinholdsson, Jan, 5,025,732, Cl. 102-521.000.
- Karmarkar, Subhash D.; and Divecha, Amarnath P., to United States of America, Navy. Centrifugal casting of composites. 5,025,849, Cl 164-97.000.
- Karniewicz, Joseph J.: *See—*
  - Lee, Ruojia; Lowrey, Tyler A.; Gonzalez, Fernando; Karniewicz, Joseph J.; and Fazan, Pierre C., 5,026,657, Cl. 437-47.000.
- Karol, Thomas J., to R T Vanderbilt Company, Inc. Substituted 2,5-dimercapto-1,3,4-thiadiazoles and lubricating compositions containing same. 5,026,865, Cl. 548-142.000.
- Kasai, Naoya: *See—*
  - Koden, Mitsuhiro; Kuratate, Tomoaki; Funada, Fumiaki; Sakaguchi, Kazuhiko; Kasai, Naoya; and Takehira, Yoshikazu, 5,026,506, Cl. 252-299.610.
- Kasano, Kenji: *See—*
  - Oguri, Motohiro; Kano, Yoshiaki; Mishima, Kiyotaka; Yamada, Masahiko; Kasano, Kenji; and Uemura, Masaru, 5,026,941, Cl. 585-467.000.
- Kashio, Yoshiaki: *See—*
  - Morinaka, Shigehisa; Nakashima, Tai; Yamazaki, Takeshi; Morishima, Kazuo; Kashio, Yoshiaki; and Akimori, Giichiro, 5,025,883, Cl. 180-219.000.
- Kaspar Wire Works, Inc.: *See—*
  - Ullman, Ralph J.; and Kahanek, Alan P., 5,025,908, Cl. 194-227.000.
- Kasper, Thomas A., to Royce Medical Company. Sheet plastic check valve technique. 5,026,339, Cl. 493-189.000.
- Kasting, Gerald B.: *See—*
  - Drust, Eugene G.; Kasting, Gerald B.; Smith, Ronald L.; and Szkutak, Joan B., 5,026,556, Cl. 424-449.000.

- Katayama Chemical, Inc.: *See—*
  - Katayama, Sakae; Ito, Yosuke; and Hirashima, Hidenori, 5,026,723, Cl. 514-441.000.
- Katayama, Sakae; Ito, Yosuke; and Hirashima, Hidenori, to Katayama Chemical, Inc. Microbicidal/microbiostatic composition for industrial use. 5,026,723, Cl. 514-441.000.
- Kato, Hideharu: *See—*
  - Shioiri, Tomonori; Satake, Shinichi; Sekido, Yasuo; Fujisou, Tokuo; Obuchi, Akira; and Kato, Hideharu, 5,026,536, Cl. 423-652.000.
- Kato, Hironori: *See—*
  - Matsumoto, Mitsunori; and Kato, Hironori, 5,026,289, Cl. 439-15.000.
- Kato, Hisatoyo: *See—*
  - Nojiri, Ryuji; Hayakawa, Yoshihiro; Uchiyama, Mamoru; Kato, Hisatoyo; Chino, Yasuyoshi, and Tahara, Shinichiro, 5,026,838, Cl. 536-27.000.
- Kato, Kazuo: *See—*
  - Watanabe, Kazuhiro; Kakizaki, Husayoshi; Arai, Isao; Murakami, Kimihiro; and Kato, Kazuo, 5,026,842, Cl. 540-222.000.
- Kato, Seijiro: *See—*
  - Imataki, Hiroyuki; Hiraoka, Mizuho; Ogawa, Yoshihiro; Yoshino, Hitoshi; Ichikawa, Sachiko; and Kato, Seijiro, 5,026,623, Cl. 430-270.000.
- Kato, Takashi: *See—*
  - Oshima, Keiichi; Kato, Takashi; and Murayama, Susumu, 5,026,183, Cl. 400-605.000.
- Kato, Yoshinobu: *See—*
  - Hasegawa, Akira; Kato, Yoshinobu; and Murakami, Toshifumi, 5,026,515, Cl. 264-315.000.
- Kato, Yuichi, to Ohi Seisakusho Co., Ltd. Cab locking apparatus. 5,025,880, Cl. 180-89.140.
- Katou, Hiroshi: *See—*
  - Nishida, Hiroshi; Ishigaki, Tatsuya; Ito, Atsushi; Kudou, Yoshinobu; Katou, Hiroshi; and Fujii, Kousuke, 5,027,242, Cl. 360-106.000.
- Katsura, Joji, to Matsushita Electric Industrial Co., Ltd. Semiconductor memory device having circuit for reading-out and writing-in of data. 5,027,325, Cl. 365-205.000.
- Katsura, Yoshiro, to Terumo Kabushiki Kaisha. Extracorporeal blood circulating apparatus. 5,026,525, Cl. 422-45.000.
- Katz, Howard G.; Lunsford, David; and Mudge, Paul R., to National Starch and Chemical Investment Holding Corporation. Emulsion binder for carpet and carpet tiles. 5,026,765, Cl. 524-561.000.
- Katz, William E.; Elyanow, Irving D.; and Sims, Keith J., to Ionics, Incorporated. Electrodeionization polarity reversal apparatus and process. 5,026,465, Cl. 204-182.400.
- Katzman, Allison W.: *See—*
  - Osher, John D.; Katzman, Allison W.; Luecke, Mark; and Wildman, John R., 5,026,054, Cl. 273-58.00A.
- Kawabata, Kohji: *See—*
  - Takaya, Takao; Takasugi, Hisashi; Masugi, Takashi; Yamanaka, Hideaki; and Kawabata, Kohji, 5,026,695, Cl. 514-202.000.
- Kawagishi, Hideyuki: *See—*
  - Taniguchi, Osamu; Kawagishi, Hideyuki; Tsuboyama, Akira; Okada, Shinjiro; Inaba, Yutaka; and Kanbe, Junichiro, 5,026,144, Cl. 350-350.00S.
- Kawaguchi, Keishi; Hamasaki, Tatsumi; Tadera, Yoshihiro; and Yamazaki, Sachio, to Mazda Motor Corporation. Slicing machine and control method thereof. 5,025,593, Cl. 51-165.770.
- Kawahara, Setsuko: *See—*
  - Koyama, Noboru; Nakano, Yasushi; Kawahara, Setsuko; and Nakajima, Noboru, 5,026,598, Cl. 428-323.000.
- Kawahara, Yuuji, to Fuji Electric Co., Ltd. System for detecting a reference track of a disc storage unit. 5,027,234, Cl. 360-77.080.
- Kawaji, Mikinori: *See—*
  - Owada, Nobuo; Oogaya, Kaoru; Kobayashi, Tohru; and Kawaji, Mikinori, 5,027,188, Cl. 357-68.000.
- Kawamura, Hideo, to Isuzu Ceramics Research Institute Co. Ltd. Heat-insulated four-cycle engine with prechamber. 5,025,765, Cl. 123-254.000.
- Kawanabe, Tasuku: *See—*
  - Watanabe, Toshiya; and Kawanabe, Tasuku, 5,026,961, Cl. 219-69.110.
- Kawano, Keiji: *See—*
  - Nakagawa, Hidetoshi; Kawano, Keiji; and Miyazaki, Masakatu, 5,027,385, Cl. 379-100.000.
- Kawano, Satoshi; Kimura, Yoshio; and Fukushima, Eiji, to Sanden Corporation. Pin for use in a workpiece clamping apparatus. 5,026,222, Cl. 409-225.000.
- Kawasaki Jukogyo Kabushiki Kaisha: *See—*
  - Miyabe, Hideki, 5,026,267, Cl. 425-451.900.
- Kawashima, Kiroshi; Futsuhara, Koichi; and Wada, Fumio. Ground guidance system for airplanes. 5,027,114, Cl 340-941.000.
- Kawata, Masahiko: *See—*
  - Takatani, Shinichiro; Goto, Shigeo; Kawata, Masahiko; and Hiruma, Kenji, 5,025,751, Cl. 118-733.000.
- Kawata, Tetsuro; Hashimoto, Eiri; and Miyakawa, Nobuaki, to Fuji Xerox Co., Ltd. Image-processing integrated circuit device. 5,027,423, Cl. 382-54.000.
- ke kommunikations-Elektronik GmbH & Co.: *See—*
  - Brahms, Martin; Chahabadi, Ziaedin; and Ocker, Johannes, 5,027,434, Cl. 455-606.000.
- Keane, Peter E.: *See—*
  - Mendes, Etienne; Vernieres, Jean-Claude; Keane, Peter E.; and Bachy, Andre, 5,026,711, Cl. 514-300.000.
- Kedzierski, Leonard J., III *See—*
  - Dixon, Richard P.; and Kedzierski, Leonard J., III, 5,026,540, Cl. 424-60.000.
- Keehan, Donald J. Metallic oxide-oxirane polymers and prepolymers. 5,026,816, Cl. 528-94.000.
- Keezer, William: *See—*
  - Short, William; Ickler, Christopher; Holl, Timothy; and Keezer, William, 5,027,403, Cl. 381-24.000.
- Keil, Georg, to Merz & Kreel GmbH & Co., Firma Writing implement with coaxial alternately usable tips. 5,026,189, Cl. 401-29.000.
- Keith, Alec D.: *See—*
  - Hammerstedt, Roy H.; Keith, Alec D.; and Amann, Rupert P., 5,026,342, Cl. 600-35.000.
- Kelemen, Agnes; Cserey Pechany, Eva; and Jaksa, Istvan, to Richter Gedeon Vegyeszeti Gyar Rt. Process for the conversion of corrinoids produced by microorganisms into cyanocorrinoids. 5,026,640, Cl. 435-86.000.
- Keller, Arnold: *See—*
  - Engelbrecht, Eckart; Nieder, Elmar; and Keller, Arnold, 5,026,399, Cl. 623-18.000.
- Kemp, Richard A., to Shell Oil Company. Alkoxylation process catalyzed by borate salts of the rare earth elements. 5,026,923, Cl 568-618.000.
- Kendall Company, The: *See—*
  - Burroughs, James E., 5,026,359, Cl. 604-326.000.
- Kendall, Roger V.; and Lawson, John W., to Foodscience Corporation. Treatment of arthritis and inflammation using N,N-dimethylglycine. 5,026,728, Cl. 514-561.000.
- Kendrick, Mark F.; and Gogol, Carl A., to Leybold Inficon, Inc. Multiple crystal head for deposition thickness monitor. 5,025,664, Cl. 73-579.000.
- Kennedy, Claude D. Viscera excision for poultry and the like. 5,026,317, Cl. 452-106.000.
- Kenyon, Douglas E.: *See—*
  - Haines, Hiemi K.; Monger, Teresa G.; Kenyon, Douglas E.; and Galvin, Lance J., 5,025,863, Cl. 166-305.100.
- Kerr, Janice M.: *See—*
  - McBride, William J.; Baldwin, Ronald M.; Kerr, Janice M.; Schultze, Lisa M.; and Salazar, Nilda, 5,026,913, Cl. 564-440.000.
- Kesten, Randy J.: *See—*
  - Linovitz, Raymond I.; and Kesten, Randy J., 5,026,375, Cl. 606-79.000.
- Kettering, Gordon L.: *See—*
  - Peregrim, Theodore J.; Kettering, Gordon L., and Kanter, Irving, 5,027,422, Cl. 382-48.000.
- Keturakis, Andrius A.: *See—*
  - Russillo, Joseph G., Jr.; Balch, Richard A.; Keturakis, Andrius A., and Velte, Scott D., 5,027,056, Cl. 324-103.00R.
- Keuter, John P.: *See—*
  - Cucuzza, Carl C.; Raterman, John M.; and Keuter, John P., 5,026,450, Cl. 156-244.110.
- Keyes, Marion A., IV; and Thompson, William L., to Elsag International B.V. Non-contacting on-line paper strength measuring system 5,025,665, Cl. 73-597.000.
- Khazam, Moses, to GenRad, Inc. Low-dead-time interval timer. 5,027,298, Cl. 364-569.000.
- Kheraluwala, Mustansir H.: *See—*
  - DeDoncker, Rik W.; Kheraluwala, Mustansir H.; and Divan, Deepakraj M., 5,027,264, Cl. 363-16.000.
- Kida, Masashi; Midorikawa, Shingo; Suzuki, Ichiro; Suzuki, Yoshihiko; and Yamaguchi, Youichi, to Yokohama Rubber Co., Ltd., The. Rubber composition for all-weather tires. 5,026,762, Cl. 524-495.000.
- Kida, Yasuhiko; Irie, Yoichiro; Takeda, Yoshiyuki; and Nagao, Tsuyoshi, to Mita Industrial Co., Ltd. Automatic document conveying device. 5,027,162, Cl. 355-320.000.
- Kidera, Toru: *See—*
  - Yamauchi, Shunji; Tanaka, Minoru; Sakamoto, Kenitiro; Morita, Yutaka; Kidera, Toru; and Mieda, Hiroki, 5,026,668, Cl 437-210.000.
- Kiezulas, Margaret P., to C. R Bard, Inc. Medical apparatus having protective, lubricious coating. 5,026,607, Cl. 428-423.700.
- Kikuchi, Makoto; Mori, Shinsaku; Nikawa, Yoshio; and Terakawa, Takashige, to Tokyo Keiki Co., Ltd. Heating apparatus for hyperthermia. 5,025,810, Cl. 128-804.000.
- Killeen, Michael J., to Warner-Lambert Co. Method for preparing an anion exchange resin delivery system. 5,026,555, Cl. 424-439.000.
- Killian, Earl A.: *See—*
  - Riordan, Thomas J.; Ries, Paul S.; Hudson, Edwin L.; and Killian, Earl A., 5,027,270, Cl. 364-200.000.
- Kilminster, Kenneth N.: *See—*
  - Begley, William J.; Chen, Teh-Hsuan; Kilminster, Kenneth N.; Poslusny, Jerrold N.; and Slusarek, Wojciech, 5,026,628, Cl. 430-382.000.
- Kim, Jae H.; and Lin, Steven H., to United States of America, National Aeronautics and Space Administration. High-gain AlGaAs/GaAs double heterojunction Darlington phototransistors for optical neural networks. 5,027,182, Cl. 357-46.000.
- Kim, Jin-woong: *See—*
  - Kim, Young-gil; Kim, Jin-woong; and Nho, Dong-wan, 5,026,441, Cl. 148-402.000.
- Kim, Young-gil; Kim, Jin-woong; and Nho, Dong-wan, to Korea Advanced Institute of Science & Technology. High strengths copper base shape memory alloy and its manufacturing process. 5,026,441, Cl. 148-402.000.
- Kim, Young H.: *See—*
  - Heitz, Thomas L.; and Kim, Young H., 5,026,799, Cl 526-192.000.

VOL
1127
ISS
4
JE
25
1991
UMI

Kimberly-Clark Corporation: *See—*
Beuther, Paul D., 5,026,458, Cl. 162-198.000.
Kimura, Hiroaki: *See—*
Kuzuya, Susumu; Hayashi, Shigeyuki; Kimura, Hiroaki; Suzuki, Tsutomu; Sonobe, Katsuyoshi; Nakata, Takashi; and Hatta, Naoyuki, 5,026,039, Cl. 271-11.000.
Kimura, Kazumasa; Nagasuna, Kinya; Namba, Takashi; Kadonaga, Kenji; Miyake, Koji; and Shimomura, Tadao, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Water-absorbent resin and production process. 5,026,800, Cl. 526-200.000.
Kimura, Keizo: *See—*
Yokoyama, Shigeki; Sato, Tadahisa, Kimura, Keizo; Furutachi, Nobuo; and Takahashi, Osamu, 5,026,867, Cl. 548-251.000.
Kimura, Masaru, to Mitsubishi Pencil Co., Ltd. Fluid application tool with convex spacers. 5,026,195, Cl. 401-283.000.
Kimura, Sakae: *See—*
Higuchi, Toshiharu; Matsumoto, Sadao; Yakabe, Toru, and Kimura, Sakae, 5,027,029, Cl. 313-446.000.
Kimura, Yoshio: *See—*
Kawano, Satoshi; Kimura, Yoshio; and Fukushima, Eiji, 5,026,222, Cl. 409-225.000.
Kinaform Technology, Inc.: *See—*
Eichel, Herman J.; and Massmann, Brent D., 5,026,559, Cl. 424-458.000.
Kindlmann, Peter J.; and Valley, Robert A., Jr., to Eastman Kodak Company. High voltage electrophoresis apparatus. 5,027,018, Cl. 307-571.000.
King, Eddie W.: *See—*
Phillips, Paul A.; and King, Eddie W., 5,027,283, Cl. 364-479.000.
King, Jerry J.: *See—*
Schutte, Michael J.; and King, Jerry J., 5,026,385, Cl. 606-167.000.
King, John R., to S&k Enterprises, Inc. Safety lock for rack systems. 5,025,937, Cl. 211-192.000.
Kinoshita, Tsutomu; and Osakabe, Toshihiko, to Asmo Co., Ltd. Compact fan unit for automobile. 5,026,251, Cl. 415-119.000.
Kinugawa, Masaaki, to Kabushiki Kaisha Toshiba. Semiconductor device. 5,027,186, Cl. 357-59.000.
Kirby, Richard C. Face mask. 5,025,507, Cl. 2-206.000.
Kirchhoff, Robert A., to Dow Chemical Company, The. Novel poly(arylcyclobutenes). 5,026,892, Cl. 556-419.000.
Kirchner, Matthew A.: *See—*
Zappa, Donald E.; Prisco, Anthony J., Jr.; and Kirchner, Matthew A., 5,025,523, Cl. 15-98.000.
Kirk, Donald R.: *See—*
Jolitz, Randal J.; and Kirk, Donald R., 5,026,747, Cl. 524-64.000.
Kirk, John; and Lord, George H., to Digital Equipment Corporation. Computer workstation including video update arrangement. 5,027,290, Cl. 364-521.000.
Kirol, Lance D.: *See—*
Rockenfeller, Uwe; and Kirol, Lance D., 5,025,635, Cl. 62-106.000.
Kirsch, Axel: *See—*
Durr, Walter; and Kirsch, Axel, 5,026,280, Cl. 433-175.000.
Durr, Walter; and Kirsch, Axel, 5,026,285, Cl. 433-173.000.
Kirsch, Jurgen: *See—*
Grigo, Ulrich; Kirsch, Jurgen; Wittmann, Dieter; Idel, Karsten-Josef; and Horlacher, Peter, 5,026,758, Cl. 524-423.000.
Kishi, Kohhei: *See—*
Tanaka, Hirohisa; Kishi, Kohhei, and Yano, Kohzo, 5,026,143, Cl. 350-336.000.
Kishi, Matsuo: *See—*
Suzuki, Terao; Kishi, Matsuo; Muraishi, Katsuyoshi; Ogawa, Kenichi; and Takashio, Hiroshi, 5,026,518, Cl. 419-12.000.
Kishimoto, Kiyoshi: *See—*
Nishi, Masami; Kishimoto, Kiyoshi; and Matsumoto, Haruo, 5,026,227, Cl. 407-119.000.
Kishimura, Yuhei: *See—*
Otake, Katsumi; Yanagimoto, Takekazu; Nakajima, Shuichi; and Kishimura, Yuhei, 5,026,236, Cl. 412-33.000.
Kita, Eizo: *See—*
Kuwabara, Takao; Inoue, Hisao; Nakagawa, Hiroto; and Kita, Eizo, 5,026,256, Cl. 417-45.000.
Kita, Katsuhiko: *See—*
Ishii, Takaaki; Sakanishi, Masayuki; and Kita, Katsuhiko, 5,027,266, Cl. 363-63.000.
Kita, Masahiro: *See—*
Negishi, Kiyoshi; Negoro, Ikuo; and Kita, Masahiro, 5,027,135, Cl. 346-154.000.
Kita, Sumio, to Sharp Kabushiki Kaisha. Image rotating device. 5,027,227, Cl. 358-488.000.
Kitagawa, Hiroji, to Kitagawa Industries Co., Ltd. Mechanical component consisting of anti-static material 5,026,602, Cl. 428-336.000.
Kitagawa Industries Co., Ltd.: *See—*
Kitagawa, Hiroji, 5,026,602, Cl. 428-336.000.
Kitagawa, Seiho: *See—*
Sekijima, Kenzo; and Kitagawa, Seiho, 5,025,605, Cl. 52-309.160.
Kitagawa, Yoshiharu: *See—*
Yasuoka, Yuji; Kitagawa, Yoshiharu; and Imai, Yoshikiyo, 5,027,094, Cl. 335-78.000.
Kitahara, Masaki: *See—*
Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kitahara, Masaki, 5,026,698, Cl. 514-215.000.
Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kitahara, Masaki, 5,026,708, Cl. 514-256.000.
Kitajima, Kimio: *See—*
Mineta, Sadayoshi; Kitajima, Kimio; and Shimazu, Kunio, 5,027,026, Cl. 310-259.000.
Kitakado, Ryuji; Yano, Hironobu; Kakuma, Hiroaki; Hoki, Tetsuo; and Kanai, Takao, to Dainippon Screen Mfg. Co., Ltd. Method of and apparatus for inspecting conductive pattern on printed board 5,027,417, Cl. 382-8.000.
Kitamura, Ikuo; Aomi, Hideki; Koyama, Satoshi; Tokunaga, Katsushi, and Okamura, Kazuo, to Daikin Industries Ltd. Coated iron carbide fine particles. 5,026,605, Cl. 428-403.000.
Kitamura, Kazuo: *See—*
Akiyama, Saburo; Murakami, Naoyuki; and Kitamura, Kazuo, 5,026,792, Cl. 525-468.000.
Kitazume, Koichi; and Arai, Kimikazu, to Daiwa Seiko, Inc. Automatic sheet feeding apparatus. 5,026,041, Cl. 271-118.000.
Kito, Shozo; Harada, Shoichi; and Imai, Hajime, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Shift lever apparatus for automatic transmission. 5,025,901, Cl. 192-4.00A.
Kitsuta, Tatsuaki; Shimotsuhama, Isao; Watanabe, Yoshio; Tanaka, Masahiro; Shiotsu, Shinichi; and Ogawa, Kazumi, to Fujitsu Limited Logic circuit which can be selected to function as a d or t type flip-flop. 5,027,005, Cl. 307-272.100.
Kiuchi, Toshiaki; and Iizuka, Shigeo, to Yoshino Kogyosho Co., Ltd. Liquid applicator. 5,026,192, Cl. 401-176.000.
Klaeren, Stephen A.: *See—*
Andrews, Mark A.; and Klaeren, Stephen A., 5,026,927, Cl. 568-863.000.
Klainer, Stanley M.; Dandge, Dileep K.; Butler, Marcus; and Goswami, Kisholoy, to FiberChem Inc Fiber optic refractive index sensor using metal cladding. 5,026,139, Cl. 350-96.290.
Klamecki, Barney: *See—*
Rekow, Elizabeth D.; Riley, Donald R.; Erdman, Arthur G., Klamecki, Barney; Zhu, Yang; and Ahn, Jeong-Ho, 5,027,281, Cl. 364-474.240.
Kleck, Jeffrey A.; Burkhardt, Andrew J.; and Bingold, Steven R., to Tektronix, Inc. Multi-standard video option for oscilloscope. 5,027,058, Cl. 324-121.00R.
Kleeman, Axel: *See—*
Drauz, Karl-Heinz; Kleeman, Axel; Prescher, Gunter; and Ritter, Gebhard, 5,026,925, Cl. 568-771.000.
Kletecka, George; and Ledesma, Victor L., to B F. Goodrich Company, The. Solventless process for preparing a tri-substituted triazine 5,026,849, Cl. 544-198.000.
Kligman, Albert M., to Upjohn Company, The. Combination of minoxidil and an antiinflammatory agent for treating patterned alopecia 5,026,691, Cl. 514-171.000.
Klingenstein, Dieter: *See—*
Kunkel, Georg; Klingenstein, Dieter; Mahr, Heinz; and Fliedner, Michael, 5,026,469, Cl. 204-298.150.
Klockow, Michael: *See—*
Prucher, Helmut; Jonas, Rochus; Piulats, Jaime; and Klockow, Michael, 5,026,705, Cl. 516-253.000.
Kloucek, Franz, to Asea Brown Boveri Ltd. Fast power semiconductor circuit. 5,027,192, Cl. 357-75.000.
Klunk, Lewis J., Jr : *See—*
Grebow, Peter E.; Li, Herschel H.; and Klunk, Lewis J, Jr., 5,026,825, Cl. 530-307.000.
Knapczyk, Jerome W.: *See—*
Dupont, William A., and Knapczyk, Jerome W., 5,026,771, Cl 525-50.000.
Knauer, Karl; and Kamp, Winfried, to Siemens Aktiengellschaft Carry-select adder. 5,027,312, Cl. 364-788.000.
Knemeyer, Friedel S.: *See—*
Slutz, David E.; and Knemeyer, Friedel S., 5,026,960, Cl. 219-69.170.
Knepler, John T.; Anson, James H.; and Brewer, Alan W., to Bunn-O-Matic Corporation. Apparatus for melting and heating shortening. 5,026,969, Cl. 219-421.000.
Knight, Darryl A.: *See—*
Leckrone, Michael E.; Kagan, Jonathan; Knight, Darryl A.; and Gunseor, Larry A., 5,026,367, Cl. 606-7.000.
Kobayashi, Akio; Tanaka, Hiroshi; Yamashita, Shoji; Fujita, Yasumasa, Hikichi, Koichi; and Kumagai, Chiaki, to Honda Giken Kogyo Kabushiki Kaisha. Controlling device for non-stage transmission for vehicles. 5,025,685, Cl. 74-866.000.
Kobayashi, Hiroshi; and Itoh, Toshiharu, to Nissan Motor Company, Limited; and NGK Spark Plug Co., Ltd. Transducer with built-in printed circuit board. 5,025,666, Cl. 73-632.000.
Kobayashi, Kazuyuki; and Takahashi, Kouji, to Mitsubishi Jukogyo Kabushiki Kaisha; and Churyo Engineering Kabushiki Kaisha. Lubricant oil amount detector of a vertical shaft type engine. 5,025,764, Cl. 123-198.00R.
Kobayashi, Makiji; Isobe, Mitsuo; Inatsuki, Tatsuya; and Ueno, Hisashi, to Kabushiki Kaisha Toshiba. Semiconductor memory. 5,027,327, Cl. 365-222.000.
Kobayashi, Masahiko, to Mita Industrial Co., Ltd. Seal structure for a chamber means containing a developer material. 5,027,156, Cl. 355-245.000.
Kobayashi, Mitsugu; Ohtani, Go; Sekino, Jun; Konno, Toshimitsu; and Maeda, Hiroshi, to Yamanouchi Pharmaceutical Co., Ltd Lyophilized pharmaceutical composition of neocarzinostatin derivative. 5,026,772, Cl. 525-54.100.
Kobayashi, Seizo: *See—*
Sano, Akira; Kamiishi, Hirofumi; Kobayashi, Seizo; Matsuura, Kazuo; and Yokoyama, Shigeki, 5,026,511, Cl. 264-28.000.
Kobayashi, Shiro. Metal-containing polymer and production process thereof. 5,026,887, Cl. 556-81.000.

Kobayashi, Tohru: *See—*
Owada, Nobuo; Oogaya, Kaoru; Kobayashi, Tohru; and Kawaji, Mikinori, 5,027,188, Cl. 357-68.000.
Koch, Roger H.: *See—*
Clark, Gregory J.; Gambino, Richard J., Koch, Roger H ; Laibowitz, Robert B.; Marwick, Allan D.; and Umbach, Corwin P., 5,026,682, Cl. 505-1.000.
Kocses, Joseph W. Safety syringe apparatus 5,026,354, Cl. 604-195.000.
Koda, Hironobu: *See—*
Sakamoto, Shunji; Watanabe, Tuyoshi; and Koda, Hironobu, 5,027,275, Cl. 364-424.050.
Kodai, Syojiro, to Mitsubishi Denki Kabushiki Kaisha. Method of producing IC cards. 5,026,452, Cl 156-293.000.
Kodama, Tomoko: *See—*
Nakamura, Makoto; and Kodama, Tomoko, 5,027,356, Cl. 371-32.000.
Kodama, Tsuyoshi: *See—*
Kajimura, Haruhiko; Nagano, Hiroo; Yamanaka, Kazuo; and Kodama, Tsuyoshi, 5,026,521, Cl. 420-422.000.
Koden, Mitsuhiro; Kuratate, Tomoaki, Funada, Fumiaki; Sakaguchi, Kazuhiko; Kasai, Naoya; and Takehira, Yoshikazu, to Sharp Kabushiki Kaisha; and Daiso Co., Ltd. Chiral smectic liquid crystal composition. 5,026,506, Cl 252-299.610.
Koehler, Robert J.: *See—*
Lytton, Kenneth G.; Bolin, Odell F ; and Koehler, Robert J., 5,025,532, Cl. 19-80.00R.
Koehnle, Hans: *See—*
Kaller, Ernst; Kugler, Karl-Heinz; Zimmermann, Christian; and Koehnle, Hans, 5,027,073, Cl. 324-388.000.
Koester, Daniel L.: *See—*
Koester, William L.; and Koester, Daniel L., 5,025,969, Cl 227-120.000.
Koester, William L.; and Koester, Daniel L. Dual actuation staple insertion apparatus. 5,025,969, Cl. 227-120.000.
Kogami, Yuji: *See—*
Fujiwara, Tatsuro; Kogami, Yuji; and Watanabe, Asako, 5,026,832, Cl. 536-7.100.
Koglin, Bernd: *See—*
Beyer, Joachim; Koglin, Bernd; Rink, Rolf; and Roth, John-Edwin, 5,026,208, Cl. 405-129.000.
Kohata, Mitsuhiro: *See—*
Nagata, Takehito; Kohata, Mitsuhiro; and Ino, Masumitsu, 5,027,226, Cl 358-482.000.
Kohli, Dalip K., to American Cyanamid Aromatic ether-ketone polyamines, intermediates and products, and methods for preparing same. 5,026,872, Cl. 548-521.000.
Kohno, Teruhisa: *See—*
Nokubo, Seiji; Kohno, Teruhisa; Hashida, Koichi; Usuki, Takashi; and Higashimura, Hideaki, 5,026,123, Cl 303-117.000.
Koike, Isao. Physiological stereo articulator. 5,026,282, Cl. 433-62.000.
Koinuma, Yutaka: *See—*
Mizuno, Koichi; Wakabayashi, Takeshige; Koinuma, Yutaka; Aizawa, Reiji, Kushiyama, Satoshi; Kabayashi, Satoru; Ohuchi, Hideo; Yoshida, Toyonobu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, 5,026,464, Cl. 204-164.000.
Koivikko, Heikki T. Electric motor including reduction-gear and circuit. 5,027,023, Cl. 310-83.000.
Koiwa, Yoshinobu, to Koiwa, Yoshinobu Shaft construction method. 5,026,216, Cl. 405-267.000.
Kojima, Hirotsugu: *See—*
Baji, Toru; Nakano, Yukio; Tanabe, Shiro; Nakagawa, Tetsuya; and Kojima, Hirotsugu, 5,027,400, Cl. 380-20.000.
Kojima, Tatsuru, to NEC Corporation. Frequency modulator utilizing frequency synthesizer. 5,027,429, Cl 455-113.000.
Kolcraft Enterprises, Inc.: *See—*
Johnson, Edward, 5,025,517, Cl. 5-99 100.
Kolenzov, Yanko A.: *See—*
Atanassov, Lyuben P.; Kolenzov, Yanko A ; Vulev, Decho I.; Primov, Ivan S.; Spassov, Peter G., Kanalev, Svetlosar K.; Andonov, Dimo P.; Yankov, Angel V.; and Dilkin, Nikolay G., 5,027,286, Cl. 364-513 000.
Kollar, Laszlo : *See—*
Bakos, Jozsef; Neil, Balint; Kollar, Laszlo , Toros, Szilard; Eifert, Gvula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna; Kuronya, Istvan; Magyari, Istvan; Timar, Judit; Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.
Kolongowski, Sidney C.: *See—*
Lockwood, Alan R., Kolongowski Sidney C.; and Doolin, Dilyard, 5,025,889, Cl. 181-250.000.
Komagome, Reijiro: *See—*
Kume, Tateo; Komagome, Reijiro; and Shiraishi, Kazuhiro, 5,025,767, Cl. 123-489.000.
Komaki, Hisashi: *See—*
Mizuno, Koichi; Wakabayashi, Takeshige; Koinuma, Yutaka; Aizawa, Reiji; Kushiyama, Satoshi; Kabayashi, Satoru; Ohuchi, Hideo; Yoshida, Toyonobu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, 5,026,464, Cl 204-164.000.
Kominami, Seiya: *See—*
Suzuki, Hiroyoshi; Ogawa, Kenji; Maekawa, Hiroko; Kominami, Seiya; and Asayama, Yoshiaki, 5,026,153, Cl. 356-1.000.
Komiya, Yutaka, to Canon Kabushiki Kaisha. Image forming apparatus with card device input. 5,027,153, Cl. 355-200.000.
Komori Corporation: *See—*
Funabashi, Isao; Ebina, Toshihiko; and Numauchi, Hiromitsu, 5,025,726, Cl. 101-352.000.
Komp, Bernd: *See—*
Kresken, Joachim; Komp, Bernd, and Stockhausen, Dolf, 5,026,690, Cl. 514-155.000.
Kondo, Masafumi: *See—*
Takahashi, Kosei; Hosoda, Masahiro; Tsunoda, Atsuo; Kondo, Masafumi; and Suyama, Takahiro, 5,027,169, Cl. 357-17.000.
Kondo, Mituo, to Fuji Photo Optical Co., Ltd Endoscope angling mechanism. 5,025,804, Cl. 128-4.000.
Kondoh, Hisao: *See—*
Nishizawa, Jun-ichi; and Kondoh, Hisao, 5,027,180, Cl. 357-38.000.
Konica Corporation: *See—*
Hoshino, Yasushi; Kakita, Tsuyoshi; and Yoshida, Makoto, 5,027,149, Cl. 354-412.000.
Koyama, Noboru; Nakano, Yasushi; Kawahara, Setsuko; and Nakajima, Noboru, 5,026,598, Cl. 428-323.000.
Masaki, Hiroya; Takagiwa, Hiroyuki; Shirose, Meizo; and Ishikawa, Michiaki, 5,026,620, Cl. 430-99.000.
Takayama, Jun; and Isoguchi, Seiichi, 5,027,215, Cl. 358-213.110.
Yamada, Taketoshi; and Habu, Takeshi, 5,026,622, Cl 430-264.000.
Konishi, Takahiro; and Kuriyama, Toshihiro, to Alps Electric Co., Ltd. Floating type magnetic head with flexure cutout 5,027,238, Cl. 360-104.000.
Konno, Toshimitsu: *See—*
Kobayashi, Mitsugu; Ohtani, Go; Sekino, Jun; Konno, Toshimitsu, and Maeda, Hiroshi, 5,026,772, Cl. 525-54 100.
Kookootsedes, Gust J., to Dow Corning Corporation. Silicone resin thermoset molding compositions. 5,026,811, Cl. 528-14.000.
Koop, Georg; and Volkl, Raimund, to ED Scharwachter GmbH & Co. KG. Convertible top for motor vehicles. 5,026,110, Cl. 296-108.000.
Kopolovics, Solomon: *See—*
Anderson, Richard J.; Goodman, Bruce J.; Riggio, Robert T.; Kopolovics, Solomon; Hernandez, Lisa C.; Chen, Chengkuo; and Romei, Russell J., 5,027,395, Cl. 380-4.000.
Korber AG: *See—*
Liebe, Reinhard; and Wochnowski, Waldemar, 5,025,813, Cl. 131-290.000.
Korea Advanced Institute of Science & Technology: *See—*
Kim, Young-gil; Kim, Jin-woong; and Nho, Dong-wan, 5,026,441, Cl. 148-402.000.
Koronis Parts, Inc.: *See—*
Webb, Edward H.; and Duclo, Marley, 5,025,760, Cl 123-73.0PP.
Korth, Bernd, to Protoned B. V. Supporting frame. 5,026,014, Cl 248-225.200.
Kosaka, Takemi; Sakamoto, Fukashi; and Hidaka, Setsuo, to Idemitsu Kosan Company Limited. Separator for alkaline cell and alkaline cell prepared by using this separator. 5,026,617, Cl. 429-206.000
Kosan Teknova A/S: *See—*
Jensen, Ove, 5,026,023, Cl. 251-144.000.
Kosecoff, Irving W. Quick release mechanism for bicycle trainer. 5,026,047, Cl. 272-73.000.
Koskenmaki, David C., to Minnesota Mining & Manufacturing. Array of densely packed discrete metal microspheres coated on a substrate. 5,026,599, Cl. 428-328.000.
Kosteva, Glenn P.; Lin, Peili; Raquin, Michel M , and Rohidoux, Raymond C., to Bull HN Information Systems Inc. Two level multiplexer circuit shifter apparatus. 5,027,300, Cl. 364-715.080.
Kosuge, Takuo; Tsuji, Kuniro; Ishida, Hitoshi; and Kosuge, Yoshiki, to Kosuge, Yoshiki; and Broadbent, James Meredyth. Derivatives of scymol sulfate. 5,026,883, Cl. 552-542.000.
Kosuge, Yoshiki: *See—*
Kosuge, Takuo; Tsuji, Kuniro; Ishida, Hitoshi; and Kosuge, Yoshiki, 5,026,883, Cl. 552-542.000.
Kotani, Hirokazu; Hiraoka, Nobutsugu; and Obayashi, Akira, to Takara Shuzo Co., Ltd. RNA polymerase gene, microorganism having said gene and the production of RNA polymerase by the use of said microorganism. 5,026,645, Cl. 435-194.000.
Kotecki, Michael R.; and Bunchkowski, Duane J., to Harnischfeger Engineers, Inc. Rail securement apparatus. 5,025,987, Cl. 238-351.000.
Koumoto, Yasuhiko; and Tokunaga, Kei, to NEC Corporation Digital division circuit using N/M-bit subtractor for N subtractions. 5,027,309, Cl. 364-766.000.
Koyama, Noboru; Nakano, Yasushi; Kawahara, Setsuko; and Nakajima, Noboru, to Konica Corporation. Magnetic recording medium. 5,026,598, Cl. 428-323.000.
Koyama, Satoshi: *See—*
Kitamura, Ikuo; Aomi, Hideki; Koyama, Satoshi; Tokunaga, Katsushi; and Okamura, Kazuo, 5,026,605, Cl. 428-403.000.
Kozierok, Leon; and Gallagher, Robert A., to Indalloy, Division of Indal Limited. Charging device. 5,026,240, Cl. 414-300.000.
Kozlovsky, William J.; Nabors, Charles D.; and Byer, Robert L., to Leland Stanford, Jr., University, Board of Trustees of Efficient laser harmonic generation employing a low-loss external optical resonator. 5,027,361, Cl. 372-22.000.
Kraanen, Willem P. M.: *See—*
Smeets, Paulus J. H. M.; Paas, Caspar G. M.; and Kraanen, Willem P. M., 5,026,770, Cl. 525-7.100.
Krajewski, Alexander A.: *See—*
Lesslie, David J.; Morris, Robert A., Messerli, Alan J., Scott, Graham A.; and Krajewski, Alexander A., 5,027,091, Cl 335-132.000.
Kraus, Charles E., to Excelermatic Inc. High ratio planetary type traction roller transmission. 5,025,671, Cl. 74-206.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Krauss-Maffei AG *See—*
  - Titus, Hans-Joachim, 5,026,169, Cl 366-287.000.
- Krehbiel, Fred L., to Molex Incorporated. Electrical socket assembly for single in-line circuit package. 5,026,297, Cl. 439-326.000
- Kresken, Joachim; Komp, Bernd; and Stockhausen, Dolf, to Chemische Fabrik Stockhausen GmbH. Antiviral agent 5,026,690, Cl. 514-155.000.
- Krespan, Carl G.; and Resnick, Paul R , to Du Pont de Nemours, E. I., and Company. Polyhalodihydrodioxins and polyhalodioxoles. 5,026,801, Cl. 526-247.000.
- Kreuzer, Friedhelm, to F.M K. Kruezer GmbH & Co. Appliance carrier. 5,026,017, Cl. 248-324.000.
- Krijgsman, Pieter. Structure for forming a reaction product. 5,026,527, Cl. 422-110.000.
- Kringe, Horst. *See—*
  - Durr, Heinrich; Kringe, Horst; Rosenthal, Manfred, and Tercic, Eduard, 5,026,184, Cl. 400-605.000.
- Kroeker, John P.; and Powers, Robert L. Speech-recognition circuitry employing phoneme estimation. 5,027,408, Cl 381-43.000.
- Krouskop, Thomas A.: *See—*
  - Spann, Donald C.; Schaefer, Daniel J.; and Krouskop, Thomas A., 5,025,519, Cl. 5-464.000.
- Krueger, Barry D. Picture frame. 5,025,579, Cl 40-452.000.
- Kruse, Heinz J.: *See—*
  - Meyer, Jurgen; Sippel, Achim; Wildau, Monika, Kruse, Heinz J.; Diel, Rainer; Becker, Wilfried; Bartsch, Gisbert; Pahnke, Klaus-Dieter; Huege, Jurgen; and Luther, Hans-Werner, 5,025,731, Cl. 102-521.000.
- Kubo, Masaaki: *See—*
  - Matsuoka, Noriyuki; and Kubo, Masaaki, 5,026,303, Cl. 439-526.000.
- Kubo, Susumu. Purification process for gold-bearing iodine lixiviant. 5,026,420, Cl. 75-712.000.
- Kubota, Yoshiro: *See—*
  - Mizuno, Koichi; Wakabayashi, Takeshige; Koinuma, Yutaka; Aizawa, Reiji; Kushiyama, Satoshi; Kabayashi, Satoru; Ohuchi, Hideo; Yoshida, Toyonohu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, 5,026,464, Cl 204-164.000.
- Kubushiki Kaisha Aoyama: *See—*
  - Iname, Morito, 5,026,578, Cl. 428-4.000.
- Kucey, Reginald M. N., to Canada, Her Majesty the Queen in right of, as represented by the Minister of Agriculture. Methods and compositions for increasing the amounts of phosphorus and/or micronutrients available for plant uptake from soils. 5,026,417, Cl. 71-35.000.
- Kuchler, Herbert: *See—*
  - von Hoessle, Wolfgang; and Kuchler, Herbert, 5,027,202, Cl. 358-109.000.
- Kudo, Hiroaki; Takiguchi, Haruhisa; Sakane, Chitose; and Sugahara, Satoshi, to Sharp Kabushiki Kaisha. Semiconductor laser device. 5,027,368, Cl. 372-96.000.
- Kudou, Yoshinobu: *See—*
  - Nishida, Hiroshi; Ishigaki, Tatsuya; Ito, Atsushi; Kudou, Yoshinobu; Katou, Hiroshi; and Fujii, Kousuke, 5,027,242, Cl. 360-106.000.
- Kuenast, Walter U., to Motorola, Inc. Rapid convergence decision feedback equalizer. 5,027,369, Cl. 375-14 000.
- Kugler, Karl-Heinz: *See—*
  - Kaller, Ernst; Kugler, Karl-Heinz; Zimmermann, Christian; and Koehnle, Hans, 5,027,073, Cl. 324-388.000.
- Kuhn, John B.; Hunt, Kenneth E.; and Thorman, Christopher S., to Deere & Company. Implement suspension mechanism. 5,025,617, Cl. 56-15.600.
- Kuhne, Helmut: *See—*
  - Diamantoglou, Michael; and Kuhne, Helmut, 5,026,834, Cl. 536-20.000.
- Kulp, Jack H.; McKenney, John D.; and Sullivan, James P., to TrafFix Devices, Inc. Traffic control element and method of erecting and stabilizing same. 5,026,204, Cl. 404-10.000.
- Kumagai, Chiaki: *See—*
  - Kobayashi, Akio; Tanaka, Hiroshi; Yamashita, Shoji; Fujita, Yasumasa; Hikicni, Koichi; and Kumagai, Chiaki, 5,025,685, Cl. 74-866.000.
- Kumar, Ravi, to Air Products and Chemicals, Inc. Adsorptive process for producing two gas streams from a gas mixture. 5,026,406, Cl. 55-26.000.
- Kume, Hideo: *See—*
  - Sano, Tasukazu; Tanaka, Hideyuki; Nakamura, Keijirou; Kume, Hideo; and Tanigawa, Kiyoshi, 5,026,136, Cl. 350-96.150.
- Kume, Nobuyuki; Miyata, Masanori; and Nakazawa, Nobuo, to Canon Kabushiki Kaisha. Image forming apparatus. 5,027,161, Cl. 355-305.000.
- Kume, Tateo; Komagome, Reijiro; and Shiraishi, Kazuhiro, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Air/fuel ratio control system for internal combustion engine and air/fuel ratio controlling oxygen density sensor. 5,025,767, Cl. 123-489.000.
- Kunig, Horst E. Non-invasive cardiac performance monitoring device and method. 5,025,795, Cl. 128-713.000.
- Kunimune, Kouichi: *See—*
  - Maeda, Hirotoshi; and Kunimune, Kouichi, 5,026,788, Cl. 525-420.000.
- Kunkel, Georg; Klingenstein, Dieter; Mahr, Heinz; and Fliedner, Michael, to Leybold Aktiengesellschaft. Apparatus for holding and turning eyeglass lenses in a high-vacuum vapor deposition or sputtering system. 5,026,469, Cl. 204-298.150.
- Kuno, Sachiko; Ueno, Ryuji; and Hayaishi, Osamu, to Research Development Corporation of Japan, and Ueno Seiyaku Kabushikikaisha Use of sex hormone. 5,026,692, Cl. 514-178.000.
- Kunz, Reiner; Babl, Albert; Zahradnicek, Ales; and Dietrich, Rainer, to Lonza Ltd. Abrasives. 5,026,404, Cl. 51-295.000.
- Kunze, Norbert, to U.S Philips Corporation. Magnetic tape cassette apparatus having a cassette catch with spring arms. 5,027,236, Cl 360-96.500.
- Kurahashi, Shigeki *See—*
  - Suetaka, Hiroyuki; and Kurahashi, Shigeki, 5,027,223, Cl. 358-342.000.
- Kuramoto, Shinichi: *See—*
  - Tsubuko, Kazuo; Kuramoto, Shinichi; Umemura, Kazuhiko, and Ohkawara, Makoto, 5,026,621, Cl 430-109 000.
- Kuramoto, Terumasa: *See—*
  - Tajima, Osamu; Kuramoto, Terumasa; and Suzuki, Yoshitaka, 5,026,180, Cl. 400-120.000.
- Kuratate, Tomoaki: *See—*
  - Koden, Mitsuhiro; Kuratate, Tomoaki; Funada, Fumiaki, Sakaguchi, Kazuhiko; Kasai, Naoya; and Takehira, Yoshikazu, 5,026,506, Cl. 252-299.610.
- Kurihara, Daiki; and Miyake, Takashi, to Dainippon Screen Mfg. Co., Ltd. Apparatus for fabricating pre-press masking film. 5,027,225, Cl. 358-448.000.
- Kurihara, Noriko: *See—*
  - Yamamoto, Kiyoshi; Hirabayashi, Keiji; Kurihara, Noriko; Taniguchi, Yasushi; and Ikoma, Keiko, 5,026,415, Cl. 65-305.000.
- Kurita Water Industries Ltd.: *See—*
  - Taya, Shiro, 5,026,523, Cl. 422-16.000.
- Kuriyama, Toshihiro: *See—*
  - Konishi, Takahiro; and Kuriyama, Toshihiro, 5,027,238, Cl. 360-104.000.
- Kuroda, Kotaro: *See—*
  - Iio, Satoshi; Watanabe, Masakazu, Imura, Toru; Kuroda, Kotaro; and Saka, Hiroyasu, 5,026,601, Cl. 428-336.000.
- Kuroiwa, Akihiko: *See—*
  - Ikeda, Takaaki; Suga, Toshihiko; and Kuroiwa, Akihiko, 5,027,040, Cl. 315-241.00R
- Kurokawa, Satoru: *See—*
  - Ito, Koichi; Matsunaga, Motomu; Kurokawa, Satoru; and Ueno, Koji, 5,026,959, Cl. 219-10.55A.
- Kuronya, Istvan: *See—*
  - Bakos, Jozsef; Neil, Balint; Kollar, Laszlo ; Toros, Szilard; Eifert, Gvula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna; Kuronya, Istvan; Magyari, Istvan; Timar, Judit; Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.
- Kurosawa, Juetsu; and Arai, Katsuhiko, to Diesel Kiki Co., Ltd. Variable capacity wobble plate compressor. 5,026,316, Cl. 417-222.000.
- Kursar, James V., to Dresser-Rand Company. Valve unloader finger assembly, a method of forming the same, a kit, and a plate therefor 5,025,830, Cl. 137-522.000.
- Kusabuka, Yoshito, to Seiko Epson Corporation. Printer with adjustable pressing plate. 5,026,185, Cl. 400-618.000.
- Kusaka, Kensaku: *See—*
  - Hirabayashi, Hiromitsu; Kusaka, Kensaku; and Mizutani, Morikazu, 5,026,276, Cl. 432-59.000.
- Kusayama, Masahiro, to Yoshida Kogyo, K.K. Bottom end stop for slide fastener. 5,025,535, Cl. 24-433.000.
- Kushibiki, Nobuo; Yoshinaga, Yoko; Kuwayama, Tetsuro; and Taniguchi, Naosato, to Canon Kabushiki Kaisha. Photosensitive material and volume type phase hologram member formed therefrom 5,026,618, Cl. 430-2.000.
- Kushiyama, Satoshi: *See—*
  - Mizuno, Koichi; Wakabayashi, Takeshige; Koinuma, Yutaka; Aizawa, Reiji; Kushiyama, Satoshi; Kabayashi, Satoru; Ohuchi, Hideo; Yoshida, Toyonobu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, 5,026,464, Cl 204-164.000.
- Kusmer, Raymond J., to Cooper Industries, Inc. Lighting application calculator. 5,027,307, Cl. 364-709.020.
- Kutsuzawa, Yoshiro: *See—*
  - Ohtsuka, Koji; Kutsuzawa, Yoshiro; Ogata, Kimio; and Ichinosawa, Hideyuki, 5,027,166, Cl. 357-15.000.
- Kutzavitch, Walter G.; and Rosenthal, Eugene J., to AT&T Bell Laboratories. General purpose low cost digital amplitude regulator. 5,027,083, Cl. 330-284.000.
- Kuwabara, Takao; Inoue, Hisao; Nakagawa, Hiroto; and Kita, Eizo, to Hitachi, Ltd.; and Kansai Electric Power Co. Ltd., The. Variable speed pumping-up system. 5,026,256, Cl. 417-45.000.
- Kuwayama, Tetsuro: *See—*
  - Kushibiki, Nobuo; Yoshinaga, Yoko; Kuwayama, Tetsuro; and Taniguchi, Naosato, 5,026,618, Cl. 430-2.000.
- Kuyama, Kouzi: *See—*
  - Saneshige, Ryoji; Kuyama, Kouzi; Hasegawa, Makoto; and Furuya, Miyuki, 5,027,025, Cl. 310-156.000.
- Kuzuya, Susumu; Hayashi, Shigeyuki; Kimura, Hiroaki; Suzuki, Tsutomu; Sonobe, Katsuyoshi; Nakata, Takashi; and Hatta, Naoyuki, to Brother Kogyo Kabushiki Kaisha; and Hayashi, Takayuki. Sheet storage case for use in image recording apparatus. 5,026,039, Cl. 271-11.000.
- Kveglis, Albert A.; and Catena, Robert J., to Sun Chemical Corporation. Water-based printing ink prepared from polyamide/acrylic graft copolymers. 5,026,755, Cl. 524-389.000.
- Kyocera Corporation: *See—*
  - Ata, Kazuhisa, 5,027,338, Cl. 369-44.290.

  - Nishi, Masami; Kishimoto, Kiyoshi; and Matsumoto, Haruo, 5,026,227, Cl. 407-119.000.
- Kyushu University: *See—*
  - Harada, Kosuke; and Sakamoto, Hiroshi, 5,027,263, Cl. 363-16.000.
- L. & C. Steinmuller GmbH. *See—*
  - Eickvonder, Wolfgang; Passmann, Norbert; Thomas, Gerhard, Tummers, Peter; and Steven, Hubert, 5,025,755, Cl 122-4.00D.
- L.I R. France: *See—*
  - Petit, Robert, 5,025,941, Cl 215-228.000.
- Lackey, John W.: *See—*
  - Friedmann, Robert C.; Lackey, John W.; and O'Neill, Brian T., 5,026,845, Cl. 549-492.000.
- LaCourse, Joanne S.: *See—*
  - Boudreau, Robert A.; and LaCourse, Joanne S., 5,026,138, Cl. 350-96.200.
- Lafferty, Donald. Photovoltaic source switching regulator with maximum power transfer efficiency without voltage change. 5,027,051, Cl. 323-222.000.
- Lagny, Pierre: *See—*
  - Bourbon, Pierre; Lagny, Pierre; and Billot, Pierre, 5,026,561, Cl. 424-673.000.
- Lagushenko, Radomir *See—*
  - Bouchard, Andre C.; Lagushenko, Radomir; and Maya, Jakob, 5,027,030, Cl. 313-619.000.
- Lai, Stephen W., to Motorola, Inc. Gate array macro cell. 5,027,319, Cl. 365-156.000.
- Laibowitz, Robert B.: *See—*
  - Clark, Gregory J.; Gambino, Richard J., Koch, Roger H.; Laibowitz, Robert B.; Marwick, Allan D.; and Umbach, Corwin P., 5,026,682, Cl 505-1.000.
- Laico, Joseph P.; and Molino, Joseph L., to Lincoln Mills, Inc. Surgical holding apparatus for distracting ankle. 5,025,802, Cl. 128-882.000.
- Lakic, Nikola. Inflatable sole lining for shoes and boots. 5,025,575, Cl 36-44.000
- Lalevee, Russell R., Sr. Dip stick guide, combination dip stick and dip stick holder. 5,025,569, Cl. 33-726.000.
- LaLonde, Gerard V.: *See—*
  - Butkovich, Michael S.; LaLonde, Gerard V ; and Ginsburgh, Irwin, 5,025,946, Cl. 220-86.300.
- Lam, Patrick W.: *See—*
  - Ho, Kam W.; and Lam, Patrick W., 5,026,794, Cl. 525-532.000.
- Lam, William Y.; and Wooton, David L., to Ethyl Petroleum Additives, Inc. Reduced ash content lubricants. 5,026,493, Cl. 252-32.7HC.
- LaMattina, John L.; McCarthy, Peter A.; and Reiter, Lawrence A., to Pfizer Inc. 2-guanidino-4-arylthiazoles for treatment of peptic ulcers. 5,026,715, Cl. 514-326.000.
- Lamb, Patrick J., to Sparta Surgical Corp. Method of applying a medical dressing device. 5,025,783, Cl. 128-156.000.
- Lambert, Edward L., Jr.; Matson, Charles B.; and Vaillette, Bernard D., to Cincinnati Milacron-Heald Corp. Method and apparatus for controlling grinding processes. 5,025,594, Cl. 51-165.930.
- Lambert, James M.: *See—*
  - Webb, Jimmy L.; Ritschard, Hans V.; and Lambert, James M., 5,026,890, Cl. 556-408.000.
- Lamberty, Bernard J.: *See—*
  - Fitzsimmons, George W.; and Lamberty, Bernard J., 5,027,124, Cl. 342-362.000.
- Lamoureaux, David. Rack for storing and displaying bottles. 5,025,936, Cl. 211-74.000.
- Landis, Donald G.: *See—*
  - Bell, Bruce A.; and Landis, Donald G., 5,026,967, Cl. 219-121.640.
- Laney, Maureen: *See—*
  - Tarnowski, Thomas L.; Hu, Mae W.; Laney, Maureen; Pease, John S.; and Ghazarossian, Vartan, 5,026,905, Cl. 562-43.000.
- Lang, Frank J.: *See—*
  - Bunn, Arthur H.; and Lang, Frank J., 5,025,939, Cl. 215-100.00A.
- Langdon, Roger M., to General Electric Company, p.l.c. Optical interference position measurement system. 5,026,162, Cl. 356-354.000.
- Langfeld, Horst; Puebla, Claudio; and Sereinig, Gunter, to Ciba-Geigy Corporation. Process for the preparation of azo dyes by carrying out coupling in the presence of an alkali metal chloride and ammonium chloride. 5,026,830, Cl. 534-582.000.
- Langley, Donald J. Fishing rod holder and signal assembly. 5,025,583, Cl. 43-17.000.
- Lanier, Ann M. Disposable fingernail polish removing device. 5,026,541, Cl. 424-61.000.
- Laporta, Maria O.: *See—*
  - Munoz, Jose R.; and Laporta, Maria O., 5,025,525, Cl. 15-167.100.
- Larik, Joost; and Forder, Walter, to Siemens Aktiengesellschaft. Circuit configuration for protecting an electronic circuit against overload. 5,027,181, Cl. 357-41.000.
- Larkin, Harold F.: *See—*
  - McKay, Geoffrey H ; Larkin, Harold F.; Doughty, Dennis J.; and Guerrette, Michael C., 5,027,095, Cl. 335-202.000.
- Larkin, John P.; Wyatt, John A ; and Hawkes, Deborah J., to Wellcome Foundation Limited. Pesticidal compounds. 5,026,874, Cl. 549-15.000.
- Larkins, Thomas H., Jr : *See—*
  - Agreda, Victor H.; and Larkins, Thomas H., Jr., 5,026,931, Cl. 570-204.000.
- Larsen, Gregory J. Reciprocating piston engine with a varying compression ratio. 5,025,757, Cl. 123-48.00R.
- Larson, Donald G.: *See—*
  - Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,027,366, Cl. 372-57.000.
- LaRue, George S.; and Williams, Timothy J., to Boeing Company, The. FFL/QFL FET logic circuits. 5,027,007, Cl. 307-443.000.
- Lasher, William W., III. Replaceable shoe heel assembly. 5,025,574, Cl. 36-42.000.
- Lasure, Randal D.; Schweizer, Werner; and Venetjoki, Ari, to Curt G. Joa, Inc. Rotary pad turner. 5,025,910, Cl. 198-377.000.
- Latina, Mark A.: *See—*
  - Dobrogowski, Michael J.; and Latina, Mark A., 5,025,811, Cl. 128-898.000.
- Latouche, Yannick: *See—*
  - Gueble, Jean-Michel; Theron, Jean-Bernard; Latouche, Yannick; Ducrocq, Jean-Bernard; and Perez, Bernard, 5,027,090, Cl. 333-202.000.
- Latz, Rudolf; and Scherer, Michael, to Leybold Aktiengesellschaft. Device for coating a substrate. 5,026,471, Cl. 204-298.190.
- Lauffer, John M.; and Schumacher, Richard A., to International Business Machines Corporation. Printed circuit boards and cards having buried thin film capacitors and processing techniques for fabricating said boards and cards. 5,027,253, Cl. 361-321.000.
- Laukart, Jakob: *See—*
  - Behre, Hans-Ulf; and Laukart, Jakob, 5,025,872, Cl. 175-246.000.
- Laurel Bank Machines Co., Ltd.: *See—*
  - Hara, Kazuhiro; and Fujii, Kiyosi, 5,027,415, Cl. 382-7.000.
- Lavin, Janice A.; and Lavin, Terence J. Tablet or pill pulverizer. 5,025,996, Cl. 241-168.000.
- Lavin, Terence J.: *See—*
  - Lavin, Janice A.; and Lavin, Terence J., 5,025,996, Cl. 241-168.000.
- Lawrence, Paul B.: *See—*
  - Rule, Mark; Fauver, Jerry S.; Fagerburg, David R.; Lawrence, Paul B.; and Watkins, Joseph J., 5,026,824, Cl. 528-389.000.
- Lawson, John W.: *See—*
  - Kendall, Roger V.; and Lawson, John W., 5,026,728, Cl. 514-561.000.
- Lawson, Kevin R., to Imperial Chemical Industries PLC. Pyrimidine derivatives. 5,026,418, Cl. 71-92.000.
- Layman, John C.; and Pugh, Cecil C., to General Motors Corporation. Master cylinder reservoir diaphragm venting arrangement. 5,025,628, Cl. 60-585.000.
- Layton, Allen C.: *See—*
  - Bayston, Thomas E.; Weidler, Roy C., Jr.; Thompson, Arthur B., Jr.; and Layton, Allen C., 5,026,156 Cl. 356-45.000.
- Leader, Haim: *See—*
  - Chiang, Peter K.; Leader, Haim; Smejkal, Ruthann M.; Gordon, Richard K.; Payne, Charlotte S.; Doctor, Bhupendra P.; and Padilla, Felipe N., 5,026,897, Cl. 560-58.000.
- Leahy, Charles E., to General Motors Corporation. Sliding and pivoting sun visor. 5,026,108, Cl. 296-97.110.
- Leask, Harald J. Method of playing a battle strategy game. 5,026,069, Cl. 273-255.000.
- Lebeque, Serge: *See—*
  - Saint-Remy, Jean-Marie; Lebrun, Philippe; Lebeque, Serge; and Masson, Pierre L., 5,026,545, Cl. 424-85.800.
- Lebert, Helmut; and Whippey, Nigel R., to Heraeus Quarzglas GmbH. Process for manufacturing quartz glass pipes having a high content of silica with only minor diameter deviations. 5,026,413, Cl. 65-29.000.
- Leblanc, Jean-Claude; Ratton, Serge; Besson, Bernard; and Desmurs, Jean-Roger, to Rhone-Poulenc Chimie. Chlorination of ortho-chlorophenol. 5,026,926, Cl. 568-779.000.
- Lebrun, Philippe: *See—*
  - Saint-Remy, Jean-Marie; Lebrun, Philippe; Lebeque, Serge; and Masson, Pierre L., 5,026,545, Cl. 424-85.800.
- Leckrone, Michael E., to Cardiovascular Laser Systems, Inc. Angioplasty catheter and method of use thereof. 5,026,366, Cl. 606-7.000.
- Leckrone, Michael E.; Kagan, Jonathan; Knight, Darryl A.; and Gunseor, Larry A., to Cardiovascular Laser Systems, Inc. Laser angioplasty catheter and a method for use thereof. 5,026,367, Cl. 606-7.000.
- Leconte, Philippe: *See—*
  - Coste, Philippe; Leconte, Philippe; Perron, Robert, and Baudoin, Michel, 5,026,900, Cl. 560-204.000.
- Ledesma, Victor L.: *See—*
  - Kletecka, George; and Ledesma, Victor L., 5,026,849, Cl. 544-198.000.
- Lee, Ernest S.: *See—*
  - Boulton, Peter I. P.; and Lee, Ernest S., 5,027,342, Cl. 370-16.000.
- Lee, Jin P.; Salcedo, F Brad; Robins, Martin F.; Roberts, Jeffrey; and Loor, Rueyming, to Leeco Diagnostic, Inc. Scavenger antibody mixture and its use for immunometric assay. 5,026,653, Cl. 436-518.000.
- Lee, John N.; and Verber, Carl M., to United States of America, Navy. Compact optical RF spectrum analyzer. 5,027,055, Cl. 324-77.00K.
- Lee, Kuo-Shu. Battery terminal clamp. 5,026,307, Cl. 439-755.000.
- Lee, Norman C., to Zarn, Inc. Apparatus for blow molding an article with compression molded areas. 5,026,268, Cl. 425-525.000.
- Lee, Ruojia; Lowrey, Tyler A.; Gonzalez, Fernando; Karniewicz, Joseph J.; and Fazan, Pierre C., to Micron Technology, Inc. Split-polysilicon CMOS DRAM process incorporating self-aligned silicidation of the cell plate, transistor gates, and N+ regions. 5,026,657, Cl. 437-47.000.
- Lee, Un K., to Hyundai Motor Company. Anti-roll system using caster control for use in vehicles. 5,026,091, Cl. 280-675.000.
- Lee, Young J., to Gold Star Electron Co., Ltd. Process for fabricating stacked trench capacitors of dynamic ram. 5,026,659, Cl. 437-52.000.
- Leeco Diagnostic, Inc.: *See—*
  - Lee, Jin P.; Salcedo, F. Brad; Robins, Martin F.; Roberts, Jeffrey; and Loor, Rueyming, 5,026,653, Cl. 436-518.000.

VOL 1127
ISS 4
JE 25
1991
UMI

- Lees, John W.: *See—*
  - Lowe, Danny D.; and Lees, John W., 5,026,051, Cl. 273-435.000.
- Lefebvre, Yvon: *See—*
  - Hayward, Marshall A.; Sabatucci, Joseph P.; Jirkovsky, Ivo L.; and Lefebvre, Yvon, 5,026,725, Cl. 514-465.000.
- Lefever, Bart: *See—*
  - Vandeweghe, Michel; Lefever, Bart; and Vandersyppe, Stefaan, 5,025,838, Cl. 139-114.000.
- Le Fur, Gerard: *See—*
  - Bianchetti, Alberto; Le Fur, Gerard; Simiand, Jacques; and Soubrie, Philippe, 5,026,716, Cl. 514-336.000.
- Leger, James R.; and Swanson, Gary J., to Massachusetts Institute of Technology. Miniature talbot cavity for lateral mode control of laser array. 5,027,359, Cl. 372-18.000.
- Lehtikoski Development OY: *See—*
  - Lehtikoski, Olavi; and Lehtikoski, Pekka, 5,026,455, Cl. 162-49.000.
- Lehtikoski, Olavi; and Lehtikoski, Pekka, to Lehtikoski Development OY Method for automatic determination of the dry pulp content, the infiltration capacity and the wire retention of a pulp suspension. 5,026,455, Cl. 162-49.000.
- Lehtikoski, Pekka: *See—*
  - Lehtikoski, Olavi; and Lehtikoski, Pekka, 5,026,455, Cl. 162-49.000.
- Leise, Walter F., Jr.: *See—*
  - Johnsen, Kenneth A.; and Leise, Walter F., Jr , 5,026,360, Cl 604-338.000.
- Le-Khac, Bi, to Arco Chemical Technology. Inc. Polymer compositions and absorbent fibers produced therefrom. 5,026,784, Cl. 525-327.600.
- Leland Stanford, Jr., University, Board of Trustees of: *See—*
  - Kozlovsky, William J.; Nabors, Charles D.; and Byer, Robert L., 5,027,361, Cl. 372-22.000.
- Leland Stanford Junior University, The Board of Trustees of the: *See—*
  - Rea, Edward C., Jr.; and Nilsson, Alan C., 5,027,367, Cl. 372-94.000.
- Le Loarer, Jean-Luc; and Tastu, Francis, to Rhone-Poulenc Chimie. Polishing compositions based on cerium and process for the preparation thereof. 5,026,421, Cl. 106-3.000
- Lengel, Theresa M.: *See—*
  - Zeitlin, Dan B.; Branthover, John B., Smith, Brian H.; Piloto, Andrew J.; Lengel, Theresa M., Carlson, Robert R., Jr.; Shum, Lanson Y.; Hodges, Paul D., Jr.; and Harris, Denise B., 5,027,255, Cl. 361-395.000.
- Lenz, Craig R., to Contact Technologies Inc Hand control. 5,025,905, Cl. 192-1.520.
- Leonard, Donald A., to GTE Government Systems Corporation. Method of remotely measuring subsurface water temperatures by stimulated raman scattering using stimulated brillouin backscattering. 5,026,999, Cl. 250-574.000.
- Leone, Marcello. Single-dose beverage cup and rectangular cross-section straw assembly. 5,025,947, Cl. 220-90.200.
- Leone, Richard J.; Cummins, Robert F.; Vitiello, Joseph; and Brochhagan, Thomas, to G.E.C. Holding Corp. Elevator car top intrusion device. 5,025,895, Cl. 187-105.000.
- Lepagnol, Jean: *See—*
  - Regnier, Gilbert, Guillonneau, Claude; Lepagnol, Jean; and Lestage, Pierre, 5,026,701, Cl. 514-235.200.
- Lesslie, David J.; Morris, Robert A., Messerli, Alan J., Scott, Graham A.; and Krajewski, Alexander A., to General Electric Company. Molded case circuit interrupter rating plug keying and interlock arrangement. 5,027,091, Cl. 335-132.000.
- Lestage, Pierre: *See—*
  - Regnier, Gilbert; Guillonneau, Claude; Lepagnol, Jean; and Lestage, Pierre, 5,026,701, Cl. 514-235.200.
- Letourneau, Andre P., to John Fluke Mfg. Co., Inc. Vacuum-actuated test fixture for testing electronic components. 5,027,063, Cl. 324-158.00F.
- Letwin, James, to Microsoft Corporation Method and operating system for executing programs in a multi-mode microprocessor. 5,027,273, Cl. 364-200.000.
- Leung, Ho-Ming: *See—*
  - Yu, Chung-Li; Pak, Edward T , and Leung, Ho-Ming, 5,027,357, Cl. 371-37.700.
- Leung, Paul; and Schwartz, Ansel M., to Leung, Paul Exercise apparatus. 5,026,050, Cl. 272-143.000.
- Levings, Randall L.; and Stoll, Ione R., to United States of America, Agriculture. Bovine monoclonal antibodies to bovine herpesvirus I from sequential fusion heterohybridomas. 5,026,646, Cl. 435-240.270.
- Levy, Mark A.: *See—*
  - Holt, Dennis A.; Levy, Mark A., and Metcalf, Brian W., 5,026,882, Cl 552-506.000.
- Lewis, Charles W., to General Motors Corporation. Orifice cup plug and seal assembly. 5,025,683, Cl 74-606.00R.
- Lewis, Elvin L. Variable tip pastry bag. 5,026,194, Cl. 401-261.000.
- Lewis, Thomas H., Jr.: *See—*
  - Tatum, Joseph F , Jr.; and Lewis, Thomas H., Jr., 5,026,508, Cl. 252-502.000.
- Leybold Aktiengesellschaft: *See—*
  - Kunkel, Georg; Klingenstein, Dieter; Mahr, Heinz, and Fliedner, Michael, 5,026,469, Cl. 204-298.150.
  - Latz, Rudolf; and Scherer, Michael, 5,026,471, Cl. 204-298.190.
- Leybold Inficon, Inc.: *See—*
  - Kendrick, Mark F.; and Gogol, Carl A , 5,025,664, Cl. 73-579.000.
- Leyshon, David W.; Sofranko, John A.; and Jones, C. Andrew, to Arco Chemical Technology, Inc. Enhanced production of ethylene from higher hydrocarbons. 5,026,935, Cl 585-315.000.
- Leyshon, David W.; Sofranko, John A., and Jones, C. Andrew, to Arco Chemical Technology, Inc. Enhanced production of propylene from higher hydrocarbons. 5,026,936, Cl. 585-315.000.
- Li, Herschel H.: *See—*
  - Grebow, Peter E.; Li, Herschel H.; and Klunk, Lewis J , Jr., 5,026,825, Cl. 530-307.000.
- Li, Shu-Tung, to Colla-Tec, Incorporated. Multi-layered, semi-permeable conduit for nerve regeneration comprised of type 1 collagen, its method of manufacture and a method of nerve regeneration using said conduit. 5,026,381, Cl. 606-152.000.
- Li, Shun P.: *See—*
  - Harwood, Richard J., Mehta, Gunvant N.; Jhawar, Ramesh C , Huang, Liang-Lii; Grim, Wayne M.; and Li, Shun P., 5,026,709, Cl. 514-263.000.
- Li, Tingye: *See—*
  - Chraplyvy, Andrew R.; Iannone, Patrick P.; Kaminow, Ivan P.; Li, Tingye; Stone, Julian; Stulz, Lawrence W.; and Tkach, Robert W., 5,027,435, Cl. 455-617.000.
- Liauh, Her-Rern, to Industrial Technology Research Institute. Polycide gate FET with salicide. 5,027,185, Cl. 357-59.000.
- Li Bassi, Giuseppe; Cadona, Luciano; and Nicora, Carlo, to Fratelli Lamberti S.p.A. Sulphurated derivatives of aromatic-aliphatic and aliphatic ketones as polymerization photoinitiators. 5,026,740, Cl. 522-14.000.
- Liebe, Joerg: *See—*
  - Roeper, Michael; Merger, Franz; Liebe, Joerg; Grenacher, Armin V.; and Hahl, Edgar, 5,026,920, Cl. 568-492.000.
- Liebe, Reinhard; and Wochnowski, Waldemar, to Korber AG Method and apparatus for making tobacco shreds. 5,025,813, Cl. 131-290.000.
- Lieberman, Ephraim; Bordoni, Maurice E.; and Thornton, Alfred K., to Cadema Medical Products, Inc. Method of treating arthritis, including rheumatoid arthritis, with 166 Holmium radionuclide. 5,026,538, Cl. 424-1.100.
- Liles, Donald T., to Dow Corning Corporation. Method of producing silicone emulsion. 5,026,768, Cl. 524-837.000.
- Liles, Donald T., to Dow Corning Corporation. Method of producing silicone emulsion. 5,026,769, Cl. 524-837.000.
- Lin, Ching T. Lockable folding joint for foldaway ladder. 5,026,198, Cl. 403-27.000.
- Lin, Jang-Keng: *See—*
  - Jeng, Bor-Shenn; Change, Gan-How; Chang, Kuange-Yao; Yan, Chih-Yen; Wu, Tieh-Min; and Lin, Jang-Keng, 5,027,304, Cl 364-518.000.
- Lin, Peili: *See—*
  - Kosteva, Glenn P., Lin, Peili; Raquin, Michel M., and Robidoux, Raymond C., 5,027,300, Cl. 364-715.080.
- Lin, Pi-Chu. Valve assembly for a piston compressor. 5,025,828, Cl. 137-512.000.
- Lin, Steven H.. *See—*
  - Kim, Jae H.; and Lin, Steven H., 5,027,182, Cl. 357-46.000.
- Lincoln Foodservice Products, Inc.: *See—*
  - Crisp, Duane L., 5,025,775, Cl. 126-21.00A
- Lincoln Mills, Inc.: *See—*
  - Laico, Joseph P., and Molino, Joseph L., 5,025,802, Cl 128-882.000.
- Lindauer Dornier Gesellschaft mbH: *See—*
  - Gielen, Markus, 5,025,837, Cl. 139-35.000.
- Linde Aktiengesellschaft: *See—*
  - Bauer, Heinz, 5,026,952, Cl. 585-800.000.
- Lindner, Christian; and Piejko, Karl-Erwin, to Bayer Aktiengesellschaft. Crosslinked triazine polymers and their use as crosslinking agents. 5,026,803, Cl. 526-261.000.
- Lindstaedt, Bernd: *See—*
  - Firatli, Ahmet; Burger, Diethard; Amsel, Klaus; and Lindstaedt, Bernd, 5,025,578, Cl 38-93.000.
- Linovitz, Raymond J.; and Kesten, Randy J., to Origin Medsystems, Inc. Surgical cutting instrument. 5,026,375, Cl. 606-79.000.
- Linsenbigler, James G Safety top sprayer. 5,025,956, Cl. 222-153.000.
- Linwood, Gary; and Duncan, Wayne, to United Manufacturing Co., Inc. Apparatus and method for position reporting. 5,027,314, Cl. 364-900.000.
- Liposome Company, Inc., The: *See—*
  - Estis, Leonard; and Livingston, Phillip, 5,026,557, Cl. 424-450.000.
- Lippard, Stephen J : *See—*
  - Bianconi, Patricia A.; Lippard, Stephen J.; Rao, Chebrolu P ; and Vrtis, Raymond N., 5,026,884, Cl. 556-12.000.
- Lisiecki, Robert E., to Elopak Systems, A.G Multi-piece flat top container. 5,025,982, Cl. 229-125.350.
- Lisowski, Walter E., to Helm Products, Inc. Retainer clip. 5,026,016, Cl. 248-314.000.
- Litt, Michael; and Bufton, Linda L., to State of Oregon acting by and through the State Board of Higher Education on behalf of Oregon Health Sciences University, The. DNA probe which reveals a hypervariable region on human chromosome 16. 5,026,837, Cl. 536-27.000.
- Littlewood, Timothy J.; Robertson, David J.; Maginley, Ronald J Chapman, Alan S. J.; Thomas, Terence N.; and Nizamuddin, Nadir, to Northern Telecom Limited. Digital key telephone system. 5,027,345, Cl. 370-58.200.
- Littrell, Chester G Coil winding form apparatus. 5,025,999, Cl. 242-110.300.
- Liu, Kou-Chang, to GAF Chemicals Corporation. Vinyl ether siloxanes. 5,026,810, Cl. 528-14.000.
- Liu, Ping Y., to General Electric Company Warpage controlled polyesters 5,026,760, Cl 524-449.000.
- Livingston, Phillip: *See—*
  - Estis, Leonard; and Livingston, Phillip, 5,026,557, Cl 424-450.000.

- Lizell, Magnus B. Method and apparatus for absorbing mechanical shock. 5,025,899, Cl. 188-299.000.
- Lizzi, Phillip J.; and Capone, Paul A., to Checkpoint Systems, Inc. Method and apparatus for electronic article surveillance. 5,027,106, Cl. 340-572.000.
- Lo, David K.: *See—*
  - Gowan, John W., Jr.; and Lo, David K., 5,026,507, Cl. 252-301.210.
- Lockheed Corporation: *See—*
  - Capodieci, Ronald F., 5,026,188, Cl. 401-1.000.
- Lockwood, Alan R.; Kolongowski, Sidney C.; and Doolin, Dilyard, to General Motors Corporation. Engine noise reducer. 5,025,889, Cl 181-250.000.
- Lockwood, Alfred; Yurkonis, Philip G.; and Ammon, James G , to Sun Microsystems, Inc. Deskside computer housing 5,027,257, Cl. 361-428.000.
- Lockwood, Dean H.. *See—*
  - Schmidt, William G.; and Lockwood, Dean H., 5,026,562, Cl. 426-68.000.
- Lodge, Philip G.; and Smith, David J. H., to British Petroleum Company p.l.c., The. Production of hydrocarbyl formates. 5,026,904, Cl. 560-232.000.
- Logan, Dale R.; and Walrath, Craig D., to Westinghouse Electric Corp. Half angle mechanism for a heliostat. 5,027,047, Cl. 318-648.000.
- Logan, David J., to Gerber Scientific Products, Inc. Sign making web with dry adhesive layer. 5,026,584, Cl. 428-41.000.
- Logan, Robert T.; Redpath, James; McGarry, George; and Roy, Robert G., to Akzo N.V. Compounds with bronchodilator activity. 5,026,724, Cl. 514-443.000.
- Logging Development Corporation: *See—*
  - Hamilton, Douglas D., 5,026,248, Cl. 414-729.000.
- Logsdon, Peter B.; Swan, Ellen L.; Stachura, Leonard M.; and Basu, Rajat S., to Allied-Signal Inc. Azeotrope-like compositions of 1,1-dichoro-1-fluoroethane; dichlorotrifluoroethane; and alkane or cycloalkane having 5 carbon atoms. 5,026,502, Cl. 252-172.000.
- Logsdon, Peter B.: *See—*
  - Swan, Ellen L.; Logsdon, Peter B.; Stachura, Leonard M.; and Basu, Rajat S., 5,026,501, Cl 252-171.000.
- Lohr & Bromkamp GmbH: *See—*
  - Welschof, Hans-Heinrich, 5,026,325, Cl. 464-146.000.
- Lohrbaecher, Volker; and Pellkofer, Erich, to BASF Aktiengesellschaft. Polyamide molding materials. 5,026,763, Cl. 524-495.000.
- Long, Alden O.: *See—*
  - Hornung, Craig W.; and Long, Alden O , 5,025,549, Cl. 29-564.400.
- Longarzo, Roland, to 2C Co. Corp. Dual writing element retractable pen. 5,026,190, Cl. 401-30.000.
- Longeat, Gerard, to Babolat VS. Equipment for stringing a tennis racket. 5,026,055, Cl 273-73.00A.
- Lonza Ltd.: *See—*
  - Kunz, Reiner; Babl, Albert, Zahradnicek, Ales, and Dietrich, Rainer, 5,026,404, Cl. 51-295.000.
  - Volker, Theodor; Althaus, Hans; and Schmidt, Andreas, 5,026,815, Cl. 528-64.000.
- Loor, Rueyming: *See—*
  - Lee, Jin P.; Salcedo, F. Brad; Robins, Martin F.; Roberts, Jeffrey; and Loor, Rueyming, 5,026,653, Cl. 436-518.000.
- Lord, George H : *See—*
  - Kirk, John; and Lord, George H , 5,027,290, Cl. 364-521.000
- L'Oreal: *See—*
  - Bugaut, Andree; and Borowiak, Herve, 5,026,401, Cl. 8-408.000.
  - Gueret, Jean-Louis; Contamin, Jean-Claude; and Ayache, Liliane, 5,026,552, Cl. 424-401 000.
- Lorenz, Gisela: *See—*
  - Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela, and Ammermann, Eberhard, 5,026,720, Cl. 514-383.000.
- Lorenzoni, Loreno: *See—*
  - Messina, Giuseppe; Lorenzoni, Loreno; and Chessa, Giovanna, 5,026,866, Cl 548-238.000.
- Loriot, Jean-Marc. Method of recognizing and locating the positions of templates disposed on sheet or plate material. 5,027,416, Cl 382-8.000.
- Lotsof, Howard S., to NDA International, Inc. Rapid method for interrupting or attenuating the nicotine/tobacco dependency syndrome. 5,026,697, Cl. 514-214.000.
- Lotte Company Limited: *See—*
  - Takemori, Toshio; Ishiga, Masaru; and Ootsubo, Toshimi, 5,026,568, Cl. 426-549.000.
- Lottick, Edward A. Electrocautery instrument 5,026,370, Cl. 606-42.000.
- Lovecky, Craig: *See—*
  - Gelardi, Anthony L.; and Lovecky, Craig, 5,026,000, Cl. 242-199.000.
- Lovin, Joseph R.: *See—*
  - Havens, Marvin R.; and Lovin, Joseph R., 5,025,922, Cl. 206-328.000.
- Lowe, Danny D.; and Lees, John W., to QSound Ltd. Sound imaging apparatus for a video game system. 5,026,051, Cl. 273-435.000.
- Lowrey, Tyler A.: *See—*
  - Lee, Ruojia; Lowrey, Tyler A.; Gonzalez, Fernando; Karniewicz, Joseph J.; and Fazan, Pierre C., 5,026,657, Cl. 437-47.000.
- Lu, Phat T.: *See—*
  - Fellmann, Jere; Wentrcek, Paul; and Lu, Phat T., 5,026,940, Cl. 585-467.000.
- Lubricating Specialties Company: *See—*
  - Paciorek, Kazimiera J. L.; Shih, Joseph G.; Randolph, Bruce B.; and Snyder, Carl E., Jr., 5,026,893, Cl 556-435.000.
- Lucas, Marthe, to Societe de Conseils et d'Etudes des Emballages S.C.E.E. Device for hanging various accessories on a screw ring or endpiece of a container. 5,025,942, Cl. 215-318.000.
- Lucas, Marthe. Distributor and applicator device with a manual closing member. 5,026,193, Cl. 401-219.000.
- Lucifier Lighting Company: *See—*
  - Freed, Herbert D., 5,027,262, Cl. 362-249.000.
- Lucy, Andrew R.: *See—*
  - Brown, Stephen L.; and Lucy, Andrew R., 5,026,674, Cl. 502-154.000.
- Ludwig, Wesley N.: *See—*
  - McGinnis, Henry J.; Hickman, Fred R., and Ludwig, Wesley N., 5,025,606, Cl. 52-741.000.
- Luecke, Mark: *See—*
  - Osher, John D.; Katzman, Allison W , Luecke, Mark, and Wildman, John R., 5,026,054, Cl. 273-58 00A
- Luff, Charles E.: *See—*
  - McNulty, George R.; and Luff, Charles E., 5,025,670, Cl. 73-865.800.
- Luhm, Ralph R., to Allfast Fastening Systems, Inc Expandable head rivet. 5,026,234, Cl. 411-507.000.
- Luhrsen, Ernst: *See—*
  - Hintzen, Ullrich; Luhrsen, Ernst; and Schuler, Andreas, 5,025,961, Cl. 222-599.000.
- Lund, Maynard. Airborne liquid spraying system for crop spraying 5,025,988, Cl. 239-171.000.
- Lundberg, Robert D.: *See—*
  - Emert, Jacob; Lundberg, Robert D.; and Gutierrez, Antonio, 5,026,495, Cl. 252-51.50R.
- Lunkenheimer, Winfried; Brandes, Wilhelm; and Hassler, Gerd, to Bayer Aktiengesellschaft. (2-cyano-2-oximinoacetyl)-amino acid derivatives. 5,026,710, Cl. 514-275.000.
- Lunsford, David: *See—*
  - Katz, Howard G.; Lunsford, David; and Mudge, Paul R., 5,026,765, Cl. 524-561.000.
- Luong, Minh P.: *See—*
  - Habib, Pierre; Martin, Andre; and Luong, Minh P , 5,026,213, Cl 405-229.000.
- Lurie, Boris J.; Schier, J. Alan; and Iskenderian, Theodore C., to United States of America, National Aeronautics and Space Administration. Fluid-loop reaction system. 5,026,008, Cl. 244-164.000.
- Lust, David A.: *See—*
  - Anderson, Neal G ; Lust, David A.; Bennett, Barbara J., Feldman, Alan F.; and Polomski, Robert E., 5,026,873, Cl. 548-533.000.
- Luther, Hans-Werner: *See—*
  - Meyer, Jurgen; Sippel, Achim; Wildau, Monika; Kruse, Heinz J ; Diel, Rainer; Becker, Wilfried; Bartsch, Gisbert; Pahnke, Klaus-Dieter; Huege, Jurgen; and Luther, Hans-Werner, 5,025,731, Cl. 102-521.000.
- Luttrell, Clyde K.; and Moore, Donald T., to Teledyne Industries, Inc Aerial gunnery target. 5,026,073, Cl. 273-360.000.
- Lutz, Milton F., II, to Midbrook Products, Inc. Axial force resisting pipe coupling. 5,026,096, Cl. 285-114 000.
- Luu, Hiep T.: *See—*
  - Daneshtalab, Mohsen; Nguyen, Dai Q.; Ha, Chan M . Luu, Hiep T., Tempest, Laurence M.; and Micetich, Ronald G., 5,026,848, Cl 544-137.000.
- Lyman, George; Mathus, Gregory; and Root, David, to Costar Corporation. Apparatus for growing tissue cultures in vitro. 5,026,649, Cl. 435-284.000.
- Lynge, Rhoda: *See—*
  - Frank, Harvey A.; and Lynge, Rhoda, 5,026,119, Cl 297-383.000.
- Lyon, Christopher J. Beverage containers. 5,025,945, Cl 220-85.00H
- Lyon, James L.: *See—*
  - McLaen, Donald F.; and Lyon, James L , 5,026,629, Cl. 430-428.000.
- Lyondell Petrochemical Company: *See—*
  - Bains, Charanjit S.; and Grosboll, Martin P., 5,026,934, Cl. 585-314.000.
- Lyons, Harold W.; and Stopa, James L., to Whelen Technologies, Inc Vehicular lightbar assembly. 5,027,260, Cl 362-74 000.
- Lytton, Kenneth G.; Bolin, Odell F.; and Koehler, Robert J., to Fiber Controls Corporation. Fiber bale opener having two opening chambers. 5,025,532, Cl. 19-80.00R.
- M.E.P. Macchine Elettroniche Piegatrici S.p.A. *See—*
  - Del Fabro, Marcello; and Del Fabro, Giorgio, 5,025,651, Cl. 72-294.000.
- Mabashi, Masayoshi: *See—*
  - Oshio, Toshiyuki; Tawata, Kenji; and Mabashi, Masayoshi, 5,027,217, Cl. 358-213.190.
- Macarthur, Charles D.: *See—*
  - Noel, Bruce W.; Borella, Henry M.; Cates, Michael R.; Turley, W. Dale; Macarthur, Charles D.; and Cala, Gregory C., 5,026,170, Cl. 374-29.000.
- Mach, Helmut: *See—*
  - Denzinger, Walter; Mach, Helmut; Mohr, Juergen; Oppenlaender, Knut; Schwen, Roland; and Vogel, Hans-Henning, 5,026,494, Cl 252-50.000.
- Mack, Gerhard: *See—*
  - Muller, Klaus; Motsch, Uwe; and Mack, Gerhard, 5,026,235, Cl. 411-523.000.
- Mackal, Glenn H.; and Weinheimer, Jacek H., to Halkey-Roberts Corporation. Electric autoinflator. 5,026,310, Cl. 441-93.000.
- Mackoll, Richard J. Method of implanting an intraocular lens in a human eye and intraocular lens for same. 5,026,393, Cl. 623-6.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Maddison, Anthony N.: *See—*
  - Selwood, Patrick G.; Maddison, Anthony N.; and Sheasby, Peter G., 5,026,612, Cl. 428-594.000.
- Madore, Linda M.: *See—*
  - Snow, Steven A.; and Madore, Linda M , 5,026,489, Cl. 252-8.800.
- Maeda, Hachiro: *See—*
  - Miyazaki, Masatoshi; Sasaki, Ken; Maeda, Hachiro; Sakai, Hisami; Kamikawa, Sumio; Takai, Kiyoshi; Ogawa, Yutaka; and Tanaka, Yuichi, 5,026,319, Cl. 452-177.000.
- Maeda, Hiroshi: *See—*
  - Kobayashi, Mitsugu; Ohtani, Go; Sekino, Jun; Konno, Toshimitsu; and Maeda, Hiroshi, 5,026,772, Cl. 525-54.100.
- Maeda, Hirotoshi; and Kunimune, Kouichi, to Chisso Corporation. Photosensitive polymer having thiol group. 5,026,788, Cl. 525-420.000.
- Maekawa, Hiroko: *See—*
  - Suzuki, Hiroyoshi; Ogawa, Kenji; Maekawa, Hiroko; Kominami, Seiya; and Asayama, Yoshiaki, 5,026,153, Cl. 356-1.000.
- Maeshima, Masanobu: *See—*
  - Oda, Kenji; Eki, Makoto; Tsutsui, Eiji; and Maeshima, Masanobu, 5,027,152, Cl. 355-200.000.
- Mage, Michael; Nardelli, Bernardetta, and McHugh, Louise, to United States of America, Health and Human Services. Avidin and streptavidin modified water-soluble polymers such as polyacrylamide, and the use thereof in the construction of soluble multivalent macromolecular conjugates. 5,026,785, Cl. 525-329.400.
- Mageland, Otto M.; and Pascucci, Gregory A., to Johnson Service Company. Input condition sensing circuit. 5,027,057, Cl. 324-115.000.
- Magg, Hans: *See—*
  - Musch, Rudiger; Magg, Hans; Obrecht, Werner; and Muller, Eberhard, 5,026,779, Cl. 525-215.000.
- Maginley, Ronald J.: *See—*
  - Littlewood, Timothy J.; Robertson, David J., Maginley, Ronald J ; Chapman, Alan S. J.; Thomas, Terence N.; and Nizamuddin, Nadir, 5,027,345, Cl. 370-58.200.
- Magyari, Istvan: *See—*
  - Bakos, Jozsef; Neil, Balint; Kollar, Laszlo , Toros, Szilard; Eifert, Gvula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna; Kuronya, Istvan; Magyari, Istvan; Timar, Judit Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.
- Mahr, Heinz: *See—*
  - Kunkel, Georg; Klingenstein, Dieter; Mahr, Heinz, and Fliedner, Michael, 5,026,469, Cl. 204-298.150.
- Mai, Max: *See—*
  - Stuttler, Herbert, Wolf, Josef; Held, Wolfgang; and Mai, Max, 5,027,219, Cl. 358-228.000.
- Maienschein, Jon L.; and Barry, Patrick E., to United States of America, Energy. Low density metal hydride foams. 5,026,670, Cl. 501-80.000.
- Maier, Alfred E.: *See—*
  - White, Richard E.; and Maier, Alfred E., 5,027,096, Cl 335-202.000.
- Mainolfi, Sylvio J.; Patry, Gerald F.; and Pensiero, Henry A., to Branson Ultrasonics Corporation. Method and apparatus for producing carpeted panels. 5,026,445, Cl. 156-73.500.
- Maitlen, C. Gene; and Franks, Simon G., to Pelibe, an OK Partnership. Medical waste grinder. 5,025,994, Cl. 241-99.000.
- Makino, Tadashi; Tabata, Tetsuro; and Hirai, Shin-ichiro, to Takeda Chemical Industries, Ltd. Spherical granules having core and their production. 5,026,560, Cl. 424-494.000.
- Malkki, Heikki. Intercom system. 5,027,347, Cl 370-62.000.
- Maloney, James J.: *See—*
  - Saunders, John B.; and Maloney, James J., 5,026,408, Cl. 62-24.000.
- MAN Roland Druckmaschinen AG *See—*
  - Abendroth, Paul; and Rebel, Herbert, 5,025,723, Cl. 101-148.000.
  - Holl, Roland; Hummel, Peter; and Rebel, Herbert, 5,025,724, Cl. 101-148.000.
- Manabe, Hajime: *See—*
  - Iba, Akio; Murata, Yoshiyuki, and Manabe, Hajime, 5,025,703, Cl. 84-718.000.
- Mancel, James D.; and Raiskums, Olaf B., to Rainbow Star Licensing, S.A. Apparatus for ornament production. 5,026,453, Cl. 156-443.000.
- Mandrin, Charles, to Sulzer Brothers Limited. Method and apparatus of obtaining natural gas from a maritime deposit 5,025,860, Cl. 166-267.000.
- Manico, Joseph A.; and Birr, Donald E., to Eastman Kodak Company. Processing apparatus. 5,027,146, Cl 354-299.000.
- Manna, Biagio C.; and Spellucci, Luciano, to Centro Progettazioni Coordinate S.r.l. Modular structure for parking lots, particularly suitable for temporary parking lots. 5,025,598, Cl. 52-126.600.
- Mannesmann Rexroth GmbH: *See—*
  - Reder, Winfried, 5,027,066, Cl 324-207.160.
- Mannoh Kogyo Co., Ltd.: *See—*
  - Shinpo, Yoshiharu; and Akiyama, Motoharu, 5,025,678, Cl. 74-473.0SW.
- Manns, William G.; Weeks, Don J.; Merryman, Jerry D , and Sheng, Chyi N , to Texas Instruments Incorporated. Position compensation of laser scan for stage movement. 5,027,132, Cl. 346-108.000.
- Manoh, Yumiko; and Seto, Akira, to Nisshin Oil Mills, Ltd., The Process for preparing a lipid composition having a high γ-linolenic acid content. 5,026,644, Cl. 435-134.000.
- Manser, Josef; Egger, Friedrich; and Seiler, Werner, to Gebruder Buhler AG. Process for producing long pasta products and apparatus for performing such a process. 5,026,567, Cl. 426-458.000.
- Mansfield, P. Michael. Truck trailer with hydraulic cargo container positioning mechanism. 5,026,228, Cl 410-52.000.
- Manus, George R.: *See—*
  - Brunskill, Michael R.; Manus, George R.; and Monegan, Edgar A , 5,025,642, Cl. 62-402.000.
- Manzer, Leo E.; and Rao, V. N. Mallikarjuna, to Du Pont de Nemours, E. I., and Company. Gas-phase fluorination process. 5,026,930, Cl 570-168.000.
- Marathon Equipment Company: *See—*
  - Spiers, Kent, 5,025,721, Cl. 100-229 00A.
- Marathon Oil Company: *See—*
  - Haines, Hiemi K.; Monger, Teresa G.; Kenyon, Douglas E.; and Galvin, Lance J., 5,025,863, Cl. 166-305.100.
  - Hollowell, James A.; Wells, Hal C.; and Robinson, Robert W , 5,026,226, Cl. 405-211.000.
- Marchand, Renaud: *See—*
  - Bonnaval-Lamothe, Michel; and Marchand, Renaud, 5,027,113, Cl. 340-825.340.
- Marchetti, Augusto. Taping machine for parallelepiped cardboard boxes to be sealed along the sides. 5,025,608, Cl. 53-135.100.
- Marchionni, Giuseppe; Viola, Gian T.; Tommasi, Giulio; Ferro, Raffaele; and Cirillo, Gianna, to Ausimont S.p.A.; and Montedison S p.A. Perfluoropolyethers having brominated end groups and fluoroelastomers obtained therefrom. 5,026,786, Cl. 525-356.000.
- Maric, Radovan R., to Union Carbide Canada Limited Automatic changeover manifold. 5,025,824, Cl. 137-113.000.
- Marion, Richard, to United States of America, Navy. Selective point detonation/delay explosive train device. 5,025,728, Cl. 102-271.000.
- Marjollet, Jacques; and Perras, Boris, to Stein Industrie. Method and device for protecting against erosion and/or corrosion steam pipes from the high-pressure stage of a turbine. 5,025,630, Cl. 60-646.000.
- Mark, Michael. *See—*
  - Reiffen, Manfred; Mark, Michael; Sauter, Robert; and Grell, Wolfgang, 5,026,702, Cl. 514-235.500.
- Markle, Kenneth E. Controlled depth primer seating tool. 5,025,706, Cl 86-37.000.
- Marlboro Marketing, Inc.: *See—*
  - Merl, Milton, 5,026,129, Cl. 312-266.000.
- Marlton, Anthony P , Fielder, Dennis A.; Halsted, Victor G., and Stockill, Trevor R., to Videologic Limited. Computer based video/-graphics display system. 5,027,212, Cl. 358-183.000.
- Marman, Douglas H.; and Winters, Robert C., to Sentrol, Inc. Method and apparatus for installing infrared sensors in intrusion detection systems. 5,026,990, Cl. 250-342.000.
- Marquette Electronics, Inc.: *See—*
  - Hafner, Curtis R., 5,025,808, Cl. 128-696 000.
- Marrison, Terrence: *See—*
  - Oakes, Graham; Marrison, Terrence, and Bridge, Martin, 5,025,975, Cl. 228-127.000.
- Marsella, John A.; Pez, Guido P ; and Coughlin, Anne M , to Air Products and Chemicals, Inc. Synthesis of highly fluorinated aromatic compounds. 5,026,929, Cl. 570-146.000.
- Marshall, Alan D., to Hewlett-Packard Method and apparatus for providing a local area network bridge 5,027,350, Cl. 370-85 130.
- Martin, Andre: *See—*
  - Habib, Pierre; Martin, Andre; and Luong, Minh P., 5,026,213, Cl 405-229.000.
- Martin, Howard. Apex root canal file 5,026,284, Cl. 433-102.000
- Martin, Jacques. Competition bow with improved vibrational behavior 5,025,774, Cl. 124-89.000.
- Martin Marietta Corporation. *See—*
  - Bayston, Thomas E.; Weidler, Roy C., Jr , Thompson, Arthur B , Jr.; and Layton, Allen C , 5,026,156, Cl. 356-45.000.
- Martin, Robert C.: *See—*
  - Bass, Alan S.; Schenck, Stephen R.; and Martin, Robert C , 5,027,014, Cl. 307-475.000.
- Martin, Thomas F.: *See—*
  - Cordle, Kevin G.; Martin, Thomas F., and Austin, James E , 5,027,399, Cl. 380-7.000.
- Martinez Sanz, Jose A.; and Gough, Rex M. K., to Pitney Bowes plc Paper handling apparatus. 5,026,035, Cl. 270-45.000.
- Martino, Susan J.: *See—*
  - Corfits, William D ; Holahan, Maurice F.; Martino, Susan J Motschman, David R ; and Thorpe, James R , 5,027,254, Cl 361-384.000.
- Marty, Claude: *See—*
  - Blondeau, Rene; Marty, Claude; and Ansquer, Patrick, 5,026,474, Cl. 208-189.000.
- Marui, Masatoshi; Inage, Tomonori; Matsui, Vuji, and Ishizuka, Tazuko, to Asahi Kogaku Kogyo Kabushiki Kaisha Exposure apparatus. 5,026,145, Cl. 350-351.000.
- Maruyama, Masaru: *See—*
  - Tanaka, Masataka; Ohto, Masao; Sekine, Tetsuo; Takahashi, Hiroshi; and Maruyama, Masaru, 5,026,350, Cl. 604-158.000.
- Maruyama, Yuji: *See—*
  - Ikegaya, Kazutoshi; Maruyama, Yuji; Sannomiya, Kunjo, Tsuda, Yukifumi; and Toba, Hiroto, 5,027,418, Cl. 382-8.000.
- Marwick, Allan D.: *See—*
  - Clark, Gregory J., Gambino, Richard J , Koch, Roger H.; Laibowitz, Robert B.; Marwick, Allan D.; and Umbach, Corwin P., 5,026,682, Cl. 505-1.000.
- Masaki, Hiroya, Takagiwa, Hiroyuki, Shirose, Meizo; and Ishikawa, Michiaki, to Konica Corporation. Method for forming electrophotographic images. 5,026,620, Cl. 430-99.000.
- Masaki, Takeshi: *See—*
  - Sato, Kimikatsu; Toyoda, Ryuichi; and Masaki, Takeshi, 5,027,115, Cl 341-13.000.

- Maschinenfabrik J. Dieffenbacher GmbH & Co. *See—*
  - Bielfeldt, Friedrich B., 5,025,652, Cl. 72-444.000.
- Masco Industries, Inc.: *See—*
  - DeLand, Daniel L.; and Semke, Douglas L., 5,025,591, Cl. 49-360.000.
- Mase, Akira, to Semiconductor Energy Laboratory Co., Ltd. Method of producing electric circuit patterns. 5,025,555, Cl. 29-840.000.
- Masiero, Leonildo: *See—*
  - Biasiotto, Vittorio; and Masiero, Leonildo, 5,025,576, Cl. 36-134.000.
- Masina, Franca: *See—*
  - Cantatore, Giuseppe; Borzatta, Valerio; and Masina, Franca, 5,026,749, Cl. 524-99.000.
- Masrur, Md. A.; Miller, John M.; and Patil, Prabhakar B., to Ford Motor Company. Field oriented motor controller for electrically powered active suspension for a vehicle. 5,027,048, Cl. 318-806.000.
- Massachusetts Institute of Technology: *See—*
  - Bianconi, Patricia A.; Lippard, Stephen J.; Rao, Chebrolu P.; and Vrtis, Raymond N., 5,026,884, Cl. 556-12.000.
  - Dietmar, Seyferth; and Rees, William S., Jr., 5,026,809, Cl. 528-4.000.
  - Leger, James R.; and Swanson, Gary J., 5,027,359, Cl. 372-18.000.
- Massarani, Madhat, to Westinghouse Electric Corp. Radial seal. 5,026,075, Cl. 277-56.000.
- Massiani, Pascale: *See—*
  - Fellmann, Jere D.; Saxton, Robert J.; Wentreek, Paul R.; Derouane, Eric G.; and Massiani, Pascale, 5,026,942, Cl. 585-467.000.
- Massmann, Brent D.: *See—*
  - Eichel, Herman J.; and Massmann, Brent D., 5,026,559, Cl. 424-458.000.
- Masson, Pierre L.: *See—*
  - Saint-Remy, Jean-Marie; Lebrun, Philippe; Lebeque, Serge; and Masson, Pierre L., 5,026,545, Cl. 424-85.800.
- Masuda, Ichiro, to Nippon Thompson Co., Ltd. Lubricatable rotary bearing assembly. 5,026,177, Cl. 384-447.000.
- Masuda, Katsutaro: *See—*
  - Arabori, Noboru; Takahashi, Hideaki; Sakai, Yoshio; Nakazato, Masao; Tanaka, Masakatsu; Takahashi, Tatsuhiko; Masuda, Katsutaro; Itoh, Masanobu, and Toda, Yuji, 5,025,896, Cl. 187-115.000.
- Masuda, Zitsuo, to Sharp Kabushiki Kaisha. Copying machine with multiple transport functions inclusive of duplex and composite copying from an intermediate feed tray by selectives top or bottom feed 5,026,037, Cl. 271-3.100.
- Masugi, Takashi: *See—*
  - Takaya, Takao; Takasugi, Hisashi; Masugi, Takashi; Yamanaka, Hideaki; and Kawabata, Kohji, 5,026,695, Cl. 514-202.000.
- Masunaga, Mikio: *See—*
  - Ueda, Hiroshi; Yoshigai, Hisaaki; and Masunaga, Mikio, 5,025,844, Cl. 152-454.000.
- Matheny, Mark T.: *See—*
  - Poirier, David C.; Matheny, Mark T., Mitchell, George C.; Swantick, Steven J.; Wroblewski, Gerald J.; Menck, Douglas W.; and Simon, Robert C., Jr., 5,025,881, Cl. 180-197.000.
- Mathew, Jacob, to Petrolite Corporation. Synthesis of 2,3,5-trisubstituted-2-cyclopentenones via base induced cyclization of alpha-chloro unsaturated ketones. 5,026,918, Cl. 568-348.000.
- Mathias, Lon J.; and Cei, Gustavo, to University of Southern Mississippi, The. Polymers derived from 2,6-substituted-4-amino-pyridines. 5,026,802, Cl. 526-259.000.
- Mathivat, Denis; Colmon, Daniel; and Philibert, Daniel, to Saint-Gobain Vitrage. High-capacity process for bending glass plates into convex shape. 5,026,414, Cl. 65-106.000.
- Mathus, Gregory: *See—*
  - Lyman, George; Mathus, Gregory; and Root, David, 5,026,649, Cl. 435-284.000.
- Matloubian, Mishel; Chen, Cheng-Eng D.; and Blake, Terence G., to Texas Instruments Incorporated. MOS transistor with improved radiation hardness. 5,026,656, Cl. 437-41.000.
- Matouka, Michael F.; and Hammersmith, Robert J., to General Motors Corporation. Pressure actuator. 5,026,125, Cl. 303-100.000.
- Matson, Charles B.: *See—*
  - Lambert, Edward L., Jr.; Matson, Charles B.; and Vaillette, Bernard D., 5,025,594, Cl. 51-165.930.
- Matsuda, Akira: *See—*
  - Ueda, Tohru; Sasaki, Takuma; Matsuda, Akira; Miyashita, Takanori; Sakata, Shinji; Yamagami, Keiji; and Fuji, Akihiro, 5,026,835, Cl. 536-23.000.
- Matsuda, Hiroto: *See—*
  - Hanzawa, Shigeru; Matsuda, Hiroto; and Fusimi, Kouzi, 5,026,671, Cl. 501-96.000.
- Matsui, Hideki; and Hagiuda, Nobuyoshi, to Nikon Corporation. Electronic flash apparatus. 5,027,039, Cl. 315-241.00P.
- Matsui, Koichi: *See—*
  - Yamagishi, Katsuaki; Matsui, Koichi; Tanaka, Toshimasa; Matsui, Nobuo; Suma, Sei; and Mino, Yoshihito, 5,025,638, Cl. 62-180.000.
- Matsui, Masataka: *See—*
  - Urakawa, Yukihiro; and Matsui, Masataka, 5,027,009, Cl. 307-446.000.
- Matsui, Nobuo: *See—*
  - Yamagishi, Katsuaki; Matsui, Koichi; Tanaka, Toshimasa; Matsui, Nobuo; Suma, Sei; and Mino, Yoshihito, 5,025,638, Cl. 62-180.000.
- Matsui, Vuji: *See—*
  - Marui, Masatoshi; Inage, Tomonori; Matsui, Vuji; and Ishizuka, Tazuko, 5,026,145, Cl. 350-351.000.
- Matsui, Yuji: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji, Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000.
- Matsui, Yutaka: *See—*
  - Misumi, Fumihiko; Ueda, Masazumi; Hara, Masato; Matsui, Yutaka; and Imai, Kiyoshi, 5,026,978, Cl. 250-205.000.
- Matsumoto, Akira: *See—*
  - Ooishi, Takashi; and Matsumoto, Akira, 5,026,412, Cl. 65-18.100.
- Matsumoto, Haruo: *See—*
  - Nishi, Masami; Kishimoto, Kiyoshi; and Matsumoto, Haruo, 5,026,227, Cl. 407-119.000.
- Matsumoto, Mitsunori; and Kato, Hironori, to Alps Electric Co., Ltd. Clock spring interconnector for steering. 5,026,289, Cl. 439-15.000.
- Matsumoto, Naoaki, to Casio Computer Co., Ltd. Sound source apparatus. 5,025,701, Cl. 84-615.000.
- Matsumoto, Sadao: *See—*
  - Higuchi, Toshiharu; Matsumoto, Sadao; Yakabe, Toru; and Kimura, Sakae, 5,027,029, Cl. 313-446.000.
- Matsumoto, Yasunobu: *See—*
  - Yorozu, Hidenori; Eguchi, Yasuteru; Ohkawa, Wataru; and Matsumoto, Yasunobu, 5,026,551, Cl. 424-44.000.
- Matsumura, Yasuo: *See—*
  - Shimizu, Isoo; Matsumura, Yasuo; and Inomata, Yoshihisa, 5,026,939, Cl. 585-439.000.
- Matsunaga, Motomu: *See—*
  - Ito, Koichi; Matsunaga, Motomu; Kurokawa, Satoru; and Ueno, Koji, 5,026,959, Cl. 219-10.55A.
- Matsuno, Yasuhiro; Terakado, Hajime; Mochizuki, Masaru; Moroshima, Heiji; and Kamei, Hiroyuki, to Hitachi, Ltd.; and Hitachi Tokyo Electronics Co., Ltd. Frequency sensor. 5,027,107, Cl. 340-572.000.
- Matsuoka, Noriyuki; and Kubo, Masaaki, to Yamaichi Electric Manufacturing Co., Ltd. Slotless type IC carrier. 5,026,303, Cl. 439-526.000.
- Matsuoka, Takeji, to MEC Machinery Co., Ltd. Coiled spring making apparatus. 5,025,648, Cl. 72-134.000.
- Matsuoka, Yasuo, to Kabushiki Kaisha Toshiba. Automatic developing apparatus. 5,026,467, Cl. 204-194.000.
- Matsushima, Yuzo; Ito, Yoshiyuki; and Yamamori, Satofumi, to Honda Giken Kogyo Kabushiki Kaisha; and Takeda Chemical Industries, Ltd. Methods of producing rigid polyurethane foams for interior or exterior use for automobiles. 5,026,739, Cl. 521-177.000.
- Matsushita Electric Industrial Co., Ltd.: *See—*
  - Arai, Kazuo; and Okada, Shinji, 5,026,509, Cl. 360-77.150.
  - Fuse, Genshu; Yamada, Toshio; Odanaka, Shinji; and Fukumoto, Masaki, 5,026,658, Cl. 437-52.000.
  - Ikegaya, Kazutoshi; Maruyama, Yuji; Sannomiya, Kunjo; Tsuda, Yukifumi; and Toba, Hiroto, 5,027,418, Cl. 382-8.000.
  - Katsura, Joji, 5,027,325, Cl. 365-205.000.
  - Miyazaki, Jinsei; Taketani, Makoto; and Mitsumata, Tadayasu, 5,026,827, Cl. 530-405.000.
  - Nagata, Yuji; Fukazawa, Toshio; Wada, Kumiko; and Tosaki, Yoshihiro, 5,027,245, Cl. 360-121.000.
  - Ono, Kenji; and Iribe, Hajime, 5,027,394, Cl. 379-434.000.
  - Saneshige, Ryoji; Kuyama, Kouzi; Hasegawa, Makoto; and Furuya, Miyuki, 5,027,025, Cl. 310-156.000.
  - Sato, Kimikatsu; Toyoda, Ryuichi; and Masaki, Takeshi, 5,027,115, Cl. 341-13.000.
  - Shinbo, Masatoshi; Fujie, Hideki; Iwakuni, Kaoru; Muto, Akira; and Aoki, Kazuhiro, 5,027,222, Cl. 358-330.000.
  - Tanaka, Takakazu; and Hirai, Yuji, 5,027,431, Cl. 455-214.000.
- Matsuura, Hideaki: *See—*
  - Shiga, Akinobu; Fukui, Yoshiharu; Sasaki, Toshio; Okawa, Masahisa; and Matsuura, Hideaki, 5,026,889, Cl. 526-142.000.
- Matsuura, Kazuo: *See—*
  - Sano, Akira; Kamiishi, Hirofumi; Kobayashi, Seizo; Matsuura, Kazuo; and Yokoyama, Shigeki, 5,026,511, Cl. 264-28.000.
- Mattes, Donald A.: *See—*
  - Zlobinsky, Yury; and Mattes, Donald A., 5,025,571, Cl. 34-72.000.
- Matthes, Reinhard; Schork, Reinhold; and Vahlensieck, Hans-Joachim, to Huls Troisdorf AG. Method and apparatus for the preparation of dichlorosilane. 5,026,533, Cl. 423-342.000.
- Matusmoto, Yasushi: *See—*
  - Sekii, Yasuaki; and Matusmoto, Yasushi, 5,027,232, Cl. 360-74.100.
- Matyas, Tibor; and Vanderlinden, Richard J., to Trinity Industries, Inc. Collapsible hitch. 5,026,229, Cl. 410-60.000.
- Matysiak, Lucien. Post-operative fitting device for a lateral colostomy. 5,026,361, Cl. 604-338.000.
- Maxim Integrated Products: *See—*
  - Dolucа, Tune, 5,027,165, Cl. 357-13.000.
- Maxwell, Peter C., to Celgene Corporation. Microbial culture having catechol 1,2-oxygenase activity. 5,026,648, Cl. 435-253.300.
- May, Randall L. Musical drum reinforcement. 5,025,697, Cl. 84-411.00R.
- May, Steven J.; Andrews, David J.; and VanKampen, Craig L., to Minnesota Mining and Manufacturing Company, The. Abrasion resistant prosthetic device. 5,026,398, Cl. 623-13.000.
- Maya, Jakob: *See—*
  - Bouchard, Andre C.; Lagushenko, Radomir; and Maya, Jakob, 5,027,030, Cl. 313-619.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Mayer, Norbert: *See—*
  - Mihm, Gerhard; Eberlein, Wolfgang; Engel, Welfhard; Trummlitz, Gunter; Mayer, Norbert; Dodds, Henri; and Hammer, Rudolf, 5,026,699, Cl. 514-220.000.
- Mayer, Theo, to Boehringer Werkzeugmaschinen GmbH Method and apparatus for machining axially symmetrical parts. 5,025,689, Cl. 82-106.000.
- Mayrhofer, Karl, to Voest-Alpine Industrieanlagenbau. Continuous casting mold arrangement for casting billets and blooms. 5,025,852, Cl. 164-468.000.
- Mazda Motor Corporation: *See—*
  - Hisashige, Nobuyasu; Yokogawa, Fukuichi, and Shinhama, Makoto, 5,025,890, Cl. 181-272.000.
  - Kawaguchi, Keishi; Hamasaki, Tatsumi; Tadera, Yoshihiro; and Yamazaki, Sachio, 5,025,593, Cl. 51-165.770.
  - Nishikaji, Satoshi, 5,026,093, Cl. 280-807.000.
  - Sakamoto, Shunji; Watanabe, Tuyoshi; and Koda, Hironobu, 5,027,275, Cl. 364-424.050.
- Mazooji, Mohammad: *See—*
  - Basehgi, Behshad; and Mazooji, Mohammad, 5,027,126, Cl. 342-372.000.
- Mazurek, Harry, to Atlantic Richfield Company. Methane conversion process. 5,026,947, Cl. 585-500.000.
- McAskill, John P., to Deere & Company Sixteen speed powershift transmission. 5,025,674, Cl. 74-360.000.
- McAuliffe, Lawrence, Jr.: *See—*
  - McCabe, Ralph P.; and McAuliffe, Lawrence, Jr., 5,025,682, Cl. 74-606.00R.
- McBride, William J.; Baldwin, Ronald M.; Kerr, Janice M.; Schultze, Lisa M.; and Salazar, Nilda, to Medi-Physics, Inc. Hydrocarbylphenyl diaminodithiol derivatives. 5,026,913, Cl. 564-440.000.
- McCabe, Ralph P.; and McAuliffe, Lawrence, Jr., to Coltec Industries Inc. Transmission solenoid retaining clip. 5,025,682, Cl. 74-606.00R.
- McCain Manufacturing Corporation: *See—*
  - Weller, Ronald W.; and Wrona, James, 5,026,038, Cl. 271-3.100.
- McCarthy, Peter A.: *See—*
  - LaMattina, John L.; McCarthy, Peter A.; and Reiter, Lawrence A., 5,026,715, Cl. 514-326.000.
- McCartney, Andrew; DeWitt, Charles; and Elliott, William, to Oneac Corporation. Power line waveform measurement system. 5,027,285, Cl. 364-483.000.
- McCarty, Lon H., to Econo Max Manufacturing. Gravity swing door hinge. 5,025,531, Cl. 16-313.000.
- McCormack, William H., to Allied-Signal Inc. Combination air data probe. 5,025,661, Cl. 73-180.000.
- McCullough, Timothy J., to Food Industry Equipment International, Inc. Pneumatic control system for meat trimming knife. 5,025,559, Cl. 30-276.000.
- McDaniel, Max P.; Pitzer, Emory W.; and Farha, Floyd E., Jr., to Phillips Petroleum Company. Peptized and phosphated inorganic oxides, catalysts, and polymerization processes. 5,026,796, Cl. 526-100.000.
- McDermott, Wayne T.: *See—*
  - Ockovic, Richard C.; McDermott, Wayne T.; and Schwarz, Alexander, 5,026,155, Cl. 356-37.000.
- McDonald, Daniel P.: *See—*
  - Van Erden, Donald L.; and McDonald, Daniel P., 5,026,563, Cl. 426-122.000.
- McDonnell-Douglas Corporation: *See—*
  - Russom, Jeff D., 5,026,140, Cl. 350-96.290.
- McEver, Rodger P.: *See—*
  - Daddona, Peter E.; Berger, Harvey J.; and McEver, Rodger P., 5,026,537, Cl. 424-1.100.
- McFarland, M. Lee: *See—*
  - Johnson, Michael W.; and McFarland, M. Lee, 5,027,249, Cl. 360-132.000.
- McGarry, George: *See—*
  - Logan, Robert T.; Redpath, James; McGarry, George; and Roy, Robert G., 5,026,724, Cl. 514-443.000.
- McGinnis, Henry J.; Hickman, Fred R.; and Ludwig, Wesley N., to Rapid Deployment Towers, Inc. Guy control system for extensible mast. 5,025,606, Cl. 52-741.000.
- McGrail, Grace: *See—*
  - McGrail, Peter; McGrail, Grace; Williams, Geoffrey A.; and Ward, Brian J., 5,027,035, Cl. 315-119.000.
- McGrail, Peter; McGrail, Grace; Williams, Geoffrey A.; and Ward, Brian J., to Topline Leisure Limited. Search lamps and torches. 5,027,035, Cl. 315-119.000.
- McGrath, Charles M.: *See—*
  - Soule, Herbert; and McGrath, Charles M., 5,026,637, Cl. 435-29.000.
- McHugh, Louise: *See—*
  - Mage, Michael; Nardelli, Bernardetta; and McHugh, Louise, 5,026,785, Cl. 525-329.400.
- McIntyre, Jack L. Passenger and wheelchair securement system for vehicles. 5,026,225, Cl. 410-23.000.
- McKay, Geoffrey H.; Larkin, Harold F.; Doughty, Dennis J.; and Guerrette, Michael C., to General Electric Company. Molded case circuit breaker cover insert. 5,027,095, Cl. 335-202.000.
- McKenney, John D.: *See—*
  - Kulp, Jack H.; McKenney, John D.; and Sullivan, James P., 5,026,204, Cl. 404-10.000.
- McKnight, Robert N.: *See—*
  - Waltuck, Morey H.; McKnight, Robert N.; and Peli, Eliezer, 5,026,151, Cl. 351-246.000.
- McLachlan, Corran N. S.; Catchpole, Owen J.; and Nicol, Ross S., to McLachlan, Corran Norman Stuart. Removal of lipid components from foodstuffs and products thereof. 5,026,565, Cl. 426-241.000.
- McLachlan, Corran Norman Stuart: *See—*
  - McLachlan, Corran N. S.; Catchpole, Owen J.; and Nicol, Ross S., 5,026,565, Cl. 426-241.000.
- McLaen, Donald F.; and Lyon, James L., to Eastman Kodak Company. Fixing bath for black and white photographic elements. 5,026,629, Cl. 430-428.000.
- McLeod, Roderick D. Wellhead tubing and casing packer and installation and removal tool. 5,025,857, Cl. 166-77.000.
- McMurtry, David R.; and Chaney, Raymond J., to Renishaw plc. Straightness interferometer system. 5,026,163, Cl. 356-363.000.
- McNally, Robert F.; and Hoeflich, John B., to Tommy Armour Golf Company. Weight-balanced golf club set. 5,026,056, Cl. 273-77.00A.
- McNulty, George R.; and Luff, Charles E. Means for introducing inspection equipment in active pipelines. 5,025,670, Cl. 73-865.800.
- McQueen, David M.; and Peskin, Charles S. Curved butterfly bileaflet prosthetic cardiac valve. 5,026,391, Cl. 623-2.000.
- McWilliams, Robert E.; and Karg, Robert L. Illuminated spirit level using fiber optic devices. 5,025,567, Cl. 33-348.200.
- MDT Corporation: *See—*
  - Powell, Anthony D.; and Miller, Raymond J., 5,026,524, Cl. 422-26.000.
- Meakin, Douglas B.: *See—*
  - Economu, Nikolaos A.; and Meakin, Douglas B., 5,026,574, Cl. 427-248.100.
- MEC Machinery Co., Ltd.: *See—*
  - Matsuoka, Takeji, 5,025,648, Cl. 72-134.000.
- Mechtrix Corporation: *See—*
  - Butler, John D., 5,025,687, Cl. 81-9.510.
- Meder, Martin G., to General Electric Company. Polysilsequioxane and polymethyl-N-hexylsilsesquioxane coating compositions. 5,026,813, Cl. 528-18.000.
- Medi-Physics, Inc.: *See—*
  - McBride, William J.; Baldwin, Ronald M.; Kerr, Janice M., Schultze, Lisa M.; and Salazar, Nilda, 5,026,913, Cl. 564-440.000.
- Medical Systems Development Corporation: *See—*
  - Schindele, Gary M., 5,025,798, Cl. 128-771.000.
- Meek, James L.: *See—*
  - Hobbs, Frank W.; and Meek, James L., 5,026,898, Cl. 560-106.000.
- Mehta, Gunvant N.: *See—*
  - Harwood, Richard J.; Mehta, Gunvant N.; Jhawar, Ramesh C., Huang, Liang-Lii; Grim, Wayne M.; and Li, Shun P., 5,026,709, Cl. 514-263.000.
- Meijer, Nils E., to Scafix AB. Device for the positional orientation of the chest strap of a three-point seat belt. 5,025,534, Cl. 24-172.000.
- Meiji Seika Kaisha, Ltd.: *See—*
  - Imamura, Kei-ichi; Gomi, Shuichi; Iwata, Michiaki; Miyadoh, Shinji; Shimura, Masaru; Shomura, Takashi; Sezaki, Masaji; and Inoye, Shigeharu, 5,026,547, Cl. 424-122.000.
- Meinhard, Stefan, to Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V. Process for the production of rigid foam comprising acrylic and/or methacrylic polymers without using fluorocarbons as a foaming agent. 5,026,738, Cl. 521-95.000.
- Melconian, Jerry O., to SOL-3- Resources, Inc. Annular vortex combustor. 5,025,622, Cl. 60-39.464.
- Melendy, Peter S.: *See—*
  - Belanger, Richard A ; Melendy, Peter S.; and Ornsteen, Robert L., 5,026,187, Cl. 401-1.000.
- Melhorn, Nathan: *See—*
  - Friedman, Paul; and Melhorn, Nathan, 5,027,376, Cl. 375-122.000.
- Melitta-Werke Bentz & Sohn: *See—*
  - Slomka, Hans-Jurgen, 5,027,425, Cl. 392-480.000.
- Menadier, Michael A.; Williams, Michael A.; and Rose, David B., to HM Electronics, Inc. Remote infrared transceiver and method of using same. 5,027,433, Cl. 455-606.000.
- Menck, Douglas W.: *See—*
  - Poirier, David C.; Matheny, Mark T.; Mitchell, George C.; Swantick, Steven J.; Wroblewski, Gerald J.; Menck, Douglas W ; and Simon, Robert C., Jr., 5,025,881, Cl. 180-197.000.
- Mendenhall, Marcus H.; and Weller, Robert A., to Vanderbilt University. Method and apparatus for time of flight medium energy particle scattering. 5,026,988, Cl. 250-287.000.
- Mendes, Etienne; Vernieres, Jean-Claude; Keane, Peter E.; and Bachy, Andre, to Sanofi. 4-amino quinolines and naphthyridines and their use as medicines. 5,026,711, Cl. 514-300.000.
- Menken, Gunther; Romeiser, Hans-Jurgen; and Steven, Josef, to Siemens Aktiengesellschaft. Nuclear power plant with water or liquid sodium coolant and a metallic component contacting the coolant. 5,026,517, Cl. 376-438.000.
- Mentor O & O, Inc.: *See—*
  - Waltuck, Morey H.; McKnight, Robert N.; and Peli, Eliezer, 5,026,151, Cl. 351-246.000.
- Merchant, Abid N., to Du Pont de Nemours, E. I., and Company. Azeotropic compositions of perfluoro-1,2-dimethylcyclobutane with methanol and 1,1-dichloro-1-fluoroethane or dichlorotrifluoroethane. 5,026,497, Cl. 252-171.000.
- Merchant, Abid N., to Du Pont de Nemours, E. I., and Company. Binary azeotropic compositions of 1,1,1,2,3,3-hexafluoro-3-methoxypropane with one of trans-1,2-dichloroethylene, cis-1,2-dichloroethylene, 1,1-dichloro-1,2-difluoroethane or 1,2-dichloro-1,1,-difluoroethane. 5,026,498, Cl. 252-171.000.
- Merchant, Abid N., to Du Pont de Nemours, E. I., and Company. Ternary azeotropic compositions of hexafluoropropylene/ethylene cyclic dimer with trans-1,2-dichloroethylene and methanol 5,026,499, Cl. 252-171.000.

- Merck & Co., Inc.: *See—*
  - Bartizal, Kenneth F.; and Onishi, Janet C., 5,026,554, Cl. 424-404.000.
  - Bock, Mark G.; Freidinger, Roger M.; and DiPardo, Robert M., 5,026,703, Cl 514-247.000.
  - Yamazaki, Shigeko, 5,026,828, Cl. 530-414.000.
- Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
  - Prucher, Helmut; Jonas, Rochus; Piulats, Jaime; and Klockow, Michael, 5,026,705, Cl. 516-253.000.
  - Radunz, Hans-Eckart, Schwartz, Harry; and Heinrich, Martin, 5,026,642, Cl. 435-117.000.
- Merger, Franz: *See—*
  - Roeper, Michael; Merger, Franz; Liebe, Joerg; Grenacher, Armin V.; and Hahl, Edgar, 5,026,920, Cl. 568-492.000.
- Merkel, Stephen L., to Nordson Corporation. System for monitoring material dispensed onto a substrate. 5,026,989, Cl. 250-338.100.
- Merker, Heinz B.: *See—*
  - Bauch, Wolf-Dieter; Helmus, Heinz; and Merker, Heinz B , 5,027,052, Cl. 323-284.000.
- Merl, Milton, to Marlboro Marketing, Inc. Merchandise display assembly. 5,026,129, Cl. 312-266.000.
- Merlot, Vincent J., Jr., to Sundance, Inc. Segmented cover system. 5,026,109, Cl. 296-105.000.
- Merrell Dow Pharmaceuticals: *See—*
  - Flynn, Gary A.; and Beight, Douglas W., 5,026,861, Cl. 514-424.000.
  - Harrison, Boyd L.; and Baron, Bruce M . 5,026,700, Cl. 514-233.800.
- Merricks, Robert A.. *See—*
  - Fagg, Barry S.; Dull, Gary M., Haberkern, Richard G.; Merricks, Robert A.; and Stewart, John E., 5,025,812, Cl. 131-297 000.
- Merryman, Jerry D.: *See—*
  - Manns, William G.; Weeks, Don J ; Merryman, Jerry D.; and Sheng, Chyi N., 5,027,132, Cl. 346-108.000.
- Mertes, Jurgen: *See—*
  - Weber, Thomas; Heckmann, Walter; Mertes, Jurgen; Tesch, Helmut; Altstaedt, Volker; Eberle, Wolfgang; Folda, Thomas; Stutz, Herbert; and Recker, Hans-Gert, 5,026,789, Cl. 525-423.000.
- Merz & Co. GmbH & Co.: *See—*
  - Muller, Werner E. G., 5,026,732, Cl. 514-691.000.
- Merz & Kreel GmbH & Co., Firma: *See—*
  - Keil, Georg, 5,026,189, Cl. 401-29.000.
- Mesheau, John S., to Butler Associates. Liquid recycling system. 5,026,488, Cl. 210-799.000.
- Messerli, Alan J.: *See—*
  - Lesslie, David J.; Morris, Robert A., Messerli, Alan J . Scott, Graham A., and Krajewski, Alexander A., 5,027,091, Cl. 335-132.000.
- Messerschmitt-Bolkow-Blohm GmbH: *See—*
  - von Hoessle, Wolfgang; and Kuchler, Herbert, 5,027,202, Cl 358-109.000.
- Messina, Giuseppe; Lorenzoni, Loreno; and Chessa, Giovanna, to Enichem Anic S.p.A. Synthesis of 2,2'-bis-Δ^2-oxazoline. 5,026,866, Cl. 548-238.000.
- Messner, Helmut, to Bruderer AG. Apparatus for controlling the feed of an intermittent web feeding apparatus. 5,026,336, Cl. 475-224.000.
- Meszaros, Mark W., to Amoco Corporation. Preparation of 4-bromo-o-xylene in liquid sulfur dioxide. 5,026,932, Cl 570-206.000.
- Metalaser Technologies, Inc.: *See—*
  - Anderson, Robert S., 5,027,365, Cl 372-56.000.
- Metcalf, Brian W.: *See—*
  - Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., 5,026,882, Cl. 552-506.000.
- Metropolitan Life Insurance Company: *See—*
  - Anderson, Richard J.; Goodman, Bruce J., Riggio, Robert T.; Kopolovics, Solomon; Hernandez, Lisa C.; Chen, Chengkuo; and Romei, Russell J., 5,027,395, Cl. 380-4.000.
- Meurer, Rolf: *See—*
  - Kalisch, Heinrich; and Meurer, Rolf, 5,025,933, Cl. 211-22.000.
- Meyco Products Inc.: *See—*
  - Weissner, David W., 5,025,513, Cl. 4-498.000.
- Meyer, Brunhilde. Model airplane. 5,026,313, Cl. 446-64.000.
- Meyer, Gerhard; Sudheimer, Gunter; Zengel, Hans; and Grothaus, Hans, to Akzo N V. Process for the preparation of aqueous ammonium thiocyanate solutions. 5,026,534, Cl. 423-366.000.
- Meyer, Jurgen; Sippel, Achim; Wildau, Monika; Kruse, Heinz J.; Diel, Rainer; Becker, Wilfried; Bartsch, Gisbert; Pahnke, Klaus-Dieter; Huege, Jurgen; and Luther, Hans-Werner, to Rheinmetall GmbH. Segmented, discardable sabot having polygonal cross-section for sub-caliber projectile. 5,025,731, Cl. 102-521.000.
- Meyer, Rolf-Volker: *See—*
  - Heinz, Hans-Detlef; Meyer, Rolf-Volker; Schulte, Helmut, and Zimmerman, Franz, 5,026,818, Cl. 528-313.000.
- Meyerhoefer, Carl H.: *See—*
  - Neuwirth, Helmuth; Meyerhoefer, Carl H., and Carney, William V., 5,027,100, Cl. 337-32.000.
- Meyerle, Michael. Infinitely variable driving and steering transmission mechanism for track-laying vehicles. 5,026,333, Cl. 475-23.000.
- Meyn B V.: *See—*
  - Meyn, Cornelis, 5,026,983, Cl. 250-223.00R.
- Meyn, Cornelis, to Meyn B.V. Method and apparatus for examining food products by means of irradiation. 5,026,983, Cl. 250-223.00R
- Micetich, Ronald G.: *See—*
  - Daneshtalab, Mohsen; Nguyen, Dai Q.; Ha, Chan M.; Luu, Hiep T.; Tempest, Laurence M.; and Micetich, Ronald G., 5,026,848, Cl 544-137.000.
- Michaely, William J., to ICI Americas Inc. Trisubstituted benzoic acid intermediates. 5,026,896, Cl. 560-23.000.
- Michalec, Jerzy: *See—*
  - Senghaas, Karl A.; Senghaas, Peter; and Michalec, Jerzy, 5,027,284, Cl. 364-479.000.
- Michaud, Horst: *See—*
  - Eichinger, Rudolf; Michaud, Horst; and Seeholzer, Josef, 5,026,457, Cl. 162-158.000.
- Michel-Kim, Herwig. Three stage process for producing producer gas from combustible waste products. 5,026,403, Cl 48-203.000.
- Michelson, Gary K. Flaval separator. 5,026,386, Cl. 606-170.000.
- Micro Linear Corporation: *See—*
  - Armstrong, Michael; and Gray, Paul R., 5,027,116, Cl. 341-120.000.
- Microcom Systems, Inc.: *See—*
  - Friedman, Paul; and Melhorn, Nathan, 5,027,376, Cl. 375-122.000.
- Micron Technology, Inc.: *See—*
  - Lee, Ruojia; Lowrey, Tyler A.; Gonzalez, Fernando; Karniewicz, Joseph J.; and Fazan, Pierre C., 5,026,657, Cl. 437-47.000.
  - Ohri, Kul B.; and Chern, Wen-Foo, 5,027,053, Cl 323-314.000.
- Microsoft Corporation: *See—*
  - Letwin, James, 5,027,273, Cl. 364-200.000
- Microwave Modules & Devices, Inc.: *See—*
  - Wisherd, David S.; Bartlow, Howard D.; and D'Anna, Pablo E., 5,027,082, Cl. 330-277.000.
- Midbrook Products, Inc.: *See—*
  - Lutz, Milton F., II, 5,026,096, Cl. 285-114.000.
- Midorikawa, Shingo: *See—*
  - Kida, Masashi; Midorikawa, Shingo; Suzuki, Ichiro; Suzuki, Yoshihiko; and Yamaguchi, Youichi, 5,026,762, Cl. 524-495.000.
- Mie Hooro Co., Ltd.: *See—*
  - Gotoh, Taiji; Yamamoto, Hidetoshi; and Yamada, Kiyoshi, 5,025,546, Cl. 29-508.000.
- Mieda, Hiroki: *See—*
  - Yamauchi, Shunji; Tanaka, Minoru; Sakamoto, Kenitiro; Morita, Yutaka; Kidera, Toru; and Mieda, Hiroki, 5,026,668, Cl 437-210.000.
- Miekka, Fred: *See—*
  - Fotland, Richard A.; and Miekka, Fred, 5,027,136, Cl. 346-159 000.
- Migita, Masahito; Kanehisa, Osamu; Shiiki, Masatoshi; and Yamamoto, Hajime, to Hitachi, Ltd. Method of manufacturing zinc chalcogenide semiconductor devices using LP-MOCVD. 5,026,661, Cl. 437-81.000.
- Migli, Carlo: *See—*
  - Ferrari, Franco, and Migli, Carlo, 5,025,530, Cl. 16-236.000.
- Mignani, Serge: *See—*
  - Audiau, Francois; Gueremy, Claude; Jimonet, Patrick, and Mignani, Serge, 5,026,717, Cl. 514-338.000.
- Mihara, Teruyoshi: *See—*
  - Hirota, Masaki; Fujiki, Norio; and Mihara, Teruyoshi, 5,027,251. Cl. 361-18.000.
- Mihm, Gerhard; Eberlein, Wolfgang; Engel, Welfhard, Trummlitz, Gunter; Mayer, Norbert; Dodds, Henri; and Hammer, Rudolf, to Dr. Karl Thomae GmbH. Use of 5,11-dihydro-6H-pyrido[2,3-b][1,4]-benzodiazepin-6-ones substituted in the 11-position for treating bradycardia and bradyarrhythmia in human and veterinary medicine. 5,026,699, Cl. 514-220.000.
- Mikulic, Leopold. *See—*
  - Plohberger, Diethard; Pichl, Volker, and Mikulic, Leopold, 5,025,769, Cl. 123-532.000.
- Miller, Archie M., to IHT, Inc. Pressure means for automatic hair and scalp treatment apparatus. 5,025,514, Cl. 4-518.000.
- Miller, Donald P., to Xerox Corporation. Sheet feeder for copiers and printers. 5,026,042, Cl 271-119.000.
- Miller, Jack V.; and Miller, Ruth E. Manufacturing method for a sculpture having simulated hair. 5,025,976, Cl. 228-165.000.
- Miller, Jay: *See—*
  - Wright, H. Burk; and Miller, Jay, 5,026,001, Cl. 244-1.00R
- Miller, John M . *See—*
  - Masrur, Md. A.; Miller, John M . and Patil, Prabhakar B., 5,027,048, Cl. 318-806.000.
- Miller, Joseph H.: *See—*
  - Austin, Jared A.; Miller, Joseph H., and Hyslop, Robert F , 5,026,587, Cl. 428-91.000.
- Miller, Mike: *See—*
  - Carlson, Lee; Green, Mike; Miller, Mike, Nissen, Rudy, and Sheng, Steve, 5,025,952, Cl. 222-3.000.
- Miller, Paul D.: *See—*
  - Orosy, Gary D. J ; Hadtke, Frederick B., and Miller, Paul D., 5,025,928, Cl. 206-581.000.
- Miller, Raymond J.. *See—*
  - Powell, Anthony D.; and Miller, Raymond J., 5,026,524, Cl 422-26.000.
- Miller, Robert L., to Tasrop, Inc. Swivel wheelchair tray 5,026,114, Cl 297-194.000.
- Miller, Robert W., to AT&T Bell Laboratories. FIFO memory arrangement including a memory location fill indication. 5,027,330, Cl. 365-239.000.
- Miller, Ruth E.: *See—*
  - Miller, Jack V.; and Miller, Ruth E., 5,025,976, Cl 228-165.000.
- Miller, William R.: *See—*
  - Tidland, John W.; Schable, Reinhold A ; Vander Bom, Casey M., Biswas, Borendra K.; and Miller, William R., 5,025,693, Cl. 83-482.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Milnes, Robert D., to AEG Westinghouse Transportation Systems, Inc. Method for tracking trains through multiple false track circuit occupancies. 5,026,009, Cl. 246-122.00R.
- Milwaukee Electric Tool Corporation: *See—*
  - Palm, Bernhard, 5,025,562, Cl 30-392.000.
- Mimoto, Toshio, to Sharp Kabushiki Kaisha. Semiconductor integrated circuit device with improved resistance against electrostatic noise. 5,027,174, Cl. 357-23.130.
- Mineau, Laurent: *See—*
  - Picault, Alain; Gandossi, Christian; and Mineau, Laurent, 5,026,434, Cl. 148-2.000.
- Mineta, Sadayoshi; Kitajima, Kimio, and Shimazu, Kunio, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Brushless motor. 5,027,026, Cl. 310-259.000.
- Minnesota Mining & Manufacturing. *See—*
  - Koskenmaki, David C., 5,026,599, Cl. 428-328.000.
- Minnesota Mining and Manufacturing Company: *See—*
  - Buchan, Gavin M.; and Ferguson, Ian J., 5,026,860, Cl. 546-271.000.
  - Heyer, Raymond F.; and Hubbard, Connie L., 5,025,596. Cl. 51-400 000.
  - Isbrandt, Russell R.; and Young, Chung I., 5,026,606, Cl. 428-421.000.
  - Johnston, Manley R.; Mulder, Robert S.; and Sipinen, Alan J., 5,026,446, Cl. 156-153.000.
  - May, Steven J.; Andrews, David J.; and VanKampen, Craig L., 5,026,398, Cl. 623-13.000.
  - Oxman, Joel D.; and Ubel, F. Andrew, III, 5,026,278, Cl. 433-41.000.
  - Stern, Richard M., 5,026,735, Cl 521-50.000.
  - Wakabayashi, Toshinori; and Sugii, Shinji, 5,026,752, Cl. 524-271.000.
  - Weigel, David C., 5,026,633, Cl. 430-551.000.
- Mino, Yoshihito: *See—*
  - Yamagishi, Katsuaki; Matsui, Koichi; Tanaka, Toshimasa; Matsui, Nobuo; Suma, Sei; and Mino, Yoshihito, 5,025,638, Cl. 62-180.000.
- Minolta Camera Kabushiki Kaisha: *See—*
  - Hotomi, Hideo; Terasaka, Yoshihisa, and Mizuno, Hiroshi, 5,027,157, Cl. 355-261.000.
  - Inoue, Manabu; and Okada, Hiroyuki, 5,027,150, Cl. 354-484.000.
  - Oda, Masataka; Hara, Yoshinobu; and Hara, Kazuyoshi, 5,027,159, Cl. 355-271.000.
- Mips Computer Systems, Inc.: *See—*
  - Riordan, Thomas J.; Ries, Paul S.; Hudson, Edwin L.; and Killian, Earl A., 5,027,270, Cl. 364-200.000.
- Miraglia, Humbert G., Jr. Word game. 5,026,071, Cl. 273-272.000.
- Mishima, Kiyotaka: *See—*
  - Oguri, Motohiro; Kano, Yoshiaki; Mishima, Kiyotaka; Yamada, Masahiko; Kasano, Kenji; and Uemura, Masaru, 5,026,941, Cl. 585-467.000.
- Misick, John H. D.: *See—*
  - Orlov, Alexei D.; Nixon, Ross O., and Misick, John H D., 5,026,271, Cl. 431-125.000.
- Mistler, Friedhelm: *See—*
  - Schmid, Reinhold, Esser, Hans-Willi; and Mistler, Friedhelm, 5,026,199, Cl. 403-313.000.
- Misumi, Fumihiko; Ueda, Masazumi; Hara, Masato; Matsui, Yutaka, and Imai, Kiyoshi, to Omron Corporation. Photoelectric switch having pulse driver circuitry. 5,026,978, Cl 250-205.000.
- Mita Industrial Co., Ltd.: *See—*
  - Kida, Yasuhiko; Irie, Yoichiro; Takeda, Yoshiyuki; and Nagao, Tsuyoshi, 5,027,162, Cl. 355-320.000.
  - Kobayashi, Masahiko, 5,027,156, Cl. 355-245.000.
  - Oda, Kenji; Eki, Makoto; Tsutsui, Eiji; and Maeshima, Masanobu, 5,027,152, Cl. 355-200.000.
  - Tanjo, Toru; and Fukuoka, Noboru, 5,026,043, Cl. 271-121.000.
- Mitchell, George C.: *See—*
  - Poirier, David C.; Matheny, Mark T.; Mitchell, George C.; Swantick, Steven J.; Wroblewski, Gerald J.; Menck, Douglas W.; and Simon, Robert C., Jr., 5,025,881, Cl. 180-197.000.
- Mitchell, Ken: *See—*
  - Yabsley, Michael; Skinder, Waclaw; and Mitchell, Ken, 5,026,442, Cl. 149-2.000.
- Mitchell, Robert D.; and Trout, Torence J., to Du Pont de Nemours, E. I., and Company. Process for making pigmented ink jet inks. 5,026,427, Cl. 106-23.000.
- Mitsubishi Denki K.K.: *See—*
  - Morishita, Mitsunaru; Uota, Kosaku, and Yasukawa, Takeshi, 5,027,276, Cl. 364-424.050.
  - Suzuki, Hiroyoshi; Ogawa, Kenji; Maekawa, Hiroko; Kominami, Seiya; and Asayama, Yoshiaki, 5,026,153, Cl 356-1.000.
- Mitsubishi Denki Kabushiki Kaisha: *See—*
  - Kodai, Syojiro, 5,026,452, Cl. 156-293.000.
  - Nishimura, Makoto; and Takase, Shigeaki, 5,027,044, Cl. 318-568.110.
  - Satoh, Shinichi, 5,027,173, Cl. 357-23.600.
  - Shinohara, Toshiaki, 5,026,669, Cl. 437-224.000.
  - Tada, Masuo; Hata, Takeki; Fukumoto, Takaaki; and Ohmori, Toshiaki, 5,025,597, Cl. 51-410.000.
  - Takahashi, Shogo, 5,027,363, Cl. 372-46.000.
  - Uetani, Kenichi, 5,027,299, Cl. 364-580.000.
  - Yamasaki, Shinzi, 5,025,894, Cl. 187-20.000.
  - Yamauchi, Shunji; Tanaka, Minoru; Sakamoto, Kenitiro; Morita, Yutaka; Kidera, Toru; and Mieda, Hiroki, 5,026,668, Cl. 437-210.000.
  - Yoshioka, Kazuo, 5,027,198, Cl. 358-85.000.
  - Yumura, Takashi, and Yamamoto, Tetsu, 5,027,340, Cl 369-219.000.
- Mitsubishi Electric Corporation: *See—*
  - Nishizawa, Jun-ichi; and Kondoh, Hisao, 5,027,180, Cl 357-38.000.
- Mitsubishi Gas Chemical Company, Inc.: *See—*
  - Okabe, Masao; Amgai, Akikzau; Eto, Haruaki, and Tanaka, Yasuo, 5,026,764, Cl. 524-540.000.
  - Takeda, Mutsuhiko; Kakuda, Minoru; Shimpo, Masafumi, and Yoshida, Kiyoshi, 5,026,875, Cl. 549-201.000.
- Mitsubishi Jidosha Kogyo Kabushiki Kaisha *See—*
  - Kume, Tateo; Komagome, Reijiro; and Shiraishi, Kazuhiro, 5,025,767, Cl. 123-489.000.
- Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
  - Hasegawa, Akira; Kato, Yoshinobu, and Murakami, Toshifumi, 5,026,515, Cl. 264-315.000.
  - Hirakoso, Hiroyuki; and Aoki, Teruyuki, 5,025,623, Cl 60-257.000
  - Kanehara, Koichi; Fukuda, Kazumi; and Uenishi, Kouichi, 5,026,972, Cl. 235-32.000.
  - Kobayashi, Kazuyuki; and Takahashi, Kouji, 5,025,764, Cl 123-198.00R.
- Mitsubishi Kasei Corporation: *See—*
  - Kaneko, Masaharu; Ozawa, Tetsuo; Yoneyama, Tomio; Imazeki, Shuji; Mukoh, Akio; and Sato, Mikio, 5,026,505, Cl. 252-299 100.
- Mitsubishi Metal Corporation: *See—*
  - Arai, Tatsuo; Shiratori, Hidehisa; Hasegawa, Ryoei; and Iizuka, Kazuo, 5,026,221, Cl. 409-137.000.
  - Sugihara, Tadashi; Takeshita, Takuo; and Ohuchi, Yukihiro, 5,026,680, Cl. 505-1.000.
- Mitsubishi Pencil Co., Ltd : *See—*
  - Kimura, Masaru, 5,026,195, Cl. 401-283.000.
- Mitsubishi Petrochemical Co., Ltd.: *See—*
  - Takagi, Kiyoji; and Nishida, Koji, 5,026,787, Cl 525-391.000.
  - Takahashi, Tadashi, 5,026,797, Cl. 526-124.000.
- Mitsui Mining Company, Limited *See—*
  - Ooishi, Takashi; and Matsumoto, Akira, 5,026,412, Cl 65-18 100.
- Mitsui Petrochemical Industries Ltd.: *See—*
  - Motika, Stephen A., Pickering, Timothy L.; Rokicki, Andrzej, and Stein, Beatrice K., 5,026,676, Cl. 502-170.000.
  - Ohe, Tatsuya; and Fujimura, Mitsuaki, 5,026,965, Cl. 219-121 700
- Mitsui Toatsu Chemicals, Inc. *See—*
  - Sugawara, Harusige, and Okawa, Takasi, 5,026,876, Cl 549-257.000.
- Mitsumata, Tadayasu: *See—*
  - Miyazaki, Jinsei; Taketani, Makoto; and Mitsumata, Tadayasu, 5,026,827, Cl. 530-405.000.
- Mitsumori, Kenichi: *See—*
  - Ikarashi, Masami; and Mitsumori, Kenichi, 5,027,036, Cl 315-169.300.
- Mitsunari, Masahiko. Driving control apparatus for automobile 5,025,879, Cl. 180-79.000.
- Mitsuya, Hiroaki: *See—*
  - Yarchoan, Robert; Mitsuya, Hiroaki; and Broder, Samuel, 5,026,687, Cl. 514-45.000.
- Mitutoyo Corporation: *See—*
  - Ichikawa, Souji, 5,026,164, Cl. 356-373.000
- Miura, Masakatsu; and Ando, Masahiko, to Aisin AW Co., Ltd. Supporting device of a planetary ring gear for an automatic transmission. 5,026,337, Cl. 475-283.000.
- Miura, Tadashi: *See—*
  - Inoue, Hiroshi; Miura, Tadashi, and Hirano, Tetsuji, 5,026,767, Cl 524-745.000.
- Miyabayashi, Toshio: *See—*
  - Ohira, Yosihiro; Ohhara, Toshio; and Miyabayashi, Toshio, 5,026,807, Cl. 526-321.000.
- Miyabe, Hideki, to Kawasaki Jukogyo Kabushiki Kaisha; and Japan Aircraft Development Corporation. Apparatus for forming thermoplastic material. 5,026,267, Cl. 425-451.900.
- Miyadoh, Shinji: *See—*
  - Imamura, Kei-ichi; Gomi, Shuichi; Iwata, Michiaki; Miyadoh, Shinji; Shimura, Masaru; Shomura, Takashi; Sezaki, Masaji; and Inoye, Shigeharu, 5,026,547, Cl. 424-122.000.
- Miyagawa, Masashi: *See—*
  - Nakajima, Kazuhiro; Inui, Toshiharu; Ishikawa, Noriyoshi; and Miyagawa, Masashi, 5,026,590, Cl 428-141.000.
- Miyahara, Shoji: *See—*
  - Hashizume, Mitsuo; and Miyahara, Shoji, 5,025,912, Cl 198-459.000.
- Miyaji, Masayoshi: *See—*
  - Oftedal, Teryl M.; Bourgeous, Clarence G.; Morita, Haruyuki; and Miyaji, Masayoshi, 5,026,335, Cl. 475-198.000.
- Miyakawa, Nobuaki: *See—*
  - Kawata, Tetsuro; Hashimoto, Eiri; and Miyakawa, Nobuaki, 5,027,423, Cl. 382-54.000.
- Miyake, Koji: *See—*
  - Kimura, Kazumasa; Nagasuna, Kinya; Namba, Takashi; Kadonaga, Kenji; Miyake, Koji; and Shimomura, Tadao, 5,026,800, Cl 526-200.000.
- Miyake, Takashi: *See—*
  - Kurihara, Daiki; and Miyake, Takashi, 5,027,225, Cl. 358-448.000.
- Miyake, Toshio: *See—*
  - Suzuki, Yukio; Suzuki, Kei; Yoneyama, Masaru; and Miyake, Toshio, 5,026,833, Cl. 536-18.100.
- Miyamoto, Kazuhisa; Miyaoka, Shuuichi; Nakamura, Kazuo; and Imai, Kenji, to Hitachi, Ltd. Write pulse signal generating circuit for a semiconductor memory device. 5,027,323, Cl. 365-189.110.

- Miyaoka, Shuuichi: *See—*
  - Miyamoto, Kazuhisa; Miyaoka, Shuuichi; Nakamura, Kazuo; and Imai, Kenji, 5,027,323, Cl 365-189.110.
- Miyashita, Takanori: *See—*
  - Ueda, Tohru; Sasaki, Takuma; Matsuda, Akira; Miyashita, Takanori; Sakata, Shinji; Yamagami, Keiji; and Fuji, Akihiro, 5,026,835, Cl. 536-23.000.
- Miyata, Hiroshi: *See—*
  - Sakurai, Shigeo; Miyata, Hiroshi; Tan, Toshimi; and Kaneko, Ryoichi, 5,027,268, Cl. 364-184.000.
- Miyata, Masanori: *See—*
  - Kume, Nobuyuki; Miyata, Masanori; and Nakazawa, Nobuo, 5,027,161, Cl. 355-305.000.
- Miyatake, Tsutomu, to Sumitomo Heavy Industries Co., Ltd. Double-focus detector utilizing chromatic aberration. 5,026,976, Cl. 250-201.400.
- Miyazaki, Hajime: *See—*
  - Yanagisawa, Michio; Ikejiri, Masahisa, Miyazaki, Hajime; Muranaka, Tsukasa, Inoue, Kunihiro; and Uchiyama, Shouichi, 5,027,077, Cl. 324-712.000.
- Miyazaki, Jinsei; Taketani, Makoto; and Mitsumata, Tadayasu, to Matsushita Electric Industrial Co., Ltd Amphetamine-protein complex as immunogen for obtaining antibodies specific to methamphetamine. 5,026,827, Cl. 530-405.000.
- Miyazaki, Masaharu: *See—*
  - Gohara, Yoshihiro; and Miyazaki, Masaharu, 5,025,762, Cl. 123-196.00S.
- Miyazaki, Masakatu: *See—*
  - Nakagawa, Hidetoshi; Kawano, Keiji; and Miyazaki, Masakatu, 5,027,385, Cl. 379-100.000.
- Miyazaki, Masatoshi; Sasaki, Ken; Maeda, Hachiro; Sakai, Hisami; Kamikawa, Sumio, Takai, Kiyoshi; Ogawa, Yutaka; and Tanaka, Yuichi, to Nippon Suisan Kaisha, Ltd.; and Nippon Fillestar Co., Ltd. Fish processing machine. 5,026,319, Cl. 452-177.000.
- Miyazaki, Yoshihisa, to Nissin Kogyo Kabushiki Kaisha. Tandem type vacuum booster. 5,025,709, Cl. 92-48.000.
- Miyoshi, Akio, to Kabushiki Kaisha Toshiba Copy prevention apparatus and method therefor. 5,027,398, Cl. 380-4.000.
- Miyoshi, Tamihiro: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000.
- Mizukoshi, Katsuro: *See—*
  - Hongo, Mikio; Mizukoshi, Katsuro; Sano, Shuzo; Kamimura, Takashi; Itoh, Fumikazu; Shimase, Akira; Haraichi, Satoshi; and Takahashi, Takahiko, 5,026,664, Cl. 437-189.000.
- Mizuno, Hiroshi: *See—*
  - Hotomi, Hideo; Terasaka, Yoshihisa; and Mizuno, Hiroshi, 5,027,157, Cl. 355-261.000.
- Mizuno, Kazunori; and Sashihara, Kenji, to Fuji Photo Film Co., Ltd Self-processing photographic film unit with nonwoven cloth in trap. 5,026,630, Cl. 430-498.000.
- Mizuno, Koichi; Wakabayashi, Takeshige; Koinuma, Yutaka; Aizawa, Reiji; Kushiyama, Satoshi; Kabayashi, Satoru; Ohuchi, Hideo; Yoshida, Toyonobu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, to Agency of Industrial Science and Technology; Yoshida, Toyonobu; and JEOL Ltd. Method and apparatus for decomposing halogenated organic compound. 5,026,464, Cl 204-164.000.
- Mizusawa, Nobutoshi: *See—*
  - Chiba, Yuji; Fujioka, Hidehiko; Mizusawa, Nobutoshi; Kariya, Takao; and Shimoda, Isamu, 5,026,239, Cl. 414-217.000.
- Mizutani, Morikazu: *See—*
  - Hirabayashi, Hiromitsu; Kusaka, Kensaku; and Mizutani, Morikazu, 5,026,276, Cl. 432-59.000.
- Mobil Oil Corp: *See—*
  - Ruhin, Mae K.; and Chu, Pochen, 5,026,943, Cl. 585-467.000.
- Mobil Oil Corporation *See—*
  - Blain, David A.; Page, Nancy M.; and Young, Lewis B., 5,026,933, Cl. 585-7.000.
  - Degnan, Thomas F., Jr., and Johnson, Ivy D., 5,026,921, Cl. 585-415.000.
  - Dessau, Ralph M., 5,026,919, Cl. 568-433.000.
  - Forbus, Thomas R., 5,026,948, Cl. 585-646.000.
  - Harandi, Mohsen N.; and Owen, Hartley, 5,026,529, Cl 422-190.000.
  - Paul, James M.; and Morris, Richard L., 5,026,481, Cl. 210-638.000.
- Mochida Pharmaceutical Co., Ltd.: *See—*
  - Watanabe, Kazuhiro; Kakizaki, Husayoshi; Arai, Isao, Murakami, Kimihiro; and Kato, Kazuo, 5,026,842, Cl. 540-222.000.
- Mochizuki, Masaru: *See—*
  - Matsuno, Yasuhiro; Terakado, Hajime; Mochizuki, Masaru; Moroshima, Heiji; and Kamei, Hiroyuki, 5,027,107, Cl. 340-572.000.
- Moen Incorporated: *See—*
  - Gayton, David E., 5,025,825, Cl. 137-119 000.
- Moffat, William A. Modular convective oven with anti-contamination features. 5,025,570, Cl. 34-72.000.
- Moghaddassi, Majid: *See—*
  - Nielsen, Arne; and Moghaddassi, Majid, 5,025,644, Cl. 66-147.000.
- Mohan, Robert J.: *See—*
  - O'Neil, Walter K., Rockey, Carl E.; and Mohan, Robert J., 5,025,906, Cl. 192-58.00B
- Mohr, Juergen: *See—*
  - Denzinger, Walter; Mach, Helmut· Mohr, Juergen, Oppenlaender, Knut, Schwen, Roland; and Vogel, Hans-Henning, 5,026,494, Cl. 252-50.000.
- Molecular Diagnostics, Inc.: *See—*
  - Dattagupta, Nanibhushan; and Albarella, James P., 5,026,840, Cl. 536-27.000.
- Molex Incorporated: *See—*
  - Fong, Jennifer L. C.; and Berg, Alan B., 5,026,295, Cl 439-135.000.
  - Krehbiel, Fred L., 5,026,297, Cl 439-326.000.
- Molino, Joseph L.: *See—*
  - Laico, Joseph P., and Molino, Joseph L., 5,025,802, Cl. 128-882.000.
- Moll, Edward W. Reverse direction calling system. 5,027,387, Cl. 379-112.000.
- Mon, George, to United States of America, Army. Laminar flow acoustic sensor-amplifier. 5,025,835, Cl. 137-833.000.
- Monegan, Edgar A.: *See—*
  - Brunskill, Michael R.; Manus, George R.; and Monegan, Edgar A., 5,025,642, Cl. 62-402.000.
- Monger, Teresa G.: *See—*
  - Haines, Hiemi K.; Monger, Teresa G., Kenyon, Douglas E.; and Galvin, Lance J., 5,025,863, Cl. 166-305.100.
- Monsanto Chemical Company: *See—*
  - Ngo, Toan M., 5,026,423, Cl. 106-14.120.
- Monsanto Company: *See—*
  - Dupont, William A.; and Knapczyk, Jerome W., 5,026,771, Cl. 525-50.000.
  - Fleet, George W. J., 5,026,870, Cl. 548-453.000
  - Getman, Daniel P.; and DeCrescenzo, Gary A., 5,026,713, Cl. 514-302.000.
- Monsees, Claude E., to Roberts Systems, Inc Inverted tray container loading apparatus. 5,025,612, Cl. 53-530.000.
- Montaner, Pedro P.; and Turro, Victor R., to Monturas, S.A. Spray pump. 5,025,958, Cl. 222-321.000.
- Montedison S.p.A.: *See—*
  - Marchionni, Giuseppe; Viola, Gian T.; Tommasi, Giulio, Ferro, Raffaele; and Cirillo, Gianna, 5,026,786, Cl. 525-356.000.
- Monturas, S.A.: *See—*
  - Montaner, Pedro P.; and Turro, Victor R. 5,025,958, Cl 222-321.000.
- Mooberry, Randall L.: *See—*
  - Crosser, Jeffery A.; Mooberry, Randall L.; Rinaldo, James D.; and Salazar-Vior, Jose M., 5,025,626, Cl. 60-460.000.
- Moody, Paul E., to United States of America, Navy. Submarine torpedo tube axial weapon restrainer. 5,025,744, Cl. 114-238.000.
- Moon, Willilam G.: *See—*
  - Hatch, Michael R.; and Moon, Willilam G., 5,027,241, Cl. 360-105.000.
- Moore, Donal, to Polytech Netting Industries, L P Automotive barrier net. 5,026,231, Cl. 410-118.000.
- Moore, Donald T.: *See—*
  - Luttrell, Clyde K.; and Moore, Donald T., 5,026,073, Cl. 273-360.000.
- Moragues-Mauri, Jacinto: *See—*
  - Vega-Noverola, Armando; Boix-Iglesias, Jose, Prieto-Soto, Jose; and Moragues-Mauri, Jacinto, 5,026,858, Cl 546-224 000.
- Mordes, John P.: *See—*
  - Rossini, Aldo A.; Mordes, John P., and Handler, Eugene S., 5,026,365, Cl. 604-891.100.
- More, Henry S.; Rorden, Louis H.; and Akkerman, Neil H., to Develco, Inc. Gimballed antenna. 5,027,129, Cl. 343-719 000
- Morell, Carol H.: *See—*
  - Henn, Robert L.; Morell, Carol H., and Daniel, Edward J., 5,026,591, Cl. 428-198.000.
- Morgan, Michael J.: *See—*
  - Day, Roger W.; and Morgan, Michael J., 5,026,774, Cl. 525-56.000.
- Morganstein, Sanford J., to Dytel Corporation Personalized automatic call routing. 5,027,384, Cl. 379-67.000.
- Mori, Hitoshi: *See—*
  - Fujisaki, Masataka; Fujisaki, Kiyotaka; Mori, Hitoshi; and Takeishi, Itugu, 5,027,207, Cl. 358-142.000.
- Mori, Shinichi: *See—*
  - Iino, Hiroshi; and Mori, Shinichi, 5,025,845, Cl 152-559.000.
- Mori, Shinsaku: *See—*
  - Kikuchi, Makoto; Mori, Shinsaku; Nikawa, Yoshio; and Terakawa, Takashige, 5,025,810, Cl. 128-804.000.
- Mori, Takahiro: *See—*
  - Hasegawa, Kenji; Mori, Takahiro; and Higuma, Masahiko, 5,027,131, Cl 346-1.100.
- Morikawa, Rindo, to Hitachi Construction Machinery Co., Ltd. Commonly housed directional and pressure compensation valves for load sensing control system. 5,025,625, Cl. 60-426.000.
- Morikawa, Shigenori; Hanzawa, Kohtaro; and Nakamura, Kazuhisa, to Casio Computer Co., Ltd. Electronic musical instrument with signal modifying apparatus. 5,025,700, Cl. 84-603.000.
- Morimoto, Akira: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka, Ikeda, Yasushi, Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4 000.
- Morinaka, Shigehisa; Nakashima, Tai; Yamazaki, Takeshi; Morishima, Kazuo; Kashio, Yoshiaki; and Akimori, Giichiro, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle provided with trunks. 5,025,883, Cl. 180-219.000.

VOL 1127
ISS 4
JE 25
1991
UMI

- Morino, Asami; and Umetsu, Masahito, to Amada Company, Limited, and Amada Wasino Co., Ltd. Wire cutting electric discharge machine. 5,026,962, Cl. 219-69 120.
- Morishima, Kazuo: *See—*
  - Morinaka, Shigehisa; Nakashima, Tai; Yamazaki, Takeshi; Morishima, Kazuo; Kashio, Yoshiaki, and Akimori, Giichiro, 5,025,883, Cl. 180-219.000
- Morishita, Isao: *See—*
  - Takeda, Nobuhiko; Morishita, Isao; and Aida, Satoshi, 5,026,120, Cl. 297-408.000.
- Morishita, Mitsuharu; Uota, Kosaku; and Yasukawa, Takeshi, to Mitsubishi Denki K.K Electric power steering device having a fail-safe relay. 5,027,276, Cl 364-424.050.
- Morita, Haruyuki: *See—*
  - Oftedal, Teryl M., Bourgeous, Clarence G , Morita, Haruyuki, and Miyaji, Masayoshi, 5,026,335, Cl. 475-198.000.
- Morita, Hideyuki: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi, Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000.
- Morita, Yutaka: *See—*
  - Yamauchi, Shunji; Tanaka, Minoru; Sakamoto, Kenitiro; Morita, Yutaka; Kidera, Toru, and Mieda, Hiroki, 5,026,668, Cl. 437-210.000.
- Moriya, Takashi: *See—*
  - Hasegawa, Kazumi; Moriya, Takashi; Hibino, Hiromi; and Takamura, Akira, 5,026,186, Cl. 400-691 000.
- Morlock, Roland *See—*
  - Finnenthal, Cornelia; Roland, Wolf-Achim, and Morlock, Roland, 5,026,440, Cl. 148-247.000.
- Morohoshi, Yukuo: *See—*
  - Takahashi, Masato; Seki, Kazuo; Yamada, Tetsuya, and Morohoshi, Yukuo, 5,026,272, Cl. 431-79.000.
- Moroshima, Heiji *See—*
  - Matsuno, Yasuhiro; Terakado, Hajime; Mochizuki, Masaru; Moroshima, Heiji; and Kamei, Hiroyuki, 5,027,107, Cl 340-572.000.
- Morozumi, Naoya; Sakata, Hirotsugu; Hayano, Makoto; Okuda, Masayuki; Fujiwara, Takayoshi; Shimoda, Moriaki; and Hattori, Hitoshi, to Kabushiki Kaisha Toshiba. Fluid compressor. 5,026,264, Cl. 418-220.000.
- Morrill, Vaughan, Jr. Sub-miniature fuse. 5,027,101, Cl. 337-297.000
- Morris, Richard L.: *See—*
  - Paul, James M.; and Morris, Richard L., 5,026,481, Cl 210-638.000.
- Morris, Robert A.: *See—*
  - Lesslie, David J , Morris, Robert A., Messerli, Alan J., Scott, Graham A.; and Krajewski, Alexander A., 5,027,091, Cl. 335-132.000.
- Morris, Robert G.: *See—*
  - Carpenter, Ronald L.; Yates, Craig E., and Morris, Robert G . 5,026,468, Cl. 204-196.000.
- Morton International, Inc.: *See—*
  - Candore, Amedeo, 5,026,172, Cl. 374-153.000.
- Mosaid Inc.. *See—*
  - Foss, Richard C., 5,027,329, Cl. 365-230.020.
- Moscatelli, David A.; Rifkin, Daniel B., and Sommer, Andreas, to Synergen, Inc; and New York University. DNA encoding a basic fibroblast growth factor. 5,026,839, Cl. 536-27.000.
- Moser, James R., Warden, Gerald D., and Bieber, Thomas E., to Bell & Howell Phillipsburg Co. Sheet separator device. 5,025,609, Cl 53-266.100.
- Moslehi, Behzad: *See—*
  - Jannson, Tomasz P.; Jannson, Joanna L.; Rich, Christopher C ; and Moslehi, Behzad, 5,026,131, Cl. 350-3.700.
- Mosley, Shawn D. High-volume auxiliary-overload-bypass valve. 5,026,258, Cl. 417-304.000
- Moss, Floyd. Hayrake hitch and method of use. 5,025,616, Cl. 56-14 900
- Mote, Charles R., Sr. External safety for handgun. 5,025,582, Cl. 42-70.060
- Motika, Stephen A ; Pickering, Timothy L.; Rokicki, Andrzej; and Stein, Beatrice K., to Air Products and Chemicals, Inc.; Arco Chemical Company; and Mitsui Petrochemical Industries Ltd. Catalyst for the copolymerization of epoxides with CO_2. 5,026,676, Cl. 502-170.000.
- Motorola, Inc.: *See—*
  - Baum, Jeffery I., 5,027,081, Cl. 330-84.000.
  - Bradshaw, Andrea E.; Baum, David M., and Rivera, Dionne A., 5,027,388, Cl. 379-112.000.
  - Czarnocki, Walter, 5,027,015, Cl. 307-491.000.
  - Gasparaitis, Bernard V.; Ruiz, Jose ; and Gatto, Donald F., 5,025,921, Cl. 206-320.000.
  - Goode, Steven H., 5,027,352, Cl. 370-110.100.
  - Hanna, John E.; and Abdi, Behrooz L., 5,027,016, Cl. 307-542.000.
  - Kuenast, Walter U., 5,027,369, Cl. 375-14.000.
  - Lai, Stephen W., 5,027,319, Cl. 365-156.000.
  - Neely, Eric D.; and Hsyng, Perng, 5,027,010, Cl. 307-456.000
  - Rossman, Mark W., 5,027,374, Cl. 375-94.000.
  - Rottinghaus, Alan P., 5,027,087, Cl. 332-127.000.
  - Rusznyak, Andreas, 5,027,054, Cl. 323-314.000.
  - Sigmon, Bernard E., 5,027,086, Cl. 331-99.000
  - Theobald, Kevin B., 5,027,381, Cl. 375-117.000.
  - Zdebel, Peter J.; and Vasquez, Barbara, 5,026,663, Cl 437-160.000.
  - Zdebel, Peter J., 5,026,665, Cl. 437-191.000.
- Motsch, Uwe: *See—*
  - Muller, Klaus; Motsch, Uwe; and Mack, Gerhard, 5,026,235, Cl. 411-523.000
- Motschman, David R.: *See—*
  - Corfits, William D.; Holahan, Maurice F , Martino, Susan J. Motschman, David R.; and Thorpe, James R , 5,027,254, Cl. 361-384.000.
- Mott, Philip J . Updike, Roger K., Sr ; and White, David C., to Borg-Warner Automotive Transmission & Engine Components Corporation. Chain-belt. 5,026,332, Cl. 474-242.000.
- Mowers, Dennis W.: *See—*
  - Davis, William R ; Mowers, Dennis W , Greenthal, Richard P , Szymanski, Paul; Wray, Ronald A.; and Davidson, Richard A , 5,027,111, Cl. 340-784.000.
- Mronga, Norbert; Ostertag, Werner; and Bock, Gustav, to BASF Aktiengesellschaft. Metal oxide coated platelet-like organic pigments 5,026,429, Cl. 106-400.000.
- MTU Motoren- und Turbinen- Union Munchen GmbH *See—*
  - Hoffelner, Herbert, 5,026,252, Cl. 415-174 200.
  - Schmid, Thomas, 5,026,098, Cl. 285-174.000.
- Mudge, Paul R.: *See—*
  - Katz, Howard G.; Lunsford, David; and Mudge, Paul R . 5,026,765, Cl. 524-561.000.
- Mueller, Louis B., to Rytec Corporation. Apparatus for accommodating application of a force in excess of a predetermined magnitude and closure employing such apparatus. 5,025,847, Cl. 160-270.000.
- Mueller, Otward M : *See—*
  - Hardy, Christopher J.; Roemer, Peter B., and Mueller, Otward M., 5,027,071, Cl. 324-309.000.
- Mukoh, Akio: *See—*
  - Kaneko, Masaharu; Ozawa, Tetsuo; Yoneyama, Tomio; Imazeki, Shuji; Mukoh, Akio; and Sato, Mikio, 5,026,505, Cl. 252-299 100
- Mulder, Robert S.: *See—*
  - Johnston, Manley R.; Mulder, Robert S., and Sipinen, Alan J , 5,026,446, Cl. 156-153.000.
- Mullenberg, Hans: *See—*
  - Raasch, Hans; and Mullenberg, Hans, 5,025,911, Cl. 198-400.000.
- Muller, Dietmar; and Helfrich, Mathias, to Fraunhofer-Gesellschaft zur Forderung der angewandten. Stabilized explosive and its production process. 5,026,443, Cl. 149-18.000.
- Muller, Eberhard: *See—*
  - Musch, Rudiger, Magg, Hans; Obrecht, Werner, and Muller, Eberhard, 5,026,779, Cl. 525-215.000.
- Muller, Klaus; Motsch, Uwe; and Mack, Gerhard, to Raymond, A. Clasp-like sheet metal nut. 5,026,235, Cl. 411-523.000.
- Muller, Laszlo. Stake puller. 5,025,867, Cl. 173-90.000.
- Muller, Robert; and Wacker, Bernd, to Dr Ing. h.c.F. Porsche AG Gear shift mechanism for a motor vehicle transmission. 5,025,677, Cl. 74-473.00R
- Muller, Werner E. G., to Merz & Co. GmbH & Co. Use of avarone for the control of AIDS and ARC. 5,026,732, Cl 514-691.000.
- Munday, Howard R.: *See—*
  - Romansky, Michael E.; Dimsa, Robert D.; and Munday, Howard R., 5,025,734, Cl. 105-26.050.
- Munoz, Jose R.; and Laporta, Maria O Tooth brush with an anatomically compatible structure. 5,025,525, Cl. 15-167.100.
- Muraishi, Katsuyoshi: *See—*
  - Suzuki, Terao, Kishi, Matsuo; Muraishi, Katsuyoshi; Ogawa, Kenichi, and Takashio, Hiroshi, 5,026,518, Cl. 419-12.000.
- Murakami, Kimihiro: *See—*
  - Watanabe, Kazuhiro; Kakizaki, Husayoshi; Arai, Isao; Murakami, Kimihiro; and Kato, Kazuo, 5,026,842, Cl. 540-222.000.
- Murakami, Naoyuki: *See—*
  - Akiyama, Saburo; Murakami, Naoyuki, and Kitamura, Kazuo, 5,026,792, Cl. 525-468.000.
- Murakami, Toshifumi: *See—*
  - Hasegawa, Akira; Kato, Yoshinobu; and Murakami, Toshifumi, 5,026,515, Cl. 264-315.000
- Muranaka, Tsukasa: *See—*
  - Yanagisawa, Michio; Ikejiri, Masahisa; Miyazaki, Hajime; Muranaka, Tsukasa; Inoue, Kunihiro; and Uchiyama, Shouichi, 5,027,077, Cl. 324-712.000.
- Murari, Bruno: *See—*
  - Cini, Carlo; and Murari, Bruno, 5,027,250, Cl. 361-90.000.
- Murata, Yoshiyuki. *See—*
  - Iba, Akio; Murata, Yoshiyuki, and Manabe, Hajime, 5,025,703, Cl 84-718.000.
- Murayama, Susumu: *See—*
  - Oshima, Keiichi; Kato, Takashi; and Murayama, Susumu, 5,026,183, Cl. 400-605.000.
- Musch, Rudiger; Magg, Hans; Obrecht, Werner; and Muller, Eberhard, to Bayer Aktiengesellschaft Mixtures of chloroprene polymers. 5,026,779, Cl. 525-215.000.
- Muto, Akira: *See—*
  - Shinbo, Masatoshi; Fujie, Hideki; Iwakuni, Kaoru; Muto, Akira, and Aoki, Kazuhiro, 5,027,222, Cl. 358-330 000.
- Muus, Frank, to TrioVing a.s. Lock arrangement. 5,025,647, Cl. 70-352.000.
- Myasoedov, Nikolai F.: *See—*
  - Zolotarev, Jury A.; Zaitsev, Dmitry A., Tatur, Vadim J.; and Myasoedov, Nikolai F., 5,026,909, Cl. 562-575.000.
- Myers, Carl J., to Warner & Swasey Company, The Vertical spindle turret lathe. 5,025,690, Cl. 82-121.000.
- Myers, David J.. *See—*
  - House, Wayne D.; and Myers, David J., 5,026,513, Cl. 264-127.000.

- Nabors, C. David; and Byer, Robert L., to Stanford University. High power continuous wave injection-locked solid state laser. 5,027,360, Cl. 372-18.000.
- Nabors, Charles D.: *See—*
  - Kozlovsky, William J.; Nabors, Charles D.; and Byer, Robert L., 5,027,361, Cl. 372-22.000.
- Naerum, Lars: *See—*
  - Honore, Tage; Jacobsen, Poul; Nielsen, Flemming E.; and Naerum, Lars, 5,026,704, Cl. 514-250.000.
- Nagai, Hihumi: *See—*
  - Itoh, Eiji; Nagase, Ryuichi; Saito, Kazuhiro; Hosaka, Hiroshi; and Nagai, Hihumi, 5,026,614, Cl. 428-658.000.
- Nagano, Hiroo: *See—*
  - Kajimura, Haruhiko; Nagano, Hiroo; Yamanaka, Kazuo; and Kodama, Tsuyoshi, 5,026,521, Cl. 420-422.000.
- Nagano, Hirosaku: *See—*
  - Noguchi, Takehiko; Sakubata, Takashi; Hisanaga, Akinori; Yoshioka, Tetsuo; and Nagano, Hirosaku, 5,026,820, Cl. 528-350.000.
- Nagao, Tsuyoshi. *See—*
  - Kida, Yasuhiko; Irie, Yoichiro; Takeda, Yoshiyuki; and Nagao, Tsuyoshi, 5,027,162, Cl. 355-320.000.
- Nagasawa, Kiyoto: *See—*
  - Yoshida, Yoshiki; Nagasawa, Kiyoto; and Kagami, Yoshinobu, 5,027,117, Cl. 341-132.000.
- Nagase, Ryuichi: *See—*
  - Itoh, Eiji; Nagase, Ryuichi, Saito, Kazuhiro; Hosaka, Hiroshi; and Nagai, Hihumi, 5,026,614, Cl. 428-658.000.
- Nagasuna, Kinya: *See—*
  - Kimura, Kazumasa; Nagasuna, Kinya; Namba, Takashi Kadonaga, Kenji; Miyake, Koji; and Shimomura, Tadao, 5,026,800, Cl. 526-200.000.
- Nagata, Takehito, Kohata, Mitsuhiro; and Ino, Masumitsu, to Ricoh Company, Ltd.; and Rocoh Research Institute of General Electronics. Contact type image sensor. 5,027,226, Cl. 358-482.000.
- Nagata, Yuji; Fukazawa, Toshio; Wada, Kumiko; and Tosaki, Yoshihiro, to Matsushita Electric Industrial Co., Ltd. Magnetic head for multi-track recording having read and write transducers formed by thin-film technology. 5,027,245, Cl. 360-121.000.
- Naka, Hiromitsu; Asai, Yutaka; and Naka, Shouzi, to Naka Technical Laboratory. Escape for a building. 5,025,891, Cl. 182-86.000.
- Naka, Shouzi: *See—*
  - Naka, Hiromitsu; Asai, Yutaka, and Naka, Shouzi, 5,025,891, Cl. 182-86.000.
- Naka Technical Laboratory *See—*
  - Naka, Hiromitsu; Asai, Yutaka, and Naka, Shouzi, 5,025,891, Cl. 182-86.000.
- Nakagaki, Shintaro: *See—*
  - Takanashi, Itsuo; Nakagaki, Shintaro, Shinonaga, Hirohiko; and Asakura, Tsutou, 5,027,216, Cl. 358-213.110.
- Nakagawa, Hidetoshi; Kawano, Keiji; and Miyazaki, Masakatu, to Tamura Electric Works, Ltd. Facsimile apparatus for communicating on external and internal telephone sets. 5,027,385, Cl. 379-100.000.
- Nakagawa, Hiroto. *See—*
  - Kuwabara, Takao; Inoue, Hisao; Nakagawa, Hiroto; and Kita, Eizo, 5,026,256, Cl. 417-45.000.
- Nakagawa, Takashi; and Sugimoto, Osamu, to Nippon Zeon Co., Ltd Process for preparation of rubber laminates. 5,026,583, Cl 428-36.800.
- Nakagawa, Tetsuya *See—*
  - Baji, Toru; Nakano, Yukio; Tanabe, Shiro; Nakagawa, Tetsuya; and Kojima, Hirotsugu, 5,027,400, Cl. 380-20.000.
- Nakai, Noboru; Isozaki, Osamu; and Iwasawa, Naozumi, to Kansai Paint Company Limited. Resin compositions and a method of curing the same. 5,026,793, Cl. 525-476.000.
- Nakajima, Ikuo; Okamura, Moriyuki; and Nishiguchi, Toshiji, to Canon Kabushiki Kaisha. Intraocular lens having a coating layer and a method for manufacturing the same. 5,026,395, Cl. 623-6.000.
- Nakajima, Kazuhiro; Inui, Toshiharu; Ishikawa, Noriyoshi; and Miyagawa, Masashi, to Canon Kabushiki Kaisha. Transfer recording medium and process for production thereof. 5,026,590, Cl. 428-141.000.
- Nakajima, Noboru: *See—*
  - Koyama, Noboru; Nakano, Yasushi; Kawahara, Setsuko; and Nakajima, Noboru, 5,026,598, Cl. 428-323.000.
- Nakajima, Shuichi: *See—*
  - Otake, Katsumi; Yanagimoto, Takekazu; Nakajima, Shuichi; and Kishimura, Yuhei, 5,026,236, Cl. 412-33.000.
- Nakakuki, Yasuhide: *See—*
  - Chino, Hidenori; Hara, Takashi; Tamura, Kenji; Nakakuki, Yasuhide; Nii, Yasuyuki; Soma, Zenya; and Nishihara, Kiyoshi, 5,027,000, Cl. 290-53.000.
- Nakamura, Kazuhisa: *See—*
  - Morikawa, Shigenori; Hanzawa, Kohtaro; and Nakamura, Kazuhisa, 5,025,700, Cl 84-603.000.
- Nakamura, Kazuo: *See—*
  - Miyamoto, Kazuhisa; Miyaoka, Shuuichi, Nakamura, Kazuo; and Imai, Kenji, 5,027,323, Cl. 365-189.110.
- Nakamura, Keijirou: *See—*
  - Sano, Tasukazu; Tanaka, Hideyuki; Nakamura, Keijirou; Kume, Hideo; and Tanigawa, Kiyoshi, 5,026,136, Cl. 350-96.150.
- Nakamura, Koki: *See—*
  - Ono, Michio; Hirai, Hiroyuki; Ohki, Nobutaka; and Nakamura, Koki, 5,026,634, Cl. 430-559.000.
- Nakamura, Makoto; and Kodama, Tomoko, to Kabushiki Kaisha Toshiba. Error control system. 5,027,356, Cl. 371-32.000.
- Nakamura, Michiei: *See—*
  - Takizawa, Minoru; Nakamura, Michiei; Takeuchi, Hitoshi; Sakamoto, Shigeru; and Horiguchi, Shojiro, 5,026,780, Cl 525-301.000.
- Nakamura, Nobuo: *See—*
  - Tanaka, Toshiyuki; Nakamura, Nobuo; and Yamamoto, Mutsuhiro, 5,027,305, Cl. 364-513.000.
- Nakamura, Shinya, to Tokyo Electric Company, Ltd. Magnetic recording and reproducing apparatus with a tape guide. 5,027,248, Cl. 360-130.210.
- Nakamura, Shuichi; Sasaki, Hakaru; and Watanabe, Rikizo, to Hitachi Metals, Ltd. High strength lead frame material and method of producing the same. 5,026,435, Cl. 148-12.00A.
- Nakamura, Shunichi: *See—*
  - Yoneda, Masataka; and Nakamura, Shunichi, 5,025,544, Cl. 29-409.000.
- Nakanishi, Kanji, to Fuji Photo Film Co., Ltd. Film magnetic head for high frequency recording. 5,027,247, Cl. 360-126.000.
- Nakano, Yasushi: *See—*
  - Koyama, Noboru; Nakano, Yasushi; Kawahara, Setsuko; and Nakajima, Noboru, 5,026,598, Cl. 428-323.000.
- Nakano, Yukio: *See—*
  - Baji, Toru; Nakano, Yukio; Tanabe, Shiro; Nakagawa, Tetsuya; and Kojima, Hirotsugu, 5,027,400, Cl. 380-20.000.
- Nakashima, Tai: *See—*
  - Morinaka, Shigehisa; Nakashima, Tai; Yamazaki, Takeshi; Morishima, Kazuo; Kashio, Yoshiaki; and Akimori, Giichiro, 5,025,883, Cl. 180-219.000.
- Nakashima, Tomoyuki, to Kabushiki Kaisha Toshiba. Memory drive device and method. 5,027,328, Cl. 365-226.000.
- Nakashima, Yoshihiko: *See—*
  - Yamamori, Masayoshi; and Nakashima, Yoshihiko, 5,025,592, Cl. 51-165.710.
- Nakata, Takashi: *See—*
  - Kuzuya, Susumu; Hayashi, Shigeyuki; Kimura, Hiroaki, Suzuki, Tsutomu; Sonobe, Katsuyoshi; Nakata, Takashi; and Hatta, Naoyuki, 5,026,039, Cl. 271-11.000.
- Nakatsuka, Takashi: *See—*
  - Ishiguro, Masaji; Iwata, Hiromitsu; Nakatsuka, Takashi; and Yamada, Yasuo, 5,026,844, Cl. 540-357.000.
- Nakayama, Jin, to Casio Computer Co., Ltd. Still image information reproducing apparatus including searching function. 5,027,230, Cl 360-35 100.
- Nakazato, Masao: *See—*
  - Arabori, Noboru; Takahashi, Hideaki; Sakai, Yoshio; Nakazato, Masao; Tanaka, Masakatsu; Takahashi, Tatsuhiko; Masuda, Katsutaro; Itoh, Masanobu; and Toda, Yuji, 5,025,896, Cl. 187-115.000.
- Nakazawa, Nobuo: *See—*
  - Kume, Nobuyuki; Miyata, Masanori; and Nakazawa, Nobuo, 5,027,161, Cl. 355-305.000.
- Namba, Takashi: *See—*
  - Kimura, Kazumasa; Nagasuna, Kinya; Namba, Takashi; Kadonaga, Kenji; Miyake, Koji; and Shimomura, Tadao, 5,026,800, Cl. 526-200.000.
- Narayan, Badhri: *See—*
  - Roddy, James E.; Narayan, Badhri; Stark, Richard A.; and Voci, Laurie L., 5,026,133, Cl. 350-6.400.
- Nardelli, Bernardetta: *See—*
  - Mage, Michael; Nardelli, Bernardetta; and McHugh, Louise, 5,026,785, Cl. 525-329.400.
- Narushima, Hiroshi, to Okuma Machinery Works, Ltd. Feed-screw support structure. 5,025,914, Cl. 198-660.000.
- Nasiatka, John R., to Duo-Fast Corporation. Furniture tool. 5,025,968, Cl. 227-8.000.
- National Carpet Equipment Inc.: *See—*
  - Anderson, Martin L.; and Nickel, Gregory, 5,025,970, Cl. 227-156.000.
- National Research Development Corporation *See—*
  - Hilton, Colin S., 5,027,414, Cl. 382-3.000.
- National Semiconductor Corp.: *See—*
  - Wong, Hee, 5,027,372, Cl. 375-67.000.
- National Starch and Chemical Investment Holding Corporation *See—*
  - Katz, Howard G.; Lunsford, David, and Mudge, Paul R., 5,026,765, Cl. 524-561.000.
  - Takagi, Motoyuki; Yoshimura, Takuji; and Yamano, Yoshihiro, 5,026,761, Cl. 524-460.000.
- National Transcommunications Limited: *See—*
  - Beech, Brian H., 5,027,210, Cl. 358-166.000.
- NCR Corporation: *See—*
  - Curry, James C., Jr., 5,027,348, Cl. 370-85.100.
  - Franklin, Gene R.; and Ho, Benedict C. M., 5,026,974, Cl. 235-449.000.
- NDA International, Inc.: *See—*
  - Lotsof, Howard S., 5,026,697, Cl. 514-214.000.
- NEC Corporation: *See—*
  - Hayakawa, Yuichi, 5,027,244, Cl. 360-119.000.
  - Iwasa, Shoichi, 5,027,175, Cl. 357-23.500.
  - Kojima, Tatsuru, 5,027,429, Cl. 455-113.000.
  - Koumoto, Yasuhiko; and Tokunaga, Kei, 5,027,309, Cl. 364-766.000.
  - Ohata, Keiichi, 5,026,655, Cl. 437-40.000.
  - Ozawa, Kazunori, 5,027,405, Cl. 381-35.000.
  - Shimizu, Toshimitsu, 5,027,427, Cl. 455-67.000.
  - Suzuki, Naoshi, 5,027,199, Cl. 358-88.000.
  - Taguchi, Tetsu, 5,027,404, Cl. 381-37.000.

VOL
1127
ISS
4
JE
25
1991
UMI

Uekido, Kouzou; Nishiyama, Michiaki; and Sakamoto, Katsuhiko, 5,026,306, Cl. 439-675.000.

Yamamura, Ryuji, 5,027,252, Cl. 361-58.000.

Yamamura, Yoshihiro; and Fuda, Hitoshi, 5,027,393, Cl. 379-410.000.

Neely, Eric D.; and Hsyng, Perng, to Motorola, Inc. TTL output driver having an increased high output level. 5,027,010, Cl. 307-456.000.

Negishi, Kiyoshi; Negoro, Ikuo; and Kita, Masahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Printer self-diagnosis device. 5,027,135, Cl. 346-154 000.

Negoro, Ikuo: *See—*

Negishi, Kiyoshi; Negoro, Ikuo; and Kita, Masahiro, 5,027,135, Cl 346-154.000.

Neiberger, Denny W., to ConAgra Pet Products Company. Jerky-style pet products. 5,026,572, Cl. 426-641.000.

Neil, Balint: *See—*

Bakos, Jozsef; Neil, Balint; Kollar, Laszlo ; Toros, Szilard; Eifert, Gyula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna; Kuronya, Istvan; Magyari, Istvan, Timar, Judit; Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.

Nelboeck-Hochstetter, Michael: *See—*

Sponer, Gisbert; Reicke, Ulrich; and Nelboeck-Hochstetter, Michael, 5,026,706, Cl. 514-255.000.

Nestec S.A.: *See—*

Aeschbach, Robert; and Philippossian, Georges, 5,026,550, Cl. 424-195.100.

Nestler, Gerhard. *See—*

Rehmer, Gerd; Boettcher, Andreas; Pfoehler, Peter; Aydin, Oral; and Nestler, Gerhard, 5,026,806, Cl. 526-316.000.

Neubauer, Russell H.: *See—*

Ferguson, Blair Q.; Bacheler, Lee T., Petteway, Stephen R.; and Neubauer, Russell H., 5,026,635, Cl. 435-5.000.

Neukermans, Armand P.; and Berger, Josef, to Tencor Instruments. Cantilevered microtip manufacturing by ion implantation and etching. 5,026,437, Cl. 148-33.300.

Neuwirth, Helmuth; Meyerhoefer, Carl H . and Carney, William V., to Porta Systems Corp. Gas tube fail safe device for telephone protector modules. 5,027,100, Cl. 337-32.000.

New Tek Manufacturing, Inc.: *See—*

Schmidt, Eugene H., and Nikkel, Lee F., 5,025,866, Cl. 172-5.000.

New York University: *See—*

Moscatelli, David A.; Rifkin, Daniel B . and Sommer, Andreas, 5,026,839, Cl. 536-27.000.

Newport News Shipbuilding and Dry Dock Company: *See—*

Schellenberg, Victor R.; Zsoldos, James, Hartman, Joy L., Smith, William H., deceased; Covington, Wilbur T.; and Conley, Allen, 5,026,211, Cl. 405-204.000.

Newton, Charles M.; and Urban, Paul L., to Cooper Industries. Surface mount soldering tip holder. 5,025,973, Cl. 228-55 000.

Newton, Thomas A., Jr.: *See—*

Barr, John D.; and Newton, Thomas A., Jr , 5,025,874, Cl. 175-329.000.

Ng, Chai-Nam: *See—*

Dhyanchand, P. John, Patel, Sunil; Ng, Chai-Nam, and Nguyen, Vietson, 5,027,265, Cl. 363-37.000.

NGK Insulators, Ltd.: *See—*

Hanzawa, Shigeru; Matsuda, Hiroto; and Fusimi, Kouzi, 5,026,671, Cl 501-96.000.

NGK Spark Plug Co., Ltd.: *See—*

Iio, Satoshi; Watanabe, Masakazu; Imura, Toru; Kuroda, Kotaro: and Saka, Hiroyasu, 5,026,601, Cl 428-336.000.

Kobayashi, Hiroshi; and Itoh, Toshiharu, 5,025,666, Cl. 73-632.000.

Ngo, Toan M., to Monsanto Chemical Company. Compositions and process for metal treatment. 5,026,423, Cl 106-14 120.

Nguyen, Dai Q.. *See—*

Daneshtalab, Mohsen; Nguyen, Dai Q ; Ha, Chan M.; Luu, Hiep T.; Tempest, Laurence M., and Micetich, Ronald G., 5,026,848, Cl. 544-137.000.

Nguyen, Vietson: *See—*

Dhyanchand, P. John; Patel, Sunil; Ng, Chai-Nam; and Nguyen, Vietson, 5,027,265, Cl. 363-37 000.

Nho, Dong-wan: *See—*

Kim, Young-gil; Kim, Jin-woong; and Nho, Dong-wan, 5,026,441, Cl. 148-402.000.

Nichols, Walter A.: *See—*

Hill, Michael, and Nichols, Walter A , 5,025,815, Cl. 131-332.000.

Nickel, Gregory: *See—*

Anderson, Martin L.; and Nickel, Gregory, 5,025,970, Cl. 227-156.000.

Nicol, Ross S.: *See—*

McLachlan, Corran N S.; Catchpole, Owen J , and Nicol, Ross S , 5,026,565, Cl. 426-241.000.

Nicolai, Jean, to SGS Thomson Microelectronics S.A. Analog signal logarithmic envelope detector. 5,027,118, Cl. 341-132.000.

Nicora, Carlo: *See—*

Li Bassi, Giuseppe; Cadona, Luciano; and Nicora, Carlo, 5,026,740, Cl 522-14.000.

Niebur, Mark J Hay feeding apparatus. 5,025,992, Cl 241-101.700.

Nieder, Elmar: *See—*

Engelbrecht, Eckart, Nieder, Elmar; and Keller, Arnold, 5,026,399, Cl 623-18.000.

Nielsen, Arne; and Moghaddassi, Majid, to Guilford Mills, Inc Sueding means in a textile fabric-producing machine. 5,025,644, Cl 66-147.000.

Nielsen, Flemming E.: *See—*

Honore, Tage; Jacobsen, Poul, Nielsen, Flemming E.; and Naerum, Lars, 5,026,704, Cl. 514-250 000.

Niemczyk, Thomas M.: *See—*

Allen, Fritz S.; Bustamante, Carlos, Niemczyk, Thomas M . and Dorman, Burton P., 5,026,159, Cl. 356-318.000.

Niggemann, Richard E.: *See—*

VanDyke, John M.; and Niggemann, Richard E., 5,025,856, Cl 165-167.000.

Nihon Beam Electronics Company, Ltd : *See—*

Ikeda, Takaaki; Suga, Toshihiko; and Kuroiwa, Akihiko, 5,027,040 Cl. 315-241.00R.

Nii, Yasuyuki: *See—*

Chino, Hidenori, Hara, Takashi; Tamura, Kenji; Nakakuki, Yasuhide; Nii, Yasuyuki; Soma, Zenya; and Nishihara, Kiyoshi, 5,027,000, Cl. 290-53.000.

Niimura, Masateru. Flooring apparatus for pool or the like 5,025,512, Cl 4-495.000.

Nikawa, Yoshio: *See—*

Kikuchi, Makoto; Mori, Shinsaku, Nikawa, Yoshio, and Terakawa, Takashige, 5,025,810, Cl. 128-804 000.

Nikkel, Lee F.: *See—*

Schmidt, Eugene H.; and Nikkel, Lee F., 5,025,866, Cl. 172-5.000

Nikon Corporation. *See—*

Matsui, Hideki; and Hagiuda, Nobuyoshi, 5,027,039, Cl. 315-241.00P.

Nikravech, Mehrdad: *See—*

Amouroux, Jacques; Nikravech, Mehrdad; Saint-Just, Jacques, and Vedrenne, Isabelle, 5,026,949, Cl. 585-648.000.

Nilssen, Ole K. Electronically controlled magnetic fluorescent lamp ballast 5,027,032, Cl. 315-103.000.

Nilsson, Alan C.: *See—*

Rea, Edward C., Jr.; and Nilsson, Alan C , 5,027,367, Cl 372-94 000.

Nilsson, Sten A.. *See—*

Jonsson, Jan L.; and Nilsson, Sten A . 5,026,535, Cl. 423-525.000

Nintendo of America, Inc.: *See—*

Ichitsubo, Norio; Kamada, Hiroshi, and Barr, Lance. 5,025,526, Cl 15-210.00R.

Nippon A.B.S., Ltd.: *See—*

Arikawa, Tetsuro, 5,026,127, Cl. 303-116.000

Nippon Fillestar Co., Ltd.. *See—*

Miyazaki, Masatoshi; Sasaki, Ken; Maeda, Hachiro; Sakai, Hisami, Kamikawa, Sumio; Takai, Kiyoshi; Ogawa, Yutaka; and Tanaka, Yuichi, 5,026,319, Cl. 452-177.000.

Nippon Hose Kyokai: *See—*

Numazawa, Junji, and Aruga, Fusayoshi, 5,027,246, Cl. 360-126.000.

Nippon Mining Co., Ltd.: *See—*

Itoh, Eiji; Nagase, Ryuichi; Saito, Kazuhiro; Hosaka, Hiroshi; and Nagai, Hihumi, 5,026,614, Cl. 428-658 000.

Johnson, Paul H., 5,026,639, Cl. 435-69.100.

Nippon Oil Co., Ltd.: *See—*

Sano, Akira; Kamiishi, Hirofumi; Kobayashi, Seizo, Matsuura, Kazuo; and Yokoyama, Shigeki, 5,026,511, Cl 264-28.000.

Shioiri, Tomonori; Satake, Shinichi, Sekido, Yasuo; Fujisou, Tokuo; Obuchi, Akira; and Kato, Hideharu, 5,026,536, Cl. 423-652.000.

Nippon Petrochemicals Company, Limited: *See—*

Shimizu, Isoo; Matsumura, Yasuo; and Inomata, Yoshihisa, 5,026,939, Cl. 585-439.000.

Nippon Roki Co., Ltd.: *See—*

Tanabe, Kazushige; and Bonkohara, Katsutoshi, 5,026,478, Cl. 210-232.000.

Nippon Shokubai Kagaku Kogyo Co., Ltd *See—*

Kimura, Kazumasa; Nagasuna, Kinya; Namba, Takashi, Kadonaga, Kenji; Miyake, Koji, and Shimomura, Tadao, 5,026,800, Cl. 526-200.000.

Urano, Yoshiaki; and Kadono, Yukio, 5,026,880, Cl. 549-430.000.

Nippon Soda Company, Ltd.. *See—*

Ishiguro, Masaji; Iwata, Hiromitsu, Nakatsuka, Takashi, and Yamada, Yasuo, 5,026,844, Cl. 540-357.000.

Nippon Steel Corporation: *See—*

Tanaka, Masaki; Abe, Norito; Yabumoto, Masao; Ushigami, Yoshiyuki; and Nozawa, Tadao, 5,026,439, Cl. 148-111.000.

Nippon Suisan Kaisha, Ltd.: *See—*

Miyazaki, Masatoshi; Sasaki, Ken; Maeda, Hachiro; Sakai, Hisami; Kamikawa, Sumio; Takai, Kiyoshi, Ogawa, Yutaka; and Tanaka, Yuichi, 5,026,319, Cl. 452-177.000.

Nippon Thompson Co., Ltd.: *See—*

Masuda, Ichiro, 5,026,177, Cl 384-447 000.

Nippon Zeon Co., Ltd.: *See—*

Nakagawa, Takashi; and Sugimoto, Osamu, 5,026,583, Cl 428-36.800.

Nojiri, Ryuji; Hayakawa, Yoshihiro; Uchiyama, Mamoru; Kato, Hisatoyo; Chino, Yasuyoshi; and Tahara, Shinichiro, 5,026,838, Cl. 536-27.000.

Nishi, Masami; Kishimoto, Kiyoshi; and Matsumoto, Haruo, to Kyocera Corporation. Cermet solid end mill. 5,026,227, Cl. 407-119.000.

Nishida, Hiroshi; Ishigaki, Tatsuya; Ito, Atsushi; Kudou, Yoshinobu, Katou, Hiroshi; and Fujii, Kousuke, to Hitachi, Ltd. Magnetic disk apparatus having at least six magnetic disks. 5,027,242, Cl 360-106.000.

Nishida, Koji: *See—*

Takagi, Kiyoji; and Nishida, Koji, 5,026,787, Cl. 525-391.000.

Nishiguchi, Masanori; and Okazaki, Naoto, to Sumitomo Electric Industries, Ltd. Semiconductor device MESFET with upper and lower layers. 5,027,170, Cl. 357-22.000.

Nishiguchi, Toshiji: *See—*

Nakajima, Ikuo; Okamura, Moriyuki; and Nishiguchi, Toshiji, 5,026,395, Cl. 623-6.000.

Nishihara, Kiyoshi: *See—*

Chino, Hidenori; Hara, Takashi; Tamura, Kenji; Nakakuki, Yasuhide; Nii, Yasuyuki; Soma, Zenya; and Nishihara, Kiyoshi, 5,027,000, Cl. 290-53.000.

Nishikaji, Satoshi, to Mazda Motor Corporation. Seat occupant restraining apparatus. 5,026,093, Cl. 280-807.000.

Nishiki, Masayuki, to Kabushiki Kaisha Toshiba. Diagnostic X-ray apparatus. 5,027,380, Cl. 378-4.000.

Nishimura, Keizo; Higuchi, Shigemitsu; and Okamura, Fuzio, to Hitachi, Ltd. Interpolation circuit for digital signal processor. 5,027,209, Cl. 358-160.000.

Nishimura, Makoto; and Takase, Shigeaki, to Mitsubishi Denki Kabushiki Kaisha. Load state decision apparatus for servomotor. 5,027,044, Cl. 318-568.110.

Nishimura, Tetsuharu: *See—*

Ishizuka, Koh; Nishimura, Tetsuharu; Tsukiji, Masaaki; and Ishii, Satoshi, 5,026,985, Cl. 250-231.160.

Nishioka, Fujio, to Tokai Regional Fishery Research Laboratory. Method for the preparation of leached fish flesh and product thereof. 5,026,573, Cl. 426-643.000.

Nishiyama, Michiaki: *See—*

Uekido, Kouzou; Nishiyama, Michiaki; and Sakamoto, Katsuhiko, 5,026,306, Cl. 439-675.000.

Nishizawa, Jun-ichi; and Kondoh, Hisao, to Mitsubishi Electric Corporation. Double gate static induction thyristor. 5,027,180, Cl. 357-38.000.

Nissan Chemical Industries, Ltd.: *See—*

Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kitahara, Masaki, 5,026,698, Cl. 514-215.000.

Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kitahara, Masaki, 5,026,708, Cl. 514-256.000.

Taniguchi, Masakazu; Baba, Masatoshi; Ochiai, Yoshinori; Hirose, Masayoshi; and Hirata, Kiminori, 5,026,850, Cl. 544-240.000.

Nissan Motor Co., Ltd.: *See—*

Hirota, Masaki; Fujiki, Norio; and Mihara, Teruyoshi, 5,027,251, Cl. 361-18.000.

Hisatomi, Masahiro; Togasaki, Yoshihiro; and Tanaka, Mitsuyasu, 5,026,294, Cl. 439-125.000.

Kobayashi, Hiroshi; and Itoh, Toshiharu, 5,025,666, Cl. 73-632.000.

Nissei Jushi Kogyo Kabushiki Kaisha: *See—*

Kanai, Toshiyuki; and Shinnoh, Nobuo, 5,026,265, Cl. 425-127.000.

Nissen, Rudy: *See—*

Carlson, Lee; Green, Mike; Miller, Mike; Nissen, Rudy; and Sheng, Steve, 5,025,952, Cl. 222-3.000.

Nisshin Oil Mills, Ltd., The: *See—*

Manoh, Yumiko; and Seto, Akira, 5,026,644, Cl. 435-134.000.

Nissin Kogyo Kabushiki Kaisha: *See—*

Miyazaki, Yoshihisa, 5,025,709, Cl. 92-48.000.

Nitto, Kouji: *See—*

Yoda, Shigeru; and Nitto, Kouji, 5,027,339, Cl. 369-54.000.

Niwa, Minoru, to Colin Electronics Co., Ltd. Pulse oximeter with physical motion sensor. 5,025,791, Cl. 128-670.000.

Nixon, James A.; Pioch, Richard P.; Schaus, John M.; and Titus, Robert D., to Eli Lilly and Company. Ring-substituted 2-amino-1,2,3,4-tetrahydronaphthalenes. 5,026,707, Cl. 514-255.000.

Nixon, Ross O.: *See—*

Orlov, Alexei D.; Nixon, Ross O.; and Misick, John H D , 5,026,271, Cl. 431-125.000.

Nizamuddin, Nadir: *See—*

Littlewood, Timothy J.; Robertson, David J.; Maginley, Ronald J.; Chapman, Alan S. J.; Thomas, Terence N.; and Nizamuddin, Nadir, 5,027,345, Cl. 370-58.200.

Nobileau, Philippe C., to Vetco Gray Inc. Casing hanger wear bushing. 5,025,864, Cl. 166-348.000.

Nobles, Anthony A. Apparatus for in-situ cutting of valves within veins and method therefor. 5,026,383, Cl. 606-159.000.

Noboru, Mitsuhiro: *See—*

Yamauchi, Miyoshi; and Noboru, Mitsuhiro, 5,027,430, Cl. 455-188.000.

Noda, Shuichiro: *See—*

Yatsunami, Takashi; Yazaki, Akira; Inoue, Satoshi; Yamamoto, Hitoshi; Yokomoto, Masaharu; Nomiyama, Jun; and Noda, Shuichiro, 5,026,856, Cl. 546-156.000.

Noel, Bruce W.; Borella, Henry M.; Cates, Michael R.; Turley, W. Dale; Macarthur, Charles D.; and Cala, Gregory C., to United States of America, Energy; and United States of America, Air Force. Optical heat flux gauge. 5,026,170, Cl. 374-29.000.

Nogi, Toshiharu: *See—*

Yamauchi, Teruo; Nogi, Toshiharu; and Ohyama, Yoshishige, 5,025,766, Cl. 123-472.000.

Noguchi, Takehiko; Sakubata, Takashi; Hisanaga, Akinori; Yoshioka, Tetsuo; and Nagano, Hirosaku, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Process for continuous mixing of a two-liquid curing type resin. 5,026,820, Cl. 528-350.000.

Nojiri, Hiromi: *See—*

Imai, Munehisa; Asano, Atsushi; Yasue, Tsutomu; Ito, Kenichiro; and Nojiri, Hiromi, 5,025,902, Cl. 192-43.000.

Nojiri, Ryuji; Hayakawa, Yoshihiro; Uchiyama, Mamoru; Kato, Hisatoyo; Chino, Yasuyoshi; and Tahara, Shinichiro, to Nippon Zeon Co., Ltd. Phosphoramidite compounds and process for production thereof. 5,026,838, Cl. 536-27.000.

Nokia Unterhaltungselektronik: *See—*

Ehrhardt, Andreas, 5,027,097, Cl. 335-213.000.

Nokubo, Seiji; Kohno, Teruhisa; Hashida, Koichi; Usuki, Takashi; and Higashimura, Hideaki, to Sumitomo Electric Industries, Ltd Flow control valve for antilock brake control device 5,026,123, Cl. 303-117.000.

Nomiyama, Jun: *See—*

Yatsunami, Takashi; Yazaki, Akira, Inoue, Satoshi; Yamamoto, Hitoshi; Yokomoto, Masaharu; Nomiyama, Jun; and Noda, Shuichiro, 5,026,856, Cl. 546-156.000.

Nomura, Tomio: *See—*

Takigawa, Shoji; Teranishi, Kiyoshi; Nomura, Tomio; Suzuki, Toshiro; and Sakai, Kozo, 5,026,496, Cl. 252-56.00R.

Nonaka, Jun: *See—*

Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji, Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi, Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000.

Nordischer Maschinebau Rud.Baader GmbH + Co K.G . *See—*

Jahnke, Joachim, 5,026,318, Cl. 452-116.000.

Nordson Corporation: *See—*

Cucuzza, Carl C.; Raterman, John M , and Keuter, John P., 5,026,450, Cl. 156-244.110.

Merkel, Stephen L., 5,026,989, Cl. 250-338.100.

North, Peter C.; Oxford, Alexander W.; and Cavalla, David J., to Glaxo Group Limited. Ketone derivatives which are antagonists of 5-HT at 5-HT$_3$ receptors, compositions containing them, and method of use. 5,026,696, Cl. 514-214.000.

North, Peter C.: *See—*

Oxford, Alexander W.; North, Peter C., and Cavalla, David J., 5,026,722, Cl. 514-397.000.

Northern Telecom Limited: *See—*

Chan, Wing-Man; Tu, Quoc H., and Chungphaisan, Vithit, 5,027,343, Cl. 370-017.000.

Littlewood, Timothy J.; Robertson, David J., Maginley, Ronald J., Chapman, Alan S. J.; Thomas, Terence N., and Nizamuddin, Nadir, 5,027,345, Cl. 370-58.200.

Svilans, Mikelis N., 5,027,178, Cl 357-30.000.

Thomas, Terence N.; Bonneville, Marc E., and Wadsworth, Douglas C., 5,027,392, Cl. 379-388.000.

Nortrans Shipping and Trading Far East PTE Ltd.: *See—*

Urdshals, Karl A. B., 5,025,742, Cl. 114-230.000.

Norwich Eaton Pharmaceuticals, Inc.: *See—*

Drust, Eugene G.; Kasting, Gerald B.; Smith, Ronald L and Szkutak, Joan B., 5,026,556, Cl. 424-449.000.

Nova Biomedical Corporation: *See—*

Harding, John C., Jr., 5,027,075, Cl. 324-662.000.

Novo Nordisk A/S: *See—*

Honore, Tage; Jacobsen, Poul; Nielsen, Flemming E.; and Naerum, Lars, 5,026,704, Cl. 514-250.000.

Novosel, John M. Golf club swing training device. 5,026,064, Cl 273-186.00E.

Nowak, Edward, to Ciba-Geigy Corporation. Microbicidal agrochemical compositions. 5,026,719, Cl. 514-383.000.

Nozawa, Tadao: *See—*

Tanaka, Masaki; Abe, Norito; Yabumoto, Masao; Ushigami, Yoshiyuki; and Nozawa, Tadao, 5,026,439, Cl. 148-111.000.

NPBI Nederlands Produktielaboratorium voor Bloedtransfusieapparatuur en Infusievloeistoffen B.V.: *See—*

Biekart, Frank T.; and Hilbrink, Hubertus E., 5,026,019, Cl. 251-4.000.

NTN Corporation: *See—*

Fukumura, Yoshikazu; and Ohki, Toshiyuki, 5,026,323, Cl 464-175.000.

Imai, Munehisa; Asano, Atsushi; Yasue, Tsutomu; Ito, Kenichiro; and Nojiri, Hiromi, 5,025,902, Cl. 192-43.000.

Ito, Yukifusa, 5,026,179, Cl. 384-523.000.

Nucleic Acid Research Institute: *See—*

Robins, Roland K.; Revankar, Ganapathi R.; and Hanna, Naeem B., 5,026,836, Cl. 536-24.000.

Nuessli, Eduard: *See—*

Faas, Jurg; Nuessli, Eduard; Grundler, Christof; Staheli, Paul; Hanselmann, Daniel; Demuth, Robert; Waeber, Rene; and Fritzsche, Peter, 5,025,533, Cl. 19-145.500.

Numauchi, Hiromitsu: *See—*

Funabashi, Isao; Ebina, Toshihiko; and Numauchi, Hiromitsu, 5,025,726, Cl. 101-352.000.

Numazawa, Junji; and Aruga, Fusayoshi, to Nippon Hose Kyokai; and Kabushiki Kaisha Sankyo Seiki Seisakusho. Thin film magnetic head and a method for manufacturing thereof. 5,027,246, Cl. 360-126.000.

Nunn, Leslie M.: *See—*

Jensen, Claus; and Nunn, Leslie M., 5,026,176, Cl. 384-53.000.

Nutter, Betty. Nasal cannula assembly. 5,025,805, Cl. 128-207.180.

Nyc, Wladimir. Internal combustion engine. 5,025,756, Cl. 123-18.00R.

Nylok Fastener Corporation: *See—*

Sessa, Eugene D.; and Duffy, Richard, 5,025,750, Cl. 118-69.000.

Oakes, Graham; Marrison, Terrence; and Bridge, Martin, to Special Melted Products Limited. Composite tubular products. 5,025,975, Cl 228-127.000.

Obara Corporation: *See—*

Saito, Jun; and Suzuki, Motohisa, 5,026,963, Cl. 219-89.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Obayashi, Akira: *See—*
  - Kotani, Hirokazu; Hiraoka, Nobutsugu; and Obayashi, Akira, 5,026,645, Cl. 435-194.000.
- Obikawa, Tsuyoshi, to Seiko Epson Corporation. 1,3-dioxane derivatives and composition including same. 5,026,879, Cl. 549-369.000.
- Obrecht, Werner: *See—*
  - Musch, Rudiger; Magg, Hans; Obrecht, Werner; and Muller, Eberhard, 5,026,779, Cl. 525-215.000.
- O'Brien, Gwendolyn I. Glove. 5,025,503, Cl. 2-163.000
- O'Brien, Michael E., to Elk River Enterprises, Inc. Reinforced laminated beam. 5,026,593, Cl. 428-215.000.
- Obuchi, Akira: *See—*
  - Shioiri, Tomonori; Satake, Shinichi; Sekido, Yasuo; Fujisou, Tokuo; Obuchi, Akira; and Kato, Hideharu, 5,026,536, Cl. 423-652.000.
- Ochiai, Yoshinori: *See—*
  - Taniguchi, Masakazu; Baba Masatoshi; Ochiai, Yoshinori; Hirose, Masayoshi; and Hirata, Kiminori, 5,026,850, Cl. 544-240.000.
- Ocker, Johannes: *See—*
  - Brahms, Martin; Chahabadi, Ziaedin; and Ocker, Johannes, 5,027,434, Cl. 455-606.000.
- Ockovic, Richard C.; McDermott, Wayne T.; and Schwarz, Alexander, to Air Products and Chemicals, Inc. Process for sizing particles using condensation nucleus counting. 5,026,155, Cl. 356-37.000.
- O'Connor, James E., to Phillips Petroleum Company Method for making variable cross section pultruded thermoplastic composite articles. 5,026,447, Cl. 156-166.000.
- O'Connor, Patrick L. Pavement and base recycle method and apparatus. 5,026,206, Cl. 404-77.000.
- Oda, Kenji; Eki, Makoto; Tsutsui, Eiji; and Maeshima, Masanobu, to Mita Industrial Co., Ltd. Image-forming machine having a process unit detachably mountable on a movable supporting and guiding means. 5,027,152, Cl. 355-200.000.
- Oda, Masataka; Hara, Yoshinobu; and Hara, Kazuyoshi, to Minolta Camera Kabushiki Kaisha. Electrophotographic image forming apparatus capable of developing normal and inverted images. 5,027,159, Cl. 355-271.000.
- Odagiri, Masaki: *See—*
  - Seto, Takatoshi; Yokoi, Takashi; Odagiri, Masaki, and Imanari, Makoto, 5,026,922, Cl. 568-486.000.
- Odaka, Seiya: *See—*
  - Hirashita, Hiroshi; and Odaka, Seiya, 5,025,897, Cl. 188-73.380.
- Odanaka, Shinji: *See—*
  - Fuse, Genshu; Yamada, Toshio; Odanaka, Shinji; and Fukumoto, Masaki, 5,026,658, Cl. 437-52.000.
- O'Dell, Thomas M.; and Overmyer, Ricky L., to AT&T Bell Laboratories. Switch-adjunct communications protocol. 5,027,358, Cl. 371-62.000.
- Oftedal, Teryl M.; Bourgeous, Clarence G; Morita, Haruyuki, and Miyaji, Masayoshi, to Deere & Company Downshifting work vehicle using differential lock switch 5,026,335, Cl. 475-198.000.
- Ogata, Kimio: *See—*
  - Ohtsuka, Koji; Kutsuzawa, Yoshiro; Ogata, Kimio; and Ichinosawa, Hideyuki, 5,027,166, Cl. 357-15.000.
- Ogawa, Kazumi. *See—*
  - Kitsuta, Tatsuaki; Shimotsuhama, Isao; Watanabe, Yoshio; Tanaka, Masahiro; Shiotsu, Shinichi; and Ogawa, Kazumi, 5,027,005, Cl. 307-272.100.
- Ogawa, Kenichi: *See—*
  - Suzuki, Terao; Kishi, Matsuo; Muraishi, Katsuyoshi; Ogawa, Kenichi; and Takashio, Hiroshi, 5,026,518, Cl. 419-12.000.
- Ogawa, Kenji: *See—*
  - Suzuki, Hiroyoshi; Ogawa, Kenji; Maekawa, Hiroko; Kominami, Seiya, and Asayama, Yoshiaki, 5,026,153, Cl 356-1.000.
- Ogawa, Yoshihiro: *See—*
  - Imataki, Hiroyuki; Hiraoka, Mizuho; Ogawa, Yoshihiro; Yoshino, Hitoshi; Ichikawa, Sachiko, and Kato, Seijiro, 5,026,623, Cl 430-270.000.
- Ogawa, Yutaka: *See—*
  - Miyazaki, Masatoshi; Sasaki, Ken; Maeda, Hachiro; Sakai, Hisanii; Kamikawa, Sumio; Takai, Kiyoshi; Ogawa, Yutaka; and Tanaka, Yuichi, 5,026,319, Cl. 452-177.000.
- Oguma, Tomio: *See—*
  - Takeda, Hisanobu; and Oguma, Tomio, 5,025,511, Cl. 4-447.000.
- Oguri, Motohiro; Kano, Yoshiaki; Mishima, Kiyotaka; Yamada, Masahiko; Kasano, Kenji; and Uemura, Masaru, to Tosho Corporation. Y zeolite catalyst. 5,026,941, Cl. 585-467.000.
- Ohata, Keiichi, to NEC Corporation. Process of fabricating a heterojunction field effect transistor. 5,026,655, Cl. 437-40.000.
- Ohe, Tatsuya; and Fujimura, Mitsuaki, to Mitsui Petrochemical Industries, Ltd. Method of and apparatus for manufacturing tube having holes. 5,026,965, Cl. 219-121.700.
- Ohhara, Toshio: *See—*
  - Ohira, Yosihiro; Ohhara, Toshio; and Miyabayashi, Toshio, 5,026,807, Cl. 526-321.000.
- Ohi Seisakusho Co., Ltd.: *See—*
  - Kato, Yuichi, 5,025,880, Cl. 180-89.140.
- Ohira, Yosihiro; Ohhara, Toshio; and Miyabayashi, Toshio, to Japan Synthetic Rubber Co., Ltd. Novel ester group-containing (meth)acrylic acid ester, novel (co)polymer thereof, composition comprising the (co)polymer and composition comprising the ester group containing (meth)acrylic acid ester. 5,026,807, Cl. 526-321.000.
- Ohkawa, Tihiro, to General Atomics. Ceramic superconductor wire apparatus and methods. 5,026,683, Cl. 505-1.000.
- Ohkawa, Wataru: *See—*
  - Yorozu, Hidenori; Eguchi, Yasuteru; Ohkawa, Wataru, and Matsumoto, Yasunobu, 5,026,551, Cl. 424-44.000.
- Ohkawara, Makoto: *See—*
  - Tsubuko, Kazuo; Kuramoto, Shinichi; Umemura, Kazuhiko; and Ohkawara, Makoto, 5,026,621, Cl. 430-109.000.
- Ohki, Nobutaka: *See—*
  - Ono, Michio; Hirai, Hiroyuki, Ohki, Nobutaka; and Nakamura, Koki, 5,026,634, Cl. 430-559.000.
- Ohki, Toshiyuki: *See—*
  - Fukumura, Yoshikazu; and Ohki, Toshiyuki, 5,026,323, Cl. 464-175.000.
- Ohmori, Toshiaki: *See—*
  - Tada, Masuo; Hata, Takeki; Fukumoto, Takaaki; and Ohmori, Toshiaki, 5,025,597, Cl. 51-410.000.
- Ohnari, Mikihiko; Sekozawa, Teruji; Funabashi, Motohisa, Atago, Takeshi; and Shioya, Makoto, to Hitachi, Ltd. Method of engine control timed to engine revolution. 5,027,278, Cl. 364-431.060.
- Ohno, Kazunori, to Fuji Photo Optical Co., Ltd. Lens changer for cameras. 5,027,144, Cl. 354-195.120.
- Ohnuma, Yoshiyuki; and Tanaka, Norio, to Achilles Corporation Process for the production of urethane-modified polyisocyanurate foam. 5,026,737, Cl. 521-78.000.
- Ohri, Kul B.; and Chern, Wen-Foo, to Micron Technology, Inc Low power $V_{CC}/2$ generator. 5,027,053, Cl. 323-314.000.
- Ohshima, Michio: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji, Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru, Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000.
- Ohshiro, Masatoshi: *See—*
  - Inoue, Katsura; Fukura, Kenichi; Tajima, Masakatsu; Iwamura, Toru; and Ohshiro, Masatoshi, 5,027,301, Cl. 362-66.000.
- Ohta, Motomi; Takahashi, Teruyoshi, Ikari, Hirotake; and Agui, Wataru, to Rohm and Haas Company. Aquatic antifouling compositions. 5,026,424, Cl. 106-18.340
- Ohtani, Go: *See—*
  - Kobayashi, Mitsugu; Ohtani, Go; Sekino, Jun; Konno, Toshimitsu; and Maeda, Hiroshi, 5,026,772, Cl. 525-54.100.
- Ohtani, Ikuji: *See—*
  - Hosoya, Kazuhiro; Ohtani, Ikuji; and Imaizumi, Kimio, 5,026,805, Cl. 526-309.000.
- Ohto, Masao: *See—*
  - Tanaka, Masataka; Ohto, Masao; Sekine, Tetsuo; Takahashi, Hiroshi; and Maruyama, Masaru, 5,026,350, Cl. 604-158.000.
- Ohtsuka, Koji; Kutsuzawa, Yoshiro; Ogata, Kimio; and Ichinosawa, Hideyuki, to Sanken Electric Co., Ltd. High voltage, high speed Schottky semiconductor device and method of fabrication. 5,027,166, Cl. 357-15.000.
- Ohuchi, Hideo: *See—*
  - Mizuno, Koichi, Wakabayashi, Takeshige; Koinuma, Yutaka; Aizawa, Reiji; Kushiyama, Satoshi; Kabayashi, Satoru, Ohuchi, Hideo; Yoshida, Toyonobu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, 5,026,464, Cl. 204-164.000.
- Ohuchi, Yukihiro: *See—*
  - Sugihara, Tadashi; Takeshita, Takuo; and Ohuchi, Yukihiro, 5,026,680, Cl. 505-1.000.
- Ohwaki, Akira: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira, and Ohwaki, Akira, 5,027,137, Cl 354-4.000.
- Ohyama, Yoshishige: *See—*
  - Yamauchi, Teruo; Nogi, Toshiharu; and Ohyama, Yoshishige, 5,025,766, Cl. 123-472.000
- OIS Optical Imaging Systems, Inc.: *See—*
  - Ondris, Miroslav, 5,026,980, Cl. 250-208.100.
- Okabe, Masao; Amgai, Akikzau; Eto, Haruaki; and Tanaka, Yasuo, to Mitsubishi Gas Chemical Company, Inc. Resin composition based on modified polyphenylene ether and polyphenylene sulfide, and molded articles therefrom. 5,026,764, Cl. 524-540.000.
- Okada, Hiroyuki: *See—*
  - Inoue, Manabu; and Okada, Hiroyuki, 5,027,150, Cl. 354-484.000.
- Okada, Shinji: *See—*
  - Arai, Kazuo; and Okada, Shinji, 5,026,509, Cl. 360-77.150.
- Okada, Shinjiro: *See—*
  - Taniguchi, Osamu; Kawagishi, Hideyuki, Tsuboyama, Akira; Okada, Shinjiro, Inaba, Yutaka, and Kanbe, Junichiro, 5,026,144, Cl. 350-350.00S.
- Okada, Tamotsu; Hosoi, Atsushi; Suzuki, Yoshihiko; and Yano, Kanji, to Canon Kabushiki Kaisha Image fixing apparatus with movable film and means for controlling film position. 5,027,160, Cl. 355-282.000.
- Okamura, Fuzio: *See—*
  - Nishimura, Keizo; Higuchi, Shigemitsu, and Okamura, Fuzio, 5,027,209, Cl. 358-160.000.
- Okamura, Kazuo: *See—*
  - Kitamura, Ikuo; Aomi, Hideki; Koyama, Satoshi; Tokunaga, Katsushi; and Okamura, Kazuo, 5,026,605, Cl. 428-403.000.
- Okamura, Moriyuki: *See—*
  - Nakajima, Ikuo; Okamura, Moriyuki; and Nishiguchi, Toshiji, 5,026,395, Cl. 623-6.000.

- Okawa, Masahisa. *See—*
  - Shiga, Akinobu; Fukui, Yoshiharu; Sasaki, Toshio; Okawa, Masahisa; and Matsuura, Hideaki, 5,026,889, Cl. 526-142.000.
- Okawa, Takasi: *See—*
  - Sugawara, Harusige; and Okawa, Takasi, 5,026,876, Cl. 549-257.000.
- Okazaki, Naoto: *See—*
  - Nishiguchi, Masanori; and Okazaki, Naoto, 5,027,170, Cl. 357-22.000.
- Okazaki, Toru; and Isojima, Shigeki, to Sumitomo Electric Industries, Ltd. Saddle type dipolar coil eliminating only sextupole components of magnetic field. 5,027,098, Cl 335-213.000.
- Okuda, Masayuki: *See—*
  - Morozumi, Naoya; Sakata, Hirotsugu; Hayano, Makoto; Okuda, Masayuki; Fujiwara, Takayoshi; Shimoda, Moriaki; and Hattori, Hitoshi, 5,026,264, Cl. 418-220.000.
- Okui, Tokujiro. Package for electronic parts. 5,025,923, Cl. 206-329.000.
- Okuma Machinery Works, Ltd.: *See—*
  - Narushima, Hiroshi, 5,025,914, Cl. 198-660.000.
- Okuyama, Takashi *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000.
- Olasupo, Kolawole R.: *See—*
  - Hills, Graham W.; Huttemann, Robert D.; and Olasupo, Kolawole R., 5,026,666, Cl. 437-195.000.
- Olenick, John A.: *See—*
  - Bourdelaise, Robert A.; Harris, David B., Harris, Denise B., and Olenick, John A., 5,027,191, Cl. 357-74.000.
- Olin Corporation: *See—*
  - Day, Roger W.; and Morgan, Michael J., 5,026,774, Cl. 525-56.000.
  - Vierod, Richard P.; Cheskis, Harvey P.; and Tyler, Derek E., 5,026,433, Cl. 148-2.000.
- Olivares, Raul A.: *See—*
  - Balyasny, Marik; Olivares, Raul A. and Sepmeyer, Arthur C., 5,026,301, Cl. 439-391.000.
- Olivier, Errol: *See—*
  - Pratt, Charles F.; Phadke, Shrikant V.; and Olivier, Errol, 5,026,776, Cl. 525-64.000.
- Olorenshaw, George M.: *See—*
  - Holt, Peter K.; and Olorenshaw, George M., 5,025,509, Cl 4-206.000.
- Olympus Optical Co., Ltd.: *See—*
  - Fujimori, Hiroyoshi, 5,027,214, Cl. 358-209.000.
  - Yamaoka, Toshihide, 5,025,552, Cl. 29-825.000.
- O'Malley, Kathleen G.: *See—*
  - Chang, Christina L.; Gaeta, Jesus M.; O'Malley, Kathleen G.; and Rowland, Stuart W., 5,027,110, Cl. 340-731.000.
- O'Mara, William E., Jr.; and Schrantz, Gregory A., to Harris Corporation. Polycrystalline silicon ohmic contacts to group III-arsenide compound semiconductors. 5,027,187, Cl. 357-65.000.
- Omron Corporation: *See—*
  - Misumi, Fumihiko; Ueda, Masazumi; Hara, Masato; Matsui, Yutaka; and Imai, Kiyoshi, 5,026,978, Cl. 250-205.000.
- Omron Tateisi Electronics Co.: *See—*
  - Yasuoka, Yuji; Kitagawa, Yoshiharu; and Imai, Yoshikiyo, 5,027,094, Cl. 335-78.000.
  - Yoda, Shigeru; and Nitto, Kouji, 5,027,339, Cl. 369-54.000.
  - Yotsuya, Teruhisa, 5,027,295, Cl. 364-552.000.
- OMYA GmbH: *See—*
  - Barthelmess, Ulrich, 5,025,930, Cl. 209-144.000.
- Ondris, Miroslav, to OIS Optical Imaging Systems, Inc. Light biased photoresponsive array having low conductivity regions separating individual cells. 5,026,980, Cl. 250-208.100.
- Oneac Corporation: *See—*
  - McCartney, Andrew; DeWitt, Charles; and Elliott, William, 5,027,285, Cl. 364-483.000.
- O'Neil, Walter K.; Rockey, Carl E.; and Mohan, Robert J., to Eaton Corporation. Remote sensing viscous fluid coupling. 5,025,906, Cl. 192-58.00B.
- O'Neill, Brian T.: *See—*
  - Friedmann, Robert C.; Lackey, John W.; and O'Neill, Brian T., 5,026,845, Cl. 549-492.000.
- O'Neill, John F.; and Benko, Lawrence R., to Call Management Products, Inc. Call management system. 5,027,391, Cl. 379-373.000.
- Onishi, Janet C.: *See—*
  - Bartizal, Kenneth F.; and Onishi, Janet C., 5,026,554, Cl. 424-404.000.
- Ono, Harry. Selectively operable split ring clutch. 5,025,907, Cl. 192-80.000.
- Ono, Kenji; and Iribe, Hajime, to Matsushita Electric Industrial Co., Ltd. Folding type telephone containing a wound electrical connection. 5,027,394, Cl. 379-434.000.
- Ono, Michio; Hirai, Hiroyuki; Ohki, Nobutaka; and Nakamura, Koki, to Fuji Photo Film Co., Ltd. Color light-sensitive material. 5,026,634, Cl. 430-559.000.
- Ono, Yoshio; and Shimano, Noriyuki, to Dainippon Screen Mfg. Co., Ltd. Method of and apparatus for simulating object image to be printed. 5,027,196, Cl. 358-76.000.
- Onoue, Akihiro, to Sanshin Kogyo Kabushiki Kaisha. Casing arrangement for marine propulsion unit. 5,026,309, Cl. 440-76.000.
- Oogaya, Kaoru: *See—*
  - Owada, Nobuo; Oogaya, Kaoru; Kobayashi, Tohru; and Kawaji, Mikinori, 5,027,188, Cl. 357-68.000.
- Ooi, Akihiko; and Hirono, Toshiaki, to Yoshida Kogyo, K. K. Apparatus for connecting strut and horizontal member. 5,026,028, Cl. 256-67.000.
- Ooishi, Takashi; and Matsumoto, Akira, to Mitsui Mining Company, Limited. Production process of machinable ceramics. 5,026,412, Cl. 65-18.100.
- Ootsubo, Toshimi: *See—*
  - Takemori, Toshio; Ishiga, Masaru; and Ootsubo, Toshimi, 5,026,568, Cl. 426-549.000.
- Opalko, Albert: *See—*
  - Crossley, Roger; Opalko, Albert; and Shepherd, Robin G., 5,026,854, Cl. 546-112.000.
- Opie, Eric A., deceased: *See—*
  - Silverstein, Fred E.; and Opie, Eric A., deceased, 5,025,778, Cl 128-4.000.
- Opielab, Inc.: *See—*
  - Silverstein, Fred E.; and Opie, Eric A., deceased, 5,025,778, Cl 128-4.000.
- Oppenlaender, Knut: *See—*
  - Denzinger, Walter; Mach, Helmut; Mohr, Juergen; Oppenlaender, Knut; Schwen, Roland; and Vogel, Hans-Henning, 5,026,494, Cl. 252-50.000.
- Orain, Michal, to Glaenzer Spicer. Method and device for finishing a concave spherical bearing surface on a roller segment, particularly for a homokinetic joint. 5,025,595, Cl. 51-291.000.
- Orbach, Zvi; and Ganor, Zeev, to Quick Technologies Ltd. Electromechanical translation apparatus. 5,027,027, Cl. 310-317.000.
- Origin Medsystems, Inc.: *See—*
  - Linovitz, Raymond J.; and Kesten, Randy J., 5,026,375, Cl. 606-79.000.
- Orlov, Alexei D.; Nixon, Ross O.; and Misick, John H. D., to Hunter Douglas International NV. Log or coal effect fire. 5,026,271, Cl. 431-125.000.
- Ornsteen, Robert L.: *See—*
  - Belanger, Richard A.; Melendy, Peter S.; and Ornsteen, Robert L., 5,026,187, Cl. 401-1.000.
- Orosy, Gary D. J.; Hadtke, Frederick B.; and Miller, Paul D., to Gillette Company, The. Travel case. 5,025,928, Cl. 206-581.000.
- Orsborn, Jesse H.; Chambers, Timothy L.; and Watt, John D., to J. I. Case Company. Control system for a cotton harvester. 5,025,614, Cl. 56-10.200.
- Orthofix S.r.l.: *See—*
  - Dezza, Ottavio; and Faccioli, Giovanni, 5,026,374, Cl. 606-72.000.
- Ortiz, Angel L., Jr.; and Schneiter, John L., to General Electric Company. Method and apparatus for optically monitoring laser materials processing. 5,026,979, Cl. 250-205.000.
- Ortolano, Ralph J.; Ball, Kenneth A.; and Bowman, Gary, to Southern California Edison. Blade assembly tool. 5,026,032, Cl. 269-43.000.
- Osakabe, Toshihiko: *See—*
  - Kinoshita, Tsutomu; and Osakabe, Toshihiko, 5,026,251, Cl. 415-119.000.
- Osanai, Satoshi; and Hiraoka, Manabu, to G-C Dental Industrial Corporation. Capsules for tooth-restoring materials. 5,026,283, Cl. 433-90.000.
- Osborne, Timothy W., to Union Carbide Coatings Service Technology Corporation. Powder coating compositions. 5,026,422, Cl. 106-14.110.
- Osher, John D.; Katzman, Allison W.; Luecke, Mark; and Wildman, John R., to Cap Toys, Inc. Toy. 5,026,054, Cl. 273-58.00A.
- Oshima, Keiichi; Kato, Takashi; and Murayama, Susumu, to Seiko Epson Corporation. Apparatus for feeding cut sheet paper and fan fold paper in a printer. 5,026,183, Cl. 400-605.000.
- Oshio, Toshiyuki; Tawata, Kenji; and Mabashi, Masayoshi, to Hitachi, Ltd. Solid-state imaging system with a feed-back circuit including a variable photo-sensitivity control circuit. 5,027,217, Cl. 358-213.190.
- Ostertag, Werner: *See—*
  - Mronga, Norbert; Ostertag, Werner; and Bock, Gustav, 5,026,429, Cl. 106-400.000.
- Otaka, Tadashi: *See—*
  - Hazaki, Eiichi; Otaka, Tadashi; and Shimizu, Minoru, 5,026,995, Cl. 250-441.100.
- Otake, Katsumi; Yanagimoto, Takekazu; Nakajima, Shuichi, and Kishimura, Yuhei, to Fuji Photo Film Co., Ltd Photograph binding apparatus. 5,026,236, Cl. 412-33.000.
- Otis Elevator Company: *See—*
  - Saito, Saburo, 5,025,893, Cl. 187-20.000.
- Ouellette, Thomas C., Jr., to Apollo Manufacturing Corporation. Temporary grate cover especially adapted for paint spray booth areas. 5,025,713, Cl. 98-115.200.
- Overgoor, Bernardus J.: *See—*
  - De Bijl, Andrianus M. J.; Iding, Wilhelmus H., and Overgoor, Bernardus J., 5,027,038, Cl. 315-209.00R.
- Overmyer, Ricky L.: *See—*
  - O'Dell, Thomas M.; and Overmyer, Ricky L., 5,027,358, Cl. 371-62.000.
- Owada, Nobuo; Oogaya, Kaoru; Kobayashi, Tohru; and Kawaji, Mikinori, to Hitachi, Ltd. Semiconductor integrated circuit device in which a semiconductor chip is mounted with solder bumps for mounting to a wiring substrate. 5,027,188, Cl. 357-68.000.
- Owen, Hartley: *See—*
  - Harandi, Mohsen N.; and Owen, Hartley, 5,026,529, Cl 422-190.000.
- Owens-Corning Fiberglas Corporation: *See—*
  - Jacob, Thomas R.; Stenger, Leonard A.; and Uffner, William E., 5,026,609, Cl. 428-489.000.

VOL
1127
ISS
4
JE
25
1991
UMI

Pollet, Jean-Claude; Williams, Gary L., Armstrong, Gordon P.; and Flautt, Martin C., 5,026,410, Cl 65-3.430.
Owens-Illinois Plastic Products Inc.: *See—*
Blackwelder, Maurice W.; and Hill, James A., 5,026,338, Cl. 493-158.000.
Oxford, Alexander W.; North, Peter C.; and Cavalla, David J., to Glaxo Group Limited. Indole derivatives. 5,026,722, Cl. 514-397.000.
Oxford, Alexander W.: *See—*
North, Peter C.; Oxford, Alexander W.; and Cavalla, David J., 5,026,696, Cl. 514-214.000.
Oxman, Joel D.; and Ubel, F. Andrew, III, to Minnesota Mining and Manufacturing Company. Dental impression tray with flange. 5,026,278, Cl. 433-41.000.
Oy Fluid-Bag Ab: *See—*
Wiklund, Christian, 5,025,925, Cl. 206-386.000.
Oya, Akiyoshi, to Yamaha Corporation. Electronic musical instrument employing time-sharing frequency modulation and variable control of harmonics. 5,025,702, Cl. 84-659.000.
Ozawa, Kazunori, to NEC Corporation. Communication system capable of improving a speech quality by a pair of pulse producing units. 5,027,405, Cl. 381-35.000.
Ozawa, Tetsuo: *See—*
Kaneko, Masaharu; Ozawa, Tetsuo; Yoneyama, Tomio; Imazeki, Shuji; Mukoh, Akio; and Sato, Mikio, 5,026,505, Cl. 252-299.100.
Paas, Caspar G. M.: *See—*
Smeets, Paulus J. H. M.; Paas, Caspar G. M.; and Kraanen, Willem P. M., 5,026,770, Cl. 525-7.100.
Pacione, Peter L. Two-piece folder. 5,025,978, Cl. 229-1.50R.
Paciorek, Kazimiera J. L.; Shih, Joseph G.; Randolph, Bruce B., and Snyder, Carl E., Jr., to Lubricating Specialties Company. Polysilahydrocarbon lubricants. 5,026,893, Cl. 556-435.000.
Padilla, Felipe N.: *See—*
Chiang, Peter K.; Leader, Haim; Smejkal, Ruthann M.; Gordon, Richard K.; Payne, Charlotte S.; Doctor, Bhupendra P.; and Padilla, Felipe N., 5,026,897, Cl. 560-58.000.
Page, Dorothy R.; and Berg, Gerald G. Canopy for playpen. 5,025,821, Cl. 135-112.000.
Page, Nancy M.: *See—*
Blain, David A.; Page, Nancy M., and Young, Lewis B., 5,026,933, Cl. 585-7.000.
Page, Philip R.: *See—*
Villax, Ivan; Heggie, William; and Page, Philip R., 5,026,693, Cl. 514-180.000.
Pahnke, Klaus-Dieter: *See—*
Meyer, Jurgen; Sippel, Achim; Wildau, Monika; Kruse, Heinz J.; Diel, Rainer; Becker, Wilfried; Bartsch, Gisbert; Pahnke, Klaus-Dieter; Huege, Jurgen; and Luther, Hans-Werner, 5,025,731, Cl. 102-521.000.
Pak, Edward T.: *See—*
Yu, Chung-Li; Pak, Edward T.; and Leung, Ho-Ming, 5,027,357, Cl. 371-37.700.
Palacios, Urania. Cooking container or like assembly for the cooking of food utilizing a microwave oven. 5,026,958, Cl. 219-10.55E.
Palara, Sergio, to SGS-Thomson Microelectronics S.r.l. Circuit for regulating the base current of a semiconductor power device. 5,027,004, Cl. 307-270.000.
Palm, Bernhard, to Milwaukee Electric Tool Corporation. Counterbalanced reciprocating mechanism. 5,025,562, Cl. 30-392.000.
Palmer, Ansell W.; and Coryea, Peter F., to General Electric Company. Electromagnetic and thermal shield for electronic energy meter. 5,027,061, Cl. 324-156.000.
Palmer, Darrel; and Radford, Richard, to Ballard Medical Products. Medical ventilating and a spirating apparatus and methods. 5,025,806, Cl. 128-203.120.
Palmer, Thomas M.; and Castonguay, Roger N., to General Electric Company. Molded case circuit breaker actuator-accessory unit having component tolerance compensation. 5,027,093, Cl. 335-176.000.
Pandey, Raj N.: *See—*
Allenger, Vincenza; Pandey, Raj N.; and Yarlagadda, Prasad, 5,026,944, Cl. 585-500.000.
Paola, Vince A.: *See—*
Biresaw, Girma; Boland, Daniel J.; Paola, Vince A.; Evans, W Thomas; Kampert, William P.; and Abels, Ronald L., 5,026,577, Cl. 428-1.000.
Paolinelli, Antonio: *See—*
Di Gioacchino, Sandro; Paolinelli, Antonio; and Re, Luciano, 5,026,906, Cl. 562-437.000.
Papallo, Thomas F., Jr.. *See—*
Castonguay, Roger N.; and Papallo, Thomas F., Jr., 5,027,092, Cl. 335-172.000.
Parente, Charles A.. *See—*
Arcas, Noe; and Parente, Charles A., 5,025,888, Cl. 181-213.000.
Park, Chin S., to Intel Corporation. Apparatus and method for improved reading/programming of virtual ground EPROM arrays. 5,027,321, Cl. 365-185.000.
Park, Myung J. Drive control method for an electromagnetic induction heating apparatus. 5,026,955, Cl. 219-10.410.
Park, Stanley C.: *See—*
Hesler, Lee J.; and Park, Stanley C., 5,026,456, Cl. 162-146.000.
Park, William R. R.: *See—*
Ziemelis, Maris J.; and Park, William R. R., 5,026,781, Cl. 525-301.000.
Park, Young-keun. Method and apparatus for growing bean sprouts. 5,025,589, Cl. 47-61.000.
Parker Hannifin Corporation: *See—*
Bastle, Clifford F., 5,026,022, Cl. 251-122.000.

Parmenter, John J.; Phillips, Robert B., and Stonestreet, Paul R., to VG Instruments Group Limited. Vacuum evaporation and deposition. 5,026,454, Cl. 156-614.000.
Pascucci, Gregory A.: *See—*
Mageland, Otto M.; and Pascucci, Gregory A., 5,027,057, Cl. 324-115.000.
Pasfield, Gail. Color care coded patient identification system. 5,026,084, Cl. 283-75.000.
Paslode GmbH. *See—*
Schafer, Manfred; Schumann, Kurt; and Tacke, Horst, 5,025,971, Cl. 227-156.000.
Passat-Maschinenbau GmbH: *See—*
Eck, Werner; Harrsch, Ernst; and Geiger, Friedrich, 5,025,645, Cl. 68-27.000.
Passmann, Norbert: *See—*
Eickvonder, Wolfgang; Passmann, Norbert; Thomas, Gerhard; Tummers, Peter; and Steven, Hubert, 5,025,755, Cl. 122-4.00D.
Pastor, Antonio C.: *See—*
Robinson, M.; Pastor, Antonio C.; and Pastor, Ricardo C., 5,026,409, Cl. 65-3.110
Pastor, Ricardo C.: *See—*
Robinson, M.; Pastor, Antonio C.; and Pastor, Ricardo C., 5,026,409, Cl. 65-3.110.
Pate, Dwight W., to Pate, Dwight W. Golf shot duplicator. 5,026,059, Cl. 273-176.00A.
Patel, Chetan N.: *See—*
Johnson, Michael L.; Patel, Chetan N.; Plourde, Marcel D.; and Wiederin, Brian J., 5,026,197, Cl. 403-24.000.
Patel, Indrajit, to Baxter International Inc. Plastic composition with anti-hemolytic effect. 5,026,347, Cl. 604-410.000.
Patel, Mahesh G.. *See—*
Hegde, Vinod R.; and Patel, Mahesh G., 5,026,731, Cl. 514-629.000.
Patel, Rutton D.: *See—*
Wong, Yiu Wah; Frederick, Jeffrey W.; and Patel, Rutton D., 5,025,831, Cl. 137-561.00A.
Patel, Sunil: *See—*
Dhyanchand, P. John; Patel, Sunil; Ng, Chai-Nam; and Nguyen, Vietson, 5,027,265, Cl. 363-37.000.
Patent Treuhand Gesellschaft fur elektrische Gluhlampen mbH: *See—*
Zuchtriegel, Anton, 5,027,033, Cl. 315-106.000.
Paterson, William D.; Wester, John; Pulliam, Norman L.; and von Eyben, Henning, to Entertainment International, Inc. 1987. Billiard table multiple electronics game device and method. 5,026,053, Cl. 273-3.00R.
Pathak, Saroj; and Prickett, Bruce, to Cypress Semiconductor Corp. EPROM circuit having enhanced programmability and improved speed and reliability. 5,027,320, Cl. 365-185.000.
Patil, Prabhakar B.: *See—*
Masrur, Md. A.; Miller, John M.; and Patil, Prabhakar B., 5,027,048, Cl. 318-806.000.
Patrick, Michael E. Shelf frame bracket. 5,026,015, Cl. 248-248.000.
Patry, Gerald F.: *See—*
Mainolfi, Sylvio J.; Patry, Gerald F.; and Pensiero, Henry A., 5,026,445, Cl. 156-73.500.
Paul, James M.; and Morris, Richard L., to Mobil Oil Corporation. Liquid membrane catalytic scale dissolution method. 5,026,481, Cl. 210-638.000.
Pavlin, Mark S., to Union Camp Corporation. Resinous binders comprising a metal rosin resinate and a pendant tertiary amine polymer. 5,026,754, Cl. 534-272.000.
Pavlin, Mark S.: *See—*
West, James C.; and Pavlin, Mark S., 5,026,753, Cl. 524-272.000.
Payne, Charlotte S.: *See—*
Chiang, Peter K.; Leader, Haim; Smejkal, Ruthann M.; Gordon, Richard K.; Payne, Charlotte S.; Doctor, Bhupendra P.; and Padilla, Felipe N., 5,026,897, Cl. 560-58.000.
Payne, Thomas R.; and Schultz, John, to General Electric Company. Temperature control system for a heating oven using a glass-ceramic temperature sensor. 5,026,971, Cl. 219-483.000.
Pease, John S.: *See—*
Tarnowski, Thomas L.; Hu, Mae W.; Laney, Maureen; Pease, John S.; and Ghazarossian, Vartan, 5,026,905, Cl. 562-43.000.
Pegasus Sewing Machine Mfg., Co., Ltd.: *See—*
Inoue, Tadashi, 5,025,739, Cl. 112-286.000.
Peglion, Jean L.; Gargouil, Yves M.; and Vilaine, Jean P., to Adir et Compagnie. 1,4-dihydropyridine compounds. 5,026,863, Cl 546-321.000.
Peiffer, Dennis G.; Bock, Jan; and Elward-Berry, Julie, to Exxon Research & Engineering. Zwitterionic functionalized polymers as deflocculants in water based drilling fluids. 5,026,490, Cl. 252-8.510.
Peiffer, James E., to Horizon Surgical, Inc. Hemostatic clip. 5,026,382, Cl. 606-158.000.
Peli, Eliezer: *See—*
Waltuck, Morey H.; McKnight, Robert N.; and Peli, Eliezer, 5,026,151, Cl. 351-246.000.
Pelibe, an OK Partnership: *See—*
Maitlen, C. Gene; and Franks, Simon G., 5,025,994, Cl. 241-99.000.
Pellkofer, Erich: *See—*
Lohrbaecher, Volker; and Pellkofer, Erich, 5,026,763, Cl. 524-495.000.
Penistone, Nigel: *See—*
Dobie, William B. S.; and Penistone, Nigel, 5,026,004, Cl. 244-53.00B.
Pensiero, Henry A.: *See—*
Mainolfi, Sylvio J.; Patry, Gerald F.; and Pensiero, Henry A., 5,026,445, Cl. 156-73.500.

Pepera, Gerald S.; and Gunsaulus, Richard S., to Allen-Bradley Company, Inc. Method and circuit for limiting access to a RAM program memory. 5,027,317, Cl. 364-900.000.
Peralta, Roselin E., to GTE Products Corporation. Method of making tungsten powder compacts. 5,026,519, Cl. 419-30.000.
Peregrim, Theodore J.; Kettering, Gordon L.; and Kanter, Irving, to Raytheon Company. Confirmed boundary pattern matching. 5,027,422, Cl. 382-48.000.
Perez, Bernard: *See—*
Gueble, Jean-Michel; Theron, Jean-Bernard; Latouche, Yannick; Ducrocq, Jean-Bernard; and Perez, Bernard, 5,027,090, Cl. 333-202.000.
Perras, Boris: *See—*
Marjollet, Jacques; and Perras, Boris, 5,025,630, Cl. 60-646.000.
Perreau, Philippe: *See—*
Sarda, Jean-Paul; Grard, Guy; Deflandre, Jean-Pierre; and Perreau, Philippe, 5,025,669, Cl. 73-798.000.
Perreault, Daniel C. Locking folding knife. 5,025,557, Cl. 30-151.000.
Perretta, Frank, to Perretta Graphics Corporation. Screw adjustment mechanism with pre-set backlash. 5,025,676, Cl. 74-441.000.
Perretta Graphics Corporation: *See—*
Perretta, Frank, 5,025,676, Cl. 74-441.000.
Perron, Robert: *See—*
Coste, Philippe; Leconte, Philippe; Perron, Robert; and Baudoin, Michel, 5,026,900, Cl. 560-204.000.
Perry, David A.: *See—*
Dutton, Christopher J.; and Perry, David A., 5,026,643, Cl 435-119.000.
Perry, Kevin D. Chimney cover apparatus. 5,025,712, Cl. 98-59.000.
Persluchtcentrale B.V.: *See—*
van der Toorn, Aart, 5,025,803, Cl. 125-23.010.
Peskin, Charles S.: *See—*
McQueen, David M.; and Peskin, Charles S., 5,026,391, Cl. 623-2.000.
Petersmann, Joseph: *See—*
Stehle, Heinz; Wehr, Thomas; Petersmann, Joseph; Seidel, Willi, Hamm, Ludwig; Foeldi, Thomas; Eschrich, Gerhard, Schwamm, Ronald; Runge, Wolfgang; Gruhle, Wolf-Dieter; and Wendel, Peter, 5,025,684, Cl. 74-862.000.
Peterson, David. Silver controller. 5,026,029, Cl 266-170.000.
Petit, Robert, to L.I.R. France. Dome shaped closure cap. 5,025,941, Cl. 215-228.000.
Petroleum Energy Center: *See—*
Shioiri, Tomonori; Satake, Shinichi; Sekido, Yasuo; Fujisou, Tokuo; Obuchi, Akira, and Kato, Hideharu, 5,026,536, Cl 423-652.000.
Petrolite Corporation: *See—*
Mathew, Jacob, 5,026,918, Cl. 568-348.000.
Thompson, Neil E. S.; and Asperger, Robert G., 5,026,483, Cl. 210-708.000.
Petrossian, Ashkhen A.: *See—*
Petrossian, Edward, and Petrossian, Ashkhen A., 5,027,200, Cl 358-103.000.
Petrossian, Edward; and Petrossian, Ashkhen A. Enhanced viewing at side and rear of motor vehicles. 5,027,200, Cl. 358-103 000.
Petrovich, Paul A. Jacketed projectile for ammunition. 5,025,730, Cl 102-516.000.
Petteway, Stephen R.: *See—*
Ferguson, Blair Q.; Bacheler, Lee T ; Petteway, Stephen R., and Neubauer, Russell H., 5,026,635, Cl. 435-5.000.
Pettis, Delmar D Portable scoring device. 5,025,748, Cl. 116-222.000).
Petzinna, Dieter: *See—*
Goldmann, Siegfried; Bossert, Friedrich; Bischoff, Hilmar; Petzinna, Dieter; Puls, Walter; and Schlossmann, Klaus, 5,026,714, Cl. 514-302.000).
Pez, Guido P.: *See—*
Marsella, John A ; Pez, Guido P., and Coughlin, Anne M , 5,026,929, Cl. 570-146.000.
Pfister GmbH: *See—*
Haefner, Hans W., 5,025,654, Cl. 73-4.00D
Pfizer Inc.: *See—*
Dutton, Christopher J.; and Perry, David A., 5,026,643, Cl. 435-119.000.
LaMattina, John L.; McCarthy, Peter A.; and Reiter, Lawrence A . 5,026,715, Cl. 514-326.000
Pfizer Products Hospital Group Inc · *See—*
Everett, Frederick A., Jr ; and Farrar, Quinton J., 5,026,358, Cl. 604-320.000.
Pfoehler, Peter: *See—*
Rehmer, Gerd; Boettcher, Andreas; Pfoehler, Peter; Aydin, Oral, and Nestler, Gerhard, 5,026,806, Cl. 526-316.000.
Phadke, Shrikant V.: *See—*
Pratt, Charles F.; Phadke, Shrikant V.; and Olivier, Errol, 5,026,776, Cl. 525-64.000.
Phelipon, Axel: *See—*
Guers, Francois; and Phelipon, Axel, 5,026,086, Cl. 280-607.000.
Philibert, Daniel: *See—*
Mathivat, Denis; Colmon, Daniel, and Philibert, Daniel, 5,026,414, Cl. 65-106.000
Philippossian, Georges: *See—*
Aeschbach, Robert; and Philippossian, Georges, 5,026,550, Cl 424-195.100.
Phillippi, Max L.: *See—*
Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G., and Stephenson, Stanley V., 5,026,168, Cl. 366-168.000.

Phillips, David O.: *See—*
Jalbert, Ronald L.; and Phillips, David O., 5,026,777, Cl. 525-65.000.
Phillips, Gerald W.: *See—*
Stavinoha, Jerome L., Phillips, Gerald W.; Puckette, Thomas A.; and Devon, Thomas J., 5,026,886, Cl. 556-70.000.
Phillips, Paul A.; and King, Eddie W., to Coca-Cola Company, The. Electronically programmable space-to-sales vender. 5,027,283, Cl. 364-479.000.
Phillips Petroleum Company: *See—*
Hogan, John P., 5,026,795, Cl. 526-74.000.
McDaniel, Max P.; Pitzer, Emory W.; and Farha, Floyd E., Jr., 5,026,796, Cl. 526-100.000.
O'Connor, James E., 5,026,447, Cl. 156-166.000.
Phillips, Robert B.: *See—*
Parmenter, John J.; Phillips, Robert B.; and Stonestreet, Paul R., 5,026,454, Cl. 156-614.000.
Phirippidis, George A. Universal modular catalog and samples organizer for vehicles. 5,025,964, Cl. 224-42.420.
Physical Optics Corporation: *See—*
Jannson, Tomasz P.; Jannson, Joanna L.; Rich, Christopher C.; and Moslehi, Behzad, 5,026,131, Cl. 350-3.700.
Picanol N.V.: *See—*
Vandeweghe, Michel; Lefever, Bart; and Vandersyppe, Stefaan, 5,025,838, Cl. 139-114.000.
Picault, Alain; Gandossi, Christian; and Mineau, Laurent, to Trefimetaux. Copper-iron-cobalt-titanium alloy with high mechanical and electrical characteristics and its production process. 5,026,434, Cl. 148-2.000.
Pichl, Volker: *See—*
Plohberger, Diethard; Pichl, Volker; and Mikulic, Leopold, 5,025,769, Cl. 123-532.000.
Pickering, Timothy L.: *See—*
Motika, Stephen A.; Pickering, Timothy L., Rokicki, Andrzej; and Stein, Beatrice K., 5,026,676, Cl. 502-170.000.
Pickles, Charles S.; Sucheski, Matthew M., and Thumma, Mark R., to AMP Incorporated. Card edge connector. 5,026,292, Cl. 439-108.000.
Pickrell, John W., to Government Innovators, Inc. Gripping apparatus. 5,026,104, Cl. 294-86.400.
Piejko, Karl-Erwin: *See—*
Lindner, Christian; and Piejko, Karl-Erwin, 5,026,803, Cl. 526-261.000.
Pierce, Clyde W.: *See—*
Hill, Amel L., 5,027,411, Cl. 381-160.000.
Piergiorgio, Anzaghi: *See—*
Riccardo, Monguzzi; Silvano, Menaspace; and Piergiorgio, Anzaghi, 5,026,843, Cl. 540-227.000.
Pierohon, Elio. Railroad support tie replacement device with track locking device. 5,025,733, Cl. 104-9.000.
Pillsbury Company, The: *See—*
Schmidt, William G.; and Lockwood, Dean H , 5,026,562, Cl 426-68.000.
Piloto, Andrew J : *See—*
Zeitlin, Dan B.; Branthover, John B., Smith, Brian H.; Piloto, Andrew J.; Lengel, Theresa M.; Carlson, Robert R., Jr.; Shum, Lanson Y.; Hodges, Paul D., Jr.; and Harris, Denise B , 5,027,255, Cl 361-395.000.
Pinckney, Kenneth P. Harp caddy. 5,026,078, Cl 280-5.200
Pino, Wilton J. Flush control assembly for pressure flush valves. 5,026,021, Cl. 251-40.000.
Pioch, Richard P.: *See—*
Nixon, James A.; Pioch, Richard P ; Schaus, John M ; and Titus, Robert D., 5,026,707, Cl. 514-255.000.
Pioneer Electronic Corporation: *See—*
Hayashi, Junkichi; and Uchida, Tamotu, 5,027,412, Cl 381-199.000.
Sugiura, Satoshi, 5,027,336, Cl. 369-44 130.
Pioneer Hi-Bred International, Inc : *See—*
Tomes, Nancy J.; Henderick, Carol A., and Glatz, Bonita A , 5,026,647, Cl. 435-244.000
Pitman, James. Mechanical security device for doors. 5,026,102, Cl. 292-259.00R.
Pitney Bowes Inc.: *See—*
Gottlieb, Robert K.; and Haidar, Elias B . 5,027,279, Cl. 364-478.000.
Pitney Bowes plc: *See—*
Martinez Sanz, Jose A.; and Gough, Rex M K., 5,026,035, Cl 270-45.000.
Pitts, Alan J.; Case, Leonard R.; and Broaddus, James E., to Halliburton Company. Automatic mixture control apparatus and method. 5,027,267, Cl. 364-172.000
Pitzer, Emory W : *See—*
McDaniel, Max P.; Pitzer, Emory W , and Farha, Floyd E., Jr., 5,026,796, Cl. 526-100 000.
Piulats, Jaime: *See—*
Prucher, Helmut, Jonas, Rochus; Piulats, Jaime; and Klockow, Michael, 5,026,705, Cl. 516-253.000.
Pixton, Dennis N. Fishing lure apparatus. 5,025,586, Cl 43-42.240.
pK Scientific Inc.: *See—*
Ranalletta, Joseph V.; Williams, Fred E., Jr.; and Kanner, Rowland W., 5,025,957, Cl. 222-189.000.
Plackard, Dennis L.: *See—*
Young, Kevin A.; and Plackard, Dennis L., 5,026,438, Cl. 148-101.000.
Platteter, Dale T.; Westfall, Robert S.; and Carter, Jeff C., to Xerox Corporation. Execution protection for floppy disks. 5,027,396, Cl. 380-4.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Plessey Overseas Limited. *See—*
  - Trundle, Clive, 5,026,619, Cl. 430-19.000.
- Plexus Pipe Products Limited: *See—*
  - van Bilderbeek, Bernard H., 5,026,200, Cl. 403-322.000.
- Plohberger, Diethard; Pichl, Volker; and Mikulic, Leopold. Device for feeding fuel into a combustion chamber of an internal combustion engine. 5,025,769, Cl. 123-532.000.
- Plourde, Marcel D.: *See—*
  - Johnson, Michael L.; Patel, Chetan N., Plourde, Marcel D., and Wiederin, Brian J., 5,026,197, Cl. 403-24.000.
- Pluim, Hendrik. *See—*
  - de Haar, Walterus T.; and Pluim, Hendrik, 5,026,430, Cl 127-34.000.
- Plyler, David. Apparatus and method for providing drinking water to poultry. 5,025,754, Cl 119-73.000.
- Pohl, Helmut, to Schoeller-Bleckmann Gesellschaft m.b.H. Process for the production of tubular bodies. 5,026,436, Cl 148-12.00B.
- Poirier, David C.; Matheny, Mark T.; Mitchell, George C.; Swantick, Steven J.; Wroblewski, Gerald J.; Menck, Douglas W.; and Simon, Robert C., Jr., to General Motors Corporation. Vehicle traction control system with fuel control. 5,025,881, Cl 180-197.000.
- Polaroid Corporation: *See—*
  - Douglas, Lawrence M., 5,027,142, Cl. 354-86.000
  - Weber, Karl, 5,026,150, Cl. 351-47.000.
- Polato, Felice; and Cecchin, Giuliano, to Himont Incorporated. Process for improving the adhesive properties of polyolefin products. 5,026,608, Cl. 428-484.000.
- Pollack, Jack, to Amtel, Inc. Vertical line mooring system 5,025,743, Cl 114-230.000.
- Pollet, Jean-Claude; Williams, Gary L.; Armstrong, Gordon P. and Flautt, Martin C., to Owens-Corning Fiberglas Corporation Process for impregnating filament strands. 5,026,410, Cl. 65-3.430.
- Pollich, Gerhard; and Unterseher, Erwin, to Heidelberger Druckmaschinen AG. Lever mechanism for adjusting phase relationship between drive wheels. 5,026,326, Cl. 474-134.000.
- Polomski, Robert E.: *See—*
  - Anderson, Neal G.; Lust, David A.; Bennett, Barbara J., Feldman, Alan F.; and Polomski, Robert E., 5,026,873, Cl. 548-533.000.
- Polysar Limited *See—*
  - Callander, Keith A., 5,026,744, Cl 524-27.000.
  - Ho, Kam W.; and Lam, Patrick W., 5,026,794, Cl 525-532.000.
- Polytech Netting Industries, L.P.. *See—*
  - Moore, Donal, 5,026,231, Cl. 410-118.000.
- Polzin, Ellen C. Display holder 5,025,581, Cl. 40-159.000.
- Pontiff, Thomas M., to Astro-Valcour, Inc. Moldable shrunken thermoplastic polymer foam beads. 5,026,736, Cl. 527-60.000.
- Porta-Nails, Inc : *See—*
  - Totten, John M., 5,025,841, Cl. 144-134.00R
- Porta Systems Corp.: *See—*
  - Neuwirth, Helmuth, Meyerhoefer, Carl H. and Carney, William V., 5,027,100, Cl 337-32.000.
- Porter, Edward W.: *See—*
  - Roberts, Jed; Baker, James K., and Porter, Edward W., 5,027,406, Cl. 381-43.000.
- Poslusny, Jerrold N.: *See—*
  - Begley, William J.; Chen, Teh-Hsuan; Kilminster, Kenneth N., Poslusny, Jerrold N.; and Slusarek, Wojciech, 5,026,628, Cl. 430-382.000.
- Putter, Stephen B. Magnetic tool holder. 5,025,966, Cl. 224-183.000.
- Pouget, Henri: *See—*
  - Queinnec, Olivier; and Pouget, Henri, 5,027,006, Cl. 307-272.300.
- Powell, Anthony D.; and Miller, Raymond J., to MDT Corporation. Apparatus for subjecting a load to a constant temperature below 100° C. in a closed chamber. 5,026,524, Cl. 422-26.000.
- Powell, Timothy: *See—*
  - Powell, Timothy R., 5,025,585, Cl. 43-25.000.
- Powell, Timothy R., to Powell, Timothy Fishing line cutter 5,025,585, Cl. 43-25.000.
- Powers, Robert L.: *See—*
  - Kroeker, John P.; and Powers, Robert L., 5,027,408, Cl. 381-43.000.
- PPG Industries, Inc.: *See—*
  - Franz, Helmut; Hanlon, James H.; and Shick, Lloyd G., 5,026,597, Cl. 428-323.000.
- Praamsma, Thomas L.. *See—*
  - Iyengar, Doreswamy R.; and Praamsma, Thomas L., 5,026,627, Cl. 430-331.000.
- Pralus, Georges. Apparatus for baking or heating various products by application of microwaves and oven applying same. 5,026,957, Cl 219-10.55M.
- Pratt, Charles F.; Phadke, Shrikant V.; and Olivier, Errol, to General Electric Company. Olefinic impact modifiers for, and blends with, thermoplastic polyesters resins. 5,026,776, Cl. 525-64.000.
- Pratt, Darin D., to RMED International, Inc. Flushable diaper device and method 5,026,363, Cl. 604-385.100.
- Pratt, Richard L.; and Dewey, Craig D., to Harnischfeger Corporation; and Yaskawa Electric Mfg. Co., Ltd. Method for increasing the speed of an alternating current motor. 5,027,049, Cl. 318-807.000.
- Preiss, Michael, to Dr. Ing. h.c.F. Porsche AG Aerodynamically constructed cover part for the underside of a motor vehicle. 5,025,878, Cl. 180-68.100.
- Premier Technologies: *See—*
  - Haferstat, Ernest C., 5,027,074, Cl. 324-539.000.
- Prescher, Gunter: *See—*
  - Drauz, Karl-Heinz; Kleeman, Axel; Prescher, Gunter; and Ritter, Gebhard, 5,026,925, Cl. 568-771.000.
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- Prickett, Bruce: *See—*
  - Pathak, Saroj; and Prickett, Bruce, 5,027,320, Cl. 365-185.000.
- Prieto-Soto, Jose: *See—*
  - Vega-Noverola, Armando; Boix-Iglesias, Jose; Prieto-Soto, Jose, and Moragues-Mauri, Jacinto, 5,026,858, Cl. 546-224.000
- Primov, Ivan S.: *See—*
  - Atanassov, Lyuben P.; Kolenzov, Yanko A. Vulev, Decho I., Primov, Ivan S.; Spassov, Peter G.; Kanalev, Svetlosar K., Andonov, Dimo P.; Yankov, Angel V., and Dilkin, Nikolay G., 5,027,286, Cl. 364-513.000.
- Princeton University, The Trustees of. *See—*
  - Taylor, Edward C.; Beardsley, George P.; Harrington, Peter J. and Fletcher, Stephen R., 5,026,851, Cl. 544-279.000.
- Prisco, Anthony J., Jr.: *See—*
  - Zappa, Donald E.; Prisco, Anthony J., Jr.; and Kirchner, Matthew A., 5,025,523, Cl. 15-98.000.
- Prochaska, Maria J Temporary window shade. 5,025,848, Cl 160-368.100.
- Procter & Gamble Company, The. *See—*
  - Forand, Karen M., 5,026,569, Cl. 426-549.000.
  - Robertson, Anthony J., 5,026,364, Cl 604-385.100.
  - Schechtman, Lee A., 5,026,589, Cl 428-138.000.
- Protel, Inc.: *See—*
  - Hughes, Larry M., 5,027,390, Cl. 379-150.000.
- Protoned B V. *See—*
  - Korth, Bernd, 5,026,014, Cl. 248-225.200.
- Prucha, David A.: *See—*
  - Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L., Prucha, David A., Reidenbach, Vincent G.; and Stephenson, Stanley V., 5,026,168, Cl. 366-168.000.
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- Pruftechnik Dieter Busch & Partner GmbH & Co.: *See—*
  - Busch, Dieter, 5,026,956, Cl. 219-10.491
  - Holzl, Roland, 5,026,998, Cl. 250-561.000.
- Przuntek, Horst; and Bittkau, Simon, to Schering AG. Injection device 5,026,357, Cl. 604-258.000.
- Puckette, Thomas A.: *See—*
  - Stavinoha, Jerome L.; Phillips, Gerald W., Puckette, Thomas A and Devon, Thomas J., 5,026,886, Cl 556-70.000.
- Puebla, Claudio: *See—*
  - Langfeld, Horst, Puebla, Claudio; and Sereinig, Gunter, 5,026,830, Cl 534-582.000.
- Pugh, Cecil C.: *See—*
  - Layman, John C.; and Pugh, Cecil C., 5,025,628, Cl 60-585.000.
- Pulliam, Norman L.: *See—*
  - Paterson, William D.; Wester, John; Pulliam, Norman L.; and von Eyben, Henning, 5,026,053, Cl. 273-3.00R.
- Puls, Walter: *See—*
  - Goldmann, Siegfried, Bossert, Friedrich; Bischoff, Hilmar; Petzinna, Dieter; Puls, Walter; and Schlossmann, Klaus, 5,026,714, Cl. 514-302.000.
- Pung, David G.; and Carty, Alan D., to Alliance Technical Services, Inc. Method and apparatus for analyzing machine control systems 5,027,293, Cl. 364-550.000
- Purbrick, John A.: *See—*
  - Dwyer, Joseph J., Jr., White, Loy R.; Haggerty, Matthew K., and Purbrick, John A., 5,027,208, Cl 358-148.000.
- Purdue Research Foundation: *See—*
  - Bier, Mark E.; Cooks, Robert G.; and Stafford, George C., 5,026,987, Cl. 250-281.000.
- QSound Ltd.: *See—*
  - Lowe, Danny D., and Lees, John W., 5,026,051, Cl. 273-435.000
- Quad/Tech, Inc.: *See—*
  - Graushar, William T., 5,025,610, Cl. 53-411.000.
- Quadrant Bioresources, Limited *See—*
  - Roser, Bruce J., 5,026,566, Cl. 426-443.000.
- Quang, Dang Vu; Amigues, Pierre; and Gaillard, Jean-Ferdinand, to Institut Francais du Petrole; and Elf France. Apparatus for reactive distillation. 5,026,459, Cl. 202-158.000.
- Quantum Corporation: *See—*
  - Hatch, Michael R.; and Moon, Willilam G., 5,027,241, Cl 360-105.000.
- Queinnec, Olivier, and Pouget, Henri, to SGS-Thomson Microelectronics S.A. Circuit for detecting a supply voltage drop and for resetting an initialization circuit. 5,027,006, Cl. 307-272.300.
- Quenin, John A.; and Jakubowicz, Raymond F., to Eastman Kodak Company. Automated capping means for analyzer pipette. 5,026,526, Cl. 422-64.000.
- Quick Technologies Ltd.: *See—*
  - Orbach, Zvi; and Ganor, Zeev, 5,027,027, Cl. 310-317.000.
- R. J. Reynolds Tobacco Company: *See—*
  - Fagg, Barry S.; Dull, Gary M.; Haberkern, Richard G.; Merricks, Robert A.; and Stewart, John E., 5,025,812, Cl. 131-297.000.
  - Raker, Mark L., 5,025,814, Cl. 131-331.000.
- R. N Koch, Inc.: *See—*
  - Berger, Barry D., 5,025,931, Cl. 211-13.000.
- R. T. Vanderbilt Company, Inc.: *See—*
  - Karol, Thomas J., 5,026,865, Cl. 548-142.000.

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- RAD-X Ltd.: *See—*
  - Westcott, Daniel R.; Tetley, William C., and Cummings, Bruce A., 5,026,994, Cl. 250-435.000.
- Radford, Richard: *See—*
  - Palmer, Darrel; and Radford, Richard, 5,025,806, Cl. 128-203.120.
- Radisch, Herbert R., Jr.: *See—*
  - Farr, Andrew F.; and Radisch, Herbert R., Jr., 5,026,384, Cl. 606-159.000.
- Radunz, Hans-Eckart; Schwartz, Harry; and Heinrich, Martin, to Merck Patent Gesellschaft mit beschrankter Haftung. Process for the enzymatic production of ketones. 5,026,642, Cl. 435-117.000.
- Raghuram, Srikantiah: *See—*
  - Schmidt, Robert J.; Rice, Lynn H. and Raghuram, Srikantiah, 5,026,951, Cl. 585-738.000.
- Rainbow Star Licensing, S.A.: *See—*
  - Mancel, James D.; and Raiskums, Olaf B., 5,026,453, Cl 156-443.000.
- Raiskums, Olaf B.: *See—*
  - Mancel, James D.; and Raiskums, Olaf B., 5,026,453, Cl. 156-443.000.
- Raker, Mark L., to R. J. Reynolds Tobacco Company. Cigarette filters containing strands of tobacco-containing materials. 5,025,814, Cl. 131-331.000.
- Ran Data Pty. Ltd.: *See—*
  - Ross, John; and Sala-Spini, Amedeo F., 5,027,112, Cl. 340-792.000.
- Ranalletta, Joseph V.; Williams, Fred E., Jr.; and Kanner, Rowland W., to Ryder International Corp.; and pK Scientific Inc. Liquid dispenser nozzle assembly. 5,025,957, Cl. 222-189.000.
- Randall, Nigel J.: *See—*
  - Sutherland, Ian A., Randall, Nigel J.; and Steer, Philip J., 5,025,787, Cl. 128-642.000.
- Randolph, Bruce B.: *See—*
  - Paciorek, Kazimiera J. L.; Shih, Joseph G.; Randolph, Bruce B.; and Snyder, Carl E., Jr., 5,026,893, Cl. 556-435.000.
- Rao, Chebrolu P.: *See—*
  - Bianconi, Patricia A.; Lippard, Stephen J.; Rao, Chebrolu P.; and Vrtis, Raymond N., 5,026,884, Cl. 556-12.000.
- Rao, V N. Mallikarjuna: *See—*
  - Manzer, Leo E.; and Rao, V. N Mallikarjuna, 5,026,930, Cl. 570-168.000.
- Rapid Deployment Towers, Inc.: *See—*
  - McGinnis, Henry J.; Hickman, Fred R., and Ludwig, Wesley N., 5,025,606, Cl. 52-741.000.
- Raquin, Michel M.: *See—*
  - Kosteva, Glenn P.; Lin, Peili; Raquin, Michel M.; and Robidoux, Raymond C., 5,027,300, Cl. 364-715.080.
- Raskin, Jef. Method and apparatus for controlling a keyboard operated device. 5,025,705, Cl. 84-743.000.
- Rasmussen, James M., to Cummins-Allison Corporation. Disc-type coin sorter with retractable guide surfaces. 5,026,320, Cl. 453-6.000.
- Rasor, William: *See—*
  - Cronce, Gary M.; Rasor, William; and Graboske, Dean, 5,025,967, Cl. 224-326.000.
- Ratalahti, Matti. Modular furniture assembly and kit therefor. 5,026,121, Cl. 297-440.000.
- Raterman, John M.: *See—*
  - Cucuzza, Carl C.; Raterman, John M., and Keuter, John P., 5,026,450, Cl. 156-244.110.
- Ratton, Serge: *See—*
  - Leblanc, Jean-Claude; Ratton, Serge; Besson, Bernard; and Desmurs, Jean-Roger, 5,026,926, Cl. 568-779.000.
- Rauth, Walter: *See—*
  - Skala, Otto; and Rauth, Walter, 5,027,432, Cl. 455-238.000.
- Ravichandran, Ramanathan, to Ciba-Geigy Corporation. 1-hydrocarbyloxy hindered amine mercaptoacid esters, thioacetals, sulfides and disulfides. 5,026,750, Cl. 524-99.000.
- Ray, Charles D.; and Dickhudt, Eugene A., to Surgical Dynamics, Inc. Surgical method and apparatus for fusing adjacent bone structures. 5,026,373, Cl. 606-61.000.
- Raymond, A.: *See—*
  - Muller, Klaus; Motsch, Uwe; and Mack, Gerhard, 5,026,235, Cl. 411-523.000.
- Raymond, Douglas W.; and Smith, Thomas W. Puff-off glove. 5,025,502, Cl. 2-159.000.
- Rayner, Robert W., to Crosfield Electronics Ltd. Film transparency holder. 5,027,151, Cl. 355-30.000.
- Raytheon Company: *See—*
  - Basehgi, Behshad; and Mazooji, Mohammad, 5,027,126, Cl. 342-372.000.
  - Peregrim, Theodore J.; Kettering, Gordon L., and Kanter, Irving, 5,027,422, Cl. 382-48.000.
  - Smith, Charles P., 5,025,663, Cl. 73-517.00A.
  - Tsukii, Toshikazu, 5,027,084, Cl. 330-295.000.
  - Wieler, James G., 5,027,122, Cl. 342-26.000.
- Razzano, John S.: *See—*
  - Hawkins, Christopher M.; Gallucci, Robert R.; and Razzano, John S., 5,026,791, Cl. 525-464.000.
- RCA Licensing Corporation: *See—*
  - Bernard, Francis S., 5,027,201, Cl. 358-105.000.
  - Fling, Russell T., 5,027,017, Cl. 307-555.000.
- Re, Alberto; and Giavarini, Francesco, to Ausimont S.r.l. Fluorinated polyurethanes endowed with improved mechanical properties, containing rubber-like polyoxyperfluoroalkylene-structure blocks and hydrogenated rigid blocks. 5,026,814, Cl 528-61.000.
- Re, Luciano: *See—*
  - Di Gioacchino, Sandro; Paolinelli, Antonio; and Re, Luciano, 5,026,906, Cl. 562-437.000.
- Rea, Edward C., Jr.; and Nilsson, Alan C., to Leland Stanford Junior University, The Board of Trustees of the. Single-frequency monolithic nonplanar ring laser and method for determining same. 5,027,367, Cl. 372-94.000.
- Reafler, Gerald G.; and Shattuck, Gordon D., Jr. Method of forming a glossy basecoat-clearcoat surface on a substrate. 5,026,448, Cl. 156-212.000.
- Reagents of the University of California, The: *See—*
  - Boublik, Jaroslav H.; Rivier, Jean E. F.; Brown, Marvin R.; and Scott, Neal A., 5,026,685, Cl 514-13.000.
- Rebel, Herbert: *See—*
  - Abendroth, Paul; and Rebel, Herbert, 5,025,723, Cl 101-148.000.
  - Holl, Roland, Hummel, Peter; and Rebel, Herbert, 5,025,724, Cl. 101-148.000.
- Recker, Hans-Gert: *See—*
  - Weber, Thomas; Heckmann, Walter; Mertes, Jurgen; Tesch, Helmut; Altstaedt, Volker; Eberle, Wolfgang; Folda, Thomas; Stutz, Herbert; and Recker, Hans-Gert, 5,026,789, Cl. 525-423.000.
- Reder, Winfried, to Mannesmann Rexroth GmbH. Inductive distance sensor using a particular oscillator impedance ratio. 5,027,066, Cl. 324-207.160.
- Redman, Richard P.: *See—*
  - Beresford, Michael P.; and Redman, Richard P., 5,026,743, Cl. 523-404.000.
- Redpath, James: *See—*
  - Logan, Robert T.; Redpath, James; McGarry, George; and Roy, Robert G., 5,026,724, Cl. 514-443.000.
- Reed Tool Company Ltd.: *See—*
  - Barr, John D.; and Newton, Thomas A., Jr., 5,025,874, Cl. 175-329.000.
- Reedy, Ronald E.; Shimabukuro, Randy L.; and Garcia, Graham A., to United States of America, Navy Dual polarity floating gate MOS analog memory device. 5,027,171, Cl. 357-23.500.
- Rees, William S., Jr.: *See—*
  - Dietmar, Seyferth; and Rees, William S., Jr., 5,026,809, Cl. 528-4.000.
- Reese, Robert J.: *See—*
  - DiCarlo, Leonard; and Reese, Robert J., 5,026,113, Cl. 296-221.000.
- Regnier, Gilbert; Guillonneau, Claude; Lepagnol, Jean; and Lestage, Pierre, to Adir et Compagnie. Morpholine compounds, compositions and use. 5,026,701, Cl. 514-235.200.
- Rehmer, Gerd, to BASF Aktiengesellschaft Radiation-crosslinkable contact adhesive mixtures. 5,026,742, Cl. 522-116.000.
- Rehmer, Gerd; Boettcher, Andreas; Pfoehler, Peter; Aydin, Oral, and Nestler, Gerhard, to BASF Aktiengesellschaft. UV-crosslinkable materials based on isoamyl (meth)acrylate copolymers. 5,026,806, Cl. 526-316.000.
- Reicke, Ulrich: *See—*
  - Sponer, Gisbert; Reicke, Ulrich; and Nelboeck-Hochstetter, Michael, 5,026,706, Cl 514-255.000.
- Reid, Donald J. Vehicle security device. 5,027,104, Cl. 340-541.000.
- Reid, Ray D.: *See—*
  - Hug, William F.; and Reid, Ray D., 5,026,146, Cl. 350-356.000.
- Reidenbach, Vincent G.: *See—*
  - Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G.; and Stephenson, Stanley V., 5,026,168, Cl. 366-168.000.
- Reiffen, Manfred; Mark, Michael; Sauter, Robert; and Grell, Wolfgang, to Dr. Karl Thomae, GmbH. Morpholines and morpholine-N-oxides and pharmaceutical compositions containing these compounds. 5,026,702, Cl. 514-235.500.
- Reimert, Larry E., to Dril-Quip, Inc. Wellhead apparatus. 5,026,097, Cl. 285-141.000.
- Reinholdsson, Jan: *See—*
  - Gustavsson, Lennart; Karlsson, Ewa; and Reinholdsson, Jan, 5,025,732, Cl. 102-521.000.
- Reiter, Lawrence A.: *See—*
  - LaMattina, John L.; McCarthy, Peter A., and Reiter, Lawrence A., 5,026,715, Cl. 514-326.000.
- Rekow, Elizabeth D.; Riley, Donald R.; Erdman, Arthur G.; Klamecki, Barney; Zhu, Yang; and Ahn, Jeong-Ho, to University of Minnesota, Regents of the. Method and apparatus for scanning and recording of coordinates describing three dimensional objects of complex and unique geometry. 5,027,281, Cl. 364-474.240.
- Renauld, Franck A. D.: *See—*
  - Colas, Andre R. L.; Renauld, Franck A. D.; and Sawicki, George C., 5,026,891, Cl. 556-413.000.
- Renfro, Wesley E., to Robert J. LeBlanc. Automatic timed release spray dispenser 5,025,962, Cl. 222-649.000.
- Renishaw plc: *See—*
  - McMurtry, David R.; and Chaney, Raymond J., 5,026,163, Cl. 356-363.000.
- Rennerfelt, Gustav. Multiturn absolute encoder. 5,025,563, Cl. 33-1.00N.
- Reno, Mark E.: *See—*
  - Hoehn, Richard K.; and Reno, Mark E., 5,026,472, Cl. 208-58.000.
- Resch, Reinhard, to Daimler-Benz AG. Braking system for a road vehicle equipped with a drive-slip control (ASR) and an anti-lock system (ABS). 5,026,124, Cl. 303-100.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Research Association for Utilization of Light Oil: *See—*
  - Seto, Takatoshi, Yokoi, Takashi; Odagiri, Masaki, and Imanari, Makoto, 5,026,922, Cl. 568-486.000.
- Research Development Corporation of Japan *See—*
  - Kuno, Sachiko; Ueno, Ryuji; and Hayaishi, Osamu, 5,026,692, Cl 514-178.000.
- Resnick, Paul R.. *See—*
  - Krespan, Carl G ; and Resnick, Paul R., 5,026,801, Cl. 526-247.000.
- Retallick, William B., to W. R. Grace & Co.-Conn Metal honeycomb catalyst support having a double taper. 5,025,649, Cl. 72-196.000.
- Reuther, Wolfgang: *See—*
  - Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, 5,026,720, Cl. 514-383.000.
- Revankar, Ganapathi R.: *See—*
  - Robins, Roland K.; Revankar, Ganapathi R.; and Hanna, Naeem B., 5,026,836, Cl. 536-24.000.
- Reynolds, Doug J. Cutter for wall covering sheet rolls 5,025,692, Cl. 83-468.000.
- Reynolds, Steve D.: *See—*
  - Stuntz, Gordon F.; Culross, Claude C., and Reynolds, Steve D., 5,026,475, Cl. 208-403.000.
- Rheinmetall GmbH: *See—*
  - Meyer, Jurgen; Sippel, Achim; Wildau, Monika, Kruse, Heinz J., Diel, Rainer; Becker, Wilfried; Bartsch, Gisbert; Pahnke, Klaus-Dieter; Huege, Jurgen, and Luther, Hans-Werner, 5,025,731, Cl. 102-521.000.
- Rhines, Michael. Portable bath tub apparatus. 5,025,515, Cl. 4-585.000.
- Rhodes, Stephen B Golf swing training club. 5,026,063, Cl. 273-186.00A.
- Rhone-Poulenc: *See—*
  - Coste, Philippe; Leconte, Philippe; Perron, Robert; and Baudoin, Michel, 5,026,900, Cl. 560-204.000.
- Rhone-Poulenc Chimie: *See—*
  - Leblanc, Jean-Claude, Ratton, Serge; Besson, Bernard, and Desmurs, Jean-Roger, 5,026,926, Cl. 568-779.000.
  - Le Loarer, Jean-Luc; and Tastu, Francis, 5,026,421, Cl. 106-3.000.
- Rhone-Poulenc Rorer Pharmaceuticals Inc.: *See—*
  - Grebow, Peter E.; Li, Herschel H . and Klunk, Lewis J., Jr., 5,026,825, Cl. 530-307.000.
- Rhone-Poulenc Sante: *See—*
  - Audiau, Francois; Gueremy, Claude; Jimonet, Patrick; and Mignani, Serge, 5,026,717, Cl. 514-338.000.
  - Duchesne, Jean-Pierre, 5,026,846, Cl. 544-1.000.
- Riccardo, Monguzzi; Silvano, Menaspace; and Piergiorgio, Anzaghi, to S.B.D. Synthetic and Biological Dvlpmnts. S.r.l. Process for the preparation of ceftriaxone. 5,026,843, Cl. 540-227.000.
- Ricci, Alessandro. *See—*
  - Braca, Giuseppe; Ricci, Alessandro; Sbrana, Glauco; Brunelli, Maurizio; Giusti, Aldo; Bertolini, Guglielmo; and Galletii, Anna M R., 5,026,675, Cl 502-159.000.
- Rice, James A.: *See—*
  - Winbow, Graham A.; Chen, Sen-Tsuen; and Rice, James A., 5,027,331, Cl. 367-75.000.
- Rice, Lynn H.: *See—*
  - Schmidt, Robert J.; Rice, Lynn H.; and Raghuram, Srikantiah, 5,026,951, Cl. 585-738.000.
- Rice, Ronald K., to Waldron, James S Truck trailer with removable side panels. 5,026,112, Cl. 296-181.000.
- Rich, Christopher C.: *See—*
  - Jannson, Tomasz P.; Jannson, Joanna L.; Rich, Christopher C.; and Moslehi, Behzad, 5,026,131, Cl. 350-3.700.
- Richards, John W.: *See—*
  - Samad, Raphael; Richards, John W.; and Gillard, Clive H., 5,027,203, Cl. 358-140.000.
- Richards, Oliver L., Jr.; and Field, Thomas L., to Allegro Microsystems, Inc. Blend-on-noise stereo decoder. 5,027,402, Cl. 381-10.000.
- Richardson, David A., to J. C. Bamford Excavators Limited. Apparatus and engine to provide power to the apparatus. 5,025,770, Cl 123-585.000.
- Richley, Edward A.; and Russell, Christopher E. Finger blood pressure measurement system. 5,025,793, Cl. 128-677.000.
- Richter, Bernd; and Adams, Helmar, to Siemens Aktiengesellschaft Apparatus for inspection and/or repair of tubes discharging into a chamber of a heat exchanger 5,025,854, Cl. 165-11.200.
- Richter Gedeon Vegyeszeti Gyar Rt: *See—*
  - Kelemen, Agnes; Cserey Pechany, Eva, and Jaksa, Istvan, 5,026,640, Cl. 435-86.000.
- Ricoh Company, Ltd.: *See—*
  - Hiroe, Akihiko; and Terao, Noriyuki, 5,027,382, Cl. 377-76.000.
  - Hisano, Kyosuke, 5,027,386, Cl. 379-100.000.
  - Hoshi, Kazunori 5,027,346, Cl. 370-58.200.
  - Nagata, Takehito; Kohata, Mitsuhiro; and Ino, Masumitsu, 5,027,226, Cl. 358-482.000.
  - Takahashi, Yasuhiro, 5,026,036, Cl. 271-3.100.
  - Tsubuko, Kazuo; Kuramoto, Shinichi; Umemura, Kazuhiko; and Ohkawara, Makoto, 5,026,621, Cl. 430-109.000.
  - Yoshida, Yoshiki; Nagasawa, Kiyoto; and Kagami, Yoshinobu, 5,027,117, Cl. 341-132.000.
- Ricoh Research Institute of General Electronics Co., Ltd.: *See—*
  - Hiroe, Akihiko; and Terao, Noriyuki, 5,027,382, Cl. 377-76.000.
- Ridenour, Ralph G., to Universal Enterprises, Inc. Adjustable gas nozzle. 5,025,990, Cl. 239-438.000.
- Ridgard, Christopher: *See—*
  - Sloman, Roger M.; and Ridgard, Christopher, 5,026,449, Cl. 156-242.000.
- Riediker, Martin, Steiner, Eginhard; Beyeler, Harry; Sitek, Franciszek; and Husler, Rinaldo, to Ciba-Geigy Corporation. Titanocenes, the use thereof, and n-substituted fluoroanilines. 5,026,625, Cl. 430-281.000.
- Riegel, Maximilian, to U.S. Philips Corporation. Memory for video signals. 5,027,204, Cl. 358-140 000.
- Ries, Paul S.: *See—*
  - Riordan, Thomas J , Ries, Paul S.; Hudson, Edwin L., and Killian, Earl A., 5,027,270, Cl. 364-200.000.
- Rieter Machine Works, Ltd: *See—*
  - Faas, Jurg; Nuessli, Eduard, Grundler, Christof, Staheli, Paul, Hanselmann, Daniel; Demuth, Robert; Waeber, Rene; and Fritzsche, Peter, 5,025,533, Cl. 19-145.500.
- Rifkin, Daniel B.: *See—*
  - Moscatelli, David A., Rifkin, Daniel B.; and Sommer, Andreas, 5,026,839, Cl. 536-27.000.
- Riggio, Robert T.. *See—*
  - Anderson, Richard J.; Goodman, Bruce J ; Riggio, Robert T., Kopolovics, Solomon; Hernandez, Lisa C.; Chen, Chengkuo; and Romei, Russell J., 5,027,395, Cl. 380-4.000.
- Rijke, Eric O., to Akzo N.V. Adjuvant mixture 5,026,543, Cl 424-81.000.
- Riley, Donald R *See—*
  - Rekow, Elizabeth D ; Riley, Donald R.; Erdman, Arthur G., Klamecki, Barney; Zhu, Yang; and Ahn, Jeong-Ho, 5,027,281, Cl. 364-474.240.
- Rinaldi, Peter L., to University of Akron, The. Alternate method of Fourier transform NMR data acquisition 5,027,072, Cl 324-312.000.
- Rinaldo, James D.: *See—*
  - Crosser, Jeffery A.; Mooberry, Randall L.; Rinaldo, James D ; and Salazar-Vior, Jose M., 5,025,626, Cl. 60-460.000.
- Ringe, Mitchell L.; and Stoll, James R., to General Mills, Inc. R-T-E cereal with psyllium. 5,026,689, Cl. 514-57 000.
- Rink, Rolf. *See—*
  - Beyer, Joachim; Koglin, Bernd; Rink, Rolf; and Roth, John-Edwin, 5,026,208, Cl. 405-129.000.
- Rinkagaku Kogyo Co., Ltd.. *See—*
  - Sakon, Ichiro; Sekiguchi, Masao; and Kanayama, Atsushi, 5,026,757, Cl. 524-414.000.
- Riordan, Thomas J.; Ries, Paul S.; Hudson, Edwin L.; and Killian, Earl A., to Mips Computer Systems, Inc. Processor controlled interface with instruction streaming. 5,027,270, Cl. 364-200.000.
- Risdon Corporation *See—*
  - Seager, Richard, 5,025,960, Cl. 222-390.000.
- Ritschard, Hans V.: *See—*
  - Webb, Jimmy L.; Ritschard, Hans V., and Lambert, James M , 5,026,890, Cl 556-408.000.
- Ritter, Gebhard: *See—*
  - Drauz, Karl-Heinz, Kleeman, Axel; Prescher, Gunter; and Ritter, Gebhard, 5,026,925, Cl. 568-771 000.
- Rivera, Dionne A : *See—*
  - Bradshaw, Andrea E.; Baum, David M , and Rivera, Dionne A , 5,027,388, Cl. 379-112.000.
- Rivier, Jean E. F.: *See—*
  - Boublik, Jaroslav H ; Rivier, Jean E. F., Brown, Marvin R., and Scott, Neal A., 5,026,685, Cl. 514-13.000.
- RMED International, Inc.: *See—*
  - Pratt, Darin D., 5,026,363, Cl. 604-385 100.
- Robbins, Tom E., to Kallista, Inc. Support post mounting assembly 5,026,013, Cl. 248-223.100.
- Robert Bosch GmbH: *See—*
  - Eckert, Konrad, 5,025,768, Cl. 123-506.000.
  - Kaller, Ernst; Kugler, Karl-Heinz; Zimmermann, Christian; and Koehnle, Hans, 5,027,073, Cl. 324-388.000.
  - Kamin, Gerhard, 5,027,213, Cl. 358-183.000.
  - Witzig, Armin; and Hachtel, Hansjoerg, 5,027,067, Cl 324-207 190.
- Robert J. LeBlanc: *See—*
  - Renfro, Wesley E., 5,025,962, Cl. 222-649.000.
- Roberts, Carl M., Jr., to Analog Devices, Incorporated Producing integrated circuit chips with reduced stress effects. 5,026,667, Cl. 437-209.000.
- Roberts, Jed; Baker, James K.; and Porter, Edward W., to Dragon Systems, Inc. Method for interactive speech recognition and training. 5,027,406, Cl. 381-43 000.
- Roberts, Jeffrey: *See—*
  - Lee, Jin P.; Salcedo, F. Brad, Robins, Martin F.; Roberts, Jeffrey; and Loor, Rueyming, 5,026,653, Cl. 436-518.000.
- Roberts Systems, Inc.: *See—*
  - Monsees, Claude E., 5,025,612, Cl. 53-530.000.
- Robertson, Anthony J., to Procter & Gamble Company, The Absorbent article having unitary waistcap and waistband. 5,026,364, Cl 604-385.100.
- Robertson, Bruce W. Multi-channel message display system and method. 5,027,211, Cl. 358-183.000.
- Robertson, David J.: *See—*
  - Littlewood, Timothy J., Robertson, David J.; Maginley, Ronald J., Chapman, Alan S. J.; Thomas, Terence N.; and Nizamuddin, Nadir, 5,027,345, Cl. 370-58.200.
- Robidoux, Raymond C.: *See—*
  - Kosteva, Glenn P ; Lin, Peili; Raquin, Michel M . and Robidoux, Raymond C., 5,027,300, Cl. 364-715.080.
- Robins, Martin F.: *See—*
  - Lee, Jin P.; Salcedo, F. Brad; Robins, Martin F.; Roberts, Jeffrey; and Loor, Rueyming, 5,026,653, Cl. 436-518.000.
- Robins, Roland K.; Revankar, Ganapathi R.; and Hanna, Naeem B., to Nucleic Acid Research Institute. 6-sulfenamide, 6-sulfinamide and 6-sulfonamide purines, purine nucleosides, purine nucleotides, pharmaceutical compositions, and processes of making. 5,026,836, Cl. 536-24.000.
- Robinson, M.; Pastor, Antonio C.; and Pastor, Ricardo C., to Hughes Aircraft Company. Preparation of fluoride glass optical preforms and fibers. 5,026,409, Cl. 65-3.110.
- Robinson, Robert W.: *See—*
  - Hollowell, James A.; Wells, Hal C.; and Robinson, Robert W., 5,026,226, Cl. 405-211.000.
- Rockenfeller, Uwe; and Kirol, Lance D., to Rocky Research. Continuous constant pressure staging of solid-vapor compound reactors. 5,025,635, Cl. 62-106.000.
- Rockey, Carl E.: *See—*
  - O'Neil, Walter K.; Rockey, Carl E.; and Mohan, Robert J., 5,025,906, Cl. 192-58.00B
- Rockwell International Corporation: *See—*
  - Soclof, Sidney I., 5,027,184, Cl. 357-49.000.
- Rocky Research: *See—*
  - Rockenfeller, Uwe; and Kirol, Lance D., 5,025,635, Cl. 62-106.000.
- Rocoh Research Institute of General Electronics: *See—*
  - Nagata, Takehito; Kohata, Mitsuhiro; and Ino, Masumitsu, 5,027,226, Cl. 358-482.000.
- Roddy, James E.; Narayan, Badhri; Stark, Richard A.; and Voci, Laurie L., to Torii Winding Machine Co., Ltd. Large format laser scanner with wavelength insensitive scanning mechanism. 5,026,133, Cl. 350-6.400.
- Rodick, Steven F. Outlet assembly for mounting to a wall stud. 5,025,944, Cl. 220-3.900.
- Rodini, David J., to Du Pont de Nemours, E. I., and Company. Staple fibers and process for making them. 5,026,603, Cl. 428-362.000.
- Rodrigue, John: *See—*
  - Stainbrook, Marlan L.; and Rodrigue, John, 5,025,991, Cl. 239-459.000.
- Roehrlein, Gerhard, to Siemens Aktiengesellschaft. Circuit arrangement for a gradiometer having superconducting quantum interferometer (SQUID) for measuring low-intensity biomagnetic fields. 5,027,069, Cl. 324-248.000.
- Roemer, Peter B.: *See—*
  - Hardy, Christopher J.; Roemer, Peter B.; and Mueller, Otward M., 5,027,071, Cl. 324-309.000.
- Roeper, Michael; Merger, Franz; Liebe, Joerg; Grenacher, Armin V.; and Hahl, Edgar, to BASF Aktiengesellschaft. Obtaining alkanals having a 2-alkyl branch from alkanal mixtures. 5,026,920, Cl. 568-492.000.
- Roesler, David F.: *See—*
  - Bay, Tod A.; Frahm, Jeffry R.; Roesler, David F.; and Gilbert, Robert, 5,026,246, Cl. 414-694.000.
- Rohm and Haas Company: *See—*
  - Haack, Thomas K.; and Greenley, David E., 5,026,491, Cl. 252-8.552.
  - Ohta, Motomi; Takahashi, Teruyoshi; Ikari, Hirotake; and Agui, Wataru, 5,026,424, Cl. 106-18.340.
- Rokicki, Andrzej: *See—*
  - Motika, Stephen A.; Pickering, Timothy L.; Rokicki, Andrzej; and Stein, Beatrice K., 5,026,676, Cl. 502-170.000.
- Roland, Wolf-Achim: *See—*
  - Finnenthal, Cornelia; Roland, Wolf-Achim; and Morlock, Roland, 5,026,440, Cl. 148-247.000.
- Rolls-Royce plc: *See—*
  - Savill, Anthony M., 5,026,232, Cl. 244-130.000.
- Romansky, Michael E.; Dimsa, Robert D.; and Munday, Howard R., to Westinghouse Air Brake Company. Locomotive equipment carriage. 5,025,734, Cl. 105-26.050.
- Romei, Russell J.: *See—*
  - Anderson, Richard J.; Goodman, Bruce J.; Riggio, Robert T.; Kopolovics, Solomon; Hernandez, Lisa C.; Chen, Chengkuo; and Romei, Russell J., 5,027,395, Cl. 380-4.000.
- Romeiser, Hans-Jurgen: *See—*
  - Menken, Gunther; Romeiser, Hans-Jurgen; and Steven, Josef, 5,026,517, Cl. 376-438.000.
- Root, David: *See—*
  - Lyman, George; Mathus, Gregory; and Root, David, 5,026,649, Cl. 435-284.000.
- Rorden, Louis H.: *See—*
  - More, Henry S ; Rorden, Louis H.; and Akkerman, Neil H., 5,027,129, Cl. 343-719.000.
- Rorer Pharmaceutical Corporation: *See—*
  - Harwood, Richard J.; Mehta, Gunvant N.; Jhawar, Ramesh C.; Huang, Liang-Lii; Grim, Wayne M.; and Li, Shun P., 5,026,709, Cl. 514-263.000.
- Rose, David B.: *See—*
  - Menadier, Michael A.; Williams, Michael A.; and Rose, David B., 5,027,433, Cl. 455-606.000.
- Rose, Michael V.; and Smith, Daniel E., to Sealed Energy Systems, Inc. Method for the assembly of lead-acid batteries and associated apparatus. 5,025,551, Cl. 29-730.000.
- Rosenthal, Eugene J.: *See—*
  - Kutzavitch, Walter G.; and Rosenthal, Eugene J., 5,027,083, Cl. 330-284.000.
- Rosenthal, Manfred: *See—*
  - Durr, Heinrich; Kringe, Horst; Rosenthal, Manfred; and Tercic, Eduard, 5,026,184, Cl. 400-605.000.
- Roser, Bruce J., to Quadrant Bioresources, Limited. Dried food containing trehalose and method for preparing same. 5,026,566, Cl. 426-443.000.
- Rosky, David S.: *See—*
  - Coy, Bruce H.; and Rosky, David S., 5,027,013, Cl. 307-475.000.

- Ross, John; and Sala-Spini, Amedeo F., to Ran Data Pty. Ltd. Graphic display systems. 5,027,112, Cl. 340-792.000.
- Rossignac, Jaroslaw R.; Epstein, David A.; Gharachorloo, Nader; Jansen, Frederik W.; and Zoulas, Christos S., to International Business Machines Corporation. Multiple depth buffers for graphics and solid modelling. 5,027,292, Cl. 364-522.000.
- Rossini, Aldo A.; Mordes, John P.; and Handler, Eugene S., to University of Massachusetts, The. Method and apparatus for therapeutically treating immunological disorders and disease states. 5,026,365, Cl. 604-891.100.
- Rossman, Mark W., to Motorola, Inc. Bit serial Viterbi decoder add-/compare/select array. 5,027,374, Cl. 375-94.000.
- Roth, Arsene: *See—*
  - Viaud, Jean; Roth, Arsene; and Anstey, Henry D., 5,025,717, Cl. 100-88.000.
  - Viaud, Jean; Roth, Arsene; and Anstey, Henry D., 5,025,718, Cl. 100-88.000.
- Roth, John-Edwin: *See—*
  - Beyer, Joachim; Koglin, Bernd; Rink, Rolf, and Roth, John-Edwin, 5,026,208, Cl. 405-129.000.
- Roth, Manfred, to Roth Werke GmbH. Method and a device for cutting a tub. 5,026,966, Cl. 219-121.720.
- Roth Werke GmbH: *See—*
  - Roth, Manfred, 5,026,966, Cl. 219-121.720.
- Rottinghaus, Alan P., to Motorola, Inc. Fast-switching frequency synthesizer. 5,027,087, Cl. 332-127.000.
- Roussel Uclaf: *See—*
  - Tessier, Jean; and Demoute, Jean-Pierre, 5,026,862, Cl. 560-124.000.
- Rowland, Stuart W.: *See—*
  - Chang, Christina L.; Gaeta, Jesus M.; O'Malley, Kathleen G.; and Rowland, Stuart W., 5,027,110, Cl. 340-731.000.
- Roxy, Frank W., to Budd Company, The. Universal system for the support and positioning of a workpiece. 5,026,033, Cl. 269-45.000.
- Roy, Robert G.: *See—*
  - Logan, Robert T.; Redpath, James; McGarry, George; and Roy, Robert G., 5,026,724, Cl. 514-443.000.
- Royce Medical Company: *See—*
  - Kasper, Thomas A., 5,026,339, Cl. 493-189.000.
- Royer, Robert E.: *See—*
  - Jagt, David L.; and Royer, Robert E., 5,026,726, Cl. 514-468.000.
- Rubber Research Institute of Malaysia, The Board of The: *See—*
  - Ishizaki, Ayaaki, 5,026,641, Cl. 435-101.000.
- Rubenberger, Karl: *See—*
  - Dausmann, Gunther, 5,026,132, Cl. 350-3.840.
- Rubin, Mae K.; and Chu, Pochen, to Mobil Oil Corp. Catalytic conversion over catalyst comprising synthetic crystal MCM-35. 5,026,943, Cl. 585-467.000.
- Ruby, Joseph H.; and Steinke, Richard W., to Honeywell Inc. Alternating cathode florescent lamp dimmer. 5,027,034, Cl. 315-106.000.
- Ruiz, Jose : *See—*
  - Gasparaitis, Bernard V.; Ruiz, Jose ; and Gatto, Donald F., 5,025,921, Cl. 206-320.000.
- Rule, Mark; Fauver, Jerry S.; Fagerburg, David R.; Lawrence, Paul B.; and Watkins, Joseph J., to Eastman Kodak Company. Copoly(phenylene sulfide). 5,026,824, Cl. 528-389.000.
- Runaldue, Thomas J., to Advanced Micro Devices, Inc. CMOS clamp circuits. 5,027,008, Cl. 307-443.000.
- Rundpack AG: *See—*
  - Schellenberg, Walter, 5,025,981, Cl. 229-118.000.
- Runge, Wolfgang: *See—*
  - Stehle, Heinz; Wehr, Thomas; Petersmann, Joseph; Seidel, Willi; Hamm, Ludwig; Foeldi, Thomas; Eschrich, Gerhard; Schwamm, Ronald; Runge, Wolfgang; Gruhle, Wolf-Dieter; and Wendel, Peter, 5,025,684, Cl. 74-862.000.
- Ruottu, Seppo K., to Einco Oy. Method and a device for controlling the mixing of gaseous flows in a fluidized bed combustion chamber. 5,026,269, Cl. 431-7.000.
- Russel, Steven M.; and Shea, Robert H., to Eastman Kodak Company. Document output apparatus having anti-dishevelment device. 5,026,034, Cl. 270-52.000.
- Russell, Christopher E.: *See—*
  - Richley, Edward A.; and Russell, Christopher E., 5,025,793, Cl. 128-677.000.
- Russell, Dale D., to Hewlett-Packard Company. Ink compositions having improved waterfastness. 5,026,426, Cl. 106-22.000.
- Russell, David J.: *See—*
  - Day, Richard A.; Gelorme, Jeffrey D.; Russell, David J.; and Wih, Steven J., 5,026,624, Cl. 430-280.000.
- Russillo, Joseph G., Jr.; Balch, Richard A.; Keturakis, Andrius A.; and Velte, Scott D., to General Electric Company. Multifunction register enclosure for energy meter. 5,027,056, Cl. 324-103.00R.
- Russom, Jeff D., to McDonnell-Douglas Corporation. Distortion-free fiber optic sensors embedded in titanium. 5,026,140, Cl. 350-96.290.
- Rusznyak, Andreas, to Motorola, Inc. Threshold dependent voltage source. 5,027,054, Cl. 323-314.000.
- Ryckebusch, Mark L. M. R.: *See—*
  - De Prycker, Martin L. F.; Ryckebusch, Mark L. M. R.; and Barri, Peter I. A., 5,027,351, Cl. 370-94.100.
- Ryco Graphic Manufacturing, Inc.: *See—*
  - Switall, Thomas G.; and Bloomquist, Robert O., 5,025,722, Cl. 101-147.000.
- Rydell, Mark A.; and Anderson, Brent L., to Everest Medical Corporation. Handle for polypectome snare with bipolar electrodes. 5,026,371, Cl. 606-47.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Ryder International Corp.: *See—*
  - Davis, Richard M., 5,025,688, Cl. 81-448.000.
  - Ranalletta, Joseph V.; Williams, Fred E., Jr.; and Kanner, Rowland W., 5,025,957, Cl. 222-189.000.
- Ryon, Randall C.; Canal, Lamia K.; and Tickner, Donald R., to Xerox Corporation. Dual mode document registration system. 5,026,044, Cl. 271-227.000.
- Rytec Corporation. *See—*
  - Mueller, Louis B., 5,025,847, Cl. 160-270.000.
- S.B.D. Synthetic and Biological Dvlpmnts. S.r.l.: *See—*
  - Riccardo, Monguzzi; Silvano, Menaspace; and Piergiorgio, Anzaghi, 5,026,843, Cl. 540-227.000.
- S&k Enterprises, Inc.: *See—*
  - King, John R., 5,025,937, Cl. 211-192.000
- SA Martin: *See—*
  - Gibert, Henri, 5,026,040, Cl. 271-35.000.
- SAB Nife AB: *See—*
  - Severinsson, Lars M., 5,025,900, Cl. 188-322.120.
- Sabatucci, Joseph P.: *See—*
  - Hayward, Marshall A.; Sabatucci, Joseph P.; Jirkovsky, Ivo L.; and Lefebvre, Yvon, 5,026,725, Cl. 514-465.000.
- Sabo, Joseph F., to Caterpillar Industrial Inc. Clamping arrangement for a lift mast. 5,026,245, Cl. 414-622.000.
- Saeki, Yukihiro; and Suzuki, Yasoji, to Kabushiki Kaisha Toshiba. Programmable logic circuit using wired-or tristate gates. 5,027,012, Cl. 307-465.000.
- Saffian, Robert A.: *See—*
  - Titmas, James A.; and Saffian, Robert A., 5,026,209, Cl. 405-133.000.
- Saika, Toshihiro; and Hatanaka, Katsunori, to Canon Kabushiki Kaisha. Photo-electric converter with intervening wirings for capacitive shielding. 5,027,176, Cl. 357-30.000.
- Saint-Gobain Vitrage: *See—*
  - Mathivat, Denis; Colmon, Daniel; and Philibert, Daniel, 5,026,414, Cl. 65-106.000.
- Saint-Just, Jacques: *See—*
  - Amouroux, Jacques; Nikravech, Mehrdad; Saint-Just, Jacques; and Vedrenne, Isabelle, 5,026,949, Cl. 585-648.000.
- Saint-Remy, Jean-Marie; Lebrun, Philippe; Lebeque, Serge; and Masson, Pierre L., to Baxter International, Inc.; and International Institute of Cellular and Molecular Pathology. Treatment of allergy and composition therefor. 5,026,545, Cl. 424-85.800.
- Saito, Jun; and Suzuki, Motohisa, to Obara Corporation. C-type welding gun. 5,026,963, Cl. 219-89.000.
- Saito, Kazuhiro: *See—*
  - Itoh, Eiji; Nagase, Ryuichi; Saito, Kazuhiro; Hosaka, Hiroshi; and Nagai, Hihumi, 5,026,614, Cl. 428-658.000.
- Saito, Saburo, to Otis Elevator Company. Vibration suppressing device for elevator. 5,025,893, Cl. 187-20.000.
- Saka, Hiroyasu: *See—*
  - Iio, Satoshi; Watanabe, Masakazu; Imura, Toru, Kuroda, Kotaro, and Saka, Hiroyasu, 5,026,601, Cl. 428-336.000
- Sakaguchi, Kazuhiko: *See—*
  - Koden, Mitsuhiro; Kuratate, Tomoaki, Funada, Fumiaki; Sakaguchi, Kazuhiko; Kasai, Naoya; and Takehira, Yoshikazu, 5,026,506, Cl. 252-299.610.
- Sakai, Hisami: *See—*
  - Miyazaki, Masatoshi; Sasaki, Ken; Maeda, Hachiro; Sakai, Hisami; Kamikawa, Sumio; Takai, Kiyoshi; Ogawa, Yutaka; and Tanaka, Yuichi, 5,026,319, Cl. 452-177.000.
- Sakai, Kozo: *See—*
  - Takigawa, Shoji; Teranishi, Kiyoshi, Nomura, Tomio; Suzuki, Toshiro; and Sakai, Kozo, 5,026,496, Cl. 252-56.00R.
- Sakai, Yoshio: *See—*
  - Arabori, Noboru, Takahashi, Hideaki; Sakai, Yoshio; Nakazato, Masao; Tanaka, Masakatsu; Takahashi, Tatsuhiko; Masuda, Katsutaro; Itoh, Masanobu, and Toda, Yuji, 5,025,896, Cl. 187-115.000.
- Sakamoto, Fukashi: *See—*
  - Kosaka, Takemi; Sakamoto, Fukashi, and Hidaka, Setsuo, 5,026,617, Cl. 429-206.000.
- Sakamoto, Hiroshi: *See—*
  - Harada, Kosuke; and Sakamoto, Hiroshi, 5,027,263, Cl. 363-16.000.
- Sakamoto, Katsuhiko: *See—*
  - Uekido, Kouzou; Nishiyama, Michiaki; and Sakamoto, Katsuhiko, 5,026,306, Cl. 439-675.000.
- Sakamoto, Kenitiro: *See—*
  - Yamauchi, Shunji, Tanaka, Minoru; Sakamoto, Kenitiro; Morita, Yutaka, Kidera, Toru, and Mieda, Hiroki, 5,026,668, Cl. 437-210.000.
- Sakamoto, Noriaki. *See—*
  - Yamane, Daiji; Sakamoto, Noriaki; and Horie, Nobuyuki, 5,026,981, Cl. 250-214.00B
- Sakamoto, Shigeru: *See—*
  - Takizawa, Minoru, Nakamura, Michiei; Takeuchi, Hitoshi, Sakamoto, Shigeru; and Horiguchi, Shojiro, 5,026,780, Cl. 525-301.000.
- Sakamoto, Shunji; Watanabe, Tuyoshi, and Koda, Hironobu, to Mazda Motor Corporation. Method for toe angle adjustment for a vehicle and a toe angle adjusting apparatus therefor 5,027,275, Cl. 364-424.050.
- Sakamoto, Yumi, to Seiko Epson Corporation. Apparatus for electronically outputting a voice and method for outputting a voice. 5,027,409, Cl. 381-51.000.
- Sakane, Chitose: *See—*
  - Kudo, Hiroaki; Takiguchi, Haruhisa, Sakane, Chitose; and Sugahara, Satoshi, 5,027,368, Cl. 372-96.000.
- Sakanishi, Masayuki: *See—*
  - Ishii, Takaaki; Sakanishi, Masayuki; and Kita, Katsuhiko, 5,027,266, Cl. 363-63.000.
- Sakashita, Mitsuaki: *See—*
  - Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kitahara, Masaki, 5,026,698, Cl. 514-215.000.
  - Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kitahara, Masaki, 5,026,708, Cl. 514-256.000.
- Sakashita, Takeshi; and Shimoda, Tomoaki, to GE Plastics Japan, Ltd Catalytic process for preparing polycarbonates from carbonic acid. 5,026,817, Cl. 528-199.000.
- Sakata, Hirotsugu: *See—*
  - Morozumi, Naoya; Sakata, Hirotsugu; Hayano, Makoto; Okuda, Masayuki; Fujiwara, Takayoshi; Shimoda, Moriaki; and Hattori, Hitoshi, 5,026,264, Cl. 418-220.000.
- Sakata, Shinji: *See—*
  - Ueda, Tohru; Sasaki, Takuma; Matsuda, Akira; Miyashita, Takanori; Sakata, Shinji; Yamagami, Keiji; and Fuji, Akihiro, 5,026,835, Cl. 536-23.000.
- Sakon, Ichiro; Sekiguchi, Masao; and Kanayama, Atsushi, to Rinkagaku Kogyo Co., Ltd. Red phosphorus flame retardant and nonflammable resinous composition containing the same. 5,026,757, Cl. 524-414.000
- Sakubata, Takashi: *See—*
  - Noguchi, Takehiko; Sakubata, Takashi; Hisanaga, Akinori; Yoshioka, Tetsuo; and Nagano, Hirosaku, 5,026,820, Cl. 528-350.000.
- Sakurai, Shigeo; Miyata, Hiroshi; Tan, Toshimi; and Kaneko, Ryoichi, to Hitachi, Ltd. System for administering life of plant. 5,027,268, Cl. 364-184.000.
- Sala-Spini, Amedeo F.: *See—*
  - Ross, John; and Sala-Spini, Amedeo F., 5,027,112, Cl. 340-792.000
- Salamonsen, Elizabeth Jeanne Opie, executrix: *See—*
  - Silverstein, Fred E.; and Opie, Eric A., deceased, 5,025,778, Cl. 128-4.000.
- Salazar, Nilda. *See—*
  - McBride, William J.; Baldwin, Ronald M. Kerr, Janice M., Schultze, Lisa M.; and Salazar, Nilda, 5,026,9[illegible]2, Cl. 564-440.000
- Salazar-Vior, Jose M.: *See—*
  - Crosser, Jeffery A.; Mooberry, Randall L.; Rinaldo, James D.; and Salazar-Vior, Jose M., 5,025,626, Cl. 60-460.000.
- Salcedo, F. Brad: *See—*
  - Lee, Jin P.; Salcedo, F. Brad, Robins, Martin F.; Roberts, Jeffrey; and Loor, Rueyming, 5,026,653, Cl. 436-518.000.
- Saleh, Lotfy L., to Hoechst Celanese Corporation. Apparatus for crimping tow including stuffer box, crimping rollers and molding rollers. 5,025,538, Cl. 28-263.000.
- Salerno, Laurie, to Ambulatory Traction Inc. Adjustable rack and pinion knee brace. 5,025,782, Cl. 128-80.00C.
- Salk Institute for Biological Studies, The: *See—*
  - Boublik, Jaroslav H., Rivier, Jean E. F.; Brown, Marvin R.; and Scott, Neal A., 5,026,685, Cl. 514-13.000.
- Salomon S.A.: *See—*
  - Guers, Francois, and Phelipon, Axel, 5,026,086, Cl. 280-607.000.
- Samad, Raphael; Richards, John W., and Gillard, Clive H., to Sony Corporation. Motion dependent video signal processing. 5,027,203, Cl. 358-140.000.
- Samad, Raphael: *See—*
  - Avis, Richard J. A.; Gillard, Clive H.; and Samad, Raphael, 5,027,205, Cl. 358-140.000.
- Samson, Ilan. Magnetically actuated amusement device 5,026,314, Cl. 446-133.000.
- SamSung Electronics Co., Ltd.: *See—*
  - Ahn, Myeong-Dal, 5,026,181, Cl. 400-208.000.
  - Jeon, Jun-Young, 5,027,172, Cl. 357-23.600.
  - Seo, Seungmo, 5,027,324, Cl. 365-205.000.
- Samuels, Allen R., to Weitek Corporation. Method and apparatus for performing double precision vector operations on a coprocessor 5,027,272, Cl. 364-200.000
- Samuels, James T., to Eastman Kodak Company. Heat exchanger for film processor 5,027,145, Cl. 354-299.000.
- Sanden Corporation. *See—*
  - Kawano, Satoshi; Kimura, Yoshio; and Fukushima, Eiji, 5,026,222, Cl. 409-225.000.
  - Terauchi, Kiyoshi, 5,025,636, Cl. 62-115.000.
- Sander, Nigel H.: *See—*
  - Evans, Roger; Jee, Michael H., Sander, Nigel H.; Smith, Ian H., and Gibson, Raymond K., 5,026,548, Cl. 424-195.100
- Sanders, Ronald J. Sight viewing apparatus 5,025,564, Cl. 33-241.000
- Sandstrom, Richard L.: *See—*
  - Akins, Robert P., Larson, Donald G.; Sengupta, Uday K., and Sandstrom, Richard L., 5,027,366, Cl. 372-57.000.
- Sandvik Aktiebolag: *See—*
  - Andersson, Ken G. E., Engstrand, Sven E. O., and Asberg, Lars G., 5,026,224, Cl. 409-234.000.
- Sandvik Special Metals Corporation: *See—*
  - Hartman, Joel R., 5,025,977, Cl. 228-171.000.
- Saneshige, Ryoji; Kuyama, Kouzi; Hasegawa, Makoto; and Furuya, Miyuki, to Matsushita Electric Industrial Co., Ltd. Flat brushless motor. 5,027,025, Cl. 310-156.000.
- Sanken Electric Co., Ltd.: *See—*
  - Ohtsuka, Koji; Kutsuzawa, Yoshiro, Ogata, Kimio; and Ichinosawa, Hideyuki, 5,027,166, Cl. 357-15.000.

- Sannomiya, Kunjo: *See—*
  - Ikegaya, Kazutoshi; Maruyama, Yuji; Sannomiya, Kunjo; Tsuda, Yukifumi; and Toba, Hiroto, 5,027,418, Cl. 382-8.000.
- Sano, Akira; Kamiishi, Hirofumi; Kobayashi, Seizo; Matsuura, Kazuo; and Yokoyama, Shigeki, to Nippon Oil Co., Ltd. Process for the production of polyethylene materials. 5,026,511, Cl. 264-28.000.
- Sano, Shuzo: *See—*
  - Hongo, Mikio; Mizukoshi, Katsuro; Sano, Shuzo; Kamimura, Takashi; Itoh, Fumikazu; Shimase, Akira; Haraichi, Satoshi; and Takahashi, Takahiko, 5,026,664, Cl. 437-189.000.
- Sano, Tasukazu; Tanaka, Hideyuki; Nakamura, Keijirou; Kume, Hideo; and Tanigawa, Kiyoshi, to Fuji Electric Co., Ltd. Optical fiber switch. 5,026,136, Cl. 350-96.150.
- Sanofi: *See—*
  - Bianchetti, Alberto; Le Fur, Gerard; Simiand, Jacques; and Soubrie, Philippe, 5,026,716, Cl. 514-336.000.
  - Boustta, Mahfoud; Huquet, Jovanka; and Vert, Michel, 5,026,821, Cl. 528-350.000.
  - Mendes, Etienne; Vernieres, Jean-Claude; Keane, Peter E.; and Bachy, Andre, 5,026,711, Cl. 514-300.000.
- Sanshin Industries Co., Ltd.: *See—*
  - Watanabe, Eifu, 5,025,763, Cl. 123-198.00E.
- Sanshin Kogyo Kabushiki Kaisha: *See—*
  - Gohara, Yoshihiro; and Miyazaki, Masaharu, 5,025,762, Cl. 123-196.00S.
  - Onoue, Akihiro, 5,026,309, Cl. 440-76.000.
  - Sumigawa, Yukio, 5,026,308, Cl. 440-61.000.
- Sanso, David W.: *See—*
  - Clark, Clarence R., III; and Sanso, David W., 5,027,143, Cl. 354-160.000.
- Sanyo Chemical Industries, Ltd.: *See—*
  - Takigawa, Shoji; Teranishi, Kiyoshi; Nomura, Tomio; Suzuki, Toshiro; and Sakai, Kozo, 5,026,496, Cl. 252-56.00R.
- Sanyo Electric Co. Ltd.: *See—*
  - Ishiguro, Kazuhisa; and Sekiguchi, Yutaka, 5,027,428, Cl. 455-67.000.
  - Yamaoka, Sueharu; and Fukuta, Tadatoshi, 5,027,237, Cl. 360-98.060.
- Saotome, Kazuo, to Taiyo Fishery Co., Ltd. Water absorbent polymer-coated article and method of producing same. 5,026,596, Cl. 428-264.000.
- Saperstein, George. Antibiotic sensitivity test for pathogenic organisms present in mastitic milk. 5,026,638, Cl. 435-32.000.
- Sarda, Jean-Paul; and Grard, Guy, to Institut Francais du Petrole. Cell for the triaxial stress testing of a rock sample and a testing method using such a cell. 5,025,668, Cl. 73-795.000.
- Sarda, Jean-Paul; Grard, Guy; Deflandre, Jean-Pierre; and Perreau, Philippe, to Institut Francais du Petrole. Device for carrying out stress tests on rock sample and other materials. 5,025,669, Cl. 73-798.000.
- Sarid, Dror: *See—*
  - Elings, Virgil B., Gurley, John A.; and Sarid, Dror, 5,025,658, Cl. 73-105.000.
- Sasaki, Hakaru: *See—*
  - Nakamura, Shuichi; Sasaki, Hakaru; and Watanabe, Rikizo, 5,026,435, Cl. 148-12.00A.
- Sasaki, Hironaka: *See—*
  - Hoshino, Ryoichi; Sasaki, Hironaka; and Yasutake, Takayuki, 5,025,855, Cl. 165-150.000.
- Sasaki, Ken: *See—*
  - Miyazaki, Masatoshi; Sasaki, Ken; Maeda, Hachiro; Sakai, Hisami; Kamikawa, Sumio; Takai, Kiyoshi; Ogawa, Yutaka; and Tanaka, Yuichi, 5,026,319, Cl. 452-177.000.
- Sasaki, Shosaku, to Toray Silicone Company, Limited. Hot-bonding silicone adhesive composition. 5,026,766, Cl. 524-588.000.
- Sasaki, Takuma: *See—*
  - Ueda, Tohru; Sasaki, Takuma; Matsuda, Akira; Miyashita, Takanori; Sakata, Shinji; Yamagami, Keiji; and Fuji, Akihiro, 5,026,835, Cl. 536-23.000.
- Sasaki, Toshio: *See—*
  - Shiga, Akinobu; Fukui, Yoshiharu; Sasaki, Toshio; Okawa, Masahisa; and Matsuura, Hideaki, 5,026,889, Cl. 526-142.000.
- Sasamoto, Shuji: *See—*
  - Sugimoto, Yoshiaki; Hosokawa, Toshihiro; Uchiumi, Yutaka; Sasamoto, Shuji; and Fujimoto, Nobuyuki, 5,026,331, Cl. 474-214.000.
- Sashihara, Kenji: *See—*
  - Mizuno, Kazunori; and Sashihara, Kenji, 5,026,630, Cl. 430-498.000.
- Satake Engineering Co., Ltd.: *See—*
  - Satake, Toshihiko, 5,025,993, Cl. 241-74.000.
- Satake, Shinichi: *See—*
  - Shioiri, Tomonori; Satake, Shinichi; Sekido, Yasuo; Fujisou, Tokuo; Obuchi, Akira; and Kato, Hideharu, 5,026,536, Cl. 423-652.000.
- Satake, Toshihiko, to Satake Engineering Co., Ltd. System for grinding grain. 5,025,993, Cl. 241-74.000.
- Sato, Hiroyuki, to Seikosha Co., Ltd. Shaft supporting structure. 5,026,175, Cl. 384-29.000.
- Sato, Kazuhiko; and Watanabe, Shizuhisa, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Automatic transmission apparatus for vehicle. 5,025,686, Cl. 74-866.000.
- Sato, Kimikatsu; Toyoda, Ryuichi; and Masaki, Takeshi, to Matsushita Electric Industrial Co., Ltd. Pen-type computer input device. 5,027,115, Cl. 341-13.000.
- Sato, Mikio: *See—*
  - Kaneko, Masaharu; Ozawa, Tetsuo; Yoneyama, Tomio; Imazeki, Shuji; Mukoh, Akio; and Sato, Mikio, 5,026,505, Cl. 252-299.100.
- Sato, Robert N.: *See—*
  - Wen, Cheng P.; Wu, Chan-Shin; and Sato, Robert N., 5,026,148, Cl. 350-386.000.
- Sato, Shuichi; and Ayusawa, Shirou, to SSMC Inc. Needle thread drawing device of a sewing machine. 5,025,738, Cl. 112-286.000.
- Sato, Tadahisa: *See—*
  - Yokoyama, Shigeki; Sato, Tadahisa; Kimura, Keizo; Furutachi, Nobuo; and Takahashi, Osamu, 5,026,867, Cl. 548-251.000.
- Satoh, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device with two separate gates per block. 5,027,173, Cl. 357-23.600.
- Satou, Masaharu: *See—*
  - Arai, Masatoshi; Fujioka, Kazutoshi; and Satou, Masaharu, 5,026,741, Cl. 522-33.000.
- Saunders, John B.; and Maloney, James J., to Union Carbide Industrial Gases Technology Corporation. Methane recovery process for the separation of nitrogen and methane. 5,026,408, Cl. 62-24.000.
- Sauter, Robert: *See—*
  - Reiffen, Manfred; Mark, Michael; Sauter, Robert; and Grell, Wolfgang, 5,026,702, Cl. 514-235.500.
- Savant Instruments, Inc.: *See—*
  - Zlobinsky, Yury; and Mattes, Donald A., 5,025,571, Cl. 34-72.000.
- Savill, Anthony M., to Rolls-Royce plc. Boundary layer devices. 5,026,232, Cl. 244-130.000.
- Sawicki, George C.: *See—*
  - Colas, Andre R. L.; Renauld, Franck A. D., and Sawicki, George C., 5,026,891, Cl. 556-413.000.
- Saxton, Robert J.: *See—*
  - Fellmann, Jere D.; Saxton, Robert J.; Wentrcek, Paul R.; Derouane, Eric G.; and Massiani, Pascale, 5,026,942, Cl. 585-467.000.
- Sbrana, Glauco: *See—*
  - Braca, Giuseppe; Ricci, Alessandro; Sbrana, Glauco; Brunelli, Maurizio; Giusti, Aldo; Bertolini, Guglielmo, and Galletti, Anna M. R., 5,026,675, Cl. 502-159.000.
- Scafix AB: *See—*
  - Meijer, Nils E., 5,025,534, Cl. 24-172.000.
- Schable, Reinhold A.: *See—*
  - Tidland, John W.; Schable, Reinhold A.; Vander Bom, Casey M., Biswas, Borendra K.; and Miller, William R., 5,025,693, Cl. 83-482.000.
- Schaefer, Daniel J.: *See—*
  - Spann, Donald C.; Schaefer, Daniel J.; and Krouskop, Thomas A., 5,025,519, Cl. 5-464.000.
- Schafer, Manfred; Schumann, Kurt; and Tacke, Horst, to Paslode GmbH. Annular cushioning buffer for fastener-driving tools. 5,025,971, Cl. 227-156.000.
- Schaffner, Kurt; and Demuth, Martin, to Studiengesellschaft Kohle mbH. Optically pure 1,3-dioxenones, methods for preparing same and use thereof. 5,026,877, Cl. 549-265.000.
- Schaus, John M.: *See—*
  - Nixon, James A.; Pioch, Richard P.; Schaus, John M.; and Titus, Robert D., 5,026,707, Cl. 514-255.000.
- Schechtman, Lee A., to Procter & Gamble Company, The. Disposable sanitary articles. 5,026,589, Cl. 428-138.000.
- Scheffel, Juergen: *See—*
  - Guber, Wolfgang; Scheffel, Juergen; and Wotzka, Friedrich, 5,026,975, Cl. 235-462.000.
- Scheffler, Gunter, to Siemens Aktiengesellschaft. Method for reducing noise and cross-color interference in television signals, and apparatus for performing the method. 5,027,194, Cl. 358-36.000.
- Scheid, Winfried: *See—*
  - Schoniger, Karl-Heinz; and Scheid, Winfried, 5,027,258, Cl. 362-31.000.
- Schellenberg, Victor R.; Zsoldos, James; Hartman, Joy L.; Smith, William H., deceased (by Smith, Monteen B., executor); Covington, Wilbur T.; and Conley, Allen, to Newport News Shipbuilding and Dry Dock Company. Water-based correctional facility and system, and method of making the same. 5,026,211, Cl. 405-204.000.
- Schellenberg, Walter, to Rundpack AG. Packing container. 5,025,981, Cl. 229-118.000.
- Schenck, Stephen R.: *See—*
  - Bass, Alan S.; Schenck, Stephen R.; and Martin, Robert C., 5,027,014, Cl. 307-475.000.
- Schenk, Bernd, to Schenk, Helga. Process and device for testing the tightness of a flexible plastic container. 5,025,657, Cl. 73-37.000.
- Schenk, Heinrich, to Siemens Aktiengesellschaft. Circuit arrangement for the equalization of digital signals received in analog form 5,027,370, Cl. 375-14.000.
- Schenk, Helga: *See—*
  - Schenk, Bernd, 5,025,657, Cl. 73-37.000.
- Scherer, Michael: *See—*
  - Latz, Rudolf; and Scherer, Michael, 5,026,471, Cl. 204-298.190.
- Schering AG: *See—*
  - Davey, David D., 5,026,712, Cl. 514-300.000.
  - Przuntek, Horst; and Bittkau, Simon, 5,026,357, Cl. 604-258.000.
- Schering Corporation: *See—*
  - Hegde, Vinod R.; and Patel, Mahesh G., 5,026,731, Cl. 514-629.000.
- Schier, J. Alan: *See—*
  - Lurie, Boris J.; Schier, J. Alan; and Iskenderian, Theodore C., 5,026,008, Cl. 244-164.000.
- Schindele, Gary M., to Medical Systems Development Corporation. Methods and apparatus for directly sensing and measuring blood related parameters. 5,025,798, Cl. 128-771.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Schlesinger, Milton J.; and Adams, Steven P., to Washington University. Antiviral peptides. 5,026,686, Cl. 514-17.000.
- Schloegl, Gunter: *See—*
  - Janocha, Siegfried; Schloegl, Gunter; Crass, Guenther, and Bothe, Lothar, 5,026,592, Cl. 428-204.000.
- Schlossmann, Klaus: *See—*
  - Goldmann, Siegfried; Bossert, Friedrich; Bischoff, Hilmar; Petzinna, Dieter; Puls, Walter; and Schlossmann, Klaus, 5,026,714, Cl. 514-302.000.
- Schlumberger Industries, Inc.: *See—*
  - de Montgolfier, Arnaud; and Goodwin, R W., 5,027,059, Cl. 324-127.000.
- Schlumberger Technology Corporation: *See—*
  - Huber, Klaus B.; Hromas, Joe C.; and Edwards, Arnold G., 5,025,861, Cl. 166-297.000.
- Schmid, Markus, to Concast Standard AG. Continuous casting apparatus with electromagnetic stirrer. 5,025,853, Cl. 164-504.000.
- Schmid, Reinhold; Esser, Hans-Willi; and Mistler, Friedhelm, to W. Schlafhorst AG & Co. Releasable connection of tubular sliding rods of a textile machine. 5,026,199, Cl. 403-313.000.
- Schmid, Thomas, to MTU Motoren- und Turbinen-Union Munchen GmbH. Coupling. 5,026,098, Cl 285-174.000.
- Schmidt, Andreas: *See—*
  - Volker, Theodor; Althaus, Hans; and Schmidt, Andreas, 5,026,815, Cl. 528-64.000.
- Schmidt, Eugene H.; and Nikkel, Lee F., to New Tek Manufacturing, Inc. Row following drawn implement with internal steering arm. 5,025,866, Cl. 172-5.000.
- Schmidt, Gregory E.: *See—*
  - Hagen, Gary P.; Schmidt, Gregory E.; Weis, John M ; and Smith, Thomas G., 5,026,917, Cl. 568-323.000.
- Schmidt, Robert J.; and Haizmann, Robert S., to UOP. Hydrotreatment-isomerization without hydrogen recycle. 5,026,950, Cl. 585-737.000.
- Schmidt, Robert J.; Rice, Lynn H.; and Raghuram, Srikantiah, to UOP. Process for paraffin isomerization with liquid phase adsorptive product separation. 5,026,951, Cl. 585-738.000.
- Schmidt, William G.; and Lockwood, Dean H., to Pillsbury Company, The. Method of freezing and ice glazing broccoli. 5,026,562, Cl 426-68.000.
- Schmitz, William B.; and Schmitz, William L., to Autoject Systems Inc Liquid medicament injector system. 5,026,349, Cl. 604-134 000.
- Schmitz, William L.: *See—*
  - Schmitz, William B.; and Schmitz, William L., 5,026,349, Cl. 604-134.000.
- Schneider, Edward T. Remote controlled high force actuator. 5,025,627, Cl. 60-527.000.
- Schneider, Paul. Flexible bird feeder. 5,025,753, Cl. 119-51.030.
- Schneider, Roy W., to United Technologies Corporation. Method for synchrophaser measurement and synchrophaser control. 5,027,277, Cl. 364-431.010.
- Schneiter, John L.: *See—*
  - Ortiz, Angel L., Jr.; and Schneiter, John L., 5,026,979, Cl. 250-205.000.
- Schoeller-Bleckmann Gesellschaft m.b.H : *See—*
  - Pohl, Helmut, 5,026,436, Cl. 148-12.00B
- Schoepe, Adolf; and Dufau, Oscar Faucet handle universal coupling. 5,025,826, Cl. 137-315.000.
- Schohe, Rudolf; Glaser, Thomas; Traber, Jorg; and Allen, George S., to Bayer Aktiengesellschaft. Substituted basic 2-aminotetralin in pharmaceuticals. 5,026,857, Cl. 514-319.000.
- Schoniger, Karl-Heinz; and Scheid, Winfried, to Inotec GmbH Gesellschaft fur Innovative Technik. Display unit. 5,027,258, Cl. 362-31.000.
- Schork, Reinhold: *See—*
  - Matthes, Reinhard; Schork, Reinhold; and Vahlensieck, Hans-Joachim, 5,026,533, Cl. 423-342.000.
- Schrantz, Gregory A.: *See—*
  - O'Mara, William E., Jr.; and Schrantz, Gregory A., 5,027,187, Cl. 357-65.000.
- Schreck, David J.: *See—*
  - Wegman, Richard W.; and Schreck, David J., 5,026,907, Cl. 562-519.000.
- Schroeder, Herbert A., to Colorado State University Research Foundation. Method for recovering and using lignin in adhesive resins by extracting demethylated lignin. 5,026,808, Cl. 527-400.000.
- Schroth, Charles K.: *See—*
  - Bellamy, John C , Christensen, Richard L.; and Schroth, Charles K., 5,027,344, Cl. 370-56.000.
- Schuco International GmbH & Co.: *See—*
  - Diekmann, Bernd, 5,026,588, Cl. 428-100.000.
- Schuldt, Hans P., to Conducta Gesellschaft fur MeB- und Regeltechnik. Gas detection system. 5,025,653, Cl. 73-1.00G.
- Schuler, Andreas: *See—*
  - Hintzen, Ullrich; Luhrsen, Ernst; and Schuler, Andreas, 5,025,961, Cl. 222-599.000.
- Schulte, Helmut: *See—*
  - Heinz, Hans-Detlef; Meyer, Rolf-Volker; Schulte, Helmut; and Zimmerman, Franz, 5,026,818, Cl. 528-313.000.
- Schultz, John: *See—*
  - Payne, Thomas R.; and Schultz, John, 5,026,971, Cl 219-483.000.
- Schultze, Lisa M.: *See—*
  - McBride, William J.; Baldwin, Ronald M.; Kerr, Janice M.; Schultze, Lisa M.; and Salazar, Nilda, 5,026,913, Cl. 564-440.000.
- Schumacher, Richard A *See—*
  - Lauffer, John M ; and Schumacher, Richard A., 5,027,253, Cl 361-321.000.
- Schumann, Kurt: *See—*
  - Schafer, Manfred; Schumann, Kurt; and Tacke, Horst, 5,025,971, Cl. 227-156.000.
- Schumm, Brooke, Jr., to Eveready Battery Company, Inc. Electroless plated plastic covers for galvanic cells. 5,026,616, Cl. 429-168.000.
- Schumm, Jeffry S.: *See—*
  - Tour, James M., Wu, Ruilian; and Schumm, Jeffry S., 5,026,894, Cl. 558-46.000.
- Schummer, Dietmar *See—*
  - Bohlendorf, Bettina; Bedorf, Norbert; Hofle, Gerhard; Schummer, Dietmar; and Sutter, Marius, 5,026,878, Cl. 549-267.000.
- Schur Plastic A/S *See—*
  - Jensen, Jorn B., 5,026,173, Cl. 383-10.000.
- Schurger, Rainer; and Bauer, Bernhard, to SKF GmbH. Sealing device for bearings, particularly bearing bushings of universal joints 5,026,324, Cl. 464-131.000.
- Schutte, Michael J.; and King, Jerry J. Double-bladed scalpel 5,026,385, Cl. 606-167.000.
- Schwamm, Ronald *See—*
  - Stehle, Heinz; Wehr, Thomas; Petersmann, Joseph, Seidel, Willi; Hamm, Ludwig; Foeldi, Thomas; Eschrich, Gerhard, Schwamm, Ronald; Runge, Wolfgang; Gruhle, Wolf-Dieter; and Wendel, Peter, 5,025,684, Cl. 74-862.000.
- Schwartz, Ansel M.: *See—*
  - Leung, Paul; and Schwartz, Ansel M., 5,026,050, Cl. 272-143.000.
- Schwartz, Harry: *See—*
  - Radunz, Hans-Eckart, Schwartz, Harry; and Heinrich, Martin, 5,026,642, Cl. 435-117.000.
- Schwarz, Alexander: *See—*
  - Ockovic, Richard C.; McDermott, Wayne T.; and Schwarz, Alexander, 5,026,155, Cl. 356-37.000.
- Schwarz, Ray P.; Wolf, David A.; and Trinh, Tinh T., to United States of America, National Aeronautics and Space Administration. Horizontally rotated cell culture system with a coaxial tubular oxygenator. 5,026,650, Cl. 435-286.000.
- Schweizer, Werner: *See—*
  - Lasure, Randal D.; Schweizer, Werner; and Venetjoki, Ari, 5,025,910, Cl. 198-377.000.
- Schwen, Roland: *See—*
  - Denzinger, Walter; Mach, Helmut; Mohr, Juergen; Oppenlaender, Knut; Schwen, Roland, and Vogel, Hans-Henning, 5,026,494, Cl. 252-50.000.
- Scientific Molding Corporation, Ltd.: *See—*
  - Johnson, Michael L.; Patel, Chetan N.; Plourde, Marcel D.; and Wiederin, Brian J., 5,026,197, Cl. 403-24.000.
- Scott, Graham A.: *See—*
  - Lesslie, David J.; Morris, Robert A.; Messerli, Alan J., Scott, Graham A.; and Krajewski, Alexander A., 5,027,091, Cl 335-132.000.
- Scott, Neal A.: *See—*
  - Boublik, Jaroslav H.; Rivier, Jean E. F.; Brown, Marvin R.; and Scott, Neal A., 5,026,685, Cl. 514-13.000.
- Seagate Technology, Inc.: *See—*
  - Hagen, Tracy M., 5,027,239, Cl. 360-104.000.
- Seager, Richard, to Risdon Corporation. Dispenser with hollow drive rod. 5,025,960, Cl. 222-390.000.
- Sealed Energy Systems, Inc.: *See—*
  - Rose, Michael V.; and Smith, Daniel E., 5,025,551, Cl. 29-730.000.
- Seegmiller, Ben L. Mine roof support truss and components. 5,026,217, Cl. 405-288.000.
- Seeholzer, Josef: *See—*
  - Eichinger, Rudolf; Michaud, Horst; and Seeholzer, Josef, 5,026,457, Cl. 162-158.000.
- Segatz, Wilhelm, to Ara-Werk Kramer GmbH & Co. Apparatus for discharging pasty materials, particularly sealing materials. 5,025,959, Cl. 222-389.000.
- Sehier, Philippe; and Kaleh, Ghassan K., to Alcatel Transmission par Faisceaux Hertziens. Self-adaptive equalizer circuit for a differentially coherent demodulation installation. 5,027,371, Cl 375-15.000.
- Seidel, Willi: *See—*
  - Stehle, Heinz; Wehr, Thomas; Petersmann, Joseph; Seidel, Willi; Hamm, Ludwig; Foeldi, Thomas; Eschrich, Gerhard; Schwamm, Ronald; Runge, Wolfgang; Gruhle, Wolf-Dieter; and Wendel, Peter, 5,025,684, Cl. 74-862.000.
- Seiko Epson Corporation: *See—*
  - Kusabuka, Yoshito, 5,026,185, Cl. 400-618.000.
  - Obikawa, Tsuyoshi, 5,026,879, Cl. 549-369.000.
  - Oshima, Keiichi; Kato, Takashi; and Murayama, Susumu, 5,026,183, Cl. 400-605.000.
  - Sakamoto, Yumi, 5,027,409, Cl. 381-51.000.
  - Yanagisawa, Michio; Ikejiri, Masahisa; Miyazaki, Hajime; Muranaka, Tsukasa; Inoue, Kunihiro; and Uchiyama, Shouichi, 5,027,077, Cl. 324-712.000.
- Seiko Instruments, Inc.: *See—*
  - Fukino, Hiroshi, 5,025,725, Cl. 101-227.000.
  - Suzuki, Terao; Kishi, Matsuo; Muraishi, Katsuyoshi; Ogawa, Kenichi; and Takashio, Hiroshi, 5,026,518, Cl. 419-12.000.
- Seiko Seiki Kabushiki Kaisha: *See—*
  - Ando, Shigenori; and Iijima, Ryuji, 5,027,280, Cl. 364-474.160.
- Seikosha Co., Ltd.: *See—*
  - Sato, Hiroyuki, 5,026,175, Cl. 384-29.000.

- Seiler, Werner: *See—*
  - Manser, Josef; Egger, Friedrich; and Seiler, Werner, 5,026,567, Cl. 426-458.000.
- Seki, Kazuo: *See—*
  - Takahashi, Masato; Seki, Kazuo; Yamada, Tetsuya; and Morohoshi, Yukuo, 5,026,272, Cl. 431-79.000.
- Sekido, Yasuo: *See—*
  - Shioiri, Tomonori; Satake, Shinichi; Sekido, Yasuo; Fujisou, Tokuo; Obuchi, Akira; and Kato, Hideharu, 5,026,536, Cl. 423-652.000.
- Sekiguchi, Masao: *See—*
  - Sakon, Ichiro; Sekiguchi, Masao; and Kanayama, Atsushi, 5,026,757, Cl. 524-414.000.
- Sekiguchi, Yutaka: *See—*
  - Ishiguro, Kazuhisa; and Sekiguchi, Yutaka, 5,027,428, Cl. 455-67.000.
- Sekii, Yasuaki; and Matusmoto, Yasushi, to Sony Corporation. Magnetic recording and reproducing apparatus with double decks synchronized for dubbing. 5,027,232, Cl. 360-74.100.
- Sekijima, Kenzo; and Kitagawa, Seiho, to Shimizu Construction Co., Ltd.; and Dainihon Glass Industry Co., Ltd. Meshwork reinforced and pre-stressed concrete member, method and apparatus for making same. 5,025,605, Cl 52-309.160.
- Sekine, Tetsuo: *See—*
  - Tanaka, Masataka, Ohto, Masao; Sekine, Tetsuo; Takahashi, Hiroshi; and Maruyama, Masaru, 5,026,350, Cl. 604-158.000.
- Sekino, Jun: *See—*
  - Kobayashi, Mitsugu; Ohtani, Go; Sekino, Jun; Konno, Toshimitsu; and Maeda, Hiroshi, 5,026,772, Cl. 525-54.100.
- Sekino, Yohsuke, to Honda Giken Kogyo Kabushiki Kaisha. Wheel suspension system for automobiles. 5,026,090, Cl. 280-673.000.
- Seko, Yasuo. *See—*
  - Sugimoto, Hajime; and Seko, Yasuo, 5,025,600, Cl. 52-167.000.
- Sekozawa, Teruji: *See—*
  - Ohnari, Mikihiko; Sekozawa, Teruji; Funahashi, Motohisa; Atago, Takeshi; and Shioya, Makoto, 5,027,278, Cl. 364-431.060.
- Selwood, Patrick G.; Maddison, Anthony N.; and Sheasby, Peter G., to Alcan International Limited, and BL Technology Limited. Structures fabricated from aluminum components and processes involved in making these structures. 5,026,612, Cl. 428-594.000.
- Semiconductor Energy Laboratory Co., Ltd. *See—*
  - Mase, Akira, 5,025,555, Cl. 29-840.000.
- Semke, Douglas L.: *See—*
  - DeLand, Daniel L.; and Semke, Douglas L., 5,025,591, Cl. 49-360.000.
- Semura, Norio; Tsuchida, Masumi; and Shimamura, Yoshihiro, to ASMO Co., Ltd. Electric actuator switch with multiple brushes. 5,027,021, Cl. 310-68.00A.
- Senghaas, Karl A.; Senghaas, Peter; and Michalec, Jerzy, to Cornelius Company, The. Auto-set drink dispenser. 5,027,284, Cl. 364-479.000.
- Senghaas, Peter: *See—*
  - Senghaas, Karl A., Senghaas, Peter; and Michalec, Jerzy, 5,027,284, Cl. 364-479.000.
- Sengupta, Uday K.: *See—*
  - Akins, Robert P ; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 5,027,366, Cl. 372-57.000.
- Sentex Systems, Incorporated: *See—*
  - Davis, William R.; Mowers, Dennis W., Greenthal, Richard P., Szymanski, Paul; Wray, Ronald A., and Davidson, Richard A., 5,027,111, Cl. 340-784.000.
- Sentrol, Inc.: *See—*
  - Marman, Douglas H.; and Winters, Robert C., 5,026,990, Cl. 250-342.000.
- Seo, Seungnio, to Samsung Electronics Co., Ltd. Sense amplifier driver for use in memory device. 5,027,324, Cl. 365-205.000.
- Sepmeyer, Arthur C.: *See—*
  - Balyasny, Marik; Olivares, Raul A.; and Sepmeyer, Arthur C., 5,026,301, Cl. 439-391.000.
- Sequa Chemicals, Inc.: *See—*
  - Floyd, William C., Dragner, louis R., and Black, Blanche H., 5,026,746, Cl. 524-50.000.
- Serafino, Anthony J.: *See—*
  - Coyle, Richard J., Jr.; Grimes, Gary J.; Haas, Lawrence J., Serafino, Anthony J.; and Shevchuk, George J., 5,026,411, Cl. 65-4.210.
- Serco Corporation: *See—*
  - Alexander, James C., 5,026,242, Cl. 414-401.000.
- Sereinig, Gunter: *See—*
  - Langfeld, Horst; Puebla, Claudio; and Sereinig, Gunter, 5,026,830, Cl. 534-582.000.
- Sergeev, Boris G.: *See—*
  - Yudovin, Lev G.; and Sergeev, Boris G., 5,026,220, Cl. 408-56.000.
- Serizawa, Haruo: *See—*
  - Usui, Masayoshi; and Serizawa, Haruo, 5,026,611, Cl. 428-593.000.
- Sessa, Eugene D.; and Duffy, Richard, to Nylok Fastener Corporation Apparatus for coating fasteners. 5,025,750, Cl. 118-69.000.
- Seto, Akira: *See—*
  - Manoh, Yumiko; and Seto, Akira, 5,026,644, Cl. 435-134.000.
- Seto, Takatoshi; Yokoi, Takashi; Odagiri, Masaki; and Imanari, Makoto, to Research Association for Utilization of Light Oil. Process for preparing glycol aldehyde. 5,026,922, Cl 568-486.000.
- SEV S.r.l.: *See—*
  - Tognana, Aldo, 5,026,322, Cl. 460-76.000.
- Sever, Robert E.; and Woodring, Dave L., to Essex Industries, Inc. Locking device for gas regulator and control apparatus. 5,026,026, Cl. 251-230.000.
- Severinsson, Lars M., to SAB Nife AB. Sealing arrangement, particularly for a rail vehicle slack adjuster. 5,025,900, Cl. 188-322.120.
- Sezaki, Masaji: *See—*
  - Imamura, Kei-ichi; Gomi, Shuichi; Iwata, Michiaki; Miyadoh, Shinji; Shimura, Masaru; Shomura, Takashi; Sezaki, Masaji; and Inoye, Shigeharu, 5,026,547, Cl. 424-122.000.
- Sgarzi, Alcide: *See—*
  - Butterfield, Donald B.; and Sgarzi, Alcide, 5,026,462, Cl. 204-129.550.
- SGS-Thomson Microelectronics, Inc.: *See—*
  - Steele, Randy C., 5,027,011, Cl. 307-465.000.
- SGS-Thomson Microelectronics S.r.l.: *See—*
  - Cini, Carlo; and Murari, Bruno, 5,027,250, Cl. 361-90.000.
  - Palara, Sergio, 5,027,004, Cl. 307-270.000.
- SGS Thomson Microelectronics S.A.: *See—*
  - Nicolai, Jean, 5,027,118, Cl. 341-132.000.
  - Queinnec, Olivier; and Pouget, Henri, 5,027,006, Cl. 307-272.300
- Shannon, Michael J.; and Turnidge, Randolf C., to Hughes Aircraft Company. Integrated circuit solder die-attach design and method. 5,027,189, Cl. 357-71.000.
- Shao, Shuyong; Feng, Jianhua; and Zhang, Xinchao, to Harbin Polytechnic University. Apparatus and method for detecting and processing impedance rheogram. 5,025,784, Cl. 128-419.0PG
- Shape Inc.: *See—*
  - Gelardi, Anthony L.; and Lovecky, Craig, 5,026,000, Cl. 242-199.000.
- Sharkey, Steven D. Enhanced cinema system. 5,026,152, Cl. 352-85.000.
- Sharp Kabushiki Kaisha: *See—*
  - Kita, Sumio, 5,027,227, Cl. 358-488.000.
  - Koden, Mitsuhiro; Kuratate, Tomoaki; Funada, Fumiaki, Sakaguchi, Kazuhiko; Kasai, Naoya; and Takehira, Yoshikazu, 5,026,506, Cl. 252-299.610.
  - Kudo, Hiroaki; Takiguchi, Haruhisa; Sakane, Chitose; and Sugahara, Satoshi, 5,027,368, Cl. 372-96.000.
  - Masuda, Zitsuo, 5,026,037, Cl. 271-3.100.
  - Mimoto, Toshio, 5,027,174, Cl. 357-23.130.
  - Takahashi, Kosei; Hosoda, Masahiro; Tsunoda, Atsuo; Kondo, Masafumi; and Suyama, Takahiro, 5,027,169, Cl. 357-17.000.
  - Tanaka, Hirohisa; Kishi, Kohhei; and Yano, Kohzo, 5,026,143, Cl. 350-336.000.
  - Tanaka, Toshiyuki; Nakamura, Nobuo; and Yamamoto, Mutsuhiro, 5,027,305, Cl. 364-513.000.
  - Yamanaka, Toshihiro; Takemoto, Tetsuyuki; Horii, Masahiro; and Taniguchi, Shoji, 5,027,334, Cl. 369-13.000.
  - Yamane, Daiji; Sakamoto, Noriaki; and Horie, Nobuyuki, 5,026,981, Cl. 250-214.00B.
  - Yamauchi, Miyoshi; and Noboru, Mitsuhiro, 5,027,430, Cl. 455-188.000.
- Shattuck, Gordon D., Jr.: *See—*
  - Reafler, Gerald G.; and Shattuck, Gordon D., Jr , 5,026,448, Cl. 156-212.000.
- Shaw Industries Ltd. *See—*
  - Trzecieski, Michael A.; and Ferguson, Clifford R., 5,026,451, Cl. 156-244.270.
- Shea, John R., Jr.; and Hall, A Risher. Invisible mullion assembly 5,026,581, Cl. 428-34.000.
- Shea, Robert H.: *See—*
  - Russel, Steven M.; and Shea, Robert H., 5,026,034, Cl. 270-52.000.
- Sheasby, Peter G. *See—*
  - Selwood, Patrick G.; Maddison, Anthony N., and Sheasby, Peter G., 5,026,612, Cl. 428-594.000.
- Sheffer, Eliezer A., to VerSuS Technology, Inc Supervised, interactive alarm reporting system. 5,027,383, Cl 379-39.000.
- Shell Oil Company: *See—*
  - Kemp, Richard A., 5,026,923, Cl. 568-618.000
- Shelnutt, Robert C., to American Fun & Games, Inc. Game and cruciform game table. 5,026,052, Cl. 273-3.00A.
- Sheng, Chyi N.: *See—*
  - Manns, William G.; Weeks, Don J.; Merryman, Jerry D.; and Sheng, Chyi N., 5,027,132, Cl 346-108.000.
- Sheng, Steve: *See—*
  - Carlson, Lee; Green, Mike; Miller, Mike; Nissen, Rudy; and Sheng, Steve, 5,025,952, Cl. 222-3.000.
- Shepherd, David S.: *See—*
  - Ford, Russell W.; and Shepherd, David S , 5,026,254, Cl 416-61.000.
- Shepherd, Robin G.: *See—*
  - Crossley, Roger; Opalko, Albert; and Shepherd, Robin G , 5,026,854, Cl. 546-112.000.
- Sherman, James B.: *See—*
  - Jarvis, J. Michael; Bass, Andrew F.; and Sherman, James B , 5,027,341, Cl. 370-13.000.
- Sherman, John D.: *See—*
  - Tannous, Medhat K.; Sherman, John D , and Cohen, Alan P., 5,026,531, Cl. 423-328.000.
- Sheu, Shen; and Hector, Louis G., to Aluminum Company of America Method of providing textures on material by rolling. 5,025,547, Cl 29-527 400.
- Shevchuk, George J.: *See—*
  - Coyle, Richard J., Jr.; Grimes, Gary J , Haas, Lawrence J.; Serafino, Anthony J.; and Shevchuk, George J , 5,026,411, Cl 65-4.210.
- Sheynberg, Iosif: *See—*
  - Godyak, Valery; and Sheynberg, Iosif, 5,027,041, Cl 315-248.000.

VOL 1127
ISS 4
JE 25 1991
UMI

- Shi, Kwo-Xyan; and Tang, Fuh-Chyun, to Industrial Technology Research Institute. Multi-phase synchronous automatic winding method and apparatus for motor stators 5,025,997, Cl. 242-1.10R.
- Shibagaki, Taro: *See—*
  - Shimizu, Fumihiko; and Shibagaki, Taro, 5,027,088, Cl. 333-1.000.
- Shibata, Toshio, to Futaba Shokuhin Kogyo Kabushiki Kaisha. Method for preparing freeze-dried rice. 5,026,570, Cl. 426-626.000.
- Shick, Lloyd G.: *See—*
  - Franz, Helmut; Hanlon, James H., and Shick, Lloyd G., 5,026,597. Cl. 428-323.000.
- Shiga, Akinobu; Fukui, Yoshiharu; Sasaki, Toshio; Okawa, Masahisa; and Matsuura, Hideaki, to Sumitomo Chemical Company, Limited. Catalyst system for olefin polymerization and method for production of olefin polymers by using the same. 5,026,889, Cl. 526-142.000.
- Shiga, Nobuo, to Sumitomo Electric Industries, Ltd. Source follower light reception circuit. 5,027,080, Cl. 330-59.000.
- Shigeta, Junji: *See—*
  - Kagaya, Osamu; Umemoto, Yasunari, and Shigeta, Junji, 5,027,167, Cl. 357-15.000.
- Shih, Joseph G.: *See—*
  - Paciorek, Kazimiera J. L.; Shih, Joseph G.; Randolph, Bruce B., and Snyder, Carl E., Jr., 5,026,893, Cl. 556-435.000.
- Shiiki, Masatoshi: *See—*
  - Migita, Masahito; Kanehisa, Osamu; Shiiki, Masatoshi; and Yamamoto, Hajime, 5,026,661, Cl. 437-81.000.
- Shill, David, to Thermoguard Equipment, Inc. Apparatus for stacking corrugated sheet material. 5,026,249, Cl. 414-789.100.
- Shimabukuro, Randy L.: *See—*
  - Reedy, Ronald E.; Shimabukuro, Randy L., and Garcia, Graham A., 5,027,171, Cl. 357-23.500.
- Shimamura, Yoshihiro: *See—*
  - Semura, Norio; Tsuchida, Masumi; and Shimamura, Yoshihiro, 5,027,021, Cl. 310-68.00A
- Shimano, Noriyuki: *See—*
  - Ono, Yoshio; and Shimano, Noriyuki, 5,027,196, Cl. 358-76.000.
- Shimase, Akira *See—*
  - Hongo, Mikio; Mizukoshi, Katsuro; Sano, Shuzo, Kamimura, Takashi; Itoh, Fumikazu; Shimase, Akira; Haraichi, Satoshi; and Takahashi, Takahiko, 5,026,664. Cl. 437-189.000.
- Shimazu, Kunio: *See—*
  - Mineta, Sadayoshi; Kitajima, Kimio: and Shimazu, Kunio, 5,027,026, Cl. 310-259.000.
- Shimizu, Atsuko: *See—*
  - Yamaguchi, Shuji; and Shimizu, Atsuko, 5,027,296, Cl. 364-562.000.
- Shimizu Construction Co., Ltd.: *See—*
  - Sekijima, Kenzo; and Kitagawa, Seiho, 5,025,605, Cl. 52-309.160.
- Shimizu, Fumihiko; and Shibagaki, Taro, to Kabushiki Kaisha Toshiba. Signal wiring board. 5,027,088, Cl. 333-1.000.
- Shimizu, Fumihiko: *See—*
  - Sugawara, Mitsuru; Yoshinaga, Akitoshi; Shimizu, Fumihiko; and Takami, Masayuki, 5,026,134, Cl. 350-96.110.
- Shimizu, Isoo; Matsumura, Yasuo; and Inomata, Yoshihisa, to Nippon Petrochemicals Company, Limited. Method for producing 4-isobutylstyrene. 5,026,939, Cl. 585-439.000.
- Shimizu, Minoru: *See—*
  - Hazaki, Eiichi; Otaka, Tadashi; and Shimizu, Minoru, 5,026,995, Cl. 250-441.100.
- Shimizu, Toshimitsu, to NEC Corporation Monitoring system for radio communication apparatus. 5,027,427, Cl. 455-67.000.
- Shimoda, Isamu: *See—*
  - Chiba, Yuji; Fujioka, Hidehiko; Mizusawa, Nobutoshi; Kariya, Takao; and Shimoda, Isamu, 5,026,239, Cl. 414-217.000.
- Shimoda, Moriaki: *See—*
  - Morozumi, Naoya; Sakata, Hirotsugu, Hayano, Makoto; Okuda, Masayuki; Fujiwara, Takayoshi; Shimoda, Moriaki; and Hattori, Hitoshi, 5,026,264, Cl. 418-220.000.
- Shimoda, Tomoaki: *See—*
  - Sakashita, Takeshi; and Shimoda, Tomoaki, 5,026,817, Cl. 528-199.000.
- Shimomura, Tadao: *See—*
  - Kimura, Kazumasa; Nagasuna, Kinya; Namba, Takashi; Kadonaga, Kenji; Miyake, Koji; and Shimomura, Tadao, 5,026,800, Cl. 526-200.000.
- Shimotsuhama, Isao: *See—*
  - Kitsuta, Tatsuaki; Shimotsuhama, Isao; Watanabe, Yoshio; Tanaka, Masahiro; Shiotsu, Shinichi; and Ogawa, Kazumi, 5,027,005, Cl. 307-272.100.
- Shimpo, Masafumi: *See—*
  - Takeda, Mutsuhiko; Kakuda, Minoru; Shimpo, Masafumi; and Yoshida, Kiyoshi, 5,026,875, Cl. 549-201.000.
- Shimura, Masaru: *See—*
  - Imamura, Kei-ichi; Gomi, Shuichi; Iwata, Michiaki; Miyadoh, Shinji; Shimura, Masaru; Shomura, Takashi; Sezaki, Masaji; and Inoye, Shigeharu, 5,026,547, Cl. 424-122.000.
- Shin-Etsu Chemical Co., Ltd.: *See—*
  - Arai, Masatoshi; Fujioka, Kazutoshi; and Satou, Masaharu, 5,026,741, Cl. 522-33.000.
- Shin-Ichi Hirano: *See—*
  - Baney, Ronald H.; and Hirano, Shin-ichi, 5,026,684, Cl. 505-1.000.
- Shin, Yoshiharu: *See—*
  - Aoki, Hideki; Akao, Masaru; and Shin, Yoshiharu, 5,026,397, Cl 623-11.000.
- Shinbo, Masatoshi; Fujie, Hideki; Iwakuni, Kaoru; Muto, Akira; and Aoki, Kazuhiro, to Matsushita Electric Industrial Co., Ltd. Apparatus for recording audio signals and video signals on a recording medium. 5,027,222, Cl. 358-330.000.
- Shinhama, Makoto *See—*
  - Hisashige, Nobuyasu; Yokogawa, Fukuichi; and Shinhama, Makoto, 5,025,890, Cl. 181-272.000.
- Shinnoh, Nobuo: *See—*
  - Kanai, Toshiyuki; and Shinnoh, Nobuo. 5,026,265, Cl. 425-127.000.
- Shinohara, Toshiaki, to Mitsubishi Denki Kabushiki Kaisha Method of eliminating burrs on a lead frame with a thin metal coating. 5,026,669, Cl. 437-224.000.
- Shinonaga, Hirohiko: *See—*
  - Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; and Asakura, Tsutou, 5,027,216, Cl. 358-213.110
- Shinpo, Yoshiharu; and Akiyama, Motoharu, to Toyota Jidosha Kabushiki Kaisha; and Mannoh Kogyo Co., Ltd. Column shift lever device. 5,025,678, Cl. 74-473.0SW.
- Shiohara, Hiroshi, to Kabushiki Kaisha Toshiba. Analog switch circuit with reduced switching noise. 5,027,019, Cl 307-579.000.
- Shioiri, Tomonori; Satake, Shinichi; Sekido, Yasuo; Fujisou, Tokuo; Obuchi, Akira; and Kato, Hideharu, to Nippon Oil Co., Ltd.; and Petroleum Energy Center. Hydrogen production from hydrocarbon. 5,026,536, Cl 423-652.000.
- Shiotsu, Shinichi: *See—*
  - Kitsuta, Tatsuaki; Shimotsuhama, Isao; Watanabe, Yoshio; Tanaka, Masahiro; Shiotsu, Shinichi; and Ogawa, Kazumi, 5,027,005, Cl 307-272.100.
- Shioya, Makoto: *See—*
  - Ohnari, Mikihiko; Sekozawa, Teruji; Funabashi, Motohisa; Atago, Takeshi; and Shioya, Makoto, 5,027,278, Cl. 364-431.060.
- Shiraishi, Kazuhiro: *See—*
  - Kume, Tateo; Komagome, Reijiro; and Shiraishi, Kazuhiro, 5,025,767, Cl. 123-489.000.
- Shiratori, Hidehisa *See—*
  - Arai, Tatsuo; Shiratori, Hidehisa, Hasegawa, Ryoei; and Iizuka, Kazuo, 5,026,221, Cl. 409-137.000.
- Shirose, Meizo: *See—*
  - Masaki, Hiroya; Takagiwa, Hiroyuki; Shirose, Meizo; and Ishikawa, Michiaki, 5,026,620, Cl. 430-99.000.
- Shnitkin, Harold; and Harrison, Glenn B., to United Technologies Corporation. Phase alignment of electronically scanned antenna arrays. 5,027,127, Cl. 342-372.000.
- Shobundo Insatsu Kabushiki Kaisha: *See—*
  - Asai, Haruo, 5,025,580, Cl. 40-152.100.
- Shoji, Takao: *See—*
  - Fujii, Masashi; Uyama, Kiichiro; Shoji, Takao; and Arai, Kenji, 5,027,378, Cl. 378-11.000.
- Shomura, Takashi: *See—*
  - Imamura, Kei-ichi; Gomi, Shuichi; Iwata, Michiaki; Miyadoh, Shinji; Shimura, Masaru; Shomura, Takashi; Sezaki, Masaji; and Inoye, Shigeharu, 5,026,547, Cl. 424-122.000.
- Short, William; Ickler, Christopher; Holl, Timothy; and Keezer, William, to Bose Corporation. Video sound. 5,027,403. Cl 381-24.000
- Showa Aluminum Kabushiki Kaisha: *See—*
  - Hoshino, Ryoichi; Sasaki, Hironaka; and Yasutake, Takayuki, 5,025,855, Cl. 165-150.000.
- Showalter, William E., to Union Oil Company of California. Steam injection piping. 5,025,862, Cl. 166-303.000.
- Shum, Lanson Y.: *See—*
  - Zeitlin, Dan B.; Branthover, John B.; Smith, Brian H., Piloto, Andrew J.; Lengel, Theresa M.; Carlson, Robert R., Jr.; Shum, Lanson Y.; Hodges, Paul D., Jr.; and Harris, Denise B., 5,027,255, Cl. 361-395.000.
- Shum, Victor K., to Amoco Corporation. Process for upgrading light apparatus. 5,026,938, Cl. 585-417.000.
- Siegel, Sharon B. Intracardiac catheter and method for detecting and diagnosing myocardial ischemia. 5,025,786, Cl. 128-642.000.
- Siemens Aktiengellschaft: *See—*
  - Knauer, Karl; and Kamp, Winfried, 5,027,312, Cl. 364-788.000.
- Siemens Aktiengesellschaft: *See—*
  - Ernst, Wolfram, 5,027,375, Cl. 375-107.000.
  - Hassler, Dietrich, 5,025,789, Cl. 128-660.030.
  - Larik, Joost; and Forder, Walter, 5,027,181, Cl. 357-41.000.
  - Menken, Gunther; Romeiser, Hans-Jurgen; and Steven, Josef, 5,026,517, Cl. 376-438.000.
  - Pribyl, Wolfgang; and Sittig, Raymond, 5,027,322, Cl. 365-189.010.
  - Richter, Bernd; and Adams, Helmar, 5,025,854, Cl. 165-11.200.
  - Roehrlein, Gerhard, 5,027,069, Cl. 324-248.000.
  - Scheffler, Gunter, 5,027,194, Cl. 358-36.000.
  - Schenk, Heinrich, 5,027,370, Cl. 375-14.000.
  - Thulke, Wolfgang, 5,027,364, Cl. 372-46.000.
- Sigmon, Bernard E., to Motorola, Inc. Dielectric resonator oscillator power combiner. 5,027,086, Cl. 331-99.000.
- Silva, Jeff S.: *See—*
  - Benvenuto, Francis S.; and Silva, Jeff S., 5,026,576, Cl. 427-355.000.
- Silvano, Menaspace: *See—*
  - Riccardo, Monguzzi; Silvano, Menaspace; and Piergiorgio, Anzaghi, 5,026,843, Cl. 540-227.000.
- Silverstein, Fred E.; and Opie, Eric A., deceased (by Salamonsen, Elizabeth Jeanne Opie, executrix), to Opielab, Inc. Endoscope with potential channels and method of using the same. 5,025,778, Cl 128-4.000.
- Simerly, Carmin C.: *See—*
  - Smith, Ian; Simerly, Carmin C.; Hilty, Jim E.; and Byerley, Mark S., 5,025,917, Cl. 198-842.000.
- Simiand, Jacques: *See—*
  - Bianchetti, Alberto; Le Fur, Gerard; Simiand, Jacques; and Soubrie, Philippe, 5,026,716, Cl. 514-336.000.

- Simon, Robert C., Jr.: *See—*
  - Poirier, David C.; Matheny, Mark T.; Mitchell, George C.; Swantick, Steven J.; Wroblewski, Gerald J.; Menck, Douglas W.; and Simon, Robert C., Jr., 5,025,881, Cl. 180-197.000.
- Simpson, Claude S.: *See—*
  - Eskew, Larry R.; and Simpson, Claude S., 5,025,522, Cl. 14-73.000.
- Simpson, Theresa L. Hair crimping device. 5,025,850, Cl. 132-225.000.
- Sims, Keith J.: *See—*
  - Katz, William E.; Elyanow, Irving D.; and Sims, Keith J., 5,026,465, Cl. 204-182.400.
- Singhal, Gopal H.; and Habeeb, Jacob J., to Exxon Research & Engineering Company. Lubricating oil containing an alkyl alkoxyalkylxanthate and zinc dialkyldithiophosphate. 5,026,492, Cl. 252-32.70E.
- Sipinen, Alan J.: *See—*
  - Johnston, Manley R.; Mulder, Robert S.; and Sipinen, Alan J., 5,026,446, Cl. 156-153.000.
- Sipp, Charles L.; and Sipp, Margaret M. Step for transport vehicle side door. 5,026,082, Cl. 280-163.000.
- Sipp, Margaret M.: *See—*
  - Sipp, Charles L.; and Sipp, Margaret M., 5,026,082, Cl. 280-163.000.
- Sippel, Achim: *See—*
  - Meyer, Jurgen; Sippel, Achim; Wildau, Monika; Kruse, Heinz J.; Diel, Rainer; Becker, Wilfried; Bartsch, Gisbert; Pahnke, Klaus-Dieter; Huege, Jurgen; and Luther, Hans-Werner, 5,025,731, Cl. 102-521.000.
- Sir, John. Cooking apparatus. 5,025,715, Cl. 99-421.0HV.
- Sircar, Shivaji, to Air Products and Chemicals, Inc. Separation of liquid mixtures by concentration swing adsorption. 5,026,482, Cl. 210-674.000.
- Sit, Hon P.; Galbi, David; and Chan, Alfred K., to Intel Corporation. Circuit for adding/subtracting two floating point operands. 5,027,308, Cl. 364-748.000.
- Sitek, Franciszek: *See—*
  - Riediker, Martin; Steiner, Eginhard; Beyeler, Harry; Sitek, Franciszek; and Husler, Rinaldo, 5,026,625, Cl. 430-281.000.
- Sittig, Raymond: *See—*
  - Pribyl, Wolfgang; and Sittig, Raymond, 5,027,322, Cl. 365-189.010.
- Skala, Otto; and Rauth, Walter, to Delco Electronics Corporation. Motor vehicle radio with an automatic volume control device. 5,027,432, Cl. 455-238.000.
- Skarda, Vladimir: *See—*
  - Worrell, Clive A.; and Skarda, Vladimir, 5,026,142, Cl. 350-96.320.
- Skene, John M.: *See—*
  - Hindagolla, Suraj L.; Thierheimer, Charles L., Jr.; and Skene, John M., 5,026,425, Cl. 106-22.000.
- SKF GmbH: *See—*
  - Schurger, Rainer, and Bauer, Bernhard, 5,026,324, Cl. 464-131.000.
- Skinder, Waclaw: *See—*
  - Yabsley, Michael; Skinder, Waclaw; and Mitchell, Ken, 5,026,442, Cl. 149-2.000.
- Skipper, John D. Piezoelectric motor. 5,027,028, Cl. 310-328.000.
- Skolnik, Howard; Dukes, Paul R., Jr.; and Gewirtz, Jonah, to Skolnik Industries, Inc. Process of koshering containers. 5,026,431, Cl. 134-3.000.
- Skolnik Industries, Inc.: *See—*
  - Skolnik, Howard; Dukes, Paul R., Jr.; and Gewirtz, Jonah, 5,026,431, Cl. 134-3.000.
- Skov, Kirsten A.; Farrell, Nicholas P.; and Chaplin, David J., to British Columbia Cancer Foundation, The. Platinum complexes with one radiosensitizing ligand. 5,026,694, Cl. 514-184.000.
- SKW Trostberg Aktiengesellschaft: *See—*
  - Eichinger, Rudolf; Michaud, Horst; and Seeholzer, Josef, 5,026,457, Cl. 162-158.000.
- Sky-Top Sunroofs Ltd.: *See—*
  - DiCarlo, Leonard; and Reese, Robert J., 5,026,113, Cl. 296-221.000.
- Slayton, Alvin L., to United Technologies Motor Systems, Inc. Dynamoelectric machine with bearing retainer. 5,027,024, Cl. 310-90.000.
- Slayton, Danny L.: *See—*
  - Tompkins, E. Neal; and Slayton, Danny L., 5,027,158, Cl. 355-271.000.
- Sloan Valve Company: *See—*
  - Wilson, John R., 5,025,516, Cl. 4-623.000.
- Sloman, Roger M.; and Ridgard, Christopher, to Advanced Composite Components Limited. Method for moulding fibre reinforced laminates. 5,026,449, Cl. 156-242.000.
- Slomka, Hans-Jurgen, to Melitta-Werke Bentz & Sohn. Flow-through heater, particularly for a coffee or tea maker. 5,027,425, Cl. 392-480.000.
- Slough, Warren H. Multiple battery system. 5,027,050, Cl. 320-61.000.
- Slusarek, Wojciech: *See—*
  - Begley, William J.; Chen, Teh-Hsuan; Kilminster, Kenneth N.; Poslusny, Jerrold N.; and Slusarek, Wojciech, 5,026,628, Cl. 430-382.000.
- Slutz, David E.; and Knemeyer, Friedel S., to General Electric Company, The. Chip breaker for polycrystalline CBN and diamond compacts. 5,026,960, Cl. 219-69.170.
- Sluyterman, Albertus A. S.; Stil, Lambert J.; and Vrinten, Marinus L. A., to U.S. Philips Corporation. Color display tube system with reduced spot growth. 5,027,042, Cl. 315-368.000.
- Smeets, Paulus J. H. M.; Paas, Caspar G. M.; and Kraanen, Willem P M., to Stamicarbon B V. Resin composition and process for preparing this resin composition. 5,026,770, Cl. 525-7.100.
- Smejkal, Ruthann M.: *See—*
  - Chiang, Peter K.; Leader, Haim; Smejkal, Ruthann M ; Gordon, Richard K.; Payne, Charlotte S.; Doctor, Bhupendra P., and Padilla, Felipe N., 5,026,897, Cl. 560-58.000.
- Smith, Brad L.; Torrence, G. Paull; Aguilo', Adolfo; and Alder, James S., to Hoechst Celanese Corporation. Methanol carbonylation process. 5,026,908, Cl. 562-519.000.
- Smith, Brian H.: *See—*
  - Zeitlin, Dan B.; Branthover, John B.; Smith, Brian H., Piloto, Andrew J.; Lengel, Theresa M.; Carlson, Robert R., Jr.; Shum, Lanson Y.; Hodges, Paul D., Jr.; and Harris, Denise B., 5,027,255, Cl. 361-395.000.
- Smith, Charles P., to Raytheon Company. Rate of angular acceleration sensor. 5,025,663, Cl. 73-517.00A.
- Smith, Daniel E. Safety device for needles of hypodermic syringes. 5,026,356, Cl. 604-192.000.
- Smith, Daniel E.: *See—*
  - Rose, Michael V.; and Smith, Daniel E., 5,025,551, Cl. 29-730.000.
- Smith, David J. H.: *See—*
  - Lodge, Philip G.; and Smith, David J H., 5,026,904, Cl. 560-232.000.
- Smith, Denzil B.; and Whitby, Melvyn F., to Baroid Technology, Inc. Actuator with automatic lock. 5,025,708, Cl. 92-19.000.
- Smith Engineering Company: *See—*
  - York, James A., deceased, 5,026,277, Cl. 432-181.000.
- Smith, Ian; Simerly, Carmin C.; Hilty, Jim E.; and Byerley, Mark S., to WYKO, Inc. Bearing assembly for conveyors. 5,025,917, Cl. 198-842.000.
- Smith, Ian H.: *See—*
  - Evans, Roger; Jee, Michael H.; Sander, Nigel H.; Smith, Ian H.; and Gibson, Raymond K., 5,026,548, Cl. 424-195.100.
- Smith, Leo F. Apparatus and crushing disposable containers. 5,025,995, Cl. 241-101.100.
- Smith, Monteen B., executor: *See—*
  - Schellenberg, Victor R.; Zsoldos, James; Hartman, Joy L.; Smith, William H., deceased; Covington, Wilbur T.; and Conley, Allen, 5,026,211, Cl. 405-204.000.
- Smith, Patrick D. Backpack with combination belt, belt-receiving pocket and closure therefor. 5,025,965, Cl. 224-151.000.
- Smith, Peter J. Root ball basket. 5,025,590, Cl. 47-76.000.
- Smith, Ronald L.: *See—*
  - Drust, Eugene G.; Kasting, Gerald B.; Smith, Ronald L.; and Szkutak, Joan B., 5,026,556, Cl. 424-449.000.
- Smith, Thomas G.: *See—*
  - Hagen, Gary P.; Schmidt, Gregory E.; Weis, John M.; and Smith, Thomas G., 5,026,917, Cl. 568-323.000.
- Smith, Thomas W.: *See—*
  - Raymond, Douglas W.; and Smith, Thomas W., 5,025,502, Cl. 2-159.000.
- Smith, William H., deceased: *See—*
  - Schellenberg, Victor R.; Zsoldos, James; Hartman, Joy L.; Smith, William H., deceased; Covington, Wilbur T.; and Conley, Allen, 5,026,211, Cl. 405-204.000.
- Smith, William R. Lighter-than-air aircraft. 5,026,003. Cl. 244-26.000.
- SmithKline Beecham Corporation: *See—*
  - Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., 5,026,882, Cl. 552-506.000.
- Smiths Industries Public Limited Company: *See—*
  - Anderson, Gregor J. M., 5,026,352, Cl. 604-178.000.
- Snow, Judith B.: *See—*
  - Dorain, Paul B.; and Snow, Judith B., 5,026,160, Cl. 356-328.000.
- Snow, Steven A.; and Madore, Linda M., to Dow Corning Corporation. Softening compositions including alkanolamino functional siloxanes. 5,026,489, Cl. 252-8.800.
- Snyder, Carl E., Jr.: *See—*
  - Paciorek, Kazimiera J. L.; Shih, Joseph G.; Randolph, Bruce B.; and Snyder, Carl E., Jr., 5,026,893, Cl. 556-435.000.
- Soane, David S.; and Barry, Stephen E., to University of California, Regents of the. Non-linear optical polymeric article and method. 5,026,147, Cl. 350-374.000.
- Soberalski, Edward D.: *See—*
  - Wright, Alan R.; and Soberalski, Edward D., 5,026,130, Cl 312-323.000.
- Societe Atochem: *See—*
  - Bollens, Eric; Szonyi, Francois; and Cambon, Aime, 5,026,910, Cl. 564-27.000.
- Societe de Conseils et d'Etudes des Emballages S.C.E.E.: *See—*
  - Lucas, Marthe, 5,025,942, Cl. 215-318.000.
- Societe de Consels de Recherches et d'Applications Scientifiques: *See—*
  - Bonato, Marc; and Eck, Charles, 5,026,855, Cl. 546-116.000.
- Societe Engiplast: *See—*
  - Goldfarb, Charles; and David, Yvon, 5,025,963, Cl. 223-85.000.
- Societe Europeenne de Propulsion: *See—*
  - Thebault, Jacques, 5,026,604, Cl. 428-367.000.
- Soclof, Sidney I., to Rockwell International Corporation NPN type lateral transistor with minimal substrate operation interference. 5,027,184, Cl. 357-49.000.
- Sofranko, John A.: *See—*
  - Leyshon, David W.; Sofranko, John A., and Jones, C. Andrew, 5,026,935, Cl. 585-315.000.
  - Leyshon, David W.; Sofranko, John A ; and Jones, C. Andrew, 5,026,936, Cl. 585-315.000.
- SOL-3- Resources, Inc.: *See—*
  - Melconian, Jerry O., 5,025,622, Cl. 60-39.464
- Soltesz, John A. System for the secure storage and transmission of data 5,027,401, Cl. 380-54.000.
- Soma, Zenya: *See—*
  - Chino, Hidenori; Hara, Takashi; Tamura, Kenji; Nakakuki, Yasuhide; Nii, Yasuyuki; Soma, Zenya; and Nishihara, Kiyoshi, 5,027,000, Cl. 290-53.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Somers, Ralph M.; and Compton, Diana R., to General Electric Company. Optical breakthrough sensor for laser drill. 5,026,964, Cl. 219-121.700.
- Sommer, Andreas: *See—*
  - Moscatelli, David A.; Rifkin, Daniel B.; and Sommer, Andreas, 5,026,839, Cl. 536-27.000.
- Sonobe, Katsuyoshi: *See—*
  - Kuzuya, Susumu; Hayashi, Shigeyuki; Kimura, Hiroaki; Suzuki, Tsutomu; Sonobe, Katsuyoshi; Nakata, Takashi; and Hatta, Naoyuki, 5,026,039, Cl. 271-11.000.
- Sony Corporation: *See—*
  - Avis, Richard J. A.; Gillard, Clive H.; and Samad, Raphael, 5,027,205, Cl. 358-140.000.
  - Furuyama, Takenori, 5,027,235, Cl. 360-77.160.
  - Kani, Tetsuo; and Inoue, Takao, 5,027,193, Cl 358-12.000.
  - Samad, Raphael; Richards, John W.; and Gillard, Clive H., 5,027,203, Cl. 358-140.000.
  - Sekii, Yasuaki; and Matusmoto, Yasushi, 5,027,232, Cl. 360-74.100.
- Soomal, Harinder S.: *See—*
  - Spanner, John R.; Hill-Male, Nonton; and Soomal, Harinder S., 5,026,346, Cl. 604-110.000.
- Sorain Cecchini Recovery, Incorporated: *See—*
  - Carrera, Pietro, 5,025,929, Cl. 209-19.000.
- Soubrie, Philippe: *See—*
  - Bianchetti, Alberto; Le Fur, Gerard; Simiand, Jacques; and Soubrie, Philippe, 5,026,716, Cl. 514-336.000.
- Soule, Herbert, and McGrath, Charles M. Immortal human mammary epithelial cell lines. 5,026,637, Cl. 435-29.000.
- Southcott, Mark R., to Ciba-Geigy Corporation. Novel oligomers useful for making cured fibre reinforced composites. 5,026,871, Cl. 548-435.000.
- Southern California Edison: *See—*
  - Ortolano, Ralph J.; Ball, Kenneth A.; and Bowman, Gary, 5,026,032, Cl. 269-43.000.
- Span-America Medical Systems, Inc.: *See—*
  - Spann, Donald C.; Schaefer, Daniel J.; and Krouskop, Thomas A., 5,025,519, Cl. 5-464.000.
- Spann, Donald C.; Schaefer, Daniel J.; and Krouskop, Thomas A., to Span-America Medical Systems, Inc. Multi-section mattress overlay for systematized pressure dispersion. 5,025,519, Cl. 5-464.000.
- Spanner, John R.; Hill-Male, Nonton; and Soomal, Harinder S., to Dowty Seals Limited. Non-reusable syringe. 5,026,346, Cl. 604-110.000.
- Sparta Surgical Corp.: *See—*
  - Lamb, Patrick J., 5,025,783, Cl. 128-156.000.
- Spassov, Peter G.: *See—*
  - Atanassov, Lyuben P.; Kolenzov, Yanko A.; Vulev, Decho I.; Primov, Ivan S.; Spassov, Peter G.; Kanalev, Svetlosar K.; Andonov, Dimo P.; Yankov, Angel V.; and Dilkin, Nikolay G., 5,027,286, Cl. 364-513.000.
- Special Melted Products Limited: *See—*
  - Oakes, Graham; Marrison, Terrence; and Bridge, Martin, 5,025,975, Cl. 228-127.000.
- Spector, George: *See—*
  - Steffl, John C.; and Spector, George, 5,026,080, Cl. 280-87.042.
- Spectra-Physics, Inc.: *See—*
  - Carlson, Lee; Green, Mike; Miller, Mike; Nissen, Rudy; and Sheng, Steve, 5,025,952, Cl. 222-3.000.
  - Winckler, Peter S., 5,026,157, Cl. 356-250.000.
- Spectral Sciences, Inc.: *See—*
  - Goldstein, Neil; Bien, Fritz; and Bernstein, Lawrence, 5,026,991, Cl. 250-343.000.
- Spellucci, Luciano: *See—*
  - Manna, Biagio C.; and Spellucci, Luciano, 5,025,598, Cl. 52-126.600.
- Spencer, Mark, to W. L. Gore & Associates, Inc. Connector. 5,026,302, Cl. 439-573.000.
- Sperry Marine, Inc.: *See—*
  - Gerdt, David W., 5,026,984, Cl. 250-227.210.
- Spiers, Kent, to Marathon Equipment Company. Lock-in device and method. 5,025,721, Cl. 100-229.00A.
- Spink, Donald R.; and Spink, Edward F., to Turbotak Inc. Spray nozzle design. 5,025,989, Cl. 239-431.000.
- Spink, Edward F.: *See—*
  - Spink, Donald R.; and Spink, Edward F., 5,025,989, Cl 239-431.000.
- Sponer, Gisbert; Reicke, Ulrich; and Nelboeck-Hochstetter, Michael, to Boehringer Mannheim GmbH. Method for treating dysuria using naftopidil. 5,026,706, Cl 514-255.000.
- Spritzer, Michael H., to General Atomics. Method and apparatus for cryogenic removal of solid materials. 5,025,632, Cl. 62-64 000.
- Squeeze Lock, Inc.: *See—*
  - Stuart, Robert B., 5,026,088, Cl. 280-637.000.
- SSMC Inc.: *See—*
  - Sato, Shuichi, and Ayusawa, Shirou, 5,025,738, Cl. 112-286.000.
- Stachura, Leonard M.: *See—*
  - Logsdon, Peter B.; Swan, Ellen L.; Stachura, Leonard M.; and Basu, Rajat S., 5,026,502, Cl. 252-172.000.
  - Swan, Ellen L.; Logsdon, Peter B.; Stachura, Leonard M., and Basu, Rajat S., 5,026,501, Cl. 252-171.000.
- Staehle, Bradford G.: *See—*
  - Burton, John H.; and Staehle, Bradford G., 5,026,377, Cl. 606-108.000.
- Stafford, George C.: *See—*
  - Bier, Mark E.; Cooks, Robert G.; and Stafford, George C., 5,026,987, Cl. 250-281.000.
- Stafford, James C., to United States of America, Navy. Engine block cylinder head bolt hole repair. 5,025,556, Cl. 29-888.011
- Staheli, Paul: *See—*
  - Faas, Jurg; Nuessli, Eduard; Grundler, Christof; Staheli, Paul, Hanselmann, Daniel; Demuth, Robert; Waeber, Rene; and Fritzsche, Peter, 5,025,533, Cl. 19-145.500.
- Stainbrook, Marlan L.; and Rodrigue, John, to Tetra Pak Holdings & Finance S.A. Valve arrangement for a liquid dispensing device 5,025,991, Cl. 239-459.000.
- Stama Maschinenfabrik GmbH: *See—*
  - Stark, Gerhard, 5,025,539, Cl. 29-26.00A
- Stamicarbon B.V.: *See—*
  - Smeets, Paulus J. H. M.; Paas, Caspar G. M . and Kraanen, Willem P. M., 5,026,770, Cl. 525-7.100.
- Stanford University: *See—*
  - Nabors, C. David, and Byer, Robert L., 5,027,360, Cl. 372-18.000.
- Stanley Works, The: *See—*
  - Hanley, Roger T.; and Belanger, Stephen D., 5,025,776, Cl. 126-194.000.
- Stanley Works Limited, The *See—*
  - Gilbert, Richard, 5,025,558, Cl. 30-162.000.
- Stark, Gerhard, to Stama Maschinenfabrik GmbH. Drilling and milling machine. 5,025,539, Cl. 29-26.00A.
- Stark, Richard A.: *See—*
  - Roddy, James E.; Narayan, Badhri, Stark, Richard A.; and Voci, Laurie L., 5,026,133, Cl. 350-6.400.
- Starr, Rogers F., Jr.; and Goenka, Lakhi N., to Sverdrup Technology, Inc. Slotted-wall extension and method for environmental wind tunnels. 5,025,659, Cl. 73-147.000
- Start S.r.l.: *See—*
  - De Benedetti, Dario, 5,025,909, Cl. 198-341.000.
- State of Oregon acting by and through the State Board of Higher Education on behalf of Oregon Health Sciences University, The: *See—*
  - Litt, Michael; and Bufton, Linda L., 5,026,837, Cl. 536-27.000.
- Stavinoha, Jerome L.; Phillips, Gerald W.; Puckette, Thomas A.; and Devon, Thomas J., to Eastman Kodak Company. Preparation of bidentate ligands. 5,026,886, Cl. 556-70.000.
- Steckel, Willi: *See—*
  - Tolle, Karl-Heinz; and Steckel, Willi, 5,026,103, Cl 292-275.000
- Stedtfeld, Hans-Werner: *See—*
  - Sturtzkopf, Robert; and Stedtfeld, Hans-Werner, 5,026,372, Cl. 606-54.000.
- Steel, Samuel. Apparatus for a solid phase synthesis of peptide analogs. 5,026,773, Cl. 525-54.110.
- Steelcase Inc.: *See—*
  - Faiks, Frederick S.; Anderson, Craig M.; and Bischoff, Daniel R., 5,026,117, Cl. 297-304.000.
- Steele, Randy C., to SGS-Thomson Microelectronics, Inc. Input row drivers for programmable logic devices. 5,027,011, Cl. 307-465.000.
- Steer, Philip J.: *See—*
  - Sutherland, Ian A.; Randall, Nigel J.; and Steer, Philip J., 5,025,787, Cl. 128-642.000.
- Steffl, John C.; and Spector, George. Castering wheels for roller skates. 5,026,080, Cl. 280-87.042.
- Stehle, Heinz; Wehr, Thomas; Petersmann, Joseph; Seidel, Willi; Hamm, Ludwig; Foeldi, Thomas; Eschrich, Gerhard; Schwamm, Ronald; Runge, Wolfgang; Gruhle, Wolf-Dieter; and Wendel, Peter, to Dr. Ing. h.c.F. Porsche AG. Method and apparatus for controlling an automatic shift transmission. 5,025,684, Cl. 74-862.000.
- Stein, Beatrice K.: *See—*
  - Motika, Stephen A.; Pickering, Timothy L.; Rokicki, Andrzej; and Stein, Beatrice K., 5,026,676, Cl. 502-170.000.
- Stein Industrie: *See—*
  - Marjollet, Jacques; and Perras, Boris, 5,025,630, Cl. 60-646.000.
- Steiner, Eginhard: *See—*
  - Riediker, Martin; Steiner, Eginhard; Beyeler, Harry; Sitek, Franciszek; and Husler, Rinaldo, 5,026,625, Cl. 430-281.000.
- Steinke, Richard W.: *See—*
  - Ruby, Joseph H.; and Steinke, Richard W., 5,027,034, Cl. 315-106.000.
- Stelzl, Florian. Portable lift for lifting motor vehicles. 5,025,892, Cl. 187-8.720.
- Stenerson, C. Lee; and Stenerson, Michael L. Range finding bow sight. 5,025,565, Cl. 33-265.000.
- Stenerson, Michael L.: *See—*
  - Stenerson, C. Lee; and Stenerson, Michael L., 5,025,565, Cl. 33-265.000.
- Stenger, Leonard A.: *See—*
  - Jacob, Thomas R.; Stenger, Leonard A.; and Uffner, William E., 5,026,609, Cl. 428-489.000.
- Stenger, Tracy K., to Johnson Enterprises, Inc. Container closure with improved sealing membrane. 5,025,955, Cl. 222-82.000.
- Stephenson, Stanley V.: *See—*
  - Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A., Reidenbach, Vincent G.; and Stephenson, Stanley V., 5,026,168, Cl. 366-168.000.
- Stern, Richard M., to Minnesota Mining and Manufacturing Company. Treatment of hazardous materials with aqueous air foam of polyhydroxy polymer. 5,026,735, Cl. 521-50.000.
- Steven, Hubert: *See—*
  - Eickvonder, Wolfgang; Passmann, Norbert; Thomas, Gerhard; Tummers, Peter; and Steven, Hubert, 5,025,755, Cl. 122-4.00D.
- Steven, Josef: *See—*
  - Menken, Gunther; Romeiser, Hans-Jurgen; and Steven, Josef, 5,026,517, Cl. 376-438.000.

- Stevenson, Mark W. Bowstring release device. 5,025,772, Cl. 124-35.200.
- Stevenson, Paul D., to General Motors Corporation. Accumulator and valve structure. 5,025,823, Cl. 137-110.000.
- Stewart, Aulette; and Clark, Ian E. Drilling method and rotary drill bit crown. 5,025,871, Cl. 175-57.000.
- Stewart, John E.: *See—*
  - Fagg, Barry S.; Dull, Gary M.; Haberkern, Richard G.; Merricks, Robert A.; and Stewart, John E., 5,025,812, Cl. 131-297.000.
- Stewart, Robert C., to Amoco Corporation. Composition and method for removing hydrogen sulfide from gas streams. 5,026,503, Cl. 252-192.000.
- Stewart & Stevenson Power, Inc.: *See—*
  - Dorn, Russell J., 5,026,244, Cl. 414-540.000.
- Stiefel, Edward I.: *See—*
  - Halbert, Thomas R.; Chianelli, Russell R.; Stiefel, Edward I.; and Jacobson, Allan J., 5,026,473, Cl 208-143.000.
- Stil, Lambert J.: *See—*
  - Sluyterman, Albertus A. S., Stil, Lambert J.; and Vrinten, Marinus L. A., 5,027,042, Cl 315-368.000.
- Stockhausen, Dolf: *See—*
  - Kresken, Joachim; Komp, Bernd; and Stockhausen, Dolf, 5,026,690, Cl. 514-155.000.
- Stockill, Trevor R.: *See—*
  - Marlton, Anthony P.; Fielder, Dennis A ; Halsted, Victor G.; and Stockill, Trevor R., 5,027,212, Cl. 358-183.000.
- Stoica, Susana, to Control Data Corporation. Logic circuit and design method for improved testability. 5,027,355, Cl. 371-22.100.
- Stoll, Ione R.: *See—*
  - Levings, Randall L.; and Stoll, Ione R., 5,026,646, Cl. 435-240 270.
- Stoll, James R.: *See—*
  - Ringe, Mitchell L.; and Stoll, James R., 5,026,689, Cl 514-57.000.
- Stoll, Kurt, to Festo KG. Mounting plate storing conductor function. 5,025,834, Cl. 137-560.000.
- Stolle Corporation, The: *See—*
  - Kaminski, Elton G., 5,025,916, Cl. 198-803 150.
- Stone, Julian: *See—*
  - Chraplyvy, Andrew R.; Iannone, Patrick P., Kaminow, Ivan P.; Li, Tingye; Stone, Julian; Stulz, Lawrence W.; and Tkach, Robert W., 5,027,435, Cl 455-617.000.
- Stonestreet, Paul R.: *See—*
  - Parmenter, John J.; Phillips, Robert B.; and Stonestreet, Paul R., 5,026,454, Cl. 156-614.000.
- Stopa, James L.: *See—*
  - Lyons, Harold W.; and Stopa, James L., 5,027,260, Cl. 362-74.000.
- Storch, Eberhard A.: *See—*
  - Dehn, Klaus-Dieter; Weidner, Hans-Peter; and Storch, Eberhard A., 5,026,201, Cl. 403-407.100.
- Strasser, Werner, to Texas Instruments Incorporated. Hermetic pressure sensor. 5,025,667, Cl. 73-724.000.
- Strauss, Wolfgang, to Daimler-Benz AG. Process for regulating the fuel/air ratio in internal combustion engines. 5,025,624, Cl 60-274.000.
- Strickland, George, to British Aerospace plc. Process for producing composite metallic structures. 5,025,974, Cl. 228-107.000.
- Stroman, Richard. Method and apparatus for inspecting produce by constructing a 3-dimensional image thereof. 5,026,982, Cl. 250-223.00R.
- Strong, A. Brent: *See—*
  - Hauwiller, Paul B.; and Strong, A. Brent, 5,026,514, Cl. 264-258.000.
- Stuart, Robert B., to Squeeze Lock, Inc. Snowboard safety strap. 5,026,088, Cl. 280-637.000.
- Studiengesellschaft Kohle mbH: *See—*
  - Schaffner, Kurt; and Demuth, Martin, 5,026,877, Cl. 549-265.000.
- Stulz, Lawrence W.: *See—*
  - Chraplyvy, Andrew R.; Iannone, Patrick P.; Kaminow, Ivan P.; Li, Tingye; Stone, Julian; Stulz, Lawrence W.; and Tkach, Robert W., 5,027,435, Cl. 455-617.000.
- Stuntz, Gordon F.; Culross, Claude C.; and Reynolds, Steve D., to Exxon Research & Engineering Company. Coal hydroconversion process comprising solvent extraction (OP-3472). 5,026,475, Cl 208-403.000.
- Sturtzkopf, Robert; and Stedtfeld, Hans-Werner. Fixation device for the external adjusting of bone fragments. 5,026,372, Cl. 606-54.000.
- Stuttler, Herbert; Wolf, Josef; Held, Wolfgang; and Mai, Max, to Josef Wolf Audio-Visuals. Apparatus and method for converting pictures or images into video signals. 5,027,219, Cl. 358-228.000.
- Stutz, Herbert: *See—*
  - Weber, Thomas; Heckmann, Walter; Mertes, Jurgen; Tesch, Helmut; Altstaedt, Volker; Eberle, Wolfgang; Folda, Thomas; Stutz, Herbert; and Recker, Hans-Gert, 5,026,789, Cl. 525-423.000.
- Su, C. J.: *See—*
  - Baseman, Joel B.; Su, C. J.; and Dallo, S. F., 5,026,636, Cl 435-6.000.
- Sub-Tv Limited Partnership: *See—*
  - Dwyer, Joseph J., Jr.; White, Loy R.; Haggerty, Matthew K., and Purbrick, John A., 5,027,208, Cl. 358-148.000.
- Sucheski, Matthew M.: *See—*
  - Pickles, Charles S.; Sucheski, Matthew M.; and Thumma, Mark R., 5,026,292, Cl. 439-108.000.
- Sudheimer, Gunter: *See—*
  - Meyer, Gerhard; Sudheimer, Gunter; Zengel, Hans; and Grothaus, Hans, 5,026,534, Cl. 423-366.000.
- Suetaka, Hiroyuki; and Kurahashi, Shigeki, to Casio Computer Co., Ltd. Electronic still camera. 5,027,223, Cl. 358-342.000.
- Suga, Toshihiko. *See—*
  - Ikeda, Takaaki; Suga, Toshihiko; and Kuroiwa, Akihiko, 5,027,040, Cl. 315-241.00R.
- Sugahara, Satoshi: *See—*
  - Kudo, Hiroaki; Takiguchi, Haruhisa; Sakane, Chitose, and Sugahara, Satoshi, 5,027,368, Cl. 372-96.000.
- Sugawara, Harusige; and Okawa, Takasi, to Mitsui Toatsu Chemicals, Inc. Process for producing maleic anhydride. 5,026,876, Cl. 549-257.000.
- Sugawara, Mitsuru; Yoshinaga, Akitoshi; Shimizu, Fumihiko; and Takami, Masayuki, to Kabushiki Kaisha Toshiba. Optical communication apparatus with base for fixing elements. 5,026,134, Cl. 350-96.110.
- Sugihara, Hideo; and Sugihara, Kazuhito, to Sugihara Trading Co., Ltd. Guide bar for a chain saw. 5,025,561, Cl. 30-387.000.
- Sugihara, Kazuhito: *See—*
  - Sugihara, Hideo; and Sugihara, Kazuhito, 5,025,561, Cl. 30-387.000.
- Sugihara, Tadashi; Takeshita, Takuo; and Ohuchi, Yukihiro, to Mitsubishi Metal Corporation. Method of manufacturing a powder of bi-based superconductive oxide containing lead and method of manufacturing a sintered body therefrom. 5,026,680, Cl 505-1.000.
- Sugihara Trading Co., Ltd.: *See—*
  - Sugihara, Hideo; and Sugihara, Kazuhito, 5,025,561, Cl 30-387.000.
- Sugii, Shinji: *See—*
  - Wakabayashi, Toshinori; and Sugii, Shinji, 5,026,752, Cl 524-271.000.
- Sugimoto, Hajime; and Seko, Yasuo, to Kaihatsu Architects & Engineers, Inc. Isolation floor system for earthquake. 5,025,600, Cl 52-167.000.
- Sugimoto, Junichi, to Fuji Xerox Co., Ltd. Method and device for controlling a plotter. 5,027,289, Cl 364-520.000.
- Sugimoto, Osamu: *See—*
  - Nakagawa, Takashi; and Sugimoto, Osamu, 5,026,583, Cl. 428-36.800.
- Sugimoto, Yoshiaki; Hosokawa, Toshihiro, Uchiumi, Yutaka; Sasamoto, Shuji; and Fujimoto, Nobuyuki, to Tsubakimoto Chain Co. Rocker joint pin type CVT chain. 5,026,331, Cl. 474-214.000.
- Sugiura, Satoshi, to Pioneer Electronic Corporation Optical information reading apparatus with tracking adjustment system. 5,027,336, Cl. 369-44.130.
- Sugiyama, Masahiro. Dental instrument for preventing accidental swallow. 5,026,281, Cl 433-30.000.
- Sullivan, David L.: *See—*
  - Davis, Darwin D.; and Sullivan, David L., 5,026,461, Cl 204-86.000.
- Sullivan, James P.: *See—*
  - Kulp, Jack H.; McKenney, John D., and Sullivan, James P., 5,026,204, Cl. 404-10.000.
- Sulzer Brothers Limited: *See—*
  - Mandrin, Charles, 5,025,860, Cl. 166-267.000.
- Suma, Sei: *See—*
  - Yamagishi, Katsuaki; Matsui, Koichi; Tanaka, Toshimasa; Matsui, Nobuo; Suma, Sei; and Mino, Yoshihito, 5,025,638, Cl. 62-180.000.
- Sumigawa, Yukio, to Sanshin Kogyo Kabushiki Kaisha. Two piece swivel bracket. 5,026,308, Cl. 440-61.000.
- Sumitomo Chemical Company, Limited: *See—*
  - Shiga, Akinobu; Fukui, Yoshiharu; Sasaki, Toshio; Okawa, Masahisa; and Matsuura, Hideaki, 5,026,889, Cl. 526-142.000.
- Sumitomo Electric Industries, Ltd.: *See—*
  - Nishiguchi, Masanori; and Okazaki, Naoto, 5,027,170, Cl. 357-22.000.
  - Nokubo, Seiji; Kohno, Teruhisa; Hashida, Koichi; Usuki, Takashi; and Higashimura, Hideaki, 5,026,123, Cl. 303-117.000.
  - Okazaki, Toru; and Isojima, Shigeki, 5,027,098, Cl. 335-213.000.
  - Shiga, Nobuo, 5,027,080, Cl. 330-59.000.
- Sumitomo Heavy Industries Co., Ltd.: *See—*
  - Miyatake, Tsutomu, 5,026,976, Cl. 250-201.400.
- Sumitomo Heavy Industries, Ltd.: *See—*
  - Ishimoto, Noriyuki; and Iida, Hirofumi, 5,026,476, Cl. 210-89 000.
- Sumitomo Metal Industries, Ltd.: *See—*
  - Kajimura, Haruhiko; Nagano, Hiroo; Yamanaka, Kazuo; and Kodama, Tsuyoshi, 5,026,521, Cl. 420-422.000.
- Summer, John D. Orthopedic head pillow. 5,025,518, Cl 5-434.000.
- Summers, James B.: *See—*
  - Brooks, Dee W.; Summers, James B.; and Holms, James H., 5,026,729, Cl. 514-575.000.
- Summers, John D.; and Jeanes, Thomas O., to Dow Chemical Company, The. Novel alicyclic polyimides and a process for making the same. 5,026,823, Cl. 528-353.000.
- Sun Chemical Corporation: *See—*
  - Kveglis, Albert A.; and Catena, Robert J., 5,026,755, Cl. 524-389.000.
- Sun Microsystems, Inc.: *See—*
  - Lockwood, Alfred; Yurkonis, Philip G.; and Ammon, James G., 5,027,257, Cl. 361-428.000.
- Sunda, Fumihiro, to Brother Kogyo Kabushiki Kaisha Image recording apparatus using a CRT as a light source. 5,027,220, Cl. 358-244.000.
- Sundance, Inc.: *See—*
  - Merlot, Vincent J., Jr., 5,026,109, Cl. 296-105.000.
- Sundstrand Corporation: *See—*
  - Dhyanchand, P. John; Patel, Sunil; Ng, Chai-Nam; and Nguyen, Vietson, 5,027,265, Cl. 363-37.000.
  - VanDyke, John M.; and Niggemann, Richard E., 5,025,856, Cl. 165-167.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Suntory Limited *See—*
  - Ishiguro, Masaji; Iwata, Hiromitsu; Nakatsuka, Takashi; and Yamada, Yasuo, 5,026,844, Cl 540-357.000.
- Surgical Dynamics, Inc.: *See—*
  - Ray, Charles D.; and Dickhudt, Eugene A., 5,026,373, Cl. 606-61.000.
- Sutherland, Ian A.; Randall, Nigel J.; and Steer, Philip J., to Imperial College of Science, Technology & Medicine, The Intrauterine probe. 5,025,787, Cl. 128-642.000.
- Sutherland, Jackie R., to Daylight Corporation Assembly for finishing doughnuts with icings and condiments. 5,025,749, Cl. 118-28.000.
- Sutter, Marius: *See—*
  - Bohlendorf, Bettina; Bedorf, Norbert; Hofle, Gerhard; Schummer, Dietmar; and Sutter, Marius, 5,026,878, Cl. 549-267.000.
- Suwa, Tetsuya; and Higurashi, Seiji, to Victor Company of Japan, Ltd. Magnetic recording apparatus and magnetic recording/reproducing apparatus. 5,027,229, Cl. 360-19.100.
- Suwanai, Naokatsu; and Tsuchiya, Osamu, to Hitachi, Ltd. Method of making semiconductor integrated circuit device with polysilicon contacts. 5,025,741, Cl. 437-52.000.
- Suyama, Takahiro: *See—*
  - Takahashi, Kosei, Hosoda, Masahiro; Tsunoda, Atsuo; Kondo, Masafumi; and Suyama, Takahiro, 5,027,169, Cl. 357-17.000.
- Suzuki, Hidefumi: *See—*
  - Takahashi, Shunzo; Izawa, Shigeru; Suzuki, Hidefumi; and Hasemi, Takashi, 5,027,337, Cl. 369-44.260.
- Suzuki, Hiroshi, to Brother Kogyo Kabushiki Kaisha. Rocking mechanism for a ribbon cassette. 5,026,182, Cl. 400-208.000.
- Suzuki, Hiroyoshi; Ogawa, Kenji; Maekawa, Hiroko; Kominami, Seiya; and Asayama, Yoshiaki, to Mitsubishi Denki K.K Vehicle tracking control for continuously detecting the distance and direction to a preceding vehicle irrespective of background dark/light distribution 5,026,153, Cl. 356-1.000.
- Suzuki, Ichiro: *See—*
  - Kida, Masashi; Midorikawa, Shingo; Suzuki, Ichiro; Suzuki, Yoshihiko; and Yamaguchi, Youichi, 5,026,762, Cl 524-495.000.
- Suzuki Jidosha Kogyo Kabushiki Kaisha: *See—*
  - Yamada, Toshiyuki, 5,025,673, Cl. 74-337.500.
- Suzuki, Kei: *See—*
  - Suzuki, Yukio; Suzuki, Kei; Yoneyama, Masaru; and Miyake, Toshio, 5,026,833, Cl. 536-18.100.
- Suzuki, Mikio: *See—*
  - Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kitahara, Masaki, 5,026,698, Cl. 514-215.000.
  - Fujikawa, Yoshihiro; Suzuki, Mikio; Iwasaki, Hiroshi; Sakashita, Mitsuaki; and Kitahara, Masaki, 5,026,708, Cl. 514-256.000.
- Suzuki, Motohisa: *See—*
  - Saito, Jun; and Suzuki, Motohisa, 5,026,963, Cl. 219-89.000.
- Suzuki, Naoshi, to NEC Corporation. Image pickup system capable of obtaining a plurality of stereo images with different base height ratios. 5,027,199, Cl. 358-88.000.
- Suzuki, Takanobu; and Furusawa, Tsutomu, to Fuji Xerox Co., Ltd. Recording apparatus. 5,027,288, Cl 364-519.000.
- Suzuki, Terao; Kishi, Matsuo; Muraishi, Katsuyoshi; Ogawa, Kenichi; and Takashio, Hiroshi, to Seiko Instruments Inc. Rare earth-iron magnet. 5,026,518, Cl. 419-12.000.
- Suzuki, Toshiro: *See—*
  - Takigawa, Shoji; Teranishi, Kiyoshi; Nomura, Tomio; Suzuki, Toshiro; and Sakai, Kozo, 5,026,496, Cl. 252-56.00R.
- Suzuki, Tsutomu: *See—*
  - Kuzuya, Susumu; Hayashi, Shigeyuki; Kimura, Hiroaki; Suzuki, Tsutomu; Sonobe, Katsuyoshi; Nakata, Takashi; and Hatta, Naoyuki, 5,026,039, Cl. 271-11.000.
- Suzuki, Yasoji: *See—*
  - Saeki, Yukihiro; and Suzuki, Yasoji, 5,027,012, Cl. 307-465.000.
- Suzuki, Yoshihiko: *See—*
  - Kida, Masashi; Midorikawa, Shingo; Suzuki, Ichiro; Suzuki, Yoshihiko; and Yamaguchi, Youichi, 5,026,762, Cl. 524-495.000
  - Okada, Tamotsu; Hosoi, Atsushi; Suzuki, Yoshihiko; and Yano, Kanji, 5,027,160, Cl. 355-282.000.
- Suzuki, Yoshitaka: *See—*
  - Tajima, Osamu; Kuramoto, Terumasa; and Suzuki, Yoshitaka, 5,026,180, Cl. 400-120.000.
- Suzuki, Yukio; Suzuki, Kei; Yoneyama, Masaru; and Miyake, Toshio, to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyuju. 4^G-alpha-D-glucopyranosyl rutin, and its preparation and uses. 5,026,833, Cl. 536-18.100.
- Sverdrup Technology, Inc.: *See—*
  - Starr, Rogers F, Jr.; and Goenka, Lakhi N., 5,025,659, Cl. 73-147.000.
- Svilans, Mikelis N., to Northern Telecom Limited. Electrically tunable interference filters and methods for their use. 5,027,178, Cl. 357-30.000.
- Swager, Timothy M.: *See—*
  - Grubbs, Robert H.; Dougherty, Dennis A.; Swager, Timothy M.; and Ginsburg, Eric J., 5,026,783, Cl 525-326.100.
- Swan, Ellen L.; Logsdon, Peter B.; Stachura, Leonard M.; and Basu, Rajat S., to Allied-Signal Inc. Azeotrope-like compositions of 1,1-dichloro-1-fluoroethane; dichlorotrifluoroethane, and dichloromethane. 5,026,501, Cl. 252-171.000.
- Swan, Ellen L.: *See—*
  - Logsdon, Peter B.; Swan, Ellen L.; Stachura, Leonard M; and Basu, Rajat S., 5,026,502, Cl. 252-172.000.
- Swanson, Gary J.: *See—*
  - Leger, James R.; and Swanson. Gary J., 5,027,359, Cl. 372-18.000.
- Swantick, Steven J.: *See—*
  - Poirier, David C.; Matheny, Mark T, Mitchell, George C., Swantick, Steven J.; Wroblewski, Gerald J.; Menck, Douglas W.; and Simon, Robert C., Jr., 5,025,881, Cl. 180-197.000.
- Swartz, Robert G: *See—*
  - Hokanson, John L., and Swartz, Robert G., 5,027,362, Cl 372-38.000.
- Sweeney, Niall; and Gyure, Sandor, to Becton Dickinson and Company Needle and hub assembly with needle contacting member. 5,026,355, Cl. 604-243.000.
- Sweeny, Edward J. Scoring system for athletic events. 5,027,102, Cl 340-323.00R.
- Swink, Don G.: *See—*
  - Whitehead, John C; and Swink, Don G., 5,026,259, Cl. 417-379.000.
- Swinney, Dale E., to Swinney, Dale E. Swinney'hair growth formula. 5,026,553, Cl. 424-401.000.
- Switall, Thomas G.; and Bloomquist, Robert O., to Ryco Graphic Manufacturing, Inc. Adjustable spray dampening system. 5,025,722, Cl. 101-147.000.
- Synergen, Inc: *See—*
  - Moscatelli, David A.; Rifkin, Daniel B., and Sommer, Andreas, 5,026,839, Cl. 536-27.000.
- Synphar Laboratories Incorporated: *See—*
  - Daneshtalab, Mohsen; Nguyen, Dai Q.; Ha, Chan M.; Luu, Hiep T., Tempest, Laurence M; and Micetich, Ronald G., 5,026,848, Cl 544-137.000.
- Syntex (U.S.A.) Inc.: *See—*
  - Tarnowski, Thomas L.; Hu, Mae W.; Laney, Maureen; Pease, John S.; and Ghazarossian, Vartan, 5,026,905, Cl. 562-43.000.
- Synthetic Products Company: *See—*
  - Grossman, Richard F.; and Tanno, David M., 5,026,888, Cl. 556-136.000.
- Szkutak, Joan B.: *See—*
  - Drust, Eugene G.; Kasting, Gerald B.; Smith, Ronald L.; and Szkutak, Joan B., 5,026,556, Cl. 424-449.000.
- Szonyi, Francois: *See—*
  - Bollens, Eric; Szonyi, Francois; and Cambon, Aime, 5,026,910. Cl. 564-27.000.
- Szymanski, Paul: *See—*
  - Davis, William R.; Mowers, Dennis W.; Greenthal, Richard P., Szymanski, Paul; Wray, Ronald A.; and Davidson, Richard A., 5,027,111, Cl. 340-784.000.
- Tabata, Tetsuro: *See—*
  - Makino, Tadashi; Tabata, Tetsuro; and Hirai, Shin-ichiro, 5,026,560, Cl. 424-494.000.
- Tabor, Thomas E. Headliner shell for vehicles. 5,026,586, Cl 428-90.000.
- Tachihara, Satoru: *See—*
  - Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000.
- Tacke, Horst: *See—*
  - Schafer, Manfred, Schumann, Kurt; and Tacke, Horst, 5,025,971, Cl. 227-156.000.
- Tacke, Rolf D., to Umberto Carnisio. Ice cream dispensing machine. 5,025,840, Cl. 141-253.000.
- Tada, Masuo; Hata, Takeki; Fukumoto, Takaaki; and Ohmori, Toshiaki, to Taiyo Sanso Co., Ltd.; and Mitsubishi Denki Kabushiki Kaisha. Processing apparatus for semiconductor wafers. 5,025,597, Cl. 51-410.000.
- Tadera, Yoshihiro: *See—*
  - Kawaguchi, Keishi; Hamasaki, Tatsumi; Tadera, Yoshihiro; and Yamazaki, Sachio, 5,025,593, Cl. 51-165.770.
- Tagami, Jun: *See—*
  - Ishii, Koji; Toyama, Kozo; and Tagami, Jun, 5,025,599, Cl. 52-167.0DF.
- Taguchi, Tetsu, to NEC Corporation. Pattern matching vocoder. 5,027,404, Cl. 381-37.000.
- Tahara, Shinichiro: *See—*
  - Nojiri, Ryuji; Hayakawa, Yoshihiro; Uchiyama, Mamoru; Kato, Hisatoyo; Chino, Yasuyoshi; and Tahara, Shinichiro, 5,026,838. Cl. 536-27.000.
- Taiyo Fishery Co., Ltd.: *See—*
  - Saotome, Kazuo, 5,026,596, Cl. 428-264.000.
- Taiyo Sanso Co., Ltd.: *See—*
  - Tada, Masuo; Hata, Takeki; Fukumoto, Takaaki; and Ohmori, Toshiaki, 5,025,597, Cl. 51-410.000.
- Tajima, Masakatsu: *See—*
  - Inoue, Katsura; Fukura, Kenichi; Tajima, Masakatsu; Iwamura, Toru; and Ohshiro, Masatoshi, 5,027,301, Cl. 362-66.000.
- Tajima, Osamu; Kuramoto, Terumasa; and Suzuki, Yoshitaka, to Victor Company of Japan, Ltd. Thermal ink-transfer printer capable of preventing off-registration of colors at color printing. 5,026,180, Cl. 400-120.000.
- Takagi, Kiyoji; and Nishida, Koji, to Mitsubishi Petrochemical Co., Ltd. Impact resistant thermoplastic resin composition. 5,026,787, Cl 525-391.000.
- Takagi, Motoyuki; Yoshimura, Takuji; and Yamano, Yoshihiro, to National Starch and Chemical Investment Holding Corporation. Elastic paint composition. 5,026,761, Cl. 524-460.000.
- Takagiwa, Hiroyuki: *See—*
  - Masaki, Hiroya; Takagiwa, Hiroyuki; Shirose, Meizo; and Ishikawa, Michiaki, 5,026,620, Cl. 430-99.000.

- Takahashi, Hideaki *See—*
  - Arabori, Noboru; Takahashi, Hideaki, Sakai, Yoshio; Nakazato, Masao; Tanaka, Masakatsu; Takahashi, Tatsuhiko; Masuda, Katsutaro; Itoh, Masanobu; and Toda, Yuji, 5,025,896, Cl. 187-115.000.
- Takahashi, Hiroshi: *See—*
  - Tanaka, Masataka, Ohto, Masao; Sekine, Tetsuo; Takahashi, Hiroshi; and Maruyama, Masaru, 5,026,350, Cl. 604-158.000.
- Takahashi, Kosei; Hosoda, Masahiro; Tsunoda, Atsuo; Kondo, Masafumi; and Suyama, Takahiro, to Sharp Kabushiki Kaisha. Semiconductor device with substrate misorientation. 5,027,169, Cl. 357-17.000.
- Takahashi, Kouji: *See—*
  - Kobayashi, Kazuyuki; and Takahashi, Kouji, 5,025,764, Cl. 123-198.00R.
- Takahashi, Masato; Seki, Kazuo; Yamada, Tetsuya; and Morohoshi, Yukuo, to Yamatake-Honeywell Co., Ltd. Combustion control device. 5,026,272, Cl. 431-79.000.
- Takahashi, Osamu: *See—*
  - Yokoyama, Shigeki; Sato, Tadahisa; Kimura, Keizo; Furutachi, Nobuo; and Takahashi, Osamu, 5,026,867, Cl. 548-251.000.
- Takahashi, Shogo, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser. 5,027,363, Cl. 372-46.000.
- Takahashi, Shunzo; Izawa, Shigeru; Suzuki, Hidefumi; and Hasemi, Takashi, to CSK Corporation. Optical recording medium and tracking method therefor 5,027,337, Cl. 369-44.260.
- Takahashi, Tadashi, to Mitsubishi Petrochemical Co., Ltd. Process for producing ethylene copolymers. 5,026,797, Cl. 526-124.000.
- Takahashi, Takahiko: *See—*
  - Hongo, Mikio; Mizukoshi, Katsuro; Sano, Shuzo; Kamimura, Takashi; Itoh, Fumikazu; Shimase, Akira; Haraichi, Satoshi; and Takahashi, Takahiko, 5,026,664, Cl. 437-189.000.
- Takahashi, Tatsuhiko: *See—*
  - Arabori, Noboru; Takahashi, Hideaki; Sakai, Yoshio; Nakazato, Masao; Tanaka, Masakatsu; Takahashi, Tatsuhiko; Masuda, Katsutaro; Itoh, Masanobu; and Toda, Yuji, 5,025,896, Cl. 187-115.000.
- Takahashi, Teruyoshi: *See—*
  - Ohta, Motomi; Takahashi, Teruyoshi; Ikari, Hirotake; and Agui, Wataru, 5,026,424, Cl. 106-18.340.
- Takahashi, Yasuhiro, to Ricoh Company, Ltd. Device for controlling stacking of paper sheets on an intermediate tray of an image forming apparatus. 5,026,036, Cl. 271-3.100.
- Takai, Kiyoshi: *See—*
  - Miyazaki, Masatoshi; Sasaki, Ken; Maeda, Hachiro; Sakai, Hisami; Kamikawa, Sumio; Takai, Kiyoshi; Ogawa, Yutaka; and Tanaka, Yuichi, 5,026,319, Cl. 452-177.000.
- Takami, Masayuki: *See—*
  - Sugawara, Mitsuru; Yoshinaga, Akitoshi; Shimizu, Fumihiko; and Takami, Masayuki, 5,026,134, Cl. 350-96.110.
- Takamura, Akira: *See—*
  - Hasegawa, Kazumi; Moriya, Takashi; Hibino, Hiromi; and Takamura, Akira, 5,026,186, Cl. 400-691.000.
- Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; and Asakura, Tsutou, to Victor Company of Japan, Ltd. Image pickup apparatus. 5,027,216, Cl. 358-213.110.
- Takara Shuzo Co., Ltd.: *See—*
  - Kotani, Hirokazu; Hiraoka, Nobutsugu; and Obayashi, Akira, 5,026,645, Cl. 435-194.000.
- Takasaki, Chiaki; Furuse, Tatuo; and Amagasaki, Morio, to Toppan Publishing Co., Ltd.; and Kabushiki Kaisha Tahara. Label feeder for a mold for plastics moldings. 5,026,266, Cl. 425-150.000.
- Takase, Shigeaki: *See—*
  - Nishimura, Makoto; and Takase, Shigeaki, 5,027,044, Cl. 318-568.110.
- Takashio, Hiroshi: *See—*
  - Suzuki, Terao; Kishi, Matsuo; Muraishi, Katsuyoshi; Ogawa, Kenichi; and Takashio, Hiroshi, 5,026,518, Cl. 419-12.000.
- Takasugi, Hisashi: *See—*
  - Takaya, Takao; Takasugi, Hisashi; Masugi, Takashi; Yamanaka, Hideaki; and Kawabata, Kohji, 5,026,695, Cl. 514-202.000.
- Takatani, Shinichiro; Goto, Shigeo; Kawata, Masahiko; and Hiruma, Kenji, to Hitachi, Ltd. Solid film growth apparatus. 5,025,751, Cl. 118-733.000.
- Takaya, Takao; Takasugi, Hisashi; Masugi, Takashi; Yamanaka, Hideaki; and Kawabata, Kohji, to Fujisawa Pharmaceutical Co., Ltd. 7-acylamino-3-substituted cephalosporanic acid derivatives. 5,026,695, Cl. 514-202.000.
- Takayama, Jun; and Isoguchi, Seiichi, to Konica Corporation. Driving apparatus for solid state image sensors including a sweeping action controller. 5,027,215, Cl. 358-213.110.
- Takayanagi, Hiroshi: *See—*
  - Hisatake, Masayuki; and Takayanagi, Hiroshi, 5,027,221, Cl. 358-300.000.
- Takayanagi, Noboru, to Kabushiki Kaisha Toshiba. Method and system for managing a process of image data acquired by a computed radiography technique and additional information added to the image data. 5,027,274, Cl. 364-413.190.
- Takebayashi, Yoichi; Iwai, Isamu; Doi, Miwako; and Fukui, Mika, to Kabushiki Kaisha Toshiba. Method and apparatus for generating patterns with a user preference learning function. 5,027,420, Cl. 382-38.000.
- Takeda Chemical Industries, Ltd.: *See—*
  - Makino, Tadashi; Tabata, Tetsuro; and Hirai, Shin-ichiro, 5,026,560, Cl. 424-494.000.
  - Matsushima, Yuzo; Ito, Yoshiyuki; and Yamamori, Satofumi, 5,026,739, Cl. 521-177.000.
- Takeda, Hisanobu; and Oguma, Tomio, to Aisin Seiki Kabushiki Kaisha. Human private parts washing apparatus. 5,025,511, Cl. 4-447.000.
- Takeda, Mutsuhiko; Kakuda, Minoru; Shimpo, Masafumi; and Yoshida, Kiyoshi, to Mitsubishi Gas Chemical Company, Inc. Stability-improved trioxane composition. 5,026,875, Cl. 549-201.000.
- Takeda, Nobuhiko; Morishita, Isao; and Aida, Satoshi, to Aisin Seiki Kabushiki Kaisha. Headrest assembly for vehicle seats. 5,026,120, Cl. 297-408.000.
- Takeda, Yoshiyuki: *See—*
  - Kida, Yasuhiko; Irie, Yoichiro; Takeda, Yoshiyuki and Nagao, Tsuyoshi, 5,027,162, Cl. 355-320.000.
- Takehira, Yoshikazu: *See—*
  - Koden, Mitsuhiro; Kuratate, Tomoaki; Funada, Fumiaki; Sakaguchi, Kazuhiko; Kasai, Naoya; and Takehira, Yoshikazu, 5,026,506, Cl. 252-299.610.
- Takeishi, Itugu: *See—*
  - Fujisaki, Masataka; Fujisaki, Kiyotaka; Mori, Hitoshi; and Takeishi, Itugu, 5,027,207, Cl. 358-142.000.
- Takemori, Toshio; Ishiga, Masaru; and Ootsubo, Toshimi, to Lotte Company Limited. Soybean snack and a process for producing it. 5,026,568, Cl. 426-549.000.
- Takemoto, Tetsuyuki: *See—*
  - Yamanaka, Toshihiro; Takemoto, Tetsuyuki; Horii, Masahiro; and Taniguchi, Shoji, 5,027,334, Cl 369-13.000.
- Takenaka Corporation: *See—*
  - Chino, Hidenori; Hara, Takashi; Tamura, Kenji; Nakakuki, Yasuhide; Nii, Yasuyuki; Soma, Zenya; and Nishihara, Kiyoshi, 5,027,000, Cl. 290-53.000.
- Takenaka, Norimasa, to Tsubakimoto Chain Co. Stepless transmission. 5,025,672, Cl. 74-208.000.
- Takeshita, Takuo: *See—*
  - Sugihara, Tadashi; Takeshita, Takuo; and Ohuchi, Yukihiro, 5,026,680, Cl. 505-1.000.
- Taketani, Makoto: *See—*
  - Miyazaki, Jinsei; Taketani, Makoto; and Mitsumata, Tadayasu, 5,026,827, Cl. 530-405.000.
- Takeuchi, Hitoshi: *See—*
  - Takizawa, Minoru; Nakamura, Michiei; Takeuchi, Hitoshi; Sakamoto, Shigeru; and Horiguchi, Shojiro, 5,026,780, Cl. 525-301.000.
- Takigawa, Shoji; Teranishi, Kiyoshi; Nomura, Tomio; Suzuki, Toshiro; and Sakai, Kozo, to Sanyo Chemical Industries, Ltd. Polymer composition useful as viscosity index improver. 5,026,496, Cl. 252-56.00R.
- Takiguchi, Haruhisa: *See—*
  - Kudo, Hiroaki; Takiguchi, Haruhisa; Sakane, Chitose; and Sugahara, Satoshi, 5,027,368, Cl. 372-96.000.
- Takizawa, Minoru; Nakamura, Michiei; Takeuchi, Hitoshi; Sakamoto, Shigeru; and Horiguchi, Shojiro, to Dainichiseika Color & Chemicals Mfg. Co., Ltd. Water swellable resin composition. 5,026,780, Cl. 525-301.000.
- Tamko Asphalt Products, Inc.: *See—*
  - Jolitz, Randal J.; and Kirk, Donald R., 5,026,747, Cl. 524-64.000.
- Tamura Electric Works, Ltd.: *See—*
  - Nakagawa, Hidetoshi; Kawano, Keiji; and Miyazaki, Masakatu, 5,027,385, Cl. 379-100.000.
- Tamura, Kenji: *See—*
  - Chino, Hidenori; Hara, Takashi; Tamura, Kenji; Nakakuki, Yasuhide; Nii, Yasuyuki; Soma, Zenya; and Nishihara, Kiyoshi, 5,027,000, Cl. 290-53.000.
- Tan, Toshimi: *See—*
  - Sakurai, Shigeo; Miyata, Hiroshi; Tan, Toshimi; and Kaneko, Ryoichi, 5,027,268, Cl. 364-184.000.
- Tanabe, Kazushige; and Bonkohara, Katsutoshi, to Nippon Roki Co., Ltd. Metal holder and protector for a disposable plastic capsule. 5,026,478, Cl. 210-232.000.
- Tanabe, Shiro: *See—*
  - Baji, Toru; Nakano, Yukio; Tanabe, Shiro; Nakagawa, Tetsuya; and Kojima, Hirotsugu, 5,027,400, Cl. 380-20.000.
- Tanabe, Takao: *See—*
  - Terunuma, Yukio; and Tanabe, Takao, 5,025,869, Cl. 173-98.000.
- Tanaka, Hideyuki: *See—*
  - Sano, Tasukazu; Tanaka, Hideyuki; Nakamura, Keijirou; Kume, Hideo; and Tanigawa, Kiyoshi, 5,026,136, Cl. 350-96.150.
- Tanaka, Hirohisa; Kishi, Kohhei; and Yano, Kohzo, to Sharp Kabushiki Kaisha. Active type liquid crystal matrix display having signal electrodes with expanded sections at group exposure boundaries. 5,026,143, Cl. 350-336.000.
- Tanaka, Hiroshi: *See—*
  - Kobayashi, Akio; Tanaka, Hiroshi; Yamashita, Shoji; Fujita, Yasumasa; Hikichi, Koichi; and Kumagai, Chiaki, 5,025,685, Cl. 74-866.000.
- Tanaka, Kanichi; and Iguchi, Shigeru, to Tokai Rika Denki Seisakusho Co. Reverse rotation preventing mechanism for synchronous motors. 5,027,022, Cl. 310-78.000.
- Tanaka, Masahiro: *See—*
  - Kitsuta, Tatsuaki; Shimotsuhama, Isao; Watanabe, Yoshio; Tanaka, Masahiro; Shiotsu, Shinichi; and Ogawa, Kazumi, 5,027,005, Cl. 307-272.100.
- Tanaka, Masakatsu: *See—*
  - Arabori, Noboru; Takahashi, Hideaki, Sakai, Yoshio; Nakazato, Masao; Tanaka, Masakatsu; Takahashi, Tatsuhiko; Masuda, Katsutaro; Itoh, Masanobu; and Toda, Yuji, 5,025,896, Cl. 187-115.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Tanaka, Masaki; Abe, Norito; Yabumoto, Masao; Ushigami, Yoshiyuki; and Nozawa, Tadao, to Nippon Steel Corporation. Process for preparing wound core having low core loss. 5,026,439, Cl. 148-111.000.
- Tanaka, Masataka; Ohto, Masao; Sekine, Tetsuo; Takahashi, Hiroshi; and Maruyama, Masaru, to Hakko Electric Machine Works Co., Ltd. Set of double needles for injecting liquid medicine. 5,026,350, Cl 604-158.000.
- Tanaka, Minoru: *See—*
  - Yamauchi, Shunji; Tanaka, Minoru; Sakamoto, Kenitiro; Morita, Yutaka; Kidera, Toru; and Mieda, Hiroki, 5,026,668, Cl. 437-210.000.
- Tanaka, Mitsuyasu: *See—*
  - Hisatomi, Masahiro; Togasaki, Yoshihiro; and Tanaka, Mitsuyasu, 5,026,294, Cl. 439-125.000.
- Tanaka, Norio: *See—*
  - Ohnuma, Yoshiyuki; and Tanaka, Norio, 5,026,737, Cl. 521-78.000.
- Tanaka, Takakazu; and Hirai, Yuji, to Matsushita Electric Industrial Co., Ltd. Radio communication apparatus. 5,027,431, Cl. 455-214.000.
- Tanaka, Toshimasa: *See—*
  - Yamagishi, Katsuaki; Matsui, Koichi; Tanaka, Toshimasa; Matsui, Nobuo; Suma, Sei; and Mino, Yoshihito, 5,025,638, Cl. 62-180.000.
- Tanaka, Toshiyuki; Nakamura, Nobuo; and Yamamoto, Mutsuhiro, to Sharp Kabushiki Kaisha. Interrogating device for changing the priority of the inference rules. 5,027,305, Cl. 364-513.000.
- Tanaka, Yasuo: *See—*
  - Okabe, Masao; Amgai, Akikzau; Eto, Haruaki; and Tanaka, Yasuo, 5,026,764, Cl. 524-540.000.
- Tanaka, Yuichi: *See—*
  - Miyazaki, Masatoshi; Sasaki, Ken; Maeda, Hachiro; Sakai, Hisami; Kamikawa, Sumio; Takai, Kiyoshi; Ogawa, Yutaka; and Tanaka, Yuichi, 5,026,319, Cl. 452-177.000.
- Tanba, Nobuo; and Ikeda, Takahide, to Hitachi, Ltd. Method of manufacturing a semiconductor device utilizing a single polycrystalline layer for all electrodes. 5,026,654, Cl. 437-31.000.
- Tang, Fuh-Chyun: *See—*
  - Shi, Kwo-Xyan; and Tang, Fuh-Chyun, 5,025,997, Cl. 242-1.10R.
- Tang, Raymond, to Hughes Aircraft Company. Semi-active phased array antenna. 5,027,125, Cl. 342-368.000.
- Tanigawa, Kiyoshi: *See—*
  - Sano, Tasukazu; Tanaka, Hideyuki, Nakamura, Keijirou; Kume, Hideo; and Tanigawa, Kiyoshi, 5,026,136, Cl. 350-96.150.
- Tanigawa, Shigeho: *See—*
  - Iwasaki, Katsunori; Tanigawa, Shigeho; and Tokunaga, Masaaki, 5,026,419, Cl. 75-254.000.
- Taniguchi, Masakazu; Baba, Masatoshi; Ochiai, Yoshinori; Hirose, Masayoshi; and Hirata, Kiminori, to Nissan Chemical Industries, Ltd. Pyridazinone derivatives, preparation thereof, and insecticidal, acaricidal, fungicidal compositions. 5,026,850, Cl. 544-240.000.
- Taniguchi, Naosato: *See—*
  - Kushibiki, Nobuo; Yoshinaga, Yoko; Kuwayama, Tetsuro; and Taniguchi, Naosato, 5,026,618, Cl. 430-2.000.
- Taniguchi, Osamu; Kawagishi, Hideyuki; Tsuboyama, Akira; Okada, Shinjiro; Inaba, Yutaka; and Kanbe, Junichiro, to Canon Kabushiki Kaisha. Liquid crystal device, alignment control method therefor and driving method therefor. 5,026,144, Cl. 350-350.00S.
- Taniguchi, Shoji: *See—*
  - Yamanaka, Toshihiro; Takemoto, Tetsuyuki; Horii, Masahiro; and Taniguchi, Shoji, 5,027,334, Cl. 369-13.000.
- Taniguchi, Yasushi: *See—*
  - Yamamoto, Kiyoshi; Hirabayashi, Keiji; Kurihara, Noriko; Taniguchi, Yasushi; and Ikoma, Keiko, 5,026,415, Cl. 65-305.000.
- Tanjo, Toru; and Fukuoka, Noboru, to Mita Industrial Co., Ltd. Overlapped-transfer preventing paper supply device in image forming apparatus. 5,026,043, Cl. 271-121.000.
- Tanno, David M.: *See—*
  - Grossman, Richard F.; and Tanno, David M., 5,026,888, Cl. 556-136.000.
- Tannous, Medhat K.; Sherman, John D.; and Cohen, Alan P., to UOP. Silicate treatment of molecular sieve agglomerates. 5,026,531, Cl 423-328.000.
- Tarnowski, Thomas L.; Hu, Mae W.; Laney, Maureen; Pease, John S.; and Ghazarossian, Vartan, to Syntex (U.S.A.) Inc. Fluorescent dyes. 5,026,905, Cl. 562-43.000.
- Tasch, Al F., Jr.: *See—*
  - Jones, Richard A.; Cowley, Alan H.; and Tasch, Al F., Jr., 5,026,575, Cl. 427-255.000.
- Tasrop, Inc.: *See—*
  - Miller, Robert L., 5,026,114, Cl. 297-194.000.
- Tastu, Francis: *See—*
  - Le Loarer, Jean-Luc; and Tastu, Francis, 5,026,421, Cl. 106-3.000.
- Tatum, Joseph F. Jr.; and Lewis, Thomas H., Jr., to Cathodic Engineering Equipment Co., Inc. Ground electrode backfill composition, anode bed. 5,026,508, Cl. 252-502.000.
- Tatur, Vadim J.: *See—*
  - Zolotarev, Jury A.; Zaitsev, Dmitry A.; Tatur, Vadim J., and Myasoedov, Nikolai F., 5,026,909, Cl. 562-575.000.
- Tawata, Kenji: *See—*
  - Oshio, Toshiyuki; Tawata, Kenji; and Mabashi, Masayoshi, 5,027,217, Cl. 358-213.190.
- Taya, Shiro, to Kurita Water Industries Ltd. Process for inhibiting corrosion of vapor/condensed water system. 5,026,523, Cl. 422-16.000.
- Taylor, Adrienne H Umbrella sling apparatus. 5,025,819, Cl. 135-16.000.
- Taylor, Dale F., to General Electric Company. Corrosion resistant cladding for nuclear fuel rods. 5,026,516, Cl. 376-416.000.
- Taylor, Edward C.; Beardsley, George P.; Harrington, Peter J., and Fletcher, Stephen R., to Princeton University, The Trustees of Pyrido[2,3-]pyrimidine derivatives. 5,026,851, Cl. 544-279.000.
- Taylor, Julian S. Multiple orifice rotatable disc in-line restrictor valve 5,025,832, Cl. 137-625 310.
- Techniweave, Inc.: *See—*
  - Crawford, James A., Jr.; and Burgess, Keith E., 5,026,595, Cl 428-246.000.
- Technologie Speciales Ingenierie -T.S.I.: *See—*
  - Habib, Pierre; Martin, Andre; and Luong, Minh P., 5,026,213, Cl. 405-229.000.
- Teijin Chemicals, Ltd.: *See—*
  - Akiyama, Saburo; Murakami, Naoyuki; and Kitamura, Kazuo, 5,026,792, Cl. 525-458.000.
- Tektronix, Inc.: *See—*
  - Bayard, Michel L., 5,026,672, Cl. 501-134.000.
  - Kleck, Jeffrey A.; Burkhardt, Andrew J.; and Bingold, Steven R., 5,027,058, Cl. 324-121.00R.
- Telco International, Ltd.: *See—*
  - Telco, Paul, 5,025,553, Cl. 29-852.000.
- Telco, Paul, to Telco International, Ltd. Circuit board manufacture. 5,025,553, Cl. 29-852.000.
- Telecommunication Laboratories, Directorate General of Telecommunications, Ministry of Communications: *See—*
  - Jeng, Bor-Shenn; Change, Gan-How; Chang, Kuange-Yao, Yan, Chih-Yen; Wu, Tieh-Min; and Lin, Jang-Keng, 5,027,304, Cl. 364-518.000.
- Teledyne Industries, Inc.: *See—*
  - Guajardo, Ciro, 5,027,020, Cl. 307-647.000.
  - Luttrell, Clyde K.; and Moore, Donald T., 5,026,073, Cl. 273-360.000.
- Tempest, Laurence M : *See—*
  - Daneshtalab, Mohsen; Nguyen, Dai Q.; Ha, Chan M.; Luu, Hiep T., Tempest, Laurence M., and Micetich, Ronald G., 5,026,848, Cl. 544-137.000.
- Tencor Instruments: *See—*
  - Neukermans, Armand P.; and Berger, Josef, 5,026,437, Cl. 148-33.300.
- Terakado, Hajime: *See—*
  - Matsuno, Yasuhiro; Terakado, Hajime; Mochizuki, Masaru; Moroshima, Heiji; and Kamei, Hiroyuki, 5,027,107, Cl. 340-572.000.
- Terakawa, Takashige: *See—*
  - Kikuchi, Makoto; Mori, Shinsaku; Nikawa, Yoshio; and Terakawa, Takashige, 5,025,810, Cl. 128-804.000.
- Teranishi, Kiyoshi: *See—*
  - Takigawa, Shoji; Teranishi, Kiyoshi; Nomura, Tomio; Suzuki, Toshiro; and Sakai, Kozo, 5,026,496, Cl. 252-56.00R.
- Terao, Noriyuki: *See—*
  - Hiroe, Akihiko; and Terao, Noriyuki, 5,027,382, Cl. 377-76.000.
- Terasaka, Yoshihisa: *See—*
  - Hotomi, Hideo; Terasaka, Yoshihisa; and Mizuno, Hiroshi, 5,027,157, Cl. 355-261.000.
- Terauchi, Kiyoshi, to Sanden Corporation. Refrigerating system having a compressor with an internally and externally controlled variable displacement mechanism. 5,025,636, Cl. 62-115.000.
- Tercic, Eduard: *See—*
  - Durr, Heinrich; Kringe, Horst; Rosenthal, Manfred; and Tercic, Eduard, 5,026,184, Cl. 400-605.000.
- Teringo, William. Non-mechanical incapacitation syringe safety needle guard. 5,026,345, Cl. 604-110.000.
- Terumo Kabushiki Kaisha: *See—*
  - Katsura, Yoshiro, 5,026,525, Cl. 422-45.000.
- Terunuma, Yukio; and Tanabe, Takao, to Hitachi Koki Company, Limited. Impact drill. 5,025,869, Cl. 173-98.000.
- Tesch, Helmut: *See—*
  - Weber, Thomas; Heckmann, Walter; Mertes, Jurgen; Tesch, Helmut; Altstaedt, Volker; Eberle, Wolfgang; Folda, Thomas; Stutz, Herbert; and Recker, Hans-Gert, 5,026,789, Cl. 525-423.000.
- Tessier, Jean; and Demoute, Jean-Pierre, to Roussel Uclaf. Process for the preparation of 1.R, cis cyclopropane di-carboxylic acid derivatives. 5,026,862, Cl. 560-124.000.
- Tetley, William C.: *See—*
  - Westcott, Daniel R.; Tetley, William C.; and Cummings, Bruce A., 5,026,994, Cl. 250-435.000.
- Tetra Pak Holdings & Finance S.A.: *See—*
  - Stainbrook, Marlan L.; and Rodrigue, John, 5,025,991, Cl 239-459.000.
- Texas Instruments Incorporated: *See—*
  - Bass, Alan S.; Schenck, Stephen R., and Martin, Robert C., 5,027,014, Cl. 307-475.000.
  - Haight, Michael H.; and Wolfe, Mark A., 5,027,003, Cl. 307-242.000.
  - Manns, William G.; Weeks, Don J.; Merryman, Jerry D.; and Sheng, Chyi N., 5,027,132, Cl. 346-108.000.
  - Matloubian, Mishel; Chen, Cheng-Eng D.; and Blake, Terence G . 5,026,656, Cl. 437-41.000.
  - Strasser, Werner, 5,025,667, Cl. 73-724.000.
- Textron Inc.: *See—*
  - Davis, Richard M., 5,025,688, Cl. 81-448.000.
- Th. Goldschmidt AG & GDF Gesellschaft fur Dentale Forschung u Innovationen GmbH: *See—*
  - Fock, Jurgen; Hahn, Gunter; and Wagenknecht, Gunter, 5,026,902, Cl. 560-223.000.

- Thamboo, Samuel V.. *See—*
  - Bhowal, Prabir R.; and Thamboo, Samuel V., 5,026,520, Cl. 420-417.000.
- Thames Water Utilities Limited: *See—*
  - James, David F., 5,026,993, Cl. 250-357.100.
- Thebault, Jacques, to Societe Europeenne de Propulsion. Composite material with refractory fibrous reinforcement and ceramic matrix. 5,026,604, Cl. 428-367.000.
- Theobald, Kevin B., to Motorola, Inc. Over speed data rate adjustment method and apparatus in an asynchronous data stream. 5,027,381, Cl. 375-117.000.
- Thermoguard Equipment, Inc.: *See—*
  - Shill, David, 5,026,249, Cl. 414-789.100.
- Theron, Jean-Bernard: *See—*
  - Gueble, Jean-Michel; Theron, Jean-Bernard, Latouche, Yannick; Ducrocq, Jean-Bernard; and Perez, Bernard, 5,027,090, Cl. 333-202.000.
- Theroux, Robert L.: *See—*
  - Abnoosi, Fatemeh; and Theroux, Robert L., 5,027,256, Cl. 361-417.000.
- Thieler, William R. Method and apparatus for opening and closing surgical wounds. 5,026,389, Cl. 606-215.000.
- Thierheimer, Charles L., Jr.: *See—*
  - Hindagolla, Suraj L.; Thierheimer, Charles L., Jr.; and Skene, John M., 5,026,425, Cl. 106-22.000.
- Thoe, Robert S., to United States of America, Energy. Chromatic X-ray magnifying method and apparatus by Bragg reflective planes on the surface of Abbe sphere. 5,027,377, Cl. 378-145.000.
- Thomann, Roland. Sidewall extension member for a drainage channel. 5,026,202, Cl. 404-4.000.
- Thomas, Alan E., to Ultracision Inc. Method and apparatus for ultrasonic surgical cutting and hemostatis. 5,026,387, Cl. 606-169 000.
- Thomas, Gerhard: *See—*
  - Eickvonder, Wolfgang; Passmann, Norbert; Thomas, Gerhard, Tummers, Peter; and Steven, Hubert, 5,025,755, Cl. 122-4.00D.
- Thomas, Kenneth D. Trash compactor apparatus and method 5,025,719, Cl. 100-99.000.
- Thomas, Tammy D. Patio cooler table. 5,025,639, Cl. 62-258.000.
- Thomas, Terence N.; Bonneville, Marc E.; and Wadsworth, Douglas C., to Northern Telecom Limited Speaker drive arrangement for loudspeaker telephone. 5,027,392, Cl. 379-388.000.
- Thomas, Terence N.: *See—*
  - Littlewood, Timothy J.; Robertson, David J.; Maginley, Ronald J : Chapman, Alan S. J.; Thomas, Terence N.; and Nizamuddin, Nadir, 5,027,345, Cl 370-58.200.
- Thompson, Arthur B , Jr.: *See—*
  - Bayston, Thomas E.; Weidler, Roy C., Jr.; Thompson, Arthur B., Jr.; and Layton, Allen C., 5,026,156, Cl. 356-45.000
- Thompson, Clyde W., to Thompson Manufacturing Company, Inc. Flap closer. 5,026,340, Cl. 493-460.000.
- Thompson Manufacturing Company, Inc.: *See—*
  - Thompson, Clyde W., 5,026,340, Cl. 493-460.000.
- Thompson, Neil E. S., and Asperger, Robert G., to Petrolite Corporation. Methods for treating hydrocarbon recovery operations and industrial waters. 5,026,483, Cl. 210-708.000.
- Thompson, William L.: *See—*
  - Keyes, Marion A , IV; and Thompson, William L., 5,025,665, Cl. 73-597.000.
- Thomson Video Equipement: *See—*
  - Artigalas, Max; and Grimaldi, Jean-Luc, 5,027,287, Cl. 364-518.000.
- Thorman, Christopher S.: *See—*
  - Kuhn, John B.; Hunt, Kenneth E.; and Thorman, Christopher S., 5,025,617, Cl. 56-15.600.
- Thorne, Hal A., to Alcatel NA. Embedded control technique for distributed control systems. 5,027,349, Cl. 370-85.100.
- Thornton, Alfred K.: *See—*
  - Lieberman, Ephraim; Bordoni, Maurice E., and Thornton, Alfred K , 5,026,538, Cl. 424-1.100.
- Thornton, Roger D., to Westinghouse Electric Corp. Redundant power bus arrangement for electronic circuits. 5,027,002, Cl. 307-35.000.
- Thorpe, James R.: *See—*
  - Corfits, William D., Holahan, Maurice F.; Martino, Susan J.; Motschman, David R.; and Thorpe, James R., 5,027,254, Cl. 361-384.000.
- Thorson, Lewis D.: *See—*
  - Hanson, Merle E.; and Thorson, Lewis D., 5,025,859, Cl 166-252.000.
- Thow, Ian, to Yale and Valor p.l.c. Composite artificial log. 5,026,579, Cl. 428-15.000.
- Thulke, Wolfgang, to Siemens Aktiengesellschaft. Laser diode with buried active layer and lateral current limitation. 5,027,364, Cl. 372-46.000.
- Thumma, Mark R.: *See—*
  - Pickles, Charles S., Sucheski, Matthew M., and Thumma, Mark R , 5,026,292, Cl. 439-108.000.
- Thurston, Andrew M., to GEC-Marconi Limited. Delta-sigma converter with bandpass filter for noise reduction in receivers. 5,027,120, Cl. 341-143.000.
- Tickner, Donald R.: *See—*
  - Ryon, Randall C.; Canal, Lamia K.; and Tickner, Donald R , 5,026,044, Cl. 271-227.000.
- Tidland Corporation, a Washington Corp.: *See—*
  - Tidland, John W.; Schable, Reinhold A.; Vander Bom, Casey M., Biswas, Borendra K.; and Miller, William R., 5,025,693, Cl. 83-482.000.
- Tidland, John W.; Schable, Reinhold A., Vander Bom, Casey M ; Biswas, Borendra K.; and Miller, William R., to Tidland Corporation, a Washington Corp. Side shifting apparatus for cutting blade in a web slitting machine. 5,025,693, Cl. 83-482.000.
- Timar, Judit: *See—*
  - Bakos, Jozsef, Neil, Balint; Kollar, Laszlo ; Toros, Szilard; Eifert, Gyula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna, Kuronya, Istvan; Magyari, Istvan; Timar, Judit. Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.
- Tinder, Landon D.; and Tinder, Richard F. Safety enclosures and systems for high speed vehicles. 5,026,006, Cl. 244-122 0AG
- Tinder, Richard F.: *See—*
  - Tinder, Landon D.; and Tinder, Richard F., 5,026,006, Cl. 244-122.0AG.
- Tinsley, Timothy M.. *See—*
  - Adams, John T.; and Tinsley, Timothy M., 5,026,270, Cl 431-24.000.
- Titmas, James A.; and Saffian, Robert A., to Eau-Viron Incorporated Containment casing for a deep well gravity pressure reactor vessel 5,026,209, Cl. 405-133.000.
- Titus, Hans-Joachim, to Krauss-Maffei AG Mixer-dryer 5,026,169, Cl 366-287.000.
- Titus, Robert D.: *See—*
  - Nixon, James A.; Pioch, Richard P ; Schaus, John M . and Titus, Robert D., 5,026,707, Cl. 514-255.000.
- Tkach, Robert W.: *See—*
  - Chraplyvy, Andrew R.; Iannone, Patrick P., Kaminow, Ivan P . Li, Tingye; Stone, Julian, Stulz, Lawrence W , and Tkach, Robert W., 5,027,435, Cl. 455-617.000.
- Toba, Hiroto: *See—*
  - Ikegaya, Kazutoshi; Maruyama, Yuji; Sannomiya, Kunjo; Tsuda, Yukifumi; and Toba, Hiroto, 5,027,418, Cl 382-8.000.
- Tobey, Jon B., to Boeing Company, The. External separator for vacuum waste system. 5,026,407, Cl. 55-185.000.
- Tobler, Hans, to Ciba-Geigy Corporation. Acylcylohexanediones and the oxime ethers thereof with herbicidal and plant growth regulating properties. 5,026,899, Cl. 560-122.000.
- Tobler, Hans, to Ciba-Geigy Corporation. Process for the preparation of 1-alkylthio-and 1-benzylthio-1-formylcyclopropanes. 5,026,916, Cl. 568-41.000
- Toda, Yuji: *See—*
  - Arabori, Noboru; Takahashi, Hideaki; Sakai, Yoshio; Nakazato, Masao; Tanaka, Masakatsu; Takahashi, Tatsuhiko; Masuda, Katsutaro; Itoh, Masanobu; and Toda, Yuji, 5,025,896, Cl 187-115.000.
- Togasaki, Yoshihiro: *See—*
  - Hisatomi, Masahiro; Togasaki, Yoshihiro; and Tanaka, Mitsuyasu, 5,026,294, Cl. 439-125.000.
- Tognana, Aldo, to SEV S.r.l. Threshing device. 5,026,322, Cl 460-76.000.
- Tokai Kogyo Kabushiki Kaisha: *See—*
  - Unuma, Sadao, 5,026,328, Cl 474-153.000
- Tokai Regional Fishery Research Laboratory: *See—*
  - Nishioka, Fujio, 5,026,573, Cl. 426-643.000.
- Tokai Rika Denki Seisakusho Co.: *See—*
  - Tanaka, Kanichi; and Iguchi, Shigeru, 5,027,022, Cl. 310-78.000.
- Tokai Rubber Industries, Ltd.: *See—*
  - Ito. Hisayuki, 5,026,024, Cl. 251-149.500.
  - Ito, Hisayuki, 5,026,025, Cl. 251-149 600.
- Tokumitsu, Jun, to Canon Kabushiki Kaisha Light signal transmission system. 5,026,137, Cl. 350-96.160.
- Tokunaga, Katsushi: *See—*
  - Kitamura, Ikuo; Aomi, Hideki; Koyama, Satoshi, Tokunaga, Katsushi; and Okamura, Kazuo, 5,026,605, Cl. 428-403.000.
- Tokunaga, Kei: *See—*
  - Koumoto, Yasuhiko; and Tokunaga, Kei, 5,027,309, Cl. 364-766.000.
- Tokunaga, Masaaki: *See—*
  - Iwasaki, Katsunori; Tanigawa, Shigeho; and Tokunaga, Masaaki, 5,026,419, Cl. 75-254.000.
- Tokyo Electric Company, Ltd.: *See—*
  - Nakamura, Shinya, 5,027,248, Cl 360-130.210
- Tokyo Keiki Co., Ltd.: *See—*
  - Akaba, Noriyuki; and Itoh, Satoshi, 5,027,130, Cl 343-872.000.
  - Ito, Koichi; Matsunaga, Motomu; Kurokawa, Satoru, and Ueno, Koji, 5,026,959, Cl. 219-10.55A
  - Kikuchi, Makoto; Mori, Shinsaku; Nikawa, Yoshio; and Terakawa, Takashige, 5,025,810, Cl. 128-804.000.
- Tolle, Karl-Heinz; and Steckel, Willi, to Ed. Scharwachter GmbH & Co. KG. Spring support for a motor vehicle door fastener 5,026,103, Cl. 292-275.000.
- Tomasiak, Mark J.: *See—*
  - Hult, David R.; and Tomasiak, Mark J., 5,025,529, Cl. 15-344.000
- Tomes, Nancy J.; Henderick, Carol A.; and Glatz, Bonita A., to Pioneer Hi-Bred International, Inc. Selective medium for propionibacterium growth. 5,026,647, Cl. 435-244.000.
- Tommasi, Giulio: *See—*
  - Marchionni, Giuseppe; Viola, Gian T.; Tommasi, Giulio; Ferro, Raffaele; and Cirillo, Gianna, 5,026,786, Cl. 525-356.000.
- Tommy Armour Golf Company: *See—*
  - McNally, Robert F.; and Hoeflich, John B., 5,026,056, Cl. 273-77.00A.
- Tompkins, E. Neal; and Slayton, Danny L., to Colorocs Corporation. Vertical print engine for electrophotographic apparatus. 5,027,158, Cl. 355-271.000.
- Tone World International Corp.: *See—*
  - Wei, Shih A., 5,027,037, Cl. 315-200.00A.

VOL
1127
ISS
4
JE
25
1991
UMI

Tonelli, Claudio; and Tortelli, Vito, to Ausimont S.r.l. Perfluoroalkenes and fluorination products thereof. 5,026,928, Cl. 570-136.000.
Topline Leisure Limited: *See—*
  McGrail, Peter; McGrail, Grace; Williams, Geoffrey A., and Ward, Brian J., 5,027,035, Cl. 315-119.000.
Toppan Printing Co., Ltd.: *See—*
  Watanabe, Toshimitsu, 5,025,924, Cl. 206-334.000
Toppan Publishing Co., Ltd.: *See—*
  Takasaki, Chiaki; Furuse, Tatuo; and Amagasaki, Morio, 5,026,266, Cl. 425-150.000.
Toray Silicone Company, Limited: *See—*
  Sasaki, Shosaku, 5,026,766, Cl. 524-588.000.
Torbert, William F. Moisture sensitive automatic windshield wiper and headlight control device. 5,027,001, Cl. 307-10.100.
Torii Winding Machine Co., Ltd.: *See—*
  Roddy, James E.; Narayan, Badhri; Stark, Richard A.; and Voci, Laurie L., 5,026,133, Cl. 350-6.400.
Toros, Szilard: *See—*
  Bakos, Jozsef; Neil, Balint; Kollar, Laszlo ; Toros, Szilard; Eifert, Gyula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna; Kuronya, Istvan; Magyari, Istvan; Timar, Judit, Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.
Torrence, G. Paull: *See—*
  Smith, Brad L.; Torrence, G. Paull. Aguilo', Adolfo; and Alder, James S., 5,026,908, Cl. 562-519.000.
Tortelli, Vito: *See—*
  Tonelli, Claudio; and Tortelli, Vito, 5,026,928, Cl. 570-136.000.
Tosaki, Yoshihiro: *See—*
  Nagata, Yuji; Fukazawa, Toshio; Wada, Kumiko; and Tosaki, Yoshihiro, 5,027,245, Cl. 360-121.000.
Tosho Corporation: *See—*
  Oguri, Motohiro; Kano, Yoshiaki; Mishima, Kiyotaka; Yamada, Masahiko; Kasano, Kenji; and Uemura, Masaru, 5,026,941, Cl. 585-467.000.
Totes', Incorporated: *See—*
  Brinker, Barry; and Busse, John E., 5,025,919, Cl. 206-214.000.
Totten, John M., to Porta-Nails, Inc. Multi-purpose support table for a router. 5,025,841, Cl. 144-134.00R.
Tour, James M.; Wu, Ruilian; and Schumm, Jeffry S., to University of South Carolina. Compound for use in the synthesis of semiconducting polymers with perpendicularly arranged cores and method of synthesizing said compound. 5,026,894, Cl. 558-46.000.
Townsend Engineering Company: *See—*
  Townsend, Ray T., 5,025,560, Cl. 30-298.000.
Townsend, Ray T., to Townsend Engineering Company. Ergonomic knife. 5,025,560, Cl. 30-298.000.
Toyama, Kozo: *See—*
  Ishii, Keji; Toyama, Kozo; and Tagami, Jun, 5,025,599, Cl. 52-167.0DF.
Toyama, Toshiko. Finger rest for recorder. 5,025,699, Cl. 84-453.000
Toyo Jozo Co., Ltd.: *See—*
  Fujiwara, Tatsuro; Kogami, Yuji, and Watanabe, Asako, 5,026,832, Cl. 536-7.100.
Toyoda, Ryuichi *See—*
  Sato, Kimikatsu; Toyoda, Ryuichi; and Masaki, Takeshi, 5,027,115, Cl. 341-13.000.
Toyomaki, Kazuya, to Victor Company of Japan, Ltd. Noise shaping requantization circuit 5,027,119, Cl. 341-144.000.
Toyota Jidosha Kabushiki Kaisha: *See—*
  Shinpo, Yoshiharu; and Akiyama, Motoharu, 5,025,678, Cl. 74-473.0SW.
  Umeyama, Mitsuhiro; Inui, Masaki; Yamamoto, Kenichi; and Wakahara, Kaoru, 5,025,680, Cl. 74-574.000.
Traber, Jorg: *See—*
  Schohe, Rudolf; Glaser, Thomas; Traber, Jorg; and Allen, George S., 5,026,857, Cl. 514-319.000.
TrafFix Devices, Inc.: *See—*
  Kulp, Jack H.; McKenney, John D., and Sullivan, James P., 5,026,204, Cl. 404-10.000.
Trefimetaux: *See—*
  Picault, Alain; Gandossi, Christian, and Mineau, Laurent, 5,026,434, Cl. 148-2.000.
Tregarthen, David N.: *See—*
  Green, William A. D.; and Tregarthen, David N., 5,025,607, Cl. 52-749.000.
Treskot, Robert A.: *See—*
  Jenkins, Richard J.; Treskot, Robert A.; Vedage, Gamini A.; and White, James F , 5,026,914, Cl. 564-451.000.
Trinh, Tinh T.: *See—*
  Schwarz, Ray P.; Wolf, David A , and Trinh, Tinh T., 5,026,650, Cl. 435-286.000.
Trinity Industries, Inc.: *See—*
  Matyas, Tibor; and Vanderlinden, Richard J., 5,026,229, Cl. 410-60.000.
TrioVing a.s.: *See—*
  Muus, Frank, 5,025,647, Cl. 70-352.000.
Trout, Torence J.: *See—*
  Mitchell, Robert D.; and Trout, Torence J., 5,026,427, Cl 106-23.000.
Trouteaud, Lee E.; and Hadick, Robert J., to Hobart Corporation Apparatus for storing and dispensing frozen comestibles. 5,025,950, Cl. 221-5.000.
Trovan Limited: *See—*
  Zirbes, Glen L.; Hadden, Leonard D.; and Troyk, Philip R., 5,025,550, Cl. 29-605.000.
Troyk, Philip R : *See—*
  Zirbes, Glen L., Hadden, Leonard D . and Troyk, Philip R., 5,025,550, Cl. 29-605.000.
Trummlitz, Gunter: *See—*
  Mihm, Gerhard, Eberlein, Wolfgang. Engel, Welfhard; Trummlitz, Gunter; Mayer, Norbert; Dodds, Henri; and Hammer, Rudolf, 5,026,699, Cl. 514-220.000.
Trundle, Clive, to Plessey Overseas Limited Reversible infra-red recording medium. 5,026,619, Cl 430-19.000.
Trzecieski, Michael A.; and Ferguson, Clifford R., to Shaw Industries Ltd. Method and apparatus for applying thermo-plastic protective coating to pipes. 5,026,451, Cl. 156-244.270.
Tsubakimoto Chain Co.: *See—*
  Hashizume, Mitsuo; and Miyahara, Shoji, 5,025,912, Cl 198-459.000.
  Sugimoto, Yoshiaki, Hosokawa, Toshihiro; Uchiumi, Yutaka, Sasamoto, Shuji; and Fujimoto, Nobuyuki, 5,026,331, Cl 474-214.000.
  Takenaka, Norimasa, 5,025,672, Cl. 74-208.000.
Tsuboyama, Akira: *See—*
  Taniguchi, Osamu; Kawagishi, Hideyuki; Tsuboyama, Akira, Okada, Shinjiro; Inaba, Yutaka; and Kanbe, Junichiro, 5,026,144, Cl. 350-350.00S.
Tsubuko, Kazuo; Kuramoto, Shinichi; Umemura, Kazuhiko, and Ohkawara, Makoto, to Ricoh Company, Ltd Toner for electrophotography. 5,026,621, Cl. 430-109.000.
Tsuchida, Masumi: *See—*
  Semura, Norio, Tsuchida, Masumi; and Shimamura, Yoshihiro. 5,027,021, Cl. 310-68.00A.
Tsuchiya, Osamu: *See—*
  Suwanai, Naokatsu, and Tsuchiya, Osamu, 5,025,741, Cl. 437-52.000.
Tsuda, Yukifumi: *See—*
  Ikegaya, Kazutoshi; Maruyama, Yuji; Sannomiya, Kunjo; Tsuda, Yukifumi; and Toba, Hiroto, 5,027,418, Cl. 382-8.000.
Tsuji, Kuniro: *See—*
  Kosuge, Takuo; Tsuji, Kuniro, Ishida, Hitoshi; and Kosuge, Yoshiki, 5,026,883, Cl. 552-542.000.
Tsukii, Toshikazu, to Raytheon Company. Transceiver modules for phased array antenna. 5,027,084, Cl. 330-295.000.
Tsukiji, Masaaki: *See—*
  Ishizuka, Koh; Nishimura, Tetsuharu; Tsukiji, Masaaki, and Ishii, Satoshi, 5,026,985, Cl. 250-231.160.
Tsumura & Co.: *See—*
  Itoh, Kouichi; Ishige, Atsushi; and Hosoya, Eikichi, 5,026,733, Cl 514-718.000.
Tsunoda, Atsuo: *See—*
  Takahashi, Kosei; Hosoda, Masahiro, Tsunoda, Atsuo; Kondo, Masafumi; and Suyama, Takahiro, 5,027,169, Cl. 357-17.000
Tsunoda, Jun, to Kabushiki Kaisha Toshiba. Pattern recognition apparatus using a plurality of candidates. 5,027,407, Cl. 381-43.000.
Tsutsui, Eiji: *See—*
  Oda, Kenji; Eki, Makoto; Tsutsui, Eiji; and Maeshima, Masanobu, 5,027,152, Cl. 355-200.000.
Tu, Quoc H : *See—*
  Chan, Wing-Man; Tu, Quoc H.; and Chungphaisan, Vithit, 5,027,343, Cl. 370-017.000.
Tucholski, Gary R., to Eveready Battery Company, Inc. Electrochemical cell with disconnect switch device. 5,026,615, Cl. 429-61.000
Tucker, Virgil R.: *See—*
  Horsley, William J., and Tucker, Virgil R., 5,027,076, Cl 324-674.000.
Tummers, Peter: *See—*
  Eickvonder, Wolfgang; Passmann, Norbert, Thomas, Gerhard; Tummers, Peter; and Steven, Hubert, 5,025,755, Cl. 122-4.00D.
Turbotak Inc.: *See—*
  Spink, Donald R.; and Spink, Edward F., 5,025,989, Cl. 239-431.000.
Turley, W. Dale: *See—*
  Noel, Bruce W.; Borella, Henry M.; Cates, Michael R.; Turley, W Dale; Macarthur, Charles D.; and Cala, Gregory C., 5,026,170, Cl. 374-29.000.
Turnidge, Randolf C.: *See—*
  Shannon, Michael J.; and Turnidge, Randolf C., 5,027,189, Cl. 357-71.000.
Turro, Victor R.: *See—*
  Montaner, Pedro P., and Turro, Victor R., 5,025,958, Cl. 222-321.000.
Tyler, Derek E.: *See—*
  Vierod, Richard P.; Cheskis, Harvey P.; and Tyler, Derek E., 5,026,433, Cl. 148-2.000.
Tyrell, John A ; and Willey, S. Jack, to General Electric Company. Polyester compositions exhibiting enhanced melt viscosity. 5,026,790, Cl. 525-438.000.
Tzikas, Athanassios, to Ciba-Geigy Corporation. Reactive dyes, their preparation and their use 5,026,847, Cl. 544-76.000.
Ube Industries, Ltd.: *See—*
  Inoue, Hiroshi; Miura, Tadashi; and Hirano, Tetsuji, 5,026,767, Cl. 524-745.000.
Ubel, F. Andrew, III: *See—*
  Oxman, Joel D.; and Ubel, F Andrew, III, 5,026,278, Cl. 433-41.000.
Uchida, Tamotu: *See—*
  Hayashi, Junkichi; and Uchida, Tamotu, 5,027,412, Cl. 381-199.000

Uchiumi, Yutaka: *See—*
  Sugimoto, Yoshiaki; Hosokawa, Toshihiro; Uchiumi, Yutaka, Sasamoto, Shuji; and Fujimoto, Nobuyuki, 5,026,331, Cl 474-214.000.
Uchiyama, Mamoru: *See—*
  Nojiri, Ryuji; Hayakawa, Yoshihiro; Uchiyama, Mamoru, Kato, Hisatoyo; Chino, Yasuyoshi, and Tahara, Shinichiro, 5,026,838, Cl. 536-27.000.
Uchiyama, Shouichi: *See—*
  Yanagisawa, Michio; Ikejiri, Masahisa; Miyazaki, Hajime; Muranaka, Tsukasa; Inoue, Kunihiro; and Uchiyama, Shouichi, 5,027,077, Cl. 324-712.000.
Ueda, Hiroshi; Yoshigai, Hisaaki; and Masunaga, Mikio, to Bridgestone Corporation. Heavy duty pneumatic radial tire having defined tire enlargement with inflation. 5,025,844, Cl. 152-454.000.
Ueda, Kazuhiko, to Victor Company of Japan, Ltd. Television camera having CCD imaging device with double line CCD section for each vertical CCD. 5,027,218, Cl. 358-213.230.
Ueda, Masazumi: *See—*
  Misumi, Fumihiko; Ueda, Masazumi; Hara, Masato; Matsui, Yutaka; and Imai, Kiyoshi, 5,026,978, Cl. 250-205.000.
Ueda, Tohru; Sasaki, Takuma; Matsuda, Akira; Miyashita, Takanori; Sakata, Shinji; Yamagami, Keiji; and Fuji, Akihiro, to Yamasa Shoyu Co., Ltd.; and Yoshitomi Pharmaceutical Industries, Ltd. Pyrimidine 2'-methylidene nucleoside compounds. 5,026,835, Cl. 536-23.000.
Uekido, Kouzou; Nishiyama, Michiaki; and Sakamoto, Katsuhiko, to NEC Corporation. Connector suitable for high-speed transmission of signals. 5,026,306, Cl. 439-675.000.
Uemura, Masaru: *See—*
  Oguri, Motohiro; Kano, Yoshiaki; Mishima, Kiyotaka; Yamada, Masahiko; Kasano, Kenji; and Uemura, Masaru, 5,026,941, Cl. 585-467.000.
Uenishi, Kouichi: *See—*
  Kanehara, Koichi; Fukuda, Kazumi; and Uenishi, Kouichi, 5,026,972, Cl. 235-32.000.
Ueno, Hisashi: *See—*
  Kobayashi, Makiji; Isobe, Mitsuo; Inatsuki, Tatsuya; and Ueno, Hisashi, 5,027,327, Cl. 365-222.000.
Ueno, Koji: *See—*
  Ito, Koichi; Matsunaga, Motomu; Kurokawa, Satoru, and Ueno, Koji, 5,026,959, Cl. 219-10.55A.
Ueno, Ryuji: *See—*
  Kuno, Sachiko; Ueno, Ryuji; and Hayaishi, Osamu, 5,026,692, Cl. 514-178.000.
Ueno Seiyaku Kabushikikaisha: *See—*
  Kuno, Sachiko; Ueno, Ryuji; and Hayaishi, Osamu, 5,026,692, Cl. 514-178.000.
Uetani, Kenichi, to Mitsubishi Denki Kabushiki Kaisha. Elevator testing apparatus. 5,027,299, Cl. 364-580.000.
Uffner, William E.: *See—*
  Jacob, Thomas R., Stenger, Leonard A.; and Uffner, William E., 5,026,609, Cl. 428-489.000.
Uhrich, Daniel T.: *See—*
  Bird, Douglas D.; and Uhrich, Daniel T., 5,025,984, Cl. 236-46.00R.
Ujiie, Yoichi; and Isozaki, Hiroyuki, to Fuji Photo Film Co., Ltd. Method of storing and displaying error information in photographic printer. 5,027,154, Cl. 355-205.000.
Ukrainec, Andrew: *See—*
  Haykin, Simon; and Ukrainec, Andrew, 5,027,123, Cl. 342-188.000.
Ullman, Ralph J.; and Kahanek, Alan P., to Kaspar Wire Works, Inc. Multiprice setting split ring coin control mechanism. 5,025,908, Cl 194-227.000.
Ultra Creative Corporation: *See—*
  Blatt, Eli, 5,026,174, Cl. 383-86.000.
Ultracision Inc.: *See—*
  Thomas, Alan E., 5,026,387, Cl. 606-169.000.
Umasankar, Guruswamy; Kade, Alexander; and Fabris, Alroy G., to General Motors Corporation. Cam actuated traction control system apparatus and method. 5,026,126, Cl. 303-100.000.
Umbach, Corwin P.: *See—*
  Clark, Gregory J.; Gambino, Richard J.; Koch, Roger H.; Laibowitz, Robert B.; Marwick, Allan D.; and Umbach, Corwin P , 5,026,682, Cl. 505-1.000.
Umberto Carnisio: *See—*
  Tacke, Rolf D., 5,025,840, Cl. 141-253.000.
Umemoto, Yasunari: *See—*
  Kagaya, Osamu; Umemoto, Yasunari; and Shigeta, Junji, 5,027,167, Cl. 357-15.000.
Umemura, Kazuhiko: *See—*
  Tsubuko, Kazuo; Kuramoto, Shinichi; Umemura, Kazuhiko; and Ohkawara, Makoto, 5,026,621, Cl. 430-109.000.
Umemura, Kiyoshi; and Irie, Teruo, to Yamaichi Electric Mfg Co., Ltd. Impact test hammer. 5,025,655, Cl. 73-11.000.
Umetsu, Masahito: *See—*
  Morino, Asami; and Umetsu, Masahito, 5,026,962, Cl. 219-69.120.
Umeyama, Mitsuhiro; Inui, Masaki; Yamamoto, Kenichi; and Wakahara, Kaoru, to Toyota Jidosha Kabushiki Kaisha. Torsional damper type flywheel device. 5,025,680, Cl. 74-574.000.
Underwood, David A.: *See—*
  Johnson, Keith H.; and Underwood, David A., 5,025,809, Cl. 128-715.000.
Union Camp Corporation: *See—*
  Pavlin, Mark S., 5,026,754, Cl. 534-272.000.
  West, James C.; and Pavlin, Mark S., 5,026,753, Cl. 524-272.000.
Union Carbide Canada Limited: *See—*
  Maric, Radovan R., 5,025,824, Cl. 137-113.000.
Union Carbide Chemicals and Plastics Technology Corporation. *See—*
  Baker, Edgar C., 5,026,903, Cl. 560-232.000.
  Campbell, Kenneth D., 5,026,945, Cl. 585-500.000.
  Wegman, Richard W.; and Schreck, David J., 5,026,907, Cl. 562-519.000.
Union Carbide Coatings Service Technology Corporation: *See—*
  Osborne, Timothy W., 5,026,422, Cl. 106-14.110.
Union Carbide Industrial Gases Technology Corporation: *See—*
  Bikson, Benjamin; and Giglia, Salvatore, 5,026,479, Cl. 210-321.800.
  Saunders, John B.; and Maloney, James J., 5,026,408, Cl. 62-24.000.
Union Oil Company of California: *See—*
  Biale, John, 5,026,782, Cl. 525-317.000.
  Showalter, William E., 5,025,862, Cl 166-303.000.
Unisys Corp.: *See—*
  Berti, Eugenio; and El-Sadi, Ashraf I., 5,027,233, Cl. 360-77.020.
United Manufacturing Co., Inc.: *See—*
  Linwood, Gary; and Duncan, Wayne, 5,027,314, Cl. 364-900.000.
United States of America
  Agriculture: *See—*
    Levings, Randall L.; and Stoll, Ione R , 5,026,646, Cl 435-240.270.
  Air Force: *See—*
    Noel, Bruce W.; Borella, Henry M.; Cates, Michael R.; Turley, W. Dale; Macarthur, Charles D.; and Cala, Gregory C., 5,026,170, Cl. 374-29.000.
  Army: *See—*
    Chiang, Peter K.; Leader, Haim; Smejkal, Ruthann M.; Gordon, Richard K.; Payne, Charlotte S.; Doctor, Bhupendra P., and Padilla, Felipe N., 5,026,897, Cl. 560-58.000.
    Gonzalez, Rene, 5,025,707, Cl. 89-36.170.
    Mon, George, 5,025,835, Cl. 137-833.000.
  Energy: *See—*
    Andrews, Mark A.; and Klaeren, Stephen A., 5,026,927, Cl. 568-863.000.
    Deason, Vance A., 5,026,154, Cl. 356-35.500.
    Maienschein, Jon L.; and Barry, Patrick E., 5,026,670, Cl. 501-80.000.
    Noel, Bruce W.; Borella, Henry M.; Cates, Michael R.; Turley, W. Dale; Macarthur, Charles D.; and Cala, Gregory C., 5,026,170, Cl. 374-29.000.
    Thoe, Robert S., 5,027,377, Cl. 378-145.000.
    Whitehead, John C.; and Swink, Don G., 5,026,259, Cl. 417-379.000.
  Health and Human Services: *See—*
    Evans, Warren H.; and Wilson, Shirley M , 5,026,826, Cl. 530-351.000.
    Hargreaves, Kenneth M.; Dubner, Ronald, and Brown, Fred, 5,025,796, Cl. 128-742.000.
    Mage, Michael; Nardelli, Bernardetta, and McHugh, Louise, 5,026,785, Cl. 525-329.400.
    Yarchoan, Robert; Mitsuya, Hiroaki; and Broder, Samuel, 5,026,687, Cl. 514-45.000.
  National Aeronautics and Space Administration: *See—*
    Kim, Jae H.; and Lin, Steven H., 5,027,182, Cl. 357-46.000.
    Lurie, Boris J.; Schier, J. Alan; and Iskenderian, Theodore C., 5,026,008, Cl. 244-164.000.
    Schwarz, Ray P.; Wolf, David A.; and Trinh, Tinh T., 5,026,650, Cl. 435-286.000.
  Navy: *See—*
    Dorain, Paul B.; and Snow, Judith B., 5,026,160, Cl. 356-328.000.
    Halling, Michael A., 5,027,333, Cl. 367-131.000.
    Hulland, Burton L., 5,027,121, Cl. 342-16.000.
    Karmarkar, Subhash D.; and Divecha, Amarnath P., 5,025,849, Cl. 164-97.000.
    Lee, John N.; and Verber, Carl M., 5,027,055, Cl. 324-77.00K.
    Marion, Richard, 5,025,728, Cl. 102-271.000.
    Moody, Paul E., 5,025,744, Cl. 114-238.000.
    Reedy, Ronald E.; Shimabukuro, Randy L., and Garcia, Graham A., 5,027,171, Cl. 357-23.500.
    Stafford, James C., 5,025,556, Cl. 29-888.011
U.S. Philips Corp.: *See—*
  Barnard, Michael E., 5,027,413, Cl. 382-1.000.
  Bauch, Wolf-Dieter; Helmus, Heinz, and Merker, Heinz B., 5,027,052, Cl. 323-284.000.
  Braat, Josephus J. M., 5,026,149, Cl. 350-432.000.
  De Bijl, Andrianus M. J.; Iding, Wilhelmus H.; and Overgoor, Bernardus J., 5,027,038, Cl. 315-209.00R.
  Deis, August A., 5,027,335, Cl. 369-37.000.
  Durr, Heinrich; Kringe, Horst; Rosenthal, Manfred; and Tercic, Eduard, 5,026,184, Cl. 400-605.000.
  Kunze, Norbert, 5,027,236, Cl. 360-96.500.
  Riegel, Maximilian, 5,027,204, Cl. 358-140.000
  Sluyterman, Albertus A. S.; Stil, Lambert J.; and Vrinten, Marinus L. A., 5,027,042, Cl. 315-368.000.
  Van Den Berg, Adrianus H. M., 5,026,312, Cl. 445-47.000.
  van der Werf, Jan E., 5,026,166, Cl. 356-401.000.
  Vreeswijk, Franciscus W. P.; and Carey Smith, Christopher M., 5,027,206, Cl. 358-141.000.
United Technologies Corporation: *See—*
  Schneider, Roy W., 5,027,277, Cl. 364-431.010.
  Shnitkin, Harold; and Harrison, Glenn B., 5,027,127, Cl. 342-372.000.
United Technologies Motor Systems, Inc.: *See—*
  Slayton, Alvin L., 5,027,024, Cl. 310-90.000.
Universal Enterprises, Inc.: *See—*
  Ridenour, Ralph G., 5,025,990, Cl. 239-438.000.

VOL 1127
ISS 4
JE 25
1991
UMI

- University of Akron, The: *See—*
  - Rinaldi, Peter L., 5,027,072, Cl 324-312.000.
- University of California, Regents of the: *See—*
  - Soane, David S.; and Barry, Stephen E., 5,026,147, Cl. 350-374.000.
- University of Cincinnati: *See—*
  - Deutsch, Edward A., 5,026,829, Cl. 534-14.000.
- University of Delaware: *See—*
  - Gates, Bruce C.; and Zhou, Pei-Ling, 5,026,673, Cl 502-62.000.
- University of Massachusetts, The: *See—*
  - Rossini, Aldo A.; Mordes, John P.; and Handler, Eugene S., 5,026,365, Cl. 604-891.100.
- University of Minnesota, Regents of the: *See—*
  - Rekow, Elizabeth D.; Riley, Donald R.; Erdman, Arthur G.; Klamecki, Barney; Zhu, Yang; and Ahn, Jeong-Ho, 5,027,281, Cl. 364-474.240.
- University of New Mexico, The: *See—*
  - Jagt, David L.; and Royer, Robert E., 5,026,726, Cl 514-468.000.
- University of South Carolina: *See—*
  - Tour, James M.; Wu, Ruilian; and Schumm, Jeffry S., 5,026,894, Cl. 558-46.000.
- University of Southern Mississippi, The: *See—*
  - Mathias, Lon J.; and Cei, Gustavo, 5,026,802, Cl. 526-259.000.
- University of Texas Board of Regents, The: *See—*
  - Baseman, Joel B.; Su, C. J.; and Dallo, S. F., 5,026,636, Cl. 435-6.000.
- University of Toronto Innovations Foundation, The: *See—*
  - Boulton, Peter I. P.; and Lee, Ernest S., 5,027,342, Cl. 370-16.000.
- Unterseher, Erwin: *See—*
  - Pollich, Gerhard; and Unterseher, Erwin, 5,026,326, Cl. 474-134.000.
- Unuma, Sadao, to Tokai Kogyo Kabushiki Kaisha. Belt driving sprocket in paper feeder. 5,026,328, Cl. 474-153.000.
- UOP: *See—*
  - Bricker, Jeffery C., 5,026,937, Cl. 585-415.000.
  - Hoehn, Richard K.; and Reno, Mark E., 5,026,472, Cl. 208-58.000.
  - Schmidt, Robert J.; and Haizmann, Robert S., 5,026,950, Cl. 585-737.000.
  - Schmidt, Robert J.; Rice, Lynn H.; and Raghuram, Srikantiah, 5,026,951, Cl. 585-738.000.
  - Tannous, Medhat K.; Sherman, John D.; and Cohen, Alan P., 5,026,531, Cl. 423-328.000.
- Uota, Kosaku: *See—*
  - Morishita, Mitsuharu; Uota, Kosaku; and Yasukawa, Takeshi, 5,027,276, Cl. 364-424.050.
- Updike, Roger K., Sr.: *See—*
  - Mott, Philip J.; Updike, Roger K., Sr., and White, David C., 5,026,332, Cl. 474-242.000.
- Upjohn Company, The: *See—*
  - Kligman, Albert M., 5,026,691, Cl. 514-171.000.
- Urakawa, Yukihiro; and Matsui, Masataka, to Kabushiki Kaisha Toshiba. Semiconductor logic circuit with a bipolar current mirror arrangement. 5,027,009, Cl. 307-446.000.
- Urano, Yoshiaki; and Kadono, Yukio, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Method for production of 1,3-dioxolanes. 5,026,880, Cl. 549-430.000.
- Urban, Paul L.: *See—*
  - Newton, Charles M.; and Urban, Paul L., 5,025,973, Cl. 228-55.000.
- Urdshals, Karl A. B., to Nortrans Shipping and Trading Far East PTE Ltd. Turret mooring for an oil tanker. 5,025,742, Cl. 114-230.000.
- Ushigami, Yoshiyuki: *See—*
  - Tanaka, Masaki; Abe, Norito; Yabumoto, Masao; Ushigami, Yoshiyuki; and Nozawa, Tadao, 5,026,439, Cl. 148-111.000.
- Usui Kokusai Kangyo Kabushiki Kaisha: *See—*
  - Usui, Masayoshi; and Serizawa, Haruo, 5,026,611, Cl. 428-593.000.
- Usui, Masayoshi; and Serizawa, Haruo, to Usui Kokusai Kangyo Kabushiki Kaisha. Metal-made carrier body for exhaust gas cleaning catalyst and production of the carrier body. 5,026,611, Cl. 428-593.000.
- Usuki, Takashi: *See—*
  - Nokubo, Seiji; Kohno, Teruhisa; Hashida, Koichi; Usuki, Takashi; and Higashimura, Hideaki, 5,026,123, Cl. 303-117.000.
- Uyama, Kiichiro: *See—*
  - Fujii, Masashi; Uyama, Kiichiro; Shoji, Takao; and Arai, Kenji, 5,027,378, Cl. 378-11.000.
- Vahlensieck, Hans-Joachim: *See—*
  - Matthes, Reinhard; Schork, Reinhold; and Vahlensieck, Hans-Joachim, 5,026,533, Cl. 423-342.000.
- Vaillette, Bernard D.: *See—*
  - Lambert, Edward L., Jr.; Matson, Charles B.; and Vaillette, Bernard D., 5,025.594, Cl. 51-165.930.
- Valeo: *See—*
  - Graton, Michet; and Dalbiez, Andre , 5,025,904, Cl. 192-106.200.
- Valley, Robert A., Jr.: *See—*
  - Kindlmann, Peter J.; and Valley, Robert A., Jr., 5,027,018, Cl. 307-571.000.
- Valmet Paper Machinery Inc.: *See—*
  - Ehrola, Juha, 5,026,005, Cl. 242-65.000.
- van Bilderbeek, Bernard H., to Plexus Pipe Products Limited. Releasable connector. 5,026,200, Cl. 403-322.000.
- Van Daele, Georges H. P.; Vlaeminck, Freddy F.; and Verdonck, Marc G. C., to Janssen Pharmaceutica N.V. 4-substituted-2(or 3)aminocarbonyl-1-piperazineacetamide. 5,026,853, Cl. 544-390.000.
- Van Den Berg, Adrianus H. M., to U.S. Philips Corporation. Method of manufacturing a shadow mask, shadow mask manufactured according to such a method, and color display tube comprising such a shadow mask. 5,026,312, Cl. 445-47.000.
- Vanderbilt University: *See—*
  - Mendenhall, Marcus H., and Weller, Robert A., 5,026,988, Cl. 250-287.000.
- Vander Bom, Casey M.: *See—*
  - Tidland, John W.; Schable, Reinhold A.· Vander Bom, Casey M.; Biswas, Borendra K.; and Miller, William R., 5,025,693, Cl. 83-482.000.
- Vanderlinden, Richard J.: *See—*
  - Matyas, Tibor; and Vanderlinden, Richard J., 5,026,229, Cl. 410-60.000.
- Vander Stel, Louis M.; and Vander Stel, Polly A. Built-in infant's seat for vehicles. 5,026,118, Cl. 297-338.000.
- Vander Stel, Polly A.: *See—*
  - Vander Stel, Louis M.; and Vander Stel, Polly A., 5,026,118, Cl 297-338.000.
- Vandersyppe, Stefaan: *See—*
  - Vandeweghe, Michel; Lefever, Bart; and Vandersyppe, Stefaan, 5,025,838, Cl. 139-114.000.
- van der Toorn, Aart, to Persluchtcentrale B.V. Device for breaking off piles. 5,025,803, Cl. 125-23.010.
- van der Werf, Jan E., to U.S. Philips Corporation. Apparatus for prealigning substrate preparatory to fine alignment. 5,026,166, Cl. 356-401.000.
- Vandeweghe, Michel; Lefever, Bart; and Vandersyppe, Stefaan, to Picanol N.V. Supporting mechanism for the back rest in a weaving machine. 5,025,838, Cl. 139-114.000.
- VanDyke, John M.; and Niggemann, Richard E., to Sundstrand Corporation. Crossflow jet impingement heat exchanger. 5,025,856, Cl. 165-167.000.
- Van Erden, Donald L.; and McDonald, Daniel P., to Zip-Pak Incorporated. Zippered closure for thermoformed package. 5,026,563, Cl. 426-122.000.
- VanKampen, Craig L.: *See—*
  - May, Steven J.; Andrews, David J.; and VanKampen, Craig L., 5,026,398, Cl. 623-13.000.
- Vanmaele, Luc J., to Agfa-Gevaert, N.V. Dyes and dye-donor elements for use in thermal dye sublimation transfer. 5,026,677, Cl. 503-227.000.
- Varner, Charles J. Kit, method and plug-receptacle arrangement. 5,026,300, Cl. 439-371.000.
- Varouxis, Alexander T.; and Carafa, Edward J. Strobe, lightmeter and tray assembly for underwater cameras. 5,027,139, Cl. 354-64.000.
- Vasquez, Barbara: *See—*
  - Zdebel, Peter J.; and Vasquez, Barbara, 5,026,663, Cl. 437-160.000.
- Vasudev, Prahalad K., to Hughes Aircraft Company. Floating base lateral bipolar phototransistor with field effect gate voltage control. 5,027,177, Cl. 357-30.000.
- Vedage, Gamini A.: *See—*
  - Jenkins, Richard J.; Treskot, Robert A.; Vedage, Gamini A.; and White, James F., 5,026,914, Cl. 564-451.000.
- Vedrenne, Isabelle: *See—*
  - Amouroux, Jacques; Nikravech, Mehrdad; Saint-Just, Jacques; and Vedrenne, Isabelle, 5,026,949, Cl. 585-648.000.
- Vega-Noverola, Armando: Boix-Iglesias, Jose; Prieto-Soto, Jose; and Moragues-Mauri, Jacinto, to Walton S.A. Piperidine derivative. 5,026,858, Cl. 546-224.000.
- Velsicol Chemical Corporation: *See—*
  - Arendt, William D., 5,026,756, Cl. 524-293.000.
- Velte, Scott D.: *See—*
  - Russillo, Joseph G., Jr.; Balch, Richard A.; Keturakis, Andrius A.; and Velte, Scott D., 5,027,056, Cl. 324-103.00R.
- Veltrop, Hans: *See—*
  - Wesemeyer, Harald; and Veltrop, Hans, 5,026,466, Cl. 204-192.380.
- Venegas, Jose G., to General Hospital Corporation, The. Apparatus and method for the detection of IV catheter obstruction and extravasation. 5,026,348, Cl. 604-122.000.
- Venetjoki, Ari: *See—*
  - Lasure, Randal D.; Schweizer, Werner; and Venetjoki, Ari, 5,025,910, Cl. 198-377.000.
- Venturello, Carlo; and D'Aloisio, Rino, to Istituto Guido Donegani S.p.A. Process for oxidizing saturated primary amines to oximes. 5,026,911, Cl. 564-253.000.
- Verber, Carl M.: *See—*
  - Lee, John N.; and Verber, Carl M., 5,027,055, Cl. 324-77.00K.
- Verdonck, Marc G. C.: *See—*
  - Van Daele, Georges H P.; Vlaeminck, Freddy F.; and Verdonck, Marc G. C., 5,026,853, Cl. 544-390.000.
- Vernieres, Jean-Claude: *See—*
  - Mendes, Etienne; Vernieres, Jean-Claude; Keane, Peter E.; and Bachy, Andre, 5,026,711, Cl. 514-300.000.
- Verseef, Jan H., to Frink America, Inc. Adjustable one-way trip edge snow plow. 5,025,577, Cl. 37-280.000.
- VerSuS Technology, Inc.: *See—*
  - Sheffer, Eliezer A., 5,027,383, Cl. 379-39.000.
- Vert, Michel: *See—*
  - Boustta, Mahfoud; Huquet, Jovanka; and Vert, Michel, 5,026,821, Cl. 528-350.000.
- Vetco Gray Inc.: *See—*
  - Nobileau, Philippe C., 5,025,864, Cl. 166-348.000.
- VG Instruments Group Limited: *See—*
  - Parmenter, John J.; Phillips, Robert B.; and Stonestreet, Paul R., 5,026,454, Cl. 156-614.000.
- Vianello, Domenico, to Ausimont S.r.l. Solvent composition for defluxing printed circuits. 5,026,500, Cl. 252-171.000.

- Viaud, Jean; Roth, Arsene; and Anstey, Henry D., to Deere & Company. Machine for forming cylindrical bales of crop. 5,025,717, Cl. 100-88.000.
- Viaud, Jean; Roth, Arsene; and Anstey, Henry D., to Deere & Company. Machine for forming cylindrical bales of crop. 5,025,718, Cl. 100-88.000.
- Victor Company of Japan, Ltd.: *See—*
  - Suwa, Tetsuya; and Higurashi, Seiji, 5,027,229, Cl. 360-19.100.
  - Tajima, Osamu; Kuramoto, Terumasa; and Suzuki, Yoshitaka, 5,026,180, Cl. 400-120.000.
  - Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; and Asakura, Tsutou, 5,027,216, Cl. 358-213.110.
  - Toyomaki, Kazuya, 5,027,119, Cl. 341-144.000.
  - Ueda, Kazuhiko, 5,027,218, Cl. 358-213.230.
- Videologic Limited: *See—*
  - Marlton, Anthony P.; Fielder, Dennis A.; Halsted, Victor G.; and Stockill, Trevor R., 5,027,212, Cl. 358-183.000.
- Viel, Gerald J. Stringed instrument with inwardly extending neck. 5,025,695, Cl. 84-293.000.
- Vielhauer, Elizabeth A. Pant's clip apparatus. 5,025,536, Cl. 24-563.000.
- Vierod, Richard P.; Cheskis, Harvey P.; and Tyler, Derek E., to Olin Corporation. Grain refinement of a copper base alloy. 5,026,433, Cl. 148-2.000.
- Vilaine, Jean P.: *See—*
  - Peglion, Jean L.; Gargouil, Yves M.; and Vilaine, Jean P., 5,026,863, Cl. 546-321.000.
- Villanueva, Carlos: *See—*
  - Caldwell, Trevor D.; and Villanueva, Carlos, 5,025,865, Cl. 166-366.000.
- Villax, Ivan; Heggie, William; and Page, Philip R., to Hovione Inter Ltd. Novel 9α-fluoro- or chloro-corticosteroid esters and a process for their preparation. 5,026,693, Cl. 514-180.000.
- Viola, Gian T.: *See—*
  - Marchionni, Giuseppe; Viola, Gian T.; Tommasi, Giulio; Ferro, Raffaele; and Cirillo, Gianna, 5,026,786, Cl. 525-356.000.
- Vitiello, Joseph: *See—*
  - Leone, Richard J.; Cummins, Robert F.; Vitiello, Joseph; and Brochhagan, Thomas, 5,025,895, Cl. 187-105.000.
- Vlaeminck, Freddy F.: *See—*
  - Van Daele, Georges H. P.; Vlaeminck, Freddy F.; and Verdonck, Marc G. C., 5,026,853, Cl. 544-390.000.
- Voci, Laurie L.: *See—*
  - Roddy, James E.; Narayan, Badhri; Stark, Richard A.; and Voci, Laurie L., 5,026,133, Cl. 350-6.400.
- Voest-Alpine Industrieanlagenbau: *See—*
  - Mayrhofer, Karl, 5,025,852, Cl. 164-468.000.
- Vogel, Hans-Henning: *See—*
  - Denzinger, Walter; Mach, Helmut; Mohr, Juergen; Oppenlaender, Knut; Schwen, Roland; and Vogel, Hans-Henning, 5,026,494, Cl. 252-50.000.
- Vogel, Helmut, to A. W. Faber-Castell GmbH & Co. Standing container. 5,025,934, Cl. 211-69.500.
- Volker, Theodor; Althaus, Hans; and Schmidt, Andreas, to Lonza Ltd Chain-lengthening agents for p-phenylene-methylenediisocyanate-prepolymers for cast polyurethane elastomers. 5,026,815, Cl. 528-64.000.
- Volkl, Raimund: *See—*
  - Koop, Georg; and Volkl, Raimund, 5,026,110, Cl. 296-108.000.
- von Eyben, Henning: *See—*
  - Paterson, William D.; Wester, John; Pulliam, Norman L.; and von Eyben, Henning, 5,026,053, Cl. 273-3.00R.
- von Hoessle, Wolfgang; and Kuchler, Herbert, to Messerschmitt-Bolkow-Blohm GmbH. Picture transmission system of optical wave guide guided missiles. 5,027,202, Cl. 358-109.000.
- von Itter, Franz-Albert, to Huels Aktiengesellschaft. Process for the preparation of cytosines. 5,026,852, Cl. 544-317.000.
- Vora, Rohitkumar H., to Hoechst Celanese Corp. High molecular weight polyimide, method of making same and articles formed therefrom. 5,026,822, Cl. 528-353.000.
- Vreeswijk, Franciscus W. P.; and Carey Smith, Christopher M., to U.S. Philips Corporation. High-definition television systems. 5,027,206, Cl. 358-141.000.
- Vrinten, Marinus L. A.: *See—*
  - Sluyterman, Albertus A. S.; Stil, Lambert J.; and Vrinten, Marinus L. A., 5,027,042, Cl. 315-368.000.
- Vrtis, Raymond N.: *See—*
  - Bianconi, Patricia A.; Lippard, Stephen J.; Rao, Chebrolu P.; and Vrtis, Raymond N., 5,026,884, Cl. 556-12.000.
- Vulev, Decho I.: *See—*
  - Atanassov, Lyuben P.; Kolenzov, Yanko A.; Vulev, Decho I., Primov, Ivan S.; Spassov, Peter G.; Kanalev, Svetlosar K.; Andonov, Dimo P.; Yankov, Angel V.; and Dilkin, Nikolay G., 5,027,286, Cl 364-513.000.
- W. L. Gore & Associates, Inc.: *See—*
  - Henn, Robert L.; Morell, Carol H.; and Daniel, Edward J., 5,026,591, Cl. 428-198.000.
  - House, Wayne D.; and Myers, David J., 5,026,513, Cl. 264-127.000.
  - Spencer, Mark, 5,026,302, Cl. 439-573.000.
- W. R. Grace & Co.-Conn.: *See—*
  - Cornelison, Richard C., 5,026,273, Cl. 431-170.000.
  - Havens, Marvin R.; and Lovin, Joseph R., 5,025,922, Cl 206-328.000.
  - Retallick, William B., 5,025,649, Cl. 72-196.000.
- W. Schlafhorst AG & Co.: *See—*
  - Raasch, Hans; and Mullenberg, Hans, 5,025,911, Cl. 198-400.000.
  - Schmid, Reinhold; Esser, Hans-Willi; and Mistler, Friedhelm, 5,026,199, Cl. 403-313.000.
- Wacker, Bernd: *See—*
  - Muller, Robert; and Wacker, Bernd, 5,025,677, Cl. 74-473.00R.
- Wada, Fumio: *See—*
  - Kawashima, Kiroshi; Futsuhara, Koichi; and Wada, Fumio, 5,027,114, Cl. 340-941.000.
- Wada, Kumiko: *See—*
  - Nagata, Yuji; Fukazawa, Toshio; Wada, Kumiko; and Tosaki, Yoshihiro, 5,027,245, Cl. 360-121.000.
- Wadsworth, Douglas C.: *See—*
  - Thomas, Terence N.; Bonneville, Marc E.; and Wadsworth, Douglas C., 5,027,392, Cl. 379-388.000.
- Waeber, Rene: *See—*
  - Faas, Jurg; Nuessli, Eduard; Grundler, Christof; Staheli, Paul; Hanselmann, Daniel; Demuth, Robert; Waeber, Rene; and Fritzsche, Peter, 5,025,533, Cl. 19-145.500.
- Wagenknecht, Gunter: *See—*
  - Fock, Jurgen; Hahn, Gunter; and Wagenknecht, Gunter, 5,026,902, Cl. 560-223.000.
- Waguespack, Arthur A., Jr. Steering wheel lock apparatus. 5,025,646, Cl. 70-209.000.
- Wakabayashi, Hideaki, to Aisin Seiki Kabushiki Kaisha. Free wheel hub system. 5,025,884, Cl. 180-247.000.
- Wakabayashi, Takeshige: *See—*
  - Mizuno, Koichi; Wakabayashi, Takeshige; Koinuma, Yutaka; Aizawa, Reiji; Kushiyama, Satoshi; Kabayashi, Satoru; Ohuchi, Hideo; Yoshida, Toyonobu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi; and Hirakawa, Shoji, 5,026,464, Cl. 204-164.000.
- Wakabayashi, Toshinori; and Sugii, Shinji, to Minnesota Mining and Manufacturing Company. Amorphous-polypropylene-based hot melt adhesive. 5,026,752, Cl. 524-271.000.
- Wakahara, Kaoru: *See—*
  - Umeyama, Mitsuhiro; Inui, Masaki; Yamamoto, Kenichi; and Wakahara, Kaoru, 5,025,680, Cl. 74-574.000.
- Wakunaga Seiyaku Kabushiki Kaisha: *See—*
  - Yatsunami, Takashi; Yazaki, Akira; Inoue, Satoshi; Yamamoto, Hitoshi; Yokomoto, Masaharu; Nomiyama, Jun; and Noda, Shuichiro, 5,026,856, Cl. 546-156.000.
- Waldemar Link GmbH & Co.: *See—*
  - Engelbrecht, Eckart; Nieder, Elmar; and Keller, Arnold, 5,026,399, Cl. 623-18.000.
- Waldron, James S.: *See—*
  - Rice, Ronald K., 5,026,112, Cl. 296-181.000.
- Wallace, Henry. Portable wellhead and welder protector system. 5,026,219, Cl. 405-303.000.
- Walrath, Craig D.: *See—*
  - Logan, Dale R.; and Walrath, Craig D., 5,027,047, Cl. 318-648.000.
- Walsh, Alison J.; and Walsh, Jean T. Evidence gathering kit. 5,025,920, Cl. 206-223.000.
- Walsh, Jean T.: *See—*
  - Walsh, Alison J.; and Walsh, Jean T., 5,025,920, Cl. 206-223.000.
- Walt, William G. Bale handler. 5,026,238, Cl. 414-24.500.
- Walton S.A.: *See—*
  - Vega-Noverola, Armando; Boix-Iglesias, Jose; Prieto-Soto, Jose; and Moragues-Mauri, Jacinto, 5,026,858, Cl 546-224.000.
- Waltuck, Morey H.; McKnight, Robert N.; and Peli, Eliezer, to Mentor O & O, Inc. Visual function tester with binocular vision testing. 5,026,151, Cl. 351-246.000.
- Wang, Wen-Mu. Towel support. 5,026,012, Cl. 248-222.100.
- Ward, Brian J.: *See—*
  - McGrail, Peter; McGrail, Grace; Williams, Geoffrey A.; and Ward, Brian J., 5,027,035, Cl. 315-119.000.
- Ward, Ernest S.: *See—*
  - Bonyhard, Peter I.; Cheng, David C.; Glover, William J.; Hendrix. Howard A.; Ward, Ernest S.; and Williams, John W., 5,026,470, Cl. 204-298.160.
- Ward, Irl E. Polyvinyl butyral pellicle compositions. 5,026,775, Cl. 525-61.000.
- Ward, Jefferson P.: *See—*
  - Harmon, J. P.; and Ward, Jefferson P., 5,027,134, Cl. 346-140.00R
- Warden, Gerald D.: *See—*
  - Moser, James R.; Warden, Gerald D.; and Bieber, Thomas E., 5,025,609, Cl. 53-266.100.
- Warner, Dale J., to Gits Bros. Mfg. Co. Omni-directional articulated mounting assembly for shaft seals. 5,026,077, Cl. 277-93.0SD
- Warner-Lambert Co.: *See—*
  - Killeen, Michael J., 5,026,555, Cl. 424-439.000.
- Warner & Swasey Company, The: *See—*
  - Myers, Carl J., 5,025,690, Cl. 82-121.000.
- Washington University: *See—*
  - Schlesinger, Milton J.; and Adams, Steven P., 5,026,686, Cl. 514-17.000.
- Watanabe, Asako: *See—*
  - Fujiwara, Tatsuro; Kogami, Yuji; and Watanabe, Asako, 5,026,832, Cl. 536-7.100.
- Watanabe, Eifu, to Sanshin Industries Co., Ltd. Latching mechanism for outboard motor cowling. 5,025,763, Cl. 123-198.00E.
- Watanabe, Kazuhiro; Kakizaki, Husayoshi; Arai, Isao; Murakami, Kimihiro; and Kato, Kazuo, to Ajinomoto Co., Inc.; and Mochida Pharmaceutical Co., Ltd. Process for preparing cephalosporin compounds. 5,026,842, Cl. 540-222.000.
- Watanabe, Masakazu: *See—*
  - Iio, Satoshi; Watanabe, Masakazu; Imura, Toru; Kuroda, Kotaro; and Saka, Hiroyasu, 5,026,601, Cl. 428-336.000.

VOL
1127
ISS
4
JE
25
1991
UMI

- Watanabe, Rikizo: *See—*
  - Nakamura, Shuichi; Sasaki, Hakaru, and Watanabe, Rikizo, 5,026,435, Cl. 148-12.00A.
- Watanabe, Shizuhisa: *See—*
  - Sato, Kazuhiko; and Watanabe, Shizuhisa, 5,025,686, Cl. 74-866.000.
- Watanabe, Toshimitsu, to Toppan Printing Co., Ltd. Container. 5,025,924, Cl. 206-334.000.
- Watanabe, Toshiya; and Kawanabe, Tasuku, to Brother Kogyo Kabushiki Kaisha. Feed apparatus. 5,026,961, Cl. 219-69.110.
- Watanabe, Tuyoshi: *See—*
  - Sakamoto, Shunji; Watanabe, Tuyoshi, and Koda, Hironobu, 5,027,275, Cl. 364-424.050.
- Watanabe, Yoshio: *See—*
  - Kitsuta, Tatsuaki; Shimotsuhama, Isao; Watanabe, Yoshio; Tanaka, Masahiro; Shiotsu, Shinichi; and Ogawa, Kazumi, 5,027,005, Cl. 307-272.100.
- Watford, Roger L. Top and launcher boxing simulation game and method. 5,026,057, Cl. 273-85.00R
- Watkins, Joseph J.: *See—*
  - Rule, Mark; Fauver, Jerry S.; Fagerburg, David R.; Lawrence, Paul B.; and Watkins, Joseph J., 5,026,824, Cl. 528-389.000.
- Watkins, William C. Combined tool and method for using same 5,025,520, Cl 7-163.000.
- Watt, James S. Strategy board game. 5,026,070, Cl. 273-261.000.
- Watt, John D.: *See—*
  - Orsborn, Jesse H.; Chambers, Timothy L.; and Watt, John D., 5,025,614, Cl. 56-10.200.
- Weatherford U.S., Inc.: *See—*
  - Glaser, Mark C., 5,025,858, Cl. 166-156.000
- Webb, Edward H.; and Duclo, Marley, to Koronis Parts, Inc. Die-cast liquid cooled cylinder and method of making. 5,025,760, Cl 123-73.0PP.
- Webb, Jimmy L.; Ritschard, Hans V.; and Lambert, James M., to General Electric Company. Method and intermediates for preparation of bis(aminoalkyl)polydiorganosiloxanes. 5,026,890, Cl. 556-408.000.
- Weber, Karl, to Polaroid Corporation. Spectacles. 5,026,150, Cl 351-47.000.
- Weber, Thomas; Heckmann, Walter; Mertes, Jurgen; Tesch, Helmut, Altstaedt, Volker; Eberle, Wolfgang; Folda, Thomas; Stutz, Herbert; and Recker, Hans-Gert, to BASF Aktiengesellschaft. Curable impact modified epoxy resin having stabilized multiphase morphology. 5,026,789, Cl. 525-423.000.
- Weeks, Don J.: *See—*
  - Manns, William G.; Weeks, Don J., Merryman, Jerry D.; and Sheng, Chyi N., 5,027,132, Cl. 346-108.000.
- Wegman, Richard W.; and Schreck, David J., to Union Carbide Chemicals and Plastics Technology Corporation. Production of carboxylic acids from alcohols using rhodium complex catalysts and organic ester source. 5,026,907, Cl. 562-519.000.
- Wehr, Thomas: *See—*
  - Stehle, Heinz; Wehr, Thomas; Petersmann, Joseph; Seidel, Willi; Hamm Ludwig; Foeldi, Thomas; Eschrich, Gerhard; Schwamm, Ronald; Runge, Wolfgang; Gruhle, Wolf-Dieter; and Wendel, Peter, 5,025,684, Cl. 74-862.000.
- Wei, Shih A., to Tone World International Corp. Controller for continuous tracing lights. 5,027,037, Cl. 315-200.00A.
- Weidler, Roy C., Jr.: *See—*
  - Bayston, Thomas E.; Weidler, Roy C., Jr.; Thompson, Arthur B., Jr.; and Layton, Allen C., 5,026,156, Cl. 356-45.000.
- Weidner, Hans-Peter: *See—*
  - Dehn, Klaus-Dieter; Weidner, Hans-Peter; and Storch, Eberhard A., 5,026,201, Cl. 403-407.100.
- Weigel, David C., to Minnesota Mining and Manufacturing Company Color photothermographic materials with development accelerator 5,026,633, Cl. 430-551.000.
- Weil, Richard C., to Aristech Chemical Corporation. Biodeteriable plastics and blends. 5,026,745, Cl. 524-47.000.
- Weiner, Hans, to Dr. Ing. h.c.F. Porsche AG. Arrangement for visually indicating the readiness of a vehicle alarm system. 5,027,103, Cl. 340-426.000.
- Weingart, Steve H.: *See—*
  - Double, Glen P.; and Weingart, Steve H., 5,027,397, Cl. 380-4.000.
- Weinheimer, Jacek H.: *See—*
  - Mackal, Glenn H.; and Weinheimer, Jacek H., 5,026,310, Cl. 441-93.000.
- Weis, John M.: *See—*
  - Hagen, Gary P.; Schmidt, Gregory E.; Weis, John M.; and Smith, Thomas G., 5,026,917, Cl. 568-323.000.
- Weiselfish, Jacob, to Gerber Garment Technology, Inc. Plotter paper advance control. 5,027,133, Cl. 346-136.000.
- Weiss, Jeffrey N. Diabetes detection method. 5,025,785, Cl. 128-633.000
- Weisser, Carl. Game equipment. 5,026,068, Cl. 273-241.000.
- Weissner, David W., to Meyco Products Inc. Pool cover with compressible safety edge. 5,025,513, Cl. 4-498.000.
- Weitek Corporation: *See—*
  - Samuels, Allen R., 5,027,272, Cl. 364-200.000.
- Wellcome Foundation Limited: *See—*
  - Larkin, John P.; Wyatt, John A., and Hawkes, Deborah J., 5,026,874, Cl. 549-15.000.
- Weller, Robert A.: *See—*
  - Mendenhall, Marcus H.; and Weller, Robert A., 5,026,988, Cl. 250-287.000.
- Weller, Ronald W., and Wrona, James, to McCain Manufacturing Corporation. Signature feeder operable with either flat or standing stacks. 5,026,038, Cl. 271-3.100.
- Wells, Hal C.: *See—*
  - Hollowell, James A.; Wells, Hal C.; and Robinson, Robert W., 5,026,226, Cl. 405-211.000.
- Welschof, Hans-Heinrich, to Lohr & Bromkamp GmbH. Constant velocity ratio plunging universal joint 5,026,325, Cl. 464-146.000.
- Wen, Cheng P.; Wu, Chan-Shin; and Sato, Robert N., to Hughes Aircraft Company High efficiency multiple quantum well structure and operating method. 5,026,148, Cl. 350-386.000.
- Wen, Steven. Structure of spherical vanity case. 5,025,817, Cl. 132-296.000.
- Wendel, Peter: *See—*
  - Stehle, Heinz; Wehr, Thomas; Petersmann, Joseph; Seidel, Willi; Hamm, Ludwig; Foeldi, Thomas; Eschrich, Gerhard; Schwamm, Ronald; Runge, Wolfgang; Gruhle, Wolf-Dieter; and Wendel, Peter, 5,025,684, Cl. 74-862.000.
- Wendorf, Wayne S. Cycle fender mount 5,026,083, Cl. 280-277.000.
- Weng, Evans. Structure of fluid level controller of piping type 5,025,827, Cl. 137-392.000.
- Wentrcek, Paul: *See—*
  - Fellmann, Jere; Wentrcek, Paul, and Lu, Phat T., 5,026,940, Cl 585-467.000.
- Wentrcek, Paul R.: *See—*
  - Fellmann, Jere D.; Saxton, Robert J.; Wentrcek, Paul R., Derouane, Eric G.; and Massiani, Pascale, 5,026,942, Cl 585-467.000.
- Wentworth, Steven W.; Crane, Robert F.; and Haas, Jon A., to Earth Tool Corporation. Pneumatic ground piercing tool. 5,025,868, Cl. 173-91.000.
- Wenzel, Edward C.; and Wenzel, Steven T. Lever-type two-cycle internal combustion engine. 5,025,759, Cl. 123-56.0AC.
- Wenzel, Steven T.: *See—*
  - Wenzel, Edward C.; and Wenzel, Steven T., 5,025,759, Cl. 123-56.0AC.
- Werner, Walter V., to Allied-Signal Inc. Fiber-optic gyroscope with reduced bias drift error caused by optical back reflections. 5,026,161, Cl. 356-350.000.
- Wesemeyer, Harald; and Veltrop, Hans, to Hauzer Holding B.V Method and device for coating cavities of objects. 5,026,466, Cl 204-192.380.
- West, Floyd D., to Frommelt Industries, Inc. High speed folding door. 5,025,846, Cl. 160-199.000.
- West, James C.; and Pavlin, Mark S., to Union Camp Corporation Resinous binders comprising a metal rosin resinate and a carboxylated polystyrene resin. 5,026,753, Cl. 524-272.000.
- Westbrook, Leslie D., to British Telecommunications public limited company. Method for fabricating a semiconductor stripe laser 5,026,662, Cl. 437-129.000.
- Westcott, Daniel R.; Tetley, William C.; and Cummings, Bruce A., to RAD-X Ltd. Method and apparatus for measuring the size distribution of particles. 5,026,994, Cl. 250-435.000.
- Wester, John: *See—*
  - Paterson, William D.; Wester, John; Pulliam, Norman L.; and von Eyben, Henning, 5,026,053, Cl. 273-3.00R.
- Western Filament, Inc.: *See—*
  - Wright, H Burk; and Miller, Jay, 5,026,001, Cl 244-1.00R
- Westfall, Robert S.: *See—*
  - Platteter, Dale T.; Westfall, Robert S., and Carter, Jeff C., 5,027,396, Cl. 380-4.000.
- Westinghouse Air Brake Company: *See—*
  - Romansky, Michael E.; Dimsa, Robert D.; and Munday, Howard R., 5,025,734, Cl. 105-26.050.
- Westinghouse Electric Co.: *See—*
  - Zeitlin, Dan B.; Branthover, John B.; Smith, Brian H.; Piloto, Andrew J.; Lengel, Theresa M.; Carlson, Robert R., Jr.; Shum, Lanson Y.; Hodges, Paul D., Jr.; and Harris, Denise B., 5,027,255, Cl. 361-395.000.
- Westinghouse Electric Corp.: *See—*
  - Beg, Mirza A., 5,027,046, Cl. 318-603.000.
  - Bourdelaise, Robert A.; Harris, David B.; Harris, Denise B.; and Olenick, John A., 5,027,191, Cl. 357-74.000.
  - Carothers, Arthur D., 5,026,233, Cl. 411-177.000.
  - Cuba, Gary W., 5,026,968, Cl. 219-145.210.
  - Logan, Dale R.; and Walrath, Craig D., 5,027,047, Cl 318-648.000.
  - Massarani, Madhat, 5,026,075, Cl. 277-56.000.
  - Thornton, Roger D., 5,027,002, Cl. 307-35.000.
  - White, Richard E.; and Maier, Alfred E., 5,027,096, Cl 335-202.000.
  - Zappa, Donald E.; Prisco, Anthony J., Jr.; and Kirchner, Matthew A., 5,025,523, Cl. 15-98.000.
- Weststrate, Marinus W.: *See—*
  - Hilgers, Lucas A. T.; and Weststrate, Marinus W., 5,026,546, Cl. 424-88.000.
- Westvaco Corporation: *See—*
  - Gowan, John W., Jr.; and Lo, David K., 5,026,507, Cl. 252-301.210.
- Weyerhaeuser Company: *See—*
  - Benston, Phyllis S.; and Cotie, Michael E., 5,025,504, Cl. 2-181.400.
- Wheelock, Robert K. Truck trailer lighting control circuit. 5,027,031, Cl. 315-77.000.
- Whelen Technologies, Inc.: *See—*
  - Lyons, Harold W.; and Stopa, James L., 5,027,260, Cl. 362-74.000.
- Whippey, Nigel R.: *See—*
  - Lebert, Helmut; and Whippey, Nigel R., 5,026,413, Cl. 65-29.000.
- Whitby, Melvyn F.: *See—*
  - Smith, Denzil B.; and Whitby, Melvyn F., 5,025,708, Cl. 92-19.000.

- White, David C.: *See—*
  - Mott, Philip J.; Updike, Roger K., Sr.; and White, David C., 5,026,332, Cl. 474-242.000.
- White, Jack D., Jr.; and Bishop, Clinton L., to Dayco Products, Inc. Belt construction, rotatable pulley and combination thereof and methods of making the same. 5,026,327, Cl. 474-152.000.
- White, James F.: *See—*
  - Jenkins, Richard J.; Treskot, Robert A.; Vedage, Gamini A.; and White, James F., 5,026,914, Cl. 564-451.000.
- White, Loy R.: *See—*
  - Dwyer, Joseph J., Jr.; White, Loy R.; Haggerty, Matthew K.; and Purbrick, John A., 5,027,208, Cl. 358-148.000.
- White, Philip J., to GTE Products Corporation. Arc tube fabrication process. 5,026,311, Cl. 445-26.000.
- White, Richard E.; and Maier, Alfred E., to Westinghouse Electric Corp. Key blocks for circuit breaker. 5,027,096, Cl 335-202.000.
- Whitehead, John C.; and Swink, Don G., to United States of America, Energy. Miniaturized pressurization system. 5,026,259, Cl. 417-379.000.
- Wiederin, Brian J.: *See—*
  - Johnson, Michael L.; Patel, Chetan N.; Plourde, Marcel D.; and Wiederin, Brian J., 5,026,197, Cl. 403-24.000.
- Wieler, James G., to Raytheon Company. Method and apparatus for doppler velocity de-aliasing. 5,027,122, Cl. 342-26.000.
- Wih, Steven J.: *See—*
  - Day, Richard A.; Gelorme, Jeffrey D.; Russell, David J.; and Wih, Steven J., 5,026,624, Cl. 430-280.000.
- Wikdahl, Nils A. L. Method for controlling apex flow in an array of parallel hydrocyclones for cleaning aqueous fiber suspensions. 5,026,486, Cl. 210-787.000.
- Wiklund, Christian, to Oy Fluid-Bag Ab. Flexible container for fluids. 5,025,925, Cl. 206-386.000.
- Wildau, Monika: *See—*
  - Meyer, Jurgen; Sippel, Achim; Wildau, Monika; Kruse, Heinz J.; Diel, Rainer; Becker, Wilfried; Bartsch, Gisbert; Pahnke, Klaus-Dieter; Huege, Jurgen; and Luther, Hans-Werner, 5,025,731, Cl. 102-521.000.
- Wildman, John R.: *See—*
  - Osher, John D.; Katzman, Allison W.; Luecke, Mark; and Wildman, John R., 5,026,054, Cl. 273-58.00A.
- Wilkes, Dutch B. Dental articulator. 5,026,279, Cl. 433-60.000.
- Willett, Elsie M. Ostomy bag holder and cover. 5,026,362, Cl. 604-345.000.
- Willey, S. Jack: *See—*
  - Tyrell, John A.; and Willey, S. Jack, 5,026,790, Cl. 525-438.000.
- Williams, Fred E., Jr.: *See—*
  - Ranalletta, Joseph V.; Williams, Fred E., Jr.; and Kanner, Rowland W., 5,025,957, Cl. 222-189.000.
- Williams, Gary L.: *See—*
  - Pollet, Jean-Claude; Williams, Gary L.; Armstrong, Gordon P.; and Flautt, Martin C., 5,026,410, Cl. 65-3.430.
- Williams, Geoffrey A.: *See—*
  - McGrail, Peter; McGrail, Grace; Williams, Geoffrey A.; and Ward, Brian J., 5,027,035, Cl. 315-119.000.
- Williams, John W.: *See—*
  - Bonyhard, Peter I.; Cheng, David C.; Glover, William J.; Hendrix, Howard A.; Ward, Ernest S.; and Williams, John W., 5,026,470, Cl. 204-298.160.
- Williams, Michael A.: *See—*
  - Menadier, Michael A.; Williams, Michael A.; and Rose, David B., 5,027,433, Cl. 455-606.000.
- Williams, Shawn C.: *See—*
  - Young, Douglas J.; and Williams, Shawn C., 5,027,068, Cl. 324-229.000.
- Williams, Timothy J.: *See—*
  - LaRue, George S.; and Williams, Timothy J., 5,027,007, Cl. 307-443.000.
- Williamson, Malcolm J.; Cummins, Kenneth L.; and Hecox, Kurt E., to Wisconsin Alumni Research Foundation. Adaptive, programmable signal processing and filtering for hearing aids. 5,027,410, Cl. 381-68.400.
- Wilson, Bruce C. Steerable memory alloy guide wires. 5,025,799, Cl. 128-772.000.
- Wilson, John R., to Sloan Valve Company. Automatic faucet. 5,025,516, Cl. 4-623.000.
- Wilson, Shirley M.: *See—*
  - Evans, Warren H.; and Wilson, Shirley M., 5,026,826, Cl. 530-351.000.
- Wilson, Wayne G., to Automotive Digital Systems, Inc. Interactive connector unit for a wiring harness. 5,026,293, Cl. 439-76.000.
- Winbow, Graham A.; Chen, Sen-Tsuen; and Rice, James A., to Exxon Production Research Company. Acoustic quadrupole shear wave logging device. 5,027,331, Cl. 367-75.000.
- Winckler, Peter S., to Spectra-Physics, Inc. Magnetic motion damping system for pendulous compensator. 5,026,157, Cl. 356-250.000.
- Wine, David E. Boat hull. 5,025,745, Cl. 114-289.000.
- Winters, Robert C.: *See—*
  - Marman, Douglas H.; and Winters, Robert C., 5,026,990, Cl. 250-342.000.
- Wintime Technology Inc.: *See—*
  - Hsu, Danny, 5,026,953, Cl. 178-19.000.
- Wirz, Arno; and Haupenthal, Rudi, to Heidelberger Druckmaschinen AG. Sheet-guiding drum assembly for sheet-fed rotary printing machines. 5,026,045, Cl. 271-277.000.
- Wischermann, Gerhard, to BTS Broadcast Television Systems GmbH Bit place oriented data storage system for digital data. 5,027,318, Cl. 365-78.000.
- Wisconsin Alumni Research Foundation: *See—*
  - DeDoncker, Rik W.; Kheraluwala, Mustansir H., and Divan, Deepakraj M., 5,027,264, Cl. 363-16.000.
  - Williamson, Malcolm J.; Cummins, Kenneth L.; and Hecox, Kurt E., 5,027,410, Cl. 381-68.400.
- Wisherd, David S.; Bartlow, Howard D.; and D'Anna, Pablo E., to Microwave Modules & Devices, Inc. Solid state RF power amplifier having improved efficiency and reduced distortion. 5,027,082, Cl. 330-277.000.
- Witt, Lewis, to Ingersoll-Rand Company. Rock bit for a down-the-hole drill. 5,025,875, Cl. 175-393.000.
- Witte, Don C. Measuring apparatus for pedal-crank assembly. 5,027,303, Cl. 364-511.000.
- Wittmann, Dieter: *See—*
  - Grigo, Ulrich; Kirsch, Jurgen; Wittmann, Dieter; Idel, Karsten-Josef; and Horlacher, Peter, 5,026,758, Cl. 524-423.000.
- Witzig, Armin; and Hachtel, Hansjoerg, to Robert Bosch GmbH Measuring device for contactless measurement of a rotational angle of a rotating shaft using eddy currents. 5,027,067, Cl. 324-207.190.
- Wochnowski, Waldemar: *See—*
  - Liebe, Reinhard; and Wochnowski, Waldemar, 5,025,813, Cl 131-290.000.
- Woerner, Hans J.: *See—*
  - Drinkard, William F., Jr.; and Woerner, Hans J., 5,026,530, Cl. 423-87.000.
- Wohl, Laszlo: *See—*
  - Bakos, Jozsef; Neil, Balint; Kollar, Laszlo, Toros, Szilard; Eifert, Gyula; Bihari, Ferenc; Boros, Peter; Durko nee Ponacz, Anna; Kuronya, Istvan; Magyari, Istvan; Timar, Judit; Bohus, Peter; and Wohl, Laszlo, 5,026,895, Cl. 560-21.000.
- Wolf, David A.: *See—*
  - Schwarz, Ray P.; Wolf, David A.; and Trinh, Tinh T., 5,026,650, Cl. 435-286.000.
- Wolf, Josef: *See—*
  - Stuttler, Herbert; Wolf, Josef; Held, Wolfgang; and Mai, Max, 5,027,219, Cl. 358-228.000.
- Wolfe, Mark A.: *See—*
  - Haight, Michael H.; and Wolfe, Mark A., 5,027,003, Cl. 307-242.000.
- Wong, Hee, to National Semiconductor Corp. Differential phase shift keying modulator. 5,027,372, Cl. 375-67.000.
- Wong, Jacob Y., to Gaztech Corporation. Spectral ratioing technique for NDIR gas analysis using a differential temperature source. 5,026,992, Cl. 250-343.000.
- Wong, Yiu Wah; Frederick, Jeffrey W.; and Patel, Rutton D., to Exxon Research & Engineering Company. Compact radial flow distributor. 5,025,831, Cl. 137-561.00A.
- Wood, Carl G.: *See—*
  - Feller, David E.; and Wood, Carl G., 5,025,698, Cl 84-453.000.
- Wood, Coleman: *See—*
  - Carpenter, Clarence W.; and Wood, Coleman, 5,026,255, Cl. 417-5.000.
- Woodring, Dave L.: *See—*
  - Sever, Robert E.; and Woodring, Dave L., 5,026,026, Cl. 251-230.000.
- Woodroffe, David, to ABB Kent plc. Number wheel counters. 5,026,973, Cl. 235-136.000.
- Woollenweber, William E. High pressure ratio turbocharger. 5,025,629, Cl. 60-600.000.
- Wooton, David L.: *See—*
  - Lam, William Y.; and Wooton, David L., 5,026,493, Cl. 252-32.7HC.
- Worchell, Karen: *See—*
  - Hardwick, Eugene R., 5,025,777, Cl. 126-263.000.
- Worrell, Clive A.; and Skarda, Vladimir, to Cogent Limited. Hollow glass waveguide. 5,026,142, Cl. 350-96.320.
- Worthington, Paul A.; Crowley, Patrick J.; and Gravestock, Michael B., to Imperial Chemical Industries plc. Triazole alkanols including an alkenyl substituent having fungicidal and plant growth regulating properties. 5,026,718, Cl. 514-383.000.
- Wotzka, Friedrich: *See—*
  - Guber, Wolfgang; Scheffel, Juergen; and Wotzka, Friedrich, 5,026,975, Cl. 235-462.000.
- Wray, Ronald A.: *See—*
  - Davis, William R.; Mowers, Dennis W.; Greenthal, Richard P.; Szymanski, Paul; Wray, Ronald A.; and Davidson, Richard A., 5,027,111, Cl. 340-784.000.
- Wright, Alan R.; and Soberalski, Edward D., to Haworth, Inc. Gear/-rack flipper door mechanism. 5,026,130, Cl. 312-323.000.
- Wright, H. Burk; and Miller, Jay, to Western Filament, Inc. Pitot static tube cover. 5,026,001, Cl. 244-1.00R.
- Wright, Hubert A., to Cambridge Applied Systems, Inc. Densitometer. 5,025,656, Cl. 73-32.00A.
- Wright, James D.: *See—*
  - Barton, Oliver A.; and Wright, James D., 5,026,626, Cl. 430-288.000.
- Wright, Walter P., to Asten Group, Inc. Two-ply papermakers forming fabric with zig-zagging MD yarns. 5,025,839, Cl. 139-383.00A.
- Wroblewski, Gerald J.: *See—*
  - Poirier, David C.; Matheny, Mark T.; Mitchell, George C.; Swantick, Steven J.; Wroblewski, Gerald J.; Menck, Douglas W.; and Simon, Robert C., Jr., 5,025,881, Cl. 180-197.000.

VOL
1127
ISS
4
JE
25
1991
UMI

Wrona, James: *See—*
Weller, Ronald W.; and Wrona, James, 5,026,038, Cl. 271-3.100.
Wu, Chan-Shin: *See—*
Wen, Cheng P., Wu, Chan-Shin, and Sato, Robert N., 5,026,148, Cl 350-386.000.
Wu, Ruilian: *See—*
Tour, James M.; Wu, Ruilian; and Schumm, Jeffry S., 5,026,894, Cl. 558-46.000.
Wu, Tieh-Min: *See—*
Jeng, Bor-Shenn; Change, Gan-How; Chang, Kuange-Yao; Yan, Chih-Yen; Wu, Tieh-Min; and Lin, Jang-Keng, 5,027,304, Cl. 364-518.000.
Wulf, Elmer B.; and Wulf, Mark E. Ski boot and ski boot-binding. 5,026,087, Cl. 280-613.000.
Wulf, Mark E.: *See—*
Wulf, Elmer B.; and Wulf, Mark E., 5,026,087, Cl. 280-613.000.
Wurz, David A.: *See—*
Curley, John L.; Hirsch, Thomas S.; and Wurz, David A., 5,027,271, Cl. 364-200.000.
Wyatt, John A.: *See—*
Larkin, John P.; Wyatt, John A., and Hawkes, Deborah J., 5,026,874, Cl. 549-15.000.
WYKO, Inc.: *See—*
Smith, Ian; Simerly, Carmin C.; Hilty, Jim E.; and Byerley, Mark S., 5,025,917, Cl. 198-842.000.
Wyman, Robert E., to Barker Products. Apparatus and method for dumping a waste receptacle. 5,026,241, Cl 414-303.000.
Xerox Corporation: *See—*
Cooley, Roderick A.; and Cronshaw, ANthony J., 5,027,195, Cl. 358-75.000.
Fan, Zhigang, 5,027,078, Cl. 358-456.000.
Miller, Donald P., 5,026,042, Cl. 271-119.000.
Platteter, Dale T.; Westfall, Robert S.; and Carter, Jeff C., 5,027,396, Cl. 380-4.000.
Ryon, Randall C.; Canal, Lamia K.; and Tickner, Donald R., 5,026,044, Cl. 271-227.000.
Yabsley, Michael; Skinder, Waclaw; and Mitchell, Ken, to ICI Australia Operations Proprietary Limited. Melt-in-fuel emulsion explosive composition and method. 5,026,442, Cl. 149-2.000.
Yabumoto, Masao: *See—*
Tanaka, Masaki; Abe, Norito; Yabumoto, Masao; Ushigami, Yoshiyuki; and Nozawa, Tadao, 5,026,439, Cl. 148-111.000.
Yakabe, Toru: *See—*
Higuchi, Toshiharu; Matsumoto, Sadao; Yakabe, Toru; and Kimura, Sakae, 5,027,029, Cl. 313-446.000.
Yale and Valor p.l.c.: *See—*
Thow, Ian, 5,026,579, Cl. 428-15.000.
Yamada, Kiyoshi: *See—*
Gotoh, Taiji; Yamamoto, Hidetoshi, and Yamada, Kiyoshi, 5,025,546, Cl. 29-508.000.
Yamada, Masahiko: *See—*
Oguri, Motohiro; Kano, Yoshiaki; Mishima, Kiyotaka; Yamada, Masahiko; Kasano, Kenji; and Uemura, Masaru, 5,026,941, Cl 585-467.000.
Yamada, Shiro. Three-dimensional constellation model and construction kit thereof. 5,026,287, Cl. 434-137.000.
Yamada, Takahiro, to Aisin Seiki K.K. Image communication system. 5,027,224, Cl. 358-434.000.
Yamada, Taketoshi; and Habu, Takeshi, to Konica Corporation. Silver halide photographic light-sensitive material restrained from producing pin-holes. 5,026,622, Cl. 430-264.000.
Yamada, Tetsuya: *See—*
Takahashi, Masato; Seki, Kazuo; Yamada, Tetsuya; and Morohoshi, Yukuo, 5,026,272, Cl. 431-79.000.
Yamada, Toshio: *See—*
Fuse, Genshu; Yamada, Toshio; Odanaka, Shinji; and Fukumoto, Masaki, 5,026,658, Cl. 437-52.000.
Yamada, Toshiyuki, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Crank case of engine for motor-bicycle. 5,025,673, Cl. 74-337.500.
Yamada, Yasuo: *See—*
Ishiguro, Masaji; Iwata, Hiromitsu; Nakatsuka, Takashi, and Yamada, Yasuo, 5,026,844, Cl. 540-357.000.
Yamagami, Keiji: *See—*
Ueda, Tohru; Sasaki, Takuma; Matsuda, Akira; Miyashita, Takanori; Sakata, Shinji; Yamagami, Keiji; and Fuji, Akihiro, 5,026,835, Cl. 536-23.000.
Yamagishi, Katsuaki; Matsui, Koichi; Tanaka, Toshimasa; Matsui, Nobuo; Suma, Sei; and Mino, Yoshihito, to Kabushiki Kaisha Toshiba. Duct type air conditioner and method of controlling the same. 5,025,638, Cl. 62-180.000.
Yamaguchi, Hidetaka: *See—*
Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka; Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000.
Yamaguchi, Shuji; and Shimizu, Atsuko, to Casio Computer Co., Ltd. Length measuring apparatus. 5,027,296, Cl. 364-562.000.
Yamaguchi, Youichi: *See—*
Kida, Masashi; Midorikawa, Shingo; Suzuki, Ichiro; Suzuki, Yoshihiko; and Yamaguchi, Youichi, 5,026,762, Cl. 524-495.000.
Yamaha Corporation: *See—*
Oya, Akiyoshi, 5,025,702, Cl. 84-659.000.
Yokoyama, Kenji, 5,027,228, Cl. 360-15.000.
Yamaichi Electric Manufacturing Co., Ltd *See—*
Matsuoka, Noriyuki; and Kubo, Masaaki, 5,026,303, Cl 439-526.000.
Umemura, Kiyoshi; and Irie, Teruo, 5,025,655, Cl. 73-11.000.
Yamamori, Masayoshi; and Nakashima, Yoshihiko, to Brother Kogyo Kabushiki Kaisha. Machine tool having workpiece machining dimension and tool length measuring functions. 5,025,592, Cl. 51-165.710.
Yamamori, Satofumi: *See—*
Matsushima, Yuzo; Ito, Yoshiyuki; and Yamamori, Satofumi, 5,026,739, Cl. 521-177.000.
Yamamoto, Hajime: *See—*
Migita, Masahito; Kanehisa, Osamu; Shiiki, Masatoshi; and Yamamoto, Hajime, 5,026,661, Cl. 437-81.000.
Yamamoto, Hidetoshi: *See—*
Gotoh, Taiji; Yamamoto, Hidetoshi; and Yamada, Kiyoshi, 5,025,546, Cl. 29-508.000.
Yamamoto, Hitoshi: *See—*
Yatsunami, Takashi; Yazaki, Akira; Inoue, Satoshi, Yamamoto, Hitoshi; Yokomoto, Masaharu; Nomiyama, Jun; and Noda, Shuichiro, 5,026,856, Cl. 546-156.000.
Yamamoto, Kenichi: *See—*
Umeyama, Mitsuhiro; Inui, Masaki; Yamamoto, Kenichi, and Wakahara, Kaoru, 5,025,680, Cl. 74-574.000.
Yamamoto, Kiyoshi; Hirabayashi, Keiji; Kurihara, Noriko; Taniguchi, Yasushi; and Ikoma, Keiko, to Canon Kabushiki Kaisha. Mold with hydrogenated amorphous carbon film for molding an optical element. 5,026,415, Cl. 65-305.000.
Yamamoto, Mutsuhiro: *See—*
Tanaka, Toshiyuki; Nakamura, Nobuo; and Yamamoto, Mutsuhiro, 5,027,305, Cl. 364-513.000.
Yamamoto, Tetsu: *See—*
Yumura, Takashi; and Yamamoto, Tetsu, 5,027,340, Cl 369-219.000.
Yamamoto, Yoshio, to Fuji Kiko Company, Limited. Structure of tiltable steering column for vehicular steering system. 5,025,679, Cl. 74-493.000.
Yamamura, Ryuji, to NEC Corporation. Semiconductor input protection device. 5,027,252, Cl. 361-58.000.
Yamamura, Yoshihiro; and Fuda, Hitoshi, to NEC Corporation. Voice conference system using echo cancellers. 5,027,393, Cl. 379-410.000.
Yamanaka, Hideaki: *See—*
Takaya, Takao; Takasugi, Hisashi; Masugi, Takashi; Yamanaka, Hideaki; and Kawabata, Kohji, 5,026,695, Cl. 514-202.000.
Yamanaka, Kazuo: *See—*
Kajimura, Haruhiko; Nagano, Hiroo; Yamanaka, Kazuo; and Kodama, Tsuyoshi, 5,026,521, Cl. 420-422.000.
Yamanaka, Toshihiro; Takemoto, Tetsuyuki; Hori, Masahiro; and Taniguchi, Shoji, to Sharp Kabushiki Kaisha. Magneto-optical disk device with movable coil. 5,027,334, Cl. 369-13.000.
Yamane, Daiji; Sakamoto, Noriaki; and Horie, Nobuyuki, to Sharp Kabushiki Kaisha. Servo control gain adjustment for an optical disk apparatus. 5,026,981, Cl. 250-214.00B.
Yamano, Yoshihiro: *See—*
Takagi, Motoyuki; Yoshimura, Takuji; and Yamano, Yoshihiro, 5,026,761, Cl. 524-460.000.
Yamanouchi Pharmaceutical Co., Ltd.. *See—*
Kobayashi, Mitsugu; Ohtani, Go; Sekino, Jun, Konno, Toshimitsu; and Maeda, Hiroshi, 5,026,772, Cl. 525-54.100.
Yamaoka, Masao: *See—*
Inukai, Masayuki; and Yamaoka, Masao, 5,026,030, Cl 266-229.000.
Yamaoka, Sueharu; and Fukuta, Tadatoshi, to Sanyo Electric Co., Ltd. Recording-reproduction apparatus for magnetic disc packs with an automatic pack changing mechanism. 5,027,237, Cl. 360-98.060.
Yamaoka, Toshihide, to Olympus Optical Co., Ltd. Method of manufacturing ion current recording head. 5,025,552, Cl. 29-825.000.
Yamasa Shoyu Co., Ltd.: *See—*
Ueda, Tohru; Sasaki, Takuma; Matsuda, Akira; Miyashita, Takanori; Sakata, Shinji; Yamagami, Keiji; and Fuji, Akihiro, 5,026,835, Cl. 536-23.000.
Yamasaki, Shinzi, to Mitsubishi Denki Kabushiki Kaisha. Parallel axis gear set and elevator hoist employing the same. 5,025,894, Cl. 187-20.000.
Yamashita, Shoji: *See—*
Kobayashi, Akio; Tanaka, Hiroshi; Yamashita, Shoji; Fujita, Yasumasa; Hikichi, Koichi; and Kumagai, Chiaki, 5,025,685, Cl. 74-866.000.
Yamatake-Honeywell Co., Ltd.: *See—*
Takahashi, Masato; Seki, Kazuo; Yamada, Tetsuya, and Morohoshi, Yukuo, 5,026,272, Cl. 431-79.000.
Yamauchi, Miyoshi; and Noboru, Mitsuhiro, to Sharp Kabushiki Kaisha. Outdoor unit low noise converter for satellite broadcast reception use. 5,027,430, Cl. 455-188.000.
Yamauchi, Shunji; Tanaka, Minoru; Sakamoto, Kenitiro; Morita, Yutaka; Kidera, Toru; and Mieda, Hiroki, to Mitsubishi Denki Kabushiki Kaisha. Apparatus and method for producing semiconductor device. 5,026,668, Cl. 437-210.000.
Yamauchi, Teruo; Nogi, Toshiharu; and Ohyama, Yoshishige, to Hitachi, Ltd. Fuel injection valve and fuel supply system equipped therewith for internal combustion engines. 5,025,766, Cl. 123-472.000.
Yamazaki, Sachio: *See—*
Kawaguchi, Keishi; Hamasaki, Tatsumi; Tadera, Yoshihiro; and Yamazaki, Sachio, 5,025,593, Cl. 51-165.770.
Yamazaki, Shigeko, to Merck & Co., Inc. Method of purifying recombinant pres-1/S-2/S/S hepatitis B antigen from yeast. 5,026,828, Cl. 530-414.000.

Yamazaki, Takeshi: *See—*
Morinaka, Shigehisa; Nakashima, Tai, Yamazaki, Takeshi; Morishima, Kazuo; Kashio, Yoshiaki; and Akimori, Giichiro, 5,025,883, Cl. 180-219.000.
Yamazaki, Yoshihiro; and Imoto, Manabu, to Asahi Kogaku Kogyo K.K. Image reader. 5,027,424, Cl. 382-65.000.
Yan, Chih-Yen: *See—*
Jeng, Bor-Shenn; Change, Gan-How; Chang, Kuange-Yao; Yan, Chih-Yen; Wu, Tieh-Min; and Lin, Jang-Keng, 5,027,304, Cl. 364-518.000.
Yanagimoto, Takekazu. *See—*
Otake, Katsumi; Yanagimoto, Takekazu; Nakajima, Shuichi; and Kishimura, Yuhei, 5,026,236, Cl. 412-33.000.
Yanagisawa, Michio; Ikejiri, Masahisa; Miyazaki, Hajime; Muranaka, Tsukasa; Inoue, Kunihiro; and Uchiyama, Shouichi, to Seiko Epson Corporation. Humidity measuring apparatus. 5,027,077, Cl. 324-712.000.
Yananton, Patrick. Non-absorbent litter for use with absorbent pad. 5,025,752, Cl. 119-169.000.
Yang, Funmei: *See—*
Bowman, Barhara H.; and Yang, Funmei, 5,026,651, Cl. 435-320.100.
Yang, Stewart L.: *See—*
Brussalis, Stacy A.; Heston, Jeffrey W. and Yang, Stewart L., 5,026,298, Cl. 439-358 000
Yankov, Angel V.: *See—*
Atanassov, Lyuben P.; Kolenzov, Yanko A.; Vulev, Decho I.; Primov, Ivan S., Spassov, Peter G.; Kanalev, Svetlosar K.; Andenov, Dimo P.; Yankov, Angel V.; and Dilkin, Nikolay G., 5,027,286, Cl. 364-513.000.
Yano, Hironobu: *See—*
Kitakado, Ryuji; Yano, Hironobu; Kakuma, Hiroaki, Hoki, Tetsuo; and Kanai, Takao, 5,027,417, Cl. 382-8.000.
Yano, Kanji: *See—*
Okada, Tamotsu; Hosoi, Atsushi; Suzuki, Yoshihiko; and Yano, Kanji, 5,027,160, Cl 355-282.000.
Yano, Kohzo: *See—*
Tanaka, Hirohisa; Kishi, Kohhei; and Yano, Kohzo, 5,026,143, Cl. 350-336.000.
Yarchoan, Robert; Mitsuya, Hiroaki; and Broder, Samuel, to United States of America, Health and Human Services. Treatment of human retroviral infections with 2',3'-dideoxyinosine alone and in combination with other antiviral compounds. 5,026,687, Cl. 514-45.000.
Yarlagadda, Prasad: *See—*
Allenger, Vincenza; Pandey, Raj N.; and Yarlagadda, Prasad, 5,026,944, Cl. 585-500.000.
Yarrington, Arthur G. Helihover amphibious aircraft. 5,026,002, Cl. 244-12.100.
Yashima, Masataka, to Canon Kabushiki Kaisha. Mold for cast molding substrate having preformat with information pits and method of using same. 5,026,510, Cl. 264-300.000.
Yaskawa Electric Mfg. Co., Ltd.: *See—*
Pratt, Richard L., and Dewey, Craig D., 5,027,049, Cl. 318-807.000.
Yasue, Tsutomu: *See—*
Imai, Munehisa; Asano, Atsushi, Yasue, Tsutomu, Ito, Kenichiro. and Nojiri, Hiromi, 5,025,902, Cl. 192-43.000.
Yasukawa, Takeshi: *See—*
Morishita, Mitsuharu, Uota, Kosaku; and Yasukawa, Takeshi, 5,027,276, Cl. 364-424.050.
Yasuoka, Yuji; Kitagawa, Yoshiharu; and Imai, Yoshikiyo, to Omron Tateisi Electronics Co. Electromagnetic relay. 5,027,094, Cl. 335-78.000.
Yasutake, Takayuki: *See—*
Hoshino, Ryoichi; Sasaki, Hironaka; and Yasutake, Takayuki, 5,025,855, Cl. 165-150.000.
Yates, Craig E.: *See—*
Carpenter, Ronald L.; Yates, Craig E.; and Morris, Robert G., 5,026,468, Cl. 204-196.000.
Yatsunami, Takashi; Yazaki, Akira, Inoue, Satoshi; Yamamoto, Hitoshi; Yokomoto, Masaharu; Nomiyama, Jun; and Noda, Shuichiro, to Wakunaga Seiyaku Kabushiki Kaisha. Isoindoline derivative. 5,026,856, Cl. 546-156.000.
Yau, Chi W.: *See—*
Jarwala, Najmi T.; and Yau, Chi W., 5,027,353, Cl. 371-27.000.
Yazaki, Akira: *See—*
Yatsunami, Takashi; Yazaki, Akira; Inoue, Satoshi; Yamamoto, Hitoshi; Yokomoto, Masaharu; Nomiyama, Jun; and Noda, Shuichiro, 5,026,856, Cl. 546-156.000.
Yazaki Corporation: *See—*
Hisatomi, Masahiro; Togasaki, Yoshihiro; and Tanaka, Mitsuyasu, 5,026,294, Cl. 439-125.000.
Yazalci Corporation: *See—*
Dohi, Hikoo, 5,025,554, Cl. 29-860.000.
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Yen, Jung-Chuan, to Huan Ting Enterprise Co., Ltd. Water purifying combination and ultraviolet lamp therefor. 5,026,477, Cl. 210-169.000.
Yocom, Thomas M.: *See—*
Garitty, James P.; and Yocom, Thomas M., 5,027,297, Cl. 364-569.000.
Yoda, Shigeru; and Nitto, Kouji, to Omron Tateisi Electronics Company. Optical card analyzing apparatus. 5,027,339, Cl. 369-54.000.
Yokogawa, Fukuichi: *See—*
Hisashige, Nobuyasu, Yokogawa, Fukuichi; and Shinhama, Makoto, 5,025,890, Cl 181-272.000
Yokohama Rubber Co., Ltd., The: *See—*
Iino, Hiroshi; and Mori, Shinichi, 5,025,845, Cl 152-559.000.
Ishizaki, Ayaaki, 5,026,641, Cl. 435-101.000.
Kida, Masashi; Midorikawa, Shingo; Suzuki, Ichiro; Suzuki, Yoshihiko; and Yamaguchi, Youichi, 5,026,762, Cl 524-495.000.
Yokoi, Takashi: *See—*
Seto, Takatoshi; Yokoi, Takashi; Odagiri, Masaki; and Imanari, Makoto, 5,026,922, Cl. 568-486.000.
Yokomoto, Masaharu: *See—*
Yatsunami, Takashi; Yazaki, Akira; Inoue, Satoshi, Yamamoto, Hitoshi; Yokomoto, Masaharu; Nomiyama, Jun; and Noda, Shuichiro, 5,026,856, Cl. 546-156.000.
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Yokoyama, Shigeki: *See—*
Sano, Akira; Kamiishi, Hirofumi; Kobayashi, Seizo; Matsuura, Kazuo; and Yokoyama, Shigeki, 5,026,511, Cl. 264-28.000.
Yoneda, Masataka; and Nakamura, Shunichi, to Yoshida Kogyo K.K. Method of joining slider body and pull tab. 5,025,544, Cl 29-409.000.
Yoneyama, Hiroyuki, to Fuji Photo Film Co., Ltd. Silver halide color photographic material. 5,026,631, Cl. 430-545.000.
Yoneyama, Masaru: *See—*
Suzuki, Yukio; Suzuki, Kei; Yoneyama, Masaru; and Miyake, Toshio, 5,026,833, Cl. 536-18.100.
Yoneyama, Tomio: *See—*
Kaneko, Masaharu; Ozawa, Tetsuo; Yoneyama, Tomio; Imazeki, Shuji; Mukoh, Akio; and Sato, Mikio. 5,026,505, Cl. 252-299.100.
Yoon, InBae. Multi-functional instruments and stretchable ligating and occluding devices. 5,026,379, Cl. 606-141.000.
York, Dorothy M., legal representative: *See—*
York, James A., deceased, 5,026,277, Cl. 432-181.000.
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Yoshida, Kiyoshi: *See—*
Takeda, Mutsuhiko; Kakuda, Minoru; Shimpo, Masafumi; and Yoshida, Kiyoshi, 5,026,875, Cl. 549-201.000.
Yoshida Kogyo, K. K.: *See—*
Ooi, Akihiko; and Hirono, Toshiaki, 5,026,028, Cl. 256-67.000.
Yoshida Kogyo, K.K.: *See—*
Kusayama, Masahiro, 5,025,535, Cl. 24-433.000.
Yoneda, Masataka; and Nakamura, Shunichi, 5,025,544, Cl. 29-409.000.
Yoshida, Makoto: *See—*
Hoshino, Yasushi; Kakita, Tsuyoshi; and Yoshida, Makoto, 5,027,149, Cl. 354-412.000.
Yoshida, Toyonobu: *See—*
Mizuno, Koichi; Wakabayashi, Takeshige; Koinuma, Yutaka, Aizawa, Reiji; Kushiyama, Satoshi; Kabayashi, Satoru; Ohuchi, Hideo; Yoshida, Toyonobu; Kubota, Yoshiro; Amano, Takanobu; Komaki, Hisashi, and Hirakawa, Shoji, 5,026,464, Cl. 204-164.000.
Yoshida, Yoshiki; Nagasawa, Kiyoto; and Kagami, Yoshinobu, to Ricoh Company, Ltd. Conversion using a variable reference based on image density. 5,027,117, Cl. 341-132.000.
Yoshigai, Hisaaki: *See—*
Ueda, Hiroshi; Yoshigai, Hisaaki; and Masunaga, Mikio, 5,025,844, Cl. 152-454.000.
Yoshimura, Takuji: *See—*
Takagi, Motoyuki; Yoshimura, Takuji; and Yamano, Yoshihiro, 5,026,761, Cl. 524-460.000.
Yoshimura, Toshitaka: *See—*
Andoh, Hiroaki; Ohshima, Michio; Matsui, Yuji; Okuyama, Takashi; Yoshimura, Toshitaka; Yamaguchi, Hidetaka, Ikeda, Yasushi; Nonaka, Jun; Miyoshi, Tamihiro; Kakimoto, Mitsuo; Iwama, Masatoshi; Morita, Hideyuki; Tachihara, Satoru; Morimoto, Akira; and Ohwaki, Akira, 5,027,137, Cl. 354-4.000.
Yoshinaga, Akitoshi: *See—*
Sugawara, Mitsuru; Yoshinaga, Akitoshi; Shimizu, Fumihiko; and Takami, Masayuki, 5,026,134, Cl. 350-96.110.
Yoshinaga, Yoko. *See—*
Kushibiki, Nobuo; Yoshinaga, Yoko; Kuwayama, Tetsuro; and Taniguchi, Naosato, 5,026,618, Cl. 430-2.000.
Yoshino, Hitoshi: *See—*
Imataki, Hiroyuki; Hiraoka, Mizuho, Ogawa, Yoshihiro; Yoshino, Hitoshi; Ichikawa, Sachiko; and Kato, Seijiro, 5,026,623, Cl 430-270.000.
Yoshino Kogyosho Co., Ltd.: *See—*
Kiuchi, Toshiaki; and Iizuka, Shigeo, 5,026,192, Cl. 401-176.000.
Yoshioka, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Teleconference system with image display and input means. 5,027,198, Cl. 358-85.000.
Yoshioka, Tetsuo: *See—*
Noguchi, Takehiko; Sakubata, Takashi; Hisanaga, Akinori; Yoshioka, Tetsuo; and Nagano, Hirosaku, 5,026,820, Cl. 528-350.000.

VOL
1127
ISS
4
JE
25
1991
UMI

Yoshitomi Pharmaceutical Industries, Ltd.: *See—*

Ueda, Tohru; Sasaki, Takuma; Matsuda, Akira; Miyashita, Takanori; Sakata, Shinji; Yamagami, Keiji; and Fuji, Akihiro, 5,026,835, Cl. 536 23.000.

Yost, Bruce A.: *See—*

Adams, Jerome T.; and Yost, Bruce A., 5,026,748, Cl. 524-66.000.

Yotsuya, Teruhisa, to Omron Tateisi Electronics Co. Apparatus for inspecting packaged electronic device. 5,027,295, Cl. 364-552.000.

Young, Chung I.: *See—*

Isbrandt, Russell R.; and Young, Chung I., 5,026,606, Cl. 428-421.000.

Young, Douglas J.; and Williams, Shawn C. Apparatus for measuring thickness of a non-metallic layer on a ferromagnetic base material. 5,027,068, Cl. 324-229.000.

Young, Kevin A.; and Plackard, Dennis L., to General Motors Corporation. Method of making self-aligning anisotropic powder for magnets. 5,026,438, Cl. 148-101.000.

Young, Lewis B.: *See—*

Blain, David A.; Page, Nancy M.; and Young, Lewis B., 5,026,933, Cl. 585-7.000.

Yu, Chung-Li; Pak, Edward T.; and Leung, Ho-Ming, to Advanced Micro Devices, Inc. ECC/CRC error detection and correction system. 5,027,357, Cl. 371-37.700.

Yudovin, Lev G.; and Sergeev, Boris G. Device for supplying lubricating-and-cooling agent to cutting tools. 5,026,220, Cl. 408-56.000.

Yumura, Takashi; and Yamamoto, Tetsu, to Mitsubishi Denki Kabushiki Kaisha. Object lens head assembly. 5,027,340, Cl. 369-219.000.

Yurkonis, Philip G.: *See—*

Lockwood, Alfred; Yurkonis, Philip G.; and Ammon, James G., 5,027,257, Cl. 361-428.000.

Zabara, Jacob. Neurocybernetic prosthesis. 5,025,807, Cl. 128-421.000.

Zahradnicek, Ales: *See—*

Kunz, Reiner; Bahl, Albert; Zahradnicek, Ales; and Dietrich, Rainer, 5,026,404, Cl. 51-295.000.

Zaitsev, Dmitry A.: *See—*

Zolotarev, Jury A.; Zaitsev, Dmitry A.; Tatur, Vadim J.; and Myasoedov, Nikolai F., 5,026,909, Cl. 562-575.000.

Zamzow, Donald D.: *See—*

Gorski, George L.; and Zamzow, Donald D., 5,026,205, Cl. 404-72.000.

Zappa, Donald E.; Prisco, Anthony J., Jr.; and Kirchner, Matthew A., to Westinghouse Electric Corp. Apparatus for remotely decontaminating reactor cavity walls. 5,025,523, Cl. 15-98.000.

Zarn, Inc.: *See—*

Lee, Norman C., 5,026,268, Cl. 425-525.000.

Zarouri, Mourad; and Carlson, Carl J., to Computer & Communications Technology Corp. Disk head assembly load beam. 5,027,240, Cl. 360-104.000.

Zdebel, Peter J.; and Vasquez, Barbara, to Motorola, Inc. Method of fabricating a structure having self-aligned diffused junctions. 5,026,663, Cl. 437-160.000.

Zdebel, Peter J., to Motorola Inc. Semiconductor device electrode method. 5,026,665, Cl. 437-191.000.

Zeitlin, Dan B.; Branthover, John B.; Smith, Brian H.; Piloto, Andrew J.; Lengel, Theresa M.; Carlson, Robert R., Jr.; Shum, Lanson Y.; Hodges, Paul D., Jr.; and Harris, Denise B., to Westinghouse Electric Co. High performance, high current miniaturized low voltage power supply. 5,027,255, Cl. 361-395.000.

Zellweger Uster AG: *See—*

Heusser, Eduard, 5,025,660, Cl. 73-160.000.

Zelson, Steve T. Contraceptive device. 5,025,800, Cl. 128-844.000.

Zemel, Bernard: *See—*

Hunt, Patricia K.; and Zemel, Bernard, 5,027,379, Cl. 378-4.000.

Zengel, Hans: *See—*

Meyer, Gerhard; Sudheimer, Gunter; Zengel, Hans; and Grothaus, Hans, 5,026,534, Cl. 423-366.000.

Zenith Data Systems Corporation: *See—*

Fakruddin, Saifee; and Foster, Mark J., 5,027,294, Cl. 364-550.000.

Zenith Electronics Corporation: *See—*

Chen, Hsing-Yao; Babicz, Eugene A.; and Gorski, Richard M., 5,027,043, Cl. 315-368.000.

Dobrovolny, Pierre, 5,027,163, Cl. 455-326.000.

Zermati, Charles; and Bristot, Pierre, to Hutchinson. Tensioner for a power transmission belt. 5,026,330, Cl. 474-138.000.

Zhang, Xinchao: *See—*

Shao, Shuyong; Feng, Jianhua; and Zhang, Xinchao, 5,025,784, Cl. 128-419.0PG.

Zhou, Pei-Ling: *See—*

Gates, Bruce C., and Zhou, Pei-Ling, 5,026,673, Cl. 502-62.000.

Zhu, Yang: *See—*

Rekow, Elizabeth D., Riley, Donald R. Erdman, Arthur G.; Klamecki, Barney, Zhu, Yang; and Ahn, Jeong-Ho, 5,027,281, Cl. 364-474.240.

Ziemelis, Maris J.; and Park, William R. R., to Dow Corning Corporation. Method of making hydrophobic copolymers hydrophilic 5,026,781, Cl. 525-301.000.

Zilog, Inc.: *See—*

Dalrymple, Monte J., 5,027,310, Cl. 364-770.000.

Zimmerman, Emil F. Interfacing lift hitch. 5,026,247, Cl. 414-703.000.

Zimmerman, Franz: *See—*

Heinz, Hans-Detlef; Meyer, Rolf-Volker; Schulte, Helmut; and Zimmerman, Franz, 5,026,818, Cl. 528-313.000.

Zimmerman, Joseph J., to Joy Technologies Inc. Temporary roof support cylinder. 5,026,218, Cl. 405-290.000.

Zimmermann, Christian: *See—*

Kaller, Ernst; Kugler, Karl-Heinz; Zimmermann, Christian; and Koehnle, Hans, 5,027,073, Cl. 324-388.000.

Zion, Diane E., to Intel Corporation. Carry select multiplexer. 5,027,311, Cl. 364-788.000.

Zip-Pak Incorporated. *See—*

Van Erden, Donald L.; and McDonald, Daniel P., 5,026,563, Cl 426-122.000.

Zirbes, Glen L.; Hadden, Leonard D., and Troyk, Philip R., to Trovan Limited. Automated method for the manufacture of small implantable transponder devices. 5,025,550, Cl. 29-605.000.

Zlobinsky, Yury; and Mattes, Donald A., to Savant Instruments, Inc. Vacuum pump with heated vapor pre-trap. 5,025,571, Cl. 34-72.000.

Zolotarev, Jury A.; Zaitsev, Dmitry A.; Tatur, Vadim J.; and Myasoedov, Nikolai F. Method for preparing biologically active organic compound labelled with hydrogen isotope. 5,026,909, Cl. 562-575.000.

Zoulas, Christos S.: *See—*

Rossignac, Jaroslaw R.; Epstein, David A., Gharachorloo, Nader; Jansen, Frederik W.; and Zoulas, Christos S., 5,027,292, Cl 364-522.000.

Zsoldos, James: *See—*

Schellenberg, Victor R.; Zsoldos, James; Hartman, Joy L.; Smith, William H., deceased; Covington, Wilbur T.; and Conley, Allen, 5,026,211, Cl. 405-204.000.

Zuchtriegel, Anton, to Patent Treuhand Gesellschaft fur elektrische Gluhlampen mbH High-efficiency fluorescent lamp operating circuit. 5,027,033, Cl. 315-106.000.

Zyskind, John L.: *See—*

Desurvire, Emmanuel; Giles, Clinton R.; and Zyskind, John L., 5,027,079, Cl. 330-4 300.

2C Co. Corp.: *See—*

Longarzo, Roland, 5,026,190, Cl 401-30.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 25TH DAY OF JUNE, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Anderson, Richard N. Method of making honeycomb structure with joined single pleat material. Re. 33,623, Cl. 156-197.000.

AT&T Bell Laboratories: *See—*

Lee, Kuo-hua; and Polanco, Samuel E., Re. 33,622, Cl. 156-643.000.

General Electric Company: *See—*

Harnden, John D., Jr.; and Kornrumpf, William P., Re. 33,618, Cl. 29-25.350.

Harnden, John D., Jr.; and Kornrumpf, William P., to General Electric Company. Method for initially polarizing and centering a piezoelectric ceramic switching device. Re. 33,618, Cl. 29-25.350.

Kornrumpf, William P.: *See—*

Harnden, John D., Jr.; and Kornrumpf, William P., Re. 33,618, Cl. 29-25.350.

Lamb, Steve R.; and Moore, Robert R. Anatomic brace fracture for the knee. Re. 33,621, Cl. 128-80.00C.

Lee, Kuo-hua; and Polanco, Samuel E., to AT&T Bell Laboratories. Integrated circuits having stepped dielectric regions. Re. 33,622, Cl 156-643.000.

Margaux, Inc.: *See—*

Persem, Jacob P., Re. 33,620, Cl. 62-215.000.

Moore, Robert R.: *See—*

Lamb, Steve R.; and Moore, Robert R., Re. 33,621, Cl. 128-80.00C.

Persem, Jacob P., to Margaux, Inc. Continuously variable capacity refrigeration system. Re. 33,620, Cl. 62-215.000

Polanco, Samuel E.: *See—*

Lee, Kuo-hua, and Polanco, Samuel E., Re. 33,622, Cl. 156-643.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Brunswick Corporation: *See—*

Carpenter, Robert L., and Swisher, Steven L., B1 4,676,450, Cl. 242-233.000.

Carpenter, Robert L.; and Swisher, Steven L., to Brunswick Corporation. Quick bail opening system for fishing reel. B1 4,676,450, 6-25-91, Cl. 242-233.000.

Fisher Scientific Company: *See—*

Geiselman, Theodore S., B1 4,906,432, Cl. 422-63.000.

Geiselman, Theodore S., to Fisher Scientific Company. Liquid handling. B1 4,906,432, 6-25-91, Cl. 422-63.000.

Horton, Stephen W.; and Percival, Dan M., to Rainier Technologies Corporation. Voice/data switch. B1 4,821,312, 6-25-91, Cl 379-102.000.

Percival, Dan M.: *See—*

Horton, Stephen W.; and Percival, Dan M., B1 4,821,312, Cl. 379-102.000.

Rainier Technologies Corporation: *See—*

Horton, Stephen W.; and Percival, Dan M., B1 4,821,312, Cl. 379-102.000.

Swisher, Steven L.: *See—*

Carpenter, Robert L., and Swisher, Steven L., B1 4,676,450, Cl. 242-233.000.

LIST OF DESIGN PATENTEES

Abe, Takashi, to Kabushiki Kaisha Toshiba. Television receiver. 317,761, 6-25-91, Cl. D14-132.000.

Accumanno, Mario B., to SSMC Inc. Double switch electric fan control. 317,754, 6-25-91, Cl. D13-162.000.

Acme Frame Products, Inc.: *See—*

Stewart, Brian S., and Moggridge, William G., 317,681, Cl. D6-310.000.

Acosta, Romana: *See—*

DeWitt, F. Carlos, 317,788, Cl. D19-88.000.

Adams, Peter E. Golf putter head. 317,807, 6-25-91, Cl. D21-219.000.

Advanced Plastics, Inc.: *See—*

Fielder, Jeffrey L., 317,720, Cl. D9-425.000.

American Standard Inc.: *See—*

Stairs, Henry M., Jr., 317,817, Cl. D23-254.000.

Andrews, Virgil L. Boat trailer. 317,735, 6-25-91, Cl. D12-101.000.

Aoki, Yasutoshi: *See—*

Enoki, Yasutaka; Makino, Shigeo; and Aoki, Yasutoshi, 317,737, Cl. D12-143.000.

Aoyagi, Juuro, to Tokyo Bi-Tech Laboratories, Inc. Tongue depressor 317,821, 6-25-91, Cl. D24-136.000.

Arai, Shigeki, to Casio Computer Co., Ltd. Multi-function programmable electronic calculator. 317,780, 6-25-91, Cl. D18-7.000.

Arcouette, Pierre. Watercraft. 317,748, 6-25-91, Cl. D12-302.000

Atwood Industries, Inc.: *See—*

Chambers, James W., 317,743, Cl. D12-161.000.

Azima, Farad, to Mission Cyrus Corporation. Laptop computer or similar article. 317,759, 6-25-91, Cl. D14-106.000.

Banks, Seth R., to Koss Corporation. Headphone or similar article. 317,767, 6-25-91, Cl. D14-205.000.

Bauwens, Joseph A., to Dey Laboratories, Inc. Liquid dispensing container. 317,715, 6-25-91, Cl. D9-302.000.

Beckerer, Frank S., Jr. Cover for a trailer hitch. 317,745, 6-25-91, Cl. D12-162.000.

Bellomo, Peter; Christiano, Robert; Fidrych, Stephen; Freeman, Michael; Morgan, Stuart; Mysel, Jon; and Romm, Michael, to Digital Equipment Corporation. Patch panel 317,750, 6-25-91, Cl D13-147.000.

Bende, Antonius F. M.: *See—*

Fabius, Albert; and Bende, Antonius F. M., 317,687, Cl. D6-429.000.

Bezzerides Company: *See—*

Bezzerides, George A.; and Feldner, Norman, 317,688, Cl. D6-463.000.

Bezzerides, George A.; and Feldner, Norman, to Bezzerides Company. Display rack. 317,688, 6-25-91, Cl. D6-463.000.

Biller, Bruce A.: *See—*

Swanson, Roy T.; Biller, Bruce A.; and Scherer, Henry W., 317,749, Cl. D13-132.000.

Boeri, Cini. Door handle. 317,706, 6-25-91, Cl. D8-308.000.

Bomatic, Inc.: *See—*

Hestehave, Borge; and Hestehave, Kjeld, 317,719, Cl. D9-375.000.

Bondini, Tiziano, to Pirelli Coordinamento Pneumatici S.p.A. Tire. 317,739, 6-25-91, Cl. D12-146.000.

Bott, John A. Article carrier stanchion. 317,744, 6-25-91, Cl. D12-157.000.

Boucher, Guy: *See—*

Lerude, Gerard; and Boucher, Guy, 317,755, Cl. D14-100.000.

Bridgestone Corporation: *See—*

Enoki, Yasutaka; Makino, Shigeo; and Aoki, Yasutoshi, 317,737, Cl. D12-143.000.

Britton, Anthony L. Chess game board. 317,791, 6-25-91, Cl. D21-24.000.

VOL 1127
ISS 4
JE 25
1991
UMI

- Buehler Products, Inc.: *See—*
  - Marvin, Murray J.; and Hairr, Ernest K., 317,723, Cl D10-49.000.
  - Marvin, Murray J.; and Hairr, Ernest K., 317,724, Cl. D10-50.000.
- Buehler, Thomas E. Fireplace insert smoke pipe connector. 317,820, 6-25-91, Cl. D23-403.000
- Bunn-O-Matic Corporation: *See—*
  - Dust, Maurice J., 317,694, Cl. D7-309.000.
- Burke, William J. Crankshaft. 317,770, 6-25-91. Cl D15-5.000.
- Butcher, Samuel; and Murner, William W Combined broom and vacuum cleaner or similar article 317,678, 6-25-91, Cl. D4-116.000.
- Cal-Camp Electronics, Inc.: *See—*
  - Chen, Ray, 317,779, Cl. D18-7.000.
- Calcomp: *See—*
  - Matsumoto, Shinji; and Takano, Tsutomu, 317,783, Cl. D18-13.000.
- Callahan, Thomas. Combination food carver and decorative illuminator. 317,700, 6-25-91, Cl. D7-693.000.
- Carol, Joyce. Combined nail polish containers and package therefor. 317,717, 6-25-91, Cl. D9-341.000.
- Carol, Joyce. Combined nail polish containers and package therefor 317,718, 6-25-91, Cl. D9-341.000
- Carter, George A., III. Automotive wheel cover 317,746, 6-25-91, Cl. D12-204 000.
- Casio Computer Co., Ltd.: *See—*
  - Arai, Shigeki, 317,780, Cl. D18-7.000.
  - Haneda, Masanori, 317,782, Cl. D18-7.000.
  - Onumata, Yuichi, 317,778, Cl D18-7.000.
  - Takahata, Kenji, 317,781, Cl. D18-7 000.
- Chambers, James W , to Atwood Industries, Inc. Fifth wheel hitch. 317,743, 6-25-91, Cl. D12-161 000.
- Charters, John D. *See—*
  - Davidson, William A.; Davidson, Silvia, and Charters, John D., 317,787, Cl. D19-62.000.
- Chen, Ray, to Cal-Camp Electronics, Inc Calculator or similar article. 317,779, 6-25-91, Cl. D18-7.000.
- Cheng, Peter S C. Tufted bow. 317,733, 6-25-91. Cl D11-184 000
- Christiano, Robert *See—*
  - Bellomo, Peter; Christiano, Robert; Fidrych, Stephen; Freeman, Michael; Morgan, Stuart, Mysel, Jon; and Romm, Michael, 317,750, Cl D13-147.000.
- Coltellerie Montana S.r.l.: *See—*
  - Martinez, Arturo, 317,698, Cl. D7-637.000.
- Combi Co., Ltd.: *See—*
  - Takahashi, Takehiko; Ishii, Yoshiyasu; and Hanashima, Taira, 317,792, Cl. D21-64.000.
  - Takahashi, Takehiko; Ishii, Yoshiyasu, and Hanashima, Taira, 317,793, Cl. D21-64.000.
- Cook, Peter, to Societe Generale des Eaux Minerales de Vittel. Bottle. 317,716, 6-25-91, Cl. D9-307.000.
- Cotty, Leslie: *See—*
  - Cunha, Cynthia; Cotty, Leslie; and Francia, Laura J., 317,734, Cl. D12-11.000.
- Crossdal, Gerard *See—*
  - Nordberg, Agneta, and Crossdal, Gerard, 317,707, Cl. D8-331.000.
- Cunha, Cynthia; Cotty, Leslie; and Francia, Laura J Infant beach sled. 317,734, 6-25-91, Cl. D12-11.000.
- Curtis, William A Rollup for toothpaste tubes or the like. 317,689, 6-25-91, Cl. D6-541.000.
- Cydrus, Robert A Drywall carrier. 317,703, 6-25-91, Cl. D8-14.000.
- Davidson, Grant M. N , to U.S. Philips Corporation Speaker grille. 317,768, 6-25-91, Cl. D14-219.000
- Davidson, Silvia: *See—*
  - Davidson, William A.; Davidson, Silvia; and Charters, John D., 317,787, Cl. D19-62.000.
- Davidson, William A.; Davidson, Silvia; and Charters, John D. Mathematical aid. 317,787, 6-25-91, Cl. D19-62.000.
- Davis, Julie Lynn: *See—*
  - Rogers, Amy J , 317,802, Cl. D21-157 000.
- DeWitt, F. Carlos, to Acosta, Romana. Aviation lap board 317,788, 6-25-91, Cl. D19-88.000.
- Dey Laboratories, Inc.: *See—*
  - Bauwens, Joseph A., 317,715, Cl. D9-302.000.
- Digital Equipment Corporation: *See—*
  - Bellomo, Peter; Christiano, Robert; Fidrych, Stephen; Freeman, Michael; Morgan, Stuart, Mysel, Jon; and Romm, Michael, 317,750, Cl. D13-147.000.
- Discovery Toys, Inc.: *See—*
  - Klitsner, Daniel B., 317,794, Cl. D21-108.000.
- Dust, Maurice J., to Bunn-O-Matic Corporation. Tea brewer. 317,694, 6-25-91, Cl. D7-309.000.
- Dynabrade, Inc.: *See—*
  - Huber, Paul W , 317,818, Cl D23-264.000.
- Elliott, Ruth; and Revell, Ian T Crib toy. 317,804, 6-25-91, Cl. D21-187.000.
- Ellison, Mearl E.; and Winck, Stanley R., to Softron International. Magnetic water conditioner. 317,813, 6-25-91 Cl. D23-207.000.
- Enoki, Yasutaka; Makino, Shigeo; and Aoki, Yasutoshi, to Bridgestone Corporation. Automobile tire. 317,737, 6-25-91, Cl D12-143.000.
- Esslinger, Hartmut, to NeXT Computer, Inc Computer monitor stand. 317,760, 6-25-91, Cl. D14-114.000.
- Fabius, Albert; and Bende, Antonius F M Telescopic support arm for computers and peripheral computer equipment 317,687, 6-25-91, Cl. D6-429.000.
- Fabri, Emilio. Cash register 317,756, 6-25-91, Cl. D14-100.000
- Feldner, Norman: *See—*
  - Bezzerides, George A.; and Feldner, Norman, 317,688, Cl. D6-463.000
- Fidrych, Stephen. *See—*
  - Bellomo, Peter, Christiano, Robert, Fidrych, Stephen; Freeman, Michael; Morgan, Stuart; Mysel, Jon; and Romm, Michael, 317,750, Cl D13-147.000.
- Fielder, Jeffrey L., to Advanced Plastics, Inc Vehicle tool box 317,720, 6-25-91, Cl. D9-425.000.
- Fiorillo, Appio; and Petrac, Wally, to Paperboard Industries Corporation. Box 317,721, 6-25-91, Cl. D9-430.000.
- Firstech Industries, Inc.: *See—*
  - Jones, George R., 317,712, Cl. D8-399 000
- Francia, Laura J · *See—*
  - Cunha, Cynthia; Cotty, Leslie, and Francia, Laura J , 317,734, Cl D12-11.000.
- Freeman, Michael: *See—*
  - Bellomo, Peter; Christiano, Robert; Fidrych, Stephen; Freeman, Michael; Morgan, Stuart, Mysel, Jon, and Romm, Michael, 317,750, Cl. D13-147.000.
- Fuji Photo Film Co., Ltd.: *See—*
  - Horikiri, Kazuhisa, 317,786, Cl. D18-36.000.
  - Isozaki, Makoto; and Okamoto, Eiichi, 317,773, Cl. D16-209.000.
- Fujino, Hitoshi: *See—*
  - Nomizu, Hidekatsu; and Fujino, Hitoshi, 317,765, Cl. D14-165 000
- Fujitsu Limited: *See—*
  - Kakiuchi, Yoshinoro; Irie, Toru; and Maki, Makoto, 317,784, Cl D18-13.000.
- Fukumoto, Tetsuhiro, to Sumitomo Rubber Industries, Ltd Automobile tire. 317,738, 6-25-91, Cl. D12-143.000.
- Fuller, Kip L., to Innovision Technologies Group, Inc. Combined steering wheel-attached lock and alarm for alternative use as a vertically-positioned visual warning light for placement in a roadway 317,708, 6-25-91, Cl. D8-331.000.
- Fuse, Chihiro: *See—*
  - Ikeya, Shinji; Ogawa, Kenichi; Fuse, Chihiro; Ohe, Yasuhiro, Miyai, Hiroyuki; Nobuchi, Koji; and Kitano, Hiroko, 317,766, Cl. D14-167.000.
- Gavin, Norman W Septic tank baffle 317,812, 6-25-91. Cl D23-206.000.
- Gefitec S A . *See—*
  - Posso, Patrick P P., 317,677, Cl D3-30.100.
- Gibbons, William F., to Gizmochine, Inc. Guitar 317,775, 6-25-91, Cl D17-14.000.
- Giorgetti, Carlo, to Giorgetti S.p.A Armchair 317,682, 6-25-91, Cl D6-379.000.
- Giorgetti, Carlo, to Giorgetti S p.A Armchair 317,683, 6-25-91, Cl D6-379.000.
- Giorgetti S.p.A.: *See—*
  - Giorgetti, Carlo, 317,682, Cl. D6-379.000.
  - Giorgetti, Carlo, 317,683, Cl. D6-379.000.
- Gizmochine, Inc.: *See—*
  - Gibbons, William F., 317,775, Cl. D17-14.000.
- Golden, Michael D., to Western Design Corporation. Ammunition magazine. 317,809, 6-25-91, Cl D22-108.000.
- Gonzalez, Louis S Bicycle polo mallet. 317,806, 6-25-91, Cl. D21-211.000.
- Greubel, Juergen, to Wella Aktiengesellschaft. Spray dispenser 317,714, 6-25-91. Cl D9-300.000.
- Grove, James E. Hedge shear. 317,701, 6-25-91, Cl. D8-5.000.
- Hairr, Ernest K.: *See—*
  - Marvin, Murray J.; and Hairr, Ernest K., 317,723, Cl. D10-49.000
  - Marvin, Murray J ; and Hairr, Ernest K., 317,724, Cl. D10-50.000
- Hanashima, Taira: *See—*
  - Takahashi, Takehiko; Ishii, Yoshiyasu; and Hanashima, Taira, 317,792, Cl. D21-64.000.
  - Takahashi, Takehiko; Ishii, Yoshiyasu; and Hanashima, Taira, 317,793, Cl. D21-64.000.
- Haneda, Masanori, to Casio Computer Co., Ltd. Multi-function programmable electronic calculator. 317,782, 6-25-91, Cl. D18-7.000.
- Heinrich Kipp Werk: *See—*
  - Tinz, Bernhard, 317,705, Cl. D8-307.000.
- Hestehave, Borge; and Hestehave, Kjeld, to Bomatic, Inc. Stackable bottle. 317,719, 6-25-91, Cl. D9-375.000.
- Hestehave, Kjeld *See—*
  - Hestehave, Borge; and Hestehave, Kjeld, 317,719, Cl. D9-375.000
- Hey, Kenneth E., to Innovision Network, Inc. Electronic billboard for advertising display or the like. 317,790, 6-25-91, Cl. D20-39.000.
- Horikiri, Kazuhisa, to Fuji Photo Film Co., Ltd. Portable photocopying machine. 317,786, 6-25-91, Cl. D18-36.000.
- Huber, Paul W., to Dynabrade, Inc. Universal pneumatic swivel 317,818, 6-25-91, Cl D23-264 000.
- Ikeya, Shinji; Ogawa, Kenichi; Fuse, Chihiro; Ohe, Yasuhiro; Miyai, Hiroyuki; Nobuchi, Koji; and Kitano, Hiroko, to Sanyo Electric Co., Ltd Combined sound recorder and reproducer 317,766, 6-25-91, Cl D14-167.000.
- Innovision Network, Inc · *See—*
  - Hey, Kenneth E., 317,790, Cl. D20-39.000.
- Innovision Technologies Group, Inc : *See—*
  - Fuller, Kip L., 317,708, Cl. D8-331.000.
- Interlego A.G.: *See—*
  - Laursen, Janni D., 317,796, Cl. D21-150.000.
  - Laursen, Janni D., 317,800, Cl. D21-157.000.
  - Pedersen, Niels M., 317,797, Cl. D21-156.000.
  - Tapdrup, Erik P., 317,799, Cl. D21-157.000.
  - Tapdrup, Erik P., 317,801, Cl. D21-157.000.
- Irie, Toru: *See—*
  - Kakiuchi, Yoshinoro, Irie, Toru; and Maki, Makoto, 317,784, Cl D18-13.000.

- Ishida, Katsuhiro: *See—*
  - Yokoi, Mitsuo; Ishida, Katsuhiro, and Tomoike, Maki, 317,757, Cl. D14-101.000.
- Ishii, Yoshiyasu: *See—*
  - Takahashi, Takehiko; Ishii, Yoshiyasu; and Hanashima, Taira, 317,792, Cl. D21-64.000.
  - Takahashi, Takehiko; Ishii, Yoshiyasu; and Hanashima, Taira, 317,793, Cl. D21-64.000.
- Isozaki, Makoto; and Okamoto, Eiichi, to Fuji Photo Film Co., Ltd Camera. 317,773, 6-25-91, Cl. D16-209.000.
- Jencks, Alan C.; and Sullivan, Jeremiah. Golf towel. 317,693, 6-25-91, Cl. D6-608.000.
- Jeromson, Jeffrey T.; and Williams, Peter C., to Whitey Co. Valve body part. 317,815, 6-25-91, Cl. D23-233.000.
- Jones, George R., to Firstech Industries, Inc. Nut retainer. 317,712, 6-25-91, Cl. D8-399.000.
- Jupiter Products, Inc.: *See—*
  - Miller, Kevin W., 317,742, Cl. D12-157.000.
- Kabushiki Kaisha Kanemitsu: *See—*
  - Kanemitsu, Toshiaki, 317,709, Cl. D8-360.000.
- Kabushiki Kaisha Tamiya Mokei: *See—*
  - Taki, Fumito, 317,795, Cl. D21-137.000.
- Kabushiki Kaisha Toshiba: *See—*
  - Abe, Takashi, 317,761, Cl. D14-132.000.
- Kakiuchi, Yoshinoro; Irie, Toru; and Maki, Makoto, to Fujitsu Limited. Printer. 317,784, 6-25-91, Cl. D18-13.000.
- Kallista, Inc.: *See—*
  - Robbins, Tom E., 317,816, Cl. D23-250.000.
- Kanemitsu, Toshiaki, to Kabushiki Kaisha Kanemitsu. Poly-V pulley. 317,709, 6-25-91, Cl. D8-360.000.
- Kaplan, Donald T. Window jam friction shoe. 317,713, 6-25-91, Cl. D8-402.000.
- Kastan, B. Linn. Bicycle fork. 317,736, 6-25-91, Cl. D12-118.000.
- Kee, Peter M. Y., to Rosalco, Inc. Blanket rack. 317,686, 6-25-91, Cl. D6-410.000.
- Kerr-Hays Company: *See—*
  - Todd Burt K., 317,722. Cl. D9-447.000.
- Kitano, Hiroko: *See—*
  - Ikeya, Shinji; Ogawa, Kenichi; Fuse, Chihiro; Ohe, Yasuhiro; Miyai, Hiroyuki; Nobuchi, Koji; and Kitano, Hiroko, 317,766, Cl. D14-167.000.
- Klitsner, Daniel B., to Discovery Toys, Inc. Construction toy figure. 317,794, 6-25-91, Cl. D21-108.000.
- Kobayashi, Hiroshi; and Nagaoka, Yasuki, to Nikon Corporation. Camera 317,772, 6-25-91, Cl. D16-209.000.
- Koss Corporation: *See—*
  - Banks, Seth R., 317,767, Cl. D14-205.000.
- Koyama, Keiichi: *See—*
  - Sakaguchi, Hiroshi; and Koyama, Keiichi, 317,777, Cl D18-7.000.
- Kozono, Seiji, to Yazaki Corporation. Housing for a bulb socket. 317,751, 6-25-91, Cl. D13-147.000.
- Kozono, Seiji, to Yazaki Corporation. Terminal for a hulb socket. 317,752, 6-25-91, Cl. D13-148.000
- Kozono, Seiji, to Yazaki Corporation Terminal for a bulb socket. 317,753, 6-25-91, Cl. D13-148.000.
- Kuroda, Yutaka, to Sumitomo Rubber Industries, Ltd. Automobile tire. 317,741, 6-25-91, Cl. D12-147.000.
- Lage, David P., to Quick Point, Inc. Beverage cup. 317,696, 6-25-91, Cl. D7-536.000.
- Lage, David P., to Quick Point, Inc. Combined coaster and cup cover. 317,697, 6-25-91, Cl. D7-624.000.
- La Mantia, Vincent A.; and Mullins, Ernest W. Advertising machine. 317,789, 6-25-91, Cl. D20-3.000.
- Lane, Stephen E.: *See—*
  - Norris, Philip R.; Lane, Stephen E.; and Petrie, Aiden J., 317,785, Cl. D18-13.000.
- LaRochelle, Raymond W. Decorative picture frame. 317,679, 6-25-91, Cl. D6-303.000.
- Laursen, Janni D., to Interlego A.G. Toy figure. 317,796, 6-25-91, Cl. D21-150.000.
- Laursen, Janni D., to Interlego A.G. Toy shark 317,800, 6-25-91, Cl. D21-157.000.
- Lerude, Gerard; and Boucher, Guy, to Telemecanique. Programming and adjusting terminal. 317,755, 6-25-91, Cl. D14-100.000.
- Lin, Haur-Jou Telephone set. 317,763, 6-25-91, Cl. D14-150.000.
- Lin, Haur-Jou Telephone set. 317,764, 6-25-91, Cl. D14-150.000.
- Lin, Stony. Combined cutlery and kitchen utensil holder or similar article. 317,699, 6-25-91, Cl. D7-640.000.
- Mackay, Frederick G., to Wichman, William John. Sunglasses with lens shading visor. 317,771, 6-25-91, Cl. D16-102.000.
- MacLeod, Alan R.: *See—*
  - Zaborowski, Thaddeus; and MacLeod, Alan R., 317,704, Cl. D8-30.000.
- Maki, Makoto *See—*
  - Kakiuchi, Yoshinoro; Irie, Toru; and Maki, Makoto, 317,784, Cl. D18-13.000.
- Makino, Shigeo: *See—*
  - Enoki, Yasutaka; Makino, Shigeo; and Aoki, Yasutoshi, 317,737, Cl. D12-143.000.
- Manthei, Michael E. Bed. 317,684, 6-25-91, Cl. D6-384.000.
- Martinez, Arturo, to Coltellerie Montana S.r.l. Knife holding block 317,698, 6-25-91, Cl. D7-637.000.
- Marvin, Murray J.; and Hairr, Ernest K., to Buehler Products, Inc. Automatic temperature control actuator. 317,723, 6-25-91, Cl. D10-49.000.
- Marvin, Murray J.; and Hairr, Ernest K , to Buehler Products, Inc. Automatic temperature control actuator 317,724, 6-25-91, Cl D10-50.000.
- Matsumoto, Shinji; and Takano, Tsutomu, to Calcomp. Thermal printer. 317,783, 6-25-91, Cl. D18-13.000.
- Matsushita Electric Industrial Co., Ltd.: *See—*
  - Mishiro, Benito; and Sugiyama, Yoshihiko, 317,758, Cl D14-102.000.
- McCord, David W Adjustable level. 317,725, 6-25-91, Cl. D10-69.000.
- McGill Manufacturing Company, Inc.: *See—*
  - Stuhlmacher, John, 317,776, Cl. D13-174.000.
- Miller, Kevin W., to Jupiter Products, Inc. Vehicle attached article carrier for lumber or the like. 317,742, 6-25-91, Cl. D12-157.000.
- Mishiro, Benito; and Sugiyama, Yoshihiko, to Matsushita Electric Industrial Co., Ltd.; and Solutions are Everything, Inc. Arithmetic processor for use in electronic computers 317,758, 6-25-91, Cl. D14-102.000.
- Mission Cyrus Corporation: *See—*
  - Azima, Farad 317,759, Cl. D14-106.000.
- Miyai, Hiroyuki: *See—*
  - Ikeya, Shinji; Ogawa, Kenichi; Fuse, Chihiro; Ohe, Yasuhiro; Miyai, Hiroyuki; Nobuchi, Koji; and Kitano, Hiroko, 317,766, Cl. D14-167.000.
- Mizushima, Kazuyuki, to Yamaha Corporation. Electronic keyboard musical instrument. 317,774, 6-25-91, Cl. D17-1.000.
- Mo, Chan C., to Topfair Industries Ltd Combined magnetic holder with arm band. 317,730, 6-25-91, Cl. D11-5.000.
- Moggridge, William G.: *See—*
  - Stewart, Brian S.; and Moggridge, William G., 317,681, Cl. D6-310.000.
- Morgan, Stuart: *See—*
  - Bellomo, Peter; Christiano, Robert. Fidrych, Stephen; Freeman, Michael; Morgan, Stuart; Mysel, Jon; and Romm, Michael, 317,750, Cl. D13-147.000.
- Movitz, Mark. Portable ball container 317,673, 6-25-91, Cl D3-36.000.
- Mullins, Ernest W.: *See—*
  - La Mantia, Vincent A.; and Mullins, Ernest W., 317,789, Cl. D20-3.000.
- Murner, William W : *See—*
  - Butcher, Samuel; and Murner, William W., 317,678, Cl. D4-116.000.
- Mysel, Jon: *See—*
  - Bellomo, Peter; Christiano, Robert, Fidrych, Stephen; Freeman, Michael; Morgan, Stuart; Mysel, Jon; and Romm, Michael, 317,750, Cl. D13-147.000.
- Nagaoka, Yasuki: *See—*
  - Kobayashi, Hiroshi; and Nagaoka, Yasuki, 317,772, Cl. D16-209.000.
- NeXT Computer, Inc.: *See—*
  - Esslinger, Hartmut, 317,760, Cl. D14-114 000.
- Nikon Corporation: *See—*
  - Kobayashi, Hiroshi; and Nagaoka, Yasuki, 317,772. Cl D16-209.000.
- Nobuchi, Koji: *See—*
  - Ikeya, Shinji; Ogawa, Kenichi; Fuse, Chihiro; Ohe, Yasuhiro; Miyai, Hiroyuki; Nobuchi, Koji; and Kitano, Hiroko, 317,766, Cl. D14-167.000.
- Nomizu, Hidekatsu; and Fujino, Hitoshi, to Twinbird Industrial Company Limited. Cassette tape player 317,765, 6-25-91, Cl D14-165.000.
- Nordberg, Agneta; and Crossdal, Gerard. Automobile lock for attachment to a steering wheel and a steering column-mounted gearshift lever. 317.707, 6-25-91, Cl. D8-331.000.
- Norris, Philip R.; Lane, Stephen E.; and Petrie, Aiden J., to Polaroid Corporation. Electronic film printer 317,785, 6-25-91, Cl. D18-13.000.
- Ogawa, Kenichi: *See—*
  - Ikeya, Shinji; Ogawa, Kenichi; Fuse, Chihiro; Ohe, Yasuhiro; Miyai, Hiroyuki; Nobuchi, Koji, and Kitano, Hiroko, 317,766, Cl. D14-167.000.
- Ohe, Yasuhiro· *See—*
  - Ikeya, Shinji; Ogawa, Kenichi; Fuse, Chihiro; Ohe, Yasuhiro, Miyai, Hiroyuki; Nobuchi, Koji; and Kitano, Hiroko, 317,766, Cl. D14-167.000.
- Okamoto, Eiichi: *See—*
  - Isozaki, Makoto; and Okamoto, Eiichi, 317,773, Cl D16-209.000.
- Oki Electric Industry Co., Ltd.: *See—*
  - Watanabe, Katsuhito, 317,762, Cl D14-138.000.
- Onumata, Yuichi, to Casio Computer Co., Ltd. Electronic calculator. 317,778, 6-25-91, Cl. D18-7.000.
- Osborne, Jerry W. Bed. 317,685, 6-25-91, Cl D6-388.000.
- Paperboard Industries Corporation: *See—*
  - Fiorillo, Appio; and Petrac, Wally, 317,721, Cl D9-430.000.
- Pedersen, Niels M., to Interlego A G Toy monkey 317,797, 6-25-91, Cl. D21-156.000.
- Penn Fabrication (U.S.A.), Inc.: *See—*
  - Sollner, Roland, 317,710, Cl. D8-394.000.
  - Sollner, Roland, 317,711, Cl. D8-394 000.
- Petrac, Wally: *See—*
  - Fiorillo, Appio; and Petrac, Wally, 317,721, Cl. D9-430.000.
- Petrie, Aiden J.: *See—*
  - Norris, Philip R.; Lane, Stephen E., and Petrie, Aiden J . 317,785, Cl. D18-13.000.
- Pirelli Coordinamento Pneumatici S.p A . *See—*
  - Bondini, Tiziano, 317,739, Cl D12-146.000

VOL
1127
ISS
4
JE
25
1991
UMI

- Polaroid Corporation: *See—*
  - Norris, Philip R.; Lane, Stephen E.; and Petrie, Aiden J., 317,785, Cl. D18-13.000
- Posso, Patrick P P., to Gefitec S.A. Tool box. 317,677, 6-25-91, Cl. D3-30.100.
- Potter, John T.; and Sabourin, Andre A. Fishing lure. 317,811, 6-25-91, Cl. D22-132.000.
- Preciptech, Inc.: *See—*
  - Schwab, James J., 317,727, Cl. D10-120.000.
- Presl, Gottfried, to Sara Lee Corporation Sandwich bread. 317,672, 6-25-91, Cl. D1-122.000.
- Quick Point, Inc.: *See—*
  - Lage, David P., 317,696, Cl. D7-536.000.
  - Lage David P., 317,697, Cl. D7-624.000.
- Rembrandt Photo Services: *See—*
  - Shipp, Robert D.; and Sarandon, Mary A., 317,675, Cl D3-56.000.
- Rentz, Willie F. Weed cutter. 317,702, 6-25-91, Cl. D8-7.000.
- Revell, Ian T.: *See—*
  - Elliott, Ruth; and Revell, Ian T., 317,804, Cl. D21-187.000.
- Reyes, Arnold J. Billiard cue brace. 317,808, 6-25-91, Cl. D21-232.000.
- Rightnour, Robert W. Rifle sling attaching clamp. 317,810, 6-25-91, Cl. D22-108.000.
- Riley, Robert Q Boat hull. 317,747, 6-25-91, Cl. D12-300.000.
- Robbins, Tom E., to Kallista, Inc. Faucet handle. 317,816, 6-25-91, Cl. D23-250.000.
- Rogers, Amy J., to Davis, Julie Lynn. Doll. 317,802, 6-25-91, Cl. D21-157.000.
- Romm, Michael: *See—*
  - Bellomo, Peter; Christiano, Robert, Fidrych, Stephen; Freeman, Michael; Morgan, Stuart; Mysel, Jon; and Romm, Michael, 317,750, Cl. D13-147.000.
- Rosalco, Inc.: *See—*
  - Kee, Peter M. Y., 317,686, Cl. D6-410.000.
- S&C Electric Company: *See—*
  - Swanson, Roy T.; Biller, Bruce A.; and Scherer, Henry W., 317,749, Cl. D13-132.000.
- Sabourin, Andre A.: *See—*
  - Potter, John T.; and Sabourin, Andre A., 317,811, Cl. D22-132.000.
- Sagie, Simon. Gem setting. 317,731, 6-25-91, Cl. D11-92.000.
- Sakaguchi, Hiroshi; and Koyama, Keiichi, to Sharp Corporation. Electronic calculator. 317,777, 6-25-91, Cl. D18-7.000.
- Sanyo Electric Co., Ltd.: *See—*
  - Ikeya, Shinji; Ogawa, Kenichi; Fuse, Chihiro; Ohe, Yasuhiro; Miyai, Hiroyuki; Nobuchi, Koji; and Kitano, Hiroko, 317,766, Cl. D14-167.000.
- Sara Lee Corporation: *See—*
  - Presl, Gottfried, 317,672, Cl. D1-122.000.
- Sarandon, Mary A.: *See—*
  - Shipp, Robert D.; and Sarandon, Mary A , 317,675, Cl. D3-56.000.
- Schawbel Corporation, The: *See—*
  - Zaborowski, Thaddeus; and MacLeod, Alan R., 317,704, Cl. D8-30.000.
- Scherer, Henry W.: *See—*
  - Swanson, Roy T.; Biller, Bruce A.; and Scherer, Henry W., 317,749, Cl. D13-132.000.
- Schwab, James J., to Preciptech, Inc. Acoustic horn. 317,727, 6-25-91, Cl. D10-120.000.
- Seikosha Co., Ltd.: *See—*
  - Tanaka, Nobuhiro, 317,728, Cl. D10-129.000.
  - Tanaka, Nobuhiro, 317,729, Cl. D10-129.000.
- Sello, Bengt, to Soft Construction AB. Air diffuser. 317,819, 6-25-91, Cl. D23-390.000.
- Sharp Corporation: *See—*
  - Sakaguchi, Hiroshi; and Koyama, Keiichi, 317,777, Cl. D18-7.000.
  - Yokoi, Mitsuo; Ishida, Katsuhiro; and Tomoike, Maki, 317,757, Cl. D14-101.000.
- Shipp, Robert D.; and Sarandon, Mary A., to Rembrandt Photo Services. Photo wallet or similar article. 317,675, 6-25-91, Cl. D3-56.000.
- Smith, Randall L. Take-apart frame with adjustable mirror. 317,680, 6-25-91, Cl. D6-309.000.
- Smith, Rex G., to Texas Saddlebags, Inc. Seat caddy. 317,674, 6-25-91, Cl. D3-40.000.
- Societe Generale des Eaux Minerales de Vittel. *See—*
  - Cook, Peter, 317,716, Cl. D9-307.000.
- Soft Construction AB: *See—*
  - Sello, Bengt, 317,819, Cl. D23-390.000.
- Softron International: *See—*
  - Ellison, Mearl E.; and Wirick, Stanley R., 317,813, Cl. D23-207.000.
- Sollner, Roland, to Penn Fabrication (U.S.A.), Inc. Speaker clamp. 317,710, 6-25-91, Cl D8-394.000.
- Sollner, Roland, to Penn Fabrication (U.S.A), Inc. Speaker clamp. 317,711, 6-25-91, Cl. D8-394.000.
- Solutions are Everything, Inc.: *See—*
  - Mishiro, Benito; and Sugiyama, Yoshihiko, 317,758, Cl. D14-102.000.
- SSMC Inc.: *See—*
  - Accumanno, Mario B., 317,754, Cl. D13-162.000.
- Stairs, Henry M., Jr., to American Standard Inc. Bathtub overflow and drain. 317,817, 6-25-91, Cl. D23-254.000.
- Stern, Leif E. Dispenser for liquid food. 317,695, 6-25-91, Cl. D7-313.000.
- Stewart, Brian S.; and Moggridge, William G., to Acme Frame Products, Inc. Picture frame assembly or similar article. 317,681, 6-25-91, Cl. D6-310.000.
- Stuhlmacher, John, to McGill Manufacturing Company, Inc. Electrical rocker switch actuator assembly. 317,776, 6 25-91, Cl. D13-174.000.
- Sugiyama, Yoshihiko: *See—*
  - Mishiro, Benito; and Sugiyama, Yoshihiko, 317,758, Cl. D14-102.000.
- Sullivan, Jeremiah: *See—*
  - Jencks, Alan C.; and Sullivan, Jeremiah, 317,693, Cl. D6-608.000
- Sumitomo Rubber Industries, Ltd.: *See—*
  - Fukumoto, Tetsuhiro, 317,738, Cl. D12-143.000.
  - Kuroda, Yutaka, 317,741, Cl. D12-147.000.
  - Takehara, Kenji, 317,740, Cl. D12-146.000.
- Sutton, Richard N Portable electronic counter 317,726, 6-25-91, Cl. D10-97.000.
- Swan, Glenn M. Irregular bouncing ball. 317,805, 6-25-91, Cl. D21-204 000.
- Swanson, Roy T.; Biller, Bruce A.; and Scherer, Henry W., to S&C Electric Company. Electrical isulator with integral current sensor. 317,749, 6-25-91, Cl. D13-132.000.
- Takahashi, Takehiko; Ishii, Yoshiyasu; and Hanashima, Taira, to Combi Co., Ltd. Toy harmonica. 317,792, 6-25-91, Cl. D21-64.000.
- Takahashi, Takehiko; Ishii, Yoshiyasu; and Hanashima, Taira, to Combi Co., Ltd. Toy tambourine. 317,793, 6-25-91, Cl. D21-64.000.
- Takahata, Kenji, to Casio Computer Co., Ltd. Multi-function programmable electronic calculator. 317,781, 6-25-91, Cl. D18-7.000.
- Takano, Tsutomu: *See—*
  - Matsumoto, Shinji; and Takano, Tsutomu, 317,783, Cl. D18-13.000.
- Takehara, Kenji, to Sumitomo Rubber Industries, Ltd Automobile tire. 317,740, 6-25-91, Cl. D12-146.000.
- Taki, Fumito, to Kabushiki Kaisha Tamiya Mokei. Toy racing car. 317,795, 6-25-91, Cl. D21-137.000.
- Tanaka, Nobuhiro, to Seikosha Co., Ltd Watch movement 317,728, 6-25-91, Cl. D10-129.000.
- Tanaka, Nobuhiro, to Seikosha Co., Ltd Watch movement. 317,729, 6-25-91, Cl. D10-129.000.
- Tapdrup, Erik P., to Interlego A.G Toy octopus. 317,799, 6-25-91, Cl. D21-157.000.
- Tapdrup, Erik P., to Interlego A.G. Toy fish. 317,801, 6-25-91, Cl. D21-157.000.
- Telemecanique: *See—*
  - Lerude, Gerard; and Boucher, Guy, 317,755, Cl. D14-100.000.
- Texas Saddlebags, Inc.: *See—*
  - Smith, Rex G., 317,674, Cl. D3-40.000.
- Thomsen, Peter. Pouch containing liquid soap or the like for use with a dispenser unit. 317,690, 6-25-91, Cl. D6-542.000.
- Tinz, Bernhard, to Heinrich Kipp Werk. Wing handle. 317,705, 6-25-91, Cl. D8-307.000.
- Todd, Burt K., to Kerr-Hays Company. Dispenser closure. 317,722, 6-25-91, Cl. D9-447.000.
- Tokyo Bi-Tech Laboratories, Inc.: *See—*
  - Aoyagi, Juuro, 317,821, Cl. D24-136.000.
- Tomlinson, Robert A. Oil filter cannister. 317,814, 6-25-91, Cl. D23-209.000.
- Tomoike, Maki: *See—*
  - Yokoi, Mitsuo; Ishida, Katsuhiro; and Tomoike, Maki, 317,757, Cl. D14-101.000.
- Topfair Industries Ltd.: *See—*
  - Mo, Chan C., 317,730, Cl. D11-5.000.
- Twinbird Industrial Company Limited: *See—*
  - Nomizu, Hidekatsu; and Fujino, Hitoshi, 317,765, Cl. D14-165.000.
- U.S. Philips Corporation: *See—*
  - Davidson, Grant M. N., 317,768, Cl. D14-219.000.
- Vernon, Frank J. Holder for greeting cards. 317,732, 6-25-91, Cl. D11-117.000.
- Vining, Raymond D., Sr. Electronic motor and gearing unit for actuating semitrailer support wheels. 317,769, 6-25-91, Cl. D15-1.000.
- Wang, Wen-Mu. Bathware support bracket. 317,691, 6-25-91, Cl. D6-550.000.
- Wang, Wen-Mu. Bathware support bracket. 317,692, 6-25-91, Cl. D6-550.000.
- Warcholik, Doris. Monkey doll. 317,798, 6-25-91, Cl. D21-156.000.
- Watanabe, Katsuhito, to Oki Electric Industry Co., Ltd. Automotive telephone control unit. 317,762, 6-25-91, Cl. D14-138.000.
- Wella Aktiengesellschaft: *See—*
  - Greubel, Juergen, 317,714, Cl. D9-300.000.
- Western Design Corporation: *See—*
  - Golden, Michael D., 317,809, Cl. D22-108.000.
- Whitey Co.: *See—*
  - Jeromson, Jeffrey T.; and Williams, Peter C., 317,815, Cl. D23-233.000.
- Wichman, William John: *See—*
  - Mackay, Frederick G., 317,771, Cl. D16-102.000.
- Williams, Peter C.: *See—*
  - Jeromson, Jeffrey T.; and Williams, Peter C., 317,815, Cl. D23-233.000.
- Wirick, Stanley R.: *See—*
  - Ellison, Mearl E.; and Wirick, Stanley R., 317,813, Cl. D23-207.000.
- Wood, Charles M.: *See—*
  - Wood, Estelee M.; and Wood, Charles M., 317,676, Cl. D3-70.000.
- Wood, Estelee M.; and Wood, Charles M. Trunk lid 317,676, 6-25-91, Cl. D3-70.000.
- Yamaha Corporation: *See—*
  - Mizushima, Kazuyuki, 317,774, Cl. D17-1.000.
- Yazaki Corporation: *See—*
  - Kozono, Seiji, 317,751, Cl. D13-147.000.
  - Kozono, Seiji, 317,752, Cl. D13-148.000.
  - Kozono, Seiji, 317,753, Cl. D13-148.000.
- Yokoi, Mitsuo; Ishida, Katsuhiro; and Tomoike, Maki, to Sharp Corporation. Order terminal for inventory control. 317,757, 6-25-91, Cl. D14-101.000.
- Zaborowski, Thaddeus; and MacLeod, Alan R., to Schawbel Corporation, The. Butane powered soldering iron. 317,704, 6-25-91, Cl. D8-30.000.
- Ziolkowski, Madeline. Doll. 317,803, 6-25-91, Cl D21-184.000.

LIST OF PLANT PATENTEES

- Austin, David C. H., to David Austin Roses. Rose plant— Auswhite. 7,564, 6-25-91, Cl. 1.000.
- Bear Creek Gardens, Inc.: *See—*
  - Warriner, William A., 7,565, Cl. 18.000.
- Cobia, Barnell L.; and Cobia, Mark E. Cactaceae plant named 'Sanibel' . 7,571, 6-25-91, Cl. 88.000.
- Cobia, Mark E.: *See—*
  - Cobia, Barnell L.; and Cobia, Mark E., 7,571, Cl. 88.000.
- David Austin Roses: *See—*
  - Austin, David C. H., 7,564, Cl. 1.000.
- Florfis AG: *See—*
  - Schumann, Ingeborg, 7,567, Cl. 68.000.
- Golden State Bulb Growers: *See—*
  - Siebold, Howard, 7,568, Cl. 68.000.
  - Siebold, Howard, 7,569, Cl. 68.000.
- Hureau, Robert C., to Societe Civile Darbonne Strawberry plant named Darline. 7,566, 6-25-91, Cl. 49.000.
- Kientzler, Ludwig, to Paul Ecke Ranch. Impatiens plant named Vulcain. 7,570, 6-25-91, Cl. 68.000.
- Paul Ecke Ranch: *See—*
  - Kientzler, Ludwig, 7,570, Cl. 68.000.
- Schumann, Ingeborg, to Florfis AG Geranium plant named Fisrom. 7,567, 6-25-91, Cl. 68.000.
- Siebold, Howard, to Golden State Bulb Growers Begonia plant named Sweet Dianne. 7,568, 6-25-91, Cl 68.000.
- Siebold, Howard, to Golden State Bulb Growers Begonia plant named Golden Anniversary. 7,569, 6-25-91, Cl. 68.000.
- Societe Civile Darbonne: *See—*
  - Hureau, Robert C., 7,566, Cl. 49.000.
- Warriner, William A., to Bear Creek Gardens, Inc. Rose plant Jacfed. 7,565, 6-25-91, Cl. 18.000.

VOL
1127

ISS
4

JE
25

1991

UMI

CLASSIFICATION OF PATENTS

ISSUED JUNE 25, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2	
51	5,025,501
159	5,025,502
163	5,025,503
181.4	5,025,504
197	5,025,505
206	5,025,506
	5,025,507
207	5,025,508
CLASS 4	
206	5,025,509
447	5,025,510
	5,025,511
495	5,025,512
498	5,025,513
518	5,025,514
585	5,025,515
623	5,025,516
CLASS 5	
99.1	5,025,517
434	5,025,518
464	5,025,519
CLASS 7	
163	5,025,520
CLASS 8	
137	5,026,400
408	5,026,401
CLASS 12	
12.4	5,025,521
CLASS 14	
73	5,025,522
CLASS 15	
98	5,025,523
104 94	5,025,524
167.1	5,025,525
210 R	5,025,526
256.5	5,025,527
302	5,025,528
344	5,025,529
CLASS 16	
236	5,025,530
313	5,025,531
CLASS 19	
80 R	5,025,532
145.5	5,025,533
CLASS 24	
172	5,025,534
433	5,025,535
563	5,025,536
CLASS 26	
18.5	5,025,537
CLASS 28	
263	5,025,538
CLASS 29	
25.35	Re.33,618
26 A	5,025,539
80	5,025,540
240	5,025,541
252	5,025,542
401.1	5,025,543
409	5,025,544
434	5,025,545
508	5,025,546
527.4	5,025,547
560	5,025,548
564.4	5,025,549
605	5,025,550
623.5	5,026,402
730	5,025,551
825	5,025,552
840	5,025,555
852	5,025,553
860	5,025,554
888.011	5,025,556
CLASS 30	
151	5,025,557
162	5,025,558
276	5,025,559
298	5,025,560
387	5,025,561
392	5,025,562
CLASS 33	
1 N	5,025,563
241	5,025,564
265	5,025,565
338	5,025,566
348.2	5,025,567
371	5,025,568
726	5,025,569
CLASS 34	
72	5,025,570
	5,025,571
202	5,025,572
CLASS 36	
30 R	5,025,573
42	5,025,574
44	5,025,575
134	5,025,576
CLASS 37	
280	5,025,577
CLASS 38	
93	5,025,578
CLASS 40	
152.1	5,025,580
159	5,025,581
452	5,025,579
CLASS 42	
70.06	5,025,582
CLASS 43	
17	5,025,583
21.2	5,025,584
25	5,025,585
42.24	5,025,586
55	5,025,587
57.1	5,025,588
CLASS 47	
61	5,025,589
76	5,025,590
CLASS 48	
203	5,026,403
CLASS 49	
360	5,025,591
CLASS 51	
165.71	5,025,592
165.77	5,025,593
165.93	5,025,594
291	5,025,595
295	5,026,404
298	5,026,405
400	5,025,596
410	5,025,597
CLASS 52	
126.6	5,025,598
167	5,025,600
167 DF	5,025,599
169.7	5,025,601
171	5,025,602
221	5,025,603
273	5,025,604
309.16	5,025,605
741	5,025,606
749	5,025,607
CLASS 53	
135.1	5,025,608
266.1	5,025,609
411	5,025,610
509	5,025,611
530	5,025,612
CLASS 54	
78	5,025,613
CLASS 55	
26	5,026,406
185	5,026,407
CLASS 56	
10.2	5,025,614
12.7	5,025,615
14.9	5,025,616
15.6	5,025,617
16.7	5,025,618
328.1	5,025,620
400.05	5,025,621
CLASS 60	
39.464	5,025,622
257	5,025,623
274	5,025,624
426	5,025,625
460	5,025,626
527	5,025,627
585	5,025,628
600	5,025,629
646	5,025,630
655	5,025,631
CLASS 62	
24	5,026,408
64	5,025,632
77	5,025,633
79	5,025,634
106	5,025,635
115	5,025,636
138	5,025,637
180	5,025,638
215	Re.33,620
258	5,025,639
324.6	5,025,640
347	5,025,641
402	5,025,642
CLASS 63	
12	5,025,643
CLASS 65	
3.11	5,026,409
3.43	5,026,410
4 21	5,026,411
18.1	5,026,412
29	5,026,413
106	5,026,414
305	5,026,415
CLASS 66	
147	5,025,644
CLASS 68	
27	5,025,645
CLASS 70	
209	5,025,646
352	5,025,647
CLASS 71	
24	5,026,416
35	5,026,417
92	5,026,418
CLASS 72	
134	5,025,648
196	5,025,649
220	5,025,650
294	5,025,651
444	5,025,652
CLASS 73	
1 G	5,025,653
4 D	5,025,654
11	5,025,655
32 A	5,025,656
37	5,025,657
105	5,025,658
147	5,025,659
160	5,025,660
180	5,025,661
459	5,025,662
517 A	5,025,663
579	5,025,664
597	5,025,665
632	5,025,666
724	5,025,667
795	5,025,668
798	5,025,669
865.8	5,025,670
CLASS 74	
206	5,025,671
208	5,025,672
337.5	5,025,673
360	5,025,674
422	5,025,675
441	5,025,676
473 R	5,025,677
473 SW	5,025,678
493	5,025,679
574	5,025,680
	5,025,681
606 R	5,025,682
	5,025,683
862	5,025,684
866	5,025,685
	5,025,686
CLASS 75	
254	5,026,419
712	5,026,420
CLASS 81	
9.51	5,025,687
448	5,025,688
CLASS 82	
106	5,025,689
121	5,025,690
CLASS 83	
140	5,025,691
468	5,025,692
482	5,025,693
CLASS 84	
282	5,025,694
293	5,025,695
314 R	5,025,696
411 R	5,025,697
453	5,025,698
	5,025,699
603	5,025,700
615	5,025,701
659	5,025,702
718	5,025,703
723	5,025,704
743	5,025,705
CLASS 86	
37	5,025,706
CLASS 89	
36.17	5,025,707
CLASS 92	
19	5,025,708
48	5,025,709
CLASS 98	
59	5,025,712
115.2	5,025,713
208	5,025,711
CLASS 99	
300	5,025,714
421 HV	5,025,715
468	5,025,716
CLASS 100	
88	5,025,717
	5,025,718
99	5,025,719
226	5,025,720
229 A	5,025,721
CLASS 101	
147	5,025,722
148	5,025,723
	5,025,724
227	5,025,725
352	5,025,726
483	5,025,727
CLASS 102	
271	5,025,728
336	5,025,729
516	5,025,730
521	5,025,731
	5,025,732
CLASS 104	
9	5,025,733
CLASS 105	
26.05	5,025,734
CLASS 106	
3	5,026,421
14.11	5,026,422
14.12	5,026,423
18.34	5,026,424
22	5,026,425
	5,026,426
23	5,026,427
38.3	5,026,428
400	5,026,429
CLASS 108	
55.3	5,025,735
CLASS 111	
152	5,025,736
CLASS 112	
286	5,025,738
	5,025,739
296	5,025,737
456	5,025,740
CLASS 114	
230	5,025,742
	5,025,743
238	5,025,744
289	5,025,745
311	5,025,746
362	5,025,747
CLASS 116	
222	5,025,748
CLASS 118	
28	5,025,749
69	5,025,750
733	5,025,751
CLASS 119	
41	5,025,619
51.03	5,025,753
73	5,025,754
169	5,025,752
CLASS 122	
4 D	5,025,755
CLASS 123	
18 R	5,025,756
48 R	5,025,757
56 AC	5,025,759
73 PP	5,025,760
90.16	5,025,761
196 S	5,025,762
198 E	5,025,763
198 R	5,025,764
254	5,025,765
472	5,025,766
489	5,025,767
506	5,025,768
527	5,025,758
532	5,025,769
585	5,025,770
CLASS 124	
25	5,025,771
35.2	5,025,772
89	5,025,774
445	5,025,773
CLASS 125	
23.01	5,025,803
CLASS 126	
21 A	5,025,775
194	5,025,776
263	5,025,777
CLASS 127	
34	5,026,430
CLASS 128	
4	5,025,778
	5,025,804
20	5,025,779
	5,025,780
64	5,025,781
80 C	Re.33,621
	5,025,782
156	5,025,783
203.12	5,025,806
207.18	5,025,805
419 PG	5,025,784
421	5,025,807
633	5,025,785
642	5,025,786
	5,025,787
653 AF	5,025,788
660.03	5,025,789
662.03	5,025,790
670	5,025,791
672	5,025,792
677	5,025,793
696	5,025,794
	5,025,808
713	5,025,795
715	5,025,809
742	5,025,796
754	5,025,797
771	5,025,798
772	5,025,799
804	5,025,810
844	5,025,800
877	5,025,801
882	5,025,802
898	5,025,811
CLASS 131	
290	5,025,813
297	5,025,812
331	5,025,814
332	5,025,815
CLASS 132	
225	5,025,850
247	5,025,816
296	5,025,817
CLASS 134	
3	5,026,431
21	5,026,432
170	5,025,818
CLASS 135	
16	5,025,819
69	5,025,820
112	5,025,821
CLASS 137	
1	5,025,822
110	5,025,823
113	5,025,824
119	5,025,825
315	5,025,826
392	5,025,827
512	5,025,828
	5,025,829
522	5,025,830
560	5,025,834
561 A	5,025,831
625.31	5,025,832
	5,025,833
833	5,025,835
CLASS 138	
110	5,025,836
CLASS 139	
35	5,025,837
114	5,025,838
383 A	5,025,839
CLASS 141	
253	5,025,840
CLASS 144	
134 R	5,025,841
367	5,025,842
CLASS 148	
2	5,026,433
	5,026,434
12 A	5,026,435
12 B	5,026,436
33.3	5,026,437
101	5,026,438
111	5,026,439
247	5,026,440
402	5,026,441
CLASS 149	
2	5,026,442
18	5,026,443
CLASS 150	
160	5,025,843
CLASS 152	
454	5,025,844
559	5,025,845
CLASS 156	
62.2	5,026,444
73.5	5,026,445
153	5,026,446
166	5,026,447
197	Re.33,623

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212	5,026,448
242	5,026,449
244 11	5,026,450
244 27	5,026,451
293	5,026,452
443	5,026,453
614	5,026,454
643	Re 33,622

CLASS 160

199	5,025,846
270	5,025,847
368 1	5,025,848

CLASS 162

49	5,026,455
146	5,026,456
158	5,026,457
198	5,026,458

CLASS 164

97	5,025,849
423	5,025,851
468	5,025,852
504	5,025,853

CLASS 165

11 2	5,025,854
150	5,025,855
167	5,025,856

CLASS 166

77	5,025,857
156	5,025,858
252	5,025,859
267	5,025,860
297	5,025,861
303	5,025,862
305 1	5,025,863
348	5,025,864
366	5,025,865

CLASS 172

5	5,025,866

CLASS 173

90	5,025,867
91	5,025,868
98	5,025,869
162 2	5,025,870

CLASS 175

57	5,025,871
246	5,025,872
329	5,025,873
	5,025,874
393	5,025,875

CLASS 178

19	5,026,953

CLASS 180

7 1	5,025,876
24.02	5,025,877
68.1	5,025,678
79	5,025,879
89 14	5,025,880
197	5,025,881
	5,025,882
219	5,025,883
247	5,025,884

CLASS 181

156	5,025,885
	5,025,886
187	5,025,887
213	5,025,888
250	5,025,889
272	5,025,890

CLASS 182

86	5,025,891

CLASS 187

8 72	5,025,892
20	5,025,893
	5,025,894
105	5,025,895
115	5,025,896

CLASS 188

73 38	5,025,897
76	5,025,898
299	5,025,899
322.12	5,025,900

CLASS 192

1 52	5,025,905
4 A	5,025,901
43	5,025,902
58 B	5,025,906
80	5,025,907
83	5,025,903
106.2	5,025,904

CLASS 194

227	5,025,908

CLASS 198

341	5,025,909
377	5,025,910
400	5,025,911
459	5,025,912
550 01	5,025,913
660	5,025,914
782	5,025,915
803.15	5,025,916
842	5,025,917

CLASS 200

84 C	5,026,954

CLASS 202

158	5,026,459

CLASS 204

59 R	5,026,460
86	5,026,461
129.55	5,026,462
164	5,026,463
	5,026,464
182 4	5,026,465
192 38	5,026,466
194	5,026,467
196	5,026,468
298.15	5,026,469
298 16	5,026,470
298 19	5,026,471

CLASS 206

45.14	5,025,918
214	5,025,919
223	5,025,920
320	5,025,921
328	5,025,922
329	5,025,923
334	5,025,924
386	5,025,925
444	5,025,926
527	5,025,927
581	5,025,928

CLASS 208

58	5,026,472
143	5,026,473
189	5,026,474
403	5,026,475

CLASS 209

19	5,025,929
144	5,025,930

CLASS 210

89	5,026,476
169	5,026,477
232	5,026,478
321 8	5,026,479
515	5,026,480
638	5,026,481
674	5,026,482
708	5,026,483
717	5,026,484
723	5,026,485
787	5,026,486
791	5,026,487
799	5,026,488

CLASS 211

13	5,025,931
20	5,025,932
22	5,025,933
69 5	5,025,934
71	5,025,935
74	5,025,936
192	5,025,937

CLASS 213

43	5,025,938

CLASS 215

100 A	5,025,939
	5,025,940
228	5,025,941
318	5,025,942

CLASS 219

10.41	5,026,955
10.491	5,026,956
10.55 A	5,026,959
10.55 E	5,026,958
10.55 M	5,026,957
69 11	5,026,961
69.12	5,026,962
69.17	5,026,960
89	5,026,963
121.64	5,026,967
121 7	5,026,964
121.70	5,026,965
121.72	5,026,966
145.21	5,026,968
421	5,026,969
465	5,026,970
483	5,026,971

CLASS 220

3.9	5,025,944
85 H	5,025,945
86.3	5,025,946
90.2	5,025,947
366	5,025,948
481	5,025,949
589	5,025,943

CLASS 221

5	5,025,950
13	5,025,951

CLASS 222

3	5,025,952
23	5,025,953
56	5,025,954
82	5,025,955
153	5,025,956
189	5,025,957
321	5,025,958
389	5,025,959
390	5,025,960
599	5,025,961
649	5,025,962

CLASS 223

85	5,025,963

CLASS 224

42 42	5,025,964
151	5,025,965
183	5,025,966
326	5,025,967

CLASS 227

8	5,025,968
120	5,025,969
156	5,025,970
	5,025,971

CLASS 228

32	5,025,972
55	5,025,973
107	5,025,974
127	5,025,975
165	5,025,976
171	5,025,977

CLASS 229

1 5 R	5,025,978
	5,025,979
73	5,025,980
118	5,025,981
125 35	5,025,982

CLASS 235

32	5,026,972
136	5,026,973
449	5,026,974
462	5,026,975

CLASS 236

12.2	5,025,983
46 R	5,025,984

CLASS 237

2 A	5,025,985
12 3 A	5,025,986

CLASS 238

351	5,025,987

CLASS 239

171	5,025,988
431	5,025,989
438	5,025,990
459	5,025,991

CLASS 241

74	5,025,993
99	5,025,994
101.1	5,025,995
101 7	5,025,992
168	5,025,996

CLASS 242

1.10 R	5,025,997
55	5,025,998
65	5,026,005
110.3	5,025,999
199	5,026,000
233	B1 4,676,450

CLASS 244

1 R	5,026,001
12 1	5,026,002
26	5,026,003
53 B	5,026,004
122 AG	5,026,006
130	5,026,232
155 A	5,026,007
164	5,026,008

CLASS 246

122 R	5,026,009

CLASS 248

188 1	5,026,010
220.4	5,026,011
222 1	5,026,012
223 1	5,026,013
225 2	5,026,014
248	5,026,015
314	5,026,016
324	5,026,017

CLASS 249

14	5,026,018

CLASS 250

201.4	5,026,976
201.9	5,026,977
205	5,026,978
	5,026,979
208 1	5,026,980
214 B	5,026,981
223 R	5,026,982
	5,026,983
227.21	5,026,984
231 16	5,026,985
255	5,026,986
281	5,026,987
287	5,026,988
338.1	5,026,989
342	5,026,990
343	5,026,991
	5,026,992
357.1	5,026,993
435	5,026,994
441.1	5,026,995
461.1	5,026,996
492.2	5,026,997
561	5,026,998
574	5,026,999

CLASS 251

4	5,026,019
5	5,026,020
40	5,026,021
122	5,026,022
144	5,026,023
149.5	5,026,024
149 6	5,026,025
230	5,026,026
301	5,026,027

CLASS 252

8 510	5,026,490
8 552	5,026,491
8.8	5,026,489
32.7 E	5,026,492
32 7 HC	5,026,493
50	5,026,494
51 5 R	5,026,495
56 R	5,026,496
171	5,026,497
	5,026,498
	5,026,499
	5,026,500
	5,026,501
172	5,026,502
186.43	5,026,504
192	5,026,503
299.1	5,026,505
299.61	5,026,506
301 21	5,026,507
502	5,026,508

CLASS 256

67	5,026,028

CLASS 264

28	5,026,511
40 6	5,026,512
127	5,026,513
258	5,026,514
300	5,026,510
315	5,026,515

CLASS 266

170	5,026,029
229	5,026,030

CLASS 267

140	5,026,031

CLASS 269

43	5,026,032
45	5,026,033

CLASS 270

	5,026,035
52	5,026,034

CLASS 271

3 1	5,026,036
	5,026,037
	5,026,038
11	5,026,039
35	5,026,040
118	5,026,041
119	5,026,042
121	5,026,043
227	5,026,044
277	5,026,045

CLASS 272

70	5,026,046
73	5,026,047
77	5,026,048
126	5,026,049
143	5,026,050

CLASS 273

3 A	5,026,052
3 R	5,026,053
58 A	5,026,054
73 A	5,026,055
77 A	5,026,056
85 R	5,026,057
93 C	5,026,058
176 A	5,026,059
176 F	5,026,060
177 R	5,026,061
183 D	5,026,062
186 A	5,026,063
186 E	5,026,064
191 A	5,026,065
192	5,026,066
220	5,026,067
241	5,026,068
255	5,026,069
261	5,026,070
272	5,026,071
308	5,026,072
360	5,026,073
435	5,026,051

CLASS 277

27	5,026,074
56	5,026,075
82	5,026,076
93 SD	5,026,077

CLASS 280

5 2	5,026,078
47 31	5,026,079
87.042	5,026,080
91	5,026,081
163	5,026,082
277	5,026,083
426	5,026,085
607	5,026,086
613	5,026,087
637	5,026,088
655	5,026,089
673	5,026,090
675	5,026,091
777	5,026,092
807	5,026,093
848	5,026,094

CLASS 283

2	5,026,095
75	5,026,084

CLASS 285

114	5,026,096
141	5,026,097
174	5,026,098
315	5,026,099

CLASS 290

53	5,027,000

CLASS 292

92	5,026,100
166	5,026,101
259 R	5,026,102
275	5,026,103

CLASS 294

86.4	5,026,104
170	5,026,105

CLASS 295

1	5,026,106

CLASS 296

37 2	5,026,107
97 11	5,026,108
105	5,026,109
108	5,026,110
146	5,026,111
181	5,026,112
221	5,026,113

CLA[illegible]

4[illegible]4	[illegible]026,114
219	5,026,115
284	5,026,116
304	5,026,117
338	5,026,118
383	5,026,119
408	5,026,120
440	5,026,121

CLASS 301

9 DN	5,026,122

CLASS 303

100	5,026,124
	5,026,125
	5,026,126
116	5,026,127
117	5,026,123

CLASS 307

10 1	5,027,001
35	5,027,002
242	5,027,003
270	5,027,004
272 1	5,027,005
272 3	5,027,006
443	5,027,007
	5,027,008
446	5,027,009
456	5,027,010
465	5,027,011
	5,027,012
475	5,027,013
	5,027,014
491	5,027,015
542	5,027,016
555	5,027,017
571	5,027,018
579	5,027,019
647	5,027,020

CLASS 310

68 A	5,027,021
78	5,027,022
83	5,027,023
90	5,027,024
156	5,027,025
259	5,027,026
317	5,027,027
328	5,027,028

CLASS 312

210 5	5,026,128
266	5,026,129
323	5,026,130

CLASS 313

446	5,027,029
619	5,027,030

CLASS 315

77	5,027,031
103	5,027,032
106	5,027,033
	5,027,034
119	5,027,035
169.3	5,027,036
200 A	5,027,037
209 R	5,027,038
241 P	5,027,039
241 R	5,027,040
248	5,027,041
368	5,027,042
	5,027,043

CLASS 318

568.11	5,027,044
571	5,027,045
603	5,027,046
648	5,027,047
806	5,027,048
807	5,027,049

CLASS 320

61	5,027,050

CLASS 323

222	5,027,051
284	5,027,052
314	5,027,053
	5,027,054

CLASS 324

77 K	5,027,055
103 R	5,027,056
115	5,027,057
121 R	5,027,058
127	5,027,059
132	5,027,060
156	5,027,061
158 F	5,027,063
158 P	5,027,062
158 T	5,027,064
204	5,027,065
207 16	5,027,066
207 19	5,027,067
229	5,027,068
248	5,027,069
309	5,027,070
	5,027,071
312	5,027,072
388	5,027,073
539	5,027,074
662	5,027,075
674	5,027,076
712	5,027,077

CLASS 330

4 3	5,027,079
59	5,027,080
84	5,027,081
277	5,027,082
284	5,027,083
295	5,027,084

CLASS 331

1 A	5,027,085
99	5,027,086

CLASS 332

127	5,027,087

CLASS 333

1	5,027,088
12	5,027,089
202	5,027,090

CLASS 335

78	5,027,094
132	5,027,091
172	5,027,092
176	5,027,093
202	5,027,095
	5,027,096
213	5,027,097
	5,027,098

CLASS 336

60	5,027,099

CLASS 337

32	5,027,100
297	5,027,101

CLASS 340

323 R	5,027,102
426	5,027,103
541	5,027,104
571	5,027,105
572	5,027,106
	5,027,107
662	5,027,108
706	5,027,109
731	5,027,110
784	5,027,111
792	5,027,112
825 34	5,027,113
941	5,027,114

CLASS 341

13	5,027,115
120	5,027,116
132	5,027,117
	5,027,118
143	5,027,120
144	5,027,119

CLASS 342

16	5,027,121
26	5,027,122
188	5,027,123
362	5,027,124
368	5,027,125
372	5,027,126
	5,027,127

CLASS 343

713	5,027,128
719	5,027,129
872	5,027,130

CLASS 346

1.1	5,027,131
108	5,027,132
136	5,027,133
140 R	5,027,134
154	5,027,135
159	5,027,136

CLASS 350

3.7	5,026,131
3.84	5,026,132
6 4	5,026,133
96.11	5,026,134
96.12	5,026,135
96 15	5,026,136
96.16	5,026,137
96 20	5,026,138
96 29	5,026,139
	5,026,140
	5,026,141
96.32	5,026,142
336	5,026,143
350 S	5,026,144
351	5,026,145
356	5,026,146
374	5,026,147
386	5,026,148
432	5,026,149

CLASS 351

47	5,026,150
246	5,026,151

CLASS 352

85	5,026,152

CLASS 354

4	5,027,137
62	5,027,138
64	5,027,139
76	5,027,140
82	5,027,141
86	5,027,142
160	5,027,143
195 12	5,027,144
299	5,027,145
	5,027,146
400	5,027,147
402	5,027,148
412	5,027,149
484	5,027,150

CLASS 355

30	5,027,151
200	5,027,152
	5,027,153
205	5,027,154
229	5,027,155
245	5,027,156
261	5,027,157
271	5,027,158
	5,027,159
282	5,027,160
305	5,027,161
320	5,027,162

CLASS 356

1	5,026,153
35.5	5,026,154
37	5,026,155
45	5,026,156
250	5,026,157
252	5,026,158
318	5,026,159
328	5,026,160
350	5,026,161
354	5,026,162
363	5,026,163
373	5,026,164
386	5,026,165
401	5,026,166

CLASS 357

4	5,027,164
13	5,027,165
15	5,027,166
	5,027,167
17	5,027,168
	5,027,169
22	5,027,170
23.13	5,027,174
23.5	5,027,171
	5,027,175
23 6	5,027,172
	5,027,173
30	5,027,176
	5,027,177
	5,027,178
34	5,027,179
38	5,027,180
41	5,027,181
46	5,027,182
48	5,027,183
49	5,027,184
59	5,027,185
	5,027,186
65	5,027,187
68	5,027,188
71	5,027,189
74	5,027,190
	5,027,191
75	5,027,192

CLASS 358

12	5,027,193
36	5,027,194
75	5,027,195
76	5,027,196
	5,027,197
85	5,027,198
88	5,027,199
103	5,027,200
105	5,027,201
109	5,027,202
140	5,027,203
	5,027,204
	5,027,205
141	5,027,206
142	5,027,207
148	5,027,208
160	5,027,209
166	5,027,210
183	5,027,211
	5,027,212
	5,027,213
209	5,027,214
213.11	5,027,215
	5,027,216
213 19	5,027,217
213.23	5,027,218
228	5,027,219
244	5,027,220
300	5,027,221
330	5,027,222
342	5,027,223
434	5,027,224
448	5,027,225
456	5,027,078
482	5,027,226
488	5,027,227

CLASS 360

15	5,027,228
19 1	5,027,229
35 1	5,027,230
71	5,027,231
74 1	5,027,232
77.02	5,027,233
77.08	5,027,234
77.15	5,026,509
77 16	5,027,235
96.5	5,027,236
98.06	5,027,237
104	5,027,238
	5,027,239
	5,027,240
105	5,027,241
106	5,027,242
113	5,027,243
119	5,027,244
121	5,027,245
126	5,027,246
	5,027,247
130 21	5 027,248
132	5,027,249

CLASS 361

18	5,027,251
58	5,027,252
90	5,027,250
321	5,027,253
384	5,027,254
395	5,027,255
417	5,027,256
428	5,027,257

CLASS 362

31	5,027,258
32	5,027,259
66	5,027,301
74	5,027,260
98	5,027,261
249	5,027,262

CLASS 363

16	5,027,263
	5,027,264
37	5,027,265
63	5,027,266

CLASS 364

172	5,027,267
184	5,027,268
200	5,027,269
	5,027,270
	5,027,271
	5,027,272
	5,027,273
413.19	5,027,274
424.05	5,027,275
	5,027,276
	5,027,302
431.01	5,027,277
431.06	5,027,278
474 16	5,027,280
474 24	5,027,281
478	5,027,279
479	5,027,282
	5,027,283
	5,027,284
483	5,027,285
511	5,027,303
513	5,027,286
	5,027,305
518	5,027,287
	5,027,304
519	5,027,288
520	5,027,289
521	5,027,290
	5,027,291
522	5,027,292
550	5,027,293
	5,027,294
552	5,027,295
562	5,027,296
569	5,027,297
	5,027,298
580	5,027,299
709.02	5,027,307
715.08	5,027,300
724 10	5,027,306
748	5,027,308
766	5,027,309
770	5,027,310
788	5,027,311
	5,027,312
900	5,027,313
	5,027,314
	5,027,315
	5,027,316
	5,027,317

CLASS 365

78	5,027,318
156	5,027,319
185	5,027,320
	5,027,321
189 01	5,027,322
189 11	5,027,323
205	5,027,324
	5,027,325
221	5,027,326
222	5,027,327
226	5,027,328
230.02	5,027,329
239	5,027,330

CLASS 366

150	5,026,167
168	5,026,168
287	5,026,169

CLASS 367

75	5,027,331
	5,027,332
131	5,027,333

CLASS 369

13	5,027,334
37	5,027,335
44 13	5,027,336
44.26	5,027,337
44.29	5,027,338
54	5,027,339
219	5,027,340

CLASS 370

13	5,027,341
16	5,027,342
56	5,027,344
58.2	5,027,345
	5,027,346
62	5,027,347
85.1	5,027,348
	5,027,349
85 13	5,027,350
94 1	5,027,351
017	5,027,343
110.1	5,027,352

CLASS 371

22 1	5,027,355
25.1	5,027,354
27	5,027,353
32	5,027,356
37 7	5,027,357
62	5,027,358

CLASS 372

18	5,027,359
	5,027,360
22	5,027,361
38	5,027,362
46	5,027,363
	5,027,364
56	5,027,365
57	5,027,366
94	5,027,367
96	5,027,368

CLASS 374

29	5,026,170
41	5,026,171
153	5,026,172

CLASS 375

14	5,027,369
	5,027,370
15	5,027,371
67	5,027,372
80	5,027,373
94	5,027,374
107	5,027,375
117	5,027,381
122	5,027,376

CLASS 376

416	5,026,516
438	5,026,517

CLASS 377

76	5,027,382

CLASS 378

4	5,027,379
	5,027,380
11	5,027,378
145	5,027,377

CLASS 379

39	5,027,383
67	5,027,384
100	5,027,385
	5,027,386
102	B1 4,821,312
112	5,027,387
	5,027,388
150	5,027,390
361	5,027,389
373	5,027,391
388	5,027,392
410	5,027,393
434	5,027,394

CLASS 380

4	5,027,395
	5,027,396
	5,027,397
	5,027,398
7	5,027,399
20	5,027,400
54	5,027,401

CLASS 381

10	5,027,402
24	5,027,403
35	5,027,405
37	5,027,404
43	5,027,406
	5,027,407
	5,027,408
51	5,027,409
68.4	5,027,410
160	5,027,411
199	5,027,412

CLASS 382

1	5,027,413
3	5,027,414
7	5,027,415
8	5,027,416
	5,027,417
	5,027,418
28	5,027,419
38	5,027,420
47	5,027,421
48	5,027,422
54	5,027,423
65	5,027,424

CLASS 383

10	5,026,173
86	5,026,174

CLASS 384

29	5,026,175
53	5,026,176
447	5,026,177
448	5,026,178
523	5,026,179

CLASS 392

480	5,027,425

CLASS 400

120	5,026,180
208	5,026,181
	5,026,182
605	5,026,183
	5,026,184
618	5,026,185
691	5,026,186

CLASS 401

1	5,026,187
	5,026,188
29	5,026,189
30	5,026,190
175	5,026,191
176	5,026,192
219	5,026,193
261	5,026,194
283	5,026,195

CLASS 402

79	5,026,196

CLASS 403

24	5,026,197
27	5,026,198
313	5,026,199
322	5,026,200
407.1	5,026,201

CLASS 404

4	5,026,202
6	5,026,203
10	5,026,204
72	5,026,205
77	5,026,206

CLASS 405

46	5,026,207
129	5,026,208
133	5,026,209
203	5,026,210
204	5,026,211
211	5,026,212
	5,026,226
229	5,026,213
240	5,026,214
266	5,026,215
267	5,026,216
288	5,026,217
290	5,026,218
303	5,026,219

CLASS 407

119	5,026,227

CLASS 408

56	5,026,220

CLASS 409

137	5,026,221
225	5,026,222
233	5,026,223
234	5,026,224

CLASS 410

23	5,026,225
52	5,026,228
60	5,026,229
100	5,026,230
118	5,026,231

CLASS 411

177	5,026,233
507	5,026,234
523	5,026,235

CLASS 412

33	5,026,236

CLASS 413

43	5,026,237

CLASS 414

24.5	5,026,238
217	5,026,239
300	5,026,240
303	5,026,241
401	5,026,242
	5,026,243
540	5,026,244
622	5,026,245
694	5,026,246
703	5,026,247
729	5,026,248
789 1	5,026,249
796.1	5,026,250

CLASS 415

119	5,026,251
174 2	5,026,252
229	5,026,253

CLASS 416

61	5,026,254

CLASS 417

5	5,026,255
45	5,026,256
222	5,026,316
295	5,026,257
304	5,026,258
379	5,026,259
407	5,026,260
555 1	5,026,261

CLASS 418

55.6	5,026,262
82	5,026,263
220	5,026,264

CLASS 419

12	5,026,518
30	5,026,519

CLASS 420

417	5,026,520
422	5,026,521
426	5,026,522

CLASS 422

16	5,026,523
26	5,026,524
45	5,026,525
63	B1 4,906,432
64	5,026,526
110	5,026,527
111	5,026,528
190	5,026,529

CLASS 423

87	5,026,530
328	5,026,531
	5,026,532
342	5,026,533
366	5,026,534
525	5,026,535
652	5,026,536

CLASS 424

1.1	5,026,537
	5,026,538
44	5,026,551
49	5,026,539
60	5,026,540
61	5,026,541
73	5,026,542
81	5,026,543
85.4	5,026,544
85.8	5,026,545
88	5,026,546
122	5,026,547
195.1	5,026,548

VOL
1127
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CLASSIFICATION OF PATENTS

	5,026,549
	5,026,550
400	5,026,558
401	5,026,552
	5,026,553
404	5,026,554
439	5,026,555
449	5,026,556
450	5,026,557
458	5,026,559
494	5,026,560
673	5,026,561

CLASS 425

127	5,026,265
150	5,026,266
451 9	5,026,267
525	5,026,268

CLASS 426

68	5,026,562
122	5,026,563
237	5,026,564
241	5,026,565
443	5,026,566
458	5,026,567
549	5,026,568
	5,026,569
626	5,026,570
636	5,026,571
641	5,026,572
643	5,026,573

CLASS 427

248 1	5,026,574
255	5,026,575
355	5,026,576

CLASS 428

1	5,026,577
4	5,026,578
15	5,026,579
17	5,026,580
34	5,026,581
36 6	5,026,582
36 8	5,026,583
41	5,026,584
71	5,026,585
90	5,026,586
91	5,026,587
100	5,026,588
138	5,026,589
141	5,026,590
198	5,026,591
204	5,026,592
215	5,026,593
220	5,026,594
246	5,026,595
264	5,026,596
323	5,026,597
	5,026,598
328	5,026,599
	5,026,600
336	5,026,601
	5,026,602
362	5,026,603
367	5,026,604
403	5,026,605
421	5,026,606
423 7	5,026,607
484	5,026,608
489	5,026,609
516	5,026,610
593	5,026,611
594	5,026,612
658	5,026,614

CLASS 429

61	5,026,615
168	5,026,616
206	5,026,617

CLASS 430

2	5,026,618
19	5,026,619
99	5,026,620
109	5,026,621
264	5,026,622
270	5,026,623
280	5,026,624
281	5,026,625
288	5,026,626
331	5,026,627
382	5,026,628
428	5,026,629
498	5,026,630
545	5,026,631
	5,026,632
551	5,026,633
559	5,026,634

CLASS 431

7	5,026,269
24	5,026,270
79	5,026,272
125	5,026,271
170	5,026,273
253	5,026,274

CLASS 432

14	5,026,275
59	5,026,276
181	5,026,277

CLASS 433

30	5,026,281
41	5,026,278
60	5,026,279
62	5,026,282
90	5,026,283
102	5,026,284
173	5,026,285
175	5,026,280

CLASS 434

98	5,026,286
137	5,026,287
169	5,026,288

CLASS 435

5	5,026,635
6	5,026,636
29	5,026,637
32	5,026,638
69 1	5,026,639
86	5,026,640
101	5,026,641
117	5,026,642
119	5,026,643
134	5,026,644
194	5,026,645
240.27	5,026,646
244	5,026,647
253.3	5,026,648
284	5,026,649
286	5,026,650
320.1	5,026,651

CLASS 436

81	5,026,652
518	5,026,653

CLASS 437

31	5,026,654
40	5,026,655
41	5,026,656
47	5,026,657
52	5,025,741
	5,026,658
	5,026,659
80	5,026,660
81	5,026,661
129	5,026,662
160	5,026,663
189	5,026,664
191	5,026,665
195	5,026,666
209	5,026,667
210	5,026,668
224	5,026,669

CLASS 439

15	5,026,289
65	5,026,290
67	5,026,291
76	5,026,293
108	5,026,292
125	5,026,294
135	5,026,295
137	5,026,299
159	5,026,296
326	5,026,297
358	5,026,298
371	5,026,300
391	5,026,301
526	5,026,303
573	5,026,302
595	5,026,304
620	5,026,305
675	5,026,306
755	5,026,307

CLASS 440

61	5,026,308
76	5,026,309

CLASS 441

93	5,026,310

CLASS 445

26	5,026,311
47	5,026,312

CLASS 446

64	5,026,313
133	5,026,314
372	5,026,315

CLASS 452

106	5,026,317
116	5,026,318
177	5,026,319

CLASS 453

6	5,026,320
54	5,026,321

CLASS 455

5	5,027,426
67	5,027,427
	5,027,428
113	5,027,429
188	5,027,430
214	5,027,431
238	5,027,432
326	5,027,163
606	5,027,433
	5,027,434
617	5,027,435
619	5,027,436

CLASS 460

76	5,026,322

CLASS 464

131	5,026,324
146	5,026,325
175	5,026,323

CLASS 474

134	5,026,326
138	5,026,330
152	5,026,327
153	5,026,328
162	5,026,329
214	5,026,331
242	5,026,332

CLASS 475

23	5,026,333
142	5,026,334
198	5,026,335
224	5,026,336
283	5,026,337

CLASS 493

158	5,026,338
189	5,026,339
460	5,026,340

CLASS 494

82	5,026,341

CLASS 501

80	5,026,670
96	5,026,671
134	5,026,672

CLASS 502

62	5,026,673
154	5,026,674
159	5,026,675
170	5,026,676

CLASS 503

227	5,026,677
	5,026,678
	5,026,679

CLASS 505

1	5,026,680
	5,026,681
	5,026,682
	5,026,683
	5,026,684

CLASS 514

13	5,026,685
17	5,026,686
45	5,026,687
50	5,026,688
57	5,026,689
155	5,026,690
171	5,026,691
178	5,026,692
180	5,026,693
184	5,026,694
202	5,026,695
214	5,026,696
	5,026,697
215	5,026,698
220	5,026,699
233 8	5,026,700
235.2	5,026,701
235 5	5,026,702
247	5,026,703
250	5,026,704
255	5,026,706
	5,026,707
256	5,026,708
263	5,026,709
275	5,026,710
300	5,026,711
	5,026,712
302	5,026,713
	5,026,714
319	5,026,857
326	5,026,715
336	5,026,716
338	5,026,717
383	5,026,718
	5,026,719
	5,026,720
396	5,026,721
397	5,026,722
424	5,026,861
438	5,026,759
441	5,026,723
443	5,026,724
465	5,026,725
468	5,026,726
520	5,026,727
561	5,026,728
575	5,026,729
586	5,026,730
629	5,026,731
691	5,026,732
718	5,026,733
723	5,026,734

CLASS 516

253	5,026,705

CLASS 521

50	5,026,735
78	5,026,737
95	5,026,738
177	5,026,739

CLASS 522

14	5,026,740
33	5,026,741
116	5,026,742

CLASS 523

404	5,026,743

CLASS 524

27	5,026,744
47	5,026,745
50	5,026,746
64	5,026,747
66	5,026,748
99	5,026,749
	5,026,750
102	5,026,751
271	5,026,752
272	5,026,753
293	5,026,756
389	5,026,755
414	5,026,757
423	5,026,758
449	5,026,760
460	5,026,761
495	5,026,762
	5,026,763
540	5,026,764
561	5,026,765
588	5,026,766
745	5,026,767
837	5,026,768
	5,026,769

CLASS 525

7 1	5,026,770
50	5,026,771
54 1	5,026,772
54 11	5,026,773
56	5,026,774
61	5,026,775
64	5,026,776
65	5,026,777
210	5,026,778
215	5,026,779
301	5,026,780
	5,026,781
317	5,026,782
326 1	5,026,783
327.6	5,026,784
329 4	5,026,785
356	5,026,786
391	5,026,787
420	5,026,788
423	5,026,789
438	5,026,790
464	5,026,791
468	5,026,792
476	5,026,793
532	5,026,794

CLASS 526

74	5,026,795
100	5,026,796
124	5,026,797
127	5,026,798
142	5,026,889
192	5,026,799
200	5,026,800
247	5,026,801
259	5,026,802
261	5 026,803
293	5,026,804
309	5,026,805
316	5,026,806
321	5,026,807

CLASS 527

60	5,026,736
400	5,026,808

CLASS 528

4	5,026,809
14	5,026,810
	5,026,811
17	5,026,812
18	5,026,813
61	5,026,814
64	5,026,815
94	5,026,816
199	5,026,817
313	5,026,818
329.1	5,026,819
350	5,026,820
	5,026,821
353	5,026,822
	5,026,823
389	5,026,824

CLASS 530

307	5,026,825
351	5,026,826
405	5,026,827
414	5,026,828

CLASS 534

14	5,026,829
272	5,026,754
582	5,026,830
752	5,026,831

CLASS 536

7 1	5,026,832
18.1	5,026,833
20	5,026,834
23	5,026,835
24	5,026,836
27	5,026,837
	5,026,838
	5,026,839
	5,026,840
58	5,026,841

CLASS 540

222	5,026,842
227	5,026,843
357	5,026,844

CLASS 544

1	5,026,846
76	5,026,847
137	5,026,848
198	5,026,849
240	5,026,850
279	5,026,851
317	5,026,852
390	5,026,853

CLASS 546

112	5,026,854
116	5,026,855
156	5,026,856
224	5,026,858
268	5,026,859
271	5,026,860
321	5,026,863
345	5,026,864

CLASS 548

142	5,026,865
238	5,026,866
251	5,026,867
346	5,026,868
435	5,026,871
436	5,026,869
453	5,026,870
521	5,026,872
533	5,026,873

CLASS 549

15	5,026,874
201	5,026,875
257	5,026,876
265	5,026,877
267	5,026,878
369	5,026,879
430	5,026,880
492	5,026,845
531	5,026,881

CLASS 552

506	5,026,882
542	5,026,883

CLASS 556

12	5,026,884
47	5,026,885
70	5,026,886
81	5,026,887
136	5,026,888
408	5,026,890
413	5,026,891
419	5,026,892
435	5,026,893

CLASS 558

46	5,026,894

CLASS 560

21	5,026,895
23	5,026,896
58	5,026,897
106	5,026,898
122	5,026,899
124	5,026,862
204	5,026,900
207	5,026,901
223	5,026,902
232	5,026,903
	5,026,904

CLASS 562

43	5,026,905
437	5,026,906
519	5,026,907
	5,026,908
575	5,026,909

CLASS 564

27	5,026,910
253	5,026,911
409	5,026,912
440	5,026,913
451	5,026,914

CLASS 568

26	5,026,915
41	5,026,916
323	5,026,917
348	5,026,918
433	5,026,919
486	5,026,922
492	5,026,920
618	5,026,923
683	5,026,924
771	5,026,925
779	5,026,926
863	5,026,927

CLASS 570

136	5,026,928
146	5,026,929
168	5,026,930
204	5,026,931
206	5,026,932

CLASS 585

7	5,026,933
314	5,026,934
315	5,026,935
	5,026,936
415	5,026,921
	5,026,937
417	5,026,938
439	5,026,939
467	5,026,940
	5,026,941
	5,026,942
	5,026,943
500	5,026,944
	5,026,945
	5,026,946
	5,026,947
646	5,026,948
648	5,026,949
737	5,026,950
738	5,026,951
800	5,026,952

CLASS 600

35	5,026,342

CLASS 604

68	5,026,343
93	5,026,344
110	5,026,345
	5,026,346
122	5,026,348
134	5,026,349
158	5,026,350
164	5,026,351
178	5,026,352
192	5,026,353
	5,026,356
195	5,026,354
243	5,026,355
258	5,026,357
320	5,026,358
326	5,026,359
338	5,026,360
	5,026,361
345	5,026,362
385.1	5,026,363
	5,026,364
410	5,026,347
891 1	5,026,365

CLASS 606

7	5,026,366
	5,026,367
15	5,026,368
36	5,026,369
42	5,026,370
47	5,026,371
54	5,026,372
61	5,026,373
72	5,026,374
79	5,026,375
96	5,026,376
108	5,026,377
109	5,026,378
141	5,026,379
152	5,026,381
158	5,026,382
159	5,026,383
	5,026,384
167	5,026,385
169	5,026,387
170	5,026,386
182	5,026,388
215	5,026,389
221	5,026,390

CLASS 623

2	5,026,391
4	5,026,392
6	5,026,393
	5,026,395
	5,026,396
8	5,026,394
11	5,026,397
13	5,026,398
18	5,026,399

CLASSIFICATION OF DESIGNS

D1—	122	317,672
D3—	30 1	317,677
	36	317,673
	40	317,674
	56	317,675
	70	317,676
D4—	116	317,678
D6—	303	317,679
	309	317,680
	310	317,681
	379	317,682
		317,683
	384	317,684
	388	317,685
	410	317,686
	429	317,687
	463	317,688
	541	317,689
	542	317,690
	550	317,691
		317,692
	608	317,693
D7—	309	317,694
	313	317,695
	536	317,696
	624	317,697
	637	317,698
	640	317,699
	693	317,700
D8—	5	317,701
	7	317,702
	14	317,703
	30	317,704
	307	317,705
	308	317,706
	331	317,707
		317,708
	360	317,709
	394	317,710
		317,711
	399	317,712
	402	317,713
D9—	300	317,714
	302	317,715
	307	317,716
	341	317,717
		317,718
	375	317,719
	425	317,720
	430	317,721
	447	317,722
D10—	49	317,723
	50	317,724
	69	317,725
	97	317,726
	120	317,727
	129	317,728
		317,729
D11—	5	317,730
	92	317,731
	117	317,732
	184	317,733
D12—	11	317,734
	101	317,735
	118	317,736
	143	317,737
		317,738
	146	317,739
		317,740
	147	317,741
	157	317,742
		317,744
	161	317,743
	162	317,745
	204	317,746
	300	317,747
	302	317 748
D13—	132	317,749
	147	317,750
		317,751
	148	317,752
		317,753
	162	317,754
	174	317,776
D14—	100	317,755
		317,756
	101	317,757
	102	317,758
	106	317,759
	114	317,760
	132	317,761
	138	317,762
	150	317,763
		317,764
	165	317,765
	167	317,766
	205	317,767
	219	317,768
D15—	1	317,769
	5	317,770
D16—	102	317,771
	209	317,772
		317,773
D17—	1	317,774
	14	317,775
D18—	7	317,777
		317,778
		317,779
		317,780
		317,781
		317,782
	13	317,783
		317,784
		317,785
	36	317,786
D19—	62	317,787
	88	317,788
D20—	3	317,789
	39	317,790
D21—	24	317,791
	64	317,792
		317,793
	108	317,794
	137	317,795
	150	317,796
	156	317,797
		317,798
	157	317,799
		317,800
		317,801
		317,802
	184	317,803
	187	317,804
	204	317,805
	211	317,806
	219	317,807
	232	317,808
D22—	108	317,809
		317,810
	132	317,811
D23—	206	317,812
	207	317,813
	209	317,814
	233	317,815
	250	317,816
	254	317,817
	264	317,818
	390	317,819
	403	317,820
D24—	136	317,821

CLASSIFICATION OF PLANTS

P —	1	7,564
	18	7,565
	49	7,566
	68	7,567
		7,568
		7,569
		7,570
	88	7,571

VOL
1127
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4
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GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 5,025,520
5,025,688
5,025,816
5,025,957
5,026,073
5,026,531
5,026,564
04 5,025,582
5,025,661
5,026,015
5,026,018
5,026,083
5,026,104
5,026,158
5,026,302
5,026,315
5,026,513
5,026,663
5,027,010
5,027,016
5,027,034
5,027,081
5,027,086
5,027,189
5,027,319
06 Re.33,621
5,025,502
5,025,570
5,025,575
5,025,629
5,025,632
5,025,642
5,025,658
5,025,697
5,025,705
5,025,715
5,025,725
5,025,743
5,025,747
5,025,777
5,025,786
5,025,790
5,025,792
5,025,818
5,025,820
5,025,826
5,025,833
5,025,848
5,025,859
5,025,862
5,025,876
5,025,932
5,025,952
5,025,964
5,025,972
5,025,976
5,025,995
5,026,001
5,026,006
5,026,008
5,026,013
5,026,020
5,026,032
5,026,047
5,026,048
5,026,059
5,026,062
5,026,071
5,026,131
5,026,141
5,026,146
5,026,147
5,026,148
5,026,188
5,026,204
5,026,234
5,026,259
5,026,260
5,026,277
5,026,301
5,026,339
5,026,341
5,026,349
5,026,353
5,026,375
5,026,383
5,026,384
5,026,386
5,026,388
5,026,396
5,026,409
5,026,437
5,026,470
5,026,484
5,026,558
5,026,576
5,026,639
5,026,666
5,026,670
5,026,683
5,026,685
5,026,782
5,026,783
5,026,823
5,026,836
5,026,893
5,026,896
5,026,905
5,026,913
5,026,940
5,026,942
5,026,982
5,026,992
5,026,999
5,027,008
5,027,013
5,027,020
5,027,051
5,027,062
5,027,064
5,027,082
5,027,084
5,027,109
5,027,111
5,027,116
5,027,125
5,027,126
5,027,129
5,027,138
5,027,165
5,027,171
5,027,177
5,027,182
5,027,184
5,027,200
5,027,233
5,027,240
5,027,241
5,027,243
5,027,257
5,027,270
5,027,272
5,027,307
5,027,308
5,027,310
5,027,311
5,027,315
5,027,320
5,027,321
5,027,333
5,027,357
5,027,361
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5,027,366
5,027,367
5,027,372
5,027,377
5,027,433
08 5,025,536
5,025,573
5,025,863
5,025,935
5,025,965
5,025,985
5,026,237
5,026,244
5,026,363
5,026,368
5,026,382
5,026,808
5,027,074
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5,027,143
5,027,303
5,027,358
5,027,391
09 5,025,776
5,025,798
5,025,960
5,026,058
5,026,196
5,026,402
5,026,405
5,026,433
5,026,445
5,026,584
5,026,638
5,026,715
5,026,716
5,026,774
5,026,840
5,026,845
5,026,865
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5,026,888
5,026,996
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5,027,091
5,027,092
5,027,093
5,027,095
5,027,133
5,027,260
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5,027,402
10 5,025,537
5,026,497
5,026,498
5,026,499
5,026,591
5,026,635
5,026,673
5,026,748
5,026,759
5,026,799
5,026,801
5,026,819
5,026,898
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5,026,930
5,027,314
11 5,026,507
5,026,773
12 5,025,586
5,025,620
5,025,745
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5,025,841
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5,026,052
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5,026,243
5,026,279
5,026,310
5,026,389
5,026,394
5,026,541
5,026,958
5,027,262
5,027,297
5,027,390
5,027,411
5,027,426
13 Re.33,620
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5,026,229
5,026,254
5,026,378
5,026,450
5,026,734
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5,027,283
15 5,026,070
16 5,026,049
5,026,094
5,026,154
5,026,657
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17 5,025,516
5,025,517
5,025,581
5,025,614
5,025,626
5,025,639
5,025,714
5,025,722
5,025,735
5,025,780
5,025,846
5,025,850
5,025,856
5,025,907
5,025,936
5,025,939
5,025,946
5,025,955
5,025,968
5,025,980
5,025,996
5,026,003
5,026,016
5,026,022
5,026,038
5,026,056
5,026,089
5,026,115
5,026,297
5,026,300
5,026,320
5,026,329
5,026,347
5,026,359
5,026,366
5,026,416
5,026,431
5,026,472
5,026,514
5,026,553
5,026,563
5,026,729
5,026,747
5,026,756
5,026,760

5,026,917
5,026,932
5,026,937
5,026,938
5,026,950
5,026,951
5,026,969
5,027,015
5,027,017
5,027,032
5,027,043
5,027,087
5,027,128
5,027,141
5,027,163
5,027,265
5,027,285
5,027,352
5,027,384
5,027,388
18 5,025,545
5,025,720
5,025,969
5,026,367
5,026,438
5,026,707
5,026,791
5,026,869
5,026,987
5,027,031
19 5,025,560
5,025,951
5,026,334
5,026,580
5,026,646
5,026,647
20 5,025,634
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5,025,749
5,026,064
21 Re.33,623
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22 5,025,646
5,025,962
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5,026,219
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5,026,492
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5,026,688
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24 5,025,727
5,025,728
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5,026,284
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5,026,390
5,026,581
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5,026,826
5,026,897
5,027,047
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5,027,191
5,027,255
25 5,025,568
5,025,569
5,025,594
5,025,621
5,025,622
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5,025,663
5,025,712
5,025,781
5,025,821
5,025,885
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5,026,066
5,026,151
5,026,160
5,026,203
5,026,291
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5,026,465
5,026,479
5,026,487
5,026,488
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5,026,771
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5,026,809
5,026,991
5,026,997
5,027,030
5,027,041
5,027,075
5,027,085
5,027,108
5,027,122
5,027,136
5,027,142
5,027,256
5,027,271
5,027,290
5,027,298
5,027,359
5,027,360
5,027,376
5,027,381
5,027,403
5,027,406
5,027,408
5,027,422
4,906,432
26 5,025,584
5,025,591
5,025,603
5,025,682
5,025,683
5,025,694
5,025,707
5,025,711
5,025,713
5,025,730
5,025,750
5,025,797
5,025,805
5,025,823
5,025,881
5,025,882
5,025,889
5,025,906
5,025,937
5,025,967
5,025,982
5,026,010
5,026,033
5,026,081
5,026,092
5,026,096
5,026,108
5,026,111
5,026,117
5,026,118
5,026,125
5,026,126
5,026,130
5,026,206
5,026,223
5,026,231
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5,026,627
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5,026,768
5,026,769
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5,026,892
5,026,954
5,027,048
5,027,294
27 5,025,548
5,025,550
5,025,564
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5,025,696
5,025,760
5,025,822
5,025,926
5,025,970
5,025,984
5,025,991
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5,026,278
5,026,371
5,026,373
5,026,377
5,026,398
5,026,562
5,026,572
5,026,599
5,026,606
5,026,633
5,026,689
5,026,735
5,026,752
5,027,089
5,027,239
5,027,249
5,027,254
5,027,281
5,027,293
5,027,355
28 5,025,588
5,025,721
5,026,114
5,026,508
5,026,802
5,027,024
29 5,025,529
5,025,542
5,025,949
5,026,026
5,026,078
5,026,113
5,026,140
5,026,327
5,026,423
5,026 444
5,026,483
5,026,493
5,026,686
5,026,713
5,026,918
5,027,101
30 5,025,543
5,025,992
5,026,385
31 5,025,866
32 5,025,635
5,026,139
33 5,026,007
5,026,046
5,026,138
5,026,187
5,026,681
5,026,977
5,027,056
5,027,061
5,027,187
5,027,208
5,027,300
34 5,025,524
5,025,572
5,025,574
5,025,602
5,025,752
5,025,759
5,025,782
5,025,783
5,025,831
5,026,101
5,026,102
5,026,161
5,026,215
5,026,299
5,026,354
5,026,355
5,026,358
5,026,360
5,026,381
5,026,387
5,026,391
5,026,400
5,026,411
5,026,473
5,026,490
5,026,529
5,026,540
5,026,554
5,026,555
5,026,626
5,026,648
5,026,712
5,026,725
5,026,731
5,026,753
5,026,754
5,026,755
5,026,765
5,026,810
5,026,813
5,026,851
5,026,859
5,026,873
5,026,903
5,026,919
5,026,921
5,027,050
5,027,079
5,027,083
5,027,106
5,027,110
5,027,201
5,027,330
5,027,353
5,027,387
5,027,395
5,027,435
35 5,026,063
5,026,159
5,026,170
5,026,726
5,027,028
36 Re.33,618
5,025,507
5,025,513
5,025,566
5,025,571
5,025,577
5,025,590
5,025,613
5,025,631
5,025,633
5,025,640
5,025,664
5,025,676
5,025,691
5,025,772
5,025,788
5,025,799
5,025,800
5,025,802
5,025,829
5,025,830
5,025,888
5,025,895
5,025,931
5,025,940
5,025,953
5,025,956
5,025,966
5,025,979
5,026,034
5,026,042
5,026,044
5,026,060
5,026,067
5,026,068
5,026,072
5,026,080
5,026,084
5,026,129
5,026,133
5,026,167
5,026,174
5,026,190
5,026,191
5,026,207
5,026,262
5,026,288
5,026,332
5,026,376
5,026,392
5,026,393
5,026,408
5,026,427
5,026,448
5,026,495
5,026,501
5,026,502
5,026,516
5,026,522
5,026,524
5,026,526
5,026,538
5,026,556
5,026,624
5,026,628
5,026,629
5,026,632
5,026,643
5,026,660
5,026,678
5,026,679
5,026,682
5,026,697
5,026,736
5,026,750
5,026,751
5,026,839
5,026,890
5,026,927
5,026,979
5,026,994
5,027,068
5,027,071
5,027,078
5,027,100
5,027,104
5,027,121
5,027,127
5,027,140
5,027,145
5,027,146
5,027,148
5,027,183
5,027,253
5,027,264
5,027,291
5,027,292
5,027,383
5,027,396
37 5,025,532
5,025,538
5,025,644
5,025,754
5,025,812
5,025,814
5,026,268
5,026,290
5,026,304
5,026,305
5,026,369
5,026,530
5,026,908
5,027,168
5,027,269
5,027,349
5,027,397
38 5,026,247
39 5,025,559
5,025,567
5,025,604
5,025,627
5,025,628
5,025,665
5,025,670
5,025,690
5,025,825
5,025,899
5,025,916
5,025,919
5,025,950
5,025,990
5,026,054
5,026,099
5,026,157
5,026,209
5,026,245
5,026,273
5,026,298
5,026,356
5,026,364
5,026,410
5,026,422
5,026,432
5,026,559
5,026,569
5,026,582
5,026,589
5,026,609
5,026,615
5,026,616
5,026,700
5,026,816
5,026,829
5,026,849
5,026,861
5,026,924
5,026,960
5,026,964
5,026,967
5,026,980
5,026,989
5,027,002
5,027,046
5,027,049
5,027,072
5,027,105
5,027,317
5,027,379
5,027,401
40 5,025,794
5,025,832
5,025,994
5,026,168
5,026,340
5,026,447
5,026,468
5,026,503
5,026,795
5,026,796
5,027,267
5,027,332
4,676,450
41 5,025,518
5,025,531
5,025,619
5,026,088
5,026,194
5,026,258
5,026,425
5,026,426
5,026,593
5,026,672
5,026,837
42 Re.33,622
5,025,510
5,025,523
5,025,547
5,025,549
5,025,551
5,025,556
5,025,609
5,025,649
5,025,706
5,025,734
5,025,775
5,025,795
5,025,807
5,025,867
5,025,954
5,026,009
5,026,050
5,026,109
5,026,135
5,026,155
5,026,218
5,026,233
5,026,246
5,026,292
5,026,342
5,026,370
5,026,406
5,026,482
5,026,491
5,026,519
5,026,528
5,026,532
5,026,537
5,026,577
5,026,597
5,026,676
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5,026,709
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5,026,745
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5,026,825
5,026,828
5,026,882
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5,026,943
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5,027,096
5,027,259
5,027,306
5,027,362
5,027,436
44 5,025,744
5,026,822
45 5,025,519
5,025,612
5,025,922
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5,026,241
5,026,587
5,026,746
5,026,894
5,026,968
5,027,348
46 5,025,736
47 5,025,508
5,025,514
5,025,522
5,025,616
5,025,659
5,025,801
5,025,917
5,026,824
5,026,931
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5,026,988
5,027,261
48 5,025,501
5,025,503
5,025,515
5,025,585
5,025,587
5,025,606
5,025,641
5,025,671
5,025,708
5,025,719
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5,026,029
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5,026,520
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5,026,636
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VOL
1127
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	5,026,886		5,027,399		5,026,211		5,025,988		5,027,373		5,025,748
	5,026,923	49	5,025,698		5,026,345		5,026,082		4,821,312		5,025,753
	5,026,934		5,025,771		5,026,456		5,026,165	54	5,026,485		5,025,808
	5,027,003		5,025,806		5,026,603		5,026,225		5,026,777		5,025,839
	5,027,011		5,025,842		5,026,984		5,026,228		5,026,907		5,025,847
	5,027,014		5,025,873		5,027,102		5,026,249		5,026,945		5,025,868
	5,027,132		5,026,217		5,027,139		5,026,407	55	5,025,562		5,025,987
	5,027,284		5,027,211		5,027,341		5,026,990		5 025,565		5,026,027
	5,027,313	50	5,025,819	53	5,025,504		5,027,007		5,025,579		5,026,128
	5,027,326		5,026,728		5,025,557		5,027,058		5,025,583		5,026,197
	5,027,331	51	5,025,505		5,025,693		5,027,063		5,025,610		5,026,205
	5,027,344		5,025,662		5,025,729		5,027,124		5,025,617		5,026,458
	5,027,369		5,025,849		5,025,778		5,027,134		5,025,618		5,027,057
	5,027,374		5,025,875		5,025,977		5,027,273		5,025,687		5,027,410

DESIGN PATENTS

04	317,747		317,731	08	317,708		317,743		317,697		317,815
	317,802		317,736		317,770		317,749	31	317,725	40	317,735
05	317,720		317,760		317,806	18	317,776	32	317,789	41	317,791
06	317,675		317,771	09	317,679	25	317,704	34	317,673	42	317,722
	317,681		317,788		317,700		317,734		317,732		317,810
	317,688		317,790		317,745		317,750		317,754	48	317,674
	317,690		317,794		317,812		317,785		317,798		317,712
	317,693		317,807	12	317,685	26	317,742		317,817		317,746
	317,701		317,808		317,803		317,744	36	317,818		317,775
	317,715		317,809		317,820	27	317,689	37	317,680	53	317,684
	317,717		317,813	17	317,672		317,713		317,723		317,702
	317,718		317,814		317,694	29	317,676		317,724	54	317,678
	317,719		317,816		317,703		317,696	39	317,769	55	317,767
	317,727										

PLANT PATENTS

06	7,565		7,568		7,569	12	7,571				

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Harry F. Manbeck, Jr., *Commissioner*

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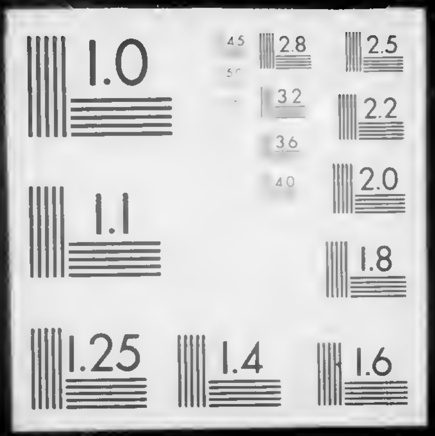

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